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November 7, 2011  
Project No. 211-225G

Mr. Brad McQuarrie  
Mt. Spokane 2000  
29500 N. Mt. Spokane Park Drive  
Mead, Washington 99021

RE:            Geohazard Evaluation  
                Proposed Trail Prescriptions  
                Mt. Spokane Ski and Snowboard Resort  
                Spokane County, Washington

Dear Mr. McQuarrie,

ALLWEST Testing & Engineering has completed a geohazard evaluation at the above-referenced site in Spokane County, Washington. The purpose of the assessment was to address the concerns of the Spokane County Division of Building and Planning. We understand that Spokane County considers the property to be within a geologically hazardous area. Geologically hazardous areas are defined as those areas having the potential for an erosion and/or landslide hazard. For a site to be classified as a geologically hazardous area, it must contain at least one of the following characteristics:

- Slopes of 30 percent or greater.
- Soils identified by the NRCS as having a severe potential for erosion.
- Existing hydraulic factors or changes in hydraulic factors caused by the proposed development that create a severe potential for erosion or landslide hazard.
- Areas historically prone to land sliding or are underlain by alluvium, landslide deposits or Latah Formation.
- Areas of uncompacted fill.
- Areas that are unstable as a result of stream bank erosion.

Based on review of the Mt. Spokane State Park Enhanced Recreation Alternative 2 Trail Prescriptions map provided to us, it appears that Spokane County considers the property to be in a geologically hazardous area due to the presence of slopes of 30 percent or

greater and the potential for erosion due to the proposed development. Spokane County requires that this condition be addressed in accordance with the Critical Areas Ordinance. This report presents the results of our geotechnical and geological analyses and recommendations to address these issues.

## PROJECT DESCRIPTION

The Mt. Spokane State Park Enhanced Recreation Alternative 2 Trail Prescriptions map indicates that the land west of the existing Mt. Spokane Resort will be developed to include seven additional trail sections encompassing approximately 76 acres of previously undeveloped land. The proposed areas in which clearing and grading will take place contain slopes greater than 30 percent (approximately 50 to 55 percent). The locations of the trail developments are shown on the attached site plan (Figure 2). The property is situated on the west side of the Mt. Spokane Ski and Snowboard Resort, located in Section 16, Township 28 North, Range 45 East of the Willamette Meridian in Spokane County, approximately as shown on the attached Site Location Map (Figure 1).

## AVAILABLE INFORMATION

We were provided a copy of the Mt. Spokane State Park Enhanced Recreation Alternative 2 Trail Prescriptions map of the project site. This plan showed the proposed lift location, trail boundaries, locations and approximate areas of clearing and grading, and the existing roads, streams, wetlands, and ground surface elevation contours. This plan was prepared by the SE Group, and was dated August 2011. A copy of the Mt. Spokane State Park Enhanced Recreation Alternative 2 Trail Prescriptions map is attached as Figure 2.

## GENERAL SOIL CONDITIONS

The USDA Natural Resources Conservation Service (NRCS) has mapped the soils on and around the site in the Soil Survey of Spokane County primarily as Vassar silt loam (VaD) with some areas of Brickel stony loam (BxD) and Moscow silt loam (MmC and MmD). These soil types are shown on the NRCS Map attached with this report (Figure 3). The Vassar soils are described as a well drained soil that formed in a thick mantle of volcanic ash over residuum weathered from granite. The Brickel soils are described as a well drained soil that formed in residuum weathered from granite mixed with a component of volcanic ash. The Moscow soils are described as a well drained soil that formed in residuum and colluvium derived from granite, gneiss, and schist mixed with a component of loess and volcanic ash. The soils exposed at the site appeared to be consistent with the described NRCS soil types.

## SITE OBSERVATIONS

A geotechnical engineer from our office visited the site on November 3, 2011. The engineer walked and viewed portions of the site from access roads to observe the exposed topographic and geologic features. The site consists of hundreds of acres of undeveloped land within Mt. Spokane State Park. The site is predominantly covered with native grasses, weeds, deciduous trees, firs, and mature pines. The higher elevations at the site consisted primarily of mature pines, firs, and grasses with areas of granite scree. The lower elevations consisted of a higher concentration of vegetation including native mature pines, firs, deciduous trees, grasses, and shrubs. Some wetland areas were also present at the site as indicated on the provided map.

