

Grain Size Distribution Analysis Report

Project Name: 2023 Quality Control

Project No.: LM23-50425

Client: Rural Municipality of Britannia

Location: [REDACTED]

Distribution:

opman@rmbritannia.com

Sample No.: 50425.001

Date Sampled: 24-Apr-23

Sampled By: Client

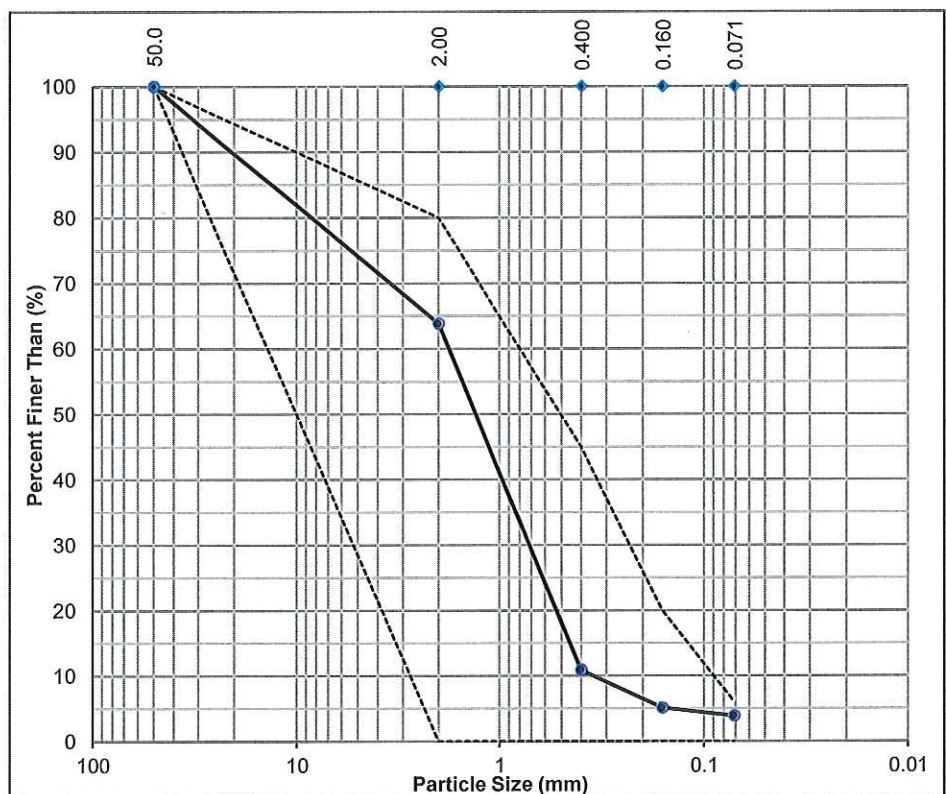
Type of Sample: Crushed gravel

Date Received: 24-Apr-23

Sample Source: Oswald Pit - Pile 4

Notes: Grading Specification for Saskatchewan Ministry of Highway and Infrastructure Type 6

Sieve Size (mm)	Specification - Percent Finer Than (%)	Percent Finer Than (%)
50.0	100	100
2.00	0 - 80	64
0.400	0 - 45	11
0.160	0 - 20	5.1
0.071	0 - 6	3.9



SolidEarth Geotechnical Inc.

