Bronte Creek Meadows Development

Preliminary Geotechnical Investigation

Project Location:
Upper Middle Road & Burloak Drive
Burlington, ON

Prepared for:
Alinea Land Corporation
4480 Paletta Court
Burlington, ON L7L 5R2

Prepared by:
MTE Consultants
123 St. George Street
London, ON N6H 3S2

February 9, 2024
Revised: February 9, 2026

MTE File No.: 52982-700

Engineers, Scientists, Surveyors.

Contents

1.0 Introduction 1
2.0 Previous and Concurrent Studies 1
3.0 Field and Laboratory Program 1
4.0 Soil Conditions 2
4.1 Topsoil and Fill Material 2
4.2 Sand, Silt, Clay Deposits 3
4.3 Glacial Till Deposits 3
4.4 Bedrock 4
5.0 Groundwater Conditions 4
6.0 Discussion and Recommendations 5
6.1 General 5
6.2 Site Preparation 6
6.3 Site Servicing 7
6.3.1 Excavations and Dewatering 7
6.3.2 Pipe Bedding 7
6.3.3 Trench Backfilling 8
6.3.4 Temporary Support Systems 8
6.3.5 Shoring Design Parameters 9
6.4 Foundation Design & Preliminary Bearing Resistance 9
6.4.1 Conventional Shallow Foundations 10
6.4.2 Deep Foundations 11
6.4.3 Raft Foundation 12
6.4.4 Elevator Pits, Basements and Underground Parking Garage Recommendations 12
6.5 Slope Stability Assessment 13
6.6 Concrete Slab-on-Grade Floors 15
6.7 Pavements 16
6.8 Curbs, Gutter and Sidewalks 17
6.9 Stormwater Management Ponds 17
6.10 Construction inspection and Testing 17
7.0 Limitations of Report 19

Tables

Table 1 - Results of Glacial Till Deposits Particle Size Distribution Analyses 3
Table 2 - Water Level Measurements Taken on September 11, 2023. 5
Table 3 - Engineered Fill Requirements 6
Table 4 - Shoring Design Parameters 9
Table 5 – Soil Parameter used in Slope Analysis 14
Table 6 - Pavement Design 16

Appendices

Appendix A Figures
Appendix B Borehole Logs
Appendix C Laboratory Test Results
Appendix D Additional Borehole Data
Appendix E MNR Rating Chart

1.0 Introduction

MTE Consultants Inc. (MTE) was retained by Alinea Land Corporation to conduct a geotechnical investigation for a proposed development located in Burlington, Ontario. The Site is an irregular shaped vacant land of approximately 132.4 hectares (327 acres) in area located southwest of the intersection of Upper Middle Road and Burloak Drive as shown on **Figure 1 in Appendix A**. The site currently comprises of woodlot and agricultural fields. Sheldon Creek, which is within the Conservation Halton (CH) Regulation Limit, passes through the southwest portion of the site in a generally northwest to southeast direction. Two smaller watercourses, also within the CH Regulation Limit, flow through the central portion of the Site in a northwest to southeast direction. A few unregulated, poorly defined watercourses are also present on the site. A hydro corridor passes through the site along the northwest limits, just south of Upper Middle Road. As previously mentioned, a treed area, know as Sheldon Creek Woodlot, occupies approximately 10 hectares of the Site, just east of Sheldon Creek.

The plans for the proposed development are provided on NAK Design Strategies drawing “Bronte Creek Meadows Concept Plan – CP.08, dated September 28, 2023”. Based on the concept plan, it is understood that the proposed development will be provided with municipal roadways and a variety of land uses including low-rise, mid-rise and high-rise residential, commercial, industrial, institutional/facilities, as well as open space. It is also understood that it is proposed to relocate and combine the two eastern regulated watercourses into one watercourse. Three road crossings of the proposed watercourse are proposed as well. The intended use of the open spaces include parks, stormwater management facilities, and landscape corridors. It is understood that no work is to be conducted on Sheldon Creek corridor and Sheldon Creek Woodlot.

The ground surface elevation at the site slope from northeast to southwest across the site from about Elevations 141.9 to 129.5 m at the borehole locations.

The purpose of this geotechnical investigation is to determine the soil and groundwater conditions in the area of the proposed development and provide geotechnical engineering recommendations for site grading, site servicing, foundations, basements, underground parking, elevator pits, basements, floor slabs, shoring design parameters, and pavement design.

2.0 Previous and Concurrent Studies

MTE is concurrently completing a hydrogeological study at the site. The results of the hydrogeological study will be provided in a separately issued report. Any relevant data from that report will be incorporated into this geotechnical report.

3.0 Field and Laboratory Program

The fieldwork for this investigation was carried out between August 30 and September 8, 2023 and involved the drilling of seventy (70) boreholes (Boreholes MW101-23 to BH170-23) to depths ranging from 2.3 to 7.5 mbgs. The locations of the boreholes are shown on the Site Plan, **Figure 1 in Appendix A**.

Private and public utility companies were contacted prior to the start of drilling activities in order to isolate underground utilities near the boring locations.

The boreholes were advanced with a CME55 track mounted drill rig equipped with continuous flight solid stem augers, supplied and operated by Geo-Environmental Drilling Inc.

Representative soil samples were recovered throughout the depths explored. Standard Penetration Tests (SPT) were carried out during sampling operations in the boreholes using conventional split spoon equipment. The SPT N-values recorded are plotted on the borehole logs in **Appendix B**.

Upon completion of drilling, ten (10) monitoring wells were installed to allow measurement of the stabilized groundwater levels and groundwater sampling and testing. The installations comprise of 1.5 m filtered screens and bentonite seals above the screens. Details of the installation and groundwater observations and measurements are provided on the appended borehole logs.

The monitoring wells were installed in accordance with Ontario Regulation 468/10. The construction, maintenance and abandonment of the wells are regulated under the province's Water Resources Act. The monitoring well network located on the site must be maintained or decommissioned in accordance with regulatory requirements.

The remaining boreholes were backfilled with soil cuttings and bentonite in accordance with Ontario Regulation 468/10 (formerly O. Reg. 903) under the provinces Water Resources Act.

The fieldwork was monitored throughout by a member of our geotechnical engineering staff, who directed the drilling procedures; conducted SPT tests; documented the soil and bedrock stratigraphies; monitored the groundwater conditions; and transported the recovered soil samples back to our office for further classification.

The ground surface elevations at the borehole locations were surveyed by MTE.

All of the soil samples collected were submitted for moisture content testing and five (5) soil samples were submitted for particle size distribution analyses. The results of the laboratory tests are provided in **Appendix C**. The remaining soil samples will be stored for a period of 3 months and will be discarded of at that time without prior request from the client to extend storage time.

4.0 Soil Conditions

Reference is provided to the appended borehole logs for soil stratigraphy details, SPT N-values, moisture content profiles, and groundwater observations and measurements. Soil conditions encountered at the site typically include topsoil and/or fill materials overlying predominantly native glacial till soils and shale bedrock.

4.1 Topsoil and Fill Material

Topsoil was encountered surficially in each of the boreholes drilled and ranged in thickness from 150 to 360 mm thick (average thickness = 170 mm). The topsoil ranged in colour from light brown, dark brown, grey to red. The topsoil comprised of silty sand to sandy silt with some gravel and trace organics and rootles. It should be noted that the topsoil was deemed moist to very moist at the time of fieldwork.

Fill materials were encountered directly beneath the surficial topsoil in twenty-two (22) of the boreholes. The fill materials ranged in thickness from 0.3 to 0.9 m (average thickness = 0.7 m) and extended to depths of 0.6 to 1.1 mbgs. The fill ranged in colour from dark brown, brown, red and gray. The fill ranged in composition from silt with some clay, sand, organics and shale fragments to clayey silt, with trace sand and organics. It should be noted that trace organics were encountered in the majority of the fill encountered, and trace shale fragments were encountered frequently throughout the fill deposits. The fill materials would be the results of tilling of the agricultural fields and classified as reworked native soils.

SPT N-values measured in the fill soils ranged from 3 to 23 blows per 300 mm penetration of the split spoon sampler indicating very loose to compact conditions. Insitu moisture contents in the fill ranged from about 8 to 21% indicating moist to saturated conditions.

4.2 Sand, Silt, Clay Deposits

Native deposits of sand, silt and clay were encountered in four (4) of the boreholes drilled. The deposits were encountered directly beneath the topsoil, excluding Borehole BH114-23 where the deposit was located beneath a native glacial till deposit.

The sand, silt and clay deposits extended to depths of 0.8 to 2.3 mbgs (Elevations 141.7 to 139.7 masl). The non-cohesive deposits ranged in composition from silt with some clay, sand, and shale fragments to silty sand with trace organics. The cohesive deposits ranged in composition from clay and silt with some sand to clay and silt with trace sand and rootles.

The SPT N-Values measured within the non-cohesive deposits ranged from 3 to above 50 blows per 300 mm penetration of the split spoon sampler indicating very loose to very dense conditions. The SPT N-Values measured within the cohesive deposits ranged from about 6 to 8 blows per 300 mm penetration of the split spoon sampler indicating firm consistencies. Insitu moisture contents measured within the non-cohesive deposits ranged from about 13 to 21% indicating very moist to saturated conditions. It should be noted that the cohesive deposits were described as at the plastic limit at the time of the field investigation.

4.3 Glacial Till Deposits

Native glacial till deposits were encountered in each of the boreholes drilled either directly underlying the topsoil, fill, or native sand, silt and clay deposits. The native glacial till was encountered at depths of 0.8 to 2.3 mbgs (Elevations 141.3 to 129.2 masl) and extended to depths ranging from 0.8 to 4.6 mbgs (Elevations 140.4 to 127.8 masl). It should be noted that the native glacial till deposits were directly intercepted by bedrock deposits underlying the glacial till in each of the boreholes drilled.

The native glacial till ranged in colour from light brown, brown, dark brown, red and grey, and ranged in composition from non-cohesive deposits comprised of gravelly silty sand to cohesive deposits comprised of clay and silt. It should be noted that trace organics were typically encountered within the upper layers of native glacial till. Shale and limestone fragments as well as layers were also encountered within the native glacial till deposits throughout the depths explored. Cobbles and/or boulders should be anticipated in the glacial till soils as well.

The results of five particle size distribution analyses conducted on the till are provided in **Appendix C** and summarized in the following table;

Table 1 - Results of Glacial Till Deposits Particle Size Distribution Analyses

Borehole Number	Sample Depth (m)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)
MW101-23	2.3 – 2.7	22	32	33	13
MW103-23	2.3 – 2.7	21	42	27	10
MW105-23	2.3 – 2.4	34	37	20	9
MW106-23	3.1 – 3.2	37	36	19	8
MW108-23	1.5 – 1.8	15	31	39	15

SPT N-Values measured within the non-cohesive deposits of the glacial till typically increase with depth and ranged from about 6 to above 50 blows per 300 mm penetration of the split spoon sampler indicating loose to very dense conditions. SPT N-Values measured within the cohesive deposits of the glacial till ranged from about 5 to above 50 blows per 300 mm penetration of the split spoons sampler indicating firm to hard consistencies. It should be noted that the SPT N-Values typically increase with depth within the till deposits.

Insitu moisture contents in the glacial till ranged from about 1 to 22% indicating damp to saturated conditions. It should be noted that the cohesive glacial till deposits were noted to be drier than the plastic limit to at the plastic limit at the time of the investigation.

4.4 Bedrock

Shale bedrock was encountered beneath the native glacial till deposits in each of the boreholes drilled. The shale deposits extended to termination depth of drilling in each of the boreholes. Based on mapping by the Ontario Geological Survey, the shale bedrock in the area of the subject site is of the Queenston formation.

The Queenston Formation consists of a mixed terrigenous-carbonate succession composed primarily of red silty shales, which are locally gypsiferous, alternating, in the middle and lower parts of the formation, with thin grey shales, calcareous siltstone, sandstone, and bioclastic limestone.

The shale bedrock was encountered at depths of 1.1 to 4.6 mbgs (Elevations 140.4 to 127.8 masl). Additional info on bedrock depths and elevations is provided in Table 202 in Appendix D.

The shale bedrock deposits ranged in colour from red, brown to grey. The shale bedrock typically comprised of weathered shale, however, it should be noted that two limestone bedrock deposits were encountered within Borehole MW107-23 at depths of 1.1 and 3.0 mbgs (Elevations 132.0 and 130.0 masl) respectively. Soil layers were encountered periodically throughout the depths explored of the shale bedrock. Limestone layers were also encountered throughout the depths explored and ranged in thickness.

It should be noted that saturated seams were encountered periodically throughout the shale bedrock.

5.0 Groundwater Conditions

Groundwater observations were carried out in the open boreholes at the time of drilling and are summarized on the borehole logs as well as **Table 201 in Appendix D.**

Ten (10) monitoring wells were installed to facilitate measurement of the groundwater elevation. Water level measurements taken on September 11, 2023 are summarized on the borehole logs as well as in the following table;

Table 2 - Water Level Measurements Taken on September 11, 2023.

Borehole Number	Borehole Elevation (masl)	Groundwater Depth (mbgs)	Groundwater Elevation (masl)
MW101-22	141.5	4.1	137.4
MW102-23	141.2	2.3	138.9
MW103-23	136.0	2.4	133.6
MW104-23	132.1	1.9	130.2
MW105-22	131.7	4.7	127.0
MW106-23	138.5	4.2	138.5
MW107-23	133.1	1.7	131.4
MW108-23	130.7	3.5	127.2
MW109-23	133.2	1.3	131.9
MW110-23	130.9	Dry	Dry

It should be noted that the groundwater levels can vary and are subject to seasonal fluctuations and local variations.

6.0 Discussion and Recommendations

6.1 General

It is understood that the project involved the design of a proposed development located in Burlington, Ontario located southwest of the intersection of Upper Middle Road and Burloak Drive as shown on **Figure 1 in Appendix A.** The Site is irregularly shaped vacant land of approximately 132.4 hectares (327 acres) in area. The Site currently comprises woodlot and agricultural fields. Sheldon Creek, which is within the Conservation Halton (CH) Regulation Limit, passes through the southwest portion of the site in a generally northwest to southeast direction. Two smaller watercourses also within the CH Regulation Limit flow through the central portion of the Site in a northwest to southeast direction. A few unregulated, poorly defined watercourses are also present on the site. A hydro corridor passes through the site along the northwest limits, just south of Upper Middle Roads. Sheldon Creek Woodlot, occupies approximately 10 hectares of the Site, just east of Sheldon Creek.

The plans for the proposed development are provided on NAK Design Strategies drawing “Bronte Creek Meadows Concept Plan – CP.08, dated September 28, 2023”. Based on the concept plan it is understood that the proposed development will be provided with municipal roadways and a variety of land uses including low-rise, mid-rise and high-rise residential, commercial, industrial, institutional/facilities, as well as open space. The intended use of the open spaces include parks, stormwater management facilities, and landscape corridors. It is understood that no work is to be conducted on Sheldon Creek corridor and Sheldon Creek Woodlot.

The ground surface elevation at the site slopes from northeast to southwest across the site from about Elevations 141.9 to 129.5 m at the borehole locations. The subsurface stratigraphy at the site generally comprises topsoil and/or fill materials overlying native glacial till soils and shale bedrock. Groundwater was measured within the open boreholes during drilling at depths of 1.5 to 6.1 mbgs (Elevations 140.4 to 125.2 masl). Groundwater was measured in the installed

monitoring wells on September 11, 2023 at depths of 1.3 to 4.7 mbgs (Elevations 138.9 to 127.0 masl).

Based on the results of this geotechnical investigation, the proposed development will be feasible; however, the groundwater conditions in the shale bedrock could influence construction. The following subsections of this report contain geotechnical recommendations pertaining to development of the property; including, site grading, site servicing, foundations, basements, underground parking, elevator pits, basements, floor slabs, shoring design parameters, and pavement design.

6.2 Site Preparation

The first construction activity that will be required for the proposed development will be grading. Prior to carrying out any cutting and engineering fill operations, the surficial topsoil must be removed and stockpiled. The fill materials should be removed from any building footprint areas. The average topsoil thickness was 170 mm and the average thickness of fill was 0.7 m at select locations. It is recommended that the average thickness across the site be increased by 0.2 m for removal/stripping calculations to account for variations at the site. The removed topsoil and fill materials could be used in landscaping areas.

The majority of the native soils as well as re-worked native soils above the groundwater table are suitable for reuse as engineered fill, if required. Organics encountered within the re-worked native materials should be separated prior to placement as engineered fill. All fill should be placed in maximum 300 mm thick lifts and compacted to the following percentages;

Table 3 - Engineered Fill Requirements

Fill Use	Minimum Compaction Required
Structural fill to support buildings	100% SPMDD
Subgrade fill beneath pavements or services	95%SPMDD
Bulk fill in landscape area	90%SPMDD

The subgrade soils are susceptible to disturbance, and it is recommended that construction traffic on the subgrade be minimized.

Structural fill used for raising grades beneath the buildings should comprise granular material such as OPSS Granular ‘A’ or ‘B’. The native soils encountered on site are suitable to be utilized as structural fill, provided that the soils are near optimum moisture content for compaction purposes. Subgrade fill material beneath the proposed pavement areas and services should meet the requirements of OPSS Select Subgrade Material. Any imported fill should be tested and verified by a geotechnical engineer prior to placement.

Structural fill pads should extend a minimum 0.3 m beyond the edge of the footing envelope of any building and down to subgrade at an angle of 45 degrees to the horizontal. Full time testing by geotechnical personnel is recommended during fill placement and compaction to monitor material quality, lift thickness, and verify the compaction by insitu density testing.

In order to minimize the effects of weather and groundwater, fill operations onsite should be carried out in the dry summer months.

6.3 Site Servicing

6.3.1 Excavations and Dewatering

It is anticipated that the entire development will be serviced with full municipal services and that the invert levels for the watermain and sewers will be at conventional depths. It is anticipated that within certain areas the excavations will be required to extend in the shale bedrock for servicing and foundation construction. These excavations will generally be feasible using a large excavator equipped with a single tooth ripper. Limestone deposits and layers were encountered throughout the site, if required to excavate through the harder limestone layers and deposits, jackhammer equipment may be required to break through.

Temporary excavations to conventional depths for installation of underground pipes at this site must comply with the Ontario Occupational Health and Safety Act and Regulations for Construction Projects. The fill materials encountered in the boreholes would be classified as Type 3 soils (O. Reg. 213/91, s. 226 (4)). Temporary side slopes must be cut at an inclination of 1.0 horizontal to 1.0 vertical or less from the base of the excavation for open cut pipe installation. The glacial till deposits and shale bedrock would be classified as Type 2 soils and temporary side slopes must be cut at an inclination of 1 horizontal to 1 vertical or less at a level 1.2 m above the base of the excavation, exclusive of groundwater effects.

Trench side slopes must be continuously inspected especially after periods of heavy rainfall or snow melt to identify areas of instability. Surface water should be directed away from entering the trench.

Due to the anticipated extent of excavations and spatial limitations at the site, it is expected that cut slopes at the inclinations noted above may not be achievable at all times. A steeper cut slope can be employed if shoring is used to protect workers. Some movement or slumping of the soils adjacent to the shoring should be expected. Further shoring requirements are discussed later in the report.

Provisions should be made in the excavation contract for excavation through the shale bedrock if depths of the underground pipes are below the shale. It should be noted that saturated seams were encountered across the site within the shale bedrock.

Minor groundwater seepage should be excepted where the excavations extend into the saturated seams within either the overburden deposits. Minor to moderate groundwater seepage should be expected as excavations proceed through the shale bedrock. Water level measurements during drilling can be found in Table 201 in Appendix D. It is our geotechnical opinion that sump pumps should be adequate to handle the nuisance dewatering from seepage zones in the glacial till and shale bedrock. However, further requirements for dewatering will be provided in the separate concurrent hydrogeological report. It will be necessary to flatten the excavation side slopes where groundwater seepage is occurring to ensure stability. Every excavation that a worker may be required to enter shall be kept reasonably free of water (O. Reg. 213/91, s. 230).

It should be noted that an Environmental Activity and Sector Registry (EASR) or Permit to Take Water (PTTW), issued by the Ministry of Environment, Conservation and Parks, will be required if the dewatering system/sumps result in a water taking of more than 50,000 L/day to 400,000 L/day, respectively.

6.3.2 Pipe Bedding

It is anticipated that invert elevation of the pipes will be at conventional 2 to 3 m depths below ground surface. No bearing problems are anticipated for pipes set on properly dewatered native

inorganic subsoil or imported structural fill. The bedding material may need to be thickened if sub-excavation encounters soft or spongy soil from the base of the service trench.

If the pipe bedding is placed directly on highly weathered shale with extensive fractures and cracks, it is recommended that a geotextile cover the shale surface to prevent loss of the bedding material in the cracks. The rock surface should be prepared to avoid any projections which could lead to damage of the pipes.

Pipe bedding for water and sewer services should be conventional Class 'B' pipe bedding comprising a minimum 150 mm thick layer of OPSS Granular 'A' aggregate below the pipe invert. Granular 'A' type aggregate should be provided around the pipe to at least 300 mm above the pipe and the bedding aggregate should be compacted to a minimum 95% Standard Proctor Maximum Dry Density (SPMDD).

A well-graded clear stone such as Coarse Aggregate for HL4 Asphaltic Concrete (OPSS 1003) could be used in the sewer trenches as bedding below the spring line of the pipe to facilitate sump pump dewatering, if necessary. The clear stone should be compacted with a plate tamper and fully wrapped with a non-woven filter cloth.

6.3.3 Trench Backfilling

The trenches above the specified pipe bedding should be backfilled with inorganic onsite soils placed in 300 mm thick lifts and compacted to at least 95% SPMDD. Wet or saturated native soils are not considered suitable for reuse as trench backfill. Any additional material required at the site should comprise imported granular soils such as OPSS Select Subgrade Material.

Shale should not be used as trench backfill unless adequate heavy equipment is used to break down the material. The properties of the shale can drastically change when exposed to air and water; therefore, it is not recommended to use shale as trench backfill.

To minimize potential problems, backfilling operations should follow closely after excavation so that only a minimal length of trench is exposed. Care should be taken to protect side slopes of excavations by diverting surface run-off away from the excavations. If construction extends into the winter, then additional steps should be taken to minimize frost and ensure that frozen material is not used as backfill.

6.3.4 Temporary Support Systems

It is anticipated that conventional shoring systems such as soldier piles with lagging or secant caisson wall would be generally suitable at the site if required, however, the method of shoring should be left to the contractor’s discretion. Sheet piles may be difficult as they may not be able to extend into the shale bedrock

Depending on the design depth, the groundwater encountered within the overburden deposits may cause difficulties with timber lagging as minor to moderate groundwater inflow would be expected through the gaps in the lagging system without proactive dewatering in advance of excavation. A cut-off shoring system such as a secant caisson wall may serve to reduce the dewatering requirements of the project.

If an excavation may affect the stability of the adjacent structure, the contractor shall take precautions to prevent damage to the adjacent building as per O.Reg 213/91, s. 229. Temporary shoring measures must be designed as per the Canadian Foundation Engineering Manual. The surcharge loading from adjacent structures must be accounted for in the design of the shoring system.

Free-draining sand and gravel materials should be used as backfill along any shoring. All backfill should be placed in maximum 300 mm thick lifts and compacted to 95% Standard

Proctor Maximum Dry Density (SPMDD). The surface of the backfill should be graded to allow drainage away from any shoring.

6.3.5 Shoring Design Parameters

The shoring must be designed to resist the lateral earth pressure. For design parameters of the shoring, the following coefficients may be used;

Table 4 - Shoring Design Parameters

Parameter	Existing Fill	OPSS Granular 'B'	Native Glacial Till	Shale Bedrock
Unit Weight (γ)	18-20 kN/m^3	21-23 kN/m^3	20-21 kN/m^3	25 kN/m^3
Friction Angle (ø')	25-27°	32-34°	28-30°	40°
Active Earth Pressure (K_a)	0.38-0.41	0.28-0.31	0.33-0.36	0.27
At Rest Earth Pressure (K_o)	0.55-0.58	0.44-0.47	0.50-0.53	0.43
Passive Earth Pressure (K_p)	2.5-2.7	3.3-3.5	2.8-3.0	3.69

Where,

K_a = *active earth pressure coefficient for walls restrained at the bottom only*

= *tan^2 (45 – ø'/2)*

K_o = *at rest earth pressure coefficient for walls restrained at the top and bottom.*

= *1 – sin ø'*

K_p = *passive earth pressure coefficient for compacted granular fill*

= *tan^2 (45 + ø'/2)*

The geotechnical parameters are referenced to the Joseph E. Bowles, Foundation Analysis and Design Manual, 5th Edition, Subsection 12.9.

The at rest earth pressure coefficient (K_0) should be utilized when movement adjacent to the wall must be minimal. The active earth pressure coefficient (K_a) can be utilized when minor movements can be tolerated.

Movement of any shoring system is inevitable but provided sound design and construction practices are employed, horizontal movements would be anticipated in the range of 0.1 to 0.25% of the height retained. Monitoring of the shoring system should be provided on a periodic basis by the site contractor.

The recommendations provided above are geotechnical parameters and should not be interpreted as a shoring design. The earth pressure coefficients are based on a level ground surface behind the shoring. Any surcharge loading at the top of the shoring must be accounted for in the design. An appropriate safety factor should be used.

The shoring should be designed by a Licensed Professional Engineer and reference is provided to the Canadian Foundation Engineering Manual, 4th Edition and Ontario Building Code specifications.

6.4 Foundation Design & Preliminary Bearing Resistance

It is understood based on the concept design plan, that the proposed development will include a variety of land uses including, low-rise, mid-rise and high-rise residential, commercial, industrial and institutional/facilities. Foundation designs for shallow foundations as well as deep

foundations are provided in the following subsections. It is also understood that underground parking and basements may also be incorporated into the proposed developments. Additional block specific investigations will be required upon completion of design.

It is also understood a potential bridge crossing at Sheldon Creek to connect to the existing Corporate Drive is possible. Further investigation would be required prior to design.

MTE recommends that the majority of the development can be constructed utilizing shallow foundations. However, where shallow foundations are not feasible to achieve the required geotechnical bearing capacity, deep foundation options are provided.

6.4.1 Conventional Shallow Foundations

It is anticipated that the majority of buildings within the proposed development will be constructed utilizing conventional shallow foundations. All topsoil, fill, vegetation and deleterious material should be removed from any footing areas.

In general, the undisturbed compact native soils are considered suitable to support building foundations. Conventional spread footing founded on the compact to very dense glacial till deposits may be designed for a factored geotechnical bearing resistance at Ultimate Limit States (ULS) of 300 kPa, and a soil bearing resistance for 25 mm of settlement at Serviceability Limit States (SLS) of 200 kPa. Differential settlements will be on the order of about 10 mm based on the soil bearing resistances above.

Footings founded on the weathered shale bedrock may be designed for a factored geotechnical bearing resistance at ULS of 2,250 kPa and a soil bearing resistance for 10 mm of settlement at SLS of 1,500 kPa.

The overburden soil founding materials are susceptible to disturbance by construction activity, especially during wet weather and care should be taken to preserve the integrity of the material as bearing strata.

The shale materials are highly susceptible to disintegration of the clay rich material when exposed to water and/or alternate cycles of wetting and drying, and freeze and thaw. It is recommended the length of time the shale is exposed be minimized in the excavation base prior to pouring concrete. If there are conflicts with scheduling, a mud mat could be placed to protect the integrity of the working surface and prevention of the shale being exposed to degradation. The mud mat should comprise a 50 to 75 mm thick layer of low strength concrete (at least 5 MPa).

The soil in trenches beneath footings for sewer and watermain services shall be compacted by tamping up to the level of the footing base, or shall be filled with concrete having a strength not less than 10 MPa, to support the footing.

The footing areas must be inspected by a geotechnical engineer to ensure that the soil/rock conditions encountered at the time of construction are suitable to support the design resistances prior to pouring concrete. Any loose, disturbed, organic and deleterious material identified during the inspection should be removed from the footing areas and replaced with structural fill or concrete.

All exterior floor slabs and footings in unheated areas must be provided with a minimum 1.2 m of earth cover after final grading in order to minimize the potential of damage due to frost action, as per Ontario Provincial Standard Drawing, OPSD 3090.101, dated November 2010. If construction is undertaken during the winter, the subgrade soil and concrete should be protected from freezing.

Where spread footings are constructed at different elevations, the difference in elevation in the individual footing should not be greater than one half of the clear distance between the footings.

The lower footing should be constructed first so that if it is necessary to construct the lower footings at a greater depth than anticipated, the elevation of the upper footings can be adjusted accordingly. Stepped strip footings should be constructed in accordance with OBC Section 9.15.3.8.

A Site Classification 'D' should be used for earthquake load and effects in accordance with Table 4.1.8.4.A. of the 2012 Ontario Building Code. A Site Classification 'C' can be used if the footings are placed on the shale bedrock.

All excavations at the site should be carried out in conformance with the Ontario Occupational Health and Safety Act and Regulations for Construction Projects. The fill materials encountered in the boreholes would be classified as Type 3 soils (O. Reg. 213/91, s. 226 (4)). Temporary side slopes must be cut at an inclination of 1.0 horizontal to 1.0 vertical or less from the base of the excavation for open cut pipe installation. The glacial till deposits and shale bedrock would be classified as Type 2 soils and temporary side slopes must be cut at an inclination of 1 horizontal to 1 vertical or less at a level 1.2 m above the base of the excavation, exclusive of groundwater effects.

6.4.2 Deep Foundations

It is evident that conventional shallow foundations may not be feasible to support the larger structures that are to be developed at the site such as the high-rise residential buildings that are proposed. Deep foundations systems may be suitable for these buildings, such as drilled pier (caisson) systems.

Drilled caissons should extend into the shale bedrock at the site. Caissons founded within the sound shale may be designed for a larger geotechnical bearing capacity then conventional shallow foundations founded on the shale bedrock. Bearing capacity values can be provided upon completion of further design of the proposed development.

Table 202 in Appendix D provides the depth of bedrock encountered across the site.

Given the variance in depth to bedrock at the site, the elevation of the shale at individual caissons must be field verified by MTE at the time of installation and adjustment to anticipated depth may be required.

Groundwater seepage should be anticipated during the drilling of the shafts through the upper soil deposits. The upper groundwater conditions encountered within the sand, clay, silt and glacial till deposits will require the use of a liner during construction. If ground conditions are such that the liner/casing may be removed during concreting of the bored pile, the procedure used should ensure that the concrete will not be disturbed, pulled apart, pinched off by earth movement, or contaminated by the entry of water or mud.

Where the base of the drilled shafts are dry upon completion of drilling, the concrete may be poured using buckets, funnels, chutes or 'elephant trunks'. Free-falling concrete should be poured through a centering chute, making it fan down the center of the hole, clear of the walls of the shaft. Where water is present at the base of the drilled hole, the concrete should be placed from the base of the shaft upwards, using a tremie pipe to displace the water and prevent segregation. The tremie pipe should be withdrawn slowly as the level of concrete rises and the water is displaced.

Full time geotechnical monitoring should be completed during the installation of deep foundation elements (caissons) at the site so that an accurate record of drilled shaft sizes, alignment, locations, lengths, founding strata, and installation procedures can be maintained.

The grade beams between the caissons must be provided with a minimum 1.2 m of earth cover after final grading in order to minimize the potential of damage due to frost action. If construction

is undertaken during the winter, the subgrade soil and concrete should be protected from freezing.

Alternative deep foundation systems such as continuous flight auger (CFA) piles or micropiles may also be suitable to support the structures; however, further design details would be required.

Full time geotechnical monitoring should be completed during the installation of deep foundations at the site so that an accurate record of drilled locations, founding strata, and installation procedures can be maintained.

6.4.3 Raft Foundation

A raft slab may also be considered, although further design details would be required to determine anticipated settlements beneath a raft slab foundation to ensure feasibility.

It should be noted that the raft foundation would be constructed upon the temporarily dewatered undisturbed native soils or shale bedrock at the site. Throughout construction, it will be necessary to consider the potential uplift pressure from the underside of the raft foundation due to hydrostatic forces. It should be noted that positive dewatering operations during construction must be continued until such time as the factored structural dead load exceeds the potential factored uplift forces.

The design of the raft foundation should be a process between the selected structural and geotechnical engineers. Once a preliminary structural design is completed and the induced loading at the base of the raft is known, the resulting SLS loading must be assessed to calculate the total and differential expected settlements.

6.4.4 Elevator Pits, Basements and Underground Parking Garage Recommendations

It is understood that elevator pits, basement or parking garages may be installed for the proposed buildings at the site. The proposed founding elevation for the underground levels has not been confirmed at the time of this report and the following are general recommendations. We recommend that all underground levels within the groundwater level be waterproofed and designed to resist hydrostatic pressures.

It is also understood that underground parking structures may be proposed for the developments across the site. Underground parking garages at the site must be provided with perimeter weeping tile systems as per the Ontario Building Code (Section 9.14). The drain tile or pipe should be laid on undisturbed or well compacted soil so that the top of the tile or pipe (minimum 100 mm diameter) is below the bottom of the basement floor slab. The top and sides of the drain tile or pipe shall be surrounded with not less than 150 mm of crushed stone or other clean coarse granular material containing no more than 10% of material that will pass the 4 mm sieve. The crushed stone should be wrapped with filter cloth. The weeping tile must drain to a suitable frost-free outlet or sump equipped with an automatic pump that will discharge water into a storm sewer service or other frost free outlet.

The portion of the exterior basement wall and floor slab below finished ground level must be waterproofed as per the Ontario Building Code (Subsection 9.13.3). Free-draining sand materials should be used for basement wall backfill. The basement wall backfill should be graded to allow drainage away from the foundation. The basement walls should be designed to resist the lateral earth pressure. For calculating the lateral earth pressure, the coefficient of earth pressure (K) may be assumed as 0.50 for cohesionless sandy soils and 1.0 for silt and clay (Section 24.12.3.3 Canadian Foundation Engineering Manual). The bulk unit weight of the retained backfill may be taken as 21 kN/m3 for well-compacted soil. An appropriate factor of safety should be employed.

The Queenston Formation shale bedrock contains substantial locked-in horizontal stresses. When released, these stresses can impose significant loading on underground structures often referred to as 'rock squeeze'. This deformation is slow developing over time and will continue past initial elastic deformations. The building foundation should not be designed to resist these forces and it is recommended that a layer of compressible material should be placed between the structure and the rock.

The subgrade for the underground levels should comprise undisturbed compact native soil or well compacted fill. A minimum 100 mm thick layer of coarse clean granular material containing not more than 10% material that will pass a 4 mm sieve shall be placed beneath slabs in houses as per Subsection 9.16.2 of the Ontario Building Code. If the subgrade soil is wet, we recommend that subfloor weeping tiles be placed and connected to the sump pit.

If a moisture-sensitive floor finish is to be applied to the slab, then we recommend that a 15 mil polyethylene moisture vapour barrier be installed directly beneath the slab as per Article 9.13.2.7 of the Ontario Building Code. The purpose of the vapour barrier is to reduce moisture transfer by diffusion as per Article 5.5.1.2 of the Ontario Building Code. Joints in the vapour barrier should be lapped not less than 100 mm.

Concrete testing should be performed onsite to determine the slump, temperature, and air entrainment; and concrete cylinders should be cast for compressive strength testing.

6.5 Slope Stability Assessment

The purpose of the slope assessment is to assess the overall stability of the slope to the southwest of the site near Sheldon Creek. A field visual inspection was completed on the slope along Sheldon Creek in August 2023. Using the Ministry of Natural Resources (MNR) Slope Stability Rating Chart, the individual cross-sections were analyzed.

The slope assessments resulted in slope ratings ranging from 15 to 43, indicating the cross-sections inspected are classified as low to moderate potential. The MNR rating chart provides an approximation of relative slope stability and investigation requirements. The completed MNR slope stability rating charts can be found in Tables I to V in Appendix E.

In order to analyze the stability of the existing slope, detailed cross sections were referenced from City of Burlington & Oakville, Road Network, Open Data Set; and Land Information Ontario, LIDAR Elevation Data, Queen's Printer for Ontario, 2023. In addition, the staked top of slope line produced by Conservation Halton and Terrastory Environmental Consulting Inc. was used in the assessment. Additional survey information can be obtained during detailed design stages if required, although it is believed that the environmental setbacks will be greater than the slope setbacks for this area. Figure 2 in Appendix A shows the location of the cross sections completed along Sheldon Creek along with associated boreholes used in analysis. Figures 3 and 4 in Appendix A show the cross-sections in greater detail along with soil stratigraphy. Cross Section C-C', D-D', F-F' and H-H' were considered to have the steepest inclinations of the subject section of slope and were analyzed using slope assessment models. The results of the modelling are provided on Figures 5 to 7 in Appendix A.

The change in elevation over the slope for Cross Section C-C' is approximately 4.0 m, and is generally sloped at inclinations of 0.8 horizontal to 1.0 vertical for the slope on the northeast side of Cross Section C-C' with the soil conditions consisting mostly of shale bedrock. Borehole BH145-23 was used in analysis of this section.

The slope for Cross Section D-D' is approximately 3.5 m in height, and is generally sloped at an inclinations of 1.9 horizontal to 1.0 vertical for the slope on the northeast side of Cross Section D-D'. Borehole BH155-23 was used in analysis of this section.

The change in elevation over the slope for Cross Section F-F' is approximately 3.0 m, and is generally sloped at an inclination of 2.0 horizontal to 1.0 vertical for the slope on the northeast side of Cross Section F-F'. Borehole BH169-23 was used in analysis of this section.

The slope for Cross Section H-H' is approximately 6.0 m in height, and is generally sloped at an inclinations of 1.0 horizontal to 1.0 vertical for the slope on the northeast side of Cross Section D-D'. Borehole MW110-23 was used in analysis of this section.

Computer models were prepared using the GeoStudio 2019 Basic Edition Software by GEO-SLOPE International Ltd. The soil stratigraphy gathered from the field investigation of the surrounding areas was incorporated into the computer analyses. It is assumed that the stratigraphy of the slope and surrounding areas would be equivalent to that of the boreholes located within the vicinity of the cross sections completed.

The software used calculates the factor of safety against failure by calculating all forces and moments for a series of idealized vertical slices through the ground with a bottom boundary chosen to represent a "trial" failure surface. A factor of safety for slope stability is then defined as the total forces or moments acting to destabilize the slope divided by the total forces acting to resist failure.

A factor of safety of unity indicates incipient failure since the analytical destabilizing and stabilizing forces are equal. Typically, for permanent and engineered cut or fill slope, a factor of safety greater than 1.5 obtained using these methods of analysis is considered acceptable.

The general soil profile at the site and surrounding area of the cross-sections comprises topsoil and fill materials overlying native glacal till and shale deposits.

The soil parameters used in the slope stability analyses are noted in the following table;

Table 5 – Soil Parameter used in Slope Analysis

Soil Type	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Angle of Internal Frcition (º)
Fill	18	0	25
Glacial Till	22	0	32
Shale	25	0	40

The groundwater levels used for the analyses were based on the groundwater levels encountered in the boreholes advanced at the site and the existing groundwater level of Sheldon Creek. It is noted that in the spring (rainy) season, groundwater pressure can be considerably higher than those measured during the rest of the year. It should be noted that slope surface infiltration during significant rainfall and snow melt can increase the groundwater pressure by saturating soil material above the water table and on the face of the slope. Additional analysis for seasonally elevated groundwater levels, as obtained from the hydrogeological report, was completed along the creek cross sections.

The slope stability analyses were carried out for a number of potential failure modes. The various failures analyzed include shallow translational type failures of the residual soil, medium depth rotational failures at the top and bottom of the slope, and deep rotational failures through the entire height of the slope.

The factors of safety are closely related to the steepness of the slopes, porewater pressure and soil strength. As previously mentioned, the minimum Factor of Safety is 1.5.

The results of the slope stability modeling indicate the existing cross-section at C-C', D-D', F-F' and H-H' have a factor of safety at 1.5 or greater for the current slope conditions. Models were not completed for the other cross-sections along the Sheldon Creek watercourse. As a conservative stable slope inclination, these areas were further setback with inclinations of 1.4 to 1 for cross section C-C' and 2.5 to 1 for all other more steepening sloped areas. Cross section C-C' used 1.4 to 1 inclination due to soil conditions of mostly shale bedrock and TRCA guidelines for those soil conditions. Due to the proximity of Sheldon Creek near the toe of the slope, a 5 m erosion setback was used for cross sections C-C', D-D', E-E' and H-H'. A 6 m access allowance was used for all the cross sections analyzed. Figure 2 in Appendix A illustrates the required development setback along the southwest slope at the site.

For the area to the northwest of cross sections B-B' and A-A', the slope inclination were very gradual and not part of the hazard setback assessment. For this region, the maximum floodplain elevation along with the edge of wooded area are shown for potential development restrictions.

For slope sections with significant bedrock stratigraphy, these areas were also examined for additional failure mechanisms such as rotational failure, freeze thaw degradation and other weathering processes. These additional failure mechanisms were considered when providing stable slope inclinations for all slope sections in bedrock.

No additional fill should be placed at the crest or face of the slope unless it is engineered free draining granular material to prevent build-up of pore water pressure within the soil structure. No excavation work should be conducted at the bottom of the slope. No infiltration of stormwater management infrastructure should be placed within the top of the slope area. The tableland area surrounding the slope should be topsoiled and seeded as soon as possible after construction to minimize surface erosion. It is recommended that excavations be monitored by a geotechnical engineer to verify subsoil conditions.

6.6 Concrete Slab-on-Grade Floors

It is understood that floor slabs for the proposed developments are to be constructed utilizing conventional concrete slab-on-grade techniques, following removal of any unsuitable fill and organic soils, and inspection of the subgrade soils where applicable.

Fill material required to raise grades below the floor slab should be compacted to 98% SPMDD. A minimum 150 mm thick layer of Granular 'A' material uniformly compacted to 100% SPMDD should be provided directly beneath the slab for leveling and support purposes.

A modulus of subgrade reaction of 30 MPa/m should be used in the design of the floor slab on the native glacial till soils.

A modulus of subgrade reaction of 40 to 50 MPa/m should be used in the design of the floor slab on bedrock.

No special underfloor drains are required, provided the exterior grades are lower than the floor slabs and positively sloped away from the buildings.

If a moisture-sensitive floor finish is to be applied to the slab, then we recommend that a 15 mil polyethylene moisture vapour barrier be installed directly beneath the slab as per Article 9.13.2.7 of the Ontario Building Code. The purpose of the vapour barrier is to reduce moisture transfer by diffusion as per Article 5.5.1.2 of the Ontario Building Code. Joints in the vapour barrier should be lapped not less than 100 mm.

The water to cement ratio and slump of the concrete utilized in the floor slab should be strictly controlled to minimize shrinkage of the slab. Control joints should be sawed into the slabs at

regular intervals within 12 hours of initial concrete placement in order to prelocate shrinkage cracks.

Concrete testing should be performed onsite to determine the slump, temperature, and air entrainment; and concrete cylinders should be cast for compressive strength testing.

6.7 Pavements

It is understood pavements will be constructed for the proposed roadways and parking lots at the site. The pavement subgrade soils will comprise native inorganic soils or imported structural fill.

The pavement component thicknesses in the following table are recommended based on the proposed pavement usage, the frost-susceptibility and strength of the subgrade soils, and the Benkelman beam spring rebound coefficient for glacial till soils;

Table 6 - Pavement Design

Pavement Component	Light Duty	Heavy Duty
Asphalt Hot Mix	90 mm	110 mm
OPSS 1010 Granular ‘A’ Base	150 mm	150 mm
OPSS 1010 Granular ‘B’ Subbase	350 mm	450 mm

Heavy duty pavements should be used for main access ways to the development and where large vehicles will frequent, such as garbage and fire trucks.

Samples of aggregates should be checked for conformance to OPSS 1010 prior to utilization on site and during construction. The Granular 'B' subbase and Granular 'A' base courses must be compacted to 100% SPMDD, as verified by insitu density testing.

The asphaltic concrete paving materials should conform to the requirements of OPSS 1150. The asphalt should be placed and compacted in accordance with OPSS 310. The Performance Graded Asphalt Cement designation for the asphaltic concrete is 58-28.

The asphaltic concrete should comprise 40 mm of HL3 surface over 50 mm of HL8 binder for the light duty pavement option and 50 mm of HL3 surface over 60 mm of HL8 binder for the heavy duty pavement option.

The pavement design is based on the assumption that construction will be carried out during the drier time of the year and that the subgrade soil is stable as determined by proof-rolling inspected by a geotechnical engineer. If the subgrade is wet and unstable, additional granular subbase will be required.

All materials and construction services required for the work should be in accordance with the relevant sections of the Ontario Provincial Standard Specifications.

Continuous subdrains should be installed beneath the curbed areas of the roadway. The purpose of the subdrains is to remove excess subsurface water in order to improve overall pavement serviceability and increase the pavement life. Consideration should be given to providing continuous subdrains along the perimeter edges of the new roadways to promote drainage of the granular materials.

The work of subdrain installation shall be in accordance with OPSS 405 and OPSD 216.021. The subdrain shall be 150 mm diameter perforated pipe conforming to OPSS 1801 or 1840, and wrapped with geotextile conforming to OPSS 1860.

6.8 Curbs, Gutter and Sidewalks

The concrete for curbs, gutters and sidewalks should be proportioned, mixed, placed and cured in accordance with the requirements of OPSS 353, and OPSS 1350 and shall meet the following specific requirements (OPSS 353.05.01):

- Minimum compressive strength = 30 MPa at 28 days
- Coarse aggregate = 19.0 mm nominal max. size
- Maximum slump = 60 mm for curb and gutter, 70 mm for sidewalks
- Air entrainment = 6.5 ± 1.5%

During cold weather any freshly placed concrete must be covered with insulating blankets to protect against freezing as per OPSS 904. Three cylinders from each day's pour should be taken for compressive strength testing. Air entrainment, temperature and slump tests should be conducted on the same batch of concrete from the test cylinders made.

6.9 Stormwater Management Ponds

It is understood that stormwater management ponds are proposed within the southern portion of the site. The existing subsurface soils in this area generally comprise topsoil overlying native till deposits and shale bedrock.

The construction of SWMF would be feasible on the site, without any significant water inflow or slope instability issues, expecting, the construction activities are performed during a drier time. General excavation rules should apply for SWMF construction following Ontario Occupational Health and Safety Act and Regulations for Construction Projects. To maintain all slopes stable at SWMF, a minimum slope inclination in glacial till must be cut at an of 1 horizontal to 1 vertical or less. To mitigate the level of erosion, the interior side slopes should be constructed at an inclination of 5 horizontal to 1 vertical above the high-water level and vegetated cover should be established.

Based on our experience the native cohesive glacial tills encountered on site have an estimated hydraulic permeability ranging from $1x10^{-6}$ to $1×10^{-8}$ m/s. Based on the permeability and plasticity of the native soils, the cohesive deposits in the area of the SWMF are suitable as use of the pond liner. A layer of granular soils can be placed above the pond bottom to assist with future maintenance, if required.

If the SWMF will extend into the shale bedrock, a geosynthetic liner may be required due to the fractures in the bedrock allowing water permeability. The liner should be installed as per manufacturer specifications.

For side slopes for berm construction in the SWMF area, the soils should be cut at inclination of 3 horizontal to 1 vertical to 5 horizontal to 1 vertical depending on soils encountered.

When the invert elevation and geometry of the SWMF is established, these recommendations should be revisited and revised, as appropriate.

6.10 Construction inspection and Testing

MTE recommends that geotechnical inspection and testing procedures be conducted throughout the various phases of the project.

Engineer site visits should be conducted to confirm geotechnical bearing resistances for footings. Soil compaction testing should be carried out on structural fill beneath the building, foundation wall backfill, subslab granular fill, and trench backfill. Laboratory and field testing of the pavement structure components (granulars and asphaltic concrete) should be conducted, as well as concrete testing for foundations, curbs and sidewalks.

MTE offers soil compaction, concrete, and asphalt testing as well as soil inspection services through our Kitchener and Burlington offices.

7.0 Limitations of Report

Services performed by MTE Consultants Inc. (MTE) were conducted in a manner consistent with the level of care and skill ordinarily exercised by members of the Geotechnical Engineering & Consulting profession practicing under similar conditions in the same geographic area were the services are provided. No other warranty or representation expressed or implied as to the accuracy of the information, conclusions or recommendations is included or intended in this report.

This report was completed for the sole use of the Client. This report is not intended to be exhaustive in scope or to imply a risk-free site. As such, this report may not deal with all issues potentially applicable to the site and may omit aspects which are or may be of interest to the reader.

In addition, it should be recognized that a soil sample result represents one distinct portion of a site at the time it is collected, and that the findings of this report are based on conditions as they existed during the time period of the investigation. The material in the report reflects our best judgment using the information available at the time the report was written. The soil and groundwater conditions between and beyond the test holes may differ from those encountered in the test holes. Should subsurface conditions arise that are different from those in the test holes MTE should be notified to determine whether or not changes should be made as a result of these conditions.

