CAMBIUM

Environmental

Geotechnical

Building Sciences

Construction Monitoring

Telephone
(866) 217.7900
(705) 742.7900

Facsimile
(705) 742.7907

Website
cambium-inc.com

Mailing Address
P.O. Box 325
52 Hunter Street East
Peterborough, ON
K9H 1G5

Locations
Peterborough
Kingston
Barrie
Oshawa

Laboratory
Peterborough

Professional Engineers Ontario

APGO

September 9, 2020

City of Kawartha Lakes
26 Francis Street,
Lindsay, ON K9V 5R8

Via email: rmonaghan@kawarthalakes.ca

Attn: Richard Monaghan, C.E.T.
Senior Engineering Technician

Re: Characterization of Street Sweepings
City of Kawartha Lakes, Ontario
Cambium Reference: 11419-001

Dear Mr. Monaghan,

The City of Kawartha Lakes is seeking reuse possibilities for the road sweepings that are collected at the end of the winter from the City roads. Rather than disposing of the sweepings as waste, the winter sand sweepings are stockpiled at the Emily, Eldon, and Bobcaygeon Public Works facilities. Cambium Inc. (Cambium) was retained by the City of Kawartha Lakes (Client) to complete physical and chemical characterization of the sweepings in order to identify potential reuse options for this material.

Samples of the sweepings were provided by the City. The chemical testing was completed by SGS Environmental Laboratories in Lakefield, Ontario. The physical testing was completed at Cambium's CCIL-certified materials testing laboratory in Peterborough, Ontario.

CHEMICAL TESTING RESULTS

Each sample was tested for the following parameters: petroleum hydrocarbons (PHCs), benzene, toluene, ethylbenzene, and xylenes (BTEX) and metals and inorganics. Analytical results were compared to the Table 1 and Table 2 Site Condition Standards (SCS) of the *Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act* (MOE, 2011). Table 1 applies to the *Full Depth Background Site Condition Standards* and Table 2 applies to *Full Depth Generic Site Condition Standards in a Potable Ground Water Condition*. Industrial / Commercial / Community (ICC) Property Use and

coarse-grained soils were selected to determine concentration exceedances for the analyzed parameters. It is noted that Community Property Use includes municipal road right-of-ways.

Table 1 SCS represent typical background concentrations encountered in Ontario, and are the most stringent criteria available for comparison. Soil that meets the Table 1 SCS is generally considered clean fill and can be handled as such. Table 2 SCS are less stringent, such that soil that exceeds the Table 2 SCS is generally considered contaminated and has to be disposed at a licensed facility (e.g., landfill) that accepts such waste. Analytical results were compared to both the Table 1 and Table 2 SCS to determine appropriate reuse of the soil.

Laboratory analytical results reported PHC F4 in the samples collected from all three depots at concentrations exceeding the Table 1 SCS, but less than the Table 2 SCS. It is likely that these concentrations were due to asphalt inclusions in the samples. All other tested parameters were reported at concentrations less than the Table 1 and Table 2 standards, as shown in the attached analytical summary table and the Laboratory Certificates of Analysis.

Based on the laboratory results, the sampled material is suitable for reuse at sites for which the Table 2 SCS for ICC Property Use and coarse-grained soils apply. Accordingly, the soil should not be placed on agricultural or residential land, nor within 30 m of a water body, but is generally suitable for the reuse options provided below.

Note that Ontario Regulation 406/19 (On-site and Excess Soil Management) will come into effect January 1, 2021. While this regulation includes some exemptions for municipalites, there may be additional requirements for road sweepings reuse in 2021.

CAMBIUM

Environmental

Geotechnical

Building Sciences

Construction Monitoring

Telephone
(866) 217.7900
(705) 742.7900

Facsimile
(705) 742.7907

Website
cambium-inc.com

Mailing Address
P.O. Box 325
52 Hunter Street East
Peterborough, ON
K9H 1G5

Locations
Peterborough
Kingston
Barrie
Oshawa

Laboratory
Peterborough

Professional Engineers Ontario

APGO

CAMBIUM

Environmental

Geotechnical

Building Sciences

Construction Monitoring

Telephone
(866) 217.7900
(705) 742.7900

Facsimile
(705) 742.7907

Website
cambium-inc.com

Mailing Address
P.O. Box 325
52 Hunter Street East
Peterborough, ON
K9H 1G5

Locations
Peterborough
Kingston
Barrie
Oshawa

Laboratory
Peterborough

Professional Engineers Ontario

APGO

September 9, 2020

GRADATION AND PHYSICAL TESTING RESULTS

The gradation test results and micro-deval fine aggregate loss results are attached to this letter and summarized in Table 1.

Table 1 Gradation and Physical Testing Results

Sieve (mm)	Emily Depot (% passing)	Eldon Depot (% passing)	Bobcaygeon Depot (% passing)
26.5	100	100	100
13.2	99.5	99.3	99.3
9.5	98.4	98.1	97.6
4.75	92.2	91.5	89.7
1.18	69.5	67.3	67.3
0.300	30.1	29.3	29.0
0.150	14.6	14.7	13.9
0.075	7.4	7.5	6.8
Fine Aggregate % loss	10.6%	9.7%	10.71%

The material from all three depots, Emily, Eldon, and Bobcaygeon, meets the gradation requirements for Granular B Type 1 and SSM material.

REUSE OPTIONS

Based on the results of the gradation and physical testing, the stockpiled street sweepings would be suitable for reuse as a Granular B Type 1 material or a Select Subgrade Material in the following situations:

- As backfill material against exterior building foundations or culverts.
- As upfill material to obtain a higher subgrade on road widenings or grade raises, prior to being covered with Granular B and Granular A. Due to the lack of stone sized particles, the reused screenings should be kept out of high traffic road subbase.

CAMBIUM

Environmental

Geotechnical

Building Sciences

Construction Monitoring

Telephone
(866) 217.7900
(705) 742.7900

Facsimile
(705) 742.7907

Website
cambium-inc.com

Mailing Address
P.O. Box 325
52 Hunter Street East
Peterborough, ON
K9H 1G5

Locations
Peterborough
Kingston
Barrie
Oshawa

Laboratory
Peterborough

- As sand backfill around catchbasins and manholes to prevent frost jacking and differential settlement due to it's low frost susceptibility and micro deval loss.

The stockpiled street sweepings from all three depots did not meet the gradation requirements for reuse as winter sand, which requires 100% passing the 9.5 mm sieve and <5% passing the 75 µm sieve.

CLOSING

We trust that this letter report meets with your immediate requirements. If you have further questions or comments, please contact the undersigned at 705-742-7900 ext. 220 or 336.

Best regards,

Cambium Inc.

Bernie Taylor, P.Eng.
Project Manager - Environmental

Jennifer Wales, P.Eng.
Project Manager – Geotechnical

BT/JW

Encl. *Table 2 – Summary of Soil Quality – Metals, Inorganics, BTEX and PHCs*
Laboratory Certificates of Analysis
Gradation and Physical Testing Results

P:\11400 to 11499\11419-001 City of Kawartha Lakes (Waste & Recycling Branch) - Soil Testing 2020 - Various Works Yards\Deliverables\2020-09-01 LTR Soil Characterization for CKL.docx

CAMBIUM

Table 2 - Summary of Soil Quality (Metals, Inorganics, BTEX and PHCs)