The majority of the site is characterized by steep slopes, which according to the elevation contours on the provided map reach slopes of approximately 50 to 55 percent. The total relief across the site is on the order of 1,450 feet. Geologic maps indicate that the bedrock geology consists of Tertiary-Cretaceous and Mesozoic granitic bedrock. The exposed soils and bedrock observed at the site are consistent with the geologic mapping.

The native soils exposed at the ground surface consisted primarily of silty sands, with poorly graded sands visible in the roadside excavations. Based on our observations and review of geologic maps and data, the site soils appear to be correctly mapped and have the characteristics described by the NRCS.

## CONCLUSIONS AND RECOMMENDATIONS

Based on our site observations and review of the available geologic data, it is our opinion that construction of the proposed development is feasible from a geohazard standpoint. It is our opinion that the erosion potential at the site is moderate having higher potential on the steeper portions of the site. However, the majority of the site was well vegetated with native grasses, weeds, pines, firs, deciduous trees, and varying amounts of brushes. We did not observe signs of significant large-scale erosion of the exposed soils on the site. No evidence of landslides was observed on or nearby the site.

Disturbance of the site due to construction activities will increase the potential for erosion. We recommend that clearing and grading of the proposed trails take place so that the least amount of site disturbance as possible is achieved. We recommend that all clearing is performed so as not to disturb the surface vegetation and existing root system (clearing above ground and leaving stumps with roots intact). Where grading operations are performed or where the surface vegetation is disturbed by clearing operations, we recommend that silt fence, erosion control berms, proper grading and/or rapid establishment of new vegetation be included as part of any construction activities at the site. Rapid establishment of new vegetation on exposed soils will likely be the most

effective measure to reduce erosion potential at the site during and after development. We recommend that permanent cut and fill slopes be inclined no steeper than 2:1 (horizontal to vertical).

We recommend that the lift towers be located at relatively flat locations along the proposed lift line and that the foundations bear on or in bedrock. Bearing the foundations on or in bedrock will allow them to resist lateral movement associated with any downward soil movement, minimize the foundation imprint, and limit potential erosion of the site soils from beneath the foundations.

We recommend that the construction of any temporary roads or trails for site access during development be performed in the late summer months when the site soils are dry and there is a reduced chance for significant precipitation at the site. Temporary roadways should be constructed with as little site disturbance as possible and incorporate the previously mentioned erosion control measures. After clearing, grading, and development are complete, all temporary trails and roadways should be re-vegetated as soon as possible.

Based on observations of the site and review of maps of the area, it is our opinion that there are no geologic hazards or other geologic concerns for the proposed activities at the site provided that there is minimal disturbance of the surface vegetation, that where there is disturbance the surface vegetation is rapidly re-established, and that all grading activities and construction of the lift towers take place in the late summer months when the site soils are dry.

## REPORT LIMITATIONS

This report has been prepared to address potential geologic hazards for the proposed Mt. Spokane Trail Prescriptions west of the Mt. Spokane Ski and Snowboard Resort in Spokane County, Washington. Our services consist of professional opinions and conclusions made in accordance with generally accepted geotechnical engineering principles and practices. This acknowledgement is in lieu of all warranties either expressed or implied.

### REMARKS

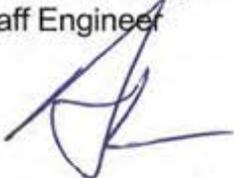
We appreciate the opportunity to be of service on this project. If you have any questions or require additional information, please do not hesitate to contact us at (509) 534-4411.

