Udora Estates

Functional Servicing and Stormwater Management Report

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Submitted by:

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Submission History

Submission	Date	In Support Of	Distributed To
1st	January 2025	Draft Plan Approval	Township of Uxbridge, Lake Simcoe Region Conservation Authority, 2695867 Ontario Inc.
2nd	January 2026	Draft Plan Approval	Township of Uxbridge, Lake Simcoe Region Conservation Authority, Region of York, Region of Durham, 2695867 Ontario Inc.

1.0 Introduction

SCS Consulting Group Ltd. has been retained by 2695867 Ontario Inc. to prepare a Functional Servicing and Stormwater Management Report (FSSR) for a proposed development on part of Lots 3 Plan 40M-2318, located in the Township of Uxbridge.

1.1 Purpose of the Functional Servicing Report

The FSSR has been prepared in support of Draft Plan Approval for the proposed development. The Draft Plan of Subdivision is provided in **Appendix A**. The proposed development consists of the following land uses:

- low density residential,
- a temporary stormwater management block, and
- proposed roads.

The purpose of this report is to demonstrate that the development can be graded and serviced in accordance with the Town of Uxbridge, Lake Simcoe Region Conservation Authority (LSRCA), The Ontario Building Code, and the Ministry of Environment, Conservation and Parks (MECP) design criteria.

1.2 Study Area

The Draft Plan of subdivision is approximately 1.94 ha in size and is bound to the north by existing low density development and Ravenshoe Road, low density development to the east fronting Regional Road 1, existing estate residential development to the south, and undeveloped land (owned by King Cole Ducks (SUB 2010 - 1)) to the west. The subject property has an unopened road right-of-way (0.77 ha) that is owned by the Township of Uxbridge that connects to Birdie Smith Court. See **Figure 1.1** for reference. All of the existing development south of the site was designed and constructed in 2006.

The existing subject lands are comprised of mostly open space area with vegetated areas. The proposed development is located within the sub-watershed of Pefferlaw Brook in Township of Uxbridge.

1.3 Background Information

In preparation of the servicing and SWM strategies, the following design guidelines and standards were used:

- Township of Uxbridge Consolidated Linear Infrastructure – Environmental Compliance Approval (CLI-ECA) Guideline (December 2024);
- Lake Simcoe Region Conservation Authority Technical Guidelines for Stormwater Management Submissions (April 2022);

- Regional Municipality of Durham Design and Construction Specifications for Regional Services (February 2017);
- Township of Uxbridge Design Criteria and Standard Detail Drawings for Subdivision Developments and Site Plans (November 2016);
- Township of Uxbridge Stormwater Management Master Plan (May 2016);
- Pefferlaw River Subwatershed Plan, LSRCA, 2012;
- Lake Simcoe Protection Plan (July 2009); and
- Ministry of Environment, Conservation and Parks (MECP) Stormwater Management Planning and Design Manual (March 2003);

The servicing and SWM strategies in this report are based on the following reports:

- On-Site Sewage System Sizing Study – Udora Development, January 2026, Prepared by Envision Consultants Ltd.;
- Water Balance Evaluation, Part Lot 35, Concession 6, Township of Uxbridge – Udora, Region of Durham, December 2025, Prepared by Gaman Consultants Inc.;
- Geotechnical Review for Stormwater Management Pond, December 2025, Prepared by Soil Engineers Ltd.;
- Geotechnical Investigation Report, November 2025, Prepared by Soil Engineers Ltd.;
- Functional Servicing & Grading Plan, November 2009, Prepared by Fabian Papa & Partners Inc.;
- Birdie Smith Court Grading Plan, September 2002, Prepared by Cole Engineering; and
- Birdie Smith Court Plan and Profile, August 2002, Prepared by Cole Engineering;

Excerpts from the above listed documents are included in **Appendix B**.

A pre-consultation meeting with Township of Uxbridge was held on May 13, 2024 which confirmed the following:

- All residential housing shall be individually serviced with private drilled wells and sewage systems; and
- An LSRCA permit is not required.

2.0 Stormwater Management

2.1 Stormwater Runoff Control Criteria

The following stormwater runoff control criteria have been established based on the greatest requirements of each of the design guidelines and standards listed in **Section 1.3** and discussions with agencies and/or previous studies. The stormwater runoff criteria are summarized below in **Table 2.1**:

Table 2.1 Stormwater Runoff Control Criteria

Criteria	Control Measure
Quantity Control	Peak Flow: Control proposed peak flows to existing peak flows for the 2 through 100 year storm events. (Township of Uxbridge, LSRCA) Volume Control: Proposed runoff volume from a 25 mm rainfall event over the total impervious area shall be captured and retained/treated on-site or in accordance with LSRCA's Flexible Treatment guidelines if full compliance with the 25 mm guideline is not possible. (LSRCA)
Quality Control	MECP Enhanced Level Protection (80% TSS Removal). Total Suspended Solids: MECP Enhanced Level Protection (80% TSS Removal). (MECP, LSRCA, Town)
Erosion Control	Detention of the 40 mm rainfall runoff for a minimum of 24 hours. (Town)
Water Budget	The site is not located within a Wellhead Protection Area (WHPA) Q1/Q2, but is within an Ecologically Significant Groundwater Recharge Area. Therefore, an evaluation of anticipated water balance changes between existing and proposed condition must be conducted, and a plan detailing how changes will be minimized must be provided.
Phosphorus Budget	Best efforts approach to ensure no increase in phosphorous loadings per the LSPP (2009). Per the Lake Simcoe Phosphorous Offsetting Policy (May 2023), control post-development levels and provide offsetting for any exceedance of pre-development levels. (LSRCA)

2.2 Existing Drainage

As illustrated in the existing storm drainage plan (**Figure 2.1**), the site generally drains from south to north. The drainage boundaries were determined using a combination of the York Region Open Data (2016), detailed survey completed by E.R. Garden limited in November 22, 2022, and detailed survey completed by IBW Surveyors in November 12, 2025 (refer to **Appendix B**).

Drainage from Catchment 101 (1.91 ha) drains from south to north, and Catchment 102 (0.23 ha) drains from south to northeast. External drainage from Catchment 103 (1.94 ha) located to the west of the property drains through the site from south to north. Drainage from Catchments 101 and 103 ultimately sheet drains north to the existing south roadside ditche on Ravenshoe Road, where it is then conveyed west to the tributary of the Pefferlaw River approximately 1350 m west of Regional Road 1. A combination of Google Map Street View and existing ditch photos were reviewed to confirm positive drainage is possible and unobstructed along the south Ravenshoe Road ditch to the existing watercourse. Field reconnaissance and visual inspection of the south Ravenshoe Road ditch will be conducted during the detailed design phase to confirm. Catchment 102 ultimately sheet drains northeast to the existing roadside ditches at Regional Road 1, where it is then conveyed to the tributary of the Pefferlaw River, approximately 400 m north of Ravenshoe Road.

Refer to existing storm drainage plan **Figure 2.1**.

2.2.1 Existing Site Characterization

The soil classifications were identified using the Ontario Soil Survey Complex from OMAFRA and land uses visible in recent aerial photography and site reconnaissance. The mapping identifies that the soils within the site limits is Pontypool Sandy Loam. According to the Design Flood Estimation Design Chart H2-6A, the soils are considered as Hydrologic Soil Group AB. This is consistent with the Geotechnical investigation report, prepared by Soil Engineers Ltd., dated November 2025 (refer to **Appendix B**). The report notes the predominant soil type is silty sand till/sandy silt till, which is a Hydrologic Soil Group A or AB according to the MTO Drainage Management Manual (1997) Design Chart 1.08. The Soil Conservation Service Curve Numbers (CN) and runoff coefficients used for the Hydrologic Soil Group AB are shown in **Table 2.2**.

Table 2.2: CN and Runoff Coefficient Summary

Land Use or Surface Classification	CN for Soil Group AB	Runoff Coefficient for Soil Group AB[1]
Pasture	61.5	0.10
Woodlot	48	0.08

Source: MTO Drainage Management Manual (1997)
Note: 1 – Runoff Coefficients used are for flat topography

Per the Water Balance Evaluation completed by Gaman Consultants Inc., WSP completed assessment of the monitoring wells, which showed that the hydraulic conductivity onsite ranged from $2.6x10^{-7}$ to $1.6x10^{-6}$ m/s, which is equivalent to infiltration rates of 33.6 to 51.7 mm/hr (refer to **Appendix F**). In-situ infiltration testing will be required at the detailed design stage for the purpose of infiltration facility design.

2.2.2 Existing Hydrologic Modelling

Hydrologic modelling was undertaken using the Visual Otthymo Version 6.0 software (VO6) based on the 4-hour Chicago and, 6-hour, 12-hour, and 24-hour SCS Type II distribution methods. The study area is located within the Township of Uxbridge, therefore, the IDF rainfall information was obtained from the Township of Uxbridge Standard Drawing No. US-600 to determine the existing peak flows to outlet locations. The existing flows from the study area to the Ravenshoe Road outlet are summarized in **Table 2.3**.

Table 2.3: Summary of Existing Flows at Ravenshoe Outlet

Return Period Storm	4–hour Chicago (m^3/s)	6-hour SCS Type II (m^3/s)	12-hour SCS Type II (m^3/s)	24-hour SCS Type II (m^3/s)
2 Year	0.028	0.051	0.062	0.077
5 Year	0.070	0.111	0.131	0.157
10 Year	0.105	0.160	0.185	0.220
25 Year	0.160	0.222	0.254	0.299
100 Year	0.283	0.358	0.392	0.445

The existing flows from the study area to the Regional Road 1 outlet are summarized in **Table 2.4**.

Table 2.4: Summary of Existing Flows at Regional Road 1 Outlet

Return Period Storm	4–hour Chicago (m^3/s)	6-hour SCS Type II (m^3/s)	12-hour SCS Type II (m^3/s)	24-hour SCS Type II (m^3/s)
2 Year	0.004	0.006	0.007	0.008
5 Year	0.009	0.012	0.013	0.016
10 Year	0.013	0.017	0.018	0.022
25 Year	0.020	0.022	0.025	0.029
100 Year	0.034	0.035	0.037	0.041

A summary of modelling parameters and an existing VO6 schematic are provided in **Appendix C**.

2.3 Best Management Practices

In accordance with the Ministry of Environment Stormwater Management Planning and Design Manual (2003), a review of stormwater management best practices was completed using a treatment train approach, which evaluated lot-level, conveyance system and end-of-pipe alternatives.

The following study area characteristics were taken into consideration:

- The topography is generally higher in the south of the site, sloping downward to the north site boundaries at approximately 5%;
- Based on the Geotechnical investigation, study area soils consisted of silty sand till/sandy silt till soils;
- Single well response tests were completed and indicate that the native soils have a percolation rate ranging from 33.6 to 51.7 mm/hr;
- Within the installed site wells, groundwater was observed at depths ranging between 0.6 m to 9.5 m below existing grade;
- The proposed residential development is approximately 2.0 ha and consists of 7 estate residential lots, a SWM pond block, and a proposed road which is external to the site; and
- The study area drains south to north.

The following are examples of at-source, conveyance and end-of-pipe controls that were evaluated for use in the proposed development. While evaluating the following controls, cost, feasibility, groundwater and grading constraints were taken into consideration.

2.3.1 Lot-Level Controls

Lot-level controls are at-source measures that reduce runoff prior to stormwater entering the conveyance system. These controls are typically proposed on private properties. Incorporating controls that require minimal maintenance can be an effective method in the treatment train approach to SWM. The following lot-level controls have been evaluated for use in the proposed development:

Increased Topsoil Depth – An increase in the restored topsoil depth on lots can be used to promote lot-level infiltration and evapotranspiration. Increased topsoil depth will contribute to lot-level quality. Therefore, a minimum depth of 0.3 m is proposed in all landscaped areas.

Passive Landscaping/Bio-Retention – Planting of gardens and other vegetation designed to minimize local runoff or use rainwater as a watering source can be used to reduce rainwater runoff by increasing evaporation, transpiration, and infiltration. By promoting infiltration through passive landscaping, water quality and quantity control is provided for the volume of water retained. Passive landscaping can provide significant SWM benefits as part of the overall treatment train approach for the proposed development. This BMP is recommended and details can be provided at the detailed design stage.

Roof Runoff to Soak-away Pits – Directing roof runoff to subsurface soak-away pits can be used to promote infiltration. By promoting infiltration water quality and quantity control is provided for the volume of water retained. Infiltration of roof runoff can provide a significant SWM benefits as part of the overall treatment train approach for the proposed development. This BMP is not recommended as roof runoff is proposed to be treated by the enhanced grassed swales within the rights-of-way.

Roof overflow to Grassed Areas – Directing roof leaders to grassed areas will contribute to water quality and water balance control by encouraging stormwater retention. This BMP is recommended and details can be provided at the detailed design stage.

A summary of the suitability of potential lot-level controls for the proposed development is provided in **Table 2.5**.

2.3.2 Conveyance Controls

Conveyance controls provide treatment of stormwater during the transport of runoff from individual lots to the receiving watercourse or end-of-pipe facility and present opportunities to distribute stormwater management techniques throughout a development. The following conveyance controls have been evaluated for use in the proposed development:

Enhanced Grassed Swales – A grassed swale will promote infiltration, filtration, and evapotranspiration, contributing to water quality and quantity control. Grassed swales need an unimpeded and relatively wide stretch of landscaped area, such as within a wide boulevard with no driveways, to function properly. Grassed swales with an infiltration trench or filtration trench below are proposed within the rights-of-way. Further details are discussed in **Section 2.9**.

Exfiltration at Rear Lot Catchbasins – Where rear lot catchbasins are required due to grading constraints, a perforated pipe system could be incorporated into the rear lot catchbasin design to promote infiltration of 'clean' stormwater runoff. By promoting infiltration, water quality and quantity control is provided for the volume of water retained. Infiltration can provide significant SWM benefits as part of the overall treatment train approach for the proposed development. Rear lot catchbasins are not proposed on the subject property, therefore this BMP is not feasible.

A summary of the suitability of potential conveyance controls for the proposed development is provided in **Table 2.5**.

2.3.3 End-of-Pipe Controls

Stormwater management facilities at the end-of-pipe receive stormwater flows from a conveyance system and provide treatment of stormwater prior to discharging flows to the receiving outlet. While lot-level and conveyance system controls are valuable components of the overall SWM plan, on their own they are not sufficient to meet the quantity and quality control objectives for the proposed development. The following end-of-pipe controls have been evaluated for use in the proposed development:

Wet Ponds, Wetlands, Dry Ponds – Sized in accordance with the MECP criteria, these end-of-pipe facilities can provide water quality, quantity, and erosion control treatment. An end-of-pipe dry pond is proposed to provide water quantity, and erosion control treatment for the development. Refer to **Section 2.5** for further details.

Stormwater Detention Facility – To meet quantity erosion control targets, stormwater runoff storage and attenuation through the use of flow restrictors can be used to control stormwater release rates. To accommodate the reduced release rate, stormwater detention facilities are required to store stormwater runoff. Stormwater storage can be provided by oversized storm sewers and controlled with flow restrictors prior to discharging to the receiving outlet. This BMP is not proposed as a dry SWM pond is being provided.

Manufactured Treatment Device - A properly sized manufactured treatment device (MTD) can assist in providing MECP Enhanced (Level 1) treatment and can contribute to the treatment train approach for water quality control. This BMP is not proposed, as Enhanced (Level 1) treatment will be provided via the enhanced grassed swales with infiltration/filtration trenches.

2.3.4 Selection of Best Management Practices

Table 2.5 summarizes the suitability of the various stormwater management controls identified for the proposed development.

Table 2.5: Recommended Stormwater BMP's

Stormwater Management Practice	Feasible (Yes/No)	Recommended (Yes/No)
Increased Topsoil Depth	Yes	Yes
Passive Landscaping/Bio-Retention	Yes	Yes
Roof Leader to Soak-away Pits	Yes	No
Roof overflow to Grassed Areas	Yes	Yes
Enhanced Grassed Swales	Yes	Yes
Exfiltration at Rear Lot Catchbasins	No	No
Stormwater Detention Facility	Yes	No
Wet Ponds, Wetlands, Dry Ponds	Yes	Yes
Manufactured Treatment Device	Yes	No

2.4 Proposed Storm Drainage

2.4.1 Interim Condition

The proposed storm drainage plan for the interim condition is shown on **Figure 2.2**. The proposed residential lots are relatively large to accommodate the required septic systems, and will therefore include significant amounts of previous areas. Impervious coverage for the residential lots was estimated based on the proposed concept plan (refer to **Appendix A**).

Runoff from the front draining lots and front yard of the proposed split draining lots in Catchment 201 (1.91 ha) is proposed to be conveyed to a proposed interim SWM facility (dry pond) via roadside enhanced grassed swales. Ultimately, the interim dry SWM pond is proposed to outlet to the existing roadside ditch on the south side of Ravenshoe Road.

Runoff from the rear yards of the proposed split draining lots in Catchment 202 (0.10 ha) and Catchment 204 (0.05 ha) is proposed to drain uncontrolled to the northern neighbouring properties, following the same drainage pattern as in the existing condition. The combined uncontrolled runoff (0.15 ha) is considered as clean water, and is less than the existing condition runoff (1.91 ha), therefore, there will be reduction in the peak flows into the neighbouring properties. Runoff from Catchment 203 (0.08 ha of open space and rear yard sloping) is proposed to drain easterly to the Regional Road 1 ditch, which ultimately drains north, toward the Ravenshoe Road and Regional Road 1 intersection.

Runoff from Catchment 103 (1.93 ha) comprised of the proposed extension of Birdie Smith court and an undeveloped lot) is proposed to drain north to the proposed interim SWM dry pond.

2.4.2 Ultimate Condition

The proposed storm drainage plan for the ultimate condition is shown on **Figure 2.3**. In the ultimate condition, runoff from Catchment 301 (0.75 ha) is proposed to drain uncontrolled to the northern neighbouring properties and Ravenshoe Road, following the same drainage pattern as in the existing condition. This uncontrolled runoff (0.75 ha) is considered as clean water, and is less than the existing condition runoff (1.91 ha), therefore, there will be reduction in the peak flows into the neighbouring properties from the current condition. Runoff from Catchment 302 (0.08 ha) will continue to drain easterly to the Regional Road 1 ditch. Runoff from the remainder of the site, along with the roads and undeveloped lot (Catchment 303 (1.30 ha) and Catchment 103 (1.94 ha)), are proposed to drain west to a proposed dry SWM pond on the King Cole Ducks property (SUB# 2010 – 1) via overland flow (refer to **Appendix B**). The temporary dry SWM pond is proposed to be decommissioned and replaced by an estate residential lot.

2.5 Proposed Stormwater Management Plan

2.5.1 Quantity Control

2.5.1.1 Peak Flow

The proposed interim end-of-pipe dry SWM pond will control proposed flows from the site to existing flow rates for the 2 to 100 year storm events. The preliminary design requirements of the interim dry pond is discussed further in **Section 2.6**.

2.5.1.2 Volume

The proposed development targets a volume control criteria to capture and treat or retain the runoff volume from the 25 mm rainfall event from new and/or fully reconstructed impervious areas. Proposed LIDs and BMPs have been sized to provide this storage volume where feasible. The locations of the proposed LID measures are shown on **Figure 2.4**. The preliminary design of these facilities is discussed further in **Section 2.7**.

2.5.2 Quality Control: TSS

Enhanced water quality control will be provided by a treatment train of Low Impact Development (LID) techniques which will include additional topsoil depth on all grassed areas, and enhanced grass swale. The proposed interim dry pond will provide additional opportunity for runoff to be filtered through the vegetation and settle within the dry pond.

The preliminary design requirements of the SWM infrastructure to provide the water quality and a detailed phosphorus budget are provided in following sections.

2.5.3 Quality Control: Phosphorus

Under the Lake Simcoe Protection Plan, a stormwater management plan must demonstrate how phosphorus loadings are minimized between existing and proposed. Furthermore, the Lake Simcoe Phosphorus Offsetting Policy (May 2023) states that:

> “The phosphorous load from the development on the property will not exceed pre-development phosphorus loadings. In situations where the phosphorous load cannot be met or demonstrated in a post-development scenario to achieve the pre-development phosphorus loadings, the developer or proponent shall be required to provide phosphorus offsetting to the LSRCA”

The MECP database application Lake Simcoe Phosphorus Loading Development Tool (v2, 01-April-2012 update) was used to complete the phosphorus budget for the proposed development. Due to the complex treatment train provided by the SWM measures outlined above a spreadsheet based on the MECP database application was developed to determine the proposed conditions phosphorus budget.

2.5.3.1 Existing Phosphorus Loadings

The existing land uses are shown on **Figure 2.5**. Based on the Phosphorus Loading Development Tool, the existing annual phosphorus loadings were calculated to be 0.07 kg/year. Refer to **Appendix D** for the phosphorus loading tool output.

2.5.3.2 Proposed Phosphorus Loadings

The proposed land uses for the proposed development are shown on **Figure 2.6**. The estate residential lots are considered low intensity development according to the MECP Phosphorus Tool. The proposed phosphorus loading with no best management practices (BMPs) was calculated to be 0.25 kg/yr (refer to **Appendix D**).

The proposed phosphorus loading with BMPs was calculated to be 0.16 kg/yr (refer to **Appendix D**). **Table 2.6** provides a summary of the phosphorus budget for the existing, condition, proposed condition with no BMP and proposed condition with BMPs.

Table 2.6: Phosphorus Budget Summary

Existing Phosphorus Loading (kg/yr)	Proposed Phosphorus Loading without BMPs (kg/yr)	Proposed Phosphorus Loading with BMPs (kg/yr)
0.07	0.25	0.16

As per LSRCA's Phosphorus Offsetting Policy, the increase in phosphorus loading will be offset at a rate of $35,770/kg/year, at a 1:1 ratio. The cost of the phosphorous offsetting will total $3,625.91, which includes a 15% administration cost.

2.5.4 Erosion Control

The erosion control criteria is to provide a minimum of 24 hour extended detention of the runoff from a 40 mm rainfall event will be provided in the dry pond. The preliminary design requirements of the SWM dry pond is discussed further in a **Section 2.6**.

The dry SWM pond will provide extended detention of the greater of the 40 mm runoff volume, or the water quality storage volume. The extended detention volume is 144 m^3 based on the 40 mm runoff volume (refer to **Appendix D**). Based on the preliminary design of the dry pond, the minimum orifice size of 75 mm diameter has been designed to detain the flows as long as feasible, up to 24 hours.

2.5.5 Water Budget

Where feasible, measures to minimize impacts on the water budget will be incorporated into the development design. As noted in the Water Balance Evaluation Report prepared by Gaman Consultants Inc., dated December 2025 (Refer to **Appendix B**), the estimated existing infiltration volume on the proposed development is approximately 5,106 m^3/year. Without mitigation the proposed development infiltration volume is approximately 4,031 m^3/year, with a recharge deficit of 1,074 m^3/year.

As recommended in the Hydrogeological Study, low impact development measures, such as enhanced swale infiltration trench will be implemented, where feasible, to maintain or increase existing infiltration rates. It is anticipated that a proposed infiltration volume of approximately 1,066 m^3 can be achieved through the proposed mitigation measures. The proposed development with mitigation infiltration volume is then anticipated to be approximately 5,097 m^3/year.

2.6 Interim Stormwater Management Pond

One interim dry SWM pond is proposed for the site, outletting to the existing south Ravenshoe Road ditch. The interim dry pond will receive major and minor flows from the proposed enhanced grassed swales and rear yards. A low flow channel graded at a minimum of 1.0% from the inlet of the pond to the outlet will convey low flows to the outlet control structure.

2.6.1 General Pond Design Criteria

Preliminary pond grading is provided on **Figure 2.7**. The pond block size was established based on the following general criteria:

- A side slope of 4:1 from the pond bottom to top of the pond will be provided;
- A maximum depth of 3 m from the pond bottom to top of the pond will be provided; and
- A minimum 75 mm diameter orifice and 450 mm diameter outlet pipe will be provided.

2.6.2 Extended Detention

The extended detention volume will be sized based on the detention of the 40 mm - 4 hour Chicago rainfall event. The facility has been designed to provide the maximum detention time of the extended detention volume through the implementation of the minimum allowable orifice size.

The required extended detention volume for the dry SWM pond is 144 m^3. This volume is greater than the 2003 MECP water quality storage requirement for dry pond, which is 32 m^3. The peak release rate for the extended detention volume is approximately 0.011 m^3/s, with a 75 mm diameter control orifice, and an extended detention time of approximately 4.0 hours.

The calculations for the extended detention requirements of the proposed interim SWM dry pond are provided in **Appendix E**.

2.6.3 Quantity Control

The proposed interim SWM dry pond will control proposed flows from the proposed development to existing flow rates for the 2 to 100 year storm events. Flows from the 2 through 100 year storm event will controlled by a 75 mm diameter orifice with an invert elevation of 244.94 m and a 3.6 m broad crested weir at an invert of 245.84 m (refer to **Appendix E**). Proposed hydrology modelling was completed using the VO6 model to determine the required pond volume. Refer to the File Safe Cloud Link provided in **Appendix C** to download the VO6 hydrology model files.

The 6-hour, 12-hour and 24-hour SCS Type II design storm and the 4-hour Chicago Storm distribution per Township of Uxbridge requirements were modelled for the proposed conditions hydrology model. A summary of the resulting storage requirements for the SWM pond is provided in **Tables 2.7** and **Table 2.8**.

Table 2.7: Interim Dry SWM Pond Operating Characteristics (4-Hour Chicago & 6-Hour SCS Type II Storms)

Storm Distribution	4-Hour Chicago		6-Hour SCS Type II	
Return Period Storm	Discharge (m^3/s)	Storage (m^3)	Discharge (m^3/s)	Storage (m^3)
2 Year	0.008	46	0.009	61
5 Year	0.011	115	0.011	148
10 Year	0.025	156	0.053	163
25 Year	0.069	166	0.133	180
100 Year	0.193	193	0.331	209

Table 2.8: Interim Dry SWM Pond Operating Characteristics (12 and 24-Hour SCS Type II Storms)

Storm Distribution	12-Hour SCS Type II		24-Hour SCS Type II	
Return Period Storm	Discharge (m^3/s)	Storage (m^3)	Discharge (m^3/s)	Storage (m^3)
2 Year	0.010	77	0.010	93
5 Year	0.029	157	0.053	163
10 Year	0.097	172	0.142	182
25 Year	0.195	194	0.264	201
100 Year	0.380	215	0.433	220

The governing design storm was determined to be 24-hour SCS Type II. The stage-storage-discharge characteristics of the interim dry SWM Pond for the governing design storm are provided below in **Table 2.9**.

Table 2.9: Interim Dry SWM Pond Stage-Storage-Discharge Characteristics

Return Period Storm	Stage (m)	Storage (m^3)	Discharge (m^3/s)
2 Year	245.66	93	0.010
5 Year	245.86	163	0.053
10 Year	245.92	182	0.142
25 Year	245.96	201	0.264
100 Year	246.00	220	0.433

2.7 Comparison of Existing Targets and Proposed Interim Flows

To the extent possible, the proposed development was designed to control proposed interim peak flows to the existing levels. **Table 2.10** and **Table 2.11** provide a comparison of existing and proposed interim peak flows at the Ravenshoe Road outlet.

Table 2.10: Comparison of Existing Targets and Proposed Interim Flows to Ravenshoe Road (4-Hour Chicago and 6-Hour SCS Type II Storms)

Storm Distribution	4-Hour Chicago		6-Hour SCS Type II	
Return Period Storm	Existing Discharge (m^3/s)	Proposed Discharge (m^3/s)	Existing Discharge (m^3/s)	Proposed Discharge (m^3/s)
2 Year	0.028	0.008	0.051	0.010
5 Year	0.070	0.011	0.111	0.015
10 Year	0.105	0.025	0.160	0.054
25 Year	0.160	0.070	0.222	0.134
100 Year	0.283	0.196	0.358	0.335

Table 2.11: Comparison of Existing Targets and Proposed Interim Flows to Ravenshoe Road (12 and 24-Hour SCS Type II Storms)

Storm Distribution	12-Hour SCS Type II		24-Hour SCS Type II	
Return Period Storm	Existing Discharge (m^3/s)	Proposed Discharge (m^3/s)	Existing Discharge (m^3/s)	Proposed Discharge (m^3/s)
2 Year	0.062	0.010	0.077	0.012
5 Year	0.131	0.030	0.157	0.054
10 Year	0.185	0.098	0.220	0.143
25 Year	0.254	0.197	0.299	0.266
100 Year	0.392	0.385	0.445	0.438

Tables 2.12 and **Table 2.13** provide a comparison of existing and proposed interim peak flows at the Regional Road 1 outlet.

Table 2.12: Comparison of Existing Targets and Proposed Interim Flows to Regional Road 1 (4-Hour Chicago and 6-Hour SCS Type II Storms)

Storm Distribution	4-Hour Chicago		6-Hour SCS Type II	
Return Period Storm	Existing Discharge (m^3/s)	Proposed Discharge (m^3/s)	Existing Discharge (m^3/s)	Proposed Discharge (m^3/s)
2 Year	0.004	0.001	0.006	0.001
5 Year	0.009	0.002	0.012	0.002
10 Year	0.013	0.003	0.017	0.003
25 Year	0.020	0.004	0.022	0.004
100 Year	0.034	0.006	0.035	0.006

Table 2.13: Comparison of Existing Targets and Proposed Interim Flows to Regional Road 1 (12 and 24-Hour SCS Type II Storms)

Storm Distribution	12-Hour SCS Type II		24-Hour SCS Type II	
Return Period Storm	Existing Discharge (m^3/s)	Proposed Discharge (m^3/s)	Existing Discharge (m^3/s)	Proposed Discharge (m^3/s)
2 Year	0.007	0.001	0.008	0.001
5 Year	0.013	0.002	0.016	0.003
10 Year	0.018	0.003	0.022	0.004
25 Year	0.025	0.004	0.029	0.005
100 Year	0.037	0.006	0.041	0.007

As shown in **Tables 2.10** to **Table 2.13**, the proposed interim peak flows are less than or equal to the existing flows for the 2 through 100 year storm events at the outlet locations.

2.8 Comparison of Existing Targets and Proposed Ultimate Flows

To the extent possible, the proposed development was designed to control proposed ultimate peak flows to the existing levels. **Table 2.14** and **Table 2.15** provide a comparison of existing and proposed ultimate peak flows at the Ravenshoe Road outlet.

Table 2.14: Comparison of Existing Targets and Proposed Ultimate Flows to Ravenshoe Road (4-Hour Chicago and 6-Hour SCS Type II Storms)

Storm Distribution	4-Hour Chicago		6-Hour SCS Type II	
Return Period Storm	Existing Discharge (m^3/s)	Proposed Discharge (m^3/s)	Existing Discharge (m^3/s)	Proposed Discharge (m^3/s)
2 Year	0.028	0.017	0.051	0.019
5 Year	0.070	0.034	0.111	0.037
10 Year	0.105	0.047	0.160	0.050
25 Year	0.160	0.068	0.222	0.067
100 Year	0.283	0.111	0.358	0.103

Table 2.15: Comparison of Existing Targets and Proposed Ultimate Flows to Ravenshoe Road (12 and 24-Hour SCS Type II Storms)

Storm Distribution	12-Hour SCS Type II		24-Hour SCS Type II	
Return Period Storm	Existing Discharge (m^3/s)	Proposed Discharge (m^3/s)	Existing Discharge (m^3/s)	Proposed Discharge (m^3/s)
2 Year	0.062	0.021	0.077	0.025
5 Year	0.131	0.040	0.157	0.047
10 Year	0.185	0.055	0.220	0.064
25 Year	0.254	0.073	0.299	0.085
100 Year	0.392	0.108	0.445	0.122

Tables 2.14 and **Table 2.15** provide a comparison of existing and proposed ultimate peak flows at the Regional Road 1 outlet.

Table 2.16: Comparison of Existing Targets and Proposed Ultimate Flows to Regional Road 1 (4-Hour Chicago and 6-Hour SCS Type II Storms)

Storm Distribution	4-Hour Chicago		6-Hour SCS Type II	
Return Period Storm	Existing Discharge (m^3/s)	Proposed Discharge (m^3/s)	Existing Discharge (m^3/s)	Proposed Discharge (m^3/s)
2 Year	0.004	0.001	0.006	0.001
5 Year	0.009	0.002	0.012	0.002
10 Year	0.013	0.003	0.017	0.003
25 Year	0.020	0.004	0.022	0.004
100 Year	0.034	0.006	0.035	0.006

Table 2.17: Comparison of Existing Targets and Proposed Flows to Regional Road 1 (12 and 24-Hour SCS Type II Storms)

Storm Distribution	12-Hour SCS Type II		24-Hour SCS Type II	
Return Period Storm	Existing Discharge (m^3/s)	Proposed Discharge (m^3/s)	Existing Discharge (m^3/s)	Proposed Discharge (m^3/s)
2 Year	0.007	0.001	0.008	0.001
5 Year	0.013	0.002	0.016	0.003
10 Year	0.018	0.003	0.022	0.004
25 Year	0.025	0.004	0.029	0.005
100 Year	0.037	0.006	0.041	0.007

As shown in **Tables 2.16** to **Table 2.17**, the proposed ultimate peak flows are less than or equal to the existing flows for the 2 through 100 year storm events at the outlet locations.

2.9 Enhanced Grassed Swale

Enhanced grassed swales are proposed within the road right-of-way (ROW). Drainage from the ROW, front draining lots, and front portion of the split draining lots will be conveyed to the enhanced grass swales via overland flow.

2.9.1 Sizing

Enhanced grassed swales with infiltration or filtration trenches below are proposed to provided on-site retention of 9.35 mm of runoff volume from new impervious surfaces. Based on the preliminary sizing, the total enhanced grass swale infiltration/filtration trench volume provided is 57.59 m^3. Refer to **Appendix F** for sizing calculations.

2.9.2 General Infiltration and Filtration Trench Design Criteria

Preliminary LID plan is provided on **Figure 2.4**. The enhanced grass swales and infiltration/filtration trenches will be designed with the following general criteria:

- Infiltration rate is 33.6 to 51.7 mm/hour with a 3.5 safety factor (9.6 to 14.8 mm/hr);
- Enhanced grass swale trench to consist of 25 mm washed clear stone and sand filter wrapped in non-woven filter cloth;
- Minimum 1.0 m separation from high groundwater level to infiltration trench invert for infiltration purposes;
- Where 1.0 m separation from high groundwater to the invert of the stone trench is not possible, the enhanced grass swale is to consist of 25 mm washed clear stone and sand filter with a subdrain and wrapped in an impermeable liner; and
- A maximum drawdown time of 48 hours.

2.10 Storm Servicing

There is no existing municipal storm sewer system available to convey flow for the site. The drainage from the site and the existing residential lots adjacent to the site drains overland and is conveyed by existing ditches along Ravenshoe Road and Regional Road 1.

The minor and major system flow drainage for the site (up to the 100 year storm event) will generally be conveyed overland along the proposed road rights-of-way roadside ditches, then to the interim dry SWM pond via a proposed storm sewer from the 100 year capture point. Sizing calculations for the 100 year capture location will be provided at the detailed design stage.

2.11 Overland Flow

Minor and major system flows (up to the 100 year storm event) will be conveyed by the roadside ditches to the 100 year capture location and piped to the interim dry SWM pond. Ditch capacity calculations are provided in **Appendix G** and show that the minor and major system flows can be safely conveyed within the proposed enhanced grass swales within the ROWs.

3.0 Sanitary Servicing

3.1 Existing Sanitary Sewer System

There are no existing municipal sanitary sewers or wastewater treatment plants available to service the site. The existing residential lots adjacent to the site are currently serviced by privately owned on-site sewage systems.

3.2 Proposed Sanitary Sewer System

The proposed sanitary treatment system for the site will consist of privately owned on-site sewage systems approved under the Ontario Building Code. As discussed in the On-Site Sewage System Sizing Study prepared by Envision Consultants ltd, dated January 2025 (refer to **Appendix B**), the proposed plan can be serviced with private sewage systems. The privately owned sewage systems and sizing will be described in greater detail at the detailed design stage.

3.3 Servicing Allocation

No sanitary servicing allocation will be required from the Region of Durham, or the Township of Uxbridge since the subject lands are proposed to be serviced by private septic systems.

4.0 Water Supply and Distribution

4.1 Existing Water Distribution

There are no existing municipal watermains or water treatment plants available to service the site. The existing residences adjacent to the site are currently serviced by private wells.

4.2 Proposed Water System

As discussed in the On-Site Sewage System Sizing Study prepared by Envision Consultants ltd, dated January 2025(refer to **Appendix B**), the proposed water source for the site will consist of privately owned wells for each lot.

5.0 Grading

5.1 Existing Grading Conditions

The existing topography has slopes in the range of 2% to 12%. The ground surface elevations through the study area range from approximately 249.1 m in the northwest corner to approximately 243.0 m adjacent Ravenshoe Road.

5.2 Proposed Grading Concept

In general, the proposed development will be graded in a manner which will satisfy the following goals:

- Satisfy the Township of Uxbridge lot and road grading criteria including:
  - Minimum Road Grade: 0.5%
  - Maximum Road Grade: 5.0%
  - Minimum Lot Grade: 2%
  - Maximum Lot Grade: 12%
- Provide continuous road grades for overland flow conveyance;
- Minimize the need for retaining walls;
- Minimize the volume of earth to be moved and minimize cut/fill differential; and
- Achieve the stormwater management objectives required for the proposed development.

A preliminary grading plan is provided on **Figure 5.1**.

The road is proposed to connect with Birdie Smith Court to the south. The proposed grading at the connection follows the future centerline grading illustrated on the Plan and Profile Drawing, prepared by Cole Engineering, dated August 2002 (refer to **Appendix B**).

Since the majority of the site slopes between 2% to 12%, and the maximum road grade is 5%. 3:1 sloping onto the adjacent properties is required to compensate the differences between the existing and proposed grades (refer to **Figure 5.1**). Permission from owners of the adjacent properties will be required for the 3:1 sloping. Alternatively, retaining walls along the edges of the rights-of-way and along the south edge of Lot 1 will be required.

In the interim drainage condition, the south ditch of the western portion of the east-west road will be reverse graded to convey flows from the western property limit, east to a 100 year capture point (refer to **Figure 5.1**). The flows will then be conveyed to the interim dry SWM pond via a 450mm diameter storm pipe.

In the ultimate condition, once the proposed King Cole Ducks subdivision (subdivision# 2010 -1) to the west has been constructed, the interim dry SWM pond will be decommissioned and replaced by an estate residential lot. The ultimate grading design for the future road connection between the Subject Land and the King Cole Ducks property is illustrated on **Figure 5.2**. This ultimate condition will involve regrading the south ditch along the western portion of the east-west road to drain from east to west, towards the King Cole Ducks subdivision.

At the detailed design stage, the preliminary grading shown on **Figure 5.1** and **5.2** will be subject to a more in-depth analysis in an attempt to balance the cut and fill volumes and minimize slopes and walls.

6.0 Rights-of-way and Sidewalks

The proposed 23.0 m right-of-way cross-sections are provided on **Figures 6.1** to **6.3.** The cross sections have been developed by modifying Township of Uxbridge Standard Detail Drawing US-201 to show the LID measures, and the proposed location for the joint utilities trench.

Since the right-of-way is classified as an estate residential street, sidewalks are not required per the Township of Uxbridge Standard Detail Drawing (refer to **Figures 6.1** to **6.3**).

7.0 Erosion and Sediment Control During Construction

During the detailed design stage, erosion and sediment control measures will be designed with a focus on erosion control practices (such as stabilization, track walking, staged earthworks, etc.) as well as sediment controls (such as fencing, mud mats, rock check dams and temporary sediment control ponds). These measures will be designed and constructed as per the “Technical Guidelines for Stormwater Management Submissions” document (LSRCA, 2022). A detailed erosion and sediment control plan will be prepared for review and approval by the Municipality and Conservation Authority prior to any proposed grading being undertaken. This plan will address phasing, inspection and monitoring aspects of erosion and sediment control. All reasonable measures will be taken to ensure sediment loading to the adjacent properties are minimized both during and following construction.

8.0 Utility Considerations

The utility companies (hydro, natural gas, and telecommunications) have been contacted to circulate the proposed draft plan of subdivision to confirm whether there is sufficient servicing capacity. Correspondence received thus far is included in **Appendix I**.

8.1 Hydro

Hydro One has confirmed that there is sufficient existing capacity to service the proposed development.

8.2 Gas

Enbridge confirmed that a gas main extension from HWY12 and Brock Concession Road 7 is required to service the proposed development.

8.3 Telecommunications and Cable

Vianet has confirmed that there is sufficient existing capacity to service the proposed development.

9.0 Summary

This Functional Servicing and Stormwater Management Report has been prepared in support of the Draft Plan of Subdivision and Zoning By-law Amendment applications for the proposed residential development in the Township of Uxbridge. This report outlines the means by which the proposed development can be graded and serviced in accordance with the Township of Uxbridge, Lake Simcoe Regional Conservation Authority (LSRCA), The Ontario Building Code, and the Ministry of Environment Conservation and Parks (MECP) design criteria.

General Information

- The existing land use is comprised of mostly barren open space with minor tree covered areas;
- The proposed development is located within the subwatershed of Pefferlaw Brook in Township of Uxbridge; and
- The proposed development consists of low density residential, an interim dry SWM pond and proposed roads.

Stormwater Management and Storm Servicing

- Quality Control: MECP enhanced quality protection (80% TSS Removal) can be provided through the use of enhanced grassed swale infiltration trenches and enhanced grassed swale filtration trenches;
- Erosion Control: The runoff volume from a 40 mm mm rainfall event will be detained over 4 hours by the interim dry pond;
- Quantity Control: Quantity control will be provided via the interim dry pond to control proposed flows from the site to existing flow rates for the 2 through 100 year storm events;
- Water Budget: Gaman Consultants Inc. has completed a water budget analysis to demonstrate that the proposed annual infiltration rates will not be less than existing rates;
- Phosphorus Budget: A phosphorus budget analysis was completed using the MECP phosphorus budget tool, which shows that the proposed phosphorus export with BMPs will be approximately 0.09 kr/yr more than existing conditions. Since the post-development phosphorus loading exceeds the pre-development phosphorus loading, the LSRCA's Phosphorus Offsetting fee of $3,625.91 is required.
- Storm Servicing:
  - Minor and major system runoff from the site (up to the 100 year storm event) will be conveyed overland along the road rights-of-way.

Sanitary Servicing

- The proposed sanitary treatment system for the site will consist of privately owned on-site sewage systems approved under the Ontario Building Code.

Water Supply and Distribution

- The proposed water source for the site will consist of privately owned wells.

Grading

- The proposed development grading has been developed to match to the existing surrounding grades, to the extent feasible, and to provide conveyance of stormwater runoff, including external drainage; and
- The site grading will be subject to further grading design at the detailed design stage.

Rights-of-Way and Sidewalks

- The Town standard 23.0 m rural estate right-of-way is proposed to be modified to incorporate infiltration/filtration trenches below the ditches.
- Since the right-of-way is classified as estate residential street, sidewalks are not required per the Township of Uxbridge Standard Detail Drawing.

Erosion and Sediment Control during Construction

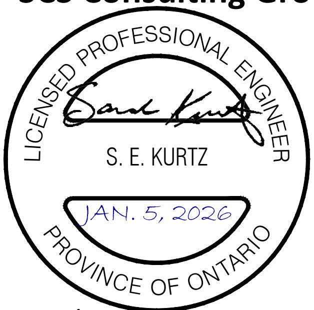
- An erosion and sediment control plan will be prepared at the detailed engineering stage, in accordance with the “Technical Guidelines for Stormwater Management Submissions” (LSRCA, 2022).

Utility Considerations

- Utility companies have been contacted to circulate the proposed draft plan of subdivision to confirm if there is sufficient servicing capacity.
- A gas main extension from HWY12 and Brock Concession Road to the site is required.
- Vianet has confirmed there is sufficient capacity.

Respectfully Submitted:

SCS Consulting Group Ltd.



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Jessie Song, E.I.T.
jsong@scsconsultinggroup.com

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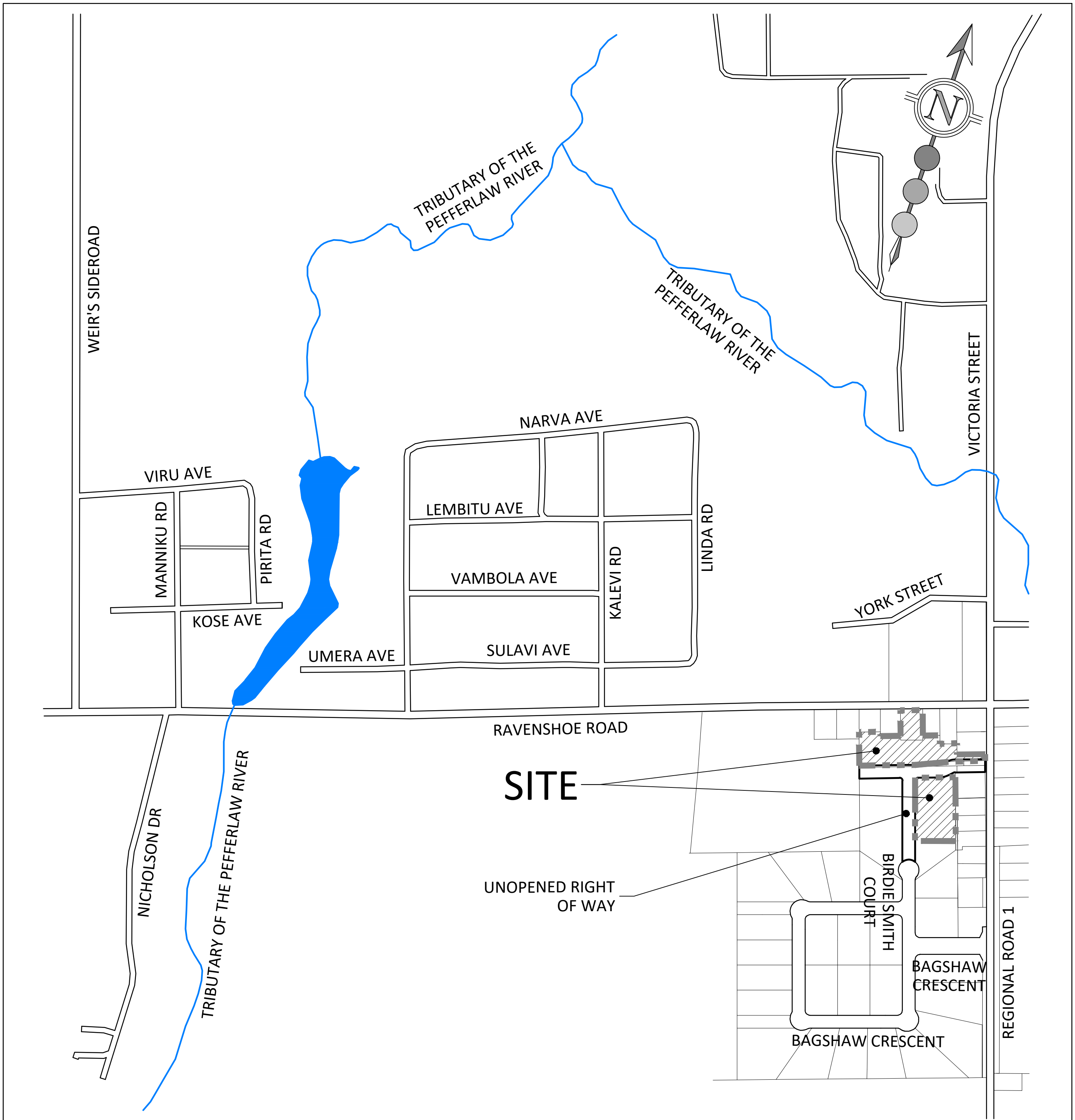


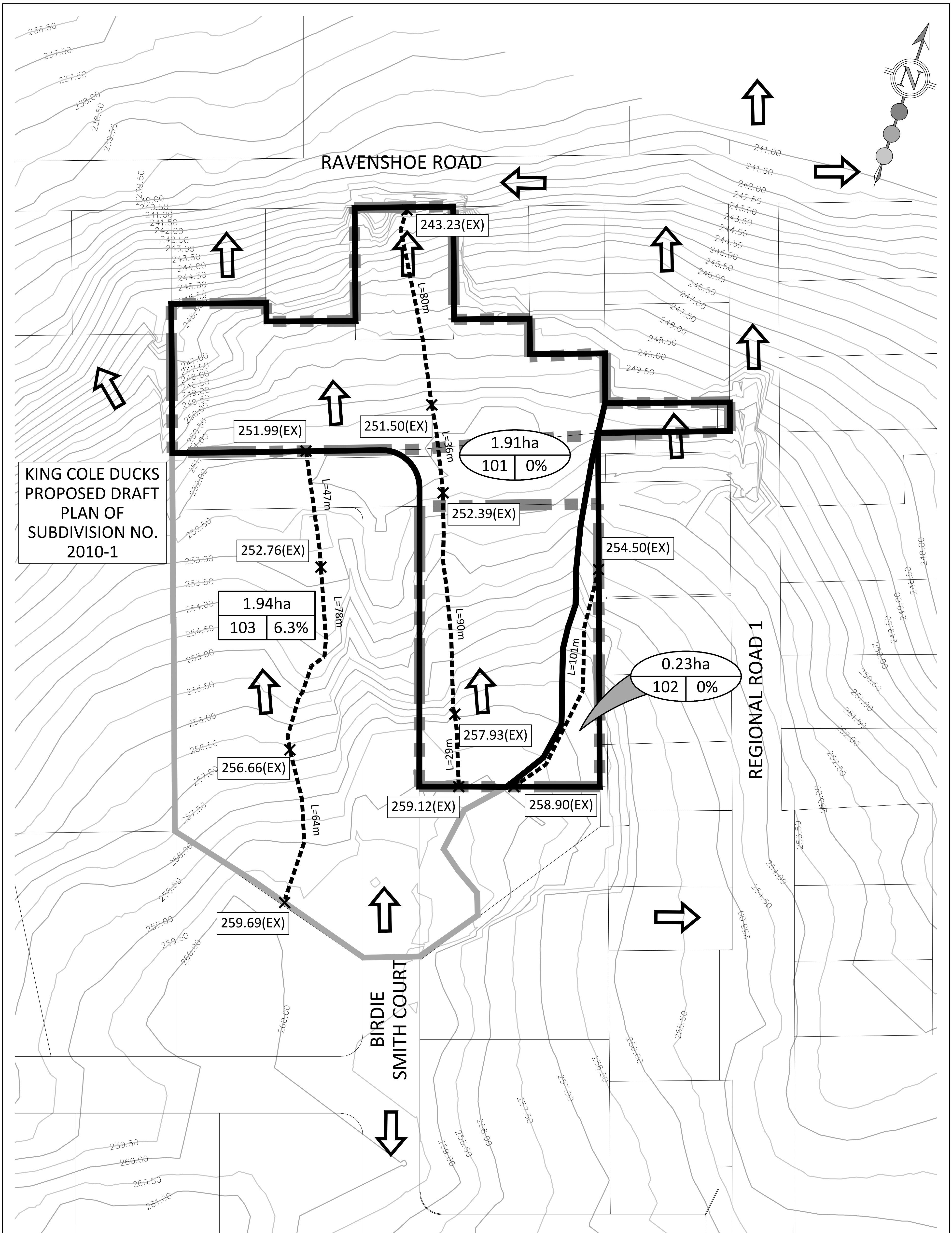
SCS consulting group ltd
30 CENTURIAN DRIVE, SUITE 100
MARKHAM, ONTARIO L3R 8B8
TEL: (905) 475-1900
FAX: (905) 475-8335

UDORA ESTATES

FSSR

SITE LOCATION PLAN

DESIGNED BY: J.S.	CHECKED BY: S.K.	PROJECT No: 2328	FIGURE No: 1.1
SCALE: N.T.S.	DATE: JANUARY 2026		



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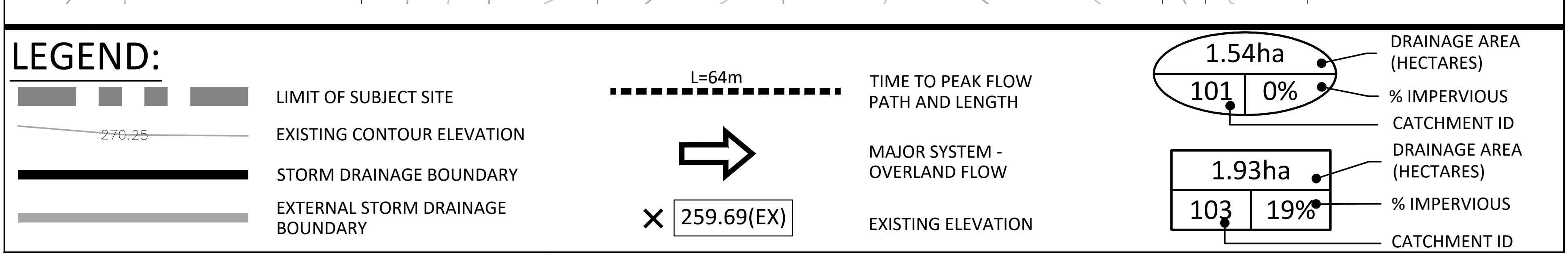

FSSR	UDORA ESTATES		EXISTING STORM DRAINAGE PLAN	
SCS consulting group ltd 30 CENTURIAN DRIVE, SUITE 100 MARKHAM, ONTARIO L3R 8B8 TEL: (905) 475-1900 FAX: (905) 475-8335	DESIGNED BY: J.S. SCALE: 1:1500	CHECKED BY: S.K. DATE: JANUARY 2026	PROJECT No: 2328	FIGURE No: 2.1

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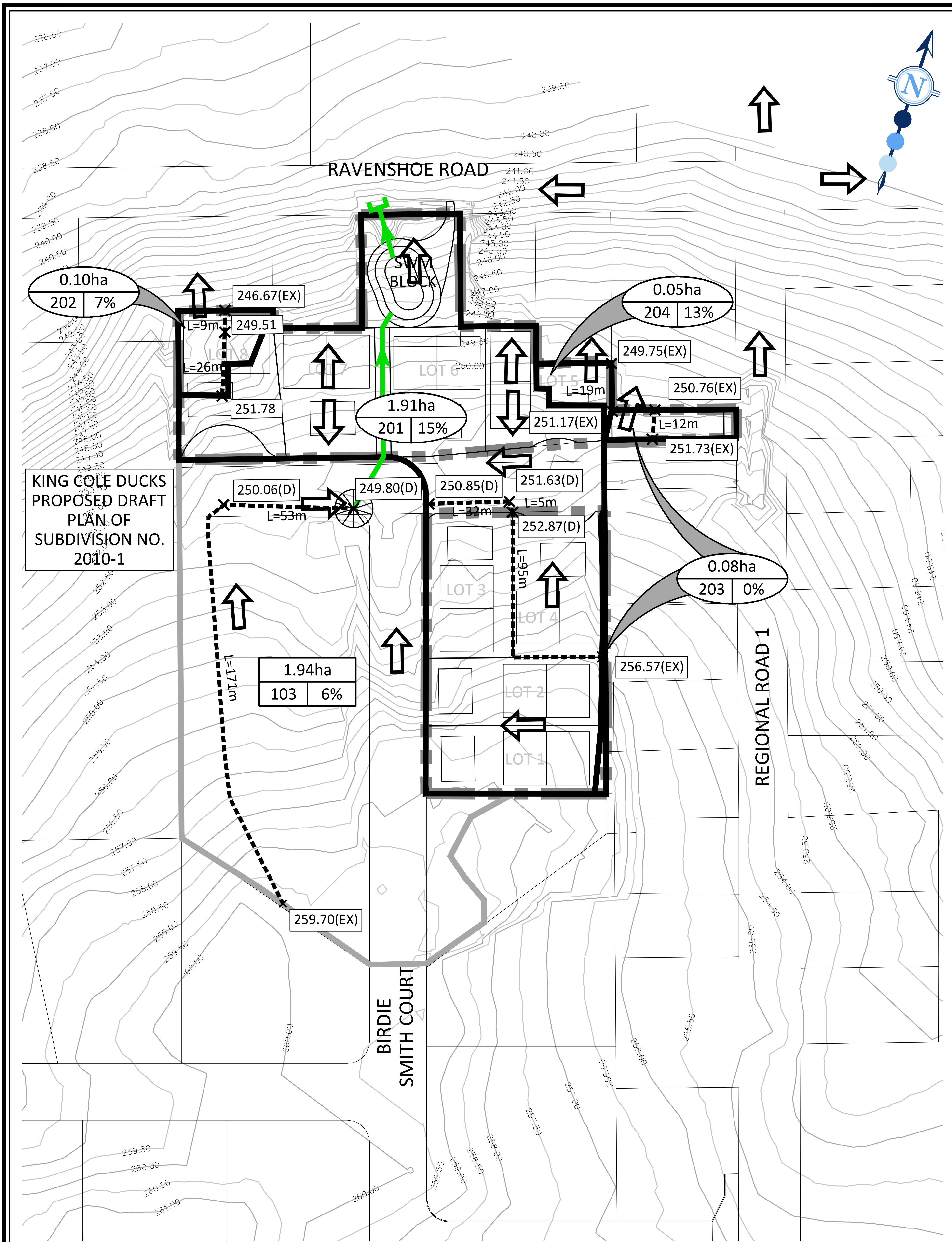

LEGEND:

- LIMIT OF SUBJECT SITE
- 270.25 EXISTING CONTOUR ELEVATION
- STORM DRAINAGE BOUNDARY
- EXTERNAL STORM DRAINAGE BOUNDARY
- PROPOSED STORM SEWER
- MAJOR SYSTEM - OVERLAND FLOW
- 100 YEAR CAPTURE LOCATION
- L=64m TIME TO PEAK FLOW PATH AND LENGTH
- 258.85(D) DITCH ELEVATION
- 252.22 PROPOSED ELEVATION
- 251.73(EX) EXISTING ELEVATION
- 1.91ha — DRAINAGE AREA (HECTARES); 201 — CATCHMENT ID; 15% — % IMPERVIOUS
- 1.94ha — DRAINAGE AREA (HECTARES); 103 — CATCHMENT ID; 6% — % IMPERVIOUS

FSSR	UDORA ESTATES		PROPOSED INTERIM STORM DRAINAGE PLAN	
SCS consulting group ltd, 30 CENTURIAN DRIVE, SUITE 100, MARKHAM, ONTARIO L3R 8B8, TEL: (905) 475-1900, FAX: (905) 475-8335	DESIGNED BY: J.S.	CHECKED BY: S.K.	PROJECT No: 2328	FIGURE No: 2.2
	SCALE: 1:1500	DATE: JANUARY 2026		

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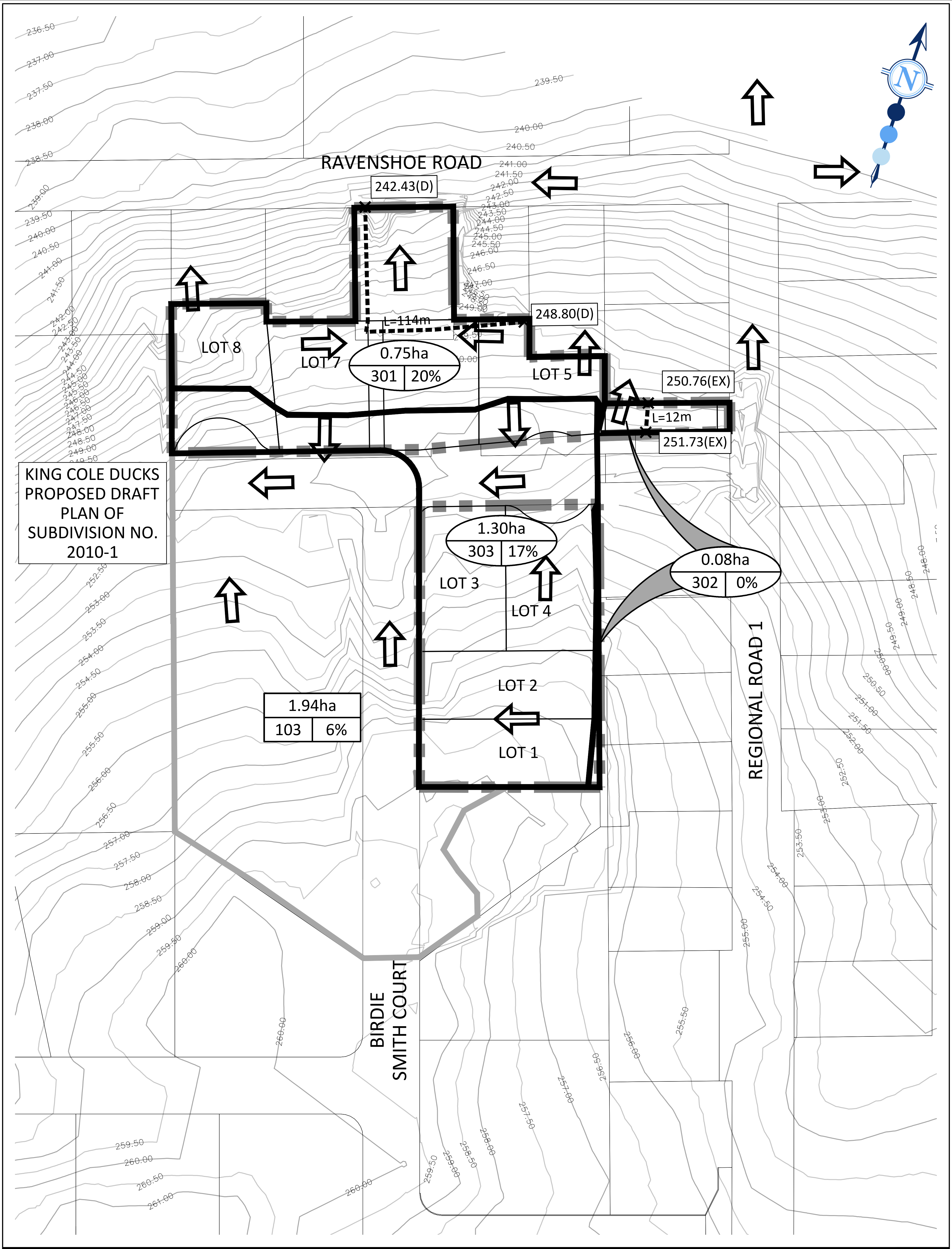

LEGEND:

	LIMIT OF SUBJECT SITE
270.25	EXISTING CONTOUR ELEVATION
	STORM DRAINAGE BOUNDARY
	EXTERNAL STORM DRAINAGE BOUNDARY
L=114m	TIME TO PEAK FLOW PATH AND LENGTH
	MAJOR SYSTEM - OVERLAND FLOW
× 258.85(D)	DITCH ELEVATION
× 250.76(EX)	EXISTING ELEVATION
0.75ha / 301 / 20%	DRAINAGE AREA (HECTARES); % IMPERVIOUS; CATCHMENT ID
1.94ha / 103 / 6%	DRAINAGE AREA (HECTARES); % IMPERVIOUS; CATCHMENT ID

FSSR	UDORA ESTATES	PROPOSED ULTIMATE STORM DRAINAGE PLAN

SCS consulting group ltd
30 CENTURIAN DRIVE, SUITE 100
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TEL: (905) 475-1900
FAX: (905) 475-8335

DESIGNED BY: J.S.	CHECKED BY: S.K.	PROJECT No: 2328	FIGURE No: 2.3
SCALE: 1:1500	DATE: JANUARY 2026		

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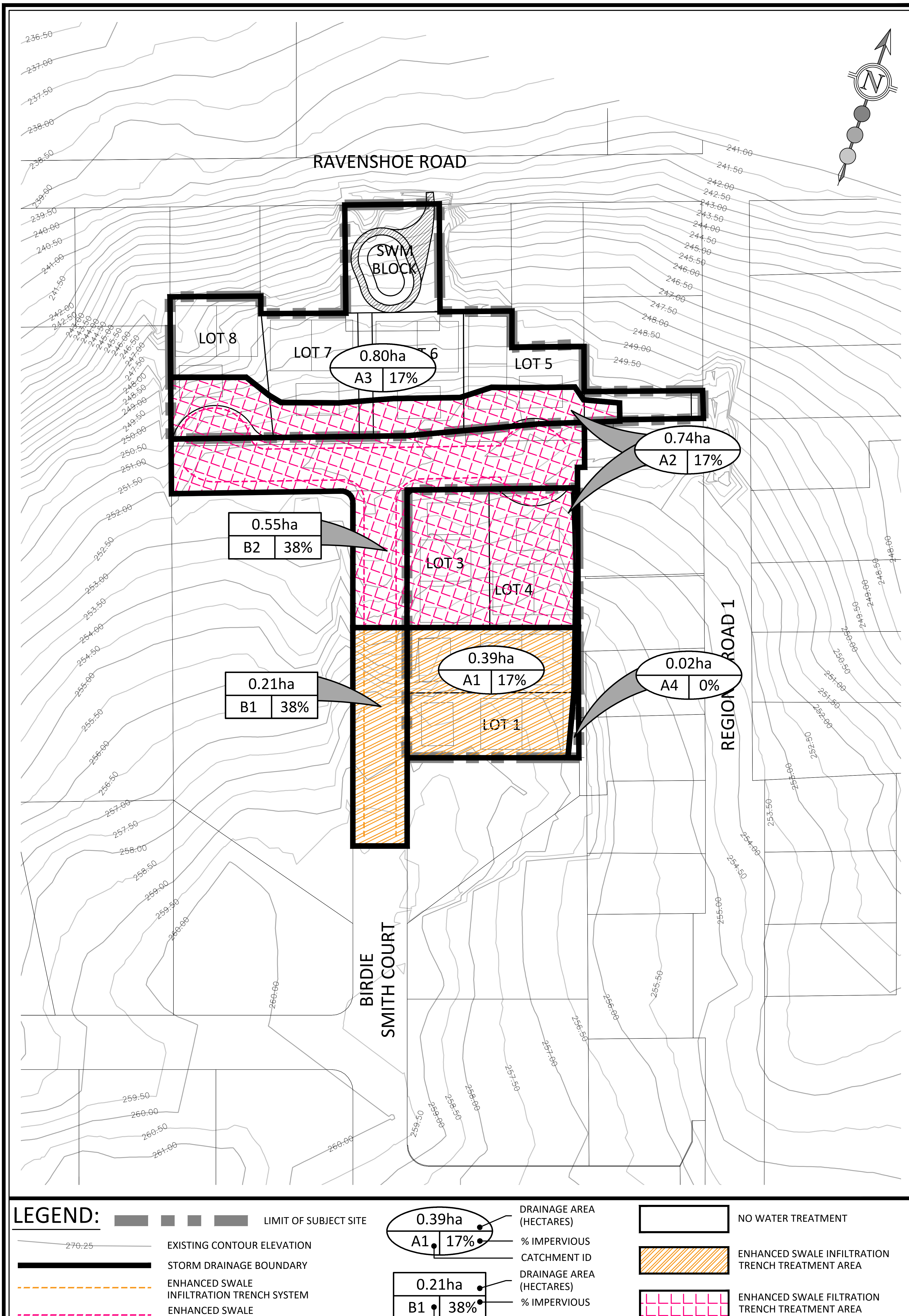

FSSR	UDORA ESTATES		PROPOSED LID PLAN	
SCS consulting group ltd 30 CENTURIAN DRIVE, SUITE 100 MARKHAM, ONTARIO L3R 8B8 TEL: (905) 475-1900 FAX: (905) 475-8335	DESIGNED BY: J.S.	CHECKED BY: S.K.	PROJECT No: 2328	FIGURE No: 2.4
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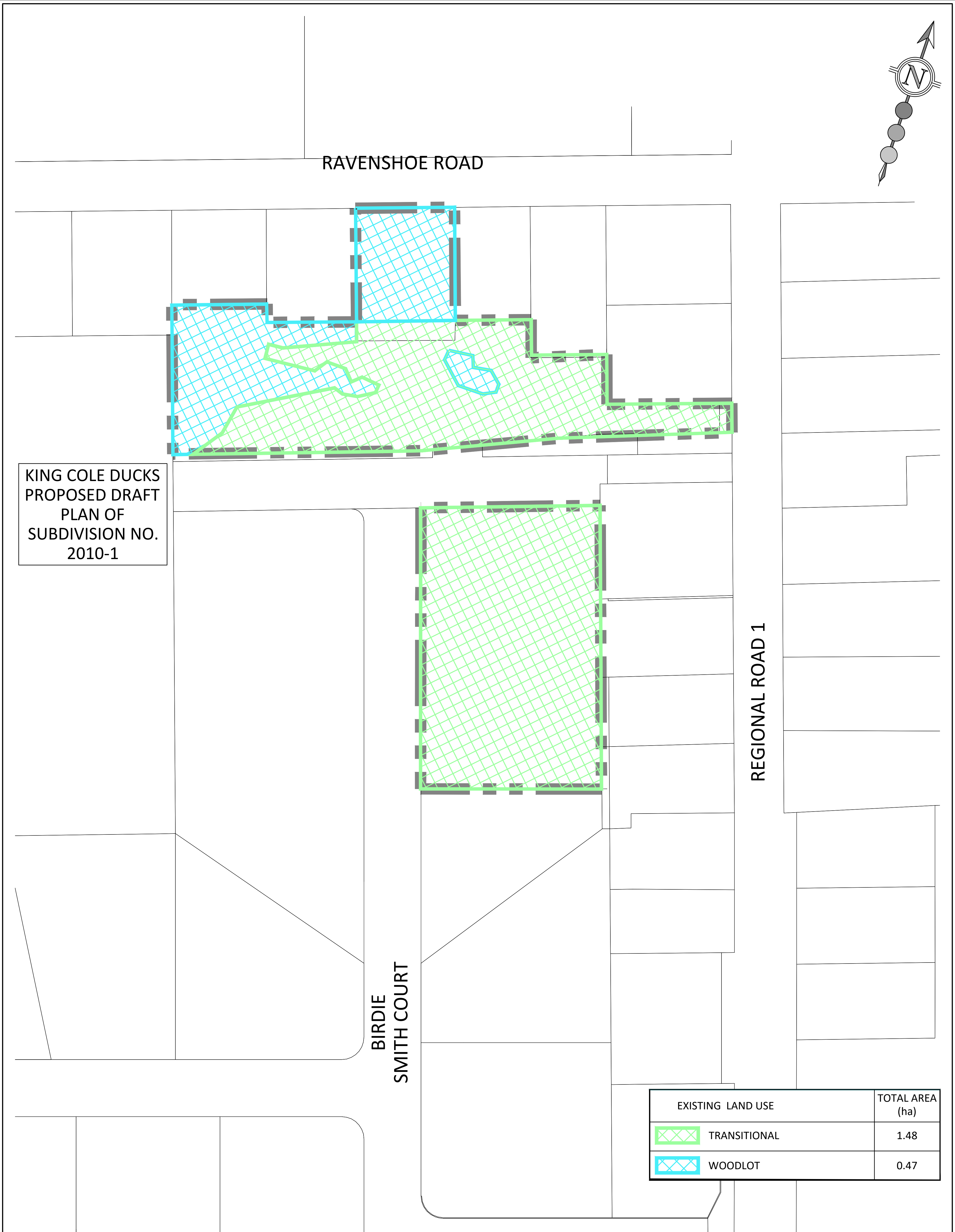

EXISTING LAND USE	TOTAL AREA (ha)
TRANSITIONAL	1.48
WOODLOT	0.47

LEGEND:

LIMIT OF SUBJECT SITE

FSSR	UDORA ESTATES		EXISTING PHOSPHORUS BUDGET PLAN	
SCS consulting group ltd 30 CENTURIAN DRIVE, SUITE 100 MARKHAM, ONTARIO L3R 8B8 TEL: (905) 475-1900 FAX: (905) 475-8335	DESIGNED BY: J.S.	CHECKED BY: S.K.	PROJECT No: 2328	FIGURE No: 2.5
	SCALE: 1:1500	DATE: JANUARY 2026		

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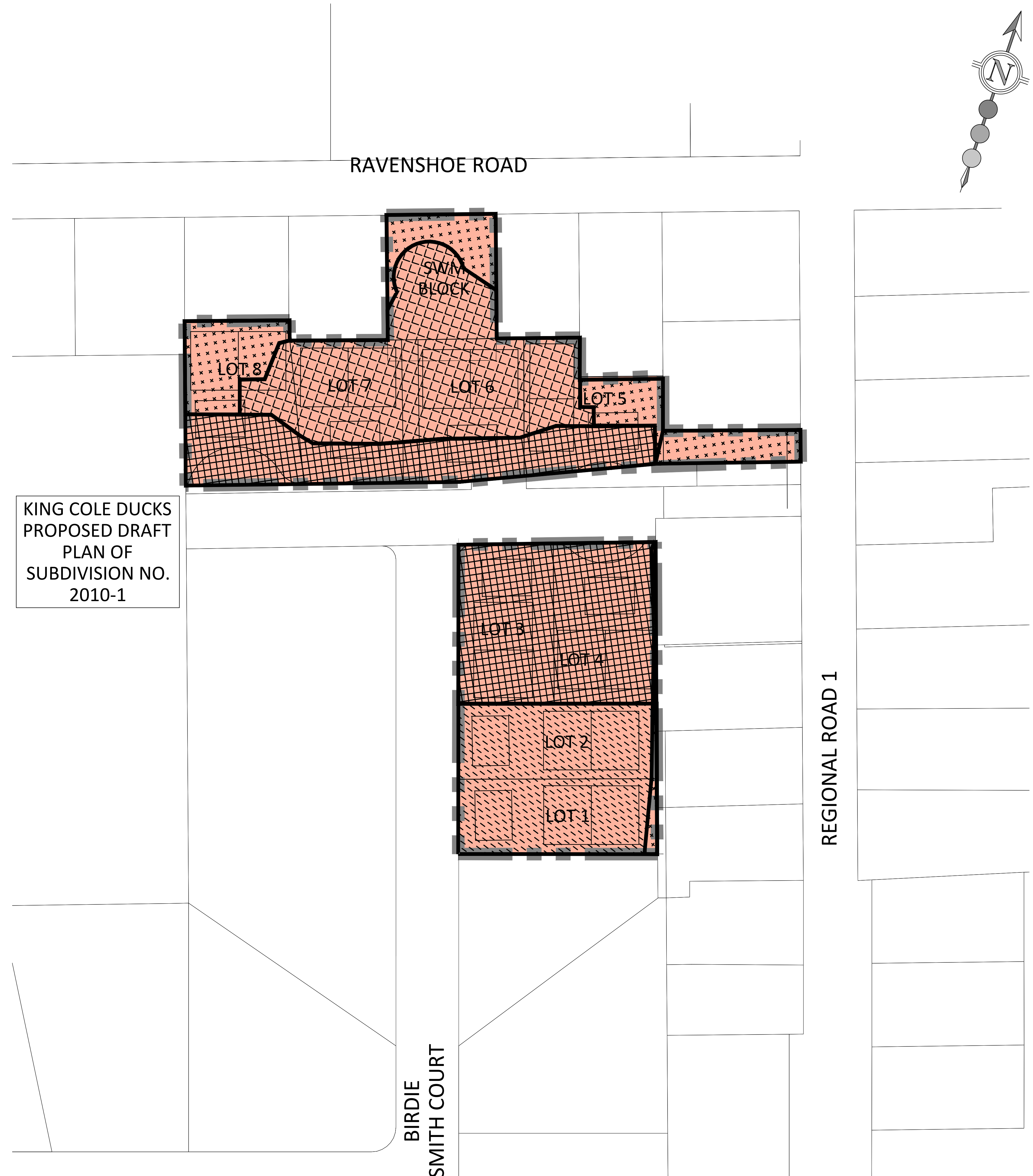

PROPOSED LAND USE	TOTAL AREA TO BEST MANAGEMENT PRACTICE (ha)			
	INFILTRATION TRENCH, MEDIA FILTERS AND DRY DETENTION POND	MEDIA FILTERS AND DRY DETENTION POND	DRY DETENTION POND	NO TREATMENT
LOW INTENSITY DEVELOPMENT (RESIDENTIAL)	0.39	0.73	0.53	0.30

LEGEND:

LIMIT OF SUBJECT SITE

FSSR	UDORA ESTATES	PROPOSED PHOSPHORUS BUDGET PLAN	
SCS consulting group ltd, 30 CENTURIAN DRIVE, SUITE 100, MARKHAM, ONTARIO L3R 8B8, TEL: (905) 475-1900, FAX: (905) 475-8335	DESIGNED BY: J.S. / CHECKED BY: S.K. / SCALE: 1:1500 / DATE: JANUARY 2026	PROJECT No: 2328	FIGURE No: 2.6

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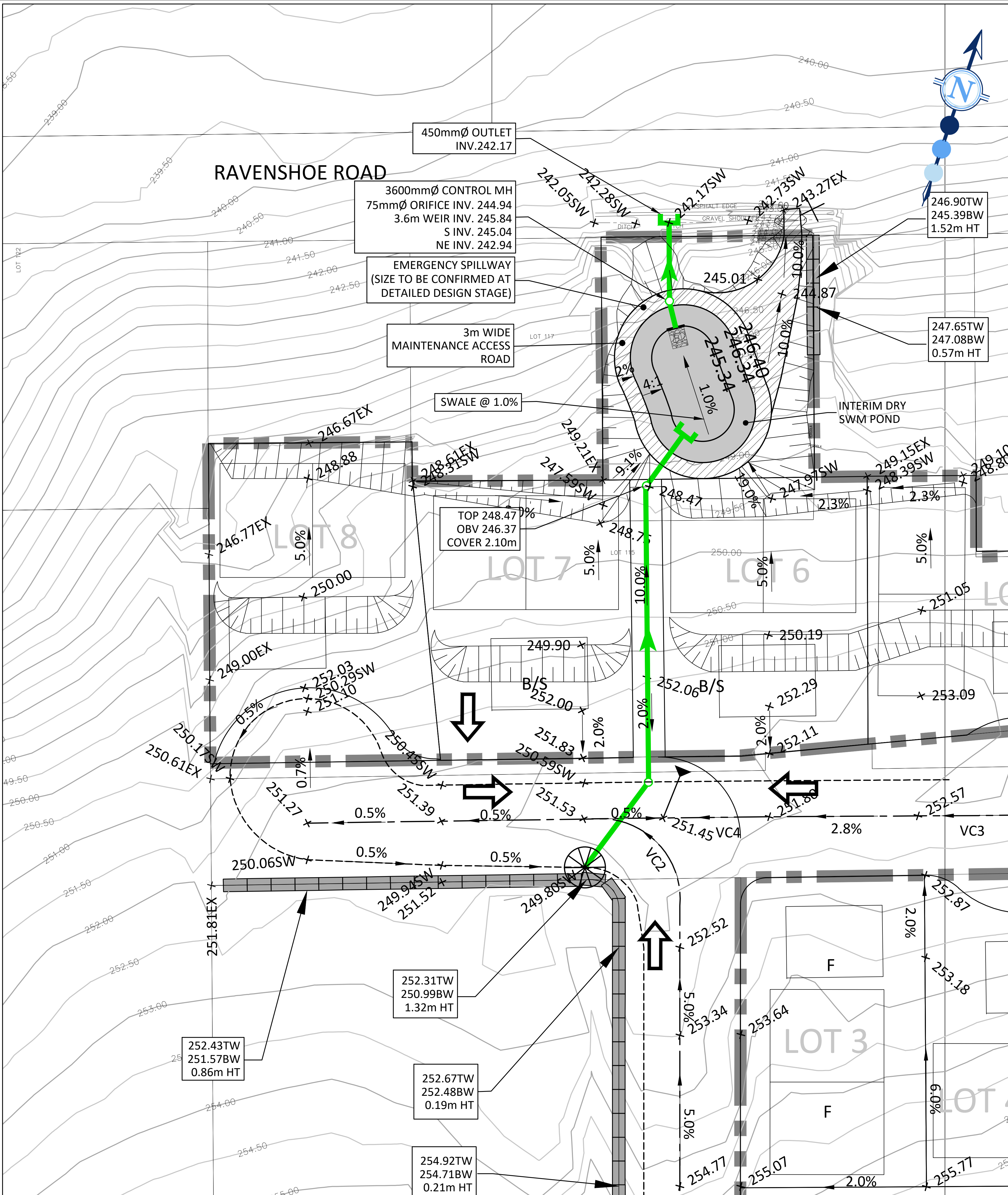

INTERIM DRY SWM POND:
POND BLOCK AREA = 0.18ha
EXTENDED DETENTION VOLUME REQUIRED = 144m^3
EXTENDED DETENTION WATER LEVEL = 245.82m
100 YEAR VOLUME REQUIRED = 220m^3
100 YEAR HIGH WATER LEVEL (HWL) = 246.00m
FREEBORAD = 0.34m

LEGEND:

	LIMIT OF SUBJECT SITE	0.5%	ROAD SLOPE	247.64	PROPOSED CONTOUR AND ELEVATION
254.00	EXISTING CONTOUR AND ELEVATION		MAX 3:1 SLOPE		RETAINING WALL
× 253.64	PROPOSED ELEVATION		LIMIT OF 3:1 GRADING ON NEIGHBORING PROPERTY		PROPOSED STORM SEWER AND MAINTENANCE HOLE
× 253.12EX	EXISTING ELEVATION		ROAD CENTERLINE		100 YEAR CAPTURE LOCATION
			DITCH CENTERLINE		

FSSR	UDORA ESTATES		PRELIMINARY INTERIM DRY SWM POND
SCS consulting group ltd 30 CENTURIAN DRIVE, SUITE 100 MARKHAM, ONTARIO L3R 8B8 TEL: (905) 475-1900 FAX: (905) 475-8335	DESIGNED BY: J.S	CHECKED BY: S.K.	PROJECT No: 2328
	SCALE: 1:750	DATE: JANUARY 2026	FIGURE No: 2.7

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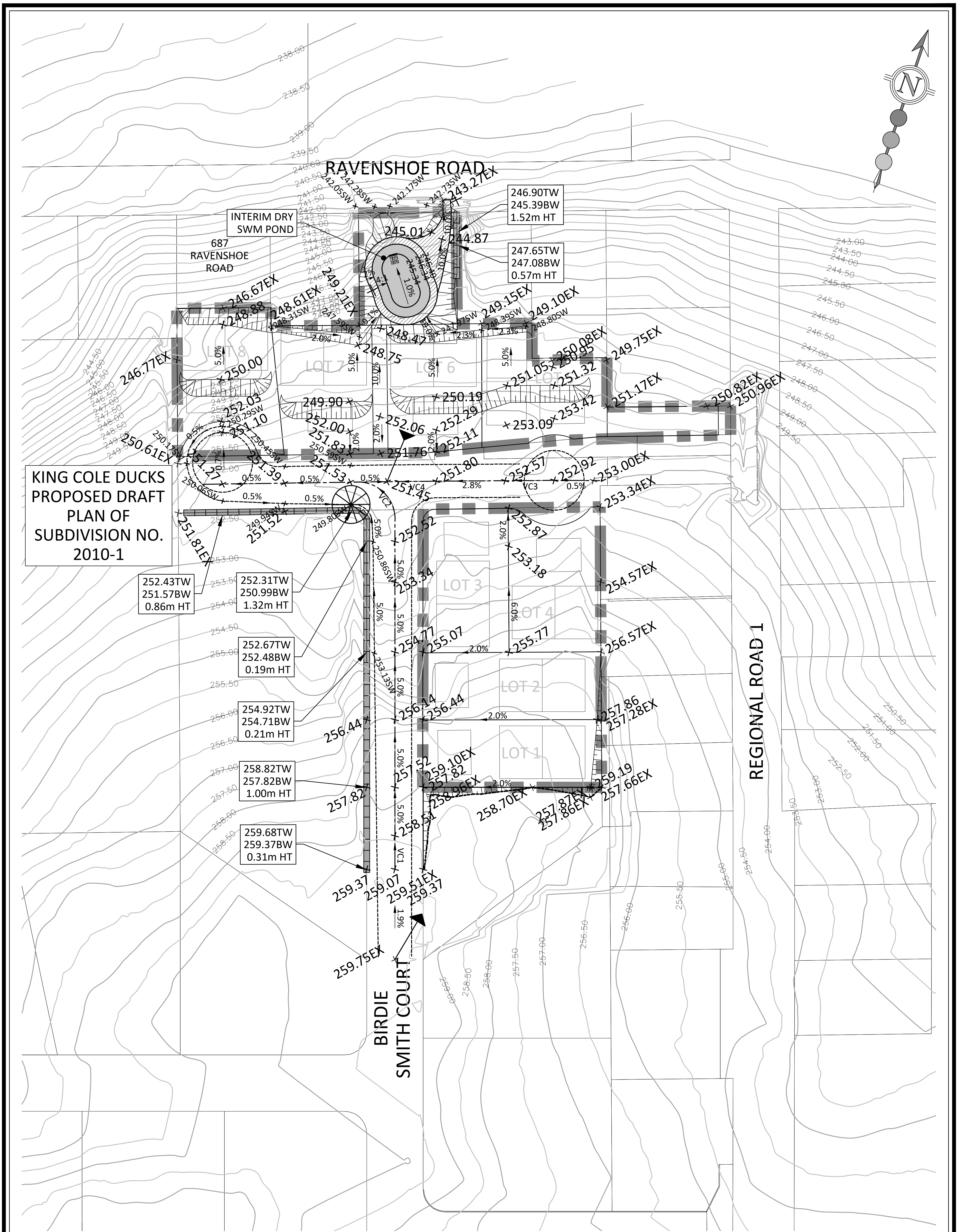
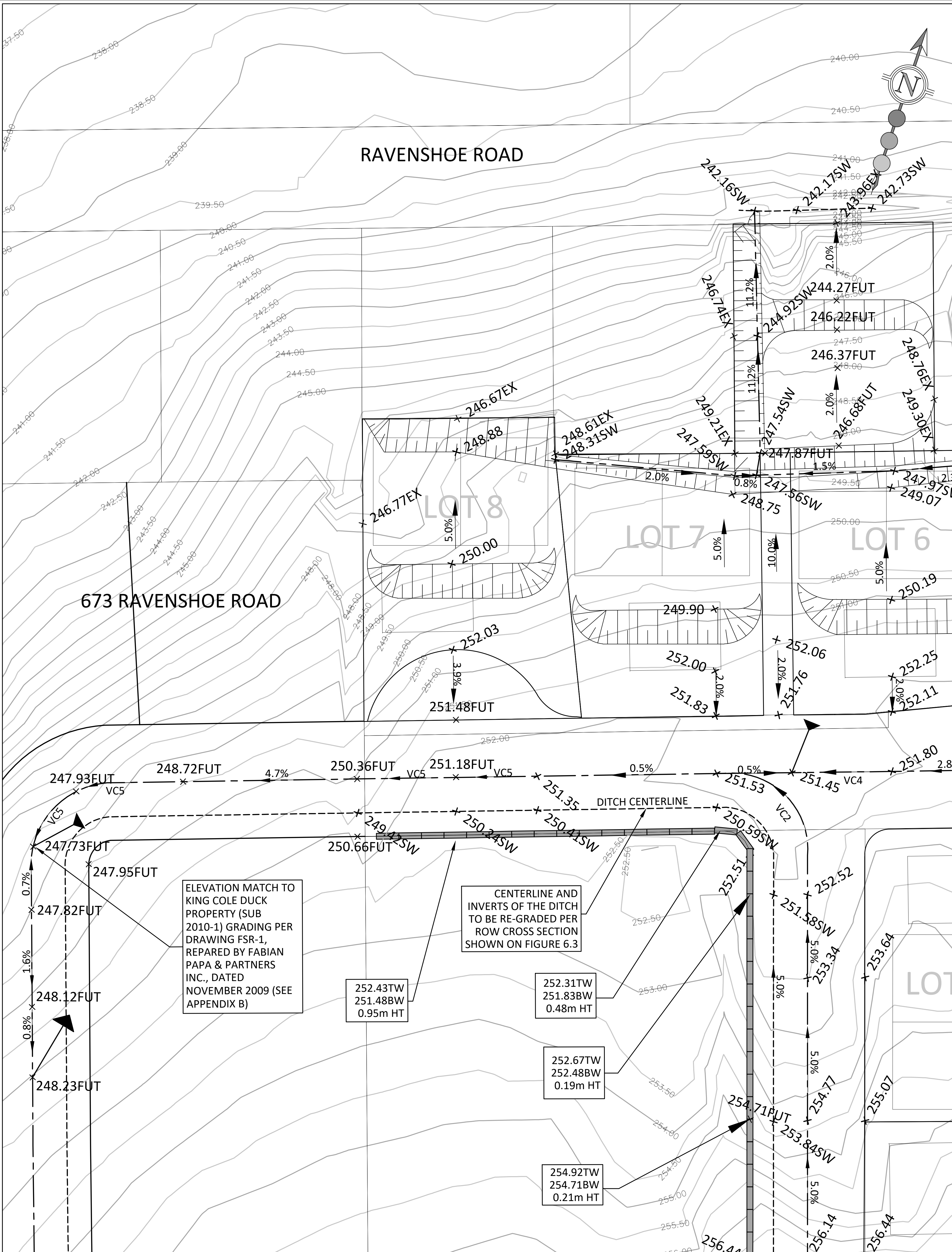


LEGEND:

(thick dashed line)	LIMIT OF SUBJECT SITE	0.5% →	ROAD SLOPE	----------------	DITCH CENTERLINE
254.00	EXISTING CONTOUR AND ELEVATION	(hatched line)	MAX 3:1 SLOPE	(hatched bar)	RETAINING WALL
× 223.91	PROPOSED ELEVATION	(dashed line)	LIMIT OF 3:1 GRADING ON NEIGHBOURING PROPERTY	(circle symbol)	100 YEAR CAPTURE POINT
× 224.35EX	EXISTING ELEVATION	(dash-dot line)	ROAD CENTERLINE		

FSSR	UDORA ESTATES		PRELIMINARY INTERIM GRADING PLAN	
SCS consulting group ltd — 30 CENTURIAN DRIVE, SUITE 100, MARKHAM, ONTARIO L3R 8B8, TEL: (905) 475-1900, FAX: (905) 475-8335	DESIGNED BY: J.S.	CHECKED BY: S.K.	PROJECT No: 2328	FIGURE No: 5.1
	SCALE: 1:1500	DATE: JANUARY 2026		



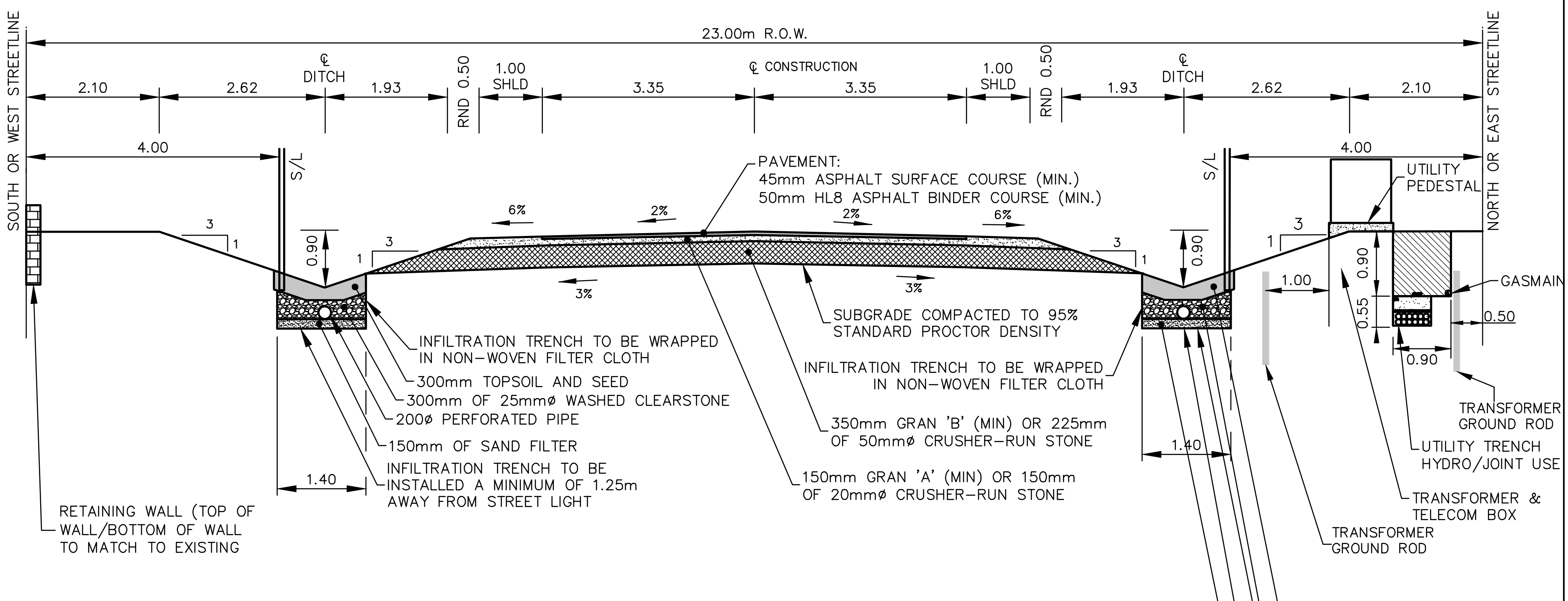
LEGEND:

	LIMIT OF SUBJECT SITE
254.00	EXISTING CONTOUR AND ELEVATION
× 248.21	PROPOSED ELEVATION
× 247.91EX	EXISTING ELEVATION
× 249.12FUT	FUTURE ELEVATION
0.5%	ROAD SLOPE
	MAX 3:1 SLOPE
	LIMIT OF 3:1 GRADING ON NEIGHBORING PROPERTY
	ROAD CENTERLINE
	RETAINING WALL

FSSR	UDORA ESTATES	PRELIMINARY ULTIMATE GRADING PLAN

SCS consulting group ltd — 30 CENTURIAN DRIVE, SUITE 100, MARKHAM, ONTARIO L3R 8B8, TEL: (905) 475-1900, FAX: (905) 475-8335	DESIGNED BY: J.S	CHECKED BY: S.K.	PROJECT No: 2328
	SCALE: 1:750	DATE: JANUARY 2026	FIGURE No: 5.2

File: P:\2328 Udora Estates\Drawings\FSP\Fig\Report Figures\2328P-GRAD-5.2.dwg - Revised by <DDILAY> : Thu, Dec 18 2025 - 12:16pm

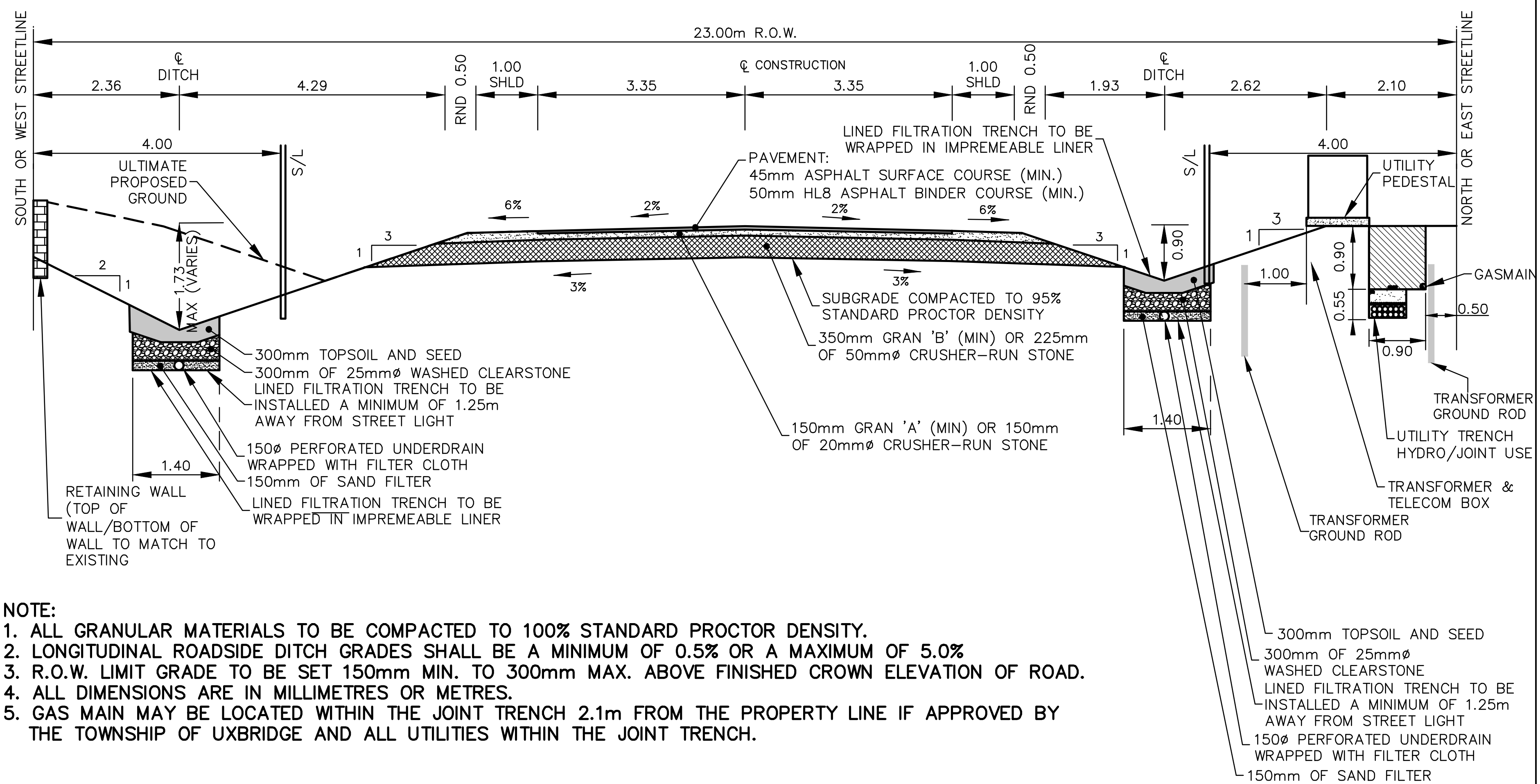


NOTE:
1. ALL GRANULAR MATERIALS TO BE COMPACTED TO 100% STANDARD PROCTOR DENSITY.
2. LONGITUDINAL ROADSIDE DITCH GRADES SHALL BE A MINIMUM OF 0.5% OR A MAXIMUM OF 5.0%
3. R.O.W. LIMIT GRADE TO BE SET 150mm MIN. TO 300mm MAX. ABOVE FINISHED CROWN ELEVATION OF ROAD.
4. ALL DIMENSIONS ARE IN MILLIMETRES OR METRES.
5. GAS MAIN MAY BE LOCATED WITHIN THE JOINT TRENCH 2.1m FROM THE PROPERTY LINE IF APPROVED BY THE TOWNSHIP OF UXBRIDGE AND ALL UTILITIES WITHIN THE JOINT TRENCH.

