VALLEY
TESTING SERVICES LTD

Consulting Engineering

Inspection & Testing

Materials Technology

Geoscience Environmental

#18 – 3275 McCallum Rd,
Abbotsford, BC
V2S 7W8

TF (1888) 855-9733
Tel. (604) 855-6568
Fax (604) 855-7378
www.valleytesting.ca

Branch Offices:

- Burnaby
  604-436-9111
- Surrey
  (604) 543-8871
- Whistler
  (604) 938-2821
- Kelowna
  (250) 860-9955
- Sechelt
  (604) 740-0920
- Squamish
  1-604-898-1420
- Salmon Arm
  (250) 803 0248
- Williams Lake
  (250) 296-4118
- Fort St. John
  (250) 261-6615
- Dawson Creek
  (250) 261-6615

VALLEY TESTING SERVICES LTD 20 YEARS 1990-2010

INNOVATION QUALITY SOLUTIONS

J. L's Excavating Ltd.

Source Acceptance Testing

Project: Pre-qualification
Petrographic Examination Of Aggregate
40mm Coarse
Material Source- J. L's Pit, Terrace, BC

Petrographic Examination in accordance with:
CSA A23.2-04 15A Petrographic Examination Of Aggregates
MOT Standard Specifications, Section 202, Appendix 2-
Petrographic Analysis Test

Submitted To:

J. L's Excavating Ltd.
Terrace, BC

Submitted By:

Valley Testing Services Ltd.
Abbotsford, BC

January 6, 2011

MTL-14689

January 6, 2011

J. L's Excavating
P.O. Box 514
Terrace, British Columbia
V8G 4B5

Attention: Mr. Gerry Lozinski

RE: Petrographic Examination Of Aggregates
40mm Coarse
Material Source- J. L's Pit, Terrace, BC

Dear Sir:

As requested Valley Testing Services Ltd. (Valley Testing) performed a petrographic examination on one sample of material as supplied by J. L's Excavating from J. L's pit in Terrace, B.C.. The material supplied is summarized in the table below. Upon receipt of the sample, the material was washed, then dried for analysis. The intended use of the material is noted in the table below.

Table 1.

Sample ID	Material Type	Source	Petrographic #	Intended Use
20mm crush	40mm crushed aggregate	J. L's pit, Terrace, BC	118	BC Hydro construction materials

The petrographic examination carried out is based on CSA A23.2-04 15A Petrographic Examination of Aggregates, and the MOT SS Section 202, Appendix 2 test method. The worksheet "MTO LS609" in the appendix A is derived from the Ontario test method LS609 for coarse aggregates. The examination assigns a "Petrographic Number" (PN) to the material, which correlates to classifications such as Good, Fair, Poor or Deleterious.

Summary

20mm Crush: The examination was performed on a processed crushed aggregate material. The material has been assigned a grade of "Good" with a PN of 118. Medium-hard volcanic rocks dominated the sample with significant amounts of hard igneous granitic rocks. Particles ranged in size from 38mm to 10mm particles; estimated fracture count was 100%. Particles were angular to sub-angular with the mean being angular (Power's Scale); generally cubic . The material was washed to aid in identification and was free from organic matter and showed no traces of silty or clay coatings. Very minor weathering was observed, with some moderate weathering noted in some individual volcanic particles. The porosity of the sample is considered low. *This aggregate material is deemed suitable for use in concrete, asphalt and general construction materials applications.*

Method

As stated previously the basis for the examination was the CSA A23.2-04 15A test method, and the MOT test method described in Appendix 2 of Section 202 of their Standard Specifications. A sample of ~3500g was split from the main sample, washed and analysed. Fracture count was estimated, and then the material was examined for its physical and mechanical properties.

Using a hand lens (16X) and microscope, as well as a magnet, steel nail and knife, and dilute HCl, the material was classified by rock type and physical condition. Classifications for the aggregates were noted on the analysis sheets in Appendix A.

Discussion of Coarse Aggregates

20mm Crush: The material used for this examination was a 40mm coarse fraction of a processed crushed aggregate from the J. L's pit, Terrace, northern BC. The coarse fraction material used was comprised of 38mm to 10mm material. The sample material was generally found to be medium hard, moderately tough with minor weathering. The porosity of the rock types were generally low, with minor amounts of moderately porous material (some of the volcanic and sedimentary rocks). The majority of the sample was composed of volcanic and igneous granitic rocks with minor sedimentary rocks. Chemical and physical alteration is minimal and does not appear to have any deleterious effects on the aggregate. No significant amounts of flat or elongated particles were observed.

The rock types identified were (in order of magnitude):

Basalt- 19.4% medium-hard, minor weathering, massive, fine grained; 3.6% brittle, moderately weathered particles.

Granite- 20.9% hard, minor weathering, massive, medium to coarse grained;

Iron rich Volcanic- 12% medium-hard, minor weathering, massive, fine grained with feldspar and quartz phenocrysts; 3.5% brittle and soft particles with rusty oxidation of minerals;

Dacite to andesite- 8.1% hard, minor weathering, fine grained with feldspar phenocrysts;

Indistinct granitic: 7.5% medium hard to hard, minor weathering, tough;

Granodiorite: 7.2% hard, minor weathering, massive, fine to medium grained;

Greywacke: 5.3% medium hard to soft, fine grained, fresh;

Feldspar porphyry: 4.5% hard, fresh;

Conglomerate: 3.1% medium hard to soft, minor weathering;

Tonalite: 2.3% hard, fresh;

Mudstone: 1.7% soft and fresh, brittle;

Volcanic tuff: 1.1% medium hard and fresh.

