REPORT

Aggregate Resource Evaluation

Aberfoyle South Pit Expansion

Submitted to:

CBM Aggregates (CBM), a division of St. Marys Cement Inc. (Canada)
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Toronto, Ontario
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Submitted by:

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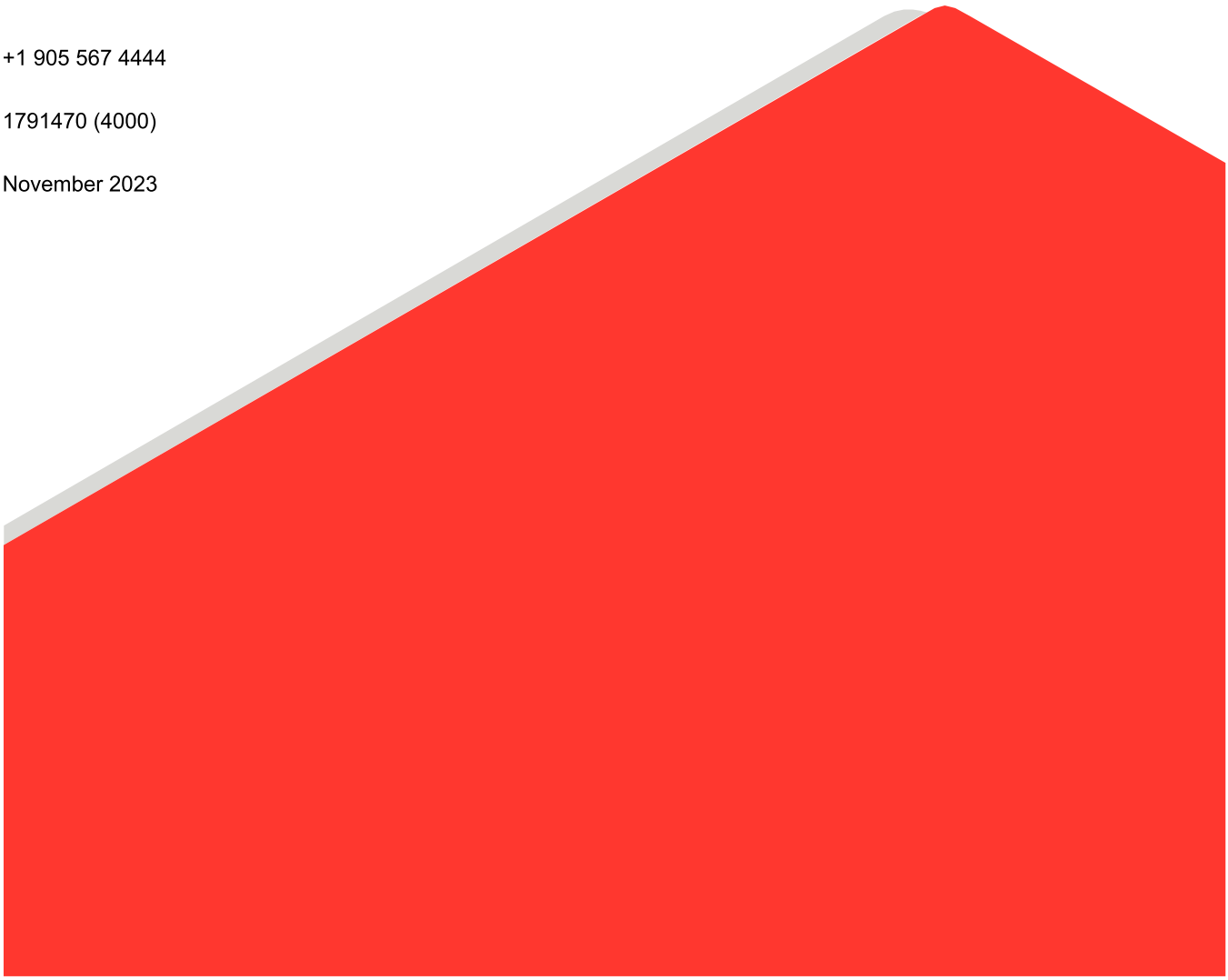
1791470 (4000)

November 2023



Distribution List

e-copy: CBM Aggregates (CBM), a division of St. Marys Cement Inc. (Canada)

e-copy: WSP Canada Inc.

Table of Contents

1.0 INTRODUCTION **1**

2.0 FIELD INVESTIGATION **1**

3.0 CORE SAMPLES **4**

4.0 GRAIN SIZE TESTING **5**

5.0 AGGREGATE QUALITY TESTING **5**

6.0 RESULTS **5**

TABLES

Table 1: Borehole and Monitoring Well Locations – Aberfoyle South Pit Expansion 3

Table 2: Well Completion Details and Groundwater Levels - Aberfoyle South Pit Expansion 4

FIGURES (after text)

Figure 1: Borehole Location Plan

Figure 2: Geological Cross-Section A-A'

APPENDICES

APPENDIX A
Borehole Logs

APPENDIX B
Core Photographs

APPENDIX C
Grain Size Tests

APPENDIX D
Aggregate Quality

APPENDIX E
Project Team CVs

1.0 INTRODUCTION

WSP Canada Inc. (WSP), formerly Golder Associates Ltd. (Golder), is pleased to provide CBM Aggregates, a division of St. Marys Cement Inc. (Canada) [CBM], with this aggregate resource report for the property located at 6947 Concession Road 2, Puslinch Township, Ontario, referred to as the Aberfoyle South Pit Expansion property.

2.0 FIELD INVESTIGATION

A drilling investigation which was completed in 2018 by Golder (now WSP) on behalf of CBM, to assess the aggregate resources on the Aberfoyle South Pit Expansion property. The drilling was contracted to Choice Sonic Drilling Ltd. (CSD) of Mount Albert, Ontario, and was performed under WSP monitoring and supervision. Borehole and monitoring well locations are shown on Figure 1.

In total, 16 boreholes were drilled on the property from January 9 to 17, 2018, four of which were completed as monitoring wells. The boreholes were each continuously cored to a nominal depth of 15 m, using a track-mounted, rotasonic (Sonic SDC 550) drill rig, which obtained a 114 mm diameter (4 ½") soil core.

An additional monitoring well (MW18-06) was drilled on November 23, 2018 to complement the existing wells around the periphery of the proposed extraction area. This location was also drilled by CSD and continuously cored.

A summary of daily field activities is provided below.

Day 1 – Tuesday January 9, 2018

- Safety Tailgate and Field Level Hazard Assessment (FLHA);
- BH18-01 cored, photographed and samples collected;
- MW18-04 cored, photographed and samples collected – well installed; and
- Drill set up at MW18-03.

Day 2 – Wednesday January 10, 2018

- Safety Tailgate and FLHA;
- MW18-03 cored, photographed and samples collected;
- BH18-02 cored, photographed and samples collected;
- BH18-03 cored, photographed and samples collected;
- BH18-04 cored, photographed and samples collected; and
- BH18-05 cored, photographed and samples collected.

Day 3 – Thursday January 11, 2018

- Safety Tailgate and FLHA;
- BH18-06 cored, photographed and samples collected;

- MW18-01 cored, photographed and samples collected – no well installed;
- Unknown well discovered near MW18-01;
- BH18-07 cored, photographed and samples collected; and
- BH18-08 cored, photographed and samples collected.

Day 4 – Friday January 12, 2018

- Safety Tailgate and FLHA;
- BH18-09 cored, photographed and samples collected;
- BH18-10 cored, photographed and samples collected; and
- Day cut short due to poor weather conditions.

Day 5 – Monday January 15, 2018

- Safety Tailgate and FLHA;
- Core samples discovered missing;
- BH18-11 cored, photographed and samples collected;
- MW18-03 well installed;
- MW18-02 cored, photographed and samples collected – well installed;
- MW18-05 cored, photographed and samples collected – well installed; and
- Protective casings installed on all wells.

Day 6 – Wednesday January 17, 2018

- Safety Tailgate and FLHA;
- Groundwater levels measured in all wells; and
- Padlocks put on all new monitoring wells for security.

Day 7 – Friday November 23, 2018

- Safety Tailgate and FLHA;
- MW18-06 cored, photographed and samples collected – well installed;
- Groundwater level measured in the new well; and
- Padlock put on the new well for security.

Each day began with a Health and Safety Tailgate meeting and Field Level Hazard Assessment (FLHA) completed by WSP staff and the drilling crew. Soil logging, sampling and soil core photography was conducted at each borehole, with large volume (20 – 40 L) samples collected from each 1.5 m interval in the borehole and submitted to CBM's material laboratory in Aberfoyle for grain size analysis.

Record of Borehole logs are provided in Appendix A. Representative core photographs of the resource encountered at each borehole have been provided in Appendix B.

The borehole locations were planned in advance by WSP and CBM personnel. Locations were staked in the field based on planned coordinates using a handheld GPS, and final locations were recorded with a handheld GPS. Approximate borehole and monitoring well elevations were subsequently estimated from Google Earth mapping for the purposes of this report. The monitoring well locations and elevations were later surveyed, and those locations and elevations are provided on the logs in Appendix A. As drilled locations (UTM NAD83 Zone 17T) and approximate elevations (masl) are summarized in Table 1.

Table 1: Borehole and Monitoring Well Locations – Aberfoyle South Pit Expansion

Borehole / Well Name	Easting (m)	Northing (m)	Approximate Elevation (masl)	Borehole Depth (m)
MW18-01	564854	4809260	303	14.9
MW18-02	565724	4809059	308	14.9
MW18-03	566010	4809432	303	14.9
MW18-04	566032	4809696	304	14.9
MW18-05	565243	4809513	307	14.9
MW18-06	565549	4809337	303	9.14
BH18-01	565981	4809639	303	14.9
BH18-02	565764	4809428	303	14.9
BH18-03	565417	4809208	304	14.9
BH18-04	565178	4808939	303	14.9
BH18-05	565081	4809023	307	14.9
BH18-06	565175	4809088	303	14.9
BH18-07	565568	4809076	304	14.9
BH18-08	565608	4809212	305	14.9
BH18-09	565698	4809315	302	14.9
BH18-10	565598	4809499	305	14.9
BH18-11	565915	4809532	303	14.9

Four of the boreholes initially drilled were completed as monitoring wells, screened in the sand and gravel within the water table aquifer. The monitoring wells were installed using 1.52 m long, No. 10 slot, 52 mm diameter (2”) Schedule 40 PVC well screens and PVC riser pipes. At each monitoring well location, the open borehole was filled with bentonite hole-plug to the desired bottom of monitoring well depth. The annulus of the borehole adjacent to the monitoring well screen was backfilled with silica sand to approximately 0.6 m above the top of the screen. The remainder of the borehole annulus was backfilled with bentonite hole-plug up to approximately 0.3 mbgs. The monitoring wells were completed with monument-style above ground casings set in concrete at ground surface and the top of the monitoring well riser pipes were equipped with removable J-plugs.

Groundwater levels in the initially installed wells were recorded on January 17, 2018 and in MW18-06 on November 30, 2018. Well completion details are summarized in Table 2.

Table 2: Well Completion Details and Groundwater Levels - Aberfoyle South Pit Expansion

Well Name	Groundwater Level (mbgs)	Ground Elevation (masl)	Screen Interval Depth (mbgs)	Screened Soil Horizon
MW18-01	-	303	-	-
MW18-02	0.787	308	7.3 – 10.3	Coarse/Medium Sand and Gravel
MW18-03	0.533	303	7.3 – 10.3	Coarse/Medium Sand and Gravel
MW18-04	0.115 (frozen)	304	8.8 – 10.8	Coarse Sand some Gravel
MW18-05	3.460	307	8.8 – 10.8	Silt and Sand some Gravel
MW18-06	0.10	303	5.8 – 9.14	Sand and Gravel

A 150 mm (6”) steel-cased well was discovered in the woods in the vicinity of the planned location for MW18-01. Upon discovery of the existing well, a new monitoring well was not initially installed at MW18-01, although the borehole was drilled, and core samples were logged and photographed.

3.0 CORE SAMPLES

After logging and photographing the cores, core samples from each 1.5 m interval were bagged and transported to the CBM Aberfoyle laboratory by CBM staff, generally on a daily basis. One exception was Friday January 12, 2018 when work was stopped early due to a severe winter storm, and samples from BH18-07, BH18-08, BH18-09 and BH18-10 were left on site that afternoon for pick-up on the following Monday morning. WSP personnel went the site on Saturday January 13, 2018 to organize the samples for pick-up in an equipment staging area at the gate on the property along the south side of the 2nd Concession Road.

On Monday January 15, 2018 WSP and CSD returned to the site to resume work and discovered that the core samples from the above-mentioned boreholes were missing and appeared to have been taken by someone attempting to disrupt the drilling investigation. Fortunately, the samples had been visually logged and photographed prior to their theft from the site. A police report was filed, but the theft was not investigated, and stolen samples were never recovered.

A summary of the core samples received by CBM for grain size testing is presented in Table 3 (sample IDs are comprised of the borehole / well name and the sample depth interval in feet).

Table 3: Summary of Core Samples submitted for Grainsize Testing – Aberfoyle South Pit Expansion Property Investigation

Borehole	Depth interval (feet)									
BH18-01	0-4	4-9	9-14	14-19	19-24	24-29	29-34	34-39	39-44	44-49
BH18-02	0-4	4-9	9-14	14-19	19-24	24-29	29-39	39-44	44-49	
BH18-03	0-4	4-9	9-14	14-19	19-24	24-29	29-34	34-39	39-49	

Borehole	Depth interval (feet)									
BH18-04	0-9	9-14	14-19	19-24	24-29	29-34	34-39	39-44	44-49	
BH18-05	0-4	4-9	9-14	14-19	19-24	24-29	29-34	34-39	39-44	44-49
BH18-06	0-4	4-9	9-14	14-19	19-24	24-29	29-34	34-39	39-44	44-49
BH18-11	0-4	4-9	9-14	14-19	19-24	24-29	29-34	34-39	39-44	
MW18-01	0-4	4-9	9-14	14-19	19-24	24-29	29-34	34-39	39-44	44-49
MW18-02	0-4	4-9	9-14	14-19	19-24	24-29	29-34	34-39	39-49	
MW18-03	0-4	4-9	9-14	14-19	19-24	24-29	29-34	34-39	39-44	44-49
MW18-04	0-4	4-9	9-14	14-19	19-24	24-29	29-34	34-39	39-44	44-49
MW18-05	0-4	4-9	9-14	14-19	19-24	24-29	29-34	34-39	39-44	44-49
MW18-06	0-5	5-10	10-12	12-15	15-18	18-22	22-30			

4.0 GRAIN SIZE TESTING

The core samples for BH18-01 to BH18-11 and MW18-01 to MW18-05 were analysed for grain size at CBM's in-house materials laboratory, while the samples from MW18-06 was for grain size analysed at Golder's material laboratory in Cambridge. The grain size curves, and fineness modulus calculations are provided in Appendix C.

5.0 AGGREGATE QUALITY TESTING

Aggregate quality testing was not specifically carried out on these samples, however, the aggregate material encountered at the Aberfoyle South expansion site was observed to be very similar in composition and gradation as the feed material currently being processed at the CBM McNally Pit from pits mining aggregate in the same geologic deposit. This material is routinely tested for quality by an independent laboratory and recent test results are provided in Appendix D.

6.0 RESULTS

With reference to the borehole logs provided in Appendix A, a southwest to northeast geological cross-section is presented on Figure 2. A generalized description of subsurface conditions encountered during drilling is as follows, from ground surface downwards:

- **Surficial Soils -** A brown silty to sandy layer was encountered in some locations up to 3 m in thickness, which was typically overlain by a thin veneer of topsoil.
- **Sand and Gravel -** A brown to grey sand and gravel layer was encountered beneath the surficial soils which varied in thickness from 6 to >15 m, with an average observed thickness of approximately 12.5 m. The relative proportions of sand and gravel vary from borehole to borehole; however, sand is typically the higher proportion material.

- **Wentworth or Port Stanley Till -** While five of the boreholes terminated in the sand and gravel, 12 of the boreholes were drilled deep enough to encounter the underlying silt till unit, which was found to vary from 2 to 7 m thick (typically about 5 m thick). The material was described as brown or grey sand and silt, silt, or clayey silt.
- **Bedrock -** Well MW18-05 (14.6 m / 292.4 masl), borehole BH18-11 (13.1 m / 289.9 masl) and previously drilled test well TW11-16 (22.0 m / 280.4 masl) all encountered the underlying medium brown dolostone of the Guelph Formation.

With reference to the cross-section A-A' presented on Figure 2, the confirmed base of the aggregate resource varies from a high elevation of 294 masl to a low elevation of ~287 masl. It is noted that BH18-01, BH18-09, BH18-10, MW18-03 and MW18-04 were terminated at elevations ranging from 290.7 to 287.1 masl, while still in sand and gravel and before fine grained material or bedrock was encountered, indicating that sand and gravel is present below the confirmed elevation of 287.1 masl at some locations within the property.

Based on the geologic information obtained during the drilling program, it is estimated that there is approximately 5.5 million tonnes of sand and gravel present on the property within the 27 Ha proposed extraction limit. This is based on an average resource thickness of 12.5 m within the extraction area, and an average material density of 1.65 tonnes / m^3. Based on the maximum predicted water table for the Site, which is presented in a separate report, more than 95% of the aggregate resources are below the water table.

With reference to Appendix C, the aggregate resource was found to have an average fineness modulus of 3.46 (full FM) indicating that the material is suitable feed to yield aggregate products such as concrete stone and concrete sand. With reference to Appendix D, the quality tests on aggregates produced from this deposit and processed at the McNally Pit meet the MTO quality standards for 19 mm, 13.2 mm, 6.7 mm concrete stone, and concrete sand. This report was prepared by Qualified Persons and their CVs are provided in Appendix E.

Signature Page

WSP Canada Inc.

[redacted]

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Environmental Scientist

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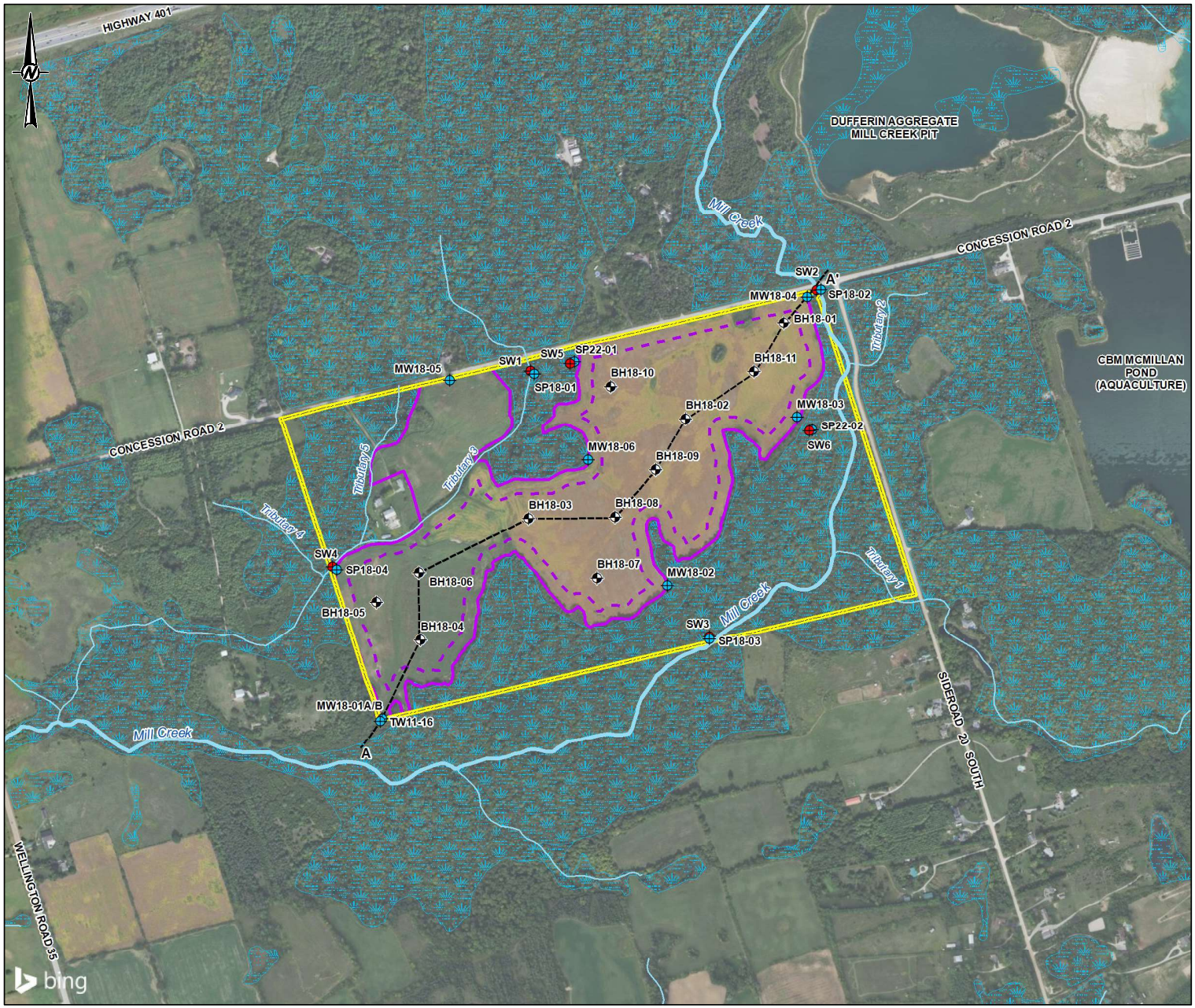
George Schneider, MSc, PGeo
Senior Geoscientist

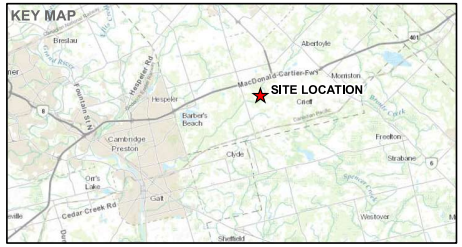
PGM/GWS/

https://golderassociates.sharepoint.com/sites/21291g/Deliverables/Hydrogeology Level 1 and 2/13 Aggregate Resources Assessment/1791470-4000-Rev2 Aberfoyle S Agg Res Report 21Nov2023.docx

FIGURES



KEY MAP



SCALE: 1:425,000

LEGEND

- Resource Evaluation Borehole
- Groundwater Monitor
- Surface Water Monitor
- Watercourse
- Site Cross-Section Line
- Provincially Significant Wetland (Evaluated)
- Property Boundary
- Proposed Extraction Area

0 100 200 300 400

1:8,500 METRES

REFERENCE(S)

1. MECP WATER WELL RECORD DATA OBTAINED SEPTEMBER 2020.
2. BASEDATA: MNRF LIO, OBTAINED 2019
3. IMAGERY SOURCE: © 2023 MICROSOFT CORPORATION © 2022 MAXAR ©CNES (2022) DISTRIBUTION AIRBUS DS
SOURCES: ESRI, HERE, GARMIN, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), (C) OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY IMAGE SEPTEMBER 2016
4. PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83 COORDINATE SYSTEM: UTM ZONE 17N

CLIENT
CBM AGGREGATES, A DIVISION OF ST. MARYS CEMENT INC.(CANADA)

PROJECT
ABERFOYLE SOUTH PIT EXPANSION

TITLE
BOREHOLE LOCATION PLAN

CONSULTANT
wsp

YYYY-MM-DD	2023-02-08
DESIGNED	SO
PREPARED	SO
REVIEWED	GWS
APPROVED	GWS

PROJECT NO.	CONTROL	REV.	FIGURE
1791470	0008	0	1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI D

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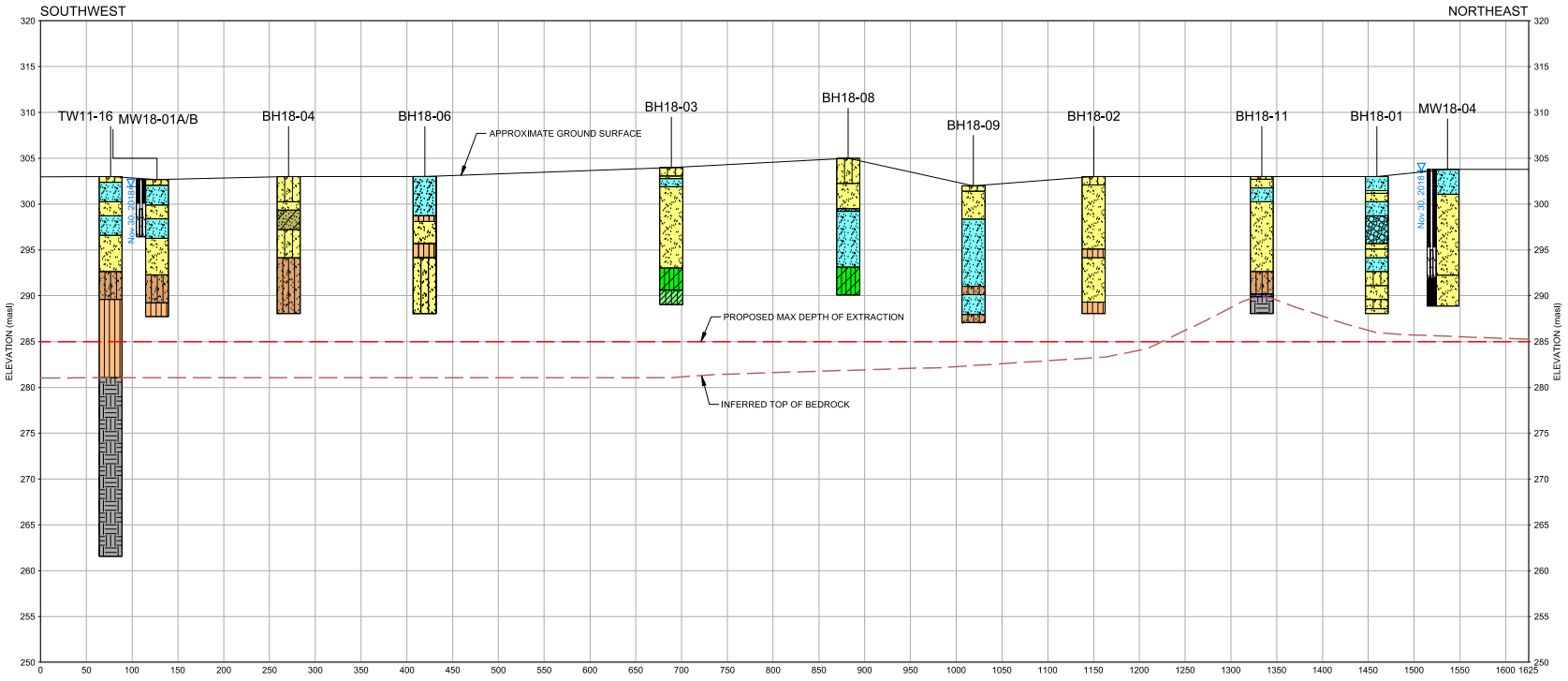

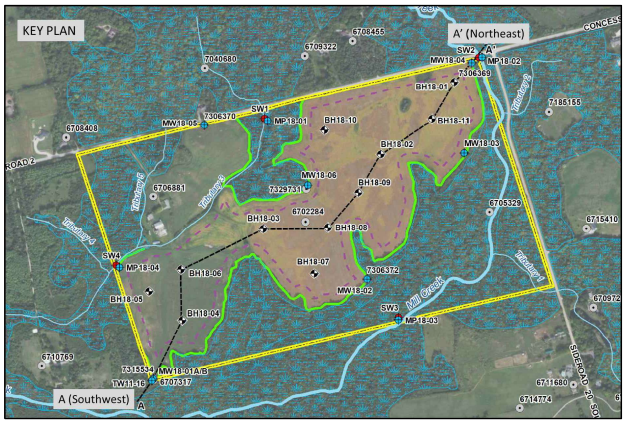

LEGEND

- GRAVEL
- SAND AND GRAVEL
- SAND
- SILTY SAND
- SILT
- SANDY SILT
- CLAYEY SILT
- SILTY CLAY
- CLAYEY SAND
- COBBLES
- BEDROCK

CLIENT
CBM AGGREGATES, A DIVISION OF ST. MARYS CEMENT INC.(CANADA)

PROJECT
ABERFOYLE SOUTH PIT EXPANSION

TITLE
GEOLOGICAL CROSS-SECTION A-A'

CONSULTANT
wsp

YYYY-MM-DD	2023-02-08
DESIGNED	
PREPARED	DD
REVIEWED	GS
APPROVED	GS

PROJECT NO.	PHASE	REV.	FIGURE
1791470	(4000)	A	2

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI B
25 mm
0

APPENDIX A

Borehole Logs

PROJECT: 1791470

LOCATION: N 4809638.92; E 565980.54

RECORD OF BOREHOLE: BH18-01

BORING DATE: January 9, 2018

SHEET 1 OF 2

DATUM: UTM 17T

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		303.00							
0	Sonic Drilling	(SW/GW) SAND and GRAVEL; brown, no odour, no staining; non-cohesive, wet		0.00	1						
				301.48							
1		(SW) SAND; brown, no odour, no staining; non-cohesive, wet		1.52 301.17							
2		(SW) SAND; brown, no odour, no staining; non-cohesive, wet		1.83 300.26	2						
3		(SW/GW) SAND and GRAVEL; brown, no odour, no staining; non-cohesive, wet		2.74	3						
4				298.73							
		(GW) GRAVEL, some sand; brown/grey, no odour, no staining; non-cohesive, wet		4.27	4						
5											
6					5						
7				295.68							
		(SW) SAND, some gravel; brown, no odour, no staining; non-cohesive, wet		7.32 295.08							
8		(SW) SAND; brown, no odour, no staining; non-cohesive, wet		7.92 294.16	6						
9		(SW/GW) SAND and GRAVEL; brown, no odour, no staining; non-cohesive, wet		8.84	7						
10		*CONTINUED NEXT PAGE*									

DEPTH SCALE

1 : 50

GOLDER
MEMBER OF WSP

LOGGED: AL

CHECKED: GWS

GTA-BHS 001 S:\CLIENTS\CBM_AGGREGATES\ABERFOLYE_PIT\02_DATA\GINT\ABERFOLYE.GPJ GAL-MIS.GDT 1/27/22

PROJECT: 1791470

LOCATION: N 4809638.92; E 565980.54

RECORD OF BOREHOLE: BH18-01

BORING DATE: January 9, 2018

SHEET 2 OF 2

DATUM: UTM 17T

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
10		*--- CONTINUED FROM PREVIOUS PAGE ---*									
10	Sonic Drilling	(SW/GW) SAND and GRAVEL; brown, no odour, no staining; non-cohesive, wet		292.64	7						
		(SM) SILTY SAND; brown, no odour, no staining; non-cohesive, wet		10.36							
11					8						
				291.11							
12		(SW) SAND, trace silt; brown, no odour, no staining; non-cohesive, wet		11.89	9						
13				289.60							
		(SM) SILTY SAND; brown, no odour, no staining; non-cohesive, wet			10						
14				288.58							
		(SW) SAND; brown, no odour, no staining; non-cohesive, wet		14.42							
15				288.06							
		END OF BOREHOLE		14.94							
16											
17											
18											
19											
20											

DEPTH SCALE

1 : 50

GOLDER
MEMBER OF WSP

LOGGED: AL

CHECKED: GWS

GTA-BHS 001 S:\CLIENTS\CBM_AGGREGATES\ABERFOLYE_PIT\02_DATA\GINT\ABERFOLYE.GPJ GAL-MIS.GDT 1/27/22

PROJECT: 1791470

LOCATION: N 4809428.49; E 565764.18

RECORD OF BOREHOLE: BH18-02

BORING DATE: January 10, 2018

SHEET 1 OF 2

DATUM: UTM 17T

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		303.00							
0	Sonic Drilling	(SM) SILTY SAND, organics; brown, no odour, no staining; moist		0.00	1						
				302.09							
1		(SW) SAND, some cobbles till 2.74 m, some gravel; brown, grey, no odour, no staining; non-cohesive, wet		0.91	2						
2											
3					3						
4											
5					4						
6					5						
7											
				295.08							
8		(ML) SILT; light brown, no odour, no staining; non-cohesive, wet		7.92	6						
				294.16							
9		(SW) SAND, some gravel; light grey, no odour, no staining; non-cohesive, wet		8.84	7						
10		*CONTINUED NEXT PAGE*									

DEPTH SCALE

1 : 50

GOLDER
MEMBER OF WSP

LOGGED: AL

CHECKED: GWS

GTA-BHS 001 S:\CLIENTS\CBM_AGGREGATES\ABERFOLYE_PIT\02_DATA\GINT\ABERFOLYE.GPJ GAL-MIS.GDT 1/27/22

PROJECT: 1791470

LOCATION: N 4809428.49; E 565764.18

RECORD OF BOREHOLE: BH18-02

BORING DATE: January 10, 2018

SHEET 2 OF 2

DATUM: UTM 17T

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
10		*--- CONTINUED FROM PREVIOUS PAGE ---*									
10	Sonic Drilling	(SW) SAND, some gravel; light grey, no odour, no staining; non-cohesive, wet			7						
11					8						
12					9						
13				289.28							
14		(ML) SILT, light brown, no odour, no staining; non-cohesive, wet		13.72	10						
15		END OF BOREHOLE		288.06 14.94							
16											
17											
18											
19											
20											

DEPTH SCALE

1 : 50

GOLDER
MEMBER OF WSP

LOGGED: AL

CHECKED: GWS

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PROJECT: 1791470

LOCATION: N 4809208.38; E 565416.81

RECORD OF BOREHOLE: BH18-03

BORING DATE: January 10, 2018

SHEET 1 OF 2

DATUM: UTM 17T

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		304.00							
0	Sonic Drilling	(SM) SILTY SAND, organics; brown, no odour, no staining; moist		0.00	1						
				303.09							
1		(SW) SAND, trace gravel; brown, grey, no odour, no staining; non-cohesive, wet		0.91							
				302.78							
		(SW/GW) SAND and GRAVEL; light brown/grey, no odour, no staining; non-cohesive, wet		1.22	2						
2				301.87							
		(SW) SAND, trace gravel from 7.32 m to 8.84 m, some gravel from 8.84 m to 10.97 m; brown, no odour, no staining; non-cohesive, wet		2.13	3						
3											
4					4						
5											
6					5						
7											
8		- Sandy silt lens at 8.08 m			6						
9											
					7						
10		*CONTINUED NEXT PAGE*									

DEPTH SCALE

1 : 50

GOLDER
MEMBER OF WSP

LOGGED: AL

CHECKED: GWS

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PROJECT: 1791470

LOCATION: N 4809208.38; E 565416.81

RECORD OF BOREHOLE: BH18-03

BORING DATE: January 10, 2018

SHEET 2 OF 2

DATUM: UTM 17T

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		--- CONTINUED FROM PREVIOUS PAGE ---									
10	Sonic Drilling	(SW) SAND, trace gravel from 7.32 m to 8.84 m, some gravel from 8.84 m to 10.97 m; brown, no odour, no staining; non-cohesive, wet		293.03	7						
11		(ML) CLAYEY SILT, trace gravel; brown, no odour, no staining; non-cohesive, wet		10.97	8						
12					9						
13				290.59							
14		(CL) SILTY CLAY, trace gravel; grey/brown, no odour, no staining; non-cohesive, wet		13.41	10						
15				289.06							
		END OF BOREHOLE		14.94							
16											
17											
18											
19											
20											

DEPTH SCALE

1 : 50

GOLDER
MEMBER OF WSP

LOGGED: AL

CHECKED: GWS

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PROJECT: 1791470

LOCATION: N 4808939.14; E 565178.26

RECORD OF BOREHOLE: BH18-04

BORING DATE: January 10, 2018

SHEET 1 OF 2

DATUM: UTM 17T

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		303.00							
0	Sonic Drilling	(SM) SILTY SAND, organics; brown, no odour, no staining; moist		0.00	1						
1											
2				300.26							
3		(SW) SAND, some gravel, trace cobbles; beige, no odour, no staining; non-cohesive, wet		2.74	2						
4		(SC) CLAYEY SAND, trace cobbles; light brown, no odour, no staining; cohesive, wet		3.66	3						
5											
6				297.22							
		(SM) SILTY SAND, trace gravel from 5.78 m to 7.32 m, trace clay from 7.32 m to 8.84 m; light grey, no odour, no staining; non-cohesive, wet		5.78	4						
7											
8					5						
				294.16							
9		(SW/ML) SAND and SILT; grey, no odour, no staining; non-cohesive, wet		8.84	6						
10		*CONTINUED NEXT PAGE*									

DEPTH SCALE

1 : 50

GOLDER
MEMBER OF WSP

LOGGED: AL

CHECKED: GWS

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PROJECT: 1791470

LOCATION: N 4808939.14; E 565178.26

RECORD OF BOREHOLE: BH18-04

BORING DATE: January 10, 2018

SHEET 2 OF 2

DATUM: UTM 17T

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		--- CONTINUED FROM PREVIOUS PAGE ---									
10	Sonic Drilling	(SW/ML) SAND and SILT; grey, no odour, no staining; non-cohesive, wet			6						
11					7						
12					8						
13											
14					9						
15				288.06							
		END OF BOREHOLE		14.94							
16											
17											
18											
19											
20											

DEPTH SCALE

1 : 50

GOLDER
MEMBER OF WSP

LOGGED: AL

CHECKED: GWS

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PROJECT: 1791470

LOCATION: N 4809022.87; E 565081.17

RECORD OF BOREHOLE: BH18-05

BORING DATE: January 10, 2018

SHEET 1 OF 2

DATUM: UTM 17T

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80); SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}); WATER CONTENT PERCENT (Wp, W, Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		307.00							
0	Sonic Drilling	(SM) SILTY SAND, organics; brown, no odour, no staining; moist		0.00	1						
1											
2				304.26	2						
3		(SW) SAND, some gravel, trace silt at 5.78 m; brown, no odour, no staining; non-cohesive, dry		2.74	3						
4											
5				301.22	4						
6		(SM) SILTY SAND; light brown, no odour, no staining; non-cohesive, wet		5.78	5						
7				299.68							
8		(SW/ML) SAND and SILT; brown, no odour, no staining; non-cohesive, wet		7.32	6						
9				298.16							
		(SM) SILTY SAND; light brown, no odour, no staining; non-cohesive, wet		8.84	7						
10		*CONTINUED NEXT PAGE*									

DEPTH SCALE

1 : 50

GOLDER
MEMBER OF WSP

LOGGED: AL

CHECKED: GWS

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PROJECT: 1791470

LOCATION: N 4809022.87; E 565081.17

RECORD OF BOREHOLE: BH18-05

BORING DATE: January 10, 2018

SHEET 2 OF 2

DATUM: UTM 17T

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		--- CONTINUED FROM PREVIOUS PAGE ---									
10	Sonic Drilling	(SM) SILTY SAND; light brown, no odour, no staining; non-cohesive, wet		296.64	7						
		(SW/ML) SAND and SILT; light brown, no odour, no staining; non-cohesive, wet		10.36							
11					8						
				295.11							
12		(ML) CLAYEY SILT; brown, no odour, no staining; non-cohesive, wet		11.89	9						
13				293.59							
		(SW/ML) SAND and SILT; light grey, no odour, no staining; non-cohesive, wet		13.41							
14					10						
				292.06							
15		END OF BOREHOLE		14.94							
16											
17											
18											
19											
20											

DEPTH SCALE

1 : 50

GOLDER
MEMBER OF WSP

LOGGED: AL

CHECKED: GWS

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PROJECT: 1791470

LOCATION: N 4809088.00; E 565175.00

RECORD OF BOREHOLE: BH18-06

BORING DATE: January 11, 2018

SHEET 1 OF 2

DATUM: UTM 17T

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		303.00							
0	Sonic Drilling	(SW/GW) SAND and GRAVEL; brown, no odour, no staining; non-cohesive, wet		0.00	1						
1					2						
2											
3					3						
4				298.73							
		(ML) SILT; grey, no odour, no staining; non-cohesive, wet		4.27							
				298.12							
5		(SW) SAND, trace gravel from 4.88 m to 5.78 m; brown, no odour, no staining; non-cohesive, wet		4.88	4						
6					5						
7				295.68							
		(ML) SILT, some sand; grey, no odour, no staining; non-cohesive, wet		7.32							
8					6						
				294.16							
9		(ML/SW) SILT and SAND, some clay, cobbles from 13.41 m to 14.49 m; grey, no odour, no staining; non-cohesive, wet		8.84	7						
10											
		CONTINUED NEXT PAGE									

DEPTH SCALE

1 : 50

GOLDER
MEMBER OF WSP

LOGGED: AL

CHECKED: GWS

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PROJECT: 1791470

LOCATION: N 4809088.00; E 565175.00

RECORD OF BOREHOLE: BH18-06

BORING DATE: January 11, 2018

SHEET 2 OF 2

DATUM: UTM 17T

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		--- CONTINUED FROM PREVIOUS PAGE ---									
10	Sonic Drilling	(ML/SW) SILT and SAND, some clay, cobbles from 13.41 m to 14.49 m; grey, no odour, no staining; non-cohesive, wet			7						
11					8						
12											
13					9						
14					10						
15				288.06							
		END OF BOREHOLE		14.94							
16											
17											
18											
19											
20											

DEPTH SCALE

1 : 50

GOLDER
MEMBER OF WSP

LOGGED: AL

CHECKED: GWS

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PROJECT: 1791470

LOCATION: N 4809075.81; E 565567.69

RECORD OF BOREHOLE: BH18-07

BORING DATE: January 11, 2018

SHEET 1 OF 2

DATUM: UTM 17T

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80)	SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕; Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3})	WATER CONTENT PERCENT (Wp, W, Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		304.00									
0	Sonic Drilling	(SW/GW) SAND and GRAVEL, trace silt from 1.22 m to 2.44 m; brown, no odour, no staining; non-cohesive, wet		0.00	1								
1													
2					2								
				301.56									
		(SM) SILTY SAND; golden brown, no odour, no staining; non-cohesive, wet		2.44									
				301.26									
3		(SW/GW) SAND and GRAVEL; brown, no odour, no staining; non-cohesive, wet		2.74	3								
4													
				299.12									
5		(SW) SAND; brown, no odour, no staining; non-cohesive, wet		4.88	4								
6					5								
7				296.68									
		(SW/GW) SAND and GRAVEL, come cobbles from 10.36 m to 11.28 m; grey, no odour, no staining; non-cohesive, wet		7.32									
8					6								
9					7								
10													
		CONTINUED NEXT PAGE											

DEPTH SCALE

1 : 50

GOLDER
MEMBER OF WSP

LOGGED: AL

CHECKED: GWS

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PROJECT: 1791470

LOCATION: N 4809075.81; E 565567.69

RECORD OF BOREHOLE: BH18-07

BORING DATE: January 11, 2018

SHEET 2 OF 2

DATUM: UTM 17T

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl; 10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		--- CONTINUED FROM PREVIOUS PAGE ---									
10	Sonic Drilling	(SW/GW) SAND and GRAVEL, come cobbles from 10.36 m to 11.28 m; grey, no odour, no staining; non-cohesive, wet			7						
11				292.72	8						
		(ML) SILT, some sand; brown, no odour, no staining; non-cohesive, wet		11.28							
				292.11							
12		(GW) GRAVEL, some sand; brown, no odour, no staining; non-cohesive, wet		11.89	9						
				291.20							
13		(ML) SILT, some gravel; brown, no odour, no staining; non-cohesive, wet		12.80							
				290.59							
14		(CL) SILTY CLAY, some cobbles; brown, no odour, no staining; cohesive, w>PL		13.41	10						
				289.06							
15		END OF BOREHOLE		14.94							
16											
17											
18											
19											
20											

DEPTH SCALE

1 : 50

GOLDER
MEMBER OF WSP

LOGGED: AL

CHECKED: GWS

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PROJECT: 1791470

LOCATION: N 4809211.84; E 565608.27

RECORD OF BOREHOLE: BH18-08

BORING DATE: January 11, 2018

SHEET 1 OF 2

DATUM: UTM 17T

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		305.00							
0	Sonic Drilling	(SW) SILTY SAND, some clay, some gravel; dark brown, no odour, no staining; non-cohesive, wet		0.00	1						
1											
2					2						
				302.26							
3		(SW) SAND; brown, no odour, no staining; non-cohesive, wet		2.74	3						
4											
5					4						
				299.51							
		(GW) GRAVEL, some sand; grey, no odour, no staining; non-cohesive, wet		5.49							
				299.22							
6		(SW/GW) SAND and GRAVEL; grey, no odour, no staining; non-cohesive, wet		5.78	5						
7											
8					6						
9											
					7						
10		*CONTINUED NEXT PAGE*									

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DEPTH SCALE

1 : 50

GOLDER
MEMBER OF WSP

LOGGED: AL

CHECKED: GWS

PROJECT: 1791470

LOCATION: N 4809211.84; E 565608.27

RECORD OF BOREHOLE: BH18-08

BORING DATE: January 11, 2018

SHEET 2 OF 2

DATUM: UTM 17T

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		--- CONTINUED FROM PREVIOUS PAGE ---									
10	Sonic Drilling	(SW/GW) SAND and GRAVEL; grey, no odour, no staining; non-cohesive, wet			7						
11					8						
				293.11							
12		(ML) CLAYEY SILT, some cobbles from 11.89 m to 13.41 m; brown, no odour, no staining; non-cohesive, wet		11.89	9						
13											
14					10						
				290.06							
15		END OF BOREHOLE		14.94							
16											
17											
18											
19											
20											

DEPTH SCALE

1 : 50

GOLDER
MEMBER OF WSP

LOGGED: AL

CHECKED: GWS

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PROJECT: 1791470

LOCATION: N 4809315.00; E 565697.95

RECORD OF BOREHOLE: BH18-09

BORING DATE: January 12, 2018

SHEET 1 OF 2

DATUM: UTM 17T

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		302.00							
0	Sonic Drilling	(SM) SILTY SAND, organics; brown, no odour, no staining; moist		0.00	1						
				301.39							
1		(SW) SAND, some gravel from 0.00 m to 1.83 m, some silt from 0.61 m to 3.66 m; brown, no odour, no staining; non-cohesive, wet		0.61	2						
2											
3					3						
				298.34							
4		(SW/GW) SAND and GRAVEL; brown/grey, no odour, no staining; non-cohesive, wet		3.66							
5					4						
6					5						
7											
8					6						
9					7						
10		*CONTINUED NEXT PAGE*									

DEPTH SCALE

1 : 50

GOLDER
MEMBER OF WSP

LOGGED: AL

CHECKED: GWS

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PROJECT: 1791470

LOCATION: N 4809315.00; E 565697.95

RECORD OF BOREHOLE: BH18-09

BORING DATE: January 12, 2018

SHEET 2 OF 2

DATUM: UTM 17T

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		--- CONTINUED FROM PREVIOUS PAGE ---									
10	Sonic Drilling	(SW/GW) SAND and GRAVEL; brown/grey, no odour, no staining; non-cohesive, wet			7						
				291.03							
11		(SW/ML) SAND and SILT, some cobbles; golden brown, no odour, no staining; non-cohesive, wet		10.97	8						
				290.11							
12		(SW/GW) SAND and GRAVEL; brown/grey, no odour, no staining; non-cohesive, wet		11.89	9						
13											
14				287.98							
		(SW/ML) SAND and SILT, some cobbles, some gravel; golden brown, no odour, no staining; non-cohesive, wet		14.02	10						
				287.06							
15		END OF BOREHOLE		14.94							
16											
17											
18											
19											
20											

DEPTH SCALE

1 : 50

GOLDER
MEMBER OF WSP

LOGGED: AL

CHECKED: GWS

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PROJECT: 1791470

LOCATION: N 4809498.81; E 565598.17

RECORD OF BOREHOLE: BH18-10

BORING DATE: January 12, 2018

SHEET 1 OF 2

DATUM: UTM 17T

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		305.00							
0	Sonic Drilling	(SM) SILTY SAND, organics; brown, no odour, no staining; moist		0.00	1						
				304.39							
		(SW/GW) SAND and GRAVEL; brown, no odour, no staining; non-cohesive, wet		0.61							
1					2						
2											
3					3						
4											
5					4						
6											
7					5						
8					6						
9											
10					7						
		CONTINUED NEXT PAGE									

DEPTH SCALE

1 : 50

GOLDER
MEMBER OF WSP

LOGGED: AL

CHECKED: GWS

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PROJECT: 1791470

LOCATION: N 4809498.81; E 565598.17

RECORD OF BOREHOLE: BH18-10

BORING DATE: January 12, 2018

SHEET 2 OF 2

DATUM: UTM 17T

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
10		*--- CONTINUED FROM PREVIOUS PAGE ---*									
10	Sonic Drilling	(SW/GW) SAND and GRAVEL; brown, no odour, no staining; non-cohesive, wet			7						
11					8						
				293.11							
12		(ML/SW) SILT and SAND, some cobbles; light brown, no odour, no staining; non-cohesive, wet		11.89	9						
13											
14					10						
				290.06							
15		END OF BOREHOLE		14.94							
16											
17											
18											
19											
20											

DEPTH SCALE

1 : 50

GOLDER
MEMBER OF WSP

LOGGED: AL

CHECKED: GWS

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PROJECT: 1791470

RECORD OF BOREHOLE: BH18-11

SHEET 1 OF 2

LOCATION: N 4809531.76; E 565915.05

BORING DATE: January 15, 2018

DATUM: UTM 17T

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		303.00							
0	Sonic Drilling	(SM) SILTY SAND, organics; brown, no odour, no staining; moist		0.00 / 302.70							
		(SW) SAND, some silt, some gravel; golden brown, no odour, no staining; non-cohesive, wet		0.30 / 301.78	1						
1		(SW/GW) SAND and GRAVEL; brown, no odour, no staining; non-cohesive, wet		1.22 / 300.26	2						
2		(SW) SAND; brown, no odour, no staining; non-cohesive, wet		2.74	3						
3											
4					4						
5					5						
6					6						
7					7						
8											
9											
10		*CONTINUED NEXT PAGE*									

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DEPTH SCALE

1 : 50

GOLDER
MEMBER OF WSP

LOGGED: AL

CHECKED: GWS

PROJECT: 1791470

LOCATION: N 4809531.76; E 565915.05

RECORD OF BOREHOLE: BH18-11

BORING DATE: January 15, 2018

SHEET 2 OF 2

DATUM: UTM 17T

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		--- CONTINUED FROM PREVIOUS PAGE ---									
10	Sonic Drilling	(SW) SAND; brown, no odour, no staining; non-cohesive, wet		292.64	7						
		(SW/ML) SAND and SILT; light brown, no odour, no staining; non-cohesive, wet		10.36							
11					8						
12					9						
				290.20							
13		(GW) GRAVEL/COBBLES; grey, no odour, no staining; non-cohesive, wet		12.80 289.89							
		BEDROCK		13.11							
14					10						
				288.06							
15		END OF BOREHOLE		14.94							
16											
17											
18											
19											
20											

DEPTH SCALE

1 : 50

GOLDER
MEMBER OF WSP

LOGGED: AL

CHECKED: GWS

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PROJECT: 1791470

LOCATION: N 4808765.98; E 565094.29

RECORD OF BOREHOLE: MW18-01A/B

BORING DATE: January 11, 2018
OFFSET WELL INSTALLED: June 21, 2018

SHEET 1 OF 2

DATUM: UTM 17T

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80)	SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3})	WATER CONTENT PERCENT (Wp, W, Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		GROUND SURFACE		302.66									
0	Sonic Drilling	TOPSOIL - (SM) SILTY SAND, organics; brown, no odour, no staining; moist		0.00 / 302.05	1								
1		(SW/GW) SAND and GRAVEL; brown, no odour, no staining; non-cohesive, wet		0.61 / 299.92	2								Nov 30, 2018 ▽ Bentonite
2													
3		(SW) SAND; golden brown, no odour, no staining; non-cohesive, wet		2.74 / 298.39	3								Sand
4													
5		(SW/GW) SAND and GRAVEL, some silt, cobbles at 4.27 m; brown, no odour, no staining; non-cohesive, wet		4.27 / 296.26	4								Screen
6													
7		(SW) SAND, trace silt, trace gravel; golden brown, no odour, no staining; non-cohesive, wet		6.40	5								
8					6								
9					7								
10		*CONTINUED NEXT PAGE*											

DEPTH SCALE
1 : 50

GOLDER
MEMBER OF WSP

LOGGED: AL
CHECKED: GWS

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PROJECT: 1791470

LOCATION: N 4808765.98; E 565094.29

RECORD OF BOREHOLE: MW18-01B

SHEET 2 OF 2

BORING DATE: January 11, 2018
OFFSET WELL INSTALLED: June 21, 2018

DATUM: UTM 17T

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		--- CONTINUED FROM PREVIOUS PAGE ---									
10	Sonic Drilling			292.30	7						
		(SW/ML) SILT and SAND, some clay at 11.89 m; brown, no odour, slight iron staining at 11.89 m; non-cohesive, wet		10.36							
11					8						
12					9						
13				289.25							
		(ML) SILT, some sand; grey; no odour, no staining; non-cohesive, wet		13.41							
14					10						
				287.72							
15		END OF BOREHOLE		14.94							
16											
17											
18											
19											
20											