*NOTE: LAYOUT IS SCHEMATIC ONLY, DETAILS TO BE PROVIDED AT DETAILED DESIGN STAGE.

FSSR	UDORA ESTATES	INTERIM AND ULTIMATE 23m R.O.W. WITH INFILTRATION TRENCH	
SCS consulting group ltd 30 CENTURIAN DRIVE, SUITE 100 MARKHAM, ONTARIO L3R 8B8 TEL: (905) 475-1900 FAX: (905) 475-8335	DESIGNED BY: J.S. CHECKED BY: S.K. SCALE: 1:100 DATE: JANUARY 2026	PROJECT No: 2328	FIGURE No: 6.1

File: P:\2328 Udora Estates\Drawings\FSP\Fig\Report Figures\2328P-ROW-6.1.dwg - Revised by <DDILAY> : Thu, Dec 18 2025 - 12:18pm



NOTE:

1. ALL GRANULAR MATERIALS TO BE COMPACTED TO 100% STANDARD PROCTOR DENSITY.
2. LONGITUDINAL ROADSIDE DITCH GRADES SHALL BE A MINIMUM OF 0.5% OR A MAXIMUM OF 5.0%
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*NOTE: LAYOUT IS SCHEMATIC ONLY, DETAILS TO BE PROVIDED AT DETAILED DESIGN STAGE.

FSSR	UDORA ESTATES			INTERIM 23m R.O.W. WITH LINED FILTRATION TRENCH	
SCS consulting group ltd 30 CENTURIAN DRIVE, SUITE 100 MARKHAM, ONTARIO L3R 8B8 TEL: (905) 475-1900 FAX: (905) 475-8335	DESIGNED BY: J.S.	CHECKED BY: S.K.		PROJECT No: 2328	FIGURE No: 6.2
	SCALE: 1:100	DATE: JANUARY 2026			

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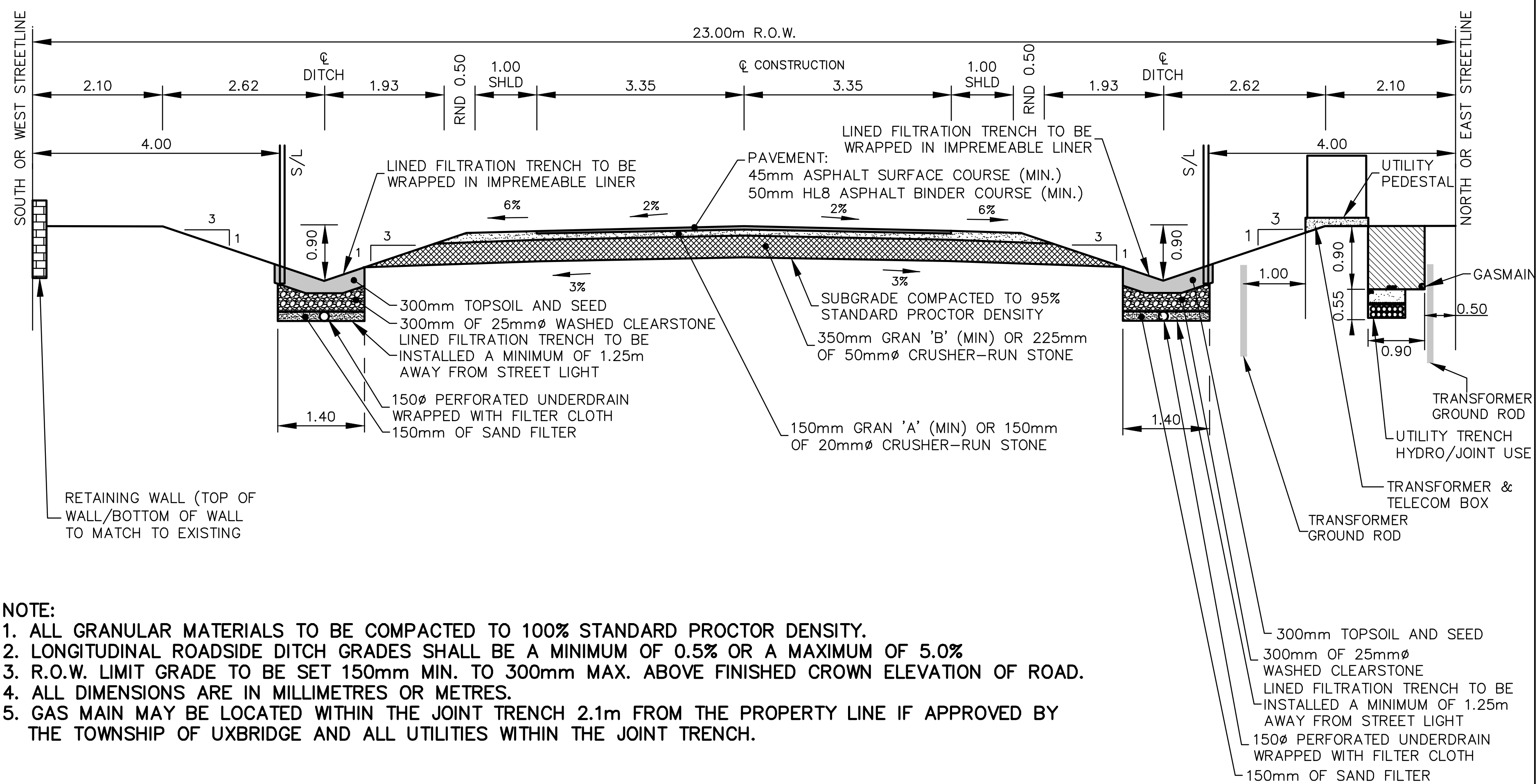

NOTE:

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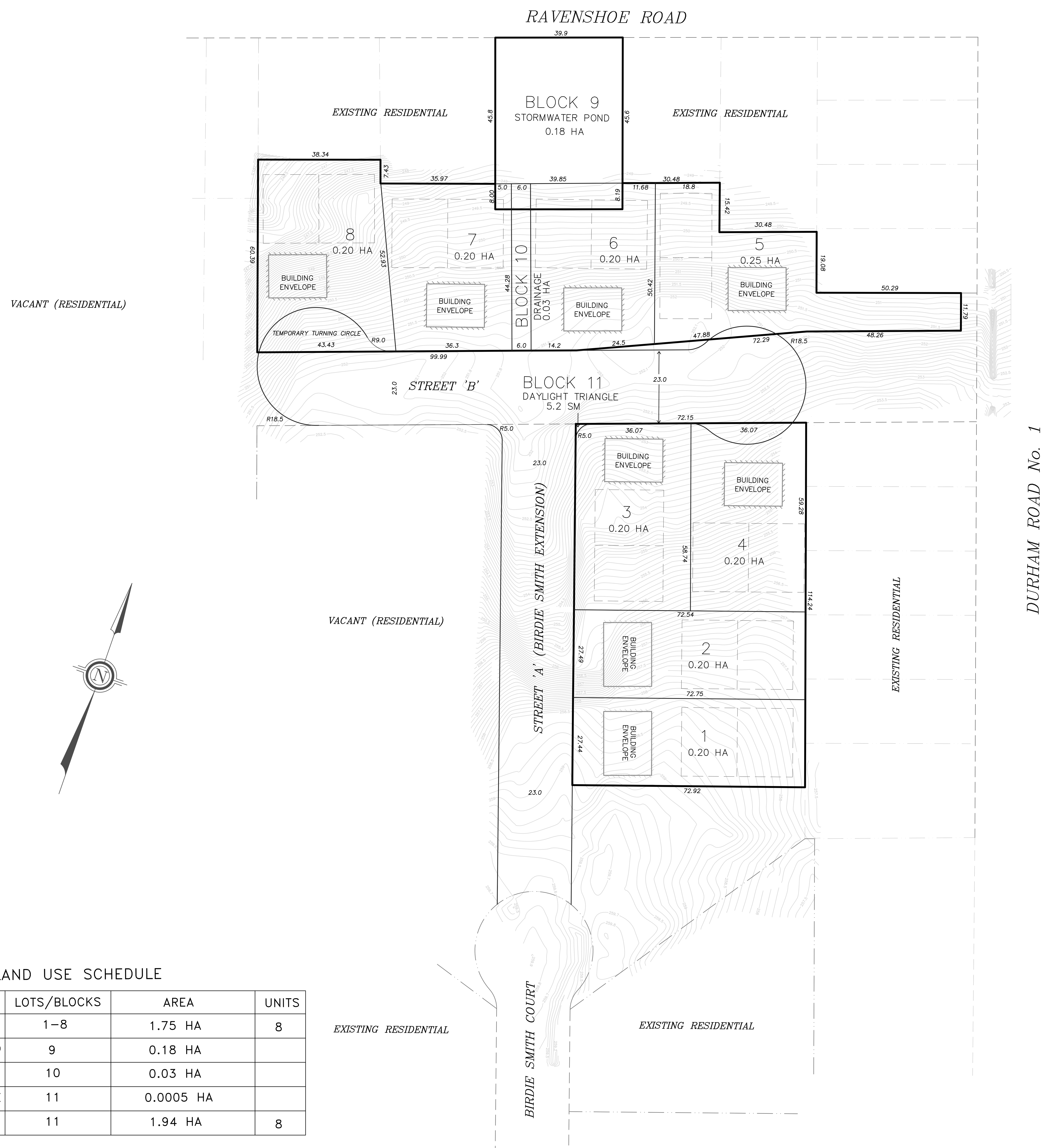
5. GAS MAIN MAY BE LOCATED WITHIN THE JOINT TRENCH 2.1m FROM THE PROPERTY LINE IF APPROVED BY THE TOWNSHIP OF UXBRIDGE AND ALL UTILITIES WITHIN THE JOINT TRENCH.

*NOTE: LAYOUT IS SCHEMATIC ONLY, DETAILS TO BE PROVIDED AT DETAILED DESIGN STAGE.

FSSR	UDORA ESTATES		ULTIMATE 23m R.O.W. WITH LINED FILTRATION TRENCH	
SCS consulting group ltd — 30 CENTURIAN DRIVE, SUITE 100, MARKHAM, ONTARIO L3R 8B8, TEL: (905) 475-1900, FAX: (905) 475-8335	DESIGNED BY: J.S.	CHECKED BY: S.K.	PROJECT No: 2328	FIGURE No: 6.3
	SCALE: 1:100	DATE: JANUARY 2026		

File: P:\2328 Udora Estates\Drawings\FSP\Fig\Report Figures\2328P-ROW-6.2.dwg – Revised by <JZHANG> : Thu, Jan 09 2025 – 11:30am

Appendix A Draft Plan



LAND USE SCHEDULE

LAND USE	LOTS/BLOCKS	AREA	UNITS
DETACHED (90'+)	1–8	1.75 HA	8
STORMWATER POND	9	0.18 HA	
DRAINAGE BLOCK	10	0.03 HA	
DAYLIGHT TRIANGLE	11	0.0005 HA	
TOTAL	11	1.94 HA	8

DRAFT PLAN OF SUBDIVISION

FILE NO. ____________________

PART OF LOT 3
PLAN 40M–2318

LOTS 94, 95, 114 & BLOCK "A"
AND PART OF LOTS 92, 93, 96,
108, 109, 110, 111, 112, 113,
115, 117, 118, 119, 120, 121 &129

PART OF CHURCH STREET
(CLOSED BY BY–LAW No. 98–022, AS IN INSTRUMENT No. D512150)
REGISTERED PLAN 64

TOWNSHIP OF UXBRIDGE
REGIONAL MUNICIPALITY OF DURHAM

OWNER'S AUTHORIZATION

I HEREBY AUTHORIZE FLAGSHIP DEVELOPMENT GROUP TO PREPARE AND SUBMIT THIS DRAFT PLAN OF SUBDIVISION FOR APPROVAL.

SIGNED ____________________ DATE __________

JOHN COOPER
2695867 ONTARIO INC.

SURVEYOR'S CERTIFICATE

I HEREBY CERTIFY THAT THE BOUNDARIES OF THE LANDS TO BE SUBDIVIDED AS SHOWN ON THIS PLAN AND THEIR RELATIONSHIP TO ADJACENT LANDS ARE CORRECTLY AND ACCURATELY SHOWN.

SIGNED ____________________ DATE __________

TED GARDEN, OLS
E.R. GARDEN LIMITED

ADDITIONAL INFORMATION

UNDER SECTION 51(17) OF THE PLANNING ACT, INFORMATION REQUIRED BY CLAUSES A,B,C,D,E,F,G,J,L ARE SHOWN ON DRAFT AND KEY PLANS.

H) PRIVATE WELLS
I) SANDY SILT
K) PRIVATE SEPTIC

DATE	REVISION	DWG
DECEMBER 11, 2025	REVISED SUBMISSION	DP–1
JANUARY 20, 2025	ORIGINAL SUBMISSION	DP–1

	DATE	SCALE	DRAWING
FLAGSHIP DEVELOPMENT GROUP	DEC 11/25	1:500	DP–1

Appendix B Background Information

Soil Engineers Ltd.
CONSULTING ENGINEERS
GEOTECHNICAL • ENVIRONMENTAL • HYDROGEOLOGICAL • BUILDING SCIENCE
90 WEST BEAVER CREEK ROAD, SUITE 100, RICHMOND HILL, ONTARIO L4B 1E7 · TEL: (416) 754-8515 · FAX: (905) 881-8335

BARRIE	MISSISSAUGA	OSHAWA	NEWMARKET	MUSKOKA	HAMILTON
TEL: (705) 721-7863	TEL: (905) 542-7605	TEL: (905) 440-2040	TEL: (905) 853-0647	TEL: (705) 721-7863	TEL: (905) 777-7956
FAX: (705) 721-7864	FAX: (905) 542-2769	FAX: (905) 725-1315	FAX: (905) 881-8335	FAX: (705) 721-7864	FAX: (905) 542-2769

A REPORT TO
J & J DEVELOPMENTS

A GEOTECHNICAL INVESTIGATION FOR PROPOSED RESIDENTIAL DEVELOPMENT

NORTH OF BIRDIE SMITH COURT
(PART OF LOT 35, CONCESSION 6)

TOWNSHIP OF UXBRIDGE (UDORA)

REFERENCE NO. 2209-S119

NOVEMBER 2025
(REVISION TO REPORT DATED NOVEMBER 2022)

DISTRIBUTION

Digital Copy - J & J Developments
Digital Copy - Soil Engineers Ltd. (Oshawa)

TABLE OF CONTENTS

TABLES

ENCLOSURES

1.0 INTRODUCTION

In accordance with the written authorization from Mr. John Cooper of J & J Developments, dated July 11, 2022, a geotechnical investigation was carried out on a parcel of vacant land at the north of Birdie Smith Court (Part of Lot 35, Concession 6) in the Township of Uxbridge (Udora).

Previous investigations were completed for the subject site and the following reports are provided for our review:

- *Sewage Impact Assessment (D-5-4) and Water Supply Study (D-5-5) completed by WSP Canada Inc. (WSP) dated June 21, 2019.*
- *Phase Two Environmental Site Assessment completed by WSP dated December 21, 2016.*

The purpose of the supplementary investigation is to reveal the subsurface conditions and to determine the engineering properties of the disclosed soils for the design and construction of the proposed residential development. The geotechnical findings and resulting recommendations are presented in this Report.

2.0 SITE AND PROJECT DESCRIPTION

The subject site, which is identified as "Part of Lot 35, Concession 6", is situated in a rural community of Udora within The Township of Uxbridge. The site is situated on the Newmarket Till, consisting of sandy silt to silty sand till.

The subject site is irregular in shape and encompasses a total area of approximately 2 hectares. It is situated to the north of Birdie Smith Court, to the southwest of Ravenshoe Road and Durham Road No. 1. It has a legal description of "Part of Registered Plan 64 and Part of Plan 40M-2318, Township of Uxbridge". At the time of investigation, the site was a vacant land covered with grass, brush and trees. The existing site gradient is relatively flat with minor undulations.

It is understood that the site will be developed into multiple residential dwellings with municipal roads and services meeting the Town/Region standards. Details of the development, however, are not available for review at the time of report preparation.

3.0 FIELD WORK

The field work, consisting of two (2) supplementary boreholes extending to a depth of 6.4 m and 6.5 m below the prevailing ground surface, was carried out on August 24, 2022. The locations of both boreholes are shown on the Borehole Location Plan, Drawing No. 1. The supplementary boreholes were labelled in 100-series to differentiate from the previous borehole investigations carried out by WSP.

The boreholes were advanced at intervals to the sampling depths by a track-mounted machine using solid stem augers and equipped with split spoon sampler for soil sampling. Standard Penetration Tests, using the procedures described on the enclosed "List of Abbreviations and Terms", were performed at the sampling depths. The test results are recorded as the Standard Penetration Resistance (or 'N' values) of the subsoil. The relative density of the non-cohesive strata and the consistency of the cohesive strata are inferred from the 'N' values. Split-spoon samples were recovered for soil classification and laboratory testing. The field work was supervised and the findings were recorded by the Geotechnical Technician.

The ground elevation at each borehole and monitoring well location was determined using hand-held Global Navigation Satellite System (GNSS) survey equipment.

4.0 SUBSURFACE CONDITIONS

All boreholes were carried out on the open field, which revealed that beneath a layer of topsoil and sand fill in places, the site is generally underlain by silty sand till/sandy silt till deposits with layers of sands and silts within the depths of investigation.

Detailed descriptions of the encountered subsurface conditions are presented on the Borehole Logs, comprising Figures 1 and 2. Borehole Logs from previous investigations are also included in the Appendix A of this report. The engineering properties of the disclosed soils are discussed herein.

4.1 **Topsoil** (All Boreholes)

A layer of topsoil, approximately 10 to 60 cm in thickness, was contacted at the ground surface in all boreholes. Thicker topsoil may be encountered in treed areas or localized low-lying areas beyond the borehole locations.

4.2 **Sand Fill** (MW17-1 and MW17-3)

A layer of sand fill was contacted below the topsoil in MW17-1 and MW17-3. It extends to a depth of 1.2 m and 1.5 m below grade, respectively. The obtained 'N' values are 4, 8, 13 and 23 blows per 30 cm of penetration, showing the sand fill is compact at lower depth while being loose near the ground surface.

4.3 **Sandy Silt Till/Silty Sand Till** (All Boreholes)

The sandy silt till and/silty sand till deposits predominates the soil stratigraphy within the depth of investigation. They generally consist of a random mixture of soil particles ranging from clay to gravel, with sand and silt being the dominant fraction. Occasional layers of clayey silt and sand can be found interbedded within the till deposits. Grain size analysis was performed on 1 representative sample of sandy silt till, and the result is plotted on Figure 3.

The recorded 'N' values range from 7 to over 100 blows, with a median of 34 blows per 30 cm of penetration, indicating the till is loose to very dense, being generally dense in relative density. The low 'N' values were contacted near the ground surface, likely being disturbed by weathering process.

The natural water content values range from 8% to 25%, with a median of 9%, indicating the silt till is generally in moist conditions. High water content is contacted near ground surface, likely an indication of higher organic content due to rootlet penetration, topsoil and weathering.

The engineering properties of the till deposits are presented below:

- Highly frost susceptible and low water erodibility.
- In excavation, the till will generally be stable in relatively steep cut; however, prolonged exposure of an excavated slope may be prone to localized sloughing.

4.4 **Silty Sand/Sandy Silt** (Boreholes 1, 3 and 102)

Native sandy silt deposit was encountered near the ground surface in Boreholes 1 and 3 while a layer of silty sand was contacted within the sandy silt till in Borehole 102. Grain size analysis was performed on 1 representative sample of the silty sand deposit and the result is plotted on Figure 4.

The recorded 'N' values range from 6 to 18, with a median of 10 blows per 30 cm of penetration, indicating the silty sand/sandy silt is lose to compact, generally compact in relative density.

The natural water content was determined for the silty sand samples in Borehole 102, which has a value of 17% and 21%, indicating the silty sand is wet. According to WSP, the sandy silt deposit found in Boreholes 1 and 3 is in moist condition.

The engineering properties of the silty sand/sandy silt deposits are presented below:

- High frost susceptibility and high water erodibility.
- Where the silty sand and sandy silt is wet, they are susceptible to impact disturbance, which may result in reduction in shear strength.
- In excavation, the sand and silt will slough readily and run with water seepage, if any, and will boil with a piezometric head of about 0.3 m.

4.5 **Sand** (Boreholes 2, MW2, MW3, MW17-1 and MW17-2)

Native sand deposit was contacted near the ground surface in Boreholes 2, MW3 and MW17-2. A lower sand deposit was also contacted in MW2 and MW17-1. Based on the description in WSP's Borehole Logs, the sand is generally fine to coarse grained with a trace to some gravel.

The obtained 'N' values ranged from 6 to over 100, with a median of 36 blows per 30 cm of penetration. This indicates the relative density of the sand deposit is loose to very dense, being generally dense. The loose sand was contacted in MW17-2 near the ground surface, likely being disturbed or weakened from weathering as a trace to some organics were identified by WSP.

The engineering properties of the sand deposit are presented below:

- Low frost susceptibility and high water erodibility.
- In excavation, the sand will slough readily to its angle of repose and run with water seepage, if any, and will boil with a piezometric head of about 0.3 m.

5.0 GROUNDWATER CONDITION

The boreholes, namely Boreholes 1, 2, 3, MW1 and MW2, were checked for the presence of groundwater and the occurrence of cave-in upon completion of drilling. They were dry and open with no occurrence of cave-in.

Subsequently, the groundwater levels were recorded in the monitoring wells (MW1, MW2, MW3, MW17-1, MW17-2 and MW17-3) and the recorded groundwater data are included in Appendix A. The groundwater levels in monitoring wells are summarized in Table 1.

Table 1 - Groundwater Levels in Monitoring Wells

MW No.	Ground El. (m)	Aug. 3, 2016		Aug. 10, 2016		Apr. 2, 2019		May 14, 2019	
		Depth (m)	El. (m)	Depth (m)	El. (m)	Depth (m)	El. (m)	Depth (m)	El. (m)
MW1	252.7	10.3	242.4	-	-	-	-	-	-
MW2	253.5	13.2	240.3	13.6	239.9	-	-	-	-
MW3	259.8	7.0	252.8	7.2	252.6	-	-	-	-
MW17-1	250.2	-	-	-	-	0.4	249.8	0.2	250.0
MW17-2	251.8	-	-	-	-	1.4	250.4	0.6	250.2
MW17-3	250.8	-	-	-	-	1.6	249.2	0.7	250.1

6.0 DISCUSSION AND RECOMMENDATIONS

All boreholes were carried out on the open field, which revealed that beneath a layer of topsoil and sand fill in places, the site is generally underlain by silty sand till/sandy silt till deposits with layers of sands and silts within the depths of investigation.

The groundwater levels were recorded at depths of between El. 252.8 m and El. 239.9 m in the monitoring wells. Based on the natural water content of the borehole samples and groundwater level results, the recorded high groundwater levels, measured at MW17-1, MW17-2 and MW17-3, may represent the presence of localized perched water in the sand and silt seams/layers and is subject to seasonal fluctuations.

It is understood that the site will be developed into multiple residential dwellings with municipal roads and services meeting the Town/Region standards. Details of the development, however, are not available for review at the time of report preparation. The geotechnical findings warranting special consideration for the proposed development are presented below:

1. The topsoil should be removed prior to site grading. It can only be reused for landscaping purposes. Any surplus must be disposed off site.
2. In areas where earth fill is required to raise the site, the earth fill can be placed in an engineered manner for building foundations, underground services, slab-on-grade and pavement construction.
3. The proposed structures can be supported on conventional spread and strip footings founded on sound native soils or engineered fill at the designed bearing level. The footing subgrade must be inspected by either the geotechnical engineer, or the geotechnical technician under the supervision of the geotechnical engineer.
4. In conventional design, the foundation wall must be damp-proofed and provided with a perimeter subdrain at wall base, connected to a positive outlet.
5. A Class 'B' bedding, consisting of compacted 19-mm Crusher-Run Limestone (CRL), or equivalent, is recommended for construction of the underground services.

The recommendations appropriate for the project described in Section 2.0 are presented herein. One must be aware that the subsurface conditions may vary between boreholes. Should this become apparent during construction, the geotechnical engineer must be consulted to determine whether the following recommendations require revision.

6.1 Site Preparation

In areas where earth fill is required to raise the site, the earth fill should be placed in an engineered manner for building foundations, underground services, slab-on-grade and pavement construction. The engineering requirements for a certifiable fill are presented below:

1. Topsoil, vegetation and organic-containing material must be removed.
2. Any existing earth fill and/or weathered soils should be subexcavated, sorted free of topsoil/organic inclusions and any deleterious materials, before reusing for engineered fill construction. The exposed subgrade must be inspected and proof-rolled prior to any fill placement.
3. Inorganic soils must be used for engineered fill construction, and they must be uniformly compacted to at least 98% Standard Proctor maximum dry density (SPMDD) up to the proposed finished grade in lifts no more than 20 cm thick. The soil moisture must be

properly controlled on the near the optimum. If the footings are to be built soon after the fill placement, the densification process for the engineered fill must be increased to 100% SPMDD.

4. If imported fill is to be used, it should be inorganic soils, free of any deleterious material with environmental issue (contamination). Any potential imported earth fill from off site must be reviewed for geotechnical and environmental quality by the appropriate personnel as authorized by the developer or agency, before it is hauled to the site.
5. If the engineered fill is to be left over the winter months, adequate earth cover, or equivalent, must be provided for protection against frost action.
6. The engineered fill must not be placed during the period when freezing ambient temperatures occur either persistently or intermittently. This is to ensure that the fill is free of frozen soils, ice and snow.
7. The engineered fill must extend over the entire graded area, and the engineered fill envelope must be clearly and accurately defined in the field and precisely documented by qualified surveyors.
8. The edge of the engineered fill must be maintained at a gradient flatter than 3H:1V, so that it is suitable for safe operation of the compactor and the required compaction can be achieved.
9. The fill operation must be supervised and monitored on a full-time basis by the geotechnical technician under the guidance of the geotechnical engineer.
10. The footing and underground services subgrade must be inspected by the geotechnical consulting firm that supervised the engineered fill placement. This is to ensure that the foundations are placed within the engineered fill envelope, and the integrity of the fill has not been compromised by interim construction, environmental degradation and/or disturbance by the footing excavation.
11. Any excavation carried out in certified engineered fill must be reported to the geotechnical consultant who supervised the fill placement in order to document the locations of excavation and/or to supervise reinstatement of the excavated areas to engineered fill status. If construction on the engineered fill does not commence within a period of 2 years from the date of certification, the condition of the engineered fill must be assessed for recertification.
12. Despite stringent control in the placement of the engineered fill, variations in soil type and density may occur in the engineered fill. Therefore, the building foundation must be properly reinforced and designed by structural engineer for the project; an abrupt differential settlement of 15 mm should be considered in the design of the foundation.

6.2 **Foundations**

The proposed structures can be supported on conventional spread and strip footings founded on native soil or engineered fill. The recommended design bearing pressures for the design of conventional spread and strip footings at the Ultimate Limit State (ULS) and Serviceability Limit State (SLS) are provided below:

- Maximum Soil Bearing Pressure at SLS = 150 kPa
- Factored Ultimate Bearing Pressure at ULS = 250 kPa

The total and differential settlements of foundations designed with the recommended bearing pressures at SLS are estimated to be 25 mm and 20 mm, respectively.

During construction, the foundation subgrade should be inspected by either the geotechnical engineer or the senior geotechnical technician to ensure that the revealed conditions are compatible with the foundation design requirements.

Where water seepage is evident or the foundation subgrade is wet, the footings must be poured with concrete immediately after the subgrade inspection. Alternatively, a mud slab of 8 to 10 cm should be provided at the bearing surface.

Footings exposed to weathering or in unheated areas should have at least 1.5 m of earth cover for protection against frost action.

The building foundation must meet the requirements specified in the latest Ontario Building Code, and the proposed structures should be designed to resist an earthquake force using Site Classification ‘D’ (stiff soil).

6.3 **Basement Construction**

The basement walls should be designed to sustain the lateral earth pressure calculated using the soil parameters stated in Section 6.7. Any applicable surcharge loads adjacent to the proposed basement must also be considered.

In conventional design, perimeter subdrains and damp-proofing of the basement walls will be required, as shown on Drawing No. 2. The subdrains should be encased in a fabric filter to protect them against blockage by silting and connected to positive outlets. Where in-situ soil is used for foundation wall backfill, prefabricated drainage boards should be used along the basement walls.

The subgrade for conventional slab-on-grade construction should consist of sound native soil or properly compacted inorganic earth fill. In preparation of the subgrade, it should be inspected and assessed by proof-rolling prior to slab-on-grade construction.

The concrete slab should be constructed on granular bedding, consisting of 19-mm CRL, or equivalent, having a minimum thickness of 15 cm and compacted to 100% SPMDD.

6.4 Underground Services

The subgrade for the underground services should consist of sound native soil or properly compacted inorganic earth fill. In areas where loose subgrade or soft spots are encountered, they should be subexcavated and replaced with bedding material, properly compacted to at least 98% SPMDD.

A Class ‘B’ granular bedding, consisting of compacted 19-mm CRL, or equivalent, is recommended for construction of underground services.

Openings to subdrains and catch basins should be shielded with a fabric filter to prevent silting. The pipe joints connected into the manholes and catch basins should be leak-proof or wrapped with an appropriate waterproof membrane. This is to prevent migration of fines due to leakage, leading to weakening of subgrade support and settlement of underground services.

In order to prevent pipe floatation when the underground services trench is deluged with water, a soil cover of at least two times the diameter of the pipe should be in place at all times after completion of the pipe installation.

The service pipes and metal fittings should be protected against corrosion. In determining the mode of protection, an estimated electrical resistivity of the disclosed soil types can be used. The proposed anode weight must meet the minimum requirements as specified by Town Standard.

6.5 Backfilling in Trenches and Excavation Areas

The on-site inorganic soils are generally suitable for structural backfill. They should be sorted free of any organics or other deleterious material, if any prior to backfilling. Any oversized boulder (over 15 cm in size) should not be used for backfill.

The backfill in-service trenches or beside foundation walls should be compacted to at least 95% SPMDD. In the zone within 1.0 m below the pavement or slab-on-grade, the backfill should be compacted to at least 98% SPMDD, with the water content 2% to 3% drier than the optimum moisture content. The lift of each backfill layer should be limited to a thickness of 20 cm.

In normal construction practice, the problem areas of ground settlement largely occur adjacent to foundation walls, columns, manholes, catch basins and services crossings. In areas which are inaccessible to a heavy compactor, granular backfill should be used so that compaction can be achieved with light-duty vibratory compactor.

6.6 Pavement Design

The recommended pavement design for rural local road is presented in Table 2.

Table 2 - Pavement Design

<table>
<tr><th>Course</th><th colspan="2">Thickness (mm)</th><th colspan="2">OPS Specifications</th></tr>
<tr><td>Asphalt Surface</td><td colspan="2">45</td><td colspan="2">HL3</td></tr>
<tr><td>Asphalt Binder</td><td colspan="2">50</td><td colspan="2">HL8</td></tr>
<tr><td>Granular Base</td><td colspan="2">150</td><td colspan="2">Granular ‘A’ or 20-mm CRL</td></tr>
<tr><td>Granular Sub-base</td><td>350</td><td>225</td><td>Granular ‘B’</td><td>50-mm CRL</td></tr>
</table>

Prior to the placement of granular materials, the subgrade should be inspected and proof-rolled. Any soft spot or wet subgrade identified should be sub-excavated and replaced by inorganic soil or granular materials, compacted to at least 98% SPMDD, with the water content at 2% to 3% drier than the optimum moisture content. The lift of each backfill layer should be limited to a thickness of 20 cm. The granular base and sub-base should be compacted to 100% SPMDD.

Along the perimeter where surface runoff may drain onto the pavement, an intercept subdrain system should be installed to prevent infiltrating precipitation from seeping into the granular bases. The subdrains should consist of filter wrapped weepers connected into the catch basins and backfilled with free-draining granular material.

While shallow water is recorded in the monitoring wells, it is anticipated that the groundwater is likely within localized sandy silt/silty sand layers at deeper depths. During the construction of the roadway, groundwater condition is unlikely to pose any significant issue as the subgrade soil will consist of either compacted earth fill or native sandy silt till near ground surface.

6.7 Soil Parameters

The recommended soil parameters for the project design are given in Table 3.

Table 3 - Soil Parameters

Unit Weight and Bulk Factor	**Bulk Unit Weight (kN/m^3)**	**Estimated Bulk Factor Loose**	**Estimated Bulk Factor Compacted**
Sandy Silt Till/Silty Sand Till	22.5	1.25	1.00
Sand	20.5	1.20	0.98
Silty Sand/Sandy Silt	21.0	1.20	1.00
Lateral Earth Pressure Coefficients	**Active K_a**	**At Rest K_0**	**Passive K_p**
Sandy Silt Till/Silty Sand Till/Silty Sand/ Sandy Silt	0.33	0.50	3.00
Sand	0.30	0.45	3.30
Estimated Coefficients of Permeability (K) and Percolation Time (T)		**K (cm/sec)**	**T (min/cm)**
Sandy Silt Till/Silty Sand Till		10^{-6}	50
Silty Sand/Sandy Silt		10^{-5}	20
Sand		10^{-3} to 10^{-4}	8 to 12
Estimated California Bearing Ratio			
Sandy Silt Till/Silty Sand Till/Silty Sand/Sandy Silt		5%	
Sand		10%	

Table 3 - Soil Parameters (cont'd)

Estimated Electrical Resistivity	
Sandy Silt Till/Silty Sand Till/Silty Sand/Sandy Silt	4500 ohm.cm
Sand	6000 ohm.cm
Coefficients of Friction	
Between Concrete and Granular Base	0.50
Between Concrete and Sound Native Soil	0.35

6.8 Excavation

Excavation should be carried out in accordance with Ontario Regulation 213/91. The types of soils are classified in Table 4.

Table 4 - Classification of Soils for Excavation

Material	Type
Wet soils	4
Sand Fill/Compacted Earth Fill, Drained soils	3
Sandy Silt Till/Silty Sand Till	2

Based on the natural water content of the borehole samples and soil profile, it is our opinion that perched water exists within the burden. Any groundwater seepage is expected to be limited in quantity. In excavation, water seepage can be removed by conventional pumping from sumps.

Prospective contractors may be asked to assess the in-situ subsurface conditions for soil cuts by digging test pits to the intended bottom of excavation. The test pits should be allowed to remain open for a few hours to assess the trenching conditions.

7.0 LIMITATIONS OF REPORT

This report was prepared by Soil Engineers Ltd. for the account of J & J Developments, and for review by the designated consultants, financial institutions and government agencies. The material in the report reflects the judgement of Jonathan Fung, P.Eng., and Kin Fung Li, P.Eng., in light of the information available to it at the time of preparation.

Use of this report is subject to the conditions and limitations of the contractual agreement. Any use which a Third Party makes of this report, or any reliance on decisions to be made based on it, is the responsibility of such Third Party. Soil Engineers Ltd. accepts no responsibility for damages, if any, suffered by any Third Party as a result of decisions made or actions based on this report.

SOIL ENGINEERS LTD.

Jonathan Fung, P.Eng.

LICENSED PROFESSIONAL ENGINEER
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NOV 27, 2025
PROVINCE OF ONTARIO

Kin Fung Li, P.Eng.
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100169280
PROVINCE OF ONTARIO

LIST OF ABBREVIATIONS AND DESCRIPTION OF TERMS

The abbreviations and terms commonly employed on the borehole logs and figures, and in the text of the report, are as follows:

SAMPLE TYPES

AS Auger sample
CS Chunk sample
DO Drive open (split spoon)
DS Denison type sample
FS Foil sample
RC Rock core (with size and percentage recovery)
ST Slotted tube
TO Thin-walled, open
TP Thin-walled, piston
WS Wash sample

PENETRATION RESISTANCE

Standard Penetration Resistance or 'N' Value:

The number of blows of a 63.5 kg hammer falling from a height of 76 cm required to advance a 51 mm outer diameter drive open sampler 30 cm into undisturbed soil, after an initial penetration of 15 cm.

Plotted as '○'

Dynamic Cone Penetration Resistance:

A continuous profile showing the number of blows per each 30 cm of penetration of a 51 mm diameter, 90° point cone driven by a 63.5 kg hammer falling from a height of 76 cm.

Plotted as '—•—'

WH Sampler advanced by static weight
PH Sampler advanced by hydraulic pressure
PM Sampler advanced by manual pressure
NP No penetration

SOIL DESCRIPTION

Cohesionless Soils:

'N' (blows/30 cm)	Compactness
0 to 4	very loose
4 to 10	loose
10 to 30	compact
30 to 50	dense
> 50	very dense

Cohesive Soils:

Undrained Shear Strength (kPa)	'N' (blows/30 cm)	Consistency
<12	<2	very soft
12 to <25	2 to <4	soft
25 to <50	4 to <8	firm
50 to <100	8 to <15	stiff
100 to 200	15 to 30	very stiff
>200	>30	hard

Method of Determination of Undrained Shear Strength of Cohesive Soils:

x 0.0 Field vane test in borehole; the number denotes the sensitivity to remoulding

△ Laboratory vane test

METRIC CONVERSION FACTORS

1 ft = 0.3048 m
1 inch = 25.4 mm
1 lb = 0.454 kg
1 ksf = 47.88 kPa

JOB NO.: 2209-S119

LOG OF BOREHOLE: BH-101

FIGURE NO.: 1

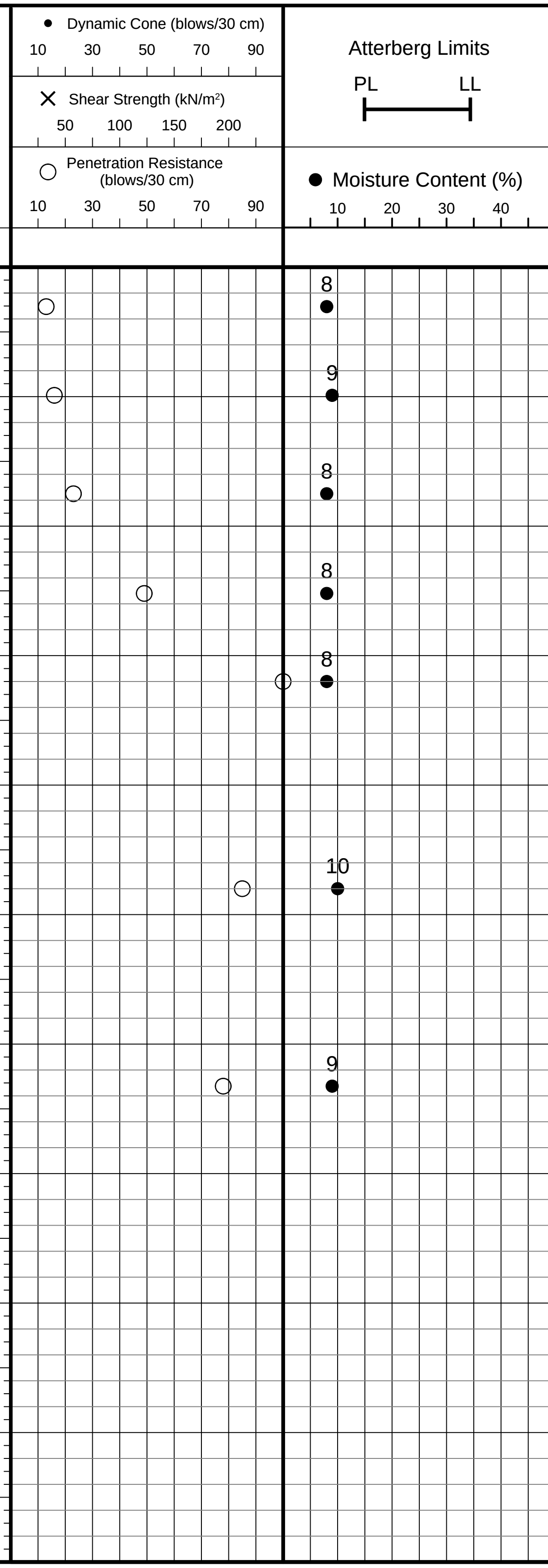
PROJECT DESCRIPTION: Proposed Residential Development

METHOD OF BORING: Solid Stem Augers

PROJECT LOCATION: North of Birdie Smith Court, Township of Uxbridge (Udora) (Part of Lot 35, Concession 6)

DRILLING DATE: October 5, 2022

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)	WATER LEVEL
253.4	Ground Surface					
0.0	**10 cm TOPSOIL**				0	
	Compact to very dense **SANDY SILT TILL** a trace of gravel occ. cobbles and boulders	1	DO	13		
		2	DO	16	1	
		3	DO	23	2	
		4	DO	49		
		5	DO	50/30	3	
	brown / grey	6	DO	85	4–5	
		7	DO	78	6	W.L. @ El. 247.6 m upon completion
246.8 / 6.5	**END OF BOREHOLE**				7–10	



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JOB NO.: 2209-S119

LOG OF BOREHOLE: BH-102

FIGURE NO.: 2

PROJECT DESCRIPTION: Proposed Residential Development

METHOD OF BORING: Solid Stem Augers

PROJECT LOCATION: North of Birdie Smith Court, Township of Uxbridge (Udora)
(Part of Lot 35, Concession 6)

DRILLING DATE: October 5, 2022

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Penetration Resistance (blows/30 cm)	Moisture Content (%)	WATER LEVEL
253.1 / 0.0	Ground Surface **40 cm TOPSOIL**						
	Brown, compact **SANDY SILT TILL** a trace of gravel occ. cobbles and boulders	1	DO	7	○	25	
		2	AS	24	○	9	
		3	DO	16	○	9	
251.0 / 2.1	Brown, loose to compact (wet) **SILTY SAND** occ. clay layers	4	DO	6	○	17	
		5	DO	17	○	21	
249.0 / 4.1	Brown, dense to very dense **SANDY SILT TILL** a trace of gravel occ. cobbles and boulders	6	DO	45	○	14	
		7	DO	50/28	○	16	W.L. @ El. 247.3 m upon completion
246.7 / 6.4	**END OF BOREHOLE**						

Legend: ● Dynamic Cone (blows/30 cm) 10 30 50 70 90; × Shear Strength (kN/m²) 50 100 150 200; ○ Penetration Resistance (blows/30 cm) 10 30 50 70 90; Atterberg Limits PL — LL; ● Moisture Content (%) 10 20 30 40

Depth Scale (m): 0 1 2 3 4 5 6 7 8 9 10

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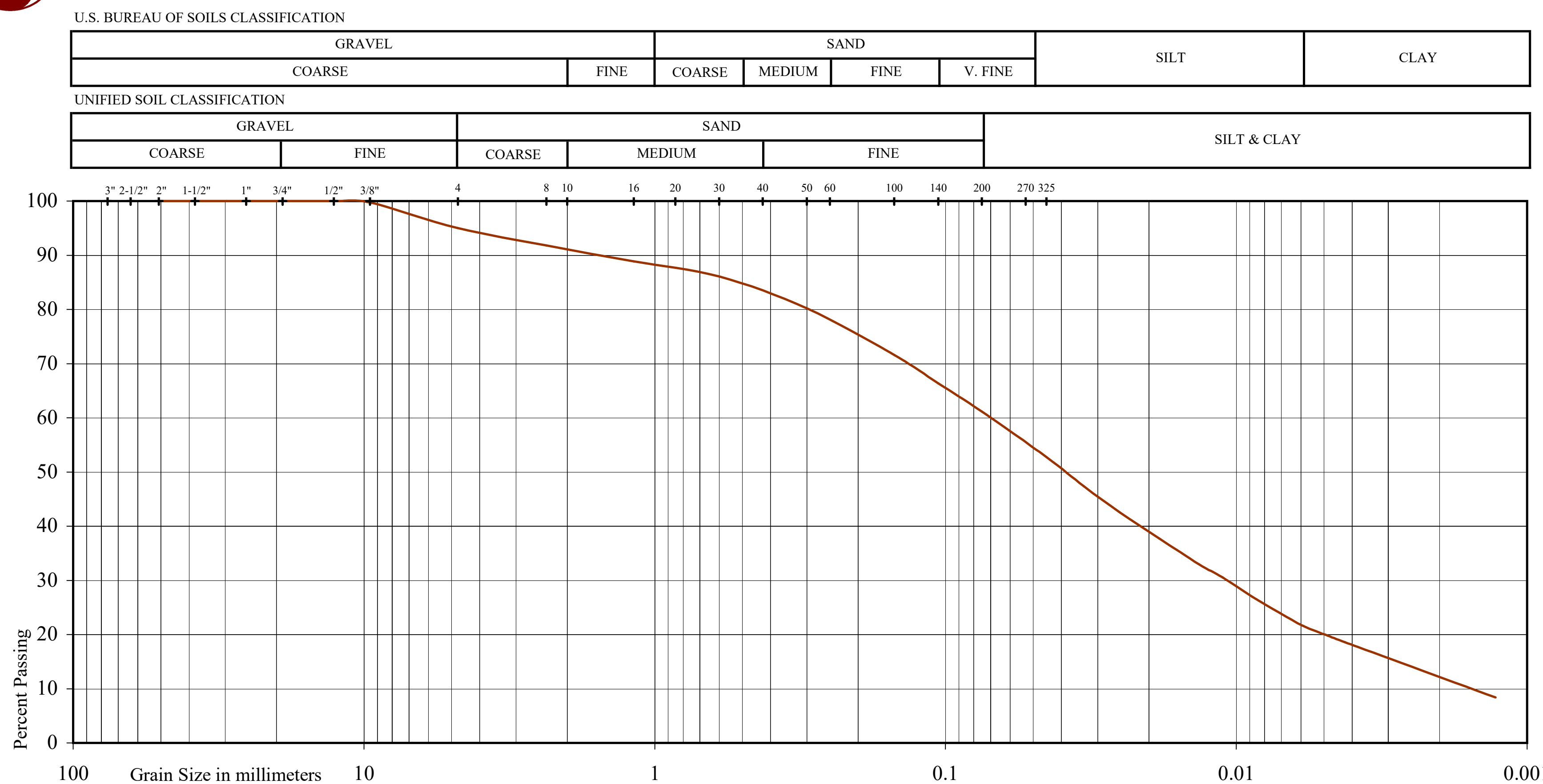
GRAIN SIZE DISTRIBUTION

Reference No: 2209 - S119



Project:	Proposed Residential Development		
Location:	North of Birdie Smith Court, Town of Uxbridge (Udora)	Liquid Limit (%) =	-
	(Part of Lot 35, Concession 6)	Plastic Limit (%) =	-
Borehole No:	101	Plasticity Index (%) =	-
Sample No:	4	Moisture Content (%) =	8
Depth (m):	2.5	Estimated Permeability	
Elevation (m):	250.9	(cm./sec.) =	10^{-6}

Classification of Sample [& Group Symbol]: SANDY SILT TILL
some clay, a trace of gravel

Figure: 3

Soil Engineers Ltd.

GRAIN SIZE DISTRIBUTION

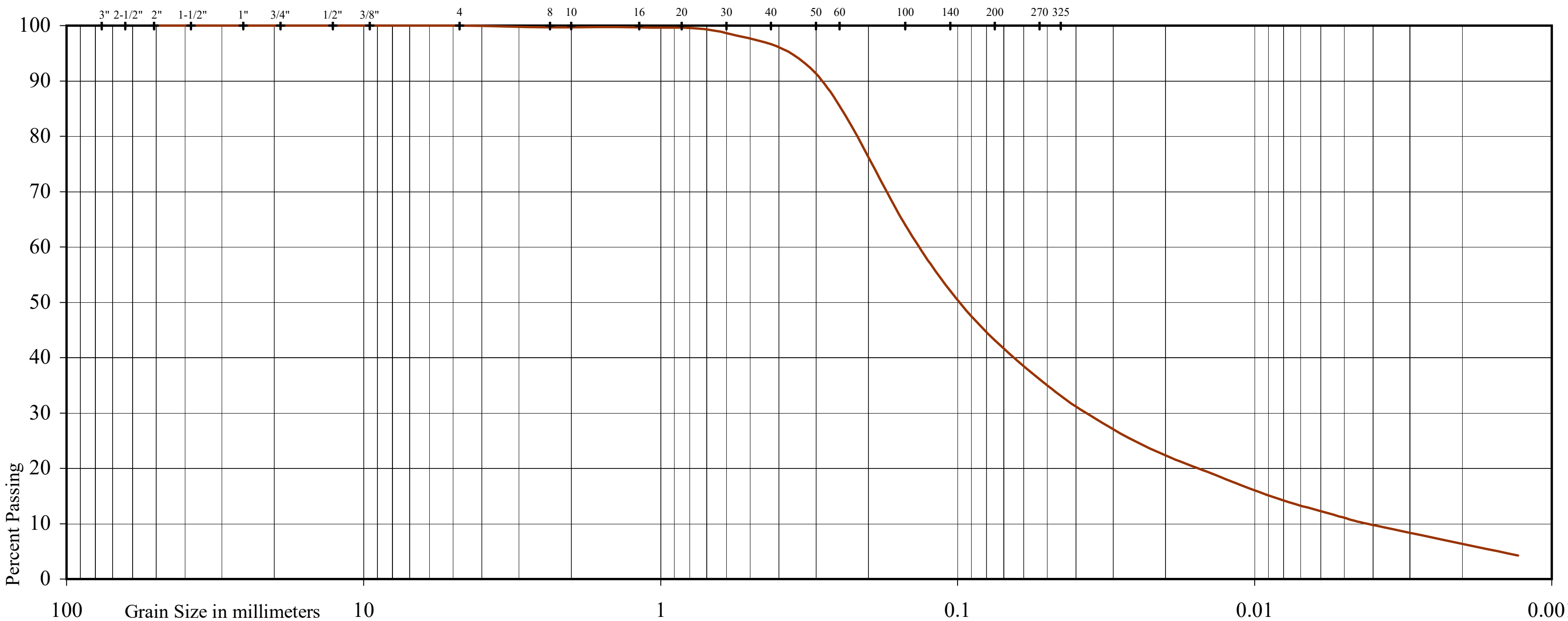
Reference No: 2209 - S119

U.S. BUREAU OF SOILS CLASSIFICATION

GRAVEL		SAND				SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	V. FINE		

UNIFIED SOIL CLASSIFICATION

GRAVEL		SAND			SILT & CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



Project: Proposed Residential Development

Location: North of Birdie Smith Court, Township of Uxbridge (Udora)

(Part of Lot 35, Concession 6)

Borehole No: 102

Sample No: 5

Depth (m): 3.3

Elevation (m): 249.8

Liquid Limit (%) = -

Plastic Limit (%) = -

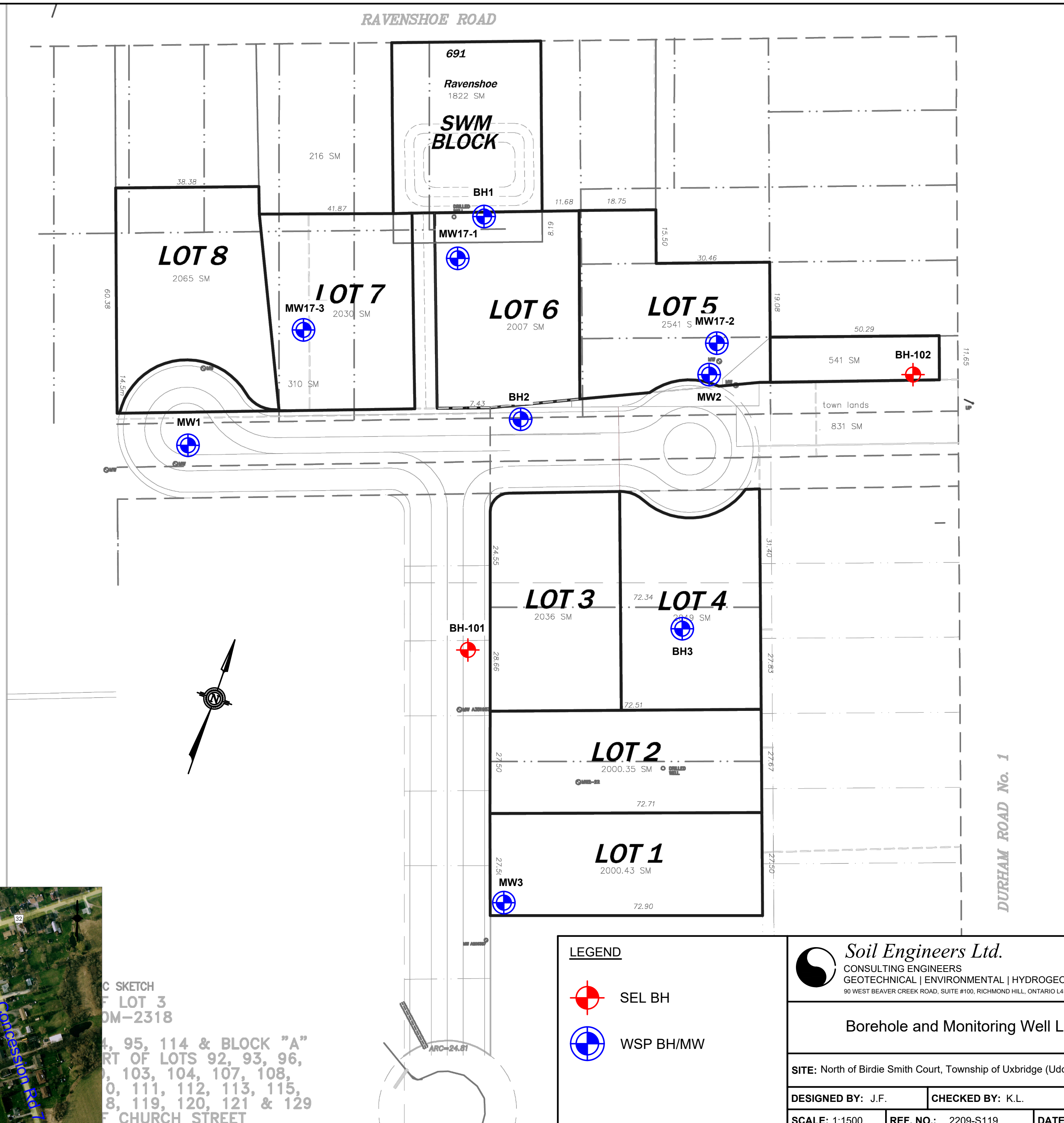
Plasticity Index (%) = -

Moisture Content (%) = 21

Estimated Permeability (cm./sec.) = 10^{-5}

Classification of Sample [& Group Symbol]: SILTY SAND
a trace of clay

Figure: 4



Key Plan (N.T.S.)

LEGEND

SEL BH

WSP BH/MW

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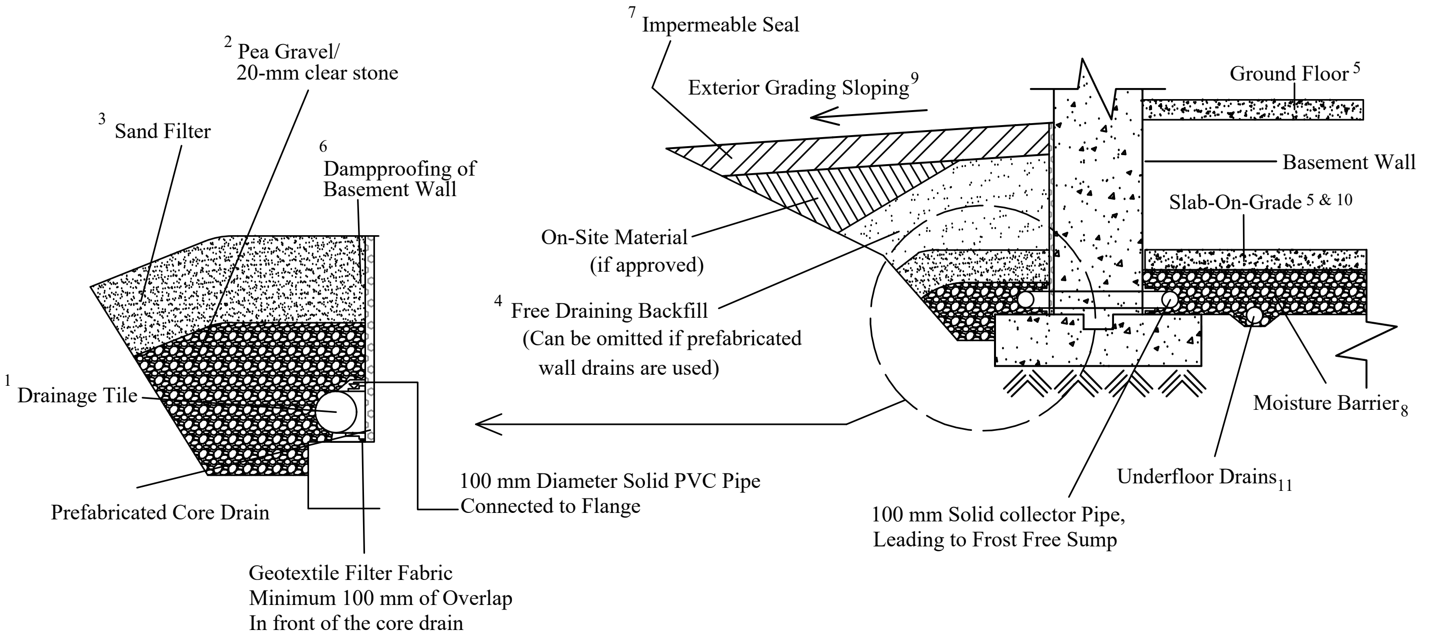
90 WEST BEAVER CREEK ROAD, SUITE #100, RICHMOND HILL, ONTARIO L4B 1E7 · TEL: (416) 754-8515 · FAX: (905) 881-8335

Borehole and Monitoring Well Location Plan

SITE: North of Birdie Smith Court, Township of Uxbridge (Udora)

DESIGNED BY: J.F.	**CHECKED BY:** K.L.	**DWG NO.:** 1

SCALE: 1:1500	**REF. NO.:** 2209-S119	**DATE:** November 2025	**REV** -



NOTES:

1. **Drainage tile**: consists of 100 mm (4") diameter weeping tile or equivalent perforated pipe leading to a positive sump or outlet. Invert to be at minimum of 150 mm (6") below underside of basement floor slab.

2. **Pea gravel**: at 150 mm (6") on the top and sides of drain. If drain is not placed on concrete footing, provide 100 mm (4") of pea gravel below drain. The pea gravel may be replaced by 20 mm clear stone provided that the drain is covered by a porous geotextile membrane of Terrafix 270R or equivalent.

3. **Filter material**: consists of C.S.A. fine concrete aggregate. A minimum of 300 mm (12") on the top and sides of gravel. This may be replaced by an approved porous geotextile membrane of Terrafix 270R or equivalent.

4. **Free-draining backfill**: OPSS Granular 'B' or equivalent, compacted to 95% to 98% (maximum) Standard Proctor dry density. Do not compact closer than 1.8 m (6') from wall with heavy equipment. This may be replaced by on-site material if prefabricated wall drains (Miradrain) extending from the finished grade to the bottom of the basement wall are used.

5. **Do not backfill** until the wall is supported by the basement floor slab and ground floor framing, or adquate bracing.

6. **Dampproofing** of the basement wall is required before backfilling

7. **Impermeable backfill seal** of compacted clay, clayey silt or equivalent. If the original soil in the vicinity is a free-draining sand, the seal may be omitted.

8. **Moisture barrier**: 20-mm clear stone or compacted OPSS Granular 'A', or equivalent. The thickness of this layer should be 150 mm (6") minimum.

9. **Exterior Grade**: slope away from basement wall on all the sides of the building.

10. **Slab-On-Grade** should not be structurally connected to walls or foundations.

11. **Underfloor drains*** should be placed in parallel rows at 6 to 8 m (20'-25') centre, on 100 mm (4") of pea gravel with 150 mm (6") of pea gravel on top and sides. The invert should be at least 300 mm (12") below the underside of the floor slab. The drains should be connected to positive sumps or outlets. Do not connect the underfloor drains to the perimeter drains.

*Underfloor drains can be deleted where not required.

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Details of Perimeter Drainage System

SITE North of Birdie Smith Court, Township of Uxbridge (Udora)			
DESIGNED BY K.L.	**CHECKED BY** B.S.	**DWG NO.** 2	
SCALE N.T.S.	**REF. NO.** 2209-S119	**DATE** November 2025	**REV** -

APPENDIX A

PREVIOUS BOREHOLE LOGS

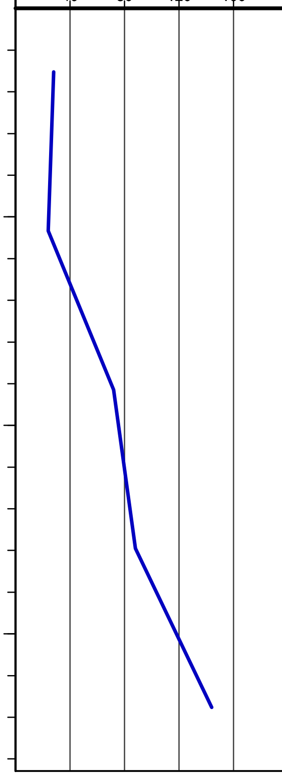
REFERENCE NO. 2209-S119

LOG OF BOREHOLE BH1

project | PART OF LOT 35 CONCESSION 6, UDORA, ONTARIO
project no. | 161-09454-00
client | TONI RISI, CAPRIS INVESTMENT LTD.
rig type | CME 75, track-mounted
date started | 2016/07/26
location | UDORA, ONTARIO
method | Solid stem augers, 150 mm dia.
supervisor | EJP
position | E: 644849 N: 4901848 (17T, Geodetic)
coring | *n/a*
reviewer | DAO

Depth Scale (m)	Elev / Depth (m)	STRATIGRAPHY	Graphic Plot	Number	Type	SPT N-Value / Core Recovery	Elevation Scale (mASL)	PID Readings	Well Details	Lab Data and Comments (GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL)
0	245.0	**GROUND SURFACE**								
		TOPSOIL: 200mm OF DARK BROWN TOPSOIL, SOME ORGANICS, MOIST		1	SS	7		0 ppm		
		SANDY SILT: BROWN SANDY SILT, SOME TO TRACE CLAY, LOOSE TO COMPACT, MOIST								
1				2	SS	6	244	0 ppm		...at 1.5m, slight odour in soil sample to 2.1m
2				3	SS	18	243	0 ppm		*SS3 chemistry:* M&I
	242.6 / 2.4	SILTY SAND TILL: BROWN SILTY SAND TILL, SOME GRAVEL, TRACE COBBLES, TRACE CLAY, MOIST, LOOSE TO DENSE		4	SS	22		0 ppm		
3				5	SS	36	242	0 ppm		...at 3.0m, slight odour in soil sample to 3.7m
	241.3 / 3.7	BOREHOLE TERMINATED AT 3.7m BELOW GROUND SURFACE IN SILTY SAND TILL.								

Penetration Test Values (Blows / 0.3m): × Dynamic Cone; 10, 20, 30, 40
Undrained Shear Strength (kPa): ○ Unconfined, + Field Vane, ● Pocket Penetrometer, ■ Lab Vane; 40, 80, 120, 160
Water Content (%) & Plasticity: PL, MC, LL; 10, 20, 30



END OF BOREHOLE

Borehole was dry and open upon completion.

LOG OF BOREHOLE BH2

WSP

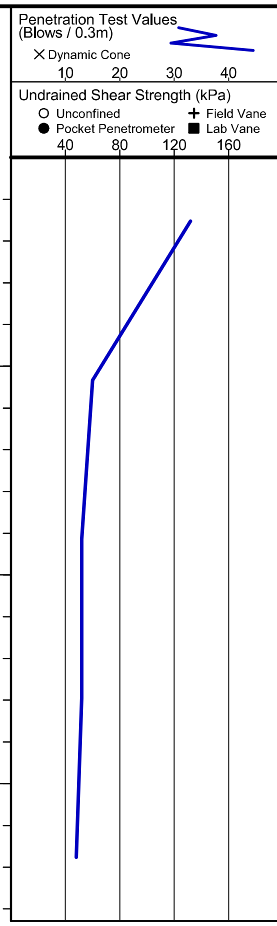
project |	PART OF LOT 35 CONCESSION 6, UDORA, ONTARIO			**project no. |**	161-09454-00
client |	TONI RISI, CAPRIS INVESTMENT LTD.	**rig type |**	CME 75, track-mounted	**date started |**	2016/07/26
location |	UDORA, ONTARIO	**method |**	Solid stem augers, 150 mm dia.	**supervisor |**	EJP
position |	E: 644893 N: 4901822 (17T, Geodetic)	**coring |**	*n/a*	**reviewer |**	DAO

SUBSURFACE PROFILE / SAMPLE

Depth Scale (m)	Elev Depth (m)	STRATIGRAPHY	Graphic Plot	Number	Type	SPT N-Value / Core Recovery	Elevation Scale (mASL)	PID Readings	Well Details	Lab Data and Comments
0	246.0	**GROUND SURFACE**								
	245.8 0.2	TOPSOIL: 500mm OF DARK BROWN TOPSOIL, SOME ORGANICS, MOIST								
		SAND: BROWN MEDIUM GRAINED SAND, TRACE CLAY, LOOSE TO COMPACT, MOIST		1	SS	33		0 ppm		
1	245.1 0.9	SANDY SILT TILL: BROWN SANDY SILT TILL, SOME TO TRACE CLAY, TRACE GRAVEL, MOIST, LOOSE		2	SS	15	245	0 ppm		*SS2 chemistry:* PAHs
2				3	SS	13	244	0 ppm		*SS3 chemistry:* PCBs
				4	SS	13		0 ppm		*SS4 chemistry:* M&I
3	243.1 2.9	SAND: BROWN MEDIUM GRAINED SAND, SOME GRAVEL, LOOSE, MOIST					243			
	242.8 3.2	SANDY SILT TILL: BROWN SANDY SILT TILL, SOME TO TRACE CLAY, TRACE GRAVEL, TRACE COBBLES, MOIST, LOOSE TO COMPACT		5	SS	12		0 ppm		*SS5 chemistry: CCME(F1-F4), BTEX, VOCs, PHCs*
	242.3 3.7	BOREHOLE TERMINATED AT 3.7m BELOW GROUND SURFACE IN SANDY SILT TILL.								

END OF BOREHOLE

Borehole was dry and open upon completion.



Water Content (%) & Plasticity: PL MC LL — 10 20 30

GRAIN SIZE DISTRIBUTION (%) (MIT): GR SA SI CL

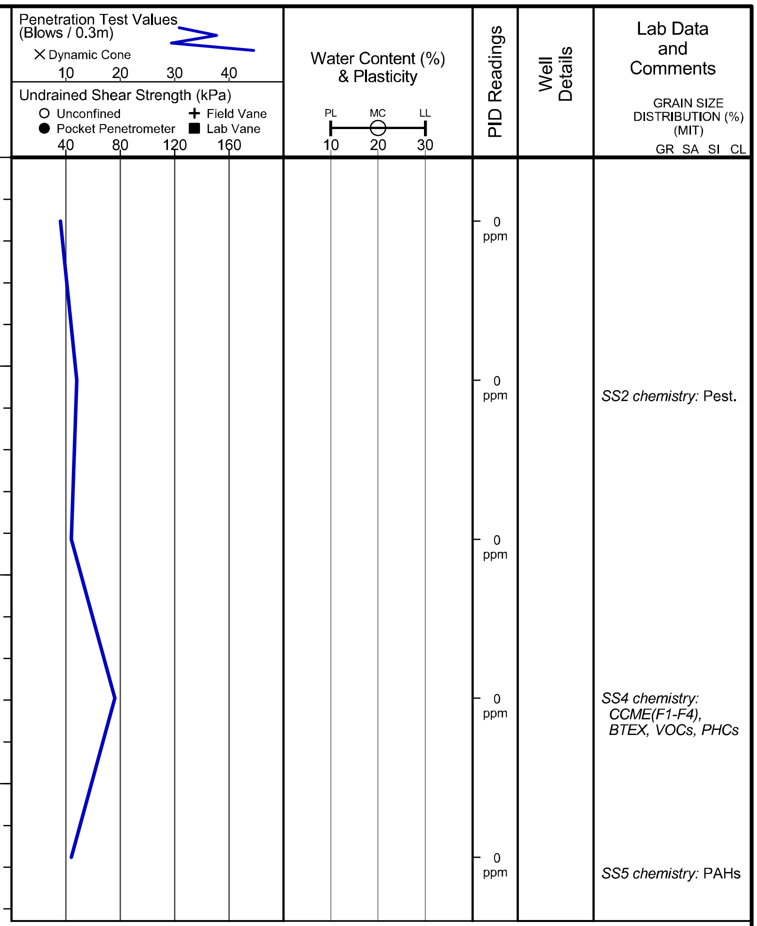
LOG OF BOREHOLE BH3

WSP

project |	PART OF LOT 35 CONCESSION 6, UDORA, ONTARIO			**project no. |**	161-09454-00
client |	TONI RISI, CAPRIS INVESTMENT LTD.	**rig type |**	CME 75, track-mounted	**date started |**	2016/07/26
location |	UDORA, ONTARIO	**method |**	Solid stem augers, 150 mm dia.	**supervisor |**	EJP
position |	E: 644929 N: 4901793 (17T, Geodetic)	**coring |**	*n/a*	**reviewer |**	DAO

SUBSURFACE PROFILE / SAMPLE

Depth Scale (m)	Elev / Depth (m)	STRATIGRAPHY	Number	Type	SPT N-Value / Core Recovery	Elevation Scale (mASL)	PID Readings	Lab Data and Comments
0	248.0	**GROUND SURFACE**				248		
	247.8 / 0.2	TOPSOIL: 600mm OF DARK BROWN TOPSOIL, SOME ORGANICS, MOIST						
		SANDY SILT: BROWN SANDY SILT TILL, SOME TO TRACE CLAY, MOIST, LOOSE	1	SS	9		0 ppm	
1			2	SS	12	247	0 ppm	*SS2 chemistry:* Pest.
2			3	SS	11	246	0 ppm	
	245.7 / 2.3	SANDY SILT TILL: BROWN SANDY SILT TILL, SOME CLAY, TRACE GRAVEL, MOIST, LOOSE	4	SS	19		0 ppm	*SS4 chemistry: CCME(F1-F4), BTEX, VOCs, PHCs*
3			5	SS	11	245	0 ppm	*SS5 chemistry:* PAHs
	244.3 / 3.7	BOREHOLE TERMINATED AT 3.7m BELOW GROUND SURFACE IN SANDY SILT TILL.						



END OF BOREHOLE

Borehole was dry and open upon completion.

LOG OF BOREHOLE MW1

project | PART OF LOT 35 CONCESSION 6, UDORA, ONTARIO — **project no. |** 161-09454-00

client | TONI RISI, CAPRIS INVESTMENT LTD. — **rig type |** CME 75, track-mounted — **date started |** 2016/07/25

location | UDORA, ONTARIO — **method |** Hollow stem augers, 215 mm dia. — **supervisor |** EJP

position | E: 644831 N: 4901800 (17T, Geodetic) — **coring |** *n/a* — **reviewer |** DAO

Elev / Depth (m)	STRATIGRAPHY
252.7	**GROUND SURFACE**
252.6 / 0.1	TOPSOIL: 300mm OF DARK BROWN TOPSOIL, SOME ORGANICS, MOIST
	SANDY SILT TILL: BROWN SANDY SILT TILL, SOME TO TRACE GRAVEL, SOME TO TRACE CLAY, TRACE COBBLES, MOIST TO WET, COMPACT
249.2 / 3.5	SAND: BROWN COARSE GRAINED SAND, SOME GRAVEL, LOOSE TO COMPACT, WET
248.9 / 3.8	SANDY SILT TILL: BROWN SANDY SILT TILL, SOME TO TRACE GRAVEL, SOME TO TRACE CLAY, TRACE COBBLES, MOIST TO WET, COMPACT

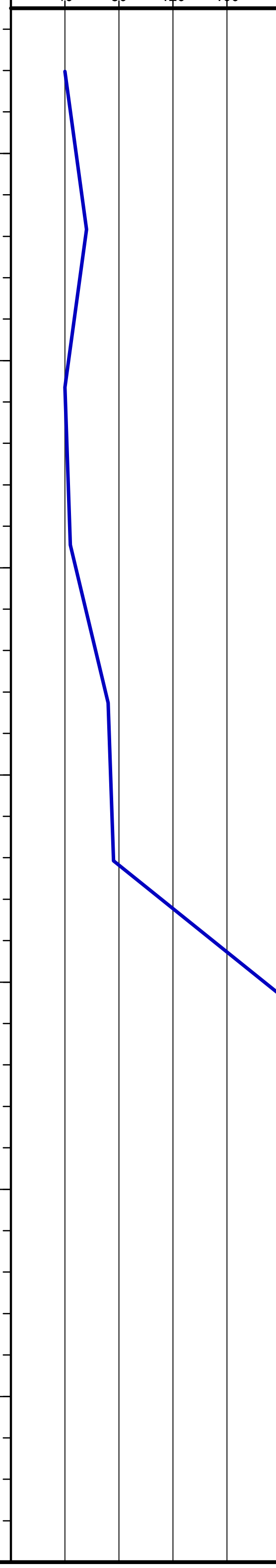
Sample Number	Type	SPT N-Value	PID Readings	Lab Data and Comments
1	SS	10	0 ppm	
2	SS	14	0 ppm	
3	SS	10	0 ppm	*SS3 chemistry:* M&I
4	SS	11	0 ppm	*SS4 chemistry:* Pest.
5	SS	18	0 ppm	
6	SS	19	0 ppm	
7	SS	90 / 225mm	0 ppm	
8	SS	50 / 50mm	0 ppm	

Penetration Test Values (Blows / 0.3m) — X Dynamic Cone: 10, 20, 30, 40

Undrained Shear Strength (kPa) — O Unconfined, + Field Vane, ● Pocket Penetrometer, ■ Lab Vane: 40, 80, 120, 160

Water Content (%) & Plasticity — PL, MC, LL: 10, 20, 30

GRAIN SIZE DISTRIBUTION (%) (MIT): GR SA SI CL



Depth Scale (m): 0–7; Elevation Scale (mASL): 252–246

(continued next page)

LOG OF BOREHOLE MW1

project |	PART OF LOT 35 CONCESSION 6, UDORA, ONTARIO			**project no. |**	161-09454-00
client |	TONI RISI, CAPRIS INVESTMENT LTD.	**rig type |**	CME 75, track-mounted	**date started |**	2016/07/25
location |	UDORA, ONTARIO	**method |**	Hollow stem augers, 215 mm dia.	**supervisor |**	EJP
position |	E: 644831 N: 4901800 (17T, Geodetic)	**coring |**	*n/a*	**reviewer |**	DAO

Depth Scale (m)	Elev Depth (m)	STRATIGRAPHY *(continued)*	Sample Number	Type	SPT N-Value / Core Recovery	Elevation Scale (mASL)	PID Readings
		SANDY SILT TILL: BROWN SANDY SILT TILL, SOME TO TRACE GRAVEL, SOME TO TRACE CLAY, TRACE COBBLES, MOIST TO WET, COMPACT *(continued)*	9	SS	96 / 200mm	245	0 ppm
8						244	
9			10	SS	87 / 225mm	243	0 ppm
10						242	
		...at 10.7 m, light brown sandy silt till, some to trace gravel, some to trace clay, trace cobbles, compact, moist to wet to 15.3 m	11	SS	50 / 50mm		0 ppm
11						241	
12			12	SS	50 / 50mm	240	0 ppm
13						239	
			13	SS	50 / 100mm		0 ppm
14						238	

Penetration Test Values (Blows / 0.3m)
× Dynamic Cone 10 20 30 40
Undrained Shear Strength (kPa)
○ Unconfined + Field Vane
● Pocket Penetrometer ■ Lab Vane
40 80 120 160

Water Content (%) & Plasticity
PL MC LL
10 20 30

Well Details

Lab Data and Comments
GRAIN SIZE DISTRIBUTION (%) (MIT)
GR SA SI CL

library: genivar - library.glb report: gen log v1 file: 161-09454-00_gint logs_sept.gpj

(continued next page)

LOG OF BOREHOLE MW1

WSP

project | PART OF LOT 35 CONCESSION 6, UDORA, ONTARIO **project no. |** 161-09454-00

client | TONI RISI, CAPRIS INVESTMENT LTD. **rig type |** CME 75, track-mounted **date started |** 2016/07/25

location | UDORA, ONTARIO **method |** Hollow stem augers, 215 mm dia. **supervisor |** EJP

position | E: 644831 N: 4901800 (17T, Geodetic) **coring |** *n/a* **reviewer |** DAO

Depth Scale (m)	Elev Depth (m)	STRATIGRAPHY	Graphic Plot	Number	Type	SPT N-Value / Core Recovery	Elevation Scale (mASL)	Penetration Test Values (Blows / 0.3m) × Dynamic Cone 10 20 30 40; Undrained Shear Strength (kPa) ○ Unconfined + Field Vane ● Pocket Penetrometer ■ Lab Vane 40 80 120 160	Water Content (%) & Plasticity PL MC LL 10 20 30	PID Readings	Well Details	Lab Data and Comments GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL
15		*(continued)*										
	237.4 15.3			14	SS	50 / 50mm				0 ppm		

BOREHOLE TERMINATED AT 15.3m BELOW GROUND SURFACE IN SANDY SILT TILL.

END OF BOREHOLE

Borehole was dry and open upon completion.

50 mm monitoring well installed.
No. 10 screen installed.

WATER LEVEL MONITORING

Date	Depth (m)	Elevation (m)
Aug 3, 2016	10.3	242.4

LOG OF BOREHOLE MW2

WSP

project | PART OF LOT 35 CONCESSION 6, UDORA, ONTARIO **project no. |** 161-09454-00

client | TONI RISI, CAPRIS INVESTMENT LTD. **rig type |** CME 75, track-mounted **date started |** 2016/07/26

location | UDORA, ONTARIO **method |** Hollow stem augers, 215 mm dia. **supervisor |** EJP

position | E: 644966 N: 4901867 (17T, Geodetic) **coring |** *n/a* **reviewer |** DAO

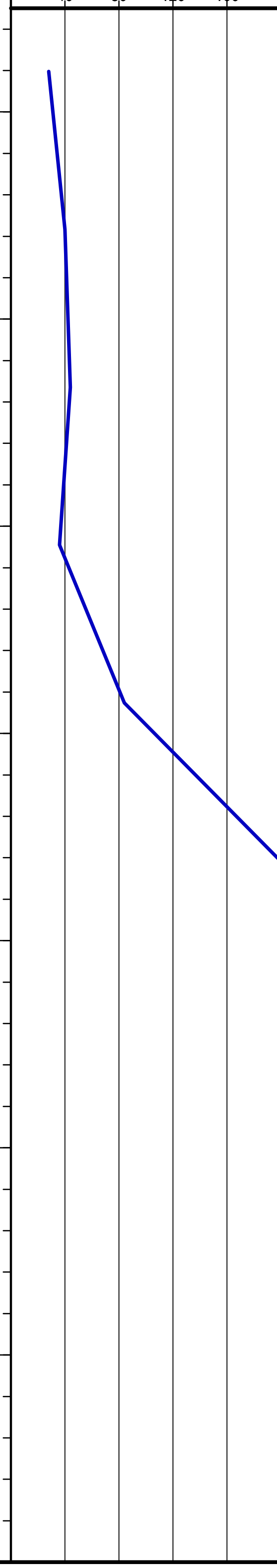
Depth Scale (m)	Elev / Depth (m)	STRATIGRAPHY	Sample Number	Type	SPT N-Value / Core Recovery	Elevation Scale (mASL)	PID Readings	Lab Data and Comments (Grain size distribution (%) (MIT) GR SA SI CL)
0	253.5	**GROUND SURFACE**						
	253.3 / 0.2	TOPSOIL: 600mm OF DARK BROWN TOPSOIL, SOME ORGANICS, MOIST	1	SS	7	253	0 ppm	
1		SANDY SILT TILL: BROWN SANDY SILT TILL, SOME TO TRACE GRAVEL, SOME TO TRACE CLAY, TRACE COBBLES, MOIST TO WET, LOOSE TO COMPACT	2	SS	10	252	0 ppm	
2			3	SS	11		0 ppm	*SS3 chemistry:* M&I
	251.2 / 2.3	CLAYEY SILT: BROWN CLAYEY SILT, SOME SAND, TRACE GRAVEL, MOIST, LOOSE TO COMPACT, WET	4	SS	9	251	0 ppm	2 21 56 21; *SS4 chemistry:* PAHs
3	250.6 / 2.9	SANDY SILT TILL: BROWN SANDY SILT TILL, SOME TO TRACE GRAVEL, SOME TO TRACE CLAY, TRACE COBBLES, MOIST TO WET, LOOSE TO COMPACT	5	SS	21	250	0 ppm	*SS5 chemistry: CCME(F1-F4), BTEX, VOCs, PHCs*
4			6	SS	54	249	0 ppm	*SS6 chemistry:* PCBs
5			7	SS	83	248	0 ppm	
6			8	SS	50 / 75mm	247	0 ppm	
7								

Penetration Test Values (Blows / 0.3m): × Dynamic Cone 10 20 30 40

Undrained Shear Strength (kPa): ○ Unconfined + Field Vane ● Pocket Penetrometer ■ Lab Vane 40 80 120 160

Water Content (%) & Plasticity: PL MC LL 10 20 30

Well Details



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LOG OF BOREHOLE MW2

WSP

project | PART OF LOT 35 CONCESSION 6, UDORA, ONTARIO **project no. |** 161-09454-00
client | TONI RISI, CAPRIS INVESTMENT LTD. **rig type |** CME 75, track-mounted **date started |** 2016/07/26
location | UDORA, ONTARIO **method |** Hollow stem augers, 215 mm dia. **supervisor |** EJP
position | E: 644966 N: 4901867 (17T, Geodetic) **coring |** *n/a* **reviewer |** DAO

Depth Scale (m)	Elev Depth (m)	STRATIGRAPHY	Number	Type	SPT N-Value / Core Recovery	Elevation Scale (mASL)	PID Readings	Lab Data and Comments
		(continued)				246		
		SANDY SILT TILL: BROWN SANDY SILT TILL, SOME TO TRACE GRAVEL, SOME TO TRACE CLAY, TRACE COBBLES, MOIST TO WET, LOOSE TO COMPACT *(continued)*	9	SS	50 / 25mm		0 ppm	
8						245		
9			10	SS	50 / 25mm	244	0 ppm	
10						243		
			11	SS	50 / 75mm		0 ppm	
11						242		
12			12	SS	50 / 50mm	241	0 ppm	
13		...at 12.7 m, brown medium to coarse grained sand, some gravel, very dense, wet to 12.8 m				240		
			13	SS	50 / 25mm		0 ppm	
14	239.2 14.3	SAND: BROWN MEDIUM TO COARSE GRAINED SAND, SOME GRAVEL,VERY DENSE, WET				239		...at 14.3m, slight odour in soil sample to 16.9m

Penetration Test Values (Blows / 0.3m): × Dynamic Cone 10 20 30 40
Undrained Shear Strength (kPa): ○ Unconfined + Field Vane ● Pocket Penetrometer ■ Lab Vane 40 80 120 160
Water Content (%) & Plasticity: PL MC LL 10 20 30
Graphic Plot; Well Details
GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

library: genivar - library.glb report: gen log v1 file: 161-09454-00_gint logs_sept.gpj

(continued next page)

LOG OF BOREHOLE MW2

project |	PART OF LOT 35 CONCESSION 6, UDORA, ONTARIO			**project no. |**	161-09454-00
client |	TONI RISI, CAPRIS INVESTMENT LTD.	**rig type |**	CME 75, track-mounted	**date started |**	2016/07/26
location |	UDORA, ONTARIO	**method |**	Hollow stem augers, 215 mm dia.	**supervisor |**	EJP
position |	E: 644966 N: 4901867 (17T, Geodetic)	**coring |**	*n/a*	**reviewer |**	DAO

Depth Scale (m)	Elev Depth (m)	STRATIGRAPHY	Graphic Plot	Number	Type	SPT N-Value / Core Recovery	Elevation Scale (mASL)	Penetration Test Values (Blows / 0.3m) / Undrained Shear Strength (kPa)	Water Content (%) & Plasticity	PID Readings	Well Details	Lab Data and Comments
15		*(continued)* SAND: BROWN MEDIUM TO COARSE GRAINED SAND, SOME GRAVEL,VERY DENSE, WET *(continued)*		14	SS	50 / 50mm	238			0 ppm		
16							237					
	236.6 16.9	BOREHOLE TERMINATED AT 16.9m BELOW GROUND SURFACE IN SAND.		15	SS	50 / 75mm				0 ppm		

Penetration Test Values legend: × Dynamic Cone; 10 20 30 40. Undrained Shear Strength (kPa): ○ Unconfined, + Field Vane, ● Pocket Penetrometer, ■ Lab Vane; 40 80 120 160. Water Content: PL MC LL; 10 20 30. GRAIN SIZE DISTRIBUTION (%) (MIT): GR SA SI CL

END OF BOREHOLE

Borehole was dry and open upon completion.

50 mm monitoring well installed.
No. 10 screen installed.