It should be recognized that the passage of time may affect the views, conclusions and recommendations (if any) provided in this report because groundwater conditions of a property can change, along with regulatory requirements. All design details were not known at the time of submission of this report and it is recommended MTE should be retained to review the final design documents prior to construction to confirm they are consistent with our report recommendations. Should additional or new information become available, MTE recommends that it be brought to our attention in order that we may determine whether it affects the contents of this report.

Any use which another party makes of this report, or any reliance on, or decisions to be made based upon it, are the responsibility of such parties. MTE accepts no responsibility for liabilities incurred by or damages, if any, suffered by another party as a result of decisions made or actions taken, based upon this report. Others with interest in the site should undertake their own investigations and studies to determine how or if the condition affects them or their plans. The contractors bidding on this project or undertaking the construction should make their own interpretation of the factual information and draw their own conclusions as to how subsurface conditions may affect their work.

The benchmark and elevations provided in this report are primarily established to identify differences between the test hole locations and should not be used for other purposes such as, planning, development, grading, and excavation.

All of which is respectfully submitted,

MTE Consultants Inc.



Aidan Challis, EIT.
Geotechnical Engineer-in-Training
519-703-5956
achallis@MTE85.com

Brett Thorner, P.Eng.
Geotechnical Engineer
519-204-6510 ext. 2226
bthorner@MTE85.com

aac:BRT:vlf

https://mte85.sharepoint.com/sites/52982-800/Shared Documents/6 - Deliverables/3 - Reports/Geotech/2026-02-09 Final Rev 2/52982-700_2026-02-09_Bronte Creek Meadows_Geo Inv_Report- REV2 Final.docx

Appendix A

Figures

Figure 1- Site Plan

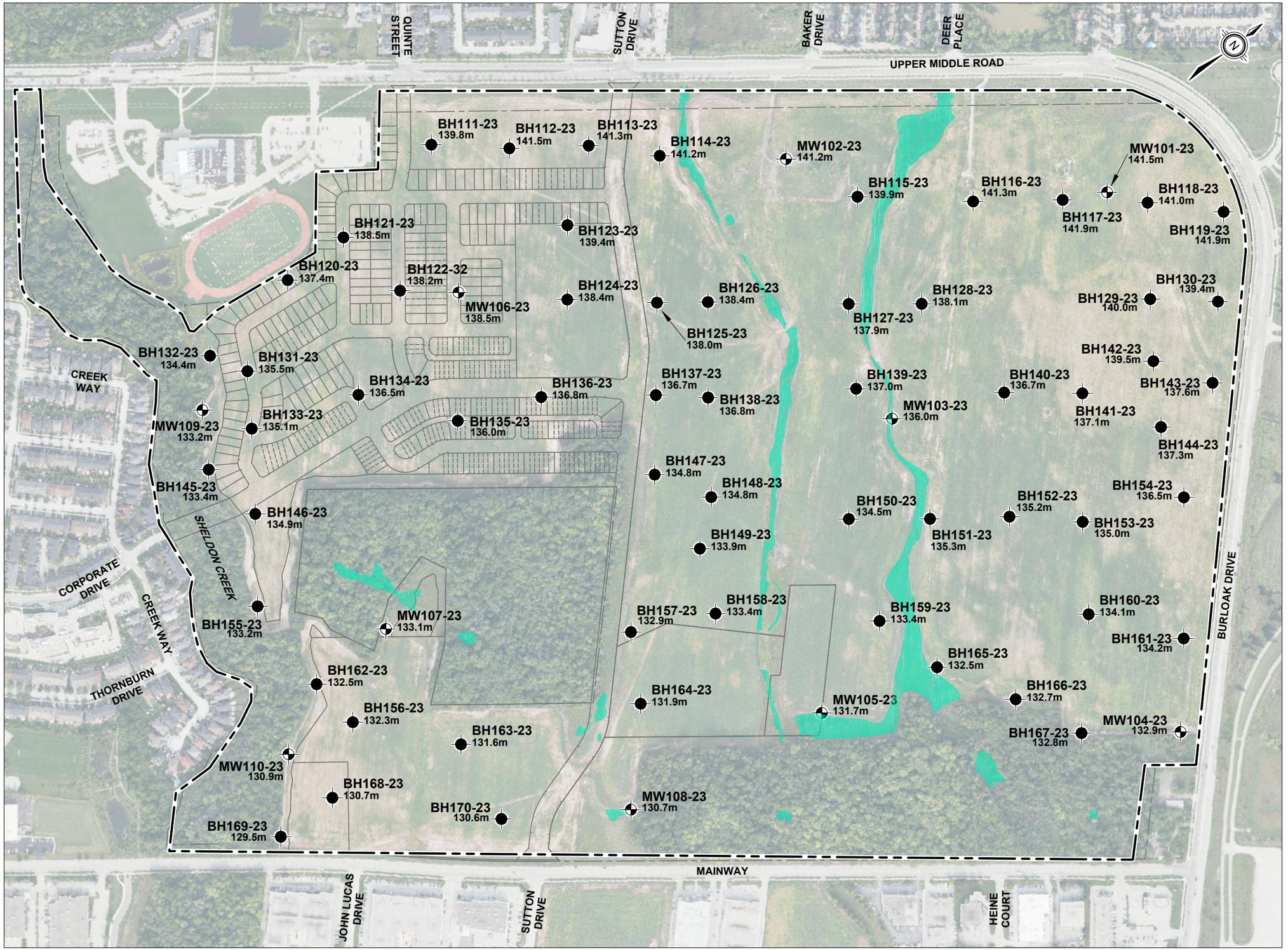
Figure 2- Slope Site Plan

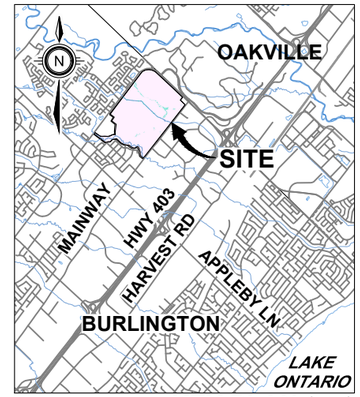
Figure 3 – Cross Sections

Figure 4 – Slope Results (Section C-C')

Figure 5 – Slope Results (Section D-D')

Figure 6 – Slope Results (Section F-F')





KEY PLAN (nts)

LEGEND

- SITE BOUNDARY
- BOREHOLE
- BOREHOLE/MONITORING WELL
- 138.4m ELEVATION (m AMSL)
- 22195 WETLAND

REFERENCES

CITY OF BURLINGTON & OAKVILLE, ROAD NETWORK, OPEN DATA SET; WETLANDS, PROVIDED BY TERRASTORY; BOUSFIELDS INC., DRAFT PLAN OF PROPOSED SUBDIVISION, DWG No. 23121-45DP, JUNE 18 - 2025; AND BING IMAGERY AS OF AUGUST 8 - 2023.

NOTES

THIS FIGURE IS SCHEMATIC ONLY AND TO BE READ IN CONJUNCTION WITH ACCOMPANYING TEXT.

BING IMAGERY USED FOR ILLUSTRATION PURPOSES ONLY AND NOT TO BE USED FOR MEASUREMENTS.

ALL LOCATIONS ARE APPROXIMATE.

0 50 100 150 200 250m

MTE
Engineers, Scientists, Surveyors

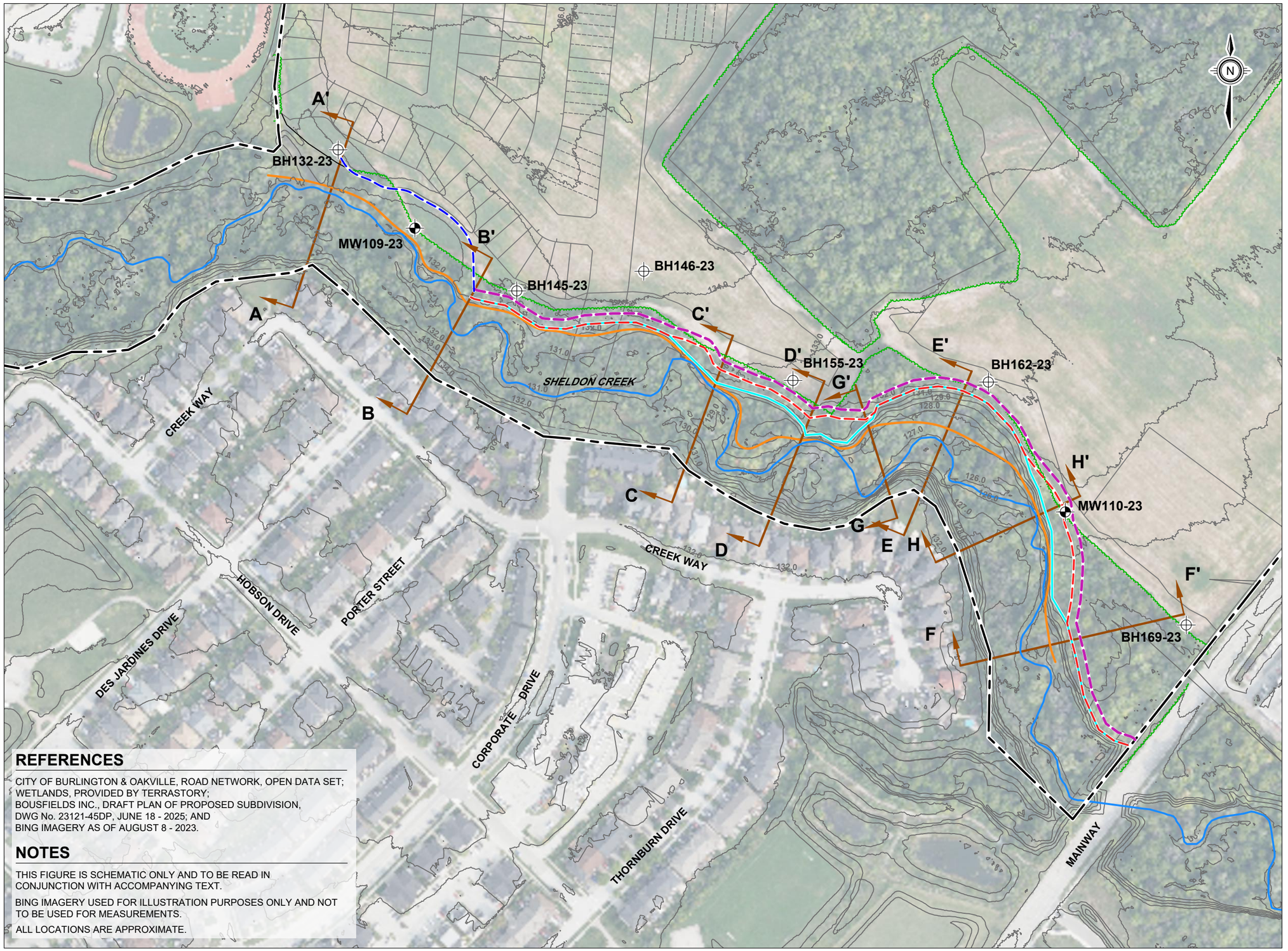
PROJECT
GEOTECHNICAL INVESTIGATION
BRONTE CREEK MEADOWS
BURLINGTON, ONTARIO

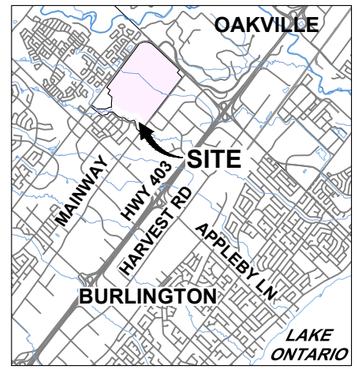
TITLE
SITE PLAN

Drawn	Scale	Figure
DCH	1:5,000	1
Checked	Project No. 52982-700	
Date 2025-06-24	Rev No. 0	

CAD: P:\P\52982\700\2_PROD\52982-700-R02 GEOTECHNICAL INVESTIGATION\52982-700-R02001.DWG
Plot Date: June 24, 2025 - 10:19 AM

CAD: P:\P\52982\700\2_PROD\52982-700-R01 GEOTECHNICAL SLOPE ASSESSMENT\52982-700-R01001.DWG
Plot Date: January 26, 2026 - 12:01 PM





KEY PLAN (nts)

LEGEND

- APPROXIMATE SITE BOUNDARY
- WATERCOURSE
- EDGE OF WOODED AREA
- TOE OF SLOPE
- TOP OF SLOPE
- LONG TERM STABLE SLOPE
- 6m ACCESS ALLOWANCE
- MAXIMUM FLOODPLAIN (133.70m-133.84m)
- A A' CROSS-SECTION
- BOREHOLE
- BOREHOLE/MONITORING WELL

0 25 50 75 100m

REFERENCES

CITY OF BURLINGTON & OAKVILLE, ROAD NETWORK, OPEN DATA SET;
WETLANDS, PROVIDED BY TERRASTORY;
BOUSFIELDS INC., DRAFT PLAN OF PROPOSED SUBDIVISION, DWG No. 23121-45DP, JUNE 18 - 2025; AND
BING IMAGERY AS OF AUGUST 8 - 2023.

NOTES

THIS FIGURE IS SCHEMATIC ONLY AND TO BE READ IN CONJUNCTION WITH ACCOMPANYING TEXT.

BING IMAGERY USED FOR ILLUSTRATION PURPOSES ONLY AND NOT TO BE USED FOR MEASUREMENTS.

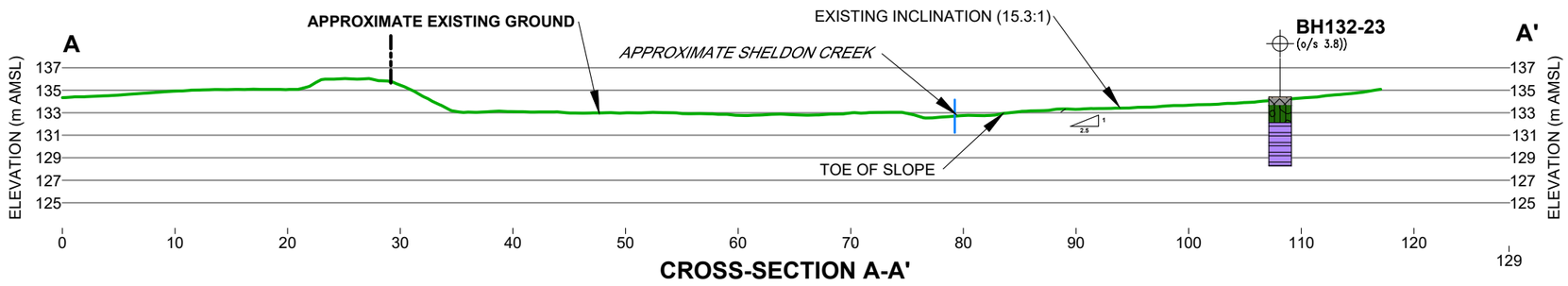
ALL LOCATIONS ARE APPROXIMATE.

MTE
Engineers, Scientists, Surveyors

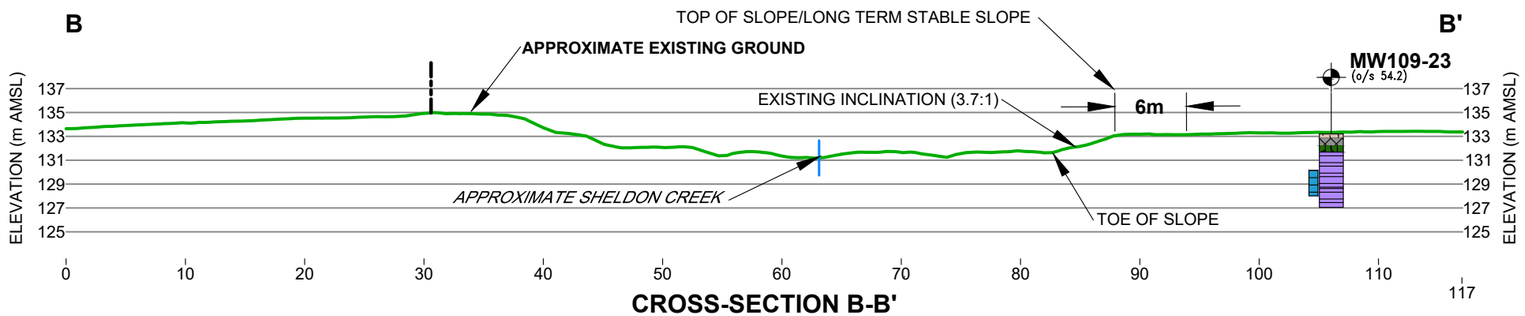
PROJECT
GEOTECHNICAL SLOPE ASSESSMENT
BRONTE CREEK MEADOWS
BURLINGTON, ONTARIO

TITLE
SITE PLAN

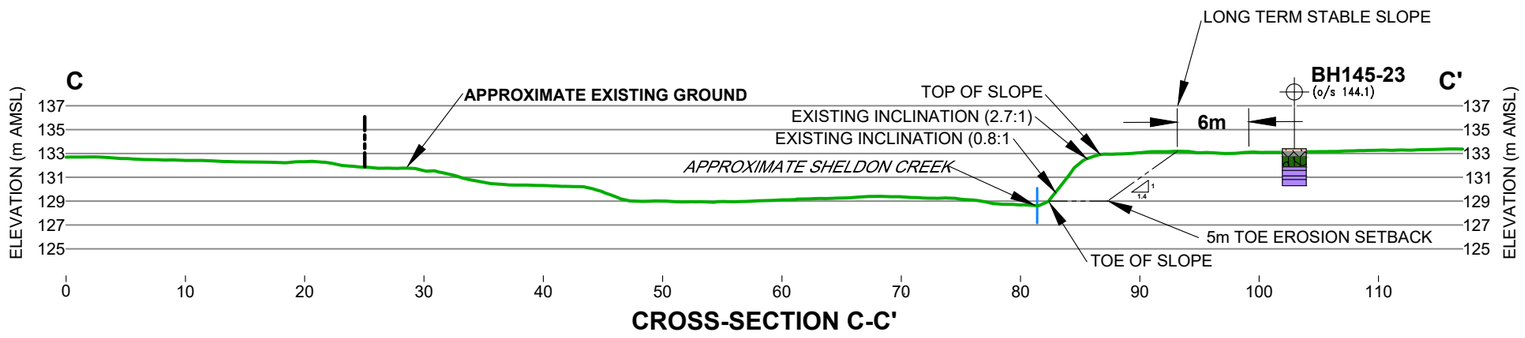
Drawn	Scale	Figure
DCH	1:2,500	2
Checked	Project No. 52982-700	
Date 2026-01-26	Rev No. 0	



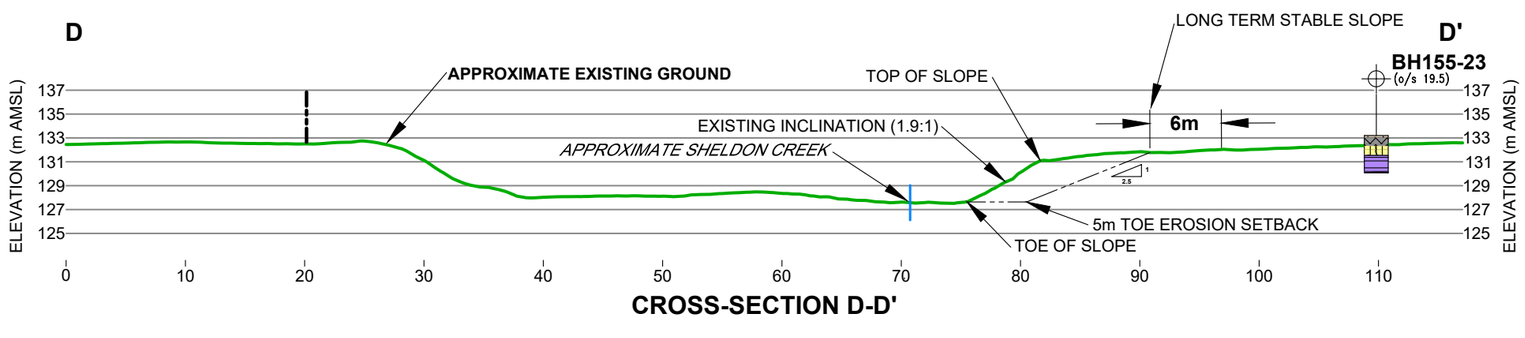
CROSS-SECTION A-A'



CROSS-SECTION B-B'



CROSS-SECTION C-C'



CROSS-SECTION D-D'

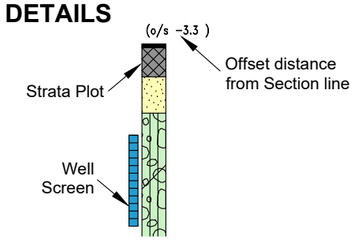
LEGEND

- APPROXIMATE WEST SITE BOUNDARY
- BOREHOLE
- BOREHOLE/MONITORING WELL

SIMPLIFIED STRATIGRAPHY

- TOPSOIL
- SILT TILL
- FILL
- SHALE

TYPICAL INSTALLATION DETAILS



REFERENCES

CITY OF BURLINGTON & OAKVILLE, ROAD NETWORK, OPEN DATA SET; AND LAND INFORMATION ONTARIO, LIDAR ELEVATION DATA, © QUEEN'S PRINTER FOR ONTARIO, 2023.

NOTES

THIS FIGURE IS SCHEMATIC ONLY AND TO BE READ IN CONJUNCTION WITH ACCOMPANYING TEXT.

ALL LOCATIONS ARE APPROXIMATE.

0 5 10 15 20 25m

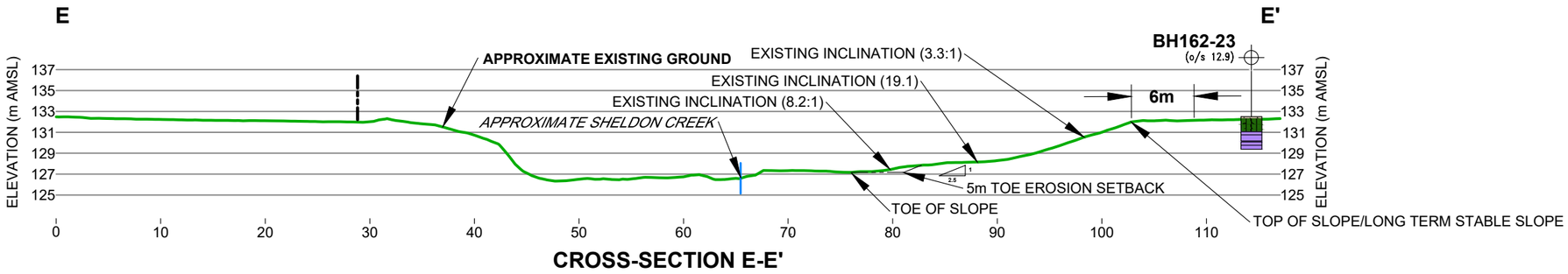
MTE
Engineers, Scientists, Surveyors

PROJECT
GEOTECHNICAL SLOPE ASSESSMENT
BRONTE CREEK MEADOWS
BURLINGTON, ONTARIO

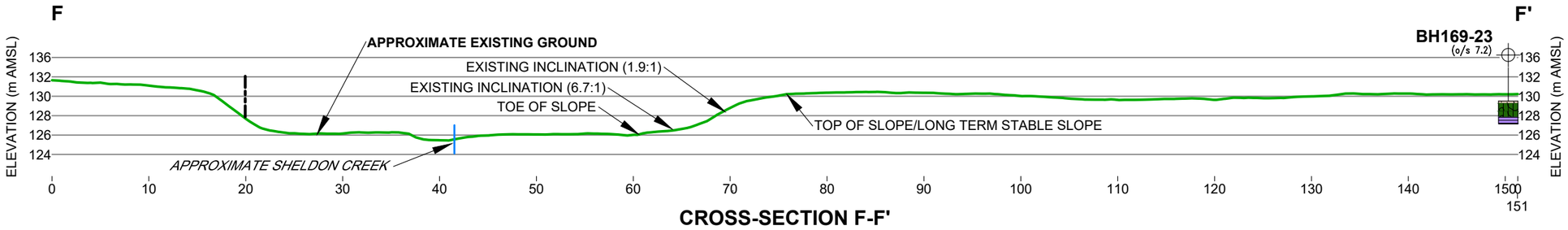
TITLE
CROSS-SECTIONS (A-D)

Drawn	Scale	Figure
DCH	1:500	3
Checked	Project No. 52982-700	
Date 2026-01-26	Rev No. 0	

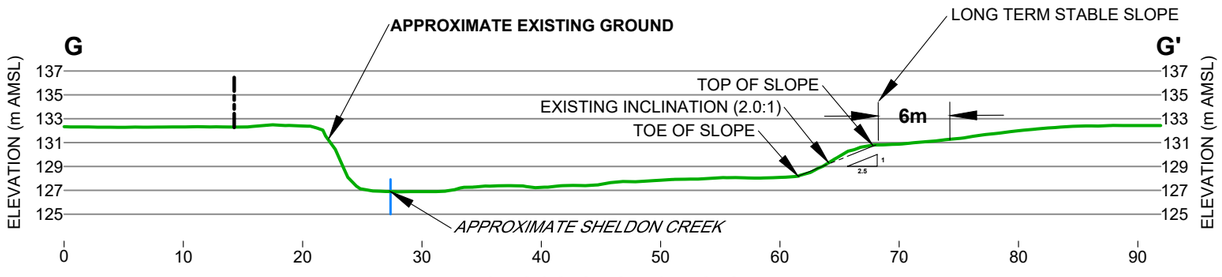
CAD: P:\P\52982\700\2_PROD\52982-700-R01 GEOTECHNICAL SLOPE ASSESSMENT\52982-700-R01001.DWG
Plot Date: January 26, 2026 - 11:02 AM



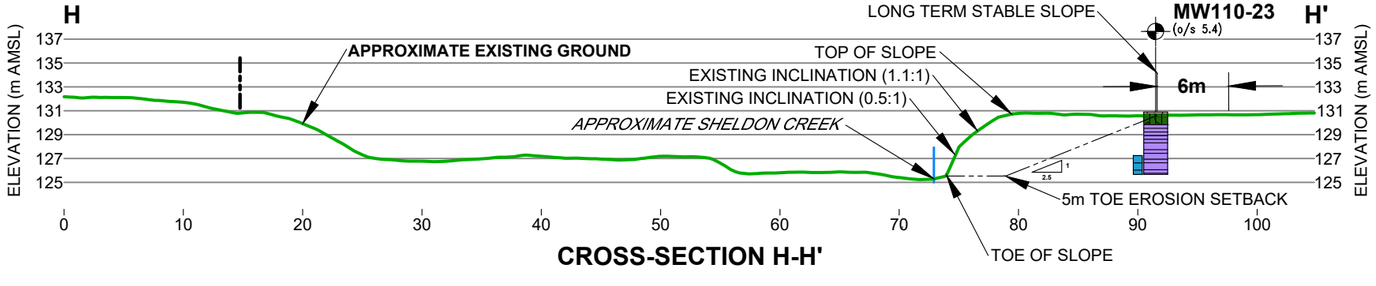
CROSS-SECTION E-E'



CROSS-SECTION F-F'



CROSS-SECTION G-G'



CROSS-SECTION H-H'

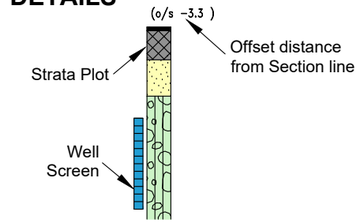
LEGEND

- APPROXIMATE WEST SITE BOUNDARY
- BOREHOLE
- BOREHOLE/MONITORING WELL

SIMPLIFIED STRATIGRAPHY

- TOPSOIL
- SILT TILL
- FILL
- SHALE

TYPICAL INSTALLATION DETAILS



REFERENCES

CITY OF BURLINGTON & OAKVILLE, ROAD NETWORK, OPEN DATA SET; AND
LAND INFORMATION ONTARIO, LIDAR ELEVATION DATA, © QUEEN'S PRINTER FOR ONTARIO, 2023.

NOTES

THIS FIGURE IS SCHEMATIC ONLY AND TO BE READ IN CONJUNCTION WITH ACCOMPANYING TEXT.

ALL LOCATIONS ARE APPROXIMATE.

0 5 10 15 20 25m

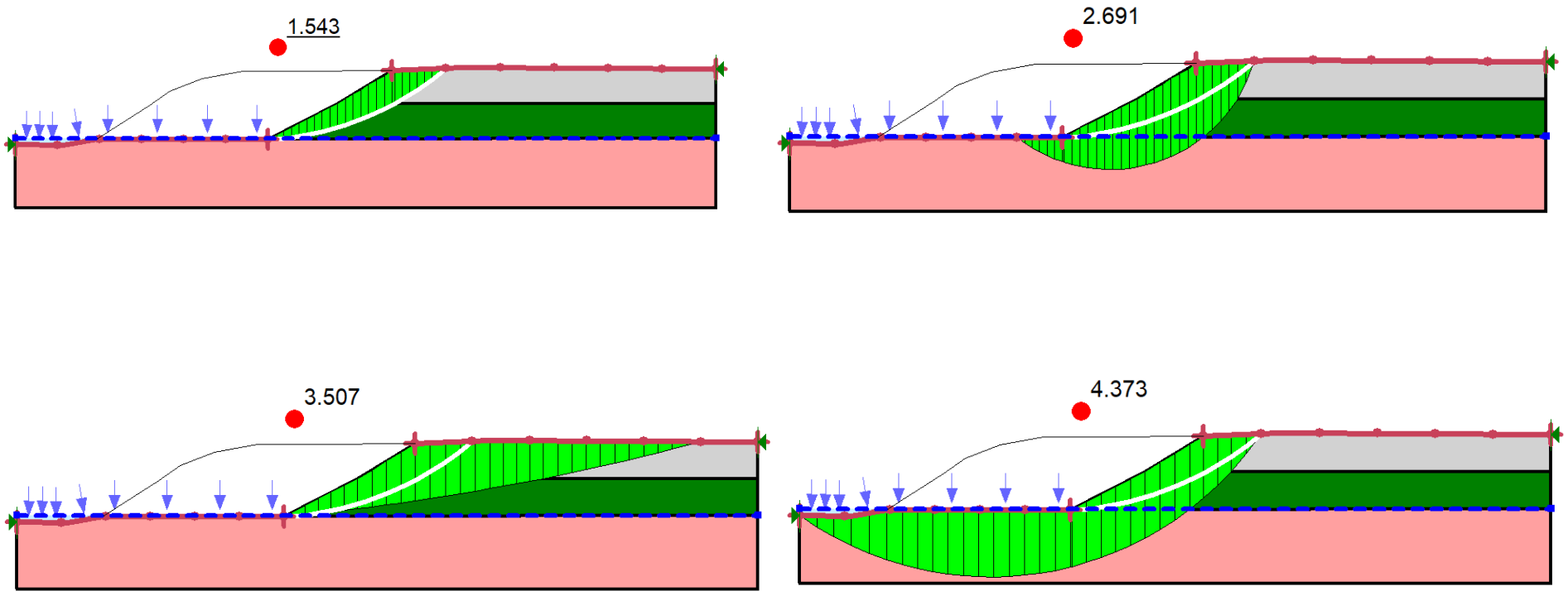
MTE
Engineers, Scientists, Surveyors

PROJECT
GEOTECHNICAL SLOPE ASSESSMENT
BRONTE CREEK MEADOWS
BURLINGTON, ONTARIO

TITLE
CROSS-SECTIONS (E-H)

Drawn: DCH	Scale: 1:500	Figure: 4
Checked:	Project No.: 52982-700	
Date: 2026-01-26	Rev No.: 0	

CAD: P:\P\52982\700\2_PROD\52982-700-R01 GEOTECHNICAL SLOPE ASSESSMENT\52982-700-R01001.DWG
Plot Date: January 26, 2026 - 11:03 AM



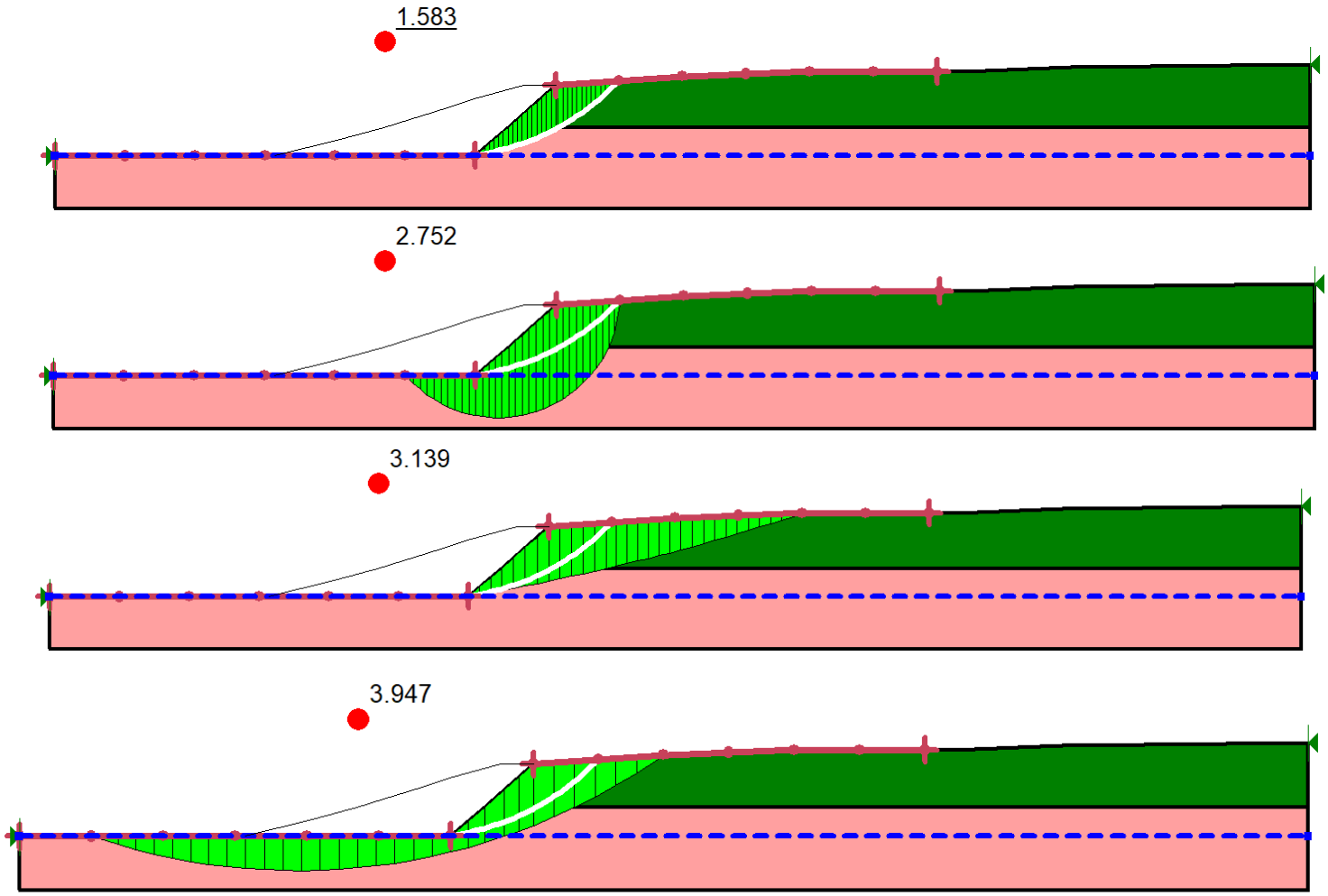
Color	Name	Model	Unit Weight (kN/m³)	Cohesion' (kPa)	Phi' (°)	Phi-B (°)	Piezometric Line
	Fill	Mohr-Coulomb	18	0	25	0	1
	Shale	Mohr-Coulomb	25	0	40	0	1
	Till	Mohr-Coulomb	22	0	32	0	1

MTE
Engineers, Scientists, Surveyors

PROJECT
Bronte Creek Meadows

TITLE
Cross Section C-C'
Model Results

Drawn	AAC	Scale	Figure 4
Checked	BRT	Project No. 52982-700	
Date	Nov 29/23	Rev No.	



Color	Name	Model	Unit Weight (kN/m³)	Cohesion' (kPa)	Phi' (°)	Phi-B (°)	Piezometric Line
	Shale	Mohr-Coulomb	25	0	40	0	1
	Till	Mohr-Coulomb	22	0	32	0	1

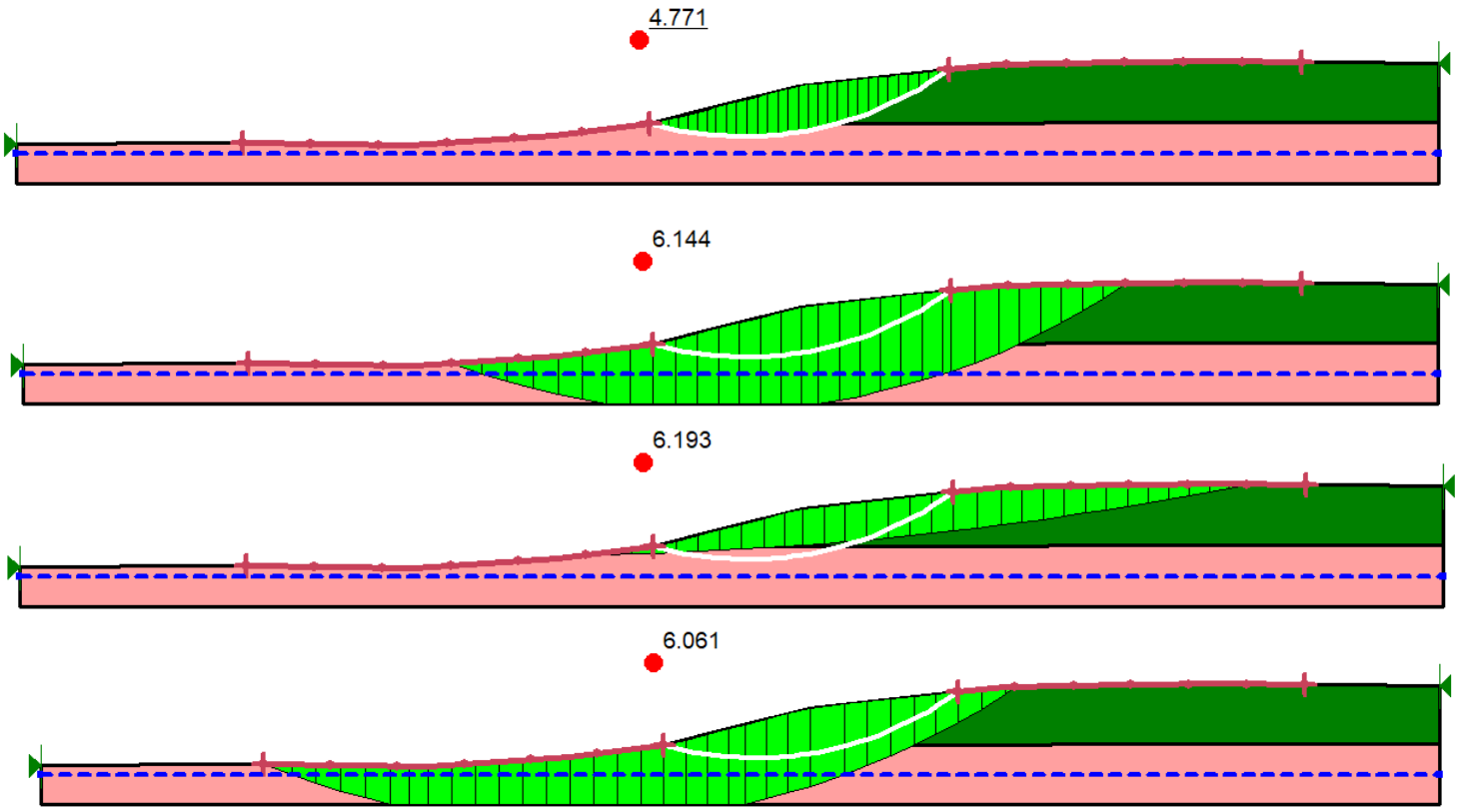
MTE
Engineers, Scientists, Surveyors

PROJECT
Bronte Creek Meadows

TITLE
Cross Section D-D'
Model Results

Drawn	AAC	Scale	
Checked	BRT	Project No.	52982-700
Date	Nov 29/23	Rev No.	

Figure 5



Color	Name	Model	Unit Weight (kN/m³)	Cohesion' (kPa)	Phi' (°)	Phi-B (°)	Piezometric Line
	Shale	Mohr-Coulomb	25	0	40	0	1
	Till	Mohr-Coulomb	22	0	32	0	1

MTE
Engineers, Scientists, Surveyors

PROJECT
Bronte Creek Meadows

TITLE
Cross Section F-F'
Model Results

Drawn	AAC	Scale	Figure 6
Checked	BRT	Project No. 52982-700	
Date	Nov 29/23	Rev No.	

Appendix B

Borehole Logs

Abbreviations and Symbols

Boreholes MW101-23 to BH170-23

The following are abbreviations and symbols commonly used on borehole logs, figures and reports.

Sample Types

AS	Auger Sample
CS	Chunk Sample
BS	Bulk Sample
GS	Grab Sample
WS	Wash Sample
SS	Split Spoon
RC	Rock Core
SC	Soil Core
TW	Thinwall, Open
TP	Thinwall, Piston

Soil Tests

PP	Pocket Penetrometer
FV	Field Vane
SPT	Standard Penetration Test
CPT	Cone Penetration Test
WC	Water Content
WL	Water Level

Penetration Resistance

Standard Penetration Test, N (ASTM D1586)	The number of blows by a 63.5 kg (140 lb) hammer dropped 760 mm (30 in.) required to drive a 50 mm (2 in.) open spilt spoon sampler for a distance of 300 mm (12 in.).
Dynamic Cone Penetration Resistance	The number of blows by a 63.5 kg (140 lb) hammer dropped 760 mm (30 in.) required to drive an uncased 50 mm (2 in.) diameter, 60o cone attached to “A” size drill rods for a distance of 300 mm (12 in.).

Soil Description

Cohesive Soils	Undrained Shear Strength (Cu)	
Consistency	kPa	psf
Very Soft	0 to 12	0 to 250
Soft	12 to 25	250 to 500
Firm	25 to 50	500 to 1,000
Stiff	50 to 100	1,000 to 2,000
Very Stiff	100 to 200	2,000 to 4,000
Hard	Above 200	Above 4,000

Cohesionless Soils	
Relative Density	SPT N Value
Very Loose	0 to 4
Loose	4 to 10
Compact	10 to 30
Dense	30 to 50
Very Dense	Above 50

WH	Sampler advanced by static weight of hammer
WR	Sampler advanced by static weight of drilling rods
PH	Sampler advanced by hydraulic force
PM	Sampler advanced by manual force

DTPL	Drier than Plastic Limit
APL	About Plastic Limit
WTPL	Wetter than Plastic Limit
mbgs	Metres below Ground Surface

ID No.: MW101-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

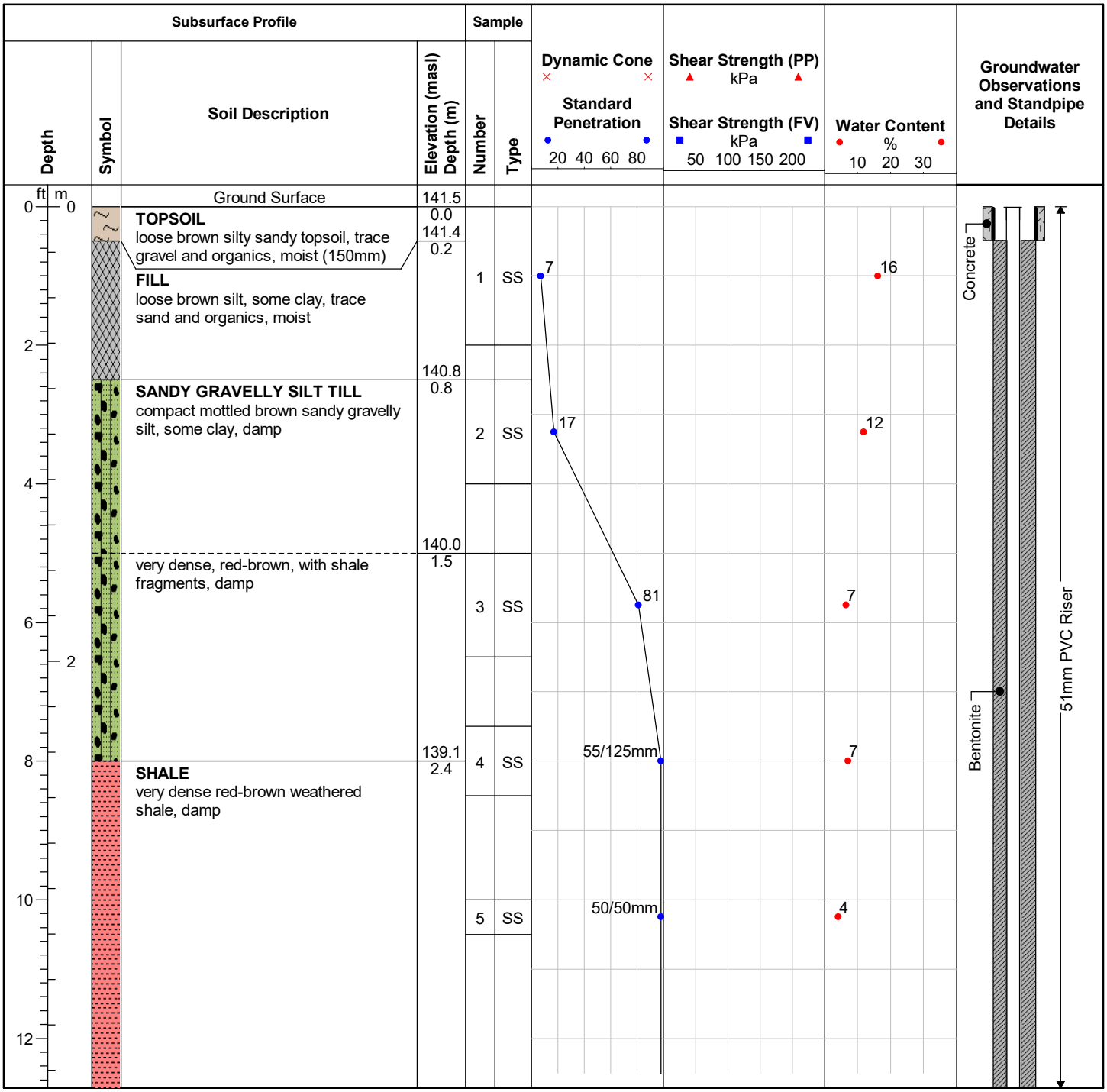
Date Completed: 8/30/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: Monument Casing



Field Technician: N. Wang

Drafted by: B. Graul

Reviewed by: B. Thorner

Notes:
Water measured at 4.1 mbgs (Elevation 137.4 masl) on September 11, 2023.

ID No.: MW101-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

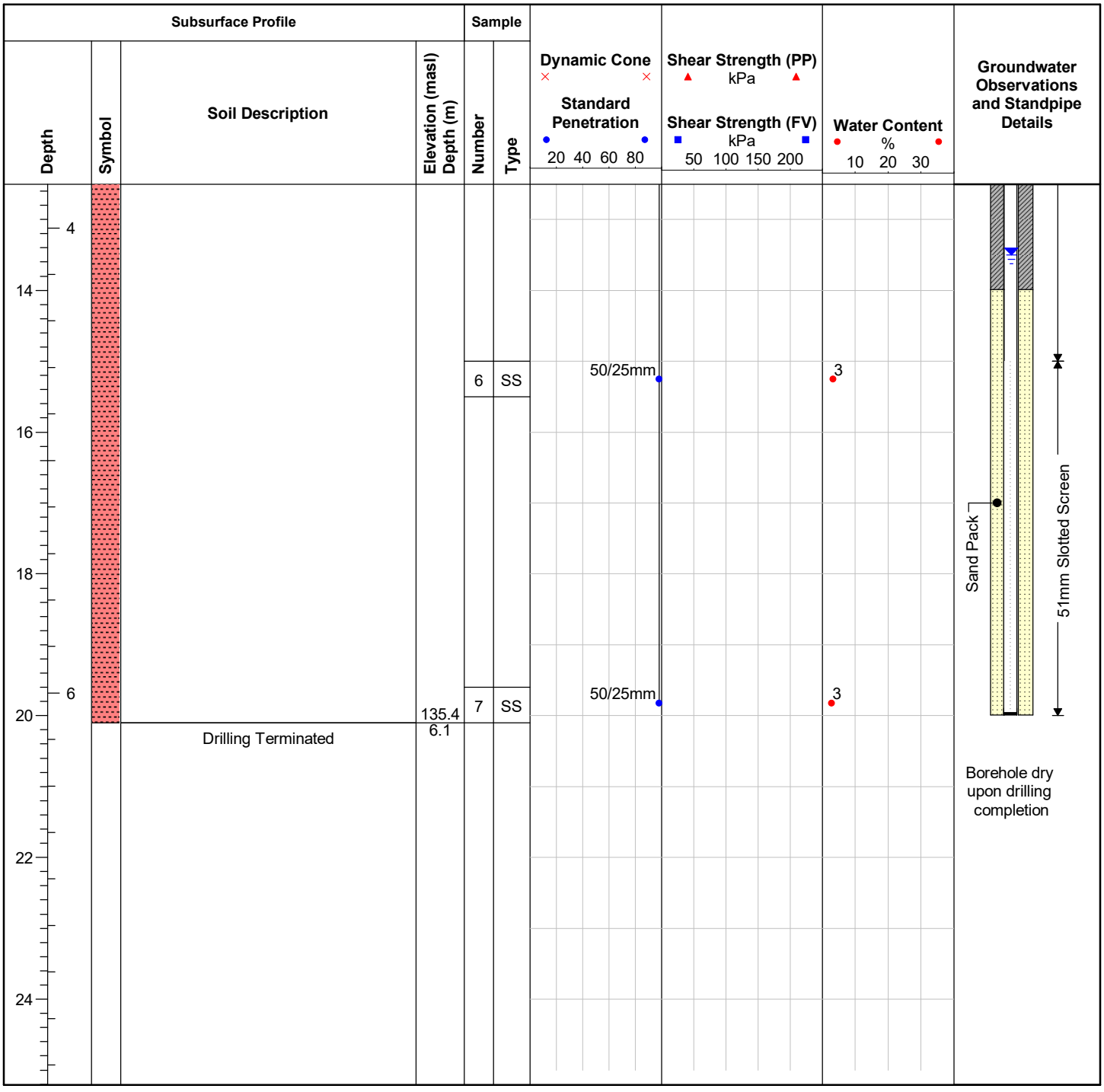
Date Completed: 8/30/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: Monument Casing



Field Technician: N. Wang

Drafted by: B. Graul

Reviewed by: B. Thorner

Sheet: 2 of 2

Notes:
Water measured at 4.1 mbgs (Elevation 137.4 masl) on September 11, 2023.

