REPORT

D-5-5 Hydrogeological Investigation - Groundwater Supply

Proposed Commercial Development at 636040 Dufferin County Road, Township of Mulmur, Ontario

Submitted to:

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1.0 INTRODUCTION

WSP Canada Inc. (WSP) was retained by Deltini Commercial Developments ('Deltini' or the 'Client') to undertake a hydrogeological investigation for a proposed 36.9 ha commercial subdivision at 636040 Dufferin County Road 19 (the 'Site') in the Hamlet of Primrose, Township of Mulmur, Dufferin County, Ontario, as shown on the Key Plan, Figure 1. The proposed subdivision will be privately serviced with individual water wells and sewage disposal systems. The purpose of this hydrogeological investigation is to assess the suitability of the Site for the use of individual water wells.

The factual data, interpretations and recommendations contained in this report pertain to a specific project as described in the report and are not applicable to any other project or site location. If the project is modified in concept, location or elevation, or if the project is not initiated within eighteen months of the date of the report, WSP should be given an opportunity to confirm that the recommendations are still valid. In addition, this report should be read in conjunction with the attached *"Important Information and Limitations of This Report"* provided in Appendix A. The reader's attention is specifically drawn to this information, as it is essential for the proper use and interpretation of this report.

1.1 Site and Project Description

The Site is located in a rural area approximately 5 kilometers east of the community of Shelburne, as shown on Figure 1. The Site is bounded to the east by County Road 19 (Prince of Wales Road), Highway 10 to south, existing agricultural, residential properties and an elementary school to the north. The property is bound on the west by a woodlot and a tributary of Primrose Creek, a north flowing tributary to the Boyne River.

The proposed lot fabric, water well and sewage system layout is shown on Draft Plan of Subdivision, Part of the East Half of Lot 1 and Part of the East Half of Lot 2, Concession 2, West of Hurontario Street, Township of Mulmur, County of Dufferin, prepared by The Jones Consulting Group Ltd, revised, 2021. A copy of the Draft Plan is provided in Appendix B. The proposed residential subdivision will consist of 12 new commercial lots and one storm water management ponds, an environmental protection block and local road.

1.2 Existing Subsurface Investigations Reports

Previous investigations at the Site include hydrogeological and geotechnical reports for subsurface investigation information, referenced as follows. The following reports are available on the Township of Mulmur - Planning Proposals website[1].

- *Geotechnical Investigation, 636040 Prince of Wales Road West, Township of Mulmur, Ontario. WSP Canada Inc., March 2018. 18101582-00 (WSP, 2018a).*

  This report documents the preliminary geotechnical assessment completed at the Site.

- *Infiltration Study, 636040 Prince of Wales Road West, Primrose, Ontario. WSP Canada Inc., October 2018. Reference No. 181-01582-01 (WSP, 2018b);*

  This report presents an assessment of the in-situ infiltration potential at the Site, for consideration of Low Impact Development (LID) techniques.

[1] https://mulmur.ca/build/current-proposals/sub01-2021-deltini-lands-primrose. Accessed June 1, 2023.

- *Water Balance Study, 636040 Prince of Wales Road West, Primrose, Ontario*. WSP Canada Inc., October 2018. Reference No. 181-01582-02 (WSP, 2021);

  This report provides a site wide water balance assessment, including an assessment with respect to post-development infiltration rates.

Both Phase One and Phase Two Environmental Site Assessments (ESA) were completed at the Site in accordance with Ontario Regulation (O.Reg.) 153/04, referenced as follows:

- *Phase One Environmental Site Assessment, 6036040 Prince of Wales Road West, Primrose Ontario*. WSP Canada Inc., February, 2018. Reference No. 181-01582-02 (WSP, 2018c; Denoted b9a).
- *Phase Two Environmental Site Assessment, 6036040 Prince of Wales Road West, Primrose Ontario*. WSP Canada Inc., March, 2018. Reference No. 181-01582-02 (WSP, 2018d; Denoted b9b).

Two additional hydrogeological related reports were provided to WSP with respect to preliminary feasibility for site servicing.

- *"Preliminary Hydrogeological and Servicing Concepts Study – Primrose, Ontario (Township of Mulmur)",* Prepared for: Township of Mulmur. Prepared by: Azimuth Environmental Consulting, Inc., dated February 2008 (revised March 2009).

  This report details a preliminary hydrogeological review and servicing concepts assessment for the Site along with properties to the west and south. MECP Water Well records were summarized to provide a conceptual site description. Industrial/commercial water supply potential demand scenarios were also provided. Azimuth conducted a total of four test pits across the site to a maximum depth of 1 m below ground surface (bgs) for percolation testing. No monitoring wells were installed as part of this investigation and no test production wells were installed as part of this preliminary assessment.

- *Preliminary Stormwater Management & Functional Servicing Report, 6036040 Prince of Wales Road.* The Jones Consulting Group Ltd. August, 2021. Reference No. FRE-17110 (70);).

  The report provides the conceptual stormwater sizing and proposed utilities.

2.0 SCOPE OF WORK

As part of their review of the Preliminary Stormwater Management and Functional Servicing Report (The Jones Consulting Group, 2021), the Township of Mulmur peer reviewer requested that a D-5-5 Investigation be completed to support the planned development. The assessment presented in this report was conducted in general accordance with the Ministry of Environment and Energy (MOEE) (now the Ministry of Environment, Conservation and Parks, [MECP]) *Procedure D-5-5, Technical Guideline for Private Wells: Water Supply Assessment* (rev. August 1996) (Procedure D-5-5), and was intended to evaluate the groundwater supply potential at the Site, assess the groundwater quality, and determine potential interference effects due to the presence of on-Site wells.

Procedure D-5-5 "applies to all development proposals for residential development involving individual water supplies", and "also applies …to industrial, commercial, or institutional developments where water is used for human consumption." The minimum requirement for testing purposes shall not be less than 13.7 L/min (3.6 US gallons per minute).

The scope of work for the assessment consisted of the following:

- Reviewing published information sources to assess the hydrogeological setting of the Site and local groundwater use, including geological and topographic mapping, and information in the MECP Water Well Record database within approximately 500 m of the Site;
- Assessing local groundwater use through a door-to-door water well survey of selected residences in the vicinity of the Site including the collection of water quality samples for analysis of a general well water quality package plus microbiological parameters by an accredited analytical laboratory;
- Retain a MECP-licensed Water Well Contractor to install nominal 152 mm diameter test wells followed by well development, chlorination, and pumping tests;
- Carry out constant rate pumping tests at each of the newly installed wells. The tests included monitoring groundwater levels in the test well, selected other supply wells, and the shallow monitoring well network;
- Collection of water quality samples from the test wells for analysis of the parameters including the list of parameters identified in Procedure D-5-5, plus microbiological parameters; and,
- Comment on the groundwater supply potential at the Site, both in terms of quantity and quality, and the considerations for the planned development; and
- Provide recommendations for future well construction.

2.1 Project Structure

Procedure D-5-5 specifies the number of wells required for the investigation, which is based on the size of the parcel. The intention is that installation and testing of (at least) the minimum number of groundwater wells will allow for adequate characterization of the groundwaters supply conditions at the Site.

The initial drilling program (Phase 1) completed in 2023 consisted of advancing and testing a series of five test wells at the Site. The results of the Phase 1 testing program indicated that hydrogeological conditions varied across the Site, such that making broad inferences on the groundwater supply potential was unfeasible. Therefore, a second phase of investigation (Phase 2) was undertaken in 2024, with the drilling and testing of five additional wells to supplement the information gained in Phase 1. All test wells completed at the Site were constructed in such a manner than they could be used as water supply wells in the future.

3.0 REVIEW OF PUBLISHED INFORMATION SOURCES

This section discusses publicly available information sources and (where applicable) a summary of the findings from the above referenced site-specific investigations concerning local hydrogeological conditions and information on existing groundwater use in the Primrose area.

3.1 Topography and Drainage

Based on Site-specific topographic data, as shown on the Draft Plan (Appendix B), the ground surface elevation of the Site ranges from approximately 451 m above sea level (masl) to 463 masl (Figure 2). On-line information available from Ontario Ministry of Natural Resources and Forestry's on-line *Ontario Flow Assessment Tool* (OFAT)[2] and the Pre-Development Stormwater Management Plan (Jones Consulting Group Ltd, drawing SWM-1,

[2] http://www.gisapplication.lrc.gov.on.ca/OFAT/Index.html

May 31, 2021; Appendix B) indicates that the topographic high near the centre of the property divides the drainage to the north and south. A north/south trending swale directs surface runoff to the north and south. Overland flow on the southern portion of the site mirrors the undulating agricultural field topography; however, both the northern and southern halves of the site, ultimately drain to Primrose creek or the unnamed tributary to Primrose Creek.

Birks Natural Heritage Consultants, Inc. (Birks NHC) completed a natural heritage evaluation of the Site (Birks, 2021, Environmental Impact Study*, 636040 Prince of Wales Road, Settlement of Primrose, Township of Mulmur*. Reference No. 04-003-2019). Based on Site-specific Ecological Land Classification community mapping prepared by Birks NHC, the site contains both agricultural and naturalized lands including wetland, woodland, watercourses and meadow areas. The unnamed tributary of Primrose Creek flows in a south to north direction along the western margin of the site and generally coincides with the wetland area. Birks NHC reports that where the stream crosses the Site the stream channel is poorly defined, with a meandering path and a substrate that is predominately bedrock.

3.2 Physiography and Geology

The Site is located within the Horseshoe Moraine physiographic region (Chapman and Putnam, 2007), which is an area of spillway and kame moraine deposits. The Site is situated on top, and approximately 1.65 km west of, the Niagara Escarpment.

3.2.1 Surficial Geology

According to the Ontario Geological Survey surficial geology mapping (OGS, 2007; Figure 3) surficial geology at the Site consists primarily of sandy glaciofluvial deposits, with coarser textured ice-contact stratified deposits on the eastern edge, and organic deposits on the southwestern edge of the Site.

Till underlies the surficial topsoil and localized areas of fill across the Site (WSP, 2018d). The till deposits are described as out-washed fine sand deposits to alluvium over loam till with textural classifications ranging in composition from gravelly, silty, sand to clayey, silt, with occasional boulders and stratified zones (Chapman and Putnam, 2007).The total thickness of the overburden deposits range from 10 to 30 m in depth for areas within 1 km of the Site and the thickness of overburden were found to be between 5 to 12 m across the Site. For the previous studies noted in Section 1.2 site-specific subsurface conditions were investigated by WSP (2018a, 2018b, 2018d and Azimuth, 2009) and the results are consistent with those found in the majority of Ministry of Environment, Conservation and Parks (MECP) Water Well Information System (WWIS) well records. Subsurface conditions were investigated through the drilling of eleven boreholes to depths ranging from 2.1 to 8.1 m below ground surface (mbgs) and surficial sediments are consistent with published information sources and previous investigations.

3.2.2 Bedrock Geology

According to OGS bedrock geology mapping (Armstrong & Dodge, 2007), the uppermost bedrock unit across the area, and at the Site, is primarily the Amabel Formation(Figure 4). Within 2 km of the Site to the north and northeast, the Amabel Formation is eroded away due to the presence of an incised river valley, formed by the Boyne River. The Amabel Formation is underlain by the Clinton-Cataract Group (Limestone and Sandstone) and the Queenston Formation (Shale) which are eroded and exposed along the face of the Niagara Escarpment.

The location of MECP water well records within the vicinity of the Site is shown on Figure 5. Data available in the WWIS well database indicate that depth to bedrock is greatest in the southwestern corner of the site and gets

shallower to the north and northeast (Figure 6A through Figure 6E). The depth to bedrock in the water well records ranges from 3 to 15 mbgs across the Site, however test pits excavated in a previous geotechnical investigation (WSP, 2019) encountered bedrock on the north end of the Site as shallow as 0.7 mbgs.

3.3 Hydrogeology

3.3.1 Overburden Aquifers

As noted in Section 3.2.1, the overburden at the Site consists of a mix of gravelly silty sand to clayey silt. The MECP water well records, and historical subsurface investigations at the Site, suggest that on a local scale, stratified deposits of coarse sand and gravel present within the overburden at the Site and the surrounding area are capable for supporting private water supply wells.

3.3.2 Bedrock Aquifers

The Amabel Formation is considered to be a relatively permeable formation; the groundwater supply wells for the Town of Shelburne are completed in the Amabel (Banks and Brunton, 2017). The Clinton and Cataract Groups consist of both aquifer and aquitard units, the most significant unit being the Cabot Head shale of the Clinton Group which acts as a regional aquitard (Brunton, 2009; Brunton & Brintnell, 2020). The underlying Queenston Formation is also recognized as a regional aquitard unit owing to the shale dominated lithology (Brogly et al., 1998). Groundwater flow through the Paleozoic bedrock (i.e., dolostones, sandstones, and shales of the Amabel Formation, Clinton-Cataract Group, and Queenston Formation) is primarily through fractures in the rock.

3.3.3 Regional Groundwater Flow

The Site is situated within the headwaters of the Nottawasaga Valley Watershed (Nottawasaga Valley Source Protection Area Approved Assessment Report, 2018). Shallow groundwater flow within the overburden and upper bedrock units is topographically driven towards the north and northwest of the Site. The deeper bedrock flow system is interpreted to receive recharge along the Niagara Escarpment and flow to the southwest towards the Michigan Basin (Banks and Brunton, 2017).

Water levels measured in monitoring wells installed in a previous geotechnical investigation (WSP, 2018a) indicate that the water table in the overburden ranges between about 1.1 to 7.1 mbgs across the Site with seasonal fluctuations ranging between 0.9 to 3.2 m.

3.4 Water Well Records

A review of MECP Water Well Records was conducted for the Primrose area, and 44 well records were identified. Of these records, 5 wells were listed as abandoned, 4 were classified as monitoring wells, and 2 were classified as “stock wells”. These wells were removed from consideration, and the remaining 33 private groundwater supply wells were assessed further. The location of the water well records is shown in plan view on Figure 5, and they are included in Figures 6A through 6E. Historically there was no requirement to register shallow dug/bored wells, therefore these can be under-represented (i.e., absent) in the Water Well Record database.

The following table summarizes data from the Water Well Record search:

Table 1: Summary of MECP Water Well Records, Primrose Area

Category	No.	(%)	Well Depth (mbgs)			Well Yield (L/min)		
			Min	Max	Avg.	Min	Max	Avg.
Overburden Wells	8	24%	7.9	12.8	10.2	9	100	52.4
Overburden-Bedrock Interface Wells	8	24%	8.2	42.7	21.0	23	182	59.5
Bedrock wells	17	52%	6.1	61.0	24.6	14	364	58.4
TOTAL	**33**	**100%**	-					

The Water Well Records indicate that the majority of the private water supply wells in the Primrose area (52%) are reported to be completed in bedrock. The average well depth for bedrock wells in the surrounding area is 33.8 m. The average depth that a water bearing zone was reported to be encountered in the bedrock was at 24.6 mbgs. The average bedrock well yield was 58.4 L/min, which is similar to the average yield of wells screened at the bedrock interface or in the overburden (59.5 L/min and 52.4 L/min respectively).

As noted in Table 1, private water wells in the Primrose area are generally completed the following three stratigraphic “zones”:

i) Overburden – shallow dug and bored wells are inferred to utilize various shallow, thin (<10 m) coarse-textured units or the glacial till unit for water supply. Coarse-textured overburden deposits are not recorded at all well locations, and are therefore inferred to be laterally discontinuous;

ii) Overburden/bedrock interface – drilled wells completed at or within the fractured bedrock at the base of the overburden till. These highly fractured bedrock zones are not recorded at all well locations and therefore are inferred to be laterally discontinuous; and,

iii) Deep bedrock – the deeper confined bedrock formations, which are commonly used for water supply in the area, are situated at an elevation of approximately 445 m masl to 455 masl. The bedrock consists of several distinct units including interbedded limestone, shale and sandstone formations. The bedrock is the aquifer most often used for private water well purposes.

The presence of ‘fresh water’ was noted in all 33 water well records with screened intervals within three zones described above. Average pumping rates report as part of the water well records ranged from 52.4 L/min to 59.5 L/min for three inferred groundwater producing zones. In the overburden/bedrock interface zone, the reported pumping rates on the well records ranged from 23 L/min to 182 L/min with an average of 59 L/min. In the deep bedrock zone, the pumping rates ranged from 14 L/min to 364 L/min with an average of 58 L/min. These rates exceed the minimum test rate of 13.7 L/min required by MECP in Procedure D-5-5 for individual groundwater supply wells.

On the basis of this information, use of the target aquifer is proposed for subject development, and test wells were installed on the Site in this aquifer and tested as detailed below in Section 6.0.

3.5 Previous Subsurface Investigations

As reported in WSP (2018a), the fieldwork for the preliminary geotechnical investigation and Phase Two Environmental Assessment was completed in February 2018, at which time Boreholes BH18-1 through BH18-11 were advanced using hollow stem auger drilling techniques (Figure 2). Five of the boreholes, BH18-04, BH18-05, BH18-08, BH18-10, and BH18-1, were completed as 50 mm diameter groundwater monitoring wells in support of groundwater monitoring activities. For the purpose of this report, the wells above are referred to as 'shallow monitoring wells. The depths of the various boreholes ranged from 3.2 to 7.0 mbgs. Details of the investigation procedures, records of borehole logs and grain size distribution curves for selected soil samples are provided in the WSP (2018a) and WSP (2018d).

During the infiltration study (WSP, 2018b) in September 2018, seven test pits were dug to allow for infiltration testing using a double ring infiltrometer. The test pits were advanced adjacent to the boreholes completed in the overburden as part of the geotechnical investigation (WSP, 2018a). Permeabilities in finer grained deposits such as clayey silt and silt were reported to range between 2.5 x 10^{-10} to 1.5 x 10^{-7} m/s, while in coarser grained deposits such as silty sand to sand and gravel permeability ranged between 2.8 x 10^{-6} to 3.0 x 10^{-3} m/s. Grain size samples were also used to calculate hydraulic conductivity for the soil which ranged from <1 x 10^{-8} m/s in clayey silt to 1.4 x 10^{-3} m/s in gravelly sand (WSP, 2018b).

3.6 Surrounding Land Use

An assessment of potentially contaminating activities and areas of potential environmental concern on the Site and adjacent lands within 250 m is provided in the Phase One ESA report (WSP, 2018c). The following is a description of the Site and adjacent lands provided in WSP (2018c):

> "The Site is currently agricultural with no structures located on the Site. There is a gravel driveway entering from Prince of Wales Road West which leads to the location of the historical dwelling and structures. Some concrete blocks, cedar fencing, fence wires and other items were still visible at the time. The Site slopes to the northwest towards the Boyne River.
>
> The surrounding properties include residential and agricultural land uses…".
>
> **"North:** From west to east: Boyne Valley Provincial Park, Primrose Elementary School and a residential property;
>
> **East:** Agricultural;
>
> **South:** From west to east: three residential properties, one vacant/agricultural property, Shelburne Motel, Steven's Restaurant (now closed), Petro Canada Gas Station (now closed), and Superburger.
>
> **West:** From north to south: Vacant/Woodlands and a commercial plaza."

Based on the information obtained and reviewed as part of the Phase One ESA, five areas of potential environmental concern (APEC) were identified (WSP, 2018c). These were investigated as part of the Phase Two ESA (WSP, 2018d) and it was determined that the development of the Site was not expected to result in a more sensitive land use than the existing condition; therefore, the submission of a Record of Site Condition (RSC) was not required.

3.7 Waste Disposal Sites

No waste disposal sites were identified in the Phase One ESA (WSP, 2018a) within 250 m of the Site. An additional review was completed for this work and WSP reviewed the Ontario Ministry of the Environment (MOE) (now the MECP) Access Environment[3], and no active or closed landfills were identified within 500 m of the Site.

4.0 D-5-5 PRIVATE WELLS: WATER SUPPLY ASSESSMENT INVESTIGATION

As noted in Procedure D-5-5, the groundwater study must address the following concerns:

- Future residents must be provided with water for domestic consumption that is of acceptable quality and of adequate quantity;
- Appropriate well construction techniques must be followed in order to minimise the possibility of well water quality degradation;
- There must be minimal adverse effects on well water in the development from sources of contamination on the site or on adjoining lands; and,
- Developments must not result in water quantity interference conflicts between users in the development and users on the adjoining lands.

The requirements of the assessment are stipulated by the MECP, including the number of wells to be drilled, the nature of the pumping tests to be conducted, and the required groundwater quality testing.

Procedure D-5-5 “applies to all development proposals for residential development involving individual water supplies”, and “also applies …to industrial, commercial, or institutional developments where water is used for human consumption.” The minimum requirement for testing purposes shall not be less than 13.7 L/min (3.6 US gallons per minute).

Supplementary guidance for commercial and industrial developments can be found in the following documents:

- *Building Code, Ontario Regulation 332/12. Part 8 Sewage Systems, Section 8.2 Design Standards. Table 8.2.1.3.B Other Occupancies.*

The required total daily design sanitary sewage flow are noted in:

- *Design Guidelines for Drinking-Water Systems, Chapter 3 – General Design Considerations (Ministry of Environment, published January 12, 2016, updated May 2023).*

These criteria apply for communal systems only; however, water demand values based on land use are summarized and updated which provide useful comparisons for planners and civil engineers.

4.1 Preliminary Private Supply Potential

The groundwater supply potential as it related to potential commercial and industrial property uses was evaluated in Azimuth (2009), making reference to the Building Code. The relevant section is restated below.

[3] Access Environment (gov.on.ca) Accessed, March 12, 2024.

"The installation of individual wells upon each lot is the current design basis for a proposed industrial/ commercial development. With regard to this design, the following assumptions have been made with respect to the required daily volumes of water required to fulfill the demands for this type of development.

- *Light industrial/ commercial development (no processing waters),*
- *A lot fabric of approximately 0.4 to 0.8 hectares per lot,*
- *Two water closets per building @ 950 L/day (OBC Table 8.2.I.3B -Warehouse),*
- *15 employees @75 L/day per employee per 8-hour shift (OBC Table 8.2.1.38 - Factory).*

For a typical industrial unit with 15 employees, potable water average day demand is ~2,800 L/day (<1 lgpm) and is based on MOE Guidelines for the design of water supply systems for factories and warehouses (MOE, 1985)."

The building code information noted above, and referenced in Azimuth (2009), remains current.

5.0 PRIVATE WATER SUPPLY ASSESSMENT

5.1 Door-To-Door Water Well Survey

A door-to-door water well survey was conducted July 17 and July 19, 2023, at 22 selected addresses in the vicinity of the Site. Eleven of the locations were commercial or institutional properties; the remainder were residential. Each residential location has been assigned a letter from A to K for privacy reasons in this report. The commercial locations were assigned a letter from Commercial A to Commercial I and the institutional locations assigned a letter from Institution A to Institution B. The purpose of the survey was to document local anecdotal experience with groundwater quality and quantity and determine the potential for establishing additional monitoring locations during the pumping tests on Site. The following summary of the survey results is provided for the private residential, commercial properties, and institutional properties:

Table 2: Summary of Private Residential, Commercial, and Institutional Water Well Survey Results

Address	Well Depth, Type	Reported Quantity	Reported Quality	Treatment System
House A	Depth unknown, drilled	No issues	Good. No issues other then hard water.	Softener.
House B	76.2 meters, drilled	No issues	Good.	UV, softener, sediment treatment, reverse osmosis.
Commercial A (Superburger)	10.67 meters, drilled.	No issues	Good.	Softener, iron treatment, reverse osmosis, UV
Commercial B (Shelburne Motel)	~26 meters, drilled.	Poor recharge noted.	Poor water quality reported.	UV, reverse osmosis, sediment filter.
Commercial C (Former Steven's Restaurant)	~2.29 meters, dug/bored.	N/A	N/A	Unknown, location shut down previously.
Commercial D	~12.2 meters, drilled.	No issues	No issues reported during conversation	Unknown

Address	Well Depth, Type	Reported Quantity	Reported Quality	Treatment System
Commercial E	Unknown depth but shallow from conversation, dug/bored	Not stated	Not stated	Unknown
Institution A (Primrose Elementary School)	~50m, drilled.	No issues.	Good post treatment.	Softener, UV, RO.
House F	~18.3 meters, drilled.	Not stated	Not stated	Not stated
House J	4.3 meters, dug.	Not stated	Not stated	Not stated
Institution B	21.34 meters, drilled	Not stated	Not stated	Not stated
Unknown, No survey response				
House C	*No response. Letter was left in mailbox.*			
House D	*No response. Gated property, survey letter left in mailbox at time of second visit.*			
House E	*No response. Letter was provided to resident.*			
House G	*No response. Letter was left in mailbox.*			
House H	*No response. Letter left in mailbox.*			
House I	*No response. Property was gated with no outside mailbox. Letter left near gate.*			
House K	*No response. Letter was provided to resident. Dug/Bored well noted on property.*			
Commercial F	*No response during interview, letter left with employee.*			
Commercial G	*No response during interview, letter left with employee.*			
Commercial H	*No response at time of visit, store was closed. Letter left at door.*			
Commercial I	*No response at time of visit. Letter left at front.*			

Two of the eleven residential properties surveyed provided a completed well survey response. Three of eleven properties either reported have drilled wells, or a drilled well was noted during the field visit. Two of eleven private residential properties were noted as having dug/bored wells during the field visit. The remaining six residential properties provided no response from the survey or the in person visit, and no wells were identified at the time of visiting.

For the commercial properties only two out of the nine provided a response to the private well survey. Three out of the nine were noted to feature drilled wells. Two out of the nine were noted to have dug/bored wells. The remaining four locations were unknown as to their water well status.

For the two institutions surveyed both were noted to have drilled wells on their properties, with only one providing information on the well.

No issues with water quantity or quality were reported by private well users, except for House A which indicated hard water. The owner of Commercial B reported poor recharge of the well. Ultraviolet treatment (for bacteria) was reported to be in use at House B, at Commercial A and B, and Institution A. The use of reverse osmosis (RO) treatment was also reported at House B, Commercial A and B, and Institution A. RO systems are typically installed to address issues of elevated salinity in groundwater. Property owners reported that sediment filters were used at House B and Commercial B.

5.2 Private Well – Monitoring During Testing

Automatic pressure transducers (data loggers) were installed within the wells at Institution A, Commercial A, and Commercial C. Dedicated sterilized drop tubes (i.e., PVC pipes) were secured at each of these wells by Licensed WSP well technicians and a data logger was placed into each of these locations using a secured line that remained in place during the Phase 1 drilling and testing program described in Section 6.0. The drop tubes and data loggers were removed from these wells after the Phase 1 program was completed, once it was established that the water levels in the area had recovered to their regular seasonal levels.

During analysis of the wells outside the property after the Phase 1 program was completed, no major changes in water level were noted in response to pumping of the test wells on site. As a result of the lack of response from the outside wells it was decided that the locations would not be monitored as part of the Phase 2 program.

5.3 Private Wells – Water Quality

Groundwater quality samples were collected from an untreated tap at Institution A on August 11, 2023 prior to completing a pumping test at the well. On February 1, 2024, samples for water quality analysis were collected from Commercial A and Commercial B. The samples were collected using standard sampling protocols and delivered in coolers with ice under chain-of-custody to Caduceon Laboratories of Barrie, Ontario, which is accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA). The samples were analyzed for microbiology and a general well water quality package similar to the parameters analyzed in the five test wells (see Section 6.0).

The results were compared to the *Ontario Drinking Water Quality Standards* (Standards) (Ontario Regulation 169/03, as amended) and the aesthetic objectives and operational guideline in *Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines* (ODWSOG) (rev. June 2006). The data were also compared to the treatability limits identified Procedure D-5-5. Copies of the laboratory Certificates of Analysis are provided in Appendix C, and copies were also provided to the respective well owners.

The following table summarizes the results of the laboratory analysis for parameters reported to exceed their respective Standards or ODWSOG values in the two water samples.

Table 3: Summary of Water Quality, Private Well Sampling

Parameter (Units)	Standard	ODWSOG		Treatability†	Institution A (Primrose Elementary School)	Commercial A (Superburger)	Commercial B (Shelburne Motel)
		AO	OG		11-Aug-23	1-Feb-24	1-Feb-24
Chloride (mg/L)	-	250	-	250	**1280**	**372**	**2070**
Sodium (mg/L)	-	20/200*	-	200	***677***	***172***	***188***
TDS (mg/L)	-	500	-	-	**2450**	**968**	**4120**
Total Hardness (as CaCO3) (mg/L)	-	-	80-100	-	**618**		

Notes:

1. Standard = Ontario Drinking Water Quality Standards (Ontario Regulation 169/03, as amended)
2. AO = aesthetic objective; OG = operational guideline
3. † = Procedure D-5-5. Technical Guideline for Private Wells: Water Supply Assessment. Last Revision August 1996. Table 3: Common Aesthetic, Analytical and Indicator Parameters
4. *, ***italicized bold font*** = The aesthetic objective for sodium in drinking water is 200 mg/L. The local Medical Officer of Health should be notified when the sodium concentration exceeds 20 mg/L so that this information may be communicated to local physicians for their use with patients on sodium restricted diets (ODWSOG, June 2003, revised June 2006).
5. **Bolded and shaded** values exceed one of the Standards, Objectives or Guidelines.
6. Red-shaded cells exceed the corresponding Standard.
7. Orange-shaded cells exceed the corresponding Aesthetic Objective.
8. Yellow-shaded cells exceed the corresponding Operational Guideline.
9. Cells with a bold, dashed border exceed the Treatability limit in Procedure D-5-5.

As presented in Table 3, the concentration of sodium and chloride in each of the groundwater samples exceeded their respective aesthetic objectives. The sodium concentrations exceed the treatment limit identified in Procedure D-5-5 at all three properties. The hardness concentration exceeding the ODWQS operational guidelines at Institution A.

6.0 FIELD INVESTIGATION

6.1 Test Well Construction (Phase 1)

In accordance with the requirements of Procedure D-5-5 it was planned that a total of five test wells would be installed at the Site as part of the Phase 1 portion of the investigation. Based on the result of discussions with the Upper Grand School Board (UGSB) it was determined that one of the proposed wells would be removed from the drilling plan, and the school well would act as the fifth well required by Procedure D-5-5.

MECP Well Tag numbers, construction dates, coordinates, grade and top of casing elevations, and screen depths and elevations are provided in Table 4. The locations of the test wells are shown on Figure 2. Copies of the MECP water well records are provided in Appendix D.

The test wells were located with the intent of providing representative coverage of the Site. The Phase 1 test wells were drilled and constructed by Aardvark Drilling Inc. (Aardvark), a MECP-licensed Water Well Contractor (#7675). The wells were constructed using auger drilling techniques to bedrock, whereby the 152.4 mm diameter steel casing was cemented in place with an annular seal. An air-driven hammer drilling method was used to advance the boreholes into the rock. Schedule 40, 101.6 mm diameter PVC liners were place within the open borehole within the bedrock. The bottom approximately 15 m portion of the PVC liner was slotted. The wells were developed by airlifting after construction.

The ground surface elevations at the test well locations were estimated by WSP using publicly available topographical data and a high resolution handheld Global Position System (GPS) device (Trimble Catalyst). The top of casing elevations were then determined using manual stick-up measurements. Accordingly, all elevation data in this report that are based on the ground surface and top of casing elevations should be considered approximate (+/- 0.1 m).

Table 4: Summary of Test Wells (Phase 1)

	Well B	Well C	Well D	Well E
Well Tag No.	A350359	A374700	A374717	A366420
Construction Date	19-Jun-2023	14-Jun-2023	20-Jun-2023	22-Jun-2023
UTM Northing (m)	4882795	4882622	4882536	4882402
UTM Easting (m)	568447	568521	568746	568486
Grade Elevation* (masl)	454.6	462.9	456.6	459.7
Casing Stick-up (m)	0.60	0.54	0.67	0.69
Top of Casing Elevation (masl)	455.20	463.44	457.27	460.39

Notes:
masl = metres above sea level
mbgs = metres below ground surface
UTM = Universal Transverse Mercator, North American Datum 83, Zone 17
* = Based on a topographical information estimated by WSP. Elevations are approximate.

The following tables provide information on the subsurface conditions and well construction for each test well as reported on the water well records (see Appendix D).

6.1.1 Well B

Well B was drilled on June 19, 2023, in the northwest potion of the Site to a total depth of 36.58 mbgs. Static water level upon completion was 4.91 mbgs. The geology is summarized in Table 5.

Table 5: Summary of Subsurface Conditions at Well B

Well B	Thickness (m)	Elevation* (masl)	Description
Well Tag No.	-	-	A350359
Grade	-	454.6	-
Overburden	2.13	454.6 – 452.5	Silty SAND, dense
Bedrock – Limestone	8.84	452.5 – 443.6	White
Bedrock – Shale	20.12	443.6 – 423.5	Grey, Red, Grey
Bedrock – Limestone	5.49	423.5 – 418.0	Grey, Brown
Screen liner	15.24		Slotted PVC liner in bedrock

Notes: masl = metres above sea level; * = based on digital elevation model at well coordinates

6.1.2 Well C

Well C was drilled on June 14, 2023, in the central portion of the Site to a total depth of 42.68 mbgs (140 ft). The static water level upon completion was 10.78 mbgs. The geology is summarized Table 6.

Table 6: Summary of Subsurface Conditions at Well C

Well C	Thickness (m)	Elevation* (masl)	Description
Well Tag No.	-	-	A374700
Grade	-	462.9	-
Overburden	10.67	462.9 – 452.2	Sand and Silt, dense
Bedrock – Shale	2.44	452.2 – 449.8	Brown
Bedrock – Limestone	9.30	449.8 – 440.5	White
Bedrock – Shale	16.01	440.5 – 424.5	Grey, Red, Grey
Bedrock – Limestone	4.27	424.5 – 420.2	Grey
Screen liner	15.24		Slotted PVC liner in bedrock

Notes: masl = metres above sea level; * = based on digital elevation model at well coordinates

6.1.3 Well D

Well D was drilled on June 20, 2023, in the southeast portion of the Site to a total depth of 15.24 mbgs (50 ft). The static water level upon completion was 0.57 mbgs. The geology is summarized Table 7.

Table 7: Summary of Subsurface Conditions at Well D

Well D	Thickness (m)	Elevation* (masl)	Description
Well Tag No.	-	-	A374717
Grade	-	456.6	-
Overburden	6.10	456.6 – 450.5	Silty CLAY between 2 m and 4.5 m; Gravely SAND from 4.5 m to 6.10 m
Bedrock – Limestone	8.54	450.5 – 442.0	White, fractured, loose shale fragments
Bedrock – Shale	0.61	442.0 – 441.4	Grey
Screen liner	7.62		Slotted liner in bedrock

Notes: masl = metres above sea level; * = based on digital elevation model at well coordinates

6.1.4 Well E

Well E was drilled on June 22, 2023 in the southwest portion of the Site to a total depth of 15.24 mbgs (50 ft). The static water level upon completion was 4.38 mbgs. The geology is summarized Table 8.

Table 8: Summary of Subsurface Conditions at Well E

Well E	Thickness (m)	Elevation* (masl)	Description
Well Tag No.	-	-	A366420
Grade	-	459.7	-
Overburden	10.82	459.7 – 448.9	Silt and sand with fine gravel, dense
Bedrock – Limestone	4.42	448.9 – 444.5	White, fractured
Screen liner	6.09		Slotted liner in bedrock

Notes: masl = metres above sea level; * = based on digital elevation model at well coordinates

6.2 Constant Rate Pumping Tests (Phase 1)

A pumping test program was completed at each of the four wells, and the school well, following installation and development. Step tests and 6-hour constant rate pumping tests were conducted by WSP staff. Groundwater levels were monitored at the test wells and selected nearby monitoring wells using both loggers and manual electronic water level tapes. Hydrographs of the pumping test data and analysis are provided in Figures E-1 to E-10, Appendix E. For the hydrographs all water level data collected by loggers were corrected to account for barometric pressure fluctuations.

Two groundwater samples were collected for subsequent laboratory analysis during each 6-hour constant rate pumping test. One sample was collected within 1-hour of the start of test and one sample was collected within 1-hour of the pump shut off.

6.2.1 Primrose Elementary School

Table 9 summarizes the groundwater level measurements at various stages of the testing, test pumping rate and duration, the maximum measured drawdown, time to recovery, and observation well responses for the constant

rate pumping test completed at Primrose Elementary School. Figures E-1 provides a hydrograph of the groundwater level at the school well during the testing and recovery period, and Figure E-2 provides a semi-log plot of the pumping data.

Table 9: Summary of Constant Rate Pumping Test – Primrose Elementary School

Primrose Elementary School Well	Rate (L/min)	Rate (m^3/day)	D-5-5 Min Rate (L/min)	Description
Pumping Rate	75.6	108.9	13.7	8 times D-5-5 minimum (20 USgpm)
	Depth (mbgs)	**Elevation (masl)**	**Date/Time/ Duration**	**Description**
Water Level at Test Start	33.58	422.22	7:39 AM	August 17, 2023
Water Level at Test End	34.37	421.44	1:39 PM	0.79 m drawdown
Test Duration	-	-	360 min	27,216 L pumped
Recovery	33.76	422.07	4:39 PM	0.63 m (80%) in 180 min
Recovery	33.55	422.25	9:39 PM	0.70 m (90%) in 480 min
Observation Wells	-	-	-	Well B and Well C
Response in Observation Wells?	-	-	-	None Observed

Notes: mbgs = metres below ground surface. masl = metres above sea level; elevations estimated from digital elevation model and should be considered approximate.

During the pumping test at Primrose Elementary School, Well B and Well C were monitored as observation wells. No response to pumping was identified at either monitoring location. Following the cessation of pumping, groundwater levels recovered to 90% of static after 8 hours. Recovery after 23 hours was observed to be 94% of the pre-pumping level. The well did not achieve full recovery within 24 hours, which indicates that the tested pumping rate exceeded the reasonable daily operational yield of the deep bedrock aquifer in this location.

The sound of cascading water was noted at the school testing, which indicates that localized, discrete fractures in the bedrock are the source of the yield in the northern portion of the Site.

Primrose Elementary school staff operate the well at 56.78 L/min (15 US gallons per minute [gpm]); however the reverse osmosis system requires a minimum of 64.35 L/min (17 USgpm) to complete a backflush cycle. Based on the current testing, the sustainable rate is inferred to be greater than 56.78 L/min (15 USgpm) but less than the 75.6 L/min (20 USgpm) tested rate.

The reasonable daily operational yield of the school well was limited by aquifer yield and the amount of time it took to fully recover. While limited drawdown suggests high pumping rates are possible over the short term, the water level at the school well continued to decline throughout the test. Pumping rates at or greater than the tested rate will require longer than 24 hours to fully recovery which could limit the long-term sustainability of the daily yield.

6.2.2 Well B

Table 10 summarizes the piezometric head measurements at various stages of the testing, test pumping rate and duration, the maximum measured drawdown, time to recovery, and observation well responses for the constant

rate pumping test completed at Well B. Figures E-3 provides a hydrograph of the groundwater level at the school well during the testing and recovery period, and Figure E-4 provides a semi-log plot of the pumping data.

Table 10: Summary of Constant Rate Pumping Test – Well B

Well B	Rate (L/min)	Rate (m^3/day)	D-5-5 Min Rate (L/min)	Description
Pumping Rate	15.1	21.8	13.7	4 USgpm
	Depth (mbgs)	**Elevation (masl)**	**Date/Time/ Duration**	**Description**
Water Level at Test Start	5.08	449.52	10:41 AM	August 22, 2023
Water Level at Test End	29.60	425.60	11:41 AM	23.92 m drawdown
Test Duration	-	-	60 min	1080 L pumped
Recovery	7.36	447.24	12:41 PM	21.64 m (90%) in 60 min
Observation Wells	-	-	-	Well C and School Well
Response in Observation Wells?	-	-	-	None Observed

Notes: mbgs = metres below ground surface. masl = metres above sea level; elevations estimated from digital elevation model and should be considered approximate.

During the pumping test at Well B, Well C and the School Well were used as observation wells. No response to pumping was identified at the observation wells. Following the cessation of pumping groundwater levels recovered to 90% of the pre-pumping water level within one hour.

The data obtained during the pumping test indicates that Well B is not capable of supplying groundwater at the Procedure D-5-5 stipulated minimum rate of 13.7 L/min. The test was aborted after one hour and it took one hour to recover to 90% of the static condition (after removing 1,080 L). This indicates poor yield in the aquifer at this location. During the pumping test period, the water level drew down to the pump intake, while pumping at a rate of 15.1 L/min. Based on the testing results, the sustainable yield at Well B was estimated to be on the order of 3.8 L/min to 7.6 L/min (1 to 2 USgpm).

6.2.3 Well C

Table 11 summarizes the piezometric head measurements at various stages of the testing, test pumping rate and duration, the maximum measured drawdown, time to recovery, and observation well responses for the constant rate pumping test completed at Well C. Figures E-5 provides a hydrograph of the groundwater level at the school well during the testing and recovery period, and Figure E-6 provides a semi-log plot of the pumping data.

Table 11: Summary of Constant Rate Pumping Test – Well C

Well C	Rate (L/min)	Rate (m^3/day)	D-5-5 Min Rate (L/min)	Description
Pumping Rate	18.9	27.25	13.7	5 US gpm
	Depth (mbgs)	**Elevation (masl)**	**Date/Time/ Duration**	**Description**
Static Water Level at Test Start	10.93	451.97	8:24 AM	August 21, 2023
Water Level at Test End	23.80	439.10	2:32 PM	12.87 m drawdown
Test Duration	-	-	360 min	8,390 L pumped
Recovery	12.13	450.77	5:16 PM	10.29 m (90%) in 164 min
Observation Wells	-	-	-	Well B and School Well
Response in Observation Wells	-	-	-	None Observed

Notes: mbgs = metres below ground surface. masl = metres above sea level; elevations estimated from digital elevation model and should be considered approximate.

During the pumping test at Well C, Well B and the School Well were used as observation wells. No response to pumping was noted at the nearby bedrock wells. Following shut off of the pump, groundwater levels to recovered to 90% of static within three hours.

Fluctuations were noted in the pumping test hydrograph (Figure E-5) which are attributed the pump being operated at the lowest flow rate setting with the range of operation. Low flow leads to flutter in the valves which are used to control the flow rate. For this test, the control valves had to be adjusted frequently in an effort to maintain a relatively constant pumping rate.

The sound of cascading water was noted at Well C during testing, which indicates that discrete fractures in the bedrock are the source of the yield in the northern portion of the Site.

Based on the data obtained during the constant rate pumping test, it is concluded that Well C is capable of support a pumping rate of approximately 18.9 L/min. During the six-hour pumping test period, approximately 40% percent (12.87 m) of the available drawdown (32.0 m) was utilized while pumping at a rate of 18.9 L/min. The well achieved 90% recovery requiring 3 hours following the 6-hour pumping test at 18.9 L/min. As such, the yield of Well C meets the required minimum specified in Procedure D-5-5.

6.2.4 Well D

Table 12 summarizes the piezometric head measurements at various stages of the testing, test pumping rate and duration, the maximum measured drawdown, time to recovery, and observation well responses for the constant rate pumping test completed at Well D. Figures E-7 provides a hydrograph of the groundwater level at the school well during the testing and recovery period, and Figure E-8 provides a semi-log plot of the pumping data.

Table 12: Summary of Constant Rate Pumping Test – Well D

Well D	Rate (L/min)	Rate (m^3/day)	D-5-5 Min Rate (L/min)	Description
Pumping Rate	75.6	108.9	13.7	4 times D-5-5 minimum (20 USgpm)
	Depth (mbgs)	**Elevation (masl)**	**Date/Time/ Duration**	**Description**
Static Water Level at Test Start	0.92	455.68	7:26 AM	August 24, 2023
Water Level at Test End	2.64	453.96	1:26 PM	1.72 m drawdown
Test Duration	-	-	360 min	27,216 L pumped
Recovery	17.72	455.50	4:26 PM	1.19 m (90%) in 240 min
Observation Wells	-	-	-	Well E and Former Steven's Restaurant
Response in Observation Wells	-	-	-	None Observed

Notes: mbgs = metres below ground surface. masl = metres above sea level; elevations estimated from digital elevation model and should be considered approximate.

During the pumping test at Well D, Well E and the Former Steven's Restaurant were used as observation wells. No response to pumping was identified at the observation wells. Following shut off of the pump, groundwater levels recovered to 90% of static within 4 hours and reached 100% after 18 hours.

During the six-hour pumping test period, approximately 33% percent (1.72 m) of the available drawdown (5.18 m) was utilized while pumping at a rate of 75.6 L/min. Based on the data obtained during the pumping test, it is concluded that Well D is capable supporting a pumping rate of at least 75.6 L/min, and as such, the yield of Well D meets the required minimum specified in Procedure D-5-5.

The reasonable daily operational yield of Well D is limited by the amount of time it took to fully recover. While limited drawdown suggests higher pumping rates are possible over the short term, the confined aquifer in the vicinity of Well D required 18 hours to fully recover following the 6-hour pumping test at 75.6 L/min. Pumping rates greater than the tested rate may require longer that 24 hours to fully recovery which could limit the long-term sustainability of the daily yield.

6.2.5 Well E

Table 13 summarizes the piezometric head measurements at various stages of the testing, test pumping rate and duration, the maximum measured drawdown, time to recovery, and observation well responses for the constant rate pumping test completed at Well E. Figures E-9 provides a hydrograph of the groundwater level at the school well during the testing and recovery period, and Figure E-10 provides a semi-log plot of the pumping data.

Table 13: Summary of Constant Rate Pumping Test – Well E

Well E	Rate (L/min)	Rate (m^3/day)	D-5-5 Min Rate (L/min)	Description
Pumping Rate	75.6	108.9	13.7	4 times D-5-5 minimum (20 USgpm)

	Depth (mbgs)	Elevation (masl)	Date/Time/ Duration	Description
Static Water Level at Test Start	4.58	455.12	7:36 AM	August 23, 2023
Water Level at Test End	5.32	454.38	1:36 PM	0.74 m drawdown
Test Duration	-	-	360 min	27,291 L pumped
Recovery	4.65	455.05	1:39 PM	0.66 m (90%) in 3 min
Recovery	4.58	455.12	1:45 AM	0.74 m (100%) in 9 min
Observation Wells	-	-	-	Well D, Superburger and Former Steven's Restaurant
Response in Observation Wells	-	-	-	None Observed

Notes: mbgs = metres below ground surface. masl = metres above sea level; elevations estimated from digital elevation model and should be considered approximate.

During the pumping test at Well E, Well D and two nearby commercial locations were used as observation wells. No response to pumping was observed at the observation wells.

During the six-hour pumping test period, approximately 17% percent (0.74 m) of the available drawdown (4.42 m) was utilized while pumping at a rate of 75.6 L/min. The well recovered to within 90% of the static level within 3 minutes of stopping pumping, and to 100% within 9 minutes. Based on the data obtained during the pumping test, it was concluded that Well E is capable of supporting a pumping rate of at least 75.6 L/min, and as such meets the required minimum specified in Procedure D-5-5.

The daily operational yield for Well E is likely higher than the tested rate. The measured groundwater level at Well E stabilized during the initial minutes of the test and did not continue to drawdown further through the testing period. When the pumping period ended, the groundwater level recovered to static conditions within ten minutes suggesting the aquifer in the vicinity of the well is highly transmissive. Additional testing may be required at Well E to determine the maximum sustainable yield for Well E.

6.3 Phase 1 – Pumping Test Summary

The results of Phase 1 drilling and testing program indicated that the groundwater supply potential across the Site varies depending on location. In the northern portion of the Site, due to the relatively thin overburden deposits and lack of a distinct permeable shallow bedrock zone, the deeper bedrock is considered the only viable 'unit' for a supply well. The yields of the deeper bedrock wells on the northern portion of the Site were found to vary from 3.8 L/min to 18.9 L/min for the on-site wells and up to 64.35 L/min at the School Well. The relatively wide variation in well yield was attributed to differences in the distribution and connectivity of the bedrock fractures network at the individual well locations, and the coincidental intersection (or lack of intersection) of these fractures during the drilling. The sound of cascading water was noted at the school well and Well C during testing, which indicates that discrete fractures in the bedrock are the source of the yield in the northern portion of the Site.

In contrast to the northern wells, Well D and Well E were completed in southern portion of the Site, within the relatively fractured, shallow bedrock. Both these wells were observed to have relatively high yields (75.6 L/min). Due to the fractured nature of the bedrock and relatively shallow well depth it was speculated that pumping from these wells may result in water taking (i.e., leakage) from the overlying coarse-grained overburden deposits.

The intent of the investigation program was to evaluate the hydrogeological conditions across the Site, and based on the results of the well drilling and testing program characterize the groundwater supply potential (in terms of both quantity and quality) to guide future development plans. Due to the spatial heterogeneity, overall complexity of the geology and marginal yields on the northern portion of the Site, it was determined that a second phase of drilling would be conducted to provide additional data on the water supply potential across the Site. The Phase 2 program, completed in 2024, consisted of advancing and testing an additional five wells (Well F, G, H, I and J).

6.4 Test Well Construction (Phase 2)

MECP Well Tag numbers, construction date, coordinates, grade and top of casing elevations, and screen depths and elevations are provided in Table 14. The locations of the test wells are shown on Figure 4. Copies of the MECP water well records are provided in Appendix D.

Five additional test wells were installed as part of Phase 2. Drilling and well construction was conducted by Aardvark, a MECP-licensed Water Well Contractor (#7675). The wells were constructed using a dual rotary drilling techniques, whereby the 152.4 mm (6”) diameter steel casing was cemented in place with an annular seal. A down-hole hammer drilling method was used to advance the boreholes into the rock. Schedule 40, 101.6 mm (4”) diameter PVC liners were place within the open hole bedrock. The lower portion of the PVC was perforated. The wells were developed by airlifting after construction.

Similar to Phase 1 drilling activities, the ground surface elevations at the test well locations were estimated by WSP using publicly available topographical data and a high resolution handheld Global Position System (GPS) device (Trimble Catalyst). For each well the top of casing elevation was estimated using a manually measured stick-up value. Accordingly, all elevation data in this report that are based on the ground surface and top of casing elevations should be considered approximate (+/- 0.1 m).

Table 14: Summary of Test Wells (Phase 2)

	Well F	Well G	Well H	Well I	Well J
Well Tag No.	A382398	A382400	A382396	A382399	A382397
Construction Date	5-Feb-2024	13-Feb-2024	13-Feb-2024	1-Feb-2024	7-Feb-2024
UTM Northing (m)	4882861	4882674	4882751	4882489	4882311
UTM Easting (m)	568593	568539	568813	568604	568507
Grade Elevation* (masl)	456.2	460.4	458.1	461	459.1
Casing Stick-up (m)	0.65	0.67	0.62	0.67	0.68
Top of Casing Elevation (masl)	456.85	461.07	458.72	461.67	459.78

Notes:
masl = metres above sea level
mbgs = metres below ground surface
UTM = Universal Transverse Mercator, North American Datum 83, Zone 17
* = Based on a digital elevation model provided to WSP. Elevations are approximate.

The following tables provide information on the subsurface conditions and well screen construction for each test well as reported on the water well records.

6.4.1 Well F

Well F was drilled on February 4, 2024 in the northern portion of the Site, to a total depth of 51.83 mbgs (170 ft). The depth to groundwater upon completion of the well installation was measured to be 31.42 mbgs. The geology is summarized Table 15.

Table 15: Summary of Subsurface Conditions at Well F

Well F	Thickness (m)	Elevation* (masl)	Description
Well Tag No.	-	-	A382398
Grade	-	456.2	-
Overburden	4.6	456.2 – 451.6	Sandy, CLAY between 0 to 4 m; Gravelly SAND from 4 to 4.6 m.
Bedrock – Limestone	9.5	451.6 – 442.2	Light brown
Bedrock – Shale	3.7	442.2 – 438.5	Blue
Bedrock – Limestone	1.2	438.5 – 437.3	Brown
Bedrock – Shale	4.0	437.3 – 433.3	Blue
Bedrock – Limestone	0.3	433.3 – 427.5	Brown
Bedrock – Shale	5.5	433.0 – 414.7	Blue
Bedrock – Limestone	12.8	427.5 – 249.2	Grey, brown and grey intervals
Bedrock – Sandstone	1.2	414.7 – 413.5	Light grey
Bedrock – Shale	0.6	413.5 – 412.9	Blue
Bedrock – Sandstone	0.6	412.9 – 412.3	Light grey
Bedrock – Shale	7.9	412.3 – 404.4	Red from 412.3 m to 410.5; Blue from 410.5 to total depth
Screen liner	15.24		Slotted liner in bedrock

Notes: masl = metres above sea level; * = based on digital elevation model at well coordinates

6.4.2 Well G

Well G was drilled on February 13, 2024 in the central portion of the Site to a total depth of 60.98 mbgs (200 ft). Static water level upon completion was 32.55 mbgs. The geology is summarized in Table 16.

Table 16: Summary of Subsurface Conditions at Well G

Well G	Thickness (m)	Elevation* (masl)	Description
Well Tag No.	-	-	A382400
Grade	-	460.4	-
Overburden	9.1	460.4 – 451.3	Gravelly SAND.

Well G	Thickness (m)	Elevation* (masl)	Description
Bedrock – Limestone	9.5	451.3 – 441.8	Lightly coloured Brown
Bedrock – Shale	3.7	441.8 – 438.1	Blue
Bedrock – Limestone	0.6	438.1 – 437.5	Brown
Bedrock – Shale	12.2	437.5 – 425.3	Blue
Bedrock – Limestone	9.8	425.3 – 415.6	Grey
Bedrock – Sandstone	3.7	415.6 – 411.9	Grey
Bedrock – Shale	12.5	411.9 – 399.4	Blue from 411.9 to 410.7 m; Red from 410.7 to total depth.
Screen liner	15.24		Slotted liner in bedrock

Notes: masl = metres above sea level; * = based on digital elevation model at well coordinates

6.4.3 Well H

Well H was drilled on February 13, 2024 in the eastern portion of the Site to a total depth of 50.0 mbgs (164 ft). Static water level upon completion was 3.19 mbgs. The geology is summarized in Table 17.

Table 17: Summary of Subsurface Conditions at Well H

Well H	Thickness (m)	Elevation* (masl)	Description
Well Tag No.	-	-	A350359
Grade	-	458.1	-
Overburden	7.9	458.1 – 450.2	Sandy Gravel
Bedrock – Limestone	6.7	450.2 – 445.8	Lightly coloured brown; grey at 448.2 m
Bedrock – Shale	3.7	445.8 – 442.1	Blue
Bedrock – Limestone	0.6	442.1 – 441.5	Brown
Bedrock – Shale	4.9	441.5 – 436.6	Red for the first 0.5 m; then blue
Bedrock – Limestone	0.6	436.6 – 436.0	Brown
Bedrock – Shale	4.9	436.0 – 433.0	Blue
Bedrock – Limestone	11.9	433.0 – 421.1	Grey for first 10 m; then brown
Bedrock – Sandstone	5.2	421.1 – 415.9	
Bedrock – Shale	5.5	419.9 – 410.4	Blue (2.1 m); Red for the remaining 3.4 m
Screen liner	15.24		Slotted liner in bedrock

Notes: masl = metres above sea level; * = based on digital elevation model at well coordinates

6.4.4 Well I

Well I was drilled on February 1, 2024 in the southern portion of the Site to a total depth of 11.89 mbgs (39 ft). Static water level upon completion 5.24 mbgs. The geology is summarized in Table 18.

Table 18: Summary of Subsurface Conditions at Well I

Well I	Thickness (m)	Elevation* (masl)	Description
Well Tag No.	-	-	A382399
Grade	-	461.0	-
Overburden	10.4	461.0 – 450.6	Gravelly SAND
Bedrock - Limestone	0.9	450.6 – 449.7	Lightly coloured brown, inferred rafted bedrock
Overburden – Gravel	0.6	449.7 – 449.1	Sandy GRAVEL

Notes: masl = metres above sea level; * = based on digital elevation model at well coordinates

Well I was completed without a PVC liner or screen at the recommendation of the driller. Drilling conditions underneath the inferred rafted bedrock prevented the installation of a traditional overburden screen whereby the telescopic screen would be installed and the casing revealed back to expose the screen to the formation. Well I has been constructed with the steel casing open to the water bearing gravels. The densely packed nature of the gravel under the bedrock prevents formation from entering the well.

6.4.5 Well J

Well J was drilled on February 7, 2024 in the southern portion of the Site to a total depth of 10.67 mbgs (35 ft). Static water level upon completion 3.13 mbgs. The geology is summarized in Table 19.

Table 19: Summary of Subsurface Conditions at Well J

Well J	Thickness (m)	Elevation* (masl)	Description
Well Tag No.	-	-	A382397
Grade	-	459.1	-
Overburden	1.5	459.1 – 457.6	Sandy CLAY
Overburden	8.84	457.6 – 451.5	Gravely SAND
Overburden	20.12	451.5 – 448.4	Sandy GRAVEL
Screen			40-slot, stainless Steel, wire wrapped well screen

Notes: masl = metres above sea level; * = based on digital elevation model at well coordinates

6.5 Constant Rate Pumping Tests (Phase 2)

A pumping test program was completed at each of the five wells following installation and development. Step tests and 6-hour constant rate pumping tests were completed on the five 2024 test wells by WSP staff and Aardvark. Groundwater levels were monitored at the test wells and selected nearby monitoring wells using both loggers and

manual electronic water level tapes. Water level data collected using the loggers were corrected to account for barometric pressure. Hydrographs of the pumping test data and analysis are provided in Figures E-11 to E-20, Appendix E. For the hydrographs all water level data collected by loggers were corrected to account for barometric pressure fluctuations.

Two groundwater samples were collection for laboratory analysis during the each 6-hour constant rate pumping tests. One sample was collected within 1-hour of the start of test and one sample was collected within 1-hour of pump shut off.

6.5.1 Well F

Table 20 summarizes the piezometric head measurements at various stages of the testing, test pumping rate and duration, the maximum measured drawdown, time to recovery, and observation well responses for the constant rate pumping test conducted at Well F. Figures E-11 provides a hydrograph of the groundwater level at the school well during the testing and recovery period, and Figure E-12 provides a semi-log plot of the pumping data.

Table 20: Summary of Constant Rate Pumping Test – Well F

Well F	Rate (L/min)	Rate (m^3/day)	D-5-5 Min Rate (L/min)	Description
Pumping Rate (0-139 min)	11.35	16.35	13.7	3 USgpm
Pumping Rate (139 – 360 min)	7.57	10.90		2 USgpm
	Depth (mbgs)	**Elevation (masl)**	**Date/Time/ Duration**	**Description**
Water Level at Test Start	31.42	424.78	7:01AM	March 6, 2024
Water Level at elapsed time of 120 min (at pumping rate of 11.35 L/min)	44.95	411.25	9:01 AM	13.53 m drawdown
Water Level at elapsed time of 300 min (at pumping rate of 7.57 L/min)	35.65	420.55	12:01 PM	4.23 m drawdown
Test Duration	-	-	360 min	2,725 L pumped
Recovery	31.86	424.34	3:16 PM	0.44 m (85%) in 135 min
Observation Wells	-	-	-	Well C, Well D, Well H and Well G
Response in Observation Wells?	-	-	-	None Observed

Notes: mbgs = metres below ground surface. masl = metres above sea level; elevations estimated from digital elevation model and should be considered approximate.

During the pumping test at Well F, Well C, Well D, Well H and Well G were used as observation wells.. No response to pumping was identified in the nearby bedrock wells.

Based on the data obtained during the pumping test it was concluded that Well F was not capable of sustained pumping at 11.35 L/min (Figure E-11). The pumping rate was reduced to 7.57 L/min after 120 minutes and remained at that rate for the remainder of the test. After decreasing the pumping rate the water level in the well recovered gradually until the end of the test. It was inferred from the test results that Well F is marginally capable of supplying 7.57 L/min and therefore does not meet the required minimum specified in Procedure D-5-5.

The reasonable daily operational yield of Well F is limited by both the available drawdown and aquifer yield at this location. The estimated sustainable yield at Well F is about 3.8 L/min to 7.6 L/min (1 – 2 US gpm) provided there is adequate overnight recovery.

6.5.2 Well G

Table 21 summarizes the piezometric head measurements at various stages of the testing, test pumping rate and duration, the maximum measured drawdown, time to recovery, and observation well responses for the constant rate pumping test completed at Well G. Figures E-13 provides a hydrograph of the groundwater level at the school well during the testing and recovery period, and Figure E-14 provides a semi-log plot of the pumping data.

Table 21: Summary of Constant Rate Pumping Test – Well G

Well G	Rate (L/min)	Rate (m^3/day)	D-5-5 Min Rate (L/min)	Description
Pumping Rate	11.36	16.35	13.7	3 USgpm
	Depth (mbgs)	**Elevation (masl)**	**Date/Time/ Duration**	**Description**
Static Water Level at Test Start	33.22	427.85	9:10 AM	March 4, 2024
Water Level at Test End	41.06	419.34	3:10 PM	8.50 m drawdown
Test Duration	-	-	360 min	4,088 L pumped
Recovery	34.93	425.47	5:10 PM	2.38 m (72%) in 120 min
Observation Wells	-	-	-	Well C, Well B, Well F and Well H
Response in Observation Wells	-	-	-	None Observed

Notes: mbgs = metres below ground surface. masl = metres above sea level; elevations estimated from digital elevation model and should be considered approximate.

During the pumping test at Well G, Well C, Well B, Well F and Well H were used as observation wells. No response to pumping was identified at any of the observation wells. Two groundwater samples were collection for laboratory analysis during the test.

During the six-hour pumping test period, approximately 50% percent (8.5 m) of the available drawdown (17.2 m) was utilized while pumping at a rate of 11.35 L/min. Based on the data obtained during the pumping test, it was concluded that Well G is capable of sustained pumping at a rate of 11.36 L/min, and as such, the yield of Well G does not meet the required minimum specified in Procedure D-5-5. Further testing may be required to determine if Well G is capable of a higher rate.

The reasonable daily operational yield of Well G is limited by both the available drawdown and the amount of time it took to fully recover. The groundwater level at Well G appeared to stabilize within one hour of starting the test; however, the recovery indicates the water level stabilized at an elevation of approximately 2 metres lower than the original static water level (Figure E-12). While limited drawdown suggests high pumping rates are possible over the short term, pumping rates greater than the tested rate may require longer that 24 hours to fully recovery which could limit the maximum daily yield.

6.5.3 Well H

Table 22 summarizes the piezometric head measurements at various stages of the testing, test pumping rate and duration, the maximum measured drawdown, time to recovery, and observation well responses for the constant rate pumping test completed at Well H. Figures E-15 provides a hydrograph of the groundwater level at the school well during the testing and recovery period, and Figure E-16 provides a semi-log plot of the pumping data.

Table 22: Summary of Constant Rate Pumping Test – Well H

Well H	Rate (L/min)	Rate (m^3/day)	D-5-5 Min Rate (L/min)	Description
Pumping Rate	30.28	43.6	13.7	2 times D-5-5 minimum (8 USgpm)
	Depth (mbgs)	**Elevation (masl)**	**Date/Time/ Duration**	**Description**
Static Water Level at Test Start	3.19	454.91	7:31 AM	March 7, 2024
Water Level at Test End	8.49	449.61	1:31 PM	5.30 m drawdown
Test Duration	-	-	360 min	10,901 L pumped
Recovery	3.74	454.36	1:56 PM	0.55 m (90%) in 25 min
Recovery	3.31	454.79	2:31 PM	0.10 m (98%) in 60 min
Observation Wells	-	-	-	Well C, Well D, Well G, Well, F
Response in Observation Wells	-	-	-	None Observed

Notes: mbgs = metres below ground surface. masl = metres above sea level; elevations estimated from digital elevation model and should be considered approximate.

During the pumping test at Well H, Well C, Well D, Well G and Well F were used as observation wells. No response to pumping was identified at any of the observation wells.

During the six-hour pumping test period, approximately 13% percent (5.3 m) of the available drawdown (42.1 m) was utilized while pumping at a rate of 30.28 L/min. Based on the data obtained during the pumping test, it was concluded that Well H is capable supporting a pumping rate of at least 30.28 L/min, and as such, meets the required minimum specified in Procedure D-5-5.

The maximum sustainable yield for Well H is likely higher than the tested rates. During the initial hour of the test the groundwater level at Well H stabilized, and did not continue to drawdown further, using only 13% of the available drawdown. When the pumping period ended, the groundwater level recovered to within 98% of the pre-pumping water level after an hour. Additional testing would be required at Well F to determine maximum sustainable pumping rate.

6.5.4 Well I

Table 23 summarizes the piezometric head measurements at various stages of the testing, test pumping rate and duration, the maximum measured drawdown, time to recovery, and observation well responses for the constant rate pumping test completed at Well I. Figures E-17 provides a hydrograph of the groundwater level at the school well during the testing and recovery period, and Figure E-18 provides a semi-log plot of the pumping data.

Table 23: Summary of Constant Rate Pumping Test – Well I

Well I	Rate (L/min)	Rate (m^3/day)	D-5-5 Min Rate (L/min)	Description
Pumping Rate	75.6	108.9	13.7	8 times D-5-5 minimum (20 US gpm)
	Depth (mbgs)	**Elevation (masl)**	**Date/Time/ Duration**	**Description**
Static Water Level at Test Start	5.24	455.76	8:34 AM	March 6, 2024
Water Level at Test End	7.29	453.72	2:34 PM	2.04 m drawdown
Test Duration	-	-	360 min	27,216 L pumped
Recovery	5.39	455.61	2:44 PM	0.15 m (93%) in 10 min
Recovery	5.30	455.70	3:34 PM	0.06 m (100%) in 60 min
Observation Wells	-	-	-	Well J, Well D, Well E
Response in Observation Wells	-	-	-	Yes, Well D up to 0.28 m of drawdown; and, Well E up to 0.04 m of drawdown.

Notes: mbgs = metres below ground surface. masl = metres above sea level; elevations estimated from digital elevation model and should be considered approximate.

During the pumping test at Well I all onsite wells were used observation wells. A response to pumping was identified at Well D with a maximum measured drawdown response of 0.28 m. Groundwater levels at Well E exhibited a maximum drawdown of 0.04 m over the testing period. No response to pumping was identified at the other nearby bedrock wells or shallow monitoring wells.

During the six-hour pumping test period, approximately 30% percent (2.04 m) of the available drawdown (6.65 m) was utilized while pumping at a rate of 75.6 L/min. When the pumping period ended, the groundwater level recovered to static condition (100% recovery) one hour. Based on the data obtained during the pumping test, it was concluded that Well I is capable of supplying approximately 75.6 L/min , and as such, meets the required minimum specified in Procedure D-5-5.

The expected daily operational yield for Well I is inferred to be similar to the tested rate. Increasing the pumping rate may be possible but could be limited by interference with wells on adjacent lots. When the pumping period ended, the groundwater level recovered to near static conditions within an hour at Well I, suggesting the shallow bedrock/overburden zone is highly transmissive; however the drawdown of 0.28 m at Well D took approximately 150 minutes to recover, which is typical of a confined aquifer response. Well E also responded to pumping at Well I, with a maximum observed drawdown of 0.04 m (4 cm) during pumping. During recovery Well E recovered to static water level within 20 minutes of shutting off the pump at Well I. It is likely that as other wells are drilled in the same aquifer on adjacent lots, additional mutual interference would be expected which may affect the maximum sustainable pumping rate of wells in this area.

6.5.5 Well J

Table 24 summarizes the piezometric head measurements at various stages of the testing, test pumping rate and duration, the maximum measured drawdown, time to recovery, and observation well responses for the constant rate pumping test completed at Well J. Figures E-19 provides a hydrograph of the groundwater level at the school well during the testing and recovery period, and Figure E-20 provides a semi-log plot of the pumping data.

Table 24: Summary of Constant Rate Pumping Test – Well J

Well J	Rate (L/min)	Rate (m^3/day)	D-5-5 Min Rate (L/min)	Description
Pumping Rate	75.60	108.86	13.7	4 times D-5-5 minimum (20 USgpm)
	Depth (mbgs)	**Elevation (masl)**	**Date/Time/ Duration**	**Description**
Static Water Level at Test Start	3.13	455.97	9:02 AM	March 4, 2024
Water Level at Test End	5.60	453.50	3:02 PM	2.47 m drawdown
Test Duration	-	-	360	27,216 L pumped
Recovery	3.22	455.88	3:04 PM	0.09 m (96%) in 2 min
Recovery	3.13	455.97	3:06 AM	0.0 m (100%) in 4 min
Observation Wells	-	-	-	Well D, Well E, Well I
Response in Observation Wells	-	-	-	None

Notes: mbgs = metres below ground surface. masl = metres above sea level; elevations estimated from digital elevation model and should be considered approximate.

During the pumping test at Well J all onsite wells were used as observation wells. No response to pumping was identified at any of the observation wells.

Based on the data obtained during the pumping test, it was concluded that Well J is capable of being pumped at a rate of up to at least 75.60 L/min. During the six-hour pumping test period, approximately 33% percent (2.47 m) of the available drawdown (7.54 m) was utilized while pumping at a rate of 75.6 L/min. As such, the yield of Well J meets the required minimum specified in Procedure D-5-5.

The reasonable daily operational yield for Well J is likely higher than the tested rates. During the initial minutes of the test the groundwater level in Well J stabilized and did not continue to drawdown further. When the pumping period ended, the groundwater level recovered to the pre-pumping level within five minutes, suggesting the overburden aquifer in the vicinity of the well is transmissive. Additional testing would be required at Well I to determine if higher pumping rates are sustainable at this location.

7.0 WATER SUPPLY POTENTIAL - QUANTITY

7.1 Aquifer Parameters

The transmissivity (T) of the confined target aquifer was estimated using the Cooper-Jacob (1946) straight-line method for the linear drawdown versus time trend per log cycle of time. The data were analyzed using the following formula:

$$T = \left(\frac{2.303\ Q}{4\ \pi\ \Delta s}\right)$$

Where: Q = pumping rate, m^3/day;
Δs = slope of the observed drawdown hydrograph per log cycle.

