Figure 15-3. Snow Storage Areas Proposed for the North Base Area

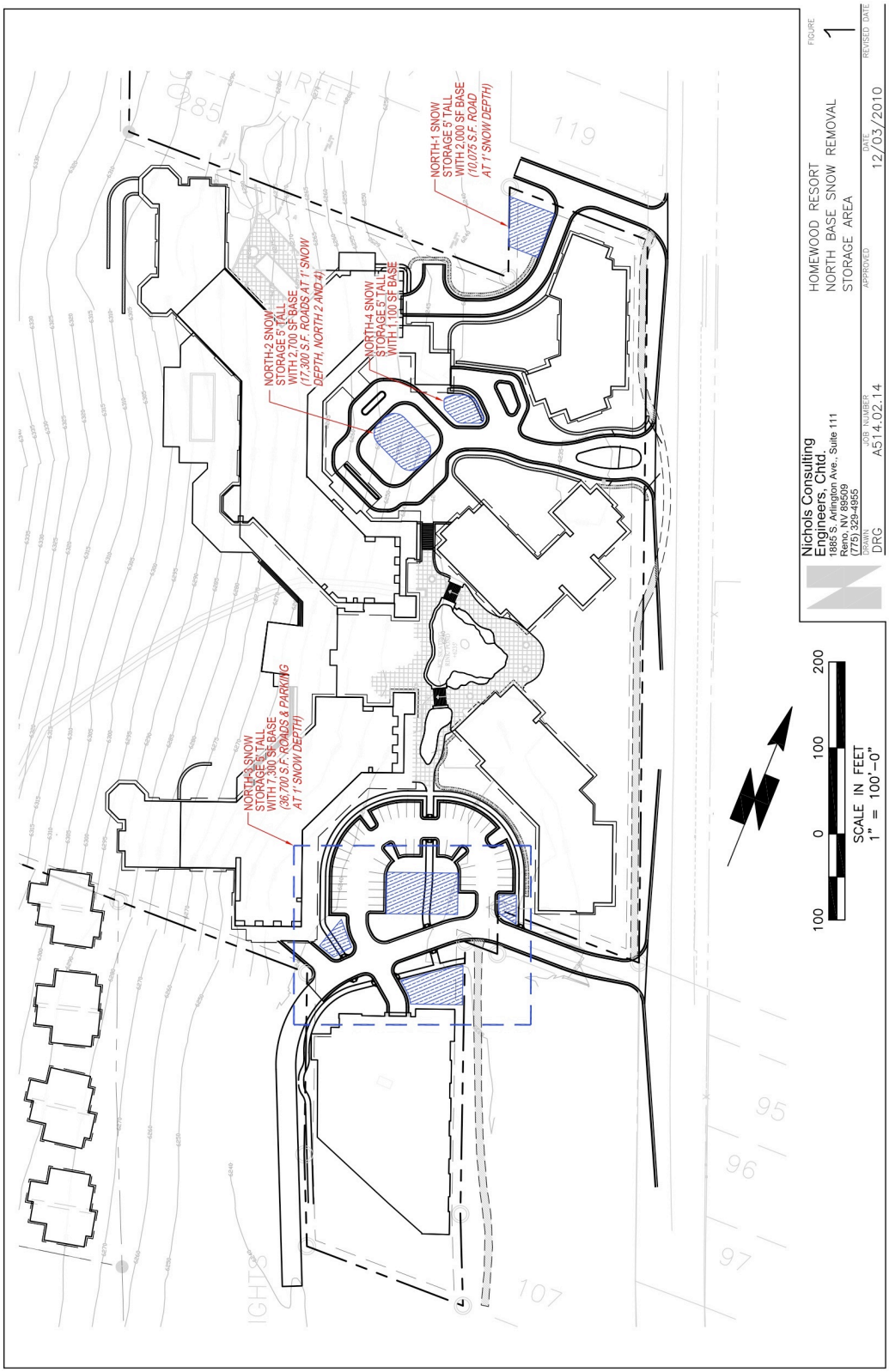
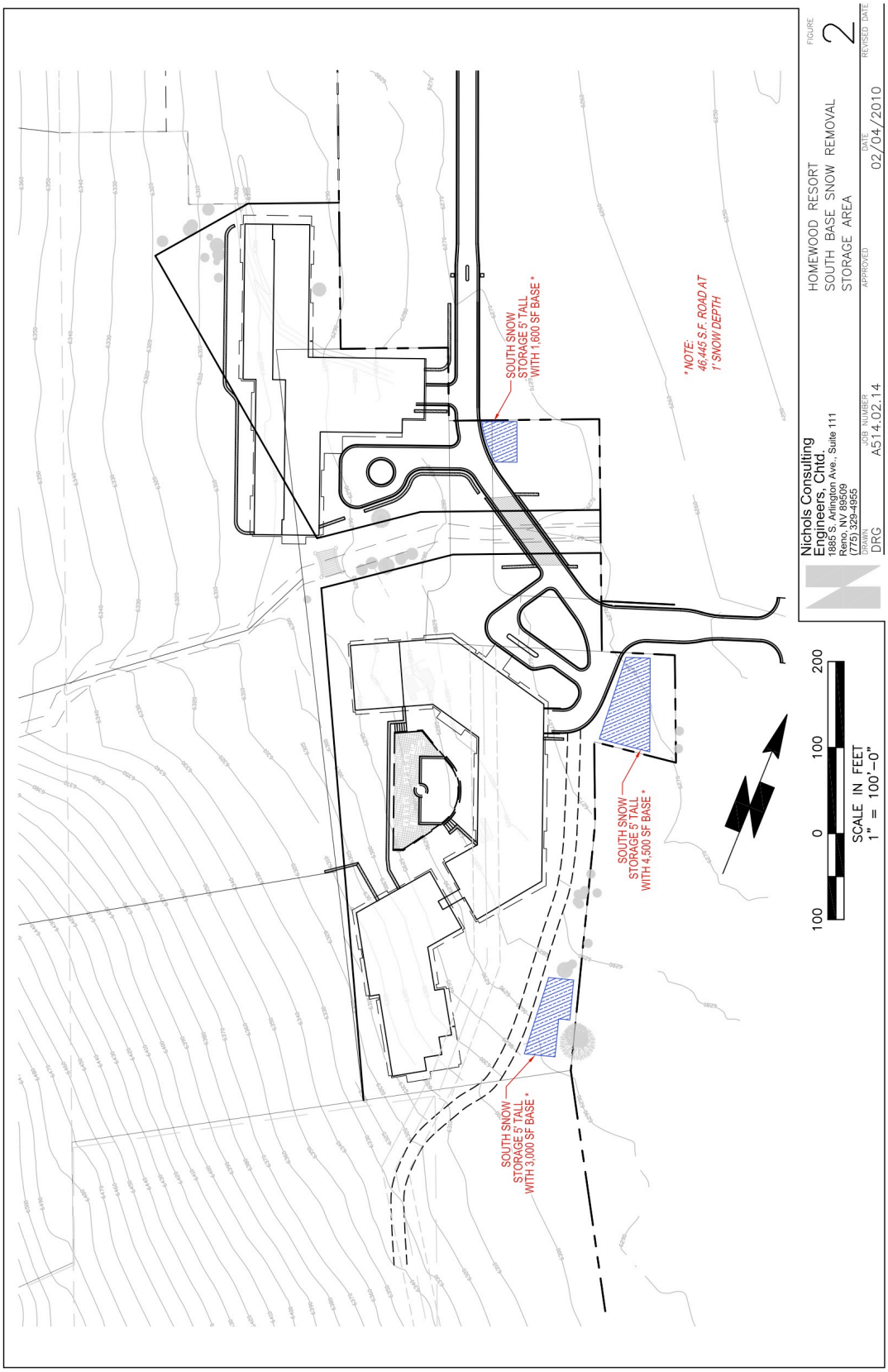


