GEOTECHNICAL INVESTIGATION REPORT
NEW SAYERS FOOD STORE
132 BURLEIGH STREET, APSLEY, ONTARIO
REDSTONE PROJECT NO. 21R110

Prepared for:

Sayers Foods Limited
132 Burleigh Street
Apsley, Ontario K0L 1A0

June 18, 2021

Redstone Engineering Inc.
1086 Hayes Line, Kawartha Lakes, ON L0A1C0
Mail: 1086 Hayes Line, Cavan, ON L0A1C0
www.redstoneeng.ca

TABLE OF CONTENTS Page

1.0 INTRODUCTION 1

2.0 PURPOSE AND SCOPE 2

3.0 FIELD AND LABORATORY PROCEDURES 3

4.0 SITE LOCATION AND SURFACE CONDITIONS 4

5.0 SUBSURFACE CONDITIONS 5
- 5.1 GENERAL 5
- 5.2 ASPHALT 5
- 5.3 FILL 5
- 5.4 INFERRED CONCRETE 6
- 5.5 SAND / SILTY SAND 7
- 5.6 INFERRED BEDROCK OR BOULDER 7
- 5.7 GROUNDWATER & CAVE-IN 7
- 5.8 CHEMICAL TESTING 8
  - 5.8.1 TCLP (Disposal) 8
  - 5.8.2 Corrosivity 8

6.0 DISCUSSION AND RECOMMENDATIONS 10
- 6.1 GENERAL 10
- 6.2 SITE PREPARATION, EXCAVATION, AND BACKFILL 10
- 6.3 GROUNDWATER CONTROL DURING CONSTRUCTION 12
- 6.4 PERMEABILITY (HYDRAULIC CONDUCTIVITY) 13
- 6.5 FOUNDATIONS 13
- 6.6 SLAB ON GRADE 17
- 6.7 PAVEMENT 17
- 6.8 GENERAL RECOMMENDATIONS 19
  - 6.8.1 Subsoil Sensitivity 19
  - 6.8.2 Test Pits During Tendering 19
  - 6.8.3 Winter Construction 19
  - 6.8.4 Wells 20
  - 6.8.5 Design Review and Construction Inspections 20

7.0 CLOSURE AND STATEMENT OF LIMITATIONS 21

TABLES

TABLE 1: GROUNDWATER DEPTH / ELEVATION SUMMARY 8
TABLE 2: SUMMARY OF AWWA SOIL CORROSIVITY POTENTIAL RATING 9
TABLE 3: SUBGRADE PERMEABILITY VALUES 13
TABLE 4: COMPETENT NATIVE SOIL - DEPTH / ELEVATION SUMMARY 14
TABLE 5: BEARING CAPACITY PRESSURE / GEOTECHNICAL RESISTANCE FOR FOOTINGS 14
TABLE 6: PORTION OF OBC TABLE 4.1.8.4.B 16
TABLE 7: PORTION OF OBC TABLE 4.1.8.4.C 16
TABLE 8: PAVEMENT STRUCTURES 18

FIGURES

FIGURE 1 BOREHOLE LOCATION PLAN

APPENDICES

APPENDIX A BOREHOLE LOGS
APPENDIX B PHYSICAL LABORATORY DATA
APPENDIX C CHEMICAL LABORATORY DATA

Redstone Engineering Inc.
1086 Hayes Line, Kawartha Lakes, ON L0A1C0
Mail: 1086 Hayes Line, Cavan, ON L0A1C0
705-768-9042 redstoneeng.ca

GEOTECHNICAL INVESTIGATION REPORT
NEW SAYERS FOOD STORE
132 BURLEIGH STREET, APSLEY, ONTARIO
REDSTONE PROJECT NO. 21R110

1.0 INTRODUCTION

This report describes the results of a geotechnical investigation performed for the design and construction of the proposed new Sayers Food Store (the Store) at 132 Burleigh Street in Apsley, Ontario. Redstone Engineering Inc. (Redstone) was retained by Sayers Foods Limited (the Client) to conduct this investigation. The work performed for this investigation was carried out under the authorization of Mr. Brian Sayers, representing the Client, in accordance with Redstone's proposal P1046 dated April 12, 2021.

It is Redstone's understanding that the former building on this site was substantially removed. Note that based on information provided by Mr. Brian Sayers at the commencement of this investigation, and based on borehole results, it appears that some subsurface elements of the previous structure may still exist below grade, including at least parts of a concrete basement slab, and concrete footings. The scope of this investigation did not confirm the presence, location, or nature of any such subsurface elements of the previous structure. It is noted that the previous building's footprint intersects with some of the proposed new building's footprint.

Blackwell's Terms of Reference for this investigation provided a description of the proposed new building's relevant parameters, including that it will be one (1) storey with mezzanine, no basement, with conventional strip and spread shallow footings expected, and anticipated lowest floor grade being at grade. No mention is made regarding the final grading compared to existing grade, but for the purpose of this report it is expected that the final grade will substantially match the existing grade, with no significant grade raises proposed. It also appears that there will be asphalt-paved parking and access areas surrounding the Store, and below-grade holding tank(s) installed in the westerly portion of the site. It is noted that one of the boreholes originally targeted for a depth of 3.0m in Blackwell's Terms of Reference was subsequently deepened to 6.7m depth, as requested by the project's architect (MJMA) by email dated May 14, 2021.

With regards to Blackwell's request for testing to satisfy Ministry of Environment, Conservation and parks (MECP) for soil disposal purposes, it is expected that construction operations will to the greatest extent possible reuse excavated soils onsite; the results of the requested soil disposal testing will facilitate offsite disposal at an appropriately-certified landfill, if needed.

2.0 PURPOSE AND SCOPE

The purpose of this geotechnical investigation is to assess the soil and groundwater conditions at the borehole locations, and based on these findings, provide geotechnical engineering opinions and recommendations relevant to supporting the Store's design and construction including earthworks construction and backfilling, groundwater control during construction, foundations and slab-on-grade, pavement structure for asphalt-paved access and parking areas, permeability (hydraulic conductivity) of the subgrade soils in the area of BH-7 and BH-8 (based on particle size distribution curves), and chemical testing of the soil to classify it as a waste for disposal purposes during construction. This scope does not include any pavement life cycle costing analysis, testing for hydrogeological, soil reuse, or environmental assessments.

The following scope of work was performed as part of this investigation.

1. Boreholes were laid out onsite in the locations requested by Blackwell's Terms of Reference for this project. The borehole locations are identified on the Borehole Location Plan (Figure 1).
2. Underground services were cleared prior to advancing the boreholes. While this investigation cleared underground utilities from the area of each borehole, it did not confirm the presence or location of all utilities at all locations or for the purpose of the project's design or construction.
3. As requested, the subsurface soil and groundwater conditions were explored by advancing, sampling and logging eight (8) boreholes as follows:
    a. seven (7) boreholes to 6.7 metres below existing grade (mbeg); and
    b. one (1) borehole to 3.0 mbeg.
4. The borehole conditions observed were recorded, and representative samples of the soils were obtained. Groundwater observations were obtained from the open boreholes during their advancement.
5. Groundwater monitoring wells were installed in three (3) boreholes.
6. The ground at the boreholes was reinstated as close as possible to its original condition upon completion of the fieldwork.
7. One (1) round of groundwater level measurements were obtained from the installed monitoring wells.
8. Laboratory analyses of representative soil samples was performed, consisting of:
    a. Physical: moisture content testing on all recovered soil samples, and grain size distribution testing on two (2) samples; and

b. Chemical:
    i. Corrosivity: one (1) sample tested for its pH, resistivity, Redox Potential, chloride, sulphate, and sulfide.
    ii. Disposal as a waste during construction: O.Reg.558/00 TCLP leachate testing performed on one (1) samples for volatile organic compounds (VOCs), polychlorinated biphenyls (PCBs), metals, and inorganics.

9. Geotechnical engineering analysis of acquired field and laboratory data, and preparation of this report summarizing Redstone's geotechnical findings and recommendations.

3.0 FIELD AND LABORATORY PROCEDURES

A field investigation was conducted under the supervision of Redstone staff on May 26 and 27, 2021. The work consisted of subsurface exploration by means of advancing, sampling and logging boreholes as follows:

- seven (7) boreholes (identified as BH-1 to BH-7) were advanced to a depth of 6.7 mbeg; and
- one (1) borehole (identified as BH-8) was advanced to a depth of 3.0 mbeg.

Detailed logs of all the boreholes were maintained, and representative samples of the materials encountered were obtained. The location of each borehole is illustrated on the attached Borehole Location Plan (Figure 1).

The boreholes were advanced using a truck-mounted drill rig equipped with 130mm (5") Outside Diameter (O.D.) solid stem augers. Representative, disturbed samples of the strata penetrated were obtained either directly off the augers, or using a split-barrel, 50 mm OD sampler advanced by a 63.5 kg hammer dropping approximately 760 mm. The results of these standard penetration tests (SPT's) are reported as "N" values on the borehole logs at the corresponding depths.

Redstone's senior geotechnical engineer supervised the drilling, including logging and sampling the boreholes. Soil samples were recovered, retained in labeled air-tight containers, and secured for subsequent review and submission for laboratory testing. Logs of the boreholes are provided in Appendix A.

The depth to groundwater and/or borehole "cave-in" was measured in the open boreholes during drilling. The boreholes were backfilled immediately after completion with a mixture of bentonite pellets and soil cuttings.

Groundwater monitoring wells were installed in three (3) boreholes using 50mm O.D. PVC casing and slot 10 screen. The monitoring well installation details are presented graphically on the borehole logs. Well screen lengths of 3.0m were used, surrounded by filter pack sand to about 0.3m above the screen, then a bentonite seal plug to just below the ground surface, with PVC stick-ups of about 0.9 to 1.0m above grade. Groundwater depth measurements were obtained from these monitoring wells on May 27, 2021. These wells remain in place as of writing this report.

The ground surface elevation at each borehole was measured by Redstone, in reference to the top of grate on a catchbasin located as shown on Figure 1, and having a geodetic elevation of 305.24m (as per a plan that was provided by the Client to Redstone by email dated May 5, 2021, and was prepared by JBF Surveyors, dated May 2, 2021 and revision dated May 4, 2021). Elevations contained in this report are strictly for engineering analytical purposes only.

Physical laboratory testing of soil samples consisted of moisture content testing of all recovered samples, and grain size distribution analyses on two (2) soil samples. The results of the moisture content and grain size distribution testing are incorporated into the borehole logs (Appendix A), while the grain size distribution lab charts are attached in Appendix B.

Chemical laboratory testing was performed as follows:

- one (1) composite soil sample was tested for its corrosivity-related parameters including pH, resistivity, Redox Potential, chloride, sulphate, and sulfide.
- One (1) composite soil sample was subjected to TCLP leachate testing for VOCs, PCBs, metals, and inorganics, and compared to O.Reg.558/00 Schedule 4 Criteria to classify it as a waste for disposal purposes.

The chemical laboratory's Certificates of Analyses (C of A's) for this testing are attached as Appendix C.

4.0 SITE LOCATION AND SURFACE CONDITIONS

The site is located along the main street of Apsley, at civic address 132 Burleigh Street, Apsley, Ontario. Much of the site remains asphalt-paved. The approximate outline of the former building footprint is evident, where pavement does not exist but rather a grey limestone screening (fill) material is present. Based on the boreholes and appearance of the site at surface, it is possible (but was unconfirmed as part of this investigation) that following removal of parts of the former building, areas of its former footprint that remained below the surrounding/adjacent grade were backfilled with a limestone screening material. As noted previously, based on information provided by Mr. Brian Sayers at the commencement of this investigation, and based on subsequent borehole results, it appears that some subsurface elements of the previous structure still exist below grade.

Immediately to the north and south of the site are adjacent properties with buildings. To the east is the main street (Burleigh Street), across which are further properties and buildings (generally commercial). To the west of this site is a treed area that appeared to be lower in elevation, with a possible drainage feature heading westerly. Note that in the course of obtaining utility locates to clear the borehole locations prior to drilling, the County of Peterborough identified that they have a sewer running approximately parallel to this site's southern boundary, and outletting to the west of the currently-paved area.

