



Environmental

Geotechnical

Building Sciences

Construction  
Monitoring

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**Locations**

Peterborough  
Kingston  
Barrie  
Oshawa

**Laboratory**

Peterborough



June 27, 2019

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

Via email: [rmonaghan@kawarthalakes.ca](mailto:rmonaghan@kawarthalakes.ca)

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

**Re: Characterization of Street Sweepings**  
**City of Kawartha Lakes, Ontario**  
**Cambium Reference: 7817-002**

---

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 the sweepings as waste, the winter sand sweepings are stockpiled at the Emily, Fenelon, and Oakwood 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



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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 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 electrical conductivity (EC) and/or sodium adsorption ratio (SAR) in the samples collected from the Emily and Oakwood depots at concentrations exceeding the Table 1 standards, but less than the Table 2 standards. It is likely that the observed EC and SAR exceedances are due to the use of de-icing salt. The results also reported PHC F3 and/or F4 in the samples collected from the Emily and Fenelon depots at concentrations exceeding the Table 1 standards, but less than the Table 2 standards. It is likely that the observed PHC F3 and F4 concentrations are 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.

## 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.



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**Table 1 Gradation and Physical Testing Results**

Sieve (mm)	Emily Depot (% passing)	Fenelon Depot (% passing)	Oakwood Depot (% passing)
26.5	100	100	100
13.2	99.6	99.9	99.9
9.5	98.6	99.4	99.6
4.75	93.1	93.2	94.9
1.18	66.9	67.1	67.6
0.300	31.6	25.4	25.2
0.150	17.7	11.1	11.2
0.075	10.3	4.7	5.7
Fine Aggregate % loss	11.2%	8.6%	14.1%

The material from the Oakwood and Fenelon Depots meet the gradation requirements for Granular B Type 1 and SSM material. The material from the Emily Depot meets the SSM gradation requirements but does not meet the Granular B Type 1 gradation requirements due to the fines percentage of 10.3%, which is more than the maximum of 8% in the specification.

## 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 (except for the Emily Depot) 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.



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June 27, 2019

- 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 the Emily Depot 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. The stockpiled street sweepings from the Fenelon and Oakwood depots do not meet the winter sand requirements, although the testing results show that they are within <1% of the requirements noted above.

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

\\camfile\Projects\7800 to 7899\7817-002 City of Kawartha Lakes - Soil Testing - Various Works Yards 2019\Deliverables\2019-06-27 LTR Soil Characterization for CKL.docx



June 27, 2019

## 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.

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### Site Assessments

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

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### Personal Liability

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

Sample Identification	Units	Laboratory Reportable Detection Limit (RDL)	Table 1 Standards <sup>1</sup>	Table 2 Standards <sup>2</sup>	Emily Depot	Fenelon Depot	Oakwood Depot
Sample Date					4-Jun-19	4-Jun-19	4-Jun-19
Barium	µg/g	0.1	220	670	17	15	20
Beryllium	µg/g	0.02	2.5	8	0.09	0.08	0.12
Boron	µg/g	1	36	120	3	2	3
Cadmium	µg/g	0.02	1.2	1.9	0.03	0.09	< 0.02
Chromium	µg/g	0.5	70	160	3.7	4.2	3.6
Cobalt	µg/g	0.01	21	80	1.5	2.1	2
Copper	µg/g	0.1	92	230	4	5.4	4.8
Lead	µg/g	0.1	120	120	2.6	1.5	2.2
Molybdenum	µg/g	0.1	2	40	0.3	0.2	0.1
Nickel	µg/g	0.5	82	270	3	3.2	3.5
Silver	µg/g	0.05	0.5	40	< 0.05	< 0.05	< 0.05
Thallium	µg/g	0.02	1	3.3	0.03	0.02	0.05
Uranium	µg/g	0.002	2.5	33	0.24	0.21	0.28
Vanadium	µg/g	3	86	86	7	12	7
Zinc	µg/g	0.7	290	340	15	57	9.9
Antimony	µg/g	0.8	1.3	40	< 0.8	< 0.8	< 0.8
Arsenic	µg/g	0.5	18	18	1.4	0.8	1.4
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	<b>6.2</b>	0.8	<b>2.8</b>
Conductivity	mS/cm	0.002	0.57	1.4	<b>0.97</b>	0.11	0.29
pH	N/A	0.05	NV	NV	8.15	8.17	8.21
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
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	189	<b>264</b>	57
F4 (C34 to C50)	µg/g	50	120	3300	<b>366</b>	<b>493</b>	108
PHC F4 (Gravimetric)	µg/g	200	120	3300	<b>1030</b>	<b>1090</b>	---

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.