Figure 15-4. Snow Storage Areas Proposed for the South Base Area



Fuel Storage. Under Alternatives 1, 3, 5 and 6 the maintenance facility currently located in the South Base area and in proximity to Homewood Creek will be relocated to the Mid-Mountain area. The existing 5,000-gallon fuel tank will remain in use at the South Base area until the start of Phase 2 development when it will be removed. At that point, new diesel fuel tanks constructed at the new Mid-Mountain area maintenance facility in Phase 1 development will be used exclusively. These Mid-Mountain tanks will be sized to sustain operations throughout the winter since they will be inaccessible by fuel trucks when roadways are snow covered. The estimates for winter operations total 40,000 gallons that would be stored in two 20,000-gallon above ground tanks located beneath the maintenance facility within the crawl space. The tanks will be serviced from the paved apron adjacent to the maintenance building. The use and operations are required to conform to the California Fire Code and receive approval from the North Lake Tahoe Fire Protection District (NLTFPD), as discussed in Chapter 17, Public Safety and Hazards.

Moving fuel tanks from the South Base area, where accidental spills could reach Homewood Creek and SEZ areas, to the Mid-Mountain area, which contains no active stream channel, reduces the potential for surface water quality impacts from accidental spills.

Stormwater Treatment Systems and Bioretention Areas. There are three perennial stream channels draining the Project area and potential hydraulic connections between ground and surface waters within the Project area. TRPA environmental thresholds WQ-4, which outlines tributary standards, WQ-5, which outlines runoff water quality parameters and standards, WQ-6, which addresses discharges to groundwater, and WQ-7, which requires attainment of existing water quality standards, apply to the Project area. TRPA discharge limits are listed in Table 15-4 and Lahontan WQOs are listed in Table 15-5.

Madden Creek and Homewood Creek are sampled during spring runoff conditions. Sample stations M-1 and E-1 are located just above the Project area boundary. Sample stations M-2 and E-2 are located just below the Project area boundary. Because of the inability to obtain grab samples at stations M-1 and E-1 due to access issues and low or absent surface flows, comparison with pollutant concentration levels of stations M-2 and E-2 is difficult. No statistically significant degradation of surface water quality due to operations within the Project area have been measured (personal communications 11/17/2009, Bud Amorfini, Lahontan; IERS 2010; 10/8/10, Bud Amorfini). In other words, the nutrient concentrations measured on samples taken above the Project area boundary exceed WQOs as often as samples taken below the Project area, with no statistical increase in concentrations measured between the samples.

To address potential long-term effects to beneficial uses and surface water quality, the Proposed Project (Alternative 1) and Alternatives 3, 5 and 6 will revegetate disturbed areas (as discussed in Chapter 3 and under potential construction impacts above) and install permanent BMPs, LID strategies and stormwater treatment systems. The combined stormwater treatment approach will capture, treat and infiltrate runoff from the Project area for expected improvements in stormwater quality as compared to existing conditions.

The State Board defines LID as a sustainable practice that benefits water supply and contributes to water quality protection. Unlike traditional storm water management, which collects and conveys storm water runoff through storm drains, pipes, or other conveyances to a centralized storm water facility. LID takes a different approach by using site design and stormwater management to maintain the site's pre-development

runoff rates and volumes. The goal of LID is to mimic a site's predevelopment hydrology by using design techniques that infiltrate, filter, store, evaporate, and detain runoff close to the source of rainfall. LID has been a proven approach in other parts of the country and is seen in California as an alternative to conventional storm water management. LID provides economical as well as environmental benefits. LID practices result in less disturbance of the development area, conservation of natural features, and prove less expensive than traditional storm water controls. The cost savings applies not only to construction costs, but also to long-term maintenance and life cycle cost. LID includes specific techniques, tools, and materials to control the amount of impervious surface, increase infiltration, improve water quality by reducing runoff from developed sites, and reduce costly infrastructure. LID practices include; bioretention facilities or rain gardens, sidewalk storage, grass swales and channels, vegetated rooftops, rain barrels and cisterns, vegetated filter strips, swales and buffers, tree preservation, roof leader disconnection, and permeable pavements and pavers, impervious surface reductions and disconnection, soil amendments, pollution prevention and good housekeeping (http://waterbaords.ca.gov/water_issues/programs/low_impact_development).

