

**ENGINEERING GEOLOGY REPORT**  
**Harley Slide**  
**Green Springs Highway OR 66**  
**Highway No. 21**  
**M.P. 11.8-12.0**

**Jackson County**

**Key 17535**  
**EA PE002600/000**

**June 16, 2017**

**By:**  
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**REGION 3 TECH CENTER, GEO/ENVIRONMENTAL UNIT**  
**OREGON DEPARTMENT OF TRANSPORTATION**

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## **1.0 INTRODUCTION**

This report presents the results of the geologic investigation completed for a landslide (Harley Slide) project located at Mile Point (MP) 11.8-12.0, State Route OR 66, Highway No. 21. The purpose of the geologic investigation was to collect surface and subsurface data for use in the landslide remediation design.

The following tasks were completed in the course of the geologic investigation:

- Advanced four drillholes within and adjacent to the slide limits and installed monitoring instrumentation consisting of four slope inclinometers and four Vibrating Wire Transducers (VWTs) to monitor slope movements and groundwater pore pressures, respectively.
- Logged soil and rock samples obtained from the drillholes and submitted select soil samples to the ODOT Materials Testing laboratory for sieve analyses, Atterberg limits and moisture percentage determination. Soil samples were obtained from Standard Penetration Tests (SPTs) completed approximately every five feet in the soil portion of the drillholes. Select rock samples were sent to the ODOT Materials Testing laboratory for completing Unconfined Compressive Strength (UCS) testing.
- Downloaded and reviewed data from all VWTs and inclinometers.
- Mapped slide limits and tension cracks visible on the surface.
- Surveyed the ground surface within and adjacent to the slide limits and used the survey data to generate a topographic map and cross-sections through the slide limits.
- Prepared this report summarizing the geologic investigations, surface and subsurface conditions

### **1.1 Project Location**

The project area is located along State Route OR 66 (Highway No. 21) at MP 11.8. The project is within the United States Geological Survey (USGS) Emigrant Lake, Oregon, 7.5 Minute Quadrangle, provisional edition 1983, in Township 39 South, Range 2 East, and Section 36, Willamette Meridian (Figure 1).

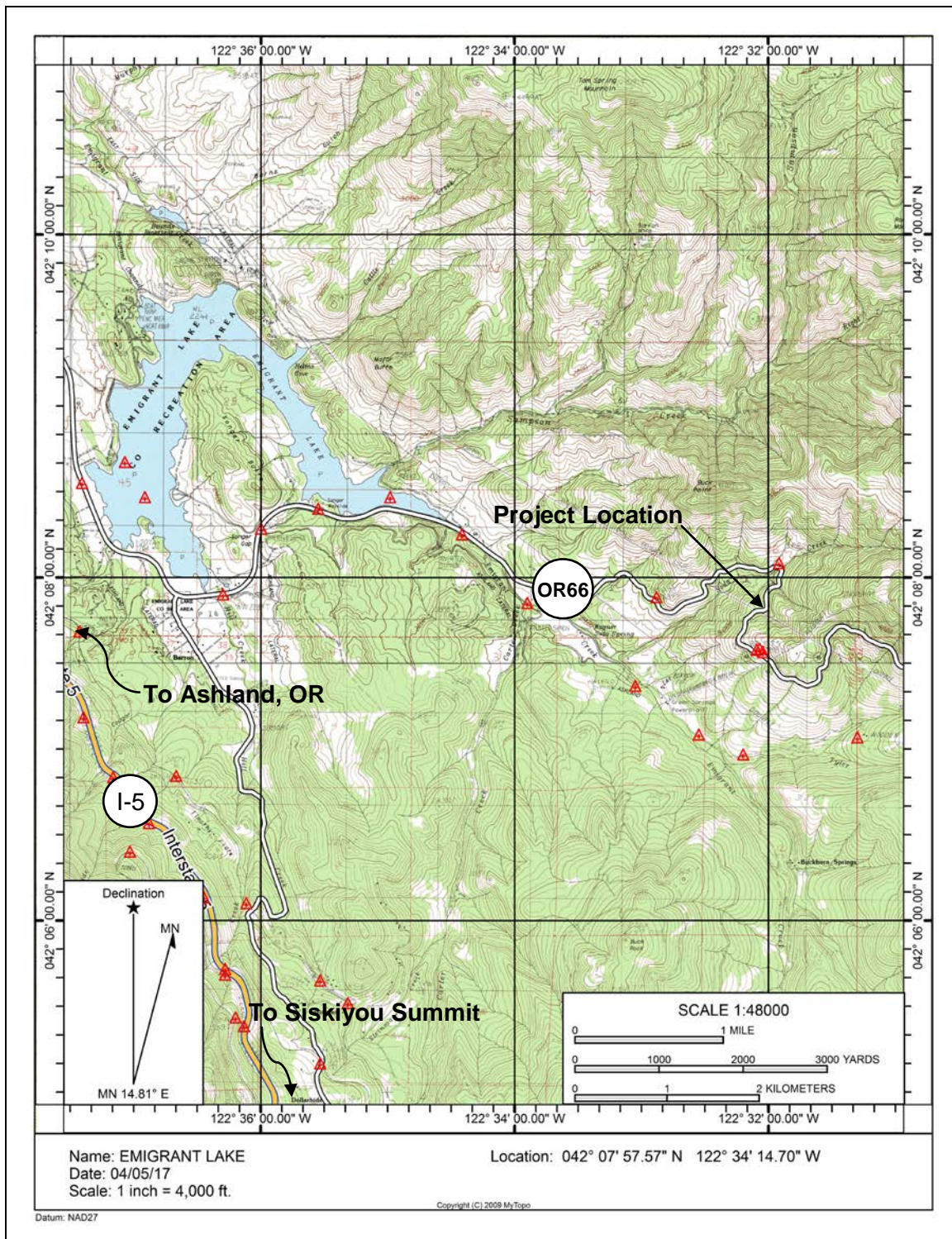


Figure 1: Site Location Map

## **1.2 Project Description**

The slide has impacted both travel lanes and extends between approximately Station (Sta.) along the "M" Line of 19+70 and Sta. 21+90 in the southbound lane of OR 66 (Sheet GA01 in Appendix A). The slide extends between an elevation of approximately 3,133 feet at the headscarp down to an elevation of approximately 3,090 feet at the toe (Sheets GA01 and GA02 in Appendix A). This slide location sits within a natural draw in steep terrain, and according to ODOT Maintenance personnel, the road alignment in this location has had stability issues each spring season for approximately the last ten years. ODOT Maintenance personnel have been patching the asphalt each year to keep the roadway operational. A drain and drain pipe were placed above the slide to divert water from the drainage away from the slide. The surface evaluation located a seep between drillholes HS-02 and HS-03. The drilling program addressed the soil and rock types and depths, the slide plane geometry and groundwater conditions.

## **1.3 Geologic Setting**

Located southeast of Ashland about 7.5 miles, the slide is mapped within the Western Cascades geologic province at an elevation of approximately 3,130 feet. The project is within the Eocene/Oligocene (25-38my) aged, Roxy (Torb) Formation. The bedrock mapped in this area is a mix of Volcanic Flow rocks of Basalt and Andesite (Smith and Roe 2015). The site has been mapped within a Landslide Deposit as shown in Figure 2 (Wiley, McClaughry and D'Allura 2011).

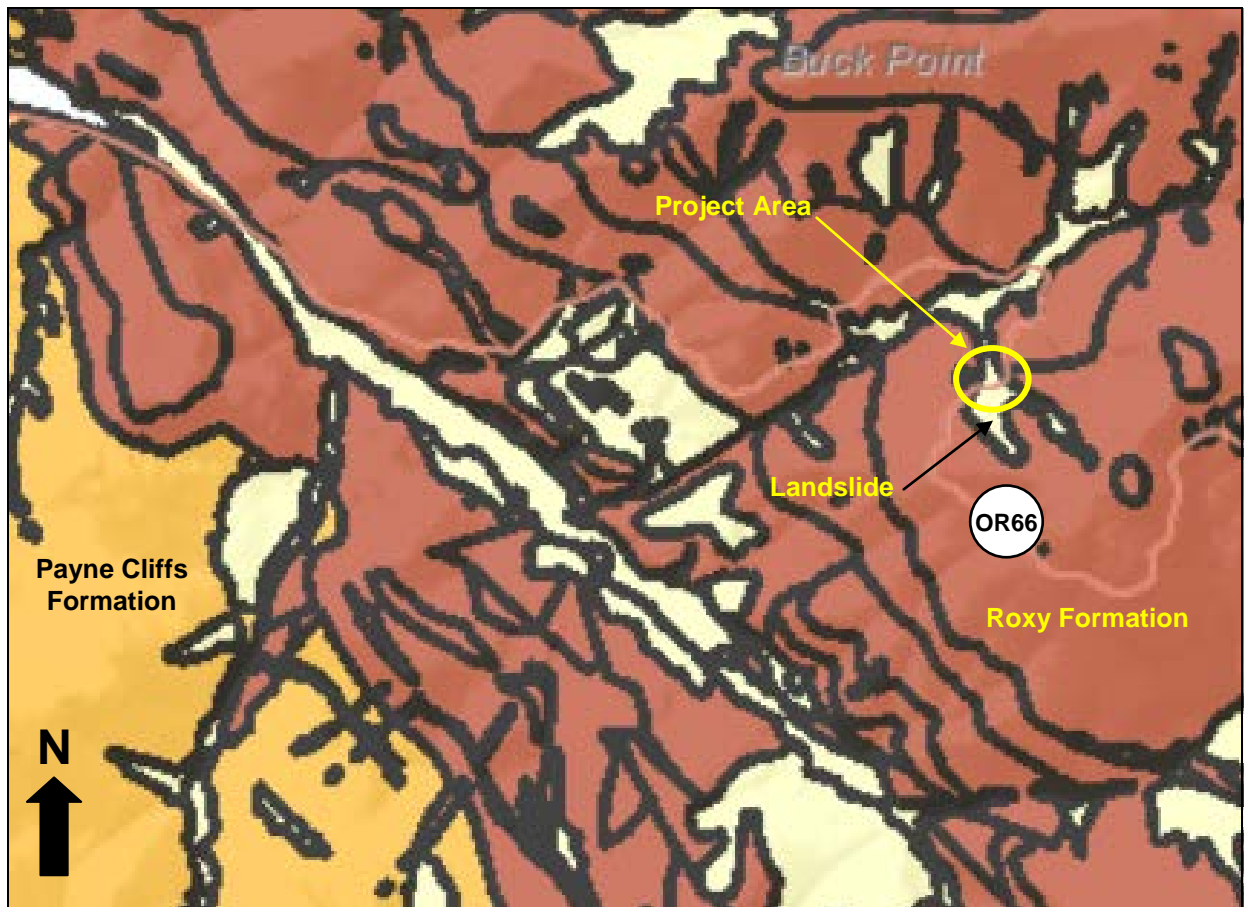


Figure 2 – Geologic Map of the project area; modified after original (Wiley, McClaughry and D’Allura 2011).

#### 1.4 Seismicity

The Geologic database and generalized geologic map of Bear Creek Valley, Jackson County, Oregon by Thomas Wiley has located faults mapped throughout the general area of the project. USGS fault maps show the Sky Lakes fault zone to the NE about 26 miles and the Klamath graben fault zone to the east approximately 31 miles. The Cedar Mountain fault zone is to the SE about 23 miles. The age and activity of these normal faults are considered Quaternary in the geologic interpretation. The Cascadia Subduction Zone is located approximately 67 miles west of the project site (Peterson, Kulm and Gray, 1986). USGS, National Seismic Hazard Mapping Project, 2008, calculates a peak bedrock acceleration of 0.13g and 0.19g for the 500-year and 1,000-year return-period earthquakes respectively, from all seismic sources in the region.



## **2.0 SUBSURFACE INVESTIGATION**

### **2.1 Drilling and Sampling**

The subsurface investigation was conducted during July 2012 and directed by personnel from the Region 3 Geology Unit. The drillholes were drilled by HazTech Drilling, Inc. of Meridian, Idaho. A total of four vertical drillholes (HS-01, HS-02, HS-03 and HS-04) were advanced in accordance with ASTM standards (Table 1). A truck-mounted drill was utilized and equipped with an automatic-trip hammer and diamond coring capabilities.

The drillholes depths ranged from 35.0 feet below ground surface (bgs) in HS-01 to 51.0 feet bgs in HS-03. The total footage drilled for the project was 172 feet. The drillholes were advanced with a combination of using Hollow Stem Auger (HSA) and HQ3 Wireline core in the soil and rock materials, respectively. A total of 42 SPTs were collected. SPTs were collected on approximate five-foot spacings. The samples collected from the SPTs were logged in general accordance with ODOT Soil and Rock classification methods (ODOT 1987). The blow counts were recorded on the drillhole logs (Appendix B). A total of 65.9 feet of core was drilled in the four drillholes. Core runs were generally five feet-long, preserved in cardboard core boxes and photographed (Appendix C). Slope inclinometers and VWTs were installed in each hole. The placing of the VWTs was determined by the depth of the water table encountered, and the bedrock contact depth. Table 1 provides a summary of the drillhole location, depth and instrumentation installations.

**Table 1  
Drillhole Summary**

Drillhole Number	Northing (feet)	Easting (feet)	Elevation (feet)	Drillhole Depth (feet)	Instrumentation Depth (feet)	
					VWT	Inclinometer
HS-01	62,082.6	45,981.3	3,132.5	35.0	19.0	35.0
HS-02	62,134.3	45,938.3	3,106.9	41.0	19.0	41.0
HS-03	62,083.3	45,895.5	3,112.5	51.0	19.0	51.0
HS-04	62,002.1	45,877.7	3,141.5	45.0	37.0	45.0

### **2.2 Material Units**

Seven material units were interpreted from the subsurface investigation: Fill (Units 1 and 2), Landslide Debris (Unit 3) and four sub-units of the Roxy Formation (Units 4, 5, 6 and 7), consisting of decomposed tuff, decomposed basalt, weathered basalt and fresh basalt, respectively. A detailed description of the material units can be found on the attached drillhole logs in Appendix B.

### **2.2.1 Fill (Unit 1)**

This material was found in drillholes HS-01, and HS-04. These two drillholes were restricted to the OR 66 roadway prism. This material overlies the slide debris (Unit 3). A total of 15.5 feet of this material was encountered during the drilling. The elevation of the basal contact of this unit ranges between 3,122.0 and 3,134.5 feet above mean sea level (MSL) in drillholes HS-01 and HS-04, respectively. The unit has an average thickness of 9.5 feet. A total of five SPTs were collected in this material with uncorrected N Values ranging between 11 and 33 with an average of 16 blows-per-foot.

This fill is composed of Sandy GRAVEL with trace silt, GW, to CLAY with trace sand, CH, to Clayey SAND with some gravel, SC. Color ranges from black, dark gray to gray and brown to dark brown. The plasticity ranges from nonplastic to high-plasticity. The soil is dry to damp, is medium dense to dense and medium stiff to stiff. The sand is fine to coarse-grained and the angular gravel is fine to coarse-grained.

### **2.2.2 Fill (Unit 2)**

This material was found in drillhole HS-03. This material was produced by the construction of the access road for the two drillholes (HS-02 and HS-03) below OR 66. This material is approximately three feet-thick. A total of one SPT was collected in this material with an uncorrected N Value of three blows-per-foot. This fill is composed of CLAY with trace sand, CH, is brown to black in color, has high-plasticity, and is moist and soft.

### **2.2.3 Slide Debris (Unit 3)**

This material was found in drillholes HS-01, HS-02 and HS-03. This material overlies the basalt and tuff of the Roxy Formation. The basal contact elevations were 3,091.3, 3,095.4 and 3,112.7 feet above MSL in drillholes HS-02, HS-03 and HS-04, respectively. A total of 14 SPTs were collected in this unit with uncorrected N Values ranging between four and 11 with an average of eight blows-per-foot.

The slide debris ranges from CLAY with some sand, trace gravel, CH, to Sandy CLAY with trace to some gravel, CH, to CLAY with trace to some sand, CH. The color of this material ranges from dark gray, black, brown, gray-brown to orange-brown. The plasticity is high with the moisture content ranging from damp to wet. The consistency is soft to stiff with fine to coarse-grained sand.

### **2.2.4 Roxy Formation - Decomposed TUFF (Unit 4)**

This material was encountered in drillholes HS-03 and HS-04. This material overlies the basalt of the Roxy Formation. The basal contact elevations ranged between 3,083.5 and 3,112.5 feet above MSL in drillholes HS-03 and HS-04, respectively. The unit has



an average thickness of 17 feet. A total of 14 SPTs were collected in this material with uncorrected N Values ranging between 12 and 35 with an average of 22 blows-per-foot.

The decomposed tuff ranges from CLAY with trace to some sand, CH, to Sandy CLAY, CH, to Clayey SAND with some gravel, SC. Colors range from light brown, brown, gray-brown, orange-brown, red-brown, to white. The plasticity is high with the moisture content ranging from damp to moist. The consistency is very stiff to hard and medium dense with fine to coarse-grained sand and fine-grained angular gravel.

### **2.2.5 Roxy Formation - Decomposed BASALT/VOLCANICS (Unit 5)**

This material was found in drillholes HS-02, HS-03 and HS-04. This material makes up the uppermost portion of the bedrock and has an average thickness of 4.3 feet. The basal contact elevations were 3,077.4, 3,085.9 and 3,111.0 feet above MSL in drillholes HS-03, HS-02 and HS-04, respectively. A total of three SPTs were collected in this material with uncorrected N Values ranging between 41 and 64 with an average of 51 (refusal).

The decomposed basalt remolds to a Clayey SAND with some gravel, SC, to SAND with some clay trace silt and gravel, SP-SM, to SP-SC. Color ranges from light brown, brown, dark brown, orange-brown, red-brown, and gray. Plasticity ranges from nonplastic to medium-plasticity, and the moisture content ranges from damp to wet. Relative density is dense to very dense. The sand is fine to coarse-grained.

### **2.2.6 Roxy Formation - Weathered BASALT/VOLCANICS (Unit 6)**

This material was found in drillholes HS-02 and HS-04. This material overlies the fresh basalt of the Roxy Formation and has an average thickness of 8.3 feet. The basal contact elevations range between 3,075.4 and 3,105.0 feet above MSL in drillholes HS-02 and HS-04, respectively. There were no SPTs collected in this unit. The weathered basalt is orange-brown to light gray, predominantly decomposed to slightly weathered, very soft to hard and very close to close jointed.

### **2.2.7 Roxy Formation - BASALT (Unit 7)**

This material was found in all the drillholes (HS-01, HS-02, HS-03 and HS-04). The average drilling thickness was 12.3 feet. The basalt is light gray to gray, fresh, medium hard to very hard and is close to wide jointed.

## **2.3 Laboratory Testing**

Selected soil and rock samples were tested for engineering properties at the ODOT Materials Laboratory located in Salem, Oregon. Laboratory tests included: Atterberg

limits, natural moisture content, and gradation of the materials and organics. Selected rock core was tested for unconfined compressive strength (UCS) at the ODOT Materials Lab. Laboratory testing results are included on the drillhole logs in Appendix B and summarized in Appendix D.

## 2.4 Instrumentation

A total of four Slope inclinometers and four VWTs were installed to monitor subsurface slope displacement and groundwater levels, respectively. The VWT installed in drillhole HS-01 was installed within the slide debris (Unit 3) immediately above the slide plane. The VWT installed in HS-02 was installed beneath the slide plane in the decomposed BASALT (Unit 5). The VWT installed in drillhole HS-03 was installed in the upper portion of the decomposed TUFF (Unit 4). The VWT installed in drillhole HS-04 was installed in the uppermost portion of the BASALT (Unit 7). Table 2 provides a summary of the groundwater elevation data with the groundwater plots provided in Appendix E.

**Table 2**  
**Instrumentation Summary**

Drillhole Number	VWT S/N	Installation Elevation (feet)	Installation Date	Groundwater Elevation (feet)		Slide Plane Elevation (feet)
				Minimum	Maximum	
HS-01	1122987	3,113.5	7/11/2012	3,121.7	3,125.8	3,113.6
HS-02	1122993	3,087.9	7/12/2012	3,088.4	3,105.9	3,092.9
HS-03	1122984	3,093.5	7/13/2012	3,103.5	3,112.9	3,097.4
HS-04	1122989	3,104.5	7/10/2012	3,105.0	3,115.4	N/A

Slope Indicator, QC-Type 2.75 inch outside diameter, inclinometer casing was installed in each hole (HS-01, HS-02, HS-03 and HS-04) coupled with one Geokon VWT. The instrumentation was placed and back-filled with a cement-bentonite grout in accordance with OWRD regulations. Subsequent monitoring was performed with routine manual data collection methods by Region 3 Geology personnel. Data were collected and plotted with a graphical representation of the ground movement. Depth to the slide plane is reported in feet bgs on the drillhole logs in Appendix B with slide plane elevations included in Table 2. Graphical inclinometer data plots of cumulative and incremental displacements are shown in Appendix F.

The inclinometer data shows deformation in drillholes HS-01, HS-02, and HS-03 and no displacement in HS-04. The slide plane in HS-01 is 18.8 feet bgs, in HS-02 is at 14.0 feet bgs, and in HS-03 is at 15.0 feet bgs (Appendix F). The cross-sections show the inferred limits of movement along this slide plane (Sheets GA01, GA02, GA03 and

GA04 in Appendix A). The direction of movement in HS-01 is northwest with an azimuth of 309°. The direction of movement in HS-02 is at an azimuth of 317°. The direction of movement in HS-03 is similar to HS-01 with an azimuth of 301°. The amount of displacement recorded in the inclinometers is greatest on the eastern portion of the slide (drillholes HS-01 and HS-02) with displacements along the basal plane ranging between 1.2 and 1.3 inches between July 19, 2012 and February 5, 2013. There was much less displacement recorded during the same timeframe on the western portion of the slide (drillhole HS-03) with a total of 0.3 inches of displacement. The inclinometer plots in Appendix F incorporate the stick-up for each inclinometer and also have a corrected A0 orientation in accordance with the resultant displacement direction.

### **3.0 DISCUSSION AND CONCLUSION**

The active landslide extends approximately 220 feet as measured along the highway stationing "M" Line between Sta. 19+70 and 21+90 with the headscarp extending into the northbound lane of OR 66 while extending between elevations 3,134 and 3,101 feet above MSL. The deepest portion of the active slide (Section C-C' on Sheet GA04) extends through the current roadway asphalt and fills down to immediately above the basalt bedrock contact (Sheet GA04). The slide plane forms a concave shape, with the easterly portion (drillholes HS-01 and HS-02) of the slide dipping to northwest and the eastern portion (drillhole HS-03) dipping northerly. The concave shape of the basal plan is sub-parallel to the underlying bedrock units with basalt bedrock encountered in drillholes HS-01 and HS-02 and tuff overlying the basalt in drillholes HS-03 and HS-04 helps form the shape of the slide plane. The tuff unit likely terminates at or near where the drainage is located below the existing highway which is immediately west of drillholes HS-01 and HS-02. The active slide plane is currently located in subsurface materials with N Values ranging between eight and 10 blows-per-foot. In drillholes HS-01, HS-02 and HS-03, the slide plane does not penetrate into the bedrock units (tuff or basalt), but based on the slide morphology, it may penetrate into the first 0.5 feet of the decomposed tuff (Unit 4). Slide debris (Unit 3) was consistently found until encountering either basalt or tuff bedrock units. However, there are portions of the active slide where the failure is propagating up through the logged slide debris indicating the presence of older and deeper historic slide movements. The slide debris material (Unit 3) consists of decomposed colluvial material from the underlying tuff and basalt units. This slide debris is likely a combination of larger-scale slide activity in the topographic draw and former highway embankment-related slope movements. Based on the nature of this material, this unit likely contains cobble and boulder-sized debris even though these materials were not directly encountered in the drillholes. The recent surface mapping was tied-in with the slide plane displacements in the slope inclinometers for determining the active slide limits.

The slide displacements are greatest near Section C-C', where the highest concentration of pore pressures are located. The deepest portion of the failure is directly beneath the area where the surface drainage is located near Section C-C'. The combination of having the lowest bedrock depths with the highest pore pressures is believed to help the slide move the greatest in this area. The northernmost toe bulge of the mapped slide limits also is consistent with the displacement data recorded in the slope inclinometers in HS-01 and HS-02. As the pore pressures decrease both to the west and east of this drainage area, the historic slide debris gains additional shear strength causing the slide to propagate back to the surface. A review of the pore pressure data indicates that during periods of maximum pore pressure readings, much of the slide is at or near fully saturated conditions with artesian pore pressures measured in HS-03. Pore pressures were significantly lower in HS-04 but this is likely because of the VWT being installed well below the bedrock contact, indicating a separate aquifer condition in drillhole HS-04 when compared with the groundwater conditions recorded in drillholes HS-01, HS-02 and HS-03.

#### **4.0 LIMITATIONS**

The recommendations presented in this report and its appendices are based on the data obtained from the subsurface explorations performed at the locations indicated in Sheets GA01, GA02, GA03 and GA04 in Appendix A. The subsurface explorations have provided detailed information at specific locations within the project area. However, variations in soil and rock conditions may exist between the test holes and groundwater levels may fluctuate periodically. The data shown in the exploration log of each test hole applies only to that particular test hole drilled on the dates indicated and is not intended to be conclusive as to the character of any material or conditions between or around the test holes (see Standard Specification 00120.25). Any interpretation or evaluation of this report by individuals outside of the Oregon Department of Transportation is done so at the sole risk of the individuals.

The nature and extent of any variations in subsurface materials or conditions may not become evident until construction. If subsurface conditions different than those identified in the test holes are observed, or are encountered during construction, or appear to be present beneath, or beyond excavations the Geotechnical Engineer, or the Project Geologist should be advised at once so that they can observe and review these conditions and reconsider the design recommendations where necessary.

It is recommended that construction operations relating to earthwork and foundations be observed by the Geotechnical Engineer or the Project Geologist to determine if the work is proceeding in accordance with the intent of the geotechnical recommendations and to allow for design changes as necessary.

## **5.0 REFERENCES**

Oregon Department of Transportation, Highway Division, 1987, Soil and Rock Classification Manual.


Peterson, Kulm, and Gray, 1986, Geologic Map of Ocean Floor off Oregon and the Adjacent Continental Margin, Oregon Department of Geology and Mineral Industries, GMS-42

Smith, R. L, and Roe, W. P., 2015, Oregon Department of Geology and Mineral Industries Oregon Geologic Data Compilation, Release No. 6 OGDC-6 (Statewide)

Wiley, J. Thomas, McClaughry D. Jason, and D'Allura, A. Jad, 2011, Geologic Database and Generalized Geologic Map of Bear Creek Valley, Jackson County, Oregon, Oregon Department of Geology and Mineral Industries

**6.0 SIGNATURE PAGE**

Prepared by: Jason Garwood, C.E.G.

