



May 9, 2019

G-4149

Subject: Project Narrative  
Landslide Repair  
9400 SE 47<sup>th</sup> Street  
Mercer Island, Washington 98040

## INTRODUCTION

GEO Group Northwest, Inc. has this narrative of the landslide repair work that was performed at the above-referenced property in Mercer Island, Washington. The repair work was performed following a landslide event which occurred during December 2015. The slide event impacted the adjacent upslope property to the north and the subject property (the project site for this narrative). Cleanup and subsequent repair activities on the site were started in early 2016 and were completed in April 2019.

## INITIAL RESPONSE ACTIVITIES

Initial activities that were implemented in early 2016 consisted of the following:

- Manual removal of vegetative landslide debris;
- Covering the slide area with plastic sheeting to prevent erosion due to precipitation; and
- Creating a temporary shallow drainage swale which traverses the disturbed slope area on the northern margin of the site property, to convey potential runoff to a vegetated area for discharge.

The plastic sheeting was used mostly during the remainder of the wet weather season following the slide event, until the time that the sandbag retaining walls were built. The drainage swale is located on the site property near to the north boundary of the property and runs gently downslope toward the east to its terminus at relatively flat area. The purpose of the swale was to intercept runoff from the plastic sheeting and ground surfaces from upslope areas (including that which was present on the adjacent upslope property), and divert it away from the area of disturbed soils.

## **REPAIR OF LANDSLIDE GROUND DISTURBANCE**

Based on conversations with the owner and our review of photographic documentation provided by the owner, we understand that these activities were performed during May to July of 2016 and consisted of the following:

- Creating benches into the soil in preparation for building the sandbag walls;
- Using available sandy soils in the work location to fill the sandbags (the surficial site soils and soils deposited from the landslide typically consisted of fine grained silty sand and were able to be used for this purpose);
- Placing filled sandbags to form an ensemble of tiered walls, which typically had heights ranging between 1 and 3.5 feet in the upper and middle portion of the repair area;
- Placing filled sandbags to also build two relatively taller walls, having heights of approximately 4 to 5.5 feet, in the lower portion of the repair area;
- Installing a shallow below-ground perforated drain line alongside the sandbag walls on the upper to middle part of the repair area, and passing below and through one of the taller sandbag walls in the lower portion of the repair area;
- Installing a steel stake and wire fence along the front of the sandbag wall that is taller than 4 feet (approximately 5.5 feet); and
- Plastic sheeting remained in place in the area upslope from the constructed sandbag walls.

The sandbags that were used have dimensions of 34 inches by 18 inches and are made from 10x10 weave, 850 denier count polypropylene. The bags are rated as having 1600 hours of ultraviolet (UV) radiation protection against sunlight and are dust-resistant and water-resistant. Sandy soils from the slide debris were used to fill the bags. The sandbags were placed in horizontally-level tiers on a prepared subgrade of exposed competent native soils. The filled bags were placed in an overlapping pattern and snugged against adjacent bags by using a tamper to achieve close stacking.

## **SUPPLEMENTAL ACTIVITIES**

### **December 2016**

December 6, 2016: William Chang, P.E., and Keith Johnson, L.E.G., of our office visited the site to observe and evaluate the existing conditions on the slope to the north of the residence at the site. We observed that the debris from the December 2015 landslide had been removed from the

site property. The slope area on the adjacent properties upslope to the northwest and north was observed to be covered with plastic sheeting which was secured with sandbags and staking. This area of plastic sheeting also extended onto the northern margin of the site property.

We observed that the storm drainage lines for the residences on the upslope adjacent properties appeared to have been temporarily re-tightlined on the ground surface to a connection to the existing buried storm drain line which runs downslope along an easement on the adjacent property to the west. This portion of storm drain line had been damaged during the December 2015 landslide.

We observed that the area of ground disturbance in the slide area on the site property had been repaired by constructing a series of retaining terraces/walls using sand bags. We observed that these terraces/walls had been keyed into the slope and the bags had been neatly and snugly stacked in overlapping vertical sequences.

### **July 2018**

On July 5, 2018, Keith Johnson of our office visited the site to observe the existing conditions in the area of the north property line. We observed that the temporary on-ground storm drainage lines in the easement area west of the site property were no longer present, and appeared to have been replaced with below-ground lines (based on the observation of cleanout stub caps at grade).

Re-contouring and re-vegetation of the slope area on the adjacent north property appeared to be in progress. An area of light water seepage was observed along the north edge of the site property (near its northwest corner), within the slide area. The seepage area was a narrow linear area several feet in length. We observed the water was being intercepted by the nearby down-slope shallow swale, and was being dissipated within the swale.

### **April 2019**




On April 30, 2019, Keith Johnson of our office re-visited the site to update our knowledge of the site conditions. We observed that, with one exception, the sandbag retaining walls had been covered with at least two layers of durable, ultraviolet light shielding landscape barrier fabric. A relatively short length of wall (wall I on the as-built site plan), was not covered. We also observed that the northernmost sandbag wall is no longer present, and that the lowest sandbag wall (wall K) had been reconfigured into a straight alignment.


We observed no indication of tilting or bulging of the walls. We observed that the areas behind the walls have been covered with soil and mulching, and that vegetation is becoming re-established. We observed that an above-ground 4"-diameter rigid PVC drainage tightline running from the face of sandbag wall J to a location on drain rock backfill behind an existing rockery had been installed. This tightline is connected to the subsurface drain line that had been installed earlier as part of the sandbag wall construction work. The immediate area of the discharge is covered with ivy and other vegetation, but we did not see or hear indications of flow from the line.

The seepage previously noted near the northwest corner of the site was again observed, but was of noticeably lesser degree was being dissipated along a shorter distance than before. No evidence of erosion or soil instability was observed in this area or elsewhere on the slope area on the site.

Respectfully Submitted,

GEO GROUP NORTHWEST, INC.

  
  
Keith Johnson  
Project Geologist  


  
William Chang, P.E.  
Principal Engineer



Enclosure: Site Plan (As-Built), by GEO Group Northwest, Inc., dated May 7, 2019.