

Aggregate Resource Evaluation for Proposed Anthony Aggregate Pit, 4454 Victoria Road South, Puslinch, Ontario

Final Report



Stantec Consulting Ltd.

Prepared for:
CBM Aggregates 55 Industrial Street, Toronto,
Ontario, M4G 3W9

July 17, 2026

Prepared by:
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Project/File:
160961457

Limitations and Sign-off

The conclusions in the Aggregate Resource Evaluation for Proposed Anthony Aggregate Pit, 4454 Victoria Road South, Puslinch, Ontario are Stantec's professional opinion, as of the time of the Report, based on a reasonable sampling of subsurface conditions at specific borehole locations. The conclusions presented in this report reflect site conditions existing at the time of the investigation and a review of available information presented herein. Should subsurface conditions be encountered which vary materially from those observed in the boreholes completed as part of this aggregate resource evaluation, we recommend that Stantec be consulted to review the additional information and verify if there are any changes to the conclusions provided in this report.

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

This report was prepared by Qualified Persons (QPs) and their Curriculum vitae are provided in Appendix E.

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Senior Hydrogeologist

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Stephen Di Biase, M.Sc., P.Geo.
Senior Hydrogeologist

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Table of Contents

Limitations and Sign-off	i
1 Introduction	1
2 Field Study Methodology and Results	2
3 Analysis and Conclusions	3
3.1 Aggregate Resource	3
4 References	4

List of Appendices

Appendix A: Figures

Figure 1	Site Location
Figure 2	Site Instrumentation
Figure 3	Cross Section A-A
Figure 4	Proposed Anthony Pit Site Plan

Appendix B: Tables

Table 1	Borehole Completion Details
Table 2	Summary of Select Soil Testing Results

Appendix C: Borehole Logs

Appendix D: Soil Testing Results

Appendix E: Project Team Curriculum Vitae



1 Introduction

CBM Aggregates a division of St. Marys Cement Inc. (Canada) (CBM) has retained Stantec Consulting Ltd. (Stantec) to prepare an aggregate resource evaluation for a proposed new aggregate pit near Aberfoyle, Ontario. The property for the proposed aggregate pit development, shown in purple on Figure 1 (Appendix A) is approximately 23.37 hectares (ha.) in size and located at 4454 Victoria Road South, in the Township of Puslinch, Wellington County. The area to be licensed as the Anthony Aggregate Pit (the Site) is approximately 18.03 ha and shown in red on Figure 1. The legal description of the Site is Lot 22, Concession 8, Geographic Township of Puslinch, Wellington County.

Figures and tables referenced within this report are attached in Appendices A and B, respectively. Borehole logs are provided in Appendix C and soil testing laboratory results are provided in Appendix D. Curriculum Vitae for the report writers are provided in Appendix E.



2 Field Study Methodology and Results

Geological borehole drilling was carried out at five locations (MW21-1 through MW21-5; Figure 2), between November 1 and 8, 2021. The boreholes were drilled by Insitu Contractors Inc. (Insitu), using a truck-mounted sonic drill-rig. Boreholes at the Site were advanced using 6-inch (152.4 mm) outer diameter sonic drill rods. Stantec staff supervised the drilling activities, collected soil samples and logged the soil core.

Following the drilling, each borehole was instrumented with a 2-inch (50 mm) diameter PVC monitoring well, in accordance with O.Reg. 903 (as recently amended). Each monitoring well is completed with a 1.5 m long, 10-slot well screen located at the base of the borehole. The annular space of the monitoring wells were backfilled with silica sand to a height of approximately 1 m above the top of the well screen. Above the sand pack, the annular space was backfilled with a bentonite slurry, up to ground surface. The monitoring wells were secured with a 4" x 4" lockable protective cover. Ground surface elevations and top of pipe reference point elevations at the five monitoring wells were surveyed by Stantec using a Trimble R10 GPS rover. Details of monitoring well construction are summarized in Table 1 (Appendix B).

The soil logs and well construction details for each borehole are provided in Appendix C. Soil samples recovered from the borehole drilling were logged and submitted to Stantec's soil testing laboratory in Markham, Ontario for analysis with respect to grain size distribution, fineness modulus (FM) of the total sample and sand, wash loss, crushable stone content, and stone/sand ratio. The grain size distribution curves are shown on Figures D1 through D5 in Appendix D. The remainder of the analytical results are included as summary tables, compiled within Appendix D. Table 2 (Appendix B) provides a summary comparison of key aggregate indicators (e.g., soil composition, FM values, uniformity coefficients and soil descriptions).



3 Analysis and Conclusions

A summary profile of the borehole drilling results (Cross Section A – A') is shown on Figure 3, with the location of the cross section delineated on Figure 2. Underlying the Site is a large deposit, approximately 23 m thick, of sand and gravel. This deposit is encountered from near ground surface to below 298 m above mean sea level (masl). Analytical results indicate the gravel size generally ranged from fine to coarse, while the sand size generally ranged from medium to coarse. These sand and gravel soils are typically well graded (i.e., uniformity coefficient greater than 10%) and contain trace amounts of fine-grained material (i.e., silt and clay). Sub-rounded cobbles were regularly encountered within this deposit. The average Fineness Modulus (FM) value of all samples collected reflects 3.1 (full value) and 2.3 (sand portion).

Lenses of silty sand to silt and sand, approximately 2 m thick, were encountered at MW21-2 through MW21-4. These lenses of finer grained soil were generally encountered between 318 masl and 308.5 masl. These sand and silt lenses are poorly graded, with a uniformity coefficient less than 4%. These layers are not considered to be laterally extensive throughout the property.

The bedrock surface was encountered at MW21-05, at an elevation of 307.33 masl. This observation is consistent with the City of Guelph's Tier 3 Study (Matrix 2017), which indicates the bedrock surface dips in a southwesterly direction beneath the Site, ranging from 308 masl along Victoria Road to approximately 292 masl along the western limit of the Site. As described in Stantec (2026a), the bedrock surface reflects the Reformatory Quarry member of the Eramosa Formation.

3.1 Aggregate Resource

The sand and gravel soils encountered at the Site reflect a valuable aggregate resource from near ground surface to the bedrock surface. The confirmed base of the aggregate resource varies from a high elevation of 308 masl (on the eastern limit of the Site) to a low elevation of 298 masl (on the western limit of the Site). According to ASTM C33 specifications, the FM of collected samples are suitable feed to yield aggregate products such as concrete stone and concrete sand.

Figure 4 shows the proposed extraction limit of the Site, which reflects an area of 8.77 ha. Based on the geologic information obtained from the field study, approximately 1 million tonnes of aggregate resource is available within the extraction limit. This is based on an aggregate resource thickness of 17.5 m (equivalent to a pit depth of 304 masl) and an average material density of 1.75 tonnes/m³.

The maximum predicted water table elevation within the limit of extraction ranges from 322.7 masl in the northeastern corner to 320.3 masl in the southwestern corner (Stantec, 2026b). Approximately 90% to 95% of the aggregate resource is therefore below water table.



4 References

American Standards Transforming Markets International. ASTM C33/C33M-24a. Standard Specification for Concrete Aggregates

Matrix Solutions Inc. March 2017. City Of Guelph and Township of Guelph/Eramosa Tier Three Water Budget and Local Area Risk Assessment.

Stantec Consulting Ltd. (Stantec). 2026a. Level I and II Water Report for Proposed Anthony Aggregate Pit, Puslinch, Ontario. Prepared for CBM Aggregates, February 2026.

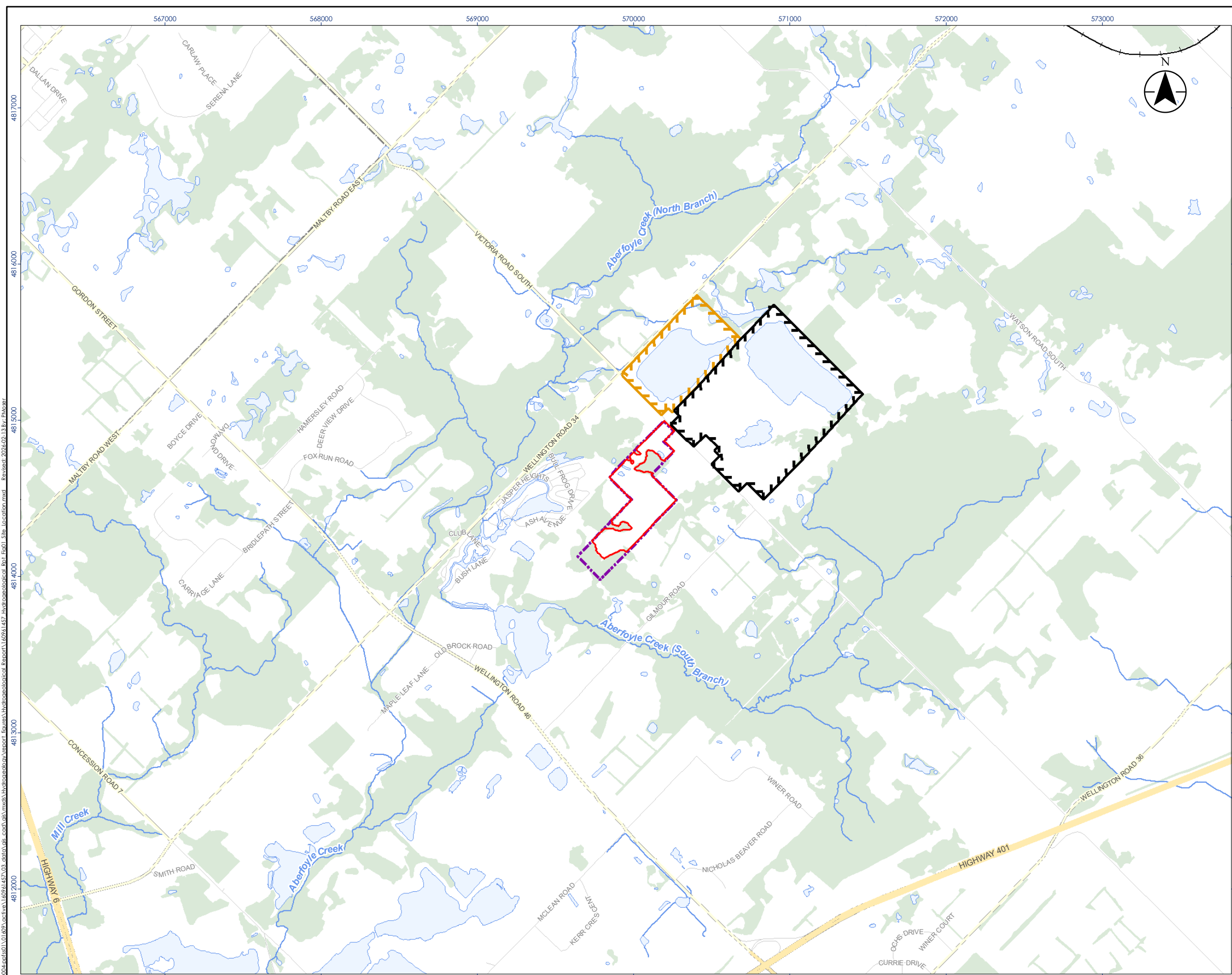
Stantec Consulting Ltd. (Stantec). 2026b. Maximum Predicted Water Table Technical Memorandum, Proposed Anthony Aggregate Pit, 4454 Victoria Road South, Puslinch, Ontario. Prepared for CBM Aggregates, February 13, 2026.