5.0 SUBSURFACE CONDITIONS

5.1 GENERAL

The subject property is located in the Algonquin Highlands physiographic region of southern Ontario (Chapman and Putnam 1973). The regional surficial geology consists of shallow till and rock ridges.

Details of the subsurface conditions encountered at the site during this investigation are presented graphically on the logs (Appendix A). It should be noted that the boundaries between the strata have been inferred from borehole observations and non-continuous samples. They generally represent a transition from one soil type to another, and should not be inferred to represent an exact plane of geological change. Further, conditions may vary between and beyond the boreholes.

Following is a summarized account of the subsurface conditions encountered in these boreholes.

The subsurface stratigraphy generally consists of pavement (asphalt over pavement base fill) or limestone screening fill, over fill and/or disturbed earth, over native soils typically consisting of fine to coarse-grained sand, with groundwater observed at depths of 3.2 to 4.3 mbeg, and caving (collapsing) soils below depths of 3.0 to 4.6 mbeg.

The following sections describe the major soil and bedrock strata and other subsurface conditions encountered during this investigation in more detail.

5.2 ASPHALT

Six (6) boreholes were advanced through the existing asphalt, which was about 50mm thick in each instance.

5.3 FILL

All the boreholes advanced through the asphalt (i.e., all boreholes except BH-2 and BH-5) encountered an immediately underlying layer of pavement base fill. This fill was generally brown, consisted of sand and gravel, and was about 130 to 150mm thick (bottom depth of 0.18 to 0.20 mbeg). It was generally in a damp in-situ state.

Within the former building area, boreholes BH-2 and BH-5 did not encounter surficial asphalt. Instead, they encountered a surficial layer of grey limestone screening fill that extended to depths of 2.0 mbeg (BH-2) and 0.2 mbeg (BH-5). This fill consisted of crushed limestone screenings, and was generally in a loose and damp in-situ state.

Beneath the pavement base fill, a soil described as either fil or disturbed earth material was encountered, that extended to depths of about 0.8 mbeg (BH-8) to 2.9 mbeg (BH-7). This soil exhibited a range of colouration including brown to dark brown to reddish brown to occasionally grey to black (indicating organic matter present). It generally consisted of sand, silty sand, or silt

and sand, with occurrences of organics in BH-4, BH-5, BH-6, BH-7, and BH-8. This fill in BH-7 also contained fragments of asphalt and occasional bricks.

A relatively thin layer of fill was noted immediately beneath the (inferred) concrete slab encountered in BH-2 (see Section 5.4 regarding Inferred Concrete). This fill was brown, consisted of sand with gravel in a damp in-situ state, and extended to an approximate depth of 2.2 mbeg.

All fill materials exhibited a variable but typically loose (occasionally compact) in-situ state of compactness / relative density, with blow counts ranging from 2 to 20 blows per 0.3m.

Moisture content tests performed on samples of the fill yielded values ranging from about 1.4 % to 26.7 % moisture by dry weight. A grain size distribution analysis performed on a sample of the fill (BH-7 SS-4) suggests the following composition: 0% gravel, 70% sand, and 30% silt and clay-sized particles (3% less than 0.002mm).

It is noted that the boreholes and sampling procedures provided only limited intersections of the fill, and due to its uncontrolled and variable/random nature, contents of this fill may differ between and beyond the boreholes.

5.4 INFERRED CONCRETE

Boreholes BH-2 and BH-5 were located within the former building footprint. Borehole BH-3 was initially located on the perimeter of the former building's footprint (prior to being relocated, see further details below).

Borehole BH-2 experienced grinding augers between depths of about 2.0 to 2.1 mbeg. Based on the nature of the grinding, and also information provided by Mr. Brian Sayers that the former building had a basement slab in this area, it is inferred (but not confirmed) that this auger grinding was caused by concrete (possibly part of the former building's basement slab).

Borehole BH-5 experienced auger grinding between depths of about 1.2 and 1.5 mbeg. This may have been cause by concrete, or cobbles/boulders within the fill.

Borehole BH-3 encountered significant auger grinding starting at a depth of about 1.1 mbeg and continuing to at least 1.4 mbeg where the leading teeth/head of the auger snapped off and the borehole was relocated about 1m southwest and redrilled past this depth with no obstructions. Based on the nature of the grinding and breakage of the auger teeth/head, it is inferred that this was caused by the presence of a concrete footing that may have contained reinforcing steel.

Note that the presence and extent of any such concrete was not confirmed as part of this investigation.

5.5 SAND / SILTY SAND

An underlying layer of native soil typically consisting of sand, with occasional occurrences of silty sand, was encountered in all the boreholes. These soils were first observed at depths ranging from 0.8 mbeg (BH-8) to 2.9 mbeg (BH-7). Boreholes located within the proposed building footprint (BH-1 to BH-6) first encountered these soils at depths ranging from 1.1 mbeg (BH-4) to 2.2 mbeg (BH-2).

These sands and silty sands appeared light brown to brown to dark brown to reddish brown, becoming grey to dark grey at depth. The sand exhibited a fine-grained to medium-grained to coarse-grained texture. Laminating was occasionally noted within the finer-grained layers of these soils. It is noted that a layer of silt (between 2.4 to 2.4 mbeg) exhibiting a grey colour and in a compact in-situ state was interbedded within the sand in BH-4.

Based on blow counts of 2 to 25 blows per 0.3m, these soils exist in a loose to compact in-situ state. It is noted that the blow counts generally decreased with depth, typically once the groundwater table was encountered.

Moisture content tests conducted on sample of these soils yielded values of about 2.4 to 29.6% moisture by dry weight. Note that higher moisture content levels, while indicating an increased level of moisture within the soil, can sometimes be associated with higher silt content. A grain size distribution analysis performed on a sample of the sand (BH-8 SS-2) suggests the following composition: 10% gravel, 84% sand, and 6% silt and clay-sized particles.

5.6 INFERRED BEDROCK OR BOULDER

While advancing the last SPT spoon test (SS-6) in borehole BH-2, the spoon met sudden refusal to further advancement and displayed evidence of having encountered either a boulder or bedrock at a depth of 6.65 mbeg. Pieces of granitic rock were observed within the tip of the spoon sampler once it was withdrawn from the borehole. Based on this, the presence of either a granitic boulder or bedrock is inferred (but not confirmed) at this depth in this borehole.

5.7 GROUNDWATER & CAVE-IN

Upon completion of advancing each borehole, the groundwater depth in the open boreholes was measured. Groundwater monitoring wells were installed in three (3) boreholes, and groundwater depth readings were obtained from these monitoring wells on May 27, 2021.

The following Table summarizes the groundwater depth (and corresponding) elevations as observed during each of these events.

Table 1: Groundwater Depth / Elevation Summary

BOREHOLE	DEPTH (mbeg) / ELEVATION (m)	
	In Open Borehole (May 26, 2021)	In Monitoring Well (May 27, 2021)
BH-1	4.3 / 301.2	3.9 / 301.6
BH-2	4.0 / 301.7	4.1 / 301.6
BH-3	4.3 / 301.4	no well installed
BH-4	3.7 / 301.3	
BH-5	4.3 / 301.4	
BH-6	3.7 / 301.3	
BH-7	3.7 / 300.7	3.2 / 301.2
BH-8	>3.1 / <302.5	no well installed

It should be noted that the groundwater levels are subject to seasonal fluctuations and in response to weather events, and at any point in time may differ from those presented herein.

5.8 CHEMICAL TESTING

5.8.1 TCLP (Disposal)

A composite sample of soil was formed by combining samples from each of the boreholes (BH-1 SS-1, BH-2 AS-1, BH-2 SS-2, BH-3 AS-1, BH-4 AS-1, BH-5 AS-1, BH-5 SS-2, BH-6 AS-1, BH-6 SS-2, BH-7 AS-1, BH-7 SS-2, BH-7 SS-3, BH-8 AS-1). This composite sample is identified as "Comp #1", and was subjected to Toxicity Characteristic Leaching Procedure (TCLP) testing for VOCs, PCBs, metals, and inorganics. The results are compared to O.Reg.558/00 Schedule 4 Standards in order to classify the material as a waste for disposal purposes at an MECP-licensed waste disposal facility.

See the laboratory C of A for this analysis (Appendix C) for detailed results. The results of this TCLP test met the O.Reg.558/00 Schedule 4 Standards. Based on these results, these soils can be considered as "non-hazardous and non-registrable" waste that is suitable for disposal at an appropriately-licensed landfill facility using a suitably-licensed hauler.

5.8.2 Corrosivity

A composite sample of soil was formed by combining a sample from each of the boreholes (BH-1 SS-2, BH-2 SS-3, BH-3 SS-2, BH-4 SS-2, BH-5 SS-3, BH-6 SS-3, BH-7 SS-4, BH-8 SS-3) and then tested for a suite of corrosivity parameters consisting of pH, resistivity, Redox Potential, chloride, sulphate, and sulfide. This composited sample is identified herein as "Comp #2". These parameters are used for assessing the tested soil's:

- potential corrosivity applicable to cast iron alloys, according to the 10-points soil evaluation procedure provided by the American Water Works Association (AWWA) C-105/A21.5-05 Standard; and

- potential for sulphate attack on concrete based on comparing the sulphate concentration to the Canadian Standard CAN3/CSA A23.1-M94 Table 3 "Additional Requirements for Concrete Subjected to Sulphate Attack".

The laboratory report for this testing is attached as Appendix C.

The following Table 2 summarizes the AWWA rating for the tested soil sample's potential for corrosion towards buried grey or ductile cast iron pipe.

Table 2: Summary of AWWA Soil Corrosivity Potential Rating

SAMPLE	pH	RESISTIVITY	REDOX POTENTIAL	SULFIDE (%)	MOISTURE	(TOTAL SCORE)
Comp #2	6.98 (0)	3940 ohms cm (0)	293 mV (0)	<0.00003 (0)	Fair drainage (1)	(1)

* Values shown in (parentheses) are the corresponding AWWA rating score

In assessing the corrosivity per the AWWA system; if the total score is 10 or more, the soil is considered potentially corrosive and warrants taking protective measures from such corrosion. Note that these analytical results only provide an indication of the potential for corrosion – this rating scale is a relatively simplistic, subjective procedure and should be viewed as a broad indicator that may not accurately predict specific cases of corrosion damage. There are also other factors which may influence the corrosion potential, such as; the nature of any effluent conveyed, the application of de-icing salts on the site and subsequent leaching into the subsoils; and stray currents. A more recent study has suggested that soil with a resistivity of less than about 2000 ohm.cm should be considered aggressive from the perspective of corrosivity. Based on the Total Score of 0, and the Resistivity of 3940 ohm.cm, the potential corrosivity of the sample tested is negligible.

The sulphate testing of this sample yielded a value of 60ug/g (60 ppm or 0.006%). Based on this result, the potential for sulphate attack on concrete is considered negligible as per CSA Standard A23.1 (Concrete Materials and Methods of Concrete Construction). It should however be noted that the final selection of the type of concrete should be made by the design engineer taking into account of all design considerations.

6.0 DISCUSSION AND RECOMMENDATIONS

6.1 GENERAL

Supporting data upon which these recommendations are based have been presented in the foregoing sections of this report. The following recommendations are governed by the physical properties of the subsurface materials that were encountered at the site and assume that they are representative of the overall site conditions. It should be noted that these conclusions and recommendations are intended for use by the designers only. Contractors bidding on or undertaking any work at the site should examine the factual results of the assessment, satisfy themselves as to the adequacy of the information for construction, and make their own interpretation of this factual data as it affects their proposed construction techniques, equipment capabilities, costs, sequencing, and the like. Comments, techniques, or recommendations pertaining to construction must not be construed as instructions to the contractor. These recommendations are based on the assumption that the final grading of the site will be at or near the existing grades, with no significant grade raises occurring. Should this not be the case, Redstone must be allowed to review the proposed final design including grades and foundations and provide updated recommendations if warranted.