There are a number of assumptions inherent in this method, including (but not limited to) the following:

- The aquifer is confined;
- The aquifer is infinite in areal extent;
- The aquifer is homogeneous, isotropic and of uniform thickness;
- The aquifer is pumped a constant rate;
- The well penetrates the entire thickness of the aquifer and thus receives water by horizontal flow; and
- The flow to the well is in unsteady state.

Not all of the above assumptions are valid in the case of each of the test wells at the Site, particularly for those wells completed as open boreholes in fractured bedrock. Despite the limitations, the Cooper-Jacob straight line method was used for the analysis as it provides a robust and conservative means to assess the hydraulic properties of the tested formation.

Based on this method, the transmissivity of the deeper confined bedrock aquifer zone (Well B, Well C, Well G, Well F and Well H) was estimated to range from 0.12 to 4.80 m^2/day. The transmissivity of the overburden/shallow bedrock aquifer Zone (Well D, Well E, Well I and Well J) was estimated to range from 19.87 to 122.69 m^2/day (Table 25).

Table 25: Summary of Estimated Transmissivity

Aquifer Zone	Pumping Well	Q (m^3/day)	Δs (m per log cycle)	Transmissivity (m^2/day)
Deep Bedrock	Primrose Elementary School	108.86	0.2	55.68 – 99.75
	Well B	21.8	22.0	0.12 – 0.18
	Well C	32.83	6.0	0.71 – 1.00
	Well F	10.90	6.0	0.19 – 0.33
	Well G	16.35	4.5	0.66 – 1.02
	Well H	43.61	2.5	3.19 – 4.80
Overburden/ Shallow Bedrock	Well D	108.86	0.90	19.87 – 22.17
	Well E	108.86	0.20	99.75 – 122.69
	Well I	108.86	0.40	49.87 – 115.43
	Well J	108.86	0.25	79.80 - 83.50

Notes: Q = daily pumping rate. s = drawdown.

No water level response was noted at any of the observation wells during the pumping tests at the deep bedrock wells, therefore the storativity of the deep bedrock could not be estimated. The storativity of the overburden/shallow bedrock zone was estimated using the observation well data collected from Well D and Well E during the pumping test at Well I.

The data were analyzed using the following formula:

$$S = \left(\frac{2.25Tt_o}{r^2}\right)$$

Where: T = transmissivity calculated as above, m^2/day;
t_o = time at which the straight line intersects the zero-drawdown axis (min);
r = distance to the pumping well (m).

Table 26: Summary of Estimated Storativity

Pumping Well	Observation Well	ΔS (m per log cycle)	Transmissivity (m^2/day)	$(t/r^2)_0$ (min/m^2)	Storativity (unitless)
Well I	Well D	0.13	75	0.00016	1.99×10^{-5}
	Well E	0.05	100	0.49	7.6×10^{-2}

Well D and E and equidistant from pumping Well I in what is inferred to be a confined overburden aquifer. The results of the pumping test response at Well D indicate a storativity value of 1.99×10^{-5}, which is consistent with a confined aquifer condition. The estimated storativity based on the data from Well E is considerably higher (7.6×10^{-2}) and is more typical of unconfined conditions. The difference in the estimated storativity suggests heterogeneities are present in the overburden on south portion of the property which will influence the performance of individual wells.

To assess the water supply capability of the test wells, the pumping rate and total volume withdrawn were compared to the minimum requirements in Procedure D-5-5, and the expected drawdown under peak demand rates has been compared with the available drawdown.

Table 27: Estimated Daily Yield

Well	Formation	Location on Site	Tested Yield	Max Daily Rate
Well B	Bedrock	Northwest	7.6 L/min (2 USgpm)	10.9 (m^3/day)
Well C	Bedrock	North-central	18.9 L/min (5 USgpm)	27.2 (m^3/day)
Well F	Bedrock	North	7.6 L/min (2 USgpm)	10.9 (m^3/day)
Well G	Bedrock	North-central	11.4L/min (3 USgpm)*	16.4 (m^3/day)
Well H	Bedrock	East	30.28 L/min (8 USgpm)*	43.6 (m^3/day)
Well D	Overburden/Bedrock Interface	Southeast	75.6 L/min (20 US gpm)	108.8 (m^3/day)
Well E	Overburden/Bedrock Interface	Southwest	75.6 L/min (20 US gpm)*	108.8 (m^3/day)

Well	Formation	Location on Site	Tested Yield	Max Daily Rate
Well I	Overburden/Bedrock Interface	Southcentral	75.6 L/min (20 US gpm)	108.8 (m^3/day)
Well J	Overburden	Southwest	75.6 L/min (20 US gpm)*	108.8 (m^3/day)

Note: * denotes wells with the potential for higher yields

As summarized on Figure 7, the testing results indicate that the yield in the bedrock wells varied from less than 7.6 L/min to (at least) 30.3 L/min. The yield for the wells completed on the northern portion of the property (Well B and Well F) was relatively low, and these wells are not capable of meeting the minimum requirements for the Procedure D-5-5 of 13.7 L/min. Their anticipated sustainable yield was on the order of 3.8 L/min to 7.6 L/min (1 to 2 USgpm), which may be sufficient for low demand uses (such as warehousing, storage, or facilities with low/no process water demands). Wells C and G had marginally higher yields and were determined to be capable of sustaining pumping rates between 11.4 L/min and 18.9 L/min (3 to 5 USgpm). Well H, located on the east side of the Site was found to be capable of sustaining a pumping rate 30.28 L/min (8 US gpm). Based the response to pumping, recovery response, and available drawdown it is anticipated that higher pumping rates may be possible at this location.

It is expected that the yield at individual bedrock wells will be constrained by the presence and productivity of fractures encountered during the drilling. It is suggested that the testing results for the bedrock wells be used only as general guide in terms of potential future land use. The water supply potential at individual lots or locations will have to be assessed on a per well basis.

On the south portion of the Site, wells completed in the overburden and overburden/ bedrock interface (Well D, Well E and Well I and Well J) were all found to be capable of meeting the Procedure D-5-5 minimum requirements and depending on the intended demand may be capable of higher sustained pumping rates than the rates used during testing. It is expected that additional wells completed on the south portion of the property, in similar fashion to the existing wells, would provide broadly similar yields.

7.2 Interference Assessment

7.2.1 Bedrock

With respect to the deep bedrock wells, no observable drawdown was detected in the surrounding bedrock monitoring wells during the pumping tests. The flow rates were low, and therefore the volumes of groundwater removed were small. A technical analysis of the effects of potential mutual well interference was not possible for deep bedrock wells. Based on the information gathered to date, additional wells installation on the northern portion of the Site with similarly low yields are unlikely to interfere with one another due to the relatively large lot fabric. For the same reason, it is considered unlikely that wells drilled on the northern portion of the Site will interfere with nearby offsite wells. However given the variability in potential yield noted in the bedrock, the installation of additional wells should involve testing and evaluation of the individual well performance to determine the potential for mutual well interference.

7.2.2 Overburden/Shallow Bedrock

During Phase 1 pumping tests at Wells D and E, located 300 m apart, were pumped for 6 hours and no drawdown response was observed in either well as a response to pumping. As part of Phase 2, Well I was drilled at a point approximately equidistant between Well D and Well E. During the pumping test at Well I, a drawdown response of

0.28 m was observed at Well D, located approximately 150 m east and a drawdown response of 0.04 m was observed in Well E located approximately 150 m to the west of Well I.

The results of the Well I testing, including the transmissivity and storativity estimates (Table 25 and Table 26), were used to estimate the potential mutual interference for well installed on the southern portion of the Site Appendix G, Table G-1 and G-2 for two scenarios. The interference estimates were made using the Theis (1935) method (see below), which calculates the distance drawdown from an individual well.

$$\Delta s = \left(\frac{2.30\mathrm{Q}}{4\pi T}\right) log \frac{2.25Tt}{r^2 S}$$

Where:

T = transmissivity calculated as above, m^2/day;
S = storativity (dimensionless);
t = time (days);
Q = discharge (m^3/day)
r = distance to the pumping well (m).

The assumptions for the interference calculations included the following:

- One well per lot based on the current lot configuration;
- The wells are pumped at an average rate of 20.83 L/min (which is assumed to be half of the tested rate);
- Assume a 20-year time frame; and
- The mutual drawdown estimates are radial in extent.

Based on the assumptions above, and the estimated transmissivity and storativity values for the overburden / shallow bedrock system, the interference expected between wells on the southern portion of the property is expected to vary between 0.40 and 0.80 m per well, depending on factors such as well spacing, pumping rate, and aquifer performance. Based on the current, preliminary lot spacing, the estimated interference for a theoretical well in the central southern portion of the Site if all wells were pumping simultaneously would be between 2.7 and 6.4 m.

Of the current wells on the south portion of the Site, Well D and E are both drilled to 15.24 m and had 88% and 93% of the total available drawdown remaining at the end of the constant rate tests. The maximum estimated mutual interference effects could be tolerated at both Well E and D.

The total depth of Well I is 11.89 mbgs with static water level of 5.24 mbgs, which results in total available drawdown at Well I of 6.65 m. Allowing for pump placement, the available drawdown falls within the range of possible cumulative interference. Based on the range of cumulative interference calculations estimated above, Well I could tolerate interference effects at the low end of the estimated range.

The estimated interference effect at off-site wells would depend on the position of the well relative to the Site wells, but using the above calculations and assuming an average well spacing of 250 m, may be expected to range from 0.25 to 0.75 m on a per well basis. These estimates are theoretical and are likely conservative; the calculations suggest that interference should have occurred between the Site test wells and the nearest off-Site wells, however no interference effects were noted during the constant rate tests.

The method of calculation for the interference effects also neglects the effects of recharge in the calculation, and the anticipated intermittent (rather than continuous) nature of water use, both of which would be expected to reduce the total interference between wells.

8.0 WATER QUALITY

8.1 Sampling Schedule

Water quality samples were collected from all test wells and Institution A during both the Phase 1 and Phase 2 constant rate testing program as detailed in the following table.

Table 28: Summary of Water Quality Sampling Schedule

Date	Test Well										Event
	School	B	C	D	E	F	G	H	I	J	
11-Aug-23	X										Prior to accessing well/removing pump
16-Aug-23	X										Pumping test – early time
17-Aug-23	X										Pumping test – late time
22-Aug-23		X									Pumping test – late time
21-Aug-23			X								Pumping test – early time
21-Aug-23			X								Pumping test – late time
23-Aug-23					X						Pumping test – early time
23-Aug-23					X						Pumping test – late time
24-Aug-23				X							Pumping test – early time
24-Aug-23				X							Pumping test – late time
04-Mar-24							X				Pumping test – early time
04-Mar-24							X				Pumping test – late time
04-Mar-24										X	Pumping test – early time
04-Mar-24										X	Pumping test – late time
06-Mar-24						X					Pumping test – early time
06-Mar-24						X					Pumping test – late time
06-Mar-24									X		Pumping test – early time
06-Mar-24									X		Pumping test – late time
07-Mar-24								X			Pumping test – early time
07-Mar-24								X			Pumping test – late time

Two water quality samples were obtained during with the first hour of the constant rate and within one hour of pump shut off of the individual constant rate pumping tests at each of the test wells and the school well to monitor for water quality changes over time.

Field parameters were measured using a YSI 556 Handheld Multiparameter instrument, except for chlorine residual measurements which were measured using a Hach DR/890 portable colorimeter. Field parameters included turbidity, pH, electrical conductivity, temperature, dissolved oxygen, redox potential, residual chlorine, visual observations of clarity, odour and off-gassing.

The parameters included as part of the early time and late time analytical suites including the following:

Early Time – General chemistry, major ions, nitrate/nitrate, and total metals parameters. The total metals parameters sample was not field filtered.

Late Time – Microbiological parameters, general chemistry, major ions, nitrate/nitrate, ammonia, TKN, ortho-phosphate, Tannins, DOC, total metals (unfiltered) and dissolved metals (field filtered) parameters.

The water quality samples were collected from secondary tap installed as part of this discharge assembly installed by Aardvark using generally accepted sampling protocols and delivered in coolers with ice under chain-of-custody to Caduceon Laboratories of Barrie, Ontario. The samples were analyzed for typical well water quality parameters that are inclusive of the minimum list of parameters identified in Procedure D-5-5. Total metals parameter analyses (i.e., unfiltered samples) were completed for each test well. In addition, to assess the concentration of metals present in the dissolved phase, selected samples filtered with a 0.45 µm in-line filter were collected for subsequent analysis of dissolved metals concentrations.

The results were compared to the *Ontario Drinking Water Quality Standards* (Standards) (Ontario Regulation 169/03, as amended) and the Aesthetic Objectives (Objectives) and Operational Guidelines (Guidelines) in *Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines* (ODWSOG) (rev. June 2006). The data were also compared to the treatability limits identified in Procedure D-5-5. Copies of the laboratory Certificates of Analysis are provided in Appendix F. Table F-1 (Appendix F) summarizes the analytical results for the water samples collected as part of Phase 1 and Table F-2 summarizes the analytical results for the water samples collected as part of Phase 2.

8.2 Water Quality Results

The following sections summarize the analytical results for the laboratory analysis with comparison to the Standards, Objectives, Guidelines and treatment limits. This summary section discusses results where the reported concentration exceeds the relevant guideline (or standard or objective). All other results not discussed below were below their applicable guideline value.

8.2.1 Health Related Guidelines

Microbiological parameters

Microbiological parameters consist of Total Coliform and *Escherichia coli* (*E. coli*). Microbiological parameters at Well B and C were unreportable due to interference during lab processes. Sample from Well D had a total coliform result of 25 colony forming units (CFU/100mL) which is above the standard of 0 CFU/100mL; the *E.coli* concentration was reported to be 0 CFU/100mL. Similar sample results were obtained at Well J, where total coliforms were 2 CFU/100 mL; however, the *E.coli* concentration was reported to be 0 CFU/100mL.

Barium

The late time groundwater sample collected from Well E exceed the Maximum Acceptable Concentration for barium, with a concentration of 1.43 mg/L compared to the Maximum Allowable Concentration (MAC) of 1.0 mg/L.

Arsenic

The groundwater sample from Well E was reported with an arsenic concentration of 0.0164 mg/L, which exceeds the MAC value 0.01 mg/L.

8.2.2 Aesthetic Objectives

Aesthetic Objectives (AO) are established for parameters that may impair the taste, odour or colour of water or which may interfere with good water quality control practices (ODWSOG, page 3). The following discusses all parameters with at least one exceedance of the Objectives.

Chloride

The chloride concentrations in the various samples were noted to exceed the AO for chloride in as described below.

Table 29: Summary of Water Quality Standard Results - Chloride

Parameter	Test Well										Aesthetic Objective (AO)
	School	B	C	D	E	F	G	H	I	J	
Chloride	998			467	1160			287	593		250 mg/L

Sodium

The sodium concentrations in the various samples were noted to exceed the AO sodium as described below.

Table 30: Summary of Water Quality Standard Results - Sodium

Parameter	Test Well										Aesthetic Objective (AO)
	School	B	C	D	E	F	G	H	I	J	
Sodium	514				521				271		20 mg/L / 200 mg/L

The aesthetic objective for sodium in drinking water is 200 mg/L. The local Medical Officer of Health should be notified when the sodium concentration exceeds 20 mg/L so that this information may be communicated to local physicians for their use with patients on sodium restricted diets.

Hardness

The hardness concentrations in the various samples were noted to exceed the AO for hardness (expressed as calcium carbonate) as described below.

Table 31: Summary of Water Quality Standard Results - Hardness

Parameter	Test Well										Aesthetic Objective (AO)
	School	B	C	D	E	F	G	H	I	J	
Hardness (as CaCO3)	510	n/a	372	580	822	211	228	429	492	275	100 mg/L

Turbidity

The turbidity concentrations in the various samples were noted to exceed the AO for laboratory measured turbidity for several samples (Well B, C, D, E, F, I and the school well), however, the field turbidity levels were consistently lower than the laboratory results. In our opinion, field turbidity is the most representative measurement of turbidity in water quality. Turbidity measurements in Table 32 summarizes the turbidity measurements from the late time samples collected during the pumping tests. The late time results are considered representative of the raw groundwater quality at the well head.

Table 32: Summary of Water Quality Standard Results – Field Turbidity

Parameter	Test Well										Aesthetic Objective (AO)
	School	B	C	D	E	F	G	H	I	J	
Tubidity (NTU or FAU)	15	>100	18			9	8	15	5		5 NTU

Iron

The laboratory results from groundwater sample analysis indicated the total iron concentrations exceeded the AO of 0.3 mg/L at Well D (1.39 mg/L), Well E (1.23 mg/L) and Well I (1.50 mg/L).

Manganese

Total manganese concentrations exceeded the Objective (0.05 mg/L) in the groundwater samples at Well D (0.103 mg/L); Well E (0.064 mg/L); Well H (0.062 mg/L); and Well I (0.076 mg/L).

8.3 Treatability

Procedure D-5-5 provides a statement in Table 3 regarding the maximum concentrations of various parameters considered “reasonably treatable”. The following points summarize the notes for the aesthetic, analytical and indicator parameters noted in Table 3 of Procedure D-5-5. The Procedure also notes that “…it is the municipality’s responsibility to decide whether development on the basis of in-home treatment systems should be permitted.”

Chloride: Chloride is not considered reasonably treatable at concentrations greater than 250 mg/L. At concentrations over 250 mg/L, chloride will produce a detectable salty taste. It is understood that both Institution A and Commercial A, which have groundwater chloride concentrations above 250 mg/L, use reverse osmosis to treat the groundwater.

Hardness: Hardness is not considered reasonably treatable at concentrations greater than 500 mg/L; however, both the Institution A and Commercial A use water softeners and reverse osmosis to treat groundwater with hardness concentrations above 500 mg/L. Highly mineralized water is common in southwestern Ontario and elevated hardness is not considered a barrier to potability. The Operational Guideline is related to corrosion and incrustation of plumbing fixtures and system performance. Where water softeners are used, the treatment can often increase the sodium content in the water. Where sodium concentrations in the raw water are high, this treatment method can pose challenges to effective treatment. Alternative softening products, such as potassium can be used as water softener media.

Sodium: Sodium is not considered reasonably treatable at concentrations greater than 200 mg/L; however, both the Institution A and Commercial A use reverse osmosis to treat groundwater with a sodium concentration approaching or greater than 200 mg/L. The concentration of sodium is increased where water softening treatment is utilized (e.g., for the treatment of colour, iron, manganese and hardness, as discussed in Section 6.2). If a water softener is installed, a separate (unsoftened) drinking water tap should be provided.

Iron and Manganese: The total iron and manganese concentrations are within the treatable limit identified in Procedure D-5-5 with the use of water softeners or greensand filters.

Turbidity: Turbidity is treatable with sediment filters.

Treatability to the intended end use (process water, irrigation, drinking water, etc.) may require further discussion with water treatment professionals.

8.4 Potential Land Use

In terms of potential land use, there are several documents which provide guidance on the range of expected water supply demands for various activities. The Design Guidelines for Drinking Water Systems (MECP, 2016, updated 2023) indicates the range of average day water taking rates for industrial water uses as 35 m^3/ha/day (light industry) to 55 m^3/ha/day (heavy industry). However, the Design Guidelines also noted “These demands will vary greatly with the type of industry”.

For commercial uses, the Design Guidelines for Drinking Water Systems indicate the average water demand as 28 m^3/ha/day (19.4 L/min). A representative lot size at the for the development is 1.9 ha, which would suggest an average water supply demand of 36.9 L/min for typical commercial uses. The above estimates for average water use for industrial, commercial, and institutional purposes do not include peaking factors to account for maximum day demand rates.

8.4.1 Design Guidelines for Drinking Water Systems

The following points provide an assessment of the general, property use potential, based on the results of the well testing and yield information contained in Table 27, and the usage requirements outlined in the Design Guidelines for Drinking Water Systems.

Heavy Industrial Uses: With an estimated average taking rate of 55 m^3/ha/day, it is considered unlikely that any single groundwater supply well installed at the Site at any location will have the capacity to support heavy industrial land uses.

Light Industrial Uses and Typical Commercial Uses: Light industrial uses and typical commercial uses may be possible on lots in the southern portion of the Site. The pumping data results indicates these land uses cannot be supported by the relatively low yield of the bedrock formation on the northern portion of the Site.

No-water/Low-Water Uses: The Design Guidelines for Drinking Water Systems do not provide explicit average usage rate for “low use” applications, such warehouses, storage facilities, etc. The water demands for such applications would require evaluation on a per facility basis, however it is expected that it would be possible to advance a well on most lots, including over the northern portion of the property, that would be capable of provided water at relatively low rates (14 m^3/ha/day; 9.7 L/min), if only for uses such as facilities (i.e., water closet).

The water supply demands for individual lots will need to be confirmed when the types of occupants are known. As discussed in Section 4.1 the Ontario Building Code Tables for Sewage System Design may provide additional insight on allowable land uses. On lots where the operational yields do not meet the desired land use demand, opportunities for water storage or importing of potable water supply may be considered.

8.4.2 Mulmur Zoning By-Law

The information from the Design Guidelines for Drinking Water Systems was compared to applicable proposed zoning information for the Site. The Township of Mulmur Comprehensive Zoning By-Law No. 28-18 (current to October 17, 2022) was compared with permitted land uses. Table 33 summarizes both efforts by the project team to categorize the potential occupants by anticipated water demand.

Table 33: Zoning By-law and Land-Use Water Demand Comparison

Generally Viable (Little to low water demand uses)	Viability subject to available water supply	Activities unlikely to be viable due to high water demand
■ Parking lots ■ Stormwater management facilities ■ Telecommunication towers transmission towers and hydroelectric substations ■ Bulk fuel depot ■ Contractor's yard ■ One accessory dwelling unit / lot ■ Farmers market ■ Gas station ■ Open space or park, park and trail access facility ■ Outdoor storage, ancillary to a permitted use, within a fully enclosed, screened and gated area ■ Self-storage facility	■ Activity Centre ■ Restaurant ■ Repair Shop ■ Building Supply and Lumber Outlet ■ Emergency Services Facility ■ Garden Centre ■ Light Manufacturing, processing, or assembly ■ Hotel or Motel ■ Personal Service Shop ■ Practitioner's Clinic ■ Repair Shop (non-vehicle) ■ Research and development establishment ■ Restaurant ■ Veterinary clinic	■ Concrete product manufacturing ■ Sawmill ■ Feed mill

Generally Viable (Little to low water demand uses)	Viability subject to available water supply	Activities unlikely to be viable due to high water demand
■ Transportation depot ■ Warehouse ■ Post office ■ Retail store, including convenience store, excluding cannabis substances ■ Child care facility ■ Business professional and administration office ■ Sales, services, and rental establishments ■ Motor vehicle body shop ■ Motor vehicle repair garage ■ Motor vehicle dealership	■ Workshop ■ Retail sales accessory to a permitted use not exceeding 35% of the total floor area ■ Commercial and industrial schools ■ Tourist information centre, interpretive centre or recreational trailhead facility ■ Service shop (non- vehicle)	

9.0 CONCLUSIONS AND RECOMMENDATIONS

Deltini Commercial Development is proposing a privately serviced commercial subdivision on a 36.9 ha site located at 606040 Prince Charles Road in the Hamlet of Primrose, Township of Mulmur, Ontario. The proposed residential subdivision will consist of commercial lots (with the final number and distribution of lots to be determined), one storm water management pond, an environmental projection block and local road. This hydrogeological assessment was completed by WSP to assess the suitability of the use of individual water wells for servicing the Site.

1) Nine 152 mm nominal diameter test wells, Well B through Well J, were constructed and tested in overburden and bedrock aquifers across the site.

    a. The well yields for bedrock wells on the northern portion of the Site were considered marginal (i.e., on the order of 7.6 L/s or less) and did not meet the minimum yield requirements described in the Procedure D-5-5.

    b. The individual well yields on the southern portion of the Site, completed in both the overburden and shallow bedrock, ranged from 75.6 L/min, and met the yield requirements described in the Procedure D-5-5.

2) During the constant rate pumping test at the existing Primrose Elementary School well, no observable drawdown was recorded at Well B or Well C (completed during Phase 1). Similarly, during the testing of Well B and Well C no drawdown was observed at the school well.

3) Interference effects were not observed between the wells on the northern portion of the Site during the constant rate pumping tests. Interference was noted between shallow bedrock wells on the southern portion of the Site, although the effect noted was minor relative to the total available drawdown. Based on the tested pumping rates, and the number of wells installed to date, the cumulative interference effect at each overburden well was conservatively estimated to be 0.5 m. The interference effects at the property limits are inferred to be negligible. With the current well configuration and proposed maximum yields, the potential cumulative interference effects from the proposed groundwater use at the Site are not anticipated to result in water quantity interference conflicts in on-Site and neighbouring water wells. If additional wells are drilled and tested these interference calculations should be revisited to incorporate new hydrogeological information.

4) Based on the results of the pumping test programs, and the findings of the private well survey, the yield of wells completed in the deep bedrock on the northern portion of the Site is expected to be relatively low and may not meet the requirements of the D-5-5 Guideline. Due to the relatively low yields, development on the northern portion of the Site may be restricted to low water demand uses.

5) Wells completed over the southern portion of the Site, in either the overburden or shallow bedrock, are expected to have yields that meet or exceed the requirements of the D-5-5 Guideline.

6) The results of groundwater quality testing at the Site, both as part of the pumping test program and at nearby private water supply wells, indicated that the groundwater quality at the Site (both in the bedrock and overburden) was generally within the Standards, Objectives and Guidelines stipulated in the Ontario Drinking Water Quality Standards for all the tested parameters, with the exception of the Objectives for sodium, chloride, iron, manganese and hardness.

7) It is expected that treatment would be required to render the water suitable for potable uses. Groundwater quality was generally better (i.e., lower sodium and chloride concentrations) for wells over the northern portion of the Site, and as such may be more amenable to treatment. The higher yielding wells in the southern portion of the Site generally had higher sodium and chloride concentrations, which may increase the treatment requirements. The chloride and sodium concentrations are considered treatable with the use of reverse osmosis, which was noted to be in use at some of the neighbouring private wells. The iron and manganese concentrations are considered treatable with the use of conventional water softeners or manganese green sand filters. The hardness concentrations are considered treatable with the use of conventional water softeners, although the use of sodium should be avoided.

8) Future occupants should be notified that treatment of the groundwater supply for sodium, chloride, hardness and where applicable, iron and manganese may be necessary depending on the water quality results from their water well.

9) Future drilled water wells should be constructed by an MECP-licensed Water Well Contractor employing licensed Water Well Technicians, in accordance with the requirements of O.Reg. 903, as amended. The installation of shallow dug, or bored wells is not recommended. Newly constructed wells should be chlorinated to remove contamination from drilling and, following installation of pumping equipment, the wells

should be re-chlorinated. In accordance with the procedure specified in O.Reg. 903, this can be accomplished by the addition of chlorine to achieve a maximum wellbore chlorine concentration of 250 mg/L.

10) The nine test wells have been completed in accordance with the requirements of O.Reg. 903, and are considered suitable for use as groundwater supply wells.

11) Any unused wells at the Site, both the test wells and shallow monitoring wells, should be decommissioned in accordance with applicable legislation.

12) The water quantity assessment did not consider potential non-domestic water uses such as irrigation systems, which are therefore not recommended without additional assessment.

13) Future well owners should refer to the following website for information on Best Management Practices for water wells from the Ontario Ministry of Agriculture, Food and Rural Affairs: www.omafra.gov.on.ca/english/environment/bmp/well.htm. Prospective occupants should also refer to the MECP document *Water Supply Wells – Requirements and Best Management Practices, Revised April 2015*

Signature Page

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Senior Hydrogeologist/Project Manager

TM/DD/rk

https://wsponlinecan.sharepoint.com/sites/ca-cx23611788/shared documents/06. deliverables/4. report/ca-gld-23611788-r-rev0-hydrog investigation_2024-05-30.docx

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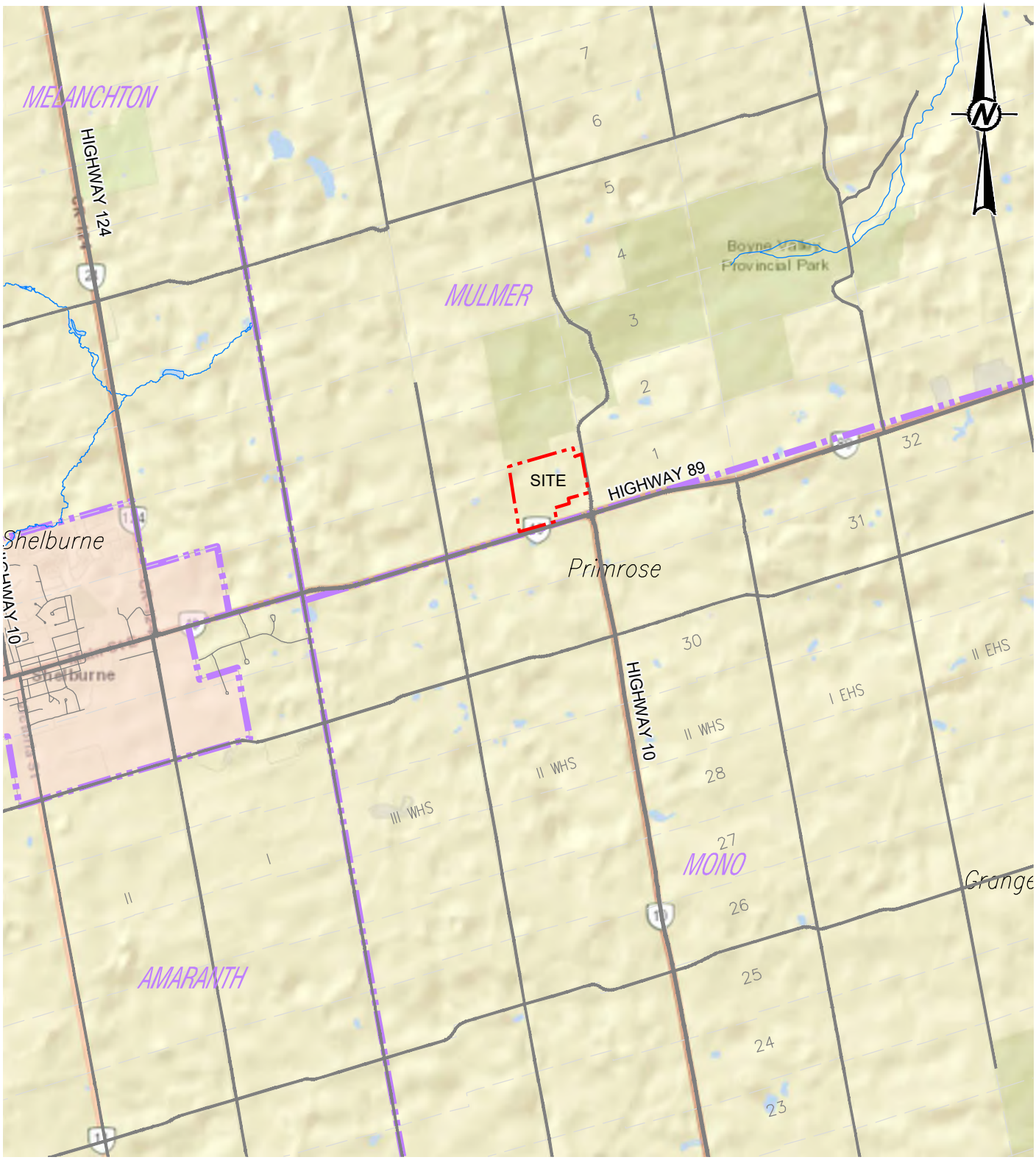
Figures



LEGEND

PROPERTY BOUNDARY

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MAPPING BASED ON ESRI GEOGRAPHY NETWORK OBM FEATURES & ESRI ORTHOPHOTOS

CLIENT
DELTINI COMMERCIAL DEVELOPMENTS

PROJECT
PRIMROSE COMMUNITY
WATER SUPPLY WELL CONSTRUCTION AND TESTING

CONSULTANT
wsp

YYYY-MM-DD	2024-03-14
DESIGNED	
PREPARED	JPR
REVIEWED	DPD
APPROVED	TLM

TITLE
SITE KEY PLAN

PROJECT NO.	CONTROL	REV.	FIGURE
23611788	0002	----	1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A

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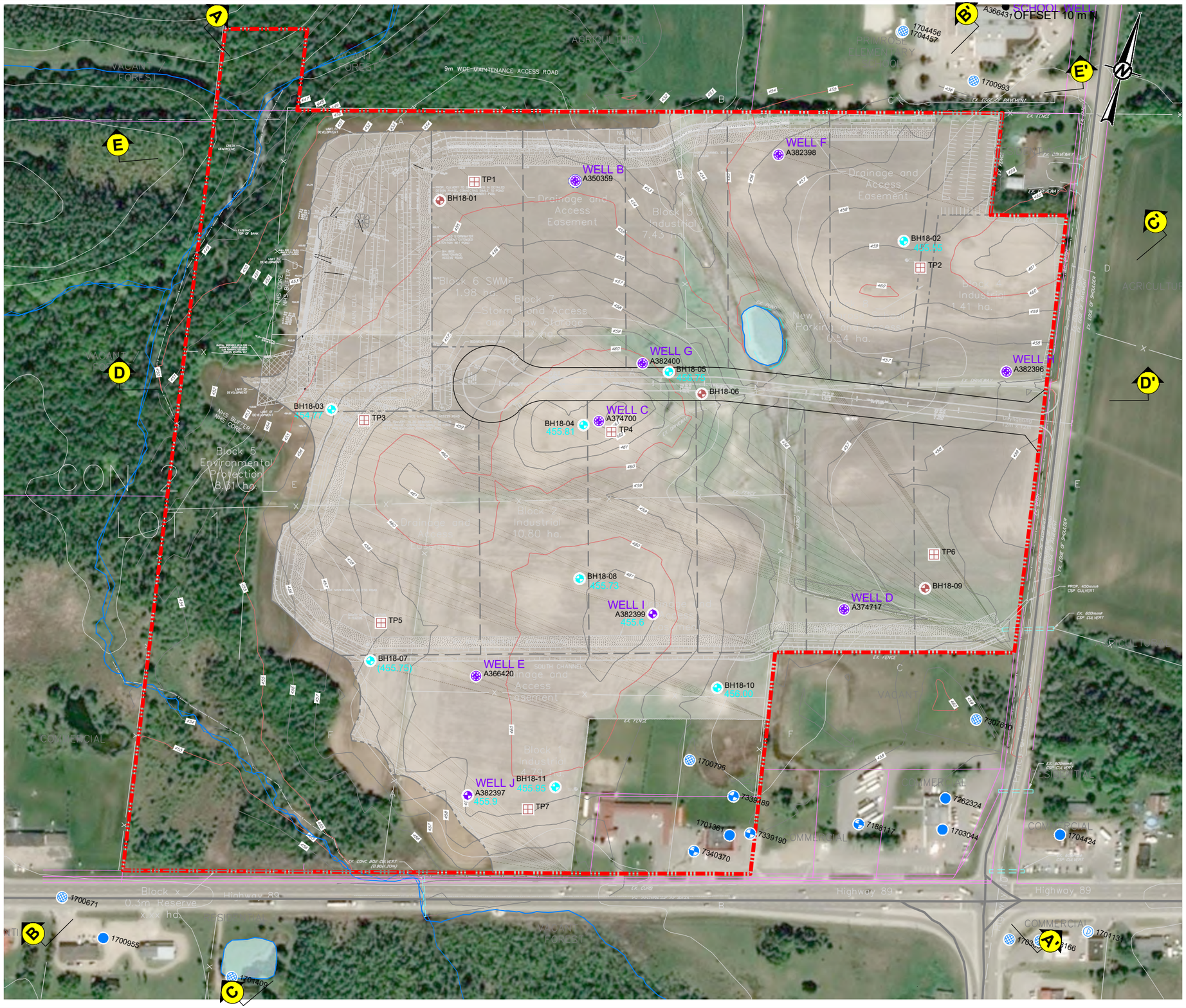

PLAN LEGEND

- DEVELOPMENT BOUNDARY
- TEST PIT
- TEST BOREHOLE
- MONITORING WELL
- 458.80 OVERBURDEN STATIC WATER LEVEL (MARCH 2020, masl)
- OVERBURDEN TEST SUPPLY WELL
- BEDROCK TEST SUPPLY WELL
- A — SITE SECTION

REFERENCES & DISCLAIMERS

ORTOIMAGE, BING 2022

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CLIENT
DELTINI COMMERCIAL DEVELOPMENTS

PROJECT
PRIMROSE COMMUNITY
WATER SUPPLY WELL CONSTRUCTION AND TESTING

TITLE
SITE DRILLLING PLAN

CONSULTANT

wsp

YYYY-MM-DD	2024-03-14
DESIGNED	
PREPARED	JPR
REVIEWED	DPD
APPROVED	TLM

PROJECT NO.	CONTROL	REV.	FIGURE
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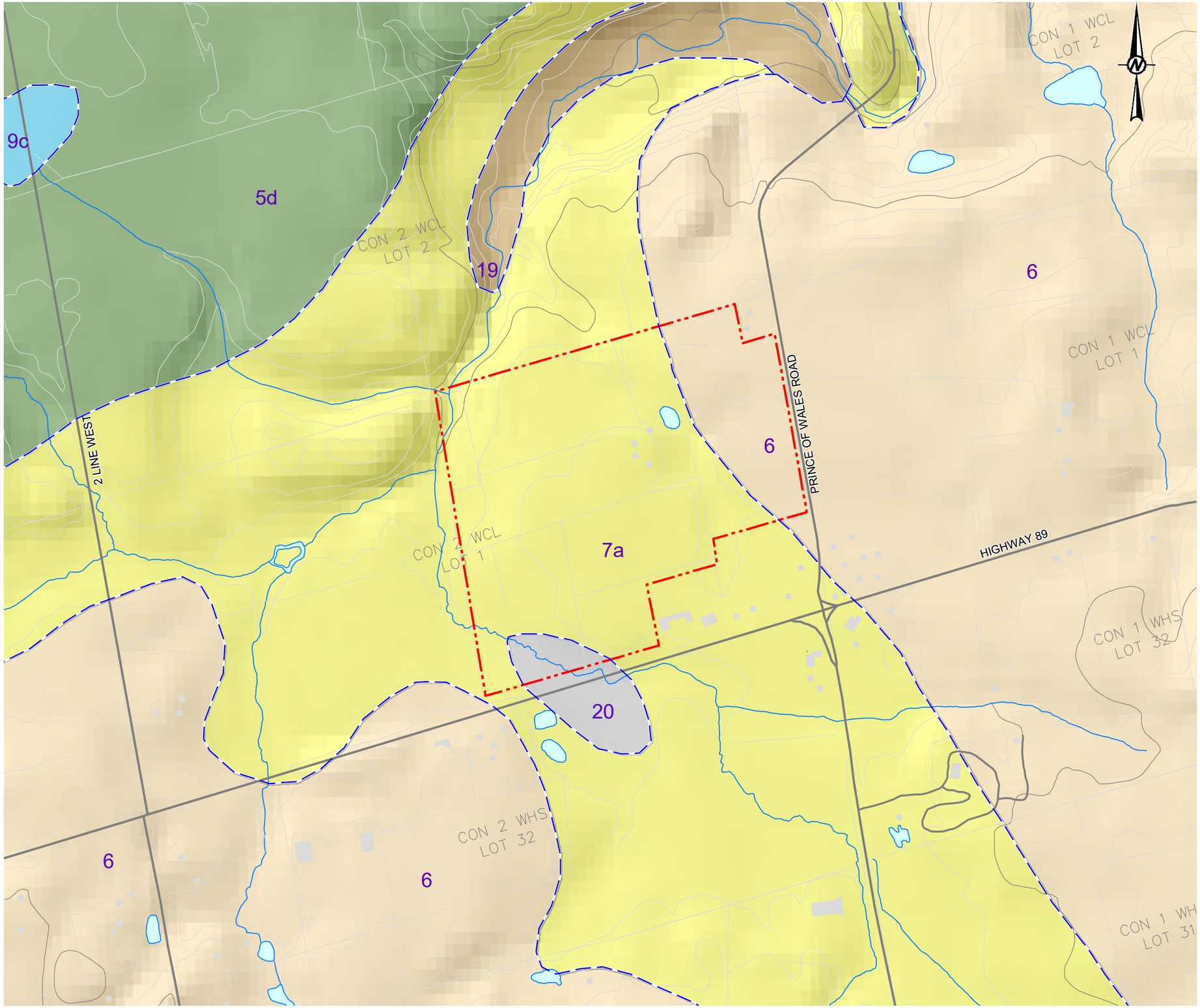

MAP KEY

	20	ORGANIC DEPOSITS
	19	FLUVIAL SILT, SAND, GRAVEL
	7a	DISTAL SAND & GRAVEL
	6	ICE CONTACT SEDIMENTS, ESKERS
	5d	FINE GRAINED TILL

REFERENCES & DISCLAIMERS

QUATERNARY MAP, DIGITAL OGS 2016; KING'S PRINTER

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CLIENT
DELTINI COMMERCIAL DEVELOPMENTS

PROJECT
PRIMROSE COMMUNITY
WATER SUPPLY WELL CONSTRUCTION AND TESTING

TITLE
QUATERNARY MAP SURFICIAL SOILS

CONSULTANT

YYYY-MM-DD	2024-03-14
DESIGNED	
PREPARED	JPR
REVIEWED	DPD
APPROVED	TLM

PROJECT NO.	CONTROL	REV.	FIGURE
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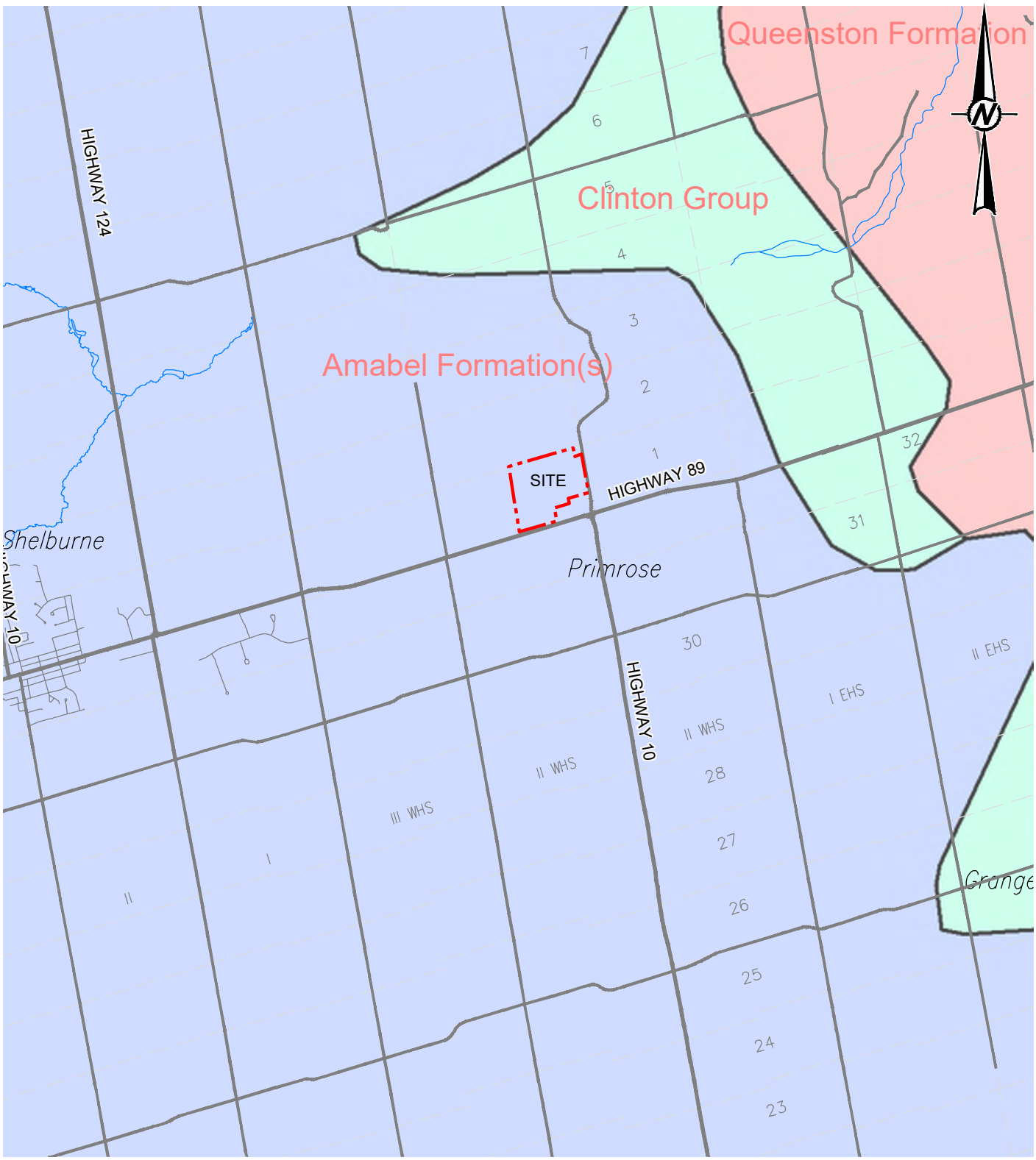

LEGEND

PROPERTY BOUNDARY

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MAPPING BASED ON ESRI GEOGRAPHY NETWORK OBM FEATURES & ESRI ORTHOPHOTOS

CLIENT
DELTINI COMMERCIAL DEVELOPMENTS

PROJECT
PRIMROSE COMMUNITY
WATER SUPPLY WELL CONSTRUCTION AND TESTING

CONSULTANT
wsp

YYYY-MM-DD	2024-03-14
DESIGNED	
PREPARED	JPR
REVIEWED	DPD
APPROVED	TLM

TITLE
BEDROCK FORMATIONS

PROJECT NO.	CONTROL	REV.	FIGURE
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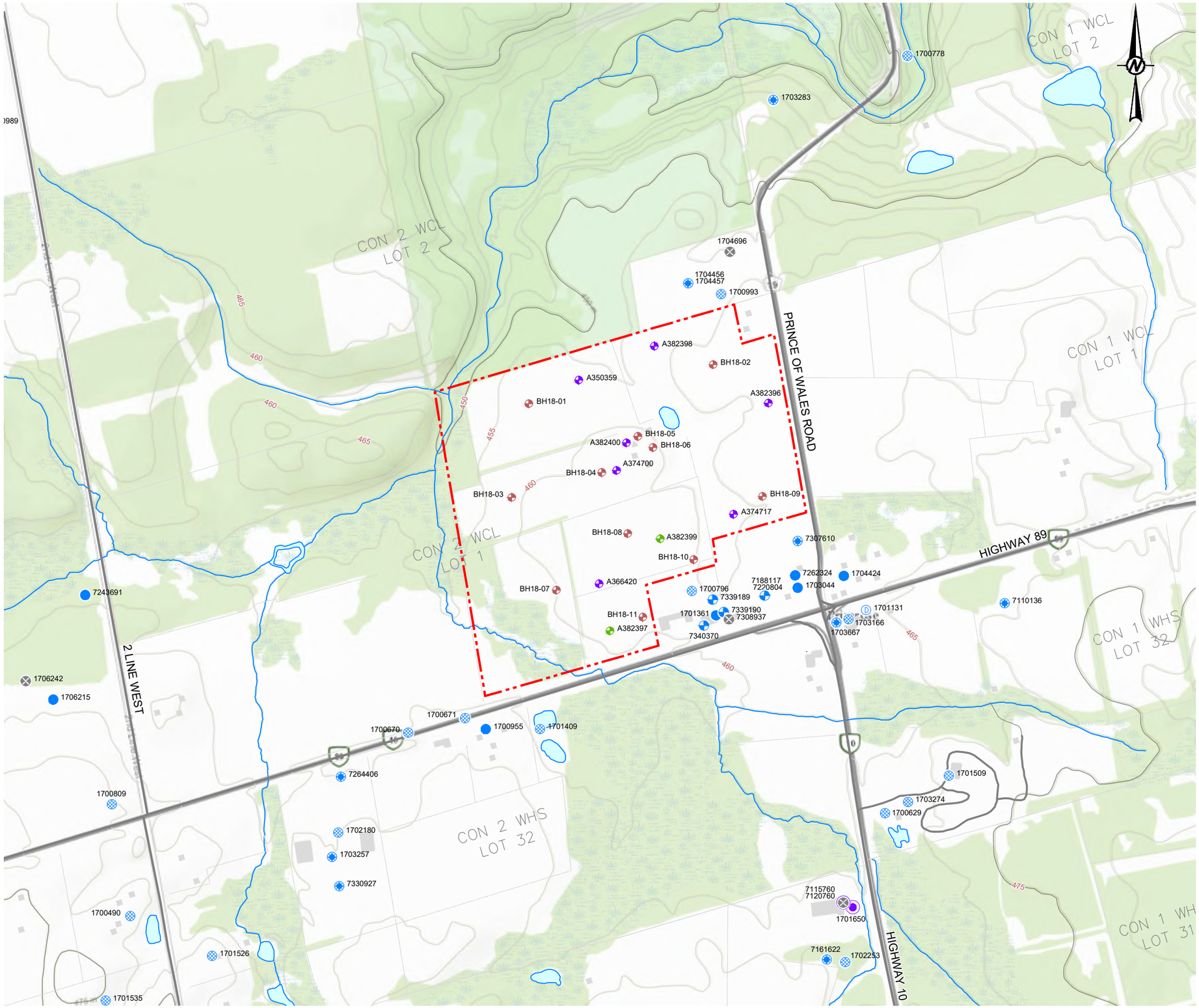

MINISTRY REPORTED WELL RECORD

- SHALLOW DUG OR BORED <10 M
- SANDPOINT
- DEEP BORED WELL >10 M
- DRILLED OVERBURDEN WELL
- TEST OR OBSERVATION WELL
- DRILLED BEDROCK WELL
- MUNICIPAL / PUBLIC SUPPLY

SITE INVESTIGATIONS

- SITE TEST BOREHOLE
- OVERBURDEN TEST SUPPLY WELL
- BEDROCK TEST SUPPLY WELL

PLAN LEGEND

- DEVELOPMENT BOUNDARY

OBM / NATURAL HERITAGE FEATURES

- WOODED AREAS
- WETLAND
- STREAM / WATERBODY

REFERENCES & DISCLAIMERS

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CLIENT
DELTINI COMMERCIAL DEVELOPMENTS

PROJECT
PRIMROSE COMMUNITY
WATER SUPPLY WELL CONSTRUCTION AND TESTING

TITLE
MINISTRY REPORTED WELL RECORDS

CONSULTANT

wsp

YYYY-MM-DD	2024-03-14
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PREPARED	JPR
REVIEWED	DPD
APPROVED	TLM

PROJECT NO.	CONTROL	REV.	FIGURE
23611788	0002	----	5

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

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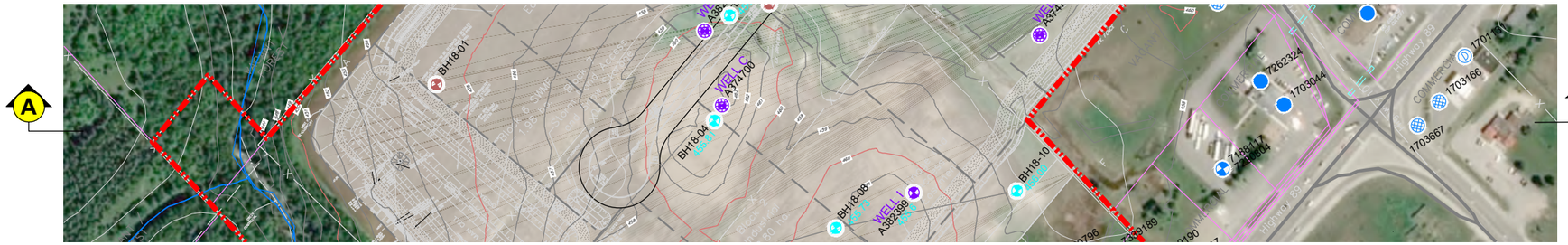

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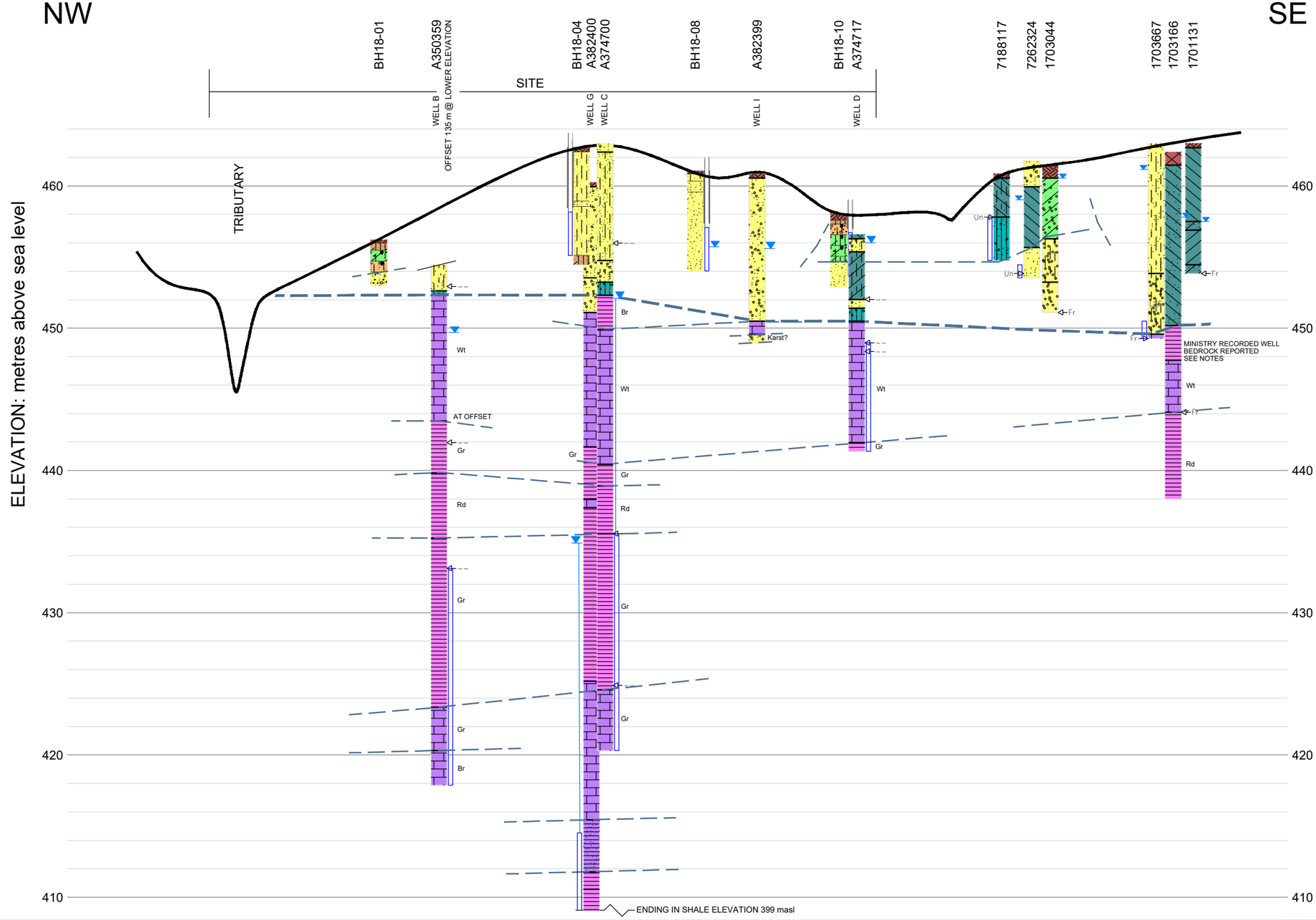

PLAN LEGEND

- SHALLOW DUG OR BORED <10 M
- DEEP BORED WELL >10 M
- DRILLED OVERBURDEN WELL
- TEST OR OBSERVATION WELL
- DRILLED BEDROCK WELL
- TEST PIT
- TEST BOREHOLE
- MONITORING WELL

SOIL PATTERN LEGEND AND GENERIC SHADING

- ORGANICS / TOPSOIL
- FILL
- SAND & GRAVEL
- SAND & GRAVEL WITH SILT
- SAND
- SAND WITH SILT
- SILTY SAND
- SILT
- SANDY SILT
- SANDY SILT WITH TO SOME CLAY
- CLAYEY SILT
- SILTY CLAY
- GRANULAR TILL
- SILTY SAND / SANDY SILT TILL
- SILT TILL
- SILTY CLAY TILL
- LIMESTONE BEDROCK
- SHALE BEDROCK
- SANDSTONE BEDROCK

- 23453 MOE RECORDED PRIVATE WELL
- RECORDED STATIC WATER LEVEL
- WATER PRODUCING ZONE
- SCREEN

FORMATION COLOUR

Br	BROWN
Wt	WHITE
Gr	GREY
Rd	RED

NOTES

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LOCATION AND ELEVATIONS OF FIELD VERIFIED WELLS ARE SUBJECT TO REVISION.

BOUNDARIES BETWEEN SOIL STRATA HAVE BEEN DETERMINED ONLY AT WELL AND TEST WELL LOCATIONS. BETWEEN THE WELLS AND TEST WELLS, BOUNDARIES ARE NOT PROVEN BUT ARE ASSUMED FROM GEOLOGICAL EVIDENCE.

SITE BEDROCK TEST WELLS INSTALLED WITH PROTECTIVE PUMP LINERS 15.24 m FROM BASE.

0 80 160 240 m
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CLIENT
DELTINI COMMERCIAL DEVELOPMENTS

PROJECT
PRIMROSE COMMUNITY
WATER SUPPLY WELL CONSTRUCTION AND TESTING

TITLE
SECTION AA

CONSULTANT

YYYY-MM-DD	2024-03-14
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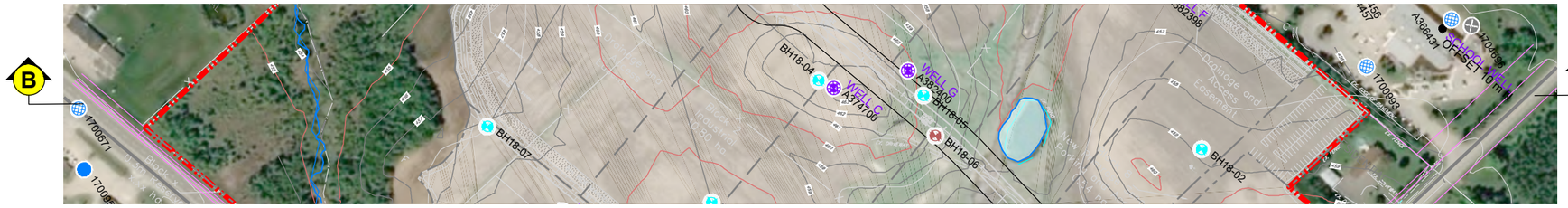
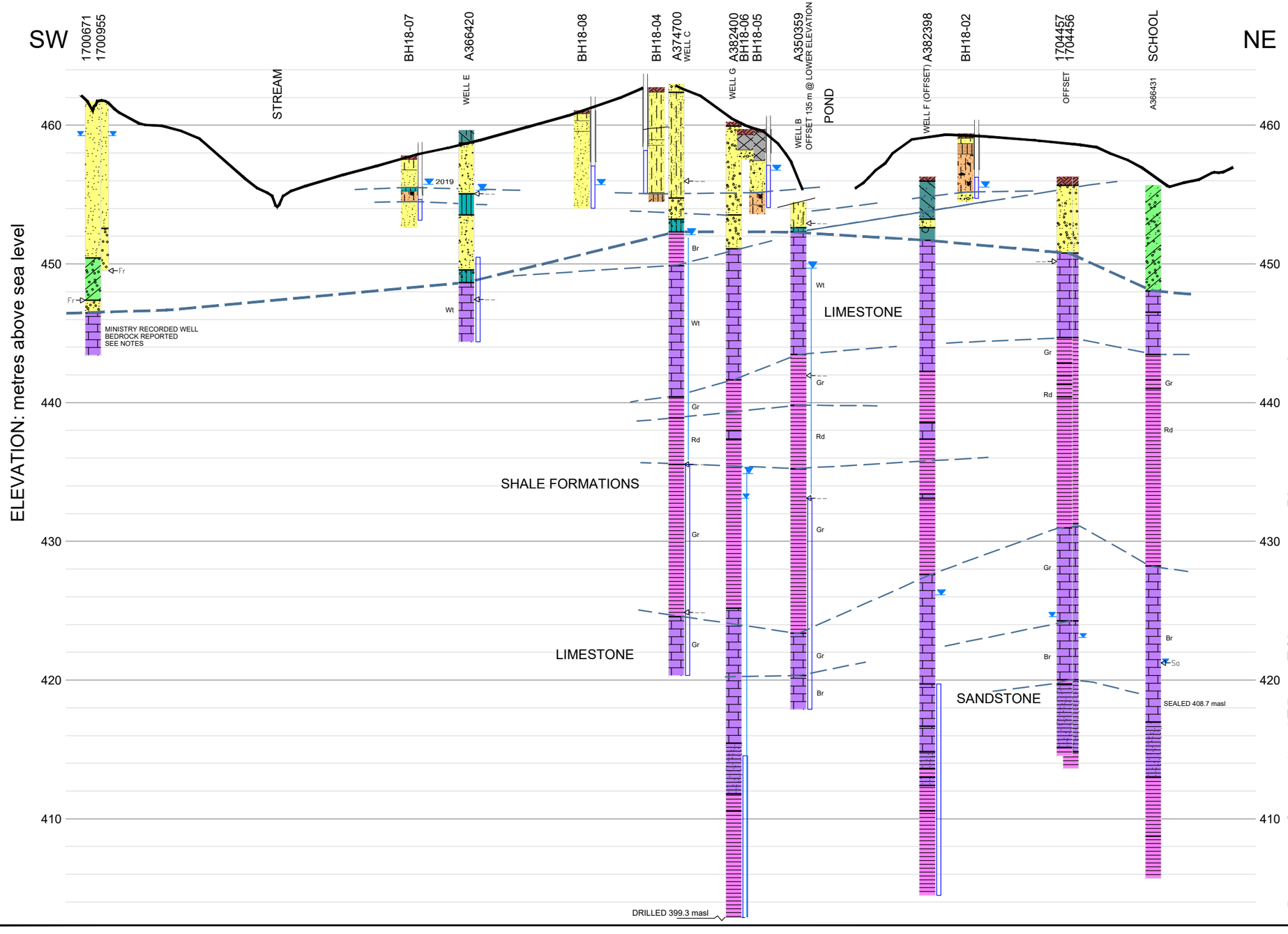
APPROVED	TLM

PROJECT NO.	CONTROL	REV.	FIGURE
23611788	0002	----	6A

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B





PLAN LEGEND

- SHALLOW DUG OR BORED <10 M
- SANDPOINT
- DEEP BORED WELL >10 M
- DRILLED OVERBURDEN WELL
- TEST OR OBSERVATION WELL
- DRILLED BEDROCK WELL
- MUNICIPAL / PUBLIC SUPPLY
- SITE MONITORING WELL

SOIL PATTERN LEGEND AND GENERIC SHADING

- ORGANICS / TOPSOIL
- FILL
- SAND & GRAVEL
- SAND & GRAVEL WITH SILT
- SAND
- SAND WITH SILT
- SILTY SAND
- SILT
- SANDY SILT
- SANDY SILT WITH TO SOME CLAY
- CLAYEY SILT
- SILTY CLAY
- GRANULAR TILL
- SILTY SAND / SANDY SILT TILL
- SILT TILL
- SILTY CLAY TILL
- LIMESTONE BEDROCK
- SHALE BEDROCK
- SANDSTONE BEDROCK

SECTION SYMBOLS

- 23453 — MOE RECORDED PRIVATE WELL
- RECORDED STATIC WATER LEVEL
- WATER PRODUCING ZONE
- SCREEN

FORMATION COLOUR

Br	BROWN
Wt	WHITE
Gr	GREY
Rd	RED

NOTES

MINISTRY OF ENVIRONMENT WATER WELL INFORMATION SYSTEM, KING'S PRINTER. LOCATION AND ELEVATIONS OF FIELD VERIFIED WELLS ARE SUBJECT TO REVISION.

BOUNDARIES BETWEEN SOIL STRATA HAVE BEEN DETERMINED ONLY AT WELL AND TEST WELL LOCATIONS. BETWEEN THE WELLS AND TEST WELLS, BOUNDARIES ARE NOT PROVEN BUT ARE ASSUMED FROM GEOLOGICAL EVIDENCE.

SITE BEDROCK TEST WELLS INSTALLED WITH PROTECTIVE PUMP LINERS 15.24 m FROM BASE.

0 80 160 240 m

1:4000

CLIENT
DELTINI COMMERCIAL DEVELOPMENTS

PROJECT
PRIMROSE COMMUNITY
WATER SUPPLY WELL CONSTRUCTION AND TESTING

TITLE
SECTION BB

CONSULTANT

wsp

YYYY-MM-DD	2024-03-14
DESIGNED	
PREPARED	JPR
REVIEWED	DPD
APPROVED	TLM

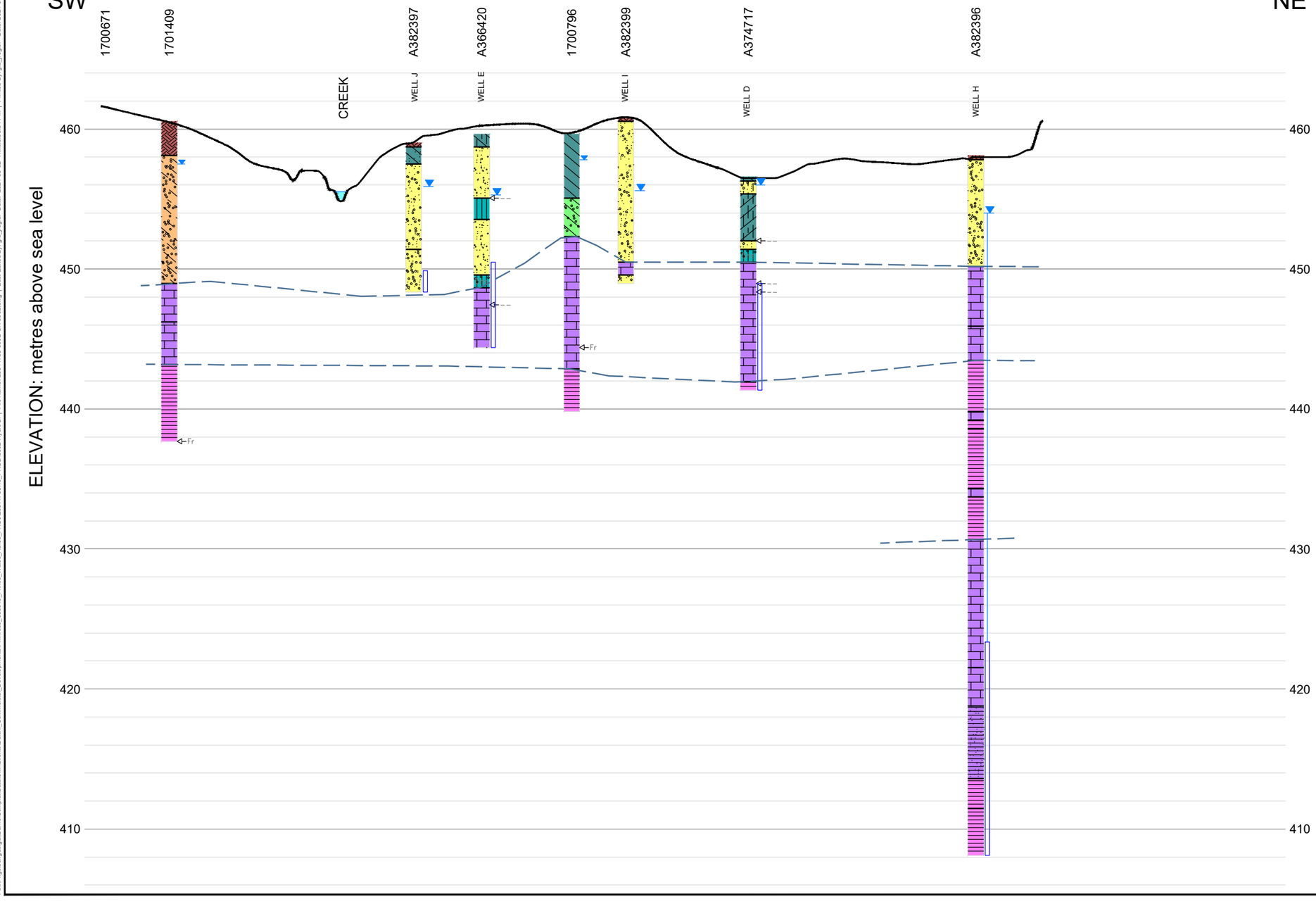
PROJECT NO.	CONTROL	REV.	FIGURE
23611788	0002	----	6B

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25 mm

0

SW NE



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1:4000

CLIENT
DELTINI COMMERCIAL DEVELOPMENTS

PROJECT
PRIMROSE COMMUNITY
WATER SUPPLY WELL CONSTRUCTION AND TESTING

TITLE
SECTION CC

CONSULTANT

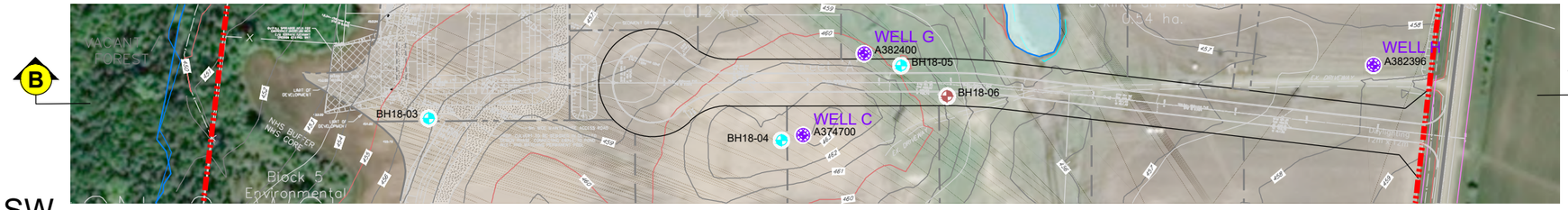
wsp

YYYY-MM-DD	2024-03-14
DESIGNED	
PREPARED	JPR
REVIEWED	DPD
APPROVED	TLM

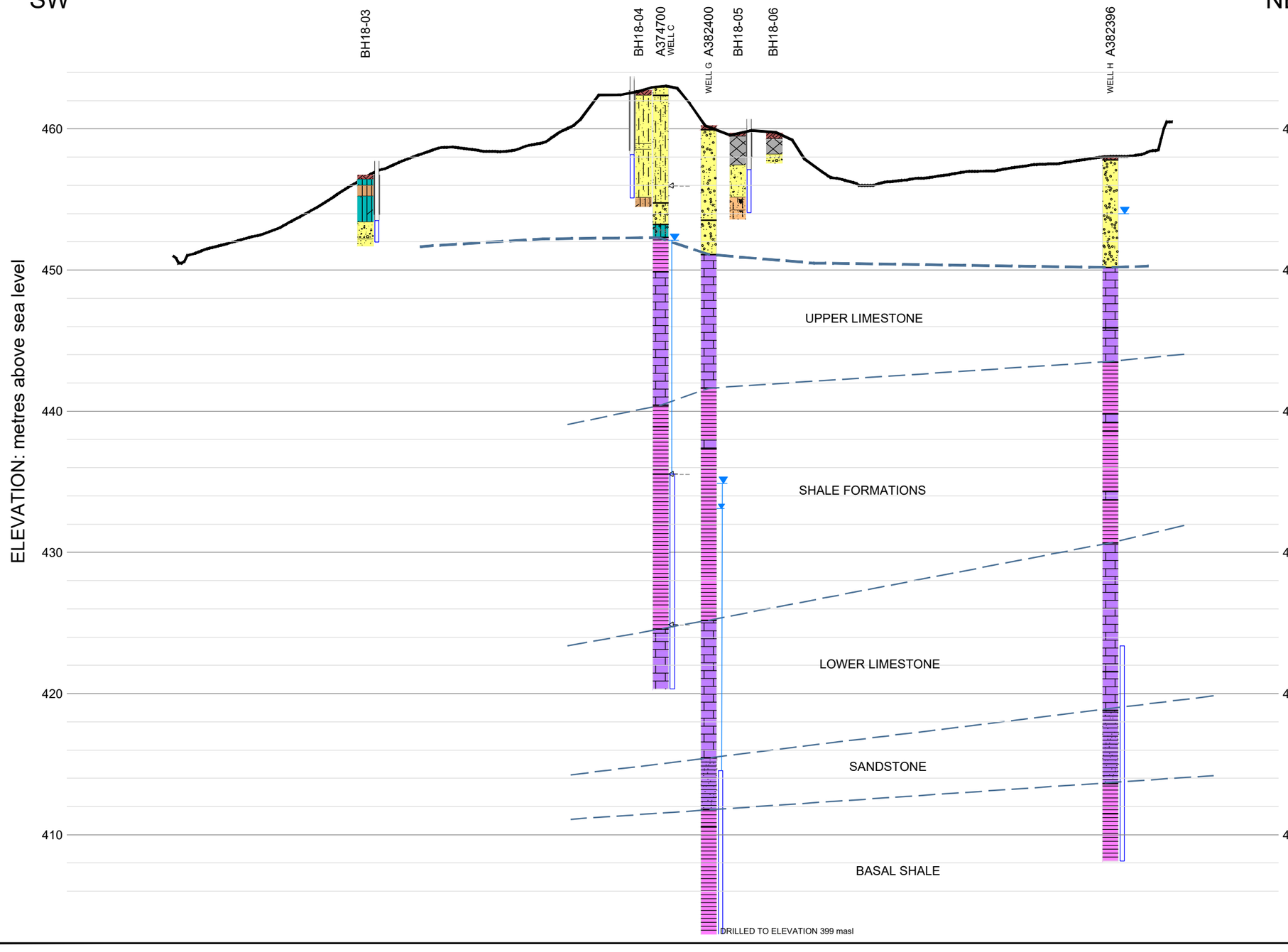
PROJECT NO.	CONTROL	REV.	FIGURE
23611788	0002	----	6C

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI B

25 mm



SW NE



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23453 MOE RECORDED PRIVATE WELL

RECORDED STATIC WATER LEVEL

WATER PRODUCING ZONE

SCREEN

FORMATION COLOUR

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Wt	WHITE
Gr	GREY
Rd	RED

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MINISTRY OF ENVIRONMENT WATER WELL INFORMATION SYSTEM, KING'S PRINTER. LOCATION AND ELEVATIONS OF FIELD VERIFIED WELLS ARE SUBJECT TO REVISION.