## FINAL REPORT

CA14211-JUN19 R

7812-002, Street Sweeping Characterization

Prepared for

**Cambium Inc.**

### First Page

#### CLIENT DETAILS

Client Cambium Inc.

Address 52 Hunter Street East  
Peterborough, ON  
K9H 1G5, Canada

Contact Bernie Taylor

Telephone 705-742-7900 ext 200

Facsimile 705-742-7907

Email bernie.taylor@cambium-inc.com; file@cambium-inc.com

Project 7812-002, Street Sweeping Characterization

Order Number

Samples Soil (3)

#### LABORATORY DETAILS

Project Specialist Brad Moore Hon. B.Sc

Laboratory SGS Canada Inc.

Address 185 Concession St., Lakefield ON, K0L 2H0

Telephone 705-652-2143

Facsimile 705-652-6365

Email brad.moore@sgs.com

SGS Reference CA14211-JUN19

Received 06/05/2019

Approved 06/12/2019

Report Number CA14211-JUN19 R

Date Reported 06/12/2019

#### 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: 12 degrees C

Cooling Agent Present: No

Custody Seal Present: No

Chain of Custody Number: 006861

#### SIGNATORIES

Brad Moore Hon. B.Sc





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# FINAL REPORT

CA14211-JUN19 R

Client: Cambium Inc.

Project: 7812-002, Street Sweeping Characteri

Project Manager: Bernie Taylor

Samplers: Dave Flemming

## PACKAGE: REG153 - BTEX (SOIL)

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

L2 = REG153 / SOIL / COARSE - TABLE 2 - Industrial/Commercial - UNDEFINED

			Sample Number		11	12	13
			Sample Name		Emily Depot	Oakwood Depot	Fenelon Depot
			Sample Matrix		Soil	Soil	Soil
			Sample Date		04/06/2019	04/06/2019	04/06/2019
Parameter	Units	RL	L1	L2	Result	Result	Result
<b>BTEX</b>							
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 (total)	µg/g	0.05	0.05	26	< 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

L2 = REG153 / SOIL / COARSE - TABLE 2 - Industrial/Commercial - UNDEFINED

			Sample Number		11	12	13
			Sample Name		Emily Depot	Oakwood Depot	Fenelon Depot
			Sample Matrix		Soil	Soil	Soil
			Sample Date		04/06/2019	04/06/2019	04/06/2019
Parameter	Units	RL	L1	L2	Result	Result	Result
<b>Hydrides</b>							
Antimony	µg/g	0.8	1.3	40	< 0.8	< 0.8	< 0.8
Arsenic	µg/g	0.5	18	18	1.4	1.4	0.8
Selenium	µg/g	0.7	1.5	5.5	< 0.7	< 0.7	< 0.7



# FINAL REPORT

CA14211-JUN19 R

Client: Cambium Inc.

Project: 7812-002, Street Sweeping Characteri:

Project Manager: Bernie Taylor

Samplers: Dave Flemming

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

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

L2 = REG153 / SOIL / COARSE - TABLE 2 - Industrial/Commercial - UNDEFINED

Sample Number	11	12	13
Sample Name	Emily Depot	Oakwood Depot	Fenelon Depot
Sample Matrix	Soil	Soil	Soil
Sample Date	04/06/2019	04/06/2019	04/06/2019