DEPTH SCALE
1 : 50

GOLDER
MEMBER OF WSP

LOGGED: AL
CHECKED: GWS

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PROJECT: 1791470

LOCATION: N 4809051.11; E 565727.23

RECORD OF BOREHOLE: MW18-02

BORING DATE: January 16, 2018

SHEET 1 OF 2

DATUM: UTM 17T

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		303.35							
0	Sonic Drilling	(SW) SAND, some gravel at 1.22 m; grey, no odour, no staining; non-cohesive, wet		0.00	1						Nov 30, 2018
1					2						
2											
3					3						Bentonite
4											
5					4						
6					5						
7											Sand
8					6						Screen
				294.51							
9		(SW/GW) SAND and GRAVEL; grey, no odour, no staining; non-cohesive, wet		8.84	7						
10		*CONTINUED NEXT PAGE*									

DEPTH SCALE

1 : 50

GOLDER
MEMBER OF WSP

LOGGED: AL

CHECKED: GWS

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PROJECT: 1791470

LOCATION: N 4809051.11; E 565727.23

RECORD OF BOREHOLE: MW18-02

BORING DATE: January 16, 2018

SHEET 2 OF 2

DATUM: UTM 17T

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
10		*--- CONTINUED FROM PREVIOUS PAGE ---*									
	Sonic Drilling	(SW/GW) SAND and GRAVEL; grey, no odour, no staining; non-cohesive, wet		292.99	7						Screen
		(SM) SILTY SAND; brown, no odour, no staining; non-cohesive, wet		10.36							
11					8						
12											Bentonite
13					9						
14											
15		END OF BOREHOLE		288.41 14.94							
16											
17											
18											
19											
20											

DEPTH SCALE

1 : 50

GOLDER
MEMBER OF WSP

LOGGED: AL

CHECKED: GWS

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PROJECT: 1791470

LOCATION: N 4809429.20; E 566018.05

RECORD OF BOREHOLE: MW18-03

BORING DATE: January 10, 2018

SHEET 1 OF 2

DATUM: UTM 17T

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp ○W WI) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		303.66							
0	Sonic Drilling	(SW) SAND; brown, no odour, no staining; non-cohesive, wet		0.00	1						Nov 30, 2018
1											
				301.83	2						
2		(SW) SAND, some cobbles at 5.18 m, some silt from 5.18 m to 5.78 m; brown, no odour, no staining; non-cohesive, wet		1.83							
3					3						Bentonite
4											
5					4						
6					5						
7											Sand
8				295.43	6						
		(SW/GW) SAND and GRAVEL; brown, no odour, no staining; non-cohesive, wet		8.23							Screen
9					7						
10		*CONTINUED NEXT PAGE*									

DEPTH SCALE

1 : 50

GOLDER
MEMBER OF WSP

LOGGED: AL

CHECKED: GWS

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PROJECT: 1791470

LOCATION: N 4809429.20; E 566018.05

RECORD OF BOREHOLE: MW18-03

BORING DATE: January 10, 2018

SHEET 2 OF 2

DATUM: UTM 17T

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		--- CONTINUED FROM PREVIOUS PAGE ---									
10	Sonic Drilling	(SW/GW) SAND and GRAVEL; brown, no odour, no staining; non-cohesive, wet		293.30	7						Screen
		(ML) SILT, some clay, some cobbles; grey, no odour, no staining; non-cohesive, wet		10.36							
11					8						
				291.77							
12		(SW) SAND, some gravel, trace cobbles; grey, no odour, no staining; non-cohesive, wet		11.89	9						Bentonite
13				290.25							
		(SW) SAND, some silt, trace cobbles; brown, no odour, no staining; non-cohesive, wet		13.41							
14					10						
				288.72							
15		END OF BOREHOLE		14.94							
16											
17											
18											
19											
20											

DEPTH SCALE

1 : 50

GOLDER
MEMBER OF WSP

LOGGED: AL

CHECKED: GWS

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PROJECT: 1791470

LOCATION: N 4809698.57; E 566029.37

RECORD OF BOREHOLE: MW18-04

BORING DATE: January 9, 2018

SHEET 1 OF 2

DATUM: UTM 17T

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		303.81							
0	Sonic Drilling	(SW/GW) SAND and GRAVEL; brown, no odour, no staining; non-cohesive, wet		0.00	1						Nov 30, 2018 ▽
1											
2					2						
				301.07							
		(SW) SAND, some gravel at 4.27 m; brown, no odour, no staining; non-cohesive, wet		2.74							
3					3						
4											Bentonite
5					4						
6					5						
7											
8					6						
9											Sand
					7						Screen
10		*CONTINUED NEXT PAGE*									

DEPTH SCALE

1 : 50

GOLDER
MEMBER OF WSP

LOGGED: AL

CHECKED: GWS

GTA-BHS 001 S:\CLIENTS\CBM_AGGREGATES\ABERFOLYE_PIT\02_DATA\GINT\ABERFOLYE.GPJ GAL-MIS.GDT 1/27/22

PROJECT: 1791470

LOCATION: N 4809698.57; E 566029.37

RECORD OF BOREHOLE: MW18-04

BORING DATE: January 9, 2018

SHEET 2 OF 2

DATUM: UTM 17T

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		--- CONTINUED FROM PREVIOUS PAGE ---									
10	Sonic Drilling	(SW) SAND, some gravel at 4.27 m; brown, no odour, no staining; non-cohesive, wet			7						
11					8						Screen
				292.23							
		(SW) SAND, some gravel from 11.58 m to 11.89 m, some silt from 11.58 m to 14.94 m; brown, no odour, no staining; non-cohesive, wet		11.58							
12					9						
13											Bentonite
14					10						
				288.87							
15		END OF BOREHOLE		14.94							
16											
17											
18											
19											
20											

DEPTH SCALE

1 : 50

GOLDER
MEMBER OF WSP

LOGGED: AL

CHECKED: GWS

GTA-BHS 001 S:\CLIENTS\CBM_AGGREGATES\ABERFOLYE_PIT\02_DATA\GINT\ABERFOLYE.GPJ GAL-MIS.GDT 1/27/22

PROJECT: 1791470

LOCATION: N 4809511.68; E 565241.19

RECORD OF BOREHOLE: MW18-05

BORING DATE: January 16, 2018

SHEET 1 OF 2

DATUM: UTM 17T

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		307.17							
0	Sonic Drilling	(SM) SILTY SAND, organics; brown, no odour, no staining; moist		0.00	1						
1				305.95							
		(SM) SILTY SAND, some cobbles; golden brown, no odour, no staining; non-cohesive, wet		1.22	2						
2				304.38							
		(ML/SW) SILT and SAND, some gravel, some cobbles and boulders from 7.32 m to 8.84 m, some clay from 13.41 m to 14.94 m; golden brown, no odour, no staining; non-cohesive, wet		2.79	3						Nov 30, 2018
3											
4					4						Bentonite
5					5						
6					6						Sand
7					7						Screen
8											
9											
10		*CONTINUED NEXT PAGE*									

DEPTH SCALE

1 : 50

GOLDER
MEMBER OF WSP

LOGGED: AL

CHECKED: GWS

GTA-BHS 001 S:\CLIENTS\CBM_AGGREGATES\ABERFOLYE_PIT\02_DATA\GINT\ABERFOLYE.GPJ GAL-MIS.GDT 1/27/22

PROJECT: 1791470

LOCATION: N 4809511.68; E 565241.19

RECORD OF BOREHOLE: MW18-05

BORING DATE: January 16, 2018

SHEET 2 OF 2

DATUM: UTM 17T

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
10		*--- CONTINUED FROM PREVIOUS PAGE ---*									
10	Sonic Drilling	(ML/SW) SILT and SAND, some gravel, some cobbles and boulders from 7.32 m to 8.84 m, some clay from 13.41 m to 14.94 m; golden brown, no odour, no staining; non-cohesive, wet			7						
11					8						Screen
12					9						
13											Bentonite
14					10						
				292.54							
		BEDROCK		14.63							
				292.23							
15		END OF BOREHOLE		14.94							
16											
17											
18											
19											
20											

DEPTH SCALE

1 : 50

GOLDER
MEMBER OF WSP

LOGGED: AL

CHECKED: GWS

GTA-BHS 001 S:\CLIENTS\CBM_AGGREGATES\ABERFOLYE_PIT\02_DATA\GINT\ABERFOLYE.GPJ GAL-MIS.GDT 1/27/22

PROJECT: 1791470

LOCATION: N 4809336.59; E 565548.98

RECORD OF BOREHOLE: MW18-06

BORING DATE: November 23, 2018

SHEET 1 OF 1

DATUM: UTM 17T

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80)	SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3})	WATER CONTENT PERCENT (Wp, W, Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		303.07									
0	Sonic Drilling	(SM) SILTY SAND, organics; brown, no odour, no staining; moist		0.00 / 302.16	1								Nov 30, 2018
1		(SW/GW) SAND and GRAVEL; grey, no odour, no staining; non-cohesive, wet		0.91 / 299.41	2								
2													
3					3								Bentonite
4		(SW) SAND; brown, no odour, no staining; non-cohesive, wet		3.66 / 296.36	4								
5					5								
6													Sand
7		(SW/GW) SAND and GRAVEL; grey, no odour, no staining; wet		6.71 / 293.93	6								Screen
8													
9													
		END OF BOREHOLE		9.14									
10													

DEPTH SCALE

1 : 50

GOLDER
MEMBER OF WSP

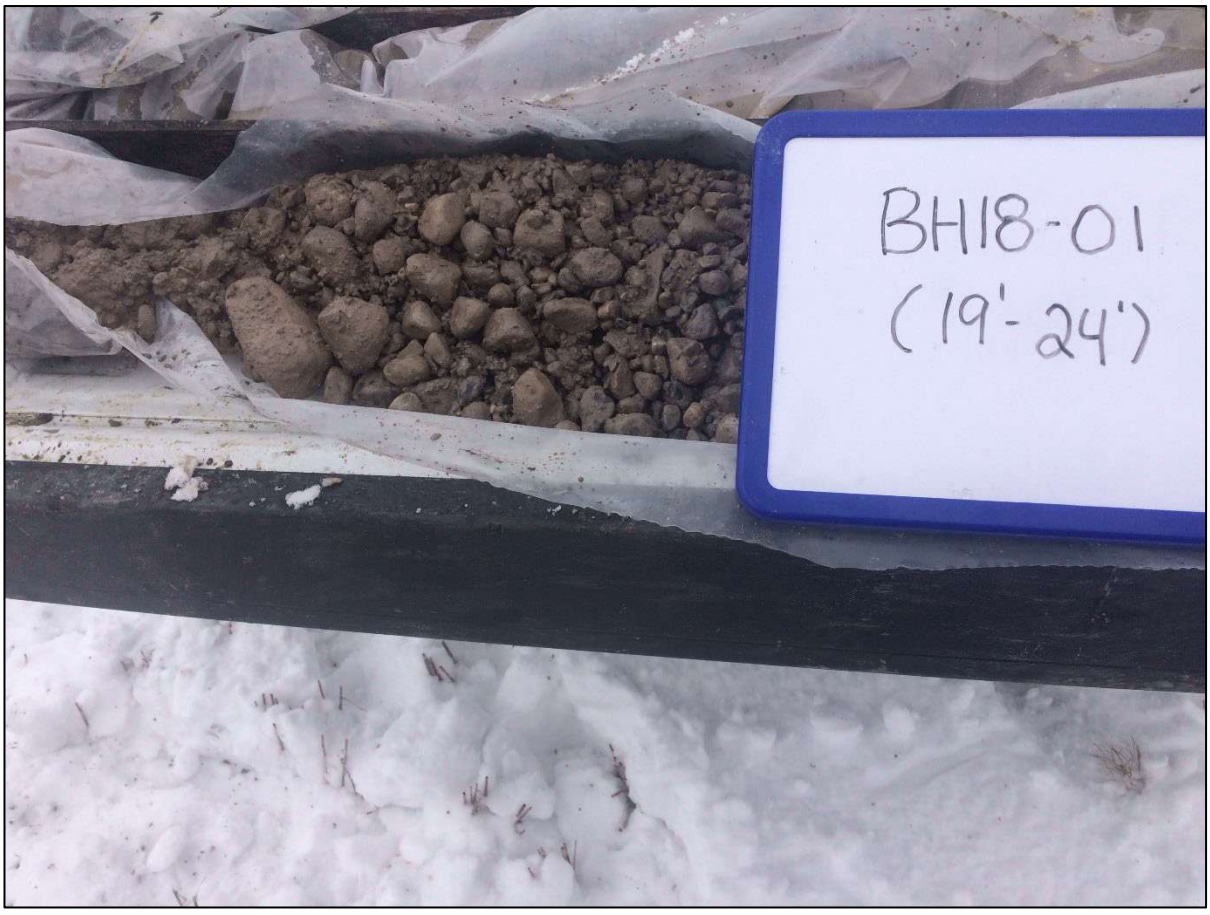
LOGGED: AL

CHECKED: GWS

GTA-BHS 001 S:\CLIENTS\CBM_AGGREGATES\ABERFOLYE_PIT\02_DATA\GINT\ABERFOLYE.GPJ GAL-MIS.GDT 1/27/22

APPENDIX B

Core Photographs



Core Photo: BH18-01 Depth: 19'- 24'

Core Photo: BH18-01 Depth: 29'- 34'

Core Photo: BH18-02 Depth: 19'- 24'

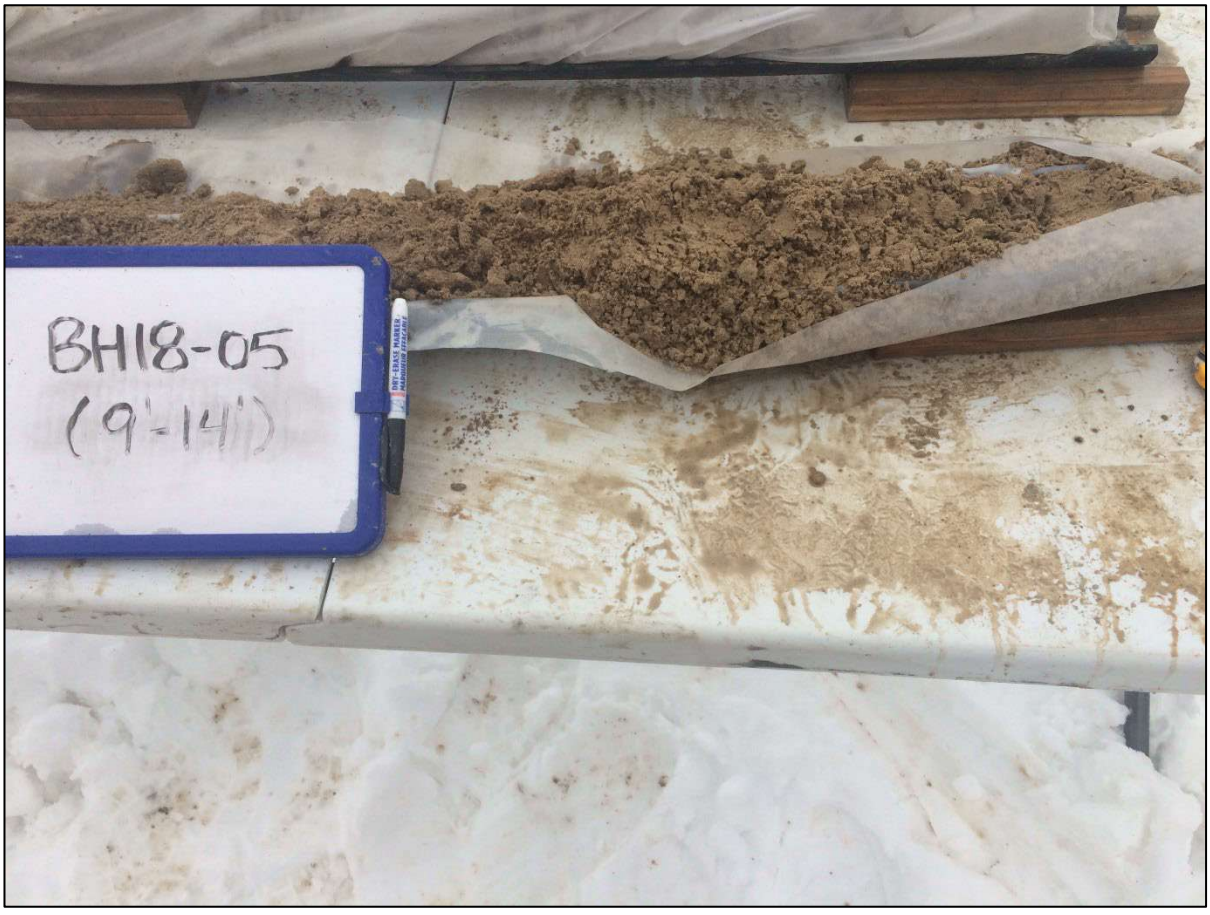
Core Photo: BH18-02 Depth: 29’- 39’

Core Photo: BH18-03 Depth: 19’- 24’

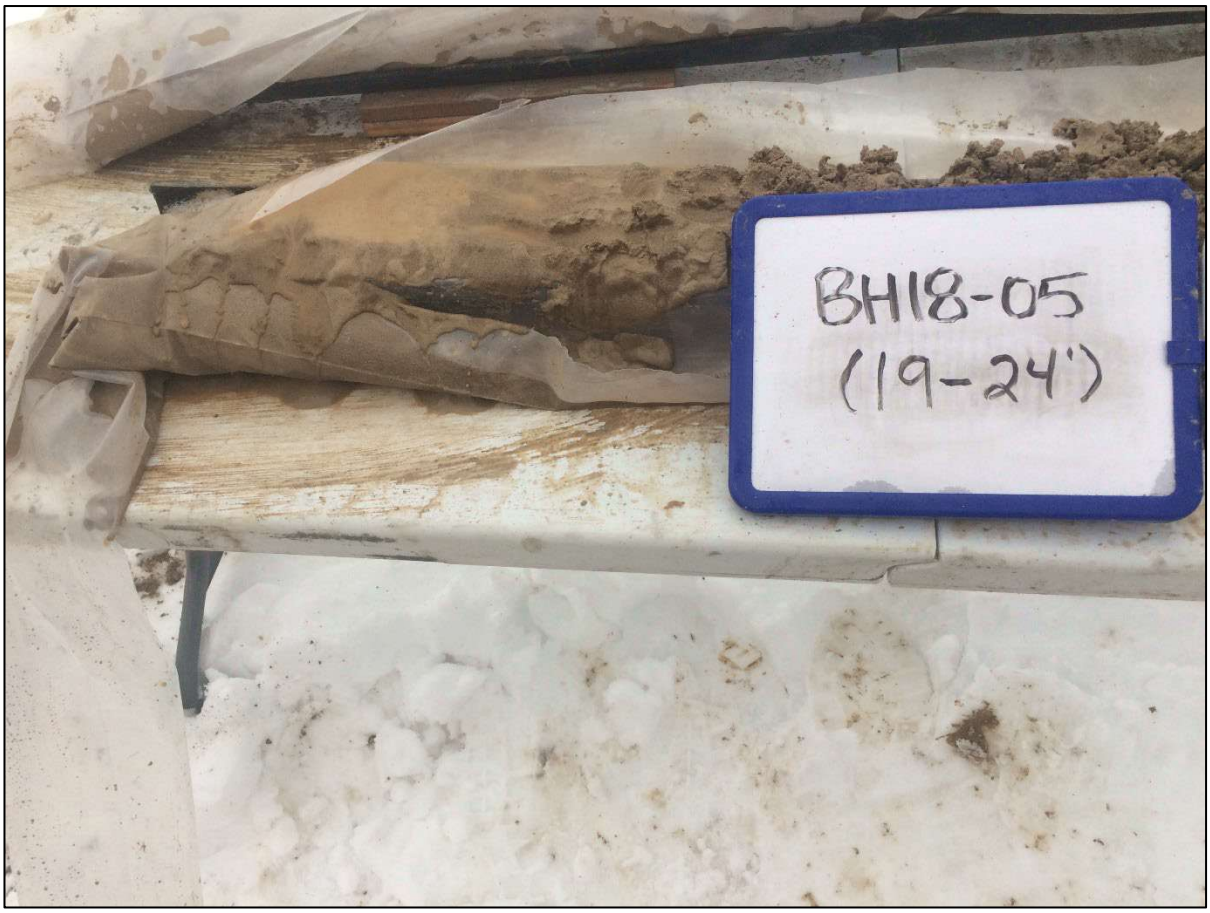
Core Photo: BH18-03 Depth: 29’- 34’

Core Photo: BH18-04 Depth: 19’- 24’

Core Photo: BH18-04 Depth: 29’- 34’

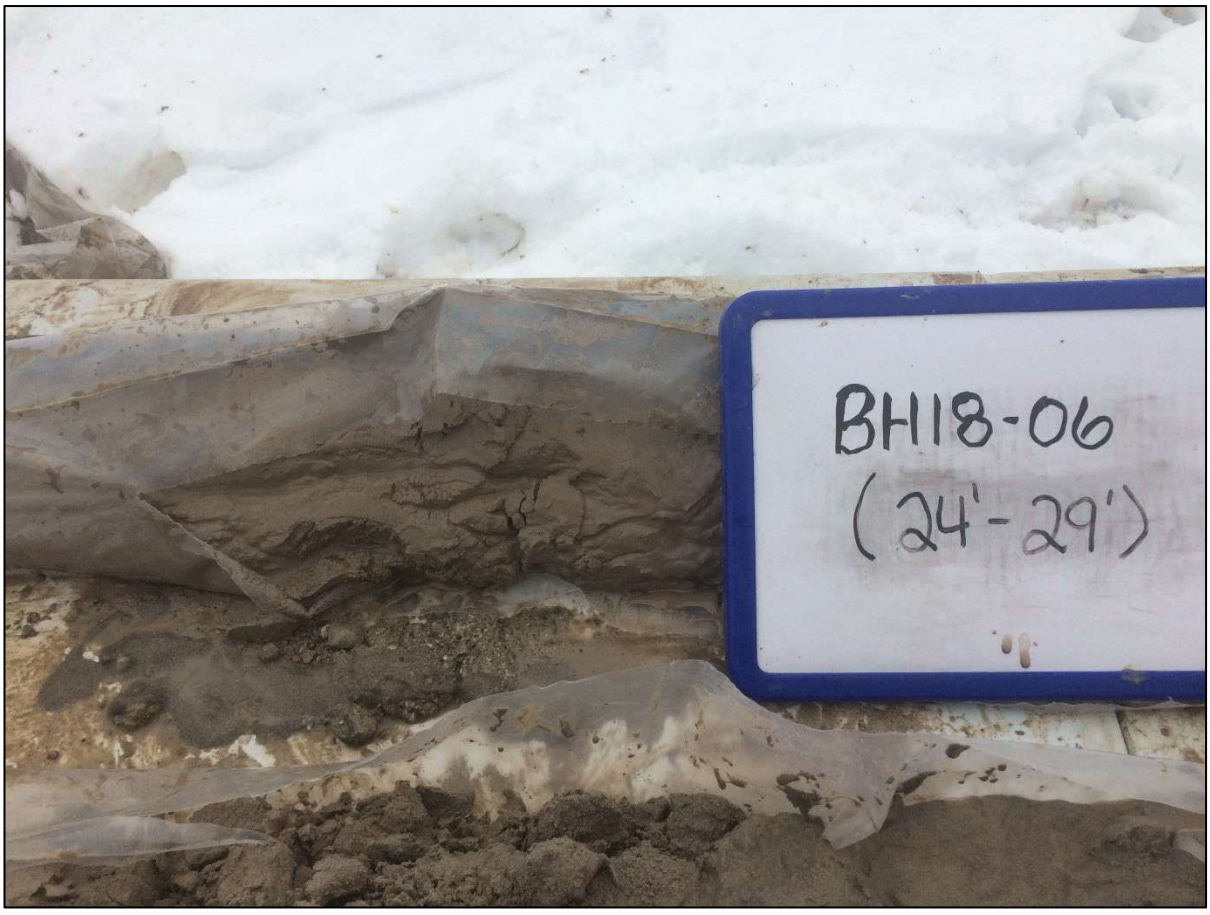


Core Photo: BH18-05 Depth: 9’- 14’

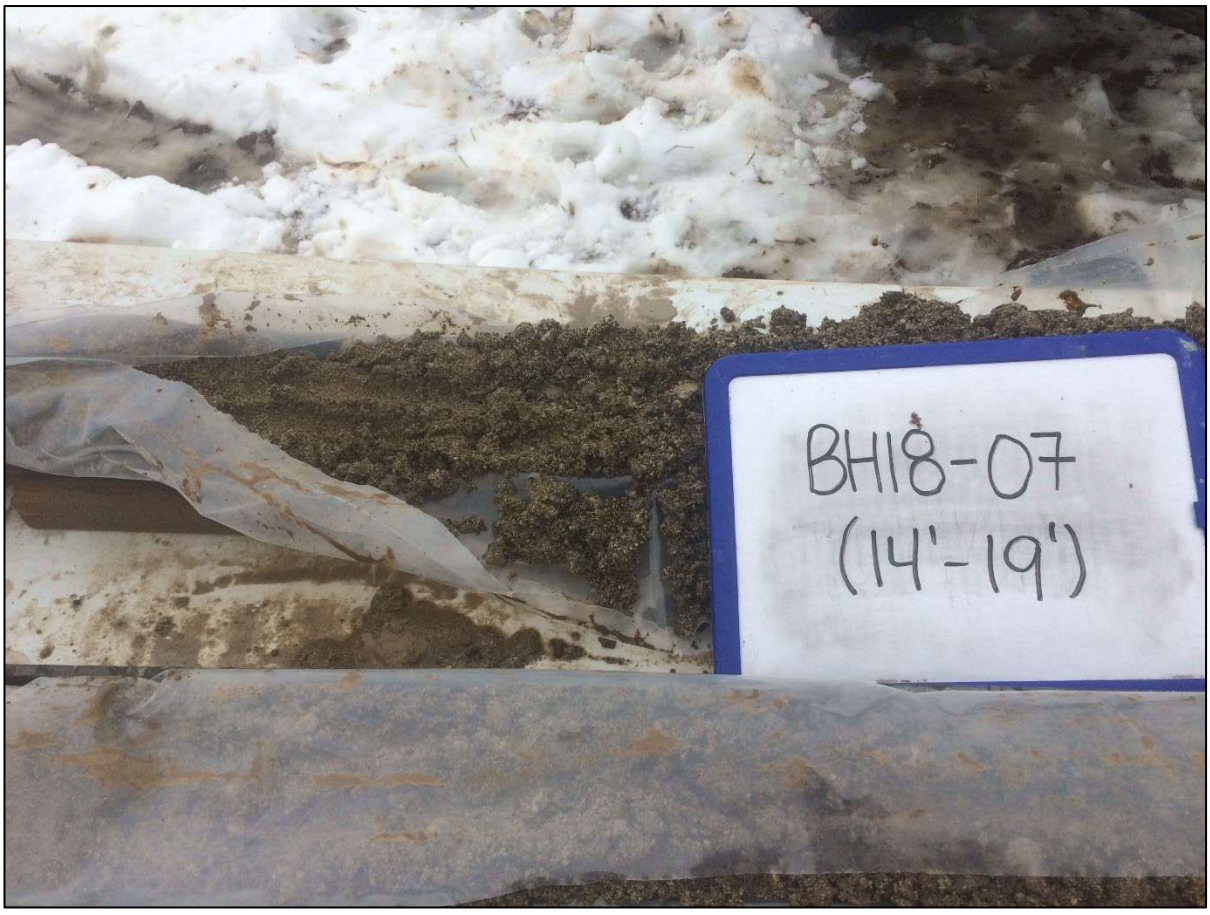


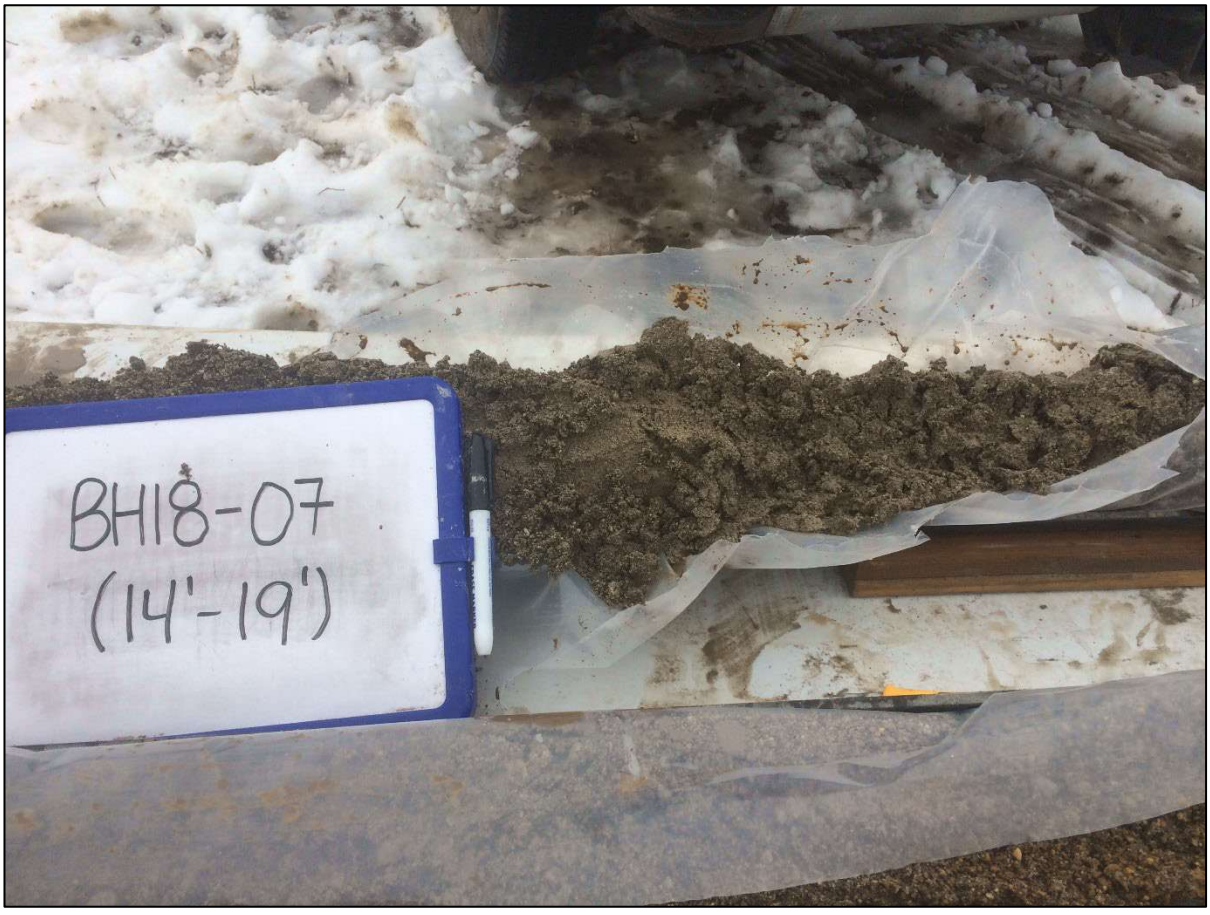
Core Photo: BH18-05 Depth: 19'- 24'

Core Photo: BH18-06 Depth: 14’- 19’



Core Photo: BH18-06 Depth: 24'- 29'





Core Photo: BH18-07 Depth: 14’- 19’

Core Photo: BH18-07 Depth: 29’- 34’

Core Photo: BH18-08 Depth: 19'- 24'

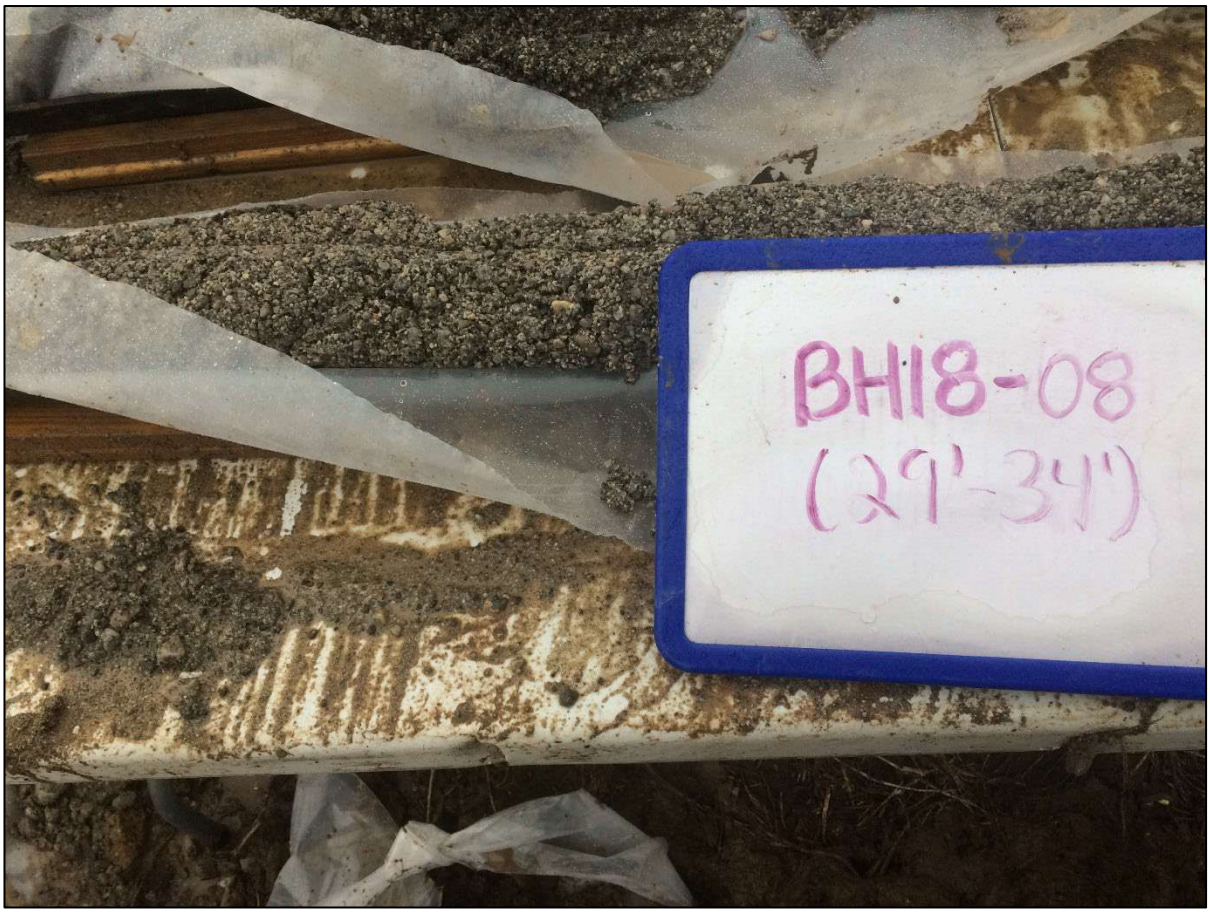
Core Photo: BH18-08 Depth: 29’- 34’

Core Photo: BH18-09 Depth: 19'- 24'

Core Photo: BH18-09 Depth: 34’-39’

Core Photo: BH18-10 Depth: 14’- 19’

Core Photo: BH18-10 Depth: 19’- 24’



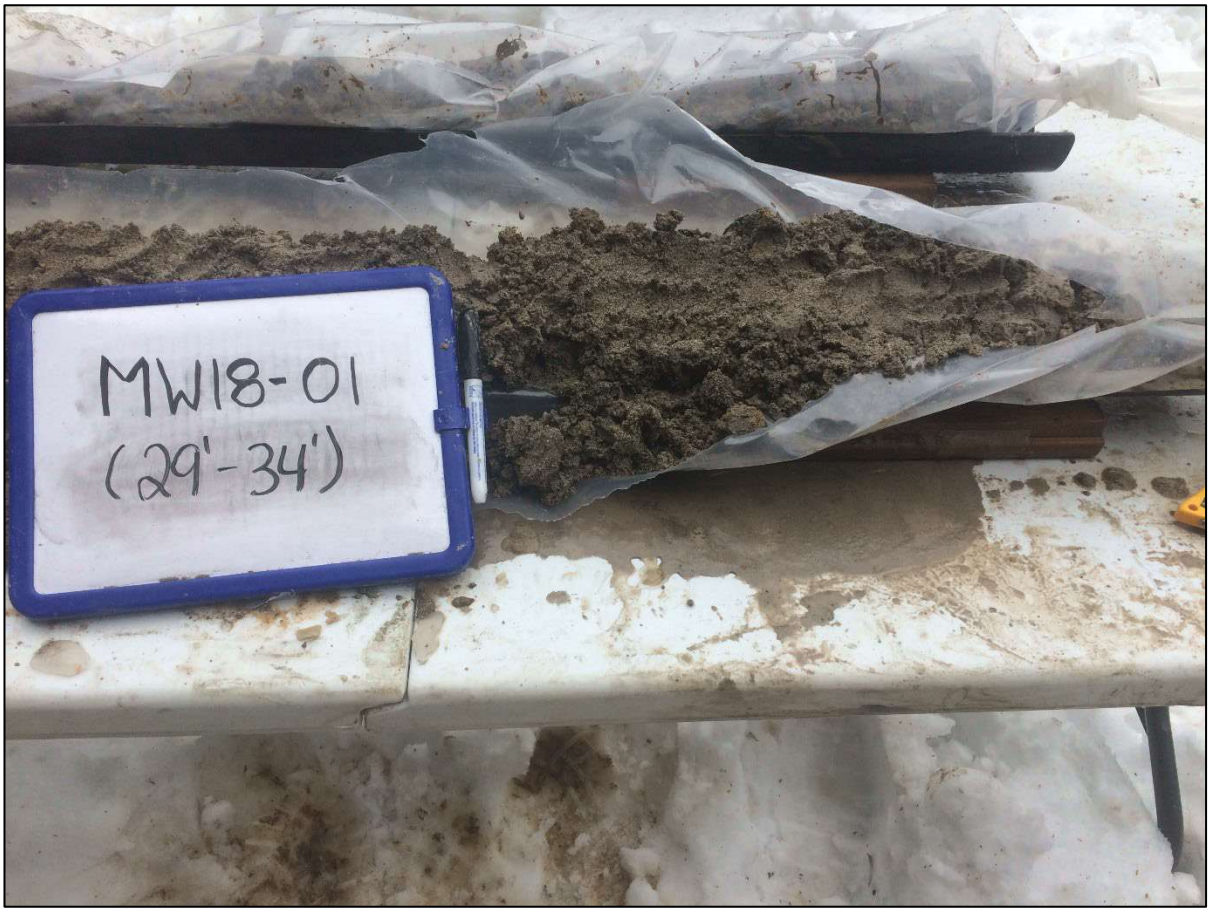
Core Photo: BH18-10 Depth: 29'- 34'

Core Photo: BH18-10 Depth: 39’- 44’

Core Photo: BH18-11 Depth: 14’- 19’

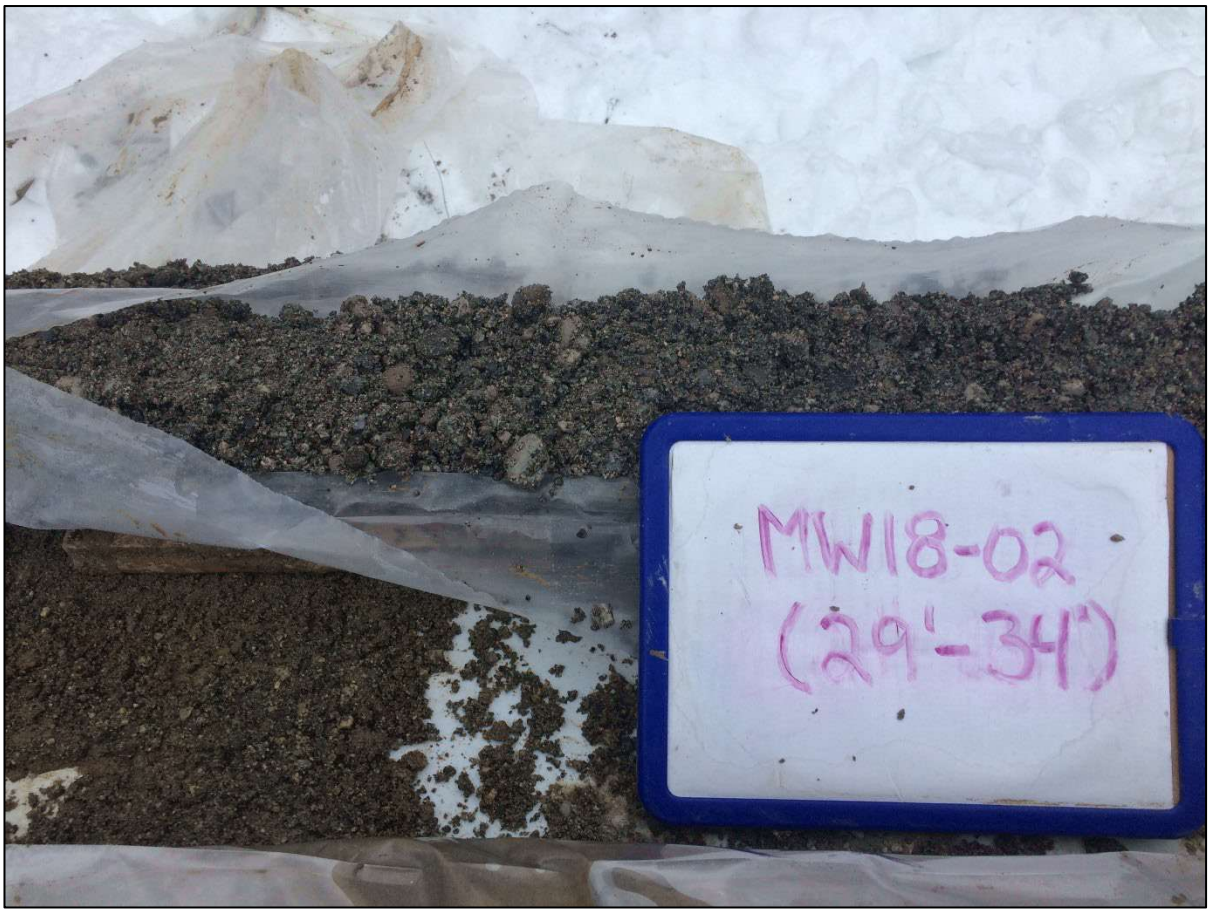
Core Photo: BH18-11 Depth: 24’- 29’

Core Photo: MW18-01 Depth: 19’- 24’

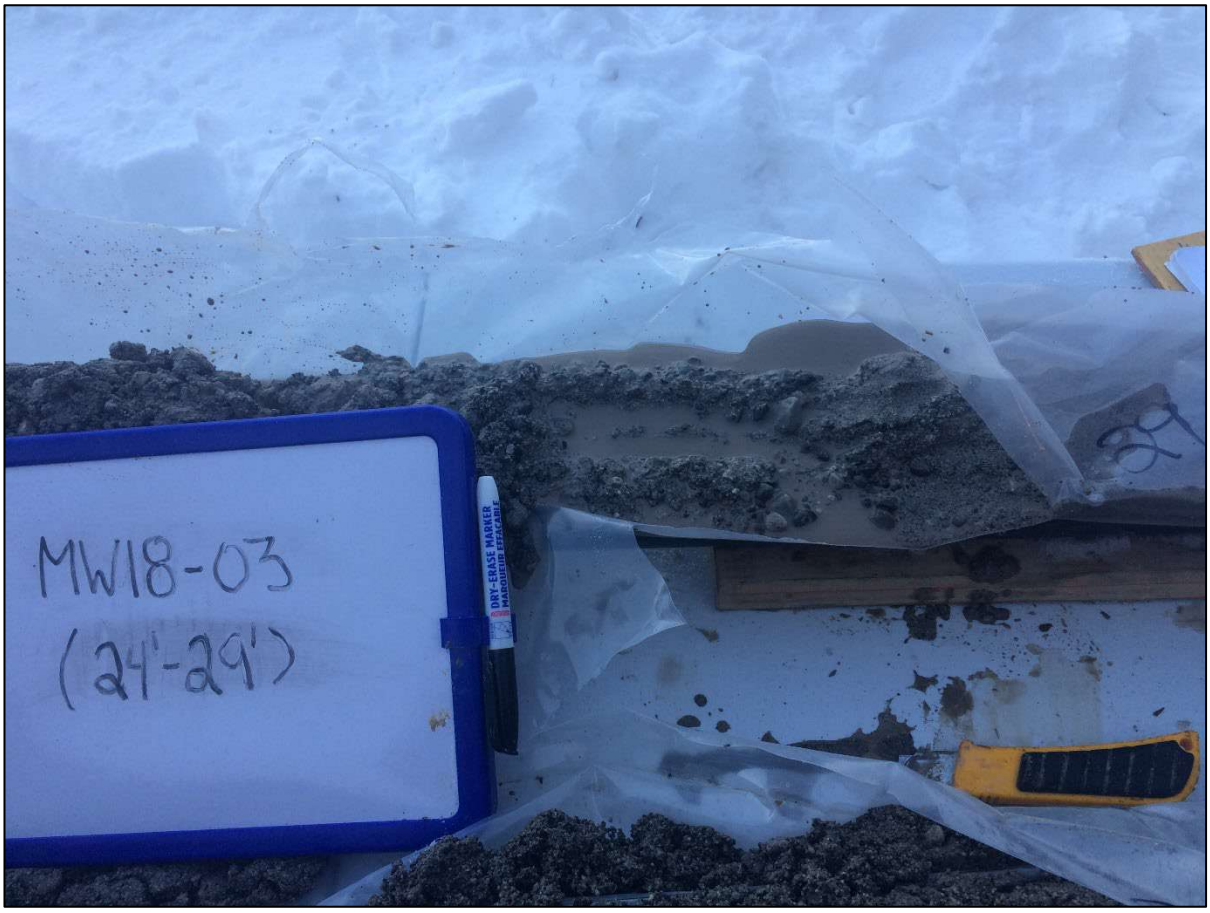


Core Photo: MW18-01 Depth: 29’- 34’

Core Photo: MW18-02 Depth: 19'- 24'



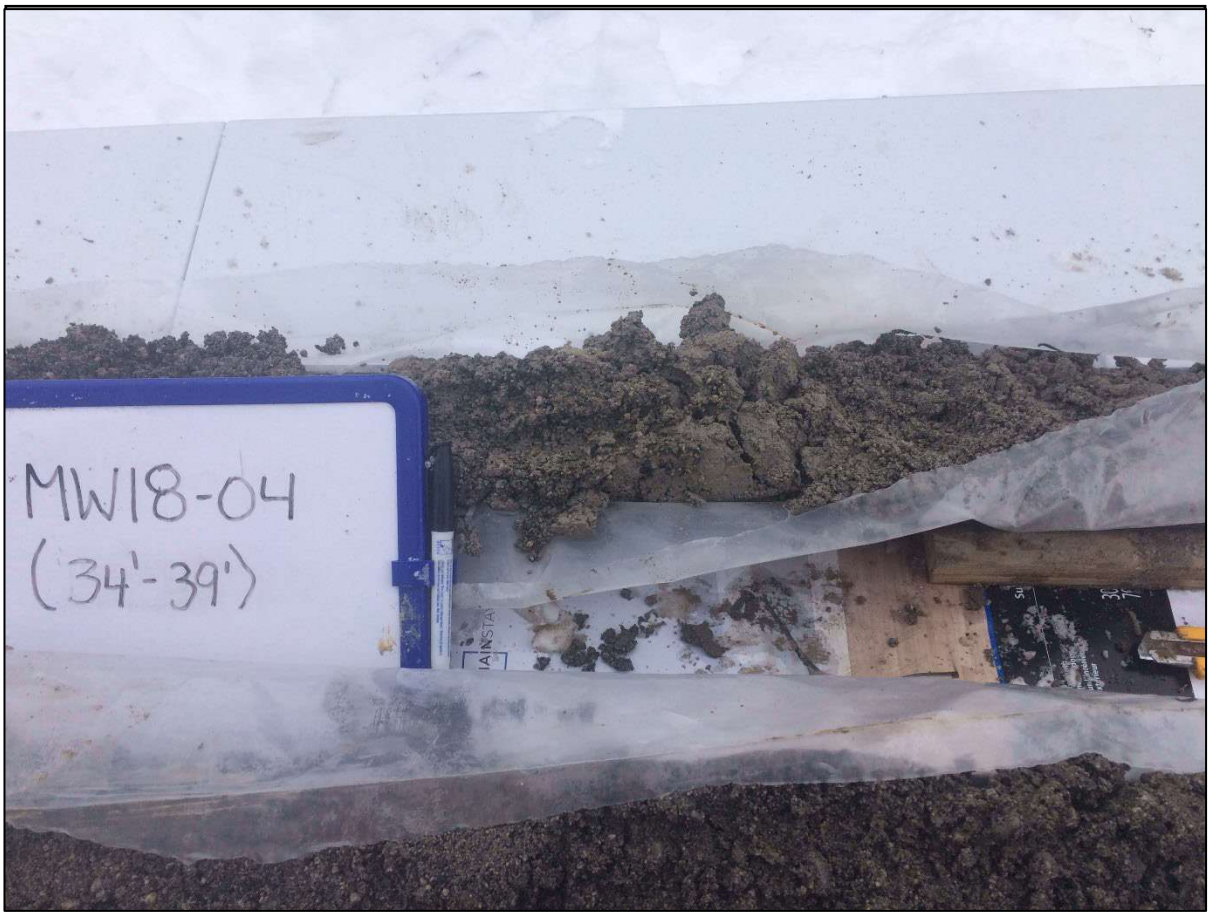
Core Photo: MW18-02 Depth: 29’- 34’



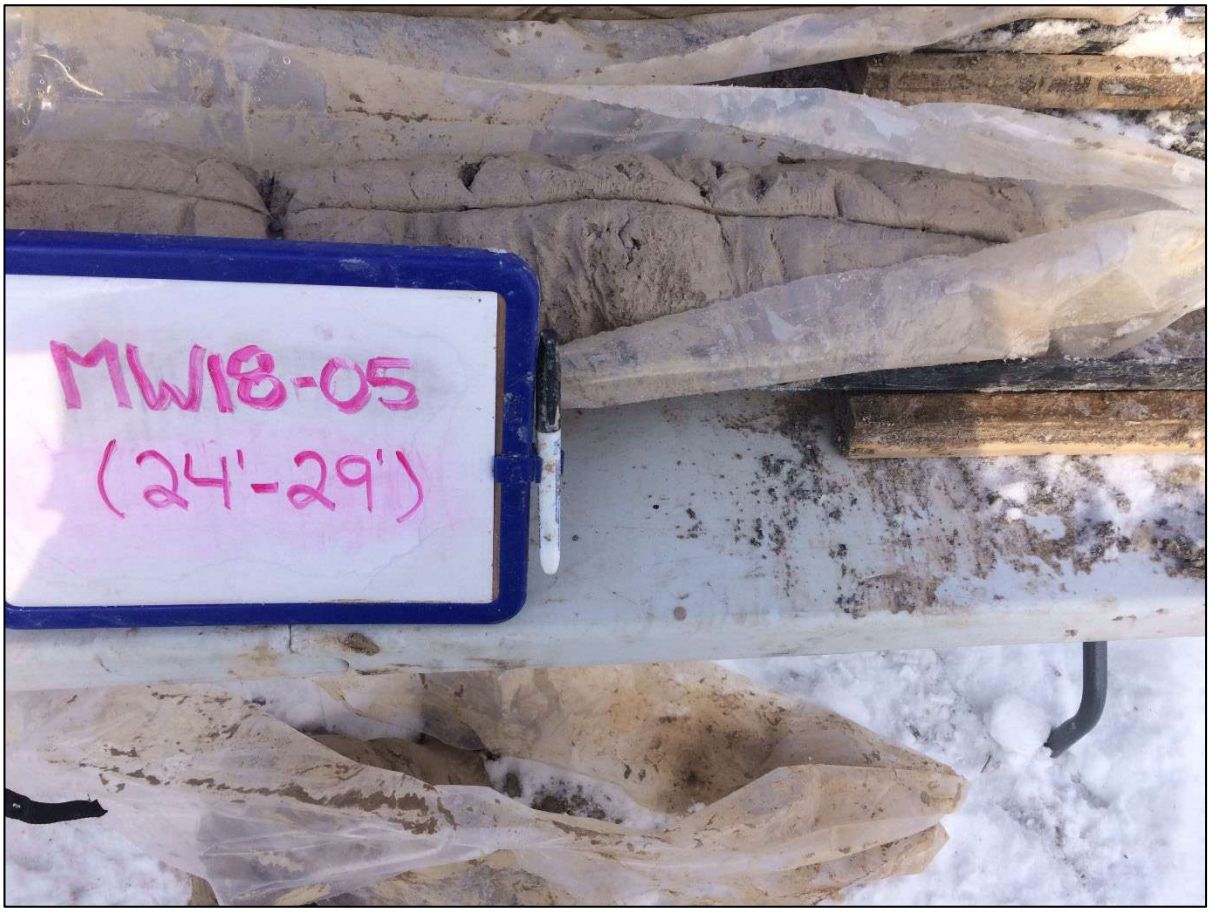
Core Photo: MW18-03 Depth: 24’- 29’

Core Photo: MW18-03 Depth: 39’- 44’

Core Photo: MW18-04 Depth: 24'- 29'



Core Photo: MW18-04 Depth: 34’-39’



Core Photo: MW18-05 Depth: 24’- 29’

Core Photo: MW18-05 Depth: 34’- 39’

