Aggregate Resource Assessment – 537086 Main Street, Horning's Mills, Ontario

February 26, 2024

Prepared for:
Angelo Carnevale

Cambium Reference: 17217-001

CAMBIUM INC.

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1.0 Introduction

Cambium Inc. (Cambium) was retained by Angelo Carnevale (Client) to complete an aggregate assessment of the property located at 537086 Main Street, Horning's Mills, Ontario (Site).

The intent of this aggregate assessment is to address Section 3.17.2(f) outlined in the Official Plan (OP) of the Township of Melancthon (Township of Melancthon, 2014), Section 4.4.2.1b) of the Dufferin County OP (Dufferin County, 2017), and Policies 2.4.2.2 and 2.5.2.5 of the Provincial Policy Statement, 2020 (PPS) (Ministry of Municipal Affairs and Housing, 2020). If known aggregate resources are available on the subject property, there is a need to demonstrate:

a) The resource use would not be feasible; or

b) The proposed land use or development serves a greater long-term public interest; and

c) Issues of public health, public safety and environmental impact are addressed.

This assessment was completed to satisfy the above clauses of the OP's and the PPS by assessing if it is feasible to develop the Site for aggregate extraction and if not feasible, to allow the proposed residential development (including 26 residential lots).

1.1 Site Description

The Site is located at 537086 Main Street in Horning's Mills, Township of Melancthon, Dufferin County and is approximately 10.2 hectares (ha). The Site is bordered by Dufferin County Road 124 to the west, Main Street to the east, and vacant and residentially developed properties to the north and south. As per Schedule B of the OP of the Township of Melancthon, the Site and most of the surrounding property is within a community land use area, the property to the south of the Site is in a light industrial land use area. See Figure 1 for the regional location of the Site.

The Site is currently undeveloped agricultural land. The proposed development consists of 26 separate residential lots, accessed from Main Street by two new roadways. In the southeastern corner of the Site, near a tributary of Pine River, a parkland is currently proposed.

According to Schedule D of the Dufferin County OP and Schedule H of the OP of the Township of Melancthon, the Site is located within a Sand and Gravel Resource Area; therefore, an Aggregate Resource Assessment (ARA) is required (Appendix A).

2.0 Methodology

A total of seven boreholes, designated as BH101-23 to BH107-23, were advanced throughout the Site on May 11th and 12th, 2023 for the geotechnical investigation (Cambium, 2024a), at predetermined locations confirmed with the Client and staked by Cambium during a site visit conducted on May 9th, 2023. The boreholes were terminated at depths ranging from 4.5 m below ground surface (mbgs) to 5.2 mbgs. The purpose of the borehole investigation was to characterize the native soil and subsurface conditions at the Site.

Soil samples were collected at approximately 0.75 m intervals in the upper 3.0 mbgs and at 1.5 m intervals below that depth. Soil samples were logged for soil type, moisture content, odour, and signs of water table presence such as staining or mottling.

The locations of the boreholes are shown on Figure 2, borehole logs are included as Appendix B, and grain size analysis is included as Appendix C.

2.1 Background Information

A thorough review of the available relevant background information was undertaken for this study, which included the following:

- Ontario Geological Survey 2010, Surficial Geology of Southern Ontario, available in digital format at 1:50,000 scale.
- Ontario Geological Survey, 2007. Paleozoic Geology of Southern Ontario, available in digital format at 1:50,000 scale.
- Ontario Geological Survey, 2007, Physiography of Southern Ontario, available in digital format at 1:50,000 scale.
- MECP Water Well Records database, available online and updated up to January 10, 2024.

3.0 Hydrogeological and Geological Context

A review of the Ontario Geology Survey (OGS) Earth mapping (OGS, 2007), the bedrock in the area of the Site consists of rocks from the Amabel Formation deposited in the Middle Silurian. The Amabel Formation is described as thick bedded, crinoidal, locally biohermal dolostone. In the region of the Site, the Amabel is described as buff to blue-grey, often mottled, fine- to coarse- crystalline dolostone which is commonly massive bedded.

It is noted that the contact for the Clinton-Cataract Group is located approximately 290 m northwest of the Site, and the contact for the Queenston Group is located approximately 950 m northwest of the Site, indicating a complex limestone geology in the area.

The Site is located in the physiographic region known as Dundalk Till Plain. Most of the region is characterized by a surficial deposit of silt; however, some of the plain is the work of the Lake Simcoe ice lobe which deposited ice-contact glacial till (Chapman & Putnam, 1984). According to Miscellaneous Release – Data 128 from the Ontario Geological Survey (OGS, 2010) the predominant overburden and soils located in the area of the Site are ice-contact stratified deposits consisting of sand and gravel, minor silt, clay and till.

The borehole investigation provided additional details of the subsurface soils at the Site, as discussed in Section 4.0.

3.1 Surrounding Water Well Records

A review of available MECP water well records within a distance of 500 m of the proposed development Site was undertaken. The following is a summary of the well records. The MECP water well records are provided in Appendix D.

The water well database indicates that 37 water wells are located within a distance of 500 m of the Site (Figure 3). The following is a summary of these well records.

Table 1 Summary of MECP Water Well Record Review

Well Completion Material		Depth of the Wells (mbgs)	Water Found Depths (mbgs)	Static Water Level (mbgs)	Well Yield Testing Rates (L/min)
Overburden Wells: 7	Minimum	4.3	3.1	1.2	9
	Maximum	60.4	59.4	26.2	45
	Geometric Mean	23.5	24.3	7.8	25
Bedrock Wells: 28	Minimum	11.9	11.6	6.1	18
	Maximum	79.2	73.5	24.4	68
	Geometric Mean	37.8	31.9	16.6	35

Of these 37 records, 28 wells are completed in bedrock and 7 were completed in overburden, and 2 did not contain information.

The geometric mean depth of the overburden wells is 23.5 m, ranging between 4.3 and 60.4 mbgs. For overburden wells, the geometric mean depth to groundwater was at 24.3 mbgs, ranging between a depth of 3.1 mbgs to 59.4 mbgs. Static water level or the potentiometric surface for the overburden aquifer has a geometric mean of 7.8 mbgs and varied between 1.2 mbgs to 26.2 mbgs. The geometric mean well yield in the overburden wells is 25 L/min and varied between 9 L/min to 45 L/min; it should be noted that at all but one of the well locations that presented pumping rate information, the recorded test pumping rates were less than 13.7 Lpm, the minimum required for MECP D-5-5 water supply assessment procedures. The material that groundwater was found within for the overburden well records was variable and described as clay, silt, sand, and gravel.

The geometric depth of the bedrock wells is 37.8 m, ranging between 11.9 mbgs and 79.2 mbgs. The groundwater in general was found in the bedrock aquifer at a geometric mean depth of 31.9 mbgs, ranging between 11.6 mbgs and 73.5 mbgs. The geometric mean static water level of the potentiometric surface in bedrock is 16.6 mbgs, ranging between 6.1 mbgs to 24.4 mbgs. The geometric mean well yield rate in the bedrock wells is 35 L/min and varied between 18 L/min to 91 L/min; all of the bedrock wells have pumping rates more than 13.7

L/min, which is the minimum requirement for the MECP D-5-5 assessment procedures. Of the 28 well records completed in bedrock, 15 of the wells were completed within limestone, 11 of the wells were completed in shale, and 2 of the well records were completed in "rock" (i.e. not recorded whether it was shale or limestone).

The water quality encountered in both overburden and bedrock wells was generally described as "fresh"; however, two well records did identify water quality as "mineral". One of the well records (no. 1701877) was from supply well installed in overburden and the other well record (no. 1700973) was from a supply well installed in rock (i.e. not specified whether shale or limestone) and the well driller specifically indicated that high iron concentrations were reported from water from this well. Water quality described as salt or gas were not identified or recorded in any of the MECP water well records examined.

Based off a review of the WWIS water well records, it is anticipated that there is a moderate yield within the bedrock aquifer(s) in the area of the Site, and that the bedrock aquifer(s) should be able to sufficiently meet the water yield demanded by the proposed development (assuming each of the 26 lots has its own water supply well). The feasibility of water supply via on-site private water wells will be confirmed through on-site investigation following MECP D-5-5 procedures, with hydraulic pumping tests of three (to be installed) on-site supply wells.

4.0 Field Investigation Results

4.1 Borehole Results

A total of seven boreholes were drilled throughout the Site to characterize the native soil and subsurface conditions. Subsurface conditions encountered during the borehole investigation at the Site generally consisted of a layer of topsoil containing organics with a thickness ranging between 0.13 m and 0.15 m. In all boreholes the topsoil was underlain by a layer of brown silty sand, predominantly containing organics. The silty sand containing organics extended to a depth of about 0.8 mbgs and contained trace amounts of gravel and clay.

Below the surficial soils, non-cohesive soil deposits inferred to be native were generally encountered to the termination depths of the boreholes. The composition of the non-cohesive deposits ranged significantly from finer-grained non-cohesive soils (sand and silt, silty sand, sand with some silt) to coarser-grained non-cohesive soils (gravel and sand, gravelly sand, to gravelly silty sand). The soils were predominantly brown in colour.

A layer of predominantly cohesive soil was encountered in BH101-23 between depths of 1.5 mbgs and 2.3 mbgs. The soil was classified as a brown silt with some clay and some sand, and a trace amount of gravel.

Bedrock was not confirmed in any of the boreholes advanced by Cambium at the Site. The boreholes were terminated at depths ranging between 4.5 mbgs and 5.2 mbgs, corresponding to elevations between 459.5 metres above sea level (masl) and 475.8 masl. Based off the MECP WWIS records, the overburden – bedrock contact is encountered between 7.0 mbgs and 45.7 mbgs within 500 m of the Site, with a geometric mean of 24.7 mbgs.

The results of the borehole investigation are summarized in Table 2, below, and borehole logs are included as Appendix B.

Table 2 Summary of Borehole Investigation

Borehole	Borehole Termination Depth (mbgs)	Depth Water Encountered (mbgs)	Coarse-Grained Soil Description at Depth
BH101-23	5.2	--	Gravel and sand, trace silt; brown; non-cohesive, moist, very dense
BH102-23	5.0	--	Silty gravel and sand, trace clay, trace organic matter; brown; non-cohesive, moist, very dense
BH103-23	4.7	--	Gravelly sand, some silt; brown; non-cohesive, moist to dry, very dense
BH104-23	5.0	4.6	Gravelly silty sand, trace clay; brown; non-cohesive, wet, very dense
BH105-23	4.5	--	Gravelly silty sand; brown; non-cohesive, moist to dry, very dense
BH106-23	4.5	--	Gravel and sand, trace silt; brown; non-cohesive, moist to dry, dense
BH107-23	5.1	--	Sand, some gravel, some silt; brown; non-cohesive, moist to dry, very dense

Grain size analyses were completed on seven soil samples. The results are summarized in Table 3. The locations of the boreholes are shown on Figure 2, borehole logs are included as Appendix B, and grain size analyses are included as Appendix C.

Table 3 Summary of Grain Size Analysis

Borehole	Depth (mbgs)	Primary Soil Description	USDS Classification	Complies with Granular A or B Specifications	Percent Silt and Clay (%)
BH101-23 SS3	1.5 – 2.1	Silt some Clay trace Gravel	ML	No	88
BH102-23 SS2	0.8 – 1.4	Gravelly Silty Sand trace Clay	SM	No	27
BH102-23 SS4	2.3 – 2.9	Silty Gravel and Sand trace Clay	SM	No	28
BH103-23 SS3	1.5 – 2.1	Sand and Silt trace Gravel trace Clay	SM	No	47
BH105-23 SS2	0.8 – 1.4	Sand and Gravel some Silt trace Clay	SM	No	21

Borehole	Depth (mbgs)	Primary Soil Description	USDS Classification	Complies with Granular A or B Specifications	Percent Silt and Clay (%)
BH106-23 SS2	0.8 – 1.4	Sand and Silt trace Clay trace Gravel	SM	No	48
BH107-23 SS2	0.8 – 1.4	Silty Sand trace Gravel trace Clay	SM	No	25

5.0 Aggregate Assessment

The depth of overburden at the Site is considered to be greater than 5.2 mbgs as bedrock was not encountered at this maximum borehole termination depth for the soils investigation. As per the MECP WWIS, the overburden – bedrock contact is encountered between 7.0 mbgs and 45.7 mbgs within 500 m of the Site, with a geometric mean of 24.7 mbgs. As such, the depth of the overburden in the area is highly variable. In general, bedrock is encountered relatively deep in the area and would not be feasible for quarry operations.

The overburden consistency was generally found to be varying mixes of gravelly, silty sand. Clean coarse-grained deposits (i.e. gravel and medium to coarse sand) require less than 5% fine-grained materials (silts or clays; fine sands) to be acceptable for use in many aggregate applications by the Ministry of Transport (MTO). As such, materials with more than 5% fine-grained materials are deemed unsuitable for extraction for aggregate operations. The grain-size analysis indicates that all of the seven samples were composed of more than 21% silt and clay, with the content of fine-grained particles ranging between 21% to 88%. The borehole logs specify that all seven boreholes have at least some fine-grained particles (greater than 10% fines) within each borehole location. These results indicate that the silt and clay content is consistently greater than 5% across the Site and therefore the soil materials are not suitable for aggregate use or applications.

It should be noted that the nearest aggregate extraction operations are approximately 900 m northwest of the Site and includes the St Marys Kasaks sand and gravel aggregate pit, and sand and gravel aggregate pits as part of the Strada Aggregates operation are located 1.5 km west of the Site. It is noted that, based off regional topographic mapping, these aggregate pit operations are located at greater elevation (10 m to 40 m) than the average topography of the Site (ranges from 482 masl along the western property line and a minimum elevation around 458 masl at the eastern property line). Typically, feasible aggregate pits are located along the peak of topographic ridges due to coarse-grained soils deposited via glacial progression/regression. The greatest topographic elevation generally contains the coarsest-grained and greatest amount of the aggregate.

There is a mapped floodplain and proposed drainage setbacks surrounding the floodplain at the Site which may limit any aggregate extraction operations (Appendix A). Furthermore, there are existing wetland complexes and/or tributaries of Pine River on and adjacent to the property which would reduce the area available for possible aggregate extraction operations (assuming that the aggregate quality was acceptable).

Groundwater was encountered at 4.3 mbgs to 4.5 mbgs at BH104-23 during the hydrogeological investigation (Cambium, 2024b). Additionally, as per the MECP WWIS, static water levels within supply wells in the area can be as shallow as 1.2 mbgs. These groundwater levels indicate that below water extraction may be required for any aggregate extraction. Additional assessments would be required to determine if impacts may result from below water extraction operations at the Site on the surrounding wetland areas and neighbouring wells.

Based on the poor quality of the overburden deposits for aggregate materials, the variable depth of overburden deposits in the area, and the presence of the on-site and adjacent wetland systems, the development of the Site as an aggregate extraction operation is deemed to not be feasible.

It has been determined that the property is not feasible for aggregate extraction based on Section 3.17.2(f) outlined in the Official Plan (OP) of the Township of Melancthon (Township of Melancthon, 2014), Section 4.4.2.1b) of the Dufferin County OP (Dufferin County, 2017), and Policies 2.4.2.2 and 2.5.2.5 of the Provincial Policy Statement, 2020 (PPS) (Ministry of Municipal Affairs and Housing, 2020), as such, the proposed residential development would be deemed an acceptable use of the land.

6.0 Closing

Cambium was retained to complete an Aggregate Resource Assessment of the property located at 537086 Main Street, Horning's Mills, Ontario. The results of the assessment indicate that the Site is not feasible for development as an extractive aggregate operation; therefore, the proposed residential development would be deemed an acceptable use of the land.

Cambium trusts that this report meets with your expectations. If you have any questions or require clarification of any aspect of this submission, please do not hesitate to contact the undersigned.

Respectfully submitted,

Cambium Inc.

DocuSigned by:
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Project Coordinator

DS

DocuSigned by:
677F3F2E4427404...

Kevin Warner, M.Sc., P.Geo. (Ltd.)
Group Manager – Water & Wastewater

2024-02-26

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7.0 References

Cambium. (2024a). *Geotechnical Investigation Report - 537086 Main Street, Horning's Mills, Ontario.* Cambium.

Cambium. (2024b). *Preliminary Hydrogeological Assessment - 537086 Main Street, Horning's Mills, Ontario.* Cambium Inc.

Chapman, L., & Putnam, D. (1984). *The Physiography of Southern Ontario.* Toronto, Ontario: Ontario Geological Survey Special.

Dufferin County. (2017). *Dufferin County Official Plan.*

Ministry of Municipal Affairs and Housing. (2020). Provincial Policy Statement. Ontario.

OGS. (2007). *Paleozoic Geology of Southern Ontario; Miscellaneous Release - Data 219.* Ontario Geological Survey.