Details regarding our conclusions and recommendations are outlined in the following sections.

6.2 SITE PREPARATION, EXCAVATION, AND BACKFILL

Prior to commencing earthwork construction, any and all topsoil, vegetation, asphalt, fill, buried structures including concrete remaining from the former building (slabs and/or footings), disturbed earth, organics and organic-bearing materials must be stripped and removed from all structural areas including the building (including foundations and floor slabs) and from beneath any utility servicing elements such as piping and tanks. These materials should also be removed from beneath all proposed new pavement areas (roads and parking/access areas), however Section 6.7 of this report presents alternative treatments for consideration in the pavement areas. In all cases the subexcavated surfaces must be inspected and approved by a qualified geotechnical engineer (or representative) familiar with the site's ground conditions, prior to placement of any fill, formwork, or foundations. The subgrade for building foundations, particularly where the excavations have advanced to depth and close to or below the groundwater table, will be susceptible to strength loss resulting from disturbances. In such cases, the Contractor should consider placing a mud mat consisting of 75mm of lean concrete on the exposed and approved subgrade surface to protect it from subsequent disturbances from construction traffic and/or exposure to weather.

Excavations should be carried out to conform to the manner specified in Ontario Regulation 213/91 and the Occupational Health and Safety Act and Regulations for Construction Projects (OHSA). All excavations above the water table not exceeding 1.2 m in depth may be constructed with unsupported slopes. It is noted that the fill soils, and all soils below the groundwater, were

generally loose, would lose strength, and would exhibit caving/sloughing and flowing characteristics upon being disturbed. The fill encountered during this investigation, and all soils located below the groundwater table, are classed by OHSA as Type 4 soil, requiring unsupported walls of excavations to be sloped at 3H:1V or flatter to the base of the excavation. The native soils above the groundwater are classed by OHSA as Type 3, requiring excavations to be sloped at 1H:1V or flatter to the excavation base. (Note that any pockets of trapped groundwater located within the native soils above the groundwater table may cause these cohesionless soils to collapse and temporarily behave similarly to a Type 4 soil upon being opened by excavations, in which case suitable localized excavation/shoring or other treatments will be necessary to stabilize).

If space is restricted such that the side slopes of excavations cannot be safely cut back in accordance with OHSA, and/or sloughing and cave-in are encountered in the excavations, and/or where the excavations are in close proximity to an existing structure (including a road, building or infrastructure), temporary shoring must be provided. To avoid overstressing of any shoring, the excavated materials must be placed away from the excavation perimeter at a minimum distance equalling 2 times the excavation's depth. Materials must not be stockpiled in close proximity to open excavations, and construction traffic must avoid being in proximity to open excavations. To protect against the adverse effects of erosion during construction, all ground surface drainage runoff should be directed away from the excavation area(s). Appropriate design and installation of all shoring is the responsibility of the Contractor.

Excavation in the soil materials should be relatively straightforward with the use of hydraulic excavators. The presence of buried objects that were inferred to be concrete (possibly remaining slab and/or footings from the former building) were encountered by some boreholes. The Contractor must be prepared to handle removal of such materials. The presence and extent of such buried concrete and/or other subsurface objects was beyond the scope of this investigation. Due to the unknown extent and quantity of such materials, it is recommended that the construction tender include a provisional per-unit rate for removal of such.

If any excavated soils will be taken offsite to a destination other than disposal at a certified landfill, it is recommended that chemical characterization testing be performed on such soils to assess for reuse in accordance with O.Reg 406/19.

Some excavated inorganic soils may be suitable for use as pavement subgrade backfill, possibly including the limestone screening fill, and some of the native sands. It is noted that some of the sand encountered was uniformly-graded, which can be a challenge to compact. The reuse of any excavated material is conditional on it being workable, at a suitable moisture content, containing no organics, debris or other unsuitable / deleterious materials, and receiving final review and approval for such reuse at the time of construction. Soils that are otherwise acceptable, but overly wet, will require prior processing (such as aeration) to lower their moisture content before being considered for approval as backfill material.

6.3 GROUNDWATER CONTROL DURING CONSTRUCTION

See Section 5.6 of this report for depths to groundwater encountered in the boreholes and monitoring wells as part of this investigation. As noted, groundwater levels are subject to seasonal fluctuations and in response to weather events, and at any point in time may differ from those presented herein. Where the groundwater table is present, it is cautioned that the typically cohesionless sandy soils will be easily disturbed, loosened, and exhibit sloughing and flowing characteristics unless properly managed including lowering of the groundwater to at least 1m below the base of all excavations, and protection of the exposed final excavation subgrades from weather, construction traffic, and other potential sources of disturbances.

Shallow excavations remaining above the groundwater table are not expected to encounter significant groundwater infiltration, and in such shallow excavations, any groundwater encountered is expected to be controlled by pumping from collection sumps to an acceptable outlet.

Where excavations extend deeper and into the groundwater table, this will require more intensive dewatering and groundwater control, including the use of filtered sumps, and/or other suitable methods of dewatering and/or sheet piling. In some cases (depending on the final design, excavation depths, and ground conditions present), localized well points within the sand may be required. It is noted that the site's grade and existing drainage feature in the westerly area of the site may be conducive to allowing temporary construction grades to utilize drainage elements (including but not necessarily limited to subdrains and/or trenched utility bedding) to assist in controlling the groundwater at manageable levels, possibly in combination with other more active dewatering techniques. In all cases, the groundwater level must be lowered and maintained at least 1m below the base of all excavations.

If short-term pumping of groundwater at volumes greater than 50,000 L/day and less than 400,000 L/day is required during the construction stage, the Environmental Activity Sector Registry (EASR) must be completed. The EASR streamlines the process and water pumping may begin once the EASR registration is completed, the fee paid and supporting document prepared. If water taking in excess of 400,000 litres/day is required, a Permit to Take Water (PTTW) must be obtained in advance. Pumping discharges must conform to any requirements from the local municipalities, conservation agencies and any other jurisdictional agencies, as well as the MECP permitting.

The preceding comments are intended for general reference and information only. The Contractor is solely responsible for the design and implementation of any required unwatering and/or dewatering, including requirements for withdrawal, handling, treatment, and discharge.

6.4 PERMEABILITY (HYDRAULIC CONDUCTIVITY)

The permeability (hydraulic conductivity) of the subgrade was estimated by use of the particle size distributions obtained, and applying the Hazen method (for sandy soils) and also considering established permeability correlation data. Table 3 presents the permeability of the encountered subgrade soil samples, based on applying both the Hazen method to the grain size data, and considering correlation data obtained from Table 2.2 Range of Values of Hydraulic Conductivity and Permeability in Groundwater, R. Alan Freeze and John A. Cherry, 1979.

Table 3: Subgrade Permeability Values

BOREHOLE	SAMPLE	DEPTH (mbeg)	SOIL TYPE	PERMEABILITY (m/s)
BH-7	SS-4	2.3 – 2.9	Silty Sand (Fill), trace Clay	$<1 \times 10^{-5}$
BH-8	SS-2	0.8 – 1.4	Sand (Native), fine to medium to coarse grained, some Gravel	$<1 \times 10^{-4}$

Based upon the Supplementary Guidelines to the Ontario Building Code 2012, this correlates to percolation times (T) in the order of 8 to 12 min/cm (BH-7 SS-4) and 5 to 10 min/cm (BH-8 SS-2). Correlating the infiltration rate to the silt and clay contents obtained by the gradation analyses performed obtains infiltration rates of 30 to 35mm/hr.

It is noted that slight variations in the soil stratigraphy may cause variations in the permeability of the soil in both vertical and horizontal orientations. This can include any sand and/or gravel seams that may allow for increased conductivity and flow rates. Conversely, zones containing increased levels of silt and/or clay will cause decreased conductivity and infiltration rates.

See Section 5.7 (Table 1) for the depth to groundwater encountered in each borehole.

6.5 FOUNDATIONS

The recommendations provided herein are based on the borehole information obtained during Redstone's fieldwork. Updates to the commentary and recommendations can be on-going as new information of the underground conditions becomes available. For example, more specific subsurface information becomes available once excavations and foundation construction is underway. In all cases, prior to placement of any lean concrete, fill, formwork, or foundations, all excavations must be inspected and approved by a qualified geotechnical engineer's representative. This will ensure that the foundation bearing material has been prepared properly at the foundation subgrade level and that the founding subgrade materials exposed are similar to those encountered during this investigation. Under no circumstances should the foundations be placed directly on organic materials, loose, frozen subgrade, construction debris, or within ponded water.

Structural loading for the Store may be supported on reinforced strip and spread concrete footings placed on the undisturbed, compact native sand, or on engineered fill constructed

directly on the undisturbed compact native sand. It is noted that the native sand typically exhibited an upper compact zone which is considered the ideal material on which to construct the footings (and/or to construct engineered fill that will support overlying footings). The following Table 4 summarizes the depths and elevations at which suitably competent native soils were observed in boreholes BH-1 to BH-7.

Table 4: Competent Native Soil - Depth / Elevation Summary

BOREHOLE	DEPTH (mbeg) / ELEVATION (m)	
	Depth (mbeg)	Elevation (m)
BH-1	1.5	304.0
BH-2	2.2	303.5
BH-3	1.5	304.2
BH-4	2.1	302.9
BH-5	2.2	303.5
BH-6	1.7	303.3
BH-7	3.2	301.2

It is noted that the native soils generally become loose with depth, and below the groundwater table. Footings must not be placed deeper than provided in Table 4 without consultation with Redstone's engineer.

For design purposes, it is recommended that such footing foundations be proportioned using the following parameters:

Table 5: Bearing Capacity Pressure / Geotechnical Resistance for Footings

PARAMETER (kPa)	UNDISTURBED COMPACT NATIVE SOIL	ENGINEERED FILL (1)		
		Rock-based	Granular	Earth Borrow
Bearing Capacity Pressure (SLS)	90	110	90	80
Geotechnical Resistance (ULS), resistance factor Φ = 0.5 applied	135	165	135	120

(1) At least 0.6m of Rock-based Fill, or at least 0.3m of Granular or Earth Borrow fill. Quality of material is to be approved prior to use as engineered fill

The following steps are recommended for the construction of any engineered fill:

1. Prepare the subgrade in accordance with Section 6.2 of this report. This includes removing any and all existing vegetation, topsoil, asphalt, fill, disturbed earth, construction debris, organics, and organic-bearing soils to the competent, undisturbed compact native soil from within the area of the proposed engineered fill.
2. The area of the engineered fill should extend horizontally 1m beyond the outside edge of the proposed foundations and then extend downward at a 1:1 slope to the suitable subgrade.
3. The base of the engineered fill area must be approved by a qualified geotechnical engineer's representative prior to placement of any fill, to ensure that all unsuitable materials have been removed, that the materials encountered are similar to those observed during this investigation, and that the subgrade is suitable for the engineered fill.
4. All engineered fill material is to be approved by Redstone or other qualified geotechnical engineer at the time of construction prior to its use.
5. Place approved engineered fill, in maximum 200 mm loose lifts, compacted to 100% of its SPMDD. Any fill material placed under sufficiently wet conditions should consist of an approved, rock-based fill, with the inclusion of appropriate geotextile fabric around the rock-based fill should the rock fill contain enough voids to warrant.
6. Full time testing and inspection of the engineered fill will be required, to ensure compliance with material and compaction specifications.

Any engineered fill upon which the footings are placed must be a minimum thickness of 0.3m, and the quality of any material considered for engineered fill must be approved prior to its use. Rock-based fill must be completely encapsulated with suitable filter fabric (to minimize any migration of fines from surrounding soils into the rock fill voids).

Self-weight settlement of engineered fill soil compacted to 98% to 100% of its SPMDD will depend on soil texture but should be anticipated to be in the range of 0.5% to 0.75% of the fill height. The rate of the settlement will also be a function of soil texture. For engineered fill consisting of Granular B material, a major portion (80% or higher) of the settlement due to the self-weight is expected to be completed during the construction stage before the placement of overlying features.

