



Real-World Geotechnical Solutions
• Investigation
• Design
• Construction Support

February 8, 2011

Project No. 09-1796

V and K Construction
10308 NW Helvetia Road
Hillsboro, OR 97124

Attention: Kerry Nussbaumer (Voice/Fax 503-647-5606)

**RE: FINAL SUMMARY REPORT
MULTNOMAH COUNTY CASE FILE #T2-09-050
NW MCNAMEE ROAD SLOPE REPAIR
13225 NW MCNAMEE ROAD
MULTNOMAH COUNTY, OREGON**

Reference: Geotechnical Evaluation of Slope Instability and Slope Repair, 13225 NW McNamee Road, Multnomah, County, Oregon, GeoPacific Engineering, Inc., August 4, 2009.

GeoPacific Engineering Inc. (GeoPacific) performed on-call construction monitoring services during construction of the above referenced project to repair a private driveway roadbed. The purpose of our monitoring was to verify that various elements of the construction were performed in accordance with the local standard of practice and our recommendations. Summary field inspection reports and density test results are attached. A final visual observation of the site was performed on February 3, 2011.

During construction, representatives of GeoPacific performed numerous on-call site visits to observe construction activities during mass grading. Field visits were performed between August 25, 2009 and January 4, 2011. During the fill placement process, GeoPacific observed an excavated keyway and benching into the hillside. Two subdrains were installed beneath the fill mass, one in the fill buttress keyway and a second intermediate subdrain on cut bench at about mid-slope height. Little groundwater seepage was observed during our site observations, and consequently the planned uppermost subdrain was eliminated. On February 4, 2011, the subdrain outlets were found to be flowing at approximate rates of less than 1 gpm.

During fill placement, forty-four compaction tests were performed at selected locations with a nuclear density gauge at approximate vertical intervals of 2 to 4 feet. Based on our observations and density tests, adequate compaction was achieved at the observed and tested locations. Summaries of our observations and test results for the project are attached. The finish grade surface inclines at about 35% to 50% grade and has been seeded with grass and covered with hay for erosion control purposes. Two silt fences have been installed, one at mid-height and one near the base of the fill slope.

In our opinion, the mass fill for the slope repair has been performed to our design recommendations and to the local standards of practice of soil engineering. The fill is considered suitable for support

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Project No. 09-1796
McNamee Road Slope Repair

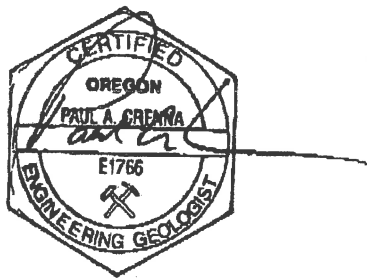
of the proposed private driveway. A summary of our field inspection reports and test results is attached.

It should be noted that the near surface soils may be subject to shallow-seated instability and erosion until vegetation can become well established. Additional plantings would help to reduce the potential for slope maintenance due to shallow slope movement and/or erosion. This brief final summary report pertains to the items specifically mentioned only. No other soil engineering consulting or inspections were performed during construction. If you have any questions, please call.

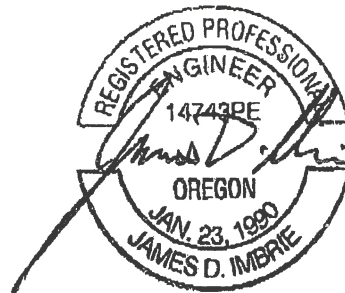
If you have any questions, please call.

Sincerely,

GeoPacific Engineering, Inc.



Paul A. Crenna, C.E.G.
Engineering Geologist



EXPIRES: 06/30/20 11

James D. Imbrie, P.E., G.E.
Geotechnical Engineer

Attachments: Field Soil Observation Summary (1 page)
Summary of Field Soil Density Tests (2 pages)

Cc: Larry and Laura Lueth (labels1@gmail.com)

Field Soil Observation Summary

Project: McNamee Road Slope Repair
Job number: OR 09-1796
Project address: 13225 NW McNamee Rd Multnomah County, OR

Daily Reports

8/25/09: GeoPacific engineering geologist, Paul A. Crenna, visited the project site to observe keyway excavation. Contractor has excavated 25-foot-wide keyway to approximate length of 28 feet. Excavation bottom consists of weathered basalt bedrock. Recommended that keyway at south end be extended and that both ends be benched.

8/31/09: GeoPacific engineering geologist, Paul A. Crenna, visited the project site to observe installed subdrain. The 25-foot-wide keyway has been enlarged to 36 feet long at the bottom with a benched south end. A T-configuration subdrain has been installed in the keyway in general accordance with GeoPacific's recommendations. The subdrain consists of a 4-inch-diameter, perforated plastic pipe with filter sock enveloped in drainrock and covered with filter fabric. Subdrain outlet extends through trench downslope through central portion of drainage bottom below keyway.

10/16/09: GeoPacific technician, Jason Burgess, was on site to observe benching in and for the slide repair engineered fill. At about the 6 foot level in the fill two benches have been cut about 6 feet back into the slope they are about 2 and 3 foot tall. Soils exposed are a brown clayey silt with grey striations and a red brown silty clay. No groundwater water is present.

9/23/10: GeoPacific technician, Jason Burgess, was on site to observe the installation of the subdrain at about the center of the fill. Per approximate elevations this drain is at about 32 feet up from the toe of the new slope. It has been laid at the back of the cut bench into native soils, an orange brown clayey silt with grey mottling. The perforated pipe has been placed along the whole back cut from north to south with positive drainage. Drain rock has been placed around the drain with filter fabric over the top of it.

