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January 15, 2021

Mr. Rob Tucker
Senior Water Resource Control Engineer
Lahontan Regional Water Quality Control Board
2501 Lake Tahoe Boulevard
South Lake Tahoe, CA 96150

Re: Heavenly Mountain Resort 2020 Environmental Monitoring Program Annual Report

Dear Mr. Tucker:

Enclosed, please find for your review the Environmental Monitoring Program Annual Report for the 2020 water year submitted in fulfillment of the monitoring and reporting requirements set forth in the California Regional Water Quality Control Board Lahontan Region Monitoring and Reporting Program No. 2015-0021 for Heavenly Ski Resort. This report also fulfills the fourth quarter sampling, covering the months of July, August and September 2020. The annual reporting requirements and location found in the report are listed below:

- Water Quality Monitoring Results and Laboratory Analysis for 4th Quarter (Appendix A)
- Storm Vault Water Quality Monitoring Results and Laboratory Analysis (Appendix B)
- California Parking Lot Vault Inspection Reports (Appendix C)
- Facilities Maintenance Monitoring for 4th Quarter (Appendix D)
- Deicer and Abrasives Application and Recovery (Appendix D)
- 2020 Road Monitoring (Appendix E)
- Facilities/Watershed Awareness Training (Appendix F)
- On-Mountain Photo Monitoring (Appendix G)

Should you require additional information or have questions regarding this report and its contents, please contact Chris Donley of Cardno at 208-272-9178.

Sincerely,

DocuSigned by:
Tom Fortune
4527A03B0D8A496...

Tom Fortune,
Vice President and General Manager

Cc: Stephanie Heller, USDA Forest Service LTBMU
Julie Roll, Tahoe Regional Planning Agency

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Date: January 15, 2021

California Regional Water Quality Control Board
Lahontan Region
2501 Lake Tahoe Boulevard
South Lake Tahoe, CA 96150

Facility Name: Heavenly Mountain Resort

Address: Post Office Box 2180
Stateline, Nevada 89449

Contact Person: Tom Fortune

Job Title: Vice President & General Manager

Phone: (775) 586-2311

Email: tfortune@vailresorts.com

WDR/NPDES Order Number: R6T-2015-0021

WDID Number: 6A090033000

Type of Report (circle one)**:** Monthly Quarterly Semi-Annual **Annual** Other

Month(s) (circle applicable month(s)*:

JAN FEB MAR APR MAY JUN
JUL AUG SEP **OCT** NOV DEC

***Annual Reports** (circle the first month of the reporting period)

Year: Water Year 2020

Violation(s)? (Please check one)

NO _____ **YES*** X

***If YES is marked complete a-g (Attach Additional information as necessary)**

a) Brief Description of Violation:

1. Heavenly Valley Creek station 43HVC-1A, Sky Meadow's site, has an annual average value exceedance of the Lahontan standards for: Total Phosphorus and Chloride.
2. Heavenly Valley Creek station 43HVC-2, Below Patsy's site, has an annual average value exceedance of the Lahontan standards for: Total Phosphorus and Chloride.
3. Heavenly Valley Creek station 43HVC-3, Property Line site, has an annual average value exceedance of the Lahontan standards for: Total Phosphorus and Chloride.
4. Bijou Park Creek station 43HVC-4, CA Parking Lot site, has annual average exceedances of the Lahontan standards for: Total Nitrogen, Total Phosphorus, and Chloride.

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5. California Parking Lot Filter Vault Effluent Point station 43HVP-2, exceeded not to exceed limits of the Lahontan standards in Water Year 2020 for: Turbidity and Total Nitrogen.

b) Section(s) of WDRs/ NPDES Permit Violated:

Board Order No. R6T-2015-0021, WDID NO. 6A090033000

c) Reported Value(s) or Volume:

43HVC-1A: *Total Phosphorus:* 0.018 mg/L
Chloride: 0.55 mg/L

43HVC-2: *Total Phosphorus*: 0.021 mg/L.
Chloride: 0.89 mg/L

43HVC-3: *Total Phosphorus*: 0.021 mg/L.
Chloride: 1.06 mg/L

43BPC-4: *Total Nitrogen:* 0.516 mg/L
Total Phosphorus: 0.100 mg/L
Chloride: 56.2 mg/L

43HVP-2: (Results from storm sample during the 3th Quarter)
Turbidity: 49 NTU
Total Nitrogen: 0.60 mg/L

d) WDRs/NPDES Limit/Condition:

Maximum receiving water concentrations for discharge in the Heavenly Valley Creek watershed to Trout Creek (Applies to 43HVC-1A, 43HVC-2, 43HVC-3 and the reference site 43HDVC-5):
Total Nitrogen: 0.19 mg/L
Total Phosphorus: 0.015 mg/L
Chloride: 0.15 mg/L
Total Suspended Solids: 60 mg/L[2]

Effluent limits for surface water runoff in the Lake Tahoe Hydrologic Unit and Additional Receiving Water Limits for Lake Tahoe (Applies to the Bijou Park Creek Site 43BPC-4):

Turbidity: 20 NTU[1]
Total Nitrogen: 0.15 mg/L
Total Phosphorus: 0.008 mg/L
Chloride: 3.0 mg/L
Total Suspended Solids: 60 mg/L[2]

Maximum concentrations not to exceed for discharge to surface waters in the Lake Tahoe Hydrologic Unit (Applies to the Effluent Storm Filter Site 43HVP-2):
Turbidity: 20.0 NTU
Total Nitrogen: 0.5 mg/L
Total Phosphorus: 0.10 mg/L
Oil and Grease: 2.0 mg/L

[1]The turbidity maximum surface water runoff effluent value is based on the average daily samples collected from a single discharge point for the Lake Tahoe Hydrologic Unit.
[2]Total Suspended Solids (TSS) value based on Lake Tahoe Basin 90th percentile value, equivalent to TRPA's regional environmental threshold carrying capacity standard.

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e) Date(s) and Duration of Violation(s): Water Year 2020 (October 1, 2019 – September 30, 2020)

f) Explanation of Cause(s):

Heavenly Valley Creek – Annual averages for total phosphorus and chloride were exceeded at each of the three sampling locations along Heavenly Valley Creek (43HVC-1A, 43HVC-2, and 43HVC-3). The annual average for total phosphorus and chloride were also exceeded at the reference reach sampling location (43HDVC-5). Annual averages for phosphorus were slightly greater at the reference reach than at any sampling locations along Heavenly Valley Creek. Daily grab samples along Heavenly Valley Creek for total nitrogen did not exceed the state standard value on any sampling dates during the water year. Heavenly Mountain Resort operations are not solely responsible for water quality exceedances since the back ground levels at the reference reach site are also above the state standard. Samples could not be collected at Sky Meadows (43HVC-1A) and at Patsy's (43HVC-2) on three occasions because of restricted on-mountain access due to COVID-19 resort closure. However, the most downstream sampling location on Heavenly Valley Creek (Property Line, 43HVC-3), was sampled on all occasions.

Bijou Park Creek – Annual averages for total nitrogen, total phosphorus and chloride exceeded the state standard for the below California Parking Lot sampling site along Bijou Park Creek (43BPC-4). Total phosphorus and chloride values were also exceeded at the reference site along Hidden Valley Creek (43HDVC-5); however, the annual averages for Bijou Park Creek (43BPC-4) are well above the reference reach exceedance values.

California Parking Lot Filter Vault Effluent Sampling Location (43HVP-2) – Turbidity and total nitrogen exceeded the state standards for the only sample collected during water year 2020. These parameters were also in exceedance of the standard at the two inlet locations (43HVP-1A and 43HVP-1B). Comparison of the inlet and effluent concentrations shows limited reduction in total phosphorus and chloride constituents; however, filtration through the vaults with regards to turbidity and total nitrogen was inconclusive. Oil and grease values were considered estimates and non-detect results provide no data review. Annual maintenance of the vaults and cartridge replacement continued in 2020 (July 2020), however storm and snow melt runoff samples through the vault and filtration system continue to be in exceedance and problematic. The Bijou Park Creek Evaluation Report, submitted with the Comprehensive Report in January 2017, outlines additional vault improvement recommendations that Heavenly should undertake in the future to help improve the filter vault water quality results.

g) Corrective Action(s): (Specify actions taken and a schedule for actions to be taken)

Heavenly swept and collected abrasives (Washoe Sand and salt) from the parking lot following resort activities during a break in the storms during the winter, however, resort closures and stay-at-home orders prevented continued abrasive collection through the spring. Heavenly applied 495 gallons of liquid brine prior to storms in lieu of abrasives. This is the most volume of brine Heavenly has been able to utilize since application began during the 2017 ski season. Continued sampling should show the effects of liquid brine rather than abrasives on downstream water quality.

During the fourth quarter, Heavenly inspected the vaults/filters, replaced filters, conducted vault maintenance, and removed excess debris within the vaults. In the past this level of effort, including filter replacement, has led to cleaner water quality samples. However, with only a single vault sampled collected during the 2020 water year, drawing conclusions regarding the filtration effectiveness of timing of filter replacement is difficult. In the future, additional samples should be collected over the course of the year to provide quantitative data towards

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improving the system.

During the 2020 summer construction season, Heavenly repaired and paved 52,000 ft^2 of deteriorating parking surfaces at base area parking lots. 47,000 ft^2 of the Boulder parking lot was paved, and 260 linear feet of K-rail was installed at the west end to the parking lot to prevent snow storage and melt from running off onto slope adjacent to Edgewood Creek. These parking lot improvements should improve future water quality results. Ongoing deterioration of the pavement at parking lots likely increases the sediment (and nutrient loading) into the creek and vault systems, therefore continued maintenance, repairs, and repaving is important to limit parking lot contributions downstream.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision following a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my knowledge of the person(s) who manage the system or those directly responsible for data gathering, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

If you have any questions or require additional information, please contact Tom Fortune at the number provided above.

Sincerely,

Signature: DocuSigned by: Tom Fortune 4527A03B0D8A496...

Name: Tom Fortune

Title: Vice President & General Manager

Environmental Monitoring Program Annual Report

Heavenly Mountain Resort—Water Year 2020

January 15, 2021

Cardno®

Document Information

Project Name	Environmental Monitoring Program Annual Report Heavenly Mountain Resort—Water Year 2020
WDID Number	6A090033000
Job Reference	E319401100
Date	January 2021

Prepared for

Heavenly Mountain Resort
224 Kingsbury Grade, (State Route 207), Suite 202, Stateline, NV 89449

Submitted to:

Lahontan Regional Water Quality Control Board
2501 Lake Tahoe Boulevard, South Lake Tahoe, CA 96150
&

Lake Tahoe Basin Management Unit (LTBMU) USFS
35 College Drive, South Lake Tahoe, 96150 CA

Prepared by:

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Project Manager Chris Donley

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Tables

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Acronyms

Annual Report	Environmental Monitoring Program Annual Report
BMI	benthic macroinvertebrate
BMP(s)	best management practice
cfs	cubic feet per second
City	City of South Lake Tahoe
CSCI	California Stream Condition Index
EIR/EIS	environmental impact report / environmental impact statement
ESIBI	Eastern Sierra Index of Biological Integrity
kg	kilogram
Lahontan	Lahontan Regional Water Quality Control Board (of the state of California)
LTBMU	Lake Tahoe Basin Management Unit (US Forest Service)
LWD	large woody debris
mg/L	milligram/liter
mmhos	millimhos per centimeter
MMP	Mitigation and Monitoring Plan
Monitoring Program	Water Quality and Best Management Practices Monitoring Program
ND	non-detect
NDEP	Nevada Division of Environmental Protection
NTU	nephelometric turbidity units
SCI	stream condition inventory
SWE	snow water equivalent
TMDL	Total Maximum Daily Load
TRPA	Tahoe Regional Planning Agency
TSS	total suspended sediment
USDA	US Department of Agriculture
USFS	US Forest Service
Vail Resorts	Vail Resorts, Inc.
WDR	Waste Discharge Requirements
ZPG™	Zeolite, Perlite and Granular Activated Carbon media

1 Introduction

Vail Resorts, Inc. (Heavenly), operates Heavenly Mountain Resort located on lands mostly owned or administered by the US Forest Service (USFS), Lake Tahoe Basin Management Unit (LTBMU).This Environmental Monitoring Program Annual Report (Annual Report) summarizes monitoring and evaluation activities conducted at Heavenly Mountain Resort during water year 2020 as a result of the implementation of the Water Quality and Best Management Practices Monitoring Program (Monitoring Program), a component of the Heavenly Mountain Resort Master Plan (Parsons1996) and the Heavenly Mountain Resort Master Plan Amendments (Parsons 2007, Hauge Breuek 2015). Submittal of this Annual Report is in partial fulfilment of monitoring and reporting requirements set forth by the Lahontan Regional Water Quality Control Board (Lahontan) in Monitoring and Reporting Program Order No. R6T-2015-0021.

The Monitoring Program was originally developed and implemented by USFS as part of the Heavenly Master Plan Draft Environmental Impact Statement (USFS 1996) and was later incorporated into the Heavenly Ski Resort Master Plan as Chapter 7 (Parsons 1996). In 2003, Lahontan issued a revised Board Order and a revised Monitoring Plan. In 2005, monitoring and reporting duties were transferred from USFS to ENTRIX, Inc. (now Cardno), which was retained by Heavenly. The stipulations in the 2007 amendment to the Heavenly Mountain Resort Master Plan, approved by the Tahoe Regional Planning Agency (TRPA) on April 25, 2007, went into effect and began the implementation stage of the plan by Heavenly in collaboration with Lahontan, USFS, and TRPA. Modifications in the Master Plan Amendment included the incorporation of all mitigation monitoring into a single report that is to be submitted annually in May to TRPA, USFS, and Lahontan. The Mitigation and Monitoring Report schedule and submittal is ongoing and due annually.

Because of newly proposed on-mountain expansion plans, a joint environmental document was developed and approved in spring 2015 (Hauge Brueck 2015), as an amendment to the Master Plan. The joint environmental document followed the past report format and submittal and provided updated and refined mitigation measures from the previous Master Plan (where appropriate). The Master Plan represents a comprehensive 20-year development plan for Heavenly Mountain Resort. Master Plan and Master Plan Amendment implementation objectives of Heavenly, TRPA, and USFS regarding protection of the environment include the following (Parsons 1996):

- Making optimal use of the natural attributes of the site without creating a significant impact on the environment (Heavenly);
- Restoring the health of sub-watersheds and other natural resource values disturbed by past activities (Heavenly);
- Protecting the environmental quality of the area (USFS);
- Providing a quality ski experience within the resort with ski runs and other disturbed areas stabilized to reduce the potential for soil erosion (USFS);
- Improving the visual quality of the area (USFS); and
- Providing for long-term preservation and restoration of Stream Environment Zones (TRPA).

The requirements of the annual Monitoring Program reports remain the same, following approval of the Master Plan Amendment. As the California Environmental Quality Act lead agency, Lahontan is the responsible party for ensuring all mitigation measures are implemented in compliance with the program. Lahontan recognizes “another agency (Forest Service or TRPA) has responsibilities for ensuring implementation” for monitoring mitigation measures outside its authority.[1] As with prior Annual Reports,

[1] California Regional Water Quality Control Board-Lahontan Region. 2015a. Board Order No. R6T-2015-0021. WDID No. 6A090033000.Waste Discharge Requirements for Heavenly Mountain Resort (pages 16–17).

the Best Management Practices Monitoring Program Report will be submitted with the TRPA's Annual Mitigation and Monitoring Report due on May 1 of the following year, i.e., May 2021.

Implementation of the Collection/Monitoring Agreement between Heavenly and the USFS (Monitoring Program) provides sufficient data to determine compliance with agency water quality standards and validate the efficiency of management practices in protecting against adverse cumulative watershed effects.

1.1 Location

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 USFS and Heavenly. Heavenly operates on National Forest System lands under a special use permit that was renewed in 2002 for a period of 40 years. Heavenly has had a USFS special use permit from USFS since 1955. In 2002, the current owner Vail Resorts, Inc., acquired Heavenly Mountain Resort.

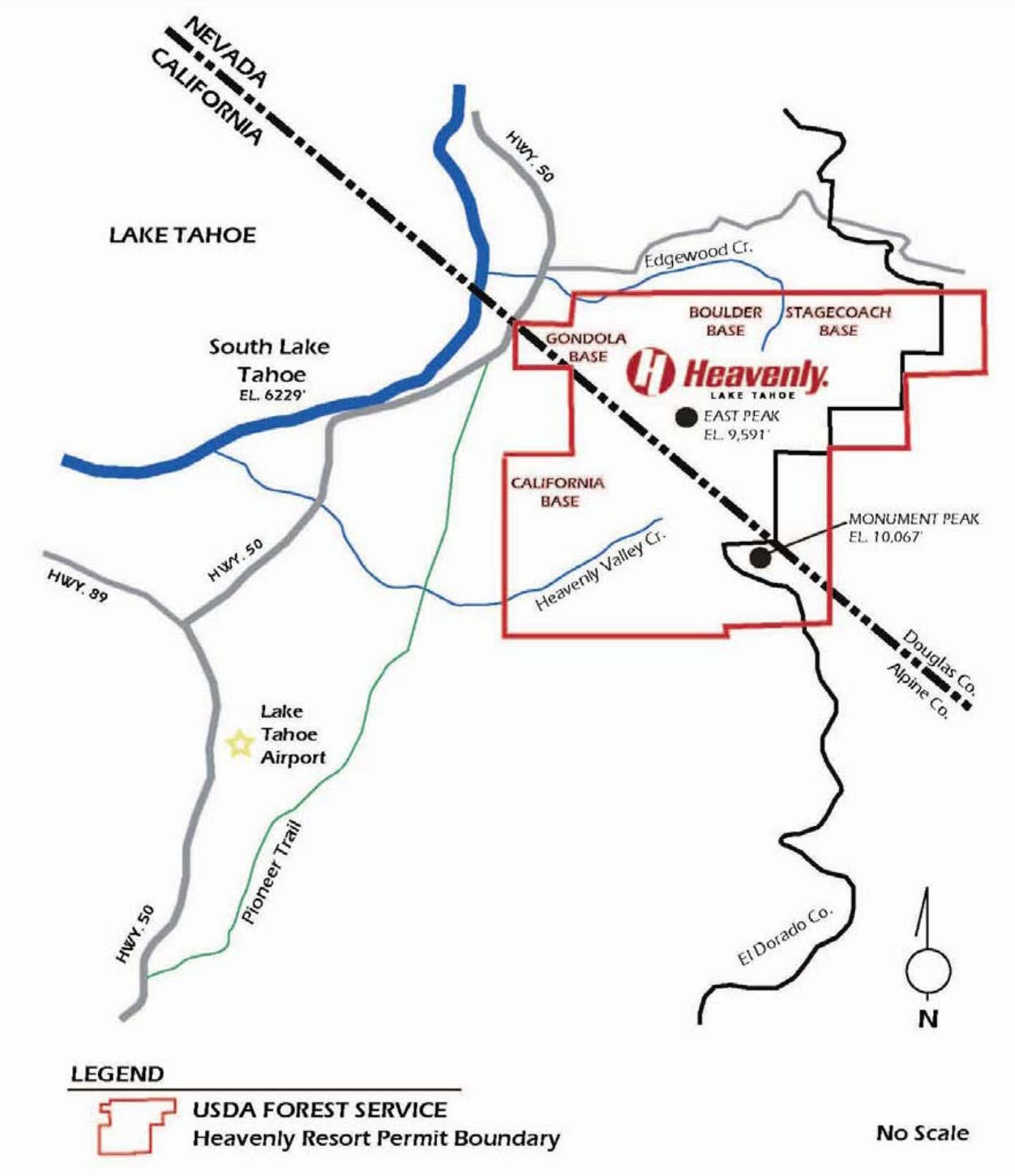
The California/Nevada state line divides the special use permit boundary with approximately 60 percent of the ski area in Nevada and 40 percent in California. Approximately 60 percent of Heavenly Mountain Resort falls under the jurisdiction of TRPA in the Lake Tahoe Basin (Parsons 1996).

1.2 Environmental Monitoring Program

The overall objective of the Environmental Monitoring Program is to evaluate and monitor water quality and overall ecological health of Heavenly Mountain creeks and watersheds while satisfying California, Nevada, and TRPA regulatory water quality requirements. Originally, the Environmental Monitoring Program included the following five major components (USFS 1996):

- Water quality monitoring to comply with regulatory monitoring requirements;
- ~~Soil cover monitoring to gain understanding of how to prevent soil loss and protect water quality~~ (see Hauge Brueck 2015 for this revision);
- Monitoring to determine best management practices (BMP) effectiveness under the various conditions at the ski area;
- Riparian conditions monitoring to determine riparian area response to Heavenly Mountain Resort activities; and
- Overall watershed condition and trend monitoring.

Four of the objectives of the Environmental Monitoring Program have not changed; however, amendments and modifications regarding the objectives have been implemented with acceptance of the joint environmental document (Hauge Brueck 2015), so soil cover monitoring was removed as a standalone objective because of the difficulty monitoring and assessing improvement. This objective is now covered under BMP monitoring (hot spot and roadways monitoring) and overall watershed condition monitoring.



Source: Parsons (2007)

Figure 1-1 Location of Heavenly Mountain Resort

1.3 Mitigation and Monitoring Plan

The Mitigation and Monitoring Plan (MMP) was Chapter 7 of the Draft Master Plan Amendment (updated in 2007). Revised measures were addressed in the joint environmental document and replace and update the Heavenly Master Plan measures (Hauge Brueck 2015). The MMP was designed to satisfy the requirements of Lahontan Board Order No. R6T-2015-0021. The MMP addresses the four objectives planning measures stated above. Key plan requirement updates are summarized as below. Updated Heavenly Valley Creek Total Maximum Daily Load (TMDL) targets included in the Lahontan Board Order No. R6T-2015-0021 are presented in Table 1-1.

Table 1-1 Heavenly Valley Creek Sediment TMDL Targets

Parameter	Target	Section/Report Reference
Instream sediment load	Maximum of 58 tons/year as a 5-year rolling average, as measured at the Property Line sampling station	2020 results presented in Section 2.4 of this report.
Stream Condition Index	Rating of "Good" or better[1]	2020 monitoring results presented in Section 3.2 of this report Long-term trend analysis discussed in the 5-year comprehensive report (due in January 2022 for water years 2017–2021)
Benthic macroinvertebrate health	Improving trend in benthic macroinvertebrate community metrics within conditions comparable to Hidden Valley Creek	2019 monitoring results presented in Section 3.3 of this report (the most recent results based on the required sampling schedule Long-term trend analysis will be discussed in the 5-year comprehensive report
Best management practices effectiveness	Rating of *Good* or better[1]	These ratings are discussed in detail in Chapters 3, 4, and 5 of that included in an appendix of the annual Mitigation and Monitoring Plan Annual Report, and are report.
Watershed Maintenance and Restoration Program	Rating of *Good* or better[1]	Implementation ratings are discussed in detail in Chapters 3, 4, and 5 of the annual Mitigation and Monitoring Plan Annual Report and presented in an appendix.

[1] Rating criteria for these parameters are included in Attachment C of Lahontan Board Order No. R6T-2015-0021.

1.3.1 Water Quality Monitoring

Lahontan Board Order Number R6T-2003-0032 updated waste discharge requirements, monitoring, and reporting in 2003. The Monitoring and Reporting Program was amended in 2011 under Board Order Number 2003-0032A1 and again in November 2013 under Board Order Number 2003-0032A2 (California Regional Water Quality Control Board, Lahontan Region 2011, 2013). In conjunction with the joint environmental document (Hauge Brueck 2015) to protect water quality, Lahontan rescinded Board Order Number R6T-2003-0032 with the passage of new Board Order Number R6T-2015-0021 (May 14, 2015).

The new Monitoring Program includes water quality monitoring at five California stream sampling stations and three California Base parking area StormFilter™ sampling stations. Monitoring and sampling is stated to occur at all California stream sites monthly as safety and stream flows permit. During the spring snowmelt period, sampling is to occur bi-weekly (every two weeks). Five runoff-sampling events at each of the three California Base parking area StormFilter™ sampling station will be conducted to collect data regarding rainfall and snow runoff and to assess performance of the StormFilters™.[2]

[2] California Regional Water Quality Control Board-Lahontan Region. 2015b. Monitoring and Reporting Program No. 2015-0021 WDID NO. 6A090033000 for Heavenly Mountain Resort (pages 1-2).

Results and discussion are reported to Heavenly, TRPA, and Lahontan in this Annual Report, with data included in Appendices A, B, and C. Constituents are identified in the Monitoring Program for sampling at each of the stations. The following primary list of constituents are monitored at each of the receiving water sampling stations:

- Discharge (flow)
- Turbidity
- Suspended sediment
- Total nitrogen (total Kjeldahl nitrogen + nitrate + nitrite)
- Total phosphorus
- Chloride

The following additional constituents are sampled at sampling stations in Nevada, based on Nevada Division of Environmental Protection (NDEP) and USFS requirements:

- Specific conductivity
- Soluble reactive phosphorus
- Dissolved phosphorus

Results of the influent and effluent samples collected from the StormFilters™ at the California Base parking lot will be used to monitor the following constituents:

- Oil and grease with silica gel treatment
- Total nitrogen (total Kjeldahl nitrogen + nitrate + nitrite)
- Total phosphorus
- Turbidity
- Chloride

1.3.2 Best Management Practices Effectiveness

The Environmental Monitoring Program includes BMP monitoring to determine the effectiveness of the BMPs in preventing soil erosion and protecting water quality under various conditions. The BMP component of the Environmental Monitoring Program was developed and initiated by LTBMU in 2004. Resource Concepts Inc. assisted with finalizing the monitoring methods and began conducting the monitoring in 2005 through the Revised Environmental Monitoring Program (December 2005) as set forth in the 1996 Master Plan and the approved Master Plan Amendment (Parsons 2007). The joint environmental document (Hauge Brueck 2015) included updates to the Environmental Monitoring Program at Heavenly Mountain Resort, while the current Lahontan Waste Discharge Requirements (WDR) (May 2015) provide additional monitoring requirements. The Watershed Maintenance and Restoration Program (WMRP) updates the requirement for status updates of restoration/mitigation projects and annual hot spot assessments on the mountain. This monitoring and reporting effort complies with regulatory jurisdictions Lahontan, TRPA, NDEP, and USFS.

Resource Concepts Inc. is currently implementing the BMP monitoring. Implementation and monitoring results for both temporary and permanent BMPs for the 2020 construction season (through the end of November 2020) will be presented in the TRPA Annual Mitigation and Monitoring Report submitted in May 2021 as outlined by the WDR.

1.3.3 Riparian Condition Monitoring

WDR outline the following sampling schedule and monitoring requirements for stream condition inventory (SCI) collection and macroinvertebrate monitoring to assess the desired conditions for Heavenly Valley Creek[3]:

- Over time, show a trend of increasing stability in channel morphology; and
- Over time, there should be improving trends in benthic macroinvertebrate (BMI) community metrics, approaching conditions in Hidden Valley Creek.

Since inception, the Riparian Condition Monitoring Program has evolved with many of the changes captured in Riparian Conditions Monitoring Plan developed by ENTRIX (now Cardno) in 2005. These monitoring efforts were implemented in 2006, 2009, 2011, 2015, and 2019. *The Environmental Monitoring Program Comprehensive Report – Heavenly Mountain Resort Water Years 2012–2016* discussed both the past monitoring schedule and the monitoring results (Cardno 2017). The 2019 monitoring effort included the Edgewood and Daggett Creeks reaches to continue to align with the California stream surveys. The 2019 collected data were presented in last year's report (*Environmental Monitoring Program Annual Report – WY 2019),* and trend analysis and comparison of data sets will be addressed in the next Comprehensive Report (due January 2022). The next schedule for SCI monitoring will occur in 2023 in compliance with the WDR requirement for monitoring once every four years.

Macroinvertebrate monitoring occurs on a two-year, on/off-cycle that began in 2006 (2006–2007, 2010–2011, 2014–2015, and 2018–2019). The historical methodology, sampling schedule, and data are included in *The Environmental Monitoring Program Comprehensive Report – Heavenly Mountain Resort Water Years 2012–2016*. As discussed in the Comprehensive Report, Cardno and Heavenly collected additional BMI samples from the Sky Meadows reach along Heavenly Valley Creek and from the Upper Hidden Creek reach in 2016 to provide data for comparison and baseline analysis. The 2016 sampling results were included in the *Environmental Monitoring Program Annual Report – WY 2017* because they were not yet available to be included in the Comprehensive Report. The 2019 sampling results for all sites are included in Section 3.1 of this report because the sampling results were not yet available at the time of the 2019 Annual Report.

In accordance with the WDR and Monitoring and Reporting Program, macroinvertebrate monitoring for all three reaches along Heavenly Valley Creek (Sky Meadows, Pasty's, and Property Line) and the baseline/reference reaches at Lower Hidden Valley Creek and Upper Hidden Valley Creek is expected to occur again during the summer of 2022. The latest Monitoring and Reporting Program includes additional stream samples for pebble counts and cobble embeddedness in conjunction with BMI sampling. This protocol was first incorporated into the 2018 sampling effort and will continue to be included in future sampling efforts. Results of 2019 pebble count and cobble embeddedness monitoring are included in Section 3.

1.3.4 Condition and Trend Monitoring

Condition and trend monitoring encompasses a number of requirements outlined in the Monitoring and Reporting Program. Monitoring requirements pertinent to the Annual Report are listed below with further discussion and annual results are presented below.

1.3.4.1 Facilities Maintenance Monitoring

As required by the Mitigation and Reporting Program in the WDR, the operation and maintenance program requires quarterly inspection at all lodges, maintenance shops and paved parking areas where

[3] California Regional Water Quality Control Board-Lahontan Region. 2015b. Monitoring and Reporting Program No. 2015-0021 WDID NO. 6A090033000 for Heavenly Mountain Resort. Attachment A: Heavenly Mountain Resort Epic Discovery Project Environmental Impact Report (CEQA), page 8.

snow removal and deicing activities are conducted[4]. At a minimum, storm water collection facilities and erosion control and sediment vaults are inspected for damage, blockage, and sediment build-up. If required, corrective measures are documented. In a good faith effort, Heavenly provides monthly inspections of the California Base lodge parking lot facility. Fourth quarter facilities and maintenance inspection monitoring logs covering the months of July, August, and September are included in Appendix D. Detailed discussion of the monitoring findings are discussed below in Section 4. During the summer months when on-mountain vehicular access is available, Heavenly photo monitors on-mountain erosion control and drainage infrastructure for documentation and potential maintenance concerns, as included in Appendix G. See Section 9 for additional information regarding on-mountain monitoring.

1.3.4.2 Snow Conditioning and Snowmaking Materials

Heavenly actively tracks and reports monthly snow conditioning totals. During the winter, huck salt is added on and around pedestrian walkways and heavily congested areas to prevent slip and falls. In addition, huck salt can be applied in terrain parks at jump feature interfaces (lips) to melt the very top snow layer, which essentially freezes and hardens to increase the longevity and durability of the snow at the jump. No snow enhancement chemicals or additives were used around the lodges and on the mountain slopes during the third or fourth quarter of water year 2020, and huck salt usage was limited during the second quarter because of the resort closure in mid-March due to the COVID-19 pandemic. No on-mountain snow operations occurred during the fourth quarter (July, August, and September) because these months are typically the warmest and driest of the water years. Similarly, snowmaking did not occur during the fourth quarter, although Heavenly does not add any additional snowmaking enhancement chemicals during snowmaking. Heavenly's snowmaking equipment and operations only require water and compressed air for on-mountain snowmaking. Annual summaries of application can be found in Section 5.

1.3.4.3 Deicer and Abrasives Application and Recovery

Heavenly actively tracks the amount of deicer and abrasives it applies to the parking lot and roadways leading to and from the California Base parking lot as required by the WDR and Monitoring and Reporting Program. Fourth quarter monthly application and recovery (sweeping) totals are reported with the monthly inspection and monitoring logs found in Appendix D. Typically, no application occurs during the fourth quarter, and recovery typically occurs during the third and fourth quarters of the water year, following winter resort operations, when roadways and parking areas are free of snow. Recovered materials are collected and delivered to South Tahoe Refuse for disposal. Heavenly includes the dumpster material weight sheets with the maintenance and inspection logs for recovery tracking purposes. The annual totals for application and recovery in water year 2020 are discussed in Section 6.

As part of the WDR and Monitoring and Reporting Program, Heavenly is also required to analyze the chemical composition of the deicer applied to the roadways and apply deicers that meet the Caltrans "specifications H" or similar.[5] In the past, Heavenly provided this information to Lahontan for deicer samples, but through discussions with Lahontan, it was determined that if the material (sand and ice) is purchased from the same vendor and same source, no additional analysis is needed. Initial analysis of the source material was performed in December 2015, and analysis was performed again in March 2018, following the receipt of a new stockpile of abrasives on February 27, 2018. The results of this analysis were included in *Environmental Monitoring Program Annual Report – WY 2018.* Laboratory analysis was conducted again in May 2020 (Appendix H) and discussion regarding this sample can be found in Section 6. As previously noted, additional laboratory analysis will be conducted when either the abrasive sample is derived from a new source, a new vendor, or at a minimum annually upon delivery of additional material.

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[4] California Regional Water Quality Control Board-Lahontan Region. 2015b. Monitoring and Reporting Program No. 2015-0021 WDID NO. 6A090033000 for Heavenly Mountain Resort (page 7).

[5] California Regional Water Quality Control Board-Lahontan Region. 2015b. Monitoring and Reporting Program No. 2015-0021 WDID NO. 6A090033000 for Heavenly Mountain Resort (page 8).

1.3.4.4 USFS Roads Monitoring

The WDR and Monitoring and Reporting Program requires that Heavenly conduct road monitoring in accordance with the Road Maintenance Agreement (between Heavenly and LTBMU)[6]. The signed agreement outlining Heavenly's maintenance and inspection requirements USFS standards regarding on-mountain roadways is included in Appendix E. Additional discussion regarding the roadway monitoring requirements is discussed in Section 7.

1.3.4.5 Facilities Watershed Awareness Training

Heavenly provides awareness training for its summer employees, subcontractors, and vendors annually as part the WDR and Monitoring and Reporting Program. Confirmation and discussion of this training is provided in Section 8 and Appendix F.

[6] California Regional Water Quality Control Board-Lahontan Region. 2015b. Monitoring and Reporting Program No. 2015-0021 WDID NO. 6A090033000 for Heavenly Mountain Resort (page 9).

2 Water Quality

2.1 Station Description

Heavenly measures water quality parameters along four creeks to determine the effects of ski area development on background conditions. Water samples were collected at seven stations in water year 2020. The sampling station identification number and sampling rationale are presented in Table 2-1 and include the required filter vault sampling stations. The approximate location of each sampling station is shown on Figure 2-1.

Table 2-1 Heavenly Valley Mountain Resort Monitoring Program Water Quality Sampling Stations

Sampling Station ID No.	Sampling Station Description	Sampling Station Name[1]	Rationale
43HVC-1A	Heavenly Valley Creek at Sky Meadows, above Snowmaking Pond	Sky Meadows	Characterized water quality in Heavenly Valley Creek drainage from the developed ski area
43HVC-2	Heavenly Valley Creek below Patsy's and Groove Chair Lifts	Patsy's	Characterized water quality in Heavenly Valley Creek drainage from the developed ski area
43HVC-3	Heavenly Valley Creek located at the Forest Service Property Line	Property Line	Characterized water quality in Heavenly Valley Creek leaving National Forest System land below Heavenly Mountain Resort
43BPC-4	Bijou Park Creek located below the Heavenly Parking Lot	Bijou Park Creek	Characterized water quality in Bijou Park Creek below the California Main Lodge and parking area
43HDVC-5	Hidden Valley Creek baseline/reference station	Hidden Valley Creek	Characterized water quality in creek draining a similar, mostly undeveloped watershed
43HVE-1	Edgewood Creek above Boulder Parking Lot	Upper Edgewood Creek	Characterized water quality in Edgewood Creek above the Boulder parking lot and below the ski runs
43HVE-2	Edgewood Creek below Boulder Parking Lot	Lower Edgewood Creek	Characterized water quality in Edgewood Creek below the Boulder parking lot
43HVP-1A	North Manhole Influent Pipe into the Filter System	Storm Vault Influent North	Characterized water quality inflow from the lower parking lot into the filter system
43HVP-1B	South Manhole Influent Pipe into the Filter System	Storm Vault Influent South	Characterized water quality inflow from the upper parking lot into the filter system
43HVP-2	West Manhole Effluent Pipe Out of the Filter System	Storm Vault Effluent	Characterized water quality exiting the filter system

[1] In the text of the document, these sampling stations are referred to by their abbreviated names.