WATER LEVEL MONITORING

Date	Depth (m)	Elevation (m)
Aug 3, 2016	13.2	240.3
Aug 10, 2016	13.6	239.9

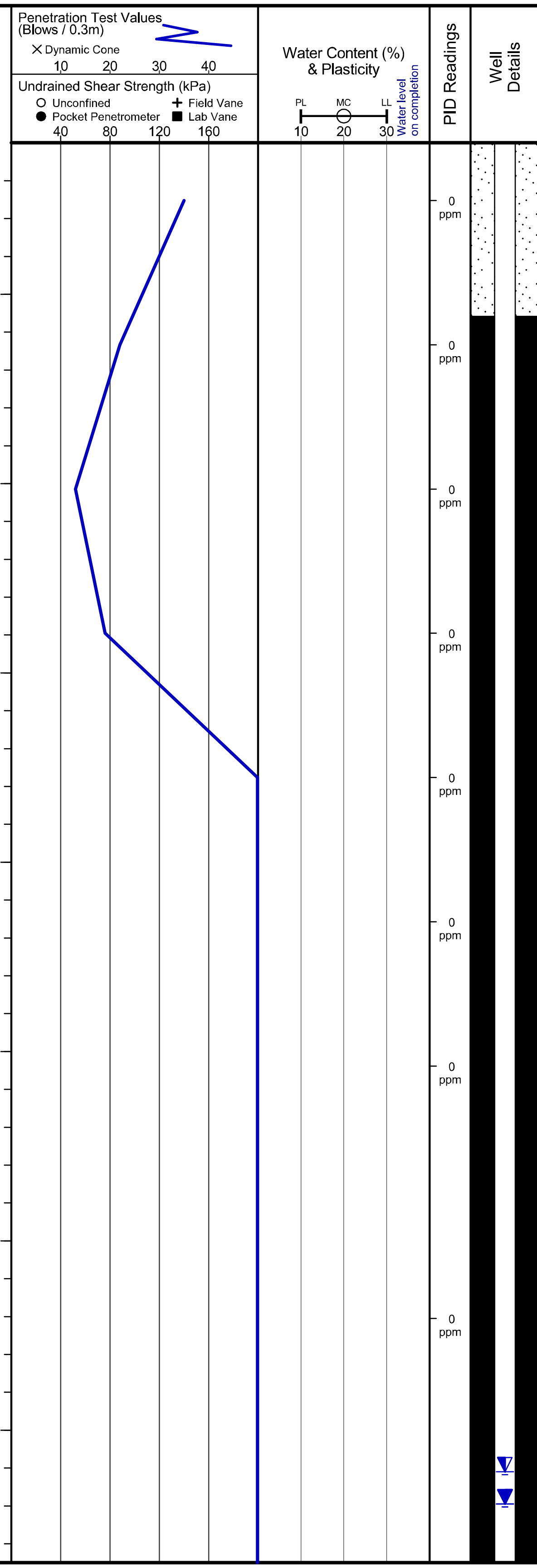
library: genivar - library.glb report: gen log v1 file: 161-09454-00_gint logs_sept.gpj

LOG OF BOREHOLE MW3

WSP

project | PART OF LOT 35 CONCESSION 6, UDORA, ONTARIO **project no. |** 161-09454-00
client | TONI RISI, CAPRIS INVESTMENT LTD. **rig type |** CME 75, track-mounted **date started |** 2016/07/25
location | UDORA, ONTARIO **method |** Hollow stem augers, 215 mm dia. **supervisor |** EJP
position | E: 644953 N: 4901706 (17T, Geodetic) **coring |** *n/a* **reviewer |** DAO

Elev / Depth (m)	STRATIGRAPHY	Sample Number	Type	SPT N-Value / Core Recovery	PID Readings	Lab Data and Comments (GR SA SI CL)
259.8	GROUND SURFACE					
259.6 / 0.2	TOPSOIL: 100mm OF DARK BROWN TOPSOIL, SOME ORGANICS, MOIST	1	SS	35	0 ppm	
259.0 / 0.8	SAND: BROWN MEDIUM GRAINED SAND, SOME TO TRACE ORGANICS, SOME TO TRACE CLAY, GRAVEL, DRY, LOOSE TO COMPACT					
	SAND AND GRAVEL: BROWN SAND AND GRAVEL FILL, DRY, COMPACT	2	SS	22	0 ppm	
258.3 / 1.5	SANDY SILT TILL: BROWN SANDY SILT TILL, SOME TO TRACE GRAVEL, SOME TO TRACE CLAY, TRACE COBBLES, MOIST TO WET, LOOSE TO COMPACT					
257.5 / 2.3	SAND: BROWN MEDIUM TO COARSE GRAINED SAND, SOME GRAVEL, LOOSE TO COMPACT, DRY	3	SS	13	0 ppm	*SS3 chemistry:* M&I
	SANDY SILT TILL: BROWN SANDY SILT TILL, SOME TO TRACE GRAVEL, SOME TO TRACE CLAY, TRACE COBBLES, MOIST TO WET, LOOSE TO COMPACT	4	SS	19	0 ppm	
		5	SS	65	0 ppm	
		6	SS	58	0 ppm	14 40 34 12
		7	SS	62	0 ppm	
	...at 6.1 m, brown medium to coarse grained sand lens, trace gravel, wet to saturated to 6.3 m	8	SS	50 / 75mm	0 ppm	



Depth Scale (m): 0–7; Elevation Scale (mASL): 259–253

library: genivar - library.glb report: gen log v1 file: 161-09454-00_gint logs_sept.gpj

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LOG OF BOREHOLE MW3

project |	PART OF LOT 35 CONCESSION 6, UDORA, ONTARIO			**project no. |**	161-09454-00
client |	TONI RISI, CAPRIS INVESTMENT LTD.	**rig type |**	CME 75, track-mounted	**date started |**	2016/07/25
location |	UDORA, ONTARIO	**method |**	Hollow stem augers, 215 mm dia.	**supervisor |**	EJP
position |	E: 644953 N: 4901706 (17T, Geodetic)	**coring |**	*n/a*	**reviewer |**	DAO

SUBSURFACE PROFILE / SAMPLE

Penetration Test Values (Blows / 0.3m): × Dynamic Cone 10 20 30 40
Undrained Shear Strength (kPa): ○ Unconfined + Field Vane ● Pocket Penetrometer ■ Lab Vane 40 80 120 160
Water Content (%) & Plasticity: PL MC LL 10 20 30; Water level on completion
PID Readings; Well Details; Lab Data and Comments — GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

Depth Scale (m)	Elev Depth (m)	STRATIGRAPHY *(continued)*	Number	Type	SPT N-Value / Core Recovery	Elevation Scale (mASL)	PID Readings
		<u>SANDY SILT TILL:</u> BROWN SANDY SILT TILL, SOME TO TRACE GRAVEL, SOME TO TRACE CLAY, TRACE COBBLES, MOIST TO WET, LOOSE TO COMPACT *(continued)*				252	
8		...at 7.7 m, brown medium to coarse grained sand lens, trace silt, trace clay, saturated to 8.0 m	9	SS	58		0 ppm
9						251	
		...at 9.1 m, brown medium to coarse grained sand lens, trace silt, trace clay, saturated to 9.4 m	10	SS	80 / 250mm		0 ppm
10						250	
11		...at 10.7 m, greyish brown medium to coarse grained sand lens, trace silt, trace clay, saturated to 10.8 m	11	SS	100 / 225mm	249	0 ppm
12						248	
13			12	SS	70	247	0 ppm
14			13	SS	90 / 175mm	246	0 ppm
						245	

(continued next page)

LOG OF BOREHOLE MW3

WSP

project |	PART OF LOT 35 CONCESSION 6, UDORA, ONTARIO			**project no. |**	161-09454-00
client |	TONI RISI, CAPRIS INVESTMENT LTD.	**rig type |**	CME 75, track-mounted	**date started |**	2016/07/25
location |	UDORA, ONTARIO	**method |**	Hollow stem augers, 215 mm dia.	**supervisor |**	EJP
position |	E: 644953 N: 4901706 (17T, Geodetic)	**coring |**	*n/a*	**reviewer |**	DAO

Depth Scale (m)	Elev Depth (m)	SUBSURFACE PROFILE: STRATIGRAPHY	Graphic Plot	SAMPLE: Number	Type	SPT N-Value / Core Recovery	Elevation Scale (mASL)	Penetration Test Values (Blows / 0.3m) × Dynamic Cone 10 20 30 40; Undrained Shear Strength (kPa) ○ Unconfined + Field Vane ● Pocket Penetrometer ■ Lab Vane 40 80 120 160	Water Content (%) & Plasticity PL MC LL 10 20 30	Water level on completion	PID Readings	Well Details	Lab Data and Comments GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL
15		*(continued)* SANDY SILT TILL: BROWN SANDY SILT TILL, SOME TO TRACE GRAVEL, SOME TO TRACE CLAY, TRACE COBBLES, MOIST TO WET, LOOSE TO COMPACT *(continued)*		14	SS	74				∇	0 ppm		
	244.0						244						
	15.9	BOREHOLE TERMINATED AT 15.8m BELOW GROUND SURFACE IN SANDY SILT TILL.											

END OF BOREHOLE

Unstabilized water level at 15.5 m below ground surface; borehole was open upon completion.

50 mm monitoring well installed.
No. 10 screen installed.

WATER LEVEL MONITORING

Date	Depth (m)	Elevation (m)
Aug 3, 2016	7.0	252.8
Aug 10, 2016	7.2	252.6

BOREHOLE NO. MW17-1

PROJECT NAME: UDORA PHASE TWO ESA
PROJECT NO.: 161-09454-00
CLIENT: CAPRIS INV. INC.
DATE COMPLETED: Sep 20, 2017
BOREHOLE TYPE: SPLIT SPOON / HOLLOW STEM AUGER
SUPERVISOR: DAO / JW
GROUND ELEVATION: 250.2 mASL
REVIEWER: SJD

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	SAMPLE TYPE	N VALUE	% WATER	% RECOVERY	PID/TOV (ppm)	REMARKS
0.0	SAND TOPSOIL: DARK BROWN SAND TOPSOIL, TRACE TO SOME SILT, TRACE ROOTLETS / ORCANICS, MOIST.	SS1	4		0	0.0	
0.4	SAND FILL: ORANGY BROWN, SAND FILL, TRACE TO NO SILT, TRACE ROOTLETS, MOIST, LOOSE.	SS2	13		1	0.0	WATER LEVEL AT 0.82 mBGS ON SEPT. 20, 2017
1.2	SILTY SAND TILL: GREYISH BROWN SILTY SAND TILL, TRACE GRAVEL, TRACE CLAY, MOIST TO WET, LOOSE.	SS3	8		0	0.0	WATER LEVEL AT 2.04 mBGS ON SEPT. 22, 2017
2.3	SILTY SAND TILL: GREYISH BROWN SILTY SAND TILL, SOME COBBLES, TRACE TO SOME CLAY, MOIST TO WET, LOOSE TO DENSE. - 0.1 m OF COBBLES FROM 2.63 m TO 2.74 m	SS4	17		1	0.0	
		SS5	26		1	0.0	
4.6	SAND AND GRAVEL: BROWN, SAND AND FINE GRAVEL, SOME COBBLES, VERY DENSE, SATURATED.	SS6	50 for 3"		0	0.0	
		SS7	50 for 2"		0	0.0	
6.7	BOREHOLE TERMINATED AT 6.7 m IN SAND AND GRAVEL.						

Depth scale: 0.0, 1.0, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0, 10.0

STRATIGRAPHY | MONITOR DETAILS

CONE PENETRATION — "N" VALUE: 10 20 30; SHEAR STRENGTH: 50 100 150 200; Intact (MaX) Cu; Remoulded Cu

WATER CONTENT %: 10 20 30; W_P W_L

BOREHOLE NO. MW17-2

PROJECT NAME: UDORA PHASE TWO ESA **PROJECT NO.:** 161-09454-00

CLIENT: CAPRIS INV. INC. **DATE COMPLETED:** Sep 21, 2017

BOREHOLE TYPE: SPLIT SPOON / HOLLOW STEM AUGER **SUPERVISOR:** DAO / JW

GROUND ELEVATION: 251.8 mASL **REVIEWER:** SJD

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	SAMPLE TYPE	N VALUE	% WATER	% RECOVERY	PID/TOV (ppm)	REMARKS
0.0	SAND TOPSOIL: SOME SILT, TRACE ORGANICS.						
0.2	SAND: DARK BROWN, SAND, SOME SILT, TRACE TO SOME ORGANICS, MOIST, LOOSE.	SS1	5		0	0.0	
1.1	SILTY SAND TILL: BROWN, SILTY SAND TILL, TRACE CLAY, TRACE GRAVEL, TRACE ORGANICS, MOIST, LOOSE.	SS2	9		0	0.0	
1.5	SILTY SAND / SANDY SILT TILL: BROWN TO GREYISH BROWN, SILTY SAND TO SANDY SILT TILL, TRACE CLAY, TRACE GRAVEL, TRACE COBBLES, MOIST TO WET, LOOSE TO COMPACT.	SS3	12		0	0.0	
		SS4	12		1	0.0	WATER LEVEL AT 5.67 mBGS ON SEPT. 21, 2017
		SS5	11		1	0.0	
		SS6	20		1	0.0	
4.6	SANDY SILT TILL: SANDY SILT TILL, VARVED CLAY LAYERS, SOME CLAY, TRACE COBBLES, TRACE GRAVEL, VERY DENSE	SS7	59		1	0.0	
							WATER LEVEL AT 2.75 mBGS ON SEPT. 22, 2017
6.1	SANDY SILT TILL: LIGHT BROWN TO GREY SANDY SILT TILL, TRACE TO SOME GRAVEL, TRACE COBBLES, MOIST, VERY DENSE.	SS8	60 for 3"		0		
6.7	BOREHOLE TERMINATED AT 6.7 m IN SANDY SILT TILL.						

Other column headings: STRATIGRAPHY; MONITOR DETAILS; CONE PENETRATION; "N" VALUE 10 20 30; SHEAR STRENGTH 50 100 150 200; Intact (MaX) Cu; Remoulded Cu; WATER CONTENT % 10 20 30; W_P W_L

N-value plot annotation: 84

Depth scale: 0.0, 1.0, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0, 10.0

BOREHOLE NO. MW17-3

PROJECT NAME: UDORA PHASE TWO ESA — **PROJECT NO.:** 161-09454-00

CLIENT: CAPRIS INV. INC. — **DATE COMPLETED:** Sep 20, 2017

BOREHOLE TYPE: SPLIT SPOON / HOLLOW STEM AUGER — **SUPERVISOR:** DAO / JW

GROUND ELEVATION: 250.8 mASL — **REVIEWER:** SJD

DEPTH (m)	STRATIGRAPHIC DESCRIPTION
0.0	SAND TOPSOIL: BROWN, TRACE ROOTLETS, MOIST.
0.4	SAND FILL: BROWN TO ORANGEY BROWN, SAND FILL, MOIST, LOOSE TO COMPACT.
1.5	SILTY SAND TO SANDY SILT TILL: GREYISH BROWN, SILTY SAND TO SANDY SILT TILL, TRACE CLAY, TRACE COBBLES, TRACE GRAVEL, MOIST TO SATURATED, COMPACT.
3.1	SANDY SILT TILL: GREYISH BROWN, SANDY SILT TILL, SOME COBBLES, TRACE CLAY, TRACE GRAVEL, VERY SATURATED.
3.8	SILTY SAND TO SANDY SILT TILL: SILTY SAND TO SANDY SILT TILL, FINE GRAVEL, COMPACT TO DENSE, VERY SATURATED.
4.6	BOREHOLE TERMINATED AT 4.6 m IN SILTY SAND TO SANDY SILT TILL.

TYPE	N VALUE	% WATER	% RECOVERY	PID/TOV (ppm)
SS1	8		0	0.0
SS2	23		0	0.0
SS3	34		0	0.0
SS4	19		1	0.0
SS5	10		0	0.0
SS6	18		1	0.0

CONE PENETRATION: "N" VALUE 10 20 30; SHEAR STRENGTH 50 100 150 200; Intact (MaX) Cu; Remoulded Cu

WATER CONTENT %: 10 20 30; W_P W_L

MONITOR DETAILS

REMARKS:

WATER LEVEL AT 2.44 mBGS ON SEPT. 22, 2017

WATER LEVEL AT 2.7 mBGS ON SEPT. 20, 2017

TABLE I-1: OBSERVED GROUNDWATER ELEVATIONS

D-5-4 AND D-5-5 ASSESSMENT

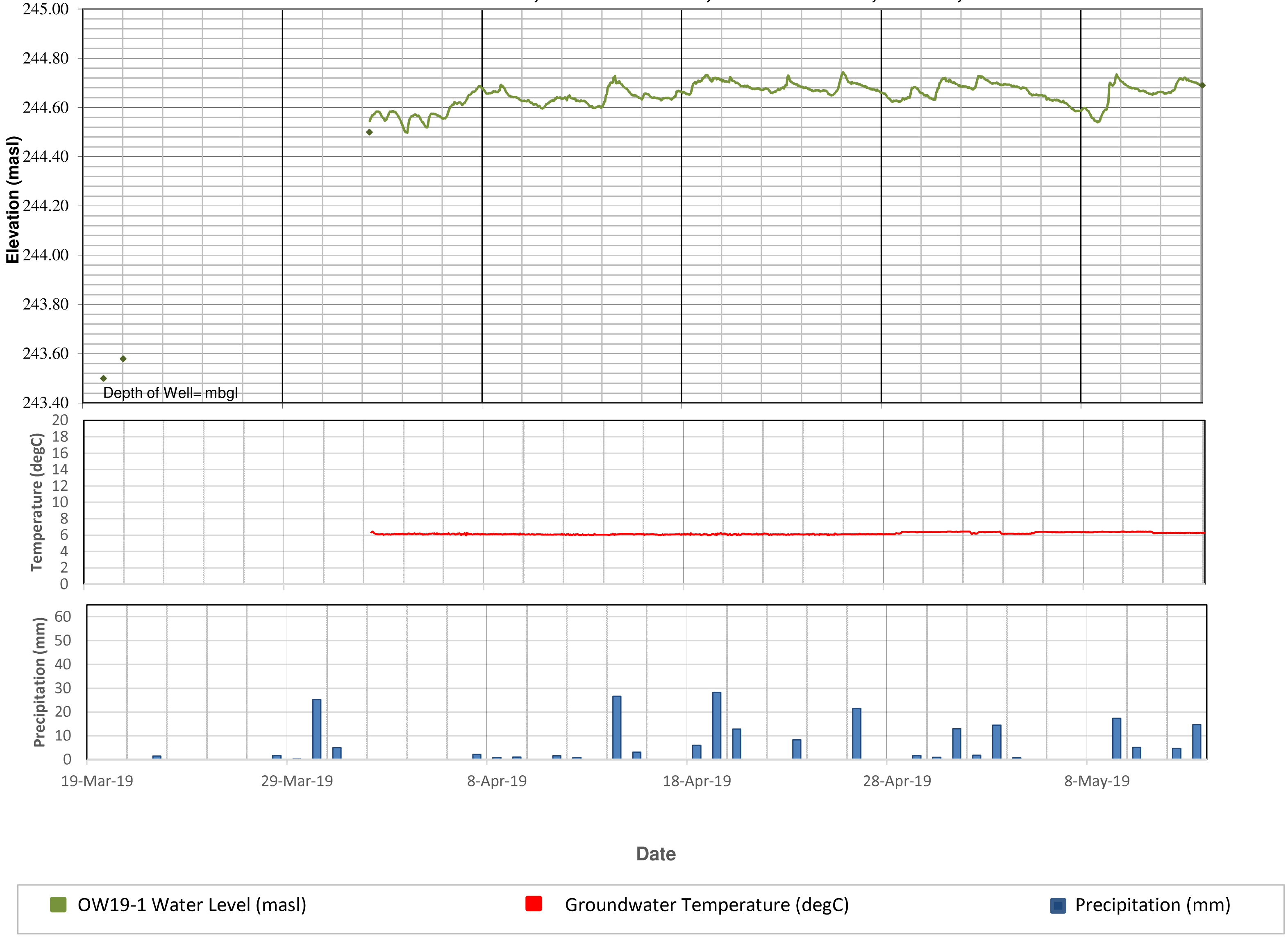
PROPOSED PLAN OF SUBDIVISION, PART OF LOTS 34 AND 35, CONCESSION 6, UDORA, ON

Monitor Designation	T.O.P Elevation (mASL)	Ground Elevation (mASL)	PVC Casing Stick-up (m)	Measurement Date	Depth to Water		Groundwater Elevation
					m bmp	m bgl	m ASL
MW17-1	245.52	244.93	0.73	20-Mar-19	2.17	1.44	243.35
				21-Mar-19	2.08	1.35	243.44
				2-Apr-19	1.16	0.43	244.36
				14-May-19	0.97	0.24	244.55
MW17-2	247.52	246.27	0.79	20-Mar-19	2.76	1.97	244.77
				21-Mar-19	2.69	1.90	244.83
				2-Apr-19	2.14	1.35	245.38
				14-May-19	1.40	0.61	246.12
MW17-3	246.53	244.333	0.82	20-Mar-19	2.73	1.91	243.80
				21-Mar-19	2.72	1.90	243.81
				2-Apr-19	2.40	1.58	244.13
				14-May-19	1.52	0.70	245.01
TW1	245.25	243.65	0.71	20-Mar-19	-	-	-
				21-Mar-19	11.84	11.13	233.41
				2-Apr-19	11.85	11.14	233.40
				14-May-19	10.56	9.85	234.69
TW19-1	253.58	252.21	0.93	20-Mar-19	14.82	13.89	238.76
				21-Mar-19	15.82	14.89	237.76
				28-Mar-19	14.10	13.17	239.48
				2-Apr-19	14.17	13.24	239.41
				14-May-19	12.38	11.45	241.20

Notes:

1) "m ASL" indicates metres above sea level.
2) "m" indicates metres.
3) "m bmp" indicates metres below measurement point, which is the top of pipe (referred to as T.O.P.)
4) "m bgl" indicates metres below ground level.
5) Monitoring wells are installed with MONUMENTt casings.

FIGURE I-1: HYDROGRPAH OF MONITORING WELL MW17-1
UDORA D-5-4 AND D-5-5 ASSESSMENT
PLAN OF SUBDIVISION, LOTS 34 AND 35, CONCESSION 6, UDORA, ON



Notes: 1) Climatic data March 2019 to present obtained from Uxbridge West Climatic Station located a 44°05'54.000" N 79°09'49.020" W 325.00 m asl

H:\Proj\18\12360-00\Tech\Phase 2\Report\D-5-4 and D-5-5 Report\Appendix I - Groundwater Level Monitoring\Table I -2 - MW17-1 Hydrograph.xlsx

FIGURE I-2 - HYDROGRAPH OF OW05-1 SHALLOW MONITORING WELL
UDORA ESTATES DEVELOPMENT
UDORA, ON

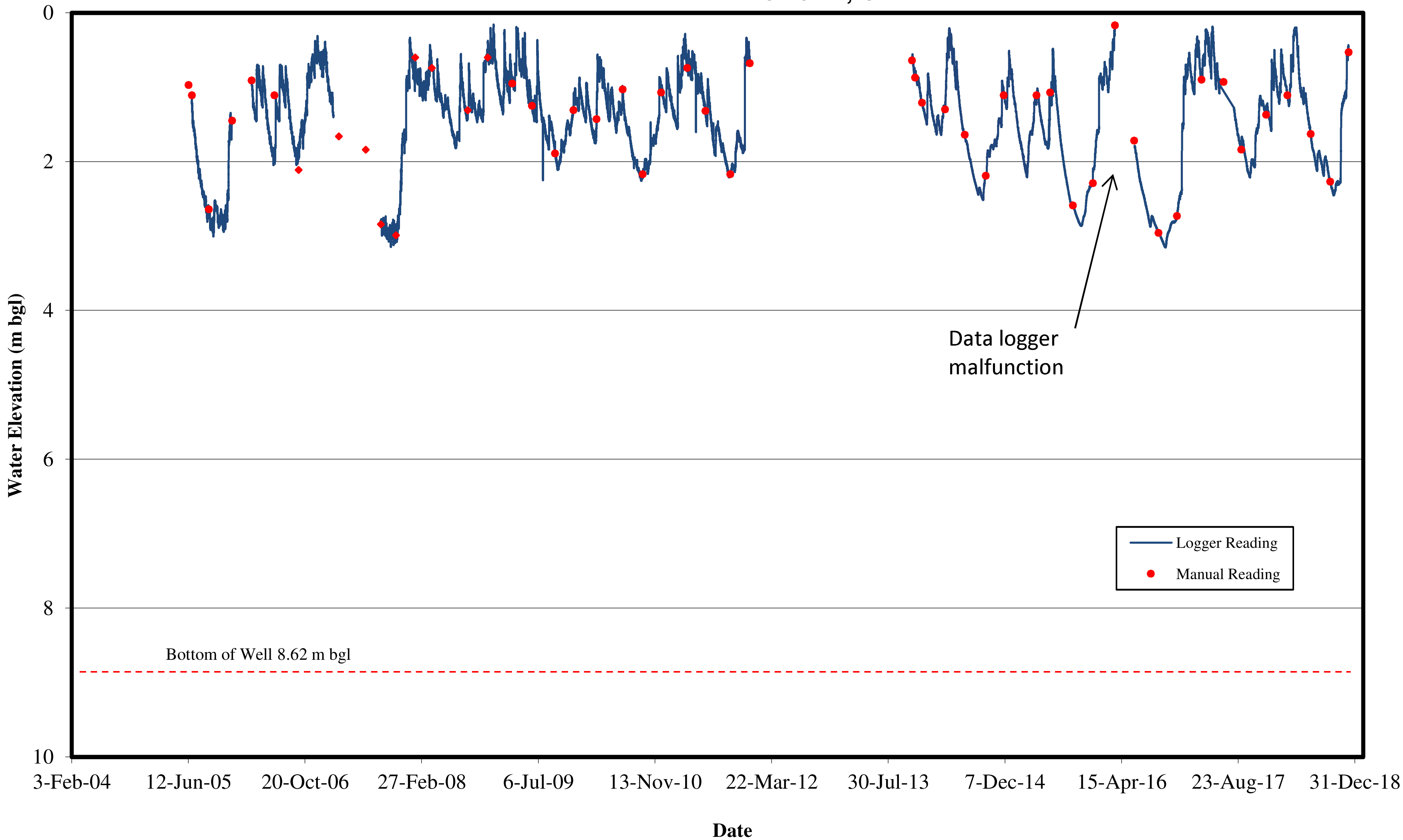


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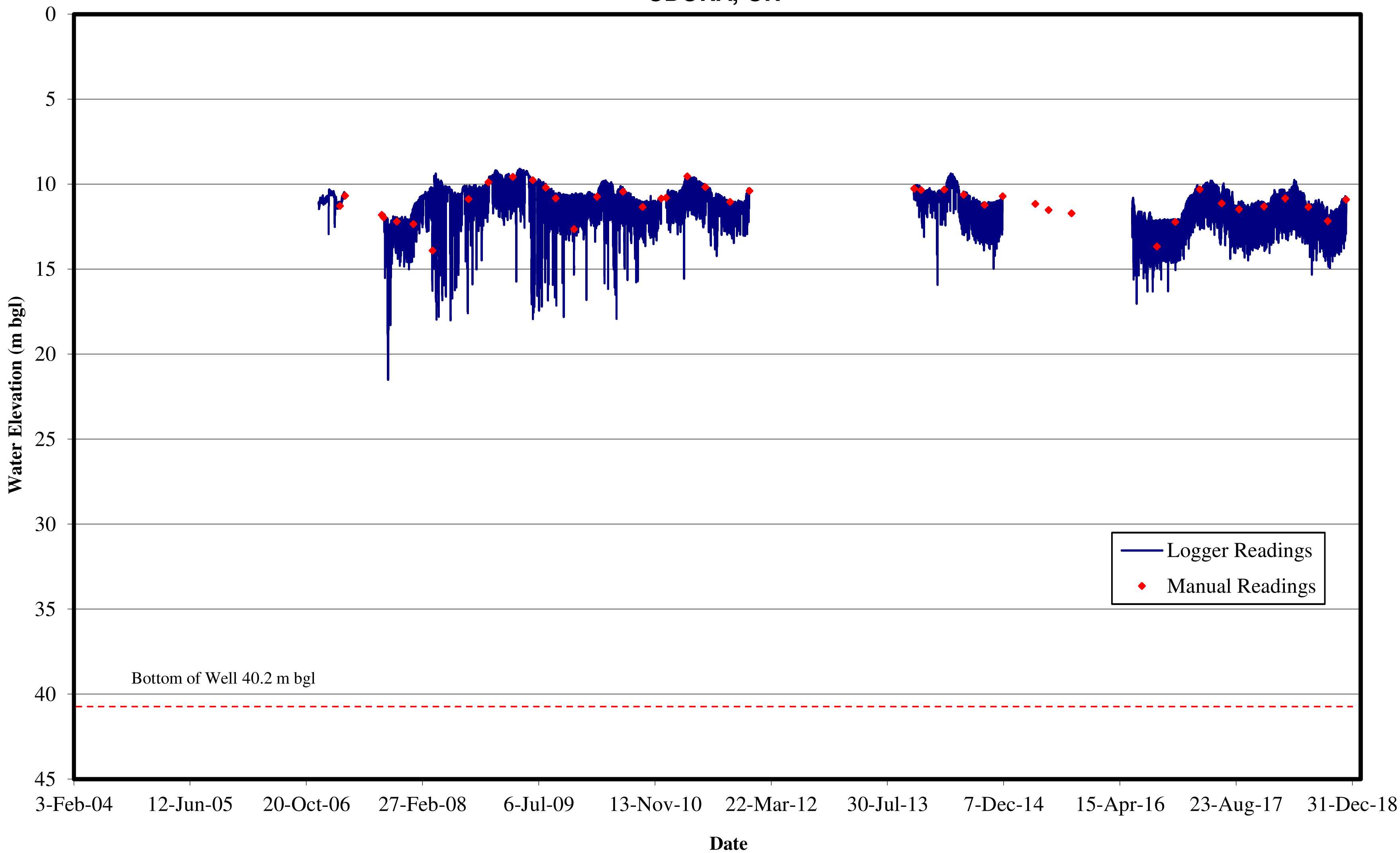
FIGURE I-2 - HYDROGRAPH OF LOT 14 WATER SUPPLY WELL
UDORA ESTATES DEVELOPMENT
UDORA, ON



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Soil Engineers Ltd.
CONSULTING ENGINEERS
GEOTECHNICAL • ENVIRONMENTAL • HYDROGEOLOGICAL • BUILDING SCIENCE
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BARRIE	MISSISSAUGA	OSHAWA	NEWMARKET	MUSKOKA	HAMILTON
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FAX: (705) 721-7864	FAX: (905) 542-2769	FAX: (905) 725-1315	FAX: (905) 881-8335	FAX: (705) 721-7864	FAX: (905) 542-2769

December 19, 2025

Reference No. 2209-S119

J & J Developments
71 Shannon Street
Toronto, Ontario
M6J 2E6

Attention: Mr. John Cooper, President

Re: A Geotechnical Review for Stormwater Management Pond
Proposed Residential Development
North of Birdie Smith Court (Part of Lot 35, Concession 6)
Township of Uxbridge (Udora)

Dear Sir;

As requested, Soil Engineers Ltd. (SEL) has reviewed the preliminary grading plan prepared by SCS Consulting Group Ltd. (SCS) dated December 2025 (Project No. 2328), and herein provide our comments and recommendations for the design and construction of stormwater management (SWM) Pond. The geotechnical findings from previous geotechnical investigation report (our Reference No. 2209-S119, dated November 2025) completed by SEL was used as part of the review.

Summary of Geotechnical Findings

Based on the geotechnical investigation completed by WSP, two (2) boreholes (i.e., BH1 and MW17-1) were carried out to the south of the SWM pond. For BH1, the subsurface soil consists of a layer of sandy silt, overlying silty sand till to a depth of 3.7 m below grade. For MW17-1, the subsurface soil consists of a layer of sand fill, overlying silty sand till to a depth of 4.6 m below grade, with sand and gravel deposit extending to 6.7 m below grade.

BH1 was recorded dry upon completion of borehole drilling. Groundwater levels were recorded in MW17-1 at depths of 0.82 m and 2.04 m below grade, or at El. 249.4 m and El. 248.2 m on September 20 and 22, 2017, respectively.

Pond Design

It is understood that the proposed SWM pond is designated as a dry pond and will be located north of the residential dwelling lots, south of Ravenshoe Road. Details of the pond design are summarized below:

Pond Bottom:	El. 245.34 m
Top of Pond:	El. 246.40 m
Side Slope Gradients:	4 horizontal (H):1 vertical (V)

Based on the currently available borehole information and the proposed pond design grading, the subgrade of the proposed SWM pond will consist of either earth fill or sand and gravel deposits. Given the pervious soil and shallow groundwater level encountered, groundwater seepage into the pond can be generally anticipated. In case where a separation between groundwater and storm water is required as well as for the stability of the pond slope, an impervious layer such as clay liner or geosynthetic clay liner (GCL) is generally recommended for SWM pond.

It should be noted that the existing grade consists of sloping terrain where subsurface soil and groundwater condition may differ from the previous boreholes carried out by WSP on the tableland at a higher elevation. Thus, it is our opinion that the existing borehole and monitoring well data may be inconclusive at this point, and further investigation should be conducted for verification of the soil and subsurface condition at SWM pond.

In general, the impervious liner must be designed with sufficient thickness to resist the buoyancy uplift from groundwater, if required. Alternatively, where the uplift pressure from groundwater is significant, an under-pond drainage system may be implemented to reduce the hydraulic head, thereby allowing for a reduction in the liner thickness. The impervious liner can be constructed with native clay deposit, which should contain at least 30% of clay content. It can be placed in lifts no more than 20 cm thick and uniformly compacted to at least 98% Standard Proctor Maximum Dry Density (SPMDD). Where clay is not readily available on-site, GCL with a ballast can be used alternatively. The on-site inorganic soil can be used for the construction of ballast, which should be installed in accordance with the manufacturer’s guideline or specifications. Any cobbles, boulders, or angular rocks should be removed from the ballast material and subgrade before placement of the GCL to avoid potential puncture or rupture of the liner.

Further discussion and recommendations can be provided once the detailed design of SWM pond becomes available for review.

Inlet/Outlet Structure

Where the inlet or outlet structure (e.g., headwall) is proposed, the foundation must be extended onto the sound native soils or engineered fill below the scouring depth or frost depth, whichever is greater. The recommended soil bearing pressures of 100 kPa (SLS) and 150 kPa (ULS) can be used for design of the structures.

The foundation subgrade should be inspected by either the geotechnical engineer or the senior geotechnical technician under the supervision of the geotechnical engineer, to ensure that the revealed conditions are compatible with the foundation design requirements

Retaining Wall

It should be noted that a 1.5 m high retaining wall is proposed to support the grading of the SWM pond. Given the exposed wall height exceeds 1.0 m, the wall must be properly designed by an experienced engineer. Additionally, a global stability assessment should be carried out to ensure long-term stability of the wall.

We trust this Letter Report satisfies your present requirements; however, should any queries arise, please feel free to contact this office.

Yours truly,
SOIL ENGINEERS LTD.

LICENSED PROFESSIONAL ENGINEER
J. H. Y. FUNG
100574280
Dec 19, 2025
PROVINCE OF ONTARIO

Jonathan Fung, P.Eng.

LICENSED PROFESSIONAL ENGINEER
Dec 19, 2025
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JF/KFL:dd

ENVISION
CONSULTANTS LTD

6415 NORTHWEST DRIVE
UNITS 37-40
MISSISSAUGA, ON L4V 1X1

January 5, 2026

Project #: 22-0223

2695867 Ontario Inc.
71 Shannon Street
Toronto, Ontario M6J 2E6

Sent via email: john@jandjdevelopments.ca

Attention: John Cooper

SUBJECT: ON-SITE SEWAGE SYSTEM SIZING STUDY – UDORA DEVELOPMENT – UPDATE 1

EnVision Consultants Ltd. (EnVision) was retained by 2695867 Ontario Inc. (the 'Client') to conduct a sewage system sizing study in accordance with the applicable regulations and guidelines of the Ontario Building Code (2024), and the Regional Municipality of Durham, to support the proposed 8-lot residential development on Part of Lots 34 and 35, Concession 6, Udora, Ontario (the 'Site'), see *Figure 1*.

It is understood that the requisite D-5-4 and D-5-5 studies for on-site sewage and water supply systems has been completed by others. The scope of this letter report is to determine if the proposed development lot fabric can support private sewage (septic) systems, drinking water wells, and building envelopes as per the Durham Region Lot Sizing Policy (*Drilled Wells and Lot Sizing Policies as Applied to Consents (Severances) and Draft Plans of Subdivision, 2010).*

As the Durham Region Lot Sizing Policy uses conceptual sewage flows, over ranges of soil percolation rates, it does not necessarily reflect the expected sewage system sizes for the planned subdivision dwellings. To better understand the actual sizing of the sewage system infrastructure at the site, and to explore the possibility for reduced leaching bed areas through alternative servicing methodologies; specifically advanced (Level IV) sewage treatment a detailed sewage servicing assessment has also been completed.

DESCRIPTION OF THE SITE

The Site is located in Durham Region, approximately 150 m southwest of the intersection of Durham Road 1 and Ravenshoe Road, in the community of Udora. The southern portion of the development lands connect with the northern extent of Birdie Smith Court. The legal description of the lands is Part of Lots 34 and 35, Concession 6, Udora, Ontario. In the recent past the site has remained vacant. The area immediately surrounding the site generally consists of rural residential properties, with extensive agricultural uses further to the east and south.

The proposed residential development, excluding roadway areas, is approximately 1.94 hectares (4.8 acres), while the average lot size for the proposed development is 0.21 ha, although lot sizes will vary. The plan also includes a 0.18 ha stormwater management block. It is understood that the dwellings will vary in size from 3 to 4 bedrooms, approximately 200 m^2 to 325 m^2 in floor area, with 3 to 4 bathrooms. Municipal services are not available at the site; therefore, the site will be serviced via private water supply and private on-site sewage system.

Based on the literature reviewed, and EnVision's knowledge of the study area, the site lies within the Peterborough Drumlin Field physiographic region as described by the Ontario Geological Survey (*Chapman and Putnam, 1984*). The Peterborough Drumlin Field is characterized by a rolling till plain containing approximately 3,000 drumlins, generally oriented in a northeast to southwest manner. Available mapping notes the nearest drumlin to be approximately 250 m southeast of the site.

The literature and mapping review describes the local surficial geology as sandy silt to silty sand till. Observations made from previous site investigations, completed by WSP Canada Inc., are consistent with the literature review as detailed later in this letter report.

The site is underlain by sedimentary bedrock belonging to the Lindsay Formation, which is primarily characterized by fine to coarse grained limestone. Drift thickness at the site is expected to be approximately 30 to 40 m in extent.

SITE INVESTIGATIONS

Historic field investigations were completed by WSP Canada Inc. as detailed in the *D-5-4 Assessment and Preliminary Water Balance Study (2018).* The historic site investigation work was completed in 2016 and 2017 and included the advancement of a total of four (4) boreholes and ten (10) test pits across the site. The shallow soils at the site generally consisted of a layer of topsoil followed by a deposit of sandy silt to silty sand till with trace clay and gravel, although in some areas a layer of sand fill was observed up to depths of 1.5 m below ground level (bgl).

WSP also completed additional soil investigations in 2019, advancing an additional ten (10) test pits to a depth of 2 m across the site. Ten (10) shallow soil samples were analyzed by WSP for particle size distribution, the results indicated that in seven (7) of the test pits, the soil percolation rate was 25 min/cm, one (1) test pit had a reported percolation rate of 45 min/cm while in one (1) test pit the percolation rate was reported as 15 min/cm and one (1) test pit reported as 10 min/cm. The particle size distribution curves have been attached to this report.

Based on the historic results EnVision has used a percolation rate of 25 min/cm this as the basis for our sewage system sizing assessment that follows.

DURHAM REGION LOT SIZING POLICY

To demonstrate that the proposed lot fabric of the subdivision (8 lots) will be capable of supporting single family dwellings with on-site sewage disposal systems, a conceptual layout has been completed. This conceptual plan assists in demonstrating that each lot on the property could be serviced in the future with an on-site sewage disposal system and a drinking water well. The conceptual layout has been provided as ***Figure 2*** which has been completed in accordance with the Durham Region planning document titled *Drilled Wells and Lot Sizing Policies as Applied to Consents (Severances) and Draft Plans of Subdivision, 2010*.

As noted in the previous section, EnVision has inferred that the prevailing soil type at the site will be a sandy silt to a silty sand till with a percolation rate of approximately 25 min/cm. Based on the Durham Region Lot sizing policy the minimum area that should be dedicated to prime and reserve leaching bed areas for this soil type is 750 m^2 (375 m^2 prime area and a 375 m^2 reserve area), as displayed in the table below:

Table 1 Conceptual Sewage System Area Estimates (Durham Region Policy)

Soil Percolation Rate	Loading Rate (L/m2)	Daily Sewage Flow (L)	Sewage System Area (Combined Prime and Reserve) ((B/A)x2)
1<T<20	10	3,000	600
20<T<35	8	3,000	750
35<T<50	6	3,000	1000
50<T	4	3,000	1500

The conceptual layout (*Figure 2)* uses a generic house footprint, a drilled well, and a generic sewage disposal system layout that was based on the Durham Region Lot Sizing Policy. The generic house footprint for each lot was demonstrated as a 20 m by 15 m rectangular block, which would contain the residence as well as the garage. The 300 m^2 footprint was inferred to be representative of the extent of the building envelopes to be constructed at the development.

A drilled well was also shown on each lot. Each well has a 15 m protected radius illustrated; sewage system distribution piping and septic tanks cannot be located within this area.

The conceptual layout demonstrates that adequate area is available on each lot to meet the Durham Region Lot Sizing Policy. During the detailed design and approval process, these sewage systems may be somewhat smaller or larger depending on the exact house details, soil percolation rates, and if advanced sewage treatment systems are used.

A further assessment of the likely sewage system sizes is provided in the section below.

DETAILED SEWAGE SERVICING ASSESSMENT

In order to provide more specific guidance as to the probable size of the septic systems servicing the subdivision properties, EnVision has undertaken a detailed sewage system assessment below.

The theoretical total daily design sewage flow for the dwellings within the development has been based on conceptual house plan information provided by the Client and the requirements of the Ontario Building Code (2024); specifically, Table 8.2.1.3.A. The theoretical sewage flow for the dwellings was determined as outlined in the table below.

Table 2 Theoretical Sewage Flow Calculations

	LOWER LIMIT OF EXPECTED FLOW		UPPER LIMIT OF EXPECTED FLOW	
Description of Unit	Number of Units	Total Flow (L/day)	Number of Units	Total Flow (L/day)
1) Bedrooms	3	1,600	4	2,000
2) Ground Floor Area	200	0	325	1,300
3) Fixture Units	25	250	31	550
Total (Row 1 Plus Higher of Rows 2 or 3)		1,850		3,300

It is noted that detailed house plans are not available at this time. To approximate the sewage flow contribution from the fixture units, EnVision has assumed that each bathroom would be a full bathroom group, and each dwelling would also have a dishwasher, kitchen sink, food preparation sink, laundry machine, and laundry sink.

Based on the above calculated sewage flow values, the daily design sewage flow for each resident is estimated to vary between 1,850 L/day to 3,300 L/day. It should be noted that the theoretical flows calculated are conservative and overestimate the actual daily sewage flow, however they have been calculated using the applicable regulations.

SCENARIO 1 – PRIMARY SEWAGE TREATMENT

Due to the predominate soil type at the site and the size of the proposed dwellings, it is likely that the Primary sewage treatment scenario may be applicable to design sewage flows less than 3,000 L/day. At this flow rate, single pod filter bed sewage disposal systems could be used. Filter bed systems are not typically advantageous at flow rate of greater than 3,000 L/day due to the requirement for a second filter pod (effective area) spaced a minimum 5 m apart.

In this scenario, sewage would be treated in a conventional manner whereby all blackwater and greywater from the dwellings would exit the house in a combined fashion and enter a septic tank. Sewage would then exit the septic tank and typically enter a pumping chamber. From the pumping chamber sewage would be pumped, on demand, to the filter bed sewage disposal system.

Filter beds are comprised of a stone layer, housing the distribution piping network, situated on top of a specified sand layer (the Filter Sand). Where a filter bed is installed on soil having a percolation rate of greater than 15 min/cm, imported sand fill shall be used to create a 15 m mantle area. The imported sand fill shall be a minimum of 250 mm deep at all locations within the leaching bed area and extend a minimum of 15 metres beyond the distribution pipe in the direction of horizontal shallow groundwater flow. The minimum area of the filter bed, constructed on native soil with a percolation rate of 25 min/cm, is calculated using the formula:

$$A = \frac{Q}{8}$$

where:

A = the area of contact (sand area) (m^2)
Q = the total daily design sanitary sewage flow (L)

Based on the above formula and the minimum and maximum expected sewage flows noted in *Table 2*, the minimum size of the leaching beds is calculated in *Table 3* below:

Table 3 Minimum Sewage System Contact Area

DESIGN SCENARIO	MINIMUM CONTACT AREA (LOWER FLOW LIMIT)	MINIMUM CONTACT AREA (UPPER FLOW LIMIT (3,000 L/DAY))
Leaching Bed Sizing	231 m^2	375 m^2

An effective area, comprised of septic stone meeting the gradation criteria set forth in Table 8.7.3.3., Division B, of the *Ontario Building Code*, overtop of the filter sand, is required to accommodate the distribution piping. The stone layer shall be rectangular in shape with the long dimension parallel to site contours and be protected by a permeable geo-textile (or equivalent). The minimum effective area (for sewage flows less than 3,000 L/day) is calculated based on:

$$A = \frac{Q}{75}$$

where:

A = the stone and pipe loading on the surface of the filter medium (m^2)
Q = the total daily design sewage flow (L)

Based on the above formula and the minimum and maximum expected sewage flows noted in *Table 2,* the minimum size of the effective area is calculated in *Table 4* below:

Table 4 Minimum Sewage System Stone Area

DESIGN SCENARIO	MINIMUM EFFECTIVE AREA (LOWER FLOW LIMIT)	MINIMUM EFFECTIVE AREA (UPPER FLOW LIMIT (3,000 L/DAY))
Effective Area Sizing	25 m^2	40 m^2

Although the theoretical minimum values in the previous tables provide the lower extent of how large a sewage system must be, the minimum constructable size can be marginally different due to factors such as the requirements for an imported sand mantle, sloping requirements, piping network design, etc.

Based on EnVision's design experience, we infer the likely minimum filter bed size for the lower flow scenario to be approximately 286 m^2 (13 m x 22 m), while the likely minimum filter bed size for the upper flow scenario (3,000 L/day) would be 380 m^2 (16.5 m x 23 m).

SCENARIO 2 – ADVANCED (LEVEL IV) SEWAGE TREATMENT

In an effort to reduce the overall area required, the Client may choose to install advanced (Level IV) sewage treatment systems prior to ultimate sewage disposal.

In this scenario the sewage would undergo primary treatment in the septic tank and then would be supplemented by further treatment with an advanced sewage treatment system. The advanced treatment unit would polish the sewage effluent to Level IV standards (10 mg/L TSS, 10 mg/L $CBOD_5$) through aerobic processes and/or physical filtration. The treated sewage effluent would be pumped, on demand, to a partially raised *Type A* dispersal bed.

Using a *Type A* sewage disposal system, in conjunction with an advanced treatment unit, there is capacity to hydraulically load the contact soils at a greater rate than conventional systems due to the reduced strength of the sewage being discharged. This allows for a reduction in the total area required for the installation.

Type A leaching beds are comprised of a stone layer, housing the distribution piping network, situated on top of a sand layer. As per the Ontario Building Code, where a *Type A* bed is installed on soil having a percolation rate of greater than 15 min/cm, imported sand fill shall be used in its construction. The imported sand fill should have a corresponding percolation rate between 6 and 10 min/cm and contain less than 5% fines (silt and clay). The imported sand fill shall be a minimum of 300 mm deep at all locations within the leaching bed area and extend a minimum of 15 metres beyond the distribution pipe in the direction of horizontal shallow groundwater flow. The minimum area of the *Type A* bed is calculated using the formula:

$$A = \frac{QT}{400}$$

where:

A = the area of contact (sand area) (m^2)
Q = the total daily design sanitary sewage flow (L)
T = the percolation rate of the native soil to a maximum of 50 (min/cm)

Based on the above formula, the minimum and maximum expected sewage flows noted in *Table 2,* and a native soil percolation rate of 25 min/cm, the minimum size of the leaching beds is calculated in *Table 5* below:

Table 5 Minimum Sewage System Contact Area

DESIGN SCENARIO	MINIMUM CONTACT AREA (LOWER FLOW LIMIT)	MINIMUM CONTACT AREA (UPPER FLOW LIMIT)
Leaching Bed Sizing	116 m^2	207 m^2

A stone layer, comprised of septic stone meeting the gradation criteria set forth in Table 8.7.3.3., Division B, of the Ontario Building Code, shall be installed to accommodate the distribution piping to obtain even distribution of the treated sewage effluent. The stone layer shall have a minimum thickness of 200 mm, be rectangular in shape with the long dimension parallel to site contours and be protected by a permeable geo-textile (or equivalent). The minimum stone area is calculated based on:

$$A = \frac{Q}{50\ or\ 75}$$

where:

A = the area of contact between the base of the stone layer and the underlying soils (m^2)
Q = the total daily design sewage flow (L)

The denominator of the equation is chosen based on the design flow rate. For flows less than 3,000 L/day the denominator is 75; otherwise, it is 50.

Based on the above formula, the minimum and maximum expected sewage flows noted in *Table 2*, the minimum size of the stone and pipe area is calculated in *Table 6* below:

Table 6 Minimum Sewage System Stone Area

DESIGN SCENARIO	MINIMUM STONE AREA (LOWER FLOW LIMIT)	MINIMUM STONE AREA (UPPER FLOW LIMIT)
Stone and Pipe Area	25 m^2	66 m^2

Although the theoretical minimum values in the previous tables provide the lower extent of how large a sewage system must be for the advanced sewage treatment scenario, the minimum constructable size can be different due to factors such as the requirements for an imported sand mantle, sloping requirements, piping network design, etc. Based on EnVision's design experience, we infer the likely minimum Type A bed size for the lower flow scenario to be approximately 286 m^2 (13 m x 22 m), while the likely minimum Type A bed size for the upper flow scenario would be 368 m^2 (16 m x 23 m).

SUMMARY OF DETAILED SEWAGE SERVICING SCENARIOS

As displayed in the scenarios above, the impact to the on-site sewage system sizes by incorporating advanced (Level IV) sewage treatment is nominal, primarily due to the sandy till nature of the soil type at the site. The requirement for a 15 m imported sand mantle necessitates larger than minimum basal contact area in the advanced treatment scenario, such that the additional capital and operating costs of advanced treatment would not be preferable.

Advanced system treatment may be preferable for the largest expected houses in the development (i.e. flows greater than 3,000 L/day) or if isolated areas of siltier soils are found in untested areas.

Advanced sewage treatment would be required should nitrate reduction be required as part of the development approval process.

CLOSING

Based on the information throughout this letter report, EnVision presents the following key findings:

- Adequate area is available on each lot to meet the Durham Region Lot Sizing Policy for the proposed 8 lot development.
- Detailed sewage servicing was evaluated under two different lot level scenarios; primary treatment discharging to filter beds and Level IV treatment discharging to Type A leaching beds.
- Based on the conceptual house details provided by the Client, and the soil information previously analyzed by WSP Canada Inc., the leaching beds will likely vary in size from about 286 m^2 to 375 m^2 in area.
- Advanced (Level IV) sewage treatment provides minimal reduction in sewage system design sizing for flows less than 3,000 L/day. Advanced sewage treatment may be preferable for flows >3,000 L/day or if nitrate reduction is required as part of the development approval process.

We trust that this information will be sufficient for the purposes of a sewage system sizing study. Please contact the undersigned at (905) 868-4032 or mvarty@envisionconsultants.ca to discuss the information contained within this letter report.

Yours sincerely,

EnVision Consultants Ltd

PMcDowell

Michael Varty, P.Eng. PMP
Director – Water
mvarty@envisionconsultants.ca

Paisley McDowell, P.Eng.
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INCLUSIONS:

Figures

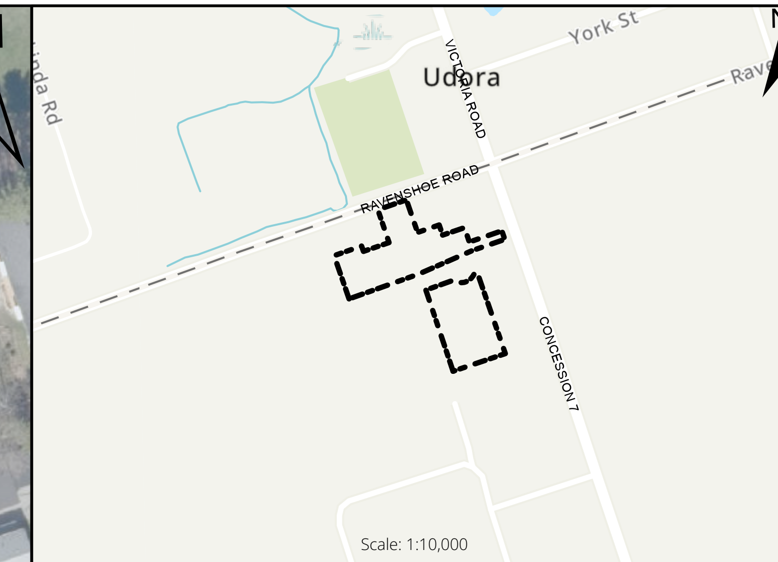
Figure 1 Site Plan

Figure 2 Conceptual Sewage System Sizing – Durham Lot Sizing Policy

Attachments

WSP Particle Size Distribution Curves

FIGURES



LEGEND

SITE BOUNDARY

TITLE

SITE LOCATION PLAN

PROJECT

ON-SITE SEWAGE SYSTEM SIZING STUDY
UDORA DEVELOPMENT
PART OF LOTS 34 & 35, CONCESSION 6
UDORA, ONTARIO

CLIENT

2695867 ONTARIO INC.

PROJECT NO.	DATE	PREPARED BY	APPROVED BY	FIGURE
22-0223	JANUARY 2026	TP	MV	1

LEGEND:

H	Conceptual Building Envelope
P	Conceptual Prime Leaching Bed (375 sq. m)
R	Conceptual Reserve Leaching Bed (375 sq. m)
W	Proposed Drinking Water Well with a 15m Protected Radius
	Existing Well to be abandoned in Accordance with Regulation 903
TP19-5 (T=25min/cm)	Approximate Test pit Location and Estimated Percolation Rate (T-Time), WSP Canada Inc. 2019

DW = Driveway

TITLE: Conceptual Servicing Plan

PROJECT : On-Site Sewage System Sizing Study - Udora Development

CLIENT : 2695867 Ontario Inc.

PREPARED BY: MV

DATE: December 2024

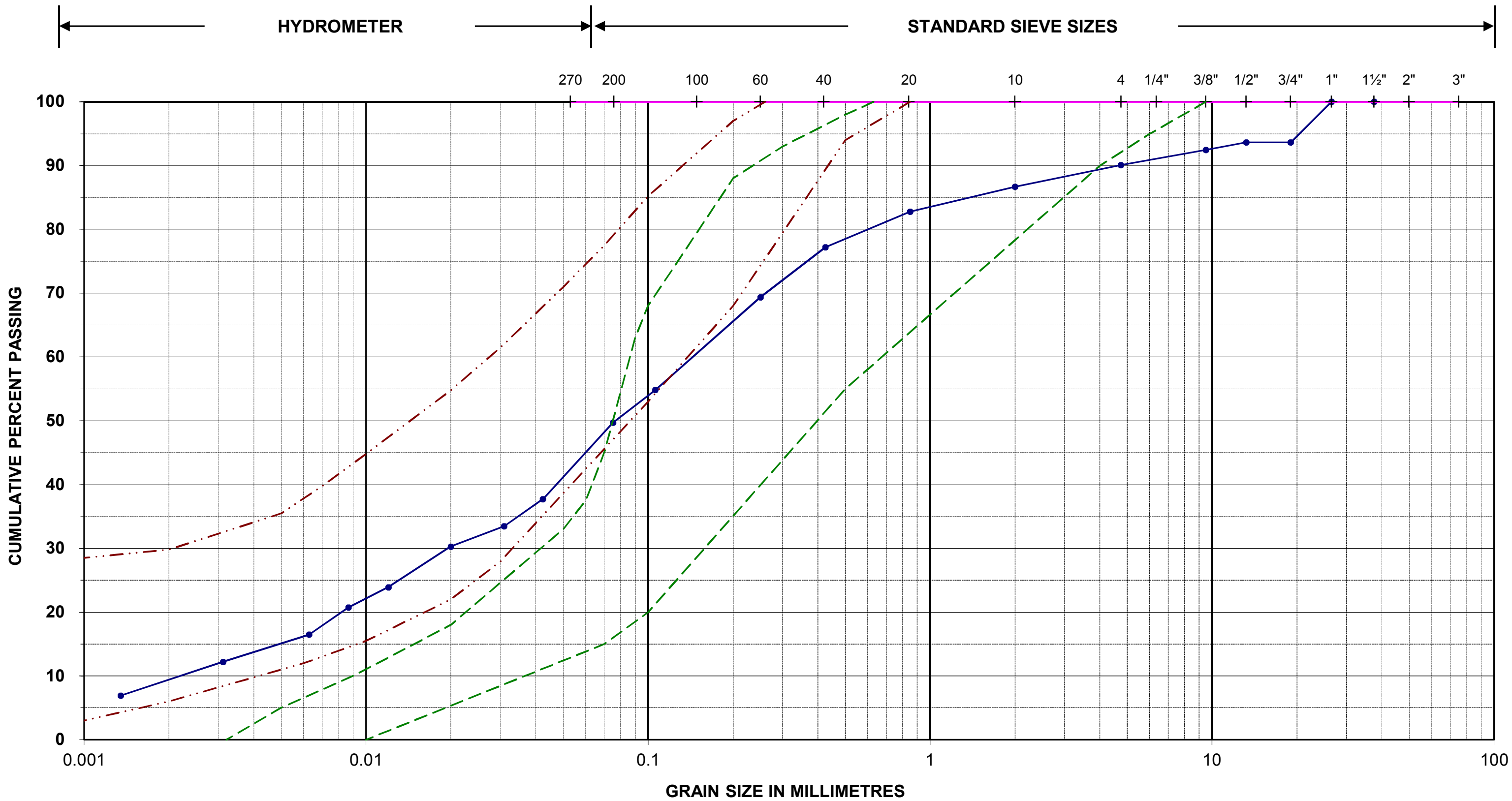
PROJECT NO: 22-0223

CHECKED BY: PLM

FIGURE NO: 2

ATTACHMENT A

PARTICLE SIZE DISTRIBUTION ASTM D422



Unified Classification System

SILT AND CLAY	SAND	GRAVEL

GRAVEL	10	%
SAND	40	%
SILT	43	%
CLAY	7	%

-------------------------- sm envelope T = 8 - 20 min/cm

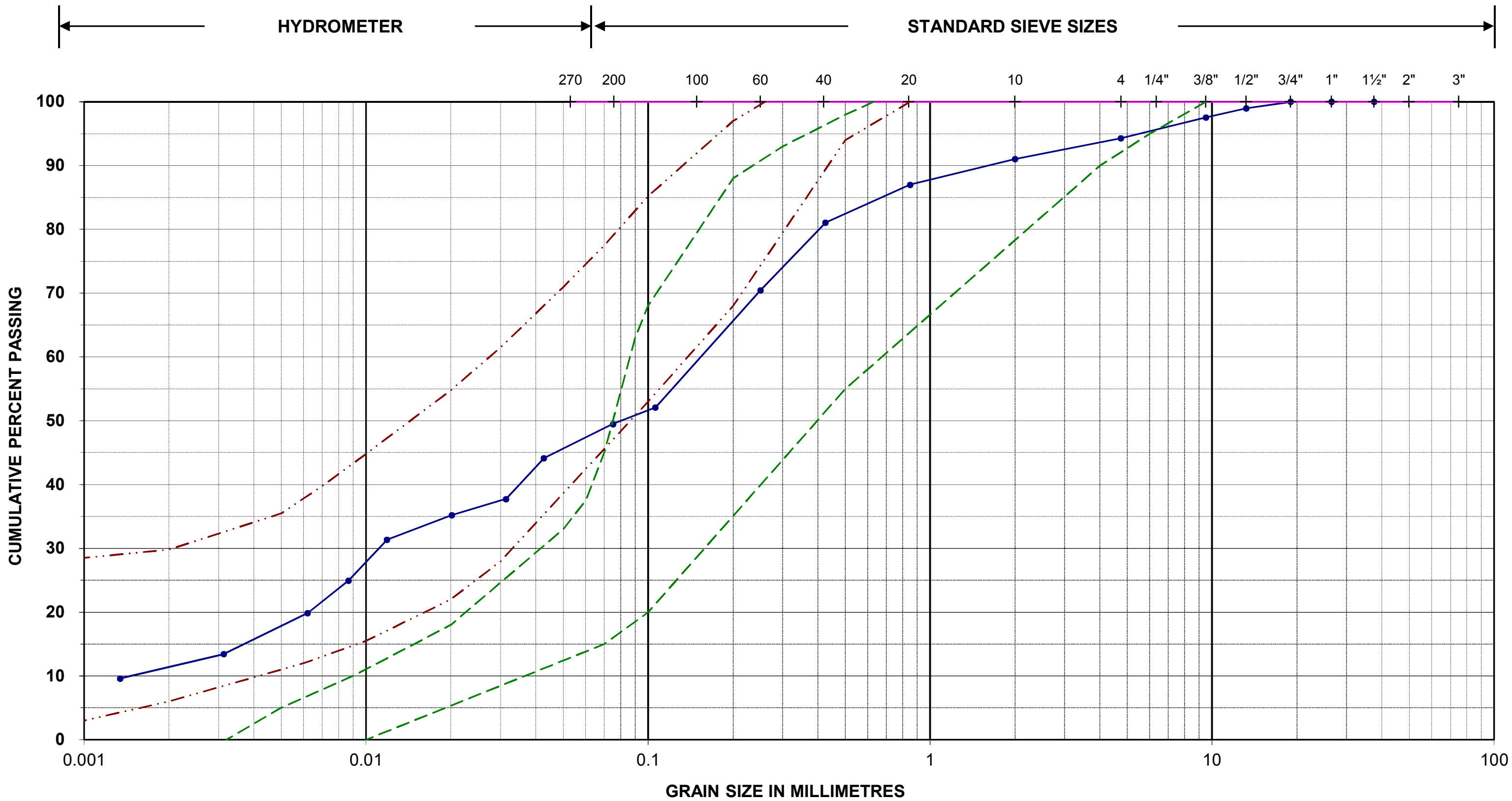
- - — - - — - - — - - ml envelope T = 20 - 50 min/cm

Estimated T = 25 min/cm

Project Name:	Udora Subdivision	**Project No.:**	181-12360-00
Location ID.:	TP19-1	**Sample No./Depth:**	SS2

Sieve Size	% Passing Coarse	Sieve Size	% Passing Fine	Hydrometer (mm)	% Passing
37.5 mm	100.0	**2.00 mm**	86.67	**0.042**	37.7
26.5 mm	100.0	**0.850 mm**	82.8	**0.020**	30.3
19.0 mm	93.7	**0.425 mm**	77.2	**0.009**	20.7
13.2 mm	93.7	**0.250 mm**	69.4	**0.003**	12.2
9.50 mm	92.4	**0.106 mm**	54.9	**0.001**	6.9
4.75 mm	90.1	**0.075 mm**	49.7		

PARTICLE SIZE DISTRIBUTION ASTM D422



Unified Classification System

SILT AND CLAY	SAND	GRAVEL

GRAVEL	6	%
SAND	45	%
SILT	40	%
CLAY	10	%

------------------------ sm envelope T = 8 - 20 min/cm

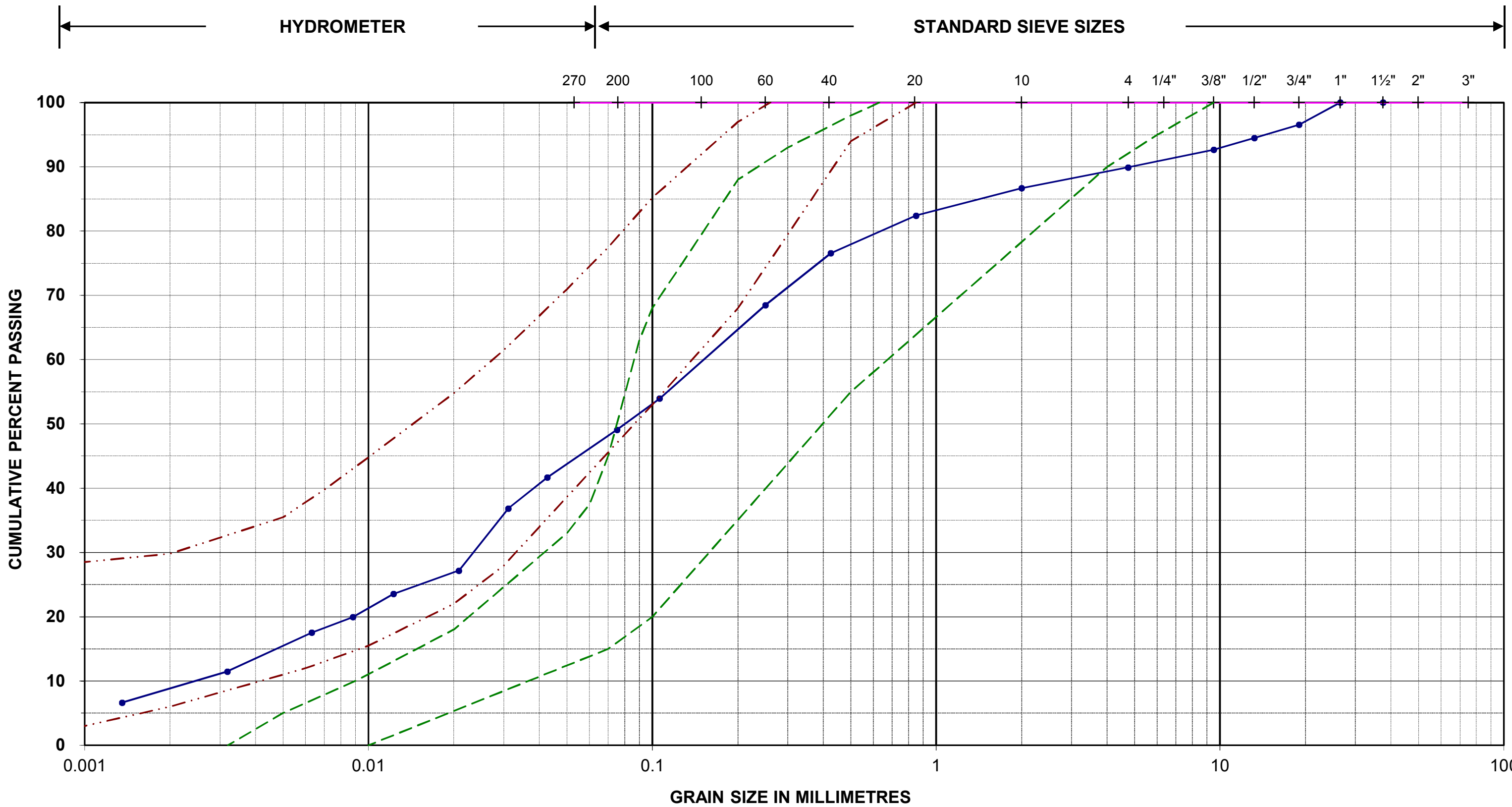
-·-·—·-·—·-·— ml envelope T = 20 - 50 min/cm

Estimated T = 25 min/cm

Project Name:	Udora Subdivision	**Project No.:**	181-12360-00
Location ID.:	TP19-2	**Sample No./Depth:**	SS1

Sieve Size	% Passing Coarse	Sieve Size	% Passing Fine	Hydrometer (mm)	% Passing
37.5 mm	100.0	**2.00 mm**	91.02	**0.043**	44.1
26.5 mm	100.0	**0.850 mm**	87.0	**0.020**	35.2
19.0 mm	100.0	**0.425 mm**	81.1	**0.009**	24.9
13.2 mm	99.0	**0.250 mm**	70.4	**0.003**	13.4
9.50 mm	97.6	**0.106 mm**	52.1	**0.001**	9.6
4.75 mm	94.3	**0.075 mm**	49.5		

PARTICLE SIZE DISTRIBUTION ASTM D422



Unified Classification System

SILT AND CLAY	SAND	GRAVEL

GRAVEL	10	%
SAND	41	%
SILT	42	%
CLAY	7	%

------------------------- sm envelope T = 8 - 20 min/cm

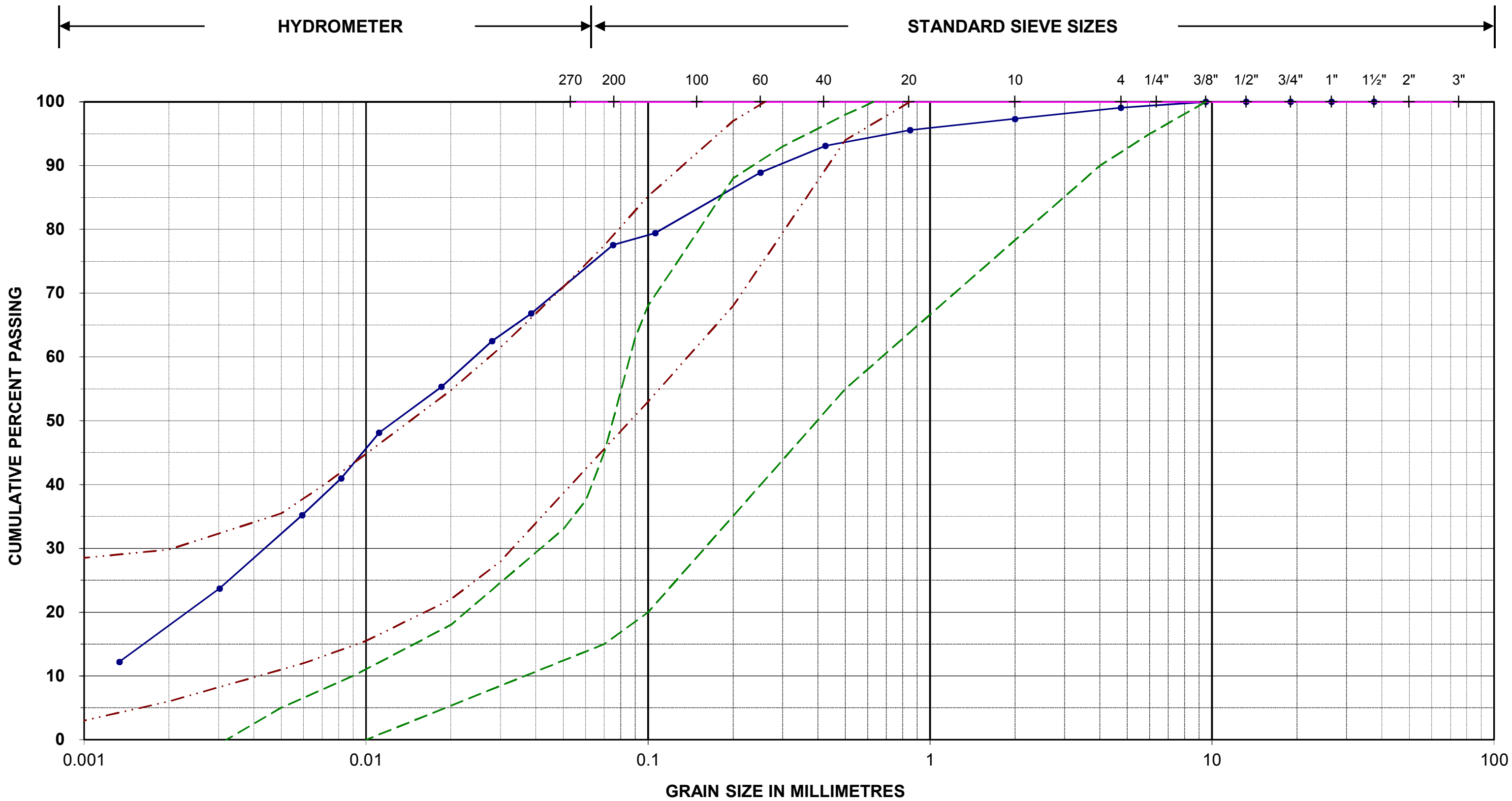
-·-·-·-·- ml envelope T = 20 - 50 min/cm

Estimated T = 25 min/cm

Project Name:	Udora Subdivision	**Project No.:**	181-12360-00
Location ID.:	TP19-3	**Sample No./Depth:**	SS1

Sieve Size	% Passing Coarse	Sieve Size	% Passing Fine	Hydrometer (mm)	% Passing
37.5 mm	100.0	**2.00 mm**	86.69	**0.043**	41.7
26.5 mm	100.0	**0.850 mm**	82.4	**0.021**	27.2
19.0 mm	96.6	**0.425 mm**	76.6	**0.009**	19.9
13.2 mm	94.5	**0.250 mm**	68.5	**0.003**	11.5
9.50 mm	92.7	**0.106 mm**	53.9	**0.001**	6.6
4.75 mm	89.9	**0.075 mm**	49.1		

PARTICLE SIZE DISTRIBUTION ASTM D422



Unified Classification System

SILT AND CLAY	SAND	GRAVEL

GRAVEL	1	%
SAND	22	%
SILT	65	%
CLAY	12	%

------------------------ sm envelope T = 8 - 20 min/cm

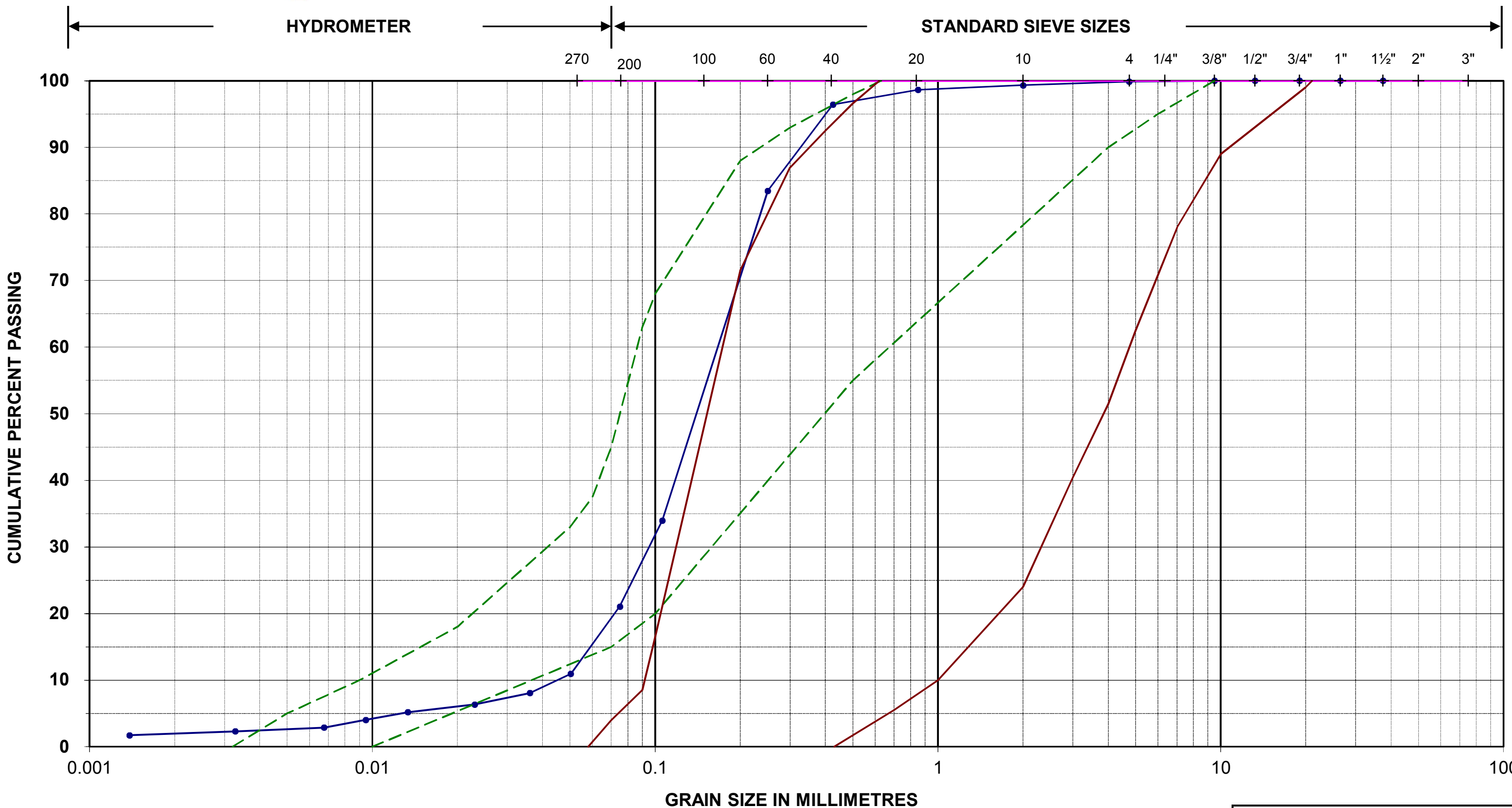
–·–·–·–·–·– ml envelope T = 20 - 50 min/cm

Estimated T = 45 min/cm

Project Name:	Udora Subdivision	**Project No.:**	181-12360-00
Location ID.:	TP19-4	**Sample No./Depth:**	SS1

Sieve Size	% Passing Coarse	Sieve Size	% Passing Fine	Hydrometer (mm)	% Passing
37.5 mm	100.0	**2.00 mm**	97.32	**0.038**	66.8
26.5 mm	100.0	**0.850 mm**	95.6	**0.018**	55.3
19.0 mm	100.0	**0.425 mm**	93.1	**0.008**	41.0
13.2 mm	100.0	**0.250 mm**	88.9	**0.003**	23.7
9.50 mm	100.0	**0.106 mm**	79.4	**0.001**	12.2
4.75 mm	99.1	**0.075 mm**	77.6		

PARTICLE SIZE DISTRIBUTION ASTM D422



Unified Classification System

SILT AND CLAY	SAND	GRAVEL

GRAVEL	0	%
SAND	79	%
SILT	19	%
CLAY	2	%

------------------------ sm envelope T = 8 - 20 min/cm

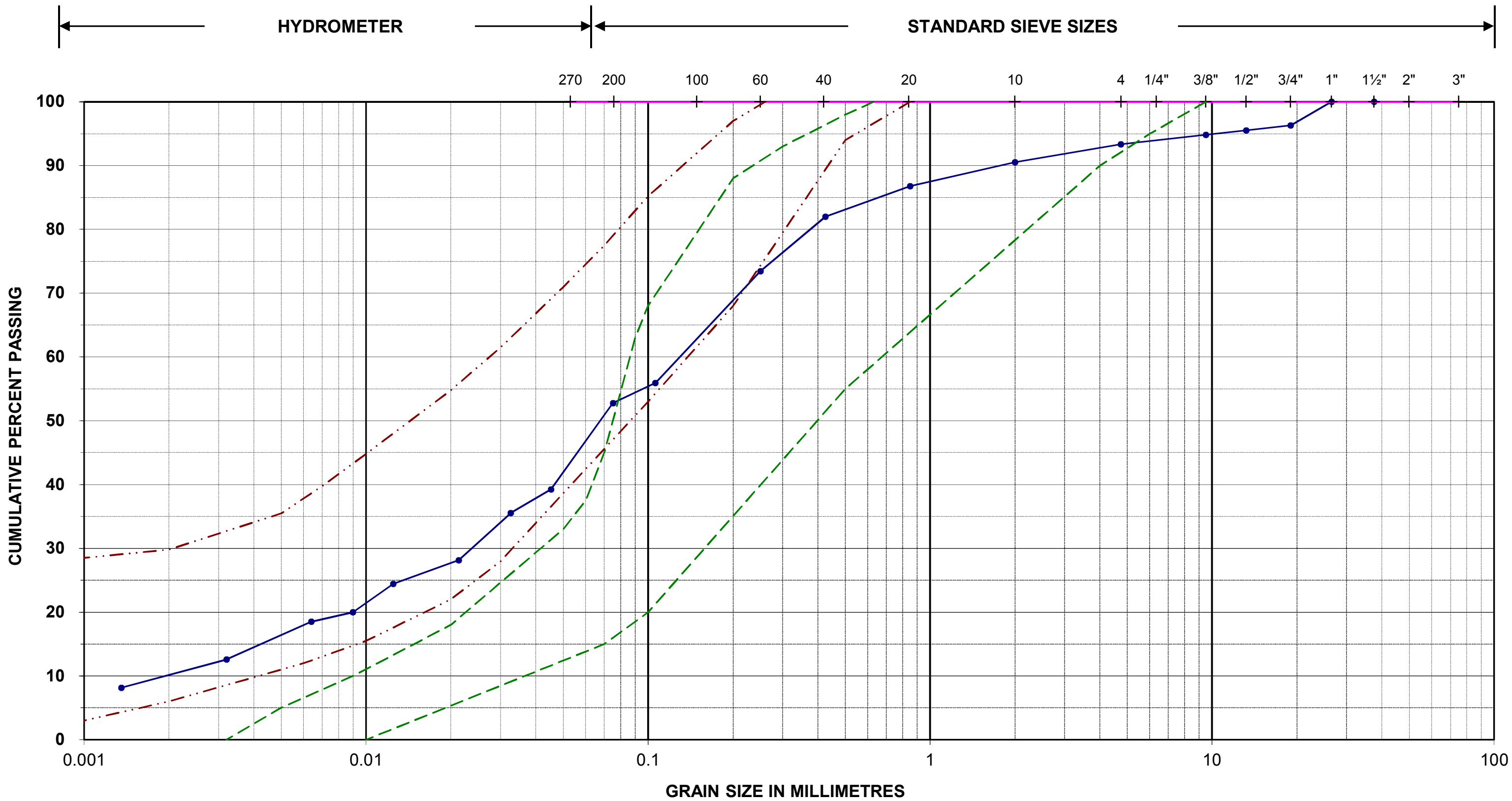
———————— sp envelope T = 2 - 8 min/cm

Estimated T = 10 min/cm

Project Name:	Udora Subdivision	**Project No.:**	181-12360-00
Location ID.:	TP19-5	**Sample No./Depth:**	SS2

Sieve Size	% Passing Coarse	Sieve Size	% Passing Fine	Hydrometer (mm)	% Passing
37.5 mm	100.0	**2.00 mm**	99.33	**0.050**	10.9
26.5 mm	100.0	**0.850 mm**	98.6	**0.023**	6.3
19.0 mm	100.0	**0.425 mm**	96.4	**0.009**	4.0
13.2 mm	100.0	**0.250 mm**	83.5	**0.003**	2.3
9.50 mm	100.0	**0.106 mm**	34.0	**0.000**	1.7
4.75 mm	99.9	**0.075 mm**	21.1		

PARTICLE SIZE DISTRIBUTION ASTM D422



Unified Classification System

SILT AND CLAY	SAND	GRAVEL

GRAVEL	7	%
SAND	41	%
SILT	45	%
CLAY	8	%

sm envelope T = 8 - 20 min/cm

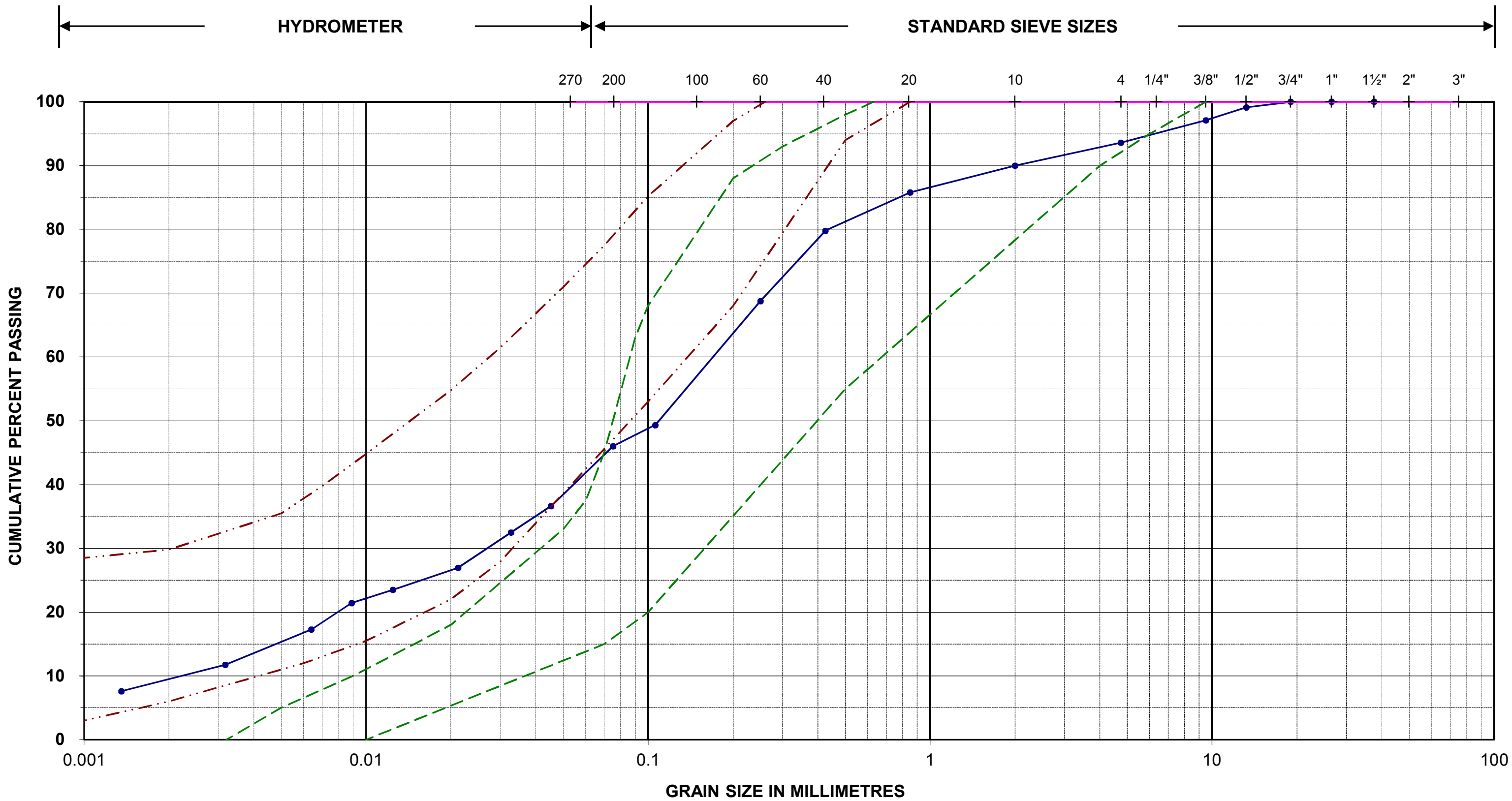
ml envelope T = 20 - 50 min/cm

Estimated T = 25 min/cm

Project Name:	Udora Subdivision	**Project No.:**	181-12360-00
Location ID.:	TP19-6	**Sample No./Depth:**	SS1

Sieve Size	% Passing Coarse	Sieve Size	% Passing Fine	Hydrometer (mm)	% Passing
37.5 mm	100.0	**2.00 mm**	90.52	**0.045**	39.2
26.5 mm	100.0	**0.850 mm**	86.8	**0.021**	28.1
19.0 mm	96.3	**0.425 mm**	82.0	**0.009**	20.0
13.2 mm	95.5	**0.250 mm**	73.4	**0.003**	12.6
9.50 mm	94.8	**0.106 mm**	55.9	**0.001**	8.1
4.75 mm	93.4	**0.075 mm**	52.8		

PARTICLE SIZE DISTRIBUTION ASTM D422



Unified Classification System

SILT AND CLAY	SAND	GRAVEL

GRAVEL	6	%
SAND	48	%
SILT	38	%
CLAY	8	%

-------------------------- sm envelope T = 8 - 20 min/cm

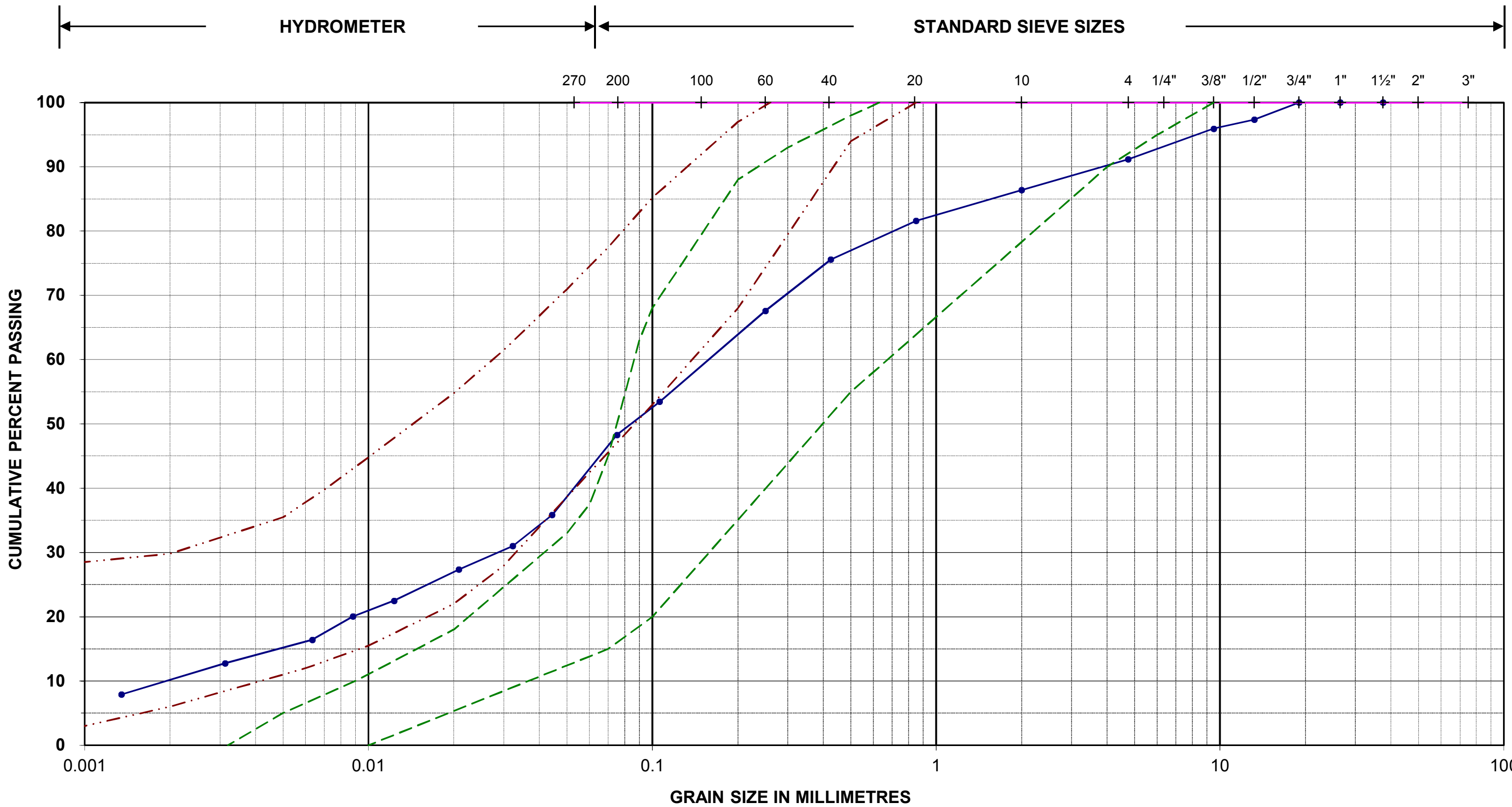
-.-.—.-.—.-.—.- ml envelope T = 20 - 50 min/cm

Estimated T = 25 min/cm

Project Name:	Udora Subdivision	**Project No.:**	181-12360-00
Location ID.:	TP19-7	**Sample No./Depth:**	SS1

Sieve Size	% Passing Coarse	Sieve Size	% Passing Fine	Hydrometer (mm)	% Passing
37.5 mm	100.0	**2.00 mm**	90.00	**0.045**	36.6
26.5 mm	100.0	**0.850 mm**	85.8	**0.021**	26.9
19.0 mm	100.0	**0.425 mm**	79.8	**0.009**	21.4
13.2 mm	99.1	**0.250 mm**	68.8	**0.003**	11.7
9.50 mm	97.1	**0.106 mm**	49.3	**0.001**	7.6
4.75 mm	93.6	**0.075 mm**	46.0		

PARTICLE SIZE DISTRIBUTION ASTM D422



Unified Classification System

SILT AND CLAY	SAND	GRAVEL

GRAVEL	9	%
SAND	43	%
SILT	40	%
CLAY	8	%

------------------------- sm envelope T = 8 - 20 min/cm

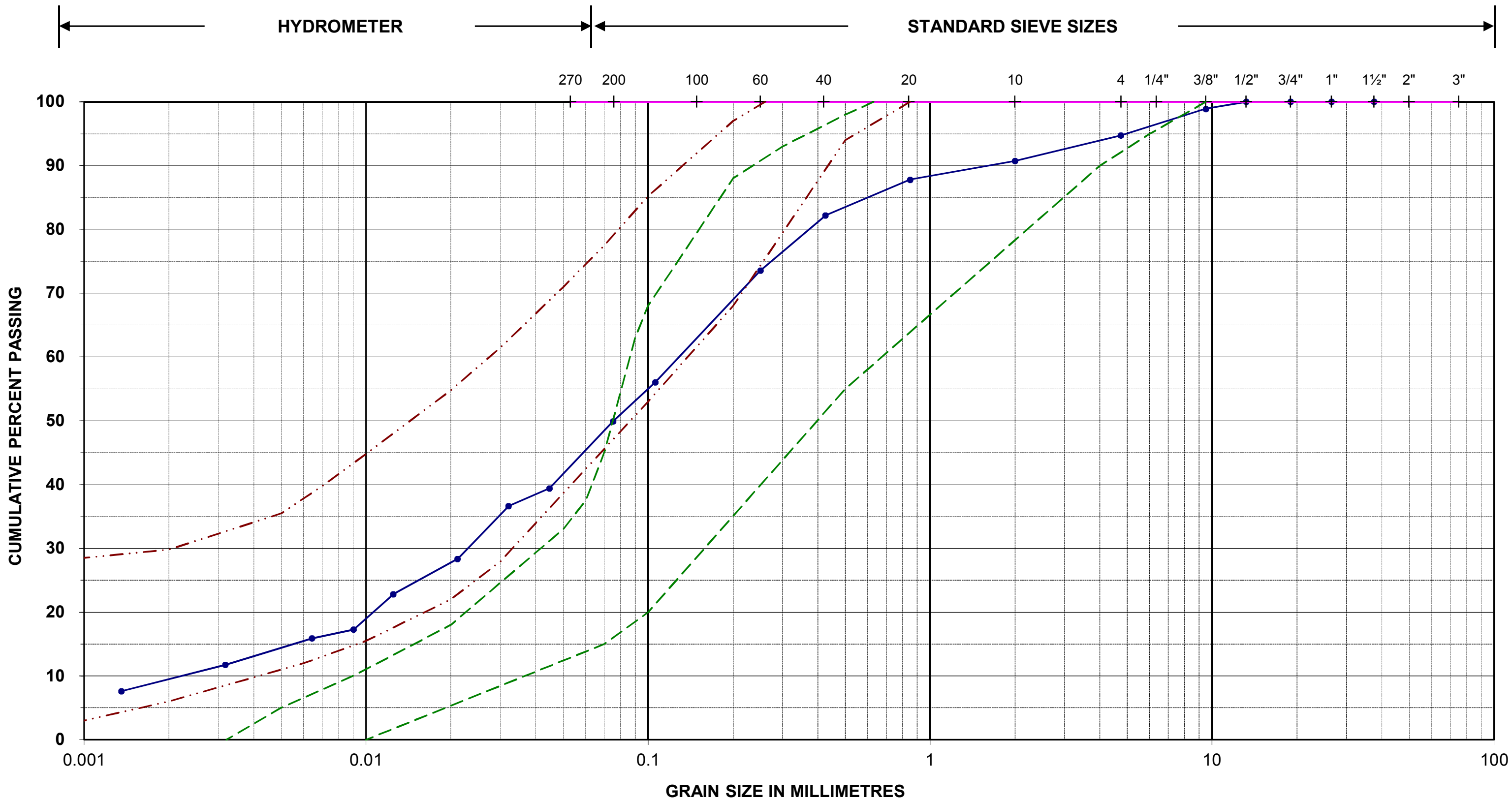
-·-·—·-·—·-·—·- ml envelope T = 20 - 50 min/cm

Estimated T = 25 min/cm

Project Name:	Udora Subdivision	**Project No.:**	181-12360-00
Location ID.:	TP19-8	**Sample No./Depth:**	SS1

Sieve Size	% Passing Coarse	Sieve Size	% Passing Fine	Hydrometer (mm)	% Passing
37.5 mm	100.0	**2.00 mm**	86.39	**0.044**	35.8
26.5 mm	100.0	**0.850 mm**	81.6	**0.021**	27.3
19.0 mm	100.0	**0.425 mm**	75.6	**0.009**	20.0
13.2 mm	97.4	**0.250 mm**	67.6	**0.003**	12.8
9.50 mm	95.9	**0.106 mm**	53.5	**0.001**	7.9
4.75 mm	91.2	**0.075 mm**	48.3		

PARTICLE SIZE DISTRIBUTION ASTM D422



Unified Classification System

SILT AND CLAY	SAND	GRAVEL

GRAVEL	5	%
SAND	45	%
SILT	42	%
CLAY	8	%

------------------------- sm envelope T = 8 - 20 min/cm

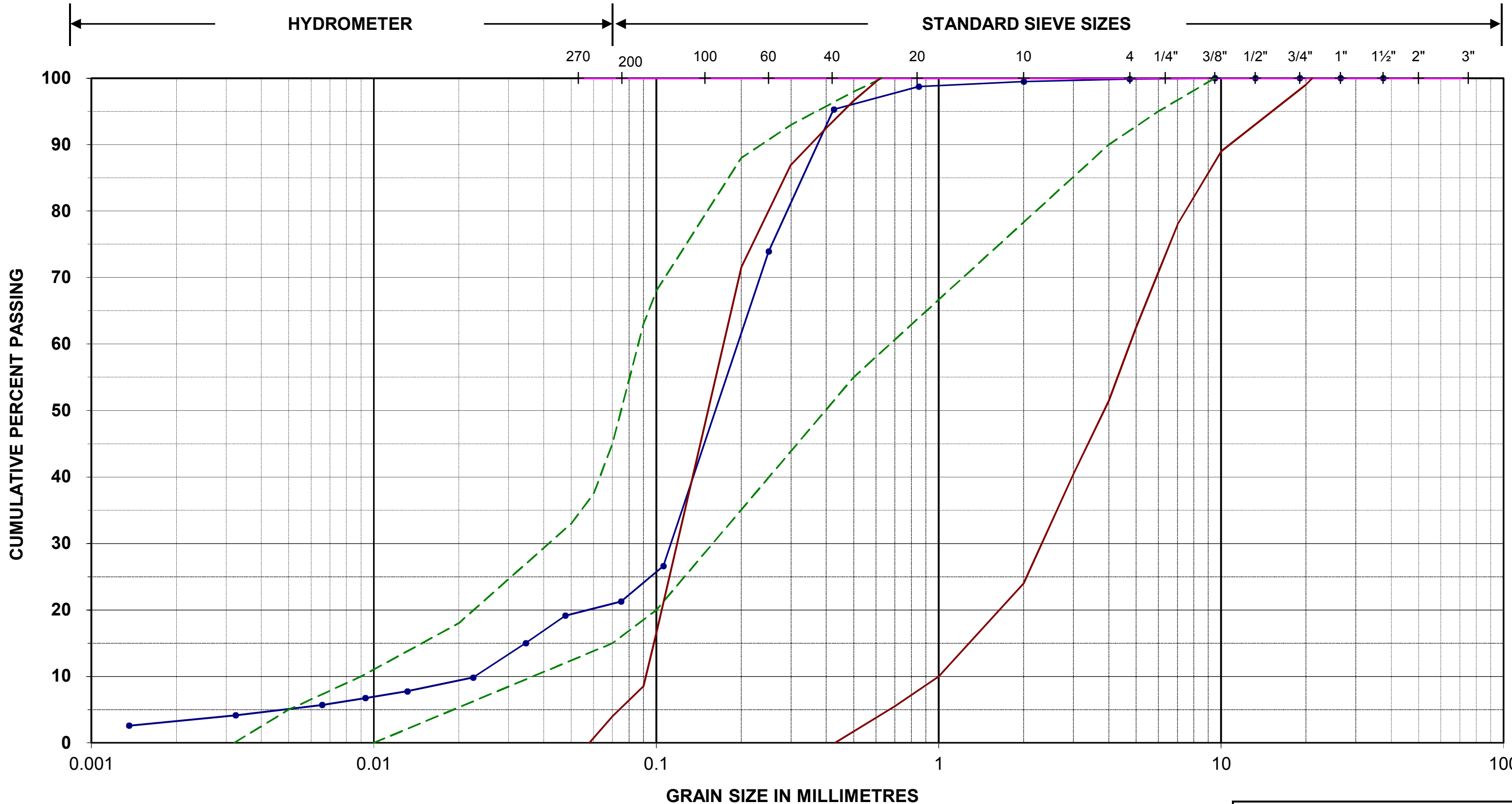
-·-—-·-·-—-·-—-·- ml envelope T = 20 - 50 min/cm

Estimated T = 25 min/cm

Project Name:	Udora Subdivision	**Project No.:**	181-12360-00
Location ID.:	TP19-10	**Sample No./Depth:**	SS1

Sieve Size	% Passing Coarse	Sieve Size	% Passing Fine	Hydrometer (mm)	% Passing
37.5 mm	100.0	**2.00 mm**	90.74	**0.045**	39.4
26.5 mm	100.0	**0.850 mm**	87.8	**0.021**	28.3
19.0 mm	100.0	**0.425 mm**	82.2	**0.009**	17.3
13.2 mm	100.0	**0.250 mm**	73.5	**0.003**	11.8
9.50 mm	98.9	**0.106 mm**	56.1	**0.001**	7.6
4.75 mm	94.7	**0.075 mm**	49.9		

PARTICLE SIZE DISTRIBUTION ASTM D422



Unified Classification System

SILT AND CLAY	SAND	GRAVEL

GRAVEL	0	%
SAND	79	%
SILT	19	%
CLAY	3	%

------------------------ sm envelope T = 8 - 20 min/cm

———————— sp envelope T = 2 - 8 min/cm

Estimated T = 15 min/cm

Project Name:	Udora Subdivision	**Project No.:**	181-12360-00
Location ID.:	TP19-9	**Sample No./Depth:**	SS1

Sieve Size	% Passing Coarse	Sieve Size	% Passing Fine	Hydrometer (mm)	% Passing
37.5 mm	100.0	**2.00 mm**	99.48	**0.048**	19.2
26.5 mm	100.0	**0.850 mm**	98.7	**0.022**	9.8
19.0 mm	100.0	**0.425 mm**	95.3	**0.009**	6.7
13.2 mm	100.0	**0.250 mm**	73.9	**0.003**	4.1
9.50 mm	100.0	**0.106 mm**	26.6	**0.000**	2.6
4.75 mm	99.9	**0.075 mm**	21.3		

GAMAN CONSULTANTS INC.

