



CHUNG & VANDER DOELEN
ENGINEERING LTD.

PRELIMINARY GEOTECHNICAL INVESTIGATION

PROPOSED ELMIRA INDUSTRIAL SUBDIVISION

1665 Scotch Line Road
Elmira, Ontario

SUBMITTED TO:

1000525725 Ontario Inc.
30 Water Street North
Kitchener, ON
N2H 5A8

ATTENTION:

Mr. Bernie Nimer



CHUNG & VANDER DOELEN
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April 2, 2026
File No.: 1650G-1v2

1000525725 Ontario Inc.
30 Water Street North
Kitchener, ON
N2H 5A8

Attention: Mr. Bernie Nimer

RE: Preliminary Geotechnical Investigation
Proposed Elmira Industrial Subdivision
1665 Scotch Line Road, Elmira, Ontario

We take pleasure in enclosing one (1) copy of our Preliminary Geotechnical Investigation Report carried out at the above-referenced Site. Soil samples will be retained for a period of three (3) months and will thereafter be disposed of unless we are otherwise instructed.

If you have any questions or clarifications are required, please contact the undersigned at your convenience.

We thank you for giving us this opportunity to be of service to you.

Yours truly,
CHUNG & VANDER DOELEN ENGINEERING LTD.

Eric Y. Chung, M. Eng., P.Eng.
Principal Engineer

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1.0 INTRODUCTION

CHUNG & VANDER DOELEN ENGINEERING LTD. (CVD) has been retained by 1000525725 Ontario Inc. to carry out a preliminary geotechnical investigation for the proposed development of an industrial subdivision located at 1665 Scotch Line Road in Elmira, Ontario.

As shown in the Draft Plan of Subdivision (MHBC, January 14, 2026), included in Appendix B, the development includes a combination of industrial use lots, roadways, two (2) stormwater management facilities (Blocks 9 and 10), along with associated landscaping and services. The Site is to be fully municipally serviced with water and wastewater infrastructure, as described in the Functional Water Servicing, Functional Sanitary Servicing, and Functional Stormwater Management Reports (March 12, 2026) provided by SBM Ltd. A Grand River Conservation Authority (GRCA) regulated wetland area is located along the western edge of the property and is to be preserved.

A roadway network, comprising Streets 'A' and 'B', will be constructed throughout the industrial subdivision, connecting it to South Field Drive in the north, and Scotch Line Road to the south. The sections of South Field Drive and Scotch Line Road bordering the subject lands are to be reconstructed and widened in order to accommodate the increased traffic resulting from the proposed industrial subdivision.

It should be noted that an approximately 0.064 ha pumping station (Block 21) is planned for the northwest corner of the property. The final design has not yet been determined; therefore, following completion of the design and a follow-up field investigation, the geotechnical aspects of the design and construction will be discussed in a final geotechnical report.

The purpose of this investigation was to determine the subsurface soil and groundwater conditions at the site and, based on the findings, to make geotechnical recommendations for:

- Site grading operations and engineered fill construction;
- Excavation condition;
- Groundwater control during construction;
- Preliminary foundation bearing pressures;
- Foundation soil classification for seismic design per OBC 2024;
- Site servicing;
- Pavement design and construction; and
- Estimates of infiltration rates of encountered soil deposits.

This preliminary geotechnical report should be read in conjunction with CVD's Scoped Hydrogeological Assessment (March 2026).

2.0 FIELDWORK

Twenty-one (21) boreholes, identified as Boreholes 1 to 21 were advanced to depths between 3.50 and 15.75 m below existing grades between March 26 and April 1, 2024. Fourteen (14) monitoring wells were installed, and these include monitoring wells in Boreholes 1 to 12, as well as nested monitoring



wells at Boreholes 4 and 8 (Boreholes 4S/4D and 8S/8D). The borehole/monitoring well locations are illustrated on the Borehole Location Plan, Drawing No. 1.

The fieldwork was carried out under the supervision of a member of our engineering team, who logged the boreholes, collected subsurface soil samples, and monitored the groundwater conditions. All CVD monitoring well/boreholes logs are included on Enclosures 1 to 23.

The boreholes were advanced using a track-mounted CME-55 drill rig, equipped both with standard 108 mm inner diameter hollow stem augers (HSA) and 152 mm outer diameter solid stem augers (SSA) operated by Davis Drilling Ltd. of Milton, Ontario. Standard penetration tests (SPTs) in accordance with ASTM Specification D1586, were carried out at frequent intervals of depth, and the results are shown on the Borehole Logs as Penetration Resistance or “N”-values. The undrained shear strength of the cohesive soil deposits was determined on the slightly disturbed SPT samples using a field pocket penetrometer. The compactness condition or consistency of the soil strata has been inferred from these various test results.

The borehole locations, temporary benchmark, and associated ground surface elevations were surveyed by CVD for the purpose of this report using a Network RTK Global Navigation Satellite System (GNSS) Receiver. The survey data was collected using The UTM Zone 17N Projection, NAD83(CSRs)v7-2010 datum and Canada Geoid Model HT2_2010v70 (CGVD28).

The referenced temporary benchmark (TBM) is described below:

TBM: Top of culvert on east side of existing railroad tracks, as shown on Drawing No. 1

Elevation: 346.21 m (Geodetic)

3.0 LABORATORY TESTING

Soil samples obtained from the in-situ tests were examined in the field and subsequently brought to our laboratory for visual and tactile examination to confirm field classification. Moisture content determination of all retrieved samples occurred.

In addition, fourteen (14) grain size distribution analyses were carried out on representative soil samples of the major soil deposits to establish the physical and engineering properties as well as assist to provide estimates of infiltration rates of the encountered soil deposits. The results of these tests are presented in Enclosures 24 to 37.

4.0 EXISTING SITE CONDITIONS

The 54.93± ha site is currently used for agricultural purposes and is primarily occupied by grass and/or crop-covered farm fields. The property is bounded to the north by South Field Drive and to the south by Scotch Line Road, which are both connected by an unnamed gravel road which passes through the centre of the site in a north-south orientation. A residential home, multiple barns, and other minor



structures exist at the centre of the property. The western boundary of the site is demarcated by the rail tracks of the Waterloo Central Rail Corridor.

A GRCA regulated wetland consisting of an intermittent creek and various small streams exists next to the railroad along the northwestern section of the property boundary. The wetland is directly connected to Drain No.1 through a culvert located under the railroad tracks along the northern edge of the wetland. Various mid-sized trees and small fences are found throughout the site and define the boundaries of each existing field.

The Town of Elmira is situated directly northwest of the property. North, south, and east of the subject lands are more agricultural fields being used primarily for growing/harvesting various crops as well as for dairy farming. Canagagigue Creek is found approximately 500± m north of the site, Conestogo River is located approximately 4± km to the south, and the Grand River is situated approximately 4± km east of the property.

In terms of local topography, ground surface elevations across the property greatly vary, and the topography can be considered as “rolling land”. The highest elevations are found around the centre of the site, with other local highs occurring along the northern and southern portions of the land. There is a large decrease in elevation from the centre of the Site westwards towards the wetland/creek, as well as a smaller decrease from the centre of the property towards the east. The ground surface elevations at the borehole locations ranged between 345.99 and 356.11 m.

5.0 SUBSURFACE CONDITIONS

The detailed subsurface conditions encountered in the twenty-one (21) boreholes advanced as part of this investigation are shown on the Borehole Log Sheets, Enclosures 1 to 23, inclusive. Enclosure A provides explanations of the various soil abbreviations and terms used on these borehole log sheets.

The following sections provide descriptions of the major soil deposits encountered in the boreholes. The stratigraphic boundaries shown on the borehole logs are inferred from non-continuous sampling conducted during advancement of the borehole drilling procedures, and therefore, represent transitions between soil types rather than exact planes of geologic change. The subsurface conditions will vary between and beyond the borehole locations.

5.1 Topsoil

Topsoil was encountered at the ground surface of all twenty-one (21) boreholes with a measured thickness ranging from 300 to 510 mm. The thickness of topsoil could vary between and beyond the borehole locations.

5.2 Fill

A layer of dark brown to brown fill materials, typically ranging in composition from sandy silt to silty



sand, and a clay content ranging from trace clay to clayey, was encountered beneath the topsoil in twenty (20) of the boreholes (excluding Borehole 8). The fill materials extended to depths between $0.5\pm$ and $2.95\pm$ m below ground surface (bgs). Occasional sand lenses/seams as well as trace amounts of topsoil and trace to some gravel were encountered in most of the boreholes. The lower stratum of fill in Borehole 17 was comprised of silty sand and gravel with occasional cobbles, and occasional brick fragments were encountered in the upper stratum.

The SPT “N”-values measured within the fill deposit ranged from 3 to 32 blows per 300 mm of penetration, indicating a variable very loose to dense compactness condition. Natural moisture contents were measured between 6 and 38%, exhibiting typically a moist to wet moisture condition. Elevated moisture contents are likely due to the presence of topsoil/organics.

5.3 Granular Deposits

A series of granular deposits were found both above and interlayered within the till deposits. The composition of these granular layers varied between silt, sandy silt, sand and silt, silty sand, fine sand, and sand and gravel. Granular deposits were encountered in Boreholes 4, 7, 8, 9, 10, 13, 14, and 16. Occasional clayey seams as well as trace to some gravel were observed within the various granular layers. Notably, a gravelly silty sand layer ($9.3\pm$ to $10.2\pm$ m bgs) was encountered within the sand and silt till deposit in Borehole 4, and silty sand to sand and silt layers were found beneath the sand and silt till deposit in Borehole 8.

These layers extended from $14.1\pm$ to $15.75\pm$ m bgs, at which point Borehole 8 was terminated. The results of five (5) grain size distribution analyses taken from the various granular deposits in Boreholes 4, 7, 8, and 9, are shown graphically on Enclosures 28, 31, and 33 to 35.

Standard penetration testing within the granular deposits yielded “N”-values ranging from 6 to over 50 blows per 300 mm of penetration, indicating a variable loose to very dense compactness condition. Natural moisture contents were measured between 4 and 30%, generally indicating moist to saturated moisture conditions.

5.4 Clayey Silt Till & Sand and Silt Till

The majority of the boreholes were predominantly comprised of either a clayey silt till or a sandy silt to sand and silt till. Most of the boreholes contained a combination of these two deposits, in which typically the clayey silt till was underlain by the sand and silt till. These deposits were encountered in nineteen (19) of the boreholes. Occasional seams and/or minor layers of granular deposits (see Section 5.3) were found interlayered within the till deposits. Occasional cobbles and/or boulders were observed within the till deposits in Boreholes 3, 4, 8, and 11. The results of three (3) grain size distribution analyses taken from the clayey silt till in Boreholes 3, 8, and 10, are shown graphically on Enclosures 26, 32, 36, and 37, and five (5) grain size distribution analyses were taken from the sand and silt till deposit in Boreholes 1, 2, and 4 to 6, are shown graphically on Enclosures 24, 25, 27, 29, and 30.



Standard penetration testing within the till deposits yielded “N”-values ranging from 4 to over 50 blows per 300 mm. The undrained shear strength obtained on retrieved samples of the cohesive clayey silt till was measured at 180 to over 250 kPa. Based on the above test results, the clayey silt till deposit is considered to have a generally very stiff to hard consistency, while the sand and silt till has a compactness condition generally ranging from compact to very dense. Natural moisture contents were measured between 5 and 27%, and the general plasticity of the clayey silt till deposit was drier than the plastic limit.

5.5 Groundwater

Throughout the field investigation, groundwater conditions were monitored during advancement of boreholes, and water level readings were measured on multiple occasions following the completion of fieldwork in all fourteen (14) installed monitoring wells (monitoring wells BH 1 to 12). Saturated conditions were encountered in seventeen (17) of the twenty-one boreholes drilled during the study.

During the investigation, two (2) aquifers were identified: a shallow groundwater table aquifer existing within the till deposit, predominantly fed by near surface granular seams/layers, and a confined aquifer existing within the deeper granular deposit. In summary, between March 2024 and February 2026, the water table aquifer (shallow aquifer) was measured at depths varying from 0.18 to 8.42 mbgs, corresponding to elevations ranging from 341.97 to 354.73 mASL, with a seasonal variation between individual wells fluctuating by up to $4.35 \pm$ m. These large differences are due to the aquitard nature of the clayey silt / sand and silt till. It is also noted that the observed groundwater table will fluctuate seasonally, such as during the spring following the period of peak snow melt, and in response to major weather events.

The shallow groundwater flow direction mimics the local topography of the Site, with groundwater travelling away from the raised plateaus of the centre, north, and south of the property, towards the west (into the wetland and creek) and towards the east (into the adjacent farmlands).

The groundwater measurements for each monitoring well and piezometer collected between March 2024, and February 2026, are summarized in Table 1, and Figures 6a and 6b provide an interpretation of on-site groundwater contours and general groundwater flow directions (both included in Appendix C).

Five (5) single well response tests were performed on monitoring wells located in the shallow water table aquifer. The hydraulic conductivities for the clayey silt/sand and silt till (wells BH 1, 3, 4S, 6, and 9) ranged from 7×10^{-8} to 1×10^{-7} m/s, while the hydraulic conductivity of Borehole 9, which was installed in the shallow sand and silt to sandy silt layer contacted above the sand and silt till, was measured at 1×10^{-6} m/s. These values are consistent with the hydraulic conductivity ranges typically associated with similar soils (Freeze & Cherry, 1979). Hydraulic conductivities calculated from soil grain sizes analysis (using the Hazen Formula) were similar in magnitude to those of the single well response tests.



6.0 DISCUSSION AND RECOMMENDATIONS

6.1 General

The development includes a combination of industrial use lots, roadways, two (2) stormwater management facilities (Blocks 9 and 10), along with associated landscaping and services. The Site is to be fully municipally serviced with water and wastewater infrastructure. A roadway network, comprising Streets 'A' and 'B', will be constructed throughout the industrial subdivision, connecting it to South Field Drive in the north, and Scotch Line Road to the south. The sections of South Field Drive and Scotch Line Road bordering the subject lands are to be reconstructed and widened in order to accommodate the increased traffic resulting from the proposed industrial subdivision. The Grand River Conservation Authority (GRCA) regulated wetland area located along the western edge of the property is to be preserved.

In general, the surficial topsoil was underlain by a $0.5\pm$ to $2.95\pm$ m thick layer of loose to compact fill materials, typically followed by a generally very stiff to hard clayey silt till and/or a compact to very dense sandy silt to sand and silt till. Most of the boreholes contained a combination of the two till deposits, in which typically the clayey silt till which was underlain by the sand and silt till. Occasional cobbles and boulders were observed within these till deposits. Additionally, occasional seams and/or minor layers of granular deposits were found interlayered within the till deposits. Granular soils varied in composition between silt, sandy silt to silty sand, fine sand, and sand and gravel. It should be noted that the northeastern and northwestern-most corners of the property contain larger concentrations of loose granular deposits, as opposed to the majority of the site which is underlain by till deposits.

Shallow saturated conditions were encountered in seventeen (17) of the boreholes. The water table aquifer was measured between March 2024 and February 2026 at depths varying from 0.18 to 8.42 mbgs, corresponding to elevations ranging from 341.97 to 354.73 mASL. The shallow groundwater flow direction mimics the local topography of the Site, with groundwater travelling away from the raised plateaus of the centre, north, and south of the property, towards the west (into the wetland and creek) and towards the east (into the adjacent farmlands). Hydraulic conductivity analysis conducted on the water table aquifer resulted in values generally ranging from 1×10^{-7} to 1×10^{-6} m/s.

6.2 Site Grading

It should be noted that due to the low infiltration rates of the predominant clayey silt till and sand and silt till deposits found throughout the majority of the site (excluding the northeastern and northwestern-most corners of the property), the water table aquifer significantly drops in elevation in the late summer/fall in comparison to the spring. As such, it is recommended that excavation for the future development be done during the typically drier summer months when ground water conditions would be expected to lie at lower elevations.

It should be noted that the thickness of the topsoil layer could vary drastically across the site from those reported at the borehole locations. Topsoil stripping operations should be conducted when the ground is not wet and can support construction equipment. Over-stripping can result when the ground conditions are wet and unstable.



Due to significant topographical changes throughout the site, site grading operations involving “cut and fill” procedures are anticipated. Materials to be used as fill during site grading operations are to be suitably handled and placed according to their final use needs.

It is recommended to construct engineered fill in areas to be raised in order to suitably support the industrial building structures, future roadways, and infrastructure servicing.

Fill and/or loose/soft soil conditions were encountered at all borehole locations and extended up to depths of 2.95± m below existing grade. The following table provides the depth and elevation at each borehole location where non-suitable soil conditions were encountered:

Borehole No.	Topsoil Thickness (mm)	Existing Ground Elevation (m)	Thickness of Non-Suitable Soils (m)	Elevation of Suitable Soils (m)
1	330	352.3±	1.5±	350.8±
2	410	352.6±	1.1±	351.5±
3	300	350.2±	0.8±	349.4±
4	380	351.5±	1.5±	350.0±
5	300	353.0±	0.8±	352.2±
6	380	352.9±	1.5±	351.4±
7	510	349.8±	1.5±	348.3±
8	360	356.1±	0.8±	355.3±
9	460	350.8±	2.5±	348.3±
10	300	346.2±	1.5±	344.7±
11	300	352.4±	0.8±	351.6±
12	330	346.5±	1.2±	345.3±
13	300	346.0±	0.6±	345.4±
14	360	350.2±	0.8±	349.4±
15	510	352.2±	1.2±	351.0±
16	410	353.4±	1.5±	351.9±
17	460	350.6±	2.9±	347.7±
18	460	355.5±	1.5±	354.0±
19	380	354.8±	0.8±	354.0±



Borehole No.	Topsoil Thickness (mm)	Existing Ground Elevation (m)	Thickness of Non-Suitable Soils (m)	Elevation of Suitable Soils (m)
20	380	353.6±	1.7±	351.9±
21	380	352.0±	2.3±	349.7±

If there is a shortage of fill, the imported fill should consist of granular-based fill meeting the gradational requirements of OPSS 1010 Select Subgrade Material. The natural moisture content of the imported soil or re-purposed on-site native soil to be used as engineered fill should be within 3% below their optimum moisture content to achieve the specified degree of compaction.

It is recommended that any proposed borrow source materials be tested prior to importing to ensure that the environmental quality of the imported fill meets all environmental approval criteria and to ensure that the natural moisture content of the fill is suitable for compaction.

It is recommended that engineered fill construction be conducted during the summer and early fall months when drier warmer weather conditions typically exist as the onsite fine-grained soils are sensitive to moisture and will become difficult to handle and compact to the specified degree of compaction when wet. Conversely, judicious addition of water may be required for preparing the granular soils to be used for engineered fill purposes.

In general, the majority of the cut materials are expected to be fine-grained soils (silty and clay-rich) which are generally frost-susceptible. Constructing engineered fill, backfilling footings, foundation walls, and service trenches using finer-grained soils during the winter months is not advisable, unless suitable weather conditions prevail, the soils are at suitable moisture content, and strict procedures are followed and monitored on a full-time basis by the geotechnical engineer.

The onsite soils are generally susceptible to softening and deformation when exposed to excessive moisture and construction traffic. As a result, it is imperative that the grading/filling operations are planned and maintained to direct surface water run-off to low points and then be positively drained by suitable means. During periods of wet weather, construction traffic should be directed along the designated construction routes so as not to disturb and rut the exposed subgrade soil. Temporary construction roads consisting of clear crushed material (such as crushed stone or recycled concrete) may be required during poor weather conditions such as wet spring or fall.

Engineered fill should be constructed in accordance with the following procedures in order to support future buildings, infrastructure servicing, and roadway pavements.

1. All existing topsoil, organic and deleterious materials should be stripped from building and roadway areas. Loose/soft soils encountered within future building areas as presented in the previous table are to also be removed. The inorganic soils may be salvaged for potential reuse as engineered fill;
2. The exposed inorganic subgrade is to be thoroughly recompacted by large heavy compaction



equipment (10 tonne sheepsfoot compactor is recommended) if it can support such equipment and remaining stable. Careful review and guidance by the geotechnical engineer are recommended should the subgrade become unstable. All prepared subgrade areas are to be inspected by qualified geotechnical personnel prior to placement of fill;

3. The required grades can then be achieved by placing approved inorganic onsite fill in maximum 200 to 300 mm thick loose lifts which are to be thoroughly compacted to at least 98% Standard Proctor maximum dry density (SPMDD). The moisture content of the fill materials should be within 3% below their optimum moisture contents in order to achieve the specified degree of compaction;
4. Engineered fill used to support future buildings, infrastructure servicing and roadway pavements must be placed such that the fill pad extends horizontally outwards at least a distance equal to the depth of fill to be placed;
5. Overly wet and organic materials should be placed in non-structural areas and outside of SWM feature areas where 90% SPMDD is adequate. Alternatively, wet inorganic soils can be mixed with drier soils to produce a suitable moisture content to allow appropriate compaction to occur if conditions dictate; and
6. All fill placement and compaction operations must be supervised on a full-time basis by qualified geotechnical personnel to approve fill material and ensure the specified degrees of compaction have been achieved.

Vibration could be generated from various construction equipment during construction, such as compactors and rollers which could be harmful to surrounding structures and buildings. Peak particle velocity (PPV) of ground motion is widely accepted as the best descriptor of potential for vibration damage to structures. The safe vibration limit can be set to 8 to 25 mm/s PPV, depending on frequency of vibrations and the sensitivity of surrounding structures to vibration.

Due to the relatively isolated location of the site, aside from the Waterloo Central Rail Corridor on the western boundary of the property, it is unlikely that any critical or susceptible infrastructure will be affected by the site grading operations. However, if deemed necessary, vibration monitoring can be performed. Vibration monitoring can be carried out to measure the PPV of ground motion from vibration generated from typical compaction equipment at the beginning of the project in the potentially critical areas. This will set criteria and establish the type of equipment to be used for this project. A pre-construction condition survey could be conducted to document the condition of the existing structures within the possible zone of influence, if necessary.

6.3 Groundwater Control and Open Cut Excavation

Excavations are generally expected to be in the order of $1\pm$ to $3.5\pm$ m deep for foundations and site servicing. The excavations will penetrate topsoil, loose to compact fill, and native stiff to hard clayey silt till and/or loose to very dense sand and silt till or other granular deposits. Provided the groundwater is controlled/lowered below the excavation depths, these materials are considered to be Type 3 Soils in



accordance with the latest Occupational Health and Safety Act.

Above the groundwater table, uncontrollable groundwater is not expected within the anticipated depths of excavation, and excavations in the Type 3 Soils are expected to remain stable during the construction period provided that side slopes are cut to 1H : 1V from the bottom of the excavation. Where seepage or perched groundwater is encountered, side slopes should be cut to more stable angles of 3H : 1V. The side slopes should be suitably protected from erosion processes. Surface run-off which inadvertently enters the excavation can be controlled by using conventional filtered sump pumping techniques, as and where required.

It should be noted that the Region of Waterloo has indicated that they will not support the use of any permanent active or passive dewatering systems on-site, and as such, any structure located within or 0.6 m or below of the water table will need to be waterproofed and hydrostatically anchored, if required.

In terms of temporary construction dewatering, where the exposed base subgrade and sidewall soils of the excavation are comprised of saturated granular deposits, it is recommended that groundwater be lowered and controlled to at least 0.6 m below the base of excavations to create and maintain a stable subgrade condition to facilitate pipe laying and backfilling operations or foundation preparation, as well as to ensure cut slope stability. It should also be noted that occasional saturated granular seams were encountered within clayey silt till deposits and will also be required to be drained if encountered.

It is expected that with the exception of the pumping station, the constructability of which will be assessed at the detailed design stage, most excavations will be less than 3.5 m in depth, and as such will be likely founded in the hydraulically tight clayey silt till / sand and silt till soils. Given the low hydraulic conductivity of these deposits, groundwater is expected to be controllable by pumping from filtered sump pits (possibly together with intercept ditching). However, it is possible that local pre-lowering of the groundwater table might be required prior to excavation through the use of well points. It is recommended that CVD be retained to review the design grades and evaluate the need for dewatering once detailed site plans are available.

6.4 Site Servicing

The subdivision will be municipally serviced with watermain and sewers. According to the Region of Waterloo Design Guidelines and Supplemental Specifications for Municipal Services (DGSSMS) (February 2022), it is anticipated that municipal servicing will generally lie 2.0± to 3.0± m below finished grades. The sanitary sewer obvert should be located a minimum of 2.8 m below final road grade, the storm sewer obvert should be located 1.5 m below final road grade, and the top of the watermain pipe should be located 1.8 to 2.0 m below finished grade.

6.4.1 Pipe Bedding

Any loose, unstable and/or organic soils encountered at the pipe invert should be sub-excavated and replaced with well compacted Granular "A" which should be placed in 150 mm thick layers and compacted to at least 95% Standard Proctor Maximum Dry Density (SPMDD). The support of pipes in



these areas can also be achieved with non-shrinkable fill if poor soil is encountered at the subgrade level and fully removed.

The bedding requirements for the services should be in accordance with both the Ontario Provincial Standard Drawings OPSD - 802 for flexible and rigid pipes, as well as the Region of Waterloo DGSSMS. The bedding shall be a Class "B" and consist of at least 150 mm thick Granular "A" compacted to at least 95% SPMDD. Granular "A" should be used to backfill around the pipe to at least 150 mm above the top of the pipe.

Particular attention should be given to ensure material placed beneath the haunches of the pipe is adequately compacted. Recycled asphalt will not be allowed to be used in Granular "A" bedding material.

6.4.2 Trench Backfill

Excavated inorganic materials are considered suitable for reuse as trench backfill. If necessary, potential mixing of drier and wetter excavated soils in proper ratios can be done to produce a suitable mixture near the material's optimum moisture content in order to achieve the required compaction specification. Conversely, judicious addition of water may be required if the soils are significantly drier than their optimum moisture content in order to facilitate suitable compaction.

The backfill should be placed in thin layers, 300 mm thick or less dependant on the demonstrated success of compaction based on in-situ density test results. Other types of materials such as organic soils, overly wet soils, boulders, and frozen materials (if work is carried out in the winter months) should not be used for backfilling. All backfill should be compacted to at least 95% SPMDD.

Backfilling operations should follow closely after excavation so that only a minimal length of trench slope is exposed at any one time so as to minimize potential problems. This will potentially minimize over-wetting of the subgrade material. Particular attention should be given to make sure frozen material is not used as backfill should construction extend into the winter season.

It has been our experience that excavated cohesive soils should be broken into smaller pieces (less than 150 mm diameter) before returning into the trench as backfill. This will eliminate "wedging" problems and reduce long term settlement. Particular attention must be made to backfilling the laterals where the trenches are narrow and against the manholes and catch-basins. Thinner lifts and additional compaction must be applied.

Frequent inspection by experienced geotechnical personnel should be carried out to examine and approve backfill material, to carefully inspect placement, and to verify that the specified degree of compaction has been obtained by in situ density testing.



6.4.3 Stormwater Management Pond Construction

The proposed industrial subdivision will be serviced by municipal stormwater management works as described in the Functional Stormwater Management Report (FSMR) completed by SBM (March 12, 2026).

Based on review of both the current development plans shown on the Draft Plan (MHBC, January 14, 2026), included in Appendix B, and the SBM FSMR, it is understood that two (2) SWM wet ponds (referred to as 'West' and 'East' SWM ponds) are planned in Blocks 9 and 10, with approximate areas of $1.56\pm$ ha and $2.24\pm$ ha, respectively. According to the SBM Grading Plan Sheet No. 5.2 and 5.3 (included in Appendix B), the bottom elevation of the West pond is planned to be set at 346.5 mASL, and the bottom elevation of the East pond at 347.5 mASL. Based on SBM's plan, the total post-development subcatchment area tributary to the East pond is approximately $319,580\text{ m}^2$, while the subcatchment area tributary to the West pond is approximately $229,700\text{ m}^2$.

It should be noted that the peak groundwater levels are interpreted to range from $346.8\pm$ to $350.5\pm$ mASL in vicinity of the East SWM area, and from $345.5\pm$ to $347.5\pm$ mASL in the West SWM area. Considering that the bottom elevations of the East and West SWM ponds are currently set at 347.5 and 346.5 mASL, depending on final grading, the groundwater table may partially intersect both ponds.

With respect to the proposed elevations of the ponds, based on the stratigraphy of Borehole 9, located in the footprint of the East SWM pond, the East pond will likely be founded within sand and silt to sandy silt soils, while the West pond will likely be founded on clayey silt / sand and silt till soils based on Boreholes 5 and 10.

Given the interpreted groundwater levels and the presence of fine-grained soils at the proposed pond foundation elevations, the potential for seepage/infiltration should be considered in the detailed design of the wet stormwater management (SWM) ponds. The determination of seepage performance criteria and the design of any liner or other water retention measures (e.g., compacted clay liner, geosynthetic liner, or equivalent), if required, are the responsibility of the civil engineer as part of the detailed stormwater management pond design.

Clayey silt soils were encountered in various boreholes across the Site. Subject to confirmation of hydraulic conductivity through additional laboratory testing and provided the materials meet the infiltration criteria established by the civil design, these soils may be considered potentially suitable for use as compacted liner material. Final suitability should be confirmed during detailed design and verified during construction through appropriate field inspection and testing.

The detailed SWM pond design should also address erosion protection and long-term sediment management. Appropriate stabilization measures (e.g., rip rap, vegetation, erosion control blankets, or similar measures) may be required at inlet and outlet locations and along pond side slopes subject to concentrated flow. Consideration should also be given to sediment control features, such as forebays or similar provisions, to limit the accumulation of fine-grained soils within the pond base and to facilitate long-term maintenance of the pond storage capacity.

During construction, the exposed pond subgrade should be inspected by the geotechnical engineer



following excavation. If soft, disturbed, or wet soils are encountered at the pond base, localized removal and replacement, drying and recompaction, or other stabilization measures may be required prior to placement of any liner or cover materials. Additional geotechnical input related to liner suitability and construction considerations can be provided during the detailed design and construction stages, if required.

Engineered fill placement and compaction for any pond liner and/or pond berm construction should follow the procedures outlined in Section 6.2 of this report, using materials approved for the intended application.

6.5 Footing Foundations

It should be noted that this current preliminary geotechnical investigation is insufficient and not intended for detailed building design purposes. It will be necessary to conduct a geotechnical investigation at each industrial lot in order to provide a detailed, site and project specific report for the design and construction of the proposed development.

Based on the twelve (12) widely spaced boreholes, footings cast on native competent stiff to hard clayey silt till, compact to very dense sand and silt till, and/or compact to dense granular deposits can be designed using a net Geotechnical Reaction of 200 kPa at SLS and Factored Geotechnical Resistance of 300 kPa at ULS.

The following table summarizes the highest founding level and elevation for the footings at the borehole locations:

Borehole No.	Existing Ground Elevation (m)	Highest Founding Depth (m)	Highest Founding Elevation (m)
1	352.31	1.61	350.70±
2	352.62	1.52	351.10±
3	350.21	1.01	349.20±
4	351.53	1.73	349.80±
5	353.02	0.82	352.20±
6	352.94	1.84	351.10±
7	349.84	1.84	348.00±
8	356.11	0.91	355.20±
9	350.80	2.60	348.20±
10	346.20	1.60	344.60±



Borehole No.	Existing Ground Elevation (m)	Highest Founding Depth (m)	Highest Founding Elevation (m)
11	352.39	1.09	351.30±
12	346.47	1.77	344.70±

Higher soil bearing capacities may be available for footings founded at elevations lower than those cited above, through a site and project specific geotechnical evaluation.

Footings founded on approved engineered fill can be designed to a net Geotechnical Reaction of 150 kPa at SLS and Factored Geotechnical Resistance of 250 kPa at ULS.

These soil bearing pressures can be achieved provided that the founding subgrade is undisturbed during construction. The majority of the settlements will take place during construction and the first loading cycle of the building. In addition, the footings should be founded below any topsoil, fill, or other deleterious materials on competent undisturbed soils. Spacing between adjacent footing steps should not be steeper than 10H to 7V.

If wet or saturated subgrade conditions are encountered, it is recommended that a 50 mm thick protective concrete slab should be poured and allowed to set on the prepared subgrade to further protect it from disturbance by construction traffic and the elements.

Exterior footings and footings in unheated portions of the building should be provided with a soil cover of not less than 1.2 m or equivalent synthetic thermal insulation for adequate frost protection. The founding subgrade soils must be protected from frost penetration during winter construction.