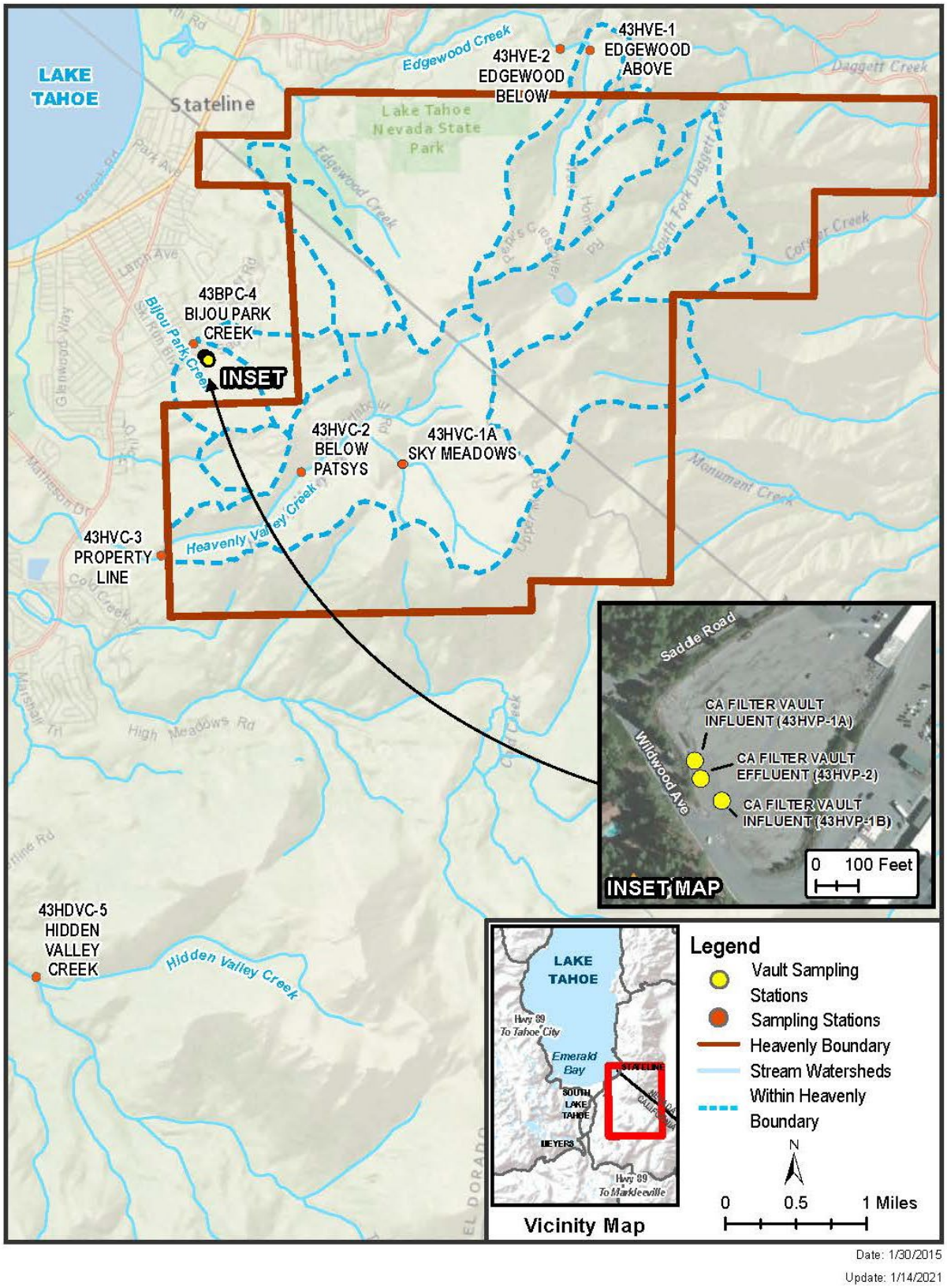
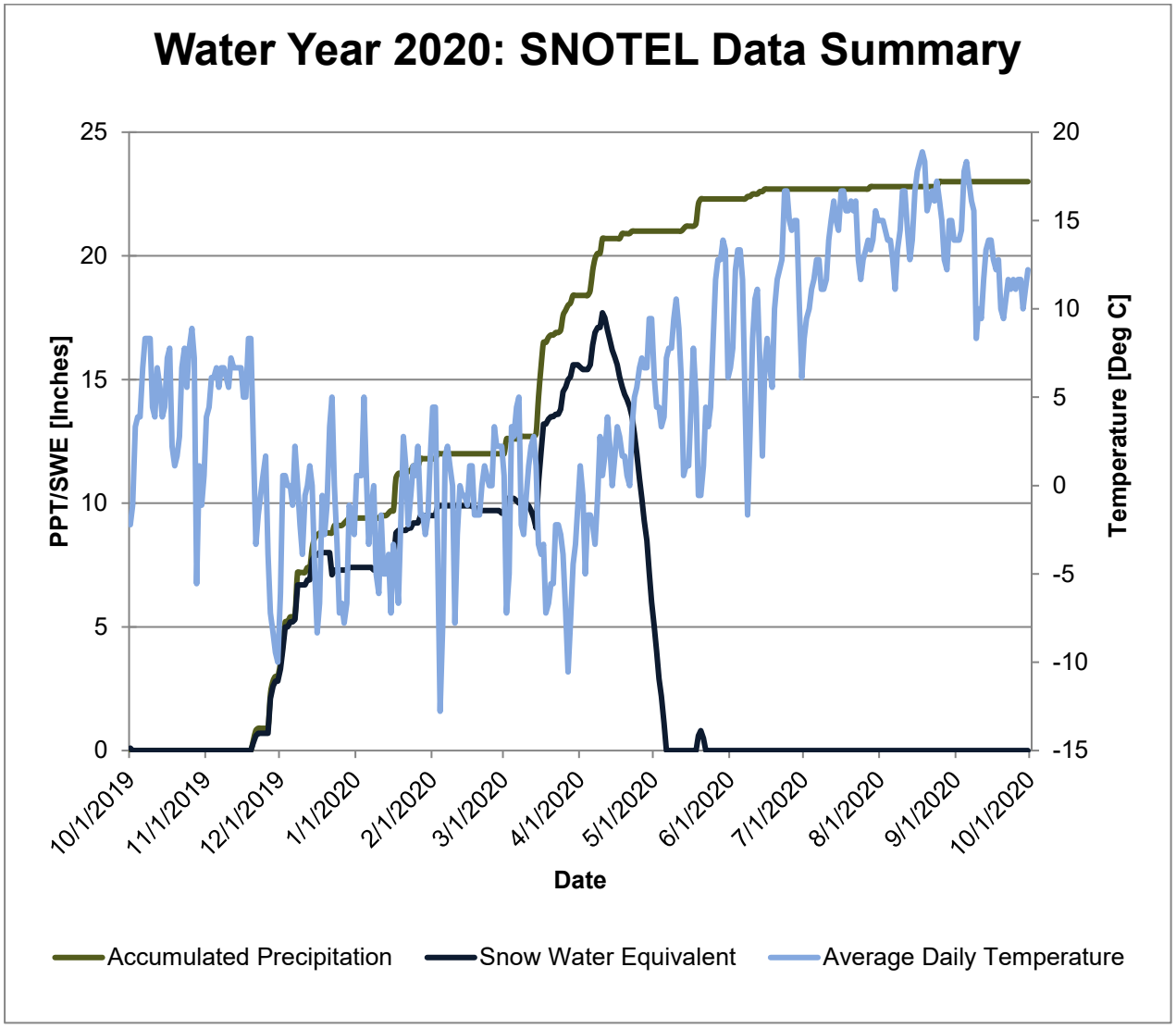


Figure 2-1 Approximate Location of Water Quality Sampling Stations

2.2 Precipitation Summary

Figure 2.2 presents precipitation data for water year 2020, as summarized by the Natural Resource Conservation Service on the National Water and Climate Center web site (http://www.wcc.nrcs.usda.gov). This figure depicts accumulated precipitation and snow water equivalent (SWE) measured at Snow Telemetry (SNOTEL) Station 19L24S (Heavenly Valley), operated by the Natural Resources Conservation Service. This station is located in the upper watershed of Heavenly Valley Creek near the current Sky Meadows (43HVC-1A) sampling station at latitude 38° 56' N, longitude 119° 54' W, and elevation 8,850 feet.



Note: PPT – liquid precipitation, SNOTEL – snow telemetry; SWE – snow water equivalent

Figure 2-2 SNOTEL Weather Graph for the Water Year 2020

2.3 Sampling Frequency and Analysis

A total of 108 stream samples were collected during water year 2020. Thirteen samples were collected at the Sky Meadows (43HVC-1A) sampling station, 14 samples were collected at the Patsy's (43HVC-2) sampling station, and 17 samples were collected at the Property Line (43HVC-3) sampling station, Bijou Park Creek (43BPC-4) sampling station, and Hidden Valley Creek (43HDVC-5) baseline/reference station. Fewer samples were collected at the on-mountain sampling stations (Sky Meadows and Patsy's) because of COVID-19 resort closure and on-mountain access restrictions. An electronic letter was sent to Lahontan in March 2020 to provide an update regarding Heavenly's monitoring and reporting required under the Monitoring and Reporting Program No. 2015-0021. In accordance with federal, state, and local guidance on COVID-19, Heavenly suspended all resort operations on March 15, 2020. Monitoring and reporting activities required by the permits continued, except for the monitoring at the on-mountain sampling stations, until road access to the stations was open. During the winter, access to these sampling stations is limited and unrealistic if mountain operations are fully closed. Heavenly Valley Creek was continuously monitored at the most downstream sampling station, Property Line (43HVC-3), which is accessible despite resort closures.

The number of samples collected at the two Edgewood Creek sampling stations typically varies because low flow conditions and resort activities can prevent sampling. Thirteen samples were collected at the Upper Edgewood Creek (43HVE-1) sampling station because of ice/snow cover across the channel from January through March 2020 and low flows in September 2020. Seventeen samples were collected at the Lower Edgewood Creek (43HVE-2) sampling station. One round of storm water samples was collected at the influent sampling stations—Storm Vault Influent North (43HVP-1A) and Storm Vault Influent South (43HVP-1B), and the outlet sampling station—Storm Vault Effluent (43HVP-2). Lack of measurable rain storms during the water year prevented consistent sampling of the filter vault locations. Table 2-2 presents a summary of sampling and analysis for water year 2020.

Analyses for specific conductivity, turbidity, suspended sediment, total nitrogen (nitrate/nitrite and total Kjeldahl nitrogen), total phosphorus, soluble reactive phosphorus, and dissolved phosphorus were performed by High Sierra Water Lab. High Sierra Water Laboratory recently re-located from Tahoe City, California, to Oakland, Oregon. Excelchem Laboratories located in Sacramento, California, performed analyses for chloride. Western Environmental Testing in Reno, Nevada, performed all constituent testing for the influent and effluent filter water quality vault samples. Where applicable, water samples are packed with ice and shipped in an ice cooler to the appropriate laboratories. Analytical results by sampling station through the fourth quarter are provided in Appendix A and Appendix B (Cardno 2020 a,b,c). The remaining 2020 laboratory results were previously submitted with the quarterly reports and are omitted in this report (duplication).

Table 2-2 Summary of Sampling Analysis—Water Year 2020

Sampling Station ID No.	Sampling Station Name	No. of Samples	Constituents Tested
43HVC-1A	Sky Meadows	13	Full suite[1, 2]
43HVC-2	Patsy's and Groove Chair Lifts	14	Full Suite[2]
43HVC-3	Property Line	17	Full suite
43BPC-4	Bijou Park Creek	17	Full suite
43HDVC-5	Hidden Valley Creek	17	Full suite
43HVE-1	Upper Edgewood Creek	13	Full suite, specific conductivity, soluble reactive phosphorus, and dissolved phosphorus[3]
43HVE-2	Lower Edgewood Creek	17	Full suite, specific conductivity, soluble reactive phosphorus, and dissolved phosphorus
43HVP-1A	Storm Vault Influent North	1	Full suite and oil and grease
43HVP-1B	Storm Vault Influent South	1	Full suite and oil and grease
43HVP-2	Storm Vault Effluent	1	Full suite and oil and grease

[1] Full suite = Discharge, turbidity, suspended sediment, nitrate/nitrite, total Kjeldahl nitrogen, total nitrogen, total phosphorus, and chloride.

[2] Samples were not obtained on four occasions at 43HVC-1A and three occasions at 43HVC-2 because of resort closures and limited access.

[3] Samples were not obtained on three occasions at 43HVE-1 because of ice cover on stream. Samples were not obtained on one other occasion because of low flows and channel vegetation.

[4] Suspended sediment analysis is not required for the filter system sampling stations.

2.4 Discharge Results

Stream flow was measured using a Marsh-McBirney meter at all of the stream sampling stations, except at Patsy's (43HVC-2), where flow was calculated from stage values by a Parshall flume. The Sky Meadows (43HVC-1A) sampling station also has a Parshall flume; however, the outlet of the flume has become submerged over time, thus reducing the accuracy of the stage-discharge relationship. Consequently, flow is also measured using the Marsh-McBirney meter at this sampling station when conditions permit. During the winter, the flume is the only viable option for estimating flow because significant snow depths and ice cover often create difficult or unsafe conditions for accessing the stream.

In June 2020, runoff discharge peaked at the upper elevation sampling stations on Heavenly Valley Creek—Sky Meadows (43HVC-1A), Patsy's (43HVC-2), and Hidden Valley Creek (43HDVC-5). Peak runoff occurred in late May at the lower elevation Heavenly Valley Creek location—Property Line (43-HVC-3). The Upper Edgewood Creek (43HVE-1) and the Lower Edgewood Creek (43HVE-2) sampling stations exhibited peak discharge values in the beginning of May. The peak discharge values for the Bijou Park Creek (43BPC-4) sampling station at the beginning of April may have been related to a warm and wet snow storm. While the timing of peak flows varied at the monitoring locations throughout the spring runoff period, the peaks occurred within the April to June window, as is typical of the Sierra Nevada Mountain range. However, the runoff trend over time is moving toward occurring during earlier months. Variations in watershed size and elevation are likely to be the cause for the earlier runoff peaks along Edgewood Creek and Bijou Park Creek. It does not appear that the snowmaking efforts performed during the 2019/2020 ski season had a significant impact on the Heavenly Valley Creek watershed because discharge at the high elevation sampling stations, including the Hidden Valley Creek baseline/reference station, occurred within a similar time frame.

Accumulated precipitation during water year 2020 (23 inches) was considerably less than the 1981–2010 average of 33.5 inches. (The Natural Resources Conservation Service has not updated the annual accumulation precipitation values on the Heavenly Valley SNOTEL site since water year 2010.[7]) Peak flow conditions were lower than average, and the water surface elevation at all monitoring locations remained below bankfull height. Two of the sampling stations had low to no flow during the fourth quarter (Upper Edgewood [43HVE-1] and Property Line [43HVC-3]), so they could not be sampled for discharge. Water year 2020 follows four water years of near or above average precipitation accumulation; water year 2017 had the greatest accumulation (70.5 inches). The four years of near or above average precipitation (2016–2019) followed four years of drought (2012–2015). The SWE measurement for 2020 (17.7 inches) was lower than the accumulated precipitation and was similar to conditions experienced during the 2012 water year. Figure 2-3 represents the past 15 water years of SNOTEL precipitation data. Figures 2-4 through 2-7 represent the annual hydrographs at each of the seven sampling stations and associated creeks.

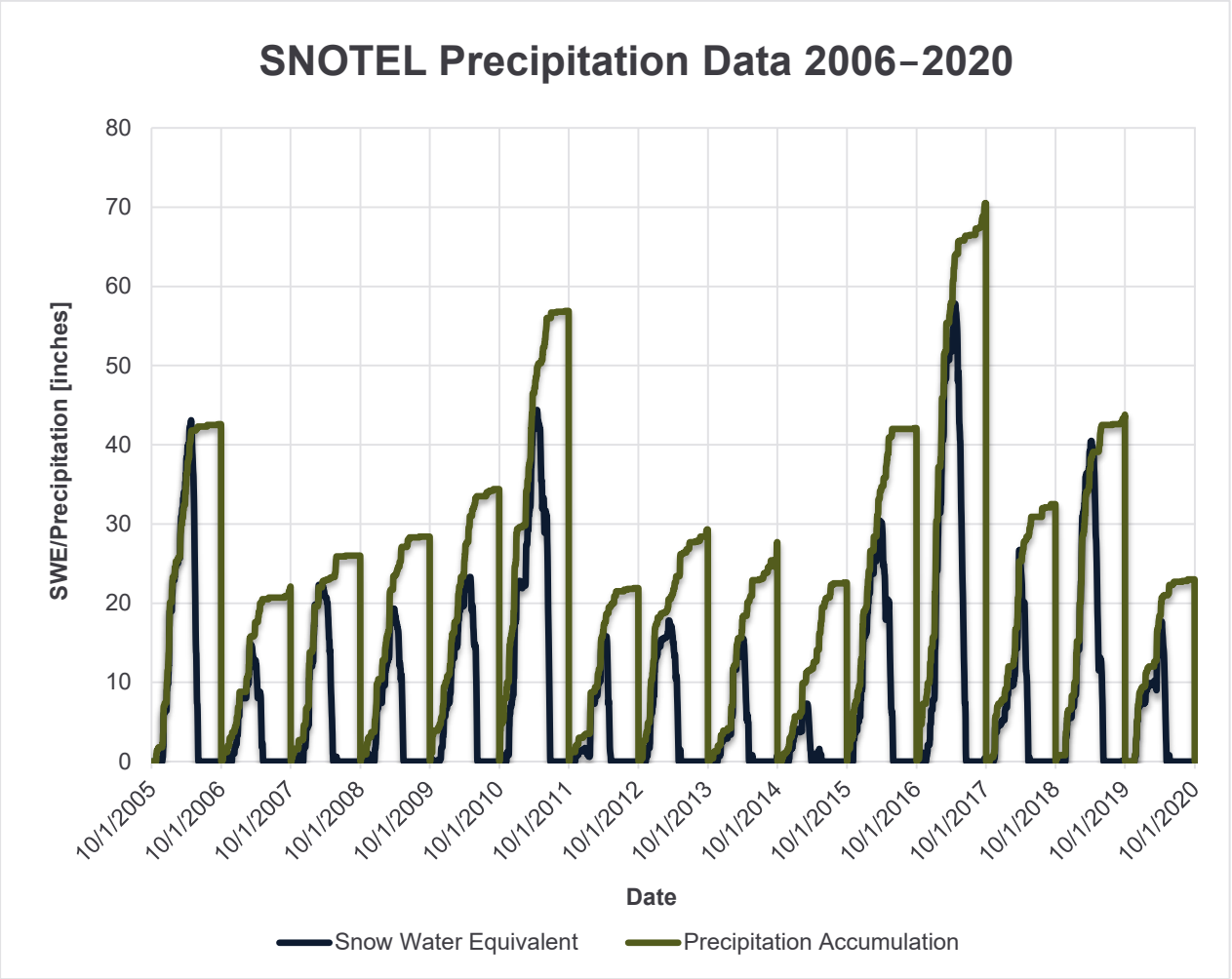


Figure 2-3 SNOTEL Precipitation Graph—Water Years 2006–2020

[7] Available at: https://wcc.sc.egov.usda.gov/reportGenerator/view/customGroupByMonthReport/daily/518:ca:SNTL%7Cid=%22%22%7Cname/1980-10-01,1981-09-30/PREC::average_1981

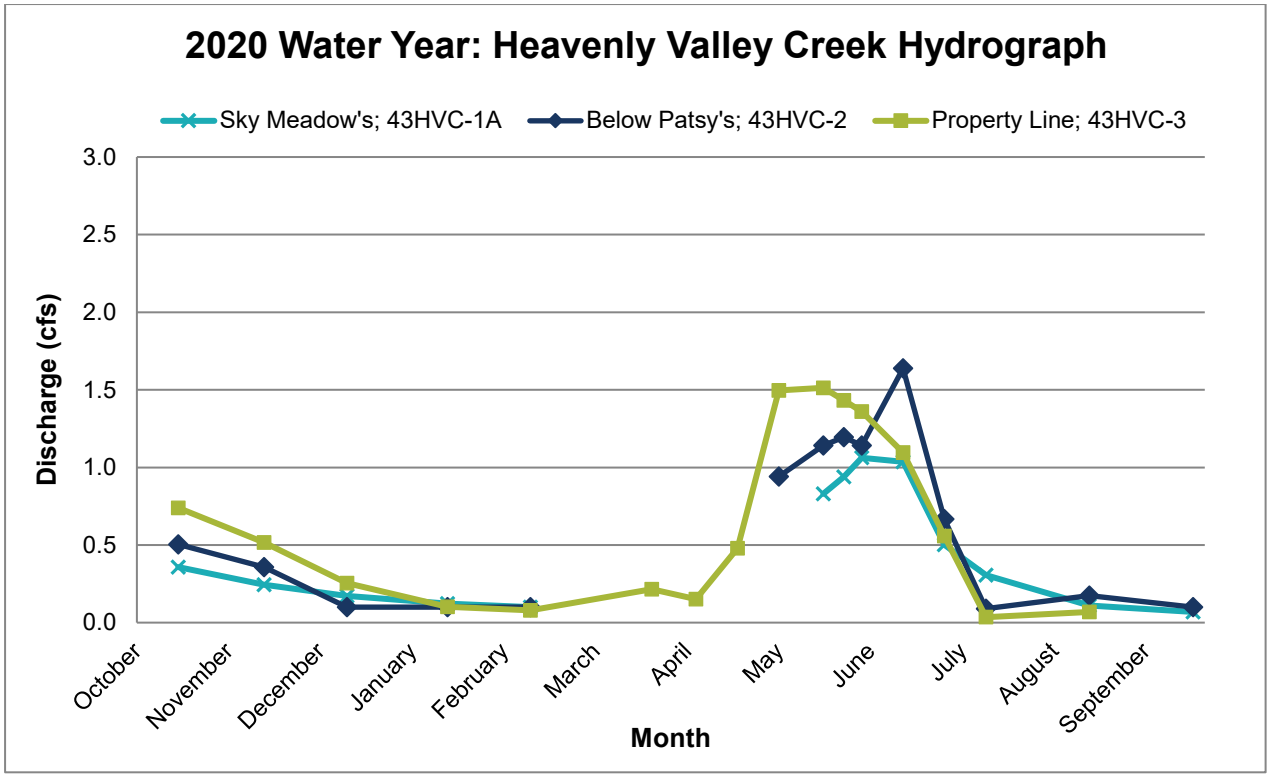


Figure 2-4 Hydrographs of Heavenly Valley Creek Sampling Stations—Water Year 2020

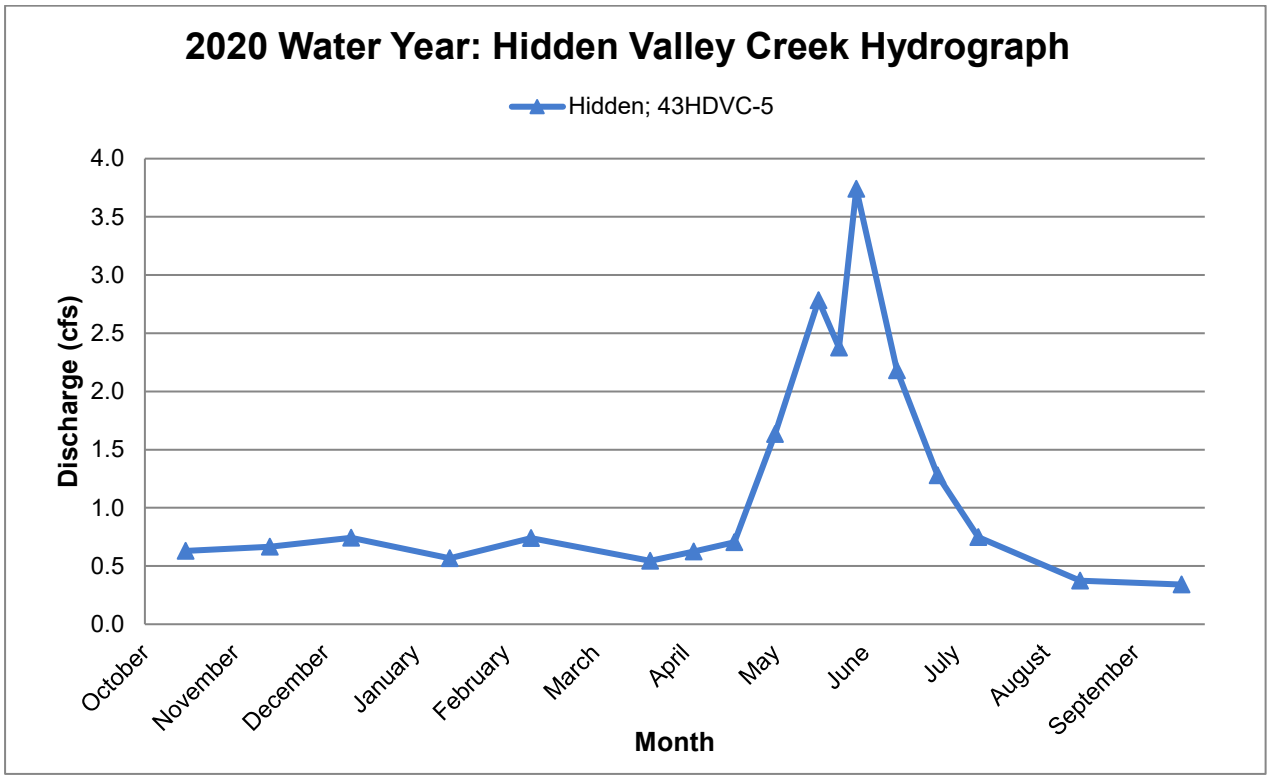


Figure 2-5 Hydrograph of the Hidden Valley Creek Baseline/Reference Station—Water Year 2020

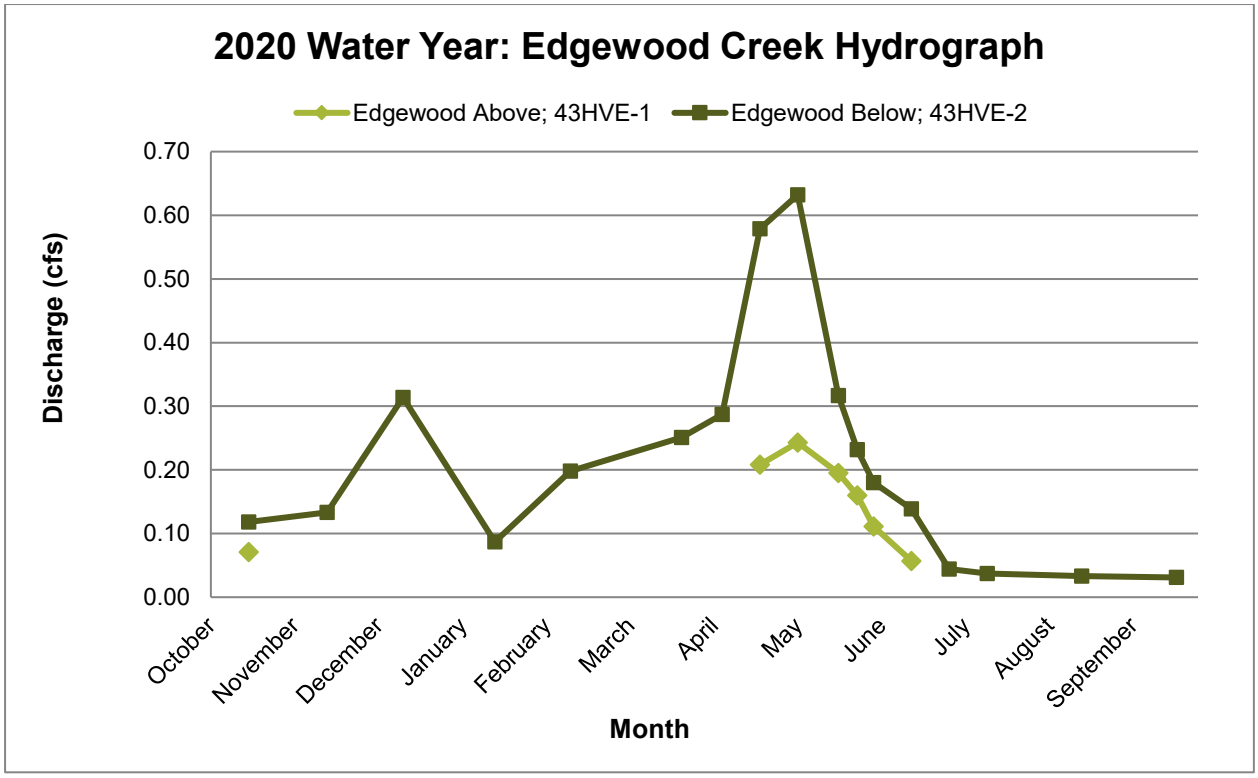


Figure 2-6 Hydrographs for Edgewood Creek Sampling Stations—Water Year 2020

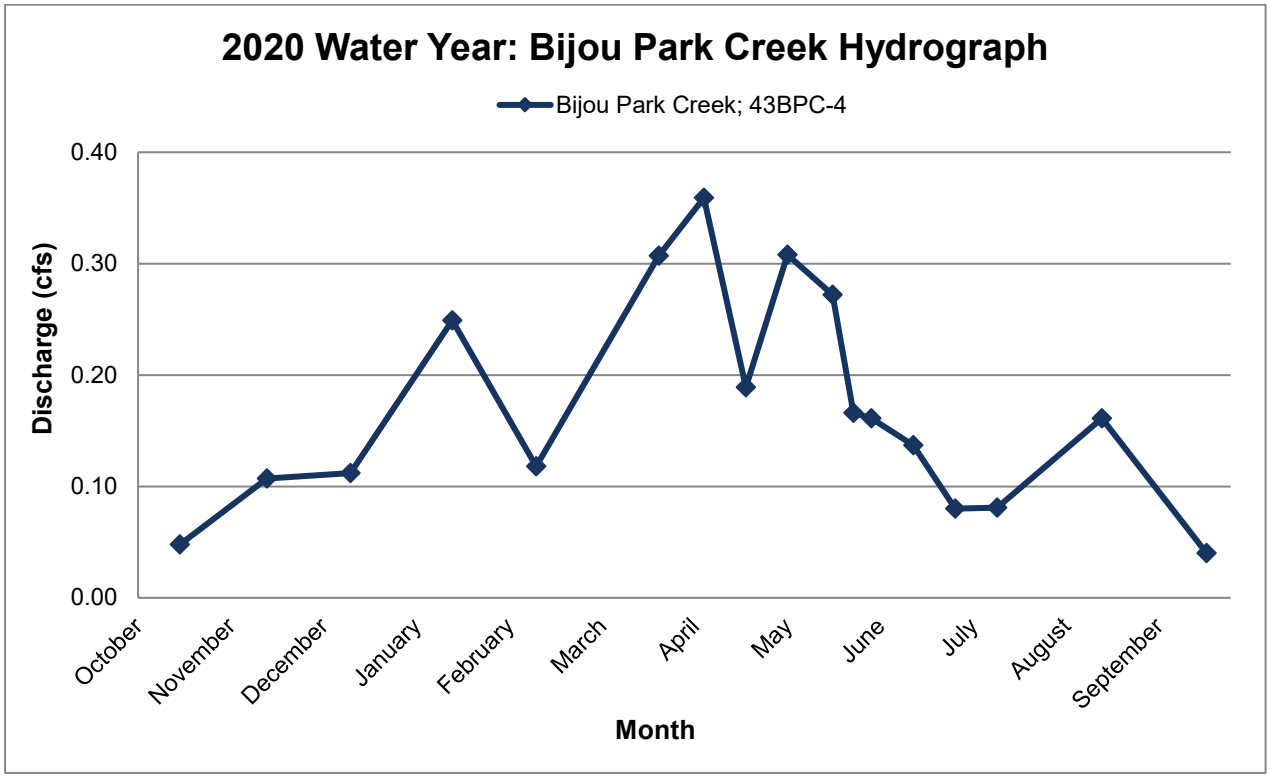


Figure 2-7 Hydrograph for Bijou Park Creek Sampling Station—Water Year 2020

2.5 Annual Load Estimates

Table 2-3 presents the annual load values calculated from flow-weighted concentration data for total nitrogen, total phosphorus, and suspended sediment for the Property Line sampling station and the Hidden Valley Creek baseline/reference station from water years 2016–2020 (5-year cycle). Annual load values are calculated by weighting the number of days between sample collections and multiplying the weighted average and the discharge measurements collected in the field. This calculated value represents the weighted flow. Laboratory values for total nitrogen, total phosphorus, and suspended sediment are multiplied and summed, and the final unit conversion is applied. These annual loading values are reported in Table 2-3 and Table 2-4. The methodology has been used in previously submitted Annual and Comprehensive Report(s) and was verified by Lahontan staff in spring 2010 (Cardno 2017).

The TMDL for sediment at Heavenly Valley Creek is a 5-year rolling average. The calculated 5-year rolling average for water years 2016–2020 is shown in Table 2-4 and equates to a total of 36.81 tons/year along Heavenly Valley Creek, approximately 0.16 ton/year less than that calculated for the water year 2019 rolling average. The Lahontan permit TMDL standard along Heavenly Valley Creek for suspended sediment is 58 tons/year. For comparison, the suspended sediment rolling average for Hidden Valley Creek was calculated to be 16.24 tons/year for the water year 2020, which was approximately an increase of 0.18 ton/year from the previous year's rolling average.

The suspended sediment load for Heavenly Valley Creek in water year 2020 was calculated to be 0.94 tons/year, a substantial decrease from the suspended sediment load of 12.16 tons/year for the previous year. Hidden Valley Creek also experienced a decrease, not as proportionally low (from 7.09 tons/year in 2019 to 2.34 tons/year in 2020). Low precipitation and runoff years are typically correlated with lower sediment loads, while higher runoff years are correlated with higher sediment loads. With the exception of water year 2020, other years experienced nearly average to above average precipitation, and the 5-year rolling average no longer included years during that drought period, all of which experienced very low sediment loading. Although water year 2017 had a spike in suspended sediment loading (161.8 tons/year), the 5-year rolling average remained relatively low, despite most years having average or above average precipitation and runoff. Overall, the decrease in constituent loading (total nitrogen, total phosphorus, and suspended sediment) during water year 2020 compared to that of water year 2019 is consistent with expectations given the considerably lower precipitation totals and flow conditions during spring runoff. Additionally, the COVID-19 closure of the resort and lack of guests, vehicles, snow conditioning, and overall resort activity may have contributed to lower constituent loading.

Table 2-3 Annual Load Values at Heavenly Valley Creek Property Line (43HVC-3) Sampling Station and Hidden Valley Creek (43HDVC-5) Baseline/Reference Station

Year	Discharge (m^3/year)	Total Nitrogen (kg/year)	Total Phosphorus (kg/year)	Suspended Sediment (tons/year)
Property Line (43HVC-3)				
2016	977,818	30	30	6.63
2017	3,912,677	983	431	161.84
2018	966,860	94	20	2.47
2019	1,299,751	162	47	12.16
2020	361,017	30	7	0.94
Hidden Valley Creek (43HDVC-5)				
2016	1,498,026	365	64	18.8
2017	4,277,635	770	164	50.5
2018	1,339,792	117	26	2.5
2019	1,958,182	215	48	7.09
2020	815,928	72	18	2.34

Note: m^3 – cubic meters; kg – kilograms

Table 2-4 Five-Year Suspended Sediment Rolling Average at Heavenly Valley Creek Property Line (43HVC-3) Sampling Station and at the Hidden Valley Creek (43HDVC-5) Baseline/Reference Station

Water Year	Property Line (HV-C3) Suspended Sediment (tons/year)	Hidden Valley Creek (HV-H5) Suspended Sediment (tons/year)
Standard	**58 ton/year: 5-year rolling average**	**58 ton/year: 5-year rolling average**
2009	0.5	1.9
2010[1]	70.5	18.6
2011	118.6	60.9
2012	1.7	3.4
2013	1.0	3.5
2014	0.24	1.5
2015	0.16	1.4
2016	6.63	18.8
2017	161.84	50.5
2018	2.47	2.5
2019	12.16	7.09
2020	0.94	2.34
5-year Rolling Average	***36.81***	***16.24***

[1] The discharge values for water year 2010 were revisited and changed the annual load calculations.

2.6 Heavenly Valley and Hidden Valley Creeks: Summary Statistics

The Lahontan state standards for Trout Creek Receiving Waters govern Heavenly Valley and Hidden Valley Creeks (Table 2-5). Statistical summaries for Heavenly Valley and Hidden Valley Creeks for water year 2020 are shown in Table 2-6 through Table 2-9 (exceedance values are shown in bold). Raw data are provided in Appendix A. The statistics were computed over the total samples for each sampling station, which typically consisted of 12 monthly monitoring samples and an additional 5 samples collected during spring runoff in April, May, and June at each sampling station. Because of on-mountain access restrictions related COVID-19 resort closures, 3 or 4 fewer samples were collected along Heavenly Valley Creek at the Sky Meadows (43HVC-1A) and Patsy's (43HVC-2) sampling stations. However, all 17 scheduled samples were collected at the most downstream sampling station on Heavenly Valley Creek (Property Line [43HVC-3]), thus capturing water quality constituent data most proximate to the confluence with other tributaries. Annual average values for total phosphorus and chloride exceeded the state standard at all three sampling stations on Heavenly Valley Creek (43HVC-1A, 43HVC-2, and 43HVC-3) and at the baseline/reference station (43HDVC-5). At the Hidden Valley Creek (43HDVC-5) baseline/reference station, chloride was non-detectable (below the laboratory reporting limit of 0.1 milligram per liter [mg/L]) on two sampling occasions.

Table 2-5 Summary of the Sampling Analysis Limits for Heavenly Valley Creek and Hidden Valley Creek—Water Year 2020

Constituents	Units	Trout Creek Receiving Water Limits[1]
Total dissolved solids	mg/L	60[2]
Total nitrogen	mg/L	0.19
Total phosphorus	mg/L	0.015
Chloride	mg/L	0.15

[1] Standards are annual averages for the receiving waters of Trout Creek.

[2] Standards are for receiving waters of Trout Creek, 90th percentile.

All sampling stations on Heavenly Valley and Hidden Valley Creeks (43HVC-1A, 43HVC-2, and 43HVC-3) and baseline/reference station (43HDVC-5) had total suspended sediment (TSS) values below the 90th percentile state standard value of 60 mg/L. The highest daily peak TSS readings were recorded on Heavenly Valley Creek were at the Sky Meadows (43-HVC1A) and Property Line (43-HVC-3) sampling stations, both at 14.5 mg/L. In comparison, the highest daily peak TSS reading at the Hidden Valley Creek (43HDVC-5) baseline/reference station was 4.0 mg/L. Both of these TSS peaks were well below the annual state standard during water year 2020. The maximum observed TSS concentrations typically coincide with the rising limb and peak of the spring runoff hydrograph, which is expected because suspended sediment is often mobilized along the stream banks and transported during spring runoff. However, in water year 2020, peak TSS values at the Sky Meadows and Property Line sampling stations were associated with warm winter storms. Across all four of the sampling stations, TSS concentrations were lower than peak values during both recent above average precipitation years and drought years, and most similar to values observed during drought water years 2012 and 2013.

Lahontan's annual state standard for total nitrogen (0.19 mg/L) is the sum of the total Kjeldahl nitrogen, which is representative of the ammonia and organic nitrogen concentrations, total nitrate, and total nitrite. A single exceedance in water year 2020 occurred along Heavenly Valley Creek at the Property Line (43HVC-3) sampling station, following a warm winter storm in January (0.22 mg/L). All other individual grab samples on Heavenly Valley Creek were below the state standard; therefore, the annual average total nitrogen concentrations at all sampling stations were below the state standard. No exceedances on individual dates occurred at the Hidden Valley Creek (43HDVC-5) baseline/reference station, thus the annual average was also below the state standard. Overall, there is a pattern of similarity between annual average nitrogen concentrations on Heavenly Valley Creek and Hidden Valley Creek, suggesting that resort operations have a less than significant impact on total nitrogen concentrations during both above and below average precipitation years.

The state standards for annual averages of total phosphorus at the Heavenly Valley Creek and Hidden Valley Creek baseline/reference station are not to exceed 0.015 mg/L. The annual average total phosphorus concentrations for water year 2020 were above the state standard at the three sampling stations (43HVC-1A, 43HVC-2, and 43HVC-3) and the baseline/reference station (43HDVC-5). Average values for these sampling stations were as follows:

- Sky Meadows (43HVC-1A)—0.018 mg/L,
- Patsy's (43HVC-2)—0.021 mg/L,
- Property Line (43HVC-3)—0.021 mg/L, and
- Hidden Valley Creek (43HDVC-5)—0.022 mg/L.

All daily samples collected throughout the water year at the Hidden Valley Creek (43HDVC-5) baseline/reference station exceeded the state standard. Daily samples collected at the Sky Meadows (43HVC-1A) sampling station were below the state standard on three occasions during the first quarter of water year 2020 and on two occasions across the first and second quarter at the Patsy's (43HVC-2) sampling station. Some forms of phosphorus are particle bound, therefore, a portion of the phosphorus levels can be attributed to mobilized sediments that occur during sustained high flows. Resort activities along Heavenly

Valley Creek appear to have a limited impact on total phosphorus levels because concentrations in the baseline/reference reach, which had similar total phosphorus levels, also exceeded state standards.

Annual average chloride values along Heavenly Valley Creek and Hidden Valley Creek for water year 2020 were above the state standard of 0.15 mg/L at all three of the sampling stations (43HVC-1A, 43HVC-2, and 43HVC-3) and the baseline/reference station (43HDVC-5). All daily samples collected during the water year also exceeded the state standard for each of the Heavenly Valley Creek stations. At the Hidden Valley Creek (43-HDVC-5) baseline/reference station, chloride was non-detectable (below the laboratory reporting limit of 0.1 mg/L) on two sampling occasions during the low flow summer months and was above the state standard for chloride the other 15 sampling rounds.

Chloride levels at these sampling stations have exceeded the state standard over the past decade. On Heavenly Valley Creek, the chloride concentrations were the highest at the Sky Meadows (43HVC-1A) sampling station but were lower than the downstream sampling stations. The cause for the increasing chloride levels along Heavenly Valley Creek is unknown. Application of salts on the terrain parks within the Heavenly Valley watershed may be one plausible cause; however, the undisturbed watershed baseline/reference station along Hidden Valley Creek (43HDVC-5) also exceeds the state standards for chloride concentrations. The annual average chloride concentration at the Hidden Valley Creek (43HDVC-5) baseline/reference station exceeded the state standard, but the chloride concentration is lower than annual chloride values obtained along the Heavenly Valley Creek (43HVC-1A, 43HVC-2, and 43HVC-3) sampling stations. Continued presence of chloride at the Hidden Valley Creek baseline/reference station suggests chloride is either naturally occurring or naturally higher levels are present within the Lake Tahoe Basin.