A stormwater treatment "train", detailed in impact HYDRO-3, has been designed for the North and South Base areas. Runoff will be conveyed to a bioretention area prior to a stormwater drop inlet where grades permit or directly to stormwater drop inlets to be routed via stormdrain pipe. Once infiltrated or conveyed to the underground system, runoff will enter a Contech Vortech® treatment vault for coarse sediment and hydrocarbon removal and then be routed to a Contech Stormfilter® for secondary treatment and fine sediment removal down to 15 microns. After exiting the secondary treatment facility, the stormwater enters the underground infiltration gallery for infiltration and soil treatment. Civil Plan Sheets C10 through C13 detail the Grading and Drainage Plans for the North Base, South Base and Mid-Mountain areas.

Contech Stormfilters® target a range of pollutants in stormwater runoff, including TSS, soluble heavy metals, oil and grease and total nutrients. This is a passive filtration systems included in the stormwater treatment train for the removal of fine sediment and particles. The Contech Vortech® system is a high flow hydrodynamic separation system that removes coarse sediment, particles, free oil and debris from stormwater runoff. The design allows for inspection of components and unobstructed maintenance access. Product evaluations for Contech Stormfilters® report mean Total Suspended Solids removal efficiencies to be 87 percent by mass (P=0.05) over the range of stormwater event mean concentrations tested. The studied systems were capable of removing particles in the vicinity of 10 microns when operating at a test standard of 7.5 gallons per minute (Contech Stormwater Solutions Inc. 2004). Other results can be reviewed at http://www.stormwater360.co.nz/?s1=products&s2=StormFilter.

Stormwater treatment system configurations at the North and South Base areas will differ depending on the total impervious area and building layout, and will treat, at a minimum, the runoff volume from the 20-year, 1-hour storm event and function to reduce pollutant concentrations to levels that comply with Lahontan and TRPA discharge limits through pretreatment actions and infiltration. The stormwater treatment systems as designed for the Proposed Project (Alternative 1) are sized in excess of the 20-year, 1-hour storm volume with capacities maximized as site conditions allow. Alternative 3 would construct more impervious surfaces as a result of larger building footprints and compared to the Proposed Project (Alternative 1) would slightly increase stormwater runoff volumes. Alternatives 5 and 6 would construct slightly less impervious surfaces, which

would slightly decrease stormwater runoff volumes. Stormwater treatment system capacity is analyzed in more detail for impact HYDRO-2.

Placer County requires installation of standard mitigation measures to permanently mark/emboss with prohibitive language such as "No Dumping! Flows to Creek" or other language as approved by the ESD, and/or graphical icons to discourage illegal dumping. Diversion of stormwater runoff around trash storage areas to minimize contact with pollutants is also required. Mitigation measures to assure compliance with these Placer County codified regulations are detailed as mitigation measures HYDRO-1b and HYDRO-1c.

CEP Resolution Compliance – Reduction in Land Coverage and Sediment Loading. The CEP Resolution for the Project requires reductions in land coverage and sediment loading for the Project area. The Proposed Project (Alternative 1), Alternatives 3, 5 and 6 reduce total existing land coverage within the Project area by 13, 8, 23 and 20 percent, respectively, and relocate land coverage from lower capability LCDs 1a and 1b to higher capability LCDs 2, 4, 5 and 6. Land coverage is detailed in Chapter 14, Geology, Soils and Seismicity under impact GEO-3.

Reductions in land coverage are expected to result in reductions in sediment loading. Sediment loading was modeled for the North Base, South Base and Mid-Mountain areas and for Tahoe Ski Bowl Way (redevelopment areas). The LSPC stormwater management analysis for quantification of the Project design benefits relies on three tracks of information associated in part with the TMDL-related studies of 2007 and 2008. The detailed LSPC stormwater management analysis for the Project area is provided in Appendix Z. Using measured infiltration and sediment yield data and daily climate data for a range of WYs and conditions three treatment scenarios were modeled. These include the runoff and the treatment effectiveness of the existing stormwater treatment systems (termed "Existing Conditions"), the proposed stormwater treatment systems (termed the "Project SWMP") and the stormwater treatment systems that would meet the TRPA 20-year, 1-hour design storm requirements (termed the "20-year BMP SWMP"). Results are presented as annual total sediment load, expressed as kilograms per year (kg/yr).

It is important to note that this loading exercise is based on daily data representing particular water year conditions and cannot be directly compared to the HMR CWE modeling analysis that considers long-term averaged data to represent relative annualized sediment yields.

Table 15-7 summarizes the annual total sediment load modeled for the redevelopment areas under wet WYs 1995 and 2006 and dry WYs 1994 and 2003 precipitation regimes. The focus of the comparison is between the Project SWMP and the 20-year BMP SWMP, with the Project SWMP representing what is proposed under the Proposed Project (Alternative 1) and the 20-year BMP SWMP representing what is required under current TRPA Code of Ordinances. The North and South Base areas are the more substantial areas of the overall Project area affecting loading and serve to illustrate the model concepts.

Table 15-8 compares annual sediment loads between the 20-year BMP SWMP and the Project SWMP. Annual total sediment leaving the project area is connected to the amount of stormwater runoff leaving the Project area each year. The Project SWMP will capture more of the stormwater volume and thus more of the annual total sediment load as shown as the percent decreases in Table 15-8. The Mid-Mountain area and Tahoe Ski Bowl Way show a negative percentage and a smaller percentage decrease, respectively,

because the 20-year BMP SWMP does not include the uphill runoff that could enter the Project area. This runoff must be contained by the Project and is thus included in the Project SWMP analysis. As a result there is a net greater excess runoff and annual sediment load from the 20-year BMP SWMP than from the Project SWMP at the Mid-Mountain area. In the Tahoe Ski Bowl Way area, there is sufficient "over-design" in the Project SWMP conditions to contain uphill runoff such that there is still a slight improvement over 20-year BMP SWMP conditions.

Appendix Z presents additional graphs for comparisons of annual sediment loading for WYs 1994, 2003 and 2006. Figure 15-5, which represents comparisons of annual sediment loading for the North and South Base areas for WY 2006, is presented below to represent a worst-case scenario under a very wet WY. Under a precipitation regime for a very wet WY, the Project SWMP for the North and South Base areas is expected to decrease annual total sediment by approximately 85 percent as compared to the 20-year BMP SWMP.