APPENDIX C

Grain Size Tests

Fineness Modulus Calculations
CBM Aberfoyle South Pit Expansion

Borehole ID	Top Depth (ft)	Bottom Depth (ft)	Full FM Value	Sand Portion FM Value
BH18-01	4	9	2.24	2.22
BH18-01	9	14	2.34	2.34
BH18-01	14	19	3.39	3.39
BH18-01	19	24	4.88	4.74
BH18-01	24	29	2.22	2.22
BH18-01	29	34	3.01	3.01
BH18-01	39	44	0.87	0.87
BH18-01	44	49	0.06	0.06
BH18-02	0	4	4.22	4.04
BH18-02	4	9	4.48	4.38
BH18-02	9	14	3.47	3.47
BH18-02	14	19	3.04	3.04
BH18-02	19	24	3.97	3.94
BH18-02	24	29	0.41	0.41
BH18-02	29	39	3.62	3.62
BH18-02	39	44	3.93	3.91
BH18-03	0	4	3.56	3.53
BH18-03	4	9	2.11	2.11
BH18-03	9	14	2.74	2.74
BH18-03	14	19	2.42	2.42
BH18-03	19	24	3.17	3.17
BH18-03	24	29	2.52	2.52
BH18-03	29	34	3.66	3.63
BH18-04	9	14	0.56	0.56
BH18-04	24	29	0.75	0.75
BH18-04	44	49	0.07	0.07
BH18-05	4	9	2.61	2.46
BH18-05	9	14	2.33	2.33
BH18-05	14	19	1.49	1.49
BH18-05	19	24	0.48	0.48
BH18-05	29	34	0.94	0.94
BH18-05	44	49	0.24	0.24
BH18-06	0	4	4.68	4.53
BH18-06	4	9	3.91	3.85
BH18-06	9	14	2.03	2.03
BH18-06	14	19	0.68	0.68
BH18-06	19	24	0.13	0.13
BH18-06	24	29	0.10	0.10
BH18-06	29	34	0.15	0.15
BH18-06	34	39	0.10	0.10
BH18-06	39	44	0.22	0.22
BH18-07	14	19	2.96	2.96
BH18-10	0	4	4.21	4.12
BH18-11	4	9	4.39	4.23
BH18-11	9	14	2.52	2.47
BH18-11	14	19	2.80	2.80
BH18-11	19	24	3.73	3.64
BH18-11	24	29	3.33	3.30

Fineness Modulus Calculations
CBM Aberfoyle South Pit Expansion

Borehole ID	Top Depth (ft)	Bottom Depth (ft)	Full FM Value	Sand Portion FM Value
BH18-11	29	34	3.69	3.64
BH18-11	34	39	0.06	0.06
MW18-01	0	4	4.18	4.09
MW18-01	4	9	3.84	3.79
MW18-01	9	14	1.88	1.88
MW18-01	14	19	4.29	3.79
MW18-01	19	24	3.66	3.44
MW18-01	24	29	1.58	1.58
MW18-01	29	34	2.18	2.18
MW18-01	34	39	0.22	0.22
MW18-01	39	44	1.19	1.19
MW18-02	4	9	2.93	2.93
MW18-02	9	14	1.98	1.98
MW18-02	14	19	3.26	3.25
MW18-02	19	24	3.77	3.75
MW18-02	24	29	3.48	3.48
MW18-02	29	34	4.46	4.41
MW18-02	34	39	0.15	0.15
MW18-02	39	49	0.07	0.07
MW18-03	0	4	4.70	4.42
MW18-03	4	9	0.60	0.60
MW18-03	9	14	2.75	2.75
MW18-03	14	19	2.81	2.81
MW18-03	19	24	2.82	2.82
MW18-03	24	29	4.37	4.20
MW18-03	29	34	3.97	3.88
MW18-03	39	44	3.87	3.82
MW18-04	4	9	5.36	5.09
MW18-04	9	14	3.05	3.05
MW18-04	14	19	4.11	3.99
MW18-04	19	24	2.98	2.98
MW18-04	24	29	4.09	3.99
MW18-04	29	34	3.78	3.72
MW18-04	34	39	3.67	3.63
MW18-04	39	44	1.05	1.05
MW18-04	44	49	0.32	0.32
MW18-06	0	5	5.46	n/c
MW18-06	5	10	5.56	n/c
MW18-06	10	12	5.60	n/c
MW18-06	12	15	1.32	n/c
MW18-06	15	18	2.14	n/c
MW18-06	18	22	1.82	n/c
MW18-06	22	30	4.48	n/c

WSP Canada Inc.
100 Scotia Court
Whitby, L1N 8Y6
905-723-2727

11/07/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012201	Report Number:	WHB03988-23

Sample Details

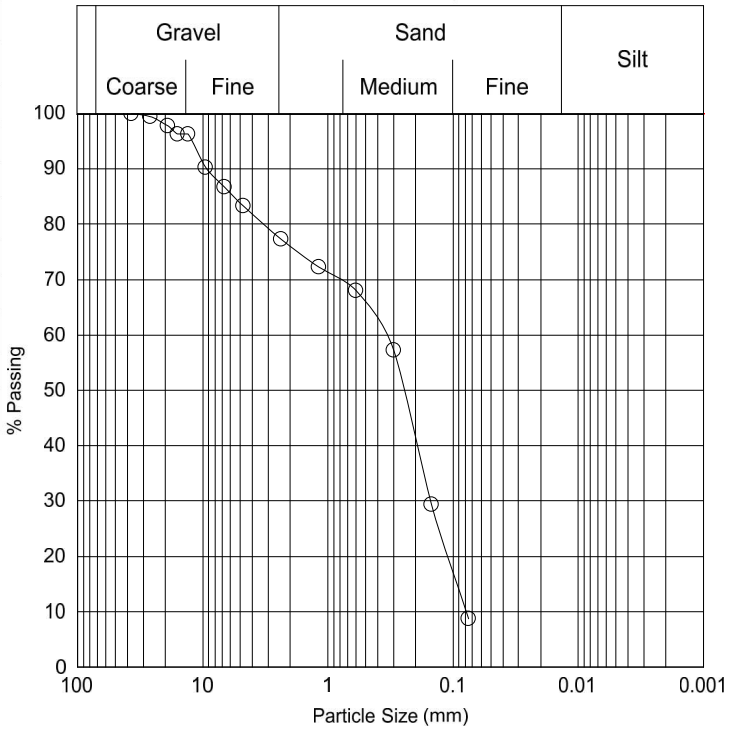
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	NA
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	4'-9'	Specification:	NA
Location:	BH18-01	Lab Number:	WHB23-04545

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5	100.0				
26.5	99.5	44.2			
19.0	97.8	189.5			
16.0	96.3	326.8			
13.2	96.3	326.8			
9.5	90.3	848.6			
6.7	86.8	1163.6			
4.75	83.4	1462.0			
2.36	77.3	2000.0			
1.18	72.3	2434.1			
0.600	68.0	2815.1			
0.300	57.2	3764.2			
0.150	29.4	6205.0			
0.075	8.7	8026.9			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
0.080	0.098	0.378	5.7	5	2.22
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
8793.6	8793.5	0.0	16.6	83.4	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

CERTIFIED BY CCIL

WSP Canada Inc.
100 Scotia Court
Whitby, L1N 8Y6
905-723-2727

11/07/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012218	Report Number:	WHB03990-23

Sample Details

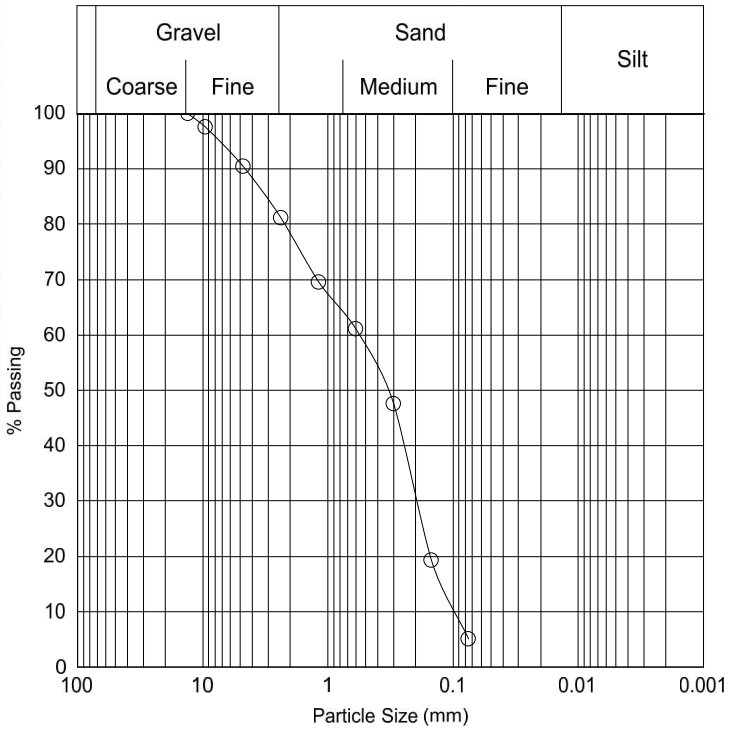
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/06/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	9'-14'	Specification:	NA
Location:	BH18-01	Lab Number:	WHB23-04549

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5					
26.5					
19.0					
16.0					
13.2	100.0				
9.5	97.6	8.9			
6.7					
4.75	90.4	35.1			
2.36	81.1	68.9			
1.18	69.5	111.4			
0.600	61.0	142.5			
0.300	47.6	191.5			
0.150	19.2	295.2			
0.075	5.1	346.7			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
0.101	0.128	0.578	3.4	6	2.34
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
365.4	365.4	0.0	9.6	90.4	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

CERTIFIED BY CCIL

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100 Scotia Court
Whitby, L1N 8Y6
905-723-2727

11/07/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012223	Report Number:	WHB03991-23

Sample Details

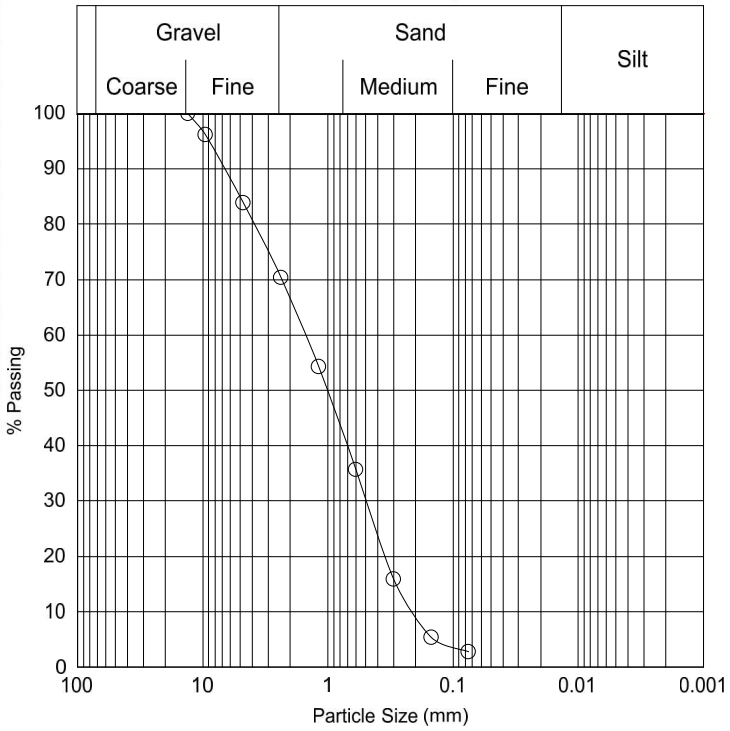
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/06/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	14'-19'	Specification:	NA
Location:	BH18-01	Lab Number:	WHB23-04550

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5					
26.5					
19.0					
16.0					
13.2	100.0				
9.5	96.2	14.6			
6.7					
4.75	83.9	61.2			
2.36	70.3	113.1			
1.18	54.2	174.7			
0.600	35.7	245.0			
0.300	15.9	320.6			
0.150	5.3	361.0			
0.075	2.7	371.0			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
0.217	0.287	1.61	5.2	7	3.38
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
381.1	381.1	0.0	16.1	83.9	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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Whitby, L1N 8Y6
905-723-2727

11/07/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012225	Report Number:	WHB03992-23

Sample Details

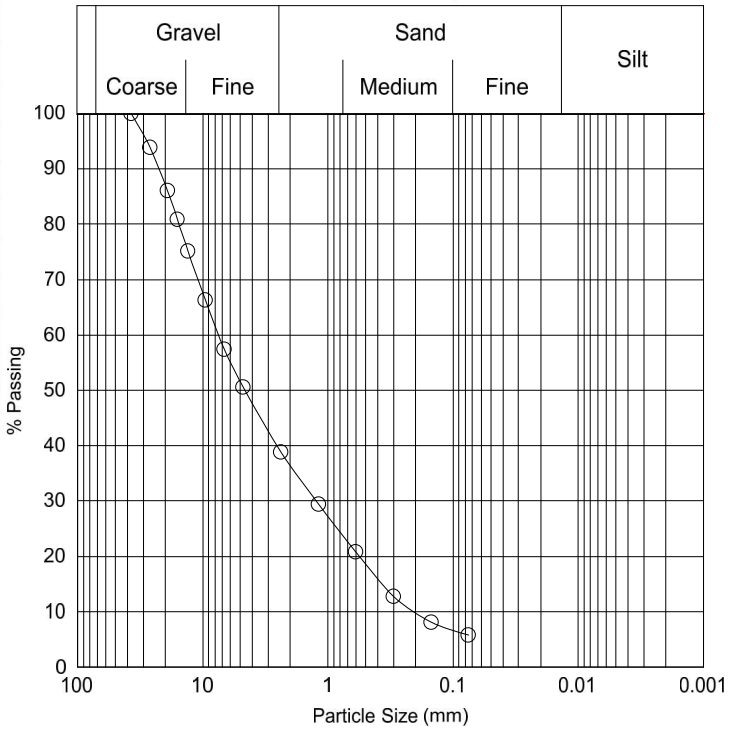
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/06/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	19'-24'	Specification:	NA
Location:	BH18-01	Lab Number:	WHB23-04551

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5	100.0				
26.5	93.8	710.8			
19.0	86.0	1599.5			
16.0	80.9	2175.8			
13.2	75.1	2839.0			
9.5	66.2	3852.5			
6.7	57.4	4844.2			
4.75	50.5	5630.1			
2.36	38.8	6969.6			
1.18	29.4	8033.4			
0.600	20.7	9027.2			
0.300	12.7	9943.5			
0.150	8.1	10459.0			
0.075	5.7	10733.2			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
0.212	0.386	7.5	18.4	36	4.74
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
11384.4	11384.3	0.0	49.5	50.5	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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905-723-2727

11/07/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012228	Report Number:	WHB03993-23

Sample Details

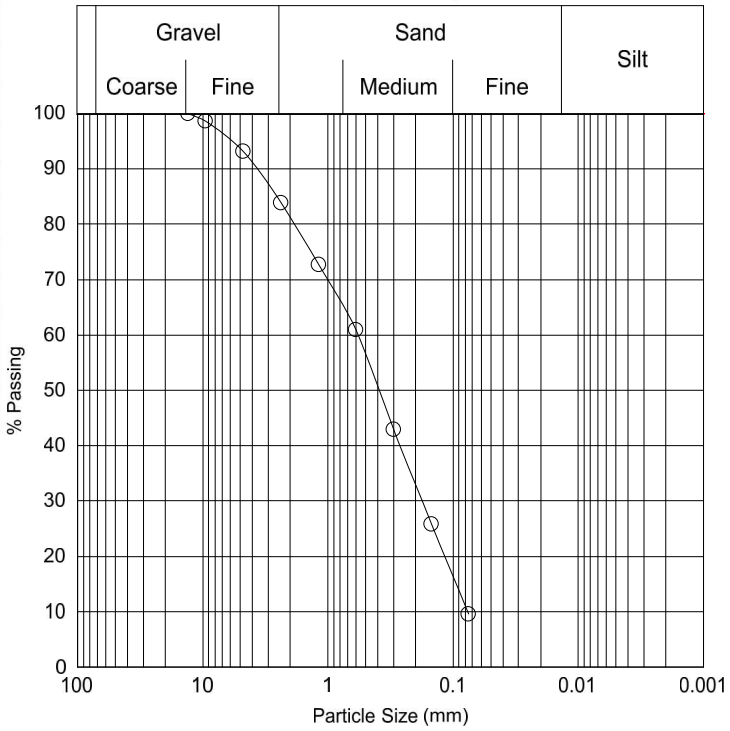
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/06/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	24'-29'	Specification:	NA
Location:	BH18-01	Lab Number:	WHB23-04552

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5					
26.5					
19.0					
16.0					
13.2	100.0				
9.5	98.6	4.1			
6.7					
4.75	93.2	20.4			
2.36	83.9	48.0			
1.18	72.7	81.4			
0.600	60.9	116.6			
0.300	42.9	170.1			
0.150	25.8	221.2			
0.075	9.5	269.7			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
0.077	0.100	0.585	2.6	8	2.22
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
298.0	298.0	0.0	6.8	93.2	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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11/07/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012229	Report Number:	WHB03994-23

Sample Details

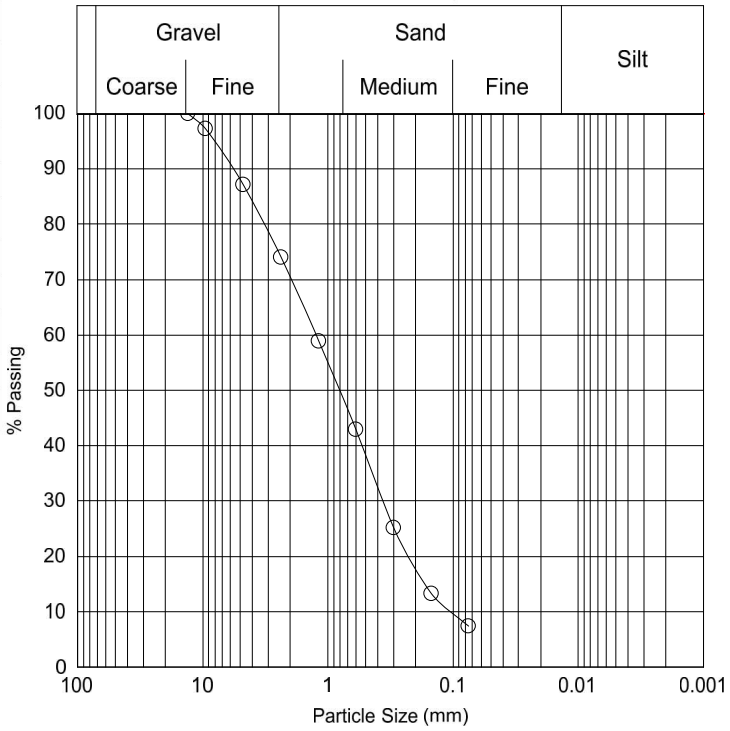
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/06/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	29'-34'	Specification:	NA
Location:	BH18-01	Lab Number:	WHB23-04554

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5					
26.5					
19.0					
16.0					
13.2	100.0				
9.5	97.3	9.7			
6.7					
4.75	87.1	46.3			
2.36	74.1	92.7			
1.18	58.9	147.2			
0.600	42.9	204.2			
0.300	25.2	267.5			
0.150	13.3	310.3			
0.075	7.4	331.5			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
0.108	0.171	1.27	4.4	12	3.01
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
357.8	357.8	0.0	12.9	87.1	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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11/07/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012230	Report Number:	WHB03995-23

Sample Details

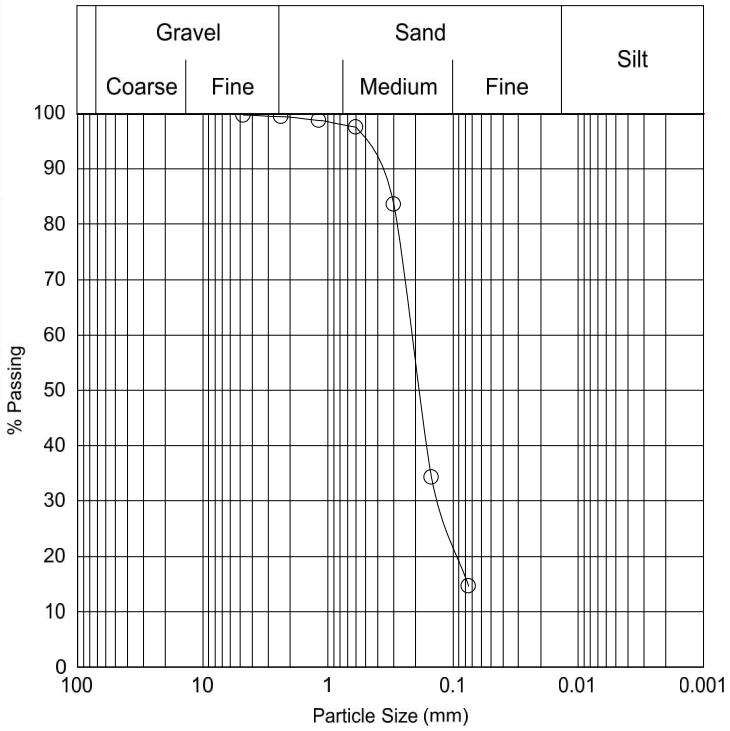
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/06/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	39'-44'	Specification:	NA
Location:	BH18-01	Lab Number:	WHB23-04555

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5					
26.5					
19.0					
16.0					
13.2					
9.5	100.0				
6.7					
4.75	99.7	1.0			
2.36	99.4	1.8			
1.18	98.8	3.7			
0.600	97.5	7.7			
0.300	83.6	49.4			
0.150	34.3	198.5			
0.075	14.6	257.9			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
	0.077	0.228	0.3	>3	0.87
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
302.1	302.1	0.0	0.3	99.7	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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11/07/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012231	Report Number:	WHB03996-23

Sample Details

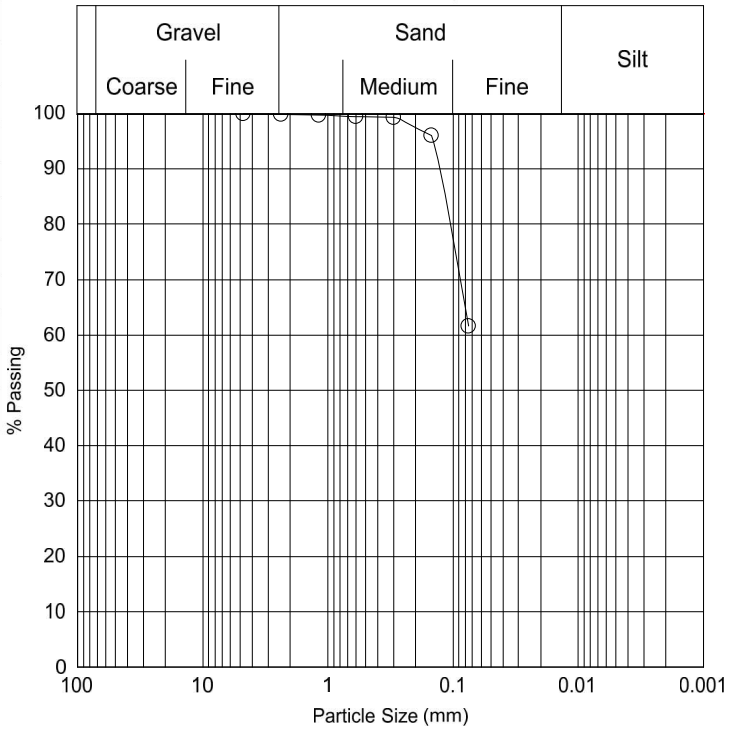
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/06/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	44'-49'	Specification:	NA
Location:	BH18-01	Lab Number:	WHB23-04556

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5					
26.5					
19.0					
16.0					
13.2					
9.5					
6.7					
4.75	100.0				
2.36	99.9	0.4			
1.18	99.7	0.9			
0.600	99.5	1.4			
0.300	99.3	2.2			
0.150	96.0	12.3			
0.075	61.6	118.2			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
			0.1		0.06
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
307.5	307.5	0.0		100.0	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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11/07/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012245	Report Number:	WHB03997-23

Sample Details

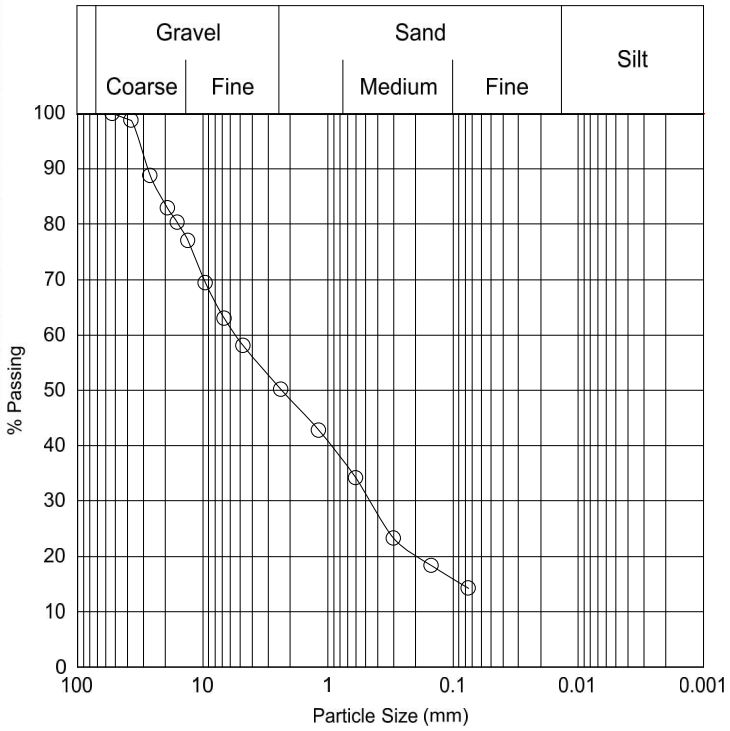
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/07/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	0'-4'	Specification:	NA
Location:	BH18-02	Lab Number:	WHB23-04559

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification Min.	Specification Max.
106.0					
63.0					
53.0	100.0				
37.5	98.8	112.4			
26.5	88.8	1087.4			
19.0	82.9	1652.1			
16.0	80.3	1904.1			
13.2	77.0	2220.8			
9.5	69.4	2964.0			
6.7	63.0	3577.7			
4.75	58.1	4052.1			
2.36	50.2	4814.6			
1.18	42.8	5531.3			
0.600	34.2	6368.5			
0.300	23.2	7436.0			
0.150	18.3	7907.2			
0.075	14.2	8299.1			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
	0.090	5.5	21.7	>73	4.04
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
9676.2	9676.2	0.0	41.9	58.1	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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905-723-2727

11/07/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012248	Report Number:	WHB03998-23

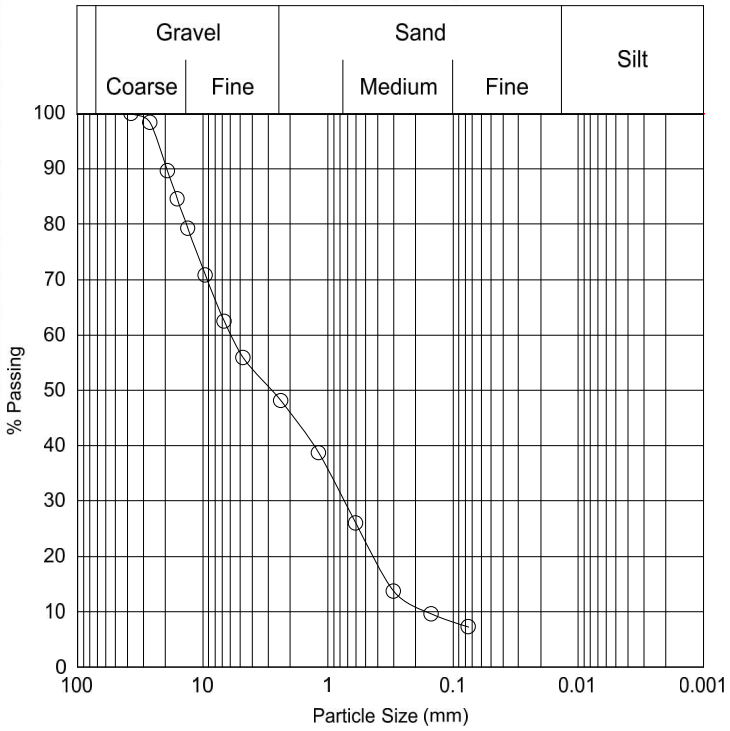
Sample Details			
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/07/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	4'-9'	Specification:	NA
Location:	BH18-02	Lab Number:	WHB23-04561

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5	100.0				
26.5	98.3	284.8			
19.0	89.6	1784.2			
16.0	84.5	2669.0			
13.2	79.2	3570.6			
9.5	70.7	5037.4			
6.7	62.5	6447.9			
4.75	55.9	7588.7			
2.36	48.1	8922.4			
1.18	38.6	10562.0			
0.600	26.0	12730.8			
0.300	13.6	14853.7			
0.150	9.6	15557.2			
0.075	7.2	15957.9			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
0.165	0.334	6.0	16.3	36	4.38
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
17199.8	17199.8	0.0	44.1	55.9	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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11/07/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012249	Report Number:	WHB03999-23

Sample Details

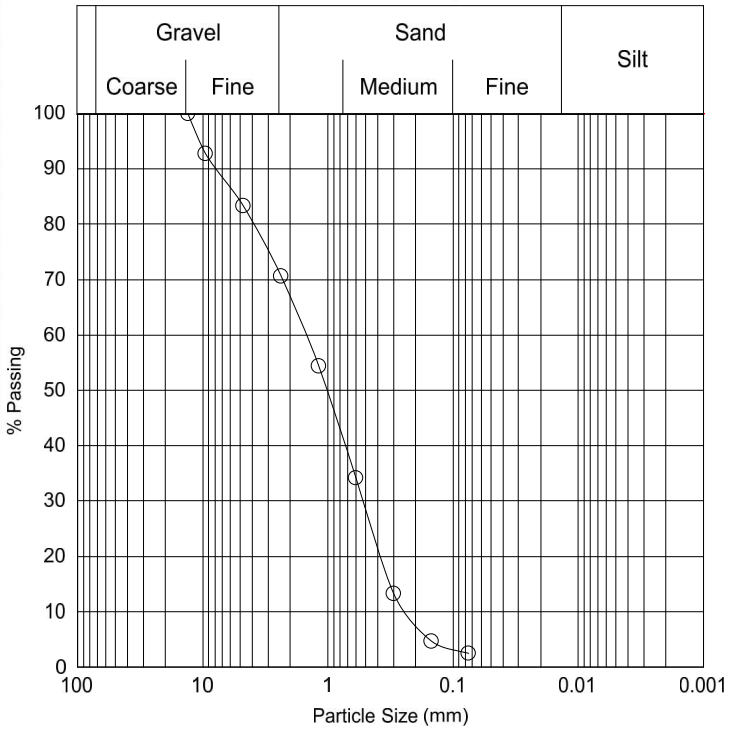
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/07/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	9'-14'	Specification:	NA
Location:	BH18-02	Lab Number:	WHB23-04562

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5					
26.5					
19.0					
16.0					
13.2	100.0				
9.5	92.8	26.4			
6.7					
4.75	83.4	60.9			
2.36	70.6	107.7			
1.18	54.4	167.1			
0.600	34.2	240.8			
0.300	13.2	318.0			
0.150	4.6	349.5			
0.075	2.5	356.9			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
0.244	0.326	1.59	5.6	7	3.47
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
366.2	366.2	0.0	16.6	83.4	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor [redacted] Title: Laboratory Team Lead

Signature:

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11/07/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012250	Report Number:	WHB04000-23

Sample Details

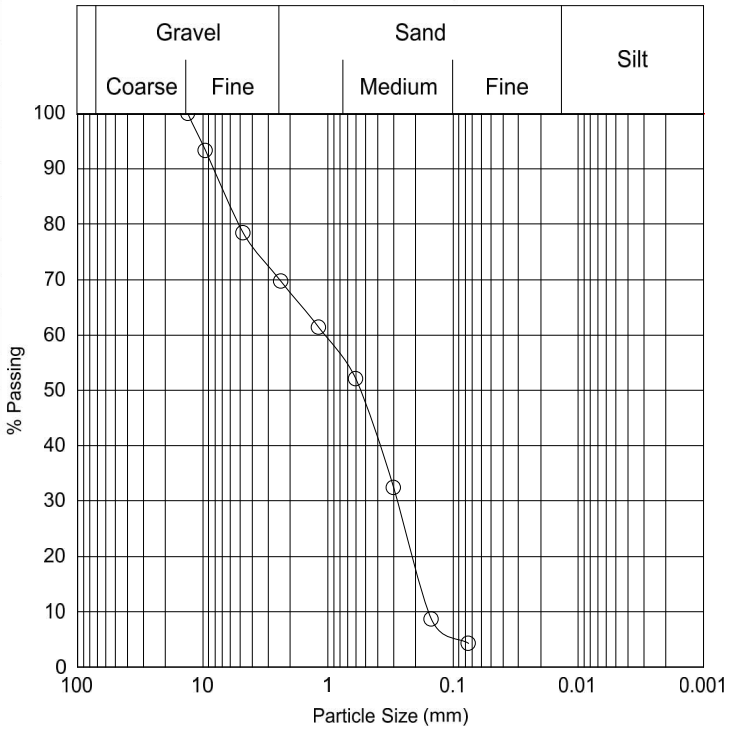
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/07/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	14'-19'	Specification:	NA
Location:	BH18-02	Lab Number:	WHB23-04563

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5					
26.5					
19.0					
16.0					
13.2	100.0				
9.5	93.3	21.8			
6.7					
4.75	78.4	70.6			
2.36	69.7	99.3			
1.18	61.4	126.4			
0.600	52.1	156.8			
0.300	32.4	221.1			
0.150	8.6	299.3			
0.075	4.3	313.3			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
0.159	0.190	1.09	6.9	7	3.04
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
327.3	327.3	0.0	21.6	78.4	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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11/07/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012251	Report Number:	WHB04001-23

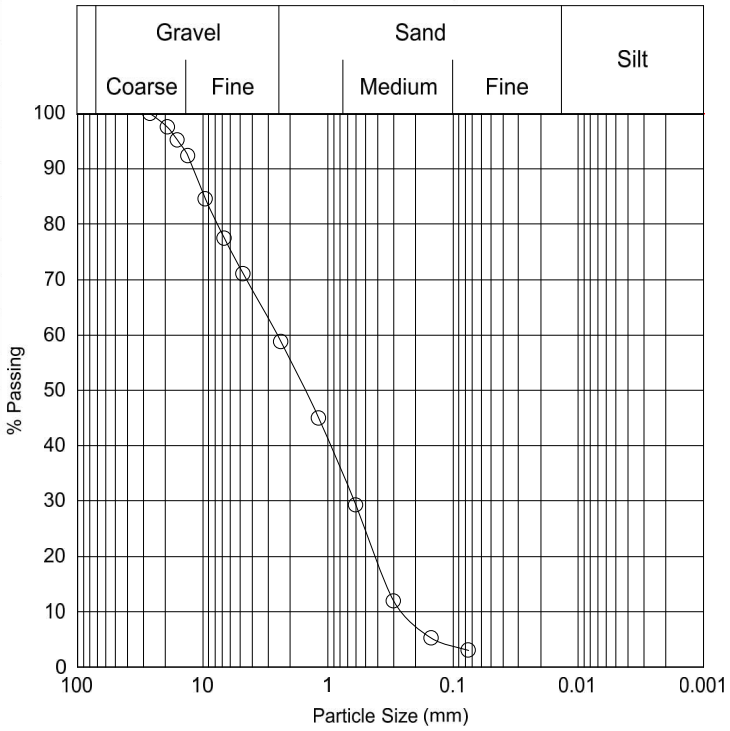
Sample Details			
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/07/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	19'-24'	Specification:	NA
Location:	BH18-02	Lab Number:	WHB23-04564

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5					
26.5	100.0				
19.0	97.5	317.9			
16.0	95.2	609.7			
13.2	92.3	977.2			
9.5	84.6	1958.7			
6.7	77.5	2854.4			
4.75	71.1	3664.7			
2.36	58.8	5233.8			
1.18	44.9	6991.3			
0.600	29.3	8976.5			
0.300	11.9	11186.7			
0.150	5.2	12027.5			
0.075	3.0	12305.9			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
0.257	0.353	2.6	9.7	10	3.94
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
12691.0	12691.1	-0.0	28.9	71.1	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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11/07/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012253	Report Number:	WHB04002-23

Sample Details

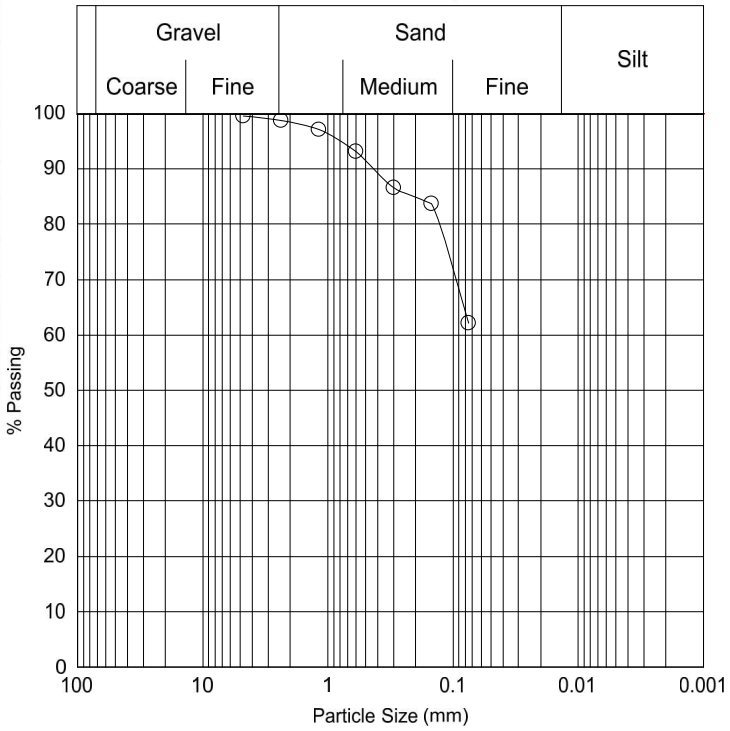
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/07/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	24'-29'	Specification:	NA
Location:	BH18-02	Lab Number:	WHB23-04565

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5					
26.5					
19.0					
16.0					
13.2					
9.5	100.0				
6.7					
4.75	99.6	1.2			
2.36	98.8	4.0			
1.18	97.1	9.3			
0.600	93.2	22.0			
0.300	86.6	43.7			
0.150	83.7	53.2			
0.075	62.2	122.9			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
			0.2		0.41
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
325.5	325.5	0.0	0.4	99.6	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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905-723-2727

11/07/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012254	Report Number:	WHB04003-23

Sample Details

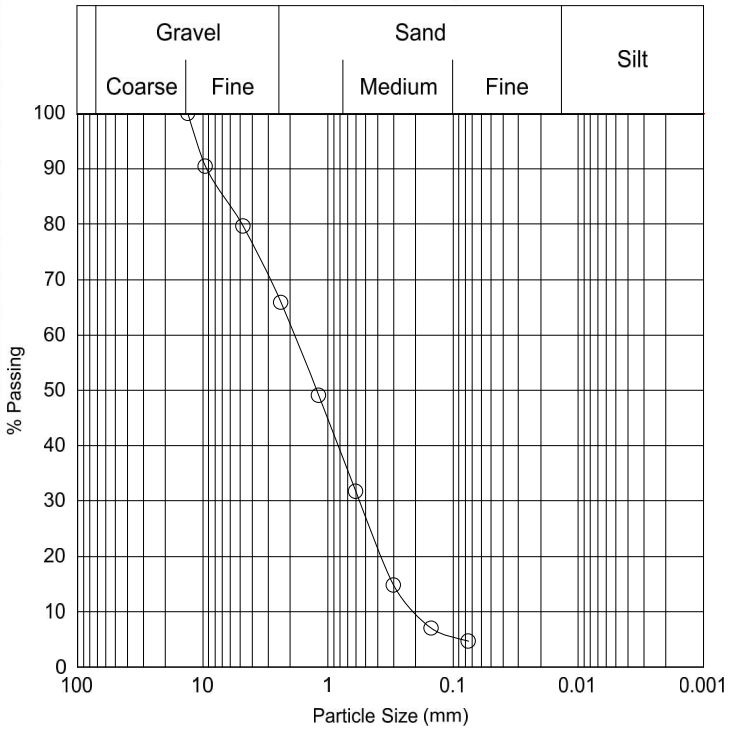
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/07/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	29'-39'	Specification:	NA
Location:	BH18-02	Lab Number:	WHB23-04566

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5					
26.5					
19.0					
16.0					
13.2	100.0				
9.5	90.5	43.9			
6.7					
4.75	79.7	93.4			
2.36	65.8	157.6			
1.18	49.0	234.7			
0.600	31.7	314.4			
0.300	14.8	392.3			
0.150	7.0	428.2			
0.075	4.6	439.0			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
0.208	0.304	1.95	7.1	9	3.61
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
460.2	460.2	0.0	20.3	79.7	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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905-723-2727

11/07/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012269	Report Number:	WHB04005-23

Sample Details

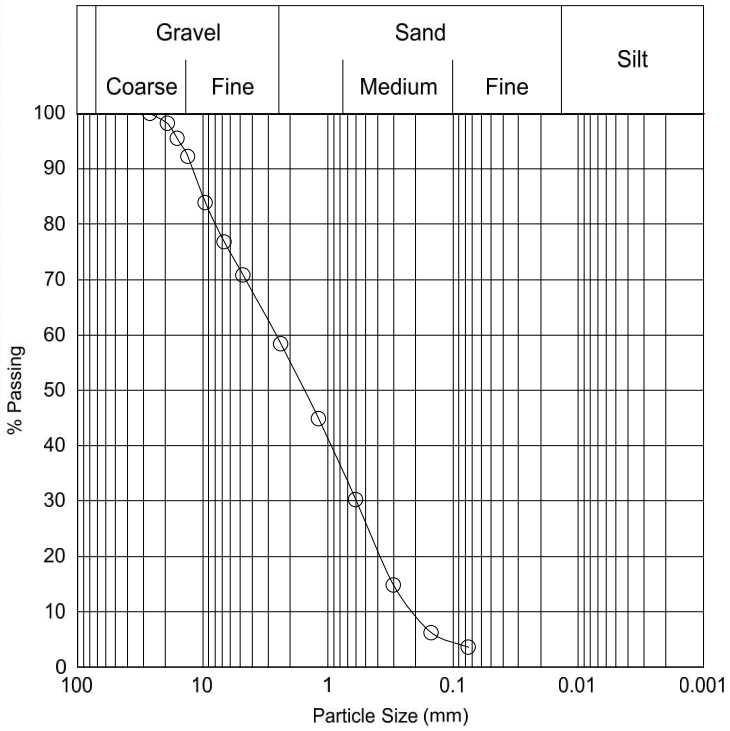
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/07/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	39'-44'	Specification:	NA
Location:	BH18-02	Lab Number:	WHB23-04567

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5					
26.5	100.0				
19.0	98.2	218.5			
16.0	95.5	560.3			
13.2	92.2	958.5			
9.5	83.9	1986.7			
6.7	76.8	2865.2			
4.75	70.7	3610.6			
2.36	58.3	5140.9			
1.18	44.8	6815.2			
0.600	30.2	8614.8			
0.300	14.7	10518.4			
0.150	6.1	11584.8			
0.075	3.5	11904.7			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
0.218	0.306	2.7	10.0	12	3.91
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
12336.7	12336.6	0.0	29.3	70.7	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: ... Title: ...

Signature:

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11/07/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012275	Report Number:	WHB04006-23

Sample Details

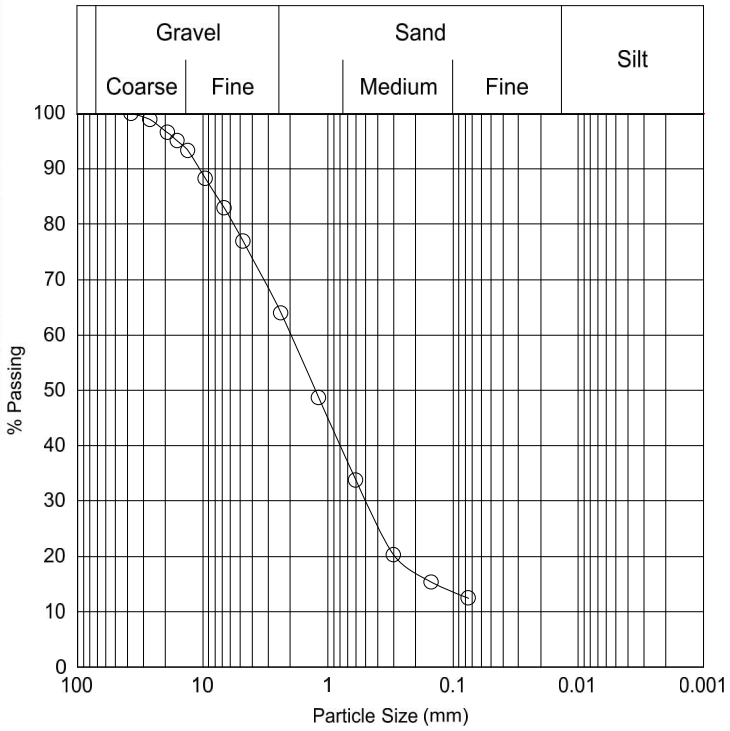
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/07/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	0'-4'	Specification:	NA
Location:	BH18-03	Lab Number:	WHB23-04587

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5	100.0				
26.5	98.9	99.4			
19.0	96.6	315.8			
16.0	95.1	460.5			
13.2	93.3	625.6			
9.5	88.3	1094.1			
6.7	82.9	1604.1			
4.75	76.9	2167.5			
2.36	63.9	3392.2			
1.18	48.7	4812.7			
0.600	33.7	6224.1			
0.300	20.2	7494.3			
0.150	15.3	7949.6			
0.075	12.4	8222.8			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
	0.142	2.1	7.8	>27	3.53
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
9388.3	9388.3	0.0	23.1	76.9	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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11/07/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012277	Report Number:	WHB04007-23

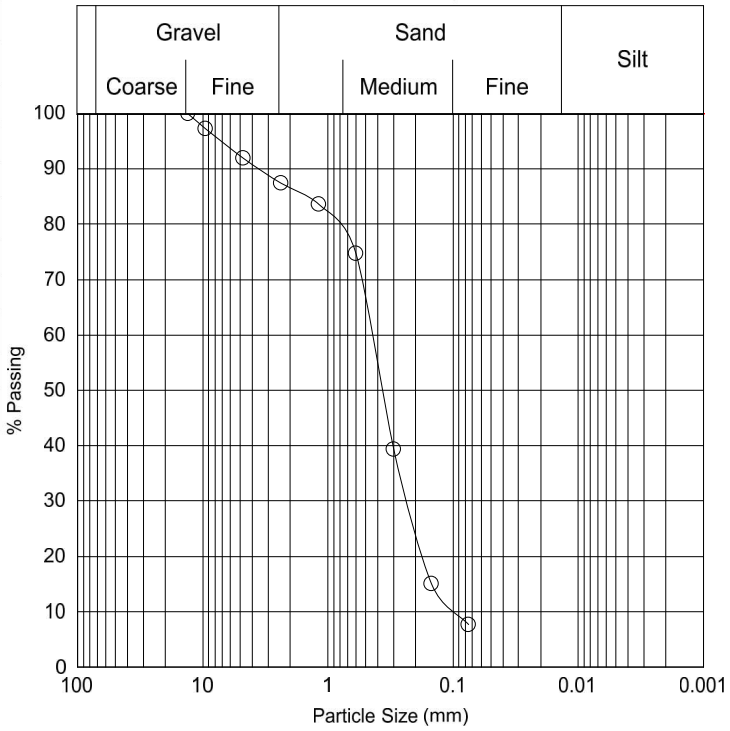
Sample Details			
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/07/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	4'-9'	Specification:	NA
Location:	BH18-03	Lab Number:	WHB23-04588

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5					
26.5					
19.0					
16.0					
13.2	100.0				
9.5	97.3	9.2			
6.7					
4.75	92.0	27.7			
2.36	87.4	43.6			
1.18	83.6	56.8			
0.600	74.7	87.4			
0.300	39.3	209.8			
0.150	15.0	293.9			
0.075	7.6	319.3			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
0.099	0.150	0.475	1.6	5	2.11
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
345.6	345.6	0.0	8.0	92.0	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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11/07/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012280	Report Number:	WHB04008-23

Sample Details

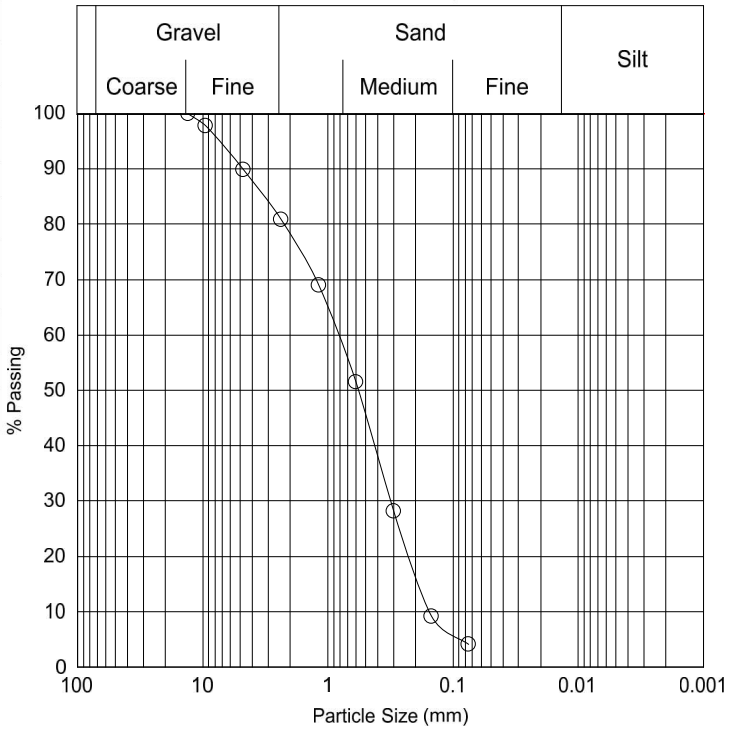
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/07/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	9'-14'	Specification:	NA
Location:	BH18-03	Lab Number:	WHB23-04589

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5					
26.5					
19.0					
16.0					
13.2	100.0				
9.5	97.8	10.7			
6.7					
4.75	89.9	47.9			
2.36	80.9	91.1			
1.18	69.0	147.6			
0.600	51.5	230.8			
0.300	28.2	341.5			
0.150	9.1	432.5			
0.075	4.1	456.6			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
0.157	0.196	0.882	3.4	6	2.74
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
475.9	475.9	0.0	10.1	89.9	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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11/07/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012282	Report Number:	WHB04009-23

Sample Details

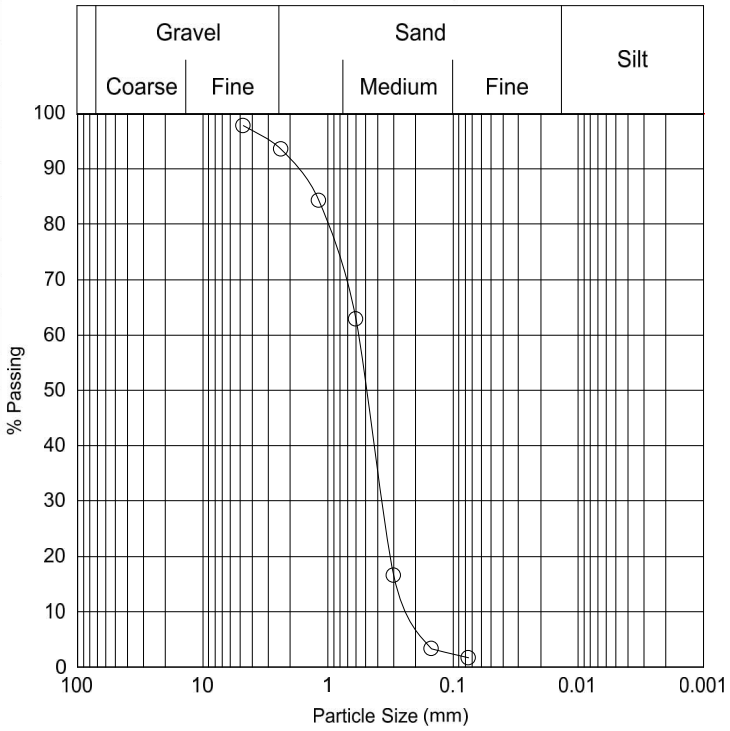
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/07/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	14'-19'	Specification:	NA
Location:	BH18-03	Lab Number:	WHB23-04590

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5					
26.5					
19.0					
16.0					
13.2					
9.5	100.0				
6.7					
4.75	97.8	8.8			
2.36	93.6	25.9			
1.18	84.3	64.0			
0.600	62.8	151.5			
0.300	16.5	339.8			
0.150	3.3	393.3			
0.075	1.7	400.0			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
0.226	0.283	0.582	1.3	3	2.42
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
406.9	406.9	0.0	2.2	97.8	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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11/07/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012285	Report Number:	WHB04010-23