Table 2-6 Statistical Summary for the Heavenly Valley Creek at Sky Meadows Sampling Station—Water Year 2020

Sky Meadows (43HVC-1A): California Lake Tahoe Receiving Water Limits (exceedances in bold)						
	Q (cfs)	**Turbidity (NTU)**	**Total Suspended Sediment (mg/L)**	**Total Nitrogen (mg/L)**	**Total Phosphorus (mg/L)**	**Chloride (mg/L)**
Standard	--	--	**60**	**0.19**	**0.015**	**0.15**
# of samples	13	13	13	13	13	13
Minimum	0.069	1.06	1.00	0.062	0.012	**0.30**
Maximum	1.062	3.18	14.50	0.150	**0.025**	**0.80**
Annual average	0.481	1.86	4.27	0.113	**0.018**	**0.55**
90th percentile	--	--	11.70	--	**--**	**--**

Notes: cfs – cubic feet per second; mg/L – milligram per liter; NTU – nephelometric turbidity unit

Table 2-7 Statistical Summary for the Heavenly Valley Creek below Patsy's and Groove Chair Lifts Sampling Station—Water Year 2020

Below Patsy's (43HVC-2): California Lake Tahoe Receiving Water Limits (exceedances in bold)						
	Q (cfs)	**Turbidity (NTU)**	**Total Suspended Sediment (mg/L)**	**Total Nitrogen (mg/L)**	**Total Phosphorus (mg/L)**	**Chloride (mg/L)**
Standard	--	--	**60**	**0.19**	**0.015**	**0.15**
# of samples	14	14	14	14	14	14
Minimum	0.090	0.27	0.50	0.063	0.015	**0.40**
Maximum	1.638	17.10	12.00	0.180	**0.051**	**1.30**
Annual average	0.590	2.14	2.80	0.105	**0.021**	**0.89**
90th percentile	--	--	7.50	--	--	--

Notes: cfs – cubic feet per second; mg/L – milligram per liter; NTU – nephelometric turbidity unit

Table 2-8 Statistical Summary for Heavenly Valley Creek located at the Forest Service Property Line Sampling Station—Water Year 2020

Property Line (43HVC-3): California Lake Tahoe Receiving Water Limits (exceedances in bold)						
	Q (cfs)	**Turbidity (NTU)**	**Total Suspended Sediment (mg/L)**	**Total Nitrogen (mg/L)**	**Total Phosphorus (mg/L)**	**Chloride (mg/L)**
Standard	**--**	**--**	**60**	**0.19**	**0.015**	**0.15**
# of samples	16	17	17	17	17	17
Minimum	0.035	0.44	0.50	0.056	0.013	**0.40**
Maximum	1.513	6.27	14.5	0.220	**0.055**	**4.00**
Annual average	0.631	1.14	2.84	0.080	**0.021**	**1.06**
90th percentile	--	--	5.70	0.056	0.013	**0.40**

Notes: cfs – cubic feet per second; mg/L – milligram per liter; NTU – nephelometric turbidity unit

Table 2-9 Statistical Summary for the Hidden Valley Creek (Lower Hidden) Baseline/Reference Station—Water Year 2020

Hidden Valley Creek (43HDVC-5): Lake Tahoe Receiving Water Limits for Trout Creek (exceedances in bold)						
	Q (cfs)	**Turbidity (NTU)**	**Total Suspended Sediment (mg/L)**	**Total Nitrogen (mg/L)**	**Total Phosphorus (mg/L)**	**Chloride (mg/L)[1]**
Standard	--	--	**60**	**0.19**	**0.015**	**0.15**
# of samples	17	17	17	17	17	17
Minimum	0.341	0.41	0.50	0.050	**0.016**	ND
Maximum	3.741	1.62	4.00	0.129	**0.028**	**0.80**
Annual average	1.216	0.94	2.55	0.089	**0.022**	**0.38**
90th percentile	--	--	4.00	--	**--**	**--**

Notes: cfs – cubic feet per second; mg/L – milligram per liter; NTU – nephelometric turbidity unit

[1] ND samples were considered as the laboratory reporting limit (0.10 mg/L) for calculation of the annual average.

2.7 Bijou Park Creek and California Parking Lot Effluent: Summary Statistics

Raw data for the Bijou Park Creek (43BPC-4) and Storm Vault Effluent (43HVP-2) sampling stations can be found in Appendices A and B, respectively. Table 2-10 summarizes the past Lahontan state standards relative to Bijou Park Creek and the Storm Vault Effluent. The state standards that apply to the Bijou Park Creek sampling station (43BPC-4) are governed by the Lake Tahoe receiving water limits for TSS, total nitrogen, total phosphorus, and chloride. The maximum concentration for discharge to a surface water governs the turbidity standard at the Bijou Park Creek (43BPC-4) sampling station. Likewise, the Storm Vault Effluent (43HVP-2) sampling station is governed by the maximum not-to-exceed concentrations for discharge to surface water. These standards took effect in May 2011, when the Amended Monitoring and Reporting Program was finalized, and were incorporated into the revised Monitoring and Reporting Programs in 2015.Table 2-11 shows the water quality analysis results for Bijou Park Creek sampling station for water year 2020.

Table 2-10 Summary of the Sampling Analysis Limits for the Bijou Park Creek (43BPC-4) and Storm Vault Effluent (43HVP-2) Sampling Stations—Water Year 2020

Constituents	Units	Maximum Concentration for Discharge to Land Treatment[1]	Maximum Concentration for Discharge to Surface Water[2]	Lake Tahoe Receiving Water Limits[3]
Turbidity	NTU	200	20	20[4]
Total suspended sediment[5]	mg/L	--	--	60
Total nitrogen	mg/L	5.0	0.5	0.15
Total phosphorus	mg/L	1.0	0.1	0.008
Chloride	mg/L	-	---	3.0

Notes: mg/L – milligram per liter; NTU – nephelometric turbidity unit

[1] The effluent limits for discharge to land were effective for discharge from the California Base area on December 31, 2004.

[2] The effluent not-to-exceed limits for discharge to surface waters were effective for discharge from the California Base area beginning November 30, 2008.

[3] The Amended Monitoring and Reporting Program, effective May 30, 2011, for water year 2012 and beyond required monitoring of the outfall of the filter vault system. Bijou Park Creek effluent limits to discharge moved to Lake Tahoe Receiving Water Limits and the outfall to the filter vaults effluent limits fall under the maximum daily concentration for discharge to surface waters.

[4] Turbidity standard for Bijou Park Creek mimic the maximum discharge to surface water because there is no upstream background sampling station for comparison.

[5] The total suspended sediment standard for tributary streams into the Lake Tahoe 90th percentile is 60 mg/L. This standard is equivalent to the Tahoe Regional Planning Agency's regional "environmental threshold carrying capacity" standard for suspended sediment in tributaries (California Regional Water Quality Control Board, Lahontan Region 2015a).

Table 2-11 Statistical Summary for the Bijou Park Creek (43BPC-4) Sampling Station—Water Year 2020

Bijou Park Creek (43BPC-4): California Lake Tahoe Receiving Water Limits (exceedances in bold)						
	Q (cfs)	Turbidity (NTU)	Total Suspended Sediment (mg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)	Chloride (mg/L)
Standard	--	**20**	**60**	**0.15**	**0.008**	**3.0**
# of samples	17	17	17	17	17	17
Min	0.040	7.8	2.0	**0.347**	**0.036**	**23.6**
Max	0.359	**58.3**	54.5	**0.751**	**0.278**	**371.0**
Annual Average	0.170	16.9	9.4	**0.516**	**0.100**	**56.2**

Notes: cfs – cubic feet per second; mg/L – milligram per liter; NTU – nephelometric turbidity unit

The annual average turbidity measurement at the Bijou Park Creek (43BPC-4) sampling station was 16.9 NTUs, which was below the state standard of 20 NTUs. Only 2 of the 17 samples collected at this sampling station were above the turbidity standard; the highest turbidity reading (58.3 NTUs), which was recorded on April 7, 2020, is considerably lower than most years, and almost a third of the 2019 highest turbidity value (144 NTUs). Higher readings were typically associated with high flows or winter storms. Because of the relatively smaller size of the watershed and increased impervious areas associated with housing, parking lots, and roadways, sheet flow runoff likely mobilizes suspended particulates, thereby increasing turbidity readings at this location. It is possible that the below average precipitation, timing of storms, or decrease of activity in the California base area and watershed resulting from COVID-19 closures contributed to the lower than typical peak value.

The annual average for TSS of 9.4 mg/L was well below the state standard of 60 mg/L at the Bijou Park Creek (43BPC-4) sampling station. The maximum daily measurement for TSS was 54.5 mg/L occurred on April 7 and was also below the state standard. As stated in the discussion of Heavenly Valley and Hidden Valley Creeks, increases in TSS concentrations typically correspond to increases in precipitation, runoff, and high stream flows, as was the case with the April 7, 2020, sampling date. However, the Bijou Park Creek sampling station is downstream of the storm filtration system, which can sometimes influence the occurrence and timing of increased TSS levels in the stream.

The annual average for total phosphorus at the Bijou Park Creek (43BPC-4) sampling station during water year 2020 was 0.100 mg/L, which is above the state receiving water standard of 0.008 mg/L. All of the 17 daily samples collected were well above the state standard. Annual average concentrations of total phosphorus also exceeded the state receiving water standard at the baseline/reference reach on Hidden Valley Creek (43HDVC-5) baseline/reference station in water year 2020 (all individual daily samples also exceeded the standard), indicating that phosphorus is naturally present within the watersheds surrounding Heavenly Mountain Resort. Total phosphorus and total nitrogen concentrations in surface water can vary with vegetation uptake, decay, and removal and changes in the hydrologic cycle, such as fluctuations in precipitation and flows.

The annual average for total nitrogen at the Bijou Park Creek (43BPC-4) sampling station of 0.516 mg/L was above the state standard of 0.15 mg/L. All of the 17 daily samples collected were well above the state standard. Since the state standard for total nitrogen was lowered from 0.50 mg/L to 0.15 mg/L, the concentrations at the Bijou Park Creek (43BPC-4) sampling station have consistently exceeded the standard. Table 2-12 shows the annual average total nitrogen concentrations for the Bijou Park Creek (43BPC-4) sampling station over the past 12 years of monitoring, clearly demonstrating these exceedances, although the annual straight average for total nitrogen concentrations has been reduced since 2007.

Table 2-12 Total Chloride and Nitrogen Annual Average Values Compared with Flow at the Bijou Park Creek (43BPC-4) Sampling Station

Water Year	Annual Average Total Chloride Values (mg/L)	Annual Average Total Nitrogen Values (mg/L)	Annual Average Flows (cfs)
2006	98	1.096	0.52
2007	82	1.47	0.26
2008	144.88	1.88	0.33
2009	119.79	0.88	0.20
2010	94.88	0.73	0.15
2011	76.29	0.66	0.46
2012	93.6	0.61	0.24
2013	73.64	0.74	0.22
2014	56.3	0.54	0.14
2015	45.9	0.54	0.11
2016	87.2	0.69	0.12
2017	61.1	0.57	0.39
2018	50.8	0.54	0.21
2019	58.5	0.55	0.27
2020	56.2	0.52	0.17

Notes: cfs – cubic feet per second; mg/L – milligram per liter

All of the 17 daily samples collected exceeded the state standard for annual average chloride concentrations at the Bijou Park Creek (43BPC-4) sampling station during water year 2020. The 2020 annual average for chloride was 56.2 mg/L, which is substantially higher than the state standard of 3.0 mg/L. The annual average for chloride was also exceeded at the Hidden Valley Creek (43HDVC-5) baseline/reference station. However, the relative level of exceedance was approximately 19 times the state standard at the Bijou Park Creek (43BPC-4) sampling station versus 2 times the state standard at the Hidden Valley Creek (43HDVC-5) baseline/reference station. Chloride readings have been problematic at Bijou Park Creek for the past decade because Heavenly and the City of South Lake Tahoe apply deicer to the roadways during storm events and prolonged freezing periods. Icy roads and entrances that can lead to potential vehicular accidents are a public safety concern. Residual chloride is known to accumulate in the environment and removal mechanisms/processes are not readily available or affordable.

The filter vault system collects storm and snow melt runoff from both the upper and lower parking lots. Table 2-13 provides a summary of the results for water year 2020. One storm sample was collected and analyzed during water year 2020 (May 5, 2020), in part, because of the lack of measurable rain events and the resort closure during snow melt runoff periods. See Appendix B for the storm filter sampling results for the Storm Vault Influent North (43HVP-1A), Storm Vault Influent South (43HVP-1B), and the Storm Vault Effluent (43HVP-2) sampling stations.

Table 2-13 Statistical Summary for California Base Storm Filter Outlet—Water Year 2020

Storm Vault Effluent Sampling Station (43HVP-2): California Maximum Concentration for Discharge to Surface Water Limits (exceedances in bold)					
	Turbidity (NTU)	**Total Nitrogen (mg/L)**	**Total Phosphorus (mg/L)**	**Chloride (mg/L)**	**Oil and Grease (mg/L)**
Standard	**20**	**0.5**	**0.10**	--	**2.0**
# of samples	1	1	1	1	1
Min	**49**	**0.6**	**0.027**	45	ND[1]
Max	**49**	**0.6**	**0.027**	45	ND[1]
% of the time in Exceedance	**100%**	**100%**	**0%**	**--**	**0%**

Notes: cfs – cubic feet per second; mg/L – milligram per liter; NTU – nephelometric turbidity unit

[1] Samples were analyzed for oil and grease, but oil and grease were not detected above the level of the reported sample reporting/quantitation limit. The reported result should be considered an estimate.

The sample collected at the Storm Vault Effluent (43HVP-2) sampling station in water year 2020 exceeded the not-to-exceed limit for turbidity (20 NTUs). This sample also exceeded the not-to-exceed limit for total nitrogen (0.50 mg/L). The sample did not exceed the limit for phosphorus and showed filtration of phosphorus through the system compared to the Storm Vault Influent North (43HVP-1A) and Storm Vault Influent South (43HVP-1B) sampling stations. The sample was analyzed for oil and grease, but oil and grease were not detected above the level of the reported sampling reporting/quantitation limit; therefore, the reported result should be considered an estimate. Storm water samples typically reflect the first flush effect, where the highest concentrations of constituents are expected to be mobilized and transported into and through the filter system.

Since 2011, the sacrificial filters have been inspected annually. Due to the variable storm and sediment loading, not all filters require replacement each year. In September 2013, the media in the sacrificial filters were changed from the originally installed Zeolite, Perlite and Granular Activated Carbon media (ZPG™) to a PhosphoSorb™ absorbent media in hopes to reduce total phosphorus exceedances. Because of the added cost associated with the PhosphoSorb™ media, only the sacrificial filters have this media. The remaining filters are still using and being replaced with ZPG™ media.

In total, 128 total filters were replaced in July 2020, and all filters were inspected and cleaned. All 14 filters in the two sacrificial units were replaced with PhosphoSorb™ media, while filters in Unit 11 were replaced with ZPG™ media. The remaining vaults were inspected and required sediment removal but did not require filter cartridge replacement. All vault units collects bypass water from the upper parking lot and California base lodge. Additional maintenance and filter replacement was performed on the hydro-dynamic separators located near the intersection of Wildwood Avenue and Saddle Road. Maintenance records along with photographs regarding the filter replacement and separator are included with the Appendix C, *California Vault Inspection Reports*.

Comparing the water quality results with the annual PhosphoSorb™ media and filter replacement show slight improvements with regard to the minimum tested constituent values, although phosphorus was exceeded in the single sample collected in water year 2020. Continued annual maintenance and filter replacement appear to show some water quality improvement as exceedance and maximum constituent values (spikes) have not risen substantially over time. However, results from the single sample collected in water year 2020 remain high. The collection of additional storm / runoff samples is needed to draw any type of conclusion with regard to the vault system's filtration and treatment efficiency.

2.8 Edgewood Creek: Summary Statistics

Edgewood Creek is located in Nevada, outside Lahontan's jurisdiction, and included in this report for compliance with the Master Plan Amendments that are within TRPA's basin jurisdiction. The two Edgewood Creek locations are sampled for compliance with NDEP standards, as shown in Table 2-14. Sampling results for water year 2020 are summarized in Table 2-15 and Table 2-16, and the raw data tables are provided in Appendix A. All standards are for single not-to-exceed values, with the exception of total nitrogen and total phosphorus, which also have not-to-exceed annual average standard values.

Table 2-14 Summary of the Sampling Analysis Limits for Edgewood Creek at Palisades Drive—Water Year 2020

Constituents	Units	NDEP Standards
Turbidity	NTU	10[1]
Total suspended sediment	mg/L	25[1]
Total nitrogen	mg/L	0.6[1] / 0.6[2]
Total phosphorus	mg/L	0.1[1]/ 0.05[2]

[1] Not to exceed standard for a single value.

[2] Not to exceed standard for the annual average.

Of the 13 daily samples collected at the Upper Edgewood Creek (43HVE-1) sampling station, 4 exceedances of NDEP standards for turbidity occurred, 5 exceedances of single value standard and an exceedance of the annual average for total phosphorus occurred, and 2 exceedances occurred for suspended sediment. No single value or annual average exceedances of total nitrogen occurred. Other exceedances occurred on a few occasions during the runoff season in the spring and in the low flow months of June–August. Exceedance values are included in Table 2-15.

Of the 17 daily samples collected at the Lower Edgewood Creek (43HVE-2) sampling station, 6 exceedances of NDEP state standard for turbidity occurred, 4 exceedances of suspended sediment and total phosphorus occurred, and 3 exceedances for total nitrogen occurred. Exceedances of turbidity, suspended sediment, and total phosphorus at the Lower Edgewood Creek (43HVE-2) sampling station occurred in November and from April–May. No single value or annual average exceedances of total nitrogen occurred. The turbidity exceedances ranged from 11 to 65 NTUs, with the maximum occurring on April 21, 2020. A single suspended sediment exceedance also occurred on April 21, 2020. The exact cause of these turbidity and suspended sediment spikes are unknown, although the exceedances in April and May occurred during sustained high flows on the rising limb of the hydrograph. The daily exceedances of suspended sediment and total phosphorus occurred on days when the turbidity standard was also exceeded, suggesting that most of the exceedances are likely correlated with sediment transport and high flows. Exceedance values are included in Table 2-16.

Table 2-15 Statistical Summary for Edgewood Creek at the Above the Boulder Parking Lot Station—Water Year 2020

Edgewood Creek Above the Boulder Parking Lot (43HVE-1): NDEP Standards for the Truckee Region – Edgewood Creek at Palisades Drive (exceedances in bold)								
	Q (cfs)	**Specific Conductivity (mmhos)**	**Turbidity (NTU)**	**Suspended Sediment (mg/L)**	**Total Nitrogen (mg/L)**	**Total Phosphorus (mg/L)**	**SRP (mg/L)**	**DP (mg/L)**
Standards[1]	--	--	**10.0[2]**	**25[2]**	**0.6[2] / 0.6[3]**	**0.1[2] / 0.05[3]**	--	--
# of samples	7	13	13	13	13	13	13	13
Min	0.057	55.0	2.61	3.00	0.140	0.037	0.002	0.011
Max	0.243	120.4	**19.30**	**32.70**	0.516	**0.212**	0.009	0.022
Annual Average	0.149	75.0	8.51	13.82	0.247	**0.099**	0.005	0.016

Notes: cfs – cubic feet per second; DP – dissolved phosphorus; mg/L – milligram per liter ;mmhos – millimhos per centimeter; NDEP – Nevada Division of Environmental Protection; NTU – nephelometric turbidity unit; SRO – soluble reactive phosphorus

[1] NDEP standards are from the Nevada Administrative Code Chapter 445A.1664.

[2] Not-to-exceed standard for a single value.

[3] Not-to-exceed standard for the annual average.

Table 2-16 Statistical Summary for Edgewood Creek at the Below the Boulder Parking Lot Station—Water Year 2020

Edgewood Creek Below the Boulder Parking Lot (43HVE-1): NDEP Standards for the Truckee Region – Edgewood Creek at Palisades Drive (exceedances in bold)								
	Q (cfs)	**Specific Conductivity (mmhos)**	**Turbidity (NTU)**	**Suspended Sediment (mg/L)**	**Total Nitrogen (mg/L)**	**Total Phosphorus (mg/L)**	**SRP (mg/L)**	**DP (mg/L)**
Standards [1]	--	--	**10.0 [2]**	**25 [2]**	**0.6 [2] / 0.6 [3]**	**0.1 [2] / 0.05 [3]**	--	--
# Samples	17	17	17	17	17	17	17	17
Min	0.031	76.30	2.21	1.00	0.145	0.024	0.003	0.010
Max	0.632	149.7	**65.70**	**74.70**	0.547	**0.427**	0.011	0.023
Annual Average	0.212	117.1	10.96	9.81	0.242	**0.069**	0.006	0.017

Notes: cfs – cubic feet per second; DP – dissolved phosphorus; mg/L – milligram per liter; NDEP – Nevada Division of Environmental Protection; NTU – nephelometric turbidity unit; SRO – soluble reactive phosphorus

[1] NDEP standards are from the Nevada Administrative Code Chapter 445A.1664.

[2] Not-to-exceed standard for a single value.

[3] Not-to-exceed standard for the annual average.

2.9 Conclusions and Recommendations

Water year 2020 had below average precipitation (23 inches), which was considerably less than the 1981–2010 average of 33.5 inches. Water year 2020 follows four years of near or above average precipitation accumulation; water year 2017 had the greatest accumulation (70.5) and other water years had approximately average or slightly greater than average precipitation. The four years of near or above average precipitation (2016–2019) followed four years of drought (2012–2015). SWE measurements for 2020 (17.7 inches) were lower than the accumulated precipitation and were similar to conditions experienced during water year 2012. Figure 2-3 presents a comparison of the SWE (water) and precipitation totals since 2005. While 2017 annual noncompliance values were higher than seen in the previous years, 2018–2020 noncompliance values and frequency returned to levels similar to pre-2017 years, more typical of the levels experienced in the average and below average years 2012–2016.

Annual noncompliance values are typically lower and less frequent in low water years than in higher precipitation years because of increased stream flows during storm events and spring runoff during higher precipitation years. The monitoring results demonstrate that constituent values in noncompliance are not solely due to mountain operations associated with the resort activities because values at the baseline/reference station at Hidden Valley Creek (43HDVC-5) also exceeded annual averages. The following sections include a summary of the Monitoring Program and the 2020 findings for each creek and applicable recommendations.

2.9.1 Heavenly Valley Creek

Annual average values for both total phosphorus and chloride were exceeded at all three sampling stations along Heavenly Valley Creek (43HVC-1A, 43HVC-2, and 43HVC-3). Annual averages for these two constituents were also exceeded for the last four water years (2016–2019). Total phosphorus and chloride annual average values have also been consistently exceeded at the baseline/reference station along Hidden Valley Creek (43HDVC-5), even despite two sample events of below the 0.1 mg/L reporting limit. The exceedances observed at the baseline/reference reach demonstrate that resort operations and development within the watershed are not solely responsible for these exceedances along Heavenly Valley Creek.

The weighted annual average values for the suspended sediment TMDL have been calculated since 2001, and the 5-year rolling average has been below the limit since 2005. Low precipitation and runoff during the prolonged drought period between 2012 and 2015, which correlate with lower sediment loading, lowered the 5-year rolling average for the past several years. The 5-year rolling average no longer included years during that drought period, and with the exception of water year 2020, other years experienced nearly average to above average precipitation. Even though the TSS load at the Property Line (43HVC-3) sampling station in water year 2017 (a very wet winter) was substantially higher than the previous or following years, the 5-year rolling average remains below the standard. Additional erosion control resources (BMPs), increased employee awareness, and on-mountain improvements are also likely contributors to an overall reduction in sediment loading. While TSS values are in compliance for Heavenly Valley Creek, other metrics such as BMI and SCI results (Section 3), will need to show improvement before possible discussion and potential (TMDL) de-listing of Heavenly Valley Creek.

2.9.2 Bijou Park Creek / California Parking Lot Effluent

Since the state standards along Bijou Park Creek were lowered to the Lake Tahoe receiving water limits, the annual average values obtained at the sampling stations have not met the standards for total nitrogen, total phosphorus, and chloride. The Amended Monitoring and Reporting Program in 2011 lowered the standards by almost a factor of 10 for these three constituents. As discussed above, total phosphorus and chloride levels were also exceeded at the baseline/reference station along Hidden Valley Creek (43HDVC-5), suggesting concentrations of these constituents can be elevated due to natural factors. However, the exceedances at the Bijou Park Creek (43BPC-4) sampling station relative to state standards were substantially greater than those at Hidden Valley Creek or Heavenly Valley Creek.

The Monitoring and Reporting Program in 2015 also lists turbidity "contributing to a condition of pollution or nuisance in Bijou Park Creek and its downstream receiving waters (Lake Tahoe)."[8] As discussed above, elevated turbidity values at this sampling station are likely due to the increased impervious area in this smaller watershed contributing sheet flow and dissolved nutrient loading to the creek. Corrective actions have been listed in the past and are summarized in the Bijou Park Creek Evaluation Report (Catalyst 2017) previously submitted with the 2012–2016 Comprehensive Report.

Chloride exceedances continue to be problematic at the Bijou Park Creek (43BPC-4) and the Storm Vault Effluent (43HVP-2) sampling stations, as well as the other California stream sampling stations (i.e., Heavenly Valley Creek and Hidden Valley Creek). Water year 2016—the 2015/2016 ski season—marked the first year that Heavenly implemented a 5:1 Washoe sand to salt mixture as its deicer for parking lots and roadways assessing the California base lodge. The smaller spreader truck and sensor allows for adequate deicer application, where in the past the large dump truck had problems dispensing a Washoe sand mixture. Heavenly continued this practice and the mixture use for water year 2020—the 2019/2020) ski season. Although Heavenly has contracted an outside vendor to apply liquid brine (salt/chlorine mixture) in lieu of excess deicer abrasives, and liquid brine was used prior to storms in December, January, and March, Heavenly has continued to recover abrasives through mechanical sweeping of the parking areas and roads leading to the resort during extended breaks between storms and during the spring and summer months following snow melt, which removes potential materials from the entering streams. Further discussion of deicer and abrasives can be found in Section 6.

Water year 2020 was the ninth year that Heavenly reported outlet results for the California parking lot filter vault system (Storm Vault Effluent [43HVP-2] sampling station) to the State Water Board. The single effluent storm sample collected in water year 2020 had constituents that exceeded the state standards for turbidity, total phosphorus, and total nitrogen. Oil and grease were non-detectable in the May 2020 effluent storm sample. There is no state standard exceedance limit for chloride at the Storm Vault Effluent (43HVP-2) sampling station; however, it is worth noting that the chloride concentration in the effluent sample was 45 mg/L, which is lower than the 2020 annual average concentration of 56.2 mg/L collected at the Bijou Park Creek (43BPC-4) sampling station, located downstream. However, there is a larger cumulative watershed area and additional inputs at Bijou Park Creek, which would be expected to contribute additional chloride mass to the stream. The Lahontan waste discharge language does state that the metric for exceedance is 10% above background levels; however, there is not a sampling station upstream of the parking lot and Storm Vault Influent sampling stations to determine the background value.

As mentioned above, and further discussed in Section 4, 128 filters were replaced in June 2020. Water year 2020 was the seventh year of data collection using the new PhosphoSorb™ media in the sacrificial vaults. Water quality results demonstrate that the use of this new media has limited the total phosphorus exceedance spikes. Phosphorus levels have remained lower in the effluent samples compared to samples prior to the use of the PhosphoSorb™ media, and the phosphorus values show a decrease through the system based on influent and effluent value comparisons. Heavenly continues to be proactive in attempting to limit discharge exceedances by replacing cartridges, maintaining the system, updating sampling equipment, and using new filtration media. Heavenly annually budgets for continued filter inspections, maintenance, and replacement, and the next round of inspections is scheduled to occur after the 2020/2021 winter season.

2.9.3 Edgewood Creek

Thirteen samples were collected at the Upper Edgewood Creek (43HVE-1) sampling station, while 17 samples were collected downstream at the Lower Edgewood Creek (43HVE-2) sampling station. The discrepancy between the total samples collected is due to resort activities, ice and snow build-up at the Edgewood sampling stations during the winter months, and a lack of flowing water and heavy vegetation within the Upper Edgewood channel during the baseflow period.

[8] California Regional Water Quality Control Board-Lahontan Region. 2015b. Monitoring and Reporting Program No. 2015-0021 WDID NO. 6A090033000 for Heavenly Mountain Resort (page 10).

Daily exceedances of NDEP standards for turbidity and total phosphorus occurred at the Upper Edgewood Creek (43HVE-1) sampling station during the runoff season (April through May and again during the baseflow period (June through August).

NDEP daily standards at the Lower Edgewood Creek (43HVE-2) sampling station were exceeded for turbidity, suspended sediment and total phosphorus during the winter and runoff period. Since the 2007 restoration project in along Edgewood Creek below the Boulder parking lot, there have been eight water years in which the daily not-to-exceed NDEP stream effluent limits were not met for all three constituents (Table 2-17). Water years 2008, 2009, 2013, and 2016–2020 had daily exceedances for turbidity, suspended sediment, and total phosphorus. Exceedances that occurred in the past four water year along Edgewood Creek are likely related to sediment transport, constituents bound to particles/sediment, at higher flows during runoff season (March through May). Exceedances also occurred late in the summer/early fall when low flow conditions cause stagnant water and suspended particulate matter to accumulate. It is also possible that the 2007 restoration project may require maintenance or additional actions to continue to reduce exceedances. Table 2-17 shows exceedances of single value results for turbidity, suspended sediment, and total phosphorus at the Lower Edgewood Creek (43HVE-2) sampling station, which is below the Boulder parking lot. The number of occasions the single value standard was exceeded is included in parenthesis, and the shaded rows highlight years when all three constituents exceeded the single value standard on at least one occasion. Heavenly is committed to comprehensive improvements at the Boulder parking lot and began a long-term plan to repair the parking lot, which began during the 2020 construction season and is discussed further in Section 4. These parking lot improvements should improve future water quality results.

Table 2-17 Constituent Results for the Lower Edgewood Creek (43HVE-2) Sampling Station—Water Years 2007–2020

Water Year	Turbidity Standard: (10 NTUs)	Suspended Sediment Standard (25.0 mg/L)	Total Phosphorus Standard (0.1 mg/L)
2007	Not exceeded	**Exceeded (1)**	**Exceeded (1)**
2008[1]	**Exceeded (1)**	**Exceeded (2)**	**Exceeded (2)**
2009	**Exceeded (1)**	**Exceeded (2)**	**Exceeded (1)**
2010	Not exceeded	**Exceeded (2)**	Not exceeded
2011	Not exceeded	**Exceeded (1)**	Not exceeded
2012	Not exceeded	Not exceeded	Not exceeded
2013	**Exceeded (1)**	**Exceeded (1)**	**Exceeded (4)**
2014	Not exceeded	**Exceeded (1)**	Not exceeded
2015	Not exceeded	Not exceeded	Not exceeded
2016	**Exceeded (1)**	**Exceeded (1)**	**Exceeded (1)**
2017	**Exceeded (1)**	**Exceeded (2)**	**Exceeded (2)**
2018	**Exceeded (2)**	**Exceeded (3)**	**Exceeded (2)**
2019	**Exceeded (4)**	**Exceeded (4)**	**Exceeded (4)**
2020	**Exceeded (4)**	**Exceeded (1)**	**Exceeded (3)**

Notes: Shaded results highlight years when all three constituents have exceeded the single value state standard.
The number is parenthesis indicates the number of occasions the standard was exceeded.

[1] Restoration along Edgewood Creek occurred during the summer of 2007. Water year 2008 was the first year after construction.

3 Riparian Condition Summary

The objective of this long-term monitoring and data collection effort is to assess the effectiveness of erosion control measures and restoration activities for stream health. Monitoring is conducted to characterize stream and riparian conditions along selected stream reaches within the Heavenly Mountain Resort area and along the baseline/reference reaches that are unaffected by Heavenly Mountain Resort activity. The evaluation and comparison of monitoring data are used to assess changes in stream and riparian conditions over time, and if changes are encountered, determine whether they are associated with operations at Heavenly Mountain Resort.

In accordance with the joint environmental document (Hauge Brueck 2015) and subsequent TMDL criteria from the Monitoring and Reporting Program, Heavenly is required to monitor and survey SCI at least once every four years corresponding with the second year of the BMI sampling on Heavenly Valley and Hidden Valley Creeks.[9] The monitoring schedule is documented in Lahontan's Monitoring and Reporting Program No. 2015-002 (WDID NO. 6A090033000).

The 2019 season marked the second year of BMI collection followed by SCI surveys. SCI survey results were included in the *Environmental Monitoring Program Annual Report – WY 2019*, but BMI results were not available at the time of reporting. The 2019 BMI results are presented below. The next round of required BMI sampling will occur in 2022 and 2023, while the next SCI surveys will occur in 2023.

The 2012–2016[10] Comprehensive Report submitted last winter provides detailed data regarding riparian conditions over time, which will again be analyzed with the addition of the 2019 data addressed in the next Comprehensive Report (due January 2022).

3.1 Benthic Macroinvertebrate Surveys

BMI data were collected at all five sampling stations during the summer months of 2019, and laboratory analysis was completed during the winter of 2020. Table 3-1 and Table 3-2 lists the threshold criteria for both the Eastern Sierra Index of Biological Integrity (ESIBI) and California Stream Condition Index (CSCI). Table 3-3 includes all scoring data for each of the five sampling stations.

Table 3-1 Thresholds Applicable to Eastern Sierra Index of Biological Integrity[1]

Supporting (Unimpaired)			Impaired	
Acceptable		Intermediate Supporting but Uncertain	Partially Supporting	Not Supporting
>89.7	89.7–80.4	80.4–63.2	63.2–42.2	<42.2
A	B	C	D	F
Very Good	Good	Fair	Poor	Very Poor
Good		Fair	Poor	

[1] Source: Herbst and Silldorff (2009)

[9] California Regional Water Quality Control Board-Lahontan Region. 2015b. Monitoring and Reporting Program No. 2015-0021 WDID NO. 6A090033000 for Heavenly Mountain Resort (pages 3-4).

[10] Cardno. 2017. Environmental Monitoring Program Comprehensive Report Heavenly Mountain Resort Water Years 2012–2016. Cardno, Zephyr Cove, Nevada.

Table 3-2 Thresholds Used to Define Condition Classes for the California Stream Condition Index

Index	Very Likely Intact (≥0.50)	Likely Intact (0.30 to 0.50)	Possibly Altered (0.10 to 0.30)	Likely Altered (0.01 to 0.10)	Very Likely Altered (< 0.01)
CSCI	> 1.0	1.00–0.92	0.91–0.79	0.78–0.63	0.62–0.00

Source: Suk (2014)

Table 3-3 Bioassessment Scores for Sampling Events at Five Stream Sampling Stations near Heavenly Ski Resort (2006–2019)[1]

Sample Year	Sample Dates	HVC-1 Sky Meadows		HVC-2 Patsy's		HVC-3 Property Line		LHC-1 Lower Hidden Valley Creek		UHC-1 Upper Hidden Valley Creek1	
		ESIBI	CSCI	ESIBI	CSCI	ESIBI	CSCI	ESIBI	CSCI	ESIBI	CSCI
2006	9/6 & 9/7	55.3	0.93	52.2	0.92	69.1	0.95	80.6	1.21	--	--
2007	8/29 & 8/30	23.6	0.41	67	0.96	74.7	0.98	93.3	1.15	--	-
2010	8/10 & 8/11	36.8	0.67	55.2	0.86	80.7	1.04	94.6	1.11	--	--
2011	8/29	49.8	0.61	75	0.75	83.5	1.01	87.8	0.90	--	--
2014	7/28 & 7/29	13.5	0.26	52.7	0.75	72.7	0.82	80.5	0.88	--	--
2015 [2]	6/8 & 6/11	55.2	0.93	39.5	0.77	72.2	0.87	91.6	0.92	32.1	0.58
2016	7/21 & 7/22	56.0	0.88	--	--	--	--	--	--	44.8	0.73
2018	7/9–7/11	61.2	0.85	43.6	0.77	66.9	0.85	99.3	1.14	57.0	0.78
2019	7/23–7/25	67.5	0.85	82.0	0.88	76.4	0.91	93.3	1.16	68.0	0.72

Notes: ESIBI – Eastern Sierra Index of Biological Integrity; CSCS – California Stream Condition Index

[1] Scoring calculated using ESIBI, 9-point metric values, and the CSCI.

[2] 2015 was the first time BMI data were collected at Upper Hidden Valley Creek.

As stated and referenced in the 2012–2016 Comprehensive Report, annual scores can be assigned a rating; however, definitive long-term trending analysis cannot be made at this time because of the low number of samples collected (Suk 2015). Using the tables above and the parameters established in the *Heavenly Valley Creek – Bioassessment Site Scores for 2014* (Suk 2015) memorandum, the 2018 scores indicate the following biotic conditions for the stations sampled:

- Sky Meadows (HVC-1)—biotic conditions have improved over time, and the 2019 biotic condition was fair/supporting according to the ESIBI, and possibly altered according to CSCI. The ESIBI scores since 2015 show improvement over time, reaching into the supporting (unimpaired) condition for the first time since monitoring began. The 2019 CSCI scores were the same as 2018 scores and have remained in the *possibly altered* classification since 2016.
- Patsy's (HVC-2)—biotic conditions have improved dramatically over the 2018 results, according to both ESIBI and CSCI. In previous years, conditions at Patsy's consistently scored in the *poor/impaired* biotic condition according to the ESIBI, but scored in the *good/supporting* condition in 2019. The CSCI score also improved from a *likely altered* classification to *possibility altered* between 2018 and 2019, although higher results were observed when monitoring was first initiated.

- Property (HVC-3)—biotic conditions are *fair/supporting* according to the ESIBI and are considered *possibility altered* according to CSCI, with both of the numerical scores improving slightly over the 2018 scores, while still keeping the site within the same condition classification.
- Lower Hidden Valley Creek, reference site (LHC-1)—biotic conditions are *very good/supporting* according to ESIBI and in *very likely intact* according to CSCI. The ESIBI score dropped slightly from 2018, although overall scores have improved since 2011. This site has classified as in *good/supporting* biotic condition and as either *very likely intact* or *likely intact* since BMI sampling began in 2006.
- Upper Hidden Valley Creek, reference site for Sky Meadows (UHC-1)—biotic conditions improved from the 2018 scores to the *fair/supporting* conditions according to the ESIBI, although they are still considered *likely altered* according to the CSCI. Both thresholds scores have improved overtime, with a slight drop in CSCI scores in 2019, although sampling at this site only began in 2015.

The 2019 BMI data show a slight improvement over the 2018 scores, with the exception of ESIBI scores at Lower Hidden Valley Creek (HVC-1) and CSCI scores at the Upper Hidden Valley Creek reach (UHC-1). CSCI classification at the Sky Meadows reach (HVC-1) remained consistent from the 2018 scores. Overall, conditions have continued to improve overtime, although not enough sample points have been collected to determine any long-term trends.