Footings and foundation walls must be suitably reinforced; as a minimum, and unless specified otherwise on the structural drawings, such reinforcement should consist of 2 continuous runs of 15M rebar throughout the footings, and 2 continuous runs of 15M rebar throughout the top and bottom of the foundation walls.

For frost protection purposes, the footings must be covered by at least 1.5m of earth (or equivalent) in all directions. Backfill to foundations should be accomplished using non-frost susceptible Granular B material.

Any subsurface structures retaining earth (including foundation walls and/or retaining walls) that are located above the groundwater table may be designed for lateral (horizontal) earth pressures using the following equation:

- p = k (w h + q), where:
    - p = the lateral earth pressure in kPa acting on the subsurface structure at depth h;
    - k_a = the coefficient of active earth pressure;
        - = 0.3 for walls restrained from the bottom only;
        - = 0.5 for walls restrained at the top and bottom. (This value is recommended for rigid walls retaining compacted backfill);
    - k_p = the coefficient of passive earth pressure, (= 3.0);
    - w = the granular or native soil bulk density in kN/m^3;
        - = 21 kN/m^3 for well compacted, OPSS-approved Granular "B";
        - = 19 kN/m^3 for native soils;
    - h = the depth (in metres) below the exterior grade at which the earth pressure is being calculated; and
    - q = the equivalent value of any surcharge (in kN/m^3) acting on the ground surface adjacent to the structure.

The recommended value for the coefficient for sliding friction between the soil and the concrete is 0.4. In addition to the above, hydrostatic forces must be taken into account in the design where the retaining structure extend below the groundwater table. Also, any additional surcharge loading that will influence the retaining structure must be taken into account in its design.

For design purposes this site is classed as Site Class D for Seismic Site Response, in accordance with the Ontario Building Code (OBC). Table 4.1.8.4.B and 4.1.8.4.C of the Ontario Building Code provide the applicable acceleration and velocity based site coefficients (the following Tables 6 and 7 provide the relevant parameters corresponding to the recommended Site Class).

Table 6: Portion of OBC Table 4.1.8.4.B

SITE CLASS	VALUES OF F_a				
	Sa(0.2)≤0.25	Sa(0.2)≤0.25	Sa(0.2)≤0.25	Sa(0.2)≤0.25	Sa(0.2)≤0.25
D	1.3	1.2	1.1	1.1	1.0

Table 7: Portion of OBC Table 4.1.8.4.C

SITE CLASS	VALUES OF F_v				
	Sa(1.0)≤0.1	Sa(1.0)≤0.1	Sa(1.0)≤0.1	Sa(1.0)≤0.1	Sa(1.0)≤0.1
D	1.4	1.3	1.2	1.1	1.1

6.6 SLAB ON GRADE

The floor slab of the proposed Store may be constructed as a normal slab-on-grade, on granular or clearstone fill over native, inorganic subsoils, prepared in accordance with Section 6.2 of this report. The slab should be formed over a base course consisting of at least 150 mm of Granular "A" material (or 19mm clearstone material beneath any slabs located below the final adjacent grade), compacted to a minimum of 100% of its SPMDD. All grade increases or infilling below the Granular "A" or clearstone should be constructed in accordance with the engineered fill steps provided in Section 6.4 of this report. All fill placed as engineered fill must be inspected, approved and compaction verified by a qualified geotechnical engineer's representative.

If the floor slab is located below any portion of the adjacent grade, an appropriately-outletted perimeter foundation drainage system is recommended.

6.7 PAVEMENT

It is assumed that the remaining pavement will be removed and fully reconstructed as part of the site's overall reconstruction. The following recommendations are provided for such new (reconstructed) paved areas.

1. Per Section 6.2, remove materials including existing topsoil, fill, organics and organic-bearing materials, and any other obviously deleterious materials to their full depth, as well as frozen earth and boulders larger than 150mm in diameter encountered at subgrade elevation for the full width of construction.

   As a less-ideal alternative to full-depth removal of the existing fill (to minimize subexcavation depths in areas where full depth removal might be impractical due to the fill depth), consideration can be given to removal of such materials only to the design subgrade level, at which point proof rolling and a geotechnical inspection of the exposed subgrade conditions would occur to assess whether it is suitable to remain, or requires further subexcavation. It must be noted that this alternative is less ideal compared to full-depth removal of the fill, since this option does not necessarily remove all the existing fill (and any underlying organics etc), and as such has the potential for reduced pavement performance over time. If this alternative strategy is used, a provision should be included for placement of geogrid and filter fabric below the pavement structure where subgrade suitability is borderline, and as such placement of geogrid and filter fabric may minimize further subexcavation in those areas.

2. Carefully proof-roll the subgrade in the presence of the geotechnical engineer's representative. Any overly soft or wet areas or other obviously deleterious materials must be excavated and properly replaced with suitable, approved backfill material.

3. Backfilling of sub-excavated areas and fine grading may be carried out using OPSS 1010 Granular B Type 1 or Select Subgrade Material (SSM). Organics, organic-bearing materials, and overly wet or silty/clayey soils are not suitable for reuse as backfill. All subgrade backfill

materials should be placed in uniform lifts not exceeding 200 mm loose thickness and compacted to at least 95% SPMDD.

4. Adequate drainage must be achieved throughout the pavement areas. There must be positive slopes (combined with subdrains if necessary) within the pavement subgrade, to allow drainage and avoid any water accumulation.

5. In any areas where the subgrade exhibits excessive amounts of moisture and any groundwater accumulation, maximize the subgrade drainage by installing subdrains in the subgrade, consisting of 150mm diameter perforated subdrain pipe wrapped with knitted sock geotextile placed in a trench excavated 300 mm by 300 mm into the subgrade. The trench should be backfilled with 19 mm clear stone. A geotextile filter fabric wrapping surrounding the stone is required.

6. To minimize the effects of frost on differing subgrade materials, construct transitions between varying depths of granular base materials at a rate of 1:10 or flatter.

7. Granular materials should consist of Granular A and B conforming to the requirements of OPSS Form 1010 or equivalent. All granular materials should have an in-situ moisture content within 2% of their respective optimal moisture content, to assist in achieving appropriate compaction. Granular A and B materials must be in accordance with OPSS Form 1010 or equivalent. The granular courses should be compacted to a minimum 100% of their respective SPMDDs.

8. All asphaltic concrete layers should be placed, spread, and compacted confirming to OPSS Form 310 or equivalent. All asphaltic concrete should be compacted to a minimum 92.0% of their respective laboratory Maximum Relative Densities (MRDs).

The recommended pavement structures for the new Store are provided below:

Table 8: Pavement Structures

Profile	Material	Minimum Thickness (mm)		Per OPSS
		Light Duty	Heavy Duty	
Asphalt Surface	H.L. 3	50		1150
Asphalt Base	H.L. 8	50		
Granular Base	Granular A	150		1010
Granular Subbase	Granular B Type 1	300	450	

The above-recommended pavement structures are for the end use of the project. During construction of the project, the recommended granular depths may not be sufficient to support loadings encountered including construction traffic and equipment.

The foregoing design considers that construction is carried out during dry periods, at the appropriate above-freezing temperatures, and that the subgrade is stable under construction equipment loadings. If construction is carried out during wet weather and heaving or rolling of

the subgrade is experienced from the proof-rolling program, additional thickness of granular materials, geo-grids reinforcement or a combination of the two may be required.

The requirement for additional granular materials and / or utilization of geo-grids is best determined during construction under the direction of the geotechnical engineer. However, in view of the above, we recommend contingency items be included into the contract for subgrade stabilization using either technique so that such methods are contractually available, if and when needed during construction.

6.8 GENERAL RECOMMENDATIONS

6.8.1 Subsoil Sensitivity

The native subgrade soils are susceptible to strength loss or deformation if saturated or disturbed by construction traffic. Therefore, where the subgrade consists of approved soil, care must be taken to protect the exposed subgrade from excess moisture and from construction traffic. If there is site work carried out during periods of wet weather and/or elevated groundwater levels, then it can be expected that the subgrade will be disturbed unless a suitable working surface is provided to protect the integrity of the subgrade soils from construction traffic. Subgrade soil preparation work cannot be adequately accomplished during overly wet weather, and the project must be scheduled accordingly.

6.8.2 Test Pits During Tendering

The Client may consider excavating test pits at representative locations of this site during the construction tendering phase, with mandatory attendance of bidding Contractors. This will allow them to make their own assessments of the fill, soil, and groundwater conditions, and how these will affect their proposed construction methods, techniques and schedules.

6.8.3 Winter Construction

The subsoils encountered at the site can be frost-susceptible and freezing conditions could cause problems to preparations for foundation, sidewalks and/or pavement subgrades. As preventive measures, the following is recommended:

1. Exposed surfaces intended to support foundations must be protected against freezing by means of loose straw and tarpaulins, heating, etc.
2. Care must be exercised so that any sidewalks and/or asphalt pavements do not interfere with the opening of doors during the winter when the soils are subject to frost heave. This problem may be minimized by any one of several means including (but not necessarily limited to) keeping the doors well above outside grade, installing structural slabs at the doors, and/or by using well graded backfill and positive drainage.

3. Because of the potential for soils to experience frost heave during winter, it is recommended that exterior service trenches be excavated with shallow transition slopes to minimize the abrupt change in density and frost-susceptibility between the granular backfill (relatively non-frost susceptible) and native soils (generally more frost-susceptible).

6.8.4 Wells

Wells that exist on site (including monitoring wells installed during this investigation) are the property of the site owner. It is suggested that the monitoring wells be maintained, for the time being, to facilitate groundwater monitoring that can lead up to construction, and/or in support of any EASR or PTTW applications. Should such monitoring become unnecessary and the wells become inactive and/or unmaintained, and in any case prior to or during initial stages of site construction, the wells must be decommissioned by an appropriately- licensed well contractor in compliance with O.Reg. 903.

6.8.5 Design Review and Construction Inspections

Due to the preliminary nature of the design details at the time of this report, Redstone must be allowed to review the design and proposed grading plans prior to their finalization, and provide updated recommendations if necessary at that time. In addition, we strongly recommend that Redstone be retained to review the related earthworks specifications when they are available.

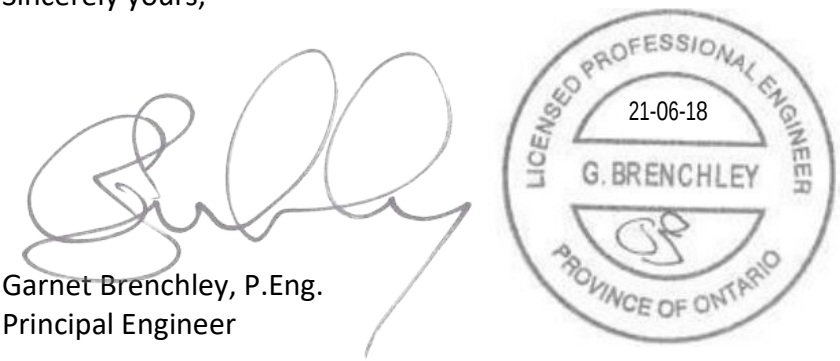
During construction, experienced geotechnical staff must observe construction activities and ensure geotechnical recommendations are carried out.

7.0 CLOSURE AND STATEMENT OF LIMITATIONS

The recommendations made in this report are in accordance with our present understanding of the project. The subsurface investigation was performed in accordance with current, generally accepted guidelines. However, should any conditions at the site be encountered which differ from those at the borehole locations, it is requested that Redstone be notified immediately in order to permit a reassessment of our recommendations in light of the changed conditions and exact project details. Redstone requests that they be permitted to review the recommendations of this report after the drawings and specifications are complete, or if the final project details should differ from that mentioned in this report.

The attached Statement of Limitations is an integral part of this report. Should questions arise regarding any aspect of this report, please contact our office.

Sincerely yours,



Garnet Brenchley, P.Eng.
Principal Engineer

Redstone Engineering Inc.