Appendix A

Figures





Legend

- Site
- 4454 Victoria Road South
- Expressway / Highway
- Major Road
- Minor Road
- Railway
- Watercourse
- Waterbody
- Wooded Area
- Municipal Boundary - Lower Tier
- Dufferin Aggregate Pit
- CBM Tikal Pit (Licence Surrendered)

0 500 1,000 metres
1:25,000 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
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Project Location 160961457 REVA
Puslinch, ON Prepared by PRM on 2026-02-13
Technical Review by SMD on 2026-02-10

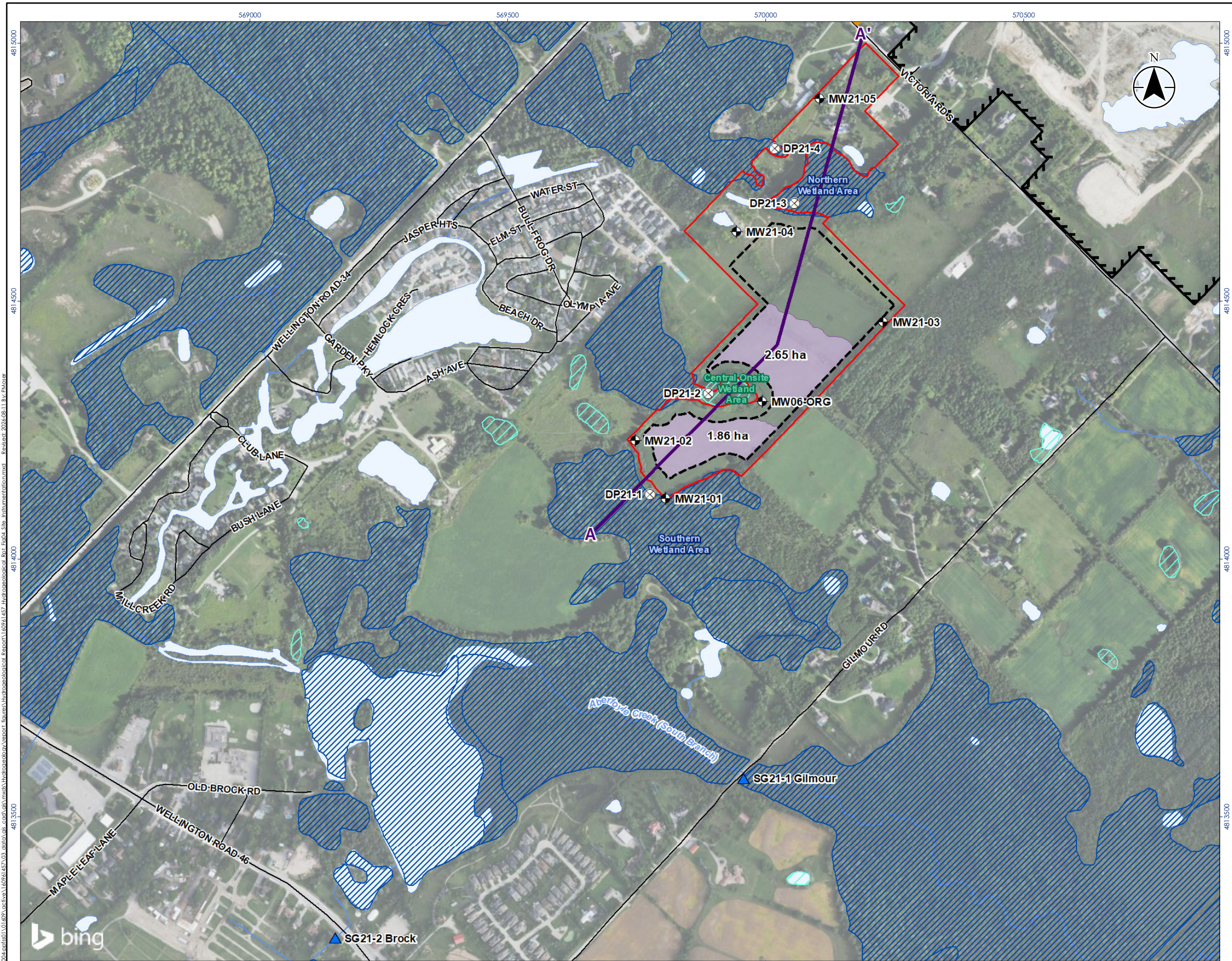
Client/Project
AGGREGATE RESOURCE EVALUATION
PROPOSED ANTHONY AGGREGATE PIT,
4454 VICTORIA ROAD SOUTH, PUSLINCH, ONTARIO

Figure No.

1

Title

Site Location



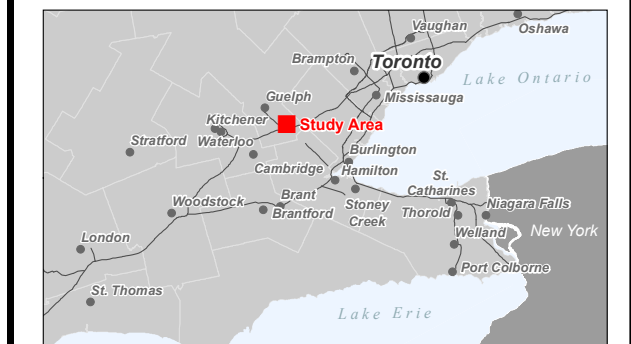
Legend

- Site
- Monitoring Well
- Drive-point Piezometer
- Surface Water Monitoring Location
- Cross-Section Location
- Road
- Watercourse
- Waterbody
- Wetland - Evaluated (Provincial)
- Wetland - Not evaluated per Ontario Wetland Evaluation System
- Dufferin Aggregate Pit
- Extraction Footprints
 - Area of Extraction Footprint
 - Below Water Table Extraction Footprint

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Notes

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Client/Project
AGGREGATE RESOURCE EVALUATION
PROPOSED ANTHONY AGGREGATE PIT,
4454 VICTORIA ROAD SOUTH, PUSLINCH, ONTARIO

Figure No.

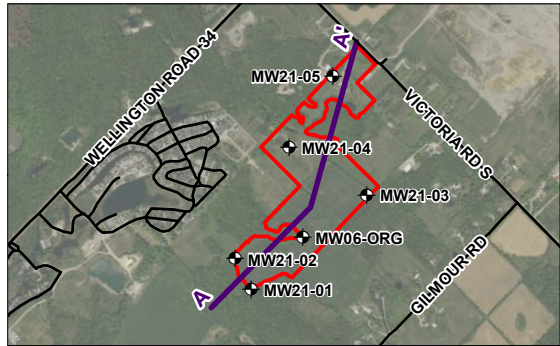
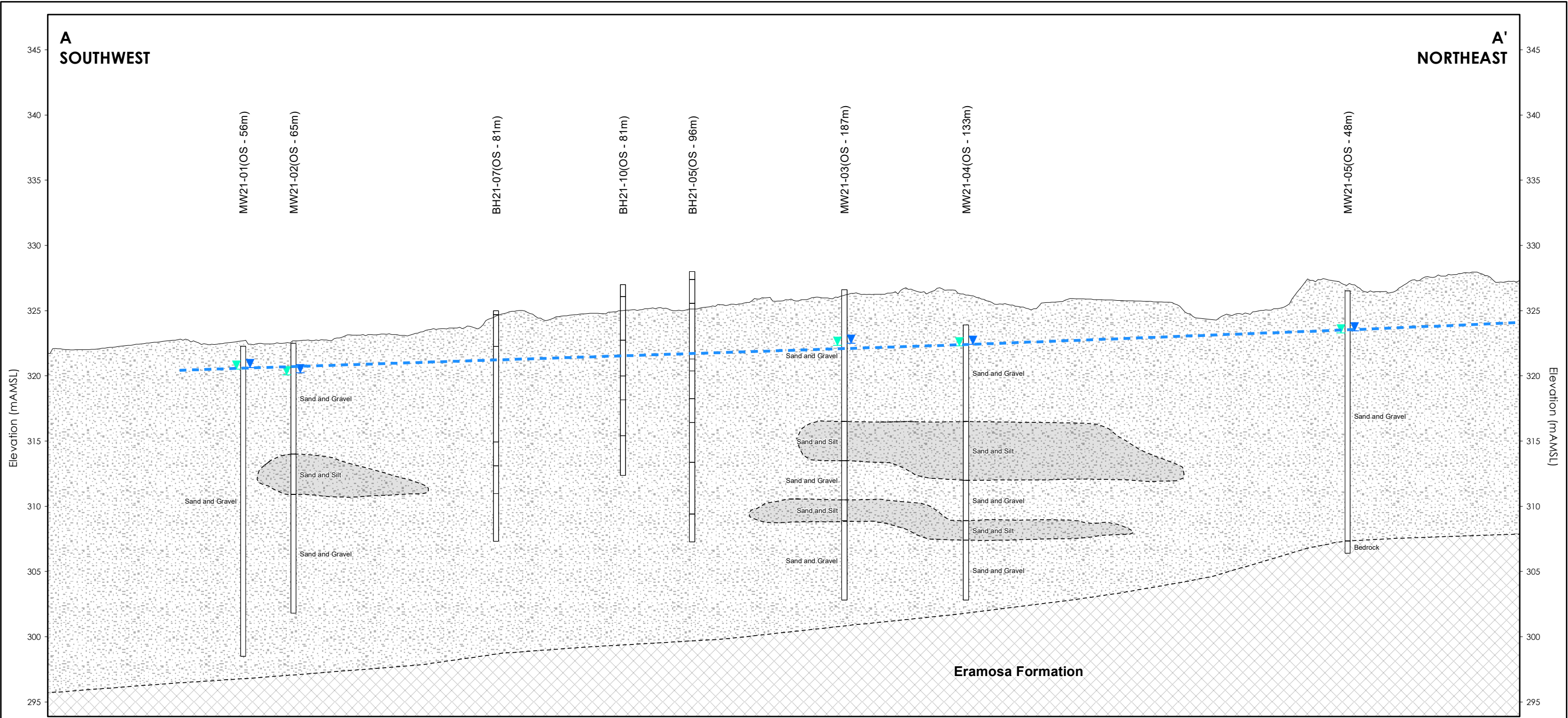
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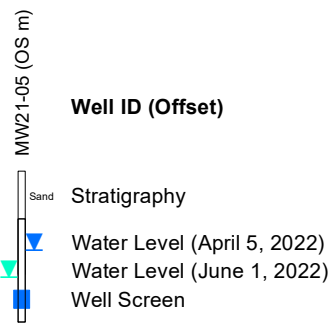
Site Instrumentation



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Revised: 2024-02-13 By: P.Moier



Notes
1.



- Legend**
- Ground Surface
 - Interpreted Geological Transition
 - Groundwater Elevation
 - Sand / Sand & Gravel
 - Sand and Silt
 - Dolostone Bedrock

Stantec

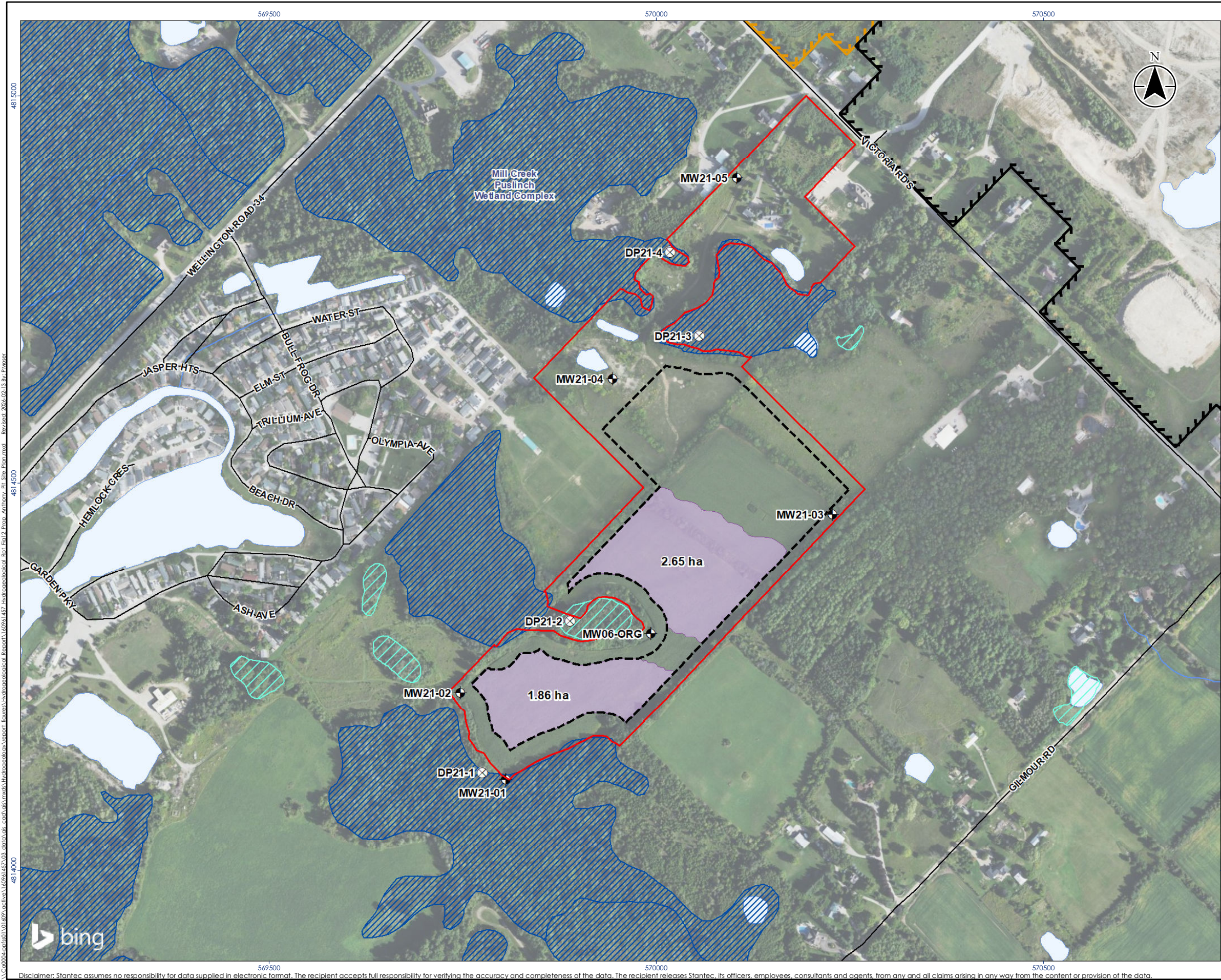
Project Location
Puslinch, ON

160961457 REVA
Prepared by PRM on 2024-02-13
Technical Review by SMD on 2024-02-10

Client/Project
AGGREGATE RESOURCE EVALUATION
PROPOSED ANTHONY AGGREGATE PIT,
4454 VICTORIA ROAD SOUTH, PUSLINCH, ONTARIO

Figure No.
3

Title
Cross-Section A-A'