The inclusion of the Upper Hidden Valley Creek reach, a high elevation undisturbed meadow site, provides the gathered data to be used a baseline to compare and contrast measurements against the disturbed meadow environment at Sky Meadows (HVC-1) along Heavenly Valley Creek. Future BMI samples along with snow pack and stream flow data are needed to help determine variability and stream health.

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4 Facilities Maintenance Monitoring

Appendix D presents the facilities monitoring checklist for July, August, and September. Previous monthly facility monitoring checklists (October through June) can be found in past quarterly reports for water year 2020 (Cardno 2020a, 2020b, 2020c). No deicer or salt application occurred on-mountain or in and around the parking lots during the fourth quarter because these months are typically the warmest months of the year and snow-related resort activities are not operational. Deicer and abrasive recovery (sweeping) in and around the California parking lot facilities, occurred in only January 2020, during a break in storms. Parking lot inspections continued on a monthly basis. Sweeping and recovery are discussed in greater detail in Section 6.

Pacific Stormwater BMP Solutions inspected storm vaults and replaced filters in July 2020. Appendix C presents the filter vaults maintenance inspection report and photographs from Pacific Stormwater BMP Solutions. All storm vault filters were inspected and regular maintenance and sediment removal was conducted. A total of 128 cartridges (14 PhosphoSorb™ and 114 ZPG™ filters) across three vaults were replaced in July 2020. The other four vaults were inspected and required sediment removal, but they did not require filter cartridge replacement.

Clean Harbors inspected the oil and grease separator at California Main Lodge at the end of July 2020, ensuring that the system continues to work as designed. Clean Harbors also removed sediment accumulation within the sediment drop inlets around the California Main Lodge and Boulder parking areas, immediately following the storm vaults filter maintenance and replacements.

During the 2020 summer construction season, Heavenly repaired and paved 52,000 square feet of deteriorating parking surfaces at base area parking lots. A total of 47,000 square feet of the Boulder parking lot were paved, and 260 linear feet of K-rail were installed at the west end to the parking lot to prevent snow storage and melt from running off onto the slope adjacent to Edgewood Creek. Observations made during the third quarter indicate that portions of the inlet roadway and parking lot at California main lot were spider cracking and failing due to increased water pooling from the adjacent clogged roadway drainage ditch. The drainage ditch as cleaned, and 5,000 square feet of deteriorated asphalt was repaired and replaced. Ongoing deterioration of the pavement at the parking lots likely increases the sediment (and nutrient loading) into the creek and vault systems; therefore, continued maintenance, repairs, and repaving are important to limit parking lot contributions downstream.

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5 Snow Condition and Snowmaking Materials

Table 5-1 summarizes the annual water year's total application of huck salt applied at monitored sites around the mountain. Four sites were initially monitored in 2011, and monitoring has expanded to include additional sites overtime. Huck salt application at the Adventure Peak Tubing location ceased in water year 2014 due to procedural changes, and this originally monitored site is no longer included in annual summaries of huck salt. The California parking lot location was added in water year 2015, and beginning in water year 2017, monitoring began at three additional sites: Tamarack Lodge, Tram Base, and World Cup Foundation Building. These sites have been added to adequately track all salt (deicer) applied in and around Heavenly Mountain Resort during winter operations. Table 5-1 summarizes the annual application and water year totals, noting that no huck salt was applied during the fourth quarter of water year 2020.

Table 5-1 Location and Application Amount of Huck Salt (Obtained from the Monthly Monitoring Logs)—Water Year 2020

Month/ Year	Top of the Gondola	World Cup Race Course	Terrain Park	CA Parking Lot Application	Tamarack Lodge Deck	Tram Base Deck	World Cup Foundation Building
				(pounds)			
October 2019	0	0	0	0	0	0	0
November 2019	2	0	0	150	0	0	0
December 2019	1.5	0	0	500	125	125	0
January 2020	2	0	0	150	0	150	0
February 2020	0	0	360	100	0	0	0
March 2020	0	0	340	1,000	0	10	0
April 2020	0	0	0	0	0	0	0
May 2020	0	0	0	0	0	0	0
June 2020	0	0	0	0	0	0	0
July 2020	0	0	0	0	0	0	0
August 2020	0	0	0	0	0	0	0
September 2020	0	0	0	0	0	0	0
Totals	**5.5**	**0**	**700**	**1,900**	**125**	**285**	**0**

Snow and ice melt products are applied to heavily used pedestrian areas including parking lots, walkways, and tram egress locations to provide safer guest access during the ski/snowboarding season. Heavenly has limited application and usage of salt around the mountain due to higher chloride concentrations recorded in the stream samples; however huck salt is often necessary for safety. Salt application at the California parking lot (main lodge), Tamarack Lodge, tram base and World Cup Foundation Building are addressed using a hand spreader or similar, although salt has not been applied at the World Cup Foundation Building since water year 2017.

Table 5-2 summarizes the past eight water years of salt application for each of the eight locations. Water year 2017 was the first year that the Tamarack Lodge, tram base and World Cup Foundation Building sites were monitored. Salt application usage was below average during the water year 2020, likely related to the below average winter snowfall (see Sections 2.2 and 2.4.1 for water year precipitation and stream discharge values), and resort closure due to COVID-19 concerns. Employee training and manager's salt application approval have been implemented over the years helping to limit salt usage and correlated chloride levels in water samples. As mentioned above, salt application at the Adventure Peak Tubing location has ceased since water year 2014 due to procedural changes, and although this site is no longer

included in future monitoring submittals, it is included in Table 5-2 as a past reference. Additional monitoring records over a longer period, and over varying precipitation years, will help to verify the application relationship with water year precipitation (snow fall) totals.

Table 5-2 Annual Huck Salt Application Records—Water Years 2011–2020[1]

Water Year	Top of the Gondola	World Cup Race Course	Terrain Park	Adventure Peak—Tubing Area	CA Parking Lot Application	Tamarack Lodge Deck	Tram Base Deck	World Cup Foundation Building	Total Summary
					(pounds)				
2011	250	900	3,360	3,400	--	--	--	--	7,910
2012	300	800	1,962	100	--	--	--	--	3,162
2013	450	1,680	4,160	400	--	--	--	--	6,690
2014	80	60	2,840	0	--	--	--	--	2,980
2015[2]	16	50	418	0	544	--	--	--	1,028
2016	38	240	0	0	2,982	--	--	--	3,260
2017[3]	0	0	555	0	3,295	463	1,050	31	5,394
2018	0	0	370	0	675	200	641	0	1,886
2019	40	0	1,580	0	1,737	359	380	0	4,096
2020	6	0	700	0	1,900	125	285	0	3,016

[1] Salt application at each location rounded to the nearest pound.

[2] Water year 2015 was the first year that deicer/salt application near and around the California lodge was tracked on a monthly basis. Application has occurred in the past water years; however, the amounts were not recorded.

[3] Water year 2017 was the first year that deicer/salt application near and around the following locations: Tamarack Lodge, tram base and World Cup Foundation Building was tracked on a monthly basis. Application likely occurred in the past water years; however, the amounts were not recorded.

6 Deicer and Abrasives Application and Recovery

Application of deicer and abrasives began on November 28, 2019, in the first quarter of water year 2020 during the first weekend of winter operations for the season. Application continued through the winter/ski season into March 2020 and ceased following resort closure on March 14. No deicer/abrasive application occurred during the third or fourth quarters according to the daily and monthly deicer logs. Deicers were primarily applied during the winter holiday season, and again during the early March storm cycle, and was typical of application rates in below average precipitation years.

Deicer recovery (sweeping and recovery) typically occurs in the late spring and summer months after the resort operations have concluded for the year, or during breaks in weather allowing recovery to occur. A minimal volume of deicer was applied in January and February 2020 due to a long break in storms, and the majority of recovery occurred in January because of dry weather conditions. In January, a mechanical sweeper was used to collect 39,040 pounds of abrasives in and around the California parking lots. Deicer recovery did not occur as typically scheduled in the spring and summer months because of the COVID-19 resort closure and stay-at-home orders. Small sections of the California Main Lodge parking lots were hand swept prior to adjacent construction or asphalt repairs, but the recovered material was not weighed.

The City of South Lake Tahoe also sweeps the roadways leading to Heavenly Mountain Resort, collecting debris, cinders, and sand that either it or Heavenly applies to roadways leading to the resort (Ski Run Blvd., Needle Peak Road, Wildwood Avenue, and Saddle Road). In theory, the city's sweeper collection values (specifically for these areas) should be added to the tracked recovery volumes below. However, the City of South Lake Tahoe also applies deicer to the roadways adjacent Heavenly Mountain Resort, and at this time, neither application nor recovery is tracked and accounted for.

Heavenly attempts to use liquid brine as an alternative to deicer and abrasives. Liquid brine is composed of dissolved magnesium and sodium chloride and was first used by Heavenly in 2017 to pre-treat roadways before storms. Unlike deicer, sprayed application of the liquid brine does not bounce off the asphalt roadway surface (like sand particles do) and provides more complete coverage in cracks, helping to melt snow and prevent ice build-up. Liquid brine application on the parking lots and roadways adjacent to the California Base area began on December 27, 2019, during the first quarter of water year 2020, and continued in January and March as storm cycles allowed. The volume of liquid brine applied during water year 2020 is included in Table 6-1. The 495 gallons of liquid brine applied is the most Heavenly has used since it began using liquid brine during the 2017 ski season. Daily and monthly deicer logs for the fourth quarter can be found in Appendix D. Table 6-1 provides volumes of deicer application and recovery for water year 2020.

Table 6-1 Summary of Deicer Application and Recovery (Water Year 2020)

Month/Year	Total Amount of Deicer and Abrasives Applied (pounds)	Total Amount of Deicer and Abrasives Recovered (pounds)	Total Amount of Liquid Brine Applied (gallons)
October 2019	0	0	0
November 2019	8,280	0	0
December 2019	54,529	0	175
January 2020	37,363	39,040	80
February 2020	9,088	0	0
March 2020	6,665	0	240
April 2020	0	0	0
May 2020	0	0	0
June 2020	0	0	0
July 2020	0	0	0
August 2020	0	0	0
September 2020	0	0	0
Totals	**115,925 lbs.**	**39,040 lbs.**	**495 Gallons.**

Annual application and recovery amounts for the past nine seasons (since application and recovery have been tracked) are shown in Table 6-2 . In water year 2020, the percentage of recovered material compared to applied material was low, due to the timing of the majority of application (during the holiday season) and the COVID-19 resort closure and state closure orders, which prevented typical recovery schedule in the spring. However, overall, Heavenly has increased its effort and effectiveness of removing abrasives from the watershed. Heavenly continues to actively rebuild and repair sections of the parking lot over time to help eliminate future pavement failures. Continuing the significant paving upgrades that took place at both the California Main Lodge parking lot and Boulder parking lot during the summers of 2018, 2019, and 2020 will help to reduce the potential for deteriorated asphalt and associated sediment from entering local watersheds and improve the effectiveness of mechanical sweeping recovery.

Table 6-2 Deicer Application and Recovery 9-Year Totals

Yearly Totals	Total Amount of Deicer and Abrasives Applied (pounds)	Total Amount of Deicer and Abrasives Recovered (pounds)	Percent Recovered
2012	255,570	88,600	35
2013	390,121	105,020	27
2014	124,824	66,060	53
2015	59,076	33,900	57
2016	178,735	124,240	70
2017	230,644	171,620	74
2018	76,543	127,180	166
2019	28,982	120,080	414
2020	115,925	39,040	34
Total	**1,460,420**	**875,740**	60

The 2019/2020 ski season marked the fifth year that Heavenly applied Washoe sand deicer. The previously used deicer consisted of a cinder base with greater porous spaces. This deicer had greater negative impacts to the environment due to the larger porous void space, nutrient attachment, and durability. Improvements to the spreader equipment allowed Heavenly to switch to the Lahontan-preferred abrasive/deicer material (Washoe sand). El Dorado County also uses the same "spec H aggregate" Washoe sand from Cinderlite as traction sand. Heavenly has also maintained a sand to salt ratio of 5:1, limiting the amount of salt applied to the roadways and entering the waterways. Heavenly received a new stockpile of abrasives in the spring of 2020. Samples of this material were delivered to El Dorado County and its in-house laboratory for analysis and comparison. Results from this analysis are included in Appendix H and summarized below. Laboratory analysis was performed in May 14, 2020, on the Washoe sand sample and the results are presented below in Table 6-3.

Table 6-3 Abrasives Results[1]

Parameter	Method of Testing Preferred	Minimum Reporting Limit	Results
Sand equivalent	CTM 217	80 minutes	Not tested
Durability	CTM 229	55 minutes	Not tested
Moisture content	CTM 226	< 5%	Not tested
Gradation	CTM 202	NA	Pass
Turbidity[2]	CalTrans 6	NA	75 NTUs

Notes: NTU – nephelometric turbidity unit

[1] Results provided by El Dorado County Public Works Department

[2] Turbidity testing was performed using El Dorado County-developed turbidity methodology

The Monitoring and Reporting Program No. 2015-0021 lists the parameters and method for testing required for abrasive usage. The testing methodology provided in Table 6-3 notes Lahontan's preferred testing methods. El Dorado County testing methods were not provided at this time; however, this information will be requested for future analysis. Sand equivalent, durability, and moisture content results were not supplied/tested for this abrasive sample, though according to the El Dorado County's findings, the abrasive "spec H traction sand met all allowable criteria for traction sand specifications designed to protect water quality and improve public safety." Heavenly and El Dorado County's joint testing effort demonstrates a good faith effort that the sand mixture and usage "meets required specifications for (both) environmental protection as well as public safety requirements / standards." Additional laboratory analysis will be conducted in the future when either the abrasive sample is derived from a new source, a new vendor, or at a minimum upon another round of delivery.

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7 USFS Roads Monitoring

The latest Monitoring and Reporting Program requires USFS roads within the boundary of Heavenly Mountain Resort.[11] In March 2015, Heavenly and the LTBMU entered into a roads maintenance and reporting agreement to coordinate future maintenance and monitoring of the on-mountain roadway network.[12] This agreement lays out the framework for roadway maintenance, new roadway construction, annual meetings, and annual reporting activities.

The Heavenly Roads Maintenance Report for 2020 was submitted to the LTBMU in October 2020. The 2020 roads maintenance summary table and map are included in this report as Appendix E. During the 2020 construction season, 14.03 miles of the on-mountain roadway network were improved and/or maintained. Of this total, 12.83 miles of roads were maintained, and 1.2 miles of roads were improved. Effectiveness of road BMPs were evaluated in 2017, fulfilling a separate monitoring requirement to be completed once every four years, and results were included as part of the BMP Effectiveness Annual Report, submitted in May 2018.

In addition to the new Monitoring and Reporting Program, USFS Region 5 has phased out the Regional BMP Evaluation Program. In the past, this program provided additional roadway maintenance and monitoring protocols (USFS 1992). In the future, USFS will require the new National US Forest Service BMP Standards and Monitoring Program that will address roadways, ski runs, and facilities. The program and protocol are still in draft form at this time; however, the agency has actively been using the protocols over the past few years. A final version of the technical guide is not currently available to the public. The new National BMP protocols programmatically assess BMP implementation and effectiveness for roadways and other land management practices (facilities and ski runs for example). All management practices associated with Heavenly Mountain Resort will be included in the sample pool for random selection and annual monitoring, which the USFS staff will conduct and report on.

Because of the low number of sites selected and random monitoring associated with the National BMP monitoring targets (approximately six evaluations per National Forest per year), Heavenly and its consultants will continue to identify and address erosion and BMP effectiveness on resort roadways, ski runs, and facilities annually.

[11] California Regional Water Quality Control Board-Lahontan Region. 2015b. Monitoring and Reporting Program for Heavenly Mountain Resort. Board Order 2015-0021. WDID No. 6A090033000 (page 9. Section D).

[12] US Forest Service, Lake Tahoe Basin Management Unit. Forest Road Maintenance and Reporting Agreement between the USDA USFS LTBMU and Heavenly Mountain Resort. March 23, 2015.

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8 Facilities Watershed Awareness Training

As required by the Monitoring and Reporting Program, Appendix F includes the attendee list and a copy of the Facilities Watershed Awareness Training presentation, which was completed on June 29, 2020, in accordance with the Centers for Disease Control and Prevention and El Dorado County pandemic guidelines (social distancing and requiring face masks). This training is typically referred to as the "BMP Breakfast Training" and had 59 attendees in 2020. The training covers the following topics: recent on-mountain projects, resort maintenance operations, identification of noxious weeds and sensitive species (*Draba*), lessons learned from past projects, information regarding the conditions of summer road usage (speed and dust), and information regarding new BMP technologies and correct BMP installation and implementation.

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9 On-Mountain Monitoring

Additional on-mountain monitoring documentation can be found in Appendix G. The inspection log table and associated project photographs show maintenance and monitoring inspections conducted during the fourth quarter of water year 2020 (July through September) and as serves as a starting point for the development pf a draft of annual work list submitted with the Mitigation and Monitoring Report. Because of snow cover and limited on-mountain access, project photo monitoring and documentation is typically limited to once per water year (typically in the fourth quarter). A number of on-mountain erosion issues were addressed by the summer maintenance crews. On-mountain road and drainage repairs are included in the Road Maintenance Report in Appendix E. Roadside drainage features on Maggie's, Groove, and Powderbowl were inspected and cleared of sediment following storm events. Water bars were added to the Lower Olympic Downhill Run, and water bars on Big Dipper run were repaired and improved to address erosion hotspots. BMPs were installed around all construction project areas and stockpiles and were regularly inspected over the course of active construction. Additionally, all on-mountain culverts were inspected and were noted to be adequate at this time. Erosion control measures implemented during the summer 2017 construction season at Hand Grenade/Roundabout were also inspected and showed revegetation progress. The CA Dam Sediment Removal Project removed and relocated 4,000 cubic yards of sediment from the snowmaking pond to the Upper Ridge Run Ski Trail for trail widening and trail stabilization. Project details and photographs are included in Appendix G. The project was permitted through Lahontan, and environmental specialists were onsite through the course of the project. As stated earlier in the report, annual storm vault inspections were performed and filter replacement occurred in July 2020 as discussed in Section 2.7 and Section 4.

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Heavenly Mountain Resort—
Water Year 2020

APPENDIX A

RAW WATER QUALITY CONSTITUENTS, WATER YEAR 2020

Appendix A
RAW WATER QUALITY CONSTITUENTS, WATER YEAR 2020

Table A-1:		Heavenly Mountain Resort water year 2019/2020 water quality monitoring data from station 43HVC-1A, Heavenly Valley Creek at Sky Meadows. This station is located above the snowmaking pond at an elevation of 8,525 feet.										
Date	**Time**	**Discharge (cfs)**	**Turbidity (ntu)**	**Suspended Sediment [2] (mg/L)**	**Total Nitrite/Nitrate (mg/L)**	**Total Kjeldahl N (mg/L)**	**Total Nitrogen (mg/L)**	**Total Phosphorus (mg/L)**	**Chloride (mg/L)**	**Site Water Temperature (Deg C)**	**Site Ambient Temperature (Deg C)**	**Precipitation (in)**
Lahontan Standards[1]		N/A	N/A	**60**	N/A	N/A	**0.190**	**0.015**	**0.15**	N/A	N/A	N/A
First Quarter WY 2019-2020												
10/15/19	13:10	0.357	1.27	2.0	0.011	0.137	0.148	0.015	**0.3**	5.8	16.9	0.0
11/13/19	12:50	0.244	1.17	1.5	0.007	0.134	0.141	0.014	**0.3**	9.8	11.8	0.0
12/11/19	13:40	0.173	1.06	1.0	0.015	0.061	0.076	0.012	**0.7**	1.8	-0.3	0.0
Second Quarter WY 2019-2020												
1/14/20	14:10	0.123	1.82	2.5	0.007	0.055	0.062	**0.016**	**0.4**	0.2	-0.1	0.1
2/11/20	13:40	0.100	3.18	14.5	0.009	0.141	0.150	**0.021**	**0.4**	1.0	1.4	0.0
3/23/20	-	Neither flow nor water quality samples could be collected because of restricted on-mountain access due to COVID-19 resort closure.										0.0
Third Quarter WY 2019-2020												
4/7/20	-	Neither flow nor water quality samples could be collected because of restricted on-mountain access due to COVID-19 resort closure.										0.5
4/21/20	-	Neither flow nor water quality samples could be collected because of restricted on-mountain access due to COVID-19 resort closure.										0.0
5/5/20	-	Neither flow nor water quality samples could be collected because of restricted on-mountain access due to COVID-19 resort closure.										0.0
5/20/20	13:05	0.830	1.69	4.0	0.037	0.078	0.115	**0.025**	**0.7**	4.5	4.7	0.2
5/27/20	13:00	0.939	2.83	2.5	0.025	0.101	0.126	**0.023**	**0.8**	9.8	20.3	0.0
6/2/20	13:20	1.062	2.17	5.0	0.024	0.114	0.138	**0.019**	**0.7**	10.3	18.3	0.0
6/16/20	12:55	1.037	1.88	7.5	0.027	0.089	0.116	**0.020**	**0.8**	10.0	14.1	0.0
6/30/20	13:30	0.503	1.59	4.0	0.018	0.097	0.115	**0.020**	**0.5**	11.9	19.7	0.0
Fourth Quarter WY 2019-2020												
7/14/20	13:05	0.307	1.19	2.5	0.013	0.100	0.113	**0.021**	**0.5**	14.0	25.0	0.0
8/18/20	13:25	0.111	2.01	5.0	0.008	0.100	0.108	**0.016**	**0.5**	14.0	23.0	0.0
9/22/20	13:00	0.069	2.36	3.5	0.005	0.059	0.064	**0.017**	**0.5**	8.5	25.0	0.0
Annual Summary	**Minimum**	0.069	1.06	1.00	0.005	0.055	0.062	0.012	**0.30**	0.2	-0.3	-
	Maximum	1.062	3.18	14.50	0.037	0.141	0.150	**0.025**	**0.80**	14.0	25.0	-
	Average	0.481	1.86	4.27	0.016	0.097	0.113	**0.018**	**0.55**	7.8	13.8	-
90th Percentile		-	-	11.70	-	-	-	**-**	**-**		-	-

[1] Standards are annual averages for the receiving waters of Trout Creek.

[2] Standards are for receiving waters of Trout Creek, 90th Percentile.

Heavenly Valley Creek - Below Patsys
(43HVC-2)

Table A-2:		Heavenly Mountain Resort water year 2019/2020 water quality monitoring data from station 43HVC-2, Heavenly Valley Creek below Patsy's Chair. This station is located just beyond ski area development within this watershed at an elevation of 8,000 feet.										
Date	**Time**	**Discharge (cfs)**	**Turbidity (ntu)**	**Suspended Sediment [2] (mg/L)**	**Total Nitrite/Nitrate (mg/L)**	**Total Kjeldahl N (mg/L)**	**Total Nitrogen (mg/L)**	**Total Phosphorus (mg/L)**	**Chloride (mg/L)**	**Site Water Temperature (Deg C)**	**Site Ambient Temperature (Deg C)**	**Precipitation (in)**
Lahontan Standards[1]		N/A	N/A	**60**	N/A	N/A	**0.190**	**0.015**	**0.15**	N/A	N/A	N/A
First Quarter WY 2019-2020												
10/15/19	12:50	0.505	0.87	1.0	0.007	0.069	0.076	**0.016**	**0.4**	5.1	13.3	0.0
11/13/19	12:35	0.358	0.53	1.0	0.008	0.055	0.063	0.015	**0.6**	10.1	4.7	0.0
12/11/19	13:05	0.100	0.65	0.5	0.002	0.078	0.080	**0.018**	**1.3**	2.5	0.9	0.0
Second Quarter WY 2019-2020												
1/14/20	14:40	0.100	0.29	2.0	0.015	0.054	0.069	**0.017**	**0.9**	1.6	0.9	0.1
2/11/20	14:00	0.100	0.27	1.5	0.025	0.052	0.077	0.015	**0.9**	2.0	4.9	0.0
3/23/20	-	Neither flow nor water quality samples could be collected because of restricted on-mountain access due to COVID-19 resort closure.										0.0
Third Quarter WY 2019-2020												
4/7/20	-	Neither flow nor water quality samples could be collected because of restricted on-mountain access due to COVID-19 resort closure.										0.5
4/21/20	-	Neither flow nor water quality samples could be collected because of restricted on-mountain access due to COVID-19 resort closure.										0.0
5/5/20	12:45	0.942	1.37	2.7	0.049	0.115	0.164	**0.020**	**1.3**	6.8	15.1	0.0
5/20/20	12:45	1.142	1.69	2.5	0.037	0.100	0.137	**0.026**	**0.9**	4.6	4.2	0.2
5/27/20	12:45	1.194	1.62	2.5	0.023	0.119	0.142	**0.019**	**0.9**	9.6	20.8	0.0
6/2/20	13:00	1.142	1.62	3.0	0.020	0.103	0.123	**0.019**	**0.9**	10.0	20.8	0.0
6/16/20	12:40	1.638	17.10	12.0	0.010	0.170	0.180	**0.051**	**1.0**	9.9	14.4	0.0
6/30/20	13:15	0.668	1.24	3.0	0.013	0.122	0.135	**0.018**	**0.6**	11.9	19.7	0.0
Fourth Quarter WY 2019-2020												
7/14/20	12:45	0.090	0.80	1.5	0.054	0.077	0.131	**0.018**	**1.3**	11.0	23.5	0.0
8/18/20	13:05	0.174	0.89	3.0	0.026	0.074	0.100	**0.020**	**0.7**	11.0	25.0	0.0
9/22/20	12:40	0.100	1.03	3.0	0.021	0.070	0.091	**0.024**	**0.7**	7.0	17.0	0.0
Annual Summary	**Minimum**	0.090	0.27	0.50	0.002	0.052	0.000	0.015	**0.40**	1.6	0.9	-
	Maximum	1.638	17.10	12.00	0.054	0.170	0.180	**0.051**	**1.30**	11.9	25.0	-
	Average	0.590	2.14	2.80	0.022	0.090	0.105	**0.021**	**0.89**	7.4	13.2	-
90th Percentile		-	-	7.50	-	-	-	**-**	**-**		-	-

[1] Standards are annual averages for the receiving waters of Trout Creek.

[2] Standards are for receiving waters of Trout Creek, 90th Percentile.

Heavenly Valley Creek - Property Line
(43HVC-3)

Table A-3:		Heavenly Mountain Resort water year 2019/2020 water quality monitoring data from station 43HVC-3, Heavenly Valley Creek at the Property Line. This station is located just above the Forest Service property line and subdivision development at an elevation of 6,620 feet.										
Date	**Time**	**Discharge (cfs)**	**Turbidity (ntu)**	**Suspended Sediment [2] (mg/L)**	**Total Nitrite/Nitrate (mg/L)**	**Total Kjeldahl N (mg/L)**	**Total Nitrogen (mg/L)**	**Total Phosphorus (mg/L)**	**Chloride (mg/L)**	**Site Water Temperature (Deg C)**	**Site Ambient Temperature (Deg C)**	**Precipitation (in)**
Lahontan Standards[1]		N/A	N/A	**60**	N/A	N/A	**0.190**	**0.015**	**0.15**	N/A	N/A	N/A
First Quarter WY 2019-2020												
10/15/19	11:30	0.739	0.79	1.0	0.001	0.078	0.079	**0.016**	**0.4**	4.2	7.3	0.0
11/13/19	11:20	0.516	0.61	1.0	0.001	0.068	0.069	**0.019**	**0.6**	4.5	11.1	0.0
12/11/19	11:55	0.254	0.48	0.5	0.019	0.066	0.085	**0.016**	**0.9**	2.0	1.5	0.0
Second Quarter WY 2019-2020												
1/14/20	12:00	0.102	6.27	14.5	0.002	0.218	**0.220**	**0.055**	**0.7**	1.3	-1.8	0.1
2/11/20	11:40	0.080	0.52	1.0	0.005	0.073	0.078	**0.016**	**0.7**	1.4	3.8	0.0
3/23/20	13:00	0.215	0.44	1.5	0.005	0.051	0.056	0.013	**0.7**	1.7	3.4	0.0
Third Quarter WY 2019-2020												
4/7/20	12:30	0.152	0.84	1.5	0.001	0.056	0.057	**0.019**	**1.6**	1.8	4.6	0.5
4/21/20	11:35	0.479	0.44	2.0	0.002	0.063	0.065	**0.016**	**4.0**	3.3	8.5	0.0
5/5/20	11:25	1.496	1.01	3.3	0.005	0.079	0.084	**0.019**	**1.3**	5.1	14.6	0.0
5/20/20	11:20	1.513	0.83	1.5	0.001	0.066	0.067	**0.026**	**1.0**	3.9	6.0	0.2
5/27/20	11:20	1.433	1.61	3.0	0.001	0.105	0.106	**0.021**	**0.8**	8.5	23.3	0.0
6/2/20	11:35	1.361	1.06	3.0	0.003	0.083	0.086	**0.018**	**0.9**	8.3	18.4	0.0
6/16/20	11:20	1.095	1.92	3.5	0.001	0.082	0.083	**0.017**	**1.0**	8.6	17.0	0.0
6/20/20	11:45	0.557	0.79	3.0	0.003	0.086	0.089	**0.018**	**0.7**	10.4	20.3	0.0
Fourth Quarter WY 2019-2020												
7/14/20	11:20	0.035	0.61	2.0	0.004	0.075	0.079	**0.020**	**1.1**	11.5	25.5	0.0
8/18/20	11:40	0.068	0.58	3.0	0.001	0.076	0.077	**0.019**	**0.9**	10.0	23.0	0.0
9/22/20	11:30	N/A[3]	0.54	3.0	0.002	0.060	0.062	**0.030**	**0.7**	8.5	21.5	0.0
Annual Summary	**Minimum**	0.035	0.44	0.50	0.001	0.051	0.000	0.013	**0.40**	1.3	-1.8	-
	Maximum	1.513	6.27	14.5	0.019	0.218	0.220	**0.055**	**4.00**	11.5	25.5	-
	Average	0.631	1.14	2.84	0.003	0.081	0.080	**0.021**	**1.06**	5.6	12.2	-
90th Percentile		-	-	5.70	-	-	-	**-**	**-**		-	-

[1] Standards are annual averages for the receiving waters of Trout Creek.

[2] Standards are for receiving waters of Trout Creek, 90th Percentile.

[3] Flow could not be sample due to low water conditions, but water quality samples were taken.

Bijou Park Creek - Below California Parking Lot
(43BPC-4)

Table A-4:		Heavenly Mountain Resort water year 2019/2020 water quality monitoring data from station 43BPC-4, Bijou Park Creek below California Parking Lot. This station is located 1/4 miles below the culvert outlet draining the parking lot off of Wildwood Avenue at an elevation of 6,530 feet.										
Date	**Time**	**Discharge (cfs)**	**Turbidity (ntu)**	**Suspended Sediment (mg/L)**	**Total Nitrite/ Nitrate (mg/L)**	**Total Kjeldahl N (mg/L)**	**Total Nitrogen (mg/L)**	**Total Phosphorus (mg/L)**	**Chloride (mg/L)**	**Site Water Temperature (Deg C)**	**Site Ambient Temperature (Deg C)**	**Precipitation (in)**
Lahontan Standards[1]		N/A	**20**	**60**	N/A	N/A	**0.150**	**0.008**	**3.0**	N/A	N/A	N/A
First Quarter WY 2019-2020												
10/15/19	12:15	0.048	16.4	8.0	0.143	0.233	**0.376**	**0.116**	**23.6**	11.8	11.6	0.0
11/13/19	12:00	0.107	**45.3**	19.0	0.200	0.210	**0.410**	**0.267**	**26.0**	11.0	10.6	0.0
12/11/19	14:20	0.112	12.6	5.0	0.157	0.594	**0.751**	**0.075**	**371.0**	7.2	2.8	0.0
Second Quarter WY 2019-2020												
1/14/20	12:45	0.249	12.9	5.5	0.171	0.225	**0.396**	**0.087**	**66.0**	5.3	-0.5	0.1
2/11/20	12:30	0.118	11.8	7.0	0.201	0.461	**0.662**	**0.087**	**66.0**	6.3	4.5	0.0
3/23/20	14:00	0.307	10.9	7.5	0.227	0.234	**0.461**	**0.072**	**47.7**	6.2	3.5	0.0
Third Quarter WY 2019-2020												
4/7/20	13:30	0.359	**58.3**	54.5	0.128	0.547	**0.675**	**0.278**	**48.7**	6.6	2.5	0.5
4/21/20	12:20	0.189	9.4	5.3	0.222	0.204	**0.426**	**0.069**	**48.0**	9.2	11.7	0.0
5/5/20	12:05	0.308	7.8	6.7	0.378	0.201	**0.579**	**0.073**	**28.7**	10.0	16.0	0.0
5/20/20	12:00	0.272	8.2	2.0	0.340	0.246	**0.586**	**0.036**	**29.2**	9.9	8.0	0.2
5/27/20	12:05	0.166	9.9	3.0	0.382	0.208	**0.590**	**0.059**	**29.9**	12.4	22.0	0.0
6/2/20	12:20	0.161	11.3	4.0	0.359	0.228	**0.587**	**0.065**	**29.6**	12.3	18.0	0.0
6/16/20	12:00	0.137	12.2	5.0	0.333	0.208	**0.541**	**0.060**	**30.1**	11.9	17.0	0.0
6/30/20	12:35	0.080	14.7	5.0	0.244	0.196	**0.440**	**0.079**	**28.0**	13.6	20.4	0.0
Fourth Quarter WY 2019-2020												
7/14/20	12:05	0.081	16.3	7.5	0.248	0.184	**0.432**	**0.111**	**26.5**	15.5	25.5	0.0
8/18/20	12:25	0.161	11.4	6.5	0.134	0.213	**0.347**	**0.041**	**27.8**	15.0	25.0	0.0
9/22/20	12:05	0.040	17.1	8.5	0.362	0.153	**0.515**	**0.123**	**28.5**	13.5	21.5	0.0
Annual Summary	**Minimum**	0.040	7.8	2.0	0.128	0.153	**0.347**	**0.036**	**23.6**	5.3	-0.5	-
	Maximum	0.359	**58.3**	54.5	0.382	0.594	**0.751**	**0.278**	**371.0**	15.5	25.5	-
	Average	0.170	16.9	9.4	0.249	0.267	**0.516**	**0.100**	**56.2**	10.5	12.9	-

[1] Standards are for receiving water objectives from the Lahontan Basin Plan expressed as an annual average.

Hidden Valley Creek - Lower Hidden
(43HDVC-5)

Table A-5:		Heavenly Mountain Resort water year 2019/2020 water quality monitoring data from station 43HDVC-5, Hidden Valley Creek baseline station. This station is located just above the confluence with Trout Creek, at an elevation of 6,680 feet.										
Date	**Time**	**Discharge (cfs)**	**Turbidity (ntu)**	**Suspended Sediment (mg/L)**	**Total Nitrite/Nitrate (mg/L)**	**Total Kjeldahl N (mg/L)**	**Total Nitrogen (mg/L)**	**Total Phosphorus (mg/L)**	**Chloride (mg/L)**	**Site Water Temperature (Deg C)**	**Site Ambient Temperature (Deg C)**	**Precipitation (in)**
Lahontan Standards[1]		N/A	N/A	**60**	N/A	N/A	**0.19**	**0.015**	**0.15**	N/A	N/A	N/A
First Quarter WY 2019-2020												
10/15/19	10:30	0.630	0.73	1.0	0.001	0.058	0.059	**0.021**	**0.3**	3.9	4.5	0.0
11/13/19	10:30	0.665	0.50	1.0	0.001	0.049	0.050	**0.021**	**0.5**	4.5	8.0	0.0
12/11/19	10:30	0.743	0.51	0.5	0.003	0.069	0.072	**0.021**	**0.5**	2.0	1.0	0.0
Second Quarter WY 2019-2020												
1/14/20	10:30	0.566	0.41	2.0	0.002	0.054	0.056	**0.024**	**0.3**	0.4	-1.8	0.1
2/11/20	10:30	0.739	0.50	4.0	0.009	0.074	0.083	**0.023**	**0.3**	-0.2	-3.1	0.0
3/23/20	11:00	0.545	0.59	2.0	0.006	0.074	0.080	**0.018**	**0.2**	1.6	0.8	0.0
Third Quarter WY 2019-2020												
4/7/20	10:30	0.624	0.57	1.0	0.011	0.118	0.129	**0.019**	**0.5**	2.5	1.4	0.5
4/21/20	10:30	0.704	1.48	3.3	0.011	0.100	0.111	**0.023**	**0.4**	2.2	3.3	0.0
5/5/20	10:30	1.635	1.48	4.0	0.006	0.096	0.102	**0.023**	**0.8**	4.7	11.0	0.0
5/20/20	10:30	2.783	1.39	3.5	0.001	0.114	0.115	**0.028**	**0.3**	3.2	4.4	0.2
5/27/20	10:30	2.377	1.62	3.0	0.001	0.123	0.124	**0.020**	**0.2**	7.2	17.6	0.0
6/2/20	10:30	3.741	1.31	2.0	0.004	0.098	0.102	**0.018**	ND	6.5	15.8	0.0
6/16/20	10:30	2.180	0.79	3.5	0.001	0.072	0.073	**0.016**	**0.6**	7.7	14.5	0.0
6/30/20	10:30	1.280	1.13	2.5	0.004	0.090	0.094	**0.020**	**0.3**	8.9	16.1	0.0
Fourth Quarter WY 2019-2020												
7/14/20	10:30	0.749	0.96	3.0	0.010	0.091	0.101	**0.024**	ND	10.5	23.5	0.0
8/18/20	10:30	0.373	1.32	4.0	0.001	0.096	0.097	**0.028**	**0.6**	13.0	22.0	0.0
9/22/20	10:30	0.341	0.65	3.0	0.001	0.065	0.066	**0.028**	**0.5**	7.0	18.5	0.0
Annual Summary	**Minimum**	0.341	0.41	0.50	0.001	0.049	0.050	**0.016**	**0.20**	-0.2	-3.1	-
	Maximum	3.741	1.62	4.00	0.011	0.123	0.129	**0.028**	**0.80**	13.0	23.5	-
	Average	1.216	0.94	2.55	0.004	0.085	0.089	**0.022**	**0.42**	5.0	9.3	-
90th Percentile[2]		-	-	4.00	-	-	-	**-**	**-**		-	-

[1] Standards are annual averages for the receiving waters of Trout Creek. For Suspended Sediment, standards are for streams tributary to Lake Tahoe. Suspended Sediment concentrations shall not exceed a 90th percentile value of 60 mg/L.