The footing excavations should be inspected by the geotechnical engineer to ensure adequate soil bearing and proper subgrade preparation.

6.6 Earthquake Considerations

In accordance with The Ontario Building Code 2024 (OBC), the proposed structure should be designed to resist earthquake load and effects as per Subsection 4.1.8.

Based on the condition of the underlying soils encountered at the boreholes, the fact that engineered fill will be constructed to replace loose/soft soils, and our experience with the local soil conditions up to a depth of 30 m, the site can be classified as **Site Class C** as per OBC Table 4.1.8.4.-B.

It is recommended that a site-specific shear wave velocity survey be undertaken to determine the average shear wave velocity (V_{s30}) within the upper 30 m of the soil profile in order to establish the Site Designation (X_v) in accordance with Clause 4.1.8.4-(2b) of the 2024 OBC. Utilizing the Site Designation in place of the generic Site Class may result in lower seismic loading requirements, thereby providing potential cost savings in the structural design. CVD can provide assistance with this matter, upon



request.

6.7 Infiltration Rate of Native Soil Deposits

Based on the laboratory gradational results and our experience, the permeability (hydraulic conductivity) and infiltration rate of the notable inorganic soil deposits encountered are estimated and provided in the following table:

Material	Permeability (K) (cm/s)	Infiltration Rate (mm/hr)
Sand and Silt Till (Enclosures 24, 25, 27, 29, and 30)	3×10^{-7} to 1×10^{-6}	<1
Clayey Silt Till (Enclosures 26, 32, 36, and 37)	1×10^{-8} to 1×10^{-7}	<1
Silt, some sand, trace clay (Enclosure 31)	1×10^{-5} to 3×10^{-5}	3 to 5
Sandy Silt (Enclosure 35)	3×10^{-5}	5
Sand and Silt (Enclosures 33 and 34)	3×10^{-4} to 1×10^{-3}	15 to 30

If an infiltration feature is to be included in the development of the property, it should be located below the footing drain/weeper and at least 5 m away from the proposed building footprints. Additionally, the infiltration features should have the base located at least 1.0 m above the groundwater table, and a minimum infiltration rate of 15 mm/hr is required.

Considering the above information, the very low infiltration rate of the native predominant clayey silt till and sand and silt till deposits and the expected relatively low depth of the water table aquifer in peak groundwater periods, enhanced on-site infiltration may be difficult to design using traditional infiltration galleries. The only potential areas of significant infiltration are located in the northeastern and northwestern-most corners of the Site, where fine granular soils and occasional sand and gravel deposits can be found; however, the lateral extent of these coarser soils is likely limited. The ultimate composition of the subsoils in these areas will need to be further explored if infiltration features are to be considered at these locations.



6.8 Pavement Design and Construction

The earth subgrade soil is generally expected to consist of fine-grained (silty and clay-rich) soils. Cognizant of the traffic volume and the subgrade soils, the following pavement component thicknesses (per Township of Woolwich standards) are considered suitable for industrial roads:

Pavement Component	Local and Collector Road Component Thickness (mm)	Arterial Road Component Thickness (mm)
HL3 Surface Asphaltic Concrete	50	50
HL8 Binder Asphaltic Concrete	90	100
Granular "A" Base Course	210	200
Granular "B" Type II Sub-base Course	450	520
Granular Base Equivalency (GBE)	790	847

Note: GBE denotes Granular Base Equivalency which is calculated using factors of 2 for asphaltic concrete, 1 for Granular "A" base and 0.67 for Granular "B" sub-base

The asphaltic concrete should consist of two layers: a 90 to 100 mm layer of HL8 and one top layer of 50 mm thick HL3.

The pavement design considers that road construction will be carried out during the drier time of the year and that the subgrade is stable, not heaving under construction equipment traffic. If the subgrade is wet or unstable, additional granular sub-base may be required.

The subgrade should be prepared in accordance with the recommendations provided in Section 6.2 and Section 6.3 prior to placement of the granular base layers.

The base and sub-base materials should be produced in accordance with the current OPSS specifications and placed and uniformly compacted to at least 100% SPMDD. The asphaltic concrete should be placed and compacted in accordance with OPSS Form 310 and to a minimum of 92% of the Marshall Density (MRD). Frequent in-situ density testing by this office should be carried out to verify that the specified degree of compaction is being achieved and maintained.

SS-1 or SS-1HH tack coat should be applied to all binder course surfaces and vertical surfaces (i.e., curbs, pavement joints, etc.) prior to placement of asphalt. Refer to OPSS 310 and OPSS 1101 for additional details.

It should be noted that even well compacted trench backfill could settle for a period of time after construction. In this regard, the surface course of the asphaltic concrete should be placed at least one (1) year after trench backfill is completed so as to allow any minor settlements to occur within the trench backfill. The incomplete pavement structure may not be capable of supporting construction traffic. Consequently, minor repairs of the sub-base, base and asphaltic concrete may be required prior to paving with the base course and/or the surface course asphaltic concrete.



Longitudinal sub-drains with positive drainage outlets are recommended to be installed at the subgrade level along the edges of the roadway construction to enhance the performance of the pavement. Systematic drainage of the granular base materials will promote the longevity of the pavement structure. The prepared earth subgrade and final pavement surfaces should be graded to direct water runoff away from buildings, sidewalks, and other similar pertinent structures. The roadway subgrade should be free of depressions and should have a 2% slope from the crown to the edge of the pavement.

6.9 Roadway/Embankment Widening

It is understood that roadway/embankment widening of South Field Drive and Scotch Line Road will potentially occur as part of the roadway reconstruction works. Roadway widening for turning lanes and/or acceleration/deceleration lanes may be required along the northern and southern boundaries of the property along these two (2) roadway project sections.

Widening of the roadway platform shall be constructed by benching of the slopes where required. Benching of earth slopes shall be completed as per requirements of OPSD-208.010.

The embankment side slopes should not be steeper than 2.5H : 1V provided that the embankment fill is constructed in accordance with the following recommendations. The side slopes below the pavement profile should be topsoiled and seeded or sodded for surface erosion protection.

The following procedures are recommended to construct the embankment fill in order to suitably support future pavement widening areas:

1. The fill/widening should be overbuilt and trimmed back to the final configuration.
2. All topsoil, vegetation and deleterious materials are to be excavated from the proposed embankment fill areas to exposed competent inorganic soils. This removal of unsuitable material is to extend to the outside edges of the proposed embankment areas to a horizontal distance at least equal to the thickness of the embankment fill that will be placed on approved subgrade soil.
3. The exposed subgrade surface should be thoroughly proof-rolled and inspected by geotechnical personnel. Any soft spots encountered during the process should be excavated to the level of competent soil.
4. The required grades can then be achieved by placing approved soils (salvaged road base materials and OPSS 1010 Select Subgrade Material) in maximum 200 to 300 mm thick levelled lifts with each lift being compacted to at least 95% SPMDD.
5. Ensure compaction is carried out to the outer edge of the fill placed.
6. Periodic in-situ density testing by this office should be performed during the construction of embankment fill to ensure the specified degree of compaction is being achieved and maintained.



6.10 Trenchless Drilling

The site is bounded to the west by the Waterloo Central Railway operated by the Southern Ontario Locomotive Restoration Society (SOLRS). Due to operational constraints associated with the rail corridor, open-cut excavation may not be feasible within this area. As such, installation of the proposed sanitary sewer and watermain through the rail corridor conducted as part of the roadway/embankment widening of Southfield Drive will likely require the use of trenchless construction methods.

Based on a review of the SBM site servicing plans and Functional Sanitary and Water Servicing Reports (March 13, 2026), the proposed watermain within the rail corridor will generally be installed at an approximate elevation of $348.5 \pm$ mASL, while the proposed sanitary sewer and force main will be constructed at elevations of approximately $342.8 \pm$ to $343.5 \pm$ mASL. It is expected that finalized elevations will be available at the detailed design stage. No storm sewer crossing is proposed through the railway corridor.

The nearest borehole to the railway crossing, Borehole 13, was explored to elevation 342.34 mASL. The borehole revealed 300 mm of topsoil followed by 200 mm of fill materials. These soils are underlain by a wet to saturated, loose to compact sandy silt deposit with trace gravel which extends to a depth of 2.40 mbgs. This deposit is further underlain by a loose, saturated, 0.55 m thick sand and gravel deposit which is underlain by a very stiff clayey sandy silt till deposit and extends to a depth of at least 3.65 mbgs (342.34 mASL).

Although no monitoring wells are located directly beside the railway crossing, based on the peak shallow groundwater flow interpretation (Figures 6a and 6b, Appendix C), it is expected that peak groundwater levels (April 30, 2024) at the railway crossing will range from approximately $344.5 \pm$ to $345.0 \pm$ mASL. Depending on final design grades, these groundwater levels are potentially above the proposed invert elevations of the sanitary sewer within the rail corridor. Accordingly, trenchless construction methods must be suitable for granular soils with limited stand-up time and potentially saturated conditions.

Based on the subsurface information available, the following conditions are considered key constraints for trenchless construction beneath the rail corridor:

- Presence of non-cohesive sand and gravel on top of cohesive clayey silt till deposits.
- Limited soil stand-up time, particularly below the groundwater table.
- Potential for groundwater inflow and running ground during excavation.
- Sensitivity of the rail corridor to ground loss, settlement, and vibration.
- Tight vertical and horizontal alignment tolerances associated with the gravity sanitary sewer.
- Potential for mixed soil interface (fill over native).

Based on the anticipated soil and groundwater conditions, the following trenchless construction methods are considered technically feasible for the proposed rail crossing from a geotechnical perspective:

1. Traditional Jack and Bore
2. Guided Auger Boring
3. Pipe Ramming



Final selection of the trenchless installation method, including construction means and methods, shall remain the responsibility of the Contractor and should be based on their assessment of subsurface conditions, construction constraints, equipment availability, and experience with the selected method.

The table below summarizes the relative advantages, disadvantages, and potential limitations and impacts associated with each trenchless installation method:

Installation Method	Advantages	Disadvantages	Potential Limitations and Impacts
Traditional Jack and Bore	• Simple equipment and lower mobilization cost • Widely available contractors	• Poor face stability in sand and gravel • Requires periodic auger withdrawal resulting in temporary loss of confinement • Limited control of line and grade • Performs poorly below groundwater table	• Elevated risk of ground loss and surface settlement • Running ground and piping in saturated granular soils • Potential misalignment of gravity sewer • Reliance on effective temporary groundwater control to mitigate instability in non-cohesive soils below the groundwater table
Guided Auger Boring	• Continuous casing support at the excavation face • Excellent line and grade control using steerable cutting head and laser guidance • Well suited to granular soils, including conditions below the groundwater table • Low vibration	• Higher cost and mobilization compared to traditional jack and bore • Requires specialized equipment and experienced contractors • Progress may be affected by large cobbles or boulders	• Minor ground loss possible if not properly operated • Cutter head deflection may occur if obstructions are encountered
Pipe Ramming	• Good performance in loose and saturated sand and gravel due to soil displacement, densification and soil plugging • No open-face excavation • Capable of advancing through cobbles and obstructions • Minimal groundwater inflow during installation, assuming appropriate groundwater control	• Limited control of line and grade • Generates vibration and noise • Typically limited to short crossing lengths • Not well suited for tight gravity sewer tolerances	• Potential misalignment of casing and carrier pipe • Vibration impacts to adjacent infrastructure • Potential for consolidation of loose/organic soils • Risk of casing damage if large obstructions are encountered



Installation Method	Advantages	Disadvantages	Potential Limitations and Impacts
	measures are implemented at the sending pit		

Further recommendations may be provided at the detailed design stage once site servicing elevations are finalized.

It is recommended that additional boreholes with monitoring wells be drilled/installed beside the railway crossing at the detailed design stage following consultation with SOLRS.

6.11 Handling of Excess Soils

Excess soil may be generated and removed off-site during the construction activities associated with the proposed site works. The management of excess soil is now governed by O.Reg. 406/19, MECP document entitled “On-Site and Excess Soil Management Regulation”. In accordance with the regulation, the Project Leader is responsible for the handling, storage, reuse, transportation, and removal of all soil. To support off-site removal of excess soil, the following is required:

- Planning Documentation
 - Assessment of Past Use
 - Sampling and Analysis Plan
 - Excess Soil Characterization Report
 - Excess Soil Destination Report
- Tracking
- Registry
- Record Keeping

Soil sampling and analysis may be required as per the above-noted MECP document and/or as per the requirement of the receiving site owner(s), depending on the volume of excess soil generated during construction. The analytical results and environmental assessment findings must be disclosed to the receiving site owner(s) and approval by the receiving site owner(s) be obtained prior to exporting/transferring the materials.

If any impacted soils are discovered during construction, CVD should be contacted for sampling and testing to determine the limit of the impacted soils.



7.0 CLOSURE

The Limitations of Report, as quoted in Appendix A, is an integral part of this report.

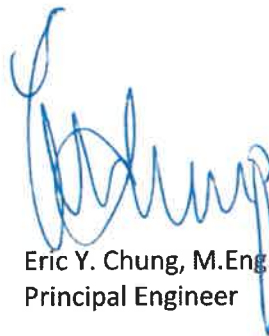
We trust that the information presented in this report is complete within our terms of reference. If there are any further questions concerning this report, please do not hesitate to contact our office.

Yours truly,

CHUNG & VANDER DOELEN ENGINEERING LTD.



Yaroslav Chudin, P.Eng.
Project Engineer



Eric Y. Chung, M.Eng., P.Eng.
Principal Engineer



APPENDIX A

LIMITATIONS OF REPORT



APPENDIX “A”

LIMITATIONS OF REPORT

The conclusions and recommendations given in this report are based on information determined at the testhole locations. Subsurface and groundwater conditions between and beyond the testholes may differ from those encountered at the testhole locations, and conditions may become apparent during construction which could not be detected or anticipated at the time of the site investigation. It is recommended practice that the Soils Engineer be retained during construction to confirm that the subsurface conditions throughout the site do not deviate materially from those encountered in the testholes.

The comments made in this report on potential construction problems and possible methods are intended only for the guidance of the designer. The number of testholes and their respective depths may not be sufficient to determine all the factors that may affect construction methods and costs. For example, the thickness of surficial topsoil or fill layers may vary markedly and unpredictably. The contractors bidding on this project or undertaking the construction should, therefore, make their own interpretation of the factual information presented and draw their own conclusion as to how the subsurface conditions may affect their work.

The benchmark and elevations mentioned in this report were obtained strictly for use in the geotechnical design of the project and by this office only, and should not be used by any other parties for any other purposes.

Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. CHUNG & VANDER DOELEN ENGINEERING LIMITED accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

The design recommendations given in this report are applicable only to the project described in the text and then only if constructed substantially in accordance with the details stated in this report. Since all details of the design may not be known, we recommend that we be retained during the final design stage to verify that the design is consistent with our recommendations, and that assumptions made in our analysis are valid.

This report does not reflect the environmental issues or concerns unless otherwise stated in the report.



APPENDIX B

SELECTED DESGN DRAWINGS



DRAFT PLAN OF SUBDIVISION

Legal Description
PART LOT 83 & 86, G.C.T. WOOLWICH;
AS IN 1267295 (REV) LIVING E OF 1288804
TOWNSHIP OF WOOLWICH
REGIONAL MUNICIPALITY OF WATERLOO

Owner's Certificate
I HEREBY AUTHORISE MCGOWAN HERRMAN BERTON CLARSON PLANNING LIMITED
TO SUBMIT THIS PLAN FOR APPROVAL

DATE: March 14, 2025

Surveyor's Certificate
I HEREBY CERTIFY THAT THE BOUNDARIES OF THE LAND TO BE SUBDIVIDED IN THIS PLAN AND
THEIR RELATIONSHIP TO THE ADJACENT LANDS ARE ACCURATE AND CORRECTLY SHOWN.

DATE: March 13, 2025

Key Plan
Subject Lands



Additional Information Required Under Section 5(17) of the Planning Act
A. C. AS SHOWN
B. C. AS SHOWN
C. AS SHOWN
D. INDUSTRIAL
E. AS SHOWN
F. AS SHOWN
G. AS SHOWN
H. INDUSTRIAL WATER SUPPLY
I. AS SHOWN
J. AS SHOWN
K. ALL SERVICES AS REQUIRED
L. AS SHOWN

Area Schedule

DESCRIPTION	BLOCKS	AREA (ha)
Industrial	1-5	37.37
Stormwater Management	5-10	3.981
Pumping Station	11	0.094
Park	12	0.971
Open Space	13	5.352
Future Development	14-20	2.822
Road Widening	21-31	2.168
0.3m Reserve	32-43	0.028
Roads	TOTAL	4.911
		54.928

Scale: 1:500

North Arrow

Scale: 1:500

Scale: 1:500

Scale: 1:500

Scale: 1:500

Scale: 1:500

Scale: 1:500

Scale: 1:500

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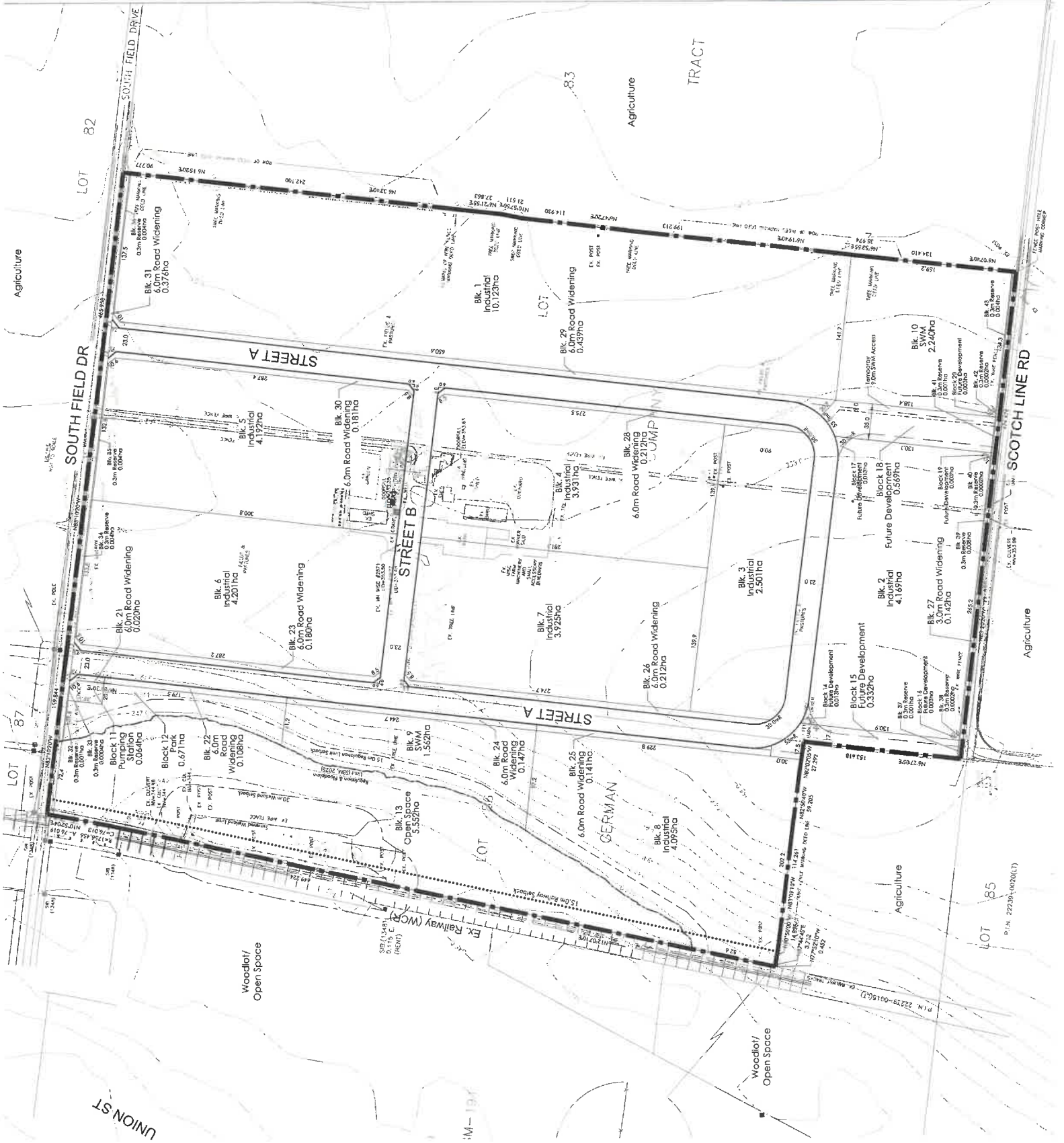
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Scale: 1:500

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Scale: 1:500



Notes

1. The plan is submitted for approval of the Regional Municipality of Waterloo.

2. The plan is submitted for approval of the Township of Woolwich.

3. The plan is submitted for approval of the County of Waterloo.

4. The plan is submitted for approval of the Province of Ontario.

5. The plan is submitted for approval of the Federal Government of Canada.

6. The plan is submitted for approval of the United Nations.

7. The plan is submitted for approval of the World Bank.

8. The plan is submitted for approval of the International Monetary Fund.

9. The plan is submitted for approval of the World Trade Organization.

10. The plan is submitted for approval of the World Health Organization.

11. The plan is submitted for approval of the World Bank Group.

12. The plan is submitted for approval of the International Labour Organization.

13. The plan is submitted for approval of the United Nations Development Programme.

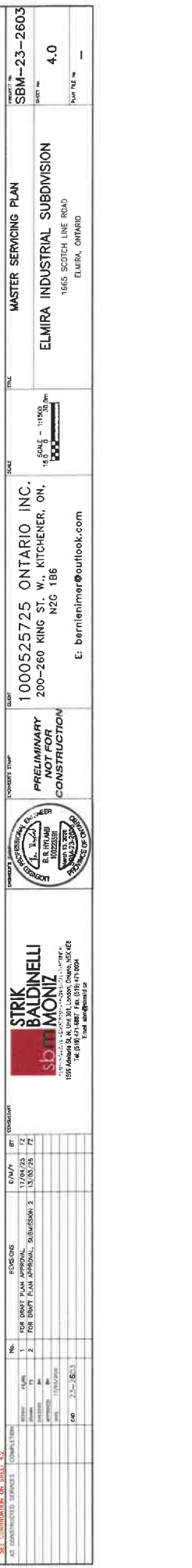
14. The plan is submitted for approval of the World Bank Group.

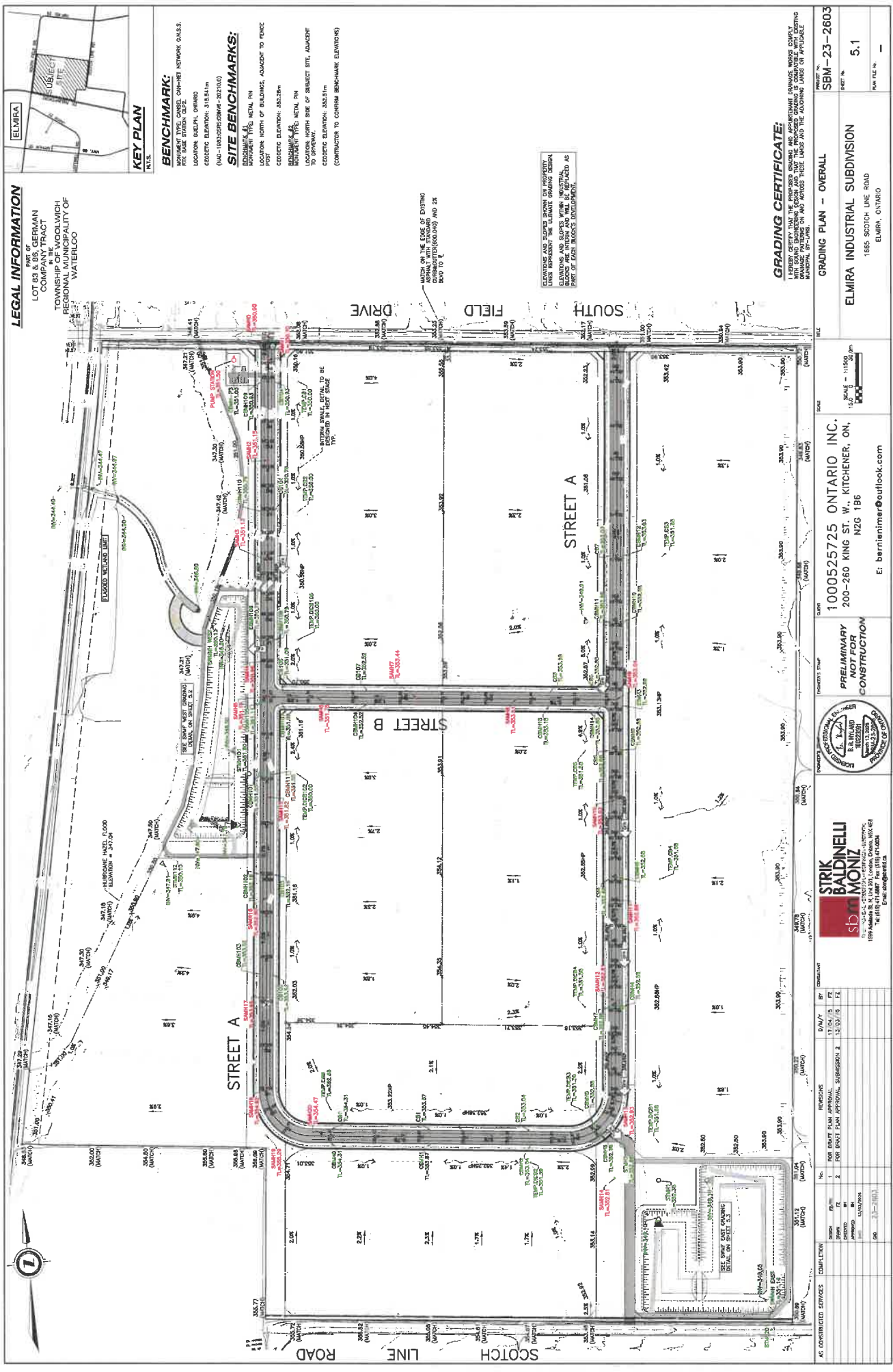
15. The plan is submitted for approval of the International Labour Organization.

16. The plan is submitted for approval of the United Nations Development Programme.

17. The plan is submitted for approval of the World Bank Group.

18. The plan is submitted for approval of the International Labour Organization.





LEGAL INFORMATION
PART OF
LOT 83 & 85, GERMAN
COMPLEX TRACT
TOWNSHIP OF WOOLWICH
REGIONAL MUNICIPALITY OF
WATERLOO

KEY PLAN
N.T.S.

BENCHMARK:
MONUMENT TYPE: CEMENT CONCRETE NETWORK DIALS.
LOCATION: 1000525725 ONTARIO INC. TRACT
COORDINATE: 1000525725 ONTARIO INC. TRACT
ELEVATION: 315.51m
(NAD-1983 UTM ZONE 18N)

SITE BENCHMARKS:
MONUMENT TYPE: METAL PIN
LOCATION: NORTH OF BUILDING, ADJACENT TO FENCE
POST
ELEVATION: 332.5m
MONUMENT TYPE: METAL PIN
LOCATION: NORTH SIDE OF SUBJECT SITE, ADJACENT
TO DRIVE
ELEVATION: 332.5m
(CONTRIBUTOR TO CONFORM BENCHMARK ELEVATIONS)

GRADING CERTIFICATE:
I HEREBY CERTIFY THAT THE PROPOSED GRADING AND APPROPRIATE DRAINAGE WERE CONSIDERED AND THE PROPOSED GRADING AND APPROPRIATE DRAINAGE WERE FOUND TO BE SATISFACTORY AND THE ADDITIONAL LANDS ON THE ADJACENT BOUNDARY.

GRADING PLAN - OVERALL
ELMIRA INDUSTRIAL SUBDIVISION
1865 SCOTCH LINE ROAD
ELMIRA, ONTARIO

1000525725 ONTARIO INC.
200-260 KING ST. W., KITCHENER, ON.
N2G 1B6
E: bernienmar@outlook.com

PRELIMINARY
NOT FOR
CONSTRUCTION

STRICK BALDINELLI
sbm
MONIZ
1099 Adelaide St. N. Unit 201, London, Ontario N6C 4E8
Tel: (613) 471-8887 Fax: (613) 471-8824
Email: info@sbm.ca

PROFESSIONAL ENGINEER
No. 13,017
B. B. MONIZ
30222501
13.01.18
13.01.18

REVISIONS

No.	DATE	BY	REVISIONS
1	13.01.18	SBM	FOR SUBMITTAL
2	13.01.18	SBM	FOR SUBMITTAL

AS CONSTRUCTED SERVICES

COMPLETION	DATE	BY	REVISIONS
1	13.01.18	SBM	FOR SUBMITTAL
2	13.01.18	SBM	FOR SUBMITTAL

DATE
13.01.18

SCALE
1:11500

PROJECT NO.
SBM-23-2603

SHEET NO.
5.1

PLAN FILE NO.
-



LEGAL INFORMATION

PART OF
LOT B3 & B6, GERMAN
COMPANY TRACT
TOWNSHIP OF WOOLWICH
REGIONAL MUNICIPALITY OF
WATERLOO

RADING CERTIFICATE:
BY CERTIFYING THAT THE PROPOSED GRADING AND
DRAINAGE OF THE LANDS SHOWN ON THIS PLAN
CONFORMS WITH THE REQUIREMENTS OF THE ACT
AND THAT THE PROPOSED GRADING IS
REASONABLY NECESSARY TO DRAIN THE
LANDS AND THE ADJACENT LANDS ON
TO THE ADJACENT PUBLIC DRAINAGE
SYSTEM, THE MUNICIPAL BY-LAW.

1

BENCHMARK:
CITY OF CHICAGO
CHICAGO BASE STATION CORP.
ON-ICE NETWORK 04MS3.

LOCATION: RUDEN, ONTARIO

ELEVATION: 316.541m

COORDINATE ELEVATION: 316.541m
(NAD=1983) (SR=CSRS95) (WGS=2011.0)

SITE BENCHMARKS:

BENCHMARK TYPE: METAL PIN

DESCRIPTION: NORTH OF BUILDINGS, ADJACENT TO FENCE
ELEVATION: 307.28m

BENCHMARK TYPE: METAL PIN

DESCRIPTION: NORTH OF BUILDINGS, ADJACENT TO FENCE
ELEVATION: 307.28m

Number of people in group	Number of people who helped
1	5
2	4
3	3
4	2
5	1

[illegible]

POTENTIAL
UNDESIRABLE
DESIGNED
DUE TO THE
2

36
35
35
35



AS CONSTRUCTED SERVICES	COMPLETION	APPROVED DATE: 17/03/2018 BY: [Signature] FOR: [Signature] APPROVED DATE: 23-1-2023 BY: [Signature]	NO. 2 FOR SOUTHERN PLANNING, SUBMISSION 2	DAYS 15 DAYS 15	BY 17 BY 17	REGIONS 2 FOR SOUTHERN PLANNING, SUBMISSION 2	STRIK BALDINELLI sbt moniz 1009 Ashdale & N. Galt St., London, Ontario N6G 1B8 Tel: 519-837-2200 Fax: 519-837-2201 Email: sbt@moniz.ca	COUNTY OF BRANT BRANT COUNTY B.R. RYAN MAYOR 2022-2026 OFFICE OF THE MAYOR COUNTY OF BRANT	PRELIMINARY NOT FOR CONSTRUCTION	PROPERTY MAP	1000525725 ONTARIO INC. 200-260 KING ST. W., KITCHENER, ON. N2G 1B6 E: bernierimer@outlook.com	SCALE = 1:500 10m	SITE	GRADING PLAN - SWMF WEST (BLOCK 9) ELMIRA INDUSTRIAL SUBDIVISION 1665 SCOTCH LINE ROAD ELMIRA, ONTARIO	SHEET NO. 5.2 SHEET 16 PLAN FILE NO. —	SBM-23-2603
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LEGAL INFORMATION

LOT 83 & 96, GERMAN
COMPANY TRACT
TOWNSHIP OF WOOLWICH
REGIONAL MUNICIPALITY OF
WATERLOO

GRADING CERTIFICATE:

I HEREBY CERTIFY THAT THE PROPOSED GRADING AND
LANDSCAPING DESIGN AND THE PROPOSED STORM
SEWER DESIGN AND THE PROPOSED DRAINAGE
DESIGN FOR THE ABOVE DESCRIBED PROPERTY
ADHERE TO THE ZONING BY-LAW AND THE
APPLICABLE MUNICIPAL BY-LAW.