Signature:  Date: 6/16/2017  
Lead Geologist



EXPIRES: 06-1-2018

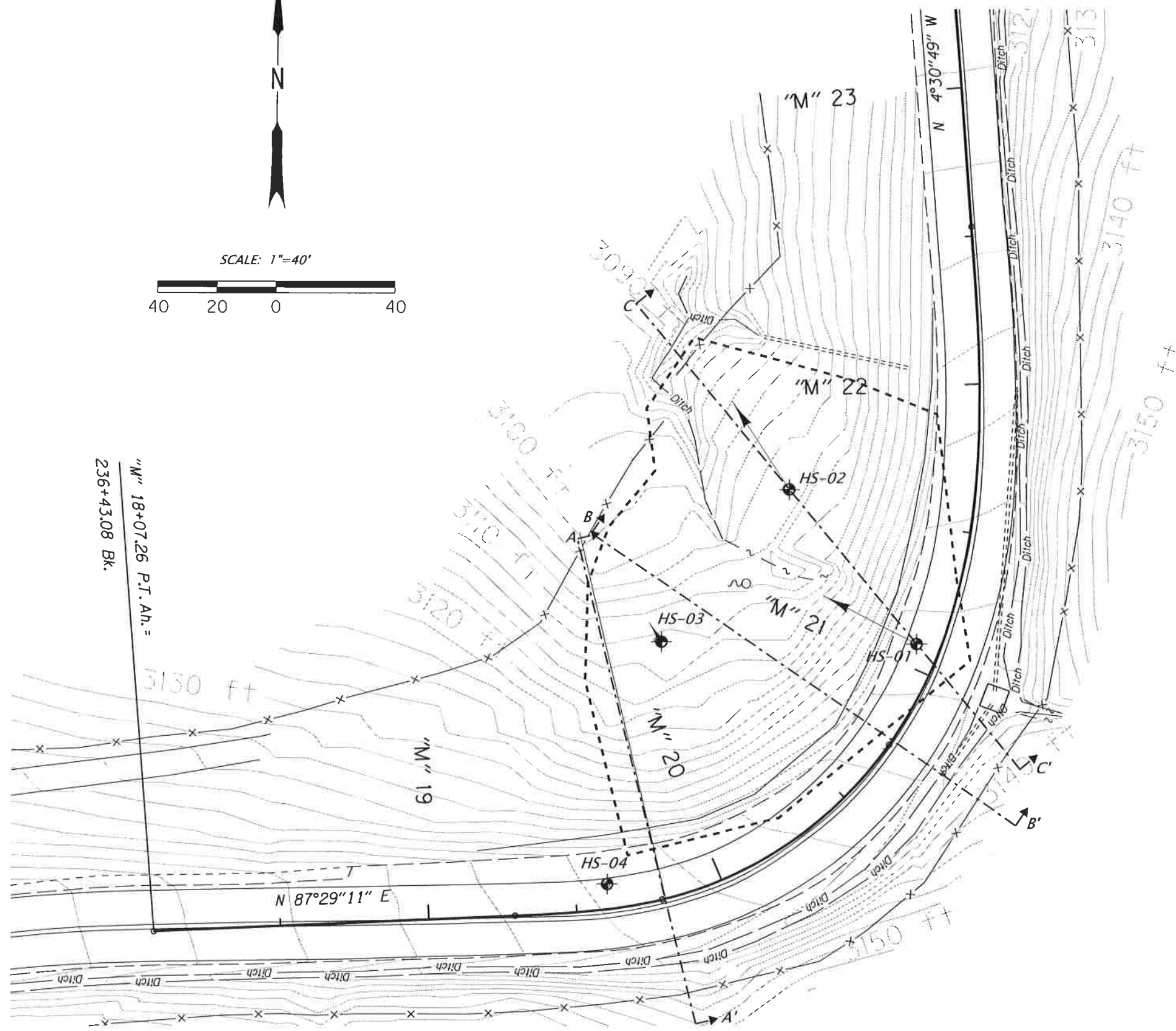
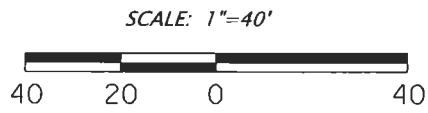
Reviewed by: Jill DeKoekkoek, R.G.

Signature:  Date: 6/16/2017  
Lead Geologist

## **APPENDIX A**

**Data Sheets GA01, GA02, GA03 and GA04**





LEGEND

- Existing fence
- Existing Edge Asphalt
- Existing Ditch
- Geotech drillhole
- Spring
- Slide Plane Movement Vectors  
1"=2" Displacement
- Drain pipe
- Approx. Slide Limit
- Cross-Section Location



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OREGON DEPARTMENT OF TRANSPORTATION



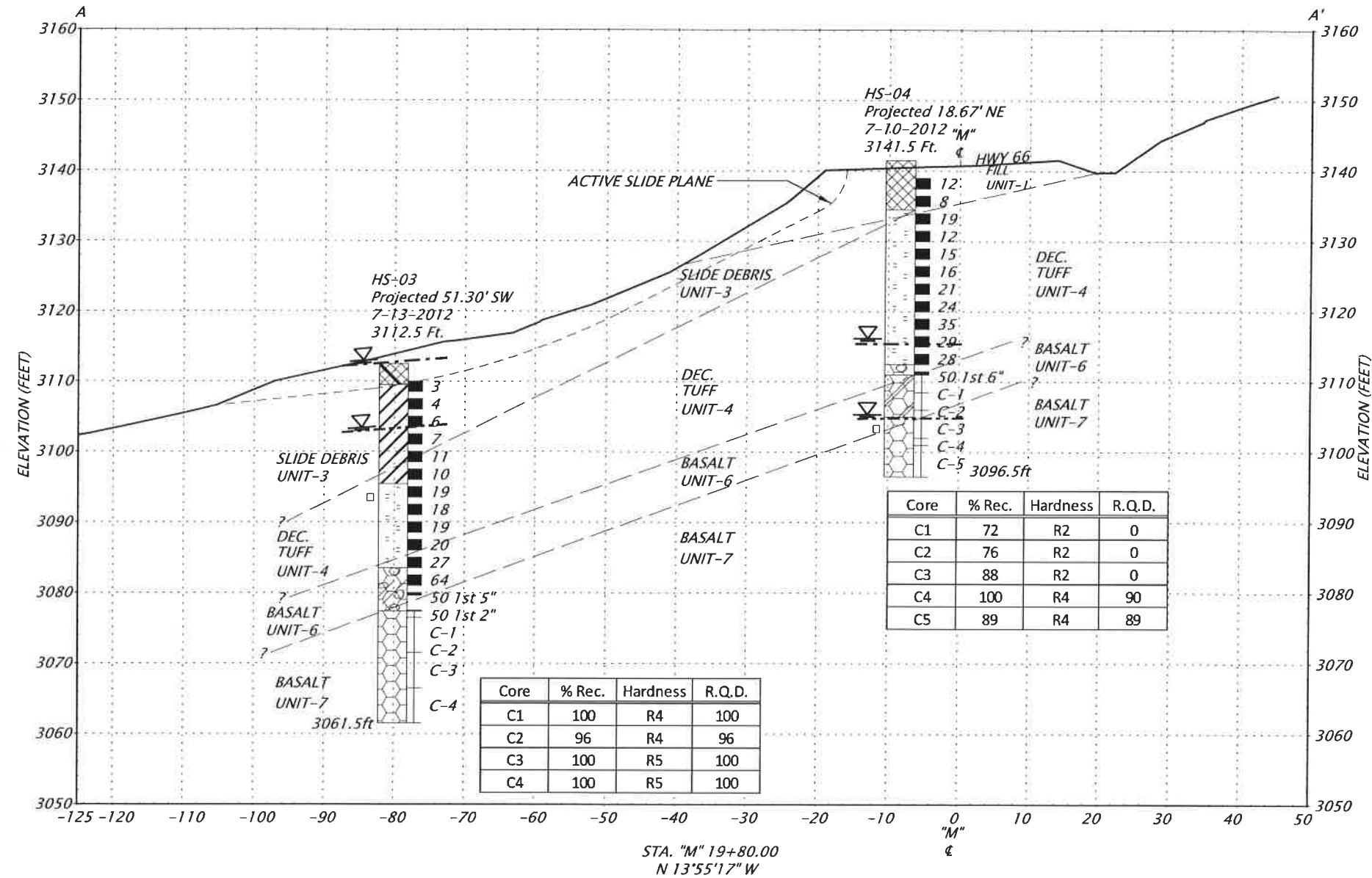
OR66: HARLEY LANDSLIDE (MP 11.80-12.00)  
GREEN SPRINGS HIGHWAY  
JACKSON COUNTY

Designer: JASON GARWOOD      Reviewer: Jill DeKoekoek  
Drafter: ERIC HIBBS              Checker: N/A

GEOTECHNICAL DATA

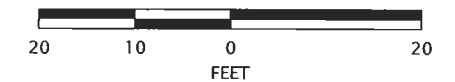
SHEET NO.  
GA01

SECTION A-A'



NOTE:  
Unit contacts reflect 3D projections

SCALE: 1"=20'



LEGEND

- (Unit-1); Clayey SAND with some gravel, SC, CLAY with trace sand, CH; dark gray to dark brown, medium to high-plasticity, dry to moist, medium dense to medium stiff, fine to coarse-grained sand, fine to coarse-grained angular gravel (Fill)
- (Unit-2); CLAY with trace sand, CH; brown to black, high-plasticity, moist, soft (Drill Road Fill)
- (Unit-3); CLAY with trace to some sand, CH, dark gray, black, gray-brown and orange-brown high-plasticity, moist to wet, soft to stiff, fine to coarse-grained sand (Slide Debris)
- (Unit-4); CLAY with trace sand, CH, to Sandy CLAY, CH, to Clayey SAND with some gravel, SC, orange-brown, red-brown to gray-brown and light brown, high plasticity, damp to moist, very stiff to hard and medium dense, fine to coarse-grained sand, fine-grained, angular gravel, Decomposed Tuff (Roxy Formation)
- (Unit-5); Clayey SAND with some gravel, SC, to SAND with some silt, SP-SM; light brown to orange-brown, gray to red-brown, nonplastic to medium-plasticity, damp to moist, very dense, fine to coarse-grained sand, fine to coarse-grained angular gravel, Decomposed Basalt (Roxy Formation)
- (Unit-6); BASALT, orange-brown to light gray, moderately weathered, soft, very close jointed (Roxy Formation)
- (Unit-7); BASALT, gray to light gray, fresh, hard to very hard, close to wide jointed (Roxy Formation)
- Max Water Level: 7/26/12 - 5/4/14
- Min Water Level: 7/26/12 - 5/4/14
- Unit Contacts
- Active Slide Plane
- Vibrating Wire Transducer



EXPIRES: 06-1-2018

OREGON DEPARTMENT OF TRANSPORTATION



OR66: HARLEY LANDSLIDE (MP 11.80-12.00)  
GREEN SPRINGS HIGHWAY  
JACKSON COUNTY

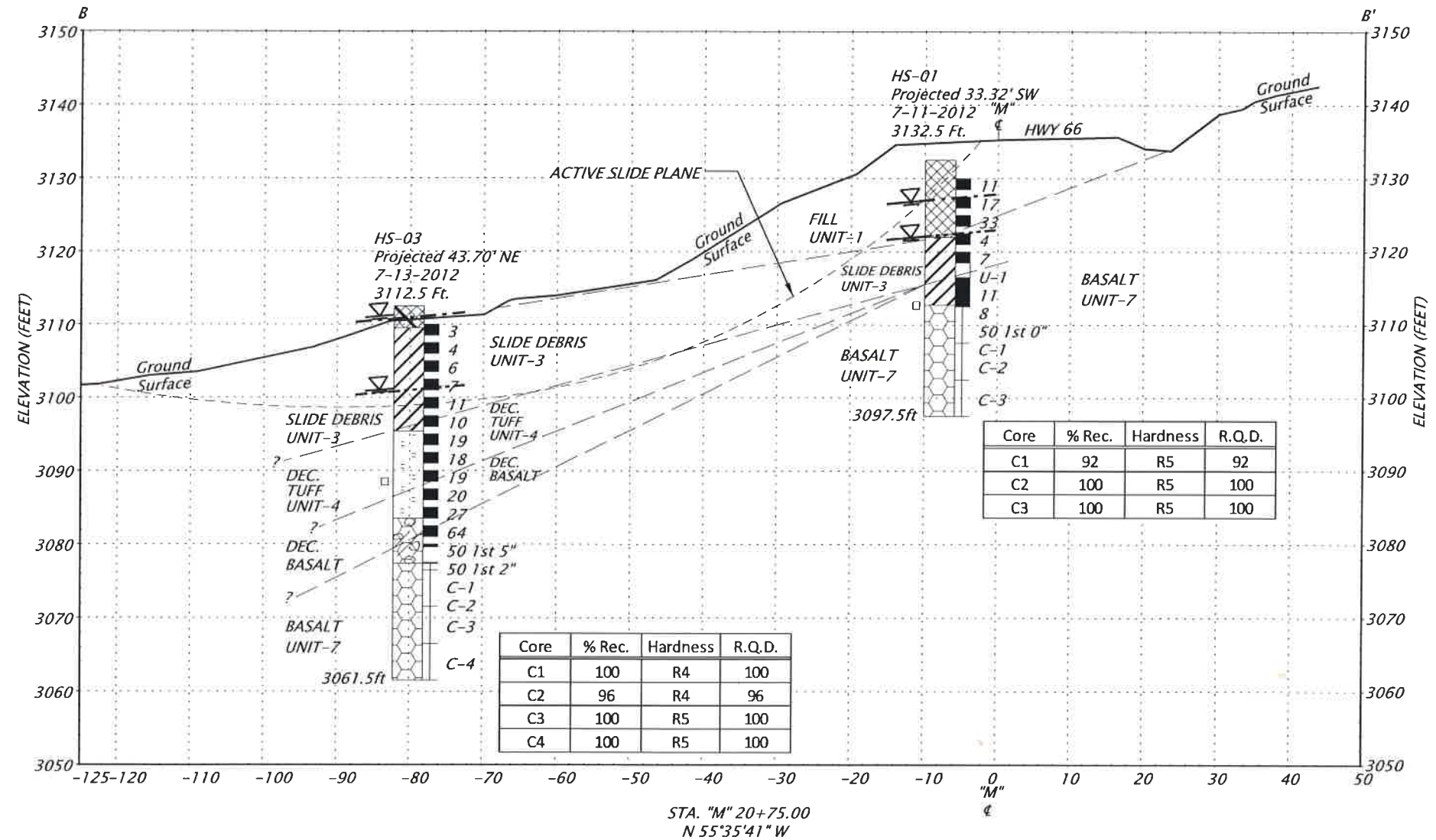
Designer: JASON GARWOOD      Reviewer: Jill DeKoekkoek  
Drafter: ERIC HIBBS      Checker: N/A

SECTION A - A'

SHEET NO.  
GA02



SECTION B-B'



NOTE:  
Unit contacts reflect 3D projections

LEGEND

- (Unit-1); Sandy GRAVEL with trace silt, GW; brown and gray, nonplastic, dry to damp, medium dense to dense, fine to coarse-grained sand, fine to coarse-grained angular gravel (Fill)
- (Unit-2); CLAY with trace sand, CH; brown to black, high-plasticity, moist, soft (Drill Road Fill)
- (Unit-3); CLAY with some sand trace gravel, CH, to CLAY with trace to some sand, CH, black to brown and orange-brown, high plasticity, moist to wet, soft to stiff, fine to coarse-grained sand (Slide Debris)
- (Unit-4); CLAY with trace sand, CH; orange-brown to gray-brown, high plasticity, moist, very stiff, Decomposed Tuff (Roxy Formation)
- (Unit-5); Clayey SAND, SC to SAND with some silt, SP-SM; orange-brown, gray to red-brown, nonplastic to low-plasticity, moist to wet, very dense, Decomposed Basalt (Roxy Formation)
- (Unit-7); BASALT, light gray to gray, fresh, hard to very hard, close to wide jointed (Roxy Formation)
- Max Water Level: 7/26/12 - 12/10/12 (HS-01)
- Min Water Level: 7/26/12 - 12/10/12 (HS-01)
- Max Water Level: 7/26/12 - 5/5/14 (HS-03)
- Min Water Level: 7/26/12 - 5/5/14 (HS-03)
- Unit Contacts
- Active Slide Plane
- Vibrating Wire Transducer

SCALE: 1"=20'



OREGON DEPARTMENT OF TRANSPORTATION



OR66: HARLEY LANDSLIDE (MP 11.80-12.00)  
GREEN SPRINGS HIGHWAY  
JACKSON COUNTY

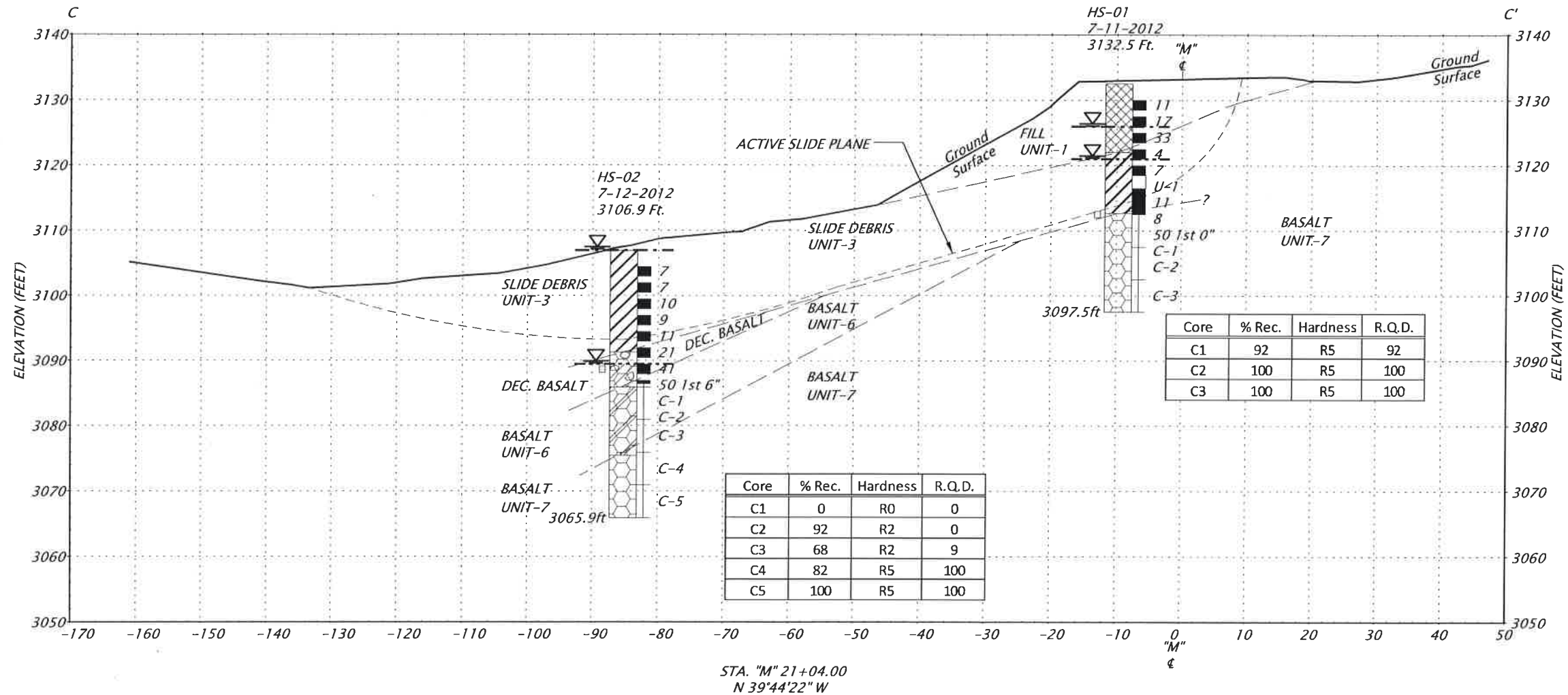
Designer: JASON GARWOOD      Reviewer: Jill DeKoekkoek  
Drafter: ERIC HIBBS              Checker: N/A

EXPIRES: 06-1-2018

SECTION B - B'

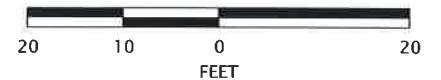
SHEET NO.  
GA03

SECTION C-C'



NOTE:  
Unit contacts reflect 3D projections

SCALE: 1"=20'



LEGEND

- (Unit-1); Sandy GRAVEL with trace silt, GW; brown and gray, nonplastic, dry to damp, medium dense to dense, fine to coarse-grained sand, fine to coarse-grained angular gravel (Fill)
- (Unit-3); CLAY with some sand trace gravel, CH, black to brown, high plasticity, moist, medium stiff to stiff (Slide Debris)
- (Unit-5); Clayey SAND with some gravel, SC to SAND with some clay and gravel, SP-SC, brown to dark brown, low to medium-plasticity, moist to wet, dense to very dense, fine to coarse-grained sand, Decomposed Basalt (Roxy Formation)
- (Unit-6); BASALT, orange-brown to gray, moderately weathered, very soft to very hard, very close to close jointed (Roxy Formation)
- (Unit-7); BASALT, light gray to gray, fresh, very hard, wide jointed (Roxy Formation)
- Max Water Level: 7/26/12 - 12/10/12 (HS-01)
- Min Water Level: 7/26/12 - 12/10/12 (HS-01)
- Max Water Level: 7/26/12 - 12/21/13 (HS-02)
- Min Water Level: 7/26/12 - 12/21/13 (HS-02)
- Unit Contacts
- Active Slide Plane
- Vibrating Wire Transducer



EXPIRES: 06-1-2018

OREGON DEPARTMENT OF TRANSPORTATION



OR66: HARLEY LANDSLIDE (MP 11.80-12.00)  
GREEN SPRINGS HIGHWAY  
JACKSON COUNTY

Designer: JASON GARWOOD Reviewer: Jill DeKoekkoek  
Drafter: ERIC HIBBS Checker: N/A

SECTION C-C'

SHEET NO.  
GA04

## **APPENDIX B**

### **Drillhole Logs**

**DRILL LOG**  
OREGON DEPARTMENT OF TRANSPORTATION


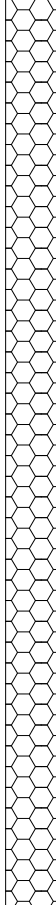
Hole No. <b>HS-01</b>
E.A. No. <b>PE001882</b>
Key No. <b>18906</b>
Start Card No.
Bridge No.
Ground Elev. <b>3132.5 ft</b>
Tube Height

Project <b>OR 66 MP 11.8</b>	Purpose <b>Landslide Investigation</b>
Highway <b>Hwy 66</b>	County <b>Jackson</b>
Hole Location Northing: <b>62,082.58</b>	Easting: <b>45,981.33</b>
Equipment <b>CME 850</b>	Driller <b>Jason/HazTec</b>
Project Geologist <b>Jason Garwood</b>	Recorder <b>Kim Wyttenberg</b>
Start Date <b>July 11, 2012</b>	End Date <b>July 11, 2012</b>
Total Depth <b>35.0 ft</b>	

Test Type	Rock Abbreviations	Typical Drilling Abbreviations																																
"A" - Advancer "X" - Auger "C" - Core "N" - Standard Penetration Test "U" - Undisturbed Sample "D" - Oversize Split Spoon Sample	<table border="0" style="width: 100%;"> <tr> <td><u>Discontinuity</u></td> <td><u>Shape</u></td> <td><u>Surface Roughness</u></td> </tr> <tr> <td>J - Joint</td> <td>PI - Planar</td> <td>P - Polished</td> </tr> <tr> <td>F - Fault</td> <td>C - Curved</td> <td>SI - Slickensided</td> </tr> <tr> <td>B - Bedding</td> <td>U - Undulating</td> <td>Sm - Smooth</td> </tr> <tr> <td>Fo - Foliation</td> <td>St - Stepped</td> <td>R - Rough</td> </tr> <tr> <td>S - Shear</td> <td>Ir - Irregular</td> <td>VR - Very Rough</td> </tr> </table>	<u>Discontinuity</u>	<u>Shape</u>	<u>Surface Roughness</u>	J - Joint	PI - Planar	P - Polished	F - Fault	C - Curved	SI - Slickensided	B - Bedding	U - Undulating	Sm - Smooth	Fo - Foliation	St - Stepped	R - Rough	S - Shear	Ir - Irregular	VR - Very Rough	<table border="0" style="width: 100%;"> <tr> <td><u>Drilling Methods</u></td> <td><u>Drilling Remarks</u></td> </tr> <tr> <td>WL - Wire Line</td> <td>LW - Lost Water</td> </tr> <tr> <td>HS - Hollow Stem Auger</td> <td>WR - Water Return</td> </tr> <tr> <td>DF - Drill Fluid</td> <td>WC - Water Color</td> </tr> <tr> <td>SA - Solid Auger</td> <td>DP - Down Pressure</td> </tr> <tr> <td>CA - Casing Advancer</td> <td>DR - Drill Rate</td> </tr> <tr> <td>HA - Hand Auger</td> <td>DA - Drill Action</td> </tr> </table>	<u>Drilling Methods</u>	<u>Drilling Remarks</u>	WL - Wire Line	LW - Lost Water	HS - Hollow Stem Auger	WR - Water Return	DF - Drill Fluid	WC - Water Color	SA - Solid Auger	DP - Down Pressure	CA - Casing Advancer	DR - Drill Rate	HA - Hand Auger	DA - Drill Action
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Depth (ft)	Test Type, No.	Percent Recovery	Soil Driving Resistance	Rock Discontinuity Data Or RQD%	Percent Natural Moisture	Material Description	Unit Description	Graphic Log	Drilling Methods, Size and Remarks	Water Level/ Date	Backfill/ Instrumentation
0	X1					X- 1 (0.0-2.5) Advance Auger	<b>0.0 - 10.5 (Unit-1); Sandy GRAVEL with trace silt, GW; brown and gray, nonplastic, dry to damp, medium dense to dense, fine to coarse-grained sand, fine to coarse-grained angular gravel; (Fill)</b>		"M" Sta. 21+08.3; -7.9 feet left		
	N1	40	5-5-6		N- 1 (2.5-4.0) Sandy GRAVEL with trace silt, GW; brown and gray, nonplastic, damp, medium dense, fine to coarse grained sand, angular, fine to coarse-grained gravel, (Fill).						
	X2					X- 2 (4.0-5.0) Advance Auger					
5	N2	40	7-5-12			N- 2 (5.0-6.5) Sandy GRAVEL, GW; gray, nonplastic, dry, medium dense, fine to coarse-grained sand, angular, fine to coarse-grained gravel, (Fill).					
	X3					X- 3 (6.5-7.5) Advance Auger				7/26/12	
	N3	47	26-18-15			N- 3 (7.5-9.0) Sandy GRAVEL, GW; gray, nonplastic, dry, dense, fine to coarse-grained sand, angular, fine to coarse-grained gravel, (Fill).				6.72' initial and high	
	X4					X- 4 (9.0-10.0) Advance Auger					
10	N4	27	2-2-2			N- 4 (10.0-11.5) (10.0'-10.5') GRAVEL with some sand, GW; black, nonplastic, damp, very loose, (Fill), (10.5'-11.5') CLAY with some sand trace gravel, CH, black, high-plasticity, moist, medium stiff, (Slide Debris).	<b>10.5 - 19.8 (Unit-3); CLAY with some sand trace gravel, CH, black to brown, high plasticity, moist, medium stiff to stiff; (Slide Debris)</b>				
	X5				X- 5 (11.5-12.5) Advance Auger						
	N5	73	1-2-5		41	N- 5 (12.5-14.0) CLAY with some sand trace gravel, CH, black, high-plasticity, moist, medium stiff, (Slide Debris). Lab No. 12-003793, gravel=11%, sand=19.9%, P200=69.1%, LL=68, PI=40.				11/17/12	
	U1	55	200-250-350-400			U- 1 (14.0-16.0) CLAY with some sand trace gravel, CH, black, high-plasticity, moist, (Slide Debris).				10.78' low	
15	N6	40	2-5-6			N- 6 (16.0-17.5) (16.0'-17.0') CLAY with some sand trace gravel, CH; black, high-plasticity, moist, stiff, (Slide Debris).					
	N7	77	1-3-5		33	N- 7 (17.5-19.0) CLAY with some sand trace gravel, CH; brown, high-plasticity, damp, stiff, (Slide Debris). Lab No. 12-003794, gravel=6%, sand=28.9%, P200=65.1%, LL=92, PI=69.					
19											VWT set at 19', 32.1 C, 8787.9, SN 1122987
											← Slide plane 18.8'

ODOT DRILL LOG HARLEY SLIDE.GPJ ODOT\_MAN.GDT 4/21/17

Depth (ft)	Test Type, No.	Percent Recovery	Soil Driving Resistance ----- Rock Discontinuity Data Or RQD%	Percent Natural Moisture	<p align="center"><u>Material Description</u></p> SOIL: Soil Name, USCS, Color, Plasticity, Moisture, Consistency/Relative Density, Texture, Cementation, Structure, Origin. ROCK: Rock Name, Color, Weathering, Hardness, Discontinuity Spacing, Joint Filling, Core Recovery, Formation Name.	<p align="center"><u>Unit Description</u></p>	Graphic Log	Drilling Methods, Size and Remarks	Water Level/ Date	Backfill/ Instrumentation	
19	X6				X-6 (19.0-19.9) Advance Auger						
20	N8 C1	0 92	50/0 R5 RQD = 92		N-8 (19.9-20.0) No Recovery C-1 (20.0-25.0) BASALT, light gray, fresh, very hard, wide jointed, CaCO3 in-fill vugs, (Roxy Formation). Lab No. 13-000284, (20.0'-20.7'), UCS=19,506.2 psi.	<p><b>19.8 - 35.0 (Unit-7); BASALT, light gray, fresh, very hard, wide jointed; (Roxy Formation)</b></p>		Bedrock contact 19.8'			
25	C2	100	R5 RQD = 100		C-2 (25.0-30.0) BASALT, light gray, fresh, very hard, wide jointed, CaCO3 vugs, (Roxy Formation). Lab No. 13-000285, (26.6'-27.2'), UCS=22,335.9 psi.				Drilling method changed to HQ3-WL, (20'-35')		
30	C3	100	R5 RQD = 100		C-3 (30.0-35.0) BASALT, light gray, fresh, very hard, wide jointed, CaCO3 vugs, (Roxy Formation).						
35					(35.0-35.0) Bottom of hole at 35.0 feet bgs.			Installed QC type 2.75" inclinometer tube to 35' Cement Bentonite Grout (35'-0')			
40								Bottom of hole 35'			
45											
48											

