

Final



Heavenly Mountain Resort Mitigation and Monitoring Plan Annual Report (October 2010 - September 2011)

May 1, 2012

Prepared For Tahoe Regional Planning Agency

Final Tahoe Regional Planning Agency

Mitigation and Monitoring Plan Annual Report Annual (October 2010 - September 2011)

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Executive Summary

On April 25, 2007, the Tahoe Regional Planning Agency's Governing Board unanimously approved Heavenly Mountain Resort's 2006 Master Plan Amendment. This annual report summarizes monitoring and evaluation activities conducted at Heavenly Mountain Resort (Heavenly) between October 2010 and September 2011 as a result of the implementation of the Mitigation and Monitoring Plan contained in the approved Master Plan Amendment.

The Mitigation and Monitoring Plan consists of planning measures, construction measures, operations and maintenance measures, and management response to monitoring and evaluation. The content of each measure is developed to mitigate potentially adverse effects from the implementation of Heavenly's Master Plan Amendment. As Heavenly implements the Master Plan Amendment, they must meet each applicable measure and utilize monitoring and evaluation results to adapt the measures if necessary.

Monitoring and evaluation is conducted by Heavenly, the Tahoe Regional Planning Agency, the USDA Forest Service, Lahontan Regional Water Quality Control Board, and local and county offices. Heavenly employs the services of Cardno ENTRIX (formerly ENTRIX, Inc.), Resource Concepts, Inc., j.c. brennan and Associates, Hauge Brueck Associates, and Integrated Environmental Restoration Services, Inc. to conduct monitoring in their field of expertise. This annual report summarizes the monitoring results based on the data evaluation.

Heavenly has complied with all applicable measures with the exception of partial compliance with regards to measures 7.4-4, 7.5-12, and 7.5-23. For each of these three partial compliance measures, Heavenly is working to decrease water quality exceedances, limit snowmaking noise exceedances at the base locations, and to minimize the disturbance and extraction of sensitive plant species to ensure full compliance. Table 1-1 summarizes the measures contained in the MMP, their relevance to the time period of interest, and Heavenly's compliance

Chapter 1 Introduction

Heavenly Mountain Resort is located on the south shore of Lake Tahoe within El Dorado and Alpine Counties of California and Douglas County of Nevada (Figure 1-1). Land ownership is shared between the United States Department of Agriculture Forest Service (Forest Service) and Heavenly. Heavenly operates on National Forest lands through a special use permit, renewed in 2002 for a period of 40 years.

A Mitigation and Monitoring Plan (MMP) was first adopted during the approval of the 1996 Heavenly Master Plan. The MMP was revised based on measures that have been completed, measures that are no longer necessary, and new measures that are required to reduce potential impacts from implementation of the Master Plan Amendment. The amended Master Plan describes the long-range development plans for Heavenly Mountain Resort. An EIS/EIR/EIS was prepared in support of the Master Plan, and contained environmental mitigation conditions, monitoring and reporting requirements.

The MMP requires Heavenly's continued compliance with existing local, regional, state, and national regulatory programs both in and out of the Tahoe Basin (Heavenly, 2007). The MMP also contains planning, construction, operations and maintenance measures, and management responses to monitoring and evaluation. Table 1-1 summarizes the measures contained in the MMP, their relevance to the time period of interest, and whether or not Heavenly is in compliance.

The MMP is conducted through the work of numerous agencies and private consultants including Heavenly, Tahoe Regional Planning Agency (TRPA), the USDA Forest Service, Cardno ENTRIX (formerly ENTRIX, Inc.), Resource Concepts, Inc. (RCI), j.c. brennan and Associates, Hauge Brueck Associates (Hauge Brueck), and Integrated Environmental Restoration Services, Inc. (IERS). The period of October 2010 to September 2011 was chosen for the Annual Report in order to include the 2010-2011 ski season and the 2011 summer construction season.



Figure 1-1 Location of Heavenly Mountain Resort

Table 1-1 Summary of Mitigation and Monitoring Plan Measures

Measure Number	Measure	2010-2011 Applicability	October 2011 Status	Discussed in Current Report	Compliance
	F	Planning Measures			
7.3-1	Obtain Summer Day Use PAOT Allocations	Adventure Peak	Project Specific	Yes	Yes
7.3-2	TRPA Mitigation Monitoring Activities	All Projects and Operations	Complete	Yes	Yes
7.3-3	Design and Site the Proposed Gondola Mid-Station Restaurant to Minimize Visibility From Off-Site Views	None	Not Built	No	N/A
7.3-4	Design and Site the Proposed Angel's Roost Communications Site to Minimize Visibility From Off-Site View	None	Not Built	No	N/A
7.3-5	Reduce Visibility of the Skiways 1 and 2 Trails Through Reduction in Cleared Areas and Retention of Vegetation	Construction Completed in 2007- 2008 with final TRPA inspection in 2009	Completed	Yes	Yes
7.3-6	7.3-6 Design and Site the Proposed Sand Dunes Lodge to Minimize Visibility From Off-Site Views		Not Built	No	N/A
	Construction Measures				
7.4-1	Revised Construction Erosion Reduction Program	All Projects and Operations	Ongoing	Yes	Yes
7.4-2	Construct Infiltration Facilities	CWE Work List	Ongoing	Yes	Yes

Measure Number	Measure	2010-2011 Applicability	October 2011 Status	Discussed in Current Report	Compliance
7.4-3	(Water-1) Control Runoff for Existing Facilities	All Projects and Operations	Ongoing	Yes	Yes
7.4-4	(Water-2) Meet Water Quality Standards	All Projects and Operations	Ongoing	Yes	Partial
7.4-5	(Water-3) Implement Adaptive Ski Run Prescriptions	California Side Ski Run Widening	Ongoing	Yes	Yes
7.4-6	(Water-4) Control Runoff due to Future Construction and Long-Term Operation Facilities	All Projects and Operations	Ongoing	Yes	Yes
7.4-7	Avoid Disturbance to SEZ or Restore/Create SEZ	None	Complete	Yes	Yes
7.4-8	Avoid Disturbance to Wetlands or Restore/Create Wetlands	None	Project Specific	No	N/A
7.4-9	(SEZ-3) Restore Future Disturbed SEZs to Meet MP 96 Mitigation Measure 7.4-3 Requirements	None	Project Specific	No	N/A
7.4-10	(SEZ-4) Restore Future Disturbed Jurisdictional Wetlands and Waters to Meet MP 96 Mitigation Measure 7.4.4 Requirements	None	Project Specific	Yes	Yes
7.4-11	(SEZ-5) Restore Disturbed SEZs due to Construction of Phase I Projects to Meet MP 96 Mitigation Measure 7.4-3 Requirements	Edgewood Creek Watershed Restoration	Partially Complete	Yes	Yes

Measure Number	Measure	2010-2011 Applicability	October 2011 Status	Discussed in Current Report	Compliance
7.4-12	(SEZ-6) Restore Jurisdictional Wetlands and Waters Disturbed Due to Construction of Phase I Projects to Meet MP 96 Mitigation Measure 7.4-4 Requirements	None	Project Specific	No	Yes
7.4-13	TRPA Land Coverage Mitigation	Gondola Lodge Completion / Children's Ski School Lodge / Umbrella Bar relocation	Ongoing	Yes	Yes
7.4-14	Reduce and Control Fugitive Dust	Summer Operations	Ongoing	Yes	Yes
7.4-15	Minimize Removal/Modification of Deciduous Trees, Wetlands, and Meadows	None	Project Specific	No	N/A
7.4-16	(BIO-2) Active Raptor and Migratory Bird Nest Site Protection Program	All Projects	Ongoing	Yes	Yes
7.4-17	Monitor and Protect Northern Goshawk	All Projects	Ongoing	Yes	Yes
7.4-18	Prohibit Skier Access on Management Prescription 9 Lands	Winter Operations	Ongoing	Yes	Yes
7.4-19	Evaluate and Monitor Known Archeological Resources Within Comstock Logging Historic District	No Significant Changes	Ongoing	Yes	N/A
7.4-20	Identify and Protect Undiscovered Archaeological Resources	All Projects	Ongoing	Yes	Yes
7.4-21	Protect the Tahoe Rim Trail	None	Not Built	No	N/A
7.4-22	Secure Adequate Water Capacity Prior to Development	Tamarack Lodge and Children's Ski School Lodge	Constructed	Yes	Yes
7.4-23	Secure Adequate Sewer Capacity Prior to Development	Tamarack Lodge and Children's Ski School Lodge	Constructed	Yes	Yes

Measure Number	Measure	2010-2011 Applicability	October 2011 Status	Discussed in Current Report	Compliance
	Operations	and Maintenance Measures			
7.5-1	Revised Cumulative Watershed Effects Restoration Program	Summer Operations	Ongoing	Yes	Yes
7.5-2	Revised Collection/Monitoring Agreement - Heavenly and Forest Service	All Projects and Operations	Ongoing	Yes	Yes
7.5-3	Maintain Water Rights Balance	All Operations	Ongoing	Yes	Yes
7.5-4	Maintain Water Flows in Heavenly Valley Creek	All Operations	Ongoing	Yes	Yes
7.5-5	Maintain Summertime Flows in Heavenly Valley Creek	All Operations	Ongoing	Yes	Yes
7.5-6	Maintain Water Flows in Daggett Creek	All Operations	Ongoing	Yes	Yes
7.5-7	Maintain Compliance with Water Entitlements	All Operations	Ongoing	Yes	Yes
7.5-8	Reduce Vehicle Emissions	All Operations	Ongoing	Yes	Yes
7.5-9	Snow Grooming Noise Mitigation Methods	Winter Operations	Ongoing	Yes	Yes
7.5-10	Snowmobile Noise Mitigation Methods	Winter Operations	Ongoing	Yes	Yes
7.5-11	Snow Removal Noise Mitigation Methods	Winter Operations	Ongoing	Yes	Yes
7.5-12	Snowmaking Noise Mitigation Methods for Base Areas	Winter Operations	Ongoing	Yes	Partial
7.5-13	Snowmaking Noise Mitigation Methods for Upper Mountain Areas	Winter Operations	Ongoing	Yes	Yes

Measure Number	Measure	2010-2011 Applicability	October 2011 Status	Discussed in Current Report	Compliance
7.5-14	(Noise-1) Limit hours of Snowmaking operation and use fan gun technology for the proposed Skyline Trail Snowmaking	None	Not Built	Yes	N/A
7.5-15	Rock Busting Noise Mitigation Methods	None	Not Built	No	N/A
7.5-16	(Noise-5) Restrict Hours of Amphitheater Operations	None	Not Built	No	N/A
7.5-17	Expanded Bus/Shuttle Access	All Operations	Ongoing	Yes	Yes
7.5-18	Discourage Use of Automobiles	All Operations	Ongoing	Yes	Yes
7.5-19	Implement the Coordinated Transportation System (CTS)	All Operations	Ongoing	Yes	Yes
7.5-20	Reduce Traffic on U.S. Highway 50 at Echo Summit	All Operations	Ongoing	Yes	Yes
7.5-21	Protect Tahoe Draba Populations within Heavenly Mountain Resort	All Operations	Project Specific	Yes	Yes
7.5-22	(VEG 1-A) Tahoe Draba Long-Term Conservation Strategy	All Operations	Ongoing	Yes	Yes
7.5-23	(VEG 1-B) Minimize Loss/Degradation of Sensitive Plant Species	All Operations	Ongoing	Yes	Partial
7.5-24	(VEG 1-C) Noxious Weed Management	All Projects and Operations	Ongoing	Yes	Yes
7.5-25	(VEG 3) Late Seral/Old Growth Forest Enhancement	None	Ongoing	Yes	Yes

Measure Number	Measure	2010-2011 Applicability	October 2011 Status	Discussed in Current Report	Compliance
7.5-26	Restrict Vehicle Traffic within the Heavenly Ski Resort MP96 Development Area Description	All Operations	Ongoing	Yes	Yes
7.5-27	Monitor and Protect Nesting and Fledgling Bird Species	No concert occurred	Not Built	No	N/A
7.5-28	Compliance with Design Review Guidelines Section 7 Exterior Lighting Standards and Code of Ordinances	Tamarack and Children's Ski School Lodge Completions	Project Specific	Yes	Yes
7.5-29	Building and Site Design	Tamarack and Children's Ski School Lodge Completions	Project Specific	Yes	Yes
7.5-30	Maintain Timber Thinning Practices	All Operations	Ongoing	Yes	Yes
7.5-31	Compliance with Existing Health and Safety Practices	All Operations	Ongoing	Yes	Yes
7.5-32	Avalanche Safety Practices	All Operations	Ongoing	Yes	Yes
7.5-33	Provide Employee Housing	All Operations	Ongoing	Yes	Yes
7.5-34	Ensure Adequate Police/Sheriff/Fire Capacity	All Operations	Ongoing	Yes	Yes
Management Response to Monitoring and Evaluation					
7.6-1	Soil and Water Quality	All Projects and Operations	Ongoing	Yes	Yes
7.6-2	Traffic and Parking	All Operations	Ongoing	Yes	Yes
7.6-3	Late Seral/Old Growth Enhancement	All Operations	Ongoing	Yes	Yes

Chapter 2 Planning Measures

Introduction

A majority of the planning measures are addressed within individual Tahoe Regional Planning Agency permits. Table 2-1 provides an update to previous season's report (October 2009 to October 2010) project list. A few of the projects listed were completed but had yet to receive final inspections for revegetation and Best Management Practices (BMPs).

Project	TRPA Permit #	Status as of October 2011
Skiways Glade	2007-0104	Completed in 2008
Powderbowl Glade	2007-0104	Completed in 2008
Skyline Trail Re-grade	2005-0412	Complete and Inspected
Lakeview Water System (Phase 1)	Qualified Exempt Maintenance	Project Completed, Tank removed and road decommissioned
California Lodge Best Management Practices (Phase 3)	BMPP 2008-0013	Complete*
Adult Ski School Lift Replacement	ESRP2008-0327	Completed, TRPA agreed to design changes that promote and encourage vegetation growth. Project closed in the fall of 2011.
Adventure Peak Zipline	2007-0105	Modifications planned for the summer of 2012.
Olympic Chairlift Replacement	2005-0411	The Olympic Chair is completed and awaiting final inspection and vegetation success. The North Bowl Chair replacement is not currently scheduled at this time.*
Edgewood Bowl and North Bowl Restoration Projects	2006-0950 & 2006-1190	Completed awaiting final inspection*
Tubing Lift	ERSP 2008-1018	Completed in December 2010. Realigned top of tubing road access. Awaiting vegetation growth for stabilization and inspection.*
Tamarack Lodge	ERSP 2009-3571 (Draft)	Completed December 2010.*

 Table 2-1
 Update on Projects Constructed Prior to the 2011 Construction Season

* The construction is complete. Revegetation and BMPs have not received final inspections.

Between October 2010 and October 2011, the following on-mountain improvements were completed:

Project	TRPA Permit #	Status as of October 2011
Bear Cave Children's Ski School Lodge	ERSP 2011-0513	Completed in October 2011.*
Relocate Umbrella Bar	ERSP 2010-0994	Bar relocated, additional BMP's needed and restoration needs to be completed at the previous site. *
CA Run Widening	ERSP 2011-0579	Run widening completed, additional ground cover needed prior to final inspection.*

Table 2-2	Ongoing Projects during the 2010-2011 Construction Season

* Construction is now complete. Revegetation and BMP's have not received final inspections, but are expected to occur during 2012.

7.3-1 Obtain Summer Day Use Person at One Time (PAOT) Allocations

Prior to construction of new summer day use facilities, Heavenly needs to obtain TRPA approval for the additional calculated persons at one time (PAOT).

Construction of the Tamarack Lodge, located near the Gondola return, was completed in December 2010. No new persons at one time (PAOT) were required for the lodge usage. This facility was operational during the summer site seeing operation, serving food and beverages to on mountain guests. Modifications to the tubing hill allowed for summer usage in 2011. The existing 250 PAOT's for the top of the Gondola has not been exceeded and operates within the existing value. TRPA's approval for additional calculated persons at one time allocations were not needed for operation and facility improvements in this area.

7.3-2 TRPA Mitigation Monitoring Activities

This measure describes the Mitigation and Monitoring Agreement that Heavenly must enter into with TRPA.

Heavenly, TRPA, and Cardno ENTRIX entered a three-party monitoring agreement in January 2008. Heavenly also provides funding to TRPA to conduct all review related to the MMP. This monitoring agreement was renewed in 2011 and again through the 2012 calendar year. This five year agreement ends in December 2012, at which time TRPA and Heavenly must request and select a proposal for contracted work related to the MMP.

7.3-5 (Scenic-6) Reduce Visibility of the Skiways 1 and 2 Trails through Reduction in Cleared Areas and Retention of Vegetation

This measure identifies specific requirements for Skiways Glades. Skiways 1 should be gladed to 50 percent retention of vegetation. Skiways 2 had to be realigned and gladed with 25 percent cleared area and 75 percent vegetation retention.

The Skiways Glades project was completed and inspected during the 2009 construction season (TRPA Permit 20070104). The design and implementation facilitated the requirements of measure 7.3-5.

Conclusion

Heavenly complied with all applicable planning measures during the 2010-2011 construction season. Project specific measures such as 7.3-3, 7.3-4 and 7.3-6 have yet to be constructed and will be discussed in future MMP annual reports upon construction and/or completion.

Chapter 3 Construction Measures

Introduction

The construction measures contained in the MMP are designed to limit the environmental impacts both during and following the construction of new projects at Heavenly. Resource Concepts Inc. (RCI) assists Heavenly in developing their BMPs and conducts on-mountain monitoring of temporary construction BMPs and permanent BMPs for all of Heavenly's capital projects and Cumulative Watershed Effects (CWE) projects. Integrated Environmental Restoration Services (IERS), along with Heavenly staff, assists in helping to develop restoration treatments and monitoring plans for disturbed areas during construction and previously constructed CWE projects. IERS is also experimenting and collecting data with regards to different soil cover treatment types and their successful implementation and establishment based on a number of practical criteria.

7.4-1 Revised Construction Erosion Reduction Program

The Revised Construction Erosion Reduction Program (CERP) is intended to minimize the rate of soil loss related to construction activities at Heavenly. The CERP has been upgraded from a mitigation measure to a design feature of each construction project through the Master Plan Amendment.

Heavenly contracted with RCI and IERS to ensure effective BMPs and restoration treatments were designed and implemented in each of their construction projects during the 2011 construction season. RCI performed inspection on both permanent and construction BMPs for implementation and effectiveness. Permanent BMP implementation resulted in 90% of the sites evaluated. Of these implemented permanent BMP's, 93% of the BMP's were found effective. Temporary BMP implementation resulted in 76% compliancy. This lower score resulted primarily from one project. Neglecting this one project, temporary BMPs were 100% fully implemented in 2011. Temporary BMP effectiveness scored fully "effective" for 95% of the evaluations performed in 2011. Recommendations moving forward include continuing coordination and communication for prompt responses to BMP concerns. As Heavenly staff become aware of repairs and/or retrofits of existing BMP's with scores that are rated less than fully "implemented", or that are not rated as "effective", improvements are made to increase the specific BMP. Experienced and knowledgeable staff and team members are essential for maintaining successful BMPs. New and different techniques for soil cover have improved effectiveness scores, and continued monitoring of these techniques over time will help to improve long-term effectiveness. Additionally future construction plans should designate necessary access routes and staging areas, limiting the areas of temporary road construction. With better planning, "permanent access routes can be constructed with adequate BMPs to Forest Service's standards" (Appendix I). Continued emphasis will be placed on maintaining and improving road drainages (maintenance BMPs), especially near recently constructed restoration projects. Better coordination between all interested parties (Heavenly, contracted consultants, and the Forest Service) regarding objectives and methods for road BMP maintenance would

improve the effectiveness of road related BMPs. An adaptive management approach towards monitoring road segments suggest the need for a "needs assessment" label for road segments. This new designation would allow for planning and implementation moving forward. RCI's 2011 BMP Effectiveness Monitoring Report is contained in Appendix I. The IERS Restoration and Monitoring 2011 Summary Report is contained in Appendix II.

7.4-2 Construct Infiltration Facilities

This measure states that all new projects contributing to impervious surface shall be designed to infiltrate the 20-year, 1-hour storm.

All infiltration facilities are designed to infiltrate the 20-year, 1-hour storm. The children's ski school lodge was the only capital improvement project constructed during the 2011 season. Modifications to the Top of the Gondola Magic Carpet surface lift had drip line infiltration trenches installed preventing storm water from leaving the site. The CWE Project and Work List recommended 23 projects for new and existing facilities in February 2011. However, only three projects were completed during the 2011 construction season (Groove Lift Upper Terminal, Blue Angle Chutes, and the Top of the Gondola Magic Carpet). Both the Groove Lift Upper Terminal and Blue Angle Chutes projects were improvements and/or maintenance projects. Three additional new construction projects were started, but were not completed in 2011 (Bear Cave Ski School Lodge, Umbrella Bar relocation, and California Ski Run Widening Unconstructed and unfinished projects for 2011 are included in the 2012 CWE list (January 2012). Additional details and results can be found in RCI's BMP Effectiveness Monitoring Report in Appendix I. Construction and design of the children's ski school lodge (Bear Cave) included onsite infiltration of storm water runoff.

7.4-3 Control Runoff for Existing Facilities

This measure requires Heavenly to install BMPs at all lodges, parking areas, and ski lifts and requires compliance with the Lahontan Updated Waste Discharge Permit for completion of the California Base BMP Retrofit project.

The 1997 CWE list is completed and Heavenly is completing the retrofit installation of permanent BMPs at all lodges, parking areas, and ski lifts. In October 2008, Heavenly completed the BMP retrofit project for the California Base Parking Lot. Though in place, the treatment system is still going through maintenance and troubleshooting procedures for sampling storm events. Storm frequency sampling, sampling quantities and results are being fine tuned at this time, though results will be submitted with quarterly and annual reports to the Lahontan Water Board for the 2012 water year that began in October 2011. A list of BMPs completed during the 2011 construction season is available in Appendix A-1, page 1 of the BMP Effectiveness Annual Report. RCI's BMP Effectiveness Report can be found in this document listed as Appendix I. Mulch coverage for the California Ski run widening project and restoration and BMPs associated with relocation of the Umbrella Bar are scheduled for completion in 2012. For detailed information with regards to the projects scheduled for completion in 2012, please refer to Appendix IV for the 2012 CWE work list (projects to be constructed in 2012). Appendix III contains the 2011 CWE work list; however as stated above in section 7-4.2, only three projects were completed in 2011. BMPs designed for the Stagecoach Base will be installed as part of the Stagecoach Redevelopment Project. The design was approved by Douglas County, under their

stormwater management standards, in the fall of 2008. This area is outside both the TRPA and USDA Forest Service jurisdictions and has yet to be constructed.

7.4-4 (WATER-2) Meet Water Quality Standards

To meet water quality standards, several items are identified in the Master Plan Amendment's MMP. These measures include implementing and maintaining the CWE Restoration Program, implementing the revised CERP, implementing the revised Environmental Monitoring Program, installation of BMPs at all facilities and parking lots, installation of a monitoring site on Daggett Creek, and prohibiting grooming on ski trails deficient of adequate snow cover.

In 2011, Heavenly continued to implement both the maintenance phase of the CWE Restoration Program and also the Revised CWE Restoration Program. Each year RCI and IERS help Heavenly utilizes adaptive management practices to prioritize maintenance and restoration projects. A list of the three projects completed during the 2011 construction season is located in Appendix I (Appendix A, page 1).Projects on the 2011 CWE work list that were rolled over to the 2012 work list include: Complete Umbrella Bar site restoration, California Side Run Widening, Heavenly Flyer Zip Line Retrieval System, Powderbowl Sewer Line Relocation, Ridge Run Snowmaking Lateral Lines, Tubing Lift Maintenance Road, Hellwinkel's Trail, Gondola Mid Station Access Road BMPs, Edgewood SEZ BMPs at Lower Boulder, Orion's Run Snowmaking Lateral Lines, Perimeter Run Re-grade, East Peak Lodge BMPs, Base of Comet Express Lift effective cover, and the East Peak Lodge Sanitary Sewer Lift Holding Tank. Detailed information concerning maintenance, monitoring, and implementation of CWE projects is located in Appendices I and II.

Heavenly also continues to implement the revised CERP and install BMPs at all facilities as discussed previously.

The Environmental Monitoring Program that has been ongoing since 1991, continued through the 2010-2011 season. Water quality monitoring was conducted monthly between October 1, 2010 and September 30, 2011 and weekly during spring runoff at six sites.

More stringent water quality parameters took effect during the 2008-2009 water year at the California Parking Lot site (at Bijou Creek). Permit conditions stated that once the BMP Retrofit Project and treatment system were in place at the California Parking Lot, more stringent water quality standards would become effective. It has been three years with these new standards in place. Heavenly reported non-compliance annual average violations at Bijou Creek with regards to total nitrogen, chloride, oil and grease, and iron levels at the California Parking Lot site. Though the state standards were exceeded, since installation the filtration system shows significant loading reduction. Suspended sediment, nitrogen, phosphorus, chloride and iron were also in violation of the annual state average along Heavenly Valley Creek. Results were reported to Lahontan, the Forest Service, and the TRPA according to the requirements of the Environmental Monitoring Program.¹

¹ Cardno ENTRIX. (2012) Environmental Monitoring Program Comprehensive Report - Heavenly Mountain Resort Water Years 2006-2011. Cardno ENTRIX. Zephyr Cove, Nevada. (Chapter 2)

Increased precipitation and stream runoff led to higher annual average values for nitrogen and phosphorus. The reference site at Hidden Valley Creek exhibited a similar trend with regards to increased levels of nitrogen, phosphorus, and chloride and this watershed is minimally affected by human development See the referenced Environmental Monitoring Program Comprehensive Report for further discussion and results from the Environmental Monitoring Program.

The Lahontan Water Quality Board amended the monitoring and reporting program in May 2011to collect a better representation of mountain operations with respect to environmental impact. Heavenly is actively working with IERS to develop both a short and long term sustainability plan addressing nutrient loading and exceedences. By reducing soil erosion, nutrient loading should also reduce in the waterway samples. Specific sites and ski run test plots are ongoing at various projects and slope aspects located around the mountain. Results from these test plots will be used to reduce sediment erosion.

Heavenly has installed a flow monitoring station at Daggett Creek and RCI is collecting the data at this site for compliance with water use permits as discussed in Chapter 4. If and when Ski Lift Z, or Ski Trails Z1, Z2, Z4, or Z8 are proposed for construction, a year prior to construction the Nevada Department of Environmental Quality (NDEP) and Forest Service will determine the location and if water quality monitoring along Daggett Creek is necessary. Appendix V contains the Daggett Creek Flow Monitoring report provided by RCI.

Heavenly requires 12" minimum compacted snow over all obstacles before grooming with snow cats is allowed. This policy protects soil and water resources along with preventing significant damage to snow cats.

7.4-5 (WATER-3) Implement Adaptive Ski Run Prescriptions

This measure requires all new ski runs to be re-vegetated according to the ski trail prescriptions in the Easy Street Run Hazard Reduction Program. It also calls for the evaluation of existing ski trails to determine if the prescription would be appropriate.

With the assistance of IERS, Heavenly is actively restoring and monitoring each construction area using site-specific soil function improvement and revegetation prescriptions. See Appendix II for detailed information for each project area. Completion of Tamarack lodge commenced in December 2010, and final inspection and restoration treatments were incorporated in 2011. The California trail widening projects occurred during 2011. Final coverage of mulch and pine needles is scheduled to occur in 2012. Soil amendments that have been used by Heavenly for restoration treatments include: compost, wood chips, aged wood chips and pine needles, and decomposed wood shavings. Only decomposed wood shavings are purchased. The other three amendments/treatment materials are generated from routine maintenance and operations or collected and stored for application. Additional information on implementation of adaptive ski run prescription and restoration treatment techniques are contained in the Heavenly Mountain Resort Restoration and Monitoring 2011 Summary Report Appendix II. All restored areas continue to undergo post-construction monitoring. Monitoring results are contained in IERS Restoration and Monitoring 2011 Summary Report in Appendix II.

7.4-6 (WATER-4) Control Runoff Due to Future Construction and Long-Term Operation Facilities

Both broad and project-specific measures are identified for Heavenly to comply with the MMP. Each new project is to have permanent and temporary BMPs as part of its design and construction. New snowmaking should be above ground, with certain exceptions. A formal BMP maintenance program shall be continued. Additionally, the Gondola Mid-Station Road shall have primary uses of limited operations associated with Gondola start-up and shutdown and emergency evacuation.

The Gondola Lodge (Tamarack) began construction during the 2010 summer months and was completed in December 2011 (the next water year). Seedlings were planted in 2011 at the Gondola Lodge fill area site. The children's ski school lodge (Bear Cave) was constructed in 2011. Both of these capital improvement projects included temporary and permanent BMP installations. During the California ski widening project, the snow making lines located along High Roller were relocated. Relocation was required due to the fact that as the ski run widened, the lines and infrastructure became exposed on the ski run. Additional work focused on the maintenance of temporary and permanent BMPs on existing facilities. The 2011 Annual CWE Project and Worklist that includes temporary and permanent BMPs can be found in Appendix VI. All permanent BMPs are designed and maintained to infiltrate at least the 20-year, 1-hour storm. BMP effectiveness and maintenance monitoring is performed by RCI as part of the Environmental Monitoring Program. The monitoring results are included in the annual report contained in Appendix I.

No new/additional snowmaking equipment was installed in 2011. New snowmaking laterals are scheduled for construction in 2012. All of these new lines will be located above ground, unless "certain situation dictate" underground placement. Snowmaking equipment was installed along the Stagecoach Trail in 2008. This project followed the continuous adaptive monitoring protocol, using revegetation and soil function improvement as BMPs. These processes are effective in infiltrating the 20-year, 1-hour storm. Performance monitoring was completed in 2009 and visual monitoring has continued since completion. Monitoring results, in 2011, show little improvement for vegetation establishment; however direct measurements show a high level of erosion resistance (rainfall simulation).² Results can be found within the Restoration and Monitoring Summary Report 2011 found in Appendix II.

The mid-station road, completed in 2008, remains in use only for emergency evacuation and limited daily operations associated with gondola start-up and shut down. "No signs of erosion have been observed since treatment implantation.³"

² Integrated Environmental Restoration Services, Inc. Heavenly Mountain Resort Restoration and Monitoring 2011 Summary Report. IERS. Tahoe City, CA. Page 79.

³ Integrated Environment Restoration Services, Inc. Heavenly Mountain Resort Restoration and Monitoring 2011 Summary Report. IERS. Tahoe City, CA. Page 59-63.

7.4-7 Avoid Disturbance to Stream Environmental Zones (SEZ) or Restore/Create SEZ

This measure identifies specific areas for restoration as well as project-specific SEZ protection components.

All required SEZ restorations have been completed by Heavenly. Heavenly also avoids disturbance to SEZs through its CWE planning process and prioritizes BMP installation and maintenance in areas that could have an impact on SEZs.

Heavenly has completed the 7.65 acres of restoration identified in the Edgewood Creek Watershed Assessment and Restoration Plan through their 2007 Lower Edgewood Restoration Project. Heavenly has also restored 8.75 acres of the Edgewood Bowl and North Bowl areas in 2006 and 2007, and revegetation growth and success await inspection by TRPA for finalization of these projects.

The restoration of 1.10 acres of SEZ at the Upper Shop was completed in 2006 and continues to be maintained by Heavenly and monitored by RCI.

7.4-8 Avoid Disturbance to Wetlands or Restore/Create Wetlands

This measure requires that Heavenly perform a wetland delineation, avoid development in wetlands, and obtain a Section 404 permit from the United States Army Corps of Engineers (USACE) if development in wetlands is necessary.

There were no plans to develop within or near wetlands during the past construction season, nor are there plans to develop within a wetland this upcoming construction season. As outlined in the Master Plan Amendment, Heavenly is avoiding disturbance to wetlands through implementation of the mitigation measures listed in 7.4-3.

7.4-9 (SEZ-3) Restore Future Disturbed SEZs to Meet MP 96 Mitigation Measure Requirements

A number of project-specific mitigation measures for avoiding disturbance to SEZs are identified in the MMP.

There were no in-basin or out-of-basin restoration projects implemented during 2011 that were identified in the mitigation measure requirements.

7.4-10 (SEZ-4) Restore Future Disturbed Jurisdictional Wetlands and Waters to Meet MP 96 Mitigation Measure Requirements

This measure requires that any project implemented by Heavenly will be located off jurisdictional wetlands and that Sky Meadows Deck and Boulder Operations be relocated off wetlands. If development within the wetlands cannot be avoided, Heavenly is required to obtain a Section 404 permit from the USACE and comply with all requirements set forth in the permit. Additionally, any tree removal activity needed for ski lifts or trails will be conducted in a fashion that does not disturb wetlands.

There were no capital improvement projects implemented during 2011 that trigger this wetland measure. This measure will be implemented when the Powderbowl Lodge is built and the Sky Meadows Deck is relocated. Trail widening in 2011 along Ridge Promenade, Liz's and Ellie's

trails, and at the High Roller terrain park occurred over snow reducing and limiting ground disturbance and impact within the watershed and jurisdictional waters.

7.4-11 (SEZ-5) Restore Disturbed SEZs Due to Construction of Phase I Projects to Meet MP 96 Mitigation Measure Requirements

This measure is both project-specific and for ongoing summer operations. It specifically provides guidelines towards the design of Skiways Trail, the Edgewood Creek restoration projects, summer road usage, vegetation removal near SEZs, tree removal for lift construction, and permitting.

Generally, Heavenly hand prunes vegetation near SEZs and removes trees over the snow. Where summer roads are not well defined, roped boundaries are erected each summer by Heavenly to protect SEZs and restored areas by limiting access. At the beginning of each field season, summer employees are required to attend a mandatory orientation about vehicle operation on summer roads and the presence and importance of BMPs in order to protect sensitive areas on the mountain.

As previously discussed in Section 7.4-7, Heavenly's portion of the Edgewood Creek Watershed Assessment and Restoration Plan is complete and is awaiting final inspection from TRPA.

7.4-12 (SEZ-6) Restore Jurisdictional Wetlands and Waters Disturbed due to Construction of Phase I Projects to Meet MP 96 Mitigation Measure 7.4-4 Requirements

This measure requires that any phase I project implemented by Heavenly will be located off jurisdictional wetlands. If development within the wetlands cannot be avoided, Heavenly is required to obtain a Section 404 permit from the USACE and comply with all requirements set forth in the permit. Additionally, any tree removal activity needed for construction will be conducted in a fashion that does not disturb wetlands.

Trail widening in 2011 occurred along: Ridge Promenade, Liz's and Ellie's trails, and at the High Roller terrain park. Tree removal occurred over snow reducing and limiting ground disturbance and impact within the watershed and jurisdictional waters. Additional slope stabilization shall be completed in 2012. No projects, including the above mentioned trail widening, triggered the need for a Section 404 permit.

7.4-13 TRPA Land Coverage Mitigation

To utilize available land coverage within the Heavenly project area, TRPA must make appropriate relocation findings included in the Code of Ordinances and BMPs must be installed and maintained as outlined in the CERP.

Heavenly had 434,580 square feet of available banked land coverage and proposes coverage relocation findings required by the 2007 Master Plan Amendment when applying for individual permits. The following projects have decreased this value to 288,900 square feet of coverage remaining: Northbowl/Olympic Express Lifts, Zip Line Adventure Ride, Gondola Hiking Trails, Mid Station Road, Northbowl/Olympic Express Lifts - Plan Revision, World Cup/East Bowl Snowmaking - Plan Revision, California Base Surface Lift Replacement, Skyline Trail Grading and Snowmaking, Top of the Gondola Lodge, Adjusted Gondola Permit Coverage, the Umbrella

Bar Relocation, Covered Surface Lift and Snowmaking, California Side Trail Widening, and Adventure Peak Improvements (that include the children's ski school lodge -Bear Cave Lodge). This value actually increased since last year following modifications to the Gondola Lodge permit.

7.4-14 Reduce and Control Fugitive Dust

During project construction, Heavenly employees and contractors are required to implement mitigation measures to minimize the generation and transport of fugitive dust. These measures may include the use of chemical dust suppressants and/or water on unpaved roads, grading and excavated areas, as well as cleaning onsite paved roadways daily in order to remove excess dirt and mud.

RCI monitors the effectiveness of Heavenly's dust control measures during their temporary and permanent BMP inspections. The frequent use of watering trucks achieved dust control measure on steep roadway slopes and stockpiling for construction projects. Plastic sheeting was used prior to expected storm events to cover the stockpiles generated from the Gondola Lodge (Tamarack) and children's ski school Lodge (Bear Cave) construction. New California Storm Water Pollution Prevention Plan (SWPPP) requirements, effective 2011 and beyond, require all stock piles that are not in use for 14 days must be covered. If in use and considered active the pile must have BMPs located around the pile, but not covered. All construction projects in California requiring a water board permit will have these same stockpile requirements. Watering trucks were used extensively limiting dust control issues at this location. Road base material was applied to the high traffic roadway located from the lower Powderbowl Terminal to 100 feet past the stream crossing of Heavenly Valley Creek (approximately the first switchback) preventing rutting. Application of this material lessened the transport of fugitive dust and lessened the need for watering. More information on dust control is located in Appendix I.

7.4-15 Minimize Removal/Modification of Deciduous Trees, Wetlands, and Meadows

Before any construction project Heavenly must have a qualified biologist conduct a vegetation survey and identify all deciduous trees, wetlands, and meadows located within or adjacent to the proposed construction corridor. Heavenly is then required to implement a final engineered alterative that avoids the loss or degradation of the identified riparian or wetland communities. If these communities are unable to be avoided, Heavenly must mitigate for the impacts.

In 2011, there were no projects located in areas that contained deciduous trees, wetlands, and/or meadows.

7.4-16 (BIO-2) Active Raptor and Migratory Bird Nest Site Protection Program

This measure requires that before construction activities, a migratory bird nest site survey will be conducted to identify any active raptor nest sites within the project area. During initial construction activities, a Forest Service biological monitor is required to be onsite to evaluate if any migratory bird nests are within 100 feet of the construction corridor. If any nests are found, the biological monitor will stop construction and consult with the Forest Service and TRPA staff within 24 hours to determine the next appropriate actions.

Under the direction and oversight of the Forest Service, Hauge Brueck Associates qualified staff conduct annual raptor and migratory bird nest surveys. Surveys conducted in 2011 did not detect

any active raptor or migratory bird nests within the survey area. Spotted owl protocol states that if there has been no detection for two consecutive years, it can be assumed that the results are accurate for an additional two years without performing additional surveys. A review of the surveyed results can be found in the 2011 Biological Survey Results Summary located in Appendix VII.

7.4-17 Monitor and Protect Northern Goshawk

Any projects that propose to affect or are within half a mile of any suitable northern goshawk habitat are required to have pre-construction surveys completed for northern goshawks. All surveys will be in accordance with the most recent Forest Service Region 5 protocol. Additionally, Heavenly Mountain Resort is required to fund updated northern goshawk habitat maps at 5-year intervals throughout the life of the Master Plan Amendment. These maps will be used when conducting any pre-construction surveys.

Hauge Brueck is approved by the Forest Service to conduct northern goshawk surveys. Both dawn acoustical and broadcast surveys were conducted using the updated habitat map generated by the Forest Service for the environmental analysis of the Master Plan Amendment. The 2011 surveys did not detect any active raptor or migratory bird nests within the surveyed area. However due to findings in the past, it is recommended that the surveys within the special use boundary continue. Results and data sheets from the surveys conducted in 2011 are contained in the 2011 Biological Survey Results Summary located in Appendix VII.

7.4-18 Prohibit Skier Access on Management Prescription 9 Lands

This measure requires that Heavenly Mountain Resort prohibits skier access from the gondola mid station.

Heavenly stations employees at the Gondola mid station to explain to skiers and riders that there is one more stop and deters them from skiing from the mid station. If guests with skis or snowboard equipment stop at the mid station, Heavenly employees require them to leave their equipment on a rack near the gondola that can be monitored. During and after larger snow storm events, occasional rider tracks can be seen from the mid station. Heavenly's policy calls for employees to contact dispatch and security to apprehend the violators at the bottom of the Gondola.

The mid station is also a physical barrier to accessing skiable terrain. It is an elevated platform with a 10-15 foot drop to the ground. The stair leading to an area below the mid station are roped off and marked "For Authorized Personnel Only." Heavenly does its due diligence to maintain compliance with this measure prohibiting skier access from the mid station. Detailed information on Heavenly's Boundary Management policies can be found in Appendix VIII.

Because of the increased precipitation and amount of snowfall for the 2010-2011 ski season, skiing and prohibited access from the Gondola mid-station was more problematic. The physical barrier was limited due to snow depth and evidence of increased tracks were visible below the deck. However employees were quick to contact security/dispatch and violators who were apprehended had their passes revoked and/or were fined.

7.4-19 Evaluate and Monitor Known Archaeological Resources within Comstock Logging Historic District

Prior to construction activities, a qualified professional must formally evaluate the project area for the National Register of Historic Places (NRHP). The LTBMU Heritage Resources staff keeps a record of possible historic sites at Heavenly Mountain Resort.

Communication with LTBMU Heritage Resources staff revealed that evaluations of archeological resources sites within the Comstock Logging Historic District occurred before 2007. Evaluations concluded that all sites but one (the Flume Site) were eligible for the NRHP (Maher, 2010). Monitoring of these eligible sites occurred throughout 2009 and 2010. Continued monitoring occurred in the Galaxy Pod area, in close proximity to proposed new ski run construction areas (Maher 2012). Additional surveys were conducted for the trail widening on the California side to ensure that there was not a conflict with the Comstock Logging District site. The location of the Gondola Lodge (Tamarack) and children's ski school Lodge (Bear Cave) do not conflict with the Comstock Logging Historic District. The LTBMU Heritage Resources staff keeps a record of possible historic sites at Heavenly Mountain Resort. If and when future construction for the proposed J Lift is to occur, Heavenly will need to plan for and avoid a prehistoric site (Maher 2012).

7.4-20 Identify and Protect Undiscovered Archaeological Resources

The LTBMU Heritage Resources staff will spot-check any proposed construction areas in consultation with the appropriate State Historic Preservation Office. If previously undiscovered resources are discovered during construction, all activity will be put on hold until the LTBMU Heritage Resources staff for either California or Nevada assess it for eligibility to the NRHP, compliance with TRPA Code Section 29, and/or (in the event of a prehistoric or ethnographic find) for Native American values.

LTBMU Heritage Resources staff has prepared a comprehensive list of historical sites within the Heavenly boundary. Surveys are done prior to choosing locations for projects. Heavenly employees and contracted construction workers receive training prior to project commencement on the protocol for an encounter with possible archaeological resources.

In 2009, to assist in project scoping and field study, a general meeting at the offices of Heavenly Mountain Resort and a site visit focusing on the Gondola's Area of Potential Effects (APE) was conducted (Lindstrom and Blom 2009). Heritage concerns were addressed by project archaeologist Susan Lindstrom and John Maher, Heritage Resource Coordinator for the USFS-LTBMU. A surface archaeological reconnaissance was conducted by Devin Gonzales Blom and Susan Lindstrom from October 26th through 29th, 2009.

Three project areas were surveyed prior to 2009 and included the Gondola project area (both lodge locations), the Snow Beach project area, and the Galaxy Pod project area. No heritage resources were encountered in either the Gondola or the Snow Beach project areas and no additional surveys were conducted in 2009 (Lindstrom and Blom 2009). However, in the Galaxy Pod project area, supplemental field studies were required, to include: (a) additional archaeological reconnaissance, (b) updates of existing archaeological site records, and (c) site boundary flagging. Monitoring continued in 2011 in the Galaxy Pod area. Areas of concern or

possibly affected were flagged and re-flagged. Proposed projects in this area will be sent to the USFS-LTBMU for a detailed survey report (Maher 2012).

Two road segments were discovered as extensions of a Comstock-era wood haul road which was first recorded by S&S Archeological Consultants in 1992, as leading downward from the Mott Canyon area to the upper reaches of the South Fork of Daggett Creek (Lindstrom and Blom 2009). These new heritage resources have been recorded on State of Nevada IMACS archaeological site records in accordance with established guidelines. Updates to these forms were completed. Copies of this report and accompanying site records have been forwarded to the USFS-LTBMU for their review and processing. An additional copy has been placed on file with Nevada State Museum, which maintains the archaeological inventory for the State of Nevada (Lindstrom and Blom 2009).

7.4-21 Protect the Tahoe Rim Trail

In order to protect the Tahoe Rim Trail (TRT) and allow for its continued used during construction of resort facilities, Heavenly Mountain Resort is required to rope off any hazardous areas within or adjacent to the TRT, prohibit construction of permanent structures which may block the use of the trail, as well as inform the public of any potential closures along the TRT.

There were no projects implemented within the vicinity of the TRT during 2011. The Tahoe Rim Trail Association is currently constructing the Van Sickle Connector and modifying the north and south trail along Kingsbury Grade. The Van Sickle Connector will tie in the casino corridor with the rim trail while the portion of trail that currently follows the roadways of North and South Benjamin will be re-routed around the surround neighborhoods off of the pavement. Neither of these projects will interfere with Heavenly Mountain Operations, nor will Heavenly operations prohibit these trail modifications.

7.4-22 Secure Adequate Water Capacity Prior to Development

Prior to development, Heavenly Mountain Resort is required to complete a detailed analysis of on-site water and sewer requirements of the project. South Tahoe Public Utility District (STPUD) and Kingsbury General Improvement District (KGID) will review the analysis and determine if water and sewer system collection and treatment capacity will be available to meet the expansion needs.

Both the Gondola Lodge (Tamarack) and the children's ski school Lodge (Bear Cave) secured water use permits prior to construction in 2010 and 2011. Both lodges are serviced by a new on mountain well. No additional projects in 2011 were implemented that increased water demand and supply by either STPUD or KGID.

7.4-23 Secure Adequate Sewer Capacity Prior to Development

Heavenly will obtain adequate sewer capacity prior to development of new on mountain facilities requiring sewer units. Heavenly generally uses the sewer capacity outline in the Master Plan of 1996. This capacity will be monitored to ensure that it will meet the requirements of the facilities outlined in the Master Plan Amendment of 2007.

South Tahoe Public Utility District (STPUD) approved the sewer requirements for the constructed Gondola Lodge (Tamarack) in 2010. STPUD permitted and approved the sewer requirements for the children's ski school Lodge (Bear Cave) in 2011. Permitting and sewer

capacity will be reviewed and accepted by STPUD and KGID prior to any future construction projects. Reserve capacity exists for future build out and projects with both STPUD and Douglas County Sewer Improvement District (DCSID) through KGID.

Conclusion

During construction, measures of the MMP are implemented during each project. Heavenly Mountain Resort maintained compliance with these measures during the planning, design, construction, and post-construction phases for each project during the 2010-2011 construction season.

Chapter 4 OPERATON AND MAINTENANCE MEASURES

Introduction

The operation and maintenance measures contained in the MMP govern both summer and winter activities necessary to run Heavenly Mountain Resort. While construction measures are project-specific, operation and maintenance measures encompass daily resort operations. These ongoing measures are usually related to either summer or winter activities.

7.5-1 Revised Cumulative Watershed Effects Restoration Program

The preparation of a Cumulative Watershed Effects (CWE) Analysis was required by TRPA guidelines for ski area expansion and was completed in 1991. The CWE Analysis identified areas that produced relatively greater than background erosion and sedimentation levels. Those areas were prioritized for rehabilitation and restoration treatments. Because all of the remedial CWE projects were completed under the 1997 CWE Restoration Program, the revised CWE focuses on long-term maintenance of facility BMPs, road and ski trail projects, site specific and localized needs, and improved implementation and effectiveness monitoring (Heavenly, 2007).

Each year Heavenly prioritizes CWE projects for both maintenance and implementation. RCI is responsible for BMP implementation and effectiveness monitoring. Results from these monitoring efforts are located in Appendix I. The status of this program is ongoing and continuous. Appendix III contains a list of CWE projects proposed during the 2011 construction season. Five projects listed on the 2011 CWE list were completed last year (Groove Upper Terminal, Lakeview Water System, Top of the Gondola Magic Carpet, the Blue Angle Chutes, and Ski Trails 14, 15, U3 and U4). BMP's were completed for the Tamarack Lodge, and construction BMP's were placed for a new access road for the Tubing Lift but construction was postponed. Most of the projects not constructed on the 2011 CWE list were rolled over and are included on the 2012 CWE project list. The "J Lift", or detachable ski lift, was not included in the 2012 project list. Appendix VI contains the list of proposed CWE projects planned for 2012.

7.5-2 Revised Collection/Monitoring Agreement – Heavenly and Forest Service

The Revised Collection/Monitoring Agreement between Heavenly and the Forest Service commenced in 2005 after adaptive management was used to make changes to the original monitoring agreement. The Collection/Monitoring Agreement requires Heavenly to conduct water quality monitoring, effective soil cover monitoring, BMP effectiveness monitoring, riparian condition monitoring, and condition and trend monitoring. Water quality and BMP effectiveness monitoring are conducted annually, while effective soil cover and riparian monitoring are conducted based on specific work plans approved by the Forest Service. Condition and trend monitoring is conducted every 5 years through the preparation of a comprehensive report. The last comprehensive report, covering a six year time frame, was prepared in 2011 and submitted in January 2012.

The Environmental Monitoring Program continues to be funded by Heavenly, but has been implemented by Cardno ENTRIX and RCI since 2005. Heavenly renewed their contract with

Cardno ENTRIX and RCI to complete water quality monitoring and BMP effectiveness monitoring in January 2008 for a five year period. 2012 marks the end of the current contracted work.

The Revised Collection/Monitoring Agreement between Heavenly and the Forest Service remains in place, however, it now provides funding for only Forest Service oversight and review of all water quality and BMP-related monitoring.

Water quality monitoring was conducted monthly between October 1, 2010 and September 30, 2011 and weekly during spring runoff at the six sites specified in the 2005 Revised Environmental Monitoring Program. Storm events were also sampled in the fall and spring at the California Parking Lot, below Patsy's and .Property Line compliance points. Results were reported to Lahontan and the Forest Service in the quarterly and annual/comprehensive report. Moving forward, the amended Lahontan permit no long requires storm sampling at the compliance points.

The results from BMP effectiveness monitoring are also reported quarterly and annually and have been discussed previously. The effective soil cover program and riparian condition monitoring for 2011 can be found in the referenced Environmental Monitoring Program Comprehensive Report (2006-2011).

An aerial photo analysis was performed in 2009 to determine effective soil cover on existing ski runs. While this methodology was comprehensive, it was not detailed enough to address the effective soil cover objectives. Since 2009, ground-truthing using California Native Plant Society's Vegetation Rapid Assessment Protocol has been conducted. The results can be subject to professional interpretation, although each of the sampling locations showed an increase in vegetation cover. Results can be found in chapter 3 and coordinating appendix D of the referenced Environmental Monitoring Program Comprehensive Report. Continued communication between Heavenly, the Forest Service, Cardno ENTRIX and IERS is in order to develop a more appropriate and or alternative measurement system to address ongoing soil stability.

Stream riparian studies were conducted during 2009 and again in 2011. Data from these studies were compared to data collected in 2006. Comparisons were made to address whether or not Heavenly mountain operations are affecting stream health. Specific reaches and creek details can be found in chapter 8 of the referenced Environmental Monitoring Program Comprehensive Report. For the many of the reaches, the channel health remained similar to findings found in 2006 and 2009. Stream health measurement changes occurred, but may be associated with ephemeral stream morphology and observer subjectivity. The next full stream riparian monitoring round will not occur until 2015.

A portion of the stream riparian studies includes bentho macro-invertebrate (BMI) studies. Samples are collected and analyzed providing a stream health index score. Sampling occurs on a two year on and two year off schedule with results collected in 2006 and 2007 along with the current round collected in 2010 and 2011. The amended Lahontan permit changed the formatting and reporting requirements for these samples. Results from the 2006 and 2007 data set are not comparable to the latest sampling round. The 2010 data has been submitted to the state water board, but the data has yet to be posted. Results from the 2011 samples will be submitted this spring. Once the database is updated with the current samples scores and an index should help to determine whether or not stream health is deteriorating, remaining the same or improving.

7.5-3 Maintain Water Rights Balance

This measure specifies that Heavenly shall implement a water use/water rights monitoring program to estimate the quantity of water supplied by each source and where the water is used.

Heavenly has installed all necessary meters to conduct the water use monitoring program and has prepared an annual water use/water balance report. The Water Use Report for the 2010-2011 season contains detailed records on water used for snowmaking and can be found in Appendix IX. The total amount of water used for snowmaking during the 2010-201 ski season was 115.78 million gallons (355.32 acre-feet). For the 2010-2011 snowmaking season 49 million gallons were purchased from KGID and STPUD (8.90 and 40.1 million gallons). The remaining amount of water used for snowmaking was supplied from the California and East Peak Lake reservoirs and incoming precipitation. Results from the water balance report state that a net of 2.2 million gallons of in-basin water were transferred out of basin during the 2010-2011 snowmaking season. "No changes have been made in the metering locations, configuration, or calculation procedure from the previous year" (Appendix IX, page 3). Metering for the Von Schmidt transfer is susceptible to lightning strikes and has been repaired numerous times. During the 2010-2011 snow making season the meter was non-functional due to a lightning strike. The meter was repaired last summer (2011) and collected a partial data set before being struck again in 2012. All purchased water supplied by outside utility providers has been provided in compliance with their approved water rights or similar permits. The sources and use of water between October 1, 2010 and September 30, 2011 are as follows:

California Main Lodge: Water for the lodge is supplied by South Tahoe Public Utility District (STPUD). No consumption data is provided by STPUD. Annual flat fee charges for STPUD water are based on the size of the water meter.

Lakeview Lodge/Snow Beach Community Water System: Water for these facilities is supplied by an underground well. The estimated consumption for the period is 340,700 gallons (1.05 acrefeet).

Sky Deck Barbeque and Bathrooms: Water for these facilities is supplied by an underground well. The estimated consumption for the period is 406,000 gallons (1.25 acre-feet).

Adventure Peak (Top of Gondola/Gondola Mid-Station): Water for these facilities is supplied by an underground well. The estimated consumption for the period is 1,538,000 gallons (4.72 acrefeet).

Boulder Lodge: Water for the lodge is supplied by Kingsbury Improvement District (KGID). Estimated consumption for the period based on water invoices from KGID is 244,734 gallons (0.75 acre-feet).

Stagecoach Lodge: Water for the lodge is supplied by KGID. Estimated consumption for the period based on water invoices from KGID is 270,000 gallons (0.83 acre-feet).

East Peak Lodge: Water for this facility is supplied by an underground well. Estimated consumption for the period in question is 382,300 gallons (1.72 acre-feet) which is less than the consumption reported last year. The difference in these values is likely due to opening of the Tamarack Lodge. Skier and rider numbers increased usage at this new location while users decreased at the East Peak Lodge location.

7.5-4 Maintain Water Flows in Heavenly Valley Creek

This measure requires a water use/water rights monitoring program specific to the California Reservoir.

Heavenly attempts to maintain flows into and out of the California reservoir in balance continuously to ensure that water rights are not exceeded. Metering equipment is in place above and below the California Reservoir; however vandalism and aged equipment have prevented continuous monitoring. New data loggers would allow for continuous monitoring. With this new information, a precise balance of flows into and out of the California reservoir can be maintained. Modifications and new equipment is proposed for installation in 2012.

7.5-5 Maintain Summertime Flows in Heavenly Valley Creek

This measure does not allow the use of water from Heavenly Valley Creek for irrigation in the summer and requires water use balance for the California Reservoir.

Heavenly does not directly take water from Heavenly Valley Creek for summer irrigation. Flows into and out of the California reservoir are manually maintained in balance continuously to ensure that water rights are not exceeded. The water balance report recommends revising operation procedures during the snowmaking season and managing summer irrigation practices to limit water transfers.

7.5-6 Maintain Water Flows in Daggett Creek

The MMP specifies that Heavenly shall install a flow gauge at East Peak Lake, monitor input via precipitation and output from East Peak Lake, and maintain release rates that satisfy water right permit 50525.

The water rights permit is based on snow making usage as opposed to maintaining flows in Daggett Creek. The permit states that 0.5 cfs of water can be used from November through March for snow making operations. There are a number of inputs to determine this value such as: well usage, stream flows out of the dam, water pumped out of the reservoir used for snow making and water pumped into the reservoir. Appendix IX contains the 2010-2011 snowmaking report, while Appendix V contains the 2010-2011 stream flow data collected and prepared by RCI on Daggett Creek. Data was not collected from July 19th through August 5th due to the data logger running out of memory. In the future, data will be downloaded as soon as access to the gauge is possible. Due to the non-uniform cross section location and low flows in the channel the discharge correlation is not very accurate during low flow measurements. RCI proposes that alternative methods can be used to demonstrate water rights compliance. If an alternative method is approved, by the Nevada Division of Water Resources, this measure will be amended.
7.5-7 Maintain Compliance with Water Entitlements

Similar to measure 7.5-3, Heavenly shall implement a water use/water rights monitoring program and comply with existing California, Nevada, and local provider water restrictions on an annual basis.

Heavenly complied with all applicable water rights in during the 2010/2011 monitoring period and prepared a water use/water rights report which is contained in Appendix IX. The East Peak well was fully operational during 10-11 snowmaking season and 17.0 million gallons (52.17 acre-feet) were pumped from the well for snowmaking. Increased precipitation and well usage decreased the total value for inter basin water transfers.

7.5-8 Reduce Vehicle Emissions

Heavenly is to work with responsible agencies to implement a mitigation package that will reduce the potential increase of ambient carbon concentrations. The mitigation package includes using contributions to development of best available control technologies and using these technologies for construction, expansion and improvement of the bus system, and improved parking management. In addition, Heavenly shall consider offering skiers/riders the option of both a morning and afternoon half-day lift ticket to reduce peak parking hour traffic.

To mitigate the resort's contribution to carbon emissions, Heavenly is implementing a carbon mitigation package that is largely centered on reducing vehicular traffic. Heavenly uses low emission vehicles for both transit and operations. The entire fleet of Heavenly snowmobiles has 4-stroke engines. Heavenly also uses state-of-the-art snowcats with Tier 3 California Air Resources Board (CARB) engines. The emissions from Tier 3 snowcats are the cleanest available on the market.

During the ski season, Heavenly provides free shuttle service between all base areas and lodging facilities. They discourage vehicular travel to the gondola by only offering paid parking. Employees can buy subsidized monthly bus passes. Heavenly contributed to the start up and operation of the Coordinated Transit System (CTS) and continues to contribute the 20% required local match for Capital Vehicle Replacement Grants from the Federal Transit Administration. Since 2005, all new and replacement buses on the BlueGo system have been low emission, alternative fuel vehicles.

Heavenly currently offers skiers and riders half-day afternoon lift tickets.

7.5-9 Snow Grooming Noise Mitigation Methods

This measure states that Heavenly shall not groom slopes within 85 feet of a Plan Area Statement (PAS) boundary.

Heavenly did not operate snow-grooming equipment within 85 feet of the PAS boundary during the 2009-2010 ski season. This was confirmed by Heavenly Mountain Operations manager, and there were no complaints received from nearby residents.

7.5-10 Snowmobile Noise Mitigation Methods

This measure encourages snowmobile noise reduction through proper fleet maintenance, replacing 2-stroke snowmobiles with 4-stroke snowmobiles, and operation of snowmobiles away from PAS boundaries.

Heavenly's entire fleet of 45 snowmobiles consists of 4-stroke technology. Studies have shown that 4-stroke engines reduce noise levels by 10 dBA when compared to 2-stroke engines (Bollard & Brennan, Inc., 2001). Heavenly also maintains their fleet regularly and keeps documentation on all maintenance.

Snowmobile use is concentrated in flat areas on the upper mountain and not near PAS boundaries. As part of the snowmobile training, riders are informed of the PAS boundaries and the limitation of operating snowmobiles within 85 feet of the boundary. Snowmobiles are operated during the daytime to have the least effect on the Community Noise Equivalent Level (CNEL), though there is no formal noise measurements conducted. Additionally, no known complaints were filed with the local jurisdiction, Heavenly, TRPA, or the Forest Service.

7.5-11 Snow Removal Noise Mitigation Methods

To reduce noise created from the snow removal process; this measure states that Heavenly should minimize night time snow removal and attempt to construct noise barriers along the perimeters of parking lots using snow.

While no formal noise measurements are conducted to determine snow removal operations' effect on the CNEL, no known complaints were filed with the local jurisdictions, Heavenly, TRPA, or the Forest Service. Additionally, Heavenly's snow removal plan calls for constructing snow berm barriers along the perimeter of the California Base, Boulder, and Stagecoach parking lots. Typically snow is removed, early in the morning prior to opening for the public, from areas furthest from adjacent houses first and pushed towards the houses to build noise barriers.

7.5-12 Snowmaking Noise Mitigation Methods for Base Areas

This measure calls for a reduction of CNELs at the base areas to 1982 values or TRPA PAS noise standards, whichever is less, through the implementation of snowmaking technology.

The CNEL is measured annually at each base area by j.c. brennan and associates. Results for the 2010-2011 season are contained in the Heavenly Ski Resort Master Plan Noise Monitoring Survey located in Appendix X.

Heavenly has completely replaced the air-water snowmaking nozzles at the California Base with quieter fan guns; however portions of the lower mountain (Round About and lower Gun Barrel) still continue to utilize air/water nozzle guns. During the 2010/2011 snow making season, the air/water nozzle guns located near the lower portion of California side were limited to reduce overall snowmaking noise levels. The California Base has a continuous noise meter which recorded sound levels during the ski season on both snowmaking and non-snowmaking days (from November 1st through March 31st). The CNEL value recorded at the monitoring location exceeded the 55 dBA standards for PAS 085 and 087, but was the lowest value recorded over the record period (57.9 dBA). The CNEL measured on days without snowmaking decreased from the previous season (56.5 dBA) and is the lowest noise measurement collected over the past 15 years. The last two seasons readings have decreased in part to the relocation of the monitoring

site that has helped dampen the unwanted background traffic noise from the intersection of Keller Road and Saddle Road. The previous location (northeast corner of Keller Road and Saddle Road adjacent to the Tahoe Seasons Resort) had reached its limitations and usefulness. Traffic noise from the current location (located at the southeast corner of Keller Road and Saddle Road) is reduced due to set back from the intersection. Traffic noise and individuals recreating in the area still influence the noise reading even on non-snowmaking days when CNEL levels were recorded. Short-term CNEL measurements were taken at the Boulder and Stagecoach base areas during snowmaking operations in November and December 2010. The noise measurement was above the permitted CNEL standard for the plan area statements and consistent with results collected in the past for both locations. Heavenly anticipates replacing the air/water nozzles at these locations after they have replaced all of the nozzles located on the California face. Heavenly is utilizing the best available low energy/low noise snowmaking technology in all new snowmaking installations consistent with the master plan and continues to replace air/water nozzle guns with low noise equipment throughout the entire mountain.

Heavenly has actively pursued several of the mitigation measures for noise reduction at base areas listed in the Master Plan Amendment; however, the measured CNELs are not meeting the scheduled reductions, therefore, this measure is listed as partially compliant.

7.5-13 Snowmaking Noise Mitigation Methods for Upper Mountain Areas

This measure calls for a reduction of existing noise levels where new snowmaking facilities would result in new PAS noise impacts.

The remote measurement for plan area 080 was conducted in February 2011 during lower mountain snowmaking operations. Noise measurements were not conducted at the upper mountain location in plan area 095due to above average snowfall and the lack of snowmaking needed. Noise measurements within plan area 080 at "Party Rock" were "barely audible and were not discernable above the background ambient noise levels" (page 20, Appendix X).

During the 2010/2011 snowmaking season, Heavenly was in compliance with this mitigation measure, as snowmaking was minimal for the upper mountain.

7.5-14 (NOISE-1) Limit Hours of Snowmaking Operation and Use of Fan Gun Technology for the Proposed Skyline Trail Snowmaking

This measure limits snowmaking on Skyline Trail to daytime hours due to the current CNEL of 78dB.

There was no snowmaking along the Skyline Trail in 2010-2011. This measure is not applicable at this time. No water lines exist along the Skyline Trail for snow making. During the Skyline Grading construction project, water lines that were proposed for snow making were removed from the capital project.

7.5-15 Rock Busting Noise Mitigation Methods

In order to mitigate the impact to a less than significant level, Heavenly must control the number, size and location of "rock busting" blasts (to meet PAS noise standards). Heavenly is to continue to implement Rock Busting Noise Mitigation measure from the 1996 Master Plan.

There were no rock busting activities and subsequent mitigation measures performed during the 2011 construction season.

7.5-16 (NOISE-2) Restrict Hours of Amphitheater Operations

This measure restricts the hours of concert nose to the daytime and early evening hours and restricts the concerts to less than 6 hours.

The amphitheater has yet to be constructed. Heavenly has conducted a concert simulation noise study; however as of 2011, no concerts have occurred and this measure is not yet applicable.

7.5-17 Expanded Bus/ Shuttle Access

To encourage bus and shuttle transportation, Heavenly is to implement the Coordinated Transportation System (CTS) and provide incentives for employees and patrons to use ski shuttle buses.

Heavenly continues to be a leading operator in the CTS system providing operating revenues and local match revenue for capital equipment purchases during the 2010-2011 season. Free parking was not available at the gondola though free shuttle service between base areas was readily available during the 2010-2011 ski season. Employees are encouraged to use the free shuttles because employee parking is limited at the Gondola base area and prohibited on weekends, peak weekends and holiday periods at the California base area. Appendix XI includes the shuttle schedule and route brochure distributed by Heavenly for the 2010-2011 season.

Additionally, Heavenly continues to monitor and collect feedback about the use of shuttles through their annual employee survey (Appendix XII). Heavenly expands the bus system with additional vehicles (between 14-18 vehicles with six additional charter buses on call) during peak weekends and holiday periods. During normal mid-week periods, 8-10 vehicles are used. The number of shuttle buses that are in use every day is tied to business volume forecasts. Resort guests are randomly surveyed on a daily basis during the ski season except for the first and last two weeks of the season.

Riders are asked to rate the timeliness of the bus system. Answers to the survey along with ridership numbers are used by Heavenly to ensure that an adequate number of shuttle vehicles are in use to respond to the guests needs. Survey results and an example survey questionnaire are included in Appendix IV.

Ridership numbers for Heavenly's free shuttle service are included in Table 4-1. The 2010-2011 ridership numbers are slightly above the previous year's numbers.

 Table 4-1
 Total Ridership Numbers for Heavenly Shuttles

2007-2008	419,183 *
2008-2009	322,486*
2009-2010	309,960
2010-2011	345,152

* includes operation of employee shuttles by transit contractor

7.5-18 Discourage Use of Automobile

To meet this measure, Heavenly is to discourage the use of automobiles as the primary mode of access to the Gondola.

Heavenly runs free shuttle service to and from all of their facilities. See Appendix XI for the 2010-2011 bus schedules and encompassing map. The bus system also makes stops at employee housing. Free parking at the Gondola is not provided. Heavenly has implemented the TRPA Employer Trip Reduction Ordinance by encouraging employees to rideshare, carpool and offering subsidized bus passes to employees for public transit.

7.5-19 Implement the Coordinated Transportation System

This measure states that Heavenly shall continue to implement their portion of the ongoing air quality and traffic mitigation measures contained in the CTS Memorandum of Understanding (MOU).

Heavenly has implemented all measures identified in the Master Plan Amendment and continues to implement its share of the CTS by offering free shuttle service in the summer and paying a fair share of costs associated with operating and maintaining the fleet of buses.

7.5-20 Reduce Traffic on U.S. Highway 50 at Echo Summit

Heavenly is to implement programs that encourage charter bus trips, air travel via Reno, and travel to the basin during off-peak periods to mitigate the possible increase of traffic on Echo Summit.

Heavenly continues to use marketing incentives to help reduce traffic at Echo Summit. Heavenly's marketing team attends ski shows and expos annually in Los Angeles and the Bay Area to promote ski packages that include group transportation discounts. By contacting group sales, Heavenly provides and offers discount lift tickets to patrons of bus vendor services. During the 2010-2011 ski season 1,099 users took advantage of this shuttle and ticket promotion. There was a ticket discount offered to skiers who traveling by passenger train via Amtrak; however this promotion has been discontinued at this time. Heavenly also offers a web page for helping patrons determine transportation options to the resort. Shuttle schedules to and from Reno and Sacramento are provided as well as a link to car rentals.

(http://www.skiheavenly.com/plan_your_trip/groups/bus_trips/)

The California Department of Transportation performs annual traffic counts at various locations on their state highways. The Mitigation Level identified in the MMP is "Non-degradation of peak hour traffic at U.S. Highway 50 and Echo Summit". The closest location to Echo Summit was at milepost 65.62, Echo Lake Road, with a peak hour vehicle count of 1,900 in 2010. This vehicular traffic number is the same value reported since 2006. While all traffic at Echo Summit is not attributable to Heavenly's operations, the average daily vehicle count at milepost 65.62 can be utilized to assist in assessing the effectiveness of Heavenly's efforts.

7.5-21 Protect Tahoe Draba Populations within Heavenly Mountain Resort

Six specific measures to protect Tahoe draba populations are identified for implementation in the MMP: surveys, fencing, avoidance, rock removal, monitoring, and an interpretive program.

During the 2011 summer months and construction season, Heavenly complied with all applicable measure for the protection of Tahoe draba populations. Tahoe draba surveys occurred prior to projects located within potential draba habitat. Surveys were performed prior to the construction and planning of the following projects: Jeep Trail Lookout Area, Mott Canyon Bail-Out, Players Terrain Park / Mambo Adventure Zone, Tamarack Hiking Trail, Cascade Ski Widening, Wedding Arch, Orion and Comet Ski Trail Widening, and Galaxy Well. Draba populations were located in the following project areas: Tamarack Hiking Trail, Cascade Ski Trail Widening, Orion and Comet Ski Trail Widening, and the Wedding Arch project during these studies

Final design at the Tamarack Hiking Trail and Wedding Arch area should not construct trails through known draba populations and include measure to confine and prevent people from wondering off the designated trails. Signs could be used to educate trail users about the presence of sensitive plants and encourage them to stay on designated trails.

The Powderbowl lodge project has not begun, and is not scheduled for construction at this time.

Every summer, Heavenly places interpretive signs about Tahoe draba along well-used driving and hiking routes to alert employees and visitors. Mandatory summer employee orientation includes a section on Tahoe draba and habitat protection.

7.5-22 (VEG 1-A) Tahoe Draba Long-Term Conservation Strategy

In addition to Measure 7.5-20: Protect Tahoe Draba Populations within Heavenly Mountain Resort, research is being conducted on Tahoe draba ecology through a Memorandum of Understanding (MOU) between the Forest Service Humboldt-Toiyabe National Forest, Forest Service LTBMU, Mount Rose Limited Partnership, Heavenly Valley Limited Partnership, and the TRPA.

Continual studies occurred during the summer of 2011 in conjunction with the 2012 CWE work list. Hauge Brueck worked with the LTBMU on surveying protocol and reporting. Draba populations were found during the surveys listed in measure 7.5-21.

7.5-23 (VEG 1-B) Minimize Loss/Degradation of Sensitive Plant Species

To protect sensitive plants at Heavenly, projects must be surveyed prior to construction and buffers must be placed around sensitive plants species. Facilities should also be sited to avoid riparian and old growth habitats.

Qualified field biologists from Hauge Brueck conducted sensitive plant surveys at each of the project sites listed below prior to construction and planning. The following sensitive plant surveys were performed:

- Jeep Trail Lookout Area August 23, 2011
- Mott Canyon Bail-Out August 23, 2011
- Players Terrain Park / Mombo Adventure Zone August 24, 2011
- Tamarack Hiking Trail August 24, 2011
- Cascade Ski Trail Widening and Run Hazard Reduction August 24, 2011
- Wedding Arch August 23, 2011
- Orion and Comet Ski Trail Widening August 25, 2011
- Galaxy Well August 24, 2011

During the summer of 2008, Forest Service botanists found one potential new site of the sensitive plant species Galena Creek rock cress (Arabis rigidissima). Heavenly implemented a 100 foot buffer around the sensitive plant area during project construction. While upheld during project implementation, the buffer was not maintained during general maintenance operations. It appears that this population was extirpated. Surveys in 2010 found an additional Galena Creek rock cress population located near the proposed "J Lift" project area. Additional visits in 2011 could not locate the plant species, though future monitoring during the summer months should continue for confirmation Assuming additional surveys prove rock cress findings, Heavenly is in partial compliance with this measure. It is recommended that Heavenly coordinate with the USFS prior to commencing work on maintenance issue projects.

7.5-24 (VEG 1-C) Noxious Weed Management

To prevent the spread of noxious weeds, Heavenly must develop and implement a long-term integrated weed management plan, use clean vehicles and materials for construction and stage them in weed-free areas, monitor new construction for 3 years, and implement an annual employee orientation and training program.

In coordination with the Forest Service, Heavenly has implemented a noxious weed management plan found within the EIR/EIS/EIS to stop the spread of noxious weeds. Equipment used for construction projects must be washed prior to entering Heavenly's property. All revegetation and erosion control materials are certified and inspected to be free of noxious weeds. IERS specifies special native seed mixes that are weed free to be used for revegetation efforts (Appendix II).

Employees are trained to identify the three most prevalent species of noxious weeds, tall whitetop, Canada thistle, and bull thistle, which have previously been found within the Heavenly boundary. Heavenly also has an independent weed monitoring program in areas that mulch and wood chips are applied. As part of Heavenly's post-project monitoring, sites are inspected for noxious weed infestations.

During the 2011 construction/summer season LTBMU staff surveyed the following six sites: the Gondola Lodge, children's magic carpet, Umbrella Bar relocation, Toe Rope relocation, snow making infrastructure east of East Peak reservoir, top of the Tamarack Chairlift, and at the proposed elevated trail and ropes course. Noxious weed infestations were found at both the Umbrella Bar relocation (Snow Beach) and top of Tamarack Chair locations. Chemical application was applied to approximately 10 plants at the Snow Beach location. Follow up inspection 20 days later showed discoloration and no buds forming on the plants at the treated location. The Tamarack invasive location was not accessible during herbicide application and treatment. Field crews manually treated the six invasive plants (Escobedo 2012).

7.5-25 Late Seral/Old Growth Forest Enhancement

To mitigate for any projects that involve the removal of late seral/old growth suitable habitat, Heavenly must enhance or restore twice the area to late seral/old growth characteristics.

Heavenly enhanced/restored a stand of forest equal to twice the area proposed for removal in the Master Plan Amendment. The enhanced forest was restored during the fall of 2007 and is located in the High Meadows area and is undergoing monitoring by the Forest Service every five years

for success. The next monitoring report will be conducted in 2012. The Forest Service documentation certifying of completion of this task is located in Appendix XIII.

7.5-26 Restrict Vehicle Traffic within the Heavenly Ski Resort MP 96 Development Area

Vehicular traffic during summer access must be restricted to existing roads only.

At the beginning of the summer, Heavenly employees undergo a mandatory comprehensive training session on summer road use and BMP awareness which includes an educational session on the environmental resources on the mountain. Each employee is required to comply with the summer driving rules.

Heavenly restricts access to the mountain through locked gates with combination locks that change monthly. Only trained Heavenly employees have access through these gates. Non-Heavenly drivers of vehicles with official business on the mountain must first receive an orientation about summer road use, agree to comply with all on-mountain access policies and procedures, and obtain a special pass to access the mountain. Heavenly keeps detailed information about these permits which must be renewed each season. Heavenly escorts are provided to anyone not familiar with the road system or their destination. If the driver or vehicle is found to not be in compliance, Heavenly reserves the right to escort them off of the mountain, and to not issue them future passes. Upon entering each locked gate, a sign is posted alerting travelers to stay on designated roads, obey a 10 mph speed limit, and be alert for potential wildlife crossings. In areas where designated roads are not clear, roped boundaries are erected and stay in place for the duration of the summer. The boundary ropes are maintained throughout the summer and when they are removed in anticipation of the upcoming winter months employees are reminded to stay on the roadways and avoid sensitive shoulder areas.

7.5-27 Monitor and Protect Nesting and Fledgling Bird Species

This measure specifies allowable dates for summer concerts at the Gondola top station.

There have been no concerts held at Heavenly (top of Gondola top station) in 2009, 2010, or 2011.

7.5-28 Compliance with Design Review Guidelines Section 7 Exterior Lighting Standards and Code of Ordinances

This measure requires that all exterior lighting be designed to comply with TRPA Design Review Guidelines Section 7 and Code of Ordinances Exterior Lighting Standards Section 30.8.

All exterior lighting fixtures for the Gondola Lodge and children's ski school lodge were found to be consistent with Section 30.8 and were approved by TRPA.

7.5-29 Building and Site Design Descriptions

All newly constructed or renovated buildings must comply with both TRPA and Forest Service design standards.

The Gondola Lodge building, children's ski school lodge and both site designs were consistent with both the TRPA Community Design Sub-element of the Regional plan, and the Forest Service Built Environment Guide for buildings on National Forest Land.

7.5-30 Maintain Timber Thinning Practices

Heavenly must work with the Forest Service to determine areas that require timber thinning as established by the LTBMU Land and Resource Management Plan. Practices should help prevent catastrophic wildfire but be consistent with management criteria for maintenance and enhancement of wildlife values.

Each year, Heavenly and Forest Service vegetation management specialists review thinning and hazard reduction needs. When areas are identified for thinning, timber thinning practices will be consistent with the Forest Service management criteria.

7.5-31 Compliance with Existing Health and Safety Practices

This measure requires Heavenly to regularly update and utilize their Hazardous Materials Business Plan, Hazardous Waste and Substance Potential Spill Emergency Plan, and Hazardous Waste Training Program and provide appropriate employee training. Heavenly fully complies with this measure.

Heavenly maintains updated copies of the following health and safety plans or practices as required by other laws:

- Hazardous Materials Business Plan
- Spill Prevention Control and Countermeasures Plan
- Injury and Illness Prevention Plan
- Hazardous Waste Handling Training
- Heavenly Emergency Response Plan
- Blood-borne pathogen training for specific departments

7.5-32 Avalanche Safety Practices

This measure addresses the issue of unexploded ordnances used for avalanche control. The Heavenly avalanche safety team is to document the locations of unexploded ordinances throughout the winter and locate the ordnances during periods of snowmelt for proper disposal.

Heavenly operates avalanche control and snow safety procedures in accordance with the Forest Service Operations and Avalanche Plan. The plan includes an approved procedure to safely dispose of unexploded ordnance. The 2010-2011 plan is included as Appendix XIV and is also on file with the Forest Service. In addition, Heavenly is licensed annually for the storage and use of explosives in connection with reducing avalanche hazards. Specific personnel are individually trained and licensed in the use of avalanche safety explosives. This plan is reviewed and updated annually as needed.

7.5-33 Provide Employee Housing

Heavenly must assist in providing employee housing by collecting information through an employee housing survey and supporting affordable housing through development, purchase, or sponsorship of existing programs.

The 2010-2011 Heavenly maximum employment levels (1,431 employees) are below the 1996-1997 levels (1,607 employees) indicated in the MMP; therefore, no additional mitigation is required. In 2010-2011, Heavenly provided 100 beds of employee housing on the California side.

Heavenly also has an employee housing assistance program that matches workers with available housing. Heavenly was a participant in the currently dormant South Lake Tahoe Housing task force. An employee housing survey is conducted annually and is contained in Appendix XII. Results from the survey indicate that a majority of employees are satisfied with their housing situation and are paying affordable rents.

7.5-34 Ensure Adequate Police/Sheriff/Fire Capacity

No significant effects on local law enforcement are expected to result from the implementation of the Master Plan Amendment and no specific mitigation level is required.

Heavenly utilizes in-house security to monitor and respond to the majority of on-mountain issues. City police or county deputy sheriffs handle criminal investigations. Special events may warrant additional security.

Heavenly communicates regularly with city and county fire departments to ensure response time and coordinate resolution of aid issues. First response mutual aid agreements are in place between adjoining fire departments. Heavenly complies with all fire district regulations during the design and operations of on-mountain facilities.

Conclusion

Compliance with the operations and maintenance portion of the MMP is an ongoing process. Heavenly complied with the MMP through careful planning and implementation, utilizing industry experts, and educating employees. Heavenly is in compliance with all of the Operation and Maintenance measures.

Chapter 5 MANAGEMENT RESPONSE TO MONITORING AND EVALUATION

Introduction

Heavenly's response to monitoring and evaluation is as important as the monitoring and evaluation itself. This portion of the MMP is to encourage adaptive management through collaboration between Heavenly and relevant interested agencies and parties.

7.6-1 Soil and Water Quality

To comply with measure 7.6-1, the results of various monitoring reports on soil and water quality are contained in this report. Heavenly's response to these reports is integral in achieving environmental improvements. Within 60 days of receiving completed monitoring reports, Heavenly, Forest Service, Lahontan, and TRPA will collaborate as necessary to develop an action plan based on monitoring results.

Heavenly has employed Cardno ENTRIX (formerly ENTRIX, Inc.) in a three-party contract with the TRPA to implement water quality monitoring services. For the 2011 water year (from September 2010 through October 2011)Cardno ENTRIX provided Quarterly Reports to Lahontan, the Forest Service, and the TRPA in fulfillment of the monitoring and reporting requirements set forth in the amended Lahontan permit. Quarterly reports were submitted on the following dates: February 1, April 29, and August 1of 2011. An Annual Report, that included the fourth quarter results, for the 2011 water year was submitted on January 17, 2012. This comprehensive report not only incorporated the results from each of the quarterly reports, but it also included six water years of data into one comprehensive report (see reference the Cardno ENTRIX Environmental Monitoring Program Comprehensive Report). The agencies provided feedback for each report and changes were implemented as necessary. Due to the close working relationship of Heavenly staff and field monitors, Heavenly often responds to field directives and corrections immediately before reports need to be issued.

Annual averages for total phosphorus, chloride and iron exceedances were reported at the two sampling sites along Heavenly Valley Creek. These parameters were also exceeded at the reference site and are not solely due to Heavenly resort operations. The annual average for total suspended sediment was exceeded at the Property Line location and the total nitrogen annual average was exceeded at the Patsy's sampling location. New standards for the California Parking Lot compliance site were implemented during the 2008-2009 water year. All of the measured constituents at this site were above permitted levels. However these values were less than values reported for the 2010 water year. Chloride levels at the California Parking Lot compliance site remain well above back ground and permitted levels.

Heavenly purchased a new sensor that was added to their spreader truck for the 2009-2010 season. The sensor gages road conditions and temperature to the control the least amount of deicer needed for success. It also reported the volume of deicer applied more accurately.

Reducing the deicer applied to the roadways should help reduce chloride levels detected in the runoff. However, because of the accuracy in measurement and prolonged winter season during the 2010/2011 season more deicer was used than in the previous year (908,960 lbs versus 135,300 lbs). Deicer application and recovery results can be found in Appendix D of Environmental Monitoring Program Annual Report (referenced). Heavenly has also installed automatic samplers in the California Parking Lot in order to better assess the effectiveness of the recently installed stormwater treatment system. Troubleshooting of the automatic samplers is ongoing though moving forward the amended Lahontan (Water Board) permit will require quarterly and annual submittal of the results

BMP effectiveness monitoring is conducted by RCI. RCI submits quarterly and annual reports adhering to the same deadlines to the appropriate agencies. These reports are attached as an appendix to the quarterly and annual water quality monitoring reports. RCI's annual report summarizes findings and trends reported throughout the summer season. The annual report also lists recommendations to improve implementation and effectiveness findings in future monitoring seasons. Feedback and comments from each of the agencies are also incorporated into Heavenly's operational and BMP practices. The overall monitoring goal is to always be in compliance with BMP installation and maintenance with all involved parties being in agreement. The BMP Effectiveness Annual Report is located in Appendix I.

The final piece of adaptive management is the work and Restoration and Monitoring Annual Report completed by IERS. IERS utilizes the results from BMP effectiveness monitoring as well as their own tests and observations done at Heavenly and designs restoration plans for onmountain project construction areas. The 2011 summer season marked the fifth continuous monitoring approach incorporating planning, implementing, and monitoring of large-scale mountain improvement projects at Heavenly minimizing runoff and erosion. Results from the annual findings are shared with Heavenly operations personnel who implement intensive soil and vegetation restoration treatments. Heavenly's operations staff and construction project managers continue to build on lessons learned. As part of the adaptive management approach, items that address success criteria will be re-defined yearly based on the past season's information collected. Success criteria did not change for the 2011 season.

In 2011 post-performance monitoring data was not collected for the Tubing Lift project. Modifications scheduled to improve the tubing lanes were scheduled for completion in 2011; however project priorities shifted these scheduled improvement for completion in 2012. Since these modifications were not implemented, permanent stabilization treatments have yet to be determined in helping control soil erosion and runoff. All of the other projects listed in the summary report (Appendix II), included post monitoring results. Findings show that plant coverage and establishment is low, and the modest success criteria of 10% coverage is unmet at the following monitoring locations: Gondola Lodge, Olympic Lift, Heavenly Flyer, Mid-Station Road, and the Stagecoach Snowmaking Upper and Lower Slope Projects. At each of these project locations, recommendations are included to help meet and increase vegetation growth and coverage. Plant coverage percentages remain low and unmet at most of the monitoring sites. New research suggests that erosion resistance is primarily dependant on soil conditions and not solely linked to vegetation.⁴ Over time, as soil conditions improve vegetation establishment growth and coverage will improve. However, at high elevations results have shown that this process typically takes longer than documented results at lower elevations.

IERS recommendations include a three phased approach. The first phase, management process, includes: expanding on the adaptive management program, integrating management responses into the summer work list (CWE), coordinating weekly meetings, and committing to a treatment implementation schedule. The second recommendation phase incorporates monitoring and assessment processes. Recommendation in this phase include: monitoring the Ridge Run test plots, indentifying and assessing road drainage issues, assessing soil development at sites 2-3 years old where vegetation growth is limited, assessing site conditions at reference locations, and inspecting treatment areas during rain events (photo monitoring). The third phase of recommendations focuses on the treatment implementation processes. The following recommendations are included under this phase: developing a plan to manage and maximize wood chip availability, protecting treatment areas that have been restored, incorporating test areas into future restoration projects, measuring fertilizer and seed application rates, documenting treatments, assessing the cost effectiveness of different treatment types, and including at least 5% western needlegrasses in upland revegetation seed mixes. Further details and in depth discussion of IERS's recommendations can be found in Appendix II. The end goal is to minimize erosion while restoring soil function and coverage with sustainable vegetation. Detailed monitoring results and further discussions from the IERS reports are located in Appendix II.

Though this task is currently ongoing, Heavenly is presently in compliance. Agency and public responses to this annual report during the 60-day comment period will be assessed and integrated into an action plan if necessary. No comments were collected for last year's report. Implementation of any action plan items will be discussed in the following year's annual report.

7.6-2 Traffic and Parking

Heavenly is to prepare a parking monitoring report at the end of each ski season that includes the following:

- Days during which overflow parking was used on Ski Run Boulevard, South Benjamin Drive, and Galaxy Bowl and any days when overflow parking was full.
- The number of parking spaces used at Galaxy Bowl each day this area was used for overflow parking.
- An explanation regarding any days during which these overflow parking areas were filled.

The monitoring reports are to be shared with the TRPA, Douglas County, El Dorado County, and the City of South Lake Tahoe and posted on the appropriate websites, not limited to the

⁴ Integrated Environment Restoration Services, Inc. Heavenly Mountain Resort Restoration and Monitoring 2011 Summary Report. IERS. Tahoe City, CA. Page 2.

Heavenly website. Based on the results of the monitoring reports, an action plan will be devised by Heavenly and interested parties within 60 days.

During the 2010-2011 ski season, Heavenly staff monitored the use of overflow parking areas. Results are shown in Table 5-1. N/A denotes that the site was non-applicable and not in use on the day in question. Holiday weekends impacted offsite parking the most. Weekends that include: New Years Eve (1/1/2011 through 1/3/11), Martin Luther King Day (1/15/11 through 1/17/11), and Presidents Day (2/18/11 through 2/21/11) typically fill all of the onsite parking and overflow into the offsite parking areas. Recent snowfall and storm cycles can peak interest and skier visits relating to increased usage of parking overflow (increased weekend skiers and riders).

Tahoe Regional Planning Agency – Mitigation and Monitoring Plan Annual Repo	ort
(October 2010 – September 2011): Final	

		5	Parking Locations:				
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	, site	, site	50. Esite				
Dates of Use:	Oti	Oth	<u> </u>				
12/4/2010	75	10	N/A				
12/11/2010	20	N/A	N/A				
12/18/2010	128	15	N/A				
12/25/2010	245	37	N/A				
1/1/2011	50	N/A	N/A				
1/2/2011	10	10	N/A				
1/5/2011	25	N/A	N/A				
1/7/2011	75	N/A	N/A				
1/8/2011	310	N/A	N/A				
1/9/2011	35	N/A	N/A				
1/15/2011	350	5	N/A				
1/16/2011	150	N/A	N/A				
1/22/2011	220	N/A	N/A				
1/29/2011	50	N/A	N/A				
2/5/2011	110	N/A	N/A				
2/12/2011	25	N/A	N/A				
2/17/2011	N/A	15	N/A				
2/18/2011	50	N/A	N/A				
2/19/2011	25	N/A	N/A				
2/20/2011	200	25	N/A				
2/21/2011	110	25	N/A				
2/25/2011	35	N/A	N/A				
2/26/2011	385	20	N/A				
2/27/2011	230	N/A	N/A				
3/5/2011	220	N/A	N/A				
3/12/2011	285	N/A	N/A				
3/19/2011	150	N/A	N/A				
4/3/2011	30	N/A	N/A				
Total	3,598	162	0				

To assess Heavenly compliance with the mitigation measure to reduce vehicle traffic, data was gathered from Nevada Department of Transportation (NDOT) and the California Department of Transportation (Caltrans) on average annual daily traffic (AADT) on US Highway 50 and Kingsbury Grade. Sites were chosen to represent major points of access to Heavenly. Sites are displayed in Figure 5-1. AADT values from 2006 through 2009 for each site are shown in Table 5-2.

Compared with the 2010 data, the 2011 values were equal to or less than the totals at all of the major access points to Heavenly Mountain Resort. With limited data, it is hard to draw finite conclusions or trends. The five years of data collect show a linear or near identical results. The economical downturn and financial troubles associated with lower skier visits in the past two seasons are not reflected in these vehicular traffic counts. Future Annual Monitoring Reports will provide more data allowing for a comparative analysis.

State - Station	Location	AADT 2006	AADT 2007	AADT 2008	AADT 2009
NV - 0050036	US-50, 0.4 miles West of SR-28 at MP 12	10,900	11,000 1	10,000	10,000
NV - 0053150	SR-207 (Kingsbury Grade) 0.5 miles East of US- 50	12,100	12,000	11,000	11,000
NV - 0050044	US-50, 300' East of the NV-CA State line	26,500	25,000	25,000	24,000
CA - MP 79.29	US-50 at the intersection of Ski Run Blvd. 2	32,500	32,500	31,500	31,000
CA - MP 65.62	US-50 at the intersection of Echo Lakes Road 3	9,000	9,000	8,900	8,900

Table 5-2 Traffic Data on US Highway 50 and State Route 207

1 Data Adjusted or Estimated

2 Annual Average Daily Traffic (Back AADT) Traveling West Bound

3 Annual Average Daily Traffic (Ahead AADT) Traveling East Bound

NDOT Data:

http://www.nevadadot.com/About NDOT/NDOT Divisions/Planning/Traffic/Annual Traffic Reports.aspx

CalTrans Data - <u>http://www.dot.ca.gov/hq/traffops/saferesr/trafdata/index.htm</u>



Figure 5-1 Location of Traffic Count Sites

7.6-3 Late Seral/Old Growth Enhancement

Monitoring is required every 5 years for any forest enhanced or restored under the mitigation measure 7.5-25 described in Chapter 4 of this report.

All work for the forest restored under this measure was completed in 2007. Monitoring will be completed in 2012 and will be evaluated to assess potential triggers that may elicit a management response.

Conclusion

Heavenly works closely with subject-area expert consultants and their own employees to immediately respond to potential problems. This allows changes to be quickly implemented and makes adaptive management more effective. Because Heavenly is so involved in the process, the results of each report usually do not trigger an action plan as action has already been taken to resolve any issues.

The feedback from agencies and interested parties generated from this report should be a valuable tool in assessing any response Heavenly has already implemented and creating new solutions for ongoing problems.

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Appendices List

- I. 2011 BMP Monitoring Report
- II. 2010-2011 Restoration and Monitoring Annual Report___
- III. 2011 CWE Work List
- IV. Bus Ridership Survey
- V. Daggett Creek Letter
- VI. 2012 CWE Work List
- VII. 2011 Biological Survey Results and Field Forms
- VIII. Boundary Management
- IX. 2010-2011 Water Use Balance Report
- X. 2010 2011 Annual Noise Survey Report
- XI. 2010 2011 Ski Shuttle and Route Schedule
- XII. Heavenly 2010 2011 Survey Results
- XIII. Forest Service Letter of Completion for Old Growth Forest Mitigation
- XIV. 2010 2011 Avalanche Rescue Plan
- XV. Environmental Monitoring Program Comprehensive Report Heavenly Mountain Resort Water Years 2006-2011 (electronic copy provided, no paper copy)





Appendix I 2011 BMP Monitoring Report

Heavenly Mountain Resort BMP Effectiveness Monitoring Construction Season Summary - 2011

Prepared For:

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Prepared By:



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Heavenly Mountain Resort BMP Effectiveness Monitoring Construction Season Summary - 2011

January 17, 2012

Prepared For:

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APPENDIX B – BMP Effectiveness Monitoring: Facilities and Construction Projects APPENDIX C – BMP Effectiveness Monitoring: Road BMP Upgrades and Reconstruction

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The following report summarizes the results of the BMP Effectiveness Monitoring at Heavenly Mountain Resort (Heavenly) for the 2011 construction season. It has been prepared by Resource Concepts, Inc. (RCI) to comply with the *Lahontan Regional Water Quality Control Board Waste Discharge Requirements (Board Order* MRP 2003-0032A1, WDID No. 6A090033000) requiring submittal of an annual monitoring report.

Best Management Practices (BMPs) are structural and non-structural measures used to reduce soil movement, control surface runoff, and improve runoff water quality. BMPs at Heavenly Mountain Resort are applied to facilities (buildings, utilities, parking lots, etc.), roads, ski runs, and construction projects. They are generally categorized as either Permanent or Temporary BMPs:

- Temporary BMPs are short-term, used during construction and maintenance projects and removed upon project completion.
- Permanent BMPs are used on a long-term basis to control contaminant sources or treat runoff, and require on-going maintenance to be effective.

Monitoring was conducted per the BMP Effectiveness component (Chapter 5) of the *Revised Environmental Monitoring Program*, as set forth in the 1996 Master Plan and the approved Master Plan Amendment (2007). BMPs are monitored for both implementation and effectiveness. BMP <u>implementation</u> concerns whether plans/specifications are adequate for resource protection, and if improvements are constructed according to design. BMP <u>effectiveness</u> is determined from observed or estimated erosion and sediment transport at sites evaluated.

Key components of the program include:

- Evaluation forms that focus on implementation and effectiveness consistent with the USDA Forest Service, Region 5, BMP Evaluation Program (Region 5 BMPEP),
- Monitoring frequency for Permanent BMPs: post-construction, 1-year post-construction, 3-, 6-, and 9-year post-construction,
- Monitoring frequency for Temporary BMPs for on-going construction projects: biweekly during construction and after precipitation events,
- The revised monitoring program "Needs Assessments" conducted on the facilities constructed prior to 2000,
- Assessment of the effects of road BMP upgrades using the water quality risk assessment protocols, stream crossing evaluations, and modeling to estimate road erosion and sediment yield.

In the past, BMP Effectiveness Monitoring reports (2004 through 2010) have provided annual recommendations for improving planning, implementation, effectiveness and monitoring of Temporary and Permanent BMPs at Heavenly. In keeping with the adaptive management approach, Heavenly has used these results and recommendations to improve the BMP retrofit and maintenance program. The following section summarizes the Resort's response to the 2010 report recommendations.

Planning

As in the past, Heavenly's annual work list has included BMP construction and maintenance items identified through the previous year's BMP Effectiveness Monitoring. Table 1 (Appendix A) lists the 2011 BMP retrofit and maintenance projects initiated based on recommendations made in 2010 and Heavenly's on-going annual inspection of erosion control facilities. Projects are typically prioritized on accessibility, potential for increasing erosion, and proximity to SEZ. Projects planned but not completed in 2011 have been included in the BMP project recommendations for 2012.

The Revised Construction Erosion Reduction Plan (CERP) continues to be a useful tool for identifying appropriate BMPs for projects without detailed sets of plans and specifications. The CERP is regularly reviewed during the planning and construction season. Additional recommendations developed from monitoring effectiveness of temporary and permanent BMPs are summarized in Appendix A. RCI has used these observations as supplemental guidance for evaluating project implementation, though they have not formally been incorporated into the CERP.

In 2011, Heavenly continued their on-going annual maintenance activities on roads including: road repairs, reconstruction of drainage dips and water bars, and grading around switchbacks. They also identified road segments to improve with aggregate base surfacing prioritized by water quality risk scores that focus on proximity to perennial drainages (2005 LTBMU). Approximately 3,300 linear feet of road was resurfaced in 2011.

Permanent BMPs

Using the adaptive management approach, observations and recommendations made in 2005 through 2010 were used to identify specific projects, incorporate general recommendations, and improve the BMP program at Heavenly. A summary of past recommendations for Permanent BMPs and how they were addressed in 2011 is included in Tables 2 and 3 (Appendix A).

Temporary BMPs

Heavenly has continued to respond to the recommendations for implementation and effectiveness of temporary construction BMPs developed through the BMP Effectiveness Monitoring Program. A summary of past recommendations for Temporary BMPs and how they were addressed in 2011 is included in Tables 4 and 5 (Appendix A).