UDORA ESTATES WATER BALANCE EVALUATION
REVISION 2
PART LOT 35, CON. 6, TWP UXBRIDGE
REGION OF DURHAM

Prepared for:
2695867 Ontario Inc.

December 2025

File 22012.04

Distribution:
1 c Client (PDF)
1 c File

GAMAN CONSULTANTS INC.
Barrie, Ont.
705-279-9156
ghendy.gaman@outlook.com

December 22, 2025

2695867 Ontario Inc.
71 Shannon St.
Toronto, On.
M6J 2E6

Attention: Mr. Jeff Risi and John Cooper

Re: Udora Estates Water Balance Evaluation Revision 2
Part Lot 35, Con. 6, TWP Uxbridge, Durham Region
File 22012.04

GAMAN Consultants Inc. is pleased to submit this hydrogeological report documenting the results of a water balance evaluation for the above noted property. The results of the water balance evaluation show a deficit in infiltration after development, and this is common with developments. There is enough recharge available from rooftops to off set the deficit using low impact development measures.

Yours truly,
GAMAN Consultants Inc.

Gary R. Hendy, P.Eng.
Consulting Engineer

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TABLES

1.0 INTRODUCTION

1.1 BACKGROUND

This report (Revision 2) provides the results of a hydrogeological assessment carried out by GAMAN Consultants Inc. (GAMAN) in support of a plan of subdivision application for the subject lands owned by 2695867 Ontario Inc. The report was initiated to document the effects of creating hard cover surfaces that prevent recharge from infiltrating to the water table.

By way of background, 2695867 Ontario Inc. owns a 1.94-ha parcel of land situated on Part Lots 34 & 35, Concession 6, Township of Uxbridge within the Hamlet of Udora, as shown in Figure 1. Figure 2 illustrates the layout of the 8 proposed lots and stormwater pond based on a Preliminary Site Grading Plan prepared by SCS, dated December 2025. The subject property has an unopened road right-of-way (0.77-ha) connecting Birdie Smith Court to Ontario Street to the west, which is owned by Township of Uxbridge. The subject land, therefore, has a combined area of 2.71-ha.

WSP Canada Inc. and GAMAN Consultants Inc. completed hydrogeological investigations of the Capris Development during 2019 for Capris Developments. The WSP Report was never finalized, and the subdivision was sold to 2695867 Ontario Inc. GAMAN Consultants was retained to re-evaluate the test data from the 2019 investigations and integrate those study results into this hydrogeological report.

This report is the second revision to the Water Balance because of comments received from the LSRCA and changes to the property. The property owners acquired the vacant lot on the north side of the site where it is proposed to construct the stormwater management pond. The former location of the pond was converted to proposed residential lot 8. Some the significant other changes to this report include LSRCA requests to reduce runoff from rooftops to 50% from 90% of the total precipitation for the purpose of mitigating recharge, and the addition of the roadway area to the water balance.

1.2 STUDY OBJECTIVES & SCOPE

The Conservation Authorities Geoscience Group developed guidelines for hydrogeological assessment submissions related to water balances. The document provides information for consultants to consider and address in technical submissions for a development site that are within a Significant Groundwater Recharge Area (SGRA). The purpose of this evaluation was to assess the changes in recharge to the site for input into appropriate mitigation methods to be implemented to maintain groundwater recharge.

The tasks required to complete the work program included:

- Background review of the physical setting of the site including physiography, surficial geology and groundwater.
- A site inspection of the site and surrounding area.
- Review soils and groundwater monitoring data from boreholes installed by other project team members.
- A review of local water well records and existing services around the site.
- Preparation of a hydrogeological report to address the 2013 Conservation Authority Guidelines for a water balance.

This report documents the study findings of these investigations.

2.0 <u>PHYSICAL SETTING</u>

2.1 PHYSIOGRAPHY, SURFICIAL GEOLOGY AND DRAINAGE

The physiography of the Site is illustrated in Figure 3. The study area is situated within the Peterborough Drumlin Field Physiographic Region as described by Chapman and Putnam (1984) as represented in the OGS Earth application accessible through the Ministry of

Northern Development and Mines Web Page. A small portion of the northeast corner of the Site lies within the Simcoe Lowlands Physiographic Region. The Peterborough Drumlin Field is characterized by a rolling till plain that is dotted with oval-shaped hills known as drumlins. Although drumlins flank the site to the east, south and west, there are no drumlins noted within the Site boundary. The till plains and drumlins dominate the landscape at a regional scale. Organic deposits of peat and muck are present in the valleys.

Surficial geology is illustrated in Figure 4. The site is situated on dominantly till-like soils comprised of heterogeneous mixtures of sand and silt with some gravel and clay. The sandy overburden west and north of the site are distinct from the surficial soils east of the site and reflect the two physiographic settings described above.

The bedrock beneath the study area is mapped as limestone/dolostone/shale/arkose/sandstone of the Simcoe Group; Lindsay Formation (Ontario Geological Survey, 2011) as illustrated on Figure 5. The depth to bedrock is estimated to be between 30 to 40 metres below ground surface (m bgs), based on overburden thickness mapping (Gao et al., 2006).

The Site is located within the Lake Simcoe Watershed. The local topography of the Site slopes from the south at an elevation of 250 metres above sea level (masl) to the north, at an elevation of approximately 240 masl. Runoff drains to the north into a drainage ditch along Ravenshoe Road and is inferred to flow into a tributary which connects to the Pefferlaw River, and subsequently Lake Simcoe (Figure 6).

2.2 HYDROGEOLOGY

The hydrogeologic setting was interpreted based on the local water well record database maintained by the MECP and plotted on Figure 7. The Oak Ridges Moraine Groundwater Program was also referenced to support the interpretation.

As noted within the test pit logs, Table E-1, the shallow overburden is comprised mostly of silty-sand to sandy-silt of varying thicknesses and fine sand, typically a minimum of 1.5 metres and up to more than 1.8 metres thick. One test pit documented silt. Particle size distribution analyses from soils from the test pits (Appendix E) are representative of shallow soils and illustrate the gradation of the soils in the uppermost portion of the overburden. The borehole logs for MW17-1, MW17-2 and MW17-3 identify a silty-sand to sandy-silt layer extending to at least 6.7 metres below ground surface (mbgs). The water well record submitted for the on-site well TW1 also noted a sandy composition to a depth of 5.7 mbgs. It is inferred, based on the drilling records, that the soil composition becomes finer grained with depth.

The regional hydrogeologic setting of the area is described below with the visual aid of hydrostratigraphic sections 'A-A' and 'B-B' in Figures 8 and 9 respectively.The hydrostratigraphy consists of the following types of units:

- Upper Unconfined Aquifer
- Upper Aquitard
- Lower Overburden Aquifer
- Bedrock Aquifer

<u>The Upper Unconfined Aquifer</u> is formed within the surficial sand plain. This unit is limited in both vertical and lateral extent, based on the physiographic setting. The unit could be a source of groundwater for shallow dug and bored wells that would extend through this unit and into the underlying till-based aquitard. Domestic wells that might extend through this unit could experience water shortages based on seasonal variations in the water table.

<u>The Upper Aquitard</u> is generally till-like at a depth of below 3 metres, and characteristic of Newmarket Till-aged deposits. This aquitard is comprised of mostly fine-grained sediments that behave as a protective layer above the water-bearing units. Portions of the aquitard

described as clay, or as sand containing a significant component of clay, will have reduced permeability. The aquitard acts as a barrier to retard the vertical movement of groundwater from the ground surface to the underlying aquifers from which water supplies will be obtained by the development. This hydrostratigraphic unit should buffer groundwater quality in the supply aquifer from shallow sources of contaminants discharged near surface. Some portions of the aquitard may contain coarser fractions that allow wells to extract enough groundwater for domestic use.

The Lower Overburden Aquifer is comprised of granular sediments of limited lateral and vertical extent. The aquifer ranges from less than 1 metre to more than 17 metres thick. The aquifer may be non-existent in some of the study area. Many of the wells on-site and off-site terminate within this aquifer. The Lower Overburden Aquifer is confined beneath the overlying Upper Aquitard. Where encountered this aquifer tends to yield sufficient water quantity for domestic use.

The fractured Limestone Bedrock Aquifer is also confined beneath the Upper Aquitard and the Lower Overburden Aquifer, and it extends across the study area. The depth to limestone is generally greater than about 20 metres below grade as observed at the King Coles Ducks Test Well TW09-2 (Figure 8). The physical evidence from previous reporting suggests that the upper portion of the bedrock aquifer and the lower overburden aquifer are hydraulically connected to one another. Either the Lower Overburden Aquifer (where encountered), or the fractured Limestone Bedrock Aquifer, is proposed as the source of groundwater for this development. The water quality in these aquifers is protected from activities at surface by the Upper Aquitard.

2.3 WATER WELL RECONNAISSANCE SURVEY

The Site is surrounded by rural residential properties to the north, east and south and borders a natural heritage system to the west, which currently remains undeveloped. No landfills, salt domes, or any other land use that would be considered major pollution sources are present within 500 metres of the Site.

Existing agricultural, domestic fertilizers and on-site sewage disposal systems would be sources of nitrogen to the shallow groundwater regime. A survey was conducted on September 25 and 27, 2018 and October 3, 2018, to identify current users of groundwater within 500 metres of the Site. Residents were asked to participate on a voluntary basis and were provided with a letter outlining the purpose of the survey. The survey was administered by a representative from WSP at the time of visitation, or the survey form was left with the resident at their request. Homeowners who were not present were left with the letter outlining the purpose of the survey and the survey form itself. The information gathered from this program was used to supplement information in the (MECP) Water Well Record database. Figure 7 shows the water well locations based on the MECP Water Well Information Service (WWIS). Information contained within the WWIS is summarized in Table A-1, Appendix A.

We understand that WSP staff visited 109 properties in the area surrounding the Site to assess private water supply wells. Thirteen responses to the survey were received. This reflects a response rate of 12%. Some residents were willing to answer a few questions regarding the well but would not allow an inspection. The responses have been summarized in Table A-2 in Appendix A.

The results of the survey indicate that there is a mixture of drilled and dug wells in the surrounding area. The majority of respondents indicated that they had good water pressure with the exception of the properties at 685 Ravenshoe Road, 25 Bagshaw Crescent, 28 Bagshaw Crescent, and 52 Victoria Road. Bagshaw Crescent is located immediately south of the proposed development. Issues related to water pressure can result from the size, age and type of pump to the depth the pump, or pump intake in the well and/or the yield of the well.

Wells that were inspected ranged from 8.2 mbgs to 46 mbgs in depth. One resident noted that their well became contaminated in 2006; however, for privacy issues we have not disclosed the location. No further information on the type of contamination was provided. An ultraviolet treatment system was installed and the resident no longer drinks the water.

The LSRCA requested the water well survey be updated because it is seven years old. In our experience and opinion, the results of the survey remain relevant today and the LSRCA requirement can be relaxed for this aspect of its Guideline for the following reasons:

1. This site is surrounded by a mature hamlet with dwellings that have existed for many decades and little new development around this site.
2. Groundwater monitoring for the Udora Estates Development south of this site for more than a decade showed no detectable changes in groundwater levels for the shallow and deep aquifers. Those reports were reviewed by the Township's Hydrogelogist.
3. The Township of Uxbridge commonly requires a groundwater monitoring and mitigation program to be implemented for developments on private services like these eight proposed lots.

3.0 SITE INVESTIGATIONS

3.1 SHALLOW SUBSURFACE SOILS

WSP excavated ten (10) test pits on-site on May 3, 2019, that are designated as TP19-1 to TP19-10 as shown on Figure 2. The field investigation was carried out under supervision of WSP to assess the subsurface soils and shallow groundwater conditions with respect to the general suitability of the Site to accommodate private sewage disposal systems. Soil samples were obtained from the test pits for visual examination and textural classification. Ten (10) samples were submitted to the WSP soils laboratory for grain size distribution analysis. The test pit logs and particle size analysis reports are presented in Appendix E.

This information was considered in preparation of the water budget evaluation for the site. Envision Consultants also relied on this information for the preparation of the on-site sewage disposal systems because their design team worked on this project as former staff of WSP.

3.2 GROUNDWATER MOVEMENT

GAMAN Consultants completed seasonal groundwater monitoring between December 2022 and November 2024. The results are documented in Table E-2, Appendix E. The interpreted direction of shallow groundwater movement is illustrated in Figure E-1, Appendix E. Shallow groundwater flows in a northwest direction towards a tributary of Pefferlaw River.

Groundwater levels show seasonal variations with spring-time highs and late summer lows. This is typical for shallow groundwater. The monitors on the low-lying north side of the site may have defective grout seals given the age of the monitors and this could be a reason for the spikes in groundwater levels documented in the report.

3.3 GROUNDWATER QUALITY

Groundwater samples were collected from the three shallow monitoring wells at MW17-1, MW17-2 and MW17-3 on February 20, 2019, to assess background water quality parameters within the shallow groundwater regime. The laboratory results of these samples are included in Appendix D. The analytical results indicate dissolved organic carbon (DOC), and hardness concentrations were above Criteria C of the Ontario Drinking Water Quality Standards (ODWQS) for each of MW17-1, MW17-2 and MW17-3. Total alkalinity was also greater than the guidelines for MW17-1 and MW17-3 with values of 510 mg/L and 517 mg/L respectively. These parameters are not a health-related concern in drinking water and can be effectively managed by point-of-use treatment systems. The groundwater samples were also analyzed for nitrate to determine the existing background nitrate concentration within the shallow groundwater regime. The groundwater had nitrate concentrations of 0.201 mg/L to 2.12 mg/L, with an average concentration of 0.88 mg/L at the time of testing. This is a reasonable estimate as the background nitrate concentration in the proposed adjacent development to the west of the Site (King Cole Ducks development) had nearly non-detectable concentrations of nitrate (0.1 mg/L) at the time of testing.

Table D-2, Appendix D includes additional water quality information from the 2024 nitrate and orthophosphate monitoring program that was implemented to assess the suitability of servicing this site with between 7 and 9 septic systems. The Certificate of Analysis were not available from the WSP report of 2019 and we have added the certificates for the 2024 monitoring program. Groundwater quality remains at background levels in the shallow aquifer on-site.

3.4 SINGLE WELL RESPONSE TESTS

Single well response tests were performed to estimate the hydraulic conductivity of the saturated soils adjacent to the well screens at MW17-1, MW17-2 and MW17-3.

WSP performed rising head tests using a bailer to remove water from the monitor. A data logger and pressure transducer were used to record the responses. The tests were completed on February 20, 2019. The data was evaluated using software and the graphical results are presented in Appendix E. Hydraulic conductivities ranged from 2.6×10^{-7} to 1.6×10^{-6} m/sec. The range of values is consistent with the observed materials.

4.0 WATER BUDGET

4.1 CLIMATE DATA

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)

Lake Simcoe Conservation Authority produced a technical document entitled ***"Lake Simcoe Data: A Reference Document to Support the Completion of Water Balance Assessments.", April 2017, Version 1.*** This document was prepared to standardize climatic data used in water balance evaluations. The data are intended to provide reasonable estimates for these evaluations; however, the qualified professional is expected to use judgement when using these data with site specific data.

The climate data for the Pefferlaw Brook Subwatershed documents the mean precipitation at 897 mm/yr. This average precipitation was used to advance the water balance evaluation for this site.

4.2 GROUNDWATER RECHARGE ESTIMATES

The following sections document estimates of groundwater recharge using LSRCA suggested values and verifying these values against other methods for consistency before selecting a suitable infiltration rate. Methods 1 and 2 are based on MECP Hydrotechnical Guidelines and Method 3 relied on values from the Oak Ridges Moraine Groundwater Program.

4.2.1 MECP Recharge Estimates

Method 1

The MOEE Hydrogeological Technical Information Requirements for Land Development Applications (1995) includes Tables 1 and 2 derived from hydrologic analysis for assessing peak runoff for storm water management.

Table 1 is premised on soil types. The silty sand to sandy silt soils at this site are consistent with recharge rates ranging from 150-200 mm/yr. Three of the test pits showed dominantly sandy soils and one showed silt. The upper range of this infiltration rate of 200 mm/yr is a reasonable average recharge rate using this methodology.

Method 2

Recharge rates derived from Table 2 of the MECP Hydrotechnical Guidelines considers infiltration factors related to:

- Topography (range of 0.1 to 0.3)
- Soil type (range of 0.1 to 0.4)
- Vegetation cover. (range of 0.1 to 0.2)

Table C-1, Appendix C documents the infiltration factors for pre-development and post-development scenarios at the site using this method. Topography was evaluated using topographic information from the site with an average slope of about 5% or 50m/km as shown in Figure C-1, Appendix C. The site reflects steep slopes with a topographic factor of 0.1 for pre-development as shown in Table C-1. Site grading usually makes the slopes gentler than the original topography. The gentler the slope, the higher the infiltration factor and higher the recharge rate post-development. Though grading could enhance recharge compared with pre-development slope factors, we have been conservative and assumed the topographic infiltration factor remains at 0.1 and continues to reflect steep slopes after grading.

Soils at the site are comprised of medium loam to loamy sand as described in Section 3.1 and as shown on Figure 10. The soils reflect an infiltration factor of 0.35 as shown in Table C-2 for pre-development and post-development.

Cover reflects the presence or absence of a canopy that can shade parts of the site and reduce evaporation. The site in its pre-development state is dominantly shrubs with some treed areas consistent with a cover factor of 0.15 and we assumed the same value for post development. The total infiltration factors pre-development and post-development are estimated at 0.60.

The Pefferlaw Brook Subwatershed Table documents precipitation surplus rates for various hydrological soil groups. The grain size analyses from ten test pits were plotted on Figure 10 to provide input to selecting appropriate soils groups for evaluating precipitation surplus at the site. Most of the soils across the site range from medium loam to sandy loam with one test result showing silt loam. The soils groups in the LSRCA Pefferlaw Brook Subwatershed Table identify Silt loam and Sandy Loam as two groups to assess water surplus for range of soils at the site. This is a small site at 2.71 ha. and it was deemed appropriate to simplify the selection of a soils group based on the average precipitation surplus values for Sandy Loam and Silt Loam from the table. The average precipitation surplus value for pasture and shrubs within the Sandy Loam to Silt Loam is 314 mm/yr. for pre-development. The average precipitation surplus value for urban lawns in post-development within the Sandy Loam to Silt Loam is 321 mm/yr.

Recharge is calculated as the product of water surplus (precipitation surplus) x Total Infiltration Factor (0.60). The predevelopment recharge rate for the site is 188 mm/year and the post-development recharge rate for urban lawns is 193 mm/year.

4.2.2 ORMPG Recharge Estimates

Method 3

The Oak Ridges Moraine Groundwater Program on-line data visualization tool was used as a guide for evaluating recharge rates. We reviewed the recharge model for the area and presented the information in Figure 11. The recharge rates within various blocks (or cells), at or adjacent to the site, show recharge rates ranging from about 121 to 562 mm/yr. The lower recharge rates appear to be influenced by urban development with larger impervious areas. The subject property is located mostly within recharge rate cells of 192 mm/year, and this is consistent with recharge rates calculated for this site in Section 4.2.1.

4.3 PRE-DEVELOPMENT & POST-DEVELOPMENT WATER BUDGETS

The existing lands are undeveloped. There are no impermeable surfaces at the site and the soils have been shown to be comprised of heterogeneous mixtures of silty-sand to sandy-silt associated with loamy sand to medium loam. Runoff and infiltration for the pre-development conditions of the site were based on water budget information presented in previous sections. Table C-2 documents the runoff and recharge rates for the pre-development and post-development scenarios.

The pre-development recharge rate for the undeveloped lands was calculated at 5,106 m^3/year based on a recharge rate of 188.4 mm/year. Runoff was calculated at 3,404 m^3/year and is expected to be conveyed off-site.

Sources of recharge for post-development include natural infiltration on urban lawns. The impermeable areas of the site include the lined stormwater pond, roads, dwellings and driveways. The total infiltration post-development on urban lawns is estimated at 4,031 m^3/year. Table C-2 documents a recharge deficit of 1,074 m^3/year for the site, equivalent to a reduction of recharge calculated at 21%.

4.4 MITIGATION

Mitigation is recommended to maintain pre-development groundwater recharge rates and to minimize or eliminate compensation fees to LSRCA. Roof top runoff is a source of clean water to off set the recharge deficit. Table C-3 documents the rooftop area at 297 m^2 for each dwelling. We understand SCS used this area to calculate impervious surfaces in the preparation of the SCS Drainage Area Figure W.1, dated December 2025 as shown on Figure 12.

In previous submissions to LSRCA for other developments, up to 90% of the total precipitation was used and permitted from rooftops. In the most recent LSRCA comment, 50% was recommended as the allowable percentage of rooftop area. This evaluation has applied this 50% value; however, higher values may be considered in future submissions if necessary. Rooftop runoff could provide 1,066 m^3/year of water to offset essentially all of the recharge deficit calculated at 1,074 m^3/yr.

In summary, it is possible to mitigate the recharge deficit at this site using clean runoff from rooftops.

5.0 CONCLUSIONS AND RECOMMENDATIONS

The conclusions and recommendations presented below are premised on the data collected and reviewed as part of these investigations:

- The site is predominantly located within the Peterborough Drumlin Field Physiographic Region while a small portion lies within the Simcoe Lowlands Physiographic Region.
- Local topography at the site slopes from the south to the north. Drainage is to the north towards a drainage ditch along Ravenshoe Road that discharges into a tributary of Pefferlaw River.
- The surficial soils at the site are comprised mostly of sandy silt-silty sand, and sandy soils. One test pit location showed silt.
- Shallow groundwater movement is from south to north through the site.
- A water well reconnaissance survey was conducted at 109 properties surrounding the Site. The results of the survey indicated that the majority of respondents have adequate water quantity.
- Groundwater monitoring data for more than a decade at the Udora Estates development on the south side of the site showed essentially no detectable changes in shallow or deep groundwater levels to warrant updating the results of the water well survey as suggested by LSRCA.
- Groundwater quality at the on-site shallow groundwater monitors showed the presence of dissolved organic carbon (DOC), alkalinity, and hardness at concentrations above the aesthetic or operational guidelines of the Ontario Drinking Water Quality Standards (ODWQS). The measured parameter values do not restrict the ability to use this water for drinking water purposes. All other parameters tested were less than or within ranges prescribed by the ODWQS.
- The average background nitrate concentration in shallow groundwater in 2019 was 0.86 mg/L and is below the ODWQS of 10 mg/L. Groundwater quality from nitrate and

orthophosphate monitoring during 2024 continues to show groundwater quality remains at background concentrations in the shallow aquifer.

- Hydraulic conductivity tests performed at the three shallow monitors provides estimates of hydraulic conductivity ranging from 2.6×10^{-7} and 1.6×10^{-6} m/sec. The range of values is consistent with the observed materials.
- The site is located outside of any defined Wellhead Protection Areas.
- The recharge rates for the shallow soils observed at this site were estimated at 189 mm/year for pre-development and 193 mm/year for post-development areas. These values are consistent with the recharge rates documented in the Oak Ridges Moraine Groundwater Program.
- The pre-development recharge was calculated at 5,106 m^3/year and the post-development recharge rate was calculated at 4,031 m^3/year. The recharge deficit caused by construction of hard covered surfaces in the post-development scenario for this site is calculated at 1,071 m^3/year and represents about a 21% reduction in recharge.
- Sources of clean runoff to off set the deficit in recharge are available from roof runoff. The volume of runoff available from these sources effectively mitigate the estimated recharge deficit for the site. LID measures to promote infiltration include advanced swale infiltration measures proposed by SCS.

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 2695867 Ontario Inc. 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 as a result of 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

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.

Lake Simcoe Region Conservation Authority, April 2017

Lake Simcoe Data: A Reference Document to Support the Completion of Water Balance Assessments, Version 1.

Lake Simcoe Region Conservation Authority, June 2013

Hydrogeological Assessment Submissions, Conservation Authority Guidelines for Development Applications.

Ministry of Environment Conservation & Parks

Water Well Records

Ministry of Environment Conservation & Parks

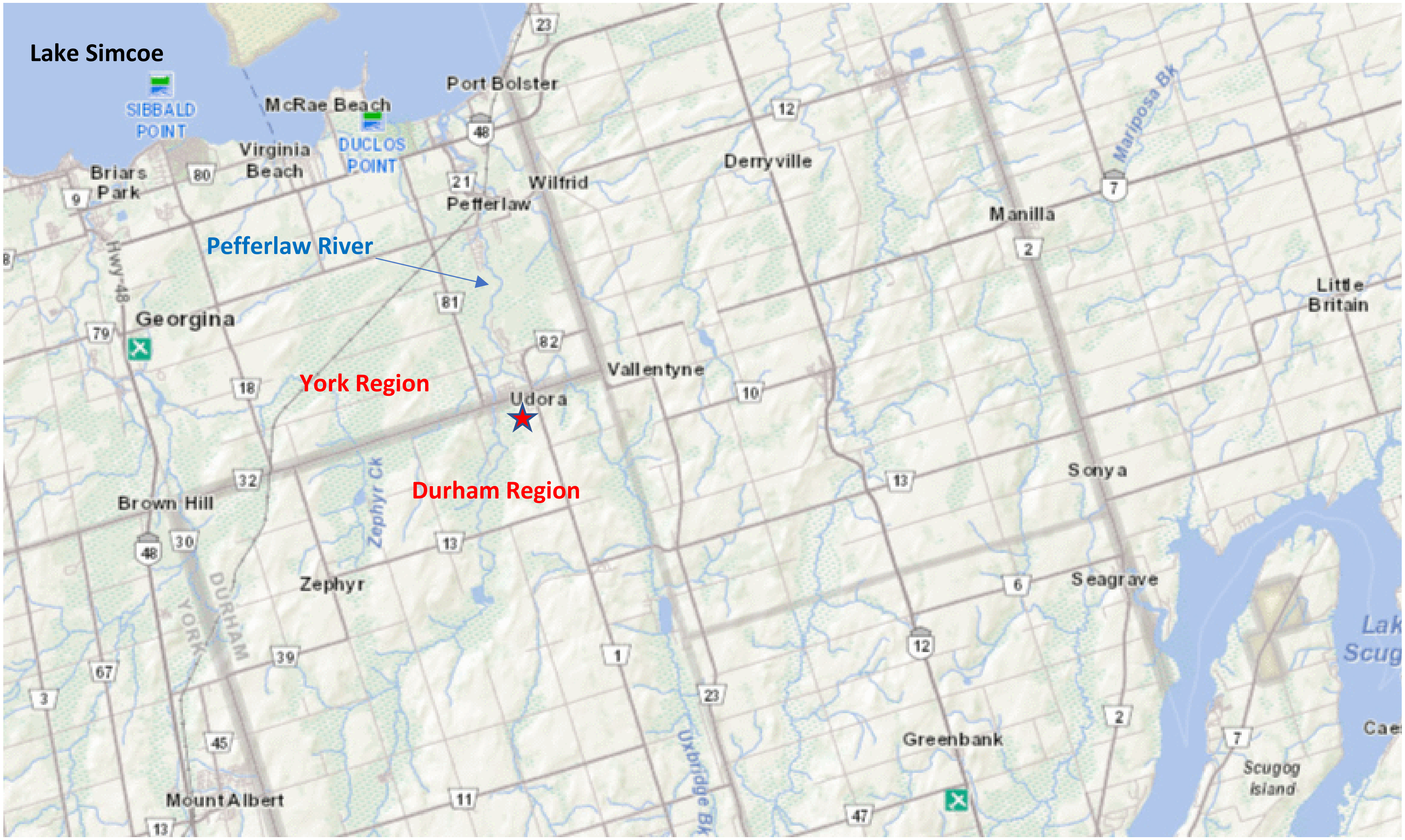
(Revision) Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines, 2006

Ministry of Environment Conservation & Parks, 1995

MOEE Hydrogeological Technical Information Requirements for Land Development Applications, ISBN 0-7778-4340-4, April, Queen's Printer.

Oak Ridges Moraine Groundwater Program, (Web-based).

FIGURES



NOTES

★ Site Location

Site Location

Udora Estates Water Balance Evaluation, Revision 2

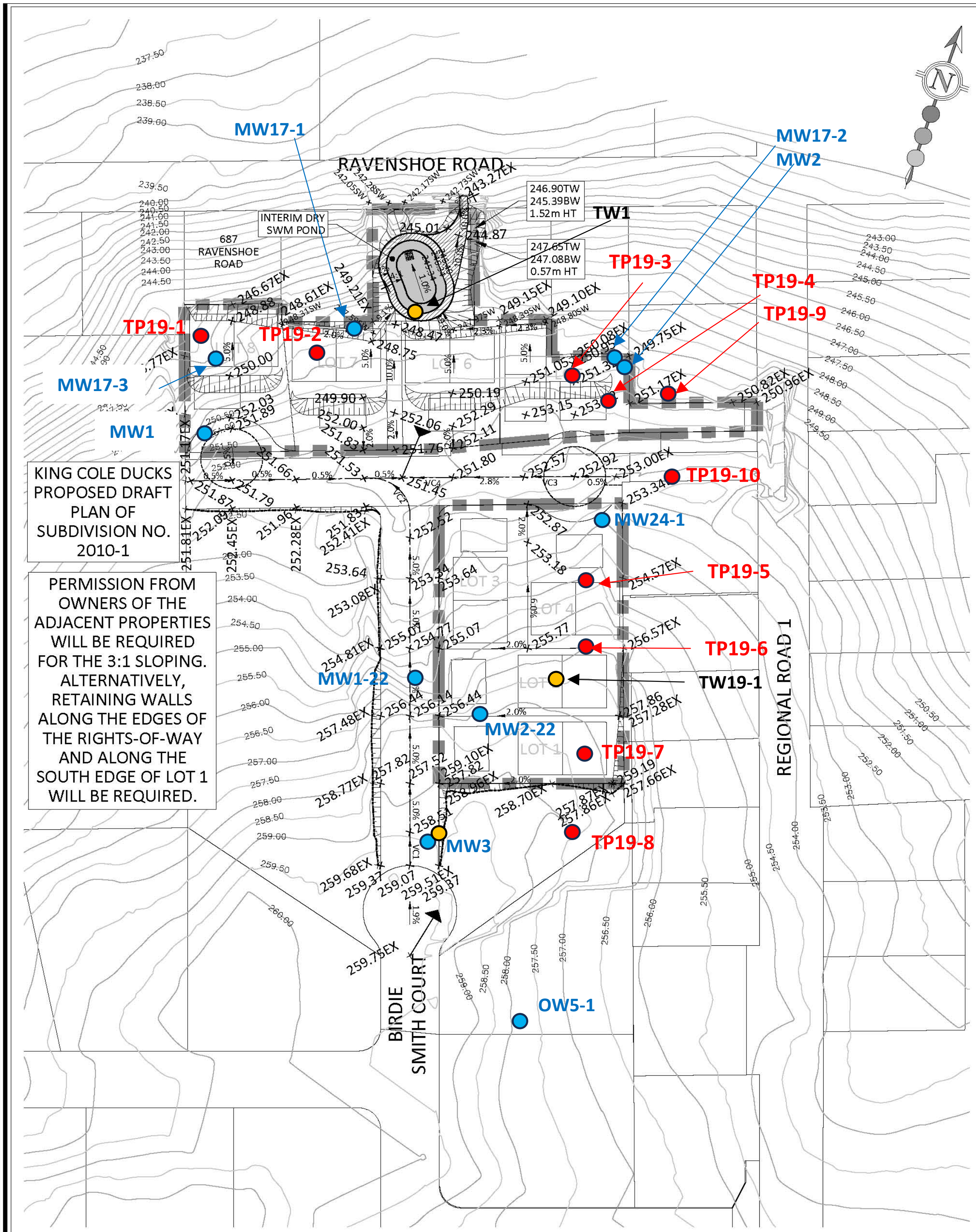
Part Lot 35, Con. 6, TWP Uxbridge

For 2695867 Ontario Inc.

Date:	Dec-25	Scale:	AS SHOWN
Project:	22012.04	Ref No:	

GAMAN Consultants Inc.

Figure 1



LEGEND:

	LIMIT OF PROPERTY	0.5%	ROAD SLOPE
254.00	EXISTING CONTOUR AND ELEVATION		MAX 3:1 SLOPE
× 223.91	PROPOSED ELEVATION		LIMIT OF 3:1 GRADING ON NEIGHBOURING PROPERTY
× 224.35EX	EXISTING ELEVATION		ROAD CENTERLINE
	EDGE OF PAVEMENT		RETAINING WALL

NOTES:

Test pit and monitor locations estimated from other maps

Map Source :SCS FSSR Preliminary Grading Plan Fig. 5.1, Dated Dec. 2025

TP19-1 Test pits location (see Envision Sept 2022 Fig. 2 Plan)

MW17-1 Groundwater Monitor Location

TW1 Water Supply Test Well Location

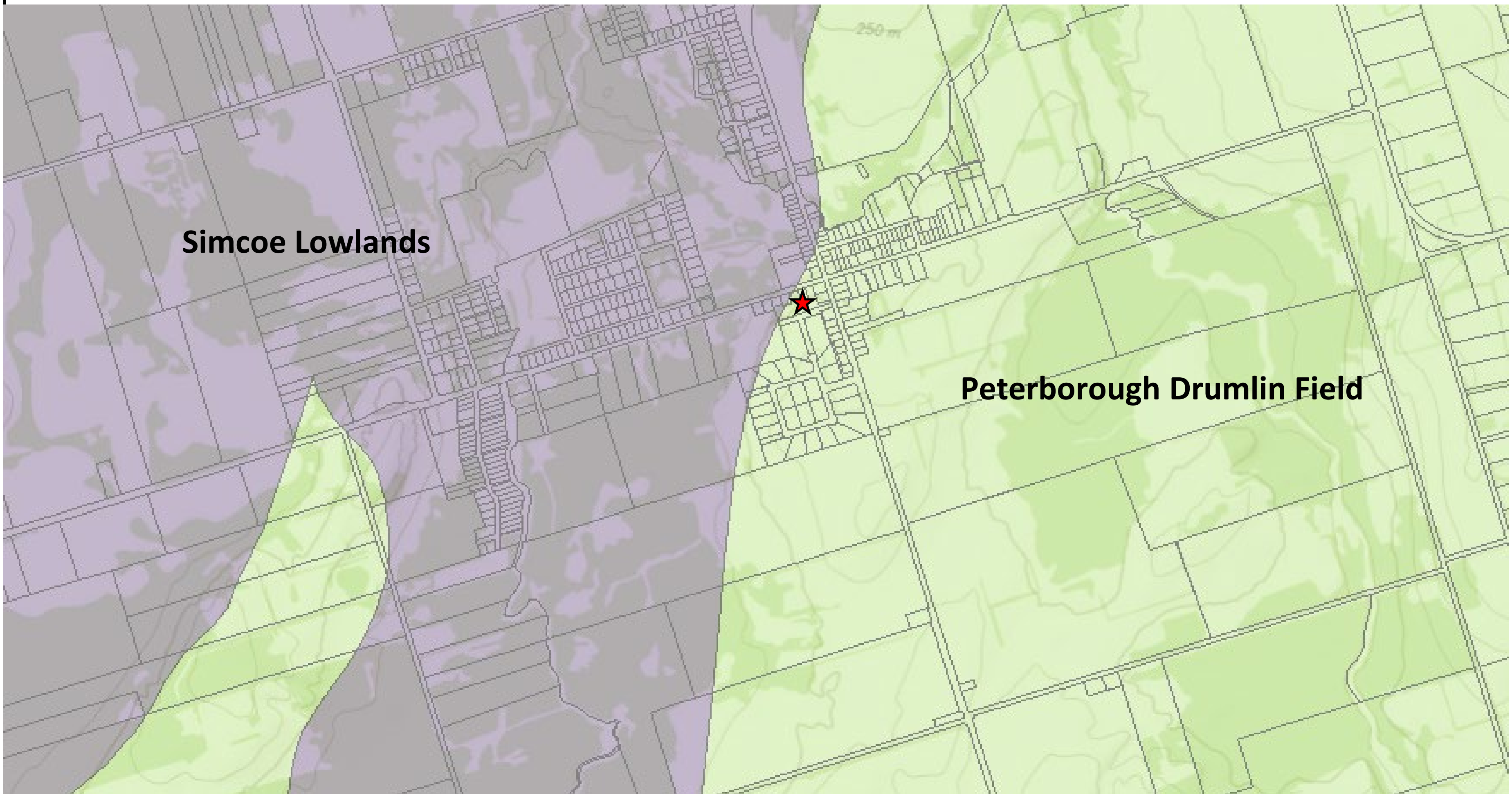
Site Plan

Udora Estates Water Balance Evaluation, Revision 2

Part Lot 35, Con. 6, TWP Uxbridge

For 2695867 Ontario Inc.

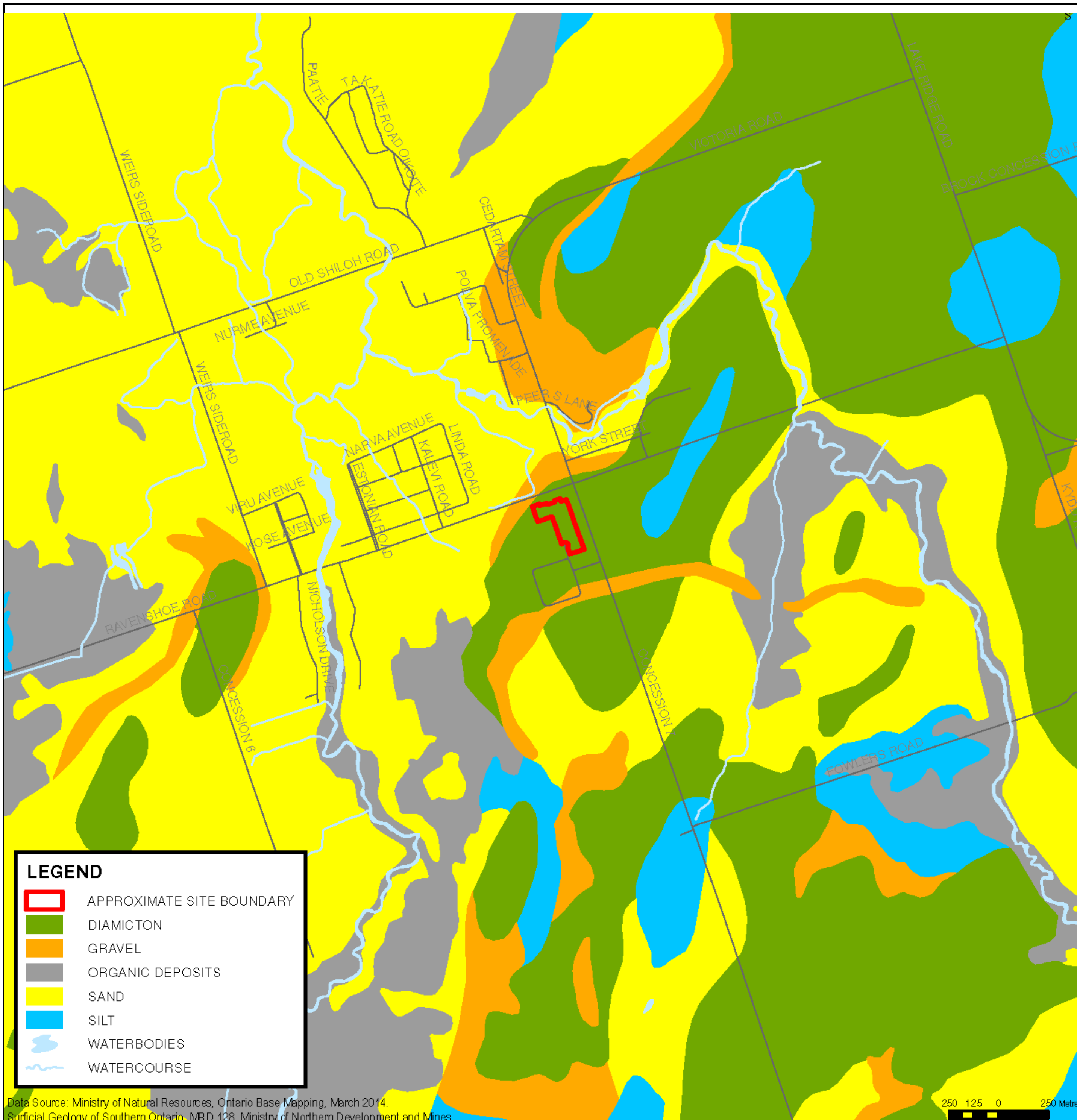
Date:	Dec-25	Scale:	AS SHOWN
Project:	22012.04	Ref No:	
GAMAN Consultants Inc.		Figure	2



NOTES

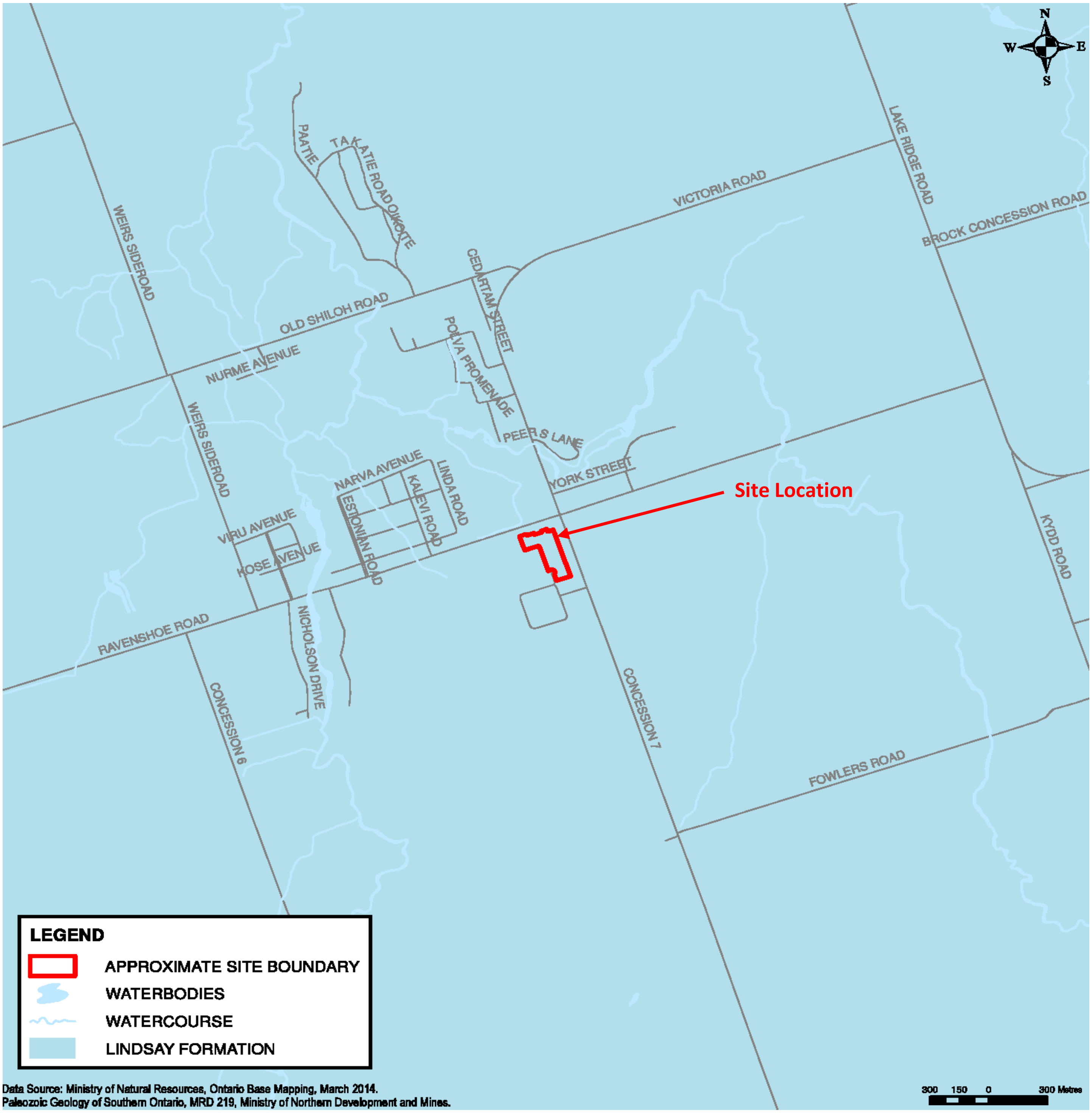
★ Site Location

Physiography			
Udora Estates Water Balance Evaluation Revision 2, Part Lot 35, Con. 6, TWP Uxbridge For 2695867 Ontario Inc.			
Date:	Dec-25	Scale:	AS SHOWN
Project:	22012.04	Ref No:	
GAMAN Consultants Inc.		Figure 3	



NOTES

SURFICIAL GEOLOGY			
Udora Estates Water Balance Evaluation Revision 2, Part Lot 35, Con. 6, TWP Uxbridge For 2695867 Ontario Inc.			
Date:	Dec-25	Scale:	AS SHOWN
Project:	22012.04	Ref No:	
GAMAN Consultants Inc.		Figure 4	



NOTES

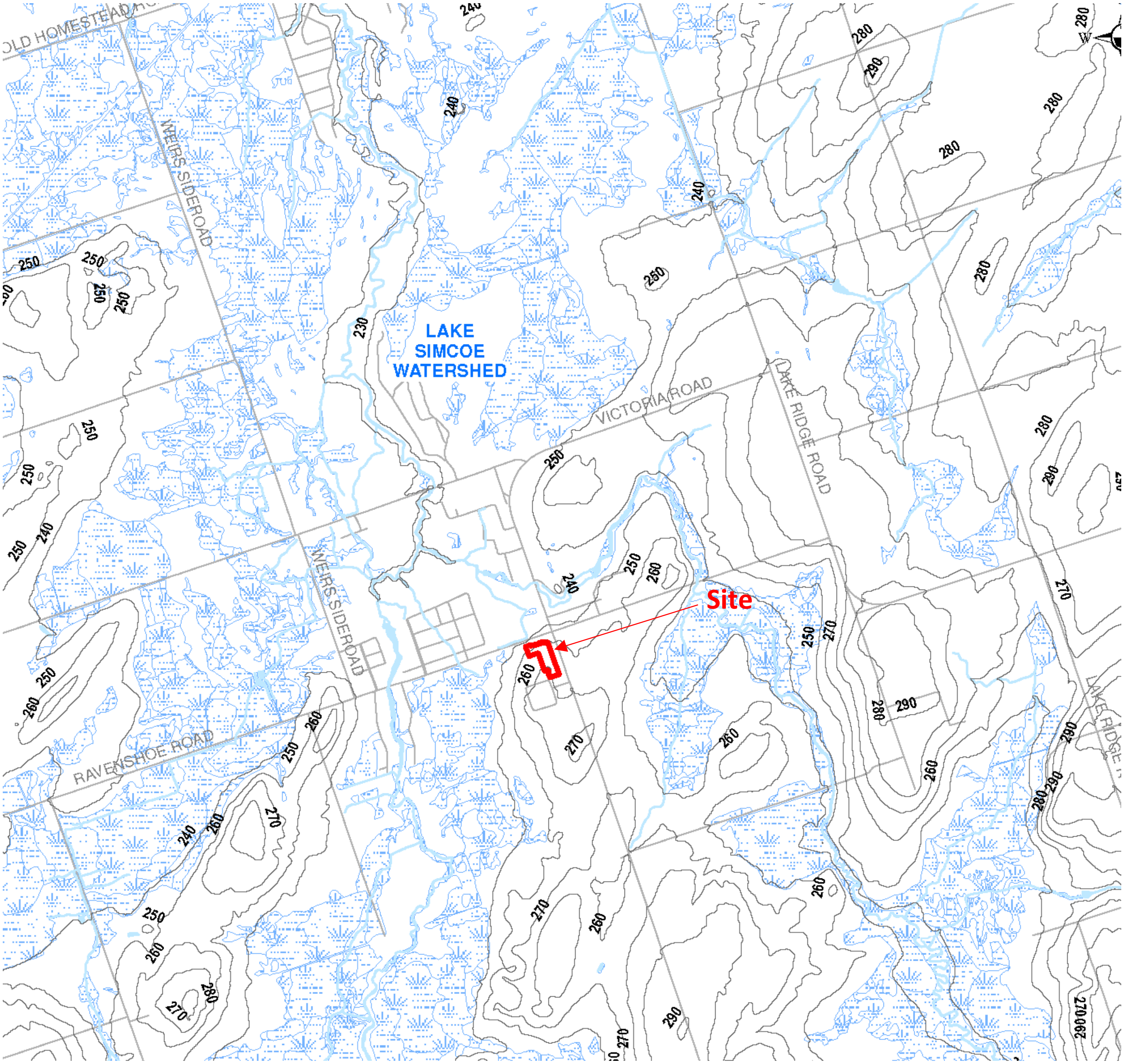
Bedrock Geology

Udora Estates Water Balance Evaluation, Revision 2
Part Lot 35, Con. 6, TWP Uxbridge
For 2695867 Ontario Inc.

Date:	Dec-25	Scale:	AS SHOWN
Project:	22012.04	Ref No:	

GAMAN Consultants Inc.

Figure 5



NOTES

Drainage

Udora Estates Water Balance Evaluation, Revision 2

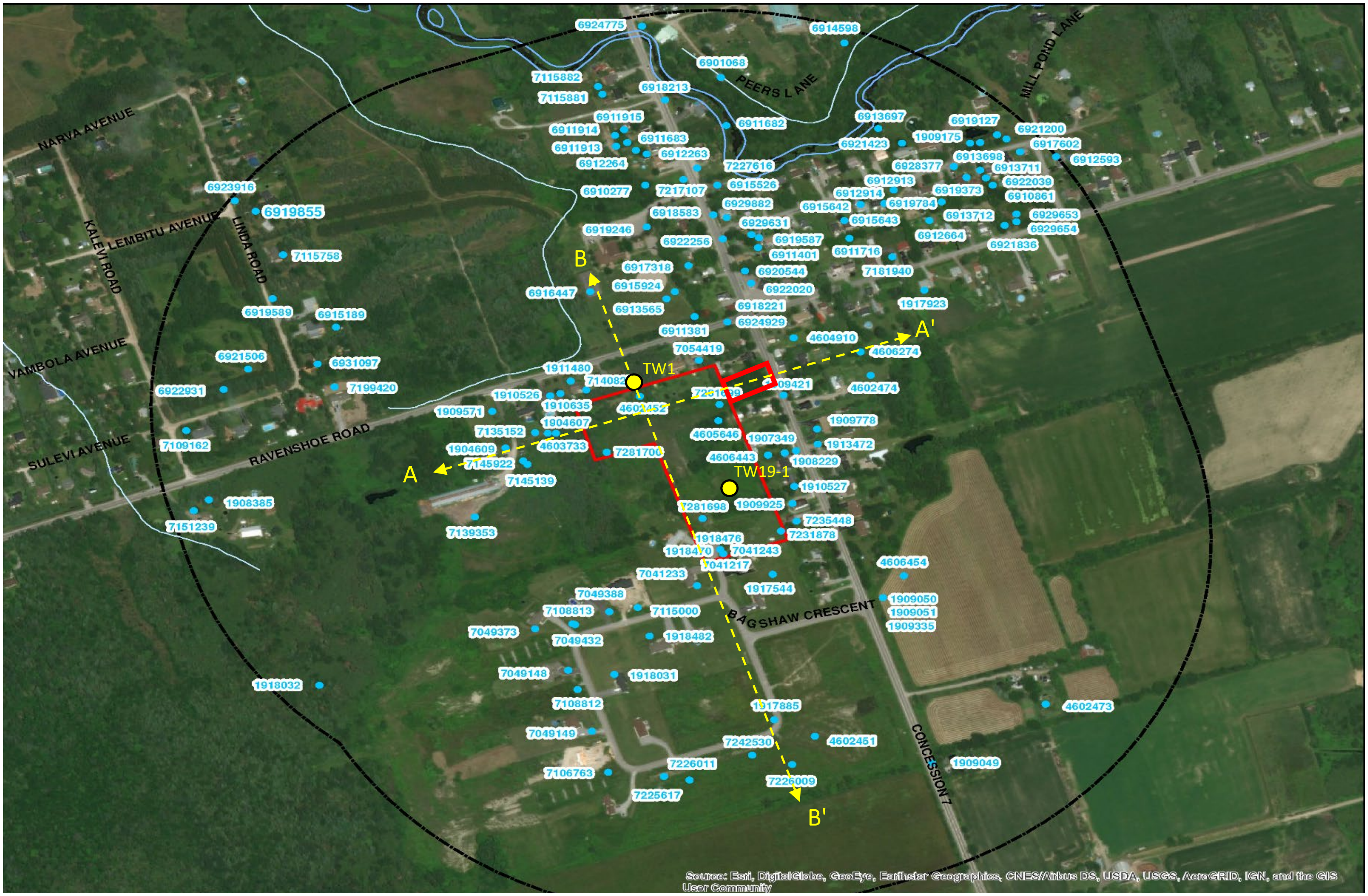
Part Lot 35, Con. 6, TWP Uxbridge

For 2695867 Ontario Inc.

Date:	Dec-25	Scale:	AS SHOWN
Project:	22012.04	Ref No:	

GAMAN Consultants Inc.

Figure 6



NOTES

Site Location

B ◄- - - - - - -► B' Line of Cross Section

Water Well Location Map

Udora Estates Water Balance Evaluation, Revision 2

Part Lot 35, Con. 6, TWP Uxbridge

For 2695867 Ontario Inc.

Date:	Dec-25	Scale:	AS SHOWN
Project:	22012.04	Ref No:	

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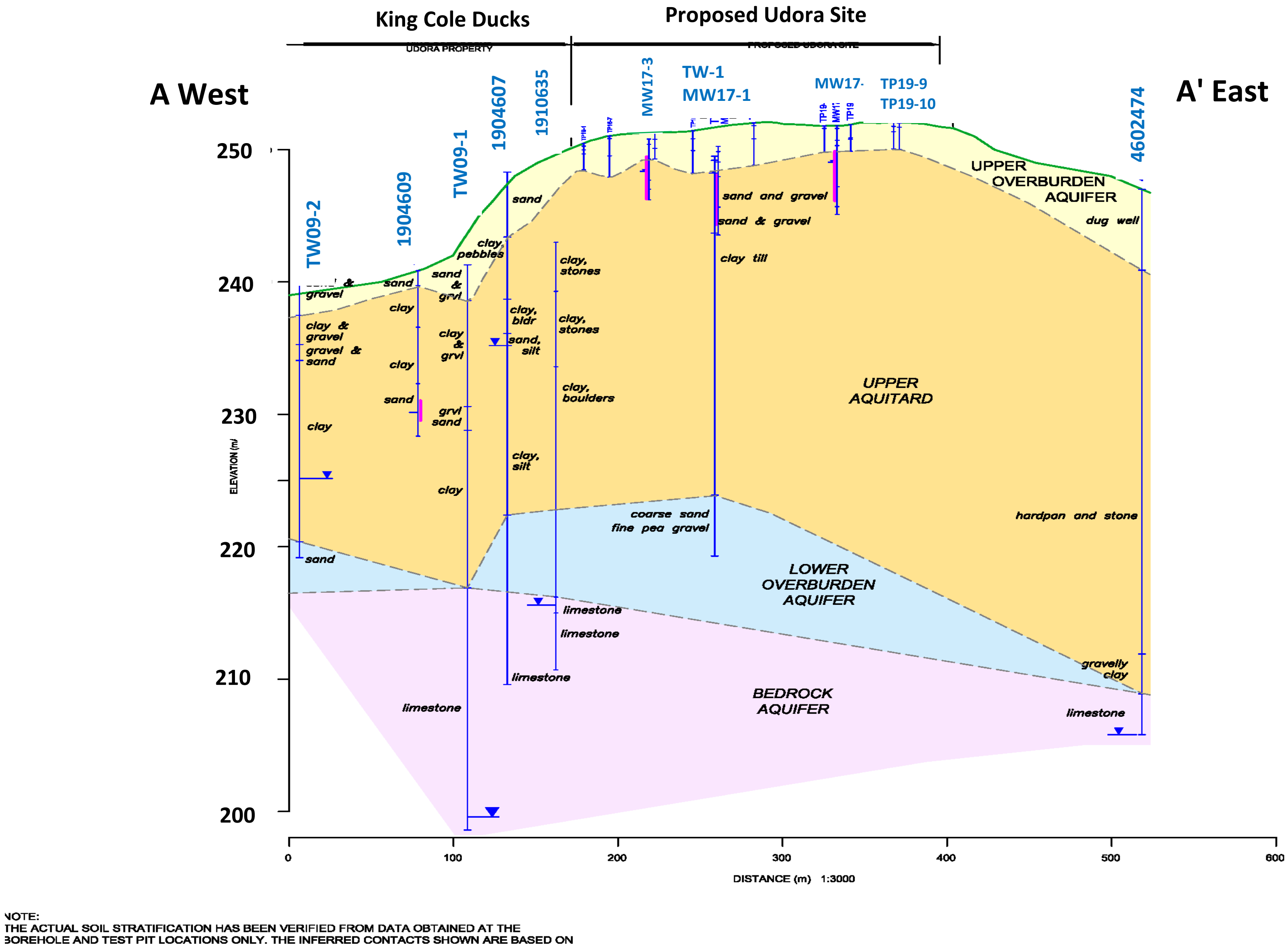
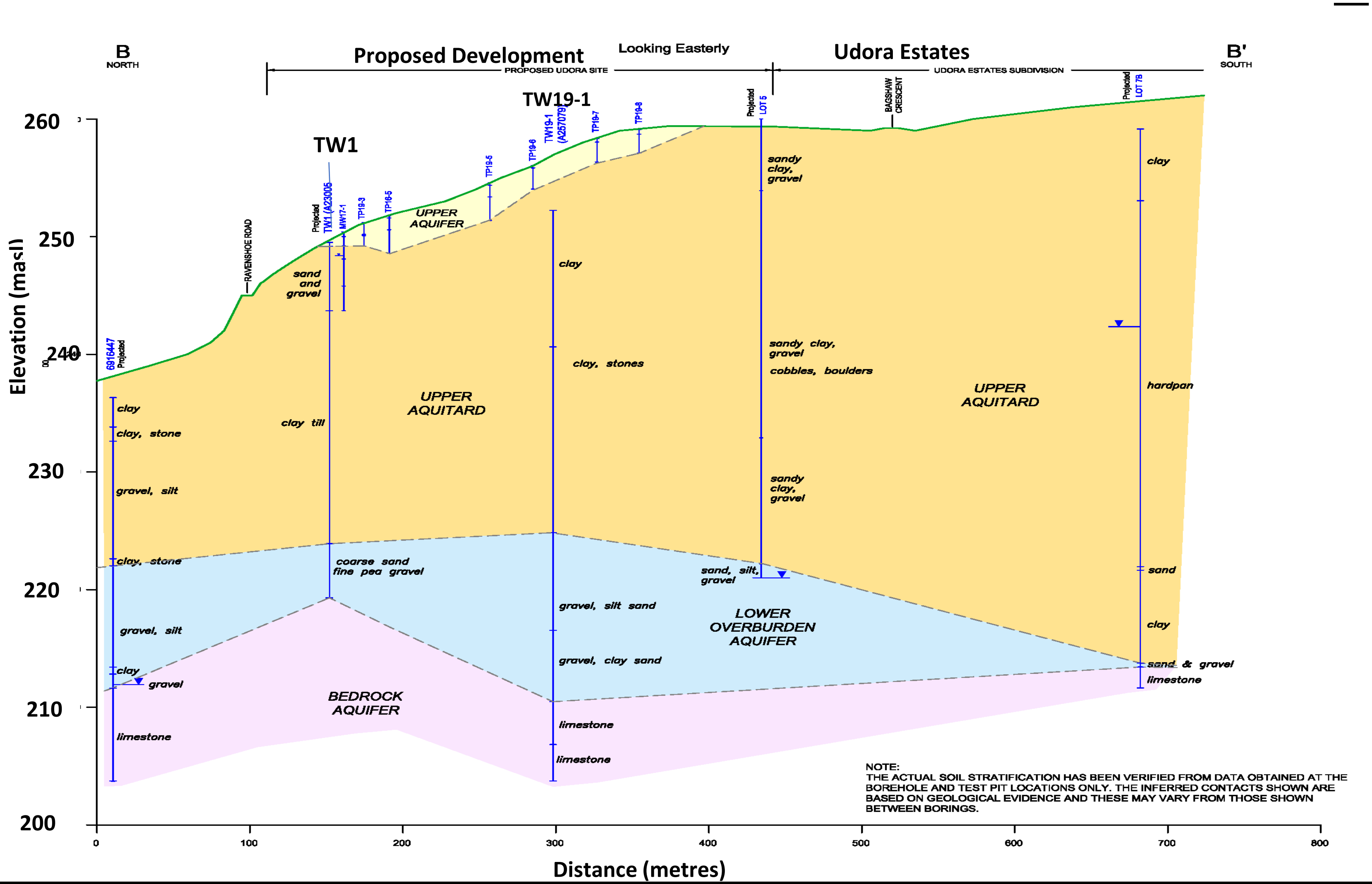
Figure 7



NOTES

Cross Section A-A'

Udora Estates Water Balance Evaluation, Revision 2 Part Lot 35, Con. 6, TWP Uxbridge For 2695867 Ontario Inc.			
Date:	Dec-25	Scale:	AS SHOWN
Project:	22012.04	Ref No:	
GAMAN Consultants Inc.		Figure 8	



NOTES

Reference Figure (WSP 2019 Draft Report)

Cross-Section B-B'

Udora Estates Water Balance Evaluation, Revision 2
Part Lot 35, Con. 6, TWP Uxbridge
For 2695867 Ontario Inc.

Date:	Dec-25	Scale:	AS SHOWN
Project:	22012.04	Ref No:	

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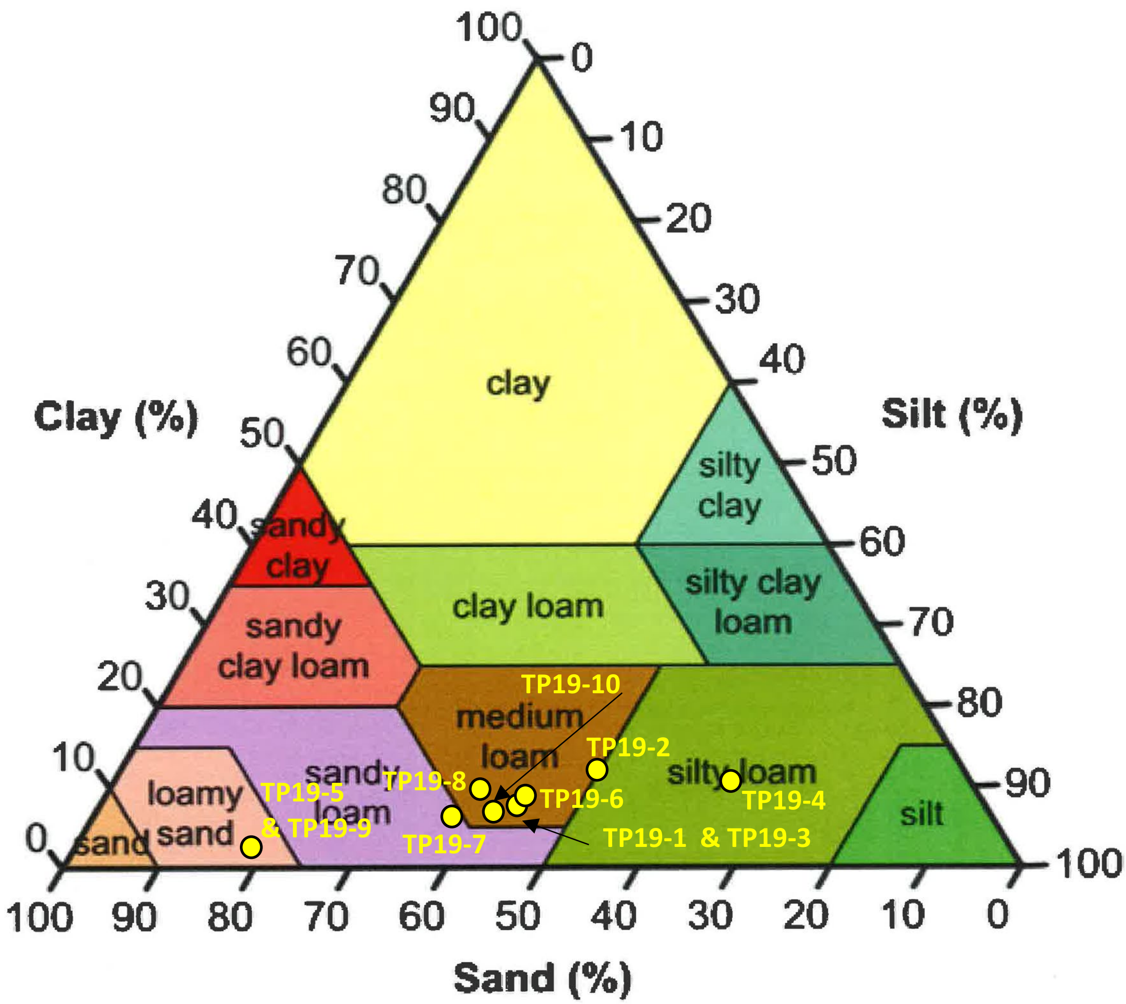
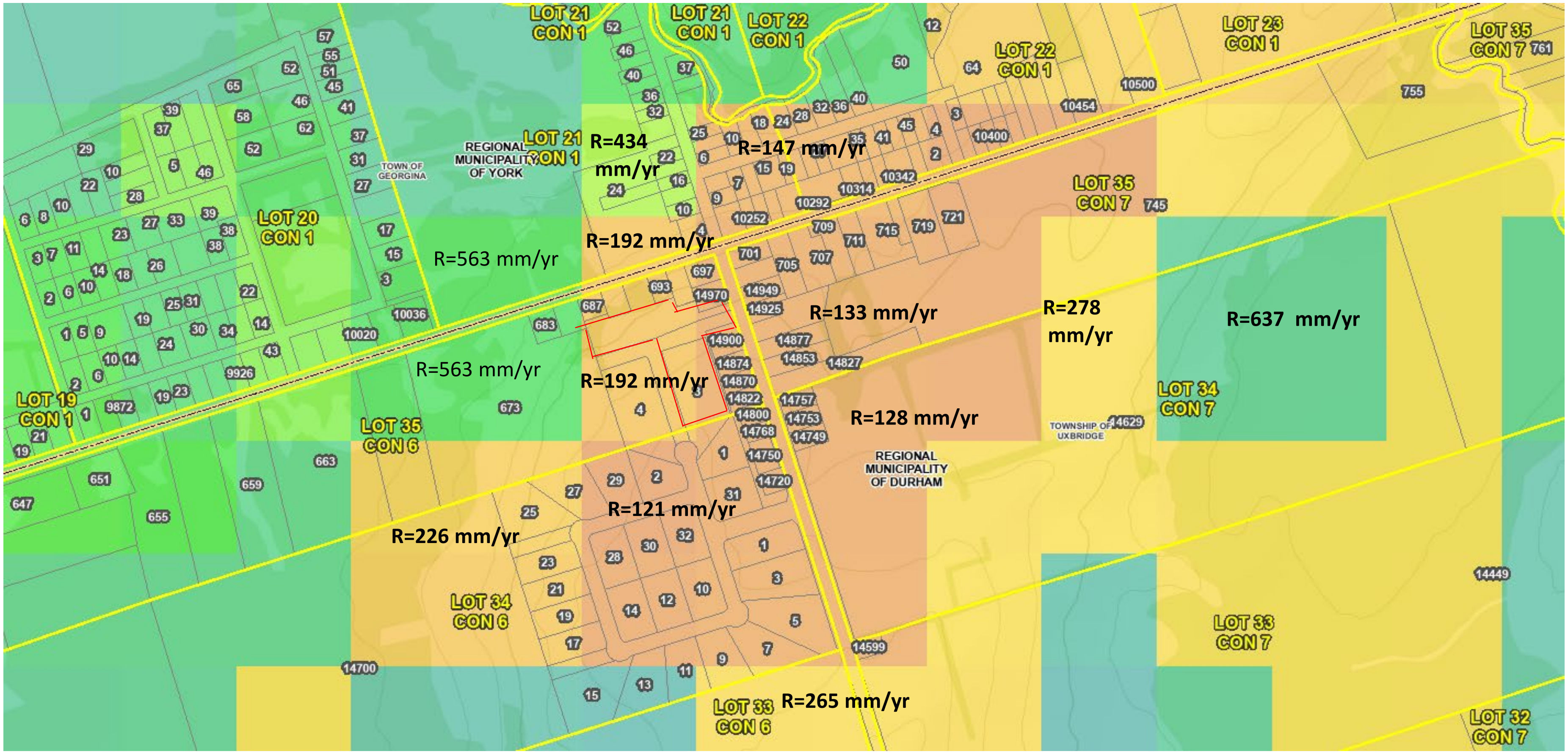
Figure 9



NOTES

TP19-1 ○ Test Pit Designation with Particle Sizes

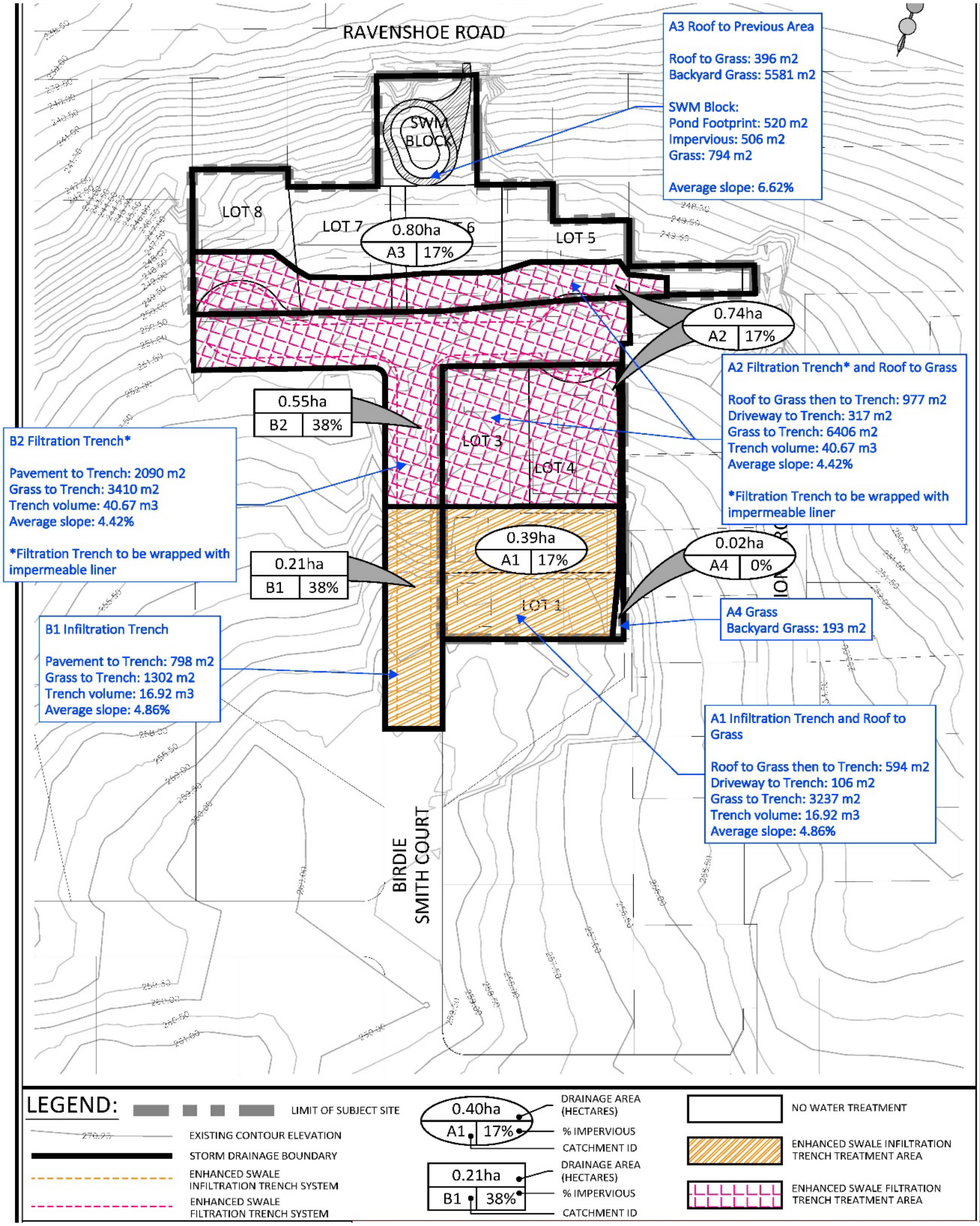
Agricultural Soils Chart			
Udora Estates Water Balance Evaluation, Revision 2 Part Lot 35, Con. 6, TWP Uxbridge For 2695867 Ontario Inc.			
Date:	Dec-25	Scale:	AS SHOWN
Project:	22012.04	Ref No:	
GAMAN Consultants Inc.		Figure 10	



NOTES

Site Location

ORMGP Recharge Rates			
Udora Estates Water Balance Evaluation, Revision 2 Part Lot 35, Con. 6, TWP Uxbridge For 2695867 Ontario Inc.			
Date:	Dec-25	Scale:	AS SHOWN
Project:	22012.04	Ref No:	
GAMAN Consultants Inc.		Figure	11



NOTES

Map Source :SCS FSSR Water Balance Drainage Area Fig. W.1, version 2328-P-LId-Prop-2.4-2.4 Dated Dec. 2025

SCS Proposed LID Plan

Udora Estates Water Balance Evaluation, Revision 2

Part Lot 35, Con. 6, TWP Uxbridge

For 2695867 Ontario Inc.

Date:	Dec-25	Scale:	AS SHOWN
Project:	22012.04	Ref No:	

GAMAN Consultants Inc.

Figure 12

APPENDICES

APPENDIX A

WELL RECORDS
WELL RECONNAISSANCE SURVEY

Table A-1 MECP Wells

Project : J&J Developments, Udora Water Balance Evaluation (22012.00)

Well ID	X	y	Elevation (m)	Well Depth (m)	Construction Method	Water Level (m)	Water Yield	LPM	Units of Measurement	Water Use	Water Status	Formation Depth(m)	Overburden or Bedrock?	Material Colour	Material 1	Material 2	Material 3
1917885	645032	4901420	260.56	24.99							Abandoned-Other		1917885				
1918470	644968	4901660	260.36		Other Method						Abandoned-Supply		1918470				
	644885		260.77	176.00	Rotary (Air)						Abandoned-Supply	23.00		BROWN	SAND	SILTY	GRAVEL
	644885		260.77	176.00	Rotary (Air)						Abandoned-Supply	60.00		GREY	SAND	SILTY	GRAVEL
	644885		260.77	176.00	Rotary (Air)						Abandoned-Supply	141 .50		GREY	CLAY	SANDY	GRAVEL
1918482	644885	4901538	260.77	176.00	Rotary (Air)						Abandoned-Supply	176 .00	1918482	GREY	LIMESTONE		
6911913	644845.7	4902228	234.75	2.13	Cable Tool						Abandoned-Supply	2.13	6911913	BROWN	CLAY	SAND	BOULDERS
6911914	644843.7	4902243	234.59	4.88	Cable Tool						Abandoned-Supply	4.88	6911914	BROWN	CLAY	SAND	BOULDERS
	644854.7		234.74	21.03	Cable Tool						Abandoned-Supply	4.27		BROWN	CLAY	SAND	BOULDERS
	644854.7		234.74	21.03	Cable Tool						Abandoned-Supply	10.67		GREY	CLAY	BOULDERS	
	644854.7		234.74	21.03	Cable Tool						Abandoned-Supply	15.24		GREY	CLAY		
6911915	644854.7	4902251	234.74	21.03	Cable Tool						Abandoned-Supply	21.03	6911915	GREY	CLAY	GRAVEL	BOULDERS
6929654	645317.8	4902121	244.21			9					Abandoned-Other		6929654				
7108813	644797	4901554	256.73								Abandoned-Supply		7108813				
7115758	644452	4902075	233.79								Unknown		7115758				
7140825	644810	4901884	243.57								Abandoned-Other		7140825				
	644741	4901780	245.50								Unknown						
7145139	644347	4901715	233.61								Unknown		7145139				
	645053		261.54	48.70		48.00	28		LPM		Unknown	5.10		BROWN	CLAY	SAND	
	645053		261.54	48.70		48.00	28		LPM		Unknown	31.00		GREY	CLAY	BOULDERS	
	645053		261.54	48.70		48.00	28		LPM		Unknown	44.00		GREY	CLAY	STONES	LAYERED
	645053		261.54	48.70		48.00	28		LPM		Unknown	45.10		GREY	CLAY		SOFT
7226009	645053	4901357	261.54	48.70		48.00	28		LPM		Unknown	48.70	7226009	GREY	LIMESTONE	CLAY	HARD
7235448	645058	4901700	257.42								Abandoned-Quality		7235448				
	644764.7	4901823	245.72	38.71	Rotary (Convent.)	13.11	6	27.276	GPM	Domestic	Water Supply	4.88		BROWN	SAND	PACKED	
	644764.7	4901823	245.72	38.71	Rotary (Convent.)	13.11	6	27.276	GPM	Domestic	Water Supply	9.75		BLUE	CLAY	STONES	DENSE

Table A-1 MECP Wells

Project : J&J Developments, Udora Water Balance Evaluation (22012.00)

Well ID	X	y	Elevation (m)	Well Depth (m)	Construction Method	Water Level (m)	Water Yield	LPM	Units of Measurement	Water Use	Water Status	Formation Depth(m)	Overburden or Bedrock?	Material Colour	Material 1	Material 2	Material 3
	644764.7	4901823	245.72	38.71	Rotary (Convent.)	13.11	6	27.276	GPM	Domestic	Water Supply	12.19		GREY	CLAY	BOULDERS	LOOSE
	644764.7	4901823	245.72	38.71	Rotary (Convent.)	13.11	6	27.276	GPM	Domestic	Water Supply	13.11		BLACK	SAND	SILT	LOOSE
	644764.7	4901823	245.72	38.71	Rotary (Convent.)	13.11	6	27.276	GPM	Domestic	Water Supply	25.91		GREY	CLAY	SILT	HARD
1904607	644764.7	4901823	245.72	38.71	Rotary (Convent.)	13.11	6	27.276	GPM	Domestic	Water Supply	38.71	B	BROWN	SHALE	HARD	
	644714.7	4901803	242.09	12.50	Rotary (Convent.)	12.50	3	13.638	GPM	Domestic	Water Supply	4.27		BROWN	SAND	PACKED	
	644714.7	4901803	242.09	12.50	Rotary (Convent.)	12.50	3	13.638	GPM	Domestic	Water Supply	8.53		BLUE	CLAY	STONES	DENSE
	644714.7	4901803	242.09	12.50	Rotary (Convent.)	12.50	3	13.638	GPM	Domestic	Water Supply	11.28		GREY	CLAY	STONES	LOOSE
1904609	644714.7	4901803	242.09	12.50	Rotary (Convent.)	12.50	3	13.638	GPM	Domestic	Water Supply	12.50	0	BLACK	SAND	SILT	LOOSE
	645044	4901796	254.86	25.91	Rotary (Convent.)	24.38	3	13.638	GPM	Domestic	Water Supply	4.27		BROWN	CLAY		
	645044	4901796	254.86	25.91	Rotary (Convent.)	24.38	3	13.638	GPM	Domestic	Water Supply	23.77		GREY	CLAY	STONES	HARD
1907349	645044	4901796	254.86	25.91	Rotary (Convent.)	24.38	3	13.638	GPM	Domestic	Water Supply	25.91	0	BROWN	GRAVEL	SAND	
	645057.7	4901799	255.03	24.99	Cable Tool	24.99	7	31.822	GPM	Domestic	Water Supply	0.61			TOPSOIL		
	645057.7	4901799	255.03	24.99	Cable Tool	24.99	7	31.822	GPM	Domestic	Water Supply	3.66			SAND	CLAY	
	645057.7	4901799	255.03	24.99	Cable Tool	24.99	7	31.822	GPM	Domestic	Water Supply	23.16			HARDPAN		
1908229	645057.7	4901799	255.03	24.99	Cable Tool	24.99	7	31.822	GPM	Domestic	Water Supply	24.99	0		SAND	GRAVEL	
	644364.7	4901730	234.05	6.40	Boring	1.52	6	27.276	GPM	Domestic	Water Supply	0.30		BLACK	TOPSOIL		
	644364.7	4901730	234.05	6.40	Boring	1.52	6	27.276	GPM	Domestic	Water Supply	1.52		BROWN	CLAY	STONES	PACKED
	644364.7	4901730	234.05	6.40	Boring	1.52	6	27.276	GPM	Domestic	Water Supply	3.05		BROWN	SAND	WATER-BEARING	PACKED
1908385	644364.7	4901730	234.05	6.40	Boring	1.52	6	27.276	GPM	Domestic	Water Supply	6.40	1908385	GREY	CLAY	PACKED	
	645160		256.34	70.10	Rotary (Convent.)					Domestic	Abandoned-Supply	0.30			TOPSOIL		
	645160		256.34	70.10	Rotary (Convent.)					Domestic	Abandoned-Supply	2.74		BROWN	FINE SAND		
	645160		256.34	70.10	Rotary (Convent.)					Domestic	Abandoned-Supply	3.05			STONES		
	645160		256.34	70.10	Rotary (Convent.)					Domestic	Abandoned-Supply	19.81		GREY	CLAY	GRAVEL	
	645160		256.34	70.10	Rotary (Convent.)					Domestic	Abandoned-Supply	24.38			LIMESTONE	ROCK	
1909050	645160	4901592	256.34	70.10	Rotary (Convent.)					Domestic	Abandoned-Supply	70.10	1909050		LIMESTONE	ROCK	
	645160	4901592	256.34	39.01	Diamond	28.35	5	22.73	GPM	Domestic	Water Supply	0.30			TOPSOIL		

Table A-1 MECP Wells

Project : J&J Developments, Udora Water Balance Evaluation (22012.00)

Well ID	X	y	Elevation (m)	Well Depth (m)	Construction Method	Water Level (m)	Water Yield	LPM	Units of Measurement	Water Use	Water Status	Formation Depth(m)	Overburden or Bedrock?	Material Colour	Material 1	Material 2	Material 3
	645160	4901592	256.34	39.01	Diamond	28.35	5	22.73	GPM	Domestic	Water Supply	0.91			SAND		
	645160	4901592	256.34	39.01	Diamond	28.35	5	22.73	GPM	Domestic	Water Supply	4.88		BROWN	CLAY	GRAVEL	SANDSTONE
	645160	4901592	256.34	39.01	Diamond	28.35	5	22.73	GPM	Domestic	Water Supply	6.71		GREY	CLAY	GRAVEL	STONES
	645160	4901592	256.34	39.01	Diamond	28.35	5	22.73	GPM	Domestic	Water Supply	18 .59		GREY	CLAY	GRAVEL	
	645160	4901592	256.34	39.01	Diamond	28.35	5	22.73	GPM	Domestic	Water Supply	24.69			FINE GRAVEL	LAYERED	CLAY
	645160	4901592	256.34	39.01	Diamond	28.35	5	22.73	GPM	Domestic	Water Supply	26.52			LIMESTONE	ROCK	
	645160	4901592	256.34	39.01	Diamond	28.35	5	22.73	GPM	Domestic	Water Supply	28.35		GREY	CLAY	GRAVEL	
	645160	4901592	256.34	39.01	Diamond	28.35	5	22.73	GPM	Domestic	Water Supply	29.26		GREY	MEDIUM SAND		
	645160	4901592	256.34	39.01	Diamond	28.35	5	22.73	GPM	Domestic	Water Supply	37.49		GREY	CLAY	GRAVEL	
1909051	645160	4901592	256.34	39.01	Diamond	28.35	5	22.73	GPM	Domestic	Water Supply	39.01	B	GREY	LIMESTONE	ROCK	
	645263	4902232	235.26	22.86	Cable Tool	21.34	15	68.19	GPM	Domestic	Water Supply	3.05		BROWN	SAND		
	645263	4902232	235.26	22.86	Cable Tool	21.34	15	68.19	GPM	Domestic	Water Supply	3.96			GRAVEL		
	645263	4902232	235.26	22.86	Cable Tool	21.34	15	68.19	GPM	Domestic	Water Supply	17.37		GREY	CLAY	SAND	
	645263	4902232	235.26	22.86	Cable Tool	21.34	15	68.19	GPM	Domestic	Water Supply	19.20			GRAVEL		
	645263	4902232	235.26	22.86	Cable Tool	21.34	15	68.19	GPM	Domestic	Water Supply	21.34		GREY	CLAY	STONES	
1909175	645263	4902232	235.26	22.86	Cable Tool	21.34	15	68.19	GPM	Domestic	Water Supply	22.86	0		COARSE SAND		
	645160	4901592	256.34	21.34	Cable Tool	17.98	4	18.184	GPM	Domestic	Water Supply	3.05		GREY	CLAY	SANDY	
	645160	4901592	256.34	21.34	Cable Tool	17.98	4	18.184	GPM	Domestic	Water Supply	12.19		GREY	SANDSTONE		
	645160	4901592	256.34	21.34	Cable Tool	17.98	4	18.184	GPM	Domestic	Water Supply	17.98		GREY	CLAY	GRAVELLY	
1909335	645160	4901592	256.34	21.34	Cable Tool	17.98	4	18.184	GPM	Domestic	Water Supply	21.34	B	GREY	LIMESTONE		
	645043	4901877	251.47	13.41	Rotary (Convent.)	12.19	6	27.276	GPM	Domestic	Water Supply	1.52		BLUE	CLAY		
	645043	4901877	251.47	13.41	Rotary (Convent.)	12.19	6	27.276	GPM	Domestic	Water Supply	11.89		BROWN	CLAY	STONES	
1909421	645043	4901877	251.47	13.41	Rotary (Convent.)	12.19	6	27.276	GPM	Domestic	Water Supply	13.41	0	BROWN	SAND	STONES	
	644699	4901854	239.78	7.32	Boring	3.66	6	27.276	GPM	Domestic	Water Supply	0.61		BLACK	TOPSOIL		
	644699	4901854	239.78	7.32	Boring	3.66	6	27.276	GPM	Domestic	Water Supply	3.66		BROWN	CLAY	STONES	PACKED
	644699	4901854	239.78	7.32	Boring	3.66	6	27.276	GPM	Domestic	Water Supply	6.10		GREY	CLAY	LAYERED	WATER-BEARING

Table A-1 MECP Wells

Project : J&J Developments, Udora Water Balance Evaluation (22012.00)