ODOT DRILL LOG HARLEY SLIDE.GPJ ODOT\_MAN.GDT 4/21/17



**DRILL LOG**  
OREGON DEPARTMENT OF TRANSPORTATION

Project <b>OR 66 MP 11.8</b>		Purpose <b>Landslide Investigation</b>	Hole No. <b>HS-02</b>
Highway <b>Hwy 66</b>		County <b>Jackson</b>	E.A. No. <b>PE001882</b>
Hole Location Northing: <b>62,134.34</b>		Easting: <b>45,938.30</b>	
Equipment <b>CME 850</b>		Driller <b>Jason/HazTec</b>	Start Card No.
Project Geologist <b>Jason Garwood</b>		Recorder <b>Kim Wyttenberg</b>	Bridge No.
Start Date <b>July 12, 2012</b>	End Date <b>July 12, 2012</b>	Total Depth <b>41.0 ft</b>	Ground Elev. <b>3106.9 ft</b>
			Tube Height

Test Type	Rock Abbreviations	Typical Drilling Abbreviations
"A" - Advancer "X" - Auger "C" - Core "N" - Standard Penetration Test "U" - Undisturbed Sample "D" - Oversize Split Spoon Sample	<u>Discontinuity</u> J - Joint F - Fault B - Bedding Fo - Foliation S - Shear  <u>Shape</u> Pl - Planar C - Curved U - Undulating St - Stepped Ir - Irregular  <u>Surface Roughness</u> P - Polished Sl - Slickensided Sm - Smooth R - Rough VR - Very Rough	<u>Drilling Methods</u> WL - Wire Line HS - Hollow Stem Auger DF - Drill Fluid SA - Solid Auger CA - Casing Advancer HA - Hand Auger  <u>Drilling Remarks</u> LW - Lost Water WR - Water Return WC - Water Color DP - Down Pressure DR - Drill Rate DA - Drill Action

Depth (ft)	Test Type, No.	Percent Recovery	Soil Driving Resistance	Rock Discontinuity Data Or RQD%	Percent Natural Moisture	Material Description	Unit Description	Graphic Log	Drilling Methods, Size and Remarks	Water Level/Date	Backfill/Instrumentation
0	X1					X- 1 (0.0-2.5) Advance Auger	<b>0.0 - 15.6 (Unit-3); Sandy CLAY with trace to some gravel, CH; dark brown to brown, high-plasticity, damp to moist, medium stiff to stiff, fine to coarse-grained sand; (Slide Debris)</b>		1.02' highest reading	1/30/13	
	N1	53	3-3-4	24	N- 1 (2.5-4.0) Sandy CLAY with some gravel, CH; dark brown to brown, high-plasticity, moist, medium stiff, (Slide Debris). Lab No. 12-003795, gravel=19%, sand=34.5%, P200=46.5%, LL=61, PI=40.						
	X2				X- 2 (4.0-5.0) Advance Auger						
5	N2	53	2-2-5		N- 2 (5.0-6.5) Sandy CLAY with trace gravel, CH; brown, high-plasticity, moist, stiff, fine to coarse-grained sand, (Slide Debris).						
	X3				X- 3 (6.5-7.5) Advance Auger						
	N3	67	2-4-6	30	N- 3 (7.5-9.0) Sandy CLAY with trace gravel, CH; brown, high-plasticity, moist, stiff, fine to coarse-grained sand, (Slide Debris). Lab No. 12-003796, gravel=8%, sand=33.7%, P200=58.3%, LL=58, PI=39.						
	X4				X- 4 (9.0-10.0) Advance Auger						
10	N4	77	2-4-5		N- 4 (10.0-11.5) Sandy CLAY with trace gravel, CH; brown, high-plasticity, moist, stiff, fine to coarse-grained sand, (Slide Debris).						
	X5				X- 5 (11.5-12.5) Advance Auger						
	N5	90	2-5-6	30	N- 5 (12.5-14.0) Sandy CLAY with trace gravel, CH; brown, high-plasticity, moist, stiff, fine to coarse-grained sand, (Slide Debris). Lab No. 12-003797, gravel=10%, sand=31.7%, P200=58.3%, LL=74, PI=52.						
	X6				X- 6 (14.0-15.0) Advance Auger						
15	N6	80	2-9-12	33	N- 6 (15.0-16.5) (15.0'-15.5') Sandy CLAY with trace gravel, CH; brown, high-plasticity, moist, stiff, fine to coarse-grained sand, (Slide Debris). Lab No. 12-003798, gravel=10%, sand=21.8%, P200=68.2%, LL=82, PI=57.						
	X7				(15.5'-16.5') Clayey SAND with some gravel, SC; brown, medium-plasticity, moist, dense, fine to coarse-grained sand, Decomposed Basalt, (Roxly Formation).						
	N7	53	8-7-34	15	N- 7 (16.5-17.5) Advance Auger N- 7 (17.5-19.0) Clayey SAND with some gravel, SC; brown, medium-plasticity, moist, dense, fine to coarse-grained sand, Decomposed Basalt, (Roxly Formation). Lab No. 12-003801, gravel=18%, sand=45.4%, P200=36.6%, LL=37, PI=19.						
20	X8					<b>15.6 - 21.0 (Unit-5); Clayey SAND with some gravel, SC to SAND with some clay and gravel, SP-SC, brown to dark brown, low to medium-plasticity, moist to wet, dense to very dense, fine to coarse-grained sand,</b>					

ODOT DRILL LOG HARLEY SLIDE.GPJ ODOT\_MAN.GDT 4/21/17



**DRILL LOG**  
OREGON DEPARTMENT OF TRANSPORTATION

Project <b>OR 66 MP 11.8</b>		Purpose <b>Landslide Investigation</b>		Hole No. <b>HS-03</b>
Highway <b>Hwy 66</b>		County <b>Jackson</b>		E.A. No. <b>PE001882</b>
Hole Location Northing: <b>62,083.26</b>		Easting: <b>45,895.53</b>		Start Card No.
Equipment <b>CME 850</b>		Driller <b>Jason/HazTec</b>		Bridge No.
Project Geologist <b>Jason Garwood</b>		Recorder <b>Kim Wyttenberg</b>		Ground Elev. <b>3112.5 ft</b>
Start Date <b>July 13, 2012</b>		End Date <b>July 13, 2012</b>		Total Depth <b>51.0 ft</b>
				Tube Height

Test Type	Rock Abbreviations	Typical Drilling Abbreviations
"A" - Advancer "X" - Auger "C" - Core "N" - Standard Penetration Test "U" - Undisturbed Sample "D" - Oversize Split Spoon Sample	<u>Discontinuity</u> J - Joint F - Fault B - Bedding Fo - Foliation S - Shear  <u>Shape</u> Pl - Planar C - Curved U - Undulating St - Stepped Ir - Irregular  <u>Surface Roughness</u> P - Polished Sl - Slickensided Sm - Smooth R - Rough VR - Very Rough	<u>Drilling Methods</u> WL - Wire Line HS - Hollow Stem Auger DF - Drill Fluid SA - Solid Auger CA - Casing Advancer HA - Hand Auger  <u>Drilling Remarks</u> LW - Lost Water WR - Water Return WC - Water Color DP - Down Pressure DR - Drill Rate DA - Drill Action

Depth (ft)	Test Type, No.	Percent Recovery	Soil Driving Resistance	Rock Discontinuity Data Or RQD%	Percent Natural Moisture	Material Description	Unit Description	Graphic Log	Drilling Methods, Size and Remarks	Water Level/ Date	Backfill/ Instrumentation
0	X1					X- 1 (0.0-2.5) Advance Auger	<b>0.0 - 3.0 (Unit-2); CLAY with trace sand, CH; brown to black, high-plasticity, moist, soft; (Drill Road Fill)</b>			5/1/13 0.0' artesian	
	N1	20	Push-1-2			N- 1 (2.5-4.0) CLAY with trace sand, CH; brown to black, high-plasticity, moist, soft, (Drill Road Fill).				7/27/12 "M" Sta. 20+31.3; -80.2 feet left	
	X2					X- 2 (4.0-5.0) Advance Auger	<b>3.0 - 17.1 (Unit-3); CLAY with trace to some sand, CH, dark gray, black, gray-brown and orange-brown high-plasticity, moist to wet, soft to stiff, fine to coarse-grained sand; (Slide Debris)</b>			1.3' initial	
5	N2	73	1-2-2		52	N- 2 (5.0-6.5) CLAY with some sand, CH; dark gray to black, high-plasticity, wet, soft, fine to coarse-grained sand, (Slide Debris). Lab No. 12-003799, gravel=1%, sand=15.3%, P200=83.7%, LL=96, PI=70.					
	X3					X- 3 (6.5-7.5) Advance Auger					
	N3	100	1-2-4			N- 3 (7.5-9.0) CLAY with trace sand, CH; dark gray to gray-brown, high-plasticity, moist, medium stiff, (Slide Debris).				9/20/13 8.95' Low	
	X4					X- 4 (9.0-10.0) Advance Auger					
10	N4	100	2-3-4			N- 4 (10.0-11.5) CLAY with trace sand, CH; gray-brown, high-plasticity, moist, medium stiff, (Slide Debris). Lab No. 12-003800, gravel=1%, sand=14.8%, P200=84.2%, LL=101, PI=76.					
	X5					X- 5 (11.5-12.5) Advance Auger					
	N5	87	2-5-6			N- 5 (12.5-14.0) CLAY with some sand, CH; gray-brown, high-plasticity, moist, stiff, fine to coarse-grained sand, (Slide Debris). Lab No. 12-003802, gravel=4%, sand=15.6%, P200=80.4%, LL=76, PI=50.					
	X6					X- 6 (14.0-15.0) Advance Auger					
15	N6	60	2-4-6			N- 6 (15.0-16.5) CLAY, CH; orange-brown, high-plasticity, moist, stiff, Decomposed Tuff, (Slide Debris). (15.0'-15.5') Lab No. 12-003803, gravel=0%, sand=4.5%, P200=95.5%, LL=126, PI=99. (15.5'-16.5') Lab No. 12-003804, gravel=0%, sand=10.5%, P200=89.5%, LL=94, PI=66.					
	X7					X- 7 (16.5-17.5) Advance Auger					
	N7	87	2-8-11			N- 7 (17.5-19.0) CLAY with trace sand, CH; orange-brown, high-plasticity, moist, very stiff, Decomposed Tuff, (Roxy Formation). Lab No. 12-003809, gravel=1%, sand=6.4%, P200=92.6%, LL=99, PI=70.					
	X8					X- 8 (19.0-20.0) Advance Auger					
20	N8	73	1-5-13			N- 8 (20.0-21.5) CLAY with trace sand, CH; orange-brown, high-plasticity, moist, very stiff, Decomposed Tuff, (Roxy Formation). Lab No. 12-003805, gravel=0%, sand=10.6%, P200=89.4%, LL=71, PI=45.					
	X9					X- 9 (21.5-22.5) Advance Auger					
	N9	80	5-7-12			N- 9 (22.5-24.0) CLAY with trace sand, CH; orange-brown to gray-brown, high-plasticity, moist, very stiff Decomposed Tuff, (Roxy Formation). Lab No. 12-003806, gravel=0%, sand=12.6%,					
25	X10						<b>17.1 - 29.0 (Unit-4); CLAY with trace sand, CH; orange-brown to gray-brown, high plasticity, moist, very stiff, Decomposed Tuff; (Roxy Formation)</b>				

ODOT DRILL LOG HARLEY SLIDE.GPJ\_ODOT\_MAN.GDT 4/21/17

Depth (ft)	Test Type, No.	Percent Recovery	Soil Driving Resistance — Discontinuity Data Or RQD%	Rock	Percent Natural Moisture	<p align="center"><u>Material Description</u></p> SOIL: Soil Name, USCS, Color, Plasticity, Moisture, Consistency/Relative Density, Texture, Cementation, Structure, Origin. ROCK: Rock Name, Color, Weathering, Hardness, Discontinuity Spacing, Joint Filling, Core Recovery, Formation Name.	<p align="center"><u>Unit Description</u></p>	Graphic Log	Drilling Methods, Size and Remarks	Water Level/ Date	Backfill/ Instrumentation
25	N10	93	6-8-12			P200=87.4%, LL=70, PI=45. X- 10 (24.0-25.0) Advance Auger					
	X11					N- 10 (25.0-26.5) CLAY with trace sand, CH; orange-brown to gray-brown, high-plasticity, moist, very stiff, Decomposed Tuff, (Roxy Formation).					
	N11	73	11-13-14		28	X- 11 (26.5-27.5) Advance Auger N- 11 (27.5-29.0) CLAY with trace sand, CH; orange-brown to gray-brown, high-plasticity, moist, very stiff, Decomposed Tuff, (Roxy Formation).					
	X12					Lab No. 12-003810, gravel=0%, sand=7.7%, P200=92.3%, LL=68, PI=42.					
30	N12	100	14-28-36			X- 12 (29.0-30.0) Advance Auger N- 12 (30.0-31.5) Clayey SAND, SC; orange-brown, low-plasticity, moist, very dense, Decomposed Basalt, (Roxy Formation).	<p><b>29.0 - 35.1 (Unit-5); Clayey SAND, SC to SAND with some silt, SP-SM; orange-brown, gray to red-brown, nonplastic to low-plasticity, moist to wet, very dense, Decomposed Basalt; (Roxy Formation)</b></p>		wet spoon		
	X13					X- 13 (31.5-32.5) Advance Auger					
	N13	25	50/5"			N- 13 (32.5-32.9) SAND with some silt, SP-SM; orange-brown, nonplastic, wet, very dense, Decomposed Basalt, (Roxy Formation).					
	X14					X- 14 (32.9-35.0) Advance Auger					
35	N14	100	50/2"			N- 14 (35.0-35.2) SAND with trace silt, SP, gray to red-brown, nonplastic, moist, very dense, Decomposed Basalt, (Roxy Formation).	<p><b>35.1 - 51.0 (Unit-7); BASALT, gray, fresh, hard to very hard, close to wide jointed; (Roxy Formation)</b></p>		Drilling method changed to HQ3-WL, (35'-51')		
	C1	100	R4			C- 1 (35.2-36.0) BASALT, gray, fresh, hard, close jointed, (Roxy Formation).					
	C2	96	RQD = 100 R4 RQD = 96			C- 1 (35.2-36.0) BASALT, gray, fresh, hard, close jointed, (Roxy Formation). Lab No. 13-000288 (35.1'-35.6') UCS=9,370.8 psi. C- 2 (36.0-41.0) BASALT, gray, fresh, hard, wide jointed, (Roxy Formation).					
	C3	100	R5 RQD = 100			C- 3 (41.0-46.0) BASALT, gray, fresh, very hard, wide jointed, (Roxy Formation). Lab No. 13-000289, (44.0'-44.6'), UCS=21,399.1 psi.					
40	C3	100	R5 RQD = 100			C- 4 (46.0-51.0) BASALT, gray, fresh, very hard, wide jointed, (Roxy Formation).					
45	C4	100	R5 RQD = 100			C- 4 (46.0-51.0) BASALT, gray, fresh, very hard, wide jointed, (Roxy Formation).					
50						(51.0-51.0) Bottom of hole at 51.0 feet bgs.			Installed QC type 2.75" inclinometer tube to 51' Cement Bentonite Grout (51'-0')		
									Bottom of hole 51'		
55											
60											
63											

ODOT DRILL LOG HARLEY SLIDE.GPJ ODOT\_MAN.GDT 4/21/17

**DRILL LOG**  
OREGON DEPARTMENT OF TRANSPORTATION

Project <b>OR 66 MP 11.8</b>		Purpose <b>Landslide Investigation</b>		Hole No. <b>HS-04</b>
Highway <b>Hwy 66</b>		County <b>Jackson</b>		E.A. No. <b>PE001882</b>
Hole Location Northing: <b>62,002.14</b>		Easting: <b>45,877.70</b>		Start Card No.
Equipment <b>CME 850</b>		Driller <b>Jason/HazTec</b>		Bridge No.
Project Geologist <b>Jason Garwood</b>		Recorder <b>Kim Wyttenberg</b>		Ground Elev. <b>3141.5 ft</b>
Start Date <b>July 10, 2012</b>		End Date <b>July 10, 2012</b>		Total Depth <b>45.0 ft</b>
				Tube Height

Test Type	Rock Abbreviations	Typical Drilling Abbreviations
"A" - Advancer "X" - Auger "C" - Core "N" - Standard Penetration Test "U" - Undisturbed Sample "D" - Oversize Split Spoon Sample	<u>Discontinuity</u> J - Joint F - Fault B - Bedding Fo - Foliation S - Shear  <u>Shape</u> Pl - Planar C - Curved U - Undulating St - Stepped Ir - Irregular  <u>Surface Roughness</u> P - Polished Sl - Slicksided Sm - Smooth R - Rough VR - Very Rough	<u>Drilling Methods</u> WL - Wire Line HS - Hollow Stem Auger DF - Drill Fluid SA - Solid Auger CA - Casing Advancer HA - Hand Auger  <u>Drilling Remarks</u> LW - Lost Water WR - Water Return WC - Water Color DP - Down Pressure DR - Drill Rate DA - Drill Action

Depth (ft)	Test Type, No.	Percent Recovery	Soil Driving Resistance	Rock Discontinuity Data Or RQD%	Percent Natural Moisture	Material Description SOIL: Soil Name, USCS, Color, Plasticity, Moisture, Consistency/Relative Density, Texture, Cementation, Structure, Origin. ROCK: Rock Name, Color, Weathering, Hardness, Discontinuity Spacing, Joint Filling, Core Recovery, Formation Name.	Unit Description	Graphic Log	Drilling Methods, Size and Remarks	Water Level/Date	Backfill/Instrumentation	
0	X1					X- 1 (0.0-2.5) Advance Auger	<b>0.0 - 7.0 (Unit-1); Clayey SAND with some gravel, SC, CLAY with trace sand, CH; dark gray to dark brown, medium to high-plasticity, dry to moist, medium dense to medium stiff, fine to coarse-grained sand, fine to coarse-grained angular gravel; (Fill)</b>		"M" Sta. 19+61.3; -8.4 feet left  Drilling method 4" ID HSA (0'-30')			
	N1	30	9-6-6		N- 1 (2.5-4.0) Clayey SAND with some gravel, SC; dark gray, medium-plasticity, dry, medium dense, fine to coarse-grained sand, fine to coarse-grained angular gravel, (Fill).							
	X2					X- 2 (4.0-5.0) Advance Auger	<b>7.0 - 29.0 (Unit-4); CLAY with trace to some sand, CH, Sandy CLAY, CH to Clayey SAND with some gravel, SC; orange-brown, brown, light brown, gray-brown, red-brown and white, high plasticity, damp to moist, very stiff to hard and medium dense, fine to coarse-grained sand, fine-grained, angular gravel, Decomposed Tuff; (Roxy Formation)</b>					
5	N2	34	3-3-5	37	N- 2 (5.0-6.5) CLAY with trace sand, CH; dark gray to dark brown, high-plasticity, moist, medium stiff, (Fill). Lab No. 12-003807, gravel=0%, sand=5.8%, P200=94.2%, LL=119, PI=86.							
	X3				X- 3 (6.5-7.5) Advance Auger							
	N3	43	6-8-11	28	N- 3 (7.5-9.0) CLAY with some sand, CH; orange-brown to brown, high-plasticity, moist, very stiff, fine to coarse-grained sand, Decomposed Tuff, (Roxy Formation). Lab No. 12-003308, gravel=1%, sand=24.7%, P200=74.3%, LL=66, PI=45.		N- 4 (10.0-11.5) No Recovery.					
	X4				X- 4 (9.0-10.0) Advance Auger							
10	N4	0	3-6-6									
	X5				X- 5 (11.5-12.5) Advance Auger							
	N5	27	7-7-8		N- 5 (12.5-14.0) Sandy CLAY, CH; gray-brown, high-plasticity, moist, very stiff, fine to coarse-grained sand, Decomposed Tuff, (Roxy Formation).							
	X6				X- 6 (14.0-15.0) Advance Auger							
15	N6	93	3-6-10	35	N- 6 (15.0-16.5) CLAY with trace sand, CH; orange-brown to light brown, high-plasticity, moist, very stiff, Decomposed Lapilli Tuff, (Roxy Formation). Lab No. 12-003811, gravel=0%, sand=9%, P200=91%, LL=81, PI=57.							
	X7				X- 7 (16.5-17.5) Advance Auger							
	N7	100	4-9-12	26	N- 7 (17.5-19.0) CLAY with trace sand, CH; light brown to red-brown, high-plasticity, damp, very stiff, Decomposed Tuff, (Roxy Formation). Lab No. 12-003812, gravel=0%, sand=8.3%, P200=91.7%, LL=88, PI=66.							
	X8				X- 8 (19.0-20.0) Advance Auger							
20												

ODOT DRILL LOG HARLEY SLIDE.GPJ ODOT\_MAN.GDT 4/21/17

Depth (ft)	Test Type, No.	Percent Recovery	Soil Driving Resistance	Rock Discontinuity Data Or RQD%	Percent Natural Moisture	Material Description  SOIL: Soil Name, USCS, Color, Plasticity, Moisture, Consistency/Relative Density, Texture, Cementation, Structure, Origin. ROCK: Rock Name, Color, Weathering, Hardness, Discontinuity Spacing, Joint Filling, Core Recovery, Formation Name.	Unit Description	Graphic Log	Drilling Methods, Size and Remarks	Water Level/ Date	Backfill/ Instrumentation		
20	N8	100	5-10-14		25	N- 8 (20.0-21.5) Sandy CLAY, CH; orange-brown, light brown to white, high-plasticity, damp, very stiff, fine to coarse-grained sand, Decomposed Tuff, (Roxy Formation). Lab No. 12-003813, gravel=1%, sand=43.8%, P200=55.2%, LL=77, PI=56. X- 9 (21.5-22.5) Advance Auger							
	X9												
	N9	100	8-15-20		28	N- 9 (22.5-24.0) CLAY with some sand, CH; orange-brown to light brown, high-plasticity, damp, hard, fine to coarse-grained sand, Decomposed Tuff, (Roxy Formation). Lab No. 12-003814, gravel=0%, sand=14.3%, P200=85.7%, LL=75, PI=51. X- 10 (24.0-25.0) Advance Auger							
	X10												
25	N10	73	7-8-21		14	N- 10 (25.0-26.5) Clayey SAND with some gravel, SC; orange-brown to red-brown, high-plasticity, damp, medium dense, fine to coarse-grained sand, fine-grained angular gravel, Decomposed Tuff, (Roxy Formation). Lab No. 12-003815, gravel=21%, sand=46.6%, P200=32.4%, LL=49, PI=28. X- 11 (26.5-27.5) Advance Auger			wet spoon 26'	5/18/13 High 26.05			
	X11												
	N11	73	8-13-15		18	N- 11 (27.5-29.0) Clayey SAND with some gravel, SC; orange-brown to light brown, high-plasticity, moist, medium dense, fine to coarse-grained sand, angular fine-grained gravel, Decomposed Tuff, (Roxy Formation). Lab No. 12-003816, gravel=20%, sand=47.9%, P200=32.1%, LL=51, PI=31. X- 12 (29.0-30.0) Advance Auger							
	X12												
30	N12	100	50/6"			N- 12 (30.0-30.5) Clayey SAND with some gravel, SC; light brown, medium-plasticity, damp, very dense, fine to coarse-grained sand, fine to coarse-grained angular gravel, Decomposed Basalt, (Roxy Formation).	<b>29.0 - 30.5 (Unit-5); Clayey SAND with some gravel, SC; light brown, medium-plasticity, damp, very dense, fine to coarse-grained sand, fine to coarse-grained angular gravel, Decomposed Basalt; (Roxy Formation)</b>  <b>30.5 - 36.5 (Unit-6); BASALT, orange-brown to light gray, moderately weathered, soft, very close jointed; (Roxy Formation)</b>  <b>36.5 - 45.0 (Unit-7); BASALT, light gray, fresh, hard, close to moderately close jointed; (Roxy Formation)</b>						
	C1	72	R2 RQD = 0			C- 1 (30.5-33.0) BASALT, orange-brown to light gray, moderately weathered, soft, very close jointed, (Roxy Formation).				Basalt bedrock contact 29'	7/26/12 Initial		
	C2	76	R2 RQD = 0			C- 2 (33.0-35.5) BASALT, orange-brown to light gray, moderately weathered, soft, very close jointed, (Roxy Formation).				Drilling method changed to HQ3-WL, (30'-45')			
	C3	88	R2 RQD = 0			C- 3 (35.5-39.5) (35.5'-36.5') BASALT, orange-brown to light gray, moderately weathered, soft, very close jointed, (Roxy Formation). (36.5'-39.5') BASALT, light gray, fresh, soft, close jointed, (Roxy Formation).					10/22/12 Low 36.44		
	C4	100	R4 RQD = 90			C- 4 (39.5-40.5) BASALT, light gray, fresh, hard, close jointed, (Roxy Formation).							
40	C5	89	R4 RQD = 89			C- 5 (40.5-45.0) BASALT, light gray, fresh, hard, close to moderately close jointed, (Roxy Formation). Lab No. 13-000290, (40.5'-41.1') UCS=9,913.3 psi.							
45						(45.0-45.0) Bottom of hole at 45.0 feet bgs.							
50													

ODOT DRILL LOG HARLEY SLIDE.GPJ ODOT\_MAN.GDT 4/21/17

## **APPENDIX C**

### **Core Photographs**





## CORE PHOTOGRAPHS



Oregon Department  
of Transportation  
April 2017

Drillhole  
HS-01  
Boxes 1 and 2 of 2

OR 66 Harley Slide  
Jackson County, Oregon





## CORE PHOTOGRAPHS



Oregon Department  
of Transportation  
April 2017

Drillhole  
HS-02  
Boxes 1 and 2 of 2

OR 66 Harley Slide  
Jackson County, Oregon





## CORE PHOTOGRAPHS



Oregon Department  
of Transportation  
April 2017

Drillhole  
HS-03  
Boxes 1 and 2 of 2

OR 66 Harley Slide  
Jackson County, Oregon





## CORE PHOTOGRAPHS



Oregon Department  
of Transportation  
April 2017

Drillhole  
HS-04  
Boxes 1 and 2 of 2

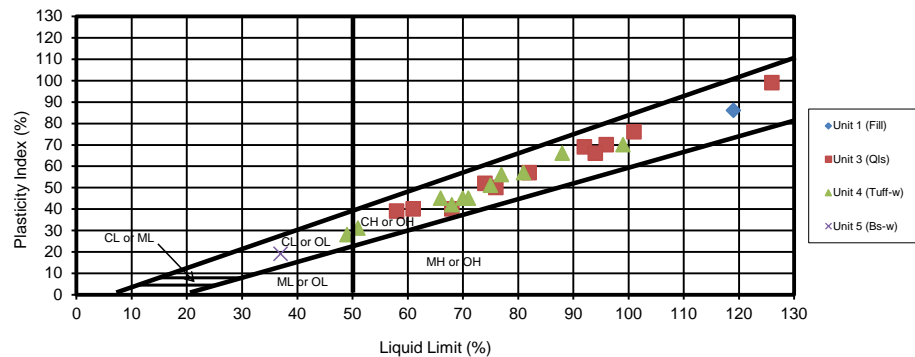
OR 66 Harley Slide  
Jackson County, Oregon

## **APPENDIX D**

### **Laboratory Testing Data**

# LABORATORY TEST RESULTS

Location			Index Testing											
Boring, Test Pit, or Hand Auger			Soil/Rock Classification			Natural		Atterburg Limits		P - 200 (%)	Unit Wt. $\gamma_w$ (lb/ft <sup>3</sup> )	Max. Compressive Strength (psi)	Resistivity $\Omega$ -cm	pH
Hole #	Sample #	Depth (ft)	Description	Unit	USCS	Moisture	LL (%)	PI (%)						
HS-04	N2	5.00	fat CLAY	Unit 1	CH	36.9	119	86	94.2					
HS-01	N5	12.50	sandy fat CLAY	Unit 3	CH	41.3	68	40	69.1					
HS-01	N7	17.50	sandy fat CLAY	Unit 3	CH	33.2	92	69	65.1					
HS-02	N1	2.50	clayey SAND with gravel	Unit 3	CH	24.3	61	40	46.5					
HS-02	N3	7.50	sandy fat CLAY	Unit 3	CH	29.6	58	39	58.3					
HS-02	N5	12.50	sandy fat CLAY	Unit 3	CH	29.6	74	52	58.3					
HS-02	N6	15.00	sandy fat CLAY	Unit 3	CH	33.3	82	57	68.2					
HS-03	N2	5.00	fat CLAY with sand	Unit 3	CH	51.6	96	70	83.7					
HS-03	N4	10.00	fat CLAY with sand	Unit 3	CH	43.6	101	76	84.2					
HS-03	N5	12.50	fat CLAY with sand	Unit 3	CH	40.2	76	50	80.4					
HS-03	N6A	15.00	fat CLAY	Unit 3	CH	42.2	126	99	95.5					
HS-03	N6B	15.50	fat CLAY	Unit 3	CH	43.3	94	66	89.5					
HS-03	N7	17.50	fat CLAY	Unit 4	CH	44.6	99	70	92.6					
HS-03	N8	20.00	fat CLAY	Unit 4	CH	36.1	71	45	89.4					
HS-03	N9	22.50	fat CLAY	Unit 4	CH	32.0	70	45	87.4					
HS-03	N11	27.50	fat CLAY	Unit 4	CH	27.8	68	42	92.3					
HS-04	N3	7.50	fat CLAY with sand	Unit 4	CH	27.8	66	45	74.3					
HS-04	N6	15.00	fat CLAY	Unit 4	CH	35.3	81	57	91.0					
HS-04	N7	17.50	fat CLAY	Unit 4	CH	25.8	88	66	91.7					
HS-04	N8	20.00	sandy fat CLAY	Unit 4	CH	24.6	77	56	55.2					
HS-04	N9	22.50	fat CLAY	Unit 4	CH	28.1	75	51	85.7					
HS-04	N10	25.00	clayey SAND with gravel	Unit 4	SC	14.3	49	28	32.4					
HS-04	N11	27.50	clayey SAND with gravel	Unit 4	SC	18.2	51	31	32.1					
HS-02	N7	17.50	clayey SAND with gravel	Unit 5	SC	15.1	37	19	36.6					
HS-01	C2	26.60	Basalt	Unit 6		0.7				153.7	22,335.9			
HS-02	C3	26.00	Basalt	Unit 6		1.1				160.6	22,831.7			
HS-01	C1	20.00	Basalt	Unit 7		0.8				158.3	19,506.2			
HS-02	C4	33.50	Basalt	Unit 7		1.0				158.0	24,783.0			
HS-03	C1	35.10	Basalt	Unit 7		1.5				151.2	9,370.8			
HS-03	C3	44.00	Basalt	Unit 7		0.8				158.1	21,399.1			
HS-04	C5	40.50	Basalt	Unit 7		0.6				149.9	9,913.3			



<b>Laboratory Test Results</b>	
Hwy: Green Springs Hwy 66	M.P. 11.8
E.A. #: PE002600 000	Date: April 2017
Harley Slide MP 11.8	Table # 3
Oregon Department of Transportation	

Contract No.: EA No.: PE001882 071 Lab No.: 12-003793  
Project: R3 SLIDE & ROCKFALL - HARLEY SLIDE OR66 MP 11.8  
Highway: County: CURRY Data Sheet No.: G 8H80 060  
Contractor: FA No.:  
Project Manager: Org Unit: 3630 Bid Item:  
Submitted By: DAN RAKER Org Unit: 3630 Sample No.: N-5  
Material Source: Qty Represented: SOIL @ DEPTH  
Sampled At: HS-01 @ 12.5'-14' Sampled By:  
DATE-Sampled: 12/ 7/12 Received: 12/ 9/26 Tested: 12/11/16 Date Reported: 12/11/16

Test Results For: **DISTURBED SOIL**

TM102 Liquid Lim: 68  
TM103 Plastic Ind: 40  
TM107 Resistivity: Ω  
pH:  
TM111 Spec Grav:  
TM117  
Torvane Shear/ Pocket Pen.  
  