Edgewood Creek - Above
(43HVE-1)

Table A-6:		Heavenly Mountain Resort water year 2019/2020 water quality monitoring data from station 43HVE-1, Edgewood Creek above Boulder Parking Lot. This station is located in Edgewood Bowl above the learn-to-ski center, at an elevation of 7,280 feet.												
Date	**Time**	**Discharge (cfs)**	**Specific Conductivity (mmhos)**	**Turbidity (ntu)**	**Suspended Sediment (mg/L)**	**Total Nitrite/Nitrate (mg/L)**	**Total Kjeldahl N (mg/L)**	**Total Nitrogen (mg/L)**	**Total Phosphorus (mg/L)**	**Soluble Reactive P (mg/L)**	**Dissolved P (mg/L)**	**Site Water Temperature (Deg C)**	**Site Ambient Temperature (Deg C)**	**Precipitation (in)**
NDEP Standards[1]		N/A	N/A	**10[2]**	**25[2]**	N/A	N/A	**0.6[2] / 0.6[3]**	**0.1[2] / 0.05[3]**	N/A	N/A	N/A	N/A	N/A
First Quarter WY 2019-2020														
10/15/19	14:30	0.071	81.3	6.08	9.0	0.001	0.175	0.176	0.066	0.005	0.011	11.9	13.3	0.0
11/13/19	14:05	-[4]	68.5	9.40	12.0	0.001	0.202	0.203	0.083	0.004	0.013	8.4	12.9	0.0
12/11/19	15:45	-[5]	60.7	3.25	3.0	0.002	0.138	0.140	0.037	0.004	0.011	N/A	N/A	0.0
Second Quarter WY 2019-2020														
1/14/20	15:45	Neither flow nor water quality samples could be collected due to snow cover across channel.												0.1
2/11/20	15:30	Neither flow nor water quality samples could be collected due to ice cover across channel. No flow was apparent under ice.												0.0
3/23/20	15:45	Neither flow nor water quality samples could be collected due to snow cover across channel.												0.0
Third Quarter WY 2019-2020														
4/7/20	14:50	-[4]	72.5	5.28	8.5	0.001	0.258	0.259	0.059	0.002	0.013	1.9	6.2	0.5
4/21/20	13:30	0.208	67.7	**19.3**	32.7	0.003	0.301	0.304	**0.209**	0.005	0.013	8.9	16.2	0.0
5/5/20	14:00	0.243	55.0	7.76	16.0	0.001	0.216	0.217	**0.115**	0.005	0.022	14.9	18.0	0.0
5/20/20	14:30	0.195	57.0	3.17	5.0	0.001	0.151	0.152	0.050	0.003	0.022	14.8	9.5	0.2
5/27/20	14:20	0.160	68.7	2.61	4.0	0.024	0.211	0.235	0.042	0.003	0.016	20.8	26.5	0.0
6/2/20	14:45	0.111	69.2	3.26	4.0	0.003	0.149	0.152	0.043	0.008	0.017	21.8	30.0	0.0
6/16/20	14:20	0.057	75.8	5.19	6.5	0.002	0.145	0.147	0.052	0.008	0.015	18.1	17.6	0.0
6/30/20	14:55	-[4]	86.3	**11.3**	17.5	0.003	0.323	0.326	**0.119**	0.005	0.019	20.0	18.6	0.0
Fourth Quarter WY 2019-2020														
7/14/20	14:05	-[4]	92.4	**15.0**	30.5	0.003	0.377	0.380	**0.212**	0.009	0.021	24.0	28.0	0.0
8/18/20	14:20	-[4]	120.4	**19.0**	31.0	0.002	0.514	0.516	**0.201**	0.009	0.02	24.0	25.0	0.0
9/22/20	14:20	Neither flow nor water quality samples could be collected due to low flow conditions.												
Annual Summary	**Minimum**	0.057	55.0	2.61	3.00	0.001	0.138	0.140	0.037	0.002	0.011	1.9	6.2	-
	Maximum	0.243	120.4	**19.30**	**32.70**	0.024	0.514	0.516	**0.212**	0.009	0.022	24.0	30.0	-
	Average	0.149	75.0	8.51	13.82	0.004	0.243	0.247	**0.099**	0.005	0.016	15.8	18.5	-

[1] NDEP Standards are from the Nevada Administrative Code (NAC) Chapter 445A.1664.

[2] Not to exceed standard for a single value.

[3] Not to excced standard for the annual average.

[4] Collected water quality samples, but could not measure flow due to stagnant water and muck layer on channel bottom

[5] Collected water quailty samples, but could not measure flow due to partial snow cover across channel

Edgewood Creek - Below
(43HVE-2)

Table A-7:		Heavenly Mountain Resort water year 2019/2020 water quality monitoring data from station 43HVE-2, Edgewood Creek below Boulder Parking Lot. This station is located 1/4 mile below the parking lot, underneath the power lines at an elevation of 7,120 feet.												
Date	**Time**	**Discharge (cfs)**	**Specific Conductivity (mmhos)**	**Turbidity (ntu)**	**Suspended Sediment (mg/L)**	**Total Nitrite/Nitrate (mg/L)**	**Total Kjeldahl N (mg/L)**	**Total Nitrogen (mg/L)**	**Total Phosphorus (mg/L)**	**Soluble Reactive P (mg/L)**	**Dissolved P (mg/L)**	**Site Water Temperature (Deg C)**	**Site Ambient Temperature (Deg C)**	**Precipitation (in)**
NDEP Standards[1]		N/A	N/A	**10[2]**	**25[2]**	N/A	N/A	**0.6[2] / 0.6[3]**	**0.1[2] / 0.05[3]**	N/A	N/A	N/A	N/A	N/A
First Quarter WY 2019-2020														
10/15/19	14:10	0.118	122.3	4.51	1.0	0.045	0.100	0.145	0.024	0.007	0.015	7.4	10.9	0.0
11/13/19	13:45	0.133	105.2	**35.60**	19.0	0.038	0.272	0.310	**0.135**	0.005	0.016	6.0	8.4	0.0
12/11/19	15:15	0.314	130.4	9.59	5.0	0.056	0.165	0.221	0.052	0.009	0.018	2.3	1.2	0.0
Second Quarter WY 2019-2020														
1/14/20	15:00	0.087	108.3	4.67	3.0	0.055	0.121	0.176	0.026	0.007	0.018	N/A	N/A	0.1
2/11/20	15:10	0.198	114.3	6.09	4.5	0.064	0.157	0.221	0.034	0.004	0.012	1.5	1.4	0.00
2/23/20	15:00	0.251	140.6	6.75	7.5	0.073	0.169	0.242	0.037	0.003	0.010	1.9	1.0	0.00
Third Quarter WY 2019-2020														
4/7/20	14:20	0.287	131.2	**16.1**	8.5	0.073	0.223	0.296	0.066	0.004	0.018	1.7	2.6	0.5
4/21/20	13:00	0.579	91.3	**65.7**	**74.7**	0.032	0.515	0.547	**0.427**	0.006	0.013	6.3	8.4	0.0
5/5/20	13:30	0.632	76.3	**11.2**	16.0	0.020	0.220	0.240	**0.102**	0.005	0.017	12.0	15.5	0.0
5/20/20	14:10	0.317	90.4	3.96	5.0	0.034	0.139	0.173	0.046	0.006	0.023	10.0	5.2	0.2
5/27/20	14:00	0.232	101.1	3.62	3.5	0.033	0.153	0.186	0.034	0.005	0.017	14.1	23.3	0.0
6/2/20	14:20	0.180	107.4	3.68	2.5	0.048	0.131	0.179	0.030	0.008	0.019	13.6	20.9	0.0
6/16/20	14:00	0.139	114.8	3.14	2.5	0.046	0.114	0.160	0.026	0.007	0.017	11.2	15.4	0.0
6/30/20	14:30	0.044	128.2	2.21	2.5	0.089	0.137	0.226	0.031	0.006	0.022	12.4	22.6	0.0
Fourth Quarter WY 2019-2020														
7/14/20	14:20	0.037	137.5	3.19	3.0	0.106	0.165	0.271	0.032	0.005	0.018	13.0	24.5	0.0
8/18/20	14:45	0.033	149.7	3.85	5.5	0.070	0.253	0.323	0.035	0.011	0.022	15.0	24.0	0.0
9/22/20	14:00	0.031	141.5	2.4	3	0.064	0.139	0.203	0.029	0.005	0.021	7.5	20.5	0.0
Annual Summary	**Minimum**	0.031	76.30	2.21	1.00	0.020	0.100	0.145	0.024	0.003	0.010	1.5	1.0	-
	Maximum	0.632	149.7	**65.70**	**74.70**	0.106	0.515	0.547	**0.427**	0.011	0.023	15.0	24.5	-
	Average	0.212	117.1	**10.96**	9.81	0.056	0.187	0.242	**0.069**	0.006	0.017	8.5	12.9	-

[1] NDEP Standards are from the Nevada Administrative Code (NAC) Chapter 445A.1664.

[2] Not to exceed standard for a single value.

[3] Not to excced standard for the annual average.

EXCELCHEM
Laboratories, Inc.

A Silver State Analytical Company

1135 W Sunset Boulevard
Suite A
Rocklin, CA 95765
Phone# 916-543-4445
Fax# 916-543-4449

ELAP Certificate No. : 2119

23 November 2020

Michelle Hochrein

Cardno

5496 Reno Corporate Drive

Reno, NV 89511

RE: E319401100/Heavenly

Work order number:2007093

Enclosed are the results of analyses for samples received by the laboratory on 07/15/20 10:15. All Quality Control results are within acceptable limits except where noted as a case narrative. If you have any questions concerning this report, please feel free to contact the laboratory.

Sincerely,

Joshua Cox, Lab Director

Excelchem Laboratories, Inc.

Cardno	Project:	E319401100/Heavenly	
5496 Reno Corporate Drive	Project Number:	E319401100	Date Reported:
Reno, NV 89511	Project Manager:	Michelle Hochrein	11/23/20 14:20

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
HDVC-5	2007093-01	Water	07/14/20 10:30	07/15/20 10:15
HVC-3	2007093-02	Water	07/14/20 11:20	07/15/20 10:15
HVC-2	2007093-03	Water	07/14/20 12:45	07/15/20 10:15
HVC-1a	2007093-04	Water	07/14/20 13:05	07/15/20 10:15
BPC-4	2007093-05	Water	07/14/20 12:05	07/15/20 10:15

Excelchem Laboratories, Inc.

Laboratory Representative

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Excelchem Laboratories, Inc.

Cardno	Project:	E319401100/Heavenly	
5496 Reno Corporate Drive	Project Number:	E319401100	Date Reported:
Reno, NV 89511	Project Manager:	Michelle Hochrein	11/23/20 14:20

HDVC-5
2007093-01 (Water)

Analyte	Result	Reporting Limit	Units	Batch	Date Prepared	Date Analyzed	Method	Notes
Ion Chromatography								
Chloride	ND	0.1	mg/L	A^G0192	07/23/20	07/24/20	EPA 300.0	

Excelchem Laboratories, Inc.

Laboratory Representative

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Excelchem Laboratories, Inc.

Cardno	Project:	E319401100/Heavenly	
5496 Reno Corporate Drive	Project Number:	E319401100	Date Reported:
Reno, NV 89511	Project Manager:	Michelle Hochrein	11/23/20 14:20

HVC-3
2007093-02 (Water)

Analyte	Result	Reporting Limit	Units	Batch	Date Prepared	Date Analyzed	Method	Notes
Ion Chromatography								
Chloride	**1.1**	0.1	mg/L	A^G0192	07/23/20	07/24/20	EPA 300.0	

Excelchem Laboratories, Inc.

Laboratory Representative

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Excelchem Laboratories, Inc.

Cardno	Project:	E319401100/Heavenly	
5496 Reno Corporate Drive	Project Number:	E319401100	Date Reported:
Reno, NV 89511	Project Manager:	Michelle Hochrein	11/23/20 14:20

HVC-2
2007093-03 (Water)

Analyte	Result	Reporting Limit	Units	Batch	Date Prepared	Date Analyzed	Method	Notes
Ion Chromatography								
Chloride	**1.3**	0.1	mg/L	A^G0192	07/23/20	07/24/20	EPA 300.0	

Excelchem Laboratories, Inc.

Laboratory Representative

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Excelchem Laboratories, Inc.

Cardno	Project:	E319401100/Heavenly	
5496 Reno Corporate Drive	Project Number:	E319401100	Date Reported:
Reno, NV 89511	Project Manager:	Michelle Hochrein	11/23/20 14:20

HVC-1a
2007093-04 (Water)

Analyte	Result	Reporting Limit	Units	Batch	Date Prepared	Date Analyzed	Method	Notes
Ion Chromatography								
Chloride	**9.7**	0.5	mg/L	A^G0192	07/23/20	07/24/20	EPA 300.0	R-07

Excelchem Laboratories, Inc.

Cardno	Project:	E319401100/Heavenly	
5496 Reno Corporate Drive	Project Number:	E319401100	Date Reported:
Reno, NV 89511	Project Manager:	Michelle Hochrein	11/23/20 14:20

HVC-1a
2007093-04RE1 (Water)

Analyte	Result	Reporting Limit	Units	Batch	Date Prepared	Date Analyzed	Method	Notes
Ion Chromatography								
Chloride	**0.5**	0.1	mg/L	A^G0192	10/05/20	10/05/20	EPA 300.0	

Excelchem Laboratories, Inc.

Laboratory Representative

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Excelchem Laboratories, Inc.

Cardno	Project:	E319401100/Heavenly	
5496 Reno Corporate Drive	Project Number:	E319401100	Date Reported:
Reno, NV 89511	Project Manager:	Michelle Hochrein	11/23/20 14:20

BPC-4
2007093-05 (Water)

Analyte	Result	Reporting Limit	Units	Batch	Date Prepared	Date Analyzed	Method	Notes
Ion Chromatography								
Chloride	**26.5**	0.5	mg/L	A^G0192	07/23/20	07/24/20	EPA 300.0	R-07

Excelchem Laboratories, Inc.

Laboratory Representative

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Excelchem Laboratories, Inc.

Cardno	Project:	E319401100/Heavenly	
5496 Reno Corporate Drive	Project Number:	E319401100	Date Reported:
Reno, NV 89511	Project Manager:	Michelle Hochrein	11/23/20 14:20

Ion Chromatography - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch A^G0192 - EPA 300.0										
Blank (A^G0192-BLK1)				Prepared: 07/23/20 Analyzed: 07/24/20						
Chloride	ND	0.1	mg/L							
LCS (A^G0192-BS1)				Prepared: 07/23/20 Analyzed: 07/24/20						
Chloride	9.9	0.1	mg/L	10.0		99.0	90-110			
LCS Dup (A^G0192-BSD1)				Prepared: 07/23/20 Analyzed: 07/24/20						
Chloride	10.0	0.1	mg/L	10.0		100	90-110	1.36	20	
Duplicate (A^G0192-DUP1)		**Source: 2007093-01**		Prepared: 07/23/20 Analyzed: 07/24/20						
Chloride	ND	0.1	mg/L		ND				20	
Matrix Spike (A^G0192-MS1)		**Source: 2007093-01**		Prepared: 07/23/20 Analyzed: 07/24/20						
Chloride	11.6	0.1	mg/L	10.0	ND	116	75-125			
Matrix Spike Dup (A^G0192-MSD1)		**Source: 2007093-01**		Prepared: 07/23/20 Analyzed: 07/24/20						
Chloride	11.8	0.1	mg/L	10.0	ND	118	75-125	1.72	20	

Excelchem Laboratories, Inc.

Laboratory Representative

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Excelchem Laboratories, Inc.

Cardno	Project:	E319401100/Heavenly	
5496 Reno Corporate Drive	Project Number:	E319401100	Date Reported:
Reno, NV 89511	Project Manager:	Michelle Hochrein	11/23/20 14:20

Notes and Definitions

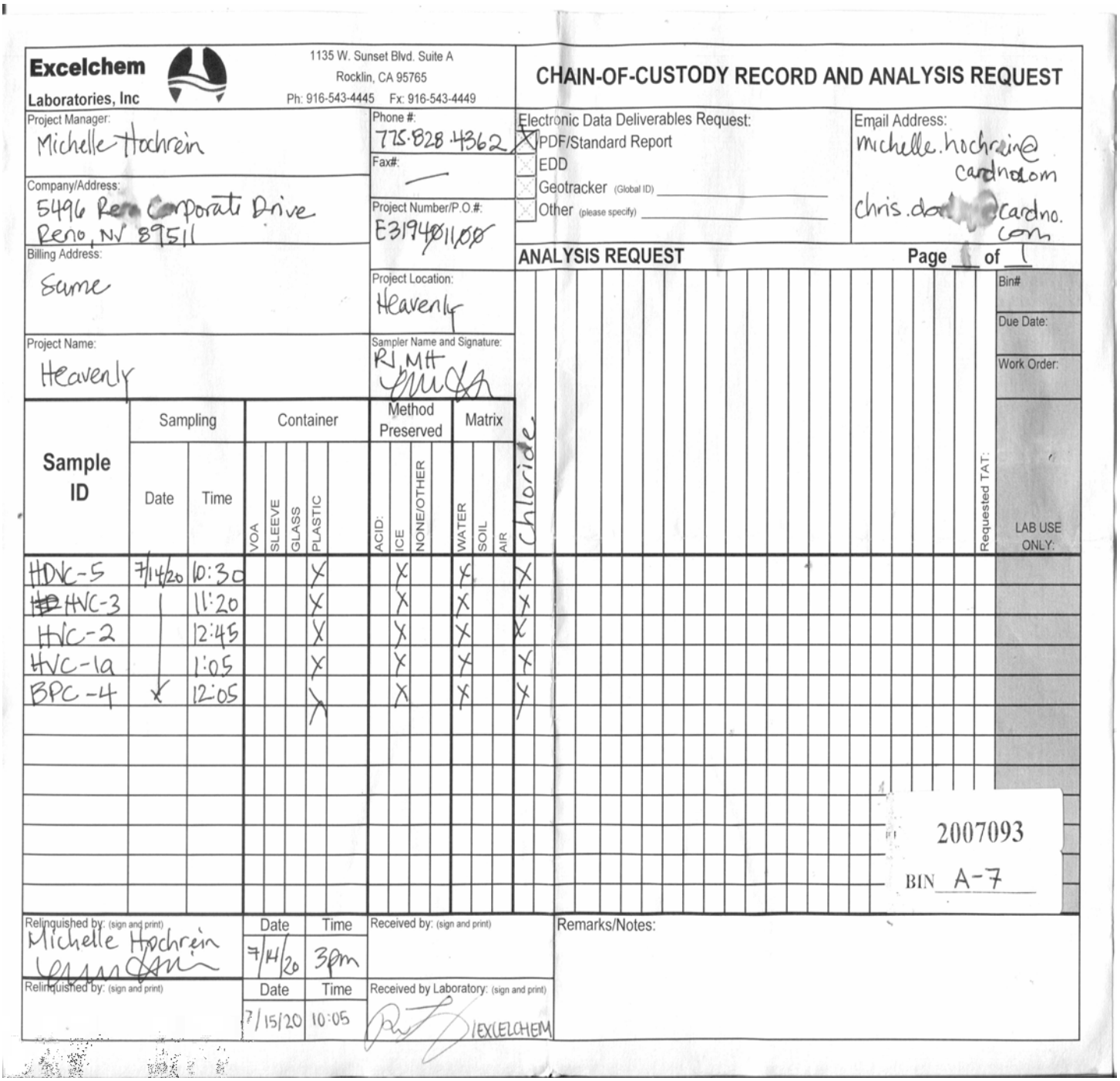
R-07 This sample was diluted due to matrix interference, resulting in elevated reporting limits

ND Analyte not detected at reporting limit.

NR Not reported

Excelchem Laboratories, Inc.

Cardno	Project:	E319401100/Heavenly	
5496 Reno Corporate Drive	Project Number:	E319401100	Date Reported:
Reno, NV 89511	Project Manager:	Michelle Hochrein	11/23/20 14:20



Excelchem Laboratories, Inc — 1135 W. Sunset Blvd. Suite A, Rocklin, CA 95765, Ph: 916-543-4445 Fx: 916-543-4449

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

Project Manager: Michelle Hochrein
Phone #: 775.828.4362
Company/Address: 5496 Reno Corporate Drive Reno, NV 89511
Fax#: —
Billing Address: Same
Project Number/P.O.#: E319401100
Project Location: Heavenly
Project Name: Heavenly
Sampler Name and Signature: RJ MH

Electronic Data Deliverables Request:
- [X] PDF/Standard Report
- [ ] EDD
- [ ] Geotracker (Global ID) _____
- [ ] Other (please specify) _____

Email Address: michelle.hochrein@cardno.com; chris.do[illegible]@cardno.com

ANALYSIS REQUEST — Page 1 of 1

Bin#: 2007093
Due Date:
Work Order:
BIN A-7

Sample ID	Sampling Date	Sampling Time	Container: VOA	SLEEVE	GLASS	PLASTIC	Method Preserved: ACID:	ICE	NONE/OTHER	Matrix: WATER	SOIL	AIR	Chloride	Requested TAT:	LAB USE ONLY:
HDVC-5	7/14/20	10:30				X		X		X			X		
~~HD~~HVC-3	"	11:20				X		X		X			X		
HVC-2	"	12:45				X		X		X			X		
HVC-1a	"	1:05				X		X		X			X		
BPC-4	"	12:05				X		X		X			X		

Relinquished by: (sign and print) Michelle Hochrein — Date: 7/14/20 — Time: 3pm
Received by: (sign and print)
Remarks/Notes:

Relinquished by: (sign and print) — Date: 7/15/20 — Time: 10:05
Received by Laboratory: (sign and print) EXCELCHEM

Excelchem Laboratories, Inc.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Laboratory Representative

Excelchem Laboratories, Inc.

Cardno	Project:	E319401100/Heavenly	
5496 Reno Corporate Drive	Project Number:	E319401100	Date Reported:
Reno, NV 89511	Project Manager:	Michelle Hochrein	11/23/20 14:20

Sample Integrity

WORK ORDER: 2007093

Date Received: 7/15/20

Company Name: Cardno
New Client: Y (N)

Section 1 – Sample Arrival Information

Sample Transport: ONTRAC (UPS) USPS Walk-In EXCELCHEM Courier Fed-Ex Other:

Transported In: (Ice Chest) Box Hand

Packing materials: Bubble Wrap Foam Packing Peanuts Paper Other: (N/A)

Has chilling process begun? (Y) N **Samples Received:** Chilled to Touch / Ambient / (On Ice)

Temperature of Samples (°C): 11.2 **Ice Chest Temperature(s) (°C):** 11.6

Section 2 – Bottle/Analysis Info.

	Yes	No	N/A	Comments
Did all bottles arrive unbroken and intact?	X			
Did all bottle labels agree with COC?	X			
Were correct containers used for the tests requested?	X			
Were correct preservations used for the tests requested?	X			
Was a sufficient amount of sample sent for tests indicated?	X			
Were bubbles present in VOA Vials?: **(Volatile Methods Only)**			X	

Section 3 – Summa/Flow regulator Information (N/A)

Used Summa#:

Unused Summa#:

Cleaning Summa#:

Regulator#:

Was there any visual damage to summa canisters **or** flow regulators? **Explain.**

Section 4 – COC Information

	Yes	No	Comments		Yes	No	Comments
COC Received	X			Analysis Requested	X		
Date Sampled	X			Samples arrived within holding time	X		
Time Sampled	X			Hold times less than 72 hours		X	
Sample ID	X			Client Name	X		
Rush Turn Around Time		X		Client Contact Information	X		

SHORT HOLD LIST (<72 hours)

pH	Chlorine	Corrosivity	Coliform	Dissolved Oxygen	Odor	Nitrate	Nitrite	Ortho-phosphate
MBAs	Asbestos	Settable Solids	Turbidity	Biochemical Oxygen Demand	HPC	Color	Tedlars	Ammonia/TKN (unpreserved)

Section 5 – Comments / Discrepancies

Client notified of discrepancies: Yes / No **Notified by:**

Comments:

Bin Number/ Location:	A-7
COC Scanned/Attached by:	RL
Samples labeled by:	RL
Sample labels reviewed by:	RL

Filled out by: Rachele Lang **Date:** 7/15/20 **Time:** 10:05

Excelchem Laboratories, Inc.

Laboratory Representative

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Client: Cardno - Heavenly Sampling
chris.donley@cardno.com

Analysis Report

Lab: High Sierra Water Lab
collin@highsierrawaterlab.com

StationCode	SampleDate	ProjectCode	CollectionTime	CollectionMethodCode	SampleTypeCode	Replicate	LabBatch	AnalysisDate	MethodName	AnalyteName	FractionName	UnitName	LabReplicate	Result	MDL	ExpectedValue
HVC-1a	14/Jul/2020	HeavenlyValley_TDML	13:05	Water_Grab	Grab	1	HSWL_07142020_NO2NO3	04/Jul/2020 00:00	EPA 353.1	Nitrate + Nitrite as N	Dissolved	ug/L	1	13	1	
HVC-2	14/Jul/2020	HeavenlyValley_TDML	12:45	Water_Grab	Grab	1	HSWL_07142020_NO2NO3	04/Jul/2020 00:00	EPA 353.1	Nitrate + Nitrite as N	Dissolved	ug/L	1	54	1	
HVC-3	14/Jul/2020	HeavenlyValley_TDML	11:20	Water_Grab	Grab	1	HSWL_07142020_NO2NO3	04/Jul/2020 00:00	EPA 353.1	Nitrate + Nitrite as N	Dissolved	ug/L	1	4	1	
HDVC-5	14/Jul/2020	HeavenlyValley_TDML	10:30	Water_Grab	Grab	1	HSWL_07142020_NO2NO3	04/Jul/2020 00:00	EPA 353.1	Nitrate + Nitrite as N	Dissolved	ug/L	1	10	1	
BPC-4	14/Jul/2020	HeavenlyValley_TDML	12:05	Water_Grab	Grab	1	HSWL_07142020_NO2NO3	04/Jul/2020 00:00	EPA 353.1	Nitrate + Nitrite as N	Dissolved	ug/L	1	248	1	
LABQA	01/Jan/1950	Not Applicable	00:00	Not Applicable	LabBlank	1	HSWL_QC_07142020_NO2NO3	04/Jul/2020 00:00	EPA 353.1	Nitrate + Nitrite as N	Total	ug/L	1	ND	1	
LABQA	01/Jan/1950	Not Applicable	00:00	Not Applicable	LCS	1	HSWL_QC_07142020_NO2NO3	04/Jul/2020 00:00	EPA 353.1	Nitrate + Nitrite as N	Total	ug/L	1	96	1	94
000NONPJ	01/Jan/1950	Not Recorded	00:00	Not Recorded	MS1	1	HSWL_QC_07142020_NO2NO3	04/Jul/2020 00:00	EPA 353.1	Nitrate + Nitrite as N	Dissolved	ug/L	1	11	1	
000NONPJ	01/Jan/1950	Not Recorded	00:00	Not Recorded	MS1	2	HSWL_QC_07142020_NO2NO3	04/Jul/2020 00:00	EPA 353.1	Nitrate + Nitrite as N	Dissolved	ug/L	2	11	1	
HVC-1a	14/Jul/2020	HeavenlyValley_TDML	13:05	Water_Grab	Grab	1	HSWL_07142020_TPHOS	26/Jul/2020 00:00	EPA 365.3	Phosphorus as P	Total	ug/L	1	21	1	
HVC-2	14/Jul/2020	HeavenlyValley_TDML	12:45	Water_Grab	Grab	1	HSWL_07142020_TPHOS	26/Jul/2020 00:00	EPA 365.3	Phosphorus as P	Total	ug/L	1	18	1	
HVC-3	14/Jul/2020	HeavenlyValley_TDML	11:20	Water_Grab	Grab	1	HSWL_07142020_TPHOS	26/Jul/2020 00:00	EPA 365.3	Phosphorus as P	Total	ug/L	1	20	1	
HDVC-5	14/Jul/2020	HeavenlyValley_TDML	10:30	Water_Grab	Grab	1	HSWL_07142020_TPHOS	26/Jul/2020 00:00	EPA 365.3	Phosphorus as P	Total	ug/L	1	24	1	
BPC-4	14/Jul/2020	HeavenlyValley_TDML	12:05	Water_Grab	Grab	1	HSWL_07142020_TPHOS	26/Jul/2020 00:00	EPA 365.3	Phosphorus as P	Total	ug/L	1	111	1	
LABQA	01/Jan/1950	Not Applicable	00:00	Not Applicable	LabBlank	1	HSWL_QC_07142020_TPHOS	26/Jul/2020 00:00	EPA 365.3	Phosphorus as P	Total	ug/L	1	ND	1	
LABQA	01/Jan/1950	Not Applicable	00:00	Not Applicable	LCS	1	HSWL_QC_07142020_TPHOS	26/Jul/2020 00:00	EPA 365.3	Phosphorus as P	Total	ug/L	1	133	1	134
000NONPJ	01/Jan/1950	Not Recorded	00:00	Not Recorded	MS1	1	HSWL_QC_07142020_TPHOS	26/Jul/2020 00:00	EPA 365.3	Phosphorus as P	Total	ug/L	1	162	1	
000NONPJ	01/Jan/1950	Not Recorded	00:00	Not Recorded	MS1	2	HSWL_QC_07142020_TPHOS	26/Jul/2020 00:00	EPA 365.3	Phosphorus as P	Total	ug/L	2	165	1	
HVC-1a	14/Jul/2020	HeavenlyValley_TDML	13:05	Water_Grab	Grab	1	HSWL_07142020_TKN	29/Jul/2020 00:00	EPA 351.2	Nitrogen, Total Kjeldahl	Total	ug/L	1	100	35	
HVC-2	14/Jul/2020	HeavenlyValley_TDML	12:45	Water_Grab	Grab	1	HSWL_07142020_TKN	29/Jul/2020 00:00	EPA 351.2	Nitrogen, Total Kjeldahl	Total	ug/L	1	77	35	
HVC-3	14/Jul/2020	HeavenlyValley_TDML	11:20	Water_Grab	Grab	1	HSWL_07142020_TKN	29/Jul/2020 00:00	EPA 351.2	Nitrogen, Total Kjeldahl	Total	ug/L	1	75	35	
HDVC-5	14/Jul/2020	HeavenlyValley_TDML	10:30	Water_Grab	Grab	1	HSWL_07142020_TKN	29/Jul/2020 00:00	EPA 351.2	Nitrogen, Total Kjeldahl	Total	ug/L	1	91	35	
BPC-4	14/Jul/2020	HeavenlyValley_TDML	12:05	Water_Grab	Grab	1	HSWL_07142020_TKN	29/Jul/2020 00:00	EPA 351.2	Nitrogen, Total Kjeldahl	Total	ug/L	1	184	35	
LABQA	01/Jan/1950	Not Applicable	00:00	Not Applicable	LabBlank	1	HSWL_QC_07142020_TKN	29/Jul/2020 00:00	EPA 351.2	Nitrogen, Total Kjeldahl	Total	ug/L	1	ND	35	
LABQA	01/Jan/1950	Not Applicable	00:00	Not Applicable	LCS	1	HSWL_QC_07142020_TKN	29/Jul/2020 00:00	EPA 351.2	Nitrogen, Total Kjeldahl	Total	ug/L	1	129	35	122
000NONPJ	01/Jan/1950	Not Recorded	00:00	Not Recorded	MS1	1	HSWL_QC_07142020_TKN	29/Jul/2020 00:00	EPA 351.2	Nitrogen, Total Kjeldahl	Total	ug/L	1	241	35	
000NONPJ	01/Jan/1950	Not Recorded	00:00	Not Recorded	MS1	2	HSWL_QC_07142020_TKN	29/Jul/2020 00:00	EPA 351.2	Nitrogen, Total Kjeldahl	Total	ug/L	2	246	35	
HVC-1a	14/Jul/2020	HeavenlyValley_TDML	13:05	Water_Grab	Grab	1	HSWL_07142020_TSS	17/Jul/2020 00:00	EPA 160.2	Total Suspended Solids	Total	mg/L	1	2.5	0.3	
HVC-2	14/Jul/2020	HeavenlyValley_TDML	12:45	Water_Grab	Grab	1	HSWL_07142020_TSS	17/Jul/2020 00:00	EPA 160.2	Total Suspended Solids	Total	mg/L	1	1.5	0.3	
HVC-3	14/Jul/2020	HeavenlyValley_TDML	11:20	Water_Grab	Grab	1	HSWL_07142020_TSS	17/Jul/2020 00:00	EPA 160.2	Total Suspended Solids	Total	mg/L	1	2.0	0.3	
HDVC-5	14/Jul/2020	HeavenlyValley_TDML	10:30	Water_Grab	Grab	1	HSWL_07142020_TSS	17/Jul/2020 00:00	EPA 160.2	Total Suspended Solids	Total	mg/L	1	3.0	0.3	
BPC-4	14/Jul/2020	HeavenlyValley_TDML	12:05	Water_Grab	Grab	1	HSWL_07142020_TSS	17/Jul/2020 00:00	EPA 160.2	Total Suspended Solids	Total	mg/L	1	7.5	0.3	
LABQA	01/Jan/1950	Not Applicable	00:00	Not Applicable	LabBlank	1	HSWL_QC_07142020_TSS	17/Jul/2020 00:00	EPA 160.2	Total Suspended Solids	Total	mg/L	1	ND	0.3	
LABQA	01/Jan/1950	Not Applicable	00:00	Not Applicable	LCS	1	HSWL_QC_07142020_TSS	17/Jul/2020 00:00	EPA 160.2	Total Suspended Solids	Total	mg/L	1	25	0.3	25
000NONPJ	01/Jan/1950	Not Recorded	00:00	Not Recorded	MS1	1	HSWL_QC_07142020_TSS	17/Jul/2020 00:00	EPA 160.2	Total Suspended Solids	Total	mg/L	1	10.5	0.3	
000NONPJ	01/Jan/1950	Not Recorded	00:00	Not Recorded	MS1	2	HSWL_QC_07142020_TSS	17/Jul/2020 00:00	EPA 160.2	Total Suspended Solids	Total	mg/L	2	10.5	0.3	
HVC-1a	14/Jul/2020	HeavenlyValley_TDML	13:05	Water_Grab	Grab	1	HSWL_07142020_Turbidity	17/Jul/2020 00:00	EPA 180.1	Turbidity	Total	NTU	1	1.19	0.1	
HVC-2	14/Jul/2020	HeavenlyValley_TDML	12:45	Water_Grab	Grab	1	HSWL_07142020_Turbidity	17/Jul/2020 00:00	EPA 180.1	Turbidity	Total	NTU	1	0.80	0.1	
HVC-3	14/Jul/2020	HeavenlyValley_TDML	11:20	Water_Grab	Grab	1	HSWL_07142020_Turbidity	17/Jul/2020 00:00	EPA 180.1	Turbidity	Total	NTU	1	0.61	0.1	
HDVC-5	14/Jul/2020	HeavenlyValley_TDML	10:30	Water_Grab	Grab	1	HSWL_07142020_Turbidity	17/Jul/2020 00:00	EPA 180.1	Turbidity	Total	NTU	1	0.96	0.1	
BPC-4	14/Jul/2020	HeavenlyValley_TDML	12:05	Water_Grab	Grab	1	HSWL_07142020_Turbidity	17/Jul/2020 00:00	EPA 180.1	Turbidity	Total	NTU	1	16.3	0.1	
LABQA	01/Jan/1950	Not Applicable	00:00	Not Applicable	LabBlank	1	HSWL_QC_07142020_Turbidity	17/Jul/2020 00:00	EPA 180.1	Turbidity	Total	NTU	1	ND	0.1	
LABQA	01/Jan/1950	Not Applicable	00:00	Not Applicable	LCS	1	HSWL_QC_07142020_Turbidity	17/Jul/2020 00:00	EPA 180.1	Turbidity	Total	NTU	1	50	0.1	50
000NONPJ	01/Jan/1950	Not Recorded	00:00	Not Recorded	MS1	1	HSWL_QC_07142020_Turbidity	17/Jul/2020 00:00	EPA 180.1	Turbidity	Total	NTU	1	0.80	0.1	
000NONPJ	01/Jan/1950	Not Recorded	00:00	Not Recorded	MS1	2	HSWL_QC_07142020_Turbidity	17/Jul/2020 00:00	EPA 180.1	Turbidity	Total	NTU	2	0.86	0.1	

Client: Cardno - Heavenly Sampling
chris.donley@cardno.com

Analysis Report

Lab: High Sierra Water Lab
collin@highsierrawaterlab.com

Site	ID	Date	Time	NO3/NO2-N	SRP-P	DP-P	TP-P	TKN	TSS	Cond	Turbidity
				(ppb)	*(ppb)*	*(ppb)*	*(ppb)*	*(ppb)*	*(mg/L)*	*(µs/cm)*	*(ntu)*
ED Above	HVE-1	7/14/2020	14:05	3	9	21	212	377	30.5	92.4	15
ED Below	HVE-2	7/14/2020	14:20	106	5	18	32	165	3	137.5	3.19

EXCELCHEM
Laboratories, Inc.

A Silver State Analytical Company

1135 W Sunset Boulevard
Suite A
Rocklin, CA 95765
Phone# 916-543-4445
Fax# 916-543-4449

ELAP Certificate No. : 2119

02 September 2020

Michelle Hochrein

Cardno

5496 Reno Corporate Drive

Reno, NV 89511

RE: Heavenly

Work order number:2008109

Enclosed are the results of analyses for samples received by the laboratory on 08/19/20 11:49. All Quality Control results are within acceptable limits except where noted as a case narrative. If you have any questions concerning this report, please feel free to contact the laboratory.

Sincerely,

Joshua Cox, Lab Director

Excelchem Laboratories, Inc.

Cardno	Project:	Heavenly	
5496 Reno Corporate Drive	Project Number:	E319401100	Date Reported:
Reno, NV 89511	Project Manager:	Michelle Hochrein	09/02/20 17:24

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
43 HDVC-5	2008109-01	Water	08/18/20 10:30	08/19/20 11:49
43 HVC-3	2008109-02	Water	08/18/20 11:40	08/19/20 11:49
43 BPC-4	2008109-03	Water	08/18/20 12:25	08/19/20 11:49
43 HVC-2	2008109-04	Water	08/18/20 13:05	08/19/20 11:49
43 HVC-1A	2008109-05	Water	08/18/20 13:20	08/19/20 11:49

Excelchem Laboratories, Inc.

Laboratory Representative

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Excelchem Laboratories, Inc.

Cardno	Project:	Heavenly	
5496 Reno Corporate Drive	Project Number:	E319401100	Date Reported:
Reno, NV 89511	Project Manager:	Michelle Hochrein	09/02/20 17:24

43 HDVC-5
2008109-01 (Water)

Analyte	Result	Reporting Limit	Units	Batch	Date Prepared	Date Analyzed	Method	Notes
Ion Chromatography								
Chloride	**0.6**	0.1	mg/L	A^I0019	09/01/20	09/02/20	EPA 300.0	

Excelchem Laboratories, Inc.

Cardno	Project:	Heavenly	
5496 Reno Corporate Drive	Project Number:	E319401100	Date Reported:
Reno, NV 89511	Project Manager:	Michelle Hochrein	09/02/20 17:24

43 HVC-3
2008109-02 (Water)

Analyte	Result	Reporting Limit	Units	Batch	Date Prepared	Date Analyzed	Method	Notes
Ion Chromatography								
Chloride	**0.9**	0.1	mg/L	A^I0019	09/01/20	09/02/20	EPA 300.0	

Excelchem Laboratories, Inc.

Laboratory Representative

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Excelchem Laboratories, Inc.

Cardno	Project:	Heavenly	
5496 Reno Corporate Drive	Project Number:	E319401100	Date Reported:
Reno, NV 89511	Project Manager:	Michelle Hochrein	09/02/20 17:24

43 BPC-4
2008109-03 (Water)

Analyte	Result	Reporting Limit	Units	Batch	Date Prepared	Date Analyzed	Method	Notes
Ion Chromatography								
Chloride	**27.8**	0.1	mg/L	A^I0019	09/01/20	09/02/20	EPA 300.0	

Excelchem Laboratories, Inc.

Laboratory Representative

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Excelchem Laboratories, Inc.

Cardno	Project:	Heavenly	
5496 Reno Corporate Drive	Project Number:	E319401100	Date Reported:
Reno, NV 89511	Project Manager:	Michelle Hochrein	09/02/20 17:24

43 HVC-2
2008109-04 (Water)

Analyte	Result	Reporting Limit	Units	Batch	Date Prepared	Date Analyzed	Method	Notes
Ion Chromatography								
Chloride	**0.7**	0.1	mg/L	A^I0019	09/01/20	09/02/20	EPA 300.0	

Excelchem Laboratories, Inc.

Laboratory Representative

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Excelchem Laboratories, Inc.