Monitoring

The BMP Effectiveness Monitoring Program has been reviewed each year to identify possible improvements consistent with an adaptive management approach.

In 2010, a need for prompt coordination throughout the construction season was noted so that Heavenly is able to schedule BMP maintenance work in a timely manner. Over the 2011 construction season, Heavenly staff was notified by RCI of any BMPs requiring improvements as soon as they were identified. The field team was responsive and professional in repairing or retrofitting temporary BMPs, often the same day they were contacted. Heavenly staff throughout the summer season also coordinated general maintenance for permanent BMPs.

Per 2010 recommendations, monitoring for road BMP upgrades was conducted in 2011.

Included in this report are BMP assessments for the 2011 summer maintenance/construction season. The 2011 season started after snowmelt in late June and ended with the first snow received in mid October. While this monitoring period is logical for seasonal operation of the Resort, it does not correspond directly with the Water Year reporting timeframe indicated in the waste discharge requirements, as noted below:

- The first quarter of the 2011 Water Year (October 1 through December 31, 2010) was reported previously as part of the 2010 Construction Season Summary (RCI, February 2011).
- No evaluations were conducted during the second quarter of the 2011 Water Year (January 1 through March 31, 2011) or the third quarter of the 2011 Water Year (April 1 through June 30, 2011) due winter closure and the late seasonal snowmelt.
- The 1st quarter of the 2012 Water Year (October 1 through December 31) is included in this report, to incorporate the logical conclusion of the summer maintenance/construction projects.

Facility and Construction Project BMP Monitoring

The annual monitoring conducted for facility maintenance and construction projects during the 2011 season uses the HV-1 and HV-2 forms and protocols. Summaries of the collected data, as well as the evaluation forms, are included in Appendix B.

Permanent BMPs

In 2011, 29 permanent BMP evaluations were performed by RCI at 29 different sites. The evaluations included post-construction monitoring at 3-year intervals and follow up visits to review BMPs after maintenance activities or after storm events.

Implementation

Permanent BMPs were generally implemented in accordance with the CERP and project specific plans through out the Resort. Minor departures for implementation of permanent BMPs were observed in two locations where plans for permanent BMPs were not sufficient to reduce erosion; these existing facilities also need minor BMP retrofits to meet the CERP guidelines. Results for implementation of permanent BMPs monitored in 2011 showed that BMPs were fully "implemented" at 90% of the sites scored. One site was not scored for implementation since it was scored in a previous year.

Effectiveness

Effectiveness of permanent BMPs observed in 2011 indicated two sites with "at risk" scores. These locations have been added to the 2012 Work List to augment the effectiveness of the BMPs at the sites. Scoring for 2011 documented 93% of the sites had "effective" Permanent BMPs. The most comment types of "effective" permanent BMPs continue to be rock slope protection, revegetation treatment areas using soil conditioning, pine needle and wood chip mulch, and infiltration/dripline BMPs at facilities.

Precipitation mostly as rain during the month of October measured between 0.3 and 0.8 inches from manual rain gauges installed near construction projects at the resort. Infiltration and erosion control BMPs installed at facilities were typically effective at controlling runoff and

reducing erosion. Where runoff was evident, erosion was minimal and sediment deposition was typically in sediment basins or catch basins.

Temporary BMPs

In 2011, Heavenly routinely used Temporary BMPs at five construction sites and one staging area. Each site was evaluated multiple times depending on the length of time between construction start and completion dates. The monitoring frequency for construction projects is biweekly and after precipitation events. A total of 39 separate Temporary BMP evaluations were conducted at six sites by RCI in 2011.

Implementation

Temporary BMPs on the whole were implemented in accordance with the CERP and project plans. Scores of fully "implemented" for all types of temporary BMPs resulted during 76% of site visits in 2011. Scores of less than fully "implemented" occurred primarily for one project plan set (see Appendix B). Once a "minor departure" for implementation is scored due to the plan set, subsequent monitoring on 2-week intervals for the remainder of the project receives that score. Excluding this one project, the temporary BMPs were 100% fully implemented in 2011.

Effectiveness

Temporary BMPs used in 2011 were typically effective at controlling runoff and erosion. Sediment barriers such as sediment fencing and fiber rolls were effective at controlling runoff during precipitation events in October which produced 0.3 to 0.8 inches of rain at the Resort. Temporary BMP effectiveness scored fully "effective" for 95% of the evaluations performed in 2011. A review of scoring for individual categories shows that designation of exclusion zones was the least effective temporary BMP in 2011.

Road BMP Upgrade and Reconstruction Monitoring

The BMP Effectiveness monitoring data for roads evaluates the effect of road reconstruction and BMP upgrade projects during the monitoring period on potential for sediment transport. Due to the limited road projects conducted in 2006 through 2008, this report addresses BMP upgrades at the Resort for the entire 6-year period (2006 through 2011). Data and monitoring methods are included in Appendix C and summarized below for both implementation and effectiveness.

Implementation

During the period of 2006 through 2011 Heavenly continued routine road maintenance activities throughout the Resort. In addition, road BMP upgrades were implemented in conjunction with facility construction and site specific road surfacing projects. A total of 3.12 miles of roads were reconstructed or upgraded and 0.79 miles of roads were decommissioned.

In general, new road segments and reconstructed road segments were designed in accordance with the road BMPs in the CERP or in site specific projects plans and specifications. However, Heavenly has not aggressively pursued recommendations in the CERP to upgrade roads to Forest Service standards. As previously noted in assessments of existing roads at Heavenly, most of the roads were not originally designed to Forest Service standards; often cut and fill slopes are over-steep, switchback approaches are not flattened, and longitudinal gradients are higher than 10 percent. In order to upgrade these roads to FS standards, redesign and significant reconstruction would be required due to the steep terrain. Proposed road

components of a few projects during the period (2006 through 2011) were not constructed due to the extent of disturbance, substantial cut and fill quantities, increased road lengths, and required tree removal (for example Northbowl Lift base terminal and Olympic Lift top terminal). Fortunately, many of these existing roads are located away from streams and drainage ways, and using the WQRAP screening process, have been determined to pose little risk to water quality. Road related erosion may necessitate continued maintenance, but the risk of sediment transport to streams and SEZ areas is minimal.

For roads scored with sediment transport risk, the program doesn't currently have a formalized monitoring approach, such as the "Needs Assessment" (HV-3 Forms), that could be used to identify site specific road BMP upgrade projects similar to the facility program. Heavenly resurfaced the summer maintenance road segments from Powderbowl Lift Base to the first switchback above Snow Beach with aggregate base in 2011, which reduced the "high" WQRAP scores to "low" and "medium". However, site specific road cross slopes and water bar spacing were not identified prior to grading, which could have further reduced risk scores and modeled sediment yield (WEPP modeled results). The WQRAP score in conjunction with site specific BMP recommendations would improve implementation of future BMP upgrades.

Effectiveness

Effectiveness of road BMP upgrades and typical existing road BMPs has been determined by the monitoring methods outlined in Appendix C (WQRAP screening process and the WEPP model), as well as general observations documented during routine and post storm event BMP evaluations.

The road BMP upgrades at Heavenly resulted in a net decrease of 0.45 miles of high risk road that correspond to an increase in 0.07 miles of low and 0.38 miles of moderate risk roads. WEPP modeling estimates also indicated that sediment yield would be reduced on an annual average basis, primarily in conjunction with use of gravel surfacing on "high risk" road segments. Stream crossings "effectiveness" scoring under road segments treated with gravel surfacing also improved. The remaining stream crossings have not changed as no specific upgrade projects have been implemented.

Precipitation and snowmelt events have been observed to cause erosion of native road surfaces and at water bar/drainage dip outlets extending below drainage dip/water bar outlets. Native road surfacing is readily subject to rutting caused by vehicle traffic on native surfacing. Techniques to improve road BMP performance suggested in the 2010 Annual Report include the following:

- Reducing runoff concentration in depressed wheel tracks using combinations of filling, grading, and road surfacing.
- Improving outlet protection with energy dissipation and enhanced infiltration capacity at runoff concentration points.
- Exploring innovative road surfacing techniques that could enhance infiltration during intense storm events, yet withstand routine traffic on the steep grades characteristic of the road system.

The following conclusions and recommendations were generated from the results of the 2011 BMP Effectiveness Monitoring at Heavenly.

Planning

Heavenly has proactively used the results of the BMP Effectiveness Monitoring Program to improve planning for BMPs for facilities at the Resort. Planning should continue to utilize the monitoring results to assist with identifying and prioritizing BMP maintenance and retrofit projects. Recommendations for future improvements and maintenance are summarized in Table 6 and were developed from the 2011 monitoring results. This summary has typically been used by Heavenly Mountain Resort to develop the Annual Work List.

The CERP has served as a valuable tool for identifying appropriate Temporary and Permanent BMPs, particularly for projects without detailed sets of plans and specifications. Therefore, it should continue to be updated consistent with the adaptive management approach incorporating BMP recommendations developed in Tables 2 through 5. In addition, the section of the CERP describing roads BMPs could be improved for specific BMPs applicable to existing roads at Heavenly, rather than referencing general Forest Service design and maintenance standards.

In coordination with Heavenly's infrastructure needs and the road BMP effectiveness monitoring results, Heavenly has a basis for identifying roads with a water quality risk and evaluating BMP upgrade effectiveness. However, the planning process could be improved to prioritize and schedule successful road BMP upgrades. RCI recommends a "Needs Assessment" component be incorporated into the roads monitoring, similar to the "Needs Assessment" adopted in 2004 for Resort facilities.

Implementation

Heavenly uses the on-going monitoring program to identify and implement permanent BMP installation and maintenance projects. Plans and specifications continue to incorporate temporary BMPs that are the most effective at Heavenly. Tables 2 and 4 in Appendix A should be used as a reference for reviewing project BMPs during development.

Continuing communication between design professionals, field personnel, and agency representatives is needed to maintain successful implementation of Temporary and Permanent BMPs. Heavenly should also continue to provide training to all personnel (staff and contractors) in BMP "awareness", which is critical in maintaining high quality BMP implementation.

Heavenly has developed an experienced field team responsible for successfully implementing BMPs. The knowledge and hands-on skills that the team has learned from multiple construction seasons has resulted in continued implementation consistency and expertise. If possible, an experienced supervisor and field team should be designated to implement BMPs each season.

Effectiveness

Successful BMP effectiveness is tied to both implementation and technology. Heavenly has a long-term commitment to environmental improvement through both planning and regulatory

means. Heavenly has improved the effectiveness of BMPs by implementing new techniques, which are reflected in the monitoring results. Tables 3 and 5 in Appendix A should be used as a reference for reviewing project BMPs for effectiveness.

In the past, soil cover achieved the lowest scores for effectiveness, but these scores have improved for recent projects using new approaches for soil conditioning, revegetation, and slope stabilization with rock and mulch combinations. Continued monitoring of these techniques will provide data on long-term effectiveness.

Exclusion zones achieved the lowest scores for effectiveness in the past year. Heavenly has increased the use of rope barricades on all summer access roads, effectively restricting vehicle traffic to existing roadways. However, construction activity has created new access routes both as short cuts or to avoid pedestrian traffic in the area. Future plans should carefully consider designating necessary access routes and staging areas, so that appropriate temporary roads can be used then adequately decommissioned, and permanent access routes can be constructed with adequate BMPs to Forest Service standards.

Heavenly has prioritized BMP installation and maintenance in areas where disturbance connects directly to SEZs and storm drains. These areas present the greatest water quality risk and, correspondingly, are locations where BMPs should be the most effective. Future monitoring and planning should continue to emphasize this priority for both facility and road BMP projects and maintenance.

An emphasis on road BMPs remains a priority for future projects. The effectiveness of roadrelated BMPs could be improved with better coordination regarding objectives and methods for road BMP maintenance. BMP design and methods may need adaptation to the unique conditions existing at the Resort.

Monitoring

The BMP Effectiveness Monitoring Program has provided useful information for evaluating the BMPs at Heavenly; particularly with respect to permanent facility BMPs and temporary construction BMPs. Results should continue to be incorporated in planning measures consistent with an adaptive management approach. RCI offers recommendations for future monitoring:

A "Needs Assessment" protocol could be incorporated in the monitoring program for the road segments identified through the WQRAP process and for stream crossings at the Resort. Similar to the "Need Assessments" protocol adopted in 2005 for facilities, results would provide a basis for planning and implementation of road BMP upgrades.

Roads on private lands are not extensive, but certain segments need to have WQRAP scores verified and be added to the Heavenly GIS database. On an annual basis, site specific problem areas for road erosion should also be reevaluated using the WQRAP and a "Needs Assessment".

The WQRAP monitoring for roads uses a distance of 450 feet from SEZ as a screening method to identify roads with risk of sediment transport. It is suggested the monitoring method for facilities adopt a similar screening distance for sites where BMPs have been implemented. After the monitoring for nine years (at three year intervals), or sooner if warranted by site stability, facilities greater then 450 feet from SEZ present little water quality risk and should no longer be monitored for BMP Effectiveness.

Appendix A

2011 Summary Tables 1 through 6
Location	Treatment
Groove Lift Upper Terminal	Effective cover improved, steep slope below terminal stabilized with rock riprap, and infiltration trench cleaned out.
Blue Angel Chutes	Effective cover improved.
Top of Gondola Magic Carpet	Drip line infiltration trenches installed.

Table 1, BMP Projects and Mainten	ance Completed in 2011

Observations/Recommendation	Responses/Actions in 2011
Revegetation specifications needed to be updated to present standards in the Lake Tahoe Basin. (2004-2005)	Revegetation specifications for construction projects were site-specific and consistent with present standards. Projects included: Adventure Peak Ski School, Tamarack Lodge, and Umbrella Bar Relocation.
Design of facilities to treat or infiltrate the 20-yr 1-hour event needed to be site- specific (2004-2005). Infiltration areas should be flat bottomed, filled with sufficient gravel or drain rock and bordered with rocks (4 to 8 inch diameter).	Maintenance and reconstruction of infiltration facilities was implemented at the following number of sites: 36 in 2006, 4 in 2007, 7 in 2008, 27 in 2009, 3 in 2010, and 1 in 2011. Dripline trenches were located to intercept roof runoff. Heavenly staff documented the calculated volumes and facility construction at each structure.
Trench settlement can be prevented by compaction and mounding. (2004-2005)	Trenching was conducted for utilities in the Top of Gondola area. Mounding was not feasible given the soil stabilization/revegetation treatments prescribed.
Use fiber rolls for long-term slope stabilization as well as temporary erosion control. (2004-2005)	Permanent fiber roll installation was not used in 2011 projects. Most slopes were protected with riprap rather than revegetation. Fiber rolls were used for temporary erosion control.
Gravel and riprap specifications should include: sizing, gradation, angularity and geotextile installation underneath. (2006)	Riprap was installed with geotextile behind it for the 2011 project at the Groove Upper Terminal.
Geotextile fabric installation for slope stabilization must address anchor trenches at fabric edges, overlaps, and appropriate anchor intervals for lined channels and steep slopes. (2006)	Geotextile fabric for slope stabilization was installed on the 2011 project at the Groove Upper Terminal with sufficient overlaps and anchor intervals.
New prescriptions for soil amendments and revegetation need better coordination regarding timing, accessibility, and materials availability. (2007)	Heavenly reused materials (soil, rock, wood chips, etc.) generated on-site. Site-specific soil amendment depth was identified and coordinated in the field with IERS.
Waterbars should be elongated and installed at an angle to the direction of traffic. (2009)	Waterbars installed throughout the mountain are typically parallel to the direction of traffic. In 2010, an angled waterbar was reconstructed near the Powderbowl Lift upper terminal to divert water away from the Blue Angel Chutes area. The waterbar performed well after the 2010-2011 winter season by diverting water to the adjacent tree covered area.
Road base should be applied in areas with steep slopes, water quality concerns (proximity to SEZ/stream crossings), and high traffic areas where rutting and dust may be a problem. (2009)	In 2011, road base was applied in a high traffic road from the Powderbowl Lower Terminal to approximately 100 feet past the stream crossing of Heavenly Valley Creek around the first switchback.
Excess fill could be reused on site to build up road base in depressed areas and improve drainage. (2010)	Top of Gondola area road reconditioning and maintenance reused excess fill.
Riprap installation on steep slopes provides better stabilization than cover with mulch (2011).	Riprap was installed for the BMP maintenance project at the Groove Upper Terminal after previous unsuccessful attempts to stabilize the slope with straw bales and wattles.

Table 2. Permanent BMP Implementation – Recommendations and Responses

Observations/Recommendation	Responses/Actions in 2011
Soil cover was not typically achieved with straw mulch after the first construction season. (2004-2005)	Heavenly continued to use different types of mulch on 2011 construction projects to meet effective soil cover objectives, including wood chip mulch and pine needle mulch (Groove Upper Terminal, California Side Trail Widening).
Revegetation develops minor deficiencies after construction that requires on-going correction for several years to provide effective soil cover. (2004-2005)	Several sites were revisited with spot seed and mulch application. Wood chip mulch or gravel, rather than revegetation, continues to appear more effective for high traffic areas.
Fabric installed on steep slopes often slides down in small sections, even anchored securely during installation. Geotextile needs continuing maintenance if vegetation is not established. (2006)	Fabric installed in 2009 was refurbished in 2010 at the East Peak Well. In 2011, it appeared that the majority fabric remained in place; however, an overlapped seam was beginning to pull apart at the end of the season. This location will be inspected again in 2012.
Projects using wood chip mulch and soil amendments appear to provide longer lasting effective cover, particularly in high traffic areas. Heavenly will continue spot treatments at facility sites where barren areas occur. (2006)	Small bare areas throughout the resort were refurbished with wood chip and pine needle mulch, particularly in high traffic areas.
Sediment from outside the project area has the potential to impair the long-term effectiveness of SEZ restoration and soil stabilization projects unless follow-up work is performed. (2007)	Follow-up stabilization work for bare spots on slopes above the Upper Maintenance Shop and Northbowl SEZ Restoration project areas is scheduled for 2012.
Wood borders for infiltration areas and trenches are often caught and pulled out by equipment in the winter, particularly in areas alongside roadways. Rock borders keyed into the soil are a more stable option to prevent movement of gravel. (2009)	Wood borders have been replaced with rock borders around infiltration areas. Rock borders were observed to hold up well from previous years.
Rock armored channels routing runoff from drip lines to infiltration areas are more effective than drip line trenches. Channel low points must be well defined; otherwise, new channels erode around rocks. (2009)	Channels were refurbished throughout the Resort as routine maintenance.
Water bar outlet protection using energy dissipaters and enhanced infiltration is effective. (2010).	Gondola Mid Station Road and the Skyline Trail water bar outlets captured sediment and minimized down slope erosion during after storm events and the 2010/2011 winter season.
Channels lined with rock or fabric accumulate sediment over time. Sediment should be routinely removed from the channels and used for fill in low areas on roads or removed from the site (2011).	In 2011, sediment was cleaned from channels as routine maintenance and removed from the site. BMPs should continue to emphasize reducing erosion and enhancing infiltration to minimize costly and time intensive removal of accumulated sediment.

Table 3. Permanent BMP Effectiveness – Recommendations and Responses

BMP Effectiveness Construction Season Summary – 2011

Observations/Recommendation	Responses/Actions in 2011
BMPs should not be disassembled prematurely, because vegetation may take several seasons to be established. Specifically, plans did not specify clearly that fiber rolls were to remain after construction. (2004-2005)	Construction project winterization included removal of sediment fence (which presents a skier hazard and does not typically last through the winter) at the end of the season. Fiber rolls remained in place as needed (Sky Base Staging Area and Top of Gondola projects).
Place BMPs prior to construction, thereby ensuring readiness for summer storms or winter closures. (2004-2005)	BMPs were in place prior to initiation of each 2011 construction project. Focus should continue on installation prior to initiation for small maintenance projects and staging areas, where no plans have been prepared, but BMPs are to be installed per the CERP.
Clean out and repair BMPs after a runoff event. (2004-2005)	After storm events, repairs were made to waterbars throughout the resort.
Maintain BMPs through the life of the project, again to ensure readiness for summer storms or winter closures. (2004-2005)	Temporary BMPs were in place during the precipitation events and winterization measures were implemented prior to snowfall.
Temporary BMPs may concentrate runoff to a discharge point (sediment fence, fiber rolls, temporary division swales, temporary culverts, and stream diversion). Provide energy dissipation and stabilization at the point where the temporary BMPs terminate. (2006)	Sediment barriers were used for projects in the Top of Gondola area, mostly parallel to the slope with outlet protection in the form of a curved straw wattle or sediment fence.
If a construction project initially proposed for a single season must be extended over the winter, winterization plans should be appended to the design documents. (2006)	Not applicable in 2011.
Maintenance of sediment fence can be reduced by using proper T-Posts for support and adequate burial of fabric edges, particularly for longer-term projects. Project designs need to allow alternative fencing at sites with substantial rock or limited access. (2007)	Fiber rolls were often used in lieu of sediment fence in 2011. Where sediment fence was used, edges were properly buried, reducing the need for frequent maintenance.
Dust control for soil stockpiles on the mountain can be improved. If water is unavailable from the snowmaking system, stockpiles need to be covered with plastic sheeting. (2007)	Stockpiles were covered with sheeting to control dust prior to storm events and at the end of the day at the Adventure Peak Ski School and the Umbrella Bar Relocation.
Location of sediment barriers (silt fence or fiber rolls) shown on project plans needs to be parallel to the slope or with energy dissipaters along the flow line and at discharge points. (2008)	Sediment barriers were shown on the plans for the Adventure Peak Ski School, Umbrella Bar Relocation and Staging Areas for California Side Trail Widening, typically on the contour. Installation typically per plans.
Staging areas should have Temporary BMPs in place before materials are stockpiled on site. (2009)	BMPs were installed prior to use at staging areas: Boulder Parking Lot and Sky Base Staging Area (part of California Side Trail Widening in 2011).
Rope fencing for road delineation is typically removed prior to the winter season. Vehicles and equipment should observe road corridors when fencing is not in place. (2011)	Crews responded after they were notified to observe the delineated roadways and stay off shoulder areas.

Table 4. Temporary BMP Implementation – Recommendations and Responses

Observations/Recommendation	Responses/Actions in 2011
Disturbance outside construction limits.	Construction limits were observed where clearly shown on the plans.
Exposed soils with potential for sediment delivery to SEZ.	Sediment barriers were generally installed and routinely maintained.
Dust control measures for stockpiles are more effective when snowmaking water is available to wet down soils. Plastic sheeting is less effective and is difficult to keep anchored in windy conditions, but may be the only option in some areas.	No projects in 2011 were located in especially wind prone areas so alternatives to plastic sheeting were not required. Plastic sheeting was used at the Top of Gondola projects (Tamarack Lodge and Adventure Peak Ski School) and at the Umbrella Bar Relocation.
Sediment fence is effective in containing excavated stockpiled soils. If stockpiles are larger than initially anticipated, the fence must be extended.	Stockpiles were generally contained with fiber rolls. Stockpiles were typically in continuous use and fiber rolls were adjusted accordingly.
Despite proper installation, burial of fabric edges does not always prevent wind from pulling the fabric out, and metal mesh backing does not always prevent holes and blowing fabric. Prompt inspection and repair of sediment fence is almost always needed after windy conditions.	In staging areas, sediment fence was installed properly and held up well over the season.
Fiber rolls are most effective when keyed into the native soil and anchored securely.	Fiber rolls in most construction areas were keyed in and staked per the plans. Fiber rolls at the base of stockpiles should be anchored with rocks or sandbags if they will be in place for a length of time.

Table 5. Temporary BMP Effectiveness – Recommendations and Responses

Location	Treatment			
Priority Projects for Follow Up Maintenance (2011)				
Gondola Top Station	Refurbish existing infiltration basin and improve drainage to maintain effectiveness (2007).			
Edgewood SEZ near Boulder Upper Terminal	Maintain road BMPs, road grading, and redirect road runoff near corner (2010).			
Hellwinkel's Trail	Maintain road BMPs from Sky Deck to Sky Water Tank (2010).			
Mid Station Road	Maintain water bars and energy dissipaters at outlets (2010).			
Tubing Lift Maintenance Road	Realign top of tubing access road, stabilize fill bank at top of lift (2010).			
Upper Vehicle Maintenance Shop	Stabilization work on gully above SEZ restoration, embankment between road and SEZ, and road intersection at base of SEZ (2010).			
Top of Tram Station	Stabilize slope on southwest corner of the building (2011).			
California Main Lodge Parking Lot	Clean out drop inlet where orange algae accumulates along Wildwood (2011).			
Umbrella Bar Relocation	Restore old Umbrella Bar location at Adventure Peak site. Install drainage dip across road below new Umbrella Bar location (2011).			
California Side Run Widening	Complete pine needle mulch application on areas accessed by construction equipment (2011).			
Olympic Upper and Lower Terminals	Improve effective cover beneath Upper Terminal. Maintain geotextile fabric lined channel at Lower Terminal (2011).			
Out of Tahoe Basin BMP Ne	eeds (2012 to 2013, Low Priority)			
East Peak Lodge	Stabilize drip lines and drainage swales near foundation of building (2007).			
East Peak Grading Area	Complete drainage and stabilization measures initiated for the area between Comet and Dipper Lift Lower Terminals (2009).			
Base of Comet Express Lift	Improve effective cover and refurbish infiltration BMPs (2010).			
East Peak Sewer Holding Tank Area	Improve effective cover and delineate vehicle turn around (2010).			
Nevada Fuel Station (\$100 Saddle)	Stabilize channel below fueling station (2011).			
East Peak Water Tank	Stabilize slope behind tank, improve effective cover (2011).			
East Peak Patrol	Stabilize slope on west side of building, improve effective cover (2011).			

Table 6. Site-Specific Recommendations For 2011 BMP Projects

Appendix B

BMP Effectiveness Monitoring –Facility and Construction Projects

2011 BMP Effectiveness Monitoring: Facilities & Construction Projects

Resource Concepts, Inc. (RCI) has been contracted by Cardno ENTRIX, Inc. to monitor Best Management Practices (BMPs) performance at Heavenly Mountain Resort. The monitoring program addresses BMP monitoring for compliance with the resort Master Plan based on requirements of the USDA Forest Service, Tahoe Regional Planning Agency and the Lahontan Regional Water Quality Control Board (Board Order R6T-2003-0032).

Methods

The RCI Field Team uses the monitoring protocols for facilities and construction projects from the written plan, <u>BMP Effectiveness Monitoring</u>, <u>Chapter 5</u>, <u>Heavenly Mountain Resort Environmental Monitoring Program</u> (December 19, 2005). The revised Environmental Monitoring Program was approved in conjunction with the Master Plan Amendment EIR/EIS/EIS (Appendix 3-1-D) in 2007. The plan assesses temporary BMPs at on-going construction sites, permanent BMPs after construction completion, and "BMP Needs" for continued resource protection at facilities constructed prior to 2000.

Temporary BMP evaluations (Form HV-1) are generally conducted biweekly during construction. Permanent BMP evaluations (Form HV-2) are conducted upon construction completion, at oneyear post-construction, and at three-year intervals after construction completion. Vegetation manipulation evaluations (Form V28) for "mitigation of soil disturbance effectiveness monitoring" are conducted annually for three seasons following implementation on ski trails. "BMP Needs" evaluations (Form HV-3) are conducted on a one-time basis for facilities constructed prior to the year 2000. Results of the assessments are entered into an ACCESS database.

Reporting Period

This report contains a synopsis of the BMP assessments completed during the 2011 construction season:

- July 1 through September 30 (4th quarter of the 2011 Water Year) and October 1 through December 31, 2011 (1st quarter of the 2012 Water Year). The evaluations from the 2011 construction season are combined in this report for consistency and comparability.
- The first quarter of the 2011 Water Year (October 1 through December 31, 2010) was included as part of the 2010 Construction Season Summary.
- No evaluations were conducted due to snow at the Resort during the second quarter of the 2011 Water Year (January 1 through March 31, 2011). No evaluations were conducted in the second quarter of the 2011 Water Year (April 1 through June 30, 2011) due to late season snow.

Assessments

During the 2011 construction season (July 1 through October 31, 2001), the RCI Field Team performed evaluations at 35 different sites: 26 within the Lake Tahoe Basin and 9 outside the Lake Tahoe Basin. Tables 1 and 2 list types of monitoring and locations evaluated in the 2011 calendar year.

Appendix B – 2011 BMP Effectiveness Monitoring: Projects and Facilities

Temporary BMP monitoring (Form HV-1) was performed at the following sites:

- Tamarack Lodge (Top of Gondola Lodge) The majority of construction work for this
 project took place in 2010 including site work, grading, utility installation, road and
 walkway relocation, slope stabilization and construction of the lodge building and the
 patio. Work in 2011 included additional revegetation measures, electrical conduit
 rerouting and installation of infiltration trenches at the magic carpet lift constructed in
 conjunction with the lodge project.
- Tubing Lift (Covered Surface Lift) at Top of Gondola In 2009, lift construction work was completed for the project. An access ramp was constructed from the top of the lift to the adjacent slopes in 2010. Work on the new access road to the top of the lift was planned for 2011 but construction was postponed until 2012. Temporary BMPs were installed in anticipation of construction.
- Adventure Peak Ski School The project included a new ski school building, play structure and modular kitchen facility at Adventure Peak, with underground utilities, site work, infiltration areas and revegetation. The existing yurt, sprung structure and attached decks were removed.
- Umbrella Bar Relocation This project relocated the Umbrella Bar from the Top of Gondola area to a new site adjacent to Snow Beach. The work included connecting existing utilities from Snow Beach to the Umbrella Bar, realignment of a section of existing road, revegetation and installation of an infiltration trench around the building.
- California Side Trail Widening Work included trail widening and hazard reduction on: Ridge Promenade, Liz's, and Ellie's Trails and High Roller Terrain Park. The plans call for 100 percent coverage on all areas accessed by construction equipment for tree and boulder removal. Staging for the project was located at the "Sky Base Staging Area."
- Staging Areas at the Sky Base, East Peak Borrow Area, and Boulder Parking Lot were used periodically for storage of wood chips, pine needles, rocks, and construction equipment. Sky Base was inspected as part of the California Side Trail Widening project; the East Peak Borrow Area was not inspected in 2011 since it was not in active use for staging. Temporary BMPs at the Boulder Parking Lot were inspected in conjunction with an HV-2 inspection of permanent BMPs.

Permanent BMP monitoring (Form HV-2) included 29 project sites:

- Olympic Express Towers
- Olympic Express Utilities
- Olympic Express Upper & Lower Terminals
- ZipRider Upper & Lower Terminals
- Gondola Mid Station Access Road
- Northbowl Lower Terminal
- California Parking Lot
- East Peak Patrol Building
- Stagecoach Lower Terminal
- Stagecoach Snowmaking
- Ski Trails: S8, S9, S10, Meteor and V12 (Nova)

- Boulder Parking Lot (All Phases)
- Edgewood Creek Upper Gully
- East Peak Well (new)
- East Peak Water Tank
- East Peak Water Line Replacement
- East Peak Well (old)
- Nevada Fuel Station (\$100 Saddle)
- Lakeview/Upper Shop Cable
- Lakeview Water System
- Groove Upper Terminal
- World Cup/East Bowl/Face Snowmaking
- Top of Tram

Appendix B – 2011 BMP Effectiveness Monitoring: Projects and Facilities

Table B.1 Types of Evaluations Performed during 2011 Construction Season

CALIFORNIA SITES		NEVADA SITES		
Lake Tahoe Basin		Lake Tahoe Basin		
Permanent BMP Evaluations	9	Permanent BMP Evaluations	11	
Temporary BMP Evaluations	33	Temporary BMP Evaluations	4	
Needs Assessments	0	Needs Assessments	0	
Carson River Basin		Carson River Basin		
Permanent BMP Evaluations	0	Permanent BMP Evaluations	9	
Temporary BMP Evaluations	0	Temporary BMP Evaluations	0	
Needs Assessments	0	Needs Assessments	0	
Total BMP Sites Evaluated– 35 Total Evaluations Performed – 66				

Table B.2. All Sites Evaluated during 2011 Construction Season

CALIFORNIA SITES	NEVADA SITES			
Lake Tahoe Basin	Lake Tahoe Basin			
1. Adventure Peak Ski School	1. Boulder Parking Lot Staging Area			
2. California Side Trail Widening	2. Boulder Parking Lot (All Phases)			
3. Tamarack Lodge (Top of Gondola)	3. East Peak Patrol			
4. Umbrella Bar Relocation	4. Edgewood Creek Upper Gully			
5. Calif. Main Lodge Parking Lot	5. Tubing Lift at the Top of Gondola			
6. Zip Line (Flyer) - Lower Terminal	6. North Bowl Lower Terminal			
7. Zip Line (Flyer) - Upper Terminal	7. Olympic Express - Line Towers			
8. Gondola Mid Station Access Road	8. Olympic Lower Terminal			
9. Gondola Top Station & Facilities	9. Olympic Upper Terminal			
10. Groove Upper	10. Olympic Express - Utilities			
11. Lakeview Water System	11. Ski Trail S8			
12. Lakeview/Upper Shop Cable	12. Ski Trail S9			
13. Top of Tram	13. Ski Trail S10			
14. Upper Maintenance Shop				
15. World Cup/E Bowl Snowmaking				
Carson River Basin	Carson River Basin			
None	1. East Peak Well (New)			
	2. East Peak Water Line Replacement			
	3. East Peak Water Tank			
	4. Stagecoach Snowmaking			
	5. East Peak Well (old)			
	6. Nevada Fuel Station (\$100 Saddle)			
	7. Ski Trail Meteor Run			
	8. Ski Trail V12 (Nova)			
	9. Stagecoach Lower Terminal			

Appendix B – 2011 BMP Effectiveness Monitoring: Projects and Facilities

Implementation and Effectiveness Scoring

The database scoring is based on a regional "rule set" developed for the Region 5 BMPEP program (USDA Forest Service, 2002). It has been modified slightly to correspond with the Heavenly rating system (outlined in Attachment A). Scoring results for the data collected for permanent and temporary BMPs in 2011 is summarized are Tables 3 and 4.

For Temporary BMPs, 28 of the 37 evaluations on the six sites were scored as "implemented" and 37 were scored as "effective" for all biweekly inspections. Of the nine evaluations at the Adventure Peak Ski School, two scored "at risk" for effectiveness due to construction equipment accessing exclusion areas. The nine evaluations conducted at the Umbrella Bar Relocation scored "effective" but with a "minor departure" for implementation. This minor departure was related to dewatering plan details in the project design.

For Permanent BMPs, Two sites out of 29 evaluated for post construction had implementation and effectiveness concerns that may require future maintenance or retrofits to correct as noted in Table 4. The sites include the Top of Tram and East Peak Water Tank.

Temporary BMP Evaluations	Survey Date	Implementation	Effectiveness
Lake Tahoe Basin - California		improvidentiation	
1. Adventure Peak Ski School	7/25/2011	1	E
2. Adventure Peak Ski School	8/5/2011	1	Е
3. Adventure Peak Ski School	8/18/2011	1	Е
4. Adventure Peak Ski School	9/1/2011	I	Е
5. Adventure Peak Ski School	9/16/2011	I	Е
6. Adventure Peak Ski School	9/29/2011	I	m ¹
7. Adventure Peak Ski School	10/11/2011	I	m ¹
8. Adventure Peak Ski School	10/14/2011	I	Е
9. Adventure Peak Ski School	10/28/2011	I	E
10. California Side Trail Widening	7/25/2011	I	E
11. California Side Trail Widening	8/18/2011	I	E
12. California Side Trail Widening	9/1/2011	I	E
13. California Side Trail Widening	9/9/2011	I	E
14. California Side Trail Widening	9/16/2011	I	E
15. California Side Trail Widening	9/29/2011	I	E
16. California Side Trail Widening	10/11/2011	I	E
17. California Side Trail Widening	10/14/2011	I	E
18. California Side Trail Widening	10/28/2011	I	E
19. Tamarack Lodge (Top of Gondola)	7/25/2011	I	E
20. Tamarack Lodge (Top of Gondola)	8/18/2011	I	E
21. Tamarack Lodge (Top of Gondola)	9/1/2011	I	E
22. Tamarack Lodge (Top of Gondola)	9/29/2011	I	E
23. Tamarack Lodge (Top of Gondola)	10/11/2011	I	E
24. Tamarack Lodge (Top of Gondola)	10/14/2011	I	E
25. Tamarack Lodge (Top of Gondola)	10/28/2011	I	E

Table B.3. Temporary BMP Summary by Site and Survey Date

Appendix B – 2011 BMP Effectiveness Monitoring: Projects and Facilities

26. Umbrella Bar Relocation	8/18/2011	m ²	E
27. Umbrella Bar Relocation	9/1/2011	m ²	E
28. Umbrella Bar Relocation	9/9/2011	m ²	E
29. Umbrella Bar Relocation	9/16/2011	m ²	E
30. Umbrella Bar Relocation	9/29/2011	m ²	E
31. Umbrella Bar Relocation	10/11/2011	m ²	E
32. Umbrella Bar Relocation	10/14/2011	m ²	E
33. Umbrella Bar Relocation	10/28/2011	m ²	E
Lake Tahoe Basin – Nevada			
34. Boulder Parking Lot Staging Area	9/9/2010	I	E
35. Tubing Lift (Covered Surface Lift) at TOG	7/25/2011	I	E
36. Tubing Lift (Covered Surface Lift) at TOG	9/1/2011	I	E
37. Tubing Lift (Covered Surface Lift) at TOG	10/28/2011	I	E
Carson River Basin - California			
None			
Carson River Basin - Nevada			
None			

I – Implemented

E – Effective

m – Minor Departure for Implementation or At Risk for Effectiveness

X – Not Implemented or Not Effective

Notes:

¹/ The Adventure Peak Ski School site received "at risk" for effectiveness scores for two inspections because an access to the site was created not shown on the plans. Once inspectors alerted the foreman, use of this access by equipment and vehicles was ceased and the area was covered with wood chips. The site will be inspected in 2012 to ensure it is not in use.

²/ The Umbrella Bar Relocation site scored a "minor departure" for implementation because the dewatering plan described on the plan set was not deemed sufficient for handling the volume of water flowing through the riprap channel due to the heavy and late snow year. Trenching crossed the riprap channel to connect utilities from Snow Beach to the Umbrella Bar Relocation site collected seepage. Heavenly proposed a satisfactory dewatering plan that was implemented once water was encountered during trenching. After utilities were installed and the trench was backfilled, the riprap channel was restored in accordance with the plans.

Permanent BMP Evaluations		Project Type	Survey Date	Implementation	Effectiveness
Lake 1	Lake Tahoe Basin - California				
1.	Calif. Main Lodge Parking Lot	3 rd Year Post Construction	9/1/2011	I	E
2.	Gondola Mid Station Access Road	3 rd Year Post Construction	10/14/2011	I	Е
3.	Groove Upper Terminal	Follow-up	9/29/2011	I	E
4.	Lakeview Water System	1 st Year Post Construction	9/1/2011	I	E
5.	Lakeview/Upper Shop Cable	6 th Year Post Construction	9/1/2011	I	E
6.	Top of Tram	Follow-up	9/21/2011	m ¹	E
7.	World Cup/E Bowl Snowmaking	6 th Year Post Construction	9/21/2011	I	Е
8.	Zip Line (Flyer) - Lower Terminal	3 rd Year Post Construction	9/16/2011	I	E
9.	Zip Line (Flyer) - Upper Terminal	3 rd Year Post Construction	10/14/2011	I	E
Lake 1	Tahoe Basin - Nevada				
10.	Boulder Parking Lot	6 th Year Post Construction	9/9/2011	I	E
11.	East Peak Patrol	3 rd Year Post Construction	8/25/2011	I	E
12.	Edgewood Creek Upper Gully	Follow-up	7/25/2011	I	E
13.	North Bowl Lower Terminal	3 rd Year Post Construction	8/25/2011	I	E
14.	Olympic Express - Line Towers	3 rd Year Post Construction	8/25/2011	I	E
15.	Olympic Lower Terminal	3 rd Year Post Construction	8/25/2011	I	E
16.	Olympic Upper Terminal	3 rd Year Post Construction	8/25/2011	I	E
17.	Olympic Express - Utilities	3 rd Year Post Construction	8/25/2011	I	E
18.	Ski Trail S10	3 rd Year Post Construction	8/25/2011	I	E
19.	Ski Trail S8	3 rd Year Post Construction	8/25/2011	I	E
20.	Ski Trail S9	3 rd Year Post Construction	8/25/2011	Ι	E
Carson River Basin - California					
	None				
Carson River Basin - Nevada					
21.	East Peak Water Tank	6 th Year Post Construction	9/9/2011	I	m²
22.	East Peak Water Line Replacement	6 th Year Post Construction	9/9/2011	I	E
23.	East Peak Well new	3 rd Year Post Construction	8/18/2011	I	E

Table B.4. Permanent BMP Summary by Site

Appendix B – 2011 BMP Effectiveness Monitoring: Projects and Facilities

Permanent BMP Evaluations	Project Type	Survey Date	Implementation	Effectiveness
24. East Peak Well (old)	6 th Year Post Construction	9/9/2011	I	E
25. Nevada Fuel Station (\$100 Saddle)	6 th Year Post Construction	9/9/2011	I	E
26. Ski Trail Meteor Run	6 th Year Post Construction	9/16/2011	I	E
27. Ski Trail V12 (Nova)	3 rd Year Post Construction	9/16/2011	I	E
28. Stagecoach Lower Terminal	3 rd Year Post Construction	9/9/2011	I	E
29. Stagecoach Snowmaking	3 rd Year Post Construction	9/21/2011	I	E

I – Implemented

E – Effective

m – Minor Departure for Implementation or At Risk for Effectiveness

X – Not Implemented or Not Effective

na – Not applicable, implementation rated in previous year(s), see attached evaluation form

¹/ The Top of Tram site received a "minor departure" score for implementation and an "at risk" score for effectiveness. The southwest corner of the building continually shows erosion and wood chips applied in previous years have eroded and did not provide sufficient stabilization. Reconditioning this area in is included on the 2012 work list

²/ The East Peak Water Tank was "implemented" but "at risk" for effectiveness. The slope behind the tank has loose, erosive soil that showed evidence of movement. This slope would benefit from stabilization and additional cover.

Attachment B.1

BMP Monitoring Rule Set

Appendix B – 2011 BMP Effectiveness Monitoring: Projects and Facilities

BMP Monitoring Rule Set – Adapted from Region 5 2002 BMPEP Rule Set

Implementation (2 questions)	Effectiveness (5 to 7 questions)
Implemented	Effective
All questions answered "meets/exceeds" and/or less than ½ of the questions are "minor departure". None are "major" or "repeated" departure. (<i>Note:</i> <i>HV protocols have only two questions so both must</i> <i>be answered "meets/exceeds" to score</i> <i>Implemented.</i>)	All questions answered "1" or "2" and less than ½ the questions are answered "2".
Minor Departure	At Risk
Greater than or equal to ¹ / ₂ the questions are answered "minor" departure. (<i>Note: HV protocols</i> <i>have only two questions so "minor departure"</i> <i>means one "meets/exceeds" and one "minor</i> <i>departure"</i>).	Greater than or equal to ½ the questions are answered as "2" or "3". No more than one question answered as "3".
Not Implemented	Not Effective
At least one question answered "major" or "repeated" departure or both questions answered "minor departure".	Two or more questions answered as "3".

Attachment B.2

California Evaluation Sheets

UTM Zone 11 Easting 246343 Northing 4312587 Construction Site Name Umbrella Base	Form HV1: Temporary BMPs for Dn-going Construction	ID# 397 Selection Code S02 Forest Tahoe District LTMBU State CA Township 12N Range 18E Section 1
Date of Project Start 7/18/2011	Survey Date/Time 7/25/2011	6th Field HUC Watershed CA-1
Reviewer(s)	Construction Foreman	
J. Sutherland, K. Roaldson	Tom Fortune	
Construction Type: Building Stru	cture Project Is: New Construction	Other (Describe) Relocation of Existing Umbrella Bar
General Information Name Of Pl	Umbrella Bar Relocation	Job No. 10-604.1
	Date 8/16/10 Rev Date	
Specific concerns associated with constru	ction project and describe BMP measures designed to ac	hived resource protection.
BMPs to protect adjacent SEZ - coir logs	sediment fence, stockpile controls, veg protective fence.	
Implementation		
 Project design included Erosion Contro hour Storm Event (per FS and Lahontan control, runoff drainage control, protection 	Plan development, and identified appropriate temporary WQRCB standards); at a minimum the contract should ac of SEZs, and hazardous substance control, please refer t	BMP measures for mitigating impacts from a 20-year 1- ddress BMP measures for the following topics: source to the Supplemental BMP checklist.
1=Meets/Exceeds 20-yr 1-Hr standard 2=Minor departure from contract and/o	s and/or no resource concerns 3=Major departu r minor resource concerns 4=Repeated dep	ure from contract and/or major resource concerns parture from contract and/or failure to address resource concerns
2) Are BMP measures constructed accord	ding to contract design specifications?	0
1 = Meets / Exceeds contract require 2 = Minor departure from contract an	ments and/or no resource concerns3 = Major departd/or minor resource concerns4 = Repeated de	ure from contract and/or major resource concerns eparture from contract and/or failure to address resource concerns
		Implementation Score:
		(BMP Monitoring Rule Set)

Effectiveness

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depostional fans, are evident near erodable soil areas; however, no evidence is observed of sediment deliverv to SEZ.	Substantial areas of exposed erodable soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.	● NA	
b) Cut and fill slope protection (including surface	erosion and slope failure potential			

erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.noted from storms <20-year 1-hour event; however, sediment transport to any SEZ, on- or off-site, is not observed.inadequate to protect erosion from cut and fill slopes from storms <20 year1 hour event; or any observation of sediment transport and/or deposition within SEZ.	erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.	noted from storms <20-year 1-hour event; however, sediment transport to any SEZ, on- or off-site, is not observed.	inadequate to protect erosion from cut and fill slopes from storms <20 year1 hour event; or any observation of sediment transport and/or deposition within SEZ.	
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.

- No evidence of erosion on-site, and no evidence of associated off-site erosion.
 Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.
 No evidence of erosion on-site, and no evidence of associated off-site erosion.
 Specific deposit runoff control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.
 - Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.
- Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.

b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

No evidence of unexpected ponding on- site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	 On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ. 	NA
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c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

- Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20year 1-hour storm event.
- Minor resource concern is evident at infiltration zones (for storms <20-yr 1hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely.
- Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management.

3) Designation of construction zone and any equipment exclusion zones

a) Sensitve areas and construction zone are adequately "flagged" and designated as "Equipment Boundary Zones"

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site.
- Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts offsite or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section.

4) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

 Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones. 	Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	 Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator. 	
		Effectiveness Score:	_
Additional Comments		(BMP Monitoring Rule Set)	
Work has not yet started. Meeting onsite with Ca	sey Blann and Jim Larmore to discuss dewaterir	g plan, BMPs for SEZ protection and construction schedule.	_

UTM Zone 11 Easting 247277 Northing 4312421	Form HV1: Temporary BMPs On-going Construction	for	ID# 363 Selection Code S02 Forest District State CA CA
			Township 12N Range 18E Section 1
Date of Project Start 7/1	5/2011 Survey Date/Time	7/25/2011 6th Fie	eld HUC Watershed CA-1
Reviewer(s)	Construction	Foreman	
J. Sutherland, K. Roaldson	Jim Larmore		
Construction Type:	Project Is:	Other	ther (Describe) Ski Trail Widening
General Information Name	Of Plans California Side Trail Widening		Job No. 11-600.1
	Date 3/24/11	Rev Date 4/22/11	
Temp. BMPs for staging area nea compacted by heavy equipment to	ar Sky Base, including sediment fence, straw wo o be restored to 100% cover.	attles, construction equipment of	exclusion fencing to protect SEZ. Areas disturbed or
Implementation			
 Project design included Erosior hour Storm Event (per FS and Lat control, runoff drainage control, pr 	n Control Plan development, and identified app nontan SWQRCB standards); at a minimum th rotection of SEZs, and hazardous substance c	ropriate temporary BMP measu e contract should address BMP ontrol, please refer to the Suppl	ures for mitigating impacts from a 20-year 1- measures for the following topics: source emental BMP checklist.
1=Meets/Exceeds 20-yr 1-Hr s 2=Minor departure from contra	tandards and/or no resource concerns ict and/or minor resource concerns	3=Major departure from con 4=Repeated departure from	tract and/or major resource concerns contract and/or failure to address resource concerns
2) Are BMP measures constructe	ed according to contract design specifications?		1
1 = Meets / Exceeds contract 2 = Minor departure from con	requirements and/or no resource concerns tract and/or minor resource concerns	3 = Major departure from con 4 = Repeated departure from	ntract and/or major resource concerns m contract and/or failure to address resource concerns
			Implementation Score:
			(BMP Monitoring Rule Set)

Effectiveness

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

• Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depostional fans, are evident near erodable soil areas; however, no evidence is observed of sediment deliverv to SEZ.	Substantial areas of exposed erodable soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.) NA
b) Cut and fill slope protection (including surface	erosion and slope failure potential		
Temporary BMP measures (such as	Minor erosion and sediment deposition is	Temporary BMP measures are	

nowever, sediment transport to any SEZ, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.))	Temporary BMP measures (such as erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.	Minor erosion and sediment deposition is noted from storms <20-year 1-hour event; however, sediment transport to any SEZ, on- or off-site, is not observed.	С	Temporary BMP measures are inadequate to protect erosion from cut and fill slopes from storms <20 year1 hour event; or any observation of sediment transport and/or deposition within SEZ.	
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

- a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.
- No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.
- Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.
- Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.

b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

No evidence of unexpected posite, or constructed detention outlets are stable (naturally st stablized with planted vegetat other type of armor) and exhit of erosion or downstream rese concerns.	onding on- ponds and table, tion, or bit no signs ource Some evidence of on-site ponding, does not appear to threaten integrit fillslopes or foundations. Or minor erosion and/or downslope resource basin outlet, such as sediment plum or small rill formation. However, sediment is not transported to SEZ is not anticipated from events <20-y 1-hour storm.	but by of On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	⊖ NA
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c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

- Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20year 1-hour storm event.
- Minor resource concern is evident at infiltration zones (for storms <20-yr 1hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely.
- Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management.

3) Designation of construction zone and any equipment exclusion zones

a) Sensitve areas and construction zone are adequately "flagged" and designated as "Equipment Boundary Zones"

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site.
- Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts offsite or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section.

4) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

Adjacent or inclusive wet/sensitive area as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.	s Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	 Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator. 	
		Effectiveness Score:	
Additional Comments		(BMP Monitoring Rule Set)	
Staging area currently being used to stockpile exclusion fencing and tree protection fencing a roadway. Sediment fencing installed along the	ogs from trees removed over snow. Staging area round the tree closest to the stockpile. Straw watt road to the Sky Base Terminal, bottom edge is se	near Sky Base is delineated with construction equipment les are in place along the bridge over the creek and alongs curely anchored in the soil.	ide the

UTM Zone 11 Easting 247760 Northing 4313741 Construction Site Name Tamar	Form HV1: Temporary BMPs fo On-going Construction ack Lodge (Top of Gondola)	אר ד ד	ID# 398 Selection Code S03 Forest LTBMU District State CA Township 12N Range 18E Section 1
Date of Project Start 7/29/	/2010 Survey Date/Time 7	/25/2011 6th Field	HUC Watershed CA-1
Reviewer(s) J. Sutherland, K. Roaldson	Construction F	oreman lim Larmore	
Construction Type: Buildin	g Structure Project Is: No	ew Construction Othe	er (Describe)
General Information Name (Df Plans Heavenly Gondola Lodge Date 06/10/2010 Re	ev Date	Job No.
Specific concerns associated with constraints of the second strain wattles to prevent runoff from damage. Dust control with water true second straints of the se	onstruction project and describe BMP measure exiting construction site. Exclusion fencing to ck.	es designed to achived resource minimize disturbance and soil co	protection.
1) Project design included Erosion C hour Storm Event (per FS and Laho control, runoff drainage control, prot	Control Plan development, and identified appro ntan SWQRCB standards); at a minimum the ection of SEZs, and hazardous substance con	priate temporary BMP measures contract should address BMP me trol, please refer to the Supplem	s for mitigating impacts from a 20-year 1- easures for the following topics: source ental BMP checklist.
1=Meets/Exceeds 20-yr 1-Hr sta 2=Minor departure from contract	ndards and/or no resource concerns and/or minor resource concerns	3=Major departure from contra 4=Repeated departure from co	ct and/or major resource concerns ntract and/or failure to address resource concerns
2) Are BMP measures constructed	according to contract design specifications?		0
1 = Meets / Exceeds contract re 2 = Minor departure from contra	equirements and/or no resource concerns act and/or minor resource concerns	3 = Major departure from contra4 = Repeated departure from c	act and/or major resource concerns contract and/or failure to address resource concerns
			Implementation Score: [I] (BMP Monitoring Rule Set)

Effectiveness

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depostional fans, are evident near erodable soil areas; however, no evidence is observed of sediment deliverv to SEZ.	Substantial areas of exposed erodable soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.	• NA	
b) Cut and fill slope protection (including surface	erosion and slope failure potential			
Temporary BMP measures (such as	Minor erosion and sediment deposition is	Temporary BMP measures are	• NA	

erosion control or geotextile blankets, inadequate to protect erosion from cut noted from storms <20-year 1-hour event; mulch or pine straw application, and fill slopes from storms <20 year--1 however, sediment transport to any SEZ, encompassing filter fences, berms or on- or off-site, is not observed. hour event; or any observation of designed swales) applied to slope sediment transport and/or deposition protection is adequate to prevent or within SEZ. severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.

2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

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- No evidence of erosion on-site, and no evidence of associated off-site erosion.
 Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.
 - Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.
- Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.

b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

No evidence of unexpected ponding on- site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	○ Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	 On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ. 	• NA
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c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

- Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20year 1-hour storm event.
- Minor resource concern is evident at infiltration zones (for storms <20-yr 1hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely.
- Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management.

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- Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site.
- Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts offsite or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section.

4) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

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1		Effectiveness Score:	_
Additional Comments		(BMP Monitoring Rule Set)	
Additional Comments No work in progress so no temporary BMPs in pla season. Final HV-2 inspection to be completed in	ce. Inspection on work completed last year. N 2012.	(BMP Monitoring Rule Set) o evidence of erosion or sediment movement after winter	_

UTM Zone 11 Easting 247850 Northing 4313936 Construction Site Name Adventure Peak	n HV1: Temporary BMPs for going Construction	or	ID# 366 Selection Code S03 Forest LTMBU District State CA Township 12N Range 18E Section 1
Date of Project Start 7/1/2011 Reviewer(s) J. Sutherland, K. Roaldson	Survey Date/Time Construction F Canyon Creek	7/25/2011 Foreman & Construction	Field HUC Watershed CA-1
Construction Type: Building Structure	e Project Is:	New Construction	Other (Describe)
General Information Name Of Plans	Adventure Peak Ski School and Date March 14, 2011 R	Summer Tubing (new plan s Rev Date June 28, 2011	et updated from origi Job No. 09601.2
Specific concerns associated with construction Temp BMPs to address erosion control, include sediment barriers.	n project and describe BMP measur ling: boundary fence, tree protectio	res designed to achived reso n fencing, restricted access,	water truck for dust control, covered/watered stockpiles,
 Project design included Erosion Control Pla hour Storm Event (per FS and Lahontan SWQ control, runoff drainage control, protection of S 	n development, and identified appr RCB standards); at a minimum the EZs, and hazardous substance co	opriate temporary BMP mea contract should address BM ntrol, please refer to the Sup	sures for mitigating impacts from a 20-year 1- IP measures for the following topics: source plemental BMP checklist.
1=Meets/Exceeds 20-yr 1-Hr standards an 2=Minor departure from contract and/or min	d/or no resource concerns nor resource concerns	3=Major departure from c 4=Repeated departure fro	ontract and/or major resource concerns m contract and/or failure to address resource concerns
2) Are BMP measures constructed according	to contract design specifications?		1
1 = Meets / Exceeds contract requiremen 2 = Minor departure from contract and/or	ts and/or no resource concerns minor resource concerns	3 = Major departure from c 4 = Repeated departure fr	contract and/or major resource concerns rom contract and/or failure to address resource concerns
			Implementation Score: IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII

Effectiveness

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

• Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depostional fans, are evident near erodable soil areas; however, no evidence is observed of sediment deliverv to SEZ.	Substantial areas of exposed erodable soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.) NA
b) Cut and fill slope protection (including surface	erosion and slope failure potential		
Temporary BMP measures (such as	Minor erosion and sediment deposition is	Temporary BMP measures are	

erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.

2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

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• No evidence of unexpected ponding on- site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	⊖ NA
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c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

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- Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts offsite or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section.

4) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

	Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.	Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	 Substantial resource concern is evident, NA such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator. 	
-			Effectiveness Score:	-
Addit	ional Comments		(BMP Monitoring Rule Set)	
Rem delin	oval of existing yurt structures in progress du eated with fencing yet, crew will install before	ring inspection. Imp: New plans have additiona equipment has access to the site after the yurt	al temporary BMP requirements. Eff 3a) Some areas not s are removed.	

UTM Zone 11 Easting 247850 F Northing 4313936 O Construction Site Name Adventure Pe	orm HV1: Temporary BMPs for n-going Construction ak Ski School		ID# 365 Selection Code S03 Forest LTMBU District State CA Township 12N Range 18E Section 1
Date of Project Start 7/1/2011 Reviewer(s) K. Roaldson	Survey Date/Time Construction Fo	/5/2011 6th Fie eman onstruction	eld HUC Watershed CA-1
Construction Type: Building Struct	ture Project Is: Ne		ther (Describe)
General Information Name Of Plan	Adventure Peak Ski School and St Date March 14, 2011 Rev	mmer Tubing (new plan set Date June 28, 2011	updated from origi Job No. 09601.2
Specific concerns associated with construct Temp BMPs to address erosion control, in sediment barriers.	tion project and describe BMP measures	designed to achived resour encing, restricted access, wa	ce protection. ater truck for dust control, covered/watered stockpiles,
 Project design included Erosion Control hour Storm Event (per FS and Lahontan S control, runoff drainage control, protection 	Plan development, and identified approp NQRCB standards); at a minimum the co of SEZs, and hazardous substance contr	riate temporary BMP measu ntract should address BMP bl, please refer to the Supple	res for mitigating impacts from a 20-year 1- measures for the following topics: source emental BMP checklist.
1=Meets/Exceeds 20-yr 1-Hr standards 2=Minor departure from contract and/or	and/or no resource concerns minor resource concerns	3=Major departure from con 4=Repeated departure from	tract and/or major resource concerns contract and/or failure to address resource concerns
2) Are BMP measures constructed accord	ing to contract design specifications?		1
1 = Meets / Exceeds contract requiren 2 = Minor departure from contract and	ents and/or no resource concerns	 = Major departure from cor = Repeated departure from 	ntract and/or major resource concerns n contract and/or failure to address resource concerns
			Implementation Score: I (BMP Monitoring Rule Set)

Effectiveness

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

• Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depostional fans, are evident near erodable soil areas; however, no evidence is observed of sediment deliverv to SEZ.	Substantial areas of exposed erodable soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.) NA
b) Cut and fill slope protection (including surface	erosion and slope failure potential		
Temporary BMP measures (such as	Minor erosion and sediment deposition is	Temporary BMP measures are	

erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.

2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

- a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.
- No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.
- Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.
- Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.

b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

• No evidence of unexpected ponding on- site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	⊖ NA
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c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

- Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20year 1-hour storm event.
- Minor resource concern is evident at infiltration zones (for storms <20-yr 1hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely.
- Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management.

3) Designation of construction zone and any equipment exclusion zones

a) Sensitve areas and construction zone are adequately "flagged" and designated as "Equipment Boundary Zones"

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site.
- Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts offsite or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section.
(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

	Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.	Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	 Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator. 	A			
			Effectiveness Score:				
Additior	al Comments		(BMP Monitoring Rule Set)				
Constru earthwo protecte	onstruction equipment exclusion fencing in place, tree removal in progress during inspection. Inspection to ensure temporary BMPs in place before start of inthwork. Imp: New plans have additional temporary BMP requirements. Eff: 3a) Some trees delineated on the plans to have protection fencing are not otected.						

UTM Zone 11 Easting 247850 Northing 4313936 Construction Site Name Adventure Peak	n HV1: Temporary BMPs fo going Construction	r	ID# 402 Selection Code S03 Forest LTMBU District State CA Township 12N Range 18E Section 1			
Date of Project Start 7/1/2011	Survey Date/Time 8, Construction Fo	/18/2011 6th Fie	eld HUC Watershed CA-1			
K. Roaldson	Canyon Creek	Construction				
Construction Type: Building Structure	Project Is:	ew Construction	ther (Describe)			
General Information Name Of Plans	Adventure Peak Ski School and S Date March 14, 2011	Summer Tubing (new plan set	updated from origi Job No. 09601.2			
Specific concerns associated with construction project and describe BMP measures designed to achived resource protection. Temp BMPs to address erosion control, including: boundary fence, tree protection fencing, restricted access, water truck for dust control, covered/watered stockpiles, sediment barriers.						
 Project design included Erosion Control Pla hour Storm Event (per FS and Lahontan SWQ control, runoff drainage control, protection of S 	n development, and identified appro RCB standards); at a minimum the c EZs, and hazardous substance cont	priate temporary BMP measu contract should address BMP trol, please refer to the Supple	res for mitigating impacts from a 20-year 1- measures for the following topics: source emental BMP checklist.			
1=Meets/Exceeds 20-yr 1-Hr standards an 2=Minor departure from contract and/or min	d/or no resource concerns nor resource concerns	3=Major departure from con 4=Repeated departure from	tract and/or major resource concerns contract and/or failure to address resource concerns			
2) Are BMP measures constructed according	to contract design specifications?		1			
1 = Meets / Exceeds contract requiremen 2 = Minor departure from contract and/or	ts and/or no resource concerns minor resource concerns	3 = Major departure from cor4 = Repeated departure from	ntract and/or major resource concerns n contract and/or failure to address resource concerns			
			Implementation Score: I (BMP Monitoring Rule Set)			

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

• Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depostional fans, are evident near erodable soil areas; however, no evidence is observed of sediment deliverv to SEZ.	Substantial areas of exposed erodable soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.) NA				
b) Cut and fill slope protection (including surface erosion and slope failure potential							
Temporary BMP measures (such as	Minor erosion and sediment deposition is	Temporary BMP measures are					

erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.

2) Runoff infiltration and drainage control system effectiveness.

- a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.
- No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.
- Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.
- Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.

• No evidence of unexpected ponding on- site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	⊖ NA
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c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

- Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20year 1-hour storm event.
- Minor resource concern is evident at infiltration zones (for storms <20-yr 1hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely.
- Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management.

3) Designation of construction zone and any equipment exclusion zones

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site.
- Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts offsite or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

	Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.	Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	 Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator. 				
1			Effectiveness Score:				
Ac	dditional Comments		(BMP Monitoring Rule Set)				
M or	Aost of the crew gone for the day; footing compacted and prepared for installation of CMU block walls, rebar in place for block installation. Some stockpiles onsite not covered and do not have wattles at the base.						

UTM Zone 11 Easting 247277 Northing 4312421 Construction Site Name	Form HV1: Tem On-going Const	porary BMPs for truction	Forest	ID# Selection Code S02 District	386 State CA
Date of Project Start	7/15/2011 Survey Date	e/Time 8/18/2011 Construction Foreman	6th Field HUC	Watershed CA-1	
K. Roaldson	Other	Jim Larmore Project Is: Other	Other (Des	scribe) Ski Trail Widening	
General Information	lame Of Plans California Sid	le Trail Widening	4/22/11	Job No. 11-600	0.1
Specific concerns associated Temp. BMPs for staging area compacted by heavy equipme	with construction project and dea a near Sky Base, including sedim ent to be restored to 100% cover	scribe BMP measures design ent fence, straw wattles, cons	ed to achived resource prote truction equipment exclusion	ction. a fencing to protect SEZ. Areas	disturbed or
Implementation 1) Project design included Era hour Storm Event (per FS and control, runoff drainage control	osion Control Plan development, d Lahontan SWQRCB standards) ol, protection of SEZs, and hazar	and identified appropriate ten); at a minimum the contract s dous substance control, pleas	nporary BMP measures for m hould address BMP measure se refer to the Supplemental	nitigating impacts from a 20-yea as for the following topics: source BMP checklist.	ur 1- ce 1
1=Meets/Exceeds 20-yr 1 2=Minor departure from co	Hr standards and/or no resource on tract and/or minor resource contract and/or minor resource contract and/or minor resource contract and the statement of the	e concerns 3=Major ncerns 4=Repe	departure from contract and ated departure from contract	l/or major resource concerns and/or failure to address resou	Irce concerns
2) Are BMP measures constructed according to contract design specifications?					
2 = Minor departure from	irract requirements and/or no resi	concerns 3 = Majo concerns 4 = Rep	eated departure from contract and	ct and/or failure to address reso Implementation Sco	ource concerns
				(BMP Monitoring R	ule Set)

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

• Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depostional fans, are evident near erodable soil areas; however, no evidence is observed of sediment deliverv to SEZ.	Substantial areas of exposed erodable soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.) NA				
b) Cut and fill slope protection (including surface erosion and slope failure potential							
Temporary BMP measures (such as	Minor erosion and sediment deposition is	Temporary BMP measures are					

erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.

2) Runoff infiltration and drainage control system effectiveness.

- a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.
- No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.
- Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.
- Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.

• No evidence of unexpected ponding on- site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	⊖ NA
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c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

- Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20year 1-hour storm event.
- Minor resource concern is evident at infiltration zones (for storms <20-yr 1hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely.
- Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management.

3) Designation of construction zone and any equipment exclusion zones

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site.
- Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts offsite or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

	Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.	Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	 Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator. 	○ NA			
			Effectiveness Score:	E			
Addition	al Comments		(BMP Monitoring Rule Set	()			
Hand cr removal protectio	and crews using chainsaws for stump reduction from trees that were cut down and removed over snow. No heavy equipment on the run yet for boulder emoval. No change to staging area from previous inspection. Staging area near Sky Base is delineated with construction equipment exclusion fencing and tree protection fencing around the tree closest to the stockpile. Straw wattles are in place along the bridge over the creek and alongside the roadway. Sediment						

fencing installed along the road to the Sky Base Terminal, bottom edge is securely anchored in the soil.

UTM Zone11Easting247760Northing4313741Construction Site Name	Form HV1: Tem On-going Cons Tamarack Lodge (Top of Gondo	HV1: Temporary BMPs for oing Construction		ID# Selection Code S03 Forest LTBMU District State Township 12N Range 18E Section	436 CA	
Date of Project Start Reviewer(s) K. Roaldson Construction Type:	7/29/2010 Survey Dat	Construction For Joe Stewart / Jir Project Is: New	B/2011 6th eman Larmore Construction	Field HUC Watershed CA-1		
General Information Name Of Plans Heavenly Gondola Lodge Job No. Date 06/10/2010 Rev Date Image: Concerns associated with construction project and describe BMP measures designed to achived resource protection. Image: Straw wattles to prevent runoff from exiting construction site. Exclusion fencing to minimize disturbance and soil compaction. Tree protective fence to reduce vegetation damage. Dust control with water truck.						
Implementation 1) Project design included Erhour Storm Event (per FS ancontrol, runoff drainage control 1=Meets/Exceeds 20-yr 1 2=Minor departure from co	osion Control Plan development d Lahontan SWQRCB standards ol, protection of SEZs, and haza -Hr standards and/or no resourc ontract and/or minor resource co	, and identified approp s); at a minimum the cc rdous substance contr e concerns ncerns	ate temporary BMP mea htract should address BM I, please refer to the Sup =Major departure from c =Repeated departure from	sures for mitigating impacts from a 20-year 1- IP measures for the following topics: source plemental BMP checklist.	0 erns	
2) Are BMP measures constructed according to contract design specifications? 1 = Meets / Exceeds contract requirements and/or no resource concerns 2 = Minor departure from contract and/or minor resource concerns 3 = Major departure from contract and/or major resource concerns 4 = Repeated departure from contract and/or failure to address resource concerns						
				Implementation Score: (BMP Monitoring Rule Set)		

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depostional fans, are evident near erodable soil areas; however, no evidence is observed of sediment deliverv to SEZ.	Substantial areas of exposed erodable soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.	● NA			
b) Cut and fill slope protection (including surface erosion and slope failure potential						

Temporary BMP measures (such as erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.	Minor erosion and sediment deposition is noted from storms <20-year 1-hour event; however, sediment transport to any SEZ, on- or off-site, is not observed.	Temporary BMP measures are inadequate to protect erosion from cut and fill slopes from storms <20 year1 hour event; or any observation of sediment transport and/or deposition within SEZ.	(•) NA
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.

- No evidence of erosion on-site, and no evidence of associated off-site erosion.
 Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.
 Observe erosion a Specification of the sediment transport processes induced off control measures are or at erosion and sediment transport processes induced by a 20-year 1-hour storm event.
 - Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.
- Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.

No evidence of unexpected ponding on- site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	 On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ. 	NA
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c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

- Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20year 1-hour storm event.
- Minor resource concern is evident at infiltration zones (for storms <20-yr 1hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely.
- Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management.

3) Designation of construction zone and any equipment exclusion zones

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site.
- Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts offsite or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

	 Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones. 	Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	 Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator. 	
			Effectiveness Score:	
Α	Additional Comments		(BMP Monitoring Rule Set)	
٢	No work in progress.			_

UTM Zone 11 Easting 246343 Northing 4312587 Construction Site Name Umbrella Bar Rel	n HV1: Temporary BMPs fe going Construction	or	ID# 400 Selection Code S02 Forest Tahoe District LTMBU State CA Township 12N Range 18E Section 1
Date of Project Start 7/18/2011	Survey Date/Time	3/18/2011 6th F	ield HUC Watershed CA-1
Reviewer(s)	Construction F	Foreman	
K. Roaldson	Tom Fortune		
Construction Type: Building Structure	Project Is:	lew Construction	Other (Describe) Relocation of Existing Umbrella Bar
General Information Name Of Plans	Umbrella Bar Relocation		Job No. 10-604.1
	Date 8/16/10 R	ev Date	
Specific concerns associated with construction	project and describe BMP measur	es designed to achived resou	urce protection.
BMPs to protect adjacent SEZ - coir logs, sedi	ment fence, stockpile controls, veg	protective fence.	
Implementation			
 Project design included Erosion Control Pla hour Storm Event (per FS and Lahontan SWQ control, runoff drainage control, protection of S 	n development, and identified appro RCB standards); at a minimum the EZs, and hazardous substance cor	opriate temporary BMP meas contract should address BMF htrol, please refer to the Supp	Pures for mitigating impacts from a 20-year 1- P measures for the following topics: source plemental BMP checklist.
1=Meets/Exceeds 20-yr 1-Hr standards and 2=Minor departure from contract and/or min	d/or no resource concerns nor resource concerns	3=Major departure from co 4=Repeated departure from	ntract and/or major resource concerns n contract and/or failure to address resource concerns
2) Are BMP measures constructed according	to contract design specifications?		1
1 = Meets / Exceeds contract requirement 2 = Minor departure from contract and/or r	is and/or no resource concerns minor resource concerns	3 = Major departure from co 4 = Repeated departure from	ontract and/or major resource concerns om contract and/or failure to address resource concerns
			Implementation Score: m (BMP Monitoring Rule Set)

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

○ Soil protection measures are effective and Exposed and/or disturbed soil areas have Substantial areas of exposed erodable \bigcirc NA no erosion is evident, or expected, on-site less than full cover, OR minor erosion, soil are not protected and evidence of or immediately off-site. OR no soil such as infrequent rills or small erosion processes, such as rills or disturbance is associated with project. depostional fans, are evident near sediment deposition are readily erodable soil areas; however, no observed. OR any evidence of sediment evidence is observed of sediment runoff to SEZ. delivery to SEZ. b) Cut and fill slope protection (including surface erosion and slope failure potential

• Temporary BMP measures (such as Minor erosion and sediment deposition is Temporary BMP measures are \bigcirc NA erosion control or geotextile blankets, noted from storms <20-year 1-hour event; inadequate to protect erosion from cut mulch or pine straw application, and fill slopes from storms <20 year--1 however, sediment transport to any SEZ, encompassing filter fences, berms or on- or off-site, is not observed. hour event; or any observation of designed swales) applied to slope sediment transport and/or deposition protection is adequate to prevent or within SEZ. severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.

2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.

- No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.
- Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.
- Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.

• No evidence of unexpected ponding on- site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	⊖ NA
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c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

- Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20year 1-hour storm event.
- Minor resource concern is evident at infiltration zones (for storms <20-yr 1hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely.
- Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management.

3) Designation of construction zone and any equipment exclusion zones

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site.
- Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts offsite or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.	Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	 Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator. 	
		Effectiveness Score: E	
Additional Comments		(BMP Monitoring Rule Set)	
Crew is working on grading the new section of roa the ditch adjacent to the road and sediment fence	ad. Temporary BMPs are in place per the plans around the drop inlet and along the SEZ. Surfa	including equipment exclusion fencing, weighted straw wattles in ace water is currently flowing in the SEZ. Imp 1): Three separate	

Crew is working on grading the new section of road. Temporary BMPs are in place per the plans including equipment exclusion fencing, weighted straw wattles the ditch adjacent to the road and sediment fence around the drop inlet and along the SEZ. Surface water is currently flowing in the SEZ. Imp 1): Three separa utilities will cross SEZ; dewatering plan will be needed since there is flowing water. 1a & 2a) Sediment fence in the designated location as shown on the plans but it will not protect the SEZ once trenching is started due to flowing water in the SEZ.

UTM Zone 11 Easting 247850 Northing 4313936 Construction Site Name Adv	Form HV1: Temporary BMPs On-going Construction	for	ID# 412 Selection Code S03 Forest LTMBU District State CA Township 12N Range 18E Section 1
Date of Project Start	7/1/2011 Survey Date/Time	9/1/2011	
Reviewer(s)	Construction	Foreman	
K. Roaldson	Canyon Cre	ek Construction	
Construction Type: Buil	Iding Structure Project Is:	New Construction Ot	her (Describe)
General Information Nam	e Of Plans Adventure Peak Ski School an	d Summer Tubing (new plan set	updated from origi Job No. 09601.2
	Date March 14, 2011	Rev Date June 28, 2011	_
Specific concerns associated with	h construction project and describe BMP meas	ures designed to achived resource	ce protection.
Temp BMPs to address erosion e sediment barriers.	control, including: boundary fence, tree protect	ion fencing, restricted access, wa	tter truck for dust control, covered/watered stockpiles,
Implementation			
 Project design included Erosio hour Storm Event (per FS and La control, runoff drainage control, p 	on Control Plan development, and identified app ahontan SWQRCB standards); at a minimum th protection of SEZs, and hazardous substance c	propriate temporary BMP measure the contract should address BMP in ontrol, please refer to the Supple	res for mitigating impacts from a 20-year 1- measures for the following topics: source mental BMP checklist.
1=Meets/Exceeds 20-yr 1-Hr 2=Minor departure from contra	standards and/or no resource concerns act and/or minor resource concerns	3=Major departure from cont 4=Repeated departure from	ract and/or major resource concerns contract and/or failure to address resource concerns
2) Are BMP measures construct	ted according to contract design specifications?	2	1
1 = Meets / Exceeds contrac 2 = Minor departure from con	t requirements and/or no resource concerns ntract and/or minor resource concerns	3 = Major departure from con 4 = Repeated departure from	tract and/or major resource concerns a contract and/or failure to address resource concerns
			Implementation Score:
			(BMP Monitoring Rule Set)

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

• Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depostional fans, are evident near erodable soil areas; however, no evidence is observed of sediment deliverv to SEZ.	Substantial areas of exposed erodable soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.) NA
b) Cut and fill slope protection (including surface	erosion and slope failure potential		
Temporary BMP measures (such as	Minor erosion and sediment deposition is	Temporary BMP measures are	

erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.

2) Runoff infiltration and drainage control system effectiveness.

- a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.
- No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.
- Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.
- Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.

• No evidence of unexpected ponding on- site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	⊖ NA
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c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

- Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20year 1-hour storm event.
- Minor resource concern is evident at infiltration zones (for storms <20-yr 1hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely.
- Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management.

3) Designation of construction zone and any equipment exclusion zones

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site.
- Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts offsite or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

 Adjacent or inclu as well as constr adequately flagg operations avoid designated zone 	sive wet/sensitive areas uction site are ed, and equipment infringement upon s.	Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	 Substantial resource concern is evident, NA such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator. 		
Additional Comments			Effectiveness Score: E (BMP Monitoring Rule Set)		
ork on CMU block walls for ski school building and underground electrical work in progress during inspection. Kitchen trailer has been moved to new location.					

Work on CMU block walls for ski school building and underground electrical work in progress during inspection. Kitchen trailer has been moved to new location. Work on play structure in progress, sediment fence in place downgradient from the construction area. Excavation of waterline near Lodge building in progress for fire service tie-in. Wattles not in place at base of stockpiles; stockpiles are actively in use. I called Jim Larmore to let him know, wattles were placed at the bottom of stockpiles that day.

UTM Zone 11 Easting 247760 Northing 4313741 Construction Site Name Tar	Form HV1: Temporary BMPs On-going Construction	for ID# 403 Selection Code S03 Forest LTBMU District State CA Township 12N Range 18E Section 1
Date of Project Start	/29/2010 Survey Date/Time	9/1/2011 6th Field HUC Watershed CA-1
Reviewer(s) K. Roaldson	Construction Joe Stewart	Foreman / Jim Larmore
Construction Type: Bui	ilding Structure Project Is:	New Construction Other (Describe)
General Information Nam	Date 06/10/2010	Job No.
Specific concerns associated with Straw wattles to prevent runoff fri damage. Dust control with water	th construction project and describe BMP measure rom exiting construction site. Exclusion fencing t r truck.	res designed to achived resource protection. o minimize disturbance and soil compaction. Tree protective fence to reduce vegetation
1) Project design included Erosic hour Storm Event (per FS and La control, runoff drainage control, p	on Control Plan development, and identified app ahontan SWQRCB standards); at a minimum the protection of SEZs, and hazardous substance co	ropriate temporary BMP measures for mitigating impacts from a 20-year 1- e contract should address BMP measures for the following topics: source ontrol, please refer to the Supplemental BMP checklist.
1=Meets/Exceeds 20-yr 1-Hr 2=Minor departure from contr	standards and/or no resource concerns ract and/or minor resource concerns	3=Major departure from contract and/or major resource concerns 4=Repeated departure from contract and/or failure to address resource concerns
2) Are BMP measures construct	ted according to contract design specifications?	1
1 = Meets / Exceeds contrac 2 = Minor departure from co	ct requirements and/or no resource concerns ontract and/or minor resource concerns	 3 = Major departure from contract and/or major resource concerns 4 = Repeated departure from contract and/or failure to address resource concerns
		Implementation Score: I (BMP Monitoring Rule Set)

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

• Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depostional fans, are evident near erodable soil areas; however, no evidence is observed of sediment deliverv to SEZ.	Substantial areas of exposed erodable soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.) NA
b) Cut and fill slope protection (including surface	erosion and slope failure potential		
Temporary BMP measures (such as	Minor erosion and sediment deposition is	Temporary BMP measures are	

D Temporary BMP measures (such as erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes. Minor erosion and sediment deposition is noted from storms <20-year 1-hour event; inade however, sediment transport to any SEZ, on- or off-site, is not observed. hour sedire within the severely limit erosion initiation and maintenance of cut and fill slopes.	nporary BMP measures are dequate to protect erosion from cut fill slopes from storms <20 year1 r event; or any observation of iment transport and/or deposition in SEZ.
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2) Runoff infiltration and drainage control system effectiveness.

- a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.
- No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.
- Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.
- Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.

• No evidence of unexpected ponding on- site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	⊖ NA
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c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

- Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20year 1-hour storm event.
- Minor resource concern is evident at infiltration zones (for storms <20-yr 1hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely.
- Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management.

3) Designation of construction zone and any equipment exclusion zones

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site.
- Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts offsite or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.	Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	 Substantial resource concern is evident, NA such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator. 	
		Effectiveness Score:	
Additional Comments		(BMP Monitoring Rule Set)	
Work on additional revegetation in area in front of adjacent to the revegetation area are for the Adver	Lodge building in progress. Crew planting by h nture Peak Ski School project.	and, no construction equipment onsite. Temporary BMPs	

UTM Zone 11 Easting 247277 Northing 4312421 Construction Site Name	Form HV1 On-going	1: Temporary BMPs f Construction	ōr		Forest	ID# Selection Code S02 District	State	390 CA
		loning			Townsr		18E Section	
Date of Project Start	7/15/2011 Sur	rvey Date/Time	9/1/2011	6th	Field HUC	Watershed CA-1		
Reviewer(s)		Construction	Foreman					
K. Roaldson		Jim Larmore						
Construction Type:	Other	Project Is:	Other		Other (Des	scribe) Ski Trail Wideni	ing	
General Information	Name Of Plans Calif	ornia Side Trail Widening				Job No.	11-600.1	_
	Date	3/24/11 F	Rev Date	4/22/11				
Temp. BMPs for staging a compacted by heavy equip	rea near Sky Base, includir oment to be restored to 100	ng sediment fence, straw wa % cover.	attles, const	ruction equipme	nt exclusion	fencing to protect SEZ.	Areas disturbed	or
Implementation 1) Project design included hour Storm Event (per FS control, runoff drainage co	Erosion Control Plan devel and Lahontan SWQRCB st ntrol, protection of SEZs, a	lopment, and identified appr andards); at a minimum the nd hazardous substance co	ropriate tem contract sh ntrol, please	porary BMP mea hould address BN e refer to the Sup	asures for m MP measure oplemental E	itigating impacts from a ss for the following topics BMP checklist.	20-year 1- s: source	1
1=Meets/Exceeds 20-y 2=Minor departure fron	r 1-Hr standards and/or no n contract and/or minor reso	resource concerns ource concerns	3=Major 4=Repea	departure from c ated departure fro	contract and om contract	/or major resource conc and/or failure to addres	erns s resource conce	rns
2) Are BMP measures co	nstructed according to cont	ract design specifications?						1
1 = Meets / Exceeds o 2 = Minor departure fr	contract requirements and/o om contract and/or minor re	or no resource concerns esource concerns	3 = Major 4 = Repe	departure from eated departure f	contract and from contrac	d/or major resource cond t and/or failure to addre	cerns ss resource conc	erns
						Implementat (BMP Monito	tion Score: oring Rule Set)	ļi —

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

• Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depostional fans, are evident near erodable soil areas; however, no evidence is observed of sediment deliverv to SEZ.	Substantial areas of exposed erodable soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.) NA
b) Cut and fill slope protection (including surface	erosion and slope failure potential		
Temporary BMP measures (such as	Minor erosion and sediment deposition is	Temporary BMP measures are	

erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.	le blankets, ation, s, berms or to slope orevent or ation and oroject does on and l slopes. noted from storms <20-year 1-hour event; however, sediment transport to any SEZ, on- or off-site, is not observed. inadequate to protect erosion from cut and fill slopes from storms <20 year1 hour event; or any observation of sediment transport and/or deposition within SEZ.
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2) Runoff infiltration and drainage control system effectiveness.

- a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.
- No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.
- Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.
- Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.

No evidence of unexpected posite, or constructed detention outlets are stable (naturally st stablized with planted vegetat other type of armor) and exhit of erosion or downstream rese concerns.	onding on- ponds and table, tion, or bit no signs ource Some evidence of on-site ponding, does not appear to threaten integrit fillslopes or foundations. Or minor erosion and/or downslope resource basin outlet, such as sediment plum or small rill formation. However, sediment is not transported to SEZ is not anticipated from events <20-y 1-hour storm.	but by of On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	⊖ NA
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c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

- Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20year 1-hour storm event.
- Minor resource concern is evident at infiltration zones (for storms <20-yr 1hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely.
- Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management.

3) Designation of construction zone and any equipment exclusion zones

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site.
- Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts offsite or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.	Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	 Substantial resource concern is evident, NA such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator. 	
		Effectiveness Score: E	
Additional Comments		(BMP Monitoring Rule Set)	
Hand crews using chainsaws for stump reduction f delineated on the plans. Crews have started stock	from trees that were cut down and removed over spiling pine needle mulch in turnouts and at the	er snow. Excavator working on removing boulders from areas top of the run for 100% coverage after excavator work is	

delineated on the plans. Crews have started stockpiling pine needle mulch in turnouts and at the top of the run for 100% coverage after excavator work is complete. No change to staging area from previous inspection. Staging area near Sky Base is delineated with construction equipment exclusion fencing and tree protection fencing around the tree closest to the stockpile. Straw wattles are in place along the bridge over the creek and alongside the roadway. Sediment

UTM Zone 11 Easting 246343 Northing 4312587 Construction Site Name Umbrella Bar Relocation	HV1: Temporary BMPs for ing Construction ation	6th Fie	ID# 389 Selection Code S02 Forest Tahoe District LTMBU State CA Township 12N Range 18E Section 1
Date of Project Start	Survey Date/Time 9/1/20		
Reviewer(s)	Construction Foreman	1	
Construction Type: Building Structure	Project Is: New Cor	struction	ther (Describe) Relocation of Existing Umbrella Bar
General Information Name Of Plans	Umbrella Bar Relocation		Job No. 10-604.1
C	Date 8/16/10 Rev Date		
Specific concerns associated with construction pr	roject and describe BMP measures desi	gned to achived resour	ce protection.
BMPs to protect adjacent SEZ - coir logs, sedime	ent fence, stockpile controls, veg protect	ve fence.	
Implementation			
 Project design included Erosion Control Plan d hour Storm Event (per FS and Lahontan SWQRC control, runoff drainage control, protection of SEZ 	levelopment, and identified appropriate CB standards); at a minimum the contract Cs, and hazardous substance control, plo	emporary BMP measu t should address BMP ase refer to the Supple	res for mitigating impacts from a 20-year 1- measures for the following topics: source emental BMP checklist.
1=Meets/Exceeds 20-yr 1-Hr standards and/or 2=Minor departure from contract and/or minor	r no resource concerns 3=Ma resource concerns 4=Re	jor departure from cont peated departure from	tract and/or major resource concerns contract and/or failure to address resource concerns
2) Are BMP measures constructed according to a	contract design specifications?		1
1 = Meets / Exceeds contract requirements a 2 = Minor departure from contract and/or min	and/or no resource concerns $3 = M$ nor resource concerns $4 = R$	ajor departure from con epeated departure from	ntract and/or major resource concerns n contract and/or failure to address resource concerns
			Implementation Score:
			(BMP Monitoring Rule Set)

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

• Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depostional fans, are evident near erodable soil areas; however, no evidence is observed of sediment deliverv to SEZ.	Substantial areas of exposed erodable soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.) NA
b) Cut and fill slope protection (including surface	erosion and slope failure potential		
Temporary BMP measures (such as	Minor erosion and sediment deposition is	Temporary BMP measures are	⊖ NA

 Tempora erosion c mulch or encompa designed protection severely transport not requi maintena 	any BMP measures (such as control or geotextile blankets, pine straw application, assing filter fences, berms or d swales) applied to slope in is adequate to prevent or limit erosion initiation and t processes. OR project does ire the construction and ance of cut and fill slopes.	Minor erosion and sediment deposition is noted from storms <20-year 1-hour event; however, sediment transport to any SEZ, on- or off-site, is not observed.	 Temporary BMP me inadequate to protect and fill slopes from s hour event; or any o sediment transport a within SEZ. 	asures are :t erosion from cut :torms <20 year1 bservation of ind/or deposition
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.

- No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.
- Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.
- Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.

• No evidence of unexpected ponding on- site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	⊖ NA
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c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

- Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20year 1-hour storm event.
- Minor resource concern is evident at infiltration zones (for storms <20-yr 1hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely.
- Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management.

3) Designation of construction zone and any equipment exclusion zones

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site.
- Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts offsite or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.	Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	 Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator. 	⊖ NA		
		Effectiveness Score: (BMP Monitoring Rule S	E		
Additional Comments (BMP Monitoring Rule Set)					

fencing, weighted straw wattles in the ditch adjacent to the road and sediment fence around the drop inlet and along the SEZ. Surface water is STILL flowing in the SEZ. Imp 1): Three separate utilities will cross SEZ; dewatering plan will be needed since there is flowing water. 1a & 2a) Sediment fence in the designated location as shown on the plans but it will not protect the SEZ once trenching is started due to flowing water in the SEZ. Crew said they will try to wait to until the

UTM Zone 11 Easting 247277 Northing 4312421 Construction Site Name	Form HV1: Temporary BMPs for On-going Construction			Forest	Selection	ID# Code S02 District Range 1	St 8E Sec	42 ate CA	27	
Date of Project Start	7/15/2011	Survey Date/Time	9/9/2011	6t	h Field HUC V	Vatershed	CA-1		<u> </u>	
Reviewer(s) K. Roaldson		Constructio	n Foreman e			Ī				
Construction Type:	Other	Project Is:	Other		Other (Des	cribe) Ski	Trail Widening	g		
General Information	Name Of Plans	California Side Trail Widening Date 3/24/11	Rev Date	4/22/11			Job No. 1	1-600.1		
Specific concerns associated with construction project and describe BMP measures designed to achived resource protection. Temp. BMPs for staging area near Sky Base, including sediment fence, straw wattles, construction equipment exclusion fencing to protect SEZ. Areas disturbed or compacted by heavy equipment to be restored to 100% cover.										
Implementation 1) Project design included I hour Storm Event (per FS a control, runoff drainage cor	Erosion Control Plar and Lahontan SWQF ttrol, protection of SI	a development, and identified ap RCB standards); at a minimum th EZs, and hazardous substance of	propriate ten he contract s control, pleas	nporary BMP me hould address E se refer to the Su	easures for mi BMP measure upplemental E	itigating imp s for the foll 3MP checkli	acts from a 2 owing topics: st.	0-year 1- source]	1
1=Meets/Exceeds 20-yr 2=Minor departure from	1-Hr standards and contract and/or min	/or no resource concerns or resource concerns	3=Major 4=Repe	departure from ated departure f	contract and/ from contract	/or major res and/or failur	source concer e to address	rns resource co	oncerns	
2) Are BMP measures constructed according to contract design specifications?										
1 = Meets / Exceeds c 2 = Minor departure fro	ontract requirements om contract and/or n	s and/or no resource concerns ninor resource concerns	3 = Majo 4 = Rep	r departure from eated departure	n contract and from contrac	l/or major re t and/or failu	source conce ure to address	rns s resource o	concerns	
						 (mplementatio BMP Monitor	n Score: ing Rule Se	l et)	

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

• Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depostional fans, are evident near erodable soil areas; however, no evidence is observed of sediment deliverv to SEZ.	Substantial areas of exposed erodable soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.) NA				
b) Cut and fill slope protection (including surface erosion and slope failure potential							
Temporary BMP measures (such as	OMinor erosion and sediment deposition is	Temporary BMP measures are					

not require the construction and maintenance of cut and fill slopes.	Imporary BMP measures (such as erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and	position is nour event; any SEZ, SEZ, Determined our event; any SEZ, Determined SEZ, Determined SEZ, Determined SEZ, Determined SEZ, Determined SEZ, Determined SEZ, Determined SEZ, Determined SEZ, Determined SEZ, Determined SEZ, Determined SEZ, Determined SEZ, Determined SEZ, Determined SEZ, Determined SEZ, Determined SEZ, Determined SEZ, Determined SEZ, Determined SEZ, Determined SEZ, Determined SEZ, Determined SEZ, Determined SEZ, Determined SEZ, Determined SEZ, Determined SEZ, Determined SEZ, Determined SEZ, Determined SEZ, SEZ, SEZ, SEZ, SEZ, SEZ, SEZ, SEZ,
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2) Runoff infiltration and drainage control system effectiveness.

- a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.
- No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.
- Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.
- Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.

• No evidence of unexpected ponding on- site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	⊖ NA
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c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

- Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20year 1-hour storm event.
- Minor resource concern is evident at infiltration zones (for storms <20-yr 1hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely.
- Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management.

3) Designation of construction zone and any equipment exclusion zones

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site.
- Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts offsite or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section.
(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

 Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones. 	Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	 Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator. 					
I		Effectiveness Score:					
Additional Comments		(BMP Monitoring Rule Set)					
Follow- up from 9/1 inspection. Hand crews using chainsaws for stump reduction from trees that were cut down and removed over snow. Excavator working on removing boulders from areas delineated on the plans. Staging area is delineated with construction equipment exclusion fencing and tree protection fencing around the tree closest to the stockpile. Straw wattles are in place along the bridge over the creek and alongside the roadway. Sediment fencing installed along the road to the Sky Base Terminal, bottom edge is securely anchored in the soil.							

2011 BMP Monitoring

UTM Zone 11 Easting 246343 Northing 4312587 Construction Site Name Umbre	Form HV1: Temporary BMPs for On-going Construction	ID# 401 Selection Code S02 Forest Tahoe District LTMBU State CA Township 12N Range 18E Section 1
Date of Project Start 7/18	3/2011 Survey Date/Time 9/	16/2011 CA-1
Reviewer(s) K. Roaldson, T. Osterhout	Construction Fo	reman
Construction Type: Buildin	ng Structure Project Is: Ne	W Construction Other (Describe) Relocation of Existing Umbrella Bar
General Information Name	Of Plans Umbrella Bar Relocation Date 8/16/10 Re	Job No. 10-604.1
Specific concerns associated with c BMPs to protect adjacent SEZ - co	construction project and describe BMP measure ir logs, sediment fence, stockpile controls, veg p	a designed to achived resource protection. rotective fence, water truck.
Implementation 1) Project design included Erosion of hour Storm Event (per FS and Laho control, runoff drainage control, pro	Control Plan development, and identified approp ontan SWQRCB standards); at a minimum the c itection of SEZs, and hazardous substance cont	riate temporary BMP measures for mitigating impacts from a 20-year 1- ontract should address BMP measures for the following topics: source ol, please refer to the Supplemental BMP checklist.
1=Meets/Exceeds 20-yr 1-Hr sta 2=Minor departure from contrac	andards and/or no resource concerns t and/or minor resource concerns	3=Major departure from contract and/or major resource concerns 4=Repeated departure from contract and/or failure to address resource concerns
2) Are BMP measures constructed	according to contract design specifications?	1
1 = Meets / Exceeds contract r 2 = Minor departure from contr	requirements and/or no resource concerns ract and/or minor resource concerns	 B = Major departure from contract and/or major resource concerns 4 = Repeated departure from contract and/or failure to address resource concerns
		Implementation Score: I (BMP Monitoring Rule Set)

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

• Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project. Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depostional fans, are evident near erodable soil areas; however, no evidence is observed of sediment deliverv to SEZ.		Substantial areas of exposed erodable soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.) NA
b) Cut and fill slope protection (including surface	erosion and slope failure potential		
Temporary BMP measures (such as	Minor erosion and sediment deposition is	Temporary BMP measures are	

erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.	erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.	noted from storms <20-year 1-hour event; however, sediment transport to any SEZ, on- or off-site, is not observed.	inadequate to protect erosion from co and fill slopes from storms <20 year- hour event; or any observation of sediment transport and/or deposition within SEZ.
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.

- No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.
- Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.
- Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.

• No evidence of unexpected ponding on- site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	⊖ NA
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c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

- Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20year 1-hour storm event.
- Minor resource concern is evident at infiltration zones (for storms <20-yr 1hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely.
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- Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts offsite or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

 Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones. Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events). 		 Substantial resource concern is evident, NA such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator. 	
		Effectiveness Score: E	
Additional Comments		(BMP Monitoring Rule Set)	
The new section of road has been graded a separate utilities to cross SEZ; dewatering p once trenching is started.	nd surfaced with road base. Crew working on excav lan will be needed. Sediment fence in the designate	ration for the waterline alongside Snow Beach. Imp 1): Three ad location on the plans is in place but it will not protect the SEZ	

UTM Zone10Easting247760Northing4313741Construction Site Name	Form HV1: Temporary BMPs for On-going Construction		ID# Selection Code S02 Forest LTBMU District Township 12N Range 18E So	437 State CA ection 1	
Date of Project Start Reviewer(s) K. Roaldson	7/29/2010 Survey Da	te/Time 9/16 Construction Fore Joe Stewart / Jim	2011 6th F nan .armore	Field HUC Watershed CA-1	
Construction Type:	Building Structure	Project Is: New	Construction	Other (Describe)	
General Information	Name Of Plans Heavenly G	ondola Lodge /10/2010	ate	Job No.	_
Specific concerns associated Straw wattles to prevent rund damage. Dust control with w	d with construction project and d off from exiting construction site ater truck.	escribe BMP measures Exclusion fencing to mi	esigned to achived reso imize disturbance and s	urce protection. oil compaction. Tree protective fence to reduc	ce vegetation
1) Project design included En hour Storm Event (per FS an control, runoff drainage control	rosion Control Plan developmen d Lahontan SWQRCB standard rol, protection of SEZs, and haza	t, and identified appropri s); at a minimum the cor ardous substance contro	te temporary BMP meas ract should address BM please refer to the Supp	sures for mitigating impacts from a 20-year 1- P measures for the following topics: source plemental BMP checklist.	
1=Meets/Exceeds 20-yr 1 2=Minor departure from c	-Hr standards and/or no resource c	ce concerns 3 oncerns 4	Major departure from co Repeated departure from	ontract and/or major resource concerns m contract and/or failure to address resource	concerns
2) Are BMP measures cons	tructed according to contract de	sign specifications?			1
1 = Meets / Exceeds con 2 = Minor departure from	ntract requirements and/or no re n contract and/or minor resource	source concerns 3 e concerns 4	Major departure from c Repeated departure from	ontract and/or major resource concerns om contract and/or failure to address resource	e concerns
				Implementation Score: (BMP Monitoring Rule	Set)

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

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b) Cut and fill slope protection (including surface	erosion and slope failure potential		
Temporary BMP measures (such as	Minor erosion and sediment deposition is	Temporary BMP measures are	

erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.

2) Runoff infiltration and drainage control system effectiveness.

- a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.
- No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.
- Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.
- Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.