Parameter	Units	RL	L1	L2	Result	Result	Result
<b>Metals and Inorganics</b>							
Moisture Content	%	-			4.6	4.4	3.2
Barium	µg/g	0.1	220	670	17	20	15
Beryllium	µg/g	0.02	2.5	8	0.09	0.12	0.08
Boron	µg/g	1	36	120	3	3	2
Cadmium	µg/g	0.02	1.2	1.9	0.03	< 0.02	0.09
Chromium	µg/g	0.5	70	160	3.7	3.6	4.2
Cobalt	µg/g	0.01	21	80	1.5	2.0	2.1
Copper	µg/g	0.1	92	230	4.0	4.8	5.4
Lead	µg/g	0.1	120	120	2.6	2.2	1.5
Molybdenum	µg/g	0.1	2	40	0.3	0.1	0.2
Nickel	µg/g	0.5	82	270	3.0	3.5	3.2
Silver	µg/g	0.05	0.5	40	< 0.05	< 0.05	< 0.05
Thallium	µg/g	0.02	1	3.3	0.03	0.05	0.02
Uranium	µg/g	0.002	2.5	33	0.24	0.28	0.21
Vanadium	µg/g	3	86	86	7	7	12
Zinc	µg/g	0.7	290	340	15	9.9	57
Water Soluble Boron	µg/g	0.5		2	< 0.5	< 0.5	< 0.5



# FINAL REPORT

CA14211-JUN19 R

Client: Cambium Inc.

Project: 7812-002, Street Sweeping Characteri

Project Manager: Bernie Taylor

Samplers: Dave Flemming

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

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

L2 = REG153 / SOIL / COARSE - TABLE 2 - Industrial/Commercial - UNDEFINED

Sample Number	11	12	13
Sample Name	Emily Depot	Oakwood Depot	Fenelon Depot
Sample Matrix	Soil	Soil	Soil
Sample Date	04/06/2019	04/06/2019	04/06/2019

Parameter	Units	RL	L1	L2	Result	Result	Result
Other (ORP)							
Mercury	µg/g	0.05	0.27	3.9	< 0.05	< 0.05	< 0.05
Sodium Adsorption Ratio	---	0.2	2.4	12	6.2	2.8	0.8
SAR Calcium	mg/L	0.09			27.5	22.6	11.0
SAR Magnesium	mg/L	0.02			21.9	1.6	0.80
SAR Sodium	mg/L	0.15			178	52.0	10.4
Conductivity	mS/cm	0.002	0.57	1.4	0.97	0.29	0.11
pH	pH Units	0.05			8.15	8.21	8.17
Chromium VI	µg/g	0.2	0.66	8	< 0.2	< 0.2	< 0.2
Free Cyanide	µg/g	0.05			< 0.05	< 0.05	< 0.05



# FINAL REPORT

CA14211-JUN19 R

Client: Cambium Inc.

Project: 7812-002, Street Sweeping Characteri:

Project Manager: Bernie Taylor

Samplers: Dave Flemming

## PACKAGE: REG153 - PHCs (SOIL)

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

L2 = REG153 / SOIL / COARSE - TABLE 2 - Industrial/Commercial - UNDEFINED

Sample Number	11	12	13
Sample Name	Emily Depot	Oakwood Depot	Fenelon Depot
Sample Matrix	Soil	Soil	Soil
Sample Date	04/06/2019	04/06/2019	04/06/2019

Parameter	Units	RL	L1	L2	Result	Result	Result
<b>PHCs</b>							
F1 (C6-C10)	µg/g	10	25	55	< 10	< 10	< 10
F1-BTEX (C6-C10)	µg/g	10			< 10	< 10	< 10
F2 (C10-C16)	µg/g	10	10	230	< 10	< 10	< 10
F3 (C16-C34)	µg/g	50	240	1700	189	57	264
F4 (C34-C50)	µg/g	50	120	3300	366	108	493
F4G-sg (GHH)	µg/g	200	120	3300	1030		1090
Chromatogram returned to baseline at nC50	Yes / No	-			NO	YES	NO