STATEMENT OF LIMITATIONS

This report is intended solely for Sayers Foods Limited and other parties explicitly identified in the report and is prohibited for use by others without Redstone's prior written consent. This report is considered Redstone's professional work product and shall remain the sole property of Redstone. Any unauthorized reuse, redistribution of or reliance on the report shall be at the Client and recipient's sole risk, without liability to Redstone. Client shall defend, indemnify and hold Redstone harmless from any liability arising from or related to Client's unauthorized distribution of the report. No portion of this report may be used as a separate entity; it is to be read in its entirety and shall include all supporting drawings and appendices.

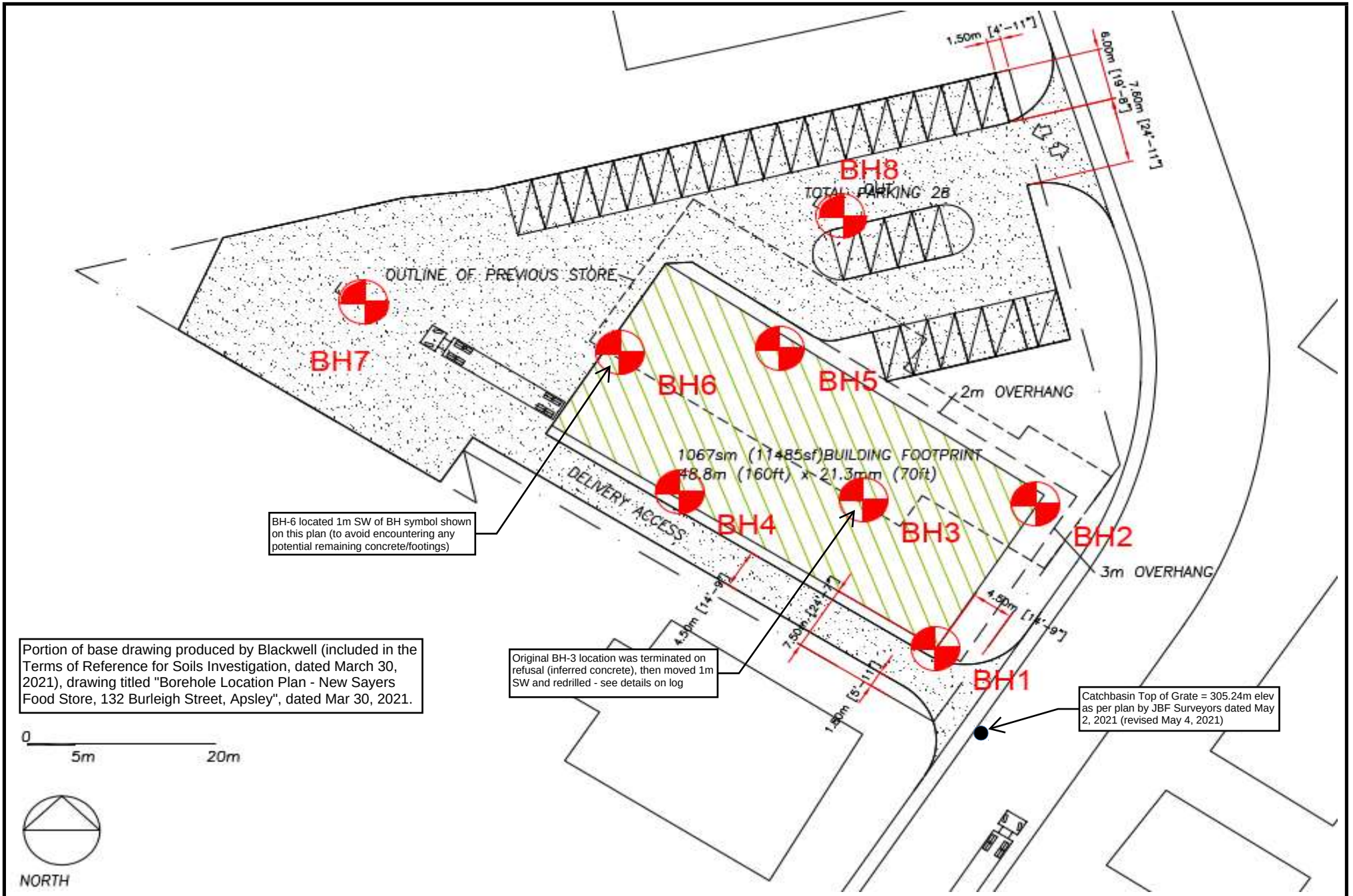
The recommendations made in this report are in accordance with our present understanding of the project, the current site use, ground surface elevations and conditions, and are based on the work scope approved by the Client and described in the report. The services were performed in a manner consistent with that level of care and skill ordinarily exercised by members of geotechnical engineering professions currently practicing under similar conditions in the same locality. No other representations, and no warranties or representations of any kind, either expressed or implied, are made. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties.

All details of design and construction are rarely known at the time of completion of a geotechnical study. The recommendations and comments made in the study report are based on our subsurface investigation and resulting understanding of the project, as defined at the time of the study. We should be retained to review our recommendations when the drawings and specifications are complete. Without this review, Redstone will not be liable for any misunderstanding of our recommendations or their application and adaptation into the final design.

By issuing this report, Redstone is the geotechnical engineer of record. It is recommended that Redstone be retained during construction of any and all foundations, and during earthwork operations to confirm the conditions of the subsoil are actually similar to those observed during our study. The intent of this requirement is to verify that conditions encountered during construction are consistent with the findings in the report and that inherent knowledge developed as part of our study is correctly carried forward to the construction phases.

It is important to emphasize that a soil investigation is, in fact, a random sampling of a site and the comments included in this report are based on the results obtained at the eight (8) borehole locations only. The subsurface conditions confirmed at these eight (8) locations may vary at other locations. The subsurface conditions can also be significantly modified by construction activities on site (ex. excavation, dewatering and drainage, blasting, pile driving, etc.). These conditions can also be modified by exposure of soils or bedrock to humidity, dry periods or frost. Soil and groundwater conditions between and beyond the test locations may differ both horizontally and vertically from those encountered at the test locations and conditions may become apparent during construction which could not be detected or anticipated at the time of our investigation. Should any conditions at the site be encountered which differ from those found at the test locations, we request that we be notified immediately in order to permit a reassessment of our recommendations. If changed conditions are identified during construction, no matter how minor, the recommendations in this report shall be considered invalid until sufficient review and written assessment of said conditions by Redstone is completed.

FIGURES



Redstone Engineering	1086 Hayes Line Cavan, Ontario 705-768-9042 www.redstoneeng.ca	Drawing Title	Orientation	Scale	Date	Project #:
		BOREHOLE LOCATION PLAN GEOTECHNICAL INVESTIGATION REPORT NEW SAYERS FOOD STORE - 132 BURLEIGH ST, APSLEY		see dimension bar (above)	May 27, 2021	21R110
					By	Figure #:
					GB	1

APPENDIX A

BOREHOLE LOGS

Redstone Engineering

BOREHOLE NO. BH-1

PROJECT NUMBER 21R110
PROJECT NAME New Sayers Food Store
CLIENT Sayers Foods
SITE ADDRESS 132 Burleigh Street, Apsley
.....
.....

DRILLING COMPANY GET Drilling
LICENCE # 7085
DRILLER M. Turnbull
DRILL RIG Truck-mounted
DRILLING METHOD Solid augers, spoon sampler
DATE DRILLED May 26, 2021

COORDINATES n/d
COORDINATE SYSTEM n/a
GROUND SURFACE ELEV (m) 305.52
TOP OF WELL CASING ELEV (m) n/d
TOTAL DEPTH (m) 6.71
LOGGED BY Garnet Brenchley, P.Eng.

WELL COMPLETION 0.94m stickup
CASING 50mm PVC
SCREEN 50mm PVC slot 10

COMMENTS Drilling Method AU = Augers and Split Spoon sampler

Depth (m)	Drilling Method	Dynamic Cone blows/0.3m	Sample (Interval and Type)	SPT (N) value (blows/0.3m)	Moisture Cont (%)	Groundwater	Well Monitor Details	Stratigraphy	Stratigraphic Description	Depth (m)	Additional Observations & Remarks	Elevation (m)
0	AU								ASPHALT (50mm)	0.05		305.5
									FILL (130mm) - brown Sand with Gravel, damp, loose to compact	0.2		
0.5									FILL or Disturbed Earth - brown / dark brown / reddish brown Sand with trace Gravel, damp, loose			305
1			SS-1	5 (4/2/3/4)	5.3							304.5
1.5										1.5		304
2			SS-2	15 (6/7/8/12)	4.6				SAND - brown / dark brown layered Sand, medium to coarse-grained, damp, compact			303.5
2.5			SS-3	10 (5/4/6/5)	6.6							303
3										3.1		302.5
3.5			SS-4	4 (2/2/2/3)	8.7				Light brown, fine-grained, damp to moist, loose			302
4						▽					Groundwater at 3.9m depth on May 27, 2021	301.5
4.5											Groundwater at 4.3m depth in open borehole upon completion of drilling	301
			SS-5	7 (1/2/5/6)	29.1							
5										4.9	Borehole caved below about 4.6m depth upon completion of drilling	300.5
									Reddish brown, fine to medium-grained, wet to saturated, compact			
5.5										5.5		300
6									Grey / dark grey laminations (Sand/Silt), medium to coarse-grained Sand with pockets of Sand/Silt laminations, wet to saturated, loose			299.5
			SS-6	3 (1/2/1/4)	20.7							
6.5										6.7		299
									Borehole terminated			

Redstone Engineering

BOREHOLE NO. BH-2

PROJECT NUMBER 21R110	**DRILLING COMPANY** GET Drilling	**COORDINATES** n/d
PROJECT NAME New Sayers Food Store	**LICENCE #** 7085	**COORDINATE SYSTEM** n/a
CLIENT Sayers Foods	**DRILLER** M. Turnbull	**GROUND SURFACE ELEV (m)** 305.69
SITE ADDRESS 132 Burleigh Street, Apsley	**DRILL RIG** Truck-mounted	**TOP OF WELL CASING ELEV (m)** n/d
.....	**DRILLING METHOD** Solid augers, spoon sampler	**TOTAL DEPTH (m)** 6.65
.....	**DATE DRILLED** May 26, 2021	**LOGGED BY** Garnet Brenchley, P.Eng.

WELL COMPLETION 0.99m stickup | **CASING** 50mm PVC | **SCREEN** 50mm PVC slot 10

COMMENTS Drilling Method AU = Augers and Split Spoon sampler

Depth (m)	Drilling Method	Dynamic Cone blows/0.3m	Sample (Interval and Type)	SPT (N) value (blows/0.3m)	Moisture Cont (%)	Groundwater	Well Monitor Details	Stratigraphy	Stratigraphic Description	Depth (m)	Additional Observations & Remarks	Elevation (m)
0	AU		AS-1		1.4				FILL - grey limestone screenings, damp, loose			305.5
0.5												305
1												304.5
1.5			SS-2	3 (4/2/1/50 =0" [bouncing]	5.7						SS-2 bouncing on solid object (concrete?) at 2.0m depth	304
2									CONCRETE	2.0	Auger grinding through/past solid object between 2.0 and 2.1m depth - presence of concrete inferred	
										2.1		303.5
									FILL - brown, disturbed Sand with Gravel, damp	2.2		
2.5			SS-3	10 (5/5/5/7)	6.9				SAND - brown / light brown layered, medium-grained, dry to damp, compact			303
3										3.1		
			SS-4	6 (2/3/3/4)	4.0				Fine to medium-grained, damp, loose			302.5
3.5												302
4						▽					Groundwater at 4.1m depth on May 27, 2021	
											Groundwater at 4.0m depth in open borehole upon completion of drilling	301.5
4.5										4.6		
			SS-5	4 (2/2/2/2)	25.3				Grey / dark grey laminated (medium-grained Sand with Silt laminations), wet, loose		Borehole caved below about 4.6m depth upon completion of drilling	301
5												300.5
5.5												300
6											SS-6 spoon bouncing at 6.65m depth - pieces of broken granite in end of spoon sampler upon extraction from borehole	
			SS-6	6 (1/1/5/50 =4" [bouncing]	19.6							299.5
6.5										6.7		
									Borehole terminated			299

Disclaimer This log must be read in conjunction with the entirety of its parent report

Redstone Engineering

BOREHOLE NO. BH-3

PROJECT NUMBER 21R110
PROJECT NAME New Sayers Food Store
CLIENT Sayers Foods
SITE ADDRESS 132 Burleigh Street, Apsley
.....
.....