Cardno	Project:	Heavenly	
5496 Reno Corporate Drive	Project Number:	E319401100	Date Reported:
Reno, NV 89511	Project Manager:	Michelle Hochrein	09/02/20 17:24

43 HVC-1A
2008109-05 (Water)

Analyte	Result	Reporting Limit	Units	Batch	Date Prepared	Date Analyzed	Method	Notes
Ion Chromatography								
Chloride	**0.5**	0.1	mg/L	A^I0019	09/01/20	09/02/20	EPA 300.0	

Excelchem Laboratories, Inc.

Laboratory Representative

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Excelchem Laboratories, Inc.

Cardno	Project:	Heavenly	
5496 Reno Corporate Drive	Project Number:	E319401100	Date Reported:
Reno, NV 89511	Project Manager:	Michelle Hochrein	09/02/20 17:24

Ion Chromatography - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch A^I0019 - EPA 300.0										
Blank (A^I0019-BLK1)				Prepared: 09/01/20 Analyzed: 09/02/20						
Chloride	ND	0.1	mg/L							
LCS (A^I0019-BS1)				Prepared: 09/01/20 Analyzed: 09/02/20						
Chloride	9.5	0.1	mg/L	10.0		95.1	90-110			
LCS Dup (A^I0019-BSD1)				Prepared: 09/01/20 Analyzed: 09/02/20						
Chloride	9.5	0.1	mg/L	10.0		95.4	90-110	0.317	20	
Duplicate (A^I0019-DUP1)		**Source: 2008109-01**		Prepared: 09/01/20 Analyzed: 09/02/20						
Chloride	0.6	0.1	mg/L		0.6			2.46	20	
Matrix Spike (A^I0019-MS1)		**Source: 2008109-01**		Prepared: 09/01/20 Analyzed: 09/02/20						
Chloride	11.0	0.1	mg/L	10.0	0.6	104	75-125			
Matrix Spike Dup (A^I0019-MSD1)		**Source: 2008109-01**		Prepared: 09/01/20 Analyzed: 09/02/20						
Chloride	10.8	0.1	mg/L	10.0	0.6	103	75-125	1.03	20	

Excelchem Laboratories, Inc.

Laboratory Representative

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Excelchem Laboratories, Inc.

Cardno	Project:	Heavenly	
5496 Reno Corporate Drive	Project Number:	E319401100	Date Reported:
Reno, NV 89511	Project Manager:	Michelle Hochrein	09/02/20 17:24

Notes and Definitions

ND Analyte not detected at reporting limit.

NR Not reported

Laboratory Representative

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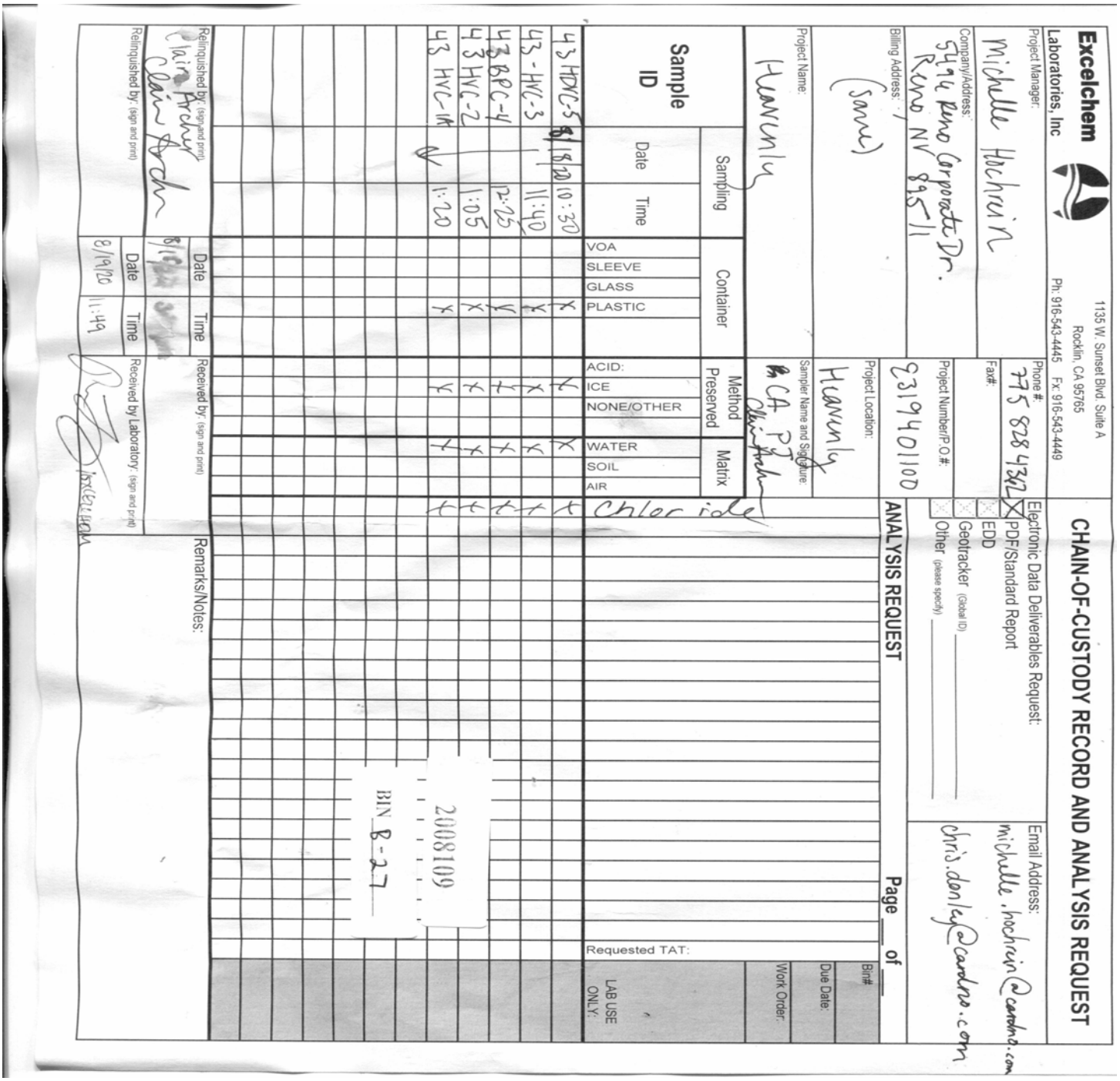
Excelchem Laboratories, Inc.

Cardno	Project:	Heavenly	
5496 Reno Corporate Drive	Project Number:	E319401100	Date Reported:
Reno, NV 89511	Project Manager:	Michelle Hochrein	09/02/20 17:24



Excelchem Laboratories, Inc.

Laboratory Representative

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Excelchem Laboratories, Inc.

Cardno	Project:	Heavenly	
5496 Reno Corporate Drive	Project Number:	E319401100	Date Reported:
Reno, NV 89511	Project Manager:	Michelle Hochrein	09/02/20 17:24

Sample Integrity

WORK ORDER: 2008109

Date Received: 8/19/20

Company Name: Cardno
New Client: Y (N)

Section 1 – Sample Arrival Information

Sample Transport: ONTRAC (UPS) USPS (Walk-In) EXCELCHEM Courier Fed-Ex Other:

Transported In: (Ice Chest) Box Hand

Packing materials: Bubble Wrap Foam Packing Peanuts Paper Other: (N/A)

Has chilling process begun? (Y) N **Samples Received:** Chilled to Touch / Ambient (On Ice)

Temperature of Samples (°C): 15.6 **Ice Chest Temperature(s) (°C):** 16.8

Section 2 – Bottle/Analysis Info.

	Yes	No	N/A	Comments
Did all bottles arrive unbroken and intact?	X			
Did all bottle labels agree with COC?	X			
Were correct containers used for the tests requested?	X			
Were correct preservations used for the tests requested?	X			
Was a sufficient amount of sample sent for tests indicated?	X			
Were bubbles present in VOA Vials?: **(Volatile Methods Only)**			X	

Section 3 – Summa/Flow regulator Information (N/A)

Used Summa#:

Unused Summa#:

Cleaning Summa#:

Regulator#:

Was there any visual damage to summa canisters **or** flow regulators? **Explain.**

Section 4 – COC Information

	Yes	No	Comments		Yes	No	Comments
COC Received	X			Analysis Requested	X		
Date Sampled	X			Samples arrived within holding time	X		
Time Sampled	X			Hold times less than 72 hours		X	
Sample ID	X			Client Name	X		
Rush Turn Around Time		X		Client Contact Information	X		

SHORT HQLD LIST (<72 hours)

pH	Chlorine	Corrosivity	Coliform	Dissolved Oxygen	Odor	Nitrate	Nitrite	Ortho-phosphate
MBAs	Asbestos	Settable Solids	Turbidity	Biochemical Oxygen Demand	HPC	Color	Tedlars	Ammonia/TKN (unpreserved)

Section 5 – Comments / Discrepancies

Client notified of discrepancies: Yes / No **Notified by:**

Comments:

Bin Number/ Location:	B-27
COC Scanned/Attached by:	PC
Samples labeled by:	PC
Sample labels reviewed by:	PC

Filled out by: Rachelle Lang **Date:** 8/19/20 **Time:** 11:50

Excelchem Laboratories, Inc.

Laboratory Representative

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Client: Cardno - Heavenly Sampling
chris.donley@cardno.com

Analysis Report

Lab: High Sierra Water Lab
collin@highsierrawaterlab.com

StationCode	SampleDate	ProjectCode	CollectionTime	CollectionMethodCode	SampleTypeCode	LabBatch	AnalysisDate	MethodName	AnalyteName	FractionName	UnitName	LabReplicate	Result	MDL	ExpectedValue
HVC-1a	18/Aug/2020	HeavenlyValley_TDML	13:25	Water_Grab	Grab	HSWL_08182020_NO2NO3	22/Aug/2020 00:00	EPA 353.1	Nitrate + Nitrite as N	Dissolved	ug/L	1	8	1	
HVC-2	18/Aug/2020	HeavenlyValley_TDML	13:05	Water_Grab	Grab	HSWL_08182020_NO2NO3	22/Aug/2020 00:00	EPA 353.1	Nitrate + Nitrite as N	Dissolved	ug/L	1	26	1	
HVC-3	18/Aug/2020	HeavenlyValley_TDML	11:40	Water_Grab	Grab	HSWL_08182020_NO2NO3	22/Aug/2020 00:00	EPA 353.1	Nitrate + Nitrite as N	Dissolved	ug/L	1	1	1	
HDVC-5	18/Aug/2020	HeavenlyValley_TDML	10:30	Water_Grab	Grab	HSWL_08182020_NO2NO3	22/Aug/2020 00:00	EPA 353.1	Nitrate + Nitrite as N	Dissolved	ug/L	1	1	1	
BPC-4	18/Aug/2020	HeavenlyValley_TDML	12:25	Water_Grab	Grab	HSWL_08182020_NO2NO3	22/Aug/2020 00:00	EPA 353.1	Nitrate + Nitrite as N	Dissolved	ug/L	1	134	1	
LABQA	01/Jan/1950	Not Applicable	00:00	Not Applicable	LabBlank	HSWL_QC_08182020_NO2NO3	22/Aug/2020 00:00	EPA 353.1	Nitrate + Nitrite as N	Total	ug/L	1	<1	1	
LABQA	01/Jan/1950	Not Applicable	00:00	Not Applicable	LCS	HSWL_QC_08182020_NO2NO3	22/Aug/2020 00:00	EPA 353.1	Nitrate + Nitrite as N	Total	ug/L	1	96	1	94
000NONPJ	01/Jan/1950	Not Recorded	00:00	Not Recorded	MS1	HSWL_QC_08182020_NO2NO3	22/Aug/2020 00:00	EPA 353.1	Nitrate + Nitrite as N	Dissolved	ug/L	1	1	1	
000NONPJ	01/Jan/1950	Not Recorded	00:00	Not Recorded	MS1	HSWL_QC_08182020_NO2NO3	22/Aug/2020 00:00	EPA 353.1	Nitrate + Nitrite as N	Dissolved	ug/L	2	1	1	
HVC-1a	18/Aug/2020	HeavenlyValley_TDML	00:00	Water_Grab	Grab	HSWL_08182020_TPHOS	30/Aug/2020 00:00	EPA 365.3	Phosphorus as P	Total	ug/L	1	16	1	
HVC-2	18/Aug/2020	HeavenlyValley_TDML	00:00	Water_Grab	Grab	HSWL_08182020_TPHOS	30/Aug/2020 00:00	EPA 365.3	Phosphorus as P	Total	ug/L	1	20	1	
HVC-3	18/Aug/2020	HeavenlyValley_TDML	00:00	Water_Grab	Grab	HSWL_08182020_TPHOS	30/Aug/2020 00:00	EPA 365.3	Phosphorus as P	Total	ug/L	1	19	1	
HDVC-5	18/Aug/2020	HeavenlyValley_TDML	00:00	Water_Grab	Grab	HSWL_08182020_TPHOS	30/Aug/2020 00:00	EPA 365.3	Phosphorus as P	Total	ug/L	1	28	1	
BPC-4	18/Aug/2020	HeavenlyValley_TDML	00:00	Water_Grab	Grab	HSWL_08182020_TPHOS	30/Aug/2020 00:00	EPA 365.3	Phosphorus as P	Total	ug/L	1	41	1	
LABQA	01/Jan/1950	Not Applicable	00:00	Not Applicable	LabBlank	HSWL_QC_08182020_TPHOS	30/Aug/2020 00:00	EPA 365.3	Phosphorus as P	Total	ug/L	1	<1	1	
LABQA	01/Jan/1950	Not Applicable	00:00	Not Applicable	LCS	HSWL_QC_08182020_TPHOS	30/Aug/2020 00:00	EPA 365.3	Phosphorus as P	Total	ug/L	1	133	1	134
000NONPJ	01/Jan/1950	Not Recorded	00:00	Not Recorded	MS1	HSWL_QC_08182020_TPHOS	30/Aug/2020 00:00	EPA 365.3	Phosphorus as P	Total	ug/L	1	12	1	
000NONPJ	01/Jan/1950	Not Recorded	00:00	Not Recorded	MS1	HSWL_QC_08182020_TPHOS	30/Aug/2020 00:00	EPA 365.3	Phosphorus as P	Total	ug/L	2	12	1	
HVC-1a	18/Aug/2020	HeavenlyValley_TDML	00:00	Water_Grab	Grab	HSWL_08182020_TKN	01/Sep/2020 00:00	EPA 351.2	Nitrogen, Total Kjeldahl	Total	ug/L	1	100	35	
HVC-2	18/Aug/2020	HeavenlyValley_TDML	00:00	Water_Grab	Grab	HSWL_08182020_TKN	01/Sep/2020 00:00	EPA 351.2	Nitrogen, Total Kjeldahl	Total	ug/L	1	74	35	
HVC-3	18/Aug/2020	HeavenlyValley_TDML	00:00	Water_Grab	Grab	HSWL_08182020_TKN	01/Sep/2020 00:00	EPA 351.2	Nitrogen, Total Kjeldahl	Total	ug/L	1	76	35	
HDVC-5	18/Aug/2020	HeavenlyValley_TDML	00:00	Water_Grab	Grab	HSWL_08182020_TKN	01/Sep/2020 00:00	EPA 351.2	Nitrogen, Total Kjeldahl	Total	ug/L	1	96	35	
BPC-4	18/Aug/2020	HeavenlyValley_TDML	00:00	Water_Grab	Grab	HSWL_08182020_TKN	01/Sep/2020 00:00	EPA 351.2	Nitrogen, Total Kjeldahl	Total	ug/L	1	213	35	
LABQA	01/Jan/1950	Not Applicable	00:00	Not Applicable	LabBlank	HSWL_QC_08182020_TKN	01/Sep/2020 00:00	EPA 351.2	Nitrogen, Total Kjeldahl	Total	ug/L	1	<35	35	
LABQA	01/Jan/1950	Not Applicable	00:00	Not Applicable	LCS	HSWL_QC_08182020_TKN	01/Sep/2020 00:00	EPA 351.2	Nitrogen, Total Kjeldahl	Total	ug/L	1	127	35	122
000NONPJ	01/Jan/1950	Not Recorded	00:00	Not Recorded	MS1	HSWL_QC_08182020_TKN	01/Sep/2020 00:00	EPA 351.2	Nitrogen, Total Kjeldahl	Total	ug/L	1	123	35	
000NONPJ	01/Jan/1950	Not Recorded	00:00	Not Recorded	MS1	HSWL_QC_08182020_TKN	01/Sep/2020 00:00	EPA 351.2	Nitrogen, Total Kjeldahl	Total	ug/L	2	128	35	
HVC-1a	18/Aug/2020	HeavenlyValley_TDML	13:15	Water_Grab	Grab	HSWL_08182020_TSS	21/Aug/2020 00:00	EPA 160.2	Total Suspended Solids	Total	mg/L	1	5.0	0.3	
HVC-2	18/Aug/2020	HeavenlyValley_TDML	13:35	Water_Grab	Grab	HSWL_08182020_TSS	21/Aug/2020 00:00	EPA 160.2	Total Suspended Solids	Total	mg/L	1	3.0	0.3	
HVC-3	18/Aug/2020	HeavenlyValley_TDML	11:41	Water_Grab	Grab	HSWL_08182020_TSS	21/Aug/2020 00:00	EPA 160.2	Total Suspended Solids	Total	mg/L	1	3.0	0.3	
HDVC-5	18/Aug/2020	HeavenlyValley_TDML	10:31	Water_Grab	Grab	HSWL_08182020_TSS	21/Aug/2020 00:00	EPA 160.2	Total Suspended Solids	Total	mg/L	1	4.0	0.3	
BPC-4	18/Aug/2020	HeavenlyValley_TDML	12:26	Water_Grab	Grab	HSWL_08182020_TSS	21/Aug/2020 00:00	EPA 160.2	Total Suspended Solids	Total	mg/L	1	6.5	0.3	
LABQA	01/Jan/1950	Not Applicable	00:00	Not Applicable	LabBlank	HSWL_QC_08182020_TSS	21/Aug/2020 00:00	EPA 160.2	Total Suspended Solids	Total	mg/L	1	<0.3	0.3	
LABQA	01/Jan/1950	Not Applicable	00:00	Not Applicable	LCS	HSWL_QC_08182020_TSS	21/Aug/2020 00:00	EPA 160.2	Total Suspended Solids	Total	mg/L	1	25	0.3	25
000NONPJ	01/Jan/1950	Not Recorded	00:00	Not Recorded	MS1	HSWL_QC_08182020_TSS	21/Aug/2020 00:00	EPA 160.2	Total Suspended Solids	Total	mg/L	1	3.0	0.3	
000NONPJ	01/Jan/1950	Not Recorded	00:00	Not Recorded	MS1	HSWL_QC_08182020_TSS	21/Aug/2020 00:00	EPA 160.2	Total Suspended Solids	Total	mg/L	2	3.0	0.3	
HVC-1a	18/Aug/2020	HeavenlyValley_TDML	00:00	Water_Grab	Grab	HSWL_08182020_Turbidity	21/Aug/2020 00:00	EPA 180.1	Turbidity	Total	NTU	1	2.01	0.1	
HVC-2	18/Aug/2020	HeavenlyValley_TDML	00:00	Water_Grab	Grab	HSWL_08182020_Turbidity	21/Aug/2020 00:00	EPA 180.1	Turbidity	Total	NTU	1	0.89	0.1	
HVC-3	18/Aug/2020	HeavenlyValley_TDML	00:00	Water_Grab	Grab	HSWL_08182020_Turbidity	21/Aug/2020 00:00	EPA 180.1	Turbidity	Total	NTU	1	0.58	0.1	
HDVC-5	18/Aug/2020	HeavenlyValley_TDML	00:00	Water_Grab	Grab	HSWL_08182020_Turbidity	21/Aug/2020 00:00	EPA 180.1	Turbidity	Total	NTU	1	1.32	0.1	
BPC-4	18/Aug/2020	HeavenlyValley_TDML	00:00	Water_Grab	Grab	HSWL_08182020_Turbidity	21/Aug/2020 00:00	EPA 180.1	Turbidity	Total	NTU	1	11.4	0.1	
LABQA	01/Jan/1950	Not Applicable	00:00	Not Applicable	LabBlank	HSWL_QC_08182020_Turbidity	21/Aug/2020 00:00	EPA 180.1	Turbidity	Total	NTU	1	<0.1	0.1	
LABQA	01/Jan/1950	Not Applicable	00:00	Not Applicable	LCS	HSWL_QC_08182020_Turbidity	21/Aug/2020 00:00	EPA 180.1	Turbidity	Total	NTU	1	50	0.1	50
000NONPJ	01/Jan/1950	Not Recorded	00:00	Not Recorded	MS1	HSWL_QC_08182020_Turbidity	21/Aug/2020 00:00	EPA 180.1	Turbidity	Total	NTU	1	1.32	0.1	
000NONPJ	01/Jan/1950	Not Recorded	00:00	Not Recorded	MS1	HSWL_QC_08182020_Turbidity	21/Aug/2020 00:00	EPA 180.1	Turbidity	Total	NTU	2	1.38	0.1	

Client: Cardno - Heavenly Sampling
chris.donley@cardno.com

Analysis Report

Lab: High Sierra Water Lab
collin@highsierrawaterlab.com

Site	ID	Date	Time	NO3/NO2-N	SRP-P	DP-P	TP-P	TKN	TSS	Cond	Turbidity
				(ppb)	*(ppb)*	*(ppb)*	*(ppb)*	*(ppb)*	*(mg/L)*	*(µs/cm)*	*(ntu)*
ED Above	HVE-1	8/18/2020	14:20	2	9	20	201	514	31	120.4	19
ED Below	HVE-2	8/18/2020	14:45	70	11	22	35	253	5.5	149.7	3.85

Client: Cardno - Heavenly Sampling
chris.donley@cardno.com

Analysis Report

Lab: High Sierra Water Lab
collin@highsierrawaterlab.com

StationCode	SampleDate	ProjectCode	CollectionTime	CollectionMethodCode	SampleTypeCode	LabBatch	AnalysisDate	MethodName	AnalyteName	FractionName	UnitName	LabReplicate	Result	MDL	ExpectedValue
HVC-1a	22/Sep/2020	HeavenlyValley_TDML	13:00	Water_Grab	Grab	HSWL_09222020_NO2NO3	26/Sep/2020 00:00	EPA 353.1	Nitrate + Nitrite as N	Dissolved	ug/L	1	5	1	
HVC-2	22/Sep/2020	HeavenlyValley_TDML	12:40	Water_Grab	Grab	HSWL_09222020_NO2NO3	26/Sep/2020 00:00	EPA 353.1	Nitrate + Nitrite as N	Dissolved	ug/L	1	21	1	
HVC-3	22/Sep/2020	HeavenlyValley_TDML	11:30	Water_Grab	Grab	HSWL_09222020_NO2NO3	26/Sep/2020 00:00	EPA 353.1	Nitrate + Nitrite as N	Dissolved	ug/L	1	2	1	
HDVC-5	22/Sep/2020	HeavenlyValley_TDML	10:30	Water_Grab	Grab	HSWL_09222020_NO2NO3	26/Sep/2020 00:00	EPA 353.1	Nitrate + Nitrite as N	Dissolved	ug/L	1	1	1	
BPC-4	22/Sep/2020	HeavenlyValley_TDML	12:05	Water_Grab	Grab	HSWL_09222020_NO2NO3	26/Sep/2020 00:00	EPA 353.1	Nitrate + Nitrite as N	Dissolved	ug/L	1	362	1	
LABQA	01/Jan/1950	Not Applicable	00:00	Not Applicable	LabBlank	HSWL_QC_09222020_NO2NO3	26/Sep/2020 00:00	EPA 353.1	Nitrate + Nitrite as N	Total	ug/L	1	<1	1	
LABQA	01/Jan/1950	Not Applicable	00:00	Not Applicable	LCS	HSWL_QC_09222020_NO2NO3	26/Sep/2020 00:00	EPA 353.1	Nitrate + Nitrite as N	Total	ug/L	1	97	1	94.00
000NONPJ	01/Jan/1950	Not Recorded	00:00	Not Recorded	MS1	HSWL_QC_09222020_NO2NO3	26/Sep/2020 00:00	EPA 353.1	Nitrate + Nitrite as N	Dissolved	ug/L	1	8	1	
000NONPJ	01/Jan/1950	Not Recorded	00:00	Not Recorded	MS1	HSWL_QC_09222020_NO2NO3	26/Sep/2020 00:00	EPA 353.1	Nitrate + Nitrite as N	Dissolved	ug/L	2	8	1	
HVC-1a	22/Sep/2020	HeavenlyValley_TDML	13:00	Water_Grab	Grab	HSWL_09222020_TPHOS	04/Oct/2020 00:00	EPA 365.3	Phosphorus as P	Total	ug/L	1	17	1	
HVC-2	22/Sep/2020	HeavenlyValley_TDML	12:40	Water_Grab	Grab	HSWL_09222020_TPHOS	04/Oct/2020 00:00	EPA 365.3	Phosphorus as P	Total	ug/L	1	24	1	
HVC-3	22/Sep/2020	HeavenlyValley_TDML	11:30	Water_Grab	Grab	HSWL_09222020_TPHOS	04/Oct/2020 00:00	EPA 365.3	Phosphorus as P	Total	ug/L	1	30	1	
HDVC-5	22/Sep/2020	HeavenlyValley_TDML	10:30	Water_Grab	Grab	HSWL_09222020_TPHOS	04/Oct/2020 00:00	EPA 365.3	Phosphorus as P	Total	ug/L	1	28	1	
BPC-4	22/Sep/2020	HeavenlyValley_TDML	12:05	Water_Grab	Grab	HSWL_09222020_TPHOS	04/Oct/2020 00:00	EPA 365.3	Phosphorus as P	Total	ug/L	1	123	1	
LABQA	01/Jan/1950	Not Applicable	00:00	Not Applicable	LabBlank	HSWL_QC_09222020_TPHOS	04/Oct/2020 00:00	EPA 365.3	Phosphorus as P	Total	ug/L	1	<1	1	
LABQA	01/Jan/1950	Not Applicable	00:00	Not Applicable	LCS	HSWL_QC_09222020_TPHOS	04/Oct/2020 00:00	EPA 365.3	Phosphorus as P	Total	ug/L	1	134	1	134.00
000NONPJ	01/Jan/1950	Not Recorded	00:00	Not Recorded	MS1	HSWL_QC_09222020_TPHOS	04/Oct/2020 00:00	EPA 365.3	Phosphorus as P	Total	ug/L	1	73	1	
000NONPJ	01/Jan/1950	Not Recorded	00:00	Not Recorded	MS1	HSWL_QC_09222020_TPHOS	04/Oct/2020 00:00	EPA 365.3	Phosphorus as P	Total	ug/L	2	73	1	
HVC-1a	22/Sep/2020	HeavenlyValley_TDML	13:00	Water_Grab	Grab	HSWL_09222020_TKN	08/Oct/2020 00:00	EPA 351.2	Nitrogen, Total Kjeldahl	Total	ug/L	1	59	35	
HVC-2	22/Sep/2020	HeavenlyValley_TDML	12:40	Water_Grab	Grab	HSWL_09222020_TKN	08/Oct/2020 00:00	EPA 351.2	Nitrogen, Total Kjeldahl	Total	ug/L	1	70	35	
HVC-3	22/Sep/2020	HeavenlyValley_TDML	11:30	Water_Grab	Grab	HSWL_09222020_TKN	08/Oct/2020 00:00	EPA 351.2	Nitrogen, Total Kjeldahl	Total	ug/L	1	60	35	
HDVC-5	22/Sep/2020	HeavenlyValley_TDML	10:30	Water_Grab	Grab	HSWL_09222020_TKN	08/Oct/2020 00:00	EPA 351.2	Nitrogen, Total Kjeldahl	Total	ug/L	1	65	35	
BPC-4	22/Sep/2020	HeavenlyValley_TDML	12:05	Water_Grab	Grab	HSWL_09222020_TKN	08/Oct/2020 00:00	EPA 351.2	Nitrogen, Total Kjeldahl	Total	ug/L	1	153	35	
LABQA	01/Jan/1950	Not Applicable	00:00	Not Applicable	LabBlank	HSWL_QC_09222020_TKN	08/Oct/2020 00:00	EPA 351.2	Nitrogen, Total Kjeldahl	Total	ug/L	1	<35	35	
LABQA	01/Jan/1950	Not Applicable	00:00	Not Applicable	LCS	HSWL_QC_09222020_TKN	08/Oct/2020 00:00	EPA 351.2	Nitrogen, Total Kjeldahl	Total	ug/L	1	110	35	122.00
000NONPJ	01/Jan/1950	Not Recorded	00:00	Not Recorded	MS1	HSWL_QC_09222020_TKN	08/Oct/2020 00:00	EPA 351.2	Nitrogen, Total Kjeldahl	Total	ug/L	1	63	35	
000NONPJ	01/Jan/1950	Not Recorded	00:00	Not Recorded	MS1	HSWL_QC_09222020_TKN	08/Oct/2020 00:00	EPA 351.2	Nitrogen, Total Kjeldahl	Total	ug/L	2	69	35	
HVC-1a	22/Sep/2020	HeavenlyValley_TDML	13:00	Water_Grab	Grab	HSWL_09222020_TSS	24/Sep/2020 00:00	EPA 160.2	Total Suspended Solids	Total	mg/L	1	3.5	0.3	
HVC-2	22/Sep/2020	HeavenlyValley_TDML	12:40	Water_Grab	Grab	HSWL_09222020_TSS	24/Sep/2020 00:00	EPA 160.2	Total Suspended Solids	Total	mg/L	1	3.0	0.3	
HVC-3	22/Sep/2020	HeavenlyValley_TDML	11:30	Water_Grab	Grab	HSWL_09222020_TSS	24/Sep/2020 00:00	EPA 160.2	Total Suspended Solids	Total	mg/L	1	3.0	0.3	
HDVC-5	22/Sep/2020	HeavenlyValley_TDML	10:30	Water_Grab	Grab	HSWL_09222020_TSS	24/Sep/2020 00:00	EPA 160.2	Total Suspended Solids	Total	mg/L	1	3.0	0.3	
BPC-4	22/Sep/2020	HeavenlyValley_TDML	12:05	Water_Grab	Grab	HSWL_09222020_TSS	24/Sep/2020 00:00	EPA 160.2	Total Suspended Solids	Total	mg/L	1	8.5	0.3	
LABQA	01/Jan/1950	Not Applicable	00:00	Not Applicable	LabBlank	HSWL_QC_09222020_TSS	24/Sep/2020 00:00	EPA 160.2	Total Suspended Solids	Total	mg/L	1	<0.3	0.3	
LABQA	01/Jan/1950	Not Applicable	00:00	Not Applicable	LCS	HSWL_QC_09222020_TSS	24/Sep/2020 00:00	EPA 160.2	Total Suspended Solids	Total	mg/L	1	25	0.3	25.00
000NONPJ	01/Jan/1950	Not Recorded	00:00	Not Recorded	MS1	HSWL_QC_09222020_TSS	24/Sep/2020 00:00	EPA 160.2	Total Suspended Solids	Total	mg/L	1	3.0	0.3	
000NONPJ	01/Jan/1950	Not Recorded	00:00	Not Recorded	MS1	HSWL_QC_09222020_TSS	24/Sep/2020 00:00	EPA 160.2	Total Suspended Solids	Total	mg/L	2	3.0	0.3	
HVC-1a	22/Sep/2020	HeavenlyValley_TDML	13:00	Water_Grab	Grab	HSWL_09222020_Turbidity	24/Sep/2020 00:00	EPA 180.1	Turbidity	Total	NTU	1	2.36	0.1	
HVC-2	22/Sep/2020	HeavenlyValley_TDML	12:40	Water_Grab	Grab	HSWL_09222020_Turbidity	24/Sep/2020 00:00	EPA 180.1	Turbidity	Total	NTU	1	1.03	0.1	
HVC-3	22/Sep/2020	HeavenlyValley_TDML	11:30	Water_Grab	Grab	HSWL_09222020_Turbidity	24/Sep/2020 00:00	EPA 180.1	Turbidity	Total	NTU	1	0.54	0.1	
HDVC-5	22/Sep/2020	HeavenlyValley_TDML	10:30	Water_Grab	Grab	HSWL_09222020_Turbidity	24/Sep/2020 00:00	EPA 180.1	Turbidity	Total	NTU	1	0.65	0.1	
BPC-4	22/Sep/2020	HeavenlyValley_TDML	12:05	Water_Grab	Grab	HSWL_09222020_Turbidity	24/Sep/2020 00:00	EPA 180.1	Turbidity	Total	NTU	1	17.1	0.1	
LABQA	01/Jan/1950	Not Applicable	00:00	Not Applicable	LabBlank	HSWL_QC_09222020_Turbidity	24/Sep/2020 00:00	EPA 180.1	Turbidity	Total	NTU	1	<0.1	0.1	
LABQA	01/Jan/1950	Not Applicable	00:00	Not Applicable	LCS	HSWL_QC_09222020_Turbidity	24/Sep/2020 00:00	EPA 180.1	Turbidity	Total	NTU	1	49.5	0.1	50.00
000NONPJ	01/Jan/1950	Not Recorded	00:00	Not Recorded	MS1	HSWL_QC_09222020_Turbidity	24/Sep/2020 00:00	EPA 180.1	Turbidity	Total	NTU	1	17.1	0.1	
000NONPJ	01/Jan/1950	Not Recorded	00:00	Not Recorded	MS1	HSWL_QC_09222020_Turbidity	24/Sep/2020 00:00	EPA 180.1	Turbidity	Total	NTU	2	17.4	0.1	

Client: Cardno - Heavenly Sampling
chris.donley@cardno.com

Analysis Report

Lab: High Sierra Water Lab
collin@highsierrawaterlab.com

Site	ID	Date	Time	NO3/NO2-N	SRP-P	DP-P	TP-P	TKN	TSS	Cond	Turbidity
				(ppb)	*(ppb)*	*(ppb)*	*(ppb)*	*(ppb)*	*(mg/L)*	*(µs/cm)*	*(ntu)*
ED Above	HVE-1	9/22/2020	14:20	-	-	-	-	-	-	-	-
ED Below	HVE-2	9/22/2020	14:00	64	5	21	29	139	3	141.5	2.4

EXCELCHEM
Laboratories, Inc.

A Silver State Analytical Company

1135 W Sunset Boulevard
Suite A
Rocklin, CA 95765
Phone# 916-543-4445
Fax# 916-543-4449

ELAP Certificate No. : 2119

05 October 2020

Michelle Hochrein

Cardno

5496 Reno Corporate Drive

Reno, NV 89511

RE: Heavenly

Work order number:2009183

Enclosed are the results of analyses for samples received by the laboratory on 09/23/20 10:11. All Quality Control results are within acceptable limits except where noted as a case narrative. If you have any questions concerning this report, please feel free to contact the laboratory.

Sincerely,

Joshua Cox, Lab Director

Excelchem Laboratories, Inc.

Cardno	Project:	Heavenly	
5496 Reno Corporate Drive	Project Number:	E320404100	Date Reported:
Reno, NV 89511	Project Manager:	Michelle Hochrein	10/05/20 17:08

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
HVC-1A	2009183-01	Water	09/22/20 13:00	09/23/20 10:11
HVC-2	2009183-02	Water	09/22/20 12:40	09/23/20 10:11
HVC-3	2009183-03	Water	09/22/20 11:30	09/23/20 10:11
BPC-4	2009183-04	Water	09/22/20 12:05	09/23/20 10:11
HDVC-5	2009183-05	Water	09/22/20 10:30	09/23/20 10:11

Excelchem Laboratories, Inc.

Laboratory Representative

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Excelchem Laboratories, Inc.

Cardno	Project:	Heavenly	
5496 Reno Corporate Drive	Project Number:	E320404100	Date Reported:
Reno, NV 89511	Project Manager:	Michelle Hochrein	10/05/20 17:08

HVC-1A
2009183-01 (Water)

Analyte	Result	Reporting Limit	Units	Batch	Date Prepared	Date Analyzed	Method	Notes
Ion Chromatography								
Chloride	**0.5**	0.1	mg/L	A^J0047	10/05/20	10/05/20	EPA 300.0	

Excelchem Laboratories, Inc.

Laboratory Representative

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Excelchem Laboratories, Inc.

Cardno	Project:	Heavenly	
5496 Reno Corporate Drive	Project Number:	E320404100	Date Reported:
Reno, NV 89511	Project Manager:	Michelle Hochrein	10/05/20 17:08

HVC-2
2009183-02 (Water)

Analyte	Result	Reporting Limit	Units	Batch	Date Prepared	Date Analyzed	Method	Notes
Ion Chromatography								
Chloride	**0.7**	0.1	mg/L	A^J0047	10/01/20	10/05/20	EPA 300.0	

Excelchem Laboratories, Inc.

Laboratory Representative

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Excelchem Laboratories, Inc.

Cardno	Project:	Heavenly	
5496 Reno Corporate Drive	Project Number:	E320404100	Date Reported:
Reno, NV 89511	Project Manager:	Michelle Hochrein	10/05/20 17:08

HVC-3
2009183-03 (Water)

Analyte	Result	Reporting Limit	Units	Batch	Date Prepared	Date Analyzed	Method	Notes
Ion Chromatography								
Chloride	**0.7**	0.1	mg/L	A^J0047	10/01/20	10/05/20	EPA 300.0	

Excelchem Laboratories, Inc.

Laboratory Representative

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Excelchem Laboratories, Inc.

Cardno	Project:	Heavenly	
5496 Reno Corporate Drive	Project Number:	E320404100	Date Reported:
Reno, NV 89511	Project Manager:	Michelle Hochrein	10/05/20 17:08

BPC-4
2009183-04 (Water)

Analyte	Result	Reporting Limit	Units	Batch	Date Prepared	Date Analyzed	Method	Notes
Ion Chromatography								
Chloride	**28.5**	0.1	mg/L	A^J0047	10/01/20	10/05/20	EPA 300.0	

Excelchem Laboratories, Inc.

Laboratory Representative

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Excelchem Laboratories, Inc.

Cardno	Project:	Heavenly	
5496 Reno Corporate Drive	Project Number:	E320404100	Date Reported:
Reno, NV 89511	Project Manager:	Michelle Hochrein	10/05/20 17:08

HDVC-5
2009183-05 (Water)

Analyte	Result	Reporting Limit	Units	Batch	Date Prepared	Date Analyzed	Method	Notes
Ion Chromatography								
Chloride	**0.5**	0.1	mg/L	A^J0047	10/05/20	10/05/20	EPA 300.0	

Excelchem Laboratories, Inc.

Laboratory Representative

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Excelchem Laboratories, Inc.

Cardno	Project:	Heavenly	
5496 Reno Corporate Drive	Project Number:	E320404100	Date Reported:
Reno, NV 89511	Project Manager:	Michelle Hochrein	10/05/20 17:08

Ion Chromatography - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch A^J0047 - EPA 300.0										
Blank (A^J0047-BLK1)				Prepared: 10/01/20 Analyzed: 10/05/20						
Chloride	ND	0.1	mg/L							
LCS (A^J0047-BS1)				Prepared: 10/01/20 Analyzed: 10/05/20						
Chloride	9.3	0.1	mg/L	10.0		92.9	90-110			
LCS Dup (A^J0047-BSD1)				Prepared: 10/01/20 Analyzed: 10/05/20						
Chloride	9.3	0.1	mg/L	10.0		93.1	90-110	0.226	20	
Duplicate (A^J0047-DUP1)		**Source: 2010001-11**		Prepared: 10/01/20 Analyzed: 10/05/20						
Chloride	0.2	0.1	mg/L		0.1			35.3	20	QR-03
Matrix Spike (A^J0047-MS1)		**Source: 2010001-11**		Prepared: 10/01/20 Analyzed: 10/05/20						
Chloride	9.2	0.1	mg/L	10.0	0.1	90.7	75-125			
Matrix Spike Dup (A^J0047-MSD1)		**Source: 2010001-11**		Prepared: 10/01/20 Analyzed: 10/05/20						
Chloride	9.2	0.1	mg/L	10.0	0.1	90.9	75-125	0.275	20	

Excelchem Laboratories, Inc.