TM127 N. Moisture: 41.33 %  
Dry Density rec'd:  
Wet Density rec'd:  
TM157 Slake Durab:  
Water Cont:  
  
TM512 Pct Organic:

Dry Density	Moisture
Max Density: Optimum Moisture:	

Sieve	Passing
3 "	
2	
1.5	
1	
3/4	100 %
1/2	93 %
3/8	93 %
1/4	91 %
# 4	89 %
10	86 %
40	80 %
200	69.1 %

Quantity	Method	Cost
1	T-265	\$ 12.00
1	T-89	36.00
1	T-90	45.00
1	D1140	74.00

Hydrometer Analysis	Subsample	Total Sample
Coarse Sand= 4.75 to 2.0 mm:		
Medium Sand= 2.0 to .42 mm:		
Fine Sand= .42 to .074 mm:		
Silt= .074 to .02 mm:		
Silt= .02 to .005 mm:		
Clay= .005 to .002 mm:		
Clay= Less Than .002 mm:		

**TOTAL CHARGES: \$ 0.00**

**REMARKS:**  
INFORMATION ONLY  
USCS CLASSIFICATION: CH - sandy fat CLAY  
\*

**KEVIN BROPHY - LABORATORY SERVICES MANAGER**

REPORT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT WRITTEN APPROVAL OF THIS LABORATORY.  
'TM' TEST METHODS CAN BE CROSS-REFERENCED WITH AASHTO AND/OR ASTM, CONTACT THIS LAB FOR ASSISTANCE.



Contract No.: EA No.: PE001882 071 Lab No.: 12-003794  
Project: R3 SLIDE & ROCKFALL - HARLEY SLIDE OR66 MP 11.8  
Highway: County: CURRY Data Sheet No.: G 8H80 060  
Contractor: FA No.:  
Project Manager: Org Unit: 3630 Bid Item:  
Submitted By: DAN RAKER Org Unit: 3630 Sample No.: N-7  
Material Source: Qty Represented: SOIL @ DEPTH  
Sampled At: HS-01 @ 17.5'-19' Sampled By:  
DATE-Sampled: 12/ 7/12 Received: 12/ 9/26 Tested: 12/11/16 Date Reported: 12/11/16

Test Results For: **DISTURBED SOIL**

TM102 Liquid Lim: 92  
TM103 Plastic Ind: 69  
TM107 Resistivity: Ω  
pH:  
TM111 Spec Grav:  
TM117  
Torvane Shear/ Pocket Pen.  
  
TM127 N. Moisture: 33.24 %  
Dry Density rec'd:  
Wet Density rec'd:  
TM157 Slake Durab:  
Water Cont:  
  
TM512 Pct Organic:

Dry Density	Moisture
Max Density: Optimum Moisture:	

Sieve	Passing
3 "	
2	
1.5	
1	
3/4	
1/2	
3/8	100 %
1/4	97 %
# 4	94 %
10	90 %
40	81 %
200	65.1 %

Quantity	Method	Cost
1	T-265	\$ 12.00
1	T-89	36.00
1	T-90	45.00
1	D1140	74.00

Hydrometer Analysis	Subsample	Total Sample
Coarse Sand= 4.75 to 2.0 mm:		
Medium Sand= 2.0 to .42 mm:		
Fine Sand= .42 to .074 mm:		
Silt= .074 to .02 mm:		
Silt= .02 to .005 mm:		
Clay= .005 to .002 mm:		
Clay= Less Than .002 mm:		

**TOTAL CHARGES: \$ 0.00**

**REMARKS:**  
INFORMATION ONLY  
USCS CLASSIFICATION: CH - sandy fat CLAY  
\*

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**Contract No.:** EA No.: PE001882 071 Lab No.: 12-003796  
Project: R3 SLIDE & ROCKFALL - HARLEY SLIDE OR66 MP 11.8  
Highway: County: CURRY Data Sheet No.: G 8H80 060  
Contractor: FA No.:  
Project Manager: Org Unit: 3630 Bid Item:  
Submitted By: DAN RAKER Org Unit: 3630 Sample No.: N-3  
Material Source: Qty Represented: SOIL @ DEPTH  
Sampled At: HS-02 @ 7.5'-9' Sampled By:  
DATE-Sampled: 12/ 7/12 Received: 12/ 9/26 Tested: 12/11/16 Date Reported: 12/11/16

Test Results For: **DISTURBED SOIL**

TM102 Liquid Lim: 58  
TM103 Plastic Ind: 39  
TM107 Resistivity: Ω  
pH:  
TM111 Spec Grav:  
TM117  
Torvane Shear/ Pocket Pen.  
  
TM127 N. Moisture: 29.63 %  
Dry Density rec'd:  
Wet Density rec'd:  
TM157 Slake Durab:  
Water Cont:  
  
TM512 Pct Organic:

Dry Density	Moisture
Max Density: Optimum Moisture:	

Sieve	Passing
3 "	
2	
1.5	
1	
3/4	
1/2	100 %
3/8	99 %
1/4	94 %
# 4	92 %
10	85 %
40	74 %
200	58.3 %

Quantity	Method	Cost
1	T-265	\$ 12.00
1	T-89	36.00
1	T-90	45.00
1	D1140	74.00

Hydrometer Analysis	Subsample	Total Sample
Coarse Sand= 4.75 to 2.0 mm:		
Medium Sand= 2.0 to .42 mm:		
Fine Sand= .42 to .074 mm:		
Silt= .074 to .02 mm:		
Silt= .02 to .005 mm:		
Clay= .005 to .002 mm:		
Clay= Less Than .002 mm:		

**TOTAL CHARGES: \$ 0.00**

**REMARKS:**  
INFORMATION ONLY  
USCS CLASSIFICATION: CH - sandy fat CLAY  
\*

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Contract No.: EA No.: PE001882 071 Lab No.: 12-003797  
Project: R3 SLIDE & ROCKFALL - HARLEY SLIDE OR66 MP 11.8  
Highway: County: CURRY Data Sheet No.: G 8H80 060  
Contractor: FA No.:  
Project Manager: Org Unit: 3630 Bid Item:  
Submitted By: DAN RAKER Org Unit: 3630 Sample No.: N-5  
Material Source: Qty Represented: SOIL @ DEPTH  
Sampled At: HS-02 @ 12.5'-14' Sampled By:  
DATE-Sampled: 12/ 7/12 Received: 12/ 9/26 Tested: 12/11/16 Date Reported: 12/11/16

Test Results For: **DISTURBED SOIL**

TM102 Liquid Lim: 74  
TM103 Plastic Ind: 52  
TM107 Resistivity: Ω  
pH:  
TM111 Spec Grav:  
TM117  
Torvane Shear/ Pocket Pen.  
  
TM127 N. Moisture: 29.60 %  
Dry Density rec'd:  
Wet Density rec'd:  
TM157 Slake Durab:  
Water Cont:  
  
TM512 Pct Organic:

Dry Density	Moisture
Max Density: Optimum Moisture:	

Sieve	Passing
3 "	
2	
1.5	
1	
3/4	100 %
1/2	96 %
3/8	96 %
1/4	93 %
# 4	90 %
10	84 %
40	76 %
200	58.3 %

Quantity	Method	Cost
1	T-265	\$ 12.00
1	T-89	36.00
1	T-90	45.00
1	D1140	74.00

Hydrometer Analysis	Subsample	Total Sample
Coarse Sand= 4.75 to 2.0 mm:		
Medium Sand= 2.0 to .42 mm:		
Fine Sand= .42 to .074 mm:		
Silt= .074 to .02 mm:		
Silt= .02 to .005 mm:		
Clay= .005 to .002 mm:		
Clay= Less Than .002 mm:		

**REMARKS:**  
INFORMATION ONLY  
USCS CLASSIFICATION: CH - sandy fat CLAY  
\*

**TOTAL CHARGES: \$ 0.00**

**KEVIN BROPHY - LABORATORY SERVICES MANAGER**

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'TM' TEST METHODS CAN BE CROSS-REFERENCED WITH AASHTO AND/OR ASTM, CONTACT THIS LAB FOR ASSISTANCE.

Contract No.: EA No.: PE001882 071 Lab No.: 12-003798  
 Project: R3 SLIDE & ROCKFALL - HARLEY SLIDE OR66 MP 11.8  
 Highway: County: CURRY Data Sheet No.: G 8H80 060  
 Contractor: FA No.:  
 Project Manager: Org Unit: 3630 Bid Item:  
 Submitted By: DAN RAKER Org Unit: 3630 Sample No.: N-6  
 Material Source: Qty Represented: SOIL @ DEPTH  
 Sampled At: HS-02 @ 15'-16.5' Sampled By:  
 DATE-Sampled: 12/ 7/12 Received: 12/ 9/26 Tested: 12/11/16 Date Reported: 12/11/16

Test Results For: **DISTURBED SOIL**

TM102 Liquid Lim: 82  
 TM103 Plastic Ind: 57  
 TM107 Resistivity: Ω  
 pH:  
 TM111 Spec Grav:  
 TM117  
 Torvane Shear/ Pocket Pen.  
  
 TM127 N. Moisture: 33.29 %  
 Dry Density rec'd:  
 Wet Density rec'd:  
 TM157 Slake Durab:  
 Water Cont:  
  
 TM512 Pct Organic:

Dry Density	Moisture
Max Density: Optimum Moisture:	

Sieve	Passing
3 "	
2	
1.5	
1	
3/4	
1/2	100 %
3/8	95 %
1/4	91 %
# 4	90 %
10	87 %
40	79 %
200	68.2 %

Quantity	Method	Cost
1	T-265	\$ 12.00
1	T-89	36.00
1	T-90	45.00
1	D1140	74.00

Hydrometer Analysis	Subsample	Total Sample
Coarse Sand= 4.75 to 2.0 mm:		
Medium Sand= 2.0 to .42 mm:		
Fine Sand= .42 to .074 mm:		
Silt= .074 to .02 mm:		
Silt= .02 to .005 mm:		
Clay= .005 to .002 mm:		
Clay= Less Than .002 mm:		

**TOTAL CHARGES: \$ 0.00**

**REMARKS:**  
 INFORMATION ONLY  
 USCS CLASSIFICATION: CH - sandy fat CLAY  
 \*

**KEVIN BROPHY - LABORATORY SERVICES MANAGER**

REPORT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT WRITTEN APPROVAL OF THIS LABORATORY.  
 'TM' TEST METHODS CAN BE CROSS-REFERENCED WITH AASHTO AND/OR ASTM, CONTACT THIS LAB FOR ASSISTANCE.

Contract No.: EA No.: PE001882 071 Lab No.: 12-003799  
Project: R3 SLIDE & ROCKFALL - HARLEY SLIDE OR66 MP 11.8  
Highway: County: CURRY Data Sheet No.: G 8H80 060  
Contractor: FA No.:  
Project Manager: Org Unit: 3630 Bid Item:  
Submitted By: DAN RAKER Org Unit: 3630 Sample No.: N-2  
Material Source: Qty Represented: SOIL @ DEPTH  
Sampled At: HS-03 @ 5'-6.5' Sampled By:  
DATE-Sampled: 12/ 7/12 Received: 12/ 9/26 Tested: 12/11/16 Date Reported: 12/11/16

Test Results For: **DISTURBED SOIL**

TM102 Liquid Lim: 96  
TM103 Plastic Ind: 70  
TM107 Resistivity: Ω  
pH:  
TM111 Spec Grav:  
TM117  
Torvane Shear/ Pocket Pen.  
  
TM127 N. Moisture: 51.57 %  
Dry Density rec'd:  
Wet Density rec'd:  
TM157 Slake Durab:  
Water Cont:  
  
TM512 Pct Organic:

Dry Density	Moisture
Max Density: Optimum Moisture:	

Sieve	Passing
3 "	
2	
1.5	
1	
3/4	
1/2	
3/8	
1/4	100 %
# 4	99 %
10	98 %
40	95 %
200	83.7 %

Quantity	Method	Cost
1	T-265	\$ 12.00
1	T-89	36.00
1	T-90	45.00
1	D1140	74.00

Hydrometer Analysis	Subsample	Total Sample
Coarse Sand= 4.75 to 2.0 mm:		
Medium Sand= 2.0 to .42 mm:		
Fine Sand= .42 to .074 mm:		
Silt= .074 to .02 mm:		
Silt= .02 to .005 mm:		
Clay= .005 to .002 mm:		
Clay= Less Than .002 mm:		

**REMARKS:**  
INFORMATION ONLY  
USCS CLASSIFICATION: CH - fat CLAY with sand  
\*

**TOTAL CHARGES: \$ 0.00**

**KEVIN BROPHY - LABORATORY SERVICES MANAGER**

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'TM' TEST METHODS CAN BE CROSS-REFERENCED WITH AASHTO AND/OR ASTM, CONTACT THIS LAB FOR ASSISTANCE.

Contract No.: EA No.: PE001882 071 Lab No.: 12-003800  
Project: R3 SLIDE & ROCKFALL - HARLEY SLIDE OR66 MP 11.8  
Highway: County: CURRY Data Sheet No.: G 8H80 060  
Contractor: FA No.:  
Project Manager: Org Unit: 3630 Bid Item:  
Submitted By: DAN RAKER Org Unit: 3630 Sample No.: N-4  
Material Source: Qty Represented: SOIL @ DEPTH  
Sampled At: HS-03 @ 10'-11.5' Sampled By:  
DATE-Sampled: 12/ 7/12 Received: 12/ 9/26 Tested: 12/11/16 Date Reported: 12/11/16

Test Results For: **DISTURBED SOIL**

TM102 Liquid Lim: 101  
TM103 Plastic Ind: 76  
TM107 Resistivity: Ω  
pH:  
TM111 Spec Grav:  
TM117  
Torvane Shear/ Pocket Pen.  
  
TM127 N. Moisture: 43.61 %  
Dry Density rec'd:  
Wet Density rec'd:  
TM157 Slake Durab:  
Water Cont:  
  
TM512 Pct Organic:

Dry Density	Moisture
Max Density: Optimum Moisture:	

Sieve	Passing
3 "	
2	
1.5	
1	
3/4	
1/2	
3/8	100 %
1/4	99 %
# 4	99 %
10	97 %
40	94 %
200	84.2 %

Quantity	Method	Cost
1	T-265	\$ 12.00
1	T-89	36.00
1	T-90	45.00
1	D1140	74.00

Hydrometer Analysis	Subsample	Total Sample
Coarse Sand= 4.75 to 2.0 mm:		
Medium Sand= 2.0 to .42 mm:		
Fine Sand= .42 to .074 mm:		
Silt= .074 to .02 mm:		
Silt= .02 to .005 mm:		
Clay= .005 to .002 mm:		
Clay= Less Than .002 mm:		

**REMARKS:**  
INFORMATION ONLY  
USCS CLASSIFICATION: CH - fat CLAY with sand  
\*

**TOTAL CHARGES: \$ 0.00**

**KEVIN BROPHY - LABORATORY SERVICES MANAGER**

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'TM' TEST METHODS CAN BE CROSS-REFERENCED WITH AASHTO AND/OR ASTM, CONTACT THIS LAB FOR ASSISTANCE.

Contract No.: EA No.: PE001882 071 Lab No.: 12-003801  
Project: R3 SLIDE & ROCKFALL - HARLEY SLIDE OR66 MP 11.8  
Highway: County: CURRY Data Sheet No.: G 8H80 060  
Contractor: FA No.:  
Project Manager: Org Unit: 3630 Bid Item:  
Submitted By: DAN RAKER Org Unit: 3630 Sample No.: N-7  
Material Source: Qty Represented: SOIL @ DEPTH  
Sampled At: HS-02 @ 17.5'-19' Sampled By:  
DATE-Sampled: 12/ 7/12 Received: 12/ 9/26 Tested: 12/11/21 Date Reported: 12/11/21

Test Results For: **DISTURBED SOIL**

TM102 Liquid Lim: 37  
TM103 Plastic Ind: 19  
TM107 Resistivity: Ω  
pH:  
TM111 Spec Grav:  
TM117  
Torvane Shear/ Pocket Pen.  
  
TM127 N. Moisture: 15.06 %  
Dry Density rec'd:  
Wet Density rec'd:  
TM157 Slake Durab:  
Water Cont:  
  
TM512 Pct Organic:

Dry Density	Moisture
Max Density: Optimum Moisture:	

Sieve	Passing
3 "	
2	
1.5	
1	
3/4	100 %
1/2	98 %
3/8	89 %
1/4	87 %
# 4	82 %
10	67 %
40	45 %
200	36.6 %

Quantity	Method	Cost
1	T89	\$ 36.00
1	T90	45.00
1	T265	12.00
1	D1140	74.00

Hydrometer Analysis	Subsample	Total Sample
Coarse Sand= 4.75 to 2.0 mm:		
Medium Sand= 2.0 to .42 mm:		
Fine Sand= .42 to .074 mm:		
Silt= .074 to .02 mm:		
Silt= .02 to .005 mm:		
Clay= .005 to .002 mm:		
Clay= Less Than .002 mm:		

**TOTAL CHARGES: \$ 0.00**

**REMARKS:**  
INFORMATION ONLY  
USCS CLASSIFICATION: SC-clayey SAND with gravel  
\*

**KEVIN BROPHY - LABORATORY SERVICES MANAGER**

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'TM' TEST METHODS CAN BE CROSS-REFERENCED WITH AASHTO AND/OR ASTM, CONTACT THIS LAB FOR ASSISTANCE.



Contract No.: EA No.: PE001882 071 Lab No.: 12-003802  
 Project: R3 SLIDE & ROCKFALL - HARLEY SLIDE OR66 MP 11.8  
 Highway: County: CURRY Data Sheet No.: G 8H80 060  
 Contractor: FA No.:  
 Project Manager: Org Unit: 3630 Bid Item:  
 Submitted By: DAN RAKER Org Unit: 3630 Sample No.: N-5  
 Material Source: Qty Represented: SOIL @ DEPTH  
 Sampled At: HS-03 @ 12.5'-14' Sampled By:  
 DATE-Sampled: 12/ 7/12 Received: 12/ 9/26 Tested: 12/11/21 Date Reported: 12/11/21

Test Results For: **DISTURBED SOIL**

TM102 Liquid Lim: 76  
 TM103 Plastic Ind: 50  
 TM107 Resistivity: Ω  
 pH:  
 TM111 Spec Grav:  
 TM117  
 Torvane Shear/ Pocket Pen.  
  
 TM127 N. Moisture: 40.18 %  
 Dry Density rec'd:  
 Wet Density rec'd:  
 TM157 Slake Durab:  
 Water Cont:  
  
 TM512 Pct Organic:

Dry Density	Moisture
Max Density: Optimum Moisture:	

Sieve	Passing
3 "	
2	
1.5	
1	
3/4	
1/2	
3/8	100 %
1/4	97 %
# 4	96 %
10	93 %
40	89 %
200	80.4 %

Quantity	Method	Cost
1	T89	\$ 36.00
1	T90	45.00
1	T265	12.00
1	D1140	44.00

Hydrometer Analysis	Subsample	Total Sample
Coarse Sand= 4.75 to 2.0 mm:		
Medium Sand= 2.0 to .42 mm:		
Fine Sand= .42 to .074 mm:		
Silt= .074 to .02 mm:		
Silt= .02 to .005 mm:		
Clay= .005 to .002 mm:		
Clay= Less Than .002 mm:		

**TOTAL CHARGES: \$ 0.00**

**REMARKS:**  
 INFORMATION ONLY  
 USCS CLASSIFICATION: CH-fat CLAY with sand  
 \*

**KEVIN BROPHY - LABORATORY SERVICES MANAGER**

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**Contract No.:** EA No.: PE001882 071 Lab No.: 12-003803  
Project: R3 SLIDE & ROCKFALL - HARLEY SLIDE OR66 MP 11.8  
Highway: County: CURRY Data Sheet No.: G 8H80 060  
Contractor: FA No.:  
Project Manager: Org Unit: 3630 Bid Item:  
Submitted By: DAN RAKER Org Unit: 3630 Sample No.: N-6A  
Material Source: Qty Represented: SOIL @ DEPTH  
Sampled At: HS-03 @ 15'-15.5' Sampled By:  
DATE-Sampled: 12/ 7/12 Received: 12/ 9/26 Tested: 12/11/21 Date Reported: 12/11/21

Test Results For: **DISTURBED SOIL**

TM102 Liquid Lim: 126  
TM103 Plastic Ind: 99  
TM107 Resistivity: Ω  
pH:  
TM111 Spec Grav:  
TM117  
Torvane Shear/ Pocket Pen.  
  
TM127 N. Moisture: 42.22 %  
Dry Density rec'd:  
Wet Density rec'd:  
TM157 Slake Durab:  
Water Cont:  
  
TM512 Pct Organic:

Dry Density	Moisture
Max Density: Optimum Moisture:	

Sieve	Passing
3 "	
2	
1.5	
1	
3/4	
1/2	
3/8	
1/4	
# 4	100 %
10	100 %
40	99 %
200	95.5 %

Quantity	Method	Cost
1	T89	\$ 36.00
1	T90	45.00
1	T265	12.00
1	D1140	44.00

Hydrometer Analysis	Subsample	Total Sample
Coarse Sand= 4.75 to 2.0 mm:		
Medium Sand= 2.0 to .42 mm:		
Fine Sand= .42 to .074 mm:		
Silt= .074 to .02 mm:		
Silt= .02 to .005 mm:		
Clay= .005 to .002 mm:		
Clay= Less Than .002 mm:		

**TOTAL CHARGES: \$ 0.00**

**REMARKS:**  
INFORMATION ONLY  
USCS CLASSIFICATION: CH-fat CLAY  
\*

**KEVIN BROPHY - LABORATORY SERVICES MANAGER**

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'TM' TEST METHODS CAN BE CROSS-REFERENCED WITH AASHTO AND/OR ASTM, CONTACT THIS LAB FOR ASSISTANCE.

Contract No.: EA No.: PE001882 071 Lab No.: 12-003804  
 Project: R3 SLIDE & ROCKFALL - HARLEY SLIDE OR66 MP 11.8  
 Highway: County: CURRY Data Sheet No.: G 8H80 060  
 Contractor: FA No.:  
 Project Manager: Org Unit: 3630 Bid Item:  
 Submitted By: DAN RAKER Org Unit: 3630 Sample No.: N-6B  
 Material Source: Qty Represented: SOIL @ DEPTH  
 Sampled At: HS-03 @ 15.5'-16.5' Sampled By:  
 DATE-Sampled: 12/ 7/12 Received: 12/ 9/26 Tested: 12/11/21 Date Reported: 12/11/21

Test Results For: **DISTURBED SOIL**

TM102 Liquid Lim: 94  
 TM103 Plastic Ind: 66  
 TM107 Resistivity: Ω  
 pH:  
 TM111 Spec Grav:  
 TM117  
 Torvane Shear/ Pocket Pen.  
  
 TM127 N. Moisture: 43.30 %  
 Dry Density rec'd:  
 Wet Density rec'd:  
 TM157 Slake Durab:  
 Water Cont:  
  
 TM512 Pct Organic:

Dry Density	Moisture
Max Density: Optimum Moisture:	

Sieve	Passing
3 "	
2	
1.5	
1	
3/4	
1/2	
3/8	
1/4	
# 4	100 %
10	99 %
40	95 %
200	89.5 %

Quantity	Method	Cost
1	T89	\$ 36.00
1	T90	45.00
1	T265	12.00
1	D1140	44.00

Hydrometer Analysis	Subsample	Total Sample
Coarse Sand= 4.75 to 2.0 mm:		
Medium Sand= 2.0 to .42 mm:		
Fine Sand= .42 to .074 mm:		
Silt= .074 to .02 mm:		
Silt= .02 to .005 mm:		
Clay= .005 to .002 mm:		
Clay= Less Than .002 mm:		

<p><b>REMARKS:</b>                  INFORMATION ONLY                  USCS CLASSIFICATION: CH-fat CLAY                  *</p>	<p><b>TOTAL CHARGES: \$ 0.00</b></p>
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Contract No.: EA No.: PE001882 071 Lab No.: 12-003805  
Project: R3 SLIDE & ROCKFALL - HARLEY SLIDE OR66 MP 11.8  
Highway: County: CURRY Data Sheet No.: G 8H80 060  
Contractor: FA No.:  
Project Manager: Org Unit: 3630 Bid Item:  
Submitted By: DAN RAKER Org Unit: 3630 Sample No.: N-8  
Material Source: Qty Represented: SOIL @ DEPTH  
Sampled At: HS-03 @ 20'-21.5' Sampled By:  
DATE-Sampled: 12/ 7/12 Received: 12/ 9/26 Tested: 12/11/21 Date Reported: 12/11/21

Test Results For: DISTURBED SOIL

TM102 Liquid Lim: 71  
TM103 Plastic Ind: 45  
TM107 Resistivity: Ω  
pH:  
TM111 Spec Grav:  
TM117  
Torvane Shear/ Pocket Pen.  
  
TM127 N. Moisture: 36.10 %  
Dry Density rec'd:  
Wet Density rec'd:  
TM157 Slake Durab:  
Water Cont:  
  
TM512 Pct Organic:

Dry Density	Moisture
Max Density: Optimum Moisture:	

Sieve	Passing
3 "	
2	
1.5	
1	
3/4	
1/2	
3/8	
1/4	
# 4	100 %
10	99 %
40	96 %
200	89.4 %

Quantity	Method	Cost
1	T89	\$ 36.00
1	T90	45.00
1	T265	12.00
1	D1140	44.00

Hydrometer Analysis	Subsample	Total Sample
Coarse Sand= 4.75 to 2.0 mm:		
Medium Sand= 2.0 to .42 mm:		
Fine Sand= .42 to .074 mm:		
Silt= .074 to .02 mm:		
Silt= .02 to .005 mm:		
Clay= .005 to .002 mm:		
Clay= Less Than .002 mm:		

TOTAL CHARGES: \$ 0.00

REMARKS:  
INFORMATION ONLY  
USCS CLASSIFICATION: CH-fat CLAY  
\*

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Contract No.: EA No.: PE001882 071 Lab No.: 12-003806  
Project: R3 SLIDE & ROCKFALL - HARLEY SLIDE OR66 MP 11.8  
Highway: County: CURRY Data Sheet No.: G 8H80 060  
Contractor: FA No.:  
Project Manager: Org Unit: 3630 Bid Item:  
Submitted By: DAN RAKER Org Unit: 3630 Sample No.: N-9  
Material Source: Qty Represented: SOIL @ DEPTH  
Sampled At: HS-03 @ 22.5'-24' Sampled By:  
DATE-Sampled: 12/ 7/12 Received: 12/ 9/26 Tested: 12/11/21 Date Reported: 12/11/21

Test Results For: **DISTURBED SOIL**

TM102 Liquid Lim: 70  
TM103 Plastic Ind: 45  
TM107 Resistivity: Ω  
pH:  
TM111 Spec Grav:  
TM117  
Torvane Shear/ Pocket Pen.  
  