ID No.: MW102-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

Date Completed: 9/1/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: Monument Casing

Depth (ft / m)	Symbol	Soil Description	Elevation (masl) / Depth (m)	Sample Number	Sample Type	Dynamic Cone / Standard Penetration	Shear Strength (PP) kPa / Shear Strength (FV) kPa	Water Content %	Groundwater Observations and Standpipe Details
0 / 0		Ground Surface	141.2						
		TOPSOIL loose brown silty topsoil, some sand, trace gravel and organics, moist (150mm)	0.0 / 141.0 / 0.2	1	SS	7		21	Concrete
		FILL loose dark brown sandy silt, moist to wet	140.4						
2		**SILT TILL** very dense red-brown silt, some clay, trace sand, with shale and limestone pieces (large), moist	0.8	2	SS	75/280mm		6	
4			139.7						
6 / 2		**SHALE** very dense red-brown weathered shale, damp	1.5	3	SS	50/25mm		9	Bentonite
8				4	SS	50/100mm		5	
10				5	SS	50/25mm		16	51mm PVC Riser
12									

Field Technician: N. Wang

Drafted by: B. Graul

Reviewed by: B. Thorner

Notes:
Water measured at 2.3 mbgs (Elevation 138.9 masl) on September 11, 2023.

ID No.: MW102-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

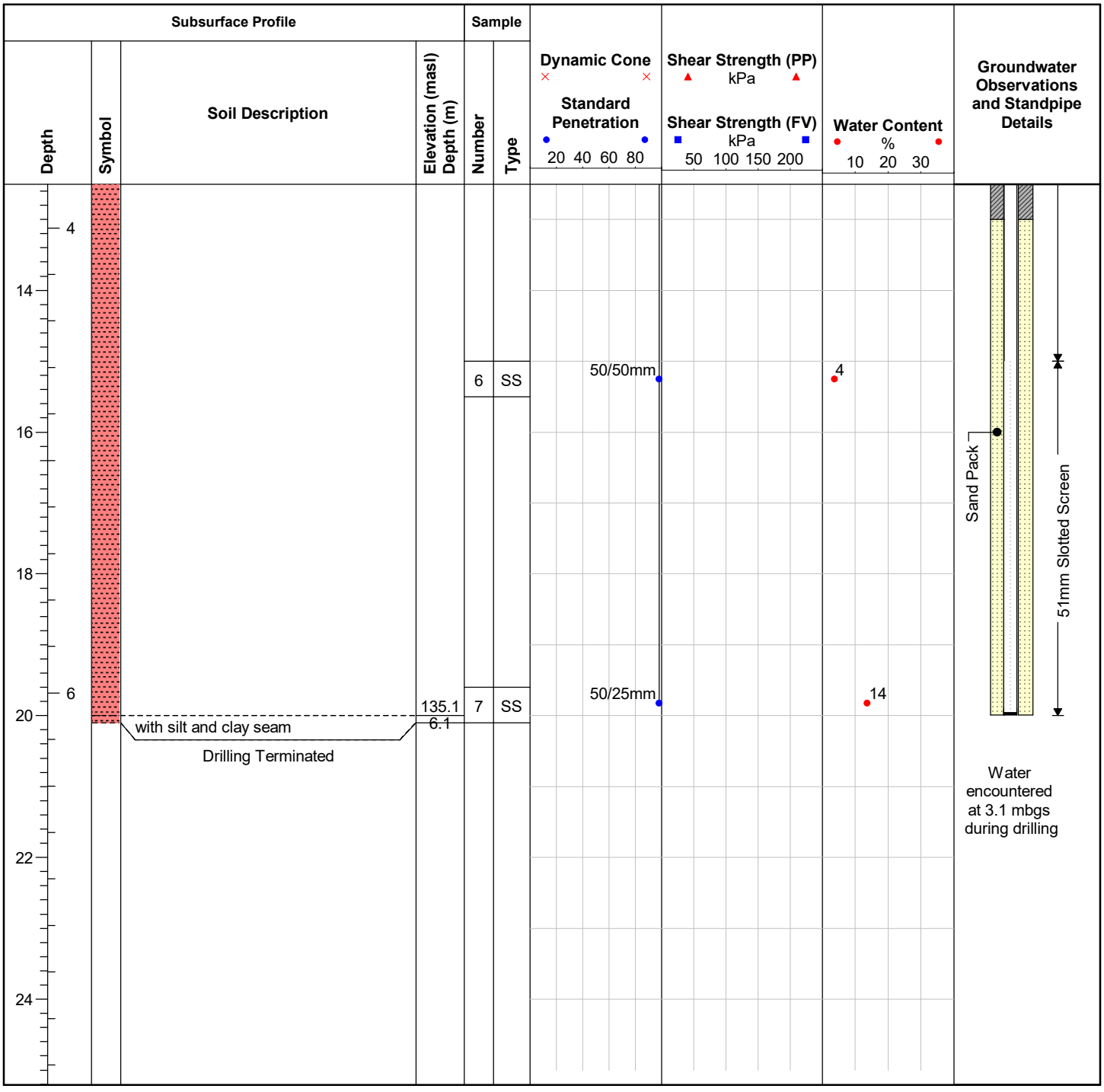
Date Completed: 9/1/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: Monument Casing



Field Technician: N. Wang

Drafted by: B. Graul

Reviewed by: B. Thorner

Sheet: 2 of 2

Notes:
Water measured at 2.3 mbgs (Elevation 138.9 masl) on September 11, 2023.

ID No.: MW103-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

Date Completed: 9/6/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

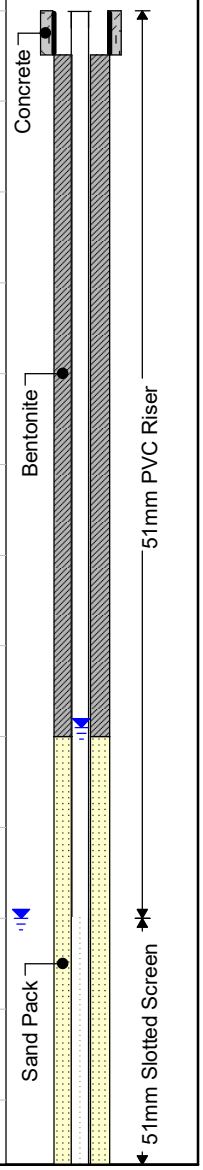
Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: Monument Casing

Depth (ft / m)	Symbol	Soil Description	Elevation (masl) / Depth (m)	Sample Number	Sample Type
0 / 0		Ground Surface	136.0		
		TOPSOIL compact mottled red-brown/grey silty topsoil, some sand, trace gravel, organics and rootlets, moist (150mm)	0.0 / 135.8		
		FILL compact dark brown silt, some sand, trace clay, with organics and rootlets, and black topsoil pockets, moist	0.2 / 135.2	1	SS
2		**SILT TILL** very dense mottled red-brown silt, some clay, trace sand, with shale fragments, damp	0.8 / 134.5	2	SS
4		shale and limestone fragments, with layering	1.5 / 133.7	3	SS
6 / 2		**SILTY GRAVELLY SAND TILL** very dense red-brown silty gravelly sand, some clay and shale fragments, moist	2.3 / 133.0	4	SS
8		**SHALE** very dense red-brown weathered shale, damp, occasional saturated silt and clay seams	3.0	5	SS
10					
12					

Sample Number	Dynamic Cone / Standard Penetration	Shear Strength (PP) kPa / Shear Strength (FV) kPa	Water Content %
1	11		8
2	64		9
3	79/180mm		8
4	90/230mm		6
5	50/50mm		6



Field Technician: N. Wang

Drafted by: B. Graul

Reviewed by: B. Thorner

Notes:
Water measured at 2.4 mbgs (Elevation 133.6 masl) on September 11, 2023.

ID No.: MW103-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

Date Completed: 9/6/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: Monument Casing

Subsurface Profile				Sample		Dynamic Cone / Standard Penetration	Shear Strength (PP) kPa / Shear Strength (FV) kPa	Water Content %	Groundwater Observations and Standpipe Details
Depth	Symbol	Soil Description	Elevation (masl) Depth (m)	Number	Type	20 40 60 80	50 100 150 200	10 20 30	
4									
14									
			131.4	6	SS	50/50mm		16	
		Drilling Terminated	4.6						
16									
18									
6									
20									
22									
24									

Snd Pack

Water encountered at 3.0 mbgs during drilling

Field Technician: N. Wang

Drafted by: B. Graul

Reviewed by: B. Thorner

Sheet: 2 of 2

Notes:
Water measured at 2.4 mbgs (Elevation 133.6 masl) on September 11, 2023.

ID No.: MW104-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

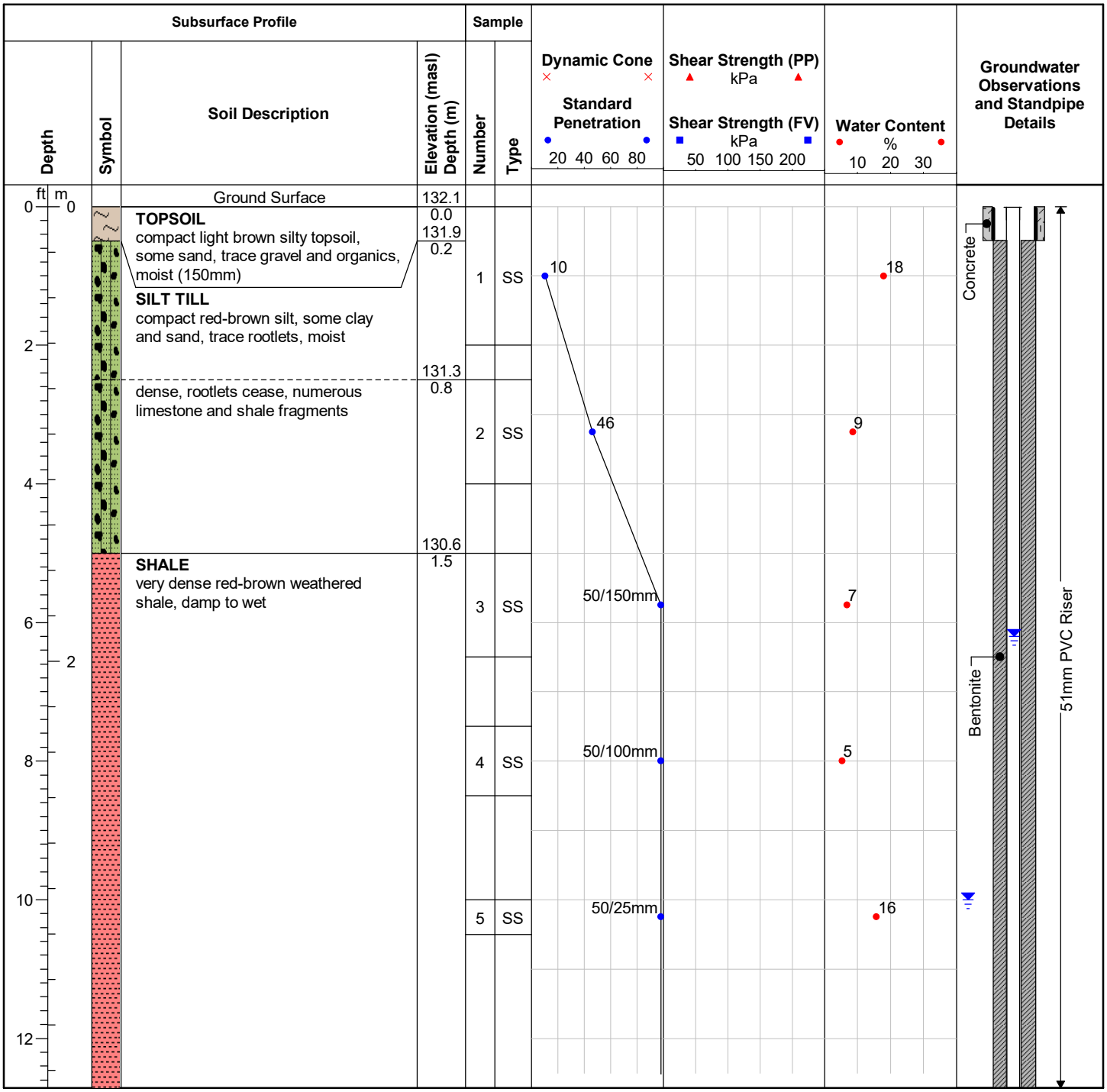
Date Completed: 8/31/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: Monument Casing



Field Technician: N. Wang

Drafted by: B. Graul

Reviewed by: B. Thorner

Notes:
Water measured at 1.9 mbgs (Elevation 130.2 masl) on September 11, 2023.

ID No.: MW104-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

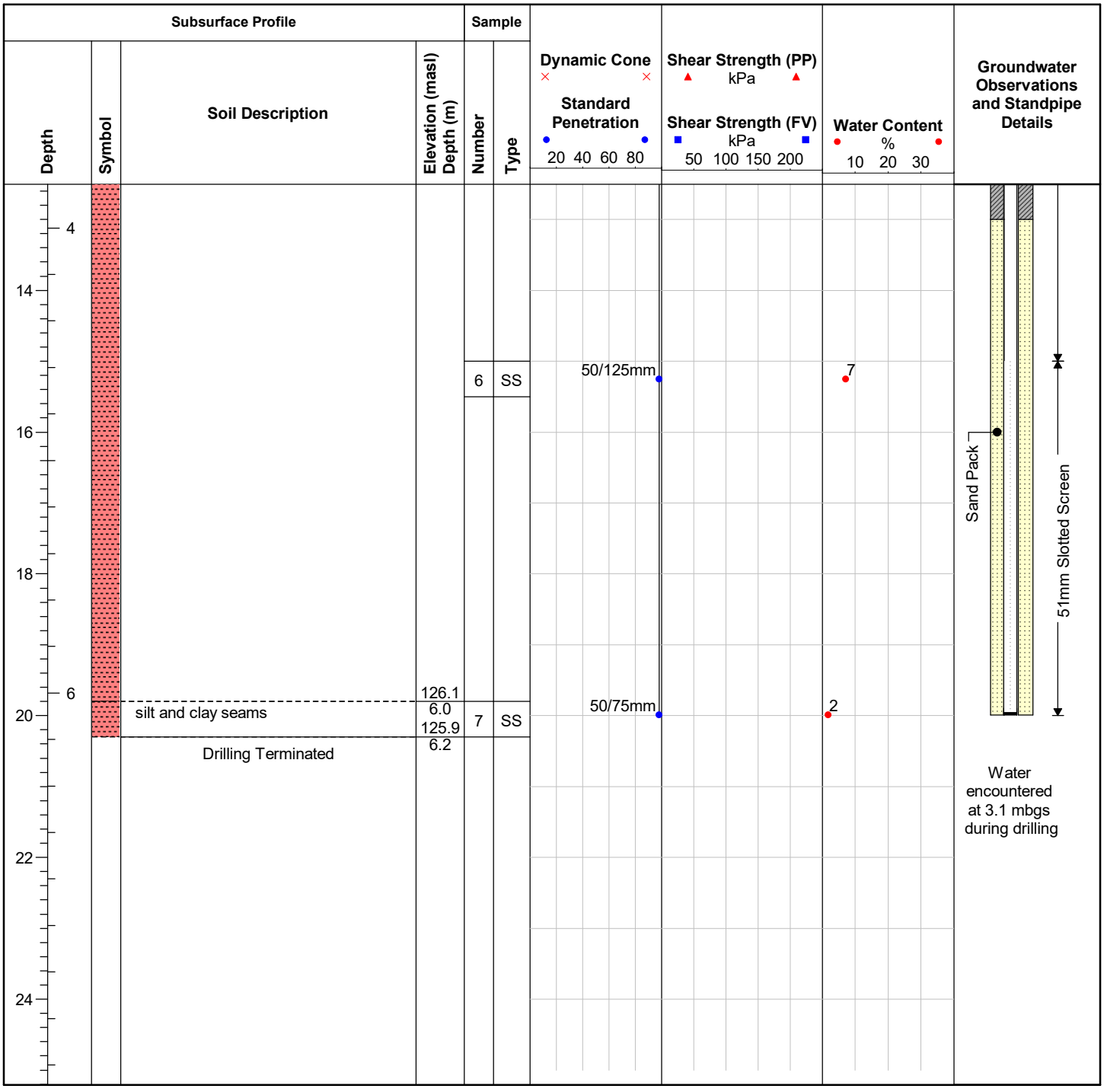
Date Completed: 8/31/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: Monument Casing



Field Technician: N. Wang

Drafted by: B. Graul

Reviewed by: B. Thorner

Sheet: 2 of 2

Notes:
Water measured at 1.9 mbgs (Elevation 130.2 masl) on September 11, 2023.

ID No.: MW105-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

Date Completed: 9/7/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: Monument Casing

Depth (ft / m)	Soil Description	Elevation (masl) / Depth (m)	Sample Number	Sample Type	Standard Penetration (Dynamic Cone)	Shear Strength (PP) kPa / Shear Strength (FV) kPa	Water Content %
0 / 0	Ground Surface	131.7					
	TOPSOIL loose mottled red-brown/brown silty topsoil, some sand, trace gravel, organics and rootlets, moist (150mm)	0.0 / 131.5 / 0.2	1	SS	10		22
2	**CLAY AND SILT TILL** stiff red-brown clay and silt, trace sand, APL	130.9					
	CLAYEY SILT TILL hard red-brown clayey silt, some sand, with large limestone pieces, DTPL	0.8	2	SS	46		13
4		130.2					
	GRAVELLY SILTY SAND TILL very dense red-brown gravelly silty sand, trace clay and shale fragments, damp	1.5	3	SS	50/150mm		7
6							
2		129.3	4	SS	50/100mm		7
8	**SHALE** very dense red-brown weathered shale, damp	2.4					
10			5	SS	50/25mm		5
12							

Groundwater Observations and Standpipe Details: Concrete; Bentonite; 51mm PVC Riser

Field Technician: N. Wang

Drafted by: B. Graul

Reviewed by: B. Thorner

Notes:
Water measured at 4.7 mbgs (Elevation 127.0 masl) on September 11, 2023.

ID No.: MW105-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

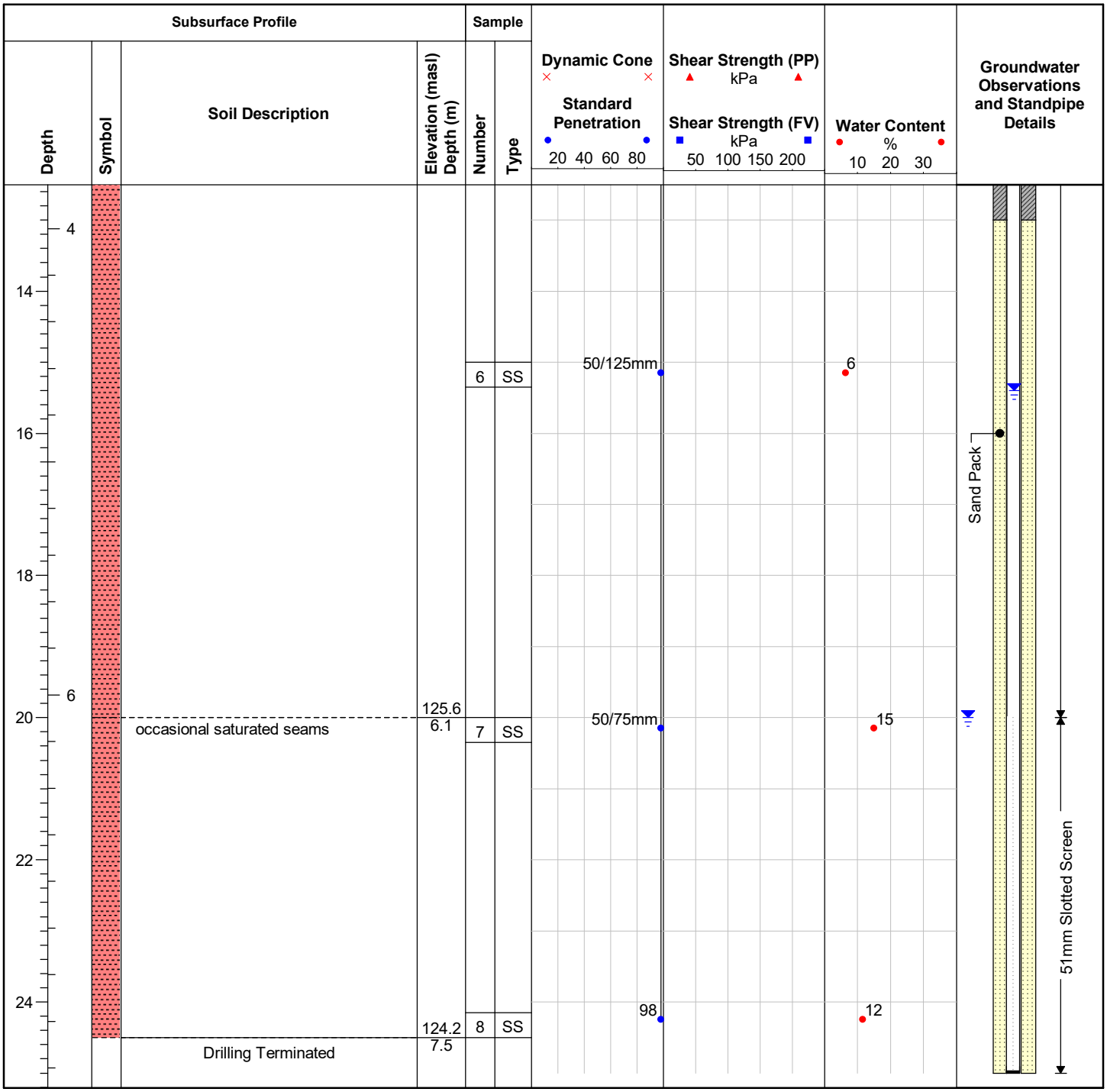
Date Completed: 9/7/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: Monument Casing



Field Technician: N. Wang

Drafted by: B. Graul

Reviewed by: B. Thorner

Sheet: 2 of 2

Notes:
Water measured at 4.7 mbgs (Elevation 127.0 masl) on September 11, 2023.

ID No.: MW106-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

Date Completed: 9/8/2023

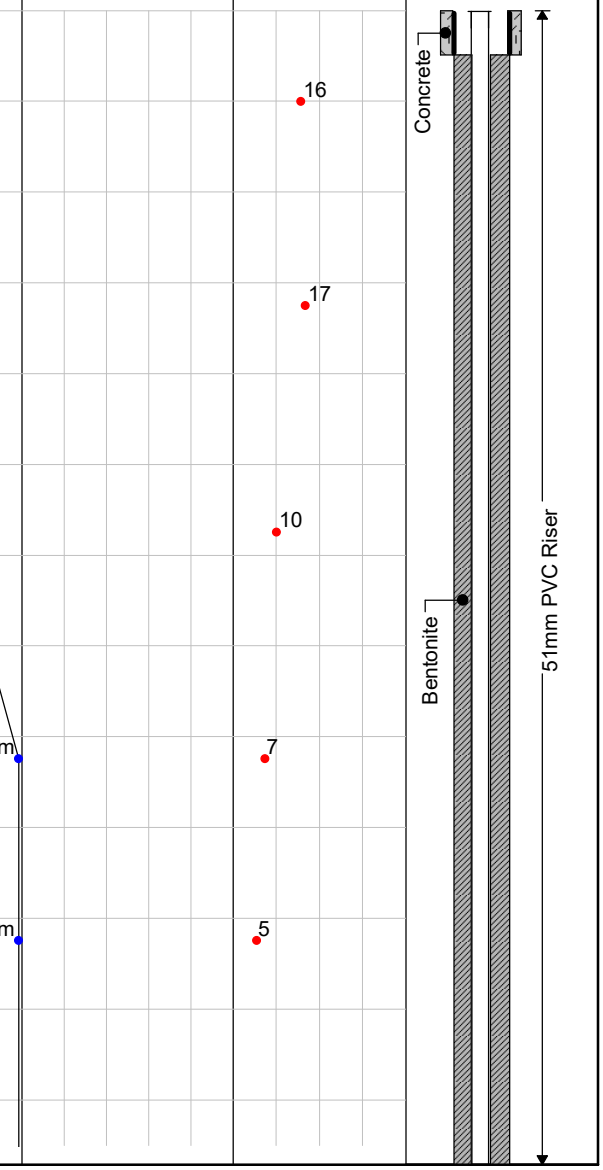
Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: Monument Casing

Depth (ft / m)	Symbol	Soil Description	Elevation (masl) / Depth (m)	Sample Number	Sample Type
0 / 0		Ground Surface	138.5		
		TOPSOIL loose brown silty topsoil, some sand, trace gravel, organics and rootlets (150mm)	0.0 / 138.3		
		FILL loose brown silt, some sand, trace gravel, organics and rootlets, moist	0.2 / 137.7	1	SS
2		**CLAYEY SILT TILL** stiff brown clayey silt, some sand, trace gravel, with light grey seams, and red-brown pockets, APL	0.8 / 137.0	2	SS
4		**SANDY SILT TILL** very dense sandy silt, some clay, trace gravel, occasional cobbles, very moist	1.5 / 136.2	3	SS
6 / 2		**SILT TILL** very dense red-brown silt, trace clay, with shale fragments, damp	2.3 / 135.5	4	SS
8		**GRAVEL AND SAND TILL** very dense red-brown gravel and sand, some silt, trace clay, moist	3.0	5	SS
10					
12					



Field Technician: N. Wang

Drafted by: B. Graul

Reviewed by: B. Thorner

Notes:
Water measured at 4.2 mbgs (Elevation 138.5 masl) on September 11, 2023.

ID No.: MW106-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

Date Completed: 9/8/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: Monument Casing

Depth	Symbol	Soil Description	Elevation (masl) / Depth (m)	Sample Number	Sample Type	Dynamic Cone / Standard Penetration	Shear Strength (PP) kPa / Shear Strength (FV) kPa	Water Content %	Groundwater Observations and Standpipe Details
4									
14									
			133.9						
		SHALE very dense red-brown shale, some silt seams, wet to saturated	4.6	6	SS	50/25mm		25	
16									Sand Pack
18									51mm Slotted Screen
6									
20			132.4	7	SS	50/25mm		16	
		Drilling Terminated	6.1						
22									
24									

Dynamic Cone / Standard Penetration: 20 40 60 80

Shear Strength (PP) kPa / Shear Strength (FV) kPa: 50 100 150 200

Water Content %: 10 20 30

Field Technician: N. Wang

Drafted by: B. Graul

Reviewed by: B. Thorner

Sheet: 2 of 2

Notes:
Water measured at 4.2 mbgs (Elevation 138.5 masl) on September 11, 2023.

ID No.: MW107-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

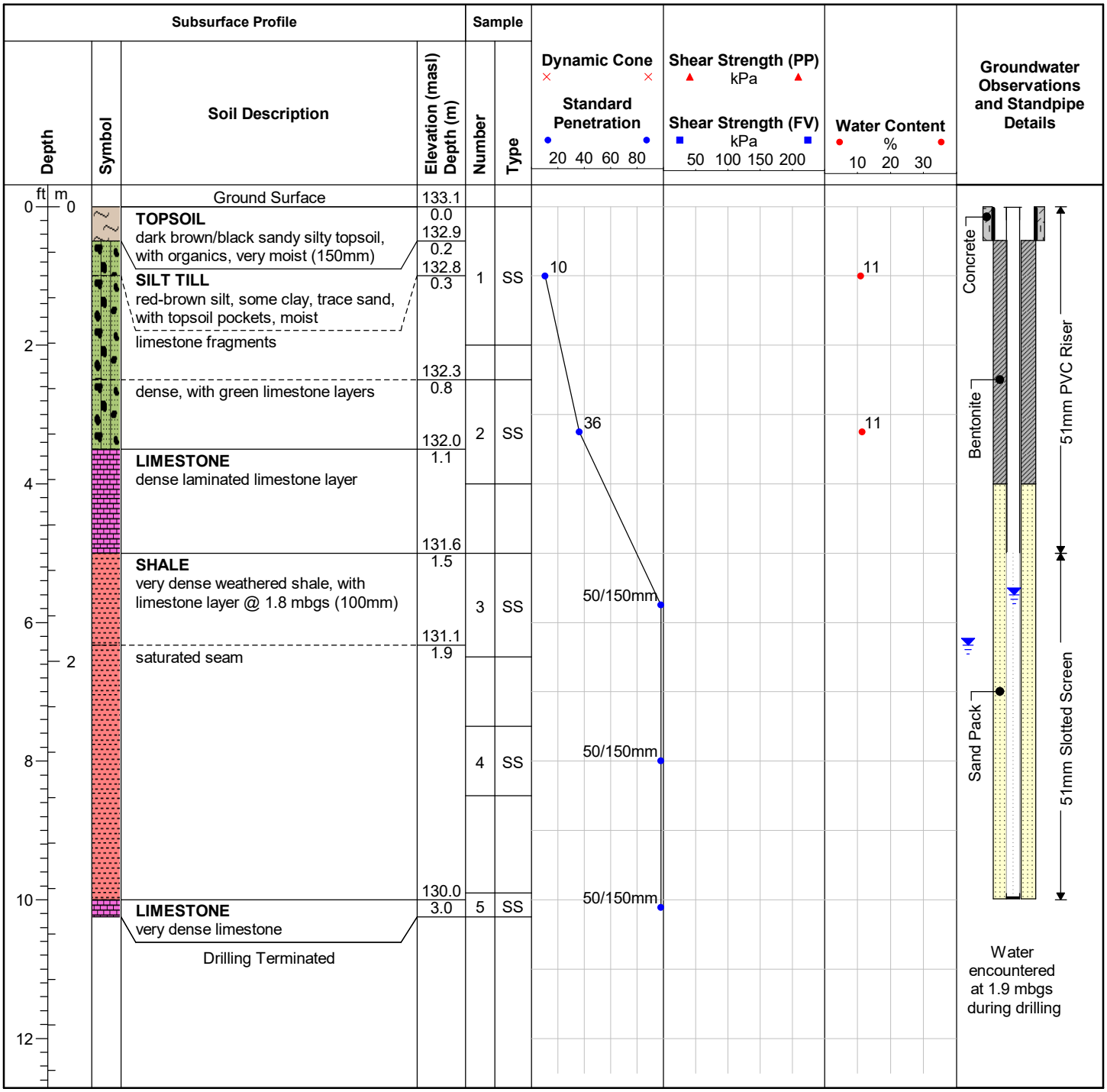
Date Completed: 8/31/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: Monument Casing



Field Technician: B. Ehgoetz

Drafted by: B. Graul

Reviewed by: B. Thorner

Sheet: 1 of 1

Notes:
Water measured at 1.7 mbgs (Elevation 131.4 masl) on September 11, 2023.

ID No.: MW108-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

Date Completed: 9/6/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: Monument Casing

Depth (ft / m)	Soil Description	Elevation (masl) / Depth (m)	Sample Number	Sample Type	Standard Penetration (Dynamic Cone)	Shear Strength (PP) kPa / Shear Strength (FV) kPa	Water Content %
0 / 0	Ground Surface	130.7					
	TOPSOIL dark brown/black sandy silty topsoil, with organics, very moist (200mm)	130.5 / 0.2					
	SANDY SILT TILL compact to very dense red-brown sandy silt, some gravel and clay, trace organics, very moist	130.2 / 0.5	1	SS	10		16
	brown, trace shale and limestone fragments						
	limestone layer @ 0.9 mbgs (50mm)	129.8 / 0.9	2	SS	50/75mm		14
	SHALE very dense red-brown weathered shale, moist	129.0 / 1.7	3	SS	50/125mm		10
	limestone layer @ 2.3 mbgs (75mm)	128.4 / 2.3	4	SS	50/150mm		

Standard Penetration: 20 40 60 80

Shear Strength kPa: 50 100 150 200

Water Content %: 10 20 30

Groundwater Observations and Standpipe Details: Concrete; Bentonite; 51mm PVC Riser

Field Technician: B. Ehgoetz

Drafted by: B. Graul

Reviewed by: B. Thorner

Notes:
Water measured at 3.5 mbgs (Elevation 127.2 masl) on September 11, 2023.

ID No.: MW108-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

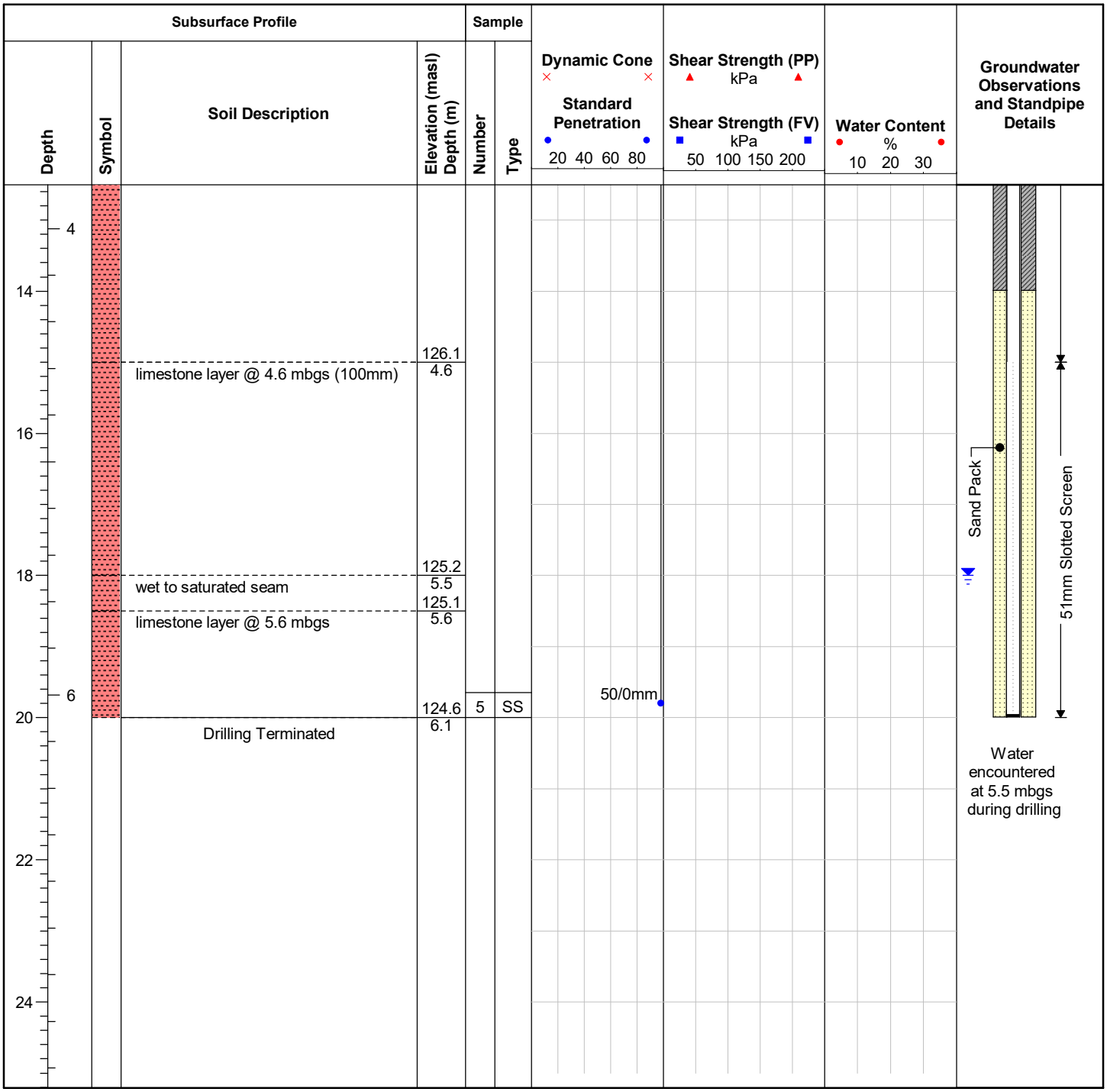
Date Completed: 9/6/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: Monument Casing



Field Technician: B. Ehgoetz

Drafted by: B. Graul

Reviewed by: B. Thorner

Sheet: 2 of 2

Notes:
Water measured at 3.5 mbgs (Elevation 127.2 masl) on September 11, 2023.

ID No.: MW109-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

Date Completed: 9/8/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: N/A

Depth (ft / m)	Symbol	Soil Description	Elevation (masl) / Depth (m)	Sample Number	Sample Type	Dynamic Cone / Standard Penetration	Shear Strength (PP) kPa / Shear Strength (FV) kPa	Water Content %	Groundwater Observations and Standpipe Details
0 / 0		Ground Surface	133.2						
		TOPSOIL dark brown sandy silty topsoil, some organics, very moist (360mm)	0.0 / 132.8	1	SS	7		21	Concrete
2		**FILL** compact to dense mottled red-brown/brown silt, some sand, trace clay, with rootlets and topsoil pockets, moist	0.4 / 132.2	2	SS	43		15	
4		**SILT TILL** dense red-brown silt, some clay, trace sand, with limestone and shale fragments, moist	1.0 / 131.7	3	SS	50/125mm		8	Bentonite
6 / 2		**SHALE** very dense red-brown weathered shale, with limestone seams, moist	1.5	4	SS	50/75mm		5	
8				5	SS	50/50mm		4	Sand Pack
10									51mm PVC Riser
12									

Dynamic Cone / Standard Penetration: 20 40 60 80

Shear Strength (PP) kPa / Shear Strength (FV) kPa: 50 100 150 200

Water Content %: 10 20 30

Field Technician: N. Wang

Drafted by: B. Graul

Reviewed by: B. Thorner

Notes:
Water measured at 1.3 mbgs (Elevation 131.9 masl) on September 11, 2023.

ID No.: MW109-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

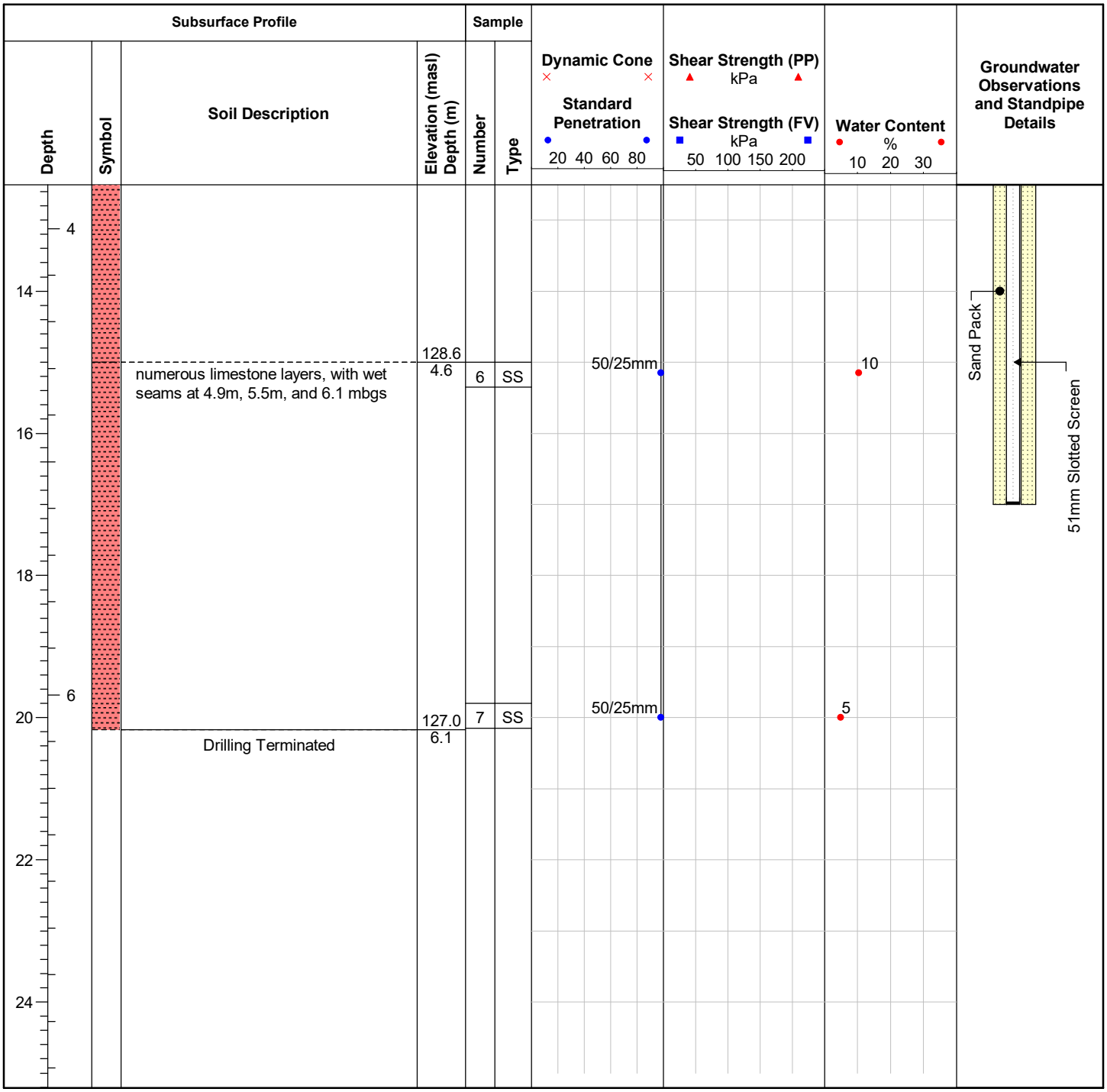
Date Completed: 9/8/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: N/A



Field Technician: N. Wang

Drafted by: B. Graul

Reviewed by: B. Thorner

Notes:
Water measured at 1.3 mbgs (Elevation 131.9 masl) on September 11, 2023.

ID No.: MW110-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

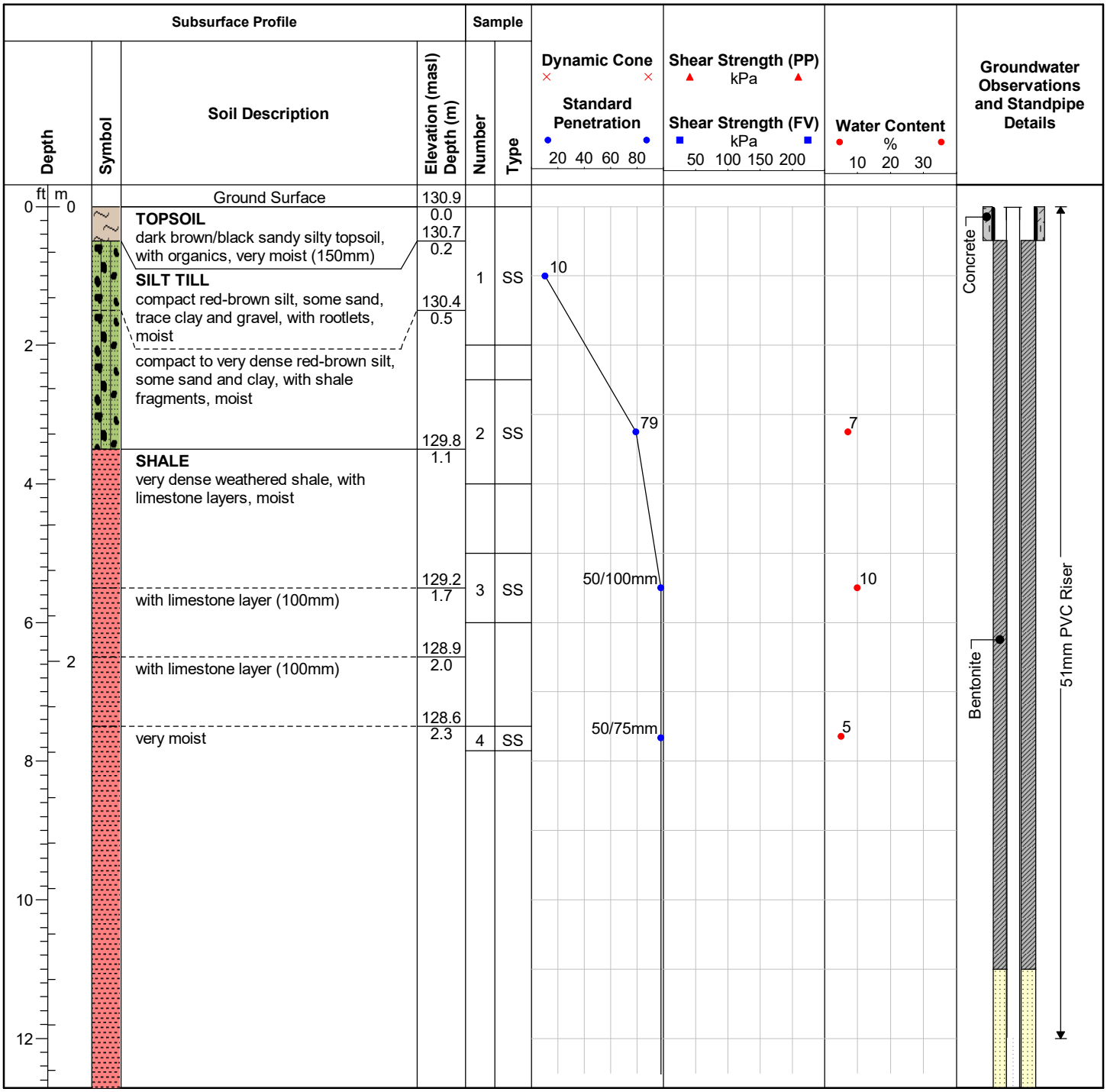
Date Completed: 9/6/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: Monument Casing



Field Technician: B. Ehgoetz

Drafted by: B. Graul

Reviewed by: B. Thorner

Notes:
Water measured on September 11, 2023. Monitoring well was dry at the time of measurement.