Sample Details

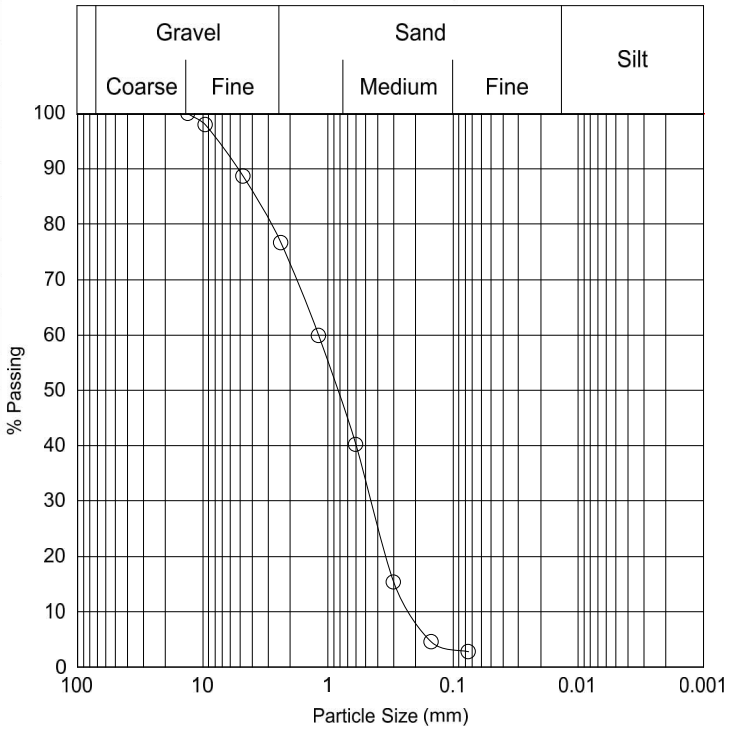
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/07/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	19'-24'	Specification:	NA
Location:	BH18-03	Lab Number:	WHB23-04591

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5					
26.5					
19.0					
16.0					
13.2	100.0				
9.5	97.9	6.8			
6.7					
4.75	88.6	37.4			
2.36	76.6	76.9			
1.18	59.9	132.0			
0.600	40.1	196.9			
0.300	15.3	278.4			
0.150	4.5	314.0			
0.075	2.7	320.0			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
0.226	0.296	1.19	4.0	5	3.17
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
328.8	328.8	0.0	11.4	88.6	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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11/07/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012288	Report Number:	WHB04011-23

Sample Details

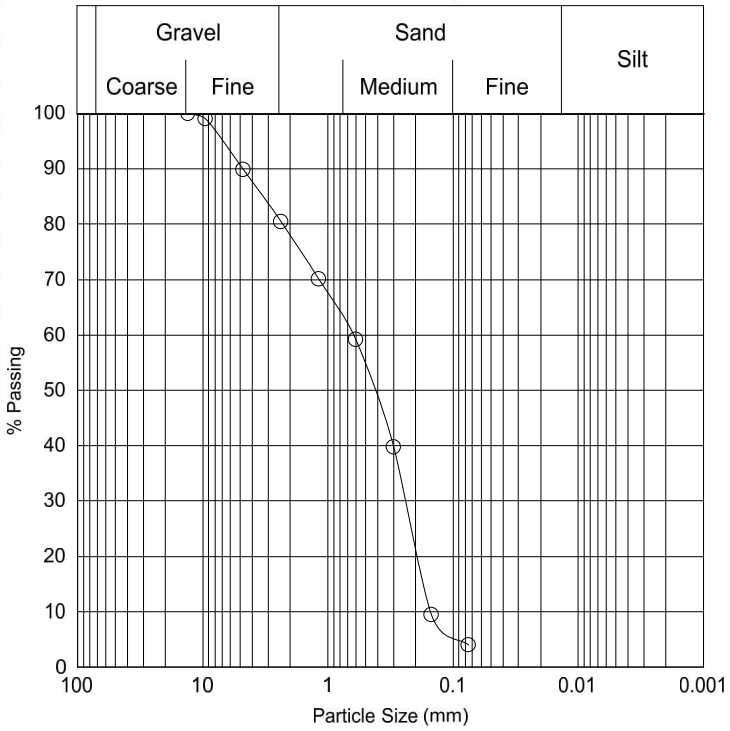
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/07/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	24'-29'	Specification:	NA
Location:	BH18-03	Lab Number:	WHB23-04592

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5					
26.5					
19.0					
16.0					
13.2	100.0				
9.5	99.0	3.9			
6.7					
4.75	89.9	38.9			
2.36	80.4	75.2			
1.18	70.1	114.8			
0.600	59.2	156.8			
0.300	39.8	231.1			
0.150	9.4	347.9			
0.075	3.9	369.1			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
0.153	0.178	0.643	3.5	4	2.52
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
384.2	384.2	0.0	10.1	89.9	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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11/07/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012289	Report Number:	WHB04012-23

Sample Details

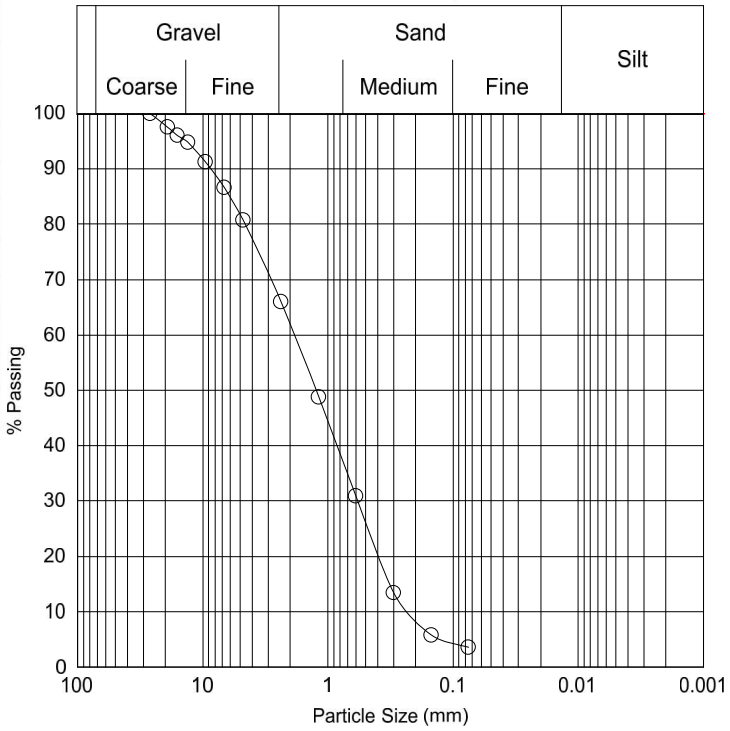
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/07/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	29'-34'	Specification:	NA
Location:	BH18-03	Lab Number:	WHB23-04593

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5					
26.5	100.0				
19.0	97.5	283.8			
16.0	96.0	464.6			
13.2	94.8	601.6			
9.5	91.2	1013.9			
6.7	86.6	1554.1			
4.75	80.8	2220.8			
2.36	66.0	3931.0			
1.18	48.8	5920.9			
0.600	30.9	7983.9			
0.300	13.4	10005.6			
0.150	5.8	10882.9			
0.075	3.6	11140.4			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
0.233	0.327	1.95	6.2	8	3.63
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
11556.9	11556.8	0.0	19.2	80.8	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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11/07/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012309	Report Number:	WHB04013-23

Sample Details

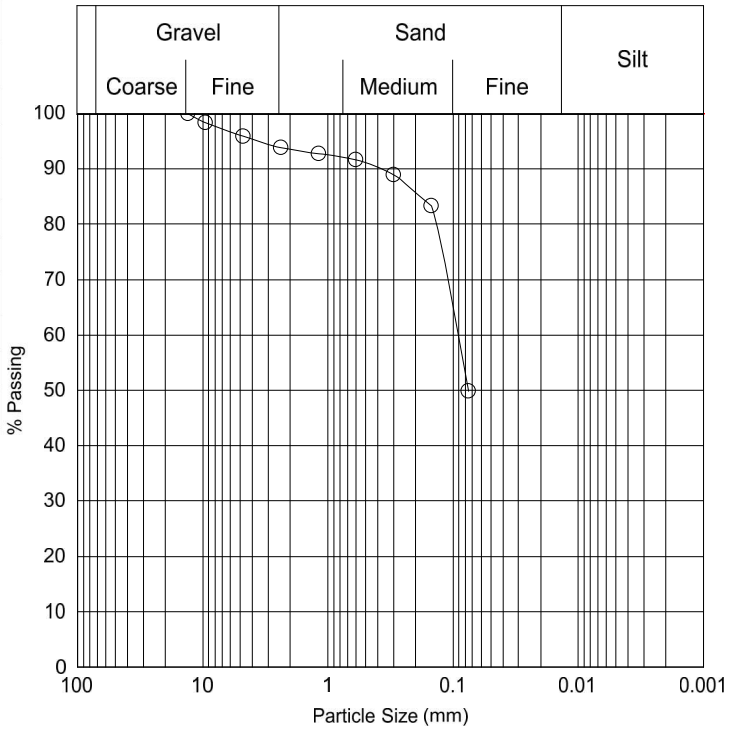
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/07/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	9'-14'	Specification:	NA
Location:	BH18-04	Lab Number:	WHB23-04594

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5					
26.5					
19.0					
16.0					
13.2	100.0				
9.5	98.3	4.9			
6.7					
4.75	95.9	12.0			
2.36	93.8	18.1			
1.18	92.7	21.5			
0.600	91.6	24.6			
0.300	88.9	32.5			
0.150	83.3	49.1			
0.075	49.9	147.1			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
		0.098	0.2	>1	0.55
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
293.4	293.4	0.0	4.1	95.9	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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905-723-2727

11/07/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012310	Report Number:	WHB04014-23

Sample Details

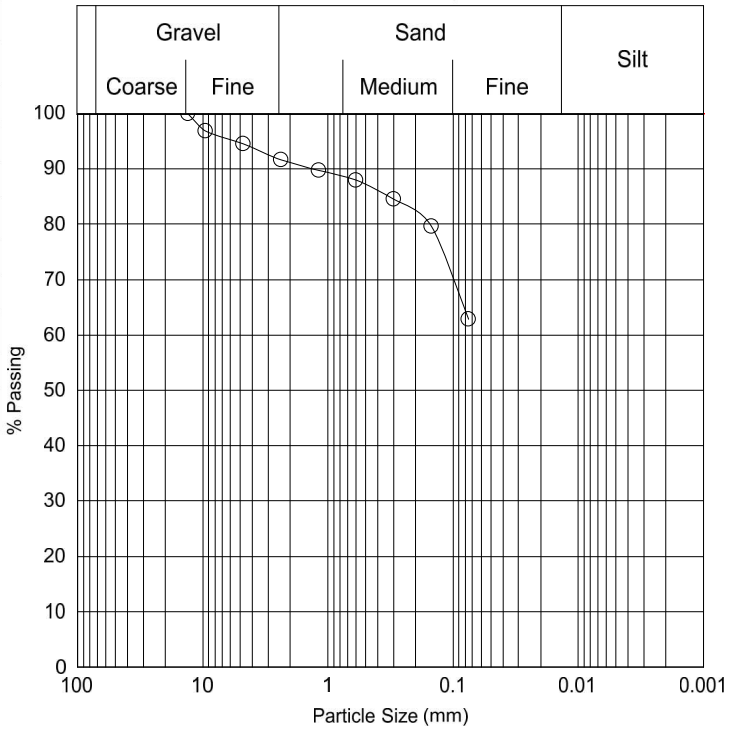
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/07/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	24'-29'	Specification:	NA
Location:	BH18-04	Lab Number:	WHB23-04595

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5					
26.5					
19.0					
16.0					
13.2	100.0				
9.5	96.9	9.8			
6.7					
4.75	94.6	16.9			
2.36	91.6	26.3			
1.18	89.8	32.1			
0.600	88.0	37.8			
0.300	84.6	48.5			
0.150	79.7	63.7			
0.075	62.9	116.4			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
			0.3		0.75
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
314.0	314.0	0.0	5.4	94.6	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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905-723-2727

11/07/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012311	Report Number:	WHB04015-23

Sample Details

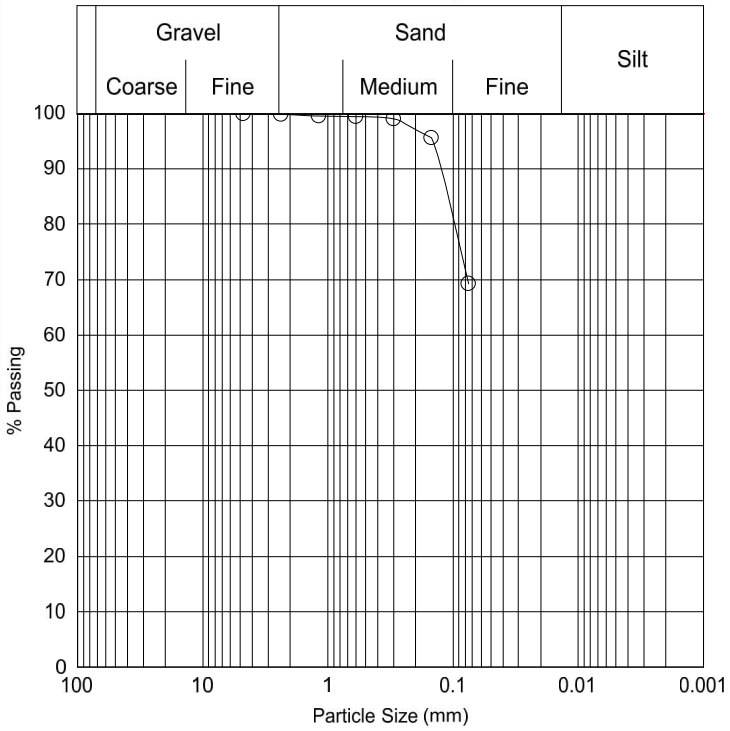
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	NA
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	44'-49'	Specification:	NA
Location:	BH18-04	Lab Number:	WHB23-04596

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5					
26.5					
19.0					
16.0					
13.2					
9.5					
6.7					
4.75	100.0				
2.36	99.8	0.7			
1.18	99.6	1.2			
0.600	99.4	1.7			
0.300	99.1	2.6			
0.150	95.6	12.8			
0.075	69.3	89.1			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
			0.1		0.07
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
290.0	290.0	0.0		100.0	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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11/07/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012314	Report Number:	WHB04016-23

Sample Details

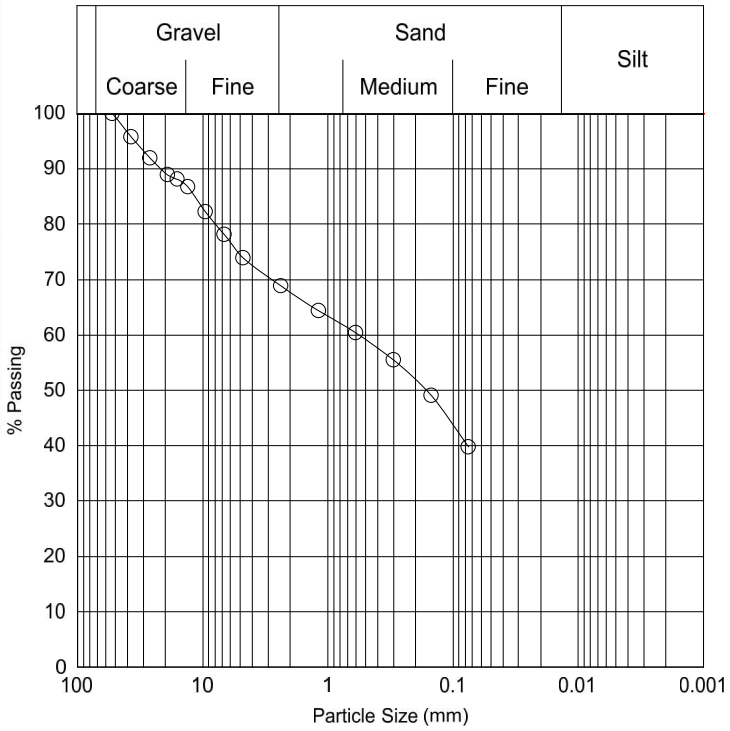
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/07/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	4'-9'	Specification:	NA
Location:	BH18-05	Lab Number:	WHB23-04597

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0	100.0				
37.5	95.7	421.2			
26.5	92.0	788.1			
19.0	89.0	1080.9			
16.0	88.1	1165.7			
13.2	86.8	1296.2			
9.5	82.3	1741.3			
6.7	78.1	2153.7			
4.75	73.9	2561.0			
2.36	68.9	3052.0			
1.18	64.4	3497.7			
0.600	60.4	3883.6			
0.300	55.5	4367.4			
0.150	49.0	5005.2			
0.075	39.8	5903.9			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
		0.576	11.7	>8	2.46
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
9814.3	9814.1	0.0	26.1	73.9	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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11/07/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012321	Report Number:	WHB04017-23

Sample Details

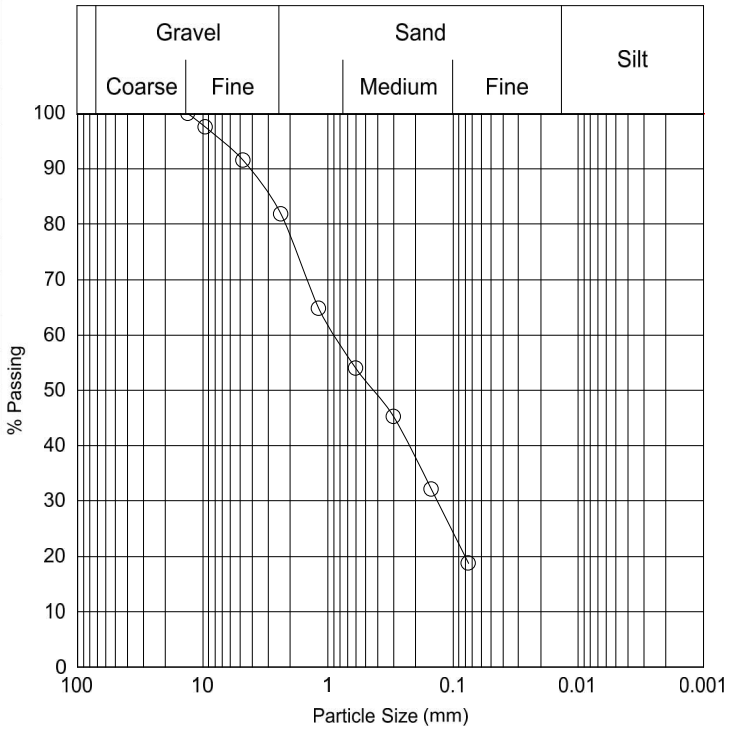
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/07/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	9'-14'	Specification:	NA
Location:	BH18-05	Lab Number:	WHB23-04598

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5					
26.5					
19.0					
16.0					
13.2	100.0				
9.5	97.5	8.6			
6.7					
4.75	91.5	29.6			
2.36	81.8	63.5			
1.18	64.7	123.2			
0.600	54.0	160.8			
0.300	45.2	191.5			
0.150	32.1	237.3			
0.075	18.7	283.9			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
		0.925	3.1	>12	2.33
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
349.4	349.4	0.0	8.5	91.5	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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11/07/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012323	Report Number:	WHB04018-23

Sample Details

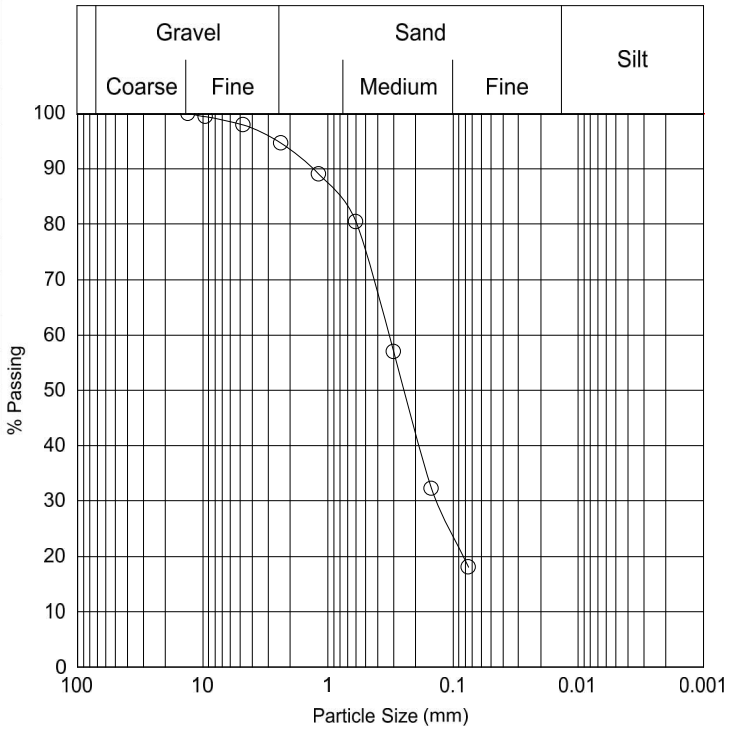
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/07/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	14'-19'	Specification:	NA
Location:	BH18-05	Lab Number:	WHB23-04599

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5					
26.5					
19.0					
16.0					
13.2	100.0				
9.5	99.5	1.7			
6.7					
4.75	98.0	6.8			
2.36	94.7	18.3			
1.18	89.1	37.7			
0.600	80.4	67.7			
0.300	56.9	148.8			
0.150	32.3	234.0			
0.075	18.1	283.0			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
		0.340	0.9	>5	1.49
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
345.6	345.6	0.0	2.0	98.0	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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11/07/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012324	Report Number:	WHB04019-23

Sample Details

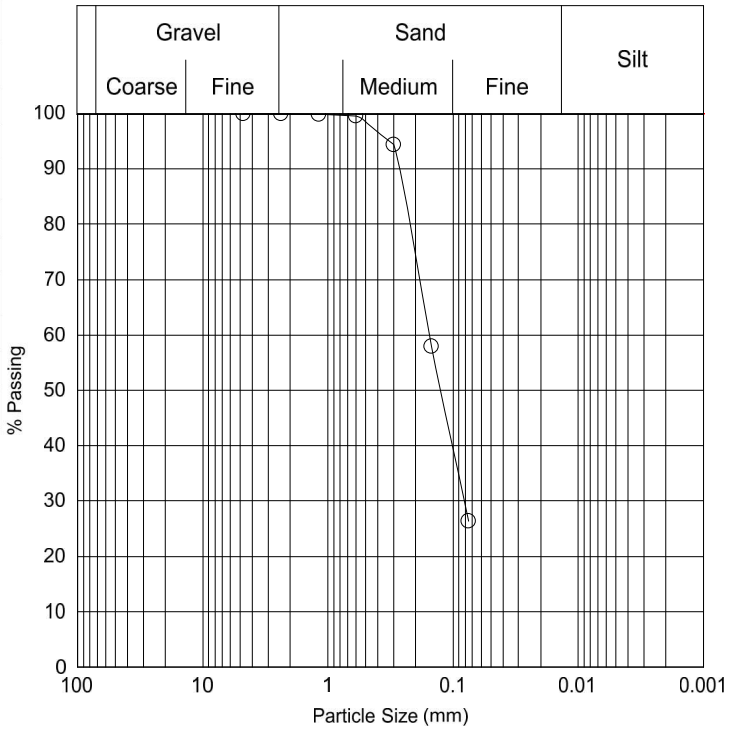
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/07/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	19'-24'	Specification:	NA
Location:	BH18-05	Lab Number:	WHB23-04600

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5					
26.5					
19.0					
16.0					
13.2					
9.5					
6.7					
4.75	100.0				
2.36	100.0	0.1			
1.18	99.8	0.5			
0.600	99.6	1.1			
0.300	94.4	17.2			
0.150	57.9	129.5			
0.075	26.4	226.4			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
		0.159	0.3	>2	0.48
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
307.8	307.8	0.0		100.0	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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Whitby, L1N 8Y6
905-723-2727

11/07/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012326	Report Number:	WHB04020-23

Sample Details

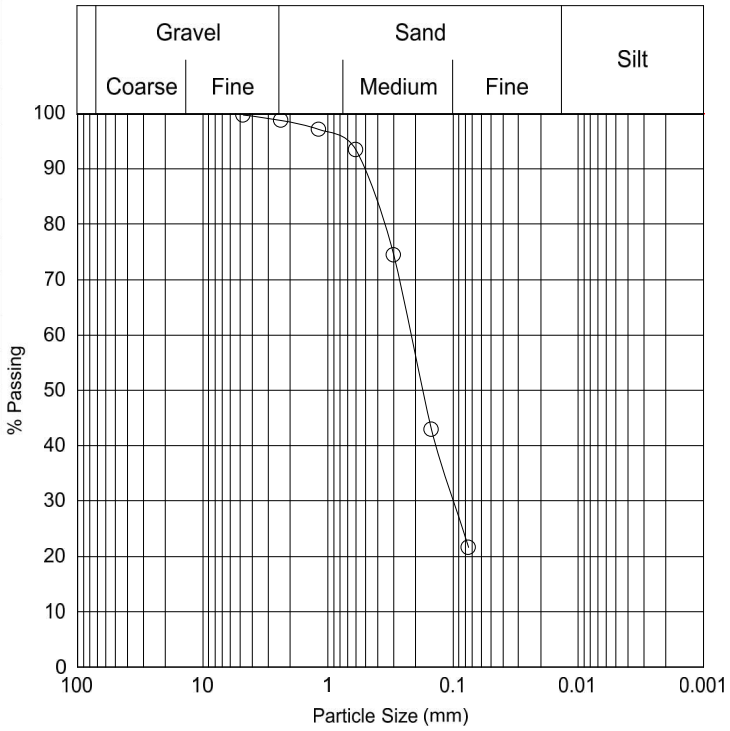
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/07/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	29'-34'	Specification:	NA
Location:	BH18-05	Lab Number:	WHB23-04601

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5					
26.5					
19.0					
16.0					
13.2					
9.5	100.0				
6.7					
4.75	99.7	1.1			
2.36	98.8	3.9			
1.18	97.1	9.3			
0.600	93.5	20.9			
0.300	74.4	82.0			
0.150	42.9	182.7			
0.075	21.6	250.8			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
		0.231	0.5	>3	0.94
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
319.9	319.9	0.0	0.3	99.7	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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11/07/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012328	Report Number:	WHB04021-23

Sample Details

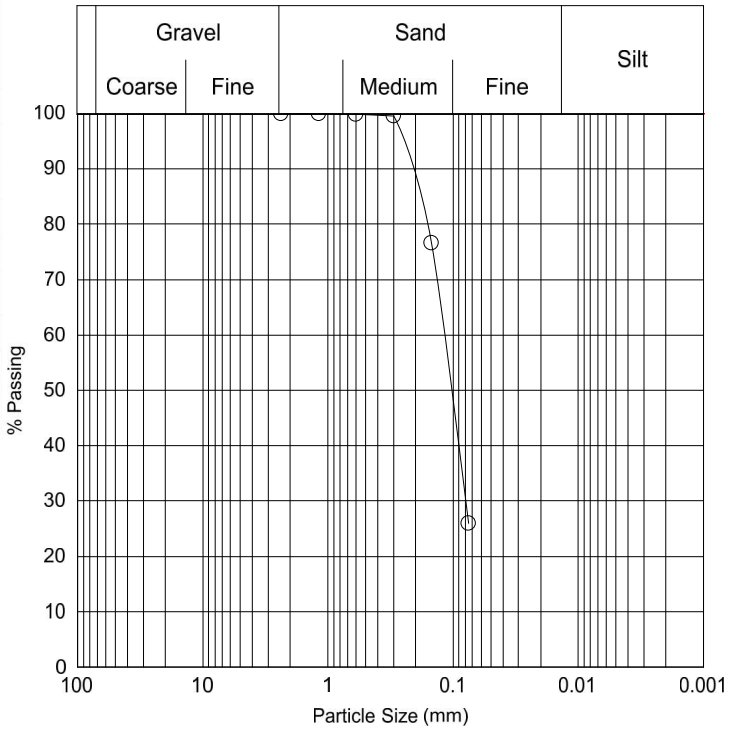
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/07/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	44'-49'	Specification:	NA
Location:	BH18-05	Lab Number:	WHB23-04602

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5					
26.5					
19.0					
16.0					
13.2					
9.5					
6.7					
4.75					
2.36	100.0				
1.18	100.0	0.1			
0.600	99.9	0.3			
0.300	99.6	1.2			
0.150	76.6	73.7			
0.075	26.0	232.7			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
		0.125	0.2	>2	0.24
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
314.4	314.4	0.0			

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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11/07/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012330	Report Number:	WHB04022-23

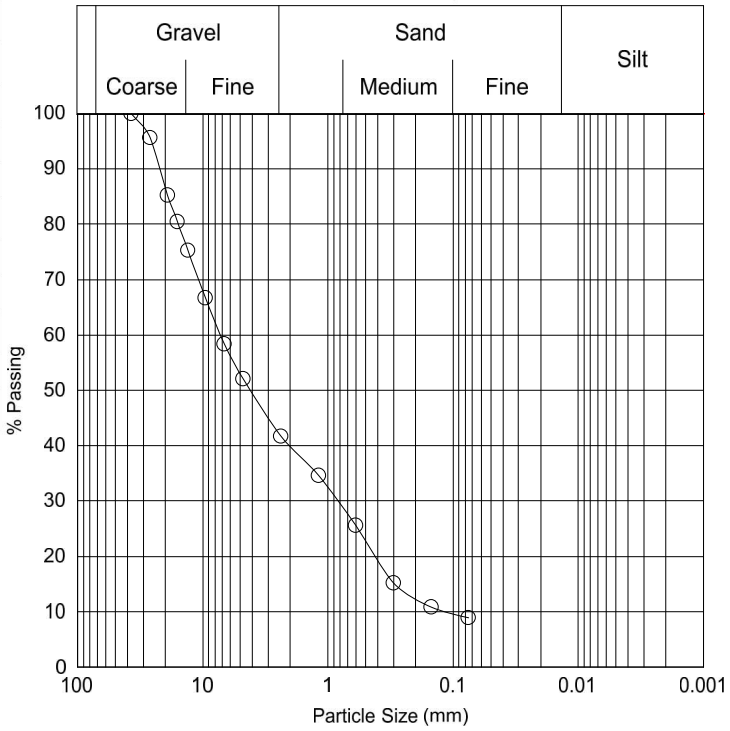
Sample Details			
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/07/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	0'-4'	Specification:	NA
Location:	BH18-06	Lab Number:	WHB23-04608

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5	100.0				
26.5	95.6	544.7			
19.0	85.3	1818.6			
16.0	80.4	2412.7			
13.2	75.3	3047.5			
9.5	66.7	4106.1			
6.7	58.4	5138.7			
4.75	52.0	5919.0			
2.36	41.7	7194.0			
1.18	34.6	8065.1			
0.600	25.6	9177.8			
0.300	15.1	10480.5			
0.150	10.8	11001.2			
0.075	8.9	11238.8			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
0.118	0.297	7.2	18.8	61	4.54
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
12339.6	12339.6	0.0	48.0	52.0	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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11/07/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012334	Report Number:	WHB04023-23

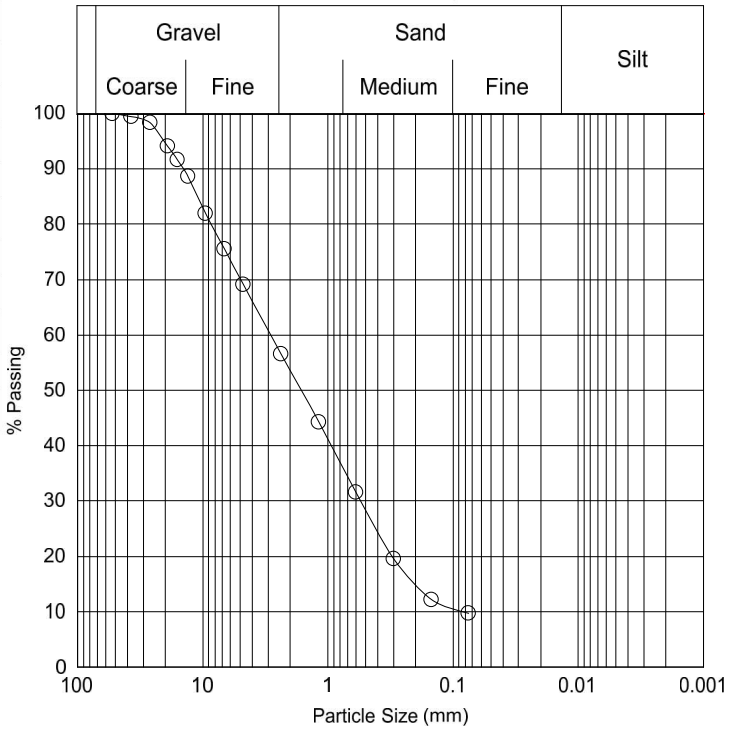
Sample Details			
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/07/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	4'-9'	Specification:	NA
Location:	BH18-06	Lab Number:	WHB23-04609

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0	100.0				
37.5	99.5	59.6			
26.5	98.4	179.1			
19.0	94.1	644.0			
16.0	91.7	906.7			
13.2	88.6	1244.8			
9.5	81.9	1973.3			
6.7	75.5	2671.6			
4.75	69.1	3374.0			
2.36	56.6	4745.7			
1.18	44.3	6089.1			
0.600	31.6	7473.9			
0.300	19.5	8800.0			
0.150	12.2	9593.5			
0.075	9.7	9867.4			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
0.084	0.208	3.0	11.2	36	3.85
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
10926.0	10926.1	-0.0	30.9	69.1	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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905-723-2727

11/07/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012335	Report Number:	WHB04024-23

Sample Details

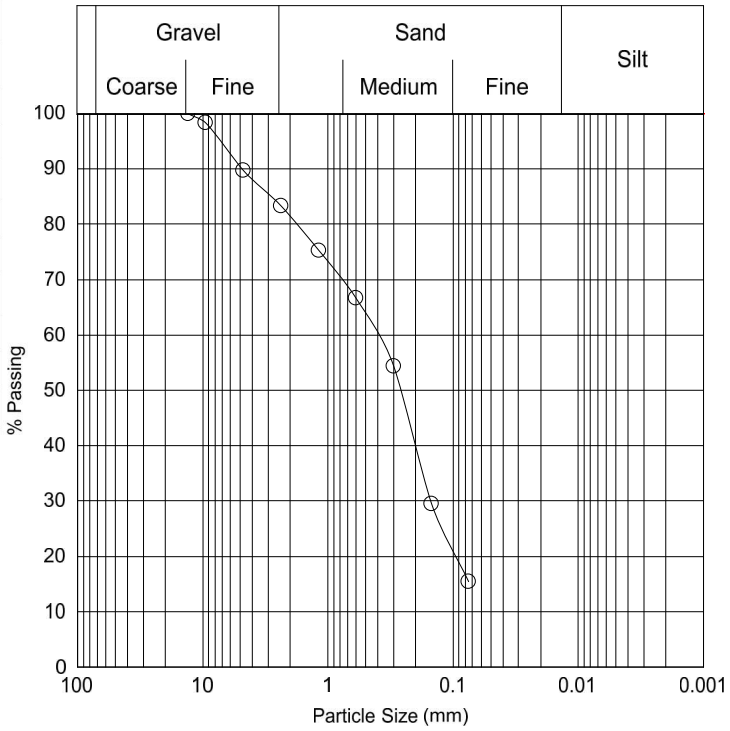
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/07/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	9'-14'	Specification:	NA
Location:	BH18-06	Lab Number:	WHB23-04610

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5					
26.5					
19.0					
16.0					
13.2	100.0				
9.5	98.4	4.7			
6.7					
4.75	89.8	30.5			
2.36	83.4	49.7			
1.18	75.3	73.9			
0.600	66.6	99.9			
0.300	54.4	136.4			
0.150	29.5	210.8			
0.075	15.4	252.7			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
		0.438	3.0	>6	2.03
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
298.8	298.8	0.0	10.2	89.8	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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905-723-2727

11/07/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012337	Report Number:	WHB04025-23

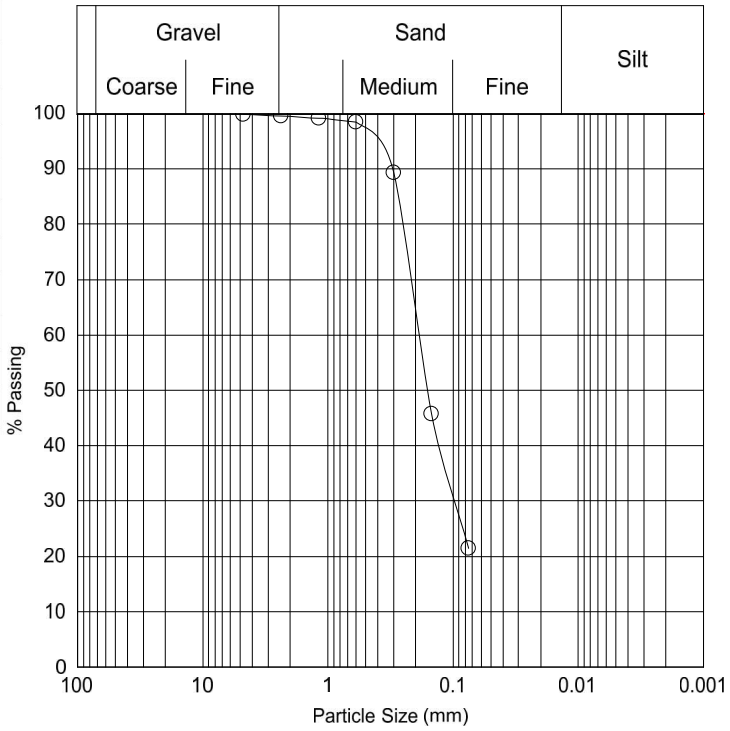
Sample Details			
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/07/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	14'-19'	Specification:	NA
Location:	BH18-06	Lab Number:	WHB23-04611

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5					
26.5					
19.0					
16.0					
13.2					
9.5	100.0				
6.7					
4.75	99.8	0.7			
2.36	99.6	1.2			
1.18	99.2	2.7			
0.600	98.5	4.9			
0.300	89.3	36.0			
0.150	45.8	181.5			
0.075	21.4	263.5			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
		0.199	0.3	>3	0.68
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
335.1	335.1	0.0	0.2	99.8	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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11/07/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012338	Report Number:	WHB04026-23

Sample Details

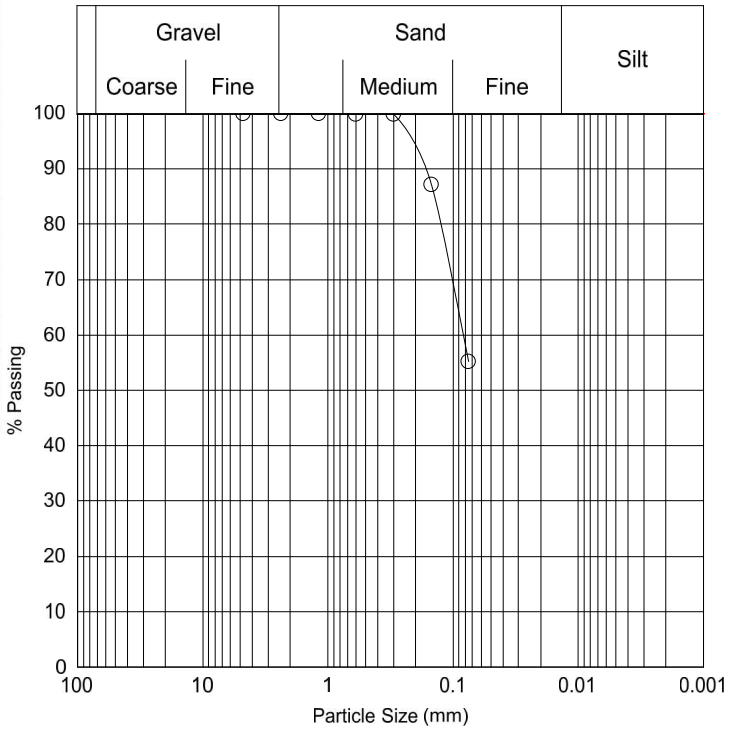
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/07/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	19'-24'	Specification:	NA
Location:	BH18-06	Lab Number:	WHB23-04612

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5					
26.5					
19.0					
16.0					
13.2					
9.5					
6.7					
4.75	100.0				
2.36	100.0	0.1			
1.18	100.0	0.1			
0.600	99.9	0.2			
0.300	99.9	0.4			
0.150	87.1	34.6			
0.075	55.2	120.0			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
		0.086	0.1	>1	0.13
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
267.9	267.9	0.0		100.0	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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11/07/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012340	Report Number:	WHB04028-23

Sample Details

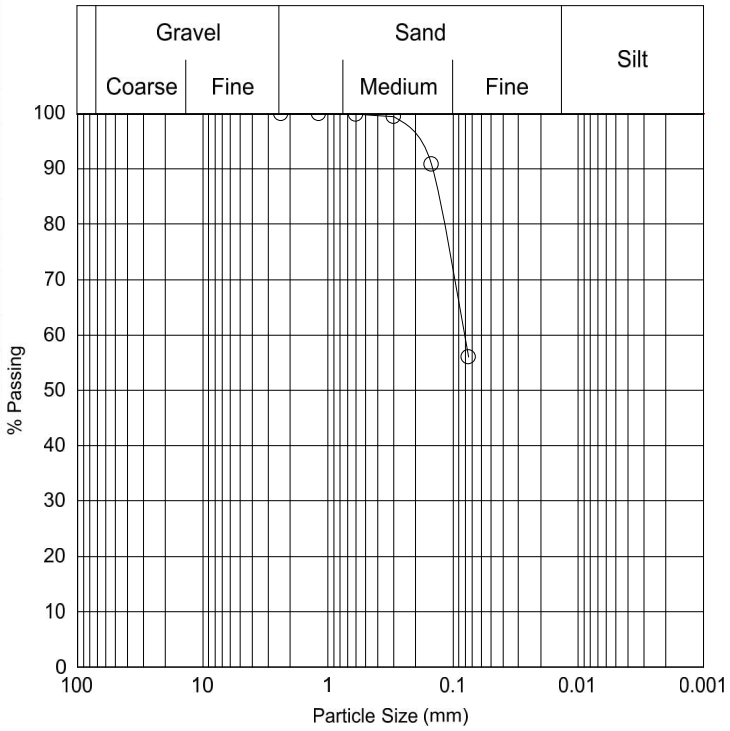
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/07/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	24'-29'	Specification:	NA
Location:	BH18-06	Lab Number:	WHB23-04613

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5					
26.5					
19.0					
16.0					
13.2					
9.5					
6.7					
4.75					
2.36	100.0				
1.18	100.0	0.1			
0.600	99.8	0.5			
0.300	99.5	1.6			
0.150	90.9	28.5			
0.075	56.0	137.1			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
		0.084	0.1	>1	0.10
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
311.5	311.5	0.0			

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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11/07/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012344	Report Number:	WHB04029-23

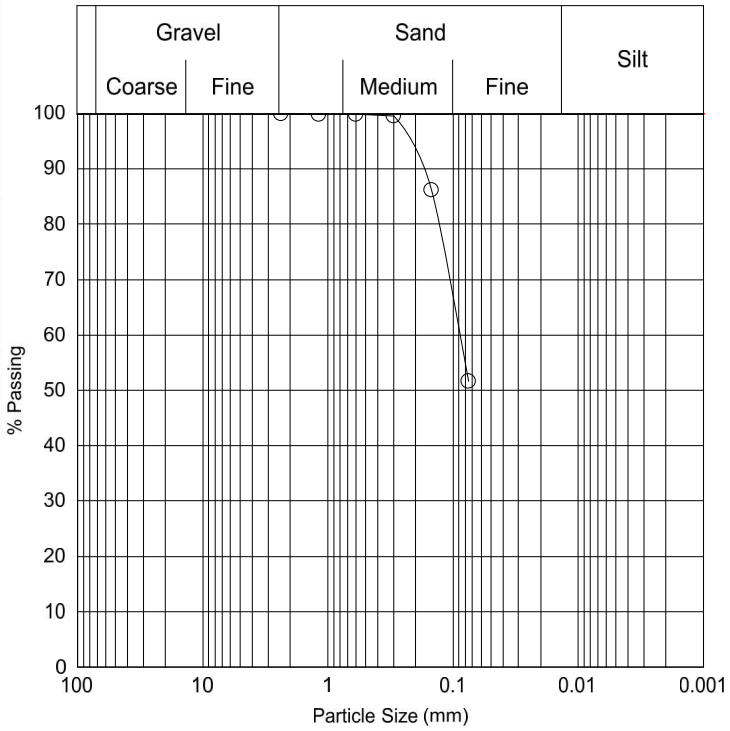
Sample Details			
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/07/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	29'-34'	Specification:	NA
Location:	BH18-06	Lab Number:	WHB23-04614

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5					
26.5					
19.0					
16.0					
13.2					
9.5					
6.7					
4.75					
2.36	100.0				
1.18	99.9	0.2			
0.600	99.8	0.7			
0.300	99.6	1.2			
0.150	86.2	45.2			
0.075	51.7	157.5			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
		0.093	0.1	>1	0.14
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
326.4	326.4	0.0			

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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11/07/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012346	Report Number:	WHB04030-23

Sample Details

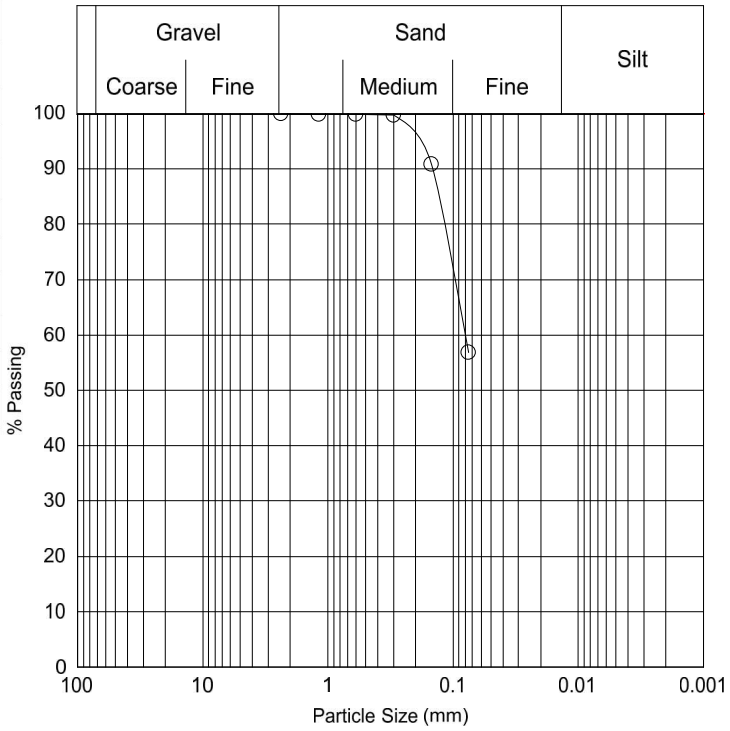
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/07/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	34'-39'	Specification:	NA
Location:	BH18-06	Lab Number:	WHB23-04615

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5					
26.5					
19.0					
16.0					
13.2					
9.5					
6.7					
4.75					
2.36	100.0				
1.18	99.9	0.4			
0.600	99.8	0.6			
0.300	99.7	0.9			
0.150	90.8	27.4			
0.075	56.8	128.8			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
		0.082	0.1	>1	0.10
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
298.1	298.1	0.0			

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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11/07/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012349	Report Number:	WHB04032-23

Sample Details

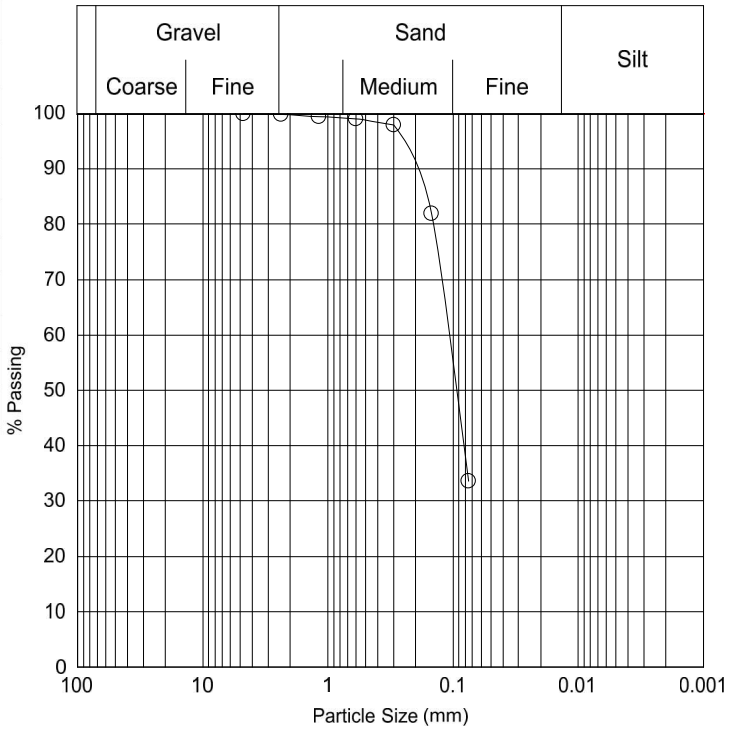
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/07/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	39'-44'	Specification:	NA
Location:	BH18-06	Lab Number:	WHB23-04616

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5					
26.5					
19.0					
16.0					
13.2					
9.5					
6.7					
4.75	100.0				
2.36	99.8	0.6			
1.18	99.5	1.4			
0.600	99.0	2.7			
0.300	98.0	5.7			
0.150	82.0	50.7			
0.075	33.6	186.8			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
		0.116	0.2	>2	0.22
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
281.5	281.5	0.0		100.0	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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905-723-2727

11/09/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012364	Report Number:	WHB04035-23

Sample Details

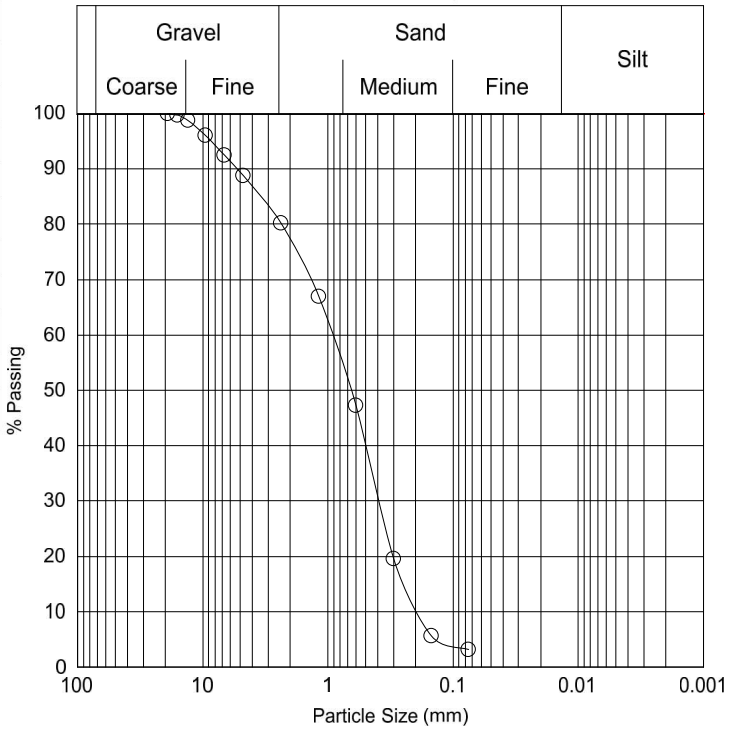
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/07/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	14'-19'	Specification:	NA
Location:	BH18-07	Lab Number:	WHB23-04642

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5					
26.5					
19.0	100.0				
16.0	99.7	28.9			
13.2	98.8	99.7			
9.5	96.0	344.9			
6.7	92.5	645.8			
4.75	88.8	967.0			
2.36	80.2	1698.8			
1.18	66.9	2848.4			
0.600	47.3	4527.6			
0.300	19.5	6917.3			
0.150	5.6	8114.8			
0.075	3.1	8333.0			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
0.197	0.251	0.976	3.7	5	2.96
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
8596.4	8596.5	-0.0	11.2	88.8	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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905-723-2727

11/09/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012367	Report Number:	WHB04036-23

Sample Details

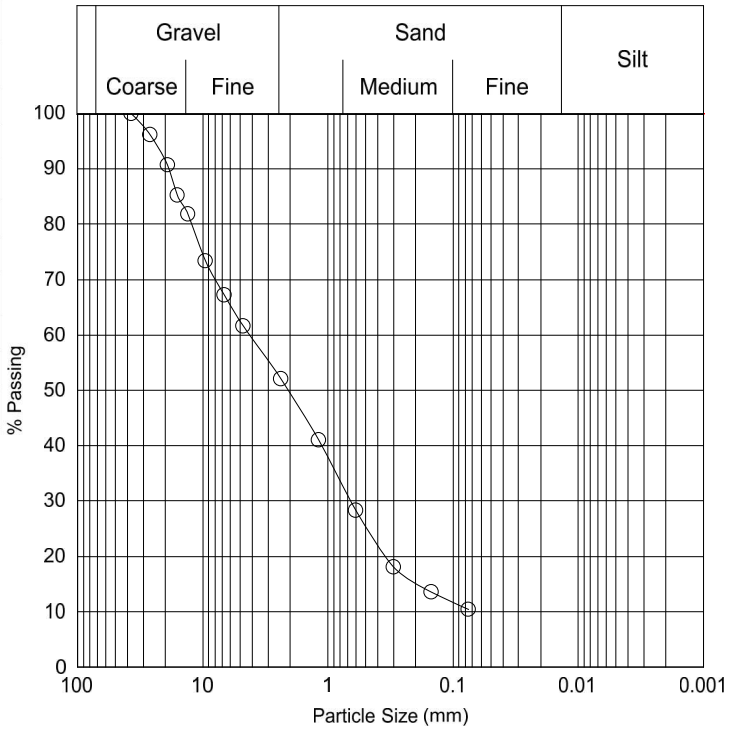
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/07/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	0'-4'	Specification:	NA
Location:	BH18-10	Lab Number:	WHB23-04644