• No evidence of unexpected ponding on- site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	⊖ NA
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c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

- Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20year 1-hour storm event.
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(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

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I		Effectiveness Score:	E
Additional Comments		(BMP Monitoring Rule Se	t)
Trenching for electrical line in progress. Straw wa at the top of the riprap slope has not been surface activity outside area where trenching is occuring.	attles in place, soil stockpiled upgradient from th ed yet. Jim Larmore says they will place wood c Dripline infiltration trenches at magic carpet not	e trench. Area requiring additional coverage behind hip mulch here in the coming weeks. No evidence of typet installed per the plans.	d the Lodge of equipment

UTM Zone 11 Easting 247277 Northing 4312421 Construction Site Name	Forn On-g California Side Tr	rm HV1: Temporary BMPs for n-going Construction		Forest	ID# 4 Selection Code S02 Forest District State CA Township 12N Range 18E Section 1					
Date of Project Start	7/15/2011	Survey Date/Time	9/16/2011 on Foreman	6t	h Field HUC V	Vatershed	CA-1			_
K. Roaldson	Other	Jim Larmo Project Is:	re Other		Other (Des	cribe) Ski	Trail Widenir	ng		
General Information	Name Of Plans	California Side Trail Widening Date 3/24/11	Rev Date	4/22/11	_		Job No.	11-600.1		
Specific concerns associate Temp. BMPs for staging ar compacted by heavy equip	Specific concerns associated with construction project and describe BMP measures designed to achived resource protection. Temp. BMPs for staging area near Sky Base, including sediment fence, straw wattles, construction equipment exclusion fencing to protect SEZ. Areas disturbed or compacted by heavy equipment to be restored to 100% cover.									
Implementation 1) Project design included I hour Storm Event (per FS a control, runoff drainage cor	Erosion Control Plar and Lahontan SWQF atrol, protection of SI	n development, and identified a RCB standards); at a minimum EZs, and hazardous substance	opropriate ten the contract s control, pleas	nporary BMP me hould address E e refer to the Su	easures for mi 3MP measure upplemental E	itigating imp s for the foll 3MP checkli	pacts from a 2 owing topics st.	20-year 1- : source	·	1
1=Meets/Exceeds 20-yr 2=Minor departure from	1-Hr standards and contract and/or min	Vor no resource concerns or resource concerns	3=Majoi 4=Repe	departure from ated departure f	contract and/ from contract	or major res and/or failur	source conce e to address	erns resource	concerns	
2) Are BMP measures con	structed according t	o contract design specifications	\$?							1
1 = Meets / Exceeds c 2 = Minor departure fro	ontract requirements om contract and/or n	s and/or no resource concerns ninor resource concerns	3 = Majo 4 = Rep	r departure from eated departure	n contract and from contrac	/or major re t and/or failu	source conce ure to addres	erns s resourc	e concerns	5
						 (mplementation BMP Monitor	on Score: ring Rule	Set)	

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

• Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depostional fans, are evident near erodable soil areas; however, no evidence is observed of sediment deliverv to SEZ.	Substantial areas of exposed erodable soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.) NA
b) Cut and fill slope protection (including surface	erosion and slope failure potential		
Temporary BMP measures (such as	Minor erosion and sediment deposition is	Temporary BMP measures are	

erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.

2) Runoff infiltration and drainage control system effectiveness.

- a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.
- No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.
- Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.
- Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.

• No evidence of unexpected ponding on- site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	⊖ NA
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c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

- Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20year 1-hour storm event.
- Minor resource concern is evident at infiltration zones (for storms <20-yr 1hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely.
- Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management.

3) Designation of construction zone and any equipment exclusion zones

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site.
- Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts offsite or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

 Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones. 	Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	 Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator.) NA
Additional Comments		Effectiveness Score: (BMP Monitoring Rule S	E Set)
Chipping of stockpiled logs in progress. Excavate	or working on removing boulders from areas deli	neated on the plans. Pine needle mulch coverage	e started at top

Chipping of stockpiled logs in progress. Excavator working on removing boulders from areas delineated on the plans. Pine needle mulch coverage started at top of run; 75% of coverage work remaining. Very effective cover where it is in place. No change to staging area from previous inspection. Area is delineated with construction equipment exclusion fencing and tree protection fencing around the tree closest to the stockpile. Straw wattles are in place along the bridge over the creek and alongside the roadway. Sediment fencing installed along the road to the Sky Base Terminal, bottom edge is securely anchored in the soil.

UTM Zone 11 Easting 247850 Northing 4313936 Construction Site Name Adventure Peak	n HV1: Temporary BMPs fo going Construction Ski School	or	ID# 410 Selection Code S03 Forest LTMBU District State CA Township 12N Range 18E Section 1
Date of Project Start 7/1/2011	Survey Date/Time	9/16/2011 6th Fie	eld HUC Watershed CA-1
K. Roaldson, T. Osterhout Construction Type: Building Structure	Canyon Creek	ew Construction	ther (Describe)
General Information Name Of Plans	Adventure Peak Ski School and E	Summer Tubing (new plan set	updated from origi Job No. 09601.2
Specific concerns associated with construction Temp BMPs to address erosion control, include sediment barriers.	n project and describe BMP measur ling: boundary fence, tree protection	es designed to achived resour n fencing, restricted access, w	ce protection. ater truck for dust control, covered/watered stockpiles,
1) Project design included Erosion Control Pla hour Storm Event (per FS and Lahontan SWQ control, runoff drainage control, protection of S	n development, and identified appro RCB standards); at a minimum the EZs, and hazardous substance cor	opriate temporary BMP measu contract should address BMP ntrol, please refer to the Supple	res for mitigating impacts from a 20-year 1- measures for the following topics: source emental BMP checklist.
1=Meets/Exceeds 20-yr 1-Hr standards an 2=Minor departure from contract and/or mi	d/or no resource concerns nor resource concerns	3=Major departure from con 4=Repeated departure from	tract and/or major resource concerns contract and/or failure to address resource concerns
2) Are BMP measures constructed according	to contract design specifications?		1
1 = Meets / Exceeds contract requiremen 2 = Minor departure from contract and/or	ts and/or no resource concerns minor resource concerns	 3 = Major departure from cor 4 = Repeated departure fror 	ntract and/or major resource concerns n contract and/or failure to address resource concerns
			Implementation Score:

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

• Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depostional fans, are evident near erodable soil areas; however, no evidence is observed of sediment deliverv to SEZ.	Substantial areas of exposed erodable soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.) NA
b) Cut and fill slope protection (including surface	erosion and slope failure potential		
Temporary BMP measures (such as	Minor erosion and sediment deposition is	Temporary BMP measures are	

nowever, sediment transport to any SEZ, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.))	Temporary BMP measures (such as erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.	Minor erosion and sediment deposition is noted from storms <20-year 1-hour event; however, sediment transport to any SEZ, on- or off-site, is not observed.	С	Temporary BMP measures are inadequate to protect erosion from cut and fill slopes from storms <20 year1 hour event; or any observation of sediment transport and/or deposition within SEZ.	
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2) Runoff infiltration and drainage control system effectiveness.

- a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.
- No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.
- Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.
- Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.

• No evidence of unexpected ponding on- site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	⊖ NA
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c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

- Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20year 1-hour storm event.
- Minor resource concern is evident at infiltration zones (for storms <20-yr 1hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely.
- Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management.

3) Designation of construction zone and any equipment exclusion zones

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site.
- Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts offsite or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

	 Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones. 	Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	 Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator. 	○ NA
			Effectiveness Score:	E
A	Additional Comments		(BMP Monitoring Rule Se	et)
F ti	Pour of concrete building floor in progress during i tie-in has been backfilled and compacted, valve ris	nspection. Work on play structure still in progress. ser pipe installed.	Excavation of waterline near Lodge building for	r fire service

UTM Zone 10 Easting 0 Northing 0 Construction Site Name Umbrella Bar Re	m HV1: Temporary BMPs fe going Construction	or	ID# 434 Selection Code S02 Forest Tahoe District LTMBU State Section
Date of Project Start Reviewer(s) K. Roaldson Construction Type:	Survey Date/Time Construction F Tom Fortune Project Is:	9/21/2011 Foreman	ther (Describe)
General Information Name Of Plans Specific concerns associated with construction	Umbrella Bar Relocation Date 8/16/10 R project and describe BMP measure	ev Date	Job No. 10-604.1
Implementation 1) Project design included Erosion Control Pla hour Storm Event (per FS and Lahontan SWC control, runoff drainage control, protection of S 1=Meets/Exceeds 20-yr 1-Hr standards an 2=Minor departure from contract and/or mi 2) Are BMP measures constructed according	n development, and identified appro IRCB standards); at a minimum the SEZs, and hazardous substance cor d/or no resource concerns nor resource concerns to contract design specifications?	opriate temporary BMP measu contract should address BMP htrol, please refer to the Supple 3=Major departure from con 4=Repeated departure from	res for mitigating impacts from a 20-year 1- measures for the following topics: source emental BMP checklist.
1 = Meets / Exceeds contract requiremen 2 = Minor departure from contract and/or	ts and/or no resource concerns minor resource concerns	3 = Major departure from cor 4 = Repeated departure from	tract and/or major resource concerns n contract and/or failure to address resource concerns Implementation Score:

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

• Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depostional fans, are evident near erodable soil areas; however, no evidence is observed of sediment deliverv to SEZ.	Substantial areas of exposed erodable soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.) NA
b) Cut and fill slope protection (including surface	erosion and slope failure potential		
Temporary BMP measures (such as	Minor erosion and sediment deposition is	Temporary BMP measures are	

erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.	erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.	noted from storms <20-year 1-hour event; however, sediment transport to any SEZ, on- or off-site, is not observed.	inadequate to protect erosion from co and fill slopes from storms <20 year- hour event; or any observation of sediment transport and/or deposition within SEZ.
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.

- No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.
- Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.
- Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.

• No evidence of unexpected ponding on- site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	⊖ NA
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c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

- Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20year 1-hour storm event.
- Minor resource concern is evident at infiltration zones (for storms <20-yr 1hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely.
- Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management.

3) Designation of construction zone and any equipment exclusion zones

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site.
- Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts offsite or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.	Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	 Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator. 	○ NA
1		Effectiveness Score:	E
Additional Comments		(BMP Monitoring Rule S	et)
Imp 1): Three separate utilities to cross SEZ; dew system will discharge to the vegetated area and with boulders. Once water is pumped out of the s	atering plan will be needed. Crew installing dew not to the SEZ. Sediment fence and straw wattl SEZ, trenching will begin for utilities crossing fro	atering system: gravel filled area with sump pum es have been reinforced with another line of wattle m the Umbrella Bar to Snow Beach. Crew also we	 D. Water from D. Water from D. State from D. State

installing rebar for the building footing.

UTM Zone 11 Easting 247850 Northing 4313936 Construction Site Name Adventue	Form HV1: Temporary BMPs fo On-going Construction re Peak Ski School	ID# 415 Selection Code S03 Forest LTMBU District State CA Township 12N Range 18E Section 1
Date of Project Start 7/1/20	Survey Date/Time	0/29/2011
Reviewer(s)	Construction F	oreman
T. Osterhout	Canyon Creek	Construction
Construction Type: Building	Structure Project Is: N	ew Construction Other (Describe)
General Information Name Of	Plans Adventure Peak Ski School and	Summer Tubing (new plan set updated from origi Job No. 09601.2
	Date March 14, 2011 R	ev Date June 28, 2011
Specific concerns associated with con	struction project and describe BMP measur	es designed to achived resource protection.
Temp BMPs to address erosion contra sediment barriers.	ol, including: boundary fence, tree protectior	n fencing, restricted access, water truck for dust control, covered/watered stockpiles,
Implementation		
1) Project design included Erosion Co hour Storm Event (per FS and Lahont control, runoff drainage control, protect	ntrol Plan development, and identified appro an SWQRCB standards); at a minimum the ction of SEZs, and hazardous substance cor	ppriate temporary BMP measures for mitigating impacts from a 20-year 1- contract should address BMP measures for the following topics: source trol, please refer to the Supplemental BMP checklist.
1=Meets/Exceeds 20-yr 1-Hr stand 2=Minor departure from contract a	dards and/or no resource concerns nd/or minor resource concerns	3=Major departure from contract and/or major resource concerns 4=Repeated departure from contract and/or failure to address resource concerns
2) Are BMP measures constructed ac	ccording to contract design specifications?	1
1 = Meets / Exceeds contract req 2 = Minor departure from contract	uirements and/or no resource concerns t and/or minor resource concerns	 3 = Major departure from contract and/or major resource concerns 4 = Repeated departure from contract and/or failure to address resource concerns
		Implementation Score:
		(BMP Monitoring Rule Set)

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

• Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depostional fans, are evident near erodable soil areas; however, no evidence is observed of sediment deliverv to SEZ.	Substantial areas of exposed erodable soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.	⊖ NA		
b) Cut and fill slope protection (including surface erosion and slope failure potential					
O Temporary BMP measures (such as	Minor erosion and sediment deposition is	Temporary BMP measures are			

erosion control or geotextile blankets, noted from storms <20-year 1-hour event; inadequate to protect erosion from cut mulch or pine straw application, however, sediment transport to any SEZ, and fill slopes from storms <20 year--1 encompassing filter fences, berms or on- or off-site, is not observed. hour event; or any observation of designed swales) applied to slope sediment transport and/or deposition protection is adequate to prevent or within SEZ. severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.

2) Runoff infiltration and drainage control system effectiveness.

- a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.
- No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.
- Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.
- Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.

٢	No evidence of unexpected ponding on- site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	⊖ NA
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c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

- Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20year 1-hour storm event.
- Minor resource concern is evident at infiltration zones (for storms <20-yr 1hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely.
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- Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts offsite or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

	 Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones. 	Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	 Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator. 	
1-			Effectiveness Score: m	_
Ad	dditional Comments		(BMP Monitoring Rule Set)	
W sti	ork on installation of underground utilities in pro ructure; not shown on the plans, it needs to be	ogress building interior work in progress during properly decommissioned before winter.	inspection,. Eff: 3a) New road established alongside play	-

UTM Zone 11 Easting 247277 Northing 4312421	Forn On-ç	n HV1: Temporary BMP Joing Construction	's for		Forest	Selection	ID# Code S02 District	J	State	416 CA
Construction Site Name					Townshi	ip 12N	Range	18E	Section	
Date of Project Start	7/15/2011	Survey Date/Time	9/29/2011	6th	Field HUC V	Vatershed	CA-1			
Reviewer(s)		Constructi	on Foreman							
T. Osterhout		Jim Larmo	ore							
Construction Type:	Other	Project Is:	Other		Other (Desc	cribe) Ski	Trail Wideni	ing		
General Information	Name Of Plans	California Side Trail Widenin	g				Job No.	11-600	.1	
		Date 3/24/11	Rev Date	4/22/11	_					
Temp. BMPs for staging a compacted by heavy equip	rea near Sky Base, i oment to be restored	ncluding sediment fence, strav to 100% cover.	v wattles, cons	truction equipme	nt exclusion f	fencing to p	protect SEZ.	Areas	disturbed	lor
Implementation 1) Project design included hour Storm Event (per FS control, runoff drainage co	Erosion Control Plar and Lahontan SWQI ntrol, protection of S	n development, and identified a RCB standards); at a minimum EZs, and hazardous substance	appropriate ten the contract s control, pleas	nporary BMP mea hould address Bl se refer to the Su	asures for mit MP measures pplemental B	tigating imp s for the fol MP checkli	pacts from a lowing topics	20-yea s: sourc	r 1- e	1
1=Meets/Exceeds 20-y 2=Minor departure fron	r 1-Hr standards and n contract and/or mir	d/or no resource concerns or resource concerns	3=Majo 4=Repe	r departure from o ated departure fr	contract and/o om contract a	or major re and/or failu	source conc re to addres	erns s resou	rce conce	erns
2) Are BMP measures co	nstructed according	to contract design specification	is?							1
1 = Meets / Exceeds o 2 = Minor departure fr	contract requirement rom contract and/or r	s and/or no resource concerns ninor resource concerns	3 = Majo 4 = Rep	or departure from eated departure	contract and/ from contract	/or major re and/or fail	esource condure	cerns ess reso	urce conc	cerns
						1	Implementat	tion Sco oring Ru	ore: ule Set)	I

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

• Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depostional fans, are evident near erodable soil areas; however, no evidence is observed of sediment deliverv to SEZ.	Substantial areas of exposed erodable soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.) NA
b) Cut and fill slope protection (including surface	erosion and slope failure potential		
Temporary BMP measures (such as	Minor erosion and sediment deposition is	Temporary BMP measures are	

nowever, sediment transport to any SEZ, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.))	Temporary BMP measures (such as erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.	Minor erosion and sediment deposition is noted from storms <20-year 1-hour event; however, sediment transport to any SEZ, on- or off-site, is not observed.	С	Temporary BMP measures are inadequate to protect erosion from cut and fill slopes from storms <20 year1 hour event; or any observation of sediment transport and/or deposition within SEZ.	
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2) Runoff infiltration and drainage control system effectiveness.

- a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.
- No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.
- Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.
- Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.

• No evidence of unexpected ponding on- site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	⊖ NA
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c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

- Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20year 1-hour storm event.
- Minor resource concern is evident at infiltration zones (for storms <20-yr 1hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely.
- Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management.

3) Designation of construction zone and any equipment exclusion zones

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site.
- Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts offsite or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.	Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	 Substantial resource concern is evident, NA such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator.
		Effectiveness Score:
Additional Comments		(BMP Monitoring Rule Set)
No change to staging area from previous inspective closest to the stockpile. Straw wattles are in the Sky Base Terminal, bottom edge is securely	tion. Area is delineated with construction equip place along the bridge over the creek and along anchored in the soil.	ment exclusion fencing and tree protection fencing around the pside the roadway. Sediment fencing installed along the road to

UTM Zone 11 Easting 246343 Northing 4312587 Construction Site Name Umb	Form HV1: Temporary BMPs fo On-going Construction	or	ID# 417 Selection Code S02 Forest Tahoe District LTMBU State CA Township 12N Range 18E Section 1
Date of Project Start 7/1	18/2011 Survey Date/Time	9/29/2011 6th Fie	eld HUC Watershed CA-1
Reviewer(s)	Construction F	oreman	
T. Osterhout	Tom Fortune		
Construction Type: Build	Jing Structure Project Is: N	lew Construction	ther (Describe) Relocation of Existing Umbrella Bar
General Information Name	Of Plans Umbrella Bar Relocation		Job No. 10-604.1
	Date 8/16/10 R	ev Date	_
Specific concerns associated with	construction project and describe BMP measur	es designed to achived resour	rce protection.
BMPs to protect adjacent SEZ - co	oir logs, sediment fence, stockpile controls, veg	protective fence, water truck.	
Implementation			
 Project design included Erosion hour Storm Event (per FS and Lah control, runoff drainage control, pr 	Control Plan development, and identified appro- nontan SWQRCB standards); at a minimum the rotection of SEZs, and hazardous substance cor	opriate temporary BMP measu contract should address BMP ntrol, please refer to the Supple	rres for mitigating impacts from a 20-year 1- measures for the following topics: source emental BMP checklist.
1=Meets/Exceeds 20-yr 1-Hr s 2=Minor departure from contra	tandards and/or no resource concerns act and/or minor resource concerns	3=Major departure from con 4=Repeated departure from	tract and/or major resource concerns contract and/or failure to address resource concerns
2) Are BMP measures constructe	ed according to contract design specifications?		1
1 = Meets / Exceeds contract 2 = Minor departure from con	requirements and/or no resource concerns tract and/or minor resource concerns	3 = Major departure from cor 4 = Repeated departure from	ntract and/or major resource concerns n contract and/or failure to address resource concerns
			Implementation Score: I (BMP Monitoring Rule Set)

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

• Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depostional fans, are evident near erodable soil areas; however, no evidence is observed of sediment deliverv to SEZ.	Substantial areas of exposed erodable soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.) NA
b) Cut and fill slope protection (including surface	erosion and slope failure potential		
Temporary BMP measures (such as	OMinor erosion and sediment deposition is	Temporary BMP measures are	

erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.

2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.

- No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.
- Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.
- Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.

No evidence of unexpected p site, or constructed detention outlets are stable (naturally st stablized with planted vegeta other type of armor) and exhil of erosion or downstream resist concerns.	onding on- ponds and table, tion, or Some evidence of on-site ponding, does not appear to threaten integrit fillslopes or foundations. Or minor erosion and/or downslope resource basin outlet, such as sediment plun or small rill formation. However, sediment is not transported to SEZ is not anticipated from events <20-y 1-hour storm.	but ty of On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area or constructed basins, exhibit major erosion including substantial scour, ri or gully formation. Or the evidence or any sediment transport to SEZ.	∩ NA a, II f
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c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

- Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20year 1-hour storm event.
- Minor resource concern is evident at infiltration zones (for storms <20-yr 1hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely.
- Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management.

3) Designation of construction zone and any equipment exclusion zones

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site.
- Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts offsite or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

	Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.	Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	 Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator. 	○ NA
1-			Effectiveness Score:	E
Ad	dditional Comments		(BMP Monitoring Rule Se	t)
lı foi	mp 1): Three separate utilities to cross SEZ; de r concrete footing in place. Stockpiles covered	watering plan was needed. Dewatering for utiliti with sheeting and straw wattles surrounding the	es already completed and trenches have been back base. Rock lined channel to be replaced.	dilled. Forms

UTM Zone 11 Easting 247760 Northing 4313741 Construction Site Name Tamar	Form HV1: Temporary BMPs fo On-going Construction rack Lodge (Top of Gondola)	or ID# 418 Selection Code S03 Forest LTBMU District State CA Township 12N Range 18E Section 1		
Date of Project Start 7/29, Reviewer(s) T. Osterhout Construction Type: Buildir	V/2010 Survey Date/Time Survey Surve	9/29/2011 6th Field HUC Watershed CA-1 Foreman Jim Larmore New Construction Other (Describe)		
General Information Name Of Plans Heavenly Gondola Lodge Job No. Date 06/10/2010 Rev Date Image: Concerns associated with construction project and describe BMP measures designed to achived resource protection. Specific concerns associated with construction project and describe BMP measures designed to achived resource protection. Straw wattles to prevent runoff from exiting construction site. Exclusion fencing to minimize disturbance and soil compaction. Tree protective fence to reduce vegetation				
Implementation 1) Project design included Erosion Control Plan development, and identified appropriate temporary BMP measures for mitigating impacts from a 20-year 1-hour Storm Event (per FS and Lahontan SWQRCB standards); at a minimum the contract should address BMP measures for the following topics: source control, runoff drainage control, protection of SEZs, and hazardous substance control, please refer to the Supplemental BMP checklist. 1 1 1 1 1 1 1 3 Maets/Exceeds 20-yr 1-Hr standards and/or no resource concerns 3				
2=Minor departure from contract and/or minor resource concerns 4=Repeated departure from contract and/or failure to address resource concerns 2) Are BMP measures constructed according to contract design specifications? 1 1 = Meets / Exceeds contract requirements and/or no resource concerns 3 = Major departure from contract and/or major resource concerns 2 = Minor departure from contract and/or minor resource concerns 3 = Major departure from contract and/or major resource concerns				
		Implementation Score: [] (BMP Monitoring Rule Set)		

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

• Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depostional fans, are evident near erodable soil areas; however, no evidence is observed of sediment deliverv to SEZ.	 Substantial areas of exposed erodable soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ. 	⊖ NA		
b) Cut and fill slope protection (including surface erosion and slope failure potential					
O Temporary BMP measures (such as	Minor erosion and sediment deposition is	O Temporary BMP measures are	⊖ NA		

erosion control or geotextile blankets, noted from storms <20-year 1-hour event; inadequate to protect erosion from cut mulch or pine straw application, however, sediment transport to any SEZ, and fill slopes from storms <20 year--1 encompassing filter fences, berms or on- or off-site, is not observed. hour event; or any observation of designed swales) applied to slope sediment transport and/or deposition protection is adequate to prevent or within SEZ. severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.

2) Runoff infiltration and drainage control system effectiveness.

- a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.
- No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.
- Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.
- Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.

No evider site, or cc outlets ar stablized other type of erosior concerns	nce of unexpected ponding on- nstructed detention ponds and e stable (naturally stable, with planted vegetation, or e of armor) and exhibit no signs or downstream resource	Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	⊖ NA
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c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

- Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20year 1-hour storm event.
- Minor resource concern is evident at infiltration zones (for storms <20-yr 1hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely.
- Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management.

3) Designation of construction zone and any equipment exclusion zones

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site.
- Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts offsite or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section.
(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

	Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.	Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	 Substantial resource concern is evident, NA such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator. 	
15			Effectiveness Score:	
A	dditional Comments		(BMP Monitoring Rule Set)	
Ti so	renching for electrical line is complete. Trench l oil per the plans. Area behind the Lodge at the	has been backfilled and covered with wood chips top of the riprap slope has been nearly complete	Wood chip mulch needs to be incorporated into the top 12" of aly covered with several inches of wood chip mulch.	

UTM Zone 11 Easting 247277 Northing 4312421 Construction Site Name	Form On-g	HV1: Temporary BMPs oing Construction	s for		Forest	Selection	ID# Code S02 District Range	18E S	State C	421 CA
Date of Project Start Reviewer(s) T. Osterhout	7/15/2011	Survey Date/Time Constructio	10/11/2011 on Foreman re	6tl	h Field HUC V	Watershed	CA-1			,
Construction Type:	Other Name Of Plans	Project Is: California Side Trail Widening	Other	4/20/44	Other (Des	cribe) Ski	Trail Widenir Job No.	ng 11-600.1		
Specific concerns associate Temp. BMPs for staging ar compacted by heavy equip	ed with construction ea near Sky Base, i ment to be restored	project and describe BMP mea ncluding sediment fence, straw to 100% cover.	sures design wattles, cons	ed to achived re	source protec	tion. fencing to p	protect SEZ.	Areas di	sturbed o	r
1) Project design included I hour Storm Event (per FS a control, runoff drainage con 1=Meets/Exceeds 20-yr 2=Minor departure from	1) Project design included Erosion Control Plan development, and identified appropriate temporary BMP measures for mitigating impacts from a 20-year 1-hour Storm Event (per FS and Lahontan SWQRCB standards); at a minimum the contract should address BMP measures for the following topics: source control, runoff drainage control, protection of SEZs, and hazardous substance control, please refer to the Supplemental BMP checklist. 1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns 3=Major departure from contract and/or major resource concerns									
2) Are BMP measures constructed according to contract design specifications? 1 1 = Meets / Exceeds contract requirements and/or no resource concerns 3 = Major departure from contract and/or major resource concerns										
2 = Minor departure from	on contract and/or n		4 = Rep	ealeo oeparture	nom contrac	i and/or fail	Implementation (BMP Monito	on Score	e:	

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

• Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depostional fans, are evident near erodable soil areas; however, no evidence is observed of sediment deliverv to SEZ.	Substantial areas of exposed erodable soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.) NA
b) Cut and fill slope protection (including surface	erosion and slope failure potential		
Temporary BMP measures (such as	Minor erosion and sediment deposition is	Temporary BMP measures are	

P Temporary BMP measure erosion control or geotes mulch or pine straw apple encompassing filter fence designed swales) applie protection is adequate to severely limit erosion init transport processes. OR not require the construct maintenance of cut and	es (such as OM ctile blankets, no ication, ho es, berms or or of to slope prevent or ication and project does ion and fill slopes.	inor erosion and sediment deposition is oted from storms <20-year 1-hour event; owever, sediment transport to any SEZ, n- or off-site, is not observed.	 Temporary BN inadequate to and fill slopes hour event; or sediment trans within SEZ. 	/IP measures are protect erosion from cut from storms <20 year1 any observation of sport and/or deposition
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2) Runoff infiltration and drainage control system effectiveness.

- a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.
- No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.
- Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.
- Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.

No evidence of unex site, or constructed o outlets are stable (na stablized with plante other type of armor) of erosion or downst concerns.	pected ponding on- letention ponds and aturally stable, d vegetation, or and exhibit no signs ream resource	Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	 On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ. 	⊖ NA
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c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

- Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20year 1-hour storm event.
- Minor resource concern is evident at infiltration zones (for storms <20-yr 1hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely.
- Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management.

3) Designation of construction zone and any equipment exclusion zones

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site.
- Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts offsite or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.	Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	 Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator.
		Effectiveness Score:
Additional Comments		(BMP Monitoring Rule Set)
Post storm inspection. Sediment fencing installed of stream crossing securely anchored. No evidence	d along the road to the Sky Base Terminal, botto e of erosion or sediment deposition to the SEZ.	m edge is securely anchored in the soil. Straw wattles on edges

UTM Zone 11 Easting 246343 Northing 4312587 Construction Site Name Umbrella Base	Form HV1: Temporary BMPs for Dn-going Construction	ID# 420 Selection Code S02 Forest Tahoe District LTMBU State CA Township 12N Range 18E Section 1				
Date of Project Start 7/18/2011	Survey Date/Time 10/11/2011 6th Fiel	d HUC Watershed CA-1				
Reviewer(s) T. Osterhout	Construction Foreman Tom Fortune					
Construction Type: Building Structure	cture Project Is: New Construction Oth	ner (Describe) Relocation of Existing Umbrella Bar				
General Information Name Of Pl	Ins Umbrella Bar Relocation Date 8/16/10 Rev Date	Job No. 10-604.1				
Specific concerns associated with constru- BMPs to protect adjacent SEZ - coir logs	ction project and describe BMP measures designed to achived resourc sediment fence, stockpile controls, veg protective fence, water truck.	e protection.				
Implementation 1) Project design included Erosion Control Plan development, and identified appropriate temporary BMP measures for mitigating impacts from a 20-year 1-hour Storm Event (per FS and Lahontan SWQRCB standards); at a minimum the contract should address BMP measures for the following topics: source control, runoff drainage control, protection of SEZs, and hazardous substance control, please refer to the Supplemental BMP checklist.						
1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns3=Major departure from contract and/or major resource concerns2=Minor departure from contract and/or minor resource concerns4=Repeated departure from contract and/or failure to address resource concerns						
2) Are BMP measures constructed acco	2) Are BMP measures constructed according to contract design specifications?					
1 = Meets / Exceeds contract require 2 = Minor departure from contract ar	ments and/or no resource concerns3 = Major departure from contd/or minor resource concerns4 = Repeated departure from	tract and/or major resource concerns contract and/or failure to address resource concerns				
		Implementation Score: IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII				

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

• Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depostional fans, are evident near erodable soil areas; however, no evidence is observed of sediment deliverv to SEZ.	Substantial areas of exposed erodable soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.) NA
b) Cut and fill slope protection (including surface	erosion and slope failure potential		
Temporary BMP measures (such as	Minor erosion and sediment deposition is	Temporary BMP measures are	⊖ NA

remporary BMP measures (such as erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.	Minor erosion and sediment deposition is noted from storms <20-year 1-hour event; however, sediment transport to any SEZ, on- or off-site, is not observed.	 Temporary BMP measures are inadequate to protect erosion from cut and fill slopes from storms <20 year1 hour event; or any observation of sediment transport and/or deposition within SEZ. 	

2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.

- No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.
- Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.
- Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.

No evidence of unex site, or constructed o outlets are stable (na stablized with plante other type of armor) of erosion or downst concerns.	pected ponding on- letention ponds and aturally stable, d vegetation, or and exhibit no signs ream resource	Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	 On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ. 	⊖ NA
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c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

- Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20year 1-hour storm event.
- Minor resource concern is evident at infiltration zones (for storms <20-yr 1hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely.
- Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management.

3) Designation of construction zone and any equipment exclusion zones

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site.
- Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts offsite or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

	• Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.	Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	 Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator. 	
1-			Effectiveness Score:	
Ad	Iditional Comments		(BMP Monitoring Rule Set)	
Im	np 1): Three separate utilities to cross SEZ; dew	ratering plan was needed. Post storm event mor	nitoring, no evidence of ponding or erosion.	

UTM Zone 11 Easting 247850 Northing 4313936 Construction Site Name Adventure Pea	orm HV1: Temporary BMPs fo n-going Construction	pr	ID# 422 Selection Code S03 Forest LTMBU District State CA Township 12N Range 18E Section 1		
Date of Project Start 7/1/2011 Reviewer(s) T. Osterhout	Survey Date/Time 10 Construction Free Canyon Creek	0/11/2011 oreman Construction	eld HUC Watershed CA-1		
Construction Type: Building Struc	ture Project Is: No	ew Construction	ther (Describe)		
General Information Name Of Plan	s Adventure Peak Ski School and S Date March 14, 2011	Summer Tubing (new plan set	updated from origi Job No. 09601.2		
Specific concerns associated with construct Temp BMPs to address erosion control, inc sediment barriers.	tion project and describe BMP measure	es designed to achived resour fencing, restricted access, w	ce protection. ater truck for dust control, covered/watered stockpiles,		
1) Project design included Erosion Control hour Storm Event (per FS and Lahontan SV control, runoff drainage control, protection of	Plan development, and identified appro VQRCB standards); at a minimum the o of SEZs, and hazardous substance con	priate temporary BMP measu contract should address BMP trol, please refer to the Supple	res for mitigating impacts from a 20-year 1- measures for the following topics: source emental BMP checklist.		
1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns3=Major departure from contract and/or major resource concerns2=Minor departure from contract and/or minor resource concerns4=Repeated departure from contract and/or failure to address resource concerns					
2) Are BMP measures constructed according to contract design specifications?					
1 = Meets / Exceeds contract requirem 2 = Minor departure from contract and/	ents and/or no resource concerns or minor resource concerns	3 = Major departure from cor 4 = Repeated departure from	ntract and/or major resource concerns n contract and/or failure to address resource concerns		
			Implementation Score: [] (BMP Monitoring Rule Set)		

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

• Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depostional fans, are evident near erodable soil areas; however, no evidence is observed of sediment deliverv to SEZ.	 Substantial areas of exposed erodable soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ. 	⊖ NA
b) Cut and fill slope protection (including surface	erosion and slope failure potential		
O Temporary BMP measures (such as	Minor erosion and sediment deposition is	O Temporary BMP measures are	⊖ NA

erosion control or geotextile blankets, noted from storms <20-year 1-hour event; inadequate to protect erosion from cut mulch or pine straw application, however, sediment transport to any SEZ, and fill slopes from storms <20 year--1 encompassing filter fences, berms or on- or off-site, is not observed. hour event; or any observation of designed swales) applied to slope sediment transport and/or deposition protection is adequate to prevent or within SEZ. severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.

2) Runoff infiltration and drainage control system effectiveness.

- a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.
- No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.
- Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.
- Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.

No evidence site, or const outlets are si stablized with other type of of erosion or concerns.	e of unexpected ponding on- tructed detention ponds and table (naturally stable, h planted vegetation, or f armor) and exhibit no signs downstream resource	Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	 On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ. 	⊖ NA
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c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

- Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20year 1-hour storm event.
- Minor resource concern is evident at infiltration zones (for storms <20-yr 1hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely.
- Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management.

3) Designation of construction zone and any equipment exclusion zones

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site.
- Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts offsite or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.	Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	 Substantial resource concern is evident, NA such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator. 	
1		Effectiveness Score: m	_
Additional Comments		(BMP Monitoring Rule Set)	
Post storm event inspection. 0.27" in nearby rain alongside play structure; not shown on the plans,	gauge. No major evidence of unexpected pon it needs to be properly decommissioned before	ding or erosion due to storm. Eff: 3a) New road established winter.	-

UTM Zone 11 Easting 247760 Northing 4313741 Construction Site Name Tamarack Loo	orm HV1: Temporary BMPs f n-going Construction Ige (Top of Gondola)	or	ID# 419 Selection Code S03 Forest LTBMU District State CA Township 12N Range 18E Section 1
Date of Project Start 7/29/2010	Survey Date/Time 1 Construction	0/11/2011 6th Fie	eld HUC Watershed CA-1
T. Osterhout	Joe Stewart /	Jim Larmore	
Construction Type: Building Struct	ture Project Is:	New Construction	ther (Describe) Post Storm
General Information Name Of Plan	B Heavenly Gondola Lodge Date 06/10/2010 F	Rev Date	Job No.
Specific concerns associated with construct Straw wattles to prevent runoff from exiting damage. Dust control with water truck.	tion project and describe BMP measu construction site. Exclusion fencing to	res designed to achived resour o minimize disturbance and soi	ce protection.
 Project design included Erosion Control hour Storm Event (per FS and Lahontan S) control, runoff drainage control, protection of 	Plan development, and identified appr VQRCB standards); at a minimum the of SEZs, and hazardous substance co	opriate temporary BMP measu contract should address BMP ntrol, please refer to the Supple	res for mitigating impacts from a 20-year 1- measures for the following topics: source emental BMP checklist.
1=Meets/Exceeds 20-yr 1-Hr standards 2=Minor departure from contract and/or	and/or no resource concerns minor resource concerns	3=Major departure from con 4=Repeated departure from	tract and/or major resource concerns contract and/or failure to address resource concerns
2) Are BMP measures constructed accord	ing to contract design specifications?		1
1 = Meets / Exceeds contract requirem 2 = Minor departure from contract and	ents and/or no resource concerns or minor resource concerns	3 = Major departure from cor4 = Repeated departure from	ntract and/or major resource concerns n contract and/or failure to address resource concerns
			Implementation Score: [] (BMP Monitoring Rule Set)

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

	Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depostional fans, are evident near erodable soil areas; however, no evidence is observed of sediment deliverv to SEZ.	 Substantial areas of exposed erodable soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ. 	⊖ NA
1	b) Cut and fill slope protection (including surface	erosion and slope failure potential		
ſ	O Temporary BMP measures (such as	Minor erosion and sediment deposition is	Temporary BMP measures are	◯ NA

erosion control or geotextile blankets, noted from storms <20-year 1-hour event; inadequate to protect erosion from cut mulch or pine straw application, however, sediment transport to any SEZ, and fill slopes from storms <20 year--1 encompassing filter fences, berms or on- or off-site, is not observed. hour event; or any observation of designed swales) applied to slope sediment transport and/or deposition protection is adequate to prevent or within SEZ. severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.

2) Runoff infiltration and drainage control system effectiveness.

- a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.
- No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.
- Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.
- Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.

• No evidence of unexpected ponding on- site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	⊖ NA
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c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

- Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20year 1-hour storm event.
- Minor resource concern is evident at infiltration zones (for storms <20-yr 1hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely.
- Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management.

3) Designation of construction zone and any equipment exclusion zones

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site.
- Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts offsite or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

	Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.	Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	 Substantial resource concern is evident, NA such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator.
			Effectiveness Score:
A	Additional Comments		(BMP Monitoring Rule Set)
M	No evidence of ponding or sediment movement a	fter storm event. Wood chips still need to be ind	corporated into soil. Rain gauge nearby filled with 0.27" rain.

UTM Zone 11 Easting 247850 Northing 4313936 Construction Site Name Adventure Peak Ski Sc	/1: Temporary BMPs for g Construction	ID# 423 Selection Code S03 Forest LTMBU District State CA
Date of Project Start 7/1/2011 St Reviewer(s) K. Roaldson	Urvey Date/Time 10/14/2011 6th Construction Foreman Canyon Creek Construction	Field HUC Watershed CA-1
Construction Type: Building Structure	Project Is: New Construction	Other (Describe)
General Information Name Of Plans Adv	e March 14, 2011 Rev Date June 28, 2011	set updated from origi Job No. 09601.2
Specific concerns associated with construction proje Temp BMPs to address erosion control, including: be sediment barriers.	ect and describe BMP measures designed to achived res oundary fence, tree protection fencing, restricted access	ource protection. , water truck for dust control, covered/watered stockpiles,
 Project design included Erosion Control Plan develour Storm Event (per FS and Lahontan SWQRCB s control, runoff drainage control, protection of SEZs, a 	elopment, and identified appropriate temporary BMP meastandards); at a minimum the contract should address BM and hazardous substance control, please refer to the Sup	Asures for mitigating impacts from a 20-year 1- MP measures for the following topics: source oplemental BMP checklist.
1=Meets/Exceeds 20-yr 1-Hr standards and/or no 2=Minor departure from contract and/or minor res	o resource concerns 3=Major departure from of source concerns source concerns 4=Repeated departure from of source concerns	contract and/or major resource concerns om contract and/or failure to address resource concerns
2) Are BMP measures constructed according to con	ntract design specifications?	1
1 = Meets / Exceeds contract requirements and, 2 = Minor departure from contract and/or minor	l/or no resource concerns 3 = Major departure from resource concerns 4 = Repeated departure f	contract and/or major resource concerns from contract and/or failure to address resource concerns
		Implementation Score: I (BMP Monitoring Rule Set)

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

• Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depostional fans, are evident near erodable soil areas; however, no evidence is observed of sediment deliverv to SEZ.	Substantial areas of exposed erodable soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.) NA
b) Cut and fill slope protection (including surface	erosion and slope failure potential		
Temporary BMP measures (such as	Minor erosion and sediment deposition is	Temporary BMP measures are	

Premporary BMP measures (such as erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes. Olyment of the measures (such as erosion and sediment deposition is noted from storms <20-year 1-hour event; inadequate however, sediment transport to any SEZ, on- or off-site, is not observed. Olyment of the measures (such as erosion and sediment deposition is noted from storms <20-year 1-hour event; inadequate is on- or off-site, is not observed. On- or off-site, is not observed. On- or off-site, is not observed.	y BMP measures are e to protect erosion from cut pes from storms <20 year1 t; or any observation of transport and/or deposition Z.
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2) Runoff infiltration and drainage control system effectiveness.

- a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.
- No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.
- Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.
- Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.

No evidence of unex site, or constructed o outlets are stable (na stablized with plante other type of armor) of erosion or downst concerns.	pected ponding on- letention ponds and aturally stable, d vegetation, or and exhibit no signs ream resource	Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	 On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ. 	⊖ NA
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c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

- Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20year 1-hour storm event.
- Minor resource concern is evident at infiltration zones (for storms <20-yr 1hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely.
- Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management.

3) Designation of construction zone and any equipment exclusion zones

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site.
- Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts offsite or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

	 Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones. 	Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	 Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator. 	○ NA
-			Effectiveness Score:	E
Add	ditional Comments		(BMP Monitoring Rule S	et)
Wo witł	rk on wood chip cover on entire project site w n wood chips	vith incorporation into top 12" of soil. Eff: 3a) Ne	w road established alongside play structure has be	en covered

UTM Zone 11 Easting 247277 Northing 4312421 Construction Site Name	Form On-g California Side Tra	HV1: Temporary BMPs for oing Construction		Forest	Selection	ID# Code S02 District Range	18E S	State C	424 A	
Date of Project Start	7/15/2011	Survey Date/Time	10/14/2011 n Foreman	6t	h Field HUC V	Vatershed	CA-1	L		
K. Roaldson	Other	Jim Larmon Project Is:	Other		Other (Des	cribe) Ski	Trail Widenir	ng		
General Information	Name Of Plans	California Side Trail Widening Date 3/24/11	Rev Date	4/22/11	_		Job No.	11-600.1		[
Specific concerns associate Temp. BMPs for staging ar compacted by heavy equip	Specific concerns associated with construction project and describe BMP measures designed to achived resource protection. Temp. BMPs for staging area near Sky Base, including sediment fence, straw wattles, construction equipment exclusion fencing to protect SEZ. Areas disturbed or compacted by heavy equipment to be restored to 100% cover.									
Implementation 1) Project design included I hour Storm Event (per FS a control, runoff drainage cor	Erosion Control Plar and Lahontan SWQF atrol, protection of SI	development, and identified ap RCB standards); at a minimum th EZs, and hazardous substance o	propriate tem ne contract s control, pleas	nporary BMP me hould address E e refer to the St	easures for mi BMP measure upplemental E	itigating imp s for the foll BMP checkli	pacts from a lowing topics ist.	20-year 1 : source	-	1
1=Meets/Exceeds 20-yr 2=Minor departure from	1-Hr standards and contract and/or min	/or no resource concerns or resource concerns	3=Major 4=Repe	departure from ated departure f	contract and/ rom contract	'or major re and/or failu	source conce re to address	erns resource	e concerns	
2) Are BMP measures con	structed according t	o contract design specifications	?							1
1 = Meets / Exceeds c 2 = Minor departure fro	ontract requirements om contract and/or n	s and/or no resource concerns ninor resource concerns	3 = Majo 4 = Rep	r departure from eated departure	from contract and	/or major re t and/or fail	esource conc ure to addres	erns s resourc	ce concern	S
						1	Implementati (BMP Monito	on Score	: I Set)	

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

• Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depostional fans, are evident near erodable soil areas; however, no evidence is observed of sediment deliverv to SEZ.	Substantial areas of exposed erodable soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.) NA
b) Cut and fill slope protection (including surface	erosion and slope failure potential		
Temporary BMP measures (such as	Minor erosion and sediment deposition is	Temporary BMP measures are	

P Temporary BMP measure erosion control or geotes mulch or pine straw apple encompassing filter fence designed swales) applie protection is adequate to severely limit erosion init transport processes. OR not require the construct maintenance of cut and	es (such as OM ctile blankets, no ication, ho es, berms or or of to slope prevent or ication and project does ion and fill slopes.	inor erosion and sediment deposition is oted from storms <20-year 1-hour event; owever, sediment transport to any SEZ, n- or off-site, is not observed.	 Temporary BN inadequate to and fill slopes hour event; or sediment trans within SEZ. 	/IP measures are protect erosion from cut from storms <20 year1 any observation of sport and/or deposition
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2) Runoff infiltration and drainage control system effectiveness.

- a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.
- No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.
- Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.
- Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.

No evidence of unex site, or constructed o outlets are stable (na stablized with plante other type of armor) of erosion or downst concerns.	pected ponding on- letention ponds and aturally stable, d vegetation, or and exhibit no signs ream resource	Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	 On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ. 	⊖ NA
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c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

- Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20year 1-hour storm event.
- Minor resource concern is evident at infiltration zones (for storms <20-yr 1hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely.
- Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management.

3) Designation of construction zone and any equipment exclusion zones

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site.
- Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts offsite or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

	Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.	Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	 Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator. 	
-			Effectiveness Score:	_
Additi	onal Comments		(BMP Monitoring Rule Set)	
Chipp of run	ing of stockpiled logs in progress. Excavate ; 75% of coverage work remaining. Per Jim	or working on removing boulders from areas deli Larmore, coverage to be completed over snow	neated on the plans. Pine needle mulch coverage started at top in order to aid access to the run. No change to staging area	,

Chipping of stockpiled logs in progress. Excavator working on removing boulders from areas delineated on the plans. Pine needle mulch coverage started at top of run; 75% of coverage work remaining. Per Jim Larmore, coverage to be completed over snow in order to aid access to the run. No change to staging area from previous inspection. Area is delineated with construction equipment exclusion fencing and tree protection fencing around the tree closest to the stockpile. Straw wattles are in place along the bridge over the creek and alongside the roadway. Sediment fencing installed along the road to the Sky Base Terminal,

UTM Zone 11 Easting 246343 Northing 4312587 Construction Site Name Umbrella E	Form HV1: Temporary BMPs for On-going Construction ar Relocation	ID# 425 Selection Code S02 Forest Tahoe District LTMBU State CA Township 12N Range 18E Section 1
Date of Project Start 7/18/201	Survey Date/Time 10/14/2011 6th Fie	d HUC Watershed CA-1
Reviewer(s) K. Roaldson	Construction Foreman Tom Fortune	
Construction Type: Building St	ucture Project Is: New Construction Ot	her (Describe) Relocation of Existing Umbrella Bar
General Information Name Of F	ans Umbrella Bar Relocation Date 8/16/10 Rev Date	Job No. 10-604.1
Specific concerns associated with const BMPs to protect adjacent SEZ - coir log	uction project and describe BMP measures designed to achived resourd s, sediment fence, stockpile controls, veg protective fence, water truck.	ce protection.
Implementation 1) Project design included Erosion Cont hour Storm Event (per FS and Lahontan control, runoff drainage control, protection	ol Plan development, and identified appropriate temporary BMP measur SWQRCB standards); at a minimum the contract should address BMP i n of SEZs, and hazardous substance control, please refer to the Supple	tes for mitigating impacts from a 20-year 1- measures for the following topics: source mental BMP checklist.
1=Meets/Exceeds 20-yr 1-Hr standar 2=Minor departure from contract and	ds and/or no resource concerns 3=Major departure from cont or minor resource concerns 4=Repeated departure from	ract and/or major resource concerns contract and/or failure to address resource concerns
2) Are BMP measures constructed accord	rding to contract design specifications?	1
1 = Meets / Exceeds contract require 2 = Minor departure from contract a	ements and/or no resource concerns 3 = Major departure from con ad/or minor resource concerns 4 = Repeated departure from	tract and/or major resource concerns a contract and/or failure to address resource concerns
		Implementation Score: IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

• Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depostional fans, are evident near erodable soil areas; however, no evidence is observed of sediment deliverv to SEZ.	Substantial areas of exposed erodable soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.) NA			
b) Cut and fill slope protection (including surface erosion and slope failure potential						
Temporary BMP measures (such as	Minor erosion and sediment deposition is	Temporary BMP measures are	⊖ NA			

remporary BMP measures (such as erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.	Minor erosion and sediment deposition is noted from storms <20-year 1-hour event; however, sediment transport to any SEZ, on- or off-site, is not observed.	 Temporary BMP measures are inadequate to protect erosion from cut and fill slopes from storms <20 year1 hour event; or any observation of sediment transport and/or deposition within SEZ. 	

2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.

- No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.
- Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.
- Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.

• No evidence of unexpected ponding on- site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	⊖ NA
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c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

- Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20year 1-hour storm event.
- Minor resource concern is evident at infiltration zones (for storms <20-yr 1hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely.
- Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management.

3) Designation of construction zone and any equipment exclusion zones

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site.
- Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts offsite or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

	 Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones. 	Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	 Substantial resource concern is evident, NA such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator. 	
10			Effectiveness Score:	_
Ac	dditional Comments		(BMP Monitoring Rule Set)	
lr tre	mp 1): Three separate utilities to cross SEZ; devention of the separate utilities to cross SEZ; devention of the second sec	vatering plan was needed. Wood chip and pine replaced with filter fabric underneath. All perm	needle mulch has been spread in bare areas and where anent BMPs are properly installed.	

UTM Zone 11 Easting 247760 Northing 4313741 Construction Site Name Tamarack Lodge	m HV1: Temporary BMPs for going Construction (Top of Gondola)		ID# 426 Selection Code S03 Forest LTBMU District State CA Township 12N Range 18E Section 1			
Date of Project Start 7/29/2010	Survey Date/Time 10/14	2011 6th Fi	eld HUC Watershed CA-1			
Reviewer(s) K. Roaldson	Construction Fore	nan .armore				
Construction Type: Building Structur	e Project Is: New	Construction	Other (Describe)			
General Information Name Of Plans	Heavenly Gondola Lodge Date 06/10/2010 Rev	ate	Job No.			
Specific concerns associated with construction Straw wattles to prevent runoff from exiting co damage. Dust control with water truck.	Specific concerns associated with construction project and describe BMP measures designed to achived resource protection. Straw wattles to prevent runoff from exiting construction site. Exclusion fencing to minimize disturbance and soil compaction. Tree protective fence to reduce vegetation damage. Dust control with water truck.					
1) Project design included Erosion Control Pla hour Storm Event (per FS and Lahontan SWC control, runoff drainage control, protection of S	n development, and identified appropri RCB standards); at a minimum the cor EZs, and hazardous substance contro	te temporary BMP measu ract should address BMP please refer to the Supp	ures for mitigating impacts from a 20-year 1- 9 measures for the following topics: source lemental BMP checklist.			
1=Meets/Exceeds 20-yr 1-Hr standards an 2=Minor departure from contract and/or mi	d/or no resource concerns 3 nor resource concerns 4	Major departure from cor Repeated departure from	ntract and/or major resource concerns a contract and/or failure to address resource concerns			
2) Are BMP measures constructed according	to contract design specifications?		1			
1 = Meets / Exceeds contract requiremen 2 = Minor departure from contract and/or	ts and/or no resource concerns 3 minor resource concerns 4	Major departure from co Repeated departure fro	ntract and/or major resource concerns m contract and/or failure to address resource concerns			
			Implementation Score: [] (BMP Monitoring Rule Set)			

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

• Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depostional fans, are evident near erodable soil areas; however, no evidence is observed of sediment delivery to SEZ.	Substantial areas of exposed erodable soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.	⊖ NA
b) Cut and fill slope protection (including surface	erosion and slope failure potential		
Temporary BMP measures (such as	Minor erosion and sediment deposition is	Temporary BMP measures are	() NA

Premporary BMP measures (such as erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes. OMinor erosion and sediment deposition is noted from storms <20-year 1-hour event; inadequate however, sediment transport to any SEZ, on- or off-site, is not observed. Ominor erosion and sediment deposition is noted from storms <20-year 1-hour event; inadequate however, sediment transport to any SEZ, on- or off-site, is not observed. Ominor erosion and sediment deposition is noted from storms <20-year 1-hour event; inadequate however, sediment transport to any SEZ, on- or off-site, is not observed.	y BMP measures are e to protect erosion from cut pes from storms <20 year1 t; or any observation of transport and/or deposition Z.
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2) Runoff infiltration and drainage control system effectiveness.

- a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.
- No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.
- Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.
- Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.

No evider site, or cc outlets ar stablized other type of erosior concerns	nce of unexpected ponding on- nstructed detention ponds and e stable (naturally stable, with planted vegetation, or e of armor) and exhibit no signs or downstream resource	Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	⊖ NA
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c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

- Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20year 1-hour storm event.
- Minor resource concern is evident at infiltration zones (for storms <20-yr 1hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely.
- Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management.

3) Designation of construction zone and any equipment exclusion zones

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site.
- Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts offsite or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.	Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	 Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator.) na	
		Effectiveness Score:	E	
Additional Comments (BMP Monitoring Rule Set)				
Wood chips being incorporated into soil during inspection with backhoe bucket. Revegetation in area in front of Lodge that was not disturbed by electrical irrenching appears to be growing. Infiltration areas have been installed at the magic carpet near the Adventure Peak Ski School (part of the Tamarack Lodge project).				

UTM Zone 11 Easting 246343 Northing 4312587 Construction Site Name Umb	Form HV1: Temporary BMPs fo On-going Construction	סי [ד	ID# 429 Selection Code S02 orest Tahoe District LTMBU State CA iownship 12N Range 18E		
Date of Project Start 7/	/18/2011 Survey Date/Time 10	0/28/2011 6th Field	HUC Watershed CA-1		
Reviewer(s) K. Roaldson	Construction F Tom Fortune	ōreman			
Construction Type: Build	Iding Structure Project Is: N	lew Construction Othe	r (Describe) Relocation of Existing Umbrella Bar		
General Information Name	e Of Plans Umbrella Bar Relocation Date 8/16/10 R	ev Date	Job No. 10-604.1		
Specific concerns associated with construction project and describe BMP measures designed to achived resource protection. BMPs to protect adjacent SEZ - coir logs, sediment fence, stockpile controls, veg protective fence, water truck.					
Implementation 1) Project design included Erosion Control Plan development, and identified appropriate temporary BMP measures for mitigating impacts from a 20-year 1- hour Storm Event (per FS and Lahontan SWQRCB standards); at a minimum the contract should address BMP measures for the following topics: source control, runoff drainage control, protection of SEZs, and hazardous substance control, please refer to the Supplemental BMP checklist.					
1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns 3=Major departure from contract and/or major resource concerns 2=Minor departure from contract and/or minor resource concerns 4=Repeated departure from contract and/or failure to address resource concerns					
2) Are BMP measures constructed according to contract design specifications?					
1 = Meets / Exceeds contrac 2 = Minor departure from cor	ct requirements and/or no resource concerns ntract and/or minor resource concerns	3 = Major departure from contra 4 = Repeated departure from c	act and/or major resource concerns ontract and/or failure to address resource concerns		
			Implementation Score: I (BMP Monitoring Rule Set)		

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

• Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depostional fans, are evident near erodable soil areas; however, no evidence is observed of sediment deliverv to SEZ.	 Substantial areas of exposed erodable soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ. 	⊖ NA		
b) Cut and fill slope protection (including surface erosion and slope failure potential					
Temporary BMP measures (such as	OMinor erosion and sediment deposition is	O Temporary BMP measures are			

remporary BMP measures (such as erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.	Minor erosion and sediment deposition is noted from storms <20-year 1-hour event; however, sediment transport to any SEZ, on- or off-site, is not observed.	 Temporary BMP measures are inadequate to protect erosion from cut and fill slopes from storms <20 year1 hour event; or any observation of sediment transport and/or deposition within SEZ. 	

2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.

- No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.
- Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.
- Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.

No evidence of unex site, or constructed of outlets are stable (na stablized with plante other type of armor) of erosion or downst concerns.	pected ponding on- letention ponds and aturally stable, d vegetation, or and exhibit no signs ream resource	Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	 On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ. 	⊖ NA
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c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

- Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20year 1-hour storm event.
- Minor resource concern is evident at infiltration zones (for storms <20-yr 1hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely.
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3) Designation of construction zone and any equipment exclusion zones

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- OMinor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site.
- Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts offsite or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section.
4) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

	Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.	Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	 Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator. 	○ NA
-			Effectiveness Score:	E
Addit	ional Comments		(BMP Monitoring Rule Se	et)
Site I mulc	has been winterized for the season. Sedime h and wood chip mulch has been applied to	nt fence has been removed and straw wattles w all bare areas.	Il remain in place. Revegetation treatment with pin	e needle

UTM Zone11Easting247850Northing4313936Construction Site Name	Form On-g	HV1: Temporary BMPs fo oing Construction	or	ID# 433 Selection Code S03 Forest LTMBU District State CA Township 12N Range 18E Section 1		
Date of Project Start Reviewer(s) K. Roaldson	7/1/2011	Survey Date/Time 10 Construction F Canyon Creek	0/28/2011 Foreman	h Field HUC Watershed CA-1		
Construction Type:	Building Structure	Project Is:	lew Construction	Other (Describe)		
General Information Name Of Plans Adventure Peak Ski School and Summer Tubing (new plan set updated from origiting Job No.) 109601.2 Date March 14, 2011 Rev Date June 28, 2011 Specific concerns associated with construction project and describe BMP measures designed to achived resource protection. Image: Specific concerns, including: boundary fence, tree protection fencing, restricted access, water truck for dust control, covered/watered stockpiles, sediment barriers.						
Implementation 1) Project design included Erosion Control Plan development, and identified appropriate temporary BMP measures for mitigating impacts from a 20-year 1-hour Storm Event (per FS and Lahontan SWQRCB standards); at a minimum the contract should address BMP measures for the following topics: source control, runoff drainage control, protection of SEZs, and hazardous substance control, please refer to the Supplemental BMP checklist. 1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns 2=Minor departure from contract and/or minor resource concerns 4=Repeated departure from contract and/or failure to address resource concerns						
2) Are BMP measures constructed according to contract design specifications? 1 1 = Meets / Exceeds contract requirements and/or no resource concerns 2 = Minor departure from contract and/or minor resource concerns 4 = Repeated departure from contract and/or failure to address resource concerns 1						
				Implementation Score: [] (BMP Monitoring Rule Set)		

Effectiveness

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

• Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depostional fans, are evident near erodable soil areas; however, no evidence is observed of sediment deliverv to SEZ.	Substantial areas of exposed erodable soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.	() NA				
b) Cut and fill slope protection (including surface erosion and slope failure potential							
Temporary BMP measures (such as	OMinor erosion and sediment deposition is	Temporary BMP measures are					

 D Temporary BMP measures (such as erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes. Minor erosion and sediment deposition is noted from storms <20-year 1-hour event; however, sediment transport to any SEZ, on- or off-site, is not observed. 	Temporary BMP measures are inadequate to protect erosion from cut and fill slopes from storms <20 year1 hour event; or any observation of sediment transport and/or deposition within SEZ.
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

- a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.
- No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.
- Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.
- Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.

No evidence of unex site, or constructed o outlets are stable (na stablized with plante other type of armor) of erosion or downst concerns.	pected ponding on- letention ponds and aturally stable, d vegetation, or and exhibit no signs ream resource	Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	 On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ. 	⊖ NA
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c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

- Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20year 1-hour storm event.
- Minor resource concern is evident at infiltration zones (for storms <20-yr 1hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely.
- Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management.

3) Designation of construction zone and any equipment exclusion zones

a) Sensitve areas and construction zone are adequately "flagged" and designated as "Equipment Boundary Zones"

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site.
- Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts offsite or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section.

4) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

	Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.	Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	 Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator.) na
			Effectiveness Score:	E
Additio	onal Comments		(BMP Monitoring Rule Set))
Site hat the top	as been winterized, no major resource cond o 12" of soil. Work still in progress on the b	cerns at this time. All excavated areas have bee uilding interior; all site work complete.	n backfilled and covered with wood chip mulch incorp	porated into

UTM Zone 11 Easting 247277 Northing 4312421	Form HV1: Ten On-going Cons	nporary BMPs for struction		ID# Selection Code S02	432 State CA
				Township 12N Range 18E	Section
Date of Project Start	7/15/2011 Survey Da	te/Time 10/28/2011	6th Field	I HUC Watershed CA-1	
Reviewer(s)		Construction Foreman			
K. Roaldson		Jim Larmore			
Construction Type:	Other	Project Is: Other	Othe	er (Describe) Ski Trail Widening	
General Information	Name Of Plans California Si	ide Trail Widening		Job No. 11-600.1	
	Date 3/2	24/11 Rev Date	4/22/11		
Temp. BMPs for staging are compacted by heavy equipr	ea near Sky Base, including sedir nent to be restored to 100% cove	nent fence, straw wattles, conserve	struction equipment exc	clusion fencing to protect SEZ. Areas d	isturbed or
Implementation 1) Project design included Erosion Control Plan development, and identified appropriate temporary BMP measures for mitigating impacts from a 20-year 1-hour Storm Event (per FS and Lahontan SWQRCB standards); at a minimum the contract should address BMP measures for the following topics: source control, runoff drainage control, protection of SEZs, and hazardous substance control, please refer to the Supplemental BMP checklist.					
1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns3=Major departure from contract and/or major resource concerns2=Minor departure from contract and/or minor resource concerns4=Repeated departure from contract and/or failure to address resource concerns					
2) Are BMP measures constructed according to contract design specifications?					
1 = Meets / Exceeds co 2 = Minor departure fro	ontract requirements and/or no re m contract and/or minor resource	source concerns 3 = Majo e concerns 4 = Rep	or departure from contra beated departure from c	act and/or major resource concerns contract and/or failure to address resour	ce concerns
				Implementation Score (BMP Monitoring Rule	e: I

Effectiveness

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

• Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depostional fans, are evident near erodable soil areas; however, no evidence is observed of sediment deliverv to SEZ.	Substantial areas of exposed erodable soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.) NA				
b) Cut and fill slope protection (including surface erosion and slope failure potential							
Temporary BMP measures (such as	Minor erosion and sediment deposition is	Temporary BMP measures are					

Premporary BMP measures (such as erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes. Olyment of the measures (such as erosion and sediment deposition is noted from storms <20-year 1-hour event; inadequate however, sediment transport to any SEZ, on- or off-site, is not observed. Olyment of the measures (such as erosion and sediment deposition is noted from storms <20-year 1-hour event; inadequate is on- or off-site, is not observed. On- or off-site, is not observed. On- or off-site, is not observed.	y BMP measures are e to protect erosion from cut pes from storms <20 year1 t; or any observation of transport and/or deposition Z.
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

- a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.
- No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.
- Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.
- Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.

No evidence site, or const outlets are si stablized with other type of of erosion or concerns.	e of unexpected ponding on- tructed detention ponds and table (naturally stable, h planted vegetation, or f armor) and exhibit no signs downstream resource	Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	 On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ. 	⊖ NA
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c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

- Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20year 1-hour storm event.
- Minor resource concern is evident at infiltration zones (for storms <20-yr 1hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely.
- Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management.

3) Designation of construction zone and any equipment exclusion zones

a) Sensitve areas and construction zone are adequately "flagged" and designated as "Equipment Boundary Zones"

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site.
- Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts offsite or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section.

4) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.	Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	 Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator. 			
-		Effectiveness Score: E			
Additional Comments		(BMP Monitoring Rule Set)			
Staging area has been winterized for the season. Sediment fence and T-posts have been removed but straw wattles over the stream crossing will remain in place. Wood chips from chipping area have been spread over the site.					

UTM Zone 11 Easting 247760 Northing 4313741 Construction Site Name Tamara	Form HV1: Temporary BMPs fo On-going Construction	ID# 431 Selection Code S03 Forest LTBMU District State CA Township 12N Range 18E				
Date of Project Start 7/29/2 Reviewer(s) K. Roaldson	010 Survey Date/Time 10 Construction F Joe Stewart / Structure	0/28/2011 Foreman Jim Larmore New Construction Other (Describe)				
General Information Name Of Plans Heavenly Gondola Lodge Job No. Date 06/10/2010 Rev Date						
Straw wattles to prevent runoff from exiting construction site. Exclusion fencing to minimize disturbance and soil compaction. Tree protective fence to reduce vegetation damage. Dust control with water truck. Implementation 1) Project design included Erosion Control Plan development, and identified appropriate temporary BMP measures for mitigating impacts from a 20-year 1-bour Storm Event (per ES and Laborata SWORCB standards): at a minimum the contract should address BMP measures for the following topics: source						
control, runoff drainage control, protection of SEZs, and hazardous substance control, please refer to the Supplemental BMP checklist. 1 1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns 3=Major departure from contract and/or major resource concerns 2=Minor departure from contract and/or minor resource concerns 4=Repeated departure from contract and/or failure to address resource concerns 2) Are BMP measures constructed according to contract design specifications? 1						
1 = Meets / Exceeds contract rec 2 = Minor departure from contract	uirements and/or no resource concerns t and/or minor resource concerns	3 = Major departure from contract and/or major resource concerns 4 = Repeated departure from contract and/or failure to address resource concerns Implementation Score: (BMP Monitoring Rule Set)				

Effectiveness

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

• Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depostional fans, are evident near erodable soil areas; however, no evidence is observed of sediment deliverv to SEZ.	Substantial areas of exposed erodable soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.) NA
b) Cut and fill slope protection (including surface	erosion and slope failure potential		
Temporary BMP measures (such as	Minor erosion and sediment deposition is	Temporary BMP measures are	

D Temporary BMP measures (such as erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.	Temporary BMP measures are inadequate to protect erosion from cut and fill slopes from storms <20 year1 hour event; or any observation of sediment transport and/or deposition within SEZ.
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

- a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.
- No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.
- Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.
- Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.

No evider site, or cc outlets ar stablized other type of erosior concerns	nce of unexpected ponding on- nstructed detention ponds and e stable (naturally stable, with planted vegetation, or e of armor) and exhibit no signs or downstream resource	Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	⊖ NA
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c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

- Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20year 1-hour storm event.
- Minor resource concern is evident at infiltration zones (for storms <20-yr 1hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely.
- Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management.

3) Designation of construction zone and any equipment exclusion zones

a) Sensitve areas and construction zone are adequately "flagged" and designated as "Equipment Boundary Zones"

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site.
- Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts offsite or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section.

4) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.	Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	 Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator.
		Effectiveness Score:
Additional Comments		(BMP Monitoring Rule Set)
Site has been winterized for the season. Part of t mulch placed in revegetation area. Coverage is e	he revegetated area in front of the Lodge has be excellent in the project area.	en covered with snow from snowmaking system. Pine needle

UTM Zone 11 Easting 245889 Form HV2: Permanent BMPs and Structure Developments	s for Buildings S Selection Code S05
Northing 4312918 Building/Structure Name Lakeview/Upper Shop Cable	Township 12N Range 18E Section 1
Date of Project Start Date of Project End 10/15/20 Reviewer(s)	004 6th Field HUC Watershed CA-6 State CA
K. Roaldson Survey Date 9/1/2011 Date B	BMP Implementation Complete Last BMP Maintenance
Structure Type: Other Survey Type 6th Year Post Cons	str Depth/Duration: Other (Describe) Utility
Plan Title: 2004 Imp. Face Airline Replacements and Ersn Job No.: 00-6	607.25 Plan Date: 05-27-2004 Plan Revision Date:
Specific concerns associated with construction project and describe BMP meas	sures designed to achieve resource protection.
Erosion control, revegetation and mulch application.	
Implementation For Permanent or Temporary-Seasonal Structures:	1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns 2=Minor departure from standards and/or minor resource concerns 3=Major departure from standards and/or major resource concerns 4=Repeated departure from standards/failure to address concerns
1) Were source control, drainage and infiltration systems, and hazardous mate 1-hour Storm Event, to achieve Forest Service and State water quality standard	erial control systems designed to maintain resource protection during a 20-year ards?
2) Are BMP measures constructed according to contract design specifications?	\$? 1
Additional Comments:	
Effectiveness	Implementation Score:
Note: Effective and adequate maintenance of BMP measures should be inclu effectiveness evaluation. When topic is not applicable, please make information	luded within the (BMP Monitoring Rule Set) ational comment.
1) Source area erosion control. Protection and stabilization of structure	e site, particularly any erosive areas.
(Note the evidence of erosion processes such as rills, gullies, sediment score pumice slopes, or deteriorated granitic areas) or areas identified for revegeta separately)	our and/or deposition on- or off-site, specifically areas naturally devoid of vegetation (e.g. tation in structure plan, see structure sketch. Constructed cut and fill slopes are addressed

ا• ؛	Nearly 70% coverage of any erodible surfaces, and no evidence of erosion.	Structure site exhibits less than full cover of soil; however, only minor erosion is evident and subsequent deposition is limited to on-site areas excluding deposition within any on-site SEZ.	 Areas of exposed soil are observed, and erosion is evident and extensive (for example sediment is transported off-site or directly to SEZ. 	⊖ NA
Ob ICCE	served progression/improvement of areas ssful revegetation, such as temporary arm	identified for revegetation in structure plan as sch oring measures (including mulch, rock, erosion cl	eduled; and adequate erosion protection measure oth or other) applied while vegetation becomes es	s applied for tablished
	Revegetation establishment proceeding as expectednew and existing vegetative cover in combination with temporary BMP measures are effective at eliminating/ mitigating erosion processes from those areas.	Revegetation efforts are not proceeding as expected. Minor additional efforts are required for successful revegetation establishment, or minor maintenance/retrofit of temporary BMP measures applied (for erosion control during revegetation efforts) is needed.	Temporary BMP measures provide inadequate erosion control, and/or specified revegetation efforts are deemed unsuccessful, as major modifications are needed to achieve vegetative ground cover goals and success. OR major on- site erosion, or any evidence of sediment delivery to SEZ.	⊖ NA
c) C	tut and fill slope protection (including surface	ce erosion and slope failure potential).		
	BMP measures (including seeding/planting, with mulch of pine straw, designed swales, retention walls or use of erosion control blankets) applied to cut or fill slopes are adequate to prevent erosion. Craks or slumping is not evident.	BMP measures applied (see the previous checkbox) exhibit minor erosion and/or deposition is noted at base of cut or fill slope, near retention walls or around erosion control blankets or mulch. However, erosion is limited to on-site areas excluding any transport to SEZ. Or retaining wall integrity is showing signs of concern, such as bulging or wavy appearance.	BMP measures are inadequate to protect erosion on cut and fill slopes from storms <20 year1 hour event; or any evidence of sediment transport and/or deposition within SEZ is observed. Or cracks are present and appear to be threatening integrity of fill and/or retaining wall. Or the occurrence of any fillslope failure has occurred.	⊖ NA

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

	Natural or newly constructed drainage control and infiltration systems are adequate to eliminate erosion and sediment transport processes. No evidence of erosion or sediment movement on-site.	Observed evidence of minor on-site erosion and sediment transport, but limited to on-site deposition, and no evidence of transport to any SEZ.	Observed evidence of substantial on-site erosion such as frequent rill formation or any observation of gully features observed, or any evidence of sediment transport to SEZ. OR where major maintenance or adaptive erosion control strategies are required for resource protection. OR where water quality data indicates exceedance of state standards.	⊖ NA
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• No evidence of unexpected ponding on- site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	⊖ NA
3) Effectiveness of hazardous substance co	ntrol measures.		
(Evaluate the effectiveness, or lack of, BMP a Spill Coordinator if accidental spill has occurre	oplied to control hazardous chemical delivery to d.)	soils, groundwater or surface water bodies. Conta	act Hazardous
 a) Evaluate the occurrence and mitigation of h water quality. 	azardous/toxic substances used for building and	d vehicle maintenance, and associated direct and	indirect effects upon
 Hazardous substance control measures provide effective mitigation. 	Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider	 Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality 	● NA

approximate volume, microtopography,

Straw wattles in good shape on slope from webcam to area near top of Gunbarrel to webcam. Revegetation is growing, not dense but typical of surrounding

vicinity to SEZ, permeability of soil, depth of stain and recent weather

events).

Additional Comments

revegetated area. No evidence of sediment transport or erosion.

Monitoring Crew Leader.

Effectiveness Score:

(BMP Monitoring Rule Set)

E

UTM Zone 10 Easting 245942 Northing 4312894 Form HV2: Permanent BMPs for Buildings and Structure Developments	ID# 344 Selection Code S02
Building/Structure Name Lakeview Water System	Township 12N Range 18E Section 1
Date of Project Start 8/25/2008 Date of Project End 9/15/2011 6th Field H Reviewer(s)	UC Watershed CA-6 State CA
K. Roaldson Survey Date 9/1/2011 Date BMP Implementation Complete	8/1/2011 Last BMP Maintenance 8/1/2011
Structure Type: Other Survey Type 1st Year Post Constr Depth/Duration:	Other (Describe) Water System
Plan Title: Lakeview Water System Job No.: 08607.1 Plan Date: 7	7/25/2008 Plan Revision Date: 7/31/2008
Specific concerns associated with construction project and describe BMP measures designed to achieve resou	rce protection.
Effective cover over trench and on decommissioned road, revegetation.	
Impermentation 1=Meets/Exceeds 20-y For Permanent or Temporary-Seasonal Structures: 1=Meets/Exceeds 20-y 1) Were source control, drainage and infiltration systems, and hazardous material control systems designed to 1-hour Storm Event, to achieve Forest Service and State water quality standards?	yr 1-Hr standards and/or no resource concerns n standards and/or minor resource concerns n standards and/or major resource concerns e from standards/failure to address concerns o maintain resource protection during a 20-year
2) Are BMP measures constructed according to contract design specifications?	1
Additional Comments:	
<u>Effectiveness</u>	Implementation Score:
Note: Effective and adequate maintenance of BMP measures should be included within the effectiveness evaluation. When topic is not applicable, please make informational comment.	(BMP Monitoring Rule Set)
1) Source area erosion control. Protection and stabilization of structure site, particularly any erosive a	areas.
(Note the evidence of erosion processes such as rills, gullies, sediment scour and/or deposition on- or off-sil pumice slopes, or deteriorated granitic areas) or areas identified for revegetation in structure plan, see struc separately)	te, specifically areas naturally devoid of vegetation (e.g. ture sketch. Constructed cut and fill slopes are addressed

۱ ؛	Nearly 70% coverage of any erodible surfaces, and no evidence of erosion.	Ostructure site exhibits less than full cover of soil; however, only minor erosion is evident and subsequent deposition is limited to on-site areas excluding deposition within any on-site SEZ.	Areas of exposed soil are observed, and erosion is evident and extensive (for example sediment is transported off-site or directly to SEZ.	⊖ NA
Ob ICCE	served progression/improvement of areas i essful revegetation, such as temporary arm	identified for revegetation in structure plan as sch oring measures (including mulch, rock, erosion cl	eduled; and adequate erosion protection measure oth or other) applied while vegetation becomes es	es applied for tablished
	Revegetation establishment proceeding as expectednew and existing vegetative cover in combination with temporary BMP measures are effective at eliminating/ mitigating erosion processes from those areas.	Revegetation efforts are not proceeding as expected. Minor additional efforts are required for successful revegetation establishment, or minor maintenance/retrofit of temporary BMP measures applied (for erosion control during revegetation efforts) is needed.	Temporary BMP measures provide inadequate erosion control, and/or specified revegetation efforts are deemed unsuccessful, as major modifications are needed to achieve vegetative ground cover goals and success. OR major on- site erosion, or any evidence of sediment delivery to SEZ.	⊖ NA
c) C	aut and fill slope protection (including surfac	e erosion and slope failure potential).		
۲	BMP measures (including seeding/planting, with mulch of pine straw, designed swales, retention walls or use of erosion control blankets) applied to cut or fill slopes are adequate to prevent erosion. Craks or slumping is not evident.	BMP measures applied (see the previous checkbox) exhibit minor erosion and/or deposition is noted at base of cut or fill slope, near retention walls or around erosion control blankets or mulch. However, erosion is limited to on-site areas excluding any transport to SEZ. Or retaining wall integrity is showing signs of concern, such as bulging or wavy appearance.	BMP measures are inadequate to protect erosion on cut and fill slopes from storms <20 year1 hour event; or any evidence of sediment transport and/or deposition within SEZ is observed. Or cracks are present and appear to be threatening integrity of fill and/or retaining wall. Or the occurrence of any fillslope failure has occurred.) NA

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

	Natural or newly constructed drainage control and infiltration systems are adequate to eliminate erosion and sediment transport processes. No evidence of erosion or sediment movement on-site.	Observed evidence of minor on-site erosion and sediment transport, but limited to on-site deposition, and no evidence of transport to any SEZ.	Observed evidence of substantial on-site erosion such as frequent rill formation or any observation of gully features observed, or any evidence of sediment transport to SEZ. OR where major maintenance or adaptive erosion control strategies are required for resource protection. OR where water quality data indicates exceedance of state standards.	⊖ NA
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No evidence of unexpected ponding on- site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	⊖ NA
3) Effectiveness of hazardous substance co	ntrol measures.		
(Evaluate the effectiveness, or lack of, BMP a Spill Coordinator if accidental spill has occurre	pplied to control hazardous chemical delivery to ed.)	soils, groundwater or surface water bodies. Conta	act Hazardous
 a) Evaluate the occurrence and mitigation of h water quality. 	azardous/toxic substances used for building and	d vehicle maintenance, and associated direct and	indirect effects upon
Hazardous substance control measures provide effective mitigation.	Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	 Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader. 	⊖ NA
		Effectiveness	Score: E
Additional Comments		(BMP Monitori	ng Rule Set)

Revegetation along trench line is robust, no evidence of erosion. Excellent coverage throughout site. Access road to old tank has been decommissioned, old tank removed and coverage is extensive.

UTM Zone 11 Easting 244964 Northing 247137 Form HV2: Permanent BMPs for I and Structure Developments	342 Buildings Selection Code S03
Building/Structure Name Calif. Main Lodge Parking Lot	Township 12N Range 18E Section 1
Date of Project Start 8/27/2007 Date of Project End 9/13/2006 Reviewer(s)	6th Field HUC Watershed CA-6 State CA
K. Roaldson Survey Date 9/1/2011 Date BMP Im	plementation Complete 10/1/2009 Last BMP Maintenance 7/15/2010
Structure Type: Other Survey Type 6th Year Post Constr Do	epth/Duration: Other (Describe) Parking Lot
Plan Title: Phase III, Calif. Base Lodge Parking Lot Water Job No.: 00-607.5	Plan Date: 05-05-2007 Plan Revision Date:
Specific concerns associated with construction project and describe BMP measures of	lesigned to achieve resource protection.
Revegetation, groundwater	
Implementation For Permanent or Temporary-Seasonal Structures: 1) Were source control, drainage and infiltration systems, and hazardous material co 1-hour Storm Event, to achieve Forest Service and State water quality standards?	1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns 2=Minor departure from standards and/or minor resource concerns 3=Major departure from standards and/or major resource concerns 4=Repeated departure from standards/failure to address concerns ntrol systems designed to maintain resource protection during a 20-year
2) Are BMP measures constructed according to contract design specifications?	1
Additional Comments:	
Effectiveness	Implementation Score:
Note: Effective and adequate maintenance of BMP measures should be included w effectiveness evaluation. When topic is not applicable, please make informational	ithin the (BMP Monitoring Rule Set) comment.
1) Source area erosion control. Protection and stabilization of structure site,	particularly any erosive areas.
(Note the evidence of erosion processes such as rills, gullies, sediment scour and pumice slopes, or deteriorated granitic areas) or areas identified for revegetation in separately)	for deposition on- or off-site, specifically areas naturally devoid of vegetation (e.g. In structure plan, see structure sketch. Constructed cut and fill slopes are addressed

 Nearly 70% coverage of any erodible surfaces, and no evidence of erosior 	Structure site exhibits less than full cover of soil; however, only minor erosion is evident and subsequent deposition is limited to on-site areas excluding deposition within any on-site SEZ.	Areas of exposed soil are observed, and erosion is evident and extensive (for example sediment is transported off-site or directly to SEZ.) na
Observed progression/improvement of ccessful revegetation, such as tempora	areas identified for revegetation in structure plan as sc ry armoring measures (including mulch, rock, erosion c	heduled; and adequate erosion protection measure sloth or other) applied while vegetation becomes es	es applied for stablished
 Revegetation establishment proceed as expectednew and existing vegetative cover in combination with temporary BMP measures are effect at eliminating/ mitigating erosion processes from those areas. 	ding Revegetation efforts are not proceeding as expected. Minor additional efforts are required for successful revegetation establishment, or minor maintenance/retrofit of temporary BMP measures applied (for erosion control during revegetation efforts) is needed.	Temporary BMP measures provide inadequate erosion control, and/or specified revegetation efforts are deemed unsuccessful, as major modifications are needed to achieve vegetative ground cover goals and success. OR major on- site erosion, or any evidence of sediment delivery to SEZ.	⊖ NA
c) Cut and fill slope protection (including	surface erosion and slope failure potential).		
BMP measures (including seeding/planting, with mulch of pine straw, designed swales, retention v or use of erosion control blankets) applied to cut or fill slopes are adec to prevent erosion. Craks or slumpi not evident.	 BMP measures applied (see the previous checkbox) exhibit minor erosion and/or deposition is noted at base of cut or fill slope, near retention walls or around erosion control blankets or mulch. However, erosion is limited to on-site areas excluding any transport to SEZ. Or retaining wall integrity is showing signs of concern, such as bulging or wavy appearance. 	BMP measures are inadequate to protect erosion on cut and fill slopes from storms <20 year1 hour event; or any evidence of sediment transport and/or deposition within SEZ is observed. Or cracks are present and appear to be threatening integrity of fill and/or retaining wall. Or the occurrence of any fillslope failure has occurred.	○ NA

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

 Natural or newly constructed drainage control and infiltration systems are adequate to eliminate erosion and sediment transport processes. No evidence of erosion or sediment movement on-site. 	 Observed evidence of minor on-site erosion and sediment transport, but limited to on-site deposition, and no evidence of transport to any SEZ. 	Observed evidence of substantial on-site erosion such as frequent rill formation or any observation of gully features observed, or any evidence of sediment transport to SEZ. OR where major maintenance or adaptive erosion control strategies are required for resource protection. OR where water quality data indicates exceedance of state standards.	⊖ NA
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	No evidence of unexpected ponding on- site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	 On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ. 	NA			
3) Effectiveness of hazardous substance control measures.							
(E Sp	(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)						

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

Hazardous substance control measures provide effective mitigation.	Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	 Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader.
		Effectiveness Score:
Additional Comments		(BMP Monitoring Rule Set)
Parking lot has been swept. Evidence of erc on Wildwood needs to be maintained; orang the area south of roadway between the upper result of the large and late snow this year. Re	ision in the form of gullies at northwest corner of e algae growth covering drop inlet. Groundwate r and lower parking lots is flowing across the pa eveg is evident on slope along Wildwood and slo	parking lot where old asphalt has deteriorated. Groundwater seep or directly south of the Shop is contained in French Drain system but rking lot and into the pretreatment system; high groundwater is a ope along roadway between upper and lower parking lots. Good

mulch coverage on areas with little reveg growth.

UTM Zone 11 Easting 248216 Northing 4312849 Form HV2: Permanent BMPs for B and Structure Developments	Suildings ID# 356 Selection Code S03
Building/Structure Name Zip Line (Flyer) - Upper Terminal Date of Project Start 9/17/2007 Date of Project End 8/1/2008 Paviawer(s) 8/1/2008	Township 12N Range 18E Section 1 6th Field HUC Watershed CA-1 State CA
T. Osterhout,K. Roaldson Survey Date 9/16/2011 Date BMP Imp	plementation Complete 8/1/2008 Last BMP Maintenance 8/1/2008
Structure Type: Lift-Top Survey Type 3rd Year Post Constr De Plan Title: 2007 Implementation Zip Line Adventure Ride a Job No.: 00-607.35	Other (Describe) Completed BMP Proj. Plan Date: 6/7/07 Plan Revision Date: 8/7/07
Specific concerns associated with construction project and describe BMP measures de Perm BMPs to minimize erosion: infiltration BMPs and effective cover.	esigned to achieve resource protection.
Implementation For Permanent or Temporary-Seasonal Structures: 1) Were source control, drainage and infiltration systems, and hazardous material control.	1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns 2=Minor departure from standards and/or minor resource concerns 3=Major departure from standards and/or major resource concerns 4=Repeated departure from standards/failure to address concerns
1-hour Storm Event, to achieve Forest Service and State water quality standards?2) Are BMP measures constructed according to contract design specifications?	
Additional Comments: Infiltration BMP not constructed. Deck partially permeable, granite boulders beneath o	deck.
Effectiveness Note: Effective and adequate maintenance of BMP measures should be included wi effectiveness evaluation. When topic is not applicable, please make informational c	Implementation Score: I (BMP Monitoring Rule Set) comment.
 Source area erosion control. Protection and stabilization of structure site, particular the evidence of erosion processes such as rills, gullies, sediment scour and/or pumice slopes, or deteriorated granitic areas) or areas identified for revegetation in separately) 	articularly any erosive areas. or deposition on- or off-site, specifically areas naturally devoid of vegetation (e.g. o structure plan, see structure sketch. Constructed cut and fill slopes are addressed

ا• ؛	Nearly 70% coverage of any erodible surfaces, and no evidence of erosion.	Structure site exhibits less than full cover of soil; however, only minor erosion is evident and subsequent deposition is limited to on-site areas excluding deposition within any on-site SEZ.	 Areas of exposed soil are observed, and erosion is evident and extensive (for example sediment is transported off-site or directly to SEZ. 	⊖ NA
Ob ICCE	served progression/improvement of areas ssful revegetation, such as temporary arm	identified for revegetation in structure plan as sch oring measures (including mulch, rock, erosion cl	eduled; and adequate erosion protection measure oth or other) applied while vegetation becomes es	s applied for tablished
	Revegetation establishment proceeding as expectednew and existing vegetative cover in combination with temporary BMP measures are effective at eliminating/ mitigating erosion processes from those areas.	Revegetation efforts are not proceeding as expected. Minor additional efforts are required for successful revegetation establishment, or minor maintenance/retrofit of temporary BMP measures applied (for erosion control during revegetation efforts) is needed.	Temporary BMP measures provide inadequate erosion control, and/or specified revegetation efforts are deemed unsuccessful, as major modifications are needed to achieve vegetative ground cover goals and success. OR major on- site erosion, or any evidence of sediment delivery to SEZ.	⊖ NA
c) C	tut and fill slope protection (including surface	ce erosion and slope failure potential).		
	BMP measures (including seeding/planting, with mulch of pine straw, designed swales, retention walls or use of erosion control blankets) applied to cut or fill slopes are adequate to prevent erosion. Craks or slumping is not evident.	BMP measures applied (see the previous checkbox) exhibit minor erosion and/or deposition is noted at base of cut or fill slope, near retention walls or around erosion control blankets or mulch. However, erosion is limited to on-site areas excluding any transport to SEZ. Or retaining wall integrity is showing signs of concern, such as bulging or wavy appearance.	BMP measures are inadequate to protect erosion on cut and fill slopes from storms <20 year1 hour event; or any evidence of sediment transport and/or deposition within SEZ is observed. Or cracks are present and appear to be threatening integrity of fill and/or retaining wall. Or the occurrence of any fillslope failure has occurred.	⊖ NA

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

	Natural or newly constructed drainage control and infiltration systems are adequate to eliminate erosion and sediment transport processes. No evidence of erosion or sediment movement on-site.	Observed evidence of minor on-site erosion and sediment transport, but limited to on-site deposition, and no evidence of transport to any SEZ.	Observed evidence of substantial on-site erosion such as frequent rill formation or any observation of gully features observed, or any evidence of sediment transport to SEZ. OR where major maintenance or adaptive erosion control strategies are required for resource protection. OR where water quality data indicates exceedance of state standards.	⊖ NA
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• No evidence of unexpected ponding on- site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	⊖ NA
3) Effectiveness of hazardous substance co	ntrol measures.		
(Evaluate the effectiveness, or lack of, BMP a Spill Coordinator if accidental spill has occurre	oplied to control hazardous chemical delivery to d.)	soils, groundwater or surface water bodies. Conta	act Hazardous
a) Evaluate the occurrence and mitigation of h water quality.	azardous/toxic substances used for building and	d vehicle maintenance, and associated direct and	indirect effects upon
• Hazardous substance control measures provide effective mitigation.	Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	 Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader. 	⊖ NA
		Effectiveness S	Score: E
Additional Comments		(BMP Monitorir	ng Rule Set)
No evidence of erosion. Effective cover is su	fficient beneath pervious deck, primarily pine ne	eedle mulch, wood chips, and rock.	

UTM Zone11Easting245906Northing4312996	Form HV2: Permanent BMPs for B and Structure Developments	uildings	Selection Cc	D# ode S02	375
Building/Structure Name Top	of Tram	То	wnship 12n	Range 18E Section	on 1
Date of Project Start Reviewer(s)	Date of Project End 10/15/2004	6th Field HU	C Watershed CA-6	State C	A
T. Osterhout, K. Roaldson	Survey Date 9/21/2011 Date BMP Imp	elementation Complete	Last	t BMP Maintenance	
Structure Type: Lift-Top	Survey Type Follow-up Dep	oth/Duration:	Other (Describe)		
Plan Title:	Job No.:	Plan Date:	Plar	Revision Date:	
Specific concerns associated with c	construction project and describe BMP measures de	esigned to achieve resourc	e protection.		
Erosion on steep slope beneath bu	ilding. Rocklined channel on northeast side of build	ling.			
For Permanent or Temporary-Sea 1) Were source control, drainage a 1-hour Storm Event, to achieve Fo	asonal Structures: and infiltration systems, and hazardous material con prest Service and State water quality standards?	1=Meets/Exceeds 20-yr 2=Minor departure from s 3=Major departure from s 4=Repeated departure fr trol systems designed to m	1-Hr standards and/or standards and/or minc standards and/or majc om standards/failure t naintain resource prote	no resource concerns or resource concerns or resource concerns o address concerns ection during a 20-year	1
2) Are BMP measures constructed	according to contract design specifications?				2
Additional Comments:					
More erosion control is needed on	the slope. Wood chips are the covering slope, but	they were insufficient to pr	event t a 2-3" deep gu	ılly.	
Effectiveness				Implementation Score:	m
Note: Effective and adequate ma effectiveness evaluation. When	intenance of BMP measures should be included wit topic is not applicable, please make informational c	thin the omment.		(BMP Monitoring Rule S	set)
1) Source area erosion control.	Protection and stabilization of structure site, pa	articularly any erosive are	eas.		
(Note the evidence of erosion pu pumice slopes, or deteriorated g separately)	rocesses such as rills, gullies, sediment scour and/o granitic areas) or areas identified for revegetation in	or deposition on- or off-site, structure plan, see structu	, specifically areas nat re sketch. Constructe	turally devoid of vegetation d cut and fill slopes are a	on (e.g. addressed

10 3	Nearly 70% coverage of any erodible surfaces, and no evidence of erosion.	• Structure site exhibits less than full cover of soil; however, only minor erosion is evident and subsequent depositon is limited to on-site areas excluding deposition within any on-site SEZ.	Areas of exposed soil are observed, and erosion is evident and extensive (for example sediment is transported off-site or directly to SEZ.	⊖ NA
Ob JCCE	served progression/improvement of areas i ssful revegetation, such as temporary arm	dentified for revegetation in structure plan as sch oring measures (including mulch, rock, erosion cl	eduled; and adequate erosion protection measure oth or other) applied while vegetation becomes es	es applied for tablished.
	Revegetation establishment proceeding as expectednew and existing vegetative cover in combination with temporary BMP measures are effective at eliminating/ mitigating erosion processes from those areas.	Revegetation efforts are not proceeding as expected. Minor additional efforts are required for successful revegetation establishment, or minor maintenance/retrofit of temporary BMP measures applied (for erosion control during revegetation efforts) is needed.	Temporary BMP measures provide inadequate erosion control, and/or specified revegetation efforts are deemed unsuccessful, as major modifications are needed to achieve vegetative ground cover goals and success. OR major on- site erosion, or any evidence of sediment delivery to SEZ.	⊖ NA
c) C	tut and fill slope protection (including surfac	e erosion and slope failure potential).		
	BMP measures (including seeding/planting, with mulch of pine straw, designed swales, retention walls or use of erosion control blankets) applied to cut or fill slopes are adequate to prevent erosion. Craks or slumping is not evident.	BMP measures applied (see the previous checkbox) exhibit minor erosion and/or deposition is noted at base of cut or fill slope, near retention walls or around erosion control blankets or mulch. However, erosion is limited to on-site areas excluding any transport to SEZ. Or retaining wall integrity is showing signs of concern, such as bulging or wavy appearance.	BMP measures are inadequate to protect erosion on cut and fill slopes from storms <20 year1 hour event; or any evidence of sediment transport and/or deposition within SEZ is observed. Or cracks are present and appear to be threatening integrity of fill and/or retaining wall. Or the occurrence of any fillslope failure has occurred.	⊖ NA

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

Natural or newly constructed drainage control and infiltration systems are adequate to eliminate erosion and sediment transport processes. No evidence of erosion or sediment movement on-site.	Observed evidence of minor on-site erosion and sediment transport, but limited to on-site deposition, and no evidence of transport to any SEZ.	Observed evidence of substantial on-site erosion such as frequent rill formation or any observation of gully features observed, or any evidence of sediment transport to SEZ. OR where major maintenance or adaptive erosion control strategies are required for resource protection. OR where water quality data indicates exceedance of state standards.	⊖ NA
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No evidence of unexpected ponding on- site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	<u>∩</u> NA
3) Effectiveness of hazardous substance co	ntrol measures.		
(Evaluate the effectiveness, or lack of, BMP ap Spill Coordinator if accidental spill has occurre	oplied to control hazardous chemical delivery to d.)	soils, groundwater or surface water bodies. Conta	act Hazardous
 a) Evaluate the occurrence and mitigation of h water quality. 	azardous/toxic substances used for building and	d vehicle maintenance, and associated direct and	indirect effects upon
• Hazardous substance control measures provide effective mitigation.	Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	 Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader. 	() NA
		Effectiveness S	Score: m

(BMP Monitoring Rule Set)

Slope is well covered by revegetation and wood chips except for area on southwest corner of building. Gully has formed and wood chips have been insufficient to prevent further erosion. Construction of a rocklined channel or other erosion control measures in this area added to 2012 work list.

