



OFFICE MEMORANDUM

DATE: March 18, 1982

TO: L. T. Oehler
Engineer of Research

FROM: R. W. Muethel

SUBJECT: Petrographic Analysis of Crushed Stone Coarse Aggregate: Gogebic Range Ski Corp. Pit No. 27-74 (Testing Laboratory Sample No. 82 A-190).
Research Project 78 TI-510, Research Report No. R-1192

On March 4, 1982, a sample of crushed stone (trap rock) was received by the Department's Testing Laboratory Section. Information accompanying the sample stated that the material was obtained from the Gogebic Range Ski Corp. Pit No. 27-74, location NW Section 32, T49N, R46W, Gogebic County. The material was submitted to the Laboratory to be tested for information. Petrographic analysis of a portion of the sample was requested by G. H. Gallup.

Summary

Rock Class	Condition of Particles	Percent of Sample
Igneous	Moderately hard to hard, fresh, and slightly porous	100.0

The sample was found to be composed predominantly of basaltic trap rock containing a variable amount of chloritic material.

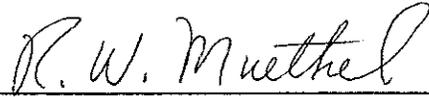
Detailed tabulations of petrographic composition, specific gravity, and absorption are included in Tables 1 and 2.

Detailed Petrography

Petrographic examination was conducted in general conformance with ASTM C295, "Petrographic Examination of Aggregates for Concrete." Representative portions—300 particles (see exception)—of the noted sieve fractions of the sample were identified megascopically along with acid testing and a scratch test for hardness, and microscopically with a stereomicroscope. Specific gravity and absorption determinations

were performed in general accordance with ASTM C127, "Specific Gravity and Absorption of Coarse Aggregate." The following sheets contain the rock type descriptions.

TESTING AND RESEARCH DIVISION



Geologist - Materials Research Unit

RWM:bt

Attachments

cc: K. A. Allemeier
M. L. O'Toole
D. F. Malott
G. H. Gallup
J. W. Burge
M. G. Brown
R. H. Vogler

TABLE 1
 PETROGRAPHIC COMPOSITION
 Testing Laboratory Sample No. 82 A-190

Rock Type	Sieve Fraction Analyzed				Computed Sample Composition
	1 to 3/4-in.	3/4 to 1/2-in.	1/2 to 3/8-in.	3/8 to No. 4	
Basalt	95.9	93.4	95.4	91.6	94.1
Volcanic Tuff	3.7	6.3	4.3	7.7	5.5
Vein Quartz	0.4	0.3	0.3	0.7	0.4
Totals, percent	100.0	100.0	100.0	100.0	100.0

NOTE: Computed sample composition is based upon counts of 242 particles in the 1 to 3/4-in. sieve fraction, and 300 particles in each of the remaining sieve fractions noted.

TABLE 2
 SPECIFIC GRAVITY AND ABSORPTION DATA
 Testing Laboratory Sample No. 82 A-190

Rock Type	Specific Gravity			Absorption, percent	Composition, percent by weight
	Bulk, dry	Bulk, ssd	Apparent		
Basalt	2.81	2.85	2.93	1.39	95.1
Volcanic Tuff	2.85	2.88	2.95	1.25	4.5
Vein Quartz	2.58	2.64	2.74	2.16	0.4
Total Sample	2.81	2.85	2.93	1.39	100.0

NOTE: Values are computed from determinations made on composite material contained in the categories noted.

IGNEOUS ROCKS

Rock Type	Basalt	Volcanic Tuff	Vein Quartz
Color	dark reddish brown to black; and mottled reddish brown or black and white, pink, or green	reddish brown; and mottled reddish brown to tan and green to gray	mottled white, pink, and dark brown to black
Texture	fine grained to microcrystalline	fine to very fine grained	massive to fine grained
Luster	dull	dull	subvitreous to dull
Hardness	matrix: Mohs 5-1/2 to 6 inclusions: Mohs 2-1/2 to 7	Mohs 6 to 7	Mohs 7 to 3
Porosity	slightly porous	non-porous to slightly porous	non-porous to finely porous
Particle Shape	angular	angular	angular
Particle Surface	fresh, rough, dented to ridged	fresh, rough, dented to ridged	fresh, rough, dented to ridged
Remarks	Many particles are amygdaloidal with chloritic to siliceous mineralization.	Many particles contain traces of bedding. Most particles are dense, with a sandy appearance. A few particles have contact exposures of basalt.	Particles are composed predominantly of quartz with intergrowths of calcite and associated minerals. Some particles contain exposures of basalt.