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5	100.0				
26.5	96.2	117.6			
19.0	90.7	288.4			
16.0	85.2	458.7			
13.2	81.8	566.5			
9.5	73.4	825.8			
6.7	67.2	1018.9			
4.75	61.6	1193.9			
2.36	52.1	1489.2			
1.18	41.0	1833.8			
0.600	28.3	2229.8			
0.300	18.1	2545.1			
0.150	13.5	2689.1			
0.075	10.4	2785.8			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
	0.199	4.3	15.8	>58	4.12
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
3107.8	3107.8	0.0	38.4	61.6	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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11/09/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012459	Report Number:	WHB04078-23

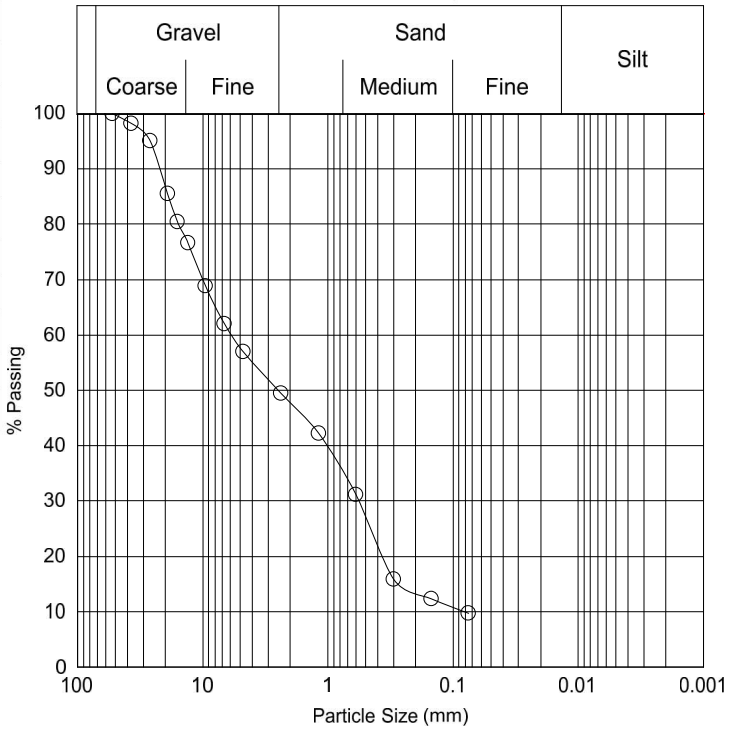
Sample Details			
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/08/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	4'-9'	Specification:	NA
Location:	BH18-11	Lab Number:	WHB23-04668

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0	100.0				
37.5	98.2	336.8			
26.5	95.1	916.6			
19.0	85.5	2685.0			
16.0	80.4	3646.6			
13.2	76.6	4342.3			
9.5	68.8	5788.6			
6.7	62.0	7052.5			
4.75	56.9	8008.7			
2.36	49.5	9385.8			
1.18	42.2	10741.1			
0.600	31.2	12775.6			
0.300	15.9	15632.7			
0.150	12.3	16287.0			
0.075	9.7	16776.2			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
0.084	0.263	5.9	18.7	71	4.23
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
18580.1	18580.2	-0.0	43.1	56.9	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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11/09/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012468	Report Number:	WHB04080-23

Sample Details

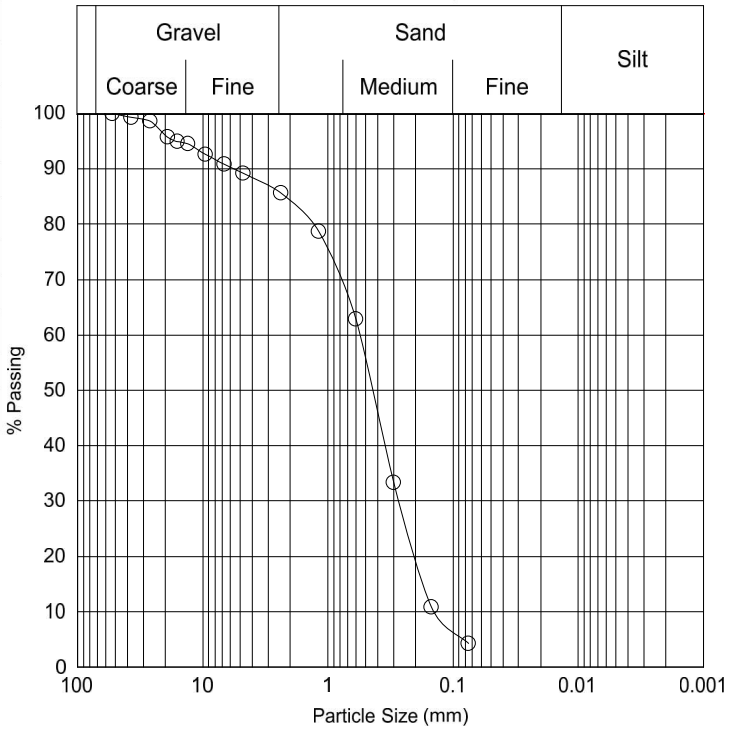
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/08/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	9'-14'	Specification:	NA
Location:	BH18-11	Lab Number:	WHB23-04669

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0	100.0				
37.5	99.3	120.6			
26.5	98.7	240.0			
19.0	95.7	791.3			
16.0	94.9	938.4			
13.2	94.5	1022.5			
9.5	92.6	1363.0			
6.7	90.9	1690.1			
4.75	89.2	2007.1			
2.36	85.6	2664.4			
1.18	78.7	3949.3			
0.600	62.8	6879.5			
0.300	33.3	12345.5			
0.150	10.8	16513.9			
0.075	4.3	17714.0			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
0.141	0.178	0.572	2.3	4	2.47
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
18506.9	18507.0	-0.0	10.8	89.2	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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Whitby, L1N 8Y6
905-723-2727

11/09/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012470	Report Number:	WHB04081-23

Sample Details

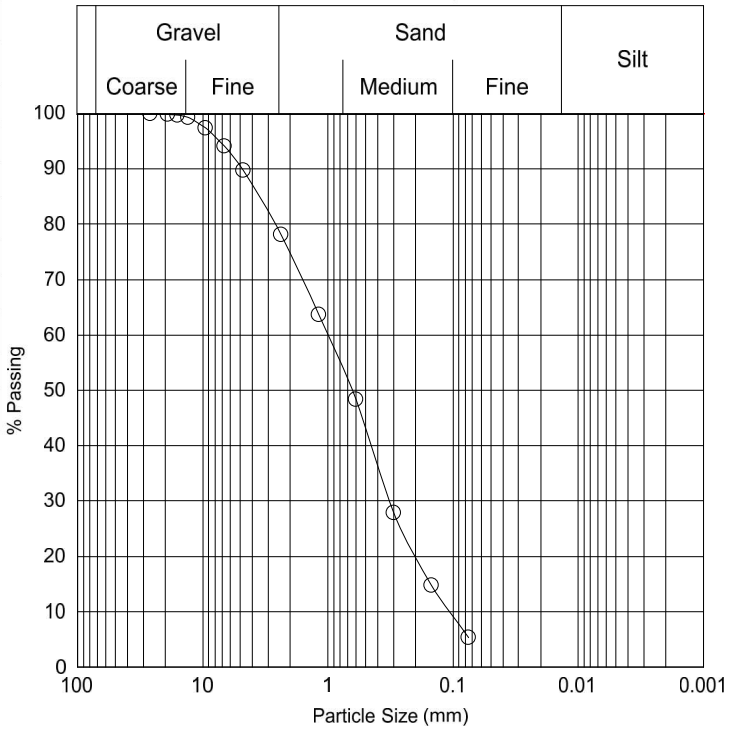
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/08/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	14'-19'	Specification:	NA
Location:	BH18-11	Lab Number:	WHB23-04670

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5					
26.5	100.0				
19.0	99.9	11.1			
16.0	99.7	36.3			
13.2	99.3	90.7			
9.5	97.4	326.8			
6.7	94.1	750.2			
4.75	89.8	1301.9			
2.36	78.1	2795.6			
1.18	63.7	4629.2			
0.600	48.3	6599.9			
0.300	27.9	9193.2			
0.150	14.7	10884.0			
0.075	5.3	12080.7			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
0.113	0.153	1.04	3.8	9	2.80
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
12754.6	12754.7	-0.0	10.2	89.8	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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905-723-2727

11/09/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012473	Report Number:	WHB04082-23

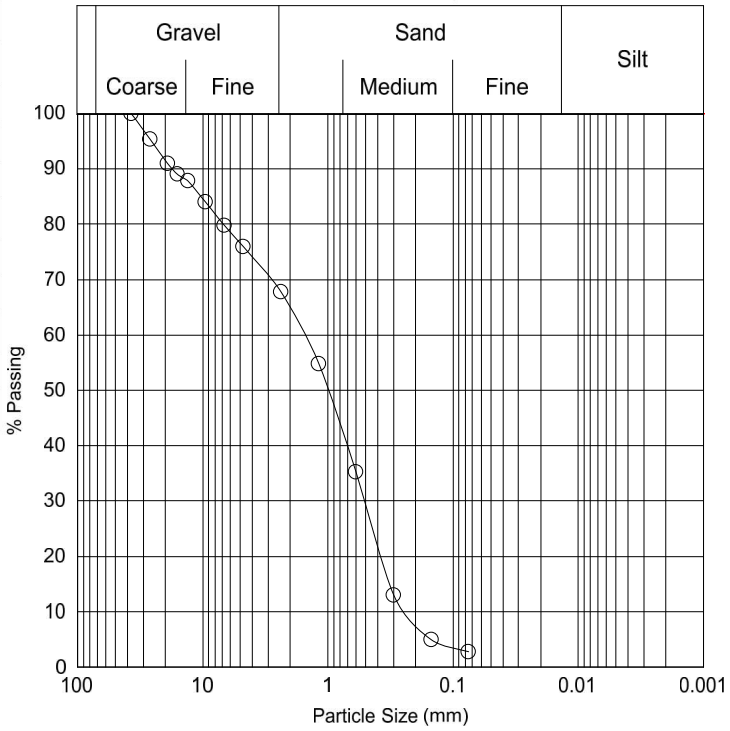
Sample Details			
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/08/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	19'-24'	Specification:	NA
Location:	BH18-11	Lab Number:	WHB23-04671

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5	100.0				
26.5	95.3	712.0			
19.0	91.0	1381.5			
16.0	89.1	1674.4			
13.2	87.8	1868.6			
9.5	84.0	2442.2			
6.7	79.8	3085.8			
4.75	75.9	3688.0			
2.36	67.7	4947.4			
1.18	54.8	6916.5			
0.600	35.2	9923.9			
0.300	13.0	13312.3			
0.150	4.9	14563.0			
0.075	2.7	14891.7			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
0.244	0.327	1.66	10.5	7	3.65
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
15307.5	15307.6	-0.0	24.1	75.9	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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11/09/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012475	Report Number:	WHB04083-23

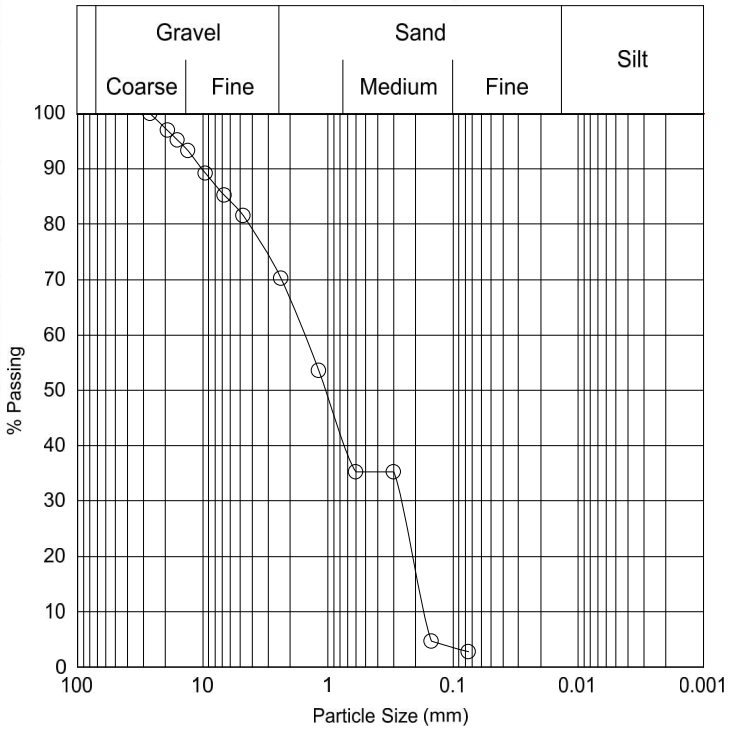
Sample Details			
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/08/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	24'-29'	Specification:	NA
Location:	BH18-11	Lab Number:	WHB23-04672

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5					
26.5	100.0				
19.0	97.0	312.4			
16.0	95.2	507.6			
13.2	93.3	704.4			
9.5	89.2	1140.3			
6.7	85.3	1545.5			
4.75	81.5	1946.3			
2.36	70.2	3140.7			
1.18	53.6	4886.5			
0.600	35.3	6817.7			
0.300	35.3	6817.7			
0.150	4.7	10046.5			
0.075	2.7	10257.7			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
0.176	0.200	1.63	6.5	9	3.30
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
10539.1	10539.3	-0.0	18.5	81.5	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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11/09/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012477	Report Number:	WHB04084-23

Sample Details

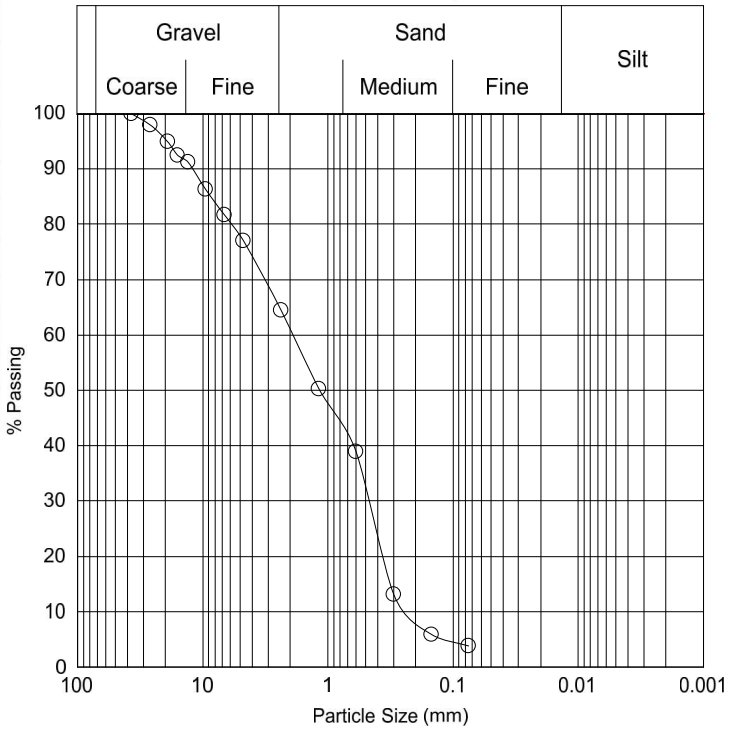
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/08/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	29'-34'	Specification:	NA
Location:	BH18-11	Lab Number:	WHB23-04673

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5	100.0				
26.5	97.9	235.3			
19.0	95.0	566.2			
16.0	92.5	845.6			
13.2	91.3	979.4			
9.5	86.4	1530.2			
6.7	81.7	2059.8			
4.75	77.1	2577.2			
2.36	64.5	3986.1			
1.18	50.3	5588.4			
0.600	39.0	6855.4			
0.300	13.1	9766.7			
0.150	5.9	10582.4			
0.075	3.8	10817.8			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
0.235	0.322	1.99	8.7	8	3.64
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
11240.1	11240.1	0.0	22.9	77.1	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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11/09/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012478	Report Number:	WHB04085-23

Sample Details

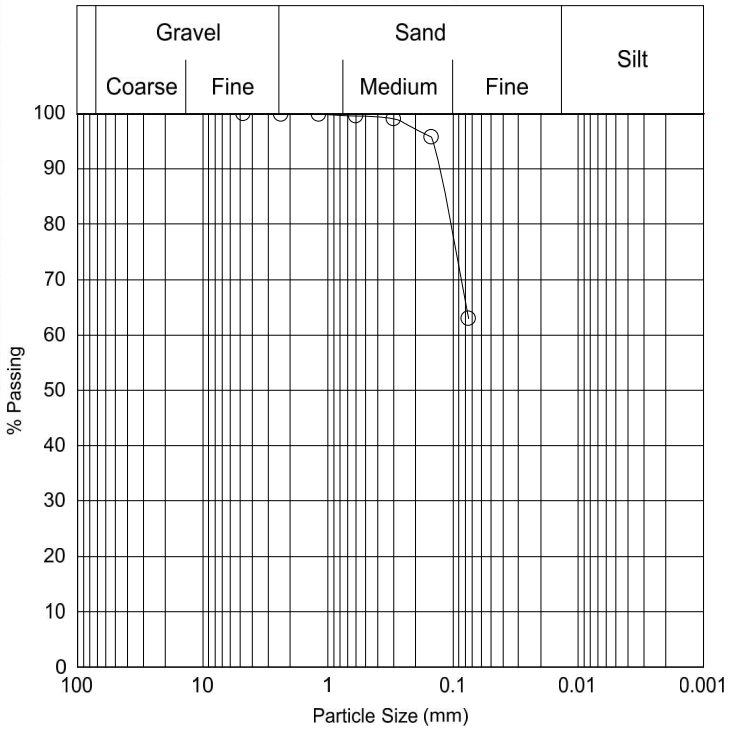
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/08/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	34'-39'	Specification:	NA
Location:	BH18-11	Lab Number:	WHB23-04674

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5					
26.5					
19.0					
16.0					
13.2					
9.5					
6.7					
4.75	100.0				
2.36	99.9	0.3			
1.18	99.8	0.5			
0.600	99.6	1.1			
0.300	99.0	2.8			
0.150	95.7	12.4			
0.075	63.0	105.9			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
			0.1		0.06
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
285.9	285.9	0.0		100.0	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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11/09/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012480	Report Number:	WHB04086-23

Sample Details

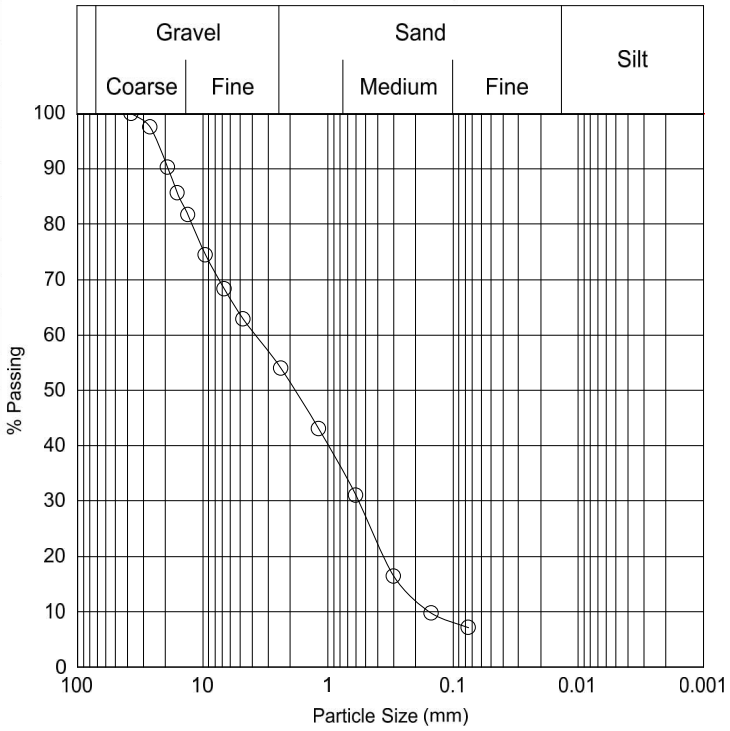
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/08/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	0'-4'	Specification:	NA
Location:	MW18-01	Lab Number:	WHB23-04675

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5	100.0				
26.5	97.6	363.7			
19.0	90.3	1465.8			
16.0	85.6	2181.6			
13.2	81.7	2774.2			
9.5	74.5	3858.2			
6.7	68.3	4800.7			
4.75	62.8	5624.9			
2.36	53.9	6973.2			
1.18	43.1	8603.2			
0.600	31.0	10443.1			
0.300	16.4	12648.0			
0.150	9.7	13654.2			
0.075	7.1	14048.0			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
0.157	0.269	4.0	15.6	26	4.09
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
15126.0	15126.0	0.0	37.2	62.8	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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905-723-2727

11/09/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012482	Report Number:	WHB04087-23

Sample Details

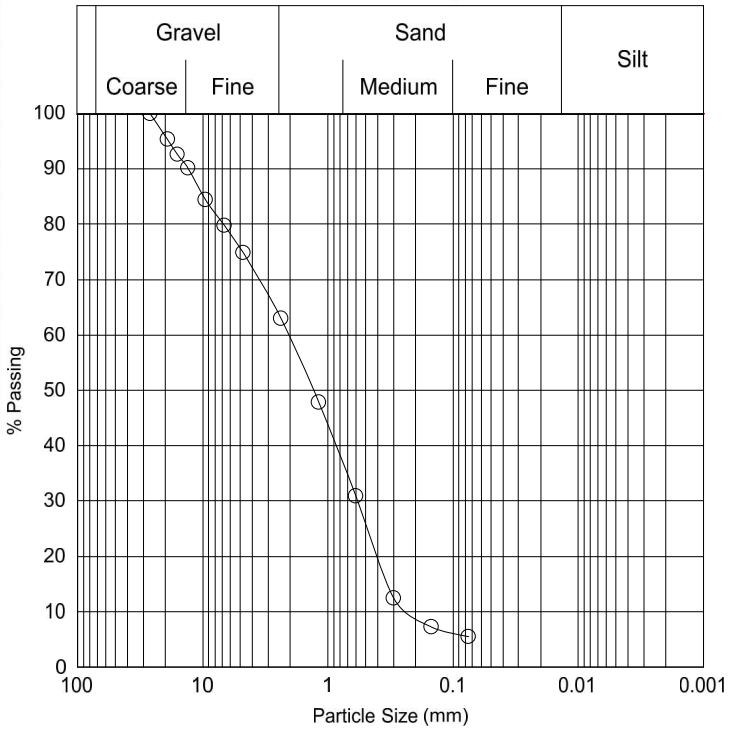
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/08/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	4'-9'	Specification:	NA
Location:	MW18-01	Lab Number:	WHB23-04676

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5					
26.5	100.0				
19.0	95.3	721.2			
16.0	92.6	1137.7			
13.2	90.1	1527.4			
9.5	84.4	2418.6			
6.7	79.8	3127.6			
4.75	74.8	3899.0			
2.36	63.0	5720.3			
1.18	47.8	8077.0			
0.600	30.9	10693.0			
0.300	12.4	13561.3			
0.150	7.3	14352.6			
0.075	5.5	14632.3			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
0.229	0.342	2.1	9.9	9	3.79
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
15478.1	15478.1	0.0	25.2	74.8	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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11/09/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012483	Report Number:	WHB04088-23

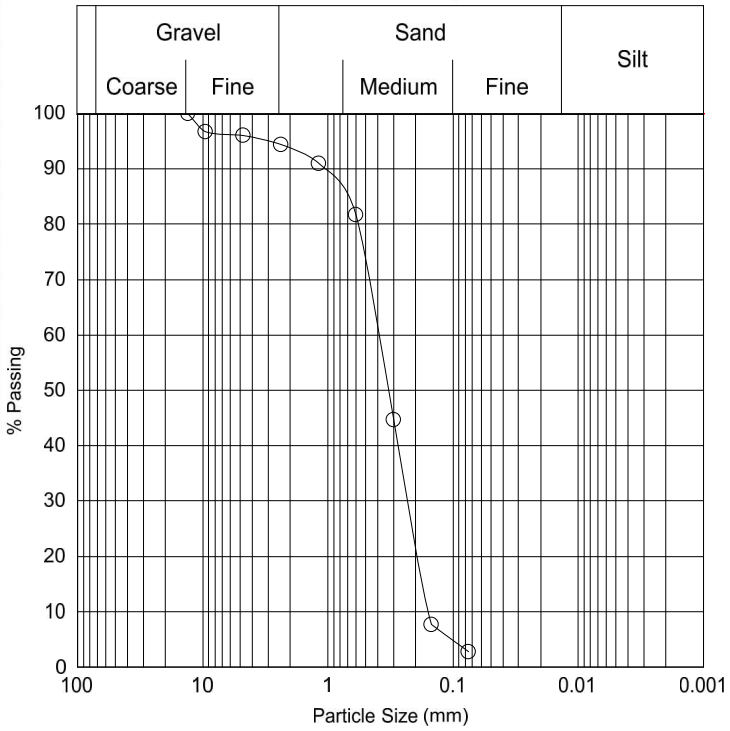
Sample Details			
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/08/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	9'-14'	Specification:	NA
Location:	MW18-01	Lab Number:	WHB23-04677

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5					
26.5					
19.0					
16.0					
13.2	100.0				
9.5	96.7	10.2			
6.7					
4.75	96.1	12.1			
2.36	94.4	17.3			
1.18	91.0	27.8			
0.600	81.7	56.4			
0.300	44.7	170.2			
0.150	7.7	284.1			
0.075	2.7	299.5			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
0.159	0.180	0.424	0.8	3	1.88
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
307.7	307.7	0.0	3.9	96.1	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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905-723-2727

11/09/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012485	Report Number:	WHB04089-23

Sample Details

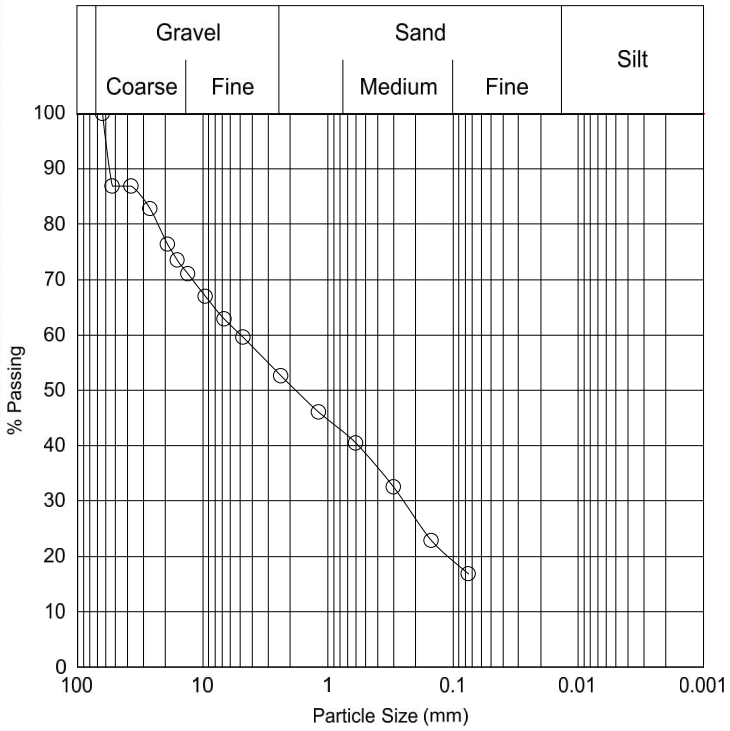
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/08/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	14'-19'	Specification:	NA
Location:	MW18-01	Lab Number:	WHB23-04678

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0	100.0				
53.0	86.9	1781.9			
37.5	86.9	1781.9			
26.5	82.8	2339.8			
19.0	76.3	3225.0			
16.0	73.5	3601.0			
13.2	71.0	3938.0			
9.5	66.9	4494.8			
6.7	62.8	5055.6			
4.75	59.5	5510.7			
2.36	52.6	6437.5			
1.18	46.1	7324.6			
0.600	40.5	8089.9			
0.300	32.5	9178.3			
0.150	22.8	10496.3			
0.075	16.8	11301.3			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
		5.0	32.4	>67	3.79
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
13591.4	13591.4	0.0	40.5	59.5	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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11/09/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012488	Report Number:	WHB04090-23

Sample Details

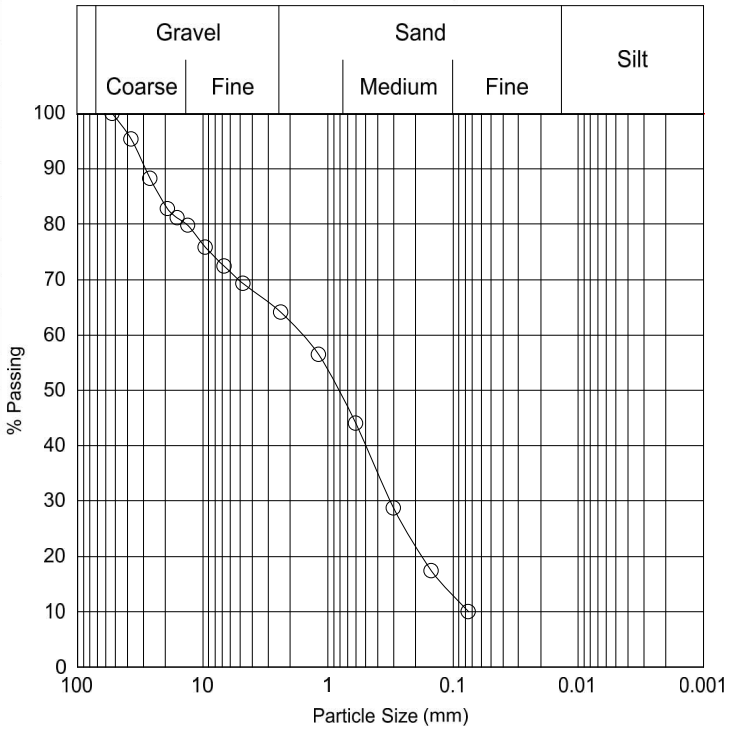
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/08/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	19'-24'	Specification:	NA
Location:	MW18-01	Lab Number:	WHB23-04679

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0	100.0				
37.5	95.3	630.5			
26.5	88.3	1576.0			
19.0	82.8	2321.4			
16.0	81.1	2548.1			
13.2	79.8	2719.3			
9.5	75.8	3269.1			
6.7	72.4	3730.0			
4.75	69.3	4148.2			
2.36	64.1	4842.0			
1.18	56.4	5882.7			
0.600	44.0	7561.7			
0.300	28.7	9625.5			
0.150	17.4	11141.3			
0.075	10.0	12141.1			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
0.075	0.126	1.73	22.0	23	3.44
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
13493.7	13493.7	0.0	30.7	69.3	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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100 Scotia Court
Whitby, L1N 8Y6
905-723-2727

11/09/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012505	Report Number:	WHB04091-23

Sample Details

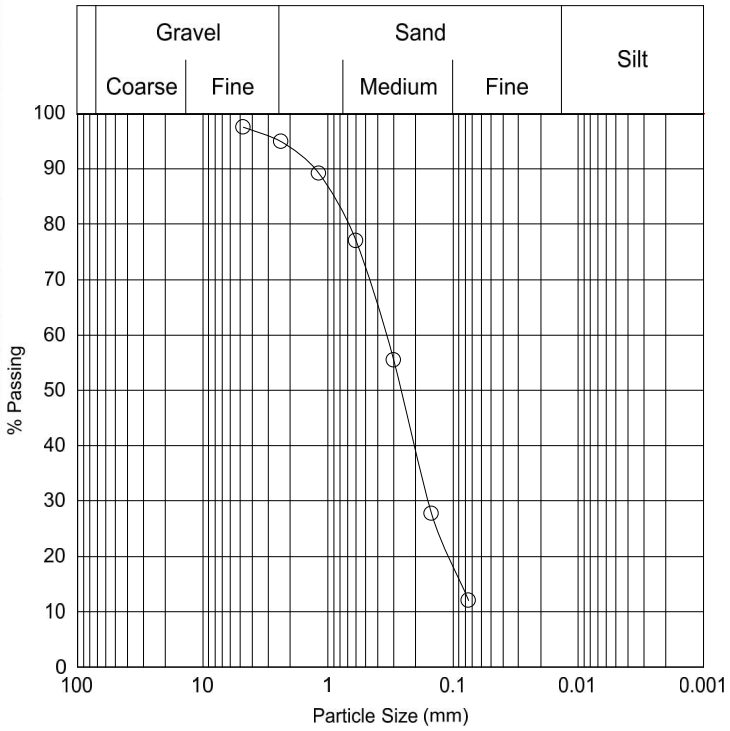
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/08/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	24'-29'	Specification:	NA
Location:	MW18-01	Lab Number:	WHB23-04680

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5					
26.5					
19.0					
16.0					
13.2					
9.5	100.0				
6.7					
4.75	97.5	7.6			
2.36	95.0	15.2			
1.18	89.2	33.1			
0.600	77.0	70.4			
0.300	55.4	136.5			
0.150	27.7	221.3			
0.075	12.0	269.4			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
	0.089	0.364	1.0	>5	1.58
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
306.0	306.0	0.0	2.5	97.5	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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905-723-2727

11/09/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012507	Report Number:	WHB04092-23

Sample Details

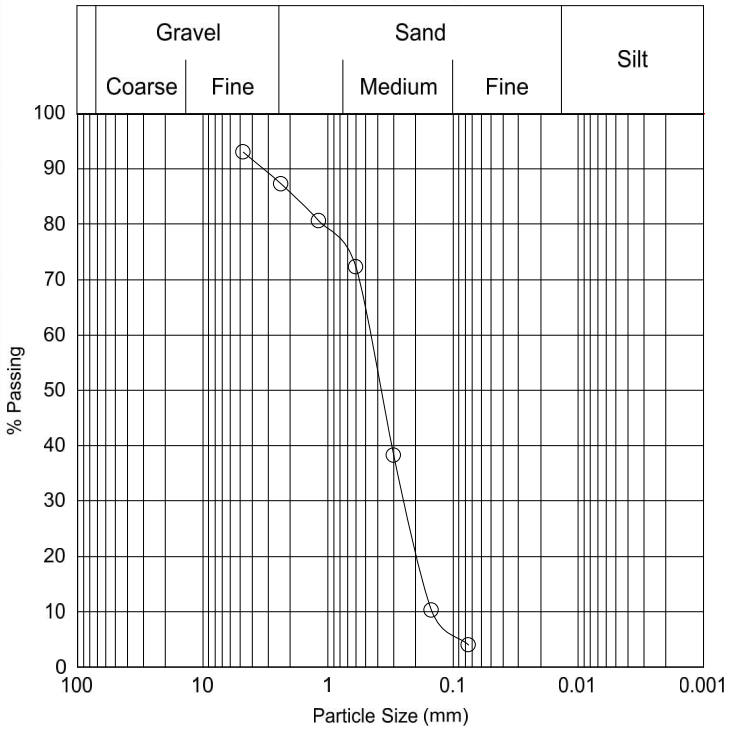
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/08/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	29'-34'	Specification:	NA
Location:	MW18-01	Lab Number:	WHB23-04681

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5					
26.5					
19.0					
16.0					
13.2					
9.5	100.0				
6.7					
4.75	93.1	23.6			
2.36	87.3	43.6			
1.18	80.6	66.7			
0.600	72.3	95.2			
0.300	38.2	212.0			
0.150	10.3	307.8			
0.075	4.0	329.5			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
0.146	0.175	0.492	2.0	3	2.18
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
343.3	343.3	0.0	6.9	93.1	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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905-723-2727

11/09/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012509	Report Number:	WHB04093-23

Sample Details

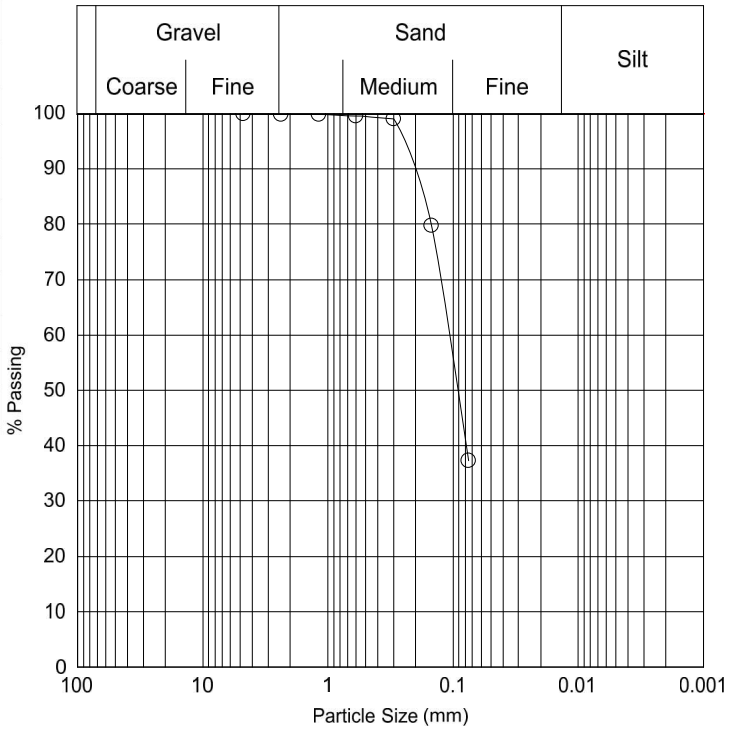
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/08/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	34'-39'	Specification:	NA
Location:	MW18-01	Lab Number:	WHB23-04682

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5					
26.5					
19.0					
16.0					
13.2					
9.5					
6.7					
4.75	100.0				
2.36	99.9	0.4			
1.18	99.9	0.5			
0.600	99.6	1.2			
0.300	99.0	3.5			
0.150	79.8	68.7			
0.075	37.3	213.7			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
		0.115	0.2	>2	0.22
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
340.7	340.7	0.0		100.0	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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11/09/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012511	Report Number:	WHB04094-23

Sample Details

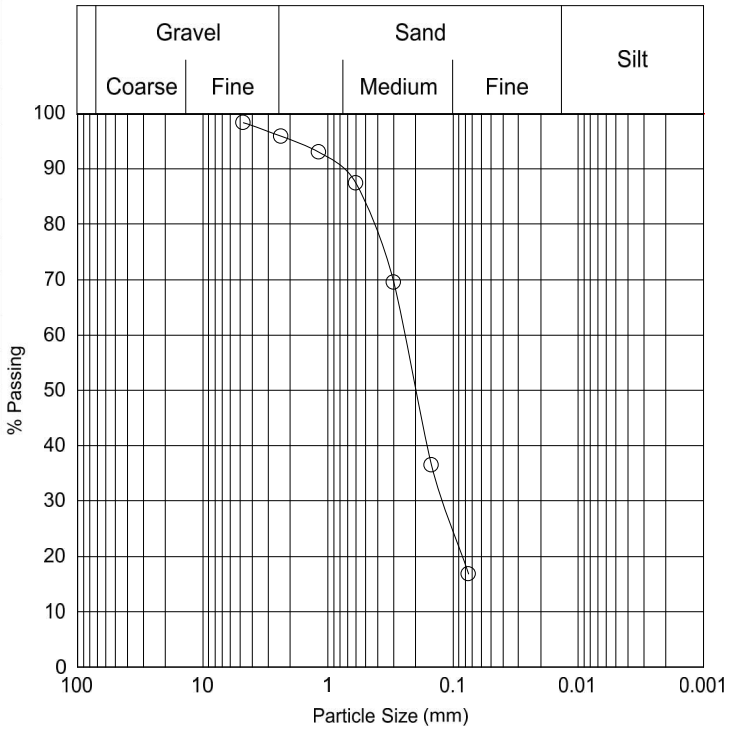
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/08/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	39'-44'	Specification:	NA
Location:	MW18-01	Lab Number:	WHB23-04683

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5					
26.5					
19.0					
16.0					
13.2					
9.5	100.0				
6.7					
4.75	98.3	5.5			
2.36	95.9	13.2			
1.18	93.0	22.6			
0.600	87.4	40.8			
0.300	69.5	98.5			
0.150	36.5	205.0			
0.075	16.8	268.7			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
		0.257	0.6	>3	1.19
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
322.8	322.8	0.0	1.7	98.3	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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11/09/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012517	Report Number:	WHB04103-23

Sample Details

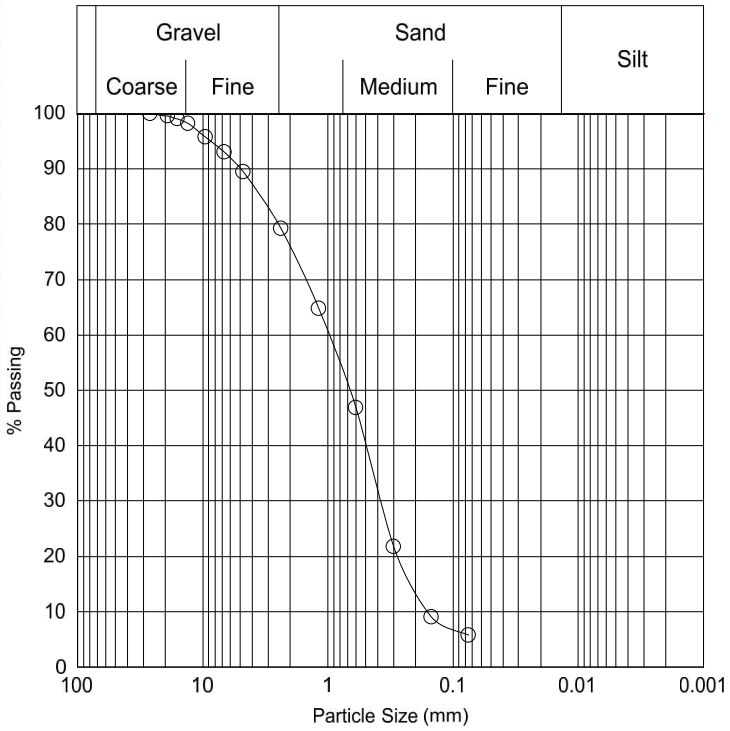
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/08/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	4'-9'	Specification:	NA
Location:	MW18-02	Lab Number:	WHB23-04684

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5					
26.5	100.0				
19.0	99.6	76.7			
16.0	99.0	176.7			
13.2	98.2	307.7			
9.5	95.8	720.5			
6.7	93.0	1202.6			
4.75	89.5	1800.0			
2.36	79.3	3542.8			
1.18	64.8	6038.0			
0.600	46.8	9128.2			
0.300	21.7	13431.5			
0.150	9.0	15619.6			
0.075	5.8	16157.0			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
0.162	0.221	1.03	3.7	6	2.93
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
17155.2	17155.1	0.0	10.5	89.5	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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905-723-2727

11/09/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012518	Report Number:	WHB04104-23

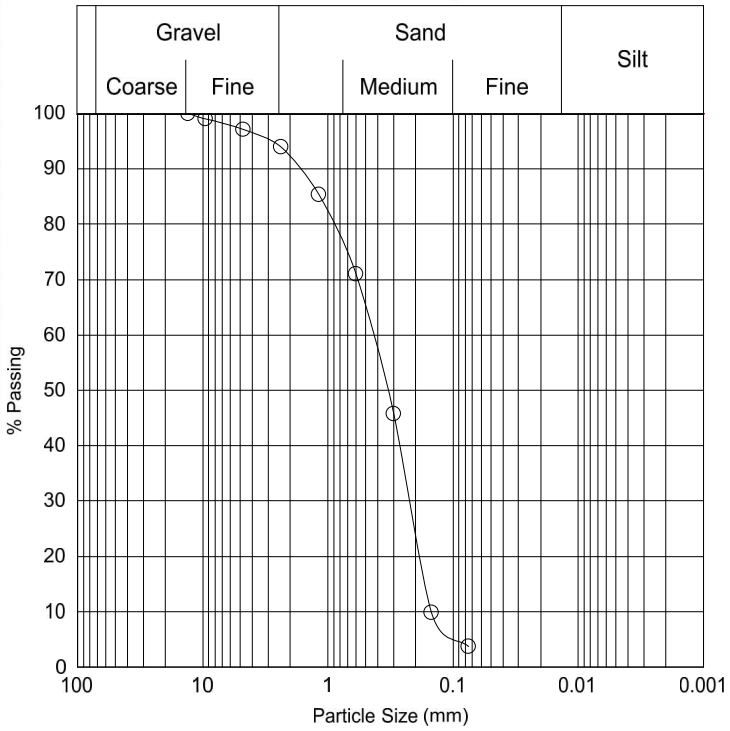
Sample Details			
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/08/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	9'-14'	Specification:	NA
Location:	MW18-02	Lab Number:	WHB23-04685

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5					
26.5					
19.0					
16.0					
13.2	100.0				
9.5	99.0	3.3			
6.7					
4.75	97.1	9.9			
2.36	94.0	20.5			
1.18	85.4	50.1			
0.600	71.0	99.5			
0.300	45.7	186.3			
0.150	9.8	309.2			
0.075	3.7	330.2			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
0.151	0.172	0.470	1.2	3	1.98
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
342.8	342.8	0.0	2.9	97.1	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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Whitby, L1N 8Y6
905-723-2727

11/09/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012519	Report Number:	WHB04105-23

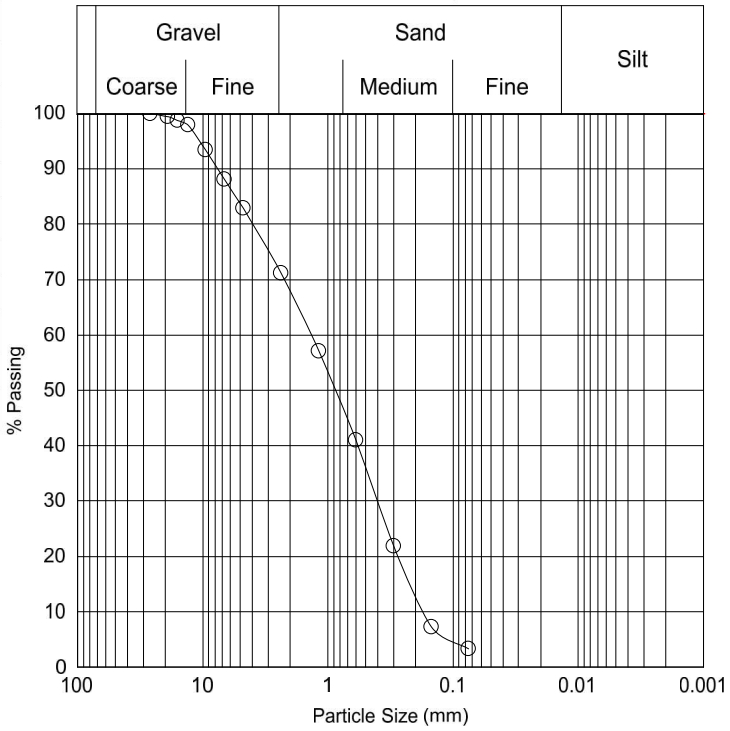
Sample Details			
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/08/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	14'-19'	Specification:	NA
Location:	MW18-02	Lab Number:	WHB23-04686

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5					
26.5	100.0				
19.0	99.5	82.3			
16.0	98.8	195.5			
13.2	97.9	352.2			
9.5	93.4	1084.7			
6.7	88.1	1967.0			
4.75	82.9	2814.4			
2.36	71.2	4750.2			
1.18	57.1	7074.6			
0.600	41.0	9729.5			
0.300	21.9	12881.9			
0.150	7.2	15304.3			
0.075	3.3	15947.1			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
0.179	0.230	1.42	5.5	8	3.25
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
16495.5	16495.5	0.0	17.1	82.9	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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Whitby, L1N 8Y6
905-723-2727

11/09/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012520	Report Number:	WHB04106-23

Sample Details

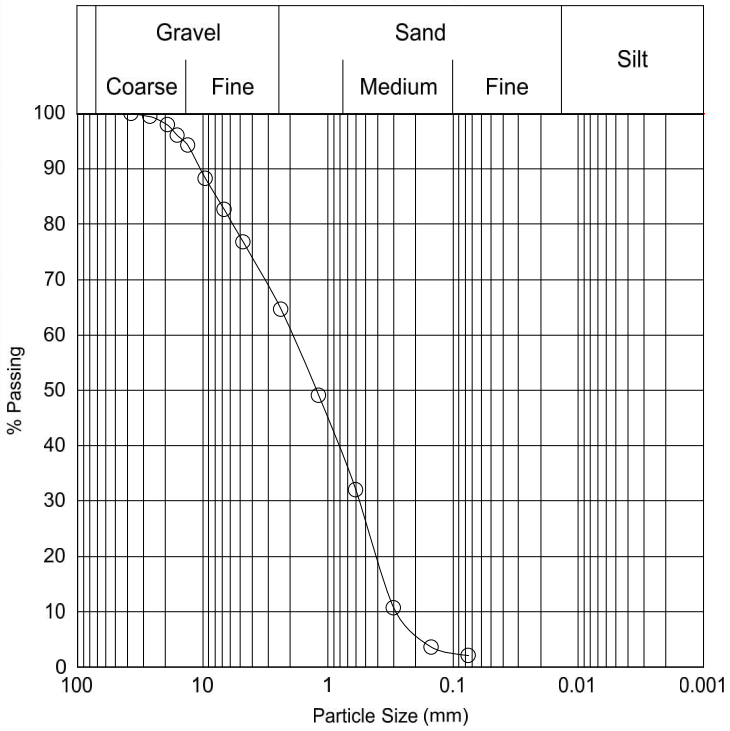
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/08/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	19'-24'	Specification:	NA
Location:	MW18-02	Lab Number:	WHB23-04687

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5	100.0				
26.5	99.5	75.5			
19.0	97.9	318.0			
16.0	96.1	586.2			
13.2	94.2	884.5			
9.5	88.3	1773.5			
6.7	82.6	2644.9			
4.75	76.8	3525.2			
2.36	64.6	5371.5			
1.18	49.0	7752.3			
0.600	31.9	10346.9			
0.300	10.6	13579.6			
0.150	3.6	14638.8			
0.075	2.1	14872.0			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
0.287	0.362	2.0	7.9	7	3.75
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
15192.6	15192.7	-0.0	23.2	76.8	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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905-723-2727

11/09/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012521	Report Number:	WHB04107-23

Sample Details

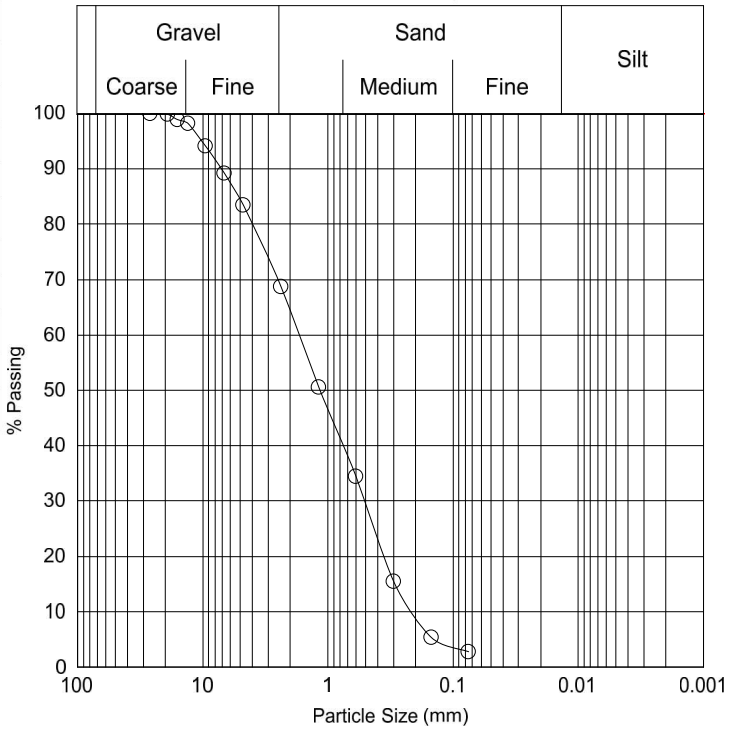
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/08/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	24'-29'	Specification:	NA
Location:	MW18-02	Lab Number:	WHB23-04688

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5					
26.5	100.0				
19.0	99.8	23.6			
16.0	98.9	130.6			
13.2	98.2	217.4			
9.5	94.1	696.4			
6.7	89.2	1285.1			
4.75	83.5	1951.2			
2.36	68.7	3708.2			
1.18	50.5	5873.2			
0.600	34.4	7782.1			
0.300	15.4	10027.5			
0.150	5.3	11233.6			
0.075	2.8	11528.4			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
0.220	0.294	1.80	5.3	8	3.48
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
11859.1	11859.0	0.0	16.5	83.5	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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905-723-2727

11/09/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012522	Report Number:	WHB04108-23