While simple summary statements are difficult to make, given the complexity of storms, antecedent soil moisture conditions and other variables, the data shows that in wetter years, which represent worst-case scenarios, sediment and presumably fine sediment loads from the Project SWMP design are 80 to 86 percent less than those produced by the standard 20-year BMP SWMP design (Grismer 2010).

Table 15-7

Annual Stormwater Sediment Loads for Existing, 20-year BMP and Project SWMP Designs - Wet (1995 & 2006) and Dry (1994 & 2003) WY Analyses

Project Area	Existing Conditions (kg)*				20-yr BMP SWMP (kg)*				Project SWMP (kg)*			
	1994WY	1995WY	2003WY	2006WY	1994WY	1995WY	2003WY	2006WY	1994WY	1995WY	2003WY	2006WY
North Base Area	246,584	3,749,270	1,496,700	3,715,798	520,583	4,489,815	1,925,338	4,387,778	10,339	652,201	222,518	646,511
South Base Area	56,549	1,851,045	651,730	1,800,059	249,545	2,420,741	1,023,528	2,411,095	9,479	372,205	131,627	368,548
Mid-Mtn Base Area	15,353	475,818	166,708	461,902	21,493	491,426	177,498	497,680	28,649	187,886	68,063	162,855
Tahoe Ski Bowl Way	98,685	1,324,050	522,235	1,260,036	100,199	1,209,091	492,269	1,125,043	72,542	510,820	219,642	491,384
Total	**419,165**	**7,402,179**	**2,839,377**	**7,239,801**	**893,813**	**8,613,068**	**3,620,637**	**8,423,602**	**123,003**	**1,725,107**	**643,854**	**1,671,304**

Source: HMR Water Quality – Quantification of Design Benefits, Dr. Mark Grismer, May 26, 2010

Notes: * 1 kilogram = 0.001 Metric Tonnes

Table 15-8

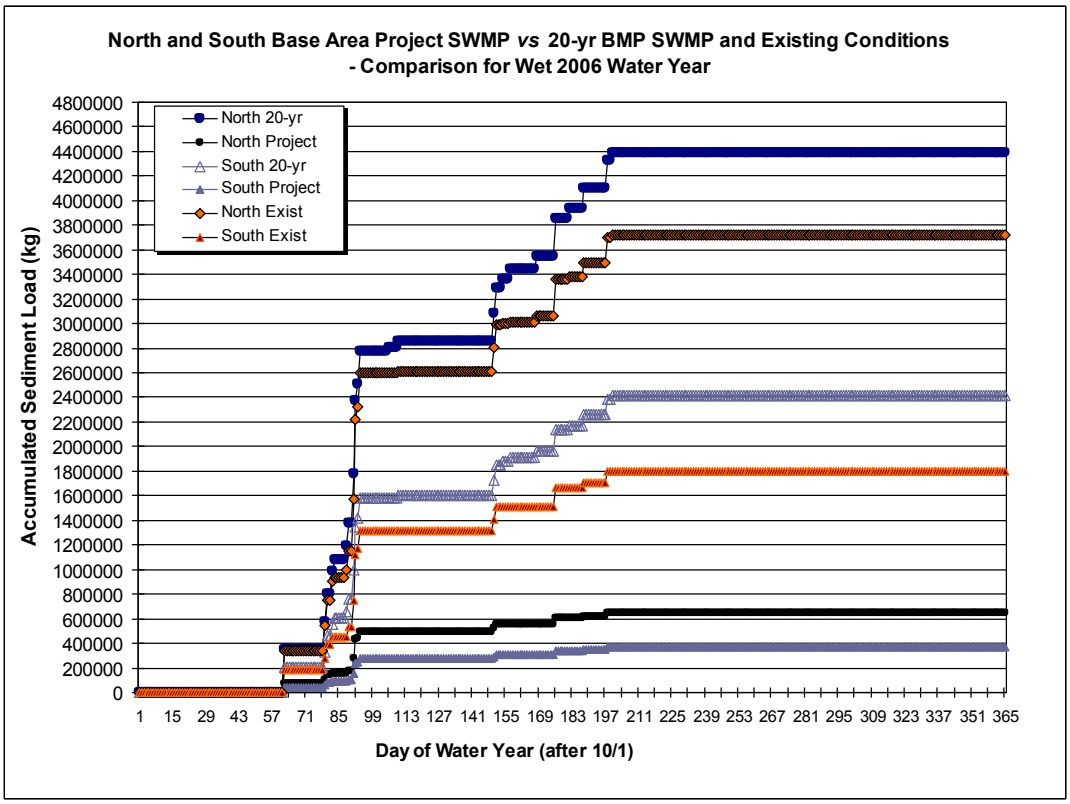
Decrease in Stormwater Sediment Loads for Project SWMP Compared to 20-year BMPs SWMP Designs in Wet (1995 & 2006) and Dry (1994 & 2003) WY Analyses

Project Area	Project SWMP (kg*)							
	1994WY	% Change	1995WY	% Change	2003WY	% Change	2006WY	% Change
North Base Area	510,243	98.0%	3,837,614	85.5%	1,702,820	88.4%	3,741,267	85.3%
South Base Area	240,065	96.2%	2,048,536	84.6%	891,901	87.1%	2,042,547	84.7%
Mid-Mtn Base Area	-7,156	-33.3%	303,540	61.8%	109,435	61.7%	334,825	67.3%
Tahoe Ski Bowl Way	27,657	27.6%	698,271	57.8%	272,627	55.4%	633,659	56.3%
Overall	**772,804**	**86.5%**	**6,889,956**	**80.0%**	**2,978,786**	**82.3%**	**6,754,304**	**80.2%**

Source: HMR Water Quality – Quantification of Design Benefits, Dr. Mark Grismer, May 26, 2010

Notes: * 1 kilogram = 0.001 Metric Tonnes

Figure 15-5. Accumulated sediment load from the North and South Base Areas Under Wet WY Conditions (WY 2006)



Source: HMR Water Quality – Quantification of Design Benefits, Dr. Mark Grismer, May 26, 2010

Combined Level of Long-term Impact to Surface Water Quality and Beneficial Uses. Compared to existing conditions, long-term contributions from the Project area to stormwater runoff, snowmelt and atmospheric deposition will be reduced and minimized through installation of stormwater treatment systems, bioretention areas, reductions in land coverage, and continued revegetation of disturbed areas and ski trails. Conclusive results concerning effectiveness of compliance measures cannot be adequately stated without inspection, monitoring and maintenance of the proposed treatment systems and permanent BMPs, however.