Additional Comments

UTM Zone Easting Northing	0	Form HV2: and Structu	Permanent BMPs for ire Developments	Buildings	Selection	ID# Code S05	358
Building	/Structure Name	World Cup/E Bowl Snowr	making		Township 12N	Range 18E Se	ction 1
Date of Reviewer(s)	Project Start	Date of Proje	ect End 10/15/2005	6th Field H	HUC Watershed	6 State	CA
T. Osterhou	t,K. Roaldson	Survey Date	9/21/2011 Date BMP	mplementation Complete		ast BMP Maintenance	7/15/2006
Structure Ty	vpe: Other	Survey Type	e 6th Year Post Constr	Depth/Duration:	Other (Describe)	Snow making infrastr	ucture
Plan Title:			Job No.:	Plan Date:		Plan Revision Date:	
A series of and Oct. of Implements For Perman 1) Were so 1-hour Sto	snowmkaing proje 2006 as follows: F ation nent or Temporar purce control, drain rrm Event, to achie	cts was performed in 2003 Perfect Ride Improvements y-Seasonal Structures: age and infiltration system ve Forest Service and Stat	s, EB Line B, EB/WC Line C B, EB Line B, EB/WC Line C s, and hazardous material o te water quality standards?	1=Meets/Exceeds 20- 2=Minor departure fro 3=Major departure fro 4=Repeated departure	-yr 1-Hr standards and m standards and/or n m standards and/or n from standards and/or n e from standards/failu o maintain resource p	de for the projects during ns. The project numbers d/or no resource concerns najor resource concerns re to address concerns rotection during a 20-yea	August, Sept, s for the plan
2) Are BMI	P measures constr	ucted according to contrac	ct design specifications?				0
Additional	Comments:						
Project im	plementation rated	in 2005 and not repeated	for follow up maintenance of	on combined evaluation.			
Effective	ness					Implementation Scor	e:
Note: Effectiver	ective and adequaness evaluation. V	te maintenance of BMP m Vhen topic is not applicable	easures should be included e, please make informationa	within the al comment.		(BMP Monitoring Ru	e Set)
1) Source	e area erosion co	ntrol. Protection and sta	bilization of structure site	, particularly any erosive	areas.		
(Note th pumice separate	e evidence of eros slopes, or deterior ely)	ion processes such as rills ated granitic areas) or area	s, gullies, sediment scour an as identified for revegetation	d/or deposition on- or off-s in structure plan, see stru	site, specifically areas cture sketch. Constru	naturally devoid of vege icted cut and fill slopes a	tation (e.g. ire addressed

۱ ؛	Nearly 70% coverage of any erodible surfaces, and no evidence of erosion.	Ostructure site exhibits less than full cover of soil; however, only minor erosion is evident and subsequent deposition is limited to on-site areas excluding deposition within any on-site SEZ.	Areas of exposed soil are observed, and erosion is evident and extensive (for example sediment is transported off-site or directly to SEZ.	⊖ NA
Ob ICCE	served progression/improvement of areas i essful revegetation, such as temporary arm	identified for revegetation in structure plan as sch oring measures (including mulch, rock, erosion cl	eduled; and adequate erosion protection measure oth or other) applied while vegetation becomes es	es applied for tablished
	Revegetation establishment proceeding as expectednew and existing vegetative cover in combination with temporary BMP measures are effective at eliminating/ mitigating erosion processes from those areas.	Revegetation efforts are not proceeding as expected. Minor additional efforts are required for successful revegetation establishment, or minor maintenance/retrofit of temporary BMP measures applied (for erosion control during revegetation efforts) is needed.	Temporary BMP measures provide inadequate erosion control, and/or specified revegetation efforts are deemed unsuccessful, as major modifications are needed to achieve vegetative ground cover goals and success. OR major on- site erosion, or any evidence of sediment delivery to SEZ.	⊖ NA
c) C	aut and fill slope protection (including surfac	e erosion and slope failure potential).		
۲	BMP measures (including seeding/planting, with mulch of pine straw, designed swales, retention walls or use of erosion control blankets) applied to cut or fill slopes are adequate to prevent erosion. Craks or slumping is not evident.	BMP measures applied (see the previous checkbox) exhibit minor erosion and/or deposition is noted at base of cut or fill slope, near retention walls or around erosion control blankets or mulch. However, erosion is limited to on-site areas excluding any transport to SEZ. Or retaining wall integrity is showing signs of concern, such as bulging or wavy appearance.	BMP measures are inadequate to protect erosion on cut and fill slopes from storms <20 year1 hour event; or any evidence of sediment transport and/or deposition within SEZ is observed. Or cracks are present and appear to be threatening integrity of fill and/or retaining wall. Or the occurrence of any fillslope failure has occurred.) NA

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

	Natural or newly constructed drainage control and infiltration systems are adequate to eliminate erosion and sediment transport processes. No evidence of erosion or sediment movement on-site.	Observed evidence of minor on-site erosion and sediment transport, but limited to on-site deposition, and no evidence of transport to any SEZ.	Observed evidence of substantial on-site erosion such as frequent rill formation or any observation of gully features observed, or any evidence of sediment transport to SEZ. OR where major maintenance or adaptive erosion control strategies are required for resource protection. OR where water quality data indicates exceedance of state standards.	⊖ NA
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>) measures. ed to control hazardous chemical delivery to ardous/toxic substances used for building an	soils, groundwater or surface water bodies. Conta d vehicle maintenance, and associated direct and	ict Hazardous indirect effects upon
)Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	 Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader. 	() NA
	Effectiveness S (BMP Monitorir	core: E
	Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	Out of outside definition with a series of the series o

UTM Zone 11 Easting 245927 Northing 4312791 Building/Structure Name Groove - Upper Terminal	ID# 373 Selection Code S03 Township 12N Range 18E Section 1
Date of Project Start 9/1/2011 Date of Project End 6th Field Reviewer(s)	d HUC Watershed CA-1 State CA
K. Roaldson Survey Date 9/29/2011 Date BMP Implementation Complet	e Last BMP Maintenance 9/29/2011
Structure Type: Lift-Top Survey Type Follow-up Depth/Duration:	Other (Describe) Completed BMP Proj.
Plan Title: Infiltration BMP Maintenance Job No.: Plan Date:	Plan Revision Date:
Specific concerns associated with construction project and describe BMP measures designed to achieve res	source protection.
Downspout protection, drywell for infiltration and mulch cover. Steep slope with bare erodbile soils	
Implementation	
Telefor 1=Meets/Exceeds 2 2=Minor departure 3=Major departure 3=Major departures: 4=Repeated depart	20-yr 1-Hr standards and/or no resource concerns from standards and/or minor resource concerns from standards and/or major resource concerns ure from standards/failure to address concerns
1) Were source control, drainage and infiltration systems, and hazardous material control systems designed 1-hour Storm Event, to achieve Forest Service and State water quality standards?	d to maintain resource protection during a 20-year
2) Are BMP measures constructed according to contract design specifications?	1
Additional Comments:	
Slope stabilization implemented with fabric and riprap slope.	
Effectiveness	Implementation Score:
Note: Effective and adequate maintenance of BMP measures should be included within the effectiveness evaluation. When topic is not applicable, please make informational comment.	(BMP Monitoring Rule Set)
1) Source area erosion control. Protection and stabilization of structure site, particularly any erosion	ve areas.
(Note the evidence of erosion processes such as rills, gullies, sediment scour and/or deposition on- or of pumice slopes, or deteriorated granitic areas) or areas identified for revegetation in structure plan, see st separately)	f-site, specifically areas naturally devoid of vegetation (e.g. tructure sketch. Constructed cut and fill slopes are addressed

۱ ؛	Nearly 70% coverage of any erodible surfaces, and no evidence of erosion.	Ostructure site exhibits less than full cover of soil; however, only minor erosion is evident and subsequent deposition is limited to on-site areas excluding deposition within any on-site SEZ.	Areas of exposed soil are observed, and erosion is evident and extensive (for example sediment is transported off-site or directly to SEZ.	⊖ NA
Ob ICCE	served progression/improvement of areas i essful revegetation, such as temporary arm	identified for revegetation in structure plan as sch oring measures (including mulch, rock, erosion cl	eduled; and adequate erosion protection measure oth or other) applied while vegetation becomes es	es applied for tablished
	Revegetation establishment proceeding as expectednew and existing vegetative cover in combination with temporary BMP measures are effective at eliminating/ mitigating erosion processes from those areas.	Revegetation efforts are not proceeding as expected. Minor additional efforts are required for successful revegetation establishment, or minor maintenance/retrofit of temporary BMP measures applied (for erosion control during revegetation efforts) is needed.	Temporary BMP measures provide inadequate erosion control, and/or specified revegetation efforts are deemed unsuccessful, as major modifications are needed to achieve vegetative ground cover goals and success. OR major on- site erosion, or any evidence of sediment delivery to SEZ.	⊖ NA
c) C	aut and fill slope protection (including surfac	e erosion and slope failure potential).		
۲	BMP measures (including seeding/planting, with mulch of pine straw, designed swales, retention walls or use of erosion control blankets) applied to cut or fill slopes are adequate to prevent erosion. Craks or slumping is not evident.	BMP measures applied (see the previous checkbox) exhibit minor erosion and/or deposition is noted at base of cut or fill slope, near retention walls or around erosion control blankets or mulch. However, erosion is limited to on-site areas excluding any transport to SEZ. Or retaining wall integrity is showing signs of concern, such as bulging or wavy appearance.	BMP measures are inadequate to protect erosion on cut and fill slopes from storms <20 year1 hour event; or any evidence of sediment transport and/or deposition within SEZ is observed. Or cracks are present and appear to be threatening integrity of fill and/or retaining wall. Or the occurrence of any fillslope failure has occurred.) NA

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

	Natural or newly constructed drainage control and infiltration systems are adequate to eliminate erosion and sediment transport processes. No evidence of erosion or sediment movement on-site.	Observed evidence of minor on-site erosion and sediment transport, but limited to on-site deposition, and no evidence of transport to any SEZ.	Observed evidence of substantial on-site erosion such as frequent rill formation or any observation of gully features observed, or any evidence of sediment transport to SEZ. OR where major maintenance or adaptive erosion control strategies are required for resource protection. OR where water quality data indicates exceedance of state standards.	⊖ NA
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• No evidence of unexpected ponding on- site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	⊖ NA
3) Effectiveness of hazardous substance co	ntrol measures.		
(Evaluate the effectiveness, or lack of, BMP a Spill Coordinator if accidental spill has occurrea) Evaluate the occurrence and mitigation of h water quality.	pplied to control hazardous chemical delivery to ed.) nazardous/toxic substances used for building an	soils, groundwater or surface water bodies. Conta d vehicle maintenance, and associated direct and	act Hazardous indirect effects upon
• Hazardous substance control measures provide effective mitigation.	Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	 Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader.) NA
		Effectiveness	Score: E
Additional Comments		(BMP Monitori	ng Rule Set)

BMP maintenance and slope protection completed. Riprap with geotextile fabric installed on steep, bare slope below lift terminal. Wood chip mulch and pine needle mulch applied in all areas with exposed soils. Sediment collected in infiltration area cleaned out. Marked improvement to entire site.

UTM Zone 11 Easting 247137 Northing 4314141 Building/Structure Name Gondola Mid Station Access Road	Buildings ID# 374 Selection Code S03 Township 12N Range 18E Section 1
Date of Project Start 7/3/2008 Date of Project End Reviewer(s)	6th Field HUC Watershed CA-7 State CA
K. Roaldson Survey Date 10/14/2011 Date BMP Im	plementation Complete
Structure Type: Other Survey Type Follow-up De	pth/Duration: Other (Describe) Road/drainage BMPs
Plan Title: Job No.:	Plan Date: Plan Revision Date:
Implementation For Permanent or Temporary-Seasonal Structures: 1) Were source control, drainage and infiltration systems, and hazardous material con 1-hour Storm Event, to achieve Forest Service and State water quality standards?	1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns 2=Minor departure from standards and/or minor resource concerns 3=Major departure from standards and/or major resource concerns 4=Repeated departure from standards/failure to address concerns htrol systems designed to maintain resource protection during a 20-year
2) Are BMP measures constructed according to contract design specifications?	1
Additional Comments:	
Effectiveness	Implementation Score:
Note: Effective and adequate maintenance of BMP measures should be included w effectiveness evaluation. When topic is not applicable, please make informational of	ithin the (BMP Monitoring Rule Set)
1) Source area erosion control. Protection and stabilization of structure site, p	articularly any erosive areas.
(Note the evidence of erosion processes such as rills, gullies, sediment scour and/ pumice slopes, or deteriorated granitic areas) or areas identified for revegetation ir separately)	or deposition on- or off-site, specifically areas naturally devoid of vegetation (e.g. a structure plan, see structure sketch. Constructed cut and fill slopes are addressed

۱ ؛	Nearly 70% coverage of any erodible surfaces, and no evidence of erosion.	O Structure site exhibits less than full cover of soil; however, only minor erosion is evident and subsequent depositon is limited to on-site areas excluding deposition within any on-site SEZ.	Areas of exposed soil are observed, and erosion is evident and extensive (for example sediment is transported off-site or directly to SEZ.	() NA
Ob JCCE	served progression/improvement of areas i essful revegetation, such as temporary armo	dentified for revegetation in structure plan as sch oring measures (including mulch, rock, erosion cl	eduled; and adequate erosion protection measure oth or other) applied while vegetation becomes es	s applied for tablished
0	Revegetation establishment proceeding as expectednew and existing vegetative cover in combination with temporary BMP measures are effective at eliminating/ mitigating erosion processes from those areas.	Revegetation efforts are not proceeding as expected. Minor additional efforts are required for successful revegetation establishment, or minor maintenance/retrofit of temporary BMP measures applied (for erosion control during revegetation efforts) is needed.	Temporary BMP measures provide inadequate erosion control, and/or specified revegetation efforts are deemed unsuccessful, as major modifications are needed to achieve vegetative ground cover goals and success. OR major on- site erosion, or any evidence of sediment delivery to SEZ.	⊖ NA
c) C	cut and fill slope protection (including surfac	e erosion and slope failure potential).		
	BMP measures (including seeding/planting, with mulch of pine straw, designed swales, retention walls or use of erosion control blankets) applied to cut or fill slopes are adequate to prevent erosion. Craks or slumping is not evident.	BMP measures applied (see the previous checkbox) exhibit minor erosion and/or deposition is noted at base of cut or fill slope, near retention walls or around erosion control blankets or mulch. However, erosion is limited to on-site areas excluding any transport to SEZ. Or retaining wall integrity is showing signs of concern, such as bulging or wavy appearance.	BMP measures are inadequate to protect erosion on cut and fill slopes from storms <20 year1 hour event; or any evidence of sediment transport and/or deposition within SEZ is observed. Or cracks are present and appear to be threatening integrity of fill and/or retaining wall. Or the occurrence of any fillslope failure has occurred.	⊖ NA

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

	Natural or newly constructed drainage control and infiltration systems are adequate to eliminate erosion and sediment transport processes. No evidence of erosion or sediment movement on-site.	Observed evidence of minor on-site erosion and sediment transport, but limited to on-site deposition, and no evidence of transport to any SEZ.	Observed evidence of substantial on-site erosion such as frequent rill formation or any observation of gully features observed, or any evidence of sediment transport to SEZ. OR where major maintenance or adaptive erosion control strategies are required for resource protection. OR where water quality data indicates exceedance of state standards.	⊖ NA
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• No evidence of unexpected ponding on- site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	⊖ NA	
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 3) Effectiveness of hazardous substance co (Evaluate the effectiveness, or lack of, BMP a Spill Coordinator if accidental spill has occurred a) Evaluate the occurrence and mitigation of h water quality. 	ntrol measures. oplied to control hazardous chemical delivery to ed.) azardous/toxic substances used for building and	soils, groundwater or surface water bodies. Conta d vehicle maintenance, and associated direct and	act Hazardous indirect effects upon	
Hazardous substance control measures provide effective mitigation.	Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil,	 Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader. 	○ NA	

Section of decommissioned road has good coverage, but little revegetation growth (less than 25% of reseeded area shows growth). Surrounding area has little understory vegetation. Drainage dips along roadway are in good condition, less than half of the rock filled outlets are filled with sediment. Sediment removal

depth of stain and recent weather

events).

Additional Comments

added to 2012 worklist as maintenance item.

Effectiveness Score:

(BMP Monitoring Rule Set)

E

UTM Zone 11 Facting 247664 Form HV2: Permanent BMPs for B	uildings	370
Northing 4313738 and Structure Developments		
Building/Structure Name Zip Line (Flyer) - Lower Terminal	Township 12N Range 18E	Section 1
Date of Project Start 9/17/2007 Date of Project End 8/1/2008	6th Field HUC Watershed CA-1	State CA
Reviewer(s)	Isomentation Complete	0/1/2010
		8/1/2010
Structure Type: Lift-Base Survey Type 3rd Year Post Constr Dep	oth/Duration: 1.2" TOG to Other (Describe)	
Plan Title: Zip Line Adventure and Top of Gondola Special Job No.: 00-607.35	Plan Date: 06/07/2007 Plan Revision Dat	te: 08/07/2007
Specific concerns associated with construction project and describe BMP measures de	signed to achieve resource protection.	
Effective cover and infiltration		
·		
Implementation		
	1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource of 2=Minor departure from standards and/or minor resource con	ncerns
For Permanent or Temporary-Seasonal Structures:	3=Major departure from standards and/or major resource cor 4=Repeated departure from standards/failure to address con	ncerns
1) Were source control, drainage and infiltration systems, and hazardous material con 1-hour Storm Event, to achieve Forest Service and State water quality standards?	trol systems designed to maintain resource protection during a	a 20-year 1
2) Are BMP measures constructed according to contract design specifications?		1
Additional Comments:	ek par plane, but dock is perforated w/ no guttere, so dry wells	not pooded. Ground
rocky with cover and infiltration trenches would not be suitable.	ek per plans, but deck is penorated w/ no gutters, so dry weils	not needed. Ground
Effectiveness	Implementatio	on Score:
Note: Effective and adequate maintenance of BMP measures should be included wit effectiveness evaluation. When topic is not applicable, please make informational co	hin the (BMP Monitor omment.	ring Rule Set)
1) Source area erosion control. Protection and stabilization of structure site, pa	articularly any erosive areas.	
(Note the evidence of erosion processes such as rills, gullies, sediment scour and/c pumice slopes, or deteriorated granitic areas) or areas identified for revegetation in separately)	r deposition on- or off-site, specifically areas naturally devoid o structure plan, see structure sketch. Constructed cut and fill s	of vegetation (e.g. lopes are addressed

۱ ؛	Nearly 70% coverage of any erodible surfaces, and no evidence of erosion.	Ostructure site exhibits less than full cover of soil; however, only minor erosion is evident and subsequent deposition is limited to on-site areas excluding deposition within any on-site SEZ.	Areas of exposed soil are observed, and erosion is evident and extensive (for example sediment is transported off-site or directly to SEZ.	⊖ NA
Ob ICCE	served progression/improvement of areas i essful revegetation, such as temporary arm	identified for revegetation in structure plan as sch oring measures (including mulch, rock, erosion cl	eduled; and adequate erosion protection measure oth or other) applied while vegetation becomes es	es applied for tablished
	Revegetation establishment proceeding as expectednew and existing vegetative cover in combination with temporary BMP measures are effective at eliminating/ mitigating erosion processes from those areas.	Revegetation efforts are not proceeding as expected. Minor additional efforts are required for successful revegetation establishment, or minor maintenance/retrofit of temporary BMP measures applied (for erosion control during revegetation efforts) is needed.	Temporary BMP measures provide inadequate erosion control, and/or specified revegetation efforts are deemed unsuccessful, as major modifications are needed to achieve vegetative ground cover goals and success. OR major on- site erosion, or any evidence of sediment delivery to SEZ.	⊖ NA
c) C	aut and fill slope protection (including surfac	e erosion and slope failure potential).		
۲	BMP measures (including seeding/planting, with mulch of pine straw, designed swales, retention walls or use of erosion control blankets) applied to cut or fill slopes are adequate to prevent erosion. Craks or slumping is not evident.	BMP measures applied (see the previous checkbox) exhibit minor erosion and/or deposition is noted at base of cut or fill slope, near retention walls or around erosion control blankets or mulch. However, erosion is limited to on-site areas excluding any transport to SEZ. Or retaining wall integrity is showing signs of concern, such as bulging or wavy appearance.	BMP measures are inadequate to protect erosion on cut and fill slopes from storms <20 year1 hour event; or any evidence of sediment transport and/or deposition within SEZ is observed. Or cracks are present and appear to be threatening integrity of fill and/or retaining wall. Or the occurrence of any fillslope failure has occurred.) NA

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

	Natural or newly constructed drainage control and infiltration systems are adequate to eliminate erosion and sediment transport processes. No evidence of erosion or sediment movement on-site.	Observed evidence of minor on-site erosion and sediment transport, but limited to on-site deposition, and no evidence of transport to any SEZ.	Observed evidence of substantial on-site erosion such as frequent rill formation or any observation of gully features observed, or any evidence of sediment transport to SEZ. OR where major maintenance or adaptive erosion control strategies are required for resource protection. OR where water quality data indicates exceedance of state standards.	⊖ NA
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No evidence of unexpected ponding on- site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	⊖ NA
3) Effectiveness of hazardous substance co	ontrol measures.		
(Evaluate the effectiveness, or lack of, BMP a Spill Coordinator if accidental spill has occurre	pplied to control hazardous chemical delivery to ed.)	soils, groundwater or surface water bodies. Conta	act Hazardous
 a) Evaluate the occurrence and mitigation of h water quality. 	nazardous/toxic substances used for building and	d vehicle maintenance, and associated direct and	indirect effects upon
• Hazardous substance control measures provide effective mitigation.	Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	 Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader. 	⊖ NA
		Effectiveness	Score: E
Additional Comments		(BMP Monitori	ng Rule Set)

No evidence of erosion or sediment transport. Terminal and deck constructed with minimal disturbance, maintaining both natural cover and infiltration capacity. Infiltration trench or dry wells do not appear applicable.

Attachment B.3

Nevada Evaluation Sheets

Appendix B – 2011 BMP Effectiveness Monitoring: Projects and Facilities

Resource Concepts, Inc.

UTM Zone 11 Easting 247850 For Northing 4313936 Construction Site Name Tubing Lift (Cove	m HV1: Temporary BMPs for going Construction ered Surface Lift) at Top of Gondola	or	ID# 367 Selection Code S03 Forest LTMBU District State Township 12N Range 18E Section 1
Date of Project Start 8/24/2009	Survey Date/Time	7/25/2011 6th	Field HUC Watershed CA-1
Reviewer(s) J. Sutherland, K. Roaldson	Construction F	Foreman	
Construction Type:	Project Is:	New Construction	Other (Describe)
General Information Name Of Plans	Adventure Peak Ski School and Date March 14, 2011	Summer Tubing (new plan s ev Date June 28, 2011	set updated from origi Job No. 09601.2
Specific concerns associated with constructio	n project and describe BMP measur ding: boundary fence, restricted acc	res designed to achived reso ess, water truck for dust cor	purce protection. htrol, covered/watered stockpiles, sediment barriers.
Implementation 1) Project design included Erosion Control Pla hour Storm Event (per FS and Lahontan SWC control, runoff drainage control, protection of a	an development, and identified appr QRCB standards); at a minimum the SEZs, and hazardous substance co	opriate temporary BMP mea contract should address BM ntrol, please refer to the Sup	Asures for mitigating impacts from a 20-year 1- MP measures for the following topics: source oplemental BMP checklist.
1=Meets/Exceeds 20-yr 1-Hr standards ar 2=Minor departure from contract and/or m	nd/or no resource concerns inor resource concerns	3=Major departure from c 4=Repeated departure from	contract and/or major resource concerns om contract and/or failure to address resource concerns
2) Are BMP measures constructed according	g to contract design specifications?		1
1 = Meets / Exceeds contract requiremen 2 = Minor departure from contract and/or	nts and/or no resource concerns minor resource concerns	3 = Major departure from 6 4 = Repeated departure f	contract and/or major resource concerns rom contract and/or failure to address resource concerns
			Implementation Score: I (BMP Monitoring Rule Set)

Effectiveness

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

• Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depostional fans, are evident near erodable soil areas; however, no evidence is observed of sediment deliverv to SEZ.	Substantial areas of exposed erodable soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.) NA
b) Cut and fill slope protection (including surface	erosion and slope failure potential		
Temporary BMP measures (such as	Minor erosion and sediment deposition is	Temporary BMP measures are	

Importany BMP measures (such as erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes. Minor erosion and sediment deposition is noted from storms <20-year 1-hour event; inadequation, one or off-site, is not observed. Minor erosion and sediment deposition is noted from storms <20-year 1-hour event; inadequation, one or off-site, is not observed.	ry BMP measures are te to protect erosion from cut opes from storms <20 year1 nt; or any observation of transport and/or deposition Z.
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

- a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.
- No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.
- Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.
- Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.

• No evidence of unexpected ponding on- site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	⊖ NA
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c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

- Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20year 1-hour storm event.
- Minor resource concern is evident at infiltration zones (for storms <20-yr 1hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely.
- Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management.

3) Designation of construction zone and any equipment exclusion zones

a) Sensitve areas and construction zone are adequately "flagged" and designated as "Equipment Boundary Zones"

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site.
- Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts offsite or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section.

4) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.	Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	 Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator. 	
		Effectiveness Score: E	
Additional Comments		(BMP Monitoring Rule Set)	
Wood chips placed around entire tubing area and construction. New construction equipment acces downslope side. No work on new access road in	on public access path. Infiltration trenches ben s road needs to be constructed; area is delineat progress yet.	eath lift still need to be reconstructed after damage from ed with exclustion fencing and straw wattles are installed on the	

UTM Zone 11 Easting 247850 Northing 4313936 Construction Site Name T	Form HV1: Temporary BMPs for On-going Construction Tubing Lift (Covered Surface Lift) at Top of Gondola	or	ID# 393 Selection Code S03 Forest LTMBU District State Township 12N Range 18E Section 1
Date of Project Start	8/24/2009 Survey Date/Time	9/1/2011 6th Fie	eld HUC Watershed CA-1
Reviewer(s) K. Roaldson	Construction F Gary Birch	Foreman	
General Information	ame Of Plans Adventure Peak Ski School and	Summer Tubing (new plan set	t updated from origi Job No. 09601.2
Specific concerns associated Temp BMPs to address erosio	with construction project and describe BMP measur on control, including: boundary fence, restricted acc	ess, water truck for dust contro	rce protection. ol, covered/watered stockpiles, sediment barriers.
1) Project design included Ero hour Storm Event (per FS and control, runoff drainage contro	psion Control Plan development, and identified appro d Lahontan SWQRCB standards); at a minimum the ol, protection of SEZs, and hazardous substance co	opriate temporary BMP measu contract should address BMP htrol, please refer to the Suppl	ures for mitigating impacts from a 20-year 1- measures for the following topics: source emental BMP checklist.
1=Meets/Exceeds 20-yr 1- 2=Minor departure from co	Hr standards and/or no resource concerns ontract and/or minor resource concerns	3=Major departure from con 4=Repeated departure from	ntract and/or major resource concerns o contract and/or failure to address resource concerns
2) Are BMP measures constr	ructed according to contract design specifications?		1
1 = Meets / Exceeds cont 2 = Minor departure from	tract requirements and/or no resource concerns contract and/or minor resource concerns	3 = Major departure from con 4 = Repeated departure from	ntract and/or major resource concerns m contract and/or failure to address resource concerns
			Implementation Score: I (BMP Monitoring Rule Set)

Effectiveness

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

• Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depostional fans, are evident near erodable soil areas; however, no evidence is observed of sediment deliverv to SEZ.	Substantial areas of exposed erodable soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.) NA
b) Cut and fill slope protection (including surface	erosion and slope failure potential		
Temporary BMP measures (such as	Minor erosion and sediment deposition is	Temporary BMP measures are	

 D Temporary BMP measures (such as erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes. Minor erosion and sediment deposition is noted from storms <20-year 1-hour event; however, sediment transport to any SEZ, on- or off-site, is not observed. 	Temporary BMP measures are inadequate to protect erosion from cut and fill slopes from storms <20 year1 hour event; or any observation of sediment transport and/or deposition within SEZ.
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

- a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.
- No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.
- Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.
- Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.

No evidence of unex site, or constructed o outlets are stable (na stablized with plante other type of armor) of erosion or downst concerns.	pected ponding on- letention ponds and aturally stable, d vegetation, or and exhibit no signs ream resource	Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	 On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ. 	⊖ NA
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c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

- Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20year 1-hour storm event.
- Minor resource concern is evident at infiltration zones (for storms <20-yr 1hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely.
- Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management.

3) Designation of construction zone and any equipment exclusion zones

a) Sensitve areas and construction zone are adequately "flagged" and designated as "Equipment Boundary Zones"

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site.
- Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts offsite or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section.

4) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.	Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	 Substantial resource concern is evident, NA such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator.
		Effectiveness Score: E
Additional Comments		(BMP Monitoring Rule Set)
NO CHANGE FROM PREVIOUS INSPECTION.	No work on new access road in progress yet, to	emporary BMPs in place.

UTM Zone 11 Easting 247850 Northing 4313936 Construction Site Name Tubing Lift (Cove	m HV1: Temporary BMPs for going Construction ered Surface Lift) at Top of Gondola	or	ID# 430 Selection Code S03 Forest LTMBU District State NV Township 12N Range 18E Section 1
Date of Project Start 8/24/2009 Reviewer(s) K. Roaldson	Survey Date/Time 10 Construction F Gary Birch	D/28/2011 Foreman	eld HUC Watershed CA-1
Construction Type: Lift	Project Is:	lew Construction	ther (Describe)
General Information Name Of Plans	Adventure Peak Ski School and S Date March 14, 2011 R	Summer Tubing (new plan set ev Date June 28, 2011	t updated from origi Job No. 09601.2
Specific concerns associated with construction Temp BMPs to address erosion control, includ	n project and describe BMP measur ding: boundary fence, restricted acce	es designed to achived resou ess, water truck for dust contr	rce protection. ol, covered/watered stockpiles, sediment barriers.
Implementation 1) Project design included Erosion Control Pla hour Storm Event (per FS and Lahontan SWC control, runoff drainage control, protection of S	an development, and identified appro RCB standards); at a minimum the SEZs, and hazardous substance cor	opriate temporary BMP measu contract should address BMP trol, please refer to the Suppl	ures for mitigating impacts from a 20-year 1- measures for the following topics: source emental BMP checklist.
1=Meets/Exceeds 20-yr 1-Hr standards an 2=Minor departure from contract and/or mi	d/or no resource concerns nor resource concerns	3=Major departure from cor 4=Repeated departure from	ntract and/or major resource concerns a contract and/or failure to address resource concerns
2) Are BMP measures constructed according	to contract design specifications?		1
1 = Meets / Exceeds contract requiremen 2 = Minor departure from contract and/or	ts and/or no resource concerns minor resource concerns	3 = Major departure from co 4 = Repeated departure from	ntract and/or major resource concerns m contract and/or failure to address resource concerns
			Implementation Score: I (BMP Monitoring Rule Set)

Effectiveness

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

• Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depostional fans, are evident near erodable soil areas; however, no evidence is observed of sediment deliverv to SEZ.	Substantial areas of exposed erodable soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.) NA
b) Cut and fill slope protection (including surface	erosion and slope failure potential		
Temporary BMP measures (such as	Minor erosion and sediment deposition is	Temporary BMP measures are	

Importany BMP measures (such as erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes. Minor erosion and sediment deposition is noted from storms <20-year 1-hour event; inadequation, one or off-site, is not observed. Minor erosion and sediment deposition is noted from storms <20-year 1-hour event; inadequation, one or off-site, is not observed.	ry BMP measures are te to protect erosion from cut opes from storms <20 year1 nt; or any observation of transport and/or deposition Z.
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

- a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.
- No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.
- Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.
- Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.

No evidence of unex site, or constructed o outlets are stable (na stablized with plante other type of armor) of erosion or downst concerns.	pected ponding on- letention ponds and aturally stable, d vegetation, or and exhibit no signs ream resource	Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	 On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ. 	⊖ NA
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c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

- Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20year 1-hour storm event.
- Minor resource concern is evident at infiltration zones (for storms <20-yr 1hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely.
- Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management.

3) Designation of construction zone and any equipment exclusion zones

a) Sensitve areas and construction zone are adequately "flagged" and designated as "Equipment Boundary Zones"

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site.
- Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts offsite or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section.

4) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

	Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.	Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	 Substantial resource concern is evident, NA such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator. 	
1			Effectiveness Score:	
Ac	dditional Comments		(BMP Monitoring Rule Set)	
N	No work completed on the new access road this	season. Rope fencing and T-posts removed for	the winter season, straw wattles to remain in place over winter.	

UTM Zone 10 Easting 0 Northing 0	/1: Temporary BMPs for g Construction	ID# 435 Selection Code S02 Forest Private District State
Construction Site Name Boulder Parking Lot Sta	aging Area	Township Range Section
Date of Project Start Su	urvey Date/Time 9/9/2011 6th Field	HUC Watershed
Reviewer(s)	Construction Foreman	
K. Roaldson		
Construction Type:	Project Is:	er (Describe)
General Information Name Of Plans		Job No.
Date	e Rev Date	· · · · · ·
Specific concerns associated with construction project	ct and describe BMP measures designed to achived resource	e protection.
Implementation		
 Project design included Erosion Control Plan deve hour Storm Event (per FS and Lahontan SWQRCB s control, runoff drainage control, protection of SEZs, a 	elopment, and identified appropriate temporary BMP measure standards); at a minimum the contract should address BMP m and hazardous substance control, please refer to the Suppler	es for mitigating impacts from a 20-year 1- neasures for the following topics: source nental BMP checklist.
1=Meets/Exceeds 20-yr 1-Hr standards and/or no 2=Minor departure from contract and/or minor res	c) resource concerns 3=Major departure from contra source concerns 4=Repeated departure from contra	act and/or major resource concerns ontract and/or failure to address resource concerns
2) Are BMP measures constructed according to con	ntract design specifications?	1
1 = Meets / Exceeds contract requirements and/ 2 = Minor departure from contract and/or minor r	/or no resource concerns3 = Major departure from contraresource concerns4 = Repeated departure from contra	act and/or major resource concerns contract and/or failure to address resource concerns
		Implementation Score: IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII

Effectiveness

1) Source Control BMP

a) Effectiveness of applied BMP measures (artificial or vegetative) designed to protect exposed or disturbed soil surfaces including soil storage piles and compacted areas.

• Soil protection measures are effective and no erosion is evident, or expected, on-site or immediately off-site. OR no soil disturbance is associated with project.	Exposed and/or disturbed soil areas have less than full cover, OR minor erosion, such as infrequent rills or small depostional fans, are evident near erodable soil areas; however, no evidence is observed of sediment deliverv to SEZ.	Substantial areas of exposed erodable soil are not protected and evidence of erosion processes, such as rills or sediment deposition are readily observed. OR any evidence of sediment runoff to SEZ.) NA
b) Cut and fill slope protection (including surface	erosion and slope failure potential		
Temporary BMP measures (such as	Minor erosion and sediment deposition is	Temporary BMP measures are	

P Temporary BMP measures (such as erosion control or geotextile blankets, mulch or pine straw application, encompassing filter fences, berms or designed swales) applied to slope protection is adequate to prevent or severely limit erosion initiation and transport processes. OR project does not require the construction and maintenance of cut and fill slopes.	ion is Temporary BMP measures are event; inadequate to protect erosion from cut SEZ, and fill slopes from storms <20 year1 hour event; or any observation of sediment transport and/or deposition within SEZ.
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2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

- a) Effectiveness of erosion control measures applied to limit erosion processes and sediment delivery to SEZ.
- No evidence of erosion on-site, and no evidence of associated off-site erosion. Existing, or newly constructed, runoff and drainage control measures are adequate to eliminate erosion and sediment transport processes induced by a 20-year 1-hour storm event.
- Observed evidence of minor on-site erosion and sediment transport. Specifically, only minor erosion and/or deposition observed adjacent to any runoff control measures, such as infrequent rill formation near ditch-lines, or at erosion control measures; however, sediment delivery to SEZ is not observed or anticipated.
- Observed evidence of major or substantial project induced erosion, either on- or off-site, such as frequent rills (>3) or any gully exhibiting direct sediment delivery to ditch-line, or erosion control measures overwhelmed (e.g. substantial erosion around or overtop of straw bales/sediment fence/erosion cloth/etc.). OR any evidence of sediment delivery to SEZ.

No evider site, or cc outlets ar stablized other type of erosior concerns	nce of unexpected ponding on- nstructed detention ponds and e stable (naturally stable, with planted vegetation, or e of armor) and exhibit no signs or downstream resource	Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	⊖ NA
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c) Effectiveness of natural or constructed infiltration zones including designated vegetative zones, duff/litter areas, gravel armor areas, infiltration trenches/ditches or other permeable area designed to collect and treat runoff to insure water quality.

- Natural or constructed infiltration zones are effective and properly maintained to ensure resource protection during a 20year 1-hour storm event.
- Minor resource concern is evident at infiltration zones (for storms <20-yr 1hr), such as improper maintenance or the lack of proper/adequate bordering material to control distribution of infiltration area; however, SEZ contamination is not observed or likely.
- Major impacts observed on- or off-site or any evidence of contamination within SEZ, such as capacity of infiltration BMP measures have been noticeably breached or exceeded. Major resource concerns (or the need for immediate maintenance) should be brought to the attention of Management.

3) Designation of construction zone and any equipment exclusion zones

a) Sensitve areas and construction zone are adequately "flagged" and designated as "Equipment Boundary Zones"

- Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.
- Minor breach of designated boundaries, with limited adverse impacts upon sensitive zones or off-site.
- Major breach of designated boundary zones by equipment operation, and observed soil or vegetation impacts offsite or any activity induced impact within SEZ. If mitigation is required, please make recommendations in comment section.

4) Effectiveness of hazardous substance control measures.

(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)

a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.

	Adjacent or inclusive wet/sensitive areas as well as construction site are adequately flagged, and equipment operations avoid infringement upon designated zones.	Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and ground water contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	 Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator. 	○ NA	
			Effectiveness Score:	E	
A	dditional Comments		(BMP Monitoring Rule S	et)	
S	Straw wattles protecting drop inlets in parking lot. No signs of erosion.				

UTM Zone 11 ID# ID#	336
Lasting 240007 Northing 4315801	
Building/Structure Name Edgewood Creek Upper Gully Township 13N Range 19E	Section 30
Date of Project Start 9/12/2006 Date of Project End 9/30/2006 Reviewer(s) 6th Field HUC Watershed NV-3	State NV
J. Sutherland, K. Roaldson Survey Date 7/25/2011 Date BMP Implementation Complete 10/1/2006 Last BMP Mainte	nance 9/1/2008
Structure Type: Other Survey Type Runoff Survey Depth/Duration: Other (Describe) SEZ restoration	าก
Plan Title: Edgewood Creek Upper Gully Stabilization Proj Job No.: 04-452 Plan Date: 07-11-2006 Plan Revision Date:	te:
Specific concerns associated with construction project and describe BMP measures designed to achieve resource protection.	
Stream restoration with permanent BMPs: gabion check dams and fabric channel lining.	
Implementation I=Meets/Exceeds 20-yr 1-Hr standards and/or no resource of 2=Minor departure from standards and/or minor resource of 3=Major departure from standards and/or major resource of 4=Repeated departure from standards/failure to address control departure from standards/failure from	concerns ncerns ncerns ncerns
1-hour Storm Event, to achieve Forest Service and State water quality standards?	
2) Are BMP measures constructed according to contract design specifications?	1
Additional Comments:	
None	
Effectiveness Implementation	on Score:
Note: Effective and adequate maintenance of BMP measures should be included within the (BMP Monito effectiveness evaluation. When topic is not applicable, please make informational comment.	ring Rule Set)
1) Source area erosion control. Protection and stabilization of structure site, particularly any erosive areas.	
(Note the evidence of erosion processes such as rills, gullies, sediment scour and/or deposition on- or off-site, specifically areas naturally devoid pumice slopes, or deteriorated granitic areas) or areas identified for revegetation in structure plan, see structure sketch. Constructed cut and fill s separately)	of vegetation (e.g. lopes are addressed

1●) 3	Nearly 70% coverage of any erodible surfaces, and no evidence of erosion.	Structure site exhibits less than full cover of soil; however, only minor erosion is evident and subsequent deposition is limited to on-site areas excluding deposition within any on-site SEZ.	 Areas of exposed soil are observed, and erosion is evident and extensive (for example sediment is transported off-site or directly to SEZ. 	⊖ NA
Ob ICCE	essful revegetation, such as temporary arm	identified for revegetation in structure plan as sch oring measures (including mulch, rock, erosion cl	eduled; and adequate erosion protection measure oth or other) applied while vegetation becomes es	s applied for tablished
	Revegetation establishment proceeding as expectednew and existing vegetative cover in combination with temporary BMP measures are effective at eliminating/ mitigating erosion processes from those areas.	Revegetation efforts are not proceeding as expected. Minor additional efforts are required for successful revegetation establishment, or minor maintenance/retrofit of temporary BMP measures applied (for erosion control during revegetation efforts) is needed.	Temporary BMP measures provide inadequate erosion control, and/or specified revegetation efforts are deemed unsuccessful, as major modifications are needed to achieve vegetative ground cover goals and success. OR major on- site erosion, or any evidence of sediment delivery to SEZ.	⊖ NA
c) C	Cut and fill slope protection (including surfac	ce erosion and slope failure potential).		
	BMP measures (including seeding/planting, with mulch of pine straw, designed swales, retention walls or use of erosion control blankets) applied to cut or fill slopes are adequate to prevent erosion. Craks or slumping is not evident.	BMP measures applied (see the previous checkbox) exhibit minor erosion and/or deposition is noted at base of cut or fill slope, near retention walls or around erosion control blankets or mulch. However, erosion is limited to on-site areas excluding any transport to SEZ. Or retaining wall integrity is showing signs of concern, such as bulging or wavy appearance.	BMP measures are inadequate to protect erosion on cut and fill slopes from storms <20 year1 hour event; or any evidence of sediment transport and/or deposition within SEZ is observed. Or cracks are present and appear to be threatening integrity of fill and/or retaining wall. Or the occurrence of any fillslope failure has occurred.	⊖ NA

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

	Natural or newly constructed drainage control and infiltration systems are adequate to eliminate erosion and sediment transport processes. No evidence of erosion or sediment movement on-site.	Observed evidence of minor on-site erosion and sediment transport, but limited to on-site deposition, and no evidence of transport to any SEZ.	Observed evidence of substantial on-site erosion such as frequent rill formation or any observation of gully features observed, or any evidence of sediment transport to SEZ. OR where major maintenance or adaptive erosion control strategies are required for resource protection. OR where water quality data indicates exceedance of state standards.	⊖ NA
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No evidence of unexpected ponding on- site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	○ Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	<u>∩</u> NA		
3) Effectiveness of hazardous substance control measures.					
(Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous Spill Coordinator if accidental spill has occurred.)					
a) Evaluate the occurrence and mitigation of hazardous/toxic substances used for building and vehicle maintenance, and associated direct and indirect effects upon water quality.					

• Hazardous substance control measures provide effective mitigation.	Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	 Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader. 	
		Effectiveness Score:	
Additional Comments		(BMP Monitoring Rule Set)	
Inspection during high water year to observe SEZ with flowing water during runoff period. Several locations along the restored reach have running water and show areas of sediment deposition. Gablops are in good condition and are capturing sediment and appear to be functioning property. Additional natural check			

show areas of sediment deposition. Gabions are in good condition and are capturing sediment and appear to be functioning properly. Additional natural check dams of fallen trees are also preventing sediment transport. Erosion control blanket/fabric channel lining has disintegrated but the channel side slopes do not appear to be eroding into the channel bottom. Reveg looks robust and healthy.

UTM Zone 11 Easting 249074 Northing 4314386 Form HV2: Permanent BMPs for B and Structure Developments	uildings ID# 341 Selection Code S03	
Building/Structure Name East Peak Well (New)	Township 13N Range 19E Section 31	
Date of Project Start 7/7/2008 Date of Project End 11/30/2008 Reviewer(s)	6th Field HUC Watershed NV-2+5 State NV	
K. Roaldson Survey Date 8/18/2011 Date BMP Imp	Dementation Complete 11/30/2010 Last BMP Maintenance 11/30/201	0
Structure Type: Other Survey Type 3rd Year Post Constr Dep	oth/Duration: Other (Describe) Well	
Plan Title: East Peak Reservoir East Peak Well Building Job No.: 08-204.1	Plan Date: 10/1/08 Plan Revision Date:	1
Specific concerns associated with construction project and describe BMP measures de	signed to achieve resource protection.	
Implementation	1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns	
For Permanent or Temporary-Seasonal Structures:	2=Minor departure from standards and/or minor resource concerns 3=Major departure from standards and/or major resource concerns 4=Repeated departure from standards/failure to address concerns	
1) Were source control, drainage and infiltration systems, and hazardous material cont 1-hour Storm Event, to achieve Forest Service and State water quality standards?	trol systems designed to maintain resource protection during a 20-year	
2) Are BMP measures constructed according to contract design specifications?	1	
Additional Comments:		-
<u> </u>		
Effectiveness	Implementation Score:	T
Note: Effective and adequate maintenance of BMP measures should be included wit effectiveness evaluation. When topic is not applicable, please make informational contents of the statement of th	thin the (BMP Monitoring Rule Set) omment.	
1) Source area erosion control. Protection and stabilization of structure site, pa	articularly any erosive areas.	
(Note the evidence of erosion processes such as rills, gullies, sediment scour and/o pumice slopes, or deteriorated granitic areas) or areas identified for revegetation in separately)	r deposition on- or off-site, specifically areas naturally devoid of vegetation (e.g. structure plan, see structure sketch. Constructed cut and fill slopes are addressed	

1●) 3	Nearly 70% coverage of any erodible surfaces, and no evidence of erosion.	Structure site exhibits less than full cover of soil; however, only minor erosion is evident and subsequent deposition is limited to on-site areas excluding deposition within any on-site SEZ.	 Areas of exposed soil are observed, and erosion is evident and extensive (for example sediment is transported off-site or directly to SEZ. 	⊖ NA
Ob ICCE	essful revegetation, such as temporary arm	identified for revegetation in structure plan as sch oring measures (including mulch, rock, erosion cl	eduled; and adequate erosion protection measure oth or other) applied while vegetation becomes es	s applied for tablished
	Revegetation establishment proceeding as expectednew and existing vegetative cover in combination with temporary BMP measures are effective at eliminating/ mitigating erosion processes from those areas.	Revegetation efforts are not proceeding as expected. Minor additional efforts are required for successful revegetation establishment, or minor maintenance/retrofit of temporary BMP measures applied (for erosion control during revegetation efforts) is needed.	Temporary BMP measures provide inadequate erosion control, and/or specified revegetation efforts are deemed unsuccessful, as major modifications are needed to achieve vegetative ground cover goals and success. OR major on- site erosion, or any evidence of sediment delivery to SEZ.	⊖ NA
c) C	Cut and fill slope protection (including surfac	ce erosion and slope failure potential).		
	BMP measures (including seeding/planting, with mulch of pine straw, designed swales, retention walls or use of erosion control blankets) applied to cut or fill slopes are adequate to prevent erosion. Craks or slumping is not evident.	BMP measures applied (see the previous checkbox) exhibit minor erosion and/or deposition is noted at base of cut or fill slope, near retention walls or around erosion control blankets or mulch. However, erosion is limited to on-site areas excluding any transport to SEZ. Or retaining wall integrity is showing signs of concern, such as bulging or wavy appearance.	BMP measures are inadequate to protect erosion on cut and fill slopes from storms <20 year1 hour event; or any evidence of sediment transport and/or deposition within SEZ is observed. Or cracks are present and appear to be threatening integrity of fill and/or retaining wall. Or the occurrence of any fillslope failure has occurred.	⊖ NA

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

	Natural or newly constructed drainage control and infiltration systems are adequate to eliminate erosion and sediment transport processes. No evidence of erosion or sediment movement on-site.	Observed evidence of minor on-site erosion and sediment transport, but limited to on-site deposition, and no evidence of transport to any SEZ.	Observed evidence of substantial on-site erosion such as frequent rill formation or any observation of gully features observed, or any evidence of sediment transport to SEZ. OR where major maintenance or adaptive erosion control strategies are required for resource protection. OR where water quality data indicates exceedance of state standards.	○ NA
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• No evidence of unexpected ponding on- site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	 On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ. 	⊖ NA	
3) Effectiveness of hazardous substance control measures. (Evaluate the effectiveness, or lack of, BMP applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact Hazardous				
Spill Coordinator if accidental spill has occurre	d.)		in diverse affects and a	
a) Evaluate the occurrence and mitigation of n water quality.	azardous/toxic substances used for building an	a venicle maintenance, and associated direct and	indirect effects upon	
• Hazardous substance control measures provide effective mitigation.	Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not	 Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact 	⊖ NA	

• Hazardous substance control measures provide effective mitigation.	Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	 Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader. 	IA
		Effectiveness Score:	E
Additional Comments		(BMP Monitoring Rule	Set)
Cut slope behind the well house that was surfaced with large boulders shows no signs of movement or erosion. Sufficient wood chip mulch on area not used for parking. Revegetation is sparse, but growth is apparent on the erosion control blanketed slope between the well house and the road. Site is in good condition, does not require maintenance at this time.			

E.

UTM Zone 11 Easting 248867 Northing 4315031 Puilding (Structure Name) Ohumpic Express Upper Terminel	Buildings ID# 345 Selection Code S02
Date of Project Start 7/23/2007 Date of Project End	6th Field HUC Watershed NV-3 State NV
Reviewer(s) K. Roaldson, T. Osterhout Survey Date 8/25/2011 Date BMP Im	Dementation Complete
Structure Type: Lift-Top Survey Type 3rd Year Post Constr De	pth/Duration: Other (Describe)
Plan Title: 2007 Implementation - Northbowl/Olympic Expr Job No.: 00-607.32 Specific concerns associated with construction project and describe BMP measures d Erosion and sediment transport prevention, revegetation establishment	Plan Date: 06/27/2007 Plan Revision Date: esigned to achieve resource protection.
Implementation For Permanent or Temporary-Seasonal Structures:	1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns 2=Minor departure from standards and/or minor resource concerns 3=Major departure from standards and/or major resource concerns 4=Repeated departure from standards/failure to address concerns
1) were source control, drainage and inititation systems, and hazardous material con 1-hour Storm Event, to achieve Forest Service and State water quality standards?	Itroi systems designed to maintain resource protection during a 20-year
2) Are BMP measures constructed according to contract design specifications?	1
Additional Comments:	
Effectiveness	Implementation Score:
Note: Effective and adequate maintenance of BMP measures should be included w effectiveness evaluation. When topic is not applicable, please make informational of	thin the (BMP Monitoring Rule Set)
1) Source area erosion control. Protection and stabilization of structure site, p	articularly any erosive areas.
(Note the evidence of erosion processes such as rills, gullies, sediment scour and/ pumice slopes, or deteriorated granitic areas) or areas identified for revegetation in separately)	or deposition on- or off-site, specifically areas naturally devoid of vegetation (e.g. structure plan, see structure sketch. Constructed cut and fill slopes are addressed

ا•) ؛	Nearly 70% coverage of any erodible surfaces, and no evidence of erosion.	Structure site exhibits less than full cover of soil; however, only minor erosion is evident and subsequent deposition is limited to on-site areas excluding deposition within any on-site SEZ.	 Areas of exposed soil are observed, and erosion is evident and extensive (for example sediment is transported off-site or directly to SEZ. 	⊖ NA
Ob ICCE	served progression/improvement of areas ssful revegetation, such as temporary arm	identified for revegetation in structure plan as sch oring measures (including mulch, rock, erosion cl	eduled; and adequate erosion protection measure oth or other) applied while vegetation becomes es	s applied for tablished
	Revegetation establishment proceeding as expectednew and existing vegetative cover in combination with temporary BMP measures are effective at eliminating/ mitigating erosion processes from those areas.	Revegetation efforts are not proceeding as expected. Minor additional efforts are required for successful revegetation establishment, or minor maintenance/retrofit of temporary BMP measures applied (for erosion control during revegetation efforts) is needed.	Temporary BMP measures provide inadequate erosion control, and/or specified revegetation efforts are deemed unsuccessful, as major modifications are needed to achieve vegetative ground cover goals and success. OR major on- site erosion, or any evidence of sediment delivery to SEZ.	⊖ NA
c) C	tut and fill slope protection (including surface	ce erosion and slope failure potential).		
	BMP measures (including seeding/planting, with mulch of pine straw, designed swales, retention walls or use of erosion control blankets) applied to cut or fill slopes are adequate to prevent erosion. Craks or slumping is not evident.	BMP measures applied (see the previous checkbox) exhibit minor erosion and/or deposition is noted at base of cut or fill slope, near retention walls or around erosion control blankets or mulch. However, erosion is limited to on-site areas excluding any transport to SEZ. Or retaining wall integrity is showing signs of concern, such as bulging or wavy appearance.	BMP measures are inadequate to protect erosion on cut and fill slopes from storms <20 year1 hour event; or any evidence of sediment transport and/or deposition within SEZ is observed. Or cracks are present and appear to be threatening integrity of fill and/or retaining wall. Or the occurrence of any fillslope failure has occurred.	⊖ NA

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

	Natural or newly constructed drainage control and infiltration systems are adequate to eliminate erosion and sediment transport processes. No evidence of erosion or sediment movement on-site.	Observed evidence of minor on-site erosion and sediment transport, but limited to on-site deposition, and no evidence of transport to any SEZ.	Observed evidence of substantial on-site erosion such as frequent rill formation or any observation of gully features observed, or any evidence of sediment transport to SEZ. OR where major maintenance or adaptive erosion control strategies are required for resource protection. OR where water quality data indicates exceedance of state standards.	⊖ NA
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basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	or gully formation. Or the evidence of any sediment transport to SEZ.	
ontrol measures.		
applied to control hazardous chemical delivery to red.)	soils, groundwater or surface water bodies. Contac	xt Hazardous
hazardous/toxic substances used for building and	d vehicle maintenance, and associated direct and in	ndirect effects upon
Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	 Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader. 	⊖ NA
	Effectiveness So	core: E
	 Dash outer, such as sediment primes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm. ontrol measures. applied to control hazardous chemical delivery to red.) hazardous/toxic substances used for building and hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events). 	Dash outlet, such as sediment purnes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm. on guiy formation. On the evidence of any sediment transport to SEZ. ontrol measures. applied to control hazardous chemical delivery to soils, groundwater or surface water bodies. Contact red.) hazardous/toxic substances used for building and vehicle maintenance, and associated direct and in hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events). Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader. Effectiveness Si

UTM Zone Form HV2: Permanent BMPs for E and Structure Developments	ID# 350 Selection Code \$03
Building/Structure Name Olympic Express - Line Towers	Township 13N Range 18E Section 36
Date of Project Start 8/4/2007 Date of Project End Reviewer(s) T. Osterhout, K. Roaldson Survey Date 8/25/2011	6th Field HUC Watershed NV-3 State NV
Structure Type: Other Survey Type 3rd Year Post Constr De	pth/Duration: Other (Describe) Lift Towers
Plan Title: 2007 Implementation - Northbowl/Olympic Expr Job No.: 00-607.32	Plan Date: 6/27/2007 Plan Revision Date:
Specific concerns associated with construction project and describe BMP measures d Source control BMPs: Effective cover	esigned to achieve resource protection.
Implementation For Permanent or Temporary-Seasonal Structures:	1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns 2=Minor departure from standards and/or minor resource concerns 3=Major departure from standards and/or major resource concerns 4=Repeated departure from standards/failure to address concerns
1) Were source control, drainage and infiltration systems, and hazardous material con 1-hour Storm Event, to achieve Forest Service and State water quality standards?	trol systems designed to maintain resource protection during a 20-year
2) Are BMP measures constructed according to contract design specifications?	1
Additional Comments:	
Effectiveness	Implementation Score:
Note: Effective and adequate maintenance of BMP measures should be included w effectiveness evaluation. When topic is not applicable, please make informational of	thin the (BMP Monitoring Rule Set) comment.
1) Source area erosion control. Protection and stabilization of structure site, p	articularly any erosive areas.
(Note the evidence of erosion processes such as rills, gullies, sediment scour and/ pumice slopes, or deteriorated granitic areas) or areas identified for revegetation in separately)	or deposition on- or off-site, specifically areas naturally devoid of vegetation (e.g. structure plan, see structure sketch. Constructed cut and fill slopes are addressed

ا• ؛	Nearly 70% coverage of any erodible surfaces, and no evidence of erosion.	Structure site exhibits less than full cover of soil; however, only minor erosion is evident and subsequent deposition is limited to on-site areas excluding deposition within any on-site SEZ.	 Areas of exposed soil are observed, and erosion is evident and extensive (for example sediment is transported off-site or directly to SEZ. 	⊖ NA
Ob ICCE	served progression/improvement of areas ssful revegetation, such as temporary arm	identified for revegetation in structure plan as sch oring measures (including mulch, rock, erosion cl	eduled; and adequate erosion protection measure oth or other) applied while vegetation becomes es	s applied for tablished
	Revegetation establishment proceeding as expectednew and existing vegetative cover in combination with temporary BMP measures are effective at eliminating/ mitigating erosion processes from those areas.	Revegetation efforts are not proceeding as expected. Minor additional efforts are required for successful revegetation establishment, or minor maintenance/retrofit of temporary BMP measures applied (for erosion control during revegetation efforts) is needed.	Temporary BMP measures provide inadequate erosion control, and/or specified revegetation efforts are deemed unsuccessful, as major modifications are needed to achieve vegetative ground cover goals and success. OR major on- site erosion, or any evidence of sediment delivery to SEZ.	⊖ NA
c) C	tut and fill slope protection (including surface	ce erosion and slope failure potential).		
	BMP measures (including seeding/planting, with mulch of pine straw, designed swales, retention walls or use of erosion control blankets) applied to cut or fill slopes are adequate to prevent erosion. Craks or slumping is not evident.	BMP measures applied (see the previous checkbox) exhibit minor erosion and/or deposition is noted at base of cut or fill slope, near retention walls or around erosion control blankets or mulch. However, erosion is limited to on-site areas excluding any transport to SEZ. Or retaining wall integrity is showing signs of concern, such as bulging or wavy appearance.	BMP measures are inadequate to protect erosion on cut and fill slopes from storms <20 year1 hour event; or any evidence of sediment transport and/or deposition within SEZ is observed. Or cracks are present and appear to be threatening integrity of fill and/or retaining wall. Or the occurrence of any fillslope failure has occurred.	⊖ NA

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

	Natural or newly constructed drainage control and infiltration systems are adequate to eliminate erosion and sediment transport processes. No evidence of erosion or sediment movement on-site.	Observed evidence of minor on-site erosion and sediment transport, but limited to on-site deposition, and no evidence of transport to any SEZ.	Observed evidence of substantial on-site erosion such as frequent rill formation or any observation of gully features observed, or any evidence of sediment transport to SEZ. OR where major maintenance or adaptive erosion control strategies are required for resource protection. OR where water quality data indicates exceedance of state standards.	⊖ NA
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• No evidence of unexpected ponding on- site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	 On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ. 	⊖ NA
3) Effectiveness of hazardous substance co	ntrol measures.		
(Evaluate the effectiveness, or lack of, BMP a Spill Coordinator if accidental spill has occurre	oplied to control hazardous chemical delivery to d.)	soils, groundwater or surface water bodies. Conta	ct Hazardous
a) Evaluate the occurrence and mitigation of h water quality.	azardous/toxic substances used for building an	d vehicle maintenance, and associated direct and	indirect effects upon
• Hazardous substance control measures provide effective mitigation.	Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	 Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader. 	○ NA
		Effectiveness S	Score: E
Additional Comments		(BMP Monitorin	ng Rule Set)
Little evidence of erosion at towers. Some ma	ay benefit from additional wood chip mulch cove	erage but no resource concerns at this time.	

UTM Zone 11 Easting 249347 Northing 4316164 Building/Structure Name North Bowl Lower Terminal Date of Project Start Date of Project End Reviewer(s) Survey Date 8/25/2011	ID# 357 Selection Code \$03 Township 13N Range 19E Section 30 6th Field HUC Watershed NV-3 State NV
Structure Type: Lift-Base Survey Type 3rd Year Post Constr De	pth/Duration: Other (Describe)
Plan Title: Job No.: Specific concerns associated with construction project and describe BMP measures de Rock lined channels to SEZ, and erosion control blanket along slopes.	Plan Date: Plan Revision Date: Plan Revision Date:
Implementation For Permanent or Temporary-Seasonal Structures: 1) Were source control, drainage and infiltration systems, and hazardous material cor 1-hour Storm Event, to achieve Forest Service and State water quality standards?	1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns 2=Minor departure from standards and/or minor resource concerns 3=Major departure from standards and/or major resource concerns 4=Repeated departure from standards/failure to address concerns 1trol systems designed to maintain resource protection during a 20-year
 2) Are BMP measures constructed according to contract design specifications? Additional Comments: Access road switchback adjacent to the creek bank was not stabilized. Erosion at was 	ater bar outlets near the lift terminal was stabilized.
 Effectiveness Note: Effective and adequate maintenance of BMP measures should be included wie effectiveness evaluation. When topic is not applicable, please make informational of 1) Source area erosion control. Protection and stabilization of structure site, p (Note the evidence of erosion processes such as rills, gullies, sediment scour and/pumice slopes, or deteriorated granitic areas) or areas identified for revegetation in constrated. 	Implementation Score: I (BMP Monitoring Rule Set) omment. articularly any erosive areas. or deposition on- or off-site, specifically areas naturally devoid of vegetation (e.g. structure plan, see structure sketch. Constructed cut and fill slopes are addressed

ا• ؛	Nearly 70% coverage of any erodible surfaces, and no evidence of erosion.	Structure site exhibits less than full cover of soil; however, only minor erosion is evident and subsequent deposition is limited to on-site areas excluding deposition within any on-site SEZ.	 Areas of exposed soil are observed, and erosion is evident and extensive (for example sediment is transported off-site or directly to SEZ. 	⊖ NA
Ob ICCE	served progression/improvement of areas ssful revegetation, such as temporary arm	identified for revegetation in structure plan as sch oring measures (including mulch, rock, erosion cl	eduled; and adequate erosion protection measure oth or other) applied while vegetation becomes es	s applied for tablished
	Revegetation establishment proceeding as expectednew and existing vegetative cover in combination with temporary BMP measures are effective at eliminating/ mitigating erosion processes from those areas.	Revegetation efforts are not proceeding as expected. Minor additional efforts are required for successful revegetation establishment, or minor maintenance/retrofit of temporary BMP measures applied (for erosion control during revegetation efforts) is needed.	Temporary BMP measures provide inadequate erosion control, and/or specified revegetation efforts are deemed unsuccessful, as major modifications are needed to achieve vegetative ground cover goals and success. OR major on- site erosion, or any evidence of sediment delivery to SEZ.	⊖ NA
c) C	tut and fill slope protection (including surface	ce erosion and slope failure potential).		
	BMP measures (including seeding/planting, with mulch of pine straw, designed swales, retention walls or use of erosion control blankets) applied to cut or fill slopes are adequate to prevent erosion. Craks or slumping is not evident.	BMP measures applied (see the previous checkbox) exhibit minor erosion and/or deposition is noted at base of cut or fill slope, near retention walls or around erosion control blankets or mulch. However, erosion is limited to on-site areas excluding any transport to SEZ. Or retaining wall integrity is showing signs of concern, such as bulging or wavy appearance.	BMP measures are inadequate to protect erosion on cut and fill slopes from storms <20 year1 hour event; or any evidence of sediment transport and/or deposition within SEZ is observed. Or cracks are present and appear to be threatening integrity of fill and/or retaining wall. Or the occurrence of any fillslope failure has occurred.	⊖ NA

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

	Natural or newly constructed drainage control and infiltration systems are adequate to eliminate erosion and sediment transport processes. No evidence of erosion or sediment movement on-site.	Observed evidence of minor on-site erosion and sediment transport, but limited to on-site deposition, and no evidence of transport to any SEZ.	Observed evidence of substantial on-site erosion such as frequent rill formation or any observation of gully features observed, or any evidence of sediment transport to SEZ. OR where major maintenance or adaptive erosion control strategies are required for resource protection. OR where water quality data indicates exceedance of state standards.	⊖ NA
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site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	<u> </u>
3) Effectiveness of hazardous substance co	ontrol measures.		
(Evaluate the effectiveness, or lack of, BMP a Spill Coordinator if accidental spill has occurre	pplied to control hazardous chemical delivery to ed.)	soils, groundwater or surface water bodies. Conta	act Hazardous
	pazardous/toxic substances used for building and	d vehicle maintenance, and associated direct and	indirect effects upon
a) Evaluate the occurrence and mitigation of r water quality.			·
 a) Evaluate the occurrence and mitigation of r water quality. Hazardous substance control measures provide effective mitigation. 	Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	 Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader. 	○ NA
 a) Evaluate the occurrence and mitigation of r water quality. Hazardous substance control measures provide effective mitigation. 	Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	 Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader. 	O NA
UTM Zone11Easting248872Northing4314848	S Selection Code S03		
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Building/Structure Name Olympic Express - Utilities	Township 13N Range 19E Section 31		
Date of Project Start 8/4/2007 Date of Project End Reviewer(s)	6th Field HUC Watershed NV-3 State NV		
K. Roaldson Survey Date 8/25/2011 Date BMP Implementati	Dast BMP Maintenance		
Structure Type: Other Survey Type Routine Depth/Duration	on: Other (Describe) Utilities Trench		
Plan Title: 2007 Implementation - Northbowl/Olympic Expr Job No.: 00-607.32	Plan Date: 06/27/2007 Plan Revision Date:		
Specific concerns associated with construction project and describe BMP measures designed to	achieve resource protection.		
See plan set. BMPs include: exclusion fence, sediment barrier, revegetation. Resource concerns	s: restore effective cover and minimize disturbance.		
1=Meet 2=Minol 3=Majol 4=Repe 1) Were source control, drainage and infiltration systems, and hazardous material control system 1) Were source control, drainage and infiltration systems, and hazardous material control system	s/Exceeds 20-yr 1-Hr standards and/or no resource concerns departure from standards and/or minor resource concerns ated departure from standards and/or major resource concerns ated departure from standards/failure to address concerns		
1-nour Storm Event, to achieve Forest Service and State water quality standards?			
2) Are BMP measures constructed according to contract design specifications?	1		
Additional Comments:			
None			
Effectiveness	Implementation Score:		
Note: Effective and adequate maintenance of BMP measures should be included within the effectiveness evaluation. When topic is not applicable, please make informational comment.	(BMP Monitoring Rule Set)		
1) Source area erosion control. Protection and stabilization of structure site, particularly	any erosive areas.		
(Note the evidence of erosion processes such as rills, gullies, sediment scour and/or depositi pumice slopes, or deteriorated granitic areas) or areas identified for revegetation in structure separately)	on on- or off-site, specifically areas naturally devoid of vegetation (e.g. plan, see structure sketch. Constructed cut and fill slopes are addressed		

10) ?	Nearly 70% coverage of any erodible surfaces, and no evidence of erosion.	Structure site exhibits less than full cover of soil; however, only minor erosion is evident and subsequent deposition is limited to on-site areas excluding deposition within any on-site SEZ.	 Areas of exposed soil are observed, and erosion is evident and extensive (for example sediment is transported off-site or directly to SEZ. 	⊖ NA
Ob	eserved progression/improvement of areas essful revegetation, such as temporary arm	identified for revegetation in structure plan as sch oring measures (including mulch, rock, erosion cl	eduled; and adequate erosion protection measure oth or other) applied while vegetation becomes es	s applied for tablished
0	Revegetation establishment proceeding as expectednew and existing vegetative cover in combination with temporary BMP measures are effective at eliminating/ mitigating erosion processes from those areas.	• Revegetation efforts are not proceeding as expected. Minor additional efforts are required for successful revegetation establishment, or minor maintenance/retrofit of temporary BMP measures applied (for erosion control during revegetation efforts) is needed.	Temporary BMP measures provide inadequate erosion control, and/or specified revegetation efforts are deemed unsuccessful, as major modifications are needed to achieve vegetative ground cover goals and success. OR major on- site erosion, or any evidence of sediment delivery to SEZ.	⊖ NA
c) C	Cut and fill slope protection (including surfac	ce erosion and slope failure potential).		
۲	BMP measures (including seeding/planting, with mulch of pine straw, designed swales, retention walls or use of erosion control blankets) applied to cut or fill slopes are adequate to prevent erosion. Craks or slumping is not evident.	BMP measures applied (see the previous checkbox) exhibit minor erosion and/or deposition is noted at base of cut or fill slope, near retention walls or around erosion control blankets or mulch. However, erosion is limited to on-site areas excluding any transport to SEZ. Or retaining wall integrity is showing signs of concern, such as bulging or wavy appearance.	BMP measures are inadequate to protect erosion on cut and fill slopes from storms <20 year1 hour event; or any evidence of sediment transport and/or deposition within SEZ is observed. Or cracks are present and appear to be threatening integrity of fill and/or retaining wall. Or the occurrence of any fillslope failure has occurred.) NA

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

۲	Natural or newly constructed drainage control and infiltration systems are adequate to eliminate erosion and sediment transport processes. No evidence of erosion or sediment movement on-site.	Observed evidence of minor on-site erosion and sediment transport, but limited to on-site deposition, and no evidence of transport to any SEZ.	Observed evidence of substantial on-site erosion such as frequent rill formation or any observation of gully features observed, or any evidence of sediment transport to SEZ. OR where major maintenance or adaptive erosion control strategies are required for resource protection. OR where water quality data indicates exceedance of state standards.	○ NA
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• No evidence of unexpected ponding on- site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	⊖ NA
3) Effectiveness of hazardous substance co (Evaluate the effectiveness, or lack of, BMP a	pplied to control hazardous chemical delivery to	soils, groundwater or surface water bodies. Conta	act Hazardous
Spill Coordinator if accidental spill has occurre	ed.)		
a) Evaluate the occurrence and mitigation of h water quality.	nazardous/toxic substances used for building and	d vehicle maintenance, and associated direct and	indirect effects upon
Hazardous substance control measures provide effective mitigation.	Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	 Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader. 	⊖ NA
		Effectiveness \$	Score: E
Additional Comments		(BMP Monitorin	ng Rule Set)
Revegetation is sparse along the trench line,	coverage is sufficient. No erosion evident at hy	vdrants.	

T.

UTM Zone11Easting248839Northing4315424	ID# 368 Selection Code \$03
Building/Structure Name Ski Trail S10	Township 13N Range 18E Section 36
Date of Project Start Date of Project End Reviewer(s)	6th Field HUC Watershed NV-3 State NV
T. Osterhout Survey Date 8/25/2011 Date BMP In	plementation Complete
Structure Type: Ski Trail Survey Type 3rd Year Post Constr D	epth/Duration: Other (Describe)
Plan Title: 2007 Implementation - Northbowl/Olympic Expr Job No.: 00-607.32	Plan Date: 06/27/2007 Plan Revision Date:
Specific concerns associated with construction project and describe BMP measures of	designed to achieve resource protection.
See Hard Copy of Form V28: Vegetation Manipulation	
Implementation For Permanent or Temporary-Seasonal Structures: 1) Were source control, drainage and infiltration systems, and hazardous material control for the second state water quality standards?	1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns 2=Minor departure from standards and/or minor resource concerns 3=Major departure from standards and/or major resource concerns 4=Repeated departure from standards/failure to address concerns
2) Are BMP measures constructed according to contract design specifications?	
Additional Comments:	
Effectiveness	Implementation Score:
Note: Effective and adequate maintenance of BMP measures should be included v effectiveness evaluation. When topic is not applicable, please make informational	vithin the (BMP Monitoring Rule Set) comment.
1) Source area erosion control. Protection and stabilization of structure site,	particularly any erosive areas.
(Note the evidence of erosion processes such as rills, gullies, sediment scour and pumice slopes, or deteriorated granitic areas) or areas identified for revegetation i separately)	/or deposition on- or off-site, specifically areas naturally devoid of vegetation (e.g. ∩ structure plan, see structure sketch. Constructed cut and fill slopes are addressed

) Soil Protection measures, artificial or vegetati	tve, designed to eliminate erosion by runoff and r	ain-drop impact	
Nearly 70% coverage of any erodible surfaces, and no evidence of erosion.	Structure site exhibits less than full cover of soil; however, only minor erosion is evident and subsequent deposition is limited to on-site areas excluding deposition within any on-site SEZ.	Areas of exposed soil are observed, and erosion is evident and extensive (for example sediment is transported off-site or directly to SEZ.) NA
Observed progression/improvement of areas accessful revegetation, such as temporary arm	identified for revegetation in structure plan as sch oring measures (including mulch, rock, erosion cl	eduled; and adequate erosion protection measure oth or other) applied while vegetation becomes es	s applied for tablished
Revegetation establishment proceeding as expectednew and existing vegetative cover in combination with temporary BMP measures are effective at eliminating/ mitigating erosion processes from those areas.	Revegetation efforts are not proceeding as expected. Minor additional efforts are required for successful revegetation establishment, or minor maintenance/retrofit of temporary BMP measures applied (for erosion control during revegetation efforts) is needed.	Temporary BMP measures provide inadequate erosion control, and/or specified revegetation efforts are deemed unsuccessful, as major modifications are needed to achieve vegetative ground cover goals and success. OR major on- site erosion, or any evidence of sediment delivery to SEZ.) NA
) Cut and fill slope protection (including surface	e erosion and slope failure potential).		
BMP measures (including seeding/planting, with mulch of pine straw, designed swales, retention walls or use of erosion control blankets) applied to cut or fill slopes are adequate to prevent erosion. Craks or slumping is not evident.	BMP measures applied (see the previous checkbox) exhibit minor erosion and/or deposition is noted at base of cut or fill slope, near retention walls or around erosion control blankets or mulch. However, erosion is limited to on-site areas excluding any transport to SEZ. Or retaining wall integrity is showing signs of concern, such as bulging or wavy appearance.	BMP measures are inadequate to protect erosion on cut and fill slopes from storms <20 year1 hour event; or any evidence of sediment transport and/or deposition within SEZ is observed. Or cracks are present and appear to be threatening integrity of fill and/or retaining wall. Or the occurrence of any fillslope failure has occurred.) NA

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

Natural or newly constructed drainage control and infiltration systems are adequate to eliminate erosion and sediment transport processes. No evidence of erosion or sediment movement on-site.	Observed evidence of minor on-site erosion and sediment transport, but limited to on-site deposition, and no evidence of transport to any SEZ.	Observed evidence of substantial on-site erosion such as frequent rill formation or any observation of gully features observed, or any evidence of sediment transport to SEZ. OR where major maintenance or adaptive erosion control strategies are required for resource protection. OR where water quality data indicates exceedance of state standards.	NA
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site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	osome evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	
) Effectiveness of hazardous substance co Evaluate the effectiveness, or lack of, BMP a Spill Coordinator if accidental spill has occurre a) Evaluate the occurrence and mitigation of h	ontrol measures. pplied to control hazardous chemical delivery to ed.) nazardous/toxic substances used for building and	soils, groundwater or surface water bodies. Con d vehicle maintenance, and associated direct and	tact Hazardous d indirect effects upor
water quality.			
 Water quality. Hazardous substance control measures provide effective mitigation. 	Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader.	() NA
 Water quality. Hazardous substance control measures provide effective mitigation. 	Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader.	NA Score: E

UTM Zone 11 Easting 248637 Northing 431770 Building/Structure Name Ski Trail S9 Date of Project Start Date of Project End Reviewer(s) Survey Date 8/25/2011 T. Osterhout Survey Date 8/25/2011	ID# 366 Selection Code S03 Township 13N Range 18E Section 36 6th Field HUC Watershed NV-3 State NV Idementation Complete Last BMP Maintenance Image: Section State Image: Section
Structure Type: Ski Trail Survey Type 3rd Year Post Constr Dep	oth/Duration: Other (Describe)
Plan Title: 2007 Implementation - Northbowl/Olympic Expr Job No.: 00-607.32 Specific concerns associated with construction project and describe BMP measures de See Hard Copy of Form V28: Vegetation Manipulation Section Manipulation	Plan Date: 06/27/2007 Plan Revision Date: signed to achieve resource protection.
Implementation For Permanent or Temporary-Seasonal Structures:	1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns 2=Minor departure from standards and/or minor resource concerns 3=Major departure from standards and/or major resource concerns 4=Repeated departure from standards/failure to address concerns
1-hour Storm Event, to achieve Forest Service and State water quality standards?	
2) Are BMP measures constructed according to contract design specifications? Additional Comments:	
Effectiveness Note: Effective and adequate maintenance of BMP measures should be included wit effectiveness evaluation. When topic is not applicable, please make informational co	Implementation Score:
(Note the evidence of erosion processes such as rills, gullies, sediment scour and/c pumice slopes, or deteriorated granitic areas) or areas identified for revegetation in separately)	r deposition on- or off-site, specifically areas naturally devoid of vegetation (e.g. structure plan, see structure sketch. Constructed cut and fill slopes are addressed

) Soil Protection measures, artificial or vegetati	tve, designed to eliminate erosion by runoff and r	ain-drop impact	
Nearly 70% coverage of any erodible surfaces, and no evidence of erosion.	Structure site exhibits less than full cover of soil; however, only minor erosion is evident and subsequent deposition is limited to on-site areas excluding deposition within any on-site SEZ.	Areas of exposed soil are observed, and erosion is evident and extensive (for example sediment is transported off-site or directly to SEZ.) NA
Observed progression/improvement of areas accessful revegetation, such as temporary arm	identified for revegetation in structure plan as sch oring measures (including mulch, rock, erosion cl	eduled; and adequate erosion protection measure oth or other) applied while vegetation becomes es	s applied for tablished
Revegetation establishment proceeding as expectednew and existing vegetative cover in combination with temporary BMP measures are effective at eliminating/ mitigating erosion processes from those areas.	Revegetation efforts are not proceeding as expected. Minor additional efforts are required for successful revegetation establishment, or minor maintenance/retrofit of temporary BMP measures applied (for erosion control during revegetation efforts) is needed.	Temporary BMP measures provide inadequate erosion control, and/or specified revegetation efforts are deemed unsuccessful, as major modifications are needed to achieve vegetative ground cover goals and success. OR major on- site erosion, or any evidence of sediment delivery to SEZ.) NA
) Cut and fill slope protection (including surface	e erosion and slope failure potential).		
BMP measures (including seeding/planting, with mulch of pine straw, designed swales, retention walls or use of erosion control blankets) applied to cut or fill slopes are adequate to prevent erosion. Craks or slumping is not evident.	BMP measures applied (see the previous checkbox) exhibit minor erosion and/or deposition is noted at base of cut or fill slope, near retention walls or around erosion control blankets or mulch. However, erosion is limited to on-site areas excluding any transport to SEZ. Or retaining wall integrity is showing signs of concern, such as bulging or wavy appearance.	BMP measures are inadequate to protect erosion on cut and fill slopes from storms <20 year1 hour event; or any evidence of sediment transport and/or deposition within SEZ is observed. Or cracks are present and appear to be threatening integrity of fill and/or retaining wall. Or the occurrence of any fillslope failure has occurred.) NA

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

Natural or newly constructed drainage control and infiltration systems are adequate to eliminate erosion and sediment transport processes. No evidence of erosion or sediment movement on-site.	Observed evidence of minor on-site erosion and sediment transport, but limited to on-site deposition, and no evidence of transport to any SEZ.	Observed evidence of substantial on-site erosion such as frequent rill formation or any observation of gully features observed, or any evidence of sediment transport to SEZ. OR where major maintenance or adaptive erosion control strategies are required for resource protection. OR where water quality data indicates exceedance of state standards.	NA
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site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	
•) Effectiveness of hazardous substance co (Evaluate the effectiveness, or lack of, BMP a Spill Coordinator if accidental spill has occurre	phied to control hazardous chemical delivery to ed.)	soils, groundwater or surface water bodies. Con	tact Hazardous d indirect effects upon
water quality.	C C		
 A Evaluate the occurrence and mitigation of water quality. Hazardous substance control measures provide effective mitigation. 	Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader.	, () NA
 A Evaluate the occurrence and mitigation of a water quality. Hazardous substance control measures provide effective mitigation. 	Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader.	Score: E

UTM Zone 11 Easting 248867 Northing 4315031 Puilding/Ctructure Name Otympic Leaver Terminel	ID# 346 Selection Code S02 Township 12N
	Township 13N Range 19E Section 31
Date of Project Start 7/23/2007 Date of Project End Reviewer(s)	6th Field HUC Watershed NV-3 State NV
K. Roaldson Survey Date 8/25/2011 Date BMP Implementation	on Complete 9/9/2010 Last BMP Maintenance 9/9/2010
Structure Type: Lift-Base Survey Type 3rdYear Post Constr Depth/Duration	n: Other (Describe)
Plan Title: 2007 Implementation - Northbowl/Olympic Expr Job No.: 00-607.32	Plan Date: 06/27/2007 Plan Revision Date:
Specific concerns associated with construction project and describe BMP measures designed to	achieve resource protection.
Sediment transport prevention, revegetation establishment	
Implementation 1=Meets For Permanent or Temporary-Seasonal Structures: 1=Meets 1) Were source control, drainage and infiltration systems, and hazardous material control system 1+Neuronal State 1-hour Storm Event, to achieve Forest Service and State water quality standards? 1+Neuronal State	/Exceeds 20-yr 1-Hr standards and/or no resource concerns departure from standards and/or minor resource concerns departure from standards and/or major resource concerns ated departure from standards/failure to address concerns as designed to maintain resource protection during a 20-year
2) Are BMP measures constructed according to contract design specifications?	1
Additional Comments:	, ,
Effectiveness	Implementation Score:
Note: Effective and adequate maintenance of BMP measures should be included within the effectiveness evaluation. When topic is not applicable, please make informational comment.	(BMP Monitoring Rule Set)
1) Source area erosion control. Protection and stabilization of structure site, particularly	any erosive areas.
(Note the evidence of erosion processes such as rills, gullies, sediment scour and/or deposition pumice slopes, or deteriorated granitic areas) or areas identified for revegetation in structure p separately)	on on- or off-site, specifically areas naturally devoid of vegetation (e.g. olan, see structure sketch. Constructed cut and fill slopes are addressed

۱ ؛	Nearly 70% coverage of any erodible surfaces, and no evidence of erosion.	Ostructure site exhibits less than full cover of soil; however, only minor erosion is evident and subsequent deposition is limited to on-site areas excluding deposition within any on-site SEZ.	Areas of exposed soil are observed, and erosion is evident and extensive (for example sediment is transported off-site or directly to SEZ.	⊖ NA
Ob ICCE	served progression/improvement of areas i essful revegetation, such as temporary arm	identified for revegetation in structure plan as sch oring measures (including mulch, rock, erosion cl	eduled; and adequate erosion protection measure oth or other) applied while vegetation becomes es	es applied for tablished
	Revegetation establishment proceeding as expectednew and existing vegetative cover in combination with temporary BMP measures are effective at eliminating/ mitigating erosion processes from those areas.	Revegetation efforts are not proceeding as expected. Minor additional efforts are required for successful revegetation establishment, or minor maintenance/retrofit of temporary BMP measures applied (for erosion control during revegetation efforts) is needed.	Temporary BMP measures provide inadequate erosion control, and/or specified revegetation efforts are deemed unsuccessful, as major modifications are needed to achieve vegetative ground cover goals and success. OR major on- site erosion, or any evidence of sediment delivery to SEZ.	⊖ NA
c) C	aut and fill slope protection (including surfac	e erosion and slope failure potential).		
۲	BMP measures (including seeding/planting, with mulch of pine straw, designed swales, retention walls or use of erosion control blankets) applied to cut or fill slopes are adequate to prevent erosion. Craks or slumping is not evident.	BMP measures applied (see the previous checkbox) exhibit minor erosion and/or deposition is noted at base of cut or fill slope, near retention walls or around erosion control blankets or mulch. However, erosion is limited to on-site areas excluding any transport to SEZ. Or retaining wall integrity is showing signs of concern, such as bulging or wavy appearance.	BMP measures are inadequate to protect erosion on cut and fill slopes from storms <20 year1 hour event; or any evidence of sediment transport and/or deposition within SEZ is observed. Or cracks are present and appear to be threatening integrity of fill and/or retaining wall. Or the occurrence of any fillslope failure has occurred.	⊖ NA

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

	Natural or newly constructed drainage control and infiltration systems are adequate to eliminate erosion and sediment transport processes. No evidence of erosion or sediment movement on-site.	Observed evidence of minor on-site erosion and sediment transport, but limited to on-site deposition, and no evidence of transport to any SEZ.	Observed evidence of substantial on-site erosion such as frequent rill formation or any observation of gully features observed, or any evidence of sediment transport to SEZ. OR where major maintenance or adaptive erosion control strategies are required for resource protection. OR where water quality data indicates exceedance of state standards.	⊖ NA
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• No evidence of unexpected ponding on- site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	<u>∩</u> NA
3) Effectiveness of hazardous substance co	ntrol measures.		
(Evaluate the effectiveness, or lack of, BMP a Spill Coordinator if accidental spill has occurre	oplied to control hazardous chemical delivery to ed.)	soils, groundwater or surface water bodies. Conta	ct Hazardous
 a) Evaluate the occurrence and mitigation of h water quality. 	azardous/toxic substances used for building and	d vehicle maintenance, and associated direct and	indirect effects upon
• Hazardous substance control measures provide effective mitigation.	Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, visitiv to SEZ parmochility of apil	 Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader. 	○ NA

Effectiveness Score:

(BMP Monitoring Rule Set)

E

Infiltration area beneath operator's booth, and drip line infiltration trenches beneath lift terminal are in good shape. Riprap slope below road is stable. Reveg is sparse but apparent. Pyramat lined channel has sediment deposition; needs to be cleaned out. One DLIT may require maintenance, wood chips migrating into infiltration area.

Additional Comments

UTM Zone 11 Easting 248632 Northing 4312901 Building/Structure Name Ski Trail S8 Date of Project Start 9/1/2005 Date of Project Start 9/1/2005 Reviewer(s) Survey Date K. Roaldson Survey Date	Buildings ID# Selection Code S02 Township 12N Range 19E Section 6 6th Field HUC Watershed NV-1 State NV plementation Complete Last BMP Maintenance Image Image Image	369
Structure Type: Ski Trail Survey Type 6th Year Post Constr Dep	pth/Duration: Other (Describe)	
Plan Title: Job No.: Specific concerns associated with construction project and describe BMP measures de See Hard Copy of Form V28: Vegetation Manipulation	Plan Date: Plan Revision Date: esigned to achieve resource protection.	
Implementation For Permanent or Temporary-Seasonal Structures: 1) Were source control, drainage and infiltration systems, and hazardous material con 1-hour Storm Event, to achieve Forest Service and State water quality standards?	1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns 2=Minor departure from standards and/or minor resource concerns 3=Major departure from standards and/or major resource concerns 4=Repeated departure from standards/failure to address concerns	
2) Are BMP measures constructed according to contract design specifications? Additional Comments:		_
 <u>Effectiveness</u> Note: Effective and adequate maintenance of BMP measures should be included wit effectiveness evaluation. When topic is not applicable, please make informational control. 1) Source area erosion control. Protection and stabilization of structure site, particular explosion of erosion processes such as rills, gullies, sediment scour and/or pumice slopes, or deteriorated granitic areas) or areas identified for revegetation in 	Implementation Score: I ithin the (BMP Monitoring Rule Set) comment. articularly any erosive areas. or deposition on- or off-site, specifically areas naturally devoid of vegetation (e.g. structure plan, see structure sketch. Constructed cut and fill slopes are address	g. ssed
separately)		

) Soil Protection measures, artificial or vegetati	tve, designed to eliminate erosion by runoff and r	ain-drop impact	
Nearly 70% coverage of any erodible surfaces, and no evidence of erosion.	Structure site exhibits less than full cover of soil; however, only minor erosion is evident and subsequent deposition is limited to on-site areas excluding deposition within any on-site SEZ.	Areas of exposed soil are observed, and erosion is evident and extensive (for example sediment is transported off-site or directly to SEZ.) NA
Observed progression/improvement of areas accessful revegetation, such as temporary arm	identified for revegetation in structure plan as sch oring measures (including mulch, rock, erosion cl	eduled; and adequate erosion protection measure oth or other) applied while vegetation becomes es	s applied for tablished
Revegetation establishment proceeding as expectednew and existing vegetative cover in combination with temporary BMP measures are effective at eliminating/ mitigating erosion processes from those areas.	Revegetation efforts are not proceeding as expected. Minor additional efforts are required for successful revegetation establishment, or minor maintenance/retrofit of temporary BMP measures applied (for erosion control during revegetation efforts) is needed.	Temporary BMP measures provide inadequate erosion control, and/or specified revegetation efforts are deemed unsuccessful, as major modifications are needed to achieve vegetative ground cover goals and success. OR major on- site erosion, or any evidence of sediment delivery to SEZ.) NA
) Cut and fill slope protection (including surface	e erosion and slope failure potential).		
BMP measures (including seeding/planting, with mulch of pine straw, designed swales, retention walls or use of erosion control blankets) applied to cut or fill slopes are adequate to prevent erosion. Craks or slumping is not evident.	BMP measures applied (see the previous checkbox) exhibit minor erosion and/or deposition is noted at base of cut or fill slope, near retention walls or around erosion control blankets or mulch. However, erosion is limited to on-site areas excluding any transport to SEZ. Or retaining wall integrity is showing signs of concern, such as bulging or wavy appearance.	BMP measures are inadequate to protect erosion on cut and fill slopes from storms <20 year1 hour event; or any evidence of sediment transport and/or deposition within SEZ is observed. Or cracks are present and appear to be threatening integrity of fill and/or retaining wall. Or the occurrence of any fillslope failure has occurred.) NA

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

 Natural or newly constructed drainage control and infiltration systems are adequate to eliminate erosion and sediment transport processes. No evidence of erosion or sediment movement on-site. Observed evidence of minor on-site erosion and sediment transport, but limited to on-site deposition, and no evidence of transport to any SEZ. 	Observed evidence of substantial on-site erosion such as frequent rill formation or any observation of gully features observed, or any evidence of sediment transport to SEZ. OR where major maintenance or adaptive erosion control strategies are required for resource protection. OR where water quality data indicates exceedance of state standards.	
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site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	
) Effectiveness of hazardous substance co Evaluate the effectiveness, or lack of, BMP a Spill Coordinator if accidental spill has occurre	ntrol measures. pplied to control hazardous chemical delivery to ed.)	soils, groundwater or surface water bodies. Cor	ntact Hazardous
 a) Evaluate the occurrence and mitigation of h vater quality. 			
 a) Evaluate the occurrence and mitigation of hwater quality. Azardous substance control measures provide effective mitigation. 	Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	Substantial resource concern is evident such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader.	, () NA
 a) Evaluate the occurrence and mitigation of hwater quality. Azardous substance control measures provide effective mitigation. 	Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	Substantial resource concern is evident such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader.	, ONA

UTM Zone 10 Easting 248976 Northing 4314389 Building/Structure Name East Peak Patrol Date of Project Start 9/20/2008 Date of Project Start 9/20/2008 Reviewer(s) Survey Date 8/25/2011 K. Roaldson Survey Date 8/25/2011	ID# 371 Selection Code S02 Township 13N Range 19E Section 31 6th Field HUC Watershed NV-3 State NV Complete 9/1/2008 Last BMP Maintenance 9/1/2008
Structure Type: Other Survey Type 3rd Year Post Constr Depth/Duration: Plan Title: Job No.: Plan Specific concerns associated with construction project and describe BMP measures designed to ac Dia line infiltration instruction project and describe BMP measures designed to ac	Other (Describe) an Date: Plan Revision Date:
Implementation 1=Meets/E For Permanent or Temporary-Seasonal Structures: 1=Meets/E 1) Were source control, drainage and infiltration systems, and hazardous material control systems 1-hour Storm Event, to achieve Forest Service and State water quality standards?	xceeds 20-yr 1-Hr standards and/or no resource concerns eparture from standards and/or minor resource concerns eparture from standards and/or major resource concerns ad departure from standards/failure to address concerns designed to maintain resource protection during a 20-year
2) Are BMP measures constructed according to contract design specifications? Additional Comments:	1
 <u>Effectiveness</u> Note: Effective and adequate maintenance of BMP measures should be included within the effectiveness evaluation. When topic is not applicable, please make informational comment. 1) Source area erosion control. Protection and stabilization of structure site, particularly and the effective relation of the effective relation of the effective relation of the effective relation. 	Implementation Score: I (BMP Monitoring Rule Set)
(Note the evidence of erosion processes such as rills, guillies, sediment scour and/or deposition pumice slopes, or deteriorated granitic areas) or areas identified for revegetation in structure pla separately)	on- or on-site, specifically areas naturally devoid of vegetation (e.g. n, see structure sketch. Constructed cut and fill slopes are addressed

۱() ؛	Nearly 70% coverage of any erodible surfaces, and no evidence of erosion.	• Structure site exhibits less than full cover of soil; however, only minor erosion is evident and subsequent deposition is limited to on-site areas excluding deposition within any on-site SEZ.	Areas of exposed soil are observed, and erosion is evident and extensive (for example sediment is transported off-site or directly to SEZ.	⊖ NA
Ob Icce	served progression/improvement of areas essful revegetation, such as temporary arm	identified for revegetation in structure plan as sch oring measures (including mulch, rock, erosion cl	eduled; and adequate erosion protection measure oth or other) applied while vegetation becomes es	s applied for tablished
	Revegetation establishment proceeding as expectednew and existing vegetative cover in combination with temporary BMP measures are effective at eliminating/ mitigating erosion processes from those areas.	Revegetation efforts are not proceeding as expected. Minor additional efforts are required for successful revegetation establishment, or minor maintenance/retrofit of temporary BMP measures applied (for erosion control during revegetation efforts) is needed.	Temporary BMP measures provide inadequate erosion control, and/or specified revegetation efforts are deemed unsuccessful, as major modifications are needed to achieve vegetative ground cover goals and success. OR major on- site erosion, or any evidence of sediment delivery to SEZ.	⊖ NA
:) C	Cut and fill slope protection (including surfac	e erosion and slope failure potential).		
	BMP measures (including seeding/planting, with mulch of pine straw, designed swales, retention walls or use of erosion control blankets) applied to cut or fill slopes are adequate to prevent erosion. Craks or slumping is not evident.	BMP measures applied (see the previous checkbox) exhibit minor erosion and/or deposition is noted at base of cut or fill slope, near retention walls or around erosion control blankets or mulch. However, erosion is limited to on-site areas excluding any transport to SEZ. Or retaining wall integrity is showing signs of concern, such as bulging or wavy appearance.	BMP measures are inadequate to protect erosion on cut and fill slopes from storms <20 year1 hour event; or any evidence of sediment transport and/or deposition within SEZ is observed. Or cracks are present and appear to be threatening integrity of fill and/or retaining wall. Or the occurrence of any fillslope failure has occurred.	⊖ NA

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

 Natural or newly constructed drainage control and infiltration systems are adequate to eliminate erosion and sediment transport processes. No evidence of erosion or sediment movement on-site. 	• Observed evidence of minor on-site erosion and sediment transport, but limited to on-site deposition, and no evidence of transport to any SEZ.	Observed evidence of substantial on-site erosion such as frequent rill formation or any observation of gully features observed, or any evidence of sediment transport to SEZ. OR where major maintenance or adaptive erosion control strategies are required for resource protection. OR where water quality data indicates exceedance of state standards.	⊖ NA
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• No evidence of unexpected ponding on- site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	⊖ NA
3) Effectiveness of hazardous substance co	ntrol measures.		
(Evaluate the effectiveness, or lack of, BMP and Spill Coordinator if accidental spill has occurred a) Evaluate the occurrence and mitigation of h	oplied to control hazardous chemical delivery to d.) azardous/toxic substances used for building an	soils, groundwater or surface water bodies. Conta	act Hazardous indirect effects upon
water quality.			· .
• Hazardous substance control measures provide effective mitigation.	Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	 Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader. 	⊖ NA
		Effectiveness	Score: E
Additional Comments		(BMP Monitori	ng Rule Set)

Drip line infiltration trenches with sedimentation basins are free of sediment and debris after winter season. Effective cover could be improved and slope on west side of building has evidence of erosion.

UTM Zone 11 Easting 249072 Northing 4314387 Building/Structure Name East Peak Well (old) Date of Project Start Date of Project End	ID# 361 Selection Code S03 Township 13N Range 19E Section 31 6th Field HUC Watershed NV-2+5 State NV
Reviewer(s)	
K. Roaldson Survey Date 9/9/2011 Date BMP Im	Last BMP Maintenance
Structure Type: Other Survey Type 6th Year Post Constr De	pth/Duration: Other (Describe) Utility
Plan Title: Work Plan; East Peak Replacement Well Job No.:	Plan Date: 08-25-2003 Plan Revision Date:
Implementation	
For Permanent or Temporary-Seasonal Structures:	1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns 2=Minor departure from standards and/or minor resource concerns 3=Major departure from standards and/or major resource concerns 4=Repeated departure from standards/failure to address concerns
1) Were source control, drainage and infiltration systems, and hazardous material con 1-hour Storm Event, to achieve Forest Service and State water quality standards?	trol systems designed to maintain resource protection during a 20-year
2) Are BMP measures constructed according to contract design specifications?	1
Additional Comments:	
Effectiveness	Implementation Score:
Note: Effective and adequate maintenance of BMP measures should be included w effectiveness evaluation. When topic is not applicable, please make informational of	thin the (BMP Monitoring Rule Set) omment.
1) Source area erosion control. Protection and stabilization of structure site, p	articularly any erosive areas.
(Note the evidence of erosion processes such as rills, gullies, sediment scour and/ pumice slopes, or deteriorated granitic areas) or areas identified for revegetation ir separately)	or deposition on- or off-site, specifically areas naturally devoid of vegetation (e.g. structure plan, see structure sketch. Constructed cut and fill slopes are addressed

ا• ؛	Nearly 70% coverage of any erodible surfaces, and no evidence of erosion.	Structure site exhibits less than full cover of soil; however, only minor erosion is evident and subsequent deposition is limited to on-site areas excluding deposition within any on-site SEZ.	 Areas of exposed soil are observed, and erosion is evident and extensive (for example sediment is transported off-site or directly to SEZ. 	⊖ NA
Ob ICCE	served progression/improvement of areas ssful revegetation, such as temporary arm	identified for revegetation in structure plan as sch oring measures (including mulch, rock, erosion cl	eduled; and adequate erosion protection measure oth or other) applied while vegetation becomes es	s applied for tablished
	Revegetation establishment proceeding as expectednew and existing vegetative cover in combination with temporary BMP measures are effective at eliminating/ mitigating erosion processes from those areas.	Revegetation efforts are not proceeding as expected. Minor additional efforts are required for successful revegetation establishment, or minor maintenance/retrofit of temporary BMP measures applied (for erosion control during revegetation efforts) is needed.	Temporary BMP measures provide inadequate erosion control, and/or specified revegetation efforts are deemed unsuccessful, as major modifications are needed to achieve vegetative ground cover goals and success. OR major on- site erosion, or any evidence of sediment delivery to SEZ.	⊖ NA
c) C	tut and fill slope protection (including surface	ce erosion and slope failure potential).		
	BMP measures (including seeding/planting, with mulch of pine straw, designed swales, retention walls or use of erosion control blankets) applied to cut or fill slopes are adequate to prevent erosion. Craks or slumping is not evident.	BMP measures applied (see the previous checkbox) exhibit minor erosion and/or deposition is noted at base of cut or fill slope, near retention walls or around erosion control blankets or mulch. However, erosion is limited to on-site areas excluding any transport to SEZ. Or retaining wall integrity is showing signs of concern, such as bulging or wavy appearance.	BMP measures are inadequate to protect erosion on cut and fill slopes from storms <20 year1 hour event; or any evidence of sediment transport and/or deposition within SEZ is observed. Or cracks are present and appear to be threatening integrity of fill and/or retaining wall. Or the occurrence of any fillslope failure has occurred.	⊖ NA

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

	Natural or newly constructed drainage control and infiltration systems are adequate to eliminate erosion and sediment transport processes. No evidence of erosion or sediment movement on-site.	Observed evidence of minor on-site erosion and sediment transport, but limited to on-site deposition, and no evidence of transport to any SEZ.	Observed evidence of substantial on-site erosion such as frequent rill formation or any observation of gully features observed, or any evidence of sediment transport to SEZ. OR where major maintenance or adaptive erosion control strategies are required for resource protection. OR where water quality data indicates exceedance of state standards.	⊖ NA
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• No evidence of unexpected ponding on- site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	○ Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	⊖ NA
3) Effectiveness of hazardous substance co	ntrol measures.		
(Evaluate the effectiveness, or lack of, BMP a Spill Coordinator if accidental spill has occurre	pplied to control hazardous chemical delivery to ed.)	soils, groundwater or surface water bodies. Conta	act Hazardous
a) Evaluate the occurrence and mitigation of h water quality.	azardous/toxic substances used for building and	d vehicle maintenance, and associated direct and	indirect effects upon
• Hazardous substance control measures provide effective mitigation.	Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	 Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader. 	⊖ NA
		Effectiveness	Score: E
Additional Comments		(BMP Monitori	ng Rule Set)
No evidence of erosion or ponding around w	ell head. Straw bales still placed around well he	ad. Reveg taking place, vigorous growth.	