OGS. (2010). *Surficial geology of Southern Ontario; Miscellaneous Release - Data 128 - Revised.* Ontario Geological Survey.

Township of Melancthon. (2014). *Official Plan of the Township of Melancthon.*

8.0 Standard Limitations

Limited Warranty

In performing work on behalf of a client, Cambium relies on its client to provide instructions on the scope of its retainer and, on that basis, Cambium determines the precise nature of the work to be performed. Cambium undertakes all work in accordance with applicable accepted industry practices and standards. Unless required under local laws, other than as expressly stated herein, no other warranties or conditions, either expressed or implied, are made regarding the services, work or reports provided.

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Site Assessments

A site assessment is created using data and information collected during the investigation of a site and based on conditions encountered at the time and particular locations at which fieldwork is conducted. The information, sample results and data collected represent the conditions only at the specific times at which and at those specific locations from which the information, samples and data were obtained and the information, sample results and data may vary at other locations and times. To the extent that Cambium's work or report considers any locations or times other than those from which information, sample results and data was specifically received, the work or report is based on a reasonable extrapolation from such information, sample results and data but the actual conditions encountered may vary from those extrapolations.

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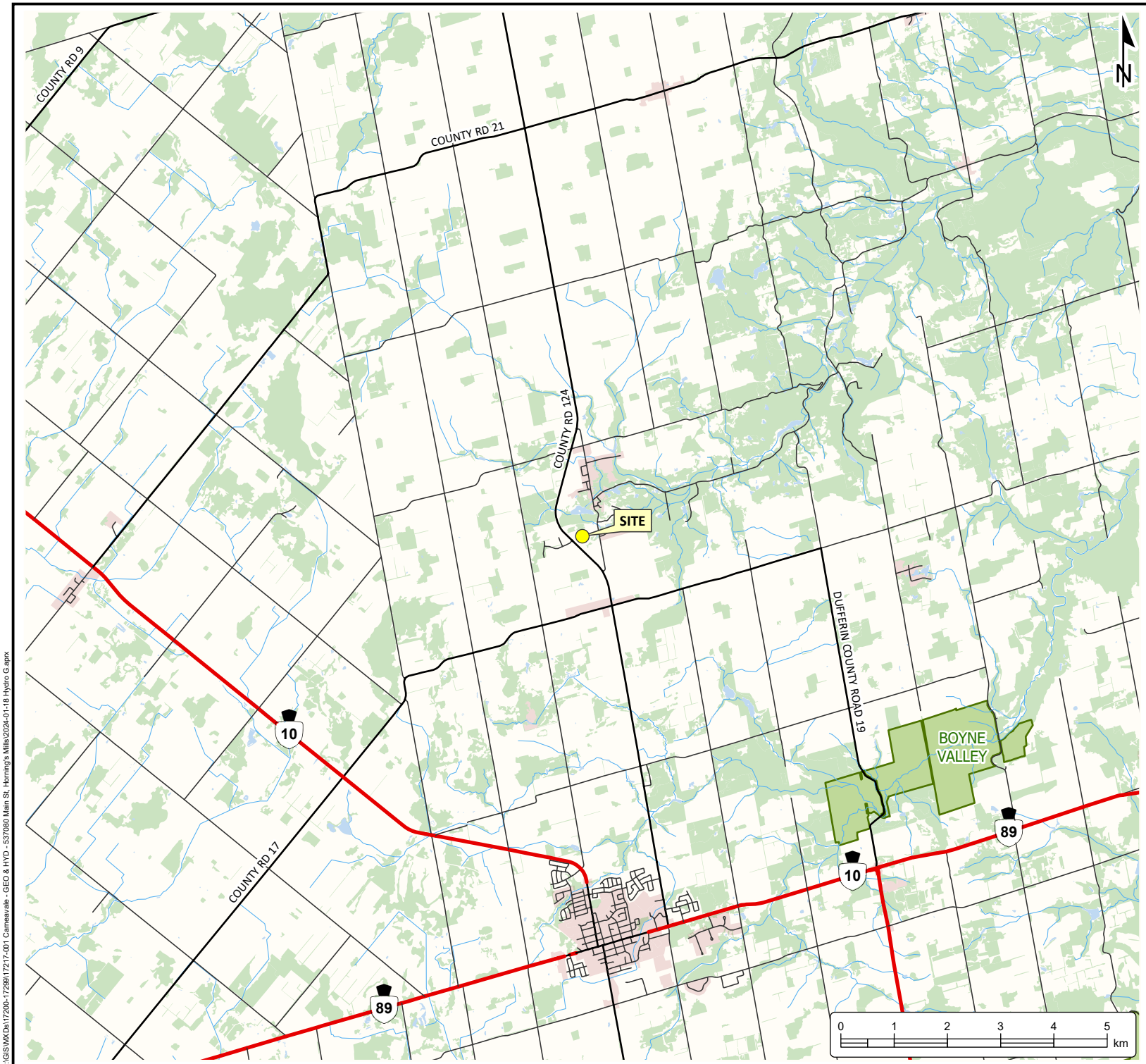
The client expressly agrees that Cambium employees shall have no personal liability to the client with respect to a claim, whether in contract, tort and/or other cause of action in law. Furthermore, the client agrees that it will bring no proceedings nor take any action in any court of law against Cambium employees in their personal capacity.

Appended Figures



AGGREGATE RESOURCE ASSESSMENT

ANGELO CARNEVALE
537086 Main Street Horning's Mills, Ontario

LEGEND

- Highway
- Major Road
- Minor Road
- Railway
- Watercourse
- Water Area
- First Nations Reserve
- Provincial Park
- Wooded Area
- Built Up Area

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SITE LOCATION PLAN

Project No.: 17217-001		Date: January 2024	Rev.:
Scale: 1:100,000		Projection: NAD 1983 UTM Zone 17N	
Created by: DBB	Checked by: SK	Figure: 1	

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AGGREGATE RESOURCE ASSESSMENT

ANGELO CARNEVALE
537086 Main Street Horning's Mills, Ontario

LEGEND

- Borehole
- Monitoring Well
- Inferred Top of Bank (Cambium, May 2023)
- Site (approximate)

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SITE PLAN

Project No.: 17217-001		Date: January 2024 Rev.:	
Scale: 1:3,000		Projection: NAD 1983 UTM Zone 17N	
Created by: DBB	Checked by: SK	Figure: **2**	

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AGGREGATE RESOURCE ASSESSMENT

ANGELO CARNEVALE
537086 Main Street Horning's Mills, Ontario

LEGEND

- Water Well Record
- Study Area (500m)
- Site (approximate)

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MECP WELL RECORDS WITHIN 500m

Project No.: 17217-001		Date: January 2024	Rev.:
Scale: 1:8,250		Projection: NAD 1983 UTM Zone 17N	
Created by: DBB	Checked by: SK	Figure: 3	

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Appendix A

Proposed Development Plan and Land Information

DRAFT PLAN OF SUBDIVISION
DPS --/--
<NAME>

LEGAL DESCRIPTION

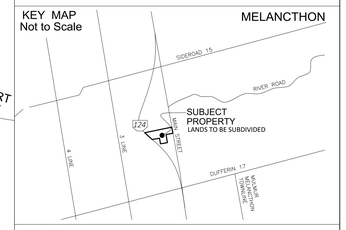
PART OF LOT 13
CONCESSION 2
OLD SURVEY
TOWNSHIP OF MELANCTHON
COUNTY OF DUFFERIN

SCALE 1 : 750

0 5 10 20 30 40 50 metres

VAN HARTEN SURVEYING INC.

KEY MAP
Not to Scale



SCHEDULE: RE: SECTION 51 - THE PLANNING ACT.

(a) AS SHOWN
(b) AS SHOWN
(c) AS SHOWN
(d) SINGLE DETACHED RESIDENTIAL WITH PARKLAND
(e) AS SHOWN
(f) AS SHOWN
(g) AS SHOWN
(h) DRILLED WELL (PROPOSED)
(i) SAND AND LOAM
(j) AS SHOWN
(k) NO MUNICIPAL SERVICES AVAILABLE
(l) SUBJECT TO EASEMENT AS IN INSTRUMENT No. MEL18578

LAND USE SCHEDULE

LAND USE	LOTS / BLOCKS	AREA (Ha)	Area (ac)	UNITS
SINGLE DETACHED RESIDENTIAL	LOTS 1 - 26	7.43	18.36	26
STORM WATER MANAGEMENT POND	BLOCK 1	0.56	1.39	
FUTURE PARK LOT	BLOCK 2	0.79	1.95	
EMERGENCY ACCESS	BLOCK 3	0.03	0.07	
0.3 RESERVE	BLOCKS 4 - 6	0.01	0.02	
STREET A		0.99	2.45	
STREE B		0.36	0.89	
TOTAL		10.17	25.13	

PROPERTY DESCRIPTION

ALL OF PIN 34139-0103
PART OF LOT 13
CONCESSION 2
OLD SURVEY
TOWNSHIP OF MELANCTHON
COUNTY OF DUFFERIN
SUBJECT TO EASEMENT AS IN INSTRUMENT No. MEL18578

SURVEYOR'S CERTIFICATE

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

DATE: _____

LUKE G. WILCOX, O.L.S.

OWNER'S CERTIFICATE

I AUTHORIZE VAN HARTEN SURVEYING INC. TO PREPARE AND SUBMIT THIS DRAFT PLAN OF SUBDIVISION TO THE TOWN OF MELANCTHON.

OWNER: ANGELO CARNEVALE JR.

DATE: _____

<NAME>
I HAVE THE AUTHORITY TO BIND THE CORPORATION

Van Harten
LAND SURVEYORS - ENGINEERS

Kitchener/Waterloo Ph: 519-742-8371 | Guelph Ph: 519-821-2763 | Orangeville Ph: 519-940-4110

www.vanharten.com info@vanharten.com

DRAWN BY: FCF | CHECKED BY: LGW | PROJECT No. 32159-23-OP

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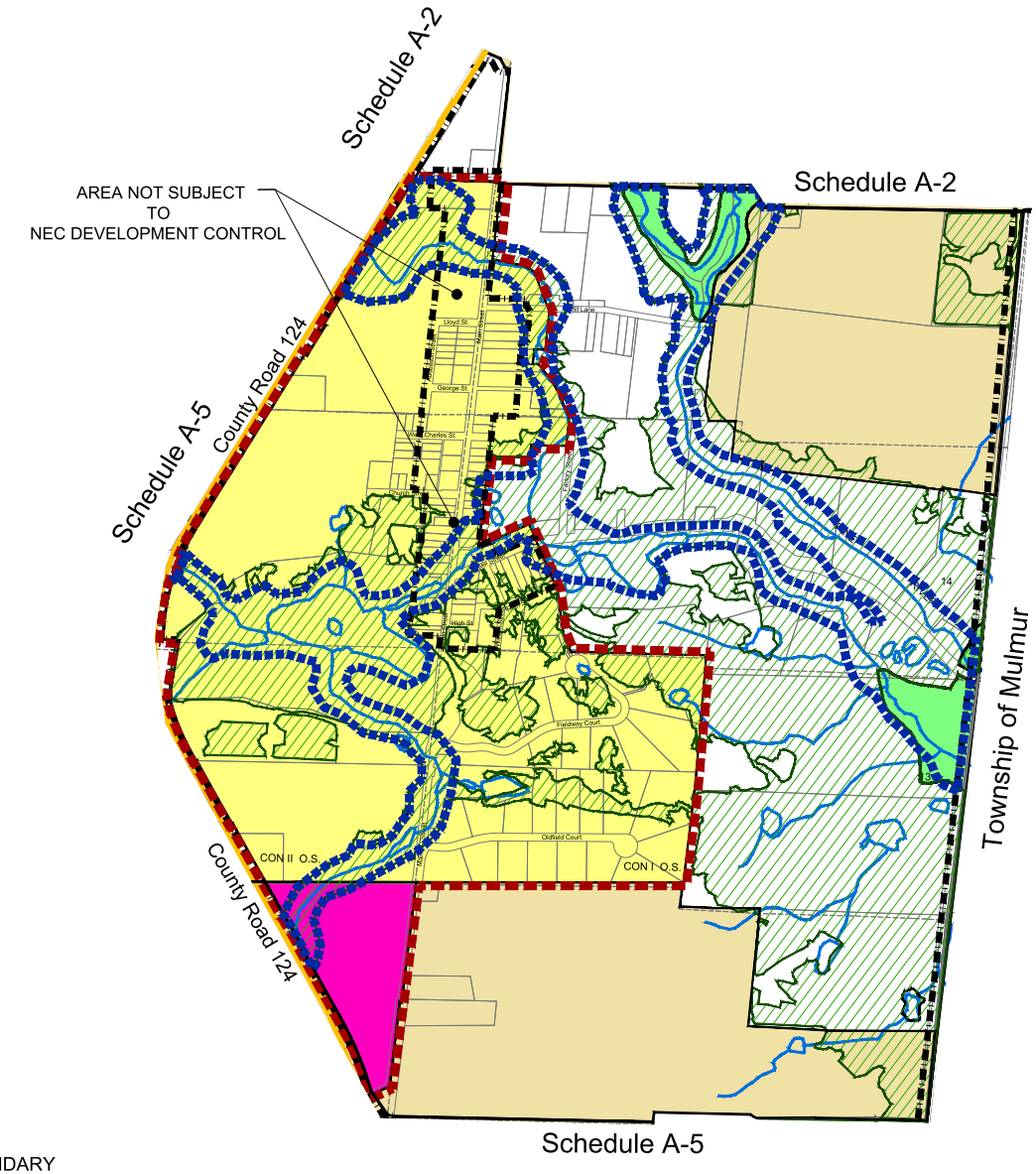
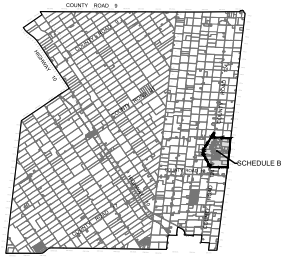




SCHEDULE B
LAND USE & ROADS PLAN

OFFICIAL PLAN
FOR
TOWNSHIP OF MELANCTHON
(Horning's Mills)

125 0 125 250 375 500 625
SCALE = 1:12,500

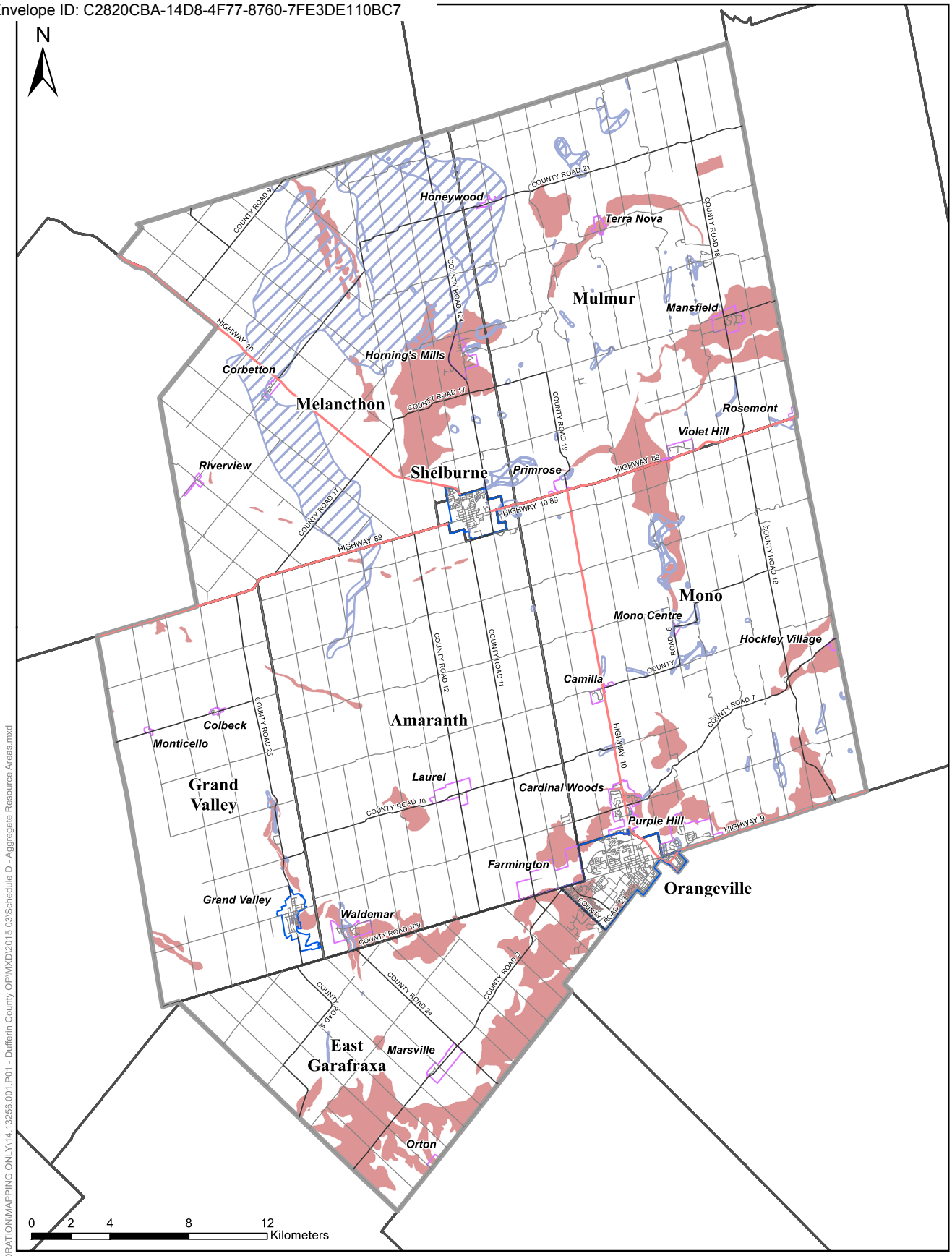
- AGRICULTURAL
- RURAL
- ENVIRONMENTAL PROTECTION
- ENVIRONMENTAL CONSERVATION
  (Also see Section 5.5.3 (g))
- COMMUNITY
- LIGHT INDUSTRIAL
- NIAGARA ESCARPMENT DEVELOPMENT CONTROL AREA
- PROVINCIAL HIGHWAY
- ARTERIAL ROAD
- LOCAL ROAD
- EXISTING MINERAL AGGREGATE HAUL ROUTE
- RAIL LINE RIGHT-OF-WAY

This schedule must be read in conjunction with the Official Plan's policies and Schedules D to H.