TM127 N. Moisture: 31.98 %  
Dry Density rec'd:  
Wet Density rec'd:  
TM157 Slake Durab:  
Water Cont:  
  
TM512 Pct Organic:

Dry Density	Moisture
Max Density: Optimum Moisture:	

Sieve	Passing
3 "	
2	
1.5	
1	
3/4	
1/2	
3/8	
1/4	
# 4	100 %
10	99 %
40	95 %
200	87.4 %

Quantity	Method	Cost
1	T89	\$ 36.00
1	T90	45.00
1	T265	12.00
1	D1140	44.00

Hydrometer Analysis	Subsample	Total Sample
Coarse Sand= 4.75 to 2.0 mm:		
Medium Sand= 2.0 to .42 mm:		
Fine Sand= .42 to .074 mm:		
Silt= .074 to .02 mm:		
Silt= .02 to .005 mm:		
Clay= .005 to .002 mm:		
Clay= Less Than .002 mm:		

**TOTAL CHARGES: \$ 0.00**

**REMARKS:**  
INFORMATION ONLY  
USCS CLASSIFICATION: CH-fat CLAY  
\*

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**Contract No.:** EA No.: PE001882 071 Lab No.: 12-003807  
**Project:** R3 SLIDE & ROCKFALL - HARLEY SLIDE OR66 MP 11.8  
**Highway:** County: CURRY **Data Sheet No.:** G 8H80 060  
**Contractor:** **FA No.:**  
**Project Manager:** Org Unit: 3630 **Bid Item:**  
**Submitted By:** DAN RAKER Org Unit: 3630 **Sample No.:** N-2  
**Material Source:** **Qty Represented:** SOIL @ DEPTH  
**Sampled At:** HS-04 @ 5'-6.5' **Sampled By:**  
**DATE-Sampled:** 12/ 7/12 **Received:** 12/ 9/26 **Tested:** 12/11/21 **Date Reported:** 12/11/21

Test Results For: **DISTURBED SOIL**

TM102 Liquid Lim: 119  
TM103 Plastic Ind: 86  
TM107 Resistivity: Ω  
pH:  
TM111 Spec Grav:  
TM117  
Torvane Shear/ Pocket Pen.  
  
TM127 N. Moisture: 36.91 %  
Dry Density rec'd:  
Wet Density rec'd:  
TM157 Slake Durab:  
Water Cont:  
  
TM512 Pct Organic:

Dry Density	Moisture
Max Density: Optimum Moisture:	

Sieve	Passing
3 "	
2	
1.5	
1	
3/4	
1/2	
3/8	
1/4	
# 4	100 %
10	98 %
40	97 %
200	94.2 %

Quantity	Method	Cost
1	T89	\$ 36.00
1	T90	45.00
1	T265	12.00
1	D1140	44.00

Hydrometer Analysis	Subsample	Total Sample
Coarse Sand= 4.75 to 2.0 mm:		
Medium Sand= 2.0 to .42 mm:		
Fine Sand= .42 to .074 mm:		
Silt= .074 to .02 mm:		
Silt= .02 to .005 mm:		
Clay= .005 to .002 mm:		
Clay= Less Than .002 mm:		

**TOTAL CHARGES: \$ 0.00**

**REMARKS:**  
INFORMATION ONLY  
USCS CLASSIFICATION: CH-fat CLAY  
\*

**KEVIN BROPHY - LABORATORY SERVICES MANAGER**

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'TM' TEST METHODS CAN BE CROSS-REFERENCED WITH AASHTO AND/OR ASTM, CONTACT THIS LAB FOR ASSISTANCE.

Contract No.: EA No.: PE001882 071 Lab No.: 12-003808  
Project: R3 SLIDE & ROCKFALL - HARLEY SLIDE OR66 MP 11.8  
Highway: County: CURRY Data Sheet No.: G 8H80 060  
Contractor: FA No.:  
Project Manager: Org Unit: 3630 Bid Item:  
Submitted By: DAN RAKER Org Unit: 3630 Sample No.: N-3  
Material Source: Qty Represented: SOIL @ DEPTH  
Sampled At: HS-04 @ 7.5'-9' Sampled By:  
DATE-Sampled: 12/ 7/12 Received: 12/ 9/26 Tested: 12/11/21 Date Reported: 12/11/21

Test Results For: DISTURBED SOIL

TM102 Liquid Lim: 66  
TM103 Plastic Ind: 45  
TM107 Resistivity: Ω  
pH:  
TM111 Spec Grav:  
TM117  
Torvane Shear/ Pocket Pen.  
  
TM127 N. Moisture: 27.83 %  
Dry Density rec'd:  
Wet Density rec'd:  
TM157 Slake Durab:  
Water Cont:  
  
TM512 Pct Organic:

Dry Density	Moisture
Max Density: Optimum Moisture:	

Sieve	Passing
3 "	
2	
1.5	
1	
3/4	
1/2	
3/8	
1/4	100 %
# 4	99 %
10	97 %
40	89 %
200	74.3 %

Quantity	Method	Cost
1	T89	\$ 36.00
1	T90	45.00
1	T265	12.00
1	D1140	74.00

Hydrometer Analysis	Subsample	Total Sample
Coarse Sand= 4.75 to 2.0 mm:		
Medium Sand= 2.0 to .42 mm:		
Fine Sand= .42 to .074 mm:		
Silt= .074 to .02 mm:		
Silt= .02 to .005 mm:		
Clay= .005 to .002 mm:		
Clay= Less Than .002 mm:		

TOTAL CHARGES: \$ 0.00

REMARKS:  
INFORMATION ONLY  
USCS CLASSIFICATION: CH-fat CLAY with sand  
\*

KEVIN BROPHY - LABORATORY SERVICES MANAGER

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'TM' TEST METHODS CAN BE CROSS-REFERENCED WITH AASHTO AND/OR ASTM, CONTACT THIS LAB FOR ASSISTANCE.

Contract No.: EA No.: PE001882 071 Lab No.: 12-003809  
Project: R3 SLIDE & ROCKFALL - HARLEY SLIDE OR66 MP 11.8  
Highway: County: CURRY Data Sheet No.: G 8H80 060  
Contractor: FA No.:  
Project Manager: Org Unit: 3630 Bid Item:  
Submitted By: DAN RAKER Org Unit: 3630 Sample No.: N-7  
Material Source: Qty Represented: SOIL @ DEPTH  
Sampled At: HS-03 @ 17.5'-19' Sampled By:  
DATE-Sampled: 12/ 7/12 Received: 12/ 9/26 Tested: 12/11/21 Date Reported: 12/11/21

Test Results For: **DISTURBED SOIL**

TM102 Liquid Lim: 99  
TM103 Plastic Ind: 70  
TM107 Resistivity: Ω  
pH:  
TM111 Spec Grav:  
TM117  
Torvane Shear/ Pocket Pen.  
  
TM127 N. Moisture: 44.60 %  
Dry Density rec'd:  
Wet Density rec'd:  
TM157 Slake Durab:  
Water Cont:  
  
TM512 Pct Organic:

Dry Density	Moisture
Max Density: Optimum Moisture:	

Sieve	Passing
3 "	
2	
1.5	
1	
3/4	
1/2	
3/8	
1/4	100 %
# 4	99 %
10	98 %
40	97 %
200	92.6 %

Quantity	Method	Cost
1	T89	\$ 36.00
1	T90	45.00
1	T265	12.00
1	D1140	74.00

Hydrometer Analysis	Subsample	Total Sample
Coarse Sand= 4.75 to 2.0 mm:		
Medium Sand= 2.0 to .42 mm:		
Fine Sand= .42 to .074 mm:		
Silt= .074 to .02 mm:		
Silt= .02 to .005 mm:		
Clay= .005 to .002 mm:		
Clay= Less Than .002 mm:		

**TOTAL CHARGES: \$ 0.00**

**REMARKS:**  
INFORMATION ONLY  
USCS CLASSIFICATION: CH-fat CLAY  
\*

**KEVIN BROPHY - LABORATORY SERVICES MANAGER**

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'TM' TEST METHODS CAN BE CROSS-REFERENCED WITH AASHTO AND/OR ASTM, CONTACT THIS LAB FOR ASSISTANCE.



**Contract No.:** EA No.: PE001882 071 Lab No.: 12-003810  
**Project:** R3 SLIDE & ROCKFALL - HARLEY SLIDE OR66 MP 11.8  
**Highway:** County: CURRY **Data Sheet No.:** G 8H80 060  
**Contractor:** FA No.:  
**Project Manager:** Org Unit: 3630 **Bid Item:**  
**Submitted By:** DAN RAKER Org Unit: 3630 **Sample No.:** N-11  
**Material Source:** Qty Represented: SOIL @ DEPTH  
**Sampled At:** HS-03 @ 27.5'-29' **Sampled By:**  
**DATE-Sampled:** 12/ 7/12 **Received:** 12/ 9/26 **Tested:** 12/11/21 **Date Reported:** 12/11/21

Test Results For: **DISTURBED SOIL**

TM102 Liquid Lim: 68  
TM103 Plastic Ind: 42  
TM107 Resistivity: Ω  
pH:  
TM111 Spec Grav:  
TM117  
Torvane Shear/ Pocket Pen.  
  
TM127 N. Moisture: 27.80 %  
Dry Density rec'd:  
Wet Density rec'd:  
TM157 Slake Durab:  
Water Cont:  
  
TM512 Pct Organic:

Dry Density	Moisture
Max Density: Optimum Moisture:	

Sieve	Passing
3 "	
2	
1.5	
1	
3/4	
1/2	
3/8	
1/4	100 %
# 4	100 %
10	99 %
40	95 %
200	92.3 %

Quantity	Method	Cost
1	T89	\$ 36.00
1	T90	45.00
1	T265	12.00
1	D1140	74.00

Hydrometer Analysis	Subsample	Total Sample
Coarse Sand= 4.75 to 2.0 mm:		
Medium Sand= 2.0 to .42 mm:		
Fine Sand= .42 to .074 mm:		
Silt= .074 to .02 mm:		
Silt= .02 to .005 mm:		
Clay= .005 to .002 mm:		
Clay= Less Than .002 mm:		

**TOTAL CHARGES: \$ 0.00**

**REMARKS:**  
INFORMATION ONLY  
USCS CLASSIFICATION: CH-fat CLAY  
\*

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Contract No.: EA No.: PE001882 071 Lab No.: 12-003811  
Project: R3 SLIDE & ROCKFALL - HARLEY SLIDE OR66 MP 11.8  
Highway: County: CURRY Data Sheet No.: G 8H80 060  
Contractor: FA No.:  
Project Manager: Org Unit: 3630 Bid Item:  
Submitted By: DAN RAKER Org Unit: 3630 Sample No.: N-6  
Material Source: Qty Represented: SOIL @ DEPTH  
Sampled At: HS-04 @ 15'-16.5' Sampled By:  
DATE-Sampled: 12/ 7/12 Received: 12/ 9/26 Tested: 12/11/21 Date Reported: 12/11/21

Test Results For: **DISTURBED SOIL**

TM102 Liquid Lim: 81  
TM103 Plastic Ind: 57  
TM107 Resistivity: Ω  
pH:  
TM111 Spec Grav:  
TM117  
Torvane Shear/ Pocket Pen.  
  
TM127 N. Moisture: 35.28 %  
Dry Density rec'd:  
Wet Density rec'd:  
TM157 Slake Durab:  
Water Cont:  
  
TM512 Pct Organic:

Dry Density	Moisture
Max Density: Optimum Moisture:	

Sieve	Passing
3 "	
2	
1.5	
1	
3/4	
1/2	
3/8	
1/4	
# 4	100 %
10	99 %
40	95 %
200	91.0 %

Quantity	Method	Cost
1	T89	\$ 36.00
1	T90	45.00
1	T265	12.00
1	D1140	44.00

Hydrometer Analysis	Subsample	Total Sample
Coarse Sand= 4.75 to 2.0 mm:		
Medium Sand= 2.0 to .42 mm:		
Fine Sand= .42 to .074 mm:		
Silt= .074 to .02 mm:		
Silt= .02 to .005 mm:		
Clay= .005 to .002 mm:		
Clay= Less Than .002 mm:		

**TOTAL CHARGES: \$ 0.00**

**REMARKS:**  
INFORMATION ONLY  
USCS CLASSIFICATION: CH-fat CLAY  
\*

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MATERIALS LABORATORY  
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<b>Contract No.:</b>	<b>EA No.:</b> PE001882 071	<b>Lab No.:</b>	<b>12-003812</b>
Project: R3 SLIDE & ROCKFALL - HARLEY SLIDE OR66 MP 11.8	County: CURRY	<b>Data Sheet No.:</b> G 8H80 060	
Highway:		FA No.:	
Contractor:		Bid Item:	
Project Manager:	Org Unit: 3630	Sample No.:	N-7
Submitted By: DAN RAKER	Org Unit: 3630	Qty Represented:	SOIL @ DEPTH
Material Source:		Sampled By:	
Sampled At: HS-04 @ 17.5'-19'		DATE-Sampled: 12/ 7/12	Received: 12/ 9/26
		Tested: 12/11/21	Date Reported: 12/11/21

**Test Results For: DISTURBED SOIL**

TM102 Liquid Lim: 88 TM103 Plastic Ind: 66 TM107 Resistivity: Ω pH: TM111 Spec Grav: TM117 Torvane Shear/ Pocket Pen.  TM127 N. Moisture: 25.84 % Dry Density rec'd: Wet Density rec'd: TM157 Slake Durab: Water Cont:  TM512 Pct Organic:
--

Dry Density	Moisture
Max Density: Optimum Moisture:	

Sieve	Passing
3 "	
2	
1.5	
1	
3/4	
1/2	
3/8	
1/4	
# 4	100 %
10	100 %
40	98 %
200	91.7 %

Quantity	Method	Cost
1	T89	\$ 36.00
1	T90	45.00
1	T265	12.00
1	D1140	44.00

Hydrometer Analysis	Subsample	Total Sample
Coarse Sand= 4.75 to 2.0 mm:		
Medium Sand= 2.0 to .42 mm:		
Fine Sand= .42 to .074 mm:		
Silt= .074 to .02 mm:		
Silt= .02 to .005 mm:		
Clay= .005 to .002 mm:		
Clay= Less Than .002 mm:		

<b>REMARKS:</b> INFORMATION ONLY USCS CLASSIFICATION: CH-fat CLAY *	<b>TOTAL CHARGES: \$ 0.00</b>
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'TM' TEST METHODS CAN BE CROSS-REFERENCED WITH AASHTO AND/OR ASTM, CONTACT THIS LAB FOR ASSISTANCE.

Contract No.: EA No.: PE001882 071 Lab No.: 12-003813  
Project: R3 SLIDE & ROCKFALL - HARLEY SLIDE OR66 MP 11.8  
Highway: County: CURRY Data Sheet No.: G 8H80 060  
Contractor: FA No.:  
Project Manager: Org Unit: 3630 Bid Item:  
Submitted By: DAN RAKER Org Unit: 3630 Sample No.: N-8  
Material Source: Qty Represented: SOIL @ DEPTH  
Sampled At: HS-04 @ 20'-21.5' Sampled By:  
DATE-Sampled: 12/ 7/12 Received: 12/ 9/26 Tested: 12/11/21 Date Reported: 12/11/21

Test Results For: DISTURBED SOIL

TM102 Liquid Lim: 77  
TM103 Plastic Ind: 56  
TM107 Resistivity: Ω  
pH:  
TM111 Spec Grav:  
TM117  
Torvane Shear/ Pocket Pen.  
  
TM127 N. Moisture: 24.59 %  
Dry Density rec'd:  
Wet Density rec'd:  
TM157 Slake Durab:  
Water Cont:  
  
TM512 Pct Organic:

Dry Density	Moisture
Max Density: Optimum Moisture:	

Sieve	Passing
3 "	
2	
1.5	
1	
3/4	
1/2	
3/8	
1/4	100 %
# 4	99 %
10	91 %
40	69 %
200	55.2 %

Quantity	Method	Cost
1	T89	\$ 36.00
1	T90	45.00
1	T265	12.00
1	D1140	74.00

Hydrometer Analysis	Subsample	Total Sample
Coarse Sand= 4.75 to 2.0 mm:		
Medium Sand= 2.0 to .42 mm:		
Fine Sand= .42 to .074 mm:		
Silt= .074 to .02 mm:		
Silt= .02 to .005 mm:		
Clay= .005 to .002 mm:		
Clay= Less Than .002 mm:		

REMARKS:  
INFORMATION ONLY  
USCS CLASSIFICATION: CH-sandy fat CLAY  
\*

TOTAL CHARGES: \$ 0.00

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Contract No.: EA No.: PE001882 071 Lab No.: 12-003814  
Project: R3 SLIDE & ROCKFALL - HARLEY SLIDE OR66 MP 11.8  
Highway: County: CURRY Data Sheet No.: G 8H80 060  
Contractor: FA No.:  
Project Manager: Org Unit: 3630 Bid Item:  
Submitted By: DAN RAKER Org Unit: 3630 Sample No.: N-9  
Material Source: Qty Represented: SOIL @ DEPTH  
Sampled At: HS-04 @ 22.5'-24' Sampled By:  
DATE-Sampled: 12/ 7/12 Received: 12/ 9/26 Tested: 12/11/21 Date Reported: 12/11/21

Test Results For: DISTURBED SOIL

TM102 Liquid Lim: 75  
TM103 Plastic Ind: 51  
TM107 Resistivity: Ω  
pH:  
TM111 Spec Grav:  
TM117  
Torvane Shear/ Pocket Pen.  
  
TM127 N. Moisture: 28.09 %  
Dry Density rec'd:  
Wet Density rec'd:  
TM157 Slake Durab:  
Water Cont:  
  
TM512 Pct Organic:

Dry Density	Moisture
Max Density: Optimum Moisture:	

Sieve	Passing
3 "	
2	
1.5	
1	
3/4	
1/2	
3/8	
1/4	
# 4	100 %
10	99 %
40	95 %
200	85.7 %

Quantity	Method	Cost
1	T89	\$ 36.00
1	T90	45.00
1	T265	12.00
1	D1140	44.00

Hydrometer Analysis	Subsample	Total Sample
Coarse Sand= 4.75 to 2.0 mm:		
Medium Sand= 2.0 to .42 mm:		
Fine Sand= .42 to .074 mm:		
Silt= .074 to .02 mm:		
Silt= .02 to .005 mm:		
Clay= .005 to .002 mm:		
Clay= Less Than .002 mm:		

<b>REMARKS:</b> INFORMATION ONLY USCS CLASSIFICATION: CH-fat CLAY *	<b>TOTAL CHARGES: \$ 0.00</b>
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Contract No.: EA No.: PE001882 071 Lab No.: 12-003815  
Project: R3 SLIDE & ROCKFALL - HARLEY SLIDE OR66 MP 11.8  
Highway: County: CURRY Data Sheet No.: G 8H80 060  
Contractor: FA No.:  
Project Manager: Org Unit: 3630 Bid Item:  
Submitted By: DAN RAKER Org Unit: 3630 Sample No.: N-10  
Material Source: Qty Represented: SOIL @ DEPTH  
Sampled At: HS-04 @ 25'-26.5' Sampled By:  
DATE-Sampled: 12/ 7/12 Received: 12/ 9/26 Tested: 12/11/21 Date Reported: 12/11/21

Test Results For: **DISTURBED SOIL**

TM102 Liquid Lim: 49  
TM103 Plastic Ind: 28  
TM107 Resistivity: Ω  
pH:  
TM111 Spec Grav:  
TM117  
Torvane Shear/ Pocket Pen.  
  
TM127 N. Moisture: 14.30 %  
Dry Density rec'd:  
Wet Density rec'd:  
TM157 Slake Durab:  
Water Cont:  
  
TM512 Pct Organic:

Dry Density	Moisture
Max Density: Optimum Moisture:	

Sieve	Passing
3 "	
2	
1.5	
1	
3/4	100 %
1/2	89 %
3/8	86 %
1/4	81 %
# 4	79 %
10	69 %
40	69 %
200	32.4 %

Quantity	Method	Cost
1	T89	\$ 36.00
1	T90	45.00
1	T265	12.00
1	D1140	74.00

Hydrometer Analysis	Subsample	Total Sample
Coarse Sand= 4.75 to 2.0 mm:		
Medium Sand= 2.0 to .42 mm:		
Fine Sand= .42 to .074 mm:		
Silt= .074 to .02 mm:		
Silt= .02 to .005 mm:		
Clay= .005 to .002 mm:		
Clay= Less Than .002 mm:		

**TOTAL CHARGES: \$ 0.00**

**REMARKS:**  
INFORMATION ONLY  
USCS CLASSIFICATION: SC-clayey SAND with gravel  
\*

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Contract No.: EA No.: PE001882 071 Lab No.: 12-003816  
Project: R3 SLIDE & ROCKFALL - HARLEY SLIDE OR66 MP 11.8  
Highway: County: CURRY Data Sheet No.: G 8H80 060  
Contractor: FA No.:  
Project Manager: Org Unit: 3630 Bid Item:  
Submitted By: DAN RAKER Org Unit: 3630 Sample No.: N-11  
Material Source: Qty Represented: SOIL @ DEPTH  
Sampled At: HS-04 @ 27.5'-29' Sampled By:  
DATE-Sampled: 12/ 7/12 Received: 12/ 9/26 Tested: 12/11/21 Date Reported: 12/11/21

Test Results For: **DISTURBED SOIL**

TM102 Liquid Lim: 51  
TM103 Plastic Ind: 31  
TM107 Resistivity: Ω  
pH:  
TM111 Spec Grav:  
TM117  
Torvane Shear/ Pocket Pen.  
  
TM127 N. Moisture: 18.17 %  
Dry Density rec'd:  
Wet Density rec'd:  
TM157 Slake Durab:  
Water Cont:  
  
TM512 Pct Organic:

Dry Density	Moisture
Max Density: Optimum Moisture:	

Sieve	Passing
3 "	
2	
1.5	
1	
3/4	100 %
1/2	94 %
3/8	90 %
1/4	85 %
# 4	80 %
10	64 %
40	44 %
200	32.1 %

Quantity	Method	Cost
1	T89	\$ 36.00
1	T90	45.00
1	T265	12.00
1	D1140	74.00

Hydrometer Analysis	Subsample	Total Sample
Coarse Sand= 4.75 to 2.0 mm:		
Medium Sand= 2.0 to .42 mm:		
Fine Sand= .42 to .074 mm:		
Silt= .074 to .02 mm:		
Silt= .02 to .005 mm:		
Clay= .005 to .002 mm:		
Clay= Less Than .002 mm:		

**REMARKS:**  
INFORMATION ONLY  
USCS CLASSIFICATION: SC-clayey SAND with gravel  
\*

**TOTAL CHARGES: \$ 0.00**

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**OREGON DEPARTMENT OF TRANSPORTATION  
MATERIALS LABORATORY  
800 AIRPORT RD. SE SALEM, OR 97301-4792**

<b>Contract No.:</b>	<b>EA No.:</b> PE001882 071	<b>Lab No.:</b> 13-000284
Project: R3 SLIDE & ROCKFALL - HARLEY SLIDE OR66 MP 11.8		
Highway:	County: CURRY	Data Sheet No.: G 8H80061
Contractor:		FA No.:
Project Manager:	Org Unit: 3630	Bid Item:
Submitted By: DAN RAKER	Org Unit: 3630	Sample No.: C-1
Material Source: JOBSITE		Qty Represented:
Sampled At: HS-01, 20-20.7'		Sampled By:
DATE-Sampled: 12/ 7/12	Received: 13/ 2/14	Tested: 13/ 3/ 8
		Date Reported: 13/ 3/ 8

**Test Results For: ROCK CORE**

TM102 Liquid Lim:  
 TM103 Plastic Ind:  
 TM107 Resistivity: Ω  
                   pH:  
 TM111 Spec Grav:  
 TM117  
 Torvane Shear/ Pocket Pen.