Laboratory Representative

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Excelchem Laboratories, Inc.

Cardno	Project:	Heavenly	
5496 Reno Corporate Drive	Project Number:	E320404100	Date Reported:
Reno, NV 89511	Project Manager:	Michelle Hochrein	10/05/20 17:08

Notes and Definitions

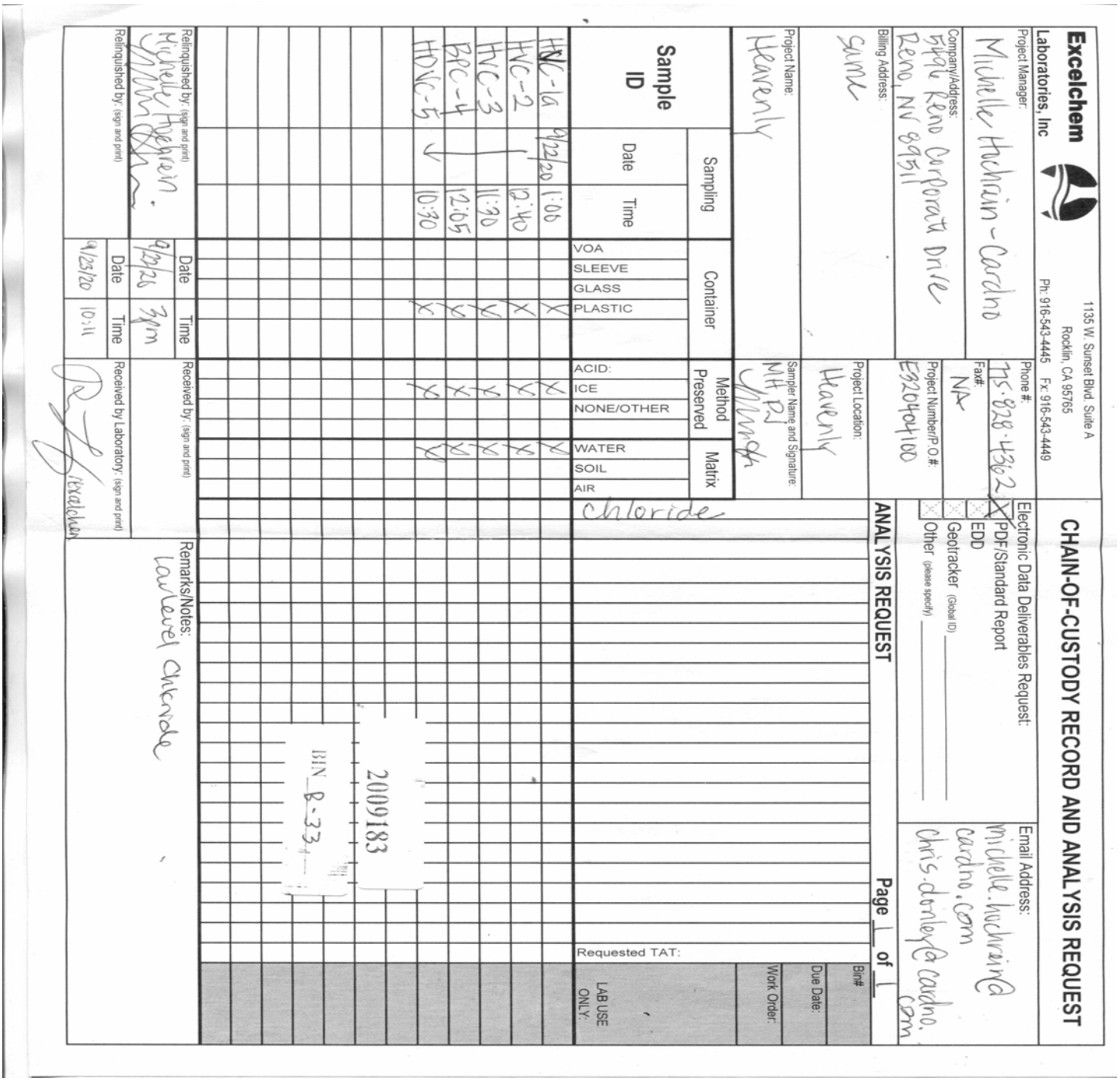
QR-03 The RPD value for the sample duplicate or MS/MSD was outside of QC acceptance limits due to matrix interference. QC batch accepted based on LCS and/or LCSD recovery.

ND Analyte not detected at reporting limit.

NR Not reported

Excelchem Laboratories, Inc.

Cardno	Project:	Heavenly	
5496 Reno Corporate Drive	Project Number:	E320404100	Date Reported:
Reno, NV 89511	Project Manager:	Michelle Hochrein	10/05/20 17:08



Excelchem Laboratories, Inc.

Laboratory Representative

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Excelchem Laboratories, Inc.

Cardno	Project:	Heavenly	
5496 Reno Corporate Drive	Project Number:	E320404100	Date Reported:
Reno, NV 89511	Project Manager:	Michelle Hochrein	10/05/20 17:08

Sample Integrity

WORK ORDER: 2009183

Date Received: 9-23-20

Company Name: Cardno
New Client: Y (N)

Section 1 – Sample Arrival Information

Sample Transport: ONTRAC (UPS) USPS Walk-In EXCELCHEM Courier Fed-Ex Other:_____
Transported In: (Ice Chest) Box Hand
Packing materials: Bubble Wrap Foam Packing Peanuts Paper Other: N/A
Has chilling process begun? (Y) N **Samples Received:** Chilled to Touch / Ambient / (On Ice)
Temperature of Samples (°C): 2.4 **Ice Chest Temperature(s) (°C):** 4.4

Section 2 – Bottle/Analysis Info.

	Yes	No	N/A	Comments
Did all bottles arrive unbroken and intact?	X			
Did all bottle labels agree with COC?	X			
Were correct containers used for the tests requested?	X			
Were correct preservations used for the tests requested?	X			
Was a sufficient amount of sample sent for tests indicated?	X			
Were bubbles present in VOA Vials?: (**Volatile Methods Only**)			X	

Section 3 – Summa/Flow regulator Information (N/A)

Used Summa#:
Unused Summa#:
Cleaning Summa#:
Regulator#:
Was there any visual damage to summa canisters or flow regulators? **Explain.**

Section 4 – COC Information

	Yes	No	Comments		Yes	No	Comments
COC Received	X			Analysis Requested	X		
Date Sampled	X			Samples arrived within holding time	X		
Time Sampled	X			Hold times less than 72 hours		X	
Sample ID	X			Client Name	X		
Rush Turn Around Time		X		Client Contact Information	X		

SHORT HOLD LIST (<72 hours)

pH	Chlorine	Corrosivity	Coliform	Dissolved Oxygen	Odor	Nitrate	Nitrite	Ortho-phosphate
MBAs	Asbestos	Settable Solids	Turbidity	Biochemical Oxygen Demand	HPC	Color	Tedlars	Ammonia/TKN (unpreserved)

Section 5 – Comments / Discrepancies

Client notified of discrepancies: Yes / No **Notified by:**
Comments:

Bin Number/ Location:	B-33
COC Scanned/Attached by:	PC
Samples labeled by:	PC
Sample labels reviewed by:	PC

Filled out by: Rachelle Lang **Date:** 9/23/20 **Time:** 10:12

Excelchem Laboratories, Inc.

Laboratory Representative

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Heavenly Mountain Resort—Water Year 2020

APPENDIX B

RAW WATER QUALITY CONSTITUENTS, CA FILTER VAULTS, WATER YEAR 2020

Appendix B
RAW WATER QUALITY CONSTITUENTS, CA FILTER VAULTS, WATER YEAR 2020

B.1 43HVP-1a - CA Parking Lot Filter Vault Northern Influent Sampling Station Water Quality Data

B.2 43HVP-1b - CA Parking Lot Filter Vault Southern Influent Sampling Station Water Quality Data

B.3 43HVP-2 - CA Parking Lot Filter Vault Effluent Sampling Station Water Quality Data

B.4 WetLab Vault Analysis

Table C-1	Heavenly Mountain Resort water year 2020 water quality monitoring data from influent station 43HVP-1a (North), California Parking Lot Filter Vault influent point one. This station is located within the CA parking lot.									
Date	**Notes**	**Time**	**Turbidity (NTU)**	**Total Phosphorus (mg/L)**	**Nitrate Nitrogen (mg/L)**	**Nitrite Nitrogen (mg/L)**	**Total Kjeldahl Nitrogen (mg/L)**	**Total Nitrogen Calc. (mg/L)**	**Chloride (mg/L)**	**Oil & Grease (mg/L)**
Lahontan Standards		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
First Quarter WY 2020										
No samples were taken during the first quarter of WY 2020										
Second Quarter WY 2020										
No samples were taken during the second quarter of WY 2020										
Third Quarter WY 2020										
5/18/2020	[1,2]	7:00	53	0.041	0.14	ND	0.61	0.75	76	ND
Fourth Quarter WY 2020										
No samples were taken during the fourth quarter of WY 2020										

Notes:

[1] The Oil & Grease matrix spike/matrix spike duplicate (MS/MSD) values for the analysis of this parameter were outside acceptance criteria due to probable matrix interference. The reported result should be considered an estimate.

[2] The Oil & Grease analyte was analyzed for, but was not detected above the level of the reported sample reporting/quantitation limit. The reported result should be considered an estimate.

Table C-2	Heavenly Mountain Resort water year 2020 water quality monitoring data from influent station 43HVP-1b (South), California Parking Lot Filter Vault influent point two. This station is located within the CA parking lot.									
Date	**Notes**	**Time**	**Turbidity (NTU)**	**Total Phosphorus (mg/L)**	**Nitrate Nitrogen (mg/L)**	**Nitrite Nitrogen (mg/L)**	**Total Kjeldahl Nitrogen (mg/L)**	**Total Nitrogen Calc. (mg/L)**	**Chloride (mg/L)**	**Oil & Grease (mg/L)**
Lahontan Standards			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
First Quarter WY 2020										
No samples were taken during the first quarter of WY 2020										
Second Quarter WY 2020										
No samples were taken during the second quarter of WY 2020										
Third Quarter WY 2020										
5/18/2020	[1]	6:40	44	0.030	0.090	ND	0.50	0.59	21	ND
Fourth Quarter WY 2020										
No samples were taken during the fourth quarter of WY 2020										

Notes:

[1] The Oil & Grease analyte was analyzed for, but was not detected above the level of the reported sample reporting/quantitation limit. The reported result should be considered an estimate.

California Parking Lot - StormFitler
Effluent (43HVP-2)

Table C-3	Heavenly Mountain Resort water year 2020 water quality monitoring data from effluent station 43HVP-2, California Parking Lot Filter Vault effluent point. This station is located within the CA parking lot.									
Date	**Notes**	**Time**	**Turbidity (NTU)**	**Total Phosphorus (mg/L)**	**Nitrate Nitrogen (mg/L)**	**Nitrite Nitrogen (mg/L)**	**Total Kjeldahl Nitrogen (mg/L)**	**Total Nitrogen Calc. (mg/L)**	**Chloride (mg/L)**	**Oil & Grease (mg/L)**
Lahontan Standards[1]			**20.0**	**0.10**	N/A	N/A	N/A	**0.5**	N/A	**2.0**
First Quarter WY 2020										
No samples were taken during the first quarter of WY 2020										
Second Quarter WY 2020										
No samples were taken during the second quarter of WY 2020										
Third Quarter WY 2020										
5/18/2020	[2]	7:20	**49**	0.027	0.13	ND	0.46	**0.60**	45	ND
Fourth Quarter WY 2020										
No samples were taken during the fourth quarter of WY 2020										
Annual Summary	**Min**		49	0.027	0.13	ND	0.46	0.60	45.0	0.0
	Max		49	0.027	0.13	ND	0.46	0.60	45.0	0.0
	# of Samples		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
# of Noncompliance Samples			**1.0**	**0.0**	-	-	-	**1.0**	-	**0.0**
% of Noncompliance Samples			**100%**	**0%**	-	-	-	**100%**	-	**0%**

Notes:
[1] Standards are maximum concentration for discharge to surface waters not to exceed, effective November 30, 2008.
[2] The Oil & Grease analyte was analyzed for, but was not detected above the level of the reported sample reporting/quantitation limit. The reported result should be considered an estimate.

6/5/2020

Cardno
PO Box 1533
Zephyr Cove, NV 89448
Attn: Melanie Greene

OrderID: *20050506*

Dear: Melanie Greene

This is to transmit the attached analytical report. The analytical data and information contained therein was generated using specified or selected methods contained in references, such as Standard Methods for the Examination of Water and Wastewater, online edition, Methods for Determination of Organic Compounds in Drinking Water, EPA-600/4-79-020, and Test Methods for Evaluation of Solid Waste, Physical/Chemical Methods (SW846) Third Edition.

The samples were received by WETLAB-Western Environmental Testing Laboratory in good condition on 5/19/2020. Additional comments are located on page 2 of this report.

If you should have any questions or comments regarding this report, please do not hesitate to call.

Sincerely,

Jennifer Delaney
QA Manager

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LAS VEGAS
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Las Vegas, Nevada 89102
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fax (702) 622-2868
EPA LAB ID: NV00932

Western Environmental Testing Laboratory
Report Comments

Cardno - 20050506

Specific Report Comments

None

Report Legend

B	--	Blank contamination; Analyte detected above the method reporting limit in an associated blank
D	--	Due to the sample matrix dilution was required in order to properly detect and report the analyte. The reporting limit has been adjusted accordingly.
HT	--	Sample analyzed beyond the accepted holding time
J	--	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit. The reported result should be considered an estimate.
K	--	The TPH Diesel Concentration reported here likely includes some heavier TPH Oil hydrocarbons reported in the TPH Diesel range as per EPA 8015.
L	--	The TPH Oil Concentration reported here likely includes some lighter TPH Diesel hydrocarbons reported in the TPH Oil range as per EPA 8015.
M	--	The matrix spike/matrix spike duplicate (MS/MSD) values for the analysis of this parameter were outside acceptance criteria due to probable matrix interference. The reported result should be considered an estimate.
N	--	There was insufficient sample available to perform a spike and/or duplicate on this analytical batch.
NC	--	Not calculated due to matrix interference
QD	--	The sample duplicate or matrix spike duplicate analysis demonstrated sample imprecision. The reported result should be considered an estimate.
QL	--	The result for the laboratory control sample (LCS) was outside WETLAB acceptance criteria and reanalysis was not possible. The reported data should be considered an estimate.
S	--	Surrogate recovery was outside of laboratory acceptance limits due to matrix interference. The associated blank and LCS surrogate recovery was within acceptance limits
SC	--	Spike recovery not calculated. Sample concentration >4X the spike amount; therefore, the spike could not be adequately recovered
U	--	The analyte was analyzed for, but was not detected above the level of the reported sample reporting/quantitation limit. The reported result should be considered an estimate.

General Lab Comments

Per method recommendation (section 4.4), Samples analyzed by methods EPA 300.0 and EPA 300.1 have been filtered prior to analysis.

The following is an interpretation of the results from EPA method 9223B:
A result of zero (0) indicates absence for both coliform and Escherichia coli meaning the water meets the microbiological requirements of the U.S. EPA Safe Drinking Water Act (SDWA). A result of one (1) for either test indicates presence and the water does not meet the SDWA requirements. Waters with positive tests should be disinfected by a certified water treatment operator and retested.

Per federal regulation the holding time for the following parameters in aqueous/water samples is 15 minutes: Residual Chlorine, pH, Dissolved Oxygen, Sulfite.

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Western Environmental Testing Laboratory
Analytical Report

Cardno
PO Box 1533
Zephyr Cove, NV 89448
Attn: Melanie Greene
Phone: (775) 588-9069 **Fax:** (775) 588-9219
PO\Project: *Heavenly*

Date Printed: 6/5/2020
OrderID: *20050506*

Customer Sample ID: HVP-1A (North)
WETLAB Sample ID: 20050506-001

Collect Date/Time: 5/18/2020 07:00
Receive Date: 5/19/2020 13:30

Analyte	Method	Results		Units	DF	RL	Analyzed	LabID
General Chemistry								
Total Phosphorous as P	SM 4500-P E	0.041		mg/L	1	0.020	5/22/2020	NV00925
Total Suspended Solids (TSS)	SM 2540D	37		mg/L	1	10	5/20/2020	NV00925
Total Nitrogen	Calc.	0.75		mg/L	1	0.25	5/21/2020	NV00925
Turbidity (Nephelometric)	EPA 180.1	53		NTU	6	0.60	5/19/2020	NV00925
Oil & Grease (SGT-HEM)	EPA 1664	ND	M,U	mg/L	1	2.0	6/3/2020	NV00925
Anions by Ion Chromatography								
Chloride	EPA 300.0	76		mg/L	1	0.25	5/19/2020	NV00925
Nitrate Nitrogen	EPA 300.0	0.14		mg/L	1	0.030	5/19/2020	NV00925
Nitrite Nitrogen	EPA 300.0	ND		mg/L	1	0.020	5/19/2020	NV00925
Flow Injection Analyses								
Total Kjeldahl Nitrogen	EPA 351.2	0.61		mg/L	0.5	0.20	5/21/2020	NV00925

DF=Dilution Factor, RL = Reporting Limit (minimum 3X the MDL), ND = Not Detected <RL or <MDL (if listed)

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Las Vegas, Nevada 89102
tel (702) 475-8899
fax (702) 622-2868
EPA LAB ID: NV00932

Customer Sample ID: HVP-1B (South) **Collect Date/Time:** 5/18/2020 06:40
WETLAB Sample ID: 20050506-002 **Receive Date:** 5/19/2020 13:30

Analyte	Method	Results		Units	DF	RL	Analyzed	LabID
General Chemistry								
Total Phosphorous as P	SM 4500-P E	0.030		mg/L	1	0.020	5/22/2020	NV00925
Total Suspended Solids (TSS)	SM 2540D	29		mg/L	1	10	5/20/2020	NV00925
Total Nitrogen	Calc.	0.59		mg/L	1	0.25	5/21/2020	NV00925
Turbidity (Nephelometric)	EPA 180.1	44		NTU	6	0.60	5/19/2020	NV00925
Oil & Grease (SGT-HEM)	EPA 1664	ND	U	mg/L	1	2.0	6/3/2020	NV00925
Anions by Ion Chromatography								
Chloride	EPA 300.0	21		mg/L	1	0.25	5/19/2020	NV00925
Nitrate Nitrogen	EPA 300.0	0.090		mg/L	1	0.030	5/19/2020	NV00925
Nitrite Nitrogen	EPA 300.0	ND		mg/L	1	0.020	5/19/2020	NV00925
Flow Injection Analyses								
Total Kjeldahl Nitrogen	EPA 351.2	0.50		mg/L	0.5	0.20	5/21/2020	NV00925

DF=Dilution Factor, RL = Reporting Limit (minimum 3X the MDL), ND = Not Detected <RL or <MDL (if listed)

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fax (702) 622-2868
EPA LAB ID: NV00932

Customer Sample ID: HVP-2 (Outlet) **Collect Date/Time:** 5/18/2020 07:20
WETLAB Sample ID: 20050506-003 **Receive Date:** 5/19/2020 13:30

Analyte	Method	Results		Units	DF	RL	Analyzed	LabID
General Chemistry								
Total Phosphorous as P	SM 4500-P E	0.027		mg/L	1	0.020	5/22/2020	NV00925
Total Suspended Solids (TSS)	SM 2540D	30		mg/L	1	10	5/20/2020	NV00925
Total Nitrogen	Calc.	0.60		mg/L	1	0.25	5/21/2020	NV00925
Turbidity (Nephelometric)	EPA 180.1	49		NTU	6	0.60	5/19/2020	NV00925
Oil & Grease (SGT-HEM)	EPA 1664	ND	U	mg/L	1	2.0	6/3/2020	NV00925
Anions by Ion Chromatography								
Chloride	EPA 300.0	45		mg/L	1	0.25	5/19/2020	NV00925
Nitrate Nitrogen	EPA 300.0	0.13		mg/L	1	0.030	5/19/2020	NV00925
Nitrite Nitrogen	EPA 300.0	ND		mg/L	1	0.020	5/19/2020	NV00925
Flow Injection Analyses								
Total Kjeldahl Nitrogen	EPA 351.2	0.46		mg/L	0.5	0.20	5/21/2020	NV00925

DF=Dilution Factor, RL = Reporting Limit (minimum 3X the MDL), ND = Not Detected <RL or <MDL (if listed)

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Western Environmental Testing Laboratory
QC Report

QCBatchID	QCType	Parameter	Method	Result	Actual	% Rec	Units
QC20050740	Blank 1	Turbidity (Nephelometric)	EPA 180.1	ND			NTU
QC20050749	Blank 1	Chloride	EPA 300.0	ND			mg/L
		Nitrate Nitrogen	EPA 300.0	ND			mg/L
		Nitrite Nitrogen	EPA 300.0	ND			mg/L
QC20050825	Blank 1	Total Suspended Solids (TSS)	SM 2540D	ND			mg/L
QC20050826	Blank 1	Total Suspended Solids (TSS)	SM 2540D	ND			mg/L
QC20050845	Blank 1	Total Kjeldahl Nitrogen	EPA 351.2	ND			mg/L
QC20050905	Blank 1	Total Phosphorous as P	SM 4500-P E	ND			mg/L
QC20060240	Blank 1	Oil & Grease (SGT-HEM)	EPA 1664	ND			mg/L

QCBatchID	QCType	Parameter	Method	Result	Actual	% Rec	Units
QC20050740	LCS 1	Turbidity (Nephelometric)	EPA 180.1	4.82	5.00	96	NTU
QC20050749	LCS 1	Chloride	EPA 300.0	9.86	10.0	99	mg/L
		Nitrate Nitrogen	EPA 300.0	0.476	0.500	95	mg/L
		Nitrite Nitrogen	EPA 300.0	0.471	0.500	94	mg/L
QC20050825	LCS 1	Total Suspended Solids (TSS)	SM 2540D	197	200	99	mg/L
QC20050825	LCS 2	Total Suspended Solids (TSS)	SM 2540D	198	200	99	mg/L
QC20050826	LCS 1	Total Suspended Solids (TSS)	SM 2540D	198	200	99	mg/L
QC20050826	LCS 2	Total Suspended Solids (TSS)	SM 2540D	197	200	98	mg/L
QC20050845	LCS 1	Total Kjeldahl Nitrogen	EPA 351.2	0.970	1.00	97	mg/L
QC20050905	LCS 1	Total Phosphorous as P	SM 4500-P E	0.257	0.250	103	mg/L
QC20060240	LCS 1	Oil & Grease (SGT-HEM)	EPA 1664	8.80	10.0	88	mg/L

QCBatchID	QCType	Parameter	Method	Duplicate Sample	Sample Result	Duplicate Result	Units	RPD
QC20050740	Duplicate 1	Turbidity (Nephelometric)	EPA 180.1	20050491-001	217	203	NTU	7 %
QC20050740	Duplicate 2	Turbidity (Nephelometric)	EPA 180.1	20050504-006	18.1	18.3	NTU	1 %
QC20050825	Duplicate 1	Total Suspended Solids (TSS)	SM 2540D	20050502-004	ND	ND	mg/L	<1%
QC20050825	Duplicate 2	Total Suspended Solids (TSS)	SM 2540D	20050504-002	ND	ND	mg/L	10 %
QC20050826	Duplicate 1	Total Suspended Solids (TSS)	SM 2540D	20050504-003	ND	ND	mg/L	<1%
QC20050826	Duplicate 2	Total Suspended Solids (TSS)	SM 2540D	20050504-006	15.3	16.0	mg/L	4 %

QCBatchID	QCType	Parameter	Method	Spike Sample	Sample Result		MS Result	MSD Result	Spike Value	Units	MS %Rec	MSD %Rec	RPD %
QC20050749	MS 1	Chloride	EPA 300.0	20050504-006	0.306		1.63	1.63	1.25	mg/L	106	106	<1
		Nitrate Nitrogen	EPA 300.0	20050504-006	0.033		0.549	0.557	0.5	mg/L	103	105	1
		Nitrite Nitrogen	EPA 300.0	20050504-006	ND		0.132	0.130	0.125	mg/L	106	104	2
QC20050845	MS 1	Total Kjeldahl Nitrogen	EPA 351.2	20050566-001	ND	M	0.658	0.660	0.5	mg/L	NC	NC	NC
QC20050845	MS 2	Total Kjeldahl Nitrogen	EPA 351.2	20050504-003	ND	J	0.544	0.523	0.5	mg/L	93	89	4
QC20050905	MS 1	Total Phosphorous as P	SM 4500-P E	20050504-001	ND	U	0.255	0.264	0.25	mg/L	102	105	4
QC20050905	MS 2	Total Phosphorous as P	SM 4500-P E	20050504-006	0.055		0.297	0.312	0.25	mg/L	97	103	5
QC20060240	MS 1	Oil & Grease (SGT-HEM)	EPA 1664	20050506-001	ND	M,	4.24	0	10	mg/L	NC	NA	NA

DF=Dilution Factor, RL = Reporting Limit (minimum 3X the MDL), ND = Not Detected <RL or <MDL (if listed)

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WETLAB
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tel (702) 475-8899 | fax (702) 776-6152

WETLAB Order ID. 20050506
Sparks Control #
Elko Control #
LV Control #
Report Due Date
Page ____ of ____

Client: Cardno
Address: 295 Hwy 50, Suite #1
City, State & Zip: Zephyr Cove, NV 89448
Contact: ~~Shaun Buckman~~ Melanie Greene
Phone: 775.~~588.9069~~ 339 3328 Collector's Name: ~~Frank P~~ Raph Townsend
Fax: PWS/Project Name: Heavenly
P.O. Number: melanie.greene
Email: ~~shaun.buckman~~@cardno.com PWS/Project Number:

Turnaround Time Requirements
Standard ✓
5 Day* (25%) 72 Hour* (50%)
48 Hour* (100%) 24 Hour* (200%)
*Surcharges Will Apply

Samples Collected From Which State? NV CA ✓ Other
Compliance Monitoring? Yes ✓ No
Report to Regulatory Agency? Yes ✓ No
Report Results Via PDF ✓ EDD Other
Standard QC Required? Yes ✓ No

Billing Address (if different than Client Address)
Company
Address
City, State & Zip
Contact
Phone Fax
Email shaun.buckman@cardno.com

SAMPLE ID/LOCATION	DATE	TIME	PRES TYPE *	SAMPLE TYPE **	NO. OF CONTAINERS	Oil and Grease w/ Silica Gel	Total Phosphorus	Chloride	Nitrate as Nitrogen	Nitrite as Nitrogen	TKN (Kjeldahl)	Total Nitrogen	Turbidity	TSS		Spl. No.
HVP-1A (North)	5/18/20	0700	1,2,4	SW	4	✓	✓	✓	✓	✓	✓	✓	✓	✓		1
HVP-1B (South)	5/18/20	0640	1,2,4	SW	4	✓	✓	✓	✓	✓	✓	✓	✓	✓		2
HVP-2 (Outlet)	5/18/20	0720	1,2,4	SW	6	✓	✓	✓	✓	✓	✓	✓	✓	✓		3
#RL's										2005		4				
O+G 2.0 mg/L										0506		3				
TP 0.01 mg/L																
TN 0.1 mg/L																
Turb 1 NTU																
~~TSS~~ Cl 0.1 mg/L																

Instructions/Comments/Special Requirements: Oil and Grease - Amber bottles 2 Each for inlets (North and South)

4 Amber bottles for the Outlet (add acid).. 1 Pink Bottle (add acid) and 1 White Bottle (General) for each of the 3 locations.

Sample Matrix Key:** DW = Drinking Water WW = Wastewater SW = Surface Water MW = Monitoring Well SD = Solid/Sludge SO = Soil HW = Hazardous Waste OTHER: SW

***SAMPLE PRESERVATIVES:** 1=Unpreserved 2=H2SO4 3=NaOH 4=HCl 5=HNO3 6=Na2S2O3 7=ZnOAc+NaOH 8=HCl/VOA Vial

Temp	Custody Seal	# of Containers	DATE	TIME	Samples Relinquished By	Samples Received By
°C	Y N None	14	05/19/20	11:30	Melanie Greene	
2.3 °C	Y N None	14	5/19/20	1:30		
°C	Y N None					
°C	Y N None					

WETLAB'S Standard Terms and Conditions apply unless written agreements specify otherwise. Payment terms are Net 30.

Client/Collector attests to the validity and authenticity of this (these) sample(s) and, is (are) aware that tampering with or intentionally mislabeling the sample(s) location, date or time of collection may be considered fraud and subject to legal action (NAC445.0636). SB initial

To the maximum extent permitted by law, the Client agrees to limit the liability of WETLAB for the Client's damages to the total compensation received, unless other agreements are made in writing. This limitation shall apply regardless of the cause of action or legal theory pled or asserted. SB initial

WETLAB will dispose of samples 90 days from sample receipt. Client may request a longer sample storage time for an additional fee. Please contact your Project Manager for details. SB initial

301.2E

Heavenly Mountain Resort—Water Year 2020

APPENDIX C

CALIFORNIA VAULT INSPECTION REPORTS

Appendix C
CALIFORNIA VAULT INSPECTION REPORTS

Pacific Stormwater BMP Solutions
P.O. Box 12246
Santa Rosa , Ca
(707)994.3711 office
www.pacstorm.com

Stormwater Maintenance Report 2020

Heavenly Ski Resort Main Lodge Units 3,4 and 9

REPORT CONTENTS

This report contains information regarding the results off the BMP(s) maintenance performed at the Heavenly Ski site.
The following information is provided for each BMP:

Maintenance Date
Maintenance Information
Weather Conditions
BMP Location
BMP Designation, Type and Configuration
Sediment, Water, and Hydrocarbon Levels if present
BMP overall Condition
BMP Components Condition
Additional Comments and Observations
Maintenance Photos
Any further recommended Action

MAINTENANCE SUMMARY

Based on the results of an inspection of BMP(s), the following action was completed:

☐ All maintained BMP's are operating within manufacturer's established specifications. Next inspection to take place Spring 2021,

☐ Repairs to one or more off the inspected BMPs is required.

☑ Full service maintenance completed on one or more of the BMP's. See report specifics for details.

Pacific Stormwater BMP Solutions

Stormwater Maintenance Report

PROJECT INFORMATION

Name Heavenly Main Lodge **Unit #** 3

Address 1504 Wildwood Dr, South Lake Tahoe, Ca.

MAINTENANCE DETAILS

Field Manager Gordon Clem **System ID** .03

Date 7/23/2020 **GPS Coordinates**

Weather Dry

SYSTEM TYPE StormFilter SF **MEDIA TYPE** Phoso

CONFIGURATION Manhole **CARTRIDGE#** 7

SIZE

Sediment Depth - inlet bay N/A **Pronounced Scum Line?** Yes

Sediment Depth - Cartridge Bay 3" **Excessive Hydrocarbons?** No

Sediment Depth - Annular N/A

Water Level - Static 13"

Physical Condition of Unit: Unit appears to be in good working condition.

Field Managers Comments:

Maintenance completed and system is treating runoff as designed. Maintenance included sediment removal and replacement of filters.

Maintenance completed? Yes **Repairs Required?** No

MAINTENANCE AUTHENTICITY

This hereby certifies that the information contained in this report is accurate and was obtained using accepted industry practices.

By: Gordon Clem **Company:** Pacific Stormwater Solutions

Signature: Gordon Clem **Date:** 7/23/20

Title: Maintenance Manager

Pacific Stormwater BMP Solutions

Stormwater Maintenance Report

PROJECT INFORMATION

Name Heavenly Main Lodge **Unit#** 9

Address 1504 Wildwood Dr, South Lake Tahoe, Ca.

MAINTENANCE DETAILS

Inspector Gordon Clem **System ID** .09

Date 7/23/2020 **GPS Coordinates**

Weather Dry

SYSTEM TYPE StormFilter SF **MEDIA TYPE** Phoso

CONFIGURATION Manhole **CARTRIDGE#** 7

SIZE

Sediment Depth - inlet bay N/A **Pronounced Scum Line?** No

Sediment Depth - Cartridge Bay 1" **Excessive Hydrocarbons?** No

Sediment Depth - Annular N/A

Water Level - Static 8"

Physical Condition of Unit: Unit appears to be in good working condition.

Inspector Comments:

Maintenance completed and system is treating runoff as designed. Maintenance included sediment removal and replacement of filters.

Maintenance completed? Yes **Repairs Required?** No

AUTHENTICITY

This hereby certifies that the information contained in this report is accurate and was obtained using accepted industry practices.

By: Gordon Clem **Company:** **Pacific Stormwater Solutions**

Signature: Gordon Clem **Date:** 7/23/20

Title: Maintenance Manager

Pacific Stormwater BMP Solutions

Stormwater Maintenance Report

PROJECT INFORMATION

Name Heavenly Main Lodge **Unit #** 4

Address 1504 Wildwood Dr, South Lake Tahoe, Ca.

MAINTENANCE DETAILS

Inspector Gordon Clem **System ID** .04

Date 7/23/2020 **GPS Coordinates**

Weather Dry

SYSTEM TYPE StormFilter SF **MEDIA TYPE** ZPG

CONFIGURATION Vault **CARTRIDGE#** 93

SIZE **11x34**

Sediment Depth - inlet bay 2" **Pronounced Scum Line?** Yes

Sediment Depth - Cartridge Bay .5" **Excessive Hydrocarbons?** No

Sediment Depth - Annular N/A

Water Level - Static 1"

Physical Condition of Unit: Unit appears to be in good working condition.

Inspector Comments:

Partial maintenance completed with sediment being removed. No filter replacement done at this time due to media is loose and unimpacted.

Maintenance completed? Yes **Repairs Required?** No

AUTHENTICITY

This hereby certifies that the information contained in this report is accurate and was obtained using accepted industry practices.

By: Gordon Clem **Company:** Pacific Stormwater Solutions

Signature: Gordon Clem **Date:** 7/23/20

Title: Maintenance Manager

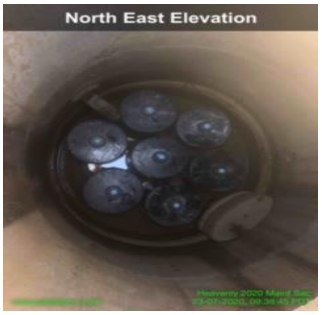
Pacific Stormwater BMP Solutions

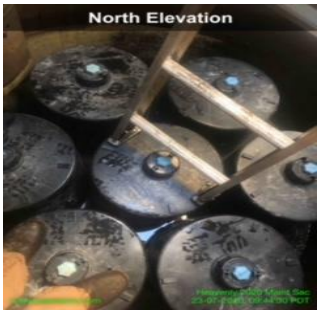
Stormwater Maintenance Report

MAINTENANCE PHOTOS

Unit #3 Cartridge bay New filters installed

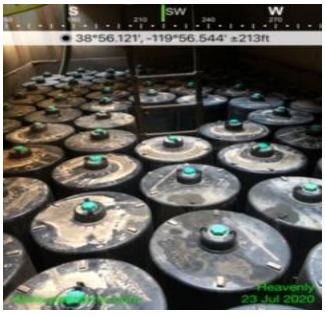
Maintenance completed with new filters installed.

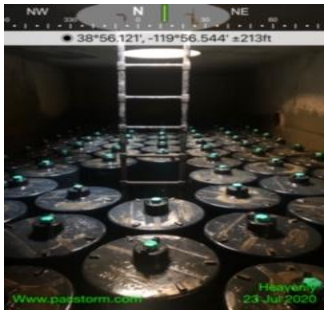




Unit #9 Cartridge bay New filters installed

Maintenance completed with new filters installed.





Unit #4

Partial maintenance with sediment removal due to filters are not impacted.

STORMWATER TREATMENT UNIT

MAINTENANCE COMPLIANCE 2020

Heavenly Main Lodge
1504 Wildwood Ave
South Lake Tahoe, Ca.

Let it be known that on July 23rd, 2020 Three CONTECH stormwater Media Filter systems were maintained by a qualified professional at a frequency and in a manner consistent with the manufacturer's guidelines for general inspection and maintenance. All systems are operating as designed. Maintenance was completed on all three units. Recommend next inspection Spring 2021.

Therefore, based on these activities and by signed authorization below, this hereby certifies that the StormFilter Stormwater treatment systems at the above referenced location are currently performing as designed.

CERTIFICATE AUTHORIZATION

Gordon Clem
Maintenance Manager
Pacific Stormwater BMP Solutions
11/30/20

Pacific Stormwater BMP Solutions
P.O. Box 12246
Santa Rosa , Ca
(707)994.3711 office
www.pacstorm.com

Stormwater Maintenance Report 2020

Heavenly Ski Resort Main Lodge Units 5, 10, 11

REPORT CONTENTS

This report contains information regarding the results off the BMP(s) maintenance performed at the Heavenly Ski site.
The following information is provided for each BMP:

Maintenance Date
Maintenance Information
Weather Conditions
BMP Location
BMP Designation, Type and Configuration
Sediment, Water, and Hydrocarbon Levels if present
BMP overall Condition
BMP Components Condition
Additional Comments and Observations
maintenance Photos
Any further recommended Action

MAINTENANCE SUMMARY

Based on the results of an inspection of BMP(s), the following action was completed:

☑ All maintained BMP's are operating within manufacturer's established specifications. Next inspection to take place Spring 2021

☐ Repairs to one or more off the inspected BMPs is required.

☑ Full service maintenance was performed on the following BMP's. See report specifics for details.

Pacific Stormwater BMP Solutions

Stormwater Maintenance Report

PROJECT INFORMATION

Name Heavenly Main Lodge **Unit #** 5

Address 1504 Wildwood Dr, South Lake Tahoe, Ca.

MAINTENANCE DETAILS

Field Manager Gordon Clem **System ID** .05

Date 07/23/20 **GPS Coordinates**

Weather Dry

SYSTEM TYPE StormFilter SF **MEDIA TYPE** ZPG

CONFIGURATION Vault **CARTRIDGE#** 114

SIZE **11x34**

Sediment Depth - inlet bay N/A **Pronounced Scum Line?** Yes

Sediment Depth - Cartridge Bay 3" **Excessive Hydrocarbons?** No

Sediment Depth - Annular N/A

Water Level - Static 1"

Physical Condition of Unit: Unit appears to be in good working condition.

Field Managers Comments:

Partial maintenance completed. Sediment removed. Power wash internal components. Filter replacement not recommended due to media is loose and unimpacted. Unit is ready for Winter.

Maintenance Required? No **Repairs Required?** No

MAINTENANCE AUTHENTICITY

This hereby certifies that the information contained in this report is accurate and was obtained using accepted industry practices.

By: Gordon Clem **Company:** Pacific Stormwater Solutions

Signature: Gordon Clem **Date:** 07/23/20

Title: Maintenance Manager

Pacific Stormwater BMP Solutions

Stormwater Maintenance Report

PROJECT INFORMATION

Name Heavenly Main Lodge **Unit#** 10

Address 1504 Wildwood Dr, South Lake Tahoe, Ca.

