



SML 100085

NE 12-063-19-W4

Aggregate Supply Analysis

Prepared for: JMB Crushing Systems ULC

October 2018

CPP
ENVIRONMENTAL

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SUMMARY OF FINDINGS



1 Overview

CPP Environmental was contracted to complete an aggregate supply analysis on SML 100085 (NE 12-063-19-W4) to confirm the estimated aggregate volumes identified in *Section 5.3 Depth and Volume of Deposit* in the Conservation Reclamation Business Plan developed in 2014.

To confirm the aggregate testing data, additional aggregate testing was completed by Spec Aggregate September 27 to 29th, 2018. The new testing data included both a sample of previously tested locations and new randomly selected test holes. In total, 21 locations were tested; 3 previous holes and 18 random test holes. Previous testing data was available for comparison.

2 Methodology

Data analysis was completed using Microsoft excel, with previous and new testing data being entered into similar formatted spreadsheets. All raw data was entered in feet and converted to metres for analysis. Previous testing GPS data was used to map sampled test hole locations. New random testing locations from Spec Aggregate were mapped using UTM coordinates. Refer to Appendix 1 for testing locations.

Table 1: Sample Test Holes and Random Test Holes completed by Spec.

Description	Test hole	UTM Zone 12	
Sample test holes	370	0386998	6033397
	371	0387237	6033867
	372	0387369	6033858
Random test hole. Unable to drill at sample test hole. Location offset	372(2)	0387366	6033861
Random test holes	19	0387359	6033260
	20	0387351	6033288
	21	0387359	6033526
	22	0387196	6034051
	23	0387225	6033991
	24	0387310	6034009
	25	0387384	6034021
	26	0387447	6033893
	27	0387293	6033830
	28	0387304	6033927
	29	0387329	6033906
	30	0387274	6033986
	31	0387385	6033768
	32	0387468	6033658
	33	0387352	6033638
34	0387283	6033659	
35	0387345	6033459	
36	0387443	6033527	

SUMMARY OF FINDINGS



Aggregate testing data from the 2018 test holes was compared with previous testing data to evaluate the similarity and accuracy of the aggregate profile. Due to differences in description between drillers, the gravel and sand deposit thickness was used for comparison. The previous testing data contained a small number of test holes (6) and as such, direct comparison of the aggregate profile was limited.

Information from three previous test holes was available to evaluate the similarity, accuracy, and aggregate profile of the random testing locations. These previous test holes were selected based on proximity to the 2018 test locations.

Table 2: Previous testing data used in aggregate profile comparison

Previous Test holes	2018 Test Hole used in comparison
368	Random test hole 32
369	Random test hole 20
373	Random test hole 25

Total excavation depth was determined to be unsuitable for determining aggregate volume due to the presence of large aggregate material and the consolidation of the deposit which resulted in failure to drill. Aggregate supply was determined using the average deposit thickness from the new testing data. The average deposit thickness of the new data was compared to the average thickness listed in *Section 5.3* of the 2014 CRBP. An average sand deposit thickness was not provided in the 2014 CRBP, as such, a comparison of average sand deposit could not be completed.

Aggregate volumes based on the new testing data were calculated separately for both gravel and sand deposits and summed to equal the total estimated volume.

2.1 Determination of Movable Area

After communications with Spec, it was determined that the aggregate deposit was located within an isolated esker and not present across the entire SML area. This determination was due to on-site observations and test holes with little aggregate and/or predominately clay layers in close proximity to, but not within SML boundary. To establish the movable area for the new volume calculation, GIS mapping was used to select a portion of the SML based on appearance (photo imagery) and the location of test holes with little aggregate and predominate clay layers. The movable area was determined to be 20.26 ha.

3 Assumptions

- both gravel and sand deposits were considered viable aggregate material in the new volume calculation
- no reject was assumed in the new volume estimate

SUMMARY OF FINDINGS

4 Results

The aggregate deposit was found to consist of a combination of isolated sand layers (lenses) and gravel layers with a mix of rock (cobble, boulders, etc.) and sand.

Full aggregate depth was not reached in 57% (12 of the 21) of the testing locations due to presence of large aggregate material and consolidation of the deposit which resulted in failure to drill.

Comparison of specific test hole profiles between new and previous data found to be inconsistent due to the limited number of previous test holes that were available for comparison.

Based on the new test data, the deposit thickness was found to be lower than previous data as identified in *Section 5.3* of the 2014 CRBP. However, due to the high percentage of drilling failures, the deposit is believed to be greater than the average thickness of 6.8 m.

Table 3: Comparison of average deposit thicknesses

	Gravel (m)	Sand (m)
Average thickness based on new testing data	6.8	2.09
Average thickness identified in CRBP <i>Section 5.3</i>	8.6	N/A

Comparison of total volume estimates between the new and previous data were found to be similar. The calculated estimated total aggregate volume based on the new data was found to be **1,802,050 m³** which is approximately 94% of the previous estimation of 1.92M m³.

Table 4: Calculation of estimated aggregate volume based on new testing data.

Description	Value
Minable area based on GIS delineation (20.26 ha)	202,600 m ²
New average aggregate thickness	6.80 m
Estimated volume aggregate (thickness x minable area)	1,378,203 m ³
New average sand thickness	2.09m
Estimated volume sand (thickness x minable area)	423,847 m ³
Total Estimated Aggregate volume (gravel volume + sand volume)	1,802,050 m³



APPENDICES

Appendix 1 – Test Hole Locations



SML 100085

Aggregate Supply Analysis

- ★ Previously Drilled
- Sample Test Holes
- Previous Test Holes
- Used in Comparison Analysis
- ◆ Random Test Holes
- ▭ SML100085
- ▭ Estimated Mining Area (20.26 ha)



Source: Contains information licensed under the Open Government Licence – Canada, Alberta, DigitalGlobe.

Imagery acquisition date: August 6, 2014

Coordinates system: NAD 1983 UTM Zone 12N



1:4,000



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Prepared by: R. Ok