As a result, the level of impact is considered potentially significant until monitoring results prove compliance with TRPA discharge standards, as outlined in the TRPA Code of Ordinances Chapter 81, and State WQOs, as outlined in the Lahontan Basin Plan and forthcoming updated WDRs. Mitigation measure HYDRO-1d outlines the requirements of the Inspection, Operations, Maintenance and Monitoring Plan for Stormwater Treatment Systems and Permanent BMPs. Mitigation measure HYDRO-1e outlines follow up measures to be taken should monitoring results report compromised effectiveness of permanent BMPs or stormwater treatment systems.

Compliance with CWE Project Area TOCs. The HMR CWE analysis was completed in compliance with TRPA Ski Area Master Plan requirements and models the annualized total sediment (T/yr) or sediment yield that could result from implementation of the Proposed Project (Alternative 1) and alternatives. Following the methodology outlined in Section 3 of Appendix W, sediment yield is modeled for the four Project area watersheds. Figure 15-6 compares the four sediment yields predicted under the conditions of each alternative to the Project Area TOCs for Madden, Homewood and Quail Lake Creek watersheds and Intervening Zone 7000. Exceedance of an individual Project Area TOC is considered a significant impact. Each of the four watersheds is considered individually so that a significant decrease in total sediment in one watershed does not mask an increase in another watershed.

The existing sediment yields for Intervening Zone 7000, Madden Creek, and Quail Lake Creek Project area watersheds currently exceed the Project Area TOCs, while the existing sediment yield for Homewood Creek watershed is below its Project area TOC. Note that existing sediment yields are termed "Baseline" in Figure 15-6.

The HMR CWE analysis concludes that implementation of the Proposed Project (Alternative 1) or Alternative 3, 5 and 6 will reduce sediment yields originating within the Project area watersheds as compared to existing conditions. Three of the four sediment yields will be at or below their Project Area TOC through implementation of the Project. The results are discussed below according to watershed.

Intervening Zone 7000. The existing sediment yield for Intervening Zone 7000 is 62 T/yr, which exceeds the Project Area TOC (55 T/yr) by 7 T/yr. Under the Proposed Project (Alternative 1) and Alternatives 3, 5 and 6, the sediment yield will be reduced to 56, 58, 56, and 56 T/yr, respectively, a reduction of 5.3 T/yr which is within 1 T/yr of the Project Area TOC for Intervening Zone 7000. This 1 T/yr is within the expected 10 percent margin of error of the CWE model (personal communications September 22, 2010 – Mark Grismer). The HMR CWE analysis takes into consideration the installation of the stormwater treatment systems proposed for Alternatives 1, 3, 5 and 6 in the North Base area that are located in Intervening Zone 7000; however, because the model is based on standardized sedimentation rates that are applied to certain land uses, the model may not adequately assess the treatment levels of these systems. Additionally, treatment level sediment reduction assumptions for the model exercise erred on the conservative side when treatment systems, BMPs and other approaches had a reported range of effectiveness. The Project installs a number of higher-level treatments that are not reflected fully in the CWE model, as to not overstate the treatment effects. If higher level treatment assumptions were incorporated into the model, post-project sediment yields under Alternative 1, 3, 5 and 6 conditions would likely decrease by 2 to 10 Percent. Thus, where sediment yields are close to the TOC, specifically in Intervening Zone 7000, the actual reduction can be expected to be greater than modeled (IERS 2010).

Furthermore, the sediment loading analysis specific to the North and South Base areas and the Mid-Mountain and Tahoe Ski Bowl Way considers the affects of the proposed stormwater treatment "trains" (Please see Figure 15-8 below for the treatment train schematic). When considering the results from the base area loading analysis presented in Table 15-7, the Project is measured to reduce annual sediment loads originating from the North Base area by approximately 83 percent compared to existing conditions during a wet water year such as WY2006. It is recognized that the sediment loading results for the North and South Base areas cannot be directly compared to the HMR CWE results because of the scale differences; the HMR CWE analysis considers annualized sediment yields, while the loading exercise considers data on a daily timescale for particular water

years. The conclusion can be made, however, that the relative yield reduction from the North and South Base stormwater treatment systems would be reflected as more than a 1 T/yr decrease sediment yield.

Additional analysis and support for the conclusion that post-project conditions reduce sediment yield from Intervening Zone 7000 to the level of the TOC are referenced to Appendix W.

Figure 15-6. Sediment Yields (T/yr) for Project Area Watersheds vs. Project Area TOCs

	Baseline	TOC	Project	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6
INT 7000	62	55	56	62	58	49	56	56
Madden	459	435	425	459	425	380	425	425
Homewood	828	865	799	828	777	814	784	784
Quail	152	147	151	152	149	136	149	150
Combined	1500	1502	1431	1500	1409	1379	1414	1415

Source: IERS 2010

Notes: Existing Sediment Yields are termed "Baseline" in this figure. The terms are used interchangeably.

Madden Creek Watershed. Sediment yield in Madden Creek watershed is currently 459 T/yr, which exceeds the Project Area TOC for this watershed (i.e., 435 T/yr) by 24 T/yr. Under the Proposed Project (Alternative 1) and Alternatives 3, 5 and 6, sediment yield would be reduced to 425 T/yr, which is below the Project Area TOC for Madden Creek watershed.

Homewood Creek Watershed. Sediment yield in Homewood Creek watershed is currently 828 T/yr, which is below its Project Area TOC (865 T/yr). Under the Proposed Project (Alternative 1) the sediment yield will be reduced to 799 T/yr and under

Alternatives 3, 5 and 6, sediment yield will be reduced to 777, 784 and 784 T/yr, respectively.