ID No.: MW110-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

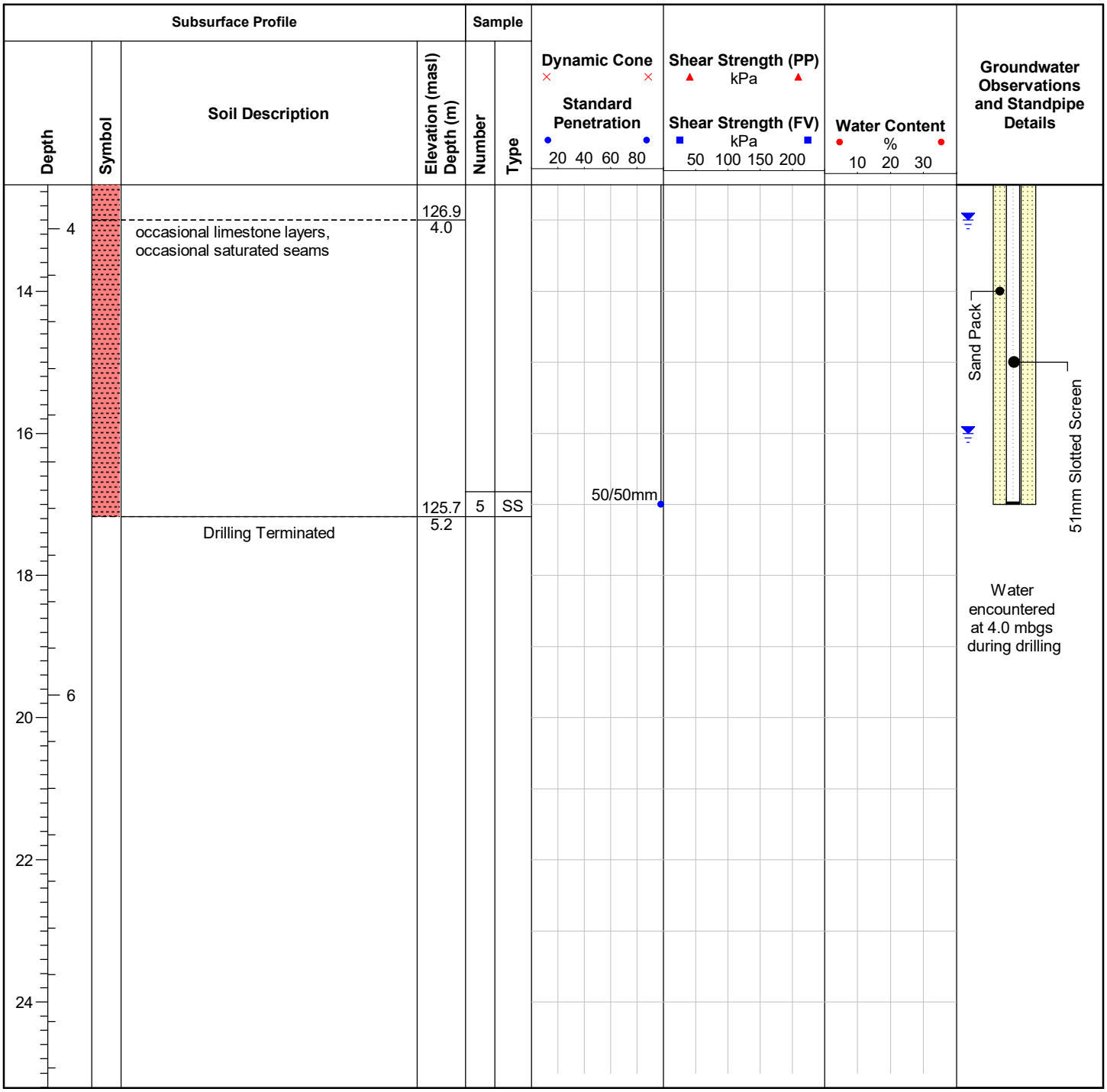
Date Completed: 9/6/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: Monument Casing



Field Technician: B. Ehgoetz

Drafted by: B. Graul

Reviewed by: B. Thorner

Sheet: 2 of 2

Notes:
Water measured on September 11, 2023. Monitoring well was dry at the time of measurement.

ID No.: BH111-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

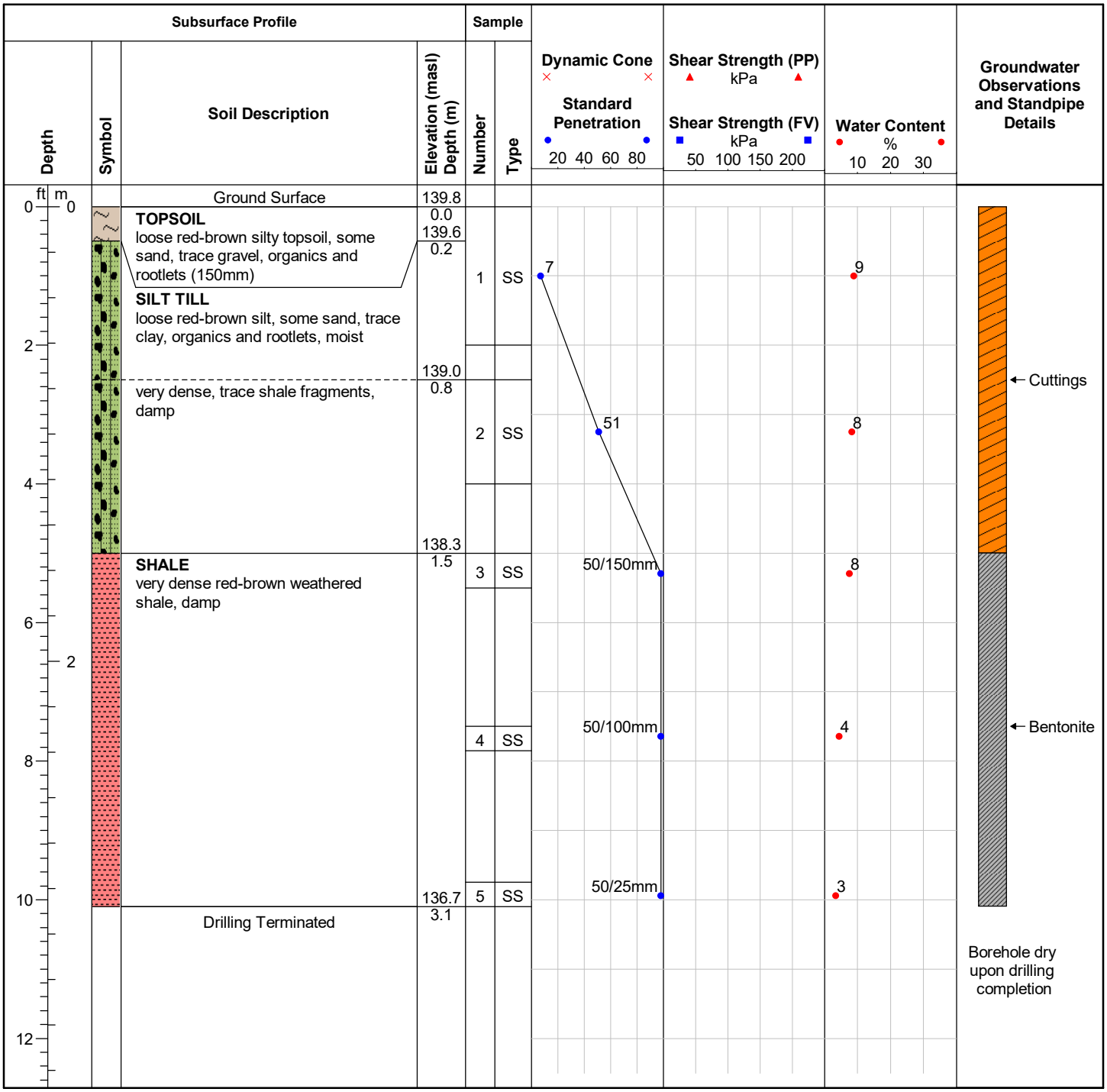
Date Completed: 9/5/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: N/A



Field Technician: N. Wang

Drafted by: B. Graul

Reviewed by: B. Thorner

MTE

ID No.: BH112-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

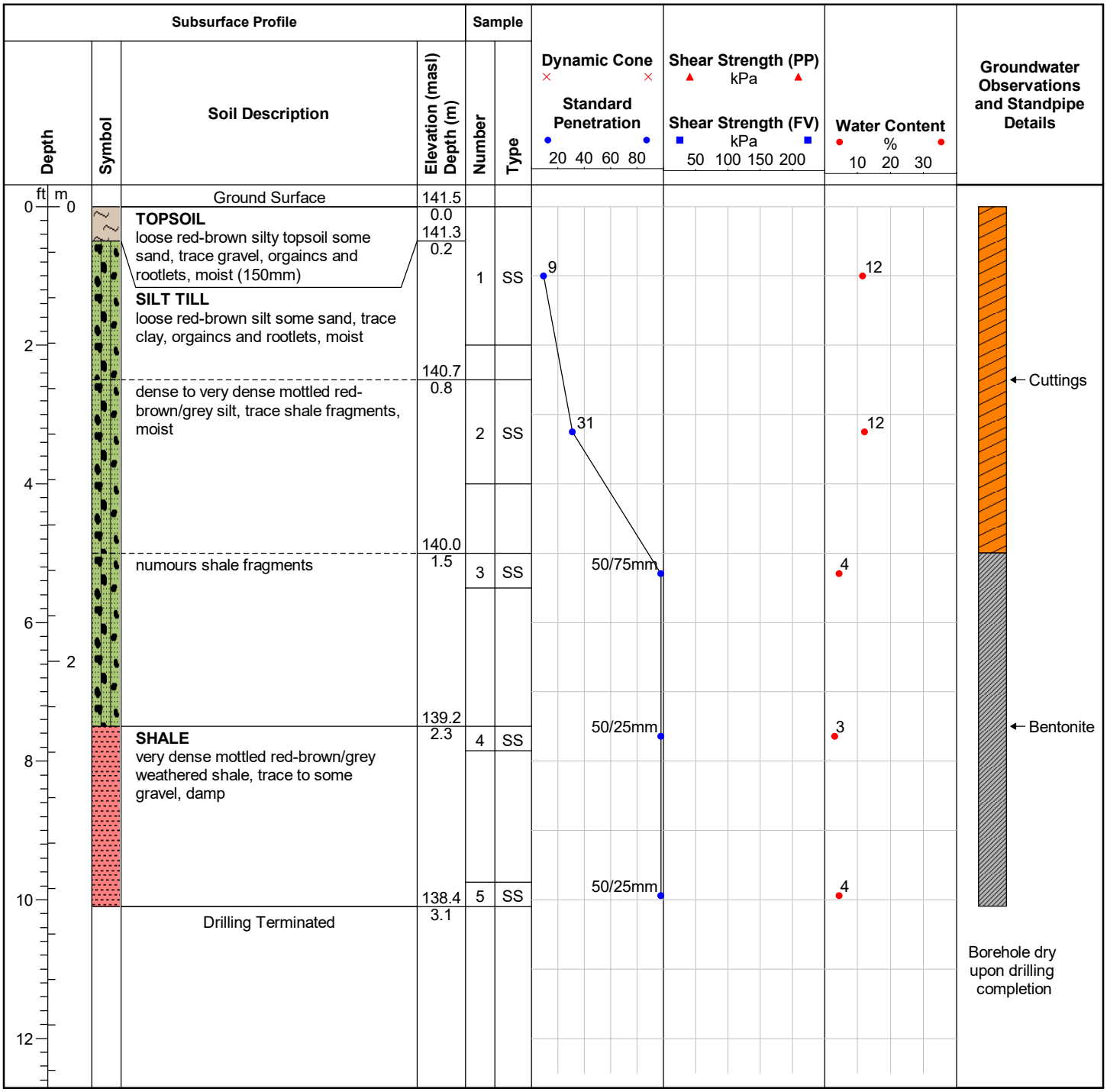
Date Completed: 9/5/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: N/A



Field Technician: N. Wang

Drafted by: B. Graul

Reviewed by: B. Thorner

Sheet: 1 of 1

ID No.: BH113-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

Date Completed: 9/1/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: N/A

Depth (ft / m)	Symbol	Soil Description	Elevation (masl) / Depth (m)	Sample Number	Sample Type	Dynamic Cone / Standard Penetration	Shear Strength (PP) kPa / Shear Strength (FV) kPa	Water Content %	Groundwater Observations and Standpipe Details
0 / 0		Ground Surface	141.3						
		TOPSOIL loose brown silty topsoil, some sand, trace gravel, organics and rootlets, moist (150mm)	0.0 / 141.1 / 0.2	1	SS	7		18	
		SILT TILL loose brown silt, some sand and clay, trace rootlets, moist	140.5						
		very dense, red-brown, trace sand, with shale and limestone fragments, moist	0.8	2	SS	80/225mm		8	
		SHALE very dense red-brown weathered shale, moist to damp	139.8 / 1.5	3	SS	50/150mm		11	
				4	SS	50/125mm		7	
				5	SS	50/100mm		6	
		Drilling Terminated	138.2 / 3.1						

Cuttings

Bentonite

Borehole dry upon drilling completion

Field Technician: N. Wang

Drafted by: B. Graul

Reviewed by: B. Thorner

MTE

ID No.: BH114-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

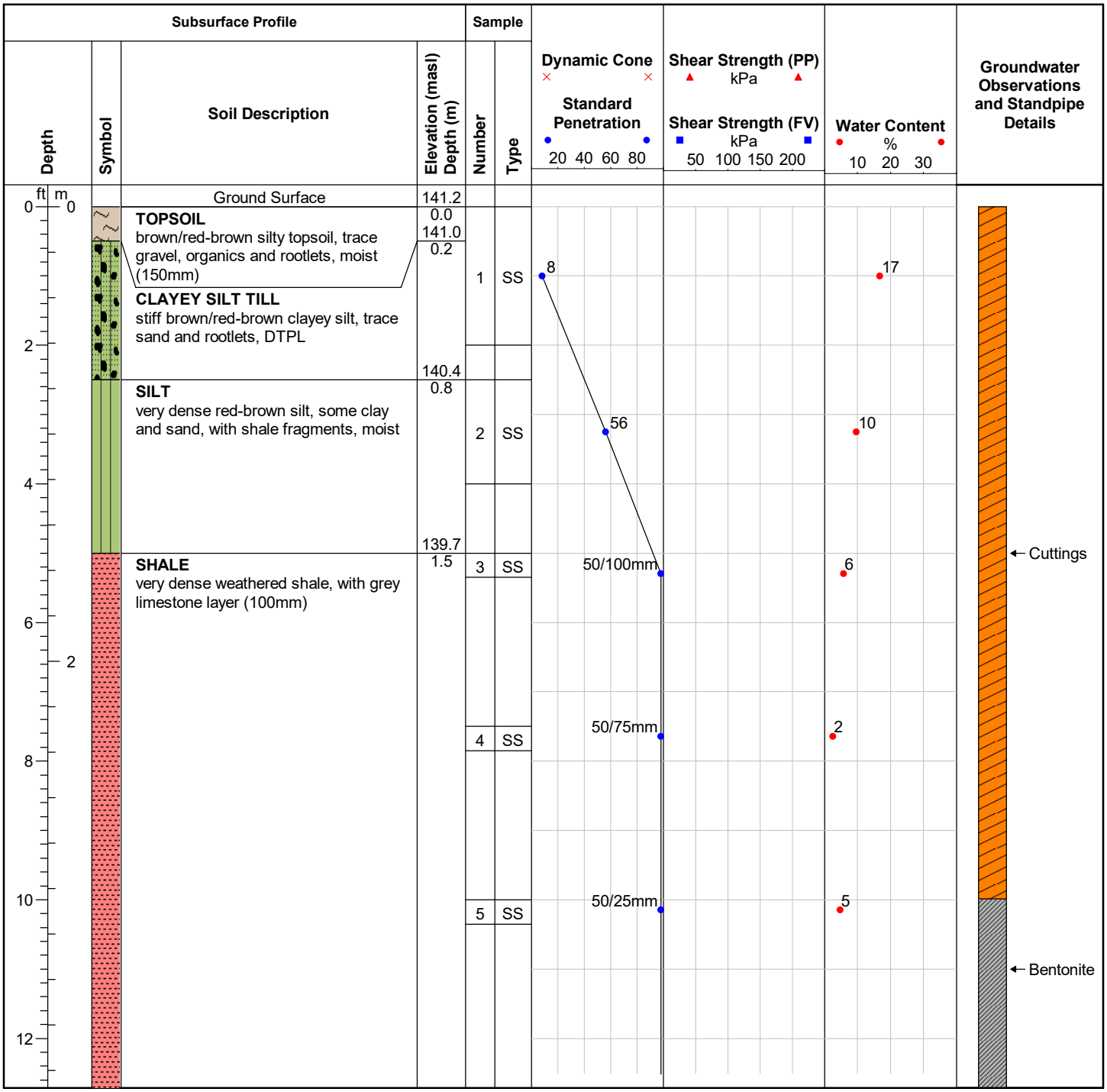
Date Completed: 9/1/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: N/A



Field Technician: N. Wang

Drafted by: B. Graul

Reviewed by: B. Thorner

Sheet: 1 of 2

ID No.: BH114-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

Date Completed: 9/1/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: N/A

Subsurface Profile				Sample		Dynamic Cone / Standard Penetration (20 40 60 80)	Shear Strength (PP) kPa / Shear Strength (FV) kPa (50 100 150 200)	Water Content % (10 20 30)	Groundwater Observations and Standpipe Details
Depth	Symbol	Soil Description	Elevation (masl) Depth (m)	Number	Type				
14									
16									
18									
20									
22									
24									
4									
6									
			136.6	6	SS	50/50mm		2	
		Drilling Terminated	4.6						Bentonite; Borehole dry upon drilling completion

Field Technician: N. Wang

Drafted by: B. Graul

Reviewed by: B. Thorner

MTE

ID No.: BH115-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

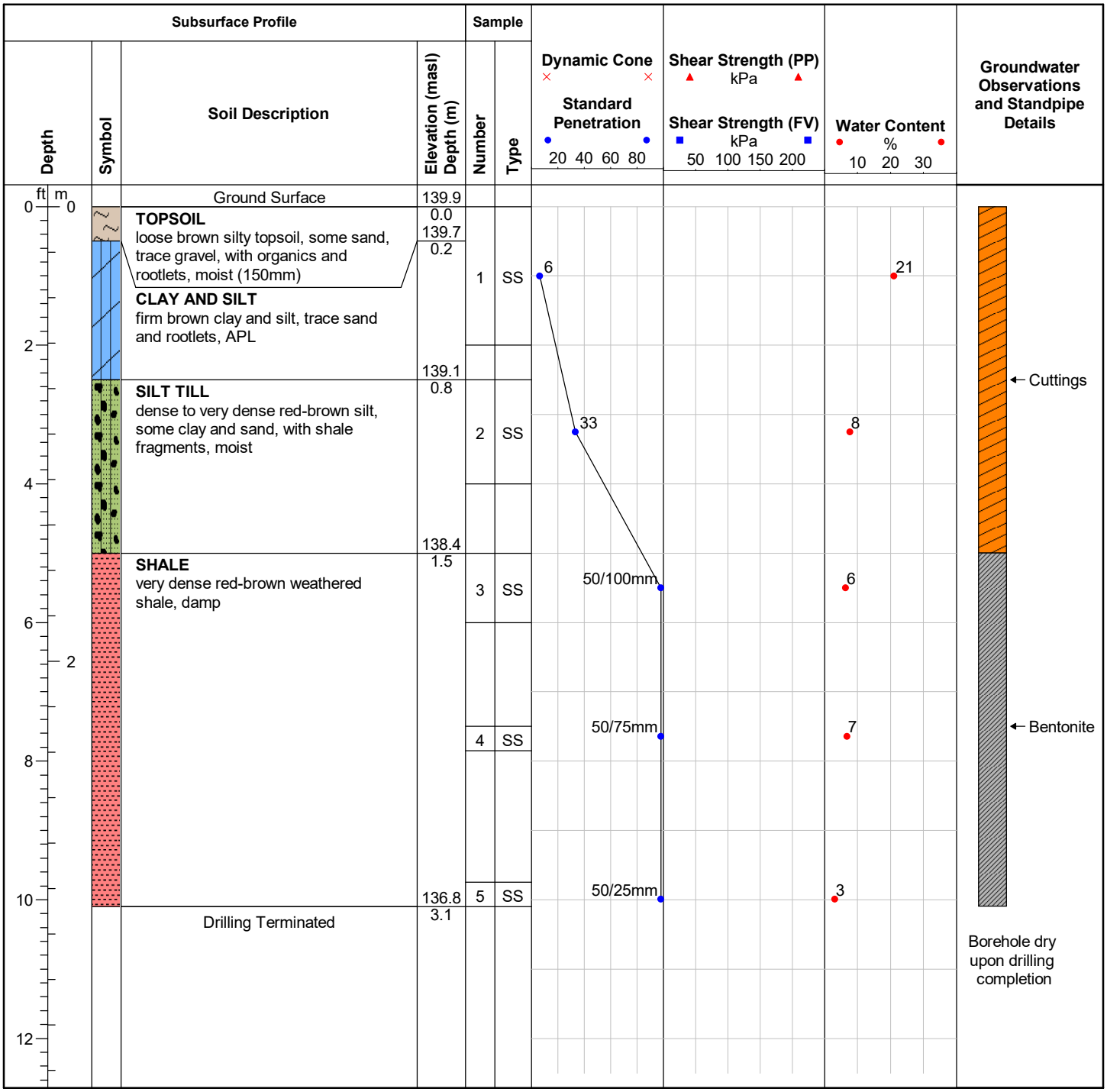
Date Completed: 9/1/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: N/A



Field Technician: N. Wang

Drafted by: B. Graul

Reviewed by: B. Thorner

Sheet: 1 of 1

ID No.: BH116-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

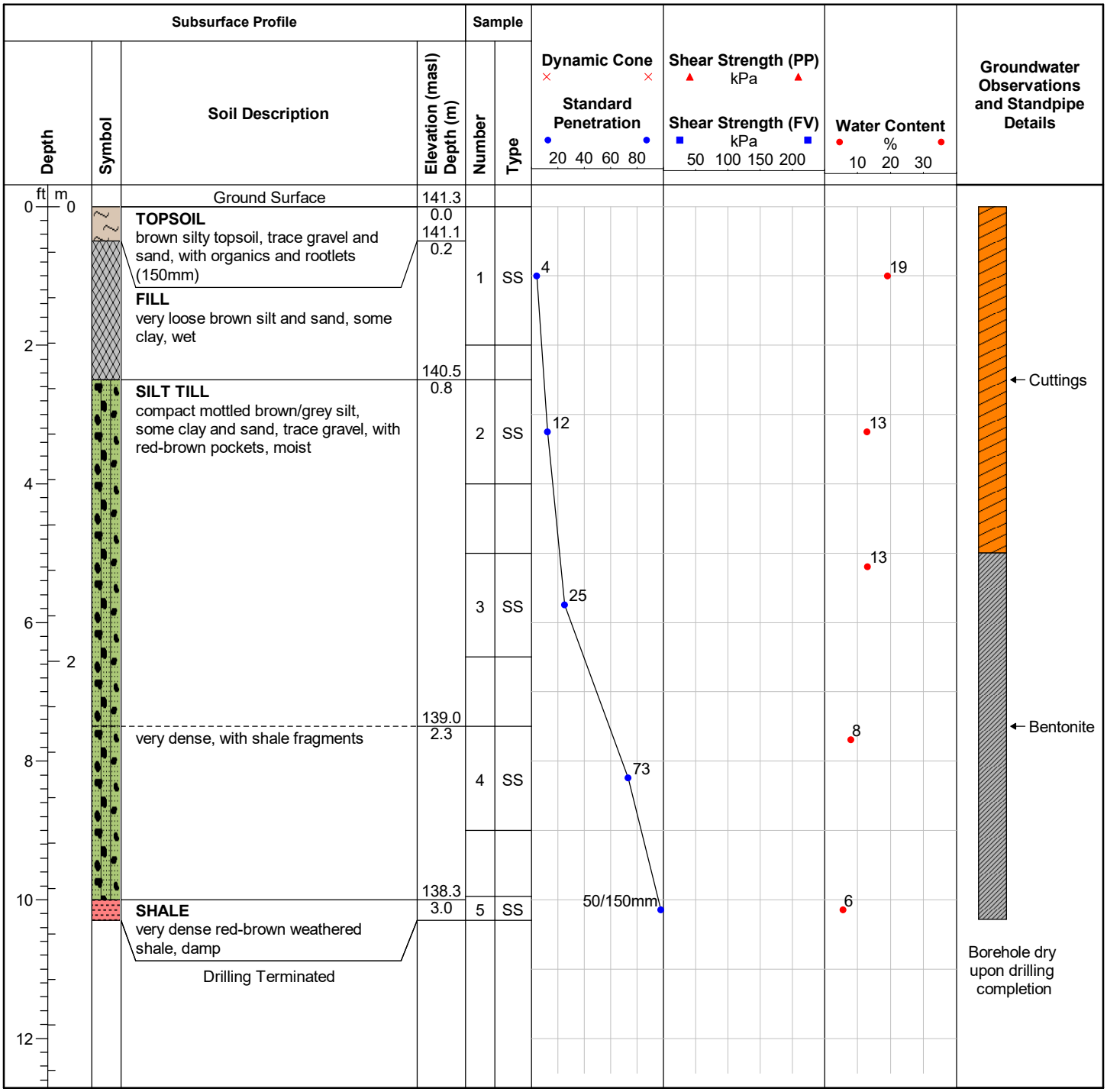
Date Completed: 8/30/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: N/A



Field Technician: N. Wang

Drafted by: B. Graul

Reviewed by: B. Thorner

Sheet: 1 of 1

ID No.: BH117-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

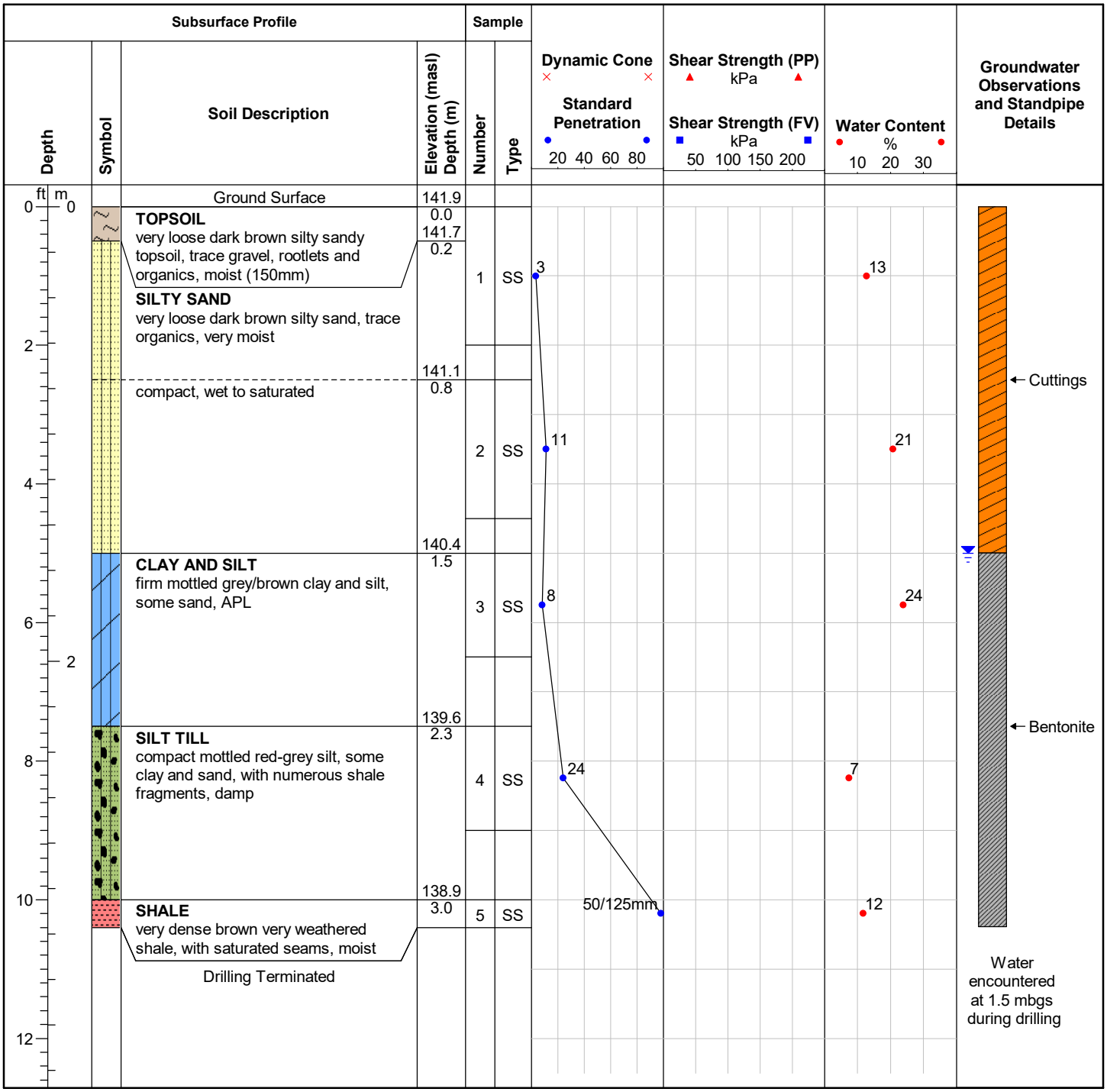
Date Completed: 8/30/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: N/A



Field Technician: N. Wang

Drafted by: B. Graul

Reviewed by: B. Thorner

Sheet: 1 of 1

ID No.: BH118-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

Date Completed: 8/30/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: N/A

Depth (ft / m)	Symbol	Soil Description	Elevation (masl) / Depth (m)	Sample Number	Sample Type	Standard Penetration (Dynamic Cone)	Shear Strength (PP) kPa / Shear Strength (FV) kPa	Water Content %	Groundwater Observations and Standpipe Details
0 ft / 0 m		Ground Surface	141.0						
		TOPSOIL loose red-brown silty topsoil, trace gravel, organics and rootlets, moist (150mm)	0.0 / 140.8						
		SILT TILL loose mottled red-brown/brown silt, some clay and sand, trace rootlets, very moist	0.2	1	SS	7		17	
2			140.2						
		very dense, red-brown, with numerous shale fragments	0.8	2	SS	74/250mm		7	← Cuttings
4			139.5						
		SHALE very dense red-brown weathered shale, moist	1.5	3	SS	50/75mm		7	
6 — 2									← Bentonite
			138.6	4	SS	50/75mm		6	
8		Drilling Terminated	2.4						Borehole dry upon drilling completion
10									
12									

Standard Penetration: 20 40 60 80

Shear Strength kPa: 50 100 150 200

Water Content %: 10 20 30

Field Technician: N. Wang

Drafted by: B. Graul

Reviewed by: B. Thorner

MTE

ID No.: BH119-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

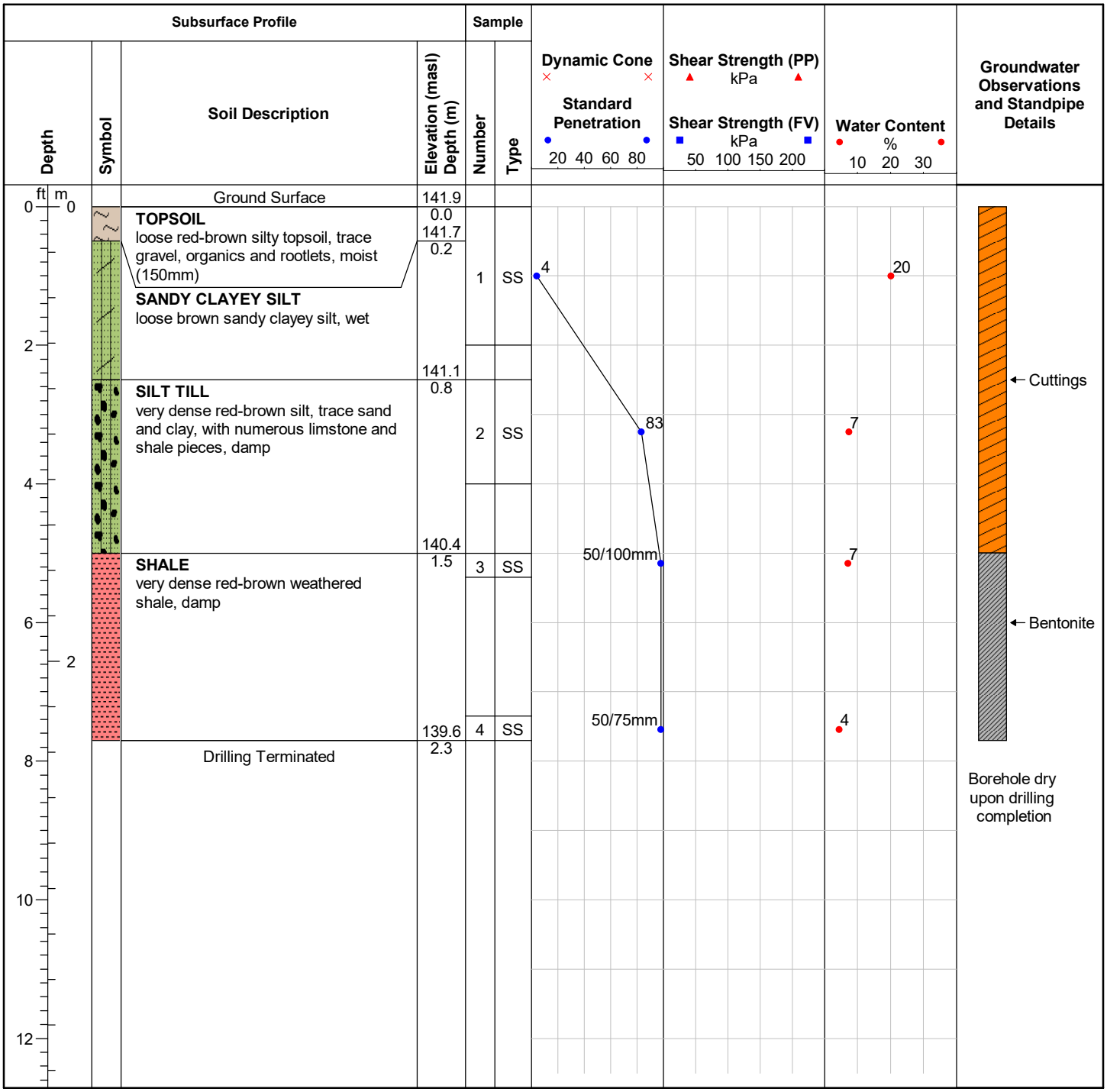
Date Completed: 8/30/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: N/A



Field Technician: N. Wang

Drafted by: B. Graul

Reviewed by: B. Thorner

Sheet: 1 of 1

ID No.: BH120-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

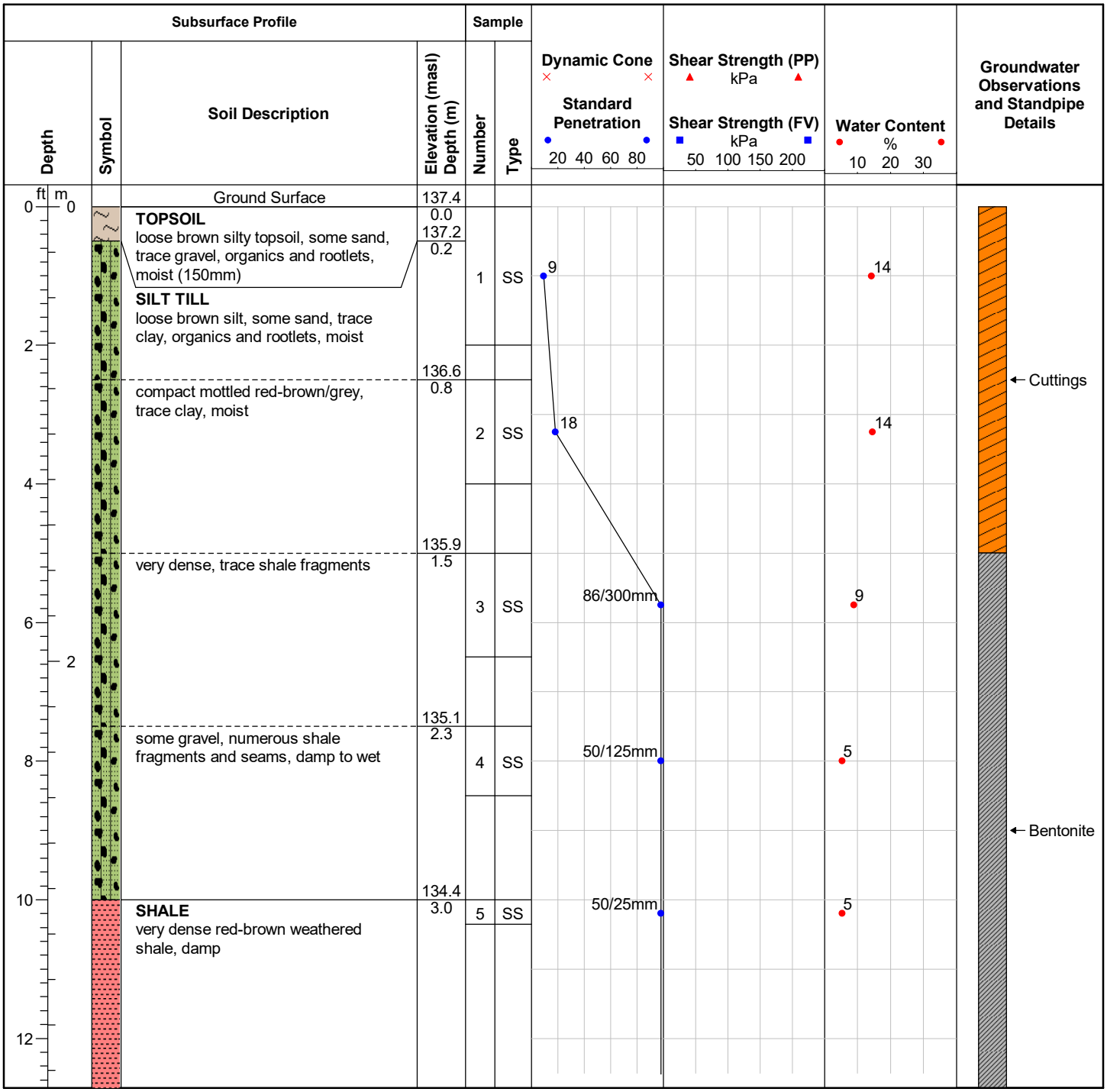
Date Completed: 9/5/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: N/A



Field Technician: N. Wang

Drafted by: B. Graul

Reviewed by: B. Thorner

Sheet: 1 of 2

ID No.: BH120-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

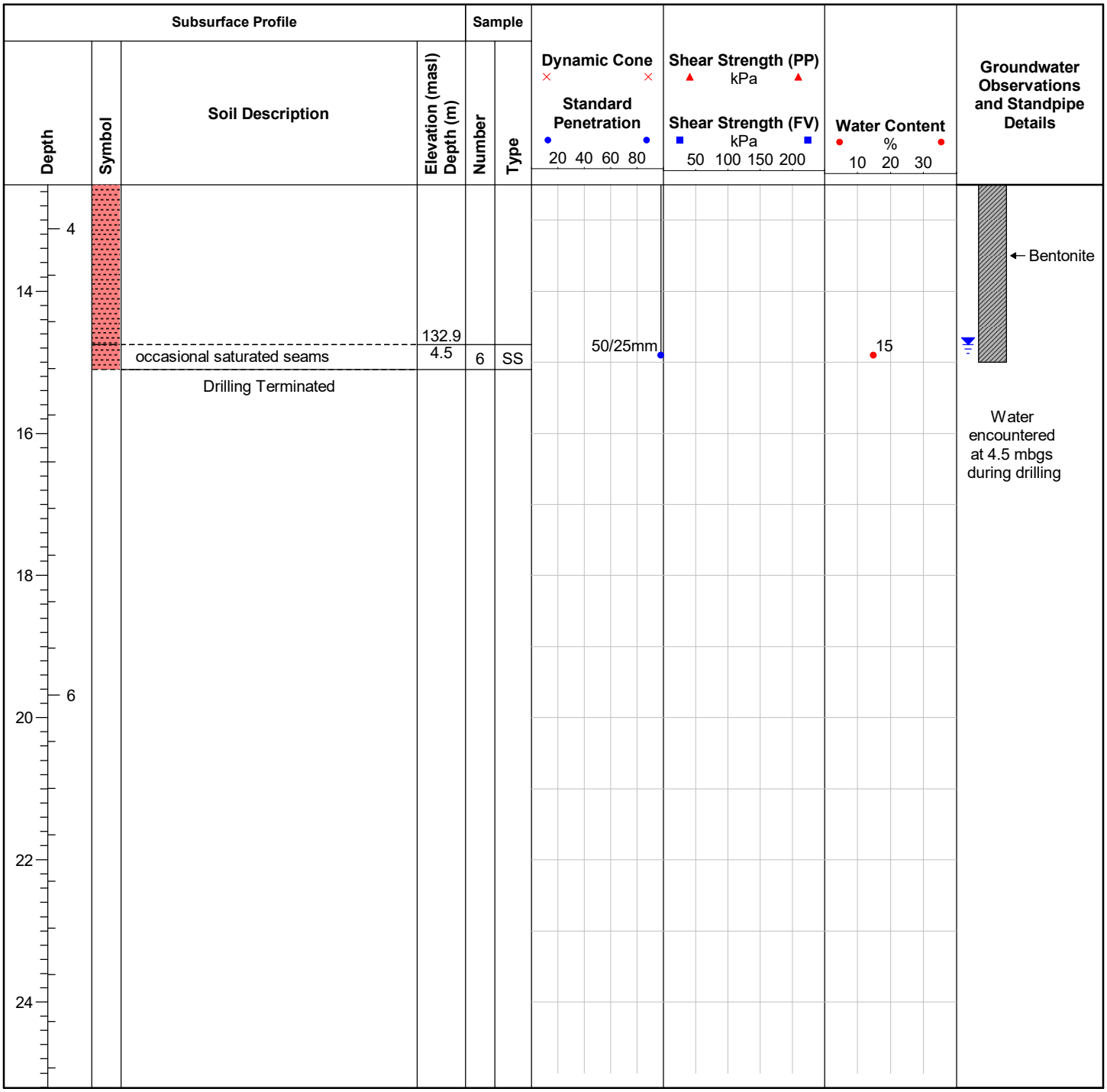
Date Completed: 9/5/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: N/A



Field Technician: N. Wang

Drafted by: B. Graul

Reviewed by: B. Thorner

Sheet: 2 of 2

ID No.: BH121-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

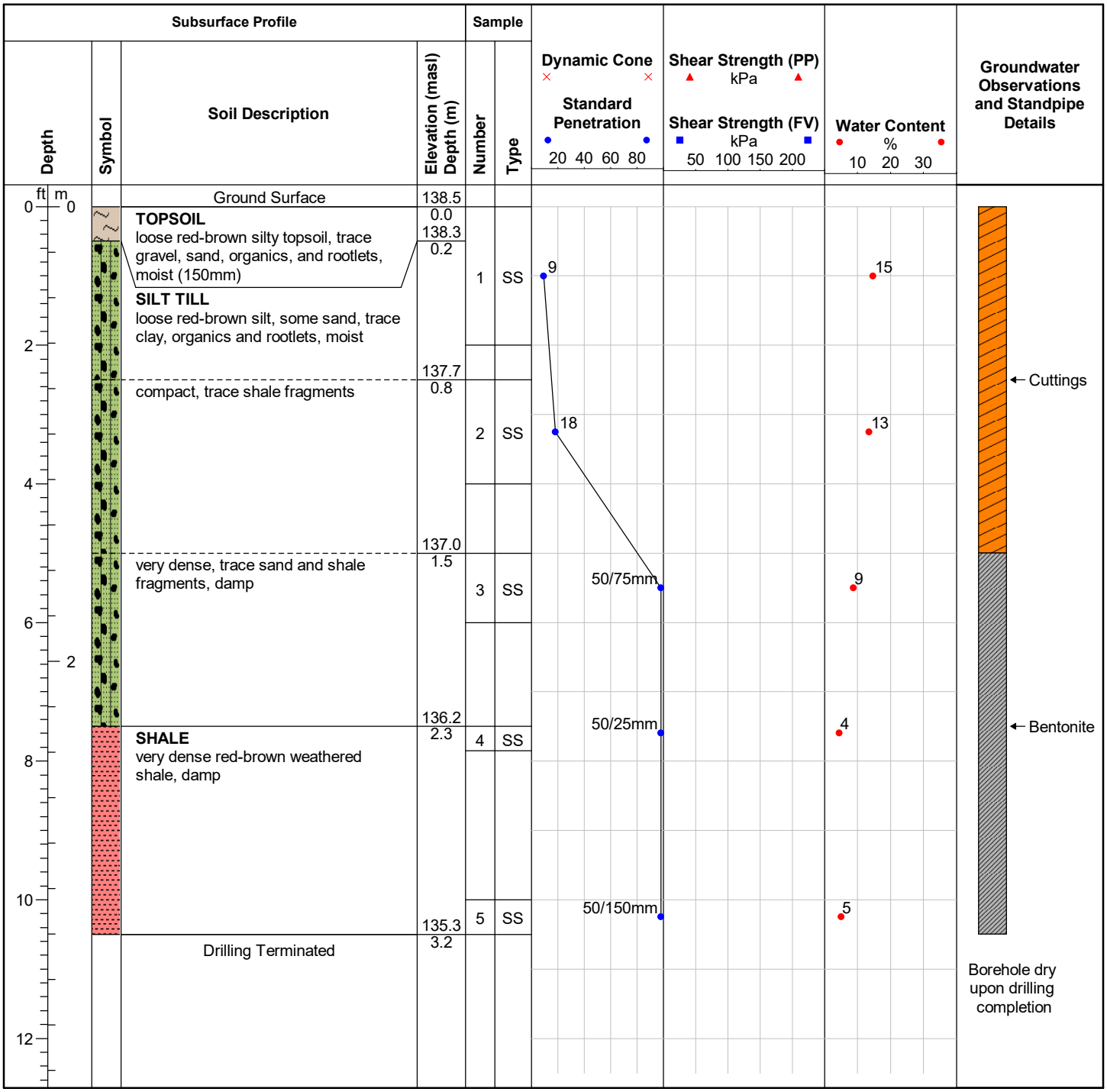
Date Completed: 9/5/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: N/A



Field Technician: N. Wang

Drafted by: B. Graul

Reviewed by: B. Thorner

Sheet: 1 of 1

ID No.: BH122-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

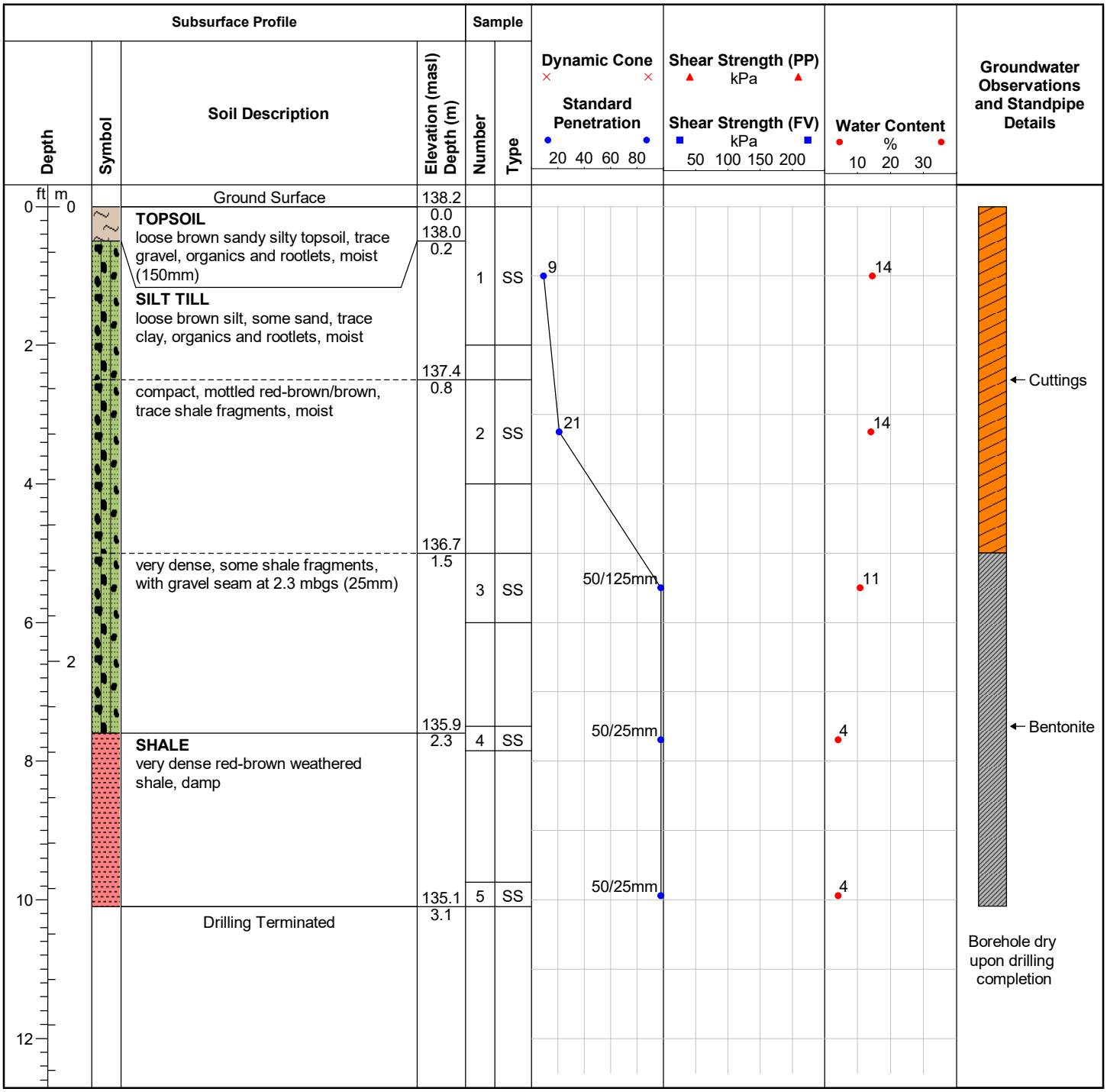
Date Completed: 9/8/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: N/A