Sample Identification	Units	Laboratory Reportable Detection Limit (RDL)	Table 1 Standards [1]	Table 2 Standards [2]	Emily Depot	Eldon Depot	Bobcaygeon Depot
Sample Date					12-Aug-20	12-Aug-20	12-Aug-20
Barium	µg/g	0.1	220	670	25	20	25
Beryllium	µg/g	0.02	2.5	8	0.14	0.11	0.11
Boron	µg/g	1	36	120	5	4	5
Cadmium	µg/g	0.02	1.2	1.9	0.03	< 0.02	< 0.02
Chromium	µg/g	0.5	70	160	5.7	5.1	5.1
Cobalt	µg/g	0.01	21	80	2.4	1.8	1.9
Copper	µg/g	0.1	92	230	6.2	7	4
Lead	µg/g	0.1	120	120	2.9	2.4	2.6
Molybdenum	µg/g	0.1	2	40	0.3	0.2	0.2
Nickel	µg/g	0.5	82	270	4.3	3.6	3.6
Silver	µg/g	0.05	0.5	40	< 0.05	< 0.05	< 0.05
Thallium	µg/g	0.02	1	3.3	0.05	0.03	0.02
Uranium	µg/g	0.002	2.5	33	0.35	0.31	0.31
Vanadium	µg/g	3	86	86	10	8	7
Zinc	µg/g	0.7	290	340	14	13	11
Antimony	µg/g	0.8	1.3	40	< 0.8	< 0.8	< 0.8
Arsenic	µg/g	0.5	18	18	1.2	1	1.2
Selenium	µg/g	0.7	1.5	5.5	< 0.7	< 0.7	< 0.7
Mercury	µg/g	0.05	0.27	3.9	< 0.05	< 0.05	< 0.05
Boron (Hot Water Soluble)	µg/g	0.5	NV	2	< 0.5	< 0.5	< 0.5
Sodium Adsorption Ratio	N/A	0.2	2.4	12	1.1	1	1.6
Conductivity	mS/cm	0.002	0.57	1.4	0.2	0.23	0.25
pH	N/A	0.05	NV	NV	7.95	7.98	8.1
Chromium VI	µg/g	0.2	0.66	8	< 0.2	< 0.2	< 0.2
Cyanide	µg/g	0.05	0.051	0.051	< 0.05	< 0.05	< 0.05
Benzene	µg/g	0.02	0.02	0.32	< 0.02	< 0.02	< 0.02
Ethylbenzene	µg/g	0.05	0.05	1.1	< 0.05	< 0.05	< 0.05
Toluene	µg/g	0.05	0.2	6.4	< 0.05	< 0.05	< 0.05
Xylene Mixture	µg/g	0.05	0.05	26	< 0.05	< 0.05	< 0.05
m/p-xylene	µg/g	0.05	NV	NV	< 0.05	< 0.05	< 0.05
o-xylene	µg/g	0.05	NV	NV	< 0.05	< 0.05	< 0.05
F1 (C6 to C10)	µg/g	10	25	55	< 10	< 10	< 10
F2 (C10 to C16)	µg/g	10	10	230	< 10	< 10	< 10
F3 (C16 to C34)	µg/g	50	240	1700	111	108	175
F4 (C34 to C50)	µg/g	50	120	3300	**267**	**232**	**353**
Gravimetric Heavy Hydrocarbons	µg/g	200	120	3300	**837**	**848**	**1080**

Notes:

1. Table 1 (Soil Other Than Sediment, Residential/Parkland/Institutional/Industrial/Commercial/Community Property Use) of the Soil Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act.

2. Table 2 (Soil Other Than Sediment, Industrial/Commercial/Community Property Uses, Coarse) of the Soil Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act.

Bold - value exceeds Table 1 standard.

Bold and Shaded - value exceeds Table 2 standard.

Bold and underline - Laboratory RDL exceeds standard.

"NV" indicates no value.

"-" indicates value not analyzed.

SGS

FINAL REPORT

CA14180-AUG20 R

11419-00 Street Sweeping Characterization

Prepared for

Cambium Inc.

FINAL REPORT

First Page

CLIENT DETAILS		LABORATORY DETAILS	
Client	Cambium Inc.	Project Specialist	Brad Moore Hon. B.Sc
		Laboratory	SGS Canada Inc.
Address	52 Hunter Street East Peterborough, ON K9H 1G5. Canada	Address	185 Concession St., Lakefield ON, K0L 2H0
Contact	Bernie Taylor	Telephone	705-652-2143
Telephone	705-742-7900 ext 200	Facsimile	705-652-6365
Facsimile	705-742-7907	Email	brad.moore@sgs.com
Email	bernie.taylor@cambium-inc.com; file@cambium-inc.com	SGS Reference	CA14180-AUG20
Project	11419-00 Street Sweeping Characterization	Received	08/12/2020
Order Number		Approved	08/19/2020
Samples	Soil (3)	Report Number	CA14180-AUG20 R
		Date Reported	08/19/2020

COMMENTS

CCME Method Compliance: Analyses were conducted using analytical procedures that comply with the Reference Method for the CWS for Petroleum Hydrocarbons in Soil and have been validated for use at the SGS laboratory, Lakefield, ON site.

Quality Compliance: Instrument performance / calibration quality criteria were met and extraction and analysis limits for holding times were met.

nC6 and nC10 response factors within 30% of response factor for toluene: YES

nC10, nC16 and nC34 response factors within 10% of the average response for the three compounds: YES

C50 response factors within 70% of nC10 + nC16 + nC34 average: YES

Linearity is within 15%: YES

F4G - gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.
The results for F4 and F4G are both reported and the greater of the two values is to be used in application to the CWS PHC.

Hydrocarbon results are expressed on a dry weight basis.

Temperature of Sample upon Receipt: 24 degrees C
Cooling Agent Present:No
Custody Seal Present:No

Chain of Custody Number:014259

SIGNATORIES

Brad Moore Hon. B.Sc

TABLE OF CONTENTS

PACKAGE: **REG153 - BTEX** (SOIL)

L1 = REG153 / SOIL / COARSE - TABLE 1 - Residential/Parkland/Industrial - UNDEFINED

	Sample Number	9	10	11
	Sample Name	Emily Depot	Eldon PW Depot	Bobcaygeon Depot
	Sample Matrix	Soil	Soil	Soil
	Sample Date	12/08/2020	12/08/2020	12/08/2020
Parameter	**Units** / **RL** / **L1**	**Result**	**Result**	**Result**
BTEX				
Benzene	µg/g 0.02 0.02	< 0.02	< 0.02	< 0.02
Ethylbenzene	µg/g 0.05 0.05	< 0.05	< 0.05	< 0.05
Toluene	µg/g 0.05 0.2	< 0.05	< 0.05	< 0.05
Xylene (total)	µg/g 0.05 0.05	< 0.05	< 0.05	< 0.05
m/p-xylene	µg/g 0.05	< 0.05	< 0.05	< 0.05
o-xylene	µg/g 0.05	< 0.05	< 0.05	< 0.05

PACKAGE: **REG153 - Hydrides** (SOIL)

L1 = REG153 / SOIL / COARSE - TABLE 1 - Residential/Parkland/Industrial - UNDEFINED

	Sample Number	9	10	11
	Sample Name	Emily Depot	Eldon PW Depot	Bobcaygeon Depot
	Sample Matrix	Soil	Soil	Soil
	Sample Date	12/08/2020	12/08/2020	12/08/2020
Parameter	**Units** / **RL** / **L1**	**Result**	**Result**	**Result**
Hydrides				
Antimony	µg/g 0.8 1.3	< 0.8	< 0.8	< 0.8
Arsenic	µg/g 0.5 18	1.2	1.0	1.2
Selenium	µg/g 0.7 1.5	< 0.7	< 0.7	< 0.7

Client: Cambium Inc.

Project: 11419-00 Street Sweeping Characteriz

Project Manager: Bernie Taylor

Samplers: Connor Frazer

PACKAGE: **REG153 - Metals and Inorganics** (SOIL)

L1 = REG153 / SOIL / COARSE - TABLE 1 - Residential/Parkland/Industrial - UNDEFINED

	Sample Number	9	10	11		
	Sample Name	Emily Depot	Eldon PW Depot	Bobcaygeon Depot		
	Sample Matrix	Soil	Soil	Soil		
	Sample Date	12/08/2020	12/08/2020	12/08/2020		
Parameter	**Units**	**RL**	**L1**	**Result**	**Result**	**Result**
Metals and Inorganics						
Moisture Content	%	-		3.1	3.6	2.6
Barium	µg/g	0.1	220	25	20	25
Beryllium	µg/g	0.02	2.5	0.14	0.11	0.11
Boron	µg/g	1	36	5	4	5
Cadmium	µg/g	0.02	1.2	0.03	< 0.02	< 0.02
Chromium	µg/g	0.5	70	5.7	5.1	5.1
Cobalt	µg/g	0.01	21	2.4	1.8	1.9
Copper	µg/g	0.1	92	6.2	7.0	4.0
Lead	µg/g	0.1	120	2.9	2.4	2.6
Molybdenum	µg/g	0.1	2	0.3	0.2	0.2
Nickel	µg/g	0.5	82	4.3	3.6	3.6
Silver	µg/g	0.05	0.5	< 0.05	< 0.05	< 0.05
Thallium	µg/g	0.02	1	0.05	0.03	0.02
Uranium	µg/g	0.002	2.5	0.35	0.31	0.31
Vanadium	µg/g	3	86	10	8	7
Zinc	µg/g	0.7	290	14	13	11
Water Soluble Boron	µg/g	0.5		< 0.5	< 0.5	< 0.5