- FLOODPLAIN BOUNDARY
  (See Sections 3.5 & 5.5.3)
- SETTLEMENT AREA BOUNDARY

OCTOBER, 2017

TOWNSHIP OF MELANCTHON



Legend

- Urban Settlement Area
- Community Settlement Area
- Provincial Highway
- County Road
- Other Road
- Dufferin County Boundary
- Municipal Boundaries

Mineral Aggregate Resources (S. 4.4)

- Sand and Gravel Resource Area
- Bedrock Resource Area

DUFFERIN COUNTY
OFFICIAL PLAN

Schedule D
Mineral Aggregate Resource Areas

MMM GROUP
Date: March 2015

Sources: LIO (2012), MTO (2012), Dufferin County, Aggregate Resources Inventory of Dufferin County, Paper 163-Revision 2 (2014)

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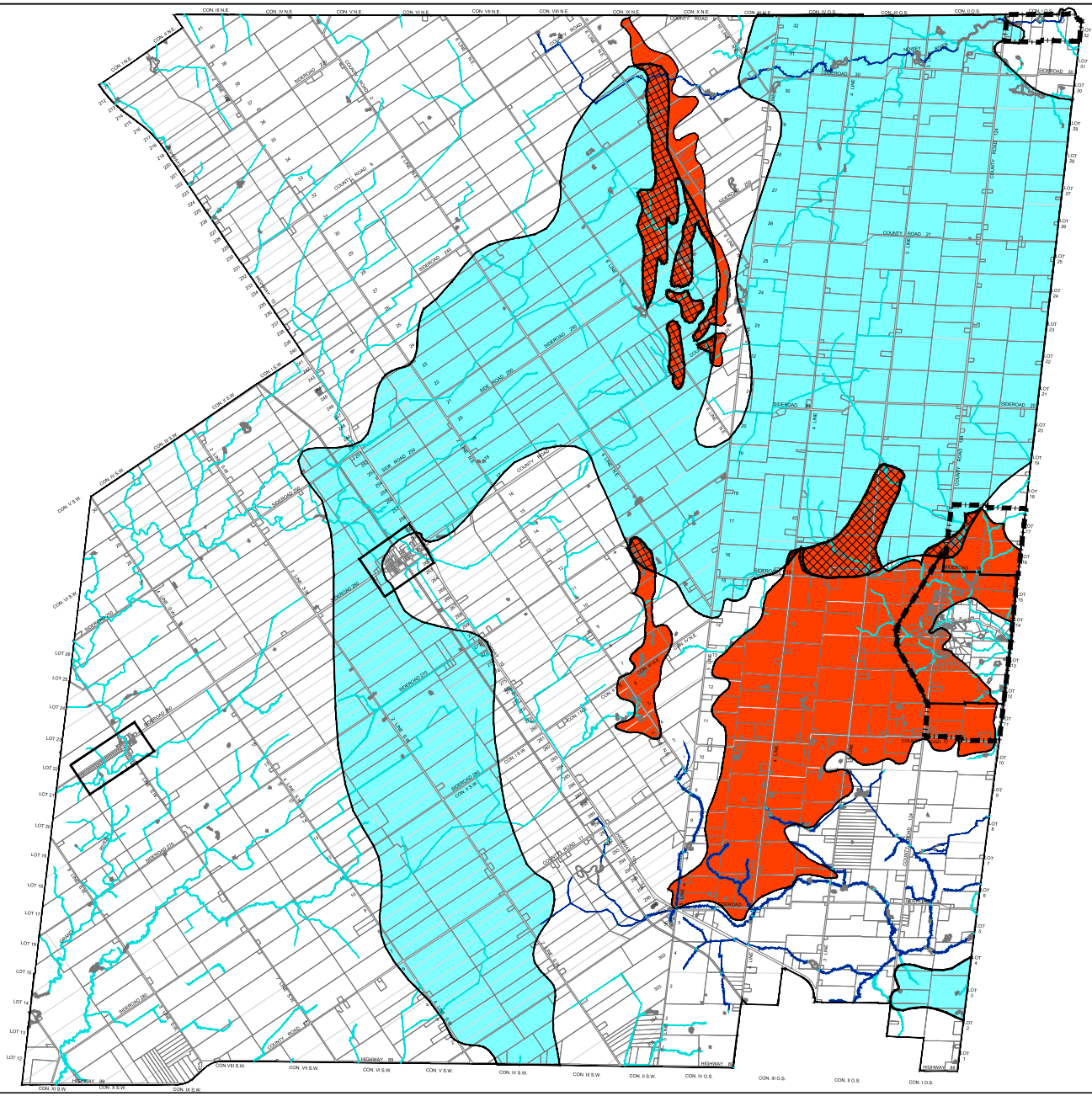


SCHEDULE H
PRIMARY MINERAL AGGREGATE RESOURCE AREAS

OFFICIAL PLAN
FOR
TOWNSHIP OF MELANCTHON

75 0 75 150 225 300 375
SCALE = 1:75,000

SAND & GRAVEL RESOURCE AREA

BEDROCK RESOURCE AREA
- WITHIN 8m OF SURFACE

AREA OF BOTH PRIMARY SAND & GRAVEL AND PRIMARY BEDROCK

See Section 3.17.

NIAGARA ESCARPMENT DEVELOPMENT CONTROL AREA

N

OCTOBER, 2017

TOWNSHIP OF MELANCTHON

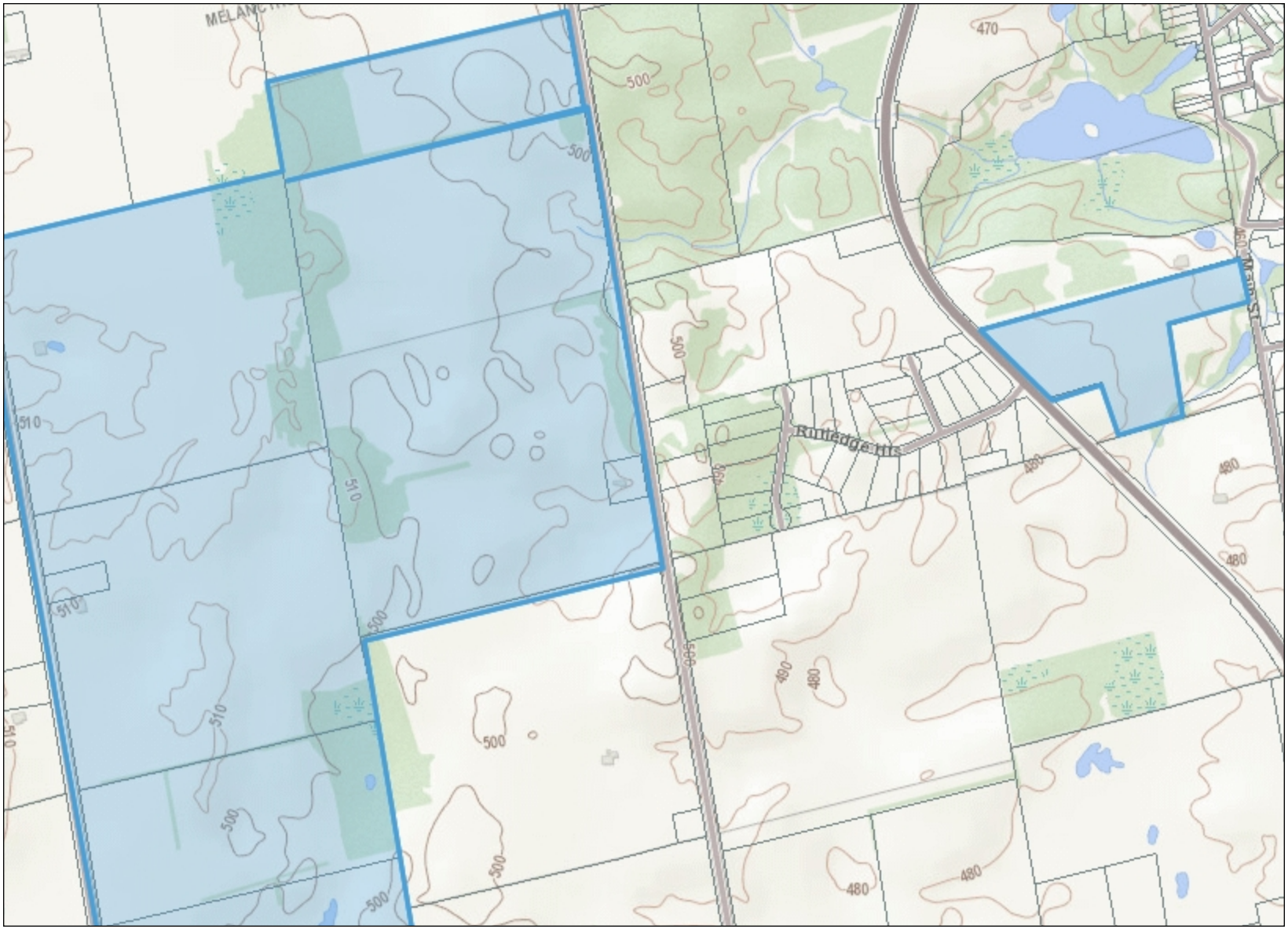
Ontario

MINISTRY OF NATURAL RESOURCES AND FORESTRY

Make a Topographic Map

Regional Topography Map

Notes:



Legend

- Building as Symbol
- Building to Scale
- Airport
- Heliport \ Hospital Heliport
- Seaplane Base
- Ferry Route
- Trail
- Bruce Trail
- Greenbelt Route
- Rideau Trail
- Trans Canada Trail
- Voyageur Trail
- Waterfront Trail
- Railway \ Train Station
- Railway with Bridge
- Railway with Tunnel
- Road (Major → Minor)
- Winter Road
- Road with Bridge
- Road with Tunnel
- Primary, Kings or 400 Series Highway
- Secondary Highway
- Tertiary Highway
- District, County, Regional or Municipal Road
- Toll Highway
- One Way Road
- Road with Permanent Blocked Passage
- Road with Address Ranges
- Hydro Line, Communication Line or Unknown Transmission Line
- Natural Gas Pipeline, Water Pipeline or Unknown Pipeline
- Spot Height
- Index Contour
- Contour
- Wooded Area
- Wetland
- Waterbody
- Waterbody Elevation
- Watercourse
- Falls
- Rapids
- Rapids \ Falls
- Rapids
- Rocks
- Lock Gate
- Dam \ Hydro Wall
- Dam \ Hydro Wall
- Provincial \ State Boundary
- International Boundary
- Upper Tier \ District Municipal Boundary
- Lower Tier \ Single Tier Municipal Boundary
- Lot Line
- Indian Reserve
- Provincial Park
- National Park
- Conservation Reserve
- Military Lands

0 0.7 km

Projection: Web Mercator

The Ontario Ministry of Natural Resources and Forestry shall not be liable in any way for the use of, or reliance upon, this map or any information on this map. This map should not be used for: navigation, a plan of survey, routes, nor locations. THIS IS NOT A PLAN OF SURVEY.

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Appendix B
Borehole Logs

CAMBIUM

Client: Angelo Carnevale
Contractor: Walker Drilling
Project No.: 17217-001
Location: 537090 Main Street

Project Name: 537090 Main Street, Horning's Mills, ON
Method: Track Mounted Hollow Stem Auger
Elevation: 480.25 mASL
UTM: 17 T **N:** 4888586 **E:** 563201

Log of Borehole: BH101-23
Page: 1 of 1
Date Completed: May 11, 2023

Elevation (m)	Depth	Lithology	Description	Elevation / Depth	Number	Type	% Recovery	SPT (N)	Atterberg Limits (%) LL PL PI — 25 50 75 / % Moisture 25 50 75	Shear Strength Cu, kPa (nat V. rem V.) — 20 40 60 80 / SPT (N) 20 40 60 80	Well Installation	Log Notes
480.2	0		**TOPSOIL:** (~125mm thick)	480.12	1A	SS			18.6%		Cap	Monitoring well dry when measured on June 6, 2023.
			(SM) SILTY SAND: trace clay, trace gravel, trace organic matter; brown; non-cohesive, moist, loose	0.13 / 479.49	1B	SS	30	5	18.0%	5	Bentonite Plug	
479.8	0.5											
479.2	1		**(SW) SAND:** some silt, trace gravel; brown; non-cohesive, moist, compact	0.76 / 478.73	2	SS	60	13	9.7%	13	Riser	
478.8	1.5		**(ML) SILT:** some clay, some sand, trace gravel; brown; cohesive, moist, hard	1.52 / 477.96	3	SS	60	36	22.3%	36		
478.2	2											
477.8	2.5		**(GW) GRAVEL:** AND SAND: trace silt; brown; non-cohesive, moist, very dense	2.29 / 475.68	4	SS	70	64	3.4%	64	Sand Pack	
477.2	3				5	SS	40	72	3.8%	72	PVC Screen	
476.8	3.5											
476.2	4											
475.8	4.5		**(SM) SILTY SAND:** some gravel; brown; non-cohesive, dry, compact	4.57 / 475.07	6	SS	70	20	3.5%	20	Cap	
475.2	5											
474.8	5.5		Borehole terminated @ 5.2 mbgs due to target depth achieved.	5.18								
474.2	6											
473.8	6.5											
473.2	7											
472.8												

GRAINSIZE DISTRIBUTION

SAMPLE	GRAVEL	SAND	SILT	CLAY
3	1	11	74	14

1m = 24 units

Logged By: WA **Input By:** WA

Peterborough, Barrie, Oshawa, Kingston, Ottawa

CAMBIUM

Client: Angelo Carnevale
Contractor: Walker Drilling
Project No.: 17217-001
Location: 537090 Main Street

Project Name: 537090 Main Street, Horning's Mills, ON
Method: Track Mounted Solid Stem Auger
Elevation: 478.2 mASL
UTM: 17 T **N:** 4888617 **E:** 563305

Log of Borehole: BH102-23
Page: 1 of 1
Date Completed: May 11, 2023

Elevation (m)	Depth	Description	Elevation / Depth	Number	Type	% Recovery	SPT (N)	Atterberg Limits (%) LL PL PI / % Moisture (25 50 75)	Shear Strength Cu, kPa (nat V. rem V.) / SPT (N) (20 40 60 80)	Well Installation	Log Notes
478.2	0	**TOPSOIL:** (~150mm thick)	478.05	1A	SS			24.0%			
		(SM) SILTY SAND: trace clay, trace gravel; brown; non-cohesive, moist, compact	0.15	1B	SS	60	12	10.6%	12		
477.7	0.5		477.44								
		(SW) SAND: some silt, some gravel; brown; non-cohesive, moist, very dense	0.76	2	SS	70	56	5.4%	56		
477.2	1		476.68								
476.7	1.5	**(GW) GRAVEL:** Silty GRAVEL and SAND, trace clay; trace organic matter; brown; non-cohesive, moist, very dense	1.52	3	SS	70	57	5.8%	57		
476.2	2										
475.7	2.5	- less to no organic matter		4	SS	70	71	4.4%	71		
475.2	3										
				5	SS	70	100	5.2%	100		
474.7	3.5										
474.2	4										
473.7	4.5		473.63								
		(SM) SILTY SAND: some gravel; brown; non-cohesive, moist to dry, very dense	4.57	6	SS	70	71	4.0%	71		
473.2	5		473.17								Borehole was open and dry upon completion of drilling
		Borehole terminated @ 5 mbgs due to target depth achieved.	5.03								
472.7	5.5										
472.2	6										
471.7	6.5										
471.2	7										
470.7											