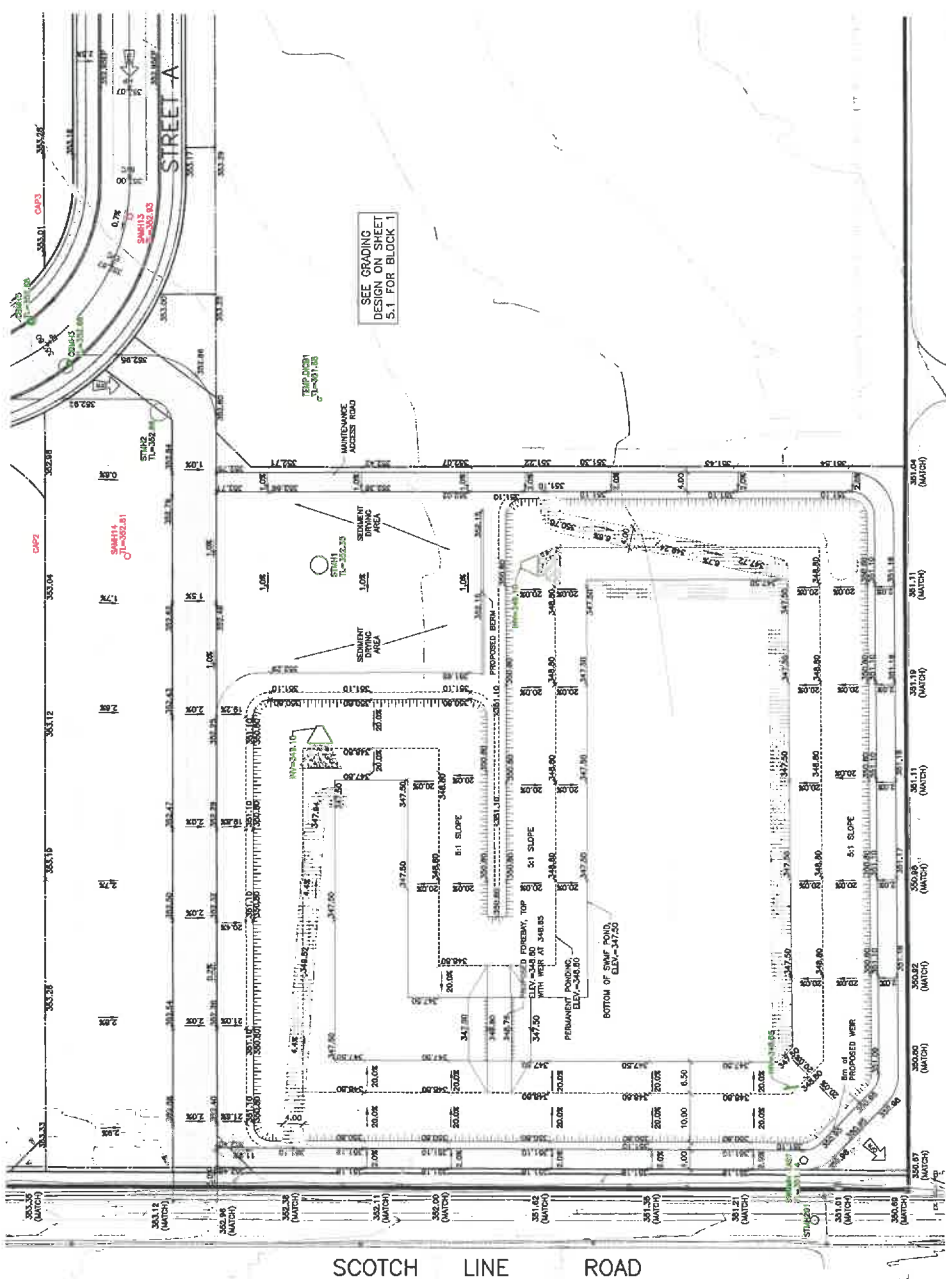


BENCHMARK:
BENCHMARK 1: 305.11
LOCATION: DULPH, ONTARIO
COORDINATE ELEVATION: 315.51m
(NAD-1983/95 DTM-2010.0)

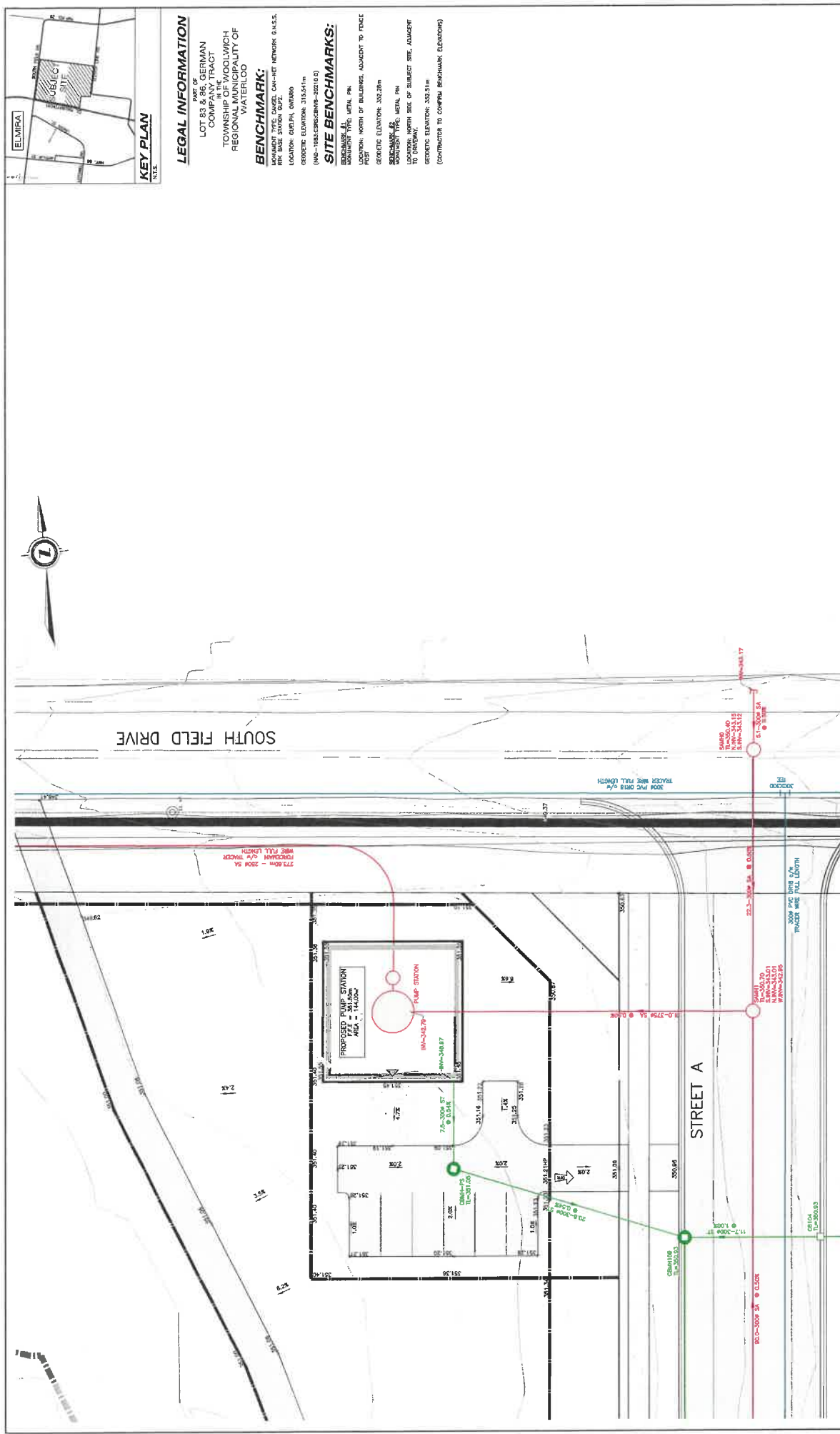
SITE BENCHMARKS:
BENCHMARK 1: 305.11
LOCATION: NORTH OF BENCHMARK, ADJACENT TO FENCE
POST
COORDINATE ELEVATION: 302.28m
(NAD-1983/95 DTM-2010.0)

BENCHMARK 2: 305.11
LOCATION: NORTH SIDE OF SUBJECT SITE ADJACENT
TO DRIVEWAY
COORDINATE ELEVATION: 302.51m
(NAD-1983/95 DTM-2010.0)

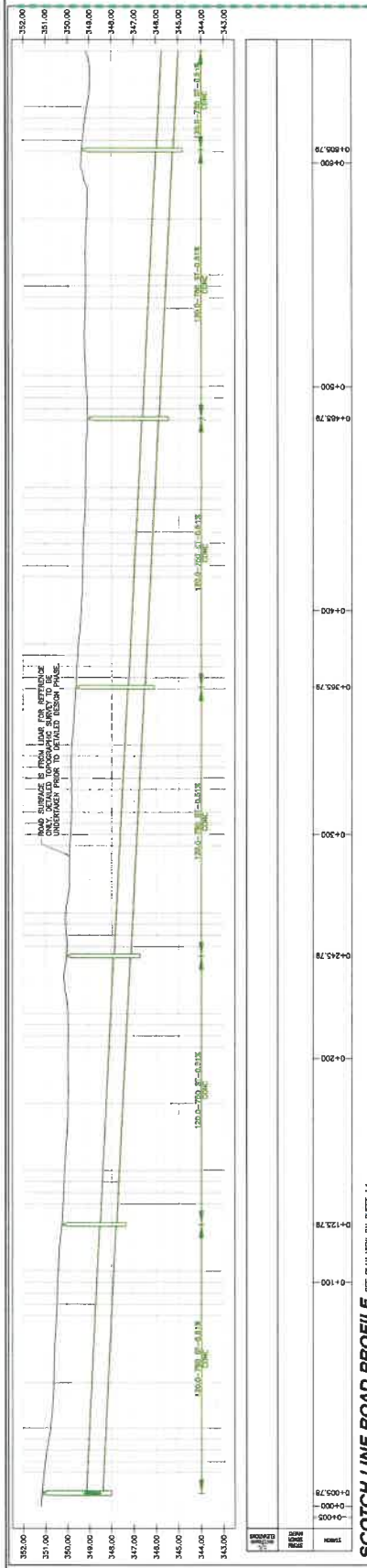
(CONTRACTOR TO CONFIRM BENCHMARK ELEVATIONS)



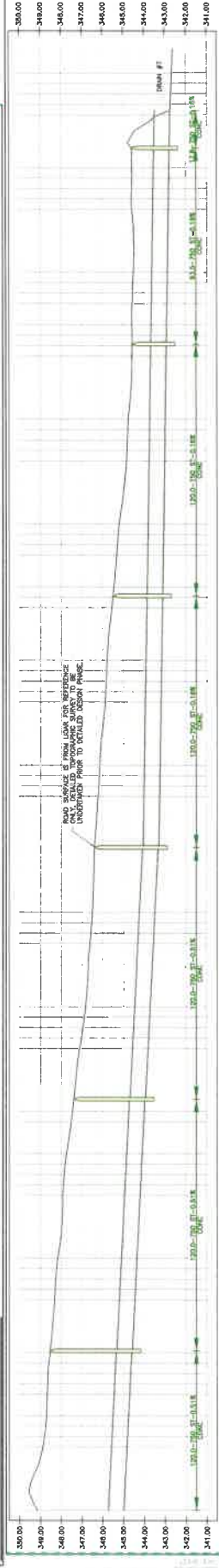
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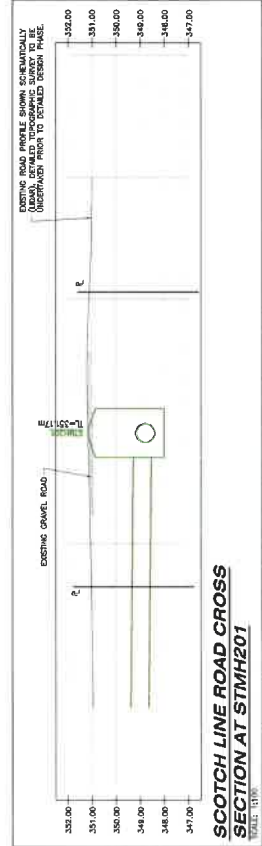
AS CONSTRUCTED SERVICES		COMPLETION	NO.	DATE	BY	REVISIONS
SANITARY PUMP STATION			1	1/1/17	BT	1.0
ENGINEERING PLAN			2	1/1/17	BT	1.0
SUBDIVISION			3	1/1/17	BT	1.0
ELMIRA INDUSTRIAL SUBDIVISION			4	1/1/17	BT	1.0
1665 SCOTCH LINE ROAD			5	1/1/17	BT	1.0
ELMIRA, ONTARIO			6	1/1/17	BT	1.0
PROJECT NO.			7	1/1/17	BT	1.0
SBM-23-2603			8	1/1/17	BT	1.0
SHEET NO.			9	1/1/17	BT	1.0
7.0			10	1/1/17	BT	1.0
PLAN FILE NO.			11	1/1/17	BT	1.0
E. bernier@outlook.com			12	1/1/17	BT	1.0



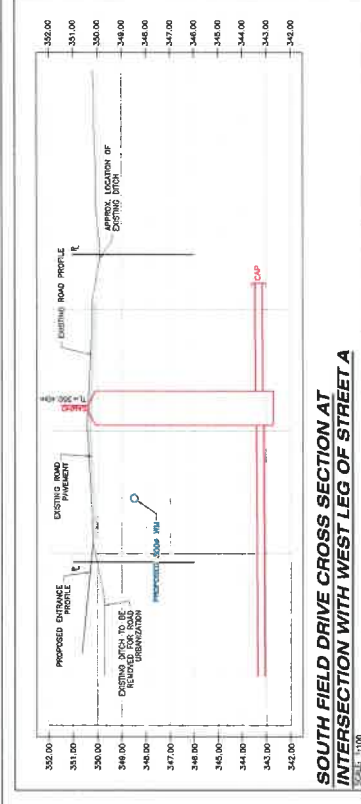
SCOTCH LINE ROAD PROFILE SEE PLAN VIEW ON SHEET 4.1



SCOTCH LINE ROAD PROFILE SEE PLAN VIEW ON SHEET 4.1



SCOTCH LINE ROAD CROSS SECTION AT STMH201



SOUTH FIELD DRIVE CROSS SECTION AT INTERSECTION WITH WEST LEG OF STREET A

AS CONSTRUCTED SERVICES COMPLETION DATE: 12/15/18 NO. OF SERVICES: 2 FOR SUBMIT PLAN APPROVAL, SUBMISSION 2 APPROVED BY: 11/28/2018 DATE: 11/28/2018		REVISIONS NO. 1 DATE 12/15/18 BY 11/28/2018		DATE 12/15/18 BY 11/28/2018		PROJECT NO. SBM-23-2603	
CONTRACTOR STRIK BALDINELLI 1299 Lakeshore S.W. Unit 204, Victoria, BC V8V 4G4 Tel: (250) 474-8887 Fax: (250) 474-9024 Email: info@strikbaldinelli.com		CLIENT 1000525725 ONTARIO INC. 200-260 KING ST. W., KITCHENER, ON, N2G 1B6 E: bernier@outlook.com		SCALE 1" = 100' 1" = 100' 1" = 100'		EXTERNAL ROAD PROFILES & CROSS-SECTIONS ELMIRA INDUSTRIAL SUBDIVISION 1665 SCOTCH LINE ROAD ELMIRA, ONTARIO	
PROJECT NO. SBM-23-2603		SHEET NO. 7.1		PLAN NO. --		DATE 12/15/18	



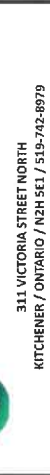
LEGEND

Borehole Location Borehole and Monitoring Well Location Site Boundary

Image Ref.: Region of Waterloo GIS, ESRI, Retrieved May 9, 2024.

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Proposed Industrial Subdivision

[illegible]

... ..

Checked By: PD Scale: 1:4000 Drawing No.: I

APPENDIX C
HYDROGEOLOGICAL DATA



Table 1: Summary of Water Levels, Elevations & Fluctuations

[illegible]

Notes: 1) All Elevations Referenced to Geodetic Survey by CVD.

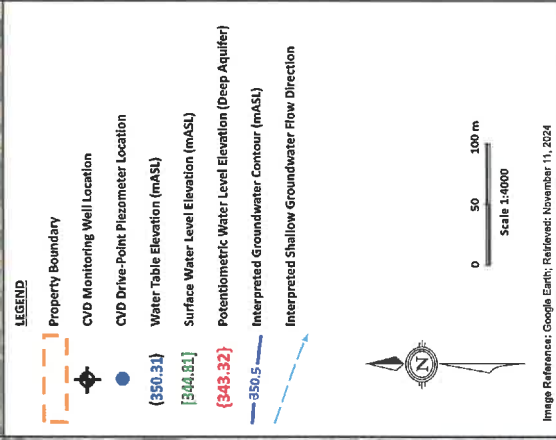
2) **Bolded elevations represent the maximum water table aquifer elevation measured at each monitoring well throughout all seasons.**

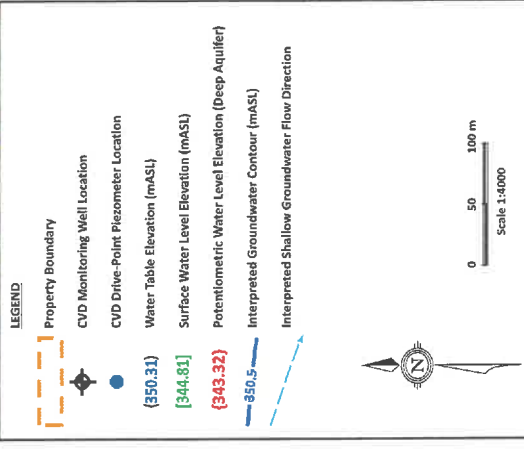
3) Negative water level indicates that water level is above ground.

4) : Monitoring well / piezometer dry.

5) Negative fluctuation indicates drop in water level relative to baseline.

6) : Water level not stabilized.





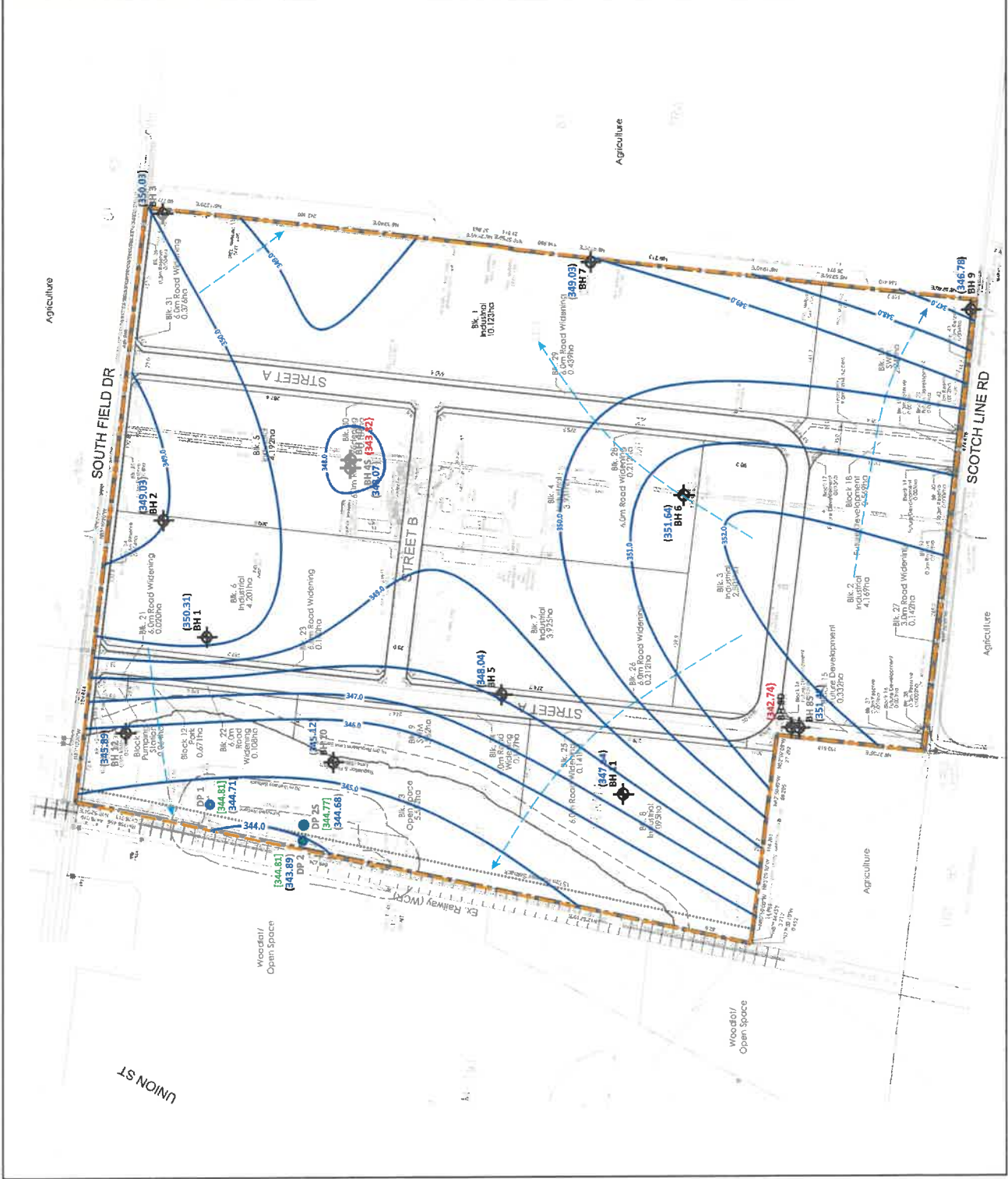
DWG. Ref.: M-BO; "Draft Plan of Subdivision", File No. 23084, January 14, 2026

Figure 6b:
Shallow Groundwater Table Interpretation
Post-Development
(April 30, 2024)

Hydrogeological Assessment
Elmira Industrial Subdivision
1665 Scotch Line Road
Elmira, ON

CHUNG & VANDER DOLEN
ENGINEERING LTD.
311 VICTORIA STREET NORTH
KITCHENER / ONTARIO / N2H 2E1 / 519-442-8979

Drawn By: YC / PD Date: March 2026 File No.: 1650H





CHUNG & VANDER DOELEN
ENGINEERING LTD.

311 Victoria Street North
Kitchener / Ontario / N2H 5E1
519-742-8979

Response Test - Water Level Data and Analysis

Page 1 of 6

Project: Elmira Industrial Subdivision

Number: 1650

Client: 1000525725 Ontario Inc.

Location: 1665 Scotch Line Road, Elmira, ON Response Test: BH 1

Test Conducted by: R.S.

Test Date: 2024-05-02

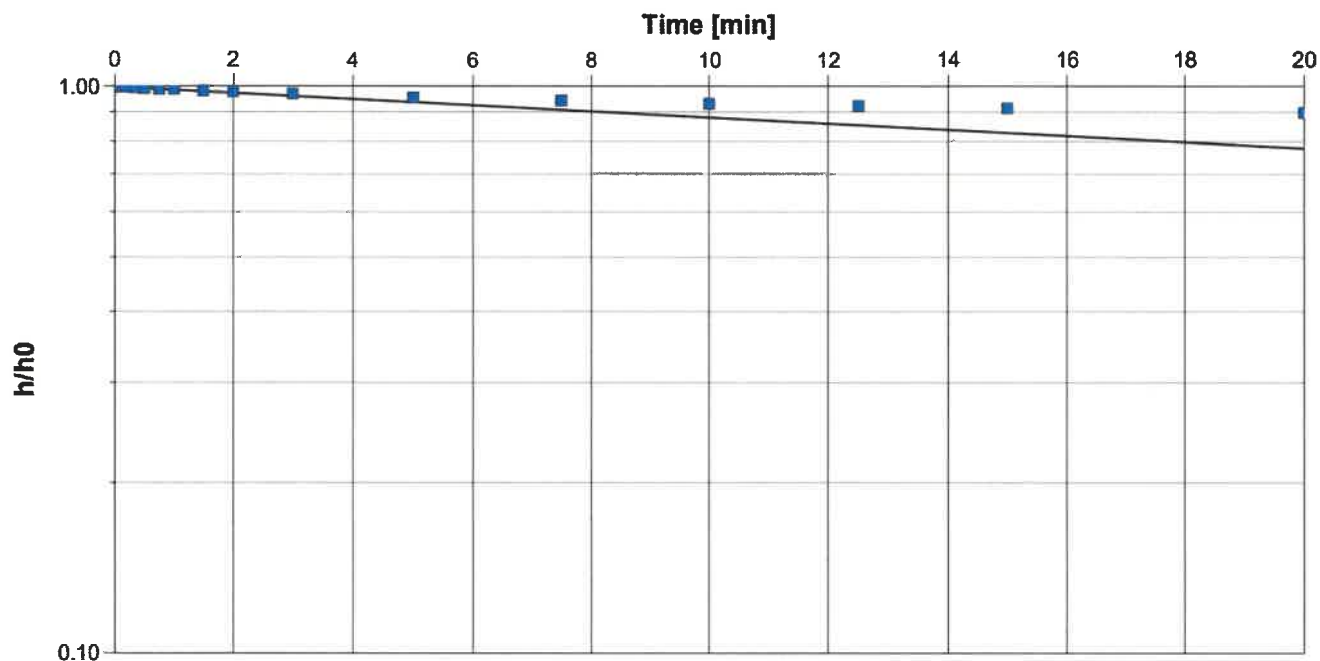
Aquifer Thickness: 4.6 m

Water level at t=0 [m]: 3.16

Static Water Level [m]: 1.95

Water level change at t=0 [m]: 1.22

	Time [min]	Water Level [m]	WL Change [m]
1	0	3.161	1.216
2	0.0833	3.159	1.214
3	0.1667	3.156	1.211
4	0.3333	3.154	1.209
5	0.5	3.151	1.206
6	0.75	3.148	1.203
7	1	3.145	1.20
8	1.5	3.139	1.194
9	2	3.134	1.189
10	3	3.124	1.179
11	5	3.108	1.163
12	7.5	3.093	1.148
13	10	3.078	1.133
14	12.5	3.068	1.123
15	15	3.056	1.111
16	20	3.038	1.093



Calculation using Bouwer & Rice

Observation Well

Hydraulic Conductivity
[m/s]

BH 1

7.12×10^{-8}



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Response Test - Water Level Data and Analysis Page 2 of 6

Project: Elmira Industrial Subdivision

Number: 1650

Client: 1000525725 Ontario Inc.

Location: 1665 Scotch Line Road, Elmira, ON Response Test: BH 3

Test Conducted by: R.S.

Test Date: 2024-05-02

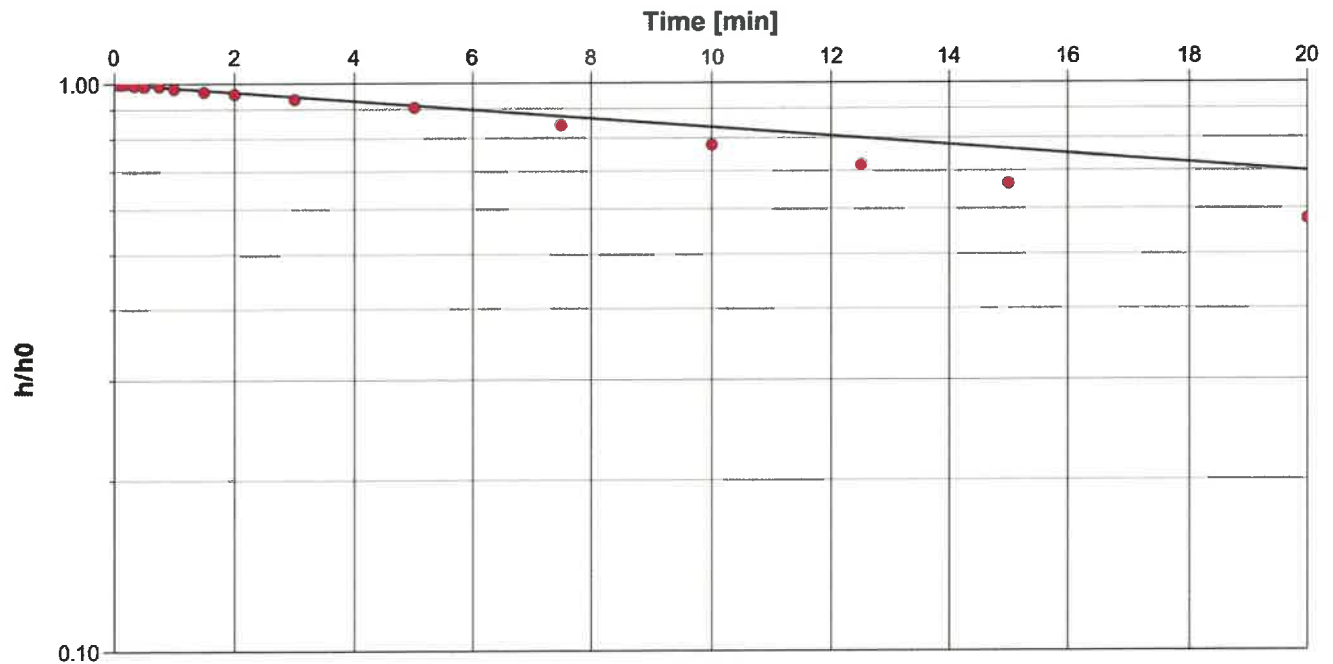
Aquifer Thickness: 4.8 m

Water level at t=0 [m]: 1.62

Static Water Level [m]: 0.38

Water level change at t=0 [m]: 1.24

	Time [min]	Water Level [m]	WL Change [m]
1	0	1.618	1.243
2	0.0833	1.615	1.24
3	0.1667	1.614	1.239
4	0.3333	1.608	1.233
5	0.5	1.603	1.228
6	0.75	1.602	1.227
7	1	1.59	1.215
8	1.5	1.577	1.202
9	2	1.565	1.19
10	3	1.541	1.166
11	5	1.502	1.127
12	7.5	1.421	1.046
13	10	1.34	0.965
14	12.5	1.266	0.891
15	15	1.201	0.826
16	20	1.09	0.715



Calculation using Bouwer & Rice

Observation Well	Hydraulic Conductivity [m/s]
BH 3	9.73×10^{-8}



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Response Test - Water Level Data and Analysis

Page 3 of 6

Project: Elmira Industrial Subdivision

Number: 1650

Client: 1000525725 Ontario Inc.

Location: 1665 Scotch Line Road, Elmira, ON Response Test: BH 4D

Test Conducted by: R.S.