PACKAGE: **REG153 - Other (ORP)** (SOIL)

L1 = REG153 / SOIL / COARSE - TABLE 1 - Residential/Parkland/Industrial - UNDEFINED

	Sample Number	9	10	11
	Sample Name	Emily Depot	Eldon PW Depot	Bobcaygeon Depot
	Sample Matrix	Soil	Soil	Soil
	Sample Date	12/08/2020	12/08/2020	12/08/2020
Parameter	**Units**	**RL**	**L1**	**Result**	**Result**	**Result**
Other (ORP)						
Mercury	µg/g	0.05	0.27	< 0.05	< 0.05	< 0.05
Sodium Adsorption Ratio	No unit	0.2	2.4	1.1	1.0	1.6
SAR Calcium	mg/L	0.09		21.5	36.2	22.4
SAR Magnesium	mg/L	0.02		1.6	2.1	1.5
SAR Sodium	mg/L	0.15		20.2	22.6	29.7
Conductivity	mS/cm	0.002	0.57	0.20	0.23	0.25
pH	pH Units	0.05		7.95	7.98	8.10
Chromium VI	µg/g	0.2	0.66	< 0.2	< 0.2	< 0.2
Free Cyanide	µg/g	0.05	0.051	< 0.05	< 0.05	< 0.05

PACKAGE: **REG153 - PHCs** (SOIL)

L1 = REG153 / SOIL / COARSE - TABLE 1 - Residential/Parkland/Industrial - UNDEFINED

				Sample Number	9	10	11
				Sample Name	Emily Depot	Eldon PW Depot	Bobcaygeon Depot
				Sample Matrix	Soil	Soil	Soil
				Sample Date	12/08/2020	12/08/2020	12/08/2020
Parameter	**Units**	**RL**	**L1**		**Result**	**Result**	**Result**
PHCs							
F1 (C6-C10)	µg/g	10	25		< 10	< 10	< 10
F1-BTEX (C6-C10)	µg/g	10			< 10	< 10	< 10
F2 (C10-C16)	µg/g	10	10		< 10	< 10	< 10
F3 (C16-C34)	µg/g	50	240		111	108	175
F4 (C34-C50)	µg/g	50	120		267	232	353
F4G-sg (GHH)	µg/g	200	120		837	848	1080
Chromatogram returned to baseline at nC50	Yes / No	-			NO	NO	NO

EXCEEDANCE SUMMARY

Parameter	Method	Units	Result	REG153 / SOIL / COARSE - TABLE 1 - Residential/Parkland/Industrial - UNDEFINED L1
Emily Depot				
F4 (C34 to C50)	CCME Tier 1	µg/g	267	120
Gravimetric Heavy Hydrocarbons	CCME Tier 1	µg/g	837	120
Eldon PW Depot				
F4 (C34 to C50)	CCME Tier 1	µg/g	232	120
Gravimetric Heavy Hydrocarbons	CCME Tier 1	µg/g	848	120
Bobcaygeon Depot				
F4 (C34 to C50)	CCME Tier 1	µg/g	353	120
Gravimetric Heavy Hydrocarbons	CCME Tier 1	µg/g	1080	120

QC SUMMARY

Conductivity

Method: EPA 6010/SM 2510 I Internal ref.: ME-CA-IENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.	
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Lir (%)
								Low	High		Low
Conductivity	EWL0179-AUG20	mS/cm	0.002	<0.002	ND	10	100	90	110	NA	

Cyanide by SFA

Method: SM 4500 I Internal ref.: ME-CA-IENVISFA-LAK-AN-005

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.	
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Lir (%)
								Low	High		Low
Free Cyanide	SKA0087-AUG20	µg/g	0.05	<0.05	ND	20	96	80	120	104	75

Hexavalent Chromium by SFA

Method: EPA218.6/EPA3060A I Internal ref.: ME-CA-IENVISKA-LAK-AN-012

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.	
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Lir (%)
								Low	High		Low
Chromium VI	SKA5050-AUG20	ug/g	0.2	<0.2	ND	20	90	80	120	88	75

QC SUMMARY

Mercury by CVAAS

Method: EPA 7471A/EPA 245 I Internal ref.: ME-CA-[ENVISPE-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.	
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%) Low	Recovery Limits (%) High	Spike Recovery (%)	Recovery Li (%) Low
Mercury	EMS0067-AUG20	µg/g	0.05	<0.05	ND	20	100	80	120	98	70

Metals in aqueous samples - ICP-OES

Method: MOE 4696e01/EPA 6010 I Internal ref.: ME-CA-[ENVISPE-LAK-AN-003

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.	
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%) Low	Recovery Limits (%) High	Spike Recovery (%)	Recovery Li (%) Low
SAR Calcium	ESG0043-AUG20	mg/L	0.09	<0.09	0	20	100	80	120	100	70
SAR Magnesium	ESG0043-AUG20	mg/L	0.02	<0.02	4	20	99	80	120	104	70
SAR Sodium	ESG0043-AUG20	mg/L	0.15	<0.15	2	20	98	80	120	104	70

QC SUMMARY

Metals in Soil - Aqua-regia/ICP-MS

Method: EPA 3050/EPA 200.8 I Internal ref.: ME-CA-[ENVISPE-LAK-AN-005

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.	
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Lir (%)
								Low	High		Low
Silver	EMS0067-AUG20	ug/g	0.05	<0.05	ND	20	100	70	130	105	70
Arsenic	EMS0067-AUG20	µg/g	0.5	<0.5	1	20	101	70	130	93	70
Barium	EMS0067-AUG20	ug/g	0.1	<0.1	3	20	103	70	130	104	70
Beryllium	EMS0067-AUG20	µg/g	0.02	<0.02	7	20	99	70	130	89	70
Boron	EMS0067-AUG20	µg/g	1	<1	4	20	109	70	130	100	70
Cadmium	EMS0067-AUG20	µg/g	0.02	<0.02	3	20	97	70	130	104	70
Cobalt	EMS0067-AUG20	µg/g	0.01	<0.01	0	20	96	70	130	112	70
Chromium	EMS0067-AUG20	µg/g	0.5	<0.5	12	20	98	70	130	117	70
Copper	EMS0067-AUG20	µg/g	0.1	<0.1	3	20	100	70	130	108	70
Molybdenum	EMS0067-AUG20	µg/g	0.1	<0.1	ND	20	96	70	130	110	70
Nickel	EMS0067-AUG20	ug/g	0.5	<0.5	ND	20	94	70	130	109	70
Lead	EMS0067-AUG20	ug/g	0.1	<0.1	2	20	101	70	130	99	70
Antimony	EMS0067-AUG20	µg/g	0.8	<0.8	ND	20	94	70	130	112	70
Selenium	EMS0067-AUG20	µg/g	0.7	<0.7	ND	20	100	70	130	102	70
Thallium	EMS0067-AUG20	µg/g	0.02	<0.02	0	20	102	70	130	100	70
Uranium	EMS0067-AUG20	µg/g	0.002	<0.002	19	20	99	70	130	94	70
Vanadium	EMS0067-AUG20	µg/g	3	<3	0	20	97	70	130	110	70
Zinc	EMS0067-AUG20	µg/g	0.7	<0.7	1	20	95	70	130	102	70

QC SUMMARY

Petroleum Hydrocarbons (F1)

Method: CCME Tier 1 | Internal ref.: ME-CA-IENVIGC-LAK-AN-010

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.	
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%) Low	Recovery Limits (%) High	Spike Recovery (%)	Recovery Li (%) Low
F1 (C6-C10)	GCM0212-AUG20	µg/g	10	<10	ND	30	109	80	120	103	60

Petroleum Hydrocarbons (F2-F4)

