



DEHAVEN Quarry

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REVISION DATE 4/24/2008  
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Environmental Services     Geotechnical Engineering     Construction Materials Testing     Special Inspections

Darren Lee  
4 Lees Excavation  
515 Noble Road  
Ontario, OR 97914

Phone: (208) 230-2360  
Fax: (541) 262-3360

**Re: Malheur County Source Evaluation Report  
Quantity and Quality Analysis (OAR 660-23-180)  
Moore's Hollow Road, Ontario, Oregon**

**Dear Mr. Lee:**

Per your request, MTI has performed a borrow source evaluation at the above-referenced project. The purpose of this evaluation was to determine approximate quantities and suitability of aggregates for Granular Borrow Aggregates. Our investigation included analysis of previously trenched areas, sampling of soils encountered, testing of borrow deposits and estimation of the approximate quantity, as per the requirements specified by Oregon Administrative Rule (OAR) 660-23-180 (Minerals and Aggregate Resources). Site location, trench locations, and quantity of borrow materials are contained herein.

**Project Description and Site Location:**

The proposed borrow source is approximately 11 miles north and 4.5 miles west of the City of Ontario and occupies a portion of the NE $\frac{1}{4}$ SW $\frac{1}{4}$  of Section 13, Township 16 South, Range 46 East, Willamette Meridian. MTI understands the proposed borrow source presently exists as privately owned property.

Access to the site may be gained by traveling north from the City of Ontario on Oregon State Highway 201 approximately 11 miles to its intersection with Noble Road. Turn west on Noble Road and continue for approximately 1 mile to the intersection of Noble Road and Buckhorn Road. Proceed south on Buckhorn road for approximately  $\frac{3}{4}$  mile to the intersection of Moore's Hollow Road. Continue west on Moore's Hollow Road for approximately 2.5 miles. At this point the road will 'Y' and the cut face is located approximately  $\frac{1}{4}$  mile to the north on the east side of the hill.

**General Geology Of Area:**

The subject site is located within the Western Snake River Flood Plain. Within this region, this geomorphologic feature consists of a broad, thick sequence of alluvial silts, clays, sands and gravel. These sediments typically have been deposited on Miocene (24 to 5 million years ago) basalt flows and tuffaceous sediments of the eastern region of the Columbia Plateau. This thick sequence of generally fine-grained sediments, predominately derived from the Idaho Batholith, contains minor intercalated tuffs and basalt flows within the earliest deposits. Most of these sediments were placed during the latter part of the Miocene and are predominately of lacustrine origin. Lakes were created within this area as a result of basalt flow impoundments formed to the west along the ancestral Columbia River. Many of the fossil leaf forms uncovered in these lacustrine plain sediments indicate the presence of a wet tropical climate that prevailed at this time. Early Quaternary age (1.6 million years ago to present) sediments deposited on top of the lacustrine plain were apparently deposited during a time of extremely dry climatic conditions in which little water was present for removal, sorting, and deposition of the debris. With a gradual return to a wetter climate, the surrounding hills again began to erode to their present form.

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**Description Of Borrow Materials:**

The proposed borrow source site exists as a gently to steeply sloping hillside across the majority of the property. Prior to our field investigation, the eastern hillside portion of the property had been stripped of organics and topsoil. Several trenches were excavated to expose underlying materials. This report is based on depths and materials encountered in these trenches and exposed aggregates on the south portion of the described mountain/hill in the section labeled Site Location.

Gravel at the site is the proposed borrow source material to be mined. Poorly graded gravel sediments found in the upper 2.5 feet were light brown, dry, dense, fine to medium-grained sand, with 3 inch minus sub-rounded cobbles. Beneath the poorly graded gravel sediments was poorly-graded sand that was light brown, dry, medium dense to dense, with fine to medium-grained sand that extended to a depth of 4.3 feet below ground surface (bgs). Beneath the poorly graded sand sediments was poorly graded gravel that was light brown, dry, dense, with fine to medium-grained sand, with occasional 3 inch minus sub-rounded gravel. Weak to moderate calcium carbonate cementation was observed from 4.3 to 5.8 feet bgs in the poorly graded gravel sediments. Poorly graded gravel sediments extended beyond the termination depth of the test pit.

**Quantity Of Borrow Materials:**

An estimated quantity of 400,000 tons of material has been calculated from results of MTT's field investigation. This estimate is based on a calculated volume of Approximately 5,00,000 cubic feet of material with a density of 160 pounds per cubic foot. Variation in actual quantity of up to 25% should be expected, based on the method of measurement and changes in actual geology.