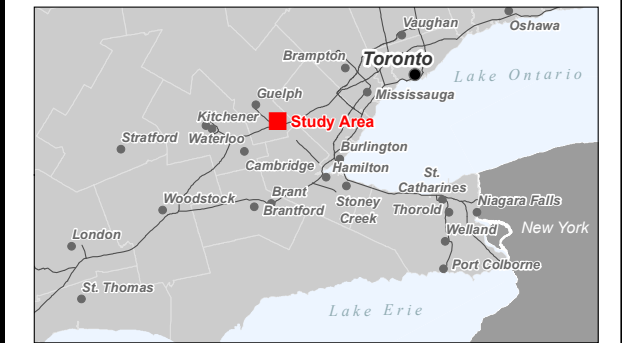


Legend

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- Drive-point Piezometer
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AGGREGATE RESOURCE EVALUATION
PROPOSED ANTHONY AGGREGATE PIT,
4454 VICTORIA ROAD SOUTH, PUSLINCH, ONTARIO

Figure No.
4
Title
Proposed Anthony Pit Site Plan

Appendix B

Tables



Table 1
Borehole Completion Details
Aggregate Resource Evaluation
Proposed Anthony Aggregate Pit

Monitor ID	Location	Installation Date	Coordinates		Elevation		Stick-up (m AGS)	Borehole Depth (m BGS)	Screen Diameter (mm)	Screened Interval				Screened Unit
			Easting	Northing	Ground Surface m AMSL	Top of Casing m AMSL				Bottom of Screen/Open Hole (m BGS) (m AMSL)		Top of Screen/Open Hole (m BGS) (m AMSL)		
Monitoring Wells														
MW21-01	Aberfoyle, ON	2021	569805.7	4814118	322.27	323.05	0.78	23.77	50	20.42	301.85	18.90	303.37	Sand/Gravel
MW21-02	Aberfoyle, ON	2021	569746.8	4814230	322.48	323.27	0.79	20.88	50	18.59	303.89	15.54	306.94	Sand/Gravel
MW21-03	Aberfoyle, ON	2021	570227.5	4814460	326.6	327.5	0.90	23.77	50	16.76	309.84	13.72	312.88	Sand/Gravel
MW21-04	Aberfoyle, ON	2021	569943.3	4814635	323.85	324.63	0.78	21.03	50	20.73	303.12	17.68	306.17	Sand/Gravel
MW21-05	Aberfoyle, ON	2021	570103.8	4814894	326.53	327.37	0.84	20.12	50	8.23	318.30	5.18	321.35	Sand/Gravel
MW06-ORG	Aberfoyle, ON	unknown	569992.9	4814306	322.74	323.81	1.07	4.31	50	4.31	318.43	unknown	unknown	Sand/Gravel

Notes:

m AGS: metres above ground surface
m BGS: metres below ground surface
m AMSL: metres above mean sea level

Table 2
Summary of Select Soil Testing Results
Aggregate Resource Evaluation
Proposed Anthony Aggregate Pit

Hole	Sample ID	Run Depth Range (m)	Run Depth Range (mASL)	% Gravel	% Sand	%Silt/ Clay	Full FM Value	Sand Portion FM Value	d ₆₀ value (mm)	d ₁₀ value (mm)	Uniformity Coefficient (%)	General Soil Description
MW21-01	1	0 to 2.44	322.27 to 319.83	43.5	53.1	3.4	3.47	2.11	8	0.1	80	SAND and GRAVEL, trace silt
	2	2.44 to 5.49	319.83 to 316.78	47.0	52.1	0.9	4.79	3.72	6.7	0.4	17	SAND and GRAVEL, trace silt
	3	5.49 to 8.53	316.78 to 313.74	14.3	84.9	0.8	2.32	2.08	0.7	0.11	6	gravelly SAND, trace silt
	4	8.53 to 9.14	313.74 to 313.13	36.3	63.3	0.4	3.84	3.11	3.5	0.25	14	SAND and GRAVEL, trace silt
	5	9.14 to 10.06	313.13 to 312.21	16.4	78.2	5.4	1.54	1.14	0.26	0.08	3	gravelly SAND, some silt
	6	10.06 to 11.58	312.21 to 310.69	2.7	91.7	5.6	1.41	1.41	0.28	0.08	4	SAND, some silt, trace gravel
	7	11.58 to 13.11	310.69 to 309.16	48.1	51.2	0.7	2	2.5	9	0.11	82	SAND and GRAVEL, trace silt
	8	13.11 to 14.63	309.16 to 307.64	0.7	97.5	1.8	1.32	1.32	0.3	0.09	3	SAND, trace gravel and silt
	9	14.63 to 16.15	307.64 to 306.12	32.4	67.0	0.6	3.62	3.18	2.8	0.2	14	gravelly SAND, trace silt
	10	16.15 to 17.68	306.12 to 304.59	59.2	39.7	1.1	4.52	3.25	11	0.25	44	SAND and GRAVEL, trace silt
	11	17.68 to 19.20	304.59 to 303.07	49.6	48.7	1.7	4	2.56	11	0.11	100	SAND and GRAVEL, trace silt
	12	19.20 to 20.73	303.07 to 301.54	56.2	43.1	0.7	4.34	2.98	13	0.2	65	SAND and GRAVEL, trace silt
	13	20.73 to 22.25	301.54 to 300.02	49.1	49.6	1.3	3.69	2.67	9	0.11	82	SAND and GRAVEL, trace silt
	14	22.25 to 23.77	300.02 to 298.5	36.3	62.4	1.3	3.1	2.07	2.4	0.11	22	SAND and GRAVEL, trace silt
MW21-02	1	0 to 1.52	322.48 to 320.96	70.8	28.8	0.4	6.01	4.13	20	0.9	22	sandy GRAVEL, trace silt
	2	1.52 to 2.44	320.96 to 320.04	68.7	30.3	1.0	5.62	3.78	20	0.5	40	gravelly SAND, trace silt
	3	2.44 to 3.96	320.04 to 318.52	87.0	12.8	0.2	7.25	4.56	40	3	13	GRAVEL, some sand, trace silt
	4	3.96 to 5.49	318.52 to 316.99	50.5	49.1	0.4	4.54	3.2	12	0.3	40	SAND and GRAVEL, trace silt
	5	5.49 to 7.01	316.99 to 315.47	0.0	96.0	4.0	0.54	0.54	0.16	0.08	2	SAND, trace silt
	6	7.01 to 8.53	315.47 to 313.95	0.0	97.5	2.5	0.2	0.2	0.11	0.08	1	SAND, trace silt
	7	8.53 to 10.06	313.95 to 312.42	0.0	50.8	49.2	0.03	0.03	0.86	0.05	17	SAND and SILT
	8	10.06 to 11.58	312.42 to 310.90	0.0	62.2	37.8	0.03	0.03	0.95	0.06	16	SAND and SILT
	9	11.58 to 13.11	310.9 to 309.37	3.5	94.5	2.0	1.79	1.78	0.4	0.1	4	SAND, trace gravel and silt
	10	13.11 to 14.63	309.37 to 307.85	65.1	34.5	0.4	5.14	3.4	20	0.35	57	SAND and GRAVEL, trace silt
	11	14.63 to 16.15	307.85 to 306.33	25.1	71.9	3.0	2.66	2.11	1.1	0.1	11	gravelly SAND, trace silt
	12	16.15 to 17.68	306.33 to 304.80	13.5	84.8	1.7	1.93	1.61	0.4	0.1	4	gravelly SAND, trace silt
	13	17.68 to 19.20	304.8 to 303.28	0.0	99.2	0.8	1	1	0.2	0.1	2	SAND, trace silt
	14	19.20 to 20.73	303.28 to 301.75	36.4	61.5	2.1	3.08	2.49	3.6	0.1	36	SAND and GRAVEL, trace silt
MW21-03	1	0 to 1.52	326.60 to 325.08	43.7	55.6	0.7	4.39	3.48	5.5	0.23	24	SAND and GRAVEL, trace silt
	2	1.52 to 3.05	325.08 to 323.55	75.6	24.1	0.3	6.46	4.07	30	1	30	sandy GRAVEL, trace silt
	3	3.05 to 3.96	323.55 to 322.64	88.4	11.5	0.1	7.66	4.93	40	4	10	sandy GRAVEL, trace silt
	4	3.96 to 5.49	322.64 to 321.11	63.3	36.4	0.3	5.78	4.11	17	0.8	21	SAND and GRAVEL, trace silt
	5	5.49 to 8.53	321.11 to 318.07	80.8	19.0	0.2	6.75	4.37	30	1.8	17	sandy GRAVEL, trace silt
	6	8.53 to 10.06	318.07 to 316.54	0.4	98.4	1.2	1.18	1.17	0.3	0.11	3	SAND, trace gravel and silt
	7	10.06 to 11.58	316.54 to 315.02	0.0	94.2	5.8	0.75	0.75	0.2	0.08	3	SAND, some silt
	8	11.58 to 13.11	315.02 to 313.49	0.0	92.8	7.2	0.42	0.42	0.15	0.078	2	SAND, some silt
	9	13.11 to 14.63	313.49 to 311.97	0.8	97.2	2.0	0.86	0.86	0.2	0.087	2	SAND, trace gravel and silt
	10	14.63 to 16.15	311.97 to 310.45	34.1	62.8	3.1	3.22	2.69	2.8	0.12	23	gravelly SAND, trace silt
	11	16.15 to 17.68	310.45 to 308.92	0.0	85.7	14.3	0.11	0.11	0.1	0.07	1	SAND and SILT
	12	17.68 to 19.20	308.92 to 307.40	35.3	63.8	0.9	2.6	1.29	1.4	0.089	16	SAND and GRAVEL, trace silt
	13	19.20 to 20.73	307.40 to 305.87	26.9	69.7	3.4	2.37	1.81	1.2	0.087	14	gravelly SAND, trace silt
	14	20.73 to 22.25	305.87 to 304.35	3.5	94.0	2.5	1.99	1.98	0.5	0.1	5	SAND, trace gravel and silt
	15	22.25 to 23.77	304.35 to 302.83	0.4	93.7	5.9	0.78	0.78	0.2	0.08	3	SAND, some silt, trace gravel
MW21-04	1	0 to 1.52	323.85 to 322.33	47.1	51.7	1.2	3.75	2.42	10	0.11	91	SAND and GRAVEL, trace silt
	2	1.52 to 2.74	322.33 to 321.11	54.0	45.3	0.7	3.63	3.37	13	0.17	76	SAND and GRAVEL, trace silt
	3	2.74 to 4.27	321.11 to 319.58	52.7	47.1	0.2	4.08	3.79	11	0.5	22	SAND and GRAVEL, trace silt
	4	4.27 to 5.79	319.58 to 318.06	48.4	51.3	0.3	4.09	3.77	7	0.4	18	SAND and GRAVEL, trace silt
	5	5.79 to 7.32	318.06 to 316.53	0.0	98.7	1.3	0.44	0.44	0.13	0.08	2	SAND, trace silt
	6	7.32 to 8.84	316.53 to 315.01	0.0	65.1	34.9	0.02	0.02	0.097	0.05	2	Silty SAND
	7	8.84 to 10.36	315.01 to 313.49	0.0	58.0	42.0	0.04	0.04	0.095	0.05	2	SAND and SILT
	8	10.36 to 11.89	313.49 to 311.96	0.0	82.0	18.0	0.07	0.07	0.11	0.066	2	Silty SAND
	9	11.89 to 13.41	311.96 to 310.44	10.3	89.2	0.5	1.4	1.31	0.28	0.088	3	gravelly SAND, trace silt
	10	13.41 to 14.94	310.44 to 308.91	2.3	92.3	5.4	2.43	2.43	1	0.09	11	SAND, some silt, trace gravel
	11	14.94 to 16.46	308.91 to 307.39	0.0	61.7	38.3	0.23	0.23	0.1	0.05	2	SAND and SILT
	12	16.46 to 17.98	307.39 to 305.87	2.1	96.9	1.0	2.06	2.04	0.5	0.17	3	SAND, trace gravel and silt
	13	17.98 to 18.59	305.87 to 305.26	90.5	9.4	0.1	4.49	4.12	40	2.7	15	GRAVEL, some sand, trace silt
	14	18.59 to 20.12	305.26 to 303.73	69.8	29.7	0.5	4.41	3.97	16	0.8	20	sandy GRAVEL, trace silt
	15	20.12 to 21.03	303.73 to 302.82	99.4	0.6	0.0	4.52	4.07	40	10	4	GRAVEL, trace sand
MW21-05	1	0 to 1.52	326.53 to 325.01	67.8	31.5	0.7	5.62	3.86	18	0.06	300	sandy GRAVEL, trace silt
	2	1.52 to 2.44	325.01 to 324.09	74.8	24.9	0.3	6.27	4.06	30	0.09	333	sandy GRAVEL, trace silt
	3	2.44 to 3.96	324.09 to 322.57	70.6	29.2	0.2	6.05	4.11	21	0.08	263	sandy GRAVEL, trace silt
	4	3.96 to 5.49	322.57 to 321.04	83.2	16.6	0.2	6.9	4.41	40	2	20	sandy GRAVEL, trace silt
	5	5.49 to 7.01	321.04 to 319.52	76.8	23.1	0.1	6.75	4.31	50	1.1	45	sandy GRAVEL, trace silt
	6	7.01 to 8.53	319.52 to 318.00	0.0	86.9	13.1	0.49	0.49	0.14	0.07	2	silty SAND
	7	8.53 to 10.06	318.00 to 316.47	52.2	45.8	2.0	4.22	2.78	14	0.14	100	SAND and GRAVEL, trace silt
	8	10.06 to 11.58	316.47 to 314.95	34.4	64.3	1.3	3.09	2.41	3	0.11	27	gravelly SAND, trace silt
	9	11.58 to 13.11	314.95 to 313.42	31.0	65.5	3.5	2.64	2.1	2	0.1	20	gravelly SAND, trace silt
	10	13.11 to 14.63	313.42 to 311.9	34.2	62.3	3.5	2.98	2.26	3	0.1	30	gravelly SAND, trace silt
	11	14.63 to 16.15	311.9 to 310.38	35.0	60.4	4.6	2.89	2.18	3	0.1	30	SAND and GRAVEL, trace silt
	12	16.15 to 17.68	310.38 to 308.85	26.0	69.8	4.2	2.62	2.2	1.7	0.1	17	gravelly SAND, trace silt
	13	17.68 to 19.20	308.85 to 307.33	64.7	34.6	0.7	4.43	2.81	16	0.15	107	sandy GRAVEL, trace silt
Notes:							Overall Average Values:		3.1	2.3		