Method: CCME Tier 1 | Internal ref.: ME-CA-IENVIGC-LAK-AN-010

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.	
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%) Low	Recovery Limits (%) High	Spike Recovery (%)	Recovery Li (%) Low
F2 (C10-C16)	GCM0244-AUG20	µg/g	10	<10	ND	30	108	80	120	118	60
F3 (C16-C34)	GCM0244-AUG20	µg/g	50	<50	7	30	108	80	120	118	60
F4 (C34-C50)	GCM0244-AUG20	µg/g	50	<50	13	30	108	80	120	118	60

QC SUMMARY

Petroleum Hydrocarbons (F4G)

Method: CCME Tier 1 | Internal ref.: ME-CA-[ENVIGC-LAK-AN-010

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.	
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Lin (%)
								Low	High		Low
F4G-sg (GHH)	GCM0275-AUG20	µg/g	200	<200	5	30	99	80	120	NA	60

pH

Method: SM 4500 | Internal ref.: ME-CA-[ENVIEWL-LAK-AN-001

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.	
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Lin (%)
								Low	High		Low
pH	ARD0041-AUG20	pH Units	0.05		0	20	100	80	120		

QC SUMMARY

Volatile Organics

Method: EPA 5035A/5030B/8260C | Internal ref.: ME-CA-[ENV]GC-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.	
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%) Low	Recovery Limits (%) High	Spike Recovery (%)	Recovery Li (%) Low
Benzene	GCM0211-AUG20	µg/g	0.02	< 0.02	ND	50	85	60	130	95	50
Ethylbenzene	GCM0211-AUG20	µg/g	0.05	< 0.05	ND	50	87	60	130	95	50
m/p-xylene	GCM0211-AUG20	µg/g	0.05	< 0.05	ND	50	87	60	130	95	50
o-xylene	GCM0211-AUG20	µg/g	0.05	< 0.05	ND	50	87	60	130	95	50
Toluene	GCM0211-AUG20	µg/g	0.05	< 0.05	ND	50	87	60	130	94	50

Water Soluble Boron

Method: O.Reg. 15 3/04 | Internal ref.: ME-CA-[ENV] SPE-LAK-AN-003

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.	
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%) Low	Recovery Limits (%) High	Spike Recovery (%)	Recovery Li (%) Low
Water Soluble Boron	ESG0042-AUG20	µg/g	0.5	<0.5	ND	20	99	80	120	104	70

QC SUMMARY

Method Blank: a blank matrix that is carried through the entire analytical procedure. Used to assess laboratory contamination.

Duplicate: Paired analysis of a separate portion of the same sample that is carried through the entire analytical procedure. Used to evaluate measurement precision.

LCS/Spike Blank: Laboratory control sample or spike blank refer to a blank matrix to which a known amount of analyte has been added. Used to evaluate analyte recovery and laboratory accuracy without sample matrix effects.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate laboratory accuracy with sample matrix effects.

Reference Material: a material or substance matrix matched to the samples that contains a known amount of the analyte of interest. A reference material may be used in place of a matrix spike.

RL: Reporting limit

RPD: Relative percent difference

AC: Acceptance criteria

Multielement Scan Qualifier: as the number of analytes in a scan increases, so does the chance of a limit exceedance by random chance as opposed to a real method problem. Thus, in multielement scans, for the LCS and matrix spike, up to 10% of the analytes may exceed the quoted limits by up to 10% absolute and the spike is considered acceptable.

Duplicate Qualifier: for duplicates as the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL

Matrix Spike Qualifier: for matrix spikes, as the concentration of the native analyte increases, the uncertainty of the matrix spike recovery increases. Thus, the matrix spike acceptance limits apply only when the concentration of the matrix spike is greater than c equal to the concentration of the native analyte.

LEGEND

FOOTNOTES

NSS Insufficient sample for analysis.
RL Reporting Limit.
↑ Reporting limit raised.
↓ Reporting limit lowered.
NA The sample was not analysed for this analyte
ND Non Detect

Samples analysed as received. Solid samples expressed on a dry weight basis. "Temperature Upon Receipt" is representative of the whole shipment and may not reflect the temperature of individual samples.

Analysis conducted on samples submitted pursuant to or as part of Reg. 153/04, are in accordance to the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act" published by the Ministry and dated March 9, 2004 as amended.

-- End of Analytical Report --

Request for Laboratory Services and CHAIN OF CUSTODY

SGS Environment, Health & Safety - Lakefield: 185 Concession St., Lakefield, ON K0L 2H0 Phone: 705-652-2000 Fax: 705-652-6365 Web: www.sgs.com/environment
- London: 657 Consortium Court, London, ON, N6E 2S8 Phone: 519-672-4500 Toll Free: 877-848-8060 Fax: 519-672-0361

No: 014259 Page 1 of 1

Laboratory Information Section - Lab use only

Received By: Chris Irwin
Received Date: 08, 12, 20 (mm/dd/yy)
Received Time: 13 : 59 (hr : min)
Received By (signature): Chris Irwin
Custody Seal Present: Yes ☐ No ☑
Custody Seal Intact: Yes ☐ No ☑
Cooling Agent Present: Yes ☐ No ☑ Type: none
Temperature Upon Receipt (°C) 24.25.24
LAB LIMS #: CA-14180-Aug20

REPORT INFORMATION

Company: Cambium Inc
Contact: Bernie Taylor
Address: 52 Hunter St, Peterborough, ON, K9H 2G5
Phone: 705-742-7900
Fax:
Email:

INVOICE INFORMATION

☒ (same as Report Information)
Company:
Contact:
Address:
Phone:
Email:

Quotation #:
Project #: 11419-00
P.O. #:
Site Location/ID: Street Sweeping Characterization

TURNAROUND TIME (TAT) REQUIRED

☒ Regular TAT (5-7days)
TAT's are quoted in business days (exclude statutory holidays & weekends).
Samples received after 6pm or on weekends: TAT begins next business day
RUSH TAT (Additional Charges May Apply): ☐ 1 Day ☐ 2 Days ☐ 3 Days ☐ 4 Days
PLEASE CONFIRM RUSH FEASIBILITY WITH SGS REPRESENTATIVE PRIOR TO SUBMISSION
Specify Due Date:
NOTE: DRINKING (POTABLE) WATER SAMPLES FOR HUMAN CONSUMPTION MUST BE SUBMITTED WITH SGS DRINKING WATER CHAIN OF CUSTODY

REGULATIONS

Regulation 153/04: ☐ Table 1 ☐ Table 2 ☐ Table 3 ☐ Table ____ ☐ Res/Park ☐ Ind/Com ☐ Agri/Other Soil Texture: ☒ Coarse ☐ Medium ☐ Fine
Other Regulations: ☐ Reg 347/558 (3 Day min TAT) ☐ PWQO ☐ MMER ☐ CCME ☐ Other: ☐ MISA
Sewer By-Law: ☐ Sanitary ☐ Storm Municipality:

RECORD OF SITE CONDITION (RSC) ☐ YES ☒ NO

ANALYSIS REQUESTED

	SAMPLE IDENTIFICATION	DATE SAMPLED	TIME SAMPLED	# OF BOTTLES	MATRIX	M&I: Field Filtered (Y/N)	M&I: Metals & Inorganics (incl CrVI, CN, Hg, pH, (B(HWS), EC, SAR–soil) (Cl, Na–water)	M&I: Full Metals Suite (ICP metals plus B(HWS)-soil only) Hg, CrVI	M&I: ICP Metals only (Sb,As,Ba,Be,B,Cd,Cr,Co,Cu,Pb,Mo,Ni,Se,Ag,Tl,U,V,Zn)	SVOC: PAHs only	SVOC: SVOCs (all incl PAHs, ABNs, CPs)	PCB: PCBs Total ☐ Aroclor ☐	PHC: F1-F4 + BTEX	PHC: F1-F4 only (no BTEX)	VOC: VOCs (all incl BTEX)	VOC: BTEX only	Pest: Pesticides (Organochlorine or specify other)	Other (please specify)	Other (please specify)	Other (please specify)	Other (please specify)	Other (please specify)	Other (please specify): Sewer Use: (Specify pkg)	Other (please specify): Water Characterization Pkg ☐ General ☐ Extended	TCLP: Specify TCLP tests ☐M&I ☐VOC ☐PCB ☐B(a)P ☐ABN ☐Ignit.	COMMENTS:
1	Emily Depot	10-08-20	13:10	4	Soil		X						X												Samples collected 10/08/20 but Saved on 12/08/20
2	Eldon PW Depot	10-08-20	13:15	4	Soil		X						X												
3	Bobcaygeon Depot	10-08-20	13:20	4	Soil		X						X												
4																									
5																									
6																									
7																									
8																									
9																									
10																									
11																									
12																									