DRILLING COMPANY GET Drilling
LICENCE # 7085
DRILLER M. Turnbull
DRILL RIG Truck-mounted
DRILLING METHOD Solid augers, spoon sampler
DATE DRILLED May 26, 2021

COORDINATES n/d
COORDINATE SYSTEM n/a
GROUND SURFACE ELEV (m) 305.71
TOP OF WELL CASING ELEV (m) n/d
TOTAL DEPTH (m) 6.71
LOGGED BY Garnet Brenchley, P.Eng.

WELL COMPLETION no well installed
CASING
SCREEN

COMMENTS Drilling Method AU = Augers and Split Spoon sampler

Depth (m)	Drilling Method	Dynamic Cone blows/0.3m	Sample (Interval and Type)	SPT (N) value (blows/0.3m)	Moisture Cont (%)	Groundwater	Well Monitor Details	Stratigraphy	Stratigraphic Description	Depth (m)	Additional Observations & Remarks	Elevation (m)
0	AU		AS-1		6.3				ASPHALT (50mm)	0.05	Initial drilling of BH-3 encountered Fill (grey limestone screenings) over Fill (reddish brown Sand) over inferred concrete starting at about 1.07m depth. This initial attempt at BH-3 was terminated on practical refusal to further advancement within the inferred concrete (due to reinforcing steel or other impenetrable object within the inferred concrete), and then relocated 1m SW and redrilled. The logged BH-3 conditions herein are what was encountered in this relocated BH-3.	305.5
									FILL (130mm) - brown Sand with Gravel, damp, loose to compact	0.2		
0.5									FILL - reddish brown Sand, fine to medium-grained, loose, damp			305
1												
												304.5
1.5			SS-2	18 (6/9/9/9)	3.9					1.5		
									SAND - brown / dark brown, medium to coarse-grained, damp, compact			304
2												
			SS-3	13 (5/6/7/8)	8.6					2.4		303.5
2.5									Light grey / dark grey layered, fine to medium-grained, damp, compact			
												303
3										3.1		
			SS-4	12 (5/6/6/7)	4.6				Brown, medium to coarse-grained, damp, compact			302.5
3.5												
												302
4										4.0		
						▽			With Silt, grey / dark grey Sand/Silt laminations, with reddish brown mottling, fine-grained, wet to saturated, loose		Groundwater at 4.3m depth in open borehole upon completion of drilling	301.5
4.5												
			SS-5	2 (1/1/1/3)	27.4						Borehole caved below about 4.3m depth upon completion of drilling	301
5												
												300.5
5.5												
												300
6												
			SS-6	2 (1/1/1/2)	22.1							299.5
6.5										6.7		
									Borehole terminated			299

Redstone Engineering

BOREHOLE NO. BH-4

PROJECT NUMBER 21R110
PROJECT NAME New Sayers Food Store
CLIENT Sayers Foods
SITE ADDRESS 132 Burleigh Street, Apsley
.....
.....

DRILLING COMPANY GET Drilling
LICENCE # 7085
DRILLER M. Turnbull
DRILL RIG Truck-mounted
DRILLING METHOD Solid augers, spoon sampler
DATE DRILLED May 26, 2021

COORDINATES n/d
COORDINATE SYSTEM n/a
GROUND SURFACE ELEV (m) 304.98
TOP OF WELL CASING ELEV (m) n/d
TOTAL DEPTH (m) 6.71
LOGGED BY Garnet Brenchley, P.Eng.

WELL COMPLETION no well installed
CASING
SCREEN

COMMENTS Drilling Method AU = Augers and Split Spoon sampler

Depth (m)	Drilling Method	Dynamic Cone blows/0.3m	Sample (Interval and Type)	SPT (N) value (blows/0.3m)	Moisture Cont (%)	Groundwater	Well Monitor Details	Stratigraphy	Stratigraphic Description	Depth (m)	Additional Observations & Remarks	Elevation (m)
	AU								ASPHALT (50mm)	0.05		
			AS-1		6.1				FILL (130mm) - brown Sand with Gravel, damp, loose to compact	0.2		
0.5									FILL - dark brown Silty Sand with Gravel, trace Organics, dry to damp, loose			304.5
1			SS-2	6 (4/3/3/3)	15.5					1.1		304
									SAND - brown, fine-grained, damp, loose			
1.5										1.5		303.5
			SS-3	5 (2/2/3/5)	8.6				Light brown, fine-grained, damp, loose			
2										2.1		303
									SILT - grey Silt with Sand, damp, compact	2.4		
2.5			SS-4	26 (9/12/14/16)	3.4				SAND - brown / dark brown mottled Sand, coarse-grained, damp, compact			302.5
3										3.1		302
			SS-5	21 (7/10/11/15)	8.4				Brown / dark grey layered, medium to coarse-grained, damp to moist, compact. Interbedded (~every 0.3m) with grey Sandy Silt (grey/dark grey laminated), moist, compact		Groundwater at 3.7m depth in open borehole upon completion of drilling	
3.5						▽						301.5
4											Borehole caved below about 3.7m depth upon completion of drilling	301
4.5										4.6		300.5
			SS-6	13 (4/5/8/10)	17.6				Grey, wet to saturated, compact			
5												300
5.5												299.5
6												299
			SS-7	10 (1/4/6/9)	16.9							
6.5										6.7		298.5
									Borehole terminated			298

Redstone Engineering

BOREHOLE NO. BH-5

PROJECT NUMBER 21R110
PROJECT NAME New Sayers Food Store
CLIENT Sayers Foods
SITE ADDRESS 132 Burleigh Street, Apsley
.....
.....

DRILLING COMPANY GET Drilling
LICENCE # 7085
DRILLER M. Turnbull
DRILL RIG Truck-mounted
DRILLING METHOD Solid augers, spoon sampler
DATE DRILLED May 26, 2021

COORDINATES n/d
COORDINATE SYSTEM n/a
GROUND SURFACE ELEV (m) 305.73
TOP OF WELL CASING ELEV (m) n/d
TOTAL DEPTH (m) 6.71
LOGGED BY Garnet Brenchley, P.Eng.

WELL COMPLETION no well installed
CASING
SCREEN

COMMENTS Drilling Method AU = Augers and Split Spoon sampler

Depth (m)	Drilling Method	Dynamic Cone blows/0.3m	Sample (Interval and Type)	SPT (N) value (blows/0.3m)	Moisture Cont (%)	Groundwater	Well Monitor Details	Stratigraphy	Stratigraphic Description	Depth (m)	Additional Observations & Remarks	Elevation (m)
0	AU		AS-1		5.2				FILL (190mm) - grey limestone screenings, damp, loose	0.2		305.5
0.5									FILL - reddish brown Sand with Silt, trace Organics, damp, loose			305
1										1.2		304.5
1.5			SS-2	3 (1/1/2/4)	10.9				Brown Sand with Gravel, trace to some dark brown Organics, damp, loose	1.8	Augers grinding through/past object between about 1.2 and 1.5m depth. Possible concrete or cobbles (not confirmed)	304
2									SAND - brown, fine to medium-grained, damp, loose	2.2		303.5
2.5			SS-3	18 (6/8/10/14)	6.8				Brown / dark brown layered, medium-grained, damp, compact			303
3										3.1		302.5
3.5			SS-4	25 (8/11/14/11	7.9				Brown / light brown layered, fine to medium-grained, damp, compact			302
4										4.0		301.5
4.5						▽			Brown / dark brown layered, medium-grained, wet, loose		Groundwater at 4.3m depth in open borehole upon completion of drilling	301
5			SS-5	6 (5/4/2/5)	29.6					4.9	Borehole caved below about 4.6m depth upon completion of drilling	300.5
5.5			AS-6		22.8				Reddish brown, wet, loose			300
6										6.1		299.5
6.5			SS-7	6 (1/2/4/4)	20.2				Grey / dark grey laminated (Sand/Silt), fine to medium-grained, wet to saturated, loose	6.7		299
									Borehole terminated			

Redstone Engineering

BOREHOLE NO. BH-6

PROJECT NUMBER 21R110
PROJECT NAME New Sayers Food Store
CLIENT Sayers Foods
SITE ADDRESS 132 Burleigh Street, Apsley
.....
.....

DRILLING COMPANY GET Drilling
LICENCE # 7085
DRILLER M. Turnbull
DRILL RIG Truck-mounted
DRILLING METHOD Solid augers, spoon sampler
DATE DRILLED May 26, 2021

COORDINATES n/d
COORDINATE SYSTEM n/a
GROUND SURFACE ELEV (m) 305.02
TOP OF WELL CASING ELEV (m) n/d
TOTAL DEPTH (m) 6.71
LOGGED BY Garnet Brenchley, P.Eng.

WELL COMPLETION no well installed
CASING
SCREEN

COMMENTS Drilling Method AU = Augers and Split Spoon sampler

Depth (m)	Drilling Method	Dynamic Cone blows/0.3m	Sample (Interval and Type)	SPT (N) value (blows/0.3m)	Moisture Cont (%)	Groundwater	Well Monitor Details	Stratigraphy	Stratigraphic Description	Depth (m)	Additional Observations & Remarks	Elevation (m)
	AU								ASPHALT (50mm)	0.05		305
			AS-1		7.2				FILL (130mm) - brown Sand with Gravel, damp, loose to compact	0.2		
0.5									FILL - dark brown Silty Sand with trace Gravel, damp, loose			304.5
			SS-2	20 (10/10/10/7)	7.6				Brown / dark brown / grey / black mottled Silty Sand with trace Gravel and Organics, damp, loose to compact	1.1		
1												304
1.5									SAND - reddish brown, fine-grained, damp, loose to compact (compact at 1.7m)	1.5		303.5
			SS-3	14 (2/5/9/8)	4.5				Brown, medium-grained, damp, compact	2.1		
2												303
			SS-4	22 (10/11/11/11)	4.6					2.4		
2.5									Brown / dark brown layered, medium-grained, damp, compact			302.5
3										3.1		302
			SS-5	18 (6/8/10/10)	18.1	▽			Grey / dark grey layered, medium-grained, moist to wet, compact		Groundwater at 3.7m depth in open borehole upon completion of drilling	
3.5												301.5
4										4.0	Borehole caved below about 3.7m depth upon completion of drilling	301
									Dark brown to reddish brown to grey / dark grey layered, medium to coarse-grained, wet, loose			
4.5												300.5
			SS-6	8 (1/4/4/8)	22.7							
5												300
5.5												299.5
6												299
			SS-7	8 (1/3/5/8)	17.5				Grey / dark grey laminated (Sand/Silt) and interbedded with grey coarse-grained Sand, wet to saturated, loose to compact			
6.5										6.7		298.5
									Borehole terminated			

Redstone Engineering

BOREHOLE NO. BH-7

PROJECT NUMBER 21R110
PROJECT NAME New Sayers Food Store
CLIENT Sayers Foods
SITE ADDRESS 132 Burleigh Street, Apsley
.....
.....

DRILLING COMPANY GET Drilling
LICENCE # 7085
DRILLER M. Turnbull
DRILL RIG Truck-mounted
DRILLING METHOD Solid augers, spoon sampler
DATE DRILLED May 26, 2021

COORDINATES n/d
COORDINATE SYSTEM n/a
GROUND SURFACE ELEV (m) 304.36
TOP OF WELL CASING ELEV (m) n/d
TOTAL DEPTH (m) 6.71
LOGGED BY Garnet Brenchley, P.Eng.