- FM reflects Fineness Modulus

Appendix C

Borehole Logs

Monitoring Well: MW21-01

Project: Aberfoyle Tikal Pit Expansion
Client: CBM Aggregates
Location: Aberfoyle, ON
Number: 160961457
Field investigator: R. Baker
Contractor: Insitu

Method: Sonic
Date started/completed: 01-Nov-2021 / 02-Nov-2021
Ground surface elevation: 322.27 m AMSL
Top of casing elevation: 323.05 m AMSL
Easting: 569806
Northing: 4814118

SUBSURFACE PROFILE				SAMPLE DETAILS			INSTALLATION DETAILS	
Depth	Graphic Log	Stratigraphic Description	Elevation (m AMSL) Depth (m BGS)	Sample Number	Sample Type	Recovery	Diagram	Description
(ft) (m)			323.79					
0	0	Ground Surface SAND and GRAVEL trace silt	322.27 0.00					← Above Ground Casing 0.77 m stick-up
5	2			1	GB	22" 23%		← Cement Seal 0 to 0.3 m
10	4			2	GB	50" 52%		
15				3	GB	18" 19%		
20	6			4	GB	60" 100%		← 168 mm Diameter Borehole
25	8							← Bentonite Grout 1 to 17.7 m
30	10	SAND some silt and gravel	313.13 9.14	5	GB	60" 100%		
35				6	GB	55" 92%		
40	12	SAND and GRAVEL trace silt	310.69 11.58	7	GB	58" 97%		← 51 mm Diameter Schedule 40 PVC riser
45	14	SAND trace gravel and silt	309.16 13.11	8	GB	60" 100%		
50				9	GB	48" 80%		
55	16	SAND and GRAVEL trace silt	307.64 14.63	10	GB	55" 92%		← Bentonite Chips 17.7 to 18.3 m
60	18			11	GB	48" 80%		← No. 2 Silica Sand 18.3 to 23.8 m
65	20			12	GB	50" 83%		← No. 10 Slot Schedule 40 PVC Screen 51 mm Diameter 18.9 to 20.4 m
70	22			13	GB	60" 100%		
75								
24		End of Borehole	298.50 23.77					

Screen Interval: 18.90 - 20.42 m BGS
Sand Pack Interval: 18.29 - 23.77 m BGS
Well Seal Interval: 0.30 - 18.29 m BGS

Notes:
m AMSL - metres above mean sea level
m BGS - metres below ground surface
GB - grab sample
n/a - not available



Monitoring Well: MW21-02

Project: Aberfoyle Tikal Pit Expansion
Client: CBM Aggregates
Location: Aberfoyle, ON
Number: 160961457
Field investigator: R. Baker
Contractor: Insitu

Method: Sonic
Date started/completed: 02-Nov-2021 / 03-Nov-2021
Ground surface elevation: 322.48 m AMSL
Top of casing elevation: 323.27 m AMSL
Easting: 569747
Northing: 4814230

SUBSURFACE PROFILE				SAMPLE DETAILS			INSTALLATION DETAILS	
Depth	Graphic Log	Stratigraphic Description	Elevation (m AMSL) Depth (m BGS)	Sample Number	Sample Type	Recovery	Diagram	Description
(ft) (m)			324.00					
0	0	Ground Surface	322.48					Above Ground Casing 0.83 m stick-up
5	2	SAND and GRAVEL trace silt	0.00	1	GB	48" 80%		Bentonite Chips 0 to 0.6 m
10	4			2	GB	36" 100%		
15	4			3	GB	48" 80%		
20	6	SAND trace silt	316.99	4	GB	60" 100%		
25	8		5.49	5	GB	60" 100%		168 mm Diameter Borehole
30	10	SAND and SILT	313.95	6	GB	60" 100%		Bentonite Grout 1 to 14.3 m
35	10		8.53	7	GB	60" 100%		51 mm Diameter Schedule 40 PVC riser
40	12	SAND trace gravel and silt	310.90	8	GB	60" 100%		
45	14	SAND and GRAVEL trace silt	309.37	9	GB	50" 83%		
50	16	Gravelly SAND trace silt	307.85	10	GB	60" 100%		
55	16		14.63	11	GB	48" 80%		Bentonite Chips 14.3 to 14.9 m
60	18			12	GB	60" 100%		No. 2 Silica Sand 14.9 to 20.9 m
65	20	SAND and GRAVEL trace silt	303.28	13	GB	60" 100%		No. 10 Slot Schedule 40 PVC Screen 51 mm Diameter 15.5 to 18.6 m
70	20		19.20	14	GB	60" 100%		
		End of Borehole	301.60					
			20.88					

Screen Interval: 15.54 - 18.59 m BGS
 Sand Pack Interval: 14.94 - 20.88 m BGS
 Well Seal Interval: 0.00 - 14.94 m BGS

Notes:
 m AMSL - metres above mean sea level
 m BGS - metres below ground surface
 GB - grab sample
 n/a - not available



Monitoring Well: MW21-03

Project: Aberfoyle Tikal Pit Expansion
Client: CBM Aggregates
Location: Aberfoyle, ON
Number: 160961457
Field investigator: R. Baker
Contractor: Insitu

Method: Sonic
Date started/completed: 03-Nov-2021 / 04-Nov-2021
Ground surface elevation: 326.60 m AMSL
Top of casing elevation: 327.50 m AMSL
Easting: 570228
Northing: 4814460

SUBSURFACE PROFILE				SAMPLE DETAILS			INSTALLATION DETAILS	
Depth	Graphic Log	Stratigraphic Description	Elevation (m AMSL) Depth (m BGS)	Sample Number	Sample Type	Recovery	Diagram	Description
(ft) (m)			328.12					
0	0	Ground Surface	326.60					← Above Ground Casing 0.87 m stick-up
5	2	SAND and GRAVEL trace silt	0.00	1	GB	48" 133%		Bentonite Chips 0 to 0.6 m
10	4			2	GB	60" 100%		
15	6			3	GB	30" 50%		
20	8			4	GB	60" 100%		← 168 mm Diameter Borehole
25	10			5	GB	60" 50%		← Bentonite Grout 1 to 12.5 m
30	12			6	GB	60" 100%		← 51 mm Diameter Schedule 40 PVC riser
35	14	SAND some silt	316.54	7	GB	60" 100%		
40	16		10.06	8	GB	60" 100%		
45	18	SAND trace gravel and silt	313.49	9	GB	60" 100%		← Bentonite Chips 12.5 to 13.1 m
50	20		13.11	10	GB	60" 100%		← No. 2 Silica Sand 13.1 to 23.8 m
55	22	SAND and SILT	310.45	11	GB	60" 100%		← No. 10 Slot Schedule 40 PVC Screen 51 mm Diameter 13.7 to 16.8 m
60	24	SAND trace gravel and silt	16.15	12	GB	60" 100%		
65	26		308.92	13	GB	60" 100%		
70	28		17.68	14	GB	60" 100%		
75	30	SAND and GRAVEL trace silt	304.35	15	GB	60" 100%		
24		End of Borehole	22.25					
			302.83					
			23.77					

Screen Interval: 13.72 - 16.76 m BGS
 Sand Pack Interval: 13.11 - 23.77 m BGS
 Well Seal Interval: 0.00 - 13.11 m BGS

Notes:
 m AMSL - metres above mean sea level
 m BGS - metres below ground surface
 GB - grab sample
 n/a - not available



Monitoring Well: MW21-04

Project: Aberfoyle Tikal Pit Expansion
Client: CBM Aggregates
Location: Aberfoyle, ON
Number: 160961457
Field investigator: R. Baker
Contractor: Insitu

Method: Sonic
Date started/completed: 04-Nov-2021 / 05-Nov-2021
Ground surface elevation: 323.85 m AMSL
Top of casing elevation: 324.62 m AMSL
Easting: 569943
Northing: 4814635

SUBSURFACE PROFILE				SAMPLE DETAILS			INSTALLATION DETAILS	
Depth	Graphic Log	Stratigraphic Description	Elevation (m AMSL) Depth (m BGS)	Sample Number	Sample Type	Recovery	Diagram	Description
(ft) (m)			325.37					
0	0	Ground Surface	323.85					← Above Ground Casing 0.77 m stick-up
5	2	SAND and GRAVEL trace silt	0.00	1	GB	55" 92%		Bentonite Chips 0 to 0.6 m
10	4			2	GB	36" 75%		
15				3	GB	60" 100%		
20	6		318.06	4	GB	60" 100%		← 168 mm Diameter Borehole
25	8	SAND trace silt fining downward sequent to SAND and SILT	5.79	5	GB	60" 100%		
30				6	GB	60" 100%		← 51 mm Diameter Schedule 40 PVC riser
35	10		313.49	7	GB	60" 100%		← Bentonite Grout 0.6 to 16.5 m
40	12	SAND trace gravel and silt	10.36	8	GB	55" 92%		
45			310.44	9	GB	55" 115%		
50	14	SAND and SILT	13.41	10	GB	55" 76%		
55	16		307.39	11	GB	60" 125%		
60	18	SAND trace silt coarsening downward sequence to GRAVEL, trace sand	16.46	12	GB	60" 83%		← Bentonite Chips 16.5 to 17.1 m
65			303.73	13	GB	60" 250%		← No. 2 Silica Sand 17.1 to 21.0 m
70	20	Drillers only able to advance casing to 20.1 m BGS	20.12	14	GB	60" 100%		← No. 10 Slot Schedule 40 PVC Screen 51 mm Diameter 17.7 to 20.7 m
72		End of Borehole	21.03	15	GB	60" 167%		

Screen Interval: 17.68 - 20.73 m BGS
 Sand Pack Interval: 17.07 - 21.03 m BGS
 Well Seal Interval: 0.00 - 17.07 m BGS