1m = 24 units

GRAINSIZE DISTRIBUTION

SAMPLE	GRAVEL	SAND	SILT	CLAY
4	36	36	21	7

Logged By: WA **Input By:** WA

Peterborough, Barrie, Oshawa, Kingston, Ottawa

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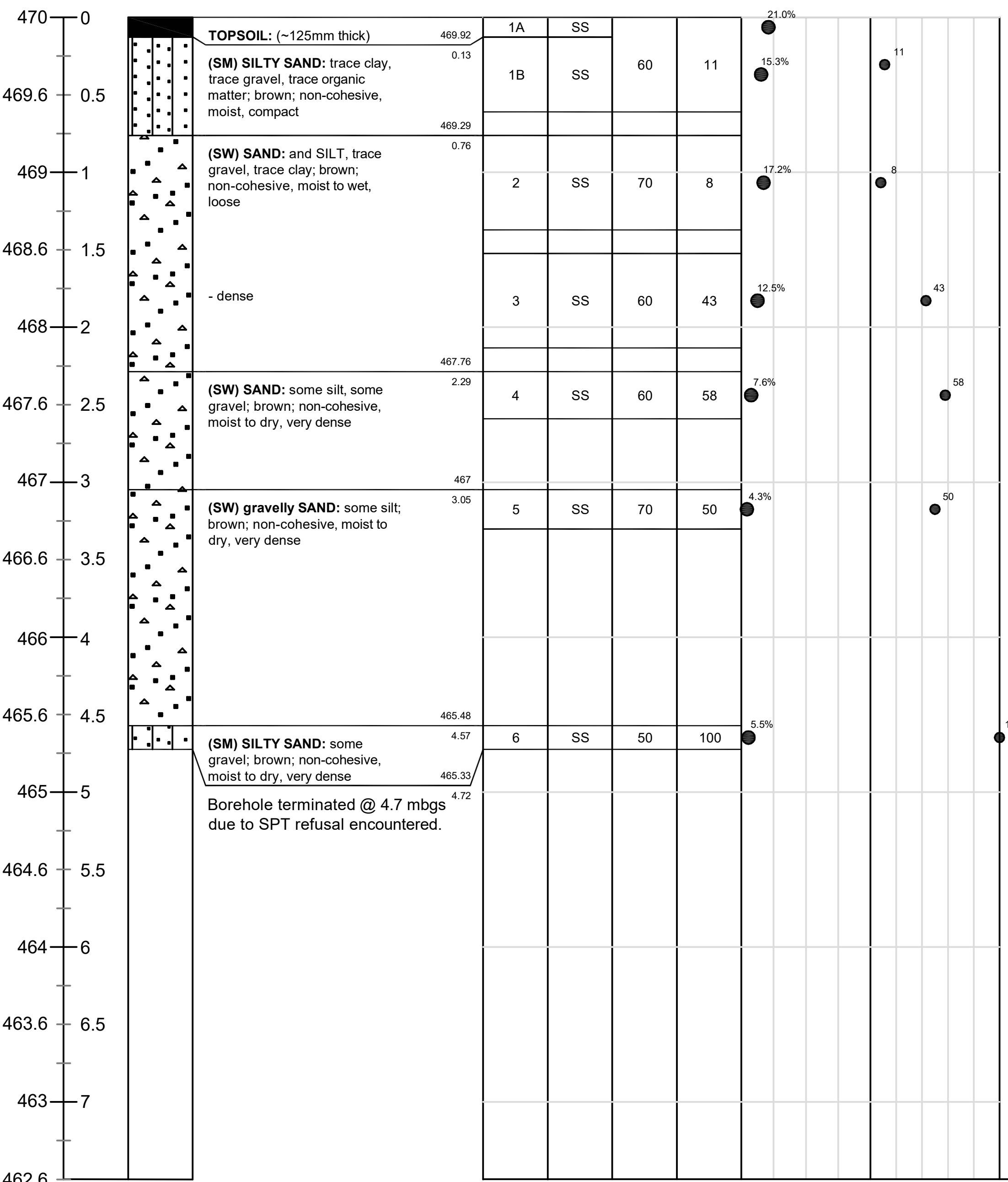
CAMBIUM

Client: Angelo Carnevale
Contractor: Walker Drilling
Project No.: 17217-001
Location: 537090 Main Street

Project Name: 537090 Main Street, Horning's Mills, ON
Method: Track Mounted Solid Stem Auger
Elevation: 470.05 mASL
UTM: 17 T **N:** 4888687 **E:** 563505

Log of Borehole: BH103-23
Page: 1 of 1
Date Completed: May 11, 2023



Elevation (m)	Depth (m)	Description	Elevation / Depth	Number	Type	% Recovery	SPT (N)	% Moisture	Log Notes
470.05	0	**TOPSOIL:** (~125mm thick)	469.92 / 0.13	1A	SS			21.0%	
		(SM) SILTY SAND: trace clay, trace gravel, trace organic matter; brown; non-cohesive, moist, compact	469.29 / 0.76	1B	SS	60	11	15.3%	
		(SW) SAND: and SILT, trace gravel, trace clay; brown; non-cohesive, moist to wet, loose		2	SS	70	8	17.2%	
		- dense	467.76 / 2.29	3	SS	60	43	12.5%	
		(SW) SAND: some silt, some gravel; brown; non-cohesive, moist to dry, very dense	467 / 3.05	4	SS	60	58	7.6%	
		(SW) gravelly SAND: some silt; brown; non-cohesive, moist to dry, very dense	465.48 / 4.57	5	SS	70	50	4.3%	
		(SM) SILTY SAND: some gravel; brown; non-cohesive, moist to very dense	465.33 / 4.72	6	SS	50	100	5.5%	Borehole was open and dry upon completion of drilling. Spoon bouncing at depth of 4.7mbgs

Borehole terminated @ 4.7 mbgs due to SPT refusal encountered.

GRAINSIZE DISTRIBUTION	SAMPLE	GRAVEL	SAND	SILT	CLAY
	3	9	44	40	7

1m = 24 units

Logged By: WA **Input By:** WA

Peterborough, Barrie, Oshawa, Kingston, Ottawa

CAMBIUM

Client: Angelo Carnevale
Contractor: Walker Drilling
Project No.: 17217-001
Location: 537090 Main Street

Project Name: 537090 Main Street, Horning's Mills, ON
Method: Track Mounted Solid Stem Auger
Elevation: 464.45 mASL
UTM: 17 T **N:** 4888732 **E:** 563621

Log of Borehole: BH104-23
Page: 1 of 1
Date Completed: May 11, 2023

Elevation (m)	Depth	Description	Number	Type	% Recovery	SPT (N)	Atterberg Limits (%) / % Moisture	Shear Strength Cu, kPa / SPT (N)	Well Installation	Log Notes
464.4	0	**TOPSOIL:** (~125mm thick) 464.32	1A	SS			23.3%		Cap	Water level measured within monitoring well at a depth of 4.3 mbgs (460.15 mASL) on June 6, 2023.
464	0.5	**(SM) SILTY SAND:** trace clay, trace organic matter; brown; non-cohesive, moist, compact 0.13 / 463.69	1B	SS	50	18	8.4%	18	Bentonite Plug	
463.4	1	**(SW) SAND:** some silt, trace gravel; brown; non-cohesive, moist, compact 0.76	2	SS	60	11	4.7%	11	Riser	
463	1.5	- some gravel; very dense	3	SS	70	61	8.9%	61		
462.4	2									
462	2.5		4	SS	50	50	7.1%	50	Sand Pack	
461.4	3									
461	3.5	- trace gravel	5	SS	60	53	8.0%	53	PVC Screen	
460.4	4									
460	4.5	459.88							Cap	
459.4	5	**(SM) gravelly SILTY SAND:** trace clay; brown; non-cohesive, wet, very dense 4.57 / 459.5	6	SS	70	100	10.3%	100		
459	5.5	Borehole terminated @ 5 mbgs due to target depth achieved. 4.95								
458.4	6									
458	6.5									
457.4	7									
457										

GRAINSIZE DISTRIBUTION: SAMPLE | GRAVEL | SAND | SILT | CLAY

1m = 24 units

Logged By: WA **Input By:** WA

Peterborough, Barrie, Oshawa, Kingston, Ottawa

Client: Angelo Carnevale
Contractor: Walker Drilling
Project No.: 17217-001
Location: 537090 Main Street

Project Name: 537090 Main Street, Horning's Mills, ON
Method: Track Mounted Solid Stem Auger
Elevation: 472.6 mASL
UTM: 17 T **N:** 4888533 **E:** 563517

Log of Borehole: BH105-23
Page: 1 of 1
Date Completed: May 12, 2023

Elevation (m)	Depth	Description	Number	Type	% Recovery	SPT (N)	Atterberg Limits (%) / % Moisture	Shear Strength Cu, kPa / SPT (N)	Well Installation	Log Notes
472.6	0	**TOPSOIL:** (~150mm thick) 472.45	1A	SS			22.2%			
472.1	0.5	**(SM) SILTY SAND:** trace clay, trace organic matter; brown; non-cohesive, moist, loose 0.15	1B	SS	60	8	21.1%	8		
		471.84								
471.6	1	**(SW) SAND:** and GRAVEL: some silt, trace clay; brown; non-cohesive, moist, compact 0.76	2	SS	70	25	6.2%	25		
471.1	1.5	- very dense	3	SS	60	100	5.6%	100		
470.6	2									
470.1	2.5	- moist to dry	4	SS	40	61	7.2%	61		Auger shaking at depth of 2.3mbgs to depth of 3.0mbgs
469.6	3	469.55								
469.1	3.5	**(SM) gravelly SILTY SAND:** brown; non-cohesive, moist to dry, very dense 3.05	5	SS	50	55	5.7%	55		Spoon bouncing
468.6	4									
468.1	4.5	468.1	6	SS	20	50	4.7%	50		Spoon bouncing
		Borehole terminated @ 4.5 mbgs due to SPT refusal encountered. 4.5								Borehole caved to depth of 3.6mbgs and was dry upon completion of drilling
467.6	5									
467.1	5.5									
466.6	6									
466.1	6.5									
465.6	7									
465.1										

Atterberg Limits (%): LL, PL, PI — 25 50 75
% Moisture: 25 50 75
Shear Strength Cu, kPa: nat V., rem V. — 20 40 60 80
SPT (N): 20 40 60 80

GRAINSIZE DISTRIBUTION

SAMPLE	GRAVEL	SAND	SILT	CLAY
2	35	44	18	3

1m = 24 units

Logged By: WA **Input By:** WA

Peterborough, Barrie, Oshawa, Kingston, Ottawa

CAMBIUM

Client: Angelo Carnevale
Contractor: Walker Drilling
Project No.: 17217-001
Location: 537090 Main Street

Project Name: 537090 Main Street, Horning's Mills, ON
Method: Track Mounted Solid Stem Auger
Elevation: 474.35 mASL
UTM: 17 T **N:** 4888425 **E:** 563458

Log of Borehole: BH106-23
Page: 1 of 1
Date Completed: May 12, 2023

Elevation (m)	Depth	Description	Elevation / Depth	Number	Type	% Recovery	SPT (N)	Atterberg Limits (%) LL PL PI / % Moisture	Shear Strength Cu, kPa (nat V., rem V.) / SPT (N)	Well Installation	Log Notes
474.4	0	**TOPSOIL:** (~125mm thick)	474.22	1A	SS			25.4%		Cap	Monitoring well dry when measured on June 6, 2023.
		(SM) SILTY SAND: trace clay, trace gravel; trace organic matter; brown; non-cohesive, moist, compact	0.13 / 473.59	1B	SS	50	11	18.4%	11	Bentonite Plug	
473.8	0.5									Riser	
		(SM) SILTY SAND: trace gravel; brown; non-cohesive, moist, compact	0.76	2	SS	80	19	15.6%	19		
473.4	1										
472.8	1.5	- some gravel; dense		3	SS	60	33	8.8%	33		
472.4	2										
			471.91	4A	SS			4.2%			
471.8	2.5	**(SW) SAND:** trace gravel; light grey to white; transparent, moist to dry, very dense	2.44	4B	SS	70	100	2.8%	100	Sand Pack	
471.4	3		471.3								
		(SM) SILTY SAND: trace gravel; brown; non-cohesive, moist to dry, dense	3.05	5	SS	70	50	6.1%	50	PVC Screen	Spoon bouncing at depth of 3.2mbgs
470.8	3.5										
470.4	4										Auger shaking at depth of 3.2mbgs to depth of 4.4mbgs
			469.93								
469.8	4.5	**(GW) GRAVEL:** AND SAND: trace silt; brown; non-cohesive, moist to dry, dense	4.42 / 469.83	6	SS	40	50		50	Cap	Spoon bouncing at depth of 4.5mbgs.
469.4	5	Borehole terminated @ 4.5 mbgs due to SPT refusal encountered.	4.52								
468.8	5.5										
468.4	6										
467.8	6.5										
467.4	7										
466.8											

GRAINSIZE DISTRIBUTION: SAMPLE | GRAVEL | SAND | SILT | CLAY

1m = 24 units

Logged By: WA **Input By:** WA

Peterborough, Barrie, Oshawa, Kingston, Ottawa

CAMBIUM

Client: Angelo Carnevale
Contractor: Walker Drilling
Project No.: 17217-001
Location: 537090 Main Street

Project Name: 537090 Main Street, Horning's Mills, ON
Method: Track Mounted Solid Stem Auger
Elevation: 480.9 mASL
UTM: 17 T **N:** 4888538 **E:** 563305

Log of Borehole: BH107-23
Page: 1 of 1
Date Completed: May 12, 2023

Elevation (m)	Depth	Description	Number	Type	% Recovery	SPT (N)	Atterberg Limits (%) / % Moisture	Shear Strength Cu, kPa / SPT (N)	Well Installation	Log Notes
480.9	0	**TOPSOIL:** (~125mm thick) 480.77	1A	SS			25.4%			
		0.13 **(SM) SILTY SAND:** trace organic matter; brown; non-cohesive, moist, compact	1B	SS	50	13	19.3%	13		
480.4	0.5	480.14								
		0.76 **(SM) SILTY SAND:** trace gravel, trace clay; brown; non-cohesive, moist, compact	2	SS	80	25	6.6%	25		
479.9	1									
		- very dense	3	SS	50	100	6.5%	100		
479.4	1.5									
478.9	2	478.61								
		2.29 **(SW) SAND:** some gravel, some silt, brown; non-cohesive, moist to dry, very dense	4	SS	70	89	3.6%	89		Spoon bouncing at depth of 2.6mbgs
478.4	2.5									
477.9	3		5	SS	60	50	4.7%	50		Spoon bouncing at depth of 3.2mbgs
477.4	3.5									
476.9	4									
476.4	4.5		6	SS	70	65	3.2%	65		
475.9	5	475.85								Spoon bouncing ad depth of 5.0mbgs
		5.05 Borehole terminated @ 5.1 mbgs due to SPT refusal encountered.								Borehole caved to depth of 3.9mbgs and was dry upon completion of drilling
475.4	5.5									
474.9	6									
474.4	6.5									
473.9	7									
473.4										

Atterberg Limits (%): LL, PL, PI — 25 50 75
% Moisture: 25 50 75
Shear Strength Cu, kPa: nat V., rem V. — 20 40 60 80
SPT (N): 20 40 60 80