**Degradation Testing Results:**

As requested MTT has performed Oregon Sodium Sulfate on the sample referenced below. The testing was performed in accordance with ODOT Specifications: Section 02630. The results obtained in our laboratory were as follows:

<b>Source and Description:</b>	Test Pit 1						
<b>Sample ID:</b>	80082						
<b>Sampling and Preparation:</b>	ASTM D75:		AASHTO T2:	X	AASHTO T87:	X	ASTM D421/D2217:
<b>Test Standard:</b>	ODOT TM208	X					

Nominal Maximum Size of Aggregate	4" (100 mm)	Specifications
Sediment Height In Inches:	0.1	3" Max
Percent Passing #20 Screen:	9.4	30% Max

Note: Water used for testing was distilled, and at a controlled temperature of 25 degrees Celsius (77°F).



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**Geotechnical Investigation Test Pit Log**

Test Pit Log #: TP-1      Date Advanced: 03/25/2008      Logged by: Odo Grandi, EIT

Excavated by: Client Supplied      Location: See Site Map Plate

Depth to Water Table: Not Encountered      Total Depth: 11.9 Feet bgs

Depth (Feet bgs)	Field Description and USCS Soil and Sediment Classification	Sample Type	Sample Depth (Feet bgs)	QP	Lab Test ID
0.0-2.5	Poorly Graded Sandy Gravel (GP): <i>Light brown, dry dense, fine to medium-grained sand, 3 inch minus sub-rounded gravel.</i> —Small amounts of organic material to 1.2 feet bgs.	BS	0.2-0.8		80080
2.5-4.3	Poorly Graded Sand (SP): <i>Light brown, dry, medium dense to dense, with fine to medium-grained sand, with occasional 2 inch minus sub-rounded gravel.</i>	BS	2.8-4.0		80075
4.3-11.9	Poorly Graded Sandy Gravel (GP): <i>Light brown, dry, dense, fine to medium-grained sand, 3 inch minus sub-rounded gravel.</i> —Weak to moderate calcium carbonate cementation from 4.3 to 5.8 feet bgs. —Little to no side wall sloughing.	BS	8.4-9.5		80080

Lab Test ID	M	LL	PI	Sand Equivalent	Sieve Analysis				
					#4	#10	#40	#100	#200
-	%	-	-	-					
80080	1.1	NP	NP	81	43	38	14	1	0.4
80075	2.8	NP	NP	81	97	96	52	1	0.7



**MATERIALS  
TESTING &  
INSPECTION**

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**Summary of Suitability Testing:**

The following table has been prepared in order to summarize test results of aggregate suitability testing of samples obtained during the onsite exploration activities. Testing was performed on uncrushed aggregates.

Sample Description	Soundness (Weighted Loss%)	L.A. Abrasion (Weighted Loss)	Oregon Degradation
Gravel with Sand  1/4" to 2" in size	0.2%	14.3%	9.4 % Passing #20 Screen
			0.1" Sediment Height
2002 ODOT Standard Specifications according to section 02630	Tested Per AASHTO T 104	Tested Per AASHTO T 96	TESTED Per ODOT TM 208
	12.0% Maximum Loss	35.0 % Maximum Loss	Passing #20 Screen - 30% Max
			Sediment Height - 3" Max

**Warranty and Limiting Conditions:**

The field observations and research reported herein are considered sufficient in detail and scope to form a reasonable basis for the purposes cited above. MTI warrants that the findings contained herein have been promulgated in accordance with generally accepted test procedures and only for the project described in this report. No other warranties are implied or expressed. Any comments in this report concerning onsite conditions and/or observations, including soil appearances and odors, are provided as general information and are not intended to describe, quantify or evaluate any environmental concern or situation. No estimate of lateral extend of source material has been performed.

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### Unified Soil Classification System

Major Divisions		Symbol	Soil Descriptions
Coarse Grained Soils <50% passes #200 sieve	Gravel and Gravelly Soils <50% coarse fraction passes #4 sieve	GW	Well-graded gravels, gravel-sand mixtures, little or no fines
		GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines
		GM	Silty gravels, Poorly-graded gravel-sand-silt mixtures
		GC	Clayey gravels, Poorly-graded gravel-sand-clay mixtures
	Sand and Sandy Soils >50% coarse fraction passes #4 sieve	SW	Well-graded sands, gravelly sands, little or no fines
		SP	Poorly-graded sands, gravelly sands, little or no fines
		SM	Silty sands, Poorly-graded sand-gravel-silt mixtures
		SC	Clayey sands, Poorly-graded sand-gravel-clay mixtures
Fine Grained Soils >50% passes #200 sieve	Silts and Clays LL < 50	ML	Inorganic silts & very fine sands, silty or clayey fine sands, clayey silts
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
		OL	Organic silts and organic silt-clays of low plasticity
	Silts and Clays LL > 50	MH	Inorganic silts, micaceous or diatomaceous fine sand or silt
		CH	Inorganic clays of high plasticity, fat clays
		OH	Organic silts and clays of medium-to-high plasticity
Highly Organic Soils		PT	Peat, humus, hydric soils with high organic content

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