Well ID	X	y	Elevation (m)	Well Depth (m)	Construction Method	Water Level (m)	Water Yield	LPM	Units of Measurement	Water Use	Water Status	Formation Depth(m)	Overburden or Bedrock?	Material Colour	Material 1	Material 2	Material 3
1909571	644699	4901854	239.78	7.32	Boring	3.66	6	27.276	GPM	Domestic	Water Supply	7.32	1909571	GREY	CLAY	STONES	CEMENTED
	645082	4901829	253.55	40.54	Cable Tool	39.62	80	363.68	GPM	Domestic	Water Supply	21.34		BROWN	CLAY	STONEY	
	645082	4901829	253.55	40.54	Cable Tool	39.62	80	363.68	GPM	Domestic	Water Supply	25.91		GREY	CLAY	STONEY	
	645082	4901829	253.55	40.54	Cable Tool	39.62	80	363.68	GPM	Domestic	Water Supply	28.96		WHITE	CLAY	STONEY	
	645082	4901829	253.55	40.54	Cable Tool	39.62	80	363.68	GPM	Domestic	Water Supply	39.62		GREY	CLAY	SANDY	
	645082	4901829	253.55	40.54	Cable Tool	39.62	80	363.68	GPM	Domestic	Water Supply	40.54		GREY	SAND	GRAVEL	
1909778	645082	4901829	253.55	40.54	Cable Tool	39.62	80	363.68	GPM	Domestic	Water Supply	40.54	B	WHITE	LIMESTONE		
	645053.7	4901725	256.87	18.29	Cable Tool	18.29	20	90.92	GPM	Domestic	Water Supply	2.44		BROWN	SAND	GRAVEL	
	645053.7	4901725	256.87	18.29	Cable Tool	18.29	20	90.92	GPM	Domestic	Water Supply	15 .24		GREY	SAND	GRAVEL	BOULDERS
	645053.7	4901725	256.87	18.29	Cable Tool	18.29	20	90.92	GPM	Domestic	Water Supply	17.07		BLUE	SAND	CLAY	
1909925	645053.7	4901725	256.87	18.29	Cable Tool	18.29	20	90.92	GPM	Domestic	Water Supply	18 .29	0	BROWN	SAND	GRAVEL	
	644767.7	4901876	241.68	27.13	Rotary (Convent.)	22.25	10	45.46	GPM	Domestic	Water Supply	0.61		BROWN	CLAY	TOPSOIL	SOFT
	644767.7	4901876	241.68	27.13	Rotary (Convent.)	22.25	10	45.46	GPM	Domestic	Water Supply	2.44		BROWN	GRAVEL	CLAY	LOOSE
	644767.7	4901876	241.68	27.13	Rotary (Convent.)	22.25	10	45.46	GPM	Domestic	Water Supply	5.49		GREY	CLAY	SOFT	
	644767.7	4901876	241.68	27.13	Rotary (Convent.)	22.25	10	45.46	GPM	Domestic	Water Supply	22.25		BLUE	CLAY	SANDY	HARD
1910526	644767.7	4901876	241.68	27.13	Rotary (Convent.)	22.25	10	45.46	GPM	Domestic	Water Supply	27.13	B	GREY	LIMESTONE	HARD	
	645055.7	4901749	256.00	44.20	Rotary (Convent.)	43.28	12	54.552	GPM	Domestic	Water Supply	0.61		BROWN	SAND	FILL	LOOSE
	645055.7	4901749	256.00	44.20	Rotary (Convent.)	43.28	12	54.552	GPM	Domestic	Water Supply	8.23		BROWN	CLAY	STONES	HARD
	645055.7	4901749	256.00	44.20	Rotary (Convent.)	43.28	12	54.552	GPM	Domestic	Water Supply	39.93		GREY	CLAY	BOULDERS	SILT
1910527	645055.7	4901749	256.00	44.20	Rotary (Convent.)	43.28	12	54.552	GPM	Domestic	Water Supply	44.20	B	GREY	LIMESTONE	HARD	
	644779.7	4901879	241.82	32.31	Rotary (Convent.)	26.82	8	36.368	GPM	Domestic	Water Supply	3.66		BROWN	CLAY	STONES	HARD
	644779.7	4901879	241.82	32.31	Rotary (Convent.)	26.82	8	36.368	GPM	Domestic	Water Supply	9.45		BLUE	CLAY	STONES	SOFT
	644779.7	4901879	241.82	32.31	Rotary (Convent.)	26.82	8	36.368	GPM	Domestic	Water Supply	26.82		BLUE	CLAY	BOULDERS	HARD
	644779.7	4901879	241.82	32.31	Rotary (Convent.)	26.82	8	36.368	GPM	Domestic	Water Supply	28.04		GREY	LIMESTONE	SHALE	
1910635	644779.7	4901879	241.82	32.31	Rotary (Convent.)	26.82	8	36.368	GPM	Domestic	Water Supply	32.31	B	GREY	LIMESTONE	HARD	
	644791.7	4901897	240.00	35.05	Cable Tool	32.92	5	22.73	GPM	Domestic	Water Supply	6.10		BROWN	CLAY	SOFT	

Table A-1 MECP Wells

Project : J&J Developments, Udora Water Balance Evaluation (22012.00)

Well ID	X	y	Elevation (m)	Well Depth (m)	Construction Method	Water Level (m)	Water Yield	LPM	Units of Measurement	Water Use	Water Status	Formation Depth(m)	Overburden or Bedrock?	Material Colour	Material 1	Material 2	Material 3
	644791.7	4901897	240.00	35.05	Cable Tool	32.92	5	22.73	GPM	Domestic	Water Supply	8.53		GREY	CLAY		
	644791.7	4901897	240.00	35.05	Cable Tool	32.92	5	22.73	GPM	Domestic	Water Supply	26.52		GREY	CLAY	STONES	
	644791.7	4901897	240.00	35.05	Cable Tool	32.92	5	22.73	GPM	Domestic	Water Supply	30.48		GREY	CLAY		
	644791.7	4901897	240.00	35.05	Cable Tool	32.92	5	22.73	GPM	Domestic	Water Supply	32.00		GREY	CLAY	GRAVEL	
	644791.7	4901897	240.00	35.05	Cable Tool	32.92	5	22.73	GPM	Domestic	Water Supply	32.92		GREY	SAND	CLAY	SILT
1911480	644791.7	4901897	240.00	35.05	Cable Tool	32.92	5	22.73	GPM	Domestic	Water Supply	35.05	0	GREY	SHALE		
	645083	4901808	254.39	23.77	Rotary (Convent.)	23.77	8	36.368	GPM	Domestic	Water Supply	0.30		BLACK	TOPSOIL	PACKED	
	645083	4901808	254.39	23.77	Rotary (Convent.)	23.77	8	36.368	GPM	Domestic	Water Supply	8.53		BROWN	CLAY	STONES	HARD
	645083	4901808	254.39	23.77	Rotary (Convent.)	23.77	8	36.368	GPM	Domestic	Water Supply	19.20		GREY	CLAY	STONES	HARD
	645083	4901808	254.39	23.77	Rotary (Convent.)	23.77	8	36.368	GPM	Domestic	Water Supply	22.86		GREY	SAND	STONES	LOOSE
1913472	645083	4901808	254.39	23.77	Rotary (Convent.)	23.77	8	36.368	GPM	Domestic	Water Supply	23.77	0	GREY	STONES	CLAY	HARD
	645209	4902025	242.26	33.53	Rotary (Air)	33.00	75	75	LPM	Domestic	Water Supply	6.71		BROWN	SAND		
	645209	4902025	242.26	33.53	Rotary (Air)	33.00	75	75	LPM	Domestic	Water Supply	28.66		GREY	CLAY	STONES	
1917923	645209	4902025	242.26	33.53	Rotary (Air)	33.00	75	75	LPM	Domestic	Water Supply	33.53	B	GREY	LIMESTONE		
	644843		260.78	37.80	Rotary (Air)	36.88	4		LPM	Domestic	Test Hole	4.57		BROWN	SAND	CLAY	STONES
	644843		260.78	37.80	Rotary (Air)	36.88	4		LPM	Domestic	Test Hole	6.10		BROWN	SAND	GRAVEL	
	644843		260.78	37.80	Rotary (Air)	36.88	4		LPM	Domestic	Test Hole	9.75		GREY	CLAY	SILT	SOFT
	644843		260.78	37.80	Rotary (Air)	36.88	4		LPM	Domestic	Test Hole	12.19		BROWN	CLAY	SILT	SOFT
	644843		260.78	37.80	Rotary (Air)	36.88	4		LPM	Domestic	Test Hole	28.96		GREY	CLAY		
	644843		260.78	37.80	Rotary (Air)	36.88	4		LPM	Domestic	Test Hole	29.87		GREY	GRAVEL	SILT	
	644843		260.78	37.80	Rotary (Air)	36.88	4		LPM	Domestic	Test Hole	36.88		GREY	SILT	SAND	
1918031	644843	4901484	260.78	37.80	Rotary (Air)	36.88	4		LPM	Domestic	Test Hole	37.80	1918031	BROWN	SAND		
	644495		237.22	48.16	Rotary (Air)	47.85	5		LPM	Domestic	Test Hole	0.61		BROWN	TOPSOIL		
	644495		237.22	48.16	Rotary (Air)	47.85	5		LPM	Domestic	Test Hole	8.84		BROWN	SAND	CLAY	
	644495		237.22	48.16	Rotary (Air)	47.85	5		LPM	Domestic	Test Hole	9.14		BROWN	GRAVEL		
	644495		237.22	48.16	Rotary (Air)	47.85	5		LPM	Domestic	Test Hole	27.74		GREY	CLAY		

Table A-1 MECP Wells

Project : J&J Developments, Udora Water Balance Evaluation (22012.00)

Well ID	X	y	Elevation (m)	Well Depth (m)	Construction Method	Water Level (m)	Water Yield	LPM	Units of Measurement	Water Use	Water Status	Formation Depth(m)	Overburden or Bedrock?	Material Colour	Material 1	Material 2	Material 3
	644495		237.22	48.16	Rotary (Air)	47.85	5		LPM	Domestic	Test Hole	29.57		BROWN	CLAY		
	644495		237.22	48.16	Rotary (Air)	47.85	5		LPM	Domestic	Test Hole	38.10		GREY	CLAY		
	644495		237.22	48.16	Rotary (Air)	47.85	5		LPM	Domestic	Test Hole	38.71		GREY	SAND		
	644495		237.22	48.16	Rotary (Air)	47.85	5		LPM	Domestic	Test Hole	43.89		GREY	CLAY		
1918032	644495	4901469	237.22	48.16	Rotary (Air)	47.85	5		LPM	Domestic	Test Hole	48.16	1918032	BROWN	ROCK		
	644968	4901660	260.36	77.94	Rotary (Air)	43.13	3	13.638	GPM	Domestic	Water Supply	4.88		BROWN	CLAY	SILTY	GRAVEL
	644968	4901660	260.36	77.94	Rotary (Air)	43.13	3	13.638	GPM	Domestic	Water Supply	31.39		GREY	CLAY	SANDY	GRAVEL
	644968	4901660	260.36	77.94	Rotary (Air)	43.13	3	13.638	GPM	Domestic	Water Supply	39.32		GREY	CLAY	SANDY	SILT
	644968	4901660	260.36	77.94	Rotary (Air)	43.13	3	13.638	GPM	Domestic	Water Supply	43.13		GREY	CLAY	SANDY	GRAVEL
1918476	644968	4901660	260.36	77.94	Rotary (Air)	43.13	3	13.638	GPM	Domestic	Water Supply	77.94	B	GREY	LIMESTONE		
	644873.7	4901875	249.89	36.58	Cable Tool	35.05	2	9.092	GPM	Domestic	Water Supply	7.62			PREVIOUSLY DUG		
	644873.7	4901875	249.89	36.58	Cable Tool	35.05	2	9.092	GPM	Domestic	Water Supply	14.63		GREY	MEDIUM		
	644873.7	4901875	249.89	36.58	Cable Tool	35.05	2	9.092	GPM	Domestic	Water Supply	27.74		GREY	CLAY	GRAVEL	
4602452	644873.7	4901875	249.89	36.58	Cable Tool	35.05	2	9.092	GPM	Domestic	Water Supply	36.58	B		LIMESTONE		
	645145.7	4901905	245.99	41.15	Cable Tool	38.10	7	31.822	GPM	Domestic	Water Supply	6.10			PREVIOUSLY DUG		
	645145.7	4901905	245.99	41.15	Cable Tool	38.10	7	31.822	GPM	Domestic	Water Supply	35.05			HARDPAN	STONES	
	645145.7	4901905	245.99	41.15	Cable Tool	38.10	7	31.822	GPM	Domestic	Water Supply	38.10			CLAY	GRAVEL	
4602474	645145.7	4901905	245.99	41.15	Cable Tool	38.10	7	31.822	GPM	Domestic	Water Supply	41.15	B		LIMESTONE		
	645054.7	4901958	246.44	8.53	Boring	3.05	10	45.46	GPM	Domestic	Water Supply	0.30		BLACK	TOPSOIL		
	645054.7	4901958	246.44	8.53	Boring	3.05	10	45.46	GPM	Domestic	Water Supply	3.05		BROWN	CLAY		
	645054.7	4901958	246.44	8.53	Boring	3.05	10	45.46	GPM	Domestic	Water Supply	3.35		BROWN	CLAY	SILT	
	645054.7	4901958	246.44	8.53	Boring	3.05	10	45.46	GPM	Domestic	Water Supply	6.40		BLUE	CLAY	STONES	
	645054.7	4901958	246.44	8.53	Boring	3.05	10	45.46	GPM	Domestic	Water Supply	7.01		BLUE	CLAY	SILT	
4604910	645054.7	4901958	246.44	8.53	Boring	3.05	10	45.46	GPM	Domestic	Water Supply	8.53	4604910	BLUE	CLAY	STONES	
	644965.7	4901841	253.97	43.28	Rotary (Convent.)	43.28	6	27.276	GPM	Domestic	Water Supply	6.10		BROWN	CLAY	STONES	
	644965.7	4901841	253.97	43.28	Rotary (Convent.)	43.28	6	27.276	GPM	Domestic	Water Supply	40.54		BLUE	CLAY	STONES	

Table A-1 MECP Wells

Project : J&J Developments, Udora Water Balance Evaluation (22012.00)

Well ID	X	y	Elevation (m)	Well Depth (m)	Construction Method	Water Level (m)	Water Yield	LPM	Units of Measurement	Water Use	Water Status	Formation Depth(m)	Overburden or Bedrock?	Material Colour	Material 1	Material 2	Material 3
4605646	644965.7	4901841	253.97	43.28	Rotary (Convent.)	43.28	6	27.276	GPM	Domestic	Water Supply	43.28	B	GREY	LIMESTONE		
SAND																	
	645133.7	4901938	245.45	15.24	Cable Tool	14.02	6	27.276	GPM	Domestic	Water Supply	0.61		BLACK	TOPSOIL		
	645133.7	4901938	245.45	15.24	Cable Tool	14.02	6	27.276	GPM	Domestic	Water Supply	3.05		BROWN	CLAY	BOULDERS	
	645133.7	4901938	245.45	15.24	Cable Tool	14.02	6	27.276	GPM	Domestic	Water Supply	12.19		GREY	CLAY	GRAVEL	
4606274	645133.7	4901938	245.45	15.24	Cable Tool	14.02	6	27.276	GPM	Domestic	Water Supply	15 .24	0	GREY	CLAY	GRAVEL	
	645024.7	4901793	255.09	45.72	Cable Tool	41.76	15	68.19	GPM	Domestic	Water Supply	0.61		BLACK	TOPSOIL		
	645024.7	4901793	255.09	45.72	Cable Tool	41.76	15	68.19	GPM	Domestic	Water Supply	6.10		BROWN	CLAY	STONES	HARD
	645024.7	4901793	255.09	45.72	Cable Tool	41.76	15	68.19	GPM	Domestic	Water Supply	22.86		BLUE	CLAY	STONES	HARDPAN
	645024.7	4901793	255.09	45.72	Cable Tool	41.76	15	68.19	GPM	Domestic	Water Supply	23.77		GREY	GRAVEL	CLAY	
	645024.7	4901793	255.09	45.72	Cable Tool	41.76	15	68.19	GPM	Domestic	Water Supply	40.54		GREY	CLAY	STONES	HARDPAN
4606443	645024.7	4901793	255.09	45.72	Cable Tool	41.76	15	68.19	GPM	Domestic	Water Supply	45.72	B	WHITE	LIMESTONE	HARD	
	645184.7	4901623	255.56	43.89	Cable Tool	41.15	15	68.19	GPM	Domestic	Water Supply	6.10		BROWN	CLAY	SAND	
	645184.7	4901623	255.56	43.89	Cable Tool	41.15	15	68.19	GPM	Domestic	Water Supply	9.14		BROWN	CLAY	STONES	
	645184.7	4901623	255.56	43.89	Cable Tool	41.15	15	68.19	GPM	Domestic	Water Supply	18 .29		BLUE	CLAY	STONES	HARDPAN
	645184.7	4901623	255.56	43.89	Cable Tool	41.15	15	68.19	GPM	Domestic	Water Supply	27.43		BLUE	CLAY	GRAVEL	LAYERED
	645184.7	4901623	255.56	43.89	Cable Tool	41.15	15	68.19	GPM	Domestic	Water Supply	39.32		BLUE	CLAY	BOULDERS	HARDPAN
4606454	645184.7	4901623	255.56	43.89	Cable Tool	41.15	15	68.19	GPM	Domestic	Water Supply	43.89	B	WHITE	LIMESTONE	FRACTURED	
	644879.7	4902173	234.64	12.50	Cable Tool	12.50	10	45.46	GPM	Domestic	Water Supply	3.66		BROWN	CLAY	MEDIUM SAND	
	644879.7	4902173	234.64	12.50	Cable Tool	12.50	10	45.46	GPM	Domestic	Water Supply	12.19		BLUE	CLAY	STONES	
6910277	644879.7	4902173	234.64	12.50	Cable Tool	12.50	10	45.46	GPM	Domestic	Water Supply	12.50	0	GREY	GRAVEL	MEDIUM SAND	
	645289.7	4902173	240.83	18.90	Rotary (Convent.)	18.90	20	90.92	GPM	Domestic	Water Supply	6.10		BROWN	SAND		
	645289.7	4902173	240.83	18.90	Rotary (Convent.)	18.90	20	90.92	GPM	Domestic	Water Supply	12.50		BLUE	CLAY		
	645289.7	4902173	240.83	18.90	Rotary (Convent.)	18.90	20	90.92	GPM	Domestic	Water Supply	15.24		GREY	CLAY	SILT	STONES
6910861	645289.7	4902173	240.83	18.90	Rotary (Convent.)	18.90	20	90.92	GPM	Domestic	Water Supply	18.90	0	GREY	SAND	GRAVEL	STONES
	644937.7	4901988	242.15	14.63	Rotary (Convent.)	14.63	6	27.276	GPM	Domestic	Water Supply	5.49		BROWN	CLAY	STONES	

Table A-1 MECP Wells

Project : J&J Developments, Udora Water Balance Evaluation (22012.00)

Well ID	X	y	Elevation (m)	Well Depth (m)	Construction Method	Water Level (m)	Water Yield	LPM	Units of Measurement	Water Use	Water Status	Formation Depth(m)	Overburden or Bedrock?	Material Colour	Material 1	Material 2	Material 3
	644937.7	4901988	242.15	14.63	Rotary (Convent.)	14.63	6	27.276	GPM	Domestic	Water Supply	10.97		GREY	CLAY	STONES	BOULDERS
6911381	644937.7	4901988	242.15	14.63	Rotary (Convent.)	14.63	6	27.276	GPM	Domestic	Water Supply	14.63	0	GREY	SAND	GRAVEL	
	645012.7	4902085	237.54	24.99	Rotary (Convent.)	24.99	10	45.46	GPM	Domestic	Water Supply	0.91		BROWN	CLAY		
	645012.7	4902085	237.54	24.99	Rotary (Convent.)	24.99	10	45.46	GPM	Domestic	Water Supply	3.66		BROWN	GRAVEL		
	645012.7	4902085	237.54	24.99	Rotary (Convent.)	24.99	10	45.46	GPM	Domestic	Water Supply	24.69		BLUE	CLAY	SILT	STONES
6911401	645012.7	4902085	237.54	24.99	Rotary (Convent.)	24.99	10	45.46	GPM	Domestic	Water Supply	24.99	0	GREY	GRAVEL		
	644975.7	4902257	230.66	18.90	Rotary (Convent.)	13.72	5	22.73	GPM	Domestic	Water Supply	1.83		BROWN	SAND	GRAVEL	
	644975.7	4902257	230.66	18.90	Rotary (Convent.)	13.72	5	22.73	GPM	Domestic	Water Supply	4.27		BROWN	GRAVEL		
	644975.7	4902257	230.66	18.90	Rotary (Convent.)	13.72	5	22.73	GPM	Domestic	Water Supply	13 .72		BLUE	CLAY	STONES	
	644975.7	4902257	230.66	18.90	Rotary (Convent.)	13.72	5	22.73	GPM	Domestic	Water Supply	14.02		GREY	SAND		
	644975.7	4902257	230.66	18.90	Rotary (Convent.)	13.72	5	22.73	GPM	Domestic	Water Supply	18 .59		BLUE	CLAY	STONES	
6911682	644975.7	4902257	230.66	18.90	Rotary (Convent.)	13.72	5	22.73	GPM	Domestic	Water Supply	18 .90	B	GREY	LIMESTONE		
	644858.7	4902233	235.02	28.04	Rotary (Convent.)	10.67	8	36.368	GPM	Domestic	Water Supply	2.44		BROWN	CLAY	STONES	
	644858.7	4902233	235.02	28.04	Rotary (Convent.)	10.67	8	36.368	GPM	Domestic	Water Supply	10.67		GREY	CLAY	STONES	
	644858.7	4902233	235.02	28.04	Rotary (Convent.)	10.67	8	36.368	GPM	Domestic	Water Supply	10.97		GREY	GRAVEL		
	644858.7	4902233	235.02	28.04	Rotary (Convent.)	10.67	8	36.368	GPM	Domestic	Water Supply	19.51		GREY	CLAY	BOULDERS	STONES
6911683	644858.7	4902233	235.02	28.04	Rotary (Convent.)	10.67	8	36.368	GPM	Domestic	Water Supply	28.04	B	GREY	LIMESTONE		
	645120.7	4902098	238.91	34.75	Rotary (Convent.)	29.26	4	18.184	GPM	Domestic	Water Supply	0.61		BROWN	SAND	FILL	
	645120.7	4902098	238.91	34.75	Rotary (Convent.)	29.26	4	18.184	GPM	Domestic	Water Supply	0.91		BLACK	TOPSOIL		
	645120.7	4902098	238.91	34.75	Rotary (Convent.)	29.26	4	18.184	GPM	Domestic	Water Supply	6.10		BROWN	CLAY	STONES	BOULDERS
	645120.7	4902098	238.91	34.75	Rotary (Convent.)	29.26	4	18.184	GPM	Domestic	Water Supply	28.65		GREY	CLAY	STONES	BOULDERS
	645120.7	4902098	238.91	34.75	Rotary (Convent.)	29.26	4	18.184	GPM	Domestic	Water Supply	29.26		GREY	GRAVEL		
6911716	645120.7	4902098	238.91	34.75	Rotary (Convent.)	29.26	4	18.184	GPM	Domestic	Water Supply	34.75	B	GREY	LIMESTONE		
	644881.7	4902217	235.12	19.81	Cable Tool	19.51	13	59.098	GPM	Domestic	Water Supply	3.66		BLUE	CLAY		
	644881.7	4902217	235.12	19.81	Cable Tool	19.51	13	59.098	GPM	Domestic	Water Supply	7.32		GREY	GRAVEL		
	644881.7	4902217	235.12	19.81	Cable Tool	19.51	13	59.098	GPM	Domestic	Water Supply	18.59		BLUE	CLAY	STONES	

Table A-1 MECP Wells

Project : J&J Developments, Udora Water Balance Evaluation (22012.00)

Well ID	X	y	Elevation (m)	Well Depth (m)	Construction Method	Water Level (m)	Water Yield	LPM	Units of Measurement	Water Use	Water Status	Formation Depth(m)	Overburden or Bedrock?	Material Colour	Material 1	Material 2	Material 3
6912263	644881.7	4902217	235.12	19.81	Cable Tool	19.51	13	59.098	GPM	Domestic	Water Supply	19.81	B	GREY	LIMESTONE		
	644868.7	4902222	235.01	18.59	Cable Tool	17.37	20	90.92	GPM	Domestic	Water Supply	5.49		YELLOW	SAND	CLAY	
	644868.7	4902222	235.01	18.59	Cable Tool	17.37	20	90.92	GPM	Domestic	Water Supply	7.32		GREY	BOULDERS		
	644868.7	4902222	235.01	18.59	Cable Tool	17.37	20	90.92	GPM	Domestic	Water Supply	13 .72		BLUE	CLAY	SAND	
	644868.7	4902222	235.01	18.59	Cable Tool	17.37	20	90.92	GPM	Domestic	Water Supply	17.37		BROWN	CLAY	SAND	
6912264	644868.7	4902222	235.01	18.59	Cable Tool	17.37	20	90.92	GPM	Domestic	Water Supply	18 .59	0	BROWN	SAND	GRAVEL	
	645364.7	4902213	242.82	25.91	Cable Tool	24.99	10	45.46	GPM	Domestic	Water Supply	3.66			SAND	STONES	
	645364.7	4902213	242.82	25.91	Cable Tool	24.99	10	45.46	GPM	Domestic	Water Supply	9.75			GRAVEL	STONES	
	645364.7	4902213	242.82	25.91	Cable Tool	24.99	10	45.46	GPM	Domestic	Water Supply	24.99			STONES		
6912593	645364.7	4902213	242.82	25.91	Cable Tool	24.99	10	45.46	GPM	Domestic	Water Supply	25.91	0	BROWN	GRAVEL		
	645214.7	4902123	239.40	16.15	Rotary (Convent.)	16.15	6	27.276	GPM	Domestic	Water Supply	3.35		BROWN	SAND		
	645214.7	4902123	239.40	16.15	Rotary (Convent.)	16.15	6	27.276	GPM	Domestic	Water Supply	9.14		BLUE	CLAY		
	645214.7	4902123	239.40	16.15	Rotary (Convent.)	16.15	6	27.276	GPM	Domestic	Water Supply	10.06		GREY	CLAY	STONES	
	645214.7	4902123	239.40	16.15	Rotary (Convent.)	16.15	6	27.276	GPM	Domestic	Water Supply	15.24		GREY	CLAY	STONES	
6912664	645214.7	4902123	239.40	16.15	Rotary (Convent.)	16.15	6	27.276	GPM	Domestic	Water Supply	16.15	0	GREY	SAND	GRAVEL	
	645172.7	4902166	236.84	14.63	Rotary (Convent.)	14.63	12	54.552	GPM	Domestic	Water Supply	2.44		BROWN	SAND	GRAVEL	
	645172.7	4902166	236.84	14.63	Rotary (Convent.)	14.63	12	54.552	GPM	Domestic	Water Supply	10.67		BLUE	CLAY		
	645172.7	4902166	236.84	14.63	Rotary (Convent.)	14.63	12	54.552	GPM	Domestic	Water Supply	13.41		GREY	CLAY	STONES	
6912913	645172.7	4902166	236.84	14.63	Rotary (Convent.)	14.63	12	54.552	GPM	Domestic	Water Supply	14.63	0	GREY	SAND	GRAVEL	
	645161.7	4902147	237.48	14.63	Rotary (Convent.)	14.63	10	45.46	GPM	Domestic	Water Supply	2.13		BROWN	GRAVEL	SAND	
	645161.7	4902147	237.48	14.63	Rotary (Convent.)	14.63	10	45.46	GPM	Domestic	Water Supply	13 .72		GREY	CLAY	STONES	
6912914	645161.7	4902147	237.48	14.63	Rotary (Convent.)	14.63	10	45.46	GPM	Domestic	Water Supply	14.63	0	GREY	SAND	GRAVEL	
	644904.7	4902013	239.32	13.11	Cable Tool	11.89	20	90.92	GPM	Domestic	Water Supply	2.13		BROWN	CLAY	SAND	
	644904.7	4902013	239.32	13.11	Cable Tool	11.89	20	90.92	GPM	Domestic	Water Supply	9.75		BROWN	SAND	CLAY	STONES
	644904.7	4902013	239.32	13.11	Cable Tool	11.89	20	90.92	GPM	Domestic	Water Supply	11.89		BROWN	FINE SAND		
	644904.7	4902013	239.32	13.11	Cable Tool	11.89	20	90.92	GPM	Domestic	Water Supply	12.50		BROWN	COARSE SAND		

Table A-1 MECP Wells

Project : J&J Developments, Udora Water Balance Evaluation (22012.00)

Well ID	X	y	Elevation (m)	Well Depth (m)	Construction Method	Water Level (m)	Water Yield	LPM	Units of Measurement	Water Use	Water Status	Formation Depth(m)	Overburden or Bedrock?	Material Colour	Material 1	Material 2	Material 3
6913565	644904.7	4902013	239.32	13.11	Cable Tool	11.89	20	90.92	GPM	Domestic	Water Supply	13 .11	0	BLACK	GRAVEL		
	645154.7	4902253	231.04	10.97	Cable Tool	5.49	20	90.92	GPM	Domestic	Water Supply	5.49		BROWN	CLAY	SANDY	
	645154.7	4902253	231.04	10.97	Cable Tool	5.49	20	90.92	GPM	Domestic	Water Supply	9.75		GREY	GRAVEL	CLAY	
6913697	645154.7	4902253	231.04	10.97	Cable Tool	5.49	20	90.92	GPM	Domestic	Water Supply	10.97	0	GREY	GRAVEL	CLEAN	
	645274.7	4902233	236.15	10.67	Cable Tool	5.79	12	54.552	GPM	Domestic	Water Supply	5.79		BROWN	CLAY	SANDY	
	645274.7	4902233	236.15	10.67	Cable Tool	5.79	12	54.552	GPM	Domestic	Water Supply	9.14		GREY	GRAVEL		
6913698	645274.7	4902233	236.15	10.67	Cable Tool	5.79	12	54.552	GPM	Domestic	Water Supply	10.67	0	GREY	GRAVEL	CLEAN	
	645274.7	4902194	238.72	17.68	Rotary (Convent.)	17.68	25	113.65	GPM	Domestic	Water Supply	2.74		BROWN	SAND		
	645274.7	4902194	238.72	17.68	Rotary (Convent.)	17.68	25	113.65	GPM	Domestic	Water Supply	9.75		BLUE	CLAY		
	645274.7	4902194	238.72	17.68	Rotary (Convent.)	17.68	25	113.65	GPM	Domestic	Water Supply	15.24		GREY	CLAY	STONES	
6913711	645274.7	4902194	238.72	17.68	Rotary (Convent.)	17.68	25	113.65	GPM	Domestic	Water Supply	17.68	0	GREY	SAND	GRAVEL	
	645229.7	4902149	238.76	16.76	Rotary (Convent.)	16.76	7	31.822	GPM	Domestic	Water Supply	2.74		BROWN	SAND		
	645229.7	4902149	238.76	16.76	Rotary (Convent.)	16.76	7	31.822	GPM	Domestic	Water Supply	8.23		BLUE	CLAY		
	645229.7	4902149	238.76	16.76	Rotary (Convent.)	16.76	7	31.822	GPM	Domestic	Water Supply	9.14		RED	GRANITE	BOULDERS	
	645229.7	4902149	238.76	16.76	Rotary (Convent.)	16.76	7	31.822	GPM	Domestic	Water Supply	14.63		GREY	CLAY	STONES	
6913712	645229.7	4902149	238.76	16.76	Rotary (Convent.)	16.76	7	31.822	GPM	Domestic	Water Supply	16.76	0	GREY	SAND	GRAVEL	
	645114.7	4902373	234.85	25.30	Rotary (Convent.)	22.25	6	27.276	GPM	Domestic	Water Supply	0.91		BROWN	SAND	DRY	
	645114.7	4902373	234.85	25.30	Rotary (Convent.)	22.25	6	27.276	GPM	Domestic	Water Supply	3.35		BROWN	GRAVEL	DRY	
	645114.7	4902373	234.85	25.30	Rotary (Convent.)	22.25	6	27.276	GPM	Domestic	Water Supply	6.10		BROWN	GRAVEL	SAND	
	645114.7	4902373	234.85	25.30	Rotary (Convent.)	22.25	6	27.276	GPM	Domestic	Water Supply	9.14		BROWN	SAND	CLAY	PACKED
	645114.7	4902373	234.85	25.30	Rotary (Convent.)	22.25	6	27.276	GPM	Domestic	Water Supply	16.46		GREY	CLAY	BOULDERS	HARD
	645114.7	4902373	234.85	25.30	Rotary (Convent.)	22.25	6	27.276	GPM	Domestic	Water Supply	18 .29		GREY	GRAVEL	SILT	CEMENTED
	645114.7	4902373	234.85	25.30	Rotary (Convent.)	22.25	6	27.276	GPM	Domestic	Water Supply	21.95		GREY	CLAY	STONES	HARD
	645114.7	4902373	234.85	25.30	Rotary (Convent.)	22.25	6	27.276	GPM	Domestic	Water Supply	22.86		GREY	SAND	SILT	POROUS
	645114.7	4902373	234.85	25.30	Rotary (Convent.)	22.25	6	27.276	GPM	Domestic	Water Supply	24.69		GREY	CLAY	STONES	HARD
6914598	645114.7	4902373	234.85	25.30	Rotary (Convent.)	22.25	6	27.276	GPM	Domestic	Water Supply	25.30	B	GREY	LIMESTONE	HARD	

Table A-1 MECP Wells

Project : J&J Developments, Udora Water Balance Evaluation (22012.00)

Well ID	X	y	Elevation (m)	Well Depth (m)	Construction Method	Water Level (m)	Water Yield	LPM	Units of Measurement	Water Use	Water Status	Formation Depth(m)	Overburden or Bedrock?	Material Colour	Material 1	Material 2	Material 3
	644514.7	4901973	234.91	17.98	Rotary (Convent.)	17.98	9	40.914	GPM	Domestic	Water Supply	3.05		BROWN	GRAVEL	LOOSE	
	644514.7	4901973	234.91	17.98	Rotary (Convent.)	17.98	9	40.914	GPM	Domestic	Water Supply	9.14		GREY	CLAY	STONES	HARD
	644514.7	4901973	234.91	17.98	Rotary (Convent.)	17.98	9	40.914	GPM	Domestic	Water Supply	17.07		GREY	SILT	CLAY	HARD
6915189	644514.7	4901973	234.91	17.98	Rotary (Convent.)	17.98	9	40.914	GPM	Domestic	Water Supply	17.98	B	GREY	LIMESTONE	SHALY	
	644964.7	4902173	234.00	13.72	Cable Tool	10.67	10	45.46	GPM	Domestic	Water Supply	0.61		BLACK	TOPSOIL		
	644964.7	4902173	234.00	13.72	Cable Tool	10.67	10	45.46	GPM	Domestic	Water Supply	2.74		BROWN	CLAY		
	644964.7	4902173	234.00	13.72	Cable Tool	10.67	10	45.46	GPM	Domestic	Water Supply	10.67		GREY	CLAY	STONES	PACKED
6915526	644964.7	4902173	234.00	13.72	Cable Tool	10.67	10	45.46	GPM	Domestic	Water Supply	13 .72	0	GREY	GRAVEL	SAND	
	645114.7	4902123	237.81	13.11	Cable Tool	11.58	6	27.276	GPM	Domestic	Water Supply	7.01		BROWN	CLAY		
	645114.7	4902123	237.81	13.11	Cable Tool	11.58	6	27.276	GPM	Domestic	Water Supply	11.58		YELLOW	SAND	GRAVEL	LAYERED
6915642	645114.7	4902123	237.81	13.11	Cable Tool	11.58	6	27.276	GPM	Domestic	Water Supply	13 .11	0	BROWN	SAND	GRAVEL	LAYERED
	645114.7	4902123	237.81	13.41	Cable Tool	11.28	8	36.368	GPM	Domestic	Water Supply	4.88		BROWN	CLAY	STONES	
	645114.7	4902123	237.81	13.41	Cable Tool	11.28	8	36.368	GPM	Domestic	Water Supply	11.28		YELLOW	CLAY	SAND	
6915643	645114.7	4902123	237.81	13.41	Cable Tool	11.28	8	36.368	GPM	Domestic	Water Supply	13 .41	0	BROWN	SAND	GRAVEL	LAYERED
	644914.7	4902023	239.39	7.01	Boring	3.66	2	9.092	GPM	Domestic	Water Supply	0.30			TOPSOIL		
	644914.7	4902023	239.39	7.01	Boring	3.66	2	9.092	GPM	Domestic	Water Supply	3.66			CLAY		
6915924	644914.7	4902023	239.39	7.01	Boring	3.66	2	9.092	GPM	Domestic	Water Supply	7.01	6915924		HARDPAN	STONES	
	644814.7	4902023	234.73	32.61	Rotary (Convent.)	27.43	3	13.638	GPM	Domestic	Water Supply	3.66		BROWN	CLAY	DENSE	
	644814.7	4902023	234.73	32.61	Rotary (Convent.)	27.43	3	13.638	GPM	Domestic	Water Supply	13.72		GREY	CLAY	STONES	HARD
	644814.7	4902023	234.73	32.61	Rotary (Convent.)	27.43	3	13.638	GPM	Domestic	Water Supply	14.33		GREY	GRAVEL	SILT	CEMENTED
	644814.7	4902023	234.73	32.61	Rotary (Convent.)	27.43	3	13.638	GPM	Domestic	Water Supply	22.86		GREY	CLAY	STONES	HARD
	644814.7	4902023	234.73	32.61	Rotary (Convent.)	27.43	3	13.638	GPM	Domestic	Water Supply	23.47		GREY	GRAVEL	SILT	CEMENTED
	644814.7	4902023	234.73	32.61	Rotary (Convent.)	27.43	3	13.638	GPM	Domestic	Water Supply	24.69		GREY	CLAY	HARD	
	644814.7	4902023	234.73	32.61	Rotary (Convent.)	27.43	3	13.638	GPM	Domestic	Water Supply	24.99		GREY	GRAVEL	CEMENTED	
6916447	644814.7	4902023	234.73	32.61	Rotary (Convent.)	27.43	3	13.638	GPM	Domestic	Water Supply	32.61	B	GREY	LIMESTONE	HARD	
	644930.7	4902060	238.48	13.72	Cable Tool	12.80	15	68.19	GPM	Domestic	Water Supply	7.62			PREVIOUSLY DUG		

Table A-1 MECP Wells

Project : J&J Developments, Udora Water Balance Evaluation (22012.00)

Well ID	X	y	Elevation (m)	Well Depth (m)	Construction Method	Water Level (m)	Water Yield	LPM	Units of Measurement	Water Use	Water Status	Formation Depth(m)	Overburden or Bedrock?	Material Colour	Material 1	Material 2	Material 3
	644930.7	4902060	238.48	13.72	Cable Tool	12.80	15	68.19	GPM	Domestic	Water Supply	12.80		BROWN	CLAY	STONES	HARD
6917318	644930.7	4902060	238.48	13.72	Cable Tool	12.80	15	68.19	GPM	Domestic	Water Supply	13.72	0	GREY	COARSE SAND	GRAVEL	
	645322	4902220	240.47	10.06	Rotary (Convent.)	9.14	12	54.552	GPM	Domestic	Water Supply	0.30		BROWN	TOPSOIL		
	645322	4902220	240.47	10.06	Rotary (Convent.)	9.14	12	54.552	GPM	Domestic	Water Supply	2.44		BROWN	CLAY		
	645322	4902220	240.47	10.06	Rotary (Convent.)	9.14	12	54.552	GPM	Domestic	Water Supply	4.57		BROWN	GRAVEL	HARD	
	645322	4902220	240.47	10.06	Rotary (Convent.)	9.14	12	54.552	GPM	Domestic	Water Supply	5.49		BROWN	SAND	HARD	
	645322	4902220	240.47	10.06	Rotary (Convent.)	9.14	12	54.552	GPM	Domestic	Water Supply	8.53		BROWN	GRAVEL	HARD	
6917602	645322	4902220	240.47	10.06	Rotary (Convent.)	9.14	12	54.552	GPM	Domestic	Water Supply	10.06	0	BROWN	SAND	HARD	
	644903	4902293	234.36	31.70	Rotary (Convent.)	31.70	20	90.92	GPM	Domestic	Water Supply	3.66		BROWN	SAND	DRY	
	644903	4902293	234.36	31.70	Rotary (Convent.)	31.70	20	90.92	GPM	Domestic	Water Supply	8.53		BROWN	COARSE GRAVEL	SAND	
	644903	4902293	234.36	31.70	Rotary (Convent.)	31.70	20	90.92	GPM	Domestic	Water Supply	28.65		YELLOW	CLAY	STONES	HARD
6918213	644903	4902293	234.36	31.70	Rotary (Convent.)	31.70	20	90.92	GPM	Domestic	Water Supply	31.70	B	GREY	LIMESTONE		
	645004.7	4902035	240.74	12.19	Cable Tool	10.97	8	36.368	GPM	Domestic	Water Supply	0.61		BROWN	FILL	STONES	
	645004.7	4902035	240.74	12.19	Cable Tool	10.97	8	36.368	GPM	Domestic	Water Supply	5.79		BROWN	SAND	CLAY	LOOSE
	645004.7	4902035	240.74	12.19	Cable Tool	10.97	8	36.368	GPM	Domestic	Water Supply	10.97		BLUE	CLAY	STONES	
6918221	645004.7	4902035	240.74	12.19	Cable Tool	10.97	8	36.368	GPM	Domestic	Water Supply	12.19	0	BROWN	SAND	CLAY	LAYERED
	644960	4902131	234.99	26.52	Cable Tool	24.38	7	31.822	GPM	Domestic	Water Supply	7.62		BROWN	CLAY	SAND	STONES
	644960	4902131	234.99	26.52	Cable Tool	24.38	7	31.822	GPM	Domestic	Water Supply	24.38		GREY	CLAY	STONEY	
6918583	644960	4902131	234.99	26.52	Cable Tool	24.38	7	31.822	GPM	Domestic	Water Supply	26.52	B		LIMESTONE		
	645294.7	4902244	237.51	22.86	Cable Tool	21.95	30	136.38	GPM	Domestic	Water Supply	0.61			TOPSOIL		
	645294.7	4902244	237.51	22.86	Cable Tool	21.95	30	136.38	GPM	Domestic	Water Supply	3.66			SAND	GRAVEL	
	645294.7	4902244	237.51	22.86	Cable Tool	21.95	30	136.38	GPM	Domestic	Water Supply	10.06		BROWN	CLAY	STONEY	SANDY
	645294.7	4902244	237.51	22.86	Cable Tool	21.95	30	136.38	GPM	Domestic	Water Supply	21.95		GREY	CLAY	SANDY	
6919127	645294.7	4902244	237.51	22.86	Cable Tool	21.95	30	136.38	GPM	Domestic	Water Supply	22.86	0	GREY	COARSE SAND		
	645258.7	4902184	238.05	10.97	Rotary (Convent.)	8.53	15	68.19	GPM	Domestic	Water Supply	0.61		BROWN	SAND	FILL	LOOSE
	645258.7	4902184	238.05	10.97	Rotary (Convent.)	8.53	15	68.19	GPM	Domestic	Water Supply	2.74		BLACK	TOPSOIL	LOOSE	

Table A-1 MECP Wells

Project : J&J Developments, Udora Water Balance Evaluation (22012.00)

Well ID	X	y	Elevation (m)	Well Depth (m)	Construction Method	Water Level (m)	Water Yield	LPM	Units of Measurement	Water Use	Water Status	Formation Depth(m)	Overburden or Bedrock?	Material Colour	Material 1	Material 2	Material 3
	645258.7	4902184	238.05	10.97	Rotary (Convent.)	8.53	15	68.19	GPM	Domestic	Water Supply	4.88		RED	SAND	CLAY	SOFT
	645258.7	4902184	238.05	10.97	Rotary (Convent.)	8.53	15	68.19	GPM	Domestic	Water Supply	8.53		GREY	CLAY	SILT	HARD
6919373	645258.7	4902184	238.05	10.97	Rotary (Convent.)	8.53	15	68.19	GPM	Domestic	Water Supply	10.97	0	RED	SAND	GRAVEL	LOOSE
	645014	4902099	236.84	32.00	Rotary (Convent.)	31.39	10	45.46	GPM	Domestic	Water Supply	0.30		BROWN	TOPSOIL		
	645014	4902099	236.84	32.00	Rotary (Convent.)	31.39	10	45.46	GPM	Domestic	Water Supply	3.66		BROWN	SAND		
	645014	4902099	236.84	32.00	Rotary (Convent.)	31.39	10	45.46	GPM	Domestic	Water Supply	23.47		GREY	CLAY	STONES	HARDPAN
6919587	645014	4902099	236.84	32.00	Rotary (Convent.)	31.39	10	45.46	GPM	Domestic	Water Supply	32.00	B	GREY	LIMESTONE	CLAY	
	644439.7	4902013	233.94	18.90	Rotary (Convent.)	14.02	20	90.92	GPM	Domestic	Water Supply	0.91		BROWN	SAND		
	644439.7	4902013	233.94	18.90	Rotary (Convent.)	14.02	20	90.92	GPM	Domestic	Water Supply	3.66		BROWN	SAND	STONES	HARD
	644439.7	4902013	233.94	18.90	Rotary (Convent.)	14.02	20	90.92	GPM	Domestic	Water Supply	14.02		GREY	CLAY	STONES	HARD
6919589	644439.7	4902013	233.94	18.90	Rotary (Convent.)	14.02	20	90.92	GPM	Domestic	Water Supply	18.90	B	GREY	LIMESTONE		
	645133.7	4902146	237.22	13.72	Cable Tool	13.41	15	68.19	GPM	Domestic	Water Supply	2.13		BROWN	CLAY	TOPSOIL	
	645133.7	4902146	237.22	13.72	Cable Tool	13.41	15	68.19	GPM	Domestic	Water Supply	8.84		BROWN	CLAY	SAND	
	645133.7	4902146	237.22	13.72	Cable Tool	13.41	15	68.19	GPM	Domestic	Water Supply	13 .41		GREY	CLAY	STONES	
6919784	645133.7	4902146	237.22	13.72	Cable Tool	13.41	15	68.19	GPM	Domestic	Water Supply	13 .72	0	GREY	SAND	GRAVEL	CLEAN
6919855	644419.7	4902136	233.41	10.97	Rotary (Convent.)	7.62	20	90.92	GPM	Domestic	Water Supply	0.30	0	BROWN	TOPSOIL	SAND	
	644419.7	4902136	233.41	10.97	Rotary (Convent.)	7.62	20	90.92	GPM	Domestic	Water Supply	10.97		BROWN	SAND	STONES	SANDY
	644997.7	4902052	239.54	13.72	Cable Tool	12.80	6	27.276	GPM	Domestic	Water Supply	0.30		BROWN	TOPSOIL	SOFT	
	644997.7	4902052	239.54	13.72	Cable Tool	12.80	6	27.276	GPM	Domestic	Water Supply	2.74		BROWN	SAND	STONES	
	644997.7	4902052	239.54	13.72	Cable Tool	12.80	6	27.276	GPM	Domestic	Water Supply	10.06		GREY	CLAY	GRAVEL	
	644997.7	4902052	239.54	13.72	Cable Tool	12.80	6	27.276	GPM	Domestic	Water Supply	12.50		GREY	GRAVEL	STONES	BOULDERS
6920544	644997.7	4902052	239.54	13.72	Cable Tool	12.80	6	27.276	GPM	Domestic	Water Supply	13 .72	0	BLACK	COARSE SAND		
	645305.7	4902238	238.54	22.56	Rotary (Air)	22.56	60	272.76	GPM	Domestic	Water Supply	11 .28		BROWN	CLAY	SOFT	
	645305.7	4902238	238.54	22.56	Rotary (Air)	22.56	60	272.76	GPM	Domestic	Water Supply	17.37		GREY	CLAY	STONES	HARD
6921200	645305.7	4902238	238.54	22.56	Rotary (Air)	22.56	60	272.76	GPM	Domestic	Water Supply	22.56	0	GREY	COARSE GRAVEL	CLEAN	
	645182.7	4902232	233.23	10.97	Rotary (Convent.)	6.10	25	113.65	GPM	Domestic	Water Supply	1.22		BLACK	PEAT	TOPSOIL	LOOSE

Table A-1 MECP Wells

Project : J&J Developments, Udora Water Balance Evaluation (22012.00)

Well ID	X	y	Elevation (m)	Well Depth (m)	Construction Method	Water Level (m)	Water Yield	LPM	Units of Measurement	Water Use	Water Status	Formation Depth(m)	Overburden or Bedrock?	Material Colour	Material 1	Material 2	Material 3
	645182.7	4902232	233.23	10.97	Rotary (Convent.)	6.10	25	113.65	GPM	Domestic	Water Supply	2.13		BROWN	GRAVEL	SAND	LOOSE
	645182.7	4902232	233.23	10.97	Rotary (Convent.)	6.10	25	113.65	GPM	Domestic	Water Supply	6.10		BLUE	CLAY	DENSE	
	645182.7	4902232	233.23	10.97	Rotary (Convent.)	6.10	25	113.65	GPM	Domestic	Water Supply	8.53		GREY	SAND	LAYERED	
6921423	645182.7	4902232	233.23	10.97	Rotary (Convent.)	6.10	25	113.65	GPM	Domestic	Water Supply	10.97	0	GREY	GRAVEL	LOOSE	
	644410.7	4901914	234.01	17.37	Cable Tool	17.37	6	27.276	GPM	Domestic	Water Supply	0.30		BROWN	TOPSOIL		
	644410.7	4901914	234.01	17.37	Cable Tool	17.37	6	27.276	GPM	Domestic	Water Supply	5.49		BROWN	SAND		
	644410.7	4901914	234.01	17.37	Cable Tool	17.37	6	27.276	GPM	Domestic	Water Supply	12.19		GREY	CLAY		
6921506	644410.7	4901914	234.01	17.37	Cable Tool	17.37	6	27.276	GPM	Domestic	Water Supply	17.37	B	BROWN	SHALE	ROCK	SAND
	645303.7	4902116	243.40	25.91	Cable Tool	24.99	20	90.92	GPM	Domestic	Water Supply	0.30		BROWN	TOPSOIL		
	645303.7	4902116	243.40	25.91	Cable Tool	24.99	20	90.92	GPM	Domestic	Water Supply	7.01		BROWN	SAND	LOOSE	
	645303.7	4902116	243.40	25.91	Cable Tool	24.99	20	90.92	GPM	Domestic	Water Supply	16.15		BLUE	CLAY	STONES	STICKY
	645303.7	4902116	243.40	25.91	Cable Tool	24.99	20	90.92	GPM	Domestic	Water Supply	18 .29		BROWN	CLAY	SAND	LAYERED
	645303.7	4902116	243.40	25.91	Cable Tool	24.99	20	90.92	GPM	Domestic	Water Supply	19.81		GREY	CLAY		
	645303.7	4902116	243.40	25.91	Cable Tool	24.99	20	90.92	GPM	Domestic	Water Supply	24.69		GREY	GRAVEL	LOOSE	
	645303.7	4902116	243.40	25.91	Cable Tool	24.99	20	90.92	GPM	Domestic	Water Supply	24.99		GREY	CLAY		
6921836	645303.7	4902116	243.40	25.91	Cable Tool	24.99	20	90.92	GPM	Domestic	Water Supply	25.91	0	BLACK	COARSE SAND		
	645004.7	4902035	240.74	30.18	Cable Tool	28.04	10	45.46	GPM	Domestic	Water Supply	12.19			PREV. DRILLED		
	645004.7	4902035	240.74	30.18	Cable Tool	28.04	10	45.46	GPM	Domestic	Water Supply	13 .41		BROWN	CLAY	SAND	LAYERED
	645004.7	4902035	240.74	30.18	Cable Tool	28.04	10	45.46	GPM	Domestic	Water Supply	25.91		GREY	CLAY	STONES	HARD
	645004.7	4902035	240.74	30.18	Cable Tool	28.04	10	45.46	GPM	Domestic	Water Supply	26.21		GREY	CLAY	SOFT	
	645004.7	4902035	240.74	30.18	Cable Tool	28.04	10	45.46	GPM	Domestic	Water Supply	28.04		GREY	LIMESTONE	HARD	
6922020	645004.7	4902035	240.74	30.18	Cable Tool	28.04	10	45.46	GPM	Domestic	Water Supply	30.18	B	WHITE	LIMESTONE		
	645281.7	4902183	239.79	13.72	Cable Tool	12.19	7	31.822	GPM	Domestic	Water Supply	1.22		BLACK	MUCK	SOFT	
	645281.7	4902183	239.79	13.72	Cable Tool	12.19	7	31.822	GPM	Domestic	Water Supply	2.44		BROWN	SAND		
	645281.7	4902183	239.79	13.72	Cable Tool	12.19	7	31.822	GPM	Domestic	Water Supply	12.19		GREY	CLAY	SOFT	
6922039	645281.7	4902183	239.79	13.72	Cable Tool	12.19	7	31.822	GPM	Domestic	Water Supply	13 .72	0		COARSE SAND	LOOSE	

Table A-1 MECP Wells

Project : J&J Developments, Udora Water Balance Evaluation (22012.00)

Well ID	X	y	Elevation (m)	Well Depth (m)	Construction Method	Water Level (m)	Water Yield	LPM	Units of Measurement	Water Use	Water Status	Formation Depth(m)	Overburden or Bedrock?	Material Colour	Material 1	Material 2	Material 3
	644971	4902097	236.68	17.68	Rotary (Air)	16.15	10	45.46	GPM	Domestic	Water Supply	5.18		BROWN	CLAY	STONES	HARD
	644971	4902097	236.68	17.68	Rotary (Air)	16.15	10	45.46	GPM	Domestic	Water Supply	13 .72		GREY	CLAY	BOULDERS	HARD
	644971	4902097	236.68	17.68	Rotary (Air)	16.15	10	45.46	GPM	Domestic	Water Supply	14.33		GREY	CLAY	DENSE	
6922256	644971	4902097	236.68	17.68	Rotary (Air)	16.15	10	45.46	GPM	Domestic	Water Supply	17.68	0	BLACK	FINE SAND	CLEAN	
	644382	4901885	234.04	21.34	Rotary (Air)	21.34	10	45.46	GPM	Domestic	Water Supply	4.57		BROWN	SAND	PACKED	
	644382	4901885	234.04	21.34	Rotary (Air)	21.34	10	45.46	GPM	Domestic	Water Supply	15.85		GREY	CLAY	GRAVEL	SOFT
6922931	644382	4901885	234.04	21.34	Rotary (Air)	21.34	10	45.46	GPM	Domestic	Water Supply	21.34	B	GREY	LIMESTONE	HARD	
	644395	4902151	233.25	19.81	Rotary (Convent.)	12.50	10	45.46	GPM	Domestic	Water Supply	3.96		BROWN	SAND	STONES	LOOSE
	644395	4902151	233.25	19.81	Rotary (Convent.)	12.50	10	45.46	GPM	Domestic	Water Supply	11.58		BLUE	CLAY	SILT	LAYERED
	644395	4902151	233.25	19.81	Rotary (Convent.)	12.50	10	45.46	GPM	Domestic	Water Supply	12.19		GREY	CLAY	STONES	CEMENTED
	644395	4902151	233.25	19.81	Rotary (Convent.)	12.50	10	45.46	GPM	Domestic	Water Supply	13 .41		GREY	LIMESTONE	SHALE	FILL
6923916	644395	4902151	233.25	19.81	Rotary (Convent.)	12.50	10	45.46	GPM	Domestic	Water Supply	19.81	B	GREY	LIMESTONE	FRACTURED	
	644876	4902397	233.03	25.91	Rotary (Convent.)	25.91	10	45.46	GPM	Domestic	Water Supply	5.18		BROWN	GRAVEL	CLAY	LOOSE
	644876	4902397	233.03	25.91	Rotary (Convent.)	25.91	10	45.46	GPM	Domestic	Water Supply	7.62		BROWN	STONES	CLAY	HARD
	644876	4902397	233.03	25.91	Rotary (Convent.)	25.91	10	45.46	GPM	Domestic	Water Supply	9.75		BLUE	CLAY	SOFT	
	644876	4902397	233.03	25.91	Rotary (Convent.)	25.91	10	45.46	GPM	Domestic	Water Supply	22.86		BROWN	SILT	GRAVEL	LOOSE
	644876	4902397	233.03	25.91	Rotary (Convent.)	25.91	10	45.46	GPM	Domestic	Water Supply	25.91			LIMESTONE		
6924775	644876	4902397	233.03	25.91	Rotary (Convent.)	25.91	10	45.46	GPM	Domestic	Water Supply	25.91	0	GREY	CLAY	SAND	STONES
	644977	4901980	244.13	23.47	Rotary (Air)	23.47	8	36.368	GPM	Domestic	Water Supply	3.66		BROWN	SAND	GRAVEL	LOOSE
	644977	4901980	244.13	23.47	Rotary (Air)	23.47	8	36.368	GPM	Domestic	Water Supply	17.68		GREY	CLAY	HARD	STONES
6924929	644977	4901980	244.13	23.47	Rotary (Air)	23.47	8	36.368	GPM	Domestic	Water Supply	23.47	B	GREY	LIMESTONE	HARD	
	645244	4902199	236.30	28.90	Rotary (Convent.)		36	36	LPM	Domestic	Water Supply	0.60		BROWN	TOPSOIL	SOFT	
	645244	4902199	236.30	28.90	Rotary (Convent.)		36	36	LPM	Domestic	Water Supply	2.40		RED	SAND		LOOSE
	645244	4902199	236.30	28.90	Rotary (Convent.)		36	36	LPM	Domestic	Water Supply	5.70		BROWN	SAND	STONES	LOOSE
	645244	4902199	236.30	28.90	Rotary (Convent.)		36	36	LPM	Domestic	Water Supply	7.30		BROWN	CLAY	SAND	SOFT
	645244	4902199	236.30	28.90	Rotary (Convent.)		36	36	LPM	Domestic	Water Supply	15.40		GREY	CLAY	DENSE	DENSE

Table A-1 MECP Wells

Project : J&J Developments, Udora Water Balance Evaluation (22012.00)

Well ID	X	y	Elevation (m)	Well Depth (m)	Construction Method	Water Level (m)	Water Yield	LPM	Units of Measurement	Water Use	Water Status	Formation Depth(m)	Overburden or Bedrock?	Material Colour	Material 1	Material 2	Material 3
	645244	4902199	236.30	28.90	Rotary (Convent.)		36	36	LPM	Domestic	Water Supply	17.30		BROWN	SAND	GRAVEL	LAYERED
	645244	4902199	236.30	28.90	Rotary (Convent.)		36	36	LPM	Domestic	Water Supply	24.60		GREY	GRAVEL	CEMENTED	
6928377	645244	4902199	236.30	28.90	Rotary (Convent.)		36	36	LPM	Domestic	Water Supply	28.90	B	GREY	LIMESTONE	ROCK	HARD
	645005	4902103	236.52	11.28	Rotary (Air)	11.00	38	38	LPM	Domestic	Water Supply	5.19		BROWN	SAND		
6929631	645005	4902103	236.52	11.28	Rotary (Air)	11.00	38	38	LPM	Domestic	Water Supply	11.28	0	BROWN	SAND	GRAVEL	
	645317.5	4902132	244.39	19.20	Cable Tool	17.98	90	409.14	GPM	Domestic	Water Supply	0.30		BLACK	TOPSOIL		
	645317.5	4902132	244.39	19.20	Cable Tool	17.98	90	409.14	GPM	Domestic	Water Supply	8.23		BROWN	CLAY		
	645317.5	4902132	244.39	19.20	Cable Tool	17.98	90	409.14	GPM	Domestic	Water Supply	8.53		BROWN	GRAVEL	CLAY	
	645317.5	4902132	244.39	19.20	Cable Tool	17.98	90	409.14	GPM	Domestic	Water Supply	15 .85		BLUE	CLAY	STONES	
	645317.5	4902132	244.39	19.20	Cable Tool	17.98	90	409.14	GPM	Domestic	Water Supply	17.98		GREY	GRAVEL	CLAY	
6929653	645317.5	4902132	244.39	19.20	Cable Tool	17.98	90	409.14	GPM	Domestic	Water Supply	19.20	0	GREY	SAND	GRAVEL	
	644976	4902127	235.04	14.02	Cable Tool	14.00	22.7	22.7	LPM	Domestic	Water Supply	0.30		BLACK	TOPSOIL		
	644976	4902127	235.04	14.02	Cable Tool	14.00	22.7	22.7	LPM	Domestic	Water Supply	12.81			HARDPAN		
6929882	644976	4902127	235.04	14.02	Cable Tool	14.00	22.7	22.7	LPM	Domestic	Water Supply	14.02	0		SAND	GRAVEL	
	644493	4901921	234.64	21.60	Rotary (Convent.)		22	22	LPM	Domestic	Water Supply	1.80		RED	SAND	LOOSE	
	644493	4901921	234.64	21.60	Rotary (Convent.)		22	22	LPM	Domestic	Water Supply	7.00		GREY	CLAY	SOFT	
	644493	4901921	234.64	21.60	Rotary (Convent.)		22	22	LPM	Domestic	Water Supply	11.80		GREY	STONES	CLAY	HARD
	644493	4901921	234.64	21.60	Rotary (Convent.)		22	22	LPM	Domestic	Water Supply	15 .80		GREY	SAND	STONES	CLAY
	644493	4901921	234.64	21.60	Rotary (Convent.)		22	22	LPM	Domestic	Water Supply	17.00		GREY	LIMESTONE	CLAY	FRACTURED
6931097	644493	4901921	234.64	21.60	Rotary (Convent.)		22	22	LPM	Domestic	Water Supply	21.60	B	GREY	LIMESTONE	HARD	
	644972	4901654	260.36	32.61	Rotary (Air)	31.39	3	13.638	GPM	Domestic	Water Supply	0.30		BLACK	TOPSOIL		
	644972	4901654	260.36	32.61	Rotary (Air)	31.39	3	13.638	GPM	Domestic	Water Supply	4.88		BROWN	SAND	SILTY	GRAVEL
	644972	4901654	260.36	32.61	Rotary (Air)	31.39	3	13.638	GPM	Domestic	Water Supply	13.41		GREY	CLAY	SANDY	GRAVEL
	644972	4901654	260.36	32.61	Rotary (Air)	31.39	3	13.638	GPM	Domestic	Water Supply	17.37		GREY	CLAY	SANDY	GRAVEL
	644972	4901654	260.36	32.61	Rotary (Air)	31.39	3	13.638	GPM	Domestic	Water Supply	31.39		GREY	GRAVEL	CLAY	SANDY
	644972	4901654	260.36	32.61	Rotary (Air)	31.39	3	13.638	GPM	Domestic	Water Supply	32.61		GREY	SAND	GRAVEL	

Table A-1 MECP Wells

Project : J&J Developments, Udora Water Balance Evaluation (22012.00)

Well ID	X	y	Elevation (m)	Well Depth (m)	Construction Method	Water Level (m)	Water Yield	LPM	Units of Measurement	Water Use	Water Status	Formation Depth(m)	Overburden or Bedrock?	Material Colour	Material 1	Material 2	Material 3
7041217	644972	4901654	260.36	32.61	Rotary (Air)	31.39	3	13.638	GPM	Domestic	Water Supply		0	GREY	GRAVEL	SANDY	CLAY
	644941	4901609	260.75	39.01	Rotary (Air)	37.80	4	18.184	GPM	Domestic	Water Supply	6.10		BROWN	CLAY	SANDY	GRAVEL
	644941	4901609	260.75	39.01	Rotary (Air)	37.80	4	18.184	GPM	Domestic	Water Supply	27.13		GREY	CLAY	SANDY	GRAVEL
	644941	4901609	260.75	39.01	Rotary (Air)	37.80	4	18.184	GPM	Domestic	Water Supply	37.80		GREY	CLAY	SANDY	GRAVEL
	644941	4901609	260.75	39.01	Rotary (Air)	37.80	4	18.184	GPM	Domestic	Water Supply	39.01		GREY	SAND	SILT	GRAVEL
7041233	644941	4901609	260.75	39.01	Rotary (Air)	37.80	4	18.184	GPM	Domestic	Water Supply		0	GREY	CLAY	SANDY	GRAVEL
	644972		260.36	53.64	Rotary (Air)					Domestic	Abandoned-Supply	0.30		BLACK	TOPSOIL		
	644972		260.36	53.64	Rotary (Air)					Domestic	Abandoned-Supply	5.18		BROWN	SAND	SILTY	GRAVEL
	644972		260.36	53.64	Rotary (Air)					Domestic	Abandoned-Supply	6.10		BROWN	SAND	SILTY	GRAVEL
	644972		260.36	53.64	Rotary (Air)					Domestic	Abandoned-Supply	20.73		GREY	CLAY	SANDY	GRAVEL
	644972		260.36	53.64	Rotary (Air)					Domestic	Abandoned-Supply	24.99		GREY	GRAVEL	CLAY	SANDY
	644972		260.36	53.64	Rotary (Air)					Domestic	Abandoned-Supply	39.01		GREY	CLAY	SANDY	GRAVEL
	644972		260.36	53.64	Rotary (Air)					Domestic	Abandoned-Supply	42.98		GREY	CLAY	GRAVEL	
7041243	644972	4901654	260.36	53.64	Rotary (Air)					Domestic	Abandoned-Supply	53.64	7041243	GREY	LIMESTONE		
	644789	4901490	258.63	42.97	Rotary (Convent.)	40.00	18.92	18.92	LPM	Domestic	Water Supply	1.82		BROWN	SAND	STONES	
	644789	4901490	258.63	42.97	Rotary (Convent.)	40.00	18.92	18.92	LPM	Domestic	Water Supply	3.35		GREY	CLAY	TILL	STONES
	644789	4901490	258.63	42.97	Rotary (Convent.)	40.00	18.92	18.92	LPM	Domestic	Water Supply	10.05		GREY	CLAY	TILL	
	644789	4901490	258.63	42.97	Rotary (Convent.)	40.00	18.92	18.92	LPM	Domestic	Water Supply	21.03		GREY	CLAY	TILL	BOULDERS
	644789	4901490	258.63	42.97	Rotary (Convent.)	40.00	18.92	18.92	LPM	Domestic	Water Supply	26.21		GREY	CLAY	TILL	STONES
	644789	4901490	258.63	42.97	Rotary (Convent.)	40.00	18.92	18.92	LPM	Domestic	Water Supply	39.62		GREY	CLAY	TILL	SAND
7049148	644789	4901490	258.63	42.97	Rotary (Convent.)	40.00	18.92	18.92	LPM	Domestic	Water Supply	42.97	B	GREY	LIMESTONE	HARD	
	644817	4901404	261.24	47.54	Rotary (Convent.)	44.00	11.35	11.35	LPM	Domestic	Water Supply	5.48		BROWN	CLAY	TILL	STONES
	644817	4901404	261.24	47.54	Rotary (Convent.)	44.00	11.35	11.35	LPM	Domestic	Water Supply	17.06		GREY	CLAY	TILL	STONES
	644817	4901404	261.24	47.54	Rotary (Convent.)	44.00	11.35	11.35	LPM	Domestic	Water Supply	29.56		GREY	CLAY		
	644817	4901404	261.24	47.54	Rotary (Convent.)	44.00	11.35	11.35	LPM	Domestic	Water Supply	33.22		GREY	CLAY	STONES	DENSE
	644817	4901404	261.24	47.54	Rotary (Convent.)	44.00	11.35	11.35	LPM	Domestic	Water Supply	43.89		GREY	CLAY	TILL	SAND

Table A-1 MECP Wells

Project : J&J Developments, Udora Water Balance Evaluation (22012.00)

Well ID	X	y	Elevation (m)	Well Depth (m)	Construction Method	Water Level (m)	Water Yield	LPM	Units of Measurement	Water Use	Water Status	Formation Depth(m)	Overburden or Bedrock?	Material Colour	Material 1	Material 2	Material 3
7049149	644817	4901404	261.24	47.54	Rotary (Convent.)	44.00	11.35	11.35	LPM	Domestic	Water Supply	47.54	B	GREY	LIMESTONE	HARD	
	644750	4901548	254.11	39.01	Rotary (Air)	37.80	6	27.276	GPM	Domestic	Water Supply	2.74		BROWN	SILT	GRAVEL	
	644750	4901548	254.11	39.01	Rotary (Air)	37.80	6	27.276	GPM	Domestic	Water Supply	5.79		BROWN	SAND	SILT	
	644750	4901548	254.11	39.01	Rotary (Air)	37.80	6	27.276	GPM	Domestic	Water Supply	15.24		BROWN	GRAVEL	SANDY	CLAY
	644750	4901548	254.11	39.01	Rotary (Air)	37.80	6	27.276	GPM	Domestic	Water Supply	18 .59		GREY	GRAVEL	SANDY	CLAY
	644750	4901548	254.11	39.01	Rotary (Air)	37.80	6	27.276	GPM	Domestic	Water Supply	21.03		GREY	SILT	CLAY	GRAVEL
	644750	4901548	254.11	39.01	Rotary (Air)	37.80	6	27.276	GPM	Domestic	Water Supply	22.25		GREY	SILT	SAND	CLAY
	644750	4901548	254.11	39.01	Rotary (Air)	37.80	6	27.276	GPM	Domestic	Water Supply	23.16		GREY	CLAY	GRAVEL	
7049373	644750	4901548	254.11	39.01	Rotary (Air)	37.80	6	27.276	GPM	Domestic	Water Supply	39.01	0	GREY	GRAVEL	CLAYEY	
	644837	4901572	258.65	47.85	Rotary (Convent.)	21.95	1.5	6.819	GPM	Domestic	Water Supply	6.10		BROWN	SAND	CLAY	GRAVEL
	644837	4901572	258.65	47.85	Rotary (Convent.)	21.95	1.5	6.819	GPM	Domestic	Water Supply	20.42		GREY	SAND	CLAY	GRAVEL
	644837	4901572	258.65	47.85	Rotary (Convent.)	21.95	1.5	6.819	GPM	Domestic	Water Supply	21.95		GREY	SAND	CLAY	GRAVEL
	644837	4901572	258.65	47.85	Rotary (Convent.)	21.95	1.5	6.819	GPM	Domestic	Water Supply	24.99		GREY	SAND	CLAY	GRAVEL
	644837	4901572	258.65	47.85	Rotary (Convent.)	21.95	1.5	6.819	GPM	Domestic	Water Supply	26.21		GREY	SAND	CLAY	GRAVEL
	644837	4901572	258.65	47.85	Rotary (Convent.)	21.95	1.5	6.819	GPM	Domestic	Water Supply	29.87		GREY	GRAVEL		
	644837	4901572	258.65	47.85	Rotary (Convent.)	21.95	1.5	6.819	GPM	Domestic	Water Supply	34.14		GREY	SAND	CLAY	GRAVEL
	644837	4901572	258.65	47.85	Rotary (Convent.)	21.95	1.5	6.819	GPM	Domestic	Water Supply	41.30		GREY	SAND	CLAY	GRAVEL
7049388	644837	4901572	258.65	47.85	Rotary (Convent.)	21.95	1.5	6.819	GPM	Domestic	Water Supply	47.85	B	GREY	LIMESTONE		
	644794	4901555	256.52	60.20	Rotary (Air)	40.54	2	9.092	GPM	Domestic	Water Supply	5.49		BROWN	SILT	GRAVEL	
	644794	4901555	256.52	60.20	Rotary (Air)	40.54	2	9.092	GPM	Domestic	Water Supply	25.60		GREY	CLAY	GRAVEL	
	644794	4901555	256.52	60.20	Rotary (Air)	40.54	2	9.092	GPM	Domestic	Water Supply	35.97		GREY	SILT	GRAVEL	
	644794	4901555	256.52	60.20	Rotary (Air)	40.54	2	9.092	GPM	Domestic	Water Supply	39.01		GREY	CLAY	GRAVEL	
	644794	4901555	256.52	60.20	Rotary (Air)	40.54	2	9.092	GPM	Domestic	Water Supply	40.54		GREY	GRAVEL	SAND	
7049432	644794	4901555	256.52	60.20	Rotary (Air)	40.54	2	9.092	GPM	Domestic	Water Supply	60.20	B	GREY	LIMESTONE		
	644943	4901926	249.55	42.07	Rotary (Air)	33.00	24	24	LPM	Domestic	Water Supply	9.15		BROWN	CLAY	GRAVEL	HARD
	644943	4901926	249.55	42.07	Rotary (Air)	33.00	24	24	LPM	Domestic	Water Supply	33.84		GREY	CLAY	STONES	HARD

Table A-1 MECP Wells

Project : J&J Developments, Udora Water Balance Evaluation (22012.00)

Well ID	X	y	Elevation (m)	Well Depth (m)	Construction Method	Water Level (m)	Water Yield	LPM	Units of Measurement	Water Use	Water Status	Formation Depth(m)	Overburden or Bedrock?	Material Colour	Material 1	Material 2	Material 3
7054419	644943	4901926	249.55	42.07	Rotary (Air)	33.00	24	24	LPM	Domestic	Water Supply	42.07	B	GREY	LIMESTONE		HARD
	644836	4901346	261.24	47.86	Rotary (Air)	25.00	40	40	LPM	Domestic	Water Supply	5.19		BROWN	CLAY		HARD
	644836	4901346	261.24	47.86	Rotary (Air)	25.00	40	40	LPM	Domestic	Water Supply	24.38		GREY	CLAY	STONES	HARD
	644836	4901346	261.24	47.86	Rotary (Air)	25.00	40	40	LPM	Domestic	Water Supply	25.91		GREY	SAND		LOOSE
	644836	4901346	261.24	47.86	Rotary (Air)	25.00	40	40	LPM	Domestic	Water Supply	39.01		GREY	CLAY		DENSE
	644836	4901346	261.24	47.86	Rotary (Air)	25.00	40	40	LPM	Domestic	Water Supply	42.37		GREY	GRAVEL	CLAY	LAYERED
7106763	644836	4901346	261.24	47.86	Rotary (Air)	25.00	40	40	LPM	Domestic	Water Supply	47.86	B	GREY	LIMESTONE		HARD
	644800	4901463	260.24	46.02	Rotary (Convent.)	42.37	8	36.368	GPM	Domestic	Water Supply	3.35		GREY	SAND		LOOSE
	644800	4901463	260.24	46.02	Rotary (Convent.)	42.37	8	36.368	GPM	Domestic	Water Supply	7.01		GREY	CLAY	TILL	STONES
	644800	4901463	260.24	46.02	Rotary (Convent.)	42.37	8	36.368	GPM	Domestic	Water Supply	14.02		GREY	CLAY	TILL	STONES
	644800	4901463	260.24	46.02	Rotary (Convent.)	42.37	8	36.368	GPM	Domestic	Water Supply	17.07		GREY	CLAY	TILL	SAND
	644800	4901463	260.24	46.02	Rotary (Convent.)	42.37	8	36.368	GPM	Domestic	Water Supply	27.74		GREY	CLAY	TILL	HARD
	644800	4901463	260.24	46.02	Rotary (Convent.)	42.37	8	36.368	GPM	Domestic	Water Supply	41.76		GREY	CLAY	TILL	FINE GRAVEL
7108812	644800	4901463	260.24	46.02	Rotary (Convent.)	42.37	8	36.368	GPM	Domestic	Water Supply	46.02	B	GREY	LIMESTONE		HARD
	644338	4901827	234.25	18.80	Cable Tool	18.80	40	40	LPM	Domestic	Water Supply	0.30		BLACK	TOPSOIL		SOFT
	644338	4901827	234.25	18.80	Cable Tool	18.80	40	40	LPM	Domestic	Water Supply	3.60		BROWN	SAND	CLAY	
	644338	4901827	234.25	18.80	Cable Tool	18.80	40	40	LPM	Domestic	Water Supply	14.60		GREY	CLAY	STONES	MEDIUM-GRAINED
7109162	644338	4901827	234.25	18.80	Cable Tool	18.80	40	40	LPM	Domestic	Water Supply	18.80	B	GREY	LIMESTONE	CLAY	HARD
	644871	4901578	260.04	48.16	Rotary (Convent.)	48.16	4	18.184	GPM	Domestic	Water Supply	10.67		BROWN	CLAY		HARD
	644871	4901578	260.04	48.16	Rotary (Convent.)	48.16	4	18.184	GPM	Domestic	Water Supply	35.66		GREY	CLAY	SAND	HARD
	644871	4901578	260.04	48.16	Rotary (Convent.)	48.16	4	18.184	GPM	Domestic	Water Supply	42.06		GREY	CLAY		DENSE
7115000	644871	4901578	260.04	48.16	Rotary (Convent.)	48.16	4	18.184	GPM	Domestic	Water Supply	48.16	B	GREY	LIMESTONE		HARD
	644829	4902301	233.44	18.80	Cable Tool	18.00	16	16	LPM	Domestic	Water Supply	0.30		BLACK	TOPSOIL		LOOSE
	644829	4902301	233.44	18.80	Cable Tool	18.00	16	16	LPM	Domestic	Water Supply	3.60		BROWN	SAND	CLAY	MEDIUM SAND
	644829	4902301	233.44	18.80	Cable Tool	18.00	16	16	LPM	Domestic	Water Supply	12.10		GREY	CLAY	STONES	
	644829	4902301	233.44	18.80	Cable Tool	18.00	16	16	LPM	Domestic	Water Supply	13.70		BROWN	SAND		LOOSE

Table A-1 MECP Wells

Project : J&J Developments, Udora Water Balance Evaluation (22012.00)

Well ID	X	y	Elevation (m)	Well Depth (m)	Construction Method	Water Level (m)	Water Yield	LPM	Units of Measurement	Water Use	Water Status	Formation Depth(m)	Overburden or Bedrock?	Material Colour	Material 1	Material 2	Material 3
	644829	4902301	233.44	18.80	Cable Tool	18.00	16	16	LPM	Domestic	Water Supply	16.40		GREY	CLAY		SOFT
7115881	644829	4902301	233.44	18.80	Cable Tool	18.00	16	16	LPM	Domestic	Water Supply	18.80	0	BROWN	SAND	CLAY	PACKED
	644824	4902312	232.91	31.30	Cable Tool	31.00	8	8	LPM	Domestic	Water Supply	0.30		BLACK	TOPSOIL		LOOSE
	644824	4902312	232.91	31.30	Cable Tool	31.00	8	8	LPM	Domestic	Water Supply	1.80		BROWN	SAND	CLAY	MEDIUM SAND
	644824	4902312	232.91	31.30	Cable Tool	31.00	8	8	LPM	Domestic	Water Supply	21.30		GREY	CLAY	STONES	MEDIUM-GRAINED
7115882	644824	4902312	232.91	31.30	Cable Tool	31.00	8	8	LPM	Domestic	Water Supply	31.30	B	GREY	LIMESTONE	CLAY	HARD
	644750	4901824	244.42	42.67	Rotary (Convent.)		2	9.092	GPM	Domestic	Water Supply	2.74		BROWN	SAND	STONES	
	644750	4901824	244.42	42.67	Rotary (Convent.)		2	9.092	GPM	Domestic	Water Supply	10.36		BROWN	CLAY	STONES	
	644750	4901824	244.42	42.67	Rotary (Convent.)		2	9.092	GPM	Domestic	Water Supply	10.67		GREY	CLAY	STONES	
	644750	4901824	244.42	42.67	Rotary (Convent.)		2	9.092	GPM	Domestic	Water Supply	12.50		GREY	GRAVEL	SAND	
	644750	4901824	244.42	42.67	Rotary (Convent.)		2	9.092	GPM	Domestic	Water Supply	24.38		GREY	CLAY	STONES	SILTY
	644750	4901824	244.42	42.67	Rotary (Convent.)		2	9.092	GPM	Domestic	Water Supply	29.57		BROWN	LIMESTONE		
7135152	644750	4901824	244.42	42.67	Rotary (Convent.)		2	9.092	GPM	Domestic	Water Supply	42.67	B	GREY	LIMESTONE		
	644679	4901706	243.50	21.34	Rotary (Convent.)	20.12	10	45.46	GPM	Domestic	Water Supply	3.05		BROWN	SAND	CLAY	STONES
	644679	4901706	243.50	21.34	Rotary (Convent.)	20.12	10	45.46	GPM	Domestic	Water Supply	5.18		GREY	CLAY	STONES	
	644679	4901706	243.50	21.34	Rotary (Convent.)	20.12	10	45.46	GPM	Domestic	Water Supply	6.40		GREY	GRAVEL	SAND	
	644679	4901706	243.50	21.34	Rotary (Convent.)	20.12	10	45.46	GPM	Domestic	Water Supply	20.12		GREY	CLAY	STONES	SILTY
7139353	644679	4901706	243.50	21.34	Rotary (Convent.)	20.12	10	45.46	GPM	Domestic	Water Supply	21.34	0	GREY	COARSE SAND		
	645171	4902072	239.93	21.90	Cable Tool	21.00	24	24	LPM	Domestic	Water Supply	0.30		BLACK	TOPSOIL		MEDIUM-GRAINED
	645171	4902072	239.93	21.90	Cable Tool	21.00	24	24	LPM	Domestic	Water Supply	2.10		BROWN	SAND		MEDIUM-GRAINED
	645171	4902072	239.93	21.90	Cable Tool	21.00	24	24	LPM	Domestic	Water Supply	12.80		BROWN	CLAY	SAND	SOFT
	645171	4902072	239.93	21.90	Cable Tool	21.00	24	24	LPM	Domestic	Water Supply	20.70		GREY	CLAY	STONES	MEDIUM-GRAINED
7181940	645171	4902072	239.93	21.90	Cable Tool	21.00	24	24	LPM	Domestic	Water Supply	21.90	0	BROWN	SAND	GRAVEL	LOOSE
	644513	4901889	234.69	21.34	Rotary (Convent.)	21.34	10	45.46	GPM	Domestic	Water Supply	1.52		BROWN	SAND	GRAVEL	LOOSE
	644513	4901889	234.69	21.34	Rotary (Convent.)	21.34	10	45.46	GPM	Domestic	Water Supply	3.66		BROWN	SAND	CLAY	
	644513	4901889	234.69	21.34	Rotary (Convent.)	21.34	10	45.46	GPM	Domestic	Water Supply	14.63		GREY	CLAY	STONES	HARD

Table A-1 MECP Wells

Project : J&J Developments, Udora Water Balance Evaluation (22012.00)

Well ID	X	y	Elevation (m)	Well Depth (m)	Construction Method	Water Level (m)	Water Yield	LPM	Units of Measurement	Water Use	Water Status	Formation Depth(m)	Overburden or Bedrock?	Material Colour	Material 1	Material 2	Material 3
	644513	4901889	234.69	21.34	Rotary (Convent.)	21.34	10	45.46	GPM	Domestic	Water Supply	15.85		BROWN	SAND	CLAY	LAYERED
	644513	4901889	234.69	21.34	Rotary (Convent.)	21.34	10	45.46	GPM	Domestic	Water Supply	16.15		GREY	CLAY		HARD
7199420	644513	4901889	234.69	21.34	Rotary (Convent.)	21.34	10	45.46	GPM	Domestic	Water Supply	21.34	B	GREY	LIMESTONE		HARD
	644925	4902181	235.09	27.43	Rotary (Convent.)	27.43	6	27.276	GPM	Domestic	Water Supply	7.62		BROWN	SAND	PACKED	
	644925	4902181	235.09	27.43	Rotary (Convent.)	27.43	6	27.276	GPM	Domestic	Water Supply	21.34		GREY	CLAY	SOFT	
	644925	4902181	235.09	27.43	Rotary (Convent.)	27.43	6	27.276	GPM	Domestic	Water Supply	21.95		GREY	GRAVEL	SILT	LOOSE
7217107	644925	4902181	235.09	27.43	Rotary (Convent.)	27.43	6	27.276	GPM	Domestic	Water Supply	27.43	B	GREY	LIMESTONE		HARD
	644902	4901340	261.71	39.62	Rotary (Air)	41.15	10	45.46	GPM	Domestic	Water Supply	5.49		BROWN	SAND		SOFT
	644902	4901340	261.71	39.62	Rotary (Air)	41.15	10	45.46	GPM	Domestic	Water Supply	6.10		GREY	GRAVEL	SAND	LOOSE
	644902	4901340	261.71	39.62	Rotary (Air)	41.15	10	45.46	GPM	Domestic	Water Supply	12.19		BROWN	SILT	SANDY	SOFT
	644902	4901340	261.71	39.62	Rotary (Air)	41.15	10	45.46	GPM	Domestic	Water Supply	32.61		GREY	CLAY	TILL	DENSE
	644902	4901340	261.71	39.62	Rotary (Air)	41.15	10	45.46	GPM	Domestic	Water Supply	33.22		GREY	SILT	FINE SAND	SILT
	644902	4901340	261.71	39.62	Rotary (Air)	41.15	10	45.46	GPM	Domestic	Water Supply	38.10		GREY	CLAY	TILL	DENSE
7225617	644902	4901340	261.71	39.62	Rotary (Air)	41.15	10	45.46	GPM	Domestic	Water Supply	39.62	0	GREY	SAND	GRAVEL	SILT
	644932	4901335	261.74	41.10	Rotary (Convent.)	41.00	40	40	LPM	Domestic	Water Supply	5.40		BROWN	CLAY	SAND	
	644932	4901335	261.74	41.10	Rotary (Convent.)	41.00	40	40	LPM	Domestic	Water Supply	11.20		GREY	CLAY		SOFT
	644932	4901335	261.74	41.10	Rotary (Convent.)	41.00	40	40	LPM	Domestic	Water Supply	13.70		BROWN	GRAVEL	SAND	LOOSE
	644932	4901335	261.74	41.10	Rotary (Convent.)	41.00	40	40	LPM	Domestic	Water Supply	36.50		GREY	CLAY	BOULDERS	
	644932	4901335	261.74	41.10	Rotary (Convent.)	41.00	40	40	LPM	Domestic	Water Supply	39.60		GREY	CLAY		HARD
	644932	4901335	261.74	41.10	Rotary (Convent.)	41.00	40	40	LPM	Domestic	Water Supply	40.20		GREY	GRAVEL	SAND	PACKED
7226011	644932	4901335	261.74	41.10	Rotary (Convent.)	41.00	40	40	LPM	Domestic	Water Supply	41.10	B	GREY	LIMESTONE	CLAY	HARD
	644941	4902197	235.18	27.00	Rotary (Convent.)	25.00	16	16	LPM	Domestic	Water Supply	4.60		BROWN	SAND	CLAY	
	644941	4902197	235.18	27.00	Rotary (Convent.)	25.00	16	16	LPM	Domestic	Water Supply	8.80		GREY	CLAY		
	644941	4902197	235.18	27.00	Rotary (Convent.)	25.00	16	16	LPM	Domestic	Water Supply	10.60		GREY	SAND	CLAY	LOOSE
	644941	4902197	235.18	27.00	Rotary (Convent.)	25.00	16	16	LPM	Domestic	Water Supply	22.50		GREY	CLAY	STONES	
7227616	644941	4902197	235.18	27.00	Rotary (Convent.)	25.00	16	16	LPM	Domestic	Water Supply	27.00	B	GREY	LIMESTONE	CLAY	HARD

Table A-1 MECP Wells

Project : J&J Developments, Udora Water Balance Evaluation (22012.00)

Well ID	X	y	Elevation (m)	Well Depth (m)	Construction Method	Water Level (m)	Water Yield	LPM	Units of Measurement	Water Use	Water Status	Formation Depth(m)	Overburden or Bedrock?	Material Colour	Material 1	Material 2	Material 3
	645040	4901686	258.31	48.46	Rotary (Convent.)	48.46	20	90.92	GPM	Domestic	Water Supply	5.79		BROWN	CLAY		TILL
	645040	4901686	258.31	48.46	Rotary (Convent.)	48.46	20	90.92	GPM	Domestic	Water Supply	35.66		GREY	CLAY	STONES	HARD
	645040	4901686	258.31	48.46	Rotary (Convent.)	48.46	20	90.92	GPM	Domestic	Water Supply	39.93		GREY	CLAY	SILT	LAYERED
7231878	645040	4901686	258.31	48.46	Rotary (Convent.)	48.46	20	90.92	GPM	Domestic	Water Supply	48.46	B	GREY	LIMESTONE		HARD
	645006	4901370	261.22	41.15	Rotary (Air)	41.15	5	22.73	GPM	Domestic	Water Supply	7.62		GREY	SAND	CLAY	LAYERED
	645006	4901370	261.22	41.15	Rotary (Air)	41.15	5	22.73	GPM	Domestic	Water Supply	11 .28		BROWN	SAND		SOFT
	645006	4901370	261.22	41.15	Rotary (Air)	41.15	5	22.73	GPM	Domestic	Water Supply	28.96		GREY	CLAY	TILL	DENSE
	645006	4901370	261.22	41.15	Rotary (Air)	41.15	5	22.73	GPM	Domestic	Water Supply	37.19		GREY	CLAY		STICKY
7242530	645006	4901370	261.22	41.15	Rotary (Air)	41.15	5	22.73	GPM	Domestic	Water Supply	41.15	0	BROWN	SAND	SILT	STONES
	645218	4901359	264.82	29.26	Rotary (Reverse)	23.77	3	13.638	GPM	Livestock	Water Supply	0.30			TOPSOIL		
	645218	4901359	264.82	29.26	Rotary (Reverse)	23.77	3	13.638	GPM	Livestock	Water Supply	1.22		BROWN	FINE SAND		
	645218	4901359	264.82	29.26	Rotary (Reverse)	23.77	3	13.638	GPM	Livestock	Water Supply	4.27			CLAY	STONES	GRAVEL
	645218	4901359	264.82	29.26	Rotary (Reverse)	23.77	3	13.638	GPM	Livestock	Water Supply	6.40		GREY	CLAY	GRAVEL	STONES
	645218	4901359	264.82	29.26	Rotary (Reverse)	23.77	3	13.638	GPM	Livestock	Water Supply	10.67			COARSE GRAVEL	CLAY	STONES
	645218	4901359	264.82	29.26	Rotary (Reverse)	23.77	3	13.638	GPM	Livestock	Water Supply	19.81			COARSE GRAVEL	SILTY	STONES
	645218	4901359	264.82	29.26	Rotary (Reverse)	23.77	3	13.638	GPM	Livestock	Water Supply	20.73		GREY	CLAY		
	645218	4901359	264.82	29.26	Rotary (Reverse)	23.77	3	13.638	GPM	Livestock	Water Supply	23.77			FINE SAND	CLAY	GRAVEL
	645218	4901359	264.82	29.26	Rotary (Reverse)	23.77	3	13.638	GPM	Livestock	Water Supply	24.69		GREY	MEDIUM SAND		
	645218	4901359	264.82	29.26	Rotary (Reverse)	23.77	3	13.638	GPM	Livestock	Water Supply	26.21		GREY	MEDIUM SAND	CLAY	
1909049	645218	4901359	264.82	29.26	Rotary (Reverse)	23.77	3	13.638	GPM	Livestock	Water Supply	29.26	0	GREY	CLAY	SAND	GRAVEL
	645079.7	4901397	261.10	47.55	Cable Tool	45.72	4	18.184	GPM	Livestock	Water Supply	6.10		BROWN	CLAY		
	645079.7	4901397	261.10	47.55	Cable Tool	45.72	4	18.184	GPM	Livestock	Water Supply	37.19			HARDPAN		
	645079.7	4901397	261.10	47.55	Cable Tool	45.72	4	18.184	GPM	Livestock	Water Supply	37.49			MEDIUM		
	645079.7	4901397	261.10	47.55	Cable Tool	45.72	4	18.184	GPM	Livestock	Water Supply	45.42		BLUE	CLAY		
	645079.7	4901397	261.10	47.55	Cable Tool	45.72	4	18.184	GPM	Livestock	Water Supply	45.72			MEDIUM SAND	GRAVEL	
4602451	645079.7	4901397	261.10	47.55	Cable Tool	45.72	4	18.184	GPM	Livestock	Water Supply	47.55	B		LIMESTONE		

Table A-1 MECP Wells

Project : J&J Developments, Udora Water Balance Evaluation (22012.00)

Well ID	X	y	Elevation (m)	Well Depth (m)	Construction Method	Water Level (m)	Water Yield	LPM	Units of Measurement	Water Use	Water Status	Formation Depth(m)	Overburden or Bedrock?	Material Colour	Material 1	Material 2	Material 3
SAND																	
	645351.7	4901442	263.47	32.00	Cable Tool	32.00	9	40.914	GPM	Livestock	Water Supply	5.49		RED	CLAY		
	645351.7	4901442	263.47	32.00	Cable Tool	32.00	9	40.914	GPM	Livestock	Water Supply	25.30		BLUE	CLAY	STONES	
	645351.7	4901442	263.47	32.00	Cable Tool	32.00	9	40.914	GPM	Livestock	Water Supply	27.43			GRAVEL	CLAY	SILT
	645351.7	4901442	263.47	32.00	Cable Tool	32.00	9	40.914	GPM	Livestock	Water Supply	30.48			HARDPAN		
	645351.7	4901442	263.47	32.00	Cable Tool	32.00	9	40.914	GPM	Livestock	Water Supply	32.00			MEDIUM SAND	GRAVEL	
	644774.7	4901823	247.09	21.03	Cable Tool	20.73	8	36.368	GPM	Livestock	Water Supply	5.49		RED	MEDIUM SAND	CLAY	
	644774.7	4901823	247.09	21.03	Cable Tool	20.73	8	36.368	GPM	Livestock	Water Supply	20.73			HARDPAN		
4602473	644774.7	4901823	247.09	21.03	Cable Tool	20.73	8	36.368	GPM	Livestock	Water Supply	21.03	0		GRAVEL		
	644968.7	4902325	234.77	9.75	Boring	9.14	10	45.46	GPM	Livestock	Water Supply	9.14		BLUE	CLAY	STONES	
6901068	644968.7	4902325	234.77	9.75	Boring	9.14	10	45.46	GPM	Livestock	Water Supply	9.75	6901068		GRAVEL		
7281698	644947	4901704	259.87		Boring					Monitoring	Test Hole		7281698				
7281699	644967	4901864	252.69		Boring					Monitoring	Test Hole		7281699				
7281700	644834	4901797	252.12		Boring					Monitoring	Test Hole		7281700				
	645030		258.78	9.14	Other Method					Not Used	Observation Wells	4.57		BROWN	SAND	SILT	
	645030		258.78	9.14	Other Method					Not Used	Observation Wells	7.62		BROWN	SILT	SAND	
1917544	645030	4901625	258.78	9.14	Other Method					Not Used	Observation Wells	9.14	1917544	GREY	SILT	SAND	
	644881.7	4902114	235.97	28.65	Rotary (Convent.)	22.25	7	31.822	GPM	Public	Water Supply	0.61		BROWN	SAND	TOPSOIL	SOFT
	644881.7	4902114	235.97	28.65	Rotary (Convent.)	22.25	7	31.822	GPM	Public	Water Supply	4.88		BROWN	CLAY	STONES	HARD
	644881.7	4902114	235.97	28.65	Rotary (Convent.)	22.25	7	31.822	GPM	Public	Water Supply	18 .90		GREY	CLAY	STONES	HARD
	644881.7	4902114	235.97	28.65	Rotary (Convent.)	22.25	7	31.822	GPM	Public	Water Supply	21.34		GREY	GRAVEL	SAND	SILT
	644881.7	4902114	235.97	28.65	Rotary (Convent.)	22.25	7	31.822	GPM	Public	Water Supply	22.25		GREY	CLAY	STONES	HARD
6919246	644881.7	4902114	235.97	28.65	Rotary (Convent.)	22.25	7	31.822	GPM	Public	Water Supply	28.65	B	GREY	LIMESTONE	HARD	
	644736		244.61	30.48	Rotary (Convent.)				GPM	Test Hole	Abandoned-Supply	2.13		BROWN	SAND	GRAVEL	SILT
	644736		244.61	30.48	Rotary (Convent.)				GPM	Test Hole	Abandoned-Supply	9.14		BROWN	CLAY	STONES	SILT
	644736		244.61	30.48	Rotary (Convent.)				GPM	Test Hole	Abandoned-Supply	10.67		GREY	SAND	FINE SAND	

Table A-1 MECP Wells

Project : J&J Developments, Udora Water Balance Evaluation (22012.00)