### EXCEEDANCE SUMMARY

				REG153 / SOIL / COARSE - TABLE 1 - Residential/Parklan d/Industrial - UNDEFINED	REG153 / SOIL / COARSE - TABLE 2 - Industrial/Commer cial - UNDEFINED
Parameter	Method	Units	Result	L1	L2
Emily Depot					
F4 (C34 to C50)	CCME Tier 1	µg/g	366	120	
Gravimetric Heavy Hydrocarbons	CCME Tier 1	µg/g	1030	120	
Conductivity	EPA 6010/SM 2510	µg/g	0.97	0.57	
Sodium Adsorption Ratio	MOE 4696e01/EPA 6010	µg/g	6.2	2.4	
Oakwood Depot					
Sodium Adsorption Ratio	MOE 4696e01/EPA 6010	µg/g	2.8	2.4	
Fenelon Depot					
F3 (C16 to C34)	CCME Tier 1	µg/g	264	240	
F4 (C34 to C50)	CCME Tier 1	µg/g	493	120	
Gravimetric Heavy Hydrocarbons	CCME Tier 1	µg/g	1090	120	

## QC SUMMARY

### Conductivity

Method: EPA 6010/SM 2510 | 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 Lin (%)
								Low	High		Low
Conductivity	EWL0123-JUN19	mS/cm	0.002	<0.002	0	10	99	90	110	NA	

### Cyanide by SFA

Method: SM 4500 | 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 Lin (%)
								Low	High		Low
Free Cyanide	SKA5021-JUN19	µg/g	0.05	<0.05	ND	20	97	80	120	101	75

### Hexavalent Chromium by IC

Method: EPA218.6/EPA3060A | Internal ref.: ME-CA-IENVIC-LAK-AN-008

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
Chromium VI	DIO0119-JUN19	µg/g	0.2	<0.2	ND	20	98	80	120	94	75

## QC SUMMARY

### Mercury by CVAAS

Method: EPA 7471A/EPA 245 | Internal ref.: ME-CA-IENVISPE-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.	
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limit (%)
								Low	High		Low
Mercury	EMS0032-JUN19	µg/g	0.05	<0.05	ND	20	101	80	120	93	70

### Metals in aqueous samples - ICP-OES

Method: MOE 4696e01/EPA 6010 | Internal ref.: ME-CA-IENVISPE-LAK-AN-003

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.	
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limit (%)
								Low	High		Low
SAR Calcium	ESG0021-JUN19	mg/L	0.09	<0.09	4	20	99	80	120	100	70
SAR Magnesium	ESG0021-JUN19	mg/L	0.02	<0.02	ND	20	96	80	120	101	70
SAR Sodium	ESG0021-JUN19	mg/L	0.15	<0.15	4	20	91	80	120	93	70