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SITE BEDROCK TEST WELLS INSTALLED WITH PROTECTIVE PUMP LINERS 15.24 m FROM BASE.

0 60 120 180 m

1:3000

CLIENT
DELTINI COMMERCIAL DEVELOPMENTS

PROJECT
PRIMROSE COMMUNITY
WATER SUPPLY WELL CONSTRUCTION AND TESTING

TITLE
SITE SECTION D - D'

CONSULTANT

YYYY-MM-DD	2024-03-14
DESIGNED	
PREPARED	JPR
REVIEWED	DPD
APPROVED	TLM

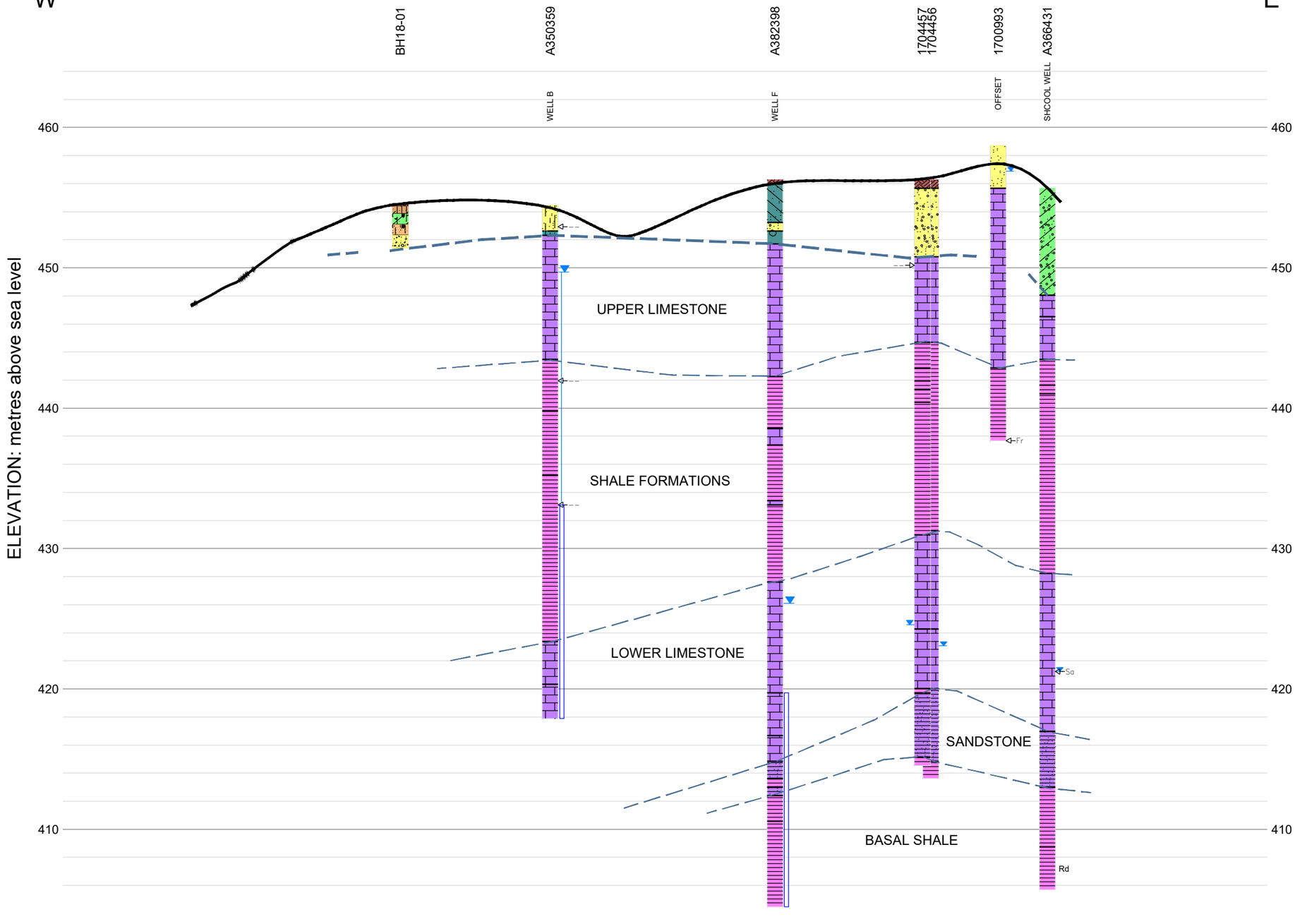
PROJECT NO.	CONTROL	REV.	FIGURE
23611788	0002	----	6D

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25 mm

W

E



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0 60 120 180 m

1:3000

CLIENT
DELTINI COMMERCIAL DEVELOPMENTS

PROJECT
PRIMROSE COMMUNITY
WATER SUPPLY WELL CONSTRUCTION AND TESTING

TITLE
SITE SECTION E - E'

CONSULTANT

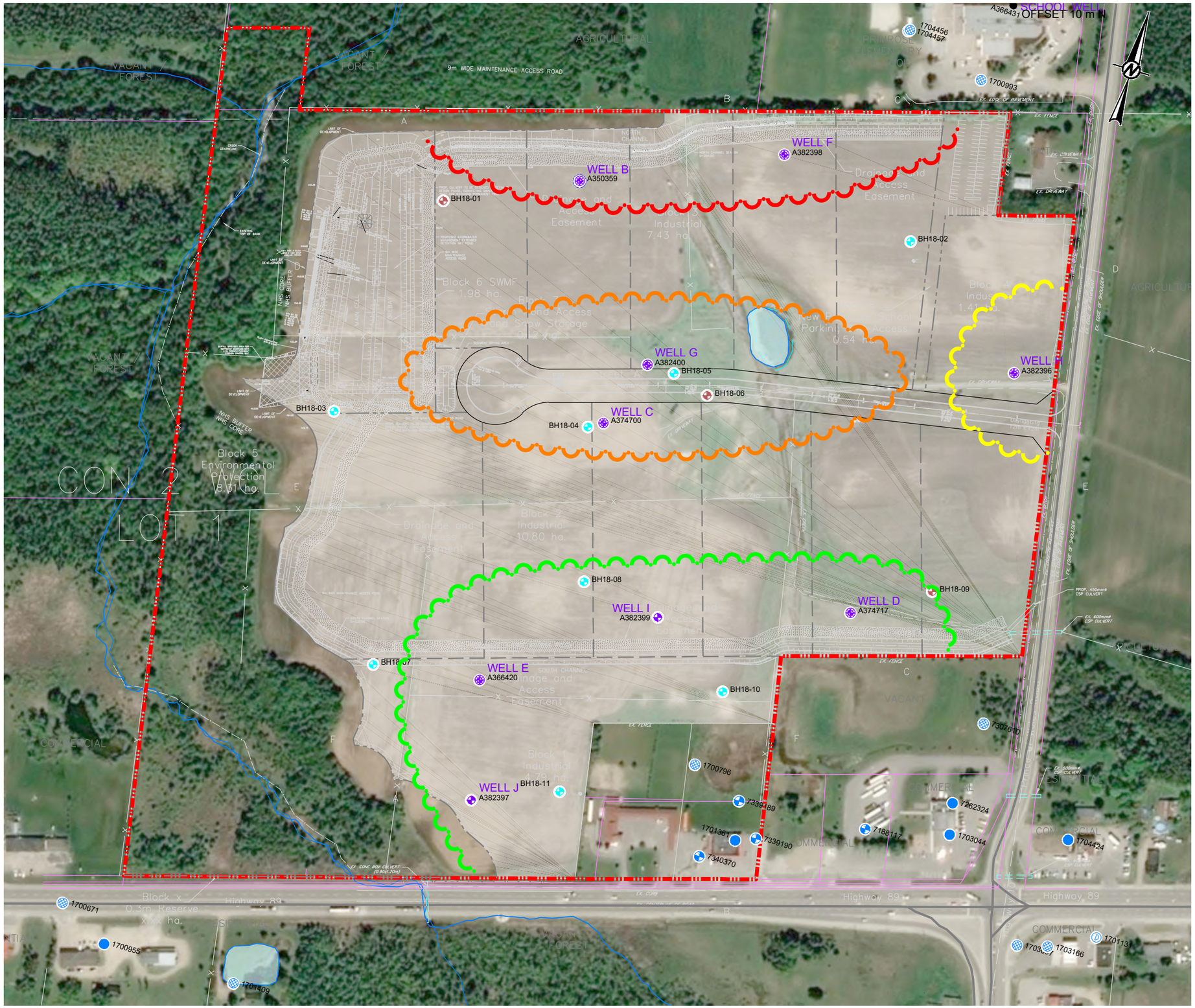
wsp

YYYY-MM-DD	2024-03-14
DESIGNED	
PREPARED	JPR
REVIEWED	DPD
APPROVED	TLM

PROJECT NO.	CONTROL	REV.	FIGURE
23611788	0002	----	6E

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

0 25 mm



PLAN LEGEND

- DEVELOPMENT BOUNDARY
- TEST PIT
- TEST BOREHOLE
- MONITORING WELL
- OVERBURDEN TEST SUPPLY WELL
- BEDROCK TEST SUPPLY WELL

TEST AREA MAXIMUM OPERATIONAL WELL YIELD (APPROXIMATE)

BEDROCK	OVERBURDEN
<2 USG (<7.6 L/min)	20 USG (75.6 L/min)
5 USG (18.9 L/min)	
8 USG (30.3 L/min)	

REFERENCES & DISCLAIMERS

ORTOIMAGE, BING 2022

ALIGNMENT OF ORTHOGRAPHIC IMAGERY IS APPROXIMATED TO SELECT FEATURES ON DATUM. AWAY FROM POINTS OF ALIGNMENT THE ORTHOGRAPHIC IMAGE MAY BE DIMENSIONALLY SKEWED OR PROJECTED OFF THE MAP DATUM PLANE.

0 60 120 180 m

1:3000

PLOTTED 11X17" TABLOID PROJECTION IS UTM NAD 83 ZONE 17

CLIENT
DELTINI COMMERCIAL DEVELOPMENTS

PROJECT
PRIMROSE COMMUNITY
WATER SUPPLY WELL CONSTRUCTION AND TESTING

TITLE
MAXIMUM OPERATIONAL WELL YIELD

CONSULTANT

YYYY-MM-DD	2024-05-02
DESIGNED	TLM
PREPARED	JPR
REVIEWED	TLM
APPROVED	DPD

PROJECT NO.	CONTROL	REV.	FIGURE
23611788	0002	----	7

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25 mm

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Path: \\polder.grp\gal\Barrie\Complex\Data\SIM\Clients\Deltini_Commercial_Developments\Primrose_636040_Prince_Wales_Rd\99_PROJ\23611788\40_PROD\0002-Hydro\G_ | File Name: 23611788-0002-CH-0002.dwg | Last Edited By: gld_jregier Date: 2024-05-02 Time:2:59:19 PM | Printed By: gld_jregier Date: 2024-05-02 Time:2:59:32 PM

APPENDIX A

Important Information and Limitations of this Report

IMPORTANT INFORMATION AND LIMITATIONS OF THIS REPORT

Standard of Care: WSP Canada Inc. (WSP) has prepared this report in a manner consistent with that level of care and skill ordinarily exercised by members of the engineering and science professions currently practising under similar conditions in the jurisdiction in which the services are provided, subject to the time limits and physical constraints applicable to this report. No other warranty, expressed or implied is made.

Basis and Use of the Report: This report has been prepared for the specific site, design objective, development and purpose described to WSP by the Client. The factual data, interpretations and recommendations pertain to a specific project as described in this report and are not applicable to any other project or site location. Any change of site conditions, purpose, development plans or if the project is not initiated within eighteen months of the date of the report may alter the validity of the report. WSP cannot be responsible for use of this report, or portions thereof, unless WSP is requested to review and, if necessary, revise the report.

The information, recommendations and opinions expressed in this report are for the sole benefit of the Client. No other party may use or rely on this report or any portion thereof without WSP's express written consent. If the report was prepared to be included for a specific permit application process, then upon the reasonable request of the client, WSP may authorize in writing the use of this report by the regulatory agency as an Approved User for the specific and identified purpose of the applicable permit review process. Any other use of this report by others is prohibited and is without responsibility to WSP. The report, all plans, data, drawings and other documents as well as all electronic media prepared by WSP are considered its professional work product and shall remain the copyright property of WSP, who authorizes only the Client and Approved Users to make copies of the report, but only in such quantities as are reasonably necessary for the use of the report by those parties. The Client and Approved Users may not give, lend, sell, or otherwise make available the report or any portion thereof to any other party without the express written permission of WSP. The Client acknowledges that electronic media is susceptible to unauthorized modification, deterioration and incompatibility and therefore the Client can not rely upon the electronic media versions of WSP's report or other work products.

The report is of a summary nature and is not intended to stand alone without reference to the instructions given to WSP by the Client, communications between WSP and the Client, and to any other reports prepared by WSP for the Client relative to the specific site described in the report. In order to properly understand the suggestions, recommendations and opinions expressed in this report, reference must be made to the whole of the report. WSP can not be responsible for use of portions of the report without reference to the entire report.

Unless otherwise stated, the suggestions, recommendations and opinions given in this report are intended only for the guidance of the Client in the design of the specific project. The extent and detail of investigations, including the number of test holes, necessary to determine all of the relevant conditions which may affect construction costs would normally be greater than has been carried out for design purposes. Contractors bidding on, or undertaking the work, should rely on their own investigations, as well as their own interpretations of the factual data presented in the report, as to how subsurface conditions may affect their work, including but not limited to proposed construction techniques, schedule, safety and equipment capabilities.

Soil, Rock and Ground Water Conditions: Classification and identification of soils, rocks, and geologic units have been based on commonly accepted methods employed in the practice of geotechnical engineering and related disciplines. Classification and identification of the type and condition of these materials or units involves judgment, and boundaries between different soil, rock or geologic types or units may be transitional rather than abrupt. Accordingly, WSP does not warrant or guarantee the exactness of the descriptions.

Special risks occur whenever engineering or related disciplines are applied to identify subsurface conditions and even a comprehensive investigation, sampling and testing program may fail to detect all or certain subsurface conditions. The environmental, geologic, geotechnical, geochemical and hydrogeologic conditions that WSP interprets to exist between and beyond sampling points may differ from those that actually exist. In addition to soil variability, fill of variable physical and chemical composition can be present over portions of the site or on adjacent properties. The professional services retained for this project include only the geotechnical aspects of the subsurface conditions at the site, unless otherwise specifically stated and identified in the report. The presence or implication(s) of possible surface and/or subsurface contamination resulting from previous activities or uses of the site and/or resulting from the introduction onto the site of materials from off-site sources are outside the terms of reference for this project and have not been investigated or addressed.

Soil and groundwater conditions shown in the factual data and described in the report are the observed conditions at the time of their determination or measurement. Unless otherwise noted, those conditions form the basis of the recommendations in the report. Groundwater conditions may vary between and beyond reported locations and can be affected by annual, seasonal and meteorological conditions. The condition of the soil, rock and groundwater may be significantly altered by construction activities (traffic, excavation, groundwater level lowering, pile driving, blasting, etc.) on the site or on adjacent sites. Excavation may expose the soils to changes due to wetting, drying or frost. Unless otherwise indicated the soil must be protected from these changes during construction.

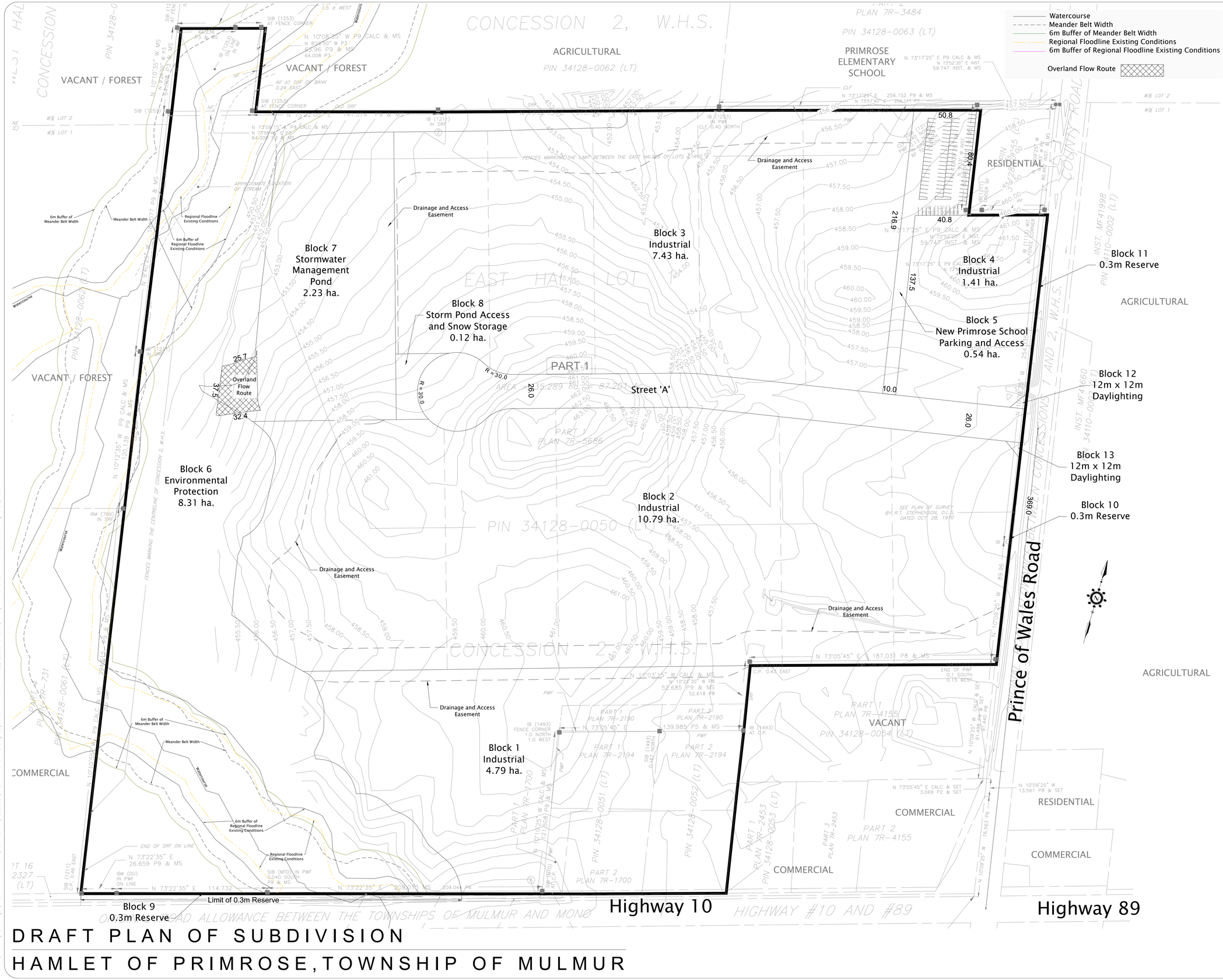
Sample Disposal: WSP will dispose of all uncontaminated soil and/or rock samples 90 days following issue of this report or, upon written request of the Client, will store uncontaminated samples and materials at the Client’s expense. In the event that actual contaminated soils, fills or groundwater are encountered or are inferred to be present, all contaminated samples shall remain the property and responsibility of the Client for proper disposal.

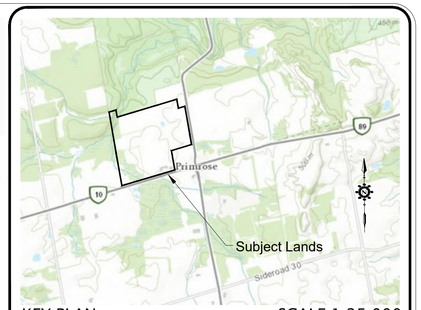
Follow-Up and Construction Services: All details of the design were not known at the time of submission of WSP's report. WSP should be retained to review the final design, project plans and documents prior to construction, to confirm that they are consistent with the intent of WSP's report.

During construction, WSP should be retained to perform sufficient and timely observations of encountered conditions to confirm and document that the subsurface conditions do not materially differ from those interpreted conditions considered in the preparation of WSP's report and to confirm and document that construction activities do not adversely affect the suggestions, recommendations and opinions contained in WSP's report. Adequate field review, observation and testing during construction are necessary for WSP to be able to provide letters of assurance, in accordance with the requirements of many regulatory authorities. In cases where this recommendation is not followed, WSP's responsibility is limited to interpreting accurately the information encountered at the borehole locations, at the time of their initial determination or measurement during the preparation of the Report.

APPENDIX B

Provided Information





KEY PLAN SCALE 1:25,000

Draft Plan of Subdivision

Part of the East Half of Lot 1 And,
Part of the East Half of Lot 2,
Concession 2,
West of Hurontario Street
Township of Mulmur, County of Dufferin
2023

OWNER'S CERTIFICATE

I, THE UNDERSIGNED, BEING THE REGISTERED OWNER OF THE SUBJECT LANDS, HEREBY AUTHORIZE THE JONES CONSULTING GROUP LTD., TO PREPARE THIS DRAFT PLAN OF SUBDIVISION AND TO SUBMIT SAME TO THE TOWNSHIP OF MULMUR FOR APPROVAL.

DATE

636040 Prince of Wales Road:
Deltini Commercial Developments Inc.
506249 Highway 89: Deltini (Mulmur) Inc.
506243 Highway 89: Deltini (Primrose) Inc.

SURVEYOR'S CERTIFICATE

I CERTIFY THAT THE BOUNDARIES OF THE LANDS TO BE SUBDIVIDED AND THEIR RELATIONSHIP TO ADJACENT LANDS ARE ACCURATELY AND CORRECTLY SHOWN.

DATE RUDY MAK, OLS

ADDITIONAL INFORMATION REQUIRED UNDER SECTION 51(17) OF THE PLANNING ACT

a) SHOWN ON DRAFT PLAN
b) SHOWN ON DRAFT PLAN
c) SHOWN ON KEY PLAN
d) INDUSTRIAL, EP & SWM
e) SHOWN ON DRAFT PLAN
f) SHOWN ON DRAFT PLAN
g) SHOWN ON DRAFT PLAN
h) MUNICIPAL PIPED WATER TO BE PROVIDED
i) SANDY/CLAY LOAM
j) SHOWN ON DRAFT PLAN
k) ALL MUNICIPAL SERVICES TO BE PROVIDED
l) SHOWN ON DRAFT PLAN

STATISTICS	AREA (ha.)
Industrial Blocks (BLOCKS 1 - 4)	24.42 ha.
Primrose Parking & Access (BLOCK 5)	0.54 ha.
Environmental Protection (BLOCK 6)	8.31 ha.
Stormwater Management (BLOCK 7)	2.23 ha.
Snow Storage (BLOCK 8)	0.12 ha.
Daylighting and 0.3m Reserves (BLOCK 9 - 13)	0.03 ha.
Road (STREET 'A')	1.34 ha.
TOTAL	36.99 ha.

SCHEDULE OF REVISIONS

DATE	DESCRIPTION	DRAWN
OCT. 20/2020	REVISIONS AS PER COMMENTS	m.c.r.
JAN. 11/2021	REVISIONS AS PER ENG COMMENTS	m.c.r.
MARCH 22/2021	REVISIONS OLS	m.c.r.
APRIL 1/2021	ADD ENVIRONMENTAL LINEWORK FROM WSP	m.c.r.
APRIL 15/2021	UPDATE ENVIRONMENTAL LINEWORK LABELS	m.c.r.
APRIL 29/2021	UPDATE EASEMENT AS PER ENG REVISION	m.c.r.
JUNE 2/2021	NEW BDY FROM OLS/UPDATE DP ACCORDINLY	m.c.r.
DEC. 23/2022	NEW BIRKS LINEWORK/REVISE SETTLEMENT BNDY TO OP	m.c.r.
JAN. 31/2023	NEW BIRKS LINEWORK/REVISE SETTLEMENT BNDY TO OP	m.c.r.
FEB. 7/2023	NEW ENG SWM POND LAYOUT/SCHOOL PARKING BLK	m.c.r.
FEB. 15/2023	PREP FOR SUBMISSION	m.c.r.
FEB. 22/2023	ADD NEW EASEMENTS/FINALIZE FOR SUBMISSION	m.c.r.

0 10 50 100M
SCALE 1 : 1250 (A1)

MULMUR PROPERTY

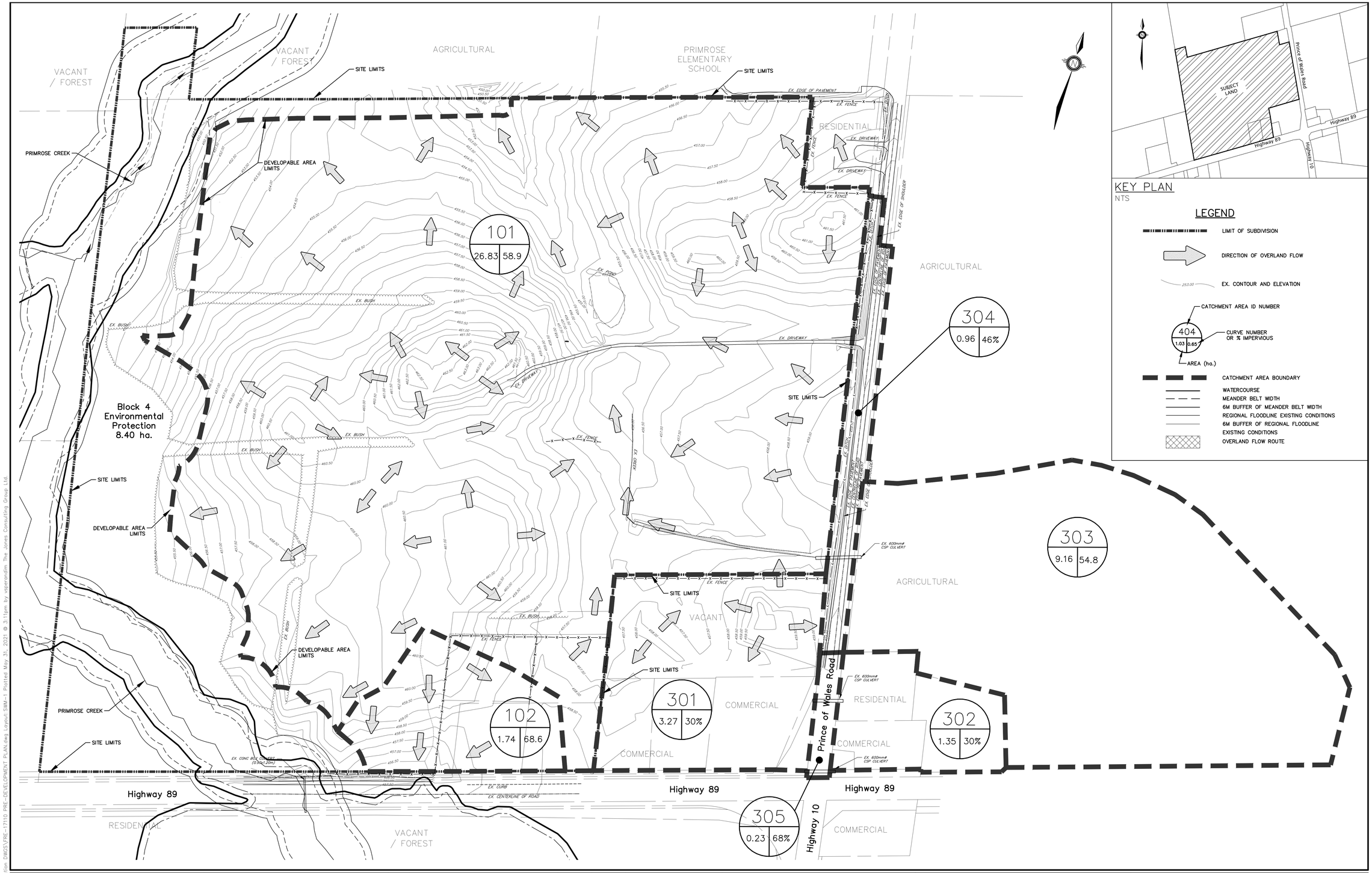
PROPOSED DRAFT PLAN OF SUBDIVISION

Raymond J. Duhamel
REGISTERED PROFESSIONAL PLANNER
R.P.P.

Date Issued:	JULY 9, 2020
Checked By:	RD
Project No.:	FRE-17110
Drawn By:	m.c.r.
Drawing Name:	FRE-17110-DP-2.dwg

JONES CONSULTING GROUP LTD.
PLANNERS & ENGINEERS
229 Mapleview Drive East, Unit 1, Barrie, Ontario, L4N 0W5
Phone: 705-734-2538 Fax: 705-734-1056
www.joneconsulting.com

DRAFT PLAN OF SUBDIVISION
HAMLET OF PRIMROSE, TOWNSHIP OF MULMUR



KEY PLAN
NTS

LEGEND

- LIMIT OF SUBDIVISION
- DIRECTION OF OVERLAND FLOW
- 253.00 EX. CONTOUR AND ELEVATION
- CATCHMENT AREA ID NUMBER
- 404 — 1.03 — 0.65 — CURVE NUMBER OR % IMPERVIOUS — AREA (ha.)
- CATCHMENT AREA BOUNDARY
- WATERCOURSE
- MEANDER BELT WIDTH
- 6M BUFFER OF MEANDER BELT WIDTH
- REGIONAL FLOODLINE EXISTING CONDITIONS
- 6M BUFFER OF REGIONAL FLOODLINE
- EXISTING CONDITIONS
- OVERLAND FLOW ROUTE

BENCHMARK:

ELEVATIONS ARE GEODETIC AND ARE DERIVED BY REAL TIME OBSERVATIONS, USING THE CAN-NET NETWORK, UTM ZONE 17, NAD83 (CSRS)(2010).

NO.	REVISIONS	DATE	INITIAL
3.	SUBMITTED FOR DPA & ZBLA	MAY 2021	MF
2.	PRELIMINARY FSR/SWMR	AUG 2020	MF
1.	CONCEPTUAL DESIGN	MAY 2020	MF

LICENSED PROFESSIONAL ENGINEER M. G. FLIS 100149153 05-31-2021 PROVINCE OF ONTARIO

DELTINI COMMERCIAL DEVELOP. LTD
636040 PRINCE OF WALES ROAD

STORMWATER MANAGEMENT PLAN
PRE-DEVELOPMENT CONDITION

JONES CONSULTING GROUP LTD. PLANNERS & ENGINEERS
229 Mapleview Dr. E, Unit 1
Barrie, ON L4N 0W5
P. 705.734.2538
F. 705.734.1056

DESIGN	VBS	SCALE: 1:1500	DATE MAY 2021
DRAWN	VBS	PROJECT FRE-17110	DWG. Nº SWM-1
CHECKED	MF/DR		

Stantec Consulting Ltd.
100-300 Hagey Boulevard, Waterloo ON N2L 0A4

January 31, 2023
File: 165630233

Attention: Mr. John Charbonneau
Capital and Renewal Project Manager
Upper Grand District School Board
500 Victoria Road North
Guelph, Ontario N1E 6K2

Dear Mr. Charbonneau,

Reference: New Water Supply Well at Primrose Public School

This letter was prepared as a summary of the new water supply well (#A366431), constructed at Primrose Public School, located at 636064 Prince of Wales Road, Mulmur, ON L9V 0B8. The school's existing water supply well was also abandoned due to failure to supply water. An Engineer from Stantec Consulting Ltd. (Stantec) on January 23, 2023 conducted a final site visit on January 23, 2023 and confirmed that the new well was generally constructed in accordance with the design recommendations from the hydrogeological study and that the water treatment system remained the same, except that the water pressure tanks and the water softeners were replaced in the mechanical room.

BACKGROUND

Stantec is supporting UGDSB in reviewing the upgrades and the associated Engineering Evaluation Report (EER) at the Primrose Public School location. During the evaluation, it was noted that sodium levels and chloride levels in the existing water supply well were elevated and rising year-on-year. Additionally, the existing well appears to be drying up and is not producing enough water to meet the school's water needs.

A well contractor (Hanlon Well Drilling & Plumbing) was brought to the site on September 09, 2022 and attempted to restore the production from the well, including efforts to blow out the well, redevelop the bottom of the well at the water-bearing zone, and replace the existing well pump. However, the restoration attempts were not successful. UGDSB determined that a new water supply well needed to be constructed at the school site immediately. A water trailer was set up onsite and trucked water was used as an interim measure. The school provides bottled water for drinking.

HYDROGEOLOGICAL STUDY

Before constructing the new well, a desktop hydrogeological study was performed by Stantec. A hydrogeological study report was issued on October 20, 2022. The report is attached for reference in **Attachment 1**. The hydrogeological study report reviewed the bedrock geology information in the area, reviewed the existing well's construction and performance, and made recommendations on the new well's construction details.

Reference: **New Water Supply Well at Primrose Public School**

NEW WELL CONSTRUCTION

A well contractor (Hanlon Well Drilling & Plumbing) was selected by UGDSB to complete the required drilling and development steps required for a new well at the school site. An onsite pre-drilling meeting was held on December 11, 2022, among UGDSB, Halon Well Drilling, and Stantec. The meeting decided that that the new well is preferred to be drilled on the back of the school property, in the playground area on the north side of the school building.

On December 06, 2022, a 152mm (6") diameter test hole was drilled to a depth of 50m (164 ft) below ground surface (BGS). Water bearing fractures were encountered between 90 ft and 140 ft BGS. An 4-hour pump test was conducted on December 09, 2022 to evaluate the potential water quantity and quality from the test hole. The pump test was witnessed by a representative from Stantec. The pump test was completed at a rate of 13 GPM for 4 hours.

A set of groundwater samples were collected at the end of the pump test on December 09, 2022 and submitted to ALS Canada Ltd. for analysis against the full Ontario Drinking Water Quality Standards (ODWS). The laboratory analysis report is included in **Attachment 2** for reference. The water quality data shows that the chloride concentration was 860 mg/L, similar to the levels in the existing well. Treatment for sodium and chloride will be needed if this water supply is to be used to provide potable water.

After reviewing the water quality results and the drilling field notes, it was determined that the source of the chloride is likely the shale formations intersected during drilling, and it was unlikely that drilling at another location on the school site would make an improvement. Therefore, it was decided to turn the test hole into a final well.

Stantec made the following recommendations via an email dated December 16, 2022 to simplify the final well construction:

1. Seal up the bottom 10 ft of the well from 154 ft to 164 ft, where the Queenston Shale formation was encountered. The Queenston Shale represents the base of any water bearing bedrock units and it is the best practice to seal it up in case it may be contributing to the poor water quality.

2. Install a 6" carbon steel casing to 41 ft below ground surface. Standard carbon steel casing is proposed instead of stainless-steel casing because the casing is situated above the static water level in the well and not exposed to the high chloride water.

3. The remainder of the well (from 41 ft to 154 ft) will be left as an open hole in the bedrock. This is the typical well construction in bedrock.

4. Install a PVC sleeve in the well to facilitate the installation and removal of the pump. The purpose of the PVC sleeve would be to prevent loose shale along the annulus of the borehole from sloughing in on top of the pump and jamming it in the well.

5. The well construction met the requirements of Ontario Regulation 903.

The new well was installed and developed on December 20, 2022. The location of the new well is provided in **Attachment 3** for reference. Well records were attached in **Attachment 4** for records. The existing well at the school site was also decommissioned and abandoned on January 05, 2023.

The new water well was connected to the treatment system inside the Mechanical Room. According to an email from Hanlon Well Drilling & Plumbing dated January 25, 2023, the following components were installed:

- Pump: Grundfos 10SQE-07-240 Variable speed, soft start pump with internal check valve.
- Control system: Grundfos constant pressure system with CU301 digital controller.
- Pump intake: set at 130 ft.
- No other screens, checks, or valves between pump and control system.
- All fittings used were solid brass and/or stainless steel.

The well was disinfected after the mechanical connections were completed, and a water sample was collected for lab analysis on January 10, 2023. The lab test report is included in **Attachment 2** for records.

FINAL SITE VISIT

A final site visit was provided by an Engineer from Stantec on January 23, 2023. The site visit photo log is provided in **Attachment 5** for reference. During the site visit, the following items were observed:

- The new well is located at the back of the school building, approximately 34 ft from the building exterior wall on the south side of the well, and approximately 38 ft from the existing storage shed on the east of the well.
- The above ground casing of the well was protected by a 3 ft x 3 ft concrete tile with a 24” Polylok riser cover.
- The top of the well casing was covered by a well cap. A stainless-steel valve tag was attached to the well casing, the tag was readable from within the concrete tile after the riser lid was taken off.
- The new well is connected to the water treatment system inside the mechanical room with a Blue PE pipe entering the building from the bottom of the slab.
- The original water pressure tanks in the mechanical room were replaced with three new water pressure tanks (equipment make/ model: Goulds/ HydroPro V350).
- The original water softeners in the mechanical room were replaced with two new water softeners (equipment make/ model: Canature/ 24X72) and two new brine tanks (equipment make/ model: JINSHI/ JS/Y-500). The new water softeners were not commissioned and operated at the time of the visit.

Reference: **New Water Supply Well at Primrose Public School**

- Other than the new water pressure tanks and the water softeners, the remaining water treatment equipment (UV system, cartridge filters, instrumentation, etc.) inside the mechanical room remains unchanged.
- The original well at the side of the school property was abandoned. The location was restored to the ground level close to the surrounding areas.

Regards,

Stantec Consulting Ltd.

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Senior Hydrogeologist
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roger.freymond@stantec.com

Attachments:

1. Hydrogeological Study Report
2. Lab Test Results
3. Location of the New Well
4. Well Records
5. Site Visit Photos

Attachment 1
Hydrogeological Study Report

Technical Memorandum No. 1 – Background Review – New Water Supply for The Primrose Elementary School

October 20, 2022
File: 165630233

Prepared for:

Upper Grand District School Board

Prepared by:

Stantec Consulting Ltd
100-300 Hagey Boulevard
Waterloo ON N2L 0A4
Stantec Consulting Ltd
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Limitations And Sign-Off

The conclusions in the Report titled Technical Memorandum No. 1 – Background Review – New Water Supply for The Primrose Elementary School are Stantec's professional opinion, as of the time of the Report, and concerning the scope described in the Report. The opinions in the document are based on conditions and information existing at the time the scope of work was conducted and do not take into account any subsequent changes. The Report relates solely to the specific project for which Stantec was retained and the stated purpose for which the Report was prepared. The Report is not to be used or relied on for any variation or extension of the project, or for any other project or purpose, and any unauthorized use or reliance is at the recipient's own risk.

Stantec has assumed all information received from Upper Grand District School Board (the "Client") and third parties in the preparation of the Report to be correct. While Stantec has exercised a customary level of judgment or due diligence in the use of such information, Stantec assumes no responsibility for the consequences of any error or omission contained therein.

This Report is intended solely for use by the Client in accordance with Stantec's contract with the Client. While the Report may be provided to applicable authorities having jurisdiction and others for whom the Client is responsible, Stantec does not warrant the services to any third party. The report may not be relied upon by any other party without the express written consent of Stantec, which may be withheld at Stantec's discretion.

Prepared by:	R.G.	Digitally signed by Roger Freymond Date: 2022.10.21 08:23:37 -04'00'	Reviewed by:		Digitally signed by Veale, Lesley Date: 2022.10.21 08:32:02 -04'00'
	Signature			Signature	
	Roger Freymond, P.Eng.			Lesley Veale, M.Sc., P.Geo.	
	Printed Name			Printed Name	

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LIST OF APPENDICES

Abbreviations

AMSL	Above Mean Sea Level
BGS	Below Ground Surface
Golder	Golder Associates Limited
GUDI	Groundwater Under the Direct Influence of Surface Water
Hanlon	Hanlon Well Drilling & Plumbing
MECP	Ministry of the Environment, Conservation and Parks
Stantec	Stantec Consulting Ltd.
UGDSB	Upper Grand District School Board
WWR	Water Well Record

1 Introduction

Primrose Elementary School is a small rural school located just north of Primrose, Ontario, within the Township of Mulmur. The school is owned and operated by the Upper Grand District School Board (UGDSB). Up until recently, potable water for the school was supplied by a single groundwater well (Primrose Well). Due to declining well yield and poor water quality, potable water is currently being trucked to the school and stored in a temporary holding tank.

The purpose of this technical memorandum as prepared by Stantec Consulting Ltd. (Stantec) is to provide a background review and recommend a plan going forward to construct a new water supply well for the school. The main objectives of the review are to:

- Provide a summary of the geological and hydrogeological conditions at the school
- Review the current water quantity and quantity data for the Primrose Well
- Identify potential test drilling locations and construction considerations for a new well

This report is arranged into three (3) sections, including this introduction. Section 2 presents a summary of background information. Section 3 presents the new well construction considerations. Appendix A includes a figure showing the proposed test well drilling locations and Appendix B includes the Ministry of the Environment, Conservation and Parks (MECP) Water Well Record (WWR) Water Well Record for the Primrose Well.

2 Background

Much of the geological and hydrogeological background for the area was summarized in Stantec's desktop Groundwater Under the Direct Influence of Surface Water (GUDI) study for the Primrose Elementary School (Stantec, 2006[1]) and the Town of Shelburne Groundwater Supply Class Environmental Assessment - Final Hydrogeological Report (Golder, 2012[2]). The Town of Shelbourne is located about 5 km west of the Primrose Elementary School. Recent well rehabilitation data for the Primrose Well was provided by Hanlon Well Drilling & Plumbing (Hanlon).

2.1 Bedrock Geology

As reported in Golder (2012[2]), the Town of Shelburne is underlain by Silurian bedrock formations consisting of dolostone and shale sequences, as follows:

Guelph Formation – The Guelph Formation is described as a light brown/beige coloured fossiliferous dolostone that is the uppermost bedrock formation beneath the Town of Shelburne. The Guelph Formation was found to be about 35 m thick in a test well drilled to west of the Town of Shelburne (Golder, 2012[2]); however, further to the east toward the Niagara Escarpment and where the Primrose Elementary School is located, the Guelph Formation is interpreted to be absent.

Eramosa Formation - The Eramosa Formation is comprised of the Stone Road Member, the Reformatory Quarry Member and the Vinemount Member. Approximately 5 m of the Eramosa Formation was encountered at a test well to the west of Shelburne (Golder, 2012[2]). The Eramosa Formation may represent the uppermost bedrock unit at the Primrose Elementary School. This formation consists of cream coloured crystalline dolostone and typically has the hydraulic properties of an aquitard meaning that the movement of groundwater through this unit is limited.

Goat Island Formation –The Goat Island Formation consists of two members; the upper Ancaster Member and lower Niagara Falls Member. The Ancaster Member is a chert rich, finely crystalline dolostone that is medium to ash grey in colour. The Niagara Falls Member is a finely crystalline and cross laminated crinoidal grainstone with small reef mounds. The finely crystalline nature of these Members results in a lower hydraulic conductivity and transmissivity compared to the underlying Gasport Formation. The presence or thickness of this unit in the vicinity of the Primrose Elementary School is not known.

[1] Stantec Consulting Ltd., 2006. Desktop GUDI Evaluation – Primrose Elementary School Drinking-Water System. Prepared for the Upper Grand District School Board, October 2006.
[2] Golder Associates (Golder), 2012. Town of Shelburne Groundwater Supply Class Environmental Assessment – Final Hydrogeological Report. October 2012.

Gasport Formation – The Gasport Formation is a cross-bedded crinoidal grainstone-packstone with sequences of reef mound and coquina (shell bed) lithofacies (Brunton, 2009[3]). This unit has commonly been referred to as the Amabel Formation in previous reports. Based on the drillers log for the Primrose Well, the base of the Gasport Formation was interpreted to be encountered at 41.4 m below ground surface (BGS). The drilling log indicated that water was found within this formation, which is considered to be the main water supply aquifer in the area.

Cabot Head Formation – The Cabot Head Formation is green to grey to red-maroon, fine grained, thinly laminated weak shale and represents a regional aquitard. The Cabot Head Formation was interpreted to be encountered at 41.4 m BGS (~412 m above mean sea level (AMSL)) at the Primrose Well, which is similar in elevation to where it was encountered in the test well located to the west of Shelburne (Golder, 2012[2]). The Cabot Head Formation represents the base of the active groundwater flow system.

2.2 Existing Well Construction and Performance Details

The existing bedrock well (Primrose Well) was constructed on September 30, 1991 to a depth of 42.7 m BGS. Bedrock was encountered at 5.5 m BGS and the well was constructed with a 203 mm (8”) diameter casing to 12.2 m BGS. A 152 mm (6”) diameter casing extending from 10.7 m to 42.7 m BGS was installed with perforations in the bottom 6 m of the casing. The annular space around the 203 mm diameter casing (i.e., upper 12.2 m) was sealed with bentonite, with the remainder of the well (including the entire 152 mm diameter casing) unsealed. It is interpreted that the purpose of the 152 mm casing was to allow the well pump to be safely installed deeper within the well.

The as-constructed performance data on the well in 1991 included a static level of 33.3 m BGS, a pumping level of 37.9 m BGS after 3 hours of pumping at 0.63 L/s. These results suggest a specific capacity of about 0.14 L/s/m. Recovery data was not available on the MECP WWR for review. The MECP WWR recommended a pumping rate of 0.63 L/s (10 GPM) and a pump setting of 42.6 m BGS.

Stantec (2006) indicated that the well had experienced a decline in production since installation, attributed the decline to the iron precipitate within the well and casing slots and recommended well rehabilitation to reduce further decline.

In September 2022, the UGDSB retained Hanlon to rehabilitate the Primrose Well. The static groundwater level was found to be 34.4 m BGS, which was similar to the as-constructed static level of 33.3 m BGS. After air-lifting the well, Hanlon attempted to pump the well at 1.58 L/s (25 GPM) and the well went dry after 4 minutes and 30 seconds of pumping. Assuming a pump intake at 42.6 m BGS, the specific capacity of the well is less 0.19 L/s/m. These testing results are not adequate to determine if current well performance is similar to as constructed conditions or well performance has declined.

The geology at the Primrose Well consists of sand and gravel to 5.5 m BGS overlying dolostone bedrock. The Primrose Well was drilled to the Cabot Head Formation, and significant additional water is not

[3] Brunton, F.R., 2009. Update of Revisions to the Early Silurian Stratigraphy of Niagara Escarpment: Integration of Sequence Stratigraphy, Sedimentology and Hydrogeology to Delineate Hydrogeologic Units. Project Unit 08 004, Summary of Field Work and Other Activities 2009, Ontario Geological Survey Open File Report 6240, p. 25 1 to 25 20.

anticipated within the deeper bedrock. A review of MECP WWR indicates that other private wells in the area are predominantly completed in the bedrock and are typically low yielding. For instance, a neighboring well to the north (MECP WWR No. 17-03283) extends to a depth of 67 m BGS and was tested at 0.32 L/s (5 GPM).

In addition to the water quantity concerns as discussed above, Stantec (2006) concluded that that the Primrose Well was vulnerable to contamination from surface sources. The water quality data indicated that nitrate has historically been elevated in the well, likely attributed to agricultural activity in the area. More recently elevated concentrations of sodium and chloride, likely from winter road salting activities, have also been an issue.

3 New well Construction Considerations

Based on the water quality and quantity constraints identified above, it is recommended that the UGDSB consider constructing a new well at the Primrose Elementary School. With respect to the location of a new well, there are a number of site constraints which limits potential drilling locations to the area east of the main building near the existing Primrose Well. Figure 1 presents two (2) potential drilling locations, with the preferred location situated directly adjacent to the existing Primrose Well. The second location is situated in the grassed area midway between the main building and Dufferin County Road 19; however, shallow bedrock is known to exist in this area, making the tie-in to the building more difficult.

Some key well construction considerations should include:

- Based on the background review, it is interpreted that the base of the active groundwater flow system is situated at about 41.4 m BGS (i.e., interpreted base of the Gasport Formation). It is recommended that a 152 mm (6") diameter test hole be drilled to a depth of about 50 m BGS to determine if there are any hydraulically significant fractures near the interface of the Gasport/Cabot Head Formations. Drilling deeper into the Cabot Head Formation is not likely to yield much/if any additional water.
- Assuming the water quantity and quality of the deeper water bearing fracture(s) are suitable, overdrill the existing hole with a 305 mm diameter hole to the top of the waterbearing fracture(s) and cement in a 203 mm diameter steel casing. By cementing in a deep casing, this should help reduce potential preferential pathways in the vicinity of the well / casing and may help reduce impacts of surface contaminants like nitrate and sodium/chloride from winter road salt. For costing purposes, it should be assumed that the grouted well casing would extend to 30 m below ground surface.
- It is expected that the final well would be completed as an open borehole from 30 m to 50 m BGS. Once constructed and following well development, a temporary pump would be used to complete a step test and 6 hr constant rate test. A water quality sample would be collected at the end of the pumping test and analyzed for the full list of Ontario Drinking Water parameters (Tables 1, 2 and 4, as well as Table 3 screening criteria).
- The existing well represents a potential transport pathway for surface contamination to the underlying aquifer and needs to be decommissioned in accordance with O. Reg. 903. To properly decommission this well, the unsealed 152 mm (6") diameter well casing needs to be removed. Given the proximity of the existing well to the new proposed well, it is recommended that bentonite chips be placed from the base of the well to about 30 m BGS. Cement grout should then be used to fill the remainder of the annular space to ground surface. The Contractor must take care to limit loss of cement grout to the bedrock formation.

APPENDICES

Appendix A Proposed Drilling Locations

568700

568800

4883100

4883000

DUFFERIN COUNTY ROAD 19

N

Existing Well to be Abandoned

Preferred Drilling Location

Secondary Drilling Location

Primrose Elementary School

Stantec

Legend

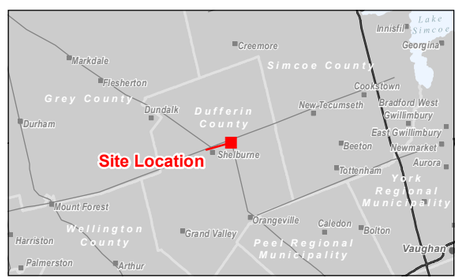
- Existing Well to be Abandoned
- Proposed Well Location

0 25 50 m

1:750 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2022.
3. Orthoimagery © First Base Solutions, 2022.



Project Location
Dufferin County

REVA
Prepared by PRM on 2022-10-20
Technical Review by RF on 2022-10-20

Client/Project
UPPER GRAND DISTRICT SCHOOL BOARD
BACKGROUND REVIEW - NEW WATER SUPPLY WELL FOR THE PRIMROSE ELEMENTARY SCHOOL

Figure No.
1

Title
Test Well Drilling Locations

Appendix B Water Well Record – Primrose Well

Ministry of the Environment
Ontario

The Ontario Water Resources Act

WATER WELL RECORD

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11 | 1704456 | MUNICIP 17006 | CON. HS W | 02

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON, BLOCK, TRACT, SURVEY, ETC.	LOT
Dufferin	Mulmur	2 W.H.S.	1

OWNER (SURNAME FIRST)	ADDRESS	DATE COMPLETED
Dufferin County Board of Education	40 Amelia St. Orangeville Ont	DAY 30 MO 09 YR 91

21 | ZONE | EASTING | NORTHING | RC | ELEVATION | RC | BASIN CODE

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	TO
	Top Soil			0	2
Brown	Sand	Gravel		2	18
Grey	Limestone			18	38
Red & Green	Shale			38	82
Grey	Limestone			82	105
Brown	Limestone			105	119
Grey	Sandstone			119	136
Green	Shale			136	140

10" Borehole; Annulus Filled with Bentonite; 6" casing; Bottom 20' of 6" is perforated; 8" casing; 40'; 140'

31

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	TO
8	1 ☑ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC	.322	+2	40
6 5/8	1 ☑ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC	.188	35	140
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC			

SCREEN (crossed out): SIZE(S) OF OPENING (SLOT NO.) | DIAMETER | LENGTH | MATERIAL AND TYPE | DEPTH TO TOP OF SCREEN

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)
0	40	8" casing
0	40	Holeplug

71 PUMPING TEST

PUMPING TEST METHOD: 1 ☑ PUMP (Air) 2 ☐ BAILER | PUMPING RATE: 10 GPM | DURATION OF PUMPING: 3 HOURS MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
33.3 m	37.92 m	37.92 m	37.98 m	38.04 m	37.90 m

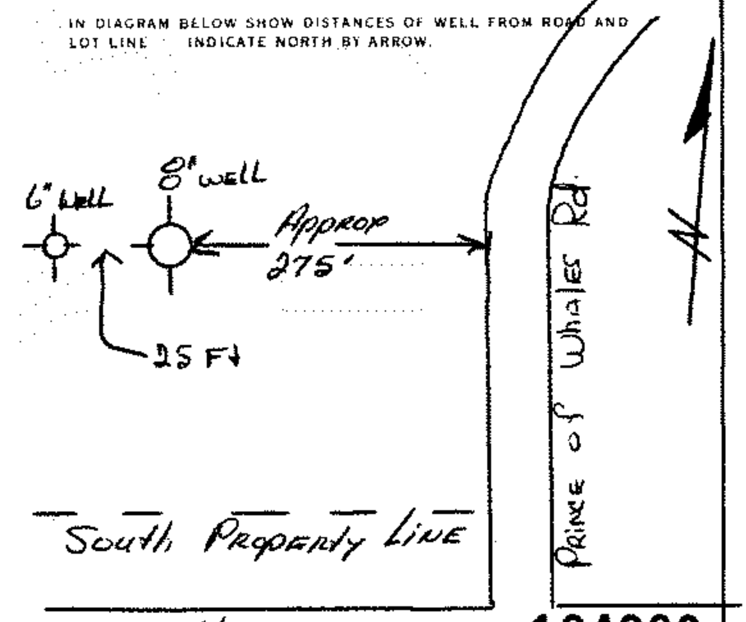
WATER LEVELS DURING: 1 ☑ PUMPING 2 ☐ RECOVERY

IF FLOWING, GIVE RATE: GPM | PUMP INTAKE SET AT: 140 FEET | WATER AT END OF TEST: 1 ☑ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE: ☐ SHALLOW ☑ DEEP | RECOMMENDED PUMP SETTING: 140 FEET | RECOMMENDED PUMPING RATE: 10 GPM

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS: Hwy 10-24-89 104283

FINAL STATUS OF WELL

1 ☑ WATER SUPPLY; 2 ☐ OBSERVATION WELL; 3 ☐ TEST HOLE; 4 ☐ RECHARGE WELL; 5 ☐ ABANDONED, INSUFFICIENT SUPPLY; 6 ☐ ABANDONED, POOR QUALITY; 7 ☐ UNFINISHED; ☐ DEWATERING

WATER USE

1 ☐ DOMESTIC; 2 ☐ STOCK; 3 ☐ IRRIGATION; 4 ☐ INDUSTRIAL; ☐ OTHER; 5 ☐ COMMERCIAL; 6 ☐ MUNICIPAL; 7 ☑ PUBLIC SUPPLY; 8 ☐ COOLING OR AIR CONDITIONING; 9 ☐ NOT USED

METHOD OF CONSTRUCTION

1 ☐ CABLE TOOL; 2 ☑ ROTARY (CONVENTIONAL); 3 ☐ ROTARY (REVERSE); 4 ☑ ROTARY (AIR); 5 ☐ AIR PERCUSSION; 6 ☐ BORING; 7 ☐ DIAMOND; 8 ☐ JETTING; 9 ☐ DRIVING; ☐ DIGGING; ☐ OTHER

CONTRACTOR

NAME OF WELL CONTRACTOR: Lunney Well Drilling | WELL CONTRACTOR'S LICENCE NUMBER: 3406

ADDRESS: RR#1 Grand Valley

NAME OF WELL TECHNICIAN: J. Broadfoot | WELL TECHNICIAN'S LICENCE NUMBER: T0370

SIGNATURE OF TECHNICIAN/CONTRACTOR: [signature] | SUBMISSION DATE: DAY 03 MO 10 YR 91

OFFICE USE ONLY

DATA SOURCE | CONTRACTOR 3406 | DATE RECEIVED APR 03 1992

DATE OF INSPECTION | INSPECTOR

REMARKS: CSS.ES

MINISTRY OF THE ENVIRONMENT COPY

FORM NO. 0506 (11/86) FORM 9

Attachment 2
Lab Test Results

ALS Canada Ltd.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **WT2224754**	Page	: 1 of 6
Client	: **Cash Clients Canada**	Laboratory	: Waterloo - Environmental
Contact	: Chad Macaulay	Account Manager	: Emily Smith
Address	: 60 Northland Rd. Unit 1 Waterloo ON Canada N2V 2B8	Address	: 60 Northland Road, Unit 1 Waterloo, Ontario Canada N2V 2B8
Telephone	: ----	Telephone	: +1 519 886 6910
Project	: Primrose Public School	Date Samples Received	: 09-Dec-2022 17:30
PO	: ----	Issue Date	: 15-Dec-2022 12:39
C-O-C number	: ----		
Sampler	: ----		
Site	: ----		
Quote number	: Hanlon Well Drilling		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- Method Blank value outliers occur - please see following pages for full details.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **Water**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Method Blank (MB) Values								
Total Metals	QC-775198-001	----	magnesium, total	7439-95-4	E420	0.0084 B mg/L	0.005 mg/L	Blank result exceeds permitted value

Result Qualifiers

Qualifier	Description
B	*Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.*

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Chloride in Water by IC										
HDPE [ON MECP] Water Sample	E235.Cl	09-Dec-2022	14-Dec-2022	----	----		14-Dec-2022	28 days	5 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE [ON MECP] Water Sample	E235.NO3	09-Dec-2022	14-Dec-2022	----	----		14-Dec-2022	7 days	5 days	✓
Anions and Nutrients : Nitrite in Water by IC										
HDPE [ON MECP] Water Sample	E235.NO2	09-Dec-2022	14-Dec-2022	----	----		14-Dec-2022	7 days	5 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE [ON MECP] Water Sample	E235.SO4	09-Dec-2022	14-Dec-2022	----	----		14-Dec-2022	28 days	5 days	✓
Microbiological Tests : Total Coliforms and E. coli (Enzyme Substrate)										
Sterile HDPE (Sodium thiosulphate) [ON MECP] Water Sample	E010	09-Dec-2022	----	----	----		10-Dec-2022	48 hrs	37 hrs	✓
Total Metals : Total metals in Water by CRC ICPMS										
HDPE total (nitric acid) Water Sample	E420	09-Dec-2022	11-Dec-2022	----	----		12-Dec-2022	180 days	3 days	✓

Legend & Qualifier Definitions

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: × = *QC frequency outside specification*; ✓ = *QC frequency within specification.*

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Chloride in Water by IC	E235.Cl	777903	1	2	50.0	5.0	✓
Nitrate in Water by IC	E235.NO3	777901	1	2	50.0	5.0	✓
Nitrite in Water by IC	E235.NO2	777904	1	2	50.0	5.0	✓
Sulfate in Water by IC	E235.SO4	777902	1	2	50.0	5.0	✓
Total Coliforms and E. coli (Enzyme Substrate)	E010	774529	1	16	6.2	5.0	✓
Total metals in Water by CRC ICPMS	E420	775198	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Chloride in Water by IC	E235.Cl	777903	1	2	50.0	5.0	✓
Nitrate in Water by IC	E235.NO3	777901	1	2	50.0	5.0	✓
Nitrite in Water by IC	E235.NO2	777904	1	2	50.0	5.0	✓
Sulfate in Water by IC	E235.SO4	777902	1	2	50.0	5.0	✓
Total metals in Water by CRC ICPMS	E420	775198	1	20	5.0	5.0	✓
Method Blanks (MB)							
Chloride in Water by IC	E235.Cl	777903	1	2	50.0	5.0	✓
Nitrate in Water by IC	E235.NO3	777901	1	2	50.0	5.0	✓
Nitrite in Water by IC	E235.NO2	777904	1	2	50.0	5.0	✓
Sulfate in Water by IC	E235.SO4	777902	1	2	50.0	5.0	✓
Total Coliforms and E. coli (Enzyme Substrate)	E010	774529	1	16	6.2	5.0	✓
Total metals in Water by CRC ICPMS	E420	775198	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Chloride in Water by IC	E235.Cl	777903	1	2	50.0	5.0	✓
Nitrate in Water by IC	E235.NO3	777901	1	2	50.0	5.0	✓
Nitrite in Water by IC	E235.NO2	777904	1	2	50.0	5.0	✓
Sulfate in Water by IC	E235.SO4	777902	1	2	50.0	5.0	✓
Total metals in Water by CRC ICPMS	E420	775198	1	20	5.0	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Coliforms and E. coli (Enzyme Substrate)	E010 Waterloo - Environmental	Water	APHA 9223 (mod)	The enzyme substrate test simultaneously detects Total Coliforms and E. coli in a 100 mL sample after incubation at 35.0 ±0.5°C for either 18 or 24 hours (dependent on reagent used).
Chloride in Water by IC	E235.Cl Waterloo - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC	E235.NO2 Waterloo - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC	E235.NO3 Waterloo - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Waterloo - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Total metals in Water by CRC ICPMS	E420 Waterloo - Environmental	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Hardness (Calculated) from Total Ca/Mg	EC100A Waterloo - Environmental	Water	APHA 2340B	"Hardness (as CaCO3), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in $CaCO_3$ equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations. Hardness from total Ca/Mg is normally comparable to Dissolved Hardness in non-turbid waters.

ALS Canada Ltd.