Well ID	X	y	Elevation (m)	Well Depth (m)	Construction Method	Water Level (m)	Water Yield	LPM	Units of Measurement	Water Use	Water Status	Formation Depth(m)	Overburden or Bedrock?	Material Colour	Material 1	Material 2	Material 3
7145922	644736	4901785	244.61	30.48	Rotary (Convent.)				GPM	Test Hole	Abandoned-Supply	24.08	7145922	GREY	CLAY	STONES	
	644736		244.61	30.48	Rotary (Convent.)				GPM	Test Hole	Abandoned-Supply	30.48		GREY	LIMESTONE		HARD

Table A-2 Water Well Reconnaissance Survey
Project: J&J Developments Udora Water Balance Evaluation (22012.00)
Hamlet of Udora, Durham Region

1- Taken either at the well or at the middle of the drive way

Address	Owner Present at Time of Site Visit (y/n)	Conduct Inspection (CI) or Left Letters (LL)	Well Types	Well Depth (ft)	Well Depth (m)	GPS Coordinate NAD 83[1] Zone	Easting	Northing	Consent to Monitor	Water Level 2018-09-25 (m bTOP)	2018-09-27 (m bTOP)	2018-03-10 (m bTOP)	Well Age (years)	Diameter (inch)	Type of Casing	Casing Condition	Stick Up (m)	Comments
1 Birdie Smith	y	LL	Drilled			17 T	0645022	4901696	yes	15.87			12	10			1.02	request an email or text prior to coming onsite
5 Bagshaw	y	CI	Drilled	151	46.0	17 T	0645029	4901408	No				2	6			1	89 ft original water depth (May 2016)
7 Bagshaw	n	-	Unknown			17 T												hostile dogs, left without approaching
9 Bagshaw	y	LL	Unknown			17 T	0644983	4901378										will consult with husband
? Bagshaw	n	LL	drilled			17 T	0644878	4901564										
11 Bagshaw	y	LL	Unkown			17 T	0644968	4901368	No									afraid of contamination
13 Bagshaw	n	LL	Drilled			17 T	0644881	4901344										
14 Bagshaw	y	LL	Drilled			17 T	0644910	4901362										will consult with husband
15 Bagshaw	n	LL	Drilled	150	45.7	17 T	0644861	4901340	No				14	8				returned quetionnaire via email, no water level taken
17 Bagshaw	y	LL	Drilled			17 T	0644823	4901373	Yes									
19 Bagshaw	y	LL	Drilled			17 T	0644817	4901401	Yes	12.62							0.70	
21 Bagshaw	y	LL	Drilled			17 T	0644818	4901438	No									extremely rude
23 Bagshaw	n	LL	Drilled			17 T	0644792	4901487										
27 Bagshaw	n	LL	Drilled			17 T	0644840	4901552										
25 Bagshaw	y	-	Drilled			17 T	0644799	4901536	No									very against the development, claims many homes already have water issues at times with multiple flushed toilet/ showers, watering lawn and filling pool
28 Bagshaw	y	CI	Drilled		38.0	17 T	0644843	4901461	Yes	19.415			>14	10			1.1	occasional water pressure issues, incomplete see notes
30 Bagshaw	n	LL	Unknown			17 T	0644898	4901547										
31 Bagshaw	n	LL	Unknown			17 T												
32 Bagshaw	y	LL	Drilled			17 T	0644931	4901556										will likely participate
2 Birdie Smith	n	LL	Unknown (assumed drilled)			17 T	0644963	4901634										
4 Birdie Smith	n	LL	Unknown (assumed drilled)			17 T	0644943	4901664										
27 Linda	n	LL	Unknown			17 T	0644413	4902096										
31 Linda	n	LL	Unknown			17 T	0644406	4902098										
37 Linda	n	LL	Unknown			17 T	0644391	4902139										
40 Linda	n	LL	Unknown			17 T	0644369	4902212										
41 Linda	n	LL	Unknown			17 T	0644373	4902210										
689 Ravenshoe	n	LL	Drilled			17 T	0644817	4901914										will look over information
687 Ravenshoe	n	LL	Drilled			17 T	0644791	4901919										
685 Ravenshoe	y	CI	Drilled			17 T	0644774	4901855	Yes		4.57		47	9				water pressure issues, house built in 1971, high iron for the last two years
683 Ravenshoe	n	LL	Drilled			17 T	0644716	4901891	Yes						Steel	Good		Received e-mail response. Well became contaminated in 2006. A UV system and additional treatment methods were installed after a few years to overcome contamination. Water is not clean but the residents do not drink.
709 Ravenshoe	y	LL	Drilled			17 T	0645123	4902030										
705 Ravenshoe	n	LL	Unknown			17 T	0645080	4902008										
701 Ravenshoe	y	LL	Drilled			17 T	0645058	1902001										
717 Ravenshoe	n	LL	Unknown			17 T	0645274	4902083										
715 Ravenshoe	n	LL	Drilled			17 T	0645248	4902064										
711 Ravenshoe	n	LL	Unknown			17 T	0645210	4902065										
10324 Ravenshoe	n	LL	Unknown			17 T	0645238	4902078										
10332 Ravenshoe	n	LL	Unknown			17 T	0645267	4902093										
10342 Ravenshoe	n	LL	Unknown			17 T	0645268	4902095										
10252 Regional Rd 1	n	LL	Unknown			17 T	0645042	4902022										
10256 Regional Rd 1	n	LL	Unknown			17 T	0645079	4902023										
10268 Regional Rd 1	n	LL	Dug			17 T	0645096	4902040										
10278 Regional Rd 1	y	LL	Drilled			17 T	0645128	4902045										concrete sealed
10292 Regional Rd 1	y	LL	Drilled			17 T	0645156	4902066										will consult with partner
10296 Regional Rd 1	n	LL	Drilled			17 T	0645178	4902067										
10300 Regional Rd 1	y	CI	Drilled			17 T	0645193	4902063	No			3.76						see sheet for info
10314 Regional Rd 1	n	LL	Unknown			17 T												
14750 Regional Rd 1	n	LL	Dug			17T	0645109	4901664							Concrete			newer well
14996 Regional Rd 1	n	LL	Drilled			17 T	0645019	4901933	Yes						Concrete	Good		Questionnaire emailed to us. Water 3.0 m down.
14970 Regional Rd 1	n	LL	Unknown			17 T	0645018	4901931										
14975 Regional Rd 1	y	LL	Dug			17 T	0645027	4901931										Owners not present, left information packet with daughter
14949 Regional Rd 1	n	LL	Dug			17 T	0645057	4901904										
14925 Regional Rd 1	y	CI	Drilled			17 T			Yes	15.55			>20	10				very old well
14899 Regional Rd 1	y	LL	Dug			17 T	0645059	4901847										Will give letter to husband
14877 Regional Rd 1	n	LL	dug			17 T	0645097	4901817										
14853 Regional Rd 1	n	LL	Unknown			17 T	0645082	4901787										
14827 Regional Rd 1	n	LL	Dug			17 T	0645117	4901769										
14757 Regional Rd 1		LL	Unknown			17 T	0645092	4901729										
14753 Regional Rd 1	n	LL	Dug			17 T	0645099	4901717										
14749 Regional Rd 1	y	LL	Dug			17 T	0645111	4901687										Concerned about damaging well, good water pressure
14720 Regional Rd 1	n	LL	Unknown			17 T	0645115	4901616										
14780 Regional Rd 1	y	LL	Dug			17 T	0645109	4901664										concrete sealed, newer well
14768 Regional Rd 1	y	LL	Drilled (assumed)			17 T	0645105	4901713					2					
14822 Regional Rd 1	n	LL	Drilled			17 T	0645065	4901718					11					good water pressure, will review docs
14870 Regional Rd 1	n	LL	Drilled			17 T	0645063	4901751										
14874 Regional Rd 1	y	LL	Drilled	80	24.4	17 T	0645052	4901771										concerned about damage, good water pressure
14900 Regional Rd 1	n	LL	Unknown			17 T	0645039	4901814										
14629 Regional Rd 1	n	LL	Unknown			17 T	0645309	4901476										
14996 Regional Rd 1	y	CI	Drilled			17 T	0644989	4901945	Yes						Concrete	Good		Water is 3m down. Well is accesible for sampling
4 Victoria Rd	y	LL	Drilled			17 T	0644986	4902009										Landlord not there, left information packet with tenant, new well, no water pressure problems

Table A-2 Water Well Reconnaissance Survey
Project: J&J Developments Udora Water Balance Evaluation (22012.00)
Hamlet of Udora, Durham Region

1- Taken either at the well or at the middle of the drive way

Address	Owner Present at Time of Site Visit (y/n)	Conduct Inspection (CI) or Left Letters (LL)	Well Types	Well Depth (ft)	Well Depth (m)	GPS Coordinate NAD 83[1] Zone	Easting	Northing	Consent to Monitor	Water Level 2018-09-25 (m bTOP)	2018-09-27 (m bTOP)	2018-03-10 (m bTOP)	Well Age (years)	Diameter (inch)	Type of Casing	Casing Condition	Stick Up (m)	Comments
9 Victoria Rd	y	LL	Unknown			17 T	0644970	4902073	No									Dog barking agressively, owner not present, Left Information Packet with son
10 Victoria Rd	y	LL	Unknown			17 T	0644968	4902038					>30					wanted to wait for wife
14 Victoria Rd	n	LL	Unknown			17 T	0644947	4902087										
16 Victoria Rd	n	LL	Unknown			17 T	0644952	4902107										
20 Victoria Rd	n	LL	Unknown			17 T	0644933	4902116										
22 Victoria Rd	n	LL	Unknown			17 T	0644927	4902129										
23 Victoria Rd	n	LL	Drilled			17 T	0644958	4902141										
25 Victoria Rd	y	LL	Unknown			17 T	0644942	4902167										Left Information Packet, underground well, will discuss with husband
28 Victoria Rd	n	LL	Unknown			17 T	0644924	4902194										
31 Victoria Rd	y	CI	Drilled	27	8.2	17 T	0644945	4902204	No	3.345			3	10				would not sign to give consent
32 Victoria Rd	y	LL	Dug			17 T	0644919	4902202					>50					Good water pressure
36 Victoria Rd	y	LL	Dug			17 T	0644913	4902221										Good water pressure, concrete sealed
37 Victoria Rd	n	LL	Unknown			17 T	0644913	4902268										
38 Victoria Rd	n	LL	Unknown			17 T	064886	4902259										
40 Victoria Rd	n	LL	Unknown			17 T	0644890	4902270										
46 Victoria Rd	n	LL	Unknown			17 T	0644878	4902306										
48 Victoria Rd	n	LL	Drilled	100	30.5	17 T	0644864	4902343										2 wells, active =100ft, one dry
52 Victoria Rd	y	-	Dug			17 T	0644832	4902335	Yes				>60		Concrete			sealed concrete, low water pressure
6 York	y	CI	Drilled				-	-	Yes	3.84				10			0.69	
7 York	n	LL	Drilled			17 T	0645016	4902096										
9 York	n	LL	Unknown			17 T	0645057	4902129										
10 York	n	LL	Unknown			17 T	0645038	4901124										
16 York	n	LL	Unknown			17 T	0645056	4902126										
19 York	y	LL	Unknown			17 T	0645097	4902141										in a rush, will read over and send documents
21 York	n	LL	Unknown			17 T	0645114	4902153										
25 York	y	CI	Drilled			17 T	0645123	4902153	Yes		1.79		>40	8			0.28	no water pressure issues
27 York	n	LL	Drilled			17 T	0645148	4902154										
28 York	y	LL	Unknown			17 T	0645105	4902164										
32 York	y	LL	Drilled			17 T	0645150	4902176										Does not want to consent because of impending change of ownership
33 York	n	LL	Drilled			17 T	0645190	4902181										
35 York	n	LL	Unknown			17 T	0645221	4902194										
36 York	n	LL	Unknown			17 T	0648196	4902178										
37 York	n	LL	Unknown			17 T	0645229	4902201										
40 York	n	LL	Unknown			17 T	0645237	4902242										
43 York	y	LL	Drilled			17 T	0645265	4902186										angry we did not provide envelopes, will review information
45 York	n	LL	Drilled			17 T	0645288	4902210										
49 York	y	LL	Drilled			17 T	0645302	4902224										will review information, does not believe the study will make a differene in the end
39/41 York	n	LL	Unknown			17 T	0645247	4902204										
Community Center, Lions Club	n	LL	Unknown			17 T	0644938	4902168										

Ontario Ministry of the Environment and Climate Change

Measurements recorded in: ☐ Metric ☑ Imperial

Well Tag No. *(Place Sticker and/or Print Below)* A230052

Tag#:A230052

Well Record

Regulation 903 Ontario Water Resources Act

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Well Owner's Information

First Name	Last Name / Organization	E-mail Address	☐ Well Constructed by Well Owner
	Coppis Investments Inc		

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. (inc. area code)
161 Oxford Street	Richmond Hill	ON	L4C4L6	4169488659

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
693 Ravenshoe Road	Uxbridge / Scott	35	7

County/District/Municipality	City/Town/Village	Province	Postal Code
Durham	Uxbridge	Ontario	L9P1R2

UTM Coordinates Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83 17	648856	4901668		

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
	Top Soil			0	1
Brown	Sand + Gravel	Seams Brown Clay	Cobbles	1	19
Grey	Clay Till	Stones + Boulders	Hard	19	84
Grey	Coarse Sand + Fine Pea Gravel / Layers of Broken Limestone			84	99

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0	20	Bentonite Slurry	

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) 85

Pumping rate (l/min / GPM) 5

Duration of pumping 1 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) 5

Disinfected? ☑ Yes ☐ No

Draw Down Time (min)	Water Level (m/ft)	Recovery Time (min)	Water Level (m/ft)
Static Level	31'9"		
1		1	
2		2	
3		3	
4		4	
5		5	
10		10	
15		15	
20		20	
25		25	
30		30	
40	62'10"	40	
50		50	
60	67'6"	60	

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	To
6 1/4	Steel	.188	+3	88
5 1/2	Steel		86 1/2	97
	With K-Packer on top and bottom			
5	1 1/2 Ft. Slotted. Open Hole		97	99

Status of Well

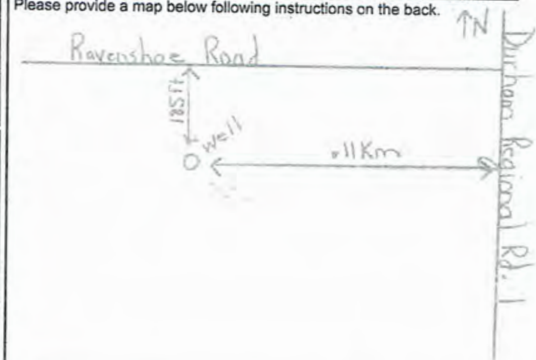
☑ Water Supply ☐ Replacement Well ☐ Test Hole ☐ Recharge Well ☐ Dewatering Well ☐ Observation and/or Monitoring Hole ☐ Alteration (Construction) ☐ Abandoned, Insufficient Supply ☐ Abandoned, Poor Water Quality ☐ Abandoned, other, specify ☐ Other, specify

Construction Record - Screen

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

Map of Well Location

Please provide a map below following instructions on the back.



Water Details

Water found at Depth 96-99 (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	10
20	88	7 7/8
88	99	6 1/8

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Roger Boadway Ent. Ltd.	1413

Business Address (Street Number/Name)	Municipality
P.O. Box 397, Sutton W	York

Province	Postal Code	Business E-mail Address
ON	L0E1R0	boadwaywells@bellnet.ca

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
9057225362	Brown, Phil

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
0035	Phil Brown	20171024

Comments: **Test Well TW1**

Well owner's information package delivered	Date Package Delivered	Date Work Completed
☐ Yes ☑ No		20170918

Ministry Use Only

Audit No. Z264126

Received

0506E (2014/11)

Contractor's Copy

Ontario Ministry of the Environment and Climate Change

Well Tag No. *(Place Sticker and/or Print Below)* A257079

Tag#:A257079

Well Record

Regulation 903 Ontario Water Resources Act

Page ____ of ____

Measurements recorded in: ☐ Metric ☑ Imperial

Well Owner's Information

First Name	Last Name / Organization	E-mail Address	☐ Well Constructed by Well Owner
	Capris Investments Inc.		

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. (inc. area code)
161 Oxford Street	Richmond Hill	ON	L4C4L6	4169488659

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
Birdie Smith Cres.	Uxbridge	34	6

County/District/Municipality	City/Town/Village	Province	Postal Code
Durham	Uxbridge	Ontario	L4P0A9

UTM Coordinates Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83 17	644981	4901754		

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
Brown	Clay	Pebbles	Hard	0	38
Grey	Clay	Stones	Hard	38	90
Grey	Gravel	Silt Sand	Mixed	90	117
Grey	Gravel	Clay Sand	Layered	117	137
Grey	Limestone		Fractured	137	149
Grey	Limestone		Hard	149	159

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0	20	Benseal	

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
6 1/4	Steel	188	+2	137
6 1/8	Open Hole		137	159

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

Construction Record - Screen

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

Water Details

Water found at Depth 159 (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	10
+2	137	6 5/8
137	159	6 1/8

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): 107

Pumping rate (l/min / GPM): 10

Duration of pumping: 1 hrs + min

Final water level end of pumping (m/ft): 77

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

Recommended pump depth (m/ft): 107

Recommended pump rate (l/min / GPM): 8

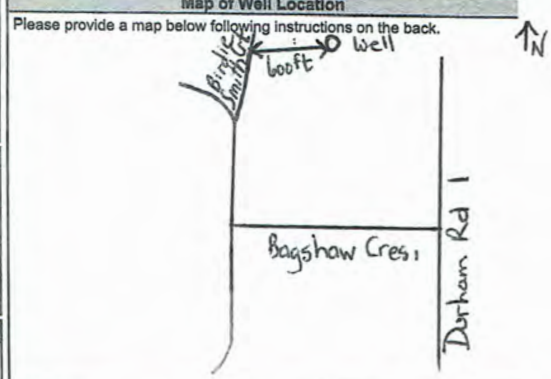
Well production (l/min / GPM): 15

Disinfected? ☐ Yes ☐ No

Draw Down Time (min)	Water Level (m/ft)	Recovery Time (min)	Water Level (m/ft)
Static Level	46		
1	63	1	74
2	65	2	71.5
3	67	3	70
4	68	4	68
5	69	5	67
10	70	10	63
15	71	15	61
20	72	20	
25	73	25	
30	74	30	
40	75	40	
50	76	50	
60	77	60	

Map of Well Location

Please provide a map below following instructions on the back.



Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Roger Boadway Ent. Ltd.	1413

Business Address (Street Number/Name)	Municipality
P.O. Box 397 Sutton W	York

Province	Postal Code	Business E-mail Address
ON	L0E1R0	boadwaywells@bellnet.ca

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
9057225362	Boadway Grant

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
00219		Y Y Y Y M M D D

Comments: **Test Well TW19-1**

Well owner's information package delivered ☑ Yes ☐ No

Date Package Delivered: 20190319

Date Work Completed: 20190319

Ministry Use Only

Audit No. Z304737

Received

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APPENDIX B

BOREHOLE LOGS

LOG OF BOREHOLE MW1

WSP

project |	PART OF LOT 35 CONCESSION 6, UDORA, ONTARIO			**project no. |**	161-09454-00
client |	TONI RISI, CAPRIS INVESTMENT LTD.	**rig type |**	CME 75, track-mounted	**date started |**	2016/07/25
location |	UDORA, ONTARIO	**method |**	Hollow stem augers, 215 mm dia.	**supervisor |**	EJP
position |	E: 644831 N: 4901800 (17T, Geodetic)	**coring |**	*n/a*	**reviewer |**	DAO

Column headings: Depth Scale (m) | SUBSURFACE PROFILE: Elev Depth (m), STRATIGRAPHY, Graphic Plot | SAMPLE: Number, Type, SPT N-Value, Core Recovery | Elevation Scale (mASL) | Penetration Test Values (Blows / 0.3m): × Dynamic Cone 10 20 30 40; Undrained Shear Strength (kPa): O Unconfined, + Field Vane, ● Pocket Penetrometer, ■ Lab Vane 40 80 120 160 | Water Content (%) & Plasticity: PL MC LL 10 20 30 | PID Readings | Well Details | Lab Data and Comments: GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

(continued)

Depth (m)	Stratigraphy	Number	Type	SPT N-Value / Core Recovery	Elevation (mASL)	PID Readings
	SANDY SILT TILL: BROWN SANDY SILT TILL, SOME TO TRACE GRAVEL, SOME TO TRACE CLAY, TRACE COBBLES, MOIST TO WET, COMPACT *(continued)*	9	SS	96 / 200mm	245	0 ppm
8					244	
9		10	SS	87 / 225mm	243	0 ppm
10						
	...at 10.7 m, light brown sandy silt till, some to trace gravel, some to trace clay, trace cobbles, compact, moist to wet to 15.3 m	11	SS	50 / 50mm	242	0 ppm
11					241	
12		12	SS	50 / 50mm	240	0 ppm
13		13	SS	50 / 100mm	239	0 ppm
14					238	

library: genivar - library.glb report: gen log v1 file: 161-09454-00_gint logs_sept.gpj

(continued next page)

LOG OF BOREHOLE MW1

WSP

project |	PART OF LOT 35 CONCESSION 6, UDORA, ONTARIO			**project no. |**	161-09454-00
client |	TONI RISI, CAPRIS INVESTMENT LTD.	**rig type |**	CME 75, track-mounted	**date started |**	2016/07/25
location |	UDORA, ONTARIO	**method |**	Hollow stem augers, 215 mm dia.	**supervisor |**	EJP
position |	E: 644831 N: 4901800 (17T, Geodetic)	**coring |**	*n/a*	**reviewer |**	DAO

Depth Scale (m)	Elev Depth (m)	SUBSURFACE PROFILE: STRATIGRAPHY	Graphic Plot	SAMPLE: Number	SAMPLE: Type	SPT N-Value / Core Recovery	Elevation Scale (mASL)	Penetration Test Values (Blows / 0.3m) × Dynamic Cone 10 20 30 40; Undrained Shear Strength (kPa) ○ Unconfined + Field Vane ● Pocket Penetrometer ■ Lab Vane 40 80 120 160	Water Content (%) & Plasticity PL MC LL 10 20 30	PID Readings	Well Details	Lab Data and Comments GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL
15		*(continued)*										
	237.4 15.3			14	SS	50 / 50mm				0 ppm		
		BOREHOLE TERMINATED AT 15.3m BELOW GROUND SURFACE IN SANDY SILT TILL. **END OF BOREHOLE** Borehole was dry and open upon completion. 50 mm monitoring well installed. No. 10 screen installed.										

WATER LEVEL MONITORING

Date	Depth (m)	Elevation (m)
Aug 3, 2016	10.3	242.4

library: genivar - library.glb report: gen log v1 file: 161-09454-00_gint logs_sept.gpj

LOG OF BOREHOLE MW2

WSP

project | PART OF LOT 35 CONCESSION 6, UDORA, ONTARIO **project no. |** 161-09454-00
client | TONI RISI, CAPRIS INVESTMENT LTD. **rig type |** CME 75, track-mounted **date started |** 2016/07/26
location | UDORA, ONTARIO **method |** Hollow stem augers, 215 mm dia. **supervisor |** EJP
position | E: 644966 N: 4901867 (17T, Geodetic) **coring |** *n/a* **reviewer |** DAO

SUBSURFACE PROFILE / SAMPLE

Elev / Depth (m)	STRATIGRAPHY	Number	Type	SPT N-Value / Core Recovery	PID Readings	Lab Data and Comments (GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL)
253.5	GROUND SURFACE					
253.3 / 0.2	TOPSOIL: 600mm OF DARK BROWN TOPSOIL, SOME ORGANICS, MOIST	1	SS	7	0 ppm	
	SANDY SILT TILL: BROWN SANDY SILT TILL, SOME TO TRACE GRAVEL, SOME TO TRACE CLAY, TRACE COBBLES, MOIST TO WET, LOOSE TO COMPACT	2	SS	10	0 ppm	
		3	SS	11	0 ppm	*SS3 chemistry:* M&I
251.2 / 2.3	CLAYEY SILT: BROWN CLAYEY SILT, SOME SAND, TRACE GRAVEL, MOIST, LOOSE TO COMPACT, WET	4	SS	9	0 ppm	2 21 56 21; *SS4 chemistry:* PAHs
250.6 / 2.9	SANDY SILT TILL: BROWN SANDY SILT TILL, SOME TO TRACE GRAVEL, SOME TO TRACE CLAY, TRACE COBBLES, MOIST TO WET, LOOSE TO COMPACT	5	SS	21	0 ppm	*SS5 chemistry: CCME(F1-F4), BTEX, VOCs, PHCs*
		6	SS	54	0 ppm	*SS6 chemistry:* PCBs
		7	SS	83	0 ppm	
		8	SS	50 / 75mm	0 ppm	

Depth Scale (m): 0, 1, 2, 3, 4, 5, 6, 7
Elevation Scale (mASL): 253, 252, 251, 250, 249, 248, 247

Penetration Test Values (Blows / 0.3m) — × Dynamic Cone: 10 20 30 40
Undrained Shear Strength (kPa) — O Unconfined, + Field Vane, ● Pocket Penetrometer, ■ Lab Vane: 40 80 120 160
Water Content (%) & Plasticity — PL MC LL: 10 20 30
Graphic Plot | Well Details

library: genivar - library.glb report: gen log v1 file: 161-09454-00_gint logs_sept.gpj

(continued next page)

LOG OF BOREHOLE MW2

project | PART OF LOT 35 CONCESSION 6, UDORA, ONTARIO **project no. |** 161-09454-00
client | TONI RISI, CAPRIS INVESTMENT LTD. **rig type |** CME 75, track-mounted **date started |** 2016/07/26
location | UDORA, ONTARIO **method |** Hollow stem augers, 215 mm dia. **supervisor |** EJP
position | E: 644966 N: 4901867 (17T, Geodetic) **coring |** *n/a* **reviewer |** DAO

Depth Scale (m)	Elev Depth (m)	STRATIGRAPHY *(continued)*	Sample Number	Type	SPT N-Value / Core Recovery	PID Readings	Lab Data and Comments
		SANDY SILT TILL: BROWN SANDY SILT TILL, SOME TO TRACE GRAVEL, SOME TO TRACE CLAY, TRACE COBBLES, MOIST TO WET, LOOSE TO COMPACT *(continued)*	9	SS	50 / 25mm	0 ppm	
9			10	SS	50 / 25mm	0 ppm	
10			11	SS	50 / 75mm	0 ppm	
12			12	SS	50 / 50mm	0 ppm	
13		...at 12.7 m, brown medium to coarse grained sand, some gravel, very dense, wet to 12.8 m	13	SS	50 / 25mm	0 ppm	
14	239.2 / 14.3	SAND: BROWN MEDIUM TO COARSE GRAINED SAND, SOME GRAVEL,VERY DENSE, WET					...at 14.3m, slight odour in soil sample to 16.9m

Depth scale: 8, 9, 10, 11, 12, 13, 14
Elevation Scale (mASL): 246, 245, 244, 243, 242, 241, 240, 239

Penetration Test Values (Blows / 0.3m): X Dynamic Cone 10 20 30 40
Undrained Shear Strength (kPa): O Unconfined + Field Vane ● Pocket Penetrometer ■ Lab Vane 40 80 120 160
Water Content (%) & Plasticity: PL MC LL 10 20 30
Well Details
GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

library: genivar - library.glb report: gen log v1 file: 161-09454-00_gint logs_sept.gpj

(continued next page)

LOG OF BOREHOLE MW2

WSP

project |	PART OF LOT 35 CONCESSION 6, UDORA, ONTARIO			**project no. |**	161-09454-00
client |	TONI RISI, CAPRIS INVESTMENT LTD.	**rig type |**	CME 75, track-mounted	**date started |**	2016/07/26
location |	UDORA, ONTARIO	**method |**	Hollow stem augers, 215 mm dia.	**supervisor |**	EJP
position |	E: 644966 N: 4901867 (17T, Geodetic)	**coring |**	*n/a*	**reviewer |**	DAO

Depth Scale (m)	Elev Depth (m)	STRATIGRAPHY	Graphic Plot	Number	Type	SPT N-Value / Core Recovery	Elevation Scale (mASL)	Penetration Test Values (Blows / 0.3m) × Dynamic Cone 10 20 30 40; Undrained Shear Strength (kPa) ○ Unconfined + Field Vane ● Pocket Penetrometer ■ Lab Vane 40 80 120 160	Water Content (%) & Plasticity PL MC LL 10 20 30	PID Readings	Well Details	Lab Data and Comments GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL
15		*(continued)* SAND: BROWN MEDIUM TO COARSE GRAINED SAND, SOME GRAVEL,VERY DENSE, WET *(continued)*		14	SS	50 / 50mm	238			0 ppm		
16							237					
	236.6 16.9			15	SS	50 / 75mm				0 ppm		

BOREHOLE TERMINATED AT 16.9m BELOW GROUND SURFACE IN SAND.

END OF BOREHOLE

Borehole was dry and open upon completion.

50 mm monitoring well installed.
No. 10 screen installed.

WATER LEVEL MONITORING

Date	Depth (m)	Elevation (m)
Aug 3, 2016	13.2	240.3
Aug 10, 2016	13.6	239.9

LOG OF BOREHOLE MW3

WSP

project | PART OF LOT 35 CONCESSION 6, UDORA, ONTARIO **project no. |** 161-09454-00

client | TONI RISI, CAPRIS INVESTMENT LTD. **rig type |** CME 75, track-mounted **date started |** 2016/07/25

location | UDORA, ONTARIO **method |** Hollow stem augers, 215 mm dia. **supervisor |** EJP

position | E: 644953 N: 4901706 (17T, Geodetic) **coring |** *n/a* **reviewer |** DAO

Penetration Test Values (Blows / 0.3m): × Dynamic Cone; 10, 20, 30, 40
Undrained Shear Strength (kPa): O Unconfined, + Field Vane, ● Pocket Penetrometer, ■ Lab Vane; 40, 80, 120, 160
Water Content (%) & Plasticity: PL, MC, LL; 10, 20, 30; Water level on completion
Lab Data and Comments: GRAIN SIZE DISTRIBUTION (%) (MIT): GR SA SI CL

Elev / Depth (m)	Stratigraphy	Number	Type	SPT N-Value	PID Readings	Lab Data and Comments
259.8	GROUND SURFACE					
259.6 / 0.2	TOPSOIL: 100mm OF DARK BROWN TOPSOIL, SOME ORGANICS, MOIST					
	SAND: BROWN MEDIUM GRAINED SAND, SOME TO TRACE ORGANICS, SOME TO TRACE CLAY, GRAVEL, DRY, LOOSE TO COMPACT	1	SS	35	0 ppm	
259.0 / 0.8	SAND AND GRAVEL: BROWN SAND AND GRAVEL FILL, DRY, COMPACT	2	SS	22	0 ppm	
	SANDY SILT TILL: BROWN SANDY SILT TILL, SOME TO TRACE GRAVEL, SOME TO TRACE CLAY, TRACE COBBLES, MOIST TO WET, LOOSE TO COMPACT					
258.3 / 1.5	SAND: BROWN MEDIUM TO COARSE GRAINED SAND, SOME GRAVEL, LOOSE TO COMPACT, DRY	3	SS	13	0 ppm	*SS3 chemistry:* M&I
257.5 / 2.3	SANDY SILT TILL: BROWN SANDY SILT TILL, SOME TO TRACE GRAVEL, SOME TO TRACE CLAY, TRACE COBBLES, MOIST TO WET, LOOSE TO COMPACT	4	SS	19	0 ppm	
		5	SS	65	0 ppm	
		6	SS	58	0 ppm	14 40 34 12
		7	SS	62	0 ppm	
	...at 6.1 m, brown medium to coarse grained sand lens, trace gravel, wet to saturated to 6.3 m	8	SS	50 / 75mm	0 ppm	

Depth Scale (m): 0, 1, 2, 3, 4, 5, 6, 7
Elevation Scale (mASL): 259, 258, 257, 256, 255, 254, 253

(continued next page)

LOG OF BOREHOLE MW3

project | PART OF LOT 35 CONCESSION 6, UDORA, ONTARIO **project no. |** 161-09454-00
client | TONI RISI, CAPRIS INVESTMENT LTD. **rig type |** CME 75, track-mounted **date started |** 2016/07/25
location | UDORA, ONTARIO **method |** Hollow stem augers, 215 mm dia. **supervisor |** EJP
position | E: 644953 N: 4901706 (17T, Geodetic) **coring |** *n/a* **reviewer |** DAO

SUBSURFACE PROFILE | SAMPLE | Elevation Scale (mASL) | Penetration Test Values (Blows / 0.3m): × Dynamic Cone 10 20 30 40; Undrained Shear Strength (kPa): ○ Unconfined, + Field Vane, ● Pocket Penetrometer, ■ Lab Vane 40 80 120 160 | Water Content (%) & Plasticity: PL MC LL 10 20 30 | Water level on completion | PID Readings | Well Details | Lab Data and Comments: GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

Depth Scale (m)	Elev Depth (m)	STRATIGRAPHY *(continued)*	Graphic Plot	Number	Type	SPT N-Value / Core Recovery	Elevation Scale (mASL)	PID Readings
		SANDY SILT TILL: BROWN SANDY SILT TILL, SOME TO TRACE GRAVEL, SOME TO TRACE CLAY, TRACE COBBLES, MOIST TO WET, LOOSE TO COMPACT *(continued)*					252	
8		...at 7.7 m, brown medium to coarse grained sand lens, trace silt, trace clay, saturated to 8.0 m		9	SS	58		0 ppm
9							251	
		...at 9.1 m, brown medium to coarse grained sand lens, trace silt, trace clay, saturated to 9.4 m		10	SS	80 / 250mm		0 ppm
10							250	
11		...at 10.7 m, greyish brown medium to coarse grained sand lens, trace silt, trace clay, saturated to 10.8 m		11	SS	100 / 225mm	249	0 ppm
12							248	
				12	SS	70		0 ppm
13							247	
14				13	SS	90 / 175mm	246	0 ppm
							245	

library: genivar - library.glb **report:** gen log v1 **file:** 161-09454-00_gint logs_sept.gpi

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LOG OF BOREHOLE MW3

project |	PART OF LOT 35 CONCESSION 6, UDORA, ONTARIO			**project no. |**	161-09454-00
client |	TONI RISI, CAPRIS INVESTMENT LTD.	**rig type |**	CME 75, track-mounted	**date started |**	2016/07/25
location |	UDORA, ONTARIO	**method |**	Hollow stem augers, 215 mm dia.	**supervisor |**	EJP
position |	E: 644953 N: 4901706 (17T, Geodetic)	**coring |**	*n/a*	**reviewer |**	DAO

Depth Scale (m)	Elev Depth (m)	SUBSURFACE PROFILE: STRATIGRAPHY	Graphic Plot	SAMPLE: Number	Type	SPT N-Value / Core Recovery	Elevation Scale (mASL)	Penetration Test Values (Blows / 0.3m) × Dynamic Cone 10 20 30 40; Undrained Shear Strength (kPa) ○ Unconfined + Field Vane ● Pocket Penetrometer ■ Lab Vane 40 80 120 160	Water Content (%) & Plasticity PL MC LL 10 20 30; Water level on completion	PID Readings	Well Details	Lab Data and Comments GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL
15		*(continued)* SANDY SILT TILL: BROWN SANDY SILT TILL, SOME TO TRACE GRAVEL, SOME TO TRACE CLAY, TRACE COBBLES, MOIST TO WET, LOOSE TO COMPACT *(continued)*		14	SS	74			∇	0 ppm		
	244.0 15.9	BOREHOLE TERMINATED AT 15.8m BELOW GROUND SURFACE IN SANDY SILT TILL.					244					

END OF BOREHOLE

Unstabilized water level at 15.5 m below ground surface; borehole was open upon completion.

50 mm monitoring well installed.
No. 10 screen installed.

WATER LEVEL MONITORING

Date	Depth (m)	Elevation (m)
Aug 3, 2016	7.0	252.8
Aug 10, 2016	7.2	252.6

BOREHOLE NO. MW17-1

PROJECT NAME: UDORA PHASE TWO ESA
PROJECT NO.: 161-09454-00
CLIENT: CAPRIS INV. INC.
DATE COMPLETED: Sep 20, 2017
BOREHOLE TYPE: SPLIT SPOON / HOLLOW STEM AUGER
SUPERVISOR: DAO / JW
GROUND ELEVATION: 250.2 mASL
REVIEWER: SJD

DEPTH (m)	STRATIGRAPHIC DESCRIPTION
0.0 – 0.4	SAND TOPSOIL: DARK BROWN SAND TOPSOIL, TRACE TO SOME SILT, TRACE ROOTLETS / ORCANICS, MOIST.
0.4 – 1.2	SAND FILL: ORANGY BROWN, SAND FILL, TRACE TO NO SILT, TRACE ROOTLETS, MOIST, LOOSE.
1.2 – 2.3	SILTY SAND TILL: GREYISH BROWN SILTY SAND TILL, TRACE GRAVEL, TRACE CLAY, MOIST TO WET, LOOSE.
2.3 – 4.6	SILTY SAND TILL: GREYISH BROWN SILTY SAND TILL, SOME COBBLES, TRACE TO SOME CLAY, MOIST TO WET, LOOSE TO DENSE. - 0.1 m OF COBBLES FROM 2.63 m TO 2.74 m
4.6 – 6.7	SAND AND GRAVEL: BROWN, SAND AND FINE GRAVEL, SOME COBBLES, VERY DENSE, SATURATED.
6.7	BOREHOLE TERMINATED AT 6.7 m IN SAND AND GRAVEL.

SAMPLE TYPE	N VALUE	% WATER	% RECOVERY	PID/TOV (ppm)
SS1	4		0	0.0
SS2	13		1	0.0
SS3	8		0	0.0
SS4	17		1	0.0
SS5	26		1	0.0
SS6	50 for 3"		0	0.0
SS7	50 for 2"		0	0.0

CONE PENETRATION; "N" VALUE 10 20 30; SHEAR STRENGTH 50 100 150 200; Intact (MaX) Cu; Remoulded Cu
WATER CONTENT % 10 20 30; W_P W_L

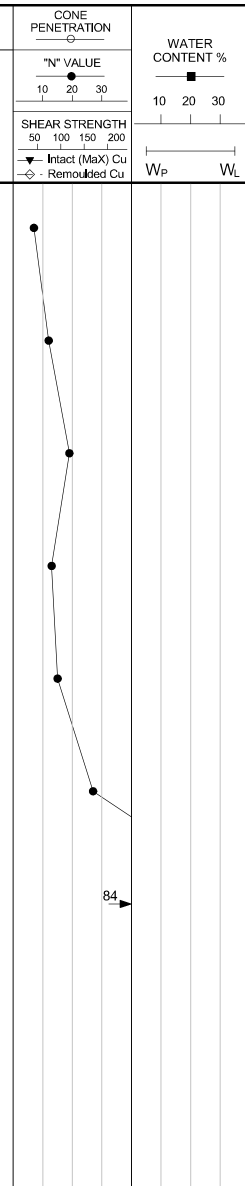
REMARKS:
WATER LEVEL AT 0.82 mBGS ON SEPT. 20, 2017
WATER LEVEL AT 2.04 mBGS ON SEPT. 22, 2017

WSP GEOTECH (METRIC) 161-09454-00 MW LOGS.GPJ WSP_ENV_V1.GDT 10/31/17

BOREHOLE NO. MW17-2

PROJECT NAME: UDORA PHASE TWO ESA
PROJECT NO.: 161-09454-00
CLIENT: CAPRIS INV. INC.
DATE COMPLETED: Sep 21, 2017
BOREHOLE TYPE: SPLIT SPOON / HOLLOW STEM AUGER
SUPERVISOR: DAO / JW
GROUND ELEVATION: 251.8 mASL
REVIEWER: SJD

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	SAMPLE TYPE	N VALUE	% WATER	% RECOVERY	PID/TOV (ppm)	REMARKS
0.0 – 0.2	SAND TOPSOIL: SOME SILT, TRACE ORGANICS.						
0.2 – 1.1	SAND: DARK BROWN, SAND, SOME SILT, TRACE TO SOME ORGANICS, MOIST, LOOSE.	SS1	5		0	0.0	
		SS2	9		0	0.0	
1.1 – 1.5	SILTY SAND TILL: BROWN, SILTY SAND TILL, TRACE CLAY, TRACE GRAVEL, TRACE ORGANICS, MOIST, LOOSE.						
1.5 – 4.6	SILTY SAND / SANDY SILT TILL: BROWN TO GREYISH BROWN, SILTY SAND TO SANDY SILT TILL, TRACE CLAY, TRACE GRAVEL, TRACE COBBLES, MOIST TO WET, LOOSE TO COMPACT.	SS3	12		0	0.0	
		SS4	12		1	0.0	WATER LEVEL AT 5.67 mBGS ON SEPT. 21, 2017
		SS5	11		1	0.0	
		SS6	20		1	0.0	
4.6 – 6.1	SANDY SILT TILL: SANDY SILT TILL, VARVED CLAY LAYERS, SOME CLAY, TRACE COBBLES, TRACE GRAVEL, VERY DENSE	SS7	59		1	0.0	
							WATER LEVEL AT 2.75 mBGS ON SEPT. 22, 2017
6.1 – 6.7	SANDY SILT TILL: LIGHT BROWN TO GREY SANDY SILT TILL, TRACE TO SOME GRAVEL, TRACE COBBLES, MOIST, VERY DENSE.	SS8	60 for 3"		0		
6.7	BOREHOLE TERMINATED AT 6.7 m IN SANDY SILT TILL.						



BOREHOLE NO. MW17-3

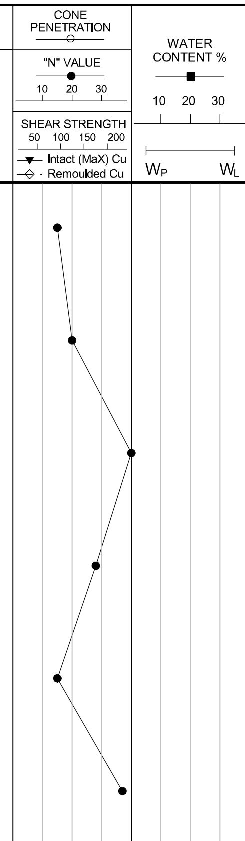
PROJECT NAME: UDORA PHASE TWO ESA | **PROJECT NO.:** 161-09454-00

CLIENT: CAPRIS INV. INC. | **DATE COMPLETED:** Sep 20, 2017

BOREHOLE TYPE: SPLIT SPOON / HOLLOW STEM AUGER | **SUPERVISOR:** DAO / JW

GROUND ELEVATION: 250.8 mASL | **REVIEWER:** SJD

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	TYPE	N VALUE	% WATER	% RECOVERY	PID/TOV (ppm)	REMARKS
0.0	SAND TOPSOIL: BROWN, TRACE ROOTLETS, MOIST.	SS1	8		0	0.0	
0.4	SAND FILL: BROWN TO ORANGEY BROWN, SAND FILL, MOIST, LOOSE TO COMPACT.	SS2	23		0	0.0	
1.5	SILTY SAND TO SANDY SILT TILL: GREYISH BROWN, SILTY SAND TO SANDY SILT TILL, TRACE CLAY, TRACE COBBLES, TRACE GRAVEL, MOIST TO SATURATED, COMPACT.	SS3	34		0	0.0	
		SS4	19		1	0.0	WATER LEVEL AT 2.44 mBGS ON SEPT. 22, 2017 WATER LEVEL AT 2.7 mBGS ON SEPT. 20, 2017
3.1	SANDY SILT TILL: GREYISH BROWN, SANDY SILT TILL, SOME COBBLES, TRACE CLAY, TRACE GRAVEL, VERY SATURATED.	SS5	10		0	0.0	
3.8	SILTY SAND TO SANDY SILT TILL: SILTY SAND TO SANDY SILT TILL, FINE GRAVEL, COMPACT TO DENSE, VERY SATURATED.	SS6	18		1	0.0	
4.6	BOREHOLE TERMINATED AT 4.6 m IN SILTY SAND TO SANDY SILT TILL.						



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Phase Two Environmental Site Assessment
HOLE DESIGNATION: MW1-22
PROJECT NUMBER: 12585643
DATE COMPLETED: 31 October 2022
CLIENT: 2695867 Ontario Inc.
DRILLING METHOD: HSA
LOCATION: Part of Lot 35, Conc. 6, Udora, Ontario
FIELD PERSONNEL: D. Blair

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH BGS	MONITOR INSTALLATION	SAMPLE NUMBER	INTERVAL	REC (%)	'N' Value	PID (ppm)
	TOPSOIL, organic	0.06	Concrete					
	SANDY SILT, trace organics, brown, dry	0.30		1		45	2	0.4
0.5	SANDY SILT, trace gravel, brown, dry							
1.0				2		75	14	0.3
1.5								
2.0				3		100	24	0.2
2.5				4		100	21	0.9
3.0								
3.5				5		100	50	0.7
4.0			Bentonite					
4.5								
5.0				6		100	57	0.8
5.5								
6.0								
6.5				7		100	81	0.6

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS

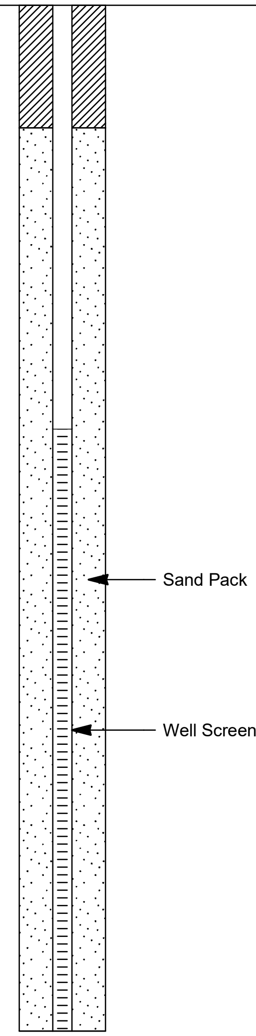
STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Phase Two Environmental Site Assessment
PROJECT NUMBER: 12585643
CLIENT: 2695867 Ontario Inc.
LOCATION: Part of Lot 35, Conc. 6, Udora, Ontario

HOLE DESIGNATION: MW1-22
DATE COMPLETED: 31 October 2022
DRILLING METHOD: HSA
FIELD PERSONNEL: D. Blair

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH BGS	SAMPLE NUMBER	INTERVAL	REC (%)	'N' Value	PID (ppm)
8.0			8	X	100	58	0.6
9.5			9	X	100	85	0.6
11.0	SAND, trace silt, grey, wet	10.97	10	X	100	70	0.9
12.19	END OF BOREHOLE @ 12.19m BGS	12.19					

MONITOR INSTALLATION



WELL DETAILS
Screened interval:
9.14 to 12.19m BGS
Length: 3.05m
Diameter: 51mm
Slot Size: #10
Material: PVC
Sand Pack:
7.62 to 12.19m BGS
Material: Silica

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ◯

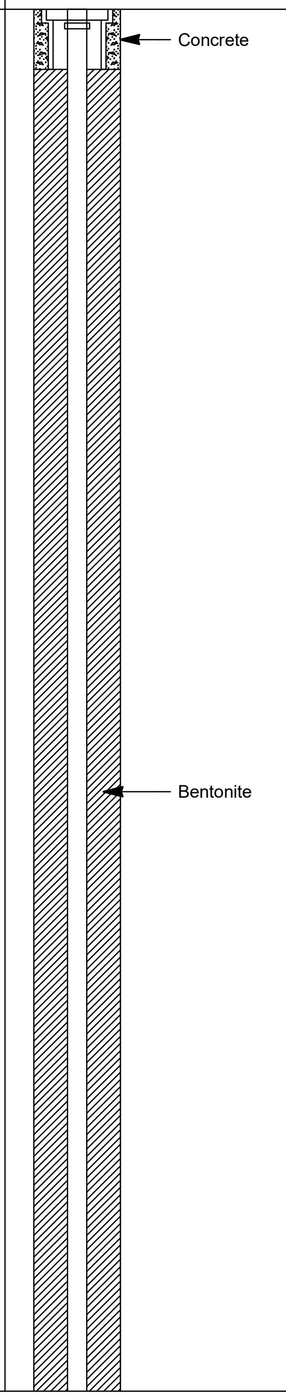
STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Phase Two Environmental Site Assessment
PROJECT NUMBER: 12585643
CLIENT: 2695867 Ontario Inc.
LOCATION: Part of Lot 35, Conc. 6, Udora, Ontario

HOLE DESIGNATION: MW2-22
DATE COMPLETED: 24 October 2022
DRILLING METHOD: HSA
FIELD PERSONNEL: D. Blair

DEPTH BGS	STRATIGRAPHIC DESCRIPTION & REMARKS
0.06	TOPSOIL, organic
0.46	SILTY SAND, trace gravel, brown, dry, trace organics
0.53	SAND, brown, dry
1.52	SILTY SAND, trace gravel, trace organics, brown, dry
1.98	SAND, trace gravel, brown, dry
6.10	SILTY SAND, trace gravel, brown, dry
	SILT, trace sand, trace gravel, brown, dry

MONITOR INSTALLATION



NUMBER	REC (%)	'N' Value	PID (ppm)
1	45	10	0.3
2	75	17	0.4
3	100	40	0.4
4	100	24	
5	100	50	0.7
6	100	50/5	0.7
7	100	50/5	0.4

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

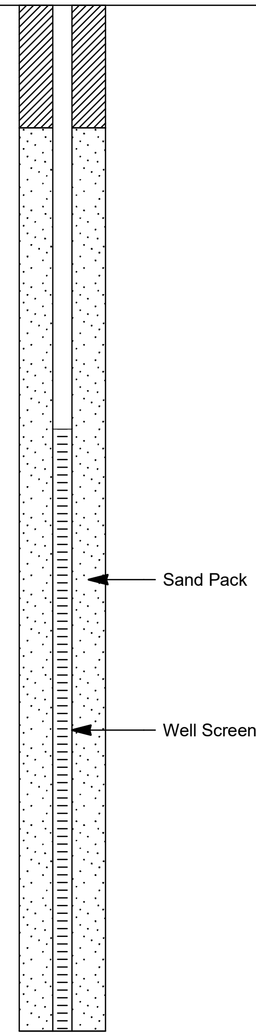
PROJECT NAME: Phase Two Environmental Site Assessment
PROJECT NUMBER: 12585643
CLIENT: 2695867 Ontario Inc.
LOCATION: Part of Lot 35, Conc. 6, Udora, Ontario

HOLE DESIGNATION: MW2-22
DATE COMPLETED: 24 October 2022
DRILLING METHOD: HSA
FIELD PERSONNEL: D. Blair

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH BGS	SAMPLE NUMBER	INTERVAL	REC (%)	'N' Value	PID (ppm)
7.62	- grey at 7.62m BGS						
8.0			8	X	100	50/5	0.9
9.5			9	X	100	50/5	0.8
10.67	SAND, trace silt, brown, wet	10.67					
11.0			10	X	100	50/5	1.0
12.19	END OF BOREHOLE @ 12.19m BGS	12.19					

Depth scale (m BGS): 7.5, 8.0, 8.5, 9.0, 9.5, 10.0, 10.5, 11.0, 11.5, 12.0, 12.5, 13.0, 13.5

MONITOR INSTALLATION



WELL DETAILS
Screened interval:
9.14 to 12.19m BGS
Length: 3.05m
Diameter: 51mm
Slot Size: #10
Material: PVC
Sand Pack:
7.62 to 12.19m BGS
Material: Silica

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (circled sample number)

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Phase Two Environmental Site Assessment
PROJECT NUMBER: 12585643
CLIENT: 2695867 Ontario Inc.
LOCATION: Part of Lot 35, Conc. 6, Udora, Ontario

HOLE DESIGNATION: BH3-22
DATE COMPLETED: 31 October 2022
DRILLING METHOD: HSA
FIELD PERSONNEL: D. Blair

DEPTH BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	BOREHOLE
0.06	TOPSOIL, organic, brown, wet	
0.23	SAND, brown, wet	
	SANDY SILT, trace gravel, brown, moist	
	- dry at 2.29m BGS	Bentonite
	- grey/brown at 3.81m BGS	
	- boulder at 4.27m BGS	
4.57	END OF BOREHOLE @ 4.57m BGS	

SAMPLE

NUMBER	INTERVAL	REC (%)	'N' Value	PID (ppm)
1	X	60	8	0
2	X	60	9	0
3	X	100	10	0
4	X	55	23	0
5	X	100	34	0
6	X	100	69	0

DEPTH m BGS: 0.5, 1.0, 1.5, 2.0, 2.5, 3.0, 3.5, 4.0, 4.5, 5.0, 5.5, 6.0, 6.5

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ◯

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Phase Two Environmental Site Assessment
PROJECT NUMBER: 12585643
CLIENT: 2695867 Ontario Inc.
LOCATION: Part of Lot 35, Conc. 6, Udora, Ontario

HOLE DESIGNATION: BH4-22
DATE COMPLETED: 1 November 2022
DRILLING METHOD: HSA
FIELD PERSONNEL: D. Blair

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH BGS	BOREHOLE	SAMPLE NUMBER	INTERVAL	REC (%)	'N' Value	PID (ppm)
	TOPSOIL, organic	0.12						
	SANDY SILT, trace gravel, brown, dry			1		45	15	0
0.5								
1.0				2		100	15	0.2
1.5								
2.0				3		20	21	0
	- wet at 2.29m BGS		Bentonite					
2.5				4		80	8	0.2
3.0								
	- dry at 3.35m BGS			5		80	17	0
3.5								
4.0				6		100	19	0
	- sand lens, dry at 4.27m BGS							
4.5	END OF BOREHOLE @ 4.57m BGS	4.57						
5.0								
5.5								
6.0								
6.5								

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Phase Two Environmental Site Assessment
HOLE DESIGNATION: BH5-22
PROJECT NUMBER: 12585643
DATE COMPLETED: 31 October 2022
CLIENT: 2695867 Ontario Inc.
DRILLING METHOD: HSA
LOCATION: Part of Lot 35, Conc. 6, Udora, Ontario
FIELD PERSONNEL: D. Blair

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH BGS	BOREHOLE	SAMPLE NUMBER	INTERVAL	REC (%)	'N' Value	PID (ppm)
	TOPSOIL, organic, brown, dry	0.06						
	SANDY SILT, trace gravel, brown, dry		Bentonite	1	X	55	12	0
0.5–1.0				2	X	100	17	0
1.5–2.0				3	X	95	10	0
2.5	- boulder at 2.44m BGS			4	X	80	21	0
3.0–3.5	- grey/brown at 3.05m BGS			5	X	100	13	0
4.0				6	X	70	19	0
	SAND, trace silt, grey, wet	4.27						
4.5	END OF BOREHOLE @ 4.57m BGS	4.57						

Depth scale: 0.5, 1.0, 1.5, 2.0, 2.5, 3.0, 3.5, 4.0, 4.5, 5.0, 5.5, 6.0, 6.5

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ◯

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Phase Two Environmental Site Assessment
HOLE DESIGNATION: BH6-22
PROJECT NUMBER: 12585643
DATE COMPLETED: 1 November 2022
CLIENT: 2695867 Ontario Inc.
DRILLING METHOD: SSA
LOCATION: Part of Lot 35, Conc. 6, Udora, Ontario
FIELD PERSONNEL: D. Blair

DEPTH BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	BOREHOLE
	TOPSOIL, organic	Bentonite
0.67	SANDY SILT, trace gravel, brown, dry	
2.29	SAND, trace silt, brown, wet - boulder at 2.90m BGS - boulder at 3.96m BGS	
4.57	END OF BOREHOLE @ 4.57m BGS	

SAMPLE NUMBER	REC (%)	'N' Value	PID (ppm)
1	55	2	0.2
2	75	14	0.1
3	25	24	0.1
4	55	34	0.2
5	75	27	0.4
6	95	64	0.1

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

PROJECT NAME: Phase Two Environmental Site Assessment

PROJECT NUMBER: 12585643

CLIENT: 2695867 Ontario Inc.

LOCATION: Part of Lot 35, Conc. 6, Udora, Ontario

HOLE DESIGNATION: MW1-22

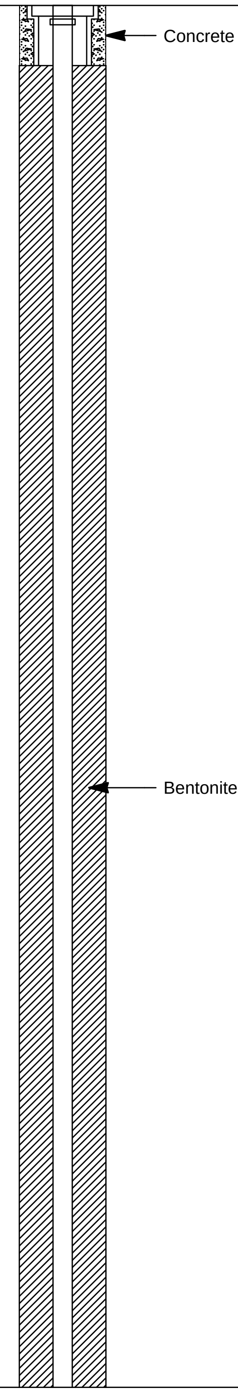
DATE COMPLETED: 31 October 2022

DRILLING METHOD: HSA

FIELD PERSONNEL: D. Blair

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH BGS
	TOPSOIL, organic	0.06
	SANDY SILT, trace organics, brown, dry	0.30
	SANDY SILT, trace gravel, brown, dry	

MONITOR INSTALLATION



SAMPLE NUMBER	REC (%)	'N' Value	PID (ppm)
1	45	2	0.4
2	75	14	0.3
3	100	24	0.2
4	100	21	0.9
5	100	50	0.7
6	100	57	0.8
7	100	81	0.6

Depth scale (m BGS): 0.5, 1.0, 1.5, 2.0, 2.5, 3.0, 3.5, 4.0, 4.5, 5.0, 5.5, 6.0, 6.5

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Phase Two Environmental Site Assessment
PROJECT NUMBER: 12585643
CLIENT: 2695867 Ontario Inc.
LOCATION: Part of Lot 35, Conc. 6, Udora, Ontario

HOLE DESIGNATION: MW1-22
DATE COMPLETED: 31 October 2022
DRILLING METHOD: HSA
FIELD PERSONNEL: D. Blair

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH BGS	MONITOR INSTALLATION	SAMPLE NUMBER	INTERVAL	REC (%)	'N' Value	PID (ppm)
7.5								
8.0				8		100	58	0.6
8.5								
9.0								
9.5				9		100	85	0.6
10.0			Sand Pack					
10.5			Well Screen					
11.0	SAND, trace silt, grey, wet	10.97		10		100	70	0.9
11.5								
12.0								
12.5	END OF BOREHOLE @ 12.19m BGS	12.19						
13.0								
13.5								

<u>WELL DETAILS</u>
Screened interval:
9.14 to 12.19m BGS
Length: 3.05m
Diameter: 51mm
Slot Size: #10
Material: PVC
Sand Pack:
7.62 to 12.19m BGS
Material: Silica

<u>NOTES:</u> MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

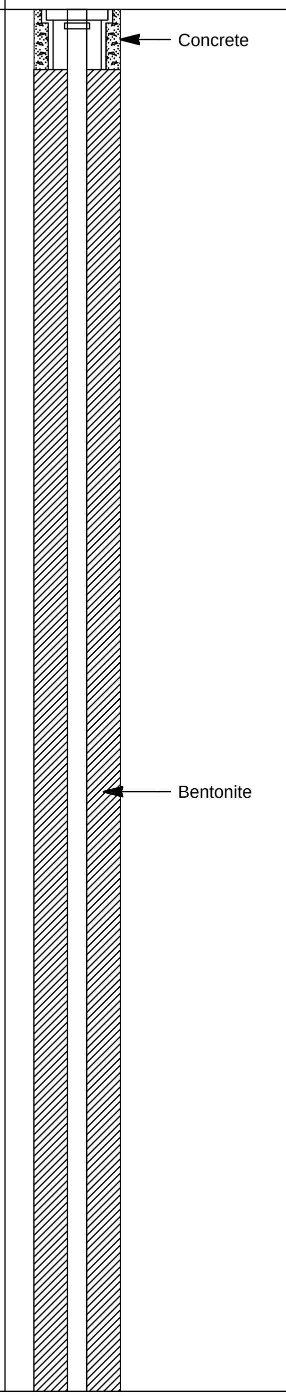
PROJECT NAME: Phase Two Environmental Site Assessment
PROJECT NUMBER: 12585643
CLIENT: 2695867 Ontario Inc.
LOCATION: Part of Lot 35, Conc. 6, Udora, Ontario

HOLE DESIGNATION: MW2-22
DATE COMPLETED: 24 October 2022
DRILLING METHOD: HSA
FIELD PERSONNEL: D. Blair

STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH BGS
TOPSOIL, organic	0.06
SILTY SAND, trace gravel, brown, dry, trace organics	0.46
SAND, brown, dry	0.53
SILTY SAND, trace gravel, trace organics, brown, dry	1.52
SAND, trace gravel, brown, dry	1.98
SILTY SAND, trace gravel, brown, dry	6.10
SILT, trace sand, trace gravel, brown, dry	

DEPTH m BGS scale: 0.5, 1.0, 1.5, 2.0, 2.5, 3.0, 3.5, 4.0, 4.5, 5.0, 5.5, 6.0, 6.5

MONITOR INSTALLATION



SAMPLE

NUMBER	INTERVAL	REC (%)	'N' Value	PID (ppm)
1		45	10	0.3
2		75	17	0.4
3		100	40	0.4
4		100	24	
5		100	50	0.7
6		100	50/5	0.7
7		100	50/5	0.4

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

PROJECT NAME: Phase Two Environmental Site Assessment
PROJECT NUMBER: 12585643
CLIENT: 2695867 Ontario Inc.
LOCATION: Part of Lot 35, Conc. 6, Udora, Ontario

HOLE DESIGNATION: MW2-22
DATE COMPLETED: 24 October 2022
DRILLING METHOD: HSA
FIELD PERSONNEL: D. Blair

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH BGS	MONITOR INSTALLATION	SAMPLE NUMBER	INTERVAL	REC (%)	'N' Value	PID (ppm)
7.5	- grey at 7.62m BGS							
8.0				8	X	100	50/5	0.9
9.5				9	X	100	50/5	0.8
10.0			Sand Pack					
10.67	SAND, trace silt, brown, wet	10.67	Well Screen					
11.0				10	X	100	50/5	1.0
12.19	END OF BOREHOLE @ 12.19m BGS	12.19						

WELL DETAILS
Screened interval:
9.14 to 12.19m BGS
Length: 3.05m
Diameter: 51mm
Slot Size: #10
Material: PVC
Sand Pack:
7.62 to 12.19m BGS
Material: Silica

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS

LOG OF BOREHOLE BH/MW24-1

PROJECT: Capris Subdivision Udora		REF. NO.: 22-0223a
CLIENT: J&J Development Group	Method: Hollow Stem Auger	ENCL NO.:
PROJECT LOCATION: Udora, ON	Diameter: 152 mm	ORIGINATED BY SH
DATUM: Geodetic	Date: Mar-08-2024 to Mar-08-2024	COMPILED BY PD
BH LOCATION: N 4901797.173 E 644983.609	Equipment: Pontil Drilling CME	CHECKED BY RB

ELEV (m) / DEPTH	DESCRIPTION	SAMPLE NUMBER	TYPE	"N" BLOWS/0.3 m	GROUND WATER CONDITIONS	ELEVATION
256.2	Ground Surface					
256.0 / 0.1	**TOPSOIL:** 76 mm					256
	SANDY SILT: trace gravel, brown, moist, loose	1	SS			255
		2	SS			254
253.2 / 3.0	**SANDY SILT TILL:** trace gravel, light brown, moist	3	SS	40	Bentonite	253, 252
251.7 / 4.6	**SILTY SAND TILL:** some gravel, light brown, moist	4	SS	59	W. L. 251.1 m Mar 08, 2024	
250.1 / 6.1	**SANDY SILT TILL:** trace gravel, brown, moist	5	SS	99/ 275mm		250, 249
248.6 / 7.6	**SILTY SAND:** brown, wet	6	SS	100/ 225mm	Sand	248
247.1 / 9.1	**SILTY SAND:** trace clay, grey, wet	7	SS	76	Screen	247

Other columns (no data recorded on this page): Soil Head Space Vapors – PID (ppm) 10 20 30 40; CGD (ppm) 10 20 30 40; PLASTIC LIMIT W_P, NATURAL MOISTURE CONTENT W, LIQUID LIMIT W_L – WATER CONTENT (%) 10 20 30; POCKET PEN. (Cu) (kPa); NATURAL UNIT WT (kN/m³); REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL.

Continued Next Page

GROUNDWATER ELEVATIONS
Measurement 1st ▽ 2nd ▼ 3rd ▼ 4th ▼

GRAPH NOTES: $+^3$, $\times^3$: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

ENVISION CONSULTANTS LTD

LOG OF BOREHOLE BH/MW24-1

PROJECT: Capris Subdivision Udora
CLIENT: J&J Development Group
PROJECT LOCATION: Udora, ON
DATUM: Geodetic
BH LOCATION: N 4901797.173 E 644983.609

Method: Hollow Stem Auger
Diameter: 152 mm
Date: Mar-08-2024 to Mar-08-2024
Equipment: Pontil Drilling CME

REF. NO.: 22-0223a
ENCL NO.:
ORIGINATED BY SH
COMPILED BY PD
CHECKED BY RB

(m) ELEV DEPTH	SOIL PROFILE: DESCRIPTION (Continued)	STRATA PLOT	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: "N" BLOWS/0.3 m	GROUND WATER CONDITIONS	ELEVATION	Soil Head Space Vapors: PID (ppm) 10 20 30 40	Soil Head Space Vapors: CGD (ppm) 10 20 30 40	PLASTIC LIMIT W_P / NATURAL MOISTURE CONTENT W / LIQUID LIMIT W_L — WATER CONTENT (%) 10 20 30	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m^3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
	SILTY SAND: trace clay, grey, wet(Continued)						246						
245.6 10.7	**END OF BOREHOLE** Notes: 1) 50 mm dia. monitoring well was installed upon completion of drilling, screened from 7.62 m to 10.67 m. Water Level Readings: Date W.L. Depth (mbgs) March 8, 2024 5.15												

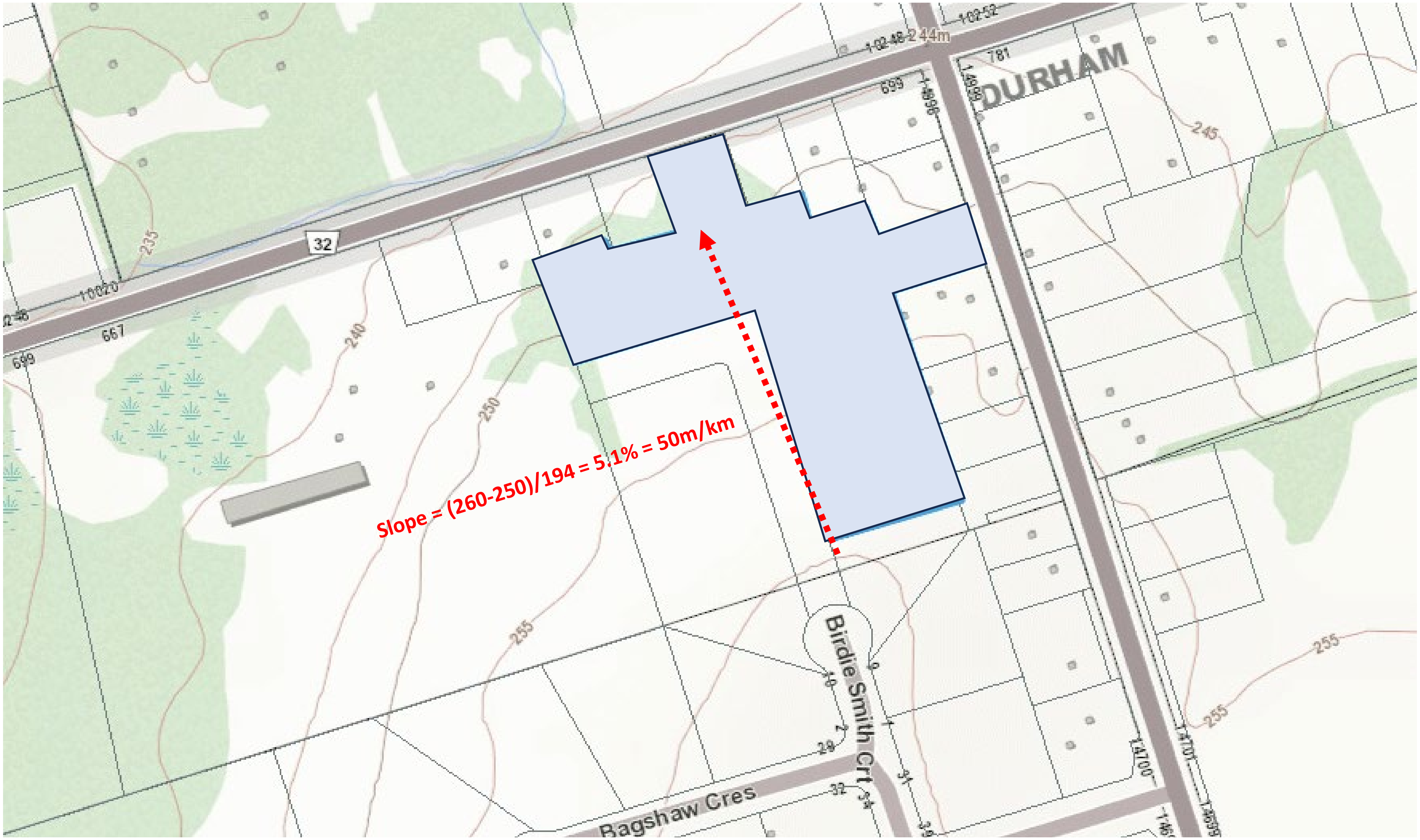
GROUNDWATER ELEVATIONS

Measurement 1st 2nd 3rd 4th

GRAPH NOTES $+^3, \times^3$: Numbers refer to Sensitivity ○ ε=3% Strain at Failure

APPENDIX C

WATER BUDGET



Topography Infiltration Factor

Udora Estates Water Balance Evaluation, Revision 2

Part Lot 35, Con. 6, TWP Uxbridge

For 2695867 Ontario Inc.

Date:	Dec-25	Scale:	AS SHOWN
Project:	22012.04	Ref No:	

GAMAN Consultants Inc.

Figure C-1

NOTES

Site Location

TABLE C-1: INFILTRATION FACTORS

Project: Udora Estates Water Balance Evaluation Revision 2, Part Lots 24 & 35, Con. 6 TWP Uxbridge (22012.04)

MOECC 1995 Hydrogeological Technical Information Requirements (page 4-62)

Desription of Area/Development Site		**Pre-development**		**Post-development**	
TOPOGRAPHY	**Factor**	Description	Factor	Description	Factor
Flat lying, average slope < 0.6m/km	0.3	Hilly land	0.1	Hilly land	0.1
Rolling land average slope of 2.8-3.8m	0.2				
Hilly land, average slopes of 28-47 metres	0.1				
SOILS					
Tight impervious Clay	0.1	Medium Loam to Sandy Loam	0.35	Med. Loam - Sandy Loam	0.35
Medium combinations of clay and loam	0.2			Impermeable Surfaces	0
open sandy loam	0.4				
COVER					
Cultivated land	0.1	Shrubs	0.15	Urban Lawn	0.15
Woodland	0.2				
Total Infiltration factor for pervious areas with medium loam to sandy loam pre-development and post-development.			**0.6**	Med. Loam to Sandy Loam	**0.6**
Total Infiltration factor for impermeable surfaces			**Not applicable**	Driveways and Rooftops	**0**

TABLE C-2: PRE-DEVELOPMENT AND POST-DEVELOPMENT WATER BUDGETS

Project: Udora Estates Water Balance Evaluation Revision 2, Part Lots 24 & 35, Con. 6 TWP Uxbridge (22012.04)

	PRE-DEVELOPMENT WATER BUDGET	
	Water Surplus (mm/yr) Average Silt Loam to F.Sandy Loam from LSRCA	314.0
	Infiltration Areas (m2) is gross property area pre-development	27,100
	Pre-Development Infiltration Factor	0.6
	Infiltration Rate (mm/yr)	188.4
A	Total Recharge m3/yr	5,106
	Total Recharge mm/yr	188
	Runoff m3/year	3,404

	POST-DEVELOPMENT RECHARGE RATES BY CATCHMENT AREA	Total	Catchment Area					
			A1	A2	A3	A4	B1	B2
	Water Surplus Ubran Lawns (mm/yr)	321	321	321	321	321	321	321
1	Infiltration Rate (mm/year) Urban Lawns WS x Infiltration Factor	0.6	193	193	193	193	193	193
2	Catchment Area (ha) (see Figure 12)	2.71	0.39	0.74	0.8	0.02	0.21	0.55
	% impermeable (See Figure 12)		17%	17%	17%	0%	38%	38%
3	% permeable		83%	83%	83%	100%	62%	62%
B	Recharge Rate (m3/yr) "B" = "1" x "2" x "3"	4,031	623	1183	1279	39	251	657
C	Recharge Deficit (m3/year) = "A" - "B"	1,074	21%					

Assumptions:

***Impervious areas include: Roads, Driveways, Dwellings & Lined Pond. Runoff from Rooftop Area is only source of clean water for mitigation.**

Table C-3: Recharge Mitigation

Project: Udora Estates Water Balance Evaluation Revision 2, Part Lots 24 & 35, Con. 6 TWP Uxbridge (22012.04)

	Source of Recharge	Rooftop Area (m2)	50% Roof runoff	Total Precip (mm/yr)	Total Rooftop Recharge (m3/year)
D	Total Recharge from Rooftop Runoff assumed 8 roofs at 297m2/roof	297	0.5	897	1,066
E=D-C	Recharge Deficit after mitigation **(E)**				9
F = E / A	Percent reduction **(F)** in pre-development LSRCA recharge target is <7%				0.2%

NOTE: Roof top areas consistent with SCS FSSR areas

APPENDIX D

GROUNDWATER CHEMISTRY

TABLE D-1: SHALLOWS GROUNDWATER QUALITY RESULTS
PROEJECT: Udora Estates Water Balance Evaluation Revision 2 (22012.04)

Parameters	UNIT	ODWQS (1)	MW17-1	MW17-2	MW17-3
Sample Date			20-Feb-19	20-Feb-19	20-Feb-19
Calculated Parameters					
Anion Sum	me/L	-	8.92	7.55	8.92
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	-	510	436	517
Calculated TDS	mg/L	500	473	451	531
Carb. Alkalinity (calc. as CaCO3)	mg/L	30-500	<10	<10	<10
Cation Sum	me/L	-	7.58	8.81	10.6
Hardness (CaCO3)	mg/L	80-100	369	430	517
Ion Balance (% Difference)	%	-	85	117	119
Langelier Index	N/A	-	0.7	0.6	0.6
Saturation pH	N/A	-	6.66	6.65	6.54
Inorganics					
Total Ammonia-N	mg/L	-	0.01	<0.010	0.014
Conductivity	umho/cm	-	600	710	824
Dissolved Organic Carbon	mg/L	5	7.04	6.38	7.31
Orthophosphate (P)	mg/L	-	<0.0030	0.019	<0.0030
pH	pH	6.5-8.5	7.35	7.25	7.12
Dissolved Sulphate (SO4)	mg/L	500	14.1	7.91	14.1
Alkalinity (Total as CaCO3)	mg/L	30-500	510	436	517
Dissolved Chloride (Cl)	mg/L	250	8.05	2.52	4.14
Nitrite (N)	mg/L	1[1]	0.01	<0.010	<0.010
Nitrate (N)	mg/L	10[1]	0.302	2.12	0.201
Nitrate + Nitrite (N)	mg/L	10	0.312	2.12	0.201
Metals					
Dissolved Aluminum (Al)	mg/L	0.1	<0.0050	<0.0050	<0.0050
Dissolved Antimony (Sb)	mg/L	0.006[1]	<0.00010	<0.00010	<0.00010
Dissolved Arsenic (As)	mg/L	0.01[1]	0.00013	0.00039	0.00025
Dissolved Barium (Ba)	mg/L	1[1]	0.0518	0.0532	0.0536
Dissolved Beryllium (Be)	mg/L	0.004	<0.00010	<0.00010	<0.00010
Dissolved Boron (B)	mg/L	5[1]	0.03	0.1	0.051
Dissolved Cadmium (Cd)	mg/L	0.05[1]	<0.000010	<0.000010	0.000032
Dissolved Calcium (Ca)	mg/L	-	125	153	174
Dissolved Chromium (Cr)	mg/L	0.05[1]	0.00051	0.00097	<0.00050
Dissolved Cobalt (Co)	mg/L	0.0038	<0.00010	<0.00010	<0.00010
Dissolved Copper (Cu)	mg/L	1	0.00326	0.00103	0.00463
Dissolved Iron (Fe)	mg/L	0.3	<0.010	<0.010	<0.010
Dissolved Lead (Pb)	mg/L	0.01	0.00015	<0.000050	0.000108
Dissolved Magnesium (Mg)	mg/L	-	14	11.7	20.1
Dissolved Manganese (Mn)	mg/L	0.05	<0.00050	0.0005	0.00071
Dissolved Molybdenum (Mo)	mg/L	0.07	0.00008	0.000144	0.000067

TABLE D-1: SHALLOWS GROUNDWATER QUALITY RESULTS
PROEJECT: Udora Estates Water Balance Evaluation Revision 2 (22012.04)

Parameters	UNIT	ODWQS (1)	MW17-1	MW17-2	MW17-3
Sample Date			20-Feb-19	20-Feb-19	20-Feb-19
Calculated Parameters					
Dissolved Nickel (Ni)	mg/L	0.1	<0.00050	<0.00050	0.00075
Dissolved Phosphorus (P)	mg/L	-	<0.050	<0.050	<0.050
Dissolved Potassium (K)	mg/L	-	0.728	0.855	0.819
Dissolved Selenium (Se)	mg/L	0.05[1]	0.000261	0.00062	0.000205
Dissolved Silicon (Si)	mg/L	-	6.34	6.93	7.67
Dissolved Silver (Ag)	mg/L	0.0015	<0.000050	<0.000050	<0.000050
Dissolved Sodium (Na)	mg/L	200	4.24	4.52	6.55
Dissolved Strontium (Sr)	mg/L	-	0.244	0.278	0.327
Dissolved Thallium (Tl)	mg/L	0.002	<0.000010	<0.000010	<0.000010
Dissolved Titanium (Ti)	mg/L	-	<0.00030	<0.00030	<0.00030
Dissolved Uranium (U)	mg/L	0.02[1]	0.000305	0.000362	0.000342
Dissolved Vanadium (V)	mg/L	0.0062	<0.00050	0.00075	<0.00050
Dissolved Zinc (Zn)	mg/L	5	0.003	0.0012	0.0146

NOTES

1) Superscript indicated a MAC, other values are AO.
2) Yellow shading indicates parameter reportable detection limit exceeds ODWQS
3) Ontario Drinking Water Quality Standard for use under O.Reg. 169/03 of the Safe Drinking Water Act (2002).

Table D-2: Groundwater Quality

Project: Udora Estates Water Balance Evaluation, Rev, Part Lot 35, Con. 6, TWP Uxbridge(22012.04)

Nitrate Concentrations (mg/L)

Date	MW17-1 (A-235172)	MW17-2	MW17-3	MW3	MW2-22	MW24-1	OW05-1
16-Mar-24	<0.05	2.33	0.06	<0.05	<0.05	0.46	<0.05
10-Apr-24	0.07	1.5	0.09	<0.05	<0.05	0.53	1.87
6-May-24	0.11	0.63	0.11	0.07	0.06	0.64	2.3
27-Jul-24	0.14	0.12	0.11	<0.05	<0.05	0.54	3.97
30-Sep-24	0.66	<0.05	0.45	<0.05	0.27	1.76	5.35
30-Nov-24	0.6	0.25	0.62	0.21	0.1	1.46	3.89
Average	**0.32**	**0.97**	**0.24**	**0.14**	**0.14**	**0.90**	**3.48**

Orthophosphate Concentrations (mg/L)

Date	MW17-1 (A-235172)	MW17-2	MW17-3	MW3	MW2-22	MW24-1	OW05-1
16-Mar-24	0.006	0.005	0.004	0.004	0.004	0.002	<0.002
10-Apr-24	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
6-May-24	0.003	0.005	0.002	0.004	<0.002	0.002	0.002
27-Jul-24	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
30-Sep-24	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
30-Nov-24	0.018	0.012	0.01	0.012	0.01	0.008	0.006
Average	**0.009**	**0.007**	**0.005**	**0.007**	**0.007**	**0.004**	**0.004**

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: - **REPORT No: 24-007186 - Rev. 0**

Report To:
Gaman Consultants Inc
7 Pinsent Court
Barrie, ON L4N 6E3

CADUCEON Environmental Laboratories
112 Commerce Park Dr Unit L
Barrie, ON L4N 8W8

Attention: Gary Hendy

DATE RECEIVED:	2024-Mar-18	CUSTOMER PROJECT:	Udora Estates
DATE REPORTED:	2024-Mar-20	P.O. NUMBER:	22012.02
SAMPLE MATRIX:	Ground Water		

Analyses	Qty	Site Analyzed	Authorized	Date Analyzed	Lab Method	Reference Method
Anions (Liquid)	7	OTTAWA	PCURIEL	2024-Mar-19	A-IC-01	SM 4110B
Orthophosphate (Liquid)	7	KINGSTON	JYEARWOOD	2024-Mar-20	NH3-001	SM 4500NH3

R.L. = Reporting Limit
NC = Not Calculated
Test methods may be modified from specified reference method unless indicated by an *

		Parameter	Nitrate (N)	Nitrite (N)	o-Phosphate (P)
		Units	mg/L	mg/L	mg/L
		R.L.	0.05	0.05	0.002
		Limits	10.0	1.0	
		DWG	MAC	MAC	
Client I.D.	Sample I.D.	Date Collected	-	-	-
MW17-1	24-007186-1	2024-Mar-16	<0.05	<0.05	0.006
MW17-2	24-007186-2	2024-Mar-16	2.33	<0.05	0.005
MW17-3	24-007186-3	2024-Mar-16	0.06	<0.05	0.004
MW3	24-007186-4	2024-Mar-16	<0.05	<0.05	0.004
MW2-22	24-007186-5	2024-Mar-16	<0.05	<0.05	0.004
MW24-1	24-007186-6	2024-Mar-16	0.46	<0.05	0.002
OW5-1	24-007186-7	2024-Mar-16	<0.05	<0.05	<0.002

DWG - Drinking Water Guidelines
ODWS - Ontario Drinking Water Standards
AO - Aesthetic Objectives
IMAC - Interim Maximum Acceptable Concentration
MAC - Maximum Acceptable Concentration
ODWO - D-5-5 Objective
OG - Operational Guidelines
WL - Warning Level - Sodium Restricted Diets

M. Dubien

Michelle Dubien
Data Specialist

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Final Report

C.O.C.: -

REPORT No: 24-007186 - Rev. 0

Report To:
Gaman Consultants Inc
7 Pinsent Court
Barrie, ON L4N 6E3

CADUCEON Environmental Laboratories
112 Commerce Park Dr Unit L
Barrie, ON L4N 8W8

Attention: Gary Hendy

DATE RECEIVED: 2024-Mar-18
DATE REPORTED: 2024-Mar-20
SAMPLE MATRIX: Ground Water

CUSTOMER PROJECT: Udora Estates
P.O. NUMBER: 22012.02

Analyses	Qty	Site Analyzed	Authorized	Date Analyzed	Lab Method	Reference Method
Anions (Liquid)	7	OTTAWA	PCURIEL	2024-Mar-19	A-IC-01	SM 4110B
Orthophosphate (Liquid)	7	KINGSTON	JYEARWOOD	2024-Mar-20	NH3-001	SM 4500NH3

R.L. = Reporting Limit
NC = Not Calculated
Test methods may be modified from specified reference method unless indicated by an *

		Parameter	Nitrate (N)	Nitrite (N)	o-Phosphate (P)
		Units	mg/L	mg/L	mg/L
		R.L.	0.05	0.05	0.002
		Limits	10.0	1.0	
		DWG	MAC	MAC	
Client I.D.	**Sample I.D.**	**Date Collected**	-	-	-
MW17-1	24-007186-1	2024-Mar-16	<0.05	<0.05	0.006
MW17-2	24-007186-2	2024-Mar-16	2.33	<0.05	0.005
MW17-3	24-007186-3	2024-Mar-16	0.06	<0.05	0.004
MW3	24-007186-4	2024-Mar-16	<0.05	<0.05	0.004
MW2-22	24-007186-5	2024-Mar-16	<0.05	<0.05	0.004
MW24-1	24-007186-6	2024-Mar-16	0.46	<0.05	0.002
OW5-1	24-007186-7	2024-Mar-16	<0.05	<0.05	<0.002

DWG - Drinking Water Guidelines
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IMAC - Interim Maximum Acceptable Concentration
MAC - Maximum Acceptable Concentration
ODWO - D-5-5 Objective
OG - Operational Guidelines
WL - Warning Level - Sodium Restricted Diets

Michelle Dubien
Data Specialist

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REPORT No: 24-012724 - Rev. 0

Report To:
Gaman Consultants Inc
7 Pinsent Court
Barrie, ON L4N 6E3

CADUCEON Environmental Laboratories
112 Commerce Park Dr Unit L
Barrie, ON L4N 8W8

Attention: Gary Hendy

DATE RECEIVED:	2024-May-07	CUSTOMER PROJECT:	Udora Estates
DATE REPORTED:	2024-May-13	P.O. NUMBER:	22012.02
SAMPLE MATRIX:	Ground Water		

Analyses	Qty	Site Analyzed	Authorized	Date Analyzed	Lab Method	Reference Method
Anions (Liquid)	7	OTTAWA	LMACGREGOR	2024-May-09	A-IC-01	SM 4110B
Orthophosphate (Liquid)	7	KINGSTON	JYEARWOOD	2024-May-10	NH3-001	SM 4500NH3

R.L. = Reporting Limit
NC = Not Calculated
Test methods may be modified from specified reference method unless indicated by an *

		Parameter	Nitrate (N)	o-Phosphate (P)
		Units	mg/L	mg/L
		R.L.	0.05	0.002
		Limits		
		DWG		
Client I.D.	Sample I.D.	Date Collected	-	-
MW17-1	24-012724-1	2024-May-06	0.11	0.005
MW17-2	24-012724-2	2024-May-06	0.63	0.003
MW17-3	24-012724-3	2024-May-06	0.11	0.002
MW3	24-012724-4	2024-May-06	0.07	0.004
MW2-22	24-012724-5	2024-May-06	0.06	<0.002
MW24-1	24-012724-6	2024-May-06	0.64	0.002
OW5-1	24-012724-7	2024-May-06	2.30	0.002

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IMAC - Interim Maximum Acceptable Concentration
MAC - Maximum Acceptable Concentration
ODWO - D-5-5 Objective
OG - Operational Guidelines
WL - Warning Level - Sodium Restricted Diets

M. Dubien

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REPORT No: 24-022883 - Rev. 0

Report To:
Gaman Consultants Inc
7 Pinsent Court
Barrie, ON L4N 6E3

CADUCEON Environmental Laboratories
112 Commerce Park Dr Unit L
Barrie, ON L4N 8W8

Attention: Gary Hendy

DATE RECEIVED:	2024-Jul-29	CUSTOMER PROJECT:	Udora Estates
DATE REPORTED:	2024-Jul-31	P.O. NUMBER:	22012.02
SAMPLE MATRIX:	Ground Water		

Analyses	Qty	Site Analyzed	Authorized	Date Analyzed	Lab Method	Reference Method
Anions (Liquid)	7	OTTAWA	PCURIEL	2024-Jul-30	A-IC-01	SM 4110B
Orthophosphate (Liquid)	7	KINGSTON	JYEARWOOD	2024-Jul-31	NH3-001	SM 4500NH3

R.L. = Reporting Limit
NC = Not Calculated
Test methods may be modified from specified reference method unless indicated by an *

		Parameter	Nitrate (N)	o-Phosphate (P)
		Units	mg/L	mg/L
		R.L.	0.05	0.002
		Limits	10.0	
		DWG	MAC	
Client I.D.	**Sample I.D.**	**Date Collected**	-	-
MW 17-1	24-022883-1	2024-Jul-27	0.14	<0.002
MW 17-2	24-022883-2	2024-Jul-27	0.12	<0.002
MW 17-3	24-022883-3	2024-Jul-27	0.11	<0.002
MW3	24-022883-4	2024-Jul-27	<0.05	<0.002
MW 2-22	24-022883-5	2024-Jul-27	<0.05	<0.002
MW 24-1	24-022883-6	2024-Jul-27	0.54	<0.002
OW 5-1	24-022883-7	2024-Jul-27	3.97	<0.002

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MAC - Maximum Acceptable Concentration
ODWO - D-5-5 Objective
OG - Operational Guidelines
WL - Warning Level - Sodium Restricted Diets

M. Dubien

Michelle Dubien
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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: -

REPORT No: 24-030604 - Rev. 0

Report To:
Gaman Consultants Inc
7 Pinsent Court
Barrie, ON L4N 6E3

CADUCEON Environmental Laboratories
112 Commerce Park Dr Unit L
Barrie, ON L4N 8W8

Attention: Gary Hendy

DATE RECEIVED: 2024-Oct-02
DATE REPORTED: 2024-Oct-09
SAMPLE MATRIX: Ground Water

CUSTOMER PROJECT: Udora Estates
P.O. NUMBER: 22012.02

Analyses	Qty	Site Analyzed	Authorized	Date Analyzed	Lab Method	Reference Method
Anions (Liquid)	7	OTTAWA	LMACGREGOR	2024-Oct-07	A-IC-01	SM 4110B
Orthophosphate (Liquid)	7	KINGSTON	JYEARWOOD	2024-Oct-08	NH3-001	SM 4500NH3

R.L. = Reporting Limit
NC = Not Calculated
Test methods may be modified from specified reference method unless indicated by an *

		Parameter	Nitrate (N)	o-Phosphate (P)
		Units	mg/L	mg/L
		R.L.	0.05	0.002
		Limits	10.0	
		DWG	MAC	
Client I.D.	**Sample I.D.**	**Date Collected**	-	-
MW17-1	24-030604-1	2024-Sep-30	0.66	<0.002
MW17-2	24-030604-2	2024-Sep-30	<0.05	<0.002
MW17-3	24-030604-3	2024-Sep-30	0.45	<0.002
MW3	24-030604-4	2024-Sep-30	<0.05	<0.002
MW2-22	24-030604-5	2024-Sep-30	0.27	<0.002
MW24-1	24-030604-6	2024-Sep-30	1.76	<0.002
OW5-1	24-030604-7	2024-Sep-30	5.35	<0.002

DWG - Drinking Water Guidelines
ODWS - Ontario Drinking Water Standards
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IMAC - Interim Maximum Acceptable Concentration
MAC - Maximum Acceptable Concentration
ODWO - D-5-5 Objective
OG - Operational Guidelines
WL - Warning Level - Sodium Restricted Diets

Michelle Dubien
Data Specialist

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: -

REPORT No: 24-035442 - Rev. 0

Report To:
Gaman Consultants Inc
7 Pinsent Court
Barrie, ON L4N 6E3

CADUCEON Environmental Laboratories
112 Commerce Park Dr Unit L
Barrie, ON L4N 8W8

Attention: Gary Hendy

DATE RECEIVED:	2024-Nov-12	CUSTOMER PROJECT:	Udora Estates
DATE REPORTED:	2024-Nov-20	P.O. NUMBER:	22012.02
SAMPLE MATRIX:	Ground Water		

Analyses	Qty	Site Analyzed	Authorized	Date Analyzed	Lab Method	Reference Method
Anions (Liquid)	7	OTTAWA	LMACGREGOR	2024-Nov-15	A-IC-01	SM 4110B
Orthophosphate (Liquid)	7	KINGSTON	JYEARWOOD	2024-Nov-15	NH3-001	SM 4500NH3

R.L. = Reporting Limit
NC = Not Calculated
Test methods may be modified from specified reference method unless indicated by an *

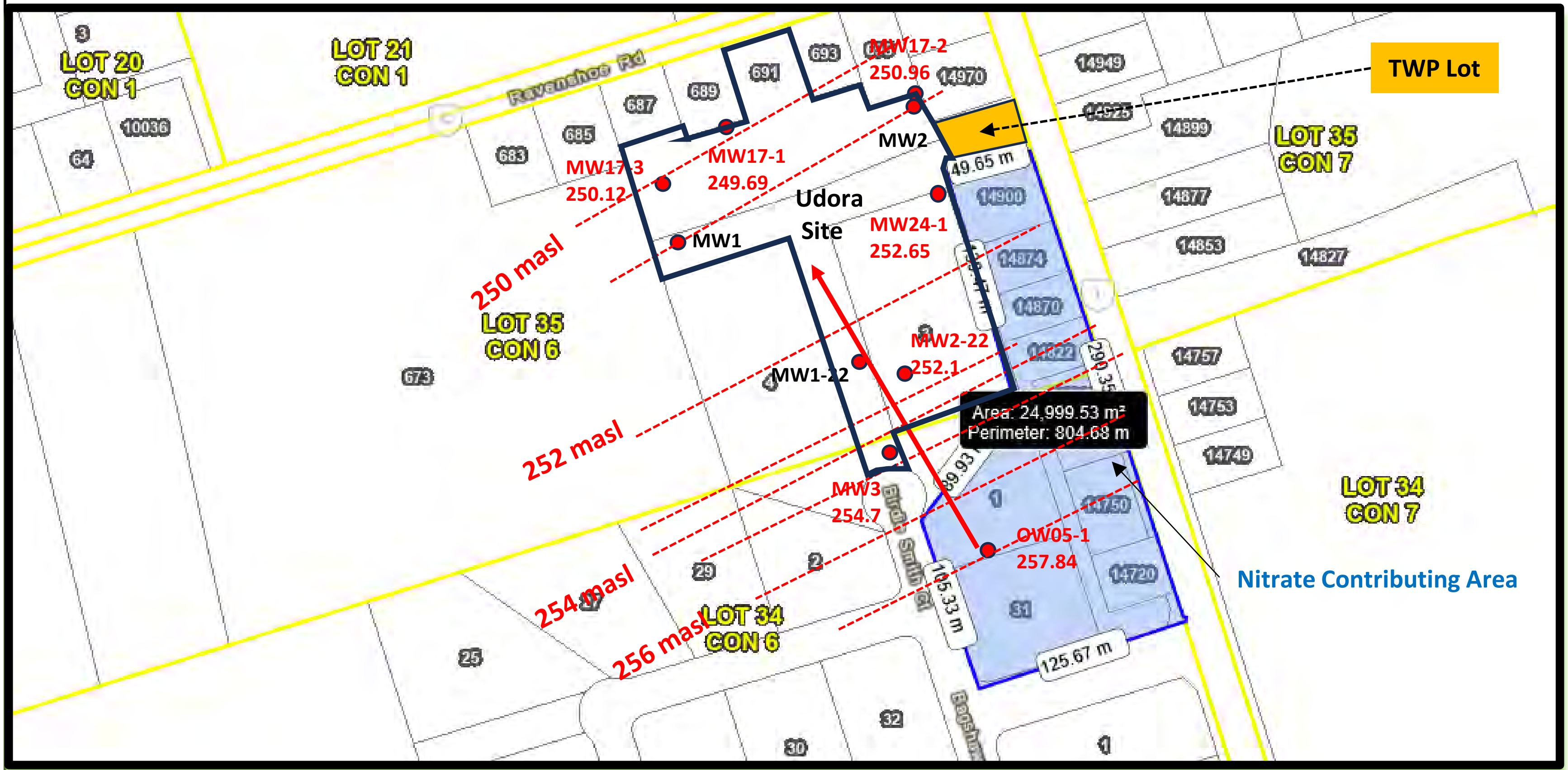
		Parameter	Nitrate (N)	o-Phosphate (P)
		Units	mg/L	mg/L
		R.L.	0.05	0.002
Client I.D.	**Sample I.D.**	**Date Collected**	-	-
MW17-1	24-035442-1	2024-Nov-09	0.60	0.018
MW17-2	24-035442-2	2024-Nov-09	0.25	0.012
MW17-3	24-035442-3	2024-Nov-09	0.62	0.010
MW3	24-035442-4	2024-Nov-09	0.21	0.012
MW2-22	24-035442-5	2024-Nov-09	0.10	0.010
MW24-1	24-035442-6	2024-Nov-09	1.46	0.008
OW5-1	24-035442-7	2024-Nov-09	3.89	0.006

M. Dubien

Michelle Dubien
Data Specialist

APPENDIX E

SHALLOW SOILS AND GROUNDWATER



NOTES

Interpreted direction shallow groundwater

255.1 MW3 — Groundwaterm monitor location, designation, and water level elevation on April 9, 2024.

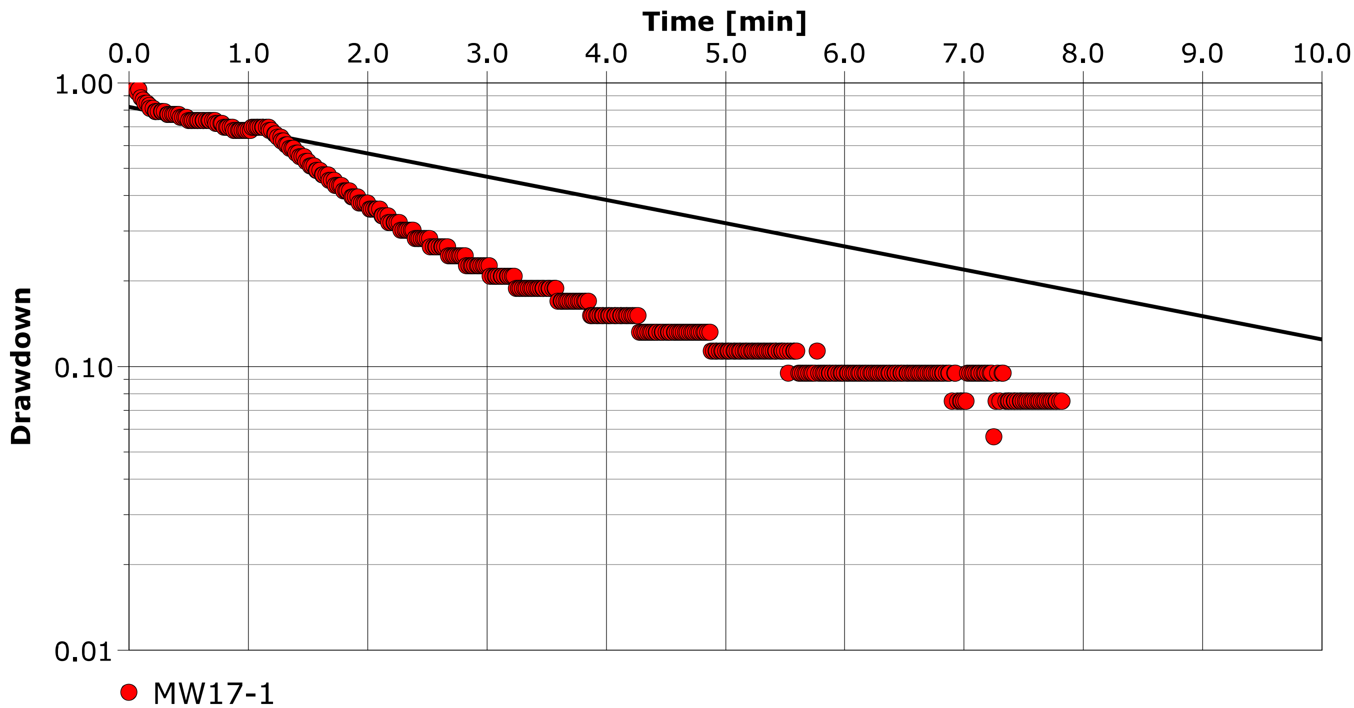
--------- Interpreted Groundwater Contour

MW1 & MW2 & MW1-22 Deep Monitors

Interpreted Shallow Groundwater Table (April 9, 2024)	
Udora Estates Water Balance Evaluation, Revision 2, Part Lot 35, Con. 6, TWP Uxbridge For 2695867 Ontario Inc.	
Date: Dec-25	Scale: AS SHOWN
Project: 22012.04	Ref No:
GAMAN Consultants Inc.	Figure E-1

Slug Test Analysis Report	
Project:	Hydrgeological Investigation
Number:	181-12360-00
Client:	Capris Investments Inc.