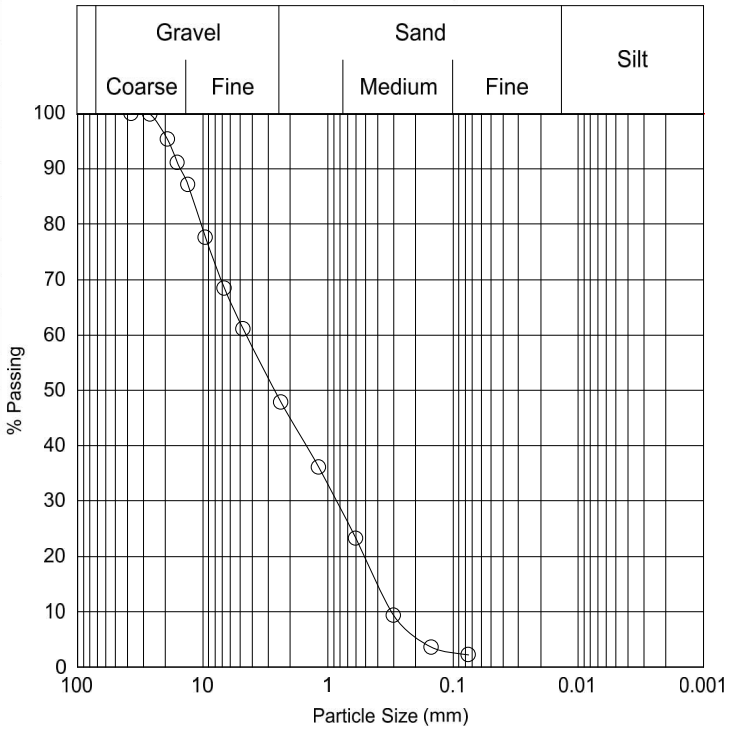
Sample Details			
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/08/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	29'-34'	Specification:	NA
Location:	MW18-02	Lab Number:	WHB23-04689

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5	100.0				
26.5	99.8	32.3			
19.0	95.4	679.5			
16.0	91.1	1323.2			
13.2	87.2	1895.7			
9.5	77.6	3321.1			
6.7	68.4	4682.8			
4.75	61.0	5771.7			
2.36	47.8	7720.3			
1.18	36.1	9463.0			
0.600	23.2	11371.0			
0.300	9.3	13426.9			
0.150	3.6	14262.0			
0.075	2.2	14473.7			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
0.315	0.423	4.6	12.4	14	4.41
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
14801.3	14801.4	-0.0	39.0	61.0	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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905-723-2727

11/09/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012523	Report Number:	WHB04109-23

Sample Details

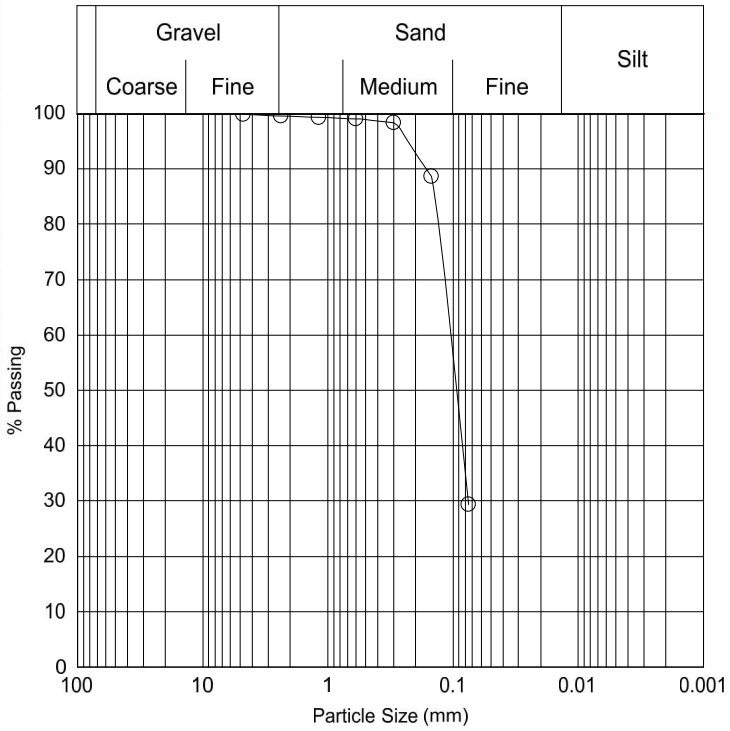
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/08/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	34'-39'	Specification:	NA
Location:	MW18-02	Lab Number:	WHB23-04690

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5					
26.5					
19.0					
16.0					
13.2					
9.5	100.0				
6.7					
4.75	99.9	0.2			
2.36	99.6	1.2			
1.18	99.3	2.1			
0.600	99.0	2.9			
0.300	98.4	4.8			
0.150	88.6	33.7			
0.075	29.4	208.9			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
		0.114	0.1	>2	0.15
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
295.7	295.7	0.0	0.1	99.9	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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905-723-2727

11/09/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012524	Report Number:	WHB04110-23

Sample Details

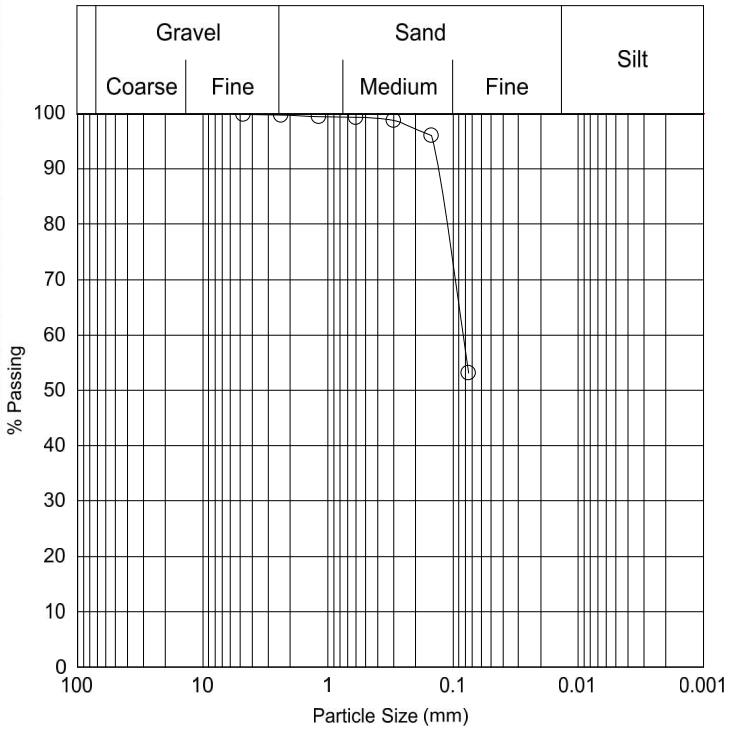
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/08/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	39'-49'	Specification:	NA
Location:	MW18-02	Lab Number:	WHB23-04691

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5					
26.5					
19.0					
16.0					
13.2					
9.5	100.0				
6.7					
4.75	99.9	0.4			
2.36	99.7	1.0			
1.18	99.5	1.6			
0.600	99.3	2.2			
0.300	98.8	3.8			
0.150	96.1	12.0			
0.075	53.1	145.1			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
		0.087	0.1	>1	0.07
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
309.3	309.3	0.0	0.1	99.9	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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11/09/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012525	Report Number:	WHB04111-23

Sample Details

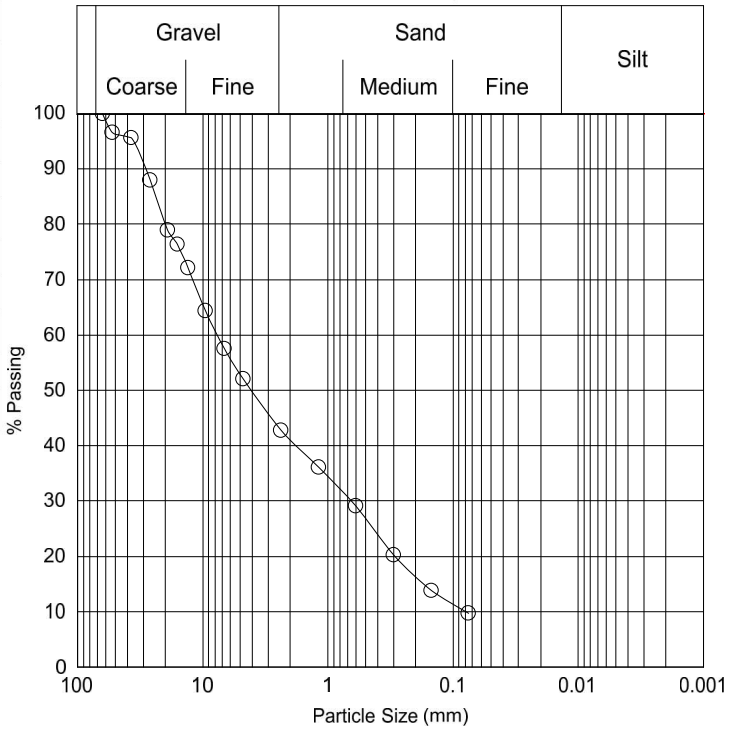
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/08/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	0'-4'	Specification:	NA
Location:	MW18-03	Lab Number:	WHB23-04692

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0	100.0				
53.0	96.6	266.9			
37.5	95.6	346.0			
26.5	88.0	937.4			
19.0	79.0	1641.9			
16.0	76.4	1851.7			
13.2	72.1	2184.5			
9.5	64.4	2787.7			
6.7	57.5	3327.1			
4.75	52.1	3750.0			
2.36	42.7	4491.6			
1.18	36.1	5003.9			
0.600	29.1	5557.3			
0.300	20.2	6249.0			
0.150	13.8	6751.3			
0.075	9.7	7071.6			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
0.080	0.178	7.7	24.0	96	4.42
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
7834.3	7834.4	-0.0	47.9	52.1	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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11/09/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012526	Report Number:	WHB04112-23

Sample Details

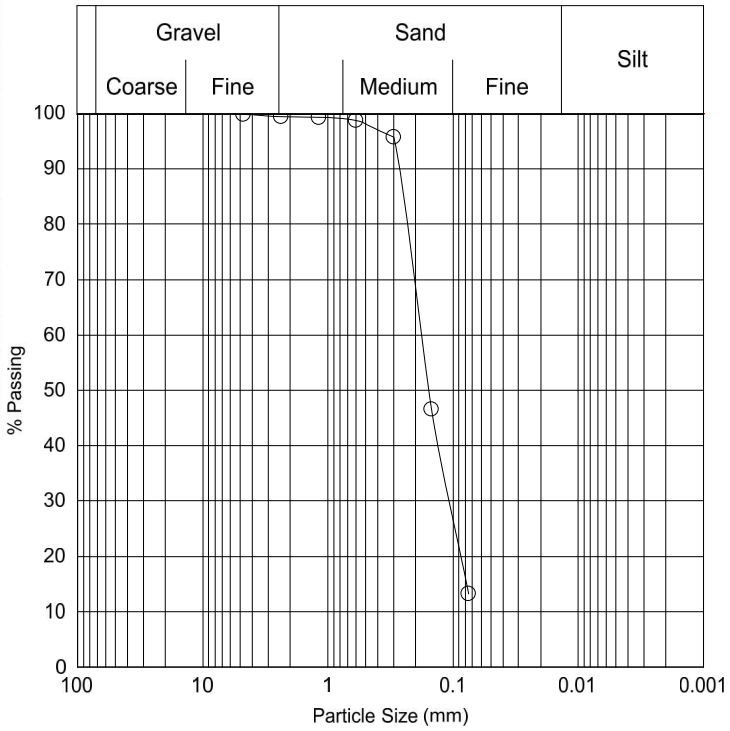
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/08/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	4'-9'	Specification:	NA
Location:	MW18-03	Lab Number:	WHB23-04693

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5					
26.5					
19.0					
16.0					
13.2					
9.5	100.0				
6.7					
4.75	99.9	0.3			
2.36	99.5	1.7			
1.18	99.3	2.4			
0.600	98.8	3.9			
0.300	95.8	13.5			
0.150	46.6	172.0			
0.075	13.2	279.4			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
	0.079	0.191	0.3	>3	0.60
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
322.0	322.0	0.0	0.1	99.9	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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11/09/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012527	Report Number:	WHB04113-23

Sample Details

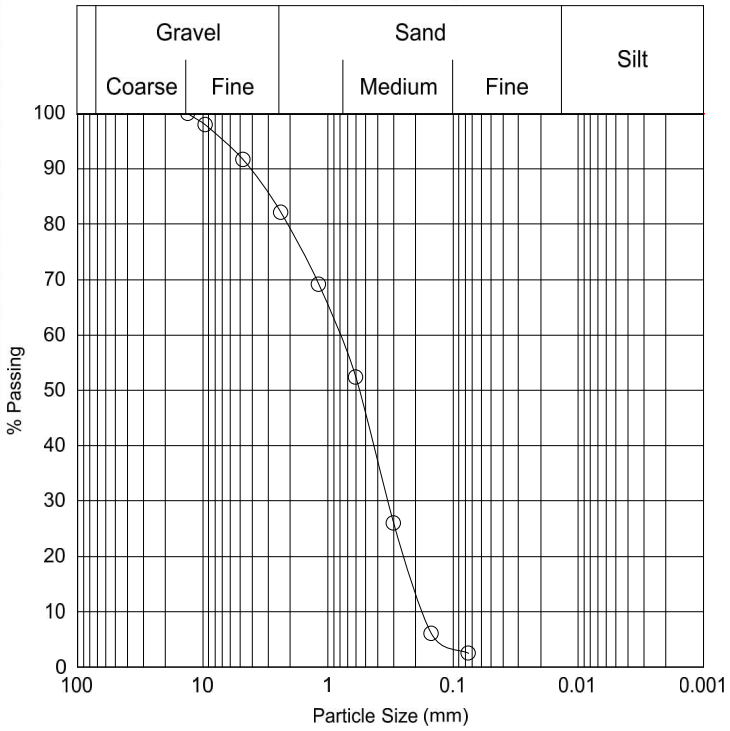
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/08/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	9'-14'	Specification:	NA
Location:	MW18-03	Lab Number:	WHB23-04694

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5					
26.5					
19.0					
16.0					
13.2	100.0				
9.5	98.0	7.2			
6.7					
4.75	91.6	30.6			
2.36	82.1	64.9			
1.18	69.1	112.1			
0.600	52.3	172.9			
0.300	25.9	268.8			
0.150	6.0	341.1			
0.075	2.4	354.2			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
0.180	0.218	0.866	3.1	5	2.75
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
362.8	362.8	0.0	8.4	91.6	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012529	Report Number:	WHB04114-23

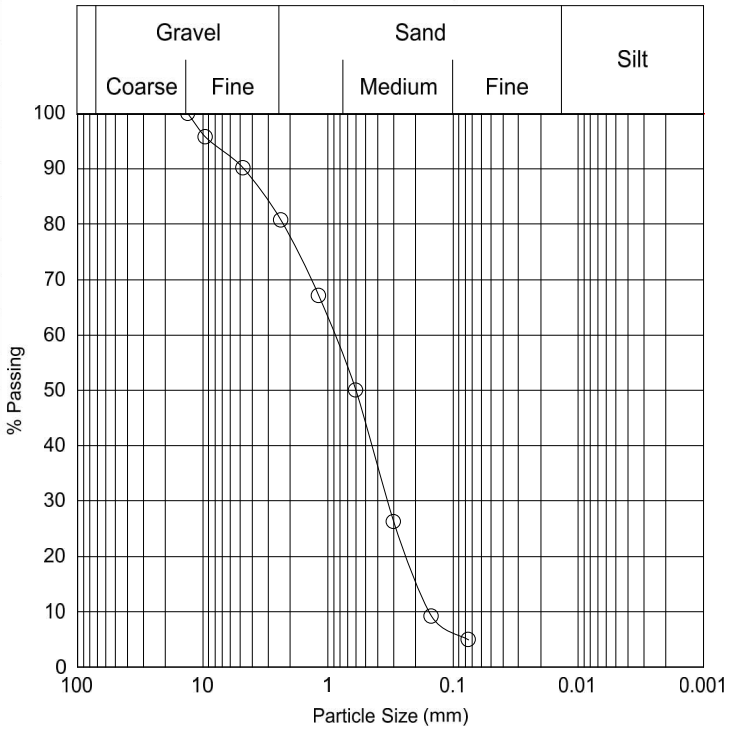
Sample Details			
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/08/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	14'-19'	Specification:	NA
Location:	MW18-03	Lab Number:	WHB23-04695

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5					
26.5					
19.0					
16.0					
13.2	100.0				
9.5	95.7	16.8			
6.7					
4.75	90.1	38.4			
2.36	80.8	74.3			
1.18	67.1	127.6			
0.600	50.0	194.0			
0.300	26.2	286.2			
0.150	9.2	352.4			
0.075	4.9	368.7			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
0.157	0.201	0.939	3.4	6	2.81
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
387.9	387.9	0.0	9.9	90.1	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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11/09/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012531	Report Number:	WHB04115-23

Sample Details

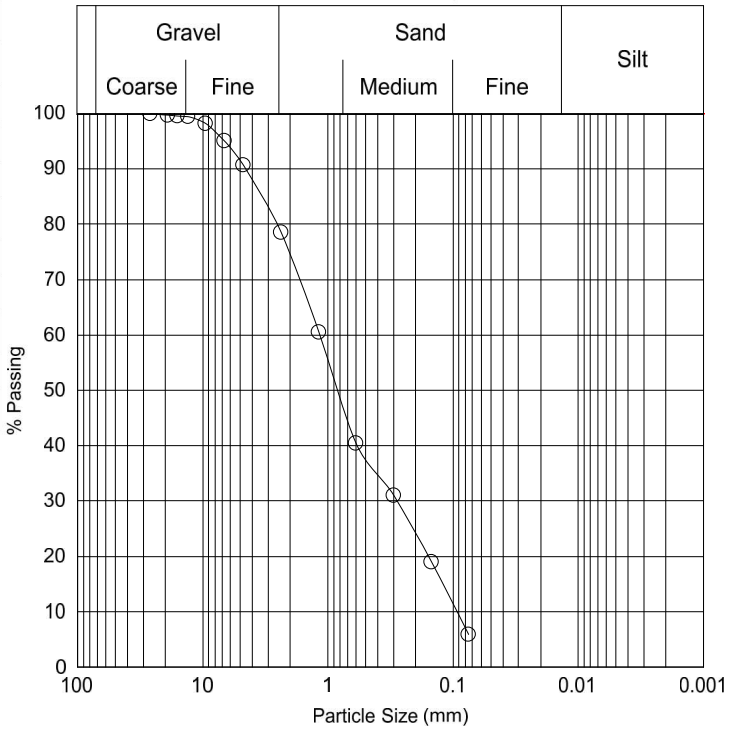
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/08/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	19'-24'	Specification:	NA
Location:	MW18-03	Lab Number:	WHB23-04696

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5					
26.5	100.0				
19.0	99.7	43.6			
16.0	99.6	62.9			
13.2	99.5	74.2			
9.5	98.2	262.0			
6.7	95.1	701.8			
4.75	90.7	1337.0			
2.36	78.6	3070.6			
1.18	60.5	5656.6			
0.600	40.4	8535.1			
0.300	31.0	9878.6			
0.150	19.0	11608.6			
0.075	5.9	13475.8			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
0.098	0.127	1.17	3.6	12	2.82
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
14324.6	14324.5	0.0	9.3	90.7	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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905-723-2727

11/09/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012533	Report Number:	WHB04116-23

Sample Details

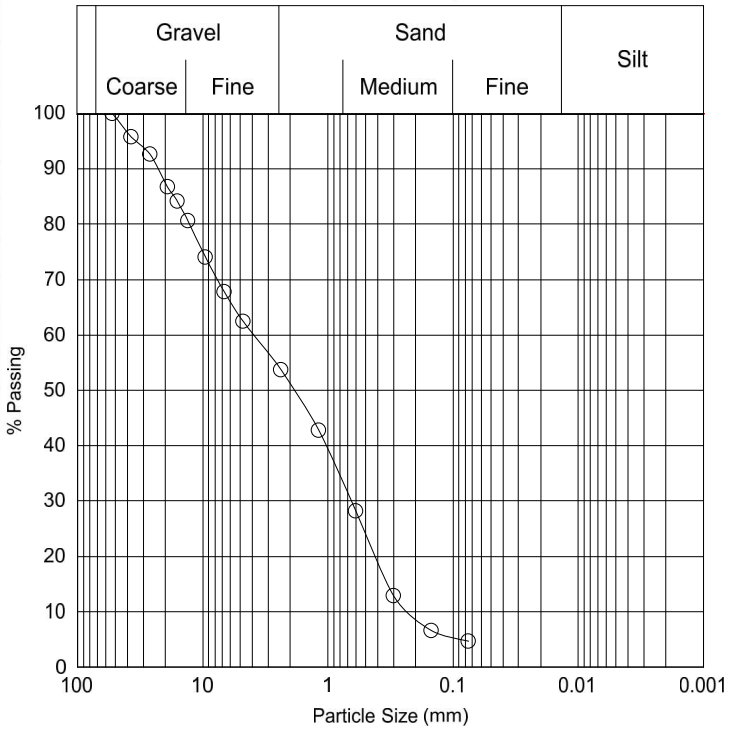
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/08/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	24'-29'	Specification:	NA
Location:	MW18-03	Lab Number:	WHB23-04697

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0	100.0				
37.5	95.8	707.1			
26.5	92.6	1255.4			
19.0	86.7	2259.2			
16.0	84.1	2702.6			
13.2	80.6	3300.2			
9.5	74.0	4424.1			
6.7	67.7	5489.8			
4.75	62.4	6394.6			
2.36	53.7	7882.0			
1.18	42.8	9723.8			
0.600	28.1	12227.0			
0.300	12.9	14815.7			
0.150	6.6	15882.2			
0.075	4.6	16220.8			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
0.231	0.341	4.1	17.0	18	4.19
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
17008.8	17008.8	0.0	37.6	62.4	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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11/09/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012534	Report Number:	WHB04117-23

Sample Details

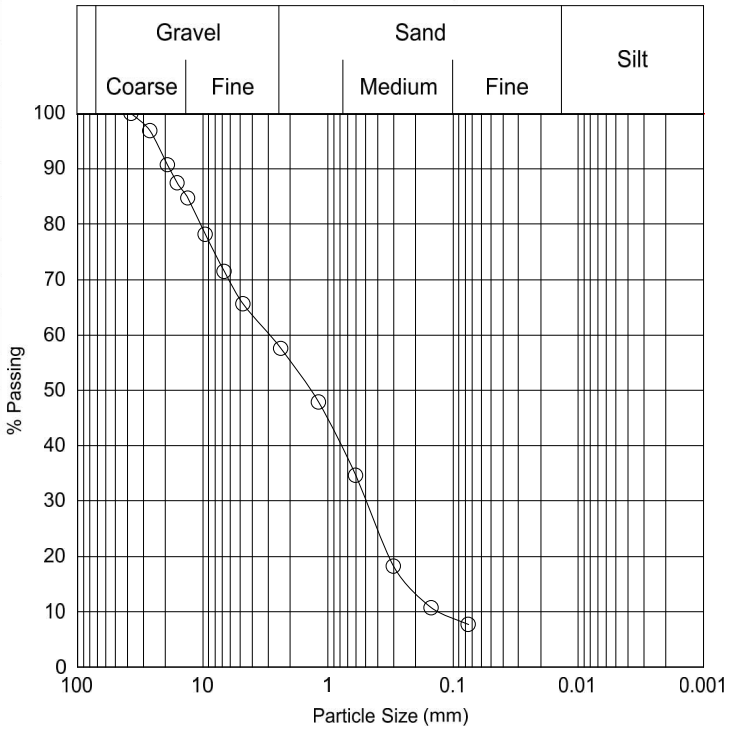
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/08/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	29'-34'	Specification:	NA
Location:	MW18-03	Lab Number:	WHB23-04698

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5	100.0				
26.5	96.9	342.2			
19.0	90.7	1037.0			
16.0	87.5	1391.0			
13.2	84.7	1695.3			
9.5	78.1	2435.0			
6.7	71.4	3172.9			
4.75	65.6	3820.1			
2.36	57.5	4717.0			
1.18	47.8	5793.3			
0.600	34.5	7266.3			
0.300	18.2	9077.0			
0.150	10.6	9925.4			
0.075	7.6	10258.8			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
0.135	0.237	3.1	13.5	23	3.88
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
11098.8	11098.7	0.0	34.4	65.6	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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11/09/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012535	Report Number:	WHB04118-23

Sample Details

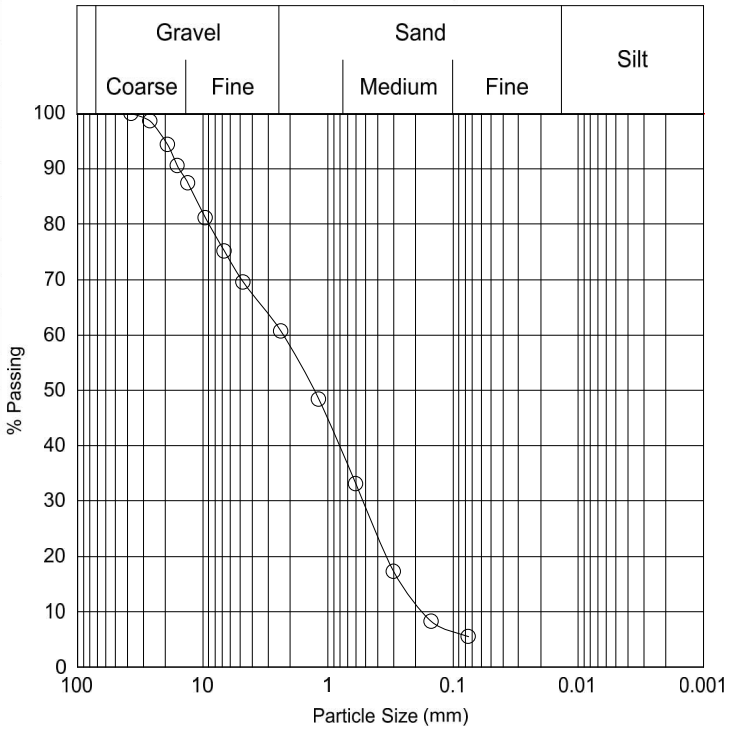
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/08/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	39'-44'	Specification:	NA
Location:	MW18-03	Lab Number:	WHB23-04699

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5	100.0				
26.5	98.6	183.5			
19.0	94.4	767.1			
16.0	90.6	1270.0			
13.2	87.5	1698.6			
9.5	81.2	2557.5			
6.7	75.1	3377.3			
4.75	69.5	4143.6			
2.36	60.7	5332.6			
1.18	48.4	7011.8			
0.600	33.1	9091.1			
0.300	17.2	11238.0			
0.150	8.2	12469.2			
0.075	5.4	12843.9			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
0.180	0.263	2.3	11.7	13	3.82
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
13579.2	13579.3	-0.0	30.5	69.5	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012537	Report Number:	WHB04119-23

Sample Details

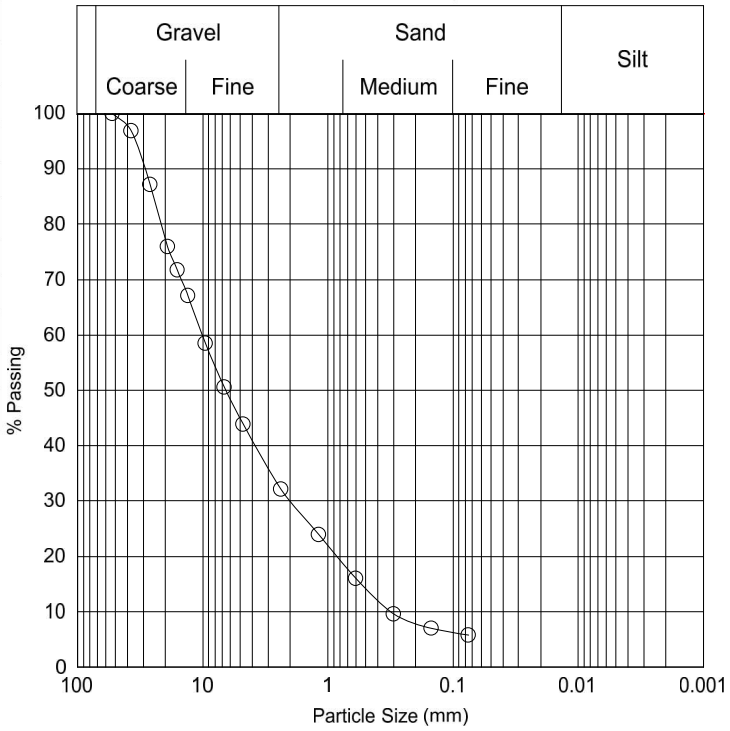
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/08/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	4'-9'	Specification:	NA
Location:	MW18-04	Lab Number:	WHB23-04700

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0	100.0				
37.5	96.8	286.8			
26.5	87.2	1143.4			
19.0	76.0	2154.5			
16.0	71.7	2538.2			
13.2	67.1	2946.8			
9.5	58.5	3717.1			
6.7	50.5	4435.6			
4.75	43.9	5025.2			
2.36	32.1	6088.3			
1.18	23.9	6822.1			
0.600	16.0	7529.2			
0.300	9.6	8102.7			
0.150	7.0	8335.4			
0.075	5.7	8457.5			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
0.319	0.553	10.1	25.0	32	5.09
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
8964.9	8964.9	0.0	56.1	43.9	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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100 Scotia Court
Whitby, L1N 8Y6
905-723-2727

11/09/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012538	Report Number:	WHB04120-23

Sample Details

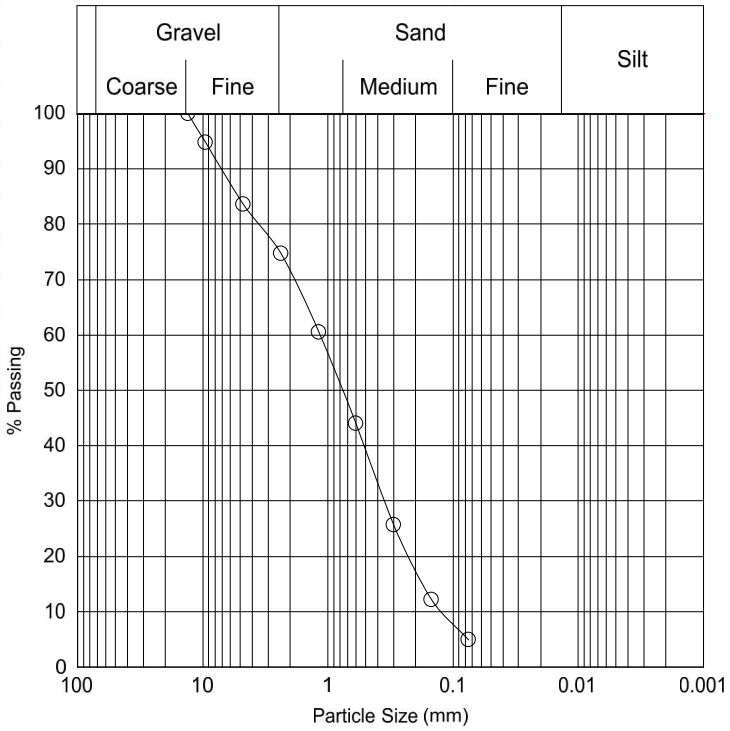
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/08/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	9'-14'	Specification:	NA
Location:	MW18-04	Lab Number:	WHB23-04701

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5					
26.5					
19.0					
16.0					
13.2	100.0				
9.5	94.8	16.2			
6.7					
4.75	83.6	51.2			
2.36	74.7	78.8			
1.18	60.5	123.3			
0.600	44.0	174.6			
0.300	25.7	231.6			
0.150	12.2	273.8			
0.075	4.9	296.6			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
0.127	0.181	1.16	5.3	9	3.05
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
311.8	311.8	0.0	16.4	83.6	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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Whitby, L1N 8Y6
905-723-2727

11/09/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012539	Report Number:	WHB04121-23

Sample Details

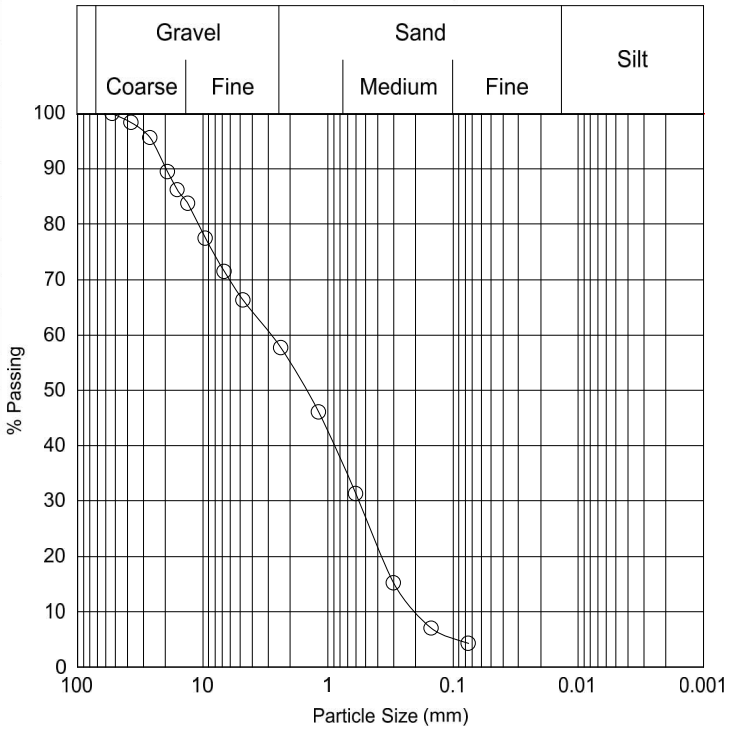
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/08/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	14'-19'	Specification:	NA
Location:	MW18-04	Lab Number:	WHB23-04702

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0	100.0				
37.5	98.4	155.1			
26.5	95.6	435.0			
19.0	89.5	1029.5			
16.0	86.2	1352.2			
13.2	83.8	1582.9			
9.5	77.5	2199.6			
6.7	71.5	2796.7			
4.75	66.3	3297.5			
2.36	57.6	4154.7			
1.18	46.1	5276.6			
0.600	31.3	6734.4			
0.300	15.1	8316.4			
0.150	7.0	9110.5			
0.075	4.2	9381.3			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
0.206	0.298	3.0	14.6	15	3.99
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
9796.7	9796.7	0.0	33.7	66.3	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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11/09/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012540	Report Number:	WHB04122-23

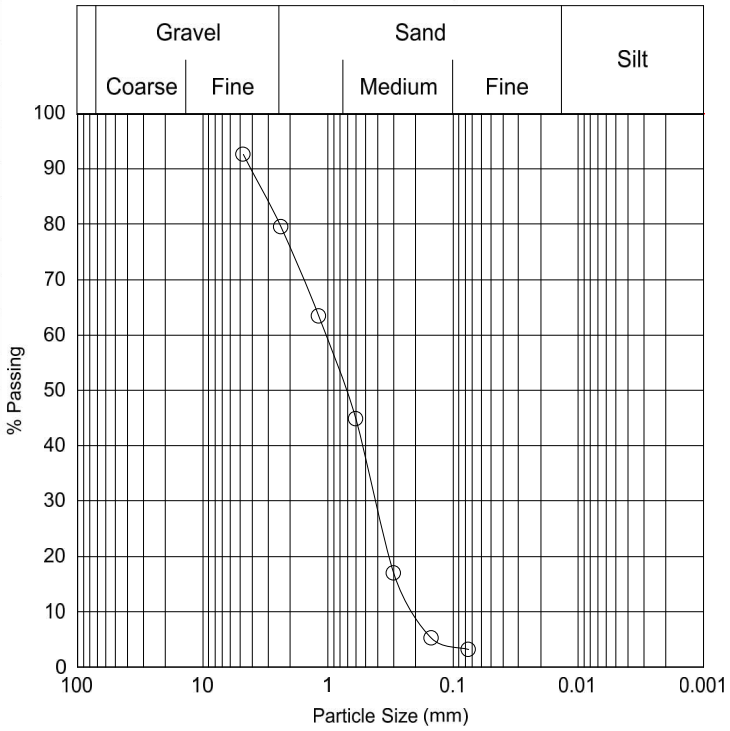
Sample Details			
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/08/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	19'-24'	Specification:	NA
Location:	MW18-04	Lab Number:	WHB23-04703

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5					
26.5					
19.0					
16.0					
13.2					
9.5	100.0				
6.7					
4.75	92.6	24.6			
2.36	79.5	68.0			
1.18	63.4	121.6			
0.600	44.8	183.0			
0.300	17.0	275.4			
0.150	5.2	314.4			
0.075	3.1	321.4			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
0.211	0.275	1.07	3.4	5	2.98
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
331.8	331.8	0.0	7.4	92.6	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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11/09/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012541	Report Number:	WHB04123-23

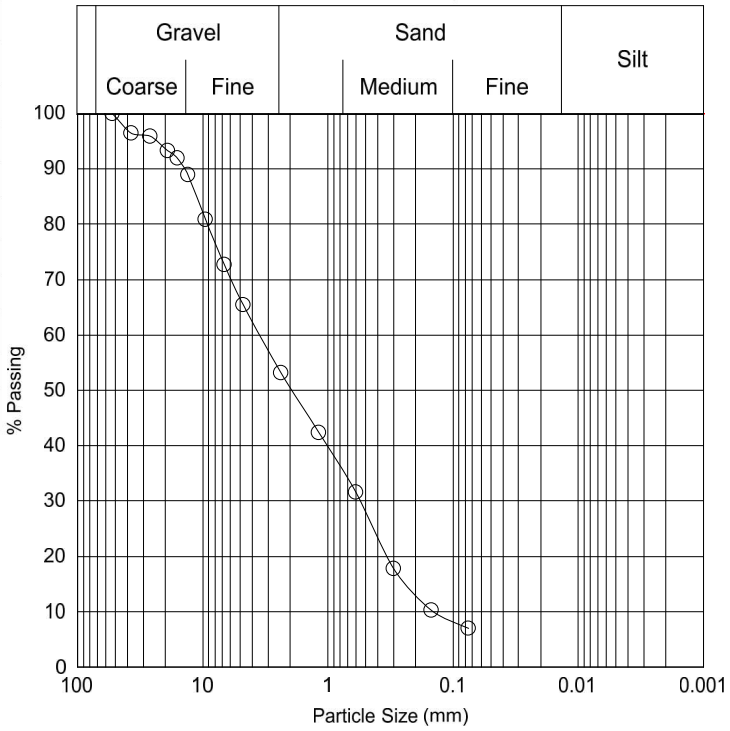
Sample Details			
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/08/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	24'-29'	Specification:	NA
Location:	MW18-04	Lab Number:	WHB23-04704

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0	100.0				
37.5	96.5	295.7			
26.5	95.9	346.3			
19.0	93.3	575.8			
16.0	91.9	693.1			
13.2	88.9	949.2			
9.5	80.9	1628.5			
6.7	72.7	2331.3			
4.75	65.5	2945.1			
2.36	53.1	4001.3			
1.18	42.4	4919.9			
0.600	31.5	5852.6			
0.300	17.7	7028.6			
0.150	10.2	7672.2			
0.075	6.9	7952.5			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
0.145	0.246	3.7	11.4	25	3.99
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
8539.7	8539.6	0.0	34.5	65.5	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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11/09/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012545	Report Number:	WHB04124-23

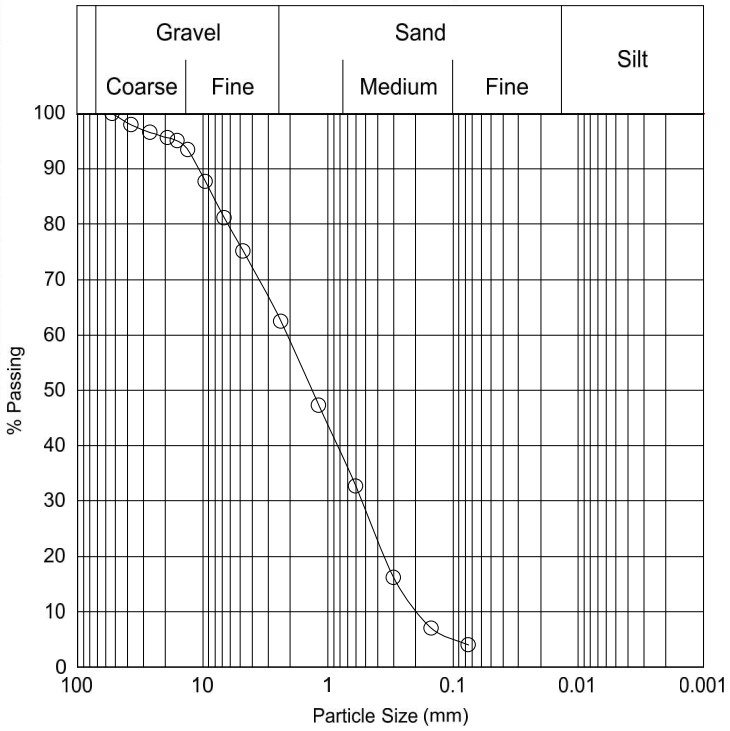
Sample Details			
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/09/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	29'-34'	Specification:	NA
Location:	MW18-04	Lab Number:	WHB23-04705

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0	100.0				
37.5	97.9	197.2			
26.5	96.6	321.7			
19.0	95.6	407.0			
16.0	95.1	461.2			
13.2	93.5	610.0			
9.5	87.7	1151.4			
6.7	81.1	1771.2			
4.75	75.1	2329.7			
2.36	62.4	3513.7			
1.18	47.2	4941.8			
0.600	32.6	6301.3			
0.300	16.1	7849.2			
0.150	7.0	8694.9			
0.075	4.0	8979.7			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
0.199	0.282	2.2	8.4	11	3.72
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
9352.2	9352.2	0.0	24.9	75.1	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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11/09/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012547	Report Number:	WHB04125-23

Sample Details

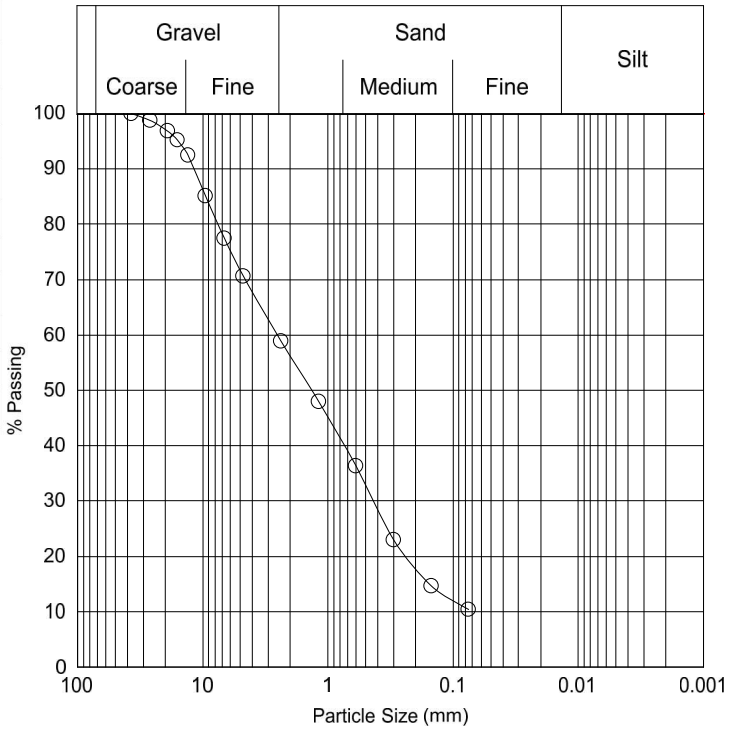
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/09/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	34'-39'	Specification:	NA
Location:	MW18-04	Lab Number:	WHB23-04706

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5	100.0				
26.5	98.8	135.5			
19.0	96.9	340.0			
16.0	95.2	523.0			
13.2	92.5	814.9			
9.5	85.1	1611.4			
6.7	77.5	2442.0			
4.75	70.6	3189.3			
2.36	58.9	4457.6			
1.18	48.0	5646.5			
0.600	36.4	6898.0			
0.300	22.9	8368.5			
0.150	14.6	9261.4			
0.075	10.4	9725.9			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
	0.157	2.6	9.5	>34	3.64
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
10849.9	10849.8	0.0	29.4	70.6	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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Whitby, L1N 8Y6
905-723-2727

11/09/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012548	Report Number:	WHB04126-23

Sample Details

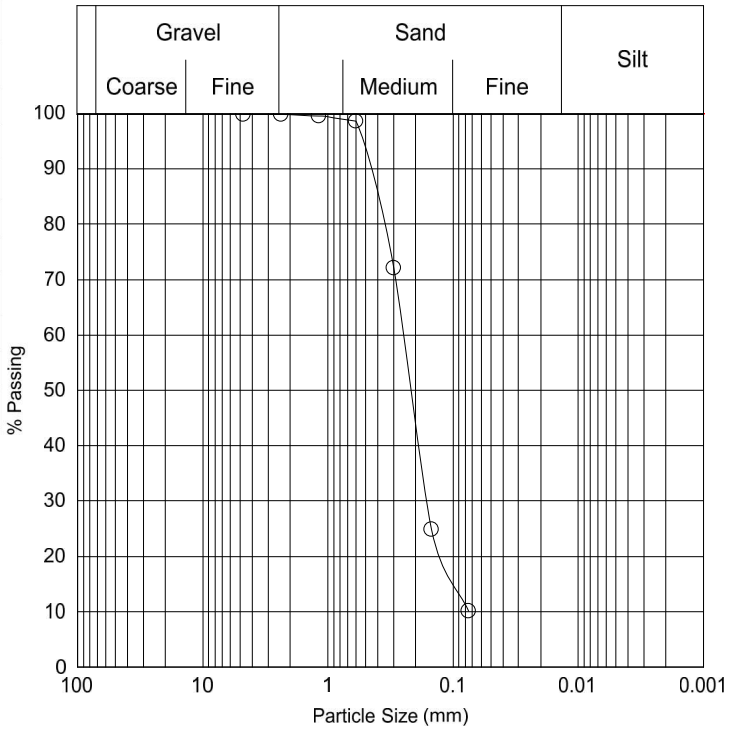
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/09/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	39'-44'	Specification:	NA
Location:	MW18-04	Lab Number:	WHB23-04707

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5					
26.5					
19.0					
16.0					
13.2					
9.5	100.0				
6.7					
4.75	99.9	0.3			
2.36	99.8	0.7			
1.18	99.6	1.2			
0.600	98.7	4.3			
0.300	72.1	90.5			
0.150	24.8	243.4			
0.075	10.1	291.2			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
	0.100	0.262	0.4	>3	1.05
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
323.8	323.8	0.0	0.1	99.9	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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100 Scotia Court
Whitby, L1N 8Y6
905-723-2727

11/09/2023

Sieve Analysis of Fine and Coarse Aggregates

Testing Standard: MTO LS-602 (Rev. 33)

Project Number:	1791470A-18000	Client:	Votorantim Cimentos
Contract Number:		Project Name:	VCNA/Lake Pit Lic Extender/Puslinch
Testing Program:	012549	Report Number:	WHB04127-23

Sample Details

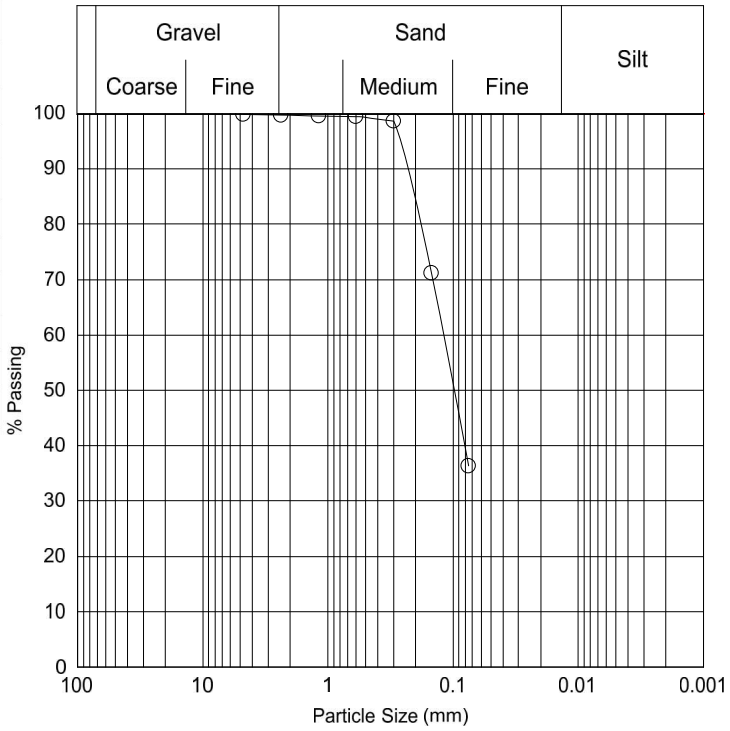
Date Sampled:	01/28/2018	Sampled By:	R. Ackerman
Date Received:	11/06/2023	Date Tested:	11/09/2023
Supplier:	NA	Tested By:	R. Ackerman
Source:	NA	Sample Type:	Granular- No Envelope
Sample No.:	44'-49'	Specification:	NA
Location:	MW18-04	Lab Number:	WHB23-04708

Results

Sieve Analysis

Sieve Size (mm)	Percent Passing	Cum. Mass Retained	Acceptable (Yes/No)	Specification	
				Min.	Max.
106.0					
63.0					
53.0					
37.5					
26.5					
19.0					
16.0					
13.2					
9.5	100.0				
6.7					
4.75	99.8	0.7			
2.36	99.7	0.8			
1.18	99.6	1.1			
0.600	99.5	1.5			
0.300	98.6	4.1			
0.150	71.2	86.3			
0.075	36.4	190.6			

Particle Size Distribution by Sieve Analysis



Aggregate Properties

D10	D15	D60	D85	Cu	Fineness Modulus
		0.126	0.2	>2	0.32
Initial Dry Mass (g)	**Final Mass (g)**	**Percent Loss**	**Percent Coarse**	**Percent Fine**	
299.5	299.5	0.0	0.2	99.8	

Lab Reporting Comments / Deviations:

General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature: [redacted]

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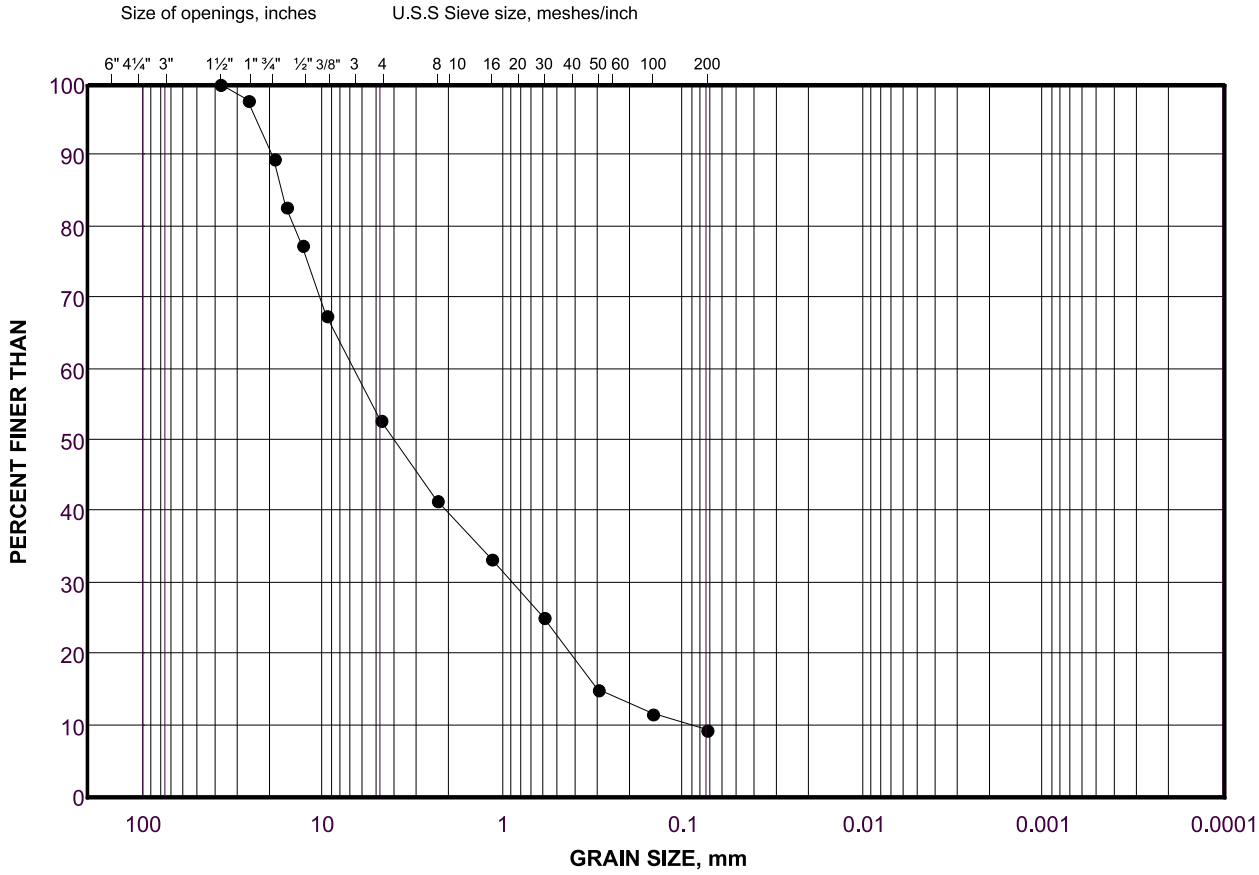
GRAIN SIZE DISTRIBUTION