Sincerely,

ALLWEST Testing & Engineering, LLC



Kevin R. Funke, E.I.T.  
Staff Engineer

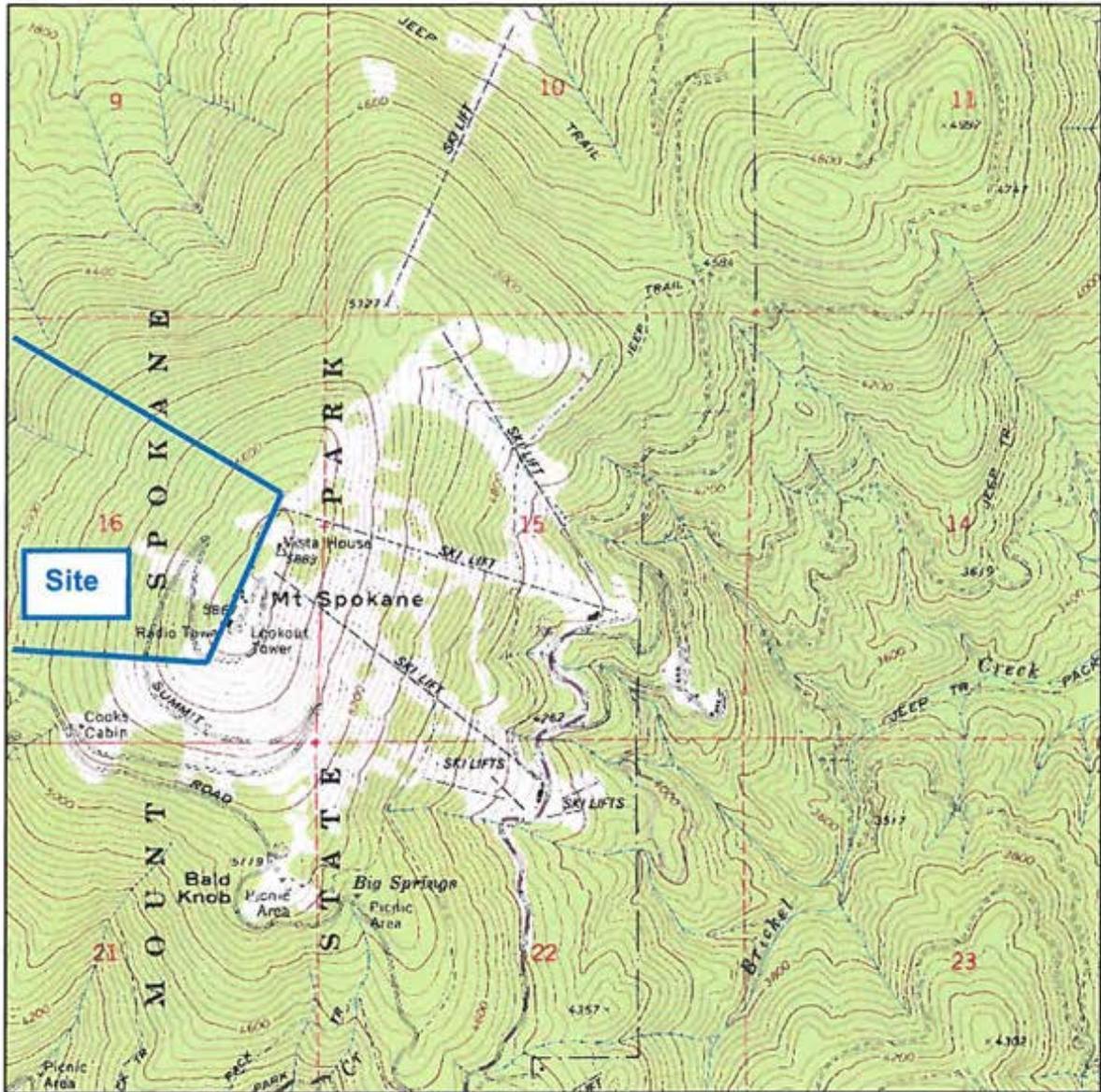


Paul T. Nelson, P.E.  