WELL COMPLETION 0.89m stickup
CASING 50mm PVC
SCREEN 50mm PVC slot 10

COMMENTS Drilling Method AU = Augers and Split Spoon sampler

Depth (m)	Drilling Method	Dynamic Cone blows/0.3m	Sample (Interval and Type)	SPT (N) value (blows/0.3m)	Moisture Cont (%)	Groundwater	Well Monitor Details	Stratigraphy	Stratigraphic Description	Depth (m)	Additional Observations & Remarks	Elevation (m)
0	AU								ASPHALT (50mm)	0.05		304
			AS-1		7.9				FILL (130mm) - brown Sand with Gravel, damp, loose to compact	0.2		
0.5									FILL - dark brown Sand and Silt with Gravel and Organics throughout, fragments of asphalt and occasional bricks, damp, loose			303.5
1			SS-2	8 (8/4/4/4)	7.8							
1.5			SS-3	3 (3/2/1/1)	9.2							303
2												302.5
2.5			SS-4	2 (1/1/1/6)	26.7				Silty Sand trace Clay, wet, loose		SS-4: 0% Gravel, 70% Sand, 30% Silt and Clay (3% <0.002mm)	302
3										2.9	Groundwater at 3.2m depth on May 27, 2021	301.5
			SS-5	20 (4/9/11/12)	16.5	▽			SAND - brown, fine-grained, moist to wet, loose to compact (compact at 3.2m depth)	3.4	Borehole caved below about 3.0m depth upon completion of drilling	301
3.5									SILTY SAND - grey / light grey / tan mottled, wet, compact		Groundwater at 3.7m depth in open borehole upon completion of drilling	
4												300.5
4.5										4.6		300
			SS-6	8 (3/4/4/5)	15.5				SAND - brown / grey mottled, medium to coarse-grained, interbedded with fine-grained Sand with Silt (light grey / dark grey laminated), wet to saturated, loose			299.5
5												
5.5												299
6												298.5
			SS-7	5 (1/2/3/7)	15.5							
6.5										6.7		298
									Borehole terminated			297.5

Redstone Engineering

BOREHOLE NO. BH-8

PROJECT NUMBER 21R110
PROJECT NAME New Sayers Food Store
CLIENT Sayers Foods
SITE ADDRESS 132 Burleigh Street, Apsley
.....
.....

DRILLING COMPANY GET Drilling
LICENCE # 7085
DRILLER M. Turnbull
DRILL RIG Truck-mounted
DRILLING METHOD Solid augers, spoon sampler
DATE DRILLED May 26, 2021

COORDINATES n/d
COORDINATE SYSTEM n/a
GROUND SURFACE ELEV (m) 305.62
TOP OF WELL CASING ELEV (m) n/d
TOTAL DEPTH (m) 3.05
LOGGED BY Garnet Brenchley, P.Eng.

WELL COMPLETION no well installed
CASING
SCREEN

COMMENTS Drilling Method AU = Augers and Split Spoon sampler

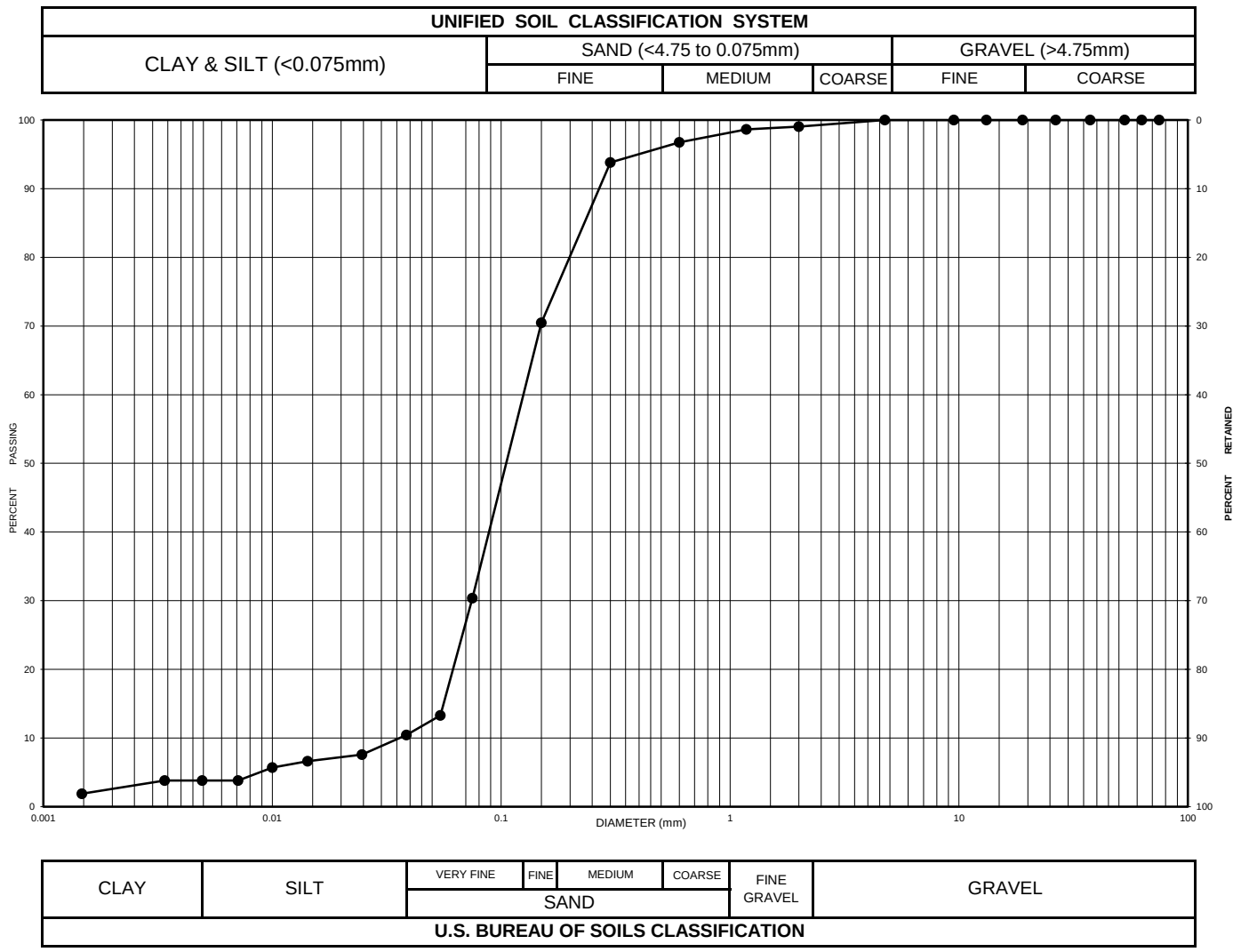
Depth (m)	Drilling Method	Dynamic Cone blows/0.3m	Sample (Interval and Type)	SPT (N) value (blows/0.3m)	Moisture Cont (%)	Groundwater	Well Monitor Details	Stratigraphy	Stratigraphic Description	Depth (m)	Additional Observations & Remarks	Elevation (m)
0	AU								ASPHALT (50mm)	0.05		305.5
			AS-1		12.0				FILL (150mm) - brown Sand with Gravel, damp, loose to compact	0.2		
0.5									FILL - dark brown Silt and Sand with Gravel and Organics, damp, loose	0.8		305
			SS-2	10 (3/4/6/10)	6.1				SAND - light brown, fine to medium to coarse-grained, damp, compact		SS-2: 10% Gravel, 84% Sand, 6% Silt and Clay	
1												304.5
1.5										1.5		
			SS-3	12 (4/5/7/8)	2.4				Brown / dark brown layered, medium to coarse-grained, damp, compact			304
2											No groundwater in open borehole upon completion of drilling	303.5
			SS-4	11 (5/5/6/6/9)	7.4					2.4		
2.5									Brown / dark brown layered, medium-grained, damp to moist, compact. Interbedded with grey fine-grained Sand with Silt (between about 2.3m and 2.5m)		Borehole remained open to its full depth upon completion of drilling	303
3										3.1		
									Borehole terminated			302.5
3.5												302
4												301.5
4.5												301
5												300.5
5.5												300
6												299.5
6.5												299

APPENDIX B

PHYSICAL LABORATORY DATA

GRAIN SIZE DISTRIBUTION CHART

Client:	*Redstone Engineering*	Project No.:	*21R110*
Project:	*Sayers Food*	Location:	*Apsley, Ontariio*
Sampled By:	*Garnet Brenchley*	Date:	*May 26, 2021*
Sample No.:	*BH-7 SS-4*	Depth:	*7.5 - 9.5'*

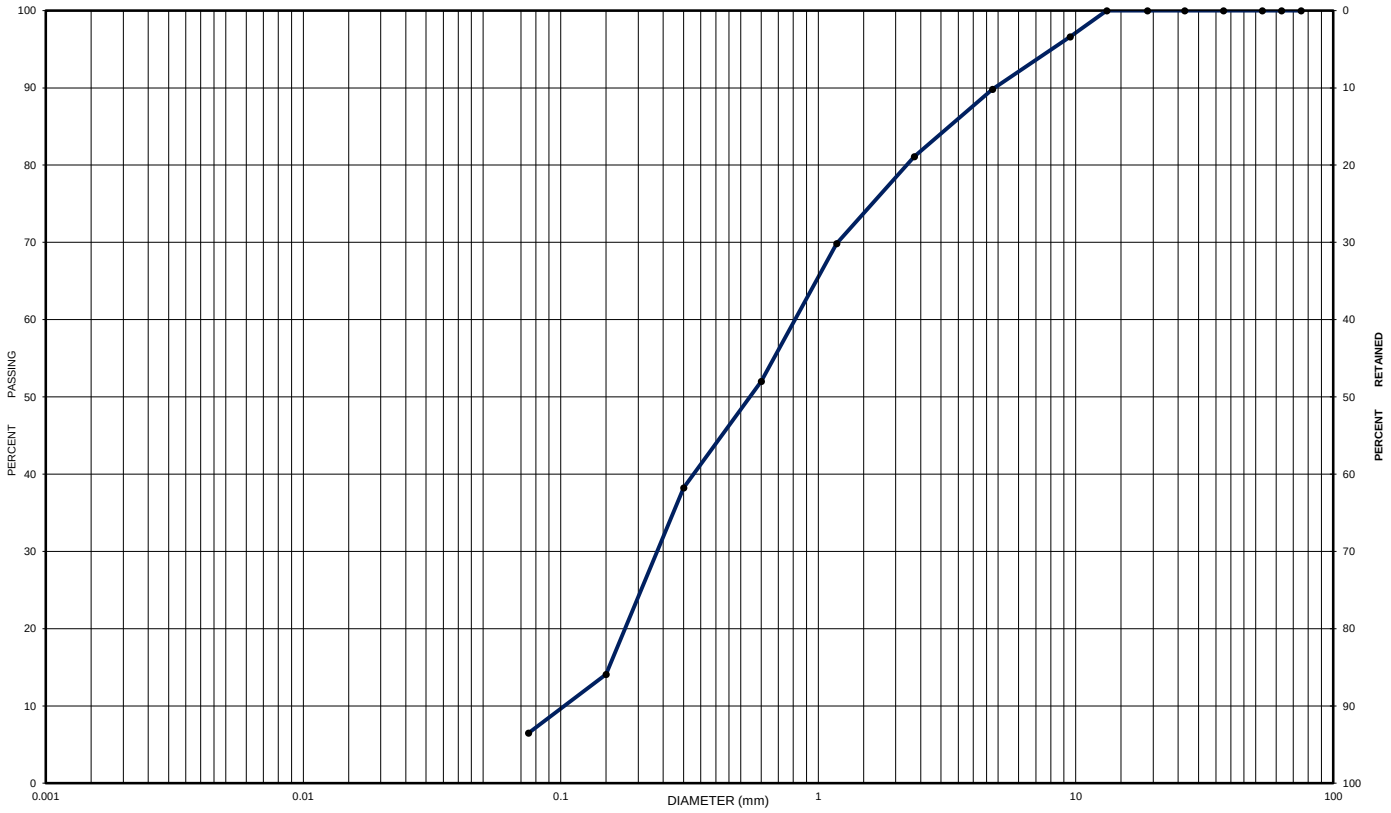


Sample No.	Depth	Description	Moisture Content	Gravel	Sand	Silt	Clay	Class.
BH-7 SS-4	*7.5 - 9.5'*	*Silty SAND*	*26.7*	*0*	*70*	*27*	*3*	*SM*

GRAIN SIZE DISTRIBUTION CHART

Client:	*Redstone Engineering*	Project No.:	*21R110*
Project:	*Sayers Food*	Location:	*Apsley, Ontario*
Sample By:	*Garnet Brenchley*	Date:	*May 26, 2021*
Sample No.:	*BH-8 SS-2*	Depth:	*2.5 - 4.5'*

UNIFIED SOIL CLASSIFICATION SYSTEM					
CLAY & SILT (<0.075mm)	SAND (<4.75 to 0.075mm)			GRAVEL (>4.75mm)	
	FINE	MEDIUM	COARSE	FINE	COARSE



CLAY	SILT	SAND				FINE GRAVEL	GRAVEL
		VERY FINE	FINE	MEDIUM	COARSE		
U.S. BUREAU OF SOILS CLASSIFICATION							

Sample No.	Depth	Description	Moisture Content	Gravel	Sand	Silt & Clay	Class.
BH-8 SS-2	*2.5 - 4.5'*	*SAND, well graded some gravel*	*6.1*	*10*	*84*	*6*	*SW*

APPENDIX C

CHEMICAL LABORATORY DATA

CADUCEON™ ENVIRONMENTAL LABORATORIES
Client committed. Quality assured.