Field Technician: N. Wang

Drafted by: B. Graul

Reviewed by: B. Thorner

Sheet: 1 of 1

ID No.: BH123-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

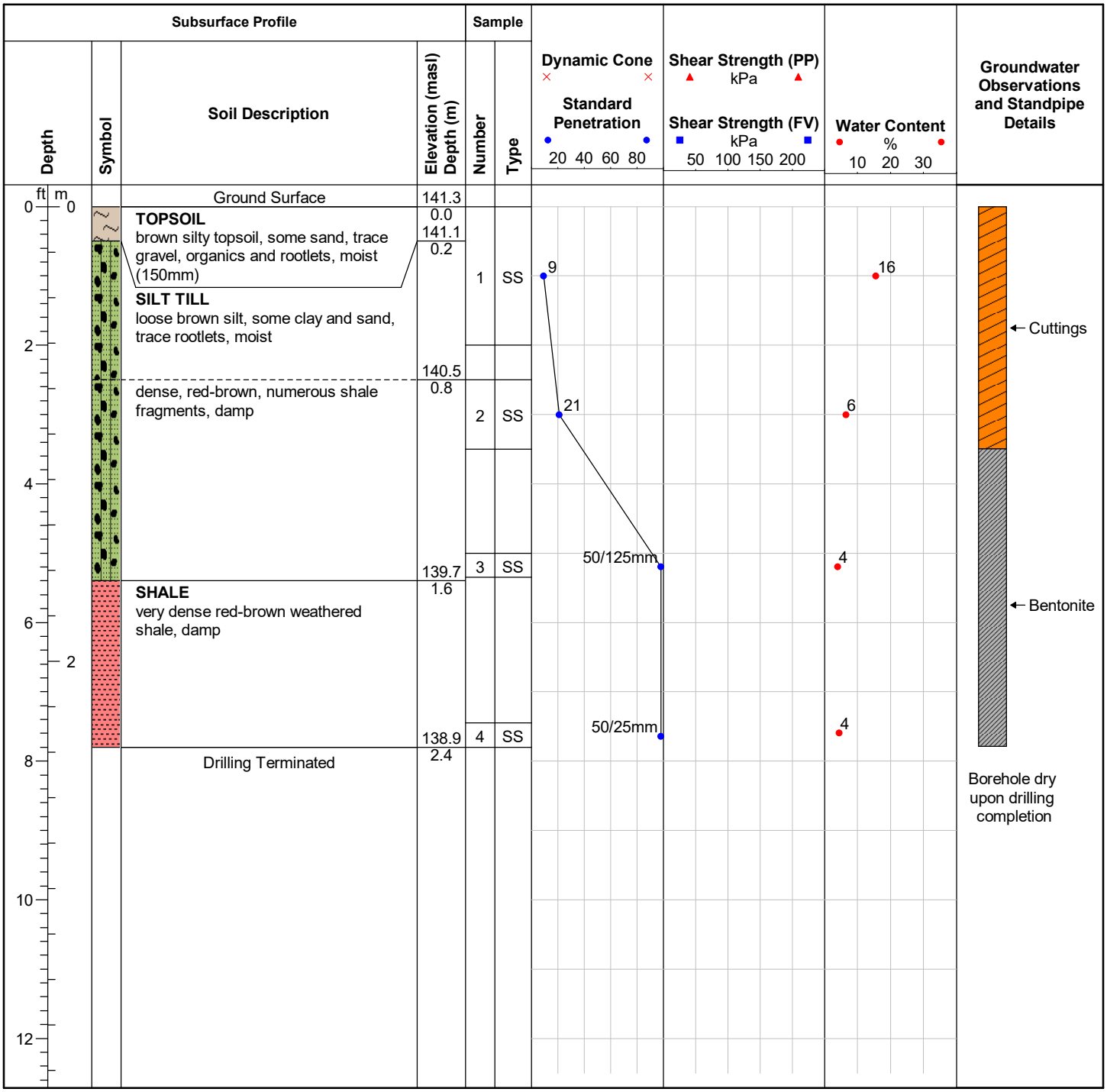
Date Completed: 9/8/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: N/A



Field Technician: N. Wang

Drafted by: B. Graul

Reviewed by: B. Thorner

Sheet: 1 of 1

ID No.: BH124-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

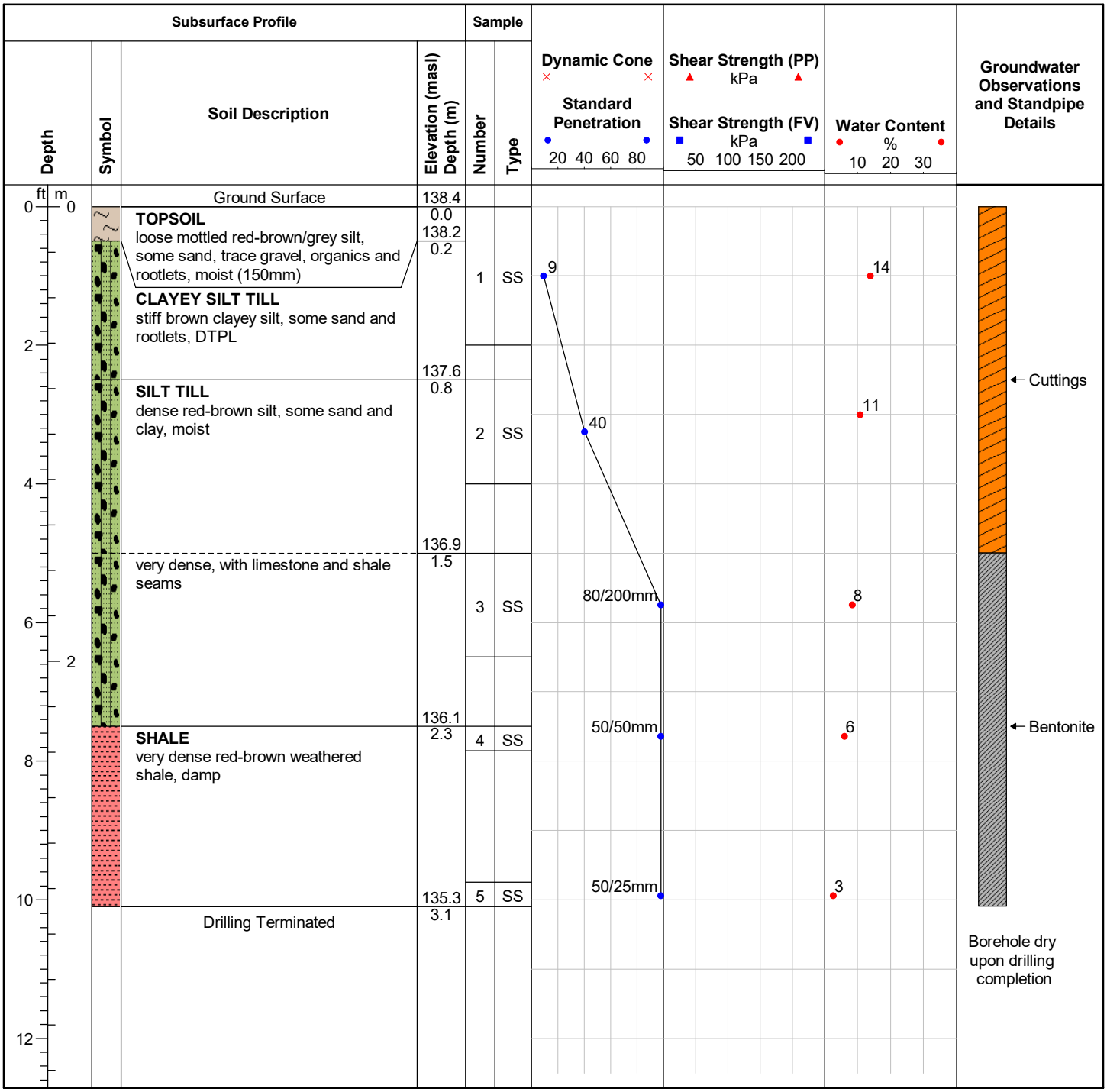
Date Completed: 9/8/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: N/A



Field Technician: N. Wang

Drafted by: B. Graul

Reviewed by: B. Thorner

Sheet: 1 of 1

ID No.: BH125-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

Date Completed: 9/8/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: N/A

Depth (ft / m)	Symbol	Soil Description	Elevation (masl) / Depth (m)	Sample Number	Sample Type	Standard Penetration (Dynamic Cone)	Shear Strength (PP) kPa / Shear Strength (FV) kPa	Water Content %	Groundwater Observations and Standpipe Details
0 ft / 0 m		Ground Surface	138.0						
		TOPSOIL loose brown red-brown silty topsoil, some sand, trace gravel, organics and rootlets, moist (150mm)	0.0 / 137.8						
		CLAYEY SILT TILL stiff brown clayey silt, some sand, trace rootlets, DTPL	0.2 / 137.2	1	SS	9		14	
2 ft / 1 m		**SILT TILL** dense to very dense red-brown silt, some gravel, sand and shale, moist	0.8 / 136.3	2	SS	40		5	← Cuttings
				3	SS	80/200mm		6	← Bentonite
6 ft / 2 m		**SHALE** very dense red-brown weathered shale, damp	1.7 / 135.7	4	SS	50/50mm		3	
		Drilling Terminated	2.3						Borehole dry upon drilling completion
8 ft									
10 ft									
12 ft									

Field Technician: N. Wang

Drafted by: B. Graul

Reviewed by: B. Thorner

MTE

ID No.: BH126-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

Date Completed: 9/8/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: N/A

Depth (ft / m)	Symbol	Soil Description	Elevation (masl) / Depth (m)	Sample Number	Sample Type
0 / 0		Ground Surface	138.4		
		TOPSOIL loose mottled brown/red-brown silty topsoil, some sand, trace gravel, organics and rootlets, moist (150mm)	0.0 / 138.2 / 0.2	1	SS
2		**FILL** loose mottled brown/red-brown silt, some sand, trace gravel, organics and rootlets, moist	137.6		
		SILT TILL dense to very dense red-brown silt, some clay and sand, with shale fragments, moist	0.8	2	SS
4			136.8		
		SHALE very dense red-brown weathered shale, some silt, damp	1.6	3	SS
6 / 2					
			136.1	4	SS
8		Drilling Terminated	2.3		
10					
12					

Dynamic Cone – Standard Penetration: 8, 35, 50/50mm, 50/50mm

Shear Strength (PP) kPa / Shear Strength (FV) kPa

Water Content %: 12, 8, 7, 4

Groundwater Observations and Standpipe Details: Cuttings; Bentonite; Borehole dry upon drilling completion

Field Technician: N. Wang

Drafted by: B. Graul

Reviewed by: B. Thorner

MTE

ID No.: BH127-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

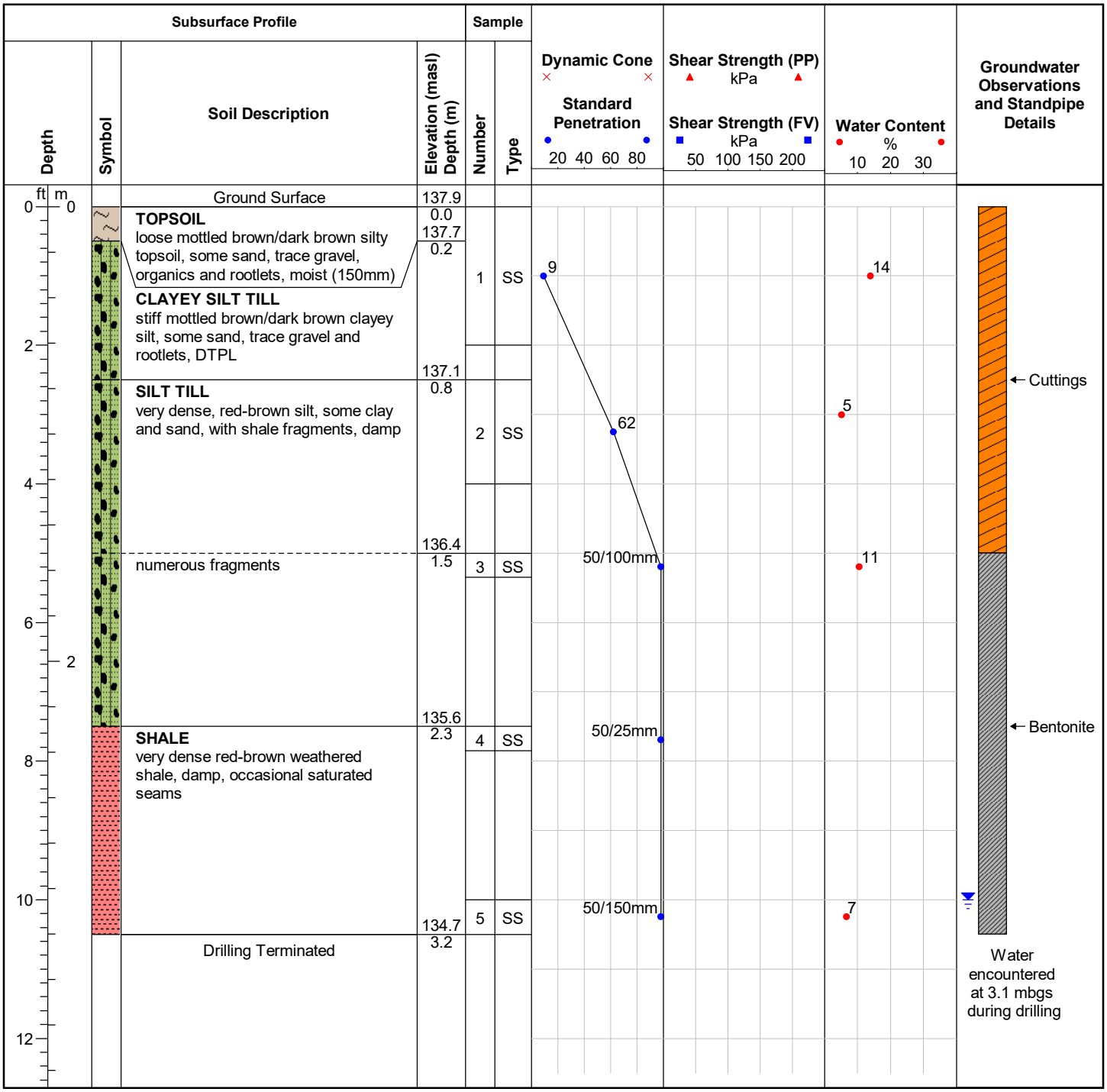
Date Completed: 9/7/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: N/A



Field Technician: N. Wang

Drafted by: B. Graul

Reviewed by: B. Thorner

Sheet: 1 of 1

ID No.: BH128-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

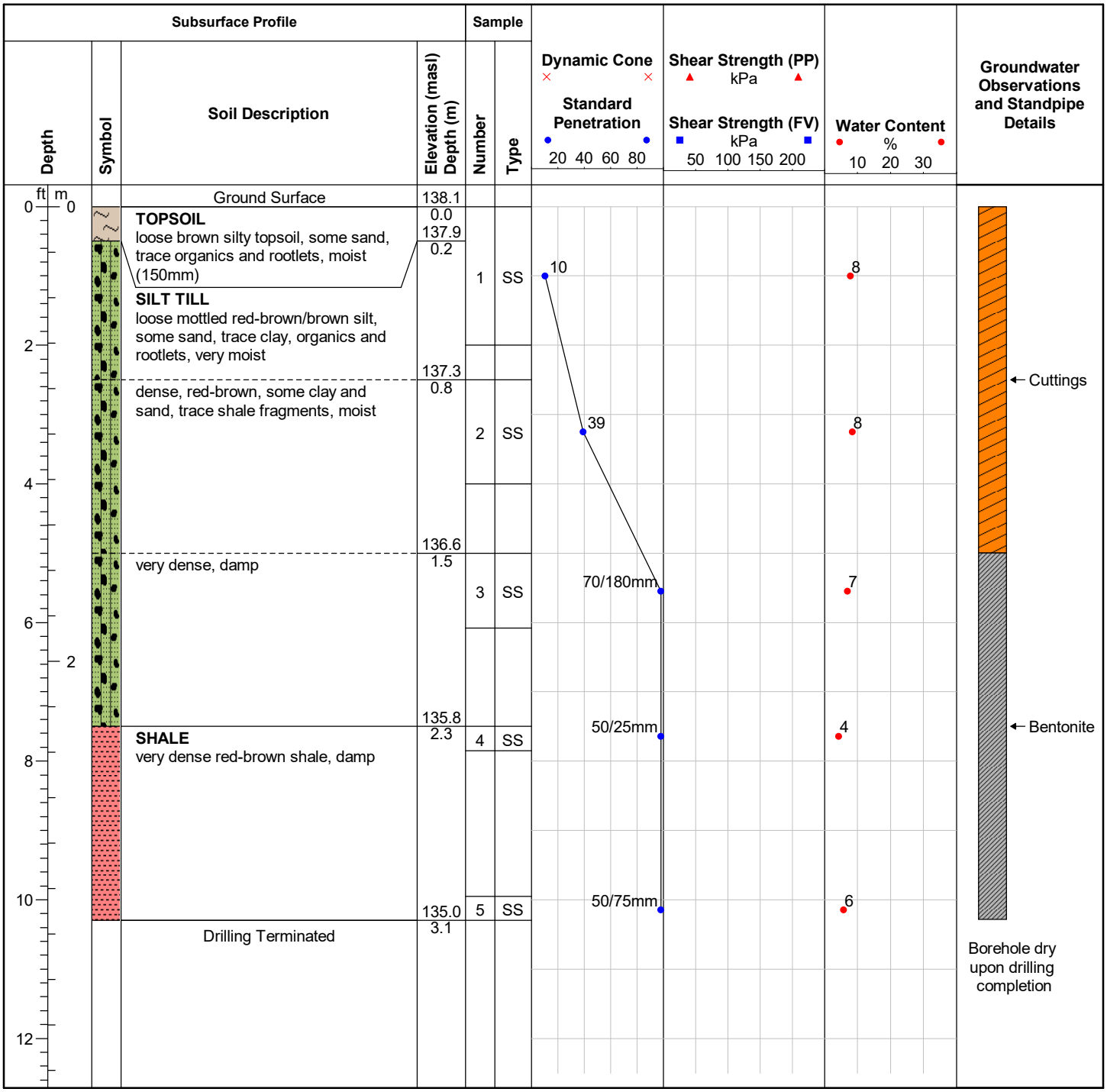
Date Completed: 9/6/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: N/A



Field Technician: N. Wang

Drafted by: B. Graul

Reviewed by: B. Thorner

Sheet: 1 of 1

ID No.: BH129-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

Date Completed: 8/30/2023

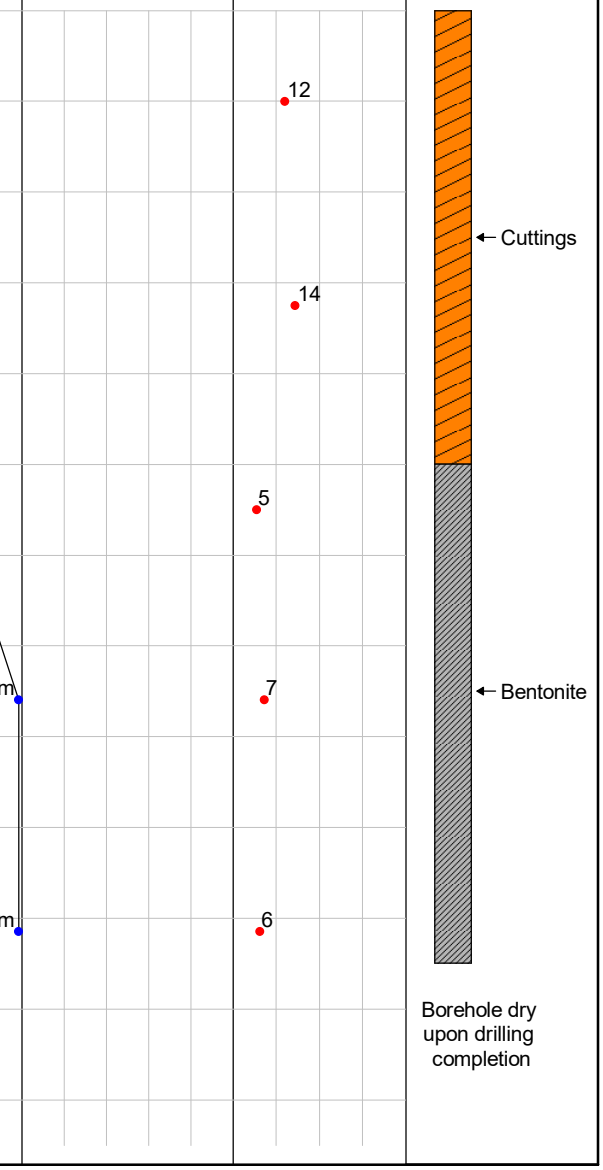
Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: N/A

Depth (ft / m)	Symbol	Soil Description	Elevation (masl) / Depth (m)	Sample Number	Sample Type
0 / 0		Ground Surface	140.1		
		TOPSOIL very loose brown silty sandy topsoil, trace organics and rootlets, moist (150mm)	0.0 / 139.9		
		FILL very loose brown silty sand, trace organics and rootlets, moist	0.2 / 139.3	1	SS
2		**CLAYEY SILT TILL** very stiff brown clayey silt, some sand, trace gravel, DTPL	0.8 / 138.6	2	SS
4		**SILT TILL** very dense red-brown silt, some clay, trace sand and gravel, with limestone layers and shale fragments, damp	1.5 / 137.8	3	SS
6 / 2		**SHALE** very dense red-brown weathered shale, damp	2.3 / 137.0	4	SS
8				5	SS
10		Drilling Terminated	3.1		
12					



Groundwater Observations and Standpipe Details

Borehole dry upon drilling completion

Field Technician: N. Wang

Drafted by: B. Graul

Reviewed by: B. Thorner

MTE

Sheet: 1 of 1

ID No.: BH130-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

Date Completed: 8/30/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: N/A

Depth (ft / m)	Symbol	Soil Description	Elevation (masl) / Depth (m)	Sample Number	Sample Type
0 / 0		Ground Surface	139.4		
		TOPSOIL loose brown silty topsoil, some sand, trace shale, organics and rootlets, moist (150mm)	0.0 / 139.2 / 0.2	1	SS
2 /		**FILL** loose brown silt, some clay and sand, with shale fragments, organics and rootlets, moist	138.6		
4 /		**SILT TILL** dense to very dense red-brown silt, trace clay and sand, with shale and limestone, damp	0.8 / 137.9	2	SS
6 / 2		**SHALE** very dense red-brown weathered shale, damp	1.5	3	SS
8 /				4	SS
		Drilling Terminated	136.8 / 2.6		
10 /					
12 /					

Dynamic Cone – Standard Penetration: 20 40 60 80

Shear Strength (PP) kPa

Shear Strength (FV) kPa: 50 100 150 200

Water Content %: 10 20 30

Dynamic Cone: 6, 38, 50/100mm, 50/125mm

Water Content: 14, 6, 7, 6

Groundwater Observations and Standpipe Details: ← Cuttings; ← Bentonite

Borehole dry upon drilling completion

Field Technician: N. Wang

Drafted by: B. Graul

Reviewed by: B. Thorner

MTE

Sheet: 1 of 1

ID No.: BH131-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

Date Completed: 9/5/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: N/A

Depth (ft / m)	Symbol	Soil Description	Elevation (masl) / Depth (m)	Sample Number	Sample Type	Dynamic Cone / Standard Penetration	Shear Strength (PP) kPa / Shear Strength (FV) kPa	Water Content %	Groundwater Observations and Standpipe Details
0 ft / 0 m		Ground Surface	135.5						
		TOPSOIL loose mottled brown/dark brown silty topsoil, some sand, trace gravel, orgaincs and rootlets, moist (150mm)	0.0 / 135.3 / 0.2	1	SS	7		17	
2		**CLAYEY SILT TILL** firm mottled brown/dark brown clayey silt, some sand, organics and rootlets, DTPL	134.7 / 0.8	2	SS	43		11	← Cuttings
4		**SILT TILL** dense to very dense red-brown/grey silt, some to trace sand, trace shale fragments, damp		3	SS	50/125mm		12	
6				4	SS	50/75mm		5	
8									
10		**SHALE** very dense red-brown weathered shale, damp	132.4 / 3.1	5	SS	50/50mm		3	← Bentonite
12									

Dynamic Cone / Standard Penetration: 20 40 60 80

Shear Strength (PP) kPa / Shear Strength (FV) kPa: 50 100 150 200

Water Content %: 10 20 30

Field Technician: N. Wang

Drafted by: B. Graul

Reviewed by: B. Thorner

MTE

ID No.: BH131-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

Date Completed: 9/5/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: N/A

Subsurface Profile				Sample		Dynamic Cone / Standard Penetration (20 40 60 80)	Shear Strength (PP) kPa / Shear Strength (FV) kPa (50 100 150 200)	Water Content % (10 20 30)	Groundwater Observations and Standpipe Details
Depth	Symbol	Soil Description	Elevation (masl) Depth (m)	Number	Type				
4									Bentonite
14									
			130.9	6	SS	50/25mm		3	
		Drilling Terminated	4.6						Borehole dry upon drilling completion
16									
18									
6									
20									
22									
24									

Field Technician: N. Wang

Drafted by: B. Graul

Reviewed by: B. Thorner

MTE

ID No.: BH132-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

Date Completed: 9/5/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: N/A

Depth (ft / m)	Symbol	Soil Description	Elevation (masl) / Depth (m)	Sample Number	Sample Type	Dynamic Cone / Standard Penetration	Shear Strength (PP) kPa / Shear Strength (FV) kPa	Water Content %	Groundwater Observations and Standpipe Details
0 / 0		Ground Surface	134.4						
		TOPSOIL loose mottled brown/grey sandy silty topsoil, trace gravel, organics and rootlets, moist (150mm)	0.0 / 134.2 / 0.2	1	SS	14		21	
		FILL loose mottled brown/grey sandy clayey silt, moist	133.6						
2		**SILT TILL** dense to very dense red-brown silt, some clay and sand, with shale fragments, wet	0.8	2	SS	46		15	
4				3	SS	50/125mm		8	← Cuttings
6 / 2			132.1						
		SHALE very dense red-brown weathered shale, damp	2.3	4	SS	50/50mm		5	
8									
10				5	SS	50/50mm		4	
12									← Bentonite

Dynamic Cone / Standard Penetration: 20 40 60 80

Shear Strength (PP) kPa / Shear Strength (FV) kPa: 50 100 150 200

Water Content %: 10 20 30

Field Technician: N. Wang

Drafted by: B. Graul

Reviewed by: B. Thorner

MTE

ID No.: BH132-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

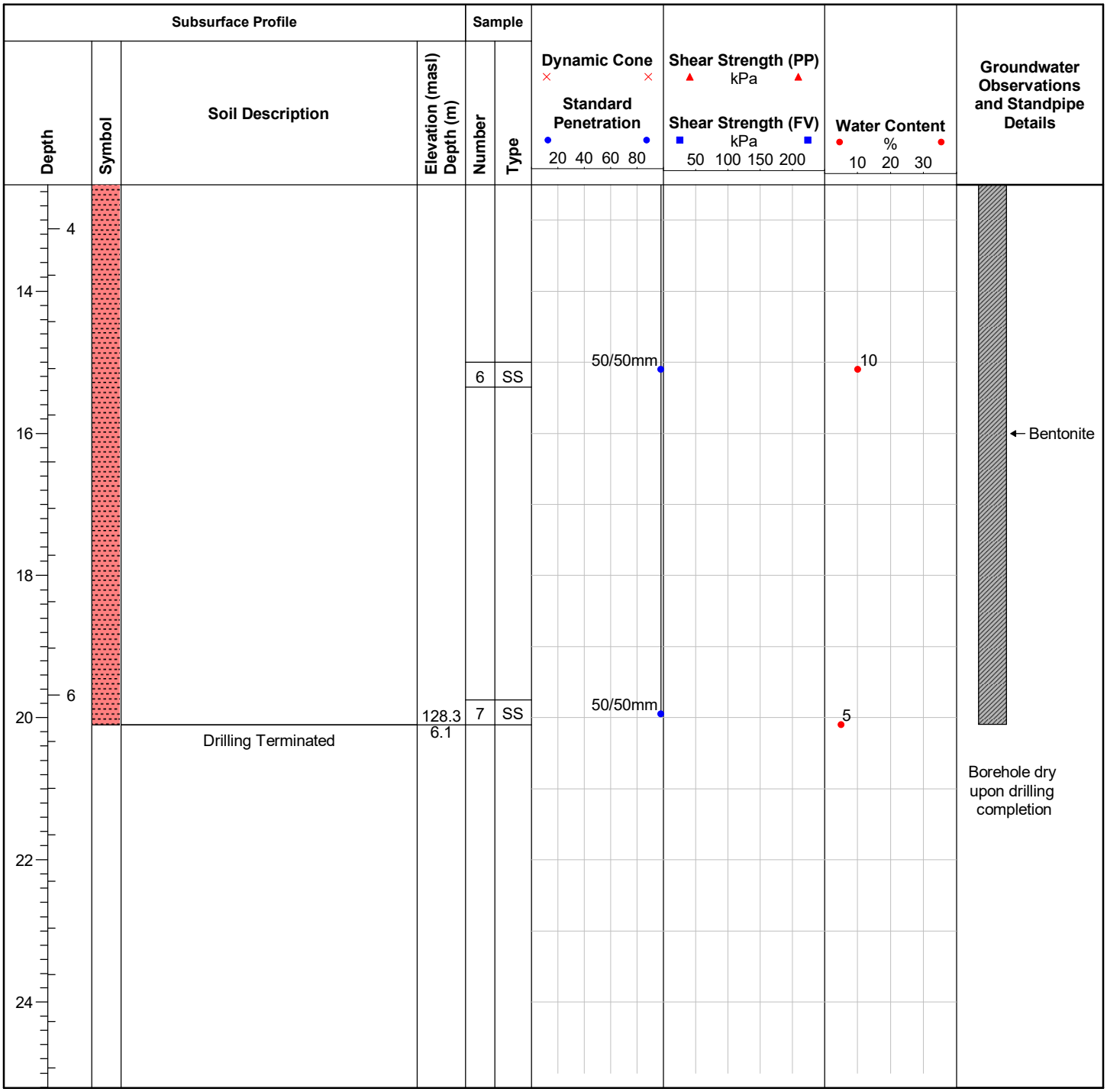
Date Completed: 9/5/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: N/A



Field Technician: N. Wang

Drafted by: B. Graul

Reviewed by: B. Thorner

Sheet: 2 of 2

ID No.: BH133-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

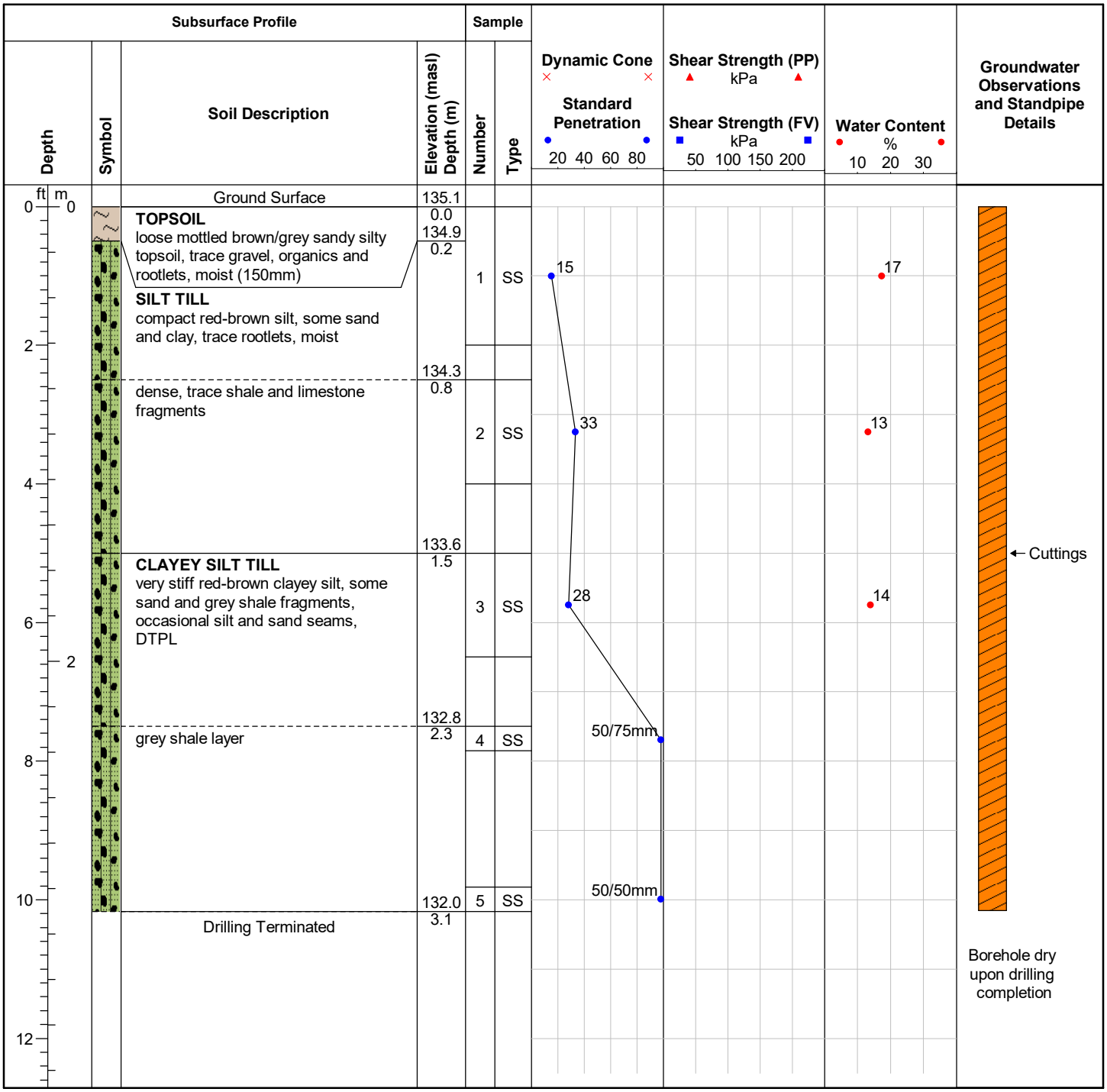
Date Completed: 9/8/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: N/A



Field Technician: B. Ehgoetz

Drafted by: B. Graul

Reviewed by: B. Thorner

Sheet: 1 of 1

Notes:
Auger refusal at 3.1mbgs due to bedrock

ID No.: BH134-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

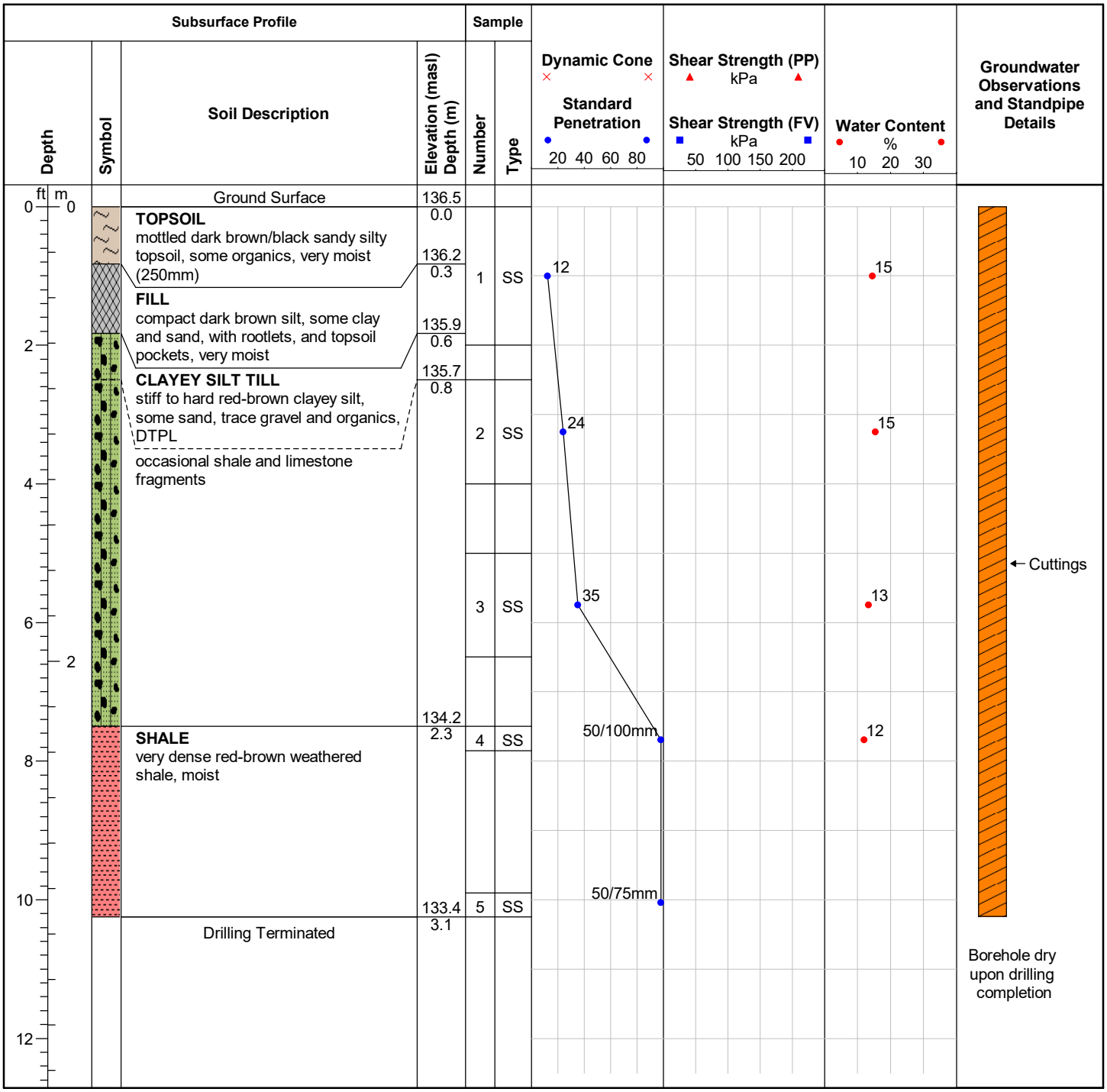
Date Completed: 9/7/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: N/A



Field Technician: B. Ehgoetz

Drafted by: B. Graul

Reviewed by: B. Thorner

Sheet: 1 of 1

ID No.: BH135-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

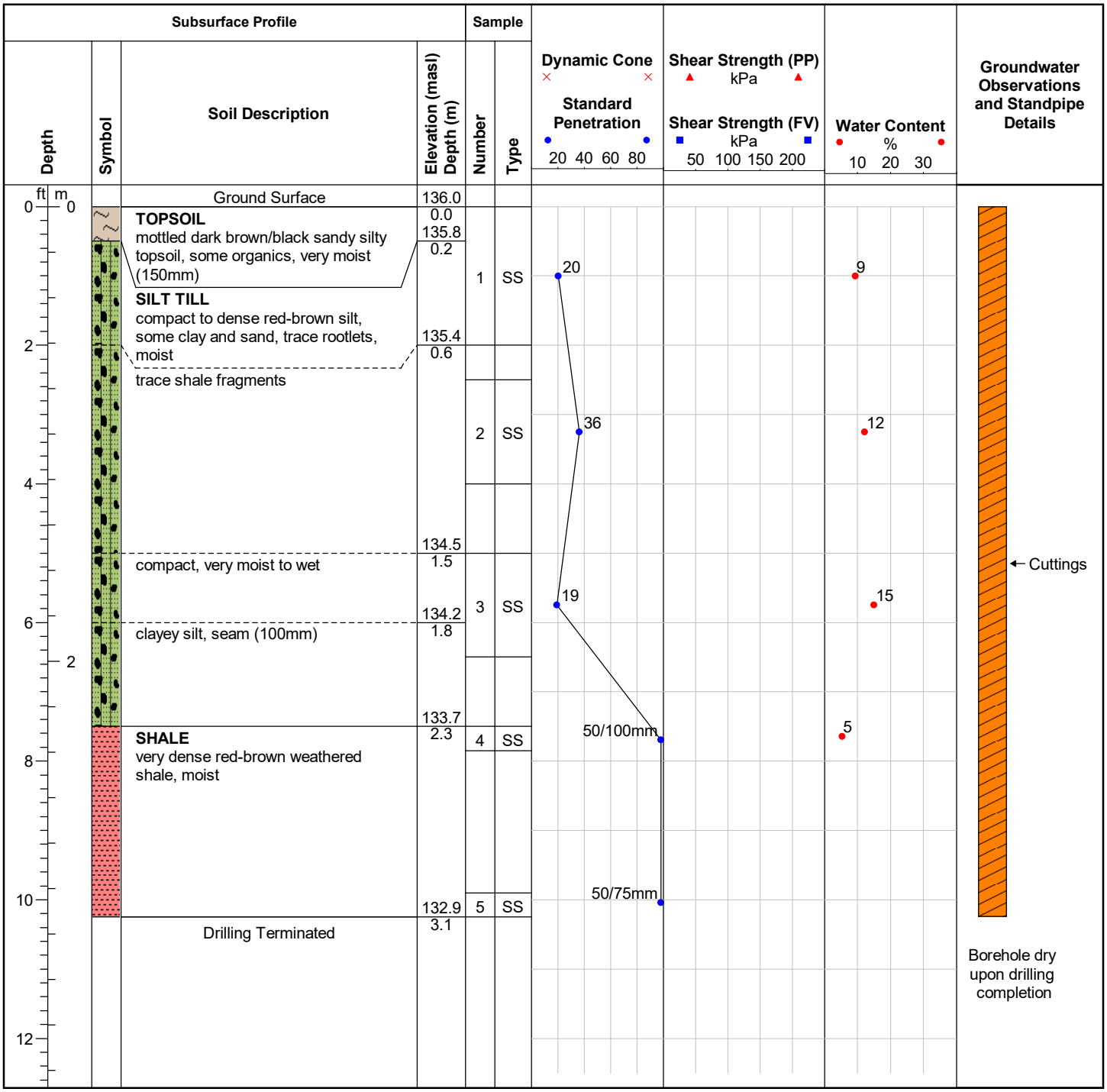
Date Completed: 9/7/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: N/A



Field Technician: B. Ehgoetz

Drafted by: B. Graul

Reviewed by: B. Thorner

Sheet: 1 of 1

ID No.: BH136-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

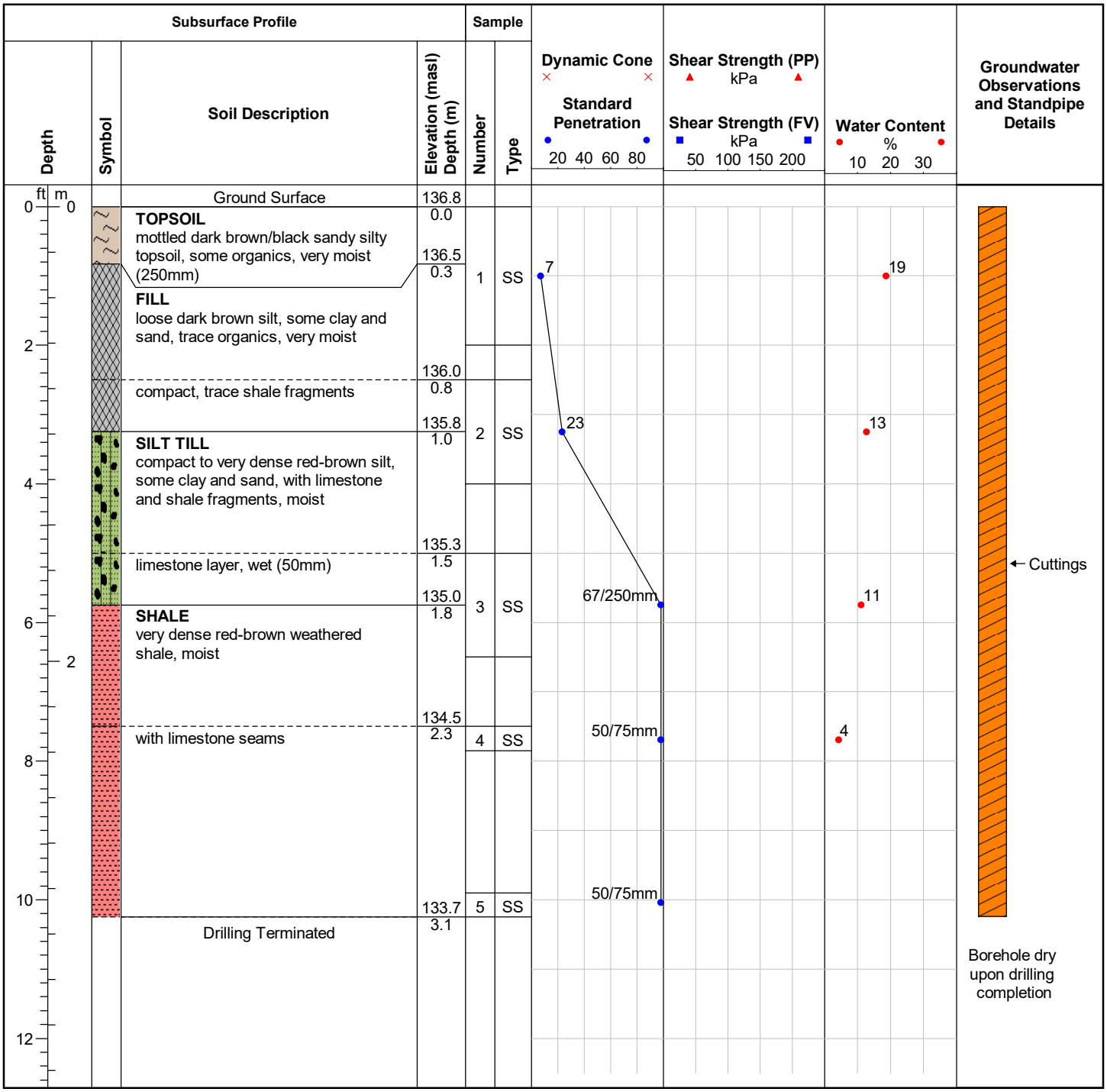
Date Completed: 9/7/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: N/A



Field Technician: B. Ehgoetz

Drafted by: B. Graul

Reviewed by: B. Thorner

Sheet: 1 of 1

ID No.: BH137-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

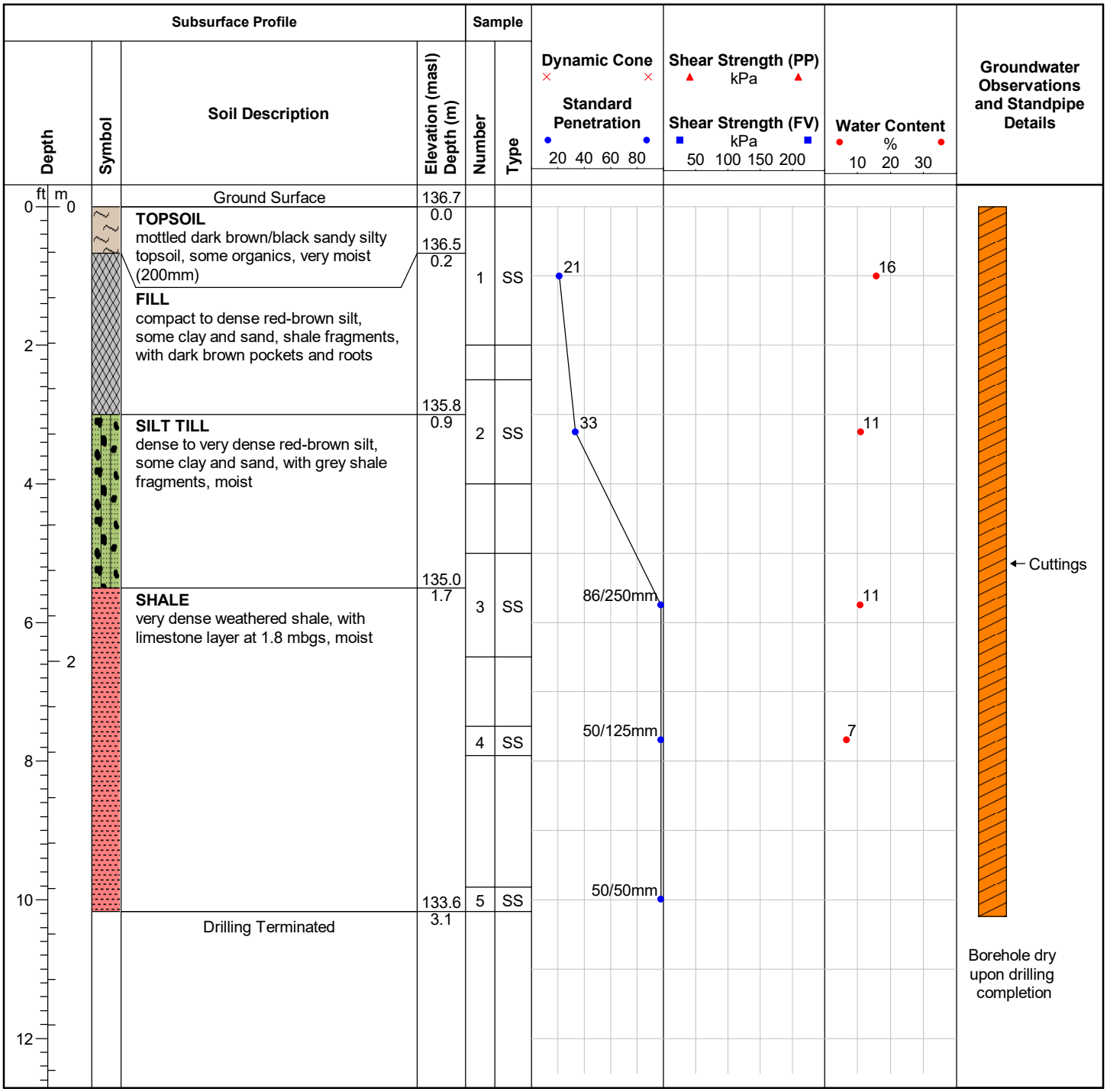
Date Completed: 9/7/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: N/A