GRAINSIZE DISTRIBUTION

SAMPLE	GRAVEL	SAND	SILT	CLAY
2	7	68	20	5

1m = 24 units

Logged By: WA **Input By:** WA

Appendix C
Grain Size Analysis

Grain Size Distribution Chart

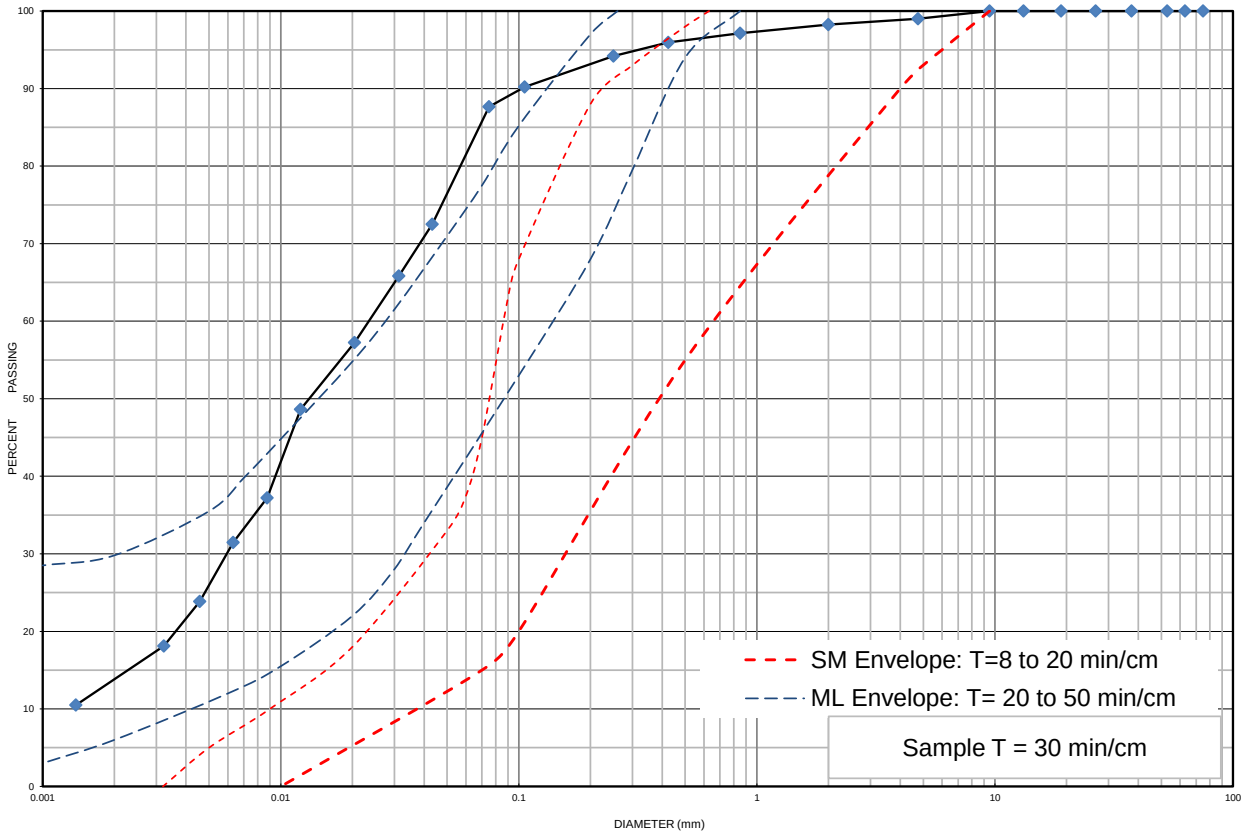
Project Number: *17217-001* **Client:** *Angelo Carnevale*

Project Name: *537090 Main Street Horning's Mills*

Sample Date: *May 11-12, 2023* **Sampled By:** *Waleed El-Taweel - Cambium Inc.*

Location: *BH 101-23 SS 3* **Depth:** *1.5 m to 2.1 m* **Lab Sample No:** *S-23-0825*

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



MIT SOIL CLASSIFICATION SYSTEM								
CLAY	SILT	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	BOULDERS
		SAND			GRAVEL			

Borehole No.	Sample No.	Depth	Gravel	Sand	Silt	Clay	Moisture
BH 101-23	SS 3	1.5 m to 2.1 m	1	11	74	14	22.3

Description	Classification	D_{60}	D_{30}	D_{10}	C_u	C_c
Silt some Clay some Sand trace Gravel	ML	0.0240	0.0059	-	-	-

Additional information availabe upon request

Issued By: _____ *Date Issued:* *May 24, 2023*

(Senior Project Manager)

Cambium Inc. (Laboratory)
866.217.7900 | cambium-inc.com
194 Sophia St. | Peterborough | ON | K9H 1E5

Grain Size Distribution Chart

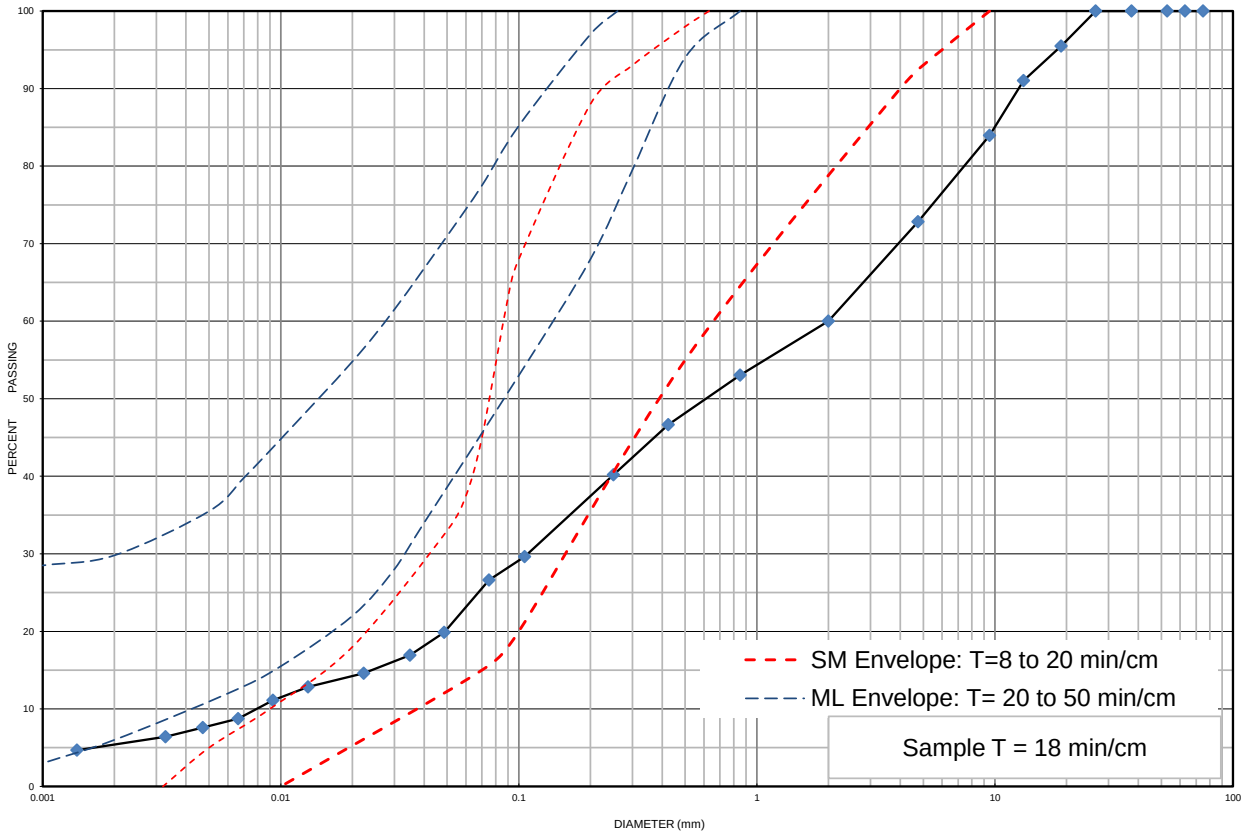
Project Number: *17217-001* **Client:** *Angelo Carnevale*

Project Name: *537090 Main Street Horning's Mills*

Sample Date: *May 11 & 12, 2023* **Sampled By:** *Waleed El-Taweel - Cambium Inc.*

Location: *BH 102-23 SS 2* **Depth:** *0.8 m to 1.4 m* **Lab Sample No:** *S-23-1741*

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



MIT SOIL CLASSIFICATION SYSTEM								
CLAY	SILT	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	BOULDERS
		SAND			GRAVEL			

Borehole No.	Sample No.	Depth	Gravel	Sand	Silt	Clay	Moisture
BH 102-23	SS 2	0.8 m to 1.4 m	27	46	21	6	5.4

Description	Classification	D_{60}	D_{30}	D_{10}	C_u	C_c
Gravelly Silty Sand trace Clay	SM	2.000	0.120	0.008	250.00	0.90

Additional information availabe upon request

Issued By: _____ *Date Issued:* *October 24, 2023*

(Senior Project Manager)

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Grain Size Distribution Chart

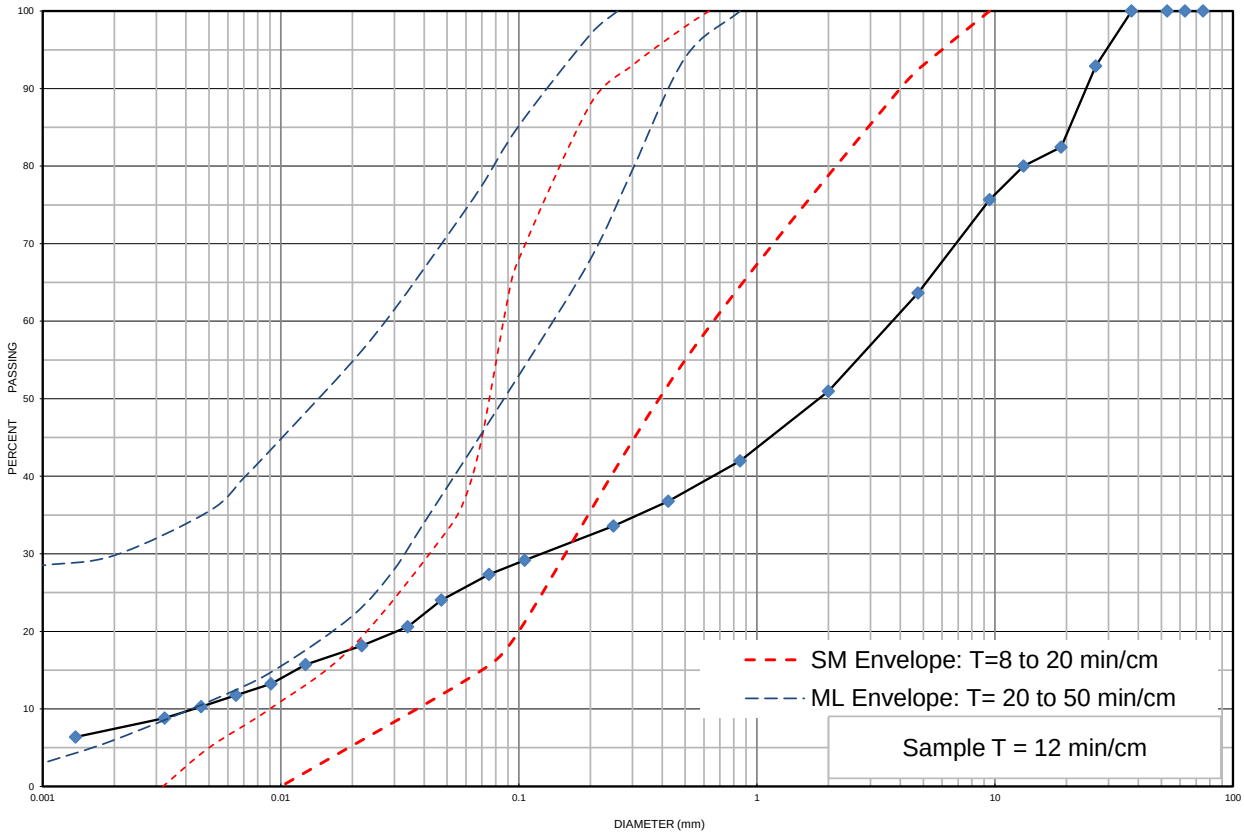
Project Number: *17217-001* **Client:** *Angelo Carnevale*

Project Name: *537090 Main Street Horning's Mills*

Sample Date: *May 11-12, 2023* **Sampled By:** *Waleed El-Taweel - Cambium Inc.*

Location: *BH 102-23 SS 4* **Depth:** *2.3 m to 2.9 m* **Lab Sample No:** *S-23-0826*

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



MIT SOIL CLASSIFICATION SYSTEM								
CLAY	SILT	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	BOULDERS
		SAND			GRAVEL			

Borehole No.	Sample No.	Depth	Gravel	Sand	Silt	Clay	Moisture
BH 102-23	SS 4	2.3 m to 2.9 m	36	36	21	7	4.4

Description	Classification	D_{60}	D_{30}	D_{10}	C_u	C_c
Silty Gravel and Sand trace Clay	SM	3.7000	0.1300	0.0042	880.95	1.09

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Grain Size Distribution Chart

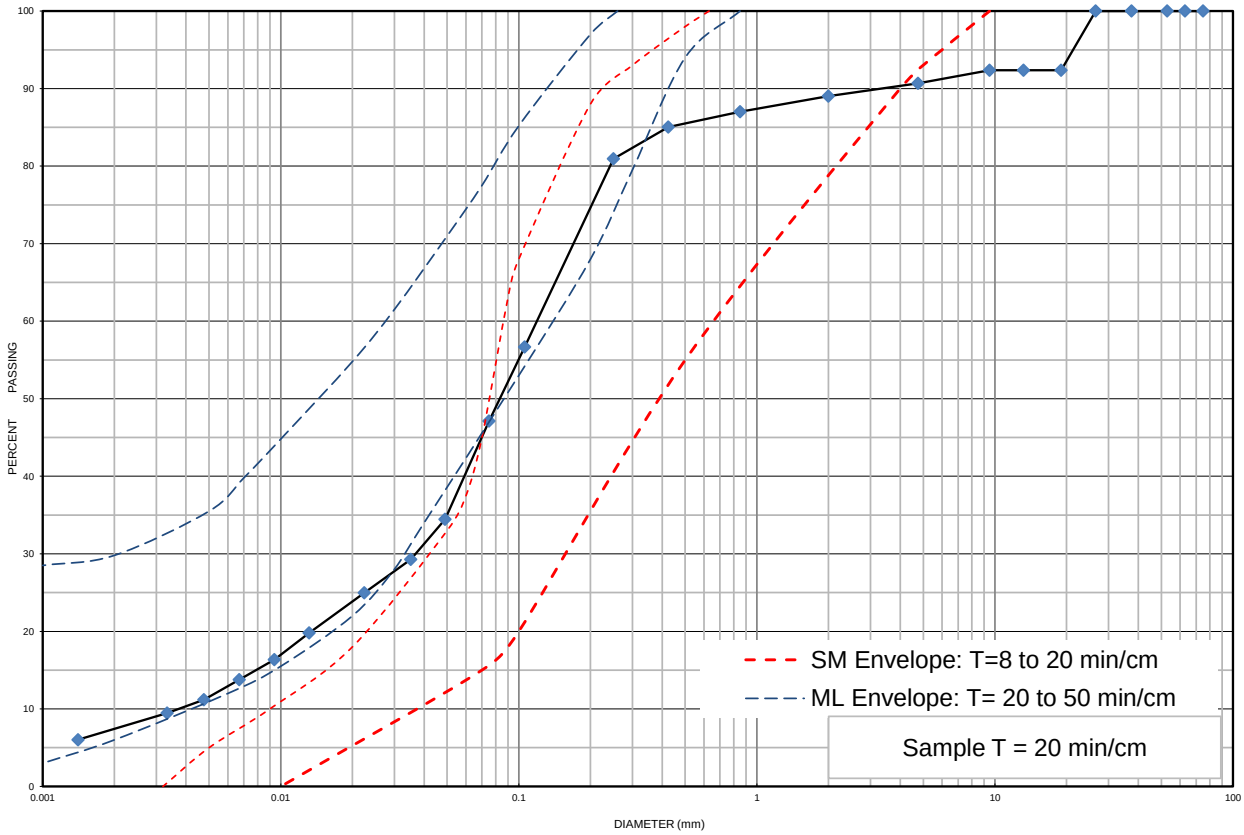
Project Number: *17217-001* **Client:** *Angelo Carnevale*

Project Name: *537090 Main Street Horning's Mills*

Sample Date: *May 11-12, 2023* **Sampled By:** *Waleed El-Taweel - Cambium Inc.*

Location: *BH 103-23 SS 3* **Depth:** *1.5 m to 2.1 m* **Lab Sample No:** *S-23-0827*

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



MIT SOIL CLASSIFICATION SYSTEM								
CLAY	SILT	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	BOULDERS
		SAND			GRAVEL			

Borehole No.	Sample No.	Depth	Gravel	Sand	Silt	Clay	Moisture
BH 103-23	SS 3	1.5 m to 2.1 m	9	44	40	7	12.5

Description	Classification	D_{60}	D_{30}	D_{10}	C_u	C_c
Sand and Silt trace Gravel trace Clay	SM	0.1300	0.0370	0.0038	34.21	2.77

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Grain Size Distribution Chart