Per past few visits adequate benching has been cut back into the native soils. Between 4 to 8 feet back into native soils and between 4 to 8 feet high. A few areas with very minor water seepage and moist soils have been noted.

1/4/11: GeoPacific technician, Jason Burgess, was on site to observe the final soil fill on the slide repair area for future driveway. It appears that this is at finished grade. Straw and grass is present on the driveway area. When driveway is constructed we recommend skimming off the top foot or so of soil that has been softened from wet weather. This top foot of soil has probed soft with a steel T probe. These should be removed to competent soils and have the recommended crushed rock section be brought up from there.

[Go back to the task select page for McNamee Road Slope Repair](#)

[Go back to the project select page](#)

Summary of Field Soil Density Tests

Project: McNamee Road Slope Repair
 Job number: OR 09-1796
 Client: V and K Construction

Summary Coding and Explanation

Date of test	Test number	Test location	Elev (ft)	C.P. (%)	Max density (pcf)	Field moist (%)	Dry density (pcf)	Comp spec (%)	Comp result (%)	Test status
9/28/09	SF1	Keyway-Northeast	+2		113.7	12.1	103.0	90	91	Passed
9/28/09	SF2	Keyway-Northwest	+2		113.7	15.4	103.7	90	91	Passed
9/28/09	SF3	Keyway-Southwest	+2		113.7	12.8	105.8	90	93	Passed
9/28/09	SF4	Keyway-Southeast	+2		113.7	15.2	105.4	90	93	Passed
10/2/09	SF5	Keyway-Southeast	+4		113.7	12.9	104.0	90	92	Passed
10/2/09	SF6	Keyway-Southwest	+4		113.7	13.4	103.5	90	91	Passed
10/2/09	SF7	Keyway-Northwest	+4		113.7	12.9	105.4	90	93	Passed
10/2/09	SF8	Keyway-Northeast	+4		113.7	13.8	103.0	90	91	Passed
10/16/09	SF9	Slide repair northwest	+6		113.7	16.4	103.7	90	91	Passed
10/16/09	SF10	Slide repair southwest	+6		113.7	17.0	106.4	90	94	Passed
10/16/09	SF11	Slide repair southeast	+6		113.7	17.3	104.5	90	92	Passed
10/16/09	SF12	Slide repair northeast	+6		113.7	16.1	102.8	90	90	Passed
8/9/10	SF13	Slope repair southwest	+10		109.3	14.8	104.1	90	95	Passed
8/9/10	SF14	Slope repair northwest	+10		109.3	14.6	105.7	90	97	Passed
8/9/10	SF15	Slope repair east center	+10		109.3	14.3	104.8	90	96	Passed
8/16/10	SF16	Slope repair southwest	+13		109.3	18.5	103.5	90	95	Passed
8/16/10	SF17	Slope repair northwest	+13		109.3	16.5	106.2	90	97	Passed
8/16/10	SF18	Slope repair east center	+13		109.3	18.2	104.4	90	96	Passed
9/14/10	SF19	Outer edge south	+18		115.4	16.9	105.8	90	92	Passed
9/14/10	SF20	Outer edge north	+18		115.4	16.4	104.0	90	90	Passed
9/14/10	SF21	Back in fill north	+18		115.4	16.0	106.1	90	92	Passed
9/14/10	SF22	Back in fill south	+18		115.4	15.2	106.5	90	92	Passed
9/22/10	SF23	Back in fill north	+22		115.4	18.7	105.2	90	91	Passed
9/22/10	SF24	Back in fill south	+22		115.4	16.5	106.0	90	92	Passed
9/22/10	SF25	Back in fill south	+27		115.4	15.7	107.0	90	93	Passed
9/22/10	SF26	Back in fill north	+27		115.4	16.5	104.6	90	91	Passed
9/22/10	SF27	Back in fill north	+30		115.4	17.6	104.8	90	91	Passed
9/22/10	SF28	Back in fill south	+30		115.4	14.3	105.5	90	91	Passed
9/23/10	SF29	Back in fill north	+33		115.4	15.1	104.2	90	90	Passed
9/23/10	SF30	Back in fill south	+33		115.4	14.6	108.4	90	94	Passed
9/24/10	SF31	Back in fill south	+43		115.4	15.8	104.3	90	90	Passed
9/24/10	SF32	Back in fill north	+43		115.4	15.0	106.4	90	92	Passed

9/29/10	SF33	In fill holes dug	+36		115.4	16.4	103.9	90	90	Passed
9/29/10	SF34	In fill holes dug	+38		115.4	16.9	103.9	90	90	Passed
9/29/10	SF35	In fill holes dug	+40		115.4	18.8	104.3	90	90	Passed
10/1/10	SF36	Front of fill south	+46		115.4	14.7	109.6	90	95	Passed
10/1/10	SF37	Front of fill north	+46		115.4	16.0	107.8	90	93	Passed
10/1/10	SF38	Back in fill north	+46		115.4	13.1	105.0	90	91	Passed
10/1/10	SF39	Back in fill south	+46		115.4	14.6	106.9	90	93	Passed
10/6/10	SF40	Back in fill north	+49		115.4	17.7	105.2	90	91	Passed
10/6/10	SF41	Back in fill south	+49		115.4	15.2	106.1	90	92	Passed
10/15/10	SF42	Back in fill north	+52		115.4	17.8	104.3	90	90	Passed
10/15/10	SF43	Back in fill center	+52		115.4	18.4	104.1	90	90	Passed
10/15/10	SF44	Back in fill south	+52		115.4	17.0	105.7	90	92	Passed

[Go back to the task select page for McNamee Road Slope Repair](#)

[Go back to the project select page](#)