Observations/Comments/Special Instructions

Sampled By (NAME): Connor Frazer Signature: Date: 08, 12, 20 (mm/dd/yy)
Relinquished by (NAME): Connor Frazer Signature: Date: 08, 12, 20 (mm/dd/yy)

Pink Copy - Client
Yellow & White Copy - SGS

Revision #: 1.2
Date of Issue: 09 Sept, 2019

CAMBIUM

Environmental

Geotechnical

Building Sciences

Construction Monitoring

Telephone
(866) 217.7900
(705) 742.7900

Facsimile
(705) 742.7907

Website
cambium-inc.com

Mailing Address
P.O. Box 325
52 Hunter Street East
Peterborough, ON
K9H 1G5

Locations
Peterborough
Kingston
Barrie
Oshawa

Laboratory
Peterborough

Professional Engineers Ontario

APGO

QUALIFICATIONS AND LIMITATIONS

Limited Warranty

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

Reliance on Materials and Information

The findings and results presented in reports prepared by Cambium are based on the materials and information provided by the client to Cambium and on the facts, conditions and circumstances encountered by Cambium during the performance of the work requested by the client. In formulating its findings and results into a report, Cambium assumes that the information and materials provided by the client or obtained by Cambium from the client or otherwise are factual, accurate and represent a true depiction of the circumstances that exist. Cambium relies on its client to inform Cambium if there are changes to any such information and materials. Cambium does not review, analyze or attempt to verify the accuracy or completeness of the information or materials provided, or circumstances encountered, other than in accordance with applicable accepted industry practice. Cambium will not be responsible for matters arising from incomplete, incorrect or misleading information or from facts or circumstances that are not fully disclosed to or that are concealed from Cambium during the provision of services, work or reports.

Facts, conditions, information and circumstances may vary with time and locations and Cambium's work is based on a review of such matters as they existed at the particular time and location indicated in its reports. No assurance is made by Cambium that the facts, conditions, information, circumstances or any underlying assumptions made by Cambium in connection with the work performed will not change after the work is completed and a report is submitted. If any such changes occur or additional information is obtained, Cambium should be advised and requested to consider if the changes or additional information affect its findings or results.

When preparing reports, Cambium considers applicable legislation, regulations, governmental guidelines and policies to the extent they are within its knowledge, but Cambium is not qualified to advise with respect to legal matters. The presentation of information regarding applicable legislation, regulations, governmental guidelines and policies is for information only and is not intended to and should not be interpreted as constituting a legal opinion concerning the work completed or conditions outlined in a report. All legal matters should be reviewed and considered by an appropriately qualified legal practitioner.

Site Assessments

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

Only conditions at the Site and locations chosen for study by the client are evaluated; no adjacent or other properties are evaluated unless specifically requested by the client. Any physical or other aspects of the Site chosen for study by the client, or any other matter not specifically addressed in a report prepared by Cambium, are beyond the scope of the work performed by Cambium and such matters have not been investigated or addressed.

No Reliance

Cambium's services, work and reports are provided solely for the exclusive use of the client which has retained the services of Cambium and to which its reports are addressed. Cambium is not responsible for the use of its work or reports by any other party, or for the reliance on, or for any decision which is made by any party using the services or work performed by or a report prepared by Cambium without Cambium's express written consent. Any party that relies on services or work performed by Cambium or a report prepared by Cambium without Cambium's express written consent, does so at its own risk. No report of Cambium may be disclosed or referred to in any public document without Cambium's express prior written consent. Cambium specifically disclaims any liability or responsibility to any such party for any loss, damage, expense, fine, penalty or other such thing which may arise or result from the use of any information, recommendation or other matter arising from the services, work or reports provided by Cambium.

Limitation of Liability

Cambium is not responsible for any lost revenues, lost profits, cost of capital, or any special, indirect, consequential or punitive damages suffered by the client or any other party in reliance on any Cambium work or report. Cambium's total liability and responsibility to the client or any other person for any and all losses, costs, expenses, damages, claims, causes of action or other liability whatsoever which do or may result or arise from or be in relation to Cambium's services, work (or failure to perform services or work) or reports shall be limited to the invoiced charges for the work performed by Cambium.

Personal Liability

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

Gradation Analysis

Client Name: *City of Kawartha Lakes - Waste and Recycling E*
Project No.: *11419-001*

Project Name: *CKL - Soil Testing 2020 - Various Works Yards*

Source: *No. 1 Emily Depot*
Date Sampled: *August 10, 2020*

Sampled By: *Client*
Lab No.: *AG-20-0291*

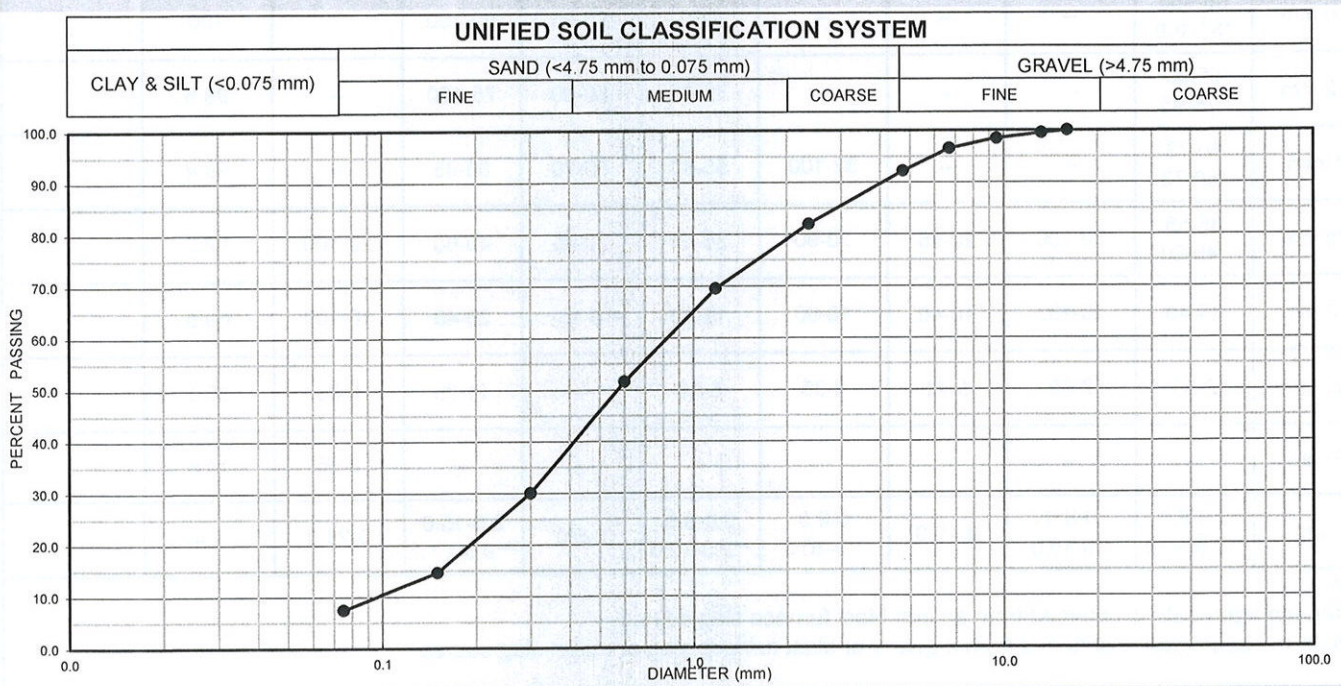
Material Type: *No Specs*

Sieves (mm)	% Passing* Sample
Coarse Aggregate	
150.00	
106.00	
63.00	
53.00	
37.50	
26.50	
19.00	
16.00	100.0
13.20	99.5
9.50	98.4
6.70	96.5
4.75	92.2