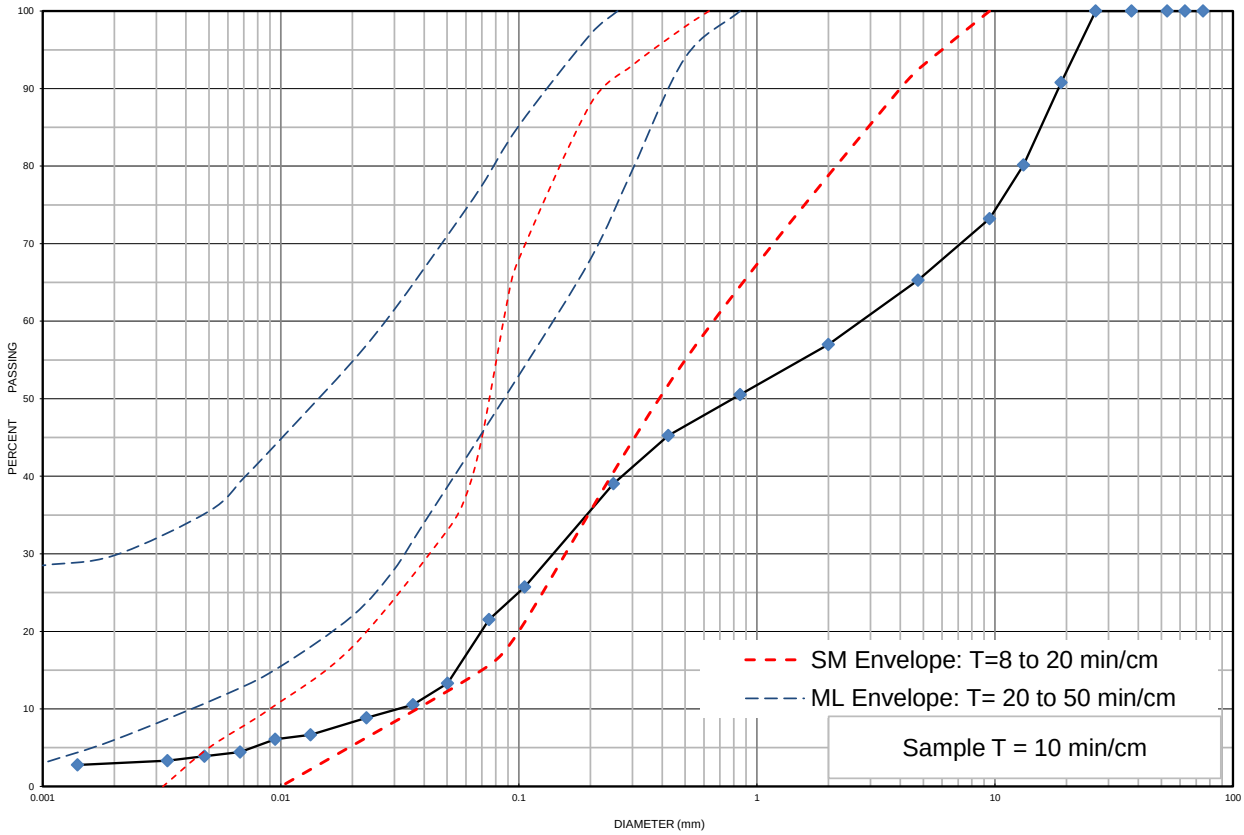
Project Number: *17217-001* **Client:** *Angelo Carnevale*

Project Name: *537090 Main Street Horning's Mills*

Sample Date: *May 11-12, 2023* **Sampled By:** *Waleed El-Taweel - Cambium Inc.*

Location: *BH 105-23 SS 2* **Depth:** *0.8 m to 1.4 m* **Lab Sample No:** *S-23-0828*

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



MIT SOIL CLASSIFICATION SYSTEM								
CLAY	SILT	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	BOULDERS
		SAND			GRAVEL			

Borehole No.	Sample No.	Depth	Gravel	Sand	Silt	Clay	Moisture
BH 105-23	SS 2	0.8 m to 1.4 m	35	44	18	3	6.2

Description	Classification	D_{60}	D_{30}	D_{10}	C_u	C_c
Sand and Gravel some Silt trace Clay	SM	2.700	0.145	0.030	90.00	0.26

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Grain Size Distribution Chart

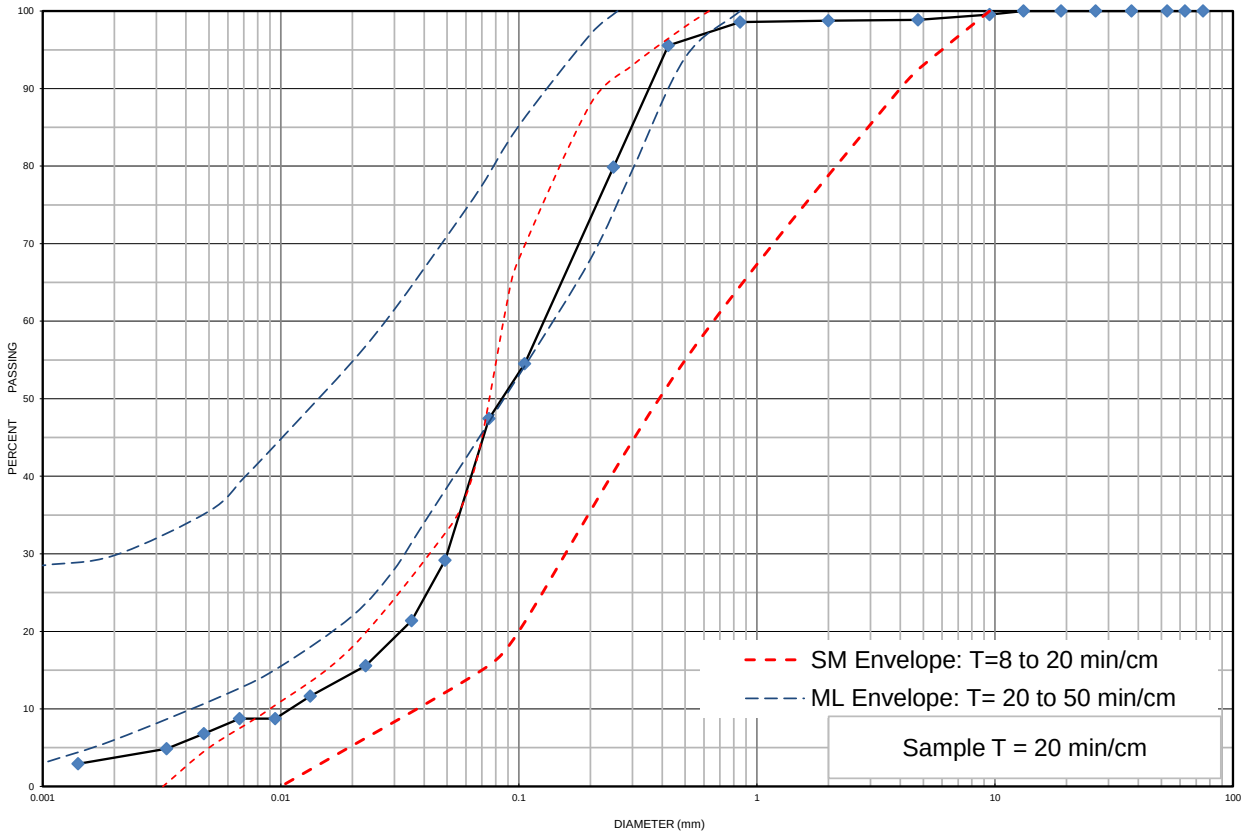
Project Number: *17217-001* **Client:** *Angelo Carnevale*

Project Name: *537090 Main Street Horning's Mills*

Sample Date: *May 11 & 12, 2023* **Sampled By:** *Waleed El-Taweel - Cambium Inc.*

Location: *BH 106-23 SS 2* **Depth:** *0.8 m to 1.4 m* **Lab Sample No:** *S-23-1742*

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



MIT SOIL CLASSIFICATION SYSTEM								
CLAY	SILT	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	BOULDERS
		SAND			GRAVEL			

Borehole No.	Sample No.	Depth	Gravel	Sand	Silt	Clay	Moisture
BH 106-23	SS 2	0.8 m to 1.4 m	1	51	44	4	11.4

Description	Classification	D_{60}	D_{30}	D_{10}	C_u	C_c
Sand and Silt trace Clay trace Gravel	SM	0.140	0.050	0.012	11.67	1.49

Additional information availabe upon request

Issued By: _____ *Date Issued:* *October 24, 2023*

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Grain Size Distribution Chart

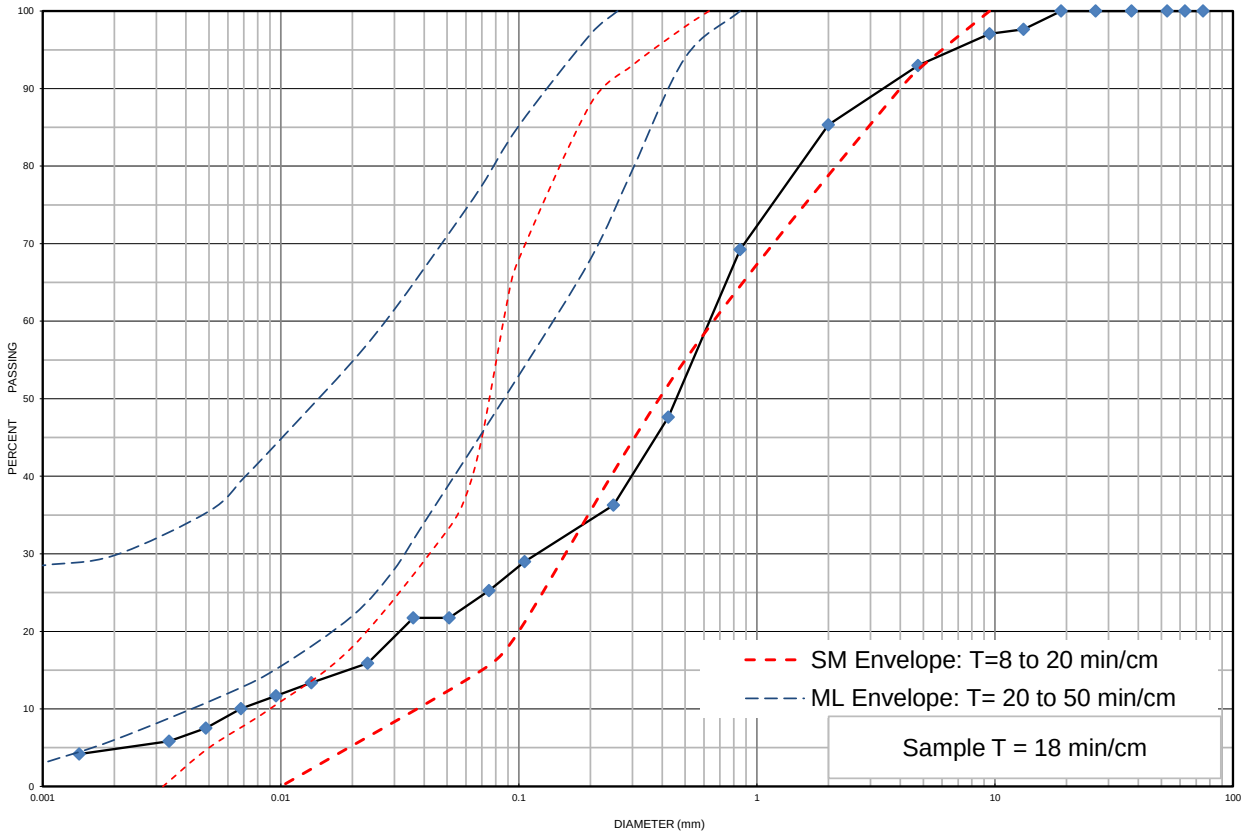
Project Number: *17217-001* **Client:** *Angelo Carnevale*

Project Name: *537090 Main Street Horning's Mills*

Sample Date: *May 11-12, 2023* **Sampled By:** *Waleed El-Taweel - Cambium Inc.*

Location: *BH 107-23 SS 2* **Depth:** *0.8 m to 1.4 m* **Lab Sample No:** *S-23-0829*

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



MIT SOIL CLASSIFICATION SYSTEM								
CLAY	SILT	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	BOULDERS
		SAND			GRAVEL			

Borehole No.	Sample No.	Depth	Gravel	Sand	Silt	Clay	Moisture
BH 107-23	SS 2	0.8 m to 1.4 m	7	68	20	5	6.6

Description	Classification	D_{60}	D_{30}	D_{10}	C_u	C_c
Silty Sand trace Gravel trace Clay	SM	0.6400	0.1250	0.0068	94.12	3.59

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Issued By: _____ *Date Issued:* *May 24, 2023*

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Appendix D

MECP Well Records

Water Well Records Summary Report

Produced by Cambium Inc. using MOECP Water Well Information System (WWIS)

All units in meters unless otherwise specified

Well ID: 1700304 **Easting:** 563756 **UTM Zone** 17
Construction Date: 1966-11-04 **Northing:** 4889091 **Positional Accuracy:** margin of error : 100 m - 300 m

Well Depth:	39.6	**Water Kind**	FRESH	**Pump Rate (LPM):**	32
Well Diameter (cm):	10.2	**Final Status**	Water Supply	**Recommended Pump Rate:**	23
Water First Found:	38.7	**Primary Water Use:**	Domestic	**Pumping Duration (h:m):**	5 : 0
Static Level:	20				

Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0	37.5
2	LIMESTONE	37.5	39.6

Well ID: 1700326 **Easting:** 563692 **UTM Zone** 17
Construction Date: 1959-12-07 **Northing:** 4888302 **Positional Accuracy:** margin of error : 100 m - 300 m

Well Depth:	27.4	**Water Kind**	FRESH	**Pump Rate (LPM):**	23
Well Diameter (cm):	10.2	**Final Status**	Water Supply	**Recommended Pump Rate:**	23
Water First Found:	26.8	**Primary Water Use:**	Livestock	**Pumping Duration (h:m):**	4 : 0
Static Level:	24				

Layer:	Driller's Description:	Top:	Bottom:
1	TOPSOIL	0	1.22
2	HARDPAN	1.22	12.2
3	MEDIUM SAND	12.2	21.3
4	ROCK	21.3	27.4

Well ID: 1700330 **Easting:** 563550 **UTM Zone** 17
Construction Date: 1964-11-04 **Northing:** 4889122 **Positional Accuracy:** margin of error : 100 m - 300 m

Well Depth:	11.9	**Water Kind**	FRESH	**Pump Rate (LPM):**	45
Well Diameter (cm):	10.2	**Final Status**	Water Supply	**Recommended Pump Rate:**	36
Water First Found:	11.6	**Primary Water Use:**	Domestic	**Pumping Duration (h:m):**	2 : 0
Static Level:	6				

Layer:	Driller's Description:	Top:	Bottom:
1	PREV. DRILLED	0	1.52
2	ROCK	1.52	9.14
3	SHALE	9.14	11.9

Well ID: 1700331 **Easting:** 563554 **UTM Zone** 17
Construction Date: 1967-12-01 **Northing:** 4889172 **Positional Accuracy:** margin of error : 100 m - 300 m

Well Depth:	27.4	**Water Kind**	FRESH	**Pump Rate (LPM):**	27
Well Diameter (cm):	10.2	**Final Status**	Water Supply	**Recommended Pump Rate:**	18
Water First Found:	27.4	**Primary Water Use:**	Domestic	**Pumping Duration (h:m):**	4 : 0
Static Level:	14				

Layer:	Driller's Description:	Top:	Bottom:
1	MEDIUM SAND	0	25.9
2	MEDIUM SAND	25.9	27.1
3	GRAVEL	27.1	27.4

Well ID: 1700971
Construction Date: 1969-05-14
Easting: 563574
Northing: 4889103
UTM Zone 17
Positional Accuracy: margin of error : 30 m - 100 m

Well Depth: 26.5
Well Diameter (cm): 10.2
Water First Found: 26.5
Static Level: 12
Water Kind FRESH
Final Status Water Supply
Primary Water Use: Domestic
Pump Rate (LPM): 41
Recommended Pump Rate: 36
Pumping Duration (h:m): 3 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	MEDIUM SAND	0	26.2
2	LIMESTONE	26.2	26.5

Well ID: 1700973
Construction Date: 1969-05-14
Easting: 563734
Northing: 4889143
UTM Zone 17
Positional Accuracy: margin of error : 30 m - 100 m

Well Depth: 33.2
Well Diameter (cm): 10.2
Water First Found: 33.2
Static Level: 20
Water Kind MINERIAL
Final Status Water Supply
Primary Water Use: Domestic
Pump Rate (LPM): 41
Recommended Pump Rate: 27
Pumping Duration (h:m): 4 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	GRAVEL	0	12.2
2	MEDIUM SAND	12.2	32.6
3	LIMESTONE	32.6	33.2

Well ID: 1701152
Construction Date: 1970-12-14
Easting: 563650
Northing: 4889165
UTM Zone 17
Positional Accuracy: margin of error : 30 m - 100 m