MTO LS-602

FIGURE 1



LEGEND

SYMBOL	BOREHOLE	SAMPLE	DEPTH(ft)
●	MW18-06	1	0.0 - 5.0

Fineness Modulus: 5.46

Project Number: 1791470

Checked By: [redacted]

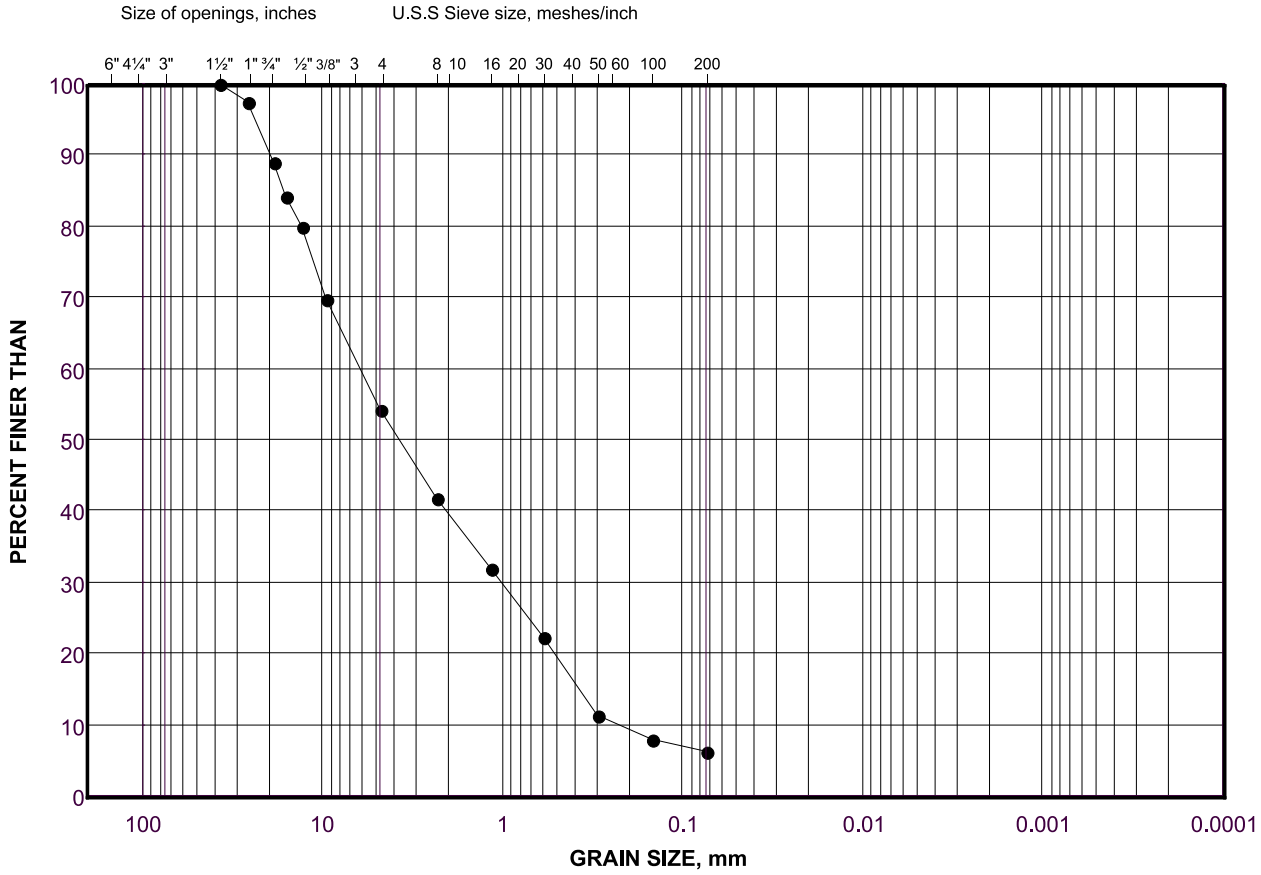
Golder Associates

Date: 06-Dec-18

GRAIN SIZE DISTRIBUTION

MTO LS-602

FIGURE 2



LEGEND

SYMBOL	BOREHOLE	SAMPLE	DEPTH(ft)
●	MW18-06	2	5.0 - 10.0

Fineness Modulus: 5.56

Project Number: 1791470

Checked By: [redacted]

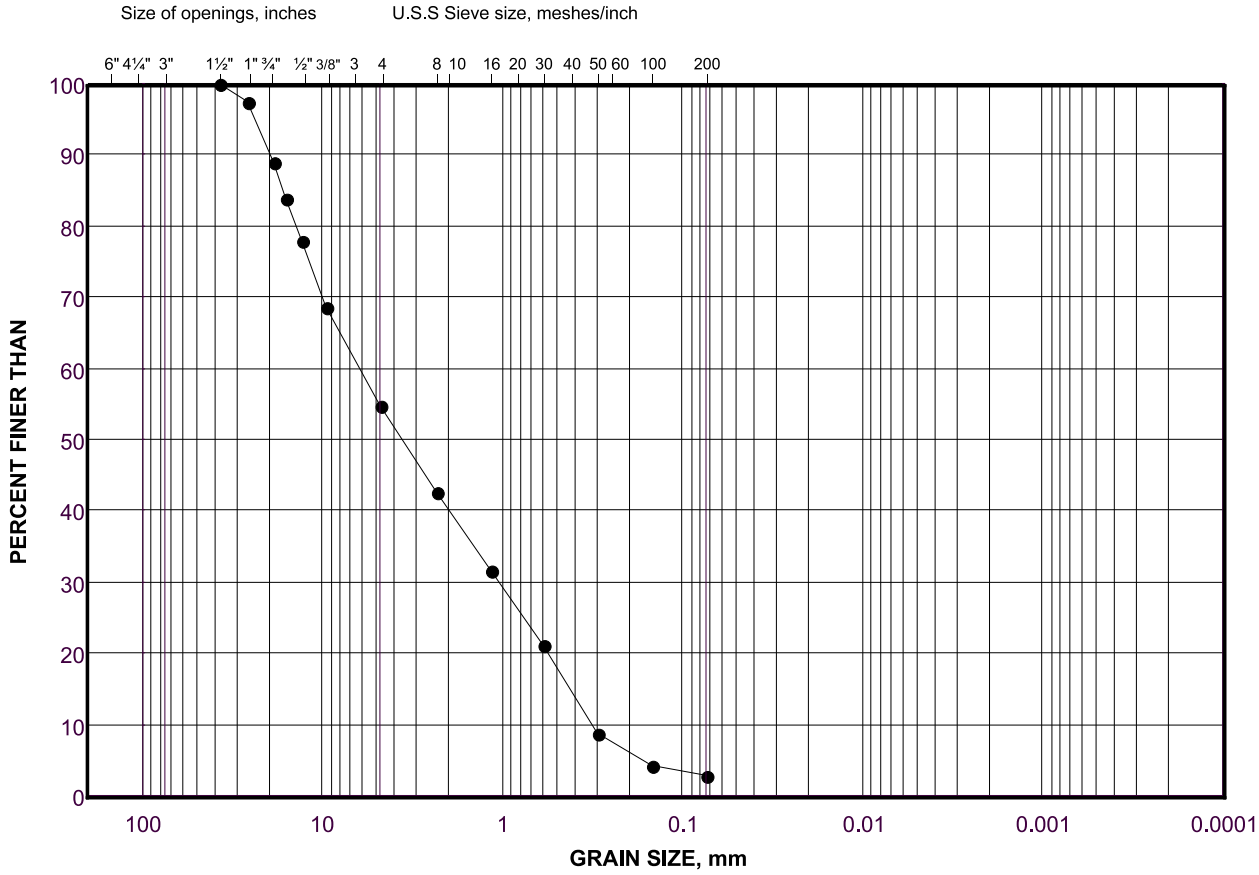
Golder Associates

Date: 06-Dec-18

GRAIN SIZE DISTRIBUTION

MTO LS-602

FIGURE 3A



LEGEND

SYMBOL	BOREHOLE	SAMPLE	DEPTH(ft)
●	MW18-06	3A	10.0 - 12.0

Fineness Modulus: 5.60

Project Number: 1791470

Checked By: [redacted]

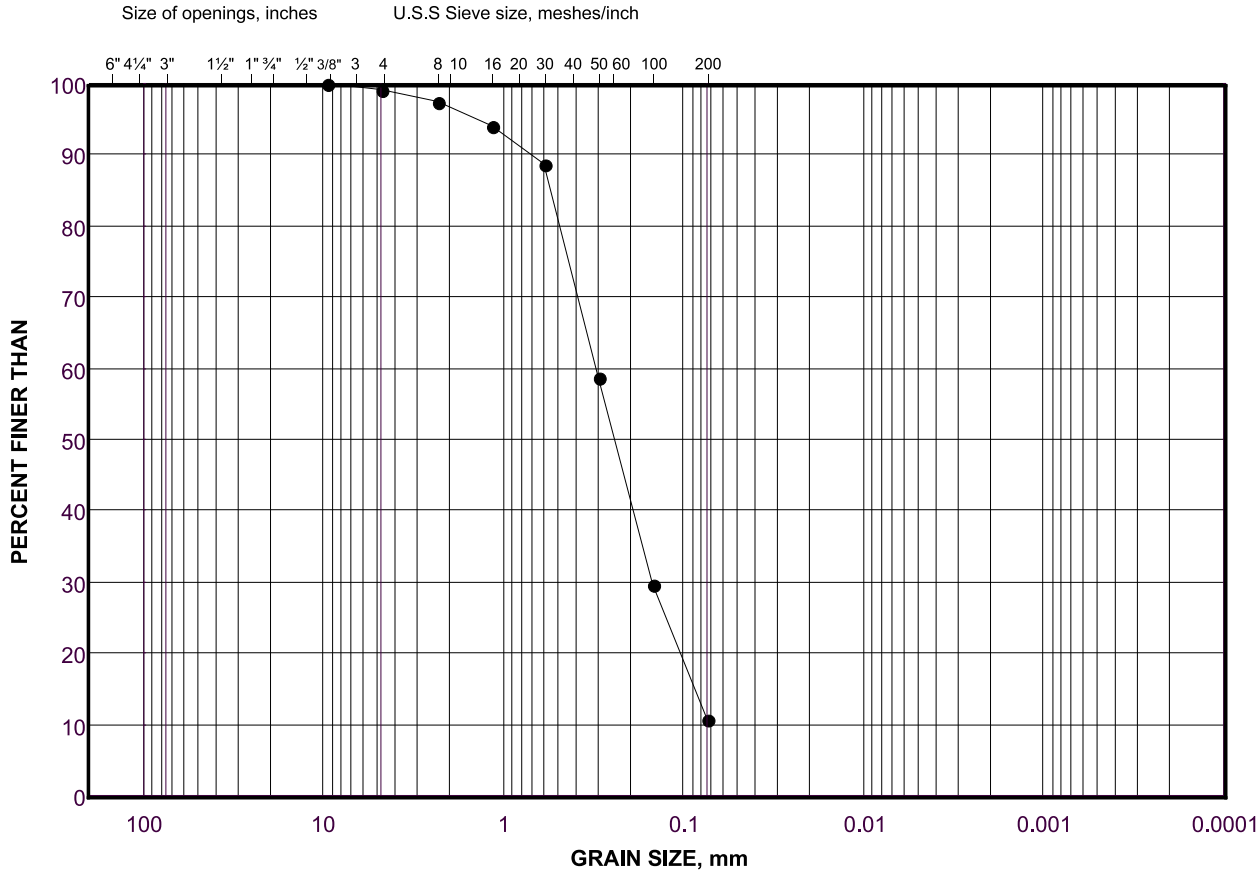
Golder Associates

Date: 06-Dec-18

GRAIN SIZE DISTRIBUTION

MTO LS-602

FIGURE 3B



LEGEND

SYMBOL	BOREHOLE	SAMPLE	DEPTH(ft)
●	MW18-06	3B	12.0 - 15.0

Fineness Modulus: 1.32

Project Number: 1791470

Checked By: [redacted]

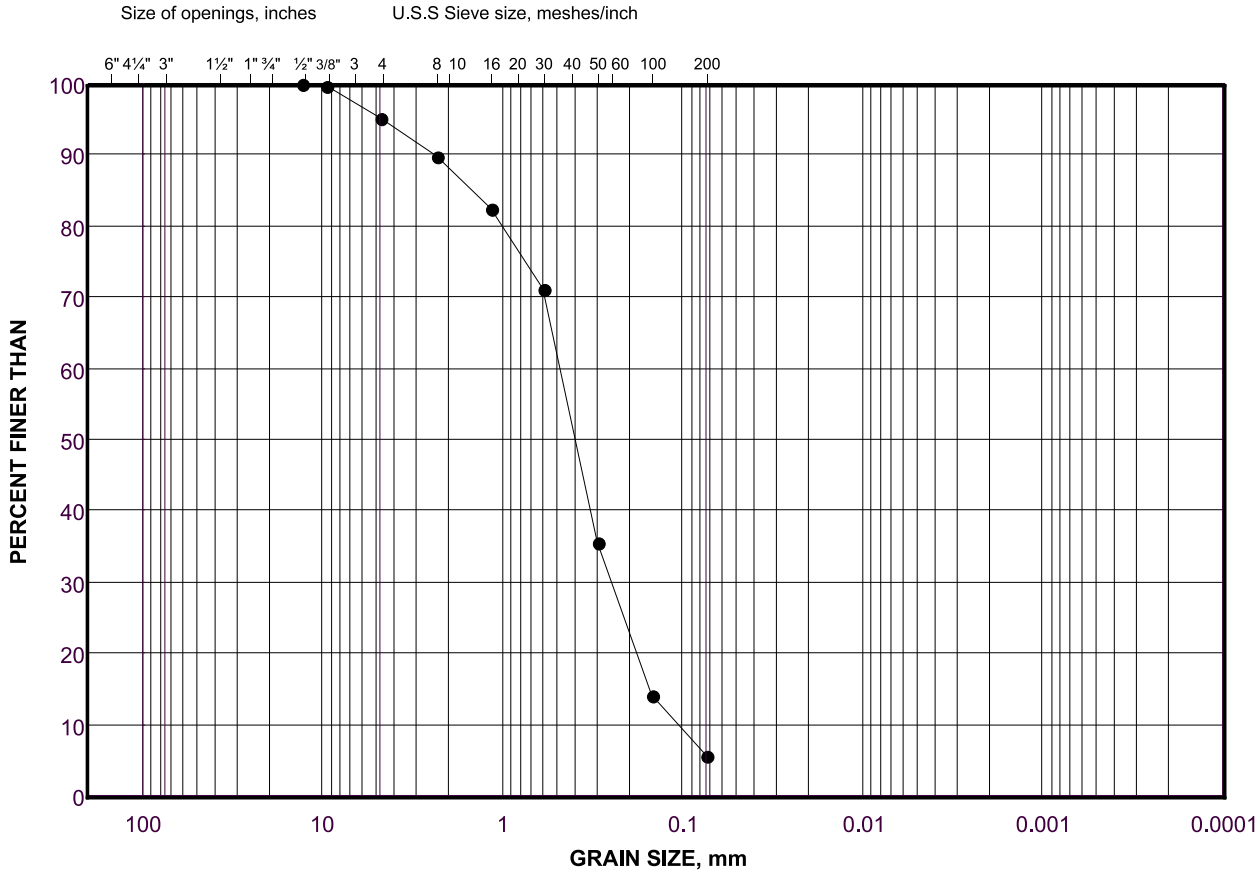
Golder Associates

Date: 06-Dec-18

GRAIN SIZE DISTRIBUTION

MTO LS-602

FIGURE 4



LEGEND

SYMBOL	BOREHOLE	SAMPLE	DEPTH(ft)
●	MW18-06	4	15.0 - 18.0

Fineness Modulus: 2.14

Project Number: 1791470

Checked By: [redacted]

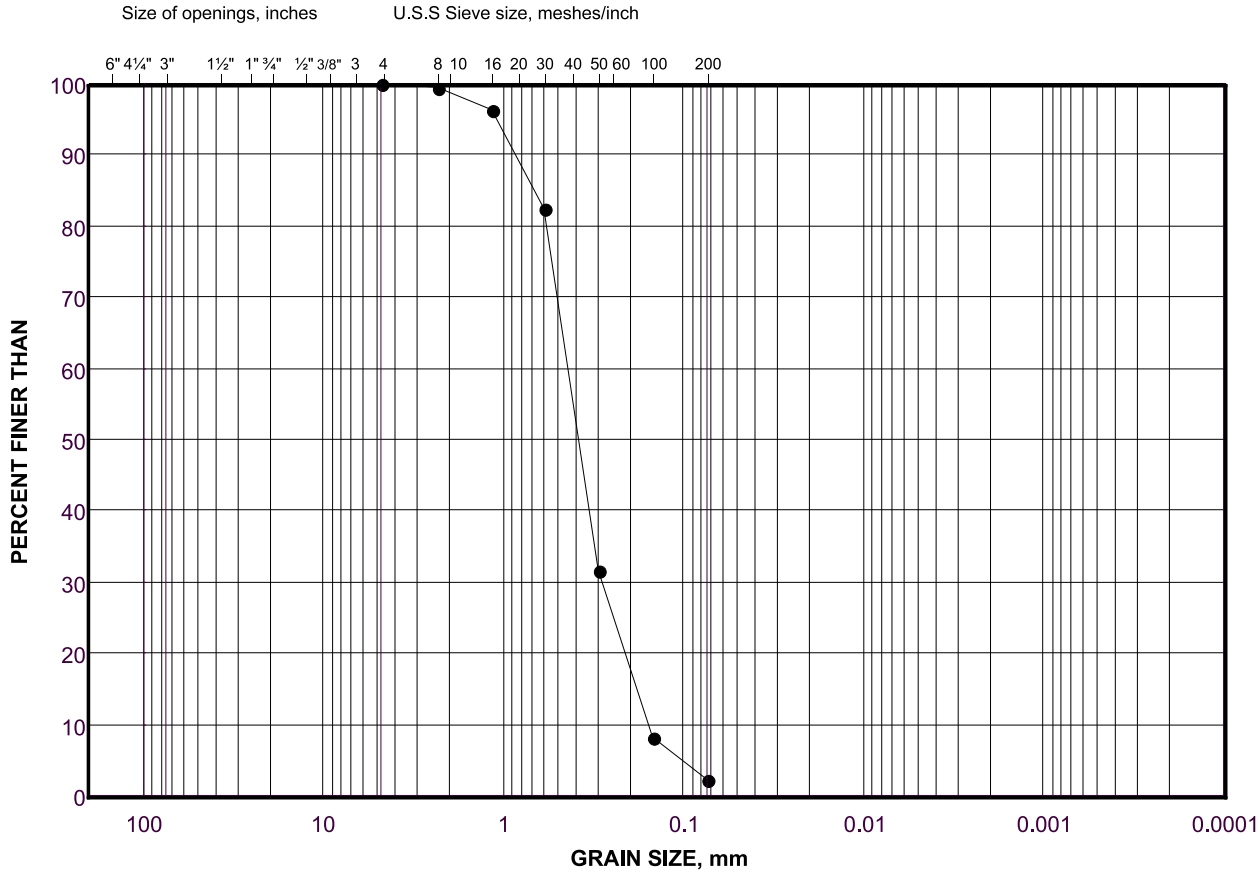
Golder Associates

Date: 06-Dec-18

GRAIN SIZE DISTRIBUTION

MTO LS-602

FIGURE 5



LEGEND

SYMBOL	BOREHOLE	SAMPLE	DEPTH(ft)
●	MW18-06	5	18.0 - 22.0

Fineness Modulus: 1.82

Project Number: 1791470

Checked By: [redacted]

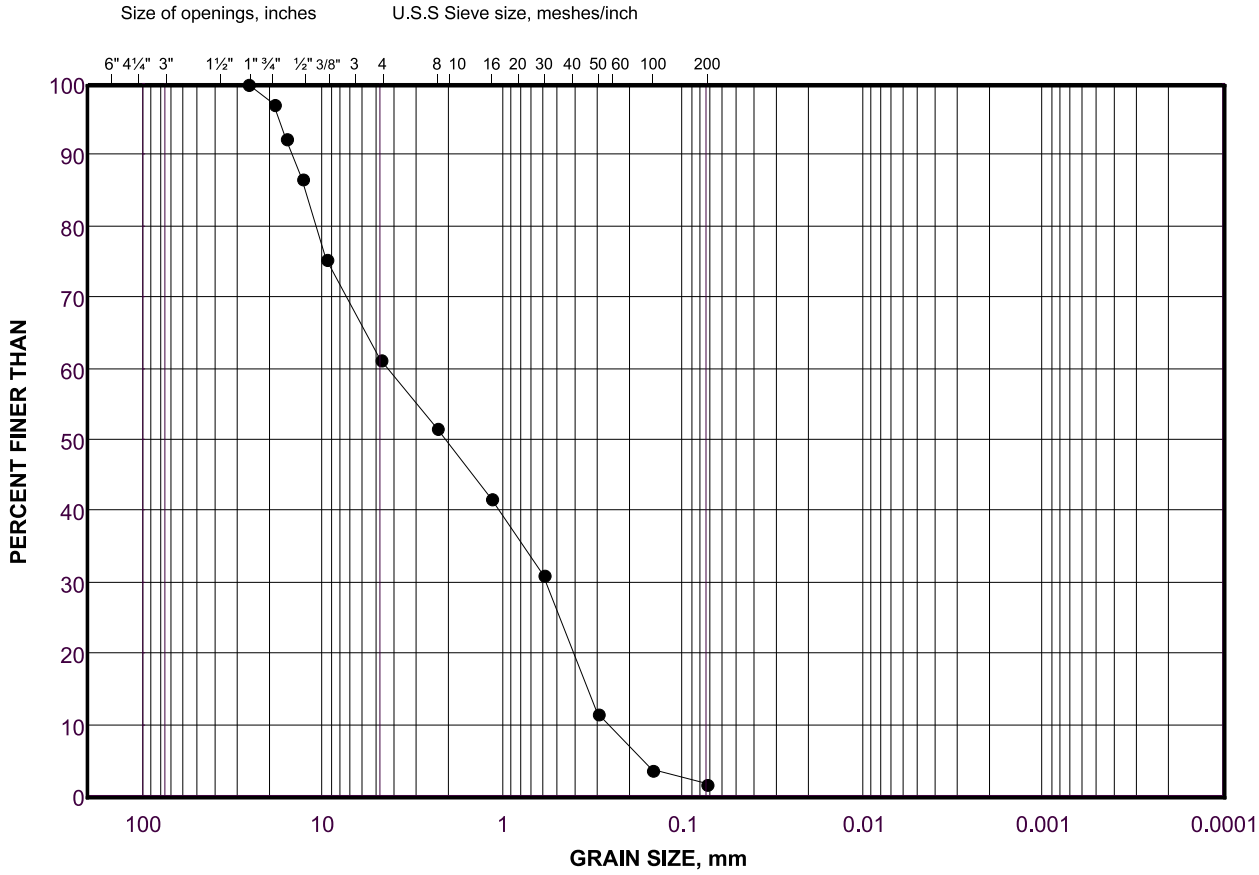
Golder Associates

Date: 06-Dec-18

GRAIN SIZE DISTRIBUTION

MTO LS-602

FIGURE 6



LEGEND

SYMBOL	BOREHOLE	SAMPLE	DEPTH(ft)
●	MW18-06	6	22.0 - 30.0

Fineness Modulus: 4.48

Project Number: 1791470

Checked By: [redacted]

Golder Associates

Date: 06-Dec-18

APPENDIX D

Aggregate Quality

AME
Materials Engineering

10 Perdue Court, Units 2&3
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Tel: 905.840.5914
Fax: 905.840.7859
email: ame@amecorp.ca

Mr. Kirby Cuellar
CBM Aggregates, Quality Manager
7512 Concession #2
RR#2
Cambridge, Ontario
N3C 2V4
email: kirby.cuellar@vcimentos.com

January 23, 2023

AME Project No.: 30864.001

Re: Concrete Aggregate Results for CBM Aggregates
19.0mm Concrete Stone, Aberfoyle Pit
Lab No.: MG-38401

Further to the receipt of one (1) aggregate sample in our Laboratory, testing has been completed as requested for the following physical properties:

Test Standard	Description
LS-601	Wash Pass 75µm
LS-602	Sieve Analysis of Aggregates
LS-604	Specific Gravity and Absorption of Coarse Aggregate
LS-607	Percent Crushed Particles, 1 Face
LS-608	Percent Flat and Elongated Particles
LS-609	Petrographic Analysis of Coarse Aggregate
LS-614	Freezing & Thawing of Coarse Aggregate
LS-618	Micro Deval Abrasion of Coarse Aggregate
LS-620	Accelerated Detection of Potentially Deleterious Alkali-Silica Reactive Aggregate by Expansion of Mortar Bars
N/A	Determination of Total Carbon and Total Sulphur Content of Aggregate by Infrared Absorption

The aggregate was tested in accordance with the applicable standards outlined in the “MTO Laboratory Testing Manual”. Total carbon and total sulphur content were analyzed by Activation Laboratories Ltd., Ancaster, which is ISO 17025 accredited analytical laboratory. The test results and applicable specification are presented in the following Table 1.

Table 1
Result Summary 19.0mm Concrete Stone, Aberfoyle Pit

Sample Number	Description / Test Method	Test Result	Specifications for Concrete Aggregate
MG-38401	Wash Pass 75µm / LS-601	0.8% Loss	Max 1.0% Loss Pavement, Structures, Sidewalks, Curb & Gutter and Base
	Sieve Analysis / LS-602	See Attached	Meets Spec.
	Specific Gravity / LS-604	Bulk 2.670 SSD 2.711 Apparent 2.784 (Control 2.685)	N/A
	Absorption / LS-604	1.53% (Control 0.42%)	Max 2.0% Pavement, Structures, Sidewalks, Curb & Gutter and Base
	% Crushed / LS-607	84.8%	N/A
	Percent Flat and Elongated / LS-608	2.1%	Max 20% Pavement, Structures, Sidewalks, Curb & Gutter and Base
	Petrographic Number / LS-609	110	Max 125 Pavement Max 140 Structures, Sidewalks, Curb & Gutter and Base
	Micro Deval Abrasion / LS-618	9.9% (Control 12.8%)	Max 14% Loss
	Freeze-Thaw / LS-614	2.0% (Control 11.2%)	Max 6%
	Expansion of Mortar Bars / LS-620	0.044% (Control 0.361%)	Max. 0.150% Pavement, Structures, Sidewalks, Curb & Gutter and Base
	Total Sulphur Content	0.02%	Max. 1%
	Total Carbon Content	11.2%	N/A

Specifications source: OPSS 1002, “Aggregates for Concrete”, April 2018

Copies of the laboratory certifications for sieve analysis, petrographic analysis and mortar bar analysis are attached to this letter.

We trust this report contains the information you require. If you have any questions, please do not hesitate to contact this office.

Yours truly,

AME – Materials Engineering

[redacted]

Mahendra Sukhandan
Laboratory Supervisor

[redacted]

Jessica Yao, P.Eng.
Laboratory Manager

AME
Materials Engineering

10 Perdue Court, Units 2 & 3,
Caledon, ON L7C 3M6
Tel: (905) 840-5914 Fax: (905) 840-7859

Concrete Aggregate Analysis Report

Client:	CBM Aggregates	Contract:	N/A	Report Date:	01-20-23
Project Name:	Laboratory Testing	Job Number:	30864.001	Date Sampled:	12-09-22
Material Type:	19.0 mm Struct.	Sample Number:	MG-38401	Date Tested:	12-21-22
Source:	Aberfoyle Pit	Product Code:	N/A	Tested By:	PV
Location:	N/A	Lot/Sublot:	N/A	Reviewed By:	MS

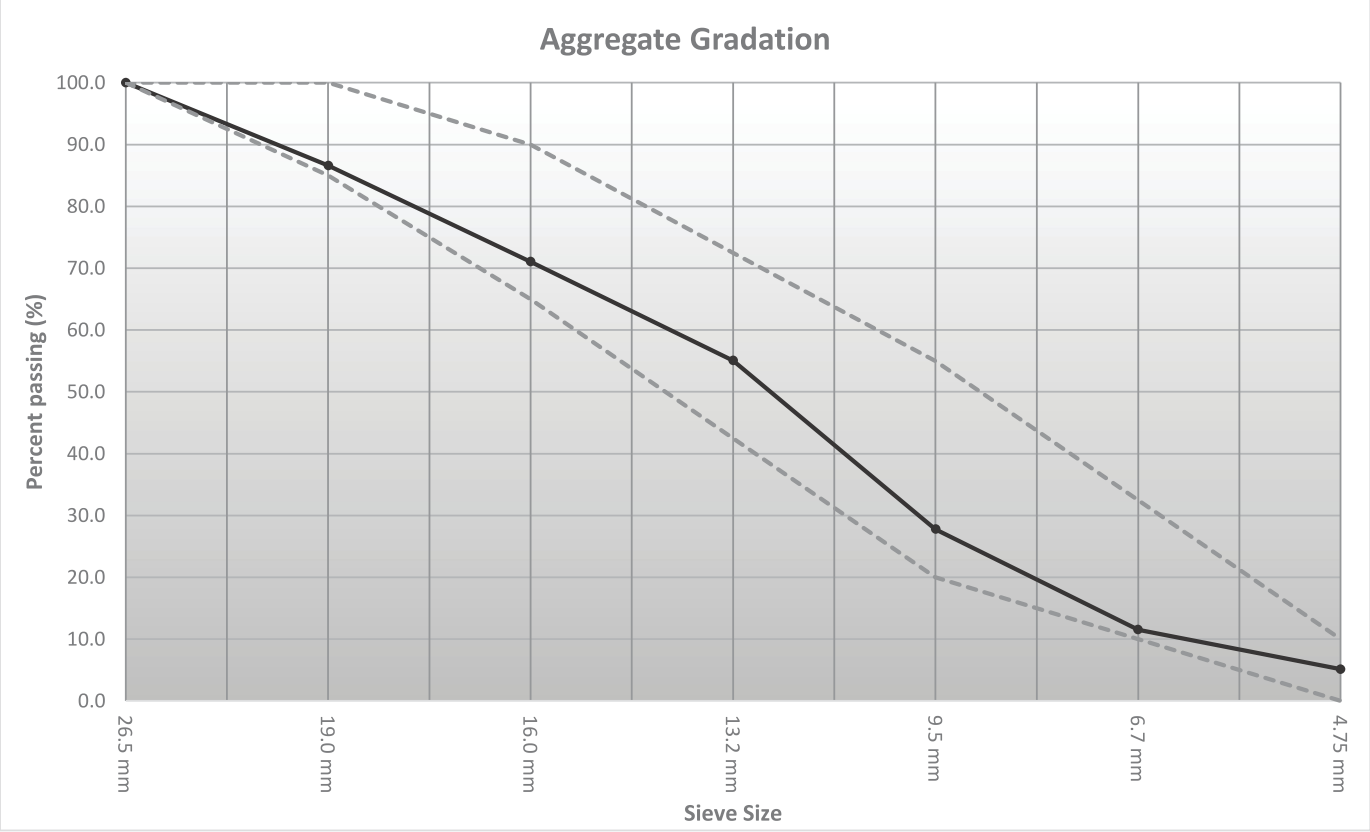
Aggregate Gradation: (LS-602)

Sieve Size	% Passing	Spec.
26.5 mm	100.0	100.0
19.0 mm	86.6	85 - 100
16.0 mm	71.1	65 - 90
13.2 mm	55.1	
9.5 mm	27.8	20 - 55
6.7 mm	11.5	
4.75 mm	5.1	0 - 10

Physical Properties:

Laboratory Tests	Result	Spec.
LS-601 - Wash Pass 75 µm	0.8	1% Max.
LS-604 - Relative Density (C/A)	2.670	N/A
LS-604 - Absorption (C/A)	1.53	2% Max.
LS-607 - % Crushed Particles	84.8	N/A
LS-608 - Flat & Elongated Particles 4:1	2.1	20% Max.
LS-609 - Petrographic Number (Coarse)	110	125 Max.
LS-614 - Freezing & Thawing	2.0	6% Max.
LS-618 - Micro Deval Abrasion (Coarse) % Loss	9.9	14% Max.
LS-620 - Accelerated Mortar Bars	0.044	0.15% Max.
Total Sulphur	0.02	1% Max.
Total Carbon	11.2	N/A

**Specification Source: OPSS.PROV 1002*



**More information available upon request*

AME – MATERIALS TESTING AND ENGINEERING SPECIALISTS
10 Perdue Court, Units 2 & 3, Caledon, ON, L7C 3M6, Tel: 905 840 5914, Fax: 905 840 7859

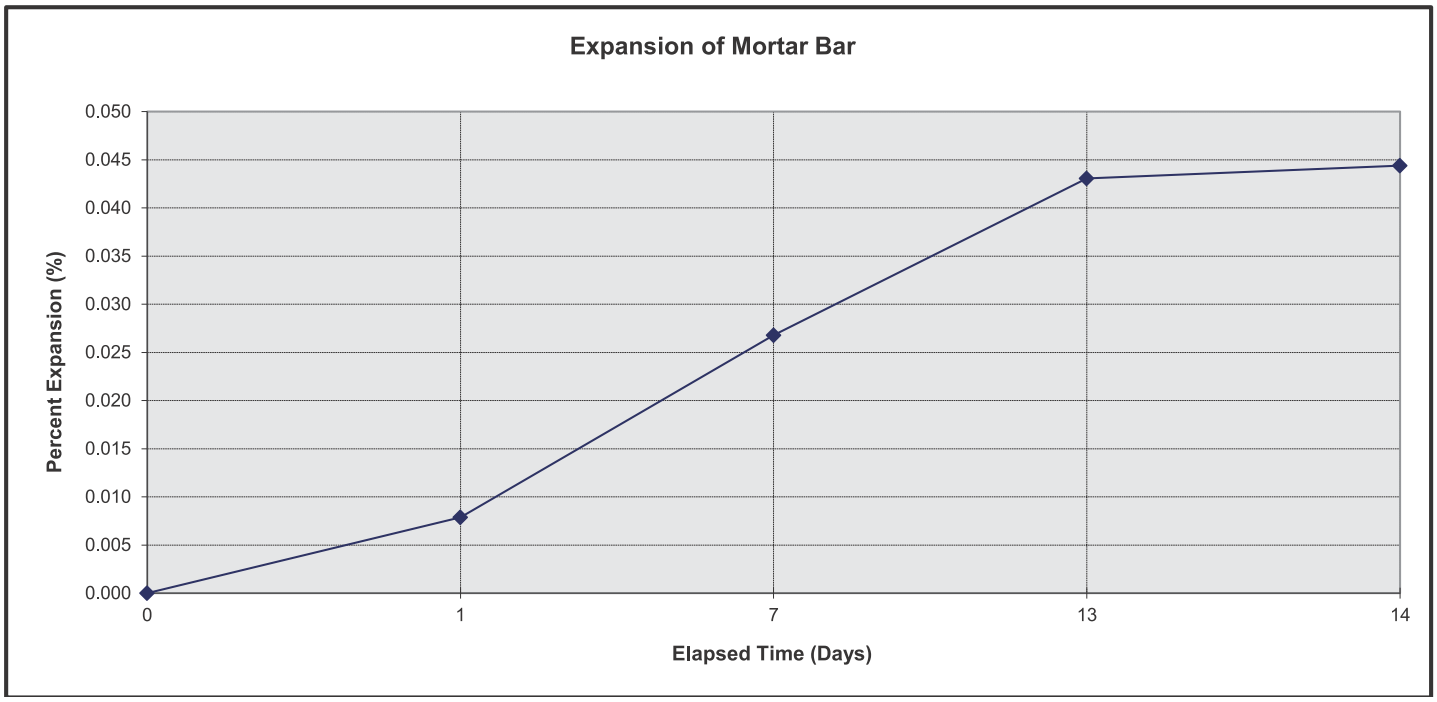
MORTAR BAR EXPANSION TEST

◉ LS-620
○ CSA-A23.2-25A

Job No.: 30864.001 **Lab No.:** MG-38401 **Cement Type:** Ash Grove Type GU
Client: CBM Aggregates **Material:** 19mm Concrete Stone **Cement Alkali Content:** 0.9370
Job Name: Laboratory Testing **Source:** Aberfoyle Pit **Water/Cement Ratio:** 0.50

Date Cast : 21-Dec-22
Bar Length: 295.021 mm **Gauge Length:** 253.767 mm **Stud Length:** 20.627 mm

Date	Elapsed Time (Days)	Measurement - Length of Mortar Bar Test Specimen (mm)			Expansion - Length Change of Mortar Bar Test Specimen (mm)			Percent Expansion			Average Expansion
	MBar ID>	A	B	C	A	B	C	A	B	C	%
22-Dec-22	Initial	1.414	1.582	1.132	0.000	0.000	0.000	0.0000	0.0000	0.0000	**0.000**
23-Dec-22	0	1.612	1.780	1.302	0.000	0.000	0.000	0.0000	0.0000	0.0000	**0.000**
24-Dec-22	1	1.628	1.802	1.324	0.016	0.022	0.022	0.0063	0.0087	0.0087	**0.008**
30-Dec-22	7	1.680	1.848	1.370	0.068	0.068	0.068	0.0268	0.0268	0.0268	**0.027**
05-Jan-23	13	1.724	1.886	1.412	0.112	0.106	0.110	0.0441	0.0418	0.0433	**0.043**
06-Jan-23	14	1.728	1.892	1.412	0.116	0.112	0.110	0.0457	0.0441	0.0433	**0.044**



AME Materials Engineering

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COARSE AGGREGATE PETROGRAPHIC ANALYSIS (PETROGRAPHIC NUMBER, PN)

(●) LS-609
( ) CSA A23.2-15A

Sample No.:	MG-38401	Project No.:	30864.001	Date Sampled:	12-9-2022
Material Type:	19.0 mm Struct.	Client:	CBM Aggregates	Date Tested:	1-10-2023
Sample Source:	Aberfoyle Pit	Analyst:	Jessica Yao	Product Code:	

TYPE	TYPE No.	/R19		P19.0/R13.2		P13.2/R9.5		P9.5/R4.75		Weighted Composition (%)
		Mass (g)	% of Fraction	Mass (g)	% of Fraction	Mass (g)	% of Fraction	Mass (g)	% of Fraction	
CARBONATE (hard; silty, hard)	1	1410.6	87.1	1337.2	85.5	446.8	85.3	167.5	78.9	84.1
CARBONATE (surface weathered; silt, surface weathered; medium hard; silty, medium hard)	20	58.0	3.6	111.0	7.1	34.7	6.6	16.6	7.8	6.6
CARBONATE (sandy, hard or medium hard)	2	34.0	2.1	18.4	1.2	4.3	0.8	6.1	2.9	1.6
CARBONATE (slightly cherty: <5%chert)	21									
MARBLE (hard or medium hard)	23									
CONGLOMERATE-SANDSTONE-ARKOSE (hard)	3					3.2	0.6			0.2
CONGLOMERATE-SANDSTONE-ARKOSE (medium hard)	22									
GREYWACKE-ARGILLITE (hard or medium hard)	6									
GNEISS-AMPHIBOLITE -SCHIST (hard)	4	73.3	4.5	46.8	3.0	7.9	1.5	7.3	3.4	2.9
QUARTZITE	5	11.3	0.7							0.1
GRANITE-DIORITE-GABBRO (hard)	8			10.1	0.6	6.9	1.3	4.7	2.2	1.1
VOLCANIC (hard)	7									
TRAP (<20% sulphide)	9									
QUARTZ (vein or pegmatitic)	10									
GYPSITE (<10% gypsum)	77									
TOTAL GOOD AGGREGATE	-	1587.2	98.0	1523.5	97.4	503.8	96.2	202.2	95.3	96.6
CARBONATE (soft; silty, soft; slightly shaley)	35	13.1	0.8	21.3	1.4	12.3	2.3	8.7	4.1	2.2
CARBONATE (soft, pitted)	41									
CARBONATE (deeply weathered; silty, deeply weathered)	42									
CARBONATE (sandy, soft)	40									
MARBLE (brittle)	24									
CHERT-CHERTY CARBONATE (<20% leached chert)	26	18.5	1.1	16.1	1.0					0.5
CONGLOMERATE-SANDSTONE-ARKOSE (brittle)	30									
GREYWACKE (brittle)	29									
ENCRUSTATION	52			3.8	0.2	5.9	1.1			0.4
GNEISS-AMPHIBOLITE-SCHIST (brittle)	25									
ARGILLITE (medium soft)	34									
GRANITE-DIORITE-GABBRO (brittle)	27									
VOLCANIC (soft)	28									
TOTAL FAIR AGGREGATE	-	31.6	2.0	41.2	2.6	18.2	3.5	8.7	4.1	3.1
CARBONATE (shaley; clayey; silty, clayey)	43								1.4	
CARBONATE (ochreous; sandy, ochreous)	44									
MARBLE (friable)	49									
CHERT-CHERTY CARBONATE (>20% leached chert)	45									
CONGLOMERATE-SANDSTONE-ARKOSE (friable)	46									
SILTSTONE	56									
CEMENTATION (partial)	53					1.8	0.3	0.9	0.4	0.2
CEMENTATION (total)	54									
GNEISS-AMPHIBOLITE (friable)	50									
SCHIST (soft)	55									
GRANITE-DIORITE-GABBRO (friable)	51									
VOLCANIC (very soft, porous)	48									
GYPSITE (gypsum 10 to 49%)	78									
TOTAL POOR AGGREGATE	-					1.8	0.3	0.9	1.8	0.2
OCHRE	60									
SHALE	61									
CLAY	62							0.4	0.2	0.0
VOLCANIC-GNEISS-SCHIST (decomposed)	63									
TOTAL DELETERIOUS AGGREGATE	-							0.4	0.2	0.0
CONTAMINANTS (Not included in PN)										
TOTALS (with contaminants)		1618.8	100.0	1564.7	100.0	523.8	100.0	212.2	101.4	100.0
Estimate % Crushed	% GOOD	× 1 =	98.0	× 1 =	97.4	× 1 =	96.2	× 1 =	95.3	**Weighted Average PN**
Additional Information Below	% FAIR	× 3 =	5.9	× 3 =	7.9	× 3 =	10.4	× 3 =	12.3	
	% POOR	× 6 =		× 6 =		× 6 =	2.1	× 6 =	10.9	
	% DELETERIOUS	× 10 =		× 10 =		× 10 =		× 10 =	1.9	
HOT MIX, CONCRETE & SURFACE TREATMENT PN =		104		105		109		120		**110**

Fill in the Cumulative %'s Retained on Each Sieve in the Retained 4.75 mm Portion of the As-Received Sample (i.e. from LS-602)

P75.0 / R53.0	P53.0 / R37.5	P37.5 / R26.5	P26.5 / R19.0	P19.0 / R13.2	P13.2 / R9.5	P9.5 / R4.75
			14.1	47.4	76.1	100.0

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Mr. Kirby Cuellar
CBM Aggregates, Quality Manager
7512 Concession #2
RR#2
Cambridge, Ontario
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email: kirby.cuellar@vcimentos.com

January 23, 2023

AME Project No.: 30864.001

Re: Concrete Aggregate Results for CBM Aggregates
6.7mm Round, Aberfoyle Pit
Lab No.: MG-38402

Further to the receipt of one (1) aggregate sample in our Laboratory, testing has been completed as requested for the following physical properties:

Test Standard	Description
LS-601	Wash Pass 75µm
LS-602	Sieve Analysis of Aggregates
LS-604	Specific Gravity and Absorption of Coarse Aggregate
LS-607	Percent Crushed Particles, 1 Face
LS-608	Percent Flat and Elongated Particles
LS-614	Freezing & Thawing of Coarse Aggregate
LS-618	Micro Deval Abrasion of Coarse Aggregate

The aggregate was tested in accordance with the applicable standards outlined in the “MTO Laboratory Testing Manual”. The test results and applicable specification are presented in the following Table 1.

Table 1
Result Summary 6.7mm Round, Aberfoyle Pit

Sample Number	Description / Test Method	Test Result	Specifications for Concrete Coarse Aggregate
MG-38402	Wash Pass 75µm / LS-601	0.9% Loss	Max 1.0% Loss Pavement, Structures, Sidewalks, Curb & Gutter and Base
	Sieve Analysis / LS-602	See Attached	N/A
	Specific Gravity / LS-604	Bulk 2.651 SSD 2.692 Apparent 2.765 (Control 2.685)	N/A
	Absorption / LS-604	1.55% (Control 0.42%)	Max 2.0% Pavement, Structures, Sidewalks, Curb & Gutter and Base
	% Crushed / LS-607	85.6%	N/A
	Percent Flat and Elongated / LS-608	0.5%	Max 20% Pavement, Structures, Sidewalks, Curb & Gutter and Base
	Freeze/Thaw / LS-614	5.2% (Control 11.2%)	Max 6%
	Micro Deval Abrasion / LS-618	11.5% (Control 12.8%)	Max 14% Loss Pavement Max 17% Loss Structures, Sidewalks, Curb & Gutter and Base

Specifications source: OPSS 1002, “Aggregates for Concrete”, April 2018

A copy of the laboratory certification for sieve analysis is attached to this letter.

We trust this report contains the information you require. If you have any questions, please do not hesitate to contact this office.

Yours truly,

AME – Materials Engineering

[redacted]
Mahendra Sukhandan
Laboratory Supervisor

[redacted]
Jessica Yao, P.Eng.
Laboratory Manager

AME Materials Engineering

10 Perdue Court, Units 2 & 3,
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Concrete Aggregate Analysis Report

Client:	CBM Aggregates	Contract:	N/A	Report Date:	01-18-23
Project Name:	Laboratory Testing	Job Number:	30864.001	Date Sampled:	12-08-22
Material Type:	6.7 mm Stone	Sample Number:	MG-38402	Date Tested:	01-03-23
Source:	CBM - Aberfoyle Pit	Product Code:	N/A	Tested By:	SH
Location:	CBM - Aberfoyle Pit	Lot/Sublot:	N/A	Reviewed By:	MS

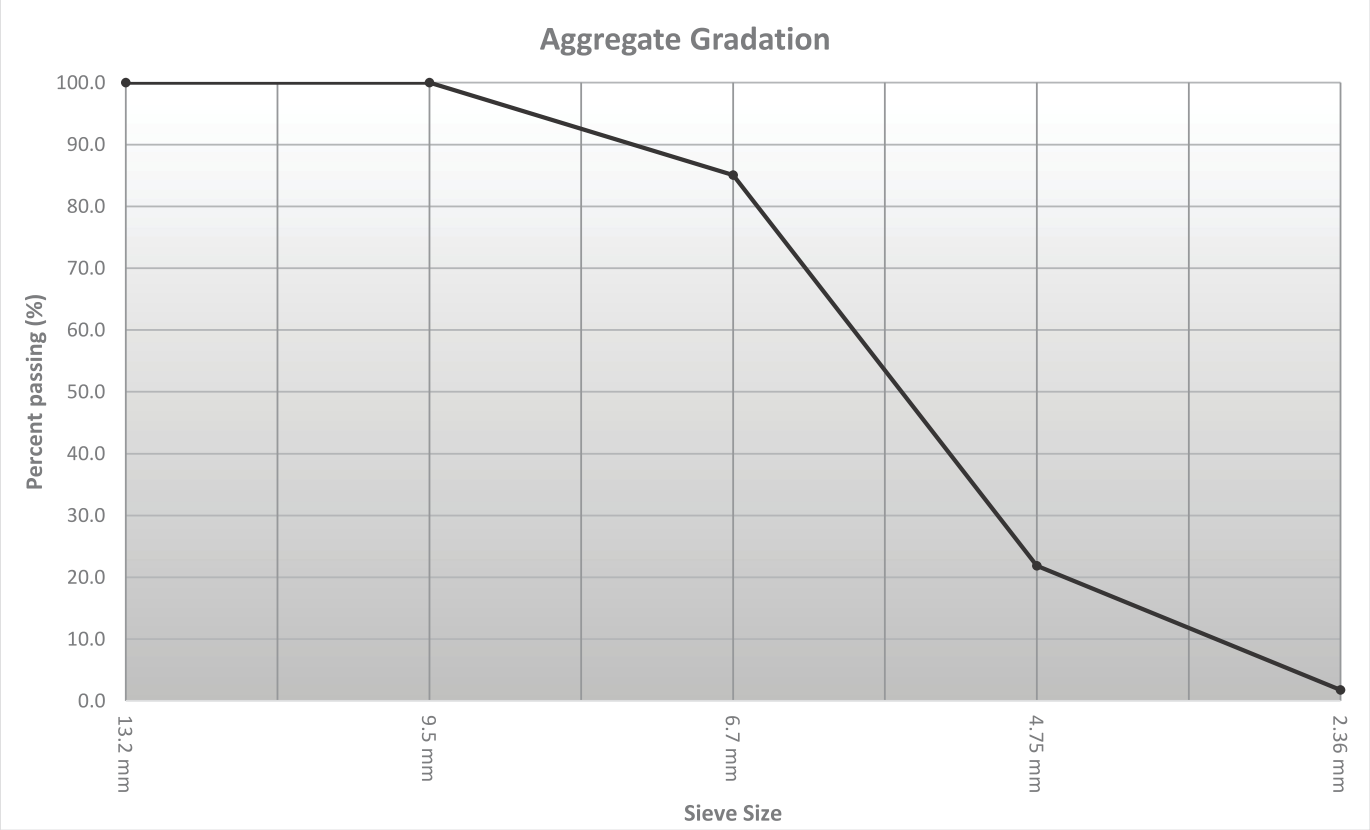
Aggregate Gradation: (LS-602)

Sieve Size	% Passing	Spec.
13.2 mm	100.0	100.0
9.5 mm	100.0	
6.7 mm	85.1	75 - 100
4.75 mm	21.9	40 - 80
2.36 mm	1.8	0 - 20

Physical Properties:

Laboratory Tests	Result	Spec.
LS-601 - Wash Pass 75 µm	0.9	1% Max.
LS-604 - Relative Density (C/A)	2.651	N/A
LS-604 - Absorption (C/A)	1.55	2% Max.
LS-607 - % Crushed Particles	85.6	N/A
LS-608 - Flat & Elongated Particles 4:1	0.5	20% Max.
LS-614 - Freezing & Thawing	5.2	6% Max.
LS-618 - Micro Deval Abrasion (Coarse) % Loss	11.5	17% Max.

Specification Source: OPSS.PROV 1002



More information available upon request

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Mr. Kirby Cuellar
CBM Aggregates, Quality Manager
7512 Concession #2
RR#2
Cambridge, Ontario
N3C 2V4
email: kirby.cuellar@vcimentos.com

January 23, 2023

AME Project No.: 30864.001

Re: Concrete Aggregate Results for CBM Aggregates
Concrete Sand, Aberfoyle Pit
Lab No.: MG-38403

Further to the receipt of one (1) aggregate sample in our Laboratory, testing has been completed as requested for the following physical properties:

Test Standard	Description
LS-602	Sieve Analysis of Aggregates
LS-605	Specific Gravity and Absorption of Fine Aggregate
LS-610	Organic Impurities in Fine Aggregate
LS-616	Petrographic Analysis Fine Aggregate
LS-619	Micro Deval Abrasion of Fine Aggregate
LS-620	Accelerated Detection of Potentially Deleterious Alkali-Silica Reactive Aggregate by Expansion of Mortar Bars
N/A	Determination of Total Carbon and Total Sulphur Content of Aggregate by Infrared Absorption

The aggregate was tested in accordance with the applicable standards outlined in the “MTO Laboratory Testing Manual”. Total carbon and total sulphur content were tested by Activation Laboratories Ltd., Ancaster, which is ISO 17025 accredited analytical laboratory. The test results and applicable specifications are presented in the following Table 1.

Table 1
Result Summary Concrete Sand, Aberfoyle Pit

Sample Number	Description / Test Method	Test Result	Specifications for Concrete Aggregate
MG-38403	Sieve Analysis / LS-602	See Attached	Meets Spec.
	Specific Gravity / LS-605	Bulk 2.706 SSD 2.735 Apparent 2.789 (Control 2.632)	N/A
	Absorption / LS-605	1.10% (Control 1.41%)	N/A
	Organic Impurities / LS-610	Color Plate #1	Color Lighter than Organic Plate #3
	Petrographic Analysis (FA) / LS-616	See attached	N/A
	Micro Deval / LS-619	14.2% Loss (Control 13.8%)	Maximum 20.0% Loss
	Expansion of Mortar Bars / LS-620	0.058% (Control 0.361%)	Maximum 0.150% at 14 days
	Total Sulphur Content	0.04%	Max. 1%
	Total Carbon Content	10.3%	N/A

Specifications source: OPSS 1002, “Aggregates for Concrete”, April 2018

Copies of the laboratory certifications for sieve analysis, petrographic analysis and mortar bar analysis are attached to this letter.

We trust this report contains the information you require. If you have any questions, please do not hesitate to contact this office.

