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Date: July 11, 2017

Project: 16-3480L Laboratory Testing
 Aggregate Acceptance

Client: Mr. Fred Huppert
 Huppert Brothers Construction
 3509 54th Street West
 Billings, Montana 59106

Copies:

Source: Laurel South Quarry
Date Sampled: 5/17/17

Sample: Whiskey River
Sampled by: FH/HB

Test Method	Lab Result	FP-14 705.02 Riprap Specification
Sodium Sulfate Soundness loss, <i>average of 3 coarse size ranges</i> (ASTM C 88)	---	12% max
Sodium Sulfate Soundness loss, <i>average of 4 fine size ranges</i> (ASTM C 88)	---	---
LA Abrasion loss, <i>crushed and sized to grading A</i> (ASTM C 535)	---	50% max
Freeze-Thaw loss, <i>recommend weighted average of 4 rocks of varying geology, through 30 cycles</i> (ASTM D 5312)	0.16% *	no FP-14 spec, but typ 10% max for those projects that specify
Specific Gravity, <i>recommend an average of 8 rocks of varying geology</i> (ASTM D 6473)	2.428 bulk Dry 2.453 bulk SSD 2.491 apparent 1.06% absorption	--- --- 2.40 min 4% max

* Freeze-Thaw photos attached on page 2.


 Joe B. DeBar, PE
 Materials Lab Manager

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Whiskey River samples before 30 freeze-thaw cycles.



Whiskey River samples after 30 freeze-thaw cycles.