Well Depth: 25
Well Diameter (cm): 12.7
Water First Found: 25
Static Level: 11
Water Kind FRESH
Final Status Water Supply
Primary Water Use: Domestic
Pump Rate (LPM): 27
Recommended Pump Rate: 23
Pumping Duration (h:m): 4 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	MEDIUM SAND	0	6.1
1	MEDIUM SAND	0	6.1
2	GRAVEL	6.1	21.0
2	GRAVEL	6.1	21.0
3	MEDIUM SAND	21.0	23.8
3	MEDIUM SAND	21.0	23.8
4	LIMESTONE	23.8	25
4	LIMESTONE	23.8	25

Well ID: 1701317
Construction Date: 1972-06-09
Easting: 563564
Northing: 4889073
UTM Zone 17
Positional Accuracy: margin of error : 30 m - 100 m

Well Depth: 25.3
Well Diameter (cm): 10.2
Water First Found: 25.3
Static Level: 12
Water Kind FRESH
Final Status Water Supply
Primary Water Use: Domestic
Pump Rate (LPM): 23
Recommended Pump Rate: 23
Pumping Duration (h:m): 1 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	GRAVEL	0	15.9
2	SAND	15.9	19.5
3	GRAVEL	19.5	25.3

Well ID: 1701877
Construction Date: 1975-05-27
Easting: 563805
Northing: 4889139
UTM Zone 17
Positional Accuracy: margin of error : 100 m - 300 m

Well Depth: 27.7
Well Diameter (cm): 12.7
Water First Found: 27.7
Static Level: 18
Water Kind MINERIAL
Final Status Water Supply
Primary Water Use: Domestic
Pump Rate (LPM): 32
Recommended Pump Rate: 27
Pumping Duration (h:m): 3 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0	1.83
2	CLAY	1.83	24.4
3	GRAVEL	24.4	27.7

Well ID: 1702519
Construction Date: 1979-06-01
Easting: 563914
Northing: 4888223
UTM Zone 17
Positional Accuracy: margin of error : 100 m - 300 m

Well Depth: 25
Well Diameter (cm): 15.2
Water First Found: 23.8
Static Level: 14
Water Kind FRESH
Final Status Water Supply
Primary Water Use: Livestock
Pump Rate (LPM): 27
Recommended Pump Rate: 27
Pumping Duration (h:m): 1 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0	9.45
1	CLAY	0	9.45
2	LIMESTONE	9.45	10.4
2	LIMESTONE	9.45	10.4
3	COARSE GRAVEL	10.4	11.9
3	COARSE GRAVEL	10.4	11.9
4	LIMESTONE	11.9	25
4	LIMESTONE	11.9	25

Well ID: 1702982
Construction Date: 1984-03-19
Easting: 563016
Northing: 4888589
UTM Zone 17
Positional Accuracy: unknown UTM

Well Depth: 39.0
Well Diameter (cm): 12.7
Water First Found: 34.4
Static Level: 26
Water Kind FRESH
Final Status Water Supply
Primary Water Use: Domestic
Pump Rate (LPM): 45
Recommended Pump Rate: 45
Pumping Duration (h:m): 2 : 30

Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0	1.52
2	GRAVEL	1.52	33.2
3	ROCK	33.2	34.1
4	UNKNOWN TYPE	34.1	39.0

Well ID: 1703053
Construction Date: 1985-01-04
Easting: 562905
Northing: 4889187
UTM Zone 17
Positional Accuracy: unknown UTM

Well Depth: 49.4
Well Diameter (cm): 20.3
Water First Found: 48.8
Static Level: 8
Water Kind FRESH
Final Status Water Supply
Primary Water Use: Domestic
Pump Rate (LPM): 136
Recommended Pump Rate: 114
Pumping Duration (h:m): 1 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	TOPSOIL	0	0.30
1	TOPSOIL	0	0.30

1	TOPSOIL	0	0.30
1	TOPSOIL	0	0.30
2	CLAY	0.30	3.66
2	CLAY	0.30	3.66
2	CLAY	0.30	3.66
2	CLAY	0.30	3.66
3	SHALE	3.66	4.57
3	SHALE	3.66	4.57
3	SHALE	3.66	4.57
3	SHALE	3.66	4.57
4	LIMESTONE	4.57	25
4	LIMESTONE	4.57	25
4	LIMESTONE	4.57	25
4	LIMESTONE	4.57	25
5	SHALE	25	49.4
5	SHALE	25	49.4
5	SHALE	25	49.4
5	SHALE	25	49.4

Well ID: 1703058
Construction Date: 1985-02-14

Easting: 562905
Northing: 4889187

UTM Zone 17
Positional Accuracy: unknown UTM

Well Depth: 30.8
Well Diameter (cm): 15.2
Water First Found: 29.3
Static Level: 10

Water Kind FRESH
Final Status Water Supply
Primary Water Use: Public

Pump Rate (LPM): 45
Recommended Pump Rate: 36
Pumping Duration (h:m): 1 : 30

Layer:	Driller's Description:	Top:	Bottom:
1	GRAVEL	0	4.27
1	GRAVEL	0	4.27
2	COARSE GRAVEL	4.27	4.88
2	COARSE GRAVEL	4.27	4.88
3	SHALE	4.88	5.49
3	SHALE	4.88	5.49
4	SHALE	5.49	7.62
4	SHALE	5.49	7.62
5	SHALE	7.62	18.3
5	SHALE	7.62	18.3
6	SHALE	18.3	20.7
6	SHALE	18.3	20.7
7	SHALE	20.7	30.8
7	SHALE	20.7	30.8

Well ID: 1703481
Construction Date: 1987-10-23
Easting: 562905
Northing: 4889187
UTM Zone 17
Positional Accuracy: unknown UTM

Well Depth: 34.8
Well Diameter (cm): 15.2
Water First Found: 34.8
Static Level:
Water Kind Not stated
Final Status Water Supply
Primary Water Use: Domestic
Pump Rate (LPM): 50
Recommended Pump Rate: 45
Pumping Duration (h:m): 12 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	FILL	0	1.52
1	FILL	0	1.52
1	FILL	0	1.52
1	FILL	0	1.52
2	GRAVEL	1.52	9.14
2	GRAVEL	1.52	9.14
2	GRAVEL	1.52	9.14
2	GRAVEL	1.52	9.14
3	SHALE	9.14	12.2
3	SHALE	9.14	12.2
3	SHALE	9.14	12.2
3	SHALE	9.14	12.2
4	LIMESTONE	12.2	34.8
4	LIMESTONE	12.2	34.8
4	LIMESTONE	12.2	34.8
4	LIMESTONE	12.2	34.8

Well ID: 1703825
Construction Date: 1989-03-17
Easting: 562905
Northing: 4889187
UTM Zone 17
Positional Accuracy: unknown UTM

Well Depth: 43
Well Diameter (cm):
Water First Found: 42.1
Static Level: 20
Water Kind Not stated
Final Status Water Supply
Primary Water Use: Domestic
Pump Rate (LPM): 23
Recommended Pump Rate: 23
Pumping Duration (h:m): 1 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0	11.6
1	CLAY	0	11.6
1	CLAY	0	11.6
2	LIMESTONE	11.6	15.9
2	LIMESTONE	11.6	15.9
2	LIMESTONE	11.6	15.9
3	LIMESTONE	15.9	17.7
3	LIMESTONE	15.9	17.7
3	LIMESTONE	15.9	17.7
4	LIMESTONE	17.7	38.4
4	LIMESTONE	17.7	38.4
4	LIMESTONE	17.7	38.4
5	SHALE	38.4	43

5	SHALE	38.4	43
5	SHALE	38.4	43

Well ID: 1704054 **Easting:** 562905 **UTM Zone** 17
Construction Date: 1990-02-20 **Northing:** 4889187 **Positional Accuracy:** unknown UTM

Well Depth: 29 **Water Kind** FRESH **Pump Rate (LPM):** 68
Well Diameter (cm): 15.2 **Final Status** Water Supply **Recommended Pump Rate:** 45
Water First Found: 27.4 **Primary Water Use:** Domestic **Pumping Duration (h:m):** 12 : 0
Static Level: 11

Layer:	Driller's Description:	Top:	Bottom:
1	STONES	0	9.14
2	CLAY	9.14	15.2
3	CLAY	15.2	22.9
4	SHALE	22.9	29

Well ID: 1704163 **Easting:** 563016 **UTM Zone** 17
Construction Date: 1990-05-08 **Northing:** 4888589 **Positional Accuracy:** unknown UTM

Well Depth: 42.1 **Water Kind** FRESH **Pump Rate (LPM):** 45
Well Diameter (cm): 15.2 **Final Status** Water Supply **Recommended Pump Rate:** 45
Water First Found: 33.5 **Primary Water Use:** Domestic **Pumping Duration (h:m):** 6 : 0
Static Level: 18

Layer:	Driller's Description:	Top:	Bottom:
1	TOPSOIL	0	0.61
2	CLAY	0.61	8.53
3	CLAY	8.53	24.4
4	CLAY	24.4	25.6
5	LIMESTONE	25.6	29
6	LIMESTONE	29	36.6
7	LIMESTONE	36.6	40.5
8	LIMESTONE	40.5	41.8
9	SHALE	41.8	42.1

Well ID: 1704207 **Easting:** 562905 **UTM Zone** 17
Construction Date: 1990-07-24 **Northing:** 4889187 **Positional Accuracy:** unknown UTM

Well Depth: 18.6 **Water Kind** FRESH **Pump Rate (LPM):** 23
Well Diameter (cm): 15.2 **Final Status** Water Supply **Recommended Pump Rate:** 23
Water First Found: 16.8 **Primary Water Use:** Domestic **Pumping Duration (h:m):** 1 : 0
Static Level: 5

Layer:	Driller's Description:	Top:	Bottom:
1	TOPSOIL	0	0.30
2	CLAY	0.30	6.1
3	CLAY	6.1	12.2
4	SHALE	12.2	18.3
5	LIMESTONE	18.3	18.6

Well ID: 1704336
Construction Date: 1991-05-22
Easting: 563016
Northing: 4888589
UTM Zone 17
Positional Accuracy: unknown UTM

Well Depth: 22
Well Diameter (cm): 15.2
Water First Found: 22
Static Level: 11
Water Kind FRESH
Final Status Water Supply
Primary Water Use: Domestic
Pump Rate (LPM): 91
Recommended Pump Rate: 68
Pumping Duration (h:m): 1 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	TOPSOIL	0	0.30
1	TOPSOIL	0	0.30
1	TOPSOIL	0	0.30
1	TOPSOIL	0	0.30
2	SAND	0.30	6.71
2	SAND	0.30	6.71
2	SAND	0.30	6.71
2	SAND	0.30	6.71
3	CLAY	6.71	10.4
3	CLAY	6.71	10.4
3	CLAY	6.71	10.4
3	CLAY	6.71	10.4
4	CLAY	10.4	21.0
4	CLAY	10.4	21.0
4	CLAY	10.4	21.0
4	CLAY	10.4	21.0
5	LIMESTONE	21.0	22
5	LIMESTONE	21.0	22
5	LIMESTONE	21.0	22
5	LIMESTONE	21.0	22

Well ID: 1704665
Construction Date: 1993-12-24
Easting: 563016
Northing: 4888589
UTM Zone 17
Positional Accuracy: unknown UTM

Well Depth: 4.27
Well Diameter (cm): 45.7
Water First Found: 3.05
Static Level: 3
Water Kind FRESH
Final Status Water Supply
Primary Water Use: Domestic
Pump Rate (LPM): 14
Recommended Pump Rate: 9
Pumping Duration (h:m): 1 : 30

Layer:	Driller's Description:	Top:	Bottom:
1	TOPSOIL	0	0.61
2	CLAY	0.61	3.05
3	SAND	3.05	4.27

Well ID: 1705035
Construction Date: 1997-06-25
Easting: 562905
Northing: 4889187
UTM Zone 17
Positional Accuracy: unknown UTM

Well Depth: 72.5
Well Diameter (cm): 15.2
Water First Found: 46.6
Static Level: 23
Water Kind FRESH
Final Status Water Supply
Primary Water Use: Domestic
Pump Rate (LPM): 14
Recommended Pump Rate: 14
Pumping Duration (h:m): 1 : 30

Layer:	Driller's Description:	Top:	Bottom:

1	TOPSOIL	0	0.30
1	TOPSOIL	0	0.30
1	TOPSOIL	0	0.30
2	SAND	0.30	7.62
2	SAND	0.30	7.62
2	SAND	0.30	7.62
3	GRAVEL	7.62	17.7
3	GRAVEL	7.62	17.7
3	GRAVEL	7.62	17.7
4	SAND	17.7	18.9
4	SAND	17.7	18.9
4	SAND	17.7	18.9
5	SILT	18.9	24.4
5	SILT	18.9	24.4
5	SILT	18.9	24.4
6	CLAY	24.4	42.1
6	CLAY	24.4	42.1
6	CLAY	24.4	42.1
7	GRAVEL	42.1	43
7	GRAVEL	42.1	43
7	GRAVEL	42.1	43
8	LIMESTONE	43	43.9
8	LIMESTONE	43	43.9
8	LIMESTONE	43	43.9
9	SILT	43.9	47.2
9	SILT	43.9	47.2
9	SILT	43.9	47.2
10	SHALE	47.2	59.7
10	SHALE	47.2	59.7
10	SHALE	47.2	59.7
11	SHALE	59.7	61.9
11	SHALE	59.7	61.9
11	SHALE	59.7	61.9
12	SHALE	61.9	72.5
12	SHALE	61.9	72.5
12	SHALE	61.9	72.5

Well ID: 1705498
Construction Date: 2000-05-11
Easting: 563016
Northing: 4888588
UTM Zone 17
Positional Accuracy: unknown UTM

Well Depth: 35.4
Well Diameter (cm): 15.2
Water First Found: 34.4
Static Level: 14
Water Kind Not stated
Final Status Water Supply
Primary Water Use: Domestic
Pump Rate (LPM): 82
Recommended Pump Rate: 68
Pumping Duration (h:m): 1 :

Layer:	Driller's Description:	Top:	Bottom:
1	TOPSOIL	0	0.30
1	TOPSOIL	0	0.30
2	SAND	0.30	14.6
2	SAND	0.30	14.6
3	SAND	14.6	27.1
3	SAND	14.6	27.1
4	SAND	27.1	28.0
4	SAND	27.1	28.0
5	LIMESTONE	28.0	29
5	LIMESTONE	28.0	29
6	LIMESTONE	29	31.1
6	LIMESTONE	29	31.1
7	LIMESTONE	31.1	35.4
7	LIMESTONE	31.1	35.4

Well ID: 1705499
Construction Date: 2000-05-11
Easting: 563016
Northing: 4888588
UTM Zone 17
Positional Accuracy: unknown UTM

Well Depth:
Well Diameter (cm):
Water First Found:
Static Level:
Water Kind
Final Status
Primary Water Use:
Pump Rate (LPM):
Recommended Pump Rate:
Pumping Duration (h:m):

Layer:	Driller's Description:	Top:	Bottom:

Well ID: 1705990
Construction Date: 2003-03-17
Easting: 563607
Northing: 4888178
UTM Zone 17
Positional Accuracy: margin of error : 300 m - 1 km

Well Depth: 36
Well Diameter (cm): 15.2
Water First Found: 35.0
Static Level: 20
Water Kind Not stated
Final Status Water Supply
Primary Water Use: Domestic
Pump Rate (LPM): 45
Recommended Pump Rate: 36
Pumping Duration (h:m): 2 : 37

Layer:	Driller's Description:	Top:	Bottom:
1	SAND	0	3.66
1	SAND	0	3.66
1	SAND	0	3.66
2	GRAVEL	3.66	14.0
2	GRAVEL	3.66	14.0
2	GRAVEL	3.66	14.0
3	GRAVEL	14.0	17.7
3	GRAVEL	14.0	17.7

3	GRAVEL	14.0	17.7
4	SANDSTONE	17.7	35.0
4	SANDSTONE	17.7	35.0
4	SANDSTONE	17.7	35.0
5	SHALE	35.0	36
5	SHALE	35.0	36
5	SHALE	35.0	36

Well ID: 1706159
Construction Date: 2003-12-09

Easting: 563013
Northing: 4888587

UTM Zone 17
Positional Accuracy: unknown UTM

Well Depth: 37.2
Well Diameter (cm): 15.2
Water First Found: 35.0
Static Level: 23