Field Technician: B. Ehgoetz

Drafted by: B. Graul

Reviewed by: B. Thorner

Sheet: 1 of 1

ID No.: BH138-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

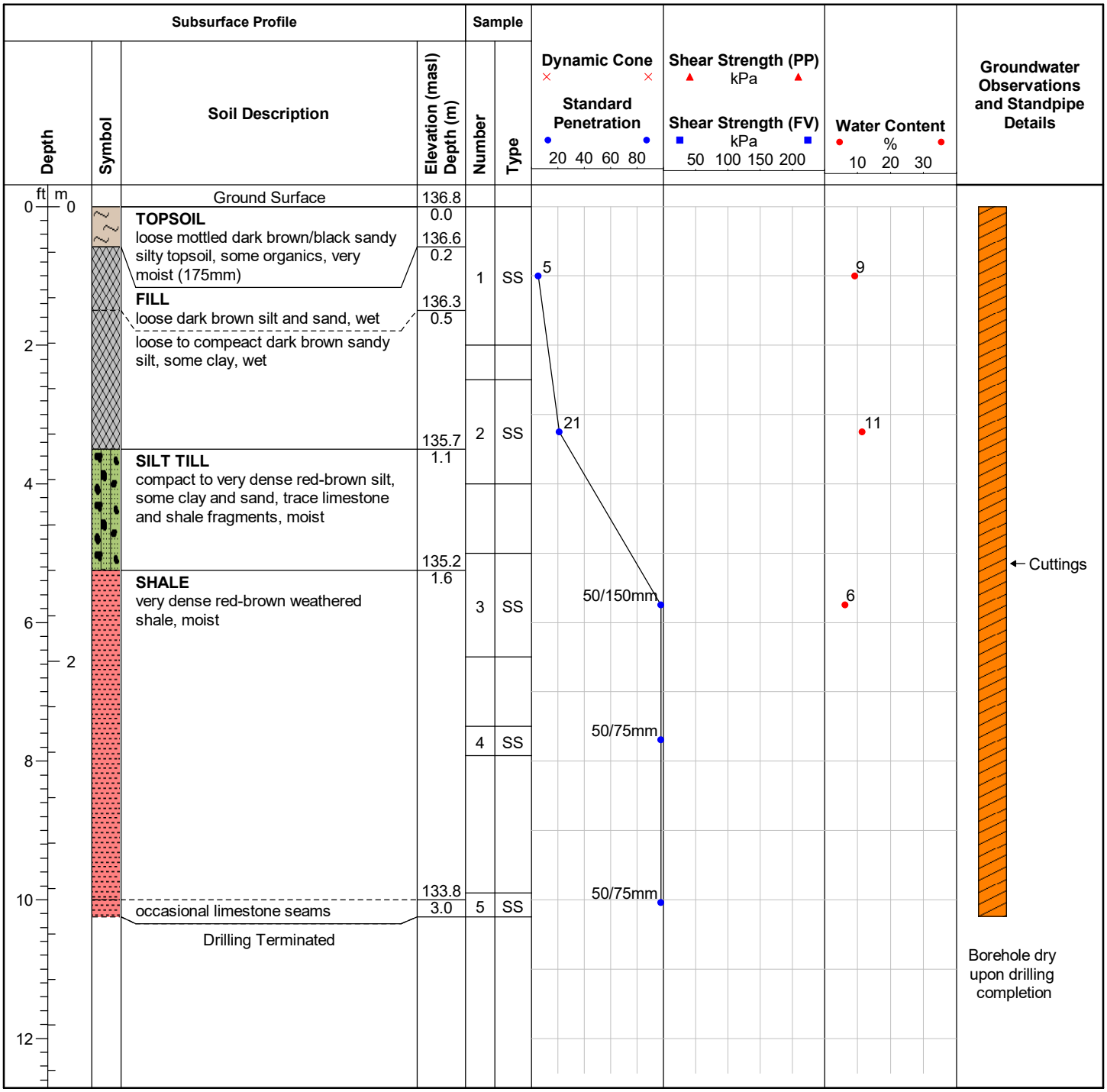
Date Completed: 9/7/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: N/A



Field Technician: B. Ehgoetz

Drafted by: B. Graul

Reviewed by: B. Thorner

Sheet: 1 of 1

ID No.: BH139-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

Date Completed: 9/7/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: N/A

Depth (ft / m)	Symbol	Soil Description	Elevation (masl) / Depth (m)	Sample Number	Sample Type	Dynamic Cone / Standard Penetration	Shear Strength (PP) kPa / Shear Strength (FV) kPa	Water Content %	Groundwater Observations and Standpipe Details
0 / 0		Ground Surface	137.0						
		TOPSOIL loose brown silty sandy topsoil, trace gravel, organics and rootlets, moist (150mm)	0.0 / 136.8						
		SANDY SILT TILL loose brown sandy silt, trace clay, organics and rootlets, moist	0.2	1	SS	8		17	
2			136.2						
		CLAYEY SILT TILL very stiff red-brown clayey silt, some sand, trace shale fragments, APL	0.8	2	SS	30		16	
4			135.5						← Cuttings
		SILT TILL very dense red-brown silt, some sand and shale fragments, trace clay, damp	1.5	3	SS	50/75mm		5	
6			134.7						
2		**SHALE** very dense red-brown weathered shale, damp	2.3	4	SS	50/75mm		5	
8		Drilling Terminated							Borehole dry upon drilling completion
10									
12									

Field Technician: N. Wang

Drafted by: B. Graul

Reviewed by: B. Thorner

Sheet: 1 of 1

ID No.: BH140-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

Date Completed: 9/6/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: N/A

Depth (ft / m)	Symbol	Soil Description	Elevation (masl) / Depth (m)	Sample Number	Sample Type	Standard Penetration (Dynamic Cone)	Shear Strength (PP) kPa / Shear Strength (FV) kPa	Water Content %	Groundwater Observations and Standpipe Details
0 ft / 0 m		Ground Surface	136.7						
		TOPSOIL brown silty topsoil, trace gravel, sand, organics, and rootlets, moist (150mm)	0.0 / 136.5 / 0.2						
		SILT TILL compact mottled brown/grey silt, trace gravel, sand, organics, and rootlets, moist		1	SS	13		10	
2 ft / 2 m			135.9 / 0.8						
		dense red-brown silt, some sand and clay, trace shale, moist		2	SS	37		9	
4 ft			135.2 / 1.5						← Cuttings
		very dense, some shale fragments,damp		3	SS	50/75mm		6	
6 ft / 2 m			134.4 / 2.3						
		SHALE very dense red-brown weathered shale, damp	134.2 / 2.5	4	SS	50/25mm		5	
8 ft		Drilling Terminated							Borehole dry upon drilling completion
10 ft									
12 ft									

Dynamic Cone / Standard Penetration: 20 40 60 80

Shear Strength (PP) kPa / Shear Strength (FV) kPa: 50 100 150 200

Water Content %: 10 20 30

Field Technician: N. Wang

Drafted by: B. Graul

Reviewed by: B. Thorner

MTE

ID No.: BH141-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

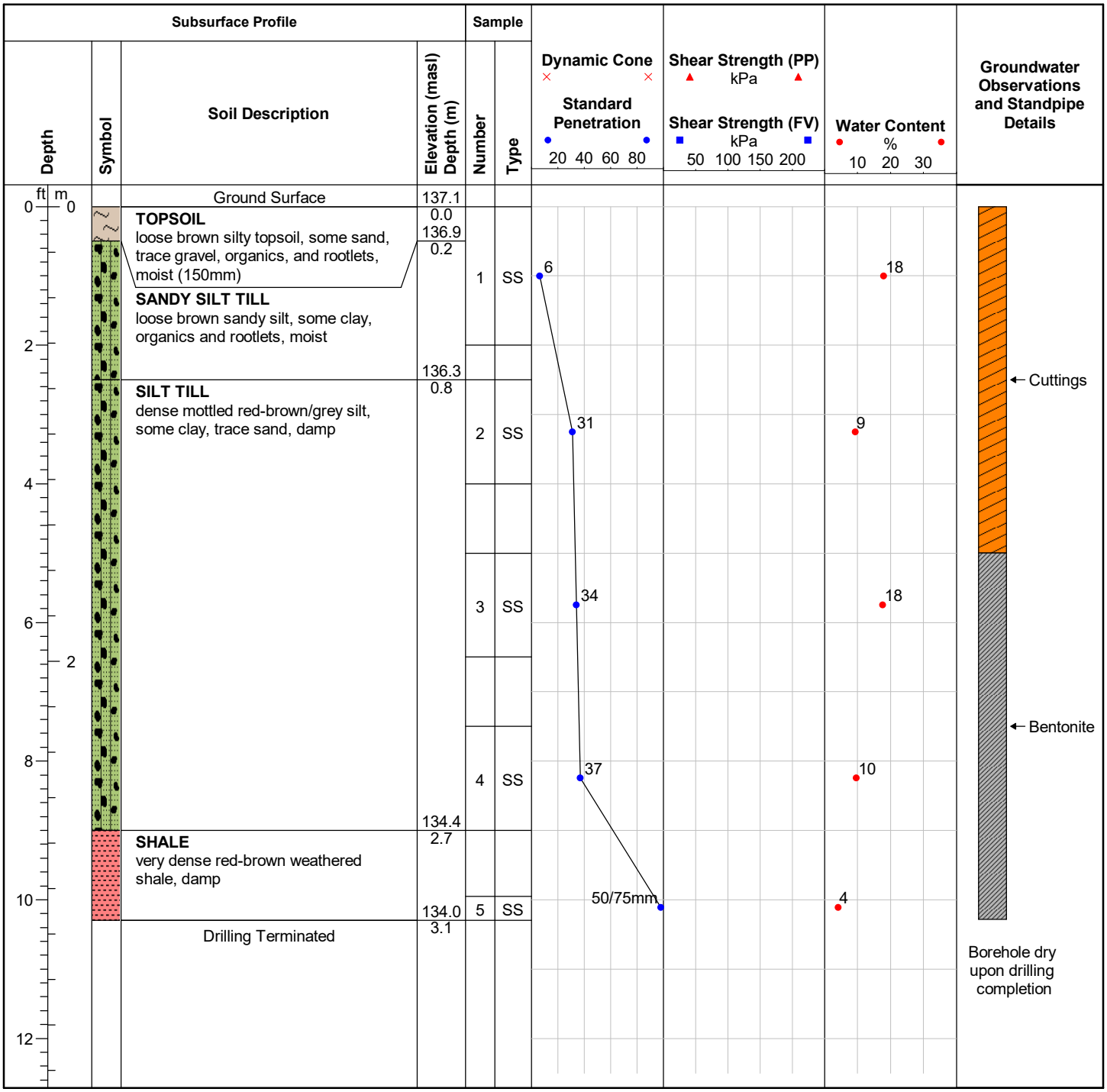
Date Completed: 8/31/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: N/A



Field Technician: N. Wang

Drafted by: B. Graul

Reviewed by: B. Thorner

Sheet: 1 of 1

ID No.: BH142-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

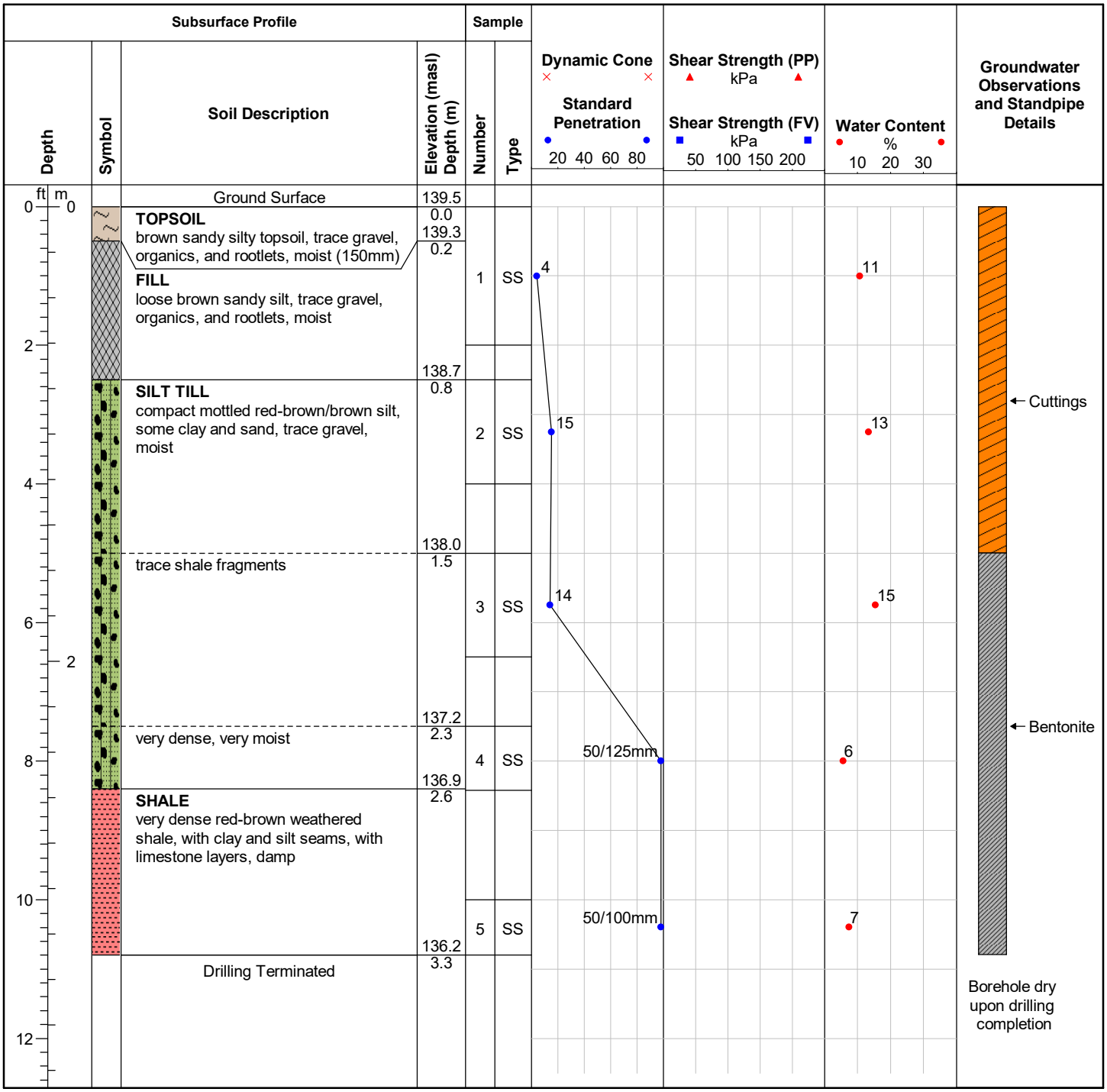
Date Completed: 8/31/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: N/A



Field Technician: N. Wang

Drafted by: B. Graul

Reviewed by: B. Thorner

Sheet: 1 of 1

ID No.: BH143-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

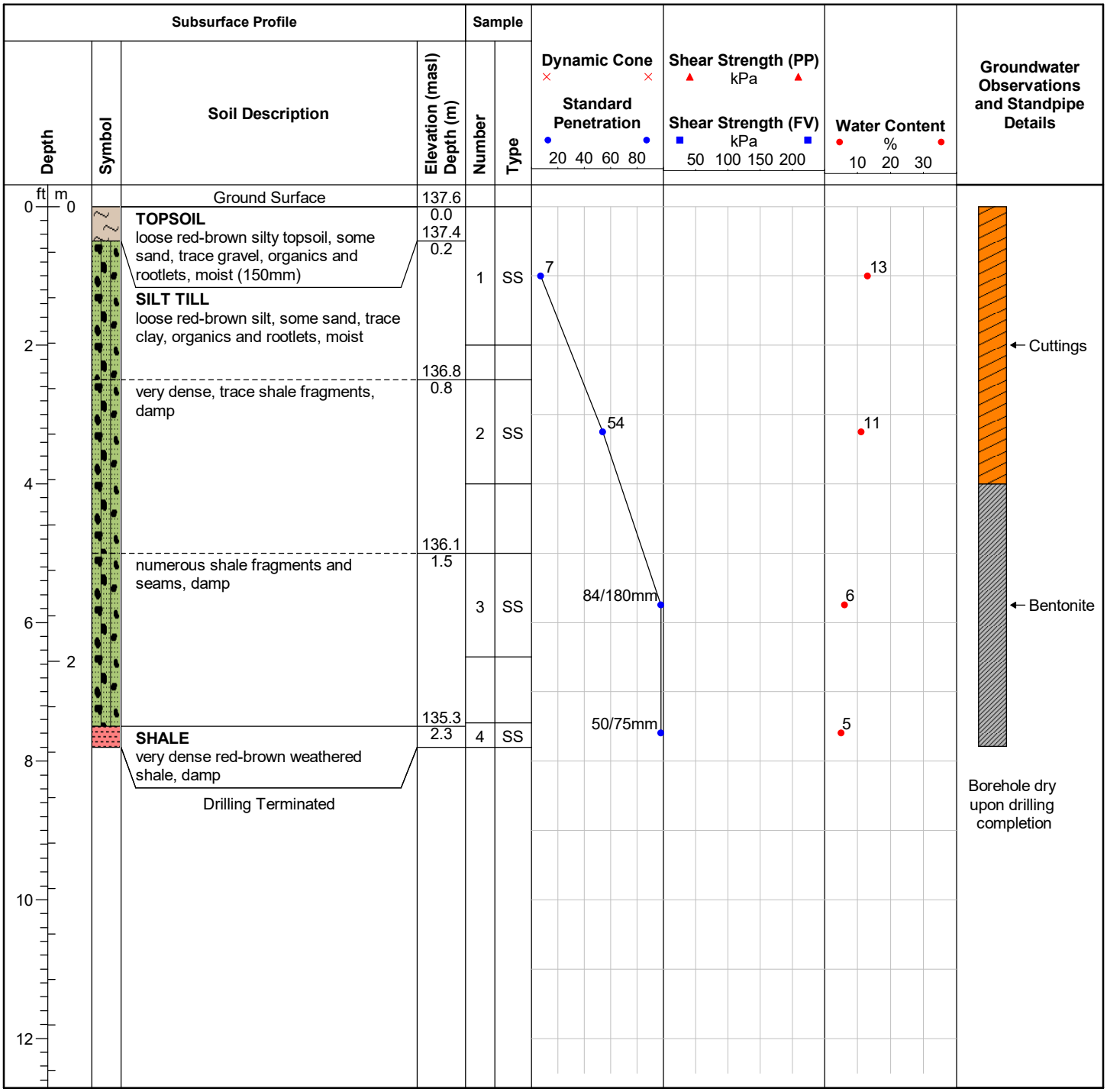
Date Completed: 8/31/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: N/A



Field Technician: N. Wang

Drafted by: B. Graul

Reviewed by: B. Thorner

Sheet: 1 of 1

ID No.: BH144-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

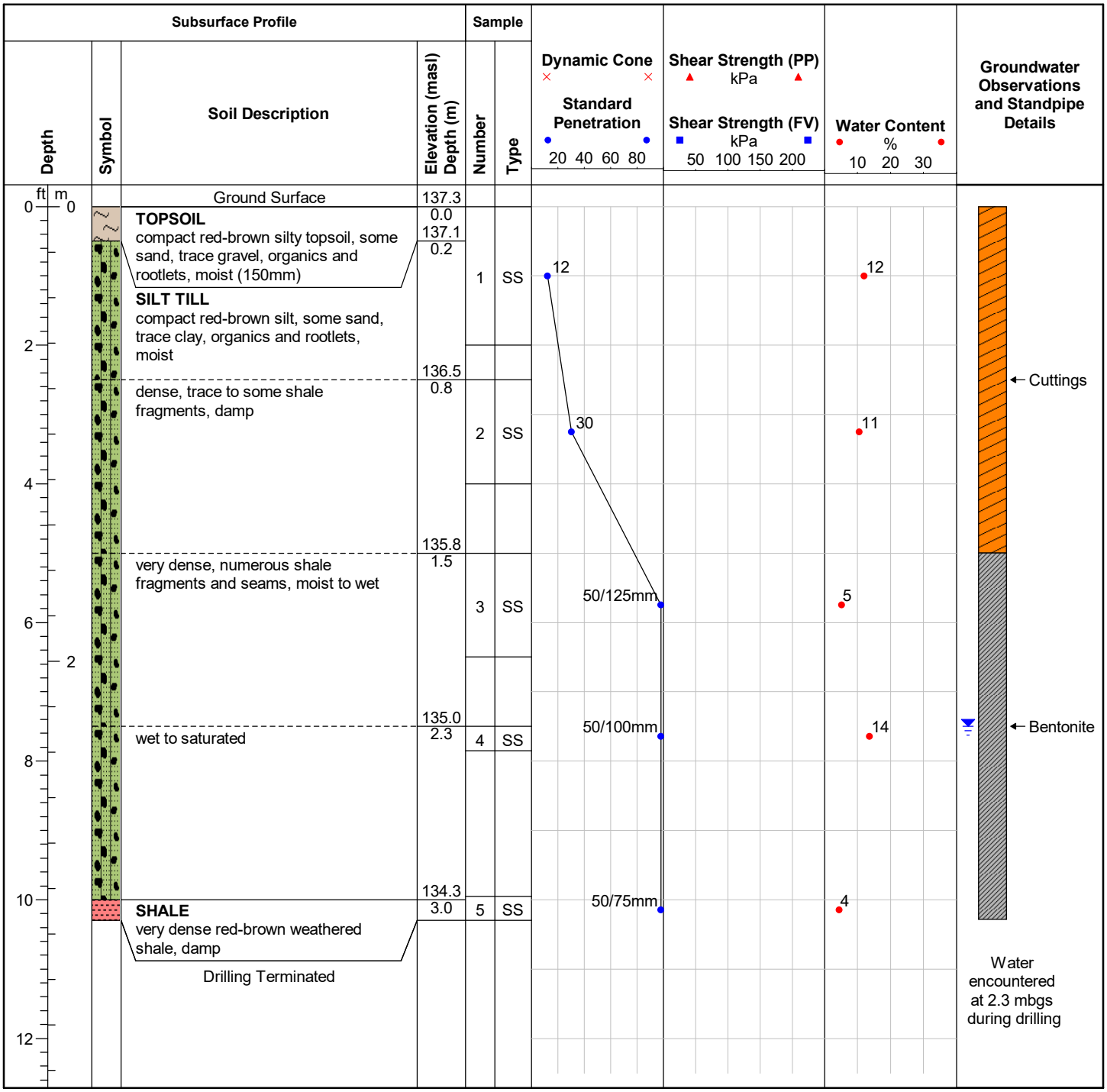
Date Completed: 8/31/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: N/A



Field Technician: N. Wang

Drafted by: B. Graul

Reviewed by: B. Thorner

MTE

Sheet: 1 of 1

ID No.: BH145-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

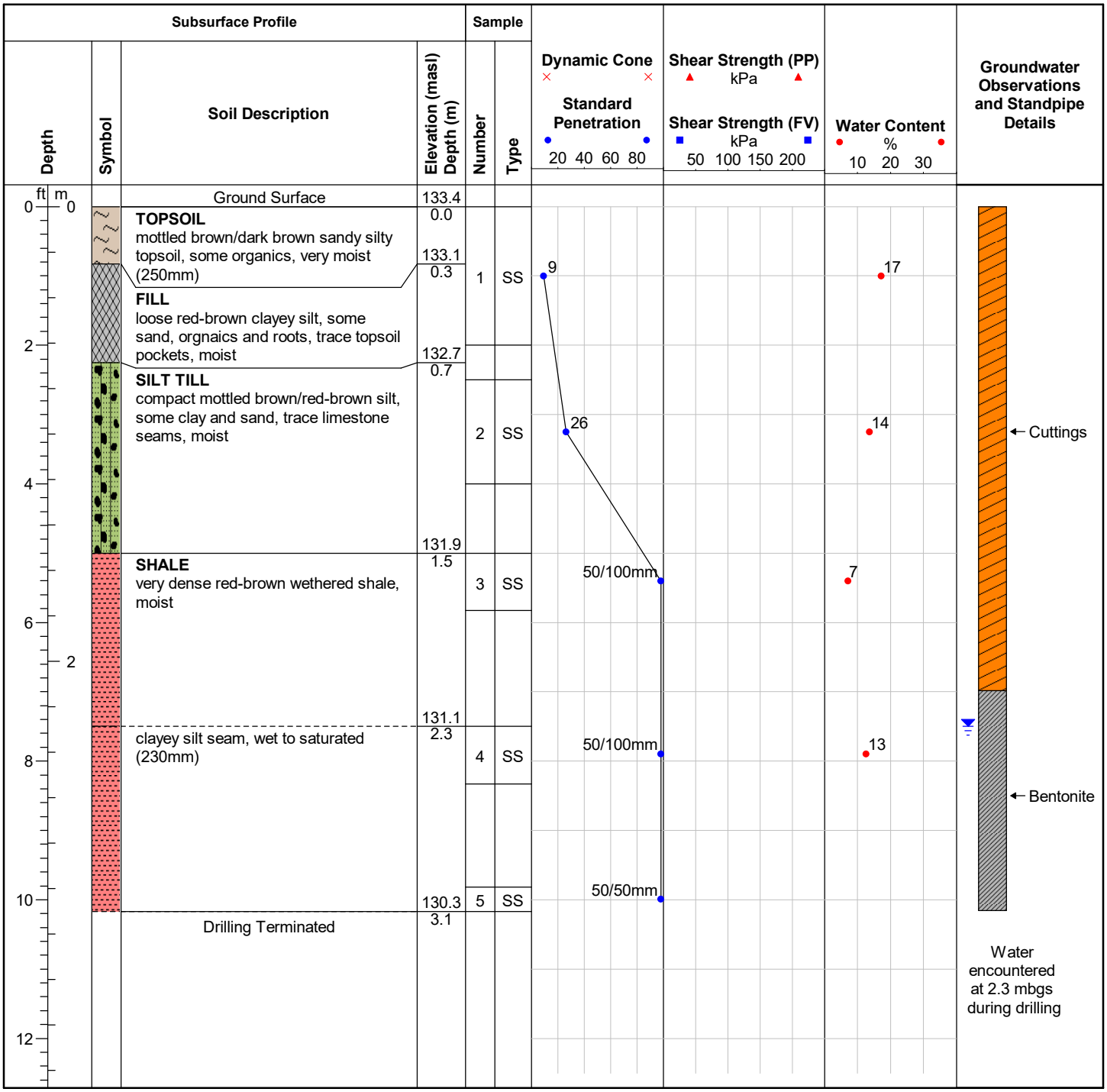
Date Completed: 9/8/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: N/A



Field Technician: B. Ehgoetz

Drafted by: B. Graul

Reviewed by: B. Thorner

Sheet: 1 of 1

ID No.: BH146-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

Date Completed: 9/7/2023

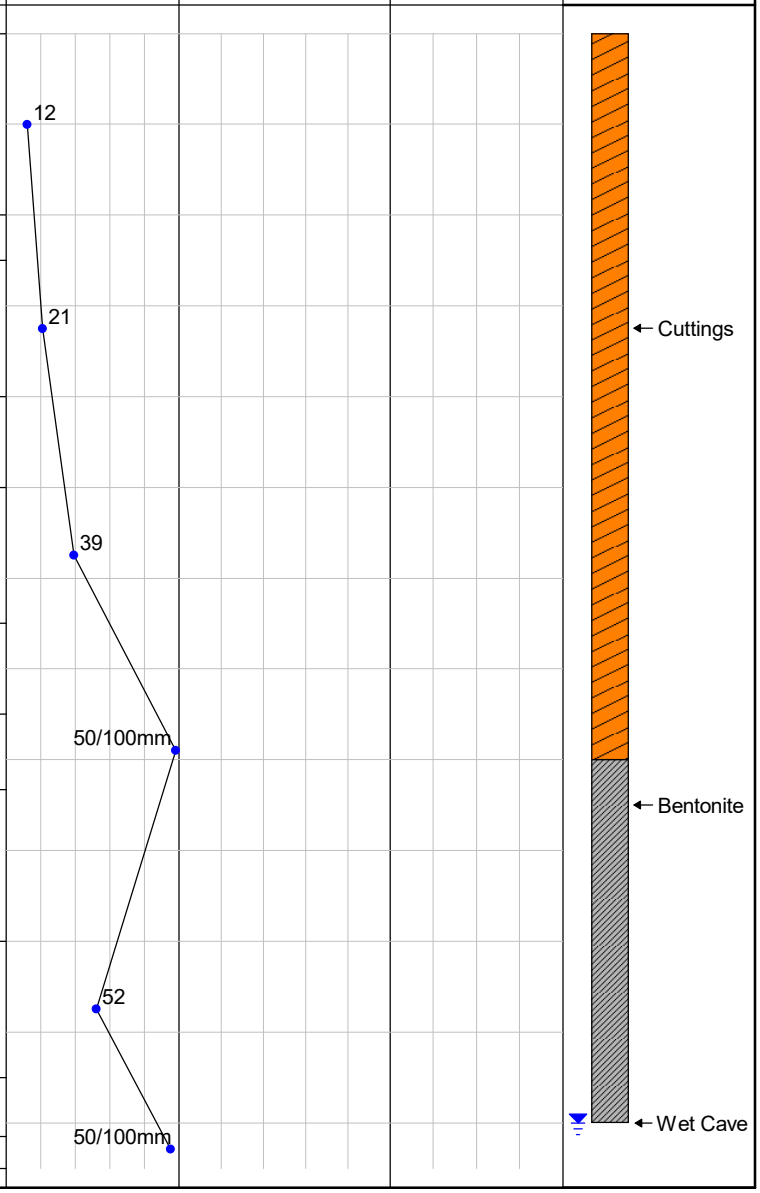
Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: N/A

Depth (ft)	Depth (m)	Symbol	Soil Description	Elevation (masl)	Depth (m)	Sample Number	Sample Type
0	0		Ground Surface	134.9			
			TOPSOIL mottled dark brown/black sandy silt, some organics, very moist (200mm)	134.7	0.0		
			FILL compact brown silt, some clay and sand, trace roots and topsoil, very moist	134.0	0.2	1	SS
2			**SILT TILL** compact red-brown silt, some clay and sand, trace shale fragments, and organics, moist	133.4	0.9	2	SS
4			**CLAYEY SILT TILL** hard red-brown clayey silt, some sand, trace limestone, DTPL	133.1	1.5	3	SS
6	2		**SILT TILL** dense red-brown silt, some clay and sand, moist	132.6	1.8		
8			**SHALE** very dense red-brown weathered shale, moist	132.2	2.3	4	SS
			limestone layer (100mm)	131.9	2.7		
10			with clayey silt seams, moist	131.2	3.0	5	SS
12			saturated seam	131.1	3.7	6	SS
					3.8		



Field Technician: B. Ehgoetz

Drafted by: B. Graul

Reviewed by: B. Thorner

Sheet: 1 of 1

Notes:
Water encountered at 3.7 mbgs during drilling.

ID No.: BH147-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

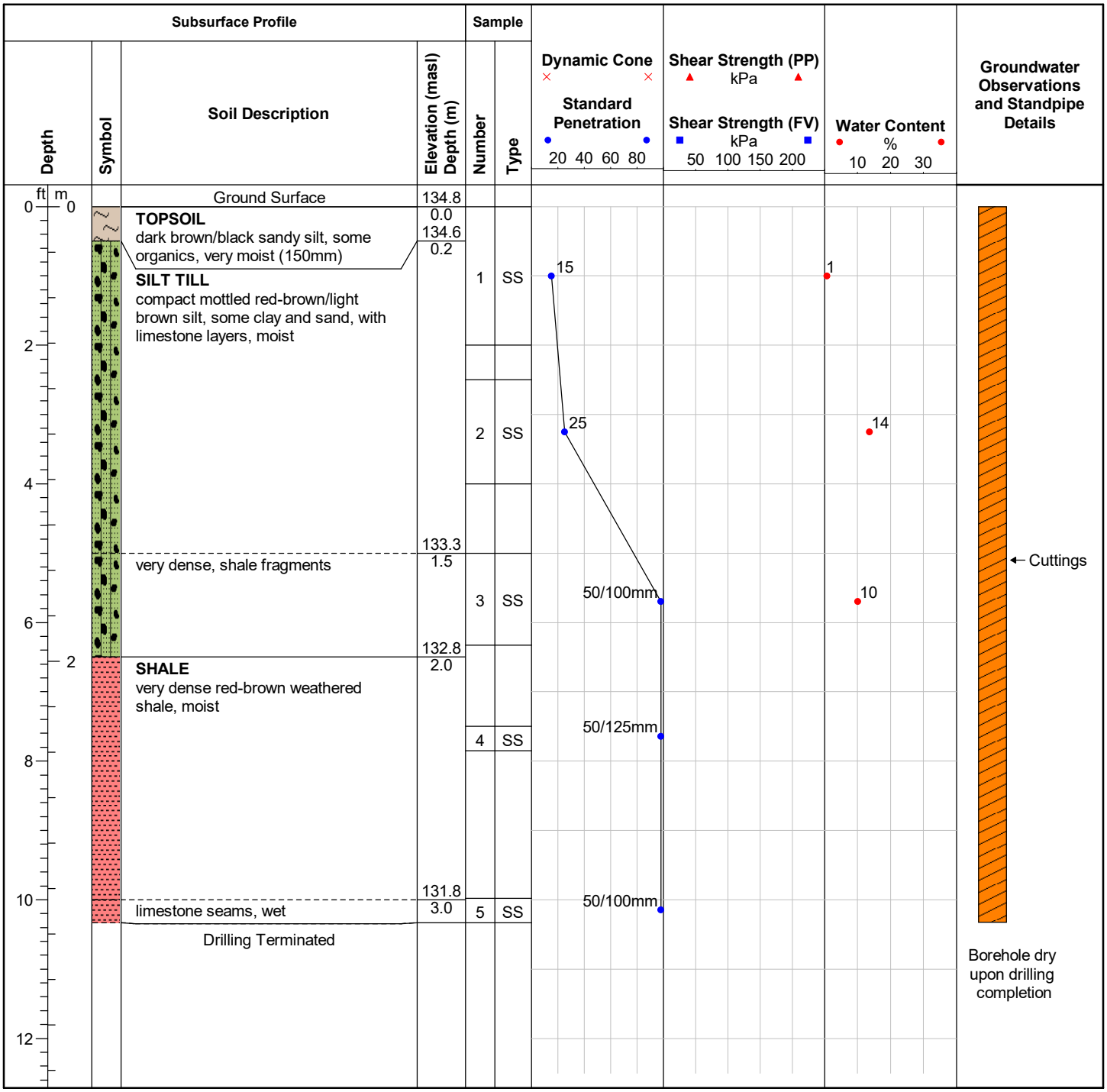
Date Completed: 9/7/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: N/A



Field Technician: B. Ehgoetz

Drafted by: B. Graul

Reviewed by: B. Thorner

Sheet: 1 of 1

ID No.: BH148-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

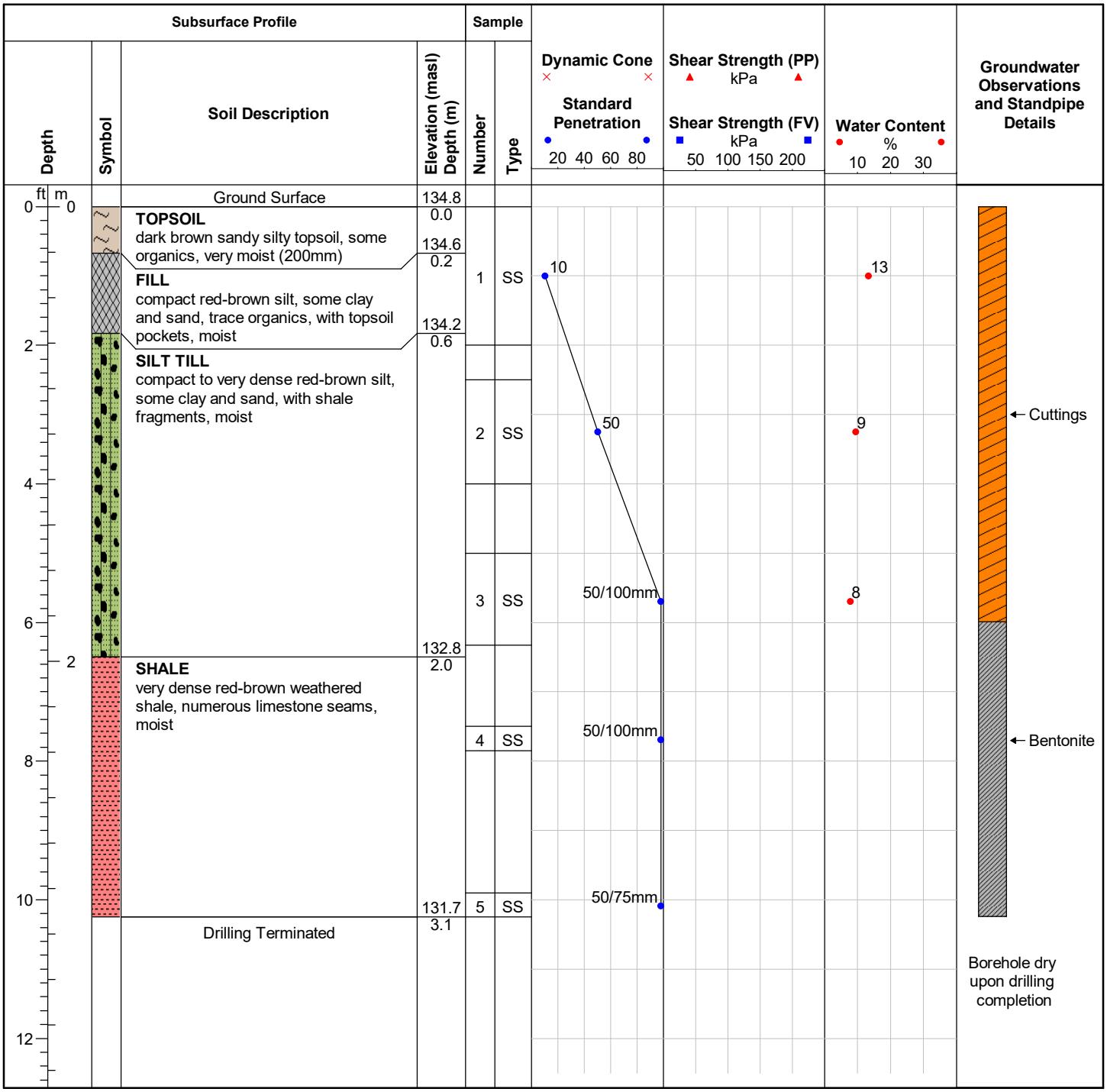
Date Completed: 9/6/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: N/A



Field Technician: B. Ehgoetz

Drafted by: B. Graul

Reviewed by: B. Thorner

Sheet: 1 of 1

ID No.: BH149-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

Date Completed: 9/6/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: N/A

Depth (ft / m)	Symbol	Soil Description	Elevation (masl) / Depth (m)	Sample Number	Sample Type
0 / 0		Ground Surface	133.9		
		TOPSOIL dark brown sandy silty topsoil, some organics, very moist (200mm)	0.0 / 133.7		
		FILL compact red-brown silt, some clay and sand, trace organics, with topsoil pockets, very moist	0.2 / 133.1	1	SS
2		**SILT TILL** dense red-brown silt, some clay and sand, numerous limestone layers, moist	0.8 / 132.4	2	SS
4		**SHALE** very dense red-brown weathered shale, numerous limestone seams, moist	1.5 / 131.6	3	SS
6 / 2				4	SS
8		Drilling Terminated	2.3		
10					
12					

Dynamic Cone / Standard Penetration: 20 40 60 80

Shear Strength (PP) kPa / Shear Strength (FV) kPa: 50 100 150 200

Water Content %: 10 20 30

Standard Penetration: 10, 42, 87/275mm, 50/50mm

Water Content: 15, 11, 8

Groundwater Observations and Standpipe Details: Cuttings; Bentonite

Borehole dry upon drilling completion

Field Technician: B. Ehgoetz

Drafted by: B. Graul

Reviewed by: B. Thorner

MTE

ID No.: BH150-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

Date Completed: 9/7/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: N/A

Depth (ft / m)	Symbol	Soil Description	Elevation (masl) / Depth (m)	Sample Number	Sample Type	Standard Penetration (Dynamic Cone)	Shear Strength (PP) kPa / Shear Strength (FV) kPa	Water Content %	Groundwater Observations and Standpipe Details
0 ft / 0 m		Ground Surface	134.5						
		TOPSOIL mottled dark brown/grey silty topsoil, some gravel and sand, trace organics and rootlets, moist (150mm)	0.0 / 134.3 / 0.2	1	SS	13		11	
2		**SILT TILL** compact mottled dark brown/grey silt, some gravel and sand, trace organics and rootlets, moist	133.7						
		compact red-brown silt, trace sand, gravel and clay, with grey seams, damp	0.8	2	SS	28		10	
4			133.0						
		SHALE very dense red-brown weathered shale, damp	1.5	3	SS	50/125mm		6	
6 — 2			132.2						
		with limestone, damp	2.3	4	SS	50/125mm		5	
8		Drilling Terminated							
10									
12									

Standard Penetration: 20 40 60 80

Shear Strength kPa: 50 100 150 200

Water Content %: 10 20 30

Groundwater Observations and Standpipe Details: ← Cuttings; ← Bentonite

Borehole dry upon drilling completion

Field Technician: N. Wang

Drafted by: B. Graul

Reviewed by: B. Thorner

MTE

Sheet: 1 of 1

ID No.: BH151-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

Date Completed: 9/7/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: N/A

Depth (ft / m)	Symbol	Soil Description	Elevation (masl) / Depth (m)	Sample Number	Sample Type	Standard Penetration (Dynamic Cone)	Shear Strength (PP) kPa	Shear Strength (FV) kPa	Water Content %	Groundwater Observations and Standpipe Details
0 / 0		Ground Surface	135.3							
		TOPSOIL compact brown silty topsoil, some sand, trace gravel, organics and rootlets, moist (150mm)	0.0 / 135.1 / 0.2	1	SS	11			20	
		SILT TILL compact brown silt, some sand, trace gravel, organics and rootlets, moist								
2		very dense, red-brown damp	134.5 / 0.8	2	SS	70			20	
4		trace shale fragments	133.8 / 1.5	3	SS	50/75mm			20	
6 / 2		**SHALE** very dense red-brown weathered shale, damp	133.5 / 1.8	4	SS	50/125mm			20	
8		Drilling Terminated	132.9 / 2.4							
10										
12										

Cuttings

Bentonite

Borehole dry upon drilling completion

Field Technician: N. Wang

Drafted by: B. Graul

Reviewed by: B. Thorner

MTE

ID No.: BH152-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

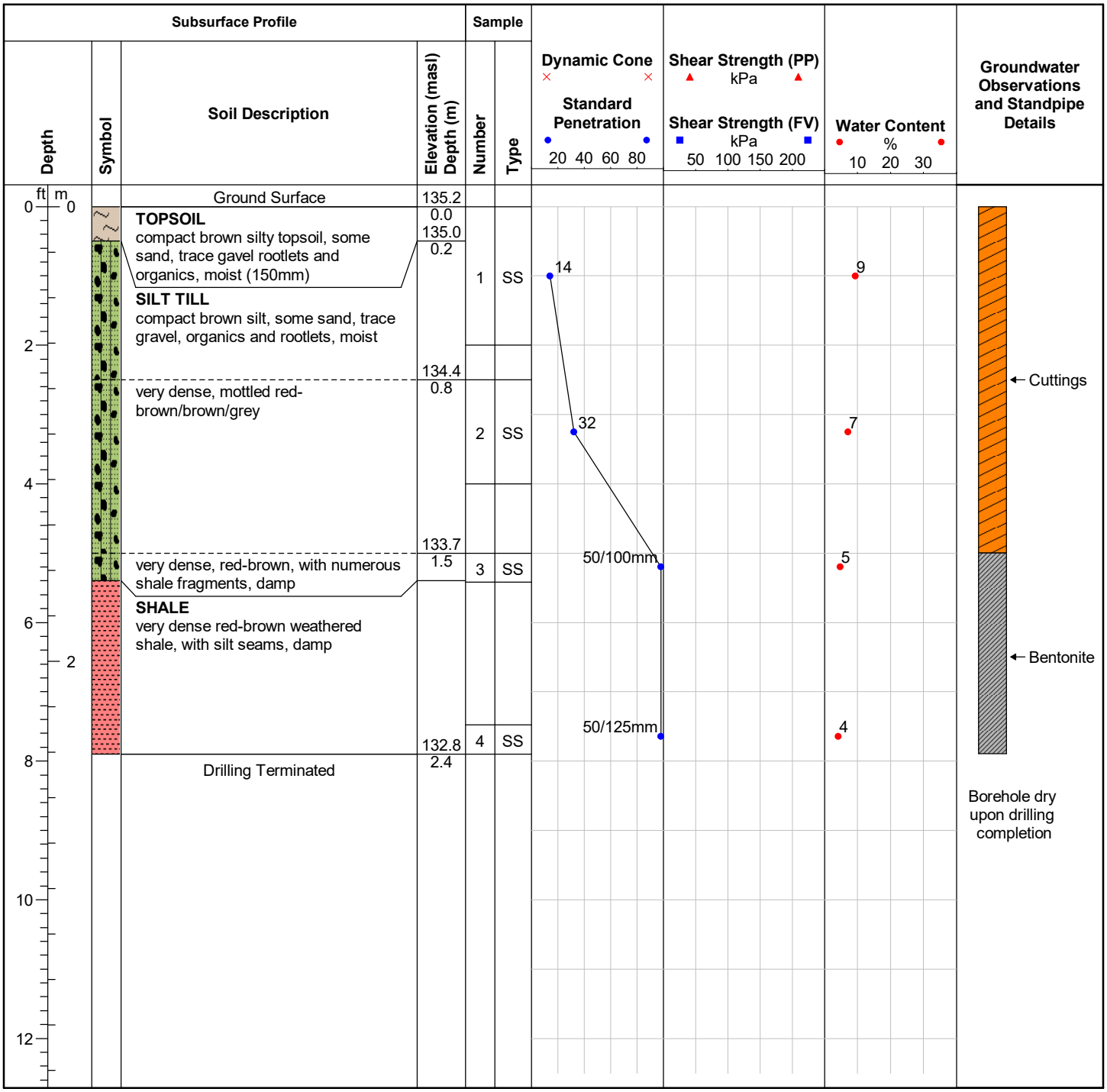
Date Completed: 9/6/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: N/A