TM127 N. Moisture: 0.81 %  
 Dry Density rec'd: 157.01 PC  
 Wet Density rec'd: 158.28 PC  
 TM157 Slake Durab:  
   Water Cont:

TM512 Pct Organic:

Dry Density	Moisture
Max Density:	
Optimum Moisture:	

Sieve	Passing
3 "	
2	
1.5	
1	
3/4	
1/2	
3/8	
1/4	
# 4	
10	
40	
200	

Quantity	Method	Cost
1	D7012	\$ 58.00
1	T265	12.00
1	154X	29.00

Hydrometer Analysis	Subsample	Total Sample
Coarse Sand= 4.75 to 2.0 mm:		
Medium Sand= 2.0 to .42 mm:		
Fine Sand= .42 to .074 mm:		
Silt= .074 to .02 mm:		
Silt= .02 to .005 mm:		
Clay= .005 to .002 mm:		
Clay= Less Than .002 mm:		

<b>REMARKS:</b> INFORMATION ONLY UNIAXIAL COMPRESSIVE STRENGTH = 19,506.2 PSI *	<b>TOTAL CHARGES: \$ 0.00</b>
--	-------------------------------

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**UNCONFINED COMPRESSIVE STRENGTH of INTACT ROCK CORE  
 ASTM D 7012-10**

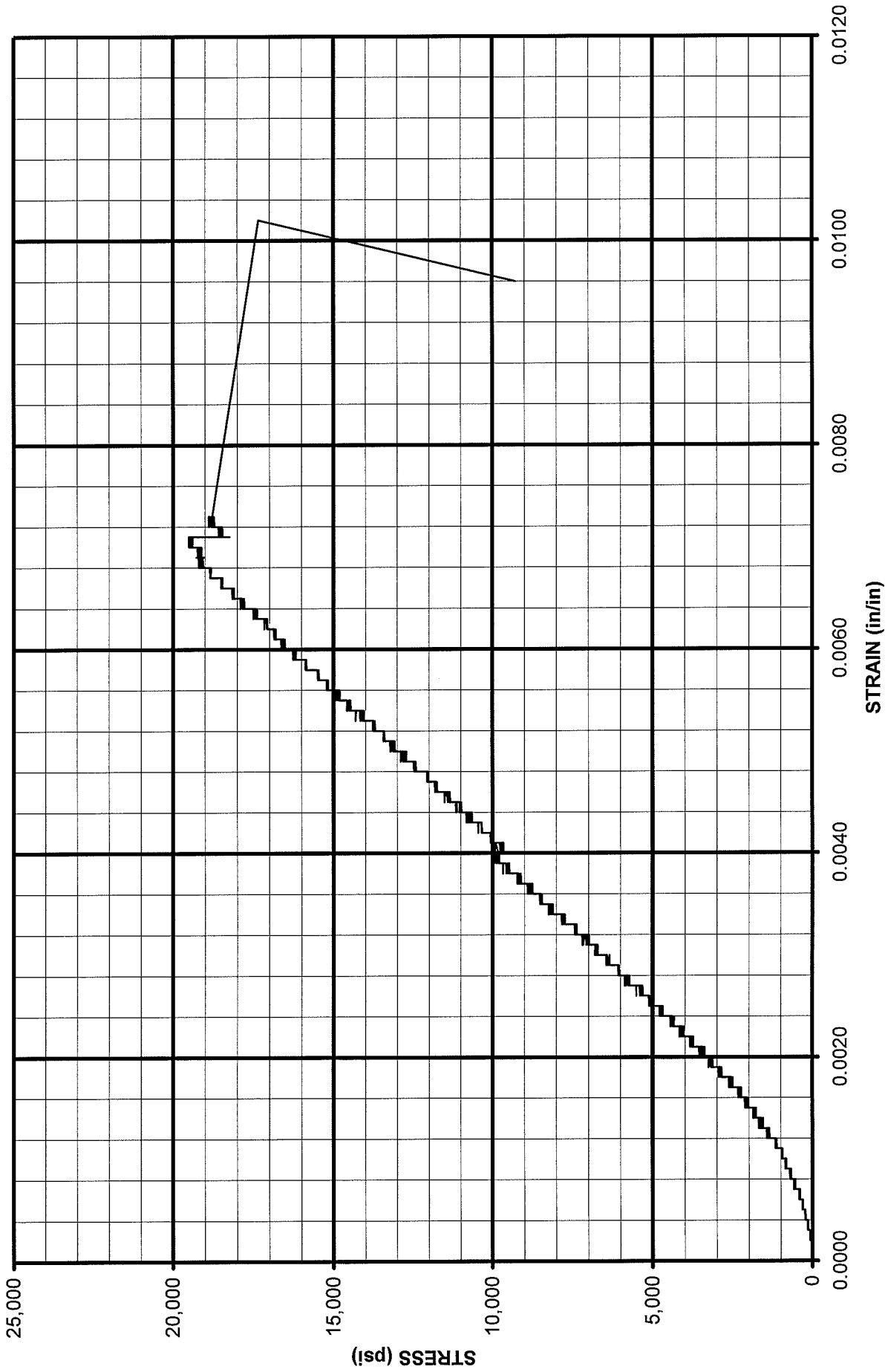
PROJECT	Harley Slide OR66 MP 11.8	LAB NUMBER	13-000284
SAMPLE #	HS-01, C-1	DEPTH	20.0' - 20.7'
HEIGHT (in)	5.8078	INITIAL WET WT. (g)	1,084.9
DIAMETER (in)	2.3926	FINAL DRY WT. (g)	1,076.2
AREA (in <sup>2</sup> )	4.4960	MOISTURE (%)	0.80
*Length to Diameter (L/D) ratio =	2.4	WET DENSITY (lb/ft <sup>3</sup> )	158.3
Maximum Stress =	<b>19,506.2 psi</b>	DRY DENSITY (lb/ft <sup>3</sup> )	157.0
Strain Rate =	0.14% / Min		

TIME (min)	LOAD (lb)	DEFLECTION (in)	STRAIN (in/in)	STRESS (psi)
0.00	0	0.0000	0.0000	0.0
0.25	30	0.0557	0.0096	6.7
0.50	1,710	0.0037	0.0006	380.3
0.75	3,168	0.0051	0.0009	704.6
1.00	4,971	0.0065	0.0011	1105.6
1.25	7,312	0.0078	0.0013	1626.3
1.50	9,979	0.0093	0.0016	2219.5
1.75	13,109	0.0109	0.0019	2915.7
2.00	16,529	0.0122	0.0021	3676.4
2.25	20,042	0.0139	0.0024	4457.7
2.50	23,669	0.0152	0.0026	5264.5
2.75	27,535	0.0166	0.0029	6124.3
3.00	31,342	0.0181	0.0031	6971.1
3.25	35,281	0.0195	0.0034	7847.2
3.50	39,168	0.0210	0.0036	8711.7
3.75	43,126	0.0224	0.0039	9592.1
4.00	44,421	0.0238	0.0041	9880.1
4.25	48,397	0.0253	0.0044	10764.5
4.50	52,213	0.0267	0.0046	11613.2
4.75	56,072	0.0283	0.0049	12471.5
5.00	59,841	0.0296	0.0051	13309.8
5.25	63,746	0.0311	0.0054	14178.4
5.50	67,659	0.0326	0.0056	15048.7
5.75	71,656	0.0340	0.0059	15937.7
6.00	75,347	0.0356	0.0061	16758.7
6.25	78,751	0.0370	0.0064	17515.8
6.50	82,622	0.0385	0.0066	18376.8
6.75	86,278	0.0398	0.0069	19189.9
7.00	82,251	0.0414	0.0071	18294.3
7.18	41,683	0.0557	0.0096	9271.1

\*2.0 to 2.5 L/D is required

LAB # 13-000284  
HS-01, C-1, 20.0' - 20.7'

UNCONFINED COMPRESSIVE STRENGTH of INTACT ROCK CORE (ASTM D 7012-10)



UNIAXIAL COMPRESSIVE STRENGTH 19,506.2 PSI

OREGON DEPARTMENT OF TRANSPORTATION  
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Contract No.: EA No.: PE001882 071 Lab No.: **13-000285**  
Project: R3 SLIDE & ROCKFALL - HARLEY SLIDE OR66 MP 11.8  
Highway: County: CURRY Data Sheet No.: G 8H80061  
Contractor: FA No.:  
Project Manager: Org Unit: 3630 Bid Item:  
Submitted By: DAN RAKER Org Unit: 3630 Sample No.: C-2  
Material Source: JOBSITE Qty Represented:  
Sampled At: HS-01, 26.6-27.2' Sampled By:  
DATE-Sampled: 12/ 7/12 Received: 13/ 2/14 Tested: 13/ 3/ 8 Date Reported: 13/ 3/ 8

Test Results For: ROCK CORE

TM102 Liquid Lim:  
TM103 Plastic Ind:  
TM107 Resistivity: Ω  
pH:  
TM111 Spec Grav:  
TM117  
Torvane Shear/ Pocket Pen.  
  
TM127 N. Moisture: 0.69 %  
Dry Density rec'd: 152.65 PC  
Wet Density rec'd: 153.70 PC  
TM157 Slake Durab:  
Water Cont:  
  
TM512 Pct Organic:

Dry Density Moisture  
  
  
  
  
  
  
  
  
  
Max Density:  
Optimum Moisture:

Sieve Passing  
  
3 "  
2  
1.5  
1  
3/4  
1/2  
3/8  
1/4  
# 4  
10  
40  
200

Quantity	Method	Cost
1	D7012	\$ 58.00
1	T265	12.00
1	154X	29.00

Hydrometer Analysis	Subsample	Total Sample
Coarse Sand= 4.75 to 2.0 mm:		
Medium Sand= 2.0 to .42 mm:		
Fine Sand= .42 to .074 mm:		
Silt= .074 to .02 mm:		
Silt= .02 to .005 mm:		
Clay= .005 to .002 mm:		
Clay= Less Than .002 mm:		

TOTAL CHARGES: \$ 0.00

REMARKS:  
INFORMATION ONLY  
UNIAXIAL COMPRESSIVE STRENGTH = 22,335.9 PSI  
\*

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'TM' TEST METHODS CAN BE CROSS-REFERENCED WITH AASHTO AND/OR ASTM, CONTACT THIS LAB FOR ASSISTANCE.

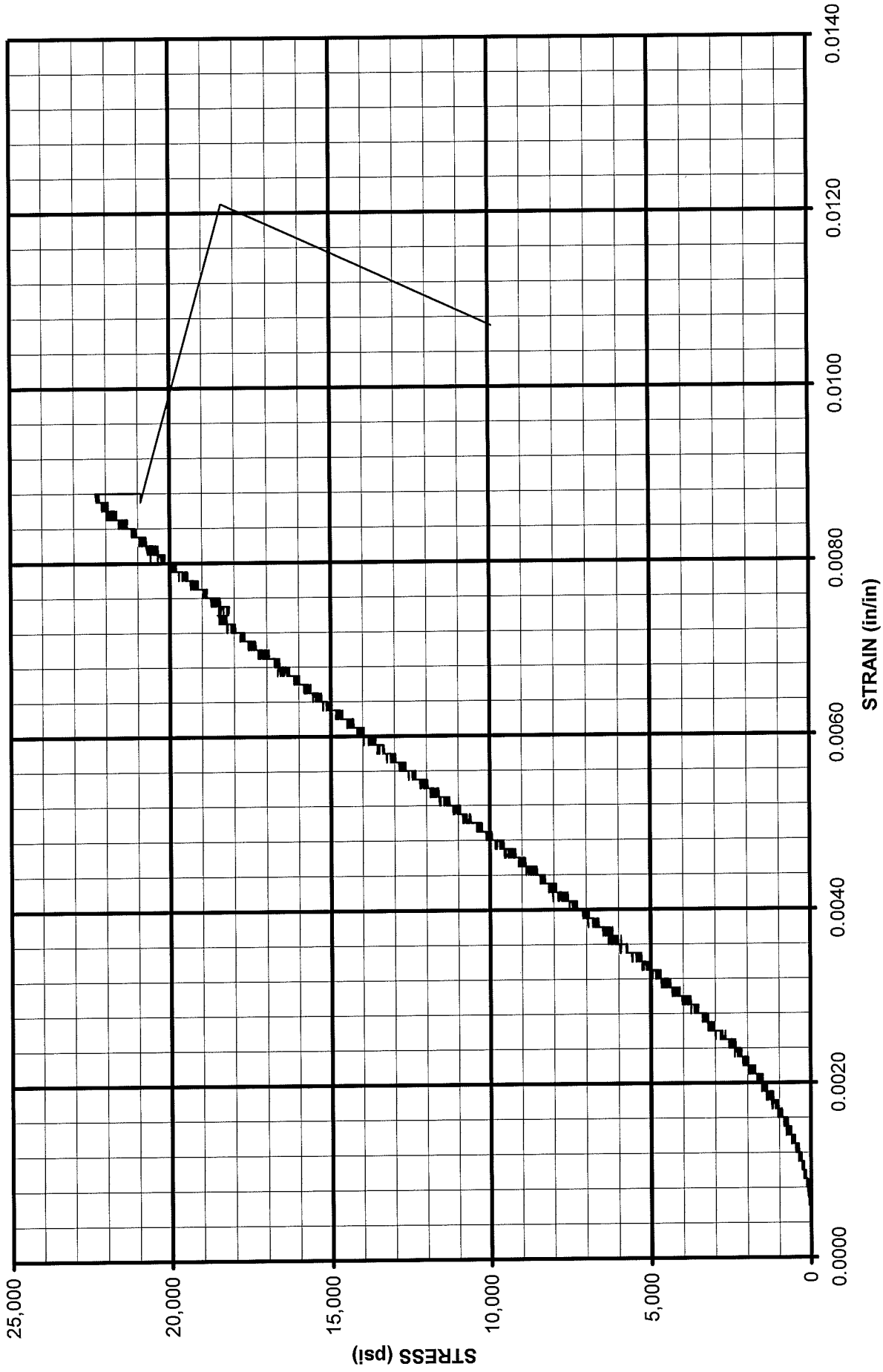
**UNCONFINED COMPRESSIVE STRENGTH of INTACT ROCK CORE  
 ASTM D 7012-10**

PROJECT	Harley Slide OR66 MP 11.8	LAB NUMBER	13-000285
SAMPLE #	HS-01, C-2	DEPTH	26.6' - 27.2'
HEIGHT (in)	5.5911	INITIAL WET WT. (g)	1,011.7
DIAMETER (in)	2.3896	FINAL DRY WT. (g)	1,004.8
AREA (in <sup>2</sup> )	4.4848	MOISTURE (%)	0.68
*Length to Diameter (L/D) ratio =	2.3	WET DENSITY (lb/ft <sup>3</sup> )	153.7
Maximum Stress =	22,335.9 psi	DRY DENSITY (lb/ft <sup>3</sup> )	152.7
Strain Rate =	0.14% / Min		

TIME (min)	LOAD (lb)	DEFLECTION (in)	STRAIN (in/in)	STRESS (psi)
0.00	0	0.0000	0.0000	0.0
0.25	2	0.0601	0.0107	0.4
0.50	160	0.0030	0.0005	35.7
0.75	420	0.0044	0.0008	93.6
1.00	1,105	0.0057	0.0010	246.4
1.25	2,096	0.0072	0.0013	467.4
1.50	3,567	0.0083	0.0015	795.4
1.75	5,200	0.0102	0.0018	1159.5
2.00	7,096	0.0112	0.0020	1582.2
2.25	9,537	0.0130	0.0023	2126.5
2.50	12,454	0.0142	0.0025	2776.9
2.75	15,438	0.0157	0.0028	3442.3
3.00	18,740	0.0170	0.0030	4178.6
3.25	22,087	0.0186	0.0033	4924.9
3.50	25,669	0.0199	0.0036	5723.6
3.75	29,165	0.0214	0.0038	6503.1
4.00	32,874	0.0226	0.0040	7330.1
4.25	36,577	0.0237	0.0042	8155.8
4.50	40,472	0.0255	0.0046	9024.3
4.75	44,093	0.0269	0.0048	9831.7
5.00	47,840	0.0282	0.0050	10667.1
5.25	51,571	0.0298	0.0053	11499.1
5.50	55,446	0.0312	0.0056	12363.1
5.75	59,307	0.0326	0.0058	13224.0
6.00	63,033	0.0337	0.0060	14054.8
6.25	66,812	0.0352	0.0063	14897.4
6.50	70,675	0.0366	0.0065	15758.8
6.75	74,216	0.0379	0.0068	16548.3
7.00	77,923	0.0395	0.0071	17374.9
7.25	81,639	0.0405	0.0072	18203.5
7.50	82,986	0.0424	0.0076	18503.8
7.75	86,842	0.0437	0.0078	19363.6
8.00	90,592	0.0450	0.0080	20199.8
8.25	93,982	0.0465	0.0083	20955.7
8.50	97,420	0.0479	0.0086	21722.3
8.75	97,693	0.0492	0.0088	21783.1
8.77	44,345	0.0601	0.0107	9887.8

\*2.0 to 2.5 L/D is required

UNCONFINED COMPRESSIVE STRENGTH OF INTACT ROCK CORE (ASTM D 7012-10)



UNIAXIAL COMPRESSIVE STRENGTH 22,335.9 PSI

**OREGON DEPARTMENT OF TRANSPORTATION  
MATERIALS LABORATORY  
800 AIRPORT RD. SE SALEM, OR 97301-4792**

<b>Contract No.:</b>	<b>EA No.:</b> PE001882 071	<b>Lab No.:</b> 13-000286
<b>Project:</b> R3 SLIDE & ROCKFALL - HARLEY SLIDE OR66 MP 11.8		
<b>Highway:</b>	<b>County:</b> CURRY	<b>Data Sheet No.:</b> G 8H80061
<b>Contractor:</b>		<b>FA No.:</b>
<b>Project Manager:</b>	<b>Org Unit:</b> 3630	<b>Bid Item:</b>
<b>Submitted By:</b> DAN RAKER	<b>Org Unit:</b> 3630	<b>Sample No.:</b> C-3
<b>Material Source:</b> JOBSITE		<b>Qty Represented:</b>
<b>Sampled At:</b> HS-01, 26.0-26.5'		<b>Sampled By:</b>
<b>DATE-Sampled:</b> 12/ 7/12	<b>Received:</b> 13/ 2/14	<b>Tested:</b> 13/ 3/ 8
		<b>Date Reported:</b> 13/ 3/ 8

**Test Results For: ROCK CORE**

TM102 Liquid Lim: TM103 Plastic Ind: TM107 Resistivity: Ω pH: TM111 Spec Grav: TM117 Torvane Shear/ Pocket Pen.  TM127 N. Moisture: 1.13 % Dry Density rec'd: 158.82 PC Wet Density rec'd: 160.61 PC TM157 Slake Durab: Water Cont:  TM512 Pct Organic:
---

Dry Density            Moisture           Max Density: Optimum Moisture:
--

Sieve            Passing  3    " 2 1.5 1 3/4 1/2 3/8 1/4 #    4 10 40 200
--

Quantity	Method	Cost
1	D7012	\$ 58.00
1	T265	12.00
1	154X	29.00

Hydrometer Analysis	Subsample	Total Sample
Coarse Sand= 4.75 to 2.0 mm:		
Medium Sand= 2.0 to .42 mm:		
Fine Sand= .42 to .074 mm:		
Silt= .074 to .02 mm:		
Silt= .02 to .005 mm:		
Clay= .005 to .002 mm:		
Clay= Less Than .002 mm:		

<b>TOTAL CHARGES:</b> \$ 0.00
-------------------------------

**REMARKS:**  
 INFORMATION ONLY  
 UNIAXIAL COMPRESSIVE STRENGTH = 22,831.7 PSI  
 \*

**KEVIN BROPHY - LABORATORY SERVICES MANAGER**

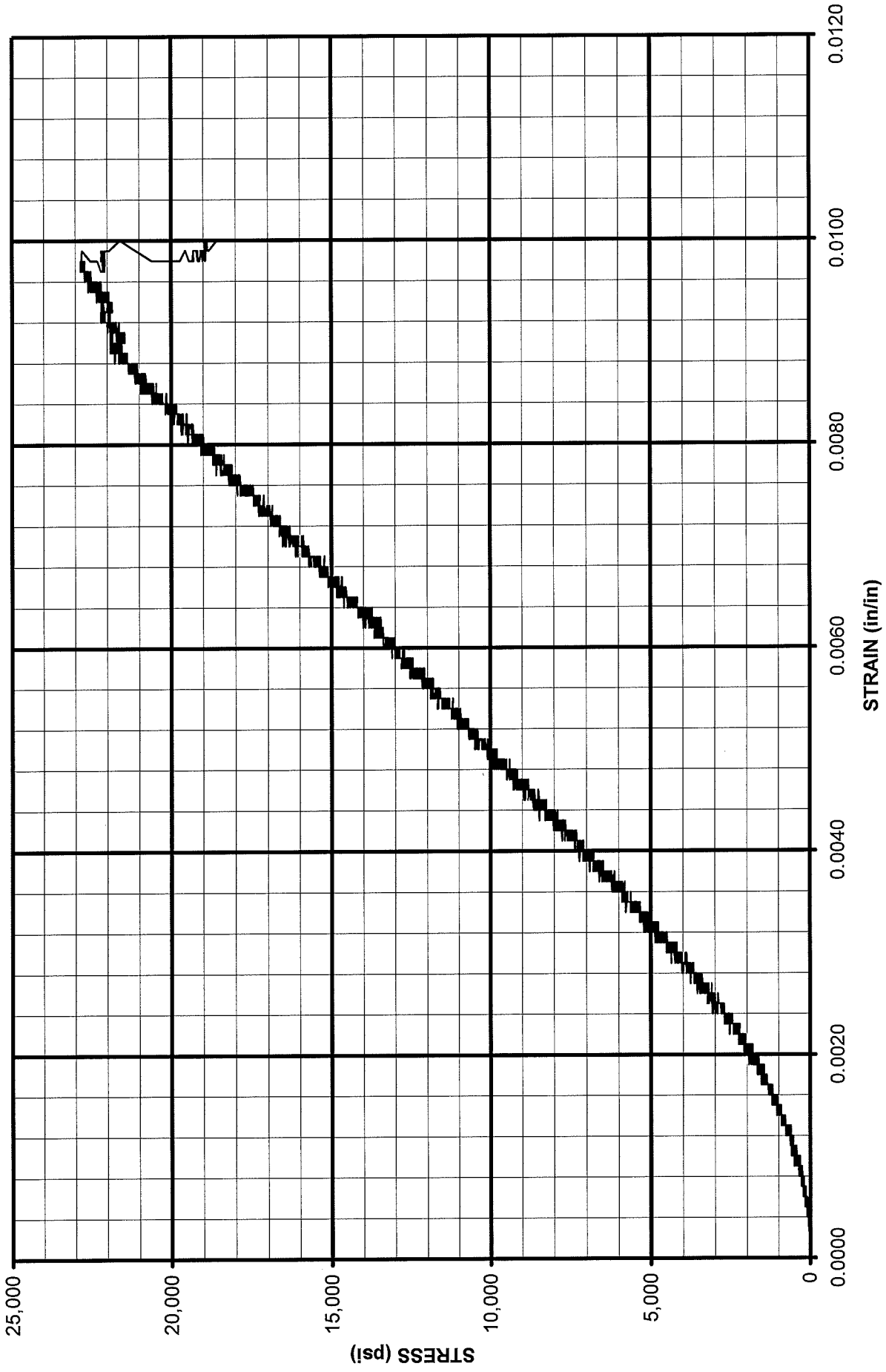
REPORT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT WRITTEN APPROVAL OF THIS LABORATORY.  
 'TM' TEST METHODS CAN BE CROSS-REFERENCED WITH AASHTO AND/OR ASTM, CONTACT THIS LAB FOR ASSISTANCE.

**UNCONFINED COMPRESSIVE STRENGTH of INTACT ROCK CORE  
 ASTM D 7012-10**

PROJECT	Harley Slide OR66 MP 11.8	LAB NUMBER	13-000286
SAMPLE #	HS-01, C-3	DEPTH	26.0' - 26.5'
HEIGHT (in)	4.9715	INITIAL WET WT. (g)	943.4
DIAMETER (in)	2.3939	FINAL DRY WT. (g)	932.9
AREA (in <sup>2</sup> )	4.5009	MOISTURE (%)	1.13
*Length to Diameter (L/D) ratio =	2.1	WET DENSITY (lb/ft <sup>3</sup> )	160.6
Maximum Stress =	22,831.7 psi	DRY DENSITY (lb/ft <sup>3</sup> )	158.8
Strain Rate =	0.10% / Min		

TIME (min)	LOAD (lb)	DEFLECTION (in)	STRAIN (in/in)	STRESS (psi)
0.00	0	0.0000	0.0000	0.0
0.25	3	0.0496	0.0100	0.7
0.50	653	0.0031	0.0006	145.1
0.75	1,388	0.0038	0.0008	308.4
1.00	2,371	0.0052	0.0010	526.8
1.25	3,709	0.0066	0.0013	824.1
1.50	5,429	0.0078	0.0016	1206.2
1.75	7,176	0.0093	0.0019	1594.3
2.00	9,297	0.0102	0.0021	2065.6
2.25	11,736	0.0112	0.0023	2607.5
2.50	14,562	0.0126	0.0025	3235.4
2.75	17,384	0.0142	0.0029	3862.3
3.00	20,406	0.0156	0.0031	4533.8
3.25	23,622	0.0163	0.0033	5248.3
3.50	26,706	0.0182	0.0037	5933.5
3.75	29,970	0.0196	0.0039	6658.7
4.00	33,269	0.0204	0.0041	7391.6
4.25	36,640	0.0218	0.0044	8140.6
4.50	40,008	0.0228	0.0046	8888.9
4.75	43,328	0.0243	0.0049	9626.5
5.00	46,800	0.0254	0.0051	10397.9
5.25	50,117	0.0265	0.0053	11134.9
5.50	53,520	0.0280	0.0056	11891.0
5.75	56,989	0.0292	0.0059	12661.7
6.00	60,232	0.0306	0.0062	13382.2
6.25	63,032	0.0308	0.0062	14004.3
6.50	66,698	0.0326	0.0066	14818.8
6.75	70,035	0.0341	0.0069	15560.2
7.00	73,352	0.0353	0.0071	16297.2
7.25	76,517	0.0364	0.0073	17000.4
7.50	80,286	0.0379	0.0076	17837.8
7.75	83,738	0.0395	0.0079	18604.7
8.00	86,996	0.0402	0.0081	19328.6
8.25	90,318	0.0417	0.0084	20066.7
8.50	93,389	0.0428	0.0086	20749.0
8.75	96,758	0.0438	0.0088	21497.5
9.00	97,697	0.0453	0.0091	21706.1

UNCONFINED COMPRESSIVE STRENGTH OF INTACT ROCK CORE (ASTM D 7012-10)



UNIAXIAL COMPRESSIVE STRENGTH 22,831.7 PSI



**OREGON DEPARTMENT OF TRANSPORTATION  
MATERIALS LABORATORY  
800 AIRPORT RD. SE SALEM, OR 97301-4792**

<b>Contract No.:</b>	<b>EA No.:</b> PE001882 071	<b>Lab No.:</b> <span style="border: 1px solid black; padding: 2px;">13-000287</span>
<b>Project:</b> R3 SLIDE & ROCKFALL - HARLEY SLIDE OR66 MP 11.8	<b>County:</b> CURRY	<b>Data Sheet No.:</b> G 8H80061
<b>Highway:</b>	<b>Org Unit:</b> 3630	<b>FA No.:</b>
<b>Contractor:</b>	<b>Org Unit:</b> 3630	<b>Bid Item:</b>
<b>Project Manager:</b>		<b>Sample No.:</b> C-4
<b>Submitted By:</b> DAN RAKER		<b>Qty Represented:</b>
<b>Material Source:</b> JOBSITE		<b>Sampled By:</b>
<b>Sampled At:</b> HS-02, 33.5-34.1'		
<b>DATE-Sampled:</b> 12/ 7/12	<b>Received:</b> 13/ 2/14	<b>Tested:</b> 13/ 3/ 8
		<b>Date Reported:</b> 13/ 3/ 8

**Test Results For: ROCK CORE**

TM102 Liquid Lim: TM103 Plastic Ind: TM107 Resistivity: Ω pH: TM111 Spec Grav: TM117 Torvane Shear/ Pocket Pen.  TM127 N. Moisture: 0.95 % Dry Density rec'd: 156.54 PC Wet Density rec'd: 158.03 PC TM157 Slake Durab: Water Cont:  TM512 Pct Organic:
---

Dry Density	Moisture
Max Density: Optimum Moisture:	

Sieve	Passing
3 "	
2	
1.5	
1	
3/4	
1/2	
3/8	
1/4	
# 4	
10	
40	
200	

Quantity	Method	Cost
1	D7012	\$ 58.00
1	T265	12.00
1	154X	29.00

Hydrometer Analysis	Subsample	Total Sample
Coarse Sand= 4.75 to 2.0 mm:		
Medium Sand= 2.0 to .42 mm:		
Fine Sand= .42 to .074 mm:		
Silt= .074 to .02 mm:		
Silt= .02 to .005 mm:		
Clay= .005 to .002 mm:		
Clay= Less Than .002 mm:		

**REMARKS:**  
 INFORMATION ONLY  
 UNIAXIAL COMPRESSIVE STRENGTH = 24,783.0 PSI  
 \*

**TOTAL CHARGES: \$ 0.00**

**KEVIN BROPHY - LABORATORY SERVICES MANAGER**

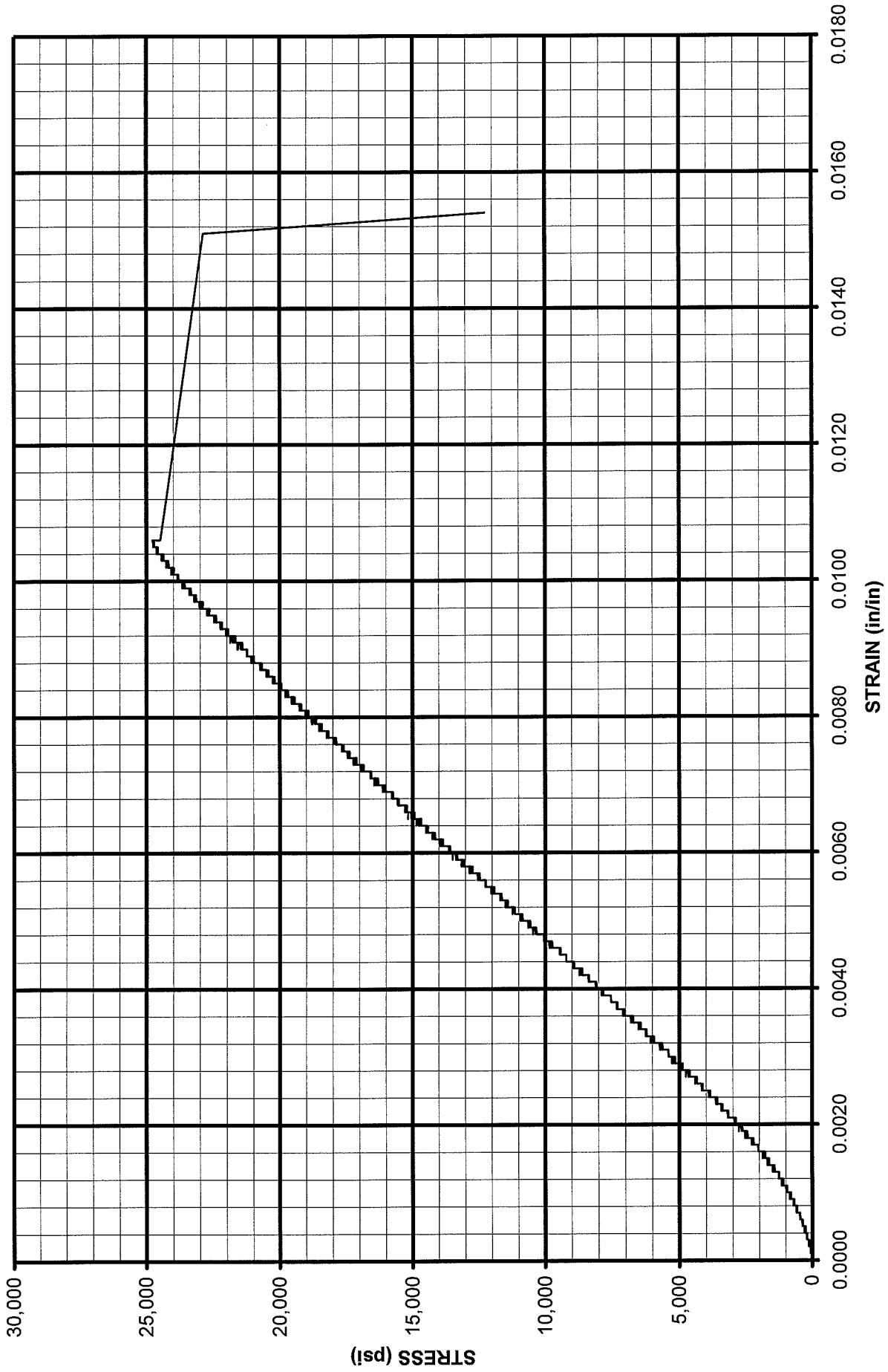
REPORT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT WRITTEN APPROVAL OF THIS LABORATORY.  
 'TM' TEST METHODS CAN BE CROSS-REFERENCED WITH AASHTO AND/OR ASTM, CONTACT THIS LAB FOR ASSISTANCE.