Water Kind Not stated
Final Status Water Supply
Primary Water Use: Domestic

Pump Rate (LPM): 68
Recommended Pump Rate: 55
Pumping Duration (h:m): 1 : 30

Layer:	Driller's Description:	Top:	Bottom:
1	TOPSOIL	0	0.61
1	TOPSOIL	0	0.61
1	TOPSOIL	0	0.61
1	TOPSOIL	0	0.61
1	TOPSOIL	0	0.61
1	TOPSOIL	0	0.61
2	CLAY	0.61	2.44
2	CLAY	0.61	2.44
2	CLAY	0.61	2.44
2	CLAY	0.61	2.44
2	CLAY	0.61	2.44
2	CLAY	0.61	2.44
3	CLAY	2.44	27.7
3	CLAY	2.44	27.7
3	CLAY	2.44	27.7
3	CLAY	2.44	27.7
3	CLAY	2.44	27.7
3	CLAY	2.44	27.7
4	LIMESTONE	27.7	31.4
4	LIMESTONE	27.7	31.4
4	LIMESTONE	27.7	31.4
4	LIMESTONE	27.7	31.4
4	LIMESTONE	27.7	31.4
4	LIMESTONE	27.7	31.4
5	LIMESTONE	31.4	37.2
5	LIMESTONE	31.4	37.2
5	LIMESTONE	31.4	37.2
5	LIMESTONE	31.4	37.2

5	LIMESTONE	31.4	37.2
5	LIMESTONE	31.4	37.2

Well ID: 1706413
Construction Date: 2005-07-04
Easting: 563729
Northing: 4888869
UTM Zone 17
Positional Accuracy: margin of error : 30 m - 100 m

Well Depth: 73.2
Well Diameter (cm): 15.9
Water First Found: 71.3
Static Level: 17
Water Kind FRESH
Final Status Water Supply
Primary Water Use: Domestic
Pump Rate (LPM): 27
Recommended Pump Rate: 27
Pumping Duration (h:m): 1 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	SAND	0	4.27
1	SAND	0	4.27
1	SAND	0	4.27
1	SAND	0	4.27
2	CLAY	4.27	10.4
2	CLAY	4.27	10.4
2	CLAY	4.27	10.4
2	CLAY	4.27	10.4
3	CLAY	10.4	30.5
3	CLAY	10.4	30.5
3	CLAY	10.4	30.5
3	CLAY	10.4	30.5
4	LIMESTONE	30.5	40.5
4	LIMESTONE	30.5	40.5
4	LIMESTONE	30.5	40.5
4	LIMESTONE	30.5	40.5
5	SHALE	40.5	46.9
5	SHALE	40.5	46.9
5	SHALE	40.5	46.9
5	SHALE	40.5	46.9
6	SHALE	46.9	73.2
6	SHALE	46.9	73.2
6	SHALE	46.9	73.2
6	SHALE	46.9	73.2

Well ID: 1706482
Construction Date: 2005-10-03
Easting: 563975
Northing: 4889017
UTM Zone 17
Positional Accuracy: margin of error : 30 m - 100 m

Well Depth: 59.7
Well Diameter (cm): 12.7
Water First Found: 49.7
Static Level: 16
Water Kind
Final Status Water Supply
Primary Water Use: Domestic
Pump Rate (LPM): 50
Recommended Pump Rate: 36
Pumping Duration (h:m): 50 :

Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0	2.13
1	CLAY	0	2.13
1	CLAY	0	2.13

1	CLAY	0	2.13
1	CLAY	0	2.13
1	CLAY	0	2.13
1	CLAY	0	2.13
1	CLAY	0	2.13
1	CLAY	0	2.13
1	CLAY	0	2.13
1	CLAY	0	2.13
1	CLAY	0	2.13
1	CLAY	0	2.13
1	CLAY	0	2.13
1	CLAY	0	2.13
1	CLAY	0	2.13
1	CLAY	0	2.13
2	GRAVEL	2.13	12.2
2	GRAVEL	2.13	12.2
2	GRAVEL	2.13	12.2
2	GRAVEL	2.13	12.2
2	GRAVEL	2.13	12.2
2	GRAVEL	2.13	12.2
2	GRAVEL	2.13	12.2
2	GRAVEL	2.13	12.2
2	GRAVEL	2.13	12.2
2	GRAVEL	2.13	12.2
2	GRAVEL	2.13	12.2
2	GRAVEL	2.13	12.2
2	GRAVEL	2.13	12.2
2	GRAVEL	2.13	12.2
2	GRAVEL	2.13	12.2
2	GRAVEL	2.13	12.2
2	GRAVEL	2.13	12.2
3	CLAY	12.2	32
3	CLAY	12.2	32
3	CLAY	12.2	32
3	CLAY	12.2	32
3	CLAY	12.2	32
3	CLAY	12.2	32
3	CLAY	12.2	32
3	CLAY	12.2	32

3	CLAY	12.2	32
3	CLAY	12.2	32
3	CLAY	12.2	32
3	CLAY	12.2	32
3	CLAY	12.2	32
3	CLAY	12.2	32
3	CLAY	12.2	32
3	CLAY	12.2	32
3	CLAY	12.2	32
3	CLAY	12.2	32
4	SHALE	32	33.5
4	SHALE	32	33.5
4	SHALE	32	33.5
4	SHALE	32	33.5
4	SHALE	32	33.5
4	SHALE	32	33.5
4	SHALE	32	33.5
4	SHALE	32	33.5
4	SHALE	32	33.5
4	SHALE	32	33.5
4	SHALE	32	33.5
4	SHALE	32	33.5
4	SHALE	32	33.5
4	SHALE	32	33.5
4	SHALE	32	33.5
4	SHALE	32	33.5
4	SHALE	32	33.5
4	SHALE	32	33.5
5	CLAY	33.5	42.1
5	CLAY	33.5	42.1
5	CLAY	33.5	42.1
5	CLAY	33.5	42.1
5	CLAY	33.5	42.1
5	CLAY	33.5	42.1
5	CLAY	33.5	42.1
5	CLAY	33.5	42.1
5	CLAY	33.5	42.1
5	CLAY	33.5	42.1
5	CLAY	33.5	42.1
5	CLAY	33.5	42.1
5	CLAY	33.5	42.1

5	CLAY	33.5	42.1
5	CLAY	33.5	42.1
5	CLAY	33.5	42.1
5	CLAY	33.5	42.1
5	CLAY	33.5	42.1
6	GRAVEL	42.1	43
6	GRAVEL	42.1	43
6	GRAVEL	42.1	43
6	GRAVEL	42.1	43
6	GRAVEL	42.1	43
6	GRAVEL	42.1	43
6	GRAVEL	42.1	43
6	GRAVEL	42.1	43
6	GRAVEL	42.1	43
6	GRAVEL	42.1	43
6	GRAVEL	42.1	43
6	GRAVEL	42.1	43
6	GRAVEL	42.1	43
6	GRAVEL	42.1	43
6	GRAVEL	42.1	43
6	GRAVEL	42.1	43
6	GRAVEL	42.1	43
6	GRAVEL	42.1	43
7	CLAY	43	45.7
7	CLAY	43	45.7
7	CLAY	43	45.7
7	CLAY	43	45.7
7	CLAY	43	45.7
7	CLAY	43	45.7
7	CLAY	43	45.7
7	CLAY	43	45.7
7	CLAY	43	45.7
7	CLAY	43	45.7
7	CLAY	43	45.7
7	CLAY	43	45.7
7	CLAY	43	45.7
7	CLAY	43	45.7
7	CLAY	43	45.7
7	CLAY	43	45.7
7	CLAY	43	45.7
7	CLAY	43	45.7

8	SHALE	45.7	59.7
8	SHALE	45.7	59.7
8	SHALE	45.7	59.7
8	SHALE	45.7	59.7
8	SHALE	45.7	59.7
8	SHALE	45.7	59.7
8	SHALE	45.7	59.7
8	SHALE	45.7	59.7
8	SHALE	45.7	59.7
8	SHALE	45.7	59.7
8	SHALE	45.7	59.7
8	SHALE	45.7	59.7
8	SHALE	45.7	59.7
8	SHALE	45.7	59.7
8	SHALE	45.7	59.7
8	SHALE	45.7	59.7
8	SHALE	45.7	59.7
8	SHALE	45.7	59.7

Well ID: 7100320
Construction Date: 2008-01-09

Easting: 563942
Northing: 4888984

UTM Zone 17
Positional Accuracy: margin of error : 10 - 30 m

Well Depth: 54.3
Well Diameter (cm): 15.2
Water First Found: 51
Static Level: 13

Water Kind Not stated
Final Status Water Supply
Primary Water Use: Domestic

Pump Rate (LPM): 22
Recommended Pump Rate: 22
Pumping Duration (h:m): 1 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	SAND	0	6.12
2	CLAY	6.12	22.9
3	SAND	22.9	25.9
4	CLAY	25.9	35.0
5	SHALE	35.0	54.3

Well ID: 7100321
Construction Date: 2008-01-09

Easting: 563938
Northing: 4888980

UTM Zone 17
Positional Accuracy: margin of error : 10 - 30 m

Well Depth: 29.9
Well Diameter (cm): 15.2
Water First Found: 27
Static Level: 8

Water Kind
Final Status Water Supply
Primary Water Use: Domestic

Pump Rate (LPM): 45
Recommended Pump Rate: 45
Pumping Duration (h:m): 1 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	SAND	0	3
2	SAND	3	20.1
3	LIMESTONE	20.1	29.9

Well ID: 7140973
Construction Date: 2010-03-04

Easting: 563823
Northing: 4888528

UTM Zone 17
Positional Accuracy: margin of error : 30 m - 100 m

Well Depth: 29.3
Well Diameter (cm): 15.2
Water First Found: 13.1
Static Level: 9

Water Kind Untested
Final Status Water Supply
Primary Water Use: Domestic

Pump Rate (LPM): 68
Recommended Pump Rate: 68
Pumping Duration (h:m): 1 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	SAND	0	1.21
1	SAND	0	1.21
2	CLAY	1.21	4.26
2	CLAY	1.21	4.26
3	GRAVEL	4.26	7.01
3	GRAVEL	4.26	7.01
4	SHALE	7.01	7.6
4	SHALE	7.01	7.6
5	GRAVEL	7.6	8.53
5	GRAVEL	7.6	8.53
6	SHALE	8.53	9.75
6	SHALE	8.53	9.75
7	LIMESTONE	9.75	22.3
7	LIMESTONE	9.75	22.3
8	SHALE	22.3	29.3
8	SHALE	22.3	29.3

Well ID: 7188688
Construction Date: 2012-10-04

Easting: 562944
Northing: 4888489

UTM Zone 17
Positional Accuracy: margin of error : 30 m - 100 m

Well Depth: 44.2
Well Diameter (cm): 15.2
Water First Found: 36.9
Static Level: 22

Water Kind FRESH
Final Status Water Supply
Primary Water Use: Domestic

Pump Rate (LPM): 36
Recommended Pump Rate: 36
Pumping Duration (h:m): 1 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0	5.49
1	CLAY	0	5.49
1	CLAY	0	5.49
1	CLAY	0	5.49
2	GRAVEL	5.49	16.8
2	GRAVEL	5.49	16.8
2	GRAVEL	5.49	16.8
2	GRAVEL	5.49	16.8
3	CLAY	16.8	27.7
3	CLAY	16.8	27.7
3	CLAY	16.8	27.7
3	CLAY	16.8	27.7
4	LIMESTONE	27.7	37.5

4	LIMESTONE	27.7	37.5
4	LIMESTONE	27.7	37.5
4	LIMESTONE	27.7	37.5
5	LIMESTONE	37.5	43.6
5	LIMESTONE	37.5	43.6
5	LIMESTONE	37.5	43.6
5	LIMESTONE	37.5	43.6
6	SHALE	43.6	44.2
6	SHALE	43.6	44.2
6	SHALE	43.6	44.2
6	SHALE	43.6	44.2

Well ID: 7199023
Construction Date: 2013-03-20

Easting: 562832
Northing: 4888384

UTM Zone 17
Positional Accuracy: margin of error : 30 m - 100 m

Well Depth: 46.3
Well Diameter (cm): 15.2
Water First Found: 43.3
Static Level: 22

Water Kind FRESH
Final Status Water Supply
Primary Water Use: Domestic

Pump Rate (LPM): 36
Recommended Pump Rate: 36
Pumping Duration (h:m): 1 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	SILT	0	8.53
1	SILT	0	8.53
1	SILT	0	8.53
1	SILT	0	8.53
2	SAND	8.53	26.5
2	SAND	8.53	26.5
2	SAND	8.53	26.5
2	SAND	8.53	26.5
3	CLAY	26.5	32.3
3	CLAY	26.5	32.3
3	CLAY	26.5	32.3
3	CLAY	26.5	32.3
4	LIMESTONE	32.3	38.1
4	LIMESTONE	32.3	38.1
4	LIMESTONE	32.3	38.1
4	LIMESTONE	32.3	38.1
5	LIMESTONE	38.1	46.0
5	LIMESTONE	38.1	46.0
5	LIMESTONE	38.1	46.0
5	LIMESTONE	38.1	46.0
6	SHALE	46.0	46.3
6	SHALE	46.0	46.3
6	SHALE	46.0	46.3
6	SHALE	46.0	46.3

Well ID: 7246259
Construction Date: 2015-08-10

Easting: 562823
Northing: 4888398

UTM Zone 17
Positional Accuracy: margin of error : 30 m - 100 m

Well Depth: 45.1
Well Diameter (cm): 15.9
Water First Found: 33.5
Static Level: 20

Water Kind FRESH
Final Status Water Supply
Primary Water Use: Domestic

Pump Rate (LPM): 18
Recommended Pump Rate: 18
Pumping Duration (h:m): 2 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0	11.3
1	CLAY	0	11.3
1	CLAY	0	11.3
1	CLAY	0	11.3
2	CLAY	11.3	25.6
2	CLAY	11.3	25.6
2	CLAY	11.3	25.6
2	CLAY	11.3	25.6
3	LIMESTONE	25.6	29.3
3	LIMESTONE	25.6	29.3
3	LIMESTONE	25.6	29.3
3	LIMESTONE	25.6	29.3
4	LIMESTONE	29.3	45.1
4	LIMESTONE	29.3	45.1
4	LIMESTONE	29.3	45.1
4	LIMESTONE	29.3	45.1

Well ID: 7273758
Construction Date: 2016-10-21

Easting: 563021
Northing: 4888537

UTM Zone 17
Positional Accuracy: margin of error : 30 m - 100 m

Well Depth: 79.3
Well Diameter (cm): 12.7
Water First Found: 73.5
Static Level: 21

Water Kind FRESH
Final Status Water Supply
Primary Water Use: Domestic

Pump Rate (LPM): 45
Recommended Pump Rate: 45
Pumping Duration (h:m): 3 :

Layer:	Driller's Description:	Top:	Bottom:
1	SAND	0	2.44
1	SAND	0	2.44
1	SAND	0	2.44
2	GRAVEL	2.44	25.3
2	GRAVEL	2.44	25.3
2	GRAVEL	2.44	25.3
3	LIMESTONE	25.3	36.9
3	LIMESTONE	25.3	36.9
3	LIMESTONE	25.3	36.9
4	LIMESTONE	36.9	41.8
4	LIMESTONE	36.9	41.8
4	LIMESTONE	36.9	41.8
5	SHALE	41.8	67.4

5	SHALE	41.8	67.4
5	SHALE	41.8	67.4
6	ROCK	67.4	75
6	ROCK	67.4	75
6	ROCK	67.4	75
7	SHALE	75	79.3
7	SHALE	75	79.3
7	SHALE	75	79.3

Well ID: 7285247
Construction Date: 2017-04-13
Easting: 562914
Northing: 4888329
UTM Zone 17
Positional Accuracy: margin of error : 30 m - 100 m

Well Depth: 43.3
Well Diameter (cm): 15.2
Water First Found: 39.9
Static Level: 22
Water Kind FRESH
Final Status Water Supply
Primary Water Use: Domestic
Pump Rate (LPM): 32
Recommended Pump Rate: 32
Pumping Duration (h:m): 1 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0	3.66
1	CLAY	0	3.66
2	CLAY	3.66	22.9
2	CLAY	3.66	22.9
3	CLAY	22.9	30.2
3	CLAY	22.9	30.2
4	LIMESTONE	30.2	43.3
4	LIMESTONE	30.2	43.3

Well ID: 7311464
Construction Date: 2018-05-18
Easting: 563054
Northing: 4888378
UTM Zone 17
Positional Accuracy: margin of error : 30 m - 100 m

Well Depth: 43.3
Well Diameter (cm): 15.2
Water First Found: 39.3
Static Level: 21
Water Kind FRESH
Final Status Water Supply
Primary Water Use: Domestic
Pump Rate (LPM): 55
Recommended Pump Rate: 45
Pumping Duration (h:m): 1 :

Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0	5.18
1	CLAY	0	5.18
1	CLAY	0	5.18
1	CLAY	0	5.18
2	SAND	5.18	22.6
2	SAND	5.18	22.6
2	SAND	5.18	22.6
2	SAND	5.18	22.6
3	CLAY	22.6	25.3
3	CLAY	22.6	25.3
3	CLAY	22.6	25.3
3	CLAY	22.6	25.3
4	LIMESTONE	25.3	43.3

4	LIMESTONE	25.3	43.3
4	LIMESTONE	25.3	43.3
4	LIMESTONE	25.3	43.3