**SOIL BORING LOG and WELL CONSTRUCTION**

**PROJECT**: UPRR Mosier Derailment  
**LOCATION**: Mosier, OR  
**Date Drilled**: 6/13/2016

**DRILLING CONTRACTOR**: Environmental West Explorations

**DRILLING METHOD AND EQUIPMENT USED**: Air Rotary B-90

**WATER LEVELS**: 22.85 feet

**DEPTHS BELOW SURFACE (FT)**

<table>
<thead>
<tr>
<th>Depth (FT)</th>
<th>Sample Interval (FT)</th>
<th>USCS Group Symbol</th>
<th>Soil Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>2</td>
<td>GP</td>
<td>2-inch minus gravel fill</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>GP</td>
<td>Dry compacted clean gravel fill</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td>GP</td>
<td>As above</td>
</tr>
<tr>
<td>15</td>
<td></td>
<td>GP</td>
<td>Grayish-Brown silty sandy gravel - silt matrix with 3-4&quot; rounded to subrounded poorly graded gravel, f-m sand, no odor, no sheen (fill?), moist</td>
</tr>
<tr>
<td>20</td>
<td></td>
<td>GP</td>
<td>Increase in moisture at 20'</td>
</tr>
<tr>
<td>25</td>
<td></td>
<td>GM</td>
<td>As above</td>
</tr>
<tr>
<td>30</td>
<td></td>
<td>GM</td>
<td>Increase in fines at 35'</td>
</tr>
<tr>
<td>35</td>
<td></td>
<td>GC</td>
<td>Grayish Brown clayey gravel - clay matrix with occasional f-c angular basalt fragments, no odor, no sheen, saturated. Drilling becomes hard at 39.5'</td>
</tr>
<tr>
<td>40</td>
<td></td>
<td></td>
<td>35' Bottom Depth of Screen</td>
</tr>
</tbody>
</table>

**WELL CONSTRUCTION DIAGRAM**

- 12' flush-mount vault and cement seal (to 1.0' bgs)
- 17.0' to 2.0' Bentonite Chip Seal
- 17.0' to 20.0' Filter Pack
- 20' Top Depth of Screen

**Well Casing and Screen Materials**

- **Casing Material**: Sch 40 PVC
- **Casing Diameter**: 4-in
- **Seal Type**: 3/8' Bentonite Chips
- **Screen Type**: Sch 40, 0.010" Milled Slots
- **Filter Sand Type**: 20 Colorado Silica Sand
- **Screen Length**: 15 ft

**Boring logged by drill cuttings from cyclone**
**SOIL BORING LOG and WELL CONSTRUCTION**

**PROJECT**: UPRR Mosier Derailment  
**LOCATION**: Mosier, OR  
**Date Drilled**: 6/15/2016  
**DRILLING CONTRACTOR**: Environmental West Explorations  
**DRILLING METHOD AND EQUIPMENT USED**: Air Rotary B-90

**WATER LEVELS**: 22.06 feet  
**START**: 14:20  
**END**: 16:45  
**LOGGER**:

<table>
<thead>
<tr>
<th>DEPTH BELOW SURFACE (FT)</th>
<th>SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY</th>
<th>WELL CONSTRUCTION DIAGRAM</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>___ __ __</td>
<td><strong>SAMPLE INTERVAL (FT)</strong></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>2-inch minus gravel fill</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td>Increase in f-m sand at 12'</td>
</tr>
<tr>
<td>15</td>
<td></td>
<td>Increase in moisture at 21'</td>
</tr>
<tr>
<td>30</td>
<td></td>
<td>Increase of f-m sand at 31'</td>
</tr>
</tbody>
</table>

**Well Casing and Screen Materials**

- **Casing Material**: Sch 40 PVC  
- **Seal Type**: 3/8" Bentonite Chips  
- **Pack Type**: 10-20 Colorado Silica Sand  
- **Screen Length**: 15 ft  
- **Screen Type**: Sch 40, 0.010" Milled Slots

Boring logged by drill cuttings from cyclone.
**SOIL BORING LOG and WELL CONSTRUCTION**

**PROJECT: UPRR Mosier Derailment**  
**LOCATION: Mosier, OR**  
**Date Drilled: 6/16/2016**  
**DRILLING CONTRACTOR: Cascade Drilling**  
**DRILLING METHOD AND EQUIPMENT USED: Sonic track mount**  
**WATER LEVELS: 14.8 feet**  
**START: 10:30**  
**END: 11:30**  
**LOGGER:**