Notes:
 m AMSL - metres above mean sea level
 m BGS - metres below ground surface
 GB - grab sample
 n/a - not available



Monitoring Well: MW21-05

Project: Aberfoyle Tikal Pit Expansion
Client: CBM Aggregates
Location: Aberfoyle, ON
Number: 160961457
Field investigator: R. Baker
Contractor: Insitu

Method: Sonic
Date started/completed: 08-Nov-2021
Ground surface elevation: 326.53 m AMSL
Top of casing elevation: 327.37 m AMSL
Easting: 570104
Northing: 4814894

SUBSURFACE PROFILE				SAMPLE DETAILS			INSTALLATION DETAILS	
Depth	Graphic Log	Stratigraphic Description	Elevation (m AMSL) Depth (m BGS)	Sample Number	Sample Type	Recovery	Diagram	Description
(ft) (m)			328.05					
0	0	Ground Surface	326.53					Above Ground Casing 0.90 m stick-up
5	2	SAND and GRAVEL trace silt	0.00	1	GB	60" 100%		Cement Seal 0 to 0.3 m
10	4			2	GB	36" 100%		168 mm Diameter Borehole
15	4			3	GB	60" 100%		Bentonite Grout 1 to 4.8 m
20	6			4	GB	36" 60%		51 mm Diameter Schedule 40 PVC riser
25	8	Silty SAND	319.52	5	GB	60" 100%		No. 2 Silica Sand 4.8 to 8.5 m
30	10		7.01	6	GB	60" 100%		No. 10 Slot Schedule 40 PVC Screen 51 mm Diameter 5.2 to 8.2 m
35	10	SAND and GRAVEL trace silt	316.47	7	GB	60" 100%		
40	12		10.06	8	GB	60" 100%		
45	14			9	GB	60" 100%		
50	16			10	GB	60" 100%		
55	18			11	GB	60" 100%		Bentonite Grout 8.5 to 20.1 m
60	18			12	GB	60" 100%		
65	20			13	GB	60" 100%		
		End of Borehole	306.41	14	GB	36" 100%		
			20.12					

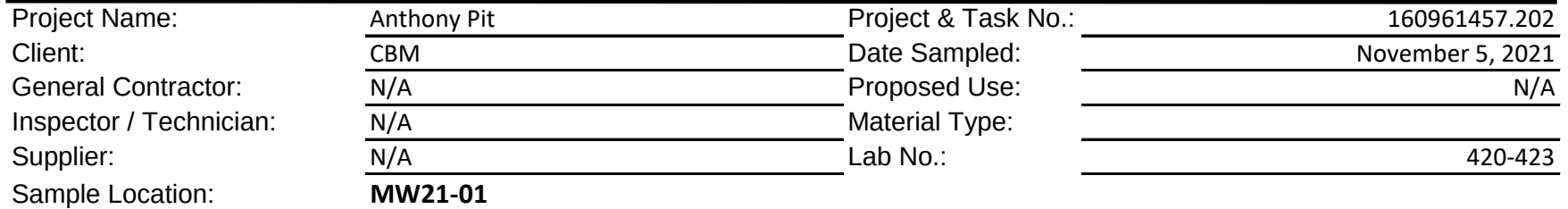
Screen Interval: 5.18 - 8.23 m BGS
 Sand Pack Interval: 4.57 - 8.53 m BGS
 Well Seal Interval: 0.30 - 4.57 m BGS

Notes:
 m AMSL - metres above mean sea level
 m BGS - metres below ground surface
 GB - grab sample
 n/a - not available



Appendix D

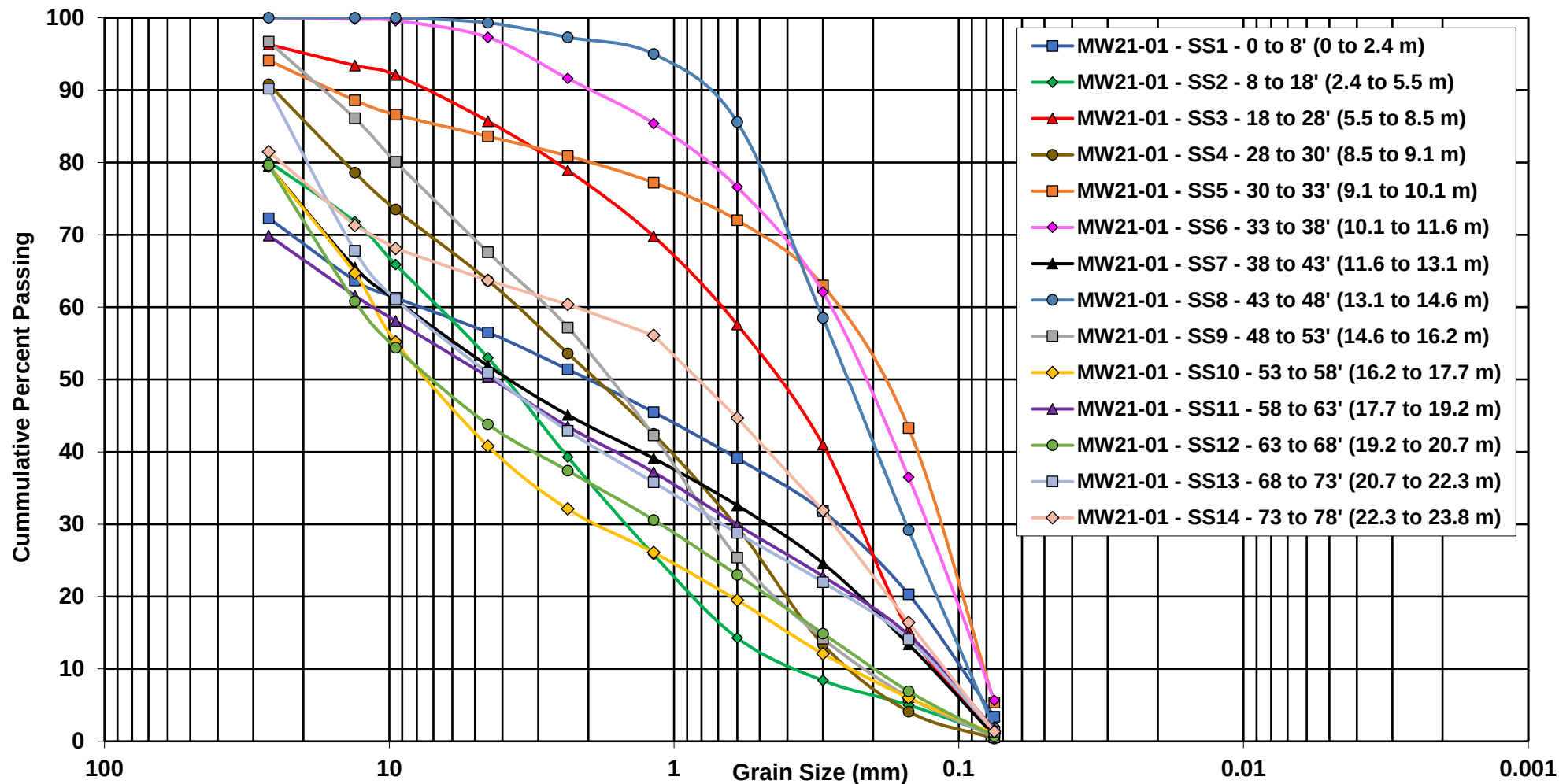
Soil Testing Results

[illegible]

Grain Size Distribution Test Report (ISO 14688-1:2002)

FIGURE D1

MW21-01



Cobble Size	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	Gravel		Sand				

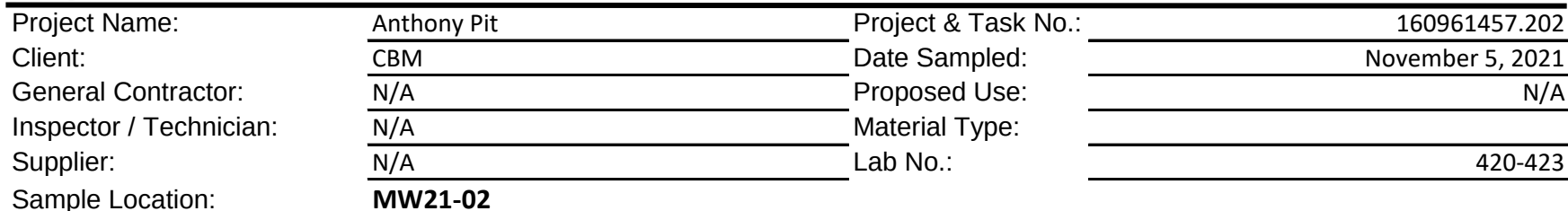
DATE: September 2022



prepared by: RD

PROJECT: 160961457

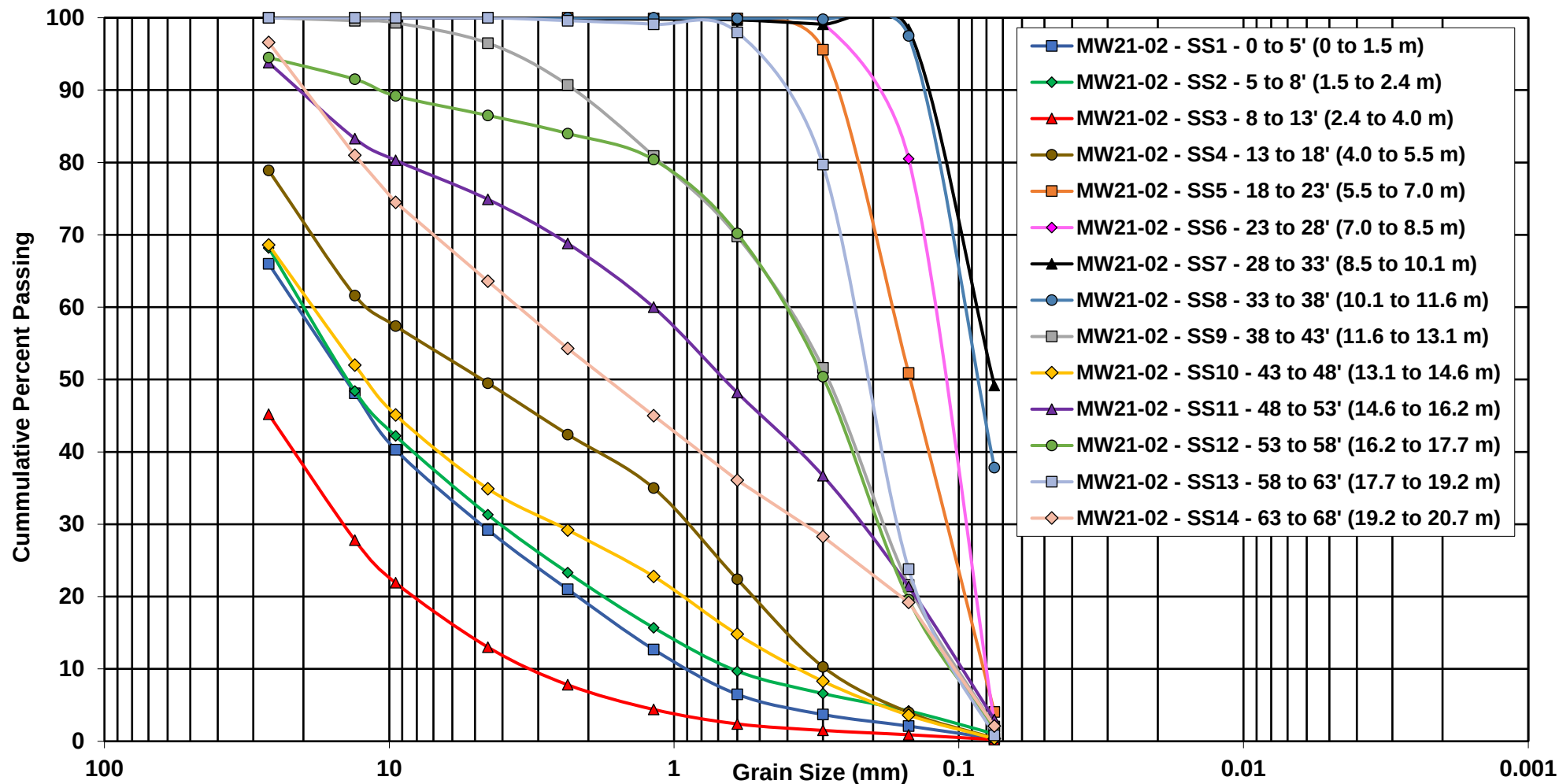
CHK: SMD

[illegible]

Grain Size Distribution Test Report (ISO 14688-1:2002)