Test Date: 2024-05-02

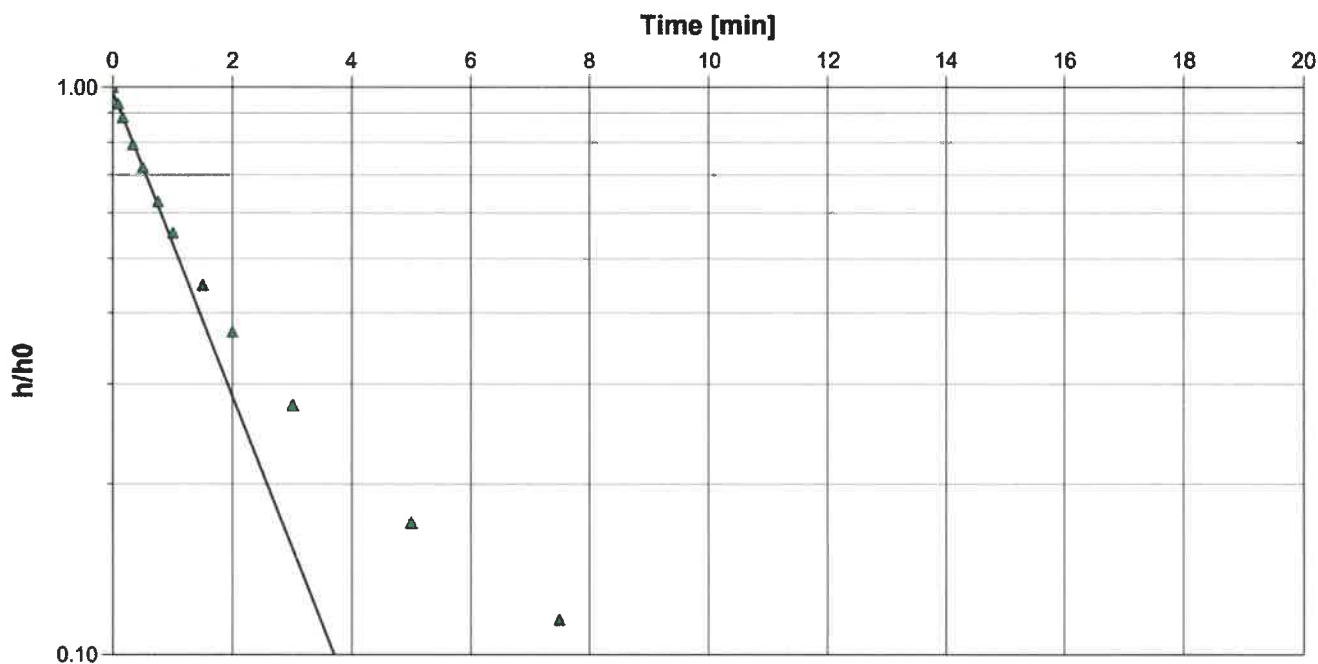
Aquifer Thickness: 1.8 m

Water level at t=0 [m]: 8.82

Static Water Level [m]: 8.21

Water level change at t=0 [m]: 0.61

	Time [min]	Water Level [m]	WL Change [m]
1	0	8.819	0.607
2	0.0833	8.779	0.567
3	0.1667	8.749	0.537
4	0.3333	8.692	0.48
5	0.5	8.65	0.438
6	0.75	8.594	0.382
7	1	8.549	0.337
8	1.5	8.484	0.272
9	2	8.437	0.225
10	3	8.379	0.167
11	5	8.316	0.104
12	7.5	8.282	0.07
13	10	8.262	0.05
14	12.5	8.251	0.039
15	15	8.242	0.03
16	20	8.231	0.019



Calculation using Bouwer & Rice

Observation Well

Hydraulic Conductivity
[m/s]

BH 4D

1.00×10^{-5}



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Response Test - Water Level Data and Analysis

Page 4 of 6

Project: Elmira Industrial Subdivision

Number: 1650

Client: 1000525725 Ontario Inc.

Location: 1665 Scotch Line Road, Elmira, ON Response Test: BH 4S

Test Conducted by: R.S.

Test Date: 2024-05-02

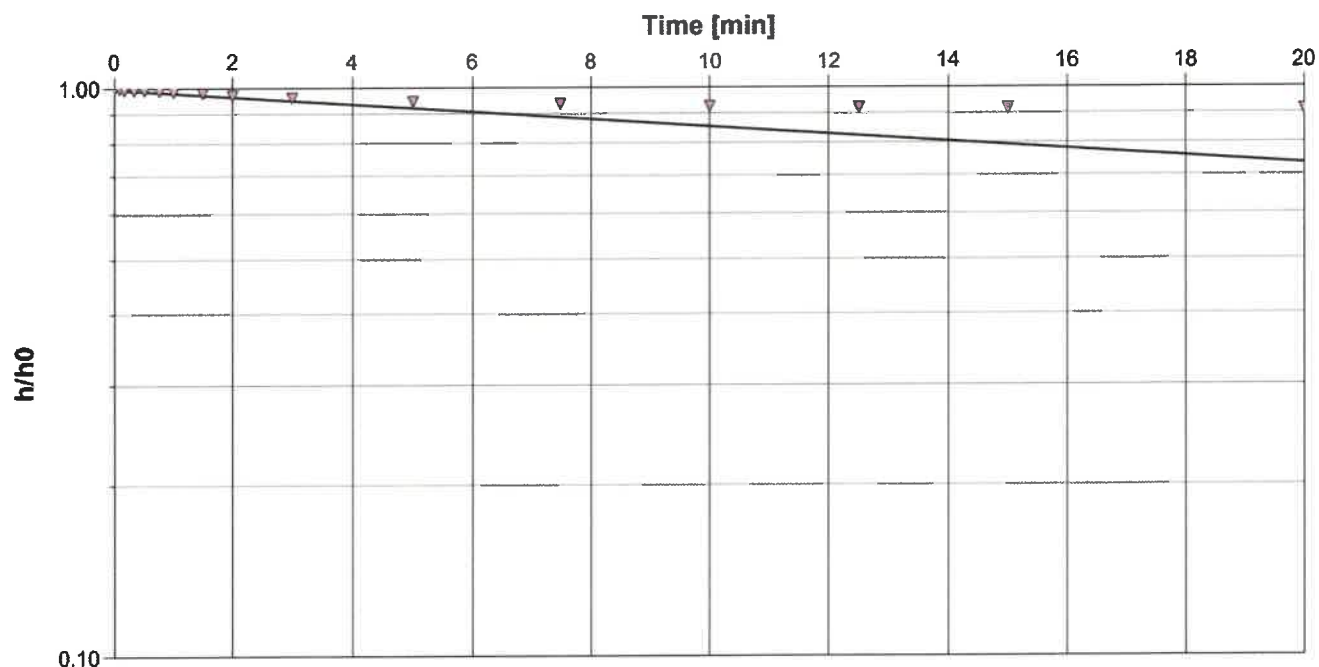
Aquifer Thickness: 2.0 m

Water level at t=0 [m]: 4.33

Static Water Level [m]: 3.76

Water level change at t=0 [m]: 0.57

	Time [min]	Water Level [m]	WL Change [m]
1	0	4.33	0.57
2	0.0833	4.328	0.568
3	0.1667	4.325	0.565
4	0.3333	4.325	0.565
5	0.5	4.324	0.564
6	0.75	4.323	0.563
7	1	4.321	0.561
8	1.5	4.318	0.558
9	2	4.312	0.552
10	3	4.307	0.547
11	5	4.30	0.54
12	7.5	4.294	0.534
13	10	4.288	0.528
14	12.5	4.285	0.525
15	15	4.283	0.523
16	20	4.28	0.52



Calculation using Bouwer & Rice

Observation Well	Hydraulic Conductivity [m/s]
BH 4S	1.19×10^{-7}



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519-742-8979

Response Test - Water Level Data and Analysis

Page 5 of 6

Project: Elmira Industrial Subdivision

Number: 1650

Client: 1000525725 Ontario Inc.

Location: 1665 Scotch Line Road, Elmira, ON Response Test: BH 6

Test Conducted by: R.S.

Test Date: 2024-05-02

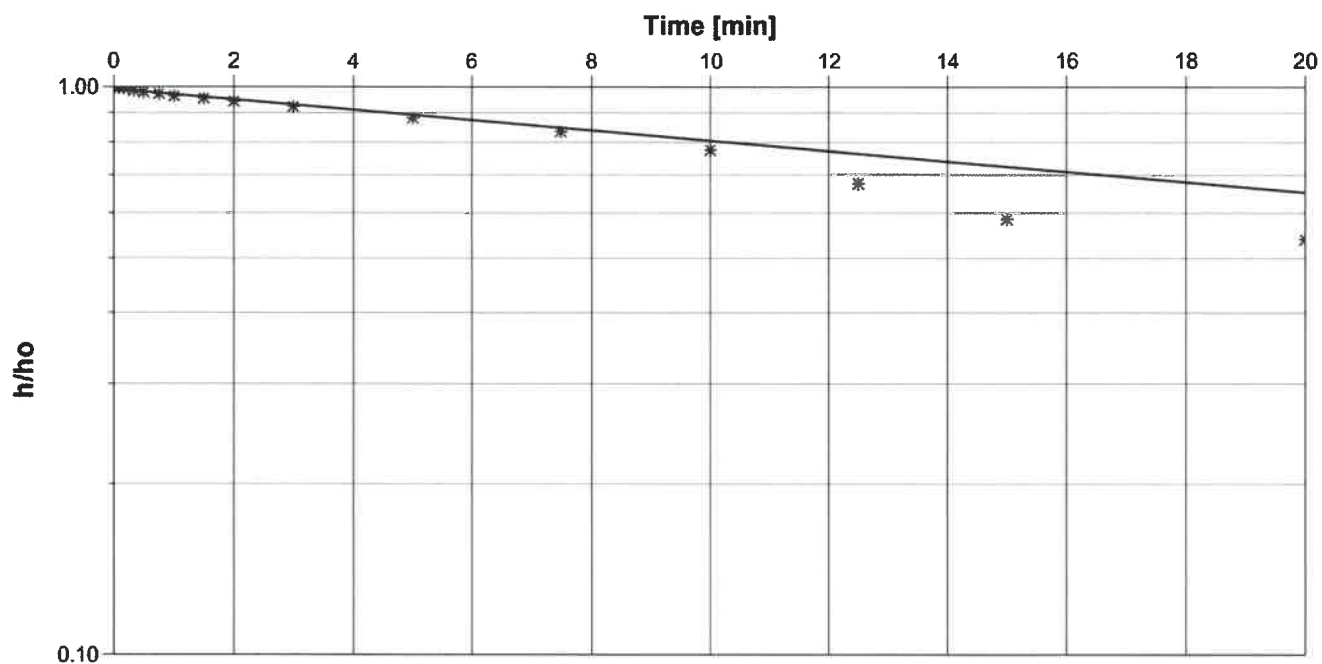
Aquifer Thickness: 6.5 m

Water level at t=0 [m]: 2.57

Static Water Level [m]: 1.21

Water level change at t=0 [m]: 1.35

	Time [min]	Water Level [m]	WL Change [m]
1	0	2.568	1.354
2	0.0833	2.563	1.349
3	0.1667	2.56	1.346
4	0.3333	2.548	1.334
5	0.5	2.541	1.327
6	0.75	2.533	1.319
7	1	2.521	1.307
8	1.5	2.508	1.294
9	2	2.493	1.279
10	3	2.463	1.249
11	5	2.407	1.193
12	7.5	2.345	1.131
13	10	2.263	1.049
14	12.5	2.131	0.917
15	15	2.008	0.794
16	20	1.944	0.73



Calculation using Bouwer & Rice

Observation Well

Hydraulic Conductivity
[m/s]

BH 6

1.06×10^{-7}



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Response Test - Water Level Data and Analysis Page 6 of 6

Project: Elmira Industrial Subdivision

Number: 1650

Client: 1000525725 Ontario Inc.

Location: 1665 Scotch Line Road, Elmira, ON Response Test: BH 9

Test Conducted by: R.S.

Test Date: 2024-05-01

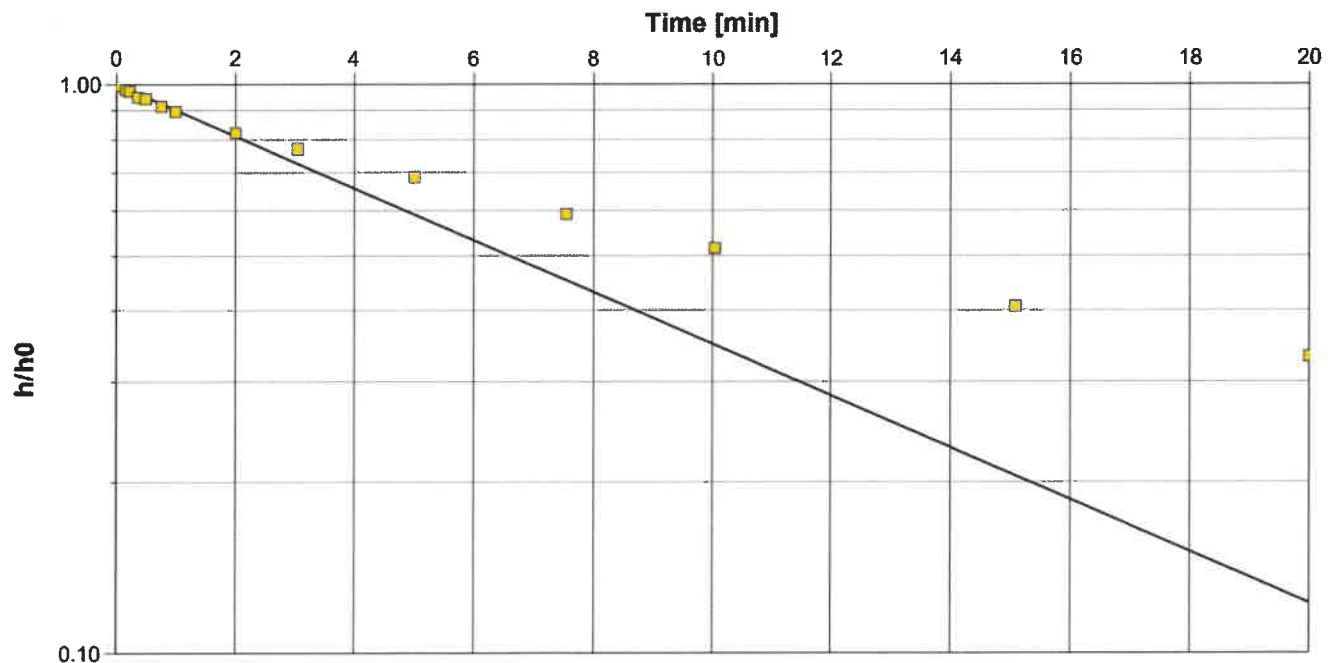
Aquifer Thickness: 1.5 m

Water level at t=0 [m]: 5.01

Static Water Level [m]: 4.03

Water level change at t=0 [m]: 0.99

	Time [min]	Water Level [m]	WL Change [m]
1	0	5.013	0.987
2	0.0667	5.006	0.98
3	0.15	4.993	0.967
4	0.2167	4.987	0.961
5	0.35	4.964	0.938
6	0.4833	4.956	0.93
7	0.75	4.928	0.902
8	0.9833	4.909	0.883
9	2	4.838	0.812
10	3.05	4.787	0.761
11	5.0167	4.705	0.679
12	7.55	4.61	0.584
13	10.05	4.534	0.508
14	15.0833	4.427	0.401
15	20	4.354	0.328



Calculation using Bouwer & Rice

Observation Well	Hydraulic Conductivity [m/s]
BH 9	1.49×10^{-6}

APPENDIX D

ENCLOSURES



Soil Abbreviations and Terms Used on Record of Borehole Sheets

TERMINOLOGY DESCRIBING COMMON SOIL TYPES:

Topsoil	- mixture of soil and humus capable of supporting vegetation
Peat	- mixture of visible and invisible fragments of decayed organic matter
Till	- unstratified glacial deposit which may range from clay to boulders
Fill	- soil materials identified as being placed anthropologically

CLASSIFICATION (UNIFIED SYSTEM)

Clay	<0.002mm
Silt	0.002 to .075mm
Sand	0.075 to 4.75mm
	Fine 0.075 to 0.425 mm
	Medium 0.425 to 2.0 mm
	Coarse 2.0 to 4.75 mm
Gravel	4.75 to 75mm
	Fine 4.75 to 19 mm
	Coarse 19 to 75 mm
Cobbles	75 to 300mm
Boulders	>300mm

TERMINOLOGY

Soil Composition	% by Weight
"traces"	<10%
"some"(eg. some silt)	10-20%
Adjective (eg. sandy)	20-35%
"and"(eg. sand and gravel)	35-50%

Standard Penetration Resistance (SPT): Standard Penetration Resistance ('N' Values) refers to the number of blows required to advance a standard (ASTM D1586) 51 mm Ø (2 inch) split-spoon sampler by the use of a free falling, 63.5 Kg (140lbs) hammer. The number of blows from the drop weight is recorded for every 15 cm (6 inches). The hammer is dropped from a distance of 0.76m (30 inches) providing 474.5 Joules per blow. When the sampler is driven a total of 45 cm (18 inches) into the soil, the standard penetration index ('N' Value) is the total number of blows for the last 30 cm (12 inches).

Dynamic Cone Penetration Resistance (DCPT): Dynamic Cone Penetration Resistance is similar to a SPT with the 474.5 Joule/blow impulse provided by the free falling hammer where the split-spoon sampler is replaced by a 51 mm Ø, 60° conical point and the number of blows is recorded continuously for every 30 cm (12 inches).

COHESIVE SOILS CONSISTENCY

	(kPa)	(P.S.F.)	Nominal 'N' Value
Very Soft	<12	<250	0-2
Soft	12-25	250-500	2-4
Firm	25-50	500-1000	4-8
Stiff	50-100	1000-2000	8-15
Very Stiff	100-200	2000-4000	15-30
Hard	>200	>4000	>30

RELATIVE DENSITY OF COHESIONLESS SOIL

	'N' Value
Very Loose	0-4
Loose	4-10
Compact	10-30
Dense	30-50
Very Dense	>50

MOISTURE CONDITIONS:

Cohesive Soil
DTPL- Drier than plastic limit
APL- About plastic limit
WTPL- Wetter than plastic limit
MWTPL- Much wetter than plastic limit

Cohesionless Soil
Damp
Moist
Wet
Saturated

SAMPLE TYPES AND ADDITIONAL FIELD TESTS

SS	Split Spoon Sample	GS	Grab Sample	PP	Pocket Penetrometer
	(obtained from SPT)	BS	Bulk Sample	VANE	Peak & Remolded shear
AS	Auger Sample	TW	Thin Wall Sample or Shelby Tube	DMT	Flat Plate Dilatometer

LABORATORY TESTS

SG	Specific Gravity	S	Sieve Analysis	W	Water Content
H	Hydrometer	P	Field Permeability	K	Lab Permeability
W_p	Plastic Limit	W_L	Liquid Limit	I_p	Plasticity Index
GSA	Grain Size Analysis	C	Consolidation	UNC	Unconfined compression

FILE No: 1650

BOREHOLE No. 1

Enclosure No.: 1

Sheet 1 of 1



Client: 1000525725 Ontario Inc.

Project: Elmira Industrial Subdivision

Location: 1665 Scotch Line Road, Elmira, Ontario

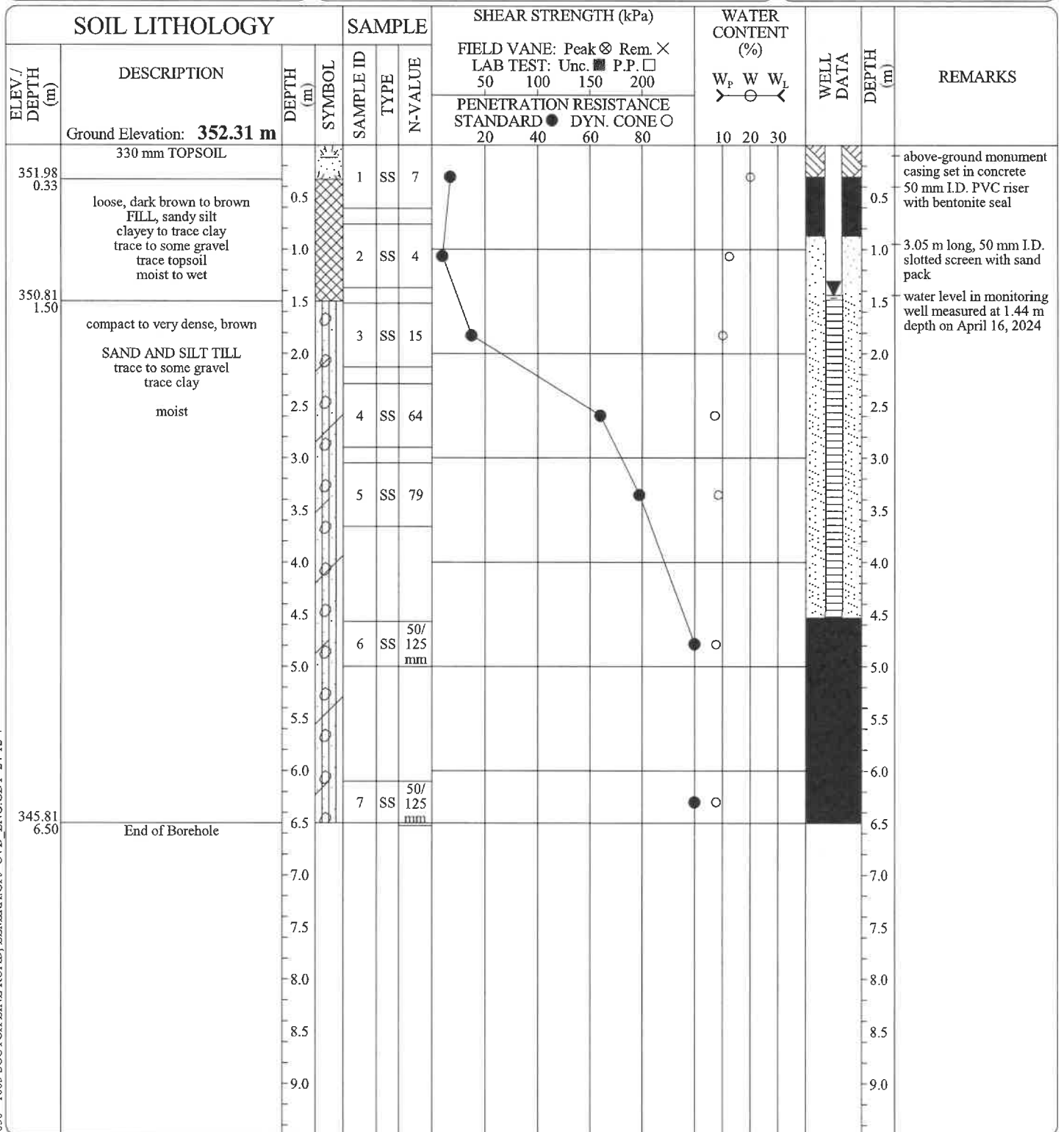
EQUIPMENT DATA

Machine: CME-55 Track

Method: Solid Stem Augers

Size: 152 mm O.D.

Date: Apr 01 - 24 TO Apr 01 - 24



PROJECT MANAGER: EYC

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ENGINEERING LTD.

311 Victoria Street North

Kitchener, Ontario N2H 5E1

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CVD BOREHOLE (2017) 1650 - 1665 SCOTCH LINE ROAD, ELMIRA, GPJ CVD ENG.GDT 24-12-4

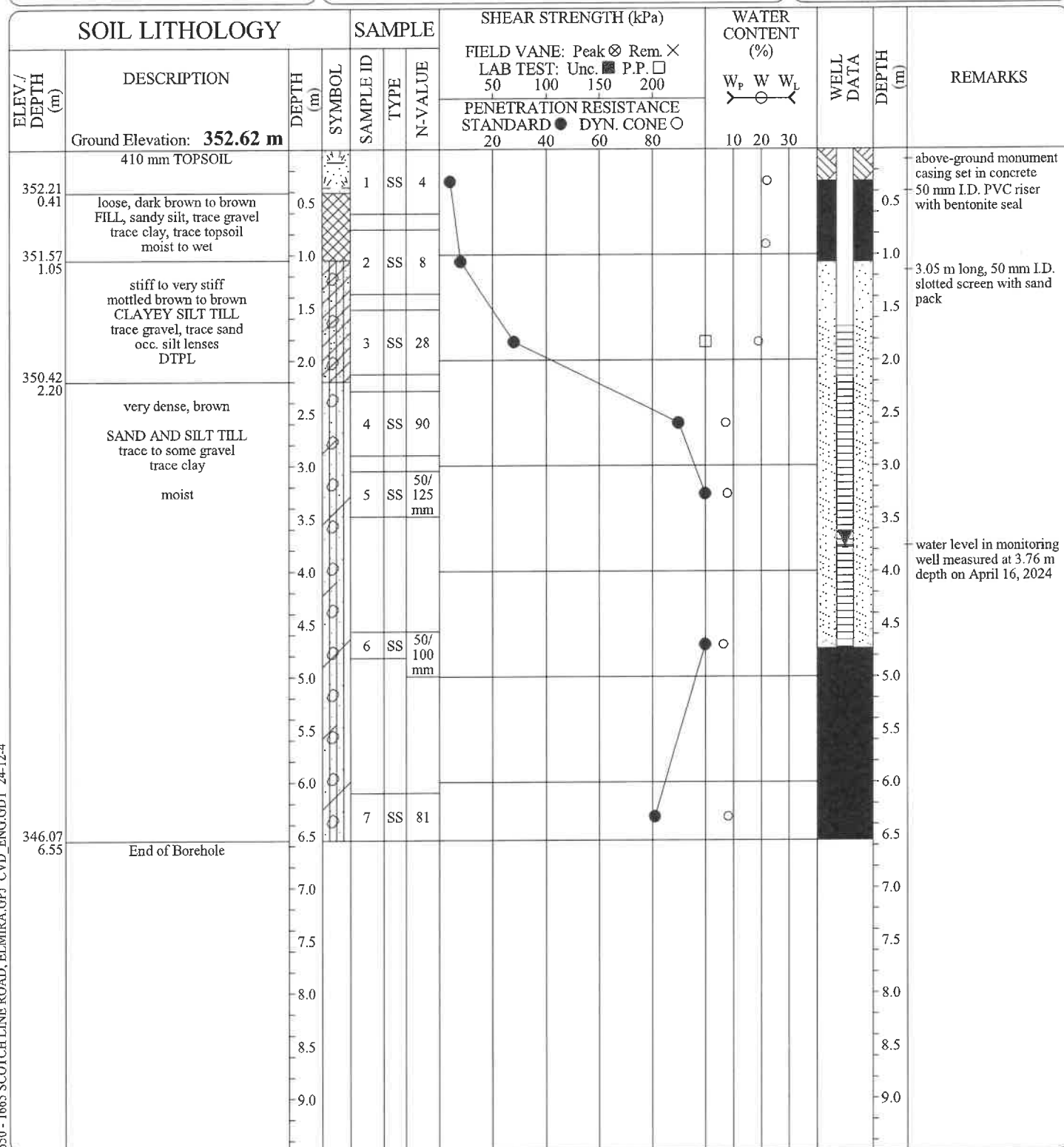
BOREHOLE No. 2



Location: 1665 Scotch Line Road, Elmira, Ontario

EQUIPMENT DATA

Machine: **CME-55 Track**
Method: **Solid Stem Augers**
Size: **152 mm O.D.**
Date: **Apr 01 - 24 TO Apr 01 - 24**



CVD BOREHOLE (2017) 1650 - 1665 SCOTCHLINE ROAD, ELMIRA, GPJ CVD ENG.GDT 24-12-4

PROJECT MANAGER: EYC

CHUNG & VANDER DOELEN
ENGINEERING LTD.

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Kitchener, Ontario N2H 5E1
ph. (519) 742-8979, fx. (519) 742-7739

FILE No: 1650**BOREHOLE No. 3**Client: **1000525725 Ontario Inc.**Project: **Elmira Industrial Subdivision**Location: **1665 Scotch Line Road, Elmira, Ontario****EQUIPMENT DATA**Machine: **CME-55 Track**Method: **Solid Stem Augers**Size: **152 mm O.D.**Date: **Mar 26 - 24 TO Mar 26 - 24**

SOIL LITHOLOGY				SAMPLE			SHEAR STRENGTH (kPa)				WATER CONTENT (%)			WELL DATA	DEPTH (m)	REMARKS
ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SYMBOL	SAMPLE ID	TYPE	N-VALUE	FIELD VANE: Peak ⊗ Rem. × LAB TEST: Unc. ■ P.P. □ 50 100 150 200				W _P W W _L					
							PENETRATION RESISTANCE STANDARD ● DYN. CONE ○ 20 40 60 80				↗ — ○ ↖					
Ground Elevation: 350.21 m											10 20 30					
349.91 0.30	300 mm TOPSOIL			1	SS	6	●						○			above-ground monument casing set in concrete water level in monitoring well measured at 0.34 m depth on April 16, 2024 50 mm I.D. PVC riser with bentonite seal 3.05 m long, 50 mm I.D. slotted screen with sand pack
349.46 0.75	loose, brown FILL, sand and silt trace gravel, trace topsoil	0.5														
	very stiff to hard mottled brown to brown	1.0		2	SS	18	●				■		○			
	CLAYEY SILT TILL some sand to sandy trace gravel occ. sand lenses occ. cobbles	1.5														
		2.0		3	SS	18	●				■		○			
	DTPL trace to some sand occ. silt lenses	2.5		4	SS	18	●				■		○			
		3.0														
		3.5		5	SS	19	●				■		○			
		4.0														
	some sand to sandy	4.5														
		5.0		6	SS	33	●				■		○			
345.01 5.20	End of Borehole															
		5.5														
		6.0														
		6.5														
		7.0														
		7.5														
		8.0														
		8.5														
		9.0														

above-ground monument casing set in concrete water level in monitoring well measured at 0.34 m depth on April 16, 2024 50 mm I.D. PVC riser with bentonite seal

3.05 m long, 50 mm I.D. slotted screen with sand pack

PROJECT MANAGER: **EYC**
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ENGINEERING LTD.**

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FILE No: 1650

BOREHOLE No. 4D

Enclosure No.: 4

Sheet 1 of 2



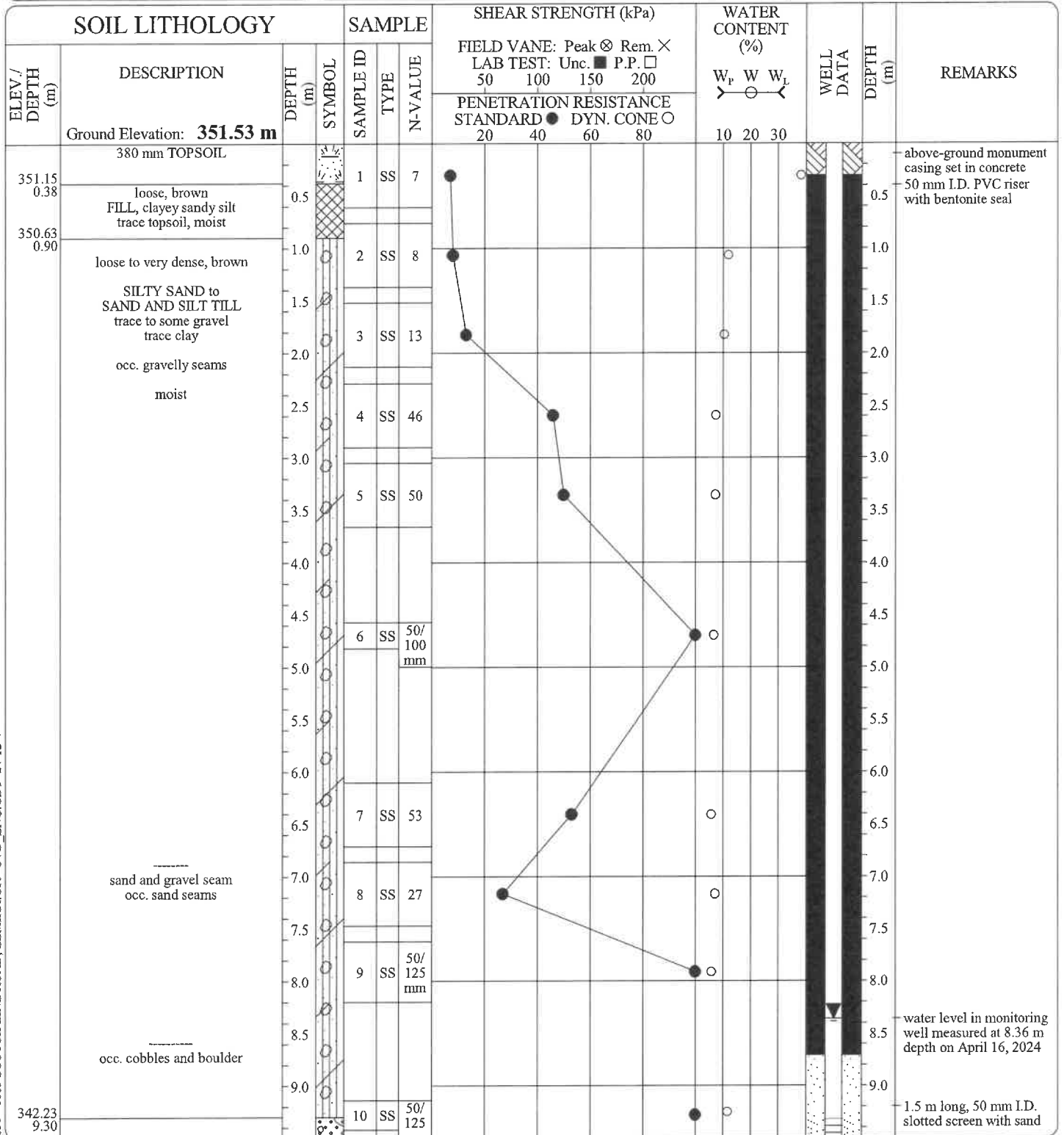
Client: 1000525725 Ontario Inc.