QUALITY CONTROL REPORT

Work Order	: **WT2224754**	Page	: 1 of 10
Client	: Cash Clients Canada	Laboratory	: Waterloo - Environmental
Contact	: Chad Macaulay	Account Manager	: Emily Smith
Address	: 60 Northland Rd. Unit 1 Waterloo ON Canada N2V 2B8	Address	: 60 Northland Road, Unit 1 Waterloo, Ontario Canada N2V 2B8
Telephone	:	Telephone	: +1 519 886 6910
Project	: Primrose Public School	Date Samples Received	: 09-Dec-2022 17:30
PO	: ----	Date Analysis Commenced	: 10-Dec-2022
C-O-C number	: ----	Issue Date	: 15-Dec-2022 12:39
Sampler	: ---- ----		
Site	: ----		
Quote number	: Hanlon Well Drilling		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Jon Fisher	Department Manager - Inorganics	Waterloo Inorganics, Waterloo, Ontario
Jon Fisher	Department Manager - Inorganics	Waterloo Metals, Waterloo, Ontario
Ruby Sujeepan		Waterloo Microbiology, Waterloo, Ontario

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Anions and Nutrients (QC Lot: 777901)											
WT2224980-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3	0.020	mg/L	0.931	0.933	0.226%	20%	----
Anions and Nutrients (QC Lot: 777902)											
WT2224980-001	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	30.9	31.0	0.370%	20%	----
Anions and Nutrients (QC Lot: 777903)											
WT2224980-001	Anonymous	chloride	16887-00-6	E235.Cl	0.50	mg/L	74.1	74.4	0.396%	20%	----
Anions and Nutrients (QC Lot: 777904)											
WT2224980-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
Microbiological Tests (QC Lot: 774529)											
WT2224754-001	Water Sample	coliforms, Escherichia coli [E. coli]	----	E010	1	MPN/100mL	<1	<1	0	Diff <2x LOR	----
		coliforms, total	----	E010	1	MPN/100mL	1	<1	0	Diff <2x LOR	----
Total Metals (QC Lot: 775198)											
WT2224452-001	Anonymous	aluminum, total	7429-90-5	E420	0.0030	mg/L	0.0479	0.0495	3.35%	20%	----
		antimony, total	7440-36-0	E420	0.00010	mg/L	0.00041	0.00040	0.000009	Diff <2x LOR	----
		arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00347	0.00344	0.866%	20%	----
		barium, total	7440-39-3	E420	0.00010	mg/L	0.0492	0.0489	0.502%	20%	----
		beryllium, total	7440-41-7	E420	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		boron, total	7440-42-8	E420	0.010	mg/L	0.680	0.676	0.669%	20%	----
		cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.0000077	0.0000089	0.0000012	Diff <2x LOR	----
		calcium, total	7440-70-2	E420	0.050	mg/L	33.9	33.3	1.81%	20%	----
		cesium, total	7440-46-2	E420	0.000010	mg/L	0.000017	0.000016	0.000001	Diff <2x LOR	----
		chromium, total	7440-47-3	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		cobalt, total	7440-48-4	E420	0.00010	mg/L	<0.00010	0.00010	0.000004	Diff <2x LOR	----
		copper, total	7440-50-8	E420	0.00050	mg/L	0.00099	0.00102	0.00003	Diff <2x LOR	----
		iron, total	7439-89-6	E420	0.010	mg/L	0.050	0.053	0.002	Diff <2x LOR	----
		lead, total	7439-92-1	E420	0.000050	mg/L	0.000059	0.000101	0.000043	Diff <2x LOR	----
		lithium, total	7439-93-2	E420	0.0010	mg/L	0.0523	0.0500	4.60%	20%	----
		magnesium, total	7439-95-4	E420	0.0050	mg/L	31.0	31.3	0.745%	20%	----
		manganese, total	7439-96-5	E420	0.00010	mg/L	0.0237	0.0240	1.45%	20%	----
		molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.0117	0.0113	3.31%	20%	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Total Metals (QC Lot: 775198) - continued											
WT2224452-001	Anonymous	nickel, total	7440-02-0	E420	0.00050	mg/L	0.00056	0.00060	0.00004	Diff <2x LOR	----
		phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		potassium, total	7440-09-7	E420	0.050	mg/L	17.8	17.9	0.556%	20%	----
		rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00512	0.00525	2.59%	20%	----
		selenium, total	7782-49-2	E420	0.000050	mg/L	0.000073	0.000068	0.000005	Diff <2x LOR	----
		silicon, total	7440-21-3	E420	0.10	mg/L	6.42	6.26	2.60%	20%	----
		silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		sodium, total	7440-23-5	E420	0.050	mg/L	41.7	41.6	0.256%	20%	----
		strontium, total	7440-24-6	E420	0.00020	mg/L	1.49	1.46	2.07%	20%	----
		sulfur, total	7704-34-9	E420	0.50	mg/L	29.5	29.3	0.656%	20%	----
		tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		thallium, total	7440-28-0	E420	0.000010	mg/L	0.000017	0.000016	0.000001	Diff <2x LOR	----
		thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		tin, total	7440-31-5	E420	0.00010	mg/L	0.00945	0.00917	3.00%	20%	----
		titanium, total	7440-32-6	E420	0.00030	mg/L	0.00093	0.00098	0.00005	Diff <2x LOR	----
		tungsten, total	7440-33-7	E420	0.00010	mg/L	0.00013	0.00013	0.000002	Diff <2x LOR	----
		uranium, total	7440-61-1	E420	0.000010	mg/L	0.00128	0.00127	0.637%	20%	----
		vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		zinc, total	7440-66-6	E420	0.0030	mg/L	<0.0030	<0.0030	0	Diff <2x LOR	----
		zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Anions and Nutrients (QCLot: 777901)						
nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 777902)						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 777903)						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 777904)						
nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	<0.010	----
Microbiological Tests (QCLot: 774529)						
coliforms, Escherichia coli [E. coli]	----	E010	1	MPN/100mL	<1	----
coliforms, total	----	E010	1	MPN/100mL	<1	----
Total Metals (QCLot: 775198)						
aluminum, total	7429-90-5	E420	0.003	mg/L	<0.0030	----
antimony, total	7440-36-0	E420	0.0001	mg/L	<0.00010	----
arsenic, total	7440-38-2	E420	0.0001	mg/L	<0.00010	----
barium, total	7440-39-3	E420	0.0001	mg/L	<0.00010	----
beryllium, total	7440-41-7	E420	0.00002	mg/L	<0.000020	----
bismuth, total	7440-69-9	E420	0.00005	mg/L	<0.000050	----
boron, total	7440-42-8	E420	0.01	mg/L	<0.010	----
cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	----
calcium, total	7440-70-2	E420	0.05	mg/L	<0.050	----
cesium, total	7440-46-2	E420	0.00001	mg/L	<0.000010	----
chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	----
cobalt, total	7440-48-4	E420	0.0001	mg/L	<0.00010	----
copper, total	7440-50-8	E420	0.0005	mg/L	<0.00050	----
iron, total	7439-89-6	E420	0.01	mg/L	<0.010	----
lead, total	7439-92-1	E420	0.00005	mg/L	<0.000050	----
lithium, total	7439-93-2	E420	0.001	mg/L	<0.0010	----
magnesium, total	7439-95-4	E420	0.005	mg/L	# 0.0084	B
manganese, total	7439-96-5	E420	0.0001	mg/L	<0.00010	----
molybdenum, total	7439-98-7	E420	0.00005	mg/L	<0.000050	----
nickel, total	7440-02-0	E420	0.0005	mg/L	<0.00050	----
phosphorus, total	7723-14-0	E420	0.05	mg/L	<0.050	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 775198) - continued						
potassium, total	7440-09-7	E420	0.05	mg/L	<0.050	----
rubidium, total	7440-17-7	E420	0.0002	mg/L	<0.00020	----
selenium, total	7782-49-2	E420	0.00005	mg/L	<0.000050	----
silicon, total	7440-21-3	E420	0.1	mg/L	<0.10	----
silver, total	7440-22-4	E420	0.00001	mg/L	<0.000010	----
sodium, total	7440-23-5	E420	0.05	mg/L	<0.050	----
strontium, total	7440-24-6	E420	0.0002	mg/L	<0.00020	----
sulfur, total	7704-34-9	E420	0.5	mg/L	<0.50	----
tellurium, total	13494-80-9	E420	0.0002	mg/L	<0.00020	----
thallium, total	7440-28-0	E420	0.00001	mg/L	<0.000010	----
thorium, total	7440-29-1	E420	0.0001	mg/L	<0.00010	----
tin, total	7440-31-5	E420	0.0001	mg/L	<0.00010	----
titanium, total	7440-32-6	E420	0.0003	mg/L	<0.00030	----
tungsten, total	7440-33-7	E420	0.0001	mg/L	<0.00010	----
uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	<0.00050	----
zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	----
zirconium, total	7440-67-7	E420	0.0002	mg/L	<0.00020	----

Qualifiers

Qualifier	Description
B	*Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.*

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Anions and Nutrients (QCLot: 777901)									
nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	2.5 mg/L	99.3	90.0	110	----
Anions and Nutrients (QCLot: 777902)									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 777903)									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 777904)									
nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	0.5 mg/L	99.1	90.0	110	----
Total Metals (QCLot: 775198)									
aluminum, total	7429-90-5	E420	0.003	mg/L	0.1 mg/L	98.9	80.0	120	----
antimony, total	7440-36-0	E420	0.0001	mg/L	0.05 mg/L	97.6	80.0	120	----
arsenic, total	7440-38-2	E420	0.0001	mg/L	0.05 mg/L	101	80.0	120	----
barium, total	7440-39-3	E420	0.0001	mg/L	0.0125 mg/L	105	80.0	120	----
beryllium, total	7440-41-7	E420	0.00002	mg/L	0.005 mg/L	98.0	80.0	120	----
bismuth, total	7440-69-9	E420	0.00005	mg/L	0.05 mg/L	96.8	80.0	120	----
boron, total	7440-42-8	E420	0.01	mg/L	0.05 mg/L	93.1	80.0	120	----
cadmium, total	7440-43-9	E420	0.000005	mg/L	0.005 mg/L	96.7	80.0	120	----
calcium, total	7440-70-2	E420	0.05	mg/L	2.5 mg/L	96.6	80.0	120	----
cesium, total	7440-46-2	E420	0.00001	mg/L	0.0025 mg/L	97.8	80.0	120	----
chromium, total	7440-47-3	E420	0.0005	mg/L	0.0125 mg/L	95.9	80.0	120	----
cobalt, total	7440-48-4	E420	0.0001	mg/L	0.0125 mg/L	97.4	80.0	120	----
copper, total	7440-50-8	E420	0.0005	mg/L	0.0125 mg/L	94.1	80.0	120	----
iron, total	7439-89-6	E420	0.01	mg/L	0.05 mg/L	96.4	80.0	120	----
lead, total	7439-92-1	E420	0.00005	mg/L	0.025 mg/L	102	80.0	120	----
lithium, total	7439-93-2	E420	0.001	mg/L	0.0125 mg/L	97.8	80.0	120	----
magnesium, total	7439-95-4	E420	0.005	mg/L	2.5 mg/L	105	80.0	120	----
manganese, total	7439-96-5	E420	0.0001	mg/L	0.0125 mg/L	96.4	80.0	120	----
molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.0125 mg/L	93.9	80.0	120	----
nickel, total	7440-02-0	E420	0.0005	mg/L	0.025 mg/L	95.8	80.0	120	----
phosphorus, total	7723-14-0	E420	0.05	mg/L	0.5 mg/L	102	80.0	120	----
potassium, total	7440-09-7	E420	0.05	mg/L	2.5 mg/L	101	80.0	120	----
rubidium, total	7440-17-7	E420	0.0002	mg/L	0.005 mg/L	100.0	80.0	120	----
selenium, total	7782-49-2	E420	0.00005	mg/L	0.05 mg/L	97.9	80.0	120	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
					Concentration	LCS	Low	High	Qualifier
Total Metals (QCLot: 775198) - continued									
silicon, total	7440-21-3	E420	0.1	mg/L	0.5 mg/L	102	80.0	120	----
silver, total	7440-22-4	E420	0.00001	mg/L	0.005 mg/L	85.9	80.0	120	----
sodium, total	7440-23-5	E420	0.05	mg/L	2.5 mg/L	97.1	80.0	120	----
strontium, total	7440-24-6	E420	0.0002	mg/L	0.0125 mg/L	94.6	80.0	120	----
sulfur, total	7704-34-9	E420	0.5	mg/L	2.5 mg/L	93.9	80.0	120	----
tellurium, total	13494-80-9	E420	0.0002	mg/L	0.005 mg/L	89.4	80.0	120	----
thallium, total	7440-28-0	E420	0.00001	mg/L	0.05 mg/L	100	80.0	120	----
thorium, total	7440-29-1	E420	0.0001	mg/L	0.005 mg/L	100.0	80.0	120	----
tin, total	7440-31-5	E420	0.0001	mg/L	0.025 mg/L	93.8	80.0	120	----
titanium, total	7440-32-6	E420	0.0003	mg/L	0.0125 mg/L	93.6	80.0	120	----
tungsten, total	7440-33-7	E420	0.0001	mg/L	0.005 mg/L	96.5	80.0	120	----
uranium, total	7440-61-1	E420	0.00001	mg/L	0.00025 mg/L	105	80.0	120	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	0.025 mg/L	98.4	80.0	120	----
zinc, total	7440-66-6	E420	0.003	mg/L	0.025 mg/L	95.8	80.0	120	----
zirconium, total	7440-67-7	E420	0.0002	mg/L	0.005 mg/L	92.8	80.0	120	----

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 777901)										
WT2224980-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3	2.39 mg/L	2.5 mg/L	95.6	75.0	125	----
Anions and Nutrients (QCLot: 777902)										
WT2224980-001	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	92.3 mg/L	100 mg/L	92.3	75.0	125	----
Anions and Nutrients (QCLot: 777903)										
WT2224980-001	Anonymous	chloride	16887-00-6	E235.Cl	93.7 mg/L	100 mg/L	93.7	75.0	125	----
Anions and Nutrients (QCLot: 777904)										
WT2224980-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2	0.464 mg/L	0.5 mg/L	92.8	75.0	125	----
Total Metals (QCLot: 775198)										
WT2224452-002	Anonymous	aluminum, total	7429-90-5	E420	ND mg/L	0.1 mg/L	ND	70.0	130	----
		antimony, total	7440-36-0	E420	0.0510 mg/L	0.05 mg/L	102	70.0	130	----
		arsenic, total	7440-38-2	E420	0.0496 mg/L	0.05 mg/L	99.3	70.0	130	----
		barium, total	7440-39-3	E420	ND mg/L	0.0125 mg/L	ND	70.0	130	----
		beryllium, total	7440-41-7	E420	0.00465 mg/L	0.005 mg/L	93.1	70.0	130	----
		bismuth, total	7440-69-9	E420	0.0454 mg/L	0.05 mg/L	90.8	70.0	130	----
		boron, total	7440-42-8	E420	ND mg/L	0.05 mg/L	ND	70.0	130	----
		cadmium, total	7440-43-9	E420	0.00478 mg/L	0.005 mg/L	95.5	70.0	130	----
		calcium, total	7440-70-2	E420	ND mg/L	2.5 mg/L	ND	70.0	130	----
		cesium, total	7440-46-2	E420	0.00254 mg/L	0.0025 mg/L	102	70.0	130	----
		chromium, total	7440-47-3	E420	0.0118 mg/L	0.0125 mg/L	94.4	70.0	130	----
		cobalt, total	7440-48-4	E420	0.0116 mg/L	0.0125 mg/L	93.1	70.0	130	----
		copper, total	7440-50-8	E420	0.0108 mg/L	0.0125 mg/L	86.7	70.0	130	----
		iron, total	7439-89-6	E420	ND mg/L	0.05 mg/L	ND	70.0	130	----
		lead, total	7439-92-1	E420	0.0233 mg/L	0.025 mg/L	93.2	70.0	130	----
		lithium, total	7439-93-2	E420	ND mg/L	0.0125 mg/L	ND	70.0	130	----
		magnesium, total	7439-95-4	E420	ND mg/L	2.5 mg/L	ND	70.0	130	----
		manganese, total	7439-96-5	E420	ND mg/L	0.0125 mg/L	ND	70.0	130	----
		molybdenum, total	7439-98-7	E420	ND mg/L	0.0125 mg/L	ND	70.0	130	----
		nickel, total	7440-02-0	E420	0.0223 mg/L	0.025 mg/L	89.4	70.0	130	----
		phosphorus, total	7723-14-0	E420	0.490 mg/L	0.5 mg/L	97.9	70.0	130	----
		potassium, total	7440-09-7	E420	ND mg/L	2.5 mg/L	ND	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Total Metals (QCLot: 775198) - continued										
WT2224452-002	Anonymous	rubidium, total	7440-17-7	E420	0.00458 mg/L	0.005 mg/L	91.6	70.0	130	----
		selenium, total	7782-49-2	E420	0.0495 mg/L	0.05 mg/L	99.0	70.0	130	----
		silicon, total	7440-21-3	E420	ND mg/L	0.5 mg/L	ND	70.0	130	----
		silver, total	7440-22-4	E420	0.00434 mg/L	0.005 mg/L	86.8	70.0	130	----
		sodium, total	7440-23-5	E420	ND mg/L	2.5 mg/L	ND	70.0	130	----
		strontium, total	7440-24-6	E420	ND mg/L	0.0125 mg/L	ND	70.0	130	----
		sulfur, total	7704-34-9	E420	ND mg/L	2.5 mg/L	ND	70.0	130	----
		tellurium, total	13494-80-9	E420	0.00455 mg/L	0.005 mg/L	91.0	70.0	130	----
		thallium, total	7440-28-0	E420	0.0468 mg/L	0.05 mg/L	93.5	70.0	130	----
		thorium, total	7440-29-1	E420	0.00472 mg/L	0.005 mg/L	94.3	70.0	130	----
		tin, total	7440-31-5	E420	0.0238 mg/L	0.025 mg/L	95.0	70.0	130	----
		titanium, total	7440-32-6	E420	ND mg/L	0.0125 mg/L	ND	70.0	130	----
		tungsten, total	7440-33-7	E420	0.00388 mg/L	0.005 mg/L	77.7	70.0	130	----
		uranium, total	7440-61-1	E420	ND mg/L	0.00025 mg/L	ND	70.0	130	----
		vanadium, total	7440-62-2	E420	0.0245 mg/L	0.025 mg/L	98.2	70.0	130	----
		zinc, total	7440-66-6	E420	0.0216 mg/L	0.025 mg/L	86.5	70.0	130	----
		zirconium, total	7440-67-7	E420	0.00392 mg/L	0.005 mg/L	78.5	70.0	130	----

Chain of Custody (COC) / Analytical Request Form

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number:

Page

Environmental Division Waterloo

Work Order Reference WT2224754

Telephone : +1 519 886 6910

Report To	Contact and company name below will appear on the final report
Company:	Hanlon Well Drilling
Contact:	Chad Macaulay
Phone:	519-710-5564
	Company address below will appear on the final report
Street:	5896 Wellington Road #7
City/Province:	Guelph, ON
Postal Code:	N1H 6J2
Invoice To	Same as Report To ☐ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: ☐ PDF ☐ EXCEL ☐ EDD (DIGITAL)

Quality Control (QC) Report with Report ☐ YES ☐ NO

☐ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☐ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax chad@hanlonwelldrilling.com

Email 2

Email 3

Invoice Distribution

Select Invoice Distribution: ☐ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax chad@hanlonwelldrilling.com

Email 2

Select Service Level Below - Contact your AM to

Regular [R] ☑ Standard TAT if received by 3 pr

PRIORITY (Business Days): 4 day [P4-20%] ☐ | 3 day [P3-25%] ☐ | 2 day [P2-50%] ☐

EMERGENCY: 1 Business | Same Day, W | (Laboratory

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selec

Analysis Re

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	CASH100 / WT2022CASH1000117	AFE/Cost Center:	PO#
Job #:	Primrose Public School	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only):	WT2224754	ALS Contact:	Sampler:

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	Total Coliforms, E. Coli	Total Metals, Hardness	Anions (Cl, NO2, NO3, SO4)	Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below	SAMPLES ON HOLD	SUSPECTED HAZARD (see Special Instructions)
	Water Sample	9-Dec-22		Water	3	R	R	R			

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human consumption/ use? ☐ YES ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

New well construction

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ | SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ | Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
				5.2°C			

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date: 09/Dec/2022	Time: 17:30 PM

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form.**

MA MM-504, GC-213,

UNIVERSITY of GUELPH

LABORATORY SERVICES
Agriculture and Food Laboratory

FINAL Report
Submission# **23-003036**
Reported: 2023-Jan-12

Submitted By:
Client ID: **1784979**
WELLINGTON PLUMBING AND HEATING LTD
KYLE MCDONALD
656 IMPERIAL RD N
GUELPH, ON N1H 7M3

Phone: 519 821-4130
Sampling Date: 2023-Jan-10
Received Date: 2023-Jan-10

Owner:
KYLE MCDONALD

Water- E Coli and Coli DC Agar **Method ID:MID-137**

Date Authorized: 2023-Jan-11 14:20

Sample ID	Client Sample ID	Specimen Type Sampling Date / Time	Coliform - water	E. coli - water
0001	**PRIMROSE P.S.**	Water 23-JAN-10 06:45	0cfu/100mL	0cfu/100mL

Water heterotrophic spread **Method ID:MID-143**

Date Authorized: 2023-Jan-12 14:45

Sample ID	Client Sample ID	Specimen Type Sampling Date / Time	water heterotrophic spread
0001	**PRIMROSE P.S.**	Water 23-JAN-10 06:45	170cfu/mL

Co-Supervisor: Susan Lee PhD, Agriculture and Food Laboratory 519 823-1268 ext 57211 suelee@uoguelph.ca
Co-Supervisor: Carlos Leon Velarde PhD, Agriculture and Food Laboratory 519 823-1268 ext 57301 cleonvel@uoguelph.ca

Attachment 3
Location of the New Well

Stantec

Legend

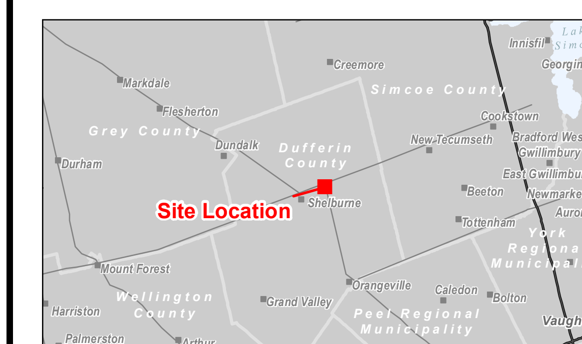
- Existing Well - Abandoned
- New Well Location

0 25 50 m

1:750 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2022.
3. Orthoimagery © First Base Solutions, 2022.



Project Location
Dufferin County

REVA
Prepared by PRM on 2023-01-30
Technical Review by TW on 2023-01-30

Client/Project
UPPER GRAND DISTRICT SCHOOL BOARD
BACKGROUND REVIEW - NEW WATER SUPPLY WELL
FOR THE PRIMROSE ELEMENTARY SCHOOL

Figure No.
1

Title
Well Locations

Attachment 4
Well Records

General Instructions and Explanations for completing a Well Record

A completed electronic Well Record Form must be delivered to the well purchaser and the owner of the land on which the well is situated within 14 days after the date on which the well's structural stage is complete. The electronic Well Record must also be forwarded within 30 days after the date on which the well's structural stage is complete to the ministry through email to the following email address: WellRecordSubmission@ontario.ca

False and Misleading Information

Subsection 98(2) of the *Ontario Water Resources Act*, R.S.O. 1990 c. O. 40, states that:

"No person shall orally, in writing or electronically, give or submit false or misleading information in any statement, document or data, to any provincial officer, the Minister, the Ministry or the Agency, any employee in or agent of the Ministry or the Agency, or any person involved in carrying out a program of the Ministry or the Agency in respect of any matter related to this Act or the regulations."

Further, subsection 98(3) of the Act states that:

"No person shall include false or misleading information in any document or data required to be created, stored or submitted under this Act."

Measurements

All measurements must be recorded in the specified unit, metric or imperial by checking off the applicable box on the top of the form. You must use the checked unit consistently throughout the well record. Measurements must be reported to 1/10th of a metre if the unit is a metre. All measurements of depth must be referenced to ground surface.

Well Owner's Information

A "well owner" means the owner of land upon which a well is situated and includes a tenant or lessee of the land and a well purchaser. If the "well owner" is an individual, record the owner's last name and first name or if the "well owner" is a business, government or other organization, record the name in the "organization" area.

Well Location

Street Number/Name and City/town/Village must be provided, if available.

Geographic Township, Concession and Lot must be reported if the well is located in an area where such information exists.

UTM Coordinates must be recorded each time a Well Record is completed. Click the button [Test UTM in Map] to use the UTM Coordinates to plot the location to Google map. This allows verification of the UTM Coordinates. This will also automatically populate the County/District.

Municipal Plan and Sublet Number may be provided, if available.

Overburden and Bedrock Materials

For each formation encountered during construction, choose words from the lists that best describe the formation on the basis of general colour, most common material, other materials, and general description of the formation.

General Colours are White, Yellow, Grey, Brown, Blue, Red, Green and Black.

Examples of Materials are: Fill, Silt, Top Soil, Coarse Sand, Slate, Muck, Gravel, Limestone, Dolomite, Quartzite, Peat, Stones, Fine Sand, Shale, Granite, Clay, Boulders, Medium Sand, Sandstone, and Greenstone.

Some definitions are as follows:

- Clay: Composed of very fine particles. Forms dense hard lumps or clods when dry and a very elastic putty-like mass when wet. It can be rolled between fingers to form a long, flexible ribbon.
- Silt: Grain size, midway between sand and clay. It may form clods which, when broken, feel soft and floury. When moist, it will form a cast that can be handled freely without breaking. Rolled between thumb and finger, it will not "ribbon" but will give a broken appearance.

- Sand: Grains are loose and granular and may be seen and felt readily. Squeezed in the hand when dry, it falls apart when the pressure is released. Squeezed when moist, it will form a cast that will crumble when touched. Should be listed as fine sand, medium sand or coarse sand.
- Gravel: Rock fragments greater than 0.3 cm in diameter.

Examples of General Descriptions are Loose, Cemented, Previously Dug or Bored, Porous, Layered, Previously Drilled, Dense, Soft, Wood Fragments, Packed, Hard.

Abandonment

To report abandonment of a well, check off the applicable box in Type on the top of the form. Details of abandonment must be recorded in the Abandonment and Sealing Section. Additional comments may be entered in the comments box under the Information section.

Annular Space

Record all material placed in the annular space around the single casing or around the permanent outer casing. If the well is a telescoped well [i.e., a well with an outer casing and inner casing(s)] or if the well is a multi-level nested test hole, report the depth from, depth to, material and volume placed for the annular space between two different sized casings or between the inner casing(s) and the side of the well in the “Comments” area of this electronic well record form.

Method of Construction

If the equipment used to construct the well is not on the list, check “Other (specify)” and record the type of equipment, check each equipment that applies.

Well Use

If the well’s use is not provided on the list, check “Other (specify)” and record the use of the well. If the well has multiple uses, check each use that applies.

Status of Well

If the well’s status is not provided on the list, check “Other (specify)” and record the use of the well. If the well has multiple statuses, check each use that applies.

Construction Record – Casing and Open Hole

Use negative values to report the top of casing above ground surface. For example, if the top of the casing is 0.4 metres above the ground surface and the bottom of the casing 6.0 metres below the ground surface, record the casing “Depth From” as -0.4.

If the top of casing is located below the ground surface (e.g., if a test hole is constructed and the top of casing is located below the ground surface in a flush mounted well vault), report the top of the casing from below ground surface. For example, if the top of the casing is 0.1 metres below the ground surface and the bottom of the casing is 6 metres below the ground surface, record the casing “Depth From” as 0.1.

Note: If a drive shoe is used, the shoe is considered casing and it must be reported if the shoe has a different inside diameter thickness.

If a portion of the well was created an open hole, record the location of the open hole on a separate row, including the diameter and the depth (top and bottom of open hole) from the ground surface.

Construction Record – Well Screen

A “well screen” means perforated pipe or tubing, unsealed concrete tiles or other material installed in a well to filter out particulate matter and form the water intake zone. Therefore, the length of a well screen includes any slotted or perforated area and unsealed area of pipe or tiles.

Water Details

- if groundwater was located, record the depth from the ground surface to the location of the groundwater resource, and
- record if the groundwater quality is “Untested,” “Fresh” (i.e., not salty), or “Other (specify).” If “Other (specify)” is recorded, use the “Other (specify)” dropdown list toselect the type of groundwater (e.g., salty, blackish water, yellowish water, mineralized, etc.).

Check off “Gas” if natural gas was encountered during well construction.

Note: Natural gas encounters need to be immediately reported to the ministry at 1-800-268-6060, well purchaser and the owner of the land.

Results of Well Yield Testing

Check off “Pumping Discontinued” if pumping was discontinued before 1 hour of continuous pumping. Explain the reason why pumping was discontinued or in some cases not performed (e.g., the well went dry, impossible to install pump in small diameter well, static water level from test hole or dewatering well was obtained and is reported instead of completing a yield test etc.).

Note: Equipment breakdown is not an acceptable reason for checking off “Pumping Discontinued” on the well record form. If groundwater in the well is flowing out of the well, provide the rate of flow, and check off “Flowing Well” (i.e., static water level above the ground surface).

In the “Results of Well Yield Testing” section of the well record form, record:

- the depth to the intake of the pump,
- the rate of pumping and duration of pumping period during the yield test,
- the final water level when pumping stops,
- water level measurements made during pumping (drawdown) and recovery. All water level measurements must be referenced from below the ground surface for each time interval specified in the drawdown and recovery boxes.

If the water level measurements remain the same over a period of time, continue to measure and report the same water level measurement for the remaining pumping or recovery time intervals.

If pumping continuously for at least 1 hour, but the design of the well does not allow for water level measurements (e.g., driven point well), the person constructing the well is not required to report drawdown or recovery water level measurements.

Map of Well Location

In the “Map of Well Location” section of the well record form, click the map area to attach a map of the well location. The map must show sufficient information to locate the well, including:

- a mark on the map showing the well,
- a scale on the map, and
- where available, the name of the structure, street or surface water body nearest to the well.

Note: More than one map can be added to the well record form by clicking on “Add Map (+)” to add an additional map.

Information

Record any additional information (e.g., observations, tests, additional licensed well technicians who worked on the well, additional annular space details for a telescoped well or a multi-level nested test hole, reasons for not providing a well owner information package) in the comments area.

Declaration

Check the declaration statement to confirm that the person constructing the well agrees with the following statement: “I hereby confirm that I am the person who constructed the well and I hereby confirm that the information on the form is correct and accurate”.

Validate

Click the validate button. If there is no missing information, you will be asked to enter the well tag again to make sure the well tag is entered correctly (only enter the numeric portion of the tag number). The audit number will then be changed from “**incomplete**” to an assigned audit number. The signature field will then be available. Click on “signature” to enter the well technician’s electronic signature. For instructions on how to create an electronic signature, please visit the Adobe Digital IDs website using the following link: https://helpx.adobe.com/acrobat/using/digital-ids.html

Notice of Collection of Personal Information

Personal information contained on this form is collected pursuant to sections 35-50 and 75(2) of the *Ontario Water Resources Act* and section 16.3 of the Wells Regulation. This information will be used for the purpose of maintaining a public record of wells in Ontario. This form and the information contained on the form will be stored in the Ministry's well record database and made publicly available. Questions about this collection should be directed to the Water Well Customer Service Representative at the Wells Help Desk, 125 Resources Road, Toronto Ontario M9P 3V6, at 1-888-396-9355 or wellshelpdesk@ontario.ca.

Fields marked with an asterisk (*) are mandatory.

Well Tag Number *
A 366431

Type *

☑ Construction ☐ Abandonment

Measurement recorded in: *

☐ Metric ☑ Imperial

1. Well Owner's Information

Last Name and First Name, or Organization is mandatory. *

Last Name	First Name
Organization	**Email Address**
Primrose Public School	

Current Address

Unit Number	Street Number *	Street Name *	City/Town/Village	
	636064	Prince of Wales Road	Mulmur	
Country	**Province**		**Postal Code**	**Telephone Number**
Canada	Ontario		L9V 0B8	

2. Well Location

Address of Well Location

Unit Number	Street Number *	Street Name *	Township
	636064	Prince of Wales	Mulmur

Lot	Concession	County/District/Municipality	
		Dufferin	
City/Town		**Province**	**Postal Code**
Mulmur		Ontario	L9V 0B8

UTM Coordinates	Zone *	Easting *	Northing *		Municipal Plan and Sublot Number
NAD 83	17	568727	4883033	Test UTM in Map	

Other

3. Overburden and Bedrock Material *

Well Depth * 164 (ft)

General Colour	Most Common Material	Other Materials	General Description	Depth From	Depth To

				(ft)	(ft)
	Clay	Gravel	Sand	0	24.6
Grey	Limestone			24.6	30
Brown	Limestone	Gravel	Clay	30	40
Green	Shale			40	46
Grey	Shale			46	48
Red	Shale			48	90
Brown	Limestone			90	127
	Sandstone			127	140
Blue	Shale			140	154
Red	Shale			154	164

4. Annular Space *

Depth From (ft)	Depth To (ft)	Type of Sealant Used (Material and Type)	Volume Placed (cubic feet)
0	20	Bentonite	7

5. Method of Construction *

☐ Cable Tool ☐ Rotary (Conventional) ☐ Rotary (Reverse) ☐ Boring ☐ Air percussion ☐ Diamond
☐ Jetting ☐ Driving ☐ Digging ☐ Rotary (Air) ☐ Augering ☐ Direct Push
☑ Other (specify) DR

6. Well Use *

☑ Public ☐ Industrial ☐ Cooling & Air Conditioning
☐ Domestic ☐ Commercial ☐ Not Used
☐ Livestock ☐ Municipal ☐ Monitoring
☐ Irrigation ☐ Test Hole ☐ Dewatering
☐ Other (specify) _____

7. 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) _____

8. Construction Record - Casing * (use negative number(s) to indicate depth above ground surface)

Inside Diameter (in)	Open Hole **or** Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness	Depth From (ft)	Depth To (ft)
6	Steel	0.188	0	41

9. Construction Record - Screen

Outside Diameter (in)	Material (Plastic, Galvanized, Steel)	Slot Number	Depth From (ft)	Depth To (ft)

10. Water Details

Water found at Depth 113 (ft) ☐ Gas Kind of water ☐ Fresh ☐ Untested ☐ Other

11. Hole Diameter

Depth From (ft)	Depth To (ft)	Diameter (in)
0	20	10
20	41	6.63
41	164	6

12. Results of Well Yield Testing

☐ Pumping Discontinued

Explain _____

If flowing give rate

☐ Flowing _____ (GPM)

Draw down

Time (min)	Static Level	1	2	3	4	5	10	15	20	25	30	40	50	60
Water Level (ft)	113.3	114.2	114.3	114.3	114.4	114.4	114.5	114.7	114.7	114.8	114.9	114.9	114.9	115.0

Recovery

Time (min)	1	2	3	4	5	10	15	20	25	30	40	50	60
Water Level (ft)	115	114.4	114.3	114.3	114.3	114.0	113.8	113.7	113.6	113.5	113.4	113.3	113.3

After test of well yield, water was

☐ Clear and sand free ☑ Other (specify) Cloudy

Pump intake set at	Pumping rate	Duration of pumping	Final water level end of pumping	Disinfected? *
130 (ft)	20 (GPM)	1 hrs + min	115 (ft)	☑ Yes ☐ No

Recommended pump depth	Recommended pump rate	Well production
130 (ft)	15 (GPM)	25 (GPM)

13. Map of Well Location *

Map 1. Please Click the map area below to import an image file to use as the map. ☐ Make map area bigger

14. Information

Well owner's information package delivered	Date Package Delivered (yyyy/mm/dd)	Date Work Completed (yyyy/mm/dd) *
☐ Yes ☐ No		2022/12/22

Comments

15. Well Contractor and Well Technician Information

Business Name of Well Contractor *	Well Contractor's License Number *
Aardvark Drilling Inc.	7675

Business Address

Unit Number	Street Number	Street Name *
C	25	Lewis Road

City/Town/Village *	Province	Postal Code *
Guelph	ON	N1H 1E9

Business Telephone Number	Business Email Address
519-826-9340	info@aardvarkdrillinginc.com

Last Name of Well Technician *	First Name of Well Technician *	Well Technician's License Number *
Gerrits	David	3864

16. Declaration *

☑ I hereby confirm that I am the person who constructed the well and I hereby confirm that the information on the form is correct and accurate.

Last Name	First Name	Email Address
England	Matthew	mengland@aardvarkdrillinginc.com

Signature	Date Submitted (yyyy/mm/dd)
Matt England Digitally signed by Matt England Date: 2023.01.18 13:30:33 -05'00'	2023/01/18

17. Ministry Use Only

Audit Number

UI8S U74W

Attachment 5
Site Visit Photos

Site Visit Photo Log
Date: January 23, 2023
Location: Primrose Public School
Project: 165630233

Figure 1
New well installed with 3ft x 3ft concrete well tile

Figure 2
Well casing with cap inside the concrete tile

Figure 3
Stainless steel well tag on the casing

Figure 4
Water supply pipe from the well into the mechanical room

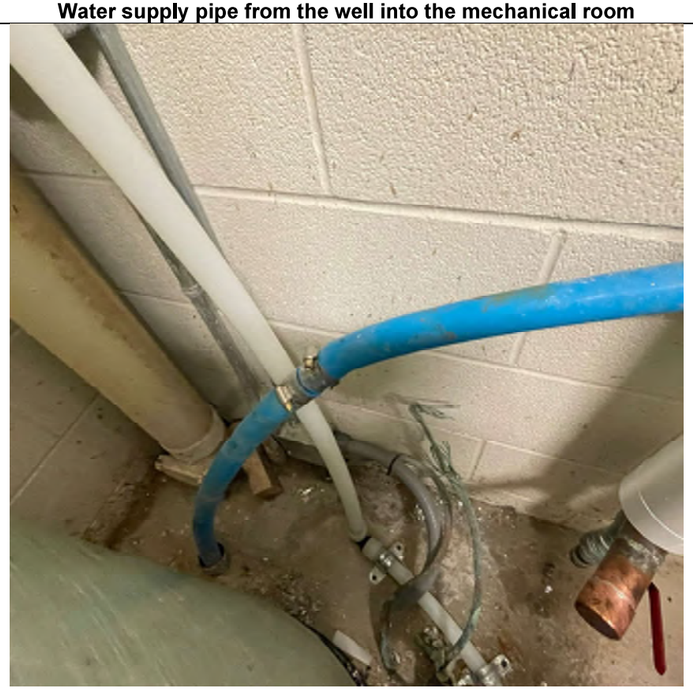
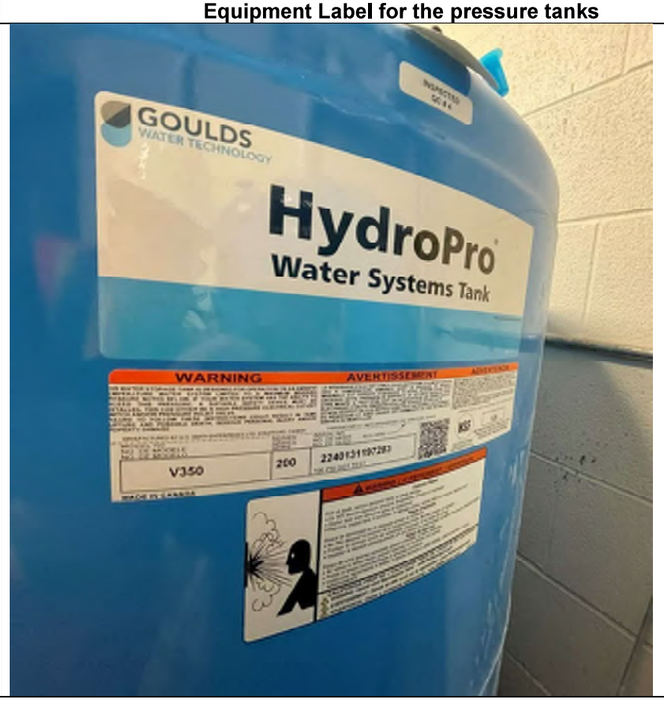


Figure 5
Three new water pressure tanks in the mechanical room

Figure 6
Equipment Label for the pressure tanks



Site Visit Photo Log
Date: January 23, 2023
Location: Primrose Public School
Project: 165630233

Figure 7
Two new water softeners with Brine Tanks in the mechanical room

Figure 8
Equipment label on the new water softeners

Figure 9
Closer Look at the Water Softner

Figure 10
Closer look at the Brine Tank

Figure 11
Existing well was abandoned from the location

APPENDIX C

Private Well Survey Data and Results

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G115124 **REPORT No: 23-020827 - Rev. 0**

Report To:
WSP Canada Inc. - Barrie
121 Commerce Park Drive, Unit L
Barrie, ON L4N 8X1

CADUCEON Environmental Laboratories
112 Commerce Park Dr Unit L
Barrie, ON L4N 8W8

Attention: Colin Imrie

DATE RECEIVED: 2023-Aug-11
DATE REPORTED: 2023-Aug-17
SAMPLE MATRIX: Ground Water

CUSTOMER PROJECT: CA-GLD-23611788
P.O. NUMBER:

Analyses	Qty	Site Analyzed	Authorized	Date Analyzed	Lab Method	Reference Method
Anions (Liquid)	1	OTTAWA	VKASYAN	2023-Aug-15	A-IC-01	SM 4110B
Cond/pH/Alk Auto (Liquid)	1	OTTAWA	MDON	2023-Aug-15	COND-02/PH-02/ALK-02	SM 2510B/4500H/2320B
Coliforms - DC Media (Liquid)	1	BARRIE	NMUELLER	2023-Aug-11	ECTC-001	MECP E3407
Ion Balance (Calc)	1	OTTAWA	STAILLON		CP-028	MECP E3196
ICP/OES (Liquid)	1	OTTAWA	NHOGAN	2023-Aug-16	D-ICP-01	SM 3120B

R.L. = Reporting Limit
NC = Not Calculated
Test methods may be modified from specified reference method unless indicated by an *

Christine Burke
Laboratory Manager

Parameter	Units	R.L.	Limits	DWG	Client I.D.: School Sample I.D.: 23-020827-1 Date Collected: 2023-Aug-11
Total Coliform (DC Media)	CFU/100mL	1	0	MAC	0
E coli (DC Media)	CFU/100mL	1	0	MAC	0
Background (DC Media)	CFU/100mL	1			39
Alkalinity(CaCO3) to pH4.5	mg/L	5	500	OG	336
pH @25°C	pH units	-	8.5	OG	7.89
Conductivity @25°C	uS/cm	1			4430
Fluoride	mg/L	0.1	1.5	MAC	<0.7
Chloride	mg/L	0.5	250	AO	1280
Nitrate (N)	mg/L	0.05	10.0	MAC	3.73
Nitrite (N)	mg/L	0.05	1.0	MAC	<0.40
Sulphate	mg/L	1	500	AO	47
Hardness (as CaCO3)	mg/L as CaCO3	0.02	100	OG	618
Calcium	mg/L	0.02			186
Copper	mg/L	0.002	1	AO	0.054
Iron	mg/L	0.005	0.3	AO	0.033
Magnesium	mg/L	0.02			37.2
Manganese	mg/L	0.001	0.05	AO	0.002
Potassium	mg/L	0.1			2.4
Sodium	mg/L	0.2	200, 20, 20	AO, WL, MAC	677
Zinc	mg/L	0.005	5	AO	0.149
Anion Sum	meq/L	-			44.2

Christine Burke
Laboratory Manager

Parameter	Units	R.L.	Limits	DWG	Client I.D.: School Sample I.D.: 23-020827-1 Date Collected: 2023-Aug-11
Cation Sum	meq/L	-			41.9
% Difference	%	-			2.69
TDS (Ion Sum Calc)	mg/L	1	500	AO	2450
Conductivity Calc	µmho/cm	-			4200
pH (Client Data)	pH units	-			6.88
Temperature (Client Data)	°C	-			14.9

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

Summary of Exceedances

Aesthetic Objectives

School	Found Value	Limit
Chloride	1280	250
Sodium	677	200
TDS (Ion Sum Calc)	2450	500

Maximum Acceptable Concentration

School	Found Value	Limit
Sodium	677	20

Operational Guidelines

School	Found Value	Limit
Hardness (as CaCO3)	618	100

Warning Level - Sodium Restricted Diets

School	Found Value	Limit
Sodium	677	20

Christine Burke
Laboratory Manager

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G114778 **REPORT No: 24-003124 - Rev. 0**

Report To:
WSP Canada Inc. - Barrie
121 Commerce Park Drive, Unit L
Barrie, ON L4N 8X1

CADUCEON Environmental Laboratories
112 Commerce Park Dr Unit L
Barrie, ON L4N 8W8

Attention: Colin Imrie

DATE RECEIVED: 2024-Feb-01
DATE REPORTED: 2024-Feb-07
SAMPLE MATRIX: Ground Water

CUSTOMER PROJECT: CA-GLD-23611788
P.O. NUMBER:

Analyses	Qty	Site Analyzed	Authorized	Date Analyzed	Lab Method	Reference Method
Anions (Liquid)	2	OTTAWA	PCURIEL	2024-Feb-02	A-IC-01	SM 4110B
Colour (Liquid)	2	OTTAWA	AWILSON	2024-Feb-07	A-COL-01	SM 2120C
Cond/pH/Alk Auto (Liquid)	2	OTTAWA	SBOUDREAU	2024-Feb-02	COND-02/PH-02/ALK-02	SM 2510B/4500H/2320B
DOC/DIC (Liquid)	2	OTTAWA	VKASYAN	2024-Feb-05	C-OC-01	EPA 415.2
E.Coli m-TECH Media (Liquid)	2	BARRIE	IMANOJ	2024-Feb-01	EC-001	MECP E3371
Fecal Coliforms (Liquid)	2	KINGSTON	BBURTCH	2024-Feb-02	FC-001	SM 9222D
ICP/OES (Liquid)	2	OTTAWA	NHOGAN	2024-Feb-06	D-ICP-01	SM 3120B
Ammonia (Liquid)	2	KINGSTON	JYEARWOOD	2024-Feb-02	NH3-001	SM 4500NH3
Total Coliforms (m-Endo Media)	2	BARRIE	IPATEL	2024-Feb-01	TC-001	SM 9222B
Turbidity (Liquid)	2	OTTAWA	AWILSON	2024-Feb-06	A-TURB-01	SM 2130B

R.L. = Reporting Limit
NC = Not Calculated
Test methods may be modified from specified reference method unless indicated by an *

Michelle Dubien
Data Specialist

Final Report

REPORT No: 24-003124 - Rev. 0

				Client I.D.	Motel	Superburger
				Sample I.D.	24-003124-1	24-003124-2
				Date Collected	2024-Feb-01	2024-Feb-01
Parameter	**Units**	**R.L.**	**Limits**		-	-
Total Coliform	CFU/100mL	1			<2	<2
E coli	CFU/100mL	1	100	PWQO	0	0
Fecal Coliform	CFU/100mL	1			0	0
Alkalinity(CaCO3) to pH4.5	mg/L	5			361	281
TDS (Calc. from Cond.)	mg/L	3			4120	968
Conductivity @25°C	uS/cm	1			7220	1760
pH @25°C	pH units	-	8.5	PWQO	7.87	7.80
Colour	TCU	2			3	<2
Turbidity	NTU	0.1			6.0	25.6
Chloride	mg/L	0.5			2070	372
Nitrate (N)	mg/L	0.05			<2.00	<0.40
Nitrite (N)	mg/L	0.05			<2.00	<0.40
Sulphate	mg/L	1			73	54
Ammonia (N)-Total (NH3+NH4)	mg/L	0.05			<0.05	0.06
Dissolved Organic Carbon	mg/L	0.2			1.9	2.1
Calcium	µg/L	20			51700	159000
Iron	µg/L	5	300	PWQO	1240	1930
Magnesium	µg/L	20			13700	25200
Manganese	µg/L	1			15	91
Sodium	µg/L	200			1880000	172000
pH (Client Data)	pH units	-			7.52	7.20

Michelle Dubien
Data Specialist

				Client I.D.	Motel	Superburger
				Sample I.D.	24-003124-1	24-003124-2
				Date Collected	2024-Feb-01	2024-Feb-01
Parameter	**Units**	**R.L.**	**Limits**		-	-
Temperature (Client Data)	°C	-			10.7	8.0

: PWQO Limits
INTERIM: Interim PWQO
PWQO: PWQO

Summary of Exceedances		
PWQO		
Motel	**Found Value**	**Limit**
Iron	1240	300
Superburger	**Found Value**	**Limit**
Iron	1930	300

Michelle Dubien
Data Specialist

July 14, 2023

PRIVATE WATER WELL SURVEY

WSP Canada Inc. is conducting a voluntary survey of private water well owners in your area to obtain information on the existing water wells and to identify potential candidates for a future well monitoring program. The survey is being completed in support of a planned commercial development located on Prince of Wales Road, north of Highway 89.

The survey consists of the attached questionnaire which requests basic water well information. Please answer the questionnaire as thoroughly as possible. The information will be used by our hydrogeologists as part of an assessment of existing water well use in the area, and may be shared with the project team, the proponent, and government agencies such as Township of Mulmur. The following options are available to return the completed survey form to us:

- **By Mail:** Please use the self-addressed envelope to mail in the completed questionnaire;
- **By Phone:** Please contact Mr. Colin Imrie at (647) 326-3497, to complete the questionnaire over the phone;
- **By E-mail:** Please scan the completed form and e-mail it to: Colin.Imrie@wsp.com; or Tracy.Meldrum@wsp.com

Selected well owners may be requested to participate in a well monitoring program which may involve the measurement of water levels and may include collection of water quality samples. If you wish to be considered for participation in the well monitoring program, please complete and sign the attached consent form, and return it to WSP via one of the indicated methods.

We ask that you return the completed forms by **August 4, 2023**. If you have any additional questions or concerns, please contact the undersigned. Thank you for your cooperation and assistance.

Sincerely,

WSP Canada Inc.

Tracy Meldrum, MSc, P.Geo.
Senior Hydrogeologist

Colin Imrie, G.I.T.
Geo-Environmental Consultant

Attachments: Water Well Survey Form; Well Owner Consent Form

WSP Canada Inc.
121 Commerce Park Drive, Unit L, Barrie, Ontario, L4N 8X1, Canada
T: +1 705 722 4492 F: +1 705 722 3786

PRIVATE WATER WELL MONITORING PROGRAM – WELL OWNER CONSENT FORM

Water Quality Sampling

To document well water quality, selected well owners may be asked for permission to collect water quality samples from an untreated portion of the water supply system (for example, an outdoor tap without a hose or a water line that by-passes a water softener).

Water Level Measurements

To document and monitor groundwater levels, selected well owners may be asked for permission to collect water level measurements within their water well. Measuring the water level will require that the wellhead area be easily accessible, and the removal of the well cap by the owner. Water levels may be monitored through the installation of a datalogger to automatically record water levels for the duration of the program, with periodic datalogger retrieval to download water level data. Activities that require access to the well will be carried out under the direction of a licensed water well contractor.

By providing your consent below, you agree to provide access to your well for the purposes of monitoring as described above. You acknowledge that the results of the sampling program, including laboratory analyses for water samples, may be shared with the project team and government agencies such as the Township of Mulmur, and the Ontario Ministry of the Environment, Conservation and Parks.

To indicate your consent, please complete the following form, and return it to our representative. WSP will not complete any monitoring activities without your expressed written consent.

CONSENT FORM – WELL MONITORING PROGRAM

I provide consent for WSP Canada Inc. and/or their subcontractor(s) to access a sampling tap and my water well for monitoring purposes as described above.

I DO _____/ DO NOT _____ (check one) provide consent to collect water samples from an outdoor tap and to access my well to measure water levels in my absence.

Address: _____

Name: _____

Signature: _____ DATE _____

Daytime Telephone: _____

Evening Telephone: _____

Email: _____

Location of outdoor tap to sample: _____

Comments: _____

Project No.: 23611788

Date: _____

DOMESTIC WATER WELL SURVEY FORM
WSP Canada Inc.
Contact: Colin Imrie, 647-326-3497

Name:

Well Owner: First: _____ Last: _____

Resident: First: _____ Last: _____

Address:

Street

Address:_____ Or

Legal Address: Lot: ____ Part: ____ Concession: ____ Municipality: _____

911 Number: _____

Contact Information:

Daytime Telephone Number: _____ Evening Telephone Number: _____

Email**:** _____

Do you have a water well? YES / NO *(please circle one)*

Are you connected to municipal supply? YES / NO *(please circle one)*

Do you use your well for potable (drinking) purposes? YES / NO *(please circle one)*

Do you drink bottled water? YES / NO *(please circle one)*

Is the interior of your well accessible for water level measurements? YES / NO *(please circle one)*

Where is your well located? (describe): _____

_____

Well Diameter: _____ (inches) or: _____ (metres)

Well Depth: _____ (feet) or: _____ (metres)

Well Type: Hand Dug ____ Bored ____ Drilled ____

Casing Type: Steel ____ Concrete ____ Culvert ____ Stone/Wood ____ Cribbed ____

Pump Type: Submersible ____ Suction Lift ____ Jet ____ Other (describe):_____

Pump location: House / Well *(please circle one)*

Treatment system: _____

Well Age: _____ Years **Original Drilling Date:** _____

DOMESTIC WATER WELL SURVEY FORM
WSP Canada Inc.
Contact: Colin Imrie, 647-326-3497

Do you have a MOE Water Well Record Form? YES / NO *(please circle one)*

If yes, MOE Water Well Record Number: _____

Is there a MOE Ontario Well Tag on your well? YES / NO *(please circle one)*

If yes, MOE Ontario Well Tag Number: _____

Well Usage (check all that apply):

Domestic ____ Livestock ____ Commercial ____ Irrigation ____ Not Used ____

Gardening _____ Other: _____

Well Capacity: (gpm = gallons per minute)

0-5 gpm ____ 5-10 gpm ____ 10-20 gpm ____ >20 gpm ____

Water Quality:

Good ____ Poor ____ How often do you sample your well? _____

Do you have analytical laboratory reports? YES / NO *(please circle one)*

Water Quality Issues:

Turbidity ____ Mineral ____ Salt ____ Sulphur ____ Gas ____ Bacteria ____

Other: _____

Water Level

Depth from ground surface _____ (ft) or: _____ (m)

Depth of water column _____ (ft) or: _____ (m)

Please describe any water quantity or quality problems experienced with the well:

_____

_____

_____

If selected, would you be willing to participate in a water well monitoring program (e.g., water level monitoring and/or water quality sampling)? YES / NO *(please circle one)*

DOMESTIC WATER WELL SURVEY FORM
WSP Canada Inc.
Contact: Name Phone No. Fax: Fax No.

Additional Remarks:

_____

_____

_____

Please provide a sketch of well(s) and septic system relative to house, road or other landmarks in the provided area below:

GPS: _____ N _____E

Photo #: _____

APPENDIX D

MECP Well Logs

General Instructions and Explanations for completing a Well Record

A completed electronic Well Record Form must be delivered to the well purchaser and the owner of the land on which the well is situated within 14 days after the date on which the well's structural stage is complete. The electronic Well Record must also be forwarded within 30 days after the date on which the well's structural stage is complete to the ministry through email to the following email address: WellRecordSubmission@ontario.ca

False and Misleading Information

Subsection 98(2) of the *Ontario Water Resources Act*, R.S.O. 1990 c. O. 40, states that:

"No person shall orally, in writing or electronically, give or submit false or misleading information in any statement, document or data, to any provincial officer, the Minister, the Ministry or the Agency, any employee in or agent of the Ministry or the Agency, or any person involved in carrying out a program of the Ministry or the Agency in respect of any matter related to this Act or the regulations."

Further, subsection 98(3) of the Act states that:

"No person shall include false or misleading information in any document or data required to be created, stored or submitted under this Act."

Measurements

All measurements must be recorded in the specified unit, metric or imperial by checking off the applicable box on the top of the form. You must use the checked unit consistently throughout the well record. Measurements must be reported to 1/10th of a metre if the unit is a metre. All measurements of depth must be referenced to ground surface.

Well Owner's Information

A "well owner" means the owner of land upon which a well is situated and includes a tenant or lessee of the land and a well purchaser. If the "well owner" is an individual, record the owner's last name and first name or if the "well owner" is a business, government or other organization, record the name in the "organization" area.

Well Location

Street Number/Name and City/town/Village must be provided, if available.

Geographic Township, Concession and Lot must be reported if the well is located in an area where such information exists.

UTM Coordinates must be recorded each time a Well Record is completed. Click the button [Test UTM in Map] to use the UTM Coordinates to plot the location to Google map. This allows verification of the UTM Coordinates. This will also automatically populate the County/District.

Municipal Plan and Sublet Number may be provided, if available.

Overburden and Bedrock Materials

For each formation encountered during construction, choose words from the lists that best describe the formation on the basis of general colour, most common material, other materials, and general description of the formation.

General Colours are White, Yellow, Grey, Brown, Blue, Red, Green and Black.

Examples of Materials are: Fill, Silt, Top Soil, Coarse Sand, Slate, Muck, Gravel, Limestone, Dolomite, Quartzite, Peat, Stones, Fine Sand, Shale, Granite, Clay, Boulders, Medium Sand, Sandstone, and Greenstone.

Some definitions are as follows:

- Clay: Composed of very fine particles. Forms dense hard lumps or clods when dry and a very elastic putty-like mass when wet. It can be rolled between fingers to form a long, flexible ribbon.
- Silt: Grain size, midway between sand and clay. It may form clods which, when broken, feel soft and floury. When moist, it will form a cast that can be handled freely without breaking. Rolled between thumb and finger, it will not "ribbon" but will give a broken appearance.

- Sand: Grains are loose and granular and may be seen and felt readily. Squeezed in the hand when dry, it falls apart when the pressure is released. Squeezed when moist, it will form a cast that will crumble when touched. Should be listed as fine sand, medium sand or coarse sand.
- Gravel: Rock fragments greater than 0.3 cm in diameter.

Examples of General Descriptions are Loose, Cemented, Previously Dug or Bored, Porous, Layered, Previously Drilled, Dense, Soft, Wood Fragments, Packed, Hard.

Abandonment

To report abandonment of a well, check off the applicable box in Type on the top of the form. Details of abandonment must be recorded in the Abandonment and Sealing Section. Additional comments may be entered in the comments box under the Information section.

Annular Space

Record all material placed in the annular space around the single casing or around the permanent outer casing. If the well is a telescoped well [i.e., a well with an outer casing and inner casing(s)] or if the well is a multi-level nested test hole, report the depth from, depth to, material and volume placed for the annular space between two different sized casings or between the inner casing(s) and the side of the well in the “Comments” area of this electronic well record form.

Method of Construction

If the equipment used to construct the well is not on the list, check “Other (specify)” and record the type of equipment, check each equipment that applies.

Well Use

If the well’s use is not provided on the list, check “Other (specify)” and record the use of the well. If the well has multiple uses, check each use that applies.

Status of Well

If the well’s status is not provided on the list, check “Other (specify)” and record the use of the well. If the well has multiple statuses, check each use that applies.

Construction Record – Casing and Open Hole

Use negative values to report the top of casing above ground surface. For example, if the top of the casing is 0.4 metres above the ground surface and the bottom of the casing 6.0 metres below the ground surface, record the casing “Depth From” as -0.4.

If the top of casing is located below the ground surface (e.g., if a test hole is constructed and the top of casing is located below the ground surface in a flush mounted well vault), report the top of the casing from below ground surface. For example, if the top of the casing is 0.1 metres below the ground surface and the bottom of the casing is 6 metres below the ground surface, record the casing “Depth From” as 0.1.

Note: If a drive shoe is used, the shoe is considered casing and it must be reported if the shoe has a different inside diameter thickness.

If a portion of the well was created an open hole, record the location of the open hole on a separate row, including the diameter and the depth (top and bottom of open hole) from the ground surface.

Construction Record – Well Screen

A “well screen” means perforated pipe or tubing, unsealed concrete tiles or other material installed in a well to filter out particulate matter and form the water intake zone. Therefore, the length of a well screen includes any slotted or perforated area and unsealed area of pipe or tiles.

Water Details

- if groundwater was located, record the depth from the ground surface to the location of the groundwater resource, and
- record if the groundwater quality is “Untested,” “Fresh” (i.e., not salty), or “Other (specify).” If “Other (specify)” is recorded, use the “Other (specify)” dropdown list toselect the type of groundwater (e.g., salty, blackish water, yellowish water, mineralized, etc.).

Check off “Gas” if natural gas was encountered during well construction.

Note: Natural gas encounters need to be immediately reported to the ministry at 1-800-268-6060, well purchaser and the owner of the land.

Results of Well Yield Testing

Check off “Pumping Discontinued” if pumping was discontinued before 1 hour of continuous pumping. Explain the reason why pumping was discontinued or in some cases not performed (e.g., the well went dry, impossible to install pump in small diameter well, static water level from test hole or dewatering well was obtained and is reported instead of completing a yield test etc.).

Note: Equipment breakdown is not an acceptable reason for checking off “Pumping Discontinued” on the well record form. If groundwater in the well is flowing out of the well, provide the rate of flow, and check off “Flowing Well” (i.e., static water level above the ground surface).

In the “Results of Well Yield Testing” section of the well record form, record:

- the depth to the intake of the pump,
- the rate of pumping and duration of pumping period during the yield test,
- the final water level when pumping stops,
- water level measurements made during pumping (drawdown) and recovery. All water level measurements must be referenced from below the ground surface for each time interval specified in the drawdown and recovery boxes.

If the water level measurements remain the same over a period of time, continue to measure and report the same water level measurement for the remaining pumping or recovery time intervals.

If pumping continuously for at least 1 hour, but the design of the well does not allow for water level measurements (e.g., driven point well), the person constructing the well is not required to report drawdown or recovery water level measurements.

Map of Well Location

In the “Map of Well Location” section of the well record form, click the map area to attach a map of the well location. The map must show sufficient information to locate the well, including:

- a mark on the map showing the well,
- a scale on the map, and
- where available, the name of the structure, street or surface water body nearest to the well.

Note: More than one map can be added to the well record form by clicking on “Add Map (+)” to add an additional map.

Information

Record any additional information (e.g., observations, tests, additional licensed well technicians who worked on the well, additional annular space details for a telescoped well or a multi-level nested test hole, reasons for not providing a well owner information package) in the comments area.

Declaration

Check the declaration statement to confirm that the person constructing the well agrees with the following statement: “I hereby confirm that I am the person who constructed the well and I hereby confirm that the information on the form is correct and accurate”.

Validate

Click the validate button. If there is no missing information, you will be asked to enter the well tag again to make sure the well tag is entered correctly (only enter the numeric portion of the tag number). The audit number will then be changed from “**incomplete**” to an assigned audit number. The signature field will then be available. Click on “signature” to enter the well technician’s electronic signature. For instructions on how to create an electronic signature, please visit the Adobe Digital IDs website using the following link: https://helpx.adobe.com/acrobat/using/digital-ids.html

Ontario

Ministry of the Environment, Conservation and Parks

Well Record - Regulation 903

Ontario Water Resources Act

Notice of Collection of Personal Information

Personal information contained on this form is collected pursuant to sections 35-50 and 75(2) of the *Ontario Water Resources Act* and section 16.3 of the Wells Regulation. This information will be used for the purpose of maintaining a public record of wells in Ontario. This form and the information contained on the form will be stored in the Ministry's well record database and made publicly available. Questions about this collection should be directed to the Water Well Customer Service Representative at the Wells Help Desk, 125 Resources Road, Toronto Ontario M9P 3V6, at 1-888-396-9355 or wellshelpdesk@ontario.ca.

Fields marked with an asterisk (*) are mandatory.

Well Tag Number *
A 350359

Type *

☑ Construction ☐ Abandonment

Measurement recorded in: *

☐ Metric ☑ Imperial

1. Well Owner's Information

Last Name and First Name, or Organization is mandatory. *

Last Name	First Name

Organization	Email Address
Deltini Commercial Developments Inc.	

Current Address

Unit Number	Street Number *	Street Name *	City/Town/Village
	1350	Shawson Drive	Mississauga

Country	Province	Postal Code	Telephone Number
Canada	Ontario	L4W 1C5	212-794-9844

2. Well Location

Address of Well Location

Unit Number	Street Number *	Street Name *	Township
	636040	Prince of Wales Road	Mulmur

Lot	Concession	County/District/Municipality
		Dufferin

City/Town	Province	Postal Code
Shelburne	Ontario	L0N 1S0

UTM Coordinates	Zone *	Easting *	Northing *		Municipal Plan and Sublot Number
NAD 83	17	568447	4882795	Test UTM in Map	

Other
Location B Test Production Well

3. Overburden and Bedrock Material *

Well Depth * 120 (ft)

General Colour	Most Common Material	Other Materials	General Description	Depth From	Depth To

				(ft)	(ft)
Brown	Sand	Silt		0	6
Brown	Silt	Sand	Dense	6	7
White	Limestone			7	36
Grey	Shale			36	48
Red	Shale			48	63
Grey	Shale			63	102
Grey	Limestone			102	112
Brown	Limestone			112	120

4. Annular Space *

Depth From (ft)	Depth To (ft)	Type of Sealant Used (Material and Type)	Volume Placed (cubic feet)
0	20	Portland Cement	11.69

5. Method of Construction *

☐ Cable Tool ☐ Rotary (Conventional) ☐ Rotary (Reverse) ☑ Boring ☑ Air percussion ☐ Diamond
☐ Jetting ☐ Driving ☐ Digging ☐ Rotary (Air) ☐ Augering ☐ Direct Push
☐ Other (specify) _____

6. Well Use *

☐ Public ☐ Industrial ☐ Cooling & Air Conditioning
☑ Domestic ☐ Commercial ☐ Not Used
☐ Livestock ☐ Municipal ☐ Monitoring
☐ Irrigation ☑ Test Hole ☐ Dewatering
☐ Other (specify) _____

7. 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) _____

8. Construction Record - Casing * (use negative number(s) to indicate depth above ground surface)

Inside Diameter (in)	Open Hole **or** Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness	Depth From (ft)	Depth To (ft)
6	Steel	0.188	-2.5	20
4	Plastic	0.25	70	120

9. Construction Record - Screen

Outside Diameter (in)	Material (Plastic, Galvanized, Steel)	Slot Number	Depth From (ft)	Depth To (ft)
4.5	Plastic		70	120

10. Water Details

Water found at Depth 5 (ft)	☐ Gas	Kind of water	☐ Fresh	☑ Untested	☐ Other		
Water found at Depth 41	☐ Gas	Kind of water	☐ Fresh	☑ Untested	☐ Other		
Water found at Depth 70	☐ Gas	Kind of water	☐ Fresh	☑ Untested	☐ Other		

11. Hole Diameter

Depth From (ft)	Depth To (ft)	Diameter (in)
0	9	14
9	20	10
20	120	6

12. Results of Well Yield Testing

☐ Pumping Discontinued

Explain _____

If flowing give rate

☐ Flowing _____ (GPM)

Draw down

Time (min)	Static Level	1	2	3	4	5	10	15	20	25	30	40	50	60
Water Level (ft)														

Recovery

Time (min)	1	2	3	4	5	10	15	20	25	30	40	50	60
Water Level (ft)													

After test of well yield, water was

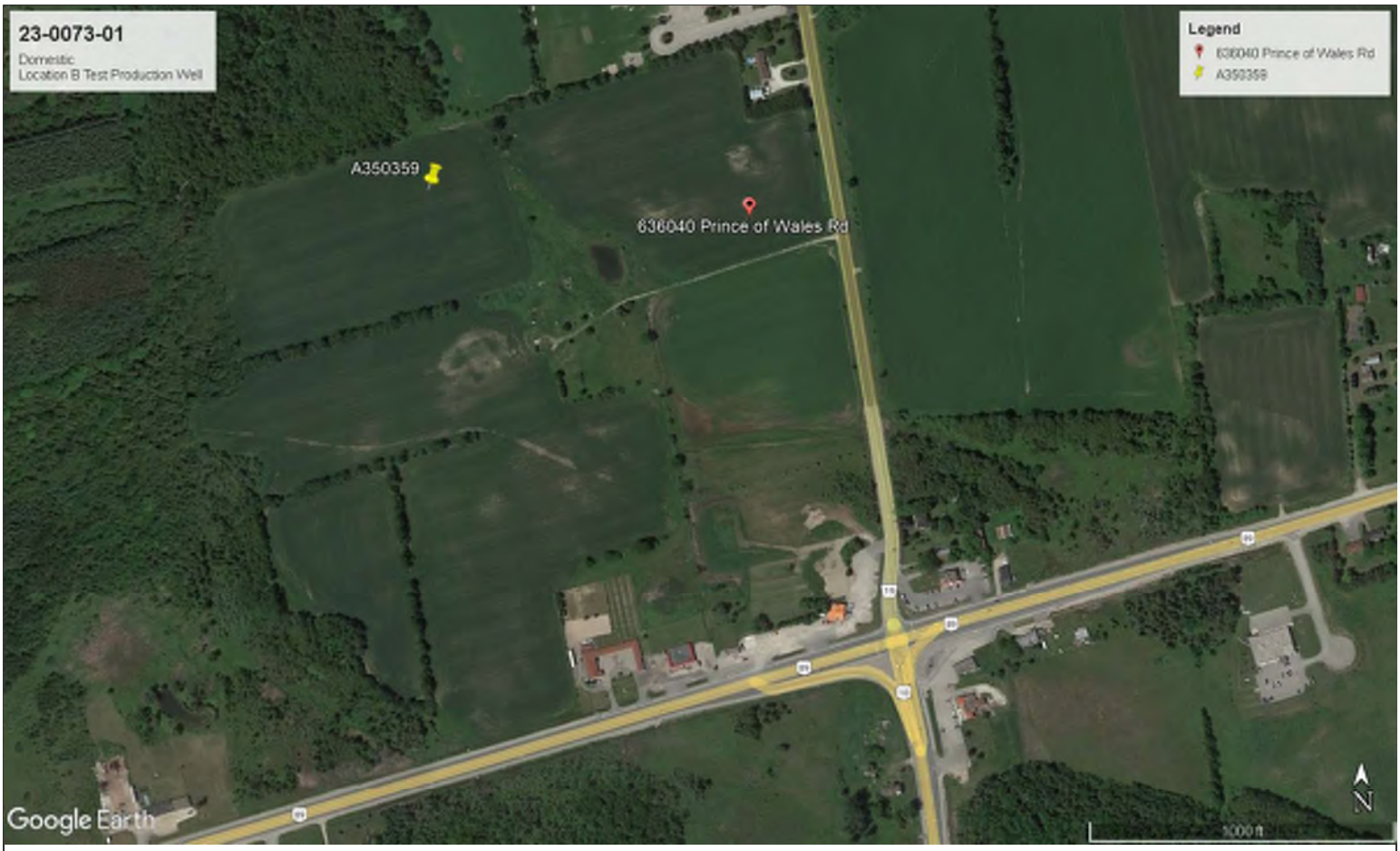
☐ Clear and sand free ☐ Other (specify)

Pump intake set at (ft)	Pumping rate (GPM)	Duration of pumping hrs + min	Final water level end of pumping (ft)	Disinfected? *
				☐ Yes ☑ No

Recommended pump depth (ft)	Recommended pump rate (GPM)	Well production (GPM)

13. Map of Well Location *

Map 1. Please Click the map area below to import an image file to use as the map. ☑ Make map area bigger



14. Information

Well owner's information package delivered	Date Package Delivered (yyyy/mm/dd)	Date Work Completed (yyyy/mm/dd) *
☐ Yes ☐ No		2023/06/26

Comments
Section 3, Overburden and Bedrock Materials further details:
(0-6') Other Materials: silt, gravel, cobbles.
(6-7') Other Materials: sand, gravel, cobbles; General Description: dense - till.
Section 9, Construction Record - Screen further details:
Material: PVC slotted.
Section 12, Results of Well Yield Testing: Pump testing to be conducted by WSP.

15. Well Contractor and Well Technician Information

Business Name of Well Contractor *	Well Contractor's License Number *
Aardvark Drilling Inc.	7675

Business Address

Unit Number	Street Number	Street Name *
C	25	Lewis Road

City/Town/Village *	Province	Postal Code *
Guelph	ON	N1H 1E9

Business Telephone Number	Business Email Address
519-826-9340	info@aardvarkdrillinginc.com

Last Name of Well Technician *	First Name of Well Technician *	Well Technician's License Number *
Grant	Donald	3311

16. Declaration *

☑ I hereby confirm that I am the person who constructed the well and I hereby confirm that the information on the form is correct and accurate.

Last Name	First Name	Email Address
England	Matthew	mengland@aardvarkdrillinginc.com

Signature	Date Submitted (yyyy/mm/dd)
Matt England Digitally signed by Matt England Date: 2023.07.05 11:18:19 -04'00'	2023/07/05

17. Ministry Use Only

Audit Number

PPD2 53PE

General Instructions and Explanations for completing a Well Record

A completed electronic Well Record Form must be delivered to the well purchaser and the owner of the land on which the well is situated within 14 days after the date on which the well's structural stage is complete. The electronic Well Record must also be forwarded within 30 days after the date on which the well's structural stage is complete to the ministry through email to the following email address: WellRecordSubmission@ontario.ca

False and Misleading Information

Subsection 98(2) of the *Ontario Water Resources Act*, R.S.O. 1990 c. O. 40, states that:

"No person shall orally, in writing or electronically, give or submit false or misleading information in any statement, document or data, to any provincial officer, the Minister, the Ministry or the Agency, any employee in or agent of the Ministry or the Agency, or any person involved in carrying out a program of the Ministry or the Agency in respect of any matter related to this Act or the regulations."