FIGURE D2

MW21-02



Cobble Size	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	Gravel		Sand				

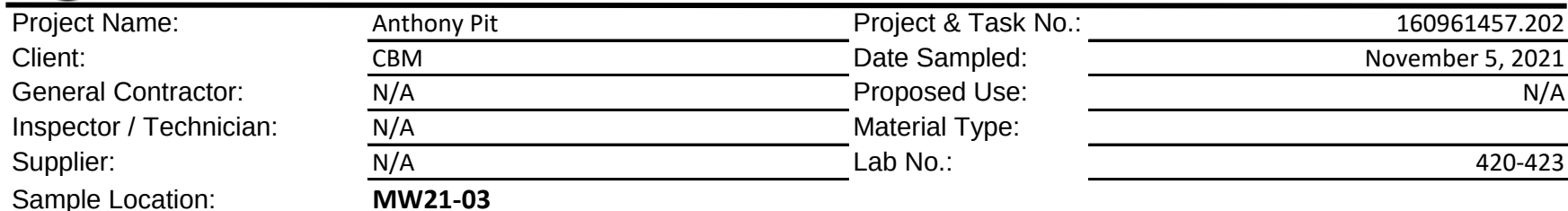
DATE: September 2022

PROJECT: 160961457



prepared by: RD

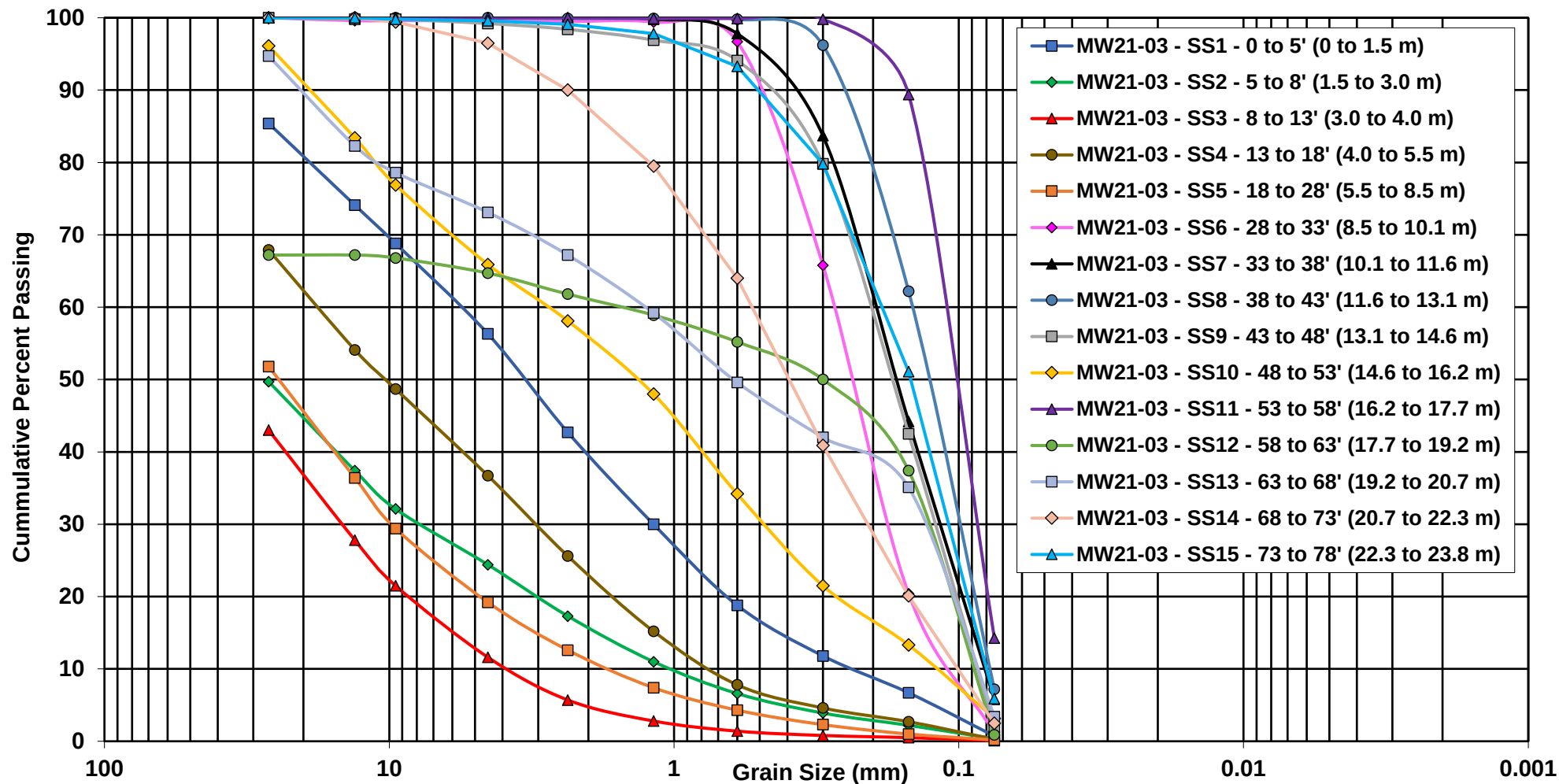
CHK: SMD

[illegible]

Grain Size Distribution Test Report (ISO 14688-1:2002)

FIGURE D3

MW21-03



Cobble Size	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	Gravel		Sand				

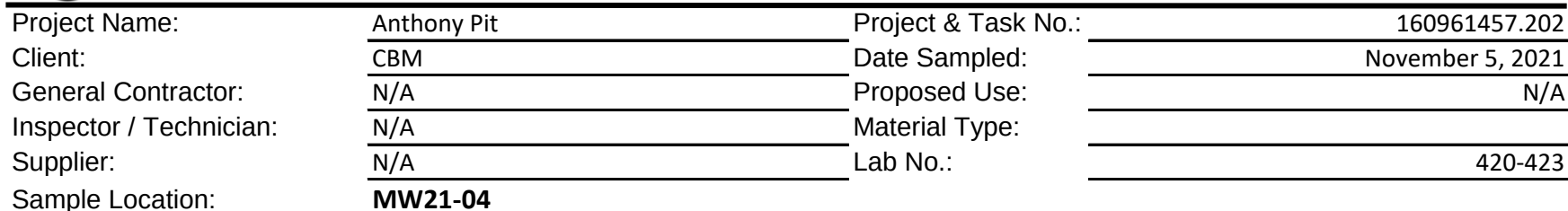
DATE: September 2022

PROJECT: 160961457



prepared by: RD

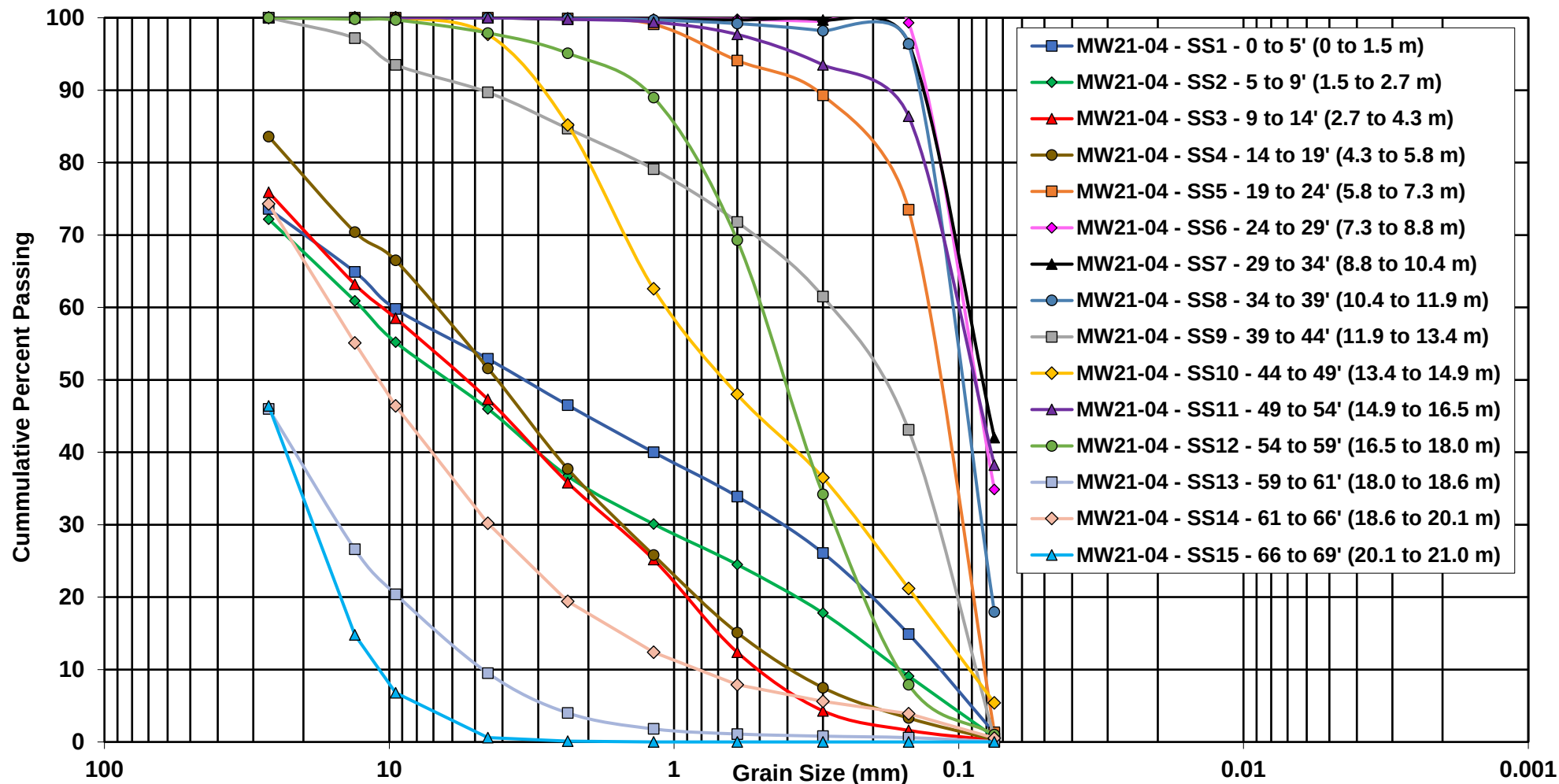
CHK: SMD

[illegible]

Grain Size Distribution Test Report (ISO 14688-1:2002)