## QC SUMMARY

Metals in Soil - Aqua-regia/ICP-MS

Method: EPA 3050/EPA 200.8 | Internal ref.: ME-CA-IENVISPE-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 Lin (%)
								Low	High		
Silver	EMS0032-JUN19	ug/g	0.05	<0.05	ND	20	102	70	130	101	70
Arsenic	EMS0032-JUN19	µg/g	0.5	<0.5	7	20	92	70	130	92	70
Barium	EMS0032-JUN19	ug/g	0.1	<0.1	10	20	107	70	130	94	70
Beryllium	EMS0032-JUN19	µg/g	0.02	<0.02	1	20	100	70	130	95	70
Boron	EMS0032-JUN19	µg/g	1	<1	6	20	108	70	130	96	70
Cadmium	EMS0032-JUN19	µg/g	0.02	<0.02	4	20	100	70	130	104	70
Cobalt	EMS0032-JUN19	µg/g	0.01	<0.01	0	20	102	70	130	109	70
Chromium	EMS0032-JUN19	µg/g	0.5	<0.5	1	20	101	70	130	108	70
Copper	EMS0032-JUN19	µg/g	0.1	<0.1	1	20	104	70	130	104	70
Molybdenum	EMS0032-JUN19	µg/g	0.1	<0.1	12	20	95	70	130	106	70
Nickel	EMS0032-JUN19	ug/g	0.5	<0.5	7	20	105	70	130	109	70
Lead	EMS0032-JUN19	ug/g	0.1	<0.1	2	20	103	70	130	95	70
Antimony	EMS0032-JUN19	µg/g	0.8	<0.8	ND	20	108	70	130	97	70
Selenium	EMS0032-JUN19	µg/g	0.7	<0.7	ND	20	103	70	130	102	70
Thallium	EMS0032-JUN19	µg/g	0.02	<0.02	ND	20	101	70	130	96	70
Uranium	EMS0032-JUN19	µg/g	0.002	<0.002	1	20	101	70	130	93	70
Vanadium	EMS0032-JUN19	µg/g	3	<3	2	20	103	70	130	107	70
Zinc	EMS0032-JUN19	µg/g	0.7	<0.7	3	20	103	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 (%)		Spike Recovery (%)	Recovery Li (%)
								Low	High		Low
F1 (C6-C10)	GCM0139-JUN19	µg/g	10	<10	ND	30	105	80	120	100	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 (%)		Spike Recovery (%)	Recovery Li (%)
								Low	High		Low
F2 (C10-C16)	GCM0161-JUN19	µg/g	10	<10	ND	30	99	80	120	96	60
F3 (C16-C34)	GCM0161-JUN19	µg/g	50	<50	24	30	99	80	120	96	60
F4 (C34-C50)	GCM0161-JUN19	µg/g	50	<50	13	30	99	80	120	96	60

## QC SUMMARY

### Petroleum Hydrocarbons (F4G)

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 (%)		Spike Recovery (%)	Recovery Limit (%)
								Low	High		
F4G-sg (GHH)	GCM0217-JUN19	µg/g	200	<200	11	30	99	80	120	NA	60

### pH

Method: SM 4500 | Internal ref.: ME-CA-IENVIEWL-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 Limit (%)
								Low	High		
pH	ARD0026-JUN19	pH Units	0.05		0	20	101	80	120		

## QC SUMMARY

### Volatile Organics

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

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.	
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Li (%)
								Low	High		Low
Benzene	GCM0139-JUN19	µg/g	0.02	<0.02	ND	50	90	60	130	86	50
Ethylbenzene	GCM0139-JUN19	µg/g	0.05	<0.05	ND	50	90	60	130	89	50
m/p-xylene	GCM0139-JUN19	µg/g	0.05	<0.05	ND	50	94	60	130	93	50
o-xylene	GCM0139-JUN19	µg/g	0.05	<0.05	ND	50	93	60	130	92	50
Toluene	GCM0139-JUN19	µg/g	0.05	<0.05	ND	50	91	60	130	89	50

### Water Soluble Boron

Method: O.Req. 153/04 | Internal ref.: ME-CA-ENV1 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 (%)		Spike Recovery (%)	Recovery Li (%)
								Low	High		Low
Water Soluble Boron	ESG0015-JUN19	µg/g	0.5	<0.5	ND	20	103	80	120	101	70

## QC SUMMARY

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**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 or 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.

SGS provides criteria information (such as regulatory or guideline limits and summary of limit exceedances) as a service. Every attempt is made to ensure the criteria information in this report is accurate and current, however, it is not guaranteed. Comparison to the most current criteria is the responsibility of the client and SGS assumes no responsibility for the accuracy of the criteria levels indicated. This document is issued, on the Client's behalf, by the Company under its General Conditions of Service available on request and accessible at [http://www.sgs.com/terms\\_and\\_conditions.htm](http://www.sgs.com/terms_and_conditions.htm). The Client's attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any other holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents.

This report must not be reproduced, except in full. This report supersedes all previous versions.