Field Technician: N. Wang

Drafted by: B. Graul

Reviewed by: B. Thorner

Sheet: 1 of 1

ID No.: BH153-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

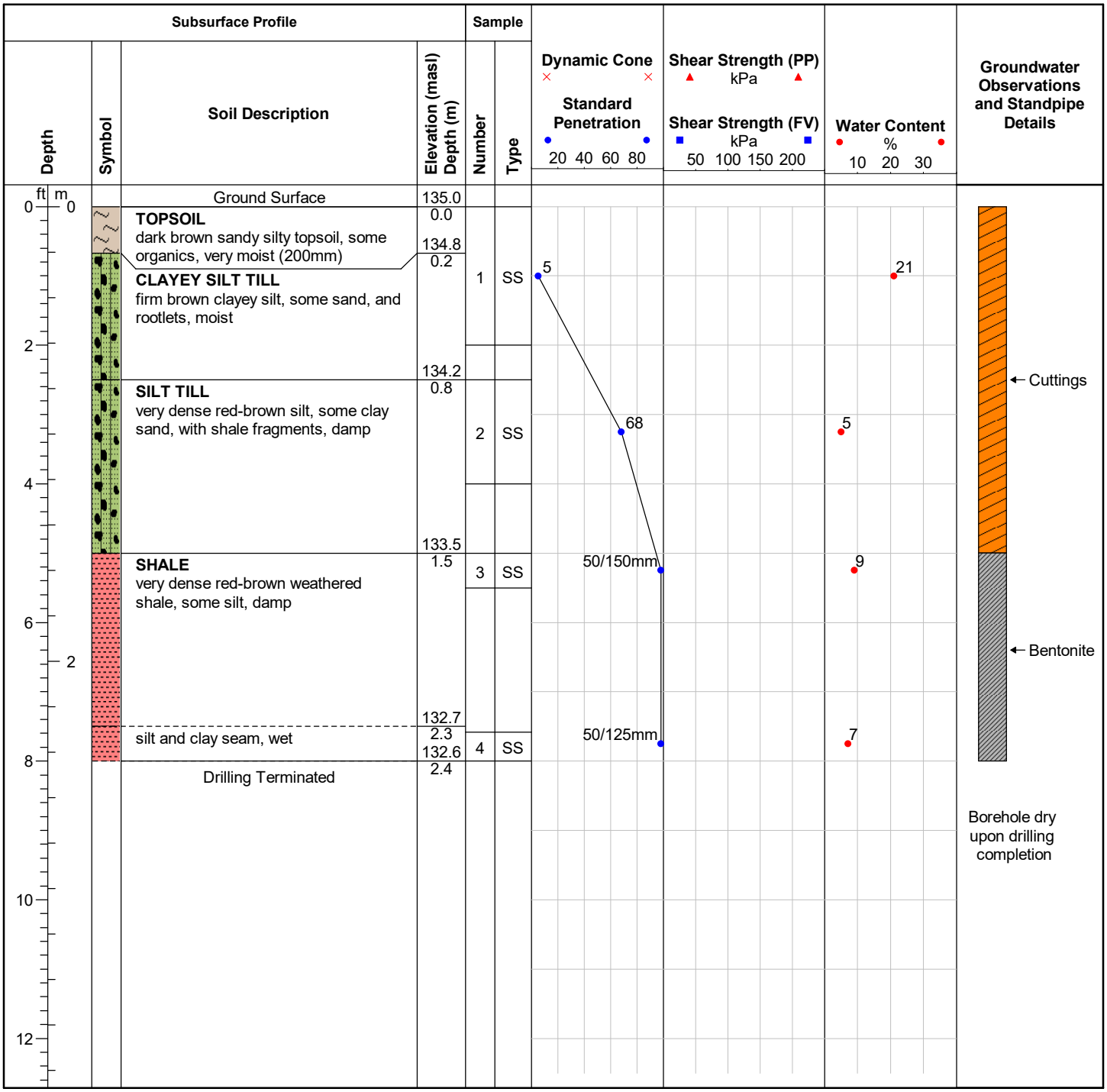
Date Completed: 8/31/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: N/A



Field Technician: N. Wang

Drafted by: B. Graul

Reviewed by: B. Thorner

Sheet: 1 of 1

ID No.: BH154-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

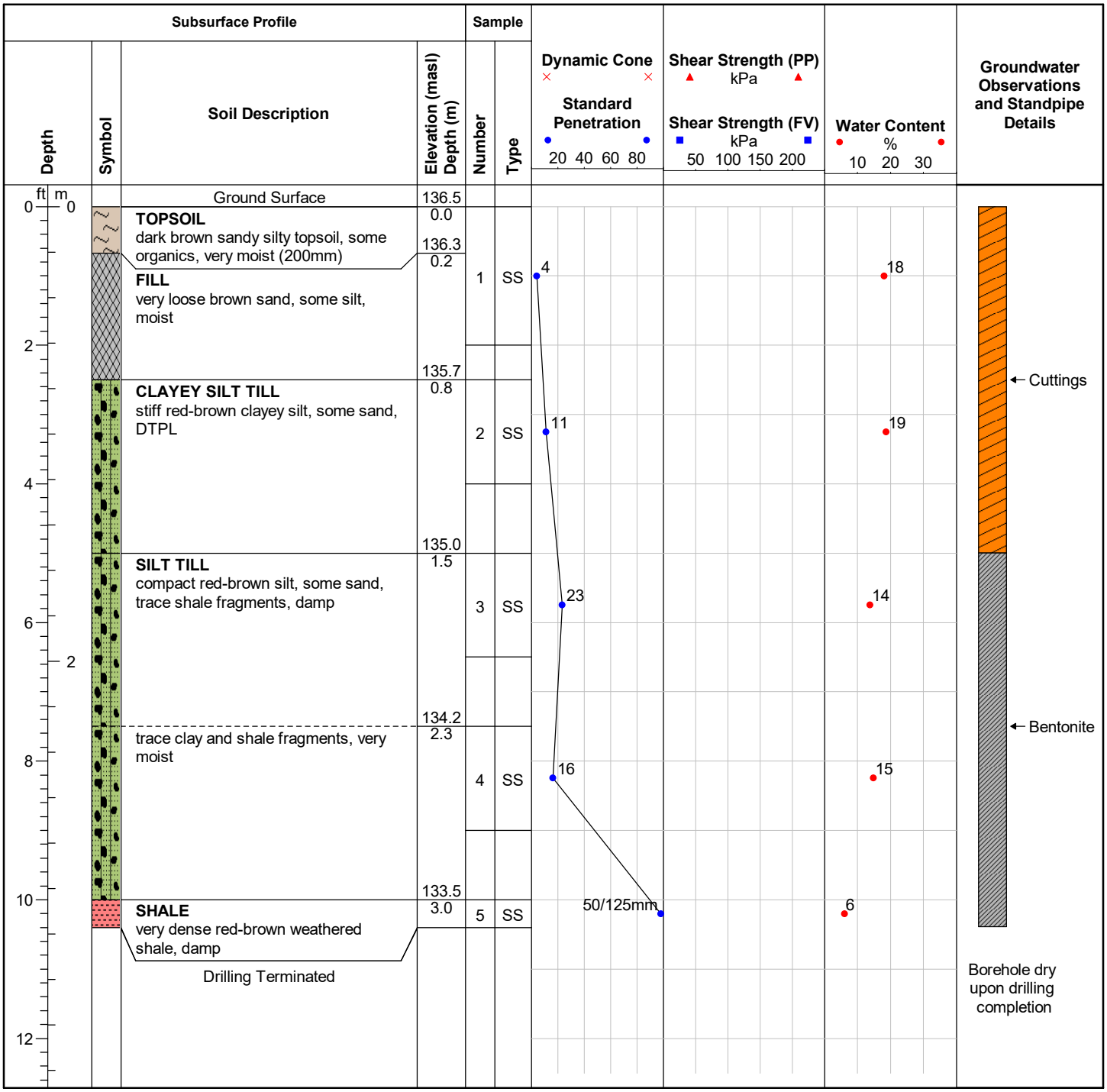
Date Completed: 8/31/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: N/A



Field Technician: N. Wang

Drafted by: B. Graul

Reviewed by: B. Thorner

Sheet: 1 of 1

ID No.: BH155-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

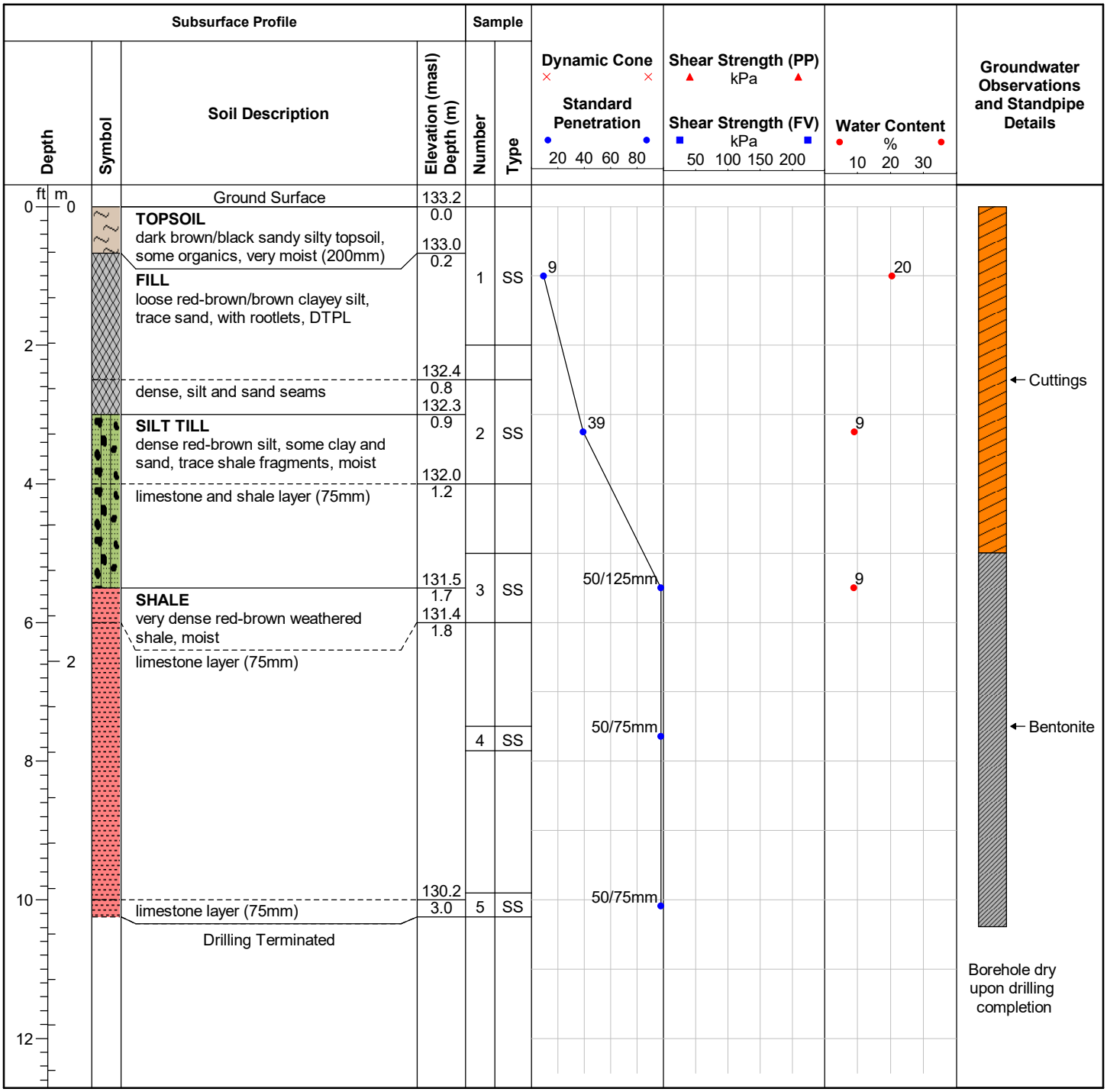
Date Completed: 9/7/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: N/A



Field Technician: B. Ehgoetz

Drafted by: B. Graul

Reviewed by: B. Thorner

Sheet: 1 of 1

ID No.: BH156-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

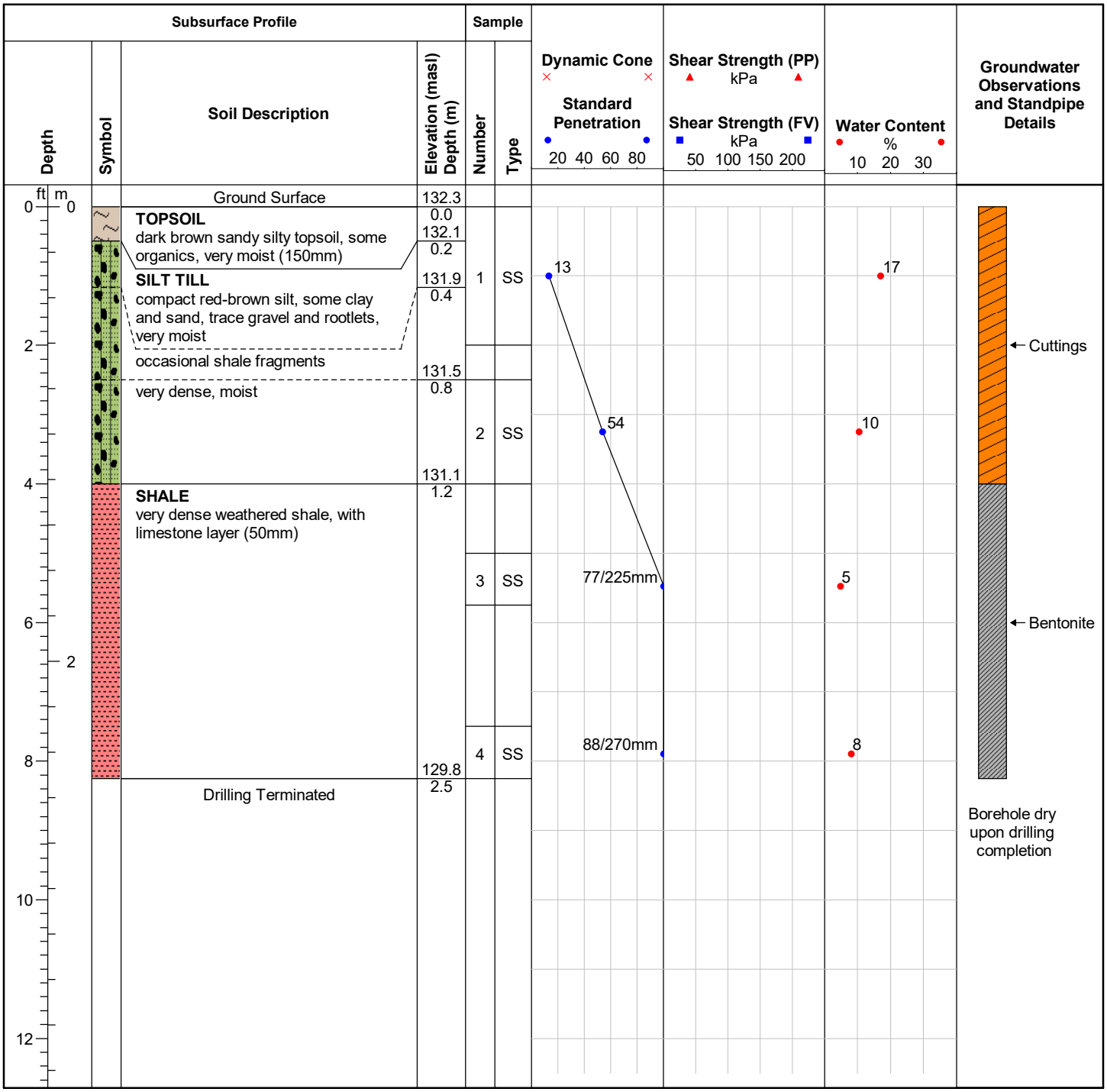
Date Completed: 9/5/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: N/A



Field Technician: B. Ehgoetz

Drafted by: B. Graul

Reviewed by: B. Thorner

Sheet: 1 of 1

ID No.: BH157-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

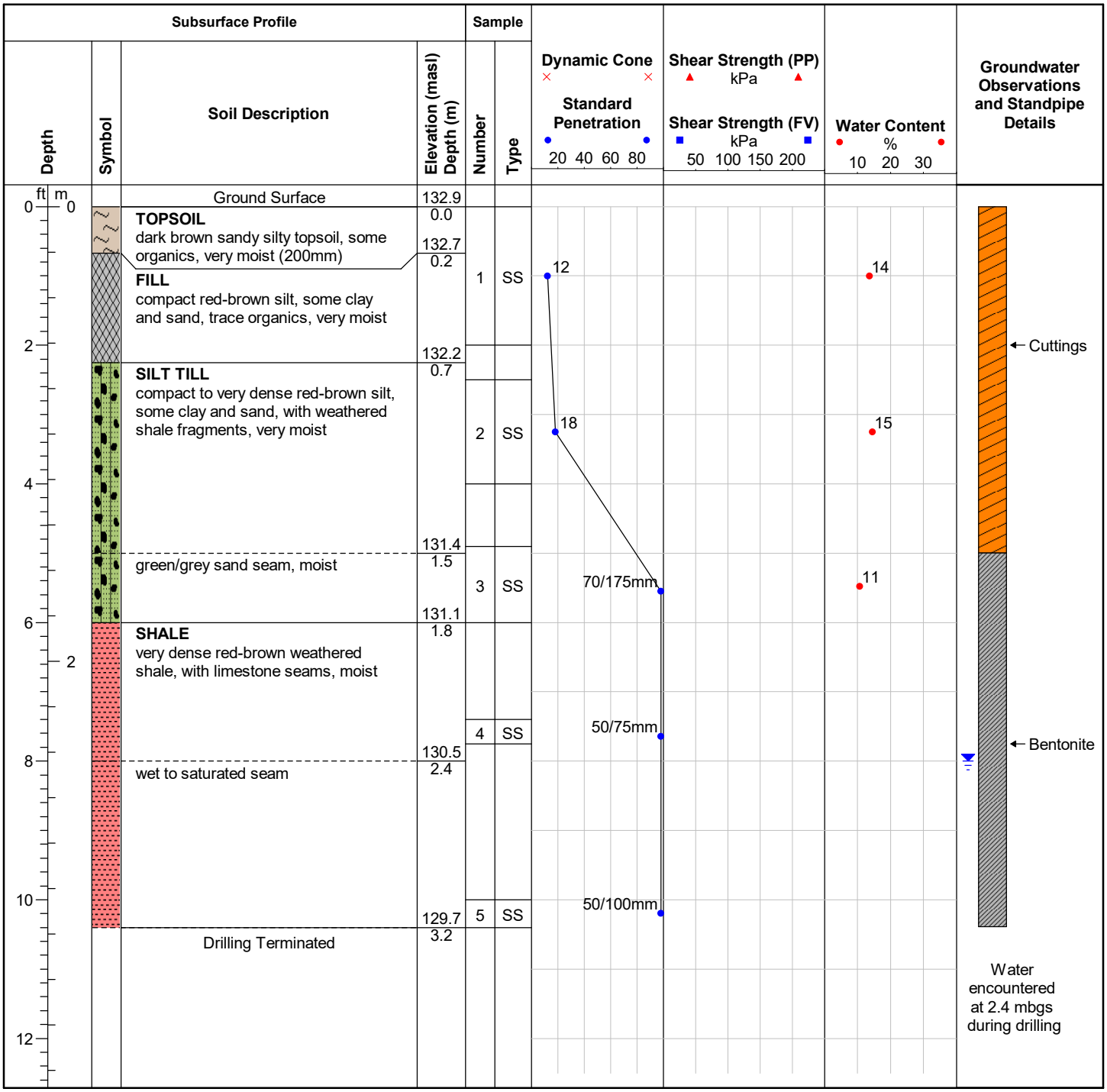
Date Completed: 9/6/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: N/A



Field Technician: B. Ehgoetz

Drafted by: B. Graul

Reviewed by: B. Thorner

Sheet: 1 of 1

ID No.: BH158-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

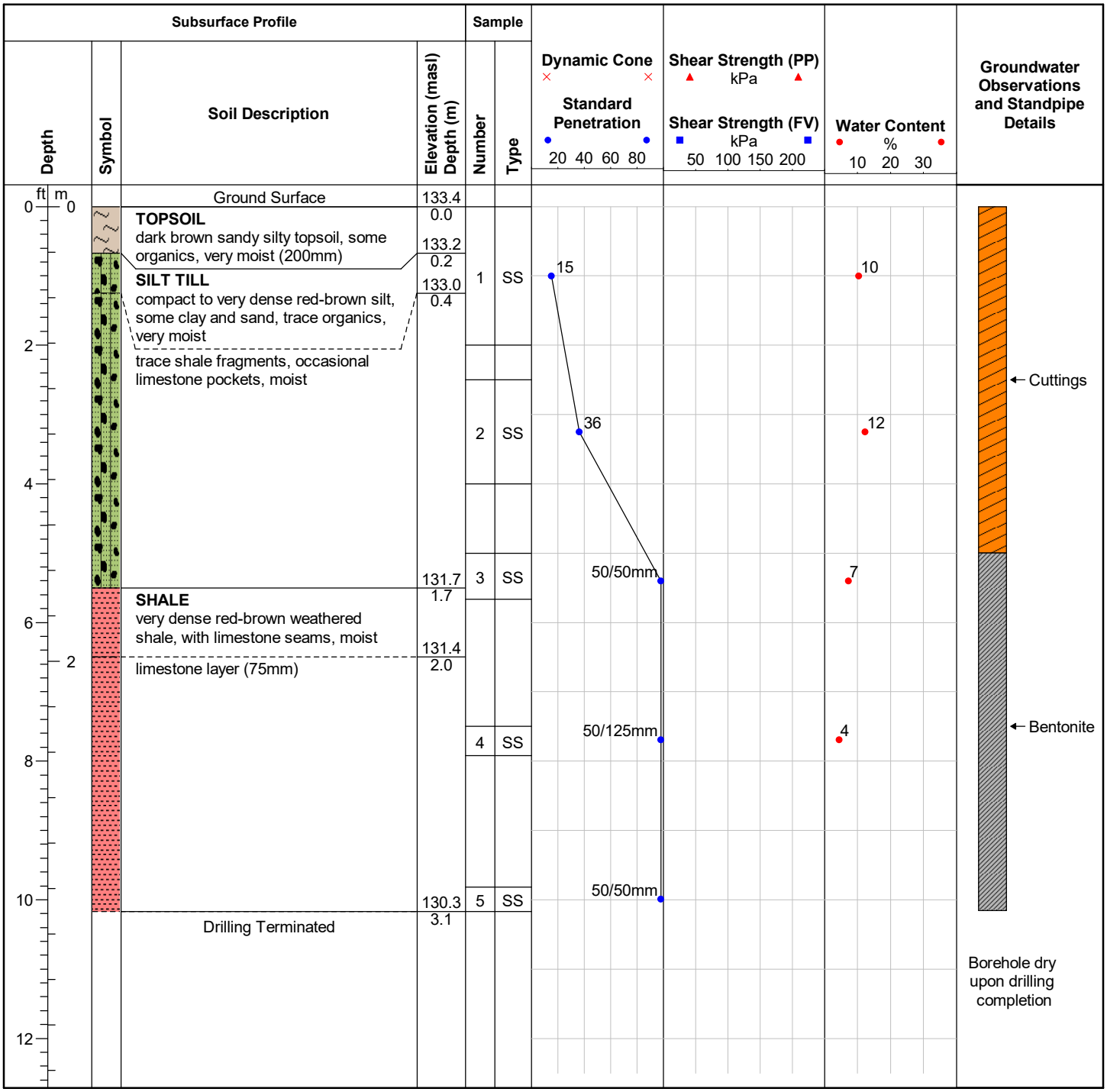
Date Completed: 9/6/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: N/A



Field Technician: B. Ehgoetz

Drafted by: B. Graul

Reviewed by: B. Thorner

Sheet: 1 of 1

ID No.: BH159-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

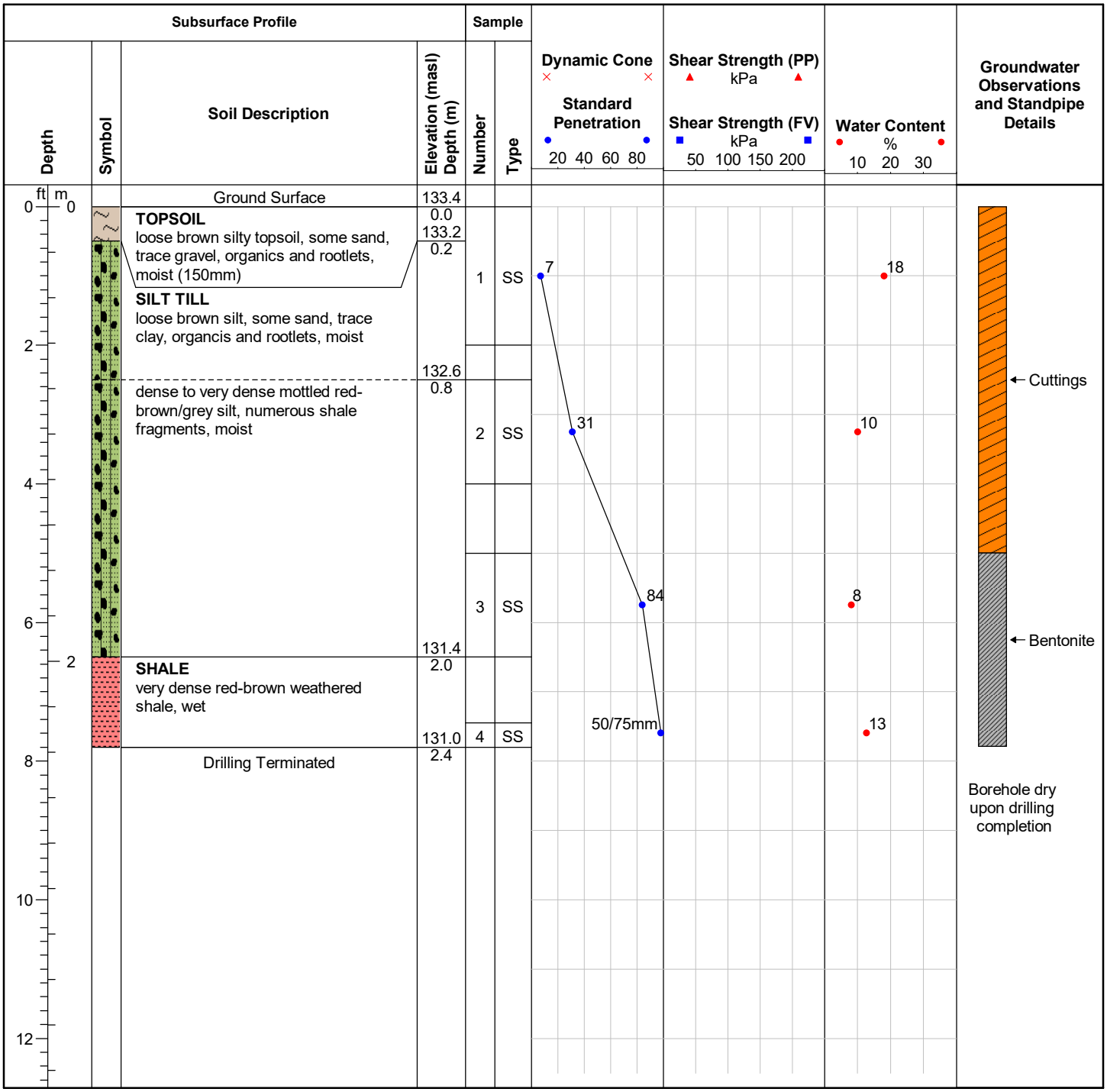
Date Completed: 9/7/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: N/A



Field Technician: N. Wang

Drafted by: B. Graul

Reviewed by: B. Thorner

Sheet: 1 of 1

ID No.: BH160-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

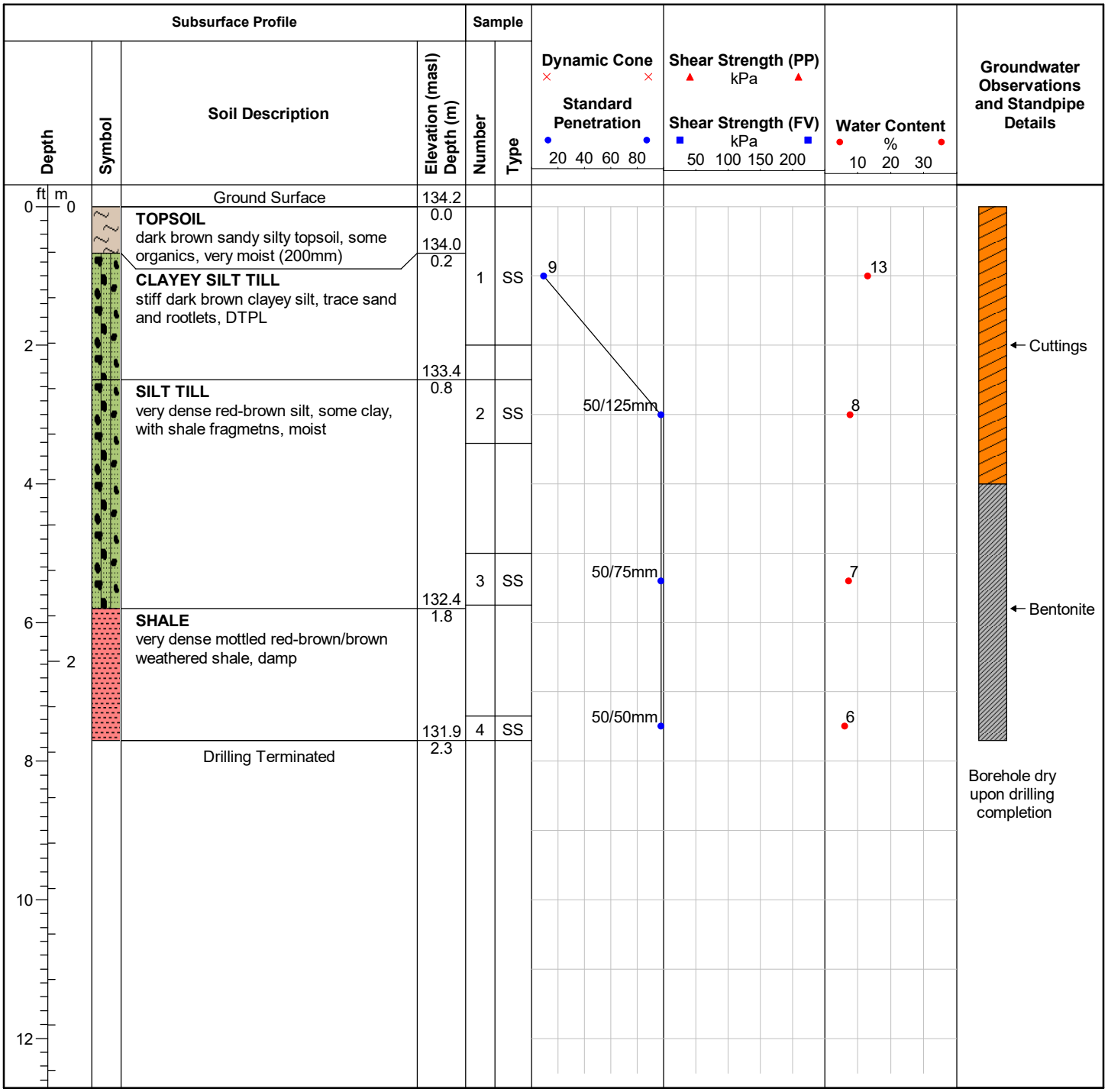
Date Completed: 8/31/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: N/A



Field Technician: N. Wang

Drafted by: B. Graul

Reviewed by: B. Thorner

Sheet: 1 of 1

ID No.: BH161-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

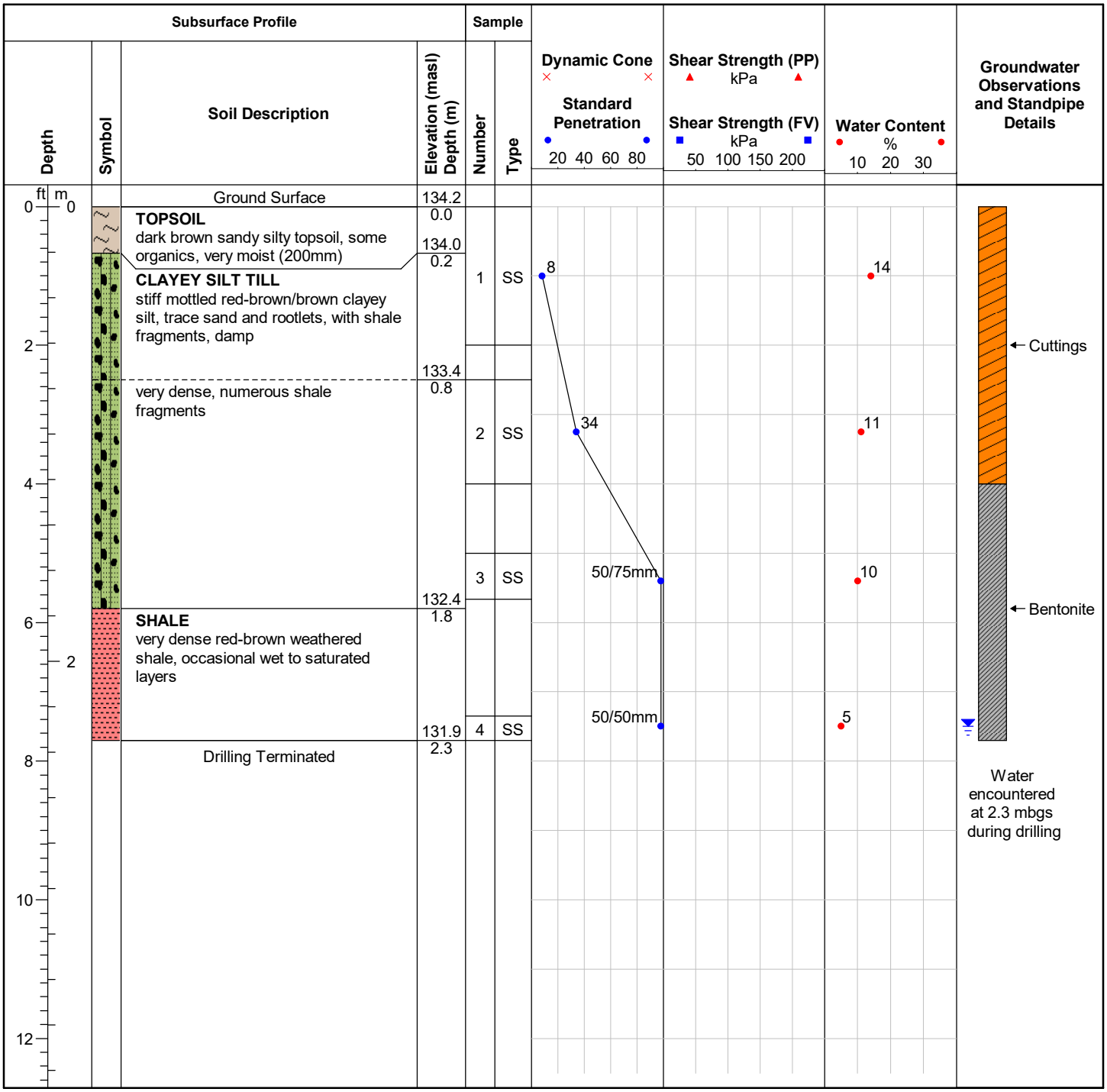
Date Completed: 8/31/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: N/A



Field Technician: N. Wang

Drafted by: B. Graul

Reviewed by: B. Thorner

Sheet: 1 of 1

ID No.: BH162-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

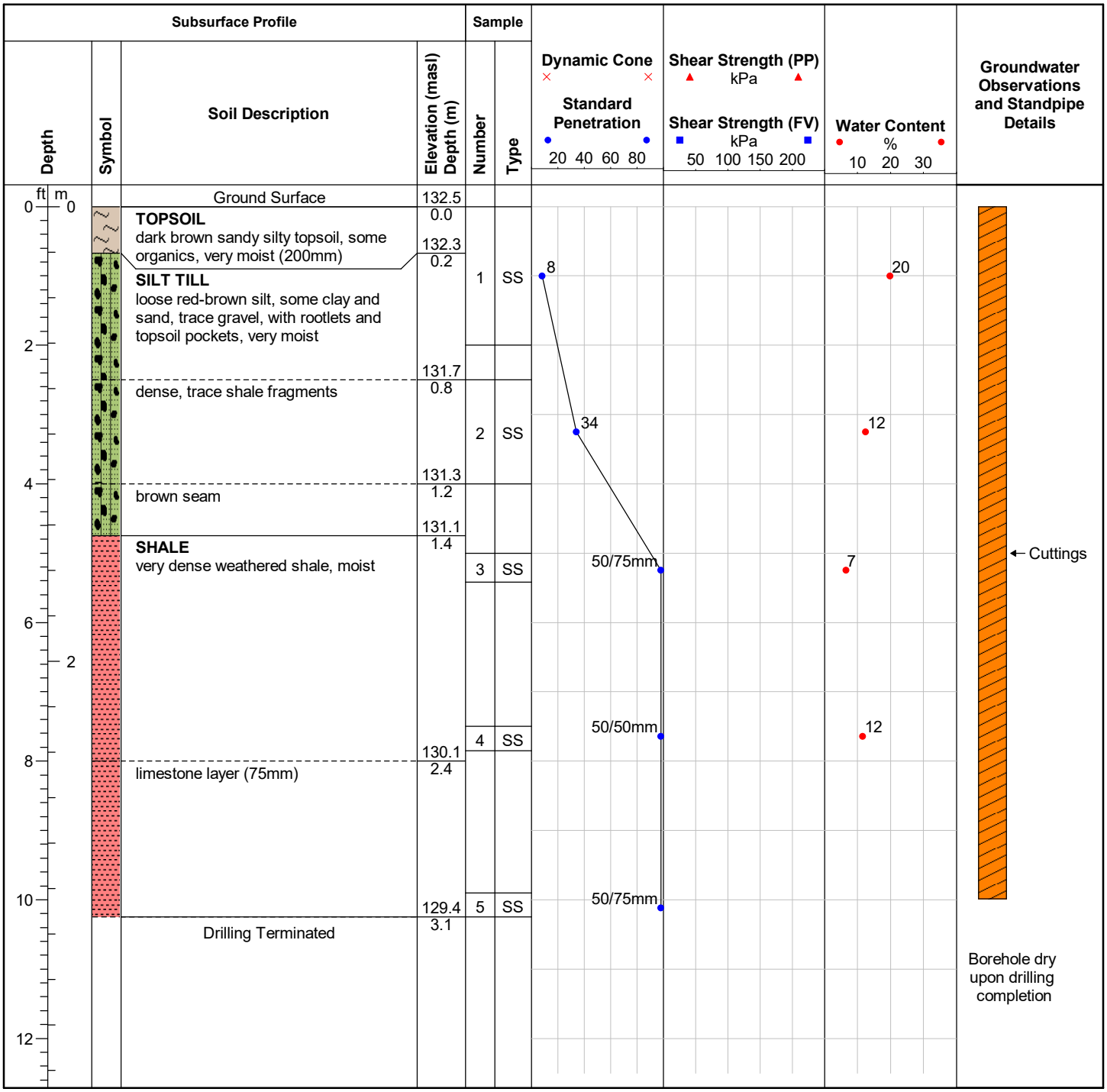
Date Completed: 9/5/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: N/A



Field Technician: B. Ehgoetz

Drafted by: B. Graul

Reviewed by: B. Thorner

Sheet: 1 of 1

ID No.: BH163-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

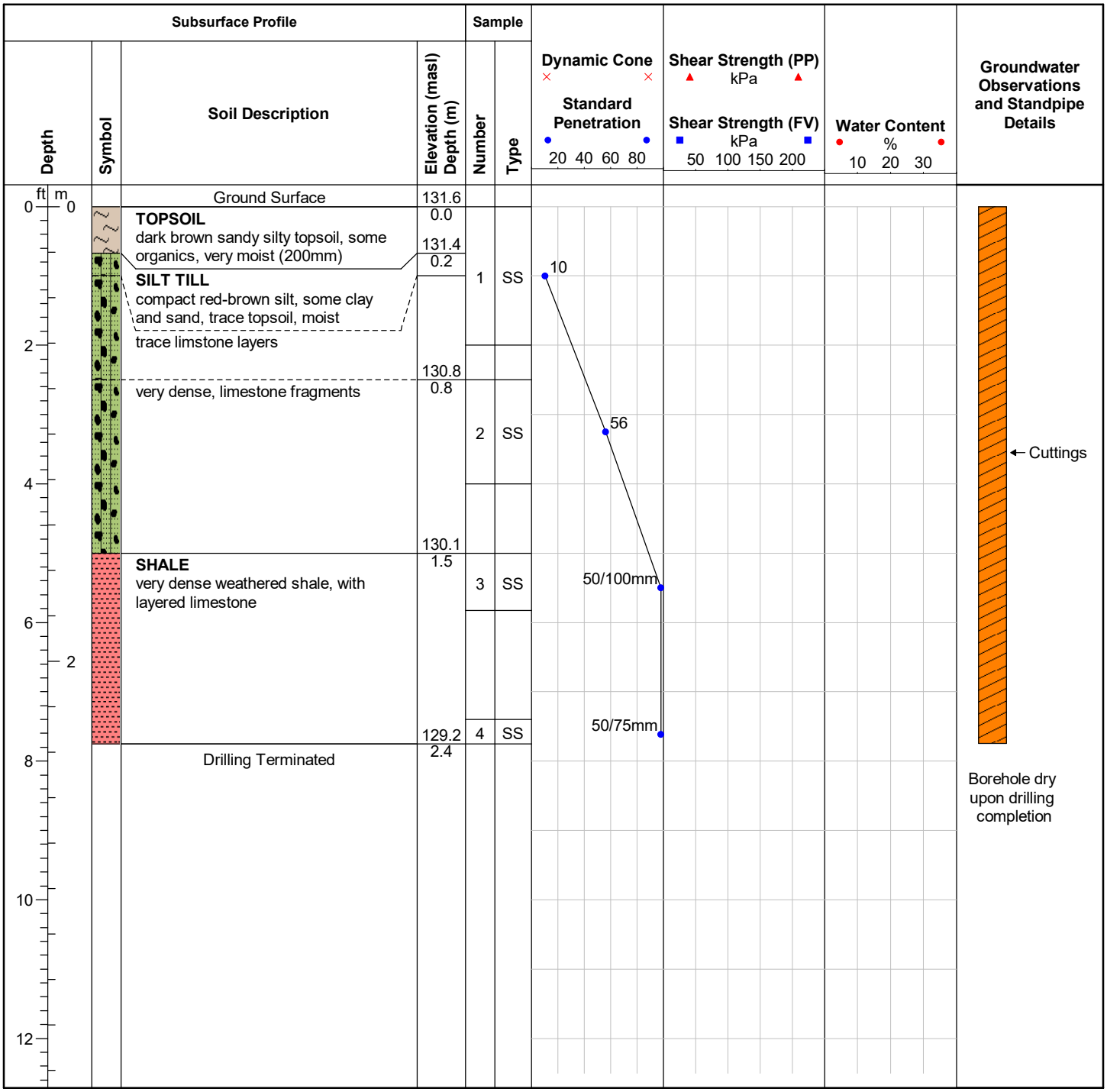
Date Completed: 9/6/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: N/A



Field Technician: B. Ehgoetz

Drafted by: B. Graul

Reviewed by: B. Thorner

Sheet: 1 of 1

ID No.: BH164-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

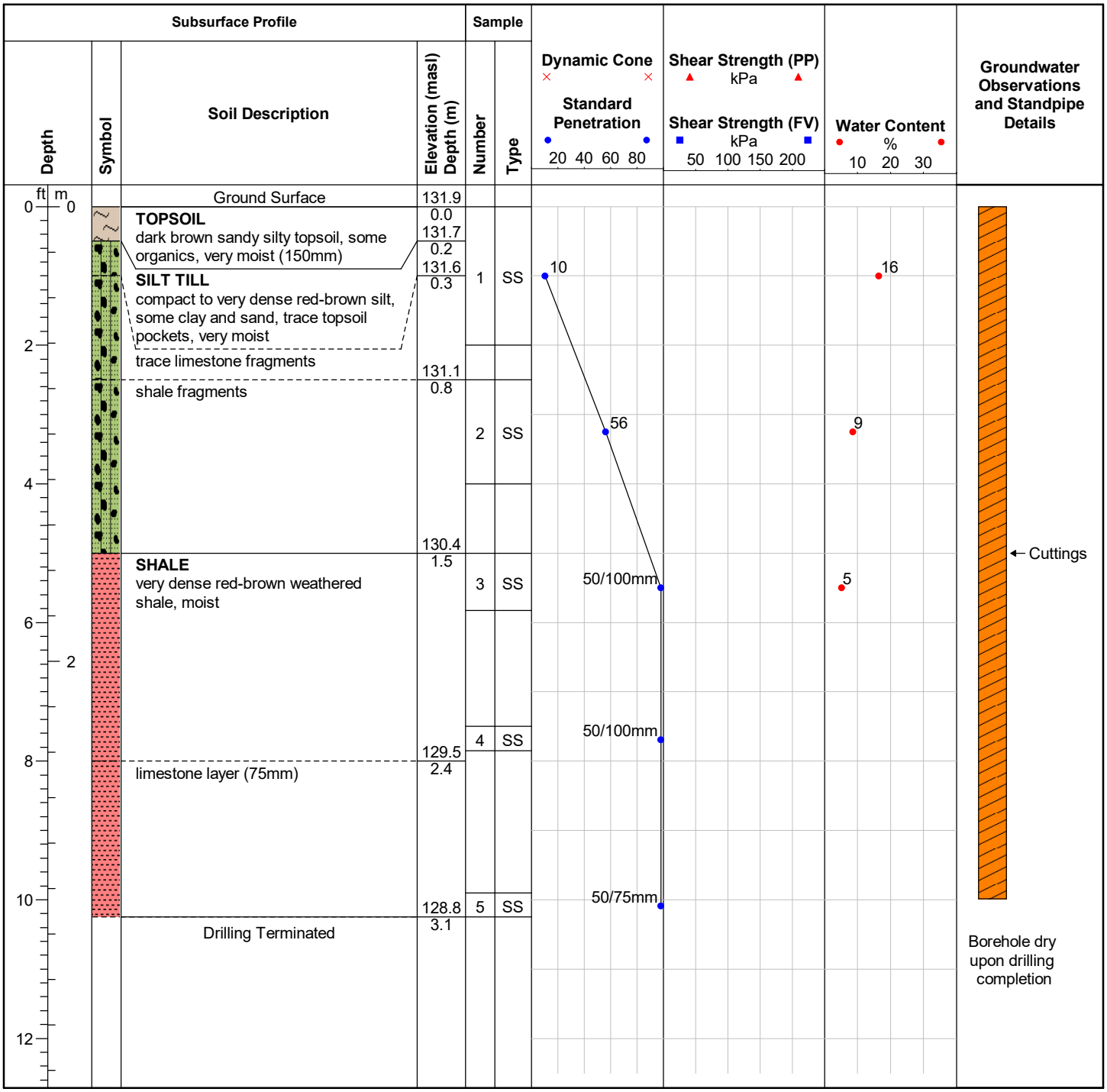
Date Completed: 9/6/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: N/A



Field Technician: B. Ehgoetz

Drafted by: B. Graul

Reviewed by: B. Thorner

MTE

Sheet: 1 of 1

ID No.: BH165-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

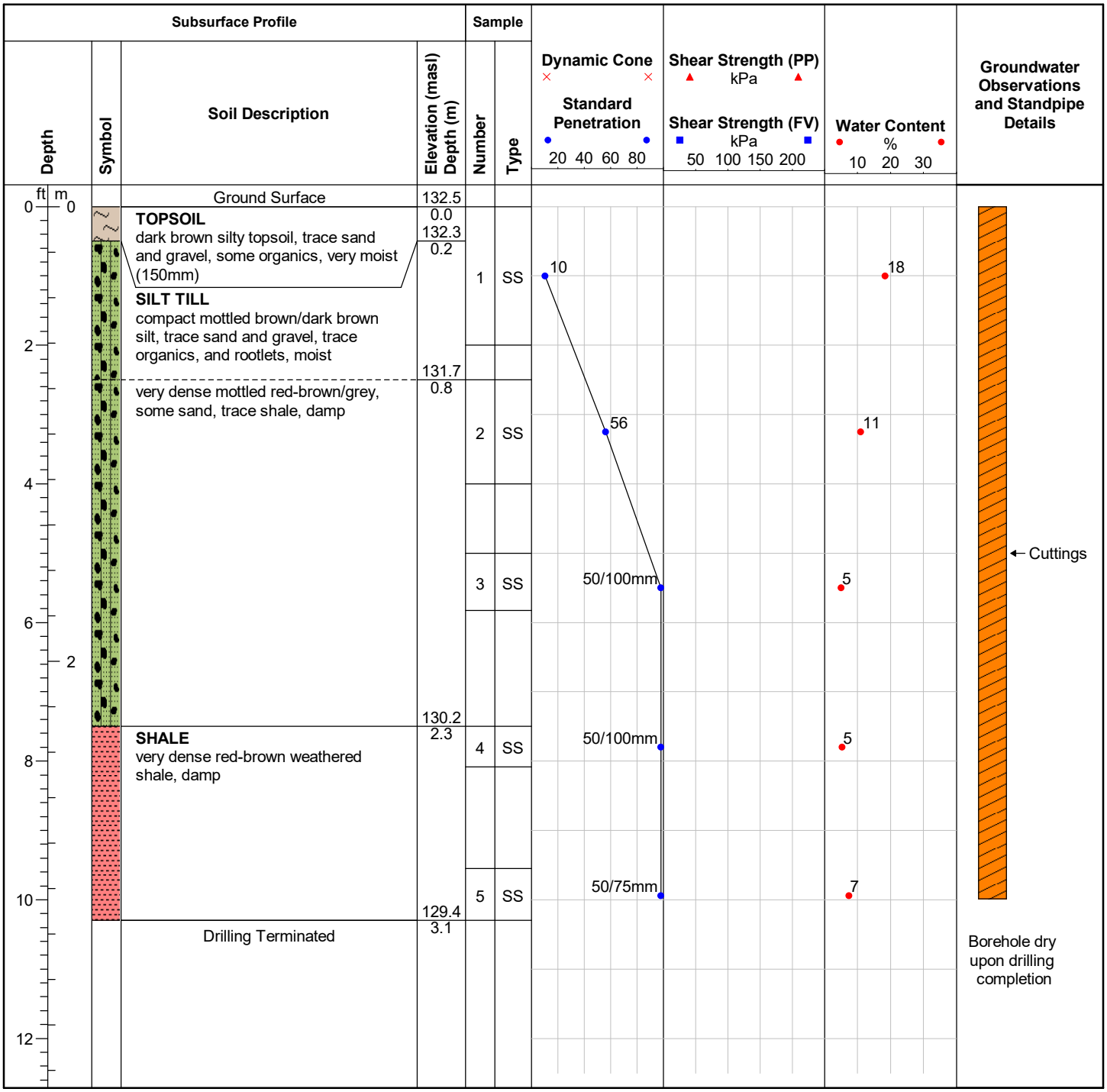
Date Completed: 9/6/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: N/A