T.

UTM Zone 11 Easting 248976 Northing 4314389 Form HV2: Permanent BMPs for Buildings and Structure Developments Selection	ID# 362 Code S03
Building/Structure Name East Peak Water Tank Township 13N	Range 18E Section 31
Date of Project Start 7/16/2005 Date of Project End 6th Field HUC Watershed NV- Reviewer(s)	-2+5 State NV
K. Roaldson Survey Date 9/9/2011 Date BMP Implementation Complete	Last BMP Maintenance
Structure Type: Other Survey Type 6th Year Post Constr Depth/Duration: Other (Describe)	Water Tank
Plan Title: East Peak Water Tank Grading Plan Job No.: 00-607-43 Plan Date: 7/6/05	Plan Revision Date:
Specific concerns associated with construction project and describe BMP measures designed to achieve resource protection.	
See Plans: Erosion resulting from concentrated runoff flows from compacted areas (roads and parking areas). Potential for concerning foundation surfaces.	entrated flows from tank and
Implementation 1=Meets/Exceeds 20-yr 1-Hr standards and 2=Minor departure from standards and/or n 3=Major departure from standards and/or n 4=Repeated departure from standards/failu	d/or no resource concerns ninor resource concerns najor resource concerns ire to address concerns
1) Were source control, drainage and infiltration systems, and hazardous material control systems designed to maintain resource p 1-hour Storm Event, to achieve Forest Service and State water quality standards?	protection during a 20-year
2) Are BMP measures constructed according to contract design specifications?	1
Additional Comments:	, ,
Effectiveness	Implementation Score:
Note: Effective and adequate maintenance of BMP measures should be included within the effectiveness evaluation. When topic is not applicable, please make informational comment.	(BMP Monitoring Rule Set)
1) Source area erosion control. Protection and stabilization of structure site, particularly any erosive areas.	
(Note the evidence of erosion processes such as rills, gullies, sediment scour and/or deposition on- or off-site, specifically areas pumice slopes, or deteriorated granitic areas) or areas identified for revegetation in structure plan, see structure sketch. Constru separately)	naturally devoid of vegetation (e.g. ucted cut and fill slopes are addressed

10 8	Nearly 70% coverage of any erodible surfaces, and no evidence of erosion.	• Structure site exhibits less than full cover of soil; however, only minor erosion is evident and subsequent deposition is limited to on-site areas excluding deposition within any on-site SEZ.	Areas of exposed soil are observed, and erosion is evident and extensive (for example sediment is transported off-site or directly to SEZ.	⊖ NA
Ob Icce	essful revegetation, such as temporary arm	identified for revegetation in structure plan as sch oring measures (including mulch, rock, erosion cl	eduled; and adequate erosion protection measure oth or other) applied while vegetation becomes es	s applied for tablished
0	Revegetation establishment proceeding as expectednew and existing vegetative cover in combination with temporary BMP measures are effective at eliminating/ mitigating erosion processes from those areas.	• Revegetation efforts are not proceeding as expected. Minor additional efforts are required for successful revegetation establishment, or minor maintenance/retrofit of temporary BMP measures applied (for erosion control during revegetation efforts) is needed.	Temporary BMP measures provide inadequate erosion control, and/or specified revegetation efforts are deemed unsuccessful, as major modifications are needed to achieve vegetative ground cover goals and success. OR major on- site erosion, or any evidence of sediment delivery to SEZ.	⊖ NA
:) C	Cut and fill slope protection (including surfac	e erosion and slope failure potential).		
	BMP measures (including seeding/planting, with mulch of pine straw, designed swales, retention walls or use of erosion control blankets) applied to cut or fill slopes are adequate to prevent erosion. Craks or slumping is not evident.	BMP measures applied (see the previous checkbox) exhibit minor erosion and/or deposition is noted at base of cut or fill slope, near retention walls or around erosion control blankets or mulch. However, erosion is limited to on-site areas excluding any transport to SEZ. Or retaining wall integrity is showing signs of concern, such as bulging or wavy appearance.	BMP measures are inadequate to protect erosion on cut and fill slopes from storms <20 year1 hour event; or any evidence of sediment transport and/or deposition within SEZ is observed. Or cracks are present and appear to be threatening integrity of fill and/or retaining wall. Or the occurrence of any fillslope failure has occurred.	⊖ NA

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

 Natural or newly constructed drainage control and infiltration systems are adequate to eliminate erosion and sediment transport processes. No evidence of erosion or sediment movement on-site. 	 Observed evidence of minor on-site erosion and sediment transport, but limited to on-site deposition, and no evidence of transport to any SEZ. 	Observed evidence of substantial on-site erosion such as frequent rill formation or any observation of gully features observed, or any evidence of sediment transport to SEZ. OR where major maintenance or adaptive erosion control strategies are required for resource protection. OR where water quality data indicates exceedance of state standards.	⊖ NA
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site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	 Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm. 	or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	
Effectiveness of hazardous substance of	control measures.	soile aroundwater or ourface water bodies. Contr	ot Hozordouo
Evaluate the effectiveness, or lack of, BMP spill Coordinator if accidental spill has occur	applied to control nazardous chemical delivery to red.)	solis, groundwater of surface water bodies. Conta	ict Hazardous
) Evaluate the occurrence and mitigation of vater quality.	hazardous/toxic substances used for building and	d vehicle maintenance, and associated direct and	indirect effects upon
 Hazardous substance control measures provide effective mitigation. 	Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	 Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader. 	○ NA
		Effectiveness S	Score: m

UTM Zone Form HV2: Permanent BMPs for B Easting and Structure Developments	uildings Selection Code S03	363
Building/Structure Name E. Peak Water Line Replacement	Township 13N Range 19E	Section 31
Date of Project Start Date of Project End Reviewer(s)	6th Field HUC Watershed NV-2+5 State	e NV
K. Roaldson Survey Date 9/9/2011 Date BMP Imp	lementation Complete	e
Structure Type: Other Survey Type 6th Year Post Constr Dep	oth/Duration: Other (Describe) Utility	
Plan Title: East Peak Water Line Replacement Job No.: 00-607.26	Plan Date: 08-06-2004 Plan Revision Date:	
Specific concerns associated with construction project and describe BMP measures de	signed to achieve resource protection.	
See Plans. Concentrated runoff from compacted (roads and pag areas) and hard surfa	aces (pumphouse roof).	
Implementation For Permanent or Temporary-Seasonal Structures: 1) Were source control, drainage and infiltration systems, and hazardous material control	1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concer 2=Minor departure from standards and/or minor resource concer 3=Major departure from standards and/or major resource concer 4=Repeated departure from standards/failure to address concerr trol systems designed to maintain resource protection during a 20-	erns ns ns is
1-hour Storm Event, to achieve Forest Service and State water quality standards?		
2) Are BMP measures constructed according to contract design specifications?		1
Additional Comments:		
Effectiveness	Implementation Se	core:
Note: Effective and adequate maintenance of BMP measures should be included wit effectiveness evaluation. When topic is not applicable, please make informational co	hin the (BMP Monitoring F omment.	Rule Set)
1) Source area erosion control. Protection and stabilization of structure site, pa	articularly any erosive areas.	
(Note the evidence of erosion processes such as rills, gullies, sediment scour and/o pumice slopes, or deteriorated granitic areas) or areas identified for revegetation in separately)	r deposition on- or off-site, specifically areas naturally devoid of ve structure plan, see structure sketch. Constructed cut and fill slope	getation (e.g. s are addressed

ا• ؛	Nearly 70% coverage of any erodible surfaces, and no evidence of erosion.	Structure site exhibits less than full cover of soil; however, only minor erosion is evident and subsequent deposition is limited to on-site areas excluding deposition within any on-site SEZ.	 Areas of exposed soil are observed, and erosion is evident and extensive (for example sediment is transported off-site or directly to SEZ. 	⊖ NA
Ob ICCE	served progression/improvement of areas ssful revegetation, such as temporary arm	identified for revegetation in structure plan as sch oring measures (including mulch, rock, erosion cl	eduled; and adequate erosion protection measure oth or other) applied while vegetation becomes es	s applied for tablished
	Revegetation establishment proceeding as expectednew and existing vegetative cover in combination with temporary BMP measures are effective at eliminating/ mitigating erosion processes from those areas.	Revegetation efforts are not proceeding as expected. Minor additional efforts are required for successful revegetation establishment, or minor maintenance/retrofit of temporary BMP measures applied (for erosion control during revegetation efforts) is needed.	Temporary BMP measures provide inadequate erosion control, and/or specified revegetation efforts are deemed unsuccessful, as major modifications are needed to achieve vegetative ground cover goals and success. OR major on- site erosion, or any evidence of sediment delivery to SEZ.	⊖ NA
c) C	tut and fill slope protection (including surface	ce erosion and slope failure potential).		
	BMP measures (including seeding/planting, with mulch of pine straw, designed swales, retention walls or use of erosion control blankets) applied to cut or fill slopes are adequate to prevent erosion. Craks or slumping is not evident.	BMP measures applied (see the previous checkbox) exhibit minor erosion and/or deposition is noted at base of cut or fill slope, near retention walls or around erosion control blankets or mulch. However, erosion is limited to on-site areas excluding any transport to SEZ. Or retaining wall integrity is showing signs of concern, such as bulging or wavy appearance.	BMP measures are inadequate to protect erosion on cut and fill slopes from storms <20 year1 hour event; or any evidence of sediment transport and/or deposition within SEZ is observed. Or cracks are present and appear to be threatening integrity of fill and/or retaining wall. Or the occurrence of any fillslope failure has occurred.	⊖ NA

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

	Natural or newly constructed drainage control and infiltration systems are adequate to eliminate erosion and sediment transport processes. No evidence of erosion or sediment movement on-site.	Observed evidence of minor on-site erosion and sediment transport, but limited to on-site deposition, and no evidence of transport to any SEZ.	Observed evidence of substantial on-site erosion such as frequent rill formation or any observation of gully features observed, or any evidence of sediment transport to SEZ. OR where major maintenance or adaptive erosion control strategies are required for resource protection. OR where water quality data indicates exceedance of state standards.	⊖ NA
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site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	
) Effectiveness of hazardous substance co	ontrol measures.		
(Evaluate the effectiveness, or lack of, BMP a Spill Coordinator if accidental spill has occurre	pplied to control hazardous chemical delivery to ed.)	soils, groundwater or surface water bodies. Conta	act Hazardous
a) Evaluate the occurrence and mitigation of h water quality.	nazardous/toxic substances used for building and	d vehicle maintenance, and associated direct and	indirect effects upon
 a) Evaluate the occurrence and mitigation of hwater quality. Hazardous substance control measures provide effective mitigation. 	 Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events). 	 Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader. 	indirect effects upon
 a) Evaluate the occurrence and mitigation of hwater quality. Hazardous substance control measures provide effective mitigation. 	 Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events). 	d vehicle maintenance, and associated direct and Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader. Effectiveness	indirect effects upon O NA Score:

UTM Zone 11	ID# 360
Easting 249576 Form HV2: Permanent BMPs for I	3uildings Selection Code S03
Northing 4315370 and Structure Developments	
Building/Structure Name Stagecoach Snowmaking	Township 13N Range 19E Section 30
Date of Project Start 9/10/2008 Date of Project End 10/15/2008 Reviewer(s)	6th Field HUC Watershed NV-2+5 State NV
K. Roaldson Survey Date 9/21/2011 Date BMP Im	plementation Complete 9/25/2009 Last BMP Maintenance
Structure Type: Other Survey Type 3rd Year Post Constr D	epth/Duration: Other (Describe) Snowmaking Line
Plan Title: Stagecoach Snowmaking Project Description a Job No.: 08151.1	Plan Date: 7/30/2008 Plan Revision Date:
Specific concerns associated with construction project and describe BMP measures of	esigned to achieve resource protection.
ļ	
Implementation	
	1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns
For Permanent or Temporary-Seasonal Structures:	3=Major departure from standards and/or major resource concerns 4=Repeated departure from standards/failure to address concerns
1) Were source control, drainage and infiltration systems, and hazardous material co 1-hour Storm Event, to achieve Forest Service and State water quality standards?	ntrol systems designed to maintain resource protection during a 20-year
2) Are BMP measures constructed according to contract design specifications?	1
Additional Comments:	
Effectiveness	Implementation Score:
Note: Effective and adequate maintenance of BMP measures should be included we effectiveness evaluation. When topic is not applicable, please make informational	ithin the (BMP Monitoring Rule Set) comment.
1) Source area erosion control. Protection and stabilization of structure site,	particularly any erosive areas.
(Note the evidence of erosion processes such as rills, gullies, sediment scour and pumice slopes, or deteriorated granitic areas) or areas identified for revegetation i separately)	or deposition on- or off-site, specifically areas naturally devoid of vegetation (e.g. structure plan, see structure sketch. Constructed cut and fill slopes are addressed

ا• ؛	Nearly 70% coverage of any erodible surfaces, and no evidence of erosion.	Structure site exhibits less than full cover of soil; however, only minor erosion is evident and subsequent deposition is limited to on-site areas excluding deposition within any on-site SEZ.	 Areas of exposed soil are observed, and erosion is evident and extensive (for example sediment is transported off-site or directly to SEZ. 	⊖ NA
Ob ICCE	served progression/improvement of areas ssful revegetation, such as temporary arm	identified for revegetation in structure plan as sch oring measures (including mulch, rock, erosion cl	eduled; and adequate erosion protection measure oth or other) applied while vegetation becomes es	s applied for tablished
	Revegetation establishment proceeding as expectednew and existing vegetative cover in combination with temporary BMP measures are effective at eliminating/ mitigating erosion processes from those areas.	Revegetation efforts are not proceeding as expected. Minor additional efforts are required for successful revegetation establishment, or minor maintenance/retrofit of temporary BMP measures applied (for erosion control during revegetation efforts) is needed.	Temporary BMP measures provide inadequate erosion control, and/or specified revegetation efforts are deemed unsuccessful, as major modifications are needed to achieve vegetative ground cover goals and success. OR major on- site erosion, or any evidence of sediment delivery to SEZ.	⊖ NA
c) C	tut and fill slope protection (including surface	ce erosion and slope failure potential).		
	BMP measures (including seeding/planting, with mulch of pine straw, designed swales, retention walls or use of erosion control blankets) applied to cut or fill slopes are adequate to prevent erosion. Craks or slumping is not evident.	BMP measures applied (see the previous checkbox) exhibit minor erosion and/or deposition is noted at base of cut or fill slope, near retention walls or around erosion control blankets or mulch. However, erosion is limited to on-site areas excluding any transport to SEZ. Or retaining wall integrity is showing signs of concern, such as bulging or wavy appearance.	BMP measures are inadequate to protect erosion on cut and fill slopes from storms <20 year1 hour event; or any evidence of sediment transport and/or deposition within SEZ is observed. Or cracks are present and appear to be threatening integrity of fill and/or retaining wall. Or the occurrence of any fillslope failure has occurred.	⊖ NA

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

	Natural or newly constructed drainage control and infiltration systems are adequate to eliminate erosion and sediment transport processes. No evidence of erosion or sediment movement on-site.	Observed evidence of minor on-site erosion and sediment transport, but limited to on-site deposition, and no evidence of transport to any SEZ.	Observed evidence of substantial on-site erosion such as frequent rill formation or any observation of gully features observed, or any evidence of sediment transport to SEZ. OR where major maintenance or adaptive erosion control strategies are required for resource protection. OR where water quality data indicates exceedance of state standards.	⊖ NA
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No evidence of unexpected ponding on- site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	⊖ NA
3) Effectiveness of hazardous substance co	ntrol measures.		
(Evaluate the effectiveness, or lack of, BMP a Spill Coordinator if accidental spill has occurre	pplied to control hazardous chemical delivery to ed.)	soils, groundwater or surface water bodies. Conta	act Hazardous
 a) Evaluate the occurrence and mitigation of h water quality. 	azardous/toxic substances used for building and	d vehicle maintenance, and associated direct and	indirect effects upon
Hazardous substance control measures provide effective mitigation.	Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	 Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader. 	⊖ NA
		Effectiveness	Score: E
Additional Comments		(BMP Monitori	ng Rule Set)

Good cover above snowmaking line with pine needle mulch. Reveg is successful in areas that were watered along the road. Reveg not as successful along steep areas of the buried snowmaking line alignment. No evidence of rilling at fan gun bases.

UTM Zone 11 Easting 249582 Northing 4317073 Building/Structure Name Boulder Parking Lot (All Phases)	ID# 364 Selection Code \$03 Township 13N Range 19E Section 30
Date of Project Start 8/1/2003 Date of Project End 10/15/2005 Reviewer(s) K. Roaldson Survey Date 9/9/2011 Date BMP Imp Structure Type: Parking Lot Survey Type 6th Year Post Constr Dep	6th Field HUC Watershed NV-3 State NV Ilementation Complete Last BMP Maintenance oth/Duration: Other (Describe)
Plan Title: Boulder Parking Lot Water Quality Improvement Job No.: 00-607-04 Specific concerns associated with construction project and describe BMP measures de Erosion and/or sediment delivery to Edgewood Creek SEZ.	Plan Date: 04-01-2003 Plan Revision Date: 05-05-2003 signed to achieve resource protection.
Implementation For Permanent or Temporary-Seasonal Structures:	1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns 2=Minor departure from standards and/or minor resource concerns 3=Major departure from standards and/or major resource concerns 4=Repeated departure from standards/failure to address concerns
1-hour Storm Event, to achieve Forest Service and State water quality standards?2) Are BMP measures constructed according to contract design specifications?	
Additional Comments: Rock lined channels were not constructed on west slopes above parking lot to avoid a	dditional disturbance from construction activity.
 <u>Effectiveness</u> Note: Effective and adequate maintenance of BMP measures should be included wit effectiveness evaluation. When topic is not applicable, please make informational ca 1) Source area erosion control. Protection and stabilization of structure site. pa 	hin the (BMP Monitoring Rule Set) (BMP any erosive areas.
(Note the evidence of erosion processes such as rills, gullies, sediment scour and/or pumice slopes, or deteriorated granitic areas) or areas identified for revegetation in separately)	r deposition on- or off-site, specifically areas naturally devoid of vegetation (e.g. structure plan, see structure sketch. Constructed cut and fill slopes are addressed

اں ؛	Nearly 70% coverage of any erodible surfaces, and no evidence of erosion.	• Structure site exhibits less than full cover of soil; however, only minor erosion is evident and subsequent deposition is limited to on-site areas excluding deposition within any on-site SEZ.	Areas of exposed soil are observed, and erosion is evident and extensive (for example sediment is transported off-site or directly to SEZ.	⊖ NA
Ob JCC6	served progression/improvement of areas i ssful revegetation, such as temporary arm	identified for revegetation in structure plan as sch oring measures (including mulch, rock, erosion cl	eduled; and adequate erosion protection measure oth or other) applied while vegetation becomes es	es applied for tablished
	Revegetation establishment proceeding as expectednew and existing vegetative cover in combination with temporary BMP measures are effective at eliminating/ mitigating erosion processes from those areas.	Revegetation efforts are not proceeding as expected. Minor additional efforts are required for successful revegetation establishment, or minor maintenance/retrofit of temporary BMP measures applied (for erosion control during revegetation efforts) is needed.	Temporary BMP measures provide inadequate erosion control, and/or specified revegetation efforts are deemed unsuccessful, as major modifications are needed to achieve vegetative ground cover goals and success. OR major on- site erosion, or any evidence of sediment delivery to SEZ.	⊖ NA
c) C	ut and fill slope protection (including surfac	e erosion and slope failure potential).		
	BMP measures (including seeding/planting, with mulch of pine straw, designed swales, retention walls or use of erosion control blankets) applied to cut or fill slopes are adequate to prevent erosion. Craks or slumping is not evident.	BMP measures applied (see the previous checkbox) exhibit minor erosion and/or deposition is noted at base of cut or fill slope, near retention walls or around erosion control blankets or mulch. However, erosion is limited to on-site areas excluding any transport to SEZ. Or retaining wall integrity is showing signs of concern, such as bulging or wavy appearance.	BMP measures are inadequate to protect erosion on cut and fill slopes from storms <20 year1 hour event; or any evidence of sediment transport and/or deposition within SEZ is observed. Or cracks are present and appear to be threatening integrity of fill and/or retaining wall. Or the occurrence of any fillslope failure has occurred.) NA

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

	Natural or newly constructed drainage control and infiltration systems are adequate to eliminate erosion and sediment transport processes. No evidence of erosion or sediment movement on-site.	Observed evidence of minor on-site erosion and sediment transport, but limited to on-site deposition, and no evidence of transport to any SEZ.	Observed evidence of substantial on-site erosion such as frequent rill formation or any observation of gully features observed, or any evidence of sediment transport to SEZ. OR where major maintenance or adaptive erosion control strategies are required for resource protection. OR where water quality data indicates exceedance of state standards.	○ NA
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No evidence of unexpected ponding on- site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	⊖ NA
3) Effectiveness of hazardous substance co	ntrol measures.		
(Evaluate the effectiveness, or lack of, BMP a Spill Coordinator if accidental spill has occurre	pplied to control hazardous chemical delivery to ed.)	soils, groundwater or surface water bodies. Conta	ict Hazardous
 a) Evaluate the occurrence and mitigation of h water quality. 	azardous/toxic substances used for building and	d vehicle maintenance, and associated direct and	indirect effects upon
 Hazardous substance control measures provide effective mitigation. 	Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	 Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader.) NA
		Effectiveness S	Score: E

Additional Comments

(BMP Monitoring Rule Set)

Minor erosion from parking lot runoff into SEZ near Boulder Lodge Driveway. Slopes above parking lot show some sediment transport but does not move offsite. Some fuel leaking onto paved area from parked snow moving equipment.

UTM Zone 11 Easting 248727 Northing 4314571 Building/Structure Name Nevada Fuel Station (\$100 Saddle)	Buildings ID# 349 Selection Code S05 Township 13N Range 19E Section 31
Date of Project Start Date of Project End Reviewer(s)	6th Field HUC Watershed NV-3 State NV
K. Roaldson Survey Date 9/9/2011 Date BMP Im	blementation Complete Last BMP Maintenance
Structure Type: Other Survey Type 6th Year Post Constr De	pth/Duration: Other (Describe) Utility
Plan Title: None Job No.: None	Plan Date: None Plan Revision Date: None
Hazardous materials storage area. Runoff produced from hard-surface (concrete) are Implementation For Permanent or Temporary-Seasonal Structures: 1) Were source control, drainage and infiltration systems, and hazardous material con 1-hour Storm Event, to achieve Forest Service and State water quality standards?	 a. Erosion from concentrated runoff potential. 1=Meets/Exceeds 20-yr 1-Hr standards and/or no resource concerns 2=Minor departure from standards and/or minor resource concerns 3=Major departure from standards and/or major resource concerns 4=Repeated departure from standards/failure to address concerns
2) Are BMP measures constructed according to contract design specifications?	1
Additional Comments:	
None	
Effectiveness	Implementation Score:
Note: Effective and adequate maintenance of BMP measures should be included w effectiveness evaluation. When topic is not applicable, please make informational or	thin the (BMP Monitoring Rule Set) comment.
1) Source area erosion control. Protection and stabilization of structure site, p	articularly any erosive areas.
(Note the evidence of erosion processes such as rills, gullies, sediment scour and/ pumice slopes, or deteriorated granitic areas) or areas identified for revegetation in separately)	or deposition on- or off-site, specifically areas naturally devoid of vegetation (e.g. structure plan, see structure sketch. Constructed cut and fill slopes are addressed

()N ຣເ	early 70% coverage of any erodible urfaces, and no evidence of erosion.	Structure site exhibits less than full cover of soil; however, only minor erosion is evident and subsequent deposition is limited to on-site areas excluding deposition within any on-site SEZ.	 Areas of exposed soil are observed, and erosion is evident and extensive (for example sediment is transported off-site or directly to SEZ. 	⊖ NA
Obs Icces	erved progression/improvement of areas i ssful revegetation, such as temporary armo	dentified for revegetation in structure plan as sch oring measures (including mulch, rock, erosion cl	eduled; and adequate erosion protection measure oth or other) applied while vegetation becomes es	es applied for tablished
•	Revegetation establishment proceeding as expectednew and existing vegetative cover in combination with temporary BMP measures are effective at eliminating/ mitigating erosion processes from those areas.	Revegetation efforts are not proceeding as expected. Minor additional efforts are required for successful revegetation establishment, or minor maintenance/retrofit of temporary BMP measures applied (for erosion control during revegetation efforts) is needed.	Temporary BMP measures provide inadequate erosion control, and/or specified revegetation efforts are deemed unsuccessful, as major modifications are needed to achieve vegetative ground cover goals and success. OR major on- site erosion, or any evidence of sediment delivery to SEZ.	⊖ NA
c) Cu	it and fill slope protection (including surfac	e erosion and slope failure potential).		
٠	BMP measures (including seeding/planting, with mulch of pine straw, designed swales, retention walls or use of erosion control blankets) applied to cut or fill slopes are adequate to prevent erosion. Craks or slumping is not evident.	BMP measures applied (see the previous checkbox) exhibit minor erosion and/or deposition is noted at base of cut or fill slope, near retention walls or around erosion control blankets or mulch. However, erosion is limited to on-site areas excluding any transport to SEZ. Or retaining wall integrity is showing signs of concern, such as bulging or wavy appearance.	BMP measures are inadequate to protect erosion on cut and fill slopes from storms <20 year1 hour event; or any evidence of sediment transport and/or deposition within SEZ is observed. Or cracks are present and appear to be threatening integrity of fill and/or retaining wall. Or the occurrence of any fillslope failure has occurred.	⊖ NA

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

	Natural or newly constructed drainage control and infiltration systems are adequate to eliminate erosion and sediment transport processes. No evidence of erosion or sediment movement on-site.	Observed evidence of minor on-site erosion and sediment transport, but limited to on-site deposition, and no evidence of transport to any SEZ.	Observed evidence of substantial on-site erosion such as frequent rill formation or any observation of gully features observed, or any evidence of sediment transport to SEZ. OR where major maintenance or adaptive erosion control strategies are required for resource protection. OR where water quality data indicates exceedance of state standards.	○ NA
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No evidence of unexpected ponding on- site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	⊖ NA
3) Effectiveness of hazardous substance co	ontrol measures.		
(Evaluate the effectiveness, or lack of, BMP a Spill Coordinator if accidental spill has occurre	pplied to control hazardous chemical delivery to ed.)	soils, groundwater or surface water bodies. Cont	act Hazardous
a) Evaluate the occurrence and mitigation of h water quality.	nazardous/toxic substances used for building and	d vehicle maintenance, and associated direct and	indirect effects upon
Hazardous substance control measures provide effective mitigation.	Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	 Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader. 	⊖ NA
		Effectiveness	Score: E
Additional Comments		(BMP Monitori	ng Rule Set)

No evidence of hazardous substances out of containment area, no drips or spills in containment area. Additional coverage downslope from the site where water concentrates from the site would be beneficial.
UTM Zone 11 Easting 249840 Northing 4316356 D 11 Form HV2: Permar and Structure Deve	ent BMPs for Buildings elopments	Select	ID# tion Code S02	359
Building/Structure Name Stagecoach Lower Terminal			Range 19E Sec	ation 30
Date of Project Start Date of Project End Reviewer(s)	10/15/2008	6th Field HUC Watershed	NV-2+5 State	NV
K. Roaldson Survey Date 9/9/20	11 Date BMP Implementation	Complete	Last BMP Maintenance	
Structure Type: Lift-Base Survey Type 3rd Ye	ear Post Constr Depth/Duration:	Other (Descrit	be) Completed BMP Proj.	
Plan Title: 1998 Implementation: Stagecoach Lift Erosion Jo	b No.: 98604.1 Pla	an Date: 08/11/98	Plan Revision Date:	
Specific concerns associated with construction project and descril	e BMP measures designed to ac	hieve resource protection.		
Effective cover around lift, drip line infiltration areas.				
Implementation For Permanent or Temporary-Seasonal Structures: 1) Were source control, drainage and infiltration systems, and had them Storm Event to ophious Ecret Service and Stote water and them Store Service and Stote water and them Store Service and Stote water and the service Service and Stote water and the service Service Service and Stote water and the service S	1=Meets/E 2=Minor de 3=Major de 4=Repeate	xceeds 20-yr 1-Hr standards eparture from standards and/c eparture from standards and/c d departure from standards/fa designed to maintain resourc	and/or no resource concerns or minor resource concerns or major resource concerns ailure to address concerns exe protection during a 20-year	
2) Are BMP measures constructed according to contract design s	pecifications?			1
Additional Comments:				
Effectiveness			Implementation Score	:
Note: Effective and adequate maintenance of BMP measures s effectiveness evaluation. When topic is not applicable, please	hould be included within the nake informational comment.		(BMP Monitoring Rule	e Set)
1) Source area erosion control. Protection and stabilization	of structure site, particularly a	ny erosive areas.		
(Note the evidence of erosion processes such as rills, gullies, pumice slopes, or deteriorated granitic areas) or areas identified separately)	ediment scour and/or deposition d for revegetation in structure pla	on- or off-site, specifically are n, see structure sketch. Cons	eas naturally devoid of vegeta structed cut and fill slopes and	ation (e.g. e addressed

ا• ؛	Nearly 70% coverage of any erodible surfaces, and no evidence of erosion.	Structure site exhibits less than full cover of soil; however, only minor erosion is evident and subsequent deposition is limited to on-site areas excluding deposition within any on-site SEZ.	 Areas of exposed soil are observed, and erosion is evident and extensive (for example sediment is transported off-site or directly to SEZ. 	⊖ NA
Ob ICCE	served progression/improvement of areas ssful revegetation, such as temporary arm	identified for revegetation in structure plan as sch oring measures (including mulch, rock, erosion cl	eduled; and adequate erosion protection measure oth or other) applied while vegetation becomes es	s applied for tablished
	Revegetation establishment proceeding as expectednew and existing vegetative cover in combination with temporary BMP measures are effective at eliminating/ mitigating erosion processes from those areas.	Revegetation efforts are not proceeding as expected. Minor additional efforts are required for successful revegetation establishment, or minor maintenance/retrofit of temporary BMP measures applied (for erosion control during revegetation efforts) is needed.	Temporary BMP measures provide inadequate erosion control, and/or specified revegetation efforts are deemed unsuccessful, as major modifications are needed to achieve vegetative ground cover goals and success. OR major on- site erosion, or any evidence of sediment delivery to SEZ.	⊖ NA
c) C	tut and fill slope protection (including surface	ce erosion and slope failure potential).		
	BMP measures (including seeding/planting, with mulch of pine straw, designed swales, retention walls or use of erosion control blankets) applied to cut or fill slopes are adequate to prevent erosion. Craks or slumping is not evident.	BMP measures applied (see the previous checkbox) exhibit minor erosion and/or deposition is noted at base of cut or fill slope, near retention walls or around erosion control blankets or mulch. However, erosion is limited to on-site areas excluding any transport to SEZ. Or retaining wall integrity is showing signs of concern, such as bulging or wavy appearance.	BMP measures are inadequate to protect erosion on cut and fill slopes from storms <20 year1 hour event; or any evidence of sediment transport and/or deposition within SEZ is observed. Or cracks are present and appear to be threatening integrity of fill and/or retaining wall. Or the occurrence of any fillslope failure has occurred.	⊖ NA

2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Functioning condition (potential for sediment and/or nutrient delivery to SEZ) of designated infiltration zones, such as detention basins, settling ponds, driplines, gravel armor areas or infiltration trenches, as well as any system outlets.

	Natural or newly constructed drainage control and infiltration systems are adequate to eliminate erosion and sediment transport processes. No evidence of erosion or sediment movement on-site.	Observed evidence of minor on-site erosion and sediment transport, but limited to on-site deposition, and no evidence of transport to any SEZ.	Observed evidence of substantial on-site erosion such as frequent rill formation or any observation of gully features observed, or any evidence of sediment transport to SEZ. OR where major maintenance or adaptive erosion control strategies are required for resource protection. OR where water quality data indicates exceedance of state standards.	⊖ NA
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b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

No evidence of unexpected ponding on- site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	<u>∩</u> NA
3) Effectiveness of hazardous substance co	ntrol measures.	colle groundwater er ourfoge water bodige. Contre	at Hazardaya
Spill Coordinator if accidental spill has occurre	pplied to control nazardous chemical delivery to ed.)	solis, groundwater of surface water bodies. Conta	ICT Hazardous
a) Evaluate the occurrence and mitigation of h water quality.	azardous/toxic substances used for building and	d vehicle maintenance, and associated direct and	indirect effects upon
Hazardous substance control measures provide effective mitigation.	Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	 Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader.) NA
		Effectiveness S	Score: E

(BMP Monitoring Rule Set)

Reveg is vigorous, high traffic areas are covered with wood chips and drip line infiltration trenches are installed and functioning. Slope south of lift terminal shows erosion but is typical for decomposed granite soil slope, no evidence of erosion is attributed to the lift terminal.

Additional Comments

UTM Zone 11 Easting 248893 Northing 431974 Duilding (Structure Name) Chi Tabil (42 (March)	BMPs for Buildings nents	Selection C	ID#	367
Building/Structure Name Ski Trail V12 (Nova)			Range 18E Se	iction 36
Date of Project Start Date of Project End Reviewer(s)	6th Fi	eld HUC Watershed NV-2-	+5 State	NV
T. Osterhout Survey Date 9/16/2011	Date BMP Implementation Compl	Las	st BMP Maintenance	
Structure Type: Ski Trail Survey Type 3rd Year Pos	st Constr Depth/Duration:	Other (Describe)		
Plan Title: Job No.:	Plan Date	e: Pla	an Revision Date:	
Specific concerns associated with construction project and describe BM	P measures designed to achieve r	esource protection.		
See Hard Copy of Form V28: Vegetation Manipulation				
Implementation For Permanent or Temporary-Seasonal Structures: 1) Were source control, drainage and infiltration systems, and hazardou	1=Meets/Exceeds 2=Minor departur 3=Major departur 4=Repeated depa	20-yr 1-Hr standards and/c e from standards and/or min e from standards and/or maj arture from standards/failure ed to maintain resource pro	or no resource concerns nor resource concerns to address concerns tection during a 20-yea	is
1-hour Storm Event, to achieve Forest Service and State water quality s	standards?			
2) Are BMP measures constructed according to contract design specific	cations?			
Additional Comments:				
Effectiveness			Implementation Scor	re: I
Note: Effective and adequate maintenance of BMP measures should effectiveness evaluation. When topic is not applicable, please make it	be included within the informational comment.		(BMP Monitoring Rul	le Set)
1) Source area erosion control. Protection and stabilization of str	ucture site, particularly any ero:	sive areas.		
(Note the evidence of erosion processes such as rills, gullies, sedime pumice slopes, or deteriorated granitic areas) or areas identified for r separately)	ent scour and/or deposition on- or evegetation in structure plan, see	off-site, specifically areas na structure sketch. Construct	aturally devoid of vege red cut and fill slopes a	tation (e.g. are addressed

) Soil Protection measures, artificial or vegetati	tve, designed to eliminate erosion by runoff and r	ain-drop impact	
Nearly 70% coverage of any erodible surfaces, and no evidence of erosion.	Structure site exhibits less than full cover of soil; however, only minor erosion is evident and subsequent deposition is limited to on-site areas excluding deposition within any on-site SEZ.	Areas of exposed soil are observed, and erosion is evident and extensive (for example sediment is transported off-site or directly to SEZ.) NA
Observed progression/improvement of areas accessful revegetation, such as temporary arm	identified for revegetation in structure plan as sch oring measures (including mulch, rock, erosion cl	eduled; and adequate erosion protection measure oth or other) applied while vegetation becomes es	s applied for tablished
Revegetation establishment proceeding as expectednew and existing vegetative cover in combination with temporary BMP measures are effective at eliminating/ mitigating erosion processes from those areas.	Revegetation efforts are not proceeding as expected. Minor additional efforts are required for successful revegetation establishment, or minor maintenance/retrofit of temporary BMP measures applied (for erosion control during revegetation efforts) is needed.	Temporary BMP measures provide inadequate erosion control, and/or specified revegetation efforts are deemed unsuccessful, as major modifications are needed to achieve vegetative ground cover goals and success. OR major on- site erosion, or any evidence of sediment delivery to SEZ.) NA
) Cut and fill slope protection (including surface	e erosion and slope failure potential).		
BMP measures (including seeding/planting, with mulch of pine straw, designed swales, retention walls or use of erosion control blankets) applied to cut or fill slopes are adequate to prevent erosion. Craks or slumping is not evident.	BMP measures applied (see the previous checkbox) exhibit minor erosion and/or deposition is noted at base of cut or fill slope, near retention walls or around erosion control blankets or mulch. However, erosion is limited to on-site areas excluding any transport to SEZ. Or retaining wall integrity is showing signs of concern, such as bulging or wavy appearance.	BMP measures are inadequate to protect erosion on cut and fill slopes from storms <20 year1 hour event; or any evidence of sediment transport and/or deposition within SEZ is observed. Or cracks are present and appear to be threatening integrity of fill and/or retaining wall. Or the occurrence of any fillslope failure has occurred.) NA

2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Functioning condition (potential for sediment and/or nutrient delivery to SEZ) of designated infiltration zones, such as detention basins, settling ponds, driplines, gravel armor areas or infiltration trenches, as well as any system outlets.

Natural or newly constructed drainage control and infiltration systems are adequate to eliminate erosion and sediment transport processes. No evidence of erosion or sediment movement on-site.	Observed evidence of minor on-site erosion and sediment transport, but limited to on-site deposition, and no evidence of transport to any SEZ.	Observed evidence of substantial on-site erosion such as frequent rill formation or any observation of gully features observed, or any evidence of sediment transport to SEZ. OR where major maintenance or adaptive erosion control strategies are required for resource protection. OR where water quality data indicates exceedance of state standards.) NA
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b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	
) Effectiveness of hazardous substance co Evaluate the effectiveness, or lack of, BMP a Spill Coordinator if accidental spill has occurre	ntrol measures. pplied to control hazardous chemical delivery to ed.)	soils, groundwater or surface water bodies. Cor	ntact Hazardous
 a) Evaluate the occurrence and mitigation of h vater quality. 			
 a) Evaluate the occurrence and mitigation of hwater quality. Azardous substance control measures provide effective mitigation. 	Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	Substantial resource concern is evident such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader.	, () NA
 a) Evaluate the occurrence and mitigation of hwater quality. Azardous substance control measures provide effective mitigation. 	Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	Substantial resource concern is evident such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader.	, ONA

UTM Zone 11 Easting 248632 Northing 4312901 Building/Structure Name Ski Trail Meteor Run Date of Project Start 9/1/2005 Date of Project Start 9/1/2005 Reviewer(s) Starse Date	uildings Selection Township 12N 6th Field HUC Watershed NV	ID# 365 Code S02 Range 19E Section 6
Structure Type: Ski Trail Survey Type 3rd Year Post Constr Delegate	oth/Duration: Other (Describe)	
Plan Title: Job No.: Specific concerns associated with construction project and describe BMP measures de See Hard Copy of Form V28: Vegetation Manipulation	Plan Date:	Plan Revision Date:
Implementation For Permanent or Temporary-Seasonal Structures: 1) Were source control, drainage and infiltration systems, and hazardous material con 1-hour Storm Event, to achieve Forest Service and State water quality standards?	1=Meets/Exceeds 20-yr 1-Hr standards an 2=Minor departure from standards and/or r 3=Major departure from standards and/or r 4=Repeated departure from standards/failu trol systems designed to maintain resource p	d/or no resource concerns ninor resource concerns najor resource concerns ire to address concerns
2) Are BMP measures constructed according to contract design specifications? Additional Comments:		
Effectiveness Note: Effective and adequate maintenance of BMP measures should be included wir effectiveness evaluation. When topic is not applicable, please make informational c 1) Source area erosion control. Protection and stabilization of structure site, pa (Note the evidence of erosion processes such as rills, gullies, sediment scour and/o pumice slopes, or deteriorated granitic areas) or areas identified for revegetation in	thin the comment. articularly any erosive areas. or deposition on- or off-site, specifically areas structure plan, see structure sketch. Constru	Implementation Score: [] (BMP Monitoring Rule Set) naturally devoid of vegetation (e.g. ucted cut and fill slopes are addressed

) Soil Protection measures, artificial or vegetati	tve, designed to eliminate erosion by runoff and r	ain-drop impact	
Nearly 70% coverage of any erodible surfaces, and no evidence of erosion.	Structure site exhibits less than full cover of soil; however, only minor erosion is evident and subsequent deposition is limited to on-site areas excluding deposition within any on-site SEZ.	Areas of exposed soil are observed, and erosion is evident and extensive (for example sediment is transported off-site or directly to SEZ.) NA
Observed progression/improvement of areas accessful revegetation, such as temporary arm	identified for revegetation in structure plan as sch oring measures (including mulch, rock, erosion cl	eduled; and adequate erosion protection measure oth or other) applied while vegetation becomes es	s applied for tablished
Revegetation establishment proceeding as expectednew and existing vegetative cover in combination with temporary BMP measures are effective at eliminating/ mitigating erosion processes from those areas.	Revegetation efforts are not proceeding as expected. Minor additional efforts are required for successful revegetation establishment, or minor maintenance/retrofit of temporary BMP measures applied (for erosion control during revegetation efforts) is needed.	Temporary BMP measures provide inadequate erosion control, and/or specified revegetation efforts are deemed unsuccessful, as major modifications are needed to achieve vegetative ground cover goals and success. OR major on- site erosion, or any evidence of sediment delivery to SEZ.) NA
) Cut and fill slope protection (including surface	e erosion and slope failure potential).		
BMP measures (including seeding/planting, with mulch of pine straw, designed swales, retention walls or use of erosion control blankets) applied to cut or fill slopes are adequate to prevent erosion. Craks or slumping is not evident.	BMP measures applied (see the previous checkbox) exhibit minor erosion and/or deposition is noted at base of cut or fill slope, near retention walls or around erosion control blankets or mulch. However, erosion is limited to on-site areas excluding any transport to SEZ. Or retaining wall integrity is showing signs of concern, such as bulging or wavy appearance.	BMP measures are inadequate to protect erosion on cut and fill slopes from storms <20 year1 hour event; or any evidence of sediment transport and/or deposition within SEZ is observed. Or cracks are present and appear to be threatening integrity of fill and/or retaining wall. Or the occurrence of any fillslope failure has occurred.) NA

2) Runoff infiltration and drainage control system effectiveness.

(Evaluate any on-site runoff control features, or lack thereof, including any measure designed to direct site runoff or dissipate erosive energy at system outlets, including drainage ditches, constructed berms, erosion cloth placement, constructed swales, driplines, or other designated infiltration areas. Maintenance of these features should also be addressed. When available, verification with water quality monitoring data may be essential to assess the degree of effectiveness.)

a) Functioning condition (potential for sediment and/or nutrient delivery to SEZ) of designated infiltration zones, such as detention basins, settling ponds, driplines, gravel armor areas or infiltration trenches, as well as any system outlets.

Natural or newly constructed drainage control and infiltration systems are adequate to eliminate erosion and sediment transport processes. No evidence of erosion or sediment movement on-site.	Observed evidence of minor on-site erosion and sediment transport, but limited to on-site deposition, and no evidence of transport to any SEZ.	Observed evidence of substantial on-site erosion such as frequent rill formation or any observation of gully features observed, or any evidence of sediment transport to SEZ. OR where major maintenance or adaptive erosion control strategies are required for resource protection. OR where water quality data indicates exceedance of state standards.	NA
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b) Ponding of runoff. For this item, consideration should be given to the location of ponded water with respect to foundation, cut and fill slope integrity, health concerns, as well as soil displacement and erosion induced from pond outlet.

site, or constructed detention ponds and outlets are stable (naturally stable, stablized with planted vegetation, or other type of armor) and exhibit no signs of erosion or downstream resource concerns.	Some evidence of on-site ponding, but does not appear to threaten integrity of fillslopes or foundations. Or minor erosion and/or downslope resource concerns, are evident at constructed basin outlet, such as sediment plumes or small rill formation. However, sediment is not transported to SEZ and is not anticipated from events <20-year 1-hour storm.	On-site ponding observed that is threatening fillslope or foundation integrity. And/or outlet of ponded area, or constructed basins, exhibit major erosion including substantial scour, rill or gully formation. Or the evidence of any sediment transport to SEZ.	
) Effectiveness of hazardous substance co (Evaluate the effectiveness, or lack of, BMP a Spill Coordinator if accidental spill has occurr a) Evaluate the occurrence and mitigation of I	ontrol measures. upplied to control hazardous chemical delivery to ed.) nazardous/toxic substances used for building and	soils, groundwater or surface water bodies. Con d vehicle maintenance, and associated direct and	tact Hazardous d indirect effects upon
water quality.			
 water quality. Hazardous substance control measures provide effective mitigation. 	Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader.	NA
 Water quality. Hazardous substance control measures provide effective mitigation. 	Minor evidence of improper use of hazardous substances, such as chemical or mineral stains; however, evidence of SEZ contamination is not observed and, ground water and soil contamination is limited (consider approximate volume, microtopography, vicinity to SEZ, permeability of soil, depth of stain and recent weather events).	Substantial resource concern is evident, such as direct/indirect evidence of SEZ or groundwater contamination. If immediate action is warranted, contact Management and Hazardous Spill Coordinator and Water Quality Monitoring Crew Leader.	NA Score: E

Appendix C

BMP Effectiveness Monitoring – Road BMP Upgrades and Reconstruction

2011 BMP Effectiveness Monitoring: Road Upgrades and Reconstruction

Resource Concepts, Inc. (RCI) has been contracted by Cardno ENTRIX, Inc. to monitor Best Management Practices (BMPs) performance at Heavenly Mountain Resort. RCI uses the monitoring protocol for roads from the written plan, BMP Effectiveness Monitoring, Chapter 5, Heavenly Mountain Resort Environmental Monitoring Program (December 19, 2005). The monitoring methods designated in Heavenly's BMP Effectiveness Monitoring are consistent with the monitoring program implemented previously by the LTBMU to evaluate road BMP upgrades throughout the Lake Tahoe Basin (LTBMU 2005).

The goals of the monitoring for roads are to:

- Document road decommissioning,
- Evaluate BMP Effectiveness at stream crossings consistent with the Forest Service, Region 5, BMP Evaluation Program (BMPEP) protocols,
- Assess the change in risk scoring of sediment transport as a result of BMP upgrades or road reconstruction, and
- Estimate the change in sediment load resulting from BMP upgrades.

Methods

The BMP Effectiveness Monitoring used at Heavenly uses a combination of the following methods to collect and analyze data for road BMP upgrades.

Annual BMP Effectiveness Monitoring for Construction Projects

Roads modified through facility construction projects at the Resort are incorporated in the annual monitoring described in Appendix B. Temporary and permanent BMPs are evaluated using project plans and specifications as a basis for verifying BMP implementation. Periodic post construction inspections are then used to score BMP effectiveness. The miles of road reconstructed and decommissioned are documented on a project-by-project basis.

Stream Crossing BMP Evaluation Program (BMPEP) Ratings

The protocols for scoring of stream crossings have been developed by Region 5 of the USDA Forest Service under their regional program. The qualitative assessment of BMPs near stream crossings utilizes protocols: E08 - Road Surface, Drainage and Slope Protection; E09 - Stream Crossings; and E11 - Control of Sidecast Material. Evaluations using these protocols were conducted at stream crossing locations on Forest system roads within the Resort in 2011. These locations have been previously evaluated by the LTBMU (2004 Forest Road BMP Upgrade Monitoring Program, October 2005) using the same protocols.

Water Quality Risk Assessment Protocol (WQRAP) Ratings

WQRAP ratings are used as a screening tool to assess the risk of sediment transport and water quality impairment for road segments at drainage crossings, road segments hydrologically connected to stream environment zones (SEZ), and road segments in non-SEZs that may pose a water quality risk. Risk scores for Forest system roads at the Resort were developed in 2004 and 2005. RCI reevaluated road segments where BMP upgrades were implemented or where they were reconstructed as part of larger facility improvement projects. Road modifications for project construction in 2006 through 2008 were minimal and as a result no additional monitoring was conducted at the three-year interval. Several projects were completed between 2008 and

2011, the six-year interval in the monitoring period. Tables C.1 and C.2 list the water quality risk scores for individual road features and the overall risk score ratings, respectively.

Connected Length	Score
Not connected	0
<91 meters (100 yds)	5
91-275 meters (100-300 yds)	15
>275 meters (300 yds)	35
Road Grade	
<5%	0
6-10%	10
>10%	20
Surface Type	
Gravel or paved	0
Native	10
¹ Inlet Condition	
Good	0
Poor	10
¹ Diversion Distance	
No diversion potential	0
<23 meters	5
23-91 meters	10
>91 meters	25
² SEZ or NON-SEZ	
NON-SEZ	0
SEZ	20
² Chronic Erosion Feature	
None	0
Present	15

Table C.1. Water Quality Risk Scores for Individual Road Features

1. Applies to crossings only.

2. Applies to SEZs and Non-SEZs only.

Table C.2. Overall Water Quality Risk Score for Road Segments at Crossings, in SEZs and Non-SEZs.

Risk Category	Total Score (X)
High	X>60
Moderate	X=25-60
Low	X<25

Water Erosion Prediction Program Modeling (WEPP) Ratings

Predicted erosion and sediment yield rates, estimated by modeling, were used to evaluate the effectiveness of road BMP upgrades implemented by Heavenly during the monitoring period (2006 through 2011). WEPP input data was collected for modified road segments that had been assessed as a water quality risk through the WQRAP screening process. WEPP modeling was conducted using the online version of the WEPP Forest Erosion Predictor, using the "Road Batch" model. Corresponding segments previously modeled by the LTBMU were modeled with updated parameters for climate and soil texture. Table C.3 summarizes the input variables used for the WEPP Road Batch estimates.

Table C.3. WEPP Parameters

	Input Variable	Notes
1	Climate	The Heavenly Valley CA climate station was used for the model. Modeling conducted in 2004 used climates developed with Cligen for each watershed.
2	Soil Texture	From the four options: clay loam, loam, sandy loam, and silt loam; sandy loam was determined to be the most representative of the soil texture at Heavenly.
3	Percent Rock	Rock fragments in WEPP are considered rocks in the soil. To maintain comparability between 2004 and 2011, 0% rock was used.
4	Road Design	The model has four options: insloped, bare ditch (ib); insloped rock ditch (iv); outsloped, unrutted (ou); and outsloped, rutted (or).
5	Road Surface	WEPP options include: native, graveled or paved.
6	Traffic Level	WEPP options for traffic level include: High, Low and No Traffic. Roads with year-round traffic or logging roads with high use are considered High. Roads with low recreational use during dry conditions are modeled as Low (this setting is typical of most roads in the LTBMU). Where vegetation has grown in one-half or more of the road, No traffic is used. All roads were modeled as Low Traffic.
7	Road Gradient (%)	Refers to the slope of the road between drainage points. WEPP has constraints between 0.1% and 40%.
8	Road Horizontal Length (meter)*	Refers to the length of the road between drainage points. WEPP requires a range between 0.3 and 100 meters.
9	Road Horizontal Width (meter)*	WEPP has three definitions for outsloped roads, rutted; outsloped roads, unrutted; and insloped roads. Road width is considered to be the width of the entire road. WEPP requires a range between 0.3 and 100 meters.
10	Fillslope slope (%)	WEPP requires a range between 0.1% and 150%.
11	Fillslope horizontal length (meter)	WEPP requires a range between 0.3 and 100 meters.
12	Buffer gradient (%)	Refers to the gradient of the buffer, the area between the road and a stream, meadow, spring, or lake. WEPP allows a range between 0.1 and 100 percent.
13	Buffer Horizontal Length (meter)	Refers to the horizontal length of the buffer, the area between the road and a stream, meadow, spring, or lake. WEPP allows a range between 0.3 and 300 meters.

Results

Road Reconstruction and Decommissioning

During the period 2006 through 2011, a total of 3.12 miles of roads were reconstructed or upgraded using permanent sediment and erosion control BMPs such as:

- Drainage dips,
- Outlet protection for dips and cross drains,
- Gravel base in lieu of native soil road surfacing,
- Wood chip and gravel mulch on parking and low traffic access roads,
- Pavement and lined ditches in higher traffic areas,
- Rock slope protection for cut and fill slopes, and
- Revegetation for cut and fill slopes.

Facility projects also incorporated about 0.79 miles of road decommissioning, as summarized in Table C.4. BMP upgrades projects included several road segments in the Heavenly Valley Creek watershed, where native road surfacing was replaced with gravel surfacing.

Project/Road Segment Description	Year Completed	Length of Reconstructed Road (miles)	Length of Decommissioned Road (miles)
Project Related Road Reconstru	uction		
Powderbowl Upper Terminal	2006	0.08	0.07
Access			
Edgewood Creek Project Below	2007	0.06	
Boulder Parking Lot			
Olympic Express Lower	2007	0.28	0.17
Terminal Access			
East Peak Lake Grading Area	2008	0.08	
Gondola Mid Station Road	2008	0.54	0.4
Skyline Trail	2008	0.66	
Upper Maintenance Shop	2009	0.14	
Lakeview Water System Tank	2011		0.12
Access Removal			
Umbrella Bar Relocation	2011	0.05	0.03
Tamarack Lodge Project	2011	0.17	
Road BMP Upgrade Projects			
Groove Lift Base Toward	2008	0.2	
Patsy's Lift Top			
Powderbowl Lift Base to	2011	0.1	
Umbrella Bar Relocation			
Umbrella Bar Relocation to	2011	0.46	
Switchback			
Face Gravel Surfacing	2007	0.3	
Totals		3.12	0.79

 Table C.4. Road Reconstruction or BMP Projects 2006 through 2011

Stream Crossings Evaluated Using BMPEP Protocols

The BMPEP protocol evaluates implementation and effectiveness of BMPs at each stream crossing. The six stream crossing on Forest system roads at Heavenly were evaluated by RCI in 2011 and results are summarized in Table C.5. Two of the Heavenly Valley Creek stream crossings were located in road segments treated with gravel surfacing in 2011. While BMPEP protocols state that monitoring on road projects should be completed following at least one winter season, the area was monitored for preliminary results to be included in this reporting period. The sites will be revisited in 2012 for final post-winter monitoring per the protocol. No other permanent BMP upgrades or retrofit projects were implemented at the stream crossings during 2006 through 2011.

Table C.5. S	Stream	Crossing	BMPEP	Monitoring	Results
--------------	--------	----------	-------	------------	---------

Watershed	Road Number	Type of Evaluation	BMPEP Results 2011	BMPEP Results 2004/2005
Heavenly Valley Creek	12N40E	Road Surface and Slope Protection	Implemented & Effective	Implemented & Effective
(California Dam)		Stream Crossing	Implemented & Effective	Implemented & Effective
		Control of Sidecast Material	Implemented & Effective	Implemented & Effective
Heavenly Valley Creek	12N40	Road Surface and Slope Protection	Implemented & Effective	Implemented & Not Effective
(2 CMP culverts at the road		Stream Crossing	Implemented & Effective	Not Implemented & Effective
switchback)		Control of Sidecast Material	Implemented & Effective	Implemented & Effective
Heavenly Valley Creek	12N40	Road Surface and Slope Protection	Implemented & Effective	Implemented & Not Effective
(CMP daylights near Powderbowl		Stream Crossing	Implemented & Effective	Implemented & Effective
Base)		Control of Sidecast Material	Implemented & Effective	Implemented & Effective
Heavenly Valley Creek	13N52	Road Surface and Slope Protection	Implemented & Effective	Implemented & Effective
(Crossing to Sky Base)		Stream Crossing	Implemented & Not Effective	Implemented & Not Effective
		Control of Sidecast Material	Implemented & Effective	Implemented & Effective
Mott Creek	13N52	Road Surface and Slope Protection	Implemented & Not Effective	Implemented & Not Effective
		Stream Crossing	Implemented & Effective	Implemented & Effective
		Control of Sidecast Material	Implemented & Effective	Implemented & Effective
Daggett Creek	13N52	Road Surface and Slope Protection	Implemented & Not Effective	Implemented & Not Effective
		Stream Crossing	Implemented & Effective	Implemented & Effective
		Control of Sidecast Material	Implemented & Not Effective	Implemented & Not Effective

The BMPEP ratings qualitatively score typical stream crossing BMPs for implementation and effectiveness. Comparing the results from the 2004/2005 surveys to the 2011 monitoring indicted a change at two stream crossings. The BMP upgrade project conducted on the road segment 12N40 along the Heavenly Valley Creek SEZ improved the scoring for the stream crossings (two CMP culverts at the switchback and the CMP culvert that daylights near the Powderbowl Lower Terminal). BMP upgrades included grading and gravel surfacing in 2011. The remaining stream crossings show no change from monitoring conducted in 2004/2005. Stream crossings on Heavenly Valley Creek (to Sky Base), Daggett Creek, and Mott Creek continue to have evaluations with not effective scores since BMP upgrades have not yet been implemented in these areas.

WQRAP Ratings

Forest system roads reconstructed or upgraded with BMPs during the period of 2006 through 2011 (Table C.4) were reevaluated using the WQRAP screening process. Approximately 0.61 miles of upgrades were located on road segments previously identified by the LTBMU as low, moderate or high risk (LTBMU 2007) in the Heavenly Valley Creek watershed. In 2011, a maintenance project that graded and added gravel surfacing to these segments resulted in a 0.45 mile reduction of high risk segments, a 0.38 mile increase in moderate risk segments and a 0.07 mile increase in low risk segments. The other 3.3 miles of upgraded roads were located on road segments that were not identified as a sediment transport risk (LTBMU 2004). Table C.6 indicates the change in risk scoring of sediment transport as a result of BMP upgrades and road reconstruction projects implemented from 2006 through 2011.

Table C.6.	WQRAP	Risk Ratings	- Road Pro	iects in 200	6 through 2011.
		i tion i tatiligo		Joolo III 200	o an oagn zorn

Risk Score	2004/2005	2011	Changes in
	Miles	Miles	Miles
Not rated	1.02	*	-1.02
No risk	2.28	3.3	+1.02
Low	0.04	0.11	+0.07
Moderate	0.12	0.5	+0.38
High	0.45	0.0	-0.45

*All "not rated" segments in 2004/2005 were rated "no risk" in 2011.

WEPP Ratings

The 0.61 miles of road segments identified through the WQRAP screening process with low, moderate or high scores that received BMP upgrades were also modeled for pre and post project conditions using the WEPP Road Batch model. Pre project road conditions were based on the WEPP data collected by the LTBMU in 2004 and 2005 (LTBMU 2007). All of these road segments are located along the main summer access road between the base of the Powderbowl Lift and the first switchback past Snow Beach along Heavenly Valley Creek.

Road segments were modeled for pre and post project conditions identified by RCI using filed observations and available mapping. Due to discrepancies between the segment numbers in the GIS database and previously reported monitoring results (LTBMU 2007), WEPP estimates for the 2006-2011 monitoring period could not be compared directly to the 2004 conditions. Pre and post project conditions are compared in Table C.7 and indicate a net decrease in road erosion and sediment yield.

Parameter	Pre Project	Post Project
Sediment Leaving the Road (metric tons)	2.5	1.3
Sediment Leaving the Buffer (metric tons)	0.4	0.2
Rainfall Runoff (inches)	0.2	0.3
Snowmelt Runoff(inches)	51	13

	_				
Table C.7.	Summar	of Pre and	l Post Upgrade	e WEPP N	lodel Estimates
	e anna j		i i oot opgiaa		IO GOI EOUIIIGUOO

In general, decreased "sediment leaving the road" represents reduced erosion road maintenance needs and decreased "sediment leaving the buffer" represents a water quality benefit. The decreases for these road segments are related to replacement of native soil road surfaces with gravel. It should also be noted the model predicts reduced rainfall and snowmelt runoff.

Appendix II 2010-2011 Restoration and Monitoring Annual Report

Heavenly Mountain Resort Restoration and Monitoring 2011 Summary Report



Prepared By

Kevin Drake

Integrated Environmental Restoration Services

April 11, 2012



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Executive Summary

Does replacing a chairlift or clearing trees for a new ski run increase runoff and erosion? Can soilbased restoration treatments achieve resilience and self-sustaining sediment source control at highelevation disturbed sites without requiring ongoing maintenance? Heavenly Mountain Resort is using an adaptive management-based approach to planning, implementing, and monitoring construction and restoration projects that will enable them to answer a number of these important questions. This approach has been supported by the League to Save Lake Tahoe, the USDA Forest Service - Lake Tahoe Basin Management Unit, the Tahoe Regional Planning Agency, and the Lahontan Regional Water Quality Control Board and is an integral component of Heavenly's Master Plan Amendment EIR.

This report describes the process and results of using an outcome-based adaptive management approach to plan, implement, monitor and continually improve specific projects and overall watershed management approaches at Heavenly. Projects implemented under this program to date include lift replacement, lodge construction, spoils placement and stabilization, zip line construction, road construction and removal, ski run clearing and glading, and waterline and snowmaking line installation. In total, 309,915 square feet (7.1 acres) of erosion control and/or restoration treatments have been implemented at Heavenly between 2007 and 2011 as part of this program (see Table 1). For each project, goals and success criteria have been defined, performance monitoring has been conducted using simulated rainfall and a suite of soil and vegetation measurements, and follow-up actions have been developed where needed in order to achieve project success criteria. Despite much discussion about adaptive management in the Lake Tahoe Basin, this program is one of the only known multi-year examples of adaptive management actually being applied to improve the sediment source control effectiveness of on-the-ground restoration projects in the Lake Tahoe Basin.

We have tested many assumptions and gained valuable knowledge about restoration of ecological function in arid, high-elevation sites through this program. Performance monitoring results from seven restoration projects using soil-based restoration treatments indicate overall improvements in most measured parameters and substantial decreases in sediment yield within 1 years of treatment. Compared to pre-treatment conditions, soil-based restoration treatments have achieved the following results within one year of treatment completion:

- 67% 133% decrease in sediment yields
- 18% 270% increase in infiltration rates
- 50% 940% increase in penetrometer depth to refusal
- 30% 1900% increase in total ground cover
- 12% 161% increase in soil organic matter

Table 1. Restoration treatment summary, 2007-2011.

Project	Treatment Area (ft ²)
Olympic Lift	104,224
Heavenly Flyer	10,514
Mid Station Road	9,940
Skyline Trail	27,964
Lakeview Lodge Water System	56,756
Stagecoach Snowmaking	74,017
Gondola Lodge	26,500
TOTAL	309,915

Most projects have achieved substantial improvements in erosion resistance and ecological function, despite falling short of achieving the seemingly modest success criterion for plant cover (10%), even after several seasons of temporary irrigation on several projects. A growing body of research published since this program began is consistent with monitoring results from Heavenly, confirming that erosion resistance is primarily dependent on soil conditions (edaphic factors) and associated functional indices such as soil density/infiltration, mulch/surface protection, and soil carbon/organic matter (Burt and Rice 2009, Grismer et al. 2008), not on vegetation. Such soil conditions are also a pre-requisite for establishment self-sustaining native vegetation, but this process happens quite slowly in many areas of Heavenly. Through the adaptive management process and a steadfast focus on the overall program goal of sediment source control, Heavenly is committed to testing and demonstrating a range of treatment approaches that create site conditions that are ecologically resilient, erosion-resistant and are capable of supporting self-sustaining native vegetation.

This information being developed in this program is of great value in this region and beyond, as little monitoring of restoration treatment effectiveness has been conducted in high elevation (above 8000 ft) settings with poorly developed soils, particularly those derived from decomposed granite. The Heavenly restoration and monitoring program is demonstrating and continually refining a new model for land management, one that rethinks and tests assumptions about project outcomes. This program is also helping to develop new restoration treatment techniques, expand understanding of treatment effectiveness, define and refine appropriate success criteria, and sharing this information to support similar efforts within and beyond the Tahoe Basin.

Chapter 1: Overview



Introduction

This report describes the five years of restoration treatments and monitoring results for seven mountain improvement projects at Heavenly Mountain Resort (Figure 1). These projects were approved as part of Heavenly Mountain Resort's 2007 Master Plan Amendment. Integrated Environmental Restoration Services (IERS) principal Michael Hogan began working with Heavenly in 2006 to facilitate an agreement between Heavenly, the USDA Forest Service - Lake Tahoe Basin Management Unit (LTBMU), and the League to Save Lake Tahoe that established common ground between all parties. This agreement laid out a framework for setting clear goals, defining "success" in quantitative terms, developing low-maintenance and effective treatment strategies, and directly measuring the results of project implementation. This framework follows the principles of adaptive management (described below).

Project Overview

IERS has been working with Heavenly since 2006 to set goals and objectives, define success criteria, develop soil and vegetation treatment approaches, conduct pre-treatment (baseline) and post-treatment (performance) monitoring to measure whether each project had a net impact on soil, vegetation, or runoff and sediment transport, and to document implementation activities. The five projects implemented in 2007 were: Olympic Lift Replacement, Heavenly Flyer Construction (Zip Line), Mid Station Road Restoration, North Bowl Ski Run Clearing, and Orion II Ski Run Clearing (Figure 1). Three additional projects were implemented in 2008: Skyline Trail Regrade, Lakeview Lodge Water System Improvements, and Stagecoach Snowmaking. IERS conducted performance monitoring for all of the above projects in 2009. In 2009, the Tubing Lift project was partially constructed and restoration treatments were completed. In 2011, seedlings were planted in the Gondola Lodge fill area and removal/treatment of the old water tank road – the final element of the Lakeview Lodge Water Project – was completed. Post-treatment monitoring will be conducted at the old water tank road in 2012.

Report Structure

Chapter 1 describes the overall site characteristics, lists overall program goals, describes how "success" is defined and measured, and provides a general description of the restoration techniques and monitoring methods employed. **Chapters 2 and 3** describe project-specific objectives, success criteria, monitoring results, and treatment elements implemented for each project. Projects are grouped into one of these two chapters, depending on whether or not performance monitoring has been completed yet. **Chapter 2** covers one project with pre-treatment monitoring results only (Tubing Lift) while **Chapter 3** covers projects with both pre-treatment and performance monitoring results. **Chapter 4** summarizes conclusions and recommendations, the summary of recommended management responses and includes literature cited.

Results for each project are presented in the following format:

- Overview description of the type of project, associated impacts to soil and vegetation, and timing of both treatments and monitoring.
- Site Description description of the geographic location, physical conditions and ecological characteristics of each project site Objectives and Success Criteria description of specific objectives and success criteria by which each project is being evaluated.

- Restoration Treatments summary of specific soil and vegetation restoration treatments implemented at each project site.
- Monitoring Results graphical summary of monitoring results
- Management Response/Follow-up Action comparison of monitoring results to project success criteria. Summarizes what worked, what did not, and what (if any) management response or follow-up actions should be taken to achieve project success criteria.



Figure 1. Locations of restoration projects at Heavenly Mountain Resort, 2007-2011.

Adaptive Management Overview

The Heavenly Valley Master Plan Amendment EIR of 2007 included an innovative approach to project implementation known as adaptive management. For many years in the Lake Tahoe Basin, projects have been designed to comply with regulations. In that attempt to comply is embedded the assumption that compliance measures actually attain the goals that they are designed to attain. However, a majority of the BMPs currently approved for a specific project have not been tested or measured for performance in the type of situation or conditions to which they are being applied. In fact, most permanent BMPs are based on output from models, such as the Universal Soil Loss Equation. Thus we have made little progress toward either understanding or improving performance on many of the standard and accepted BMPs. Heavenly has departed from this approach and while the adaptive management system being employed assures compliance, this approach is being used to investigate the actual performance of both standard and newly developed BMPs in order to assure a higher level of environmental performance and cost-effectiveness. Below is a brief description of the adaptive management model being employed at Heavenly.

The concept of adaptive management¹ has been applied for centuries under a number of different

names. Physical engineers have used this approach since the first structure or bridge was constructed to continually learn from 'failures' and successes to improve designs. In the realm of applied science, including restoration and erosion control, adaptive management has not, until recently, been widely embraced. This effort at Heavenly Mountain Resort is one of the first truly adaptivelymanaged projects in the Lake Tahoe Basin.

Adaptive management has a dual nature. First, adaptive management is a <u>philosophical approach</u> toward resource management that acknowledges that we do not completely understand the system that we are working with. It acknowledges that we will proceed with a project or program using existing information while we gather the



program using existing information while we gather the knowledge that we lack. Second, adaptive management is a <u>structured decision-making process</u> designed to increase knowledge and understanding. That process includes the following components, usually addressed in a stepwise fashion:

- 1. Articulate management goals and objectives Goals have been set for the entire program with clear objectives and success criteria defined for each project.
- 2. Identify "knowns and unknowns"/gather information Heavenly's restoration and monitoring program provides a practical framework for translating "knowns," "unknowns," assumptions and ideas into hypotheses to be tested in the context of new projects. In this manner, Heavenly is able to utilize proven and/or promising treatment approaches while addressing research needs and filling information gaps.

¹ The adaptive management approach being applied at Heavenly has been pioneered by the California Alpine Resorts Environmental Cooperative (CAREC) and is described in greater detail in the Sediment Source Control Handbook, which is available at: www.IERStahoe.com or www.sbcouncil.org

- 3. Assess strategies Monitoring results from past projects are used as the basis for developing treatment strategies for new projects that are most likely to achieve project objectives and success criteria.
- 4. Research and tests Test plots are incorporated into project-scale treatments whenever possible to test assumptions and fill information gaps identified in step 2 in order to expand Heavenly's toolkit of effective restoration treatments.
- 5. Plan and implement All treatments are monitored by IERS staff during implementation in order to ensure that treatments are implemented according to plan and to document asbuilt conditions to support monitoring and continual improvement.
- 6. Monitor and evaluate Quantitative, defensible monitoring is conducted before construction and one year following treatment to evaluate treatment effectiveness relative to pre-defined success criteria.
- 7. Assess results Monitoring data are analyzed, summarized and reported annually (in this report). Management responses are recommended to address treatments that did not meet the project objectives and success criteria. These results are shared with regulatory agencies as well as other regional stakeholders.
- 8. Review and revise This final and critical step in the adaptive management cycle involves continual reassessment and improvement of treatment practices by incorporating information gained through monitoring into future projects and treatments. This step also includes refinement of success criteria if suggested by new knowledge or understanding. The management responses found in Chapter 3 are part of this review and revise process.

Overall Site Description

Heavenly Mountain Resort (Heavenly) is a ski resort located on the east slope of the central Sierra Nevada Mountains in the Carson Range on the southeast side of the Lake Tahoe Basin. Heavenly spans Nevada and California and has approximately 650 acres of ski runs, 30 ski lifts, 35 structures, and approximately 30 miles of roads within the resort boundary.

Soils are derived from granitic parent material and deposits of decomposed granite rock including quartz, monzonite, and granodiorite. Heavenly is predominantly located within a mixed conifer forest, with some of the upper reaches of the resort within a Western White Pine Series vegetation type (Sawyer and Keeler-Wolf, 1995). Elevations range from 6,225 ft above mean sea level (AMSL) in the Heavenly Village to 10,400 ft AMSL at the top of the Sky Express.

The environment varies from densely forested at the lower elevations to open and exposed slopes at the higher elevations. The overstory is dominated by red fir (*Abies magnifica*), whitebark pine (*Pinus albicaulis*), Western white pine (*Pinus monticola*), lodgepole pine (*Pinus contorta*), and mountain hemlock (*Tsuga mertensiana*). Native plants dominate the understory in undisturbed areas and include pinemat manzanita (*Arctostaphylos nevadensis*) and huckleberry oak (*Quercus vacciniifolia*). Native grasses and forbs are also present. At the higher elevations, plant cover is sparser and large areas of bare soil exist. Ski runs and other disturbed and revegetated areas tend to be dominated by non-native fescue (*Festuca trachyphylla*).

Overall Program Goals

Treatment Goals

- To implement projects that result in no net increase in runoff or sediment transport
- To implement sediment source control treatments that are either self-sustaining (as measured by resilience indices, discussed below) OR are accompanied by a plan for ongoing maintenance and management to maintain erosion resistance
- To develop and demonstrate an applied adaptive management program for development, management and maintenance activities in upper watersheds

Monitoring Goals

- To quantitatively assess whether projects result in no net increase in runoff or sediment transport
- To identify and quantify indices of long-term ecosystem sustainability to the greatest extent possible
- To use monitoring data to determine the cost-effectiveness of restoration techniques
- To use monitoring data to improve effectiveness of future treatments

Defining Success Criteria

A project without a clearly defined target will not reach that target. The purpose of success criteria is, among other things, to minimize the condition described in the old adage: "If you don't know where you're going, any road will get you there." Success criteria are a set of numerical values or other specific descriptors of the target future condition of an area that are measured or observed in the field to determine whether goals and objectives have been achieved. Success criteria must be explicitly linked to project goals and objectives if they are to be valid and useful. Success criteria are most often defined as a range of acceptable values with upper or lower thresholds rather than a single numeric target in order to account for variability in natural systems and confidence in the accuracy of different measurement and analysis methods. Success criteria should reflect realistic and appropriate targets that are based on measured data whenever possible.

Success criteria are also subject to adjustment or change in some cases, especially when new elements are encountered such as the use of new techniques, ecosystems not previously worked in, or other novel situations where the outcome is not assured. At the same time, even in new situations, success criteria are based on a 'best guess' outcome that is derived from previous work. Adjustments may be required if, through careful monitoring, one discovers that the targets set are unattainable, unrealistic and/or not accurate indicators of goal or objective attainment. However, adjusting or changing success criteria must be done in a well substantiated, carefully considered manner. Defensible reasoning must be presented to support success criteria adjustment with new criteria presented based on monitoring data, rather than simply a desire to change the criteria.

Using Success Criteria within Adaptive Management

In the context of applied adaptive management, unmet success criteria serve as "trigger points" for actions or "management responses". Success criteria are also adjusted when monitoring and field reality clearly suggest that criteria are unrealistic or physically unattainable. A pre-defined management response represents a commitment by the project owner or manager to take action to achieve the project goals if the success criteria are not met or to review and revise the criteria themselves if justified. Potential management responses should be defined during project planning and directly linked to success criteria and monitoring. Additional management responses may also be developed after project implementation and monitoring are complete, once the sources of the problem and potential solutions are more clearly understood. In some cases, the success criteria themselves may need to be refined so that they reflect the most realistic and appropriate targets possible.

Over time, the success criteria presented in this report will continue to be refined based on the results of monitoring both treatment and reference areas at Heavenly and other similar sites. In this way, success criteria become more representative of the system in which we are working and provide a framework for comparing our initial understanding about that system to what we are learning from ongoing field measurements. Thus, initial success criteria reflect our best understanding of the system and system response to treatment at the outset of the project.

Little monitoring of restoration treatment effectiveness has been conducted in high elevation (above 8,000 ft) settings with poorly developed soils, particularly those derived from decomposed granite. Heavenly's adaptive management-based restoration and monitoring program is a rare but sorely

needed opportunity to help fill important information gaps and provide a quantitative, defensible basis for defining success for restoration in high-elevation settings at Heavenly and throughout the region.

Developing Appropriate Management Responses

Management responses are developed for each success criteria during project planning in order to describe the types of responses that could be deployed to address unmet success criteria. When a specific success criterion is not met, it "triggers" an action, and that action should be based on information gathered through quantitative monitoring, qualitative observations and field experience, which is not always available during project planning. Within the context of this program, management responses are defined as on-the-ground treatment actions (re-tilling a compacted area, for instance). Other follow-up actions may also be defined to gather additional information, such as assessing soil development processes, which is used to inform potential on-the-ground treatment actions (management responses).

Effective management responses should always be directly linked to goals and objectives. Given the primary program goal at Heavenly of "no net increase in runoff or sediment transport," the scale and intensity of a given management response should be commensurate with the level of certainty that runoff or sediment yield has actually increased. Success criteria for Heavenly projects are based on both direct measurements and indirect indices of erosion potential. For instance, rainfall simulation provides a <u>direct</u> measurement of erosion potential whereas all other monitoring parameters included as success criteria serve as indices or indicators of erosion potential and longer-term *resilience* of sediment source control treatments. Even the various types of plant and mulch cover measurements are intended to be indicators of erosion potential, rather than any sort of direct measurement of erosion.

The different forms of monitoring used in this program have been carefully defined to allow a range of information of various importance or 'weight'. While all of the monitoring measurements offer useful information, not all may be equally useful to determine a trigger point. Greater weight, for instance, is put on the rainfall simulation-derived sediment yield results than on other indirect indices of erosion when evaluating the overall functional condition and erosion resistance of a site and the need for a particular type of management response. For example, if the criteria for plant cover or soil organic matter are not met but the criteria for sediment yield and total cover are met, monitoring results would indicate that the overall project outcome is aligned with the project objective (no net increase in runoff or sediment transport) but that further monitoring and/or observations to evaluate the longer-term trajectory of soil organic matter and vegetation response may be needed. Alternatively, if measured sediment yield slightly exceeds the success criterion but available monitoring data suggests that the difference in sediment yield is within the range of natural variability measured at Heavenly, the success criterion may be revised to account for the range of natural variability.

Success criteria, monitoring, and management responses are used to determine and ensure that site conditions are trending in the intended direction. That is, toward a *resilient system* that is able to respond to perturbations and continue providing the ecological services such as clean water. Since we are working with complex and dynamic natural systems that we do not fully understand, an unmet success criterion does not always warrant a treatment action. The type, scale and intensity of management responses should be proportionate with the relative erosion risk level of a particular site, which requires integration and interpretation of a range of ecological variables (which are manifested as success criteria). In the context of applied adaptive management, success criteria and

management responses provide a useful framework for translating goals into measurable targets, stating and testing assumptions, increasing both flexibility and accountability in project implementation, and ultimately improving the success of erosion control and restoration efforts over time.

Focusing on Function over Form

For many decades, the success of erosion control projects has been defined largely in terms of plant cover or other form-based measures of vegetation response. In this adaptive management program at Heavenly, a seemingly modest plant cover success criteria of 10% has been maintained for the past several years. Recent research conducted since this program began has confirmed that erosion resistance is primarily dependent on soil edaphic factors that are driven by functional indices such as soil density/infiltration, mulch/surface protection, and soil carbon/organic matter (Burt and Rice 2009, Grismer et al. 2008). Most treatment efforts at Heavenly over the past 3-4 years have met the success criteria for direct erosion measurements (e.g. sediment yield, infiltration rate) and indices of key soil edaphic² factors responsible for controlling erosion (e.g. organic matter, soil density). However, unmet vegetation success criteria in the first year or two after treatment have triggered actions such as reseeding and irrigation in an effort to accelerate vegetation establishment on several projects. In most cases these actions have not led to achievement of vegetation success criteria and in some isolated areas, temporary irrigation has actually *increased* erosion. One year following treatment, the overall functional goal of "no increase in runoff or sediment yield" had been met but in pursuit of the commonly accepted form-based indicator of erosion control success - vegetation cover - additional resources were expended with no further reduction in erosion risk.

In the arid, high-alpine conditions at Heavenly, soil development and vegetation establishment is a very slow process, even in undisturbed "native" areas. Rather, the ecosystem's natural strategy for resisting erosion and sustaining itself is to capture energy in the form of carbon through breakdown and assimilation of surface organic matter. The soil-based treatment approach at Heavenly has been aiming to reestablish the same soil edaphic factors found in undisturbed areas in areas where those factors have been disrupted (e.g. compaction, topsoil removal, etc.). When soil edaphic factors are optimized, not only is the overall goal of erosion resistance achieved but conditions are created that will eventually support native vegetation. At some sites, nearby seeds transported by wind or



Figure 2. Little to no understory vegetation and no evidence of erosion in an undisturbed area at Heavenly.

animals or root-propagating plants may have a competitive advantage over hand-applied commercial seed. The key variable is time, and we have limited understanding of how these sites will change over time. The adaptive management process being used at Heavenly is based on this premise that while we cannot effectively predict change, we can take steps to learn from each project and simultaneously assure that the goal of erosion resistance is achieved and maintained over time.

 $^{^{2}}$ of or relating to the physical, chemical and biological conditions of the soil. Edaphic characteristics include such factors as water content, aeration, and the availability of nutrients.

Moving forward, we are proposing a systematic approach that emphasizes the soil edaphic factors that are required control erosion in the *present* and recognizes that such erosion-resistant soil conditions are a requirement for long-term re-establishment of self-sustaining vegetation communities. This approach is quite different than the way most erosion control efforts are planned, implemented and assessed, and is essentially an important shift from a vegetation-oriented "landscaping" approach to a function-driven "ecosystem" approach. Management responses consistent with this approach are defined for specific projects within this report.
Restoration Treatment Techniques and Materials

Full Soil and Vegetation Restoration Treatment

Full soil and vegetation restoration treatment includes the following: soil loosening with amendments and/or topsoil, fertilizer, native seed, and mulch applications. These materials and techniques represent an integrated treatment approach that aims to restore key functions of the soil-vegetation system in a cost-effective manner in order to provide low-maintenance, sustainable sediment source control. This combination of treatment elements is also affectionately referred to as the "Full Hogan."

Soil Amendments

Soil amendments, such as wood chips, tub grindings, and compost, are used to add organic matter and nutrients to the soil. When organic matter is incorporated into disturbed soil, it improves the infiltration and water holding capacity of the soil. Organic matter is also necessary to create a soil environment in which a robust microbial community can develop while establishing long-term nutrient cycling that, over time, supports native vegetation. Each amendment serves a different purpose in restoring soil function. Soils are tested prior to treatment to determine the types and quantities of amendments most appropriate for a given site.

Amendments are applied to the soil surface in an even layer before tilling. Soil amendments were generally applied at depths of approximately 3 to 5 inches at Heavenly restoration treatment areas, depending on site conditions, treatment goals and amendment type. Four types of soil amendments were used in Heavenly restoration treatments from 2007 - 2009:

- Full Circle Integrated Tahoe Blend Zero Compost, consisting of 100% composted coarse wood overs ranging in size from 3/8" to 3"
- Wood chips, generated on-site at Heavenly
- "Boulder Lodge Blend", consisting of aged wood chips and pine needles from Heavenly's "Compost Your Combustibles" Program
- Decomposed wood shavings, consisting of well-aged wood shavings from a nearby firewood operation in Meyers. Supplies of this amendment were limited, and it was only used at the Olympic Lift Bottom area.



Figure 3. Soil amendments – wood chips and compost.

Soil Loosening (Tilling)

Soil loosening is used to remove compaction from dense soil and to incorporate amendments into the soil before fertilizing, seeding, and mulching. Soil loosening tends to increase infiltration rates, thereby decreasing runoff and associated sediment transport (Grismer and Hogan 2005). Soil loosening also allows plant roots to penetrate more easily into the soil, therefore allowing them greater access to water and nutrients while helping to stabilize the soil. All soil loosening treatments at Heavenly have been implemented using the bucket of a full sized excavator (or a backhoe in a few cases) to till soil and incorporate amendments. Soil tilling is conducted in a manner that mixes the subsurface material with the amendments (such as wood chips or compost) and leaves the subsurface irregular or "scalloped" (i.e. rough, not smooth; Figure 4 and Figure 5).



Figure 4. Tilling/scalloping with full-sized excavator



Figure 5. Result of tilling/scalloping

Fertilizer

Fertilizer is typically added to support short-term plant growth while carbon-rich soil amendments, such as wood chips or composted coarse-overs, are broken down by soil microbes and provide more available nutrients in the long-term to support plant growth. Biosol (6-1-3) is an organic, slow-release fertilizer, and was the only fertilizer used at the 2007-2009 restoration treatment areas. The nutrients present in Biosol are released much more gradually than with most other commercial fertilizers, providing a longer-term source of nutrients to support establishment of native perennial species while reducing the potential for leaching into groundwater. Biosol is applied to the soil surface and incorporated into the top 1 inch of the soil using a rake.

Seed

Two native upland seed mixes were developed for Heavenly projects (Table 2 and Table 3). In addition, a mesic mix was developed for a wetter area on Patsy's Trail for the Lakeview Lodge project (Table 4). A high elevation mix was also used for the Lakeview project (Table 5). Seed selection is important in any restoration project; however, it is important to note that many sites where vegetation and topsoil have been removed are not capable of supporting robust vegetation. Therefore, seeding should always be a part of a larger process of soil re-capitalization. The other treatments described in this section (tilling, soil amendments, mulch) are an integral part of



Figure 6. Applying and raking seed.

establishing a sustainable soil and vegetation community that provides long-term sediment source

control. Native perennial species with deep root systems were specifically selected because they provide a high level of soil stabilization. Grasses, which dominate the seed mix, have the densest root system of the herbaceous species and are the first to establish in the natural successional process that eventually leads to a mature tree and shrub-dominated community. Seeding is an integral part of full soil restoration, which includes soil loosening, incorporation of amendments into the soil, fertilizer application, and mulch. Seed is applied to the soil and raked lightly to ¹/₄ inch below the surface.

Species (Common Name)	Species (Botanical Name)	Pure Live Seed (%)
Squirreltail	Elymus elymoides	46%
Blue wildrye	Elymus glaucus	11%
Mountain brome (Mokelumne or El Dorado)	Bromus carinatus	29%
Antelope bitterbrush	Purshia tridentata	6%
Greenleaf manzanita	Arctostaphylos patula	6%
Sulphur flower buckwheat	Eriogonum umbellatum	2%

Table 2. Heavenly Upland Seed Mix

Table 3. Lakeview Upland Seed Mix

Species (Common Name)	Species (Botanical Name)	Pure Live Seed (%)
Squirreltail	Elymus elymoides	48%
Western needlegrass	Achnatherum occidentale	2%
Mountain brome (Mokelumne or El Dorado)	Bromus carinatus	20%
Antelope bitterbrush	Purshia tridentata	10%
Sulphur flower buckwheat	Eriogonum umbellatum	8%
Slender wheatgrass (Revenue)	Elymus trachycaulus	12%

Table 4. Lakeview Moist Site Seed Mix

Species (Common Name)	Species (Botanical Name)	Pure Live Seed (%)
Tufted hairgrass	Deschampsia caespitosa	20%
Meadow barley	Hordeum brachyantherum	20%
Baltic rush	Juncus balticus	10%
Nebraska sedge	Carex nebrascensis	15%
Rocky mountain iris	Iris missouriensis	20%
Purple monkeyflower	Mimulus lewisii	5%
Sierra larkspur	Delphinium glaucum	10%

Table 5. Lakeview High Elevation Seed Mix

Species (Common Name)	Species (Botanical Name)	Pure Live Seed (%)
Mountain brome (Bromar)	Bromus carinatus	20%
Slender wheatgrass (Revenue)	Elymus trachycaulus	20%
Big bluegrass	Poa ampla	5%
Idaho fescue (Winchester)	Festuca idahoensis	5%
Streambank wheatgrass	Elymus lanceolatus	15%
Prairie junegrass	Koeleria macrantha	15%
Tufted hair grass	Deschampsia cespitosa	5%
Sandberg bluegrass	Poa secunda	5%
Sheep fescue	Festuca ovina	5%

Table 6. Stagecoach Upland Seed Mix

Species (Common Name)	Species (Botanical Name)	Pure Live Seed (%)
Squirreltail	Elymus elymoides	52%
Mountain brome (Mokelumne or El Dorado)	Bromus carinatus	20%
Antelope bitterbrush	Purshia tridentata	20%
Sulphur flower buckwheat	Eriogonum umbellatum	8%

Table 7. Gondola Lodge Upland Seed Mix

Species (Common Name)	Species (Botanical Name)	Pure Live Seed (%)
Squirreltail	Elymus elymoides	60%
Mountain brome (Mokelumne or El Dorado)	Bromus carinatus	20%
Antelope bitterbrush	Purshia tridentata	6%
Sulphur flower buckwheat	Eriogonum umbellatum	4%
Showy penstemon	Penstemon speciosus	6%
Sierra wallflower	Erysimum capitatum	4%

Mulch

Mulch is a protective layer of material, spread on the soil surface, that can serve to decrease erosion and sediment transport, decrease evaporation of water from the soil, and contribute to long-term nutrient cycling. Mulches commonly used for erosion control in the Sierra Nevada include pine needles, wood shreds, and rice straw. However, pine needles and wood shreds have proven to be far more durable and effective at reducing sediment transport than rice straw when applied consistently over treated areas. At sites in the Lake Tahoe Basin, a consistent cover of pine needle mulch has been shown to reduce sediment yield by as much as 50% compared to adjacent, partiallytreated areas with little mulch (Grismer et al. 2008).



Figure 7. Aged pine needles were applied as mulch at several projects.

Pine needles and wood chips/shreds are the only mulches that were used at Heavenly restoration treatments in 2007 and 2008.

Monitoring Methods

Before a discussion of individual methods, it is important to understand sampling during field data collection and to understand how an area is selected for monitoring.

Monitoring Area Selection

Monitoring areas were selected at each project based on the type and magnitude of impacts to soil and vegetation (disturbance and restoration) that were expected, construction plans, and coordination with Heavenly operations personnel. In general, the more complex the project, the greater the level of monitoring effort required to adequately characterize the impacts of the project on runoff and sediment transport (i.e. erosion). Within the general area of interest, a smaller, but representative area is chosen for the monitoring described below.

Monitoring Data Collection: Sampling versus Whole Area Measuring

We define monitoring within an adaptive management context as measurements to detect change in a system or system attributes over time. Monitoring is an attempt to understand specific system attributes and to see how they change. Plant cover, soil nutrients, erosion potential are all attributes that we attempt to measure. However, it's usually impossible to count every plant or blade of grass in an area or to measure all of the soil nutrients. So we take what we hope are representative samples of those attributes. We measure small subsets of the overall system of interest and we hope to get a representative understanding of the overall system. Unfortunately, natural systems can be extremely variable. Statistics help us to understand whether our measurements are accurate or not. In taking samples, there are a number of places where 'error' occurs and thus, we develop our success criteria with a margin of error or a 'plus or minus' factor. This error is cumulative and comes from measurement instruments themselves, the observers, the statistical methodology and laboratory processes, among other things. While we would like to have a sense that numbers represent precise reality, they are, after all, an approximation. Our intent is to develop numbers that we have a certain confidence in. So when we list that plant cover in one area is 10% and in another area it is 15%, the difference is likely to be from the potential 'error' that we've discussed and not a real difference.

While this sounds like an excuse for numerical inaccuracy, we are really stating that we can be confident within set limits. Further; we are really looking for trends in the data that reflect trends in the attribute of interest.

Rainfall Simulation

The rainfall simulator is a custom-designed monitoring tool used to simulate natural rainfall events and directly measure infiltration, runoff, and erosion rates from disturbed, treated, and reference areas. The rainfall simulator "rains" on a square plot from a height of 3.3 feet (Figure 8 and Figure 9). The rate of rainfall is controlled (typically 4.7 inches per hour) and runoff is collected from a trough at the bottom of a 6.5 ft² frame that has been pounded into the ground. The volume of water collected is measured, and then the volume of infiltration is calculated by subtracting the volume of runoff from the total volume of water applied to the plot. If runoff is not observed during the first 30-45 minutes, the simulation is stopped. The average steady state infiltration rate is calculated from three simulation frames and the collected runoff samples are then analyzed for steady state sediment yield (referred to as "sediment yield" throughout this report). Often times, post-treatment simulations were conducted outside the pre-treatment monitoring area to capture a range of the varied treatment applied during restoration. The pre-treatment data was used as a comparison for all post-treatment simulations at a particular site and is presented next to the post-treatment data for each plot.

A cone penetrometer is used to record the depth to refusal (DTR) surrounding the runoff frames before and after rainfall simulations. Soil moisture is also measured in each runoff frame before and after rainfall simulations. After rainfall simulation, the wetting depth is measured at nine locations within the frame to determine how deeply water has infiltrated into the soil column.

Three simulations were conducted at each site pre-treatment in an effort to account for the widely varying soil hydrologic properties within a site. Sediment yields can vary by thousands of lbs/acre/in at a single site, but are more commonly are within a one hundred lbs/acre/in of each other. This variability, along with collection and analysis variability were accounted for in determining the sediment yield success criteria. Infiltration rates, while still variable for the same reasons mentioned above, are generally with 0.5-1 in/hr of each other within a particular site.

At the Gondola Lodge, runoff samples were not collected due to the flat topography of the site. Instead, the steady state infiltration rate of the soil was measured by first setting the rainfall rate of the simulator to 2 L/min, then lowering the rainfall rate until infiltration was achieved.



Figure 8. Rain drops are generated from more than 800 hypodermic needles on the rainfall simulator.



Figure 9. Rainfall simulation in action at the Gun Barrel Top Terminal Slope monitoring area.

Rainfall simulation was conducted at the Olympic lift project, the Lakeview Lodge project (except Patsy's trail in 2008), the Stagecoach project, the Tubing Lift project, Mid Station Road, Heavenly Flyer top, and North Bowl. Rainfall simulation was not conducted at Heavenly Flyer bottom due to the presence a rare plant and the high concentration of rocks at the site.

Runoff Simulation

The runoff simulator is a custom-designed tool used to induce surface runoff (such as spring snowmelt). Like the rainfall simulator, this tool is used to directly measure infiltration, runoff and erosion rates from disturbed, treated and reference areas. Runoff simulation was conducted at Skyline Patsy's Trail at the Lakeview Lodge project. Runoff frames are often easier to install than rainfall frames in rocky or highly compacted areas. The runoff simulator is a 3.3 feet wide PVC pipe with 50 evenly spaced holes that are one-sixteenth inches in diameter (Figure 10).



Figure 10. The runoff simulator at the Skyline trail. The PVC pipe is visible just below the boulder and the collection frame is at the bottom of the photo.



Figure 11. The runoff simulator and test area post-simulation at the Lakeview Lodge Patsy's Trail monitoring site. The PVC pipe is visible at the top of the photo and the collection frame is at the bottom.

When water is pumped though the pipe and exits the holes, an even flow of water across the entire width of the pipe is produced, thereby simulating snowmelt runoff through sheet flow. Snowmelt can produce a significant amount of runoff and sediment, which can lead to severe erosion problems. The application rate ranges from 2.5 to 5.9 in/hr. A collection trough is installed 6.6 feet down slope from the runoff pipe and all runoff is collected. The same measurements and samples are collected for the runoff simulator as for the rainfall simulator.

Soil and Site Physical Conditions

Penetrometer Depth to Refusal (DTR)

Penetrometer DTR is measured along transects. Penetrometer DTR measurements are used as a surrogate for soil density. A cone penetrometer with a ¹/₂ inch diameter tip is pushed straight down into the soil until a maximum pressure of 350 pounds per square inch is reached (Figure 12 and Figure 13). The depth at which that pressure is reached is recorded as the depth to refusal (DTR). The depths are marked in 3 inch increments and can be read to the nearest 1 or 2 inches.

Penetrometer DTRs can only be compared at similar soil moisture levels, because DTR increases with increasing soil moisture. DTRs are not presented if soil moisture levels are not comparable between years.

Soil Moisture

A hydrometer is used to measure volumetric soil moisture content adjacent to the penetrometer readings at a depth of 4.7 inches (Figure 14).

Solar Exposure

Solar radiation measurements are taken using a Solar Pathfinder (Figure 15). Solar input affects evaporation rates and soil temperature, which may affect time of seed germination, germination rate, rate of plant growth, and soil microbial activity. It is an important variable to consider when monitoring plant growth and soil development.



Figure 12. Cone penetrometer dial, showing pressure applied in pounds per square inch.



Figure 13. Conducting cone penetrometer readings along transects.



Figure 14. Conducting soil moisture readings along Figure 15. Solar pathfinder in use. transects.

Cover

Cover point monitoring is a statistically defensible method of measuring foliar plant cover and ground cover. Cover is measured along randomly located transects using a metal rod with a laser pointer mounted 3.3 feet high. After the rod is leveled in all directions, the button on the laser pointer is depressed and two cover measurements are recorded (Figure 16 and Figure 17):

- the first hit cover
- the ground hit cover

The first hit cover is the first vegetation intercepted by the laser and measures the foliar cover by plant leaves or stems. The first hit vegetation is moved aside and the ground hit cover is identified. Ground hit cover is litter, mulch, basal (or rooted) plant cover, rocks, woody debris, or bare ground.





Figure 16. Cover pointer in use along transects.

Figure 17. Cover pointer rod with first hit cover and ground cover hit by the laser. The laser pointer hits are circled in red. The first cover hit is a native grass and the ground hit cover is pine needle mulch.

Basal and foliar plant cover is recorded by species and organized into four categories: lifeform, perennial/annual/woody, native/alien, and seeded/volunteer. Each species is classified based on whether it is native to the Tahoe area, and whether it was seeded during treatment. Ocular estimates of species composition are recorded.

Cover point monitoring was conducted at the 80% confidence level in most cases. For areas dominated by bare soil, dozens of transects can be required to reach the 80% confidence level. In these cases, 10 transects were recorded.

Soil Nutrient Analysis

Successful revegetation and soil treatments require adequate nutrient capital in the soil. Readily available sources of nitrogen, sufficient organic matter, and a robust microbial community are necessary to support vigorous and self-sustaining vegetation. Previous studies of soil nutrient levels at revegetation sites throughout the Tahoe area found that high plant cover was associated with high levels of total nitrogen (Claassen and Hogan 2002). Total Kjeldahl nitrogen (TKN) and organic matter are used as indicators of soil condition in this study.

Soil sub-samples are collected from a depth of 0-12 inches following the removal of the mulch layer (Figure 18). Three soil sub-samples are combined and sieved to remove any material larger than 0.08 inches in diameter, then sent to A&L Laboratories (Modesto, CA) for S3C nutrient suite, TKN, and organic matter analysis.

Like soil hydrologic properties, soil nutrient levels can vary widely, even within a small area. Three sub-samples are collected for each sample sent to the lab to help account for some of this natural variability. In addition to the natural variability, each nutrient value is accurate to a certain degree, depending on the analysis method used at the laboratory. The organic matter lab analysis is accurate within 20%, while TKN lab analysis is accurate to within 8%. The success criteria developed for

organic matter and TKN reflect the variability encountered during the soil sample collection and analysis process.



Figure 18. Soil sub-sample collection.