Further, subsection 98(3) of the Act states that:

"No person shall include false or misleading information in any document or data required to be created, stored or submitted under this Act."

Measurements

All measurements must be recorded in the specified unit, metric or imperial by checking off the applicable box on the top of the form. You must use the checked unit consistently throughout the well record. Measurements must be reported to 1/10th of a metre if the unit is a metre. All measurements of depth must be referenced to ground surface.

Well Owner's Information

A "well owner" means the owner of land upon which a well is situated and includes a tenant or lessee of the land and a well purchaser. If the "well owner" is an individual, record the owner's last name and first name or if the "well owner" is a business, government or other organization, record the name in the "organization" area.

Well Location

Street Number/Name and City/town/Village must be provided, if available.

Geographic Township, Concession and Lot must be reported if the well is located in an area where such information exists.

UTM Coordinates must be recorded each time a Well Record is completed. Click the button [Test UTM in Map] to use the UTM Coordinates to plot the location to Google map. This allows verification of the UTM Coordinates. This will also automatically populate the County/District.

Municipal Plan and Sublet Number may be provided, if available.

Overburden and Bedrock Materials

For each formation encountered during construction, choose words from the lists that best describe the formation on the basis of general colour, most common material, other materials, and general description of the formation.

General Colours are White, Yellow, Grey, Brown, Blue, Red, Green and Black.

Examples of Materials are: Fill, Silt, Top Soil, Coarse Sand, Slate, Muck, Gravel, Limestone, Dolomite, Quartzite, Peat, Stones, Fine Sand, Shale, Granite, Clay, Boulders, Medium Sand, Sandstone, and Greenstone.

Some definitions are as follows:

- Clay: Composed of very fine particles. Forms dense hard lumps or clods when dry and a very elastic putty-like mass when wet. It can be rolled between fingers to form a long, flexible ribbon.
- Silt: Grain size, midway between sand and clay. It may form clods which, when broken, feel soft and floury. When moist, it will form a cast that can be handled freely without breaking. Rolled between thumb and finger, it will not "ribbon" but will give a broken appearance.

- Sand: Grains are loose and granular and may be seen and felt readily. Squeezed in the hand when dry, it falls apart when the pressure is released. Squeezed when moist, it will form a cast that will crumble when touched. Should be listed as fine sand, medium sand or coarse sand.
- Gravel: Rock fragments greater than 0.3 cm in diameter.

Examples of General Descriptions are Loose, Cemented, Previously Dug or Bored, Porous, Layered, Previously Drilled, Dense, Soft, Wood Fragments, Packed, Hard.

Abandonment

To report abandonment of a well, check off the applicable box in Type on the top of the form. Details of abandonment must be recorded in the Abandonment and Sealing Section. Additional comments may be entered in the comments box under the Information section.

Annular Space

Record all material placed in the annular space around the single casing or around the permanent outer casing. If the well is a telescoped well [i.e., a well with an outer casing and inner casing(s)] or if the well is a multi-level nested test hole, report the depth from, depth to, material and volume placed for the annular space between two different sized casings or between the inner casing(s) and the side of the well in the “Comments” area of this electronic well record form.

Method of Construction

If the equipment used to construct the well is not on the list, check “Other (specify)” and record the type of equipment, check each equipment that applies.

Well Use

If the well’s use is not provided on the list, check “Other (specify)” and record the use of the well. If the well has multiple uses, check each use that applies.

Status of Well

If the well’s status is not provided on the list, check “Other (specify)” and record the use of the well. If the well has multiple statuses, check each use that applies.

Construction Record – Casing and Open Hole

Use negative values to report the top of casing above ground surface. For example, if the top of the casing is 0.4 metres above the ground surface and the bottom of the casing 6.0 metres below the ground surface, record the casing “Depth From” as -0.4.

If the top of casing is located below the ground surface (e.g., if a test hole is constructed and the top of casing is located below the ground surface in a flush mounted well vault), report the top of the casing from below ground surface. For example, if the top of the casing is 0.1 metres below the ground surface and the bottom of the casing is 6 metres below the ground surface, record the casing “Depth From” as 0.1.

Note: If a drive shoe is used, the shoe is considered casing and it must be reported if the shoe has a different inside diameter thickness.

If a portion of the well was created an open hole, record the location of the open hole on a separate row, including the diameter and the depth (top and bottom of open hole) from the ground surface.

Construction Record – Well Screen

A “well screen” means perforated pipe or tubing, unsealed concrete tiles or other material installed in a well to filter out particulate matter and form the water intake zone. Therefore, the length of a well screen includes any slotted or perforated area and unsealed area of pipe or tiles.

Water Details

- if groundwater was located, record the depth from the ground surface to the location of the groundwater resource, and
- record if the groundwater quality is “Untested,” “Fresh” (i.e., not salty), or “Other (specify).” If “Other (specify)” is recorded, use the “Other (specify)” dropdown list toselect the type of groundwater (e.g., salty, blackish water, yellowish water, mineralized, etc.).

Check off “Gas” if natural gas was encountered during well construction.

Note: Natural gas encounters need to be immediately reported to the ministry at 1-800-268-6060, well purchaser and the owner of the land.

Results of Well Yield Testing

Check off “Pumping Discontinued” if pumping was discontinued before 1 hour of continuous pumping. Explain the reason why pumping was discontinued or in some cases not performed (e.g., the well went dry, impossible to install pump in small diameter well, static water level from test hole or dewatering well was obtained and is reported instead of completing a yield test etc.).

Note: Equipment breakdown is not an acceptable reason for checking off “Pumping Discontinued” on the well record form. If groundwater in the well is flowing out of the well, provide the rate of flow, and check off “Flowing Well” (i.e., static water level above the ground surface).

In the “Results of Well Yield Testing” section of the well record form, record:

- the depth to the intake of the pump,
- the rate of pumping and duration of pumping period during the yield test,
- the final water level when pumping stops,
- water level measurements made during pumping (drawdown) and recovery. All water level measurements must be referenced from below the ground surface for each time interval specified in the drawdown and recovery boxes.

If the water level measurements remain the same over a period of time, continue to measure and report the same water level measurement for the remaining pumping or recovery time intervals.

If pumping continuously for at least 1 hour, but the design of the well does not allow for water level measurements (e.g., driven point well), the person constructing the well is not required to report drawdown or recovery water level measurements.

Map of Well Location

In the “Map of Well Location” section of the well record form, click the map area to attach a map of the well location. The map must show sufficient information to locate the well, including:

- a mark on the map showing the well,
- a scale on the map, and
- where available, the name of the structure, street or surface water body nearest to the well.

Note: More than one map can be added to the well record form by clicking on “Add Map (+)” to add an additional map.

Information

Record any additional information (e.g., observations, tests, additional licensed well technicians who worked on the well, additional annular space details for a telescoped well or a multi-level nested test hole, reasons for not providing a well owner information package) in the comments area.

Declaration

Check the declaration statement to confirm that the person constructing the well agrees with the following statement: “I hereby confirm that I am the person who constructed the well and I hereby confirm that the information on the form is correct and accurate”.

Validate

Click the validate button. If there is no missing information, you will be asked to enter the well tag again to make sure the well tag is entered correctly (only enter the numeric portion of the tag number). The audit number will then be changed from “**incomplete**” to an assigned audit number. The signature field will then be available. Click on “signature” to enter the well technician’s electronic signature. For instructions on how to create an electronic signature, please visit the Adobe Digital IDs website using the following link: https://helpx.adobe.com/acrobat/using/digital-ids.html

Ontario

Ministry of the Environment, Conservation and Parks

Well Record - Regulation 903

Ontario Water Resources Act

Notice of Collection of Personal Information

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Fields marked with an asterisk (*) are mandatory.

Well Tag Number *
A 374700

Type *

☑ Construction ☐ Abandonment

Measurement recorded in: *

☐ Metric ☑ Imperial

1. Well Owner's Information

Last Name and First Name, or Organization is mandatory. *

Last Name	First Name

Organization	Email Address
Deltini Commercial Developments Inc.	

Current Address

Unit Number	Street Number *	Street Name *	City/Town/Village
	1350	Shawson Drive	Mississauga

Country	Province	Postal Code	Telephone Number
Canada	Ontario	L4W 1C5	212-794-9844

2. Well Location

Address of Well Location

Unit Number	Street Number *	Street Name *	Township
	636040	Prince of Wales Road	Mulmur

Lot	Concession	County/District/Municipality
		Dufferin

City/Town	Province	Postal Code
Shelburne	Ontario	L0N 1S0

UTM Coordinates	Zone *	Easting *	Northing *		Municipal Plan and Sublot Number
NAD 83	17	568521	4882622	Test UTM in Map	

Other
Location C Test Production Well

3. Overburden and Bedrock Material *

Well Depth * 140 (ft)

General Colour	Most Common Material	Other Materials	General Description	Depth From	Depth To

				(ft)	(ft)
Brown	Sand	Gravel		0	2
Brown	Fine Sand	Silt		2	27
Brown	Sand	Gravel	Silt	27	32
Brown	Silt	Stones	Dense	32	35
Brown	Shale			35	43
White	Limestone			43	73.5
Grey	Shale			73.5	79
Red	Shale			79	90
Grey	Shale			90	126
Grey	Limestone			126	140

4. Annular Space *

Depth From (ft)	Depth To (ft)	Type of Sealant Used (Material and Type)	Volume Placed (cubic feet)
0	38	Portland Cement	33.17

5. Method of Construction *

- [ ] Cable Tool
- [ ] Rotary (Conventional)
- [ ] Rotary (Reverse)
- [x] Boring
- [x] Air percussion
- [ ] Diamond
- [ ] Jetting
- [ ] Driving
- [ ] Digging
- [ ] Rotary (Air)
- [ ] Augering
- [ ] Direct Push
- [ ] Other (specify) _____

6. Well Use *

- [ ] Public
- [ ] Industrial
- [ ] Cooling & Air Conditioning
- [x] Domestic
- [ ] Commercial
- [ ] Not Used
- [ ] Livestock
- [ ] Municipal
- [ ] Monitoring
- [ ] Irrigation
- [x] Test Hole
- [ ] Dewatering
- [ ] Other (specify) _____

7. Status of Well *

- [x] Water Supply
- [ ] Replacement Well
- [x] 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) _____

8. Construction Record - Casing * (use negative number(s) to indicate depth above ground surface)

Inside Diameter (in)	Open Hole **or** Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness	Depth From (ft)	Depth To (ft)
6	Steel	0.188	-2.5	38
4	Plastic	0.25	0	140

9. Construction Record - Screen

Outside Diameter (in)	Material (Plastic, Galvanized, Steel)	Slot Number	Depth From (ft)	Depth To (ft)
4.5	Plastic		90	140

10. Water Details

Water found at Depth 23 (ft)	☐ Gas	Kind of water	☐ Fresh	☑ Untested	☐ Other	
Water found at Depth 90	☐ Gas	Kind of water	☐ Fresh	☑ Untested	☐ Other	
Water found at Depth 125	☐ Gas	Kind of water	☐ Fresh	☑ Untested	☐ Other	

11. Hole Diameter

Depth From (ft)	Depth To (ft)	Diameter (in)
0	38	14
38	140	6

12. Results of Well Yield Testing

☐ Pumping Discontinued

Explain _____

If flowing give rate

☐ Flowing _____ (GPM)

Draw down

Time (min)	Static Level	1	2	3	4	5	10	15	20	25	30	40	50	60
Water Level (ft)														

Recovery

Time (min)	1	2	3	4	5	10	15	20	25	30	40	50	60
Water Level (ft)													

After test of well yield, water was

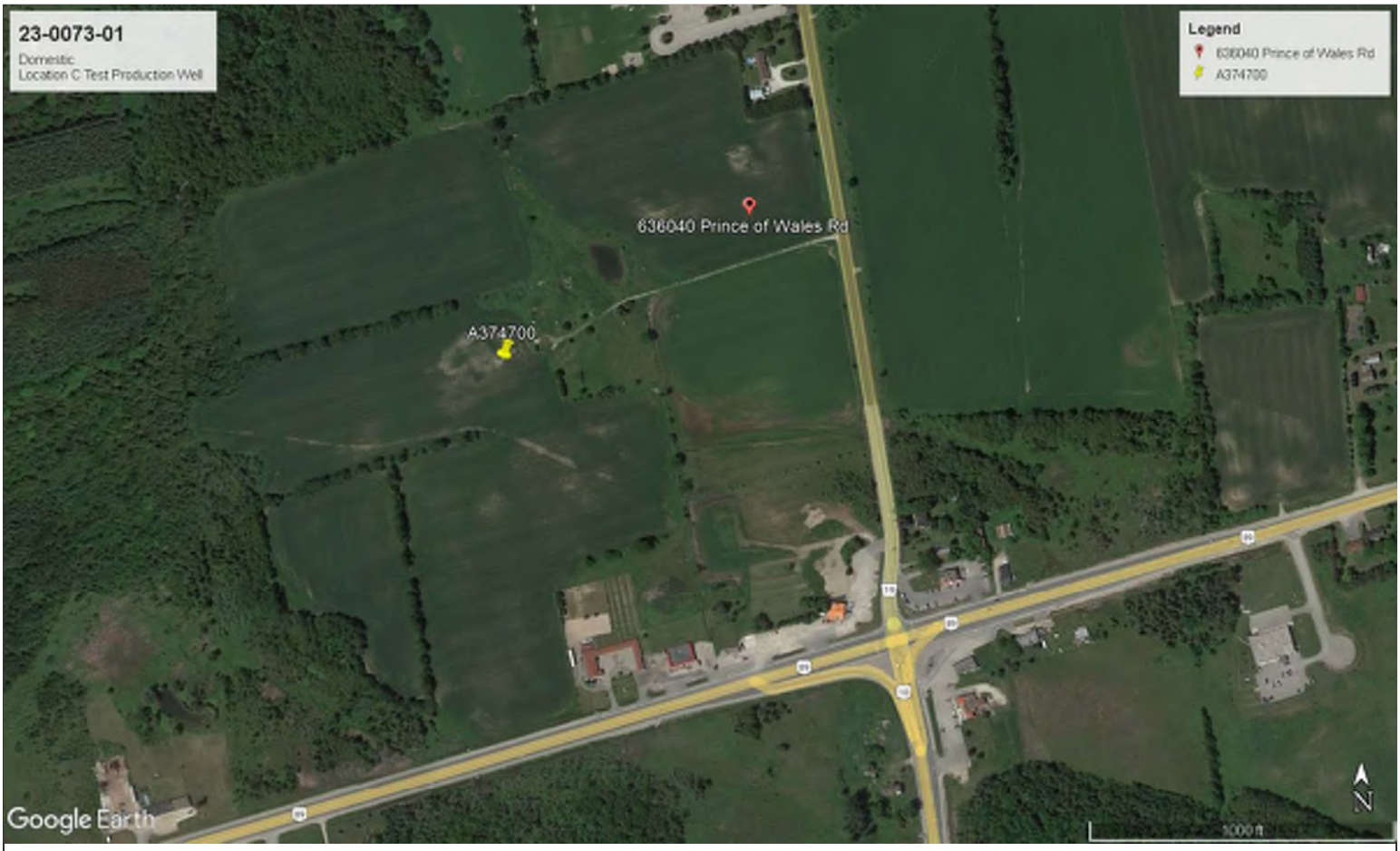
☐ Clear and sand free ☐ Other (specify)

Pump intake set at (ft)	Pumping rate (GPM)	Duration of pumping hrs + min	Final water level end of pumping (ft)	Disinfected? *
				☐ Yes ☑ No

Recommended pump depth (ft)	Recommended pump rate (GPM)	Well production (GPM)

13. Map of Well Location *

Map 1. Please Click the map area below to import an image file to use as the map. ☑ Make map area bigger



14. Information

Well owner's information package delivered	Date Package Delivered (yyyy/mm/dd)	Date Work Completed (yyyy/mm/dd) *
☐ Yes ☐ No		2023/06/26

Comments

Section 3, Overburden and Bedrock Materials further details:
(2-27') Most Common Material: fine/medium sand.
(32-35') Most Common Material: sandy silt with stones.
Section 9, Construction Record - Screen further details:
Material: PVC slotted.
Section 12, Results of Well Yield Testing: Pump Testing to be conducted by WSP.

15. Well Contractor and Well Technician Information

Business Name of Well Contractor *	Well Contractor's License Number *
Aardvark Drilling Inc.	7675

Business Address

Unit Number	Street Number	Street Name *
C	25	Lewis Road

City/Town/Village *	Province	Postal Code *
Guelph	ON	N1H 1E9

Business Telephone Number	Business Email Address
519-826-9340	info@aardvarkdrillinginc.com

Last Name of Well Technician *	First Name of Well Technician *	Well Technician's License Number *
Grant	Donald	3311

16. Declaration *

☑ I hereby confirm that I am the person who constructed the well and I hereby confirm that the information on the form is correct and accurate.

Last Name	First Name	Email Address
England	Matthew	mengland@aardvarkdrillinginc.com

Signature	Date Submitted (yyyy/mm/dd)
Matt England Digitally signed by Matt England Date: 2023.07.05 11:15:05 -04'00'	2023/07/05

17. Ministry Use Only

Audit Number

BFWN KESS

General Instructions and Explanations for completing a Well Record

A completed electronic Well Record Form must be delivered to the well purchaser and the owner of the land on which the well is situated within 14 days after the date on which the well's structural stage is complete. The electronic Well Record must also be forwarded within 30 days after the date on which the well's structural stage is complete to the ministry through email to the following email address: WellRecordSubmission@ontario.ca

False and Misleading Information

Subsection 98(2) of the *Ontario Water Resources Act*, R.S.O. 1990 c. O. 40, states that:

"No person shall orally, in writing or electronically, give or submit false or misleading information in any statement, document or data, to any provincial officer, the Minister, the Ministry or the Agency, any employee in or agent of the Ministry or the Agency, or any person involved in carrying out a program of the Ministry or the Agency in respect of any matter related to this Act or the regulations."

Further, subsection 98(3) of the Act states that:

"No person shall include false or misleading information in any document or data required to be created, stored or submitted under this Act."

Measurements

All measurements must be recorded in the specified unit, metric or imperial by checking off the applicable box on the top of the form. You must use the checked unit consistently throughout the well record. Measurements must be reported to 1/10th of a metre if the unit is a metre. All measurements of depth must be referenced to ground surface.

Well Owner's Information

A "well owner" means the owner of land upon which a well is situated and includes a tenant or lessee of the land and a well purchaser. If the "well owner" is an individual, record the owner's last name and first name or if the "well owner" is a business, government or other organization, record the name in the "organization" area.

Well Location

Street Number/Name and City/town/Village must be provided, if available.

Geographic Township, Concession and Lot must be reported if the well is located in an area where such information exists.

UTM Coordinates must be recorded each time a Well Record is completed. Click the button [Test UTM in Map] to use the UTM Coordinates to plot the location to Google map. This allows verification of the UTM Coordinates. This will also automatically populate the County/District.

Municipal Plan and Sublet Number may be provided, if available.

Overburden and Bedrock Materials

For each formation encountered during construction, choose words from the lists that best describe the formation on the basis of general colour, most common material, other materials, and general description of the formation.

General Colours are White, Yellow, Grey, Brown, Blue, Red, Green and Black.

Examples of Materials are: Fill, Silt, Top Soil, Coarse Sand, Slate, Muck, Gravel, Limestone, Dolomite, Quartzite, Peat, Stones, Fine Sand, Shale, Granite, Clay, Boulders, Medium Sand, Sandstone, and Greenstone.

Some definitions are as follows:

- Clay: Composed of very fine particles. Forms dense hard lumps or clods when dry and a very elastic putty-like mass when wet. It can be rolled between fingers to form a long, flexible ribbon.
- Silt: Grain size, midway between sand and clay. It may form clods which, when broken, feel soft and floury. When moist, it will form a cast that can be handled freely without breaking. Rolled between thumb and finger, it will not "ribbon" but will give a broken appearance.

- Sand: Grains are loose and granular and may be seen and felt readily. Squeezed in the hand when dry, it falls apart when the pressure is released. Squeezed when moist, it will form a cast that will crumble when touched. Should be listed as fine sand, medium sand or coarse sand.
- Gravel: Rock fragments greater than 0.3 cm in diameter.

Examples of General Descriptions are Loose, Cemented, Previously Dug or Bored, Porous, Layered, Previously Drilled, Dense, Soft, Wood Fragments, Packed, Hard.

Abandonment

To report abandonment of a well, check off the applicable box in Type on the top of the form. Details of abandonment must be recorded in the Abandonment and Sealing Section. Additional comments may be entered in the comments box under the Information section.

Annular Space

Record all material placed in the annular space around the single casing or around the permanent outer casing. If the well is a telescoped well [i.e., a well with an outer casing and inner casing(s)] or if the well is a multi-level nested test hole, report the depth from, depth to, material and volume placed for the annular space between two different sized casings or between the inner casing(s) and the side of the well in the “Comments” area of this electronic well record form.

Method of Construction

If the equipment used to construct the well is not on the list, check “Other (specify)” and record the type of equipment, check each equipment that applies.

Well Use

If the well’s use is not provided on the list, check “Other (specify)” and record the use of the well. If the well has multiple uses, check each use that applies.

Status of Well

If the well’s status is not provided on the list, check “Other (specify)” and record the use of the well. If the well has multiple statuses, check each use that applies.

Construction Record – Casing and Open Hole

Use negative values to report the top of casing above ground surface. For example, if the top of the casing is 0.4 metres above the ground surface and the bottom of the casing 6.0 metres below the ground surface, record the casing “Depth From” as -0.4.

If the top of casing is located below the ground surface (e.g., if a test hole is constructed and the top of casing is located below the ground surface in a flush mounted well vault), report the top of the casing from below ground surface. For example, if the top of the casing is 0.1 metres below the ground surface and the bottom of the casing is 6 metres below the ground surface, record the casing “Depth From” as 0.1.

Note: If a drive shoe is used, the shoe is considered casing and it must be reported if the shoe has a different inside diameter thickness.

If a portion of the well was created an open hole, record the location of the open hole on a separate row, including the diameter and the depth (top and bottom of open hole) from the ground surface.

Construction Record – Well Screen

A “well screen” means perforated pipe or tubing, unsealed concrete tiles or other material installed in a well to filter out particulate matter and form the water intake zone. Therefore, the length of a well screen includes any slotted or perforated area and unsealed area of pipe or tiles.

Water Details

- if groundwater was located, record the depth from the ground surface to the location of the groundwater resource, and
- record if the groundwater quality is “Untested,” “Fresh” (i.e., not salty), or “Other (specify).” If “Other (specify)” is recorded, use the “Other (specify)” dropdown list toselect the type of groundwater (e.g., salty, blackish water, yellowish water, mineralized, etc.).

Check off “Gas” if natural gas was encountered during well construction.

Note: Natural gas encounters need to be immediately reported to the ministry at 1-800-268-6060, well purchaser and the owner of the land.

Results of Well Yield Testing

Check off “Pumping Discontinued” if pumping was discontinued before 1 hour of continuous pumping. Explain the reason why pumping was discontinued or in some cases not performed (e.g., the well went dry, impossible to install pump in small diameter well, static water level from test hole or dewatering well was obtained and is reported instead of completing a yield test etc.).

Note: Equipment breakdown is not an acceptable reason for checking off “Pumping Discontinued” on the well record form. If groundwater in the well is flowing out of the well, provide the rate of flow, and check off “Flowing Well” (i.e., static water level above the ground surface).

In the “Results of Well Yield Testing” section of the well record form, record:

- the depth to the intake of the pump,
- the rate of pumping and duration of pumping period during the yield test,
- the final water level when pumping stops,
- water level measurements made during pumping (drawdown) and recovery. All water level measurements must be referenced from below the ground surface for each time interval specified in the drawdown and recovery boxes.

If the water level measurements remain the same over a period of time, continue to measure and report the same water level measurement for the remaining pumping or recovery time intervals.

If pumping continuously for at least 1 hour, but the design of the well does not allow for water level measurements (e.g., driven point well), the person constructing the well is not required to report drawdown or recovery water level measurements.

Map of Well Location

In the “Map of Well Location” section of the well record form, click the map area to attach a map of the well location. The map must show sufficient information to locate the well, including:

- a mark on the map showing the well,
- a scale on the map, and
- where available, the name of the structure, street or surface water body nearest to the well.

Note: More than one map can be added to the well record form by clicking on “Add Map (+)” to add an additional map.

Information

Record any additional information (e.g., observations, tests, additional licensed well technicians who worked on the well, additional annular space details for a telescoped well or a multi-level nested test hole, reasons for not providing a well owner information package) in the comments area.

Declaration

Check the declaration statement to confirm that the person constructing the well agrees with the following statement: “I hereby confirm that I am the person who constructed the well and I hereby confirm that the information on the form is correct and accurate”.

Validate

Click the validate button. If there is no missing information, you will be asked to enter the well tag again to make sure the well tag is entered correctly (only enter the numeric portion of the tag number). The audit number will then be changed from “**incomplete**” to an assigned audit number. The signature field will then be available. Click on “signature” to enter the well technician’s electronic signature. For instructions on how to create an electronic signature, please visit the Adobe Digital IDs website using the following link: https://helpx.adobe.com/acrobat/using/digital-ids.html

Notice of Collection of Personal Information

Personal information contained on this form is collected pursuant to sections 35-50 and 75(2) of the *Ontario Water Resources Act* and section 16.3 of the Wells Regulation. This information will be used for the purpose of maintaining a public record of wells in Ontario. This form and the information contained on the form will be stored in the Ministry's well record database and made publicly available. Questions about this collection should be directed to the Water Well Customer Service Representative at the Wells Help Desk, 125 Resources Road, Toronto Ontario M9P 3V6, at 1-888-396-9355 or wellshelpdesk@ontario.ca.

Fields marked with an asterisk (*) are mandatory.

Well Tag Number *
A374717

Type *

☑ Construction ☐ Abandonment

Measurement recorded in: *

☐ Metric ☑ Imperial

1. Well Owner's Information

Last Name and First Name, or Organization is mandatory. *

Last Name	First Name

Organization	Email Address
Deltini Commercial Developments Inc.	

Current Address

Unit Number	Street Number *	Street Name *	City/Town/Village
	1350	Shawson Drive	Mississauga

Country	Province	Postal Code	Telephone Number
Canada	Ontario	L4W 1C5	212-794-9844

2. Well Location

Address of Well Location

Unit Number	Street Number *	Street Name *	Township
	636040	Prince of Wales Road	Mulmur

Lot	Concession	County/District/Municipality
		Dufferin

City/Town	Province	Postal Code
Shelburne	Ontario	L0N 1S0

UTM Coordinates	Zone *	Easting *	Northing *		Municipal Plan and Sublot Number
NAD 83	17	568746	4882536	Test UTM in Map	

Other
Location D Test Production Well

3. Overburden and Bedrock Material *

Well Depth * 50 (ft)

General Colour	Most Common Material	Other Materials	General Description	Depth From	Depth To

				(ft)	(ft)
Brown	Clay	Silt	Topsoil	0	1
Brown	Sand	Gravel	Silty	1	4
Grey	Clay	Silty	Moist	4	15
Brown	Sand	Gravel		15	17
Brown	Silt	Stones	Dense	17	20
White	Limestone	Shale	Loose	20	48
Grey	Shale			48	50

4. Annular Space *

Depth From (ft)	Depth To (ft)	Type of Sealant Used (Material and Type)	Volume Placed (cubic feet)
0	23	Portland Cement	20.08

5. Method of Construction *

- [ ] Cable Tool
- [ ] Rotary (Conventional)
- [ ] Rotary (Reverse)
- [x] Boring
- [x] Air percussion
- [ ] Diamond
- [ ] Jetting
- [ ] Driving
- [ ] Digging
- [ ] Rotary (Air)
- [ ] Augering
- [ ] Direct Push
- [ ] Other (specify) _____

6. Well Use *

- [ ] Public
- [ ] Industrial
- [ ] Cooling & Air Conditioning
- [x] Domestic
- [ ] Commercial
- [ ] Not Used
- [ ] Livestock
- [ ] Municipal
- [ ] Monitoring
- [ ] Irrigation
- [x] Test Hole
- [ ] Dewatering
- [ ] Other (specify) _____

7. Status of Well *

- [x] Water Supply
- [ ] Replacement Well
- [x] 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) _____

8. Construction Record - Casing * (use negative number(s) to indicate depth above ground surface)

Inside Diameter (in)	Open Hole **or** Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness	Depth From (ft)	Depth To (ft)
6	Steel	0.188	-2.5	23
4	Plastic	0.25	0	50

9. Construction Record - Screen

Outside Diameter (in)	Material (Plastic, Galvanized, Steel)	Slot Number	Depth From (ft)	Depth To (ft)
4.5	Plastic		25	50

10. Water Details

Water found at Depth 15 (ft)	☐ Gas	Kind of water	☐ Fresh	☑ Untested	☐ Other	
Water found at Depth 24.5	☐ Gas	Kind of water	☐ Fresh	☑ Untested	☐ Other	
Water found at Depth 27	☐ Gas	Kind of water	☐ Fresh	☑ Untested	☐ Other	

11. Hole Diameter

Depth From (ft)	Depth To (ft)	Diameter (in)
0	23	14
23	50	6

12. Results of Well Yield Testing

☐ Pumping Discontinued

Explain _____

If flowing give rate

☐ Flowing _____ (GPM)

Draw down

Time (min)	Static Level	1	2	3	4	5	10	15	20	25	30	40	50	60
Water Level (ft)														

Recovery

Time (min)	1	2	3	4	5	10	15	20	25	30	40	50	60
Water Level (ft)													

After test of well yield, water was

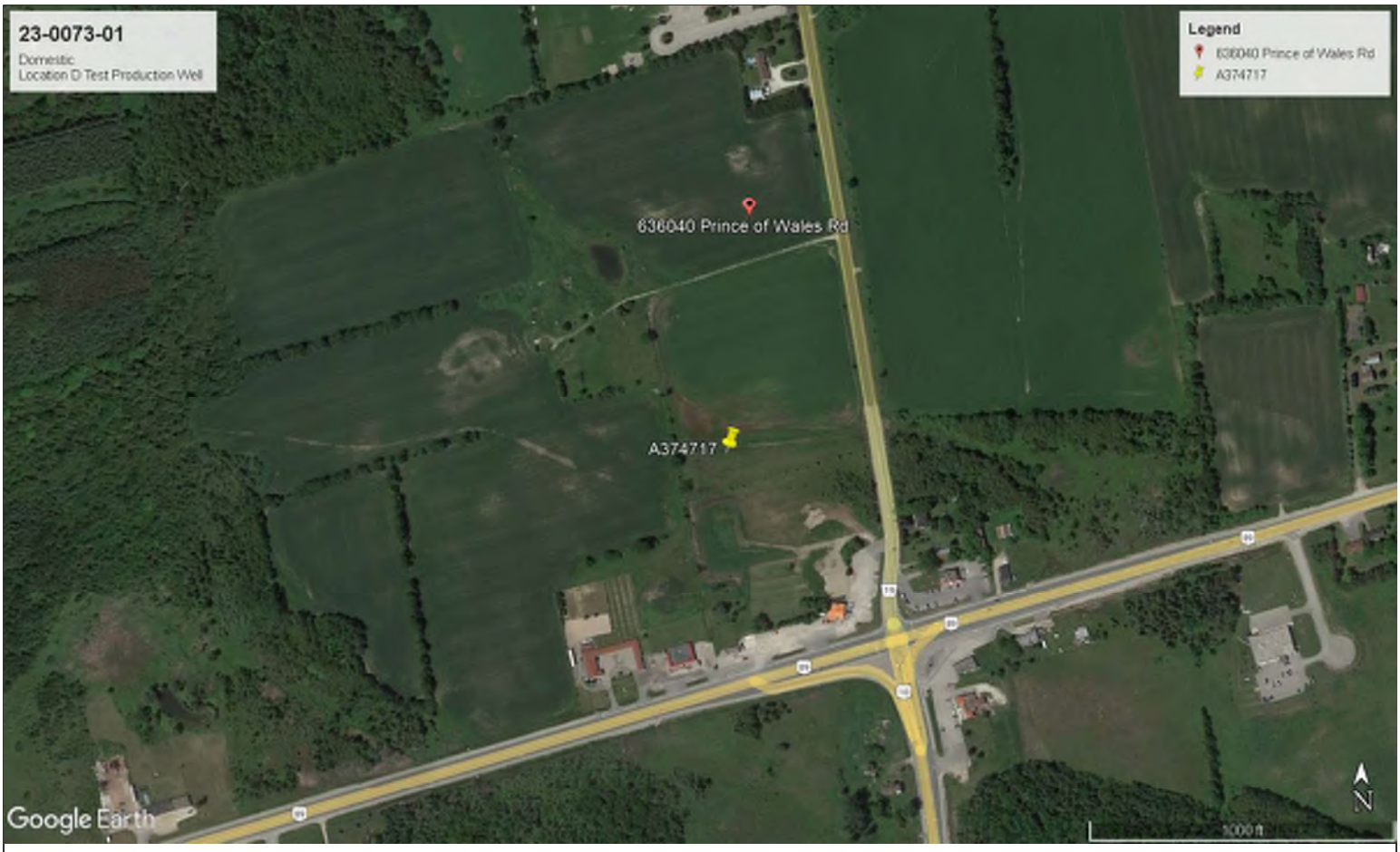
☐ Clear and sand free ☐ Other (specify)

Pump intake set at (ft)	Pumping rate (GPM)	Duration of pumping hrs + min	Final water level end of pumping (ft)	Disinfected? *
				☐ Yes ☑ No

Recommended pump depth (ft)	Recommended pump rate (GPM)	Well production (GPM)

13. Map of Well Location *

Map 1. Please Click the map area below to import an image file to use as the map. ☑ Make map area bigger



14. Information

Well owner's information package delivered	Date Package Delivered (yyyy/mm/dd)	Date Work Completed (yyyy/mm/dd) *
☐ Yes ☐ No		2023/06/26

Comments
Section 3, Overburden and Bedrock Materials further details:
(17-20') Most Common Material: sandy silt.
(20-48') General Description: very loose/broken rock at 24.5' and 27'.
Section 9, Construction Record - Screen further details:
Material: PVC slotted.
Section 12, Results of Well Yield Testing: Pump Testing to be conducted by WSP.

15. Well Contractor and Well Technician Information

Business Name of Well Contractor *	Well Contractor's License Number *
Aardvark Drilling Inc.	7675

Business Address

Unit Number	Street Number	Street Name *
C	25	Lewis Road

City/Town/Village *	Province	Postal Code *
Guelph	ON	N1H 1E9

Business Telephone Number	Business Email Address
519-826-9340	info@aardvarkdrillinginc.com

Last Name of Well Technician *	First Name of Well Technician *	Well Technician's License Number *
Grant	Donald	3311

16. Declaration *

☑ I hereby confirm that I am the person who constructed the well and I hereby confirm that the information on the form is correct and accurate.

Last Name	First Name	Email Address
England	Matthew	mengland@aardvarkdrillinginc.com

Signature	Date Submitted (yyyy/mm/dd)
Matt England Digitally signed by Matt England Date: 2023.07.05 11:17:11 -04'00'	2023/07/05

17. Ministry Use Only

Audit Number

PV5N EZTR

General Instructions and Explanations for completing a Well Record

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Examples of General Descriptions are Loose, Cemented, Previously Dug or Bored, Porous, Layered, Previously Drilled, Dense, Soft, Wood Fragments, Packed, Hard.

Abandonment

To report abandonment of a well, check off the applicable box in Type on the top of the form. Details of abandonment must be recorded in the Abandonment and Sealing Section. Additional comments may be entered in the comments box under the Information section.

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Record all material placed in the annular space around the single casing or around the permanent outer casing. If the well is a telescoped well [i.e., a well with an outer casing and inner casing(s)] or if the well is a multi-level nested test hole, report the depth from, depth to, material and volume placed for the annular space between two different sized casings or between the inner casing(s) and the side of the well in the “Comments” area of this electronic well record form.

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If the equipment used to construct the well is not on the list, check “Other (specify)” and record the type of equipment, check each equipment that applies.

Well Use

If the well’s use is not provided on the list, check “Other (specify)” and record the use of the well. If the well has multiple uses, check each use that applies.

Status of Well

If the well’s status is not provided on the list, check “Other (specify)” and record the use of the well. If the well has multiple statuses, check each use that applies.

Construction Record – Casing and Open Hole

Use negative values to report the top of casing above ground surface. For example, if the top of the casing is 0.4 metres above the ground surface and the bottom of the casing 6.0 metres below the ground surface, record the casing “Depth From” as -0.4.

If the top of casing is located below the ground surface (e.g., if a test hole is constructed and the top of casing is located below the ground surface in a flush mounted well vault), report the top of the casing from below ground surface. For example, if the top of the casing is 0.1 metres below the ground surface and the bottom of the casing is 6 metres below the ground surface, record the casing “Depth From” as 0.1.

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- if groundwater was located, record the depth from the ground surface to the location of the groundwater resource, and
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In the “Results of Well Yield Testing” section of the well record form, record:

- the depth to the intake of the pump,
- the rate of pumping and duration of pumping period during the yield test,
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Map of Well Location

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- a scale on the map, and
- where available, the name of the structure, street or surface water body nearest to the well.

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Click the validate button. If there is no missing information, you will be asked to enter the well tag again to make sure the well tag is entered correctly (only enter the numeric portion of the tag number). The audit number will then be changed from “**incomplete**” to an assigned audit number. The signature field will then be available. Click on “signature” to enter the well technician’s electronic signature. For instructions on how to create an electronic signature, please visit the Adobe Digital IDs website using the following link: https://helpx.adobe.com/acrobat/using/digital-ids.html

Ontario

Ministry of the Environment, Conservation and Parks

Well Record - Regulation 903

Ontario Water Resources Act

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Fields marked with an asterisk (*) are mandatory.

Well Tag Number *
A 366420

Type *

☑ Construction ☐ Abandonment

Measurement recorded in: *

☐ Metric ☑ Imperial

1. Well Owner's Information

Last Name and First Name, or Organization is mandatory. *

Last Name	First Name

Organization	Email Address
Deltini Commercial Developments Inc.	

Current Address

Unit Number	Street Number *	Street Name *	City/Town/Village
	1350	Shawson Drive	Mississauga

Country	Province	Postal Code	Telephone Number
Canada	Ontario	L4W 1C5	212-794-9844

2. Well Location

Address of Well Location

Unit Number	Street Number *	Street Name *	Township
	636040	Prince of Wales Road	Mulmur

Lot	Concession	County/District/Municipality
		Dufferin

City/Town	Province	Postal Code
Shelburne	Ontario	L0N 1S0

UTM Coordinates	Zone *	Easting *	Northing *		Municipal Plan and Sublot Number
NAD 83	17	568486	4882402	Test UTM in Map	

Other
Location E Test Production Well

3. Overburden and Bedrock Material *

Well Depth * 50 (ft)

General Colour	Most Common Material	Other Materials	General Description	Depth From	Depth To

				(ft)	(ft)
Brown	Clay	Silt		0	3
Brown	Sand	Fine Gravel		3	15
Brown	Silt			15	20
Brown	Sand	Fine Gravel		20	33
Brown	Silt	Stones	Dense	33	35.5
White	Limestone			35.5	50

4. Annular Space *

Depth From (ft)	Depth To (ft)	Type of Sealant Used (Material and Type)	Volume Placed (cubic feet)
0	38	Portland Cement	33.17

5. Method of Construction *

- [ ] Cable Tool
- [ ] Rotary (Conventional)
- [ ] Rotary (Reverse)
- [x] Boring
- [x] Air percussion
- [ ] Diamond
- [ ] Jetting
- [ ] Driving
- [ ] Digging
- [ ] Rotary (Air)
- [ ] Augering
- [ ] Direct Push
- [ ] Other (specify) _____

6. Well Use *

- [ ] Public
- [ ] Industrial
- [ ] Cooling & Air Conditioning
- [x] Domestic
- [ ] Commercial
- [ ] Not Used
- [ ] Livestock
- [ ] Municipal
- [ ] Monitoring
- [ ] Irrigation
- [x] Test Hole
- [ ] Dewatering
- [ ] Other (specify) _____

7. Status of Well *

- [x] Water Supply
- [ ] Replacement Well
- [x] 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) _____

8. Construction Record - Casing * (use negative number(s) to indicate depth above ground surface)

Inside Diameter (in)	Open Hole **or** Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness	Depth From (ft)	Depth To (ft)
6	Steel	0.188	-2.5	38
4	Plastic	0.25	0	50

9. Construction Record - Screen

Outside Diameter (in)	Material (Plastic, Galvanized, Steel)	Slot Number	Depth From (ft)	Depth To (ft)
4.5	Plastic		30	50

10. Water Details

Water found at Depth 15 (ft)	☐ Gas	Kind of water	☐ Fresh	☑ Untested	☐ Other		
Water found at Depth 40	☐ Gas	Kind of water	☐ Fresh	☑ Untested	☐ Other		

11. Hole Diameter

Depth From (ft)	Depth To (ft)	Diameter (in)
0	38	14
38	50	6

12. Results of Well Yield Testing

☐ Pumping Discontinued

Explain _____

If flowing give rate

☐ Flowing _____ (GPM)

Draw down

Time (min)	Static Level	1	2	3	4	5	10	15	20	25	30	40	50	60
Water Level (ft)														

Recovery

Time (min)	1	2	3	4	5	10	15	20	25	30	40	50	60
Water Level (ft)													

After test of well yield, water was

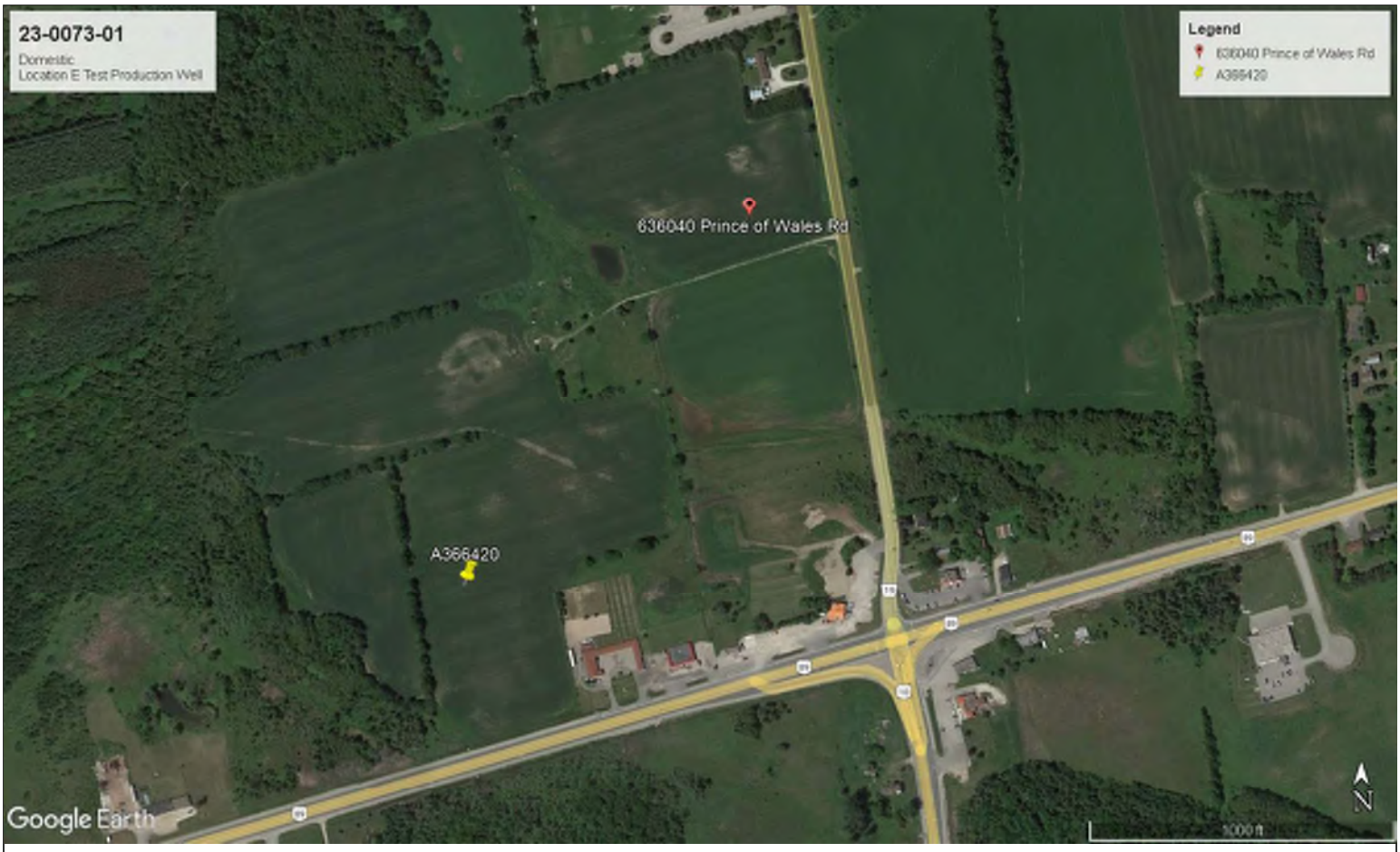
☐ Clear and sand free ☐ Other (specify)

Pump intake set at (ft)	Pumping rate (GPM)	Duration of pumping hrs + min	Final water level end of pumping (ft)	Disinfected? *
				☐ Yes ☑ No

Recommended pump depth (ft)	Recommended pump rate (GPM)	Well production (GPM)

13. Map of Well Location *

Map 1. Please Click the map area below to import an image file to use as the map. ☑ Make map area bigger



14. Information

Well owner's information package delivered	Date Package Delivered (yyyy/mm/dd)	Date Work Completed (yyyy/mm/dd) *
☐ Yes ☐ No		2023/06/26

Comments

Section 3, Overburden and Bedrock Materials further details:
(3-15') Other Materials: some stone/fine gravel.
(20-33') Most Common Material: sand (fine/medium).
(33-35.5') Most Common Material: sandy silt.
(35.5-50') General Description: very broken rock with some gravel at 40'.
Section 9, Construction Record - Screen further details:
Material: PVC slotted.
Section 12: Results of Well Yield Testing further details: Pump Testing to be conducted by WSP.

15. Well Contractor and Well Technician Information

Business Name of Well Contractor *	Well Contractor's License Number *
Aardvark Drilling Inc.	7675

Business Address

Unit Number	Street Number	Street Name *
C	25	Lewis Road

City/Town/Village *	Province	Postal Code *
Guelph	ON	N1H 1E9

Business Telephone Number	Business Email Address
519-826-9340	info@aardvarkdrillinginc.com

Last Name of Well Technician *	First Name of Well Technician *	Well Technician's License Number *
Grant	Donald	3311

16. Declaration *

☑ I hereby confirm that I am the person who constructed the well and I hereby confirm that the information on the form is correct and accurate.

Last Name	First Name	Email Address
England	Matthew	mengland@aardvarkdrillinginc.com

Signature	Date Submitted (yyyy/mm/dd)
Matt England Digitally signed by Matt England Date: 2023.07.05 11:13:36 -04'00'	2023/07/05

17. Ministry Use Only

Audit Number

Y72F 2XJS

General Instructions and Explanations for completing a Well Record

A completed electronic Well Record Form must be delivered to the well purchaser and the owner of the land on which the well is situated within 14 days after the date on which the well's structural stage is complete. The electronic Well Record must also be forwarded within 30 days after the date on which the well's structural stage is complete to the ministry through email to the following email address: WellRecordSubmission@ontario.ca

False and Misleading Information

Subsection 98(2) of the *Ontario Water Resources Act*, R.S.O. 1990 c. O. 40, states that:

"No person shall orally, in writing or electronically, give or submit false or misleading information in any statement, document or data, to any provincial officer, the Minister, the Ministry or the Agency, any employee in or agent of the Ministry or the Agency, or any person involved in carrying out a program of the Ministry or the Agency in respect of any matter related to this Act or the regulations."

Further, subsection 98(3) of the Act states that:

"No person shall include false or misleading information in any document or data required to be created, stored or submitted under this Act."

Measurements

All measurements must be recorded in the specified unit, metric or imperial by checking off the applicable box on the top of the form. You must use the checked unit consistently throughout the well record. Measurements must be reported to 1/10th of a metre if the unit is a metre. All measurements of depth must be referenced to ground surface.

Well Owner's Information

A "well owner" means the owner of land upon which a well is situated and includes a tenant or lessee of the land and a well purchaser. If the "well owner" is an individual, record the owner's last name and first name or if the "well owner" is a business, government or other organization, record the name in the "organization" area.

Well Location

Street Number/Name and City/town/Village must be provided, if available.

Geographic Township, Concession and Lot must be reported if the well is located in an area where such information exists.

UTM Coordinates must be recorded each time a Well Record is completed. Click the button [Test UTM in Map] to use the UTM Coordinates to plot the location to Google map. This allows verification of the UTM Coordinates. This will also automatically populate the County/District.

Municipal Plan and Sublet Number may be provided, if available.

Overburden and Bedrock Materials

For each formation encountered during construction, choose words from the lists that best describe the formation on the basis of general colour, most common material, other materials, and general description of the formation.

General Colours are White, Yellow, Grey, Brown, Blue, Red, Green and Black.

Examples of Materials are: Fill, Silt, Top Soil, Coarse Sand, Slate, Muck, Gravel, Limestone, Dolomite, Quartzite, Peat, Stones, Fine Sand, Shale, Granite, Clay, Boulders, Medium Sand, Sandstone, and Greenstone.

Some definitions are as follows:

- Clay: Composed of very fine particles. Forms dense hard lumps or clods when dry and a very elastic putty-like mass when wet. It can be rolled between fingers to form a long, flexible ribbon.
- Silt: Grain size, midway between sand and clay. It may form clods which, when broken, feel soft and floury. When moist, it will form a cast that can be handled freely without breaking. Rolled between thumb and finger, it will not "ribbon" but will give a broken appearance.

- Sand: Grains are loose and granular and may be seen and felt readily. Squeezed in the hand when dry, it falls apart when the pressure is released. Squeezed when moist, it will form a cast that will crumble when touched. Should be listed as fine sand, medium sand or coarse sand.
- Gravel: Rock fragments greater than 0.3 cm in diameter.

Examples of General Descriptions are Loose, Cemented, Previously Dug or Bored, Porous, Layered, Previously Drilled, Dense, Soft, Wood Fragments, Packed, Hard.

Abandonment

To report abandonment of a well, check off the applicable box in Type on the top of the form. Details of abandonment must be recorded in the Abandonment and Sealing Section. Additional comments may be entered in the comments box under the Information section.

Annular Space

Record all material placed in the annular space around the single casing or around the permanent outer casing. If the well is a telescoped well [i.e., a well with an outer casing and inner casing(s)] or if the well is a multi-level nested test hole, report the depth from, depth to, material and volume placed for the annular space between two different sized casings or between the inner casing(s) and the side of the well in the “Comments” area of this electronic well record form.

Method of Construction

If the equipment used to construct the well is not on the list, check “Other (specify)” and record the type of equipment, check each equipment that applies.

Well Use

If the well’s use is not provided on the list, check “Other (specify)” and record the use of the well. If the well has multiple uses, check each use that applies.

Status of Well

If the well’s status is not provided on the list, check “Other (specify)” and record the use of the well. If the well has multiple statuses, check each use that applies.

Construction Record – Casing and Open Hole

Use negative values to report the top of casing above ground surface. For example, if the top of the casing is 0.4 metres above the ground surface and the bottom of the casing 6.0 metres below the ground surface, record the casing “Depth From” as -0.4.

If the top of casing is located below the ground surface (e.g., if a test hole is constructed and the top of casing is located below the ground surface in a flush mounted well vault), report the top of the casing from below ground surface. For example, if the top of the casing is 0.1 metres below the ground surface and the bottom of the casing is 6 metres below the ground surface, record the casing “Depth From” as 0.1.

Note: If a drive shoe is used, the shoe is considered casing and it must be reported if the shoe has a different inside diameter thickness.

If a portion of the well was created an open hole, record the location of the open hole on a separate row, including the diameter and the depth (top and bottom of open hole) from the ground surface.

Construction Record – Well Screen

A “well screen” means perforated pipe or tubing, unsealed concrete tiles or other material installed in a well to filter out particulate matter and form the water intake zone. Therefore, the length of a well screen includes any slotted or perforated area and unsealed area of pipe or tiles.

Water Details

- if groundwater was located, record the depth from the ground surface to the location of the groundwater resource, and
- record if the groundwater quality is “Untested,” “Fresh” (i.e., not salty), or “Other (specify).” If “Other (specify)” is recorded, use the “Other (specify)” dropdown list toselect the type of groundwater (e.g., salty, blackish water, yellowish water, mineralized, etc.).

Check off “Gas” if natural gas was encountered during well construction.

Note: Natural gas encounters need to be immediately reported to the ministry at 1-800-268-6060, well purchaser and the owner of the land.

Results of Well Yield Testing

Check off “Pumping Discontinued” if pumping was discontinued before 1 hour of continuous pumping. Explain the reason why pumping was discontinued or in some cases not performed (e.g., the well went dry, impossible to install pump in small diameter well, static water level from test hole or dewatering well was obtained and is reported instead of completing a yield test etc.).

Note: Equipment breakdown is not an acceptable reason for checking off “Pumping Discontinued” on the well record form. If groundwater in the well is flowing out of the well, provide the rate of flow, and check off “Flowing Well” (i.e., static water level above the ground surface).

In the “Results of Well Yield Testing” section of the well record form, record:

- the depth to the intake of the pump,
- the rate of pumping and duration of pumping period during the yield test,
- the final water level when pumping stops,
- water level measurements made during pumping (drawdown) and recovery. All water level measurements must be referenced from below the ground surface for each time interval specified in the drawdown and recovery boxes.

If the water level measurements remain the same over a period of time, continue to measure and report the same water level measurement for the remaining pumping or recovery time intervals.

If pumping continuously for at least 1 hour, but the design of the well does not allow for water level measurements (e.g., driven point well), the person constructing the well is not required to report drawdown or recovery water level measurements.

Map of Well Location

In the “Map of Well Location” section of the well record form, click the map area to attach a map of the well location. The map must show sufficient information to locate the well, including:

- a mark on the map showing the well,
- a scale on the map, and
- where available, the name of the structure, street or surface water body nearest to the well.

Note: More than one map can be added to the well record form by clicking on “Add Map (+)” to add an additional map.

Information

Record any additional information (e.g., observations, tests, additional licensed well technicians who worked on the well, additional annular space details for a telescoped well or a multi-level nested test hole, reasons for not providing a well owner information package) in the comments area.

Declaration

Check the declaration statement to confirm that the person constructing the well agrees with the following statement: “I hereby confirm that I am the person who constructed the well and I hereby confirm that the information on the form is correct and accurate”.

Validate

Click the validate button. If there is no missing information, you will be asked to enter the well tag again to make sure the well tag is entered correctly (only enter the numeric portion of the tag number). The audit number will then be changed from “**incomplete**” to an assigned audit number. The signature field will then be available. Click on “signature” to enter the well technician’s electronic signature. For instructions on how to create an electronic signature, please visit the Adobe Digital IDs website using the following link: https://helpx.adobe.com/acrobat/using/digital-ids.html

Notice of Collection of Personal Information

Personal information contained on this form is collected pursuant to sections 35-50 and 75(2) of the *Ontario Water Resources Act* and section 16.3 of the Wells Regulation. This information will be used for the purpose of maintaining a public record of wells in Ontario. This form and the information contained on the form will be stored in the Ministry's well record database and made publicly available. Questions about this collection should be directed to the Water Well Customer Service Representative at the Wells Help Desk, 125 Resources Road, Toronto Ontario M9P 3V6, at 1-888-396-9355 or wellshelpdesk@ontario.ca.

Fields marked with an asterisk (*) are mandatory.

Well Tag Number *
A 382398

Type *

☑ Construction ☐ Abandonment

Measurement recorded in: *

☐ Metric ☑ Imperial

1. Well Owner's Information

Last Name and First Name, or Organization is mandatory. *

Last Name	First Name
Organization	**Email Address**
Deltini Commercial Developments Inc.	

Current Address

Unit Number	Street Number *	Street Name *	City/Town/Village		
	1350	Shawson Drive	Mississauga		
Country	**Province**		**Postal Code**	**Telephone Number**	
Canada	Ontario		L4W 1C5	212-794-9844	

2. Well Location

Address of Well Location

Unit Number	Street Number *	Street Name *	Township		
	636040	Prince of Wales Road	Mulmur		
Lot	**Concession**		**County/District/Municipality**		
			Dufferin		
City/Town			**Province**	**Postal Code**	
Primrose			Ontario	L0N 1S0	

UTM Coordinates	Zone *	Easting *	Northing *		Municipal Plan and Sublot Number
NAD 83	17	568593	4882861	Test UTM in Map	

Other
Test Well F.

3. Overburden and Bedrock Material *

Well Depth * 170 (ft)

General Colour	Most Common Material	Other Materials	General Description	Depth From	Depth To

				(ft)	(ft)
Brown	Topsoil			0	1
Brown	Clay	Sand		1	10
Brown	Sand	Gravel		10	12
	Boulders			12	15
Brown	Limestone		Light-Coloured	15	46
Blue	Shale			46	58
Brown	Limestone			58	62
Blue	Shale			62	75
Brown	Limestone			75	76
Blue	Shale			76	94
Grey	Limestone			94	120
Brown	Limestone			120	130
Grey	Limestone			130	136
Grey	Sandstone		Light-Coloured	136	140
Blue	Shale			140	142
Grey	Sandstone		Light-Coloured	142	144
Blue	Shale			144	150
Red	Shale			150	170

4. Annular Space *

Depth From (ft)	Depth To (ft)	Type of Sealant Used (Material and Type)	Volume Placed (cubic feet)
0	21	Bentonite Grout and Holeplug	7.31

5. Method of Construction *

- [ ] Cable Tool
- [ ] Rotary (Conventional)
- [ ] Rotary (Reverse)
- [ ] Boring
- [ ] Air percussion
- [ ] Diamond
- [ ] Jetting
- [ ] Driving
- [ ] Digging
- [ ] Rotary (Air)
- [ ] Augering
- [ ] Direct Push
- [x] Other (specify) DR

6. Well Use *

- [ ] Public
- [ ] Industrial
- [ ] Cooling & Air Conditioning
- [ ] Domestic
- [ ] Commercial
- [ ] Not Used
- [ ] Livestock
- [ ] Municipal
- [ ] Monitoring
- [ ] Irrigation
- [x] Test Hole
- [ ] Dewatering
- [ ] Other (specify)

7. Status of Well *

- [ ] Water Supply
- [ ] Replacement Well
- [x] 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) _____

8. Construction Record - Casing * (use negative number(s) to indicate depth above ground surface)

Inside Diameter (in)	Open Hole **or** Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness	Depth From (ft)	Depth To (ft)
6	Steel	0.188	-2	22
4	Plastic	0.237	20	170

9. Construction Record - Screen

Outside Diameter (in)	Material (Plastic, Galvanized, Steel)	Slot Number	Depth From (ft)	Depth To (ft)

10. Water Details

Water found at Depth (ft) ☐ Gas Kind of water ☐ Fresh ☐ Untested ☐ Other

11. Hole Diameter

Depth From (ft)	Depth To (ft)	Diameter (in)
0	21	10
21	22	6.63
22	170	6

12. Results of Well Yield Testing

- [ ] Pumping Discontinued

Explain _____

If flowing give rate

- [ ] Flowing _____ (GPM)

Draw down

Time (min)	Static Level	1	2	3	4	5	10	15	20	25	30	40	50	60
Water Level (ft)														

Recovery

Time (min)	1	2	3	4	5	10	15	20	25	30	40	50	60
Water Level (ft)													

After test of well yield, water was

☐ Clear and sand free ☐ Other (specify)

Pump intake set at (ft)	Pumping rate (GPM)	Duration of pumping hrs + min	Final water level end of pumping (ft)	Disinfected? *
				☐ Yes ☑ No

Recommended pump depth (ft)	Recommended pump rate (GPM)	Well production (GPM)

13. Map of Well Location *

Map 1. Please Click the map area below to import an image file to use as the map. ☑ Make map area bigger

14. Information

Well owner's information package delivered	Date Package Delivered (yyyy/mm/dd)	Date Work Completed (yyyy/mm/dd) *
☐ Yes ☐ No		2024/02/05

Comments

Section 3, Overburden and Bedrock Materials further details:
(1-10') Other Materials: sand, gravel.
(10-12') Other Materials: gravel, clay.

Section 8, Construction Record - Casing further details:
4" Plastic: Schedule 40 PVC 4" Perforated Liner.

Section 12, Results of Well Yield Testing: Pump Testing to be conducted by WSP.

15. Well Contractor and Well Technician Information

Business Name of Well Contractor *	Well Contractor's License Number *
Aardvark Drilling Inc.	7675

Business Address

Unit Number	Street Number	Street Name *
C	25	Lewis Road

City/Town/Village *	Province	Postal Code *
Guelph	ON	N1H 1E9

Business Telephone Number	Business Email Address
519-826-9340	info@aardvarkdrillinginc.com

Last Name of Well Technician *	First Name of Well Technician *	Well Technician's License Number *
Turner	Jason	4636

16. Declaration *

☑ I hereby confirm that I am the person who constructed the well and I hereby confirm that the information on the form is correct and accurate.

Last Name	First Name	Email Address
England	Matthew	mengland@aardvarkdrillinginc.com

Signature	Date Submitted (yyyy/mm/dd)
Matt England Digitally signed by Matt England Date: 2024.02.28 10:33:25 -05'00'	2024/02/28

17. Ministry Use Only

Audit Number

TITC 7A8Z

General Instructions and Explanations for completing a Well Record

A completed electronic Well Record Form must be delivered to the well purchaser and the owner of the land on which the well is situated within 14 days after the date on which the well's structural stage is complete. The electronic Well Record must also be forwarded within 30 days after the date on which the well's structural stage is complete to the ministry through email to the following email address: WellRecordSubmission@ontario.ca

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Measurements

All measurements must be recorded in the specified unit, metric or imperial by checking off the applicable box on the top of the form. You must use the checked unit consistently throughout the well record. Measurements must be reported to 1/10th of a metre if the unit is a metre. All measurements of depth must be referenced to ground surface.

Well Owner's Information

A "well owner" means the owner of land upon which a well is situated and includes a tenant or lessee of the land and a well purchaser. If the "well owner" is an individual, record the owner's last name and first name or if the "well owner" is a business, government or other organization, record the name in the "organization" area.

Well Location

Street Number/Name and City/town/Village must be provided, if available.

Geographic Township, Concession and Lot must be reported if the well is located in an area where such information exists.

UTM Coordinates must be recorded each time a Well Record is completed. Click the button [Test UTM in Map] to use the UTM Coordinates to plot the location to Google map. This allows verification of the UTM Coordinates. This will also automatically populate the County/District.

Municipal Plan and Sublet Number may be provided, if available.

Overburden and Bedrock Materials

For each formation encountered during construction, choose words from the lists that best describe the formation on the basis of general colour, most common material, other materials, and general description of the formation.

General Colours are White, Yellow, Grey, Brown, Blue, Red, Green and Black.

Examples of Materials are: Fill, Silt, Top Soil, Coarse Sand, Slate, Muck, Gravel, Limestone, Dolomite, Quartzite, Peat, Stones, Fine Sand, Shale, Granite, Clay, Boulders, Medium Sand, Sandstone, and Greenstone.

Some definitions are as follows:

- Clay: Composed of very fine particles. Forms dense hard lumps or clods when dry and a very elastic putty-like mass when wet. It can be rolled between fingers to form a long, flexible ribbon.
- Silt: Grain size, midway between sand and clay. It may form clods which, when broken, feel soft and floury. When moist, it will form a cast that can be handled freely without breaking. Rolled between thumb and finger, it will not "ribbon" but will give a broken appearance.

- Sand: Grains are loose and granular and may be seen and felt readily. Squeezed in the hand when dry, it falls apart when the pressure is released. Squeezed when moist, it will form a cast that will crumble when touched. Should be listed as fine sand, medium sand or coarse sand.
- Gravel: Rock fragments greater than 0.3 cm in diameter.

Examples of General Descriptions are Loose, Cemented, Previously Dug or Bored, Porous, Layered, Previously Drilled, Dense, Soft, Wood Fragments, Packed, Hard.

Abandonment

To report abandonment of a well, check off the applicable box in Type on the top of the form. Details of abandonment must be recorded in the Abandonment and Sealing Section. Additional comments may be entered in the comments box under the Information section.

Annular Space

Record all material placed in the annular space around the single casing or around the permanent outer casing. If the well is a telescoped well [i.e., a well with an outer casing and inner casing(s)] or if the well is a multi-level nested test hole, report the depth from, depth to, material and volume placed for the annular space between two different sized casings or between the inner casing(s) and the side of the well in the “Comments” area of this electronic well record form.

Method of Construction

If the equipment used to construct the well is not on the list, check “Other (specify)” and record the type of equipment, check each equipment that applies.

Well Use

If the well’s use is not provided on the list, check “Other (specify)” and record the use of the well. If the well has multiple uses, check each use that applies.

Status of Well

If the well’s status is not provided on the list, check “Other (specify)” and record the use of the well. If the well has multiple statuses, check each use that applies.

Construction Record – Casing and Open Hole

Use negative values to report the top of casing above ground surface. For example, if the top of the casing is 0.4 metres above the ground surface and the bottom of the casing 6.0 metres below the ground surface, record the casing “Depth From” as -0.4.

If the top of casing is located below the ground surface (e.g., if a test hole is constructed and the top of casing is located below the ground surface in a flush mounted well vault), report the top of the casing from below ground surface. For example, if the top of the casing is 0.1 metres below the ground surface and the bottom of the casing is 6 metres below the ground surface, record the casing “Depth From” as 0.1.

Note: If a drive shoe is used, the shoe is considered casing and it must be reported if the shoe has a different inside diameter thickness.

If a portion of the well was created an open hole, record the location of the open hole on a separate row, including the diameter and the depth (top and bottom of open hole) from the ground surface.

Construction Record – Well Screen

A “well screen” means perforated pipe or tubing, unsealed concrete tiles or other material installed in a well to filter out particulate matter and form the water intake zone. Therefore, the length of a well screen includes any slotted or perforated area and unsealed area of pipe or tiles.

Water Details

- if groundwater was located, record the depth from the ground surface to the location of the groundwater resource, and
- record if the groundwater quality is “Untested,” “Fresh” (i.e., not salty), or “Other (specify).” If “Other (specify)” is recorded, use the “Other (specify)” dropdown list toselect the type of groundwater (e.g., salty, blackish water, yellowish water, mineralized, etc.).

Check off “Gas” if natural gas was encountered during well construction.

Note: Natural gas encounters need to be immediately reported to the ministry at 1-800-268-6060, well purchaser and the owner of the land.

Results of Well Yield Testing

Check off “Pumping Discontinued” if pumping was discontinued before 1 hour of continuous pumping. Explain the reason why pumping was discontinued or in some cases not performed (e.g., the well went dry, impossible to install pump in small diameter well, static water level from test hole or dewatering well was obtained and is reported instead of completing a yield test etc.).

Note: Equipment breakdown is not an acceptable reason for checking off “Pumping Discontinued” on the well record form. If groundwater in the well is flowing out of the well, provide the rate of flow, and check off “Flowing Well” (i.e., static water level above the ground surface).

In the “Results of Well Yield Testing” section of the well record form, record:

- the depth to the intake of the pump,
- the rate of pumping and duration of pumping period during the yield test,
- the final water level when pumping stops,
- water level measurements made during pumping (drawdown) and recovery. All water level measurements must be referenced from below the ground surface for each time interval specified in the drawdown and recovery boxes.

If the water level measurements remain the same over a period of time, continue to measure and report the same water level measurement for the remaining pumping or recovery time intervals.

If pumping continuously for at least 1 hour, but the design of the well does not allow for water level measurements (e.g., driven point well), the person constructing the well is not required to report drawdown or recovery water level measurements.

Map of Well Location

In the “Map of Well Location” section of the well record form, click the map area to attach a map of the well location. The map must show sufficient information to locate the well, including:

- a mark on the map showing the well,
- a scale on the map, and
- where available, the name of the structure, street or surface water body nearest to the well.

Note: More than one map can be added to the well record form by clicking on “Add Map (+)” to add an additional map.

Information

Record any additional information (e.g., observations, tests, additional licensed well technicians who worked on the well, additional annular space details for a telescoped well or a multi-level nested test hole, reasons for not providing a well owner information package) in the comments area.

Declaration

Check the declaration statement to confirm that the person constructing the well agrees with the following statement: “I hereby confirm that I am the person who constructed the well and I hereby confirm that the information on the form is correct and accurate”.

Validate

Click the validate button. If there is no missing information, you will be asked to enter the well tag again to make sure the well tag is entered correctly (only enter the numeric portion of the tag number). The audit number will then be changed from “**incomplete**” to an assigned audit number. The signature field will then be available. Click on “signature” to enter the well technician’s electronic signature. For instructions on how to create an electronic signature, please visit the Adobe Digital IDs website using the following link: https://helpx.adobe.com/acrobat/using/digital-ids.html

Notice of Collection of Personal Information

Personal information contained on this form is collected pursuant to sections 35-50 and 75(2) of the *Ontario Water Resources Act* and section 16.3 of the Wells Regulation. This information will be used for the purpose of maintaining a public record of wells in Ontario. This form and the information contained on the form will be stored in the Ministry's well record database and made publicly available. Questions about this collection should be directed to the Water Well Customer Service Representative at the Wells Help Desk, 125 Resources Road, Toronto Ontario M9P 3V6, at 1-888-396-9355 or wellshelpdesk@ontario.ca.

Fields marked with an asterisk (*) are mandatory.

Well Tag Number *
A 382400

Type *

☑ Construction ☐ Abandonment

Measurement recorded in: *

☐ Metric ☑ Imperial

1. Well Owner's Information

Last Name and First Name, or Organization is mandatory. *

Last Name	First Name

Organization	Email Address
Deltini Commercial Developments Inc.	