<table>
<thead>
<tr>
<th>DEPTH BELOW SURFACE (FT)</th>
<th>SOIL NAME</th>
<th>USCS GROUP SYMBOL</th>
<th>COLOR</th>
<th>MOISTURE CONTENT</th>
<th>RELATIVE DENSITY</th>
<th>CONSISTENCY</th>
<th>SOIL STRUCTURE</th>
<th>MINERALOGY</th>
<th>CASING MATERIAL</th>
<th>SCREEN TYPE</th>
<th>SEAL TYPE</th>
<th>FILTER SAND TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>GM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>GP</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>10</td>
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<tr>
<td>15</td>
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<tr>
<td>20</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Well Casing and Screen Materials**
- **Casing Material:** Sch 40 PVC
- **Casing Diameter:** 2-in
- **Seal Type:** 3/8" Bentonite Chips
- **Pack Type:** 10-
- **Filter Sand Type:** 10-20 Colorado Silica Sand
- **Screen Length:** 15 ft
- **Screen Type:** Sch 40, 0.010" Milled Slots

**Core Description:**

- **0 ft:** Brown silty gravel - 3-4 inch rounded to subrounded gravel with occasional cobbles in a silt matrix, dry (fill?)
- **5 ft:** Grayish-Brown gravel - 1-inch subrounded gravel with silt and f-m sand matrix, poorly graded, loose, dry.
- **10 ft:** Increase of moisture at 12'
- **15 ft:** Brown to Reddish brown sandy gravel - f-c angular to subangular sand with f-m gravel. Gravel is subangular consisting of basalt with quartz (alluvium), poorly graded, no odor, no sheen, saturated
- **22 ft:** Bottom Depth of Screen

**WELL CONSTRUCTION DIAGRAM**

- 12' flush-mount vault and cement seal (to 1.0' bgs)
- 5.0' to 1.0' Bentonite Chip Seal
- 7' Top Depth of Screen
- 5.0' to 23.0' Filter Pack
- 22' Bottom Depth of Screen
**PROJECT NUMBER**
678490

**BORING NUMBER**
MW-2

**SHEET 1 OF 1**

**SOIL BORING LOG and WELL CONSTRUCTION**

**PROJECT:** UPRR Mosier Derailment  
**LOCATION:** Mosier, OR  
**Date Drilled:** 6/17/2016

**DRILLING CONTRACTOR:** Cascade Drilling  
**DRILLING METHOD AND EQUIPMENT USED:** Sonic track mount  
**WATER LEVELS:** 10.6 feet

**START:** 10:30  
**END:** 11:30  
**LOGGER:**

<table>
<thead>
<tr>
<th>DEPTH BELOW SURFACE (FT)</th>
<th>SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.</th>
<th>CASING MATERIAL, SCREEN TYPE, SEAL TYPE, FILTER SAND TYPE.</th>
<th>PID READING</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Brown silty gravel - 3-4 inch rounded to subrounded gravel with occasional cobbles in a silt matrix, dry.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12' flush-mount vault and cement seal (to 1.0’ bgs)</td>
<td></td>
<td>4.0’ to 1.0’ Bentonite Chip Seal</td>
<td>0.1</td>
</tr>
<tr>
<td>5</td>
<td>Grayish-Brown gravel - 1-inch subrounded gravel with silt and f-m sand matrix, poorly graded, loose, dry.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5' Top Depth of Screen</td>
<td></td>
<td>4.0’ to 21.0’ Filter Pack</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Increase of moisture at 9’</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Grades to Brown to Grayish Brown Gravel - f-c angular to subangular sand with silt. Gravel is angular to subrounded (1-3”) alluvium, poorly graded, no odor, no sheen, saturated</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20’ Bottom Depth of Screen</td>
<td></td>
<td>20 Colorado Silica Sand</td>
<td>0.2</td>
</tr>
</tbody>
</table>

**WELL CONSTRUCTION DIAGRAM**

**Well Casing and Screen Materials**
- **Casing Material:** Sch 40 PVC
- **Casing Diameter:** 2-in
- **Seal Type:** 3/8” Bentonite Chips
- **Pack Type:** 10-20 Colorado Silica Sand
- **Screen Length:** 15 ft
- **Screen Type:** Sch 40, 0.010” Milled Slots
## Soil Boring Log and Well Construction

**Project:** UPRR Mosier Derailment  
**Location:** Mosier, OR  
**Date Drilled:** 6/17/2016

**Drilling Contractor:** Cascade Drilling  
**Drilling Method and Equipment Used:** Sonic track mount  
**Water Levels:** 10.0 feet  
**Start:** 08:00  
**End:** 09:00  
**Logger:**