Field Technician: N. Wang

Drafted by: B. Graul

Reviewed by: B. Thorner

Sheet: 1 of 1

ID No.: BH166-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

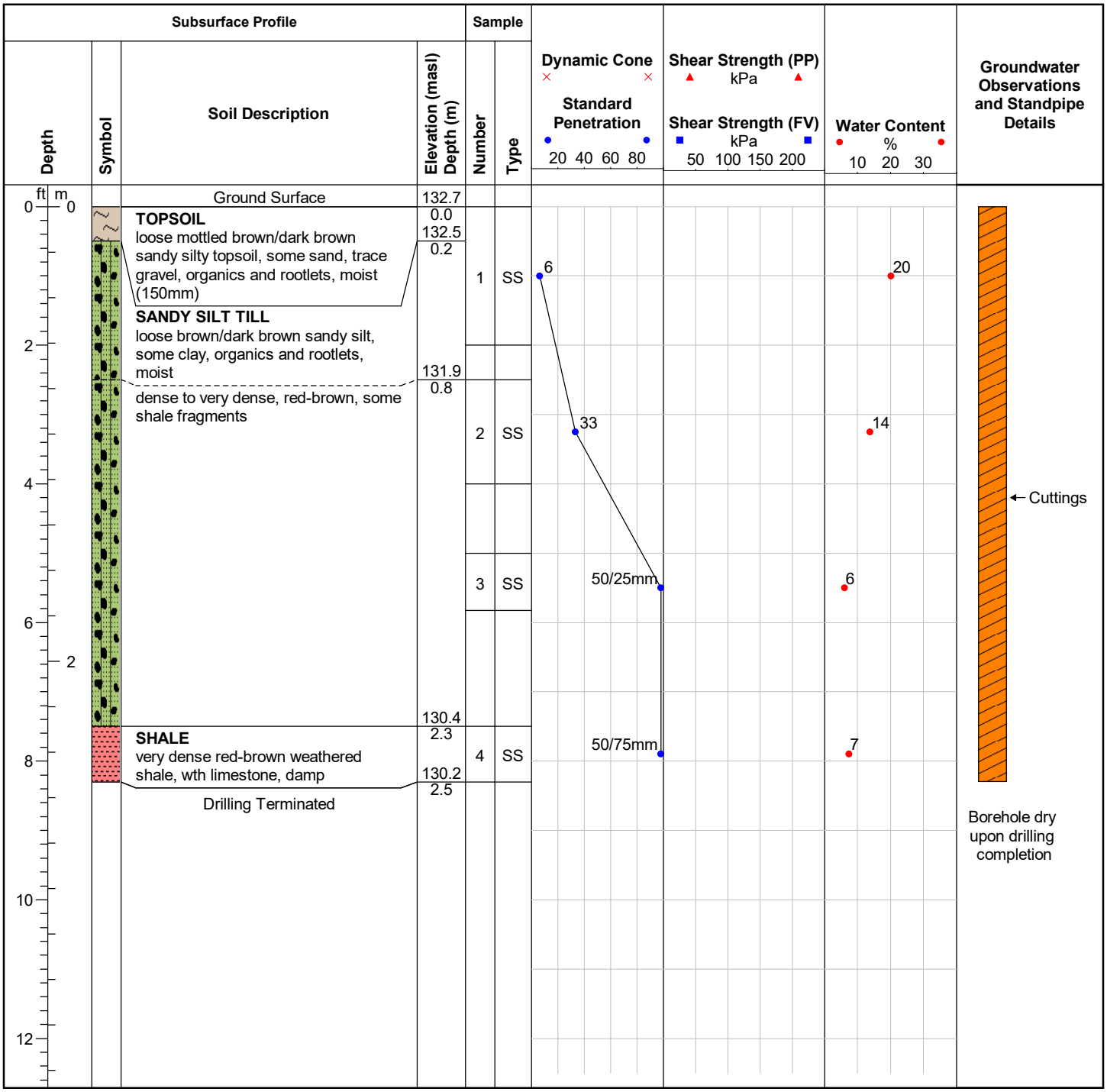
Date Completed: 9/6/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: N/A



Field Technician: N. Wang

Drafted by: B. Graul

Reviewed by: B. Thorner

Sheet: 1 of 1

ID No.: BH167-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

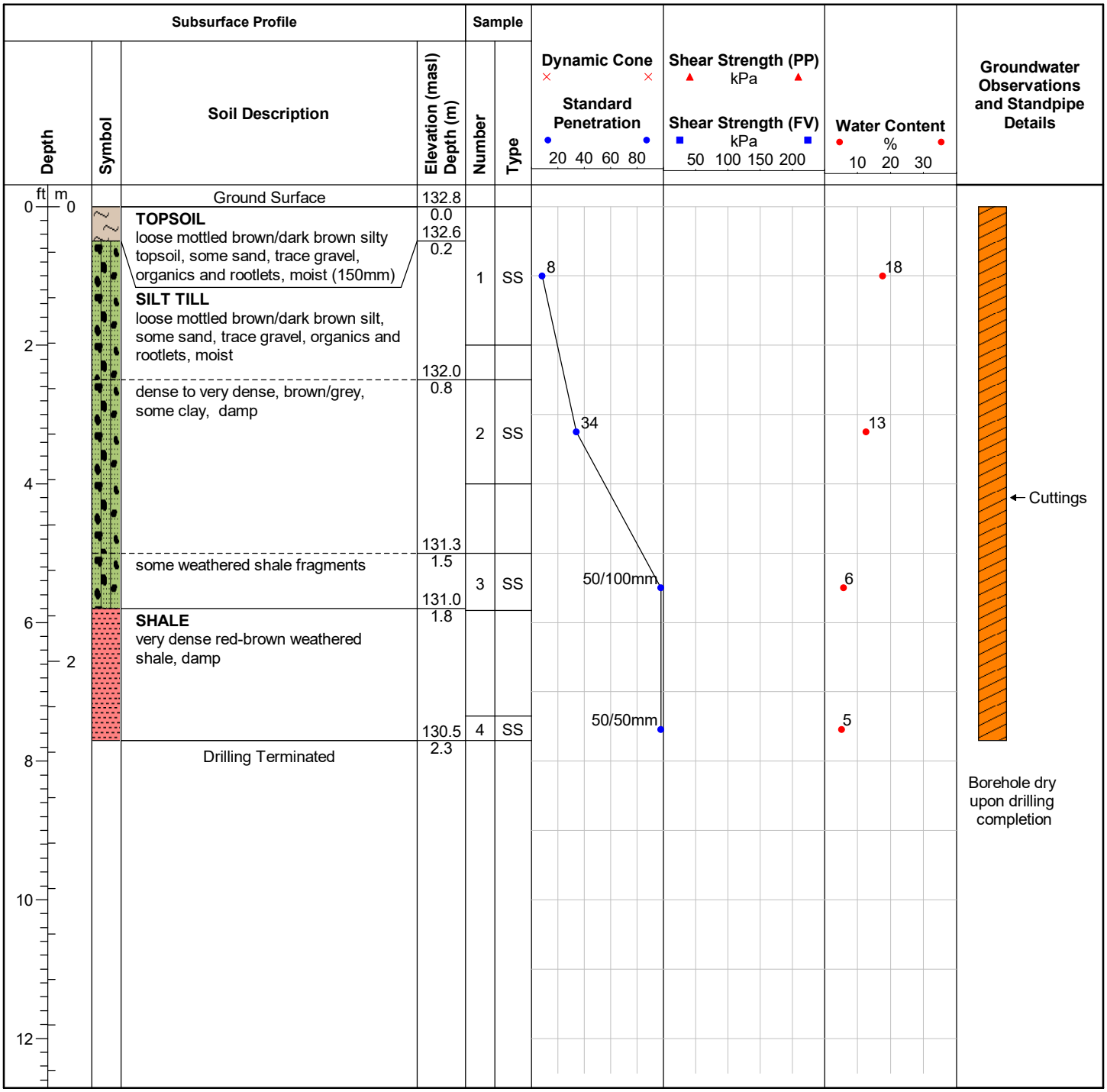
Date Completed: 9/6/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: N/A



Field Technician: N. Wang

Drafted by: B. Graul

Reviewed by: B. Thorner

Sheet: 1 of 1

ID No.: BH168-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

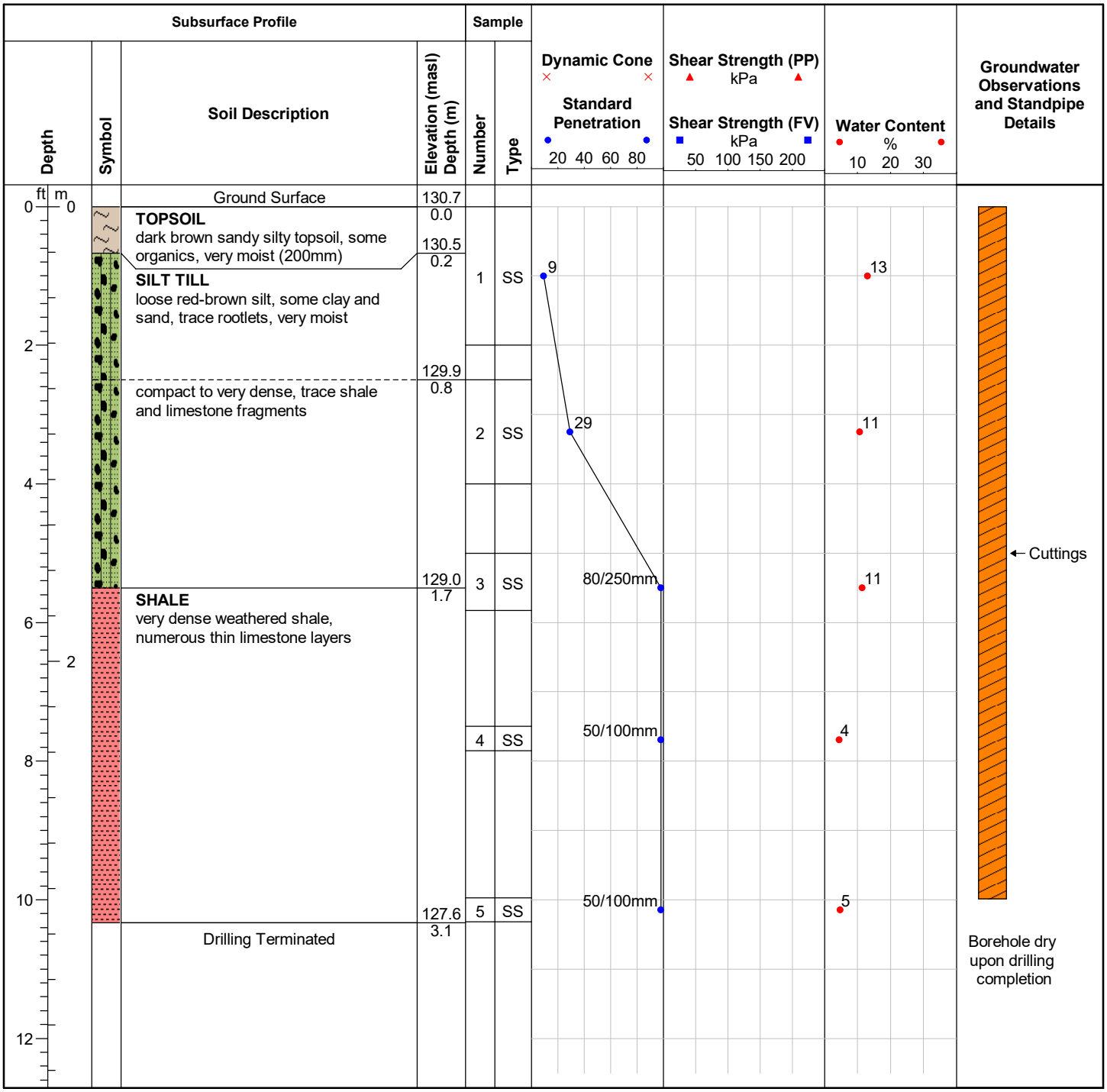
Date Completed: 9/6/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: N/A



Field Technician: B. Ehgoetz

Drafted by: B. Graul

Reviewed by: B. Thorner

Sheet: 1 of 1

ID No.: BH169-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

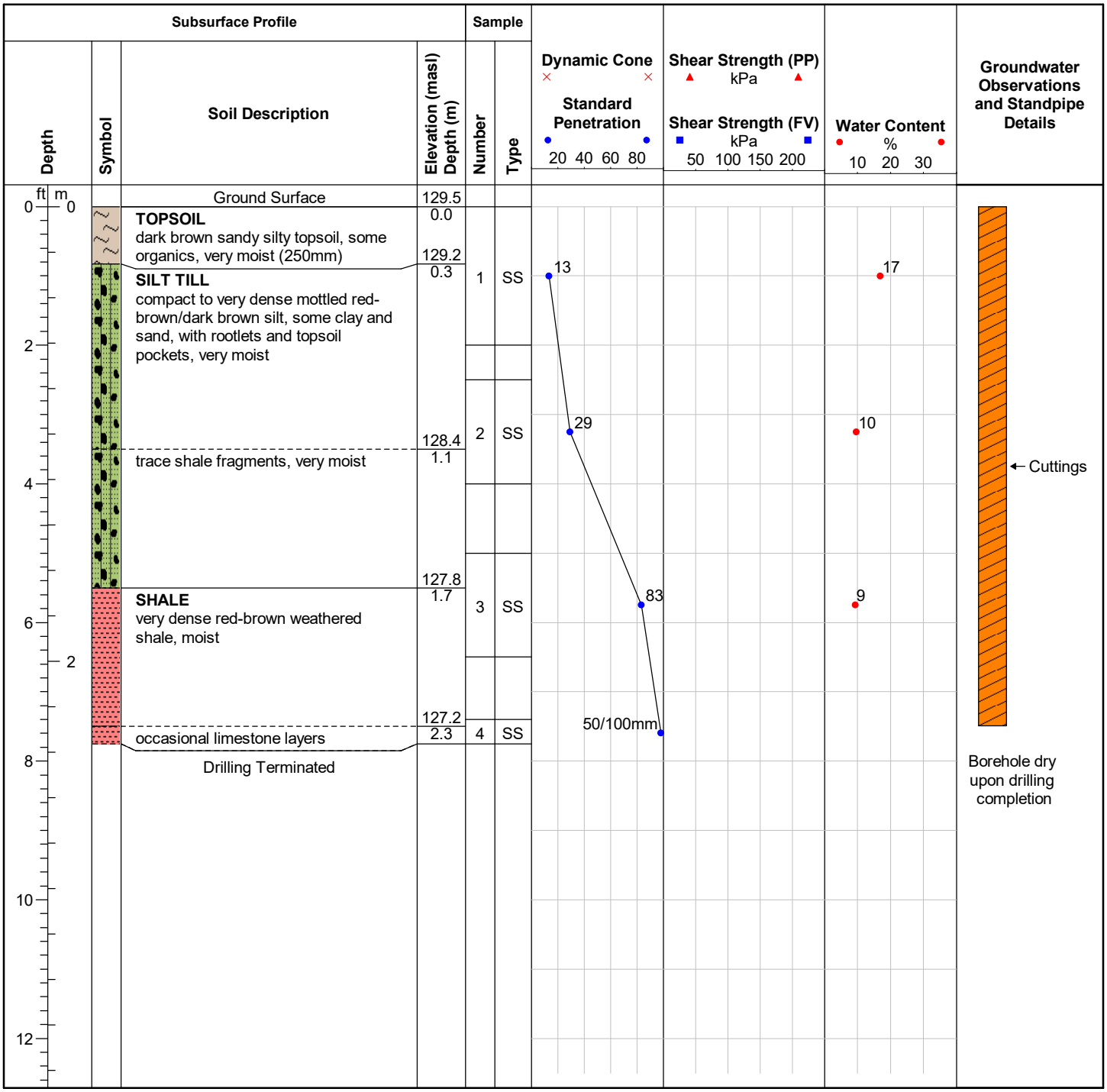
Date Completed: 9/6/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: N/A



Field Technician: B. Ehgoetz

Drafted by: B. Graul

Reviewed by: B. Thorner

Sheet: 1 of 1

ID No.: BH170-23

Project Name: Bronte Creek Meadows Geotechnical Investigation

MTE File No.: 52982-700

Client: Alinea Land Corporation

Site Location: Upper Middle Road & Burloak Drive, Burlington, ON

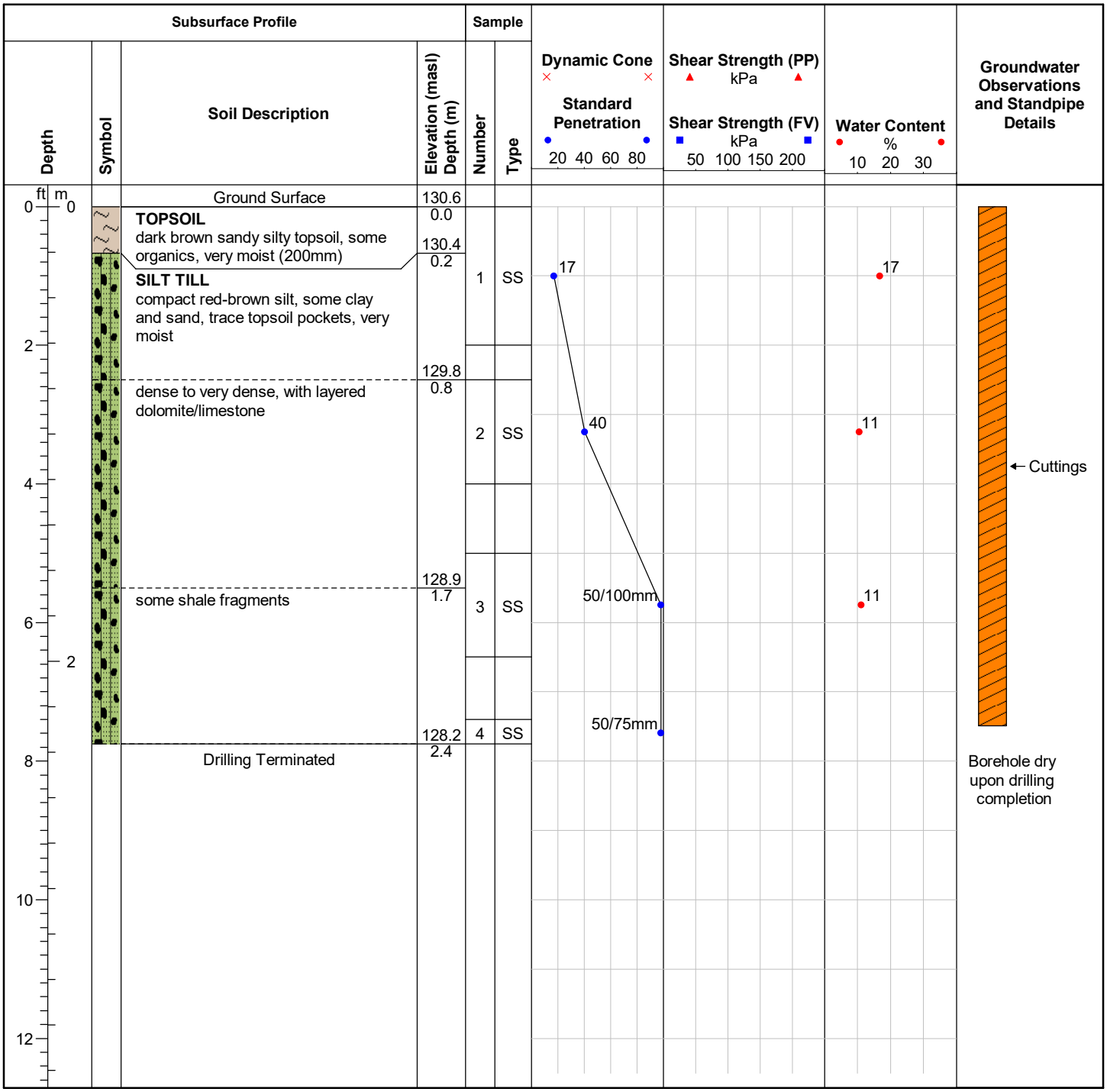
Date Completed: 9/5/2023

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: CME55

Drill Method: Solid Stem Auger

Protective Cover: N/A



Field Technician: B. Ehgoetz

Drafted by: B. Graul

Reviewed by: B. Thorner

Notes:
Auger refusal at 2.4mbgs due to bedrock

Appendix C

Laboratory Test Results

Table 101

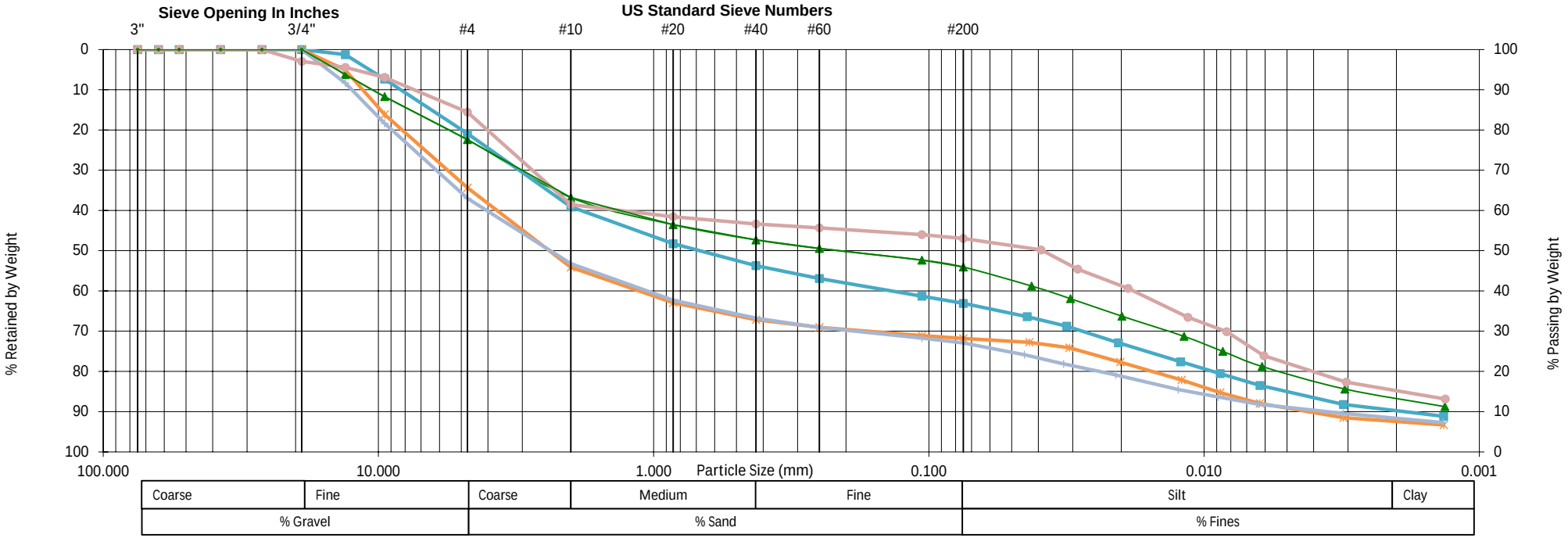
Particle Size Distribution Analysis Test Results

Project Name: Bronte Creek Meadows
Client: Alinea Land Corporation
Project Location: Burlington, ON

Date Sampled: Aug. 30 - Sept. 7, 2023
Date Tested: Oct. 2 - 10, 2023

MTE File No.: 52982-700
Table No: 101

Unified Soil Classification



Symbol	Borehole ID	Sample #	Sample Depth	Description
▲	MW101-23	SS-4	2.3-2.7 mbgs	Sandy Gravelly SILT, some Clay
■	MW103-23	SS-4	2.3-2.7 mbgs	Silty Gravelly SAND, some Clay
✳	MW105-23	SS-4	2.3-2.4 mbgs	Gravelly Silty SAND, trace Clay
+	MW106-23	SS-5	3.1-3.2 mbgs	GRAVEL and SAND, some Silt, trace Clay
●	MW108-23	SS-3	1.5-1.8 mbgs	Sandy SILT, some Gravel and Clay

CERTIFIED BY CCIL
Canadian Council of Independent Laboratories
For specific tests as listed on www.ccil.com

NOTES:

Appendix D

Additional Borehole Data

Tables 201 and 202

Table 201 - Water Level Measurements During Drilling

Borehole Number	Borehole Elevation (masl)	Groundwater Depth (mbgs)	Groundwater Elevation (masl)	Soil Type
MW101-23	141.5	DRY	DRY	DRY
MW102-23	141.2	3.1	138.1	Shale (Seams)
MW103-23	136.0	3.0	133.0	Shale (Seams)
MW104-23	132.1	3.1	129.0	Shale (Seams)
MW105-23	131.7	6.1	125.6	Shale (seams)
MW106-23	138.5	4.6	133.9	Shale (Seams)
MW107-23	133.1	1.9	131.1	Shale (Seams)
MW108-23	130.7	5.5	125.2	Shale (Seams)
MW109-23	133.2	DRY	DRY	DRY
MW110-23	130.9	4.0	126.9	Shale (Seams)
BH111-23	139.8	DRY	DRY	DRY
BH112-23	141.5	DRY	DRY	DRY
BH113-23	141.9	DRY	DRY	DRY
BH114-23	141.2	DRY	DRY	DRY
BH115-23	139.9	DRY	DRY	DRY
BH116-23	141.3	DRY	DRY	DRY
BH117-23	141.9	1.5	140.4	Clay and Silt
BH118-23	141.0	DRY	DRY	DRY
BH119-23	141.9	DRY	DRY	DRY
BH120-23	137.4	4.5	132.9	Shale (Seams)
BH121-23	138.5	DRY	DRY	DRY
BH122-23	138.2	DRY	DRY	DRY
BH123-23	141.3	DRY	DRY	DRY
BH124-23	138.4	DRY	DRY	DRY
BH125-23	138.0	DRY	DRY	DRY
BH126-23	138.4	DRY	DRY	DRY
BH127-23	137.9	3.1	134.8	Shale (Seams)
BH128-23	138.1	DRY	DRY	DRY
BH129-23	140.1	DRY	DRY	DRY
BH130-23	139.4	DRY	DRY	DRY
BH131-23	135.5	DRY	DRY	DRY
BH132-23	134.4	DRY	DRY	DRY

Borehole Number	Borehole Elevation (masl)	Groundwater Depth (mbgs)	Groundwater Elevation (masl)	Soil Type
BH133-23	135.1	DRY	DRY	DRY
BH134-23	136.5	DRY	DRY	DRY
BH135-23	136.0	DRY	DRY	DRY
BH136-23	136.8	DRY	DRY	DRY
BH137-23	136.7	DRY	DRY	DRY
BH138-23	136.8	DRY	DRY	DRY
BH139-23	137.0	DRY	DRY	DRY
BH140-23	136.7	DRY	DRY	DRY
BH141-23	137.1	DRY	DRY	DRY
BH142-23	139.5	DRY	DRY	DRY
BH143-23	137.6	DRY	DRY	DRY
BH144-23	137.3	2.3	135.0	Silt Till
BH145-23	133.4	2.3	131.1	Shale (Seams)
BH146-23	134.9	3.7	131.2	Shale (Seams)
BH147-23	134.8	DRY	DRY	DRY
BH148-23	134.8	DRY	DRY	DRY
BH149-23	133.9	DRY	DRY	DRY
BH150-23	134.5	DRY	DRY	DRY
BH151-23	135.3	DRY	DRY	DRY
BH152-23	135.2	DRY	DRY	DRY
BH153-23	135.0	DRY	DRY	DRY
BH154-23	136.5	DRY	DRY	DRY
BH155-23	133.2	DRY	DRY	DRY
BH156-23	132.3	DRY	DRY	DRY
BH157-23	132.9	2.4	130.5	Shale (Seams)
BH158-23	133.4	DRY	DRY	DRY
BH159-23	133.4	DRY	DRY	DRY
BH160-23	134.2	DRY	DRY	DRY
BH161-23	134.2	2.3	131.9	Shale (Seams)
BH162-23	132.5	DRY	DRY	DRY
BH163-23	131.6	DRY	DRY	DRY
BH164-23	131.9	DRY	DRY	DRY
BH165-23	132.5	DRY	DRY	DRY

Borehole Number	Borehole Elevation (masl)	Groundwater Depth (mbgs)	Groundwater Elevation (masl)	Soil Type
BH166-23	132.7	DRY	DRY	DRY
BH167-23	132.8	DRY	DRY	DRY
BH168-23	130.7	DRY	DRY	DRY
BH169-23	129.5	DRY	DRY	DRY
BH170-23	130.6	DRY	DRY	DRY

Table 201 - Water Level Measurements During Drilling

Borehole Number	Borehole Elevation (masl)	Groundwater Depth (mbgs)	Groundwater Elevation (masl)	Soil Type
MW101-23	141.5	DRY	DRY	DRY
MW102-23	141.2	3.1	138.1	Shale (Seams)
MW103-23	136.0	3.0	133.0	Shale (Seams)
MW104-23	132.1	3.1	129.0	Shale (Seams)
MW105-23	131.7	6.1	125.6	Shale (seams)
MW106-23	138.5	4.6	133.9	Shale (Seams)
MW107-23	133.1	1.9	131.1	Shale (Seams)
MW108-23	130.7	5.5	125.2	Shale (Seams)
MW109-23	133.2	DRY	DRY	DRY
MW110-23	130.9	4.0	126.9	Shale (Seams)
BH111-23	139.8	DRY	DRY	DRY
BH112-23	141.5	DRY	DRY	DRY
BH113-23	141.9	DRY	DRY	DRY
BH114-23	141.2	DRY	DRY	DRY
BH115-23	139.9	DRY	DRY	DRY
BH116-23	141.3	DRY	DRY	DRY
BH117-23	141.9	1.5	140.4	Clay and Silt
BH118-23	141.0	DRY	DRY	DRY
BH119-23	141.9	DRY	DRY	DRY
BH120-23	137.4	4.5	132.9	Shale (Seams)
BH121-23	138.5	DRY	DRY	DRY
BH122-23	138.2	DRY	DRY	DRY
BH123-23	141.3	DRY	DRY	DRY
BH124-23	138.4	DRY	DRY	DRY
BH125-23	138.0	DRY	DRY	DRY
BH126-23	138.4	DRY	DRY	DRY
BH127-23	137.9	3.1	134.8	Shale (Seams)
BH128-23	138.1	DRY	DRY	DRY
BH129-23	140.1	DRY	DRY	DRY
BH130-23	139.4	DRY	DRY	DRY
BH131-23	135.5	DRY	DRY	DRY
BH132-23	134.4	DRY	DRY	DRY

Borehole Number	Borehole Elevation (masl)	Groundwater Depth (mbgs)	Groundwater Elevation (masl)	Soil Type
BH133-23	135.1	DRY	DRY	DRY
BH134-23	136.5	DRY	DRY	DRY
BH135-23	136.0	DRY	DRY	DRY
BH136-23	136.8	DRY	DRY	DRY
BH137-23	136.7	DRY	DRY	DRY
BH138-23	136.8	DRY	DRY	DRY
BH139-23	137.0	DRY	DRY	DRY
BH140-23	136.7	DRY	DRY	DRY
BH141-23	137.1	DRY	DRY	DRY
BH142-23	139.5	DRY	DRY	DRY
BH143-23	137.6	DRY	DRY	DRY
BH144-23	137.3	2.3	135.0	Silt Till
BH145-23	133.4	2.3	131.1	Shale (Seams)
BH146-23	134.9	3.7	131.2	Shale (Seams)
BH147-23	134.8	DRY	DRY	DRY
BH148-23	134.8	DRY	DRY	DRY
BH149-23	133.9	DRY	DRY	DRY
BH150-23	134.5	DRY	DRY	DRY
BH151-23	135.3	DRY	DRY	DRY
BH152-23	135.2	DRY	DRY	DRY
BH153-23	135.0	DRY	DRY	DRY
BH154-23	136.5	DRY	DRY	DRY
BH155-23	133.2	DRY	DRY	DRY
BH156-23	132.3	DRY	DRY	DRY
BH157-23	132.9	2.4	130.5	Shale (Seams)
BH158-23	133.4	DRY	DRY	DRY
BH159-23	133.4	DRY	DRY	DRY
BH160-23	134.2	DRY	DRY	DRY
BH161-23	134.2	2.3	131.9	Shale (Seams)
BH162-23	132.5	DRY	DRY	DRY
BH163-23	131.6	DRY	DRY	DRY
BH164-23	131.9	DRY	DRY	DRY
BH165-23	132.5	DRY	DRY	DRY

Borehole Number	Borehole Elevation (masl)	Groundwater Depth (mbgs)	Groundwater Elevation (masl)	Soil Type
BH166-23	132.7	DRY	DRY	DRY
BH167-23	132.8	DRY	DRY	DRY
BH168-23	130.7	DRY	DRY	DRY
BH169-23	129.5	DRY	DRY	DRY
BH170-23	130.6	DRY	DRY	DRY

Appendix E

MNR Rating Charts

Tables I to V

TABLE I

SLOPE STABILITY RATING CHART

Site Location: Bronte Creek Meadows	Project No.: 52982-700
Property Owner: Alinea Land Corporation	Inspection Date: August 2023
Inspected By: B.Thorner	Weather: Sunny

	Rating Value (select one)
	Cross Section A-A'
1. SLOPE INCLINATION Degrees horizontal:vertial a) 16 or less 3:1 or flatter b) 16 to 26 2:1 to 3:1 c) 26 or more steeper than 2:1	<0> 6 16
2. SOIL STRATIGRAPHY a) Shale, Limestone (bedrock) b) Sand, Gravel c) Till d) Clay, Silt e) Fill	0 6 <9> 12 16
3. SEEPAGE FROM SLOPE FACE a) None or near bottom only b) Near mid-slope only c) Near crest only or from several levels	<0> 6 12
4. SLOPE HEIGHT a) 2m or less b) 2.1 to 5m c) 5.1 to 10m d) more than 10m	<0> 2 4 8
5. VEGETATION COVER ON SLOPE FACE a) Well vegetated: heavy shrubs or forested with mature trees b) Light vegetation: mostly grass, weeds, occasional trees, shrubs c) No vegetation, bare	0 <4> 8
6. TABLE LAND DRAINAGE a) Table land flat, no apparent drainage over slope b) Minor drainage over slope, no active erosion c) Drainage over slope, active erosion, gullies	0 <2> 4
7. PROXIMITY OF WATERCOURSE TO SLOPE TOE a) 15 metres or more from slope toe b) Less than 15 metres from slope toe	0 <6>
8. PREVIOUS LANDSLIDE ACTIVITY a) No b) Yes	<0> 6
SLOPE INSTABILITY RATING — RATING VALUES TOTAL	Total **21**
INVESTIGATION REQUIREMENTS Toe Erosion?	No

1. Low potential	<24	Site Inspection only, confirmation, report letter.
2. Slight potential	25-35	Site inspection and surveying, preliminary study, detailed report.
3. Moderate potential	>35	Borehole investigation, piezometers, lab tests, surveying, detailed report.

NOTES:
a) This chart does not apply to rock slopes or to Leda Clay slopes (Ottawa area).
b) Choose only one from each category and compare total rating with above requirements.
c) If there is a water body (stream, creek, river, pond, bay, lake) at the slope toe, the potential for toe erosion and undercutting should be evaluated in detail and, protection provided if required.

Reference: Table 4.2, Technical Guide – River & Stream Systems: Erosion Hazard Limit. Ontario Ministry of Natural Resources.

TABLE II

SLOPE STABILITY RATING CHART

Site Location: Bronte Creek Meadows	Project No.: 52982-700
Property Owner: Alinea Land Corporation	Inspection Date: August 2023
Inspected By: B.Thorner	Weather: Sunny

	Rating Value (select one)
	Cross Section B-B'
1. SLOPE INCLINATION Degrees horizontal:vertial a) 16 or less 3:1 or flatter b) 16 to 26 2:1 to 3:1 c) 26 or more steeper than 2:1	<0> 6 16
2. SOIL STRATIGRAPHY a) Shale, Limestone (bedrock) b) Sand, Gravel c) Till d) Clay, Silt e) Fill	0 6 <9> 12 16
3. SEEPAGE FROM SLOPE FACE a) None or near bottom only b) Near mid-slope only c) Near crest only or from several levels	<0> 6 12
4. SLOPE HEIGHT a) 2m or less b) 2.1 to 5m c) 5.1 to 10m d) more than 10m	<0> 2 4 8
5. VEGETATION COVER ON SLOPE FACE a) Well vegetated: heavy shrubs or forested with mature trees b) Light vegetation: mostly grass, weeds, occasional trees, shrubs c) No vegetation, bare	0 <4> 8
6. TABLE LAND DRAINAGE a) Table land flat, no apparent drainage over slope b) Minor drainage over slope, no active erosion c) Drainage over slope, active erosion, gullies	0 <2> 4
7. PROXIMITY OF WATERCOURSE TO SLOPE TOE a) 15 metres or more from slope toe b) Less than 15 metres from slope toe	<0> 6
8. PREVIOUS LANDSLIDE ACTIVITY a) No b) Yes	<0> 6
SLOPE INSTABILITY RATING — RATING VALUES TOTAL — INVESTIGATION REQUIREMENTS Toe Erosion?	Total **15** No

1. Low potential	<24	Site Inspection only, confirmation, report letter.
2. Slight potential	25-35	Site inspection and surveying, preliminary study, detailed report.
3. Moderate potential	>35	Borehole investigation, piezometers, lab tests, surveying, detailed report.

NOTES:
a) This chart does not apply to rock slopes or to Leda Clay slopes (Ottawa area).
b) Choose only one from each category and compare total rating with above requirements.
c) If there is a water body (stream, creek, river, pond, bay, lake) at the slope toe, the potential for toe erosion and undercutting should be evaluated in detail and, protection provided if required.

Reference: Table 4.2, Technical Guide – River & Stream Systems: Erosion Hazard Limit. Ontario Ministry of Natural Resources.

TABLE III

SLOPE STABILITY RATING CHART

Site Location: Bronte Creek Meadows	Project No.: 52982-700
Property Owner: Alinea Land Corporation	Inspection Date: August 2023
Inspected By: B.Thorner	Weather: Sunny

	Rating Value (select one)
	Cross Sections C-C' & D-D'
1. SLOPE INCLINATION Degrees horizontal:vertial a) 16 or less 3:1 or flatter b) 16 to 26 2:1 to 3:1 c) 26 or more steeper than 2:1	0 6 <16>
2. SOIL STRATIGRAPHY a) Shale, Limestone (bedrock) b) Sand, Gravel c) Till d) Clay, Silt e) Fill	0 6 <9> 12 16
3. SEEPAGE FROM SLOPE FACE a) None or near bottom only b) Near mid-slope only c) Near crest only or from several levels	<0> 6 12
4. SLOPE HEIGHT a) 2m or less b) 2.1 to 5m c) 5.1 to 10m d) more than 10m	0 <2> 4 8
5. VEGETATION COVER ON SLOPE FACE a) Well vegetated: heavy shrubs or forested with mature trees b) Light vegetation: mostly grass, weeds, occasional trees, shrubs c) No vegetation, bare	0 4 <8>
6. TABLE LAND DRAINAGE a) Table land flat, no apparent drainage over slope b) Minor drainage over slope, no active erosion c) Drainage over slope, active erosion, gullies	0 <2> 4
7. PROXIMITY OF WATERCOURSE TO SLOPE TOE a) 15 metres or more from slope toe b) Less than 15 metres from slope toe	0 <6>
8. PREVIOUS LANDSLIDE ACTIVITY a) No b) Yes	<0> 6
SLOPE INSTABILITY RATING — RATING VALUES TOTAL — INVESTIGATION REQUIREMENTS Toe Erosion?	Total **43** Yes

1. Low potential	<24	Site Inspection only, confirmation, report letter.
2. Slight potential	25-35	Site inspection and surveying, preliminary study, detailed report.
3. Moderate potential	>35	Borehole investigation, piezometers, lab tests, surveying, detailed report.

NOTES:
a) This chart does not apply to rock slopes or to Leda Clay slopes (Ottawa area).
b) Choose only one from each category and compare total rating with above requirements.
c) If there is a water body (stream, creek, river, pond, bay, lake) at the slope toe, the potential for toe erosion and undercutting should be evaluated in detail and, protection provided if required.

Reference: Table 4.2, Technical Guide – River & Stream Systems: Erosion Hazard Limit. Ontario Ministry of Natural Resources.

TABLE IV

SLOPE STABILITY RATING CHART

Site Location: Bronte Creek Meadows Property Owner: Alinea Land Corporation Inspected By: B.Thorner	Project No.: 52982-700 Inspection Date: August 2023 Weather: Sunny

	Rating Value (select one) **Cross Section E-E'**
1. SLOPE INCLINATION Degrees horizontal:vertial a) 16 or less 3:1 or flatter b) 16 to 26 2:1 to 3:1 c) 26 or more steeper than 2:1	<0> 6 16
2. SOIL STRATIGRAPHY a) Shale, Limestone (bedrock) b) Sand, Gravel c) Till d) Clay, Silt e) Fill	0 6 <9> 12 16
3. SEEPAGE FROM SLOPE FACE a) None or near bottom only b) Near mid-slope only c) Near crest only or from several levels	<0> 6 12
4. SLOPE HEIGHT a) 2m or less b) 2.1 to 5m c) 5.1 to 10m d) more than 10m	0 <2> 4 8
5. VEGETATION COVER ON SLOPE FACE a) Well vegetated: heavy shrubs or forested with mature trees b) Light vegetation: mostly grass, weeds, occasional trees, shrubs c) No vegetation, bare	0 <4> 8
6. TABLE LAND DRAINAGE a) Table land flat, no apparent drainage over slope b) Minor drainage over slope, no active erosion c) Drainage over slope, active erosion, gullies	0 <2> 4
7. PROXIMITY OF WATERCOURSE TO SLOPE TOE a) 15 metres or more from slope toe b) Less than 15 metres from slope toe	0 <6>
8. PREVIOUS LANDSLIDE ACTIVITY a) No b) Yes	<0> 6
SLOPE INSTABILITY RATING — RATING VALUES TOTAL	Total **23**
INVESTIGATION REQUIREMENTS Toe Erosion?	No

1. Low potential	<24	Site Inspection only, confirmation, report letter.
2. Slight potential	25-35	Site inspection and surveying, preliminary study, detailed report.
3. Moderate potential	>35	Borehole investigation, piezometers, lab tests, surveying, detailed report.

NOTES:
a) This chart does not apply to rock slopes or to Leda Clay slopes (Ottawa area).
b) Choose only one from each category and compare total rating with above requirements.
c) If there is a water body (stream, creek, river, pond, bay, lake) at the slope toe, the potential for toe erosion and undercutting should be evaluated in detail and, protection provided if required.

Reference: Table 4.2, Technical Guide – River & Stream Systems: Erosion Hazard Limit. Ontario Ministry of Natural Resources.

TABLE V

SLOPE STABILITY RATING CHART

Site Location: Bronte Creek Meadows	Project No.: 52982-700
Property Owner: Alinea Land Corporation	Inspection Date: August 2023
Inspected By: B.Thorner	Weather: Sunny

	Rating Value (select one)
	Cross Section F-F' & G-G'
1. SLOPE INCLINATION Degrees horizontal:vertial a) 16 or less 3:1 or flatter b) 16 to 26 2:1 to 3:1 c) 26 or more steeper than 2:1	<0> 6 16
2. SOIL STRATIGRAPHY a) Shale, Limestone (bedrock) b) Sand, Gravel c) Till d) Clay, Silt e) Fill	0 6 <9> 12 16
3. SEEPAGE FROM SLOPE FACE a) None or near bottom only b) Near mid-slope only c) Near crest only or from several levels	<0> 6 12
4. SLOPE HEIGHT a) 2m or less b) 2.1 to 5m c) 5.1 to 10m d) more than 10m	0 <2> 4 8
5. VEGETATION COVER ON SLOPE FACE a) Well vegetated: heavy shrubs or forested with mature trees b) Light vegetation: mostly grass, weeds, occasional trees, shrubs c) No vegetation, bare	0 <4> 8
6. TABLE LAND DRAINAGE a) Table land flat, no apparent drainage over slope b) Minor drainage over slope, no active erosion c) Drainage over slope, active erosion, gullies	0 <2> 4
7. PROXIMITY OF WATERCOURSE TO SLOPE TOE a) 15 metres or more from slope toe b) Less than 15 metres from slope toe	<0> 6
8. PREVIOUS LANDSLIDE ACTIVITY a) No b) Yes	<0> 6
SLOPE INSTABILITY RATING — RATING VALUES TOTAL — INVESTIGATION REQUIREMENTS Toe Erosion?	Total **17** No

1. Low potential	<24	Site Inspection only, confirmation, report letter.
2. Slight potential	25-35	Site inspection and surveying, preliminary study, detailed report.
3. Moderate potential	>35	Borehole investigation, piezometers, lab tests, surveying, detailed report.

NOTES:
a) This chart does not apply to rock slopes or to Leda Clay slopes (Ottawa area).
b) Choose only one from each category and compare total rating with above requirements.
c) If there is a water body (stream, creek, river, pond, bay, lake) at the slope toe, the potential for toe erosion and undercutting should be evaluated in detail and, protection provided if required.

Reference: Table 4.2, Technical Guide – River & Stream Systems: Erosion Hazard Limit. Ontario Ministry of Natural Resources.

TABLE III

SLOPE STABILITY RATING CHART

Site Location: Bronte Creek Meadows Property Owner: Alinea Land Corporation Inspected By: B.Thorner	Project No.: 52982-700 Inspection Date: August 2023 Weather: Sunny

	Rating Value (select one) **Cross Section H-H'**
1. SLOPE INCLINATION Degrees horizontal:vertial a) 16 or less 3:1 or flatter b) 16 to 26 2:1 to 3:1 c) 26 or more steeper than 2:1	0 6 <16>
2. SOIL STRATIGRAPHY a) Shale, Limestone (bedrock) b) Sand, Gravel c) Till d) Clay, Silt e) Fill	0 6 <9> 12 16
3. SEEPAGE FROM SLOPE FACE a) None or near bottom only b) Near mid-slope only c) Near crest only or from several levels	<0> 6 12
4. SLOPE HEIGHT a) 2m or less b) 2.1 to 5m c) 5.1 to 10m d) more than 10m	0 <2> 4 8
5. VEGETATION COVER ON SLOPE FACE a) Well vegetated: heavy shrubs or forested with mature trees b) Light vegetation: mostly grass, weeds, occasional trees, shrubs c) No vegetation, bare	0 4 <8>
6. TABLE LAND DRAINAGE a) Table land flat, no apparent drainage over slope b) Minor drainage over slope, no active erosion c) Drainage over slope, active erosion, gullies	0 <2> 4
7. PROXIMITY OF WATERCOURSE TO SLOPE TOE a) 15 metres or more from slope toe b) Less than 15 metres from slope toe	0 <6>
8. PREVIOUS LANDSLIDE ACTIVITY a) No b) Yes	<0> 6
SLOPE INSTABILITY RATING — RATING VALUES TOTAL — INVESTIGATION REQUIREMENTS Toe Erosion?	Total **43** Yes

1. Low potential	<24	Site Inspection only, confirmation, report letter.
2. Slight potential	25-35	Site inspection and surveying, preliminary study, detailed report.
3. Moderate potential	>35	Borehole investigation, piezometers, lab tests, surveying, detailed report.

NOTES:
a) This chart does not apply to rock slopes or to Leda Clay slopes (Ottawa area).
b) Choose only one from each category and compare total rating with above requirements.
c) If there is a water body (stream, creek, river, pond, bay, lake) at the slope toe, the potential for toe erosion and undercutting should be evaluated in detail and, protection provided if required.

Reference: Table 4.2, Technical Guide – River & Stream Systems: Erosion Hazard Limit. Ontario Ministry of Natural Resources.