Current Address

Unit Number	Street Number *	Street Name *	City/Town/Village
	1350	Shawson Drive	Mississauga

Country	Province	Postal Code	Telephone Number
Canada	Ontario	L4W 1C5	212-794-9844

2. Well Location

Address of Well Location

Unit Number	Street Number *	Street Name *	Township
	636040	Prince of Wales Road	Mulmur

Lot	Concession	County/District/Municipality
		Dufferin

City/Town	Province	Postal Code
Primrose	Ontario	L0N 1S0

UTM Coordinates	Zone *	Easting *	Northing *		Municipal Plan and Sublot Number
NAD 83	17	568539	4882674	Test UTM in Map	

Other
Test Well G.

3. Overburden and Bedrock Material *

Well Depth * 200 (ft)

General Colour	Most Common Material	Other Materials	General Description	Depth From	Depth To

				(ft)	(ft)
Brown	Topsoil			0	1
Brown	Sand	Gravel		1	22
Brown	Sand	Gravel		22	30
Brown	Limestone		Light-Coloured	30	61
Blue	Shale			61	73
Brown	Limestone			73	75
Blue	Shale			75	115
Grey	Limestone			115	147
Grey	Sandstone			147	159
Blue	Shale			159	163
Red	Shale			163	200

4. Annular Space *

Depth From (ft)	Depth To (ft)	Type of Sealant Used (Material and Type)	Volume Placed (cubic feet)
0	22	Bentonite Grout and Holeplug	7.66

5. Method of Construction *

☐ Cable Tool ☐ Rotary (Conventional) ☐ Rotary (Reverse) ☐ Boring ☐ Air percussion ☐ Diamond
☐ Jetting ☐ Driving ☐ Digging ☐ Rotary (Air) ☐ Augering ☐ Direct Push
☑ Other (specify) DR

6. Well Use *

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

7. 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)

8. Construction Record - Casing * (use negative number(s) to indicate depth above ground surface)

Inside Diameter (in)	Open Hole **or** Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness	Depth From (ft)	Depth To (ft)
6	Steel	0.188	-2	34
4	Plastic	0.237	20	200

9. Construction Record - Screen

Outside Diameter (in)	Material (Plastic, Galvanized, Steel)	Slot Number	Depth From (ft)	Depth To (ft)

10. Water Details

Water found at Depth (ft) ☐ Gas Kind of water ☐ Fresh ☐ Untested ☐ Other

11. Hole Diameter

Depth From (ft)	Depth To (ft)	Diameter (in)
0	22	10
22	34	6.63
34	200	6

12. Results of Well Yield Testing

☐ Pumping Discontinued

Explain

If flowing give rate

☐ Flowing (GPM)

Draw down

Time (min)	Static Level	1	2	3	4	5	10	15	20	25	30	40	50	60
Water Level (ft)	89.27	93.47	95.41	97.34	99.28	101.15	110.04	118.57	124.97	129.76	132.97	136.94	139.07	140.52

Recovery

Time (min)	1	2	3	4	5	10	15	20	25	30	40	50	60
Water Level (ft)	138.29	136.29	134.32	132.55	130.91	124.34	120.6	118.34	116.83	115.75	114.5	113.81	113.32

After test of well yield, water was

☐ Clear and sand free ☑ Other (specify) Cloudy, more development required.

Pump intake set at	Pumping rate	Duration of pumping	Final water level end of pumping	Disinfected? *
187.14 (ft)	3 (GPM)	1 hrs + min	140.52 (ft)	☐ Yes ☑ No

Recommended pump depth	Recommended pump rate	Well production
(ft)	(GPM)	(GPM)

13. Map of Well Location *

Map 1. Please Click the map area below to import an image file to use as the map. ☑ Make map area bigger

14. Information

Well owner's information package delivered	Date Package Delivered (yyyy/mm/dd)	Date Work Completed (yyyy/mm/dd) *
☐ Yes ☐ No		2024/02/13

Comments

Section 3, Overburden and Bedrock Materials further details:
(1-22') Other Materials: gravel, clay.

Section 8, Construction Record - Casing further details:
4" Plastic: Schedule 40 PVC 4" Perforated Liner.

Section 12, Results of Well Yield Testing further details: Preliminary Pump Test results from February 1 recorded. Additional Pump Testing to be conducted by WSP.

15. Well Contractor and Well Technician Information

Business Name of Well Contractor *	Well Contractor's License Number *
Aardvark Drilling Inc.	7675

Business Address

Unit Number	Street Number	Street Name *
C	25	Lewis Road

City/Town/Village *	Province	Postal Code *
Guelph	ON	N1H 1E9

Business Telephone Number	Business Email Address
519-826-9340	info@aardvarkdrillinginc.com

Last Name of Well Technician *	First Name of Well Technician *	Well Technician's License Number *
Turner	Jason	4636

16. Declaration *

☑ I hereby confirm that I am the person who constructed the well and I hereby confirm that the information on the form is correct and accurate.

Last Name	First Name	Email Address
England	Matthew	mengland@aardvarkdrillinginc.com

Signature	Date Submitted (yyyy/mm/dd)
Matt England Digitally signed by Matt England Date: 2024.02.28 10:35:30 -05'00'	2024/02/28

17. Ministry Use Only

Audit Number

PQPD SZYZ

General Instructions and Explanations for completing a Well Record

A completed electronic Well Record Form must be delivered to the well purchaser and the owner of the land on which the well is situated within 14 days after the date on which the well's structural stage is complete. The electronic Well Record must also be forwarded within 30 days after the date on which the well's structural stage is complete to the ministry through email to the following email address: WellRecordSubmission@ontario.ca

False and Misleading Information

Subsection 98(2) of the *Ontario Water Resources Act*, R.S.O. 1990 c. O. 40, states that:

"No person shall orally, in writing or electronically, give or submit false or misleading information in any statement, document or data, to any provincial officer, the Minister, the Ministry or the Agency, any employee in or agent of the Ministry or the Agency, or any person involved in carrying out a program of the Ministry or the Agency in respect of any matter related to this Act or the regulations."

Further, subsection 98(3) of the Act states that:

"No person shall include false or misleading information in any document or data required to be created, stored or submitted under this Act."

Measurements

All measurements must be recorded in the specified unit, metric or imperial by checking off the applicable box on the top of the form. You must use the checked unit consistently throughout the well record. Measurements must be reported to 1/10th of a metre if the unit is a metre. All measurements of depth must be referenced to ground surface.

Well Owner's Information

A "well owner" means the owner of land upon which a well is situated and includes a tenant or lessee of the land and a well purchaser. If the "well owner" is an individual, record the owner's last name and first name or if the "well owner" is a business, government or other organization, record the name in the "organization" area.

Well Location

Street Number/Name and City/town/Village must be provided, if available.

Geographic Township, Concession and Lot must be reported if the well is located in an area where such information exists.

UTM Coordinates must be recorded each time a Well Record is completed. Click the button [Test UTM in Map] to use the UTM Coordinates to plot the location to Google map. This allows verification of the UTM Coordinates. This will also automatically populate the County/District.

Municipal Plan and Sublet Number may be provided, if available.

Overburden and Bedrock Materials

For each formation encountered during construction, choose words from the lists that best describe the formation on the basis of general colour, most common material, other materials, and general description of the formation.

General Colours are White, Yellow, Grey, Brown, Blue, Red, Green and Black.

Examples of Materials are: Fill, Silt, Top Soil, Coarse Sand, Slate, Muck, Gravel, Limestone, Dolomite, Quartzite, Peat, Stones, Fine Sand, Shale, Granite, Clay, Boulders, Medium Sand, Sandstone, and Greenstone.

Some definitions are as follows:

- Clay: Composed of very fine particles. Forms dense hard lumps or clods when dry and a very elastic putty-like mass when wet. It can be rolled between fingers to form a long, flexible ribbon.
- Silt: Grain size, midway between sand and clay. It may form clods which, when broken, feel soft and floury. When moist, it will form a cast that can be handled freely without breaking. Rolled between thumb and finger, it will not "ribbon" but will give a broken appearance.

- Sand: Grains are loose and granular and may be seen and felt readily. Squeezed in the hand when dry, it falls apart when the pressure is released. Squeezed when moist, it will form a cast that will crumble when touched. Should be listed as fine sand, medium sand or coarse sand.
- Gravel: Rock fragments greater than 0.3 cm in diameter.

Examples of General Descriptions are Loose, Cemented, Previously Dug or Bored, Porous, Layered, Previously Drilled, Dense, Soft, Wood Fragments, Packed, Hard.

Abandonment

To report abandonment of a well, check off the applicable box in Type on the top of the form. Details of abandonment must be recorded in the Abandonment and Sealing Section. Additional comments may be entered in the comments box under the Information section.

Annular Space

Record all material placed in the annular space around the single casing or around the permanent outer casing. If the well is a telescoped well [i.e., a well with an outer casing and inner casing(s)] or if the well is a multi-level nested test hole, report the depth from, depth to, material and volume placed for the annular space between two different sized casings or between the inner casing(s) and the side of the well in the “Comments” area of this electronic well record form.

Method of Construction

If the equipment used to construct the well is not on the list, check “Other (specify)” and record the type of equipment, check each equipment that applies.

Well Use

If the well’s use is not provided on the list, check “Other (specify)” and record the use of the well. If the well has multiple uses, check each use that applies.

Status of Well

If the well’s status is not provided on the list, check “Other (specify)” and record the use of the well. If the well has multiple statuses, check each use that applies.

Construction Record – Casing and Open Hole

Use negative values to report the top of casing above ground surface. For example, if the top of the casing is 0.4 metres above the ground surface and the bottom of the casing 6.0 metres below the ground surface, record the casing “Depth From” as -0.4.

If the top of casing is located below the ground surface (e.g., if a test hole is constructed and the top of casing is located below the ground surface in a flush mounted well vault), report the top of the casing from below ground surface. For example, if the top of the casing is 0.1 metres below the ground surface and the bottom of the casing is 6 metres below the ground surface, record the casing “Depth From” as 0.1.

Note: If a drive shoe is used, the shoe is considered casing and it must be reported if the shoe has a different inside diameter thickness.

If a portion of the well was created an open hole, record the location of the open hole on a separate row, including the diameter and the depth (top and bottom of open hole) from the ground surface.

Construction Record – Well Screen

A “well screen” means perforated pipe or tubing, unsealed concrete tiles or other material installed in a well to filter out particulate matter and form the water intake zone. Therefore, the length of a well screen includes any slotted or perforated area and unsealed area of pipe or tiles.

Water Details

- if groundwater was located, record the depth from the ground surface to the location of the groundwater resource, and
- record if the groundwater quality is “Untested,” “Fresh” (i.e., not salty), or “Other (specify).” If “Other (specify)” is recorded, use the “Other (specify)” dropdown list toselect the type of groundwater (e.g., salty, blackish water, yellowish water, mineralized, etc.).

Check off “Gas” if natural gas was encountered during well construction.

Note: Natural gas encounters need to be immediately reported to the ministry at 1-800-268-6060, well purchaser and the owner of the land.

Results of Well Yield Testing

Check off “Pumping Discontinued” if pumping was discontinued before 1 hour of continuous pumping. Explain the reason why pumping was discontinued or in some cases not performed (e.g., the well went dry, impossible to install pump in small diameter well, static water level from test hole or dewatering well was obtained and is reported instead of completing a yield test etc.).

Note: Equipment breakdown is not an acceptable reason for checking off “Pumping Discontinued” on the well record form. If groundwater in the well is flowing out of the well, provide the rate of flow, and check off “Flowing Well” (i.e., static water level above the ground surface).

In the “Results of Well Yield Testing” section of the well record form, record:

- the depth to the intake of the pump,
- the rate of pumping and duration of pumping period during the yield test,
- the final water level when pumping stops,
- water level measurements made during pumping (drawdown) and recovery. All water level measurements must be referenced from below the ground surface for each time interval specified in the drawdown and recovery boxes.

If the water level measurements remain the same over a period of time, continue to measure and report the same water level measurement for the remaining pumping or recovery time intervals.

If pumping continuously for at least 1 hour, but the design of the well does not allow for water level measurements (e.g., driven point well), the person constructing the well is not required to report drawdown or recovery water level measurements.

Map of Well Location

In the “Map of Well Location” section of the well record form, click the map area to attach a map of the well location. The map must show sufficient information to locate the well, including:

- a mark on the map showing the well,
- a scale on the map, and
- where available, the name of the structure, street or surface water body nearest to the well.

Note: More than one map can be added to the well record form by clicking on “Add Map (+)” to add an additional map.

Information

Record any additional information (e.g., observations, tests, additional licensed well technicians who worked on the well, additional annular space details for a telescoped well or a multi-level nested test hole, reasons for not providing a well owner information package) in the comments area.

Declaration

Check the declaration statement to confirm that the person constructing the well agrees with the following statement: “I hereby confirm that I am the person who constructed the well and I hereby confirm that the information on the form is correct and accurate”.

Validate

Click the validate button. If there is no missing information, you will be asked to enter the well tag again to make sure the well tag is entered correctly (only enter the numeric portion of the tag number). The audit number will then be changed from “**incomplete**” to an assigned audit number. The signature field will then be available. Click on “signature” to enter the well technician’s electronic signature. For instructions on how to create an electronic signature, please visit the Adobe Digital IDs website using the following link: https://helpx.adobe.com/acrobat/using/digital-ids.html

Notice of Collection of Personal Information

Personal information contained on this form is collected pursuant to sections 35-50 and 75(2) of the *Ontario Water Resources Act* and section 16.3 of the Wells Regulation. This information will be used for the purpose of maintaining a public record of wells in Ontario. This form and the information contained on the form will be stored in the Ministry's well record database and made publicly available. Questions about this collection should be directed to the Water Well Customer Service Representative at the Wells Help Desk, 125 Resources Road, Toronto Ontario M9P 3V6, at 1-888-396-9355 or wellshelpdesk@ontario.ca.

Fields marked with an asterisk (*) are mandatory.

Well Tag Number *
A 382396

Type *

☑ Construction ☐ Abandonment

Measurement recorded in: *

☐ Metric ☑ Imperial

1. Well Owner's Information

Last Name and First Name, or Organization is mandatory. *

Last Name	First Name
Organization	**Email Address**
Deltini Commercial Developments Inc.	

Current Address

Unit Number	Street Number *	Street Name *	City/Town/Village	
	1350	Shawson Drive	Mississauga	
Country	**Province**		**Postal Code**	**Telephone Number**
Canada	Ontario		L4W 1C5	212-794-9844

2. Well Location

Address of Well Location

Unit Number	Street Number *	Street Name *	Township
	636040	Prince of Wales Road	Mulmur

Lot	Concession	County/District/Municipality	
		Dufferin	
City/Town		**Province**	**Postal Code**
Primrose		Ontario	L0N 1S0

UTM Coordinates	Zone *	Easting *	Northing *		Municipal Plan and Sublot Number
NAD 83	17	568813	4882751	Test UTM in Map	

Other
Test Well H.

3. Overburden and Bedrock Material *

Well Depth * 164 (ft)

General Colour	Most Common Material	Other Materials	General Description	Depth From	Depth To

				(ft)	(ft)
Brown	Topsoil			0	1
Brown	Gravel	Sand		1	26
Brown	Limestone		Light-Coloured	26	40
Grey	Limestone			40	48
Blue	Shale			48	60
Brown	Limestone			60	62
Red	Shale			62	64
Blue	Shale			64	78
Brown	Limestone			78	80
Blue	Shale			80	90
Grey	Limestone			90	120
Brown	Limestone			120	129
	Sandstone			129	146
Blue	Shale			146	153
Red	Shale			153	164

4. Annular Space *

Depth From (ft)	Depth To (ft)	Type of Sealant Used (Material and Type)	Volume Placed (cubic feet)
0	21	Bentonite Grout and Holeplug	7.31

5. Method of Construction *

☐ Cable Tool ☐ Rotary (Conventional) ☐ Rotary (Reverse) ☐ Boring ☐ Air percussion ☐ Diamond
☐ Jetting ☐ Driving ☐ Digging ☐ Rotary (Air) ☐ Augering ☐ Direct Push
☑ Other (specify) DR

6. Well Use *

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

7. 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) _____

8. Construction Record - Casing * (use negative number(s) to indicate depth above ground surface)

Inside Diameter (in)	Open Hole **or** Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness	Depth From (ft)	Depth To (ft)
6	Steel	0.188	-2	28
4	Plastic	0.237	24	164

9. Construction Record - Screen

Outside Diameter (in)	Material (Plastic, Galvanized, Steel)	Slot Number	Depth From (ft)	Depth To (ft)

10. Water Details

Water found at Depth (ft) ☐ Gas Kind of water ☐ Fresh ☐ Untested ☐ Other

11. Hole Diameter

Depth From (ft)	Depth To (ft)	Diameter (in)
0	21	10
21	28	6.63
28	164	6

12. Results of Well Yield Testing

☐ Pumping Discontinued

Explain _____

If flowing give rate

☐ Flowing _____ (GPM)

Draw down

Time (min)	Static Level	1	2	3	4	5	10	15	20	25	30	40	50	60
Water Level (ft)														

Recovery

Time (min)	1	2	3	4	5	10	15	20	25	30	40	50	60
Water Level (ft)													

After test of well yield, water was

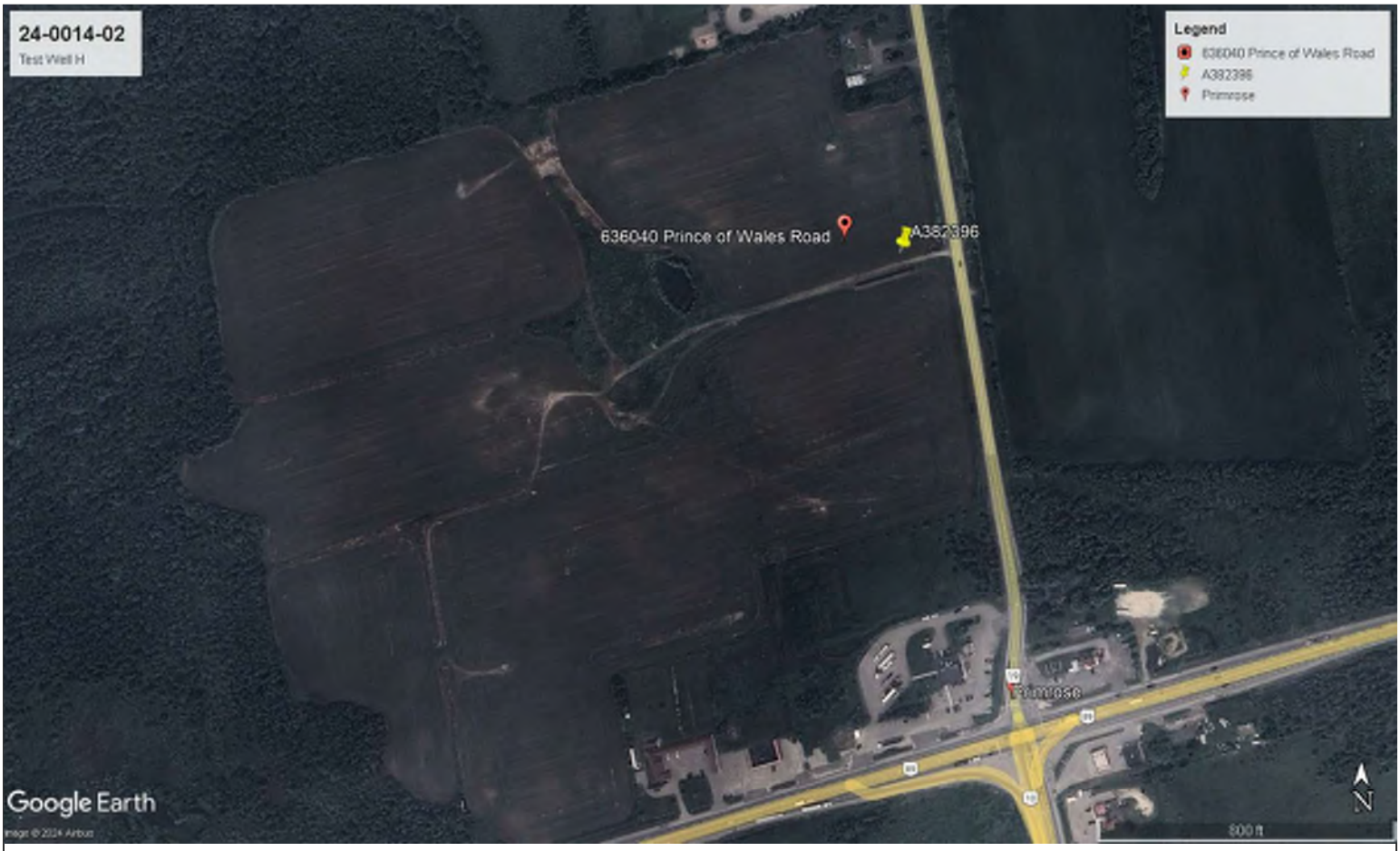
☐ Clear and sand free ☐ Other (specify)

Pump intake set at (ft)	Pumping rate (GPM)	Duration of pumping hrs + min	Final water level end of pumping (ft)	Disinfected? *
				☐ Yes ☑ No

Recommended pump depth (ft)	Recommended pump rate (GPM)	Well production (GPM)

13. Map of Well Location *

Map 1. Please Click the map area below to import an image file to use as the map. ☑ Make map area bigger



14. Information

Well owner's information package delivered	Date Package Delivered (yyyy/mm/dd)	Date Work Completed (yyyy/mm/dd) *
☐ Yes ☐ No		2024/02/13

Comments

Section 8, Construction Record - Casing further details:
4" Plastic: Schedule 40 PVC 4" Perforated Liner.

Section 12, Results of Well Yield Testing further details: Pump Testing to be conducted by WSP.

15. Well Contractor and Well Technician Information

Business Name of Well Contractor *	Well Contractor's License Number *
Aardvark Drilling Inc.	7675

Business Address

Unit Number	Street Number	Street Name *
C	25	Lewis Road

City/Town/Village *	Province	Postal Code *
Guelph	ON	N1H 1E9

Business Telephone Number	Business Email Address
519-826-9340	info@aardvarkdrillinginc.com

Last Name of Well Technician *	First Name of Well Technician *	Well Technician's License Number *
Turner	Jason	4636

16. Declaration *

☑ I hereby confirm that I am the person who constructed the well and I hereby confirm that the information on the form is correct and accurate.

Last Name	First Name	Email Address
England	Matthew	mengland@aardvarkdrillinginc.com

Signature	Date Submitted (yyyy/mm/dd)
Matt England Digitally signed by Matt England Date: 2024.02.28 10:36:36 -05'00'	2024/02/28

17. Ministry Use Only

Audit Number

B6CF 9JQ4

General Instructions and Explanations for completing a Well Record

A completed electronic Well Record Form must be delivered to the well purchaser and the owner of the land on which the well is situated within 14 days after the date on which the well's structural stage is complete. The electronic Well Record must also be forwarded within 30 days after the date on which the well's structural stage is complete to the ministry through email to the following email address: WellRecordSubmission@ontario.ca

False and Misleading Information

Subsection 98(2) of the *Ontario Water Resources Act*, R.S.O. 1990 c. O. 40, states that:

"No person shall orally, in writing or electronically, give or submit false or misleading information in any statement, document or data, to any provincial officer, the Minister, the Ministry or the Agency, any employee in or agent of the Ministry or the Agency, or any person involved in carrying out a program of the Ministry or the Agency in respect of any matter related to this Act or the regulations."

Further, subsection 98(3) of the Act states that:

"No person shall include false or misleading information in any document or data required to be created, stored or submitted under this Act."

Measurements

All measurements must be recorded in the specified unit, metric or imperial by checking off the applicable box on the top of the form. You must use the checked unit consistently throughout the well record. Measurements must be reported to 1/10th of a metre if the unit is a metre. All measurements of depth must be referenced to ground surface.

Well Owner's Information

A "well owner" means the owner of land upon which a well is situated and includes a tenant or lessee of the land and a well purchaser. If the "well owner" is an individual, record the owner's last name and first name or if the "well owner" is a business, government or other organization, record the name in the "organization" area.

Well Location

Street Number/Name and City/town/Village must be provided, if available.

Geographic Township, Concession and Lot must be reported if the well is located in an area where such information exists.

UTM Coordinates must be recorded each time a Well Record is completed. Click the button [Test UTM in Map] to use the UTM Coordinates to plot the location to Google map. This allows verification of the UTM Coordinates. This will also automatically populate the County/District.

Municipal Plan and Sublet Number may be provided, if available.

Overburden and Bedrock Materials

For each formation encountered during construction, choose words from the lists that best describe the formation on the basis of general colour, most common material, other materials, and general description of the formation.

General Colours are White, Yellow, Grey, Brown, Blue, Red, Green and Black.

Examples of Materials are: Fill, Silt, Top Soil, Coarse Sand, Slate, Muck, Gravel, Limestone, Dolomite, Quartzite, Peat, Stones, Fine Sand, Shale, Granite, Clay, Boulders, Medium Sand, Sandstone, and Greenstone.

Some definitions are as follows:

- Clay: Composed of very fine particles. Forms dense hard lumps or clods when dry and a very elastic putty-like mass when wet. It can be rolled between fingers to form a long, flexible ribbon.
- Silt: Grain size, midway between sand and clay. It may form clods which, when broken, feel soft and floury. When moist, it will form a cast that can be handled freely without breaking. Rolled between thumb and finger, it will not "ribbon" but will give a broken appearance.

- Sand: Grains are loose and granular and may be seen and felt readily. Squeezed in the hand when dry, it falls apart when the pressure is released. Squeezed when moist, it will form a cast that will crumble when touched. Should be listed as fine sand, medium sand or coarse sand.
- Gravel: Rock fragments greater than 0.3 cm in diameter.

Examples of General Descriptions are Loose, Cemented, Previously Dug or Bored, Porous, Layered, Previously Drilled, Dense, Soft, Wood Fragments, Packed, Hard.

Abandonment

To report abandonment of a well, check off the applicable box in Type on the top of the form. Details of abandonment must be recorded in the Abandonment and Sealing Section. Additional comments may be entered in the comments box under the Information section.

Annular Space

Record all material placed in the annular space around the single casing or around the permanent outer casing. If the well is a telescoped well [i.e., a well with an outer casing and inner casing(s)] or if the well is a multi-level nested test hole, report the depth from, depth to, material and volume placed for the annular space between two different sized casings or between the inner casing(s) and the side of the well in the “Comments” area of this electronic well record form.

Method of Construction

If the equipment used to construct the well is not on the list, check “Other (specify)” and record the type of equipment, check each equipment that applies.

Well Use

If the well’s use is not provided on the list, check “Other (specify)” and record the use of the well. If the well has multiple uses, check each use that applies.

Status of Well

If the well’s status is not provided on the list, check “Other (specify)” and record the use of the well. If the well has multiple statuses, check each use that applies.

Construction Record – Casing and Open Hole

Use negative values to report the top of casing above ground surface. For example, if the top of the casing is 0.4 metres above the ground surface and the bottom of the casing 6.0 metres below the ground surface, record the casing “Depth From” as -0.4.

If the top of casing is located below the ground surface (e.g., if a test hole is constructed and the top of casing is located below the ground surface in a flush mounted well vault), report the top of the casing from below ground surface. For example, if the top of the casing is 0.1 metres below the ground surface and the bottom of the casing is 6 metres below the ground surface, record the casing “Depth From” as 0.1.

Note: If a drive shoe is used, the shoe is considered casing and it must be reported if the shoe has a different inside diameter thickness.

If a portion of the well was created an open hole, record the location of the open hole on a separate row, including the diameter and the depth (top and bottom of open hole) from the ground surface.

Construction Record – Well Screen

A “well screen” means perforated pipe or tubing, unsealed concrete tiles or other material installed in a well to filter out particulate matter and form the water intake zone. Therefore, the length of a well screen includes any slotted or perforated area and unsealed area of pipe or tiles.

Water Details

- if groundwater was located, record the depth from the ground surface to the location of the groundwater resource, and
- record if the groundwater quality is “Untested,” “Fresh” (i.e., not salty), or “Other (specify).” If “Other (specify)” is recorded, use the “Other (specify)” dropdown list toselect the type of groundwater (e.g., salty, blackish water, yellowish water, mineralized, etc.).

Check off “Gas” if natural gas was encountered during well construction.

Note: Natural gas encounters need to be immediately reported to the ministry at 1-800-268-6060, well purchaser and the owner of the land.

Results of Well Yield Testing

Check off “Pumping Discontinued” if pumping was discontinued before 1 hour of continuous pumping. Explain the reason why pumping was discontinued or in some cases not performed (e.g., the well went dry, impossible to install pump in small diameter well, static water level from test hole or dewatering well was obtained and is reported instead of completing a yield test etc.).

Note: Equipment breakdown is not an acceptable reason for checking off “Pumping Discontinued” on the well record form. If groundwater in the well is flowing out of the well, provide the rate of flow, and check off “Flowing Well” (i.e., static water level above the ground surface).

In the “Results of Well Yield Testing” section of the well record form, record:

- the depth to the intake of the pump,
- the rate of pumping and duration of pumping period during the yield test,
- the final water level when pumping stops,
- water level measurements made during pumping (drawdown) and recovery. All water level measurements must be referenced from below the ground surface for each time interval specified in the drawdown and recovery boxes.

If the water level measurements remain the same over a period of time, continue to measure and report the same water level measurement for the remaining pumping or recovery time intervals.

If pumping continuously for at least 1 hour, but the design of the well does not allow for water level measurements (e.g., driven point well), the person constructing the well is not required to report drawdown or recovery water level measurements.

Map of Well Location

In the “Map of Well Location” section of the well record form, click the map area to attach a map of the well location. The map must show sufficient information to locate the well, including:

- a mark on the map showing the well,
- a scale on the map, and
- where available, the name of the structure, street or surface water body nearest to the well.

Note: More than one map can be added to the well record form by clicking on “Add Map (+)” to add an additional map.

Information

Record any additional information (e.g., observations, tests, additional licensed well technicians who worked on the well, additional annular space details for a telescoped well or a multi-level nested test hole, reasons for not providing a well owner information package) in the comments area.

Declaration

Check the declaration statement to confirm that the person constructing the well agrees with the following statement: “I hereby confirm that I am the person who constructed the well and I hereby confirm that the information on the form is correct and accurate”.

Validate

Click the validate button. If there is no missing information, you will be asked to enter the well tag again to make sure the well tag is entered correctly (only enter the numeric portion of the tag number). The audit number will then be changed from “**incomplete**” to an assigned audit number. The signature field will then be available. Click on “signature” to enter the well technician’s electronic signature. For instructions on how to create an electronic signature, please visit the Adobe Digital IDs website using the following link: https://helpx.adobe.com/acrobat/using/digital-ids.html

Notice of Collection of Personal Information

Personal information contained on this form is collected pursuant to sections 35-50 and 75(2) of the *Ontario Water Resources Act* and section 16.3 of the Wells Regulation. This information will be used for the purpose of maintaining a public record of wells in Ontario. This form and the information contained on the form will be stored in the Ministry's well record database and made publicly available. Questions about this collection should be directed to the Water Well Customer Service Representative at the Wells Help Desk, 125 Resources Road, Toronto Ontario M9P 3V6, at 1-888-396-9355 or wellshelpdesk@ontario.ca.

Fields marked with an asterisk (*) are mandatory.

Well Tag Number *
A 382399

Type *

☑ Construction ☐ Abandonment

Measurement recorded in: *

☐ Metric ☑ Imperial

1. Well Owner's Information

Last Name and First Name, or Organization is mandatory. *

Last Name	First Name
Organization	**Email Address**
Deltini Commercial Developments Inc.	

Current Address

Unit Number	Street Number *	Street Name *	City/Town/Village		
	1350	Shawson Drive	Mississauga		
Country	**Province**		**Postal Code**	**Telephone Number**	
Canada	Ontario		L4W 1C5	212-794-9844	

2. Well Location

Address of Well Location

Unit Number	Street Number *	Street Name *	Township		
	636040	Prince of Wales Road	Mulmur		
Lot	**Concession**		**County/District/Municipality**		
			Dufferin		
City/Town			**Province**	**Postal Code**	
Primrose			Ontario	L0N 1S0	

UTM Coordinates	Zone *	Easting *	Northing *		Municipal Plan and Sublot Number
NAD 83	17	568604	4882489	Test UTM in Map	

Other
Test Well I.

3. Overburden and Bedrock Material *

Well Depth * 39 (ft)

General Colour	Most Common Material	Other Materials	General Description	Depth From	Depth To

				(ft)	(ft)
Brown	Topsoil			0	1
Brown	Sand	Gravel		1	34
Brown	Limestone		Light-Coloured	34	37
Brown	Gravel	Sand		37	39

4. Annular Space *

Depth From (ft)	Depth To (ft)	Type of Sealant Used (Material and Type)	Volume Placed (cubic feet)
0	22	Bentonite Grout and Holeplug	7.66

5. Method of Construction *

- [ ] Cable Tool
- [ ] Rotary (Conventional)
- [ ] Rotary (Reverse)
- [ ] Boring
- [ ] Air percussion
- [ ] Diamond
- [ ] Jetting
- [ ] Driving
- [ ] Digging
- [ ] Rotary (Air)
- [ ] Augering
- [ ] Direct Push
- [x] Other (specify) DR

6. Well Use *

- [ ] Public
- [ ] Industrial
- [ ] Cooling & Air Conditioning
- [ ] Domestic
- [ ] Commercial
- [ ] Not Used
- [ ] Livestock
- [ ] Municipal
- [ ] Monitoring
- [ ] Irrigation
- [x] Test Hole
- [ ] Dewatering
- [ ] Other (specify)

7. Status of Well *

- [ ] Water Supply
- [ ] Replacement Well
- [x] 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)

8. Construction Record - Casing * (use negative number(s) to indicate depth above ground surface)

Inside Diameter (in)	Open Hole **or** Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness	Depth From (ft)	Depth To (ft)
6	Steel	0.188	-2	37
6	Open Hole		37	39

9. Construction Record - Screen

Outside Diameter (in)	Material (Plastic, Galvanized, Steel)	Slot Number	Depth From (ft)	Depth To (ft)

10. Water Details

Water found at Depth (ft) ☐ Gas Kind of water ☐ Fresh ☐ Untested ☐ Other

11. Hole Diameter

Depth From (ft)	Depth To (ft)	Diameter (in)
0	22	10
22	37	6.63
37	39	6

12. Results of Well Yield Testing

☐ Pumping Discontinued

Explain _____

If flowing give rate

☐ Flowing _____ (GPM)

Draw down

Time (min)	Static Level	1	2	3	4	5	10	15	20	25	30	40	50	60
Water Level (ft)														

Recovery

Time (min)	1	2	3	4	5	10	15	20	25	30	40	50	60
Water Level (ft)													

After test of well yield, water was

☐ Clear and sand free ☐ Other (specify)

Pump intake set at (ft)	Pumping rate (GPM)	Duration of pumping hrs + min	Final water level end of pumping (ft)	Disinfected? *
				☐ Yes ☑ No

Recommended pump depth (ft)	Recommended pump rate (GPM)	Well production (GPM)

13. Map of Well Location *

Map 1. Please Click the map area below to import an image file to use as the map. ☑ Make map area bigger

14. Information

Well owner's information package delivered	Date Package Delivered (yyyy/mm/dd)	Date Work Completed (yyyy/mm/dd) *
☐ Yes ☐ No		2024/02/01

Comments

Section 3, Overburden and Bedrock Materials further details:
Hole originally drilled to a depth of 70' below grade.
(39-65') Light Grey; Most Common Material: limestone.
(65-70') Blue; Most Common Material: shale.
Void backfilled with 0.59 cubic feet gravel (39-42') and 5.52 cubic feet holeplug (42-70').

Section 12, Results of Well Yield Testing: Pump Testing to be conducted by WSP.

15. Well Contractor and Well Technician Information

Business Name of Well Contractor *	Well Contractor's License Number *
Aardvark Drilling Inc.	7675

Business Address

Unit Number	Street Number	Street Name *
C	25	Lewis Road

City/Town/Village *	Province	Postal Code *
Guelph	ON	N1H 1E9

Business Telephone Number	Business Email Address
519-826-9340	info@aardvarkdrillinginc.com

Last Name of Well Technician *	First Name of Well Technician *	Well Technician's License Number *
Turner	Jason	4636

16. Declaration *

☑ I hereby confirm that I am the person who constructed the well and I hereby confirm that the information on the form is correct and accurate.

Last Name	First Name	Email Address
England	Matthew	mengland@aardvarkdrillinginc.com

Signature	Date Submitted (yyyy/mm/dd)
Matt England Digitally signed by Matt England Date: 2024.02.28 10:34:29 -05'00'	2024/02/28

17. Ministry Use Only

Audit Number

QE5O 7YJ8

General Instructions and Explanations for completing a Well Record

A completed electronic Well Record Form must be delivered to the well purchaser and the owner of the land on which the well is situated within 14 days after the date on which the well's structural stage is complete. The electronic Well Record must also be forwarded within 30 days after the date on which the well's structural stage is complete to the ministry through email to the following email address: WellRecordSubmission@ontario.ca

False and Misleading Information

Subsection 98(2) of the *Ontario Water Resources Act*, R.S.O. 1990 c. O. 40, states that:

"No person shall orally, in writing or electronically, give or submit false or misleading information in any statement, document or data, to any provincial officer, the Minister, the Ministry or the Agency, any employee in or agent of the Ministry or the Agency, or any person involved in carrying out a program of the Ministry or the Agency in respect of any matter related to this Act or the regulations."

Further, subsection 98(3) of the Act states that:

"No person shall include false or misleading information in any document or data required to be created, stored or submitted under this Act."

Measurements

All measurements must be recorded in the specified unit, metric or imperial by checking off the applicable box on the top of the form. You must use the checked unit consistently throughout the well record. Measurements must be reported to 1/10th of a metre if the unit is a metre. All measurements of depth must be referenced to ground surface.

Well Owner's Information

A "well owner" means the owner of land upon which a well is situated and includes a tenant or lessee of the land and a well purchaser. If the "well owner" is an individual, record the owner's last name and first name or if the "well owner" is a business, government or other organization, record the name in the "organization" area.

Well Location

Street Number/Name and City/town/Village must be provided, if available.

Geographic Township, Concession and Lot must be reported if the well is located in an area where such information exists.

UTM Coordinates must be recorded each time a Well Record is completed. Click the button [Test UTM in Map] to use the UTM Coordinates to plot the location to Google map. This allows verification of the UTM Coordinates. This will also automatically populate the County/District.

Municipal Plan and Sublet Number may be provided, if available.

Overburden and Bedrock Materials

For each formation encountered during construction, choose words from the lists that best describe the formation on the basis of general colour, most common material, other materials, and general description of the formation.

General Colours are White, Yellow, Grey, Brown, Blue, Red, Green and Black.

Examples of Materials are: Fill, Silt, Top Soil, Coarse Sand, Slate, Muck, Gravel, Limestone, Dolomite, Quartzite, Peat, Stones, Fine Sand, Shale, Granite, Clay, Boulders, Medium Sand, Sandstone, and Greenstone.

Some definitions are as follows:

- Clay: Composed of very fine particles. Forms dense hard lumps or clods when dry and a very elastic putty-like mass when wet. It can be rolled between fingers to form a long, flexible ribbon.
- Silt: Grain size, midway between sand and clay. It may form clods which, when broken, feel soft and floury. When moist, it will form a cast that can be handled freely without breaking. Rolled between thumb and finger, it will not "ribbon" but will give a broken appearance.

- Sand: Grains are loose and granular and may be seen and felt readily. Squeezed in the hand when dry, it falls apart when the pressure is released. Squeezed when moist, it will form a cast that will crumble when touched. Should be listed as fine sand, medium sand or coarse sand.
- Gravel: Rock fragments greater than 0.3 cm in diameter.

Examples of General Descriptions are Loose, Cemented, Previously Dug or Bored, Porous, Layered, Previously Drilled, Dense, Soft, Wood Fragments, Packed, Hard.

Abandonment

To report abandonment of a well, check off the applicable box in Type on the top of the form. Details of abandonment must be recorded in the Abandonment and Sealing Section. Additional comments may be entered in the comments box under the Information section.

Annular Space

Record all material placed in the annular space around the single casing or around the permanent outer casing. If the well is a telescoped well [i.e., a well with an outer casing and inner casing(s)] or if the well is a multi-level nested test hole, report the depth from, depth to, material and volume placed for the annular space between two different sized casings or between the inner casing(s) and the side of the well in the “Comments” area of this electronic well record form.

Method of Construction

If the equipment used to construct the well is not on the list, check “Other (specify)” and record the type of equipment, check each equipment that applies.

Well Use

If the well’s use is not provided on the list, check “Other (specify)” and record the use of the well. If the well has multiple uses, check each use that applies.

Status of Well

If the well’s status is not provided on the list, check “Other (specify)” and record the use of the well. If the well has multiple statuses, check each use that applies.

Construction Record – Casing and Open Hole

Use negative values to report the top of casing above ground surface. For example, if the top of the casing is 0.4 metres above the ground surface and the bottom of the casing 6.0 metres below the ground surface, record the casing “Depth From” as -0.4.

If the top of casing is located below the ground surface (e.g., if a test hole is constructed and the top of casing is located below the ground surface in a flush mounted well vault), report the top of the casing from below ground surface. For example, if the top of the casing is 0.1 metres below the ground surface and the bottom of the casing is 6 metres below the ground surface, record the casing “Depth From” as 0.1.

Note: If a drive shoe is used, the shoe is considered casing and it must be reported if the shoe has a different inside diameter thickness.

If a portion of the well was created an open hole, record the location of the open hole on a separate row, including the diameter and the depth (top and bottom of open hole) from the ground surface.

Construction Record – Well Screen

A “well screen” means perforated pipe or tubing, unsealed concrete tiles or other material installed in a well to filter out particulate matter and form the water intake zone. Therefore, the length of a well screen includes any slotted or perforated area and unsealed area of pipe or tiles.

Water Details

- if groundwater was located, record the depth from the ground surface to the location of the groundwater resource, and
- record if the groundwater quality is “Untested,” “Fresh” (i.e., not salty), or “Other (specify).” If “Other (specify)” is recorded, use the “Other (specify)” dropdown list toselect the type of groundwater (e.g., salty, blackish water, yellowish water, mineralized, etc.).

Check off “Gas” if natural gas was encountered during well construction.

Note: Natural gas encounters need to be immediately reported to the ministry at 1-800-268-6060, well purchaser and the owner of the land.

Results of Well Yield Testing

Check off “Pumping Discontinued” if pumping was discontinued before 1 hour of continuous pumping. Explain the reason why pumping was discontinued or in some cases not performed (e.g., the well went dry, impossible to install pump in small diameter well, static water level from test hole or dewatering well was obtained and is reported instead of completing a yield test etc.).

Note: Equipment breakdown is not an acceptable reason for checking off “Pumping Discontinued” on the well record form. If groundwater in the well is flowing out of the well, provide the rate of flow, and check off “Flowing Well” (i.e., static water level above the ground surface).

In the “Results of Well Yield Testing” section of the well record form, record:

- the depth to the intake of the pump,
- the rate of pumping and duration of pumping period during the yield test,
- the final water level when pumping stops,
- water level measurements made during pumping (drawdown) and recovery. All water level measurements must be referenced from below the ground surface for each time interval specified in the drawdown and recovery boxes.

If the water level measurements remain the same over a period of time, continue to measure and report the same water level measurement for the remaining pumping or recovery time intervals.

If pumping continuously for at least 1 hour, but the design of the well does not allow for water level measurements (e.g., driven point well), the person constructing the well is not required to report drawdown or recovery water level measurements.

Map of Well Location

In the “Map of Well Location” section of the well record form, click the map area to attach a map of the well location. The map must show sufficient information to locate the well, including:

- a mark on the map showing the well,
- a scale on the map, and
- where available, the name of the structure, street or surface water body nearest to the well.

Note: More than one map can be added to the well record form by clicking on “Add Map (+)” to add an additional map.

Information

Record any additional information (e.g., observations, tests, additional licensed well technicians who worked on the well, additional annular space details for a telescoped well or a multi-level nested test hole, reasons for not providing a well owner information package) in the comments area.

Declaration

Check the declaration statement to confirm that the person constructing the well agrees with the following statement: “I hereby confirm that I am the person who constructed the well and I hereby confirm that the information on the form is correct and accurate”.

Validate

Click the validate button. If there is no missing information, you will be asked to enter the well tag again to make sure the well tag is entered correctly (only enter the numeric portion of the tag number). The audit number will then be changed from “**incomplete**” to an assigned audit number. The signature field will then be available. Click on “signature” to enter the well technician’s electronic signature. For instructions on how to create an electronic signature, please visit the Adobe Digital IDs website using the following link: https://helpx.adobe.com/acrobat/using/digital-ids.html

Ontario

Ministry of the Environment, Conservation and Parks

Well Record - Regulation 903

Ontario Water Resources Act

Notice of Collection of Personal Information

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Fields marked with an asterisk (*) are mandatory.

Well Tag Number *
A 382397

Type *

☑ Construction ☐ Abandonment

Measurement recorded in: *

☐ Metric ☑ Imperial

1. Well Owner's Information

Last Name and First Name, or Organization is mandatory. *

Last Name	First Name

Organization	Email Address
Deltini Commercial Developments Inc.	

Current Address

Unit Number	Street Number *	Street Name *	City/Town/Village
	1350	Shawson Drive	Mississauga

Country	Province	Postal Code	Telephone Number
Canada	Ontario	L4W 1C5	212-794-9844

2. Well Location

Address of Well Location

Unit Number	Street Number *	Street Name *	Township
	636040	Prince of Wales Road	Mulmur

Lot	Concession	County/District/Municipality
		Dufferin

City/Town	Province	Postal Code
Primrose	Ontario	L0N 1S0

UTM Coordinates	Zone *	Easting *	Northing *		Municipal Plan and Sublot Number
NAD 83	17	568507	4882311	Test UTM in Map	

Other
Test Well J.

3. Overburden and Bedrock Material *

Well Depth * 35 (ft)

General Colour	Most Common Material	Other Materials	General Description	Depth From	Depth To

				(ft)	(ft)
Brown	Topsoil			0	1
Brown	Clay	Sand		1	5
Brown	Sand	Gravel		5	25
Brown	Gravel	Sand		25	35

4. Annular Space *

Depth From (ft)	Depth To (ft)	Type of Sealant Used (Material and Type)	Volume Placed (cubic feet)
0	22	Bentonite Grout and Holeplug	7.66

5. Method of Construction *

☐ Cable Tool ☐ Rotary (Conventional) ☐ Rotary (Reverse) ☐ Boring ☐ Air percussion ☐ Diamond
☐ Jetting ☐ Driving ☐ Digging ☐ Rotary (Air) ☐ Augering ☐ Direct Push
☑ Other (specify) DR

6. Well Use *

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

7. 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)

8. Construction Record - Casing * (use negative number(s) to indicate depth above ground surface)

Inside Diameter (in)	Open Hole **or** Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness	Depth From (ft)	Depth To (ft)
6	Steel	0.188	-2	30

9. Construction Record - Screen

Outside Diameter (in)	Material (Plastic, Galvanized, Steel)	Slot Number	Depth From (ft)	Depth To (ft)
5	Stainless Steel	40	30	35

10. Water Details

Water found at Depth (ft)	☐ Gas	Kind of water ☐ Fresh ☐ Untested ☐ Other

11. Hole Diameter

Depth From (ft)	Depth To (ft)	Diameter (in)
0	22	10
22	30	6.63
30	35	6

12. Results of Well Yield Testing

☐ Pumping Discontinued

Explain _____

If flowing give rate

☐ Flowing _____ (GPM)

Draw down

Time (min)	Static Level	1	2	3	4	5	10	15	20	25	30	40	50	60
Water Level (ft)														

Recovery

Time (min)	1	2	3	4	5	10	15	20	25	30	40	50	60
Water Level (ft)													

After test of well yield, water was

☐ Clear and sand free ☐ Other (specify)

Pump intake set at (ft)	Pumping rate (GPM)	Duration of pumping hrs + min	Final water level end of pumping (ft)	Disinfected? * ☐ Yes ☑ No

Recommended pump depth (ft)	Recommended pump rate (GPM)	Well production (GPM)

13. Map of Well Location *

Map 1. Please Click the map area below to import an image file to use as the map. ☑ Make map area bigger

14. Information

Well owner's information package delivered	Date Package Delivered (yyyy/mm/dd)	Date Work Completed (yyyy/mm/dd) *
☐ Yes ☐ No		2024/02/07

Comments

Section 3, Overburden and Bedrock further details:
Hole originally drilled to a depth of 40' below grade:
(35-39') Brown; Most Common Material: gravel; Other Materials: sand.
(39-40') Light Brown; Most Common Material: limestone.

Section 12, Results of Well Yield Testing: Pump Testing to be conducted by WSP.

15. Well Contractor and Well Technician Information

Business Name of Well Contractor *	Well Contractor's License Number *
Aardvark Drilling Inc.	7675

Business Address

Unit Number	Street Number	Street Name *
C	25	Lewis Road

City/Town/Village *	Province	Postal Code *
Guelph	ON	N1H 1E9

Business Telephone Number	Business Email Address
519-826-9340	info@aardvarkdrillinginc.com

Last Name of Well Technician *	First Name of Well Technician *	Well Technician's License Number *
Turner	Jason	4636

16. Declaration *

☑ I hereby confirm that I am the person who constructed the well and I hereby confirm that the information on the form is correct and accurate.

Last Name	First Name	Email Address
England	Matthew	mengland@aardvarkdrillinginc.com

Signature	Date Submitted (yyyy/mm/dd)
Matt England Digitally signed by Matt England Date: 2024.02.28 10:37:34 -05'00'	2024/02/28

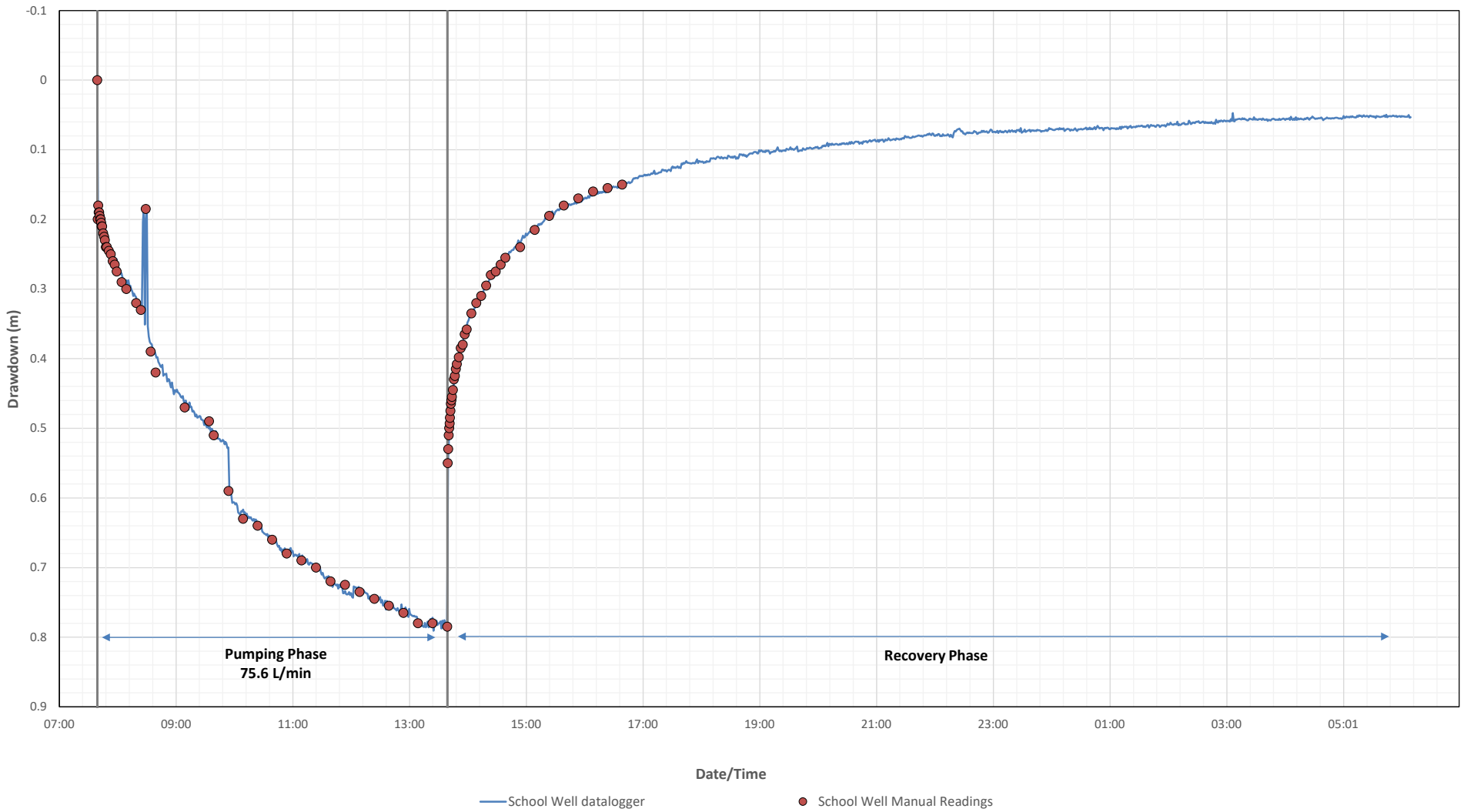
17. Ministry Use Only

Audit Number

QDYL 86BU

APPENDIX E

Pumping Test Data and Results



CLIENT
DELTINI COMMERCIAL DEVELOPMENTS

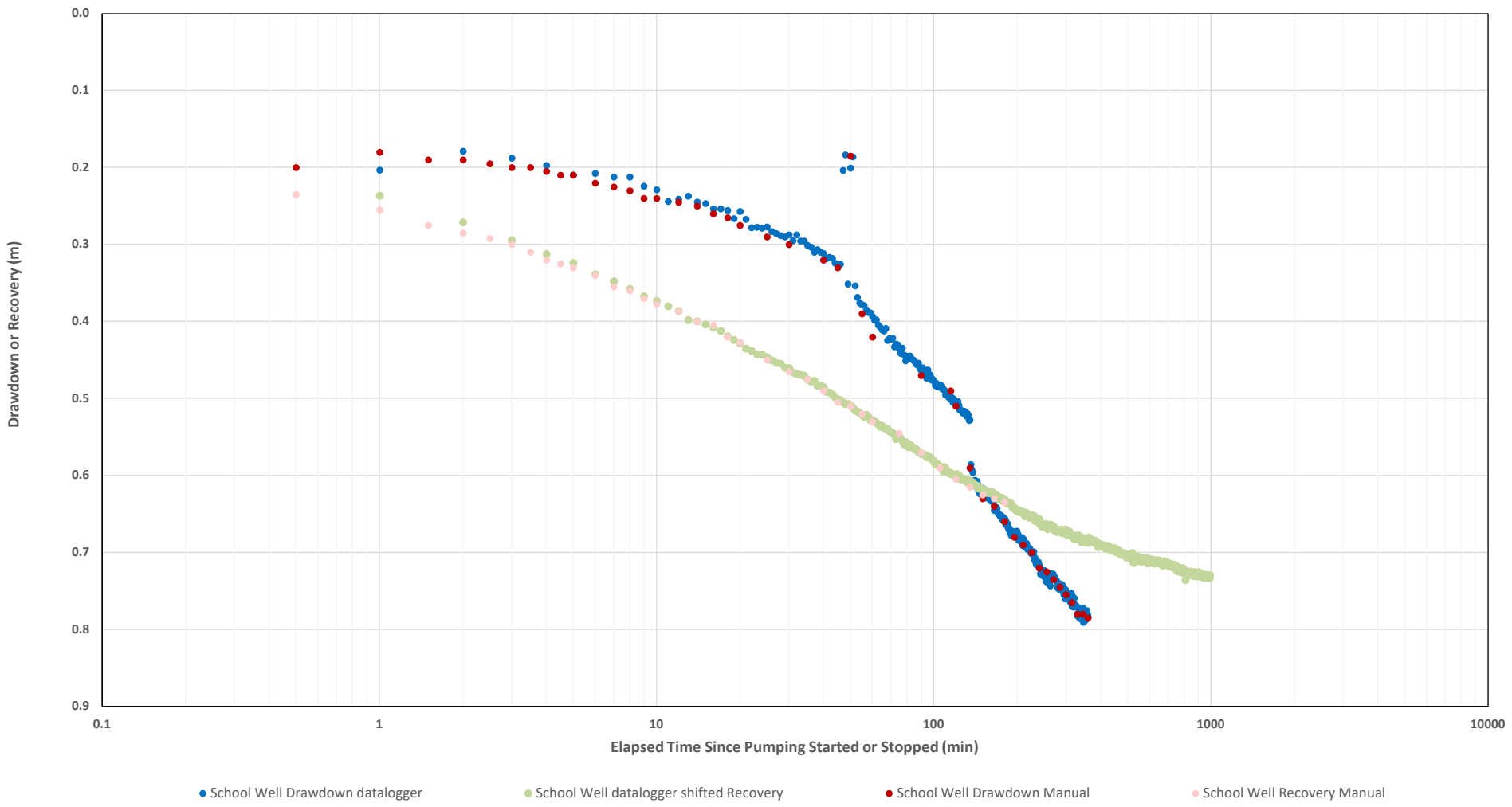
PROJECT
PRIMROSE GROUNDWATER SUPPLY STUDY

CONSULTANT

YYYY-MM-DD	2024-04-10
PREPARED	AS
DESIGN	AS
REVIEW	
APPROVED	

TITLE
Primrose Elementary School – Drawdown Hydrograph

PROJECT No.	TASK	Rev.	FIGURE
23611788	5000	A	E-1



CLIENT
DELTINI COMMERCIAL DEVELOPMENTS

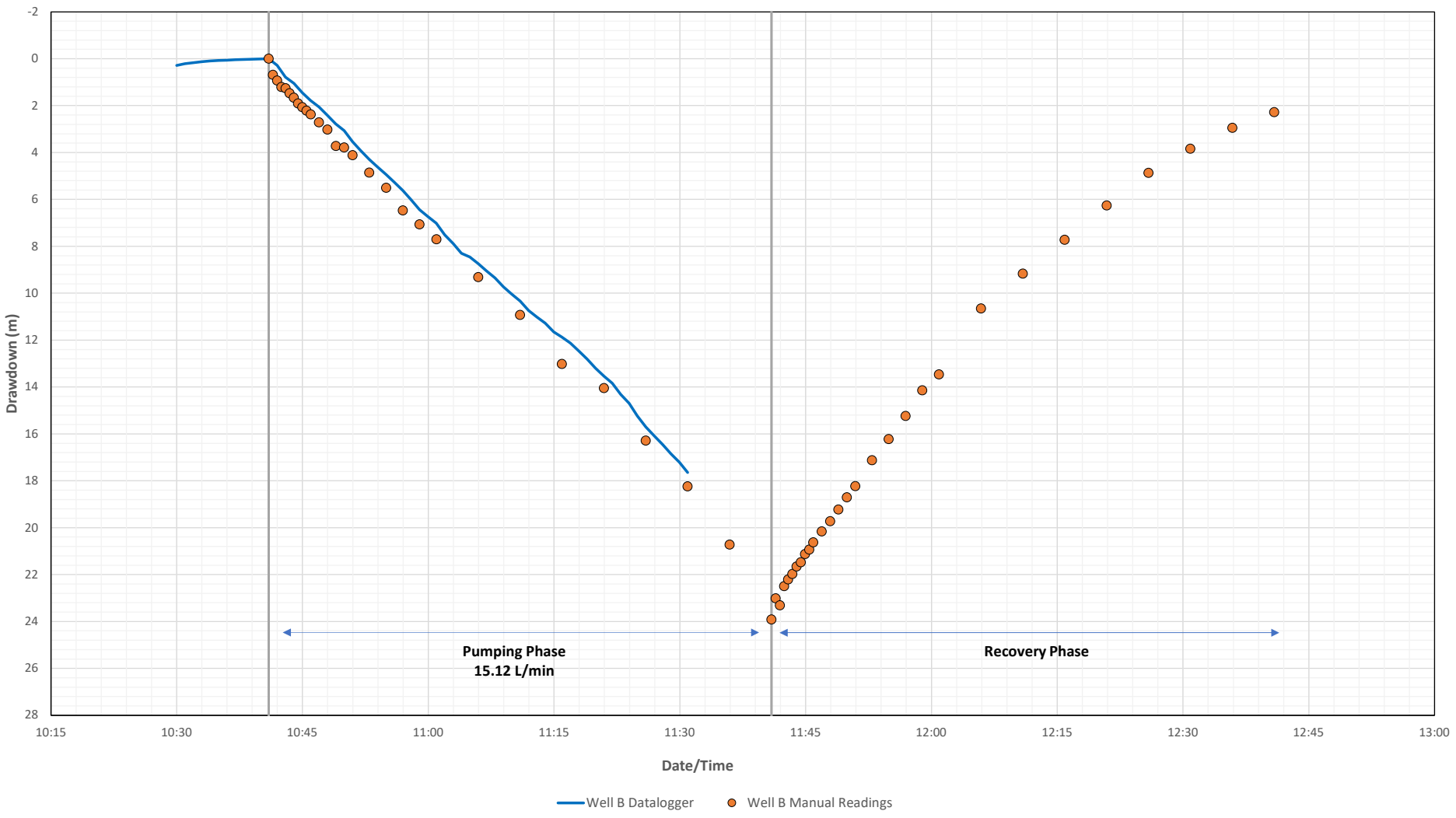
PROJECT
PRIMROSE GROUNDWATER SUPPLY STUDY

CONSULTANT
wsp

YYYY-MM-DD	2024-04-10
PREPARED	AS
DESIGN	AS
REVIEW	
APPROVED	

TITLE
Primrose Elementary School – Semi-Log Plot of Drawdown and Recovery

PROJECT No.	TASK	Rev.	FIGURE
23611788	5000	A	E-2



CLIENT
DELTINI COMMERCIAL DEVELOPMENTS

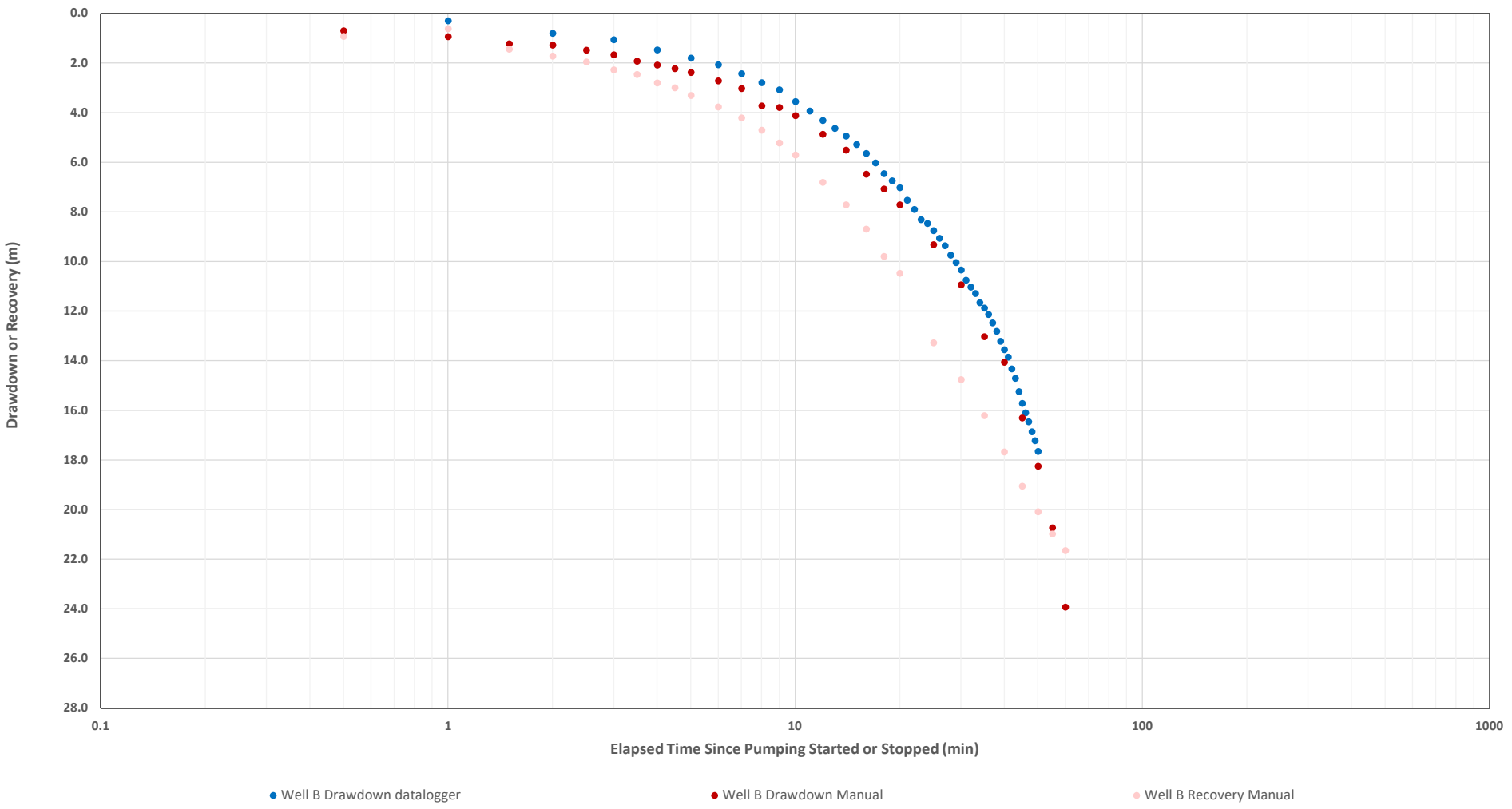
PROJECT
PRIMROSE GROUNDWATER SUPPLY STUDY

CONSULTANT

YYYY-MM-DD	2024-04-10
PREPARED	AS
DESIGN	AS
REVIEW	
APPROVED	

TITLE
Well B – Drawdown Hydrograph

PROJECT No.	TASK	Rev.	FIGURE
23611788	5000	A	E-3



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DELTINI COMMERCIAL DEVELOPMENTS

PROJECT
PRIMROSE GROUNDWATER SUPPLY STUDY

CONSULTANT

YYYY-MM-DD	2024-04-10
PREPARED	AS
DESIGN	AS
REVIEW	
APPROVED	

TITLE
Well B – Semi-Log Plot of Drawdown and Recovery

PROJECT No.	TASK	Rev.	FIGURE
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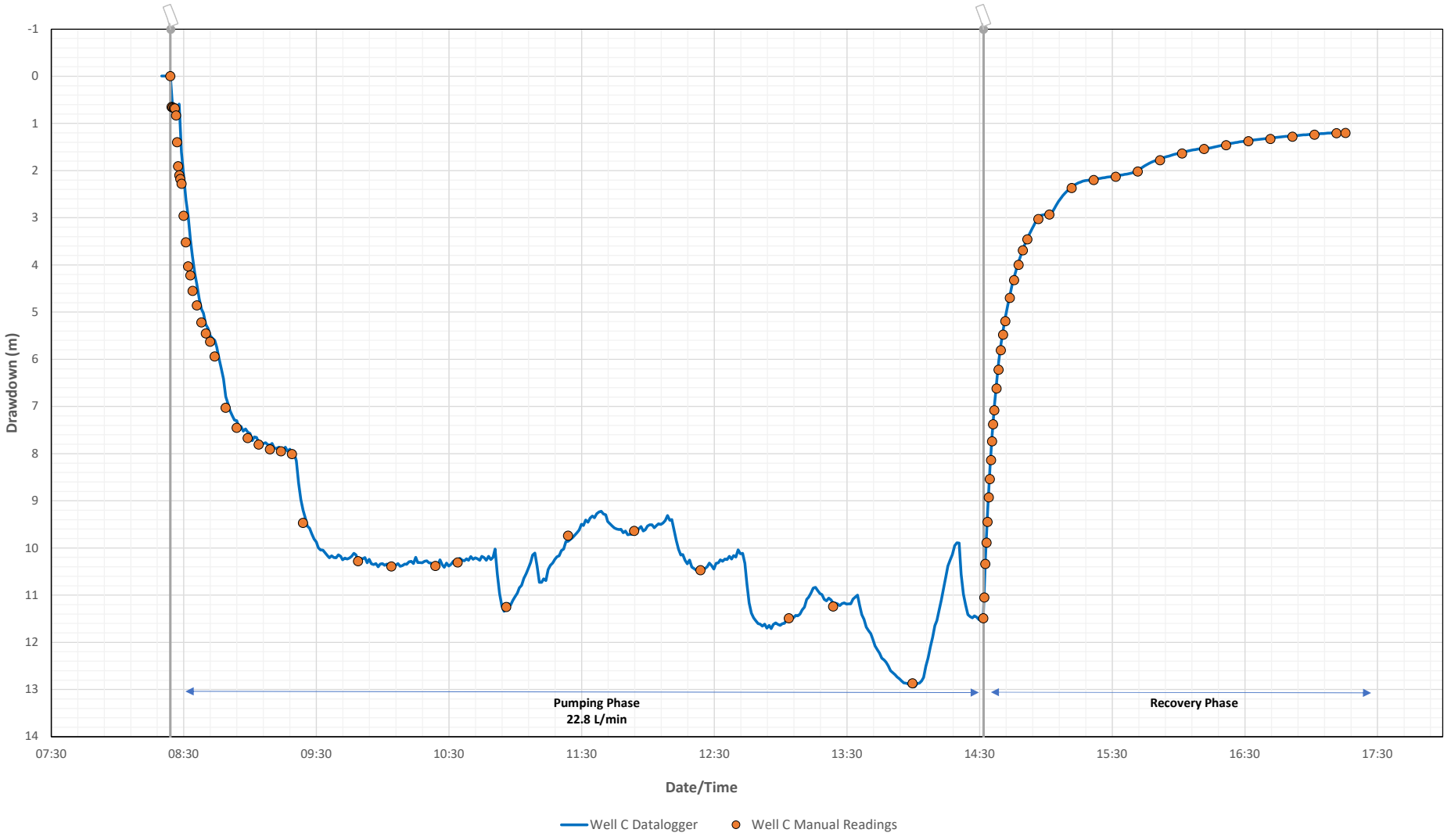