FIGURE D4

MW21-04



Cobble Size

Coarse

Fine

Coarse

Medium

Fine

Silt

Clay

Gravel

Sand

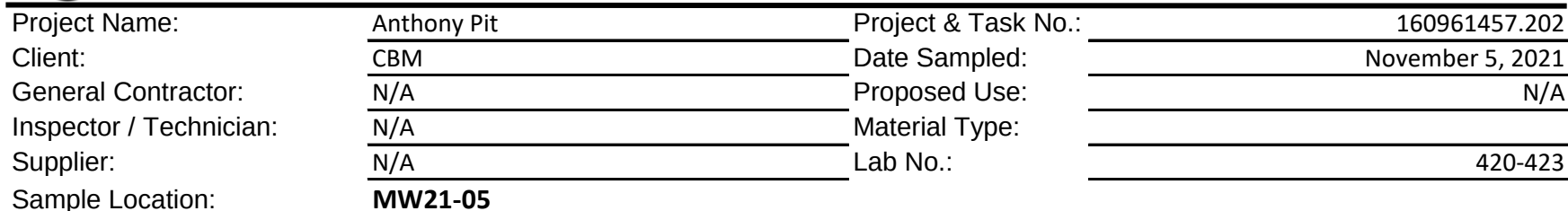
DATE: September 2022

PROJECT: 160961457



prepared by: RD

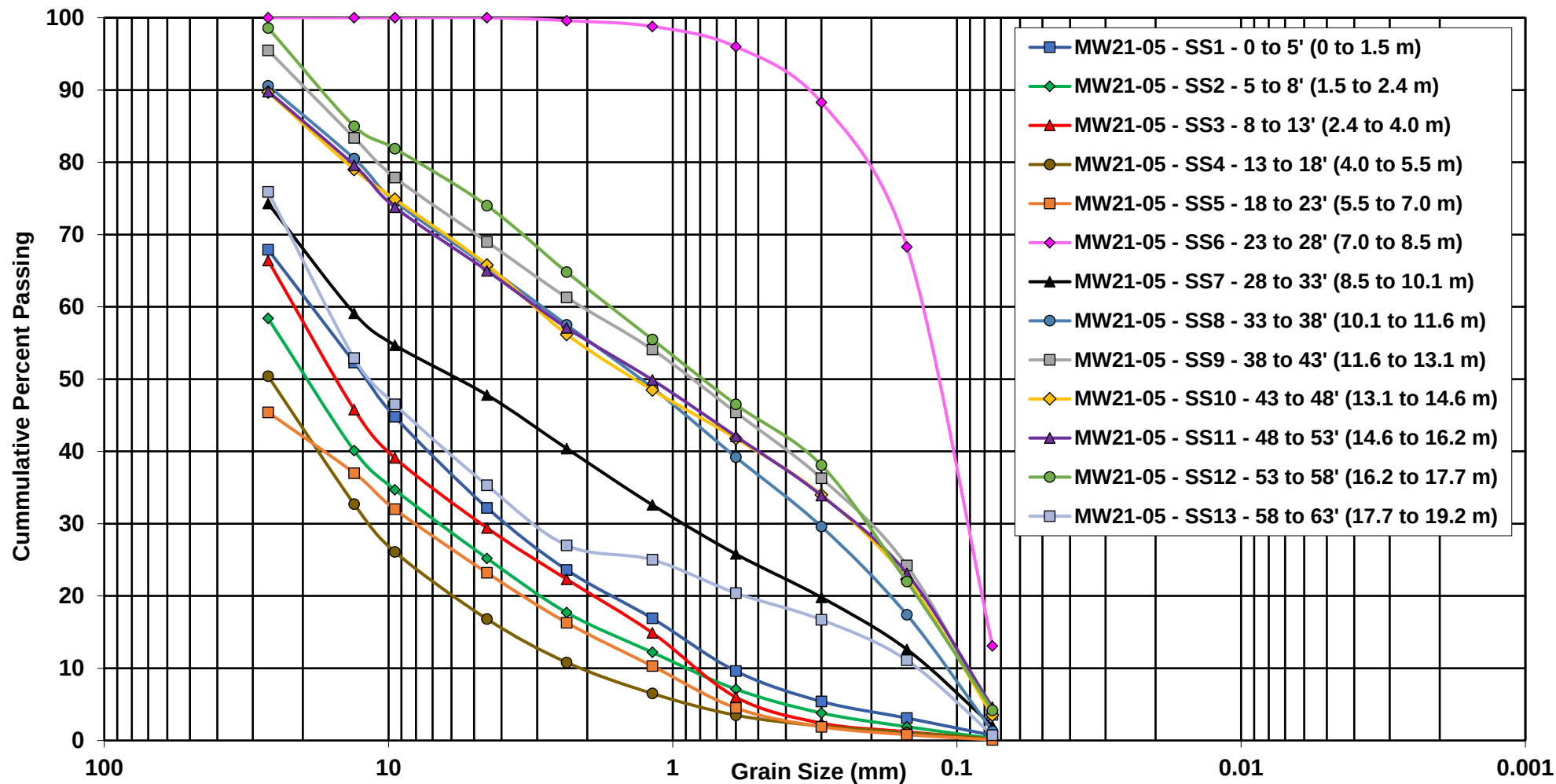
CHK: SMD

[illegible]

Grain Size Distribution Test Report (ISO 14688-1:2002)

FIGURE D5

MW21-05



Cobble Size	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	Gravel		Sand				

DATE: September 2022

PROJECT: 160961457



prepared by: RD

CHK: SMD

Appendix E

Project Team Curriculum Vitae

Senior Hydrogeologist

26 years of experience · Markham, Ontario

Stephen Di Biase is a Senior Hydrogeologist with the Environmental Services division. His 25 years of experience includes hydrogeological investigations in support of large-scale groundwater supply and dewatering projects. He brings extensive knowledge of groundwater exploration, drainage basin surveys, water balance calculations, aquifer mapping, GUDI assessments and development constraint mapping for projects located near sensitive wetlands, headwaters and kettle lake complexes in the vicinity of glacial moraines and the Niagara Escarpment.

EDUCATION

B.Sc. Earth Sciences, University of Waterloo,
Waterloo, Ontario, 1999

M.Sc. Hydrogeology, University of Toronto, Toronto,
Ontario, 2005

CERTIFICATIONS & TRAINING

Construction Dewatering and Groundwater Control
(National Groundwater Assoc.), Waterloo, Ontario,
2005

Project Management (Golder Associates Internal
Training Course), Markham, Ontario, 2005

Contracts and Liability (Golder Associates Internal
Training Course), Markham, Ontario, 2004

Project Management, Queen's University School of
Business, Ontario, 2001

Field Methods in Hydrogeology, University of
Waterloo, Ontario, 2001

Ontario Ministry of Transportation Approved for
Medium Complexity Hydrogeological Projects,
Markham, Ontario, Canada, 2023

MEMBERSHIPS

Member, National Ground Water Association

Member, Ontario Ground Water Association

Canadian National Chapter, International Association
of Hydrogeologists

Hydrogeologist, Professional Geoscientists Ontario

PROJECT EXPERIENCE

GROUNDWATER SUPPLY / WELLS

New Well Exploration Program | Township of Centre
Wellington | Elora, ON, Canada | 2021 - | Project
Manager

Construction of pilot test wells in four target areas
surrounding the communities of Elora and Fergus.
Field studies include bedrock coring, geophysical
logging, packer testing, 7-day pumping tests,
groundwater quality analysis and evaluation GUDI
conditions.

Logan Well Feasibility Assessment | City of Guelph |
Guelph, ON, Canada | 2021 - | Project Manager

Reconstruction and performance testing of a 306 mm
diameter municipal test well. This project included
management of drilling contractor, supporting
permitting applications and supervision of a 3-day
performance test. A feasibility study is being
undertaken to determine if the Logan Well will be a
viable groundwater supply source for the City of
Guelph. Field study and reporting includes an
assessment of GUDI conditions and effects of
groundwater pumping on local environmental
receptors.

Craighurst Groundwater Supply Investigation |
Craighurst Partnership Limited | Craighurst, ON,
Canada | 2020 - 2022 | Project Manager

Hydrogeology task manager responsible for
developing a new groundwater supply source for the
community of Craighurst. This project included the
construction and performance testing of a new 306
mm diameter test production well at 36 L/s. Stantec's
responsibilities for this study included contract
tendering and administration, development of a
groundwater monitoring network, securing provincial
permits to take water, supervision of a 30-day
performance test and a GUDI assessment of the new
well.

Groundwater Supply Class Environmental
Assessment | Town of Orangeville | Orangeville,
Ontario, Canada | 2018 - 2022 | Project Manager

Project Manager for the Town of Orangeville
Groundwater Supply Class Environmental
Assessment. This project included the construction
and performance testing of a new test production well
along the Town's northeastern boundary. The field
investigation included: installation of 1 cored bedrock
borehole, downhole geophysical logging of 6 test
wells, reconstruction of 3 open bedrock boreholes
with multi-level monitoring well nests and a 30-day
groundwater pumping test at 3,629 m³/day. The
effects of groundwater pumping were monitored at a
total of 34 locations, including 16 monitoring well
nests, 3 surface water stations, 5 wetland
piezometers and 10 private wells.

Guelph Water Supply Master Plan* | City of Guelph | Guelph, Ontario | 2013 - 2014 | Task Manager

Hydrogeology Task Manager responsible for the assessment of existing production well capacities. This project included a modelling analysis to assess the performance and effects of municipal well operation during conditions of drought and unforeseen well shut-downs.

Waterloo North Water Supply Class Environmental Assessment* | Region of Waterloo | Waterloo, Ontario | 2008 - 2010 | Task Manager

Hydrogeology task manager for the Waterloo North Water Supply Class Environmental Assessment. This project included the construction of a new test production well and performance testing of three test production wells within the Waterloo North Study Area. Golder's role in the Waterloo North Class EA includes management of the drilling and performance testing contracts, supporting the RMOW applications for access agreements, municipal sewer use permitting, MOE PTTWs, supervision of a 42-day performance test and preparation of an Environmental Study report supporting the test production wells through the EA process.

Southwest Quadrant Water Supply Class Environmental Assessment* | City of Guelph | Guelph, Ontario | 2008 - 2012 | Task Manager

Hydrogeology task manager for the City of Guelph Southwest Quadrant Water Supply Class Environmental Assessment. This project included the construction and performance testing of two new (15 inch diameter) test production wells in the City of Guelph. Performance testing of the new wells required a combined pumping rate of 134 L/s, a 3 km diversion of pumped groundwater, municipal sewer use permits, an Ontario Ministry of Environment Permit To Take Water, access agreements, an extensive groundwater and surface water monitoring program (including approximately 70 groundwater monitoring wells, 10 surface water monitoring stations and two private wells). A challenge during this complicated testing program was ensuring that performance testing of the new production wells did not adversely affect the operation of the existing municipal water supply system or impact surface water flow conditions in the receiving water courses.

Preliminary Design for Stage 2 Expansion of Aquifer Storage and Recovery (ASR) System * | Region of Waterloo | Kitchener, Ontario | 2008 - 2014 | Task Manager

Hydrogeology task manager supporting the preliminary design of the Stage 2 Expansion for the Regional of Waterloo Aquifer Storage and Recovery System. This project included the construction and performance assessment of six test wells at the Mannheim Water Treatment Plant. Groundwater modelling analysis was undertaken to develop a preliminary design plan that would optimize the performance of the expanded system.

Prospect Park Groundwater Supply Study* | Region of Halton | Acton, Ontario | 2011 - 2012 | Project Manager

Project Manager for the Region of Halton Prospect Park Groundwater Supply Study. This project included the analysis of data collected from the Prospect Park Well Field over a 5 year period to assess the potential to develop additional groundwater supply.

Baden-New Hamburg Water Supply Master Plan* | Regional Municipality of Waterloo | New Hamburg and Baden, Ontario | 2008 - 2010 | Task Manager

Hydrogeology Task Manager responsible for the assessment of existing production capacity of three well fields in proximity to the communities of Baden and New Hamburg.

Groundwater Supply Class Environmental Assessment* | Town of Shelburne | Shelburne, Ontario | 2009 - 2012 | Task Manager

Hydrogeology Task Manager responsible for the installation and performance testing of a new groundwater supply well in proximity to the Town of Shelburne. This project included negotiations with the Ontario Ministry of Environment regarding inter-basin transfer within the Great Lakes catchment area and a 72-hour groundwater pumping test. Golder completed an Environmental Study Report to satisfy a Federal Environmental Assessment process as well as a Provincial Class Environmental Assessment.

Aquafarms 93* | Ice River Springs | Feversham, Ontario | 2007 - 2009 | Project Manager

Carried out the field study and reporting requirements of a hydrogeological impact assessment for a commercial water supply operation. This project included aquifer performance testing, geophysical testing of water supply wells, monitoring of local domestic wells, and co-ordination of groundwater, surface water and ecological field studies.

Dagmar Ski Resort* | Dagmar Ski Resort | Glen Major, Ontario | 2003 - 2004 | Hydrogeologist

Evaluated the potential yield and hydrogeologic impact of two high-capacity water supply wells completed in the Oak Ridges Moraine Aquifer to support an application for a PTTW for the resort snow-making system.

DEWATERING AND PUMPING SYSTEMS

Toronto-York Spadina Subway Extension (TYSSE)* | Toronto Transit Commission | Toronto, Ontario, Canada | Hydrogeologist

Hydrogeologist for the Principal Engineering Consultant of the Toronto-York Spadina Subway Extension. This project included hydrogeology investigation and dewatering assessment at 6 proposed subway stations and 25 associated subsurface structures. Responsibilities included preparation of tender contract documents and specifications.

Eglinton Crosstown Light Rail Transit* | Toronto,
Ontario | Hydrogeologist

Hydrogeologist responsible for preparation of dewatering assessment supporting the design of the Yonge and Allen Road Stations of the proposed Eglinton Crosstown Light Rail Transit.

Bayview Avenue Widening* | The Miller Group |
Richmond Hill, Ontario | 2016 - 2018 | Project
Manager

Installed forty (40) 152 mm diameter pressure relief wells to depressurize a confined aquifer and facilitate the construction of a regional sewer main.

Steeles Avenue Widening* | Fermar Paving Ltd. |
Hornby, Ontario, Canada | 2016 - 2017 | Project
Manager

Installed eight (8) 150 mm diameter pressure relief wells to depressurize a confined aquifer and facilitate the construction of bridge footings across water courses.

Nuclear Waste Management Organization* | Fox
Construction Services | Darlington Nuclear Site ,
Ontario | Project Manager

Designed and installed dewatering system in support of upgrades at the Darlington Nuclear Plant

AGGREGATE SERVICES

Nelson Quarry Extension* | Nelson Aggregate Co |
Burlington, ON, Canada | 2006 - 2011 | Project
Hydrogeologist

Hydrogeologist responsible for the development of a field investigation to establish the potential impact of a proposed Quarry extension plan on locally significant environmental features. This field study required liaison with MOE officials, coordination of multi-disciplinary environmental investigations, procurement of testing permits and aquifer performance testing.