-- End of Analytical Report --



Environment, Health &amp; Safety

## Request for Laboratory Services and CHAIN OF CUSTODY

- 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: 006861

Page 1 of 1

## Laboratory Information Section - Lab use only

Received By: CAYLIN GRAHAMReceived By (signature): [Signature]Received Date (mm/dd/yyyy): 06/05/19 (mm/dd/yyyy)Custody Seal Present: ☐Cooling Agent Present: ☐ noReceived Time: 09:30Custody Seal Intact: ☐Temperature Upon Receipt (°C): 12x3LAB LIMS #: CA14211-June19

REPORT INFORMATION	INVOICE INFORMATION	PROJECT INFORMATION
Company: <u>Cumburn</u>	<input checked="" type="checkbox"/> (same as Report Information)	Quotation #: _____ P.O. #: _____
Contact: <u>Bernie Taylor</u>	Company: _____	Project #: <u>7817-002</u> Site Location/ID: <u>Street Sweeping Characterization</u>
Address: <u>52 Hunter St E</u>	Contact: _____	<b>TURNAROUND TIME (TAT) REQUIRED</b>
Phone: <u>705 742 7900</u>	Address: _____	<input checked="" type="checkbox"/> 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
Email: <u>bernie.taylor@cumburn-me.com</u>	Phone: _____	RUSH TAT (Additional Charges May Apply): <input type="checkbox"/> 1 Day <input type="checkbox"/> 2 Days <input type="checkbox"/> 3 Days <input type="checkbox"/> 4 Days
Email: _____	Email: _____	<b>PLEASE CONFIRM RUSH FEASIBILITY WITH SGS REPRESENTATIVE PRIOR TO SUBMISSION</b>
		Specify Due Date: _____ Rush Confirmation ID: _____

REGULATIONS					NOTE: DRINKING (POTABLE) WATER SAMPLES FOR HUMAN CONSUMPTION MUST BE SUBMITTED WITH SGS DRINKING WATER CHAIN OF CUSTODY															COMMENTS:									
Regulation 153/04:			Other Regulations:			Sewer By-Law:			ANALYSIS REQUESTED																				
<input checked="" type="checkbox"/> Table 1	<input type="checkbox"/> R/P/I	Soil Texture:	<input type="checkbox"/> Reg 347/558 (3 Day min TAT)	<input type="checkbox"/> PWQO	<input type="checkbox"/> MMER	<input type="checkbox"/> Sanitary	<input type="checkbox"/> PAH	<input type="checkbox"/> ABN	<input type="checkbox"/> SVOC(all)	<input type="checkbox"/> PCB	<input type="checkbox"/> VOC	<input type="checkbox"/> OP	<input type="checkbox"/> TCLP M&I	<input type="checkbox"/> VOC	<input type="checkbox"/> PCB	<input type="checkbox"/> B(a)P	<input type="checkbox"/> ABN	<input type="checkbox"/> Ignit.	<input type="checkbox"/> Water Pkg		<input type="checkbox"/> Gen.	<input type="checkbox"/> Ext.	<input type="checkbox"/> Sewer Use:						
<input checked="" type="checkbox"/> Table 2	<input checked="" type="checkbox"/> I/C/C	<input checked="" type="checkbox"/> Coarse	<input type="checkbox"/> CCME	<input type="checkbox"/> Other:	<input type="checkbox"/> Storm	<input type="checkbox"/> MISA	<input type="checkbox"/> Field Filtered (Y/N)	<input type="checkbox"/> Metals & Inorganics	<input type="checkbox"/> PCB Total	<input type="checkbox"/> Aroclor	<input type="checkbox"/> PHC F1-F4	<input type="checkbox"/> VOC	<input type="checkbox"/> BTEX	<input type="checkbox"/> F1-F4	<input type="checkbox"/> F2-F4	<input type="checkbox"/> THM	<input type="checkbox"/> Pesticides	<input type="checkbox"/> OC	<input type="checkbox"/> OP	<input type="checkbox"/> TCLP M&I	<input type="checkbox"/> VOC	<input type="checkbox"/> PCB	<input type="checkbox"/> B(a)P	<input type="checkbox"/> ABN	<input type="checkbox"/> Ignit.	<input type="checkbox"/> Water Pkg	<input type="checkbox"/> Gen.	<input type="checkbox"/> Ext.	<input type="checkbox"/> Sewer Use:
<input type="checkbox"/> Table 3	<input type="checkbox"/> A/O	<input type="checkbox"/> Medium	<input type="checkbox"/> CCME	<input type="checkbox"/> Other:	<input type="checkbox"/> Storm	<input type="checkbox"/> MISA																							
<input type="checkbox"/> Table		<input type="checkbox"/> Fine																											