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DELTINI COMMERCIAL DEVELOPMENTS

PROJECT
PRIMROSE GROUNDWATER SUPPLY STUDY

CONSULTANT

YYYY-MM-DD	2024-04-10
PREPARED	AS
DESIGN	AS
REVIEW	
APPROVED	

TITLE
Well C – Drawdown Hydrograph

PROJECT No.	TASK	Rev.	FIGURE
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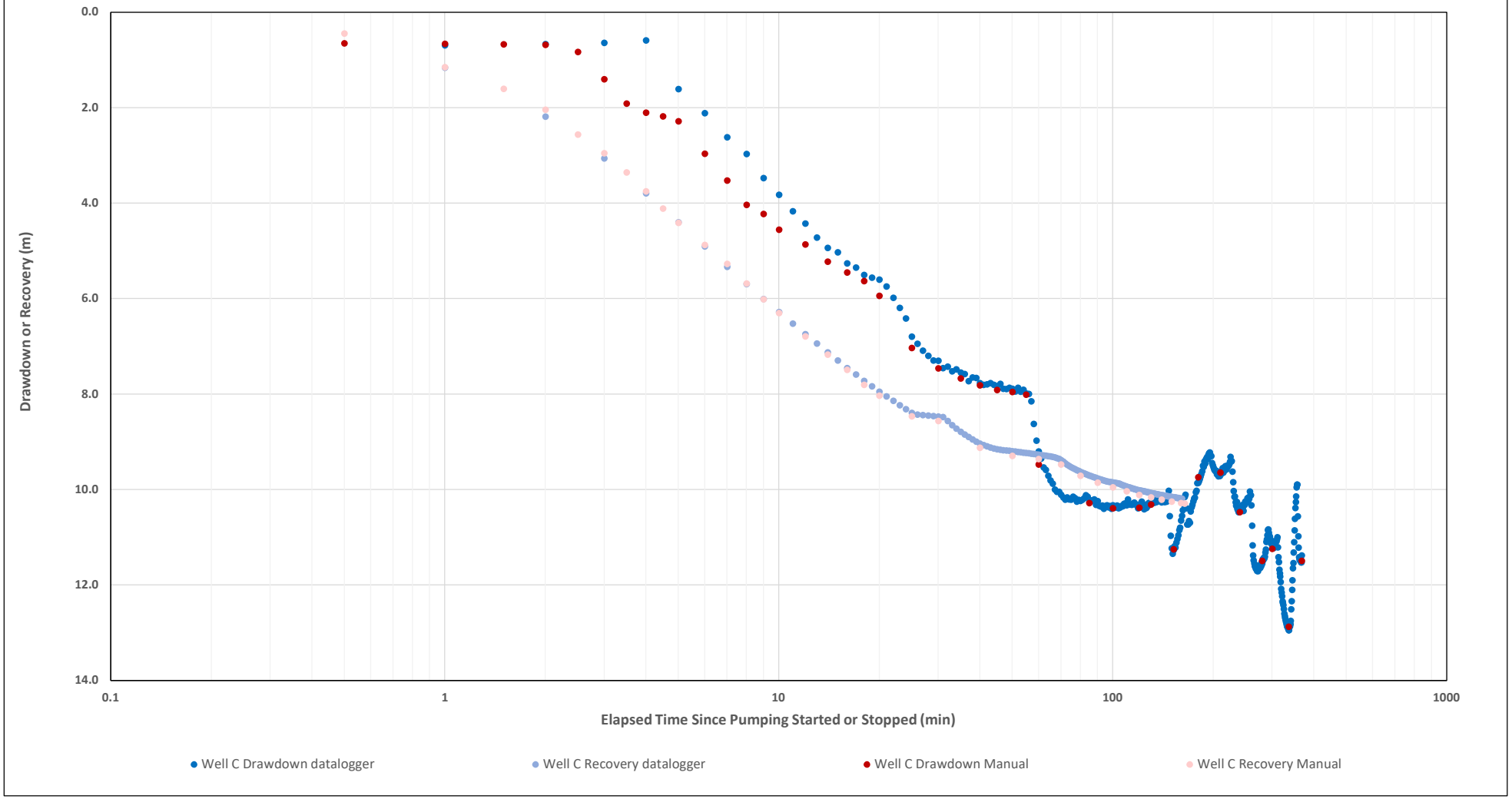

CLIENT
DELTINI COMMERCIAL DEVELOPMENTS

PROJECT
PRIMROSE GROUNDWATER SUPPLY STUDY

CONSULTANT
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YYYY-MM-DD	2024-04-10
PREPARED	AS
DESIGN	AS
REVIEW	
APPROVED	

TITLE
Well C – Semi-Log Plot of Drawdown and Recovery

PROJECT No.	TASK	Rev.	FIGURE
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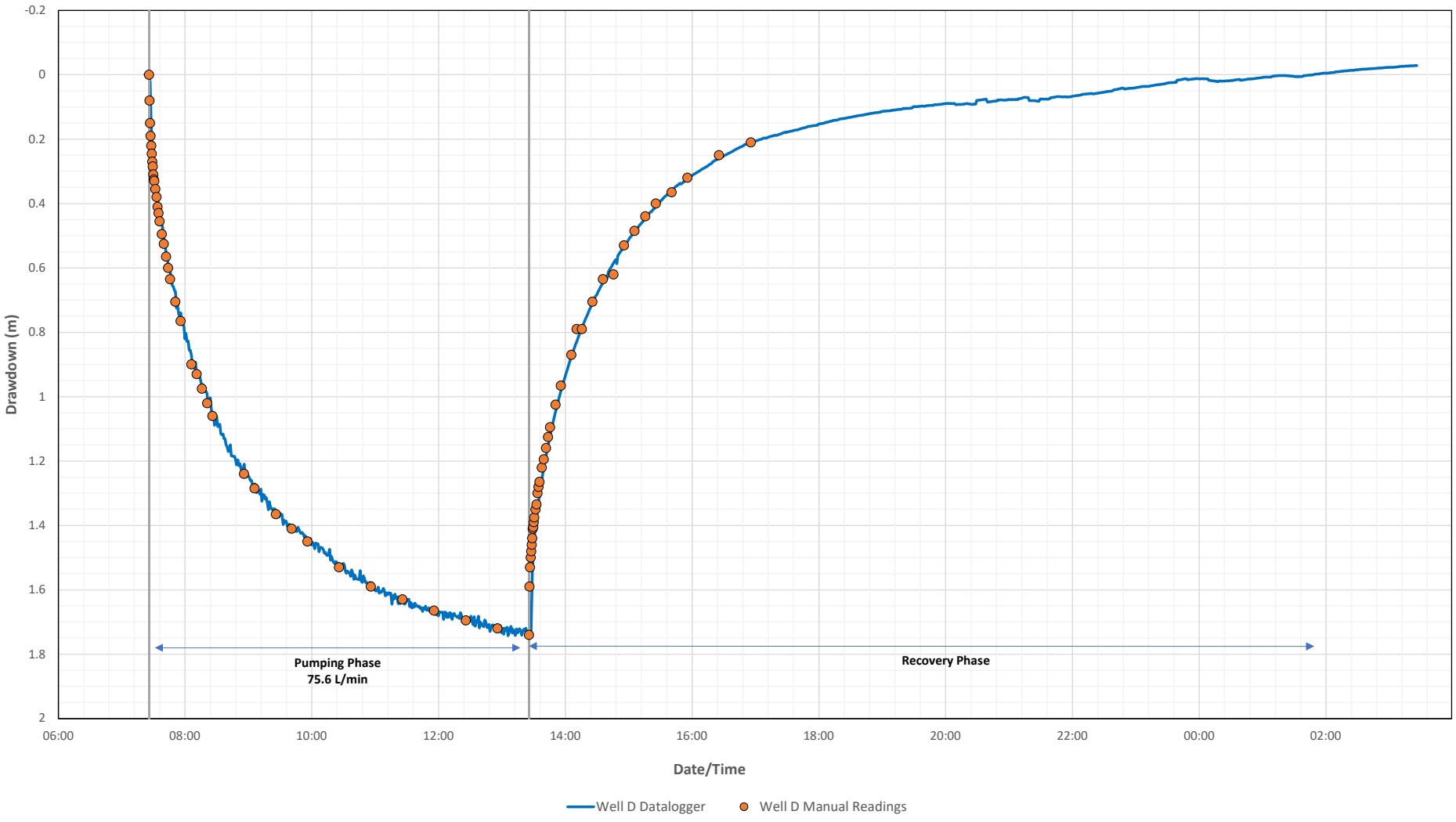

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DELTINI COMMERCIAL DEVELOPMENTS

PROJECT
PRIMROSE GROUNDWATER SUPPLY STUDY

CONSULTANT

YYYY-MM-DD	2024-04-10
PREPARED	AS
DESIGN	AS
REVIEW	
APPROVED	

TITLE
Well D – Drawdown Hydrograph

PROJECT No.	TASK	Rev.	FIGURE
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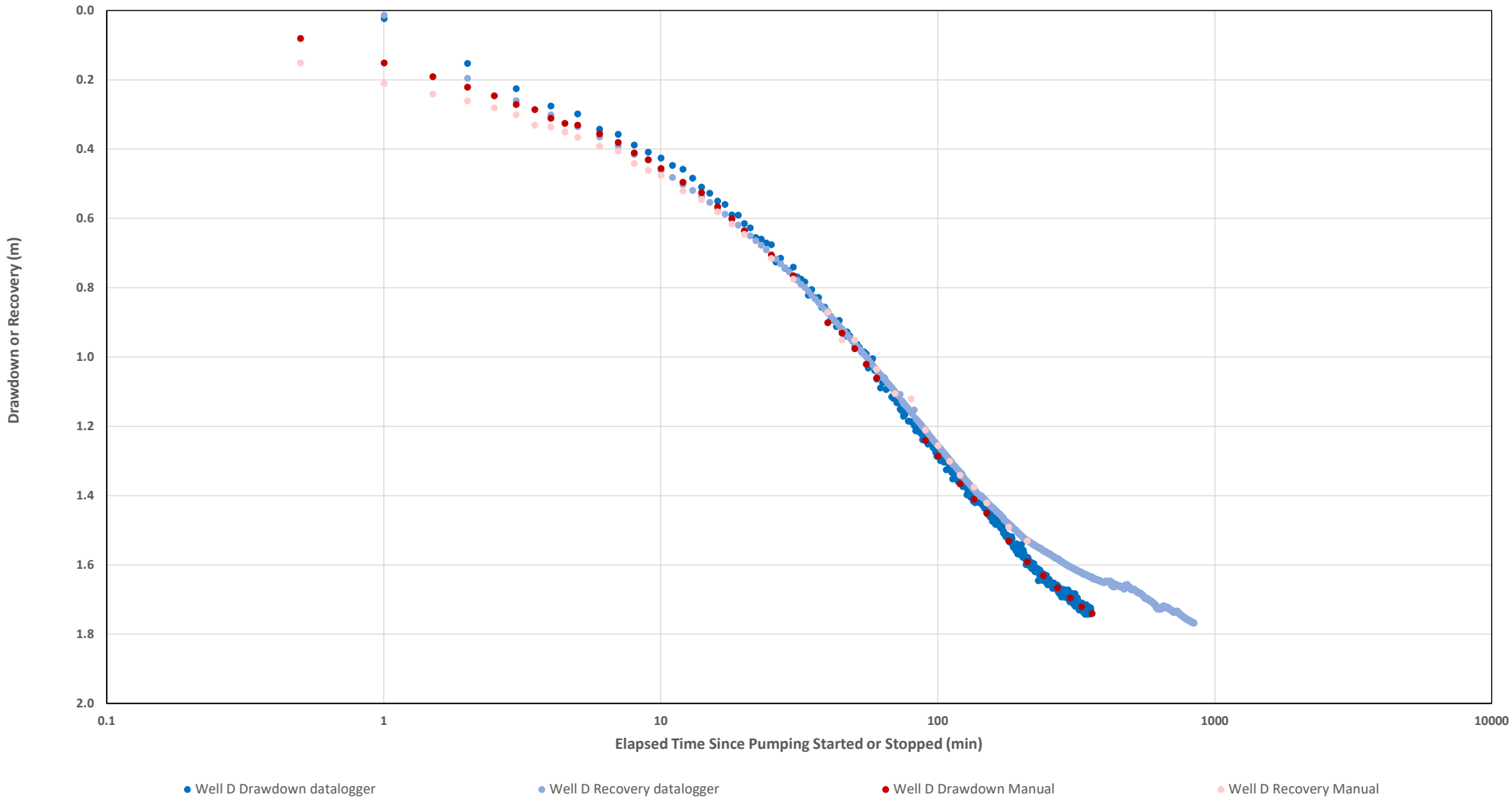

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PROJECT
PRIMROSE GROUNDWATER SUPPLY STUDY

CONSULTANT

YYYY-MM-DD	2024-04-10
PREPARED	AS
DESIGN	AS
REVIEW	
APPROVED	

TITLE
Well D – Semi-Log Plot of Drawdown and Recovery

PROJECT No.	TASK	Rev.	FIGURE
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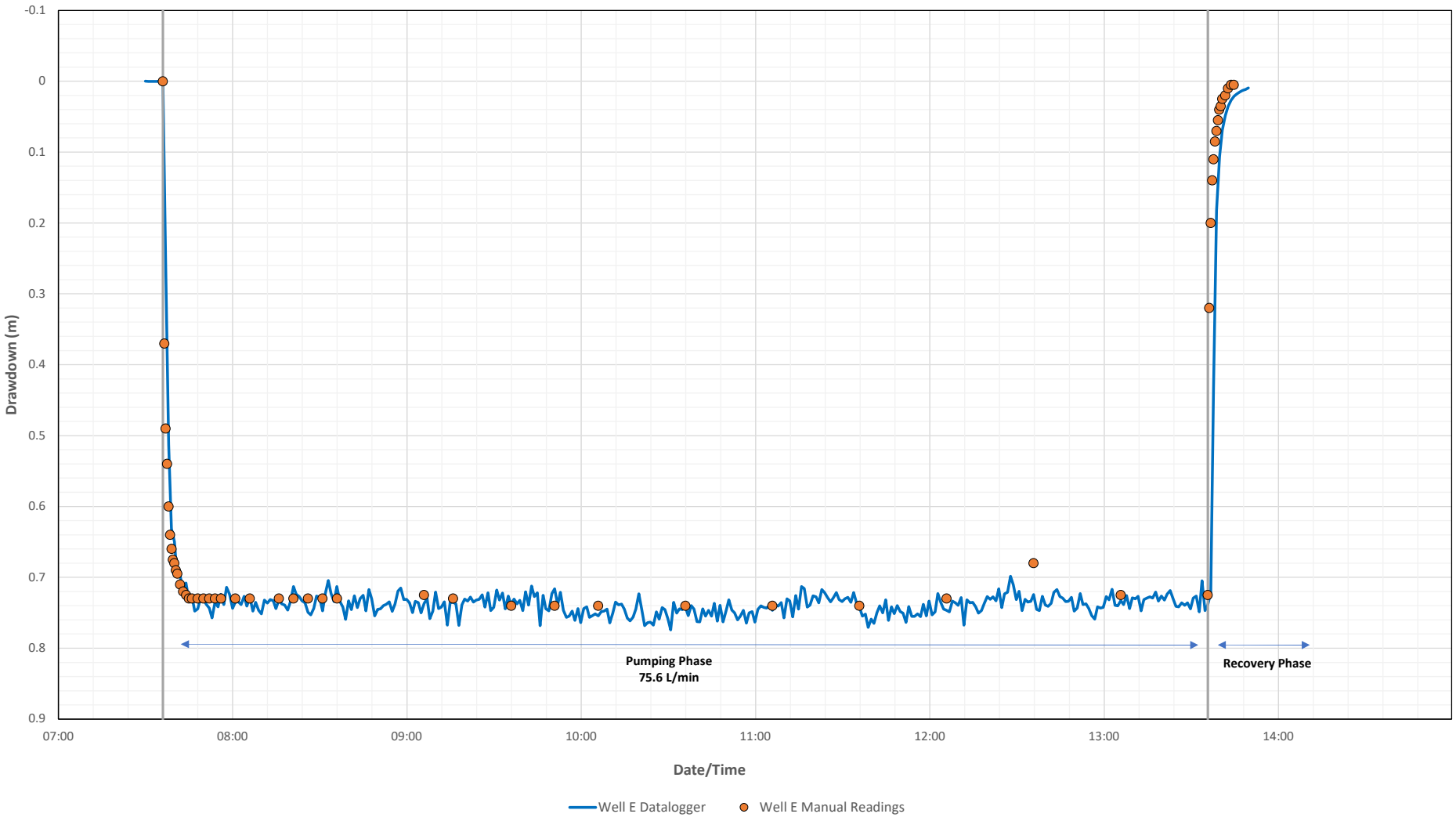

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PROJECT
PRIMROSE GROUNDWATER SUPPLY STUDY

CONSULTANT

YYYY-MM-DD	2024-04-10
PREPARED	AS
DESIGN	AS
REVIEW	
APPROVED	

TITLE
Well E – Drawdown Hydrograph

PROJECT No.	TASK	Rev.	FIGURE
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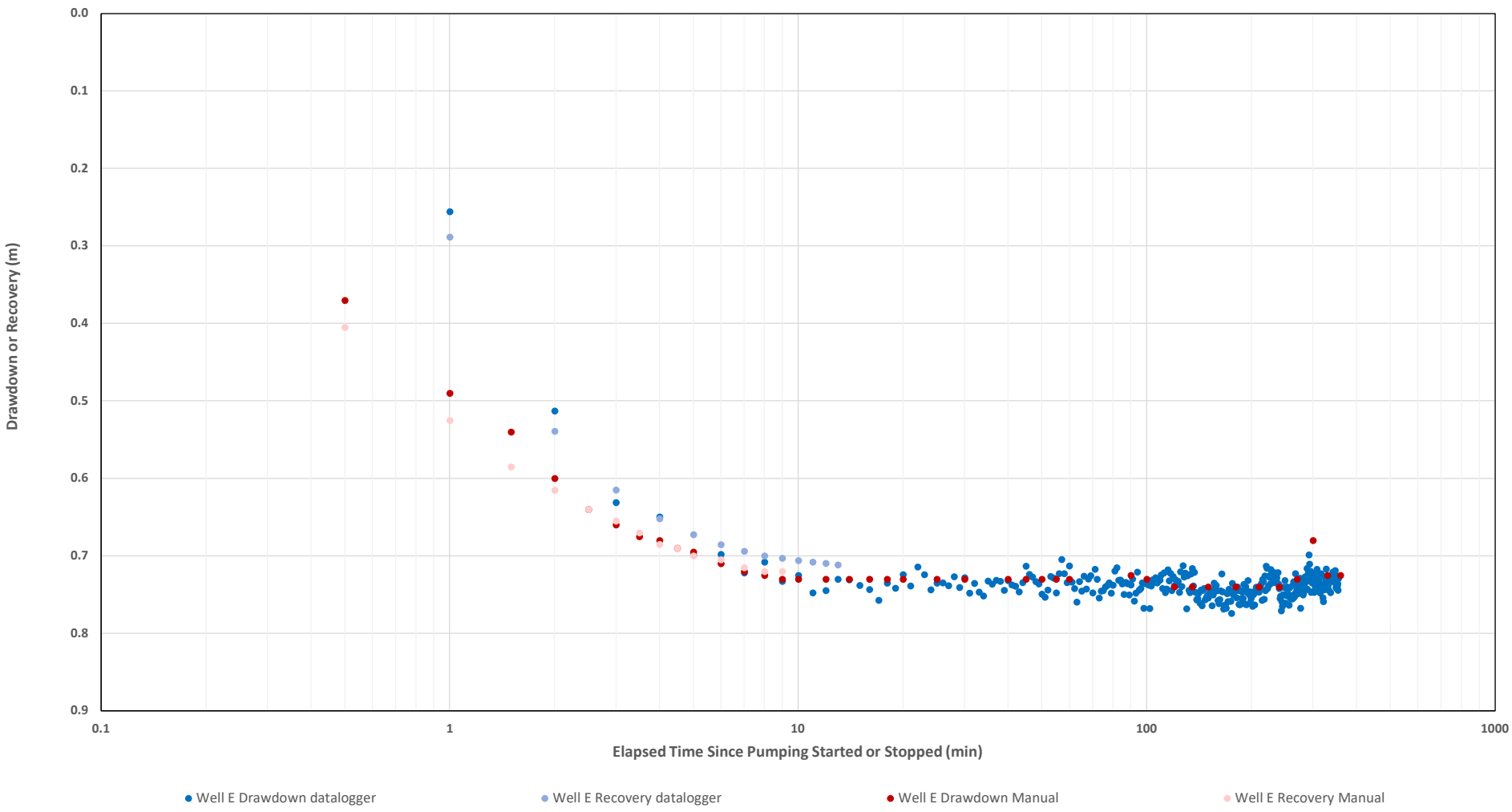

CLIENT
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PROJECT
PRIMROSE GROUNDWATER SUPPLY STUDY

CONSULTANT

YYYY-MM-DD	2024-04-10
PREPARED	AS
DESIGN	AS
REVIEW	
APPROVED	

TITLE
Well E – Semi-Log Plot of Drawdown and Recovery

PROJECT No.	TASK	Rev.	FIGURE
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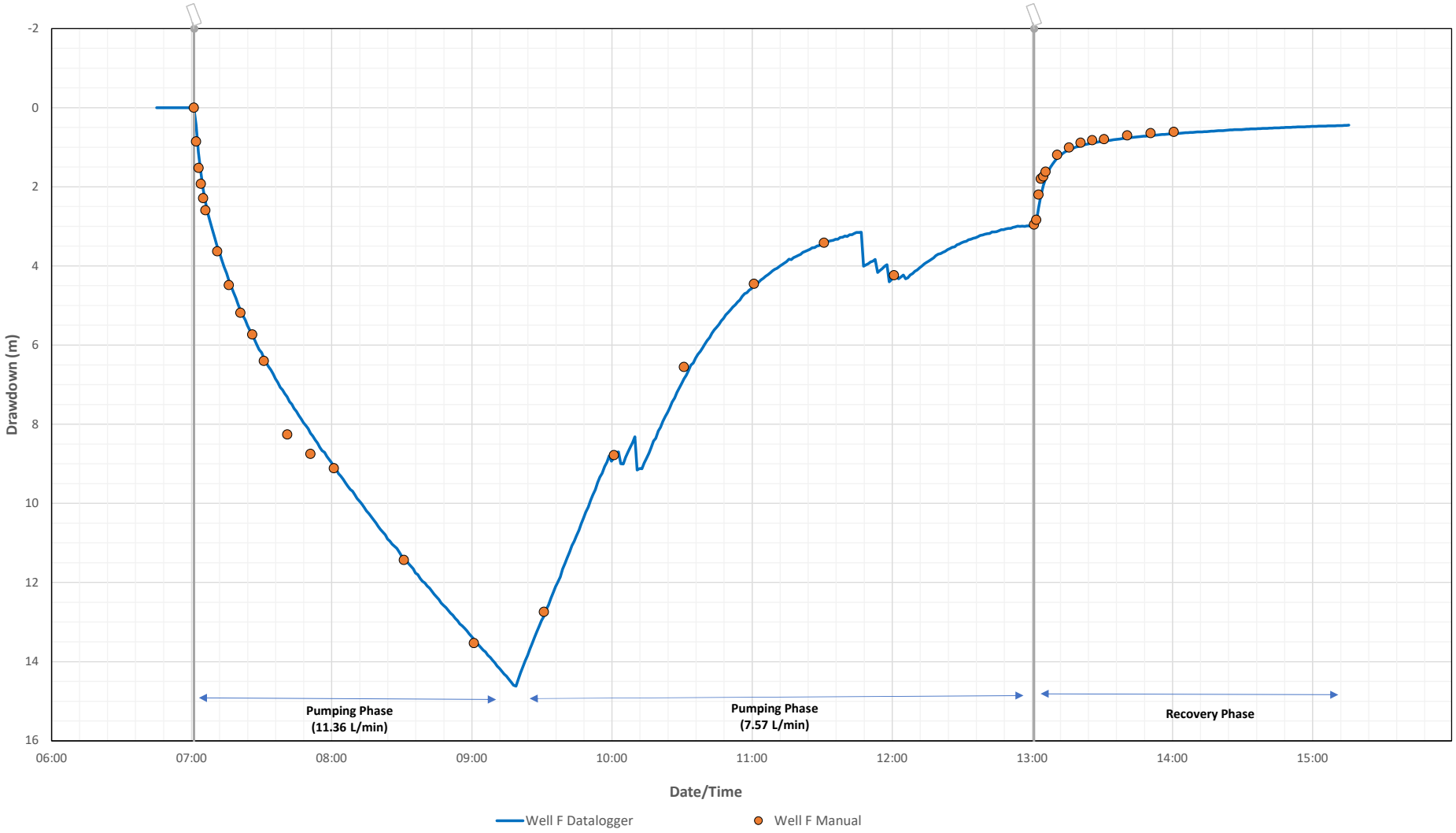

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DELTINI COMMERCIAL DEVELOPMENTS

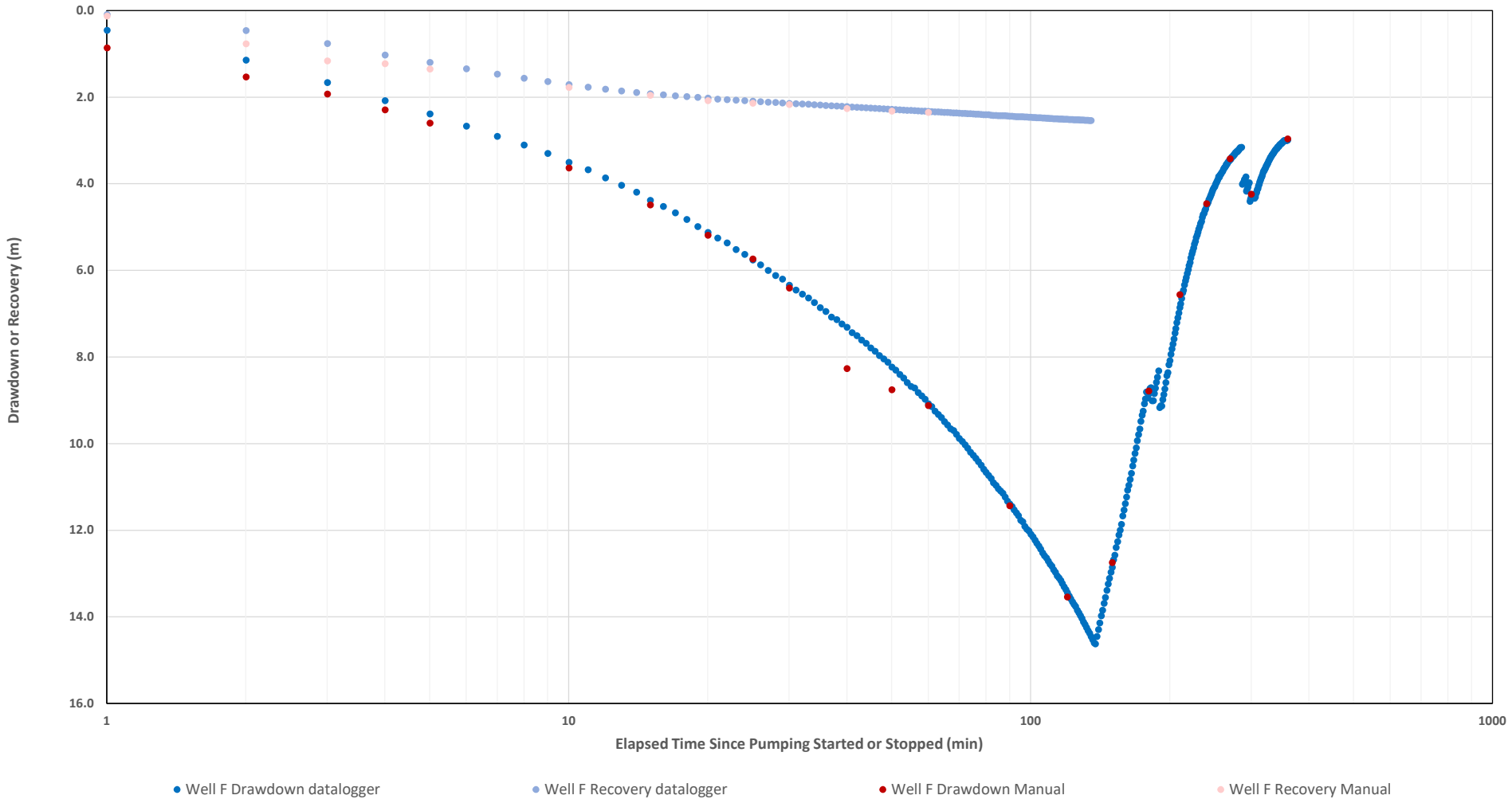
PROJECT
PRIMROSE GROUNDWATER SUPPLY STUDY

CONSULTANT

YYYY-MM-DD	2024-04-10
PREPARED	AS
DESIGN	AS
REVIEW	
APPROVED	

TITLE
Well F – Drawdown Hydrograph

PROJECT No.	TASK	Rev.	FIGURE
23611788	5000	A	E-11



CLIENT
DELTINI COMMERCIAL DEVELOPMENTS

PROJECT
PRIMROSE GROUNDWATER SUPPLY STUDY

CONSULTANT

YYYY-MM-DD	2024-04-10
PREPARED	AS
DESIGN	AS
REVIEW	
APPROVED	

TITLE
Well F – Semi-Log Plot of Drawdown and Recovery

PROJECT No.	TASK	Rev.	FIGURE
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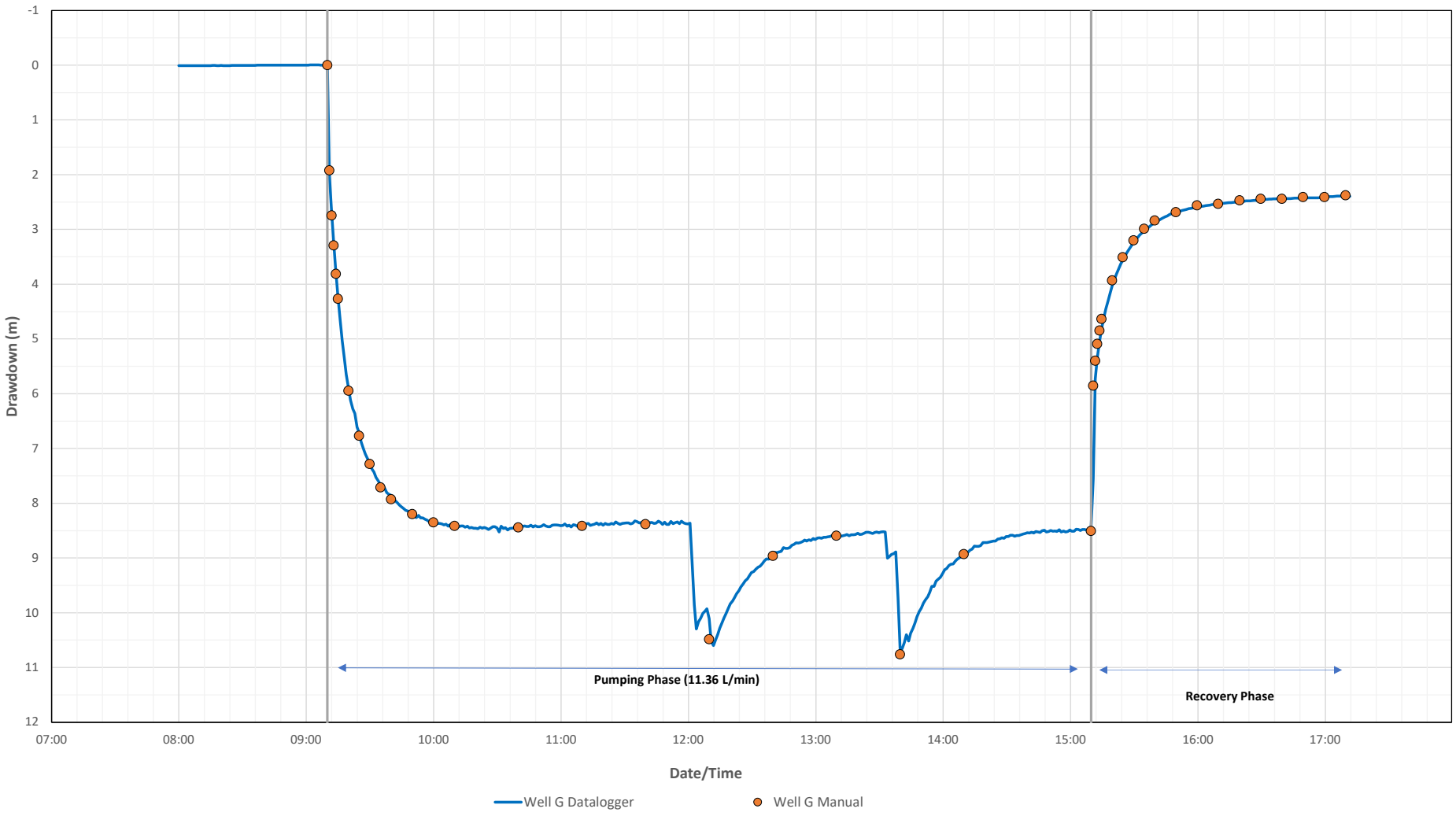


CLIENT
DELTINI COMMERCIAL DEVELOPMENTS

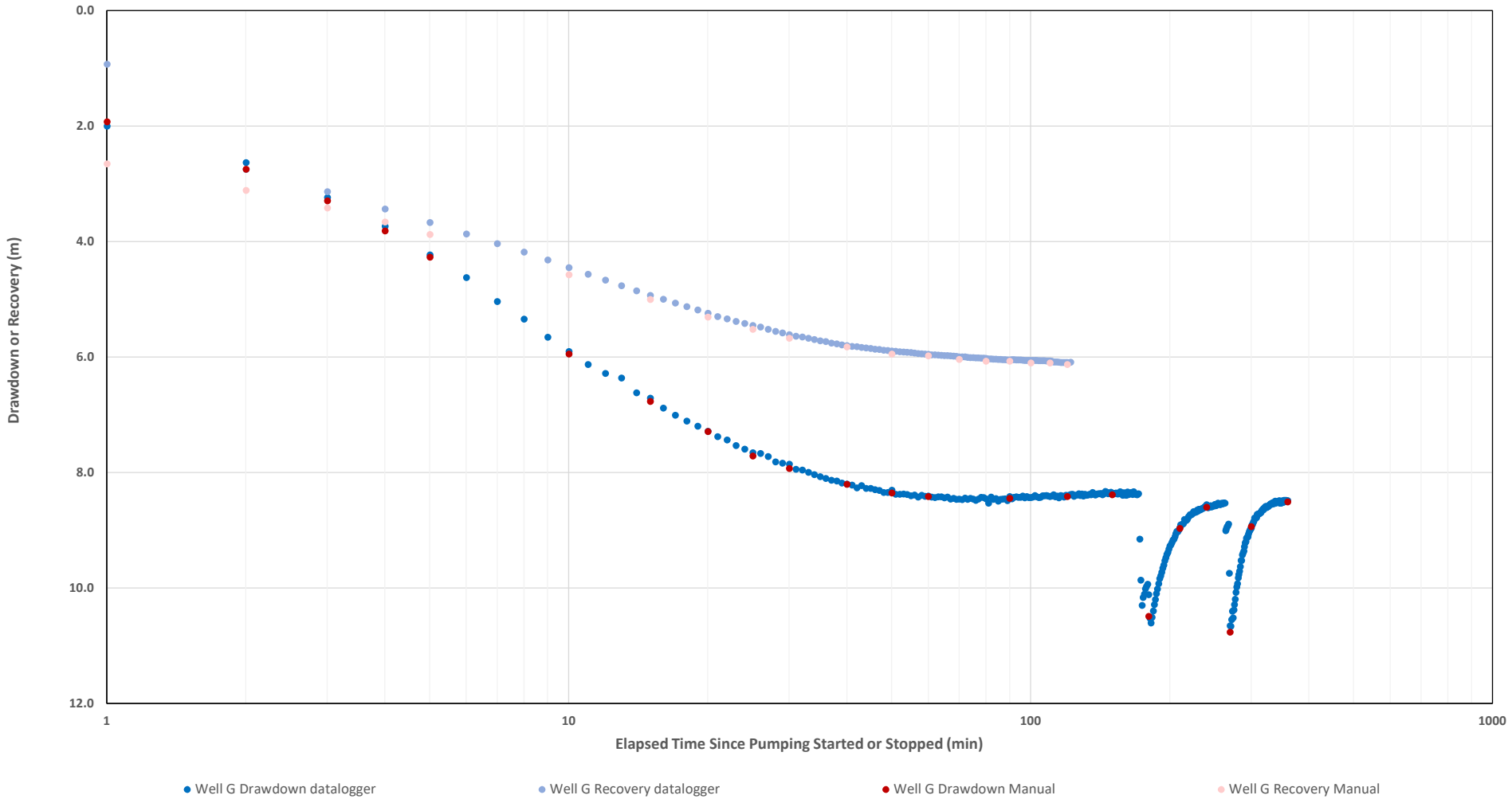
PROJECT
PRIMROSE GROUNDWATER SUPPLY STUDY

CONSULTANT

YYYY-MM-DD	2024-04-10
PREPARED	AS
DESIGN	AS
REVIEW	
APPROVED	

TITLE
Well G – Drawdown Hydrograph

PROJECT No.	TASK	Rev.	FIGURE
23611788	5000	A	E-13



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DELTINI COMMERCIAL DEVELOPMENTS

PROJECT
PRIMROSE GROUNDWATER SUPPLY STUDY

CONSULTANT

YYYY-MM-DD	2024-04-10
PREPARED	AS
DESIGN	AS
REVIEW	
APPROVED	

TITLE
Well G – Semi-Log Plot of Drawdown and Recovery

PROJECT No.	TASK	Rev.	FIGURE
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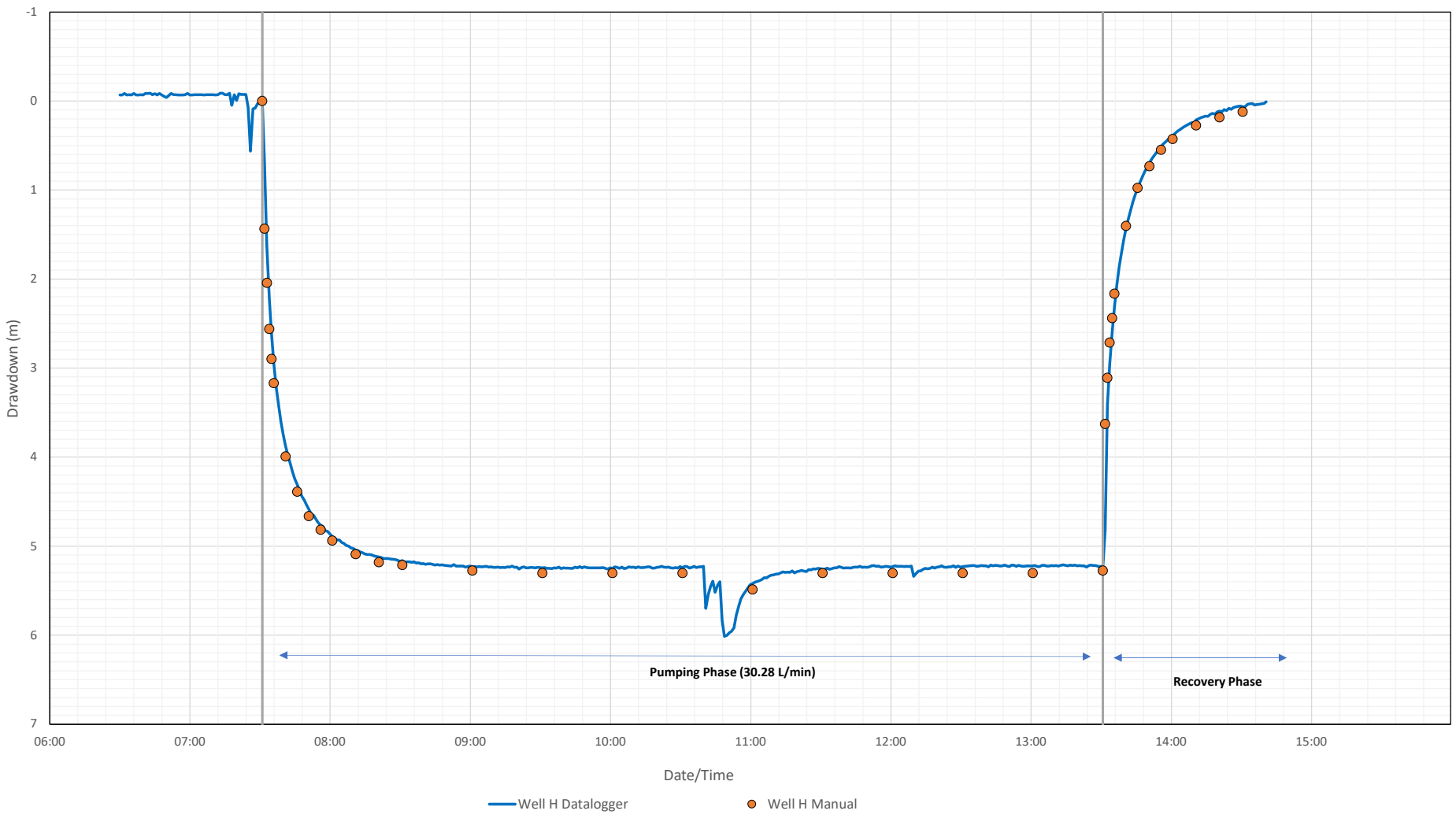

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DELTINI COMMERCIAL DEVELOPMENTS

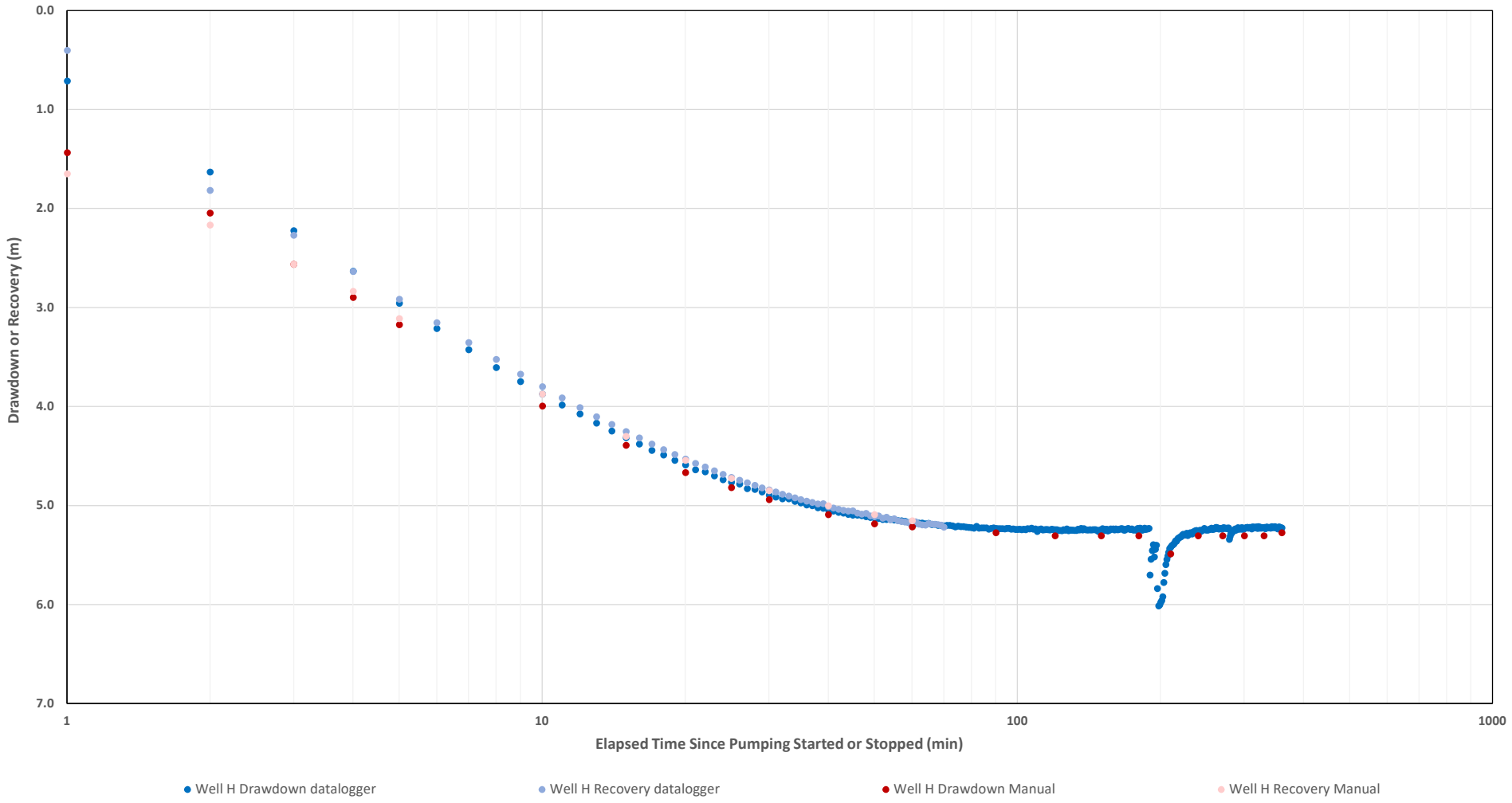
PROJECT
PRIMROSE GROUNDWATER SUPPLY STUDY

CONSULTANT

YYYY-MM-DD	2024-04-10
PREPARED	AS
DESIGN	AS
REVIEW	
APPROVED	

TITLE
Well H – Drawdown Hydrograph

PROJECT No.	TASK	Rev.	FIGURE
23611788	5000	A	E-15



CLIENT
DELTINI COMMERCIAL DEVELOPMENTS

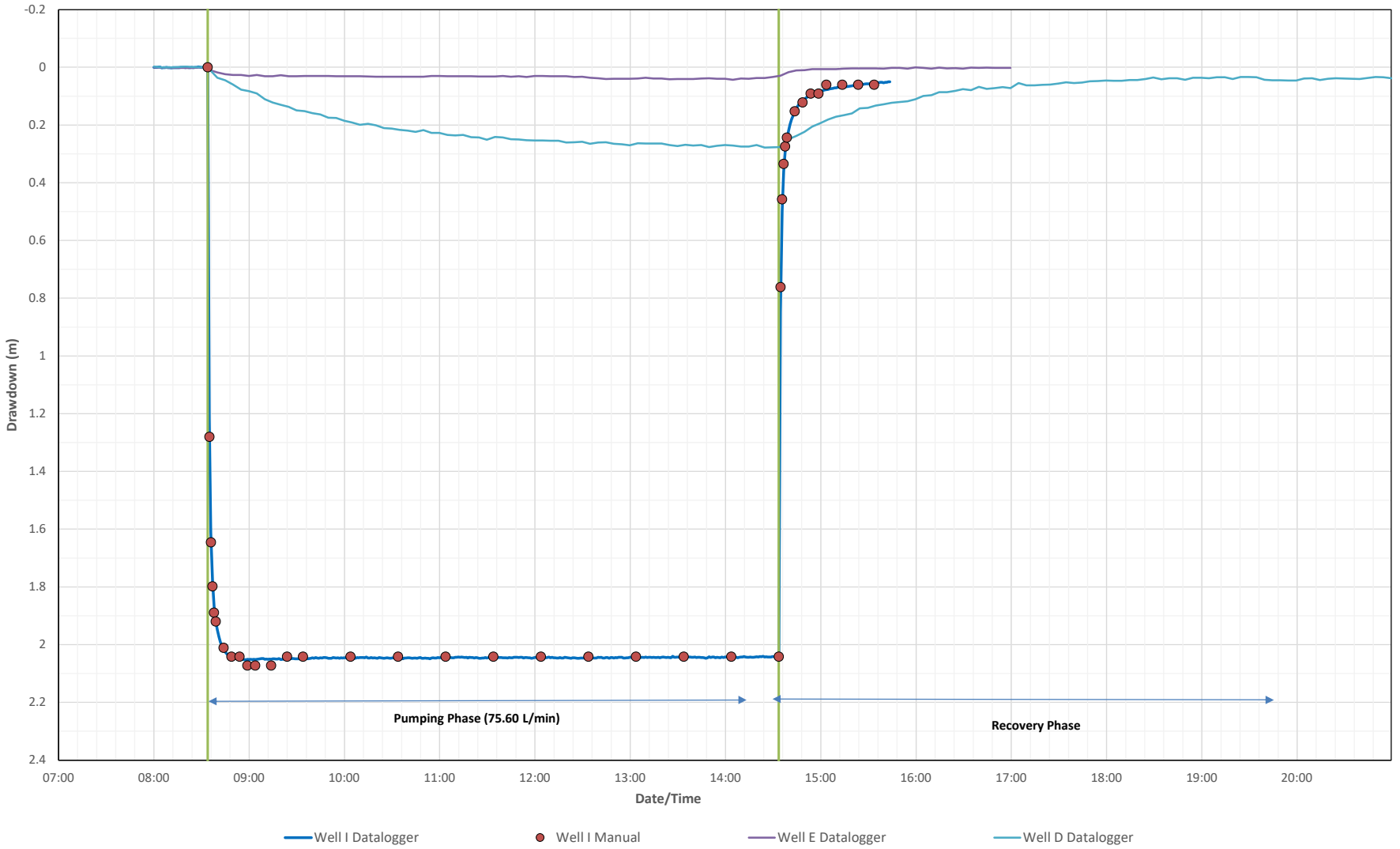
PROJECT
PRIMROSE GROUNDWATER SUPPLY STUDY

CONSULTANT

YYYY-MM-DD	2024-04-10
PREPARED	AS
DESIGN	AS
REVIEW	
APPROVED	

TITLE
Well H – Semi-Log Plot of Drawdown and Recovery

PROJECT No.	TASK	Rev.	FIGURE
23611788	5000	A	E-16



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DELTINI COMMERCIAL DEVELOPMENTS

PROJECT
PRIMROSE GROUNDWATER SUPPLY STUDY

CONSULTANT

YYYY-MM-DD	2024-04-10
PREPARED	AS
DESIGN	AS
REVIEW	
APPROVED	

TITLE
Well I – Drawdown Hydrograph

PROJECT No.	TASK	Rev.	FIGURE
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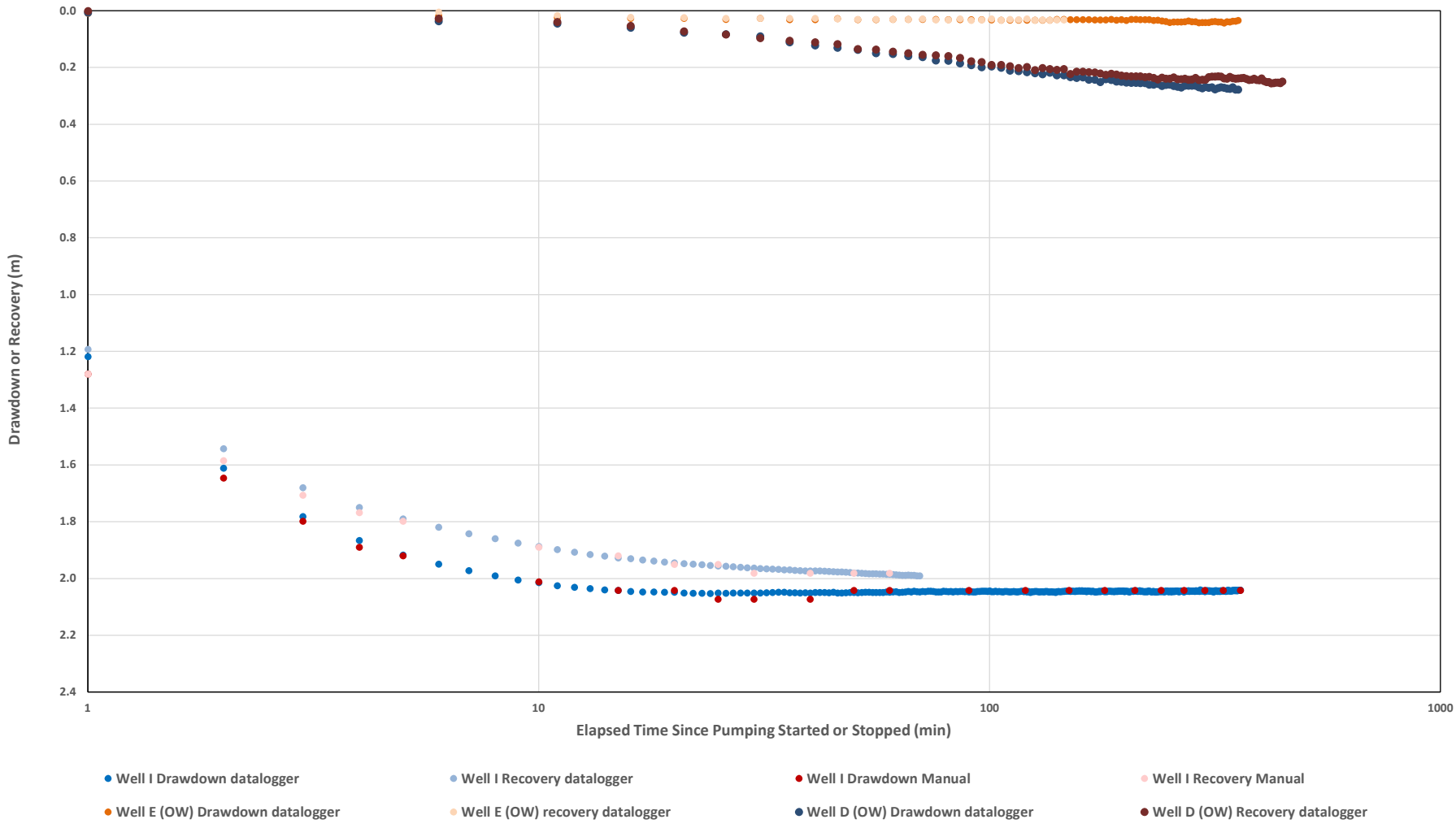


CLIENT
DELTINI COMMERCIAL DEVELOPMENTS

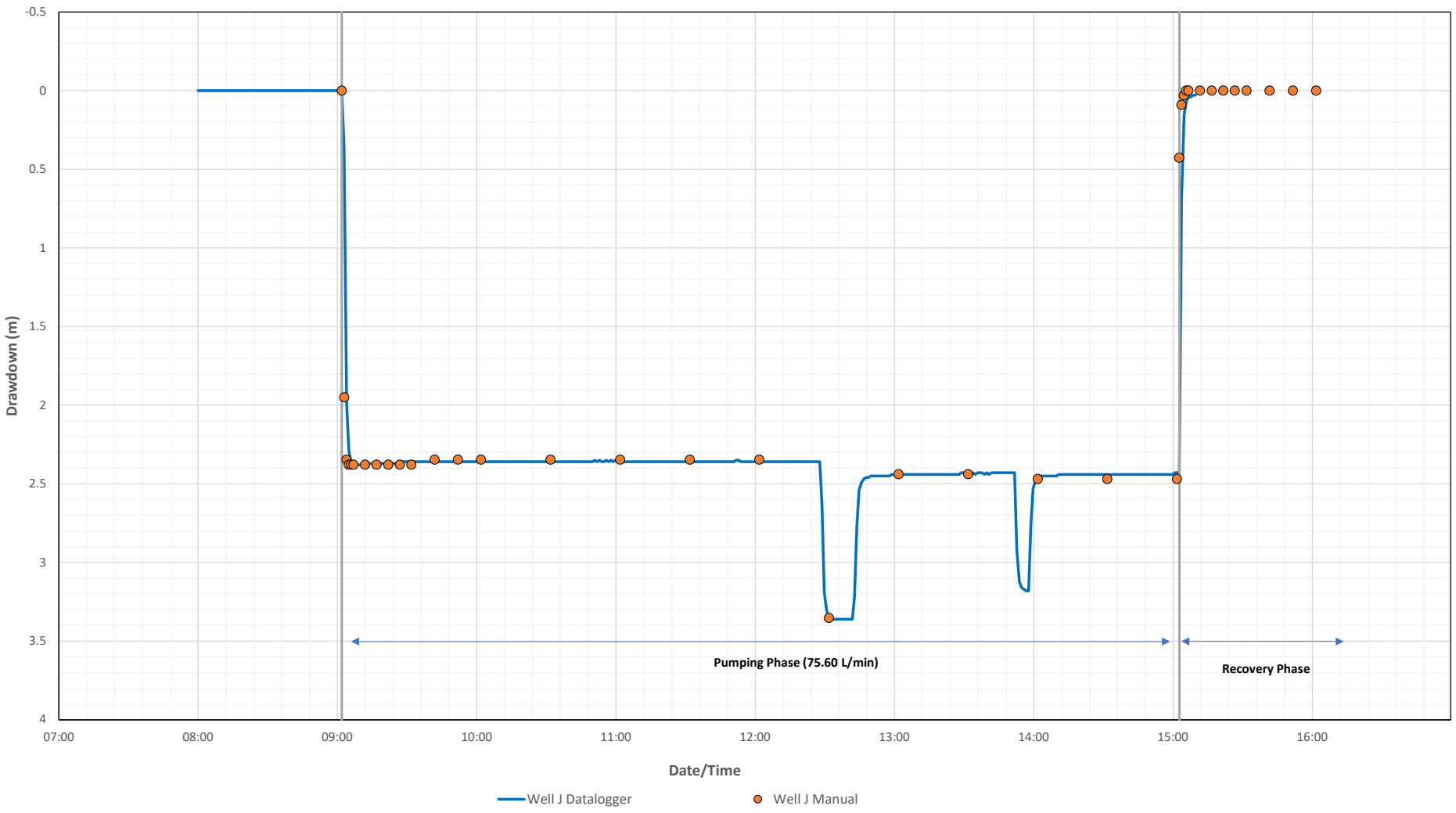
PROJECT
PRIMROSE GROUNDWATER SUPPLY STUDY

CONSULTANT

YYYY-MM-DD	2024-04-10
PREPARED	AS
DESIGN	AS
REVIEW	
APPROVED	

TITLE
Well I – Semi-Log Plot of Drawdown and Recovery

PROJECT No.	TASK	Rev.	FIGURE
23611788	5000	A	E-18



CLIENT
DELTINI COMMERCIAL DEVELOPMENTS

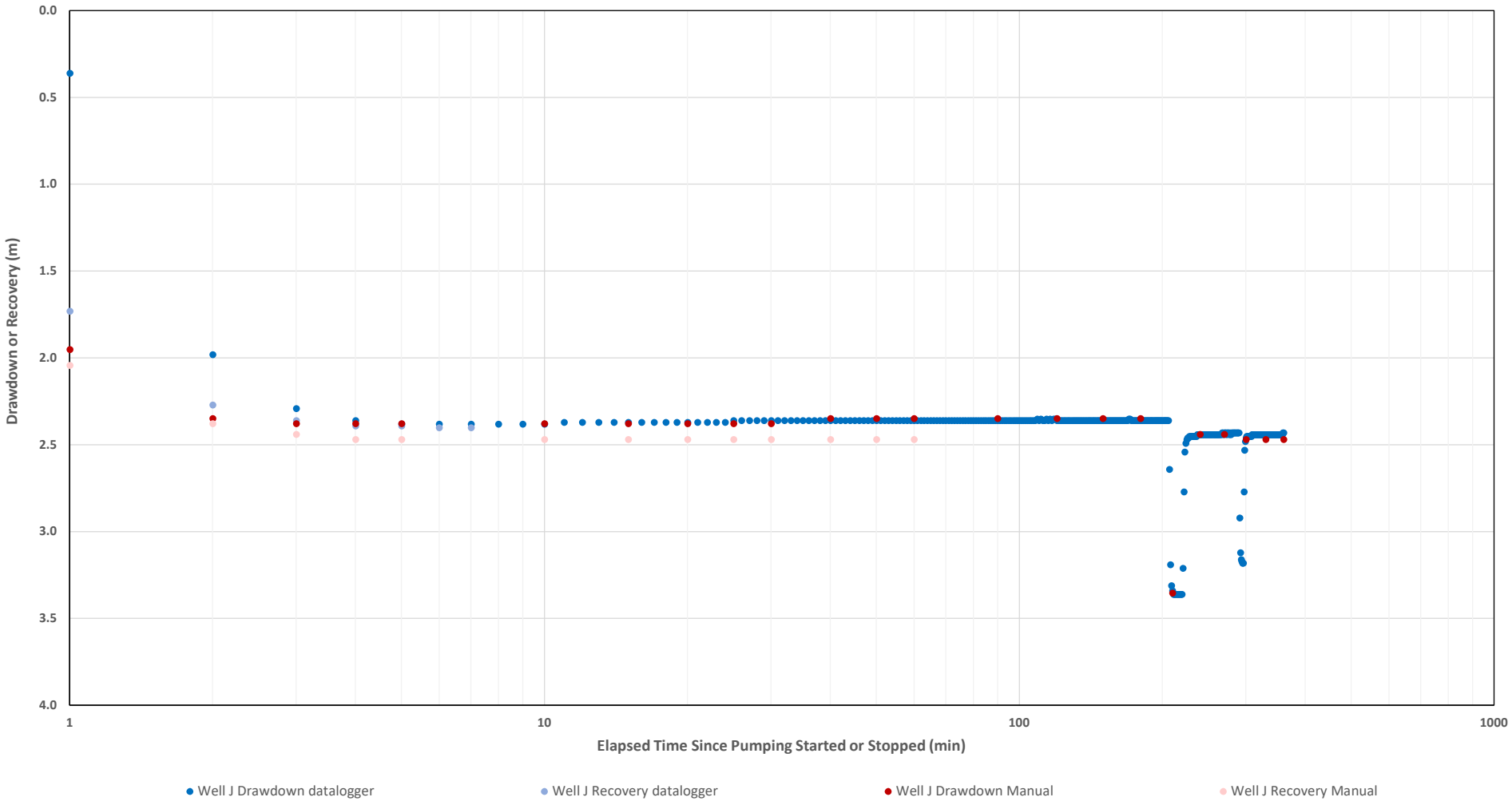
PROJECT
PRIMROSE GROUNDWATER SUPPLY STUDY

CONSULTANT

YYYY-MM-DD	2024-04-10
PREPARED	AS
DESIGN	AS
REVIEW	
APPROVED	

TITLE
Well J – Drawdown Hydrograph

PROJECT No.	TASK	Rev.	FIGURE
23611788	5000	A	E-19



CLIENT
DELTINI COMMERCIAL DEVELOPMENTS

PROJECT
PRIMROSE GROUNDWATER SUPPLY STUDY

CONSULTANT

YYYY-MM-DD	2024-04-10
PREPARED	AS
DESIGN	AS
REVIEW	
APPROVED	

TITLE
Well J – Semi-Log Plot of Drawdown and Recovery

PROJECT No.	TASK	Rev.	FIGURE
23611788	5000	A	E-20

APPENDIX F

Water Quality

Table F-1: Summary of Groundwter Quality Results - Phase 1

Client ID:						School	Well B-2	Well C-1	Well C-2	Well D-1	Well D-2	Well E-1	Well E-2
Sample ID:						23-021539-1	23-022070-1	23-021850-1	23-021850-2	23-022346-1	23-022346-2	23-022228-1	23-022228-2
Date Collected:						17-Aug-23	22-Aug-23	21-Aug-23	21-Aug-23	24-Aug-23	24-Aug-23	23-Aug-23	23-Aug-23
Parameter	**Units**	**Standard**	**AO**	**OG**	**Treatability**								
Total Coliform (DC Media)	CFU/100mL	ND	-	-	-	0	NDOGT		NDOGT		**25**		0
E coli (DC Media)	CFU/100mL	ND	-	-	-	0	NDOGT		NDOGT		0		0
Background (DC Media)	CFU/100mL	-	-	-	-		NDOGT		NDOGT		151		53
Alkalinity(CaCO3) to pH4.5	mg/L	-	-	30-500	-	317	259	261	258	347	339	333	337
pH @25°C	pH units	-	-	6.5-8.5	-	7.75	7.9	7.63	7.61	7.88	7.86	7.81	7.82
Conductivity @25°C	uS/cm	-	-	-	-	3590	764	851	853	2060	2070	4300	4160
Colour	TCU	-	5	-	7	<2	<2		<2		<2		<2
Turbidity	NTU	-	5	-	5	**32.6**	**7910**		**9.5**		**19.1**		**16.2**
Fluoride	mg/L	1.5	-	-	-	<0.7	<0.1	<0.1	<0.1	<0.7	<0.7	<0.7	<0.7
Chloride	mg/L	-	250	-	250	**998**	65.5	51.5	51.8	**460**	**467**	**1210**	**1160**
Nitrate (N)	mg/L	10	-	-	-	3.32	6.07	3.38	3.44	<0.40	<0.40	<0.40	<0.40
Nitrite (N)	mg/L	1	-	-	-	<0.40	<0.05	<0.05	<0.05	<0.40	<0.40	<0.40	<0.40
Sulphate	mg/L	-	500	-	500	45	24	104	103	49	45	33	33
Total Kjeldahl Nitrogen	mg/L	-	-	-	-	0.3	2.3		0.2		0.3		0.3
Ammonia (N)-Total (NH3+NH4)	mg/L	-	-	-	-	<0.05	0.3		0.12		0.05		0.12
Organic Nitrogen	mg/L	-	-	0.15	-	**0.3**	**2**		<0.1		**0.2**		**0.2**
Dissolved Organic Carbon	mg/L	-	5	-	10	1.1	3.5		4.6		1.3		1
Tannin & Lignin	mg/L	-	-	-	-	<0.5	0.6		<0.5		<0.5		<0.5
Sulphide	mg/L	-	0.05	-	-	<0.08	4		0.01		<0.01		<0.01
Phenolics	mg/L	-	-	-	-	<0.001	<0.001		<0.001		<0.001		<0.001
Hardness (as CaCO3)	mg/L as CaCO3	-	-	80-100	-	**510**	305	380	372	**590**	**580**	**833**	**822**
Aluminum	mg/L	-	-	0.1	-	0.09	0.03		0.18		0.08		0.1
Barium	mg/L	1	-	-	-	0.202	0.04		0.133		0.333		**1.43**
Boron	mg/L	5	-	-	-	0.044	0.309		0.418		0.014		0.017
Calcium	mg/L	-	-	-	-	156	89.5	109	107	188	185	247	244
Copper	mg/L	-	1	-	-	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Iron	mg/L	-	0.3	-	10	<0.005	<0.005	0.144	0.086	**1.48**	**1.39**	**1.22**	**1.23**
Magnesium	mg/L	-	-	-	-	29.1	19.7	26.1	25.5	29.1	28.6	52.4	51.6
Manganese	mg/L	-	0.05	-	1	0.005	0.006	0.011	0.006	**0.109**	**0.103**	**0.066**	**0.064**
Nickel	mg/L	-	-	-	-	<0.01	<0.01		<0.01		<0.01		<0.01
Potassium	mg/L	-	-	-	-	2.2	8.6	2.9	3.3	1.8	1.9	3.7	3.6
Silica	mg/L					8	9		11		13		19
Sodium	mg/L	-	200	-	200	***514***	29.5	39.1	42.4	190	197	***542***	***521***
Zinc	mg/L	-	5	-	-	0.061	0.009	0.025	0.012	0.008	0.007	0.02	0.01
Antimony	mg/L	0.006	-	-	-	<0.0001	0.0003		0.0003		<0.0001		<0.0001
Arsenic	mg/L	0.01	-	-	-	0.0008	0.0025		0.0007		<0.0001		**0.0164**
Cadmium	mg/L	0.005	-	-	-	0.000073	<0.000015		0.000043		<0.000015		<0.000015
Chromium	mg/L	0.05	-	-	-	<0.0010	<0.0010		<0.0010		<0.0010		<0.0010
Lead	mg/L	0.010	-	-	-	0.00095	0.00016		0.001		0.00005		0.00051
Molybdenum	mg/L	-	-	-	-	0.0004	0.003		0.0008		0.0004		0.0002
Selenium	mg/L	0.05	-	-	-	<0.001	<0.001		<0.001		<0.001		<0.001
Silver	mg/L	-	-	-	-	0.0002	<0.0001		<0.0001		<0.0001		<0.0001
Thallium	mg/L	-	-	-	-	0.00007	<0.00005		0.00008		<0.00005		<0.00005
Uranium	mg/L	0.02	-	-	-	0.00069	0.00081		0.00138		0.001		0.00055
Vanadium	mg/L	-	-	-	-	0.0003	0.0005		0.0002		0.0002		<0.0001
Anion Sum	meq/L	-	-	-	-	35.7	7.96	9.06	9.01	20.9	20.9	41.6	40.2
Cation Sum	meq/L	-	-	-	-	32.6	7.59	9.37	9.36	20.2	20.3	40.4	39.2
% Difference	%	-	-	-	-	4.5	2.38	1.64	1.93	1.86	1.49	1.48	1.23
TDS (Ion Sum Calc)	mg/L	-	500	-	-	**1950**	419	**504**	**503**	**1130**	**1130**	**2290**	**2220**
Conductivity Calc	µmho/cm	-	-	-	-	3410	755	873	871	2010	2020	3960	3840
pH (Client Data)	pH units					6.71	6.55	7.4	7.15	7.15	7.39	7.21	7.51
Temperature (Client Data)	°C					12.3	12.1	12.2	12.3	9.8	9.4	9.8	9.2

1. Procedure D-5-5. Technical Guideline for Private Wells: Water Supply Assessment. Last Revision August 1996. Table 3: Common Aesthetic, Analytical and Indicator Parameters
2. *, ***italicized bold font*** = The aesthetic objective for sodium in drinking water is 200 mg/L. The local Medical Officer of Health should be notified when the sodium concentration exceeds 20 mg/L so that this information may be communicated to local physicians for their use with patients on sodium restricted diets (ODWSOG, June 2003, revised June 2006).
3. **Bolded and shaded** values exceed one of the Standards, Objectives or Guidelines.
4. Red-shaded cells exceed the corresponding Standard (Ontario Drinking Water Quality Standards).
5. Orange-shaded cells exceed the corresponding Aesthetic Objective (AO).
6. Yellow-shaded cells exceed the corresponding Operational Guideline (OG).
7. Cells with a bold, dashed border exceed the Treatability limit in Procedure D-5-5.
8. NDOGT = No Data; Overgrown with Target, refers to overcrowding microbial growth

Table F-2: Groundwater Quality Results - Phase 2

Client ID:						F-1	F-2	G-1	G-2	H-1	H-2	I-1	I-2	J-1	J-2
Sample ID:						24-006254-1	24-006254-2	24-005837-1	24-005837-2	24-006341-1	24-006341-2	24-006254-3	24-006254-4	24-005837-3	24-005837-4
Date Collected:						6-Mar-24	6-Mar-24	4-Mar-24	4-Mar-24	7-Mar-24	7-Mar-24	6-Mar-24	6-Mar-24	4-Mar-24	4-Mar-24
Parameter	**Units**	**Standard**	**AO**	**OG**	**Treatability**										
Total Coliform	CFU/100mL	ND	-	-	-		0		**2**		0		0		0
E. coli	CFU/100mL	ND	-	-	-		0		0		0		0		0
Fecal Coliform	CFU/100mL	-	-	-	-		0		0		0		0		0
Alkalinity(CaCO3) to pH4.5	mg/L	-	-	30-500	-	220	221	256	255	230	230	364	364	235	236
TDS (Calc. from Cond.)	mg/L	-	500	-	-		289		470		**735**		**1260**		311
Conductivity @25°C	uS/cm	-	-	-	-	587	557	880	888	1350	1350	2290	2280	583	599
pH @25°C	pH units	-	-	6.5-8.5	-	8.22	8.18	8.09	8.1	8.04	8.11	8.11	8.12	8.09	8.09
Colour	TCU	-	5	-	7		<2		<2		<2		<2		<2
Turbidity	NTU	-	5	-	5		**10.8**		**10.4**		2.8		**12.6**		2.3
Fluoride	mg/L	1.5	-	-	-	0.5		0.8		<0.7		<0.7		<0.1	
Chloride	mg/L	-	250	-	250	42.8	31.8	97.2	99.5	**286**	**287**	**571**	**593**	22.8	27.5
Nitrate (N)	mg/L	10	-	-	-	2.14	2.2	0.94	0.89	0.7	0.67	<0.40	<0.40	4.39	4.45
Nitrite (N)	mg/L	1	-	-	-	0.08	0.09	0.09	0.1	<0.40	<0.40	<0.40	<0.40	0.07	0.07
Sulphate	mg/L	-	500	-	500	32	29	41	42	37	37	39	41	22	22
Ammonia (N)-Total (NH3+NH4)	mg/L	-	-	-	-		0.4		0.56		<0.05		0.06		<0.05
Dissolved Organic Carbon	mg/L	-	5	-	10		3.2		3.4		2.4		3.1		3.9
Hardness (as CaCO3)	mg/L as CaCO3	-	-	80-100	-	211		228		429		492		275	
Calcium	mg/L	-	-	-	-	50.9	51.8	60.8	61.9	116	118	157	158	78	78.4
Copper	mg/L	-	1	-	-	<0.002		<0.002		<0.002		0.006		<0.002	
Iron	mg/L	-	0.3	-	10	0.134	0.188	0.1	0.149	0.07	0.066	**1.48**	**1.5**	0.104	0.108
Magnesium	mg/L	-	-	-	-	20.3	20.5	18.4	18.6	33.7	33.9	24.2	24.3	19.4	19.2
Manganese	mg/L	-	0.05	-	1	0.016	0.022	0.023	0.028	**0.06**	**0.062**	**0.076**	**0.076**	0.007	0.008
Potassium	mg/L	-	-	-	-	7.7		14.1		1.8		3.9		0.8	
Sodium	mg/L	-	200	-	200	35	28.8	82.6	84.7	95.3	95.1	***268***	***271***	6.6	8.4
Zinc	mg/L	-	5	-	-	0.032		<0.005		0.008		0.009		<0.005	
Anion Sum	meq/L	-	-	-	-	6.45		8.81		13.5		24.2		6.1	
Cation Sum	meq/L	-	-	-	-	5.96		8.51		12.8		21.7		5.8	
% Difference	%	-	-	-	-	3.93		1.72		2.69		5.46		2.6	
TDS (Ion Sum Calc)	mg/L	-	500	-	-	331		472		**710**		**1280**		310	
Conductivity Calc	µmho/cm	-	-	-	-	596		845		1340		2270		564	
pH (Client Data)	pH units					7.73	7.71	6.62	7.49	7.48	7.42	7.31	7.33	7.33	7.35
Temperature (Client Data)	°C					9.06	9.43	10.26	11.16	9.35	9.55	8.17	8.46	10.71	9.18

1. Procedure D-5-5. Technical Guideline for Private Wells: Water Supply Assessment. Last Revision August 1996. Table 3: Common Aesthetic, Analytical and Indicator Parameters
2. *, ***italicized bold font*** = The aesthetic objective for sodium in drinking water is 200 mg/L. The local Medical Officer of Health should be notified when the sodium concentration exceeds 20 mg/L so that this information may be communicated to local physicians for their use with patients on sodium restricted diets (ODWSOG, June 2003, revised June 2006).
3. **Bolded and shaded** values exceed one of the Standards, Objectives or Guidelines.
4. Red-shaded cells exceed the corresponding Standard.
5. Orange-shaded cells exceed the corresponding Aesthetic Objective.
6. Yellow-shaded cells exceed the corresponding Operational Guideline.
7. Cells with a bold, dashed border exceed the Treatability limit in Procedure D-5-5.