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G099897 **REPORT No. B21-16069 (i)**

Report To:

Redstone Engineering
1086 Hayes Line,
Cavan ON L0A 1C0
Attention: Garnet Brenchley

Caduceon Environmental Laboratories
110 West Beaver Creek Rd Unit 14
Richmond Hill ON L4B 1J9
Tel: 289-475-5442
Fax: 289-562-1963

DATE RECEIVED: 28-May-21
DATE REPORTED: 04-Jun-21
SAMPLE MATRIX: Soil/Leachate

JOB/PROJECT NO.: Apsley
P.O. NUMBER: 21R110
WATERWORKS NO.

Parameter	Qty	Site Analyzed	Analyst Initials	Date Analyzed	Lab Method	Reference Method
Cyanide	1	Kingston	US	01-Jun-21	A-CN-001 (k)	SM 4500CN
Fluoride	1	Kingston	TK	03-Jun-21	A-FI COLOURMETRIC	SM 4500FD
Anions	1	Holly Lane	VK	04-Jun-21	A-IC-01 (o)	SM4110C
Mercury	1	Holly Lane	PBK	02-Jun-21	D-HG-02 (o)	SM 3112 B
Metals - ICP-OES	1	Holly Lane	hmc	02-Jun-21	D-ICP-01 (o)	SM 3120
Metals - ICP-MS	1	Holly Lane	TPR	02-Jun-21	D-ICPMS-01 (o)	EPA 200.8

O. Reg. 558 - O. Reg. 558
Schedule 4 - Schedule 4 - Leachate Toxic Criteria

Christine Burke
Lab Manager

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

CADUCEON™ ENVIRONMENTAL LABORATORIES
Client committed. Quality assured.

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G099897 **REPORT No. B21-16069 (i)**

Report To:

Redstone Engineering
1086 Hayes Line,
Cavan ON L0A 1C0
Attention: Garnet Brenchley

Caduceon Environmental Laboratories
110 West Beaver Creek Rd Unit 14
Richmond Hill ON L4B 1J9
Tel: 289-475-5442
Fax: 289-562-1963

DATE RECEIVED: 28-May-21
DATE REPORTED: 04-Jun-21
SAMPLE MATRIX: Soil/Leachate

JOB/PROJECT NO.: Apsley
P.O. NUMBER: 21R110
WATERWORKS NO.

	Client I.D. / Sample I.D. / Date Collected		Comp #1 B21-16069-1 26-May-21				O. Reg. 558 Schedule 4	
Parameter	**Units**	**R.L.**						
Cyanide (Free)	mg/L	0.005	< 0.005				20.0	
Fluoride	mg/L	0.1	< 0.1				150.0	
Nitrite (N)	mg/L	0.1	< 1					
Nitrate (N)	mg/L	0.1	< 1					
Nitrate + Nitrite (N)	mg/L	0.1	< 1				1000.0	
Arsenic	mg/L	0.02	< 0.02				2.5	
Barium	mg/L	0.001	0.599				100.0	
Boron	mg/L	0.005	0.055				500.0	
Cadmium	mg/L	0.005	< 0.005				0.5	
Chromium	mg/L	0.002	< 0.002				5.0	
Lead	mg/L	0.02	< 0.02				5.0	
Mercury	mg/L	0.00002	< 0.00002				0.1	
Selenium	mg/L	0.01	< 0.01				1.0	
Silver	mg/L	0.005	< 0.005				5	
Uranium	mg/L	0.0005	< 0.0005				10.0	

1 . Elevated RL due to matrix interference

O. Reg. 558 - O. Reg. 558
Schedule 4 - Schedule 4 - Leachate Toxic Criteria

Christine Burke
Lab Manager

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

CADUCEON™ ENVIRONMENTAL LABORATORIES
Client committed. Quality assured.

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G099897 **REPORT No. B21-16069 (i)**

Report To:

Redstone Engineering
1086 Hayes Line,
Cavan ON L0A 1C0
Attention: Garnet Brenchley

Caduceon Environmental Laboratories
110 West Beaver Creek Rd Unit 14
Richmond Hill ON L4B 1J9
Tel: 289-475-5442
Fax: 289-562-1963

DATE RECEIVED: 28-May-21
DATE REPORTED: 04-Jun-21
SAMPLE MATRIX: Soil/Leachate

JOB/PROJECT NO.: Apsley
P.O. NUMBER: 21R110
WATERWORKS NO.

Summary of Exceedances

O. Reg. 558 - O. Reg. 558
Schedule 4 - Schedule 4 - Leachate Toxic Criteria

Christine Burke
Lab Manager

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

CADUCEON™ ENVIRONMENTAL LABORATORIES
Client committed. Quality assured.

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G099897 **REPORT No. B21-16069 (ii)**

Report To:

Redstone Engineering
1086 Hayes Line,
Cavan ON L0A 1C0
Attention: Garnet Brenchley

Caduceon Environmental Laboratories
110 West Beaver Creek Rd Unit 14
Richmond Hill ON L4B 1J9
Tel: 289-475-5442
Fax: 289-562-1963

DATE RECEIVED: 28-May-21
DATE REPORTED: 04-Jun-21
SAMPLE MATRIX: Soil/Leachate

JOB/PROJECT NO.: Apsley
P.O. NUMBER: 21R110
WATERWORKS NO.

Parameter	Qty	Site Analyzed	Analyst Initials	Date Analyzed	Lab Method	Reference Method
Comment	1	Default Site	CS	03-Jun-21	C-Arochlor Comment	-
PCB's	1	Kingston	CS	03-Jun-21	C-PCB-03 K	EPA 8082
VOC's	1	Richmond Hill	JE	02-Jun-21	C-VOC-02 (rh)	EPA 8260

O. Reg. 558 - O. Reg. 558
Schedule 4 - Schedule 4 - Leachate Toxic Criteria

Christine Burke
Lab Manager

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

CADUCEON™ ENVIRONMENTAL LABORATORIES
Client committed. Quality assured.

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G099897 **REPORT No. B21-16069 (ii)**

Report To:

Redstone Engineering
1086 Hayes Line,
Cavan ON L0A 1C0
Attention: Garnet Brenchley

Caduceon Environmental Laboratories
110 West Beaver Creek Rd Unit 14
Richmond Hill ON L4B 1J9
Tel: 289-475-5442
Fax: 289-562-1963

DATE RECEIVED: 28-May-21
DATE REPORTED: 04-Jun-21
SAMPLE MATRIX: Soil/Leachate

JOB/PROJECT NO.: Apsley
P.O. NUMBER: 21R110
WATERWORKS NO.

	Client I.D. Sample I.D. Date Collected		Comp #1 B21-16069-1 26-May-21				O. Reg. 558 Schedule 4	
Parameter	**Units**	**R.L.**						
Poly-Chlorinated Biphenyls (PCB's)	mg/L	0.00005	< 0.00005				0.3	
Aroclor	-		-					
Benzene	mg/L	0.05	< 0.05				0.5	
Carbon Tetrachloride	mg/L	0.05	< 0.05				0.5	
Monochlorobenzene (Chlorobenzene)	mg/L	0.8	< 0.8				8.0	
Chloroform	mg/L	1	< 1				10.0	
Dichlorobenzene,1,2-	mg/L	2	< 2				20.0	
Dichlorobenzene,1,4-	mg/L	0.05	< 0.05				0.5	
Dichloroethane,1,2-	mg/L	0.05	< 0.05				0.5	
Dichloroethylene,1,1-	mg/L	0.1	< 0.1				1.4	
Methyl Ethyl Ketone	mg/L	20	< 20				200.0	
Dichloromethane (Methylene Chloride)	mg/L	0.05	< 0.05				5.0	
Tetrachloroethylene	mg/L	0.3	< 0.3				3.0	
Trichloroethylene	mg/L	0.5	< 0.5				5.0	
Vinyl Chloride	mg/L	0.02	< 0.02				0.2	

O. Reg. 558 - O. Reg. 558
Schedule 4 - Schedule 4 - Leachate Toxic Criteria

Christine Burke
Lab Manager

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

CADUCEON ENVIRONMENTAL LABORATORIES
Client committed. Quality assured.

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G099897 **REPORT No. B21-16069 (ii)**

Report To:

Redstone Engineering
1086 Hayes Line,
Cavan ON L0A 1C0
Attention: Garnet Brenchley

Caduceon Environmental Laboratories
110 West Beaver Creek Rd Unit 14
Richmond Hill ON L4B 1J9
Tel: 289-475-5442
Fax: 289-562-1963

DATE RECEIVED: 28-May-21
DATE REPORTED: 04-Jun-21
SAMPLE MATRIX: Soil/Leachate

JOB/PROJECT NO.: Apsley
P.O. NUMBER: 21R110
WATERWORKS NO.

Summary of Exceedances

O. Reg. 558 - O. Reg. 558
Schedule 4 - Schedule 4 - Leachate Toxic Criteria

Christine Burke
Lab Manager

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

CADUCEON ENVIRONMENTAL LABORATORIES
Client committed. Quality assured.

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G099897 **REPORT No. B21-16073**

Report To:

Redstone Engineering
1086 Hayes Line,
Cavan ON L0A 1C0
Attention: Garnet Brenchley

Caduceon Environmental Laboratories
110 West Beaver Creek Rd Unit 14
Richmond Hill ON L4B 1J9
Tel: 289-475-5442
Fax: 289-562-1963

DATE RECEIVED: 28-May-21
DATE REPORTED: 08-Jun-21
SAMPLE MATRIX: Soil

JOB/PROJECT NO.: Apsley
P.O. NUMBER: 21R110
WATERWORKS NO.

			Client I.D.		Comp #2			
			Sample I.D.		B21-16073-1			
			Date Collected		26-May-21			
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
pH @25°C	pH Units		MOEE3530	01-Jun-21/R	6.98			
Resistivity	ohms·cm		SM 2510B	03-Jun-21/O	3940			
REDOX potential	mV		In-House	02-Jun-21/R	293			
Chloride	µg/g	5	SM4110C	03-Jun-21/O	127			
Sulphate	µg/g	10	SM4110C	03-Jun-21/O	60			
Sulfide	µg/g	0.3	In-House	07-Jun-21	< 0.3 [1]			

1. Subcontracted to Testmark Labs

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Steve Garrett
Director of Laboratory Services