Project: Elmira Industrial Subdivision

Location: 1665 Scotch Line Road, Elmira, Ontario

EQUIPMENT DATA

Machine: CME-55 Track
Method: Hollow Stem Augers
Size: 108 mm I.D.
Date: Mar 28 - 24 TO Mar 28 - 24

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Kitchener, Ontario N2H 5E1
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PROJECT MANAGER: EYC

CVD BOREHOLE (2017) 1650 - 1665 SCOTCH LINE ROAD, ELMIRA, ONT. CVD ENG.GDT 24-12-4

FILE No: 1650

BOREHOLE No. 4D

Enclosure No.: 4

Sheet 2 of 2



Client: 1000525725 Ontario Inc.

Project: Elmira Industrial Subdivision

Location: 1665 Scotch Line Road, Elmira, Ontario

EQUIPMENT DATA

Machine: CME-55 Track

Method: Hollow Stem Augers

Size: 108 mm I.D.

Date: Mar 28 - 24 TO Mar 28 - 24

SOIL LITHOLOGY			SAMPLE			SHEAR STRENGTH (kPa)				WATER CONTENT (%)			WELL DATA	DEPTH (m)	REMARKS	
ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SYMBOL	SAMPLE ID	TYPE	N-VALUE	FIELD VANE: Peak ⊗ Rem. ×				LAB TEST: Unc. ■ P.P. □					
							50 100 150 200				50 100 150 200					
							PENETRATION RESISTANCE				STANDARD ● DYN. CONE ○					
							(continued)									20 40 60 80
341.33 10.20	very dense, brown GRAVELLY SILTY SAND saturated	10.0				mm									pack	
	very dense, grey to brown SANDY SILT TILL to SAND AND SILT TILL trace to some gravel occ. sand lenses moist	10.5 11.0 11.5 12.0		11	SS	50/ 100 mm					●	○		10.0 10.5 11.0 11.5 12.0		
339.08 12.45	End of Borehole	12.5		12	SS	50/ 125 mm					●	○		12.5		
		13.0												13.0		
		13.5												13.5		
		14.0												14.0		
		14.5												14.5		
		15.0												15.0		
		15.5												15.5		
		16.0												16.0		
		16.5												16.5		
		17.0												17.0		
		17.5												17.5		
		18.0												18.0		
		18.5												18.5		

PROJECT MANAGER: EYC

CHUNG & VANDER DOELEN
ENGINEERING LTD.

311 Victoria Street North

Kitchener, Ontario N2H 5E1

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FILE No: 1650

BOREHOLE No. 4S



Client: **1000525725 Ontario Inc.**
Project: **Elmira Industrial Subdivision**
Location: **1665 Scotch Line Road, Elmira, Ontario**

EQUIPMENT DATA

Machine: **CME-55 Track**
Method: **Solid Stem Augers**
Size: **152 mm O.D.**
Date: **Mar 28 - 24 TO Mar 28 - 24**

SOIL LITHOLOGY				SAMPLE			SHEAR STRENGTH (kPa)				WATER CONTENT (%)			WELL DATA	DEPTH (m)	REMARKS
ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SYMBOL	SAMPLE ID	TYPE	N-VALUE	FIELD VANE: Peak ⊗ Rem. ×				LAB TEST: Unc. ■ P.P. □					
							50	100	150	200	PENETRATION RESISTANCE					
							STANDARD ● DYN. CONE ○				W _p W _u W _L					
	Ground Elevation: 351.44 m						20	40	60	80	10	20	30			
346.94 4.50	Refer to Borehole No. 4D for soil descriptions and characteristics	0.5														above-ground monument casing set in concrete
		1.0														50 mm I.D. PVC riser with bentonite seal
		1.5														3.05 m long, 50 mm I.D. slotted screen with sand pack
		2.0														
		2.5														
		3.0														
		3.5														water level in monitoring well measured at 2.63 m depth on April 16, 2024
		4.0														
		4.5														
		5.0														
End of Borehole	5.5															
	6.0															
	6.5															
	7.0															
	7.5															
	8.0															
	8.5															
	9.0															

PROJECT MANAGER: **EYC**

**CHUNG & VANDER DOELEN
ENGINEERING LTD.**

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FILE No: 1650

BOREHOLE No. 5

Enclosure No.: 6

Sheet 1 of 1



Client: 1000525725 Ontario Inc.

Project: Elmira Industrial Subdivision

Location: 1665 Scotch Line Road, Elmira, Ontario

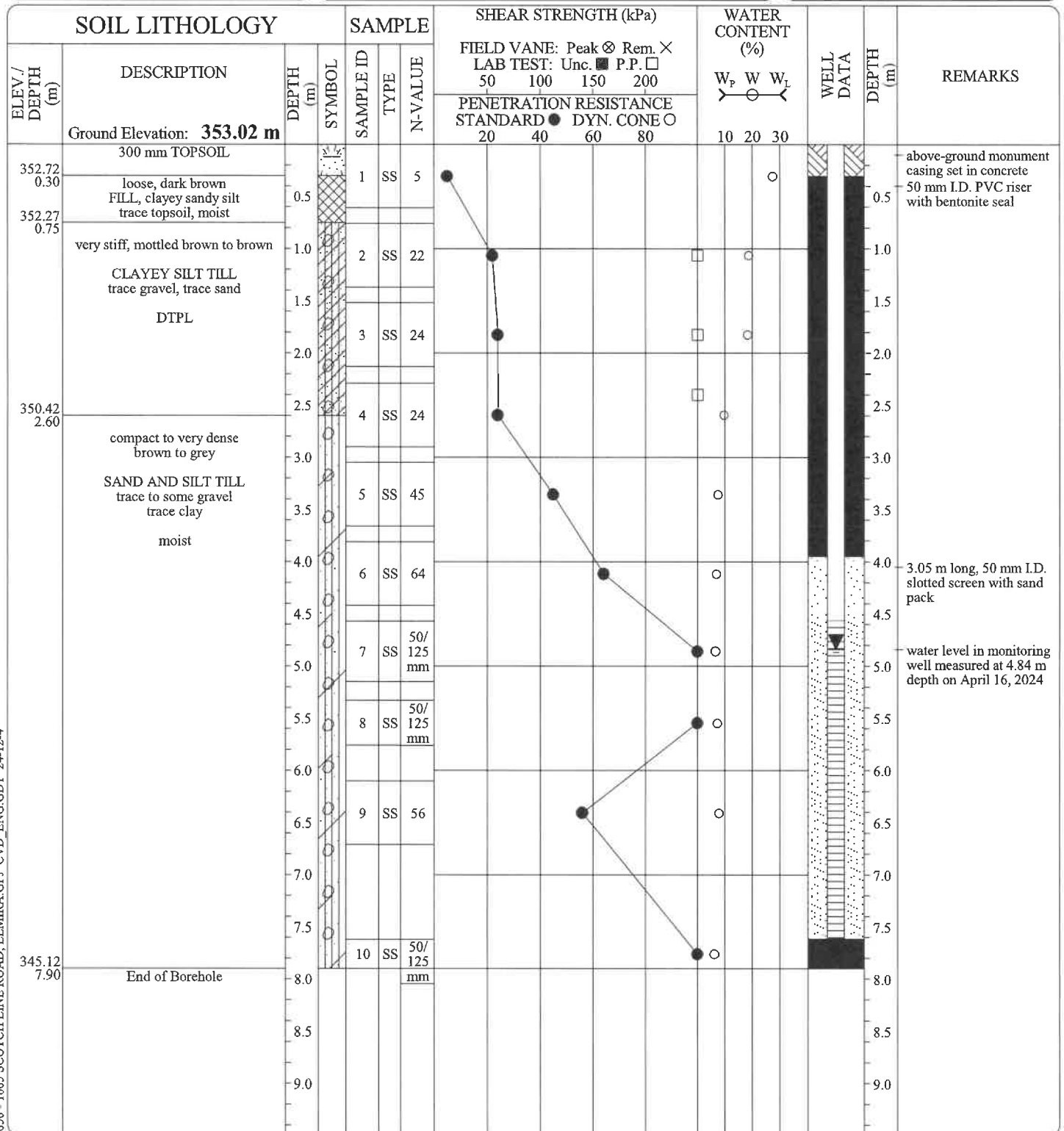
EQUIPMENT DATA

Machine: CME-55 Track

Method: Solid Stem Augers

Size: 152 mm O.D.

Date: Mar 28 - 24 TO Mar 28 - 24



water level in monitoring well measured at 4.84 m depth on April 16, 2024

PROJECT MANAGER: EYC

CHUNG & VANDER DOELEN
ENGINEERING LTD.311 Victoria Street North
Kitchener, Ontario N2H 5E1
ph. (519) 742-8979, fx. (519) 742-7739

CVD BOREHOLE (2017) 1650 - 1665 SCOTCH LINE ROAD, ELMIRA.GPJ CVD_ENG.GDT 24-12-4

FILE No: 1650

BOREHOLE No. 6

Enclosure No.: 7

Sheet 1 of 1



Client: 1000525725 Ontario Inc.

Project: Elmira Industrial Subdivision

Location: 1665 Scotch Line Road, Elmira, Ontario

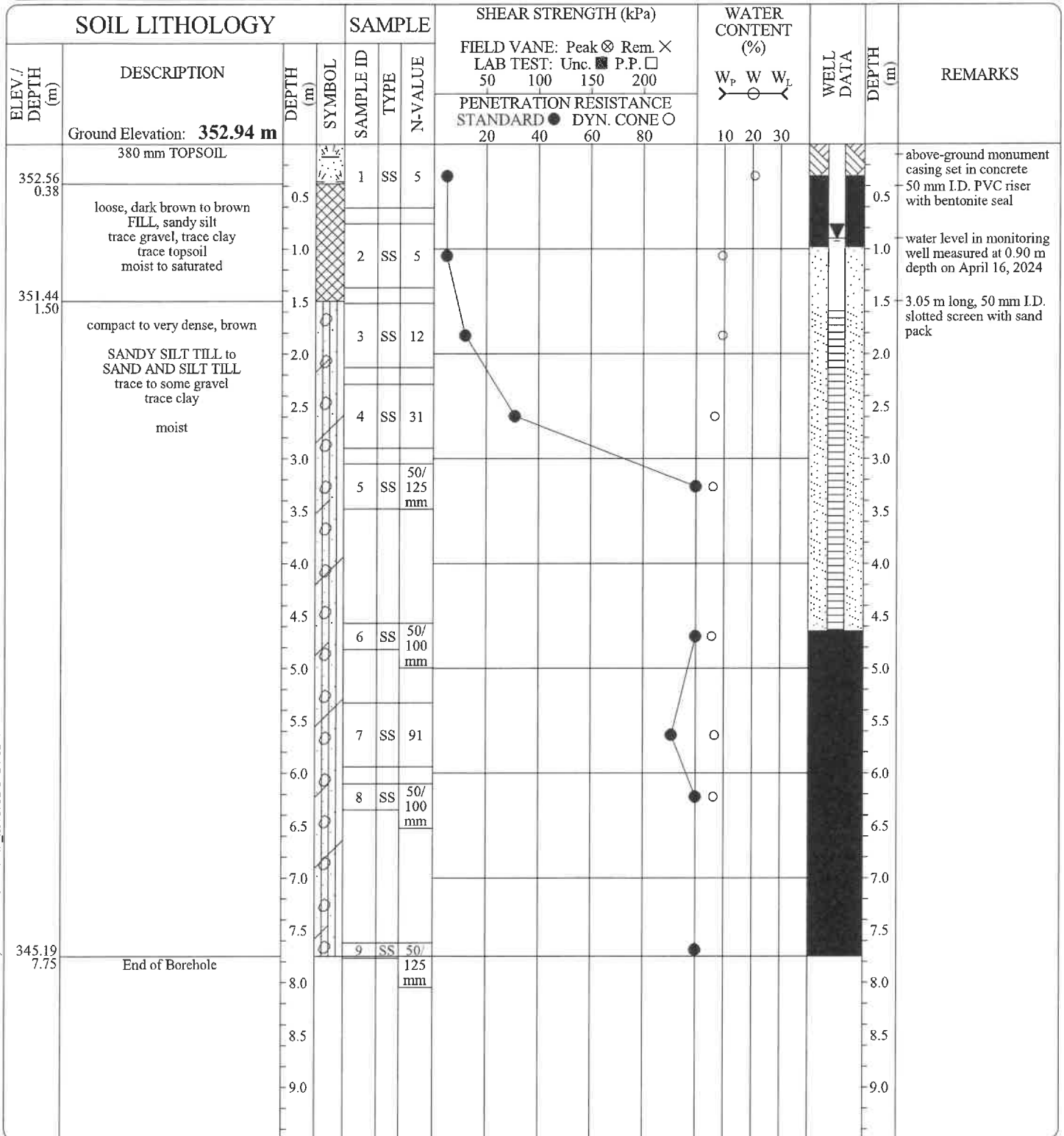
EQUIPMENT DATA

Machine: CME-55 Track

Method: Solid Stem Augers

Size: 152 mm O.D.

Date: Mar 28 - 24 TO Mar 28 - 24



PROJECT MANAGER: EYC

CHUNG & VANDER DOELEN
ENGINEERING LTD.311 Victoria Street North
Kitchener, Ontario N2H 5E1
ph. (519) 742-8979, fx. (519) 742-7739

FILE No: 1650

BOREHOLE No. 7

Enclosure No.: 8

Sheet 1 of 1



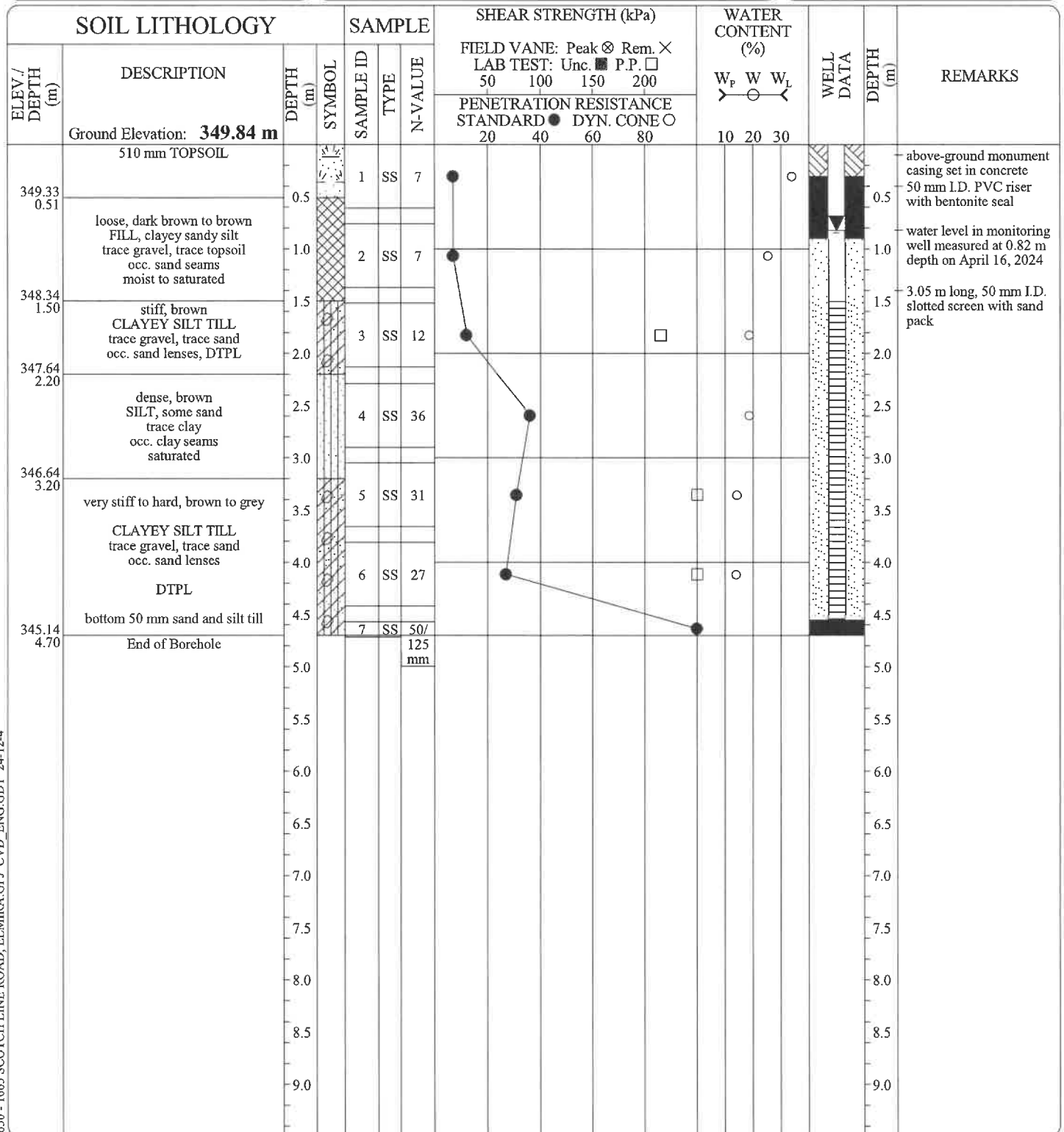
Client: 1000525725 Ontario Inc.

Project: Elmira Industrial Subdivision

Location: 1665 Scotch Line Road, Elmira, Ontario

EQUIPMENT DATA

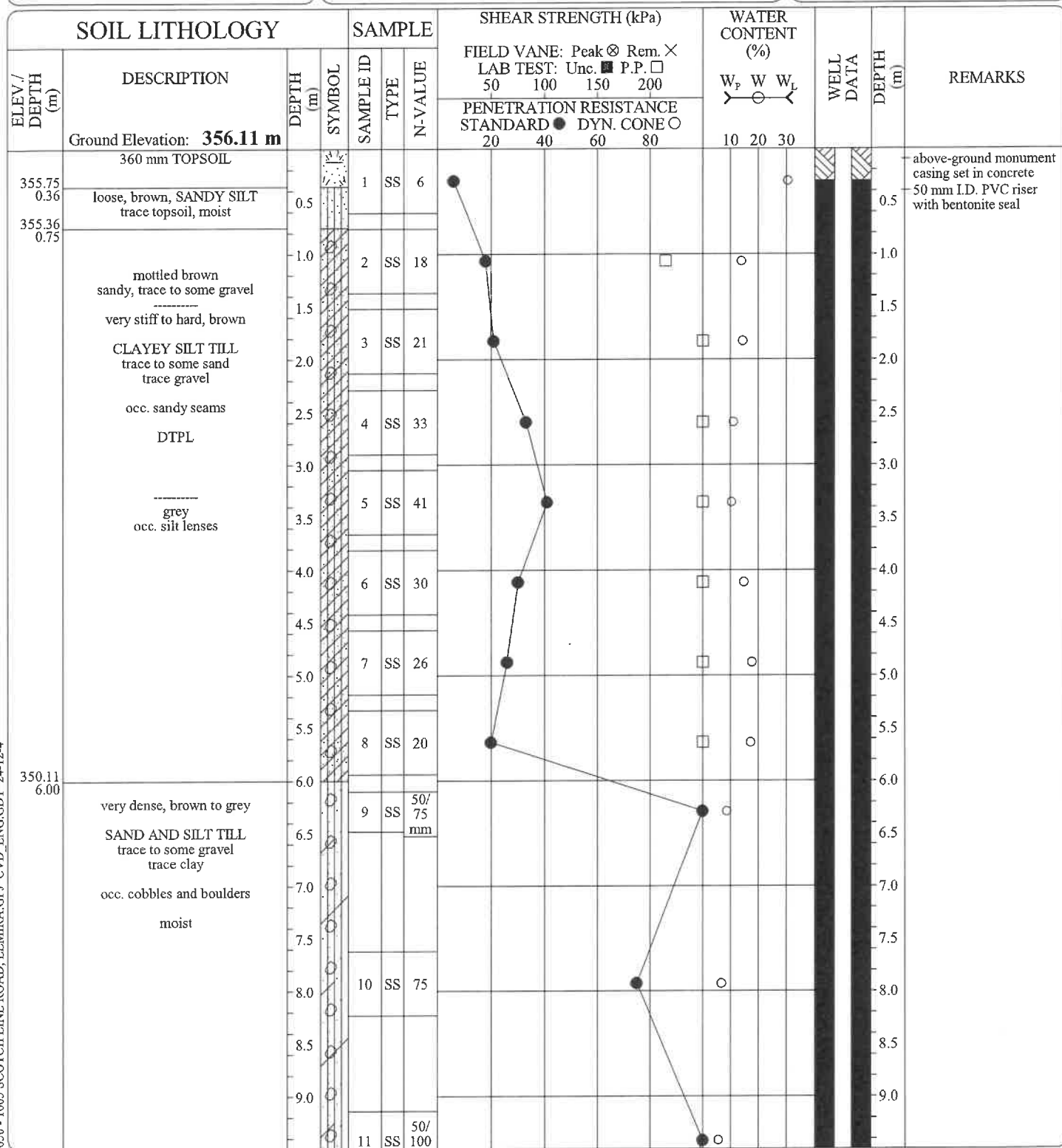
Machine: CME-55 Track
 Method: Solid Stem Augers
 Size: 152 mm O.D.
 Date: Mar 26 - 24 TO Mar 26 - 24



PROJECT MANAGER: EYC

CHUNG & VANDER DOELEN
ENGINEERING LTD.

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 Kitchener, Ontario N2H 5E1
 ph. (519) 742-8979, fx. (519) 742-7739

FILE No: 1650**BOREHOLE No. 8D**Client: **1000525725 Ontario Inc.**Project: **Elmira Industrial Subdivision**Location: **1665 Scotch Line Road, Elmira, Ontario****EQUIPMENT DATA**Machine: **CME-55 Track**Method: **Hollow Stem Augers**Size: **108 mm I.D.**Date: **Mar 27 - 24 TO Mar 27 - 24****CHUNG & VANDER DOELEN
ENGINEERING LTD.**

311 Victoria Street North

Kitchener, Ontario N2H 5E1

ph. (519) 742-8979, fx. (519) 742-7739

PROJECT MANAGER: **EYC**

FILE No: 1650

BOREHOLE No. 8D

Enclosure No.: 9

Sheet 2 of 2



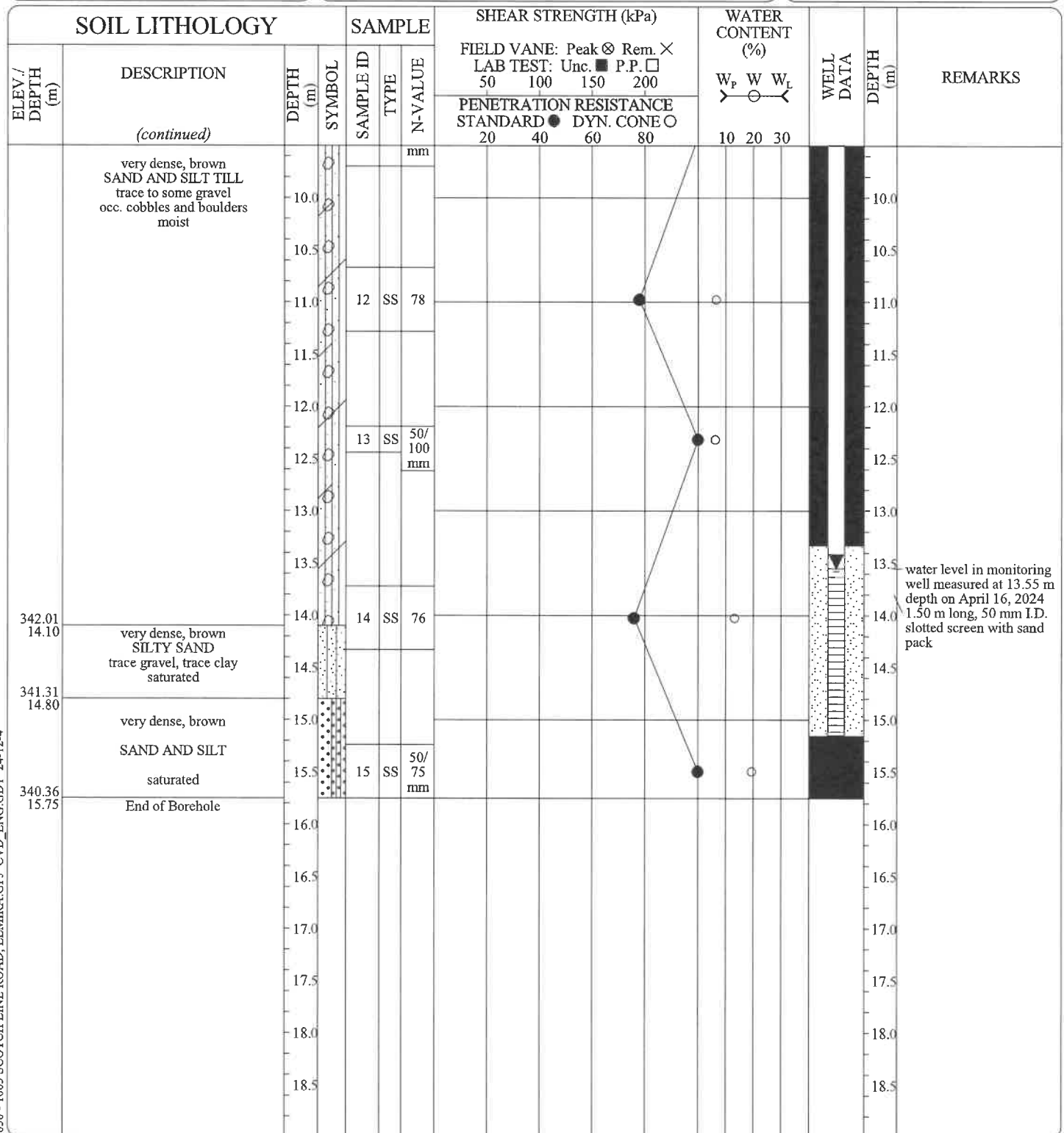
Client: 1000525725 Ontario Inc.

Project: Elmira Industrial Subdivision

Location: 1665 Scotch Line Road, Elmira, Ontario

EQUIPMENT DATA

Machine: CME-55 Track
Method: Hollow Stem Augers
Size: 108 mm I.D.
Date: Mar 27 - 24 TO Mar 27 - 24



PROJECT MANAGER: EYC

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ENGINEERING LTD.

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CVD BOREHOLE (2017) 1650 - 1665 SCOTCH LINE ROAD, ELMIRA.GPJ CVD_ENG.GDT 24-12-4

FILE No: 1650

BOREHOLE No. 8S



Client: **1000525725 Ontario Inc.**
Project: **Elmira Industrial Subdivision**
Location: **1665 Scotch Line Road, Elmira, Ontario**

EQUIPMENT DATA

Machine: **CME-55 Track**
Method: **Solid Stem Augers**
Size: **152 mm O.D.**
Date: **Mar 27 - 24 TO Mar 27 - 24**

SOIL LITHOLOGY				SAMPLE			SHEAR STRENGTH (kPa)				WATER CONTENT (%)			WELL DATA	DEPTH (m)	REMARKS	
ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SYMBOL	SAMPLE ID	TYPE	N-VALUE	FIELD VANE: Peak ⊗ Rem. × LAB TEST: Unc. ■ P.P. □ 50 100 150 200				W _p W W _L						
							PENETRATION RESISTANCE STANDARD ● DYN. CONE ○ 20 40 60 80				↔ ○ ↔						
											10 20 30						
350.75 5.35	Refer to Borehole No. 8D for soil descriptions and characteristics	0.5														3.05 m long, 50 mm I.D. slotted screen with sand pack	above-ground monument casing set in concrete 50 mm I.D. PVC riser with bentonite seal
		1.0															
		1.5															
		2.0															
		2.5															
		3.0															
		3.5															
		4.0															
		4.5															
		5.0															
	5.5	End of Borehole														water level in monitoring well measured at 5.15 m depth on April 16, 2024	
	6.0																
	6.5																
	7.0																
	7.5																
	8.0																
	8.5																
	9.0																

PROJECT MANAGER: **EYC**

**CHUNG & VANDER DOELEN
ENGINEERING LTD.**

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FILE No: 1650

BOREHOLE No. 9

Enclosure No.: 11

Sheet 1 of 1



Client: 1000525725 Ontario Inc.

Project: Elmira Industrial Subdivision

Location: 1665 Scotch Line Road, Elmira, Ontario

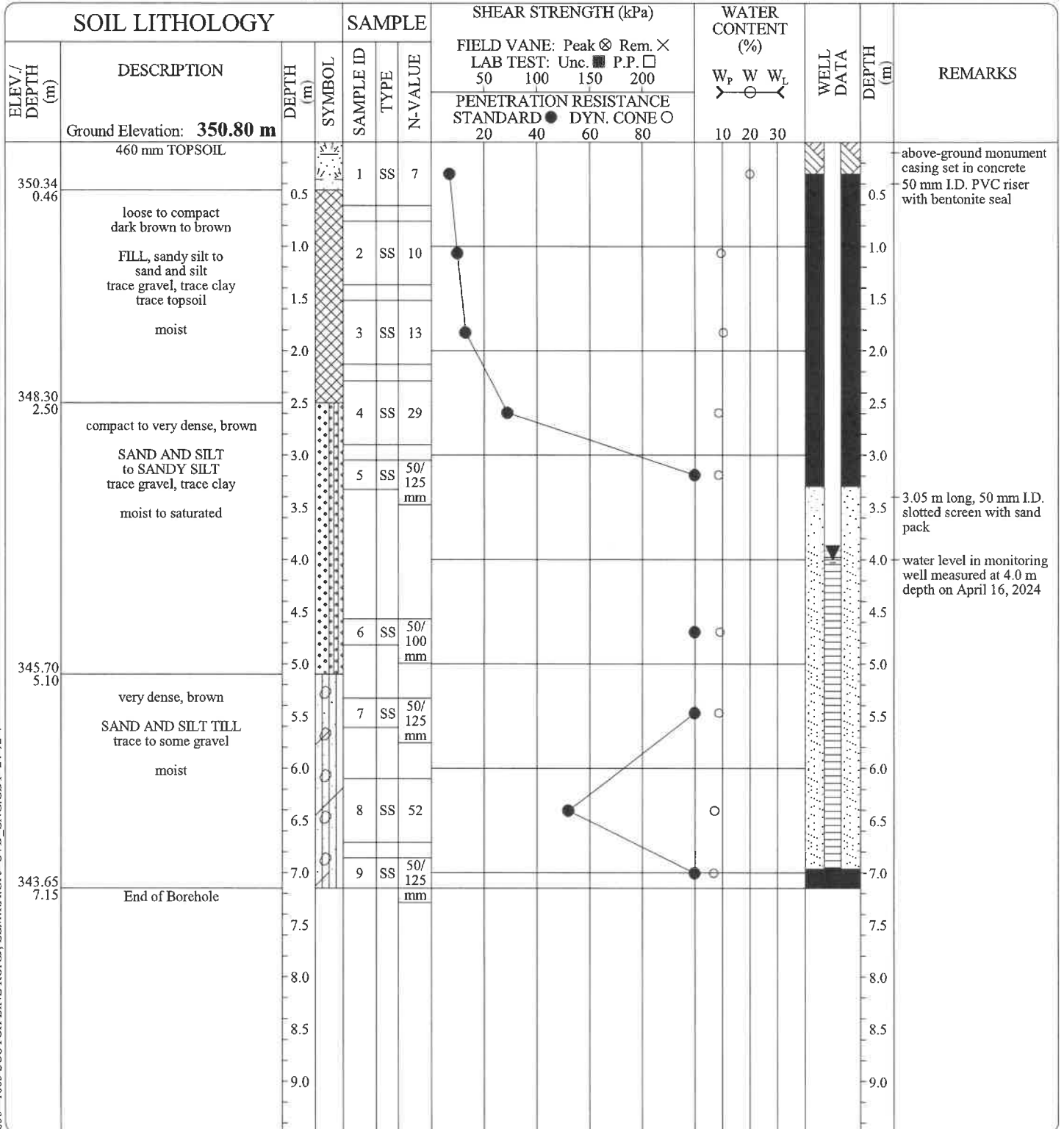
EQUIPMENT DATA

Machine: CME-55 Track

Method: Solid Stem Augers

Size: 152 mm O.D.