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G115124 **REPORT No: 23-020827 - Rev. 0**

Report To:
WSP Canada Inc. - Barrie
121 Commerce Park Drive, Unit L
Barrie, ON L4N 8X1

CADUCEON Environmental Laboratories
112 Commerce Park Dr Unit L
Barrie, ON L4N 8W8

Attention: Colin Imrie

DATE RECEIVED: 2023-Aug-11
DATE REPORTED: 2023-Aug-17
SAMPLE MATRIX: Ground Water

CUSTOMER PROJECT: CA-GLD-23611788
P.O. NUMBER:

Analyses	Qty	Site Analyzed	Authorized	Date Analyzed	Lab Method	Reference Method
Anions (Liquid)	1	OTTAWA	VKASYAN	2023-Aug-15	A-IC-01	SM 4110B
Cond/pH/Alk Auto (Liquid)	1	OTTAWA	MDON	2023-Aug-15	COND-02/PH-02/ALK-02	SM 2510B/4500H/2320B
Coliforms - DC Media (Liquid)	1	BARRIE	NMUELLER	2023-Aug-11	ECTC-001	MECP E3407
Ion Balance (Calc)	1	OTTAWA	STAILLON		CP-028	MECP E3196
ICP/OES (Liquid)	1	OTTAWA	NHOGAN	2023-Aug-16	D-ICP-01	SM 3120B

R.L. = Reporting Limit
NC = Not Calculated
Test methods may be modified from specified reference method unless indicated by an *

Christine Burke
Laboratory Manager

Parameter	Units	R.L.	Limits	DWG	Client I.D.: School Sample I.D.: 23-020827-1 Date Collected: 2023-Aug-11
Total Coliform (DC Media)	CFU/100mL	1	0	MAC	0
E coli (DC Media)	CFU/100mL	1	0	MAC	0
Background (DC Media)	CFU/100mL	1			39
Alkalinity(CaCO3) to pH4.5	mg/L	5	500	OG	336
pH @25°C	pH units	-	8.5	OG	7.89
Conductivity @25°C	uS/cm	1			4430
Fluoride	mg/L	0.1	1.5	MAC	<0.7
Chloride	mg/L	0.5	250	AO	1280
Nitrate (N)	mg/L	0.05	10.0	MAC	3.73
Nitrite (N)	mg/L	0.05	1.0	MAC	<0.40
Sulphate	mg/L	1	500	AO	47
Hardness (as CaCO3)	mg/L as CaCO3	0.02	100	OG	618
Calcium	mg/L	0.02			186
Copper	mg/L	0.002	1	AO	0.054
Iron	mg/L	0.005	0.3	AO	0.033
Magnesium	mg/L	0.02			37.2
Manganese	mg/L	0.001	0.05	AO	0.002
Potassium	mg/L	0.1			2.4
Sodium	mg/L	0.2	200, 20, 20	AO, WL, MAC	677
Zinc	mg/L	0.005	5	AO	0.149
Anion Sum	meq/L	-			44.2

Christine Burke
Laboratory Manager

Parameter	Units	R.L.	Limits	DWG	Client I.D.: School Sample I.D.: 23-020827-1 Date Collected: 2023-Aug-11
Cation Sum	meq/L	-			41.9
% Difference	%	-			2.69
TDS (Ion Sum Calc)	mg/L	1	500	AO	2450
Conductivity Calc	µmho/cm	-			4200
pH (Client Data)	pH units	-			6.88
Temperature (Client Data)	°C	-			14.9

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

Summary of Exceedances

Aesthetic Objectives

School	Found Value	Limit
Chloride	1280	250
Sodium	677	200
TDS (Ion Sum Calc)	2450	500

Maximum Acceptable Concentration

School	Found Value	Limit
Sodium	677	20

Operational Guidelines

School	Found Value	Limit
Hardness (as CaCO3)	618	100

Warning Level - Sodium Restricted Diets

School	Found Value	Limit
Sodium	677	20

Christine Burke
Laboratory Manager

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G115034 **REPORT No: 23-021294 - Rev. 0**

Report To:
WSP Canada Inc. - Barrie
121 Commerce Park Drive, Unit L
Barrie, ON L4N 8X1

CADUCEON Environmental Laboratories
112 Commerce Park Dr Unit L
Barrie, ON L4N 8W8

Attention: David Dillon

DATE RECEIVED: 2023-Aug-16
DATE REPORTED: 2023-Aug-24
SAMPLE MATRIX: Ground Water

CUSTOMER PROJECT: CA-GLD-23611788
P.O. NUMBER:

Analyses	Qty	Site Analyzed	Authorized	Date Analyzed	Lab Method	Reference Method
Anions (Liquid)	1	OTTAWA	PCURIEL	2023-Aug-17	A-IC-01	SM 4110B
Cond/pH/Alk Auto (Liquid)	1	OTTAWA	MDON	2023-Aug-17	COND-02/PH-02/ALK-02	SM 2510B/4500H/2320B
Fecal Coliforms (Liquid)	1	KINGSTON	BBURTCH	2023-Aug-17	FC-001	SM 9222D
Ion Balance (Calc)	1	OTTAWA	STAILLON		CP-028	MECP E3196
ICP/OES (Liquid)	1	OTTAWA	NHOGAN	2023-Aug-21	D-ICP-01	SM 3120B

R.L. = Reporting Limit
NC = Not Calculated
Test methods may be modified from specified reference method unless indicated by an *

Steve Garrett
Director of Laboratory Services

Parameter	Units	R.L.	Limits	Client I.D. / Sample I.D. / Date Collected / DWG	School / 23-021294-1 / 2023-Aug-16 / -
Fecal Coliform	CFU/100mL	1	0	MAC	0
Alkalinity(CaCO3) to pH4.5	mg/L	5	500	OG	332
pH @25°C	pH units	-	8.5	OG	7.91
Conductivity @25°C	uS/cm	1			4450
Fluoride	mg/L	0.1	1.5	MAC	<0.7
Chloride	mg/L	0.5	250	AO	1300
Nitrate (N)	mg/L	0.05	10.0	MAC	3.85
Nitrite (N)	mg/L	0.05	1.0	MAC	<0.40
Sulphate	mg/L	1	500	AO	49
Hardness (as CaCO3)	mg/L as CaCO3	0.02	100	OG	623
Calcium	mg/L	0.02			190
Copper	mg/L	0.002	1	AO	<0.002
Iron	mg/L	0.005	0.3	AO	0.026
Magnesium	mg/L	0.02			36.1
Manganese	mg/L	0.001	0.05	AO	0.001
Potassium	mg/L	0.1			2.4
Sodium	mg/L	0.2	200, 20, 20	AO, WL, MAC	561
Zinc	mg/L	0.005	5	AO	0.434
Anion Sum	meq/L	-			44.7
Cation Sum	meq/L	-			39.2
% Difference	%	-			6.46

Steve Garrett
Director of Laboratory Services

Parameter	Units	R.L.	Limits	DWG	Client I.D.: School Sample I.D.: 23-021294-1 Date Collected: 2023-Aug-16
TDS (Ion Sum Calc)	mg/L	1	500	AO	**2410**
Conductivity Calc	µmho/cm	-			4130
pH (Client Data)	pH units	-			6.81
Temperature (Client Data)	°C	-			13.1

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

Summary of Exceedances

Aesthetic Objectives

School	Found Value	Limit
Chloride	1300	250
Sodium	561	200
TDS (Ion Sum Calc)	2410	500

Maximum Acceptable Concentration

School	Found Value	Limit
Sodium	561	20

Operational Guidelines

School	Found Value	Limit
Hardness (as CaCO3)	623	100

Warning Level - Sodium Restricted Diets

School	Found Value	Limit
Sodium	561	20

Steve Garrett
Director of Laboratory Services

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G115036 **REPORT No: 23-021539 - Rev. 0**

Report To:
WSP Canada Inc. - Barrie
121 Commerce Park Drive, Unit L
Barrie, ON L4N 8X1

CADUCEON Environmental Laboratories
112 Commerce Park Dr Unit L
Barrie, ON L4N 8W8

Attention: Colin Imrie

DATE RECEIVED: 2023-Aug-17
DATE REPORTED: 2023-Aug-24
SAMPLE MATRIX: Ground Water

CUSTOMER PROJECT: CA-GLD-23611788
P.O. NUMBER:

Analyses	Qty	Site Analyzed	Authorized	Date Analyzed	Lab Method	Reference Method
Anions (Liquid)	1	OTTAWA	VKASYAN	2023-Aug-22	A-IC-01	SM 4110B
Colour (Liquid)	1	OTTAWA	MDON	2023-Aug-22	A-COL-01	SM 2120C
Cond/pH/Alk Auto (Liquid)	1	OTTAWA	SBOUDREAU	2023-Aug-21	COND-02/PH-02/ALK-02	SM 2510B/4500H/2320B
Coliforms - DC Media (Liquid)	1	BARRIE	NMUELLER	2023-Aug-18	ECTC-001	MECP E3407
DOC/DIC (Liquid)	1	OTTAWA	VKASYAN	2023-Aug-22	C-OC-01	EPA 415.2
Ion Balance (Calc)	1	OTTAWA	STAILLON		CP-028	MECP E3196
ICP/MS (Liquid)	1	OTTAWA	TPRICE	2023-Aug-22	D-ICPMS-01	EPA 200.8
ICP/OES (Liquid)	1	OTTAWA	NHOGAN	2023-Aug-22	D-ICP-01	SM 3120B
Ammonia (Liquid)	1	KINGSTON	KDIBBITS	2023-Aug-23	NH3-001	SM 4500NH3
Organic Nitrogen (Liquid)	1	KINGSTON	KDIBBITS	2023-Aug-23	TPTKN-001	MECP E3516.2
Phenols (Liquid)	1	KINGSTON	JMACINNES	2023-Aug-24	PHEN-01	MECP E3179
Sulphide (Liquid)	1	KINGSTON	EHINCH	2023-Aug-22	H2S-001	SM 4500-S2
Tannins (Liquid)	1	KINGSTON	EHINCH	2023-Aug-23	TAN-001	SM 5550
TP & TKN (Liquid)	1	KINGSTON	KDIBBITS	2023-Aug-22	TPTKN-001	MECP E3516.2
Turbidity (Liquid)	1	OTTAWA	MDON	2023-Aug-22	A-TURB-01	SM 2130B

R.L. = Reporting Limit
NC = Not Calculated
Test methods may be modified from specified reference method unless indicated by an *

Steve Garrett
Director of Laboratory Services

Parameter	Units	R.L.	Limits	DWG	Client I.D.: School Sample I.D.: 23-021539-1 Date Collected: 2023-Aug-17
Total Coliform (DC Media)	CFU/100mL	1	0	MAC	0
E coli (DC Media)	CFU/100mL	1	0	MAC	0
Alkalinity(CaCO3) to pH4.5	mg/L	5	500	OG	317
pH @25°C	pH units	-	8.5	OG	7.75
Conductivity @25°C	uS/cm	1			3590
Colour	TCU	2	5	AO	<2
Turbidity	NTU	0.1	5	AO	**32.6**
Fluoride	mg/L	0.1	1.5	MAC	<0.7
Chloride	mg/L	0.5	250	AO	**998**
Nitrate (N)	mg/L	0.05	10.0	MAC	3.32
Nitrite (N)	mg/L	0.05	1.0	MAC	<0.40
Sulphate	mg/L	1	500	AO	45
Total Kjeldahl Nitrogen	mg/L	0.1			0.3
Ammonia (N)-Total (NH3+NH4)	mg/L	0.05			<0.05
Organic Nitrogen	mg/L	0.1	0.15	OG	**0.3**
Dissolved Organic Carbon	mg/L	0.2	5	AO	1.1
Tannin & Lignin	mg/L	0.5			<0.5
Sulphide	mg/L	0.01	0.05	AO	**<0.08**
Phenolics	mg/L	0.001			<0.001
Hardness (as CaCO3)	mg/L as CaCO3	0.02	100	OG	**510**
Aluminum	mg/L	0.01	0.1	OG	0.09

Steve Garrett
Director of Laboratory Services

Parameter	Units	R.L.	Limits	DWG	Client I.D.: School Sample I.D.: 23-021539-1 Date Collected: 2023-Aug-17 -
Barium	mg/L	0.001	1	MAC	0.202
Boron	mg/L	0.005	5	MAC	0.044
Calcium	mg/L	0.02			156
Copper	mg/L	0.002	1	AO	0.002
Iron	mg/L	0.005	0.3	AO	<0.005
Magnesium	mg/L	0.02			29.1
Manganese	mg/L	0.001	0.05	AO	0.005
Nickel	mg/L	0.01			<0.01
Potassium	mg/L	0.1			2.2
Silica	mg/L	2			8
Sodium	mg/L	0.2	200, 20, 20	AO, WL, MAC	514
Zinc	mg/L	0.005	5	AO	0.061
Antimony	mg/L	0.0001	0.006	MAC	<0.0001
Arsenic	mg/L	0.0001	0.01	MAC	0.0008
Cadmium	mg/L	0.000015	0.005	MAC	0.000073
Chromium	mg/L	0.001	0.05	MAC	<0.0010
Lead	mg/L	0.00002	0.010	MAC	0.00095
Molybdenum	mg/L	0.0001			0.0004
Selenium	mg/L	0.001	0.05	MAC	<0.001
Silver	mg/L	0.0001			0.0002
Thallium	mg/L	0.00005			0.00007

Steve Garrett
Director of Laboratory Services

				Client I.D.	School
				Sample I.D.	23-021539-1
				Date Collected	2023-Aug-17
Parameter	Units	R.L.	Limits	DWG	-
Uranium	mg/L	0.00005	0.02	MAC	0.00069
Vanadium	mg/L	0.0001			0.0003
Anion Sum	meq/L	-			35.7
Cation Sum	meq/L	-			32.6
% Difference	%	-			4.50
TDS (Ion Sum Calc)	mg/L	1	500	AO	1950
Conductivity Calc	µmho/cm	-			3410
pH (Client Data)	pH units	-			6.71
Temperature (Client Data)	°C	-			12.3

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

Steve Garrett
Director of Laboratory Services

Summary of Exceedances

Aesthetic Objectives

School	Found Value	Limit
Turbidity	32.6	5
Chloride	998	250
Sulphide	<0.08	0.05
Sodium	514	200
TDS (Ion Sum Calc)	1950	500

Maximum Acceptable Concentration

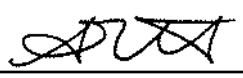
School	Found Value	Limit
Sodium	514	20

Operational Guidelines

School	Found Value	Limit
Organic Nitrogen	0.3	0.15
Hardness (as CaCO3)	510	100

Warning Level - Sodium Restricted Diets

School	Found Value	Limit
Sodium	514	20



Steve Garrett
Director of Laboratory Services

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G115018 **REPORT No: 23-021850 - Rev. 0**

Report To:
WSP Canada Inc. - Barrie
121 Commerce Park Drive, Unit L
Barrie, ON L4N 8X1

CADUCEON Environmental Laboratories
112 Commerce Park Dr Unit L
Barrie, ON L4N 8W8

Attention: Colin Imrie

DATE RECEIVED: 2023-Aug-21
DATE REPORTED: 2023-Aug-28
SAMPLE MATRIX: Ground Water

CUSTOMER PROJECT: CA-GLD-23611788
P.O. NUMBER:

Analyses	Qty	Site Analyzed	Authorized	Date Analyzed	Lab Method	Reference Method
Anions (Liquid)	2	OTTAWA	VKASYAN	2023-Aug-23	A-IC-01	SM 4110B
Colour (Liquid)	1	OTTAWA	MDON	2023-Aug-24	A-COL-01	SM 2120C
Cond/pH/Alk Auto (Liquid)	2	OTTAWA	SBOUDREAU	2023-Aug-23	COND-02/PH-02/ALK-02	SM 2510B/4500H/2320B
Coliforms - DC Media (Liquid)	1	BARRIE	NMUELLER	2023-Aug-22	ECTC-001	MECP E3407
DOC/DIC (Liquid)	1	OTTAWA	VKASYAN	2023-Aug-24	C-OC-01	EPA 415.2
Ion Balance (Calc)	2	OTTAWA	STAILLON		CP-028	MECP E3196
ICP/MS (Liquid)	1	OTTAWA	TPRICE	2023-Aug-25	D-ICPMS-01	EPA 200.8
ICP/OES (Liquid)	2	OTTAWA	AOZKAYMAK	2023-Aug-24	D-ICP-01	SM 3120B
Ammonia (Liquid)	1	KINGSTON	AMANIYA	2023-Aug-24	NH3-001	SM 4500NH3
Organic Nitrogen (Liquid)	1	KINGSTON	KDIBBITS	2023-Aug-28	TPTKN-001	MECP E3516.2
Phenols (Liquid)	1	KINGSTON	JMACINNES	2023-Aug-24	PHEN-01	MECP E3179
Sulphide (Liquid)	1	KINGSTON	EHINCH	2023-Aug-24	H2S-001	SM 4500-S2
Tannins (Liquid)	1	KINGSTON	EHINCH	2023-Aug-24	TAN-001	SM 5550
TP & TKN (Liquid)	1	KINGSTON	KDIBBITS	2023-Aug-25	TPTKN-001	MECP E3516.2
Turbidity (Liquid)	1	OTTAWA	MDON	2023-Aug-24	A-TURB-01	SM 2130B

R.L. = Reporting Limit
NC = Not Calculated
Test methods may be modified from specified reference method unless indicated by an *

Steve Garrett
Director of Laboratory Services

			Client I.D.	Well C-1	Well C-2
			Sample I.D.	23-021850-1	23-021850-2
			Date Collected	2023-08-21	2023-08-21
Parameter	**Units**	**R.L.**		-	-
Total Coliform (DC Media)	CFU/100mL	1			NDOGT (4.)
E coli (DC Media)	CFU/100mL	1			NDOGT (4.)
Background (DC Media)	CFU/100mL	1			NDOGT (4.)
Alkalinity(CaCO3) to pH4.5	mg/L	5		261	258
pH @25°C	pH units	-		7.63	7.61
Conductivity @25°C	uS/cm	1		851	853
Colour	TCU	2			<2
Turbidity	NTU	0.1			9.5
Fluoride	mg/L	0.1		<0.1	<0.1
Chloride	mg/L	0.5		51.5	51.8
Nitrate (N)	mg/L	0.05		3.38	3.44
Nitrite (N)	mg/L	0.05		<0.05	<0.05
Sulphate	mg/L	1		104	103
Total Kjeldahl Nitrogen	mg/L	0.1			0.2
Ammonia (N)-Total (NH3+NH4)	mg/L	0.05			0.12
Organic Nitrogen	mg/L	0.1			<0.1
Dissolved Organic Carbon	mg/L	0.2			4.6
Tannin & Lignin	mg/L	0.5			<0.5
Sulphide	mg/L	0.01			0.01
Phenolics	mg/L	0.001			<0.001
Hardness (as CaCO3)	mg/L as CaCO3	0.02		380	372

Steve Garrett

Director of Laboratory Services

			Client I.D.	Well C-1	Well C-2
			Sample I.D.	23-021850-1	23-021850-2
			Date Collected	2023-08-21	2023-08-21
Parameter	**Units**	**R.L.**		-	-
Aluminum	mg/L	0.01			0.18
Barium	mg/L	0.001			0.133
Boron	mg/L	0.005			0.418
Calcium	mg/L	0.02		109	107
Copper	mg/L	0.002		<0.002	<0.002
Iron	mg/L	0.005		0.144	0.086
Magnesium	mg/L	0.02		26.1	25.5
Manganese	mg/L	0.001		0.011	0.006
Nickel	mg/L	0.01			<0.01
Potassium	mg/L	0.1		2.9	3.3
Silica	mg/L	2			11
Sodium	mg/L	0.2		39.1	42.4
Zinc	mg/L	0.005		0.025	0.012
Antimony	mg/L	0.0001			0.0003
Arsenic	mg/L	0.0001			0.0007
Cadmium	mg/L	0.000015			0.000043
Chromium	mg/L	0.001			<0.0010
Lead	mg/L	0.00002			0.00100
Molybdenum	mg/L	0.0001			0.0008
Selenium	mg/L	0.001			<0.001
Silver	mg/L	0.0001			<0.0001

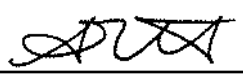
Steve Garrett

Director of Laboratory Services

			Client I.D.	Well C-1	Well C-2
			Sample I.D.	23-021850-1	23-021850-2
			Date Collected	2023-08-21	2023-08-21
Parameter	**Units**	**R.L.**		-	-
Thallium	mg/L	0.00005			0.00008
Uranium	mg/L	0.00005			0.00138
Vanadium	mg/L	0.0001			0.0002
Anion Sum	meq/L	-		9.06	9.01
Cation Sum	meq/L	-		9.37	9.36
% Difference	%	-		1.64	1.93
TDS (Ion Sum Calc)	mg/L	1		504	503
Conductivity Calc	µmho/cm	-		873	871
pH (Client Data)	pH units	-		7.40	7.15
Temperature (Client Data)	°C	-		12.2	12.3

Comments:

4. NDOGT: No data overgrown with target



Steve Garrett

Director of Laboratory Services

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G115019 **REPORT No: 23-022070 - Rev. 0**

Report To:
WSP Canada Inc. - Barrie
121 Commerce Park Drive, Unit L
Barrie, ON L4N 8X1

CADUCEON Environmental Laboratories
112 Commerce Park Dr Unit L
Barrie, ON L4N 8W8

Attention: Colin Imrie

DATE RECEIVED: 2023-Aug-22
DATE REPORTED: 2023-Aug-29
SAMPLE MATRIX: Ground Water

CUSTOMER PROJECT: CA-GLD-23611788
P.O. NUMBER: Q1949

Analyses	Qty	Site Analyzed	Authorized	Date Analyzed	Lab Method	Reference Method
Anions (Liquid)	1	OTTAWA	PCURIEL	2023-Aug-24	A-IC-01	SM 4110B
Colour (Liquid)	1	OTTAWA	MDON	2023-Aug-25	A-COL-01	SM 2120C
Cond/pH/Alk Auto (Liquid)	1	OTTAWA	SBOUDREAU	2023-Aug-24	COND-02/PH-02/ALK-02	SM 2510B/4500H/2320B
Coliforms - DC Media (Liquid)	1	BARRIE	NMUELLER	2023-Aug-23	ECTC-001	MECP E3407
DOC/DIC (Liquid)	1	OTTAWA	VKASYAN	2023-Aug-24	C-OC-01	EPA 415.2
Ion Balance (Calc)	1	OTTAWA	STAILLON		CP-028	MECP E3196
ICP/MS (Liquid)	1	OTTAWA	AOZKAYMAK	2023-Aug-28	D-ICPMS-01	EPA 200.8
ICP/OES (Liquid)	1	OTTAWA	AOZKAYMAK	2023-Aug-25	D-ICP-01	SM 3120B
Ammonia (Liquid)	1	KINGSTON	KDIBBITS	2023-Aug-28	NH3-001	SM 4500NH3
Organic Nitrogen (Liquid)	1	KINGSTON	KDIBBITS	2023-Aug-29	TPTKN-001	MECP E3516.2
Phenols (Liquid)	1	KINGSTON	JMACINNES	2023-Aug-28	PHEN-01	MECP E3179
Sulphide (Liquid)	1	KINGSTON	EHINCH	2023-Aug-24	H2S-001	SM 4500-S2
Tannins (Liquid)	1	KINGSTON	EHINCH	2023-Aug-24	TAN-001	SM 5550
TP & TKN (Liquid)	1	KINGSTON	KDIBBITS	2023-Aug-25	TPTKN-001	MECP E3516.2
Turbidity (Liquid)	1	OTTAWA	MDON	2023-Aug-25	A-TURB-01	SM 2130B

R.L. = Reporting Limit
NC = Not Calculated
Test methods may be modified from specified reference method unless indicated by an *

Steve Garrett
Director of Laboratory Services

		Client I.D.	Well B-2
		Sample I.D.	23-022070-1
		Date Collected	2023-08-22
Parameter	**Units**	**R.L.**	-
Total Coliform (DC Media)	CFU/100mL	1	NDOGT (4.)
E coli (DC Media)	CFU/100mL	1	NDOGT (4.)
Background (DC Media)	CFU/100mL	1	NDOGT (4.)
Alkalinity(CaCO3) to pH4.5	mg/L	5	259
pH @25°C	pH units	-	7.90
Conductivity @25°C	uS/cm	1	764
Colour	TCU	2	<2
Turbidity	NTU	0.1	7910
Fluoride	mg/L	0.1	<0.1
Chloride	mg/L	0.5	65.5
Nitrate (N)	mg/L	0.05	6.07
Nitrite (N)	mg/L	0.05	<0.05
Sulphate	mg/L	1	24
Total Kjeldahl Nitrogen	mg/L	0.1	2.3
Ammonia (N)-Total (NH3+NH4)	mg/L	0.05	0.30
Organic Nitrogen	mg/L	0.1	2.0
Dissolved Organic Carbon	mg/L	0.2	3.5
Tannin & Lignin	mg/L	0.5	0.6
Sulphide	mg/L	0.01	4.00
Phenolics	mg/L	0.001	<0.001
Hardness (as CaCO3)	mg/L as CaCO3	0.02	305

Steve Garrett

Director of Laboratory Services

			Client I.D.	Well B-2
			Sample I.D.	23-022070-1
			Date Collected	2023-08-22
Parameter	**Units**	**R.L.**		-
Aluminum	mg/L	0.01		0.03
Barium	mg/L	0.001		0.040
Boron	mg/L	0.005		0.309
Calcium	mg/L	0.02		89.5
Copper	mg/L	0.002		<0.002
Iron	mg/L	0.005		<0.005
Magnesium	mg/L	0.02		19.7
Manganese	mg/L	0.001		0.006
Nickel	mg/L	0.01		<0.01
Potassium	mg/L	0.1		8.6
Silica	mg/L	2		9
Sodium	mg/L	0.2		29.5
Zinc	mg/L	0.005		0.009
Antimony	mg/L	0.0001		0.0003
Arsenic	mg/L	0.0001		0.0025
Cadmium	mg/L	0.000015		<0.000015
Chromium	mg/L	0.001		<0.0010
Lead	mg/L	0.00002		0.00016
Molybdenum	mg/L	0.0001		0.0030
Selenium	mg/L	0.001		<0.001
Silver	mg/L	0.0001		<0.0001

Steve Garrett

Director of Laboratory Services

			Client I.D.	Well B-2
			Sample I.D.	23-022070-1
			Date Collected	2023-08-22
Parameter	Units	R.L.		-
Thallium	mg/L	0.00005		<0.00005
Uranium	mg/L	0.00005		0.00081
Vanadium	mg/L	0.0001		0.0005
Anion Sum	meq/L	-		7.96
Cation Sum	meq/L	-		7.59
% Difference	%	-		2.38
TDS (Ion Sum Calc)	mg/L	1		419
Conductivity Calc	µmho/cm	-		755
pH (Client Data)	pH units	-		6.55
Temperature (Client Data)	°C	-		12.1

Comments:

4. NDOGT: No data overgrown with target

Steve Garrett

Director of Laboratory Services

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G115021 **REPORT No: 23-022228 - Rev. 0**

Report To:
WSP Canada Inc. - Barrie
121 Commerce Park Drive, Unit L
Barrie, ON L4N 8X1

CADUCEON Environmental Laboratories
112 Commerce Park Dr Unit L
Barrie, ON L4N 8W8

Attention: Colin Imrie

DATE RECEIVED: 2023-Aug-23
DATE REPORTED: 2023-Aug-31
SAMPLE MATRIX: Ground Water

CUSTOMER PROJECT: CA-GLD-23611788
P.O. NUMBER:

Analyses	Qty	Site Analyzed	Authorized	Date Analyzed	Lab Method	Reference Method
Anions (Liquid)	2	OTTAWA	PCURIEL	2023-Aug-25	A-IC-01	SM 4110B
Colour (Liquid)	1	OTTAWA	MDON	2023-Aug-28	A-COL-01	SM 2120C
Cond/pH/Alk Auto (Liquid)	2	OTTAWA	SBOUDREAU	2023-Aug-25	COND-02/PH-02/ALK-02	SM 2510B/4500H/2320B
Coliforms - DC Media (Liquid)	1	BARRIE	NMUELLER	2023-Aug-23	ECTC-001	MECP E3407
DOC/DIC (Liquid)	1	OTTAWA	VKASYAN	2023-Aug-25	C-OC-01	EPA 415.2
Ion Balance (Calc)	2	OTTAWA	STAILLON		CP-028	MECP E3196
ICP/MS (Liquid)	1	OTTAWA	AOZKAYMAK	2023-Aug-28	D-ICPMS-01	EPA 200.8
ICP/OES (Liquid)	2	OTTAWA	NHOGAN	2023-Aug-29	D-ICP-01	SM 3120B
Ammonia (Liquid)	1	KINGSTON	KDIBBITS	2023-Aug-28	NH3-001	SM 4500NH3
Organic Nitrogen (Liquid)	1	KINGSTON	KDIBBITS	2023-Aug-31	TPTKN-001	MECP E3516.2
Phenols (Liquid)	1	KINGSTON	JMACINNES	2023-Aug-28	PHEN-01	MECP E3179
Sulphide (Liquid)	1	KINGSTON	EHINCH	2023-Aug-25	H2S-001	SM 4500-S2
Tannins (Liquid)	1	KINGSTON	EHINCH	2023-Aug-29	TAN-001	SM 5550
TP & TKN (Liquid)	1	KINGSTON	KDIBBITS	2023-Aug-28	TPTKN-001	MECP E3516.2
Turbidity (Liquid)	1	OTTAWA	MDON	2023-Aug-28	A-TURB-01	SM 2130B

R.L. = Reporting Limit
NC = Not Calculated
Test methods may be modified from specified reference method unless indicated by an *

Steve Garrett
Director of Laboratory Services

Final Report

REPORT No: 23-022228 - Rev. 0

Parameter	Units	R.L.	Limits	DWG	Client I.D.	Well E-1	Well E-2
					Sample I.D.	23-022228-1	23-022228-2
					Date Collected	2023-Aug-23	2023-Aug-23
						-	-
Total Coliform (DC Media)	CFU/100mL	1	0	MAC			0
E coli (DC Media)	CFU/100mL	1	0	MAC			0
Background (DC Media)	CFU/100mL	1					53
Alkalinity(CaCO3) to pH4.5	mg/L	5	500	OG		333	337
pH @25°C	pH units	-	8.5	OG		7.81	7.82
Conductivity @25°C	uS/cm	1				4300	4160
Colour	TCU	2	5	AO			<2
Turbidity	NTU	0.1	5	AO			16.2
Fluoride	mg/L	0.1	1.5	MAC		<0.7	<0.7
Chloride	mg/L	0.5	250	AO		1210	1160
Nitrate (N)	mg/L	0.05	10.0	MAC		<0.40	<0.40
Nitrite (N)	mg/L	0.05	1.0	MAC		<0.40	<0.40
Sulphate	mg/L	1	500	AO		33	33
Total Kjeldahl Nitrogen	mg/L	0.1					0.3
Ammonia (N)-Total (NH3+NH4)	mg/L	0.05					0.12
Organic Nitrogen	mg/L	0.1	0.15	OG			0.2
Dissolved Organic Carbon	mg/L	0.2	5	AO			1.0
Tannin & Lignin	mg/L	0.5					<0.5
Sulphide	mg/L	0.01	0.05	AO			<0.01
Phenolics	mg/L	0.001					<0.001
Hardness (as CaCO3)	mg/L as CaCO3	0.02	100	OG		833	822

Steve Garrett

Director of Laboratory Services

Parameter	Units	R.L.	Limits	DWG	Client I.D.	Well E-1	Well E-2
					Sample I.D.	23-022228-1	23-022228-2
					Date Collected	2023-Aug-23	2023-Aug-23
						-	-
Aluminum	mg/L	0.01	0.1	OG			0.10
Barium	mg/L	0.001	1	MAC			**1.43**
Boron	mg/L	0.005	5	MAC			0.017
Calcium	mg/L	0.02				247	244
Copper	mg/L	0.002	1	AO		<0.002	<0.002
Iron	mg/L	0.005	0.3	AO		**1.22**	**1.23**
Magnesium	mg/L	0.02				52.4	51.6
Manganese	mg/L	0.001	0.05	AO		**0.066**	**0.064**
Nickel	mg/L	0.01					<0.01
Potassium	mg/L	0.1				3.7	3.6
Silica	mg/L	2					19
Sodium	mg/L	0.2	200, 20, 20	AO, WL, MAC		**542**	**521**
Zinc	mg/L	0.005	5	AO		0.020	0.010
Antimony	mg/L	0.0001	0.006	MAC			<0.0001
Arsenic	mg/L	0.0001	0.01	MAC			**0.0164**
Cadmium	mg/L	0.000015	0.005	MAC			<0.000015
Chromium	mg/L	0.001	0.05	MAC			<0.0010
Lead	mg/L	0.00002	0.010	MAC			0.00051
Molybdenum	mg/L	0.0001					0.0002
Selenium	mg/L	0.001	0.05	MAC			<0.001
Silver	mg/L	0.0001					<0.0001

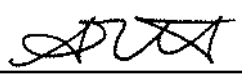
Steve Garrett
Director of Laboratory Services

Parameter	Units	R.L.	Limits	DWG	Client I.D.	Well E-1	Well E-2
					Sample I.D.	23-022228-1	23-022228-2
					Date Collected	2023-Aug-23	2023-Aug-23
						-	-
Thallium	mg/L	0.00005					<0.00005
Uranium	mg/L	0.00005	0.02	MAC			0.00055
Vanadium	mg/L	0.0001					<0.0001
Anion Sum	meq/L	-				41.6	40.2
Cation Sum	meq/L	-				40.4	39.2
% Difference	%	-				1.48	1.23
TDS (Ion Sum Calc)	mg/L	1	500	AO		2290	2220
Conductivity Calc	µmho/cm	-				3960	3840
pH (Client Data)	pH units	-				7.21	7.51
Temperature (Client Data)	°C	-				9.8	9.2

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

Steve Garrett
Director of Laboratory Services

Summary of Exceedances		
Aesthetic Objectives		
Well E-1	**Found Value**	**Limit**
Chloride	1210	250
Iron	1.22	0.3
Manganese	0.066	0.05
Sodium	542	200
TDS (Ion Sum Calc)	2290	500
Well E-2	**Found Value**	**Limit**
Turbidity	16.2	5
Chloride	1160	250
Iron	1.23	0.3
Manganese	0.064	0.05
Sodium	521	200
TDS (Ion Sum Calc)	2220	500
Maximum Acceptable Concentration		
Well E-1	**Found Value**	**Limit**
Sodium	542	20
Well E-2	**Found Value**	**Limit**
Barium	1.43	1
Sodium	521	20
Arsenic	0.0164	0.01
Operational Guidelines		
Well E-1	**Found Value**	**Limit**
Hardness (as CaCO3)	833	100
Well E-2	**Found Value**	**Limit**
Organic Nitrogen	0.2	0.15
Hardness (as CaCO3)	822	100
Warning Level - Sodium Restricted Diets		
Well E-1	**Found Value**	**Limit**
Sodium	542	20
Well E-2	**Found Value**	**Limit**
Sodium	521	20



Steve Garrett
Director of Laboratory Services

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G115022 **REPORT No: 23-022346 - Rev. 0**

Report To:
WSP Canada Inc. - Barrie
121 Commerce Park Drive, Unit L
Barrie, ON L4N 8X1

CADUCEON Environmental Laboratories
112 Commerce Park Dr Unit L
Barrie, ON L4N 8W8

Attention: Colin Imrie

DATE RECEIVED: 2023-Aug-24
DATE REPORTED: 2023-Sep-01
SAMPLE MATRIX: Ground Water

CUSTOMER PROJECT: CA-GLD-23611788
P.O. NUMBER:

Analyses	Qty	Site Analyzed	Authorized	Date Analyzed	Lab Method	Reference Method
Anions (Liquid)	2	OTTAWA	PCURIEL	2023-Aug-25	A-IC-01	SM 4110B
Colour (Liquid)	1	OTTAWA	MDON	2023-Aug-28	A-COL-01	SM 2120C
Cond/pH/Alk Auto (Liquid)	2	OTTAWA	SBOUDREAU	2023-Aug-25	COND-02/PH-02/ALK-02	SM 2510B/4500H/2320B
Coliforms - DC Media (Liquid)	1	BARRIE	NMUELLER	2023-Aug-24	ECTC-001	MECP E3407
DOC/DIC (Liquid)	1	OTTAWA	VKASYAN	2023-Aug-25	C-OC-01	EPA 415.2
Ion Balance (Calc)	2	OTTAWA	STAILLON		CP-028	MECP E3196
ICP/MS (Liquid)	1	OTTAWA	AOZKAYMAK	2023-Aug-28	D-ICPMS-01	EPA 200.8
ICP/OES (Liquid)	2	OTTAWA	NHOGAN	2023-Aug-29	D-ICP-01	SM 3120B
Ammonia (Liquid)	1	KINGSTON	KDIBBITS	2023-Aug-28	NH3-001	SM 4500NH3
Organic Nitrogen (Liquid)	1	KINGSTON	KDIBBITS	2023-Aug-30	TPTKN-001	MECP E3516.2
Phenols (Liquid)	1	KINGSTON	JMACINNES	2023-Aug-28	PHEN-01	MECP E3179
Sulphide (Liquid)	1	KINGSTON	EHINCH	2023-Aug-25	H2S-001	SM 4500-S2
Tannins (Liquid)	1	KINGSTON	EHINCH	2023-Aug-29	TAN-001	SM 5550
TP & TKN (Liquid)	1	KINGSTON	KDIBBITS	2023-Aug-29	TPTKN-001	MECP E3516.2
Turbidity (Liquid)	1	OTTAWA	MDON	2023-Aug-28	A-TURB-01	SM 2130B

R.L. = Reporting Limit
NC = Not Calculated
Test methods may be modified from specified reference method unless indicated by an *

Steve Garrett
Director of Laboratory Services

Final Report

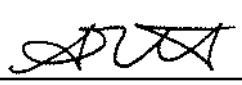
REPORT No: 23-022346 - Rev. 0

Parameter	Units	R.L.	Limits	DWG	Client I.D.	Well D-1	Well D-2
					Sample I.D.	23-022346-1	23-022346-2
					Date Collected	2023-Aug-24	2023-Aug-24
						-	-
Total Coliform (DC Media)	CFU/100mL	1	0	MAC			25
E coli (DC Media)	CFU/100mL	1	0	MAC			0
Background (DC Media)	CFU/100mL	1					151
Alkalinity(CaCO3) to pH4.5	mg/L	5	500	OG		347	339
pH @25°C	pH units	-	8.5	OG		7.88	7.86
Conductivity @25°C	uS/cm	1				2060	2070
Colour	TCU	2	5	AO			<2
Turbidity	NTU	0.1	5	AO			19.1
Fluoride	mg/L	0.1	1.5	MAC		<0.7	<0.7
Chloride	mg/L	0.5	250	AO		460	467
Nitrate (N)	mg/L	0.05	10.0	MAC		<0.40	<0.40
Nitrite (N)	mg/L	0.05	1.0	MAC		<0.40	<0.40
Sulphate	mg/L	1	500	AO		49	45
Total Kjeldahl Nitrogen	mg/L	0.1					0.3
Ammonia (N)-Total (NH3+NH4)	mg/L	0.05					0.05
Organic Nitrogen	mg/L	0.1	0.15	OG			0.2
Dissolved Organic Carbon	mg/L	0.2	5	AO			1.3
Tannin & Lignin	mg/L	0.5					<0.5
Sulphide	mg/L	0.01	0.05	AO			<0.01
Phenolics	mg/L	0.001					<0.001
Hardness (as CaCO3)	mg/L as CaCO3	0.02	100	OG		590	580

Steve Garrett

Director of Laboratory Services

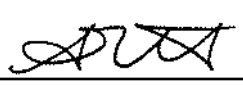
Parameter	Units	R.L.	Limits	DWG	Client I.D.	Well D-1	Well D-2
					Sample I.D.	23-022346-1	23-022346-2
					Date Collected	2023-Aug-24	2023-Aug-24
						-	-
Aluminum	mg/L	0.01	0.1	OG			0.08
Barium	mg/L	0.001	1	MAC			0.333
Boron	mg/L	0.005	5	MAC			0.014
Calcium	mg/L	0.02				188	185
Copper	mg/L	0.002	1	AO		<0.002	<0.002
Iron	mg/L	0.005	0.3	AO		**1.48**	**1.39**
Magnesium	mg/L	0.02				29.1	28.6
Manganese	mg/L	0.001	0.05	AO		**0.109**	**0.103**
Nickel	mg/L	0.01					<0.01
Potassium	mg/L	0.1				1.8	1.9
Silica	mg/L	2					13
Sodium	mg/L	0.2	200, 20, 20	AO, WL, MAC		**190**	**197**
Zinc	mg/L	0.005	5	AO		0.008	0.007
Antimony	mg/L	0.0001	0.006	MAC			<0.0001
Arsenic	mg/L	0.0001	0.01	MAC			<0.0001
Cadmium	mg/L	0.000015	0.005	MAC			<0.000015
Chromium	mg/L	0.001	0.05	MAC			<0.0010
Lead	mg/L	0.00002	0.010	MAC			0.00005
Molybdenum	mg/L	0.0001					0.0004
Selenium	mg/L	0.001	0.05	MAC			<0.001
Silver	mg/L	0.0001					<0.0001



Steve Garrett
Director of Laboratory Services

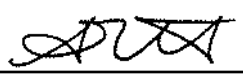
Parameter	Units	R.L.	Limits	DWG	Client I.D.	Well D-1	Well D-2
					Sample I.D.	23-022346-1	23-022346-2
					Date Collected	2023-Aug-24	2023-Aug-24
						-	-
Thallium	mg/L	0.00005					<0.00005
Uranium	mg/L	0.00005	0.02	MAC			0.00100
Vanadium	mg/L	0.0001					0.0002
Anion Sum	meq/L	-				20.9	20.9
Cation Sum	meq/L	-				20.2	20.3
% Difference	%	-				1.86	1.49
TDS (Ion Sum Calc)	mg/L	1	500	AO		1130	1130
Conductivity Calc	µmho/cm	-				2010	2020
pH (Client Data)	pH units	-				7.15	7.39
Temperature (Client Data)	°C	-				9.8	9.4

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



Steve Garrett
Director of Laboratory Services

Summary of Exceedances		
Aesthetic Objectives		
Well D-1	**Found Value**	**Limit**
Chloride	460	250
Iron	1.48	0.3
Manganese	0.109	0.05
TDS (Ion Sum Calc)	1130	500
Well D-2	**Found Value**	**Limit**
Turbidity	19.1	5
Chloride	467	250
Iron	1.39	0.3
Manganese	0.103	0.05
TDS (Ion Sum Calc)	1130	500
Maximum Acceptable Concentration		
Well D-1	**Found Value**	**Limit**
Sodium	190	20
Well D-2	**Found Value**	**Limit**
Total Coliform (DC Media)	25	0
Sodium	197	20
Operational Guidelines		
Well D-1	**Found Value**	**Limit**
Hardness (as CaCO3)	590	100
Well D-2	**Found Value**	**Limit**
Organic Nitrogen	0.2	0.15
Hardness (as CaCO3)	580	100
Warning Level - Sodium Restricted Diets		
Well D-1	**Found Value**	**Limit**
Sodium	190	20
Well D-2	**Found Value**	**Limit**
Sodium	197	20



Steve Garrett
Director of Laboratory Services

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G114839 **REPORT No: 24-005837 - Rev. 0**

Report To:
WSP Canada Inc. - Barrie
121 Commerce Park Drive, Unit L
Barrie, ON L4N 8X1

CADUCEON Environmental Laboratories
112 Commerce Park Dr Unit L
Barrie, ON L4N 8W8

Attention: Tracy Meldrum

DATE RECEIVED: 2024-Mar-04
DATE REPORTED: 2024-Mar-07
SAMPLE MATRIX: Ground Water

CUSTOMER PROJECT: CA-GLD-23611788
P.O. NUMBER:

Analyses	Qty	Site Analyzed	Authorized	Date Analyzed	Lab Method	Reference Method
Anions (Liquid)	4	OTTAWA	PCURIEL	2024-Mar-06	A-IC-01	SM 4110B
Colour (Liquid)	2	OTTAWA	STAILLON	2024-Mar-07	A-COL-01	SM 2120C
Cond/pH/Alk Auto (Liquid)	4	OTTAWA	SBOUDREAU	2024-Mar-05	COND-02/PH-02/ALK-02	SM 2510B/4500H/2320B
Coliforms - DC Media (Liquid)	2	BARRIE	IPATEL	2024-Mar-04	ECTC-001	MECP E3407
DOC/DIC (Liquid)	2	OTTAWA	VKASYAN	2024-Mar-06	C-OC-01	EPA 415.2
Fecal Coliforms (Liquid)	2	KINGSTON	BBURTCH	2024-Mar-05	FC-001	SM 9222D
Ion Balance (Calc)	2	OTTAWA	ASCHNEIDER		CP-028	MECP E3196
ICP/OES (Liquid)	4	OTTAWA	APRUDYVUS	2024-Mar-06	D-ICP-01	SM 3120B
Ammonia (Liquid)	2	KINGSTON	JYEARWOOD	2024-Mar-06	NH3-001	SM 4500NH3
Turbidity (Liquid)	2	OTTAWA	AWILSON	2024-Mar-07	A-TURB-01	SM 2130B

R.L. = Reporting Limit
NC = Not Calculated
Test methods may be modified from specified reference method unless indicated by an *

Michelle Dubien
Data Specialist

Parameter	Units	R.L.	Limits	DWG	Client I.D.	G-1	G-2	J-1	J-2
					Sample I.D.	24-005837-1	24-005837-2	24-005837-3	24-005837-4
					Date Collected	2024-Mar-04	2024-Mar-04	2024-Mar-04	2024-Mar-04
						-	-	-	-
Total Coliform (DC Media)	CFU/100mL	1	0	MAC			0		2
E coli (DC Media)	CFU/100mL	1	0	MAC			0		0
Fecal Coliform	CFU/100mL	1	0	MAC			0		0
Alkalinity(CaCO3) to pH4.5	mg/L	5	500	OG		256	236	235	255
TDS (Calc. from Cond.)	mg/L	3	500	AO			311		470
Conductivity @25°C	uS/cm	1				880	599	583	888
pH @25°C	pH units	-	8.5	OG		8.09	8.09	8.09	8.10
Colour	TCU	2	5	AO			<2		<2
Turbidity	NTU	0.1	5	AO			2.3		10.4
Fluoride	mg/L	0.1	1.5	MAC		0.8		<0.1	
Chloride	mg/L	0.5	250	AO		97.2	27.5	22.8	99.5
Nitrate (N)	mg/L	0.05	10.0	MAC		0.94	4.45	4.39	0.89
Nitrite (N)	mg/L	0.05	1.0	MAC		0.09	0.07	0.07	0.10
Sulphate	mg/L	1	500	AO		41	22	22	42
Ammonia (N)-Total (NH3+NH4)	mg/L	0.05					<0.05		0.56
Dissolved Organic Carbon	mg/L	0.2	5	AO			3.9		3.4
Hardness (as CaCO3)	mg/L as CaCO3	0.02	100	OG		228		275	
Calcium	mg/L	0.02				60.8	78.4	78.0	61.9
Copper	mg/L	0.002	1	AO		<0.002		<0.002	
Iron	mg/L	0.005	0.3	AO		0.100	0.108	0.104	0.149
Magnesium	mg/L	0.02				18.4	19.2	19.4	18.6

Michelle Dubien
Data Specialist

Final Report

REPORT No: 24-005837 - Rev. 0

Parameter	Units	R.L.	Limits	DWG	Client I.D.	G-1	G-2	J-1	J-2
					Sample I.D.	24-005837-1	24-005837-2	24-005837-3	24-005837-4
					Date Collected	2024-Mar-04	2024-Mar-04	2024-Mar-04	2024-Mar-04
						-	-	-	-
Manganese	mg/L	0.001	0.05	AO		0.023	0.008	0.007	0.028
Potassium	mg/L	0.1				14.1		0.8	
Sodium	mg/L	0.2	200, 20, 20	AO, WL, MAC		**82.6**	8.4	6.6	**84.7**
Zinc	mg/L	0.005	5	AO		<0.005		<0.005	
Anion Sum	meq/L	-				8.81		6.10	
Cation Sum	meq/L	-				8.51		5.80	
% Difference	%	-				1.72		2.60	
TDS (Ion Sum Calc)	mg/L	1	500	AO		472		310	
Conductivity Calc	µmho/cm	-				845		564	
pH (Client Data)	pH units	-				6.62	7.49	7.33	7.35
Temperature (Client Data)	°C	-				10.26	11.16	10.71	9.18

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

Michelle Dubien
Data Specialist

Summary of Exceedances		
Aesthetic Objectives		
J-2	**Found Value**	**Limit**
Turbidity	10.4	5
Maximum Acceptable Concentration		
G-1	**Found Value**	**Limit**
Sodium	82.6	20
J-2	**Found Value**	**Limit**
Total Coliform (DC Media)	2	0
Sodium	84.7	20
Operational Guidelines		
G-1	**Found Value**	**Limit**
Hardness (as CaCO3)	228	100
J-1	**Found Value**	**Limit**
Hardness (as CaCO3)	275	100
Warning Level - Sodium Restricted Diets		
G-1	**Found Value**	**Limit**
Sodium	82.6	20
J-2	**Found Value**	**Limit**
Sodium	84.7	20

Michelle Dubien
Data Specialist

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G115147 **REPORT No: 24-006254 - Rev. 0**

Report To:
WSP Canada Inc. - Barrie
121 Commerce Park Drive, Unit L
Barrie, ON L4N 8X1

CADUCEON Environmental Laboratories
112 Commerce Park Dr Unit L
Barrie, ON L4N 8W8

Attention: Tracy Meldrum

DATE RECEIVED: 2024-Mar-06
DATE REPORTED: 2024-Mar-13
SAMPLE MATRIX: Ground Water

CUSTOMER PROJECT: CA-GLD-23611788
P.O. NUMBER:

Analyses	Qty	Site Analyzed	Authorized	Date Analyzed	Lab Method	Reference Method
Anions (Liquid)	4	OTTAWA	LMACGREGOR	2024-Mar-08	A-IC-01	SM 4110B
Colour (Liquid)	2	OTTAWA	STAILLON	2024-Mar-07	A-COL-01	SM 2120C
Cond/pH/Alk Auto (Liquid)	4	OTTAWA	SBOUDREAU	2024-Mar-08	COND-02/PH-02/ALK-02	SM 2510B/4500H/2320B
DOC/DIC (Liquid)	2	OTTAWA	VKASYAN	2024-Mar-07	C-OC-01	EPA 415.2
E.Coli m-TECH Media (Liquid)	2	BARRIE	IPATEL	2024-Mar-06	EC-001	MECP E3371
Fecal Coliforms (Liquid)	2	KINGSTON	BBURTCH	2024-Mar-07	FC-001	SM 9222D
Ion Balance (Calc)	2	OTTAWA	ASCHNEIDER		CP-028	MECP E3196
ICP/OES (Liquid)	4	OTTAWA	NHOGAN	2024-Mar-11	D-ICP-01	SM 3120B
Ammonia (Liquid)	2	KINGSTON	JYEARWOOD	2024-Mar-07	NH3-001	SM 4500NH3
Total Coliforms (m-Endo Media)	2	BARRIE	CBURKE	2024-Mar-06	TC-001	SM 9222B
Turbidity (Liquid)	2	OTTAWA	AWILSON	2024-Mar-07	A-TURB-01	SM 2130B

R.L. = Reporting Limit
NC = Not Calculated
Test methods may be modified from specified reference method unless indicated by an *

Michelle Dubien
Data Specialist

Final Report

REPORT No: 24-006254 - Rev. 0

Parameter	Units	R.L.	Limits	DWG	Client I.D.	F-1	F-2	I-1	I-2
					Sample I.D.	24-006254-1	24-006254-2	24-006254-3	24-006254-4
					Date Collected	2024-Mar-06	2024-Mar-06	2024-Mar-06	2024-Mar-06
						-	-	-	-
Total Coliform	CFU/100mL	1	0	MAC			0		0
E coli	CFU/100mL	1	0	MAC			0		0
Fecal Coliform	CFU/100mL	1	0	MAC			0		0
Alkalinity(CaCO3) to pH4.5	mg/L	5	500	OG		220	221	364	364
TDS (Calc. from Cond.)	mg/L	3	500	AO			289		1260
Conductivity @25°C	uS/cm	1				587	557	2290	2280
pH @25°C	pH units	-	8.5	OG		8.22	8.18	8.11	8.12
Colour	TCU	2	5	AO			<2		<2
Turbidity	NTU	0.1	5	AO			10.8		12.6
Fluoride	mg/L	0.1	1.5	MAC		0.5		<0.7	
Chloride	mg/L	0.5	250	AO		42.8	31.8	571	593
Nitrate (N)	mg/L	0.05	10.0	MAC		2.14	2.20	<0.40	<0.40
Nitrite (N)	mg/L	0.05	1.0	MAC		0.08	0.09	<0.40	<0.40
Sulphate	mg/L	1	500	AO		32	29	39	41
Ammonia (N)-Total (NH3+NH4)	mg/L	0.05					0.40		0.06
Dissolved Organic Carbon	mg/L	0.2	5	AO			3.2		3.1
Hardness (as CaCO3)	mg/L as CaCO3	0.02	100	OG		211		492	
Calcium	mg/L	0.02				50.9	51.8	157	158
Copper	mg/L	0.002	1	AO		<0.002		0.006	
Iron	mg/L	0.005	0.3	AO		0.134	0.188	1.48	1.50
Magnesium	mg/L	0.02				20.3	20.5	24.2	24.3

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Data Specialist

Parameter	Units	R.L.	Limits	DWG	Client I.D.	F-1	F-2	I-1	I-2
					Sample I.D.	24-006254-1	24-006254-2	24-006254-3	24-006254-4
					Date Collected	2024-Mar-06	2024-Mar-06	2024-Mar-06	2024-Mar-06
						-	-	-	-
Manganese	mg/L	0.001	0.05	AO		0.016	0.022	**0.076**	**0.076**
Potassium	mg/L	0.1				7.7		3.9	
Sodium	mg/L	0.2	200, 20, 20	AO, WL, MAC		**35.0**	**28.8**	**268**	**271**
Zinc	mg/L	0.005	5	AO		0.032		0.009	
Anion Sum	meq/L	-				6.45		24.2	
Cation Sum	meq/L	-				5.96		21.7	
% Difference	%	-				3.93		5.46	
TDS (Ion Sum Calc)	mg/L	1	500	AO		331		**1280**	
Conductivity Calc	µmho/cm	-				596		2270	
pH (Client Data)	pH units	-				7.73	7.71	7.31	7.33
Temperature (Client Data)	°C	-				9.06	9.43	8.17	8.46

Elevated RLs due to sample matrix interferences

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

Michelle Dubien
Data Specialist

Summary of Exceedances		
Aesthetic Objectives		
F-2	**Found Value**	**Limit**
Turbidity	10.8	5
I-1	**Found Value**	**Limit**
Chloride	571	250
Iron	1.48	0.3
Manganese	0.076	0.05
Sodium	268	200
TDS (Ion Sum Calc)	1280	500
I-2	**Found Value**	**Limit**
TDS (Calc. from Cond.)	1260	500
Turbidity	12.6	5
Chloride	593	250
Iron	1.50	0.3
Manganese	0.076	0.05
Sodium	271	200
Maximum Acceptable Concentration		
F-1	**Found Value**	**Limit**
Sodium	35.0	20
F-2	**Found Value**	**Limit**
Sodium	28.8	20
I-1	**Found Value**	**Limit**
Sodium	268	20
I-2	**Found Value**	**Limit**
Sodium	271	20
Operational Guidelines		
F-1	**Found Value**	**Limit**
Hardness (as CaCO3)	211	100
I-1	**Found Value**	**Limit**
Hardness (as CaCO3)	492	100
Warning Level - Sodium Restricted Diets		
F-1	**Found Value**	**Limit**
Sodium	35.0	20
F-2	**Found Value**	**Limit**
Sodium	28.8	20
I-1	**Found Value**	**Limit**
Sodium	268	20
I-2	**Found Value**	**Limit**

Michelle Dubien
Data Specialist

Sodium	271	20

Michelle Dubien
Data Specialist

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: -

REPORT No: 24-006341 - Rev. 1

Report To:
WSP Canada Inc. - Barrie
121 Commerce Park Drive, Unit L
Barrie, ON L4N 8X1

CADUCEON Environmental Laboratories
112 Commerce Park Dr Unit L
Barrie, ON L4N 8W8

Attention: Tracy Meldrum

DATE RECEIVED: 2024-Mar-07
DATE REPORTED: 2024-Mar-12
SAMPLE MATRIX: Ground Water

CUSTOMER PROJECT: CA-GLD-23611788
P.O. NUMBER:

Analyses	Qty	Site Analyzed	Authorized	Date Analyzed	Lab Method	Reference Method
Anions (Liquid)	2	OTTAWA	PCURIEL	2024-Mar-08	A-IC-01	SM 4110B
Colour (Liquid)	1	OTTAWA	STAILLON	2024-Mar-12	A-COL-01	SM 2120C
Cond/pH/Alk Auto (Liquid)	2	OTTAWA	SBOUDREAU	2024-Mar-08	COND-02/PH-02/ALK-02	SM 2510B/4500H/2320B
DOC/DIC (Liquid)	1	OTTAWA	VKASYAN	2024-Mar-11	C-OC-01	EPA 415.2
E.Coli m-TECH Media (Liquid)	1	BARRIE	IMANOJ	2024-Mar-07	EC-001	MECP E3371
Fecal Coliforms (Liquid)	1	KINGSTON	BBURTCH	2024-Mar-08	FC-001	SM 9222D
Ion Balance (Calc)	1	OTTAWA	ASCHNEIDER		CP-028	MECP E3196
ICP/OES (Liquid)	2	OTTAWA	NHOGAN	2024-Mar-11	D-ICP-01	SM 3120B
Ammonia (Liquid)	1	KINGSTON	JYEARWOOD	2024-Mar-08	NH3-001	SM 4500NH3
Total Coliforms (m-Endo Media)	1	BARRIE	IMANOJ	2024-Mar-07	TC-001	SM 9222B
Turbidity (Liquid)	1	OTTAWA	AWILSON	2024-Mar-08	A-TURB-01	SM 2130B

R.L. = Reporting Limit
NC = Not Calculated
Test methods may be modified from specified reference method unless indicated by an *

Michelle Dubien
Data Specialist

Parameter	Units	R.L.	Limits	DWG	Client I.D.	H-1	H-2
					Sample I.D.	24-006341-1	24-006341-2
					Date Collected	2024-Mar-07	2024-Mar-07
					DWG	-	-
Total Coliform	CFU/100mL	1	0	MAC			0
E coli	CFU/100mL	1	0	MAC			0
Fecal Coliform	CFU/100mL	1	0	MAC			0
Alkalinity(CaCO3) to pH4.5	mg/L	5	500	OG		230	230
TDS (Calc. from Cond.)	mg/L	3	500	AO			735
Conductivity @25°C	uS/cm	1				1350	1350
pH @25°C	pH units	-	8.5	OG		8.04	8.11
Colour	TCU	2	5	AO			<2
Turbidity	NTU	0.1	5	AO			2.8
Fluoride	mg/L	0.1	1.5	MAC		<0.7	
Chloride	mg/L	0.5	250	AO		286	287
Nitrate (N)	mg/L	0.05	10.0	MAC		0.70	0.67
Nitrite (N)	mg/L	0.05	1.0	MAC		<0.40	<0.40
Sulphate	mg/L	1	500	AO		37	37
Ammonia (N)-Total (NH3+NH4)	mg/L	0.05					<0.05
Dissolved Organic Carbon	mg/L	0.2	5	AO			2.4
Hardness (as CaCO3)	mg/L as CaCO3	0.02	100	OG		429	
Calcium	mg/L	0.02				116	118
Copper	mg/L	0.002	1	AO		<0.002	
Iron	mg/L	0.005	0.3	AO		0.070	0.066
Magnesium	mg/L	0.02				33.7	33.9

Michelle Dubien
Data Specialist

Final Report

REPORT No: 24-006341 - Rev. 1

Parameter	Units	R.L.	Limits	DWG	Client I.D.	H-1	H-2
					Sample I.D.	24-006341-1	24-006341-2
					Date Collected	2024-Mar-07	2024-Mar-07
					DWG	-	-
Manganese	mg/L	0.001	0.05	AO		**0.060**	**0.062**
Potassium	mg/L	0.1				1.8	
Sodium	mg/L	0.2	200, 20, 20	AO, WL, MAC		**95.3**	**95.1**
Zinc	mg/L	0.005	5	AO		0.008	
Anion Sum	meq/L	-				13.5	
Cation Sum	meq/L	-				12.8	
% Difference	%	-				2.69	
TDS (Ion Sum Calc)	mg/L	1	500	AO		**710**	
Conductivity Calc	µmho/cm	-				1340	
pH (Client Data)	pH units	-				7.48	7.42
Temperature (Client Data)	°C	-				9.35	9.55

Elevated RLs due to sample matrix interferences
Revised report to correct sample ID's as per client request

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

Michelle Dubien
Data Specialist

Summary of Exceedances		
Aesthetic Objectives		
H-1	**Found Value**	**Limit**
Chloride	286	250
Manganese	0.060	0.05
TDS (Ion Sum Calc)	710	500
H-2	**Found Value**	**Limit**
TDS (Calc. from Cond.)	735	500
Chloride	287	250
Manganese	0.062	0.05
Maximum Acceptable Concentration		
H-1	**Found Value**	**Limit**
Sodium	95.3	20
H-2	**Found Value**	**Limit**
Sodium	95.1	20
Operational Guidelines		
H-1	**Found Value**	**Limit**
Hardness (as CaCO3)	429	100
Warning Level - Sodium Restricted Diets		
H-1	**Found Value**	**Limit**
Sodium	95.3	20
H-2	**Found Value**	**Limit**
Sodium	95.1	20

Michelle Dubien
Data Specialist

APPENDIX G

Cummulative Well Interference Assessment

Table G-1: Assessment of Mutal Interference, Scenario 1

ASSESSMENT OF MUTUAL WELL INTERFERENCE

Assumptions:

Centre point:	Well I (using Well D data)
S (-) =	2.0E-05
T (m^2/s) =	9.5E-04
T (m^2/day) =	80.00000
Q (L/d) =	54509.93389
Q (m^3/s) =	6.309E-04
Duration (yrs) =	20
Duration (s) =	630720000

From Lot	Distance (m)	20 Year Drawdown (m)
S1	150	0.79
S2	75	0.86
S3	0	1.60
S4	75	0.86
S5	150	0.79
S6	200	0.76
S7	250	0.74
Cumulative aquifer drawdown at lot S3 (south central lot) =		**6.4**

Note: Drawdowns calculated using methods of Theis (1935)

Average rate was assumed to half the tested rate.

$$s = \frac{2.30Q}{4\pi KD} \log \frac{2.25KDt}{r^2S}$$

Table G-2: Assessment of Mutual Interference, Scenario 2

ASSESSMENT OF MUTUAL WELL INTERFERENCE

Assumptions:

Centre point:	Well I (Using Well E data)
S (-) =	7.6E-02
T (m^2/s) =	1.2E-03
T (m^2/day) =	100.00000
Q (L/d) =	54509.93389
Q (m^3/s) =	6.309E-04
Duration (yrs) =	20
Duration (s) =	630720000

I

From Lot	Distance (m)	20 Year Drawdown (m)
S1	150	0.29
S2	75	0.35
S3	0	0.94
S4	75	0.35
S5	150	0.29
S6	200	0.27
S7	250	0.25
Cumulative aquifer drawdown at lot S3 (south central lot) =		**2.7**

Note: Drawdowns calculated using methods of Theis (1935)

Average rate was assumed to half the tested rate.

$$s = \frac{2.30Q}{4\pi KD} \log \frac{2.25KDt}{r^2S}$$

wsp.com