Sieves (mm)	% Passing* Sample
Fine Aggregate	
2.36	81.9
1.18	69.5
0.600	51.6
0.300	30.1
0.150	14.6
0.075	7.4

Sample Results	
Initial Dry Sample Mass (g)	8767.0
Coarse Aggregate (%)	7.8
Fine Aggregate (%)	92.2
Moisture Content (%)	3.5
% Loss	0.0

* Percentages are based on oven-dry material



Remarks:

Issued By: _____ (Senior Project Manager)

Date Issued: August 19, 2020

Cambium Inc. (Laboratory)
866.217.7900 | cambium-inc.com

AGGREGATES GRADATION REQUIREMENTS
OPSS 1010 - GRANULARS, LS-602

Client: *City of Kawartha Lakes - Waste and Recycling Branch*
Project Name: *CKL - Soil Testing 2020 - Various Works Yards*
Sampled By: *Client*
Location: *Emily Depot*
Material Type: *No Specs*
MTO Contract No.: *N/A*

Project Number: *11419-001*
Date Sampled: *August 10, 2020*
Lab Sample No.: *AG-20-0291*

Sieve Size	Gradation Requirement, % Passing								Test Result	
	A	B			M	O	S	SSM	Sample	Meets Requirements (Y/N)
		Type I	Type II	Type III						
150 mm	--	100	--	100	--	--	--	100	100	
106 mm	--	--	100	--	--	--	--	--	100	
37.5 mm	--	--	--	--	--	100	--	--	100	
26.5 mm	100	50-100	50-100	50-100	--	95-100	100	50-100	100	
19.0 mm	85-100 *87-100	--	--	--	100	80-95	90-100	--	100	
13.2 mm	65-90 *75-95	--	--	--	75-95	60-80	75-100	--	99.5	
9.5 mm	50-73 *60-73	--	--	32-100	55-80	50-70	60-85	--	98.4	
4.75 mm	35-55 *40-60	20-100	20-55	20-90	35-55	20-45	40-60	20-100	92.2	
1.18 mm	15-40	10-100	10-40	10-60	15-40	0-15	20-40	10-100	69.5	
300 µm	2-55	2-65	5-22	2-35	5-22	--	11-25	5-95	30.1	
150 µm	--	--	--	--	--	--	--	2-65	14.6	
75 µm	2.0-8.0 **2.0-10.0	0-8.0 **0-10.0	0-10.0	0-8.0 **0-10.0	2.0-8.0 **2.0-10.0	0-5.0	9.0-15.0 **9.0-17.0	0-25.0	7.4	

Notes:
* When the aggregate is obtained from an iron blast furnace slag source.
** When the aggregate is obtained from a quarry or blast furnace slag or nickel slag source.

Issued by: Stuart Baird

Stuart Baird, Senior Project Manager

August 19, 2020
Date

Cambium Inc. (Laboratory)
866.217.7900 | cambium-inc.com
701 The Queensway | Units 5-6 | Peterborough | ON | K9J 7J6

AGGREGATES PHYSICAL PROPERTIES REQUIREMENTS
OPSS 1010 - GRANULARS, LS-VARIOUS PROCDURES

Client: *City of Kawartha Lakes - Waste and Recycling Branch* **Project Number:** *11419-001*

Project Name: *CKL - Soil Testing 2020 - Various Works Yards*

Sampled By: *Client* **Date Sampled:** *August 10, 2020*

Location: *Emily Depot*

Material Type: *No Specs*

MTO Contract No.: *N/A* **Lab Sample No.:** *AG-20-0291*

LS Test Procedure Name and Number	Gradation Requirement, % Passing								Test Result	
	A	B			M	O	S	SSM	Sample	Meets Requirements (Y/N)
		Type I	Type II	Type III						
Crushed Particles % minimum, LS-607	60	-	100	-	60	100	50	-	N/A	
Unconfined Freeze-Thaw, % maximum loss, LS-614	-	-	-	-	-	15	-	-	N/A	
2 or more Crushed Faces % minimum, LS-617	-	-	-	-	-	85 (Note 1)	-	-	N/A	
Micro-Deval Abrasion, Coarse Aggregate % maximum loss LS-618	25	30 (Note 2)	30	30 (Note 2)	25	21	25	30 (Note 2)	N/A	
Micro-Deval Abrasion, Fine Aggregate % maximum loss LS-619	30	35	35	35	30	25	30	-	10.6	
Asphalt Coated Particles, % maximum, LS-621	30	30	0	30	30	0	30	0	N/A	
Amount of Contamination, LS-630	(Note 3)									
Plasticity Index, maximum, LS-703/704	0									
Determination of Permeability, k, LS-709	(Note 4)									

Notes:
1. When Granular O is produced from boulders, cobbles, or gravel retained on the 50 mm sieve.
2. The coarse aggregate Micro-Deval abrasion loss test requirement shall be waived if the material has more than 80% passing the 4.75 mm sieve.
3. Granular A, B Type I, B Type III, or M may contain up to 15 percent by mass crushed glass or ceramic materials. Granular A, B Type III, M, O, and S shall not contain more than 1.0 percent by mass of wood, clay brick and/or gypsum and/or gypsum wall board or plaster. Granular B Type II and SSM shall not contain more than 0.1 percent by mass of wood.
4. For materials north of the French/Mattawa Rivers only, the coefficient of permeability, k, shall be greater than 1.0 x 10-4 cm/s or field experience has demonstrated satisfactory
performance. Prior data demonstrating compliance with this requirement for k, shall be acceptable provided that such testing has been done within 5 years of the material being used and field performance has continually been shown to be satisfactory.

Issued by: Stuart Baird

Stuart Baird, Senior Project Manager

August 20, 2020
Date

Cambium Inc. (Laboratory)
866.217.7900 | cambium-inc.com
701 The Queensway | Units 5-6 | Peterborough | ON | K9J 7J6

Gradation Analysis

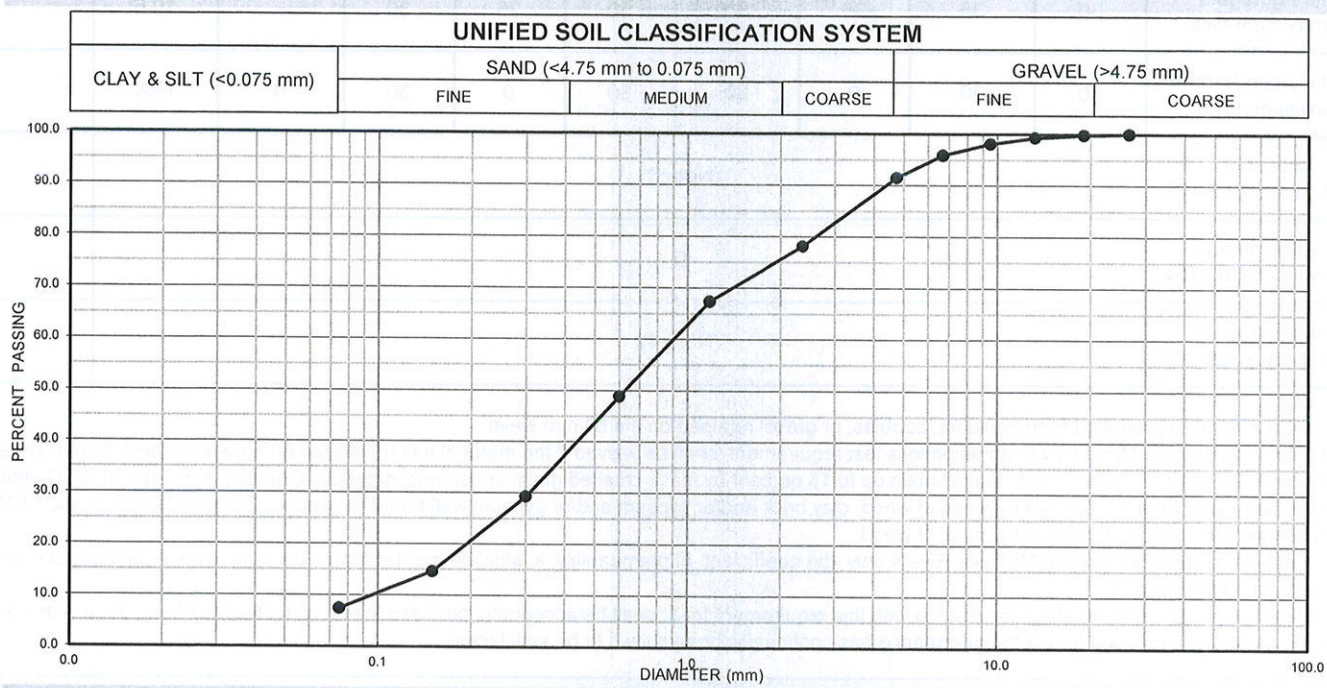
Client Name: *City of Kawartha Lakes - Waste and Recycling E*
Project No.: *11419-001*
Project Name: *CKL - Soil Testing 2020 - Various Works Yards*
Source: *No. 2 Eldon Depot*
Date Sampled: *August 10, 2020*
Sampled By: *Client*
Lab No.: *AG-20-0292*
Material Type: *No Specs*