Chapter 2: Projects with Pre-Treatment Monitoring Only



Tubing Lift Construction Project

Overview

The tubing lift project includes the installation of a covered surface lift, clearing trees and boulders to accommodate new ski school teaching areas (low-angle ski runs) and tubing lanes, and installation of a new underground snowmaking line on existing unpaved roads (Figure 19). The proposed project encompasses a range of site conditions including existing unpaved roads, expansive low-slope areas with very sparse vegetation and mulch cover ("beach-like" conditions), and forested areas further upslope. Soil and vegetation impacts associated with construction include tree clearing, trenching for snowmaking piping, and soil compaction in designated vehicle and equipment travel paths and staging areas. No mass grading was conducted. Construction of the lift and lanes began during the fall of 2009 and has continued through summer seasons 2010 and 2011. Pre-treatment soil and vegetation monitoring was conducted in summer 2009, just before construction began.

Site Description

Tubing Lift

The tubing lift was constructed in a mostly open area with some Western white pine (*Pinus monticola*) and a sparse understory of pinemat manzanita (*Arctostaphylos nevadensis*), buckwheat (*Eriogonum sp.*), penstomen (*Penstemon sp.*), and Western needlegrass (*Achnatherum occidentale*; Figure 20). No non-native species were observed. Most of the granitic parent material soil was bare; however, there was a sparse mulch cover by pine needles near the forested areas. There were some medium to large rocks that are visible above the surface. Excavation observed during pre-treatment monitoring indicated that many of the rocks were large boulders with the majority of their mass below the surface. The site is gently sloped (10 degrees), faces 181 degrees south, and had a summer solar exposure of 86%. The site elevation is approximately 9,150 feet AMSL.



Figure 19. Tubing Lift Construction Project Map.

Tubing Lanes

The tubing lanes were constructed in an open area with very few Western white pine (*Pinus monticola*) and a very sparse understory of pinemat manzanita (*Arctostaphylos nevadensis*), buckwheat (*Eriogonum sp.*), penstomen (*Penstemon sp.*), and Western needlegrass (*Achnatherum occidentale*; Figure 21). No non-native species were observed. Most of the soil was bare; however, there was a very sparse mulch cover by pine needles near the forested areas. There were some medium to large rocks that are visible above the surface. The site is gently sloped (10 degrees), faces 181 degrees south, and had a summer solar exposure of 91%. The site elevation is approximately 9,150 feet AMSL.



Figure 20. Tubing Lift, before construction, 2009.



Figure 21. Tubing Lanes, before construction, 2009.

Objectives and Success Criteria

Treatment Objective

• no net increase in runoff and/or sediment transport as a result of lift and lane installation

Monitoring Objective

• to quantitatively assess whether lift construction and run clearing resulted in a net change in runoff and/or sediment transport

Success Criteria

The following success criteria will be used to determine whether treatment goals were achieved following construction (Table 8). The success criteria emphasize a range of physical elements and soil edaphic factors necessary for an erosion-resistant site. Vegetation cover has been removed from these success criteria, as it is directly dependent on achieving the criteria stated below and not linked directly to the project treatment objectives. For further discussion of this approach, see the "Defining and Measuring Success" section in Chapter 1.

	Tubing Lift/Lanes	Management Response
Sediment Yield (lbs/acre/in)	Not greater than 100 lbs/acre/in higher than pre-treatment levels	Soil loosening with amendments and/or mulching
Infiltration Rate (in/hr)	Not greater than 0.8 in/hr lower than pre-treatment levels	Soil loosening with amendments
Penetrometer Depth (inches)	Not greater than 4 inches shallower than pre-treatment level	Soil loosening, amendments
Total Cover (%)	70% or greater	Mulching and/or seeding
Plant Cover (%)	10% or greater - to be adjusted in 2012	Seeding and/or targeted, short-term irrigation
Organic Matter (%)	Not greater than 1.5 percentage points less than pre-treatment level	Additional amendments and soil loosening
Visual Assessment	No visible signs of erosion or anthropogenic disturbance of treatment areas.	Identify causes of erosion or ongoing disturbance. Develop and implement site-specific management response plan.

Table 8. Tubing Lift Success Criteria and Management Responses.

Erosion Prevention Treatments

The tubing lift consists of two preliminary treatment areas (Table 9), Area A (north side of the lift) and Area B, south side of the lift. In 2009, construction of the tubing lift and associated snowmaking lines was not completed until mid-December and disturbed areas were mulches with wood chips. During construction of the tubing lift, wood chips were applied to provide soil surface protection in designated vehicle travel areas. In 2010 in area A, which was especially compacted, wood chips were tilled into the soil once construction was completed. Disturbed soil areas on both sides of the lift were then mulched with pine needles to fully winterize the site. In 2011, mulch was reapplied in areas where foot and vehicle traffic occurred. Permanent stabilization treatments for this site have not yet been determined, as several modifications to the tubing lanes have been proposed. Performance monitoring will be conducted after permanent stabilization treatments are implemented.

		Treatment Area	
		А	В
	Туре	WC	n/a
Amendments	Depth (in)	4	n/a
Tilling	Depth (in)	12*	n/a
	Туре	PNM	WC/PNM
Mulch	Depth (in)	2	2
Key			
WC = wood chips, PNM = pine needle mulch,			

Table 9. Tubing Lift Treatment Matrix.



Figure 22. Tubing lift, area A, covered with wood chip mulch in fall 2011.



Figure 23. Tubing lift, area B, showing disturbed areas covered in wood chip mulch in fall 2011.

Chapter 3: Projects with Post-Treatment Performance Monitoring



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Gondola Lodge Construction Project

Overview

The Gondola Lodge project includes the construction of a day lodge just north of the existing gondola building. Construction of the lodge was started in June 2010 and completed in late fall 2010. Soil and vegetation impacts associated with construction included tree clearing, grading, soil compaction and a shallow, broad spoils placement in an area that has been subjected to periodic disturbance over time. The fill area just north of the base of the Tamarack chairlift is the primary focus of the monitoring efforts. Pre-treatment soil, vegetation, and infiltration monitoring was conducted early in the summer of 2010, just before construction began. Post-treatment soil, vegetation, and infiltration monitoring was conducted late August 2011, one year after construction was completed and the spoils area was treated.

Pre-treatment Site Description, 2010

The staging area lies in a mostly open area with some Western white pine (*Pinus monticola*) and an understory dominated by red fescue (*Festuca rubra*; Figure 24 and Figure 25). No non-native species were observed. Most of the granitic parent material soil was bare; however, there was a sparse mulch cover by woodchips and plant litter. There were some medium to large rocks that are visible above the surface. The site is flat and had a summer solar exposure of 97%. The site elevation is approximately 9,150 feet AMSL.



Figure 24. Gondola Lodge staging area, before construction in 2010.



Figure 25. Gondola Lodge staging area, before construction in 2010.



Figure 26. Gondola Lodge Construction Project Map.

Objectives and Success Criteria

Treatment Objective

• No net increase in runoff and/or sediment transport as a result of lodge construction and spoil relocation

Monitoring Objective

• To quantitatively assess whether lodge construction and spoil relocation resulted in a net change in runoff and/or sediment transport

Success Criteria

The following success criteria are used to determine whether treatment goals were achieved following construction (Table 10). The success criteria emphasize a range of physical elements and soil edaphic factors necessary for an erosion-resistant site. The plant cover success criterion will be adjusted in 2012, as it is directly dependent on achieving the criteria stated below and other site-specific factors. For further discussion of this approach, see the "Defining and Measuring Success" section in Chapter 1.

	Bottom of Tamarack Chair	Management Response	Success Criteria Evaluation
Infiltration Rate (in/hr)	Not greater than 0.8 in/hr lower than pre-treatment levels	Soil loosening with amendments	$\sqrt{\text{Criterion Met}}$
Penetrometer Depth (inches)	Not greater than 4 inches shallower than pre-treatment level	Soil loosening, amendments	$\sqrt{\mathrm{Criterion}}$ Met
Total Cover (%)	70% or greater	Mulching and/or seeding	$\sqrt{\text{Criterion Met}}$
Plant Cover (%)	10% or greater – to be adjusted in 2012	Seeding and/or targeted, short-term irrigation	× Criterion Not Met
Organic Matter (%)	Not greater than 1.5 percentage points less than pre-treatment level	Additional amendments and soil loosening	$\sqrt{\text{Criterion Met}}$
Visual Assessment	No visible signs of erosion or anthropogenic disturbance of treatment areas.	Identify causes of erosion or ongoing disturbance. Develop and implement site-specific management response plan.	$\sqrt{ m Criterion}$ Met

Table 10. Gondola Lodge Success Criteria and Management Responses.

Performance Monitoring

Infiltration Rate

The slope at the Gondola Lodge fill area is relatively flat, which precluded runoff sample collection. Instead, the rainfall simulator was used to measure the steady state infiltration rate. In 2010, steady state infiltration rates ranged from 0.6 to 2.2 in/hr, with an average infiltration rate of 1.6 in/hr. In 2011, steady state infiltration rates ranged from 3.5 to 5.3 in/hr, with an average infiltration rate of 4.3 in/hr (Figure 27). This data indicates that the average infiltration rate increased 2.7 times from pre-treatment to post-treatment conditions, since the spoils material was placed without being compacted.



Figure 27. Gondola Lodge Infiltration Rate for 2010 and 2011. Each of the 3 rainfall frames are presented here. Pre-treatment infiltration monitoring was conducted in 2010.

Penetrometer DTR

In 2010, penetrometer DTR at the fill area was 5 inches, with a standard deviation of 0.8 inches. This relatively shallow DTR likely resulted in the low infiltration rates presented above. In 2011, the penetrometer DTR at the fill area was 13.7 inches, with a standard deviation of 3 inches. The 2011 penetrometer DTR is 2.75 times greater than the 2010 DTR, which meets project success criteria. Leaving the spoils material uncompacted resulted in low soil density with high infiltration capacity.





Total Cover and Plant Cover

In 2010, total cover at the fill area was71%, with 58% mulch cover, 11% other cover, and 1% understory plant cover (Figure 29). Bare soil was 29% of the ground composition. Overstory (or foliar) plant cover was 14% (no graph). In 2011, total cover was 91%, with 91% mulch cover, 9% bare ground and 0% plant cover in the sampling area. However, ocular estimates of vegetation cover for the entire treatment area averaged 5%, with pockets of vigorous, well-established grasses. Compared to pre-treatment conditions, total ground cover increased 28% following treatment in the sampling area. It is also worth noting that post-treatment monitoring in 2011 was conducted prior to the planting of approximately 250 seedlings throughout the fill area, which likely contributed to an overall increase in plant cover at the fill area.



Figure 29. Gondola Lodge Ground Cover Composition for 2010 and 2011.

Soil Nutrients

In 2010, organic matter content at the Gondola Lodge was 2.1%, while Total Kjeldahl nitrogen (TKN) was 410 ppm (no graph). In 2011, organic matter content at the Gondola Lodge was 0.8%,

while Total Kjeldahl nitrogen (TKN) was 1866 ppm. Organic matter decreased by 2.63 times from 2010 to 2011, while TKN increased 4.55 times from 2010 to 2011.



Figure 30. Organic Matter and Total Kjehldahl Nitrogen (TKN) for 2010 and 2011 at the Gondola Lodge.

Visual Erosion Assessment

In 2010, splash detachment from a rain event was visible at this site. In 2011, no signs of water or wind erosion were observed, likely due to the robust mulch cover and high surface roughness from tilling.

Restoration Treatments

The Gondola Lodge project restoration treatment area consists of a large fill placement area near the base of the Tamarack Chairlift where spoils material generated during lodge construction was placed. In 2010, the spoils material was placed in the treatment area and was left uncompacted. Four to five inches of wood chips were then placed on the surface of the fill material and incorporated to a depth of 20 to 24 inches using the bucket of an excavator. The entire area was then fertilized, seeded and mulched. The surface of the fill area was left in a slightly roughened condition to reduce the potential for erosion to be caused by snowmelt during saturated soil conditions. These treatments are summarized in Table 11. In 2011, the treatment area was planted with mountain pride (*penstemon newberryii*) and sulphur flower buckwheat (*Eriogonum umbellatum*) and irrigated using a temporary overhead system.

Amondmonto	Туре	WC
Amenuments	Depth (in)	4-5
Tilling	Depth (in)	20-24
Fortilizor	Туре	Biosol 6-1-3
reitilizei	Rate (Ibs/acre)	4000
Sood	Міх	Gondola Lodge mix*
Seed	Rate (Ibs/acre)	50*
Mulab	Туре	PNM/WC
WUICH	Depth (in)	1
Irrigation	Frequency/Duration	2x/week for 4 weeks (duration unknown)
Treatment Area	Square Feet	26,500
<u>Key</u> WC = wood chips PNM = pine needle mulch * = not verified in field		

Table 11. Gondola Lodge Treatment Matrix, 2010.

Photo Summary 2010-2011



Figure 31. Gondola Lodge site before construction, July 2010.



Figure 32. Gondola Lodge site after construction, October 2011.







Figure 34. Area across from lodge site, 2011.

Management Responses & Follow-up Actions

Success criteria were met for all categories except for total plant cover. Although no plant cover (0%) was measured along transects in the sampling area, ocular estimates of plant cover throughout the treatment area averaged 5%, with pockets of vigorous, well-established grasses. Additionally, approximately 250 seedlings were planted throughout the fill area shortly after 2011 monitoring was conducted, which likely contributed to an overall increase in plant cover.

Area	Unmet Success Criterion	Management Response	Follow-up Action
Fill	Plant Cover	Continue deep-cycle irrigation with low- flow heads (MP rotator or equivalent) to encourage deep root growth and seedling establishment	Assessment of soil edaphic factors and plant establishment in 2012

T I I I I I I I I I I I			
Table 12. Gondola Lodge Mana	gement Responses	and Follow-up) Actions.

Olympic Lift Replacement Project

Overview

The Olympic Lift Replacement Project, completed in 2007, included the replacement of the existing lift towers in addition to the top and bottom lift terminals. Disturbances to soil and vegetation associated with this project included re-grading segments of ski runs, soil compaction from heavy equipment, and trenching for utility lines. Restoration treatments were partially implemented in 2007 and completed in 2008. Performance monitoring was conducted in 2009. There are three treatment plots at the top terminal and five treatment plots at the bottom terminal. Three monitoring areas, which are within the treatment areas, have also been established for this project – one at the top terminal and two at the bottom terminal. All restoration treatment and monitoring areas are described in detail below and are shown on the project map (Figure 37).

Site Description

Olympic Lift Bottom

Olympic lift bottom is a disturbed area that encompasses the current bottom lift terminal and a portion of the Olympic Downhill ski run that funnels to the lift terminal (Figure 37, Figure 35). This site is at an elevation of 8,561 feet AMSL on rocky soil derived from granitic parent material and faces northeast. Before treatment, non-native plants were present. The surrounding vegetation includes an overstory of red fir (*Abies magnifica*), whitebark pine (*Pinus albicaulis*), and Western white pine (*Pinus monticola*), with an understory of pinemat manzanita (*Arctostaphylos nevadensis*). The treatment area is dominated by a non-native fescue (*Festuca trachyphylla*). The tree canopy cover is less than 10%, the solar exposure is 70%, and the slope angle is 20 degrees. Rills and gullies caused by water erosion were observed throughout the site pre-treatment.

Olympic Lift Top

Olympic lift top is a disturbed area surrounding the top lift terminal. It is at an elevation of 9,445 ft AMSL on granitic parent material and faces north. The surrounding vegetation includes lodgepole pine (*Pinus contorta*), whitebark pine (*Pinus albicaulis*), and native grasses. Vegetation in the treatment area includes of Western needlegrass (*Achnatherum occidentale*) and lodgepole pine. Also present was a non-native grass species, quackgrass (*Elymus trachycaulus*). There is no tree canopy cover and the solar exposure is 99%.



Figure 35. Olympic Lift Bottom, Olympic Downhill ski run, pre-treatment, 2007.



Figure 36. Olympic Lift top, pre-treatment, 2007.



Olympic Lift Replacement Project

Legend



Figure 37. Olympic Lift Replacement Project Map.



Objectives and Success Criteria

Treatment Objectives

- no net increase in runoff and/or sediment transport as a result of lift terminal replacement and associated site grading
- to establish an appropriate, self-sustaining, native plant community
- no evidence of erosion caused by lift terminals (i.e. concentrated runoff or dripping)

Monitoring Objective

• to quantitatively assess whether treatments resulted in a net change in runoff and/or sediment transport following lift terminal replacement

Success Criteria

In 2011, treatment areas that did not meet success criteria in previous years were reassessed in the field. The success criteria found in Table 13 were used to determine whether project treatment goals were achieved. The success criteria emphasize a range of physical elements and soil edaphic factors necessary for a self-sustaining, erosion-resistant site. The plant cover success criterion will be adjusted in 2012, as it is directly dependent on achieving the criteria stated below and other site-specific factors. For further discussion of this approach, see the "Defining and Measuring Success" section in Chapter 1.

	Success Criteria	Success Criteria Evaluation
Sediment Yield (Ibs/acre/in)	Not greater than 100 lbs/acre/in higher than pre-treatment levels	Top: [*] $$ Criterion Met A: ^{**} $$ Criterion Met C: ^{***} $$ Criterion Met
Infiltration Rate (in/hr)	Not greater than 0.8 in/hr lower than pre-treatment levels	Top: $$ Criterion Met A: $$ Criterion Met C: $$ Criterion Met
Penetrometer Depth (inches)	Not greater than 4 inches shallower than pre-treatment level	Top: $$ Criterion Met A: $$ Criterion Met C: $$ Criterion Met
Total Cover (%)	70% or greater	Top: $$ Criterion Met A: $$ Criterion Met C: $$ Criterion Met
Total Plant Cover (%)	10% or greater – to be adjusted in 2012	Top: $\sqrt{\text{Criterion Met}}$ A: \times Criterion Not Met C: \times Criterion Not Met
Organic Matter (%)	Not greater than 1.5 percentage points less than pre- treatment level	Top: $$ Criterion Met A: $$ Criterion Met C: $$ Criterion Met
Visual Assessment	sual AssessmentNo visible signs of erosion or anthropogenic disturbance of treatment areas. No erosion resulting from runoff or drippingTop: × Criterion N	

Table 13. Olympic Lift Success Criteria Evaluation, 2011.

	Success Criteria		Success Criteria Evaluation		
	from foundations or decks.		A: $\sqrt{\text{Criterion Met}}$		
			C: $\sqrt{\text{Criterion Met}}$		
*Top = Olympic Lift Top					
**A = Olympic Lift Bottom, Treatment Area A					
***C = Olympic Lift Bottom, Treatment Area C					

Restoration Treatments

Olympic Lift Bottom

The Olympic lift bottom consists of five individual treatment areas (Table 14). In 2007, treatments in many of these areas were started, but not completed. In 2008, treatments in all areas were completed. Soil and vegetation treatment specifications varied slightly among the different areas, depending on site conditions and planned future use. However, treatments in all areas were to include the following elements of full soil restoration: soil amendments, tilling, organic fertilizer, seed, and mulch. Temporary irrigation was also applied in several of these treatment areas to encourage rapid seed germination. Table 14 details the specific treatment elements implemented at each treatment area. The type of disturbance associated with each treatment area is described briefly below:

- Treatment Area A re-graded ski run upslope of lower lift terminal
- Treatment Area B saddle where lower lift terminal was replaced
- Treatment Area C re-graded ski run down slope of lower lift terminal
- Treatment Area D removed/treated section of Olympic Traverse Road
- Treatment Area E disturbed area along utility line trench

In 2010, a part of the Olympic lift bottom treatment area A was re-mulched with a thick layer of pine needles (greater than 4 inches in places) and was irrigated on an unknown schedule.

		Treatment Area				
		А	В	С	D	E
Amendments	Туре	WC, FCZ, DWS	WC	WC, FCZ	WC, FCZ	WC, DWS
	Depth (in)	4	4*	4	4	4
Tilling	Depth (in)	15	10	12	12	20
Fertilizer	Туре	Biosol 6-1-3	Biosol 6-1-3*	Biosol 6-1-3	Biosol 6-1-3*	Biosol 6-1- 3*
	Rate (Ibs/acre)	2,000	2,000*	2,000	2,000*	2,000*
Seed	Mix	Heavenly upland mix*				
	Rate (Ibs/acre)	87*	87*	87*	87*	87*
Mulch	Туре	PNM	PNM	PNM	PNM	PNM

Table 14. Olympic Lift Bottom Treatment Matrix, 2007 and 2008.

	Depth (in)	1	1	1	1	1
Irrigation	Frequency/ Duration	yes – unknown	yes – unknown	no	yes – unknown	no
Treatment Area	Square Feet	16,915	7,805	9,713	24,441	30,437
Koy						

<u>Key</u> WC = wood chips

FCZ = Full Circle Integrated Tahoe Blend Zero (composted coarse overs)

DWS = decomposed wood shavings

PNM = pine needle mulch

* = not verified in field



Figure 38. Olympic lift bottom, treatment area A, pre-treatment, 2007.



Figure 40. Olympic lift bottom, treatment area A, October 2011. Thick mulch cover may be limiting plant establishment but it is effectively controlling erosion. Soil investigation planned for 2012.



Figure 39. Olympic lift bottom, treatment area A, post-treatment, 2010. The re-mulched area is on the left.



Figure 41. Olympic lift bottom, treatment area C, October 2011. Widespread vegetation establishment observed. Soil investigation planned for 2012.

Olympic Lift Top

The Olympic lift top area consists of three individual treatment areas surrounding the upper Olympic lift terminal (Table 15). Soil and vegetation treatments for areas A and C included the following treatment elements: soil amendments, tilling, organic fertilizer, seed, and mulch. Area B was mulched to provide soil protection, rather than full restoration treatment, as this skier downramp area is continually impacted by grooming and skier traffic. Rock slope protection was used to stabilize the cut slope between the lift terminal and treatment area C, as soil and vegetation-based treatments were unlikely to be successful due to steep slope angles, poorly developed soils, and likelihood of ongoing disturbance. Since the area near the top of Olympic Lift serves as a popular viewpoint for hikers in the summer, Heavenly constructed a foot trail between treatment areas A and B, fenced off the treatment areas, and posted educational signage to keep visitors from disturbing the recently treated revegetation areas. These treatment area protection measures proved to be very effective during summer 2008. These treatments were partially implemented in 2007 and completed in 2008.

- Treatment Area A flat parking area above lift terminal
- Treatment Area B fill slope (skier down ramp) surrounding upslope side of lift terminal
- Treatment Area C fill slope below lift terminal

		Treatment Area			
		Α	В	С	
Amondmonto	Туре	WC, FCZ	n/a	WC, FCZ	
Amenaments	Depth (in)	4	reatment A B n/a A,196	4	
Tilling	Depth (in)	12	n/a	10	
Fortilizor	Туре	Biosol 6-1-3	n/a	Biosol 6-1-3	
Amendments Tilling Fertilizer Seed Mulch Irrigation	Rate (lbs/acre)	2,000	n/a	2,000	
Seed	Mix	Heavenly upland mix	n/a	Heavenly upland mix	
	Rate (Ibs/acre)	87	n/a	87	
Mulah	Туре	PNM	WC	PNM	
wuich	Depth (in)	1	B W(n/a W(n/a M(n/a Bioso n/a Bioso n/a Bioso n/a Contract n/a <th>1</th>	1	
Irrigation	Frequency/Duration	yes – unknown	n/a	yes – unknown	
Treatment Area	Square Feet	5,165	4,196	5,552	
<u>Key</u> WC = wood chips FCZ = Full Circle Integrated Tahoe Blend Zero (composted coarse overs) DWS = decomposed wood shavings PNM = pine needle mulch					

Table 15. Olympic Lift Top Treatment Matrix.


Figure 42. Olympic lift top, post-treatment, 2010. Note presence of vegetation.



Figure 43. Olympic lift top, post-treatment, 2011. Note vehicle tracks in treatment area.

Performance Monitoring

In 2009 and 2010, post-treatment monitoring was conducted at one plot at Olympic top and two plots at Olympic bottom. In 2010, all success criteria were met except plant cover at the bottom terminal (areas A and C) and visual erosion assessment at the top terminal. In 2011, a follow-up visual assessment was conducted at both the top and bottom terminals to determine appropriate next steps. The road erosion issue was successfully addressed at the top terminal but vehicle disturbance was noted in the treatment area. No significant change in vegetation cover was noted at the lower terminal treatment areas.

Management Responses and Follow-up Actions

In 2010, at the Olympic lift bottom plots, all of the success criteria were met, except for the plant cover criterion. Current site conditions (including a 3+" mulch layer on treatment area A) are providing a high level of erosion resistance (as indicated by past rainfall simulation monitoring results), despite having less than 10% plant cover. Soil investigation is recommended for 2012 to evaluate the trajectory of the soil-plant system. The plant cover criterion was met at the Olympic lift top; however, obvious vehicle disturbances in the treatment area now require that a portion of the area below the lift terminal (see Figure 43) be retreated.

	Unmet Success Criterion	Management Response	Follow-up Action
Тор	n/a	Loosen soil to remove tire tracks, re-seed, mulch and irrigate.	Ocular and penetrometer assessment after re-treatment in 2012.
Bottom	Plant Cover	None	Conduct soil investigation in 2012 to assess soil development and ecological trajectory. Adjust plant cover criterion based on analog (reference) conditions.
Top and	n/a	Install fencing/signage and communicate to	Visual assessment

Table 16. Olympic Lift Management Responses and Follow-up Actions.

	Unmet Success Criterion	Management Response	Follow-up Action
Bottom		staff locations of treatment areas to prevent foot and vehicle traffic	

Heavenly Flyer Construction Project

Overview

The Heavenly Flyer Construction Project includes the installation of top and bottom terminals for a new zip line. Disturbances associated with this project included soil compaction from heavy equipment and some vegetation removal. There are two distinct treatment and monitoring areas: Heavenly Flyer bottom and Heavenly Flyer top. Each restoration treatment and monitoring area is described in detail below and is shown on the project map (Figure 46).

Heavenly Flyer Bottom

Heavenly Flyer Bottom was a relatively undisturbed area before treatment that encompasses the bottom lift terminal construction area. It is at an elevation of 9,151 feet AMSL on rocky soil derived from granitic parent material and faces southeast. The Heavenly Flyer bottom site is an open high elevation conifer forest dominated by white bark pine (*Pinus albicaulis*) with some Western white pine (*Pinus monticola*). The understory includes pinemat manzanita (*Arctostaphylos nevadensis*), and native forbs and grasses. A rare plant, Carson range rockcress (*Arabis rigidissima var. demota*), was present. The tree canopy cover is less than 5%, the solar exposure is 81%, and the slope angle is 15 degrees.

Heavenly Flyer Top

Heavenly Flyer top was a relatively undisturbed before treatment area that encompasses top lift terminal construction area. It is at an elevation of 9,395 feet AMSL on rocky soil derived from granitic parent material and faces north. The Heavenly Flyer top site is dominated by white bark pine (*Pinus albicaulis*) and has a thick layer of pine needle duff. The tree canopy cover is approximately 13%, the solar exposure is 44%, and the slope angle is 15 degrees.



Figure 44. Heavenly Flyer bottom, pretreatment, 2007.



Figure 45. Heavenly Flyer Top, pre-treatment cover point monitoring, 2007.



Figure 46. Heavenly Flyer Construction Project Map.

Objectives and Success Criteria

Treatment Objectives

- no net increase in runoff and/or sediment transport as a result of lift terminal installation and associated site grading
- to establish an appropriate, self-sustaining, native plant community
- no evidence of erosion caused by zip line deck and foundations (i.e. concentrated runoff or dripping)

Monitoring Objective

• to quantitatively assess whether treatments resulted in a net change in runoff and/or sediment transport following construction of zip line terminals

Success Criteria

The following success criteria were used to determine whether implemented treatments achieved the treatment goals of the project (Table 17). The success criteria emphasize a range of physical elements and soil edaphic factors necessary for a self-sustaining, erosion-resistant site. The plant cover success criterion will be adjusted in 2012, as it is directly dependent on achieving the criteria stated below and other site-specific factors. For further discussion of this approach, see the "Defining and Measuring Success" section in Chapter 1.

	Success Criteria	Success Criteria Evaluation
Sediment Yield (lbs/acre/in)	Not greater than 100 lbs/acre/in higher than pre-treatment levels	Top: [*] √ Criterion Met Bottom: ^{**} n/a
Infiltration Rate (in/hr)	Not greater than 0.8 in/hr lower than pre-treatment levels	Top:√ Criterion Met Bottom: n/a
Penetrometer Depth (inches)	Not greater than 4 inches shallower than pre-treatment level	Top: $$ Criterion Met Bottom: $$ Criterion Met
Total Cover (%)	70% or greater	Top: $$ Criterion Met Bottom: $$ Criterion Met
Total Plant Cover (%)	10% or greater – to be adjusted in 2012	Top: × Criterion Not Met Bottom:× Criterion Not Met
Organic Matter (%)	Not greater than 1.5 percentage points less than pre- treatment level	Top: $$ Criterion Met Bottom: $$ Criterion Met
TKN (PPM)	TKN not used as a metric for measuring success	n/a, see Appendix B
Visual Assessment	No visible signs of erosion or anthropogenic disturbance of treatment areas. No erosion resulting from runoff or dripping from foundations or decks.	Top:√ Criterion Met Bottom:√ Criterion Met
*Top = Heavenly Flyer **Bottom = Heavenly F	top Iyer bottom	

Table 17. Heavenly Flyer Success Criteria Evaluation, 2011.

Restoration Treatments

Heavenly Flyer Top and Heavenly Flyer Bottom

The Heavenly Flyer top and bottom areas each consist of a single, contiguous treatment area encompassing the area of disturbance from the construction of the zip line terminals. Soil and vegetation treatments for each area included all elements of full soil and vegetation treatment: soil amendments, tilling, organic fertilizer, seed, and mulch (Table 18). In 2007, amendments were incorporated into the soil via hand tilling at both treatment areas and fertilizer and seed were applied. However, no pine needle mulch was applied. In 2008, both treatment areas were completed by applying additional seed and pine needle mulch. Specific treatments implemented for the top and bottom areas are detailed below (Table 18).

		Тор	Bottom
Americante	Туре	WC, FCZ	WC, FCZ
Amenaments	Depth (in)	4 (2″ each)	4 (2" each)
Tilling	Depth (in)	11	8
Fortilizor	Туре	Biosol 6-1-3*	Biosol 6-1-3*
rentilizer	Rate (Ibs/acre)	2,000*	2,000*
Sood	Mix	Heavenly upland mix*	Heavenly upland mix*
Seed	Rate (Ibs/acre)	87*	87*
Mulah	Туре	PNM	PNM
wuich	Depth (in)	1-2	1
Irrigation	Frequency/Duration	No	No
Treatment Area	Square Feet	2,412	7,521
<u>Key</u> WC = wood chips FCZ = Full Circle Integrated Tahoe Blend Zero (composted coarse overs) PNM = pine needle mulch			

Table 18. Heavenly Flyer Top and Bottom Treatment Matrix, 2007 and 2008.

* = not verified in field



Figure 47. Heavenly Flyer top, during construction, 2007. Pre-treatment conditions (very dense thicket of pine) were difficult to photograph.



Figure 48. Heavenly Flyer top, post-treatment, 2007.



Figure 49. Heavenly Flyer bottom, pre-treatment, 2007.



Native pine mat manzanita transplanted into treatment area in summer 2011.



Figure 50. Heavenly Flyer bottom, post-treatment, 2009.

Management Responses and Follow-up Actions

In 2009, most of the success criteria were met for the Heavenly Flyer, indicating that the project outcome was aligned with the primary project objective of no net increase in runoff or sediment yield. Monitoring results indicated high infiltration rates, very low sediment yields, low soil density (as measured by cone penetrometer), and high total cover. However, the criterion for plant cover (10%) was not met at any of the Heavenly Flyer plots in 2009 or 2010. Vegetation establishment from seed has been quite slow at this site. Additional mulch is recommended to be applied at this site to provide adequate soil protection, and a soil investigation is recommended for 2012 to evaluate soil development and the trajectory of the soil-plant system.

In 2011, Jim Larmore of Heavenly's operations staff experimented with transplanting nearby pine mat manzanita seedlings into the treatment area. More than 80% of the transplants were alive and showing no signs of stress two months after transplanting.

	Unmet Criterion	Management Response	Follow-up Action
Top and Bottom	Plant Cover	Apply additional mulch as needed to achieve a depth of 2-3 inches across the site.	Conduct soil investigation in 2012 to assess soil development and ecological trajectory. Adjust plant cover criterion based on analog (reference) conditions.

Table 19. H	leavenly Flyer Manageme	nt Responses and Follow-up Actio	ns.

Mid Station Road Project

Overview

Mid Station Road is an unpaved access road that leads from the top of the gondola to the gondola mid station. The road is only used for limited summer and emergency access. As part of the Mid Station Road Project, a portion of the road near the mid station was realigned in 2008 and the abandoned segment of the road was removed and treated to restore the soil and vegetation community (Figure 51, Figure 52, and Figure 53). The treatment area is at an elevation of 9,142 feet AMSL. The soil is derived from granitic parent material and the site faces west to southwest. Vegetation is not present in the planned treatment area. Rills and gullies, which were formed by water erosion, were present on the road surface before treatment. No signs of erosion have been observed since treatment implementation. The surrounding area has many large rocks and is dominated by white bark pine (*Pinus albicaulis*). There is no tree canopy cover in the treatment area, the solar exposure is 77%, and the slope angle is 9 degrees.



Figure 51. Mid Station Road, pre-treatment with monitoring transects, 2007.



Figure 52. Mid Station Road, grasses beginning to establish, 2011.



Figure 53. Mid Station Road Project Map.

Objectives and Success Criteria

Treatment Objectives

- no net increase in runoff and/or sediment transport as a result of road removal/restoration
- to establish an appropriate, self-sustaining, native plant community in the treated road segment

Monitoring Objective

• to quantitatively assess whether treatments resulted in a net change in runoff and/or sediment transport from the site following road removal/restoration

Success Criteria

The following success criteria were used to determine whether road removal/restoration achieved the project treatment goals (Table 20). The success criteria emphasize a range of physical elements and soil edaphic factors necessary for a self-sustaining, erosion-resistant site. The plant cover success criterion will be adjusted in 2012, as it is directly dependent on achieving the criteria stated below and other site-specific factors. For further discussion of this approach, see the "Defining and Measuring Success" section in Chapter 1.

	Success Criteria	Success Criteria Evaluation
Sediment Yield (lbs/acre/in)	Not greater than 100 lbs/acre/in higher than pre-treatment levels	$\sqrt{1}$ Criterion Met
Infiltration Rate (in/hr)	Infiltration Rate (in/hr) Not greater than 0.8 in/hr lower than pre-treatment levels	
Penetrometer Depth (inches)	Not greater than 4 inches shallower than pre-treatment level	$\sqrt{\text{Criterion Met}}$
Total Cover (%)	70% or greater	$\sqrt{1}$ Criterion Met
Total Plant Cover (%)	10% or greater – to be adjusted in 2012	× Criterion Not Met
Organic Matter (%)	Not greater than 1.5 percentage points less than pre-treatment level	$\sqrt{\text{Criterion Met}}$
Visual Assessment	No visible signs of erosion or anthropogenic disturbance of treatment areas.	$\sqrt{1}$ Criterion Met

Table 20. Mid Station Road Success Criteria Evaluation, 2010.

Restoration Treatments

In 2008, vehicle traffic was excluded from the abandoned segment of the Mid Station Road and soil and vegetation restoration treatments were implemented to functionally remove the road and restore the area to match surrounding undisturbed conditions as closely as possible. The abandoned road segment was divided into two treatment areas, one upslope of the realigned road (area A) and one down slope of the realigned road (area B; Figure 53). The treatment for area A included all elements of full soil and vegetation treatment: soil amendments, tilling, organic fertilizer, seed, and mulch. The treatment for area B included soil amendments, tilling, and mulch. Area B's treatment is intended to

maximize infiltration, thereby reducing runoff and erosion, but did not including seeding or fertilizer. This treatment area has a low slope angle and is surrounded by mature forest; therefore, it presented a low-risk opportunity to test a lower-intensity treatment. The lower-intensity treatment was focused on optimizing soil conditions and relying on natural seed cast from the surrounding vegetated areas to assist in reestablishing vegetation. The specific treatment elements implemented at each treatment area are detailed in Table 21.

		Treatment Area		
		А	В	
Amondanouto	Туре	WC	WC	
Amenuments	Depth (in)	4	4	
Tilling	Depth (in)	18	16	
Fortilizor	Туре	Biosol 6-1-3	n/a	
Fertilizer	Rate (Ibs/acre)	2,000	n/a	
Seed	Mix	Heavenly upland mix	n/a	
	Rate (Ibs/acre)	50	n/a	
Mulah	Туре	PNM	PNM	
Mulch	Depth (in)	1-2	1-2	
Irrigation	Frequency/Duration	No	no	
Treatment Area Square Feet		5,815	4,125	
<u>Key</u> WC = wood chips				
 PINIVI = pine needle r * = not verified in field 	nuicn eld			

Table 21. Mid Station Road Treatment Matrix, 2008.



Figure 54. Mid Station Road, treatment area A, pretreatment with monitoring transects, 2007 (photo point 6).



Figure 55. Mid Station Road, treatment area A, post-treatment, 2008 (photo point 6).



Figure 56. Mid Station Road, treatment area A, post-treatment, 2009 (photo point 6).



Figure 57. Mid Station Road, July 2011. Bare areas and rodent activity observed, as well as grasses beginning to establish.

Performance Monitoring

No additional quantitative monitoring was conducted in 2011, though the site was visited and visually assessed. Plant cover was still quite low, through grasses were beginning to establish in several areas since our last visit to the site in 2010. Rodent activity was observed, and total cover by mulch was patchy (due in part to rodent activity. No signs of concentrated runoff or erosion were observed.

Management Responses and Follow-up Actions

Current site conditions are achieving the goal of erosion resistance, as indicated by past rainfall simulation monitoring results, despite having less than 10% plant cover. Additional mulch should be applied to achieve a depth of 2-3 inches across the treatment area. Additionally, a soil investigation is recommended for 2012 to evaluate soil development and the trajectory of the soil-plant system.

	Unmet Criterion	Management Response	Follow-up Action
Road	Plant Cover	Apply additional mulch as needed to achieve a depth of 2-3 inches across the site.	Conduct soil investigation in 2012 to assess soil development and ecological trajectory. Adjust plant cover criterion based on analog (reference) conditions.

Overview

The Lakeview Lodge Water System Improvement Project includes a range of improvements to the water infrastructure near the Lakeview Lodge at the top of the tram. The project includes removal of the existing water tank, construction of a new water tank, and construction of new underground waterlines to tie into existing infrastructure. Construction activities are primarily taking place in previously disturbed areas. Trenching was the primary impact to soil and vegetation during the 2008 construction season. Seven treatment areas and three monitoring areas were established at this project in 2008 (Figure 58). All success criteria for the first two sites (gun barrel and Patsy's Trail) were met in 2011 after a few follow-up treatments. In 2011, the second phase of the Lakeview Lodge Water System Improvement Project was implemented, which included the following elements: removal of the existing water tank and restoration of the associated access road, and completion of an ADA trail from Lakeview Lodge to the top of the tram. Performance monitoring is planned to be conducted at the old water tank road in summer 2012.

Site Description

Gun Barrel Top Terminal Slope

The Gun Barrel top terminal slope (Gun Barrel top slope) is a disturbed slope with a summer road that switchbacks through it. The site is located on a northeast facing slope at an elevation of 8,303 feet AMSL. The site is moderately sloped (14 degrees), does not have any canopy cover, and a solar exposure of greater than 95% during the summer months. The soil is derived from granitic parent material with a low proportion of rocks greater than 0.5 inches in diameter. Conifers surround the area, which is dominated by red fir (*Abies magnifica*), Jeffrey pine (*Pinus jeffreyi*), and Western white pine (*Pinus monticola*). Greenleaf manzanita (*Arctostaphylos patula*) dominates the understory in the surrounding area. The monitoring area contains a variety of native and non-native forbs and grasses, with a few native shrub and tree seedlings. None of the non-native species are classified as invasive or noxious.

Old Water Tank Road

The old water tank road is an unpaved road that was recontoured in 2011 after the water tank was removed. Most of the road faces north-northwest at an elevation of approximately 8,261 feet AMSL. The road is gently sloped in mostly places, approximately 6 degrees. There is no canopy cover and the solar exposure is about 90% during the summer months. The solar exposure is lower at the southern part of the road near the existing water tank. The soil is derived from granitic parent material. Conifers surround the area, which is dominated by red fir (*Abies magnifica*), Jeffrey pine (*Pinus jeffreyi*), and Western white pine (*Pinus monticola*). Greenleaf manzanita (*Arctostaphylos patula*) dominates the understory, which also contain a variety of native forbs and grasses.



Figure 58. Lakeview Lodge Water System Improvement Project Map.



Figure 59. Gun Barrel top terminal slope monitoring area, pre-treatment, August 2008.

Figure 60. Old Water Tank Road, pre-treatment, looking downhill from the water tank site.

Patsy's Trail

Patsy's Trail is the ski run directly above the Snow Beach area. The conditions vary from dry in some of the lower areas to wet in the upper areas. The slope faces 130 degrees east and the slope angle is moderate at 10 degrees. The approximate elevation is 8,096 feet AMSL and the solar exposure is 90% during the summer months. There is no canopy cover, but the surrounding area is dominated by Jeffrey pine (*Pinus jeffreyi*) and red fir (*Abies magnifica*). A mix of native and non-native plant forbs and grasses were present; however, three non-native invasive plants were also found at this site: orchard grass (*Dactylis glomerata*), curly dock (*Rumex crispus*), and woolly mullein (*Verbascum thapsus*).



Figure 61. Patsy's Trail, looking up from the Snow Beach area, pre-treatment, 2008.



Figure 62. Patsy's Trail, looking down at the Snow Beach area, pre-treatment, 2008.

Objectives and Success Criteria

Treatment Objectives

- no net increase in runoff and/or sediment transport as a result of the waterline installation, the old water tank removal, or the new water tank construction
- to establish an appropriate, self-sustaining, native plant community
- no evidence of erosion from any of the waterline or water tank installation activities

Monitoring Objective

• to quantitatively assess whether treatments resulted in a net change in runoff and/or sediment transport following the trail modification

Success Criteria

In 2009 and 2010, monitoring was conducted at Gun Barrel and Patsy's Trail and results compared to success criteria to determine whether treatments achieved the project objectives (Table 23). The success criteria emphasize a range of physical elements and soil edaphic factors necessary for a self-sustaining, erosion-resistant site. In 2010, all success criteria were met except visual assessment, due to a road drainage issue affecting Gun Barrel top slope. This issue was fully addressed in 2011.

	Success Criteria	Success Criteria Evaluation
Sediment Yield (lbs/acre/in)	Not greater than 100 lbs/acre/in higher than pre-treatment levels	$GB:^* \sqrt{Criterion Met}$ PT: ^{**} $\sqrt{Criterion Met}$
Infiltration Rate (in/hr)	Not greater than 0.8 in/hr lower than pre-treatment levels	GB:√ Criterion Met PT:√ Criterion Met
Penetrometer Depth (inches)	Not greater than 4 inches shallower than pre-treatment level	GB:√ Criterion Met PT:√ Criterion Met
Total Cover (%)	70% or greater	GB:√ Criterion Met PT:√ Criterion Met
Total Plant Cover (%)	10% or greater	GB:√ Criterion Met PT:√ Criterion Met
Organic Matter (%)	Not greater than 1.5 percentage points less than pre-treatment level	GB:√ Criterion Met PT:√ Criterion Met
Visual Assessment	No visible signs of erosion including rotational failures, rilling, gullying, or other sediment transport and deposition	GB:√ Criterion Met PT:√ Criterion Met
*GB=Gun Barrel top **PT=Patsy's Trail	slope	

Table 23. Lakeview Project Success Criteria Evaluation, 2011.

Restoration Treatments

The Lakeview Lodge Water System Improvement Project consists of nine individual treatment areas (Table 24, Table 25). Areas A though F were treated in 2008; however, disturbance of areas E and F required re-treatment in 2009. Soil and vegetation treatment specifications varied slightly among

these areas, depending on site conditions and planned future use. Additionally, treatment elements were varied to test a few different treatment types. Treatments in areas A, B, E1, F1, and G included the following elements: soil amendments, tilling, organic fertilizer, seed, and mulch. Treatments in areas C, D, E2, and F2 were less intensive, and included mulch or soil loosening with mulch. These areas include road shoulders and other areas that are expected to be subject to future or ongoing disturbance.

- Treatment Area A trench line on Gun Barrel Top Terminal Slope
- Treatment Area B trench line on Gun Barrel Top Terminal Slope
- Treatment Area C trench line on road shoulder
- Treatment Area D utility box installation area
- Treatment Area E1/E2 trench line down Patsy's Trail
- Treatment Area F1/F2 trench line down Patsy's Trail
- Treatment Area G trench line down Patsy's Trail
- Treatment Area H Old Water Tank Road

		Treatment Area			
		А	В	С	D
	Туре	WC, FCZ	WC	n/a	n/a
Amendments	Depth (in)	4 (2" of each)	4	n/a	n/a
Tilling	Depth (in)	18	14	n/a	n/a
Fertilizer	Туре	Biosol 6-1-3	Biosol 6- 1-3*	n/a	n/a
	Rate (Ibs/acre)	2,000	2,000*	n/a	n/a
Seed	Mix	Lakeview upland mix	Lakeview upland mix	n/a	n/a
	Rate (Ibs/acre)	50	50	n/a	n/a
Mulah	Туре	PNM	PNM	WC	WC
wuich	Depth (in)	1	1	2	4
Irrigation	Frequency/ Duration	yes - unknown	no	n/a	no
Treatment Area Square Feet		2,449	7,033	4,697	10,057
<u>Key</u> : WC = wood chips, FCZ = Full Circle Integrated Tahoe Blend Zero (composted coarse overs), PNM = pine needle mulch, $*$ = not verified in field			arse		

Table 24. Lakeview Project Treatment Matrix, 2008 and 2009.

Table 25. Lakeview Project Treatment Matrix, continued.

		Treatment Area					
		E1	E2	F1	F2	G	н
A ma a malma a mata	Туре	WC	n/a	WC	BLB	WC	WC
Amenaments	Depth (in)	4	n/a	4	4	4	4
Tilling	Depth (in)	12	n/a	12	14	12	12
	Tume	Biosol	n/a	Biosol	n/a	Biosol	Biosol
Fertilizer	Туре	6-1-3		6-1-3		6-1-3	6-1-3
	Rate (Ibs/acre)	2,000	n/a	2,000	n/a	2,000	2,000
Seed	Mix	High Elevation Mix/Moist Mix	n/a	High Elevation Mix/Moist Mix	n/a	High Elevation Mix	High Elevation Mix
	Rate (Ibs/acre)	50	n/a	50	n/a	50	50
Madele	Туре	PN	WC	PN	BLB	PN	PN
Mulch	Depth (in)	1	4	1	1	1	2-3
Irrigation	Frequency/ Duration	Yes		Yes	no	Yes	
		4 hr/day	no	, 4 hr/day		4 hr/day	no
Treatment Area	Square Feet	2,750	8,300	2,750	1,175	14,375	3,170
Key: WC = wood chips, BLB = Boulder Lodge Blend (well-aged wood chips and pine needles), PNM = pine needle mulch.							



Figure 63. Treatment area A, pre-treatment, August 2008.



Figure 64. Treatment area A, post-treatment, 2010.



Figure 65. Treatment area B, pre-treatment, August 2008 (photo point B).



Figure 66. Treatment area B, post-treatment, 2010 (photo point B).



Figure 67. Treatment areas E, F and G, pretreatment, August 2008 (photo point A).



Figure 68. Treatment areas E, F and G, post-second treatment, 2010 (photo point A).



Figure 69. Treatment area H (old water tank road, pre-treatment, August 2008 (photo point A).



Figure 70. Treatment area H (old water tank road, post-treatment, Oct 2011 (photo point A).

Performance Monitoring

Visual Assessment

In 2010 and 2011, at both the Gun Barrel top slope and Patsy's trail, non-native plant species were observed. At the Gun Barrel top slope, *Melilotus officinalis* (yellow clover), *Bromus techtorum* (cheatgrass), and *Dactylis glomerata* (orchard grass) were found. At Patsy's trail, the above species, plus *Agrostis stolonifera* (creeping bentgrass), *Rumex crispus* (curly dock), and *Cirsium vulgare* (bull thistle) were found.

Performance monitoring results from past years can be found in the 2010 Heavenly Restoration and Monitoring Report.

Management Responses and Follow-up Actions



Figure 71. Road drainage improvements were implemented in 2011 to direct road drainage away from the treated slope below

In 2010, the Gun Barrel top slope did not meet the visual erosion assessment success criterion as a result of concentrated runoff from the road entering the treatment area. However, road drainage improvements were implemented and the treatment areas was reseeded and mulched in 2011, which fully addressed this issue (Figure 71).

In 2010, both the Gun Barrel top slope and Patsy's trail contained non-native plant species. These species should be removed at the start of the growing season and during any site visits to prevent spreading and reduce competition with native species.

Stagecoach Snowmaking Project

Overview

The Stagecoach snowmaking project includes the installation of a snowmaking line that runs from the top of the Stagecoach Lift down the Stagecoach ski run and along the shoulder of Nevada Trail. The snowmaking line includes both above-ground and below-ground segments. The below-ground segments were installed on unpaved roads and the above-ground segments were installed along the edge of a cleared ski run (Stagecoach) with large boulders and a dense shrub understory. Potential impacts associated with this project included trenching for snowmaking pipes, soil compaction, and vegetation disturbance in temporary vehicle and equipment travel paths and staging areas. Three different monitoring areas were established at this project site in 2008, before the project was constructed. Performance monitoring was completed in 2009, one year after construction. Most success criteria were met except for vegetation cover (upper and lower) and visual erosion (lower). Treatment and monitoring areas are shown on the project map (Figure 74).

Site Description

Upper Slope

The upper slope is located on the edge of a cleared ski run (Figure 72 and Figure 73). The site faces 30 degrees northeast and has a moderate slope of 16 degrees. The approximate site elevation is 8,362 feet AMSL. The canopy cover is 5% and the solar exposure ranges from 82 to 86% during the summer months. The soil is derived from granitic parent material. The surrounding area is dominated by red fir (*Abies magnifica*) and Western white pine (*Pinus monticola*), while the ski slope is mostly greenleaf manzanita (*Arctostaphylos patula*) with some chinquapin (*Chrysolepis sempervirens*). Nonnative species were not observed in this area.



Figure 72. Stagecoach snowmaking upper slope, pre-treatment, October, 2008.



Figure 73. Stagecoach snowmaking upper slope, during treatment, October, 2008.



Figure 74. Stagecoach Snowmaking Project Map.

Lower Slope

The lower slope is located on the edge of a cleared ski run. The site faces north and has a slope of 24 degrees. The approximate site elevation is 8,224 feet AMSL. There is no canopy cover and the solar exposure ranges from 55 to 70% during the summer months. The soil is derived from granitic parent material. The surrounding forested area is dominated by red fir (*Abies magnifica*), while fir (*Abies concolor*) and Western white pine (*Pinus monticola*), while the ski slope has pinemat manzanita (*Arctostaphylos nevadensis*) Western white pine, and some native grasses and forbs. Non-native species were not observed in this area.



Figure 75. Stagecoach snowmaking lower slope monitoring area, pre-treatment, August 2008.



Figure 76. Stagecoach Snowmaking lower slope monitoring area, post-treatment, August 2010.

Objectives and Success Criteria

Treatment Objectives

- no net increase in runoff and/or sediment transport as a result of the snowmaking line installation
- to establish an appropriate, self-sustaining, native plant community
- no evidence of erosion from any of the snowmaking line installation activities

Monitoring Objective

• to quantitatively assess whether treatments resulted in a net change in runoff and/or sediment transport following the snowmaking line installation

Success Criteria

The following success criteria were used to determine whether treatments achieved the project treatment goals (Table 26). The success criteria emphasize a range of physical elements and soil edaphic factors necessary for a self-sustaining, erosion-resistant site. The plant cover success criterion will be adjusted in 2012, as it is directly dependent on achieving the criteria stated below and other site-specific factors. For further discussion of this approach, see the "Defining and Measuring Success" section in Chapter 1.

	Stagecoach Success Criteria Evaluation	Stagecoach Success Criteria
Sediment Yield (lbs/acre/in)	Not greater than 100 lbs/acre/in higher than pre-treatment levels	U [*] :√ Criterion Met L ^{**} :√ Criterion Met
Infiltration Rate (in/hr)	Not greater than 0.8 in/hr lower than pre-treatment levels	U:√ Criterion Met L:√ Criterion Met
Penetrometer Depth (inches)	Not greater than 4 inches shallower than pre-treatment level	U:√ Criterion Met L:√ Criterion Met
Total Cover (%)	70% or greater	U:√ Criterion Met L:√ Criterion Met
Total Plant Cover (%)	10% or greater – to be adjusted in 2012	U:× Criterion Not Met L: × Criterion Not Met
Organic Matter (%)	Not greater than 1.5 percentage points less than pre-treatment level	U:√ Criterion Met L:√ Criterion Met
Visual Assessment	No visible signs of erosion or anthropogenic disturbance of treatment areas.	U:√ Criterion Met L:× Criterion Not Met
*U=Upper slope **L=Lower Slope		

 Table 26. Stagecoach Snowmaking Line Success Criteria Evaluation, 2011.

Restoration Treatments

The Stagecoach Snowmaking project, treated in 2008, consists of three treatment areas – A, B, and C (Table 27). Areas A and C include unpaved roads, road shoulders and other previously disturbed areas where below-ground snowmaking segments were constructed. Due to the soil disturbance associated with trenching and the general lack of ecological "capital" in areas A and C, full soil and vegetation restoration treatments were implemented to rebuild a self-sustaining soil and vegetation community. The full restoration treatment included the following elements: soil amendments, tilling, organic fertilizer, seed, and mulch. Area B is a cleared ski run where above-ground snowmaking was constructed. The run clearing activities left the topsoil and understory vegetation relatively intact; therefore, treatments were less intensive at area B than those implemented in areas A and C. The treatment at area B was designed to remove soil compaction and replace vegetation and mulch in the equipment travel corridor. Additionally, equipment travel was deliberately limited to a very narrow corridor in order to minimize impacts to soil and vegetation during construction.

	0				
		Treatment Area			
		А	В	С	
Amondmonto	Туре	WC, BLB	n/a	WC, BLB	
Amenaments	Depth (in)	4	n/a	4*	
Tilling	Depth (in)	20	14	18*	
Fortilizor	Туре	Biosol 6-1-3*	Biosol 6-1-3*	Biosol 6-1-3*	
Fertilizer	Rate (lbs/acre)	1,000*	1,000*	1,000*	

Table 27.	Stagecoach	Snowmaking	Treatment	Matrix,	2008.

Seed	Міх	Stagecoach upland mix*	Stagecoach upland mix*	Stagecoach upland mix*
	Rate (lbs/acre)	25*	25*	25*
Mulab	Туре	PNM, WC*	PNM*	PNM*
Mulch	Depth (in)	1*	1*	1*
Irrigation	Frequency/Duration	No	no	no
Treatment Area	Square Feet	5,111	6,009	2,969

<u>Key</u>

WC = wood chips

BLB = Boulder Lodge Blend (well-aged wood chips and pine needles)

PNM = pine needle mulch

* = not verified in field



Figure 77. Stagecoach Snowmaking, seeding at treatment area B, November 2008.



Figure 78. Stagecoach Snowmaking, treatment area B, during construction, September 2008.



Figure 79. Stagecoach Snowmaking, treatment area B, August 2010.



Figure 80. Stagecoach Snowmaking, treatment area C, pre-treatment, August 2008



Figure 81. Stagecoach Snowmaking, treatment area C, post-treatment, August 2010.

Performance Monitoring

Visual Erosion Assessment

In 2010, at the upper slope, no major signs of erosion were present. However, at the lower slope, concentrated drainage from the road upslope of the lower treatment area caused extensive erosion in the lower treatment area (Figure 82, Figure 83, Figure 84 and Figure 85). The success criterion, which states that no visible signs of erosion, was met for the upper slope, but was not met for the lower slope in 2010. This road drainage issue has not yet been addressed.



Figure 82. Concentrated road drainage initiating causing erosion at the top of the Stagecoach lower slope, October 2010.



Figure 83. Rill formed from road drainage heading toward Stagecoach lower slope treatment area, August 2010.



Figure 84. Gully along Stagecoach lower treatment area, August 2010. This gully was caused by concentrated drainage from the road upslope.



Figure 85. Deposition near the bottom of the Stagecoach lower treatment area, August 2010.

Management Response and Follow-up Action

In 2010 (and observed again in 2011), the plant cover success criterion was not met for either plot. The plots were revisited in 2011 to assess vegetation establishment (ocularly) but little change was observed. However, direct erosion measurements via rainfall simulation indicate that the site has a high level of erosion resistance. Other indices of site sustainability and resilience, such as penetrometer depth to refusal and soil organic matter, also suggest that site conditions have been re-established that will eventually support robust vegetation similar to the adjacent ski run. However, seeded species have been slow to germinate and nearby pine mat manzanita can take many years to establish. Soil investigation is recommended for 2012 to evaluate soil development and the potential trajectory of the soil-plant system.

Additionally, road drainage patterns near the lower treatment area should be fully assessed to generate treatment alternatives and implement road drainage improvements such concentrated flow and erosion onto the slope below the roadway is eliminated.

	Unmet Criterion	Management Response	Follow-up Action
Upper Slope	Plant Cover	Apply additional mulch as needed to achieve a depth of 2-3 inches across the site.	Conduct soil investigation in 2012 to assess soil development and ecological trajectory.

Table 28. Stagecoach Management Responses and Follow-up Action, 2010.

	Unmet Criterion	Management Response	Follow-up Action
			Adjust plant cover criterion based on analog (reference) conditions.
Lower Slope	Plant Cover	Apply additional mulch as needed to achieve a depth of 2-3 inches across the site.	Conduct soil investigation in 2012 to assess soil development and ecological trajectory. Adjust plant cover criterion based on analog (reference) conditions.
Lower Slope	Visual Assessment	 Assess road drainage patterns and treatment alternatives Implement road drainage improvements such that water is spread/infiltrated without causing erosion Reapply seed and mulch where sediment has deposited in treatment areas 	 Inspection of road drainage improvements during and after implementation Visual erosion assessment after rain event (after road improvements are completed)

Chapter 4: Conclusions, Recommendations and Management Responses



Conclusions

Restoration Projects

2011 marked the fifth year of a new approach to planning, implementing, and monitoring large-scale mountain improvement projects at Heavenly with a commitment to minimizing runoff and erosion. We continue to test different techniques, challenge our own assumptions and measure actual outcomes in order to improve efforts to restore ecological function to high-elevation disturbed sites. Heavenly operations staff continues to demonstrate increased leadership and flexibility in project

planning, implementation, and treatment documentation.

Over five years, a total area of 309,915 ft² (7.1 acres) has been treated at seven project sites under Heavenly's adaptive management program. Combined performance monitoring data from the seven sites indicates overall improvements in ecological resilience and decreases in erosion potential. Compared to pre-treatment conditions, restoration treatments resulted in the following, one year after treatment completion:

- 67% 133% decrease in sediment yields
- 18% 270% increase in infiltration rates
- 50% 940% increase in penetrometer depth to refusal
- 30% 1900% increase in total cover
- 12% 161% increase in soil organic matter

Concentrated drainage from the road system has caused erosion issues on several projects over the past two years (Olympic Lift Top, Lakeview Lodge Gun Barrel Slope, and Stagecoach Lower). Heavenly staff are constantly working to improve drainage on the roadway network throughout the resort. Greater emphasis should be placed on evaluating and improving road drainage near recently completed restoration projects (i.e. not only at stream crossings). Areas of erosion caused by roadway drainage (particularly Stagecoach Lower Slope) should be prioritized for improvements and will be added to the 2012 summer maintenance work list.

Adaptive Management Process

At the core of the adaptive management process is continual learning and adjustment of both treatment approaches and targets. Most treatment efforts at Heavenly over the past 5 years have met and exceeded the success criteria for direct erosion measurements (e.g. sediment yield, infiltration rate) and indices of soil function responsible for controlling erosion (e.g. organic matter, soil density). Despite achieving primary erosion control objectives, many treatment sites have not met



Figure 86. Jim Larmore measures soil loosening depth with a cone penetrometer.

the seemingly modest plant cover success criteria of 10%, which has been maintained for the past several years. 2012 will mark a shift in Heavenly's approach to erosion control and overall watershed management. Based on a growing body of research conducted since this program began (Burt and Rice 2009, Grismer et al. 2008), Heavenly is proposing to focus treatment efforts on soil functional indices such as soil density/infiltration, mulch/surface protection, and soil carbon/organic matter, which are required control erosion in the *present*, which recognizes that such erosion-resistant soil conditions are a requirement for re-establishment of self-sustaining vegetation communities. This approach is quite different than the way most erosion control efforts are planned, implemented and assessed, and is essentially a shift from a short-term, vegetation-based "landscaping" approach to a function-driven "ecosystem" approach. Rather than expending significant resources attempting to force vegetation to grow in the short-run, Heavenly is committed to maintaining erosion-resistant site conditions (though adding mulch cover and other methods) and refining both treatment approaches and success criteria as we learn more about the state and trajectory of site/soil conditions at both treated and analog (reference) sites.

Recommendations

Management Process

- **Expand outcome-based adaptive management program** beyond capital projects to include CWE implementation and road management efforts.
- Integrate recommended management responses into the summer work list to accelerate the timeline between project implementation and achievement of success criteria.
- Hold weekly coordination conference calls between IERS and Heavenly operations staff during field season in order to review and prioritize treatment and maintenance activities for the week.
- **Commit to treatment implementation schedule** during weekly coordination calls so that IERS is onsite during key steps in the treatment process. Treatments verified in the field by IERS have met success criteria far more often than unverified treatments.

Monitoring and Assessment Process

- Monitor the Ridge Run test plots to assess the erosion control effectiveness of mulchonly treatments at different application depths. Incorporate results into 2012 sediment source control treatments.
- Identify, assess and resolve road system drainage issues, particularly those that are impacting recently treated areas such as lower Stagecoach. Nearly all erosion issues observed at restoration projects were related to concentrated run-off from roads upslope of treatment areas.
- Assess soil development at sites treated 2-3 years ago where vegetation growth is limited in order to better understand the ecological potential and trajectory of each site. Develop metrics for assessing soil development such as soil color and structure/aggregation.
- Assess soil and site conditions at several analog (or reference) sites and refine sitespecific success criteria accordingly so that success is evaluated relative to undisturbed conditions near each site rather than pre-treatment conditions.
- **Inspect and photo document treatment areas during rain events** so that minor drainage or erosion issues can be addressed before escalating to larger erosion problems.

Treatment Implementation Process

- Develop plan to manage and maximize wood chip availability that considers anticipated restoration project needs, regional and on-mountain sources (on-mountain fuel reduction and run clearing, local defensible space contractors), minimizing hauling (import and export) and long-term storage/staging/aging. Also, investigate renting a tub grinder for a few weeks in 2012, as the material produced can be of much higher value for erosion control purposes.
- **Protect treatment areas from human disturbance.** Identify treatment areas that are in close proximity to trails or regular foot traffic and implement measures to minimize disturbance (signage, fencing, etc).

- Incorporate test areas into selected future restoration projects to evaluate management questions such as:
 - Effects of mulch type and depth on sediment yield and soil development
 - Effects of aged versus fresh wood chips used as soil amendment on soil nutrients, organic matter and plant growth
 - Effects of fertilizer application rate on soil nutrients, soil development and plant growth
 - Effects of different irrigation regimes on plant establishment (year 1), plant growth over time, and species composition
- Measure fertilizer and seed application rates expand use and understanding of standardized measurement protocols to ensure accurate and consistent application rates for seed and fertilizer (such as 5-gallon buckets marked with volumes that correspond to seed or fertilizer weight). This should be a consistent practice across all projects.
- **Document treatments** continue to work with IERS to use and refine treatment documentation forms. Documentation of site-specific treatments is critical to understanding and improving treatment cost-effectiveness.
- Assess cost-effectiveness of different treatments by tracking treatment implementation costs and comparing to monitoring results (e.g. reduced sediment yield).
- Include at least 5% western needlegrass (*Achnathrum occidentale*) in upland revegetation treatment seed mixes, particularly at high elevation sites. Western needlegrass is well-adapted to arid, high elevation sites and was the most dominant grass observed during monitoring at the Canyon test plots from 2006-2008 (Arst, 2008). While it is more expensive on a per-pound basis than most other native grasses, vegetation monitoring at Heavenly to date indicates that western needlegrass is the most cost-effective method to establish self-sustaining vegetation at most Heavenly sites.
Summary of Management Responses by Project

The following table summarizes recommended management responses and follow-up actions to be completed by either Heavenly staff or IERS in 2011 for each project and site (Table 29).

Project	Treatment Area	Unmet Success Criterion	Management Response	Follow-up Action
Gondola Lodge Fill Plant Cover		Continue deep-cycle irrigation with low-flow heads (MP rotator or equivalent) to encourage deep root growth and seedling establishment	Assessment of soil edaphic factors and plant establishment in 2012	
Olympic Lift	Тор	n/a	Loosen soil to remove tire tracks, re-seed, mulch and irrigate.	Ocular and penetrometer assessment after re- treatment in 2012.
Olympic Lift Bottom Plant Cover None		None	Conduct soil investigation in 2012 to assess soil development and ecological trajectory. Adjust plant cover criterion based on analog (reference) conditions.	
Olympic LiftTop and Bottomn/aInstall fencing/signage and commun staff locations of treatment areas to foot and vehicle traffic		Install fencing/signage and communicate to staff locations of treatment areas to prevent foot and vehicle traffic	Visual assessment	
Heavenly Flyer Top and Bottom Plant Cover		Apply additional mulch as needed to achieve a depth of 2-3 inches across the site.	Conduct soil investigation in 2012 to assess soil development and ecological trajectory. Adjust plant cover criterion based on analog (reference) conditions.	
Mid-Station Road	Road	Plant Cover	Apply additional mulch as needed to achieve a depth of 2-3 inches across the site.	Conduct soil investigation in 2012 to assess soil development and ecological trajectory. Adjust plant cover criterion based on analog (reference) conditions.
Stagecoach Snowmaking	Upper Slope	Plant Cover	Apply additional mulch as needed to achieve a depth of 2-3 inches across the site.	Conduct soil investigation in 2012 to assess soil development and ecological trajectory. Adjust plant cover criterion based on analog (reference) conditions.
Stagecoach Snowmaking	Lower Slope	Plant Cover	Apply additional mulch as needed to achieve a depth of 2-3 inches across the site.	Conduct soil investigation in 2012 to assess soil development and ecological trajectory. Adjust plant cover criterion based on analog

Table 29. Summary of management responses and follow-up actions by project and site

Project	Treatment Area	Unmet Success Criterion	Management Response	Follow-up Action
				(reference) conditions.
Stagecoach Snowmaking	Lower Slope	Visual Assessment	 Assess road drainage patterns and treatment alternatives Implement road drainage improvements such that water is spread/infiltrated without causing erosion Reapply seed and mulch where sediment has deposited in treatment areas 	 Inspection of road drainage improvements during and after implementation Visual erosion assessment after rain event (after road improvements are completed)

Literature Cited

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Schnurrenberger, C., M. Hogan and R. Arst. 2008. Upper Cutthroat Sediment Source Control Effectiveness Monitoring Project. Truckee, CA: Placer County. April 2008.

Appendix III 2011 CWE Work List

HEAVENLY MOUNTAIN RESORT 2011 ANNUAL WORK LIST February 8, 2011

Project #	Source*	Location	Treatment				
Watershed: CA-1 Heavenly Valley Creek							
1	Р	J Lift	Install new detachable ski lift.				
2	Р	Run Widening	Remove trees over snow and relocate boulders outside edges of run:				
			Ridge Promenade, Liz's, and Ellie's trails and High Roller terrain park.				
3	Р	Adventure Peak Children's Ski School Facility	Construct new building and access spur road for children's ski school.				
			Remove existing yurt and sprung structure and restore sites.				
4	Р	Relocate Umbrella Bar	Relocate existing Umbrella Bar facility from Adventure Peak to site				
			adjacent to Snow Beach, and restore Adventure Peak site.				
5	Р	Heavenly Flyer Zipline	Modify Heavenly Flyer zip line to add tensioned trolley retrieval system.				
6	RM	Powderbowl Sewer Line Relocation	Relocate section of sewer line near Powderbowl Express lift.				
7	RM	Ridge Run Snowmaking Lateral Lines	Addition of three snowmaking laterals on Ridge Run				
8	М	Tubing Lift Maintenance Road	Realign top of tubing access road, stabilize fill bank at top of lift.				
9	М	Gondola Top Station	Refurbish existing infiltration basin and improve drainage to maintain				
			effectiveness.				
10	Μ	Groove Upper Terminal	Improve soil cover to stabilize steep slope and redirect runoff to channel				
			and infiltration area.				
11	Р	Lakeview Water System	Remove old tank. Decommission old tank site and road to tank.				
12	Μ	Upper Vehicle Maintenance Shop	Stabilization work on gully above SEZ restoration, embankment				
			between road and SEZ, and road intersection and base of SEZ				
13	В	Top of Gondola Magic Carpet	Verify drip line protection/infiltration.				
14	Μ	Mid Station Road	Maintain water bars and energy dissipation at outlets				
15	М	Hellwinkel's Trail	Maintain road BMPs from Sky Deck to Sky Water Tank				
16	М	Blue Angel Chutes	Improve effective cover				
Watershed:	NV-3 Edg	ewood Creek					
17	М	Edgewood SEZ at Boulder	Maintain road BMPs, road grading, and redirect road runoff near corner				

Watershed:	NV-2 + 5]	Daggett Creek	
18	RM	Perimeter Run	Lower entrance to perimeter run by removing soil, place in existing area
			near base of Dipper Express lift.
19	RM	Orion's Run Snowmaking Lateral Lines	Addition of three snowmaking laterals on Orion's Run
20	Р	Ski Trails 14, 15 U3 and U4	Implement ski trails using over the snow logging and hazard reduction treatment.
21	В	East Peak Lodge	Stabilize drip lines and drainage swales near foundation of building.
22	М	Base of Comet Express lift	Improve effective cover and refurbish infiltration BMP
23	М	East Peak Lodge Sanitary Sewer Lift Holding Tank	Improve effective cover and delineate vehicle turn around.
Resort Wide			
24	М	Resort-Wide	Install and maintain closure signs on Ellie's Swing Trail, Betty's Return Trail, Powderbowl tower road, Lower Cal Trail below Hellwinkle's trail, East Peak Dam Road and West Round-a-bout
25	М	Resort-Wide	Develop a process to treat priority areas with long-term soil cover needs on ski runs and to identify and perform road maintenance needs. Note: This replaces the treatment listed in previous Annual CWE Work Lists as "Reseed and fertilize degenerating grassy areas on +/- 1/5 th of ski runs (all runs are reviewed/reseeded over 5 years)"
26	М	Resort-Wide	Inspect and restore all areas damaged affected by winter resort operations, including hydrants & pipe failures, and areas affected by snowcat operations; document areas treated.
27	М	Resort-Wide	Erect and maintain vehicles barriers and/or fences to prevent unauthorized vehicle access off of designated summer roads and facility parking areas.
28	М	Resort-Wide	Inspect and maintain all drainage structures.
29	М	Base Areas	Erect and maintain vehicle barriers and/or fences to prevent unauthorized vehicle access from base areas.
*Source Cod	les		
	М	BMP Maintenance Needed	
	В	Project need determined from BMP	
		Effectiveness Monitoring	

Р	Master Plan Implementation Project
RM	Resort Maintenance Project
MMP	Master Plan Monitoring & Mitigation Plan
	Requirement

Appendix IV Bus Ridership Survey

2011/12 Vail Resorts Guest Satisfaction Survey

Final Version DW November 2011

- 1) (INTIT) Enter your initials: ____
- 2) (ZIPCODE) What is the zip code of your primary residence? ___ (Use International Codes if non US Zip Code)
- 3) (RECOMM) On a scale of 0 to 10 (where 0=not at all likely to 10=highly likely), how likely would you be to recommend this resort to your friends and family?

1=0 not at all likely to recommend	
4=3 5=4	If 8 or below go to IMPROVE
6=5 7=6	
8=7 9=8	
10=9 (skip to RECOM10) 11=10 highly likely to recommend (skip to RECOM10)

- 4) (IMPROVE) What one thing could we do to make you more likely to recommend us? (skip to PREVIUSV) (ask if they gave us an 8 or below)-Please see PDF for list of responses and excel sheet for code of values.
- 5) (RECOM10) What one thing did we do to deserve your recommendation today (ask if they gave us a 9 or 10)?-Please see PDF of list of response and excel code sheet for code values.
- 6) (PREVIUSV) Prior to this trip, when did you last visit this resort?

1=this season (this winter 11/12) 2=last season (summer 2011) 3=last winter (10/11) 4=before last winter (10/11) 5=first visit

7) (ACCOM) Which best describes your accommodations on this trip?

1=paid lodging 2=staying with friends/relatives 3=second Home 4=timeshare 5=other 6=primary residence/day trip (Skip to TEXTB)

- 8) (TOWN) What town or area are you staying in? (if ACCOM = 2, 3, 4, 5, skip to TEXTB)
- 9) (LODGECODE) What is the name of the lodging property you are staying at?) (For Paid Lodging goto corresponding lodging property variable CODEH, CODEBC, CODEBRK, CODEKEY, CODESUMM, CODEVAIL)
- 10) (LODGOV) Where 1 is not satisfied at all and 5 is extremely satisfied how satisfied are you with your overall lodging experience?

(TEXTB) Now I am going to ask you to rate your satisfaction level on numerous aspects of <u>today's</u> experience, where 1=Not satisfied at all & 5=Extremely satisfied.

Not satisfied at all

Extremely satisfied

11)	(OQUAL) Overall quality of the experience	1	2	3	4	5
12)	(OVALUE) Value for price paid:	1	2	3	4	5
13)	(PARKEASE) Ease of parking:	1	2	3	4	5
14)	(PARKAT) Friendliness/helpfulness of parking lot attendants	1	2	3	4	5
15)	(BUSTIME) Timeliness of buses (if rode the bus):	1	2	3	4	5
16)	(BUSHELP) Friendliness/helpfulness of bus drivers (if rode the bus):	1	2	3	4	5
17)	(TOWAIT) Ticket office line wait (if used):					
18)	(TOPERS) Friendliness/helpfulness of ticket office personnel (if used):	1	2	3	4	5
19)	(SCANNERS) Friendliness/helpfulness of ticket scanners:	1	2	3	4	5
20)	(LIFTOPS) Friendliness/helpfulness of lift operators:	1	2	3	4	5
21)	(LIFTWAIT) Lift line waits:	1	2	3	4	5
22)	(TRAILV) Variety of trails:	1	2	3	4	5
23)	(SNOSURF) Amount of snow coverage:	1	2	3	4	5
24)	(CROWDS) Level of crowding on trails:	1	2	3	4	5
25)	(GRAMT) Amount of grooming:	1	2	3	4	5
26)	(GRAMTTXT) Was there too much or too little grooming: (ask if guest scores 1 or 2	1=too	2=too			
	in GRAMT)	much	little			
27)	(TRAILGR) Quality of trail grooming:	1	2	3	4	5
28)	(INFOGR) Availability of grooming information:	1	2	3	4	5
29)	(TRSIGN) Clearly marked trail signs:	1	2	3	4	5
30)	(SKISAFE) The mountain's attention to skier safety:	1	2	3	4	5
31)	(SPSEEN) Ski Patrol visibility (inform guest uniform color):	1	2	3	4	5
32)	(HOSTS) Friendliness/helpfulness of the guest service personnel (coat color or	1	2	c	4	E
	job):	Ι	2	3	4	5
33)	(ENVIRO)How satisfied are you in the Resorts attention to environmental					
	awareness/concerns (i.e. recycling, energy conservation, protection of	1	2	3	4	5
	natural environment, etc.):					

34) (RESTYN) Did you eat at an on-mountain food and beverage outlet?

1=Yes (got to MTN1) 2=No (Skip to TPHP)

35) (MTN1)

1. Vail

- 2. Beaver Creek
- 3. Breckenridge
- 4. Keystone
- 5. Heavenly
- 6. Northstar

36) (REST) What on-mountain food & beverage outlet did you eat at? (GOTO - RESTH, RESTVAIL, RESTKEY, RESTREC, RESTBC, RESTRS)

	Not sati	sfied at	all	Extrer	nely sa	tisfied
37)	(FOODQ) Quality of food:	1	2	3	4	5
38)	(FOODV) Variety of food:	1	2	3	4	5
39)	(FVALUE) Value of food for a resort experience:	1	2	3	4	5
40)	(FOODPERS) Friendliness/helpfulness of food personnel:	1	2	3	4	5
41)	(FOODSEAT) Availability of seating:	1	2	3	4	5
42) (FDCLEAN) Cleanliness of this resort's restrooms:				3	4	5
43)	(TPHP1) Overall Satisfaction with terrain Park/Pipe (If used):	1	2	3	4	5
44)	44) (TPAT) Friendliness/helpfulness of the Terrain Park attendants (if used):				4	5

MTN (for skip purposes)

1=Vail	(skip to ABILITY)
2=Beaver Creek	(skip to ABILITY)
3=Breckenridge	(skip to ABILITY)
4=Keystone	(skip to NIGHTYN)

KEY SECTION(NIGHTYN) Have you gone night skiing at Keystone this season? Y/N (No skip to ADPYN)

Not satisfie	Not satisfied at all			Extremely satisfied			
45) (NIGHTSKI) Rate night skiing:	1	2	3	4	5		
	· · ·	-	Ŭ	· ·	Ŭ,		

DEMOGRAPHICS

46) (ABILITY) Do you consider yourself a:

1=1st Time skier/snowboarder 5= Beginner 2=Intermediate 3=Advanced 4=Expert

47) (YEARBORN) What year were you born? _____

48) (TICKET) What type of ticket are you using today?

- 1=Single Day 2=Multi-Day 3=Season Pass
- 49) (COMMENT) Thanks very much for your time today. Is there anything else you would like the people who run this mountain to know about your experiences here? OPEN END

50) (EQUIP) Equipment Type:

1=Skis (Traditional) 2=Snowboard 3=Telemark 4=Other

51) (GENDER) Gender:

1=Male 2=Female

52) (CHAIR) Chair Number: _____



EXPERIENCE OF A LIFETIME"

Parking & Transportation -Year Over Year

Transportation scores have increased YOY the last 5 seasons.



Appendix V Daggett Creek Letter



March 27, 2012

Sent Via E-mail

Mr. Andrew Strain HEAVENLY MOUNTAIN RESORT P.O. Box 2180 Stateline, Nevada 89449

Re: Daggett Flow for the 2011 Water Year

Dear Mr. Strain:

The gauge on Daggett Creek installed below East Peak Lake in 2004 consists of a pressure transducer mounted in a perforated pipe at a confined natural section of Daggett Creek. Resource Concepts, Inc. periodically downloads the data and maintains the gauge. Pressure data is collected continuously at 15-minute intervals. Data was downloaded from the gauge three times during the water year (on August 5, 2011, September 21, 2011 and October 20, 2011). From July 19th to August 5th, the data logger did not record data due to lack of sufficient memory. In 2012, the data will be downloaded as soon as the gauge can be accessed in the spring. The attached Figure 1 graphs the pressure data collected.

RCI staff also makes stream discharge measurements when checking the gauge, in order to develop a relationship between pressure depth and stream discharge. Lower base flow is typically too shallow for a propeller type discharge meter, so a portable 60 degree v-notch weir is used to measure flow. For higher flows, we use a Swoffer (propeller type) flow meter to measure discharge. A rating curve has been developed from the in-stream measurements collected to estimate discharge from the pressure transducer/depth readings recorded by the gauge. The curve developed in 2010 was used in 2011 since in-stream measurements taken during this year did not significantly affect the existing calibration curve. Figure 2 graphs the estimated discharge.

The stream gauge below East Peak Lake has been used to support compliance monitoring for Heavenly's water rights. While the pressure transducer gauge provides a relative indication of water depth in Daggett Creek below East Peak Lake, the correlation to discharge is not very accurate, particularly in the range of 0 to 0.4 cfs. This is primarily due to the minimal flow depth and irregular cross section of the natural stream channel. In addition, the pressure transducer equipment has been difficult to maintain, due to both access limitations and because the equipment is no longer manufactured.

2012-03-27 Ltr Strain 03255-10 Heavenly JLS-td L3-48.doc

Mr. Andrew Strain March 27, 2012 Page 2

Estimation of flows into and out of East Peak Lake is needed to demonstrate adequate monitoring of annual water usage and compliance with water rights permits. RCI has proposed alternate methods to the Nevada Division of Water Resources for estimation of natural runoff and releases. If the Division concurs that alternative methods can be used to demonstrate compliance, the gauge would be unnecessary and could be removed. If not acceptable to the Division and in-stream discharge measurements must be continued, a permanent cross section (flume or V-notch weir) and new pressure transducer may be needed.

Please feel free to contact me with any comments or questions.

Sincerely,

Till Sutherland

Jill Sutherland, P.E. Project Manager

JS:td

Attachments

2012-03-27 Ltr Strain 03255-10 Heavenly JLS-td L3-48.doc





Appendix VI 2012 CWE Work List

HEAVENLY MOUNTAIN RESORT 2012 ANNUAL WORK LIST January 3, 2012 DRAFT

Project #	Source*	Location	Treatment
Watershed:	CA-1 Hea	venly Valley Creek	
1	Р	Complete Umbrella Bar Site	Restore old Umbrella Bar location at Adventure Peak site. Install water bar
		Restoration**	across road below new Umbrella Bar location.
2	Р	California Side Run Widening**	Complete 100% pine needle mulch coverage application on the following trails:
			Ridge Promenade, Liz's, and Ellie's and High Roller terrain park.
3	Р	Heavenly Flyer Zipline**	Modify Heavenly Flyer zip line trolley retrieval system.
4	Р	Player's Terrain Park Tow Lift	Install new surface handle tow lift, widening of portions of the left-hand edge of
			the existing ski trail.
5	Р	Mombo Trail Kids Adventure Zone	Install new signage and remove small diameter trees.
6	В	Upper Shop SEZ Road Crossing	Stabilize channel below road and address sediment deposition at the road
			crossing to the Upper Shop.
7	RM	Powderbowl Sewer Line Relocation**	Relocate section of sewer line near Powderbowl Express lift.
8	RM	Ridge Run Snowmaking Lateral Lines**	Addition of three snowmaking laterals on Ridge Run
9	Μ	Tubing Lift Maintenance Road**	Realign top of tubing access road, stabilize fill bank at top of lift.
10	Μ	Gondola Top Station**	Refurbish existing infiltration basin and improve drainage to maintain
			effectiveness.
11	Μ	Hellwinkel's Trail**	Maintain road BMPs from Sky Deck to Sky Water Tank
12	Μ	Maggie's	Road surfacing from Maggie's Corner to California Dam
Watershed:	CA-6 Bijo	<u>u Creek</u>	
13	Μ	Top of Tram Station	Stabilize slope on southwest corner of the building.
14	Μ	California Main Lodge Parking Lot	Clean out drop inlet where orange algae accumulates along Wildwood.
Watershed:	CA-7 Unn	<u>amed Creek - Gondola</u>	
15	Р	Adventure Peak Wedding Arch	Install wedding arch and seating area near the Gondola Mid-Station; relocate
			vehicle parking area at Mid-Station and restore existing parking area.
16	Μ	Gondola Mid Station Access Road**	Maintain water bars and energy dissipation at outlets
Watershed:	NV-3 Edg	ewood Creek	
17	Μ	Edgewood SEZ at Boulder Lower**	Additional stabilization is needed to prevent sediment from impacting the SEZ.
			Maintain road BMPs, road grading, and redirect road runoff near corner.
18	М	Olympic Upper and Lower Terminals	Improve effective cover beneath Upper Terminal. Maintain geotextile fabric
			lined ditch at Lower Terminal.

Watershed	: NV-2 + 5	Daggett Creek	
19	RM	Orion's Run Snowmaking Lateral Lines**	Addition of three snowmaking laterals on Orion's Run.
20	RM	Perimeter Run**	Lower entrance to perimeter run by removing soil, place in existing area near base of Dipper Express lift, implement Easy Street Run Hazard Reduction prescription.
21	Μ	East Peak Lodge**	Stabilize drip lines and drainage swales near foundation of building.
22	Μ	Base of Comet Express Lift**	Improve effective cover and refurbish infiltration BMP
23	М	East Peak Lodge Sanitary Sewer Lift Holding Tank**	Improve effective cover and delineate vehicle turn around.
24	М	Nevada Fuel Station (\$100 Saddle)	Stabilize channel below fueling station.
25	М	East Peak Water Tank	Stabilize slope behind tank, improve effective cover.
26	М	East Peak Patrol	Stabilize slope on west side of building, improve effective cover.
Resort Wid	le		
27	М	Resort-Wide	Install and maintain closure signs on Ellie's Swing Trail, Betty's Return Trail, Powderbowl tower road, Lower Cal Trail below Hellwinkle's trail, East Peak Dam Road and West Round-a-bout
28	M	Resort-Wide	Complete test plot monitoring and develop several erosion control treatment alternatives based on results. Prioritize treatment areas (ski runs, roads, other disturbed areas) based on erosion potential and proximity/connectivity to surface waters. Implement selected treatments in top priority areas. Assess cost- effectiveness of different treatment types to guide 2013 treatment process. Note: This replaces the treatment listed in previous Annual CWE Work Lists as "Reseed and fertilize degenerating grassy areas on +/- 1/5 th of ski runs (all runs are reviewed/reseeded over 5 years)"
29	М	Resort-Wide	Inspect and restore all areas damaged affected by winter resort operations, including hydrants & pipe failures, and areas affected by snowcat operations; document areas treated.
30	М	Resort-Wide	Erect and maintain vehicles barriers and/or fences to prevent unauthorized vehicle access off of designated summer roads and facility parking areas.
31	М	Resort-Wide	Inspect and maintain all drainage structures.
32	М	Base Areas	Maintain all BMPs and drainage structures. Erect and maintain vehicle barriers and/or fences to prevent unauthorized vehicle access from base areas.

*Source Codes					
	Μ	BMP Maintenance Needed			
	В	Project need determined from BMP Effectiveness Monitoring			
	Р	Master Plan Implementation Project			
	RM	Resort Maintenance Project			
	MMP	Master Plan Monitoring & Mitigation Plan Requirement			

**Projects from 2011 Annual Work List Shifted or Continued Implementation to 2012

Appendix VII 2011 Biological Survey Results and Field Forms

HAUGE BRUECK

ASSOCIATES

www.haugebrueck.com

CALIFORNIA

15 November 2011

P 916-283-5800 F 916-313-3445 2233 Watt Avenue, Suite 295 Sacramento, CA 95825

NEVADA

P 775-588-4700 F 775-588-4704 P.O. Box 10291 310 Dorla Court, Suite 209 Zephyr Cove, NV 89448 Mr. Andrew Strain Heavenly Mountain Resort P.O. Box 2180 Stateline, NV 89449

SUBJECT: HEAVENLY MOUNTAIN RESORT 2011 BIOLOGICAL SURVEY RESULTS SUMMARY

Dear Mr. Strain,

In order to comply with US Forest Service LTBMU requirements and to allow for preparation of environmental documentation for future construction and implementation of projects, Hauge Brueck Associates LLC has performed wildlife surveys in suitable habitat within the Special Use Permit Boundary in 2011. Surveys for both northern goshawk and California spotted owl were completed to protocol. A summary of each species surveys is provided below:

California Spotted Owl

- Methods: Surveys were conducted and completed in potentially suitable habitat within and surrounding the project area. Surveys were conducted according to the United States Forest Service "Protocol for Surveying for Spotted Owls in Proposed Management Activity Areas and Habitat Conservation Areas" (March 12, 1991, Revised February 1993). The survey points used since the 2007 field season were utilized again in 2011 to provide continuity of data collected. Data sheets for 2011 surveys are attached to this letter.
- Results: No auditory or visual detections of California spotted owls were documented within the survey area during 2011.

Northern Goshawk

Methods: Surveys were conducted and completed in suitable habitat within and adjacent to the project area for northern goshawk based on the updated habitat map generated by the US Forest Service for the environmental analysis of the Master Plan Amendment. In 2011, both dawn acoustical and broadcast survey methods were utilized and were completed to protocol. All surveys were conducted according to "Survey Methodology for Northern Goshawks in the Pacific Southwest Region, U.S. Forest Service" (14 May 2002). Data sheets for 2011 dawn acoustical and broadcast surveys are submitted with this letter. Mr. Andrew Strain 15 November 2011 Page 2

Results: No auditory or visual detections of northern goshawk were documented within the survey area in 2011.

The completion of the 2011 field surveys for northern goshawk and California spotted owl results in meeting the two-year protocol for these species. Based on Appendix A of the California spotted owl survey protocol, since no detections were documented, and the two year protocol was met, "the negative results may be considered accurate for two additional years without conducting additional surveys." The two-year timeline starts on the last day of the last survey, which would be 22 July 2011. Therefore, if implementation of projects would commence prior to 22 July 2013, no further surveys for California spotted owl would be necessary. However, if construction does not commence prior to this date, two-year protocol surveys must be conducted. The northern goshawk protocol does not include any discussion as to validity of surveys for any duration of time after protocol has been met. However, since northern goshawks have been detected in previous years, it is recommended surveys for northern goshawks are continued to determine if goshawks are nesting within the special use permit boundary.

Surveys for Tahoe draba (Draba asterophera var. asterophera) were also performed for the 2011 Capital Projects areas surveyed originally in September 2010. Survey results will be submitted to USFS and yourself under separate cover together with the 2012 Capital Project Survey results. No Tahoe draba was located in areas proposed for 2011 Capital Projects.

If you should have any questions regarding the surveys performed for the 2011 season, please do not hesitate to contact me at (775) 588-4700.

Regards,

Garth Alling Senior Planner/Biologist

Enclosures

CC: Shay Zanetti , USFS LTBMU Patrick Stone, TRPA Chris Donley, Entrix

Northern Goshawk Dawn Acoustical Survey- USFS-Lake Tahoe Basin Management Unit

Observe Additior	r:(<u>4. AU</u> al Observei	s and affiliat	Affiliati ion: (each	on: <u>14-13/</u> surveyor mu	st complete sepa	Date: <u>13 APR ZØ//</u> rate data form)
Route na Descript	ime: <u>If AN</u> ion of surve	KNY y station loca ト RUM	<u>DA</u> 4G&N ition, and I / PNV	Vis now accessed -KNR	sit#: <u>2</u> d: DABG&TT COT	CK. SKINNGOD IN FROM
Weather	: % cloud co	over: <u>60/</u>	⊭ ₄ precip:Ţ	<u>N</u> ten	np: start <u>75</u> °F	end <u>29</u> °F Beaufort wind speed: star C end 3
SUNRIS	Е: <u>06</u> С	7	START	SURVEY: <u>(</u>) <u>540</u> 1	END SURVEY: <u>() 冬() </u>
Detection UTM co	ns: (include ordinates)	time and dur	ation of vo ノつ	ocalizations, DCr76	type of vocalizat	ion, direction and distance of vocal or visual detection,
Time	Duration	Call Type	Visual?	Direction	Distance (m)	Comments (include UTM coordinates)
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Additional species detected:

ANRO STRA MTCH RBSA CORA CAGO

Vocalization descriptions: Alarm Call- a harsh kak-kak-kak repeated many times. Wail Call- a loud, plaintive, drawn out call.

Beaufort #	Wind Speed	Indicator of wind speed
0	0	smoke rises vertically.
1	1-3	wind dir. shown by smoke dir.
2	4-7	wind on face; leaves rustle
3	8-12	leaves, twigs in constant motio
4	13-18	dust and leaves move
5	19-24	small trees sway
6	25-31	large tree branches move



Northern Goshawk Dawn Acoustical Survey- USFS-Lake Tahoe Basin Management Unit

Observer: <u>G. ALLING</u> Affiliation: <u>HBA</u> Date: <u>II APR 2011</u> Additional Observers and affiliation: (each surveyor must complete separate data form)
Route name: <u>HEANGALY</u> Description of survey station location, and how accessed: DAGGGTT CK. SGE ATTAPHOND JAP SKINNED INTO SITCE FRON RIDGE TAHOLE
Weather: % cloud cover: <u>10</u> ⁷ precip: <u>7</u> temp: start <u>7</u> °F end <u>3</u> °F Beaufort wind speed: start <u>cend 3</u> SUNRISE: <u>0630</u> START SURVEY: <u>0543</u> END SURVEY: <u>680</u>

Detections: (include time and duration of vocalizations, type of vocalization, direction and distance of vocal or visual detection, UTM coordinates) \mathcal{NO} $\mathcal{D}(ST/SZT/2A)$

				0-17-	10 0	
Time	Duration	Call Type	Visual?	Direction	Distance (m)	Comments (include UTM coordinates)
		· · · · · · · · · · · · · · · · · · ·				

Additional species detected:

RBSA JTCH WBNU STJA CORA CAFI

Vocalization descriptions: <u>Alarm Call</u>- a harsh kak-kak-kak repeated many times. <u>Wail Call</u>- a loud, plaintive, drawn out call.