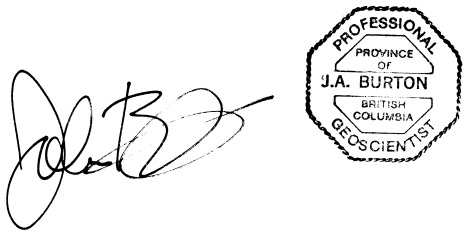
Conclusions

20mm Crush: This aggregate material is physically and mechanically suitable for concrete, asphalt, and general construction applications.

I trust this report meets your needs. Please do not hesitate to call if you require any further services or information.

Yours truly,

John Burton, P. Geo
Senior Geoscientist



References

CSA A23.2-04 15A Petrographic Examination Of Aggregates
MTO LS 609 Test Method
Best, Igneous and Metamorphic Petrology, 1982
MOT Standard Specifications for Highway Construction 2009

Note: The following image on the appendix page is for the readers visual reference only. The intent was to show what the aggregate looked like when the analysis was done. Scale was not considered necessary.

Appendix A

Aggregate Worksheets

Iron rich volcanic showing oxidized minerals (yellow).

JL's Excavating Ltd.
crushed rock- J.L's Pit
Terrace, BC

Assignment of Rock Type [BCH I-17 12.6]

Readily Identifiable Rock Types:

	grams of particles	*% of sample*
chert		
cherty argillite		
mudstone	63.3	1.7
sandstone		
quartz sandstone		
conglomerate	113.7	3.1
feldspar		
hornblende		
pyroxene		
biotite phlogopite schist		
muscovite schist		
quartz vein		
Plutonics-		
granite	764.9	20.9
quartz monzonite		
tonalite	83.1	2.3
granodiorite	261.7	7.2
indistinct granitic	273.6	7.5
peridotite		
gniess		

Rocks Identified by Visual-Physical- Chemical Tests

	grams of particles	*% of sample*
limestone		
dolomite		
gypsum		
anhydrite		
claystone		
shale		
calcite		
quartzite		
slate		
serpentinite		
Volcanics-		
dacite to andesite	294.8	8.1
obsidian		
agglomerate		
basalt	838.9	23.0
volcanic breccia		
iron rich volcanic	564.7	15.5
tuff	39.1	1.1
feldspar porphyry	163.4	4.5
ash flow tuffs		

Indistinct and Intermediate Types

	grams of particles	*% of sample*
jasper		
decomposed granitic rock		
greywacke	193.6	5.3
hornfels		
breccia		
phyillite		
amphibolite		
greenstone		

Coarse Aggregate Petrographic Analysis- MTO LS609

Client Name: J.L's Excavating Ltd.

Source: J.L's pit, Terrace, BC **Project Name:** Aggregate Qualification

Date: 04-Jan-11 **Fraction:** 40-10mm **Sample ID** 20mm crush **Analyst:** J. Burton

Type	Type No.	Mass (g)	%
Carbonate [hard; silty, hard]	01		
Carbonate [surface weathered; silty, surface weathered; medium hard: silty medium hard]	20		
Carbonate [sandy, hard or medium hard]	02		
Carbonate [slightly cherty; <5% chert]	21		
Cherty Argillite [hard or medium hard]	23		
Conglomerate-Sandstone-Arkose [hard]	03		
Conglomerate-Sandstone-Arkose [medium hard]	22	113.7	3.1
Greywacke-Argillite [hard or medium hard]	06	193.6	5.3
Gneiss-Amphibolite-Schist [hard]	04		
Quartzite [hard]	05		
Granite-Diorite-Gabbro [hard]	08	1383.3	37.8
Volcanic [hard or medium hard]	07	1641.5	44.9
Minerals [hard/medium]	09		
Quartz Porphyry	10		
Total Good Aggregate		**3332.1**	**91.2**
Carbonate [soft; silty soft; slightly shaley]	35		
Carbonate [soft, pitted]	41		
Carbonate [deeply weathered; silty, deeply weathered]	42		
Carbonate [sandy, soft]	40		
Marble [brittle]	24		
Chert-Cherty Carbonate [<20% leached chert]	26		
Conglomerate-Sandstone-Arkose [brittle]	30		
Mudstone [brittle]	29	63.3	1.7
Quartzite [slightly weathered]	52		
Gneiss-Amphibolite-Schist [brittle]	25		
Minerals [soft]	34		
Granite-Diorite-Gabbro [brittle]	27		
Volcanic [soft]	28	259.4	7.1
Total Fair Aggregate		**322.7**	**8.8**
Carbonate [shaley; clayey; silty, clayey]	43		
Carbonate [ochreous: sandy ochreous]	44		
Marble [friable]	49		
Chert-Cherty Carbonate [>20% leached chert]	45		
Conglomerate-Sandstone-Arkose [friable]	46		
Mudstone	56		
Cementation [partial]	53		
Cementation [total]	54		
Gneiss-Amphibolite [friable]	50		
Schist [soft]	55		
Granite-Diorite-Gabbro [friable]	51		
Volcanic [very soft, porous]	48		
Total Poor Aggregate		**0**	**0.0**
Ochre	60		
Carbonate/Ironstone	61		
Clay	62		
Volcanic-Gneiss Schist [decomposed]	63		
Total Deleterious Aggregate		**0**	**0.0**

% GOOD	91.2	x 1 =	91.2
% FAIR	8.8	x 3 =	26.5
% POOR	0.0	x 6 =	0.0
% DELETERIOUS	0.0	x 10 =	0.0

Estimated % Crushed: 100%

Estimated % Flat and Elongated: >3%

Asphalt and Ready-Mix Concrete PN: 118