RECORD OF SITE CONDITION (RSC) <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO																				COMMENTS:										
SAMPLE IDENTIFICATION	DATE SAMPLED	TIME SAMPLED	# OF BOTTLES	MATRIX	Field Filtered (Y/N)	Metals & Inorganics	PAH	ABN	SVOC(all)	PCB Total	Aroclor	PHC F1-F4	VOC	BTEX	F1-F4	F2-F4	THM	Pesticides	OC		OP	TCLP M&I	VOC	PCB	B(a)P	ABN	Ignit.	Water Pkg	Gen.	Ext.
1 Emily Depot	June 4/19	1520	4	Soil		X						X																		
2 Oakwood Depot	↓	1525	4	Soil		X						X																		
3 Fenelon Depot	↓	1515	4	Soil		X						X																		
4																														
5																														
6																														
7																														
8																														
9																														
10																														
11																														
12																														

Observations/Comments/Special Instructions				
Sampled By (NAME): <u>Dave Fleming</u>	Signature: <u>[Signature]</u>	Date: <u>06/04/19</u> (mm/dd/yyyy)	Pink Copy - Client	
Relinquished by (NAME): <u>Dave Fleming</u>	Signature: <u>[Signature]</u>	Date: <u>06/05/19</u> (mm/dd/yyyy)	Yellow & White Copy - SGS	

Revision #: 1.1

Date of Issue: 04 April, 2018



## AGGREGATES GRADATION REQUIREMENTS OPSS 1010 - GRANULARS, LS-602

**Client:** City of Kawartha Lakes, Waste and Recycling Branch  
**Project Name:** Soil Testing - Various Works Yards 2019  
**Sampled By:** Client  
**Location:** Emily Depot  
**Material Type:** No Specs  
**MTO Contract No.:** N/A

**Project Number:** 7817-002  
**Date Sampled:** June 3, 2019  
**Lab Sample No.:** AG-19-0152

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	--	99.6	
9.5 mm	50-73 *60-73	--	--	32-100	55-80	50-70	60-85	--	98.6	
4.75 mm	35-55 *40-60	20-100	20-55	20-90	35-55	20-45	40-60	20-100	93.1	
1.18 mm	15-40	10-100	10-40	10-60	15-40	0-15	20-40	10-100	66.9	
300 µm	2-55	2-65	5-22	2-35	5-22	--	11-25	5-95	31.6	
150 µm	--	--	--	--	--	--	--	2-65	17.7	
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	10.3	

**Notes:**

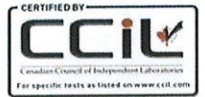
- \* When the aggregate is obtained from an iron blast furnace slag source.
- \*\* When the aggregate is obtained from a quarry or blast furnace slag or nickel slag source.

Issued by:

Stuart Baird, Senior Project Manager

June 24, 2019

Date



## AGGREGATES PHYSICAL PROPERTIES REQUIREMENTS OPSS 1010 - GRANULARS, LS-VARIOUS PROCEDURE

**Client:** City of Kawartha Lakes, Waste and Recycling Branch  
**Project Name:** Soil Testing - Various Works Yards 2019  
**Sampled By:** Client  
**Location:** Emily Depot  
**Material Type:** No Specs  
**MTO Contract No.:** N/A

**Project Number:** 7817-002

**Date Sampled:** June 3, 2019

**Lab Sample No.:** AG-19-0152

LS Test Procedure Name and Number	Gradation Requirement, % Passing								Test Result	
	A	B			M	O	S	SSM	Sample	Meets Requiremen ts (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	-	11.2	
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:

- When Granular O is produced from boulders, cobbles, or gravel retained on the 50 mm sieve.
- 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.
- 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.
- For materials north of the French/Mattawa Rivers only, the coefficient of permeability, k, shall be greater than  $1.0 \times 10^{-4}$  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