<table>
<thead>
<tr>
<th>Depth Below Surface (FT)</th>
<th>Sample Interval (FT)</th>
<th>Recovery (FT)</th>
<th>USCS Group Symbol</th>
<th>Soil Name, USCS Group Symbol, Color, Moisture Content, Relative Density, or Consistency, Soil Structure, Mineralogy</th>
<th>Well Construction Diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td></td>
<td>GM</td>
<td>Brown silty gravel - 3-4 inch rounded to subrounded gravel with occasional cobbles in a silt matrix, dry.</td>
<td>12' flush-mount vault and cement seal (to 1.0' bgs)</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td>Grayish-Brown gravel - 1-inch subrounded gravel with silt and f-m sand matrix, poorly graded, loose, dry.</td>
<td>4.0' to 1.0' Bentonite Chip Seal</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td>Increase of moisture at 9'</td>
<td>5' Top Depth of Screen</td>
</tr>
<tr>
<td>15</td>
<td></td>
<td></td>
<td>GP</td>
<td>Grades to Brown to Grayish Brown Gravel - f-c angular to subangular sand with silt. Gravel is angular to subrounded (1-3&quot;) alluvium, poorly graded, no odor, no sheen, saturated</td>
<td>4.0' to 21.0' Filter Pack</td>
</tr>
<tr>
<td>20</td>
<td></td>
<td></td>
<td></td>
<td>Increase of fines at 18'</td>
<td>20' Bottom Depth of Screen</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Brown to Grayish Brown Gravel - f-c angular to subangular sand with silt. Higher fines content than above. Gravel is angular to subrounded (1-3&quot;) alluvium, poorly graded, no odor, no sheen, saturated</td>
<td></td>
</tr>
</tbody>
</table>

**Well Casing and Screen Materials**  
- **Casing Material:** Sch 40 PVC  
- **Casing Diameter:** 2-in  
- **Seal Type:** 3/8" Bentonite Chips  
- **Pack Type:** 10-  
- **20 Colorado Silica Sand**  
- **Screen Length:** 15 ft  
- **Screen Type:** Sch 40, 0.010" Milled Slots
## SOIL BORING LOG and WELL CONSTRUCTION

**PROJECT:** UPRR Mosier Derailment  
**LOCATION:** Mosier, OR  
**Date Drilled:** 6/16/2016

**DRILLING CONTRACTOR:** Cascade Drilling  
**DRILLING METHOD AND EQUIPMENT USED:** Sonic track mount

**WATER LEVELS:** 6.0 feet  
**START:** 14:45  
**END:** 15:30  
**LOGGER:**

<table>
<thead>
<tr>
<th>DEPTH BELOW SURFACE (FT)</th>
<th>USCS GROUP SYMBOL</th>
<th>SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.</th>
<th>WELL CONSTRUCTION DIAGRAM</th>
</tr>
</thead>
<tbody>
<tr>
<td>RECOVERY (FT)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>GM</td>
<td>Brown silty gravel - 3-4 inch rounded to subrounded gravel with occasional cobbles in a silt matrix, dry</td>
<td>12&quot; flush-mount vault and cement seal (to 1.0' bgs)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Grayish-Brown gravel - 1-inch subrounded gravel with silt and f-m sand matrix, poorly graded, loose, increase of moisture at 5'</td>
<td>4.0' to 1.0' Bentonite Chip Seal 0.1</td>
</tr>
<tr>
<td></td>
<td>GP</td>
<td>Becomes saturated at 6'</td>
<td>5' Top Depth of Screen</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>ML</td>
<td>Grades to Brown Silt - Silt (soft) with occasional basalt gravel. Gravel is angular to subrounded (1&quot;) alluvium, poorly graded, no odor, no sheen, saturated</td>
<td>4.0' to 16.0' Filter Pack</td>
</tr>
<tr>
<td></td>
<td>GP</td>
<td>Grades to Grayish Brown Gravel - f-c angular to subrounded (1-3&quot;) alluvium, poorly graded, no odor, no sheen, saturated</td>
<td>15' Bottom Depth of Screen</td>
</tr>
</tbody>
</table>

### Well Casing and Screen Materials
- **Casing Material:** Sch 40 PVC  
- **Casing Diameter:** 2-in  
- **Seal Type:** 3/8" Bentonite Chips  
- **Pack Type:** 10-20 Colorado Silica Sand  
- **Screen Length:** 10 ft  
- **Screen Type:** Sch 40, 0.010" Milled Slots