Yours truly,

AME – Materials Engineering

[redacted]

Mahendra Sukhandan
Laboratory Supervisor

[redacted]

Jessica Yao, P.Eng.
Laboratory Manager

AME
Materials Engineering

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Concrete Aggregate Analysis Report

Client:	CBM Aggregates	Contract:	N/A	Report Date:	01-20-23
Project Name:	Laboratory Testing	Job Number:	30864.001	Date Sampled:	12-02-22
Material Type:	Fine Aggregate	Sample Number:	MG-38403	Date Tested:	12-21-22
Source:	Aberfoyle Pit	Product Code:	N/A	Tested By:	SH
Location:	N/A	Lot/Sublot:	N/A	Reviewed By:	MS

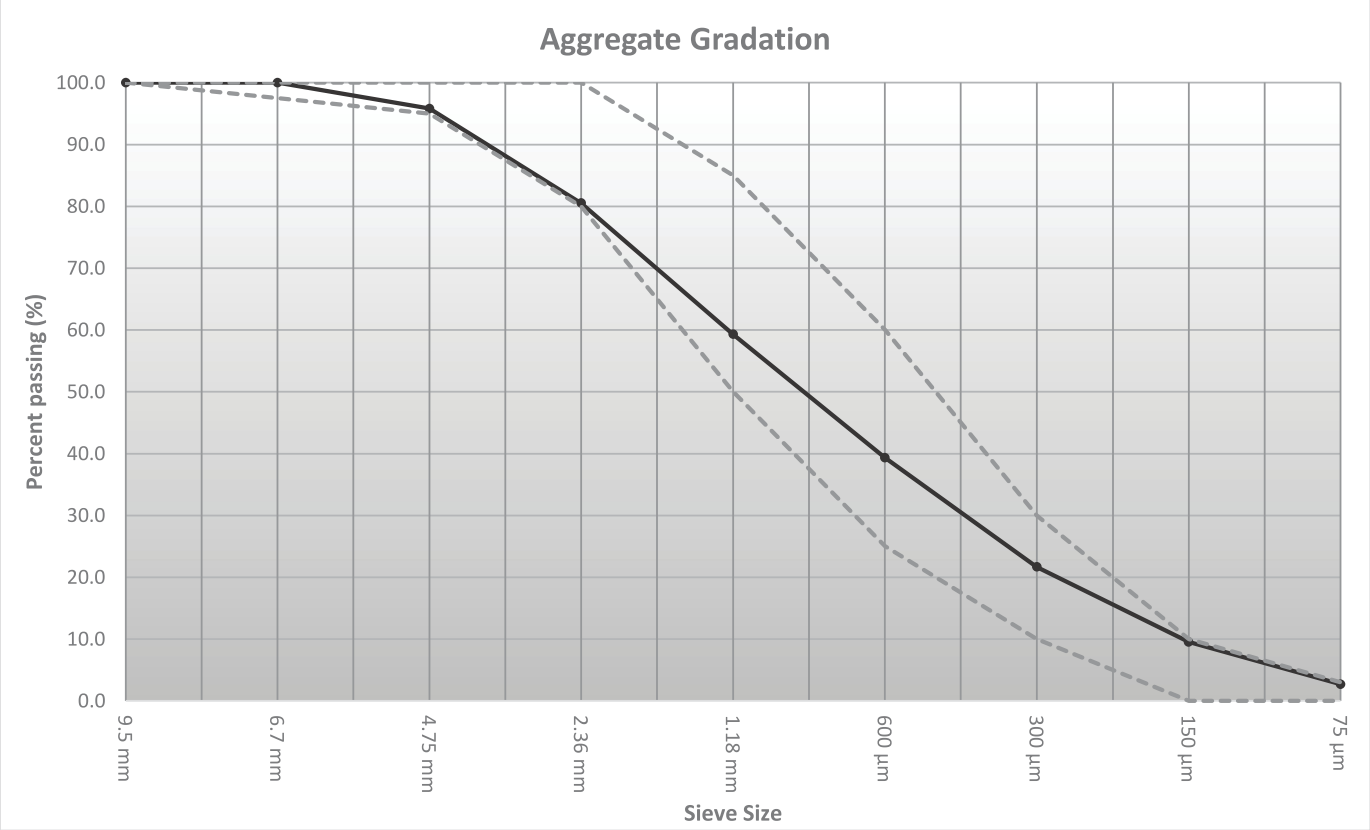
Aggregate Gradation: (LS-602)

Sieve Size	% Passing	Spec.
9.5 mm	100.0	100.0
6.7 mm	100.0	
4.75 mm	95.8	95 - 100
2.36 mm	80.5	80 - 100
1.18 mm	59.3	50 - 85
600 µm	39.4	25 - 60
300 µm	21.7	10 - 30
150 µm	9.6	0 - 10
75 µm	2.7	0 - 3

Physical Properties:

Laboratory Tests	Result	Spec.
LS-605 - Relative Density (F/A)	2.706	N/A
LS-605 - Absorption (F/A)	1.10	N/A
LS-610 - Organic Impurities	1	< 3.0
LS-616 - Petrographic Number (Fine)	Enclosed	N/A
LS-619 - Micro-Deval (Fine) % Loss	14.2	20% max.
LS-620 - Accelerated Mortar Bars	0.058	0.15% max.
Total Sulphur	0.04	1% Max.
Total Carbon	10.3	N/A

**Specification Source: OPSS.PROV 1002*



**More information available upon request*

AME – MATERIALS TESTING AND ENGINEERING SPECIALISTS
10 Perdue Court, Units 2 & 3, Caledon, ON, L7C 3M6, Tel: 905 840 5914, Fax: 905 840 7859

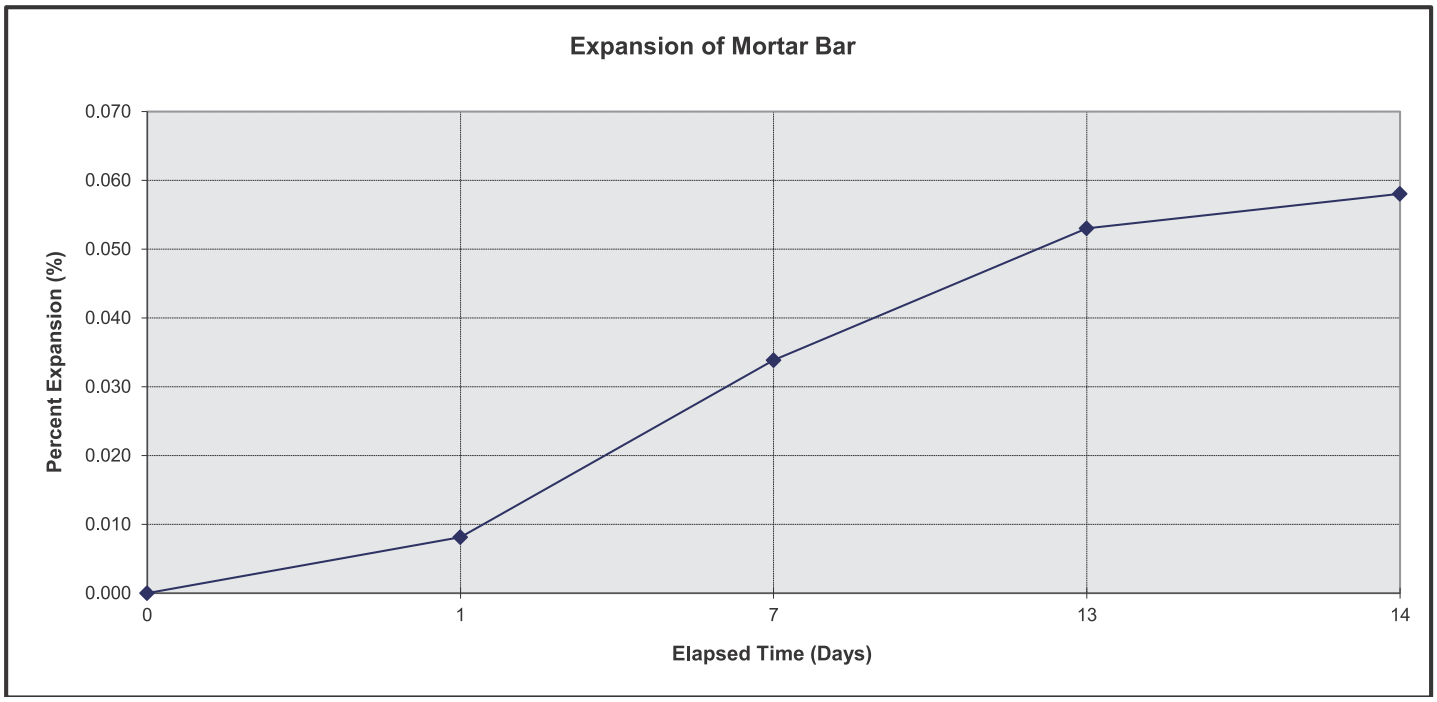
MORTAR BAR EXPANSION TEST

◉ LS-620
○ CSA-A23.2-25A

Job No.: 30864.001 **Lab No.:** MG-38403 **Cement Type:** Ash Grove Type GU
Client: CBM Aggregates **Material:** Fine Aggregate **Cement Alkali Content:** 0.9370
Job Name: Laboratory Testing **Source:** Aberfoyle Pit **Water/Cement Ratio:** 0.44

Date Cast : 21-Dec-22
Bar Length: 295.021 mm **Gauge Length:** 253.767 mm **Stud Length:** 20.627 mm

Date	Elapsed Time (Days)	Measurement - Length of Mortar Bar Test Specimen (mm)			Expansion - Length Change of Mortar Bar Test Specimen (mm)			Percent Expansion			Average Expansion
	MBar ID>	A	B	C	A	B	C	A	B	C	%
22-Dec-22	Initial	1.910	1.968	-0.416	0.000	0.000	0.000	0.0000	0.0000	0.0000	**0.000**
23-Dec-22	0	2.104	2.146	-0.238	0.000	0.000	0.000	0.0000	0.0000	0.0000	**0.000**
24-Dec-22	1	2.126	2.168	-0.220	0.022	0.022	0.018	0.0087	0.0087	0.0071	**0.008**
30-Dec-22	7	2.188	2.230	-0.148	0.084	0.084	0.090	0.0331	0.0331	0.0355	**0.034**
05-Jan-23	13	2.240	2.282	-0.106	0.136	0.136	0.132	0.0536	0.0536	0.0520	**0.053**
06-Jan-23	14	2.254	2.290	-0.090	0.150	0.144	0.148	0.0591	0.0567	0.0583	**0.058**



AME - Materials Engineering
10 Perdue Court, Units # 2 3, Caledon, Ontario, L7C 3M6
Tel: (905) 840-5914 Fax: (905) 840-7859

FINE AGGREGATE PETROGRAPHIC ANALYSIS
MTO LS-616

JOB NO. 30864.001 CLIENT: CBM Aggregates DATE: 17-01-2023

SAMPLE NO.: MG-38403 PROJECT/LOCATION: Laboratory Testing ANALYST: R. Ji

SAMPLE DESCRIPTION: Concrete Sand SAMPLE SOURCE: Aberfoyle Pit PRODUCT CODE: N/A

	SIEVE SIZE, mm												
	4.75 - 2.36		2.36 - 1.18		1.18 - 0.600		0.600 - 0.300		0.300 - 0.150		0.150 - 0.075		WEIGHTED AVERAGE
	#	%	#	%	#	%	#	%	#	%	#	%	
SILICATE ROCKS AND MINERALS (e.g. granite, gabbro, gneiss, quartz, feldspar, amphibole, quartzite)	6	3.0	10	5.0	17	8.5	43	21.5	80	40.0	80	40.0	16.4
CARBONATE ROCKS AND MINERALS (e.g. limestone, dolostone, calcite, dolomite)	192	96.0	190	95.0	183	91.5	156	78.0	120	60.0	120	60.0	83.4
SHALE, ARGILLITE, CLAY, OCHRE	2	1.0											0.2
MICACEOUS MINERALS (e.g. biotite, muscovite, chlorite)							1	0.5					0.1
CHERT (Leached and Unleached), FLINT, JASPER													
CEMENTED PARTICLES													
SULPHATE ROCKS AND MINERALS (e.g. gypsite, gypsum, anhydrite)													
SULPHATE ROCKS AND MINERALS (e.g. pyrite, pyrrhotite, chalcopyrite)													
OXIDE MINERALS (e.g. magnetite, ilmenite, hematite, chromite)													
CONTAMINATION (e.g. Glass, Slag, Coal, crushed concrete)													
OTHER (please list, describe)													
TOTAL	200	100.0	200	100.0	200	100.0	200	100.0	200	100.0	200	100.0	100.0
GRADATION, PERCENT RETAINED ON INDIVIDUAL SIEVE	16.0		22.1		20.8		18.5		12.6		Ret. 7.1 Pass 2.8		
ESTIMATED PERCENT TOTAL CRUSHED PARTICLES	60		70		80		85		90		95		

COMMENTS:

10 Perdue Court, Units 2&3
Caledon, Ontario L7C 3M6
Tel: 905.840.5914
Fax: 905.840.7859
email: ame@amecorp.ca

Mr. Kirby Cuellar
CBM Aggregates, Quality Manager
7512 Concession #2
RR#2
Cambridge, Ontario
N3C 2V4
email: kirby.cuellar@vcimentos.com

April 25, 2023

AME Project No.: 30864.001

Re: Concrete Aggregate Results for CBM Aggregates
13.2mm Concrete Stone, Aberfoyle Pit
Lab No.: MG-38662

Further to the receipt of one (1) aggregate sample in our Laboratory, testing has been completed as requested for the following physical properties:

Test Standard	Description
LS-601	Wash Pass 75µm
LS-602	Sieve Analysis of Aggregates
LS-604	Specific Gravity and Absorption of Coarse Aggregate
LS-607	Percent Crushed Particles, 1 Face
LS-608	Percent Flat and Elongated Particles
LS-614	Freezing & Thawing of Coarse Aggregate
LS-618	Micro Deval Abrasion of Coarse Aggregate

The aggregate was tested in accordance with the applicable standards outlined in the “MTO Laboratory Testing Manual”. The test results and applicable specification are presented in the following Table 1.

Table 1
Result Summary 13.2mm Concrete Stone, Aberfoyle Pit

Sample Number	Description / Test Method	Test Result	Specifications for Concrete Aggregate
MG-38662	Wash Pass 75µm / LS-601	0.6% Loss	Max 1.0% Loss Pavement, Structures, Sidewalks, Curb & Gutter and Base
	Sieve Analysis / LS-602	See Attached	Meets Spec.
	Specific Gravity / LS-604	Bulk 2.661 SSD 2.695 Apparent 2.755 (Control 2.685)	N/A
	Absorption / LS-604	1.29% (Control 0.42%)	Max 2.0% Pavement, Structures, Sidewalks, Curb & Gutter and Base
	% Crushed / LS-607	42.1%	N/A
	Percent Flat and Elongated / LS-608	0.4%	Max 20% Pavement, Structures, Sidewalks, Curb & Gutter and Base
	Micro Deval Abrasion / LS-618	12.4% (Control 12.8%)	Max 14% Pavement, Structures, Sidewalks, Curb & Gutter and Base
	Freeze-Thaw / LS-614	5.3% (Control 11.2%)	Max 6% Pavement, Structures, Sidewalks, Curb & Gutter and Base

Specifications source: OPSS 1002, “Aggregates for Concrete”, April 2018

A copy of the laboratory certification for sieve analysis is attached to this letter.

We trust this report contains the information you require. If you have any questions, please do not hesitate to contact this office.

Yours truly,

AME – Materials Engineering

[redacted]

Mahendra Sukhandan
Laboratory Supervisor

[redacted]

Jessica Yao, P.Eng.
Laboratory Manager

AME
Materials Engineering

10 Perdue Court, Units 2 & 3,
Caledon, ON L7C 3M6
Tel: (905) 840-5914 Fax: (905) 840-7859

Concrete Aggregate Analysis Report

Client:	CBM Aggregates	Contract:	N/A	Report Date:	04-24-23
Project Name:	Laboratory Testing	Job Number:	30864.001	Date Sampled:	04-09-23
Material Type:	13.2 mm Stone	Sample Number:	MG-38662	Date Tested:	04-24-23
Source:	CBM Aberfoyle Pit	Product Code:	N/A	Tested By:	PV
Location:	CBM Aberfoyle Pit	Lot/Sublot:	N/A	Reviewed By:	MS

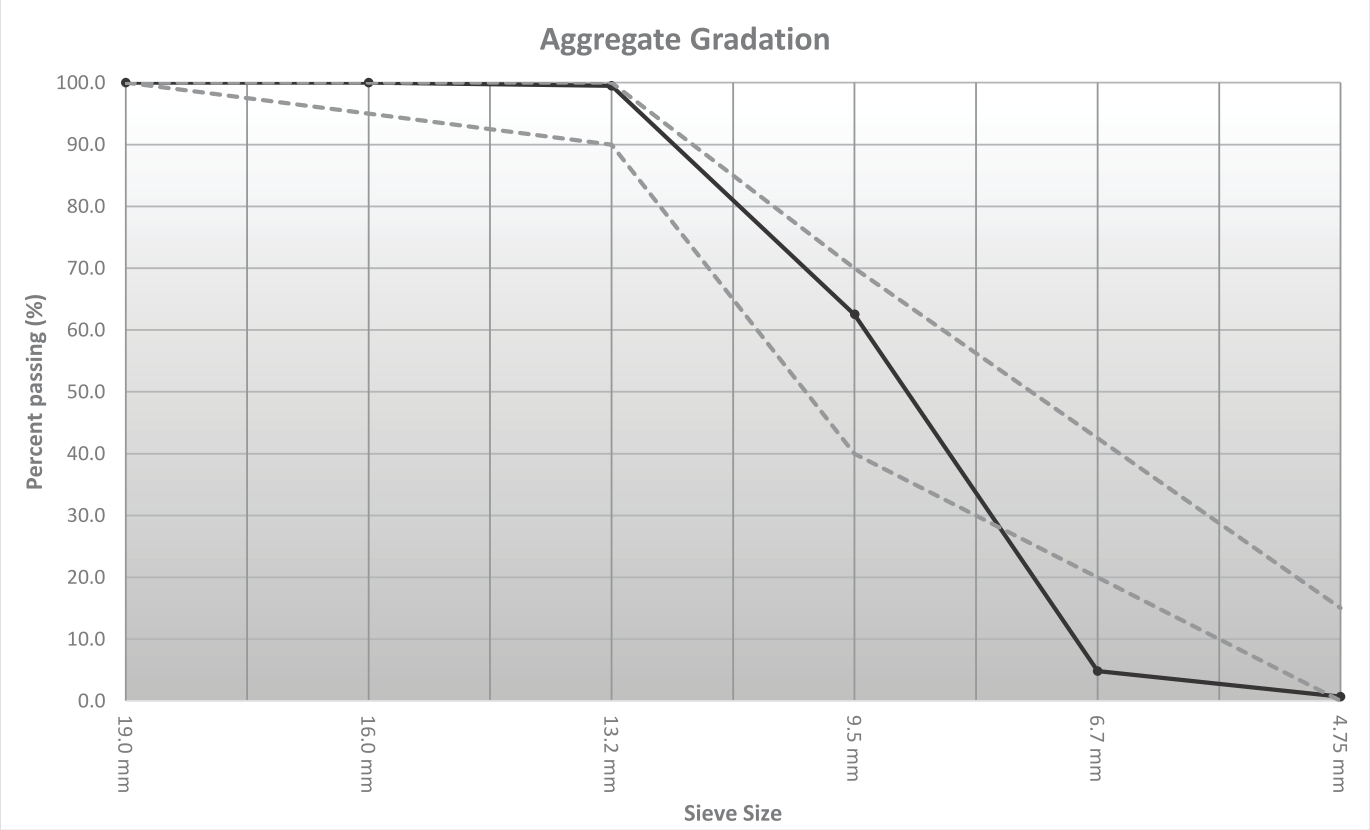
Aggregate Gradation: (LS-602)

Sieve Size	% Passing	Spec.
19.0 mm	100.0	100.0
16.0 mm	100.0	
13.2 mm	99.5	90 - 100
9.5 mm	62.5	40 - 70
6.7 mm	4.8	
4.75 mm	0.7	0 - 15

Physical Properties:

Laboratory Tests	Result	Spec.
LS-601 - Wash Pass 75 µm	0.6	1% Max.
LS-604 - Relative Density (C/A)	2.661	N/A
LS-604 - Absorption (C/A)	1.29	2% Max.
LS-607 - % Crushed Particles	42.1	N/A
LS-608 - Flat & Elongated Particles 4:1	0.4	20% Max.
LS-618 - Micro Deval Abrasion (Coarse) % Loss	12.4	14% Max.
CSA A23.2-24A - Freeze/Thaw	5.3	6% Max.

**Specification Source: OPSS.PROV 1002*



**More information available upon request*

APPENDIX E

Project Team CVs

Education

MSc. Earth Sciences, University of Waterloo, 1995

BSc. Honours Earth Sciences, Physics Minor, University of Waterloo, 1987

Professional Affiliations

Practising Member, Association of Professional Geoscientists of Ontario

Active Member, Society of Exploration Geophysicists

Member, Canadian Nuclear Society

Professional Summary

George Schneider is a Senior Geoscientist and Principal Fellow at WSP, formerly Golder Associates, with over 30 years of professional experience. George received his B.Sc. (1987) and M.Sc. (1995) in Earth Sciences from the University of Waterloo. From 1987 to 1995, he was a researcher in the Geophysics Laboratory at the Centre for Groundwater Research at the University of Waterloo and has co-authored more than 25 technical publications. George joined Golder in 1995; he became an Associate in 2002 and a Principal in 2006. George is a Professional Geoscientist registered in the Province of Ontario.

Employment History

Principal Fellow / Senior Geoscientist, WSP, formerly Golder Associates (2013 to Present)

Cambridge, Ontario

Project Manager / Director responsible for multi-disciplinary projects including nuclear waste management, explosives site remediation, mine site rehabilitation, aggregate resource studies, and groundwater supply and source water protection studies. George has been with Golder since 1995 and is currently a Principal of the Canadian Nuclear Services Group, responsible for project management, business development and client relations.

George is currently serving as a member of the Lake Erie Source Protection Committee (LESWPC) and the Waterloo-Wellington-Brant Regional Committee of the Ontario Stone Sand and Gravel Association (OSSGA).

Principal / Division Manager, Golder Associates (2006 to 2013)

Mississauga, Cambridge and Whitby, Ontario

Project director responsible for a range of multi-disciplinary projects including: environmental investigations at explosive contaminated sites and mine sites, aggregate resource studies, groundwater supply and management studies and nuclear waste management. Managed the Environmental Services Division in the GTA including: Geosciences, Geophysics, Site Characterization and Restoration, Environmental Due Diligence, Hydrogeology and Waste Management and Field Technician Groups.

Associate / Senior Project Manager, Golder Associates (2002 to 2005)

Mississauga, Ontario

Senior geoscientist responsible for the management of a diverse range of projects including: environmental investigations at explosive contaminated sites, aggregate resource studies, hydrogeological studies and geophysical investigations in support of hydrogeological studies, environmental site assessments, mine site developments, aggregate resource studies and geotechnical investigations.

Intermediate, then Senior Geoscientist, Golder Associates (1995 to 2002)

Waterloo, then Mississauga, Ontario

Responsible for project management, performing geophysical, geological and hydrogeological field investigations, numerical data analysis, data assessment, and reporting for: aggregate resource studies, groundwater resource studies, permits to take water, assessment of contaminated sites, geotechnical investigations and hydrogeologic characterization of mine tailings disposal and open pit mine sites.

Collected, processed and interpreted data for a variety of land and marine geophysical techniques including: time and frequency domain electromagnetics, magnetics, gravity, ground penetrating radar (GPR), seismic reflection and refraction, acoustic tomography, pulse velocity testing of man-made structures, cross-hole seismic testing, leak detection, vertical seismic profiling (VSP), electrical resistivity imaging (ERI), borehole camera logging and geophysical well logging including: natural gamma, gamma-gamma, neutron, temperature, deviation, inductive conductivity, magnetic, caliper, resistivity, heat-pulse flowmeter and optical televiewer.

Geophysicist, Waterloo Centre for Groundwater Research (1987 to 1995)

University of Waterloo, Waterloo, Ontario

Conducted geophysical field investigations and drilling programmes under the direction of Dr. J.P. Greenhouse and Dr. P.F. Karrow in the Waterloo Region related to the quaternary geology and the assessment of water resources in the Region including: seismic surveys, borehole geophysical surveys and two Rotasonic drilling programmes. Compiled three editions of a catalogue of geophysical logs for the Waterloo Region from 1988 to 1993. Co-authored more than 20 research papers, reports and posters, including 13 publications on the quaternary geology and/or water resources of the Waterloo Region.

Designed and constructed borehole and resistivity geophysical instruments, digital data acquisitions systems and developed innovative computer software for geophysical and hydrogeological applications. Carried out surface, borehole and laboratory geophysical investigations in support of more than 85 groundwater-related research projects including: geophysical investigations of DNAPL/LNAPL contamination, delineation of aquifers, groundwater contaminant plumes and karst features.

Other duties included: teaching assistance for University of Waterloo Earth Sciences and Geophysics courses and organization of technical conferences, short courses and field demonstrations.

PROJECT EXPERIENCE – WATER RESOURCES AND SOURCE WATER PROTECTION

Hydrogeological Assessment – Cambridge Zone 3 Class EA – Region of Waterloo (2016-2019)
Cambridge, Ontario

As a subcontractor to GM BluePlan, completed a hydrogeological assessment for the Region of Waterloo of the Cambridge Zone 3 Well Field, as part of a class EA, to examine options to increase the sustainable water supply capacity of the well field. Project Director and Senior Technical Reviewer.

Hydrogeological Assessment – Harrington McAvan (2015 – 2019)
Puslinch, Ontario

Carried out a hydrogeological and geotechnical assessment to support the re-zoning and future redevelopment of a property near Puslinch, Ontario for Farhi Holdings, including a preliminary assessment of potential water resources and septic capacity. Project Manager and Senior Technical Reviewer.

Municipal Well Construction and Testing (2015-2019)
Waterloo Region, Ontario

Project manager, contract administrator and senior technical reviewer for the construction and testing of new municipal supply wells in 2015 at K21, K4A and W6A/B and in 2016 at NH3 and Maryhill. Designed, constructed and permitted new supply wells at each of these sites in order to replace older wells with performance problems, provide system redundancy and help ensure the well fields can deliver their full permitted capacity.

Hydrogeological Assessment of Production Wells K23 and K24 (2014-2018)
Waterloo Region, Ontario

Senior technical reviewer for the hydrogeological assessment of wells K23 and K24, initiated in 2014 to better understand increasing nitrate concentrations in the wells due to nearby anthropogenic sources, primarily septic systems and agricultural fertilizers. The investigation is developing an improved understanding of the hydrogeology, aquifer vulnerability and water quality in areas around the supply wells and the interrelationships between the wells and potential contaminant sources.

Hydrogeologic Data Analysis Software System Update (2014-present)
Waterloo Region, Ontario

Project manager and senior technical reviewer for the selection and implementation of a new hydrogeologic data analysis (HDA) system for the Region. The project involved a detailed assessment of the Region's current and future data needs, the procurement and evaluation of potential commercial software solutions, and the implementation of the new software database and tools.

Hydrogeologic and Source Water Protection Services (2013-2018)
Centre Wellington, Ontario

Senior technical reviewer for hydrogeologic and source water protection services provided on an as-needed basis to the Township of Centre Wellington. The work includes on-going investigations and monitoring related to source water "Issues", as well as the evaluation of the hydrogeological aspects of infrastructure and development projects on behalf of the Township.

Hydrogeologic Services - Cambridge Aggregates (2008-present)
North Dumfries and Brant, Ontario

Senior technical reviewer for various projects for Cambridge Aggregates related to the development of large volume groundwater supply wells and Permits to Take Water for aggregate washing, and hydrogeological assessments in support of new licence applications and licence expansions under the Aggregate Resources Act.

Water Supply Class EA – Region of Waterloo (2010-2012)
West Montrose, Ontario, Canada

Senior technical reviewer for the hydrogeological component of a Water Supply Class Environmental Assessment for West Montrose. The hydrogeological component involved the exploration for an additional water supply within West Montrose. Through a field program involving drilling, hydraulic testing and water quality sampling a potential groundwater supply source was identified and carried forward as part of the assessment.

TICS Project – Region of Waterloo (2009-2012)
Waterloo Region, Ontario

Project manager for the Threats Inventory and Circumstances Survey (TICS) project for the Region of Waterloo. The project involved conducting Canada's largest drinking water census across the Waterloo Region and the evaluation of potential threats to drinking water sources in the Waterloo Region for each well field and surface water intake source.

Waterloo North Water Supply Class EA – Region of Waterloo (2008-2012)
Waterloo Region, Ontario

Senior technical advisor to the class EA project carried out for the Region of Waterloo with AECOM to develop additional groundwater supply wells in North Waterloo and Erbsville. The project involved the drilling of a new test supply well and a long term pumping test of three new supply wells, along with an extensive groundwater monitoring program.

New Wells Project – Region of Waterloo (2008-2009)
Waterloo Region, Ontario

Senior technical advisor to the project to install over 40 new monitoring wells nests throughout the Waterloo Region. Focus was on senior technical review and the interpretation of overburden and bedrock stratigraphy based on core logs, core photographs and samples, grain size analysis and geophysical logs, using nomenclature recently developed by the Ontario Geologic Survey (OGS).

Land Use Designations for Source Water Protection – Brookfield Homes (2007)
Paris, Ontario

Manager and senior technical review on a project to evaluate potential changes in land use designation within WHPAs and the associated change in risk to groundwater to well fields, that have high aquifer vulnerability ratings for a proposed development in Paris, Ontario.

Geophysical Investigation, Middleton Wellfield – Stantec (2005)
Cambridge, Ontario

Manager and senior technical reviewer on a project to use geophysical methods to map the top of bedrock and identify buried infrastructure around the Middleton Wellfield, in order to identify potential contaminant pathways to the shallow bedrock aquifer system.

IUS Project – Region of Waterloo (2005-present)
Waterloo Region, Ontario

The hydrogeological assessment and permitting of existing and potential new Municipal supply Wells for the Region of Waterloo's Integrated Urban Supply System. Assistant project manager, responsible for technical tasks, invoicing, budgeting, tendering and contract administration, presentations, interim and final reporting. Performed a technical role in the water supply development and expansion tasks carried out at the Chicopee, Breslau, Fountain Street, Lancaster, Seagrams and Waterloo North study areas.

Permit to Take Water – Lafarge (2002)
Guelph, Ontario

Completed a hydrogeologic study to support a permit to take water (PTTW) application for Lafarge Canada at the Guelph Asphalt and Ready Mix Concrete Plant in Guelph, Ontario.

Permit to Take Water – Lafarge (2002)
New Lowell, Ontario

Completed a hydrogeologic study to support a permit to take water (PTTW) application for Lafarge Canada at the Home Pit in New Lowell, Ontario.

Permit to Take Water – Heritage Golf Club (2002)
Barrie, Ontario

Completed a hydrogeologic study to support a permit to take water (PTTW) application for Heritage Golf Club near Barrie, Ontario. The work included the supervision and analysis of a 24 hour pumping test.

Geophysical Logging Investigation – Golder (1994)
Cambridge, Ontario

Acquired, processed, interpreted and reported on gamma and neutron geophysical logs in a test supply well in Cambridge East, Ontario as part of a water supply development programme for Golder Associates.

GPR, Seismic Refraction and Borehole

Acquired, processed, interpreted and reported on GPR, seismic refraction and geophysical logging surveys at Municipal well fields in the Town of Walkerton, Ontario in the hydrogeological investigation following the E. coli

Geophysical Logging - Walkerton (2000)
Walkerton, Ontario

tragedy in the summer of 2000. These surveys were used to help develop a conceptual geologic and hydrogeologic model for the site, and to identify fractured rock zones in the wells and assess the integrity of the well casing seal to the formation.

Groundwater Study - Victoria County (2000)
Oak Ridges Moraine, Ontario

Acquired gamma and conductivity geophysical logs in deep boreholes in the Oak Ridges Moraine as part of the Groundwater Study for Victoria County.

Oxford County Groundwater Study – Oxford County (2000)
Stratford, Ontario

Acquired gamma, conductivity, heat pulse flowmeter and optical televiewer geophysical logs in Municipal Supply wells in the Town of Stratford, Ontario, as part of the Oxford County Groundwater Study.

Permit to Take Water – Lafarge (2001)
New Dundee, Ontario

Completed a hydrogeologic study to support a permit to take water (PTTW) application for Lafarge Canada at Warren Bitulithic's Seibert Pit in New Dundee, Ontario.

Rotasonic Drilling Programme – Waterloo Region University of Waterloo (1990-1991)
Waterloo, Ontario

Under the direction of Dr. P.F. Karrow, carried out all aspects of two drilling programmes in 1990 and 1991 including: siting, permitting, utility clearances, drill supervision, well development, geophysical logging, vertical seismic profiling and reporting.

Borehole Geophysical Logging and Well Log Catalogue for the Waterloo Region University of Waterloo (1987-1993)
Waterloo, Ontario

Under the direction of Dr. J.P. Greenhouse, acquired the first digital geophysical logs in the Waterloo Region including: gamma, density, neutron, resistivity, conductivity and caliper log data. Collected and digitized historic logs, as well as digital logs from local consultants. Compiled these logs into a Catalogue in Viewlog format. This log catalogue formed the basis of the current understanding of the quaternary geology and overburden aquifer system in the Waterloo Region.

Seismic Reflection and VSP Studies – Waterloo Region - University of Waterloo (1987-1995)
Waterloo, Ontario

Under the direction of Dr. J.P. Greenhouse, carried out pioneering investigative work to optimise high resolution shallow seismic reflection and vertical seismic profiling geophysical methods for the characterisation of geology and aquifers in the Waterloo Region. This work culminated in the development of a controlled vibratory source for high resolution seismic surveys.

PROJECT EXPERIENCE – AGGREGATES

Aggregate Licence Investigations (2019-present)
Caledon, Ontario

Project Director and Senior Technical Reviewer for resource and hydrogeological technical studies at the Caledon properties for CBM Aggregates for a future below water table quarry licence application near Caledon, Ontario.

Aggregate Licence Investigations (2018-present)
Peterborough, Ontario

Project Director and Senior Technical Reviewer for hydrogeological, natural environment and cultural heritage technical studies at the Blezard property for CBM Aggregates near Peterborough, Ontario.

Resource Evaluation – CBM (2018)
Ayr, Ontario

Project Manager and Senior Technical Reviewer for an aggregate resource assessment at the Bromberg Pit for CBM Aggregates near Ayr Ontario.

Resource and Hydrogeological Investigation – CBM (2018) Dorchester, Ontario	Project Director and Senior Technical Reviewer for aggregate resource and hydrogeological studies at the Dorchester Pit for CBM Aggregates to support a Site Plan Amendment.
Resource and Hydrogeological Investigation – CBM (2018) Thamesford, Ontario	Project Director and Senior Technical Reviewer for aggregate resource and hydrogeological studies at the Thamesford Pit for CBM Aggregates to support a Site Plan Amendment.
Aggregate Licence Investigations – CBM (2018-present) Puslinch, Ontario	Project Director and Senior Technical Reviewer for hydrogeological, natural environment and cultural heritage studies at the Lake property for CBM Aggregates in Puslinch, Ontario.
Resource and Hydrogeological Investigation – CBM (2017) Puslinch, Ontario	Project Director and Senior Technical Reviewer for aggregate resource and hydrogeological studies at the Lanci Pit for CBM Aggregates to support a Site Plan Amendment.
Resource Evaluation – CBM (2017) North Dumfries, Ontario	Project Manager and Senior Technical Reviewer for an aggregate resource assessment at the Dabrowski Pit for CBM Aggregates.
Resource Evaluation – CBM (2017) Puslinch, Ontario	Project Manager and Senior Technical Reviewer for an aggregate resource assessment at the McNally Pit in support the expropriation of land for highway development at the McNally Pit for CBM Aggregates.
Resource and Hydrogeological Investigation – CBM (2016) North Dumfries, Ontario	Project Director and Senior Technical Reviewer for an aggregate resource evaluation and Level 1&2 Hydrogeological Assessment at the Dance Pit for CBM Aggregates in North Dumfries, Ontario.
Imported Fill Investigation – CBM (2016) Limehouse, Ontario	Project Manager for a soil sampling investigation to confirm imported soil quality at the CBM Pit near Limehouse, Ontario.
Resource Evaluation – CBM (2016) Orangeville, Ontario	Project Director and Senior Technical Reviewer for an aggregate resource evaluation at the Gray Pit for CBM Aggregates near Orangeville, Ontario.
Resource and Hydrogeological Investigation – CBM (2016) North Dumfries, Ontario	Project Director and Senior Technical Reviewer for an aggregate resource evaluation and Level 1&2 Hydrogeological Assessment at the Dance Pit for CBM Aggregates in North Dumfries, Ontario.
Aggregate Investigations - MTO Northeast (2015) North Bay, Ontario	Project Manager for aggregate investigations on numerous Crown land sites for MTO Northeast. Work included resource assessments, Level 1 / 2 Hydrogeological, Natural Heritage and Cultural Heritage Assessments, in support of Pit and Quarry Permits.
Resource Evaluation and Expert Testimony- Ministry	Provided specialized forensic engineering / geological advice and services related to aggregate resources on a property in northern Ontario. Work

of Transportation Ontario (2013-2014) Ontario	included resource modelling and resource valuation for a variety of potential land development scenarios.
Resource Evaluation Arriscraft International (2011) Ontario	Conducted a geological testing program and completed a resource evaluation of the Hill Top Pit Property in Kitchener, Ontario. Resource evaluation results were used in the appraisal of the property for the purposes of acquisition.
Aggregate Properties Valuation – Confidential (2011) Ontario, Alberta	Conducted valuation studies of more than a dozen aggregate properties in Ontario and Alberta to estimate the net present value of these properties for the purposes of financing.
Aggregate Source Investigations – MTO (2010-2011) Northeastern Ontario	Project Director and senior technical reviewer for the geological and hydrogeological components of the 2010 Northeastern Region Aggregate Source Investigation (MTO Assignment NO. 5010-E-0003) which included assessment and permitting studies for 23 sites across Ontario.
Resource Evaluation, Weeks Pit and Quarry – Altus Group (2010-2011) Parry Sound, Ontario	Senior technical review for an investigation to estimate the total aggregate resources available at the Weeks Pit and quarry property, in order to assist in the valuation of the property to settle an expropriation dispute with the owner and the MTO.
Feasibility Assessment – Lafarge (2010) Harvey Township, Ontario	Senior technical review for an investigation to assess the feasibility for the development of a limestone quarry on the Buckhorn Property in support of the renewal of a mining lease for the property.
Soil Borrow Search - IBI Group (2009-2010) Niagara, Ontario	Senior technical reviewer for a soil borrow search in the Niagara Region for the MTO, in support of new construction activities on Highway 406.
Geophysical Investigation – Confidential (2007) Ontario	Project manager and senior technical advisor for a geophysical and test pitting investigation at a confidential quarry site in Ontario to assess the potential presence of buried waste, as part of a legal claim.
Preliminary Resource Evaluation – SCAW (2004) Caledon, Ontario	Directed junior staff in a preliminary assessment of the potential for aggregate resources to be present on a property in Caledon, Ontario on behalf of the property owner.
Borehole Geophysical Logging – Confidential (2004) Brechin, Ontario	Acquired gamma and conductivity borehole geophysical logs at a property near Brechin, Ontario for a confidential client.
Acton Quarry Escarpment Seep Investigation - Dufferin Aggregates (2003) Acton, Ontario	Led a multidisciplinary project team in an investigation to assess hydrogeologic conditions at Phase 2 of the Acton Quarry and develop conceptual designs for short term and long term hydrogeologic mitigation systems to maintain seep flow in the Guelph-Amabel Formation along the Niagara Escarpment, immediately adjacent to advancing quarry workings.
Resource Evaluation – Dufferin Aggregates (2003) Ontario	Led a project team to carry out a resource evaluation of the Mosport West Pit property for Dufferin Aggregates. The project involved the integration of high quality coring methods, gradation testing of core samples and ERI (electrical

resistivity imaging) geophysical surveying to develop realistic 3D subsurface geologic models for these properties, from which available resources were then estimated and areas of preferred extraction were identified. Duties included: planning, ERI field QA/QC, ERI interpretation, correlation of geophysical and gradation data to establish empirical relationships between ERI response and resource quality and reporting.

ERI Investigation – Nelson Aggregates (2003)
Burlington, Ontario

Directed junior staff in an ERI geophysical investigation to map overburden thickness and assess the underlying rock for karst potential as part of a Level 2 Hydrogeological Assessment under the Aggregate Resources Act, for the planned expansion of the Nelson Quarry in Burlington, Ontario.

Aggregate Resource Evaluation – Confidential (2003)
Sudbury, Ontario

Carried out an evaluation of the potential aggregate resources present on properties in Dill Township near Sudbury, Ontario in support of the appraisal of the properties, which were to be expropriated from the owner by the MTO for the construction of an interchange and highway realignment.

Overburden Investigation – Dufferin Aggregates (2002)
Milton, Ontario

Conducted an ERI (electrical resistivity imaging) and test pitting investigation to develop a 3D model of overburden thickness and the top of bedrock to assist in planning overburden stripping requirements for Dufferin Aggregates in the Western Extension of the Milton North Quarry. Responsible for all aspects of planning, acquisition, processing, interpretation and reporting, as well as client liaison.

Gravel Pit Evaluation - Township of Perth East (2002)
Shakespeare, Ontario

Conducted an investigation to complete a resource evaluation, assess the net present value and make recommendations for optimization to the Perth East Gravel Pit near Shakespeare, Ontario. The Project Team consisted of Golder Associates Ltd., Beck and Associates GeoConsultants Inc. and MHBC Planning Ltd.

Aggregate Properties Valuation – Confidential (2002)
Ontario

Led a multidisciplinary project team which conducted valuations studies of four large aggregate properties in Ontario to estimate the net present value of these properties for the purposes of obtaining bank financing. The Project Team consisted of Golder Associates Ltd., Beck and Associates GeoConsultants Inc. and MHBC Planning Ltd.

Acton Quarry Resource Evaluation – Dufferin Aggregates (2002)
Acton, Ontario

Conducted a resource evaluation and estimated overburden stripping requirements for Phase 3 of the Acton Quarry, which involved ERI geophysical surveying, test pitting and drilling. Responsible for all aspects of planning, acquisition, processing, interpretation and reporting, as well as client liaison.

Overburden Investigation – Dufferin Aggregates (2001)
Milton, Ontario

Conducted a GPR and test pitting investigation to develop a 3D model of overburden thickness and the top of bedrock to assist in planning overburden stripping requirements for Dufferin Aggregates in the Milton North Quarry. Responsible for all aspects of planning, acquisition, processing, interpretation and reporting, as well as client liaison.

Quarry Resource Assessment – Dufferin Aggregates (2001)
Ontario

Acquired, processed, interpreted and reported gamma and conductivity geophysical log surveys in test boreholes at the Ogden Point Limestone Quarry to identify the stratigraphy within a Regional context and infer the suitability of strata within the quarry for use in the manufacture of cement products, based on experience elsewhere in Ontario.

Resource Evaluations – Dufferin Aggregates (1998-1999)
Ontario

Helped conduct sand and gravel resource evaluations as part of a multidisciplinary project team for Dufferin Aggregates at sand and gravel properties in Ontario including Mosport Pit 1 and 2, Bethany, TRT, Mill Creek, Paris and Naylor properties. The projects involved the integration of high quality coring methods, gradation testing of core samples and ERI (electrical resistivity imaging) geophysical surveying to develop realistic 3D subsurface geologic models for these properties, from which available resources were then estimated and areas of preferred extraction were identified. Duties included: ERI modelling and interpretation, 3D geological modelling, correlation of geophysical and gradation data to establish empirical relationships between ERI response and resource quality, volume and tonnage estimates and reporting.

PUBLICATIONS

Monier-Williams, M.E., Davis, R.K., Paillet, F.L., Turpening, R.M., Sol, S.J.Y. and Schneider, G.W. 2009. Review of Borehole Based Geophysical Site Evaluation Tools and Techniques. NWMO Technical Report TR-2009-25, 174 p.

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Greenhouse, J.P., and Schneider, G.W., 1994. Geophysics and Groundwater Supply in the Waterloo Region. A Poster. Waterloo '94, Abstracts of GAC-MAC Annual Meeting, May, 1994.

Schneider, G.W., and Greenhouse, J.P., 1994. The Geophysical Log Catalogue for the Waterloo Region. A Poster. Waterloo '94, Abstracts of GAC-MAC Annual Meeting, May, 1994.

Endres, A.L., Coe, R.D., Gilson, E.W., Zawadzki, A.A., Schneider, G.W. and Greenhouse, J.P., 1993. The use of neutron logging methods for the detection and monitoring of chlorinated solvents: A quantitative study. Proceedings of the Symposium on the Application of Geophysics to Engineering and Environmental Problems, San Diego, California, April 18-22, 1993, pp. 39-50.

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Schneider, G.W. 1993b. Geophysical well logs for the Waterloo Region and surrounding areas: A catalogue (Third Edition). Quaternary Sciences Institute Publication #9, Department of Earth Sciences, University of Waterloo, 699 p.

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Brewster, M.L., Annan, A.P., Greenhouse, J.P., Schneider, G.W., and Redman, J.D., 1992. Geophysical detection of DNAPLs: Field experiments. IAH Conference "Modern Trends in Hydrogeology", May 10-13th, Hamilton, Ontario, Canada.

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Geophysics to Engineering and Environmental Problems, April 26-29th, 1992, Oakbrook, Illinois, USA, pp. 619-628.

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Schneider, G.W., Nobes, D.C., Lockhard, M.L., and Greenhouse, J.P., 1991. Urban geophysics in the Kitchener-Waterloo region. Geological Association of Canada Program with Abstracts, Vol. 16, pp. A111. Presented at the 1991 Annual Meeting of the Geological Association of Canada, Toronto, Ontario, Canada.

Greenhouse, J.P., Nobes, D.C., and Schneider, G.W., 1990. Groundwater beneath the city: A geophysical study. Ground Water Management, Vol. 2, pp. 1179-1191. Proceedings of the Fourth Annual Outdoor Action Conference on Aquifer Restoration, Groundwater Monitoring and Geophysical Methods, Las Vegas, Nevada, USA.

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Nobes, D.C., Schneider, G.W., and Hodgson, S., 1987. Discussion on: "Effects of porosity and clay content on wave velocities in sandstones". Geophysics, Vol. 52 pp. 1439.

Golder Associates Ltd. – Cambridge

Education

Master of Science Earth Sciences, Hydrogeology, Collaborative Water Program, University of Waterloo, Waterloo, 2019

Bachelor of Applied Science Geological Engineering (Water Resources Option, Honours), University of Waterloo, Waterloo, 2014

Paul Menkveld, M.Sc., E.I.T., Environmental Scientist

Mr. Menkveld is an Environmental Scientist in the Geoscience Group at WSP Golder's Cambridge office, with more than 8 years experience in engineering consulting and hydrogeology. He is a graduate of the Geological Engineering (B.A.Sc.) and Master of Science (M.Sc.) programs at the University of Waterloo. During Mr. Menkveld's 6 years at WSP Golder, he has built meaningful experience practicing physical hydrogeology for aggregate, water supply, linear infrastructure, nuclear waste storage, contaminated sites, and mining applications. He is a skilled hydraulic and aquifer test analyst and has extensive field experience to support a range of hydrogeological investigations.

Employment History

WSP Golder – Cambridge, Ontario

Environmental Scientist (2016 to Present)

Responsible for the coordination, implementation, analysis, and reporting of hydrogeology projects for a range of applications. Developed project management skills to collect comprehensive environmental data on interdisciplinary teams for permit applications, amendments, and compliance monitoring. Mr. Menkveld has consistently managed projects with attention to detail to implement best practices and meet client expectations.

Mr. Menkveld has coordinated, supervised, and conducted field work including: borehole drilling, soil sampling (including brown field sampling), monitoring well installations, aquifer testing, groundwater sampling, and surface water sampling.

WSP Global Inc. (formerly GENIVAR and Jagger Hims Ltd.) – St. Catharine's, Ontario

Environmental Engineering Intern (2012 to 2012)

Performed data analysis, figure preparation, and technical report writing to support landfill monitoring, aggregate extraction, environmental assessments, and groundwater monitoring. Mr. Menkveld conducted a wide variety of field work including ground water monitoring and sampling, supervising drilling and logging in overburden and bed rock, stream gauging, and surface water sampling.

GeoSolv Design/Build Inc. – Aurora, Ontario

Engineering Intern (2012 to 2012)

Supervised sites of multi-million dollar projects during the geotechnical soil improvement stage and coordinated projects with contractors, clients, drillers, and suppliers to maximize project efficiency. Mr. Menkveld supervised the successful application of specialized geotechnical techniques including helical screw piles and rammed aggregate piers.

PROJECT EXPERIENCE

Maryhill Supply Well Replacement Maryhill, Ontario, Canada	Supervised drilling, including wireline PQ coring and tricone mud rotary methods, of a replacement for a municipal supply well. Supervised hydraulic testing the well, including a large scale aquifer test with the observation of private wells. Performed analysis and reporting for PTTW amendment.
Hydrogeologic Investigation and Closure Application of Closed Landfill Parry Sound, Ontario, Canada	This multi-year project included the evaluation, sale, and development of a brownfield and closed landfill site. The scope included hydrogeologic investigations to identify contaminants of concern, map their transport, assess risk, the development of reasonable use criteria, closure application to the regulator, and subsequent monitoring. Significant project coordination was required to mobilize and support a field team in a remote area to perform a range of tasks.
Mine Site Exploration Drilling and Hydraulic Testing Rankin Inlet, Nunavut, Canada	Coordinated a complex field program and supervised work site in a remote area. Responsible for core logging, fluid management, preparation of drill fluid with a tracer, packer testing, and coordination of personnel and materials via helicopter. Addressed dynamic health and safety risks in a remote location.
KW Habilitation Services Brownfield Redevelopment Kitchener, Ontario, Canada	Supported the completion of an EA Ph1 and 2 and supplemental monitoring during and following construction on a brownfield site to a higher use. Coordinated with construction subcontractors to ensure protection of and access to monitoring network.
Colour Paradise Greenhouses Research Site, Mannheim, Ontario Ontario, Canada	Conducted an extensive field program to assess the vulnerability of a shallow screened well to transient surface water features. During the course of this research program the field work included: well installation, time domain reflectometry, stream gauging, meteorology station deployment, geophysical soil moisture measurements, optical surface water tracking, groundwater sampling, resistivity measurements, and Guelph Permeameter operation. Lab work included, sieve analysis, permeameter, moisture content analysis, and the construction of a high accuracy Buchner Funnel apparatus.
NWMO Ignace Geoscientific Field Investigations Ignace, Ontario	Supervised drilling operations and fluid management of a deep borehole for preliminary deep geologic repository studies for the Nuclear Waste Management Organization. Responsibilities included managing fluid quantities, specifics of drill operation, preparation of tracer tagged drill water, preliminary borehole geophysics, and site supervision.
Metrolinx Subway Hydrogeology Scarborough, Ontario	Supported the hydrogeology and dewatering scope of the project, which included development, single well response testing, groundwater, and headspace sampling, to support design and dewatering calculations.
Free Phase PHC Site Monitoring and Remediation, Hamilton, Ontario	Supported ECA compliance groundwater and surface water monitoring on a long term industrial site with significant free phase hydrocarbon contamination in the shallow bedrock. The project required careful coordination with the requirements of the ECA and on site industrial HSSE procedures.

Cambridge Zone 3
Cambridge, Ontario

Supervised the drilling of boreholes through the Gasport Formation, including complex karst. Supervised characterization, testing, and construction of multilevel monitoring wells. Supported monitoring and analysis of large scale operational testing, including instrumentation and analysis of groundwater surface water interaction.

Hamilton Area Greenhouse
Hamilton, Ontario, Canada

Managed long term Permit to Take Water compliance monitoring, amendment and renewal applications, for greenhouse site with nitrate contamination, including water level monitoring, nitrate species analysis, and spill response. Pioneered the use of no purge hydrasleeve sampling techniques to improve efficiency and technical quality. Improved client relationship and delivered economical and consistent results.

Aggregate Extraction Site Baseline Monitoring
Brantford, Ontario, Canada

Project manager of a multi-year baseline surface water and groundwater data collection, permit to take water application, and revision of threshold triggers for extraction. Monitoring was conducted to characterize the groundwater flow system and surface water features on the site to support dynamic management of operations and mitigate environmental impacts.

Deep Geologic Repository Borehole Sealing
Tiverton, Ontario, Canada

Conducted project coordination multiple subcontractors to achieve complex project objectives and optimize progress. The scope focused on the removal and sealing of >800m boreholes instrumented with Westbay groundwater monitoring systems, across multiple aquifer systems. Successful removal required conceptual model development, creative downhole problem solving, and implementation of specialized and oil field tools.

PROFESSIONAL AFFILIATIONS

Professional Engineers of Ontario

International Association of Hydrogeologists

PUBLICATIONS

Journal Articles

Menkveld, Paul and David Rudolph. A field study of event based, seasonally affected, depression focused recharge in glaciated terrain. *University of Waterloo, Department of Earth and Environmental Sciences* (2019)

Wiebe, Andrew, Paul Menkveld, Ehsan Pasha, Jacqueline Brook, Mike Christie and David Rudolph. Impacts of Event-based Recharge on the Vulnerability of Public Supply. *Sustainability*, 13(14) (2021), 7695.

Wiebe, Andrew, Paul Menkveld, Cailin Hillier, Emilie Mesec and David Rudolph. Meteorological and hydrological data from the Alder Creek watershed. *Federated Research Data Repository*, https://doi.org/10.20383/101.0178 (2019)

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