Senior Geotechnical Engineer



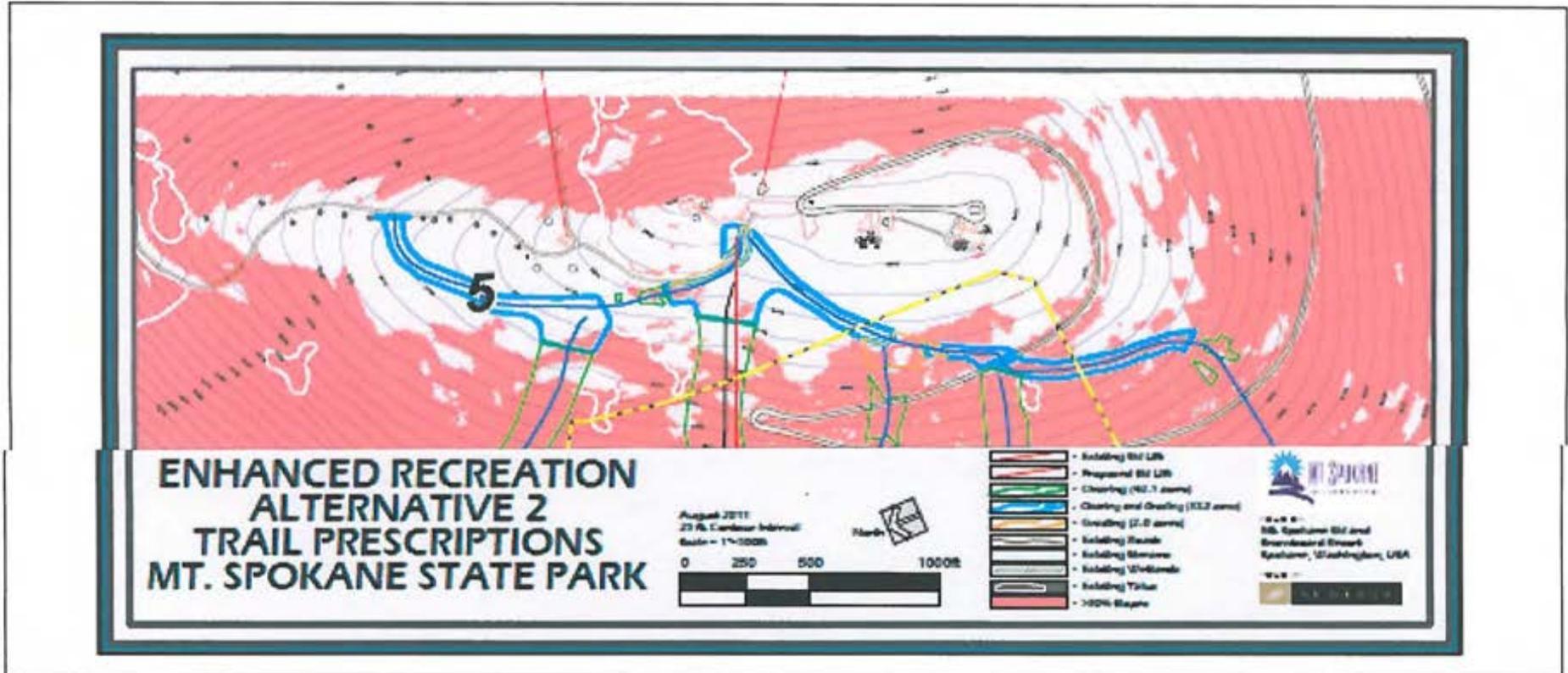
Attachments: Figure 1, Site Location Map  
Figure 2, Site Plan  
Figure 3, NRCS Soil Map