Karl Jory, P.Eng

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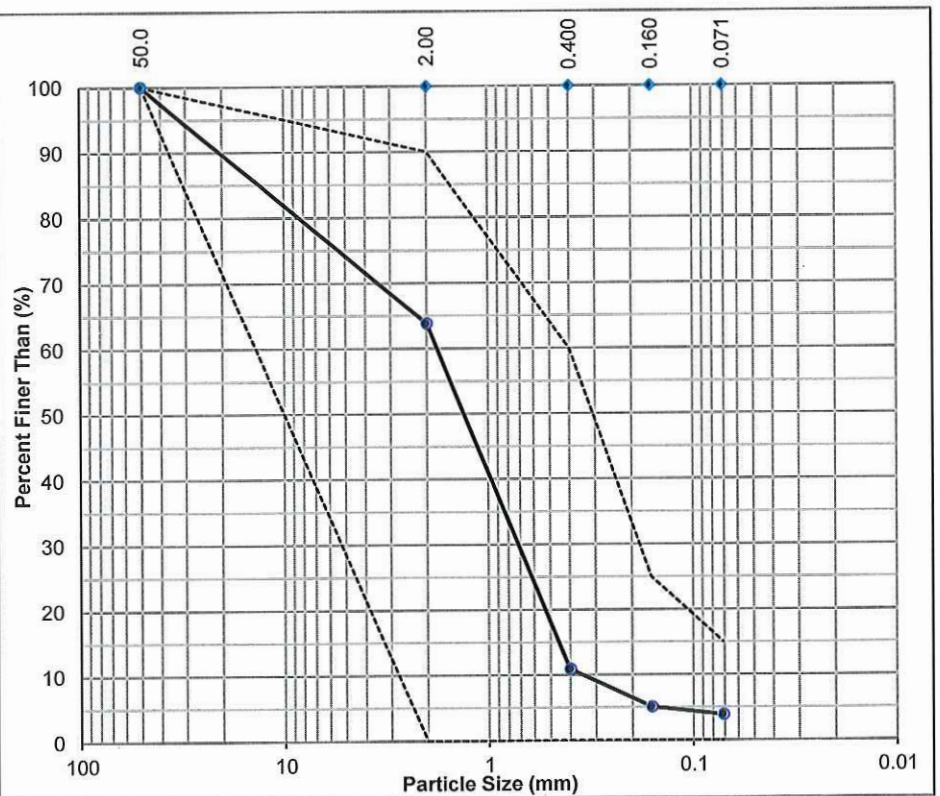
Notes: Grading Specification for Saskatchewan Ministry of Highway and Infrastructure Type 8

Sieve Size (mm)	Specification - Percent Finer Than (%)	Percent Finer Than (%)
50.0	100	100
2.00	0 - 90	64
0.400	0 - 60	11
0.160	0 - 25	5.1
0.071	0 - 15	3.9

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3300 - SPECIFICATION FOR SUB-BASE COURSE

3300 - 1 DESCRIPTION

- 1.01 The work shall consist of spreading and compacting screened or crushed aggregate on a prepared surface.
- 1.02 The following definitions shall apply for this specification:
- (a) Mean:
The arithmetic average of a set of 'n' test results constituting the sample.
 - (b) Moving average:
The arithmetic mean of 3 consecutive test results.
 - (c) Sub-base aggregate:
The aggregate before mixing, when binder is to be added or the aggregate before spreading and compacting, when no binder is to be added.
 - (d) Sub-base mix:
The sub-base aggregate after mixing with binder and water but before spreading and compacting.
 - (e) Sub-base course:
The sub-base aggregate or sub-base mix in place on the road during and after spreading and compacting.

3300 - 2 MATERIALS

Aggregate

- 2.01 Sub-base aggregate shall be composed of sound, hard, and durable particles of sand, gravel and rock free from injurious quantities of soft or flaky particles, shale, loam, clay balls and organic or other deleterious material.

3300 - 3 CONSTRUCTION

General

- 3.01 (a) Sub-base course shall comply with the requirements listed in Table 1:

TABLE 1

Sieve Designation	Percent By Weight Passing Canadian Metric Sieve Series		
	TYPE		
	6	8	10
50.0 mm	100.0	100.0	100.0
2.0 mm	0 - 80.0	0 - 90.0	
400 um	0 - 45.0	0 - 60.0	
160 um	0 - 20.0	0 - 25.0	
75 um	0 - 6.0	0 - 15.0	0 - 20.0
Plasticity Index (all types)	0 - 6.0		

- (b) A tolerance of 3% in the percent by weight passing the maximum size sieve shall be permitted providing 100% of the oversize passes the 63.0 mm sieve.
- 3.02 The following shall apply to Department owned or controlled aggregate sources shown on the plans or as described in the Special Provisions:
 - (a) Overburden shall be removed from material deposits in accordance with Specification 2260 For Removal Of Overburden.
 - (b) Stockpiles shall be constructed in accordance with Specification 3600 For Stockpiling Aggregates.
- 3.03 Binder, filler and blender sand shall be provided in accordance with Specification 3400 For Binder, Filler And Blender Sand.
- 3.04 Sub-base aggregate shall be pushed to a trap or into a stockpile prior to screening.