Date: Mar 26 - 24 TO Mar 26 - 24



PROJECT MANAGER: EYC

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CVD BOREHOLE (2017) 1650 - 1665 SCOTCH LINE ROAD, ELMIRA.GPJ CVD_ENG.GDT 24-12-4

FILE No: 1650

BOREHOLE No. 10



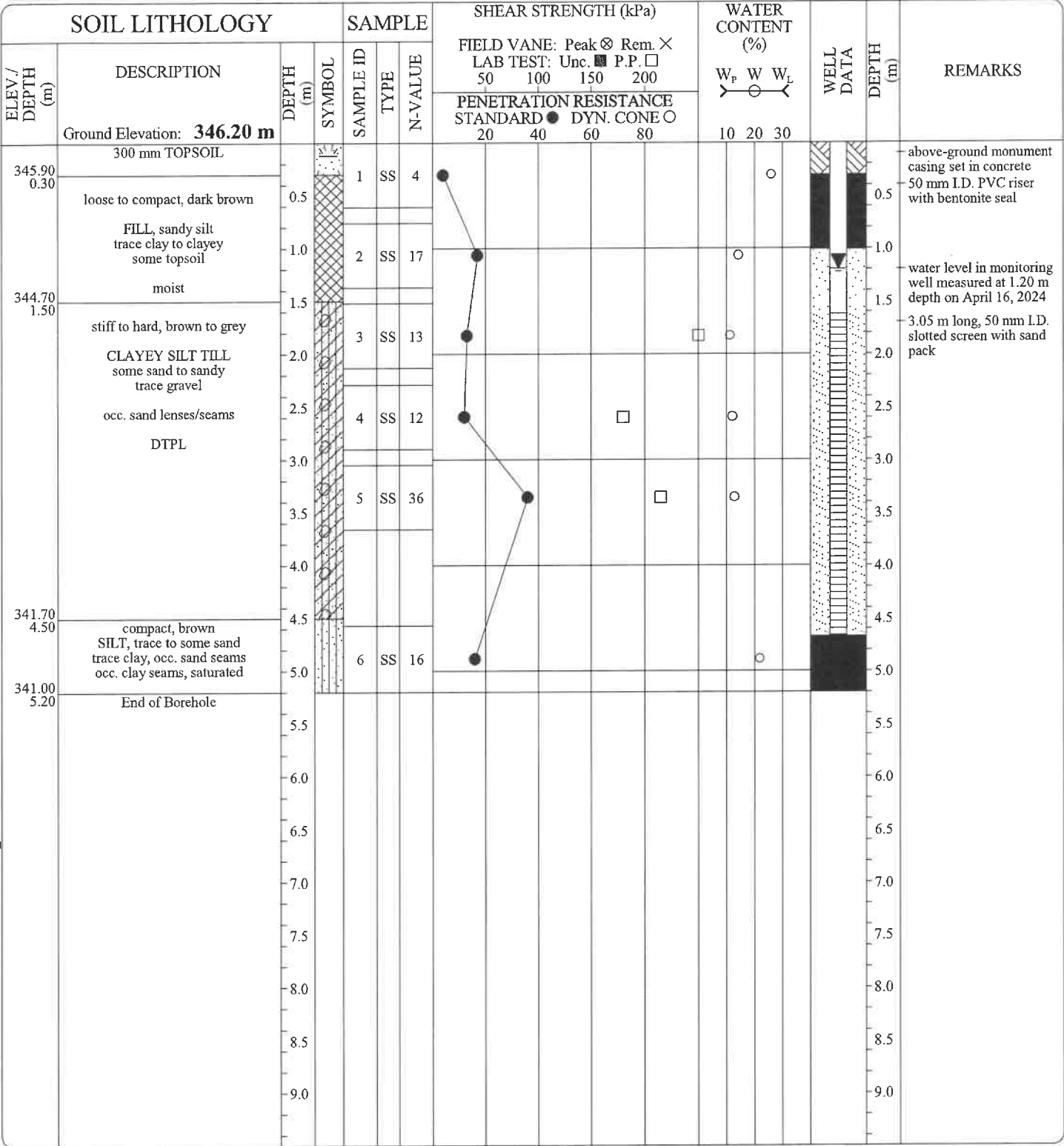
Client: 1000525725 Ontario Inc.

Project: Elmira Industrial Subdivision

Location: 1665 Scotch Line Road, Elmira, Ontario

EQUIPMENT DATA

Machine: CME-55 Track
Method: Solid Stem Augers
Size: 152 mm O.D.
Date: Apr 01 - 24 TO Apr 01 - 24



CVD BOREHOLE (2017) 1650 - 1665 SCOTCH LINE ROAD, ELMIRA, GPJ CVD, ENG, GDT 24-12-4

PROJECT MANAGER: EYC

CHUNG & VANDER DOELEN
ENGINEERING LTD.

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Kitchener, Ontario N2H 5E1
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FILE No: 1650

BOREHOLE No. 11

Enclosure No.: 13

Sheet 1 of 1



Client: 1000525725 Ontario Inc.

Project: Elmira Industrial Subdivision

Location: 1665 Scotch Line Road, Elmira, Ontario

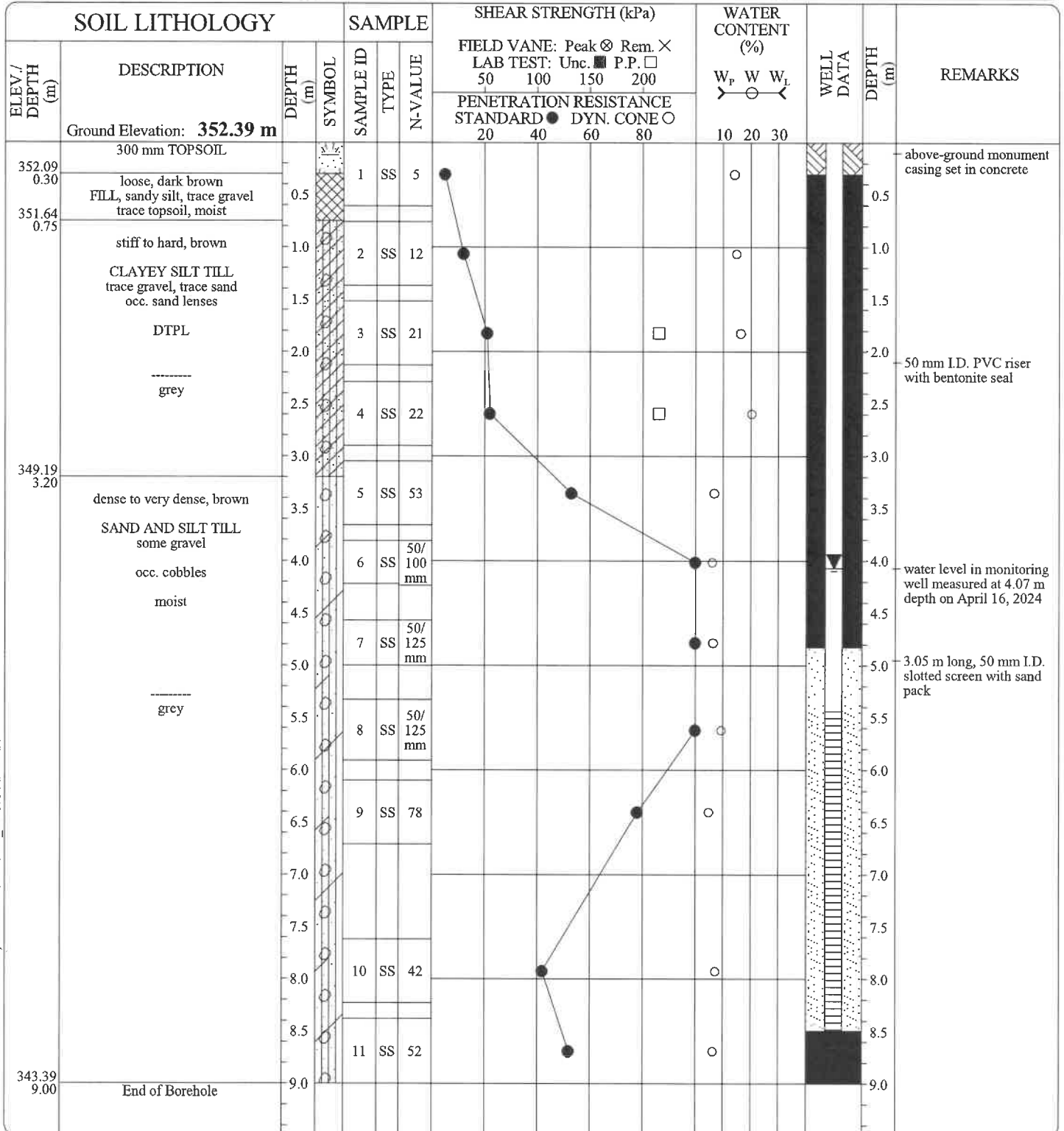
EQUIPMENT DATA

Machine: CME-55 Track

Method: Solid Stem Augers

Size: 152 mm O.D.

Date: Mar 27 - 24 TO Mar 27 - 24



PROJECT MANAGER: EYC

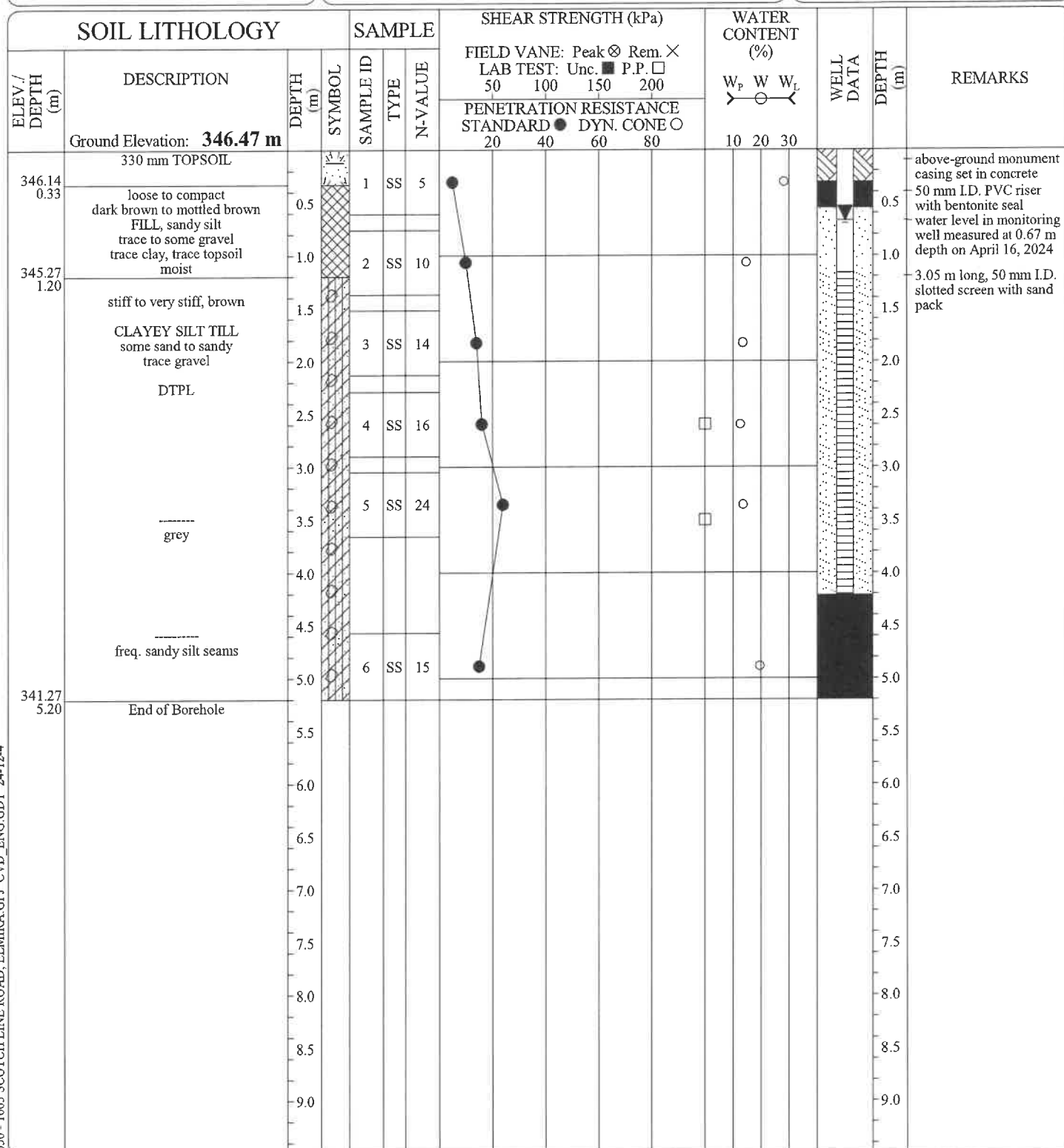
CHUNG & VANDER DOELEN
ENGINEERING LTD.

311 Victoria Street North

Kitchener, Ontario N2H 5E1

ph. (519) 742-8979, fx. (519) 742-7739

CVD BOREHOLE (2017) 1650 - 1665 SCOTCH LINE ROAD, ELMIRA.GPJ CVD_ENG.GDT 24-12-4

FILE No: 1650**BOREHOLE No. 12**Client: **1000525725 Ontario Inc.**Project: **Elmira Industrial Subdivision**Location: **1665 Scotch Line Road, Elmira, Ontario****EQUIPMENT DATA**Machine: **CME-55 Track**Method: **Solid Stem Augers**Size: **152 mm O.D.**Date: **Apr 01 - 24 TO Apr 01 - 24**

CVD BOREHOLE (2017) 1650 - 1665 SCOTCH LINE ROAD, ELMIRA.GPJ CVD_ENG.GDT 24-12-4

PROJECT MANAGER: **EYC****CHUNG & VANDER DOELEN
ENGINEERING LTD.**311 Victoria Street North
Kitchener, Ontario N2H 5E1
ph. (519) 742-8979, fx. (519) 742-7739

FILE No: 1650

BOREHOLE No. 13

Enclosure No.: 15

Sheet 1 of 1



Client: 1000525725 Ontario Inc.

Project: Elmira Industrial Subdivision

Location: 1665 Scotch Line Road, Elmira, Ontario

EQUIPMENT DATA

Machine: CME-55 Track

Method: Solid Stem Augers

Size: 152 mm O.D.

Date: Apr 01 - 24 TO Apr 01 - 24

SOIL LITHOLOGY				SAMPLE			SHEAR STRENGTH (kPa)				WATER CONTENT (%)			WELL DATA	DEPTH (m)	REMARKS
ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SYMBOL	SAMPLE ID	TYPE	N-VALUE	FIELD VANE: Peak ⊗ Rem. × LAB TEST: Unc. ■ P.P. □ 50 100 150 200				W _p W _u W _L ↔ ○ ↔					
							PENETRATION RESISTANCE STANDARD ● DYN. CONE ○ 20 40 60 80				10 20 30					
Ground Elevation: 345.99 m																
300 mm TOPSOIL																
345.69 0.30 345.49 0.50	loose, brown, FILL sandy silt, trace topsoil, moist	0.5		1	SS	9	●							○		water level at 0.9 m depth upon withdrawal of drilling augers
	loose to compact, brown															
	SANDY SILT to some sand trace gravel, trace clay	1.0		2	SS	10	●							○		
	occ. silt seams occ. clay lenses/seams	1.5														
	wet to saturated	2.0		3	SS	9	●							○		
343.59 2.40	loose, brown SAND AND GRAVEL trace silt, saturated	2.5		4	SS	9	●							○		borehole open to 3.65 m depth upon withdrawal of drilling augers
343.04 2.95	very stiff, grey CLAYEY SANDY SILT TILL trace gravel, occ. silt seams DTPL	3.0														
		3.5		5	SS	19	●						□	○		
342.34 3.65	End of Borehole															
		4.0														
		4.5														
		5.0														
		5.5														
		6.0														
		6.5														
		7.0														
		7.5														
		8.0														
		8.5														
		9.0														

water level at 0.9 m depth
upon withdrawal of
drilling augersborehole open to 3.65 m
depth upon withdrawal of
drilling augers

PROJECT MANAGER: EYC

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Kitchener, Ontario N2H 5E1
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CVD BOREHOLE (2017) 1650 - 1665 SCOTCH LINE ROAD, ELMIRA.GPJ CVD_ENG.GDT 24-12-4

FILE No: 1650**BOREHOLE No. 14**Client: **1000525725 Ontario Inc.**Project: **Elmira Industrial Subdivision**Location: **1665 Scotch Line Road, Elmira, Ontario****EQUIPMENT DATA**Machine: **CME-55 Track**Method: **Solid Stem Augers**Size: **152 mm O.D.**Date: **Apr 01 - 24 TO Apr 01 - 24**

SOIL LITHOLOGY				SAMPLE			SHEAR STRENGTH (kPa)				WATER CONTENT (%)			WELL DATA	DEPTH (m)	REMARKS	
ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SYMBOL	SAMPLE ID	TYPE	N-VALUE	FIELD VANE: Peak ⊗ Rem. × LAB TEST: Unc. ■ P.P. □ 50 100 150 200				W _p W W _L ⤵ ⊙ ⤵						
							PENETRATION RESISTANCE STANDARD ● DYN. CONE ○ 20 40 60 80				10 20 30						
Ground Elevation: 350.16 m																	
360 mm TOPSOIL																	
349.80 0.36	loose, dark brown, FILL sandy silt, trace gravel, trace clay occ. sand lenses, moist loose, brown Fine SAND some silt moist	0.5		1	SS	6	●						○				
349.41 0.75																	
		1.0		2	SS	7	●							○			
		1.5															
		2.0			3	SS	8	●						○			
		2.5															
		3.0															
		3.5		4	SS	5	●						○				
						</											

**CHUNG & VANDER DOELEN
ENGINEERING LTD.**

311 Victoria Street North

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PROJECT MANAGER: **EYC**

FILE No: 1650

BOREHOLE No. 15

Enclosure No.: 17

Sheet 1 of 1



Client: 1000525725 Ontario Inc.

Project: Elmira Industrial Subdivision

Location: 1665 Scotch Line Road, Elmira, Ontario

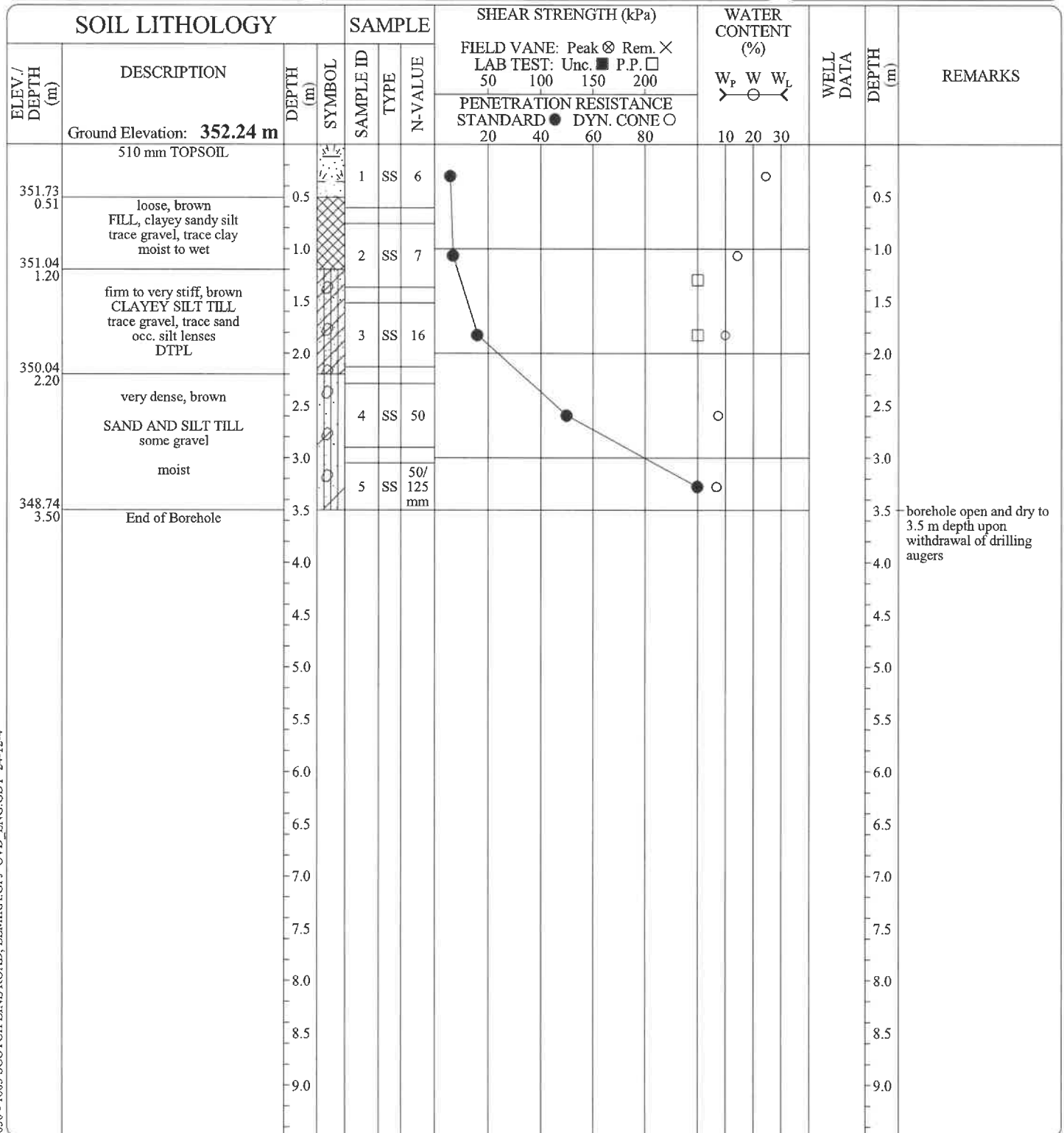
EQUIPMENT DATA

Machine: CME-55 Track

Method: Solid Stem Augers

Size: 152 mm O.D.

Date: Apr 01 - 24 TO Apr 01 - 24



PROJECT MANAGER: EYC

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ENGINEERING LTD.311 Victoria Street North
Kitchener, Ontario N2H 5E1
ph. (519) 742-8979, fx. (519) 742-7739

FILE No: 1650**BOREHOLE No. 16**Client: **1000525725 Ontario Inc.**Project: **Elmira Industrial Subdivision**Location: **1665 Scotch Line Road, Elmira, Ontario****EQUIPMENT DATA**Machine: **CME-55 Track**Method: **Solid Stem Augers**Size: **152 mm O.D.**Date: **Apr 01 - 24 TO Apr 01 - 24**

SOIL LITHOLOGY			SAMPLE			SHEAR STRENGTH (kPa)				WATER CONTENT (%)			WELL DATA	DEPTH (m)	REMARKS	
ELEV. / DEPTH (m)	DESCRIPTION	DEPTH (m)	SYMBOL	SAMPLE ID	TYPE	N-VALUE	FIELD VANE: Peak ⊗ Rem. × LAB TEST: Unc. ■ P.P. □ 50 100 150 200				W _p W W _L ↔ ○ ↔					
							PENETRATION RESISTANCE STANDARD ● DYN. CONE ○ 20 40 60 80				10 20 30					
Ground Elevation: 353.36 m																
	410 mm TOPSOIL															
352.95 0.41	loose, dark brown, FILL sandy silt, trace gravel trace clay, moist	0.5		1	SS	6	●							○	water level at 0.3 m depth upon withdrawal of drilling augers	
352.61 0.75																
351.91 1.45	loose, brown SANDY SILT trace clay saturated	1.0		2	SS	7	●							○		
	stiff, brown CLAYEY SILT trace gravel, trace sand occ. sand lenses DTPL to APL	1.5		3	SS	8	●							○		
		2.0														
		2.5	4	SS	11	●								○		
350.41 2.95	compact, brown SANDY SILT occ. clay seams, saturated	3.0		5	SS	21	●							○		
349.71 3.65	End of Borehole	3.5													borehole open to 3.65 m depth upon withdrawal of drilling augers	
		4.0														
		4.5														
		5.0														
		5.5														
		6.0														
		6.5														
		7.0														
		7.5														
		8.0														
		8.5														
		9.0														

PROJECT MANAGER: **EYC****CHUNG & VANDER DOELEN
ENGINEERING LTD.**311 Victoria Street North
Kitchener, Ontario N2H 5E1
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FILE No: 1650

BOREHOLE No. 17

Enclosure No.: 19

Sheet 1 of 1



Client: 1000525725 Ontario Inc.

Project: Elmira Industrial Subdivision

Location: 1665 Scotch Line Road, Elmira, Ontario

EQUIPMENT DATA

Machine: CME-55 Track

Method: Solid Stem Augers

Size: 152 mm O.D.

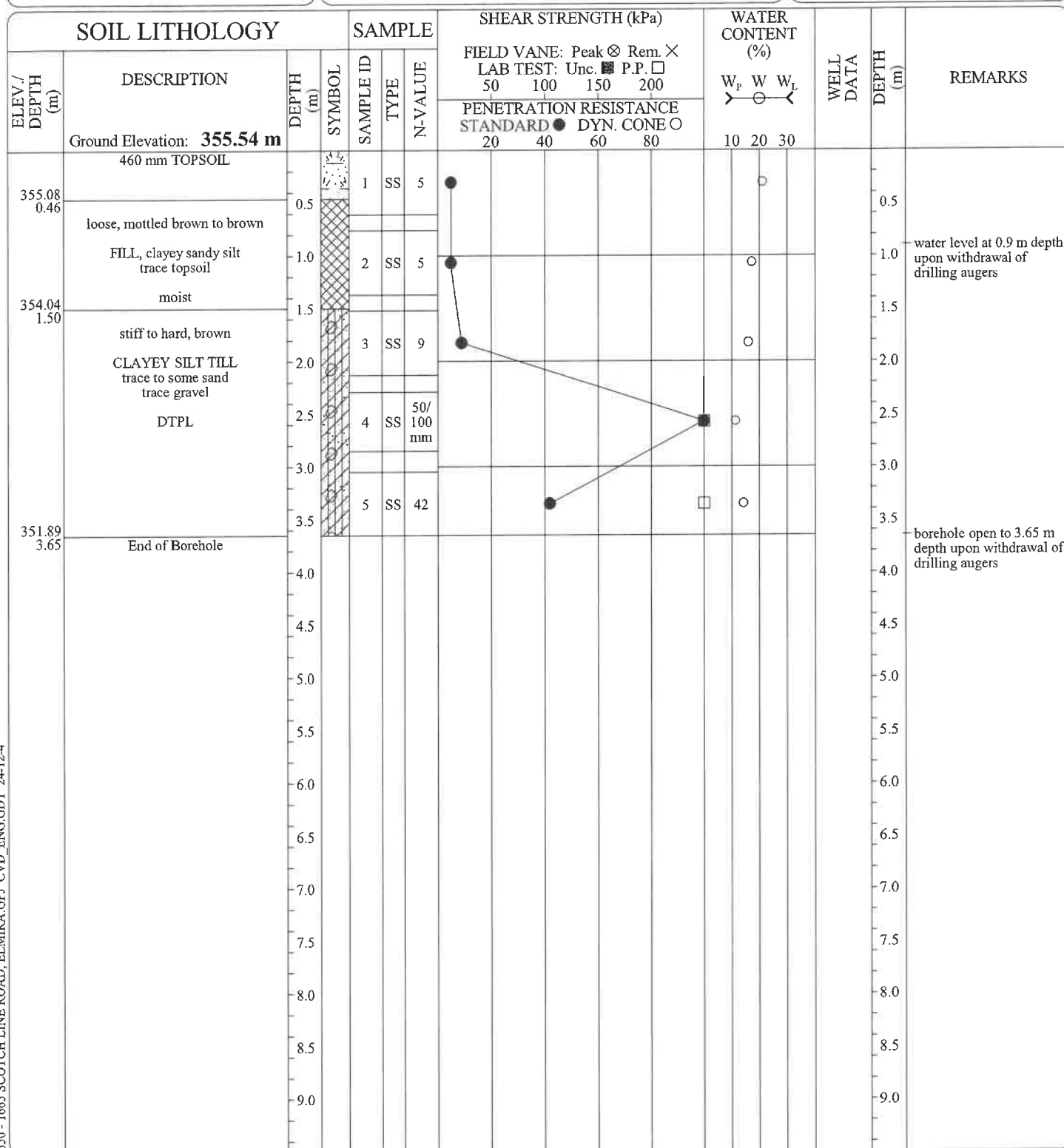
Date: Mar 26 - 24 TO Mar 26 - 24

SOIL LITHOLOGY			SAMPLE			SHEAR STRENGTH (kPa)				WATER CONTENT (%)			WELL DATA	DEPTH (m)	REMARKS	
ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SYMBOL	SAMPLE ID	TYPE	N-VALUE	FIELD VANE: Peak ⊗ Rem. × LAB TEST: Unc. ■ P.P. □ 50 100 150 200				W _p W _l W _u					
Ground Elevation: 350.61 m							PENETRATION RESISTANCE STANDARD ● DYN. CONE ○				20 40 60 80			10 20 30		
350.15 0.46	460 mm TOPSOIL	0.5		1	SS	6	●									○
	loose to compact, dark brown FILL, silty sand to sand and silt trace gravel occ. brick fragments moist	1.0		2	SS	13	●									○
349.11 1.50	compact to dense FILL, sand and gravel some silt to silty trace topsoil occ. cobbles wet to saturated	2.0		3	SS	24	●									○
		2.5		4	SS	32	●									○
347.66 2.95	hard, brown to grey CLAYEY SILT TILL some sand, trace gravel, DTPL	3.0		5	SS	37	●									□
346.96 3.65	End of Borehole	3.5														
		4.0														
		4.5														
		5.0														
		5.5														
		6.0														
		6.5														
		7.0														
		7.5														
		8.0														
		8.5														
		9.0														

borehole cave-in and
water level at 1.5 m depth
upon withdrawal of
drilling augers

PROJECT MANAGER: EYC

CHUNG & VANDER DOELEN
ENGINEERING LTD.311 Victoria Street North
Kitchener, Ontario N2H 5E1
ph. (519) 742-8979, fx. (519) 742-7739

FILE No: 1650**BOREHOLE No. 18**Client: **1000525725 Ontario Inc.**Project: **Elmira Industrial Subdivision**Location: **1665 Scotch Line Road, Elmira, Ontario****EQUIPMENT DATA**Machine: **CME-55 Track**Method: **Solid Stem Augers**Size: **152 mm O.D.**Date: **Mar 27 - 24 TO Mar 27 - 24**PROJECT MANAGER: **EYC****CHUNG & VANDER DOELEN
ENGINEERING LTD.**311 Victoria Street North
Kitchener, Ontario N2H 5E1
ph. (519) 742-8979, fx. (519) 742-7739

FILE No: 1650

BOREHOLE No. 19

Enclosure No.: 21

Sheet 1 of 1



Client: 1000525725 Ontario Inc.

Project: Elmira Industrial Subdivision

Location: 1665 Scotch Line Road, Elmira, Ontario

EQUIPMENT DATA

Machine: CME-55 Track

Method: Solid Stem Augers

Size: 152 mm O.D.

Date: Mar 26 - 24 TO Mar 26 - 24

SOIL LITHOLOGY			SAMPLE			SHEAR STRENGTH (kPa)				WATER CONTENT (%)			WELL DATA	DEPTH (m)	REMARKS										
ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SYMBOL	SAMPLE ID	TYPE	N-VALUE	FIELD VANE: Peak ⊗ Rem. × LAB TEST: Unc. ■ P.P. □ 50 100 150 200				W _p W W _L ↗ ○ ↖														
Ground Elevation: 354.83 m						PENETRATION RESISTANCE STANDARD ● DYN. CONE ○ 20 40 60 80				10 20 30															
	380 mm TOPSOIL			1	SS	6	●						○												
354.45 0.38	loose, dark brown, FILL, sandy silt, trace gravel trace topsoil, moist	0.5					●						○		0.5										
354.08 0.75																									
	sandy	1.0		2	SS	10	●						○		1.0										
	stiff to hard, brown	1.5					●						○		1.5										
	CLAYEY SILT TILL trace to some gravel trace to some sand	2.0		3	SS	15																			
	occ. silt lenses	2.5																							
	DTPL	3.0																							
		3.5					●						○		3.5										
351.53 3.30	very dense, brown			5	SS	53																			
351.18 3.65	SAND AND SILT TILL some gravel, moist																								
	End of Borehole																								
		4.0																							
		4.5																							
		5.0																							
		5.5																							
		6.0																							
		6.5																							
		7.0																							
		7.5																							
		8.0																							
		8.5																							
		9.0																							

borehole open and dry to
3.65 m depth upon
withdrawal of drilling
augers

PROJECT MANAGER: EYC

CHUNG & VANDER DOELEN
ENGINEERING LTD.