Quail Lake Creek Watershed. Sediment yield from Quail Lake Creek watershed is currently 152 T/yr, which exceed the Project Area TOC (147 T/yr) by 5 T/yr. Under the Proposed Project (Alternative 1) and Alternatives 3, 5 and 6, sediment yield will be reduced to 151, 149, 149 and 150 T/yr, respectively, but the sediment yield would still exceed the Project Area TOC for Quail Lake Creek watershed by 2 to 4 T/yr. This is likely within the expected error range of the CWE analysis as discussed above for Intervening Zone 7000, but because no supplemental analysis can be referenced in support of this conclusion, the impact is considered significant. Implementation of mitigation measure HYDRO-1f is recommended to reduce this impact to a level of less than significant.

Combined Compliance with CWE Project Area TOCs. Project Area TOCs for Madden Creek and Homewood Creek watersheds and Intervening Zone 7000 will not be exceeded under the Proposed Project (Alternative 1) and Alternatives 3, 5 and 6. Sediment yields from the Project area are expected to decrease through implementation of these alternatives, as supported by the CWE analysis results and conclusions summarized above and detailed in Appendix W. Implementation of the Proposed Project (Alternative 1) and Alternatives 3, 5 and 6 will reduce sediment yield in Quail Lake Creek watershed but could still result in exceedance of the Project Area TOC. This is a potentially significant impact that requires mitigation based on the evaluation criteria for HYDRO-1.

Mitigation: **HYDRO-1a. Design Water Quality Protection BMPs According to the California Stormwater Quality Association Stormwater BMP Handbooks and TRPA's Handbook of BMPs**

Water quality Best Management Practices (BMPs) shall be designed according to the California Stormwater Quality Association Stormwater Best Management Practice Handbooks for Construction, for New Development / Redevelopment, and/or for Industrial and Commercial, (and/or other similar source as approved by the Engineering and Surveying Department (ESD)).

Storm drainage from on- and off-site impervious surfaces (including roads) shall be collected and routed through specially designed catch basins, vegetated swales, vaults, infiltration basins, water quality basins, filters, etc. for entrapment of sediment, debris and oils/greases or other identified pollutants, as approved by the ESD. BMPs shall be designed at a minimum in accordance with the Placer County Guidance Document for Volume and Flow-Based Sizing of Permanent Post-Construction Best Management Practices for Stormwater Quality Protection. Post-development (permanent) BMPs for the project include, but are not limited to: underground water quality treatment vaults, infiltration galleries, sediment basins, bioretention areas and revegetation of disturbed areas. No water quality facility construction shall be permitted within any identified wetlands area, floodplain, or right-of-way, except as authorized by project approvals.

No water quality facility construction shall be permitted within any identified wetlands area, floodplain, or right-of-way, except as authorized by project approvals. All BMPs shall be maintained as required to insure effectiveness. The Project Applicant shall provide for the establishment of vegetation, where specified, by means of proper irrigation. Proof of on-going maintenance, such as contractual evidence, shall be provided to ESD upon request. Maintenance of these facilities shall be provided by the project owners/permittees unless, and until, a County Service Area is created and said facilities

are accepted by the County for maintenance. Contractual evidence of a monthly parking lot sweeping and vacuuming, and catch basin cleaning program shall be provided to the ESD upon request. Failure to do so will be grounds for discretionary permit revocation. Prior to Improvement Plan or Final Map approval, easements shall be created and offered for dedication to the County for maintenance and access to these facilities in anticipation of possible County maintenance.

HYDRO-1b. Storm Drain Stenciling

All storm drain inlets and catch basins within the Project area shall be permanently marked/embossed with prohibitive language such as "No Dumping! Flows to Creek" or other language as approved by the Engineering and Surveying Department and/or graphical icons to discourage illegal dumping. Message details, placement, and locations shall be included on the Improvement Plans. ESD-approved signs and prohibitive language and/or graphical icons, which prohibit illegal dumping, shall be posted at public access points along channels and creeks within the project area. The Homeowners' and/or Property Owner's association is responsible for maintaining the legibility of stamped messages and signs.

HYDRO-1c. Stormwater Routing for Refuse Management

All stormwater runoff shall be diverted around trash storage areas to minimize contact with pollutants. Trash container areas shall be screened or walled to prevent off-site transport of trash by the forces of water or wind. Trash containers shall not be allowed to leak and must remain covered when not in use.

HYDRO-1d. Inspection, Operations, Maintenance and Monitoring Plan for Stormwater Treatment Systems and Permanent BMPs

The Project Applicant shall prepare and implement an Inspection, Operations, Maintenance and Monitoring Plan for Stormwater Treatment Systems and Permanent BMPs. This plan shall comply with TRPA Code of Ordinances Chapter 25 and Chapter 81 and Lahontan's updated WDRs. TRPA, Lahontan, and Placer County shall review the plan prior to issuance of final Project approval. Post-project monitoring shall include post-project BMP effectiveness monitoring and stormwater monitoring as detailed below.

<u>Post-Project BMP Effectiveness Monitoring.</u> Revegetation/Landscaping and slope stabilizing measures shall be visually monitored annually for the first five years following construction to assess adequacy and effectiveness of BMPs. Additional BMPs shall be prescribed by the TRPA if existing treatments fail to protect the site from accelerated erosion. A qualified consultant or trained HMR staff (Note: completion of the TRPA contractor certification training is recommended) shall monitor restoration progress.

Visual monitoring of the condition and effectiveness of BMPs shall occur before and after storm events, and if necessary, corrective actions shall be taken. The contractor shall be required to maintain the effectiveness of the BMPs until the disturbed areas are stabilized and erosion is no longer a substantial threat. Restoration of disturbed areas shall be in accordance with the Restoration/Landscaping Plan.

<u>Post-Project Stormwater Monitoring.</u> Post-project stormwater monitoring shall be performed for comparison with pre-project monitoring results and for determination of compliance with State and TRPA discharge standards. Fine sediment shall be monitored as specified by TRPA and future Lake Tahoe TMDL research directives.

Monitoring results shall address the following components:

- Compliance of project area runoff with State and TRPA discharge standards;
- Stormwater treatment system effectiveness;
- Permanent BMP effectiveness;
- Revegetation/Landscaping effectiveness;
- Assessment of performance of strategies outlined in the Stormwater treatment calculations; and
- BMP and Stormwater treatment system maintenance regimes.