Processing

- 3.05 The production of sub-base course shall comply with the following:
 - (a) The Contractor shall cease operations if the moving average for any sieve does not comply with the specified requirements listed in Table 1.
 - (b) Operations shall not recommence until the specified requirements are met.
 - (c) Upon recommencement of operations, the specified requirements shall be met on each of the initial 2 tests.
 - (d) Failure to cease operations shall subject all subsequent materials to the requirements of General Provision 1400-7 (Unacceptable and Unauthorized Work).

Spreading and Compacting

- 3.06 The thickness of a compacted lift of sub-base course shall not exceed 120 mm. The lift thickness may be increased if the Contractor can demonstrate that with the use of vibratory compaction equipment and construction procedures, the compaction requirements can be achieved for lifts greater than 120 mm.
- 3.07 Sub-base courses shall be compacted until no further settlement is apparent and the particles are well keyed into place. The sub-base course shall be free from any rutting or deformations before the placement of the next course.
- 3.08 If excess moisture originating from external causes including but not limited to precipitation and/or Contractor's operation is present in the sub-base course and/or underlying material prior to the acceptance of the completed surfacing structure; the Contractor shall dry the sub-base course and/or the underlying material to the optimum moisture content and compact the sub-base and/or the underlying material to not less than the specified density or the optimum density in accordance with the requirements for Moisture-Density Proctor (STP 205-5).

Stabilizing

- 3.09 If the sub-base course proves to be unstable, the Engineer shall require the Contractor to stabilize the sub-base aggregate by one or a combination of the following methods:
 - (a) By the addition of binder or filler at the aggregate source or at the screening plant. The binder or filler shall be added and thoroughly distributed throughout the aggregate until a homogeneous mixture is obtained.
 - (b) By the addition of crushed aggregate on the road.
 - (c) By the addition of emulsified asphalt to the compaction water in the proportions designated by the Engineer. The Department shall supply the asphalt.
 - (d) Any other method proposed by the Contractor and approved by the Engineer.

Seasonal Shutdown

- 3.10 If work must be carried over from one construction season to the next, there shall be no exposed sub-base aggregate, mix or sub-base course remaining on the road unless covered by a lift of base course.

3300-4 SAMPLING AND TESTING

General

- 4.01 Unless otherwise specified, test procedures shall be in accordance with Saskatchewan Highways and Transportation's Standard Test Procedures Manual.
- 4.02 The test procedures in effect on the closing date of the tenders shall apply.

3300 - 5 MEASUREMENT

- 5.01 Sub-base course shall be measured in tonnes.

3300 - 6 PAYMENT

- 6.01 Payment for Sub-base Course shall be at the contract unit price per tonne. The contract unit price shall be full compensation for completing the work except for those activities for which specific provision for payment is made in this section.
- 6.02 If the contract includes a bid item for:
- (a) Hauling Sub-base Course and Hauling Binder, Filler And Blender Sand; payment shall be made in accordance with Specification 2405 For Hauling On The Basis Of The Kilometre.
 - (b) Watering; payment shall be made in accordance with Specification 2500 For Watering.
 - (c) Binder, Filler And Blender Sand; payment shall be made in accordance with Specification 3400 For Binder, Filler And Blender Sand.
 - (d) Granular Base Course; payment for Granular Base Course used as stabilizing agent shall be at the contract unit price For Granular Base Course.
 - (e) Prime, Tack or Flush Coat; payment for emulsified asphalt used as stabilizing agent shall be the contract unit price for Prime, Tack and Flush Coat.