Location: Udora Subdivision	Slug Test: MW17-1 DL	Test Well: MW17-1
Test Conducted by: HEC		Test Date: 2/20/2019
Analysis Performed by: KJA	MW17-1	Analysis Date: 5/9/2019
Aquifer Thickness: 4.04 m		

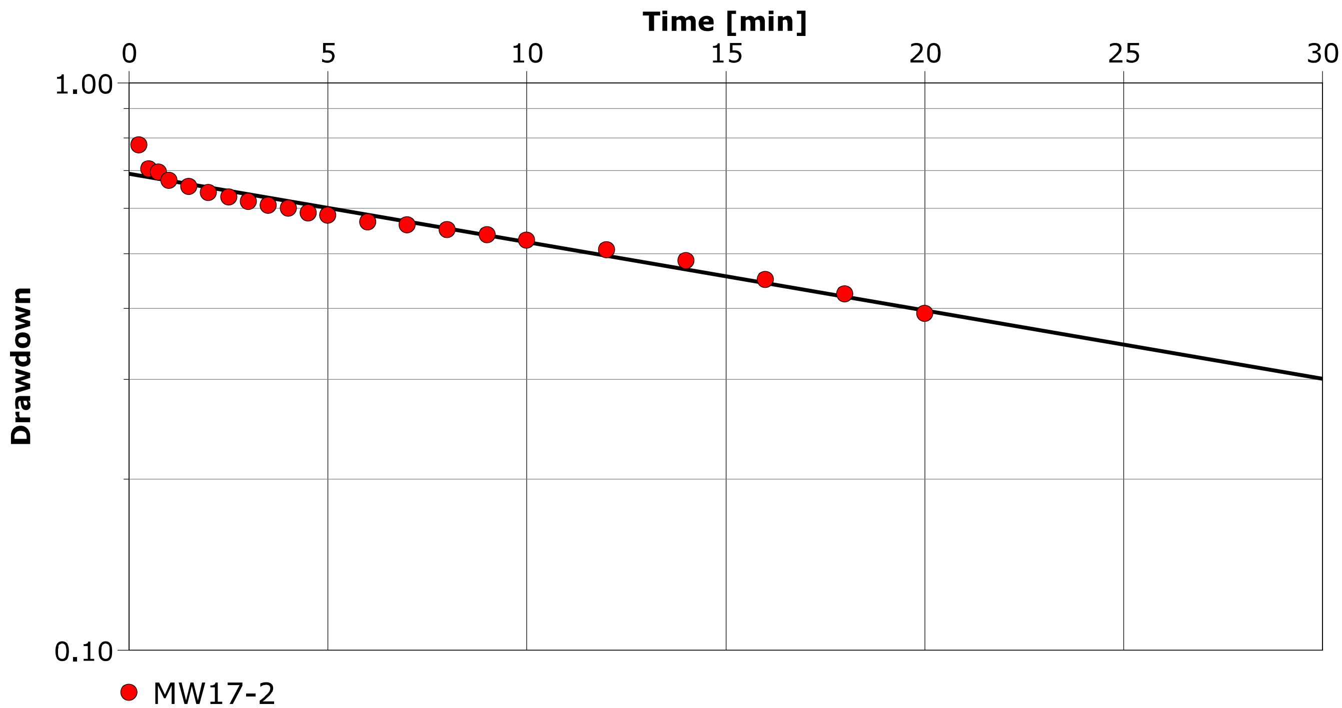


Calculation using Hvorslev

Observation Well	Hydraulic Conductivity [m/s]
MW17-1	1.56×10^{-6}

Slug Test Analysis Report	
Project:	Hydrgeological Investigation
Number:	181-12360-00
Client:	Capris Investments Inc.

Location: Udora Subdivision	Slug Test: MW17-2 Manuals	Test Well: MW17-2
Test Conducted by: HEC		Test Date: 2/20/2019
Analysis Performed by: KJA	MW17-2	Analysis Date: 5/9/2019
Aquifer Thickness: 3.26 m		

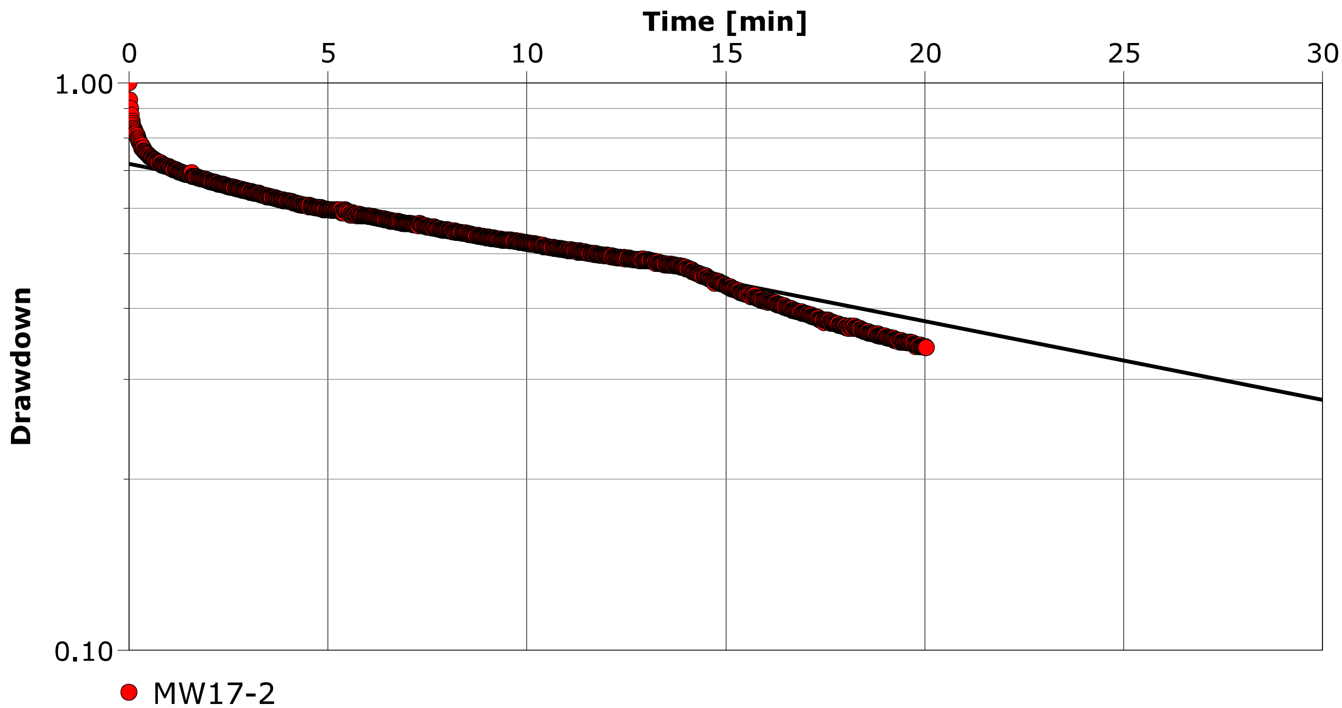


Calculation using Hvorslev

Observation Well	Hydraulic Conductivity [m/s]	
MW17-2	2.28×10^{-7}	

Slug Test Analysis Report		
Project: Hydrgeological Investigation		
Number: 181-12360-00		
Client: Capris Investments Inc.		

Location: Udora Subdivision	Slug Test: MW17-2 DL	Test Well: MW17-2
Test Conducted by: HEC		Test Date: 2/9/2019
Analysis Performed by: KJA	MW17-2	Analysis Date: 5/9/2019
Aquifer Thickness: 3.26 m		

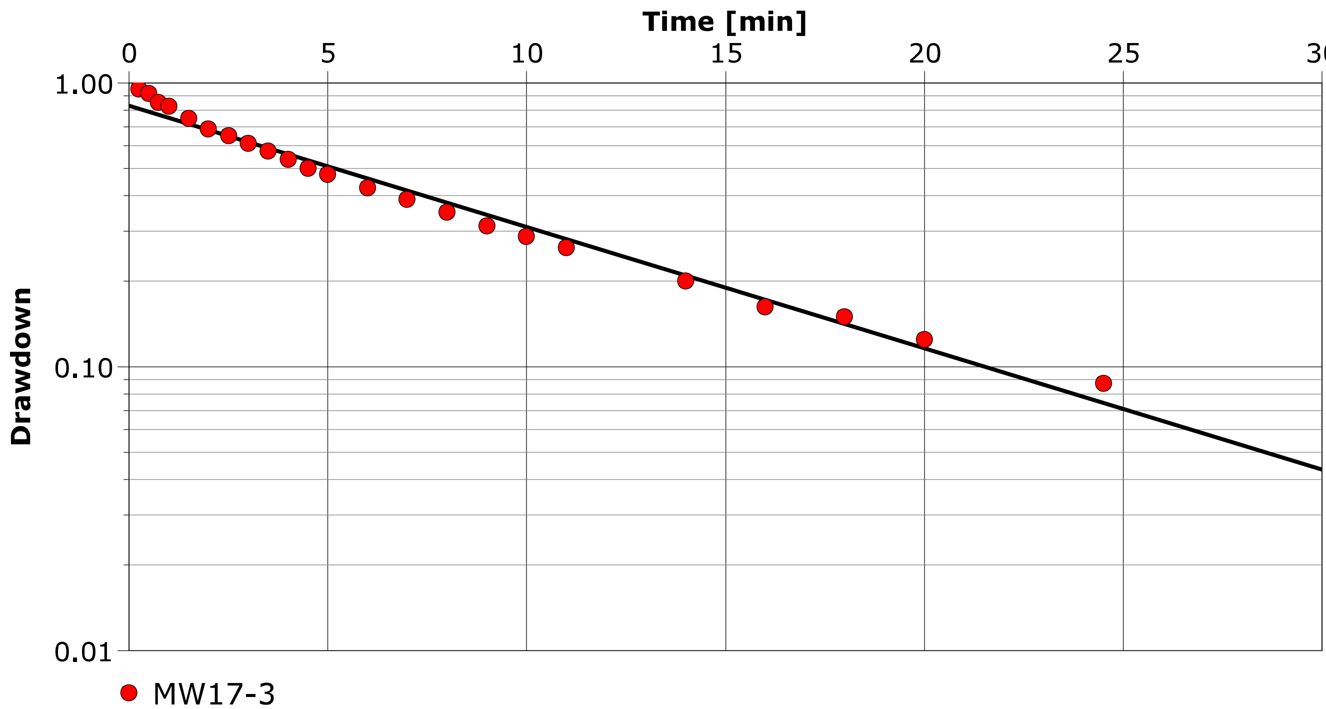


Calculation using Hvorslev

Observation Well	Hydraulic Conductivity [m/s]
MW17-2	2.64×10^{-7}

Slug Test Analysis Report	
Project:	Hydrgeological Investigation
Number:	181-12360-00
Client:	Capris Investments Inc.

Location: Udora Subdivision	Slug Test: MW17-3 Manuals	Test Well: MW17-3
Test Conducted by: HEC		Test Date: 2/20/2019
Analysis Performed by: KJA	MW17-3	Analysis Date: 5/9/2019
Aquifer Thickness: 1.90 m		

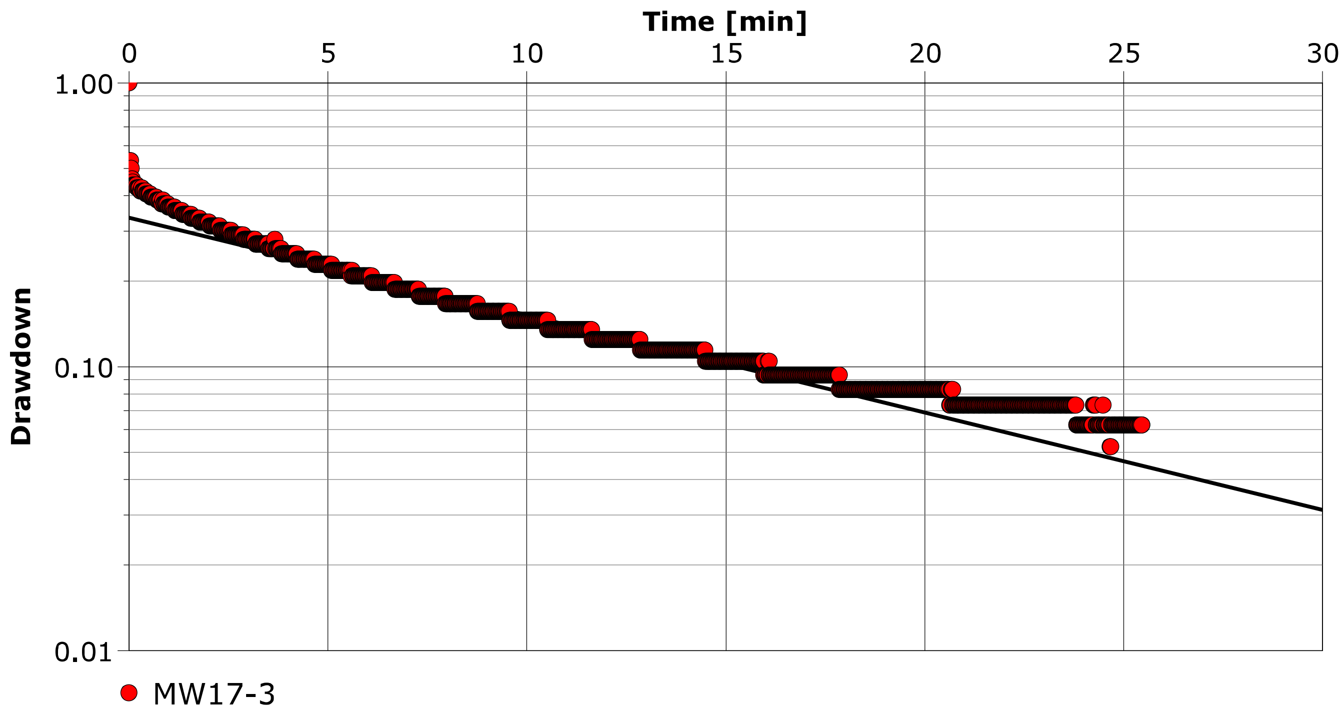


Calculation using Hvorslev

Observation Well	Hydraulic Conductivity [m/s]
MW17-3	8.13×10^{-7}

	Slug Test Analysis Report
	Project: Hydrgeological Investigation
	Number: 181-12360-00
	Client: Capris Investments Inc.

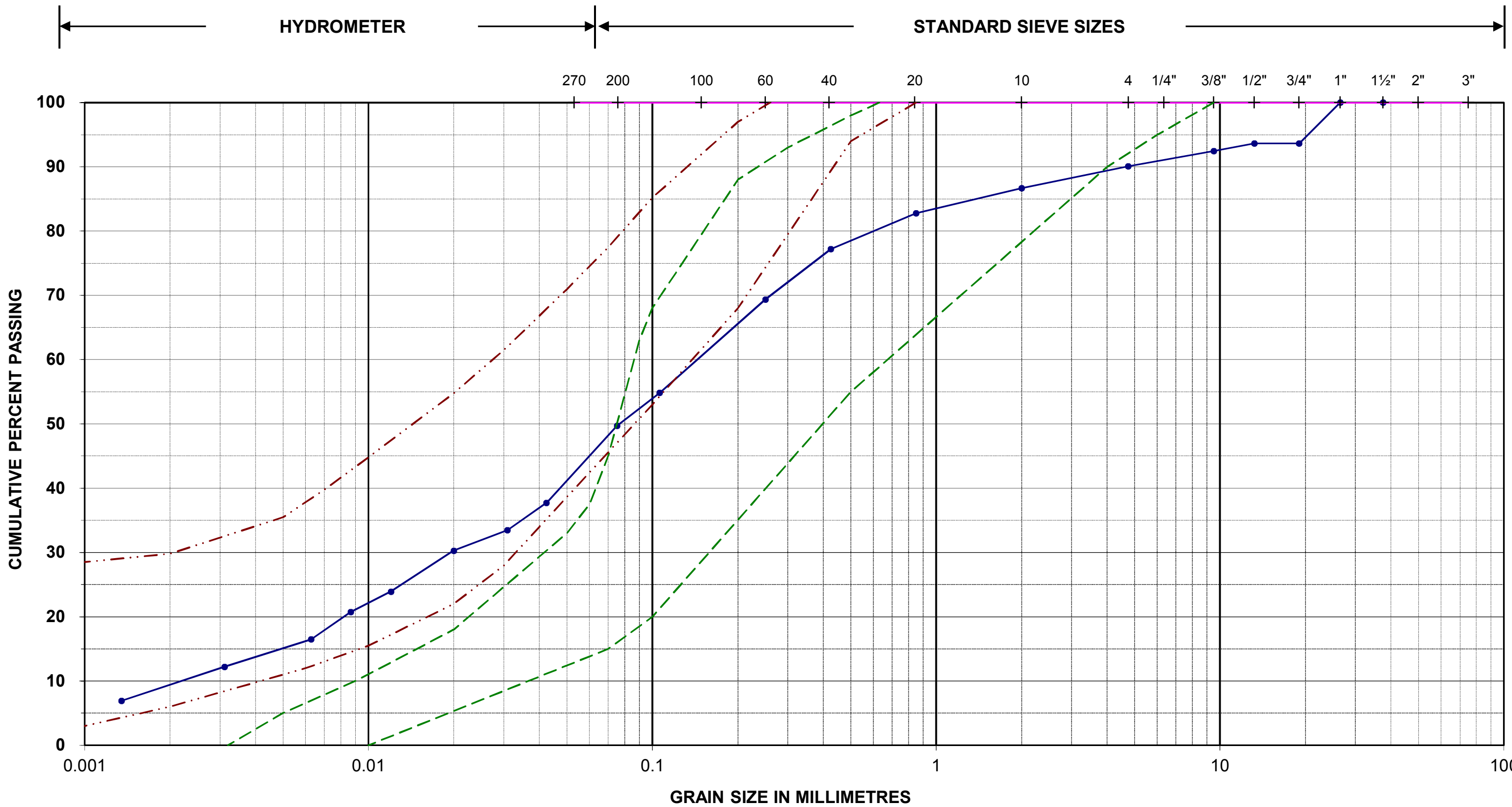
Location: Udora Subdivision	Slug Test: MW17-3 DL	Test Well: MW17-3
Test Conducted by: HEC		Test Date: 2/20/2019
Analysis Performed by: KJA	MW17-3	Analysis Date: 5/9/2019
Aquifer Thickness: 1.90 m		



Calculation using Hvorslev

Observation Well	Hydraulic Conductivity [m/s]	
MW17-3	6.53×10^{-7}	

PARTICLE SIZE DISTRIBUTION ASTM D422



Unified Classification System

SILT AND CLAY	SAND	GRAVEL

GRAVEL	10	%
SAND	40	%
SILT	43	%
CLAY	7	%

------------------------- sm envelope T = 8 - 20 min/cm

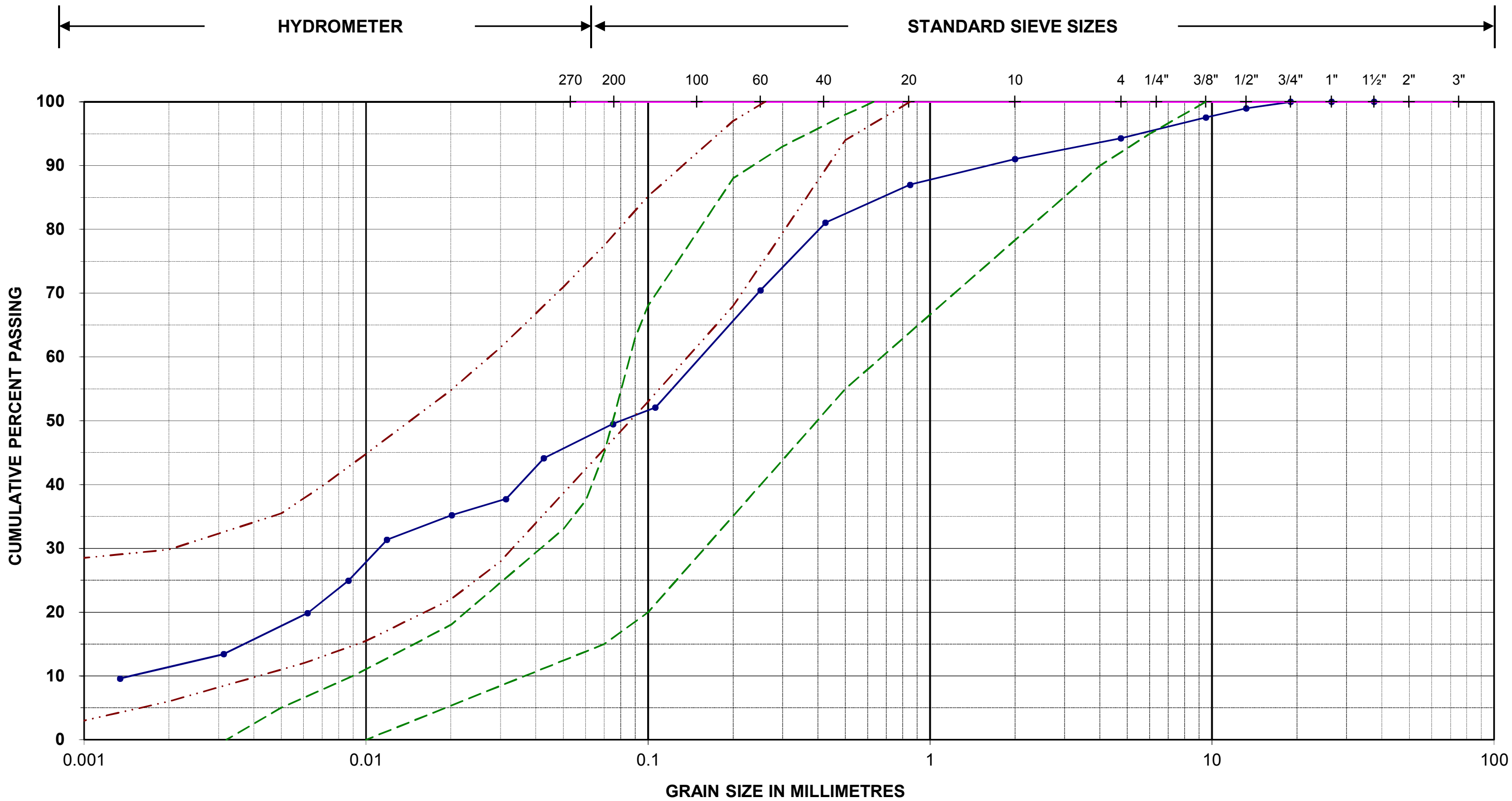
–·–·—·–·—·–·– ml envelope T = 20 - 50 min/cm

Estimated T = 25 min/cm

Project Name:	Udora Subdivision	**Project No.:**	181-12360-00
Location ID.:	TP19-1	**Sample No./Depth:**	SS2

Sieve Size	% Passing Coarse	Sieve Size	% Passing Fine	Hydrometer (mm)	% Passing
37.5 mm	100.0	**2.00 mm**	86.67	**0.042**	37.7
26.5 mm	100.0	**0.850 mm**	82.8	**0.020**	30.3
19.0 mm	93.7	**0.425 mm**	77.2	**0.009**	20.7
13.2 mm	93.7	**0.250 mm**	69.4	**0.003**	12.2
9.50 mm	92.4	**0.106 mm**	54.9	**0.001**	6.9
4.75 mm	90.1	**0.075 mm**	49.7		

PARTICLE SIZE DISTRIBUTION ASTM D422



Unified Classification System

SILT AND CLAY	SAND	GRAVEL

GRAVEL	6	%
SAND	45	%
SILT	40	%
CLAY	10	%

------------------------- sm envelope T = 8 - 20 min/cm

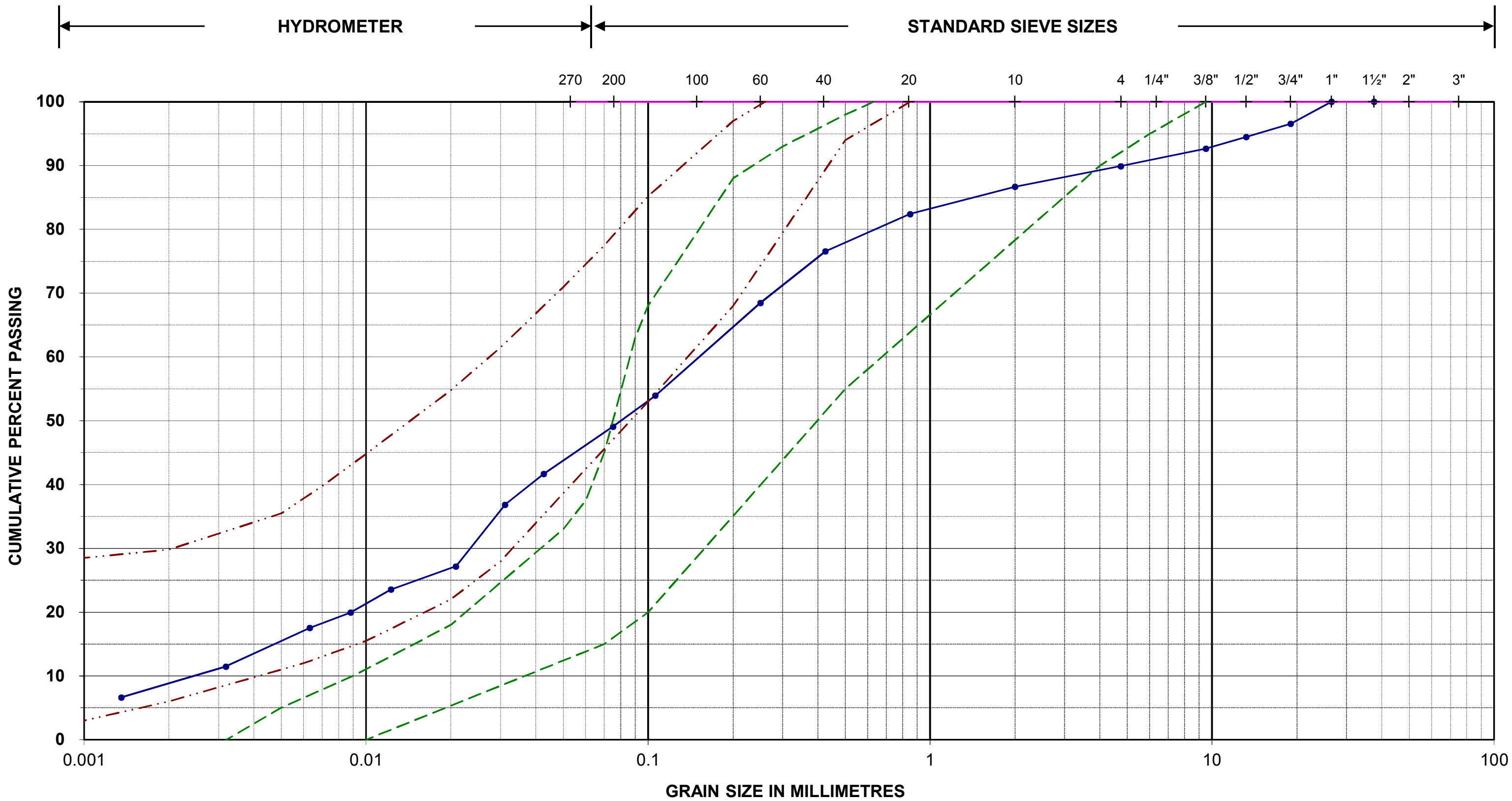
–·–·—·–·—·–·– ml envelope T = 20 - 50 min/cm

Estimated T = 25 min/cm

Project Name:	Udora Subdivision	**Project No.:**	181-12360-00
Location ID.:	TP19-2	**Sample No./Depth:**	SS1

Sieve Size	% Passing Coarse	**Sieve Size**	% Passing Fine	Hydrometer (mm)	% Passing
37.5 mm	100.0	**2.00 mm**	91.02	**0.043**	44.1
26.5 mm	100.0	**0.850 mm**	87.0	**0.020**	35.2
19.0 mm	100.0	**0.425 mm**	81.1	**0.009**	24.9
13.2 mm	99.0	**0.250 mm**	70.4	**0.003**	13.4
9.50 mm	97.6	**0.106 mm**	52.1	**0.001**	9.6
4.75 mm	94.3	**0.075 mm**	49.5		

PARTICLE SIZE DISTRIBUTION ASTM D422



Unified Classification System

SILT AND CLAY	SAND	GRAVEL

GRAVEL	10	%
SAND	41	%
SILT	42	%
CLAY	7	%

sm envelope T = 8 - 20 min/cm

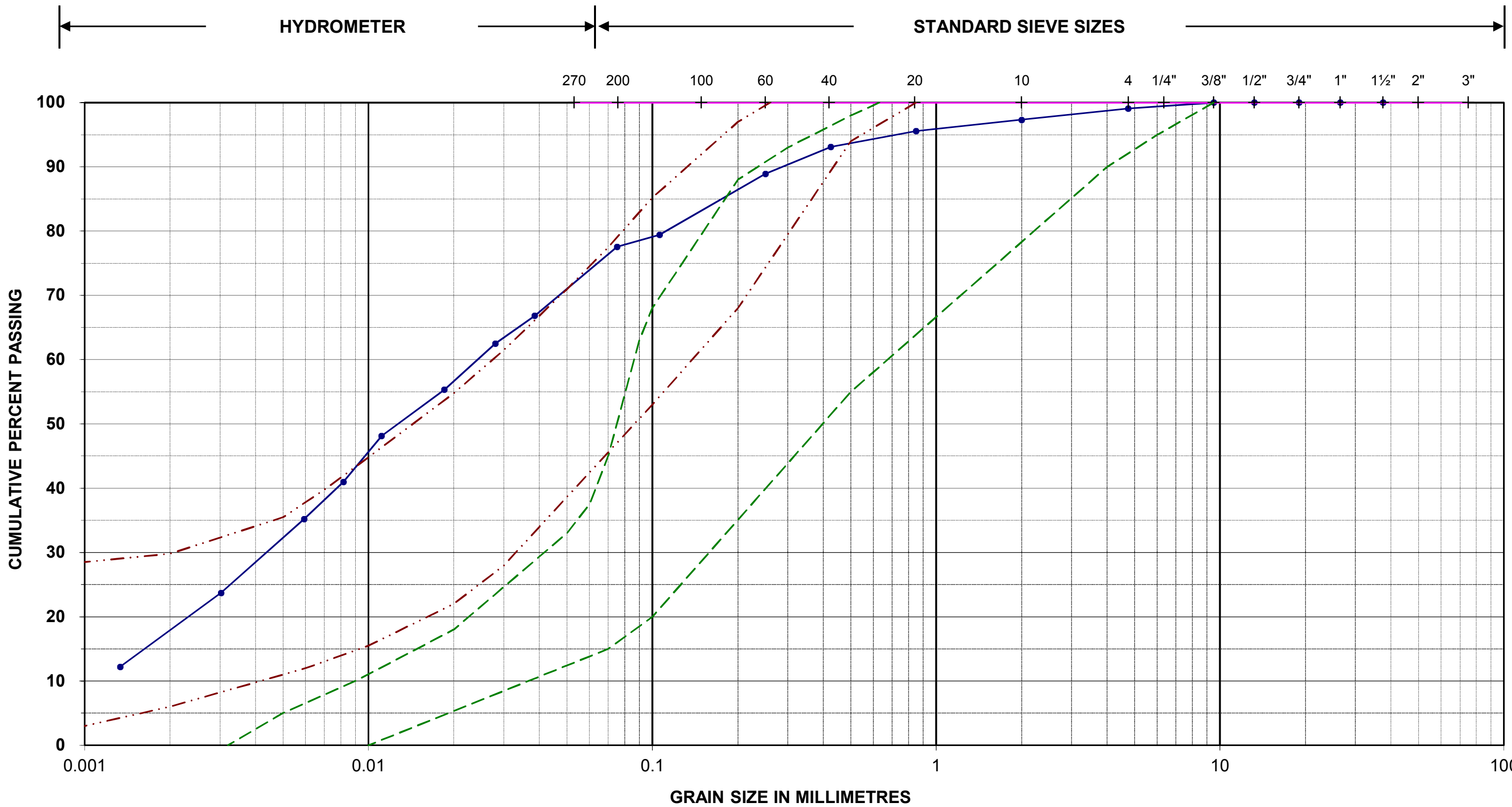
ml envelope T = 20 - 50 min/cm

Estimated T = 25 min/cm

Project Name:	Udora Subdivision	**Project No.:**	181-12360-00
Location ID.:	TP19-3	**Sample No./Depth:**	SS1

Sieve Size	% Passing Coarse	Sieve Size	% Passing Fine	Hydrometer (mm)	% Passing
37.5 mm	100.0	**2.00 mm**	86.69	**0.043**	41.7
26.5 mm	100.0	**0.850 mm**	82.4	**0.021**	27.2
19.0 mm	96.6	**0.425 mm**	76.6	**0.009**	19.9
13.2 mm	94.5	**0.250 mm**	68.5	**0.003**	11.5
9.50 mm	92.7	**0.106 mm**	53.9	**0.001**	6.6
4.75 mm	89.9	**0.075 mm**	49.1		

PARTICLE SIZE DISTRIBUTION ASTM D422



Unified Classification System

SILT AND CLAY	SAND	GRAVEL

GRAVEL	1	%
SAND	22	%
SILT	65	%
CLAY	12	%

------------------------ sm envelope T = 8 - 20 min/cm

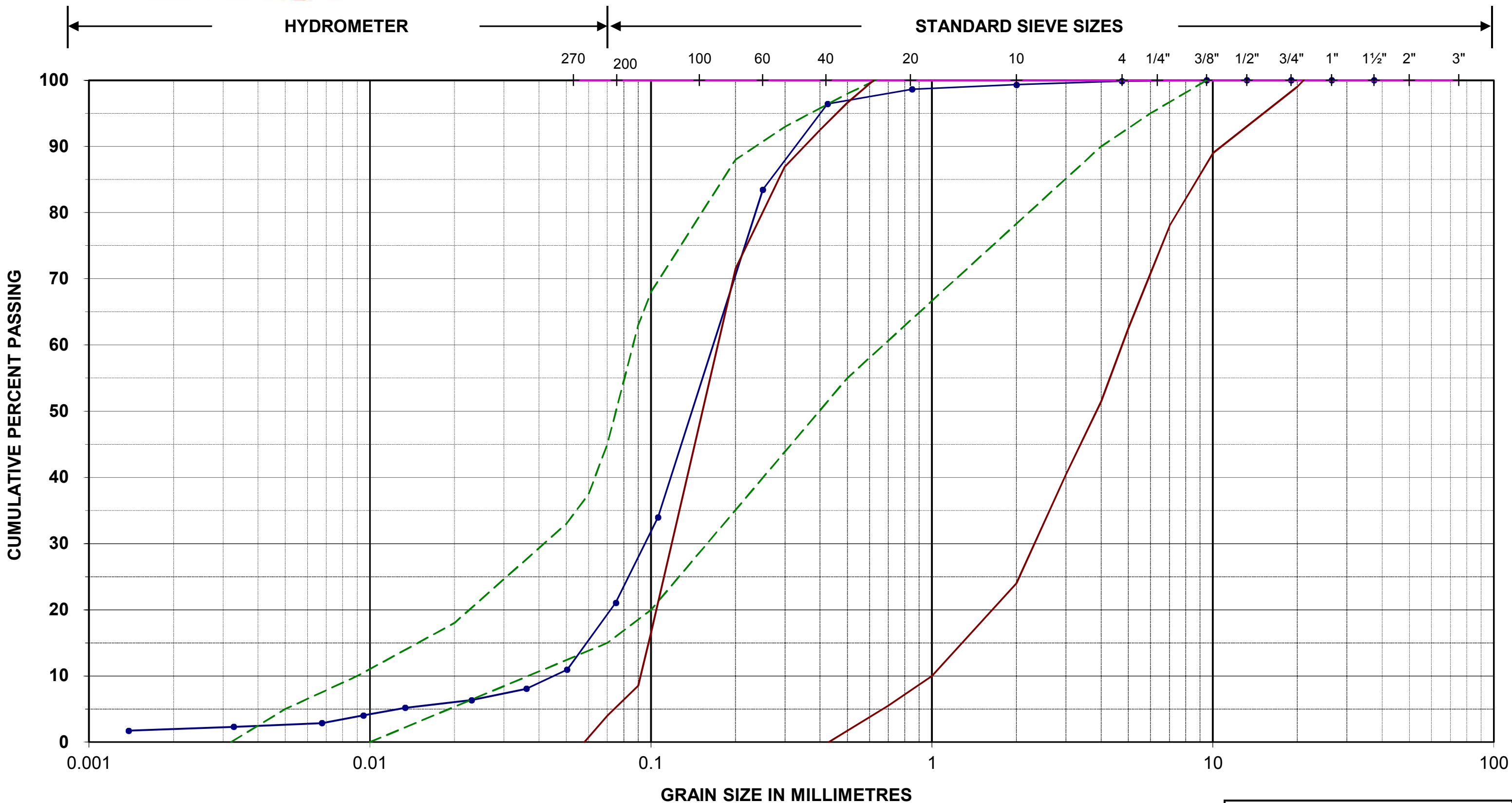
–·–·—·–·—·–·– ml envelope T = 20 - 50 min/cm

Estimated T = 45 min/cm

Project Name:	Udora Subdivision	**Project No.:**	181-12360-00
Location ID.:	TP19-4	**Sample No./Depth:**	SS1

Sieve Size	% Passing Coarse	Sieve Size	% Passing Fine	Hydrometer (mm)	% Passing
37.5 mm	100.0	**2.00 mm**	97.32	**0.038**	66.8
26.5 mm	100.0	**0.850 mm**	95.6	**0.018**	55.3
19.0 mm	100.0	**0.425 mm**	93.1	**0.008**	41.0
13.2 mm	100.0	**0.250 mm**	88.9	**0.003**	23.7
9.50 mm	100.0	**0.106 mm**	79.4	**0.001**	12.2
4.75 mm	99.1	**0.075 mm**	77.6		

PARTICLE SIZE DISTRIBUTION ASTM D422



Unified Classification System

SILT AND CLAY	SAND	GRAVEL

GRAVEL	0	%
SAND	79	%
SILT	19	%
CLAY	2	%

------------------------ sm envelope T = 8 - 20 min/cm

———————— sp envelope T = 2 - 8 min/cm

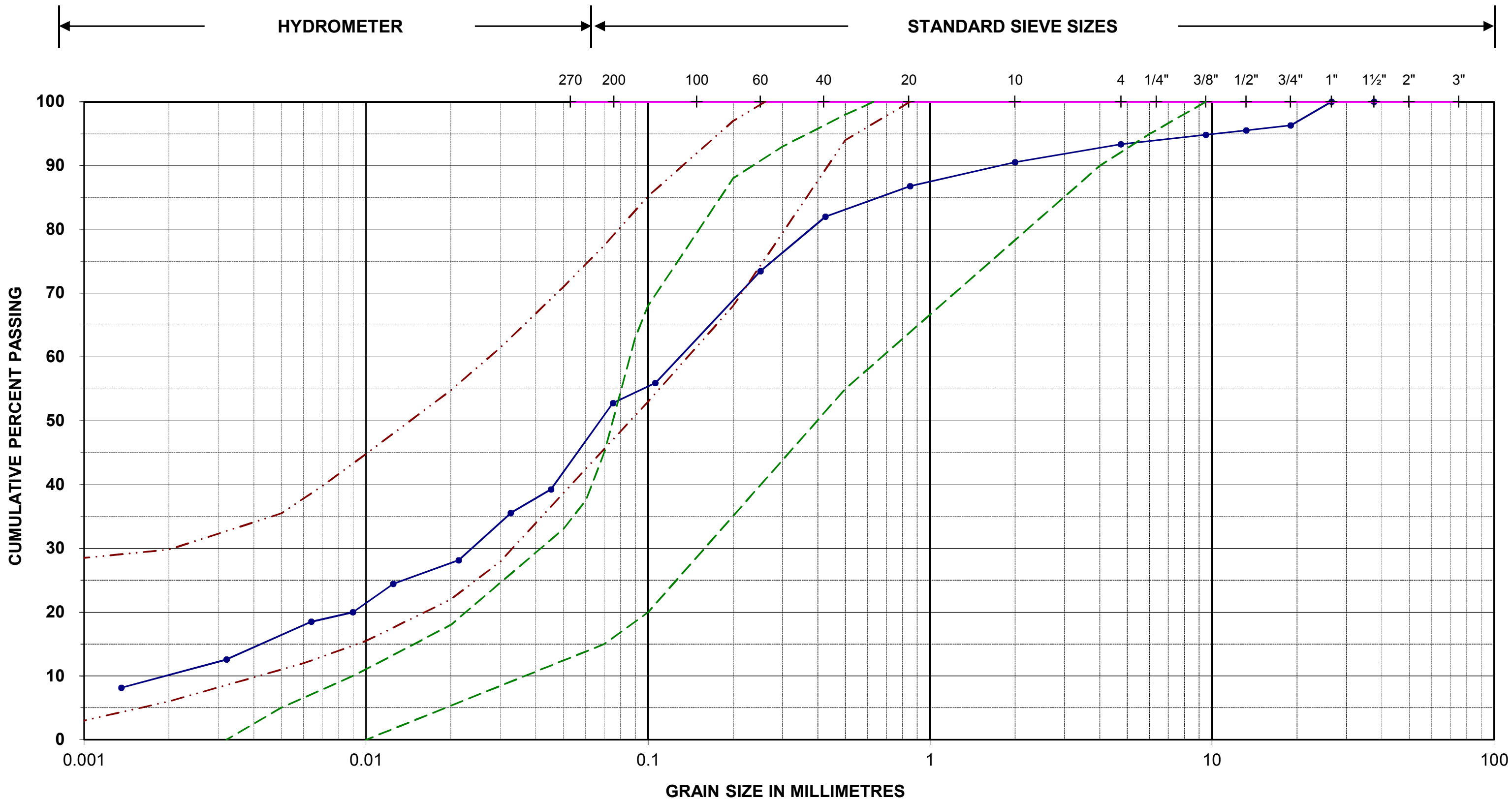
Estimated T = 10 min/cm

Project Name: Udora Subdivision **Project No.:** 181-12360-00

Location ID.: TP19-5 **Sample No./Depth:** SS2

Sieve Size	% Passing Coarse	Sieve Size	% Passing Fine	Hydrometer (mm)	% Passing
37.5 mm	100.0	**2.00 mm**	99.33	**0.050**	10.9
26.5 mm	100.0	**0.850 mm**	98.6	**0.023**	6.3
19.0 mm	100.0	**0.425 mm**	96.4	**0.009**	4.0
13.2 mm	100.0	**0.250 mm**	83.5	**0.003**	2.3
9.50 mm	100.0	**0.106 mm**	34.0	**0.000**	1.7
4.75 mm	99.9	**0.075 mm**	21.1		

PARTICLE SIZE DISTRIBUTION ASTM D422



Unified Classification System

SILT AND CLAY	SAND	GRAVEL

GRAVEL	7	%
SAND	41	%
SILT	45	%
CLAY	8	%

------------------------- sm envelope T = 8 - 20 min/cm

–·–·–·–·– ml envelope T = 20 - 50 min/cm

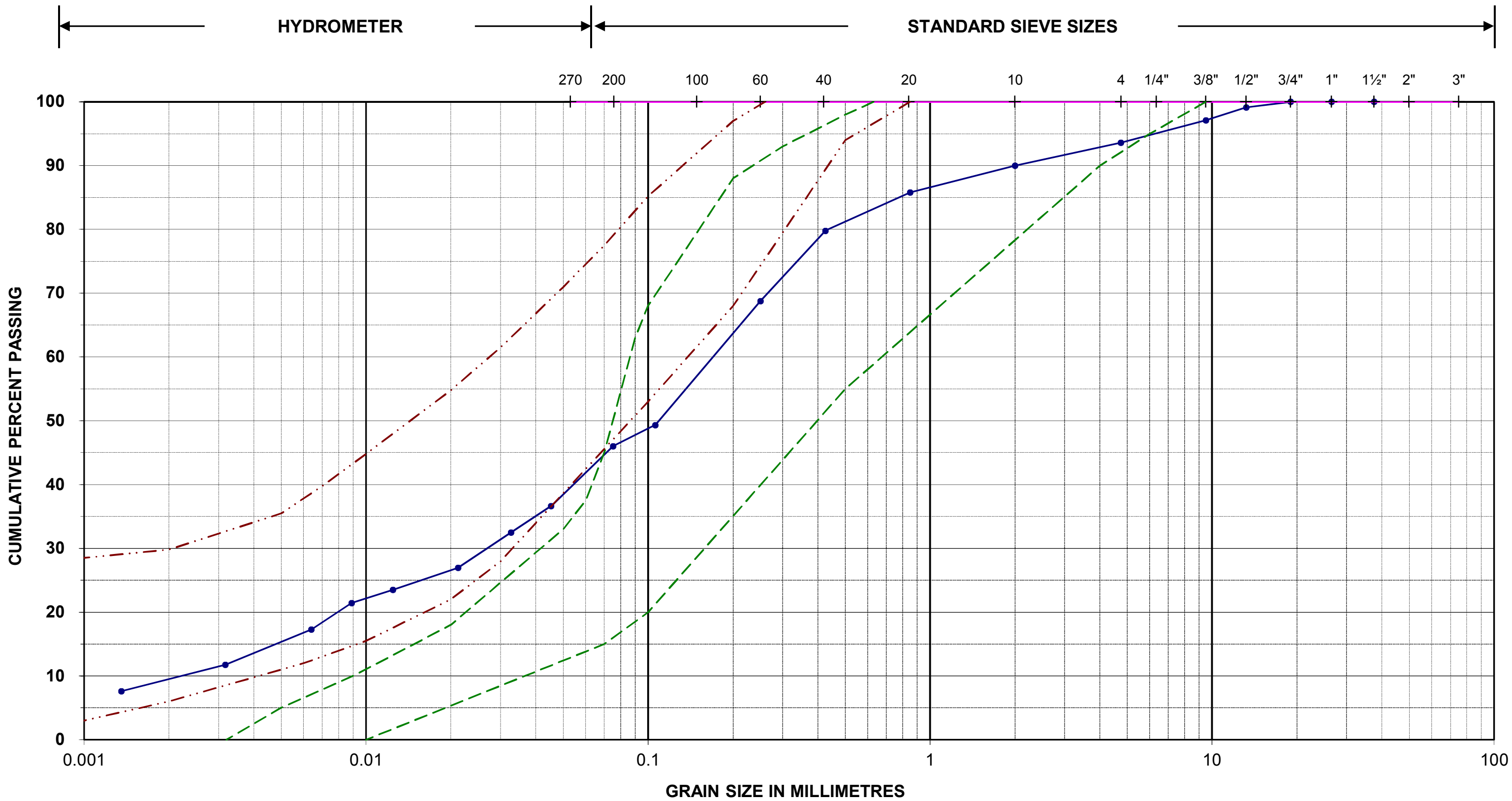
Estimated T = 25 min/cm

Project Name: Udora Subdivision **Project No.:** 181-12360-00

Location ID.: TP19-6 **Sample No./Depth:** SS1

Sieve Size	% Passing Coarse	Sieve Size	% Passing Fine	Hydrometer (mm)	% Passing
37.5 mm	100.0	**2.00 mm**	90.52	**0.045**	39.2
26.5 mm	100.0	**0.850 mm**	86.8	**0.021**	28.1
19.0 mm	96.3	**0.425 mm**	82.0	**0.009**	20.0
13.2 mm	95.5	**0.250 mm**	73.4	**0.003**	12.6
9.50 mm	94.8	**0.106 mm**	55.9	**0.001**	8.1
4.75 mm	93.4	**0.075 mm**	52.8		

PARTICLE SIZE DISTRIBUTION ASTM D422



Unified Classification System

SILT AND CLAY	SAND	GRAVEL

GRAVEL	6	%
SAND	48	%
SILT	38	%
CLAY	8	%

sm envelope T = 8 - 20 min/cm

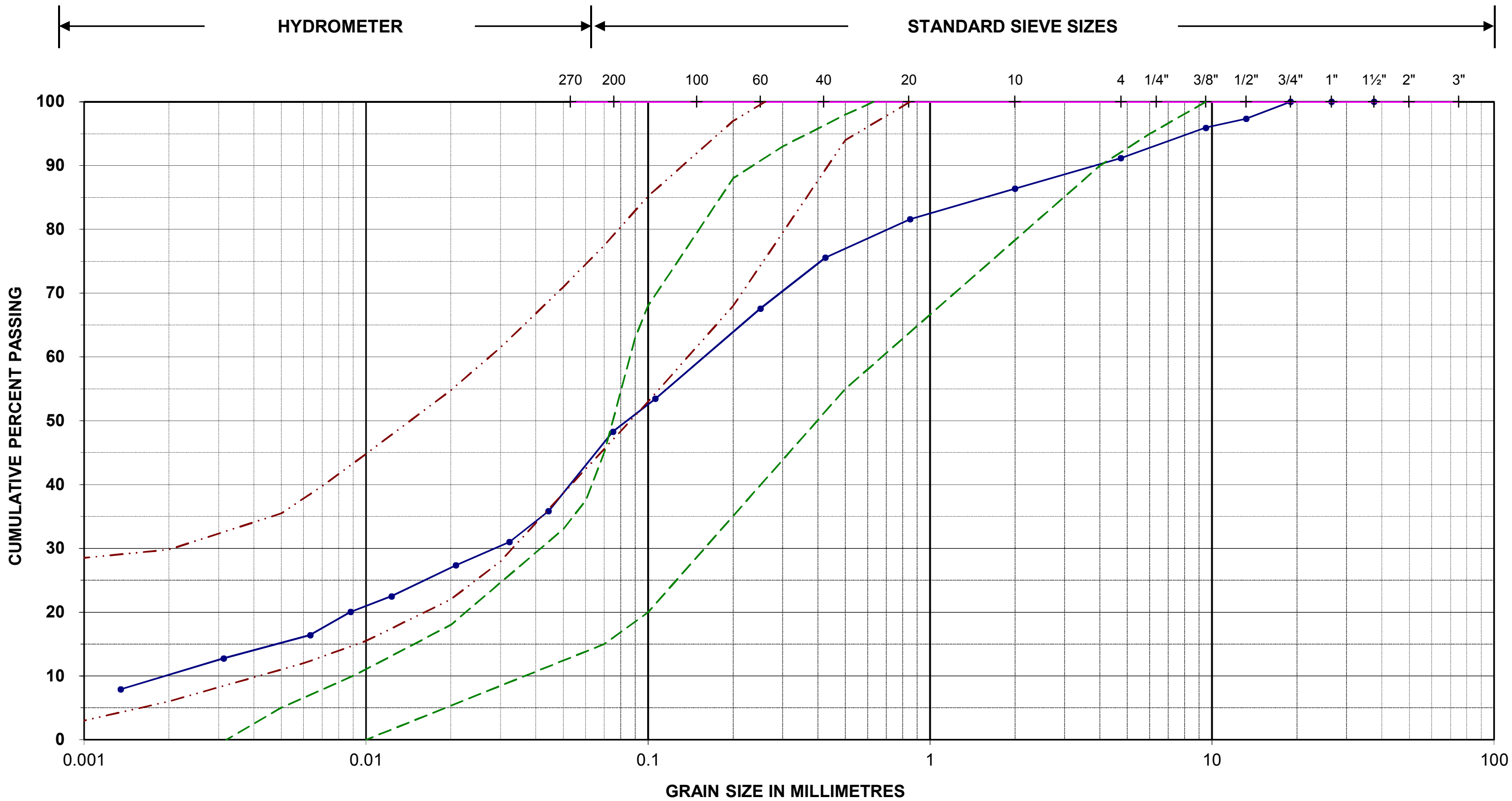
ml envelope T = 20 - 50 min/cm

Estimated T = 25 min/cm

Project Name:	Udora Subdivision	**Project No.:**	181-12360-00
Location ID.:	TP19-7	**Sample No./Depth:**	SS1

Sieve Size	% Passing Coarse	Sieve Size	% Passing Fine	Hydrometer (mm)	% Passing
37.5 mm	100.0	**2.00 mm**	90.00	**0.045**	36.6
26.5 mm	100.0	**0.850 mm**	85.8	**0.021**	26.9
19.0 mm	100.0	**0.425 mm**	79.8	**0.009**	21.4
13.2 mm	99.1	**0.250 mm**	68.8	**0.003**	11.7
9.50 mm	97.1	**0.106 mm**	49.3	**0.001**	7.6
4.75 mm	93.6	**0.075 mm**	46.0		

PARTICLE SIZE DISTRIBUTION ASTM D422



Unified Classification System

SILT AND CLAY	SAND	GRAVEL

GRAVEL	9	%
SAND	43	%
SILT	40	%
CLAY	8	%

------------------------- sm envelope T = 8 - 20 min/cm

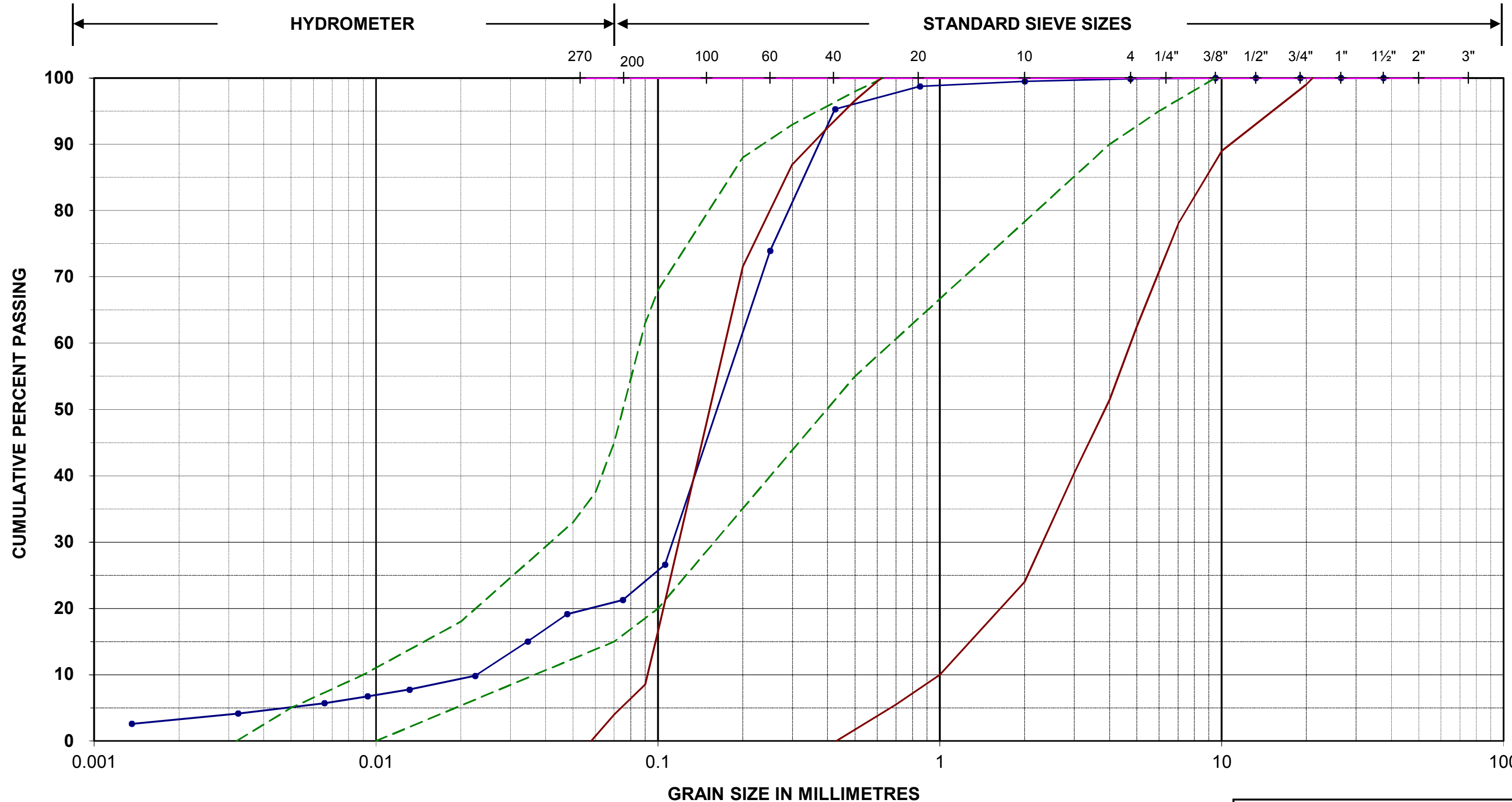
–·–·–·–·–·– ml envelope T = 20 - 50 min/cm

Estimated T = 25 min/cm

Project Name:	Udora Subdivision	**Project No.:**	181-12360-00
Location ID.:	TP19-8	**Sample No./Depth:**	SS1

Sieve Size	% Passing Coarse	Sieve Size	% Passing Fine	Hydrometer (mm)	% Passing
37.5 mm	100.0	**2.00 mm**	86.39	**0.044**	35.8
26.5 mm	100.0	**0.850 mm**	81.6	**0.021**	27.3
19.0 mm	100.0	**0.425 mm**	75.6	**0.009**	20.0
13.2 mm	97.4	**0.250 mm**	67.6	**0.003**	12.8
9.50 mm	95.9	**0.106 mm**	53.5	**0.001**	7.9
4.75 mm	91.2	**0.075 mm**	48.3		

PARTICLE SIZE DISTRIBUTION ASTM D422



Unified Classification System

SILT AND CLAY	SAND	GRAVEL

------------------------ sm envelope T = 8 - 20 min/cm

———————— sp envelope T = 2 - 8 min/cm

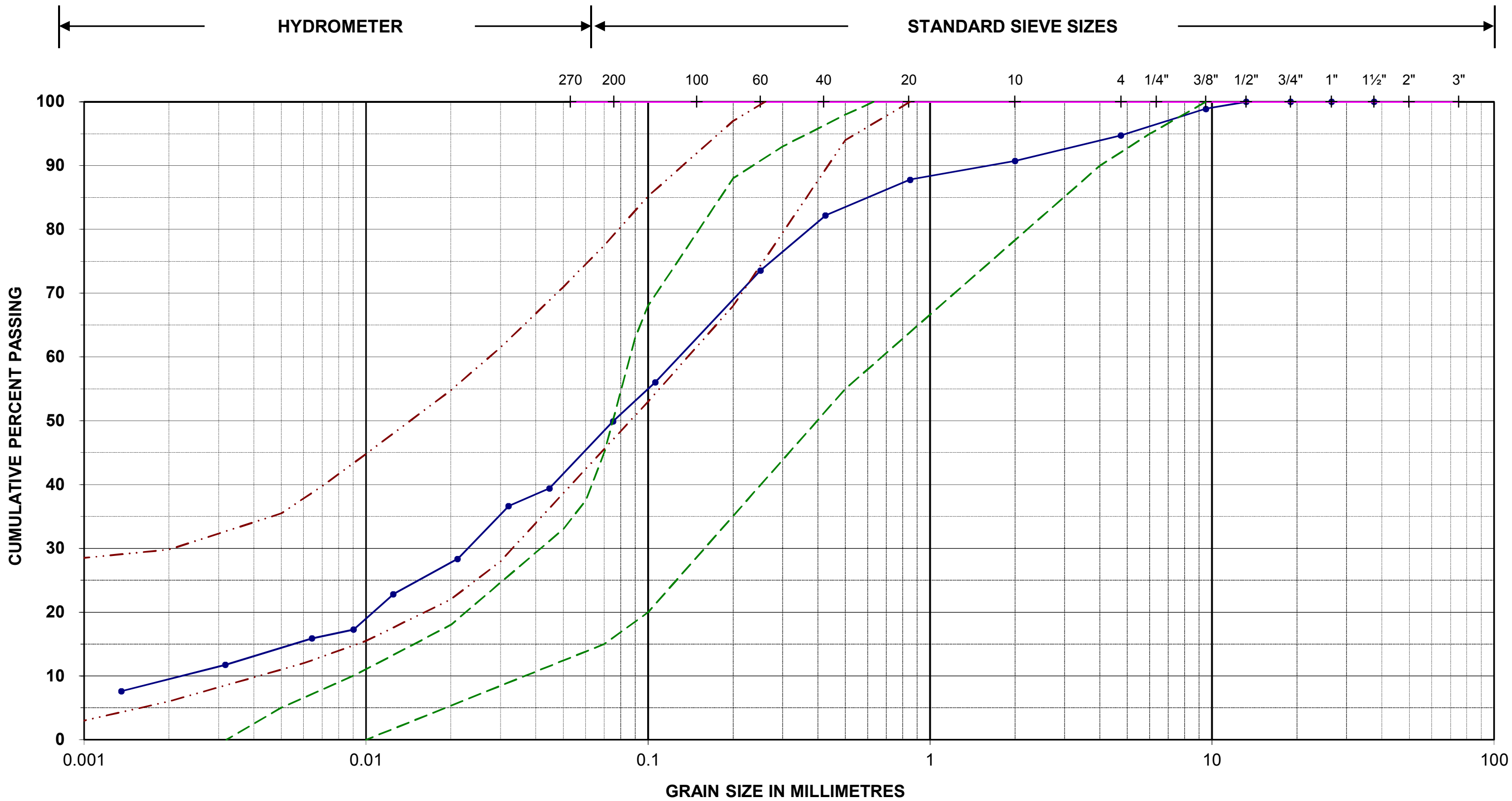
Estimated T = 15 min/cm

GRAVEL	**0**	**%**
SAND	**79**	**%**
SILT	**19**	**%**
CLAY	**3**	**%**

Project Name:	Udora Subdivision	**Project No.:**	181-12360-00
Location ID.:	TP19-9	**Sample No./Depth:**	SS1

Sieve Size	% Passing Coarse	Sieve Size	% Passing Fine	Hydrometer (mm)	% Passing
37.5 mm	100.0	**2.00 mm**	99.48	**0.048**	19.2
26.5 mm	100.0	**0.850 mm**	98.7	**0.022**	9.8
19.0 mm	100.0	**0.425 mm**	95.3	**0.009**	6.7
13.2 mm	100.0	**0.250 mm**	73.9	**0.003**	4.1
9.50 mm	100.0	**0.106 mm**	26.6	**0.000**	2.6
4.75 mm	99.9	**0.075 mm**	21.3		

PARTICLE SIZE DISTRIBUTION ASTM D422



Unified Classification System

SILT AND CLAY	SAND	GRAVEL

GRAVEL	5	%
SAND	45	%
SILT	42	%
CLAY	8	%

------------------------ sm envelope T = 8 - 20 min/cm

–·–·–·–·– ml envelope T = 20 - 50 min/cm

Estimated T = 25 min/cm

Project Name:	Udora Subdivision	**Project No.:**	181-12360-00
Location ID.:	TP19-10	**Sample No./Depth:**	SS1

Sieve Size	% Passing Coarse	Sieve Size	% Passing Fine	Hydrometer (mm)	% Passing
37.5 mm	100.0	**2.00 mm**	90.74	**0.045**	39.4
26.5 mm	100.0	**0.850 mm**	87.8	**0.021**	28.3
19.0 mm	100.0	**0.425 mm**	82.2	**0.009**	17.3
13.2 mm	100.0	**0.250 mm**	73.5	**0.003**	11.8
9.50 mm	98.9	**0.106 mm**	56.1	**0.001**	7.6
4.75 mm	94.7	**0.075 mm**	49.9		

TABLE E-1: TEST PIT LOGS

181-12360-00
Udora Subdivision
Capris Investments Inc.
May 3, 2019

Depth	Description

TP19-1

0.00 – 0.20 m	Black topsoil, silt, some sand, trace gravel, with organic material, compact, and wet.
0.20 – 0.50 m	Grey sandy silt fill, some clay and gravel, compact and wet.
0.50 – 0.80 m	Black topsoil, silt, some sand, trace gravel, with organic material, compact, and wet.
0.80 – 2.00 m	Silt and sand, some gravel and clay, boulders, compact and wet.

- Sample SS1 taken at 0.40 m
- Sample SS2 taken at 2.00 m
- Test pit open and wet at 2.00 m
- Groundwater seepage encountered at 1.80 m

TP19-2

0.00 – 0.50 m	Black topsoil, trace gravel and boulders, with organic material, wet and loose.
0.50 – 1.20 m	Grey sand and silt, some clay and gravel, orange mottling, compact and wet.
1.20 – 2.00 m	Grey, silty gravel, some boulders, wet and loose.

- Sample SS1 taken at 1.00 m
- Sample SS2 taken at 2.00 m
- Test pit caving and wet at 2.00 m
- Groundwater seepage encountered at 0.70 m

Unit 2
126 Don Hillock Drive
Aurora, ON, Canada L4G 0G9

T: 905 750-3080
wsp.com

TP19-3

0.00 – 1.00 m Black topsoil, silt, trace sand, with organic material, wet, loose, some debris present.

1.00 – 1.10 m Concrete slab.

1.10 – 2.00 m Grey silt and sand, some gravel and clay, trace boulders, orange mottling, compact and wet.

- Sample SS1 taken 2.00 m
- Test pit caving and wet at 2.00 m
- Groundwater seepage encountered at 1.00 m

TP19-4

0.00 – 0.20 m Black topsoil, silt, trace sand, with organic material, compact and wet.

0.20 – 2.00 m Grey silt and sand, some gravel and clay, orange mottling, compact and wet, debris encountered at top of layer.

- Sample SS1 taken at 2.00 m
- Test pit caving and wet at 2.00 m
- Groundwater seepage encountered at 0.30 m
- Car debris encountered at 0.30 m

TP19-5

0.00 – 0.25 m Dark brown topsoil, silty sand, with organic material, loose, wet, debris present.

0.25 – 2.00 m Half of the test pit found to be grey, gravelly silt, trace clay, compact and wet. Other half of the test pit found to be brown sand, some silt, trace clay, loose and wet.

- Sample SS1 taken at 2.00 m
- Sample SS2 taken at 2.00 m
- Test pit caving and wet at 2.00 m
- Groundwater seepage encountered at 1.50 m

TP19-6

0.00 – 0.20 m Brown topsoil, silty sand, some gravel, with organic material, debris present.

0.20 – 2.00 m Silt and sand, trace clay and gravel, some boulders, compact and dry;

- Sample SS1 taken at 2.00 m
- Test pit open and dry at 2.00 m

TP19-7

0.00 – 0.30 m Black topsoil, silty sand with organic material, loose and wet.

0.30 – 2.00 m Grey silty sand, trace clay and gravel, some boulders, compact and dry.

- Sample SS1 taken at 2.00 m
- Test pit open and dry at 2.00 m

TP19-8

0.00 – 0.40 m Black topsoil, silty sand with organic material, loose and wet.

0.40 – 2.00 m Grey sand and silt, trace gravel and clay, some boulders, compact and dry.

- Sample SS1 taken at 2.00 m
- Test pit caving and wet at 2.00 m
- Groundwater seepage encountered at 0.40 m

TP19-9

0.00 – 0.30 m Black topsoil, silty sand with organic material, loose, moist.

0.30 – 0.70 m Brown sand with some silt, trace clay, loose and moist.

0.70 – 2.00 m Grey gravelly silt, trace sand and clay, orange mottling, compact and wet.

- Sample SS1 taken at 0.70 m
- Sample SS2 taken at 2.00 m
- Test pit caving and wet at 2.00 m
- Groundwater seepage encountered at 0.70 m

TP19-10

0.00 – 0.30 m Black topsoil, silty sand with organic material, loose and dry.

0.30– 2.00 m Gravelly sand and silty, trace clay and gravel, some boulders, orange mottling, compact and wet.

- Sample SS1 taken at 2.00 m
- Test pit open and wet at 2.00 m

TABLE E-2 GROUNDWATER LEVELS

Project: Udora Estates Water Balance Evaluation (22012.00)

	MW17-1 (A -235172)*			MW17-2			MW17-3			MW1 (A-206394)			MW2			MW3		
Date	Water level (mbtoc)	Water level (mbgl)	Water level Elev. (masl)	Water level (mbtoc)	Water level (mbgl)	level Elev. (masl)	Water level (mbtoc)	Water level (mbgl)	level Elev. (masl)	Water level (mbtoc)	Water level (mbgl)	level Elev. (masl)	Water level (mbtoc)	Water level (mbgl)	level Elev. (masl)	Water level (mbtoc)	Water level (mbgl)	level Elev. (masl)
10-Dec-22	2.65	1.84	248.10	3.71	2.85	248.91	2.81	1.99	249.11	10.32	9.37	243.1	12.39	11.48	240.3	8.06	7.17	252.1
20-Mar-23	1.20	0.39	249.54	1.63	0.81	250.99	1.82	1.00	250.10	10.61	9.66	242.8	11.40	10.49	241.3	5.49	4.60	254.6
20-Apr-23	1.08	0.27	249.66	1.65	0.70	250.97	2.15	1.33	249.77	10.52	9.57	242.9	11.16	10.25	241.6	5.10	4.21	255.0
19-May-23	1.83	1.02	248.91	2.13	1.22	250.49	2.52	1.70	249.40	10.89	9.94	242.6	11.54	10.63	241.2	5.58	4.69	254.5
20-Jul-23	2.62	1.81	248.12	na	na	na	3.04	2.22	248.88	dry	na	na	na	na	na	6.89	6.00	253.2
4-Nov-23	4.13	3.32	246.61	5.27	4.51	247.35	4	3.18	247.92	12.42	11.47	241.0	12.75	11.84	240.0	8.50	7.61	251.6
16-Mar-24	1.05	0.24	249.69	1.72	0.72	250.90	1.67	0.85	250.25	11.09	10.14	242.4	11.52	10.61	241.2	6.14	5.25	254.0
9-Apr-24	1.06	0.25	249.69	1.66	1.66	250.96	1.8	0.98	250.12	10.94	9.99	242.5	11.26	10.35	241.5	5.39	4.50	254.7
6-May-24	1.10	0.29	249.64	0.69	0.69	251.93	2	1.18	249.92	11.73	10.78	241.7	11.02	10.11	241.7	5.05	4.16	255.1
27-Jul-24	2.09	1.28	248.65	2.39	2.39	250.23	2.63	1.81	249.29	11.25	10.30	242.2	11.44	10.53	241.3	6.70	5.81	253.4
30-Sep-24	3.32	2.51	247.42	4.03	4.03	248.59	3.36	2.54	248.56	12.14	11.19	241.3	12.28	11.37	240.4	7.54	6.65	252.6
9-Nov-24	3.72	2.91	247.02	4.77	4.77	247.85	3.71	2.89	248.21	7.23	6.28	246.2	12.56	11.65	240.2	8.13	7.24	252.0

TABLE E-2 GROUNDWATER LEVELS

Project: Udora Estates Water Balance Evaluation (22012.00)

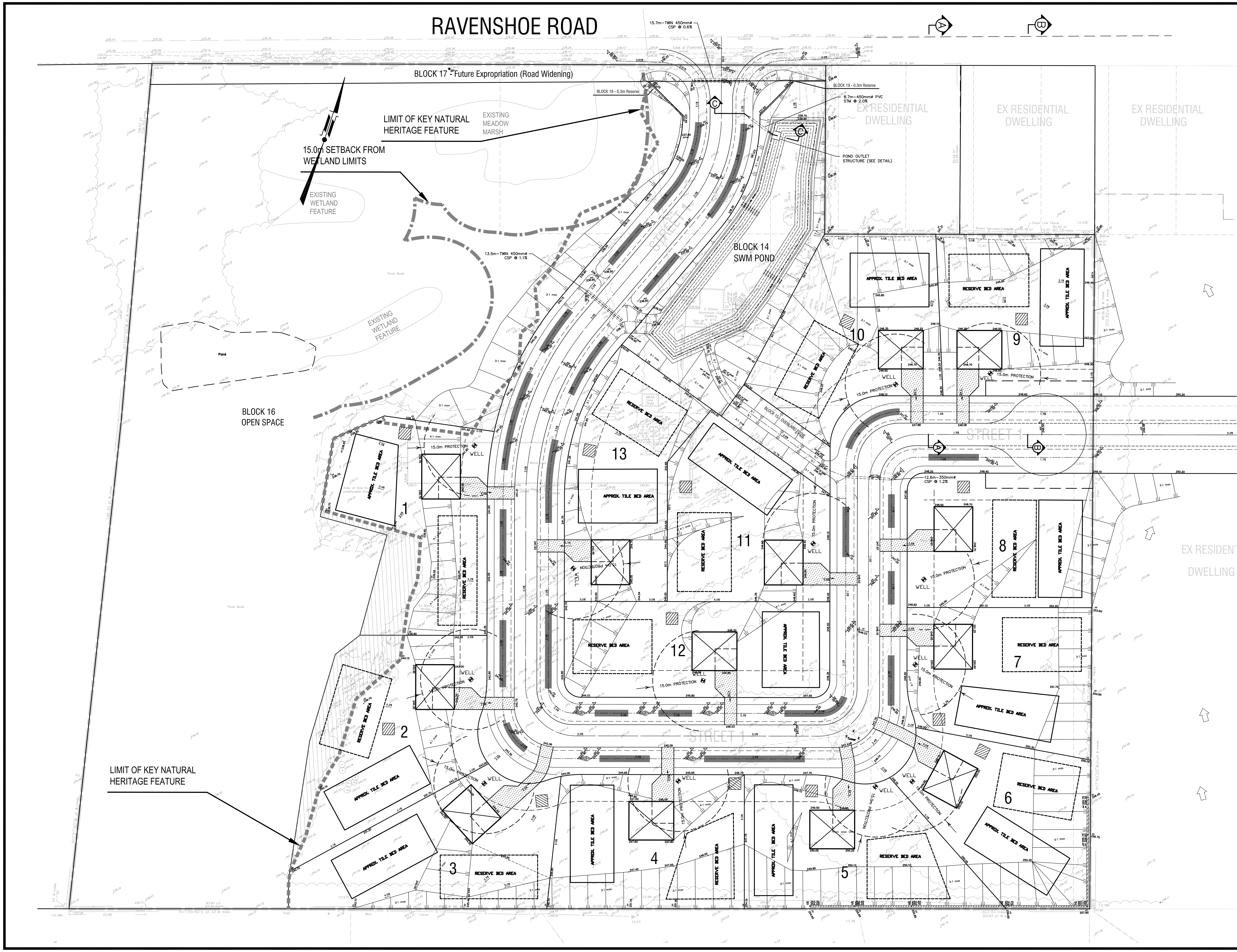
	MW1-22 (A-351957)			MW2-22			MW24-1			OW5-1		
Date	Water level (mbtoc)	Water level (mbgl)	level Elev. (masl)	Water level (mbtoc)	Water level (mbgl)	Water level Elev. (masl)	Water level (mbtoc)	Water level (mbgl)	Water level Elev. (masl)	Water level (mbtoc)	Water level (mbgl)	Water level Elev. (masl)
10-Dec-22	6.51	5.75	248.88	9.56	8.56	249.31						
20-Mar-23	4.74	3.98	250.65	6.93	5.93	251.94						
20-Apr-23	4.57	3.81	250.82	6.08	5.08	252.80						
19-May-23	4.80	4.04	250.59	6.54	5.54	252.33						
20-Jul-23	5.84	5.08	249.55	9.04	8.04	249.83						
4-Nov-23	7.05	6.29	248.34	9.57	8.57	249.30						
16-Mar-24	5.67	4.91	249.72	7.43	6.43	251.44	6.11	5.22	251.91	1.33	0.63	257.91
9-Apr-24	5.44	4.68	249.95	6.78	5.78	252.09	5.37	4.48	252.65	1.40	0.70	257.84
6-May-24	5.03	4.27	250.36	6.05	5.05	252.82	4.71	3.82	253.31	1.50	0.80	257.74
27-Jul-24	5.87	5.11	249.52	7.06	6.06	251.81	5.90	5.01	252.12	1.96	1.26	257.28
30-Sep-24	7.88	7.12	247.51	8.56	7.56	250.31	7.42	6.53	250.60	2.85	2.15	256.39
9-Nov-24	7.23	6.47	248.16	9.35	8.35	249.52	8.10	7.21	249.92	3.30	2.60	255.94

Table E-3 Monitor Well Details

Project: Udora Estates Water Balance Evaluation (22012.00)

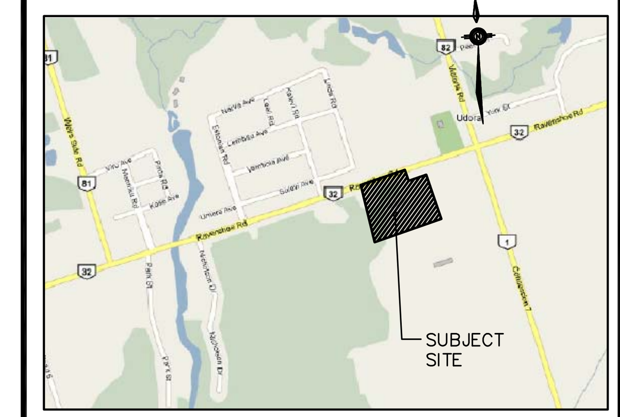
Monitor Details				
Monitor	**Well Depth (mbgl)**	**Casing Stickup (magl)**	**PVC Casing Elev.**	**Ground Elev.**
MW17-1 (A-235172)	6.10	0.81	250.74	249.93
MW17-2	6.10	0.86	252.62	251.76
MW17-3	4.60	0.82	251.92	251.10
MW1	15.30	0.95	253.45	252.50
MW2	16.90	0.91	252.71	251.80
MW3	15.90	0.89	260.12	259.23
MW1-22 (A-351957)	12.19	0.76	255.39	254.63
MW2-22	12.19	1.17	258.87	257.70
OW05-1	8.62	0.7	259.24	258.54
MW24-1	10.67	0.89	257.13	256.24

GPS Survey 2024 (Envision Consultants)



METRIC

ALL DIMENSIONS AND ELEVATIONS ARE IN METRES UNLESS OTHERWISE SHOWN



KEY PLAN

ALL SURVEY AND TOPO INFORMATION TAKEN FROM THE SURVEY AND TOPOGRAPHIC PLAN PREPARED BY LLOYD & PURCELL LTD. DATED 24 MAR 2010 (PLAN NO. S1-VI-35-2).

ELEVATIONS

ELEVATIONS SHOWN HEREON ARE GEODETIC AND IN METRES AND ARE REFERRED TO REGION OF DURHAM BENCHMARK NO. 838029, HAVING AN PUBLISHED ELEVATION OF 255.457 m.

BEARINGS

BEARINGS SHOWN HEREON ARE ASTRONOMIC AND ARE REFERRED TO THE NORTHERLY LIMIT OF PART 1 AS SHOWN ON PLAN 40R-17245 HAVING A BEARING OF N72°04'00"E.

LEGEND:

×187.27	EXISTING ELEVATION
+186.73	PROP. ELEVATION
+186.08 SW	PROP. ELEVATION AT CENTRELINE OF SWALE
	PROP. RETAINING WALL
2.0%	DRAINAGE FLOW DIRECTION AND SLOPE
	PROP. OVERLAND FLOW DIRECTION
	EX. OVERLAND FLOW DIRECTION
	PROPOSED ROOF LEADER SOAKAWAY PIT
	PROPOSED DITCH INFILTRATION TRENCH
WELL	PROPOSED DRILLED WATER WELL
	APPROXIMATE TILE BED AREA (500 sq.m) (AVE T=20MIN/CM AND 3000L/DAY)
	RESERVE TILE BED AREA

NO.	REVISION	BY	DATE
8.			
7.			
6.			
5.			
4.			
3.	REVISED PER LSRCA COMMENTS	R.F.	07-SEPT-2011
2.	REVISED PER AECOM/LSRCA COMMENTS	R.F.	22-DEC-2010
1.	REVISED PER REGION COMMENTS	R.F.	30-JUN-2010
0.	ISSUED FOR SITE PLAN APPLICATION	R.F.	13-MAY-2010

REVISIONS

CLIENT: KING COLE DUCKS LIMITED

fabian papa & partners inc.
216 Chrislea Road, Suite 501, Woodbridge, Ontario L4L 8S5
t: 905-264-2420 f: 905-264-2441 www.fabianpapa.com

MUNICIPALITY:
TOWNSHIP OF UXBRIDGE
REGION OF DURHAM

PROJECT NAME:
673 RAVENSHOE ROAD
UXBRIDGE, ONTARIO

DRAWING TITLE:
FUNCTIONAL SERVICING & GRADING PLAN

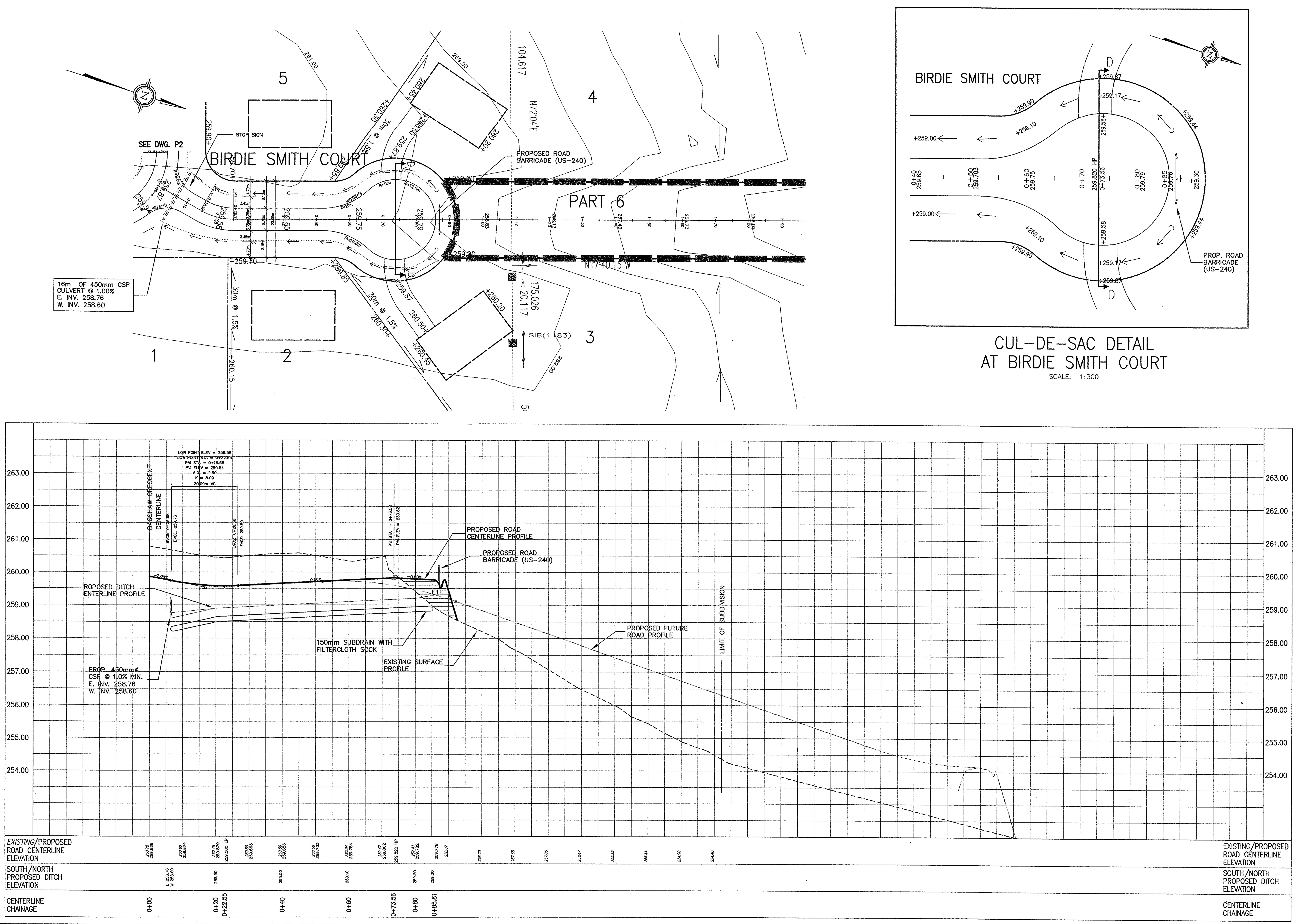
LICENSED PROFESSIONAL ENGINEER
07 SEP 2011
R. D. FILIPUZZI
PROVINCE OF ONTARIO

DWN. BY:	R.F.
DESIGNED BY:	R.F.
CHECKED BY:	P.A.
SCALE:	1:500
DATE:	NOV 27, 2009
SHEET NO:	1 OF 1

PROJECT NO.	DWG NO.	REV. NO.
10017	FSR-1	3

DRAFT PLAN NO.: ??T-?????
REGION FILE NO.: ZBA 2010-006

ALL "ENGINEERED FILL" TO BE COMPACTED TO 100% OF SPD IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE SUPERVISING GEOTECHNICAL CONSULTANT.
SUBDIVISION LANDS ARE NOT SUITABLE FOR HOUSE FOUNDATIONS EXCAVATED TO A DEPTH GREATER THAN 1.8m REFER TO REPORT BY V.A. WOOD ASSOC. DATED AUG 20, 1999
RAINWATER LEADERS TO BE DIRECTED TO DRYWELLS ON INDIVIDUAL LOTS.
RESTORATION INCLUDING ALL DISTURBED LOT AREAS, SIDE YARD AND REAR YARD SWALES TO BE SODDED ON 200mm TOPSOIL AT TIME OF HOUSE CONSTRUCTION.
EXISTING AGRICULTURAL
(23.0m FUTURE RIGHT OF WAY)
BLOCK 51
BH-1
FARM FENCE PER STANDARD US-312
EXISTING RESIDENTIAL
PART 15
PART 16
PART 17
PART 18
PART 19
PART 20
PART 21
PART 22
PART 23
PART 6
BIRDIE SMITH COURT
BAGSHAW CRESCENT
BLOCK 18
BLOCK 22
0.30m RESERVE
BLOCK 23
0.30m RESERVE
BLOCK 24
0.30m RESERVE
GABION FLOW SPREADING STRUCTURE REFER TO DWG. DE1 FOR CROSS-SECTION DETAILS
50mm CLEAR STONE FRENCH DRAIN WRAPPED IN 270R FILTERCLOTH (SEE DETAIL ON DWG P1)
RIP-RAP PROTECTION AT CSP OUTLET
DRAINAGE OUTLET (SEED ON 100mm TOPSOIL)
DRAINAGE OUTLET REFER TO DWG. DE2 FOR TYPICAL CROSS-SECTION
FRENCH DRAIN
EX. PRIVATE CATCHBASIN TOP 257.00 INVERT 256.90
EXISTING SHALLOW SWALE
LIMIT OF PHASE 1
LIMIT OF PHASE 2
REFER TO DWG. GR2
DURHAM ROAD #1
N71°55'40"E
179.870
335.673
124.000
104.617
175.026
50.292
130.454
50.603
87.782
52.730
35.052
N17°40'20"W
N17°40'15"W
N18°52'10"W
N17°18'05"W
N72°04'E
N70°20'E
8.632
40.232
TESTA CONSTRUCTION
RAVENSHOE ROAD (COUN
VILLAGE OF UDORA
PHAS
KEY PL
N.T.S.
LEGEN
EXISTING CONTOUR
PROPOSED ELEVATION
DITCH, SWALE, OR GUTTER LINE
FILL AREA
DISTURBED AREAS
SUBDRAIN
LOT DRAINAGE DIRECTION FRONT - F SPLIT - S
RAINWATER LEADER DRYWELL (GENERAL LOCATION)
WELL LOCATION & 15m PROTECTIVE RADIUS (APPROXIMATE LOCATION)
BUILDING LOCATION & SPECIFIED LOT GRADE (APPROXIMATE LOCATION)
TILE BED, RESERVE AND MANTLE LOCATION (APPROXIMATE LOCATION)
TEST WELL - REFER TO GROUND WATER INTERFERENCE BY JAGGER HIMS LIMITED. NOVEMBER 2001 MAY 2002
SEE NOTES AND DETAILS ON STA
9. REVISIONS AS PER TOWN COMMENTS
8. REVISIONS TO INCLUDED PHASE II
WORK FROM JUNE 6, 2005 PERFORMED BY C
7. REVISIONS AS PER TOWN/REGION COMM
6. REVISIONS AS PER TOWN/REGION COMM
5. REVISIONS AS PER TOWN/REGION COMM
4. REVISIONS AS PER TOWN/REGION COMM
3. REVISIONS AS PER TOWN/REGION COMM
2. REVISIONS AS PER TOWN/REGION COMM
1. REVISIONS AS PER TOWN/REGION COMM
NO. REVISIONS
REGISTERED PROFESSIONAL ENGINEER
D. DI TATA
PROVINCE OF ONTARIO
TOWNSHIP OF
REGIONAL MUNICIPAL
GRADING
RESIDENTIAL SU
TESTA CONST
PART OF LOT 34 & 35
Roberts Bell
PROFESSIONAL ENGINEERS • LAND DEVELOP
Cole Engine
100 Renfrew Drive, Suite 1
Markham, Ontario L3R 9R6
APPROVAL
DEPARTMENT OF WORKS REGIONAL MUNICIPALITY OF DURHAM
DATE
JAN. 16, 2006
SCALE: 1:750
DRAWN BY: ALX
DESIGNED BY: DDT
DATE: SEPTEMBER 16, 2002



RAVENSHOE ROAD (COU

KEY P
N.T.S.