Beaufort #	Wind Speed	Indicator of wind speed
0	0	smoke rises vertically.
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4	13-18	dust and leaves move
5	19-24	small trees sway
6	25-31	large tree branches move


Route Name/Territory: 1/64167124 Nove TH	LTB Visit# 1 Outing# 1 Date: MAY
Observers (and affiliation): G. AUUNG	
Type of Survey (spot calling SC, follow-up FO, additional visit AD):_	PDT Sunset/Sunrise: <u>7098/0544</u> Quad: <u>54</u> T
Weather: % cloud cover: <u>%</u> precip: <u>Fwk165</u>	temp: start <u>47</u> °F end <u>38</u> °F Beaufort wind speed: start <u>6</u> end <u>3</u>
Summary of Survey Results and Comments:	
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CS #	Start/Finish	V, A or B- sex	Dir.	Dis.(m)	U'	TMs	G P	Comments (include legals and elevation for detections)		
		(M,F,U)			Northing	Easting	S	ч. 		
VSI	2005-2015			-				NO RESPONSE		
VSZ.	2031-20411							í.		
<u>VS3</u>	2055-2105							ц		
VSY	2119-2129							۲ <u>ر</u>		
5	7.144-2154							t s		
6	2211-2221							\i		
7	2244-2254							17		
4	1312-2512		1					1 •		

Travel to Area Survey of Area Travel from Area Totals

Beg.Time	a		
End Time		 <u> </u>	
Total		 	
Mil. Beg			
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Beaufort #	Wind Speed	Indicator of wind speed
0	0	smoke rises vertically.
1	1-3	wind dir. shown by smoke dir.
2	4-7	wind on face; leaves rustle
3	8-12	leaves, twigs in constant motion
4	13-18	dust and leaves move
5	19-24	small trees sway
6	25-31	large tree branches move

Route Name/Territory: HEAUGNLY South	LTB	Visit#	Outing#	Date ZJW 1
Observers (and affiliation): 6. All My				
Type of Survey (spot calling SC, follow-up FO, additional visit AD): <u>SC</u> S	Sunset/Sunrise	PDT :2020/05	<u>6</u> Quad: <u>5∠7</u>	
Weather: % cloud cover: <u>80[%]</u> precip: <u>FLURRAS/Mat</u> temp): start <u>/2_</u> °F end	<u>్</u> °F Bea	ufort wind speed: s	lart \underline{Z} end \underline{Z}
Summary of Survey Results and Comments:				

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CS #	Start/Finish	V, A or	Dir.	Dis.(m)	U ⁻	ſMs	G	Comments (include legals and elevation for
#	PDT	(M,F,U)			Northing	Easting	P S	detections)
518	2020-2030							NO ROSPONSO
517	2042-2052							
5155	231.2141							11
513	2202-2212							h .
512	2229-2239							17
US7	1304-2314							11
NSA	2320-2330							11
VS10	2348-2358							17
VSX	0011.0014							GHO @ 42 = 200 0 STOPE
						Andrew		

Travel to Area Survey of Area Travel from Area Totals

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Beaufort #	Wind Speed	Indicator of wind speed			
0	0	smoke rises vertically.			
1	1-3	wind dir. shown by smoke dir.			
2	4-7	wind on face; leaves rustle			
3	8-12	leaves, twigs in constant motion			
4	13-18	dust and leaves move			
5	19-24	small trees sway			
6	25-31	large tree branches move			

Route Name/Territory: HEAUGNEY NORTH	/ LTB	Visit#	Outing# <u>1</u>	Date: 3JUNI
Observers (and affiliation): G. ALUNG				
Type of Survey (spot calling SC, follow-up FO, additional visit AD):	Sunset/Sunrise	2071 1053	SQuad: SCT	
Weather: % cloud cover: 40 b precip: 9	temp: start 50 °F end y	1 ¹ ↓°F Beau	fort wind speed: s	tart 3 end 3
Summary of Survey Results and Comments:				

NR= NO REPONSE

CS #	Start/Finish	V, A or B- sex	Dir.	Dis.(m)	יט	Ms	G	Comments (include legals and elevation for
<u> </u>		(M,F,U)			Northing	Easting	S S	detections)
151	2022-2032							NR
VSZ	2044.2054							$\overline{)}$
US 3	2109-2119							
K4	2128 - 2138							
5	1210-2220							
6	2237-2247							
1	2313-7323							
8	2351-0001		111					
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Beaufort Wind # Speed		Indicator of wind speed
0	0	smoke rises vertically.
1	1-3	wind dir. shown by smoke dir.
2	4-7	wind on face; leaves rustle
3	8-12	leaves, twigs in constant molion
4	13-18	dust and leaves move
5	19-24	small trees sway
6	25-31	large tree branches move

Route Name/Territory: HEAVGANG CORE	LTB	Visit# <u>1</u> 0	Duting# <u>1</u>	Date: ⁷ ていいう
Observers (and affiliation): <u>G. AUCNG</u>				
Type of Survey (spot calling SC, follow-up FO, additional visit AD):	Sunset/Sunrise: <u>7</u>	524 10534 (	Quad: <u>SCT</u>	·····
Weather: % cloud cover: <u>10</u> precip: <u>DRY</u> temp	: start <u>55</u> °F end <u>42</u>	<u>°</u> F Beaufor	t wind speed: sta	rt C end Z

NO RESPONSE

Summary of Survey Results and Comments:

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CS #	Start/Finish	V, A or B- sex	Dir.	Dis.(m)	רט	Ms	G	Comments (include legals and elevation for		
		(M,F,U)			Northing	Easting	S	uccentons		
1	202-4-434			11/10/14				NR		
2	2047-2057									
3	2119-2129									
Ч	2141-2151									
5	2217-22.27									
6	2251-239									
	23410 - 2350									
ÿ	0027 - 0037									
9	052-0102					and the second se				
0)	01.29-0139									
١) (	0147-0157					· · · · · · · · · · · · · · · · · · ·		J.		
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Beaufort #	Wind Speed	Indicator of wind speed
0	0	smoke rises vertically.
1	1-3	wind dir. shown by smoke dir.
2	4-7	wind on face; leaves rustle
3	8-12	leaves, lwigs in constant motion
4	13-18	dust and leaves move
5	19-24	small trees sway
6	25-31	large tree branches move

Rout	e Name/Terri	tory: <u> }#</u>	AUG	ULYE	outt	LTB		_ Visit# Outing#1 Date: المحمد ا
Obse	rvers (and affilia	tion): <u>[]</u> .	Au	Wy				
Туре	of Survey (sp	ot calling SC,	follow-up I	FO, additional	visit AD):	_Sunset/Sun	rise:	1077 16924 Quad: SCT
Weat	her: % cloud c	over: <u>/0</u> 2	Z prec	ip:	2 ter	np: start <u>5%</u> °I	F end	<u>13</u> °F Beaufort wind speed: star( <u>S</u> end <u>Z</u>
Sumr	nary of Surve	y Results	and Co	mments:		a second		
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CS #	Start/Finish	V, A or B- sex (M,F,U)	Dir.	Dis.(m)	U ⁻ Northing	۲Ms Easting	G P S	Comments (include legals and elevation for detections)
Ķ.	2028-2038					×		NR
17	2047-2057							Ì
155	2140-2150							
15a	2159-2209			,		·····		
13	2237-2247							
12	2309-1319							
vs7	233   - 2341							
JSA	2345-2355							
1510	0018-0023							
VS X	0041-0051							NO RESPONSO
						A1.		
						-		



Beaufort #	Wind Speed	Indicator of wind speed				
0	0	smoke rises vertically.				
1	1-3	wind dir. shown by smoke dir.				
2	4-7	wind on face; leaves rustle				
3	8-12	leaves, twigs in constant motion				
4	13-18	dust and leaves move				
5	19-24	small trees sway				
6	25-31	large tree branches move				

Route Name/Territory: HEAVENLY CORE	LTB Visit# Z_ Outing# 1 Date: 75 Jun
Observers (and affiliation): ALLWG	
Type of Survey (spot calling SC, follow-up FO, additional visit AD):	Sunset/Sunrise: <u>2029 /0536</u> Quad: SCT
1 ⁹	

Weather: % cloud cover: 106 precip: DR 7	temp: start GO_°F end 5Z_°F	Beaufort wind speed: start Z end Z
Summary of Survey Results and Comments:		

NO RESPONSE

CS #	Start/Finish	V, A or Br sex	Dir.	Dis.(m)	บา	Ms	G	Comments (include legals and elevation for
ļ		(M,F,U)			Northing	Easting	S S	detections)
	2029-2039							10 REPONSOF
2	2048-2058							
3	2016-2026							BAS ATTREK
4	1042-2050							
5	2109-2119						1	
Ĺ	2122-2132			<u></u>				
Ť	2,150-2200							COURAR ECAT
Y.	1227-2237							
Ï	2259-2309							
19	2341-2351							
11	0010-10020							
								porcusie
	Trav	el to Area Si	urvey of A	rea Travel f	rom Area – Tot	als		

Beg.Time	 		
End Time	 	· · · · · · · · · · · · · · · · · · ·	
Total	 		Que
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Totals			

Beaufort #	Wind Speed	Indicator of wind speed				
0	0	smoke rises vertically.				
1	1-3	wind dir. shown by smoke dir.				
2	4-7	wind on face; leaves rustle				
3	8-12	leaves, twigs in constant motion				
4	13-18	dust and leaves move				
5	19-24	small trees sway				
6	25-31	large tree branches move				

Route Name/Territory: HEAVENEY SOUTH	LTB	_Visit# <u>3</u>	Outing#	Date: 27 JUN
Observers (and affiliation): G. AUING				
Type of Survey (spot calling SC, follow-up FO, additional visit AD): 🔀	Sunset/Sunrise:	2029 10537	_Quad: <u>_Sc_7</u> _	
Weather: % cloud cover: <u>30²</u> precip: <u>7 F</u> temp	p: start <u>61</u> °F end	52°F Beauf	ort wind speed: st	art Cend 🔨
Summary of Survey Results and Comments:				

NO DOTECTIONS

CS #	Start/Finish	V, A or B- sex	Dir.	Dis.(m)	บา	UTMs		Comments (include legals and elevation for
		(M,F,U)			Northing Easting		S S	
18								NO. DOTTECTIONS
17								-
155								
150								W-3
13								13
12	~							
7								
VSA								
V57								W - 3
V58								entretter /
V510								
						· · · · · · · · · · · · · · · · · · ·		
	 Tray	el to Area Si	Invey of A	rea Travelf	 `rom Area — Tot	als		

Beg.Time		 	
End Time		 	
Total			
Mil. Beg		w Y 100 a source (a) fail a source (a)	
Mil. End	w		
Fotals			

Beaufort #	Wind Speed	Indicator of wind speed
0	0	smoke rises vertically.
1	1-3	wind dir. shown by smoke dir.
2	4-7	wind on face; leaves rustle
3	8-12	leaves, twigs in constant motion
4	13-18	dust and leaves move
5	19-24	small trees sway
6	25-31	large tree branches move

Route Name/Territory: HEAVEN24 NORTH	LTB	Visit# <u>3</u>	Outing# <u>1</u>	Date 7 JUN
Observers (and affiliation): G AU Wy				

Type of Survey (spot calling SC, follow-up FO, additional visit AD): SC Sunset/Sunrise: 2029 /0538 Quad: SCT

Weather: % cloud cover: <u>90%</u> precip: DR 17	temp: start 18 °F end O °F	Beaufort wind speed: start $3 \text{ end } 3$
Summary of Survey Results and Comments:		

No RESPONSE

CS #	Start/Finish	V, A or B. sox	Dir.	Dis.(m)	וט	ſMs	G	Comments (include legals and elevation for
<i>^π</i>		(M,F,U)			Northing	Easting	S S	detections)
VS/	2029-2039							NO DOTTOCTIONS
V52	2048-105%							PORCUPING / NR
USZ.	2110-2120							NO ROSPONST
WS4	2134 -2144							
5	2208-2218							
6	1237-2247			•				STRAWSE JBANDANST) CAR NR
7	2309-2319							A R
8	2357-6007		-					
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							1	
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I	Tray	/el to Area S	urvey of A	rea Travel (	from Area – To	tals	1	

Beaufort #	Wind Speed	Indicator of wind speed
0	0	smoke rises vertically.
1	1-3	wind dir. shown by smoke dir.
2	4-7	wind on face; leaves rustle
3	8-12	leaves, twigs in constant motion
4	13-18	dust and leaves move
5	19-24	small trees sway
6	25-31	large tree branches move

Route Name/Territory: HEAVERY CORE	LTB	Visit#_3	Outing#	Date? JUL
Observers (and affiliation): G. AUIN-				
Type of Survey (spot calling SC, follow-up FO, additional visit AD): 52	Sunset/Sunrise	:2070 /0553	_Quad:_5cT	-
Weather: % cloud cover: <u>/0^{1/2}</u> precip: <u>Dv24</u> temp	): start <u>57</u> °F enc	d°F Beau	fort wind speed: s	itart <u>_</u> end_Z_
Summary of Survey Results and Comments:			na menen kan kan kan dan dan kan kan kan kan kan kan kan kan kan k	

NO DOSTOETZANS/RESERVISE

CS #	Start/Finish	V, A or B- sev	Dir.	Dis.(m)	U [.]	UTMs G		Comments (include legals and elevation for		
	1ST	(M,F,U)			Northing	Easting	S	detections)		
11	2020-2030							NO ROSPONSO		
10	20412-2.052					×				
9	2141-2151									
B	2212-2222							ROAR WI CUBS		
Ţ	2241-2251									
6	2311-2321									
5	1340-2350									
4	1500.1100									
3	0036-0046							POORWIII		
2	0100-01/0									
1	0131-0141							DOOR WILL		

Travel to Area Survey of Area Travel from Area Totals

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End Time			·	
Total				-14
Mil. Beg		Bassid / Ju.		
Mil, End	fer			
Totals				

Beaufort #	Wind Speed	Indicator of wind speed
0	0	smoke rises vertically.
1	1-3	wind dir. shown by smoke dir.
2	4-7	wind on face; leaves rustle
3	8-12	leaves, twigs in constant motion
4	13-18	dust and leaves move
5	19-24	small trees sway
6	25-31	large tree branches move

	Nor	thern Gosha	wk Broado	east Survey ]	Form- USFS-L	ake Tahoo Dooly	<b>N</b> //		
Site: MG	GOTT (	LEAVESNE	<u>Y</u> Surve	yors: <u>G</u> A	LLWB	and Tanue Dasin	wanagem	ent Unit	
Visit #:	Outin	g #:   OI	$\int$ $1 \text{ ad} \cdot \leq 17$	- / 17/11	Defeture			_Dates JU	24
		×	<u></u>	<u>_//</u>	DGVOT/SNR	<u>18C</u> sec(s) <u>7</u>	9,31	, 32	
		Qu	lad:		TR	sec(s)			
Weather: %	% cloud cove	er: start 🕖 end 🧕	🖉 precip: start	end	temp: s	tart <u>37</u> °F end <u>70</u> °F	Beaufort w	ind speed: sta	2/3
SURVEY	INFORM	AATION:	Start Time	0732	End Time 1141	<u></u>			
RESULT	s: An	ന നഗ്				Call point	and route inf	ormation on	bacl
Detection	Time	Detection	Bearing	Distance					
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Detection	Commont								<b>Billion Colora</b> ng
Number	Comment	8							
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	(05/	tre sig	NO	CALL . D					
				Frank F	51131 14				
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	Travel To Site	Survey	Travel From Site
Start Time		• 	
Stop Time			
Total Time			
Begin Mileage			
End Mileage			
Total Mileage			

Beau-Wind Indicator of wind speed fort # Speed 0 0 Smoke rises vertically 1 1-3 wind dir. shown by smoke dir. 2 4-7 wind on face; leaves rustle 3 8-12 leaves, twigs in constant motion 4 13-18 dust and leaves move 5 19-24 small trees sway 6 25-31 large tree branches move

Total Mileage

	Nor	thern Gosha	awk Broadd	east Survey	Form- USES_	I ako Taha Da	~		
Site: <u>G/</u>	HARY	(H)	Survey	yors: G. A	U(N)(	Dake 1 anoe Basin	Managem	ent Unit	
Visit #:	Outin	ng#: / O	uad: SZ T					Date: JU	<u></u>
			u.u., <u></u>		T <u>/3</u> N	R185 sec(s) 3	1		
		Qı	1ad:		T	Rsec(s)			
Weather:	% cloud cov	er: start $\cancel{D}$ end	∠ precip: start	Ø end	a tomm				
SURVE	VINFORM	ATTON.			<u>vs</u> temp,	stant ) F end TCPF	Beaufort v	ind speed: sta	in_
		ATION:	Start Time	13/7-	End Time 16-	Z_4/ Call point	and route in	Formation	and the second
RESUL	rs: N	D PO	578527	TOALS		1	and route m	iormation on	i Dî
Number	1 Time	Detection	Bearing	Distance	ZON	E 10 UTMs			
		1 x 3 pc		(m)	Easting	Northing	Latitude	Longitude	
								Brudt	F
			<u> </u>						<u>}</u>
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	Beau- fort #	Wind Speed	Indicator of wind speed
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ŕ	2	4-7	wind on face; leaves rustle
r	3	8-12	leaves, twigs in constant motion
-	4	13-18	dust and leaves move
-	5	19-24	small trees sway
	. 6	25-31	large tree branches move

Total Time_

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Total Mileage



	Nor	thern Gosha	wk Broade	cast Survey I	Form- USES I	les Teles De les	_		
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Beau- Wind Indicator of wind speed fort # Speed 0 0 Smoke rises vertically 1 wind dir. shown by smoke dir. 1-3 2 4-7 wind on face; leaves rustle 3 leaves, twigs in constant motion. 8-12 4 13-18 dust and leaves move 5 19-24 small trees sway 6 25-31 large tree branches move



	Nor	thern Gosha	wk Broadd	ast Survey	Form, USES I.				
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	<u> </u>	'g #: <u>_/</u> Qi	$1ad: \leq \leq 1$	`` <u>```````````````````````````````````</u>	T <u>12N_</u> R	185 sec(s)	)		
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Beau- Wind fort # Speed Indicator of wind speed 0 0 Smoke rises vertically wind dir. shown by smoke dir. 1 1-3 2 4-7 wind on face; leaves rustle 3 8-12 leaves, twigs in constant motion. 4 13-18 dust and leaves move 5 19-24 small trees sway 6 25-31 large tree branches move



	Nor	thern Gosh	awk Broade	cast Survey	Form- USFS-I	ake Tahao Daat	16. <i>4</i> 7		
Site: _/ ),	ORTHR	,our	Surve	yors: G. K	HUMB	and Tanoe Dasin	Wanagem	ent Unit	
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Beau- fort #	Wind Speed	Indicator of wind speed
0	0	Smoke rises vertically
1	1-3	wind dir, shown by smoke dir
2	4-7	wind on face: leaves rustle
3	8-12	leaves, twigs in constant motion
4	13-18	dust and leaves move
5	19-24	small trees sway
6	25-31	large tree branches move

Total Time _____ Total Mileage _____

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	Nort	thern Gosha	wk Broadc	ast Survey I	⁷ orm- USFS-La	ke Tahoo Basin i	NЛ		
Site: <u>W</u> 63	US F.	ARGO	Survey	ors: 6. 1	ALLING	inte Tantoe Dasin	wanagem	ent Unit	
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Beau- Wind fort ∦ Speed Indicator of wind speed 0 0 Smoke rises vertically 1 wind dir. shown by smoke dir. 1-3 2 4-7 wind on face; leaves rustle 3 leaves, twigs in constant motion. 8-12 4 13-18 dust and leaves move 5 19-24 small trees sway 6 25-31 large tree branches move



	1401	thern Gosha	awk Broad	cast Survey	Form- USFS-L	ake Tahoe Basi	n Managam		
Site: <u>MA</u>	<u>96/65</u>	(HOTANKYA)	<u>Surve</u>	yors: <u>G</u> ./-	HUME		in managem	lent Unif	
Visit #:	Outin	g #:Q	uad: SC7			10		Date JU	2
I			<u>/</u>		$\underline{\qquad} 1 \underline{\qquad} 0.00 R$	<u>1 %G^s sec(s)</u>			
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weather. 70		er: start/b_ end (	D precip: start	end	temp: st	ari <u>46</u> °F end <u>66</u> °	'F Beaufort v	T ind speeds brit	2
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lap: Attach map and denote all call points (use O) and detections (use  $\Delta$ )

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Total Time Total Mileage



	Nor	thern Gosha	wk Broadc	east Survey	Form- USES_1 ,	ka Takas D			
Site: <u>Po</u> r	WDARE	ouse here	WFAUTSurvey	vors: C	ALCINE	ike 12110e Basin	Managem	ent Unit	
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		ь <i>"/</i> Qı	$1a0: \underline{} \underline{}$	/	$T_{R}$	<u>186</u> sec(s) <u>1</u>			
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Beau- fort #	Wind Speed	Indicator of wind speed
0	0	Smoke rises vertically
1	1-3	wind dir. shown by smoke dir.
2	4-7	wind on face; leaves rustle
3	8-12	leaves, twigs in constant motion
4	13-18	dust and leaves move
5	19-24	small trees sway
6	25-31	large tree branches move

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	Nor	thern Gosh	awk Broad	cast Survey	Form- USES_I	ako Taka Da			
Site: <u>P</u> 1	DGO	HEAVER	NG Surve	vors:	An inv	Jake Tanoe Basi	n Managem	ent Unit	
Visit #:	Outin	og #: ⁾ O	nad. 20	· · · ·	The fully			Date:	_(
		· (			T_ <u></u> TI	R_196 sec(s)	29 5 3	6.	-
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weather, %		er: start (/) end	🖉 precip: start	end		start <u>57</u> °F end 68°	F Beaufort w	(ind speed)	
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Beau- fort #	Mind Speed	Indicator of wind speed
0	0	Smoke rises vertically
1	1-3	wind dir. shown by smoke dir
2	4-7	wind on face; leaves rustle
3	8-12	leaves, twigs in constant motion
4	13-18	dust and leaves move
5	19-24	small trees sway
6	25-31	large tree branches move

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	Nor	thern Gosha	wk Broad	cast Survey	Form- USFS-La	ke Tahaa Daatu	3.4		
Site: <u>GA</u>	AXY (M	WALKSTULY)	Surve	yors: <u>G</u> . At	CINICS	Re 1 anoe basin	Managem	ent Unit	
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			<u>/</u>		T <u>/3//</u> R_	19@sec(s) 3/			
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Beau-Wind. Indicator of wind speed fort # Speed 0 0 Smoke rises vertically wind dir. shown by smoke dir. 1 1-3 2 4-7 wind on face; leaves rustle 3 8-12 leaves, twigs in constant motion. 4 13-18 dust and leaves move 5 19-24 small trees sway 6 25-31 large tree branches move

	Nor	thern Gosha	awk Broad	cast Survey	Form- USFS-	Lake Tabas Dest	3.4		
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Beau. Beau- Wind fort # Speed Indicator of wind speed 0 0 Smoke rises vertically 1 1-3 wind dir. shown by smoke dir. 2 4-7 wind on face; leaves rustle 3 leaves, twigs in constant motion. 8-12 4 dust and leaves move 13-18 5 19-24 small trees sway 6 25-31 large tree branches move

Total Time_____ Total Mileage



	Nor	thern Gosha	wk Broado	east Survey I	Form- USES. La	ko Toho D			
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Boau-Wind Indicator of wind speed iort # Speed 0 0 Smoke rises vertically 1 wind dir. shown by smoke dir. 1-3 2 wind on face; leaves rustle 4-7 3 leaves, twigs in constant motion. 8-12 4 13-18 dust and leaves move 5 19-24 small trees sway 6 large tree branches move 25-31



	Nor	thern Gosha	wk Broadc	ast Survey	Form- USES_I	ako Toho, D	<b>X</b> <i>F</i>		
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Beau-Indicator of wind speed Wind fort # Speed 0 0 Smoke rises vertically 1 1-3 wind dir. shown by smoke dir. 2 4-7 wind on face; leaves rustle 3 8-12 leaves, twigs in constant motion. 4 13-18 dust and leaves move 5 19-24 small trees sway 6 25-31 large tree branches move



	Nor	thern Gosha	awk Broad	lcast Survey I	Form- USES_1	ako Toho, D			
Site: <u>////</u> -	RTHROWL	HEAVE,	UT Surve	eyors: G. A	CLING.	Jake Tanoe Basil	n Managem	ent Unit	1
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		0	19d.		<u>15/1</u>	$R_{18C} sec(s) = 2$	5,36		
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Beau fort #	Wind Speed	Indicator of wind speed
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1	1-3	wind dir. shown by smoke dir
2	4-7	wind on face; leaves rustle
3	8-12	leaves, twigs in constant motion
4	13-18	dust and leaves move
5	19-24	small trees sway
6	25-31	large tree branches move

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Beau-Wind Speed Indicator of wind speed fort # 0 0 Smoke rises vertically 1 1-3 wind dir. shown by smoke dir. 2 4-7 wind on face; leaves rustle 3 leaves, twigs in constant motion. 8-12 4 13-18 dust and leaves move 5 small trees sway 19-24 6 25-31 large tree branches move

Total Time Total Mileage


	Nor	thern Gosha	wk Broadc	ast Survey	Form- USFS_I	aka Tahas D !	X 7		
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etection Type: A= alarm call; W= wail call; J= juvenile beg; V= visual only; N= nest; PP= plucking post; F= feather; R= roost lap: Attach map and denote all call points (use O) and detections (use  $\Delta$ )

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1	1-3	wind dir. shown by smoke dir.
2	4-7	wind on face; leaves rustle
3	8-12	leaves, twigs in constant motion
4	13-18	dust and leaves move
5	19-24	small trees sway
6	25-31	large tree branches move

Total Time _

Total Mileage



	Nor	thern Gosha	wk Broad	cast Survey	Form HEFE				
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etection Type: A= alarm call; W= wail call; J= juvenile beg; V= visual only; N= nest; PP= plucking post; F= feather; R= roost lap: Attach map and denote all call points (use O) and detections (use  $\Delta$ )

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	Beau- fort #	Wind Speed:	Indicator of wind speed
	0	0	Smoke rises vertically
	1	1-3	wind dir. shown by smoke dir
	2	4-7	wind on face; leaves rustle
ł	3	8-12	leaves, twigs in constant motion
	4	13-18	dust and leaves move
	5	19-24	small trees sway
	. 6 ]	25-31	arge tree branches move

Total Time _____ Total Mileage _____



# Appendix VIII Boundary Management

# **BOUNDARY MANAGEMENT**

- A. In perimeter areas, where it is likely for the skiing public to ski out of the patrolled area, Heavenly shall utilize a gated boundary system consisting of the following elements:
  - 1. Gates are located in areas people have traditionally gone through in order to reach an area out-of-bounds.
  - 2. Appropriate signage will be placed at the gates, informing users this is true backcountry access. Heavenly will place signs indicating that no patrolling of the area will occur, no hazards will be marked, no avalanche control work will be done and searches may or may not be conducted due to hazardous conditions. Skiers who enter the Backcountry areas will do so knowingly and will accept full responsibility for property loss, injury, and/or death. They may also be cited by local authorities and charged for the cost of their rescue.
  - 3. Gated entries will have two vertical steel posts through which a skier must pass. A steel bar will hang horizontally from one post and be held against the other by a steel spring. For someone to enter the area they must pull the bar in front of them and as they pass through, the bar will automatically close behind them. The bar will be height adjustable to allow it to remain waist-high for a normal adult. The intent in doing this is to require a physical action beyond merely going through the posts to enter the area.
  - 4. Due to the fact that this experience would be the same as any other backcountry experience, Heavenly will rarely "close" access into the terrain. The only time that these gates would be closed is when Heavenly staff is actively performing avalanche control with explosives in the adjacent permit area. Other than this special situation, the gate itself would never be locked or signed "closed". Heavenly has no way of ascertaining the hazards that exist on a day-to-day basis in that terrain.

- 5. "Closed Ski Area Boundary, Exit Through Gates Only" signage will be placed along perimeter ropes. These signs are placed at appropriate intervals so that individuals would have the opportunity to read the warning and not cross under the ropes. The signage will indicate that some routes may access private property.
- 6. Heavenly will position signs in populated areas of the resort warning of skiing outside of the defined (roped) boundary. These signs clearly state that skiing under a rope boundary carries the potential of a citation by the appropriate law enforcement, cost of search (if any), removal of their pass and the forfeiture of any future opportunity to possess a Heavenly pass.
- 7. Heavenly will provide and maintain counters at each of the gates for the entire ski season. Gate use will be monitored weekly and reported to Forest Service monthly.
- 8. Heavenly will continue to assist county search and rescue efforts when requested.
- B. Heavenly will install and maintain three gates. These gates will be monitored on a daily basis throughout the winter season to ensure signage is in place, the gates are functioning properly and that they are at the appropriate height. The gates are installed at the following locations:
  - 1. Fire Break

This gate is located to the north of the top of Olympic Chair. It accesses terrain locally termed "The Palisades".

2. Raley's Gulch

This gate is located off of California Trail at the start of Maggie's Canyon.

 Fulstone Canyon This gate is located above the existing Gate "A" of Killebrew Canyon. It controls access to the area directly to the south and east of Killebrew Canyon.

# Appendix IX 2010-2011 Water Use Balance Report

# **Heavenly Mountain Resort**

# Water Use Report, 2010-11 Season

Heavenly Mountain Resort is furnishing this report on water usage during the 2010-11 season as per the terms of the existing master plan agreement.

#### Snowmaking Water Usage

The Heavenly Mountain Resort snowmaking system consumed a total of 115.78 million gallons of water during the 2010-11 season to cover a total of 317 acres of terrain. The distribution of water sources and water consumption is described below:

Total Snowmaking Water UseCalifornia	64.79	million gallons
Total Snowmaking Water UseNevada	50.99	million gallons
Net Total Snowmaking Water Use	115.78	million gallons
Water Supplied in California	73.88	million gallons
Water Used in California	64.79	million gallons
Net Surplus (flow out of California)	9.09	million gallons
Water Supplied in Nevada	41.90	million gallons
Water Used in Nevada	50.99	million gallons
Net Deficit (Flow into Nevada)	-9.09	million gallons
Water Supplied In Basin	73.88	million gallons
Water Used in Basin	76.04	million gallons
Net Surplus (flow out of Basin)	-2.16	million gallons
Water Supplied Out of Basin	41.90	million gallons
Water Used Out of Basin	39.74	million gallons
Net Deficit (flow into Out of Basin)	2.16	million gallons
Water PurchasedSTPUD	40.12	million gallons
Water PurchasedKGID	8.90	million gallons
TOTAL WATER PURCHASED	49.02	million gallons

Table 1 provides a breakdown of water usage between California and Nevada, along with the net transfer of water between the States.



Table 12010-2011 Water Usage SummaryInter State Transfers									
	MG	In Calif	fornia	In Nevada					
Pumping Region	used	% of acre- ft	Water (MG)	% of acre- ft	Water (MG)				
Cal Base	34.8	100%	34.8	0%	0.0				
Cal Dam	26.2	100%	26.2	0.0%	0.0				
E. Peak	54.8	7%	3.8	93%	51.0				
Total	115.8		64.8		51.0				
Water Supply- (Purchased + Recharge)			73.9		41.9				
InterState Water Transfer			-9.1		9.1				

Table 2 provides a breakdown of water usage between in-basin and out of basin regions, along with the net inter-basin transfer of water. This table also provides a breakdown of Nevada water use within 4 water right quadrants as listed below (see Attachment 6 for graphical representation):

Table 22010-2011 Water Usage SummaryInter Basin									
Dumping Degion	MC used	In Basin			Basin				
Fumping Region	wig used	% of acre-ft Water (MG)		% of acre-ft	Water (MG)				
Cal Base	34.8	100%	34.8	0%	0.0				
Cal Dam	26.2	100%	26.2	0%	0.0				
E. PeakCA	3.8	0%	0.0	100%	3.8				
Total California	64.8		61.0		3.8				
Quandrant A	0.0	12.0%	6.1						
Quadrant B				58%	29.5				
Quadrant C				13%	6.4				
Quandrant D		18%	8.9						
Total Nevada	51.0		15.1		35.9				
TOTAL SNOWMAKING	115.8		76.0		39.7				
Water Supply			73.9		41.9				
Inter Basin Water Transfer			2.2		-2.2				

A - Within Tahoe Basin and south of the southern boundary of section 25, 26, 27 T. 13 N. R 18 E. and section 30 T. 13. N., R. 19 E.

B - Outside of Tahoe Basin and south of the southern boundary of section 25, 26, 27 T. 13 N. R 18 E. and section 30 T. 13. N., R. 19 E.

C - Outside of Tahoe Basin and North of the southern boundary of section 25, 26, 27 T. 13 N. R 18 E. and section 30 T. 13. N., R. 19 E.

D - Within Tahoe Basin and North of the southern boundary of section 25, 26, 27 T. 13 N. R 18 E. and section 30 T. 13. N., R. 19 E.

The following attachments provide documentation and calculations procedures used in determining these values:

Attachment 1....Map of Existing Meter Locations Attachment 2....Meter Readings Attachment 3....Schematic of Water Transfers Attachment 4....California Snowmaking Trails Attachment 5....Nevada Snowmaking Trails and Water Right Quadrants

#### **Calculation Procedures**

Water allocation calculations for Heavenly Mountain Resort are complicated by the fact that snowmaking occurs in both Nevada and California, as well as inside and outside the TRPA boundary. While the snowmaking piping distribution system for the entire resort is interlinked, there are 3 basic sub-regions:

 Cal Base This region consists of the acreage on the California side falling below Cal Dam. This entire region falls within the State of California and within the Tahoe Basin.
 Cal Dam This region consists of acreage on the California side that is above Cal Dam. This entire region falls within the State of California and within the Tahoe Basin.
 East Peak This region consists of acreage above and below East Peak Lake. The region is predominantly in Nevada, though some trails serviced at the top fall inside California. A majority of this terrain is out of the Tahoe Basin, but 25% lies inside the Basin.

Attachment 3 provides a schematic of pumping operations, meter readings, and the calculation procedure for interstate water transfers. These calculations consist of performing a water balance between the STPUD and KGID supplies, water entering and exiting reservoirs, and a flowmeter installed on the existing transfer line between the Cal Dam and East Peak systems.

The methodology used this analysis to track inter-basin water usage involves calculating the total water usage within the 3 major sub-regions (Lower Cal, Cal Dam, and East Peak) and then allocating water proportionally based on snowmaking terrain within that region that falls inside and outside the Tahoe basin. Since different trails require different design depths of snow, the allocation is based on the trail acreage x design depth for each trail, as detailed in Attachments 4 and 5. The same methodology is used to allocate East Peak water between California and Nevada. No changes have been made in the metering locations, configuration, or calculation procedure from the previous year.

The trail data provided in Attachment 5 indicates that 7% of the East Peak design acre-ft of snow coverage occurs in California. Therefore, 7% of the total 54.8 MG used for snowmaking in the East Peak sub-region is calculated to fall in California (3.8 MG) while 93% is calculated to fall in Nevada (51.0 MG)¹. Of this 51.0 MG of East Peak water that is used in Nevada, 29.5% of the design acre-ft of snow

¹ Refer to Table 1 for calculation

production occurs within the Tahoe Basin. Therefore 29.5% of the 51.0 million gallons of water used in this sub-region are calculated to be used within the Basin (15.1 MG) while 70.5% are calculated to be used outside the basin  $(35.9 \text{ MG})^2$ .

#### **Revised Operating Procedures**

The calculations indicate that a net of 2.2 million gallons of water was transferred into the basin during the 2010-2011 snowmaking season, while 9.1 MG was transferred from California to Nevada. The interbasin transfer represents only 1.8% of the total water pumped during the season. Future net transfers will be minimized by further balancing water supplies during the season and managing summer irrigation practices.

Respectfully Submitted,

Scott Barthold, PE Sno.matic Controls and Engineering, Inc.

² Refer to Table 2 for calculation



#### Attachment 2...Meter Readings

2010-2011 Meter Readings		Comp	Comparative			
		SCADA Total	SCADA Total	Pumped Volume	Source-Notes	
Description	Meter Type	10/1 to 2/22	2/23 to 9/31	(Million Gallons)		
KGID Water Purchase	GE AT868 Singe Channel, positive			8.9	From Heavenly Valley purchase records	
Way Home (deactivated)						
O75 Vault (deactivated)						
North Bowl (deactivated)						
Cross Over (deactivated)						
East Peak into Reservoir (reverse)	GE AT868 Singe Channel, negative	30,800,000	0	30.8	Meter totalizer	
East Peak out of Reservoir (forward)	GE AT868 Singe Channel, positive	63,800,000	0	63.8	Meter totalizer	
Von ShmidtCal to Nev (forward)	GE AT878 Single Channel, positive?				Meter not functioning most of the season, value calculated for report	
Von ShmidtNev to Cal (reverse)	GE AT878 Single Channel, negative?				Meter not functioning most of the season, value calculated for report	
Uphill Cal Dam PH into Reservoir	GE AT878 Single Channel, negative	9,000,000	0	9.0	Meter total plus SCADA total from 3/08-9/30	
Up Hill Cal Dam PH out of Reservoir	GE AT878 Single Channel, positive	48,100,000	0	48.1	Meter total plus SCADA total from 3/08-9/30	
Downhill Cal Dam into Reservoir-1	GE AT868 Dual Channel, Ch 1 negative	23,800,000	0	23.8	Meter total plus SCADA total from 3/08-9/30	
Downhill Cal Dam out of Reservoir-1	GE AT868 Dual Channel, Ch 1 positive	11,000,000	780,782	11.8	Meter total plus SCADA total from 3/08-9/30	
Downhill Cal Dam into Reservoir-2	GE AT868 Dual Channel, Ch 2 negative	2,619,225	0	2.6	Meter total plus SCADA total from 3/08-9/30	
Downhill Cal Dam out of Reservoir-2	GE AT868 Dual Channel, Ch 2 positive	9,300,000	0	9.3	Meter total plus SCADA total from 3/08-9/30	
Total Downhill meter into Cal Dam ReservoirChannel 1 and 2				26.4		
Total Downhill Meter out of Cal Dam ReservoirChannel 1 and 2				21.1		
Cal Base-STPUD Direct	McCrometer, Purchase Records	40,121,976	0	40.1	From Heavenly Valley purchase records	
Cal Base-STPUD from cooling tower	McCrometer, Purchase Records				From Heavenly Valley purchase records	
East Peak Well	GE AT868 Singe Channel		0	17.0	From Heavenly Valley Well Logs	

#### Snomatic Controls and Engineering, Inc

#### Attachment 3---Schematic



#### **Calculation Notes**

- 12 Read from Cal Dam uphill meter
- Based on Von Shmidt meter reading.
- 14 Based on Von Shmidt meter reading.
- 15 Cal Dam Uphill meter readding (reverse flow)
- 16 (Water Pumped from Cal Dam water transferred to NV) + (Water pumped from E Peak into CA water entering Cal Dam)
- 17 From Purchase records
- 18 From Cal Dam downhill meter
- 19 From Cal Dam Downhill Meter
- 20 Water Pumped from L Cal Water delivered to Cal Dam + gravity water running back down to lower Cal

#### 1 From E Peak Meter

- 2 Based on Von Shmidt meter reading.
- 3 Calculated by Equation 11
- 4 Water Pumped by E. Peak water sent to CA + KGID water used directly for snowmaking = Nevada SM water
- 5 Based on Von Shmidt meter reading.
- 6 Total Nevada water transfer to Cal Dam = KGID and Inflow water used in NV
- 7 Provided by Purchase Records from KGID
- 8 Based on E. Peak Meter Reading
- 9 Based on Von Schmidts meter reading
- 10 Total Water into E. Peak (from meter) water transferred to E. Peak from Von Shmidt = water transferred from Stage coach
- 11 Water purchased from KGID water transferred from KGID to E. Peak = KGID water used directly for snowmaking

#### ATTACHMENT 4---CALIFORNIA SNOWMAKING ACREAGE

Instant Prival Analogement         Trait Analogement         Trait Analogement         Trait Analogement         Trait Analogement           Solitoma Kabal, pod frait         First BW         Solitoma Kabal, pod frait         Solitoma Kabal, pod frait         Solitoma Kabal, pod frait           Bit 2         Solitoma Kabal, pod frait         Exist BWN, Inter Analogement         Solitoma Kabal, pod frait         Solitoma Kabal, pod frait           Bit 2         Solitoma Kabal, pod frait         Exist BWN, Inter Analogement         Solitoma Kabal, pod frait         Solitoma Kabal, pod frait           Bit 3         Solitoma Kabal, pod frait         Exist BWN, Inter Analogement, pod frait         Solitoma Kabal, pod frait         Solitoma Kabal, pod frait           Bit 3         Colitoma Kabal, pod frait         Model Solitoma, pod frait         Solitoma Kabal, pod frait         Solitoma Kabal, pod frait           Git 3         Model Bit 3         Model Bit 3         Solitoma Kabal, pod frait         Solitoma Kabal, pod frait         Solitoma Kabal, pod frait           Git 3         Model Bit 3         Model Bit 3         Solitoma Kabal, pod frait         Solitoma Kabal, pod frait         Solitoma Kabal, pod frait           Git 3         Model Bit 3         Model Bit 3         Solitoma Kabal, pod frait 3         Solitoma Kabal, pod frait 3	~ .
Alternal In Secia yoof trait         EAST BOWL - THE FACE         EAST BOWL - THE FACE <t< th=""><th>Sub Region</th></t<>	Sub Region
B1         EAST BOW_THE FACE         ENSTING         3.2.20         2.2.0         1.6.3         1.3.2           B1         5         WORLD LPP         ENSTING         2.0.00         2.6.3         4.6.3           B1         7         PAXSYS         ENSTING         1.0.00         2.66.4         4.6.1           G1         9         MAGGES         ENSTING         1.7.00         0.00         2.7.1           G5         1.1         CATTRACK         ENSTING         1.7.00         1.00         2.7.1           G6         1.1         MAGGES         ENSTING         1.7.00         1.01         2.7.1           G6         1.4         MONBO         ENSTING         1.7.00         1.01         2.7.1           H9         2.3         CANYON         ENSTING         1.7.00         1.01         2.7.1           H1         2.4         MAGRES         ENSTING         1.7.00         1.01         2.7.1           H1         2.5         CATTRACK         ENSTING         1.8.00         3.6.2.9         3.7.2           H1         2.5         CATTRACK         ENSTING         1.8.00         3.6.2.9         3.7.2           H1         1.2 <td< td=""><td>negion</td></td<>	negion
B2         2         GUNBAREL         EDSTING         2.030         175         8.2         4.03           E1         7         PATSYS         EMSTING         1.000         1.000         2.21.4           G1         9         MAGGES         EMSTING         1.700         2.00         7.9         2.2.1           G2         10         CATTRACK         EMSTING         1.700         4.0         1.110         7.1           G3         MAMON LEADONS         EMSTING         1.200         5.0         6.5         6.7           G4         H         LOWER MANDE         EMSTING         2.400         7.9         2.5         6.1         6.5         6.7           H9         2.3         GATONOL-SKY CANYON         EMSTING         1.480         1.03         3.3         3.9         1.1         2.5         4.7         2.4         1.1         1.1         2.5         1.1         2.5         1.1         2.5         1.1         2.5         1.1         2.5         1.1         2.5         1.1         2.5         1.1         2.5         1.5         1.5         1.5         1.5         1.5         1.5         1.5         1.5         1.5         1.5	Cal Base
D1         5         WORL DUP         EXITING         1.000         280         6.0         7.0         21.1           61         9         MAGBES         EMSTING         5.10         0.0         7.0         2.1           62         10         GATTRACK         EMSTING         1.700         4.0         1.0         2.7           65         13         MOMED         EMSTING         1.700         4.0         1.0         2.7           66         14         MOMED         EMSTING         1.700         5.0         2.6         5.         6.7         5         1.0         2.6         6.7         5         1.0         2.6         7.5         7.5         7.5         7.5         7.5         7.5         7.5         7.5         7.5         7.5         7.5         7.5         7.5         7.5         7.5         7.5         7.5         7.5         7.5         7.5         7.5         7.5         7.5         7.5         7.5         7.5         7.5         7.5         7.5         7.5         7.5         7.5         7.5         7.5         7.5         7.5         7.5         7.5         7.5         7.5         7.5         7.5         7.5 <td>Cal Base</td>	Cal Base
EI         7         PATSYS         EXITING         1.730         200         7.3         21.4           G2         10         CATTRACK         EXISTING         1.70         40         1.0         2.7           G5         13         MOMED NELOOWS         EXISTING         1.700         25         1.0         2.7           G6         14         MOMED NELOWS         EXISTING         1.700         25         1.0         2.8           G7         14         LOVERI MOMED NELOWS         EXISTING         1.700         25         1.3         1.6           G6         14         MOMED NELOWS         EXISTING         1.200         0.0         2.5         6.7           H10         24         ALAPOT (RULEY FLIES         EXISTING         1.600         100         1.0         2.4         49.6           H11         32         DEVER FLIES (FLIES         EXISTING         1.600         100         1.0         2.4         49.6           H11         32         CHUER FLIES (FLIES         EXISTING         4.00         150         1.4         3.7         2.34           H11         33         DEVER FLIES (FLIES         EXISTING         2.00         0.0	Cal Base
G1         9         MAGBES         EXSTING         5.210         80         84         22.7           G5         13         MOMBO MEJOUNS         EXSTING         1.190         1.70         4.1         1.111           G6         14         MOMBO MEJOUNS         EXSTING         1.700         4.0         1.0         2.5         1.0         2.6         1.6         1.6           G7         1.41         LOWER MOMBO         EXSTING         1.200         1.0         2.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6         1.6 </td <td>Cal Dam</td>	Cal Dam
G2         10         CAT TRACK         EXSTING         1.070         4.0         0.1         2.7           G5         13         MOMBO MEADUNS         EXSTING         1.700         2.5         1.57           G6         14         MOMBO         EXSTING         1.700         2.5         6.7           H0         23         CANTON         EXSTING         1.400         1.28         6.3         1.16.5           H10         24         JACPOT (RUSTING)         EXSTING         1.400         1.30         8.3         9.8           H11         25         H00F NOLER (STE NOWA)         EXSTING         4.400         1.80         8.9         9.7         2.34           H11         31         H00F NOLER (STE NOWA)         EXSTING         5.00         2.23         2.4         4.90           H11         32         CHLERINE SKI CENTER         EXSTING         5.00         2.23         2.4         4.90           H11         33         PARTER HALTER PULL         EXSTING         5.00         2.21         2.4         4.90           H11         33         CHLERIN FRULL         EXSTING         4.00         1.50         2.4         4.3         7.7         2.34	Cal Dam
65         13         MOMED READONS         EXISTING         1.100         7.70         4.1         1.11.           66         14         MOMED         EXISTING         1.200         90         2.5         1.0         2.5           14         LOWER MOMED         EXISTING         1.200         90         2.5         6.7           14         2.400         FOR CANON. SKY CANYON         EXISTING         2.400         1.30         3.3         3.5           11         2.5         LLZS         EXISTING         1.400         1.30         3.3         3.5           11         2.5         LLZS         EXISTING         4.400         1.01         2.4         4.84           13         2.7         UPERILLE'S FLLE'S         EXISTING         4.400         1.00         2.5         2.4           14         3.2         POINEER PLATTER PULL         EXISTING         4.00         1.00         2.6         2.4           14         1.3         POINEER PLATTER PULL         EXISTING         4.00         1.01         3.4         3.7         7.01         1.01         3.4         3.7         7.01           13         LEANT OS KOENTER         EXISTING         1.00	Cal Dam
66         14         MOMBO         EXISTING         1,700         25         6.7           H9         23         CANYON         EXISTING         2,400         128         4.3         11.5           H10         24         JACKPOT (RUSURU)         EXISTING         1,430         120         4.3         1.5           H11         26         L27S         EXISTING         4,500         100         9.6         2.3           II         21         L27S         EXISTING         4,430         100         9.6         2.3           II         22         L12S         EXISTING         4,430         100         9.6         2.3         6.2           M1         32         CHURCHS SACOL         EXISTING         1.200         2.3         6.2           M1         32         FUNCTRING         COURT INFORMER         EXISTING         1.301         0.0         2.4         6.3         1.4         0.0         2.4         6.3         0.0         2.4         6.3         0.0         2.4         6.5         0.0         2.4         6.5         0.0         2.4         6.5         0.0         2.4         6.5         0.0         0.0         0.0	Cal Dan
G7         14         LOWER MOMEO         DISTING         1.200         90         128         6.1         15.5           H19         24         CANYON - SIV CANYON         DISTING         1.860         128         6.1         15.5           H11         25         LL7S         EXSTING         1.860         120         3.3         8.9           H1         25         LL7S         EXSTING         4.630         100         12.4         4.4         4.9           K1         30         PERFECT TUBE (VEST BOWL)         EXSTING         1.200         300         2.2.3         6.7         2.3.4           "1         31         COMPARE NATES FALLES         EXSTING         2.200         300         2.2.3         6.7         2.3.4           "1         31         COMPARE PLATTES FULL         EXSTING         2.000         1.5.7         7         2.0.0           133         COMPER PLATTES FULL         EXSTING         2.000         1.5.7         7         2.0.0           144         LEANT OS INCOLTER         EXSTING         2.000         1.5.7         7         2.0.0           156         163         31         317.1         1.5.8         1.7.1 <t< td=""><td>Cal Dan</td></t<>	Cal Dan
H9         23         CANYON SIV CANYON         DISTING         2,400         128         4.1         1.5           H10         24         JACRYOT (RUSTUJU)         DISTING         1,430         125         4.3         11.5           H11         25         LZ'S         EXSTING         4,430         130         12.4         49.5           I3         27         UPPRE TULES / LLE'S         EXSTING         4,430         130         12.4         49.5           K1         30         PERFECT RIDE (WEST BOWL)         EXSTING         12.00         130         12.4         49.5           M1         33         PIONEER PLATTER FULL         EXSTING         300         12.4         4.5           M1         33         PIONEER PLATTER FULL         EXSTING         700         150         1.4         3.7           GG6         82         CASACAPE         EXSTING         2.00         143         1.5         4.0         2.1           "GG6         82         CASACAPE         EXSTING         2.00         1.4         3.7         2.0         3.4         9.2           "HH1         81         EASY STREET (1/2)         EXSTING         1.50         3.8	Cal Dan
H10         24         JACKPOT PULSUTSU)         EXISTING         1,860         125         3         3         18,9           H1         25         LUZS         EXISTING         1,430         130         33         8,9           H1         25         LUZS         EXISTING         4,630         100         12,4         49,6           K1         30         PERFECT RDE (MEST BOWL)         EXISTING         1,260         300         72         23,4           "L1         31         LUVERS NI GONOL         EXISTING         1,300         100         9,2         2,4           M1         32         CHILDREN SKI GENTER         EXISTING         300         100         9,2         2,4           M1         32         CHILDREN FRALL         EXISTING         400         150         1,4         3,7,1           "GG2         23A         SAMS DREAM         EXISTING         1,600         150         3,1         1,1         3,1         1,1         3,1         1,1         1,30         3,1         1,1         3,1         1,1         3,1         1,1         3,1         1,1         3,1         1,1         3,1         1,1         1,1         1,0,2	Cal Dan
H11         26         High ROLLER (STEAMBOAT)         EXISTING         1,430         130         100         9.6         2.59           IB         27         UPPER LLIES / LLIES         EXISTING         1,430         100         9.6         2.59           IS         27         UPPER LLIES / LLIES         EXISTING         1.24         4.96           VI         31         LOWER SK OCHOL         EXISTING         5.00         2.3         6.2           M1         32         POMEER PLATTER PULL         EXISTING         500         2.9         2.4         6.5           01         34         LEANT OS KICHER         EXISTING         4.00         150         1.4         3.7           **GG1         29         UPPA, CLIFORMA         EXISTING         2.900         145         7.4         2.00           **GG3         298         TAMARACK RETURN         EXISTING         1.00         1.00         2.21         5.6           B3         3         PISTOL         RETAIN         2.00         3.4         9.2           HH2         81         EASY STREET (1/2)         RETAIN         2.00         3.5         1.7.1           GG3         11         SWING IFALL	Cal Dan
II         25         LZS         EXISTING         4.630         100         9.6         25.8           IS         27         UPPRE LELES / ELLES         EXISTING         4.400         130         12.4         48.6           K1         30         PERFECT RIDE (WEST BOWL)         EXISTING         1.200         30.8         7         23.4           M1         32         CHILDRENS SN CENTER         EXISTING         300         100         0.9         2.4           M1         32         CHILDRENS SN CENTER         EXISTING         300         100         1.4         3.7           "GG2         28A         SAMS DREAM         EXISTING         2.000         12.5         8.0         3.1         7.1           "GG6         62         CASCADE         EXISTING         2.000         12.5         8.0         3.1         7.1           "HH1         81         EASY STREET (1/2)         ERIAN         300         300         0.0         0.0         0.0           E4         4         WATEFRALL         RETAN         300         30.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0 <td>Cal Dan</td>	Cal Dan
IS         27         UPPER ELLES / ELLES         EXISTING         4.400         130         12.4         48.6           K1         31         LOWERS SIX SCHOOL         EXISTING         1.260         300         8.7         23.4           K1         31         LOWERS SIX SCHOOL         EXISTING         500         20.0         2.3         6.2           M1         32         CHLIDERS SIX SCHOOL         EXISTING         700         150         1.4         6.5           01         34         LEARN TO SKI CENTER         EXISTING         2.00         14.7         7.4         2.00           **GG2         22A         SAMS DREAM         EXISTING         2.800         12.2         8.0         3.2         17.1           *GG3         22B         TAMARACK RETURN         EXISTING         7.40         200         3.4         9.2           HH2         81         EASY STREET II (1/2)         RETAIN         300         300         2.0         1.0         8.0         1.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0	Cal Dan
K1         30         PERFECT RIDE (WEST BOWL)         EXISTING         1.280         300         8.7         23.4           M1         32         CHLIDDENS SKI CENTER         EXISTING         300         100         0.9         2.4           M1         32         CHLIDDENS SKI CENTER         EXISTING         300         100         0.9         2.4           M1         32         CHLIDDENS SKI CENTER         EXISTING         2.000         14.5         7.4         2.00           "GG2         29A         SAMS DREAM         EXISTING         USISTING         2.000         13.5         7.4         2.00           "GG6         62         CASCADE         EXISTING         VID         XISTING         2.00         3.4         9.2           HH2         81         EASY STREET (1/2)         RETAIN         300         300         2.1         5.6           B3         3         PISTOL         REMOVE         EXISTING         1.440         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0	Cal Dan
"1.1         31         LOWER SKI SCHOOL         EXISTING         500         200         2.3         6.2           M1         32         POINEER PLATTER PULL         EXISTING         700         150         2.4         6.5           01         34         PIONEER PLATTER PULL         EXISTING         2.00         14.3         7.7           **GG2         29A         SAM*5 DREAM         EXISTING         2.00         1.4         7.4         2.00           **GG3         29B         TAMARACK RETURN         EXISTING         2.600         1.25         8.0         3.2.1           **HH1         81         EASY STREET (1/2)         RETAIN         300         300         2.1         5.6           B3         3         PISTOL         REMOVE         2.204         100         3.8         12.2           H42         81         EASY STREET (1/2)         RETAIN         3.00         3.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0 </td <td>Cal Bas</td>	Cal Bas
M1         32         CHLDRENS SN CENTER         EXISTING         390         100         0.9         2.4           N1         33         POINSEEP NETTRE PLUL         EXISTING         400         150         2.4         6.5           01         34         LEARN TO SKI CENTER         EXISTING         2.000         145         7.4         2.00           "GG3         298         SAMS DREAM         EXISTING         EXISTING         2.000         145         7.4         2.00           "GG6         82         CASCADE         EXISTING         2.000         143         1.7.1           "GG6         82         CASCADE         EXISTING         2.000         130         0.0         0.0           "HH1         81         EASY STREET (1/2)         RETAN         300         300         2.1         5.6           B3         3         PISTOL         REMOVE         EXISTING         1.640         100         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0	Cal Bas
M1         33         PIOWERP FLATTER PULL         EXISTING         700         150         2.4         6.5           °*GG1         29         (UPR) CALFORMA TRAIL         EXISTING         2.900         150         1.4         3.7           °*GG2         29A         SAMS DREAM         EXISTING         2.900         1.50         2.0           °*GG6         82         CASCADE         EXISTING         650         0.0         7.2           **HH1         81         EASY STREET (1/2)         EXISTING         7.40         200         3.4         9.2           HH2         81         EASY STREET (1/2)         RETAIN         300         0.21         5.6           B3         3         PISTOL         REMOVE         2.246         100         0.0         0.0           E2         8         GROOVE         EXISTING         7.02         200         3.4         9.2           G3         11         SWING TRAIL         RETAIN         7.00         0.0         0.0         0.0         0.0           G4         12         WATERFALL         RETAIN         1.540         100         3.5         1.7.4           G6         NC         POUDERDOVL <td>Cal Bas</td>	Cal Bas
01         34         LEAN TO SKI CENTER         EXISTING         400         150         1.4         3.7           **GG2         29A         SAMS DREAM         EXISTING         JUBUILT         1.43         10.7         420.0           **GG2         29A         SAMS DREAM         EXISTING         JUBUILT         1.43         10.7         420.0           **GG6         82         CASCADE         EXISTING         2.800         12.5         8.0         32.1           **HH1         81         EASY STREET (1/2)         EXISTING         7.40         200         3.4         9.2           HH2         81         EASY STREET (1/2)         RETAIN         300         300         2.1         5.6           B3         3         PISTOL         REMOVE         1.20         130         0.0         0.0           G3         11         SWING TRAIL         NO ACTION         1.640         100         3.8         10.2           G4         12         WATEFFAL         RETAIN         7.60         2.0         0.0         1.6           G8         NO         MCDEBOWL         RETAIN         7.60         0.0         0.0         0.0           H4	Cal Dan
***061         29         (UPR) CALFORMA TRAIL         EXISTING         29.00         145         7.4         20.0           ***062         29.8         SAMS DREAM         EXISTING         130         4.5         7.4         20.0           **066         82         CASCADE         EXISTING         650         0.0         7.2         2.0           **HH         81         EASY STREET (1/2)         EXISTING         7.40         200         3.4         9.2           HH2         81         EASY STREET (1/2)         RETAIN         300         2.1         5.6           B3         3         PISTOL         REMOVE         2.040         100         0.0         0.0           E2         8         GROVE         EXISTING         7.40         200         3.5         1.74           G3         11         SIMING TRALL         NO ACTION         1.190         30         0.0         0.0           G4         12         WATEFALL         RETAIN         1.540         100         3.5         1.41           G3         11         SIMING TRALL         NO ACTION         1.680         3.0         0.0         0.0           H1         17	Cal Dan
**.062         294         SAMS DREAM         EXISTING         LISUING         1.430         4.30         1.7.1           **.063         296         TAMARACK RETURN         EXISTING         2.800         1.25         8.00         3.2.1           **.066         82         CASCADE         EXISTING         2.800         1.25         8.00         3.2.1           **.111         81         EASY STREET (1/2)         RETAIN         3.00         3.00         2.1         5.6           B3         3         PISTOL         REMOVE         1.22         1.30         0.0         0.0           E2         8         GROVE         EXISTING         1.640         100         3.8         10.2           G3         11         SWING TRAIL         NO ACTION         1.90         3.0         0.0         0.0           G4         12         WATERFALL         RETAIN         7.60         2.50         0.0         0.0           H1         17         WOODS TRAUL         NEW         1.640         100         3.5         1.7.1           G8         NC         NEW-POWDERBOWL         RETAIN         7.60         0.0         0.0         0.0           H2	E. Peak
**GG3         298         TAMARACK RETURN         EXISTING         650         50         0         7         2.0           **GG3         CASCADE         EXISTING         7.40         200         3.4         9.2           HH2         81         EASY STREET (1/2)         EXISTING         7.40         200         3.4         9.2           HH2         81         EASY STREET II (1/2)         RETAIN         300         2.1         5.6           B3         3         PISTOL         REMOVE         2.040         100         0.0         0.0           E2         8         GROVE         EXISTING         FARMOVE         2.040         100         3.8         10.2           G3         11         SWING TRALL         NO ACTION         1.190         3.5         17.4           G8         15         POWDERBOUL (2 (Gladed)         NEW - MONDERBOUL 2 (Gladed)         NEW         14.1         100         3.5         17.4           G8         15         POMDERBOUL (2 (Gladed)         NEW - MONDERBOUL 2 (GladeD)         NO ACTION         1.000	E. Peak
**G66         82         CASCADE         EXISTING         2.00         125         8.0         32.1           **H1         81         EASY STRET (1/2)         EXISTING         7.40         200         3.4         9.2           HH2         81         EASY STRET (1/2)         RETAIN         300         300         2.1         5.6           B3         9150L         REMOVE         1.20         130         0.0         0.0           E2         8         GROVE         EXISTING         1.640         100         3.8         10.2           G3         11         SWING TRAL         NO ACTION         1.100         3.0         0.0         0.0           G4         12         WATERFAL         RETAIN         7.60         2.00         3.5         1.7.4           G8         NC         NEW - FONDERBOWL 2 (Gladed)         NEW         1.640         50         3.5         1.7.4           H1         17         WODGS TRAL         NO ACTION         1.800         3.0         0.0         0.0           H2         18         BETTYS STWIG         NO ACTION         1.000         0.0         0.0           H4         19         RIDGE EOWL	E. Peak
"HH1         81         EASY STREET (1/2)         EXSTING         740         200         3.4         9.2           HH2         81         EASY STREET II (1/2)         RETAIN         300         300         2.1         5.6           B3         3         PISTOL         REMOVE         1.220         130         0.0         0.0           E2         8         GROOVE         EXISTING         1.640         100         0.0         0.0           G3         11         SWING TRAIL         NO ACTION         1.190         30         0.0         0.0           G4         12         WATERFALL         RETAIN         7.60         200         3.5         17.4           G8         15         POWDERBOWL 2 (Gladed)         NEW         1.640         50         1.9         5.1           H1         17         WODES TRAIL         NO ACTION         1.600         0.0         0.0           H2         18         BETYS SWING         NO ACTION         1.400         100         0.0         0.0           H3         19         RIDGE BOWL         NO ACTION         1.400         100         0.0         0.0           H4         10         RETAI	E. Peal
HH2         81         EASY STRET II (1/2)         RETAIN         300         300         2.1         5.6           B3         3         PISTOL         REMOVE         1.20         130         0.0         0.0           E2         8         GROVE         EXITING         1.640         100         3.8         10.2           G3         11         SWING TRAIL         NO ACTION         1.190         3.0         0.0         0.0           G4         12         WATERFALL         RETAIN         7.60         200         3.5         17.4           G8         15         POWDERBOWL 2 (diaded)         NEW         1.640         50         1.5         5.1           H1         17         WOODS TRAIL         RETAIN         NO ACTION         1.080         30         0.0         0.0           H2         18         BETTYS SWING         NO ACTION         1.080         30         0.0         0.0           H4         19         RIGG EHUTE         NO ACTION         1.080         30         0.0         0.0           H4         19         RIGG EHUTE         NO ACTION         1.00         0.0         0.0           H4         19	E. Peak
HILL         OT         EPAT STREEL H (1/2)         THE LAIN         300         500         2.21         5.6           B4         4         WEST BOWL         REMOVE         1.220         130         0.0         0.0           E2         8         GROOVE         EMINT         REMOVE         2.204         100         3.8         10.2           G3         11         SWING TRAIL         NO ACTION         1.190         30         0.0         0.0           G4         12         WATERFALL         RETAIN         760         200         3.5         1.7.4           G3         11         SWING TRAIL         NO ACTION         1.940         50         1.9         5.1           H1         17         WOODS TRAIL         NO ACTION         2.960         2.5         0.0         0.0           H2         18         BETTYS SWING         NO ACTION         1.400         0.0         0.0         0.0           H3         19         RIGE GWL         NO ACTION         1.400         100         0.0         0.0           H3         19         RIGE CHUTE         NO ACTION         3.680         150         1.2         63.4           H4 <td></td>	
B-3         r initu.         initial         initial <thinitial< th="">         initial         in</thinitial<>	
b-1         +         HEINUYE         LINUYE         LINUYE <thlinuye< thr="">              141NC<!--</td--><td></td></thlinuye<>	
L2         0         UNUVE         EASIMUS         1,190         3.8         10.2           G3         11         SWING TRAL         NO ACTION         1,190         3.5         17.4           G8         15         POWDERBOWL         RETAIN         7.60         200         3.5         17.4           G9         NC         NEW - POWDERBOWL         RETAIN         1,540         100         3.5         1.4.1           G9         NC         NEW - POWDERBOWL         Gladed)         NEW         1,640         50         1.9         5.1           H1         17         WOODS TRAL         NO ACTION         1,080         30         0.0         0.0           H2         18         BETTYS SWING         NO ACTION         1,080         30         0.0         0.0           H3         19         RIDGE BOWL         NO ACTION         860         150         0.0         0.0           H4         19         RIDGE BOWL         SUIDTF         NO ACTION         860         150         0.0         0.0           H4         10         COWER BETTYS SUIDF         NO ACTION         500         1.0         0.0         1.1         1.2         1.3	Col D
GG         11         SMIND TRAIL         IN ACTION         1,90         30         0.0         0.0           G6         15         POWDERBOWL         RETAIN         7.60         200         3.5         17.4           G9         NC         NEW         1.640         50         1.9         5.1           H1         17         WOODS TRAIL         NO ACTION         2.960         25         0.0         0.0           H2         18         BETTYS SWING         NO ACTION         1.080         30         0.0         0.0           H3         19         RIDGE GOWL         NO ACTION         1.080         30         0.0         0.0           H4         19         RIDGE CHUTE         NO ACTION         1.000         0.0         0.0           H5         2.0         HGIR ADLER (RETTYS BUN)         RETAIN         3.00         0.0         0.0           H7         21         LOWER BETTYS         SUIDFF         NO ACTION         570         130         0.0         0.0           H3         NC         NEW - BETTYS CUTOFF         NO ACTION         50         0.0         0.0           H4         NC         NEW - SKWAS15 (GLADED)         NO A	uai Dar
C         ILL INPUL         In LIAIN         1/00         200         3.3         1/.4           G9         NC         NEW - POWDERBOWL 2 (Gladed)         NEW         1.640         50         1.9         5.1           H1         17         WODDS TAAL         NO ACTION         2.960         25         0.0         0.0           H2         18         BETTYS SWING         NO ACTION         1.080         30         0.0         0.0           H3         19         RIDGE 60UL         NO ACTION         1.080         50         0.0         0.0           H4         19         RIDGE CHUTE         NO ACTION         1.400         100         0.0         0.0         0.0           H5         20         HIGH ROLLER (BETTYS RUN)         RETAIN         3.680         150         12.7         63.4           H6         20         DUBLE DOWN (BETTYS BOWL)         RETAIN         7.00         10.0         0.0         0.0         0.0         0.0           H7         21         LOWEN BETTYS CUTOFF         NO ACTION         500         10.0         0.0         0.0           H12         NC         NEW - SKIWAYS 1 (GLADED)         NO ACTION         2.982         50 <td></td>	
Construction         Inclumin         1,340         Hui         1,340         Fund         1,411           G9         NC         NEW         1,640         50         1.9         5.1           H1         17         WOODS TRAL         NO ACTION         2,960         25         0.0         0.0           H2         18         BETTYS SWING         NO ACTION         1,400         100         0.0         0.0           H3         19         RIDGE BOWL         NO ACTION         1,400         100         0.0         0.0           H4         19         RIDGE COUL         NO ACTION         860         50         0.0         0.0           H5         20         HGR HOLLER (BETTY'S RUN)         RETAIN         710         50         0.0         0.0           H6         20         DOUBLE DOWN (BETTY'S BOWL)         RETAIN         710         50         0.0         0.0           H7         21         LOWER BETTY'S CUTOFF         NO ACTION         250         60         0.0         0.0           H13         NC         NEW - SKIWAYS 1 (GLADED)         NO ACTION         2,982         50         0.0         0.0           Ifformia In-Basin_non 'poof transp	
Loc         No         NEXT         Optimization         Left         No ACTION         2,960         25         0.0         0.0           H2         18         BETTY'S SWING         NO ACTION         1,960         30         0.0         0.0           H3         19         RIDGE EWUL         NO ACTION         1,400         100         0.0         0.0           H4         19         RIDGE CHUTE         NO ACTION         860         50         0.0         0.0           H4         19         RIGE CHUTE         NO ACTION         860         150         12.7         63.4           H6         20         DOUBLE LEWING INSTYS SUMUR         RETAIN         400         180         0.0         0.0           H7         21         LOWER BETTY'S SUTOFF         NO ACTION         500         100         0.0         0.0           H12         NC         NEW - BETTY'S CUTOFF         NO ACTION         2.60         0.0         0.0           H12         NC         NEW - SETTHINSION         RETAIN         2.740         70         3.4         9.2           15         NC         NEW - SKIWAYS 1 (GLADED)         NO ACTION         2.982         50         0.0	
H2         11         H3         H3         19         RIDGE BOWL         NO ACTION         1,680         30         0.0         0.0           H3         19         RIDGE BOWL         NO ACTION         1,400         100         0.0         0.0           H4         19         RIDGE CHUTE         NO ACTION         8,680         150         12.7         63.4           H6         20         DOUBLE DOWN (BETTY'S BOWL)         RETAIN         400         180         0.0         0.0           H7         21         LOWER BETTY'S BOWL)         RETAIN         710         50         0.0         0.0           H8         22         BETTY'S CUTOFF         NO ACTION         500         150         0.0         0.0           H12         NC         NEW - BETTY'S CUTOFF         NO ACTION         250         60         0.0         0.0           H13         NC         NEW - BETTY'S CUTOFF         NO ACTION         2.089         50         0.0         0.0           H2         27         ELLIES SWING         ACTION         2.089         50         0.0         0.0           H3         NC         NEW - SKIWAYS 2 (GLADED)         NO ACTION         2.982         <	
H2         H3         H4         H4         H4<	
H3         H3         H3         H30E CHUTE         H30 ACTION         H400         H30         0.00         0.03         0.03           H5         20         HIGH ROLLER (BETTYS RUN)         RETAIN         3,680         150         12.7         63.4           H6         20         DOUBLE DOWN (BETTYS BOWL)         RETAIN         400         180         0.0         0.0           H7         21         LOWER BETTYS CUTOFF         NO ACTION         570         130         0.0         0.0           H12         NC         NEW - BETTYS CUTOFF         NO ACTION         250         60         0.0         0.0           H13         NC         NEW - SKIWAYS 1 (GLADED)         NO ACTION         250         60         0.0         0.0           I2         27         ELLIES SWING - EXTENSION         RETAIN         2,740         70         3.4         9.2           I4         NC         NEW - SKIWAYS 2 (GLADED)         NO ACTION         2,982         50         0.0         0.0           GG5         64         49ER         RETAIN         1,710         40         1.6         6.3           HIJORTEAL         EXING         1,200         60         1.7         4.	
H7         H3         HBULD HOLER         HOLER <th< td=""><td></td></th<>	
H6         20         DOUBLE DOWN (BETTYS BOWL)         RETAIN         400         160         0.0         0.0           H7         21         LOWER BETTYS         RETAIN         710         50         0.0         0.0           H8         22         BETTYS CUTOFF         NO ACTION         500         130         0.0         0.0           H12         NC         NEW - BETTYS CUTOFF         NO ACTION         500         0.0         0.0           H13         NC         NEW - BETTYS SCAPE         NO ACTION         250         60         0.0         0.0           H4         NC         NEW - SKIWAYS 1 (GLADED)         NO ACTION         3.089         50         0.0         0.0           G65         64         49ER         RETAIN         1.710         40         1.56         42.1           2         16         RIDGE RUN         EXISTING         1.200         60         1.7         4.5           3         16         LOWER ALDER NN         EXISTING         1.200         60         1.7         4.5           3         16         LOWER ALDER NN         EXISTING         6.010         50         5.5         14.9           5 <td< td=""><td></td></td<>	
H7         21         LOWER BETTY'S         RETAIN         710         50         0.0         0.0           H8         22         BETTY'S CUTOFF         NO ACTION         570         130         0.0         0.0           H12         NC         NEW - BETTY'S CUTOFF         NO ACTION         560         0.0         0.0           H13         NC         NEW - BETTY'S CUTOFF         NO ACTION         250         60         0.0         0.0           H2         27         ELLIE'S SUNKO - EXTENSION         RETAIN         2.740         70         3.4         9.2           H4         NC         NEW - SKIWASY 1 (GLADED)         NO ACTION         2.982         50         0.0         0.0           I5         NC         NEW - SKIWASY 1 (GLADED)         NO ACTION         2.982         50         0.0         0.0           GE5         64         49ER         RETAIN         1.710         40         1.6         6.3           Ilifornia In-Basinnon 'pod' transport traits         EXISTING         17,000         40         1.7         4.5           1         6         ROUND-A-BOUT         EXISTING         1,000         5.5         14.9           5         2.9 <td></td>	
H8         22         BETTY'S CUTOFF         N0 ACTION         570         130         0.0         0.0           H12         NC         NEW - BETTY'S CUTOFF         N0 ACTION         600         150         0.0         0.0           H12         NC         NEW - BETTY'S CCAPE         N0 ACTION         600         150         0.0         0.0           H12         NC         NEW - BETTY'S SCAPE         N0 ACTION         250         60         0.0         0.0           H4         NC         NEW - SKIWAYS 1 (GLADED)         N0 ACTION         3.089         50         0.0         0.0           I5         NC         NEW - SKIWAYS 2 (GLADED)         N0 ACTION         3.089         50         0.0         0.0           G65         64         49ER         RETAIN         1.710         40         1.6         6.3 <i>iifornia In-Basinnon 'pod' transport trails</i> RETAIN         1.7000         40         15.6         42.1           2         16         RIDGE RUN         EXISTING         1.200         60         1.7         4.5           3         16         LOWER RIDGE RUN         EXISTING         1.600         1.2         3.3	
H12         NC         NEW - BETTY'S CUTOFF         NO ACTION         600         150         0.0         0.0           H13         NC         NEW - BETTY'S ESCAPE         NO ACTION         250         60         0.0         0.0           I2         27         FELIES SWING - SETTYS ESCAPE         NO ACTION         250         60         0.0         0.0           I4         NC         NEW - SKIWAYS 1 (GLADED)         NO ACTION         2,089         50         0.0         0.0           I5         NC         NEW - SKIWAYS 2 (GLADED)         NO ACTION         2,982         50         0.0         0.0           G65         64         49ER         RETAIN         1,70         40         1.6         6.3           stiffornia In-Basinnon 'pod' transport traits         5         29         CALIFORNIA TRAIL         EXISTING         1,200         60         1.7         4.5           3         16         LOWER RUDE RUN         EXISTING         6.010         50         5.5         14.9           5A         NC         NEW- CAL. TRAIL ALTERNATIVE         NEW         1.800         40         1.7         4.5           10         67         VON SCHMIDTS (1/4)         RETAIN	
H13         NC         NEW - BETTY'S ESCAPE         NO ACTION         250         60         0.0         0.0           I2         27         ELLIE'S SWING - EXTENSION         RETAIN         2.740         70         3.4         9.2           I4         NC         NEW - SKIWASY I (GLADED)         NO ACTION         2.982         50         0.0         0.0           I5         NC         NEW - SKIWASY 2 (GLADED)         NO ACTION         2.982         50         0.0         0.0           GG5         64         49ER         RETAIN         1.710         40         1.6         6.3 <i>Ilifornia In-Basinon' pod' transport trails</i> RETAIN         1.710         40         1.6         6.3 <i>Ilifornia In-Basinon' pod' transport trails</i> 6.00         1.7         4.5           3         16         LOWED-A-BOUT         EXISTING         1.200         60         1.7         4.5           3         16         LOWED-A-BOUT         EXISTING         6.010         50         5.5         14.9           5A         NC         NEW-CAL. TRAIL ALTERNATIVE         NEW         1.800         1.1         1.1         1 </td <td></td>	
ID         ID <thid< th="">         ID         ID         ID<!--</td--><td></td></thid<>	
IA         NC         NEW - SKIWAYS 1 (GLADED)         NO ACTION         3,089         50         0.0         0.0           I5         NC         NEW - SKIWAYS 2 (GLADED)         NO ACTION         2,982         50         0.0         0.0           GG5         64         49ER         RETAIN         1,710         40         1.6         6.3           alifornia in-Basinnon 'pod' transport traits         6         ROUND-A-BOUT         EXISTING         17,000         40         1.5.6         42.1           2         16         RIDGE RUN         EXISTING         1,200         60         1.7         4.5           3         16         LOWER RIDGE RUN         EXISTING         6,010         50         5.5         14.9           5A         NC         NEW- CAL. TRAIL ALTERNATIVE         NEW         1,800         40         1.7         4.5           10         67         YON SCHMIDTS (1/4)         RETAIN         10.050         5.5         14.9           5A         NC         NEW- CAL. TRAIL ALTERNATIVE         NEW         1,800         40         1.2         3.3           10         67         YON SCHMIDTS (1/4)         RETAIN         1.050         5.0         0.0	
i5         NC         NEW - SKIWAYS 2 (GLADED)         NO ACTION         2,982         50         0.0         0.0           GG5         64         49ER         RETAIN         1,710         40         1.6         6.3 <i>Ilifornia In-Basinon 'pod' transport trails</i> 1         6         ROUND-A-BOUT         EXISTING         17,000         40         15.6         42.1           2         16         RIDGE RUN         EXISTING         1,200         60         1.7         4.5           3         16         LOWER RIDGE RUN         EXISTING         6,010         50         5.5         14.9           5A         NC         NEW- CAL. TRAIL ALTERNATIVE         NEW         1,800         40         1.7         4.5           10         67         VON SCHMIDTS - MEADOW         RETAIN         1,050         50         1.2         3.3           **11         83         VON SCHMIDTS - MEADOW         RETAIN         1,000         54         2.8         7.6           12         NC         NEW - GAL. TRAIL ALTERNATIVE         NEW         1,691         40         1.6         4.2           4         28         SKYLINE TRAIL         RETAIN         3.100 <t< td=""><td></td></t<>	
G65         64         49ER         RETAIN         1,710         40         1.6         6.3           uitornia In-Basinnon 'pod' transport traits         RETAIN         1,710         40         1.6         6.3           uitornia In-Basinnon 'pod' transport traits         EXISTING         17,000         40         15.6         42.1           2         16         RUDCA-BOUT         EXISTING         1,200         60         1.7         4.5           3         16         LOWER RIDGE RUN         EXISTING         1,200         60         1.7         4.5           5         29         CALIFORNIA TRAIL         EXISTING         6,010         55         14.9           5A         NC         NEW- CAL. TRAIL ALTERNATIVE         NEW         1,800         40         1.7         4.5           10         67         VON SCHMIDTS (1/4)         RETAIN         0.00         300         4.1         11.11           1         6         ROUND-A-BOUT - REALIGNMENT         NEW         1,691         40         1.6         4.2           4         28         SKYLINE TRAIL         RETAIN         0.00         300         4.1         11.1           1         6         R	
SA         NC         NEW-CAL         EXISTING         17,000         40         15.6         42.1           2         16         RIDGE RUN         EXISTING         1,200         60         1.7         4.5           3         16         LOWER RIDGE RUN         EXISTING         1,200         60         1.7         4.5           3         16         LOWER RIDGE RUN         EXISTING         4.610         155         15.9         42.9           5         2.9         CALIFORNIA TRAIL         EXISTING         6.010         50         5.5         14.9           5A         NC         NEW- CAL. TRAIL ALTERNATIVE         NEW         1,800         40         1.7         4.5           10         67         YON SCHMIDTS (1/4)         RETAIN         600         300         4.1         11.1           1         6         ROUND-A-BOUT - REALGIMENT         NEW         1,691         4.0         2.8         7.6           4         28         SKYLINE TRAIL         RETAIN         3,100         54         2.8         7.6           12         NC         NEW - MAGGIES CANYON (GLADED)         NO ACTION         1,890         150         0.0         0.0	
Ilifornia In-Basinnon 'pod' transport traits           1         6         ROUND-A-BOUT         EXISTING         17,000         40         15.6         42.1           2         16         RIDGE RUN         EXISTING         1,200         60         1.7         4.5           3         16         LOWER RIDGE RUN         EXISTING         4,610         155         15.9         42.9           5         29         CALIFORNIA TRAIL         EXISTING         6,010         50         5.5         14.9           5A         NC         NEW- CAL. TRAIL ALTERNATIVE         NEW         1,800         40         1.7         4.5           10         67         VON SCHMIDTS - MEADOW         RETAIN         1,050         50         1.2         3.3           **11         83         VON SCHMIDTS - MEADOW         RETAIN         3,100         54         2.8         7.6           12         NC         NEW - MAGGIES CANYON (GLADED)         NO ACTION         1,890         150         0.0         0.0           Basin Total-Master Pian         Basin Total-Master Pian         Basin Total-Master Pian         91.2         262.3           Basin Total-Master Stating         91.2         262.3         91.2	
1         6         ROUNDA-BOUT         EXISTING         17,000         40         15,6         42,1           2         16         RIDGE RUN         EXISTING         1,200         60         1,7         4,5           3         16         LOWER RIDGE RUN         EXISTING         6,010         55         15,9         42,9           5         29         CALIFORNIA TRAIL         EXISTING         6,010         50         5,5         14,9           5A         NC         NEW- CAL. TRAIL ALTERNATIVE         NEW         1,800         40         1,7         4,5           10         67         VON SCHMIDTS (1/4)         RETAIN         1,050         50         1,2         3,3           **11         83         VON SCHMIDTS - MEADOW         RETAIN         1,000         54         2,8         7,6           12         NC         NEW - MAGGIES CANYON (GLADED)         NO ACTION         1,890         150         0.0         0.0           Basin TotalCal Base Existing         S8         91,2         28,2         7,6         7,9         212,4           Basin TotalCal Dam Existing         91,02         EXISTING         1,080         150         3,7         10.0 <t< td=""><td></td></t<>	
2         16         RIDGE RUN         EXISTING         1,200         60         1,7         4,5           3         16         LOWER RIDGE RUN         EXISTING         4,610         155         15,9         42,9           5         29         CALIFORNIA TRAIL         EXISTING         6,010         50         5.5         14,9           5A         NC         NEW- CAL. TRAIL ALTERNATIVE         NEW         1,800         40         1.7         4,5           10         67         VON SCHMIDTS (1/4)         RETAIN         1,050         50         1.2         3.3           ***11         83         VON SCHMIDTS - MEADOW         RETAIN         600         300         4.1         11.1.1           1         6         ROUND-A-BOUT - REALIGNMENT         NEW         1,691         40         1.6         4.2           4         28         SKYLINE TRAIL         RETAIN         3,100         54         2.8         7,6           12         NC         NEW - MAGGIES CANYON (GLADED)         NO ACTION         1,890         150         0.0         0.0           Basin TotalCal Dam Existing         57.9         212.4         706.7         33         10.0         56	Cal Bas
3         16         LOWER RIDGE RUN         EXISTING         4,610         155         15.9         42.9           5         29         CALIFORNIA TRAIL         EXISTING         6,010         50         5.5         14.9           5A         NC         NEW-CAL. TRAIL ALTERNATIVE         NEW         1,800         40         1.7         4.5           10         67         VON SCHMIDTS - MEADOW         RETAIN         1,050         50         1.2         3.3           **11         83         VON SCHMIDTS - MEADOW         RETAIN         600         300         4.1         11.1           1         6         ROUND-A-BOUT - REALIGNMENT         NEW         1,691         40         1.6         4.2           3ain Total-Master Pian         Basin Total-Master Pian         Sastin Total-Master Pian         7.7         212.8         766.7           Basin Total-Cal Base Existing         57.9         212.8         766.7         91.2         262.3           Basin Total-Cal Base Existing         0.0         0.0         0.0         0.0         0.0           V4         54         BIG DIPPER (1/5)         EXISTING         1,080         150         3.7         10.0           V8	Cal Dan
5         29         CALIFORNIA TRAIL         EXISTING         6,010         50         5.5         14.9           5A         NC         NEW- CAL. TRAIL ALTERNATIVE         NEW         1,800         40         1.7         4.5           10         67         VON SCHMIDTS (1/4)         RETAIN         1,050         50         1.2         3.3           **11         83         VON SCHMIDTS NEADOW         RETAIN         600         300         4.1         11.1           1         6         ROUND-A-BOUT - REALIGNMENT         NEW         1,691         40         1.6         4.2           4         28         SKYLINE TRAIL         RETAIN         3,100         54         2.8         7.6           12         NC         NEW - MAGGIES CANYON (GLADED)         NO ACTION         1.890         150         0.0         0.0           Basin TotalCal Dam Existing         212.8         706.7         57.9         212.4         8           Basin TotalCal Dam Existing         91.2         282.3         91.2         282.3           Basin TotalCal Dam Existing         91.2         28.4         2.6         1.080         1.50         3.7         10.0           V4         54<	Cal Dan
5A         NC         NEW- CAL. TRAIL ALTERNATIVE         NEW         1,800         40         1.7         4.5           10         67         VON SCHMIDTS (1/4)         RETAIN         1,050         50         1.2         3.3           **11         83         VON SCHMIDTS - MEADOW         RETAIN         600         300         4.1         11.1.1           1         6         ROUND-A-BOUT - REALIGNMENT         NEW         1,691         40         1.6         4.2           4         28         SKYLINE TRAIL         RETAIN         3,100         54         2.8         7.6           12         NC         NEW - MAGGIES CANYON (GLADED)         NO ACTION         1,890         150         0.0         0.0           Basin TotalCal Base Existing         57.9         212.4         706.7         8         706.7           Basin TotalCal Dam Existing         57.9         212.4         706.7         8         0.0         0.0         0.0           Idifornia Out of Basin 'pod' trails         54         BIG DIPPER (1/5)         EXISTING         1,080         150         3.7         10.0           V8         58         ORIONS (1/2)         EXISTING         1,820         200         6.	Cal Dan
5A         NC         NEW CAL. TRAIL ALTERINATIVE         NEW         1,800         40         1.7         4.5           10         67         VON SCHMIDTS (1/4)         RETAIN         1,050         50         1.2         3.3           **11         83         VON SCHMIDTS - MEADOW         RETAIN         1,050         50         1.2         3.3           1         6         ROUND-A-BOUT - REALISMMENT         NEW         1,691         40         1.6         4.2           4         28         SKYLINE TRAIL         RETAIN         3,100         54         2.8         7.6           12         NC         NEW - MAGGIES CANYON (GLADED)         NO ACTION         1,890         150         0.0         0.0           Basin TotalCal Base Existing         57.9         212.4         766.7         821.2         766.7           Basin TotalCal Base Existing         57.9         212.4         91.2         262.3           Basin TotalE Peak Existing         0.0         0.0         0.0         0.0           Vitionnia Out of Basin 'poot trails         58         ORION'S (1/2)         EXISTING         1,080         150         3.7         10.0           V8         58         ORION'S (1/2)	
10         67         VON SCHMIDTS (1/4)         RETAIN         1,050         50         1.2         3.3           **11         83         VON SCHMIDTS - MEADOW         RETAIN         600         300         4.1         11.1           1         6         ROUND-A-BOUT - REALIGNMENT         NEW         1,691         40         1.6         4.2           4         28         SKYLINE TRAIL         RETAIN         3,100         54         2.8         7.6           12         NC         NEW - MAGGIES CANYON (GLADED)         NO ACTION         1,890         150         0.0         0.0           Basin TotalCal Base Existing         212.8         706.7           Basin TotalCal Dam Existing         91.2         262.3           Basin TotalE. Peak Existing         0.0         0.0           1// V4         54         BIG DIPPER (1/5)         EXISTING         1,080         150         3.7         10.0           V8         58         ORIONS (1/2)         EXISTING         1,820         200         8.4         22.6           *V10         72         METEOR II (1/3) - (GLADED)         EXISTING - UNBULIT         970         130         2.9         7.8	
**11       83       VON SCHMIDTS - MEADOW       RETAIN       600       300       4.1       11.1         1       6       ROUND-A-BOUT - REALIGNMENT       NEW       1,691       40       1.6       4.2         4       28       SKYLINE TRALL       RETAIN       3,100       54       2.8       7.6         12       NC       NEW - MAGGIES CANYON (GLADED)       N0 ACTION       1,890       150       0.0       0.0         Basin TotalCal Base Existing       57.9       212.4       706.7         Basin TotalCal Dam Existing       91.2       262.3         Basin TotalCal Base Existing       91.2       262.3         Mut of Basin 'pod' trails       91.2       262.3         V4       54       BIG DIPPER (1/5)       EXISTING       1,080       150       3.7       10.0         V8       58       ORIONS (1/2)       EXISTING       1,820       200       6.4       22.6         *V10       72       METEOR (1/2) - (GLADED)       EXISTING - UNBULIT       970       130       2.9       7.8         **V11       75       METEOR II (1/3) - (GLADED)       REMOVE       500       100       0.0       0.0         V7       57	
1         6         ROUND-A-BOUT - REALISMMENT         NEW         1.691         40         1.6         4.2           4         28         SKYUINE TRAIL         RETAIN         3,100         54         2.8         7.6           12         NC         NEW - MAGGIES CANYON (GLADED)         NO ACTION         1,890         150         0.0         0.0           Basin TotalMaster Plan         Exain TotalCal Base Existing         57.9         212.4         706.7           Basin TotalCal Dam Existing         91.2         262.3         91.2         262.3           Basin TotalE Peak Existing         0.0         0.0         0.0         0.0           Viifornia Out of Basin 'poot trails         V4         54         BIG DIPPER (1/5)         EXISTING         1.060         150         3.7         10.0           V8         58         ORION'S (1/2)         EXISTING         1.820         200         8.4         22.6           *V10         72         METEOR II (1/3) - (GLADED)         EXISTING - UNBUILT         970         130         2.9         7.8           **V11         75         METEOR II (1/3) - (GLADED)         REMOVE         500         100         0.0         0.0           V7	
4         28         SKYLINE TRAIL         RETAIN         3,100         54         2.8         7.6           12         NC         NEW - MAGGIES CANYON (GLADED)         NO ACTION         1,890         150         0.0         0.0           Basin TotalMaster Plan         212.8         706.7         57.9         212.4         706.7           Basin TotalCal Base Existing         91.2         262.3         91.2         262.3           Basin TotalE Peak Existing         0.0         0.0         0.0         0.0           V4         54         BIG DIPPER (1/5)         EXISTING         1.080         150         3.7         10.0           V8         58         ORIONS (1/2)         EXISTING         1.820         200         8.4         22.6           *V10         72         METEOR (1/2) - (GLADED)         EXISTING - UNBUILT         970         130         2.9         7.8           **V11         75         METEOR II (1/3) - (GLADED)         REMOVE         500         100         0.0         0.0           V7         57         DIPPER BOWL (1/2)         NO ACTION         680         450         0.0         0.0	
12         NC         NEW - MAGGIES CANYON (GLADED)         NO ACTION         1,890         150         0.0         0.0           Basin TotalCal Base Existing         57.9         212.4         706.7         91.2         262.3           Basin TotalCal Base Existing         91.2         262.3         0.0         0.0         0.0           Ilifornia Out of Basin 'pod' trails         V4         54         BIG DIPPER (1/5)         EXISTING         1,080         150         3.7         10.0           V8         58         ORION'S (1/2)         EXISTING         1,820         200         8.4         22.6           *V10         72         METEOR (1/2) - (GLADED)         EXISTING - UNBULLT         970         130         2.9         7.8           **V11         75         METEOR II (1/3) - (GLADED)         REMOVE         500         100         0.0         0.0           V7         57         DIPPER BOWL (1/2)         NO ACTION         680         450         0.0         0.0	
Basin TotalMaster Plan         212.8         70b.7           Basin TotalCal Base Existing         57.9         212.4         70b.7           Basin TotalCal Base Existing         91.2         262.3           Basin TotalCal Base Existing         0.0         0.0           Jilfornia Out of Basin 'poot trails         V4         54         Big DIPPER (1/5)         EXISTING         1,080         150         3.7         10.0           V8         58         ORIONS (1/2)         EXISTING         1,820         200         8.4         22.6           *V10         72         METEOR (1/2) - (GLADED)         EXISTING - UNBUILT         970         130         2.9         7.8           **V11         75         METEOR II (1/3) - (GLADED)         REMOVE         500         100         0.0         0.0           V7         57         DIPPER BOWL (1/2)         NO ACTION         680         450         0.0         0.0           V7         57         DIPPER BOWL (1/2)         NO ACTION         680         450         0.0         0.0	
Dasin TotalCat Dase Existing         51.3         212.4           Basin TotalE. Peak Existing         91.2         262.3           Basin TotalE. Peak Existing         0.0         0.0           slifornia Out of Basin 'pod' trails         V4         54         BIG DIPPER (1/5)         EXISTING         1.080         150         3.7         10.0           V8         58         ORIONS (1/2)         EXISTING         1.820         200         8.4         22.6           *V10         72         METEOR (1/2) - (GLADED)         EXISTING - UNBUILT         970         130         2.9         7.8           **V11         75         METEOR II (1/3) - (GLADED)         REMOVE         500         100         0.0         0.0           V7         57         DIPPER BOWL (1/2)         NO ACTION         686         450         0.0         0.0           C64         61         540 DUINES         PETAININ         1.510 OU         90         2.0         80	
Justan TotalE. Peak Existing         J.1.         Loc.3           Basin TotalE. Peak Existing         0.0         0.0           V4         54         BIG DIPPER (1/5)         EXISTING         1.080         150         3.7         10.0           V8         58         ORION'S (1/2)         EXISTING         1.820         200         8.4         22.6           *V10         72         METEOR (1/2) - (GLADED)         EXISTING - UNBUILT         970         130         2.9         7.8           **V11         75         METEOR II (1/3) - (GLADED)         REMOVE         500         100         0.0         0.0           V7         57         DIPPER BOWL (1/2)         NO ACTION         680         450         0.0         0.0           C64         61         SAND DUNES         PETAININ         1.610         90         2.9         7.8	
Lifernia Out of Basin 'pod' trails         V4         54         BIG DIPPER (1/5)         EXISTING         1,080         150         3.7         10.0           V8         58         ORION'S (1/2)         EXISTING         1,820         200         8.4         22.6           *V10         72         METEOR (1/2) - (GLADED)         EXISTING - UNBUILT         970         130         2.9         7.8           **V11         75         METEOR II (1/3) - (GLADED)         REMOVE         500         100         0.0         0.0           V7         57         DIPPER BOWL (1/2)         NO ACTION         680         450         0.0         0.0           C64         61         544         DUPER         PETAININ         1.510         2.9         7.8	
Ilifornia Out of Basin 'pod' trails           V4         54         BIG DIPPER (1/5)         EXISTING         1,080         150         3.7         10.0           V8         58         ORION'S (1/2)         EXISTING         1,820         200         8.4         22.6           *V10         72         METEOR (1/2) - (GLADED)         EXISTING - UNBUILT         970         130         2.9         7.8           **V11         75         METEOR II (1/3) - (GLADED)         REMOVE         500         100         0.0         0.0           V7         57         DIPPER BOWL (1/2)         NO ACTION         680         450         0.0         0.0           C64         61         54.00         DIPER BOWL (1/2)         NO ACTION         680         450         0.0	
V4         54         BIG DIPPER (1/5)         EXISTING         1,080         150         3.7         10.0           V8         58         ORIONS (1/2)         EXISTING         1,820         200         8.4         22.6           *V10         72         METEOR (1/2) - (GLADED)         EXISTING - UNBUILT         970         130         2.9         7.8           **V11         75         METEOR II (1/3) - (GLADED)         REMOVE         500         100         0.0         0.0           V7         57         DIPPER BOWL (1/2)         NO ACTION         680         450         0.0         0.0           C64         61         54.00         DIMES         PETAININ         1.510         90         2.0         80	
V8         58         ORIONS (1/2)         EXISTING         1,820         200         8.4         22.6           *V10         72         METEOR (1/2) - (GLADED)         EXISTING - UNBUILT         970         130         2.9         7.8           **V11         75         METEOR II (1/3) - (GLADED)         REMOVE         500         100         0.0         0.0           V7         57         DIPPER BOWL (1/2)         NO ACTION         680         450         0.0         0.0           C64         61         5400 DUNES         PETADIN         1.610         90         2.9         7.8	E Peak
*V10         72         METEOR (1/2) - (GLADED)         EXISTING - UNBUILT         970         130         2.9         7.8           **V11         75         METEOR II (1/3) - (GLADED)         REMOVE         500         100         0.0         0.0           V7         57         DIPPER BOWL (1/2)         NO ACTION         680         450         0.0         0.0           C64         61         SAND DUNES         EFTAININ         1.610         90         2.9         80	E Peak
**V11 75 METEOR II (1/3) - (GLADED) REMOVE 500 100 0.0 0.0 V7 57 DIPPER BOWL (1/2) NO ACTION 680 450 0.0 0.0 CC4 61 SAND DUNES PETAIN 1610 90 2.0 80	
**V11         75         METEOR II (1/3) - (GLADED)         REMOVE         500         100         0.0         0.0           V7         57         DIPPER BOWL (1/2)         NO ACTION         680         450         0.0         0.0           C64         61         SAND DUNS         PETAININ         1.610         90         2.0         80	
V7 57 DIPPER BOWL (1/2) NO ACTION 680 450 0.0 0.0	
CC/ C1 CAND DUNES DETAIN 1.610 90 2.0 9.0	
dd4 01 3AND DONES HETAIN 1,010 00 3.0 0.0	
V1 51 MILKY WAY BOWL (2/3) NO ACTION 1,800 900 0.0 0.0	
V3 53 DIPPER KNOB RETAIN 1,730 30 1.2 3.2	
ıt of Basin TotalMaster Plan 17.9 48.4	
ut of Basin TotalCal Base Existing 0.0 0.0	
ut of Basin TotalCal Dam Existing 0.0 0.0	
ut of Basin TotalE. Peak Existing 12.1 32.6	
alifornia TotalMaster Plan 230.8 755.1	
alifornia TotalExisting 161.1 507.3	
d Bass Table 7.0 m	
ai Base lotal Existing 57.9 212.4	
al DamTotal Existing 91.2 262.3	
Peak Total Existing 12.1 32.6	
al Base Existing% In Basin 100% 100%	
al Dam Existing% In of Basin 100%	
Peak Existing% In Basin 0% 0%	

ATTACHMENT 5NEV	ADA SNOWMAKING ACREAGE											
20	07 Master Plan Amended Facilities - S	nowmaking at Buildout										
2007 Master Plan Amendment	Trail Name	2007 Master Plan Amendment	Acreage	Acre	Ac	reage by	/ Quand	rant		Acre-ft b	y Quadran	1
I rail # Nevada In Basin 'pod' trails		Snowmaking Action (1)	(acres)	π. (3)	A	В	U	U	A	В	G	U
Q1	BOULDER (EDGEWOOD) BOWL	EXISTING	17.2	68.9				17.2				68.9
S1	OLYMPIC DOWNHILL (3/5)	EXISTING	15.5	41.8	15.5				41.8			
X1	BOULDER SKI SCHOOL	EXISTING	2.8	7.6				2.8				7.6
*HH1	EASY STREET (1/2)	EXISTING	3.4	9.2	3.4				9.2			
\$2	BOULDEB CHUTE (075)	RETAIN	27	11.0								
\$3	NORTH BOWL	RETAIN	7.8	38.9								
S4	UPPER NORTH BOWL	RETAIN	4.2	21.0					ĺ			
S8	NEW - NORTH BOWL 2	NEW	5.1	13.8								
S9	NEW - NORTH BOWL 3 (Gladed)	NEW	8.1	22.0								
\$10	NEW - NORTH BOWL 4 (Gladed)	NEW	7.8	21.2								
HHZ	EASY STREET II (1/2) (wasn't on snowmaking plan)	NU AG HUN	2.1	0.0								
Nevada in Basin non 'pod' tr	ransport trails											
9	STEVES	EXISTING	0.5	1.4	0.5				1.4			
10	VON SCHMIDT'S (1/4)	RETAIN	1.2	3.3	_							
NV In Basin TotalMaster P	lan		78.5	265.5								
NV In Basin Existing Total (	all E. Peak)		39.4	128.8								
Nevada Out of Rasin 'nod' tr	aile											
R2		FXISTING	42	16.6			42				16.6	
S1	OLYMPIC DOWNHILL (2/5)	EXISTING	10.3	27.9		3.8	6.5			10.4	17.5	
\$5	CROSSOVER	EXISTING	6.7	18.1		6.7			i i	18.1		
V4	BIG DIPPER (4/5)	EXISTING	14.8	40.0		14.8				40.0		
V6	ORION'S BELT	EXISTING	1.1	2.9		1.1				2.9		
V8	ORION'S (1/2)	EXISTING	8.4	22.6		8.4				22.6		
V9	LOWER ORION'S	EXISTING	2.9	7.8		2.9				7.8		
*V10	METEUK (1/2) - (GLADED)	EXISTING - UNBUILT	2.9	/.8		10.4				50.0		
W3	COMET	EXISTING	1/1.4	28.2		10.4			-	32.2		
¥¥**	O GIVIL I	EAISTING	14.2	30.3		14.2				30.3		
Z1	NEW - WELLS FARGO 1	NEW	5.4	14.5								
Z2	NEW - WELLS FARGO 2	RETAIN	8.3	22.4					1			
Z3	NEW - WELLS FARGO 3	NEW	11.4	30.7								
Z4	NEW - WELLS FARGO 4	RETAIN	12.8	34.6								
Z5	NEW - WELLS FARGO 5	NEW	2.8	7.5								
2/	NEW - WELLS FARGO /	NEW	6.9	18.7		10.0	10			40.0	0.0	
RI D2			7.1	49.0		10.8	1.0			43.2	0.3	
R4	NEW - STAGECOACH 2	NO ACTION	0.0	0.0								
R5			0.0	0.0					1			
S6	PONDEROSA (BONANZA BOWL)	RETAIN	4.0	15.9					1			
\$7	EAST PEAK	RETAIN	3.9	15.8								
U1	PERIMETER	RETAIN	13.5	36.4								
U2	GALAXY	RETAIN	10.1	27.3								
U3	NEW - GALAXY 1	NEW	8.7	23.4								
U4	NEW - GALAXY 2	DETAIN	2.7	7.3								
VJ V12	NEW - OBION'S II	NEW	3.4	9.9								
W1	ARIES	BETAIN	1.3	3.4					1			
W2	JACK'S	NEW	3.0	8.0					1			
*HH3	SILVER SPUR	NO ACTION	0.5	1.4					ĺ			
Necada Out of Basin Non 'pe	od' transport trails											
7	LOWER WAY HOME	EXISTING	5.2	14.1		10	5.2			10.0	14.1	
10	PEPI'S	EXISTING	4.0	10.8		4.0				10.8		
14		EAISTING NEW/	6.4	17.2		2.4				0.0		
15	NEW - SCORPION	NEW	6.3	17.1								
6	NEW - NEVADA TRAIL (WAY HOME)	NEW	5.9	16.0					i			
16	NEW - FARGO TO GALAXY	NEW	1.1	2.9					ĺ			
NV-Out of Basin Total MP			229.1	690.8					j			
NV Out of Basin Existing Tot	al (all E. Peak)		97.0	307.5								
					Ac	reage by	/ Quand	rant		Acre-ft b	y Quadran	
		Acreag	je total by % of Tot	Quandrant	14.2%	/9.5	17.5	20.0	52.4	252.8	54.b	17.5%
			/6 01 101	ai Acieaye	14.2 /0	30.3 %	TOTAI	136.4	12.0%	30.0 %	TOTAI	436.3
Nevada TotalMaster P	lan		307.6	056.3	-		TOTAL	100.4			TOTAL	400.0
Novada TotalRusting			136.4	436.3						-		
% In Dooin Existing			20%	20%						-		
% III DasiliExistiliy % Out of Pagin			29%	30%								
% OUL OF DASII			/1%	10%	-							
Grand Total_2007 Mood	ter Plan		530	1711	-							
			000	1/11								
		Cal Base Total	58	212								
		% in CA	100%	100%								
		% In Basin	100%	100%								
		Cal DamTotal	91	262								
		% in CA	100%	100%								
		% in Basin	100%	100%								
		E. Peak Total	148.5	468.9								
		% in CA	8%	7%								
		E. Peak in CA	12.1	32.6								
	% 0	f E. Peak in CA-in Basin	0.0%	0.0%								
		E. Peak in NV	136.4	436.3								
	% 0	f E. Peak in NV-in Basin	28.9%	29.5%								

# Appendix X 2010-2011 Annual Noise Survey Report



Heavenly Ski Resort Master Plan Noise Monitoring Survey 2010-2011 Ski Season

> c. brennan & associates Consultants in acoustics



P.O. Box 6748 • Auburn, California 95604 263 Nevada Street • Auburn, California 95603 p.530.823.0960 • f.530.823.0961 • www.jcbrennanassoc.com

December 30, 2011

Mr. Chris Donley CardnoENTRIX P.O. Box 1533 Zephyr Cove, NV 89448

Dear Mr. Donley

j.c. brennan & associates, Inc. is pleased to provide ENTRIX and the TRPA with the Heavenly Master Plan Noise Monitoring survey for the 2010-2011 ski season. If you have any questions, please contact me at 530-823-0960, or at jbrennan@jcbrennanassoc.com.