**UNCONFINED COMPRESSIVE STRENGTH of INTACT ROCK CORE  
 ASTM D 7012-10**

PROJECT	Harley Slide OR66 MP 11.8	LAB NUMBER	13-000287
SAMPLE #	HS-02, C-4	DEPTH	33.5' - 34.1'
HEIGHT (in)	5.7335	INITIAL WET WT. (g)	1,071.0
DIAMETER (in)	2.3944	FINAL DRY WT. (g)	1,060.9
AREA (in <sup>2</sup> )	4.5028	MOISTURE (%)	0.95
*Length to Diameter (L/D) ratio =	2.4	WET DENSITY (lb/ft <sup>3</sup> )	158.0
Maximum Stress =	24,783.0 psi	DRY DENSITY (lb/ft <sup>3</sup> )	156.5
Strain Rate =	0.15% / Min		

TIME (min)	LOAD (lb)	DEFLECTION (in)	STRAIN (in/in)	STRESS (psi)
0.00	0	0.0000	0.0000	0.0
0.25	37	0.0882	0.0154	8.2
0.50	1,743	0.0034	0.0006	387.1
0.75	2,991	0.0048	0.0008	664.3
1.00	4,558	0.0063	0.0011	1012.3
1.25	6,433	0.0077	0.0013	1428.7
1.50	8,493	0.0091	0.0016	1886.2
1.75	10,826	0.0105	0.0018	2404.3
2.00	13,385	0.0120	0.0021	2972.6
2.25	16,060	0.0135	0.0024	3566.7
2.50	18,922	0.0148	0.0026	4202.3
2.75	21,846	0.0162	0.0028	4851.6
3.00	24,770	0.0177	0.0031	5501.0
3.25	27,720	0.0191	0.0033	6156.2
3.50	30,779	0.0206	0.0036	6835.5
3.75	33,809	0.0217	0.0038	7508.4
4.00	36,880	0.0234	0.0041	8190.5
4.25	39,982	0.0249	0.0043	8879.4
4.50	43,131	0.0263	0.0046	9578.7
4.75	46,194	0.0275	0.0048	10258.9
5.00	49,263	0.0291	0.0051	10940.5
5.25	52,366	0.0305	0.0053	11629.7
5.50	55,469	0.0320	0.0056	12318.8
5.75	58,585	0.0332	0.0058	13010.8
6.00	61,734	0.0348	0.0061	13710.1
6.25	64,755	0.0363	0.0063	14381.1
6.50	67,842	0.0378	0.0066	15066.6
6.75	70,853	0.0393	0.0069	15735.3
7.00	73,857	0.0406	0.0071	16402.5
7.25	76,866	0.0419	0.0073	17070.7
7.50	79,776	0.0434	0.0076	17717.0
7.75	82,795	0.0450	0.0078	18387.4
8.00	85,643	0.0464	0.0081	19019.9
8.25	88,563	0.0478	0.0083	19668.4
8.50	91,484	0.0492	0.0086	20317.1
8.75	94,306	0.0507	0.0088	20943.9
9.00	97,098	0.0521	0.0091	21563.9

UNCONFINED COMPRESSIVE STRENGTH OF INTACT ROCK CORE (ASTM D 7012-10)



UNIAXIAL COMPRESSIVE STRENGTH 24,783.0 PSI

**Contract No.:** EA No.: PE001882 071 Lab No.: 13-000288  
**Project:** R3 SLIDE & ROCKFALL - HARLEY SLIDE OR66 MP 11.8  
**Highway:** County: CURRY Data Sheet No.: G 8H80061  
**Contractor:** FA No.:  
**Project Manager:** Org Unit: 3630 Bid Item:  
**Submitted By:** DAN RAKER Org Unit: 3630 Sample No.: C-1  
**Material Source:** JOBSITE Qty Represented:  
**Sampled At:** HS-03, 35.1-35.6' Sampled By:  
**DATE-Sampled:** 12/ 7/12 **Received:** 13/ 2/14 **Tested:** 13/ 3/22 **Date Reported:** 13/ 3/22

Test Results For: ROCK CORE

TM102 Liquid Lim:  
TM103 Plastic Ind:  
TM107 Resistivity:  $\Omega$   
pH:  
TM111 Spec Grav:  
TM117  
Torvane Shear/ Pocket Pen.  
  
TM127 N. Moisture: 1.50 %  
Dry Density rec'd: 149.00 PC  
Wet Density rec'd: 151.23 PC  
TM157 Slake Durab:  
Water Cont:  
  
TM512 Pct Organic:

Dry Density	Moisture
Max Density:	
Optimum Moisture:	

Sieve	Passing
3 "	
2	
1.5	
1	
3/4	
1/2	
3/8	
1/4	
# 4	
10	
40	
200	

Quantity	Method	Cost
1	D7012	\$ 58.00
1	T265	12.00
1	154X	29.00

Hydrometer Analysis	Subsample	Total Sample
Coarse Sand= 4.75 to 2.0 mm:		
Medium Sand= 2.0 to .42 mm:		
Fine Sand= .42 to .074 mm:		
Silt= .074 to .02 mm:		
Silt= .02 to .005 mm:		
Clay= .005 to .002 mm:		
Clay= Less Than .002 mm:		

**REMARKS:**  
INFORMATION ONLY  
UNIAXIAL COMPRESSIVE STRENGTH = 9,370.8 PSI  
\*  
**KEVIN BROPHY - LABORATORY SERVICES MANAGER**

**TOTAL CHARGES: \$ 0.00**

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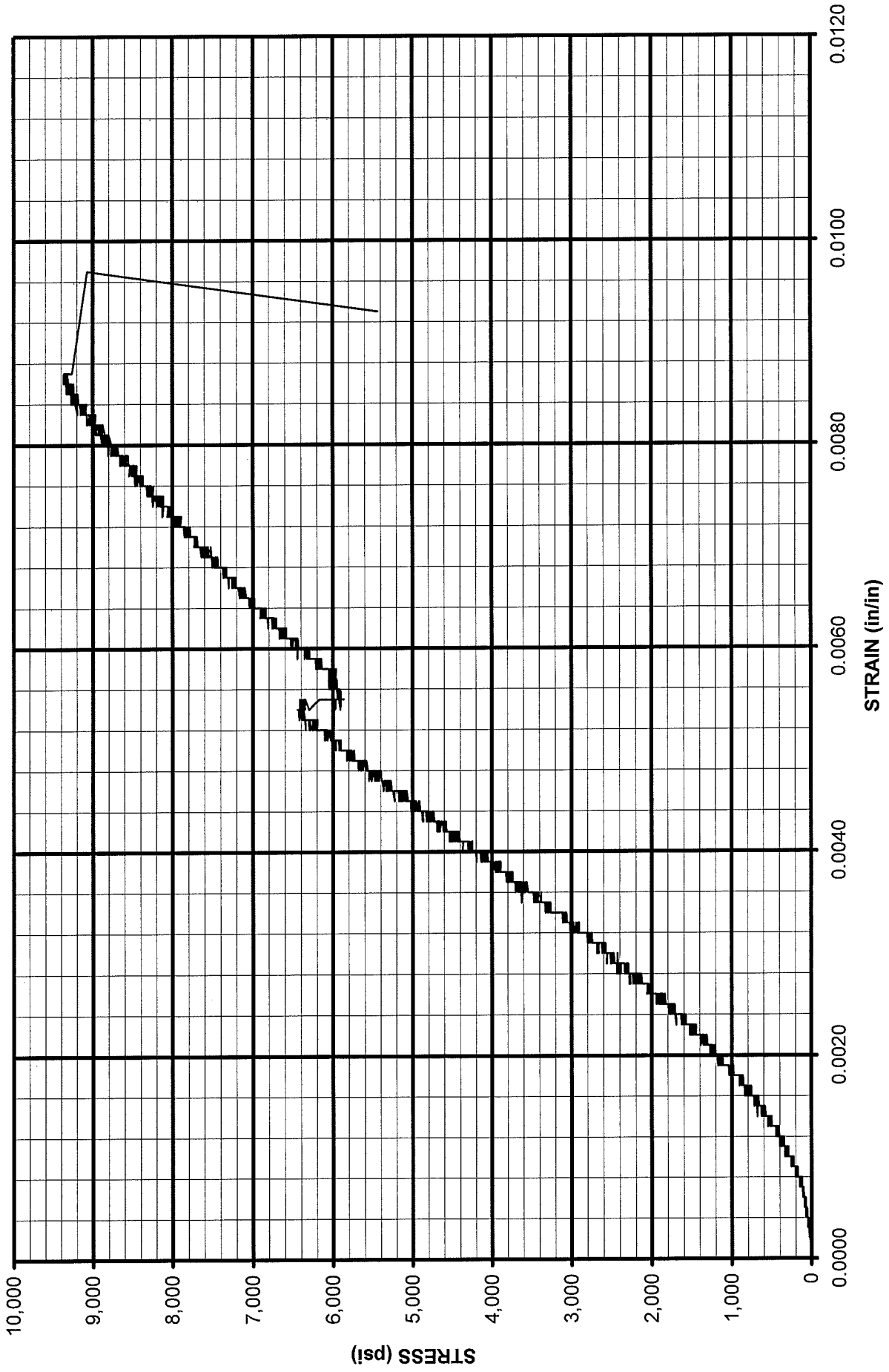
**UNCONFINED COMPRESSIVE STRENGTH of INTACT ROCK CORE  
 ASTM D 7012-10**

PROJECT	Harley Slide OR66 MP 11.8	LAB NUMBER	13-000288
SAMPLE #	HS-03, C-1	DEPTH	35.1' - 35.6'
HEIGHT (in)	5.3351	INITIAL WET WT. (g)	950.1
DIAMETER (in)	2.3900	FINAL DRY WT. (g)	936.1
AREA (in <sup>2</sup> )	4.4863	MOISTURE (%)	1.50
*Length to Diameter (L/D) ratio =	2.2	WET DENSITY (lb/ft <sup>3</sup> )	151.2
Maximum Stress =	9,370.8 psi	DRY DENSITY (lb/ft <sup>3</sup> )	149.0
Strain Rate =	0.14% / Min		

TIME (min)	LOAD (lb)	DEFLECTION (in)	STRAIN (in/in)	STRESS (psi)
0.00	0	0.0000	0.0000	0.0
0.25	14	0.0494	0.0093	3.1
0.50	718	0.0043	0.0008	160.0
0.75	1,471	0.0057	0.0011	327.9
1.00	2,450	0.0075	0.0014	546.1
1.25	3,720	0.0091	0.0017	829.2
1.50	5,233	0.0103	0.0019	1166.4
1.75	6,818	0.0120	0.0022	1519.7
2.00	8,722	0.0138	0.0026	1944.1
2.25	10,716	0.0156	0.0029	2388.6
2.50	12,720	0.0169	0.0032	2835.3
2.75	14,972	0.0187	0.0035	3337.3
3.00	17,181	0.0201	0.0038	3829.7
3.25	19,437	0.0217	0.0041	4332.5
3.50	21,851	0.0232	0.0043	4870.6
3.75	23,961	0.0251	0.0047	5340.9
4.00	26,117	0.0266	0.0050	5821.5
4.25	28,240	0.0282	0.0053	6294.7
4.50	26,824	0.0298	0.0056	5979.1
4.75	27,981	0.0314	0.0059	6237.0
5.00	29,852	0.0328	0.0061	6654.0
5.25	31,690	0.0346	0.0065	7063.7
5.50	33,126	0.0364	0.0068	7383.8
5.75	34,779	0.0379	0.0071	7752.3
6.00	36,351	0.0396	0.0074	8102.7
6.25	37,880	0.0411	0.0077	8443.5
6.50	39,315	0.0426	0.0080	8763.3
6.75	40,739	0.0443	0.0083	9080.8
7.00	41,918	0.0457	0.0086	9343.6
7.07	24,363	0.0494	0.0093	5430.5

\*2.0 to 2.5 L/D is required

UNCONFINED COMPRESSIVE STRENGTH OF INTACT ROCK CORE (ASTM D 7012-10)



UNIAXIAL COMPRESSIVE STRENGTH 9,370.8 PSI

**OREGON DEPARTMENT OF TRANSPORTATION**

**MATERIALS LABORATORY**  
800 AIRPORT RD. SE SALEM, OR 97301-4792

Page 1 of 3  
(503) 986-3000  
FAX (503) 986-3096

<b>Contract No.:</b>	<b>EA No.:</b> PE001882 071	<b>Lab No.:</b> 13-000289
Project: R3 SLIDE & ROCKFALL - HARLEY SLIDE OR66 MP 11.8	County: CURRY	<b>Data Sheet No.:</b> G 8H80061
Highway:	Org Unit: 3630	FA No.:
Contractor:	Org Unit: 3630	Bid Item:
Project Manager:		Sample No.: C-4
Submitted By: DAN RAKER		Qty Represented:
Material Source: JOBSITE		Sampled By:
Sampled At: HS-03, 44.0-44.6'		
DATE-Sampled: 12/ 7/12	Received: 13/ 2/14	Tested: 13/ 3/22
		Date Reported: 13/ 3/22

Test Results For: **ROCK CORE**

TM102 Liquid Lim:  
 TM103 Plastic Ind:  
 TM107 Resistivity: Ω  
                     pH:  
 TM111 Spec Grav:  
 TM117  
 Torvane Shear/ Pocket Pen.  
  
 TM127 N. Moisture: 0.76 %  
 Dry Density rec'd: 156.86 PC  
 Wet Density rec'd: 158.05 PC  
 TM157 Slake Durab:  
     Water Cont:  
  
 TM512 Pct Organic:

Dry Density	Moisture
Max Density:	
Optimum Moisture:	

Sieve	Passing
3"	
2	
1.5	
1	
3/4	
1/2	
3/8	
1/4	
# 4	
10	
40	
200	

Quantity	Method	Cost
1	D7012	\$ 58.00
1	T265	12.00
1	154X	29.00

Hydrometer Analysis	Subsample	Total Sample
Coarse Sand= 4.75 to 2.0 mm:		
Medium Sand= 2.0 to .42 mm:		
Fine Sand= .42 to .074 mm:		
Silt= .074 to .02 mm:		
Silt= .02 to .005 mm:		
Clay= .005 to .002 mm:		
Clay= Less Than .002 mm:		

**TOTAL CHARGES: \$ 0.00**

**REMARKS:**  
 INFORMATION ONLY  
 UNIAXIAL COMPRESSIVE STRENGTH = 21,399.1 PSI  
 \*

**KEVIN BROPHY - LABORATORY SERVICES MANAGER**

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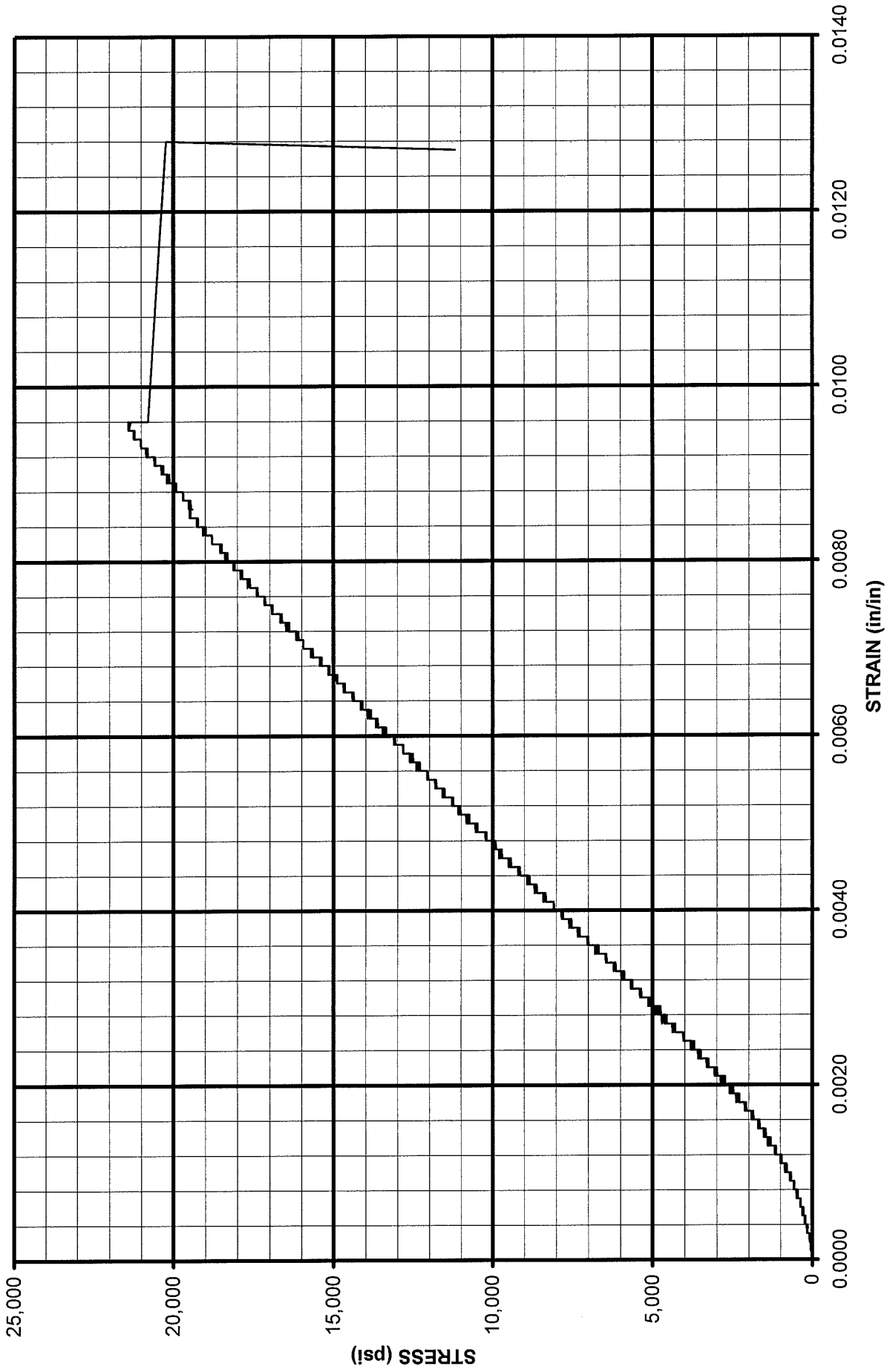
**UNCONFINED COMPRESSIVE STRENGTH of INTACT ROCK CORE  
ASTM D 7012-10**

PROJECT	Harley Slide OR66 MP 11.8	LAB NUMBER	13-000289
SAMPLE #	HS-03, C-4	DEPTH	44.0' - 44.6'
HEIGHT (in)	5.7891	INITIAL WET WT. (g)	1,082.0
DIAMETER (in)	2.3950	FINAL DRY WT. (g)	1,073.8
AREA (in <sup>2</sup> )	4.5051	MOISTURE (%)	0.76
*Length to Diameter (L/D) ratio =	2.4	WET DENSITY (lb/ft <sup>3</sup> )	158.0
Maximum Stress =	21,399.1 psi	DRY DENSITY (lb/ft <sup>3</sup> )	156.8
Strain Rate =	0.16% / Min		

TIME (min)	LOAD (lb)	DEFLECTION (in)	STRAIN (in/in)	STRESS (psi)
0.00	0	0.0000	0.0000	0.0
0.25	26	0.0734	0.0127	5.8
0.50	1,777	0.0039	0.0007	394.4
0.75	3,272	0.0057	0.0010	726.3
1.00	5,345	0.0074	0.0013	1186.4
1.25	7,818	0.0091	0.0016	1735.4
1.50	10,666	0.0109	0.0019	2367.5
1.75	13,932	0.0126	0.0022	3092.5
2.00	17,402	0.0143	0.0025	3862.7
2.25	20,921	0.0159	0.0027	4643.8
2.50	24,547	0.0178	0.0031	5448.7
2.75	28,219	0.0196	0.0034	6263.8
3.00	31,937	0.0213	0.0037	7089.1
3.25	35,542	0.0230	0.0040	7889.3
3.50	39,128	0.0248	0.0043	8685.3
3.75	42,767	0.0265	0.0046	9493.0
4.00	46,416	0.0281	0.0049	10303.0
4.25	49,946	0.0300	0.0052	11086.5
4.50	53,526	0.0318	0.0055	11881.2
4.75	57,026	0.0335	0.0058	12658.1
5.00	60,519	0.0352	0.0061	13433.4
5.25	63,940	0.0370	0.0064	14192.8
5.50	67,439	0.0387	0.0067	14969.5
5.75	70,875	0.0405	0.0070	15732.2
6.00	74,175	0.0422	0.0073	16464.7
6.25	77,472	0.0439	0.0076	17196.5
6.50	80,793	0.0456	0.0079	17933.7
6.75	83,913	0.0473	0.0082	18626.2
7.00	86,895	0.0491	0.0085	19288.1
7.25	89,023	0.0509	0.0088	19760.5
7.50	92,054	0.0526	0.0091	20433.3
7.75	94,870	0.0542	0.0094	21058.4
7.94	50,330	0.0734	0.0127	11171.8

\*2.0 to 2.5 L/D is required

UNCONFINED COMPRESSIVE STRENGTH OF INTACT ROCK CORE (ASTM D 7012-10)