June 24, 2019

Date



# AGGREGATES GRADATION REQUIREMENTS

## OPSS 1010 - GRANULARS, LS-602

**Client:** City of Kawartha Lakes, Waste and Recycling Branch

**Project Number:** 7817-002

**Project Name:** Soil Testing - Various Works Yards 2019

**Sampled By:** Client

**Date Sampled:** June 3, 2019

**Location:** Fenelon Depot

**Material Type:** No Specs

**MTO Contract No.:** N/A

**Lab Sample No.:** AG-19-0151

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	--	99.9	
9.5 mm	50-73 *60-73	--	--	32-100	55-80	50-70	60-85	--	99.4	
4.75 mm	35-55 *40-60	20-100	20-55	20-90	35-55	20-45	40-60	20-100	93.2	
1.18 mm	15-40	10-100	10-40	10-60	15-40	0-15	20-40	10-100	67.1	
300 µm	2-55	2-65	5-22	2-35	5-22	--	11-25	5-95	25.4	
150 µm	--	--	--	--	--	--	--	2-65	11.1	
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	4.7	

**Notes:**

\* When the aggregate is obtained from an iron blast furnace slag source.

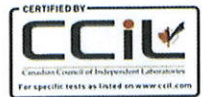
\*\* When the aggregate is obtained from a quarry or blast furnace slag or nickel slag source.

Issued by:

Stuart Baird, Senior Project Manager

June 24, 2019

Date



# AGGREGATES PHYSICAL PROPERTIES REQUIREMENTS OPSS 1010 - GRANULARS, LS-VARIOUS PROCEDURES

**Client:** City of Kawartha Lakes, Waste and Recycling Branch  
**Project Name:** Soil Testing - Various Works Yards 2019  
**Sampled By:** Client  
**Location:** Fenelon Depot  
**Material Type:** No Specs  
**MTO Contract No.:** N/A

**Project Number:** 7817-002

**Date Sampled:** June 3, 2019

**Lab Sample No.:** AG-19-0151

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	-	8.6	
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:**

- When Granular O is produced from boulders, cobbles, or gravel retained on the 50 mm sieve.
- 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.
- 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.
- For materials north of the French/Mattawa Rivers only, the coefficient of permeability, k, shall be greater than  $1.0 \times 10^{-4}$  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

June 24, 2019

Date



## AGGREGATES GRADATION REQUIREMENTS OPSS 1010 - GRANULARS, LS-602

**Client:** City of Kawartha Lakes, Waste and Recycling Branch

**Project Number:** 7817-002

**Project Name:** Soil Testing - Various Works Yards 2019

**Sampled By:** Client

**Date Sampled:** June 3, 2019

**Location:** Oakwood Depot

**Material Type:** No Specs

**MTO Contract No.:** N/A

**Lab Sample No.:** AG-19-0153

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	--	99.9	
9.5 mm	50-73 *60-73	--	--	32-100	55-80	50-70	60-85	--	99.6	
4.75 mm	35-55 *40-60	20-100	20-55	20-90	35-55	20-45	40-60	20-100	94.9	
1.18 mm	15-40	10-100	10-40	10-60	15-40	0-15	20-40	10-100	67.6	
300 µm	2-55	2-65	5-22	2-35	5-22	--	11-25	5-95	25.2	
150 µm	--	--	--	--	--	--	--	2-65	11.2	
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	5.7	

**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

June 24, 2019

Date



# AGGREGATES PHYSICAL PROPERTIES REQUIREMENTS OPSS 1010 - GRANULARS, LS-VARIOUS PROCEDURES

**Client:** City of Kawartha Lakes, Waste and Recycling Branch  
**Project Name:** Soil Testing - Various Works Yards 2019  
**Sampled By:** Client  
**Location:** Oakwood Depot  
**Material Type:** No Specs  
**MTO Contract No.:** N/A

**Project Number:** 7817-002

**Date Sampled:** June 3, 2019

**Lab Sample No.:** AG-19-0153

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	-	14.1	
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:

- When Granular O is produced from boulders, cobbles, or gravel retained on the 50 mm sieve.
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