LEGEN

EXISTING CONTOUR
PROPOSED ELEVATION
DITCH, SWALE, OR GUTTER LI
SHEET FLOW DRAINAGE
TEST WELL – REFER TO GROUND WATER INTERFERENC BY JAGGER HIM LIMITED. NOVEMBER 2001 MAY 2002
PROPOSED SUBDRAIN

ROAD STRUCTURE

40mm	HL-3 TOP A
50mm	HL-8 BASE
150mm	GRANULAR 'A
350mm	GRANULAR 'B

SEE NOTES AND DETAILS ON STANDAR

ACCEPTED TO BE IN GENERAL CONFORMANCE WITH THE TOWNSHIP OF UXBRIDGE STANDARDS. THIS ACCEPTANCE IS NOT TO BE CONSTRUED AS VERIFICATION OF ENGINEERING CONTENT.
TOTTEN SIMS HUBICKI ASSOCIATES (1997) LIMITED
DATE JAN-16, 2006

NO.	REVISIONS
9.	REVISIONS AS PER TOWN COMMENTS
8.	REVISIONS TO INCLUDED PHASE II
	WORK FROM JUNE 6, 2005 PERFORMED BY
7.	REVISIONS AS PER TOWN/REGION COM
6.	REVISIONS AS PER TOWN/REGION COM
5.	REVISIONS AS PER TOWN/REGION COM
4.	REVISIONS AS PER TOWN/REGION COM
3.	REVISIONS AS PER TOWN/REGION COM
2.	REVISIONS AS PER TOWN/REGION COM
1.	REVISIONS AS PER TOWN/REGION COM

REGISTERED PROFESSIONAL ENGINEER
D. DI TATA
Dec. 21/05
PROVINCE OF ONTARIO

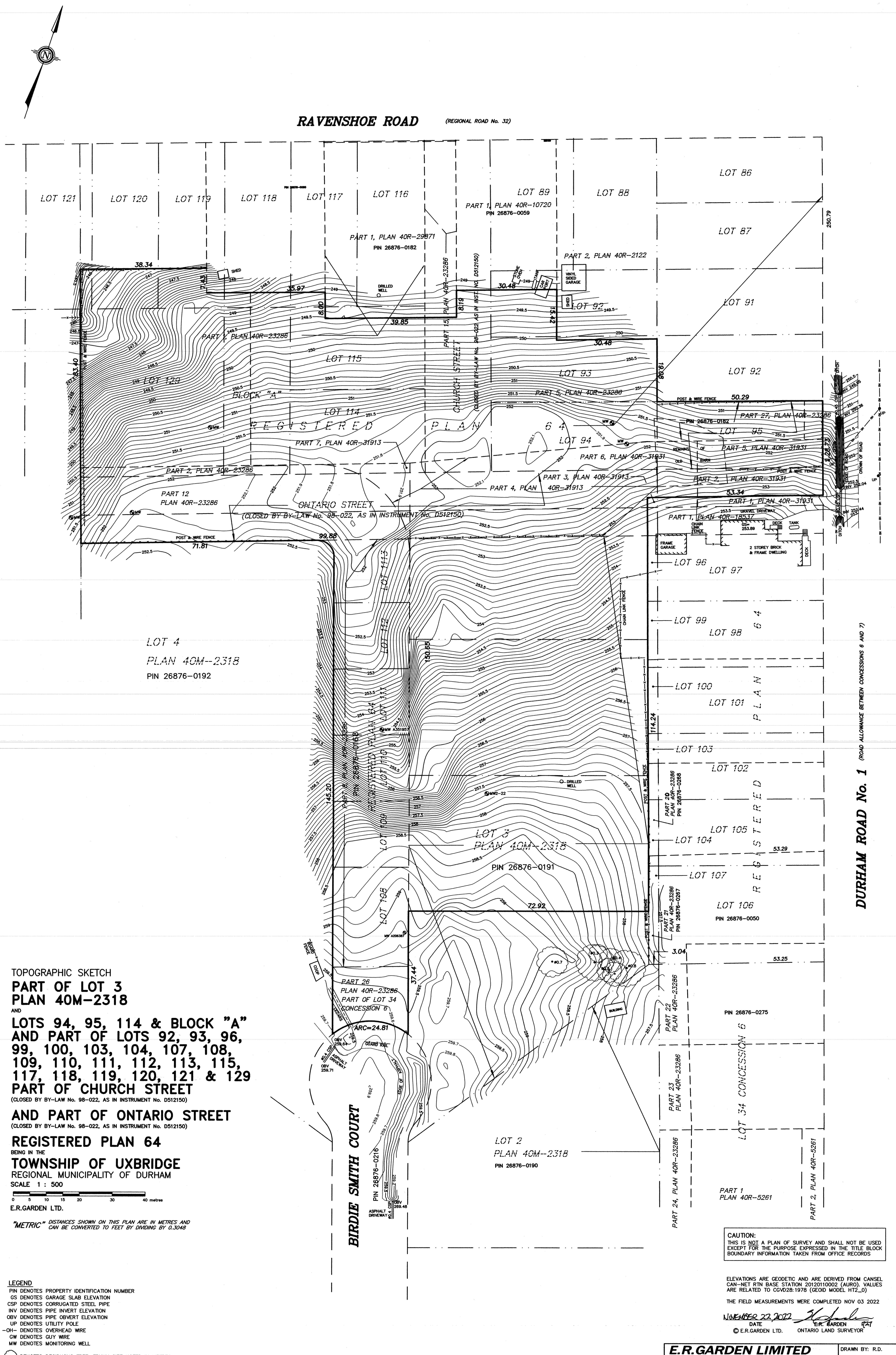
TOWNSHIP OF
REGIONAL MUNICIPAL

PLAN AND
BIRDIE SMITH COURT STA
RESIDENTIAL SU
TESTA CONST
PART OF LOT 34 & 3

Roberts Bell
PROFESSIONAL ENGINEERS • LAND DEVELO
Cole Engine
100 Renfrew Drive, Suite
Markham, Ontario L3R

SCALE: H 1:500 V 1:50

DRAWN BY: ALX
DESIGNED BY: D.D.T.
DATE: AUGUST 8, 2002



TOPOGRAPHIC SKETCH

PART OF LOT 3
PLAN 40M-2318
AND
LOTS 94, 95, 114 & BLOCK "A"
AND PART OF LOTS 92, 93, 96, 99, 100, 103, 104, 107, 108, 109, 110, 111, 112, 113, 115, 117, 118, 119, 120, 121 & 129
PART OF CHURCH STREET
(CLOSED BY BY-LAW No. 98-022, AS IN INSTRUMENT No. D512150)
AND PART OF ONTARIO STREET
(CLOSED BY BY-LAW No. 98-022, AS IN INSTRUMENT No. D512150)
REGISTERED PLAN 64
BEING IN THE
TOWNSHIP OF UXBRIDGE
REGIONAL MUNICIPALITY OF DURHAM
SCALE 1 : 500
0 5 10 15 20 30 40 metres
E.R.GARDEN LTD.

"METRIC" DISTANCES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048

LEGEND

PIN DENOTES PROPERTY IDENTIFICATION NUMBER
GS DENOTES GARAGE SLAB ELEVATION
CSP DENOTES CORRUGATED STEEL PIPE
INV DENOTES PIPE INVERT ELEVATION
OBV DENOTES PIPE OBVERT ELEVATION
UP DENOTES UTILITY POLE
-OH- DENOTES OVERHEAD WIRE
GW DENOTES GUY WIRE
MW DENOTES MONITORING WELL
DENOTES DECIDUOUS TREE, TRUNK SIZE NOTED IN METRES

CAUTION:
THIS IS NOT A PLAN OF SURVEY AND SHALL NOT BE USED EXCEPT FOR THE PURPOSE EXPRESSED IN THE TITLE BLOCK BOUNDARY INFORMATION TAKEN FROM OFFICE RECORDS

ELEVATIONS ARE GEODETIC AND ARE DERIVED FROM CANSEL CAN-NET RTN BASE STATION 20120110002 (AURO). VALUES ARE RELATED TO CGVD28:1978 (GEOID MODEL HT2_0)

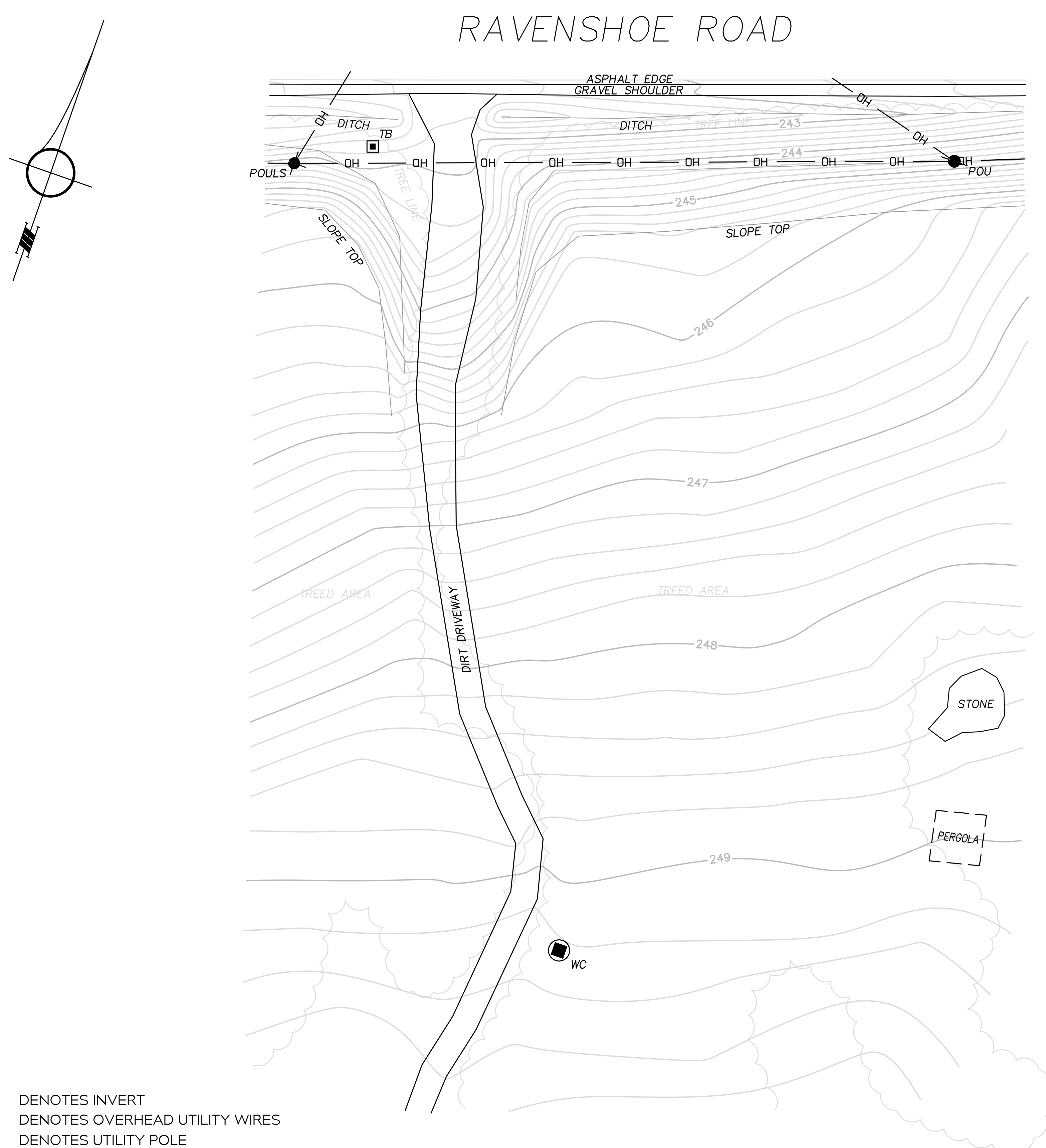
THE FIELD MEASUREMENTS WERE COMPLETED NOV 03 2022

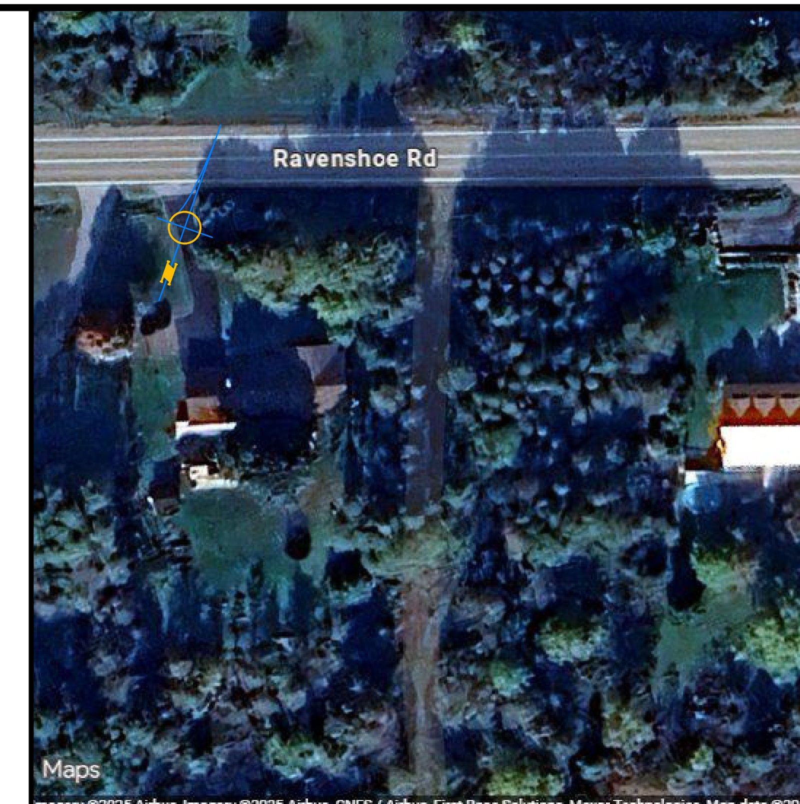
NOVEMBER 22, 2022 — DATE
E.R. GARDEN 1727 — ONTARIO LAND SURVEYOR

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
TOLL FREE 1-877-895-5600 WWW.ERGARDENLIMITED.CA

DRAWN BY: R.D.
FILE No. 22-8011

FILE NO. 22-8011





KEY PLAN - NOT TO SCALE

IMAGERY

AERIAL IMAGERY SHOWN IS FOR ILLUSTRATIVE PURPOSES ONLY AND MAY NOT DEPICT CURRENT FEATURES.

TOPOGRAPHIC BASE PLAN OF

691 RAVENSHOE ROAD

TOWNSHIP OF UXBRIDGE

SCALE 1 : 300 METRES

0 1 2 3 4 5 10 25

COORDINATE NOTE

COORDINATE VALUES AND DIGITAL FILE ARE IN GRID SYSTEM, UTM ZONE 17 (81° WEST LONGITUDE), NAD83(CSRS)v7(2010). COMBINED SCALE FACTOR = 0.999***

CONTOUR NOTE

CONTOURS SHOWN HEREON ARE DRAWN AT 0.20 METRE INTERVALS.

ELEVATION NOTE

ELEVATIONS ARE GEODETIC AND REFERRED TO THE CANADIAN GEODETIC VERTICAL DATUM (CGVD28:78) BY DIRECT MEASUREMENT TO A REAL TIME NETWORK.

DRAFT

IBW SURVEYORS

IBWSURVEYORS.COM | 1.800.667.0696

PARTY CHIEF:TE | DRAWN:AAC | CHECKED:BJ | PLOT DATE:NOVEMBER 12, 2025 | A-056619

FILE: A-056619-TOPO_v2

LEGEND

	INV	DENOTES INVERT
–OH–		DENOTES OVERHEAD UTILITY WIRES
	POU	DENOTES UTILITY POLE
	POULS	DENOTES UTILITY/LIGHT STANDARD POLE
	TB	DENOTES TERMINAL BOX
	WC	DENOTES WELL CAP ELEVATION AT TOP CENTRE

CAUTION

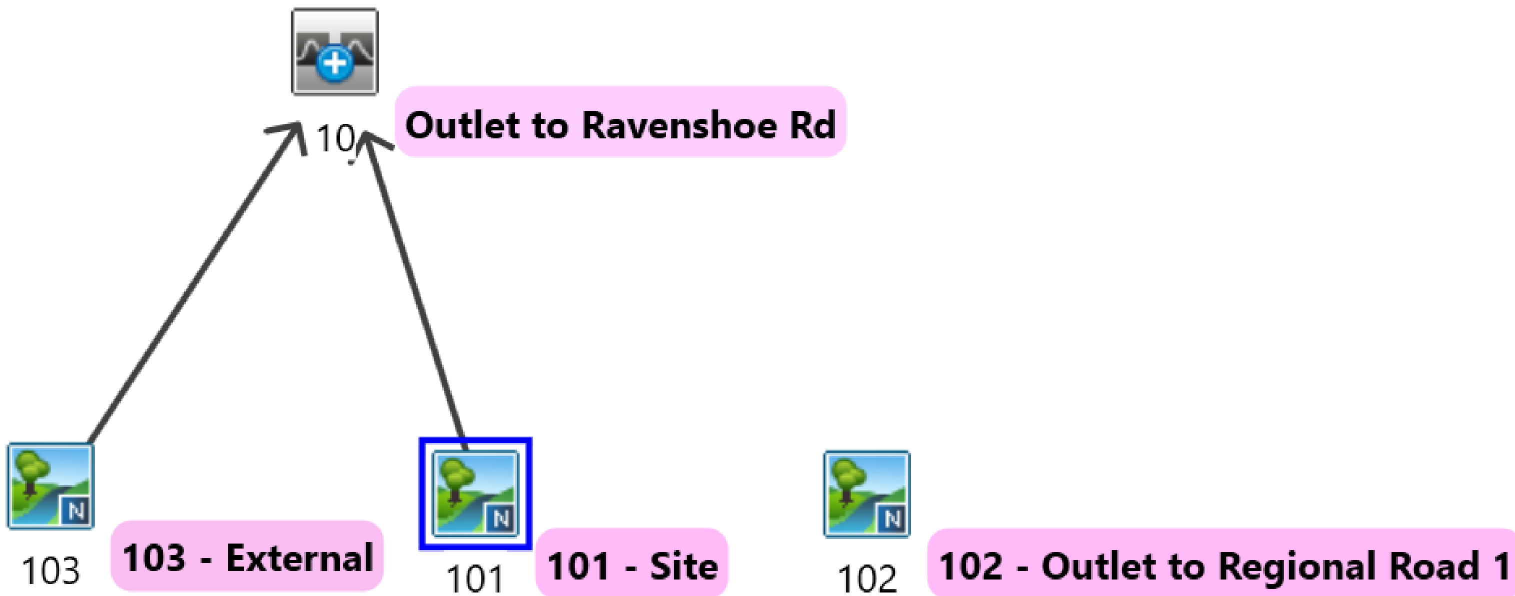
THIS IS NOT A PLAN OF SURVEY AND SHALL NOT BE USED EXCEPT FOR THE PURPOSE INDICATED IN THE TITLE BLOCK.

Appendix C Hydrology Modelling

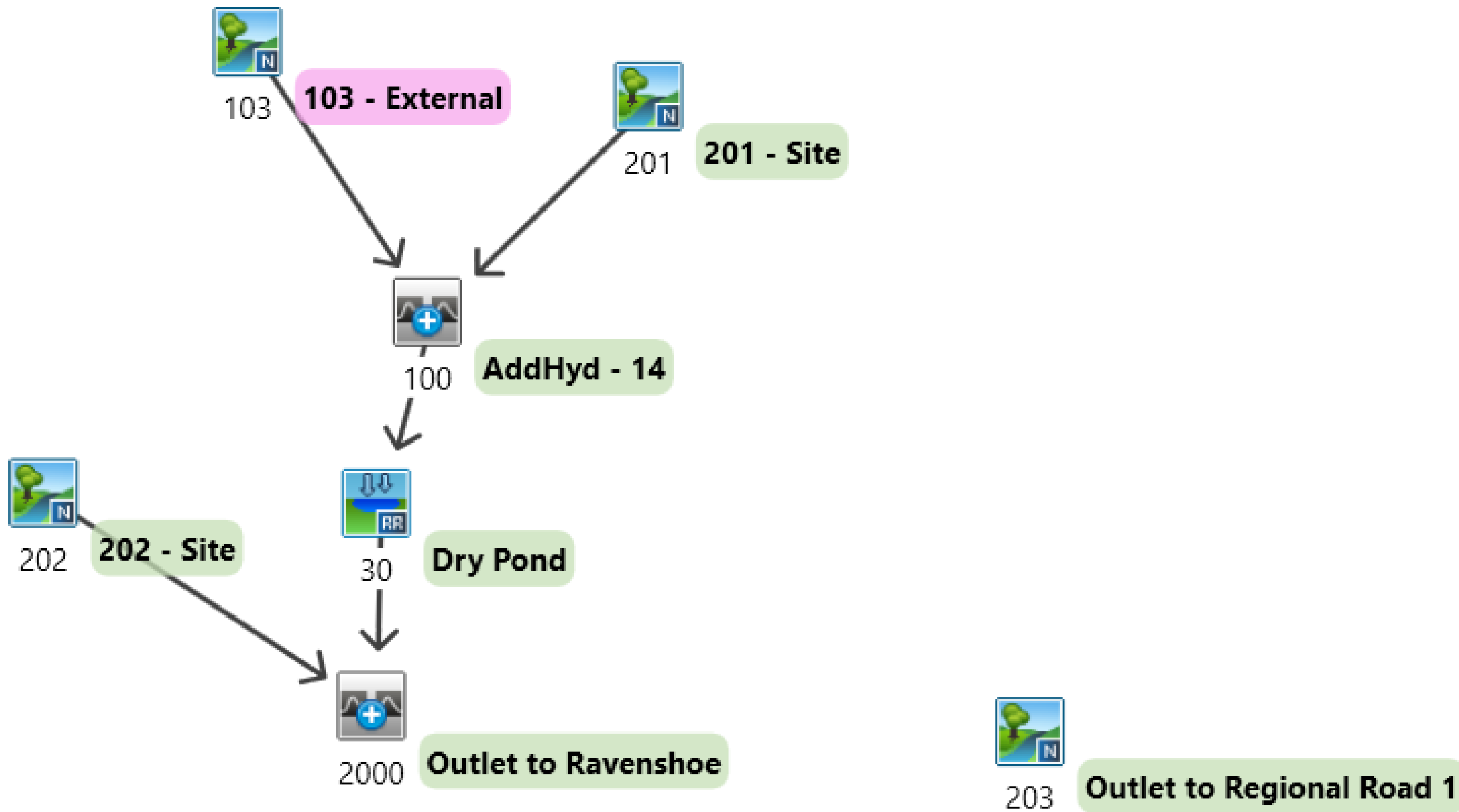
VO6 model is being provided in the following secure link:
https://filesafecloud.scsconsultinggroup.com/url/nymhzii3hvmhkztj

SCS consulting group ltd

SCS consulting group ltd	**Existing Condition VO6 Schematic**	Udora Estates Project Number: 2328 Date: December 2025



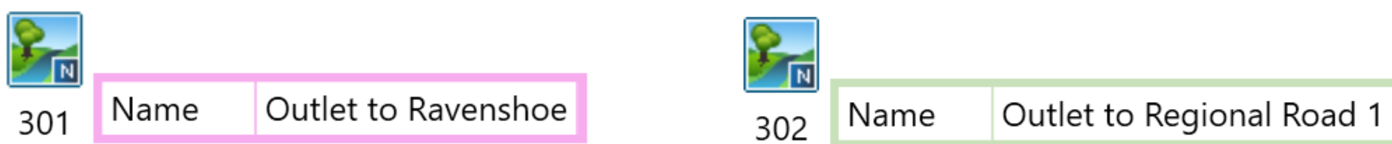
SCS consulting group ltd	**Interim Proposed Condition VO6 Schematic**	Udora Estates Project Number: 2328 Date: December 2025



P:\2328 Udora Estates\Design\SWM\FSP\Hydrology\VO6\Schematics\2328-Proposed Condition Schematic.doc

Ultimate Proposed Condition VO6 Schematic

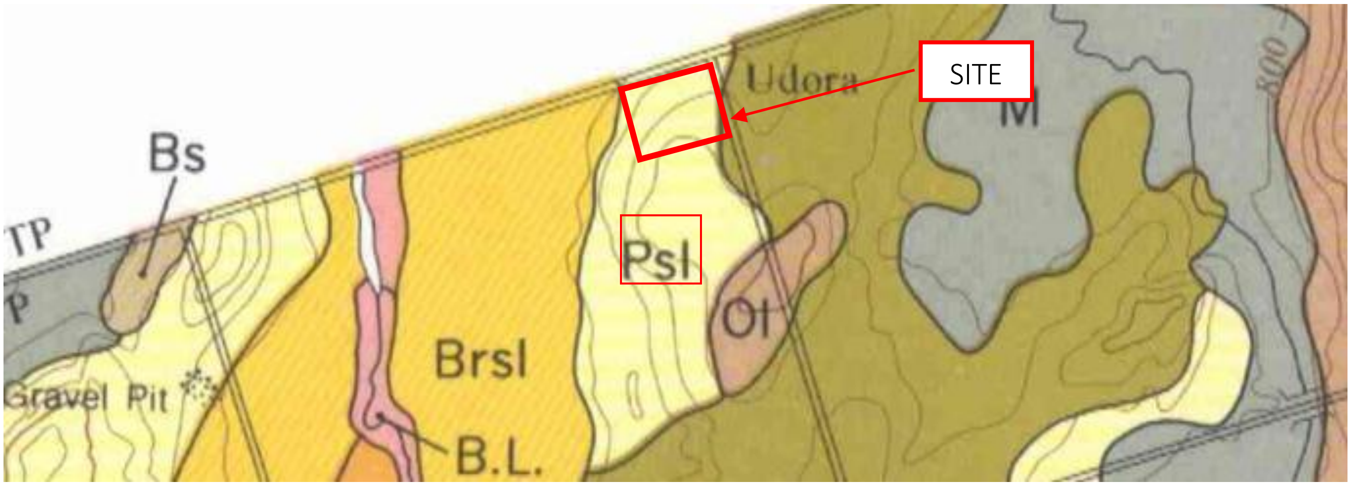
Udora Estates
Project Number: 2328
Date: December 2025



SCS consulting group ltd

Soil Map of Ontario County

Udora Estates
Project Number: 2328
Date: Dec 2025



LEGEND

SYMBOL	SOIL TYPE		GREAT GROUP	SOIL MATERIALS	DRAINAGE	TOPOGRAPHY AND SURFACE STONINESS
Psl	PONTYPOOL	sandy loam	Grey-Brown Podzolic	Calcareous sand	Good	Rolling to hilly and few stones

DESIGN FLOOD ESTIMATION

DESIGN CHARTS
CHART H2 - 6A
(Cont'd)

CHART H2-6A - continued

Soils Series	Soil Texture	Hyd. Soil Grp.	Soils Series	Soil Texture	Hyd. Soil Grp.	Soils Series	Soil Texture	Hyd. Soil Grp.
Lockport	c	D	Mountain	s l	AB	"	l	C
London	l	BC	Muck	m	B	"	si l	C
"	si l	BC	Murray	si l /f		"	si c l	CD
Lovering	si c l	C		s	B	"	c l	CD
"	c	D	Napanee	c /si l	C	"	c	CD
"	c l	CD	Neebing	s /si	B	Petherwick	si l	BC
Lyons	l	B	Nepean	s	AB	Phipps	si c l	C
Macton	l	B	Newburgh	s l	A	"	c l	C
Magnetawan	si l	BC	"	si l	BC	Piccadilly	s l	B
Mallard	s	AB	Newcastle	l	BC	"	l	BC
"	s l	AB	"	c l	C	"	si l	BC
Malton	c	C	"	si l	BC	Pike	c	D
Mannheim	l	B	Newton	s l	B	Pike Lake	l	B
Manotick	s	AB	Nelson	c	D	Plainfield	s	A
Maplewood	si l	BC	New lisk.	si c	C	Pontypool	s	A
Marionville	s	B	"	c	C	"	s l	AB
"	s l	B	Niagara	c	D	Powassan	si l	BC
Martin	s /g	AB	Nipissing	s /si	B	Preston	s l	B

Existing Conditions
VO6 Parameter Summary

NASHYD

Number	101	102	103
Description			
DT(min)	1	1	1
Area (ha)	1.91	0.23	1.94
CN*	45.0	58.0	54.0
IA(mm)	9.3	8.0	8.4
TP Method	Uplands	Uplands	Uplands
TP (hr)	0.11	0.04	0.10

Total Area = 4.08 ha

Udora Estates
Project Number: 2328
Date: December 2025
Designer Initials: J.S.

Existing Conditions
CN Calculations

Site Soils: (per OMAFRA County Soils Mapping)

Soil Type	**Hydrologic Soil Group**
Pontypool Sandy Loam	AB

TABLE OF CURVE NUMBERS (CN's)**

Land Use	Hydrologic Soil Type							Manning's	Source
	A	AB	B	BC	C	CD	D	'n'	
Meadow "Good"	30	44	58	64.5	71	74.5	78	0.40	MTO
Woodlot "Fair"	36	48	60	66.5	73	76	79	0.40	MTO
Gravel	76	80.5	85	87	89	90	91	0.30	USDA
Lawns "Good"	39	50	61	67.5	74	77	80	0.25	USDA
Pasture/Range	58	61.5	65	70.5	76	78.5	81	0.17	MTO
Crop	66	70	74	78	82	84	86	0.13	MTO
Fallow (Bare)	77	82	86	89	91	93	94	0.05	MTO
Low Density Residences	57	64.5	72	76.5	81	83.5	86	0.25	USDA
Streets, paved	98	98	98	98	98	98	98	0.01	USDA

1. MTO Drainage Manual (1997), Design Chart 1.09-Soil/Land Use Curve Numbers
2. USDA (1986), Urban Hydrology for Small Watersheds, Table 2.2-Runoff Curve Numbers for Urban Areas

HYDROLOGIC SOIL TYPE (%) - Existing Conditions

Catchment	Hydrologic Soil Type							TOTAL
	A	AB	B	BC	C	CD	D	
101	0.0	100.0	0.0	0.0	0.0	0.0	0.0	100
102	0.0	100.0	0.0	0.0	0.0	0.0	0.0	100
103	0.0	100.0	0.0	0.0	0.0	0.0	0.0	100

HYDROLOGIC SOIL TYPE (%) - Existing Conditions

Catchment	Hydrologic Soil Type							TOTAL
	A	AB	B	BC	C	CD	D	
101		100						100
102		100						100
103		100						100

LAND USE (%) - Existing Conditions

Catchment	Meadow	Woodlot	Gravel	Lawns	Pasture Range	Crop	Fallow (Bare)	Low Density Residences	Impervious	Total
101	0.0	65.2	0.0	0.0	34.8	0.0	0.0	0.0	0.0	100.0
102	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	100.0
103	0.0	38.0	0.0	0.0	55.7	0.0	0.0	0.0	6.3	100.0

Note: Where STANDHYD command used (shaded), impervious fraction is not considered in CN determination, since %Imp directly input in STANDHYD command

LAND USE (%) - Existing Conditions

Catchment	Meadow	Woodlot	Gravel	Lawns	Pasture Range	Crop	Fallow (Bare)	Low Density Residences	Impervious	Total
101		65.2			34.8					100.0
102					100.0					100.0
103		38.0			55.7				6.3	100.0

Note: Where STANDHYD command used (shaded), impervious fraction is not considered in CN determination, since %Imp directly input in STANDHYD command

CURVE NUMBER (CN) - Existing Conditions

Catchment	Meadow	Woodlot	Gravel	Lawns	Pasture Range	Crop	Fallow (Bare)	Low Density Residences	Impervious	Weighted CN
101	0.0	31.3	0.0	0.0	21.4	0.0	0.0	0.0	0.0	53
102	0.0	0.0	0.0	0.0	61.5	0.0	0.0	0.0	0.0	62
103	0.0	18.2	0.0	0.0	34.3	0.0	0.0	0.0	6.2	59

** AMC II assumed

Existing Conditions
CN Calculations

Step	Input Values				
	Subcatchment:	101		102	103
1	**CN (AMC II):**	**53**		**62**	**59**
2	CN (AMC III) =	72		79	77
3	100 Year Precipitation, P =	119.06	mm	119.06	119.06

$$Q = \frac{(P - Ia)^2}{(P - Ia) + S} \qquad S = \frac{(P - Ia)^2}{Q} - (P - Ia)$$

Q = rainfall excess or runoff, mm
S = potential maximum retention or available storage, mm

$$CN = \frac{25400}{S + 254} \qquad S = \frac{25400}{CN} - 254$$

CN* = modified SCS curve # that better reflects Ia conditions in Ontario

Step	Output Values				
	Subcatchment:	101		102	103
	S_{III} =	98.78	mm	67.52	75.87
	SCS Assumption of 0.2 S = Ia =	19.76	mm	13.50	15.17
4	Q_{III} =	49.78	mm	64.38	60.04
	Preferred Initial Abstraction, Ia =	9.3	mm	8.0	8.4
5	S^*_{III} =	132.21	mm	80.53	93.35
6	CN^*_{III} =	65.77	mm	75.93	73.13
	CN^*_{III}=	**66**	Rounded	**76**	**73**
7	**CN^*_{II}=**	**45**	convert	**58**	**54**

Explanation of Procedure

1 Determine CN based on typical AMC II conditions (attached)
2 Convert CN from AMC II to AMC III conditions (standard SCS tables)
3 Get precipitation depth P for 100 year storm
4 Using CN_{III} with Ia = 0.2S, compute Q_{III} for 100 year precipitation
5 For the same Q_{III}, compute S^*_{III} using Ia=1.5mm (or otherwise determined)
6 Compute CN^*_{III} using S^*_{III}
7 Calculate CN^*_{II} using SCS conversion table

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Existing Conditions
IA Calculations

Udora Estates
Project Number: 2328
Date: December 2025
Designer Initials: J.S.

LAND USE (%) - Existing Conditions										
Catchment	Meadow 4.07	Woodlot 3.63	Gravel 2.38	Lawns	Pasture Range	Crop	Fallow (Bare)	Low Density C	Impervious	Total
101		65.2			34.8					100.0
102					100.0					100.0
103		38.0			55.7				6.3	100.0

IA VALUES (mm) - Existing Conditions										
Catchment	Meadow	Woodlot	Gravel	Lawns	Pasture Range	Crop	Fallow (Bare)	Low Density Residences	Impervious	Total
IA (mm)	8	10	2	5	8	8	3	2	2	
101		6.5			2.8					9.3
102					8.0					8.0
103		3.8			4.5				0.1	8.4

* IA values based on LRSCA guidelines

Existing Conditions
Time to Peak Calculations

Uplands Method:

Catchment ID	High Elevation	Low Elevation	Length (m)	Slope (%)	Land Cover Type	Velocity (m/s)	Time of Concentration (s)	Time of Concentration (hr)	Time to Peak (hr)
101a	259.12	257.93	29	4.10	Pasture	0.44	65.4	0.02	0.01
101b	257.93	252.39	90	6.16	Woodland	0.37	240.4	0.07	0.04
101c	252.39	251.50	36	2.47	Pasture	0.34	104.9	0.03	0.02
101d	251.50	243.23	80	10.34	Woodland	0.48	165.0	0.05	0.03
101									**0.11**
102a	258.90	254.50	101	4.36	Pasture	0.46	221.0	0.06	0.04
102									**0.04**
103a	259.69	256.66	64	4.73	Pasture	0.48	134.3	0.04	0.02
103b	256.66	252.76	78	5.00	Woodland	0.34	231.2	0.06	0.04
103c	252.76	251.99	47	1.64	Pasture	0.28	168.5	0.05	0.03
103									**0.10**

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Interim Proposed Conditions
VO Parameter Summary

Udora Estates
Project Number: 2328
Date: December 2025
Designer Initials: J.S.

NASHYD

Number	103	201	202	203	204
Description					
DT(min)	1	1	1	1	1
Area (ha)	1.94	1.91	0.10	0.08	0.05
CN*	48.0	48.0	42.0	39.0	48.0
IA(mm)	7.5	4.5	4.8	5.0	4.6
TP Method	Uplands	Uplands	Uplands	Uplands	Uplands
TP (hr)	0.12	0.05	0.02	0.01	0.01

Total Area = 4.08 ha

SCS consulting group ltd

Interim Proposed Conditions
CN Calculations

Udora Estates
Project Number: 2328
Date: December 2025
Designer Initials: J.S.

Site Soils: (per OMAFRA County Soils Mapping)

Soil Type: Pontypool Sandy Loam

Hydrologic Soil Group: AB

TABLE OF CURVE NUMBERS (CN's)**									
Land Use	Hydrologic Soil Type							Manning's 'n'	Source
	A	AB	B	BC	C	CD	D		
Meadow "Good"	30	44	58	64.5	71	74.5	78	0.40	MTO
Woodlot "Fair"	36	48	60	66.5	73	76	79	0.40	MTO
Gravel	76	80.5	85	87	89	90	91	0.30	USDA
Lawns "Good"	39	50	61	67.5	74	77	80	0.25	USDA
Pasture/Range	58	61.5	65	70.5	76	78.5	81	0.17	MTO
Crop	66	70	74	78	82	84	86	0.13	MTO
Fallow (Bare)	77	82	86	89	91	93	94	0.05	MTO
Low Density Residences	57	64.5	72	76.5	81	83.5	86	0.25	USDA
Streets, paved	98	98	98	98	98	98	98	0.01	USDA

1. MTO Drainage Manual (1997), Design Chart 1.09-Soil/Land Use Curve Numbers
2. USDA (1986), Urban Hydrology for Small Watersheds, Table 2.2-Runoff Curve Numbers for Urban Areas

HYDROLOGIC SOIL TYPE (%) - Proposed Conditions								
Catchment	Hydrologic Soil Type							TOTAL
	A	AB	B	BC	C	CD	D	
103	0.0	100.0	0.0	0.0	0.0	0.0	0.0	100
201	0.0	100.0	0.0	0.0	0.0	0.0	0.0	100
202	0.0	100.0	0.0	0.0	0.0	0.0	0.0	100
203	0.0	100.0	0.0	0.0	0.0	0.0	0.0	100
204	0.0	100.0	0.0	0.0	0.0	0.0	0.0	100

HYDROLOGIC SOIL TYPE (%) - Proposed Conditions								
Catchment	Hydrologic Soil Type							TOTAL
	A	AB	B	BC	C	CD	D	
103		100						100
201		100						100
202		100						100
203		100						100
204		100						100

Interim Proposed Conditions
CN Calculations

LAND USE (%) - Proposed Conditions

Catchment	Meadow	Woodlot	Gravel	Lawns	Pasture Range	Crop	Fallow (Bare)	Low Density Residences	Impervious	Total
103	0.0	38.0	0.0	29.0	26.7	0.0	0.0	0.0	6.3	100.0
201	0.0	0.0	0.0	84.6	0.0	0.0	0.0	0.0	15.4	100.0
202	0.0	0.0	0.0	93.7	0.0	0.0	0.0	0.0	6.3	100.0
203	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	100.0
204	0.0	0.0	0.0	87.5	0.0	0.0	0.0	0.0	12.5	100.0

Note: Where STANDHYD command used (shaded), impervious fraction is not considered in CN determination, since %Imp directly input in STANDHYD command

LAND USE (%) - Proposed Conditions

Catchment	Meadow	Woodlot	Gravel	Lawns	Pasture Range	Crop	Fallow (Bare)	Low Density Residences	Impervious	Total
103		38.0		29.0	26.7				6.3	100.0
201				84.6					15.4	100.0
202				93.7					6.3	100.0
203				100.0						100.0
204				87.5					12.5	100.0

Note: Where STANDHYD command used (shaded), impervious fraction is not considered in CN determination, since %Imp directly input in STANDHYD command

CURVE NUMBER (CN) - Proposed Conditions

Catchment	Meadow	Woodlot	Gravel	Lawns	Pasture Range	Crop	Fallow (Bare)	Low Density Residences	Impervious	Weighted CN
103	0.0	18.2	0.0	14.5	16.4	0.0	0.0	0.0	6.2	55
201	0.0	0.0	0.0	42.3	0.0	0.0	0.0	0.0	15.1	57
202	0.0	0.0	0.0	46.9	0.0	0.0	0.0	0.0	6.1	53
203	0.0	0.0	0.0	50.0	0.0	0.0	0.0	0.0	0.0	50
204	0.0	0.0	0.0	43.7	0.0	0.0	0.0	0.0	12.3	56

** AMC II assumed

Interim Proposed Conditions
CN Calculations

Input Values

Step							
	Subcatchment:	103		201	202	203	204
1	**CN (AMC II):**	**55**		**57**	**53**	**50**	**56**
2	CN (AMC III) =	74		75	72	70	75
3	100 Year Precipitation, P =	119.06	mm	119.06	119.06	119.06	119.06

$$Q = \frac{(P - Ia)^2}{(P - Ia) + S} \qquad S = \frac{(P - Ia)^2}{Q} - (P - Ia)$$

Q = rainfall excess or runoff, mm
S = potential maximum retention or available storage, mm

$$CN = \frac{25400}{S + 254} \qquad S = \frac{25400}{CN} - 254$$

CN* = modified SCS curve # that better reflects Ia conditions in Ontario

Output Values

Step							
	Subcatchment:	103		201	202	203	204
	S_{III} =	89.24	mm	84.67	98.78	108.86	84.67
	SCS Assumption of 0.2 S = Ia =	17.85	mm	16.93	19.76	21.77	16.93
4	Q_{III} =	53.79	mm	55.84	49.78	45.91	55.84
	Preferred Initial Abstraction, Ia =	7.5	mm	4.5	4.8	5.0	4.6
5	S^*_{III} =	119.79	mm	120.37	147.94	169.29	120.10
6	CN^*_{III} =	67.95	mm	67.85	63.19	60.01	67.90
	CN^*_{III}=	**68**	Rounded	**68**	**63**	**60**	**68**
7	**CN^*_{II}=**	**48**	convert	**48**	**42**	**39**	**48**

Explanation of Procedure

1 Determine CN based on typical AMC II conditions (attached)
2 Convert CN from AMC II to AMC III conditions (standard SCS tables)
3 Get precipitation depth P for 100 year storm
4 Using CN_{III} with Ia = 0.2S, compute Q_{III} for 100 year precipitation
5 For the same Q_{III}, compute S^*_{III} using Ia=1.5mm (or otherwise determined)
6 Compute CN^*_{III} using S^*_{III}
7 Calculate CN^*_{II} using SCS conversion table

Interim Proposed Conditions
IA Calculations

LAND USE (%) - Proposed Conditions										
Catchment	Meadow	Woodlot	Gravel	Lawns	Pasture Range	Crop	Fallow (Bare)	Low Density Residences	Impervious	Total
103		38.0		29.0	26.7				6.3	100.0
201				84.6					15.4	100.0
202				93.7					6.3	100.0
203				100.0						100.0

IA VALUES (mm) - Proposed Conditions										
Catchment	Meadow	Woodlot	Gravel	Lawns	Pasture Range	Crop	Fallow (Bare)	Low Density Residences	Impervious	Total
IA (mm)	8	10	2	5	8	8	3	2	2	
103		3.8		1.4	2.1				0.1	7.5
201				4.2					0.3	4.5
202				4.7					0.1	4.8
203				5.0						5.0

* IA values based on LSRCA guidelines

Interim Proposed Conditions
Time to Peak Calculations

Uplands Method:

Catchment ID	High Elevation	Low Elevation	Length (m)	Slope (%)	Land Cover Type	Velocity (m/s)	Time of Concentration (s)	Time of Concentration (hr)	Time to Peak (hr)
103a	259.70	250.06	171	5.64	Woodland	0.36	477.3	0.13	0.09
103b	250.06	249.80	53	0.49	Waterway	0.33	158.6	0.04	0.03
103									**0.12**
201a	256.57	252.87	95	3.89	Pasture	0.43	220.0	0.06	0.04
201b	252.87	251.63	5	24.80	Pasture	1.10	4.5	0.00	0.00
201c	251.63	250.85	32	2.44	Waterway	0.72	44.1	0.01	0.01
201									**0.05**
202a	251.78	249.51	26	8.73	Pasture	0.65	40.0	0.01	0.01
202b	249.51	246.67	9	31.56	Pasture	1.24	7.2	0.00	0.01
202									**0.02**
203a	251.73	250.76	12	8.08	Pasture	0.62	19.2	0.01	0.01
203									**0.01**
204a	251.17	249.75	19	7.47	Pasture	0.60	31.7	0.01	0.01
204									**0.01**

Ultimate Proposed Conditions
VO Parameter Summary

NASHYD

Number	301	302
Description		
DT(min)	1	1
Area (ha)	0.75	0.08
CN*	52.0	39.0
IA(mm)	4.4	5.0
TP Method	Uplands	Uplands
TP (hr)	0.02	0.01

Total Area = 0.83 ha

Udora Estates
Project Number: 2328
Date: December 2025
Designer Initials: J.S.

Ultimate Proposed Conditions
CN Calculations

Site Soils: (per OMAFRA County Soils Mapping)

Soil Type	**Hydrologic Soil Group**
Pontypool Sandy Loam	AB

Land Use	TABLE OF CURVE NUMBERS (CN's)** Hydrologic Soil Type A	AB	B	BC	C	CD	D	Manning's 'n'	Source
Meadow "Good"	30	44	58	64.5	71	74.5	78	0.40	MTO
Woodlot "Fair"	36	48	60	66.5	73	76	79	0.40	MTO
Gravel	76	80.5	85	87	89	90	91	0.30	USDA
Lawns "Good"	39	50	61	67.5	74	77	80	0.25	USDA
Pasture/Range	58	61.5	65	70.5	76	78.5	81	0.17	MTO
Crop	66	70	74	78	82	84	86	0.13	MTO
Fallow (Bare)	77	82	86	89	91	93	94	0.05	MTO
Low Density Residences	57	64.5	72	76.5	81	83.5	86	0.25	USDA
Streets, paved	98	98	98	98	98	98	98	0.01	USDA

1. MTO Drainage Manual (1997), Design Chart 1.09-Soil/Land Use Curve Numbers
2. USDA (1986), Urban Hydrology for Small Watersheds, Table 2.2-Runoff Curve Numbers for Urban Areas

HYDROLOGIC SOIL TYPE (%) - Proposed Conditions

Catchment	Hydrologic Soil Type A	AB	B	BC	C	CD	D	TOTAL
301		100						100
302		100						100

Note: Where STANDHYD command used (shaded), impervious fraction is not considered in CN determination, since %Imp directly input in STANDHYD command

LAND USE (%) - Proposed Conditions

Catchment	Meadow	Woodlot	Gravel	Lawns	Pasture Range	Crop	Fallow (Bare)	Low Density Residences	Impervious	Total
301				80.5					19.5	100.0
302				100.0						100.0

Note: Where STANDHYD command used (shaded), impervious fraction is not considered in CN determination, since %Imp directly input in STANDHYD command

CURVE NUMBER (CN) - Proposed Conditions

Catchment	Meadow	Woodlot	Gravel	Lawns	Pasture Range	Crop	Fallow (Bare)	Low Density Residences	Impervious	Weighted CN
301	0.0	0.0	0.0	40.2	0.0	0.0	0.0	0.0	19.1	59
302	0.0	0.0	0.0	50.0	0.0	0.0	0.0	0.0	0.0	50

** AMC II assumed

Ultimate Proposed Conditions
CN Calculations

Input Values

Step				
	Subcatchment:	301		302
1	**CN (AMC II):**	**59**		**50**
2	CN (AMC III) =	77		70
3	100 Year Precipitation, P =	119.06	mm	119.06

$$Q = \frac{(P - Ia)^2}{(P - Ia) + S} \qquad S = \frac{(P - Ia)^2}{Q} - (P - Ia)$$

Q = rainfall excess or runoff, mm
S = potential maximum retention or available storage, mm

$$CN = \frac{25400}{S + 254} \qquad S = \frac{25400}{CN} - 254$$

CN* = modified SCS curve # that better reflects Ia conditions in Ontario

Output Values

Step				
	Subcatchment:	301		302
	S_{III} =	75.87	mm	108.86
	SCS Assumption of 0.2 S = Ia =	15.17	mm	21.77
4	Q_{III} =	60.04	mm	45.91
	Preferred Initial Abstraction, Ia =	4.4	mm	5.0
5	S^*_{III} =	104.28	mm	169.29
6	CN^*_{III} =	70.90	mm	60.01
	CN^*_{III}=	**71**	Rounded	**60**
7	**CN^*_{II}=**	**52**	convert	**39**

Explanation of Procedure

1 Determine CN based on typical AMC II conditions (attached)
2 Convert CN from AMC II to AMC III conditions (standard SCS tables)
3 Get precipitation depth P for 100 year storm
4 Using CN_{III} with Ia = 0.2S, compute Q_{III} for 100 year precipitation
5 For the same Q_{III}, compute S^*_{III} using Ia=1.5mm (or otherwise determined)
6 Compute CN^*_{III} using S^*_{III}
7 Calculate CN^*_{II} using SCS conversion table

Ultimate Proposed Conditions
IA Calculations

LAND USE (%) - Proposed Conditions										
Catchment	Meadow	Woodlot	Gravel	Lawns	Pasture Range	Crop	Fallow (Bare)	Low Density Residences	Impervious	Total
301				80.5					19.5	100.0
302				100.0						100.0

IA VALUES (mm) - Proposed Conditions										
Catchment	Meadow	Woodlot	Gravel	Lawns	Pasture Range	Crop	Fallow (Bare)	Low Density Residences	Impervious	Total
IA (mm)	8	10	2	5	8	8	3	2	2	
301				4.0					0.4	4.4
302				5.0						5.0

* IA values based on LSRCA guidelines

Ultimate Proposed Conditions
Time to Peak Calculations

Uplands Method:

Catchment ID	High Elevation	Low Elevation	Length (m)	Slope (%)	Land Cover Type	Velocity (m/s)	Time of Concentration (s)	Time of Concentration (hr)	Time to Peak (hr)
301a	248.80	242.43	114	5.59	Waterway	1.08	105.3	0.03	0.02
301									**0.02**
302a	251.73	250.76	12	8.08	Pasture	0.62	19.2	0.01	0.01
302									**0.01**

Storm Event	Run	Existing NHYD	FUT NHYD	Existing Model Flow (m^3/s)	Future Model Flow (m^3/s)	Percent Change in Flows Compared to Existing Model (%)
Ravenshoe Road Outlet						
2 Year	Run 01: 2yr 4hr 10min Chicago	10	2000	0.028	0.008	-71.4%
5 Year	Run 02: 5yr 4hr 10min Chicago	10	2000	0.070	0.011	-84.3%
10 Year	Run 03: 10yr 4hr 10min Chicago	10	2000	0.105	0.025	-76.2%
25 Year	Run 04: 25yr 4hr 10min Chicago	10	2000	0.160	0.070	-56.3%
100 Year	Run 05: 100yr 4hr 10min Chicago	10	2000	0.283	0.196	-30.7%
Regional Road 1						
2 Year	Run 01: 2yr 4hr 10min Chicago	102	203	0.004	0.001	-75.0%
5 Year	Run 02: 5yr 4hr 10min Chicago	102	203	0.009	0.002	-77.8%
10 Year	Run 03: 10yr 4hr 10min Chicago	102	203	0.013	0.003	-76.9%
25 Year	Run 04: 25yr 4hr 10min Chicago	102	203	0.020	0.004	-80.0%
100 Year	Run 05: 100yr 4hr 10min Chicago	102	203	0.034	0.006	-82.4%
Ravenshoe Road Outlet						
2 Year	Run 06: 2yr 6hr 15min SCS Type II (MTO)	10	2000	0.051	0.010	-80.4%
5 Year	Run 07: 5yr 6hr 15min SCS Type II (MTO)	10	2000	0.111	0.015	-86.5%
10 Year	Run 08: 10yr 6hr 15min SCS Type II (MTO)	10	2000	0.160	0.054	-66.3%
25 Year	Run 09: 25yr 6hr 15min SCS Type II (MTO)	10	2000	0.222	0.134	-39.6%
100 Year	Run 10: 100yr 6hr 15min SCS Type II (MTO)	10	2000	0.358	0.335	-6.4%
Regional Road 1						
2 Year	Run 06: 2yr 6hr 15min SCS Type II (MTO)	102	203	0.006	0.001	-83.3%
5 Year	Run 07: 5yr 6hr 15min SCS Type II (MTO)	102	203	0.012	0.002	-83.3%
10 Year	Run 08: 10yr 6hr 15min SCS Type II (MTO)	102	203	0.017	0.003	-82.4%
25 Year	Run 09: 25yr 6hr 15min SCS Type II (MTO)	102	203	0.022	0.004	-81.8%
100 Year	Run 10: 100yr 6hr 15min SCS Type II (MTO)	102	203	0.035	0.006	-82.9%
Ravenshoe Road Outlet						
2 Year	Run 11: 2yr 12hr 15min SCS Type II (MTO)	10	2000	0.062	0.010	-83.9%
5 Year	Run 12: 5yr 12hr 15min SCS Type II (MTO)	10	2000	0.131	0.030	-77.1%
10 Year	Run 13: 10yr 12hr 15min SCS Type II (MTO)	10	2000	0.185	0.098	-47.0%
25 Year	Run 14: 25yr 12hr 15min SCS Type II (MTO)	10	2000	0.254	0.197	-22.4%
100 Year	Run 15: 100yr 12hr 15min SCS Type II (MTO)	10	2000	0.392	0.385	-1.8%
Regional Road 1						
2 Year	Run 11: 2yr 12hr 15min SCS Type II (MTO)	102	203	0.007	0.001	-85.7%
5 Year	Run 12: 5yr 12hr 15min SCS Type II (MTO)	102	203	0.013	0.002	-84.6%
10 Year	Run 13: 10yr 12hr 15min SCS Type II (MTO)	102	203	0.018	0.003	-83.3%
25 Year	Run 14: 25yr 12hr 15min SCS Type II (MTO)	102	203	0.025	0.004	-84.0%
100 Year	Run 15: 100yr 12hr 15min SCS Type II (MTO)	102	203	0.037	0.006	-83.8%
Ravenshoe Road Outlet						
2 Year	Run 16: 2yr 24hr 15min SCS Type II (MTO)	10	2000	0.077	0.012	-84.4%
5 Year	Run 17: 5yr 24hr 15min SCS Type II (MTO)	10	2000	0.157	0.054	-65.6%
10 Year	Run 18: 10yr 24hr 15min SCS Type II (MTO)	10	2000	0.220	0.143	-35.0%
25 Year	Run 19: 25yr 24hr 15min SCS Type II (MTO)	10	2000	0.299	0.266	-11.0%
100 Year	Run 20: 100yr 24hr 15min SCS Type II (MTO)	10	2000	0.445	0.438	-1.6%
Regional Road 1						
2 Year	Run 16: 2yr 24hr 15min SCS Type II (MTO)	102	203	0.008	0.001	-87.5%
5 Year	Run 17: 5yr 24hr 15min SCS Type II (MTO)	102	203	0.016	0.003	-81.3%
10 Year	Run 18: 10yr 24hr 15min SCS Type II (MTO)	102	203	0.022	0.004	-81.8%
25 Year	Run 19: 25yr 24hr 15min SCS Type II (MTO)	102	203	0.029	0.005	-82.8%
100 Year	Run 20: 100yr 24hr 15min SCS Type II (MTO)	102	203	0.041	0.007	-82.9%

Storm Event	Run	Existing NHYD	FUT NHYD	Existing Model Flow (m^3/s)	Future Model Flow (m^3/s)	Percent Change in Flows Compared to Existing Model (%)
Ravenshoe Road Outlet						
2 Year	Run 01: 2yr 4hr 10min Chicago	10	301	0.028	0.017	-39.3%
5 Year	Run 02: 5yr 4hr 10min Chicago	10	301	0.070	0.034	-51.4%
10 Year	Run 03: 10yr 4hr 10min Chicago	10	301	0.105	0.047	-55.2%
25 Year	Run 04: 25yr 4hr 10min Chicago	10	301	0.160	0.068	-57.5%
100 Year	Run 05: 100yr 4hr 10min Chicago	10	301	0.283	0.111	-60.8%
Regional Road 1						
2 Year	Run 01: 2yr 4hr 10min Chicago	102	302	0.004	0.001	-75.0%
5 Year	Run 02: 5yr 4hr 10min Chicago	102	302	0.009	0.002	-77.8%
10 Year	Run 03: 10yr 4hr 10min Chicago	102	302	0.013	0.003	-76.9%
25 Year	Run 04: 25yr 4hr 10min Chicago	102	302	0.020	0.004	-80.0%
100 Year	Run 05: 100yr 4hr 10min Chicago	102	302	0.034	0.006	-82.4%
Ravenshoe Road Outlet						
2 Year	Run 06: 2yr 6hr 15min SCS Type II (MTO)	10	301	0.051	0.019	-62.7%
5 Year	Run 07: 5yr 6hr 15min SCS Type II (MTO)	10	301	0.111	0.037	-66.7%
10 Year	Run 08: 10yr 6hr 15min SCS Type II (MTO)	10	301	0.160	0.050	-68.8%
25 Year	Run 09: 25yr 6hr 15min SCS Type II (MTO)	10	301	0.222	0.067	-69.8%
100 Year	Run 10: 100yr 6hr 15min SCS Type II (MTO)	10	301	0.358	0.103	-71.2%
Regional Road 1						
2 Year	Run 06: 2yr 6hr 15min SCS Type II (MTO)	102	302	0.006	0.001	-83.3%
5 Year	Run 07: 5yr 6hr 15min SCS Type II (MTO)	102	302	0.012	0.002	-83.3%
10 Year	Run 08: 10yr 6hr 15min SCS Type II (MTO)	102	302	0.017	0.003	-82.4%
25 Year	Run 09: 25yr 6hr 15min SCS Type II (MTO)	102	302	0.022	0.004	-81.8%
100 Year	Run 10: 100yr 6hr 15min SCS Type II (MTO)	102	302	0.035	0.006	-82.9%
Ravenshoe Road Outlet						
2 Year	Run 11: 2yr 12hr 15min SCS Type II (MTO)	10	301	0.062	0.021	-66.1%
5 Year	Run 12: 5yr 12hr 15min SCS Type II (MTO)	10	301	0.131	0.040	-69.5%
10 Year	Run 13: 10yr 12hr 15min SCS Type II (MTO)	10	301	0.185	0.055	-70.3%
25 Year	Run 14: 25yr 12hr 15min SCS Type II (MTO)	10	301	0.254	0.073	-71.3%
100 Year	Run 15: 100yr 12hr 15min SCS Type II (MTO)	10	301	0.392	0.108	-72.4%
Regional Road 1						
2 Year	Run 11: 2yr 12hr 15min SCS Type II (MTO)	102	302	0.007	0.001	-85.7%
5 Year	Run 12: 5yr 12hr 15min SCS Type II (MTO)	102	302	0.013	0.002	-84.6%
10 Year	Run 13: 10yr 12hr 15min SCS Type II (MTO)	102	302	0.018	0.003	-83.3%
25 Year	Run 14: 25yr 12hr 15min SCS Type II (MTO)	102	302	0.025	0.004	-84.0%
100 Year	Run 15: 100yr 12hr 15min SCS Type II (MTO)	102	302	0.037	0.006	-83.8%
Ravenshoe Road Outlet						
2 Year	Run 16: 2yr 24hr 15min SCS Type II (MTO)	10	301	0.077	0.025	-67.5%
5 Year	Run 17: 5yr 24hr 15min SCS Type II (MTO)	10	301	0.157	0.047	-70.1%
10 Year	Run 18: 10yr 24hr 15min SCS Type II (MTO)	10	301	0.220	0.064	-70.9%
25 Year	Run 19: 25yr 24hr 15min SCS Type II (MTO)	10	301	0.299	0.085	-71.6%
100 Year	Run 20: 100yr 24hr 15min SCS Type II (MTO)	10	301	0.445	0.122	-72.6%
Regional Road 1						
2 Year	Run 16: 2yr 24hr 15min SCS Type II (MTO)	102	302	0.008	0.001	-87.5%
5 Year	Run 17: 5yr 24hr 15min SCS Type II (MTO)	102	302	0.016	0.003	-81.3%
10 Year	Run 18: 10yr 24hr 15min SCS Type II (MTO)	102	302	0.022	0.004	-81.8%
25 Year	Run 19: 25yr 24hr 15min SCS Type II (MTO)	102	302	0.029	0.005	-82.8%
100 Year	Run 20: 100yr 24hr 15min SCS Type II (MTO)	102	302	0.041	0.007	-82.9%

Appendix D Phosphorus Budgets

Existing Phosphorus Budget

Watershed Pefferlaw/Uxbridge Brook

To: Ravenshoe Ditch			
Land Cover	TP Loading (kg/ha/yr)	Area (ha)	TP Loading (kg/yr)
Transitional	0.04	1.48	0.06
Forest	0.03	0.47	0.01
	Total	1.95	0.07

Subwatershed	**Phosphorus Export (kg/ha/yr)**											
	Cropland	**Hay-Pasture**	**Sod Farm/Golf Course**	**High Intensity Development: Commercial /Industrial**	**High Intensity Development: Residential**	**Low Intensity Development**	**Quarry**	**Unpaved Road**	**Forest**	**Transition**	**Wetland**	**Open Water**
Monitored Subwatersheds												
Beaver River	0.22	0.04	0.01	1.82	1.32	0.19	0.06	0.83	0.02	0.04	0.02	0.26
Black River	0.23	0.08	0.02	1.82	1.32	0.17	0.15	0.83	0.05	0.06	0.04	0.26
East Holland River	0.36	0.12	0.24	1.82	1.32	0.13	0.08	0.83	0.10	0.16	0.10	0.26
Hawkestone Creek	0.19	0.10	0.06	1.82	1.32	0.09	0.10	0.83	0.03	0.04	0.03	0.26
Lovers Creek	0.16	0.07	0.17	1.82	1.32	0.07	0.06	0.83	0.06	0.06	0.05	0.26
Pefferlaw/Uxbridge Brook	0.11	0.06	0.02	1.82	1.32	0.13	0.04	0.83	0.03	0.04	0.04	0.26
Whites Creek	0.23	0.10	0.42	1.82	1.32	0.15	0.08	0.83	0.10	0.11	0.09	0.26
Unmonitored Subwatersheds												
Barrie Creeks	0.19	0.07	0.12	1.82	1.32	0.13	0.08	0.83	0.05	0.06	0.05	0.26
GeorginaCreeks	0.36	0.12	0.24	1.82	1.32	0.13	0.08	0.83	0.10	0.16	0.10	0.26
Hewitts Creek	0.19	0.07	0.12	1.82	1.32	0.13	0.08	0.83	0.05	0.06	0.05	0.26
Innisfil Creeks	0.19	0.07	0.12	1.82	1.32	0.13	0.08	0.83	0.05	0.06	0.05	0.26
Maskinonge River	0.19	0.07	0.12	1.82	1.32	0.13	0.08	0.83	0.05	0.06	0.05	0.26
Oro Creeks North	0.36	0.12	0.24	1.82	1.32	0.13	0.08	0.83	0.10	0.16	0.10	0.26
Oro Creeks South	0.19	0.07	0.12	1.82	1.32	0.13	0.08	0.83	0.05	0.06	0.05	0.26
Ramara Creeks	0.19	0.07	0.12	1.82	1.32	0.13	0.08	0.83	0.05	0.06	0.05	0.26
Talbot/Upper Talbot River	0.19	0.07	0.12	1.82	1.32	0.13	0.08	0.83	0.05	0.06	0.05	0.26
West Holland River	0.36	0.12	0.24	1.82	1.32	0.13	0.08	0.83	0.10	0.16	0.10	0.26

Phosphorous Calculations

Udora Estates
Project Number: 2328
Date: December 2025
Designer Initials: J.S.

Proposed Conditions Phosphorus Budget

Watershed Pefferlaw/Uxbridge Brook

				BMP #1			BMP #2			BMP #3		
Land Cover	TP Loading (kg/ha/yr)	Area (ha)	TP Loading (kg/yr)	BMP	TP Removal Rate (%)	TP Export (kg/yr)	BMP	TP Removal Rate (%)	Mitigated P_{load} (kg/year)	BMP	TP Removal Rate (%)	TP Export (kg/yr)
Low Intensity Development	0.13	0.39	0.05	Infiltration Trenches	60%	0.02	Sand or Media Filters	45%	0.01	Dry Detention Ponds	10%	0.01
Low Intensity Development	0.13	0.73	0.09	Sand or Media Filters	45%	0.05	Dry Detention Ponds	10%	0.05	None	0%	0.05
Low Intensity Development	0.13	0.53	0.07	Dry Detention Ponds	10%	0.06	None	0%	0.06	None	0%	0.06
Low Intensity Development	0.13	0.30	0.04	None	0%	0.04	None	0%	0.04	None	0%	0.04
	Total	1.95	0.25								**Total**	0.16

Lake Simcoe Phosphorous Offsetting Policy Calculation

Phosphorus Export =		0.09	kg/yr
Offset Ratio =		1.0	:1
Offsetting Value =	$	35,770.00	/kg/year
Offsetting Cost =	$	3,152.97	
Administration Fee =		15%	
	$	472.95	
TOTAL PHOSPHORUS OFFSETTING FEE =	**$**	**3,625.91**	

Appendix E Stormwater Management Pond Sizing Calculations

Weighted Impervious Calculation

Catchment ID	Total Area	Imperviousness	Impervious Area
	(ha)	(%)	(ha)
103	1.94	6	0.12
201	1.91	15	0.29
Total	**3.85**	**10**	**0.40**

Interim Dry Pond Water Quality and Extended Detention Sizing

EXTENDED DETENTION

Level of Protection = Basic (Level 3)

Weighted Impervious = 10 %

Drainage Area = 3.85 ha

SWMP Type = 5. Dry Pond (Continuous Flow)

Required Water Quality Storage Volume 8.2 m^3/ha

TABLE 3.2 - WATER QUALITY STORAGE REQUIREMENTS FOR DRY PONDS (FROM MOE SWM PLANNING AND DESIGN MANUAL - 2003)

Protection Level	SWMP Type	Storage Volume (m^3/ha) for Impervious Level			
		35%	55%	70%	85%
Basic (Level 3)	5. Dry Pond (Continuous Flow)	90	150	200	240

Using the 40 mm - 4 hour Chicago Storm

Erosion Control Volume (V) = Runoff Depth (mm) x Drainage Area (ha) x 10 (m^3) / (mm)(ha)

Erosion Control Volume (V) = 3.74 mm x 3.85 ha x 10 m^3 / mm·ha

Erosion Control Volume (V) = 144 m^3

Using Water Quality Storage Volume 8.2 m3/ha

Extended Detention Volume (V) = 8.2 m3/ha x Drainage Area (ha)

Extended Detention Volume (V) = 8.2 m^3/ha 3.85 ha

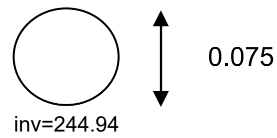
Extended Detention Volume (V) = 32 m^3

Governing Volume (V) = 144 m^3

Control Structure Summary

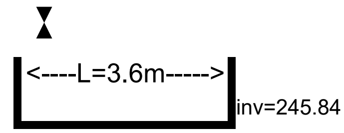
Orifice 1

Invert =	244.94	m
Size =	0.075	m
Orifice Coefficient, C =	0.62	
Obvert =	245.015	m



Broad Crested Weir (Weir 2)

Length =	3.60	m
Elevation =	245.84	m
Crest Breadth =	0.20	m



Udora Estates
Project Number: 2328
Date: November 2025
Designer Initials: J.S.

Outflow Summary

Starting Water Level (m) = 245.34
Elevation Increment (m) = 0.02

Shading represents Storage-Discharge pairings used in VO modelling

Upstream Elevation (m)	Orifice 1 Outflow (cms)	Weir 2 Outflow (cms)	Backwater Elevation (m)	Stage (m)	Total Flow (cms)	Storage (m^3)	Detention Time (hrs)	Chicago 4 Hr	SCS 12 Hr	SCS 24 Hr
245.34	0.007	0.000	0.00	245.34	0.007	0	0.0			
245.36	0.008	0.000	0.00	245.36	0.008	5	0.0			
245.38	0.008	0.000	0.00	245.38	0.008	10	0.0			
245.40	0.008	0.000	0.00	245.40	0.008	15	0.2			
245.42	0.008	0.000	0.00	245.42	0.008	20	0.4			
245.44	0.008	0.000	0.00	245.44	0.008	25	0.5			
245.46	0.008	0.000	0.00	245.46	0.008	30	0.7			
245.48	0.009	0.000	0.00	245.48	0.009	36	0.9			
245.50	0.009	0.000	0.00	245.50	0.009	41	1.1			
245.52	0.009	0.000	0.00	245.52	0.009	47	1.2	2 Year		
245.54	0.009	0.000	0.00	245.54	0.009	53	1.4			
245.56	0.009	0.000	0.00	245.56	0.009	59	1.6			
245.58	0.009	0.000	0.00	245.58	0.009	65	1.8			
245.60	0.010	0.000	0.00	245.60	0.010	71	2.0			
245.62	0.010	0.000	0.00	245.62	0.010	77	2.1		2 Year	
245.64	0.010	0.000	0.00	245.64	0.010	83	2.3			
245.66	0.010	0.000	0.00	245.66	0.010	90	2.5			2 Year
245.68	0.010	0.000	0.00	245.68	0.010	97	2.7			
245.70	0.010	0.000	0.00	245.70	0.010	103	2.9			
245.72	0.010	0.000	0.00	245.72	0.010	110	3.0			
245.74	0.011	0.000	0.00	245.74	0.011	117	3.2	5 Year		
245.76	0.011	0.000	0.00	245.76	0.011	124	3.4			
245.78	0.011	0.000	0.00	245.78	0.011	131	3.6			
245.80	0.011	0.000	0.00	245.80	0.011	138	3.8			
245.82	0.011	0.000	0.00	245.82	0.011	146	4.0		EXTENDED DETENTION	
245.84	0.011	0.000	0.00	245.84	0.011	153	4.2	10 Year	5 Year	
245.86	0.011	0.016	0.00	245.86	0.027	161	4.3			5 Year
245.88	0.012	0.045	0.00	245.88	0.056	169	4.3	25 Year	10 Year	
245.90	0.012	0.082	0.00	245.90	0.094	176	4.3			
245.92	0.012	0.126	0.00	245.92	0.138	184	4.4			10 Year
245.94	0.012	0.176	0.00	245.94	0.188	193	4.4	100 Year	25 Year	
245.96	0.012	0.232	0.00	245.96	0.244	201	4.4			25 Year
245.98	0.012	0.292	0.00	245.98	0.304	209	4.4			
246.00	0.012	0.357	0.00	246.00	0.369	217	4.4		100 Year	100 Year
246.02	0.012	0.426	0.00	246.02	0.439	226	4.4			
246.04	0.013	0.499	0.00	246.04	0.512	235	4.4			
246.06	0.013	0.594	0.00	246.06	0.607	243	4.4			
246.08	0.013	0.677	0.00	246.08	0.690	252	4.4			
246.10	0.013	0.764	0.00	246.10	0.776	261	4.4			
246.12	0.013	0.853	0.00	246.12	0.866	270	4.4			
246.14	0.013	0.946	0.00	246.14	0.960	279	4.4			
246.16	0.013	1.127	0.00	246.16	1.141	289	4.4			
246.18	0.013	1.235	0.00	246.18	1.248	298	4.4			
246.20	0.013	1.345	0.00	246.20	1.359	308	4.4			
246.22	0.014	1.459	0.00	246.22	1.472	317	4.4			
246.24	0.014	1.639	0.00	246.24	1.653	327	4.4			
246.26	0.014	1.764	0.00	246.26	1.778	337	4.4			
246.28	0.014	1.891	0.00	246.28	1.905	347	4.4			
246.30	0.014	2.022	0.00	246.30	2.036	357	4.4			
246.32	0.014	2.155	0.00	246.32	2.169	367	4.4			
246.34	0.014	2.316	0.00	246.34	2.331	378	4.4			

Appendix F LID Sizing

SCS consulting group ltd

HYDRAULIC CONDUCTIVITY LINEAR INTERPOLATION

TABLE C1: APPROXIMATE RELATIONSHIPS BETWEEN HYDRAULIC CONDUCTIVITY, PERCOLATION TIME AND INFILTRATION RATE
(FROM LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT PLANNING AND DESIGN GUIDE - 2010)

Hydraulic Conductivity, K_{fs} (centimeters/second)	Percolation Time, T (minutes/centimetre)	Infiltration Rate, 1/T (millimetres/hour)
0.1	2	300
0.01	3	150
0.001	4	75
0.0001	12	50
0.00001	20	30
0.000001	50	12

Hydraulic Conductivity (K_{fs})	0.000026	centimetres/second
Hydraulic Conductivity Upper Limit (K_{fsu})	0.0001	centimetres/second
Hydraulic Conductivity Lower Limit (K_{fsl})	0.00001	centimetres/second
Percolation Time Upper Limit (T_u)	12	minutes/centimetre
Percolation Time Lower Limit (T_l)	20	minutes/centimetre
Infiltration Rate Upper Limit ($1/T_u$)	50	millimetres/hour
Infiltration Rate Lower Limit ($1/T_l$)	30	millimetres/hour
Interpolated Infiltration Rate (1/T)	**33.56**	**millimetres/hour**

$$y = y_0 + (x - x_0)\frac{y_1 - y_0}{x_1 - x_0}$$

1. Hydraulic Conductivity per Hydrogeological Assessment prepared by (Gaman Consultants Inc., 2025)

TABLE C1: APPROXIMATE RELATIONSHIPS BETWEEN HYDRAULIC CONDUCTIVITY, PERCOLATION TIME AND INFILTRATION RATE
(FROM LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT PLANNING AND DESIGN GUIDE - 2010)

Hydraulic Conductivity, K_{fs} (centimeters/second)	Percolation Time, T (minutes/centimetre)	Infiltration Rate, 1/T (millimetres/hour)
0.1	2	300
0.01	3	150
0.001	4	75
0.0001	12	50
0.00001	20	30
0.000001	50	12

Hydraulic Conductivity (K_{fs})	0.00016	centimetres/second
Hydraulic Conductivity Upper Limit (K_{fsu})	0.001	centimetres/second
Hydraulic Conductivity Lower Limit (K_{fsl})	0.0001	centimetres/second
Percolation Time Upper Limit (T_u)	4	minutes/centimetre
Percolation Time Lower Limit (T_l)	12	minutes/centimetre
Infiltration Rate Upper Limit ($1/T_u$)	75	millimetres/hour
Infiltration Rate Lower Limit ($1/T_l$)	50	millimetres/hour
Interpolated Infiltration Rate (1/T)	**51.67**	**millimetres/hour**

$$y = y_0 + (x - x_0)\frac{y_1 - y_0}{x_1 - x_0}$$

1. Hydraulic Conductivity per Hydrogeological Assessment prepared by (Gaman Consultants Inc., 2025)

Infiltration Drawdown

	Units	Total to Infiltration Trench	Notes
P - Percolation Rate	mm/h	33.6	per Hydrogeological Assessment prepared by Gaman Consultatns Inc., 2025)
SF - Safety Factor		3.50	
n - Media Porosity		0.40	
t - Detention Time	h	48	
D - Maximum Depth of Infiltration Trench	m	1.15	$D = \frac{P * t}{SF * n * 1000}$

Weighted Impervious Calculation

(refer to Figure 2.4)

Coverage Type	Total Area	Imperviousness	Impervious Area
	(ha)	(%)	(ha)
A1	0.39	17	0.06
A2	0.74	17	0.12
A3	0.80	17	0.13
A4	0.02	0	0.00
B1	0.21	38	0.08
B2	0.55	38	0.21
Total	**2.71**	**23**	**0.61**

Required LID Treatment Volumes

Water Quality Volume

Level of Protection =	Enhanced	(Level 1)
Weighted Impervious =	23	%
Drainage Area =	2.71	ha
SWMP Type =	1. Infiltration	
Required Volume per hectare =	22.3	m^3/ha
Required Water Quality Volume =	**60.5**	**m^3**

Volume Control Volume

	Minimum		Target
Required Depth of Retention (mm) =	5	12.5	25
Impervious Area (ha) =	0.61	0.61	0.61
Required Volume Control Volume (m^3) =	**30.7**	**76.8**	**153.6**

TABLE 3.2 - WATER QUALITY STORAGE REQUIREMENTS
(FROM MOE SWM PLANNING AND DESIGN MANUAL - 2003)

Protection Level	SWMP Type	Storage Volume (m^3/ha) for Impervious Level			
		35%	55%	70%	85%
Enhanced (Level 1)	1. Infiltration	25	30	35	40
	2. Wetlands	80	105	120	140
	3. Hybrid Wet Pond/Wetland	110	150	175	195
	4. Wet Pond	140	190	225	250
Normal (Level 2)	1. Infiltration	20	20	25	30
	3. Hybrid Wet Pond/Wetland	75	90	105	120
	4. Wet Pond	90	110	130	150
Basic (Level 3)	1. Infiltration	20	20	20	20
	3. Hybrid Wet Pond/Wetland	60	70	75	80
	4. Wet Pond	60	75	85	95
	5. Dry Pond (Continuous Flow	90	150	200	240

Water Quality and Volume Control LID Sizing

Enhanced Swale Infiltration Trench

Length of Bioswales =	67.1	m
Width of Bioswales =	1.40	m
Depth of Bioswales =	0.45	m
Porosity =	0.40	

Total Infiltration Volume =	**16.92**	**m^3**	(a)

Enhanced Swale Filtration Trench

Length of Bioswales =	161.4	m
Width of Bioswales =	1.40	m
Depth of Bioswales =	0.45	m
Porosity =	0.40	

Filtration Bioswales Volume =	**40.67**	**m^3**	(b)

Total Provided

Total Provided Volume =	**57.59**	**m^3**	(a + b)
Volume Control Depth Provided =	**9.38**	**mm**	

Appendix G Overland Conveyance Calculation

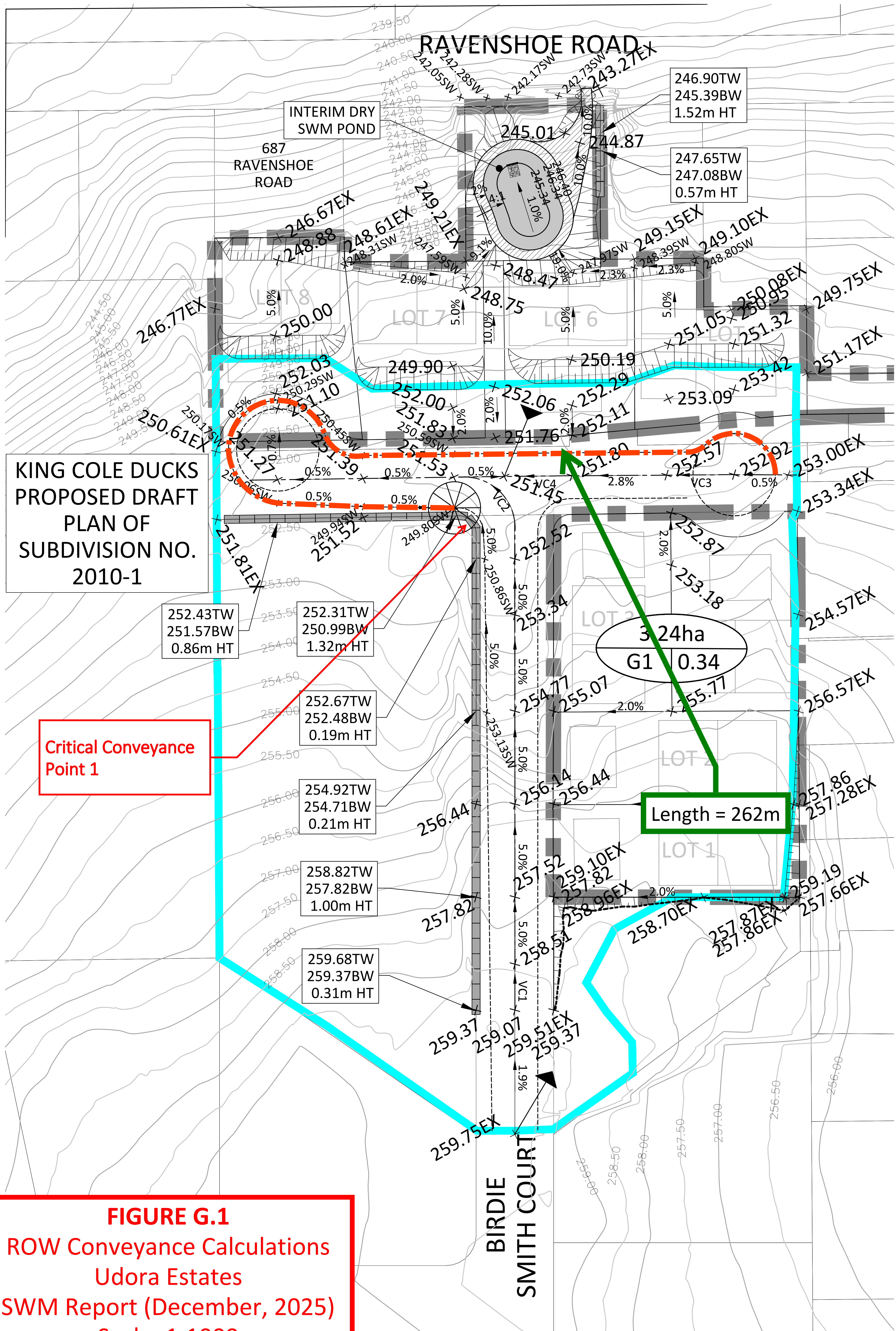


FIGURE G.1

ROW Conveyance Calculations

Udora Estates

SWM Report (December, 2025)

Scale: 1:1000

Right-of-Way Conveyance
Critical Conveyance Point 1

Catchment areas and imperviousness per Figure G.1

Catchment G1		**100 Year Return Period Factor =**	1.25
	Runoff Coefficient	Area (ha)	Weighted Runoff Coefficient (100 Year)
Estate Residential	0.40	1.94	0.30
Pervious	0.25	1.30	0.13
TOTAL	0.34	3.24	0.42

Major System	**Return Period**
	100 Year
Area (ha)=	3.24
Runoff Coeff. =	0.42
T_c (min)=	17.18
a =	**1799**
b =	**5**
c =	**0.810**
Intensity (mm/hr) =	146.13
Runoff (m^3/s) =	**0.559**

(Assumes an initial Tc of 15 mins and 262 m flowing at 2 m/s)

*Area and Runoff coefficient per Figure G.1
*Runoff Coefficient and IDF parameters per Town of Uxbridge

Required 100 Year Conveyance Capacity

Q_{100yr} (m^3/s) = **0.559**

Ditch/Enhanced Grassed Swale Capacity Calculation

(Refer to Figures G.1)

Required Channel Capacity(m^3/s)=			0.559		
Mannings' Equation			**TRAPEZOIDAL CHANNEL**		
Flow Depth (m) =	0.43				
Side Slope Ratio (H:V) =	3.0	/1	Top width	2.607	
Bed Width (m)=	0.00		Hyd. Rad, 'R'		
Area (m^2)=	0.566		0.206107321	m	
Wetted Perimeter (m)=	2.748	m	Friction Slope Sf		
Slope (%) =	0.50		0.0050	m/m	
Manning 'n' =	0.025		Velocity		
Channel Capacity, Q =	0.559	m3/sec	0.987	m/s	

Therefore, the required 100 year flow can be safely conveyed by the ROW ditch at flow depth of 0.43 m.

Appendix H Utilities Correspondence

SCS consulting group ltd

Song, Jessie

From: SWANTON Tyler <Tyler.Swanton@HydroOne.com>
Sent: January 22, 2025 10:45 AM
To: Song, Jessie
Cc: PROV LINE SUBDIVISION; Subdivision Project Management
Subject: RE: Proposed Draft Plan of Subdivision - Uxbridge

Good morning Jessie,

Pleas see Response below from our planning department. Let me know if you have any questions or concerns.

Thanks,
Tyler Swanton
(705)790-1305

Hi Tyler,
I apologize for the delayed response, please forward our below response to the consultant.

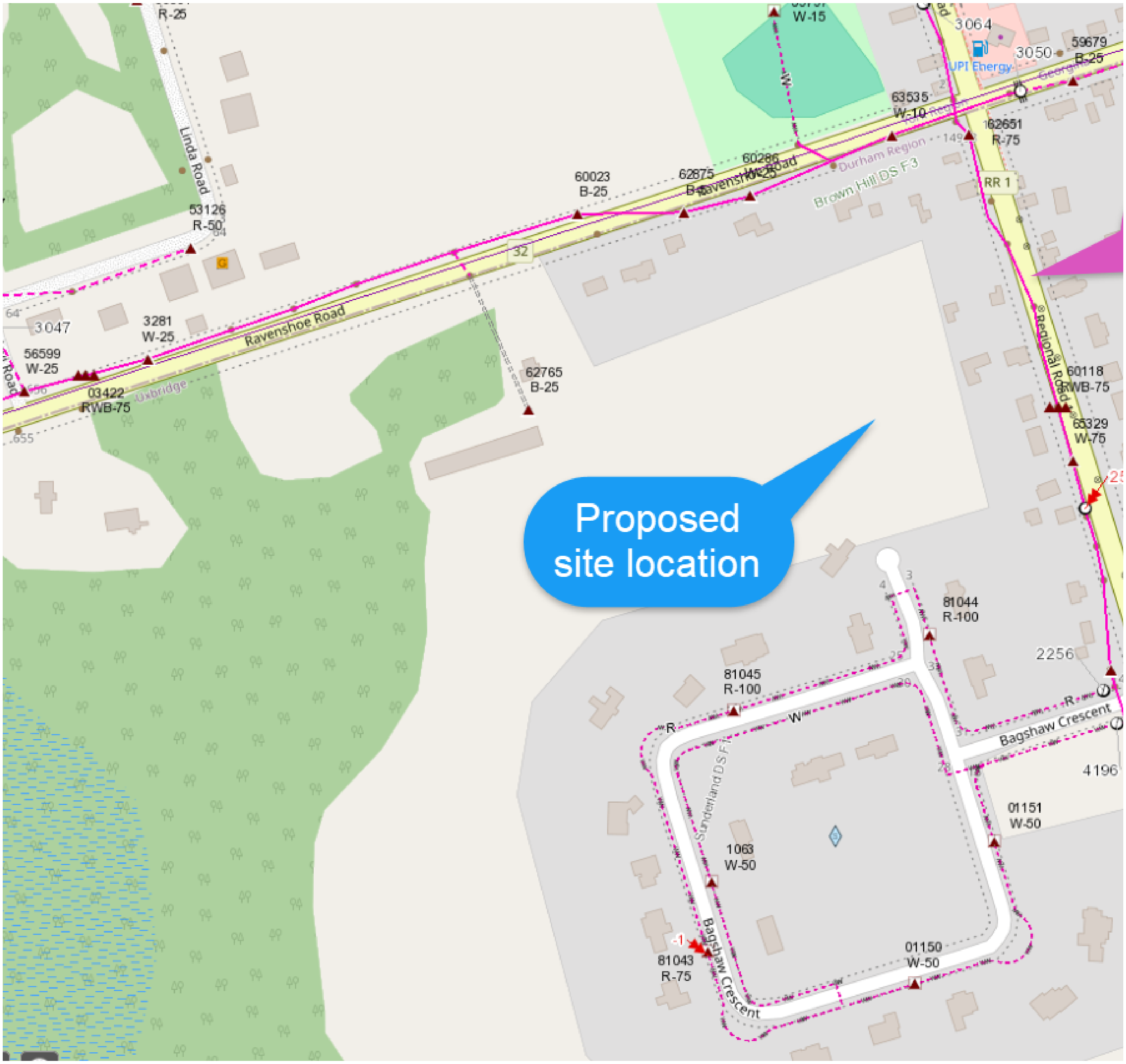
Thank you for your inquiry regarding the available capacity for a potential connection to Hydro One Networks Inc.'s ("**Hydro One**") distribution system for a proponent described at a high level below:

Civic Address and City:	Ravenshoe Rd, Uxbridge
GPS Coordinates:	GPS 44.2554, -79.1833
Load Requested by Customer (MW):	0.147 MW (Assuming Electric heat estate lots)
Type of Load:	Residential
Station & Feeder Designation:	Brown Hill DS – F3
Location of site (map screenshot):	See below

As of January 22, 2025, there is sufficient capacity available in the area to accommodate a 0.147 MW load connection. A System Impact Study (SIA) would need to be performed by Hydro One in order to determine if the existing distribution system has the capability to supply each specific load connection, within Hydro One's operating limits. The SIA would also provide the proponent with the specific requirements for connection, including, any upstream work that may be needed to be performed. At a high level, below is the option we can consider to supply the requested load:

Option 1 – Existing Brown Hill DS – F3 (4.8/8.32kV Feeder)
- No expansion costs expected

Map:



Please be aware that this information is based on the current information and condition of the distribution system, and can change without notice. The timing and funding required for connection will be determined once the official connection request is received by Hydro One and will be in accordance with Hydro One's Conditions of Service, which you can find located on our website at www.hydroone.com.

Finally, please note that Hydro One does not reserve capacity and the capacity is allocated based on a first come/first serve basis once we receive the formal load connection request. This request is not considered to be a formal load connection request.

Thank you,

Song, Jessie

From: Tom Erskine <Tom.Erskine@enbridge.com>
Sent: December 16, 2024 12:08 PM
To: Song, Jessie
Cc: Heather Whitten
Subject: RE: Proposed Draft Plan of Subdivision - Uxbridge

Good morning Jessie,

Currently, there isn't any natural gas infrastructure at this location.
This would require a gas main extension from HWY 12 and Brock Concession Rd. 7. As the nearest available gas main.

Thank you,

Tom Erskine GPI
Sr. Advisor, Construction & Project Management
New Business Projects
GTA West
—
ENBRIDGE GAS INC.
CELL: 437-992-3766
101 Honda Blvd, Markham, ON L6C 0H9

enbridgegas.com
Safety. Integrity. Respect. Inclusion. High Performance.

From: Song, Jessie <jsong@scsconsultinggroup.com>
Sent: Monday, December 16, 2024 11:21 AM
To: Tom Erskine <Tom.Erskine@enbridge.com>
Subject: [External] RE: Proposed Draft Plan of Subdivision - Uxbridge

Good morning Tom,

Just want to follow up on the below request.

Thank you,

Jessie Song, E.I.T
SCS Consulting Group Ltd.
30 Centurian Drive, Suite 100
Markham, ON, L3R 8B8
(T) 905.475.1900 Ext. 2248
(F) 905.475.8335
jsong@scsconsultinggroup.com
www.scsconsultinggroup.com

From: Song, Jessie <jsong@scsconsultinggroup.com>
Sent: December 11, 2024 11:10 AM

To: Tom.Erskine@enbridge.com
Subject: Proposed Draft Plan of Subdivision - Uxbridge

Good morning Tom,

We are currently preparing a Functional Servicing Report for the attached proposed Draft Plan of Subdivision in Uxbridge. The project is bounded by Regional Road 1 on the east, Ravenshoe Road on the north, and Birdie Smith Court on the south.

Can you please confirm that there is capacity and whether there are any system upgrades required to service the proposed development?

Thank you,

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Song, Jessie

From: Jesse Gasteiger <jesse.gasteiger@corp.vianet.ca>
Sent: December 11, 2024 10:28 AM
To: Song, Jessie
Cc: 'planning@vianet.ca'; Trevor Nelson
Subject: FW: [Vianet.ca #3057191] Proposed Draft Plan of Subdivision - Uxbridge
Attachments: Site Plan Base nov 11.pdf

CAUTION: This email originated from an **EXTERNAL SOURCE**. Please use caution when opening attachments, clicking on links or responding. When in doubt, contact our IT Department.

Hi Jessie,

Vianet has existing capacity in the area to service this new development.

We'll need to have our ducts installed in the common telecom/hydro trench. Can you send me the proposed common trench location and we'll provide a markup with our proposed plant.

Thanks.

Jesse Gasteiger
Director of Operations

Vianet | 128 Larch St Suite 502 | Sudbury, Ontario | P3E 5J8
(705) 222-9996 ext 5204 | jesse@vianet.ca
Toll Free 1-800-788-0363 | www.vianet.ca

From: Song, Jessie via RT <noclocates@tickets.vianet.ca>
Sent: December-11-24 10:13 AM
Subject: [Vianet.ca #3057191] Proposed Draft Plan of Subdivision - Uxbridge

Wed Dec 11 10:13:27 2024: Request 3057191 was acted upon by jsong@scsconsultinggroup.com.

Transaction: Ticket created by jsong@scsconsultinggroup.com
Queue: NOC::Locates
Subject: Proposed Draft Plan of Subdivision - Uxbridge
Owner: Nobody
Requestors: jsong@scsconsultinggroup.com
Status: new
Ticket URL: https://tickets.vianet.ca/Ticket/Display.html?id=3057191

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Thank you,

Jessie Song, E.I.T

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