Miscellaneous Monitoring. Performance of LID strategies (pervious pavement and pavers, cisterns, heated walk ways, bioretention areas for stormwater treatment and revegetation of slopes to improve infiltration of runoff) shall be monitored in accordance with requirements and conditions outlined in the TRPA Project Permit.

Inspection and Maintenance Program. All stormwater treatment systems and permanent BMPs shall be visually inspected monthly and maintained as necessary to assure optimal performance of systems. A long-term maintenance program shall be developed as based on monitoring results.

Reporting. Monitoring results shall be submitted to TRPA in the Post-Project Bi-Annual Monitoring Report. Recommended reporting dates are December 1st to accommodate for winterization of the project area and stormwater quality reporting according to water year (i.e., October 1, 2010 to September 30, 2011 is Water Year 2011) and June 1st during spring runoff. The report shall summarize site conditions, maintenance activities, physical observation on water quality and the degree of sedimentation, if apparent. The report will include 6 months worth of observations and corresponding field measurements and laboratory analytical results.

Surface water that is infiltrated onto groundwater shall not exceed the TRPA and State discharge to land treatment limits:

- Total Nitrogen as N: 5 mg/L;
- Total Phosphorus as P: 1mg/L;
- Iron as Fe: 4 mg/L;
- Turbidity: 200 NTU; and
- Oil and Grease: 40 mg/L.

Surface water runoff discharged to Homewood Creek shall not exceed the TRPA surface runoff concentrations stated in Chapter 81 of the TRPA Code of Ordinances and the water quality objectives of the State for receiving waters outlined in the WDRs.

HYDRO-1e. Apply Project Security Fee Towards BMP and Stormwater System Improvements and/or Restoration Projects if Discharge Limits are Not Met

If post-project monitoring determines that TRPA or State discharge standards are exceeded, the TRPA Security Deposit shall be used to implement additional water quality treatment needs in Madden Creek, Quail Lake Creek and Homewood Creek watersheds and portions of Intervening Zone 7000. The Project Applicant and its contractors shall make repairs or improvements to the proposed permanent BMPs, LID strategies (pervious pavement and pavers, cisterns, heated walk ways, bioretention areas for stormwater treatment, and revegetation of slopes to improve infiltration if runoff) and

stormwater treatment systems to improve performance and effectiveness per TRPA and Lahontan requirements. If the repairs and/or improvements result in compliance with receiving water quality objectives and discharge to land treatment and surface water limits, then no additional mitigation is required.

HYDRO-1f. Restrict Development within Quail Lake Creek Watershed until Compliance with Project Area TOC

The Project proposes no development or change in existing conditions within this watershed. Based on exceedance of the Quail Lake Creek Project Area TOC, no development within Project area portion of the Quail Lake Creek Watershed shall be permitted until annualized total sediment (T/yr) is reduced to below the Project Area TOC (147 T/yr). The Project Applicant shall identify sediment source control and land coverage removal projects within this watershed that will be completed prior to implementation of capital improvements or other actions that create soil disturbance. The Project Applicant shall monitor the effectiveness of these projects and update the HMR CWE analysis for the Quail Lake Creek watershed based on the results.

BIO-9. Final Landscape/Revegetation Plan and Fertilizer Management Plan

The Project Applicant shall prepare and implement a landscape and fertilizer management plan for the Project area. This plan shall comply with TRPA Code of Ordinances Section 31.7 Landscaping Standards and Section 81.7 Fertilizer Management. The plan shall be reviewed and approved by TRPA and the Placer County Planning Department prior to issuance of the final Project approval.

See Impact BIO-9 in Chapter 8, Biological Resources for further description.

GEO-4a. Design Construction-related BMPs According to the California Stormwater Quality Association Stormwater BMP Handbooks and TRPA's Handbook of BMPs

See impact GEO-4 in chapter 14, Soils, Geology and Seismicity.

GEO-4b. Conform to Provisions of Placer County Grading, Erosion and Sediment Control Ordinance

See impact GEO-4 in chapter 14, Soils, Geology and Seismicity.

GEO-4c. Identify Stockpiling and/or Vehicle Staging Areas on Improvement Plans

See impact GEO-4 in chapter 14, Soils, Geology and Seismicity.

GEO-4e. Obtain NPDES Permit

See impact GEO-4 in chapter 14, Soils, Geology and Seismicity.

GEO-4f. Satisfy the requirements of Section II of the Land Development Manual. (LDM).

See impact GEO-4 in chapter 14, Soils, Geology and Seismicity.

After Mitigation: *Less than Significant Impact; Proposed Project (Alternative 1) and Alts 3, 5 and 6*

Temporary construction-related impacts to surface water quality will be avoided and reduced through implementation of effective, reasonable and appropriate measures (compliance measures) to protect water quality as required by federal, regional, State and local regulations and TRPA and NPDES permit requirements. Revegetation and

landscaping are required for all disturbed areas to protect and stabilize soils and thus minimize potential impacts to surface water quality and beneficial uses. Fertilizer management (i.e. mitigation measure BIO-9) will conform to TRPA Code of Ordinances Section 81.7 to minimize the potential for fertilizers to enter surface waters. Implementation of mitigation measures HYDRO-1a, 1b and 1c and GEO-4a, 4b, 4c and 4e, respectively, assure that permanent BMPs are designed to proven effectiveness levels identified in the California Stormwater Quality Association Stormwater BMP Handbooks, that storm drain inlets are marked to discourage illegal dumping, that stormwater runoff is diverted around trash storage areas, and that final grading plans conform to Placer County grading and erosion control ordinance.

The degree of surface water quality improvement is based on engineering design objectives (e.g. Vortech treatment vault and Contech Stormfilter specifications), sediment models (e.g. project area LSCP base area loading and HMR CWE sediment yield exercises), BMP and stormwater treatment effectiveness ratings, and best available science (Referenced to IERS 2010; Grismer 2010; Ballestero, T.P. et al. 2009; Clear Creek Solutions 2005; Kennedy Jenks Consultants 2007; NDOT 2006; Praul and Sokulsky 2008; Roseen et al 2009; Puget Sound Action Team 2005; USEPA 2000; Hood et al. 2007; Funkhouser 2007; Montalto et al. 2007). Post-project monitoring, to be outlined as a requirement of mitigation measure HYDRO-1d, will determine the degree of predicted improvements to surface water quality and ensure that stormwater treatment systems and permanent BMPs are maintained to the highest levels of effectiveness.