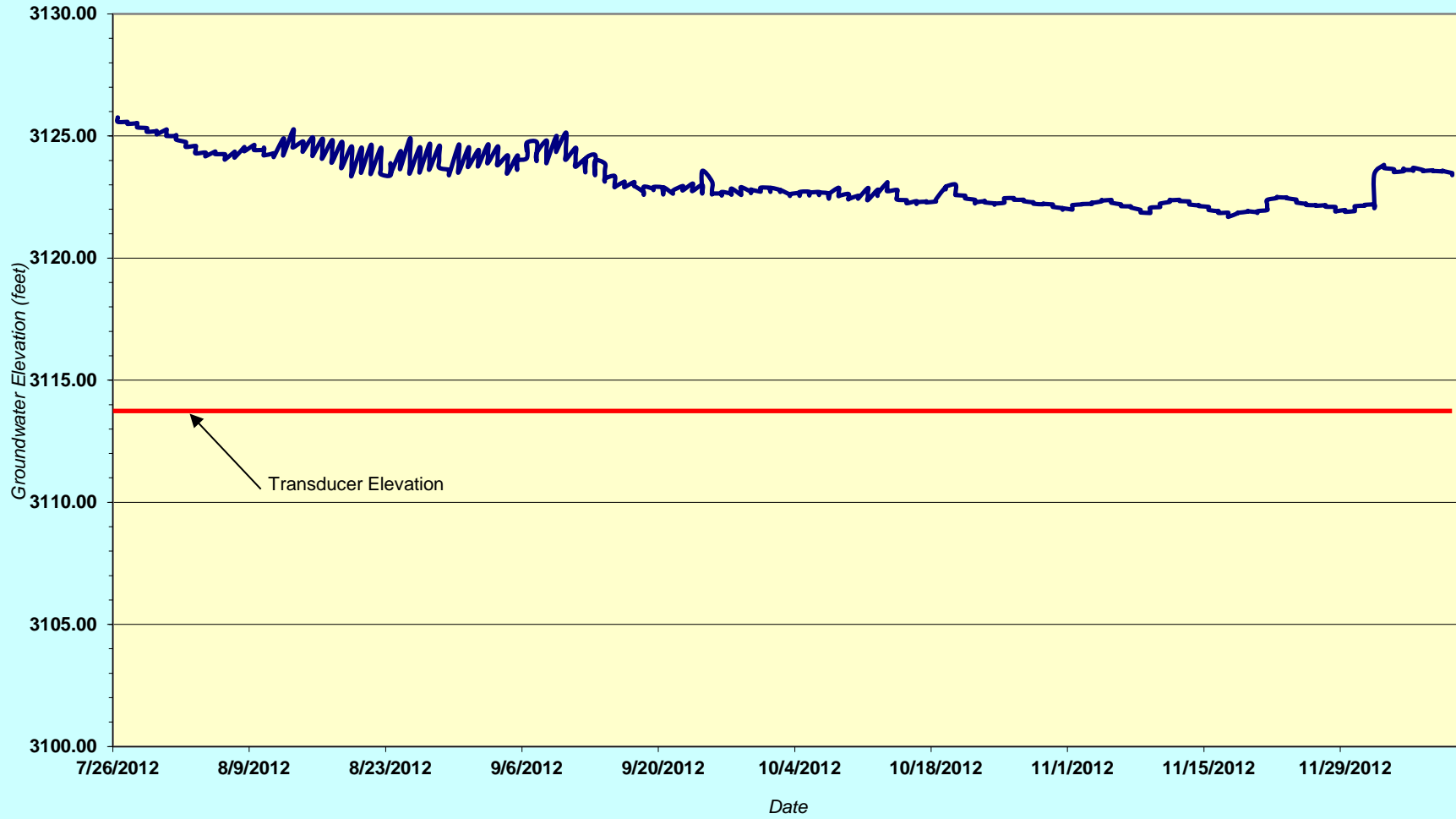


UNIAXIAL COMPRESSIVE STRENGTH 21,399.1 PSI

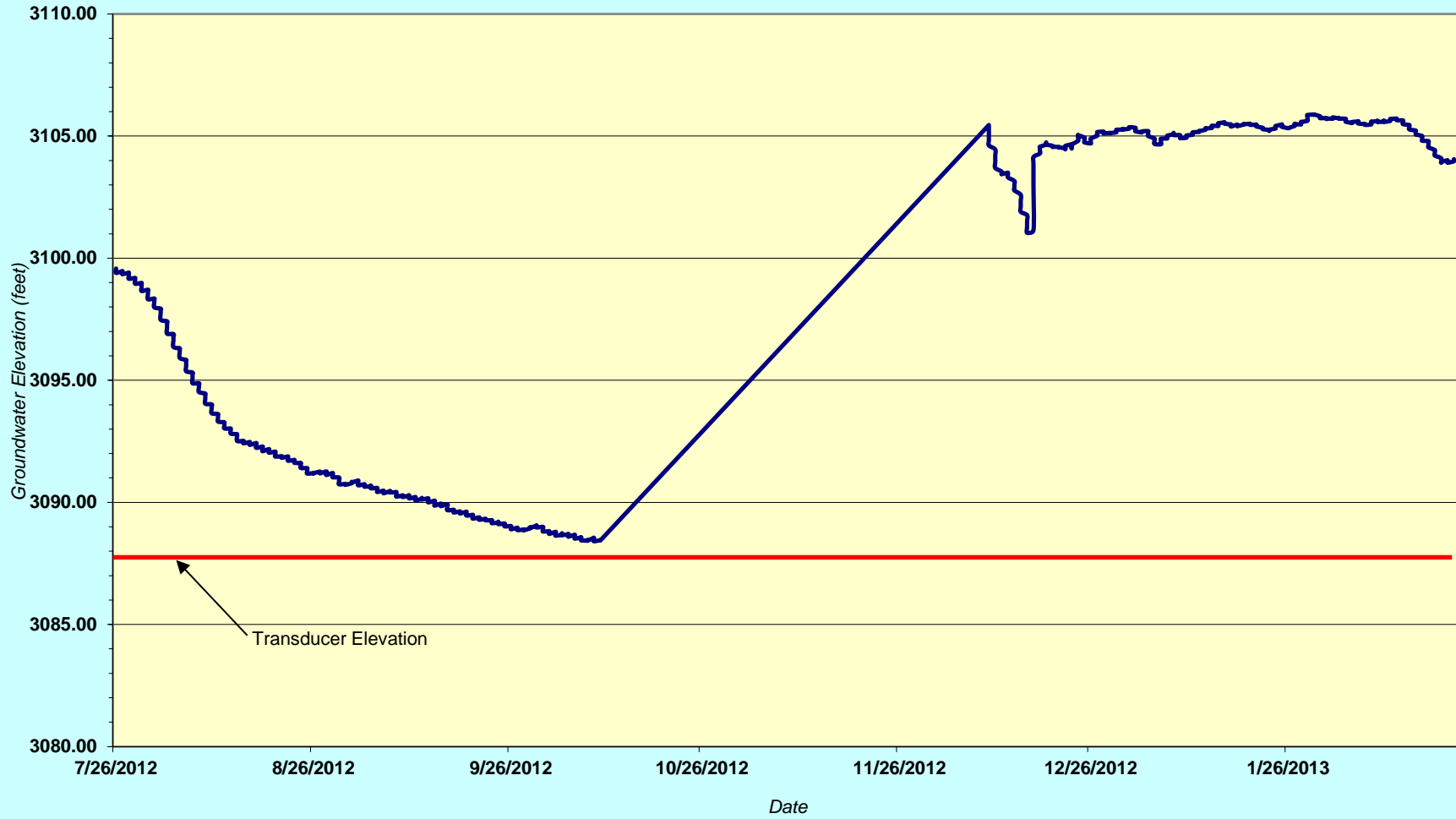
## **APPENDIX E**

### **Groundwater Data**

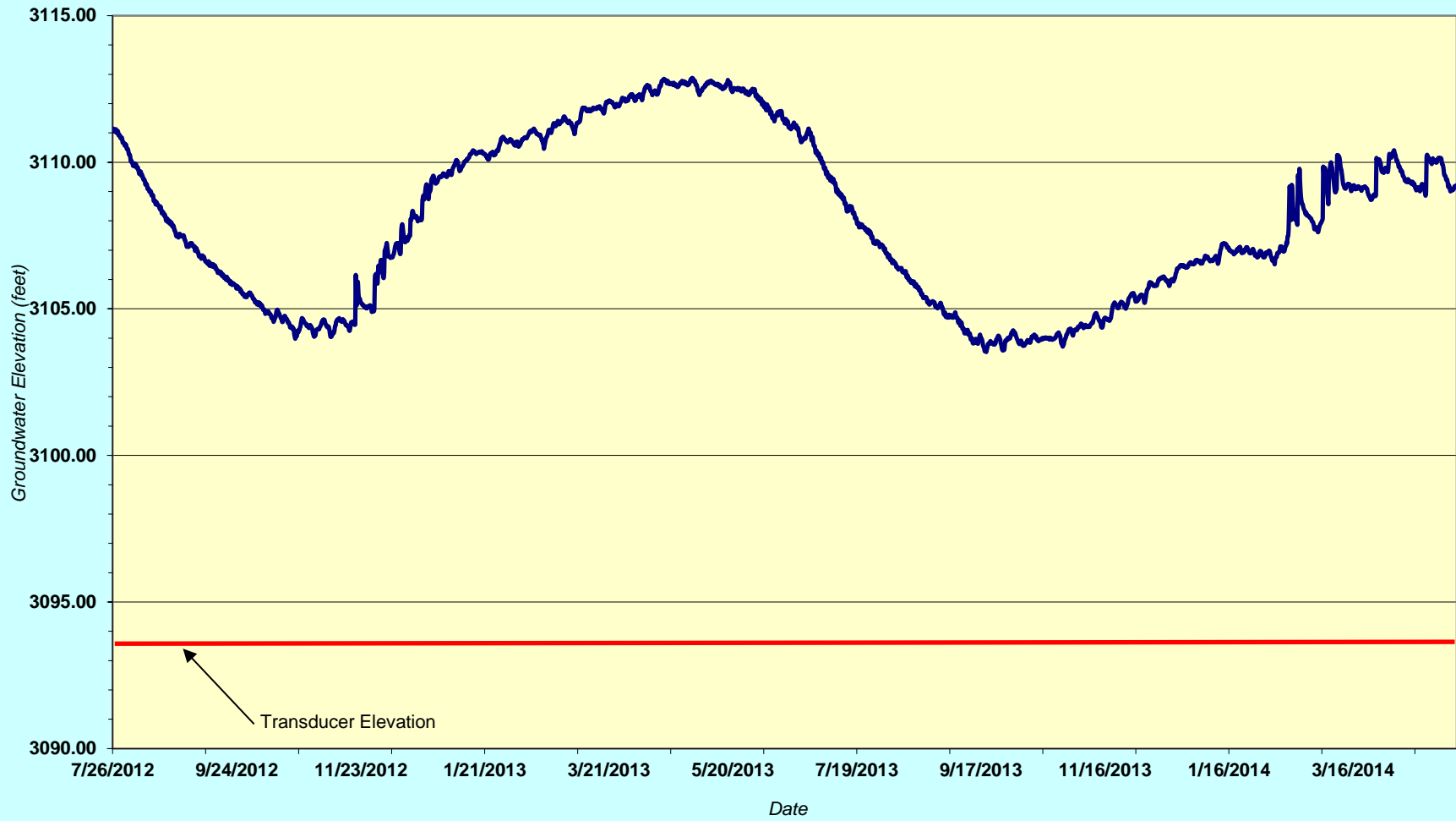
HS-01  
Collar Elevation: 3132.472 (ft)  
Transducer Elevation: 3113.472 (ft)



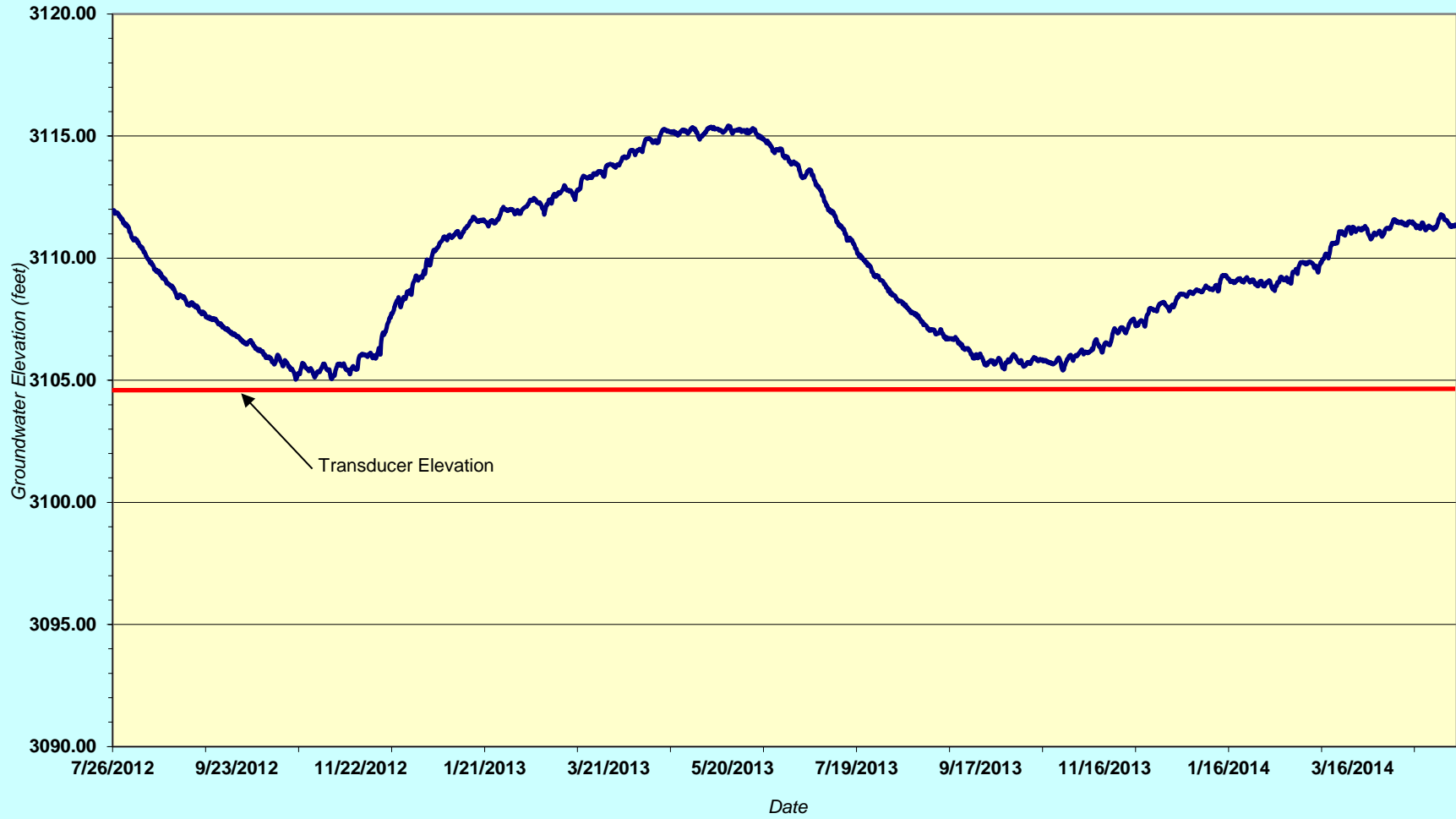
**HS-02**  
Collar Elevation: 3106.912 (ft)  
Transducer Elevation: 3087.912 (ft)



**HS-03**  
Collar Elevation: 3112.478 (ft)  
Transducer Elevation: 3093.478 (ft)



**HS-04**  
Collar Elevation: 3141.466 (ft)  
Transducer Elevation: 3104.466 (ft)



## **APPENDIX F**

### **Slope Inclinometer Data**

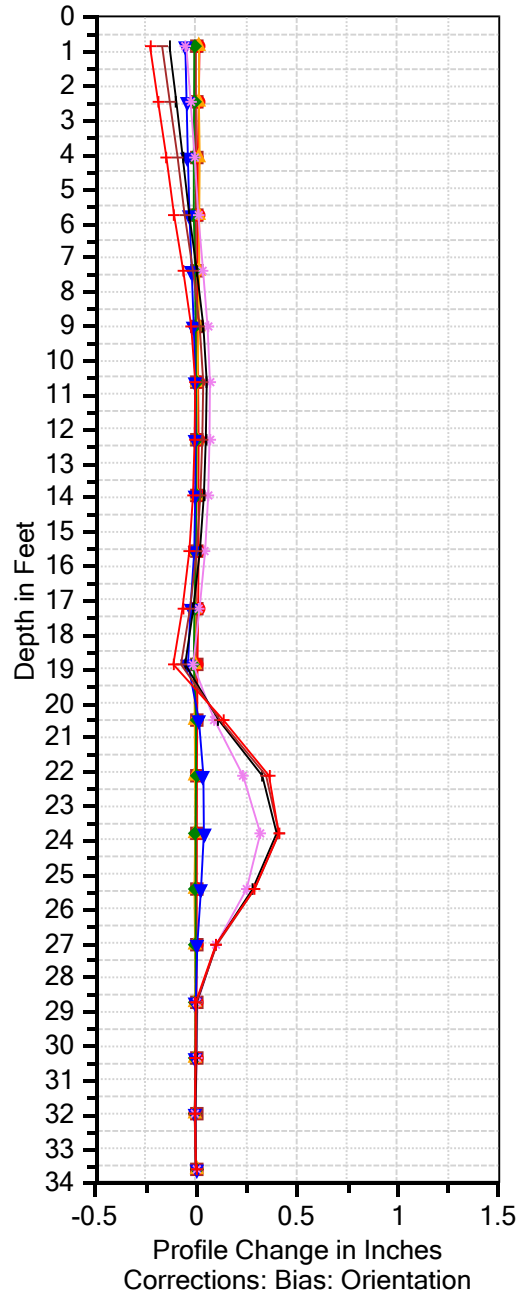
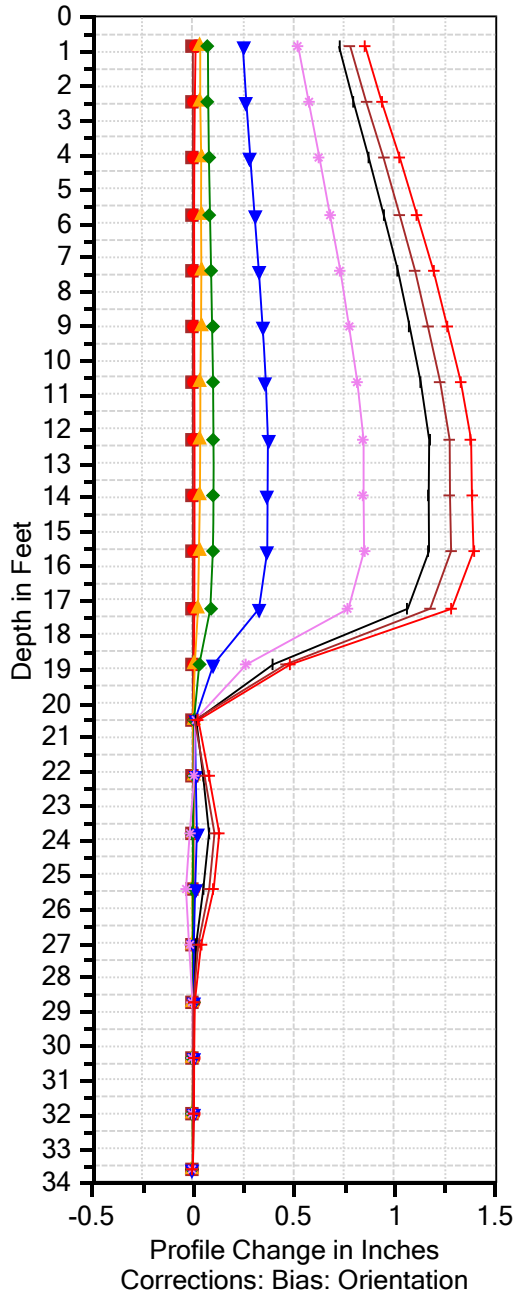


OR66 HS-01 A

OR66 HS-01 B

■ 7/19/2012    ● 7/19/2012    ▲ 7/24/2012  
◆ 8/1/2012    ▼ 8/22/2012    ✦ 9/24/2012  
+ 11/2/2012    + 12/10/2012    + 2/5/2013

■ 7/19/2012    ● 7/19/2012    ▲ 7/24/2012  
◆ 8/1/2012    ▼ 8/22/2012    ✦ 9/24/2012  
+ 11/2/2012    + 12/10/2012    + 2/5/2013



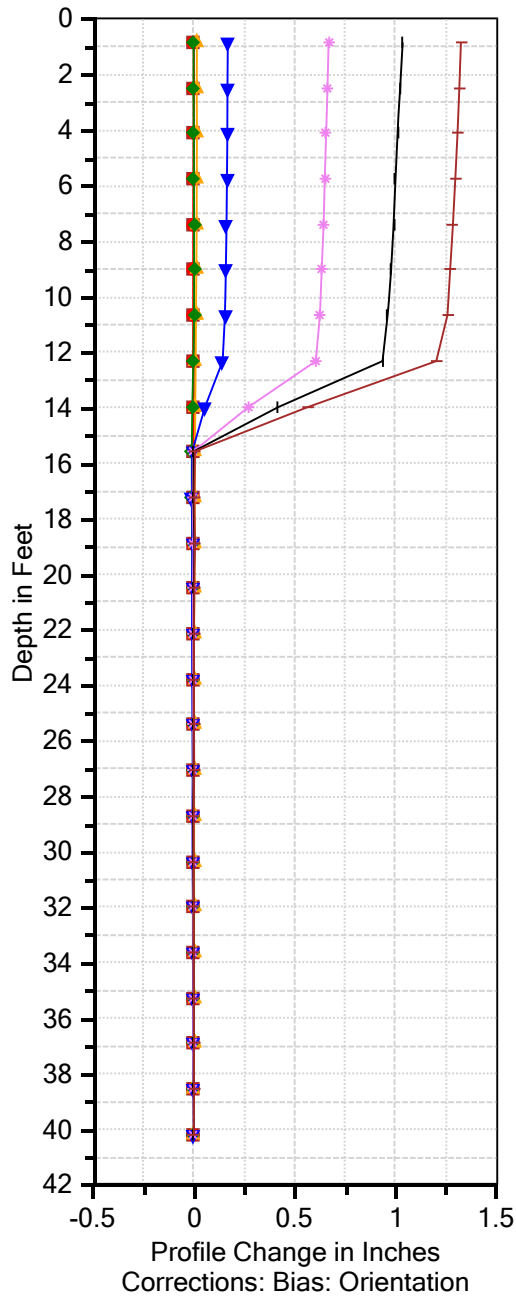
Harley Slide  
 Green Springs Hwy #21  
 (OR 66) MP 11.8  
 Jackson County, OR



A0: 309 (Corrected)  
 Stick Up (Applied): 1.64 ft.  
 Sheared @ 27.0'  
 2/5/2013

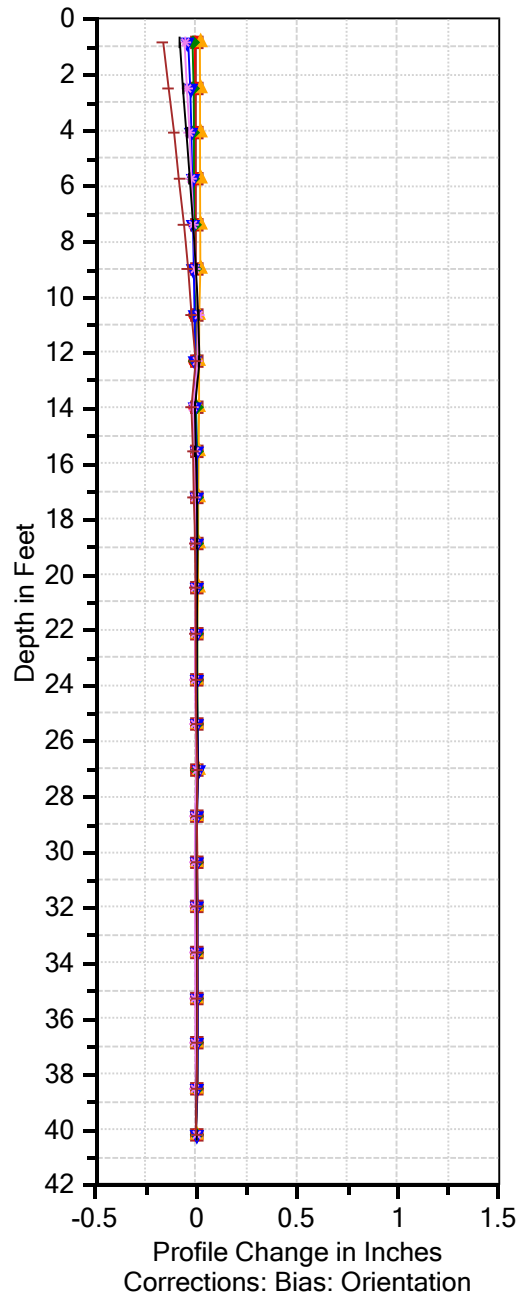
### OR66 HS-02 A

■ 7/19/2012    ● 7/19/2012    ▲ 7/24/2012  
◆ 8/1/2012    ▼ 8/22/2012    ✦ 9/24/2012  
+ 11/2/2012    — 1/17/2013



### OR66 HS-02 B

■ 7/19/2012    ● 7/19/2012    ▲ 7/24/2012  
◆ 8/1/2012    ▼ 8/22/2012    ✦ 9/24/2012  
+ 11/2/2012    — 1/17/2013



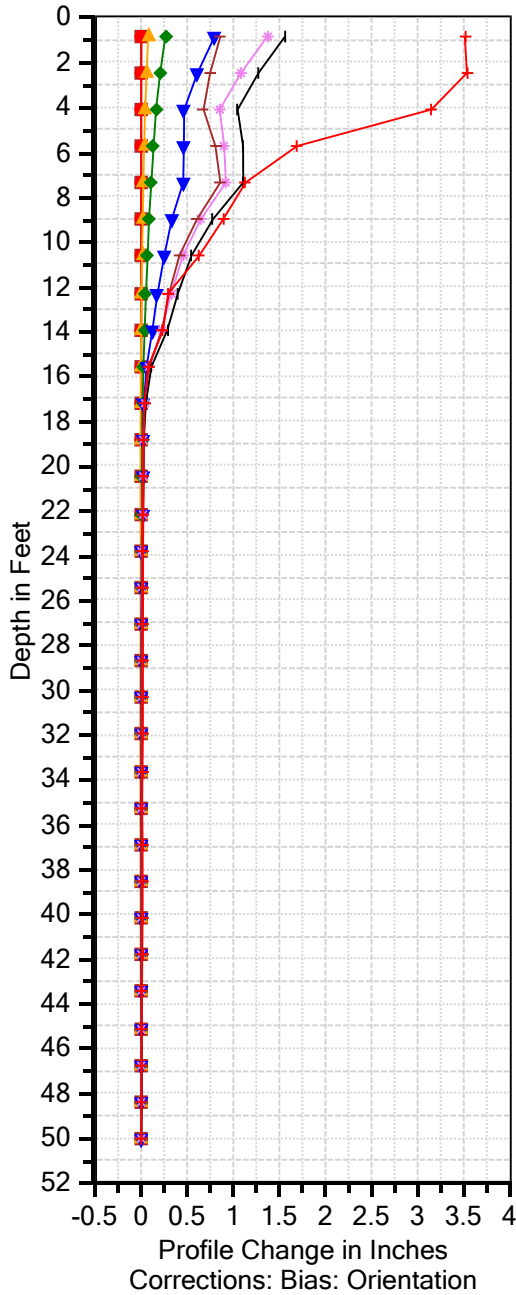
Harley Slide  
 Green Springs Hwy #21  
 (OR 66) MP 11.8  
 Jackson County, OR



A0: 321 (Corrected)  
 Stick Up (Applied): 1.64 ft.  
 Sheared @ 14.0'  
 1/17/2013

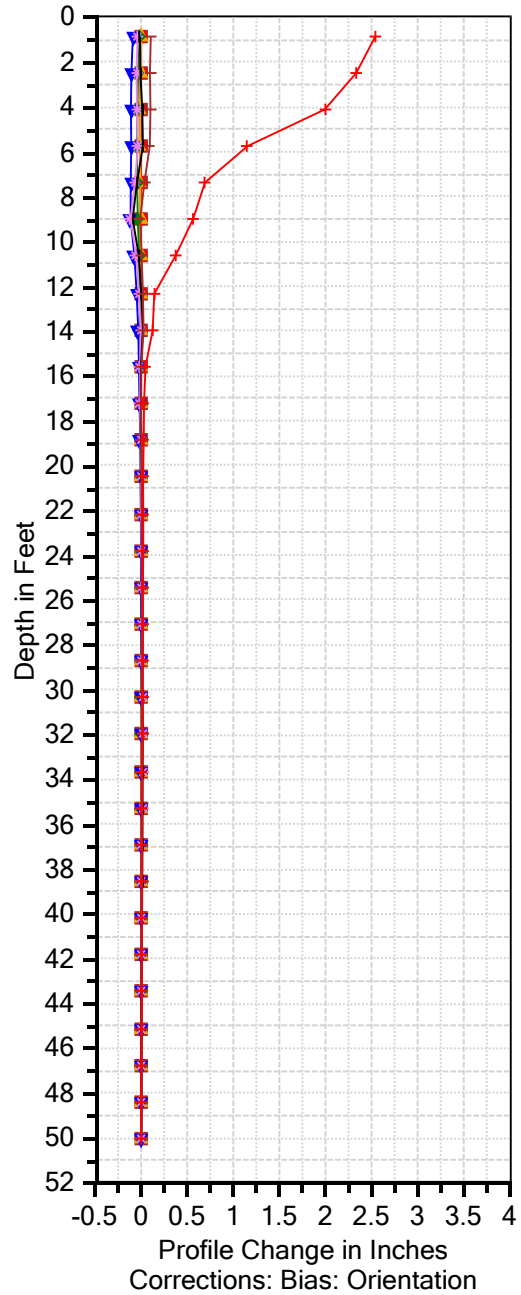
OR66 HS-03 A

■ 7/19/2012    ● 7/19/2012    ▲ 7/24/2012  
◆ 8/1/2012    ▼ 8/22/2012    ✦ 9/24/2012  
+ 11/2/2012    — 1/17/2013    + 5/2/2014



OR66 HS-03 B

■ 7/19/2012    ● 7/19/2012    ▲ 7/24/2012  
◆ 8/1/2012    ▼ 8/22/2012    ✦ 9/24/2012  
+ 11/2/2012    — 1/17/2013    + 5/2/2014

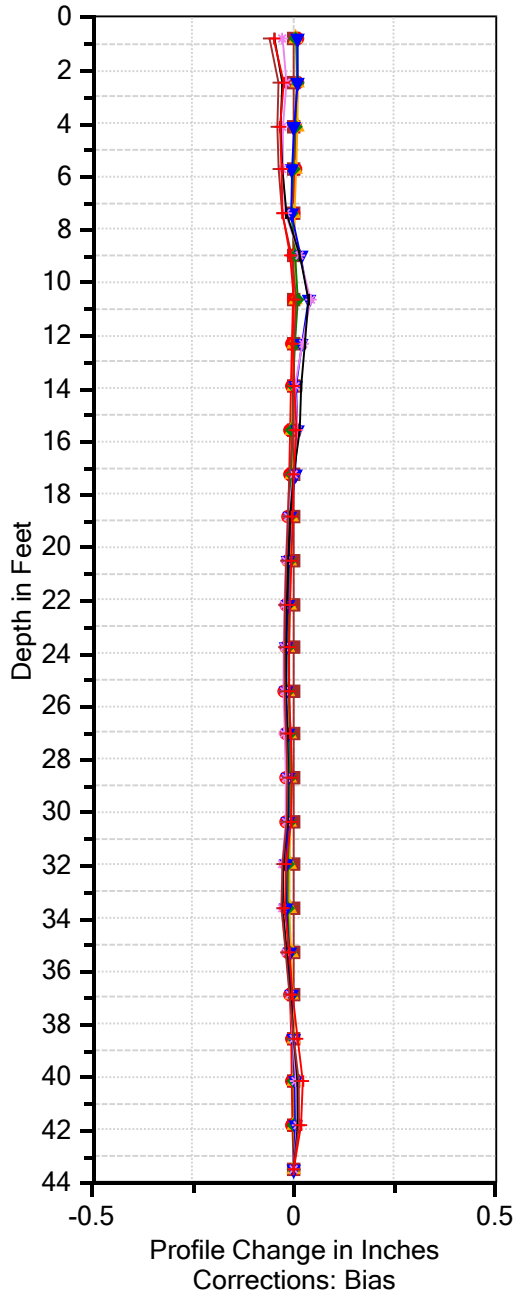
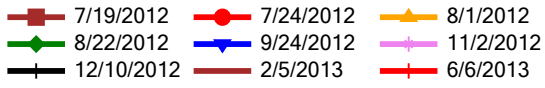


Harley Slide  
 Green Springs Hwy #21  
 (OR 66) MP 11.8  
 Jackson County, OR

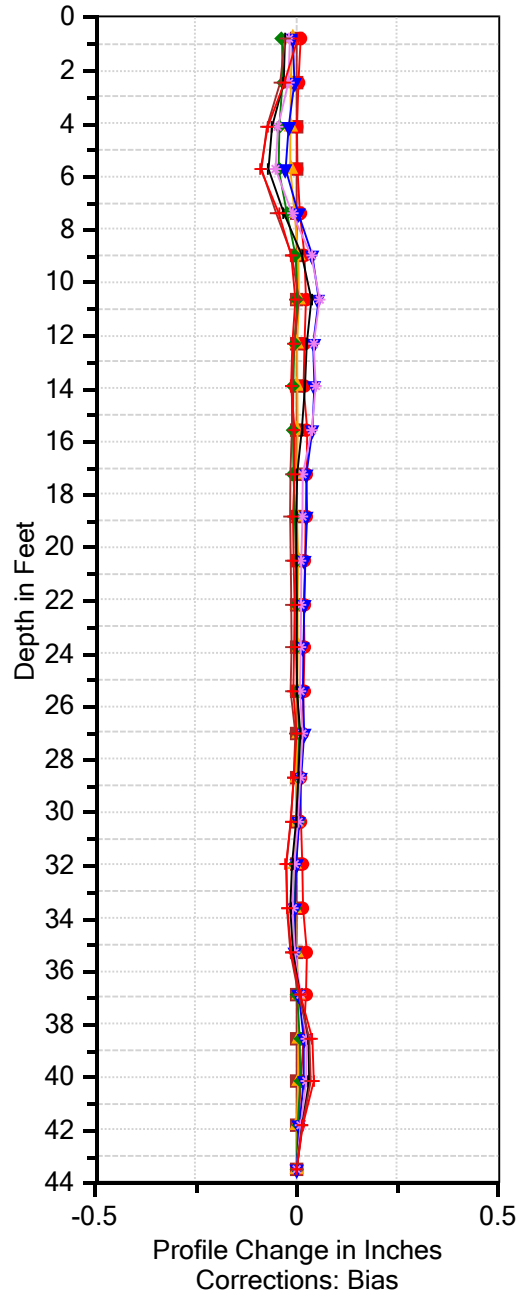
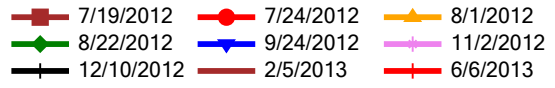


A0: 305 (Corrected)  
 Stick Up (Applied): 1.64 ft.  
 Sheared @ 15.5'  
 5/2/2014

OR66 HS-04 A



OR66 HS-04 B



Harley Slide  
Green Springs Hwy #21  
(OR 66) MP 11.8  
Jackson County, OR



A0: 343  
Stick Up (Applied): 1.64 ft.