Respectfully submitted,

lac 2m

Jim Brennan President

# I INTRODUCTION

j.c. brennan & associates, Inc. is providing a final report on the noise Heavenly Master Plan Noise Mitigation Monitoring and analysis of noise measurement data collected during the 2010/2011 snowmaking operations at Heavenly Ski Resort. The noise measurements and analysis of data are required as a condition of approval for the Heavenly Master Plan EIS/EIR. This is the fourteenth annual analysis of snowmaking operations noise levels.

j.c. brennan & associates, Inc. staff have been involved in conducting the annual snowmaking operations noise analyses since the 1996/1997 ski seasons. The previous six noise analyses for the 2004/2005 through the 2009/2010 ski seasons were prepared by j.c. brennan & associates, Inc. The five noise analyses for the 1999/2000 through the 2003/2004 ski seasons were prepared by Bollard & Brennan, Inc. The three noise analyses for the 1996/97 through 1998/99 ski seasons were prepared by Brown-Buntin Associates, Inc (BBA).

The conditions of approval for the Heavenly Master Plan EIS/EIR are aggressive, and include instituting a comprehensive noise monitoring program, the replacement of older and louder air/ water nozzles with quiet model snowmaking equipment, sound control devices for snowmaking equipment, and participation with the snowmaking industry in the research and development of quiet snowmaking equipment and sound control devices for snowmaking equipment. The current technology considers quiet snowmaking equipment to include both fan guns and more efficient air/water nozzles. Based upon noise measurement data collected for the various types of snowmaking equipment, fan guns are generally 15 dBA quieter than traditional air/water nozzles. In addition, significant reductions in noise have been realized from recent designs of some air/water nozzles. Generally, lower air pressure during the mixing process at the nozzle results in lower noise emissions. In addition, fan guns which receive air pressure from a central compressor located within a building and are not equipped with individual air compressors also result in reduced noise emissions.

Since the 1996/1997 ski season, Heavenly Ski Resort has committed to the installation of a permanent noise monitoring site at the base of the ski area near the California lodge, and to establishing the existing snowmaking noise levels at the Boulder Base and Stagecoach Base. Refer to Figure 1 for locations of noise monitoring sites.

According to the previous snowmaking noise reports, during the 1996/1997 ski season some quiet snowmaking equipment was installed and used at the California Base facilities. However, the use of quiet equipment was limited. During the 1997/1998 ski season, additional quiet snowmaking equipment was introduced into the fleet of snowmaking operations. During the 1998/1999 snowmaking operations, no additional quiet snowmaking equipment was implemented. Based upon review of the log of snowmaking activities provided by Heavenly, fan guns were used in both the lower and upper locations of the California Base during the 1999/2000 - 2003/2004 ski seasons. During the 2008/2009 and 2009/2010 ski season, fan guns were used extensively on the lower portion of the California Base area. Based upon the snowmaking logs, there was limited use of air/water nozzles on the lower portion of the California side as an effort to reduce overall snowmaking noise levels.



### II PURPOSE AND NEED

The purpose and need for the Annual Noise Monitoring Report, is to address the attainment of performance standards contained within the Heavenly Master Plan and to address progress toward attainment of the TRPA noise level criteria.

# **TRPA Criteria**

The Tahoe Regional Planning Agency (TRPA) has adopted Environmental Thresholds for the Lake Tahoe Region. The noise standards, or Thresholds as they are commonly referred to, are numerical Community Noise Equivalent Level (CNEL)¹ values for various land use categories and transportation corridors.

As a form of zoning, the TRPA has divided the Lake Tahoe Region into more than 175 separate Plan Areas. Boundaries for each of the Plan Areas have been established based upon similar land uses and the unique character of each geographic area. For each Plan Area, a Statement is made as to how that particular area should be regulated to achieve regional environmental and land use objectives. As a part of each Statement an outdoor CNEL standard is established based upon the Thresholds. Table 1 shows the existing CNEL standards for the Heavenly Plan Areas and adjacent Plan Areas.

Table 1 Plan Area Statement (PAS) CNEL Criteria						
PAS	Description	CNEL Criterion				
087	Heavenly Valley California	55 dBA				
085	Lakeview Heights (Location of California Base noise monitoring location)	55 dBA				
094	Glenwood	50 dBA				
095	Trout/Cold Creek	50 dBA				
086	Heavenly Valley Nevada	55 dBA				
082	Upper Kingsbury	55 dBA				
080	Kingsbury Drainage	50 dBA				
088	Tahoe Village	55 dBA				

¹ For an explanation of these terms, see Appendix A: "Acoustical Terminology"

#### III COMPLIANCE REPORTING

### **III.1** Snow Grooming Noise

### **III.1a Master Plan Mitigation Methods**

The Master Plan mitigation methods for snow grooming operations are to maintain an 85 foot setback from Plan Area boundaries that are adjacent to Heavenly. Operations of snow grooming equipment would not exceed Plan Area noise standards with a minimum of 85 feet of separation.

### III.1.b Master Plan Milestone/Product

Snow grooming machines are not operated within 85 feet of PAS boundaries. Portions of the fleet are replaced continually with newer technology equipment

### **III.1c** Responsible Party

Heavenly is responsible for educating snow groomers to maintain the 85 foot setback.

# III.1d PAS Criteria

PAS 080 – 50 dB CNEL PAS 082, 085, 086, 087, 088 – 55 dB CNEL PAS 095, PAS 121 – 45 dB CNEL

#### **III.1.e Results of Reporting and Determination of Compliance**

To be included in ENTRIX compliance report.

#### **III.2** Snowmobile Noise

#### **III.2.a Master Plan Mitigation Methods**

Replace all snowmobiles with 4-stroke technology. This would ensure that snowmobiles would comply with the 82 dBA single event noise level standard.

#### III.2.b Master Plan Milestone/Product

Snowmobile equipment is maintained and operated within 85 feet of PAS boundaries. Portions of the fleet are replaced with newer technology equipment on an annual basis.

#### **III.2.c Responsible Party**

Heavenly is responsible for replacing the fleet of snowmobiles with 4-stroke technology machines.

# III.2.d Criteria

The TRPA single event noise level standard for snowmobiles is 82 dBA Lmax, at a distance of 50 feet.

#### **III.2.e** Results of Reporting and Determination of Compliance

Heavenly staff reported in 2008 that all snowmobiles in the fleet are 4-stroke engine technology. Therefore, this is in compliance with the TRPA thresholds.

#### **III.3** Snow Removal Noise

### **III.3.a Master Plan Mitigation Methods**

Mitigation methods for snow removal noise impacts are to minimize nighttime snow removal operations, and by constructing noise barriers along the perimeters of the parking lots. At the California Base area, the upper parking lot should be cleared first, and clearing of the lower parking lot should be conducted during the daytime and evening hours.

### III.3.b Master Plan Milestone/Product

Snow removal equipment is operated consistent with the measures listed above.

# **III.3.c Responsible Party**

Heavenly is responsible for operating snow removal equipment consistent with the measures listed above.

# III.3.d Criteria

PAS 080 – 50 dB CNEL PAS 082, 085, 086, 087, 088 – 55 dB CNEL PAS 095, PAS 121 – 45 dB CNEL

#### **Results of Reporting and Determination of Compliance**

To be provided in ENTRIX compliance report.

# III.4 Snowmaking California Base Area Noise

# **III.4.a Master Plan Mitigation Methods**

- 1. Use of fans in place of air/water nozzles or air/water guns which are low noise;
- 2. Re-direction of nozzles and fans to minimize noise exposures at PAS boundaries;
- 3. Reduction in the numbers of nozzles and/or fans;
- 4. Use of setbacks to reduce noise exposures at PAS boundaries;
- 5. Use of noise reduction housings for air/water nozzles;
- 6. Use of barriers at low-mounted air/water nozzles;
- 7. Reduction in snowmaking activities at nighttime;
- 8. Sponsor research into reducing noise produced by snowmaking. This may include support of industry-wide research activities, specific studies concerning nozzle design sponsored directly by Heavenly, and the study of alternatives in placement of guns and fans at Heavenly.

# III.4.b Master Plan Milestone/Product

Heavenly has installed the long-tem noise monitoring station at the California Base area. The annual noise monitoring occurs from November 1, and generally through March 31st, depending on the snowmaking activities. Heavenly has completely replaced the air-water snowmaking nozzles at the base of California with fan guns. Heavenly has not implemented items 4 through 6 listed above. However, Heavenly staff has closely monitored the snowpack produced through winter storms and snowmaking operations to determine the appropriate time for discontinuing snowmaking operations and reduce nighttime snowmaking noise levels. In addition, Heavenly continues to invest in conducting noise measurements of varying types of snowmaking equipment to determine the feasibility of introducing more quiet technology snowmaking equipment.

# **III.4.c Responsible Party**

Heavenly is responsible for implementing the mitigation measures.

# III.4.d PAS Criteria

PAS 080 – 50 dB CNEL PAS 082, 085, 086, 087, 088 – 55 dB CNEL PAS 095, PAS 121 – 45 dB CNEL

# **III.4.e Results of Reporting and Determination of Compliance**

# 1996/1997 - 2009/2010 Snowmaking Noise Levels Summary:

Previous j.c brennan & associates, Inc., and Bollard & Brennan, Inc. reports provide details on the analysis of past snowmaking seasons. Previous noise monitoring surveys are provided in Tables 2 and 3.

#### 2010/2011 Snowmaking Noise Levels Summary:

The ski season during the 2010/2011 spanned a total of 151 days. Continuous snowmaking noise level measurements were conducted between November 1, 2010 and March 31, 2011 at the permanent noise monitoring site, located on the USFS property located directly east of Heavenly Ski Area, and across Keller Road (PAS 085). The monitoring site is located on the southeast corner of the intersection of Keller Road and Saddle Road, with a direct line of sight to the California Base snowmaking operations. As mentioned in previous reports, the location of the noise monitor was at the northeast corner of Keller Road and Saddle Road, and adjacent to the Tahoe Seasons Resort. That monitoring location was reaching the limitations of its usefulness. Traffic noise from the intersection of Keller Road and Saddle Road was influencing the overall measured noise levels. The current location has sufficient setback to reduce the amount of noise associated with the traffic as it affected the overall measured noise levels and the noise levels associated with the snowmaking operations.

The equipment used for the noise level measurements was a Larson Davis Laboratories (LDL) Model 820 precision integrating sound level meter which was calibrated with an LDL Model CAL 200 acoustical calibrator.

During the 2010/2011 ski season the Heavenly continued the log of snowmaking operations, also noting the use and location of snowmaking equipment, during the hours of operation when snowmaking activity occurred. Upon review of the snowmaking activities log provided by Heavenly snowmaking personnel, the measured CNEL values during snowmaking activities was determined at the noise monitoring location. Noise associated with snowmaking activities was a function of the number and location of snowmaking nozzles and/or fans guns in operation. Table 2 summarizes the previous fourteen years of snowmaking levels at the Tahoe Seasons Resort (PAS 085), as well as the 2010/2011 season.

Table 2 Summary of Measured Noise Levels at the Heavenly Base Area (Average Measured CNEL Values)							
Noise Monitoring Site GPS Coordinates (38° 56' 17.43" N - 119° 56' 18.43" W)							
Year	CNEL on Days with Snowmaking	CNEL on Days without Snowmaking	CNEL During Measurement Period	Total # of Monitoring Days	Total # of Snowmaking Days		
1996/1997	74.1 dBA	61.7 dBA	71.6 dBA				
1997/1998	73.5 dBA	61.8 dBA	70.2 dBA				
1998/1999	73.0 dBA	62.0 dBA	69.5 dBA				
1999/2000	74.3 dBA	62.0 dBA	73.0 dBA	141	101		
*2000/2001	74.1 dBA	60.0 dBA	72.2 dBA	140	89		
*2001/2002	73.9 dBA	60.3 dBA	72.1 dBA	145	93		
*2002/2003	72.0 dBA	63.1 dBA	68.3 dBA	150	61		
*2003/2004	67.4 dBA	62.3 dBA	65.7 dBA	104	56		
*2004/2005	65.3 dBA	61.5 dBA	63.1 dBA	149	51		
*2005/2006	61.0 dBA	60.9 dBA	61.4 dBA	151	41		
*2006/2007	63.7 dBA	58.1 dBA	62.6 dBA	149	75		
*2007/2008	62.4 dBA	58.2 dBA	61.6 dBA	140	62		
*2008/2009	62.4 dBA	59.7 dBA	61.2 dBA	119	75		
**2009/2010	59.8 dBA	55.5 dBA	58.1 dBA	150	72		
**2010/2011	57.9 dBA	55.6 dBA	56.5 dBA	150	52		

*The 2000/2001 - 2008/2009 measurement site was moved to the ground level of the Tahoe Seasons Resort. Previously this site was located at the roof-top of the Tahoe Seasons Resort.

** Noise measurement site moved to USFS property @ northeast corner of Keller and Saddle.

#### Year 2003-2004 Heavenly began Fan Gun Technology

The average measured CNEL value at the 2010/2011 monitoring site was 57.9 dBA when snowmaking operations occurred. This was 1.9 dBA less than the 2009/2010 season, and the second consecutive year it was below 60 dBA CNEL. This level exceeds the 55 dBA CNEL standards for PAS 085 and PAS 087. However, there has been significant progress in reducing snowmaking noise since the introduction of the Fan Technology and improved noise reduction associated with air/water guns. In addition, the measured CNEL values on days without snowmaking operations (55.6 dBA) which also exceeded the 085 and 087 Plan Area CNEL standards. It was still noted that when snowmaking did not occur there was influence from roadway traffic and individuals recreating on
the USFS property where the sound level meter is located.

Figures 2 through 6 graphically show the results of the noise monitoring, as they compare to the TRPA CNEL criterion of 55 dBA for PAS 085 and 087.

Snowmaking can occur over a significant portion of the California side of the mountain. In addition, the array of snowmaking at the California Base can include air/water nozzle and fan-gun type snowmaking equipment. The fan-guns have been found to produce noise levels which are a minimum of 10 dBA less than the traditional air-water nozzle guns, such as Ratnik and Omicron brand snowmaking nozzles. Table 3 summarizes the last nine years of CNEL values for varying types of snowmaking operations.

	Summary Based upon Varyi	T of Measured Noise ing Arrays of Snow	able 3 Levels at the Heav making Operations	enly Base Area at the California B	ase						
Year	Days with Lower Snowmaking Only	Days with Upper Snowmaking Only	Days with Lower Air/Water Nozzles Only	Days with Upper Air/Water Nozzles Only	Days with Lower Fan-Guns Only						
			Logarithmic CNEL								
2001-2002	74.7 dBA	63.7 dBA	72.2 dBA	63.7 dBA	NA ²						
2002-2003	73.0 dBA	63.0 dBA	NA ³	62.8 dBA	NA ²						
2003-2004	61.7 dBA	60.9 dBA	NA ³	60.3 dBA	61.1 dBA						
2004-2005	64.1 dBA	60.3 dBA	66.1 dBA	NA ¹	NA ²						
2005-2006	63.4 dBA	57.6 dBA	NA ³	NA ¹	63.4 dBA						
2006-2007	65.4 dBA	60.2 dBA	NA ³	59.3 dBA	65.2 dBA						
2007-2008	60.6 dBA	61.2 dBA	NA ³	62.0 dBA	60.1 dBA						
2008-2009	64.3 dBA	58.1 dBA	NA ³	63.3 dBA	63.4 dBA						
2009-2010	57.9 dBA	55.7 dBA	NA ³	58.4 dBA	57.9 dBA						
2010-2011	58.8 dBA	52.7 dBA	NA ³	51.9 dBA	58.8 dBA						
${}^{1}NA - No sno{}^{2}NA - No sno{}^{3}NA - No sno$	¹ NA - No snowmaking occurred with strictly Upper Air-Water Nozzles operating. ² NA - No snowmaking occurred with strictly Fan Guns operating. ³ NA - No snowmaking occurred with strictly Lower Air Water Nozzles Only.										

#### Figure 2 2010-106 Heavenly California Base Area Snowmaking Monitoring

Annual Snowmaking Report Summary of CNEL November-10



**NOVEMBER 2010** 

#### Figure 3 2010-106 California Base Area Heavenly Snowmaking Monitoring

Annual Snowmaking Report Summary of CNEL December-10



**DECEMBER 2010** 

#### Figure 4 2010-106 California Base Area Heavenly Snowmaking Monitoring

Annual Snowmaking Report Summary of CNEL January-11



**JANUARY 2011** 

#### Figure 5 2010-106 California Base Area Heavenly Snowmaking Monitoring

Annual Snowmaking Report Summary of CNEL February-11



#### **FEBRUARY 2011**

#### Figure 6 2010-106 California Base Area Heavenly Snowmaking Monitoring

Annual Snowmaking Report Summary of CNEL March-11



**MARCH 2011** 

The CNEL values shown in Table 3 for the 2010/2011 ski season indicate a fairly substantial decrease in noise levels associated with only upper mountain snowmaking operations. However, in review of the data, there were only approximately 10 days when only the upper snowmaking operations occurred. The data indicates that the new base location does separate out a significant contribution of the background traffic noise from the snowmaking noise.

#### Fan Gun Noise Levels

Heavenly has completed the process of converting the California Base snowmaking operations to the use of fan-guns. However, portions of the lower mountain which include the ski runs named Round About and lower Gun Barrel continue to utilize air/water nozzles. The types of fan guns which Heavenly is currently using include SMI Super Polecat. Noise level measurements were conducted on three of the air/water nozzle snowmaking guns on March 24, 2003. The results indicate that noise levels associated with the fan guns are approximately 22 dBA to 25 dBA less than a typical Omicron Whisper Gun or Ratnik Single air/water snowmaking nozzle.

Assuming that the lower California snowmaking fleet could be converted completely to fan gun technology or other low noise technology air/water nozzles, it is expected that a minimum noise level reduction of 3 dBA to 5 dBA can be achieved for all snowmaking operations. During the 2010/2011 ski season, Heavenly reported consistent use of air/water nozzles for snowmaking at the lower portion of the California side. As the upper mountain converts to fan guns, it is not expected that a significant reduction in snowmaking noise levels can be realized at the base areas. However, the upper mountain boundaries will experience significant reductions in overall snowmaking noise levels.

The determining factors on overall noise from the snowmaking system include the types of snowmaking equipment, the number of air/water nozzles or fans operating at any time, and the total hours of operations. If fan gun technology is not capable of producing the amount of snow that the air/water nozzles produce, then snowmaking operations may require an increase in the number of fan guns operating at any one time and/or an increase in hours of operation.

#### **III.5** Snowmaking at Boulder Base Area Noise

### III.5.a Master Plan Mitigation Methods

- 1. Use of fans in place of air/water nozzles or using air/water nozzles which are low noise;
- 2. Re-direction of nozzles and fans to minimize noise exposures at PAS boundaries;
- 3. Reduction in the numbers of nozzles and/or fans;
- 4. Use of setbacks to reduce noise exposures at PAS boundaries;
- 5. Use of noise reduction housings for air/water nozzles;
- 6. Use of barriers at low-mounted air/water nozzles;
- 7. Reduction in snowmaking activities at nighttime;
- 8. Sponsor research into reducing noise produced by snowmaking. This may include support of

industry-wide research activities, specific studies concerning nozzle design sponsored directly by Heavenly, and the study of alternatives in placement of guns and fans at Heavenly.

9. At the Stagecoach and Boulder Bases, Heavenly will strive to replace all air/water nozzles with fans.

#### III.5.b Master Plan Milestone/Product

During the 2010/2011 ski season, Heavenly has conducted short-term noise monitoring at the Boulder Base area. The noise monitoring occurs for short periods of time since the snowmaking only occurs for between 2 and 4 days per year. Heavenly anticipates replacing the air/water nozzles after complete replacement of nozzles with fan guns on the entire California face. Heavenly is investing in low noise technology fan gun and air/water nozzles and anticipates this is the next area for replacement of noisy air/water nozzles. Heavenly has not implemented any of the other mitigation measures listed above.

#### **III.5.c Responsible Party**

Heavenly is responsible for implementing the mitigation measures.

#### III.5.d PAS Criteria

PAS 080 – 50 dB CNEL PAS 082, 085, 086, 087, 088 – 55 dB CNEL PAS 095, PAS 121 – 45 dB CNEL

#### **III.5.e Results of Reporting and Determination of Compliance**

Short-term noise level measurements of snowmaking operations were conducted during the 2010/2011 ski season at the Boulder Base on December 15, 2010. Measured noise levels at this location were approximately 67 dBA Leq during snowmaking operations. Measurements were also conducted at the corner of Jack Circle and Bonnie Court. The measured noise levels were approximately 64 dBA Leq. The results of the ambient noise measurements for the 2010/2011 ski season and previous ski seasons are shown in Table 4. The predicted CNEL value at the Boulder Base is 74dBA. The predicted CNEL value at the Jacks Circle location is 71dBA.

	Ambient Noise Level M	easurements for th	e Boulder Base	Area							
			Measured Sour	d Level, Leq							
Year	Date	Boulder Base	Corner of Jac	k Cir. & Bonnie Ct Site 2							
		Site 1	4         Measured Sound Level, Leq         Measured Sound Level, Leq         er Base         Corner of Jack Cir. & Bonnie Ct Site         te 1       Measured         Measured       Measured for Master I         dBA       63 dBA         dBA       65 dBA         A ¹ NA         dBA       53 dBA         dBA       53 dBA         dBA       65 dBA         dBA       62 dBA         dBA       64 dBA         org this season.       53' 25.81"W)         N - 119° 53' 34.76" W)       Heaster	Measured for Master Plan							
1999-2000	December 14, 1999	70 dBA	63 dBA								
2000-2001	December 14, 2000	73 dBA	65 dBA								
2001-2002	$NA^1$	NA ¹	NA								
2002-2003	February 4, 2003	71 dBA	53 dBA								
2003-2004	December 8, 2003	60 dBA	$NA^1$								
2004-2005	December 3, 2004	66 dBA	58 dBA	65 dBA							
2005-2006	December 13, 2005	71 dBA	64 dBA								
2006-2007	December 28, 2006	68 dBA	63 dBA								
2007-2008	December 31, 2007	67 dBA	65 dBA								
2008-2009	December 24, 2008	67 dBA	65 dBA								
2009-2010	December 15, 2009	68 dBA	62 dBA								
2010-2011	December 15, 2010	67 dBA	64 dBA								
¹ Snowmaking op Boulder Base GI Jack Circle/Bon	¹ Snowmaking operations did not occur at this location during this season. Boulder Base GPS Coordinates (38° 58.3' 3.98" N - 119° 53' 25.81"W) Jack Circle/Bonnie Ct. GPS Coordinates (38° 58' 5.14" N – 119° 53' 34.76" W)										

Currently, the snowmaking operations are out of compliance with the TRPA criteria.

#### III.6 Snowmaking at Stagecoach Base Area Noise

#### III.6.a Master Plan Mitigation Methods

- 1. Use of fans in place of air/water nozzles or air/water guns which are low noise;
- 2. Re-direction of nozzles and fans to minimize noise exposures at PAS boundaries;
- 3. Reduction in the numbers of nozzles and/or fans;
- 4. Use of setbacks to reduce noise exposures at PAS boundaries;
- 5. Use of noise reduction housings for air/water nozzles;
- 6. Use of barriers at low-mounted air/water nozzles;
- 7. Reduction in snowmaking activities at nighttime;
- 8. Sponsor research into reducing noise produced by snowmaking. This may include support of industry-wide research activities, specific studies concerning nozzle design sponsored directly by Heavenly, and the study of alternatives in placement of guns and fans at Heavenly.
- 9. At the Stagecoach and Boulder Bases, Heavenly will strive to replace all air/water nozzles

with fans.

#### III.6.b Master Plan Milestone/Product

During the 2010/2011 ski season, Heavenly has conducted short-term noise monitoring at the Stagecoach Base area. The noise monitoring occurs for short periods of time since the snowmaking only occurs for between 2 and 4 days per year. Heavenly anticipates replacing the air/water nozzles after complete replacement of nozzles with fan guns on the entire California face. Heavenly has not implemented any of the mitigation measures listed above.

#### **III.6.c Responsible Party**

Heavenly is responsible for implementing the mitigation measures.

#### **III.6.d PAS Criteria**

This area is located outside of the TRPA area of influence.

#### **III.6.e** Results of Reporting and Determination of Compliance

Short-term noise level measurements of snowmaking operations were conducted during the 2010/2011 ski season at three locations of the Stagecoach Base, on November 29, 2010. The noise levels during snowmaking operations were 78 dBA Leq at 460 Quaking Aspen, 65 dBA Leq at the entrance to the Eagles Nest, and 58 dBA Leq at the entrance to the Ridge. The average hourly noise levels at the Quaking Aspen location conducted for the development of the Master Plan were between 82 dBA and 92 dBA Leq in 1996. The results of the ambient noise measurements for the 2010/2011 ski season and previous ski seasons are shown in Table 5.

	Aı	Table mbient Noise Leve Stage Coach	e 5 el Measurements Base Area								
			Measured So	und Level, L _{eq}							
Year	Date	460 Quaking Sit	g Aspen Rd. e 3	Entrance to	Eagles Nest						
		Measured	Measured for Master Plan	Site 4	Site 5						
1999-2000	December 4, 1999	87 dBA		62 dBA	78 dBA						
2000-2001	December 11, 2000	86 dBA		56 dBA	72 dBA						
2001-2002	November 30, 2001	57 dBA		55 dBA	59 dBA						
2002-2003	February 2, 2003	83 dBA			70 dBA						
2003-2004	December 8, 2003	87 dBA		58 dBA	74 dBA						
2004-2005	November 30, 2004	81 dBA	82 02 dB A	58 dBA	68 dBA						
2005-2006	December 5, 2005	81 dBA	02-92 UDA	63 dBA	73 dBA						
2006-2007	December 18, 2006	88 dBA		62 dBA	72 dBA						
2007-2008	December 20, 2007	82 dBA		60 dBA	68 dBA						
2008-2009	December 17, 2008	78 dBA		55 dBA	65 dBA						
2009-2010	December 8, 2009	78 dBA		56 dBA	62 dBA						
2010-2011	November 29, 2011	78 dBA		58 dBA	65 dBA						
Quaking Aspen Entrance to Ric Eagles Nest GP	Quaking Aspen GPS Coordinates (38° 57' 37.52" - 119° 53' 16.57" W) Entrance to Ridge GPS Coordinates (38° 57' 46.68" N - 119° 56' 3.68" W) Eagles Nest GPS Coordinates (38° 57' 35.04" N - 119° 53' 23.63" W)										

Using the data collected on November 29, 2011 shown in Table 5, a 24 hour CNEL was calculated for each of the three locations at the Stage Coach Base Area. With continuous snowmaking operations, 24 hour operations at Eagle Nest resulted in a 72 dBA CNEL. The 24 hour operations at 460 Quaking Aspen resulted in a CNEL of 85 dBA. The 24 hour operations at the entrance to The Ridge resulted in a 65 dBA CNEL.

#### **III.7** Snowmaking Upper Mountain Noise

#### **III.7.a Master Plan Mitigation Methods**

In order to reduce overall snowmaking noise the levels, Heavenly shall use fan guns or other similar noise reduction measures for all new snowmaking areas. In addition, where new snowmaking is placed adjacent to existing ski trails with snowmaking, Heavenly shall convert the existing air/water snowmaking nozzles with fan guns or use other similar noise reduction measures to maintain or reduce existing noise levels in that area.

### III.7.b Master Plan Milestone/Product

j.c. brennan & associates, Inc.

Snowmaking noise from the upper mountain areas is monitored and evaluated from the California Base Area permanent noise monitor, and through Remote Plan Area monitoring. The analysis to date indicates that upper mountain snowmaking does not exceed the ambient noise when snowmaking is not occurring. New snowmaking installations are fan guns.

#### **III.7.c Responsible Party**

Heavenly is the responsible party.

#### III.7.d PAS Criteria

PAS 080 – 50 dB CNEL PAS 082, 085, 086, 087, 088 – 55 dB CNEL PAS 095, PAS 121 – 45 dB CNEL

#### **III.7.e Results of Reporting and Determination of Compliance**

See the reporting for the California Base Area. The following provides results of the Remote Plan Area Noise Measurements

j.c. brennan & associates, Inc., conducted noise level measurements of snowmaking operations at one remote Plan Area locations February 1, 2011. The noise measurement location the area identified as "Party Rock" (Noise Measurement Site 7) located within Plan Area 080, noise measurements were not conducted at the upper mountain remote area in Plan Area 095, which is generally located adjacent to the ski area boundary, and southeast of Liz's and Canyon Runs (Noise Measurement Site 6). This was due to the fact that upper mountain snowmaking did not occur in this area due to the generous amount of natural snow during this ski season. The noise level measurements at Party Rock (Site 7) were conducted to determine if snowmaking operations at the lower mountain and base areas (which included 29 fan guns) would exceed the applicable standards.

The results of the noise measurements and field observations were that the snowmaking operations were barley audible and were not discernable above the background ambient noise levels.

GPS coordinates for the Remote Plan Area measurements sites are as follows:

Party Rock (38° 56' 27.63" N - 119° 56' 1.35" W); Liz's / Canyon Run (38° 54' 47.5" N - 119° 54' 43" W).

Noise levels do not exceed the Plan Area 080 criteria.

j.c. brennan & associates, Inc.

#### **III.8** Rock Busting Noise

#### **III.8.a Master Plan Mitigation Methods**

Rock busting generally occurs through the use of explosives and blasting. Control the number, size and location of Rock Busting blasts.

#### **III.8.b Master Plan Milestone/Product**

None

#### **III.8.c Responsible Party**

Heavenly is the responsible party.

#### **III.8.d PAS Criteria**

PAS 080 – 50 dB CNEL PAS 082, 085, 086, 087, 088 – 55 dB CNEL PAS 095, PAS 121 – 45 dB CNEL

#### **III.8.e Results of Reporting and Determination of Compliance**

Heavenly has not contacted j.c. brennan & associates, Inc. to conduct noise measurements of blasting or rock busting. It is assumed that this activity has not occurred.

#### **III.9** Amphitheater Operations Noise

#### **III.9.a Master Plan Mitigation Methods**

Restrict hours of concert noise to the daytime and early evening hours. This is consistent with the hours of operations assumed for the amphitheater noise study. In addition, concerts should not extend more than 6 hours in duration.

#### **III.9.b Master Plan Milestone/Product**

Heavenly has conducted a concert simulation and amphitheater noise study.

#### **III.9.c Responsible Party**

Heavenly is the responsible party

#### III.9.d PAS Criteria.

j.c. brennan & associates, Inc.

PAS 080 – 50 dB CNEL PAS 082, 085, 086, 087, 088 – 55 dB CNEL PAS 095, PAS 121 – 45 dB CNEL

#### **III.9.e** Results of Reporting and Determination of Compliance

No concerts have occurred to date.

#### Appendix A

#### Acoustical Terminology

- **Ambient Noise** The distinctive acoustical characteristics of a given space consisting of all noise sources audible at that location. In many cases, the term ambient is used to describe an existing or pre-project condition such as the setting in an environmental noise study.
- Attenuation The reduction of an acoustic signal.
- **A-Weighting** A frequency-response adjustment of a sound level meter that conditions the output signal to approximate human response.
- **Decibel or dB** Fundamental unit of sound, A Bell is defined as the logarithm of the ratio of the sound pressure squared over the reference pressure squared. A Decibel is one-tenth of a Bell.
- **CNEL** Community Noise Equivalent Level. Defined as the 24-hour average noise level with noise occurring during evening hours (7 10 p.m.) weighted by a factor of three (+5 dB for TRPA calculations) and nighttime hours weighted by a factor of 10 (or +10 dB) prior to averaging.
- **Frequency** The measure of the rapidity of alterations of a periodic signal, expressed in cycles per second or hertz.
- Ldn Day/Night Average Sound Level. Similar to CNEL but with no evening weighting.
- Leq Equivalent or energy-averaged sound level.
- Lmax The highest root-mean-square (RMS) sound level measured over a given period of time.
- L(n) The sound level exceeded a described percentile over a measurement period. For instance, an hourly L50 is the sound level exceeded 50% of the time during the one hour period.
- Loudness A subjective term for the sensation of the magnitude of sound.
- Noise Unwanted sound.
- Peak Noise
   The level corresponding to the highest (not RMS) sound pressure measured over a given period of time. This term is often confused with the "Maximum" level, which is the highest RMS level.
- $\mathbf{RT}_{60}$  The time it takes reverberant sound to decay by 60 dB once the source has been removed.
- Sabin
   The unit of sound absorption. One square foot of material absorbing 100% of incident sound has an absorption of 1 sabin.

   Threshold
   The unit of sound absorption of 1 sabin.
- of Hearing
   The lowest sound that can be perceived by the human auditory system, generally considered to be 0 dB for persons with perfect hearing.

   Threshold
   The lowest sound that can be perceived by the human auditory system, generally considered to be 0 dB for persons with perfect hearing.
- of Pain Approximately 120 dB above the threshold of hearing.
- Impulsive Sound of short duration, usually less than one second, with an abrupt onset and rapid decay.
- **Simple Tone** Any sound which can be judged as audible as a single pitch or set of single pitches.



**Appendix B** 2010-106 Heavenly Snowmaking Monitoring

Annual Snowmaking Report Summary of CNEL November-10

				Nev	ada				Ca	alifor	nia		
Day	CNEL dB	Snow	Up	per	Lo	wer	Up	per	Lo	wer	Base	York	
			Α	F	Α	F	Α	F	Α	F	F		CNEL Average
1-Nov	0.0	Ν											No Snowmaking 48.9
2-Nov	49.1	Ν											Snowmaking 58.6
3-Nov	49.7	Ν											Total 57.4
4-Nov	47.5	Ν											
5-Nov	49.1	N											Set up Meter
6-Nov	47.0	N											# of No Snowmaking Days 8
7-Nov	57.6	Y	60	6									# of Snowmaking Days 22
8-Nov	45.5	Y	60	6									Total Days of Monitoring 30
9-Nov	46.4	Y	72	12			12	1					
10-Nov	47.2	Y	74	12				1					1
11-Nov	46.2	Y	84	15				1					1
12-Nov	46.8	Y	80	15				1					1
13-Nov	48.0	Y	82	15									1
14-Nov	47.7	Y	74	12									1
15-Nov	46.6	N											1
16-Nov	48.4	Y	70	15			6	1					1
17-Nov	47.9	Y	70	15			6	1					1
18-Nov	54.7	N											1
19-Nov	57.8	Y	52	12			26	3					1
20-Nov	60.2	Y	52	12			26	3					1
21-Nov	62.3	Y	38	11			20	3		12			1
22-Nov	62.7	Y	60	11			36	3		12			1
23-Nov	64.5	Y	50				38	3		11			1
24-Nov	61.1	Y	44	10			34	2	4	7			1
25-Nov	60.5	Y	51	10			20			3			1.
26-Nov	56.7	Y	52	10			18			3			1
27-Nov	58.5	Y	40	10			20		4	3			1
28-Nov	61.2	Y	44	10				1	9	11			1
29-Nov	60.1	Y	66	10			16			10			1
30-Nov	59.6	Y		9	36		28	2		11			]

* A- Air Nozzles F- Fan Guns No Snowmaking Log Available Snowmaking Meter Downtime/Incomplete Data

j.c. brennan & associates

#### Appendix B

2010-106

Heavenly Snowmaking Monitoring

Annual Snowmaking Report Summary of CNEL Dec-10

				Nev	ada					California			
Day	CNEL dB	Snow	Up	per	Lo	wer	Up	per	Lo	wer	Base	York	
			Α	F	Α	F	Α	F	Α	F	F		CNEL Average
1-Dec	50.3	Ν											No Snowmaking 51.
2-Dec	50.9	Ν											Snowmaking 54.
3-Dec	50.9	Ν											Total 53.
4-Dec	51.8	Ν											
5-Dec	52.9	Y		6			26	1					
6-Dec	54.5	Y		6			26	1					# of No Snowmaking Days 1
7-Dec	49.4	Y		6			60						# of Snowmaking Days 1
8-Dec	53.5	Y					60						Total Days of Monitoring 3
9-Dec	53.2	Ν											
10-Dec	54.7	Ν											
11-Dec	49.7	Ν											
12-Dec	50.6	Ν											
13-Dec	51.6	Ν											
14-Dec	60.3	Y		10		22	12	2	22	14			
15-Dec	55.2	Y		10		22	12	2	22	14			
16-Dec	55.4	Y	22	6	56		14		22	18			
17-Dec	51.9	Y	22	6	58	1	12			13			
18-Dec	47.2	Ν											
19-Dec	53.6	Ν											
20-Dec	47.9	Ν											
21-Dec	49.4	Y	30				16						
22-Dec	46.3	Y	30				16						
23-Dec	53.1	Y	30				22						
24-Dec	48.8	Y	30				28						
25-Dec	49.3	Ν											
26-Dec	51.2	Y					40						
27-Dec	52.5	Y					62						
28-Dec	49.3	Y	30				38						
29-Dec	47.9	Y	30										
30-Dec	60.0	Y	26				28			11			
	57.0	Y	26				38			11			

snowmaking Log Ava Snowmaking Meter Downtime/Incomplete Data



### **Appendix B** 2010-106

Heavenly Snowmaking Monitoring

Annual Snowmaking Report Summary of CNEL January-11

			Ne	vada				Cal			nia		
		Snow	Up	per	Lo	wer	Up	per	Lo	wer	Base	York	
Day	CNEL dB		Α	F	Α	F	Α	F	Α	F	F		CNEL Average
1-Jan	56.0	Y	34				38			11			No Snowmaking 53.
2-Jan	53.1	Y	34				38						Snowmaking 58.
3-Jan	56.0	Y	30				34			13			Total 55.8
4-Jan	62.3	Y	30				38		20	14			
5-Jan	56.0	Y	30				28		16	13			
6-Jan	60.8	Y	30				28		16	17			# of No Snowmaking Days 2
7-Jan	60.6	Y	30				28			16			# of Snowmaking Days
8-Jan	51.7	N											I otal Days of Monitoring 30
9-Jan	53.6	N											-
10-Jan	52.5	N											4
11-Jan	46.3	N											4
12-Jan	49.9	N											4
13-Jan	51.1	IN N											4
14-Jan	52.1	IN N											4
15-Jan	55.0	IN N											
16-Jan	51.7	IN N											4
17-Jan	52.7	IN N											4
10-Jan	51.3	IN V								15			
19-Jan 20 Jan	54.9 60.0	ř V								15			-
20-Jan	52.0	ř N								15			
21-Jan	52.9	IN N											
22-Jan	54.0	N											-
20-Jan 24- Jan	50.8	N											-
24-Jan 25- Jan	49.0	N											-
26- Jan	49.0	N											-
27-Jan	47.9	N											-
28-Jan	53.1	N											4
29-Jan	53.5	N											
30-Jan	58.2	N											
31-Jan	56.9	N											
			* A- F- No S Snov	Air No Fan ( Snowr wmak er Dov	ozzle: Guns nakin ing wntim	s ig Loç ie/Inc	g Ava	ilable ete D	ata				
										I			
											Ш	_	
											Ų	j.c.	brennan & associates <i>Monsultants in acoustics</i>

## **Appendix B** 2010-106

Heavenly Snowmaking Monitoring

Annual Snowmaking Report Summary of CNEL February-11

			Nev	vada					Ca	alifor	nia		
		Snow	Up	per	Lo	wer	Up	per	Lo	wer	Base	York	
Day	CNEL dB		Α	F	Α	F	Α	F	Α	F	F		CNEL Average
1-Feb	62.7	Y								1			No Snowmaking 57.3
2-Feb	61.0	Y								1			Snowmaking 61.1
3-Feb	58.5	Y								1			Total 57.9
4-Feb	49.6	Ν											
5-Feb	53.7	Ν											
6-Feb	57.3	Ν											# of No Snowmaking Days 24
7-Feb	53.7	Ν											# of Snowmaking Days 3
8-Feb	56.6	Ν											Total Days of Monitoring 27
9-Feb	49.9	Ν											
10-Feb	47.5	Ν											
11-Feb	48.3	Ν											
12-Feb	51.6	Ν											
13-Feb	49.4	Ν											
14-Feb	62.2	Ν											
15-Feb	64.2	Ν											
16-Feb	61.0	Ν											
17-Feb	55.3	Ν											
18-Feb	57.0	Ν											
19-Feb	56.6	Ν											
20-Feb	57.6	Ν											
21-Feb	52.8	Ν											
22-Feb	49.8	Ν											
23-Feb	52.5	Ν											
24-Feb	58.3	Ν											]
25-Feb	61.3	N											
26-Feb	58.3	Ν											7
27-Feb	51.0	Ν											7
28-Feb	51.5	N											7

* A- Air Nozzles F- Fan Guns No Snowmaking Log Available Snowmaking

j.c. brennan & associates

## **Appendix B** 2010-106

Heavenly Snowmaking Monitoring

Annual Snowmaking Report Summary of CNEL March-11

			Ne	vada	L		Californi		nia				
		Snow	Up	per	Lo	wer	Up	per	Lo	wer	Base	York	
Day	CNEL dB		Α	F	Α	F	Α	F	Α	F	F		CNEL Average
1-Mar	56.0	Ν											No Snowmaking 57.0
2-Mar	57.4	Ν											Snowmaking #DIV/0!
3-Mar	56.9	Ν											Total 57.0
4-Mar	48.9	Ν											
5-Mar	51.6	Ν											
6-Mar	52.8	Ν											# of No Snowmaking Days 31
7-Mar	55.4	Ν											# of Snowmaking Days 0
8-Mar	49.3	Ν			-								Total Days of Monitoring 31
9-Mar	46.9	Ν			-								
10-Mar	58.0	Ν											
11-Mar	59.1	Ν			-								
12-Mar	51.7	Ν											
13-Mar	52.6	Ν											
14-Mar	58.7	N											
15-Mar	56.8	N											
16-Mar	60.5	N											
17-Mar	52.3	N											
18-Mar	57.7	N											
19-Mar	60.0	N											
20-Mar	58.1	N											
21-Mar	55.8	N											
22-Mar	53.2	N											
23-Mar	53.3	N											
24-Mar	59.5	N											
25-Mar	59.6	N											
26-Mar	62.5	N											
27-Mar	61.8	N											
28-Mar	56.0	N											
20-Mar	49.4	N											
30-Mar	52.4	N											
30-Mar	50.5	N											
31-IVIAI	50.5	IN									I		ļ
			* A- F- No	Air No Fan ( <mark>Sn</mark>	ozzle: Guns I <mark>OW</mark>	s <mark>ma</mark> l	king	, in	Ma	rch	201	1	l
												• 1	
											Ų	J.C.	Consultants in acoustics

### 2010-106 Heavenly Snowmaking Monitoring CNEL Summary

		CN	EL Averages	6		
	November	December	January	February	March	Average for Measurment Period
Total	57.4	53.5	55.8	57.9	57.0	56.5
Snowmaking	58.6	54.6	58.9	61.1	0.0	57.9
No Snowmaking	48.9	51.4	53.1	57.3	57.0	55.6

	November	December	January	February	March	Total
# of Snowmaking Days	22	18	9	3	0	52
Total Days of Monitoring	30	31	30	27	31	149

Annual Snowmaking CNEL (dB) 49.4

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# Appendix XI 2010-2011 Ski Shuttle and Route Schedule

Sche	edules are in effect between 8:00 a.m. and 2:00 p.m. After	2:00 p.m. bu	ises on	ly disc	harge from	m lodges or Stateline Transit Center to lodging facilities until approximately 6:00 J	p.m.
1	RED ROUTE 10 M	INUTES PAS	T THE H	IOUR	1.24	GOLD ROUTE 13 MINUTES PAST THE HO	DUR
	Begins at Stateline Transit 8:00					Begins Route at L.T.V.R. 8:00	
1	Stateline Transit Center (Departure)		:00	:30	12	L.T.V.R. (Departure) :00	:30
4	US Highway 50/Holiday Inn Express		:02	:32	23	Ski Run Boulevard/Employee Parking :01 :	:31
5	US Highway 50/Tahoe Beach & Ski		:05	:35	24	Ski Run Boulevard/Alder Inn :02	:32
6	US Highway 50/Lakeland Village		:06	:36	25	Ski Run Boulevard/Discount Ski :02	:32
7	Lakeshore Lodge & Spa		:08	:38	26	Ski Run Boulevard/Across from Rainbow Mountain :03	:33
8	US Highway 50/Best Western Timber Cove Lodo	le	:10	:40	27	Ski Run Boulevard/Black Bear Inn :04	:34
9	Inn By The Lake		:12	:42	28	Pioneer Trail & Ski Run Blvd :05	:35
10	US Highway 50/Johnson Boulevard (Safeway)		:14	:44	29	Heavenly California Lodge (Arrival) :08	:38
11	US Highway 50/Super 8 Motel		:16	:46	29	Heavenly California Lodge (Departure) :10	:40
12	LTVR (Arrival)		:18	:48	30	Ski Run Boulevard/Inn at Heavenly :12	:42
12	LTVR (Departure)		:20	:50	5	US Highway 50/Tahoe Beach & Ski :15	:45
13	US Highway 50/Fantasy Inn		.21	:51	6	US Highway 50/Lakeland Village :16	:46
14	US Highway 50/Quality Inn		.23	.53	7	Lakeshore Lodge & Spa :17	:47
1	Stateline Transit Conter (Arrival)		.25	.55	8	US Highway 50/Best Western Timber Cove Lodge :19	:49
este	Statenne fransit Center (Arrivar)		.20	.00	a	Inn By The Lake (Fremont Ave)	51
					10	US Highway 50/ Johnson Blvd (Safeway) 23	.53
				_	22	Bayarian Village (Herbert Ave) Service upon regu	lest
	ORANGE ROUTE 11 N	IINUTES PAS	IT THE	HOUR	11	US Highway 50/Super 8 Motel	.55
	Begins at Stateline Transit and Heavenly Cali	fornia Loc	lge at	8:00	10	LTVP (Arrival) 27	.57
1	Stateline Transit Center (Departure)		:00	:15	12	L.I.V.R.(Allival)	.07
2	Bellamy Court/Forest Suites Resort		:01	:16	1 State	PURPLE ROUTE 14 MINUTES PAST THE HO	OUR
3	Heavenly Village Way/Shops at Heavenly Village	•	:02	:17		Begins at Heavenly Boulder Lodge at 8:15	and the second s
15	Pioneer Trail/7-Eleven		:04	:19	41	Heavenly Boulder Lodge :15	:45
36	Pioneer Trail/Americana Village		:05	:20	42	Heavenly Stagecoach Lodge :25	:55
37	Pioneer Trail/Keller Avenue (West)		:06	:21	43	The Ridge Resorts Clubhouse* :30	:00
28	Ski Run Boulevard/Pioneer Trail		:08	:23	42	Heavenly Stagecoach Lodge :35	:05
29	Heavenly California Lodge (Arrival)		.12	.27	41	Heavenly Boulder Lodge :45	:15
29	Heavenly California Lodge (Departure)		.15	:30	*56	ervice to The Ridge Resorts begins at 8:30 a.m.	
30	Ski Run Boulevard/Inp. at Heavenly		.19	:34			_
32	Pioneer Trail/Keller Avenue (East)		.21	:36		BLUE ROUTE 15 MINUTES PAST THE HO	OUR
33	Pioneer Trail/Aspenwald Road		.22	.37	·	Begins at Stateline Transit at 8:00	
34	Pioneer Trail/Asperiwald Road		.23	.38	1	Stateline Transit Center (Departure) :00	:30
25	Pioneer Trail/Meas Read		.20	.30	38	Lakeside Inn & Casino :05	:35
1	Stateling Transit Cantor (Arrival)		.24	.00	40	State Route 207/Mott Canyon :07	:37
-	Stateline Transit Center (Arrival)		.21	.42	41	Heavenly Boulder Lodge (Arrival) :15	:45
43.4	GREEN ROUTE 12	<b>MINUTES PAS</b>	ST THE	HOUR	41	Heavenly Boulder Lodge (Departure) :20	:50
	Begins at Stateline Transit 8:00				42	Heavenly Stagecoach Lodge (Arrival) :30	:00
1	Stateline Transit Center (Departure)	:00	:20	:40	42	Heavenly Stagecoach Lodge (Departure) :35	:05
18	Harrah's East Retail Entrance	:02	:22	:42	44	State Route 207/Scotty's Hardware :48	:18
19	MontBleu Resort Casino & Spa (Arrival)	:05	:25	:45	38	Lakeside Inn & Casino :50	:20
19	MontBleu Resort Casino & Spa (Departure)	:08	:28	:48	1	Stateline Transit Center (Arrival) :55	:25
20	Horizon Casino Resort	:10	:30	:50			
	Service to Roadway Inn	Service up	on rec	uest		VIOLET BOUTE ANY	
	Best Tahoe West Inn	Service up	on rec	uest		VIOLET ROUTE 18X	
	Best Western and Royal Valhalla	Service un	on rec	uest	43	The Ridge Resorts Clubhouse	
21	Harvey's Rus Center	:13	:33	:53		a.m. 8:00 8:15 8:30 8:45 9:00 9:15 9:30 9:45 10:00	
21	Harvey's Bus Center (Departure)	.15	.35	.55		p.m. 3:00 3:15 3:30 3:45 4:00 4:15 4:30 4:45 5:00	
1		.10	.00	.00	10	Heavenly Stagecoach Lodge	

Stateline Transit Center (Arrival)

:38 :58

:18

Important Information These times are approximate and may vary due to road conditions, weather, traffic conditions and other unforeseen circumstances. BlueGO assumes no responsibility for acts or omissions of others, or for lost or stolen or damaged baggage or other personal articles, or for personal items left behind. Time tables shown are approximate and not guaranteed. Passengers should allow extra time for delays.

If you have any questions about BlueGO Heavenly Ski Shuttles, please call:

(530) 541-7149 ext. 0 www.bluego.org

	Begins Route at L.T.V.R. 8:00		
12	L.T.V.R. (Departure)	:00	:30
23	Ski Run Boulevard/Employee Parking	:01	:31
24	Ski Run Boulevard/Alder Inn	:02	:32
25	Ski Run Boulevard/Discount Ski	:02	:32
26	Ski Run Boulevard/Across from Rainbow Mountain	:03	:33
27	Ski Run Boulevard/Black Bear Inn	:04	:34
28	Pioneer Trail & Ski Run Blvd	:05	:35
29	Heavenly California Lodge (Arrival)	:08	:38
29	Heavenly California Lodge (Departure)	:10	:40
30	Ski Run Boulevard/Inn at Heavenly	:12	:42
5	US Highway 50/Tahoe Beach & Ski	:15	:45
6	US Highway 50/Lakeland Village	:16	:46
7	Lakeshore Lodge & Spa	:17	:47
8	US Highway 50/Best Western Timber Cove Lodge	:19	:49
9	Inn By The Lake (Fremont Ave)	:21	:51
10	US Highway 50/Johnson Blvd (Safeway)	:23	:53
22	Bavarian Village (Herbert Ave) Service u	pon req	uest
11	US Highway 50/Super 8 Motel	:25	:55
12	L.T.V.R.(Arrival)	:27	:57
12E	PURPLE ROUTE 14 MINUTES P	AST THE H	IOUR
	Begins at Heavenly Boulder Lodge at 8:15		
41	Heavenly Boulder Lodge	:15	:45
42	Heavenly Stagecoach Lodge	:25	:55
43	The Ridge Resorts Clubhouse*	:30	:00
42	Heavenly Stagecoach Lodge	:35	:05
41	Heavenly Boulder Lodge	:45	:15
*Se	rvice to The Ridge Resorts begins at 8:30 a.m.		
	BLUE ROUTE 15 MINUTES P	AST THE H	HOUR
	Begins at Stateline Transit at 8:00		
1	Stateline Transit Center (Departure)	:00	:30
38	Lakeside Inn & Casino	:05	:35
40	State Route 207/Mott Canyon	:07	:37
41	Heavenly Boulder Lodge (Arrival)	:15	:45
41	Heavenly Boulder Lodge (Departure)	.20	:50
42	Heavenly Stagecoach Lodge (Arrival)	.30	.00
42	Heavenly Stagecoach Lodge (Departure)	.30	.00
44	State Roule 20//Scolly's Hardware	.40	.10
30	Stateline Transit Center (Arrival)	:55	.20
1	Stateline Hansit Center (Anval)	.00	.20
and so its	VIOLET BOUTE 48Y	and the second second	
12	The Ridge Resorts Clubhouse		
40	a.m. 8:00 8:15 8:30 8:45 9:00 9:15 9:30 9:45 10:0	0	
	p.m. 3:00 3:15 3:30 3:45 4:00 4:15 4:30 4:45 5:0	0	

10 1	110 1 110	goin	000110	orubi	10000					
	a.m.	8:00	8:15	8:30	8:45	9:00	9:15	9:30	9:45	10:00
	p.m.	3:00	3:15	3:30	3:45	4:00	4:15	4:30	4:45	5:00
42 H	leaven	ly Sta	gecoa	ach Lo	odge					
	a.m.	8:08	8:23	8:38	8:53	9:08	9:23	9:38	9:53	10:08
	p.m.	3:08	3:23	3:38	3:53	4:08	4:23	4:38	4:53	5:08
43 T	he Rid	lge Re	esorts	Club	nouse					
	a.m.	8:13	8:28	8:43	8:58	9:13	9:28	9:43	9:58	
	n.m.	3:13	3:28	3:43	3:58	4:13	4:28	4:43	4:58	

THE The Violet Route 18X only operates between 8:00 a.m. to 10:00 a.m. and again from 3:00 p.m. to 5:00 p.m. Between 11:00 am and 2:00 pm utilize Purple Route 14 for RESORTS service to Heavenly Stagecoach Lodge.

Times listed are departure times. Buses only stop at designated bus stops. No flag stops or deviations allowed.





Heavenly is a proud partner with the Tahoe Regional Planning Agency, Tahoe Transportation District and BlueGO Transit Management Inc. Together we are working to replace the bus fleet with new clean-fuel technology vehicles. The new vehicles will not only improve air quality and reduce congestion in South Lake Tahoe, but they will directly improve the water quality and clarity of Lake Tahoe.

#### Heavenly is pleased to be associated with a select group of corporate partners

XPRES WATER The Official Sports The Official Card of Heavenly Beverage of Heavenly







The Official Coffee of Heavenly





#### **BLUEGO HEAVENLY SKI SHUTTLE**

The BlueGO Heavenly Ski Shuttle service is comprised of seven routes (red, green, gold and orange for California and blue, purple, and violet for Nevada). The shuttles pick up at each of the shuttle stops according to the shuttle timetables listed for each route color.

The time tables are in service from 8:00 a.m. - 2:00 p.m. After 2:00 p.m. the shuttles make continuous loops from the Gondola and California / Nevada base lodges to expedite guest return to their lodging properties until approximately 6:00 p.m.

Please allow extra time when riding shuttles during holidays and Saturdays, as the shuttles are in peak demand during these high-use periods. Shuttles also need extra time during inclement weather, as visibility and slippery road conditions require extra caution and slower speeds. BLUE

Look for the white BlueGO Heavenly Ski Shuttle stop signs to board the shuttles.

#### **GONDOLA SHUTTLE OPERATION**

In the event the gondola is not operating (due to mechanical or weather issues), the red routes will go to the California Lodge.

530-541-714

To the "Y", Emerald Bay,

At the end of the day, be sure to board a shuttle with the correct colored sign. Shuttles display colored signs near their entry doors or displayed overhead on the designation sign.

> If you have any questions about BlueGO Heavenly Ski Shuttles, please call: (530) 541-7149 ext. 0

www.bluego.org



Transit services are provided by BlueGo Transit Management, Inc under contract to the Tahoe Transportation District.

#### FOR ADDITIONAL MOUNTAIN RESORT **INFORMATION CONTACT:**

Heavenly Mountain Resort www.skiheavenly.com (775) 586-7000 Information updated as ski or weather conditions change.



## Lake Tahoe

#### **Route Key**

Orange Route 11 - Express service between Gondola Base, Stateline Transit Center and California Lodge via Pioneer Trail Green Route 12 - Casino area to Gondola Base and Stateline Transit Center d Route 13 - California Lodge to Ski Run Blvd. and U.S. Hwy 50 Purple Route 14 - The Ridge Resorts to Boulder Lodge and Stagecoach Lodges, Nevada Blue Route 15 - Gondola Base and Stateline Transit Center through Casino area to Boulder and Stagecoach Lodges, Nevada Violet Route 18X - The Ridge Resorts



at 202-720-2600 (voice and TDD.)

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	and the second sec
	The state
	Heavenly Boulder Lodge
	Heavenly Stagecoach
59	Contraction (1)
7.0	Tarre
ing Incleme	ont weather as road conditions may limit operations.
ns	P Parking
vhen returning to	o your lodge.
ige Q	Ski Run Blvd / Alder Inn Ski Run Blvd / Discount Ski
	Ski Run Blvd / Across From Rainbow Mountain Ski Run Blvd / Deerfield Lodge & Black Bear Inn
	Ski Run Bivd / Pioneer Trail     Heavenly California Lodge
.odge	Ski Run Bivd / Willow Avenue
8	Pioneer Trail / Keller Road (East) Pioneer Trail / Aspenwald Road
	<ul> <li>Pioneer Trail / Glen Road</li> <li>Pioneer Trail / Moss Road</li> </ul>
	Pioneer Trail / Americana Village     Pioneer Trail / Keller Road (West)
only)	Lakeside Inn & Casino Side Entrance     U.S. Highway 50 / Lakeside Inn & Casino
only)	Lakeside Inn & Casino Side Entrance U.S. Highway 50 / Lakeside Inn & Casino State Route 207 / Mott Canyon Tavern
Dnly)	Lakeside Inn & Casino Side Entrance U.S. Highway 50 / Lakeside Inn & Casino State Route 207 / Mott Canyon Tavern Heavenly Boulder Lodge Heavenly Stagecoach Lodge
only)	Lakeside Inn & Casino Side Entrance U.S. Highway 50 / Lakeside Inn & Casino State Route 207 / Mott Canyon Tavern Heavenly Boulder Lodge Heavenly Stagecoach Lodge The Ridge Resorts Clubhouse State Route 207 / Scotty's Hardware
SDA Fores	Lakeside Inn & Casino Side Entrance U.S. Highway 50 / Lakeside Inn & Casino State Route 207 / Mott Canyon Tavern Heavenly Boulder Lodge Heavenly Stagecoach Lodge The Ridge Resorts Clubhouse State Route 207 / Scotty's Hardware
SDA Fores ms on the l us. (Not all , U.S. Depa	Lakeside Inn & Casino Side Entrance U.S. Highway 50 / Lakeside Inn & Casino State Route 207 / Mott Canyon Tavern Heavenly Boulder Lodge Heavenly Stagecoach Lodge The Ridge Resorts Clubhouse State Route 207 / Scotty's Hardware t Service Lake Tahoe Basin Management Unit. The basis of race, color, national origin sex, religion, age prohibited bases apply to all programs.) To file a urment of Agriculture, U.S. Department of Agriculture,
SDA Fores ms on the l us. (Not all, , U.S. Depa ersons wit he print, au	<ul> <li>Lakeside Inn &amp; Casino Side Entrance</li> <li>U.S. Highway 50 / Lakeside Inn &amp; Casino</li> <li>State Route 207 / Mott Canyon Tavern</li> <li>Heavenly Boulder Lodge</li> <li>Heavenly Stagecoach Lodge</li> <li>The Ridge Resorts Clubhouse</li> <li>State Route 207 / Scotty's Hardware</li> </ul> t Service Lake Tahoe Basin Management Unit. The basis of race, color, national origin sex, religion, age prohibited bases apply to all programs.) To file a urment of Agriculture, U.S. Department of Agriculture, h disabilities who require alternative means for diotape, etc.) should contact USDA's TARGET center

## Appendix XII Heavenly 2010-2011 Survey Results

#### What is your current employment classification?

Answer Options	Response Percent	Response Count
Seasonal	63.2%	120
Year-Round	37.4%	71
	answered question	190

Which of the following categories best describes your current residence?

Answer Options	Response Percent	Response Count
House	62.1%	118
Duplex	10.0%	19
Triplex/Fourplex	3.2%	6
Townhouse/Condominium	5.3%	10
Apartment	14.2%	27
Mobile Home	3.2%	6
Employee Housing	4.2%	8
Other	1.1%	2
Other (please specify)		2
	answered question	190
Do you own or rent your current resident	ce?	
Answer Options	Response Percent	Response Count
Own	28.4%	54
Rent	72.1%	137
	answered question	190
Where do you live?		
Answer Options	Response Percent	Response Count
South Lake Tahoe	69.5%	132
Meyers/ Tahoe Paradise	6.8%	13
Stateline/ Kingsbury Grade area	10.5%	20
Zephyr Cove area	5.8%	11
Minden/ Gardnerville	5.8%	11
Carson City	2.6%	5
Other	1.1%	2
Other (please specify)		3
	answered question	190

How many people including yourself live	e in your household?	
Answer Options	Response Percent	Response Count
1	10.0%	19
2	39.5%	75
3	18.9%	36
4	20.5%	39
5	3.2%	6
6 or more	7.9%	15
	answered question	190
How many bedrooms are in your curren	t residence?	Desmanas Osumt
	4.2% 9.0%	8
	8.9%	17
2	31.0%	60 76
3	40.0%	70
4	14.2%	27
	1.1%	2
6 or more	0.0%	U 100
	answered question	190
BENTERS: How much do YOU current	ly pay for rent?	
Answer Options	Response Percent	Response Count
less than \$299	10 5%	20
\$300 - \$499	25.8%	20 49
\$500 - \$699 \$500 - \$699	12.6%	-3
\$700 - \$899	9.5%	18
\$900 - \$1099	8.4%	16
more than \$1100	8.9%	17
Not Applicable	26.3%	50
	answered question	190
	unenereu queenen	
OWNERS: How much is YOUR current	mortgage payment on you	r residence?
Answer Options	Response Percent	Response Count
less than \$399	2.1%	4
\$400 - \$599	1.6%	3
\$600 - \$799	2.6%	5
\$800 - \$999	3.2%	6
\$1000 - \$1199	4.7%	9
	,	
more than \$1200	15.8%	30
Not Applicable	15.8% 70.0%	30 133

How satisfied are you with your existing	housing situation?	
Answer Options	Response Percent	Response Count
Very Satisfied	43.2%	82
Somewhat Satisfied	34.2%	65
Neutral	10.5%	20
Somewhat Unsatisfied	10.0%	19
Very Unsatisfied	2.6%	5
	answered question	190
How would you rate the availability of ho	ousing in your community?	
Answer Options	Response Percent	Response Count
Very Good	9.5%	18
Good	36.8%	70
Neutral	36.3%	69
Poor	15.8%	30
Very Poor	3.2%	6
	answered question	190
How do you rate your cost of housing?		
Answer Options	Response Percent	Response Count
Very Good	16.3%	31
Good	39.5%	75
Neutral	23.7%	45
Poor	14.7%	28
Very Poor	6.3%	12
	answered question	190
Do you have a Car?		
Answer Options	Response Percent	Response Count
Yes	80.5%	153
No	19.5%	37
	answered question	190
How do you normally get to work?		
Answer Options	Response Percent	Response Count
Drive	69.5%	132
Truck	10.5%	20
Ride the Bus	21.6%	41
Walk/ Bike	13.2%	25
Other	1.1%	2
Other (please specify)		4
	answered question	190

# Appendix XIII Forest Service Letter of Completion for Old Growth Forest Mitigation

	United States	Forest	Lake Tahoe Basin	35 College Drive
	Department of	Service	Management Unit	South Lake Tahoe, CA 96150
~	Agriculture			530 543-2600

File Code:

Date: March 19, 20)9

Andrew Strain Heavenly Mountain Resort PO Box 2180 Stateline, NV 89449

Dear Andrew,

The High Meadows stand identified for hand thinning to improve long-term habitat conditions for northern Goshawk per the Heavenly Master Plan Amendment was treated in the fall of 2007. All contract work was completed and accepted per the contract requirements on December 6 2007. I will fax you the signed copies of the Certificate of Final Inspection and the Contract Release for this project for your records. If you have questions, please give me a call at (530) 543-2687.

Sincerely,

SCOTT PARSONS Contracting Officer's Representative

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Robert Guebard	Contracting Officer's Representative	12-6-0 '
	E [	
copy of the inspection report is enclosed.		
e last day on which work was performed was <u>12-6-</u> e All materials have been furnished, all the work h ntract in accordance with its terms has been comple	07 after which no calendar days should be chass been performed, and all the construction etcd.	narged agai ist required by the
ereby certify that the final inspection of the work un	der the above contract was made on <u>12-6-07</u>	
Matthew Gagnon CONTRACTING OFFICER	18985C Road 256 Exeter, CA 93221	
	Central Valley Forestry	
	South Shore hand Thin 2007	
CERTIFICATE OF FINAL INSPECTION (Reference FSH 6309.31)	PROJECT	_,
FOREST SERVICE	AG-9A63-C-08-0015	
12/10/2007 14:37 FAX 530 543 2693 USDA FUREST SERVICE

Ø005

	FS-6:300-16 (11/30)
IDA - Forest Service	CONTRACT NUMBER
	AG-9A63-C-08-0015
	UNIT
CONTRACT RELEASE	LTEMU
(neverance Fon 6009.11)	PROJECT
	South Shore Hand Thin 2007
£	NAME AND ADDRESS OF CONTRACTOR
	Central Valley Forestry
Melinew Gaginon	18985C Road 255
	Exotor, CA 93221
Reservations: none	
12/10/07	Central Villey Forstera
Date (n/m/cid/yyyy)	Contractor
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# Appendix XIV 2010-2011 Avalanche Rescue Plan

# HEAVENLY

# AVALANCHE

# RESCUE

# PLAN

2010-2011

# **GENERAL RESCUE PLAN**

# **General Rules**

- 1. Stay Calm
- 2. Your safety is the most important thing
- 3. Work as quickly as possible
- 4. Do not take undue risks
- 5. Discipline is essential follow the rescue plan, stick to your training and job descriptions
- 6. Remember you are the victim's best chance for a live recovery
- 7. Provide emergency care ABC^s, stabilize, and transport
- 8. Keep accurate notes of the entire operation

# **General Action Plan – Four Stage Rescue**

- 1. Accident Occurs
- 2. Accident Reported (rescue operations clock starts)
- 3. <u>Stage I initiated Immediate action</u>
  - > The alarm is sounded/ personnel is frozen at stations/ 10-19 all patrollers
  - Information is gathered from witness
  - Hasty search team is formed and dispatched (with witness if possible)
  - Rescue headquarters contacted
  - Rescue leader designated
  - Rescue recorder designated
  - Accident site commander designated
  - Arrangements made to get avalanche rescue dogs and handlers staged in appropriate safe area. Only certified rescue dogs will be dispatched.
  - Additional columns formed and dispatched

#### 4. Stage II initiated

- Additional columns formed and dispatched to accident site
- Contact medical personnel (see attached appendix)
- ➢ Make arrangements for other rescue dogs/handlers to be transported to accident site
- 5. Stage III initiated Prolonged search
  - Arrange for additional manpower to relieve tired crews
  - Additional supplies for extended search
  - Arrange for transport of toboggans, blankets, additional first aid equipment, stoves, tents, and other equipment needed for an extended search
- 6. <u>Stage IV clean up</u>

# HEAVENLY AVALANCHE RESCUE PROCEDURES

#### **Summary**

The following are steps you should follow if you are the person who receives word of a possible avalanche.

### **Initial Steps**

Sound the alarm on your radio. Broadcast the report of a possible avalanche and the location of the accident on channels one and three. Notify Dispatch at 6900. Contact all patrol stations to freeze personnel and 10-19 all patrollers.

1.	CA First Aid	6	250/6251
2	Essa Datual	6	042

Face Patrol	6943
Sky Patrol	2349
NV First Aid	2386
Dipper Patrol	2347
	Sky Patrol NV First Aid Dipper Patrol

- 6. East Peak Patrol 2348
- Make sure the eyewitness is held at, or escorted to, the nearest mountain phone or Patrol Station. It is imperative that this key person makes it back to the avalanche site if possible. If this is not possible then steps need to be taken to ensure the witness is held at a patrol station.
- Refer to the witness statement form for the necessary witness information
- > Assist in forming and dispatching a hasty team to the reported avalanche site
- Contact the first person available on the attached list of qualified Avalanche RESCUE LEADERS. (See Appendix)
- Public access must be immediately cut off from the accident site a patroller must be dispatched to close these areas.
- After a rescue leader has been appointed, notify the following people (use after hours phone numbers if necessary; page 14)

1.	Casey Blann	6268
2.	Les Marsh	6260
3.	Karen Foster	6254
4.	Brian Gannon	6250/6251
5.	Erik Birkholm	6250

- 6. Duty Patrol Supervisor 6250
- With the help of the rescue leader, assist in determining a rescue recorder and an accident site commander.

#### **Qualified Avalanche Site Commanders & Rescue Leaders**

Name	Work Ext.	Home Phone
Birkholm, Erik	6250	530-573-1928
Heavenly Snow Safety Director		805-350-2458
Terry, Colton	6250	530-559-4357
Heavenly Snow Safety Asst.		530-541-1980
Blackman, Jeremy	6250	530-545-9062
Heavenly Snow Safety		
Mcpartland, Ryan	6250	530-318-7779
Heavenly Snow Safety		530-544-8089
Gannon, Brian	6250	775-782-8783
Heavenly Ski Patrol Director		530-545-3489
Allen, Lee	6250	530-542-4273
Heavenly Ski Patrol		
Brown, Adrian	6250	530-542-2343
Heavenly Ski Patrol		

Ultimately this is a senior patroller responsibility

The Rescue Leader and the accident site commander are ultimately responsible for the safety of all field personnel involved. They are also responsible for the on-scene coordination including management of resources, record-keeping, etc. Among these responsibilities is the need to follow protocol and rigid discipline. Certain actions must be taken in a relatively specific order, and it is the responsibility of the Rescue Leader to assure that this occurs. As mentioned, the Rescue Leader's first responsibility is the safety of all field members. S/he might find it necessary to keep all involved (rescuers, media, volunteers, etc.) out of the area before the rescue can even begin, in the case of additional avalanche hazard, worsening weather or darkness, for example. Still, in the absence of these issues, the decision to proceed with the rescue is a complex one that cannot be taken lightly. If the Rescue Leader determines that the risk to rescuers is anything more than minimal, something must be done to reduce the danger. If the danger of additional avalanche cannot be controlled, or if the weather is such that the risk to the rescuers is too great, the safest action is for rescuers to retreat. After the initial hazard assessment is made, the team's leadership/Rescue Leader may decide that further avalanche control work is necessary before rescuers can enter the field (or the accident site). At this point, if explosives are to be used in avalanche control, the Rescue Leader must assure that s/he has radio communications with the control team leader. Furthermore, all associated personnel must be made aware that control work is underway.

# **RESCUE LEADER INSTRUCTIONS**

#### **Summary**

The rescue leader is the overall coordinator of the rescue operation, typically the ski patrol director, snow safety director, or a person with equal experience in all facets of the avalanche discipline. He or she should be thoroughly familiar with the rescue plan. The rescue leader should appoint a recorder to keep track of personnel and equipment and maintain a record of the rescue operation history. The rescue leader is also responsible for appointing an accident site commander who acts as his eyes and ears at the avalanche site.

- As the Rescue Leader you will determine whether or not a rescue is actually necessary if no eyewitness is present.
- > Appoint and dispatch hasty search team and/or accident site commander
- Arrange for Dog teams to be staged at an appropriate location; prior to avalanche site being deemed safe for rescue operations.
- > Appoint a scribe to keep detailed notes of the operation
- Obtain pertinent information from the witness
- > Appoint dispatcher at nearest station to accident
- > Organize subsequent Stage II columns and dispatch to accident site
- Organize Stage III
- Dispatch Second Stage Columns as needed:
- Arrange for long term search and rescue additional equipment and or manpower may be necessary
- Contact the appropriate Heavenly managers and advise them of additional equipment you may need such as: snowcats, personnel, snowmobiles, trucks, radios, drivers, food, shelter, etc.
- Notify other Tahoe basin ski areas of the incident in order to receive additional rescue personal and rescue dogs.
- Notify the following agencies:
  - 1. El Dorado County Sheriffs' Office (530) 573-3300
  - 2. Douglas County Sheriffs' Dispatch (775) 782-9935 x7
  - 3. Alpine County Sheriff's Dispatch (916) 694-2231
  - 4. U.S. Forest Service (530) 573-2600
  - 5. Mike Guarino, USDA Forest Service

Work (530) 573-2636

Home (775) 265-6023

- Contact a skiing physician (see Appendix 3) and Barton Hospital (530) 541-3420
- ➤ Contact the Barton Heavenly Clinic (530) 543-5575
- Maintain radio contact with hasty team leader and/or accident site commander
- Coordinate with other agencies and rescue groups
- Manage overall operation
- > At completion:
  - 1. Verify all personnel accounted for and evacuated
  - 2. Verify all equipment accounted for
  - 3. Report to authorities with compiled report.

# **ACCIDENT SITE COMMANDER INSTRUCTIONS**

#### **Summary**

An accident site commander is a highly experienced leader (the rescue leader's key person at the avalanche site) who is sent to the accident site as quickly as possible and relieves whoever is in charge (the Hasty team leader). The accident site commander evaluates the actions of those already on the scene and decides where to search, continuing or rearranging probe lines accordingly. A power-operated megaphone is helpful to call out instructions to column and/or probe line leaders. It is this person's job to see the big picture and guide the rescuers in the most appropriate rescue methods.

- > Upon arrival at the accident site, assume command from the hasty team leader in charge
- Get complete briefing of the rescue operations.
- Arrange for dog team search if not already done.
- Get manpower lists and dog team lists.
- Continue direction of course probe lines.
- Establish and maintain radio contact with rescue leader as soon as possible. Report progress of search and needs of rescuers.
- Arrange to remove witness and exhausted rescuers from the area
- Arrange for the RECCO to be brought to the site and assign one person to do a RECCO search
- After whole debris area has been probed, reorganize probe lines at bottom and repeat coarse probe process. Resort to fine probe technique only when course probe attempts have been unsuccessful and you have determined that there is no chance of rescuing the buried person alive.
- If rescue operation appears to be a lengthy affair, arrange with base for organizing a Third Stage.
- Continue to arrange for the replacement of tired rescuers with fresh personnel.
- Dispatch tired personnel back to base in groups, under leader. Keep track of who is leaving.
- At conclusion of rescue operations, dispatch personnel and equipment back to base in groups with a leader. MAKE SURE ALL MEMBERS AND EQUIPMENT ARE ACCOUNTED FOR.

#### **AVALANCHE RESCUE DOGS**

**Summary**-Whenever possible, Heavenly avalanche rescue operations will utilize avalanche rescue dog teams and their handlers. It is very important to know what role the dogs and their handlers play in the rescue operation. Avalanche Rescue Dogs are the most powerful tool when recovering buried avalanche victims, if the use of beacons and experienced operators are not available. Although certified dogs and their handlers are the most powerful tools we have at our disposal, teams must remember the use of the dogs must come after the rescue leader has designated the avalanche rescue site **safe for rescue operations**. Individual rescuers must not just grab a dog and go. This is to ensure the safety of all rescuers / dogs involved. Individuals must avoid making a bad situation worse. Rely on the rescue leader to guide the dog teams to a safe staging location until the avalanche site is deemed safe for rescue operations by the rescue leader / accident site commander.

It is the rescue leader's / accident site commander's duty to delegate dog teams. This is to utilize multiple teams, and not to compromise the rescue operation and the teams' safety. All personnel must rely on the dog handlers to teach the group what to do when the dogs indicate, alert, and etc. Handlers must also advise personnel how to work around his/her dog. Rescue Leaders must notify arriving resources that avalanche dogs either are or may be on scene.

Special care must be taken to assure that individuals on scene do not compromise the effectiveness of dogs by any of the following actions: Individuals who must urinate or defecate must do so far away from the site at a designated place. Human feces can contaminate the area and compromise the effectiveness of dogs. Rescuers should not spit in the area. This is especially important if rescuers who use chewing tobacco are dispersed into the field. These individuals should refrain from this activity, since any human body fluids can compromise the effectiveness of avalanche rescue dogs.

Only certified avalanche rescue dogs will be used in Heavenly rescue operations. This ensures efficiency and increases the value of our most powerful rescue tools in Heavenly's avalanche rescue plan.

# FIRST COLUMN LEADER (Hasty Search Party) INSTRUCTIONS

**Summary**-The hasty search team leader is temporarily is in charge at the accident site until the accident site commander relieves the individual. As the first leader person to arrive at the site, the hasty team leader immediately assesses the potential for further avalanches that could threaten the rescuers. If the hazard remains high, the leader must make the decision whether or not to continue the rescue operation. Any hazard that remains must be mitigated before the rescue operation can proceed. The first column leader must also establish emergency escape routes for the rescuers. The leader should also assign an avalanche guard, if possible, whose function is to watch for signs of other avalanches in or near the site. Based on clues, eyewitness accounts, and the avalanche debris, the hasty team personnel identify, prioritize, and spot probe the areas where the victim is most likely to be buried. The hasty team leader will also assign a beacon searcher to search the entire slide path. Eventually, if the first pass is not successful in recovering the victim, then a probe line will be formed at the toe of the slide, the location of which will be determined by the leader.

#### YOU ARE IN CHARGE OF THE HASTY SEARCH. WITH EMPHASIS ON SPEED AND SAFETY, PROCEED AS FOLLOWS :

- Screen out volunteers who seem unfit for the operation
- Equip each volunteer with a hasty pack and any additional equipment as assigned.
- Proceed to accident, according to the directions or the RESCUE LEADER. It may be necessary to have the witness accompany your column.
- If certified rescue dogs and dog handlers are present, dog teams will proceed to an appropriate staging area to wait to be dispatched by rescue leader.
- At avalanche site, evaluate the existing hazard and formulate the escape route. Each member of your column should know the escape route.
- Post an avalanche guard as necessary
- Designate an area outside the slide path to store and stage rescue team's personal equipment
- Begin rescue dog search if certified dogs and handlers are present.
- Assign one person to do a beacon search all other rescuers and witness MUST switch their beacons to the lowest receive setting.
- All other rescuers should set up their probes.
- > Make a through surface search of slide area, including outside perimeter.
- Mark the victim's last seen point if possible as well as any clothing or equipment found. Blue flags are used for clues, yellow flags for last seen point, and red flags are used for the deposition zone perimeter.
- Determine most likely burial regions and spot-probe all likely catchment areas in the path. Likely catchment areas include above and below trees and rocks, bends in the slide path, and at the toe of the deposition.
- ➢ If the first pass is unsuccessful, then the team must begin a course probe line with the available personnel.
- COURSE PROBE using the 'three hole' method: Work uphill starting at the toe of the slide. Keep the holes approximately two feet apart. Move forward 2 feet and repeat.
- As additional columns arrive, integrate manpower into larger probe lines. Retain leadership until Accident Site Commander arrives. Brief the Accident Site Commander upon arrival. Give him/her manpower lists.

# **COLUMN LEADERS (Second, Third, etc) INSTRUCTIONS**

#### **Summary**

Column (or probe line) leaders are personnel responsible for fast, continuous, and effective probing. This leader is also responsible for leading the column safely to the avalanche site. These individuals must be militaristic and precise in their leadership of the probing operation to increase the odds of finding the victim alive. The column leader needs to realign the probe line often to ensure maximum effectiveness and efficiency. The leader must allow individual probers to rest as they tire but make sure the overall probe line keeps moving as probers are replaced.

#### WITH EMPHASIS ON SPEED AND SAFETY, PROCEED AS FOLLOWS

- Screen out volunteers who seem unfit for the operation
- Equip each volunteer with a probe
- Pick up one shovel pack.
- > Take additional equipment as assigned by RESCUE LEADER.
- ▶ Write down the names of members in your party and give to RESCUE LEADER.
- Follow established route to accident site. Improve trail markings as necessary.
- Upon arrival at accident site, follow directions of person in charge (either Hasty Team Leader or Accident Site Commander).
- > Turn over manpower list to Accident Site Commander.

# **RESCUE RECORDER DUTIES**

#### **Summary**

The Rescue Recorder works directly for the Rescue Leader, and should be at his side at all times in order to keep an accurate written account of everything that takes place, such as:

- ➢ Names, dates and times
- Manpower lists
- Equipment Lists
- Victims (names, ages, addresses, etc.)
- Rescue history
- ➢ Witness report

Also

- $\rightarrow \underline{NO}$  information should be given out until first cleared with the respective Sheriffs' Office.
- Collect all forms, notes and written information pertaining to the operation. Give them to the Sheriffs' Department Officer in charge for deposition. Make a complete copy of the avalanche rescue for Heavenly's records.

# **RECORDER INSTRUCTIONS AND CHECKLIST**

- > Keep an account log of rescue operation, including all names, times and equipment.
- > Record the names, addresses and phone numbers of all outside personnel.
- Assist RESCUE LEADER with the remainder of all duties.
- Record the names, addresses and phone numbers of all outside suppliers and their equipment.
- Record obvious deficiencies and problems identified through closing of operation.
- Use inter-mountain phone line to sound general alarm for notification of all mountain personnel. Give location of rescue headquarters and instruct departments how to report for assignment.

# **STAGE IV – SECURING AVALANCHE RESCUE OPERATIONS**

- Accident Site Commander must make sure that all members of the rescue teams are accounted for before leaving the rescue area.
- Accident Site Commander should be sure all equipment is picked up and returned to base camp before leaving rescue area. All trail markers should be picked up on return trip.
- Rescue Leader must make sure all rescuers have returned and have signed in at the end of the operation.
- Rescue Leader should notify the appropriate Sheriffs' Office and Forest Service that the rescue effort has ceased.
- Upon return to base camp, all equipment should be returned to a central location (designated by the Rescue Leader).
- All equipment borrowed from other areas will be place in separate piles and the **Rescue** Leader will make arrangement for its inspection and return.
- All forms and notes should be turned into the **Rescue Recorder** upon arrival of rescue teams to base camp. Anyone that has written information should turn this in before leaving the rescue area. (This information will be forwarded to the Sheriff's Office)
- Ski Patrol will check all equipment and restore, replace, or repair immediately. Remove all flashlight batteries and plan for immediate replacement.
- **Rescue Leader** should make out a final report as soon as it is possible.

MD	<b>Specialty</b>	Office	Home
Barton Clinic Ca. Base	Emergency	530-543-5575	N/A
Brooks, Steve	Emergency Stateline medical	775-588-3561	775-588-5601
Marlowe, Paul	Emergency Stateline Medical	775-588-3561	775-588-5966
Martin, Brooks	General Practice	530-542-1900	530-577-8555
Muscat, Marissa	General Practice	530-543-5660	530-543-3239
Rupp, Robert	Orthopedics	775-588-3636	530-544-5457

#### List of available physicians

When rescuers discover any victims, prompt medical attention must be given. Remember that it is a common belief among the emergency medical community that "a victim is not dead until warm and dead." This is especially true of young children, and is called the "Mammalian Diving Reflex." Seemingly miraculous recoveries have been documented where drowning victims have survived without oxygen for up to 45 minutes in ice-cold water. It must be noted, however, that the speed with which the body is cooled is directly proportional to the rate of survival. Unlike drowning accidents in cold water, where the body is cooled rapidly, the avalanche victim will not cool as quickly, therefore similar recoveries are unlikely. Still, every effort to revive the victims with aggressive CPR should be maintained until the rescuers either cannot, or should not continue. Rescue members generally do not declare any person to be dead. An emergency room physician or coroner often makes this decision. Rescuers should contact their local Trauma Center Emergency Room (ER) and describe to the physician the condition of the victim, the estimated length of burial, whether the victim had an air space and/or an open airway as well as the medical attention given to the victim. This can often be done over the radio, with the assistance of local dispatch that might contact the ER physician by landline and relay the required information. In the meantime, rescuers should continue aggressive life support, including CPR, until they cannot or should not continue.

### **Equipment List for an Extended Search**

This is a list of the items that may be needed in the event of an extended search:

- 1. Extra Shovels (Heavy Duty)
- 2. Tents
- 3. Sleeping Bags
- 4. Headlamps for night operations
- 5. Floodlights (gas or propane)
- 6. Generator
- 7. Flares
- 8. Megaphone (battery powered)
- 9. Extra flagging
- 10. Toboggans
- 11. Rope
- 12. Food & Water
- 13. Stove

#### **Heavenly Management Personnel**

# Emergency Call List 2010-2011

#### **Management Personnel**

Casey Blann, VP Mountain Ops Jim Laramore, Director Snow Surfaces Les Marsh, VP Human Resources

Karen Foster, Risk Manager

Brian Gannon, Patrol Director

Erik Birkholm, Snow Safety Coordinator

James Laws, Security Manager Tom Fortune, Dir. Base Area Ops

#### **After Hours Numbers**

530-577-8313 (Home) 775-450-6896(Cell) 530-577-4660 (Home) 970-314-9523 (Cell) 775-450-9382 (Cell) 775-588-5818 (Home) 775-782-8783 (Home) 530-545-3489(Cell) 530-573-1928 (Home) 805-350-2458 (Cell) 530-577-8228 (Home) 775-450-0988 (Cell)

#### Tram Personnel

#### 3860 Saddle Rd. South lake Tahoe Ca. 96150

Steve McBride Rich McAdon Tim McFarland 530-573-8901 (Home) 530-541-1516 (Home) 775-265-4212 (Home) 775-294-2137 (Cell) Tram Outside Line 530-544-6021 Tram Extensions: 775-586-7000 Lower Station: 6958 Upper Station: 6001

#### **Gondola Personnel**

4080 Lake Tahoe Boulevard, South Lake Tahoe, Ca. 96150

James Grant – Gondola Lift Operations 757-572-5632 ext. 6066 Kevin Higgins – Gondola Maintenance Supervisor 530-573-0530 ext. 2308 / 6066 Base Station – 6066 Mid-Station – 6067 Top-Station - 6068

#### **Lift Operations**

James Grant - Director of lift operations ext. 6232 Steve Steele- Ca. Lift Supervisor ext. 6215 / 6216 Karyn Lacey - Nv. Lift Supervisor ext. 2370 / 2370 Audre Villaret- Ca. Lift Maintenance Supervisor 530-543-1713 ext. 6942 Craig Altringer -Nv. Lift Maintenance Supervisor 775-265-0058 ext.2323

# **AVALANCHE WITNESS REPORT**

Date:	Time:	
Exact Location of the Avalanche:	Time of Avalanche	
Number of Persons Buried:		
Description of victim(s)		
Avalanche Beacons: Yes / No		
Skier or Snowboarder(s)?		
Number and Condition of others at th	ne site:	
Size of the Avalanche:		
Briefly Describe Accident and Action	n/Location of Survivors:	
Witness Name		
Address		
Phone		
Signature		
Employee Taking Report		

# **Avalanche Recorder Notes**

TIME ACCIDENT WAS REPORTED:	
TIME ACCIDENT OCCURRED:	
REPORTED BY:	
LOCATION OF ACCIDENT:	
NAMES:	
PLACE AND TIME:	
TEAM LEADER:	
MEMBERS:	
EQUIPMENT:	
RESCUE LEADER	
ACCIDENT SITE COMMANDER	
RESCUE RECORDER	
RESCUE DISPATCHER	
ADDITIONAL COLUMNS DISPATCHED	
Column 2	
PLACE AND TIME:	
TEAM LEADER:	
EQUIPMENT:	
Column 3 DI ACE AND TIME	
TEAM LEADER:	
MEMBERS:	
EQUIPMENT:	

Column 4	
PLACE AND TIME:	
TEAM LEADER:	
MEMBERS:	

EQUIPMENT:	
Column 5	
PLACE AND TIME:	
TEAM LEADER:	
MEMBERS:	

EQUIPMENT:		 
<u>Column 6</u>		
PLACE AND TIME:		
TEAM LEADER:		
MEMBERS:		

EQUIPMENT:		
Column 7		
PLACE AND TIME:		
TEAM LEADER:		
MEMBERS:		

EQUIPMENT:		
Column 8		
PLACE AND TIME:		
TEAM LEADER:		
MEMBERS:		

EQUIPMENT:
------------

# Avalanche Recorder Notes (cont)

Additional Manpower List: _____

Other Notes:

# **AVALANCHE RESCUE LEADER- NOTES**

# **ACCIDENT SITE COMMANDER - NOTES**

# ACCIDENT SITE COMMANDER – SKETCH OF AVALANCHE AREA

# HASTY TEAM LEADER NOTES

Team Members

Areas Probed

Exact Location of Avalanche

# Column Team Leader - Notes

#### Column Team Members



Column Leader Notes:

#### **AVALANCHE RESCUE EQUIPMENT INVENTORY**

#### FACE PATROL (6943)

Two (2) Hasty Packs:

_____ shovels _____ collapsible probes _____ probe line markers _____ instructions for Hasty Search Team Leader _____ instructions for Accident Site Commander _____ pencils _____ extra paper One (1) Industrial probes & Shovel Pack: _____ Industrial heavy duty probes x 6 _____ shovels _____ flagging _____ probe line markers Conduit Probes SKY PATROL (2349) Two (2) Hasty Packs: _____ shovels _____ collapsible probes _____ rolls of flagging _____ probe line markers _____ instructions for Hasty Search Team _____ instructions for Accident Site Commander _____ instructions for First Column Leader _____ pencils _____ extra paper One (1) Shovel Pack: _____ shovels _____ instructions for First Column Leader

_____ flagging

_____ probe line markers

Conduit Probes

#### **DIPPER PATROL (2347)**

Two (2) Hasty Packs:

_____ shovels

_____ collapsible probes

_____ rolls of flagging

_____ probe line markers

_____ instructions for Hasty Search Team

_____ instructions for Accident Site Commander

_____ instructions for First Column Leader

_____ pencils

_____ extra paper

One (1) Industrial probe & Shovel Pack:

____Industrial heavy duty probes x 7

_____shovels

_____ instructions for First Column Leader

_____ flagging

_____ probe line markers

i. Conduit Probes

#### EAST PEAK PATROL (2348)

Two (2) Hasty Packs:

_____ shovels

_____ collapsible probes

_____ rolls of flagging

_____ probe line markers

_____ instructions for Hasty Search Team

_____ instructions for Accident Site Commander

instructions for First Column Leader

_____ pencils

_____ extra paper

One (1) Shovel Pack:

_____ shovels

_____ instructions for First Column Leader

_____ flagging

_____ probe line markers

**Conduit Probes** 

## SELF RESCUE

#### **Summary**

While no amount of training can prepare you for every possible situation, the following are tips to follow if you are caught in an avalanche.

- 1. While the avalanche is still moving
  - > Yell. Let your partners know that you are caught!
  - > Try to escape (hopefully you already had an escape route planned).
  - If you cannot escape off the slab then get rid of your equipment. Release your bindings by kicking them off and lose your poles.
  - Leave your pack on. It provides valuable protection for your back, contains things you will need if you survive, and may help you 'float' toward the surface of the avalanche while it is still moving.
  - Number one fight for your life!
- 2. As the avalanche comes to a stop
  - > Try to make a space around your face and mouth with your hands.
  - Extend a hand toward the surface
- 3. When the avalanche comes to a stop
  - > Try to relax

# WHAT TO DO IF YOUR PARTNER GETS CAUGHT

- 1. Shout out to your partner if he is not aware of the avalanche!
- 2. If he is caught it is imperative that you watch closely and get a last seen point
- 3. Memorize exactly where you saw them last with nearby landmarks (trees, rocks, etc)
- 4. If they are swallowed up by snow, watch the parcel of snow to see where it ends up
- 5. Immediately notify the nearest patrol duty station of the avalanche so the alarm can be sounded and an organized search can be mobilized
- 6. Stop, think, and plan make a decision if it is safe to proceed to the debris zone.

# METHODS OF LOCATING AVALANCHE VICTIMS

- 1. The victim must be found **alive!**
- 2. General Procedures
  - From witness or clues determine last seen area
  - Perform a beacon search even if a witness states the victim was not wearing one (the witness may be wrong, and there is always a chance more than one person was caught)
  - > Establish a probable victim trajectory in the avalanche
  - > Make a rapid but systematic check of the debris surface
  - > Mark all clues, last seen point, slide path perimeter.
  - Pick up each clue, probe around the clue, then mark it with a flag and leave in place
  - > Make initial spot probes of most likely burial regions.
  - Coarse probe from the bottom of the slide path up
  - Resort to fine probing only when the probability of a live rescue has become slight
- 3. Decisions concerning the search procedures are in the hands of the accident site commander.

# **ESTABLISHING THE VICTIM'S MOST LIKELY LOCATION**

#### 1. Generalities

- ➤ A moving avalanche resembles a fluid
- > The majority of buried victims are carried to the toe of the slide
- If two points of the victim's trajectory can be established, the victim will probably be in the flow line below the two points.
- Any terrain features that catch and hold avalanche debris are likely to catch victims.
- In a wandering gully, all bends are likely burial points. Vegetation, rocks, and obstacles act as snares.
- Maximum speed of the flowing snow occurs at the avalanche center.
- Remember that it is possible the victim got thrown clear of the debris

### **PROBING**

#### Summary

In the absence of transceivers and/or dogs, probing may give rescuers the best chance of finding the victim. Probing is a slow and tedious method of search when compared to transceivers or dogs, however, it is the only practical method if the victim is not wearing a transceiver and if a dog is unavailable. Initial spot probing will take place when the hasty team arrives on scene, but as more rescuers arrive on scene, the accident site commander will designate where these probe teams (columns) will search. Starting at the bottom of the toe of the avalanche the probe line advances uphill, working silently and steadily. Probe lines must be well disciplined and properly spaced in order to be effective. About fifteen to twenty probers per column is adequate, and if extra manpower is available a person can be placed on either end of the column to ensure alignment. The boundaries of the probe area should be marked as the probe line advances. Probing does not stop when a strike is felt. The probe is left in place and given a new probe. The column proceeds while a shoveler investigates the strike.

**<u>Course Probe</u>**: When sufficient numbers of rescuers are available use the coarse probe method.

Dimensions: Probers stand approximately elbow-to-elbow with hands on hips probing once in between feet. On command the line advances one step or approximately .7 meters and probes once again in the same manner. This results in a probe pattern of approximately 30 inches between probes across the slope and 28 inches up or down slope.

**Open Order Coarse Probe:** This is an alternative to coarse probing and is useful where terrain is steep or there are only a few probers.

Dimensions: Probers stand farther apart – approximately palm-to-palm probing once to left and once to the right. Forward advance is the same as a coarse probe - this results in the same probe pattern as a coarse probe.

**Three Probe Method:** This is again a variation of the coarse probe and it is also useful when the number of probers is small and the terrain is steep. It will typically be the method employed by the hasty team once their initial spot probes and surface search are complete.

Dimensions: Once again the probers line up palm to palm and then probe three times – once to the left, once to the right, and once in the center, keeping the holes about 60 cm apart. This kind of coarse probing has about an 80 percent chance of finding a victim on the first pass.

**<u>Fine Probing</u>**: Fine probing is high density probing. It is time consuming when compared to coarse probing, therefore it is not done until all other methods have been exhausted and a live recovery is not expected.

Dimensions: Probers line up elbow-to-elbow, probing three times – once left, once right, and once center. Forward advance is only about 12 inches. The space between probes is ten inches across slope and twelve inches upslope.





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