If the appropriate plans are approved and post-project monitoring (HYDRO-1d) determines compliance, project design and recommended mitigation measures are effective in reducing ski area operational impacts to surface water quality, then long-term impacts are reduced to a level of less than significant. Should post-project monitoring determine that measures are ineffective, mitigation measure HYDRO-1e shall be implemented, which requires the application of the TRPA project security fee towards replacement, expansion and/or upgrade of BMPs and stormwater treatment systems to maintain surface water quality and beneficial uses. If monitoring shows WQOs are continually exceeded, the Project Applicant will be required to make repairs or improvements to BMPs and stormwater treatment systems to improve effectiveness per TRPA permit requirements and WDRs. If WQOs continue to be exceeded, the Project will be subject to Lahontan and TRPA directives towards the upgrade and/or expansion and/or replacement of the installed stormwater treatment systems. These additional measures, if necessary, will ensure continued efforts toward installation and maintenance of effective, reasonable and appropriate measures to protect surface water quality and beneficial uses.

Impact: **HYDRO-2: Will Project construction or operation alter the existing surface water drainage patterns or cause increased runoff resulting in flooding or stream bank erosion or contribute runoff in rates or volumes that will exceed the capacity of existing or planned storm water drainage systems so that a 20-year, 1-hour storm runoff (approximately one inch per hour) cannot be contained on the site?**

Analysis: *Significant Impact; No Project (Alternative 2)*

Snow storage management was upgraded at HMR and stormwater treatment systems were installed in the South and North Base areas in 2006. The existing systems were permitted by TRPA and Lahontan and are assumed to capture and treat the 20-year, 1-hour peak runoff volume based on permitting conditions and on the absence of overflow from the current systems. Revegetation of ski trails and restoration of Project area roadways have reduced erosion on the upper mountain (IERS 2008), and changes in ski area operations management, such as establishing setbacks for snow storage and improving road crossings, have been made to protect Project area SEZs and stream channels.

New construction will not occur under the No Project Alternative, but continued operations of the resort could contribute to streambank erosion downstream of the Project area, as noted in the Stream Channel and Baseline Water Assessment (Kleinfelder, Inc. 2007). Existing structures will not be removed from the TRPA-delineated SEZ or 100-year FEMA flood hazard zone in the South Base area and day lighting of this reach of Homewood Creek will not occur. Existing flood risk within the Project area and to downstream private residences will persist. Based on evaluation criteria for Impact HYDRO-2, this is a significant impact.

The existing impact to surface water drainage patterns is significant based on baseline conditions, which indicate degradation of streambanks and incised channel conditions downstream of the South Base portion of the Project area (Kleinfelder 2007). Under the No Project (Alternative 2), existing impacts to Homewood Creek alignment and channel instability will persist.

Mitigation: No mitigation is available.

After Mitigation: *Significant and Unavoidable Impact; No Project (Alternative 2)*

The existing culvert conveying Homewood Creek under the Placer County Tahoe Ski Bowl Way ROW through the South Base area poses flood risk potential within the Project area and to private residences downstream. Existing flood risk and existing impacts to Homewood Creek channel stability will persist if reconfiguration of the South Base area and concurrent SEZ restoration does not occur for compliance with TRPA and Placer County set back requirements. The level of impact remains significant and unavoidable based on non-compliance with TRPA codified regulations. For purposes of Placer County, there would be no change in conditions, and therefore no impact.

Analysis: *Significant Impact; Proposed Project (Alternative 1) and Alternative 3*

Construction and operation of the Proposed Project (Alternative 1) or Alternative 3 will not cause increased runoff resulting in flooding or stream bank erosion or contribute runoff in rates or volumes that will exceed the capacity of existing or planned storm water drainage systems so that a 20-year, 1-hour storm runoff (approximately one inch per hour) cannot be contained on the site. Stormwater treatment systems are proposed to capture, treat, and infiltrate a minimum of the 20-year, 1-hour storm volume on-site; thus

removing this stormwater volume from entering existing stormwater systems downgradient from the North Base area and Homewood Creek in the South Base area. Stormwater treatment system capacities are maximized for measured site conditions.

The current surface water drainage patterns of Homewood Creek will be altered through the removal of the existing culvert under Tahoe Ski Bowl Way in the South Base area. The Proposed Project (Alternative 1) and Alternative 3 will implement the Homewood Creek SEZ Restoration project in the South Base area for improvements to existing surface water drainage patterns and stream bank and channel conditions and to alleviate flood risk within the Project area and to private residences down stream. Figures 15-7, 15-8, and 15-9 were prepared by Nichols Consulting Engineers to analyze the potential downstream impacts of removing the existing culvert crossing at Tahoe Ski Bowl Way and replace it with a bottomless arch bridge crossing. Figure 15-7 shows the calculated pre- and post-project 100-year flood plain for Homewood Creek. Removal of the culvert will improve the existing condition, which currently overtops the roadway during a 100-year event. The proposed bridge crossing will convey the 100-year peak flow without overtopping the roadway, and there will be no downstream impacts to existing structures or property, as the creek attenuates to the 100-year water surface elevation prior to leaving the Homewood property.

Section VI (Drainage Systems, Item 2. Design Storms) of the Placer County Stormwater Management Manual (SWMM) (Placer County 1990) requires that new development be planned and designed so that no damages occur to structures or improvements during the 100-year/1-hour storm and no inundation on private property occurs during the 10-year/1-hour event. The 10-year, 1-hour storm is the minimum design storm for new developments in drainages and dedicated drainage facilities in Placer County. The Project's systems are sized in excess of this event to meet the minimum TRPA 20-year/ 1-hour storm volume capacities. The development plans must identify the effects of the 100-year/1-hour storm and provision be made in the plan to prevent loss of life and damages to property during a 100-year, 1-hour storm.