Figure 1



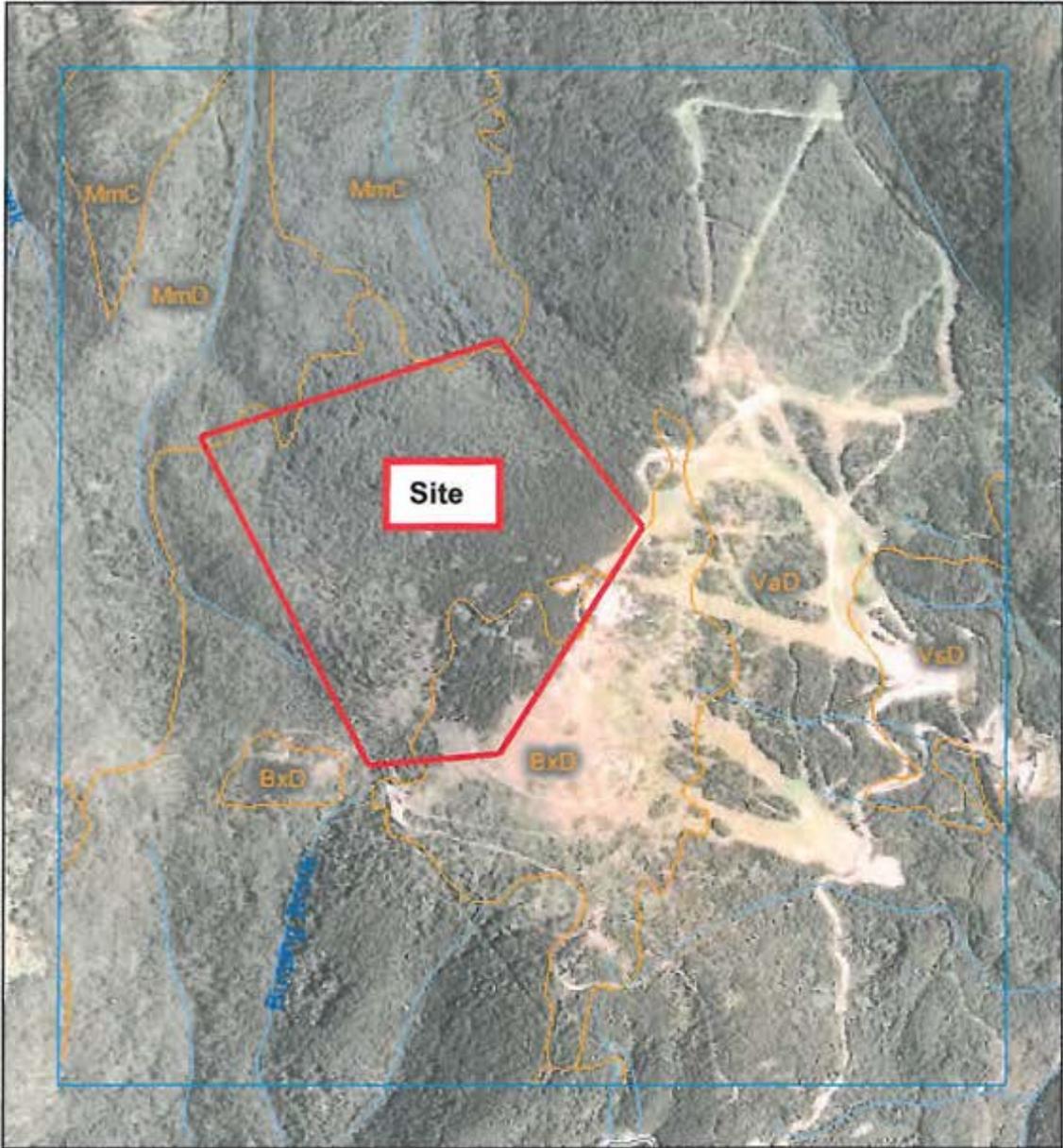
	<b>Site Location Map</b>	
Designed By: KRF	Proposed Mt. Spokane Trail Prescriptions	Project 211-225G
	Mt. Spokane Ski and Snowboard Resort Spokane County, Washington	November 7, 2011

Figure 2



	<b>Proposed Trail Map</b>	
Designed By: KRF	Proposed Mt. Spokane Trail Prescriptions	Project 211-225G
	Mt. Spokane Ski and Snowboard Resort Spokane County, Washington	November 7, 2011

Figure 3



	<b>NRCS Map</b>	
Designed By: KRF	Proposed Mt. Spokane Trail Prescriptions	Project 211-225G
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