311 Victoria Street North

Kitchener, Ontario N2H 5E1

ph. (519) 742-8979, fx. (519) 742-7739

FILE No: 1650

BOREHOLE No. 20

Enclosure No.: 22

Sheet 1 of 1



Client: 1000525725 Ontario Inc.

Project: Elmira Industrial Subdivision

Location: 1665 Scotch Line Road, Elmira, Ontario

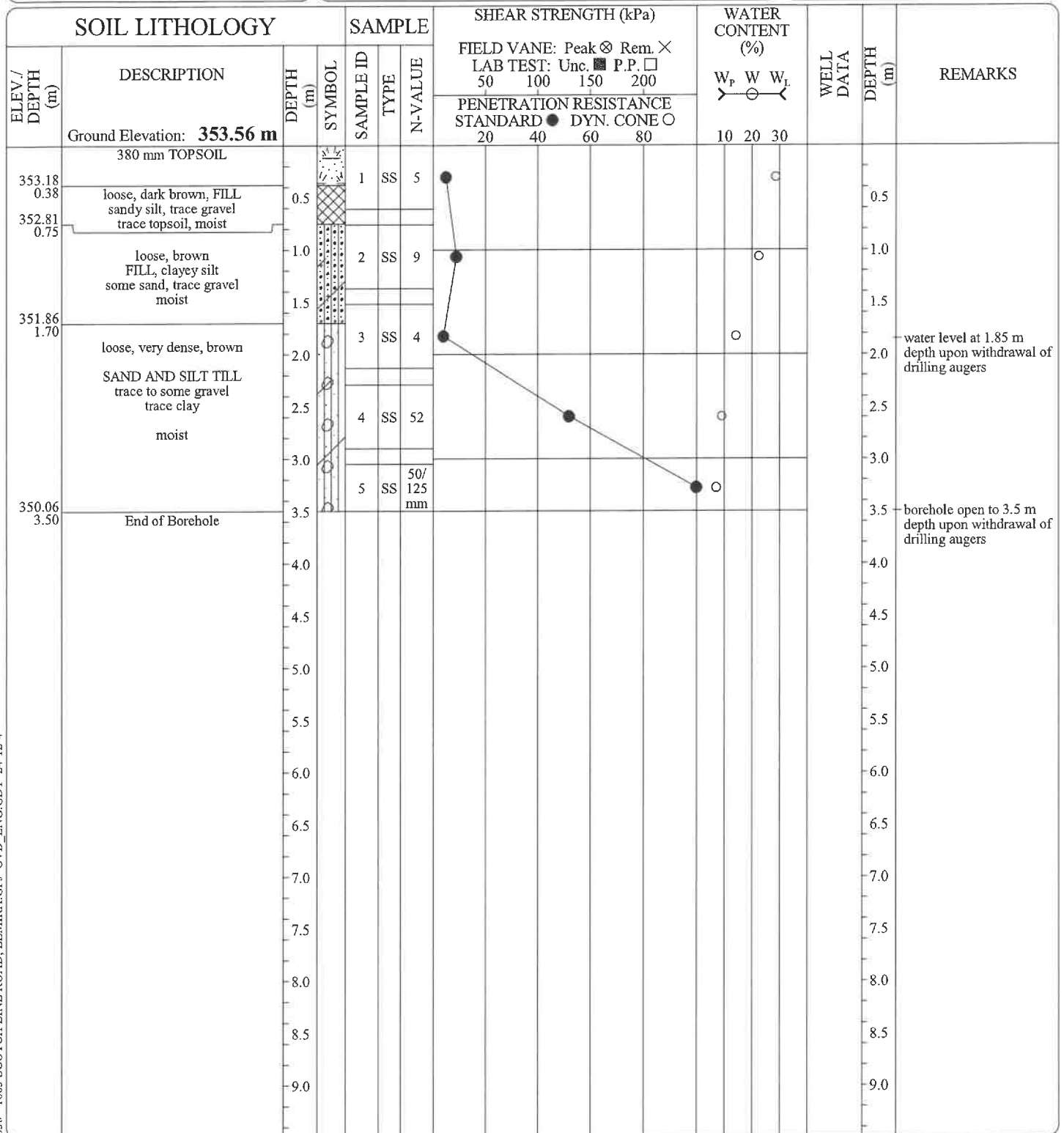
EQUIPMENT DATA

Machine: CME-55 Track

Method: Solid Stem Augers

Size: 152 mm O.D.

Date: Mar 26 - 24 TO Mar 26 - 24



CVD BOREHOLE (2017) 1650 - 1665 SCOTCH LINE ROAD, ELMIRA, GP1 CVD_ENG.GDT 24-12-4

PROJECT MANAGER: EYC

CHUNG & VANDER DOELEN
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FILE No: 1650

BOREHOLE No. 21

Enclosure No.: 23

Sheet 1 of 1



Client: 1000525725 Ontario Inc.

Project: Elmira Industrial Subdivision

Location: 1665 Scotch Line Road, Elmira, Ontario

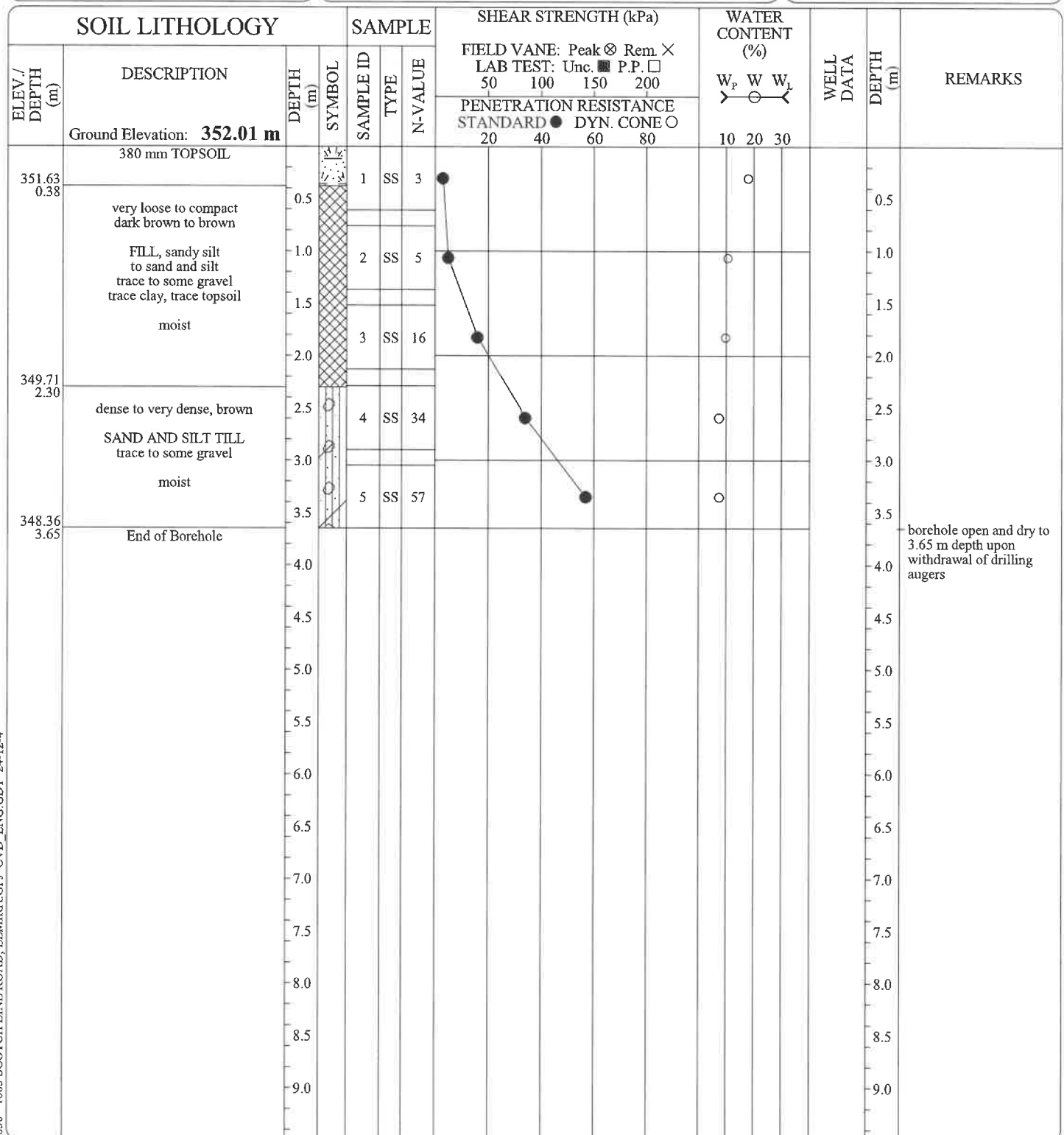
EQUIPMENT DATA

Machine: CME-55 Track

Method: Solid Stem Augers

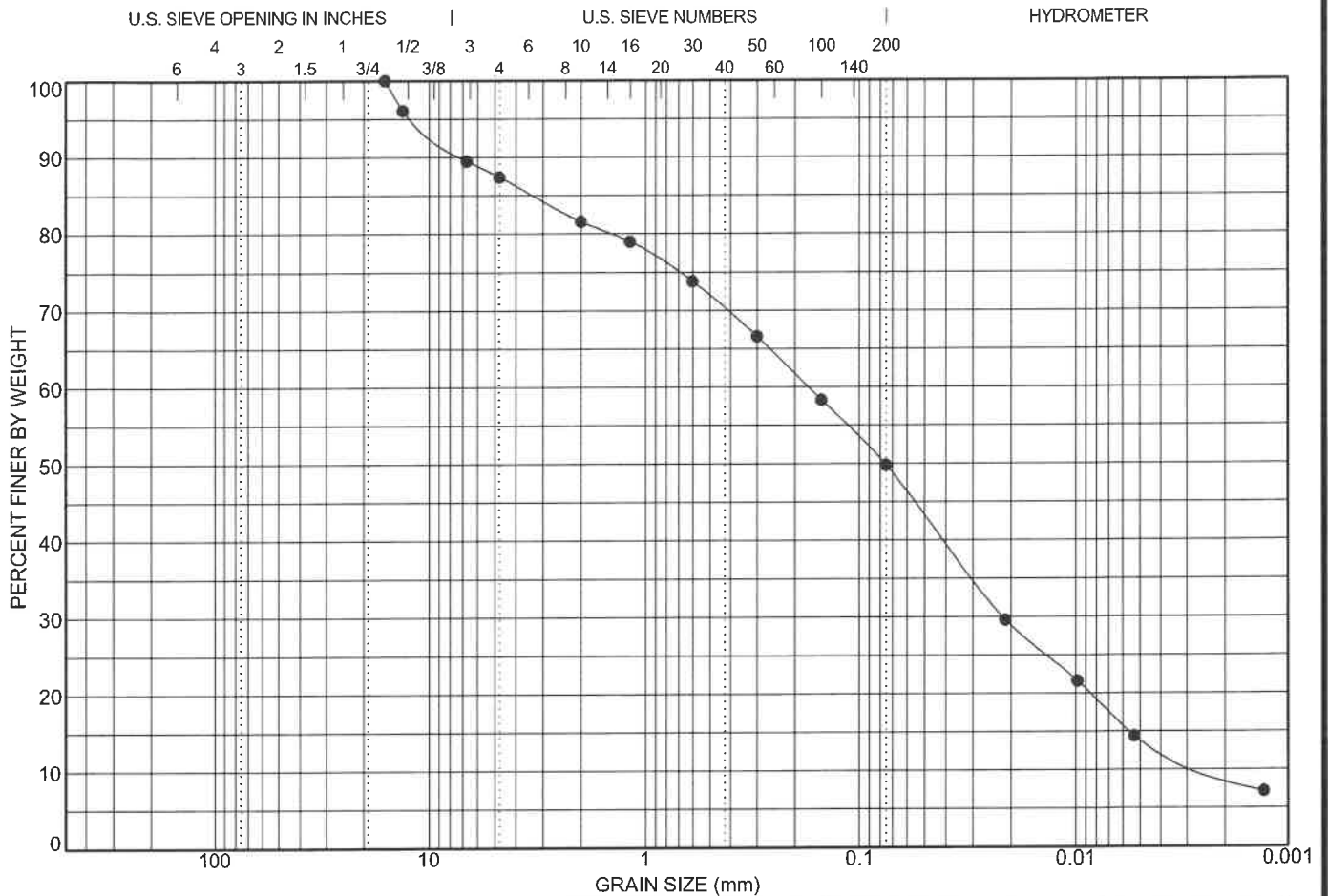
Size: 152 mm O.D.

Date: Mar 26 - 24 TO Mar 26 - 24



PROJECT MANAGER: EYC

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Kitchener, Ontario N2H 5E1
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COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

LL	PL	PI	Cc	Cu	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
			1.22	76.99	16	0.173	0.022	0.002	12.6	37.6	49.8	

Date: May. 10 - 2024
Client: 1000525725 Ontario Inc.
Contractor:
Source:
Sampled From: BH 1 - SA 3; 1.50 to 2.10 m depth
Sample No.: 1-3
Date Sampled: Apr. 01 - 2024
Sampled By: RS
Lab No.: 442
Date Tested: May. 10 - 2024
Type of Material: Sand and Silt Till, some gravel, trace clay

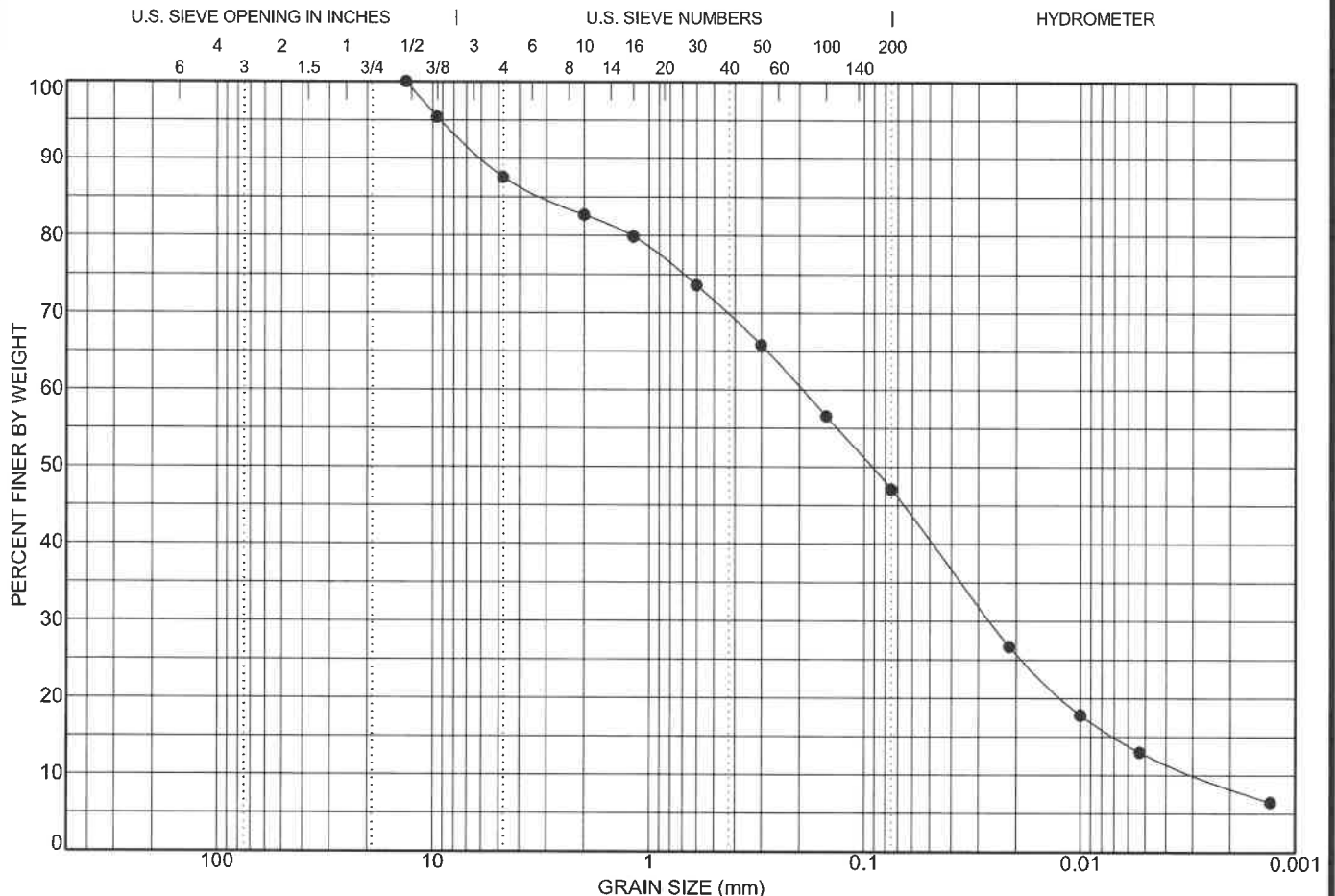
Sieve Size (mm)	Percent Passing	No Specifications



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 Telephone: 519-742-8979
 Fax: 519-742-7739
 e-mail: info@cvdengineering.com

GRAIN SIZE DISTRIBUTION

Project: Elmira Industrial Subdivision
Location: 1665 Scotch Line Road, Elmira, Ontario
File No.: 1650
Enclosure No.: 24



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

LL	PL	PI	Cc	Cu	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
			1.29	69.95	13.2	0.194	0.026	0.003	12.4	40.5		47.1

Date: May. 10 - 2024
Client: 1000525725 Ontario Inc.
Contractor:
Source:
Sampled From: BH 2 - SA 5; 3.05 to 3.50 m depth
Sample No.: 2-5
Date Sampled: Apr. 01 - 2024
Sampled By: RS
Lab No.: 443
Date Tested: May. 10 - 2024
Type of Material: Sand and Silt Till, some gravel, trace clay

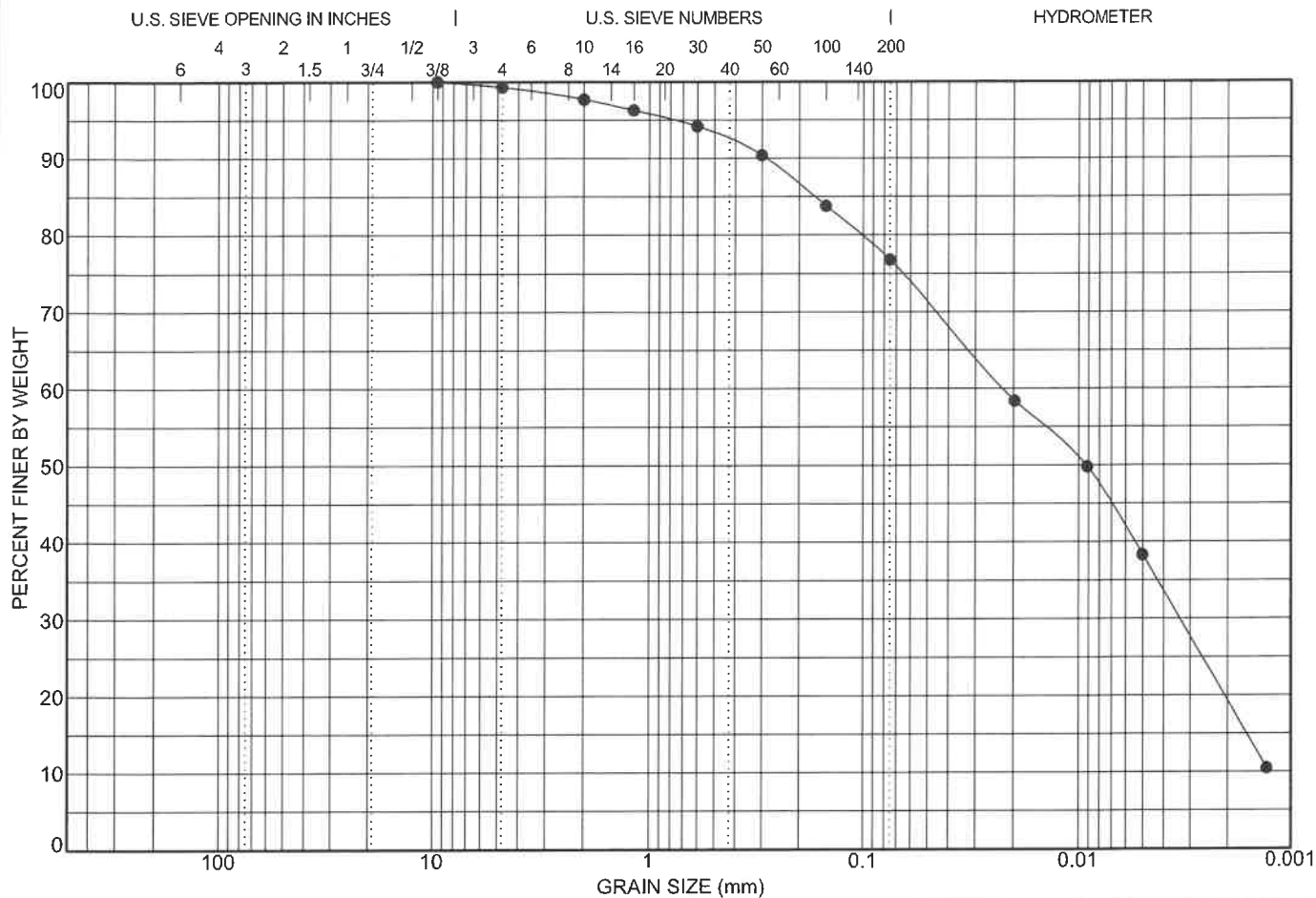
Sieve Size (mm)
Percent Passing
No Specifications



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GRAIN SIZE DISTRIBUTION

Project: Elmira Industrial Subdivision
Location: 1665 Scotch Line Road, Elmira, Ontario
File No.: 1650
Enclosure No.: 25



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

LL	PL	PI	Cc	Cu	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
					9.5	0.022	0.003		0.7	22.5	76.8	

Date: May. 10 - 2024 Client: 1000525725 Ontario Inc. Contractor: Source: Sampled From: BH 3 - SA 4; 2.30 to 2.90 m depth Sample No.: 3-4 Date Sampled: Mar. 26 - 2024 Sampled By: RS Lab No.: 444 Date Tested: May. 10 - 2024 Type of Material: Clayey Sandy Silt Till								Sieve Size (mm)	Percent Passing	No Specifications

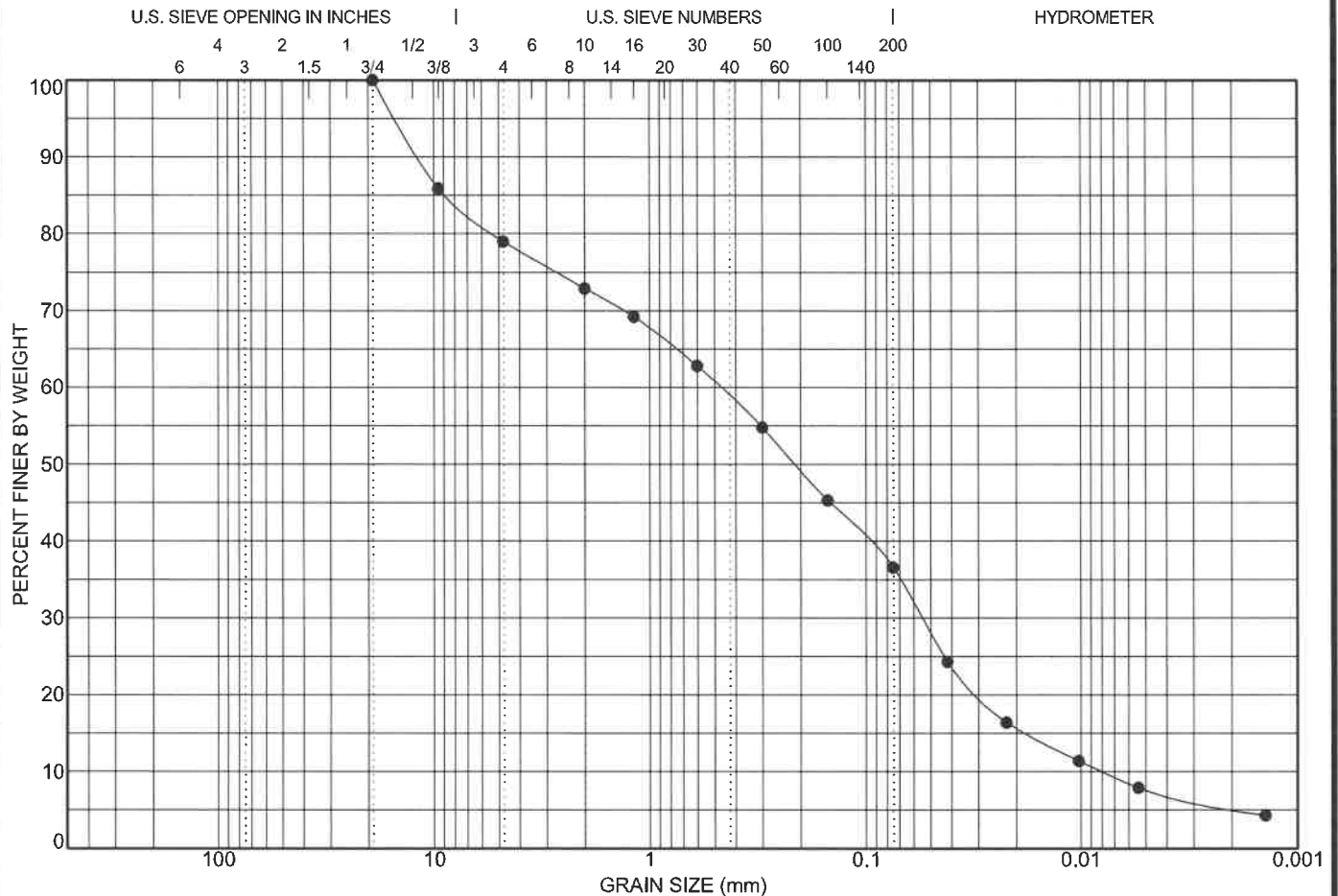


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GRAIN SIZE DISTRIBUTION

Project: Elmira Industrial Subdivision
Location: 1665 Scotch Line Road, Elmira, Ontario
File No.: 1650
Enclosure No.: 26

DM - NO SPECIFICATIONS 1650 - 1665 SCOTCH LINE ROAD, ELMIRA, ONT. L7N 1G1 24-11-5



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

LL	PL	PI	Cc	Cu	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
			0.81	59.52	19	0.471	0.055	0.008	21.0	42.4	36.6	

Date: May. 10 - 2024
Client: 1000525725 Ontario Inc.
Contractor:
Source:
Sampled From: BH 4 - SA 5; 3.05 to 3.65 m depth
Sample No.: 4-5
Date Sampled: Mar. 28 - 2024
Sampled By: RS
Lab No.: 445
Date Tested: May. 10 - 2024
Type of Material: Gravelly Silty Sand Till, trace clay

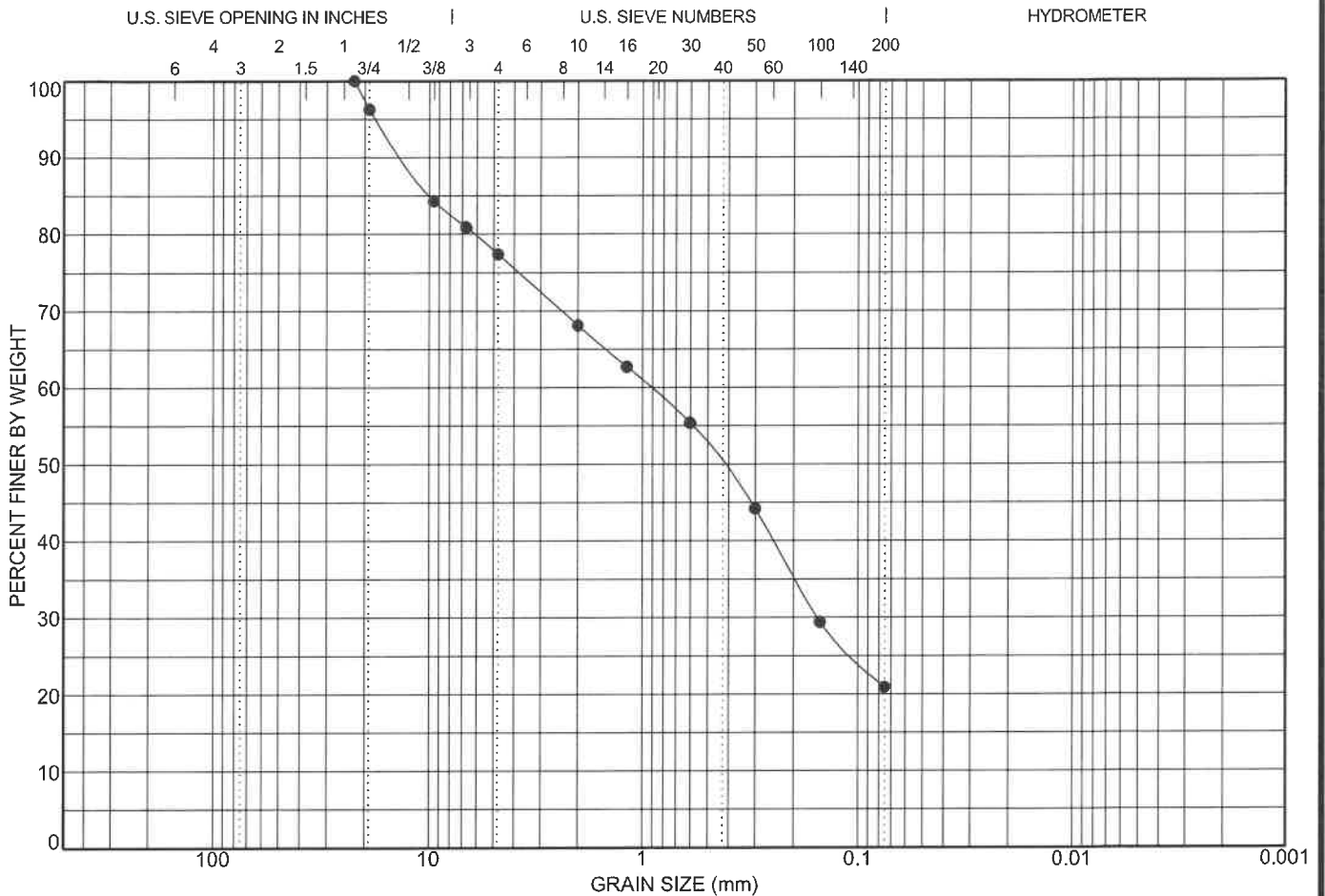
Sieve Size (mm)	Percent Passing	No Specifications



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GRAIN SIZE DISTRIBUTION

Project: Elmira Industrial Subdivision
Location: 1665 Scotch Line Road, Elmira, Ontario
File No.: 1650
Enclosure No.: 27



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

LL	PL	PI	Cc	Cu	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
					22.4	0.919	0.154		22.6	56.5	20.9	

Date: May. 10 - 2024
Client: 1000525725 Ontario Inc.
Contractor:
Source:
Sampled From: BH 4 - SA 10; 9.30 to 9.40 m depth
Sample No.: 4-10
Date Sampled: Mar. 28 - 2024
Sampled By: RS
Lab No.: 446
Date Tested: May. 10 - 2024
Type of Material: Gravelly Silty Sand