Sieves (mm)	% Passing* Sample
Coarse Aggregate	
150.00	
106.00	
63.00	
53.00	
37.50	
26.50	100.0
19.00	99.8
16.00	
13.20	99.3
9.50	98.1
6.70	95.9
4.75	91.5

Sieves (mm)	% Passing* Sample
Fine Aggregate	
2.36	78.1
1.18	67.3
0.600	48.8
0.300	29.3
0.150	14.7
0.075	7.5

Sample Results	
Initial Dry Sample Mass (g)	10897.0
Coarse Aggregate (%)	8.5
Fine Aggregate (%)	91.5
Moisture Content (%)	3.4
% Loss	0.0

* Percentages are based on oven-dry material



Remarks:

Issued By: _____ (Senior Project Manager)

Date Issued: August 19, 2020

Cambium Inc. (Laboratory)
866.217.7900 | cambium-inc.com

AGGREGATES GRADATION REQUIREMENTS
OPSS 1010 - GRANULARS, LS-602

Client: *City of Kawartha Lakes - Waste and Recycling Branch*
Project Number: *11419-001*
Project Name: *CKL - Soil Testing 2020 - Various Works Yards*
Sampled By: *Client*
Date Sampled: *August 10, 2020*
Location: *Eldon Depot*
Material Type: *No Specs*
MTO Contract No.: *N/A*
Lab Sample No.: *AG-20-0292*

Sieve Size	Gradation Requirement, % Passing								Test Result	
	A	B			M	O	S	SSM	Sample	Meets Requirements (Y/N)
		Type I	Type II	Type III						
150 mm	--	100	--	100	--	--	--	100	100	
106 mm	--	--	100	--	--	--	--	--	100	
37.5 mm	--	--	--	--	--	100	--	--	100	
26.5 mm	100	50-100	50-100	50-100	--	95-100	100	50-100	100	
19.0 mm	85-100 *87-100	--	--	--	100	80-95	90-100	--	99.8	
13.2 mm	65-90 *75-95	--	--	--	75-95	60-80	75-100	--	99.3	
9.5 mm	50-73 *60-73	--	--	32-100	55-80	50-70	60-85	--	98.1	
4.75 mm	35-55 *40-60	20-100	20-55	20-90	35-55	20-45	40-60	20-100	91.5	
1.18 mm	15-40	10-100	10-40	10-60	15-40	0-15	20-40	10-100	67.3	
300 µm	2-55	2-65	5-22	2-35	5-22	--	11-25	5-95	29.3	
150 µm	--	--	--	--	--	--	--	2-65	14.7	
75 µm	2.0-8.0 **2.0-10.0	0-8.0 **0-10.0	0-10.0	0-8.0 **0-10.0	2.0-8.0 **2.0-10.0	0-5.0	9.0-15.0 **9.0-17.0	0-25.0	7.5	

Notes:
* When the aggregate is obtained from an iron blast furnace slag source.
** When the aggregate is obtained from a quarry or blast furnace slag or nickel slag source.

Issued by: Stuart Baird, Senior Project Manager

August 19, 2020
Date

Cambium Inc. (Laboratory)
866.217.7900 | cambium-inc.com
701 The Queensway | Units 5-6 | Peterborough | ON | K9J 7J6

CAMBIUM

AGGREGATES PHYSICAL PROPERTIES REQUIREMENTS
OPSS 1010 - GRANULARS, LS-VARIOUS PROCDURES

Client: *City of Kawartha Lakes - Waste and Recycling Branch*
Project Number: *11419-001*
Project Name: *CKL - Soil Testing 2020 - Various Works Yards*
Sampled By: *Client*
Date Sampled: *August 10, 2020*
Location: *Eldon Depot*
Material Type: *No Specs*
MTO Contract No.: *N/A*
Lab Sample No.: *AG-20-0292*

LS Test Procedure Name and Number	Gradation Requirement, % Passing								Test Result	
	A	B			M	O	S	SSM	Sample	Meets Requirements (Y/N)
		Type I	Type II	Type III						
Crushed Particles % minimum, LS-607	60	-	100	-	60	100	50	-	N/A	
Unconfined Freeze-Thaw, % maximum loss, LS-614	-	-	-	-	-	15	-	-	N/A	
2 or more Crushed Faces % minimum, LS-617	-	-	-	-	-	85 (Note 1)	-	-	N/A	
Micro-Deval Abrasion, Coarse Aggregate % maximum loss LS-618	25	30 (Note 2)	30	30 (Note 2)	25	21	25	30 (Note 2)	N/A	
Micro-Deval Abrasion, Fine Aggregate % maximum loss LS-619	30	35	35	35	30	25	30	-	9.7	
Asphalt Coated Particles, % maximum, LS-621	30	30	0	30	30	0	30	0	N/A	
Amount of Contamination, LS-630	(Note 3)									
Plasticity Index, maximum, LS-703/704	0									
Determination of Permeability, k, LS-709	(Note 4)									

Notes:
1. When Granular O is produced from boulders, cobbles, or gravel retained on the 50 mm sieve.
2. The coarse aggregate Micro-Deval abrasion loss test requirement shall be waived if the material has more than 80% passing the 4.75 mm sieve.
3. Granular A, B Type I, B Type III, or M may contain up to 15 percent by mass crushed glass or ceramic materials. Granular A, B Type III, M, O, and S shall not contain more than 1.0 percent by mass of wood, clay brick and/or gypsum and/or gypsum wall board or plaster. Granular B Type II and SSM shall not contain more than 0.1 percent by mass of wood.
4. For materials north of the French/Mattawa Rivers only, the coefficient of permeability, k, shall be greater than 1.0 x 10-4 cm/s or field experience has demonstrated satisfactory
performance. Prior data demonstrating compliance with this requirement for k, shall be acceptable provided that such testing has been done within 5 years of the material being used and field performance has continually been shown to be satisfactory.

Issued by:

Stuart Baird, Senior Project Manager

August 20, 2020
Date

Cambium Inc. (Laboratory)
866.217.7900 | cambium-inc.com
701 The Queensway | Units 5-6 | Peterborough | ON | K9J 7J6