Lafarge Canada Inc.* | Lafarge Canada Inc. | Dundas,
Ontario | 2008 - 2010 | Hydrogeologist

Hydrogeologist responsible for the development of a field investigation to establish the potential impact of a proposed Quarry extension plan on locally significant environmental features. This field study required liaison with MOE officials, coordination of multi-disciplinary environmental investigations, procurement of testing permits and aquifer performance testing.

Senior Hydrogeologist, Associate

23 years of experience · Waterloo, Ontario

Aaron is a results-oriented professional and project manager with over 20 years of consulting experience focusing on hydrogeological investigations, landfill compliance and mine/aggregate licensing monitoring and reporting, environmental impact assessment studies, hydrogeological permitting and compliance, and water resources engineering. Aaron possesses a sound understanding and is proficient in the application of hydrogeological principles and field techniques.

Aaron processes strong project management skills and has acted as project manager and/or project hydrogeologist for numerous projects involving water supply evaluations, groundwater management studies, large-scale multi-year monitoring programs, hydrogeological permitting and compliance, groundwater monitoring and hydrogeological impact investigations for construction development projects, landfill, mining and aggregate monitoring, licensing and compliance, throughout Ontario. Aaron is skilled in the analysis and interpretation of aquifer performance testing data, characterization and logging of geologic formations, evaluating groundwater-surface water interactions, developing groundwater and contaminant models, and has a working knowledge of groundwater protection legislation in Ontario.

Aaron has a strong working knowledge of the Earthsoft EQuIS data management system and portal development applications through project managing the develop of these types of custom knowledge management portal solutions. Aaron has extensive experience working on projects in support of proposed construction development and dewatering, including design and implementation of baseline and long-term groundwater monitoring program

EDUCATION

B.A.Sc., University of Waterloo Environmental (Civil) Engineering, Waterloo, Ontario, Canada, 2003

REGISTRATIONS

Professional Engineer #100144791, Professional Engineers Ontario, June 14, 2010

PROJECT EXPERIENCE

HYDROGEOLOGY

Cambridge East and Waterloo North Groundwater and Surface Water Monitoring Programs | Regional Municipality of Waterloo | Cambridge, Ontario | 2021-2023 | Project Hydrogeologist

Per the Region's Water Supply Master Plan and Class EA recommendations additional groundwater and surface water monitors were installed to be included in monitoring programs for the subject areas. Aaron acted as project hydrogeologist and assisted coordination of monitoring well construction and piezometer installations for the Region's Cambridge East and Waterloo North Groundwater and Surface Water Monitoring Program. Coordinated well geophysics and rehabilitation activities. An adaptive management plan is to be developed to document response related to future increased pumping.

Hydrogeologic Assessment, South Strasburg Trunk Sanitary Sewer | City of Kitchener | Kitchener, Ontario | 2017-2021 | Project Hydrogeologist

As part of the detailed design and construction of the South and Middle Strasburg Trunk Sanitary Sewer, Aaron acted as Project Hydrogeologist to prepare the required Hydrogeologic Assessments in support of PTTW and EASR applications for construction dewatering. The assessments detailed expected dewatering locations and volumes, discharge locations, and monitoring as required. Aaron also assisted in preparation of a wetland hydrogeological assessment as required by local conservation authority.

Eagles Nest Golf Course Irrigation Well Supply Assessment | Vaughan, Ontario | 2016-2017 | Project Manager / Project Hydrogeologist

Coordinated and completed new irrigation well installation at golf course, located within secondary buffer area of Keele Valley Landfill. Completion of a hydrogeologic investigation in support of a short term testing under a permit to take water for the irrigation well. Testing included a 72-hour pumping test and water level monitoring within adjacent monitoring wells. Coordinated and attended meetings with the Agencies (City of Toronto and MECP). Completed Permit to Take Water application for the short term pumping test.

Malahide Well Supply Assessment | IGPC | Aylmer, Ontario | 2017 | Project Hydrogeologist

Aaron acted as project hydrogeologist and assisted in a due-diligence assessment of the inactive Malahide Township well as a potential future water supply source for IGPC, Aylmer, ON. Coordinated well rehabilitation activities, and completion of a hydrogeologic investigation in support of a short term testing under a permit to take water for the Malahide Township supply well. Testing included a 24-hour pumping test and water level monitoring within adjacent monitoring wells. Aaron completed MECP permitting requirements for the project.

Greensville Backup Water Supply Project | City of Hamilton | Hamilton, Ontario | 2014 | Project Hydrogeologist

Aaron acted as project hydrogeologist in coordination and completion of production well drilling in bedrock near to the Niagara escarpment, 48-hour pumping tests, groundwater and surface water monitoring, coordination with City of Hamilton and Agencies, and hydrogeological assessment report preparation for permitting.

Fourth Line Well Field Hydrogeological Impact Assessment | Regional Municipality of Halton | Acton, Ontario | 2013-2014 | Project Hydrogeologist

The Region of Halton undertook a study to investigate the potential of expanding the taking from the Fourth Line well field by including a test well. The scope of work was to assess the impacts of increasing the daily taking from the well field above the then existing permitted rate. The environmental impact assessment included assessment of results of a comprehensive well pumping test to determine impacts to groundwater users, and an ecological review of nearby terrestrial and aquatic habitat to determine impacts to natural features. Aaron acted as project hydrogeologist and assisted in completion of the environmental impact assessment for the Region of Halton. Aaron completed background data review, analysis of pumping test data, and groundwater and surface water impact assessment report preparation.

Joe Sams Leisure Park Irrigation Supply Project | City of Hamilton | Waterdown, Ontario | 2011-2013 | Project Hydrogeologist

A water supply evaluation was completed for Joe Sam's Leisure Park within the City of Hamilton and confirmed the need for additional supply to meet sports field irrigation demands. Test drilling was completed in 2011 and an additional groundwater supply well was installed within the bedrock aquifer. Aaron acted as project hydrogeologist and assisted in a hydrogeologic investigation completed in support of a long-term permit to take water including a pumping test and water groundwater and surface water level monitoring.

Water Supply Assessment | City of Hamilton | Waterdown, Ontario | 2011-2013 | Project Hydrogeologist

In 2011, a water supply evaluation was completed for Joe Sam's Leisure Park within the City of Hamilton and confirmed the need for additional supply to meet sports field irrigation demands. Test drilling was completed in 2011 and an additional groundwater supply well was installed within the bedrock aquifer. Aaron acted as project hydrogeologist and assisted in a hydrogeologic investigation completed in support of a long-term permit to take water including a pumping test and water groundwater and surface water level monitoring.

PTTW Applications and Monitoring for Development Sites | Various, Ontario | 2012-present | Project Hydrogeologist / Permitting Coordinator

Aaron acted as Project Hydrogeologist and/or Permitting Coordinator to prepare groundwater permit to take water or environmental activity and sector registry permitting for water takings required as part of construction dewatering for various development projects in Ontario. Projects have included coordination of drilling and well monitoring, analysis of data to determine required permitting approach. The site conditions have ranged from industrial, commercial areas to residential areas, agricultural fields or shallow bedrock. As part of each application, an assessment of hydrogeological conditions was completed to evaluate construction dewatering requirements and evaluate potential interference concerns and mitigation measures. Water quality was reviewed, and discharge locations and a discharge plan determined. Consultation with clients and Agencies as required.

Pond Decommissioning | London, Ontario | Hydrogeologist

Assisted in preparation of MOECC Permit to Take Water reporting and application for dewatering during pond decommissioning in London, Ontario.

Fourth Line Well Field Hydrogeological Impact Assessment | Regional Municipality of Halton | Acton, Ontario | 2013-2014 | Project Hydrogeologist

The Region of Halton undertook a study to investigate the potential of expanding the taking from the Fourth Line well field by including a test well. The scope of work was to assess the impacts of increasing the daily taking from the well field above the then existing permitted rate. The environmental impact assessment included assessment of results of a comprehensive well pumping test to determine impacts to groundwater users, and an ecological review of nearby terrestrial and aquatic habitat to determine impacts to natural features. Aaron acted as project hydrogeologist and assisted in completion of the environmental impact assessment for the Region of Halton. Aaron completed background data review, analysis of pumping test data, and groundwater and surface water impact assessment report preparation.

Hespeler Waste Water Treatment Upgrades | Cambridge, Ontario | Project Hydrogeologist

Coordination of monitoring well testing for Region of Waterloo WWTP construction upgrades project, completed MOECC Permit to Take Water reporting and application.

MINING

Bissett Creek Mine Project | Northern Graphite Corporation | Ottawa, Ontario, Canada | 2018-2021 | Project Hydrogeologist

As part of the development of an open pit mine to access the graphite deposit, Aaron acted as Project Hydrogeologist to prepare the required Hydrogeologic Assessments in support of the PTTW application to facilitate the dewatering of the open pit. The assessments characterized groundwater flow and quality in relation to the open pit, detailed expected dewatering locations and volumes, discharge locations, assessment of potential effects of dewatering on the environment, and monitoring as required.

Greenstone Gold Mine Project | Equinox Gold Greenstone Mine | Geraldton, Ontario, Canada | 2024-Present | Project Manager

Aaron acted as project manager and assisted in coordination of work between multiple disciplines and consultants including hydrogeology, geochemistry, hydrology, terrestrial and aquatic as well as process, treatment plant, and mine engineers. Coordinated with discipline leads to complete agency monitoring and reporting requirements for the open pit mine. Groundwater Conceptual Modelling Hemlo Mine Property Expansion | Barrick Gold Corporation | Hemlo, Ontario, Canada | 2024-Present | Project Manager Aaron acted as project manager and assisted in coordination of work for a conceptual groundwater modelling for a feasibility study of the mine expansion project and intended to assist in permitting requirements.

OIL AND GAS PIPELINES

Hamilton to Milton Pipeline Project | Hamilton/Milton, Ontario | Project Hydrogeologist

Coordination of monitoring well testing and sampling for Union Gas pipeline installation near Milton, ON, attended and presented at meetings with Agencies, completed MOECC Permit to Take Water application and supporting hydrogeological assessment report preparation.

Brantford to Kirkwall Pipeline Project | Hamilton, Ontario | Project Hydrogeologist

Coordination of monitoring well drilling and sampling for Union Gas pipeline installation near Hamilton, ON, completed MOECC Permit to Take Water application and supporting hydrogeological assessment report preparation.

Thunder Bay Pipeline Project | Thunder Bay, Ontario | Project Hydrogeologist

Union Gas pipeline replacement/installation near Thunder Bay, ON, completed MOECC Permit to take Water application and supporting hydrogeological assessment report preparation.

Nanticoke Meter Station | Ancaster, Ontario | Project Hydrogeologist

Coordination of monitoring well testing for TransCanada Pipelines Limited meter station construction project, completed MOECC Environmental Activity and Sector Registry reporting and registration.

PTTW Applications and Monitoring | Various, Ontario | Hydrogeologist / Project Manager

Assisted in preparation of groundwater permit to take water applications for water takings required as part of construction dewatering and pipeline installation. The site conditions have ranged from industrial, commercial areas to residential areas, agricultural fields or shallow bedrock and have crossed creeks, rivers and lakes. As part of each application, an assessment of hydrogeological conditions was completed to evaluate construction dewatering requirements and evaluate potential interference concerns and mitigation measures. Water quality was reviewed and discharge locations considered.

Hydrogeological Report and EASR Application | Toronto, Ontario | Hydrogeologist

For Enbridge Gas Distribution (EGD) sites including Keele St. and Ashtonbee Stations, Assisted in the completion of hydrogeological assessments and Permit To Take Water application / Environmental Activity and Sector Registry (EASR) registration in support of construction dewatering. The hydrogeological review detailed available site conditions, proposed construction activity, dewatering estimates and discharge options. Potential interference concerns were evaluated and mitigation measures recommended.

Trans Mountain Expansion Project Knowledge Management Portal | Trans Mountain Corporation | Calgary, Alberta, Canada | 2021-Present | Project Manager

To facilitate data transfer, storage, and assessment Stantec assisted Trans Mountain in development of a knowledge management portal for the project. Aaron acted as project manager for the knowledge management portal development, coordinating with the various stakeholders, including 3rd party consultants and Stantec personnel. Aaron oversees and coordinates the development of the portal system and database to provide digital custom solutions for data transfer and visualization.



With every community, we redefine what's possible.

Stantec is a global leader in sustainable architecture, engineering, and environmental consulting. The diverse perspectives of our partners and interested parties drive us to think beyond what's previously been done on critical issues like climate change, digital transformation, and future-proofing our cities and infrastructure. We innovate at the intersection of community, creativity, and client relationships to advance communities everywhere, so that together we can redefine what's possible.