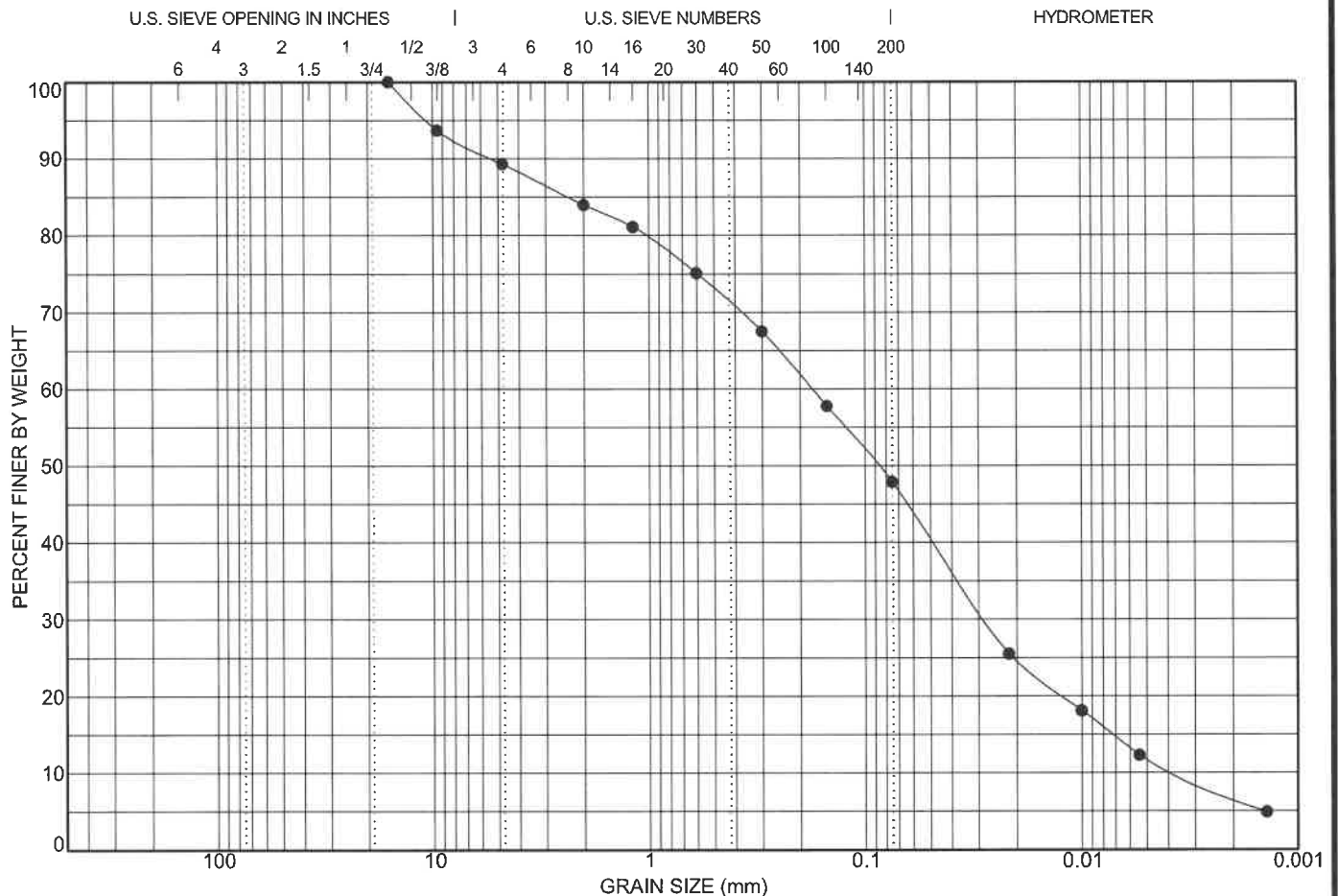
Sieve Size (mm)	Percent Passing	No Specifications



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GRAIN SIZE DISTRIBUTION

Project: Elmira Industrial Subdivision
Location: 1665 Scotch Line Road, Elmira, Ontario
File No.: 1650
Enclosure No.: 28



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

LL	PL	PI	Cc	Cu	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
			1.24	49.45	16	0.176	0.028	0.004	10.7	41.4	47.9	

Date: May. 10 - 2024
Client: 1000525725 Ontario Inc.
Contractor:
Source:
Sampled From: BH 5 - SA 7; 4.60 to 5.10 m depth
Sample No.: 5-7
Date Sampled: Mar. 28 - 2024
Sampled By: RS
Lab No.: 447
Date Tested: May. 10 - 2024
Type of Material: Sand and Silt Till, some gravel, trace clay

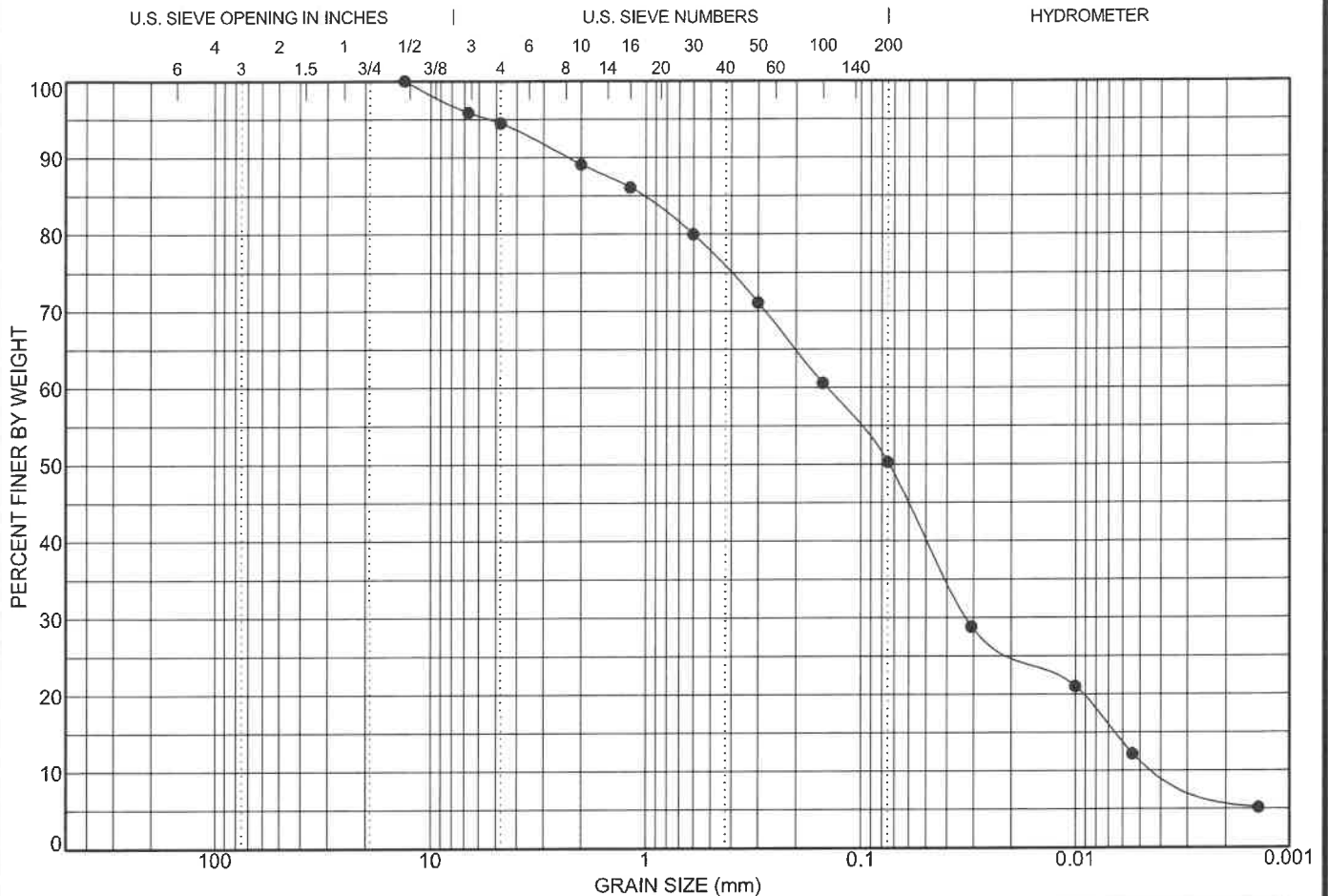
Sieve Size (mm)	Percent Passing	No Specifications

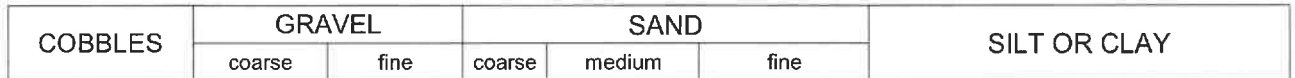


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GRAIN SIZE DISTRIBUTION

Project: Elmira Industrial Subdivision
Location: 1665 Scotch Line Road, Elmira, Ontario
File No.: 1650
Enclosure No.: 29





Date: May. 10 - 2024 Client: 1000525725 Ontario Inc. Contractor: Source: Sampled From: BH 7 - SA 4; 2.30 to 2.90 m depth Sample No.: 7-4 Date Sampled: Mar. 26 - 2024 Sampled By: RS Lab No.: 449 Date Tested: May. 10 - 2024 Type of Material: Silt, some sand, trace clay	Sieve Size (mm)	Percent Passing	No Specifications



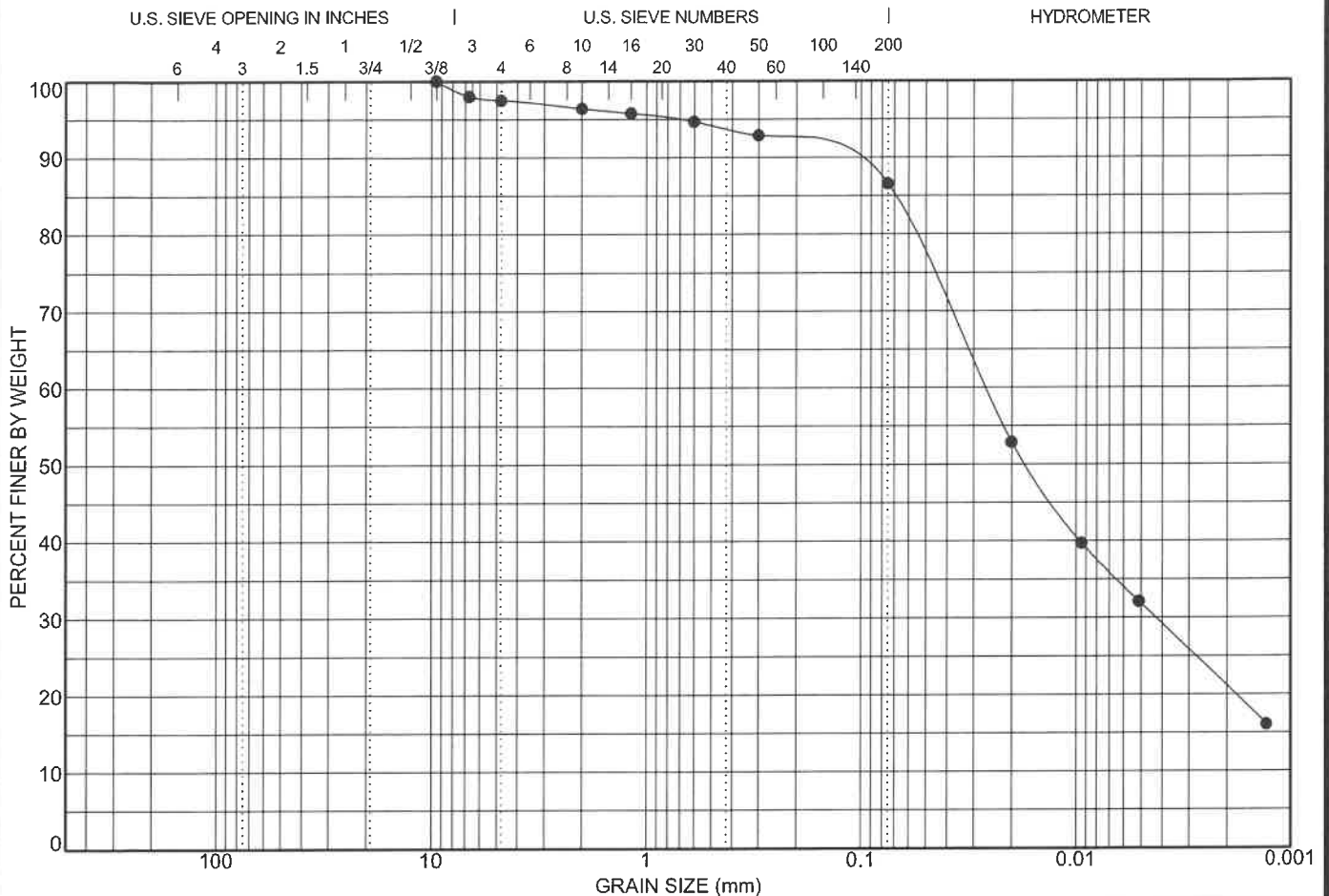
GRAIN SIZE DISTRIBUTION

Project: Elmira Industrial Subdivision

Location: 1665 Scotch Line Road, Elmira, Ontario

File No.: 1650

Enclosure No.: 31



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

LL	PL	PI	Cc	Cu	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
					9.5	0.026	0.004		2.5	10.9	86.6	

Date: May. 10 - 2024
Client: 1000525725 Ontario Inc.
Contractor:
Source:
Sampled From: BH 8 - SA 5; 3.05 to 3.65 m depth
Sample No.: 8-5
Date Sampled: Mar. 27 - 2024
Sampled By: RS
Lab No.: 450
Date Tested: May. 10 - 2024
Type of Material: Clayey Silt Till, some sand, trace gravel

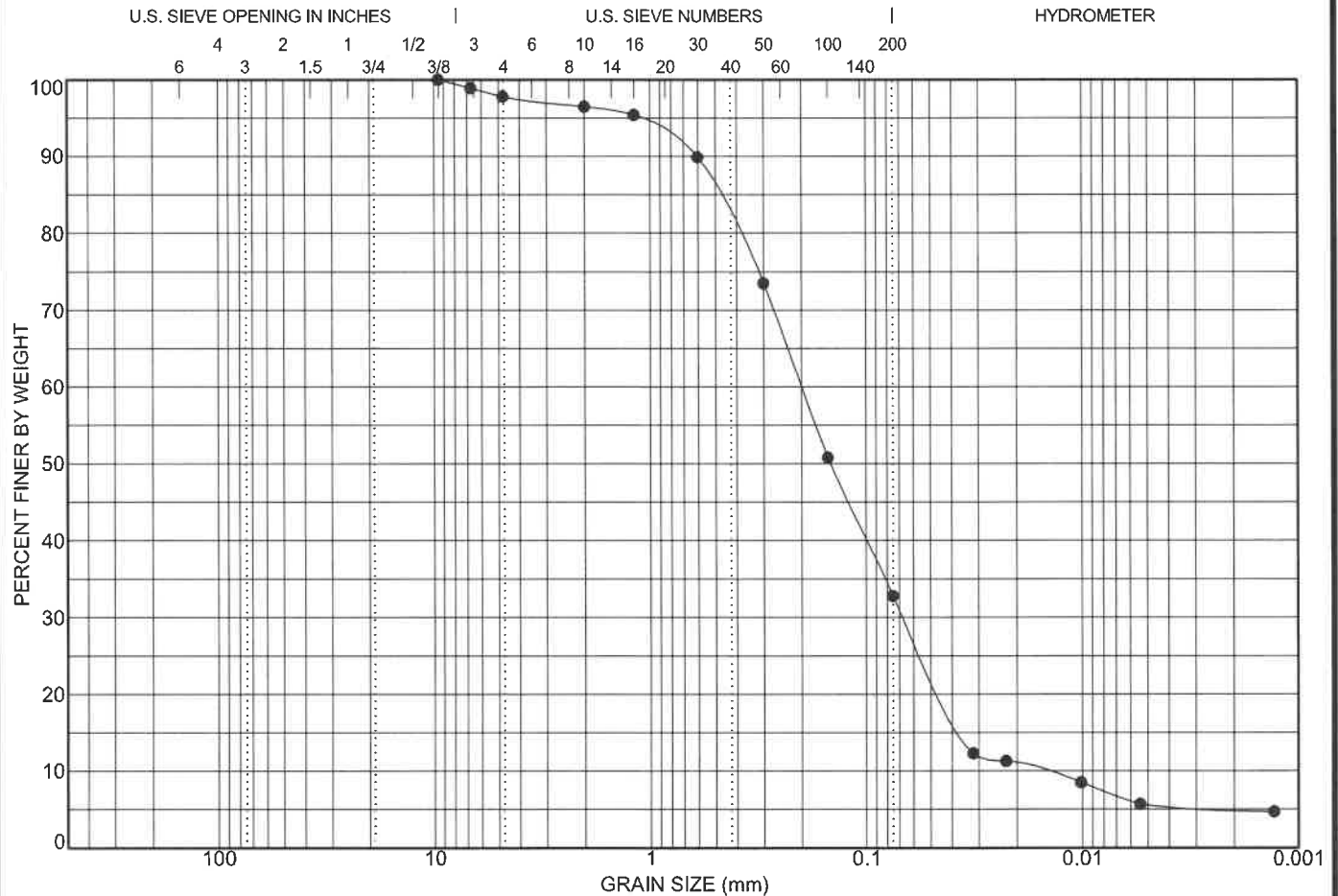
Sieve Size (mm)	Percent Passing	No Specifications



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GRAIN SIZE DISTRIBUTION

Project: Elmira Industrial Subdivision
Location: 1665 Scotch Line Road, Elmira, Ontario
File No.: 1650
Enclosure No.: 32



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

LL	PL	PI	Cc	Cu	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
			1.45	12.84	9.5	0.199	0.067	0.015	2.2	65.0	32.8	

Date: May. 10 - 2024
Client: 1000525725 Ontario Inc.
Contractor:
Source:
Sampled From: BH 8 - SA 14; 14.10 to 14.30 m depth
Sample No.: 8-14
Date Sampled: Mar. 27 - 2024
Sampled By: RS
Lab No.: 451
Date Tested: May. 10 - 2024
Type of Material: Silty Sand, trace gravel, trace clay

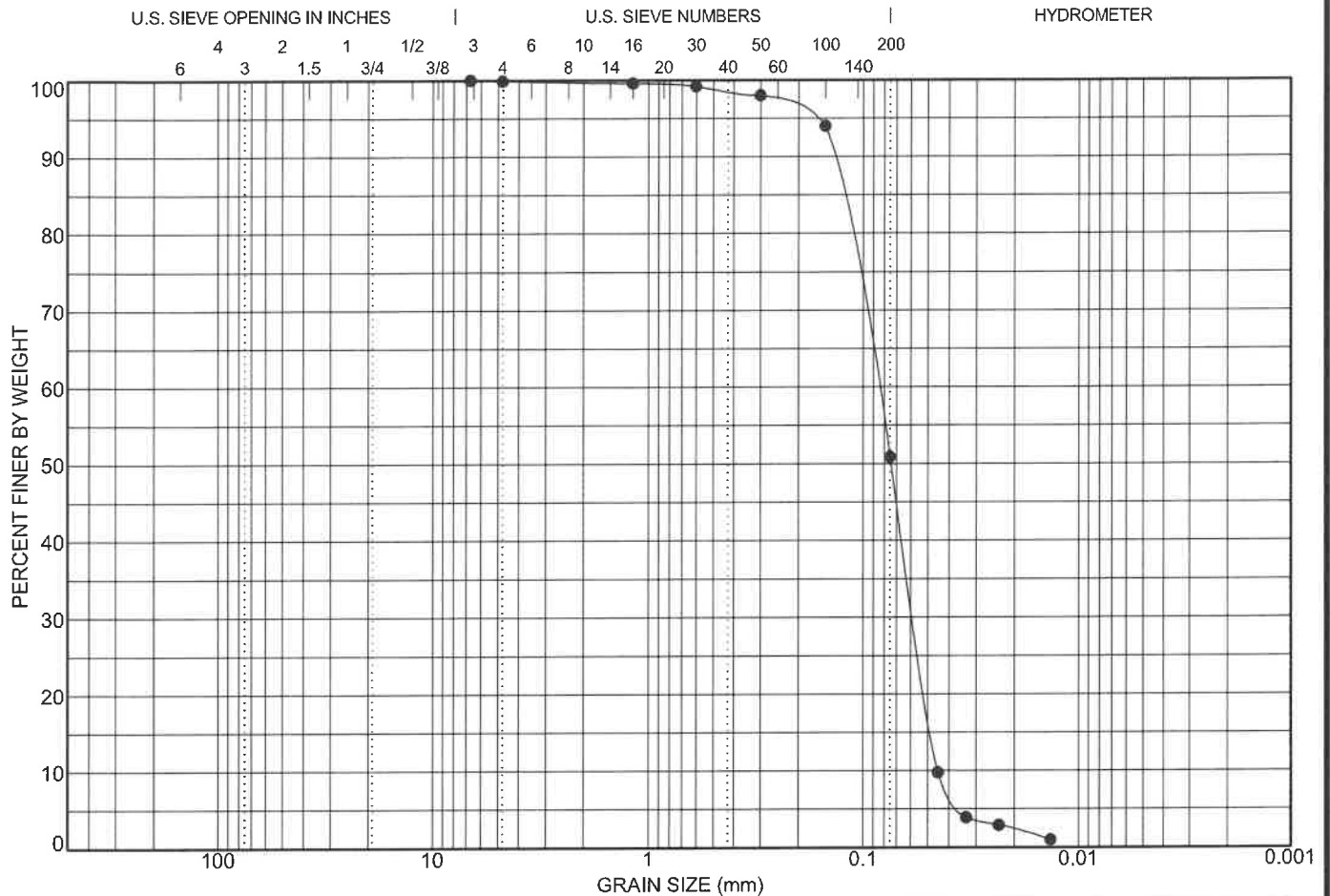
Sieve Size (mm)	Percent Passing	No Specifications



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GRAIN SIZE DISTRIBUTION

Project: Elmira Industrial Subdivision
Location: 1665 Scotch Line Road, Elmira, Ontario
File No.: 1650
Enclosure No.: 33



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

LL	PL	PI	Cc	Cu	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
			0.85	1.94	6.7	0.087	0.058	0.045	0.1	49.0	50.9	

Date: May. 10 - 2024
Client: 1000525725 Ontario Inc.
Contractor:
Source:
Sampled From: BH 8 - SA 15; 15.25 to 15.70 m depth
Sample No.: 8-15
Date Sampled: Mar. 27 - 2024
Sampled By: RS
Lab No.: 452
Date Tested: May. 10 - 2024
Type of Material: Silt and Sand

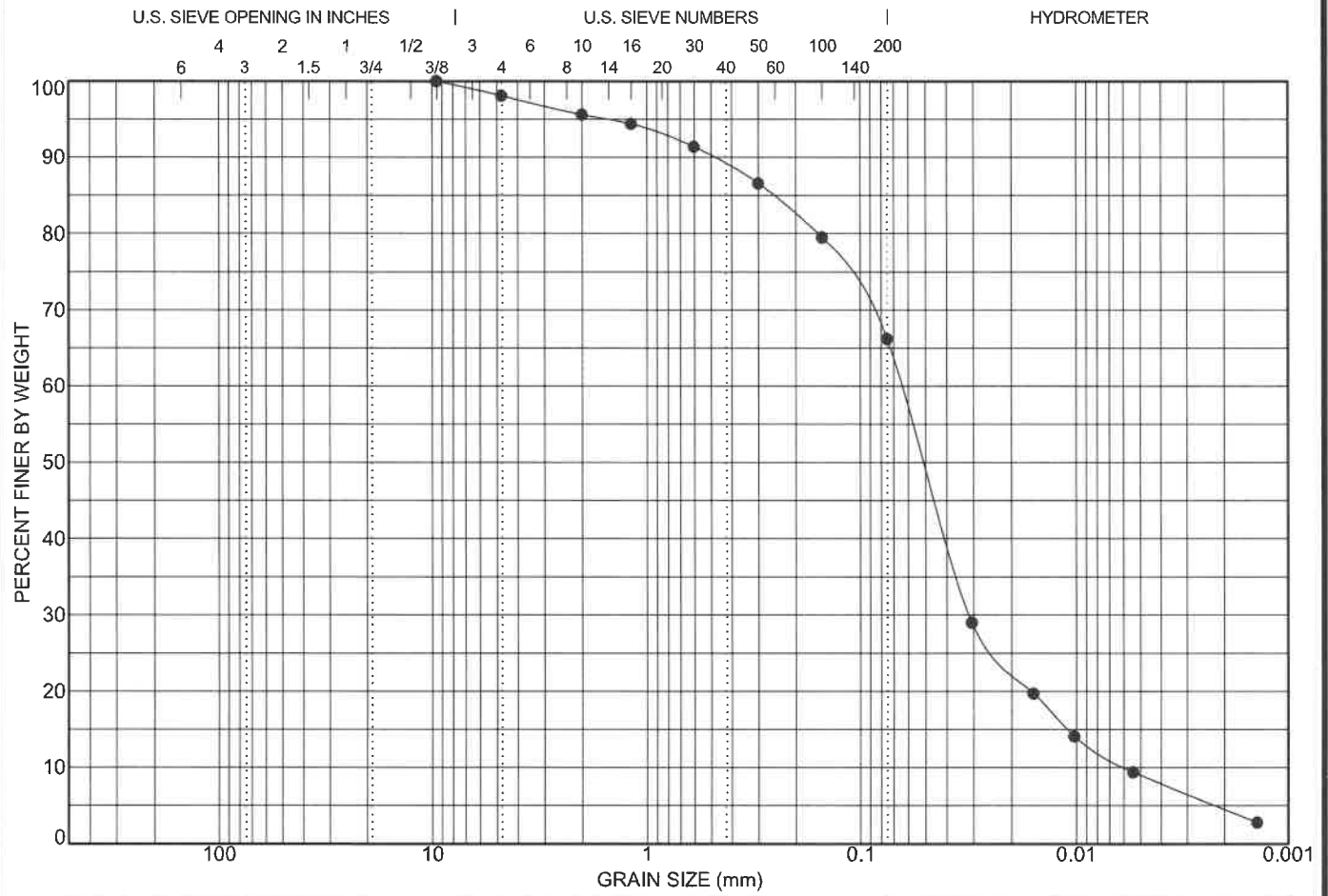
Sieve Size (mm)	Percent Passing	No Specifications



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GRAIN SIZE DISTRIBUTION

Project: Elmira Industrial Subdivision
Location: 1665 Scotch Line Road, Elmira, Ontario
File No.: 1650
Enclosure No.: 34



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

LL	PL	PI	Cc	Cu	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
			2.58	11.02	9.5	0.065	0.031	0.006	1.9	31.9		66.2

Date: May. 10 - 2024
Client: 1000525725 Ontario Inc.
Contractor:
Source:
Sampled From: BH 9 - SA 6; 4.55 to 4.80 m depth
Sample No.: 9-6
Date Sampled: Mar. 26 - 2024
Sampled By: RS
Lab No.: 453
Date Tested: May. 10 - 2024
Type of Material: Sandy Silt, trace gravel, trace clay

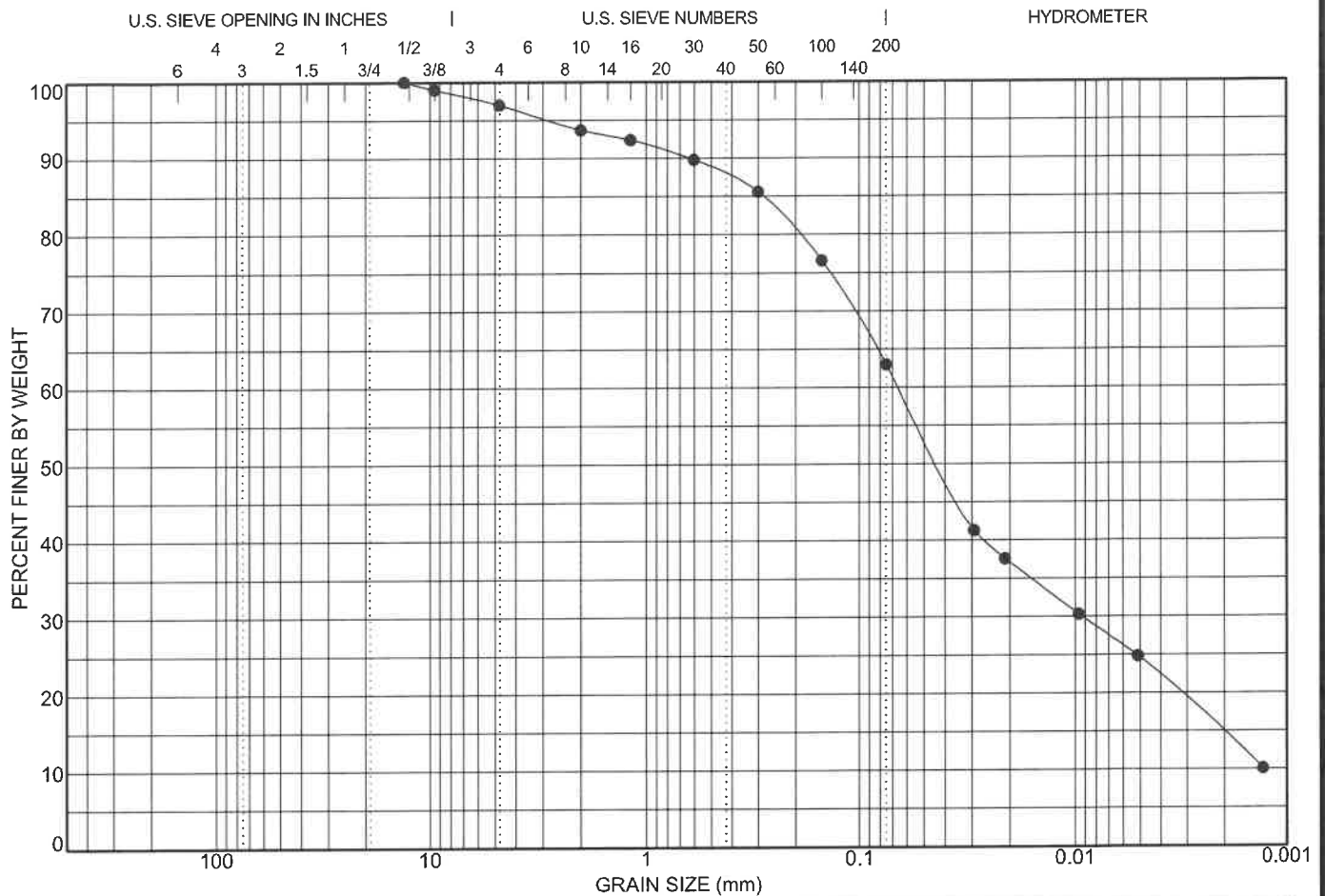
Sieve Size (mm)	Percent Passing	No Specifications



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GRAIN SIZE DISTRIBUTION

Project: Elmira Industrial Subdivision
Location: 1665 Scotch Line Road, Elmira, Ontario
File No.: 1650
Enclosure No.: 35



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

LL	PL	PI	Cc	Cu	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
					13.2	0.066	0.009		3.0	34.0	63.0	

Date: May. 10 - 2024
Client: 1000525725 Ontario Inc.
Contractor:
Source:
Sampled From: BH 10 - SA 4; 2.30 to 2.90 m depth
Sample No.: 10-4
Date Sampled: Apr. 01 - 2024
Sampled By: RS
Lab No.: 454
Date Tested: May. 10 - 2024
Type of Material: Clayey Sandy Silt Till, trace gravel

Sieve Size (mm)	Percent Passing	No Specifications



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GRAIN SIZE DISTRIBUTION

Project: Elmira Industrial Subdivision
Location: 1665 Scotch Line Road, Elmira, Ontario
File No.: 1650
Enclosure No.: 36



Date:	May. 10 - 2024	Sieve Size (mm)	Percent Passing	No Specifications
Client:	1000525725 Ontario Inc.			
Contractor:				
Source:				
Sampled From:	BH 12 - SA 3; 1.50 to 2.10 m depth			
Sample No.:	12-3			
Date Sampled:	Apr. 01 - 2024			
Sampled By:	RS			
Lab No.:	455			
Date Tested:	May. 10 - 2024			
Type of Material:	Clayey Silt Till, some sand, trace gravel			



GRAIN SIZE DISTRIBUTION

Project: Elmira Industrial Subdivision

Location: 1665 Scotch Line Road, Elmira, Ontario

File No.: 1650

Enclosure No.: 37