Gradation Analysis

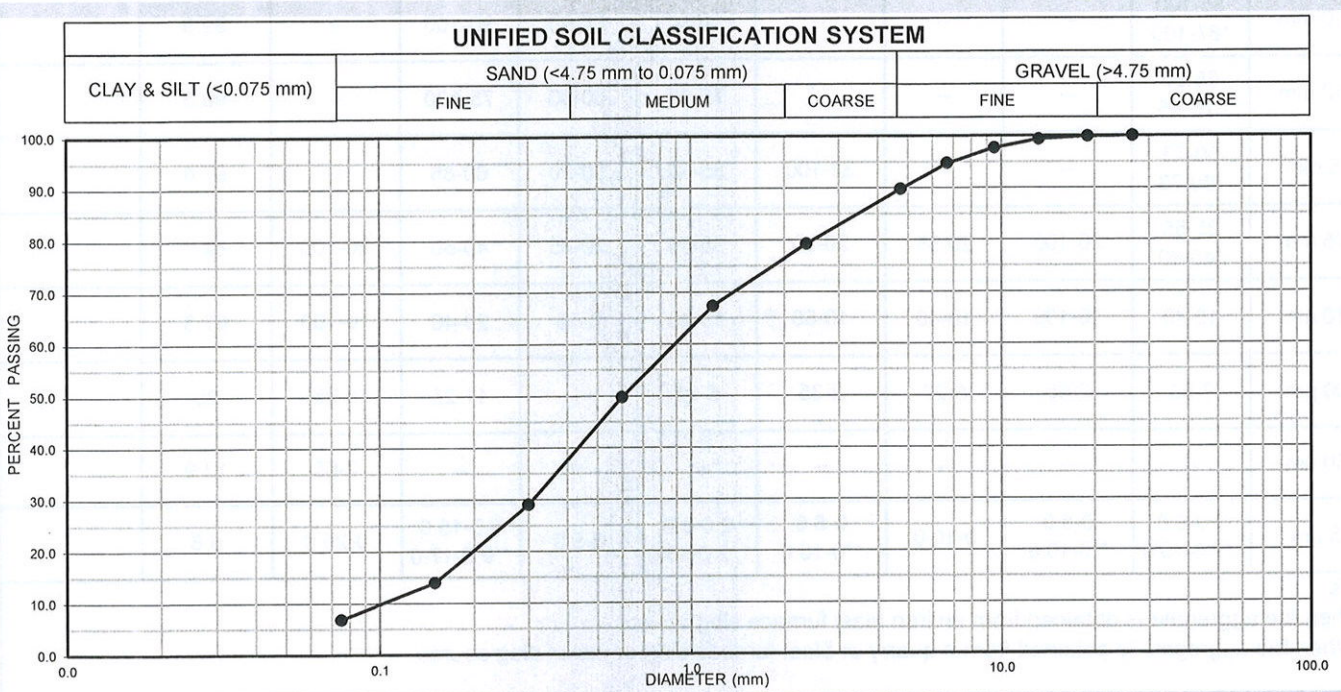
Client Name: *City of Kawartha Lakes - Waste and Recycling E*
Project No.: *11419-001*
Project Name: *CKL - Soil Testing 2020 - Various Works Yards*
Source: *No. 3 Bobcaygeon Depot*
Date Sampled: *August 10, 2020*
Sampled By: *Client*
Lab No.: *AG-20-0293*
Material Type: *No Specs*

Sieves (mm)	% Passing* Sample
Coarse Aggregate	
150.00	
106.00	
63.00	
53.00	
37.50	
26.50	100.0
19.00	99.9
16.00	
13.20	99.3
9.50	97.6
6.70	94.7
4.75	89.7

Sieves (mm)	% Passing* Sample
Fine Aggregate	
2.36	79.2
1.18	67.3
0.600	49.7
0.300	29.0
0.150	13.9
0.075	6.8

Sample Results	
Initial Dry Sample Mass (g)	10270.0
Coarse Aggregate (%)	10.3
Fine Aggregate (%)	89.7
Moisture Content (%)	2.8
% Loss	0.0

* Percentages are based on oven-dry material



Remarks:

Issued By: _____ (Senior Project Manager)

Date Issued: August 19, 2020

Cambium Inc. (Laboratory)
866.217.7900 | cambium-inc.com

AGGREGATES GRADATION REQUIREMENTS
OPSS 1010 - GRANULARS, LS-602

Client: *City of Kawartha Lakes - Waste and Recycling Branch*
Project Name: *CKL - Soil Testing 2020 - Various Works Yards*
Sampled By: *Client*
Location: *Bobcaygeon Depot*
Material Type: *No Specs*
MTO Contract No.: *N/A*

Project Number: *11419-001*
Date Sampled: *August 10, 2020*
Lab Sample No.: *AG-20-0293*

Sieve Size	Gradation Requirement, % Passing								Test Result	
	A	B			M	O	S	SSM	Sample	Meets Requirements (Y/N)
		Type I	Type II	Type III						
150 mm	--	100	--	100	--	--	--	100	100	
106 mm	--	--	100	--	--	--	--	--	100	
37.5 mm	--	--	--	--	--	100	--	--	100	
26.5 mm	100	50-100	50-100	50-100	--	95-100	100	50-100	100	
19.0 mm	85-100 *87-100	--	--	--	100	80-95	90-100	--	99.9	
13.2 mm	65-90 *75-95	--	--	--	75-95	60-80	75-100	--	99.3	
9.5 mm	50-73 *60-73	--	--	32-100	55-80	50-70	60-85	--	97.6	
4.75 mm	35-55 *40-60	20-100	20-55	20-90	35-55	20-45	40-60	20-100	89.7	
1.18 mm	15-40	10-100	10-40	10-60	15-40	0-15	20-40	10-100	67.3	
300 µm	2-55	2-65	5-22	2-35	5-22	--	11-25	5-95	29	
150 µm	--	--	--	--	--	--	--	2-65	13.9	
75 µm	2.0-8.0 **2.0-10.0	0-8.0 **0-10.0	0-10.0	0-8.0 **0-10.0	2.0-8.0 **2.0-10.0	0-5.0	9.0-15.0 **9.0-17.0	0-25.0	6.8	

Notes:
* When the aggregate is obtained from an iron blast furnace slag source.
** When the aggregate is obtained from a quarry or blast furnace slag or nickel slag source.

Issued by: Stuart Baird

Stuart Baird, Senior Project Manager

August 19, 2020
Date

Cambium Inc. (Laboratory)
866.217.7900 | cambium-inc.com
701 The Queensway | Units 5-6 | Peterborough | ON | K9J 7J6

AGGREGATES PHYSICAL PROPERTIES REQUIREMENTS
OPSS 1010 - GRANULARS, LS-VARIOUS PROCDURES

Client: *City of Kawartha Lakes - Waste and Recycling Branch*
Project Number: *11419-001*
Project Name: *CKL - Soil Testing 2020 - Various Works Yards*
Sampled By: *Client*
Date Sampled: *August 10, 2020*
Location: *Bobcaygeon Depot*
Material Type: *No Specs*
MTO Contract No.: *N/A*
Lab Sample No.: *AG-20-0293*

LS Test Procedure Name and Number	Gradation Requirement, % Passing								Test Result	
	A	B			M	O	S	SSM	Sample	Meets Requirements (Y/N)
		Type I	Type II	Type III						
Crushed Particles % minimum, LS-607	60	-	100	-	60	100	50	-	N/A	
Unconfined Freeze-Thaw, % maximum loss, LS-614	-	-	-	-	-	15	-	-	N/A	
2 or more Crushed Faces % minimum, LS-617	-	-	-	-	-	85 (Note 1)	-	-	N/A	
Micro-Deval Abrasion, Coarse Aggregate % maximum loss LS-618	25	30 (Note 2)	30	30 (Note 2)	25	21	25	30 (Note 2)	N/A	
Micro-Deval Abrasion, Fine Aggregate % maximum loss LS-619	30	35	35	35	30	25	30	-	10.7	
Asphalt Coated Particles, % maximum, LS-621	30	30	0	30	30	0	30	0	N/A	
Amount of Contamination, LS-630	(Note 3)									
Plasticity Index, maximum, LS-703/704	0									
Determination of Permeability, k, LS-709	(Note 4)									

Notes:
1. When Granular O is produced from boulders, cobbles, or gravel retained on the 50 mm sieve.
2. The coarse aggregate Micro-Deval abrasion loss test requirement shall be waived if the material has more than 80% passing the 4.75 mm sieve.
3. Granular A, B Type I, B Type III, or M may contain up to 15 percent by mass crushed glass or ceramic materials. Granular A, B Type III, M, O, and S shall not contain more than 1.0 percent by mass of wood, clay brick and/or gypsum and/or gypsum wall board or plaster. Granular B Type II and SSM shall not contain more than 0.1 percent by mass of wood.
4. For materials north of the French/Mattawa Rivers only, the coefficient of permeability, k, shall be greater than 1.0 x 10-4 cm/s or field experience has demonstrated satisfactory
performance. Prior data demonstrating compliance with this requirement for k, shall be acceptable provided that such testing has been done within 5 years of the material being used and field performance has continually been shown to be satisfactory.

Issued by: Stuart Baird, Senior Project Manager — August 20, 2020, Date

Cambium Inc. (Laboratory)
866.217.7900 | cambium-inc.com
701 The Queensway | Units 5-6 | Peterborough | ON | K9J 7J6