MAINTENANCE DETAILS

Inspector Gordon Clem **System ID** .10

Date 07/23/20 **GPS Coordinates**

Weather Dry

SYSTEM TYPE StormFilter SF **MEDIA TYPE** ZPG

CONFIGURATION Vault **CARTRIDGE#** 93

SIZE **11x34**

Sediment Depth - inlet bay 3" **Pronounced Scum Line?** Yes

Sediment Depth - Cartridge Bay .5" **Excessive Hydrocarbons?** No

Sediment Depth - Annular N/A

Water Level - Static 1"

Physical Condition of Unit: Unit appears to be in good working condition.

Inspector Comments:

Partial maintenance completed. Sediment removed. Power wash internal components. Filter replacement not recommended due to media is loose and unimpacted. Unit is ready for Winter.

Maintenance Required? No **Repairs Required?** No

AUTHENTICITY

This hereby certifies that the information contained in this report is accurate and was obtained using accepted industry practices.

By: Gordon Clem **Company:** **Pacific Stormwater Solutions**

Signature: Gordon Clem **Date:** 07/23/20

Title: Maintenance Manager

Pacific Stormwater BMP Solutions

Stormwater Maintenance Report

PROJECT INFORMATION

Name Heavenly Main Lodge **Unit #** 11

Address 1504 Wildwood Dr, South Lake Tahoe, Ca.

MAINTENANCE DETAILS

Inspector Gordon Clem **System ID** .11

Date 07/23/20 **GPS Coordinates**

Weather Dry

SYSTEM TYPE StormFilter SF **MEDIA TYPE** ZPG

CONFIGURATION Vault **CARTRIDGE#** 114

SIZE **11x34**

Sediment Depth - inlet bay 2" **Pronounced Scum Line?** Yes

Sediment Depth - Cartridge Bay 2.5" **Excessive Hydrocarbons?** No

Sediment Depth - Annular N/A

Water Level - Static 1"

Physical Condition of Unit: Unit appears to be in good working condition.

Inspector Comments:

Maintenance completed. Sediment and spent filters removed. Power wash internal components and installed manufacturer supplied OEM filters. Unit is ready for Winter.

Maintenance Required? Yes **Repairs Required?** No

AUTHENTICITY

This hereby certifies that the information contained in this report is accurate and was obtained using accepted industry practices.

By: Gordon Clem **Company:** Pacific Stormwater Solutions

Signature: Gordon Clem **Date:** 7/23/20

Title: Maintenance Manager

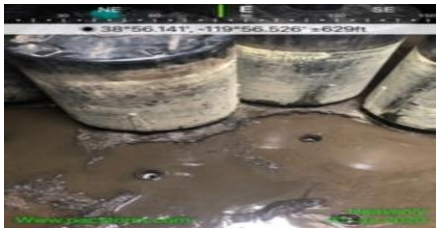
Pacific Stormwater BMP Solutions

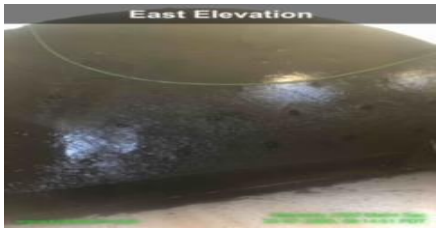
Stormwater Maintenance Report

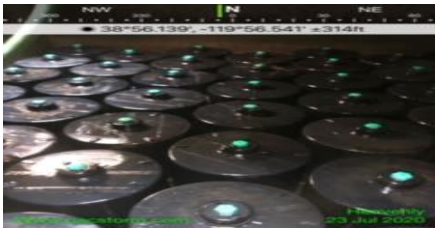
MAINTENANCE PHOTOS

Unit #5 Partial maintenance No filter replaced

Unit #10 Partial maintenance No filters replaced







Unit #11 During maintenance New filters

Maintenance was completed with filter replacements.

STORMWATER TREATMENT UNIT

MAINTENANCE COMPLIANCE 2020

Heavenly Main Lodge
1504 Wildwood Ave
South Lake Tahoe, Ca.

Let it be known that on July 23rd, 2020 Three CONTECH stormwater Media Filter systems were maintained by a qualified professional at a frequency and in a manner consistent with the manufacturer's guidelines for general inspection and maintenance. All systems are operating as designed. Maintenance was completed on unit #5, #10 and #11. Recommend next inspection Spring 2021.

Therefore, based on these activities and by signed authorization below, this hereby certifies that the StormFilter Stormwater treatment systems at the above referenced location are currently performing as designed.

CERTIFICATE AUTHORIZATION

Gordon Clem
Maintenance Manager
Pacific Stormwater BMP Solutions
11/30/20

Pacific Stormwater BMP Solutions
P.O. Box 12246
Santa Rosa , Ca
(707)544-5012 office
www.pacstorm.com

Stormwater Maintenance Report 2020

Heavenly Ski Resort Main Lodge Wildwood Ave

REPORT CONTENTS

This report contains information regarding the results off the BMP(s) maintenance performed at the Heavenly Ski site.
The following information is provided for each BMP:

Maintenance Date
Maintenance Information
Weather Conditions
BMP Location
BMP Designation, Type and Configuration
Sediment, Water, and Hydrocarbon Levels if present
BMP overall Condition
BMP Components Condition
Additional Comments and Observations
Maintenance Photos
Any further recommended Action

MAINTENANCE SUMMARY

Based on the results of an inspection of BMP(s), the following action was completed:

☑ All inspected BMPs are operating within manufacturer's established specifications. Next inspection to take place Spring 2021

☐ Repairs to one or more off the inspected BMPs is required.

☑ Maintenance of one or more of the BMP systems completed. See report specifics for details.

Pacific Stormwater BMP Solutions

Stormwater Maintenance Report

PROJECT INFORMATION

Name Heavenly Main Lodge **Unit #** Wildwood

Address Wildwood Ave, South Lake Tahoe, Ca.

MAINTENANCE DETAILS - WILDWOOD AVE Unit

Field Manager Gordon Clem **System ID**

Date 07/23/20 **GPS Coordinates** Wildwood Ave

Weather Dry

SYSTEM TYPE StormFilter SF **MEDIA TYPE** ZPG

CONFIGURATION Vault **CARTRIDGE#** 27

SIZE

Sediment Depth - inlet bay N/A **Pronounced Scum Line?** Yes

Sediment Depth - Cartridge Bay 9" **Excessive Hydrocarbons?** No

Sediment Depth - Annular N/A

Water Level - Static 4"

Physical Condition of Unit: Unit appears to be in good working condition.

Field Managers Comments:

Maintenance completed and system is treating runoff as designed. Sediment and static water removed from StormFilter and CDS unit. No filter replacement needed at this time.

Maintenance Required? Yes **Repairs Required?** No

MAINTENANCE AUTHENTICITY

This hereby certifies that the information contained in this report is accurate and was obtained using accepted industry practices.

By: Gordon Clem **Company:** Pacific Stormwater Solutions

Signature: Gordon Clem **Date:** 7/23/20

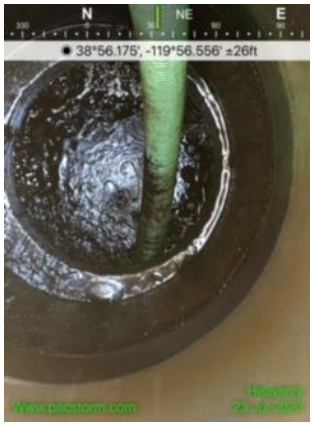
Title: Maintenance Manager

Pacific Stormwater BMP Solutions

Stormwater Maintenance Report

MAINTENANCE PHOTOS

Wildwood unit had sediment removed with no filter change.



CDS unit had sediment and static water removed.

STORMWATER TREATMENT UNIT

MAINTENANCE COMPLIANCE 2020

Heavenly Main Lodge
1504 Wildwood Ave
South Lake Tahoe, Ca.

Let it be known that on July 23rd, 2020 Wildwood CONTECH stormwater filtration system and One CDS hydrodynamic separater were maintained by a qualified professional at a frequency and in a manner consistent with the manufacturer's guidelines for general inspection and maintenance. System is operating as designed. Partial maintenance Completed as filters did not require replacement. Recommend next inspection Spring 2021.

Therefore, based on these activities and by signed authorization below, this hereby certifies that the StormFilter Stormwater treatment systems at the above referenced location are currently performing as designed.

CERTIFICATE AUTHORIZATION

Gordon Clem
Maintenance Manager
Pacific Stormwater BMP Solutions
11/30/20

Heavenly Mountain Resort—Water Year 2020

APPENDIX D

FACILITIES MAINTENANCE MONITORING REPORTS (FOURTH QUARTER)

Appendix D
FACILITIES MAINTENANCE MONITORING REPORTS (FOURTH QUARTER)

HEAVENLY SKI RESORT
DEICERS and ABRASIVES APPLICATION

(MONITORING AND REPORTING PROGRAM) BOARD ORDER NO. R6T-2015-0021
WDID 6A090033000
WASTE DISCHARGE REQUIREMENTS

DAILY LOG

MONTH/YEAR: Jul-20

LOCATION NAME: California Main Lodge

For days when Heavenly Ski Resort (discharger) applies abrasives or ice control agents on parking lots and roadways, Heavenly Personnel shall record the following daily use for weekly submittal to supervisors and monthly submittal to Frank Papandrea for input into Quarterly reporting to LRWQCB:

Location Codes:
1 H/UL – Cal Base Upper Lot
2 H/LL – Cal Base Lower Lot
3 H/W – Entrance Road (Wildwood above Saddle)
4 C/WN CSLT – Wildwood – Needle Peak
5 C/SR CSLT - Ski Run
6 C/K CSLT – Keller
7 C/S CSLT-Sherman Way
8 C/R CSLT- Regina
9 Other – **Describe**:

Material Codes
C – Cinders
NaCl- Salt
S - Sand
Other – **Describe:**
B - Brine

Date/Time	Quantity (lbs)	Location Code	Type of Material

Total Monthly APPLICATION Heavenly (lbs?)	**salt**	**sand**
	0.0	0.0
	salt	**sand**
Total Monthly APPLICATION in CSLT (lbs?)	0.0	0.0

Submit Weekly to Supervisor.

Time period covered **7/1/2020** **7/31/2020**

Ryan Smith 06/30/2020

Employee Signature/DATE

HEAVENLY SKI RESORT
DEICERS and ABARSIVES APPLICATION and RECOVERY

Monthly Summary Report

(MONITORING AND REPORTING PROGRAM) BOARD ORDER NO. R6T-2015-0021
WDID 6A090033000
WASTE DISCHARGE REQUIREMENTS

Quantity of ice control agents and abrasives used on Heavenly property and on CSLT streets. When the Dischargers apply deicers and/or abrasives on parking lots, base facilities, private roads, or City of South Lake Tahoe roads to the California Base area, the Dischargers shall keep a daily log and report a monthly summary of the following to Frank Papandrea for Quarterly reporting to LRWQCB:

Month and Year: Jul-20 **Reporter:** Ryan Smith

Location Name: Heavenly California Base and City of South Lake Tahoe Roads
Total Monthly Application: 0 lbs
Total Monthly Recovery: 0 lbs

Location of Disposal Facilities: Carson Landfill (by Tahoe Refuse)

Ryan Smith
Employee Signature

HEAVENLY SKI RESORT
DEICERS and ABRASIVES RECOVERY

(MONITORING AND REPORTING PROGRAM) BOARD ORDER NO. R6T-2015-0021
WDID 6A090033000
WASTE DISCHARGE REQUIREMENTS

DAILY LOG

MONTH/YEAR: Jul-20

LOCATION NAME: Heavenly Upper Lot (15 min, bus drop, tram)

For abrasives or ice control agents that Heavenly Ski Resort (discharger) **removed** from parking lots and roadways, Heavenly Personnel shall record the following in a daily log for weekly submittal to supervisors and monthly submittal to Frank Papandrea for input into Quarterly reporting to LRWQCB:

Location Codes:
H/UL – Cal Base Upper Lot
H/LL – Cal Base Lower Lot
H/W – Entrance Road (Wildwood above Sac
C/WN CSLT – Wildwood – Needle Peak
C/SR CSLT - Ski Run
C/K CSLT – Keller
C/S CSLT- Sherman Way
C/R CSLT - Regina
Other – **Describe**:

Material Codes
DG - Spec H Sand
NaCl - Salt
S - Sand
Other – **Describe:**

Equipment/Method Used: (first three loads fromdraingage improvement.
Mechanical Sweeper: Desert Commerical Sweeping

Date	**Type of Material**	**Quantity (lbs)**

Total Monthly RECOVERY Heavenly (lbs?) 0 Sand 0 salt

Total Monthly RECOVERY in CSLT (lbs?) 0 Sand 0 salt

Submit Monthly to Supervisor. Time period covered 7/1/2020 to 7/31/2020

Ryan Smith
Employee Signature **Supervisor Signature**

HEAVENLY SKI RESORT
CALIFORNIA PARKING LOT, LODGE and ROADS
MONITORING CHECKLIST

(MONITORING AND REPORTING PROGRAM NO.R6T-2015-0021)

Date: Jul-20 Inspector: Ryan Smith

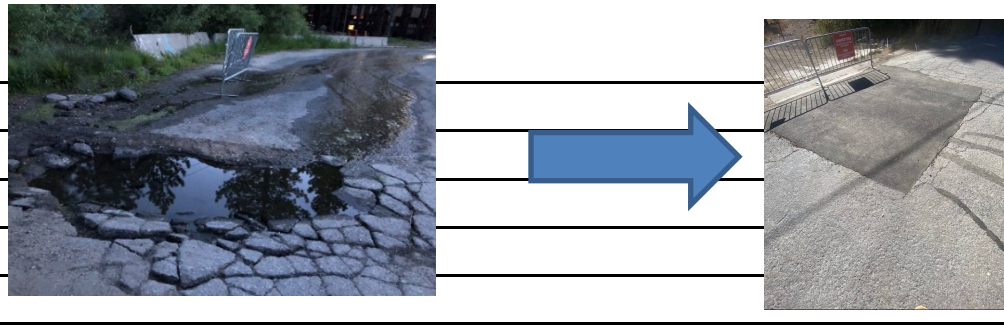
Complete the following inspection at the **CA Parking Lot, CA Base Lodge, and associated roads**, **at least once monthly** and **after significant storm events**. Turn in Checklists to Supervisor for submittal to Frank Papandrea for input into Quarterly reports to LRWQCB.

Were any of the following Observed?	Yes	No	Comments
a. Drop Inlets (CA parking Lot and Roads)			Describe Problems, Locations and Corrective Actions
1) Clogged by Debris, ice, or sediment?		X	
2) Runoff movement into the infiltration gallery?		X	
3) Damaged by vehicles or snow plow?		X	
b. Drainage Collection System (Ca Parking Lot, Roads)			Describe Problems, Locations and Corrective Actions
1) Clogged by debris, ice, or sediment?		X	
2) Movement of water through pipes, channels	X		
3) Drainage collection system damages?		X	
4) Inadequate energy dissipation?		X	
c. Sediment Traps and Vaults (CA Prkng Lot & Roads)			Describe Problem and Corrective Actions
1) sediment accumulated in each chamber of trap vaults, or galleries? If Yes, estimate depth and		X	0"
2) Traps and Vaults recently cleaned? List date of last cleaning	X		Clean Harbors DIC 07/30/2020 Pacific Stormwater Filters 07/23/2020
3) Presence of sheen, foam trash or scum?		X	
d. Erosion Control (CA parking Lot, Lodges, and Maintenance Shops)			Please Note Locations and Corrective Actions
1) Vegetation appears unhealthy?		X	
2) Gully or rill erosion on slopes?		X	
3) Sediment buildup at toes of slopes?		X	Swept sediment (did not weigh)
4) Vegetation damages by vehicles or heavy foot		X	
e. Culvert Outlet (west of Wildwood Ave)			Please Note Locations and Corrective Actions
1) Inadequate energy dissipation		x	
2) Trash or debris needs to be removed from		X	

			Please Note Locations and Corrective Actions
f. Upstream Drainage Diversion (Located on First Ride Run)			
1) Inadequate energy dissipation		X	
2) Trash or debris needs to be removed from drainage way?		X	
g. Spilled Chemicals, Paints, Fuels, Sealants, Oils,		X	
h. Sediment/Sand Buildup in CA parking Lot?		X	
i. Grease Interceptor Not Operating Properly? (CA Base Lodge)		X	

Describe any problems / activities, dates and times of problems/activities and the personnel to which problems were reported:
See attached.

Documentation of resulting actions and dates problems corrected:



Repair made July 9th, and 5,000 sf of damaged asphalt was replaced.

INSPECTION PURPOSE AND GOALS:

The purpose of the inspection is to identify actual or potential erosion and surface runoff on the project site and to identify BMP maintenance needs so that corrective measures may be immediately undertaken.

Any erosion, surface runoff problems, wastewater disposal problems, or other adverse conditions, which are found on the subject property, shall be clearly described and the corrective measures proposed by the Dischargers (Heavenly) shall be included in the quarterly monitoring report. **In the event that no such problems are found on the property, a statement certifying this condition must be included for each monthly inspection.**

PLEASE ADD ADDITIONAL INFORMATION IF NECESSARY AND ATTACH PHOTO DOCUMENTATION

CHECKLIST FOR OPERATION AND MAINTENANCE INSPECTION RECORD

Name of Area: California Base Lodge Parking Lot

Date of Inspection: 07/31/20

Name of Inpector: Ryan Smith

System/Structure Inspected: Wildwood Culvert

Structure ID or Location	Comments and Observations	Acceptable	Unacceptable	Required maintenance
Wildwood Culvert	steady water flow	X		None

HEAVENLY SKI RESORT SNOW CONDITIONING and SNOW ENHANCEMENT Water Year 2020	**(MONITORING AND REPORTING PROGRAM) BOARD ORDER NO. R6T-2015-0021 WDID 6A090033000 WASTE DISCHARGE REQUIREMENTS**	If snow-conditioning or snowmaking enhancement chemicals or other additives are used on ski slopes (including tubing runs, half-pipes, jumps, other terrain parks, and ski race areas), a **daily log** of the following information shall be kept and reported to supervisors on a **weekly** basis and to the USDA Forest Service on a **monthly** basis for input into Quarterly reporting to LRWQCB:
LOCATION: ***Heavenly Ski Resort*** Department : **Base Operations** Reporter**: Ryan Smith**	California Main Lodge	**Type of Materials Applied "traction melt "** **Approximate Acreage: 1 *ACRE)***

Date	Pounds used	ACRES
7/1/2020	0.00	0.00
7/2/2020	0.00	0.00
7/3/2020	0.00	0.00
7/4/2020	0.00	0.00
7/5/2020	0.00	0.00
7/6/2020	0.00	0.00
7/7/2020	0.00	0.00
7/8/2020	0.00	0.00
7/9/2020	0.00	0.00
7/10/2020	0.00	0.00
7/11/2020	0.00	0.00
7/12/2020	0.00	0.00
7/13/2020	0.00	0.00
7/14/2020	0.00	0.00
7/15/2020	0.00	0.00
7/16/2020	0.00	0.00
7/17/2020	0.00	0.00
7/18/2020	0.00	0.00
7/19/2020	0.00	0.00
7/20/2020	0.00	0.00
7/21/2020	0.00	0.00
7/22/2020	0.00	0.00
7/23/2020	0.00	0.00
7/24/2020	0.00	0.00
7/25/2020	0.00	0.00
7/26/2020	0.00	0.00
7/27/2020	0.00	0.00
7/28/2020	0.00	0.00
7/29/2020	0.00	0.00
7/30/2020	0.00	0.00
7/31/2020	0.00	0.00
Total	0.00	0.00

Employee sign off, **Ryan Smith**

HEAVENLY SKI RESORT
DEICERS and ABRASIVES APPLICATION

(MONITORING AND REPORTING PROGRAM) BOARD ORDER NO. R6T-2015-0021
WDID 6A090033000
WASTE DISCHARGE REQUIREMENTS

DAILY LOG

MONTH/YEAR: Aug-20

LOCATION NAME: California Main Lodge

For days when Heavenly Ski Resort (discharger) applies abrasives or ice control agents on parking lots and roadways, Heavenly Personnel shall record the following daily use for weekly submittal to supervisors and monthly submittal to Frank Papandrea for input into Quarterly reporting to LRWQCB:

Location Codes:
1 H/UL – Cal Base Upper Lot
2 H/LL – Cal Base Lower Lot
3 H/W – Entrance Road (Wildwood above Saddle)
4 C/WN CSLT – Wildwood – Needle Peak
5 C/SR CSLT - Ski Run
6 C/K CSLT – Keller
7 C/S CSLT-Sherman Way
8 C/R CSLT- Regina
9 Other – **Describe**:

Material Codes
C – Cinders
NaCl- Salt
S - Sand
Other – **Describe:**
B - Brine

Date/Time	Quantity (lbs)	Location Code	Type of Material

Total Monthly APPLICATION Heavenly (lbs?)	**salt**	**sand**
	0.0	0.0
	salt	**sand**
Total Monthly APPLICATION in CSLT (lbs?)	0.0	0.0

Submit Weekly to Supervisor.

Time period covered **8/1/2020** **8/31/2020**

Ryan Smith 06/30/2020

Employee Signature/DATE

HEAVENLY SKI RESORT
DEICERS and ABARSIVES APPLICATION and RECOVERY

Monthly Summary Report

(MONITORING AND REPORTING PROGRAM) BOARD ORDER NO. R6T-2015-0021
WDID 6A090033000
WASTE DISCHARGE REQUIREMENTS

Quantity of ice control agents and abrasives used on Heavenly property and on CSLT streets. When the Dischargers apply deicers and/or abrasives on parking lots, base facilities, private roads, or City of South Lake Tahoe roads to the California Base area, the Dischargers shall keep a daily log and report a monthly summary of the following to Frank Papandrea for Quarterly reporting to LRWQCB:

Month and Year: Aug-20 **Reporter:** Ryan Smith

Location Name: Heavenly California Base and City of South Lake Tahoe Roads
Total Monthly Application: 0 lbs
Total Monthly Recovery: 0 lbs

Location of Disposal Facilities: Carson Landfill (by Tahoe Refuse)

Ryan Smith
Employee Signature

HEAVENLY SKI RESORT
DEICERS and ABRASIVES RECOVERY

(MONITORING AND REPORTING PROGRAM) BOARD ORDER NO. R6T-2015-0021
WDID 6A090033000
WASTE DISCHARGE REQUIREMENTS

DAILY LOG

MONTH/YEAR: Aug-20

LOCATION NAME: Heavenly Upper Lot (15 min, bus drop, tram)

For abrasives or ice control agents that Heavenly Ski Resort (discharger) **removed** from parking lots and roadways, Heavenly Personnel shall record the following in a daily log for weekly submittal to supervisors and monthly submittal to Frank Papandrea for input into Quarterly reporting to LRWQCB:

Location Codes:
H/UL – Cal Base Upper Lot
H/LL – Cal Base Lower Lot
H/W – Entrance Road (Wildwood above Sac
C/WN CSLT – Wildwood – Needle Peak
C/SR CSLT - Ski Run
C/K CSLT – Keller
C/S CSLT- Sherman Way
C/R CSLT - Regina
Other – **Describe**:

Material Codes
DG - Spec H Sand
NaCl - Salt
S - Sand
Other – **Describe:**

Equipment/Method Used: (first three loads fromdraingage improvement.
Mechanical Sweeper: Desert Commerical Sweeping

Date	**Type of Material**	**Quantity (lbs)**

Total Monthly RECOVERY Heavenly (lbs?) 0 Sand 0 salt

Total Monthly RECOVERY in CSLT (lbs?) 0 Sand 0 salt

Submit Monthly to Supervisor. Time period covered 8/1/2020 to 8/31/2020

Ryan Smith
Employee Signature **Supervisor Signature**

HEAVENLY SKI RESORT
CALIFORNIA PARKING LOT, LODGE and ROADS
MONITORING CHECKLIST

(MONITORING AND REPORTING PROGRAM NO.R6T-2015-0021)

Date: Aug-20 Inspector: Ryan Smith

Complete the following inspection at the **CA Parking Lot, CA Base Lodge, and associated roads**, **at least once monthly** and **after significant storm events**. Turn in Checklists to Supervisor for submittal to Frank Papandrea for input into Quarterly reports to LRWQCB.

Were any of the following Observed?	Yes	No	Comments
a. Drop Inlets (CA parking Lot and Roads)			Describe Problems, Locations and Corrective Actions
1) Clogged by Debris, ice, or sediment?		X	
2) Runoff movement into the infiltration gallery?		X	
3) Damaged by vehicles or snow plow?		X	
b. Drainage Collection System (Ca Parking Lot, Roads)			Describe Problems, Locations and Corrective Actions
1) Clogged by debris, ice, or sediment?		X	
2) Movement of water through pipes, channels	X		
3) Drainage collection system damages?		X	
4) Inadequate energy dissipation?		X	
c. Sediment Traps and Vaults (CA Prkng Lot & Roads)			Describe Problem and Corrective Actions
1) sediment accumulated in each chamber of trap vaults, or galleries? If Yes, estimate depth and		X	0"
2) Traps and Vaults recently cleaned? List date of last cleaning	X		Clean Harbors DIC 07/30/2020 Pacific Stormwater Filters 07/23/2020
3) Presence of sheen, foam trash or scum?		X	
d. Erosion Control (CA parking Lot, Lodges, and Maintenance Shops)			Please Note Locations and Corrective Actions
1) Vegetation appears unhealthy?		X	
2) Gully or rill erosion on slopes?		X	
3) Sediment buildup at toes of slopes?		X	
4) Vegetation damages by vehicles or heavy foot		X	
e. Culvert Outlet (west of Wildwood Ave)			Please Note Locations and Corrective Actions
1) Inadequate energy dissipation		x	
2) Trash or debris needs to be removed from		X	

f. Upstream Drainage Diversion (Located on First Ride Run)			Please Note Locations and Corrective Actions
1) Inadequate energy dissipation		X	
2) Trash or debris needs to be removed from drainage way?		X	
g. Spilled Chemicals, Paints, Fuels, Sealants, Oils,		X	
h. Sediment/Sand Buildup in CA parking Lot?		X	
i. Grease Interceptor Not Operating Properly? (CA Base Lodge)		X	

Describe any problems / activities, dates and times of problems/activities and the personnel to which problems were reported:
See attached.

Documentation of resulting actions and dates problems corrected:

INSPECTION PURPOSE AND GOALS:

The purpose of the inspection is to identify actual or potential erosion and surface runoff on the project site and to identify BMP maintenance needs so that corrective measures may be immediately undertaken.

Any erosion, surface runoff problems, wastewater disposal problems, or other adverse conditions, which are found on the subject property, shall be clearly described and the corrective measures proposed by the Dischargers (Heavenly) shall be included in the quarterly monitoring report. **In the event that no such problems are found on the property, a statement certifying this condition must be included for each monthly inspection.**

PLEASE ADD ADDITIONAL INFORMATION IF NECESSARY AND ATTACH PHOTO DOCUMENTATION

CHECKLIST FOR OPERATION AND MAINTENANCE INSPECTION RECORD

Name of Area: California Base Lodge Parking Lot

Date of Inspection: 08/31/20

Name of Inpector: Ryan Smith

System/Structure Inspected: Wildwood Culvert

Structure ID or Location	Comments and Observations	Acceptable	Unacceptable	Required maintenance
Wildwood Culvert	steady water flow	X		N/A

HEAVENLY SKI RESORT SNOW CONDITIONING and SNOW ENHANCEMENT Water Year 2020	**(MONITORING AND REPORTING PROGRAM) BOARD ORDER NO. R6T-2015-0021 WDID 6A090033000 WASTE DISCHARGE REQUIREMENTS**	If snow-conditioning or snowmaking enhancement chemicals or other additives are used on ski slopes (including tubing runs, half-pipes, jumps, other terrain parks, and ski race areas), a **daily log** of the following information shall be kept and reported to supervisors on a **weekly** basis and to the USDA Forest Service on a **monthly** basis for input into Quarterly reporting to LRWQCB:
LOCATION: ***Heavenly Ski Resort*** Department : **Base Operations** Reporter**: Ryan Smith**	California Main Lodge	**Type of Materials Applied "traction melt "** **Approximate Acreage: 1 *ACRE)***

Date	Pounds used	ACRES
8/1/2020	0.00	0.00
8/2/2020	0.00	0.00
8/3/2020	0.00	0.00
8/4/2020	0.00	0.00
8/5/2020	0.00	0.00
8/6/2020	0.00	0.00
8/7/2020	0.00	0.00
8/8/2020	0.00	0.00
8/9/2020	0.00	0.00
8/10/2020	0.00	0.00
8/11/2020	0.00	0.00
8/12/2020	0.00	0.00
8/13/2020	0.00	0.00
8/14/2020	0.00	0.00
8/15/2020	0.00	0.00
8/16/2020	0.00	0.00
8/17/2020	0.00	0.00
8/18/2020	0.00	0.00
8/19/2020	0.00	0.00
8/20/2020	0.00	0.00
8/21/2020	0.00	0.00
8/22/2020	0.00	0.00
8/23/2020	0.00	0.00
8/24/2020	0.00	0.00
8/25/2020	0.00	0.00
8/26/2020	0.00	0.00
8/27/2020	0.00	0.00
8/28/2020	0.00	0.00
8/29/2020	0.00	0.00
8/30/2020	0.00	0.00
8/31/2020	0.00	0.00
Total	0.00	0.00

Employee sign off, **Ryan Smith**

HEAVENLY SKI RESORT
DEICERS and ABRASIVES APPLICATION

(MONITORING AND REPORTING PROGRAM) BOARD ORDER NO. R6T-2015-0021
WDID 6A090033000
WASTE DISCHARGE REQUIREMENTS

DAILY LOG

MONTH/YEAR: Sep-20

LOCATION NAME: California Main Lodge

For days when Heavenly Ski Resort (discharger) applies abrasives or ice control agents on parking lots and roadways, Heavenly Personnel shall record the following daily use for weekly submittal to supervisors and monthly submittal to Frank Papandrea for input into Quarterly reporting to LRWQCB:

Location Codes:
1 H/UL – Cal Base Upper Lot
2 H/LL – Cal Base Lower Lot
3 H/W – Entrance Road (Wildwood above Saddle)
4 C/WN CSLT – Wildwood – Needle Peak
5 C/SR CSLT - Ski Run
6 C/K CSLT – Keller
7 C/S CSLT-Sherman Way
8 C/R CSLT- Regina
9 Other – **Describe**:

Material Codes
C – Cinders
NaCl- Salt
S - Sand
Other – **Describe:**
B - Brine

Date/Time	Quantity (lbs)	Location Code	Type of Material

Total Monthly APPLICATION Heavenly (lbs?)	**salt**	**sand**
	0.0	0.0
	salt	**sand**
Total Monthly APPLICATION in CSLT (lbs?)	0.0	0.0

Submit Weekly to Supervisor.

Time period covered **9/1/2020** **9/30/2020**

Ryan Smith 06/30/2020

Employee Signature/DATE

HEAVENLY SKI RESORT
DEICERS and ABARSIVES APPLICATION and RECOVERY

Monthly Summary Report

(MONITORING AND REPORTING PROGRAM) BOARD ORDER NO. R6T-2015-0021
WDID 6A090033000
WASTE DISCHARGE REQUIREMENTS

Quantity of ice control agents and abrasives used on Heavenly property and on CSLT streets. When the Dischargers apply deicers and/or abrasives on parking lots, base facilities, private roads, or City of South Lake Tahoe roads to the California Base area, the Dischargers shall keep a daily log and report a monthly summary of the following to Frank Papandrea for Quarterly reporting to LRWQCB:

Month and Year: Sep-20 **Reporter:** Ryan Smith

Location Name: Heavenly California Base and City of South Lake Tahoe Roads
Total Monthly Application: 0 lbs
Total Monthly Recovery: 0 lbs

Location of Disposal Facilities: Carson Landfill (by Tahoe Refuse)

Ryan Smith
Employee Signature

HEAVENLY SKI RESORT
DEICERS and ABRASIVES RECOVERY

(MONITORING AND REPORTING PROGRAM) BOARD ORDER NO. R6T-2015-0021
WDID 6A090033000
WASTE DISCHARGE REQUIREMENTS

DAILY LOG

MONTH/YEAR: Sep-20

LOCATION NAME: Heavenly Upper Lot (15 min, bus drop, tram)

For abrasives or ice control agents that Heavenly Ski Resort (discharger) **removed** from parking lots and roadways, Heavenly Personnel shall record the following in a daily log for weekly submittal to supervisors and monthly submittal to Frank Papandrea for input into Quarterly reporting to LRWQCB:

Location Codes:
H/UL – Cal Base Upper Lot
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C/SR CSLT - Ski Run
C/K CSLT – Keller
C/S CSLT- Sherman Way
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Other – **Describe**:

Material Codes
DG - Spec H Sand
NaCl - Salt
S - Sand
Other – **Describe:**

Equipment/Method Used: (first three loads fromdraingage improvement.
Mechanical Sweeper: Desert Commerical Sweeping

Date	**Type of Material**	**Quantity (lbs)**

Total Monthly RECOVERY Heavenly (lbs?) 0 Sand 0 salt

Total Monthly RECOVERY in CSLT (lbs?) 0 Sand 0 salt

Submit Monthly to Supervisor. Time period covered 9/1/2020 to 9/30/2020

Ryan Smith
Employee Signature **Supervisor Signature**

HEAVENLY SKI RESORT
CALIFORNIA PARKING LOT, LODGE and ROADS
MONITORING CHECKLIST

(MONITORING AND REPORTING PROGRAM NO.R6T-2015-0021)

Date: Sep-20 Inspector: Ryan Smith

Complete the following inspection at the **CA Parking Lot, CA Base Lodge, and associated roads**, **at least once monthly** and **after significant storm events**. Turn in Checklists to Supervisor for submittal to Frank Papandrea for input into Quarterly reports to LRWQCB.

Were any of the following Observed?	Yes	No	Comments
a. Drop Inlets (CA parking Lot and Roads)			Describe Problems, Locations and Corrective Actions
1) Clogged by Debris, ice, or sediment?		X	
2) Runoff movement into the infiltration gallery?		X	
3) Damaged by vehicles or snow plow?		X	
b. Drainage Collection System (Ca Parking Lot, Roads)			Describe Problems, Locations and Corrective Actions
1) Clogged by debris, ice, or sediment?		X	
2) Movement of water through pipes, channels	X		
3) Drainage collection system damages?		X	
4) Inadequate energy dissipation?		X	
c. Sediment Traps and Vaults (CA Prkng Lot & Roads)			Describe Problem and Corrective Actions
1) sediment accumulated in each chamber of trap vaults, or galleries? If Yes, estimate depth and		X	0"
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3) Presence of sheen, foam trash or scum?		X	
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3) Sediment buildup at toes of slopes?		X	
4) Vegetation damages by vehicles or heavy foot		X	
e. Culvert Outlet (west of Wildwood Ave)			Please Note Locations and Corrective Actions
1) Inadequate energy dissipation		x	
2) Trash or debris needs to be removed from		X	

f. Upstream Drainage Diversion (Located on First Ride Run)			Please Note Locations and Corrective Actions
1) Inadequate energy dissipation		X	
2) Trash or debris needs to be removed from drainage way?		X	
g. Spilled Chemicals, Paints, Fuels, Sealants, Oils,		X	
h. Sediment/Sand Buildup in CA parking Lot?		X	
i. Grease Interceptor Not Operating Properly? (CA Base Lodge)		X	

Describe any problems / activities, dates and times of problems/activities and the personnel to which problems were reported:
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Documentation of resulting actions and dates problems corrected:

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CHECKLIST FOR OPERATION AND MAINTENANCE INSPECTION RECORD

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Date of Inspection: 09/30/20

Name of Inpector: Ryan Smith

System/Structure Inspected: Wildwood Culvert

Structure ID or Location	Comments and Observations	Acceptable	Unacceptable	Required maintenance
Wildwood Culvert	steady water flow	X		N/A

HEAVENLY SKI RESORT SNOW CONDITIONING and SNOW ENHANCEMENT Water Year 2020	**(MONITORING AND REPORTING PROGRAM) BOARD ORDER NO. R6T-2015-0021 WDID 6A090033000 WASTE DISCHARGE REQUIREMENTS**	If snow-conditioning or snowmaking enhancement chemicals or other additives are used on ski slopes (including tubing runs, half-pipes, jumps, other terrain parks, and ski race areas), a **daily log** of the following information shall be kept and reported to supervisors on a **weekly** basis and to the USDA Forest Service on a **monthly** basis for input into Quarterly reporting to LRWQCB:
LOCATION: ***Heavenly Ski Resort*** Department : **Base Operations** Reporter**: Ryan Smith**	California Main Lodge	**Type of Materials Applied "traction melt "** **Approximate Acreage: 1 *ACRE)***

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9/3/2020	0.00	0.00
9/4/2020	0.00	0.00
9/5/2020	0.00	0.00
9/6/2020	0.00	0.00
9/7/2020	0.00	0.00
9/8/2020	0.00	0.00
9/9/2020	0.00	0.00
9/10/2020	0.00	0.00
9/11/2020	0.00	0.00
9/12/2020	0.00	0.00
9/13/2020	0.00	0.00
9/14/2020	0.00	0.00
9/15/2020	0.00	0.00
9/16/2020	0.00	0.00
9/17/2020	0.00	0.00
9/18/2020	0.00	0.00
9/19/2020	0.00	0.00
9/20/2020	0.00	0.00
9/21/2020	0.00	0.00
9/22/2020	0.00	0.00
9/23/2020	0.00	0.00
9/24/2020	0.00	0.00
9/25/2020	0.00	0.00
9/26/2020	0.00	0.00
9/27/2020	0.00	0.00
9/28/2020	0.00	0.00
9/29/2020	0.00	0.00
9/30/2020	0.00	0.00
10/1/2020	0.00	0.00
Total	0.00	0.00

Employee sign off, **Ryan Smith**

Heavenly Mountain Resort—Water Year 2020

APPENDIX E

2020 ROADS MONITORING

Appendix E
2020 ROADS MONITORING

E.1 2020 Road Report Transmission to LTBMU

E.2 Heavenly Road Maintenance Table 2020

E.3 Heavenly Road Maintenance Map

From: Frank Papandrea
To: Michelle Hochrein
Cc: Chris Donley
Subject: FW: Heavenly 2020 Roads Maintenance Report
Date: Monday, November 16, 2020 12:03:22 PM
Attachments: 2020 Heavenly Roads Maintenance Report.xlsx
Heavenly Forest Service Roads.pdf
Heavenly Road Summary January 2015.pdf

Michelle-

I am still working on the Mountain Money Tickets with Blair, for creek sampling. I don't have any answers yet. I also left Pac Storm a message on the maintenance report for 2020, as they did not perform an annual inspection on the vaults this spring/summer due to COVID-19.

I will get the Erosion and facilities report over to you as well. That is complete, I just need to get the photo report put together and completed.

Thanks, FP

From: Frank Papandrea
Sent: Sunday, October 11, 2020 10:28 PM
To: Gabor, Michael -FS <mgabor@fs.fed.us>
Cc: Bryan Hickman <BHickman@vailresorts.com>; James Grant <jgrant@vailresorts.com>; Chris Donley <Chris.Donley@cardno.com>
Subject: Heavenly 2020 Roads Maintenance Report

Mike-

1.2 miles of USFS Roads were improved in the Upper CA Area in 2020. The area between CA Dam and Upper Ridge Run had heavy maintenance work going in Aug./Sept due to the Cal Dam Sediment Removal Project. Maintenance crews completed maintenance prior to the Cal Cam project to get them in good shape for the heavy traffic and continued maintenance both during and after the project. In summary over 4,000 Cubic Yards of Sediment from CA Dam Reservoir, was relocated to Upper Ridge Run area. This Upper "Promenade" area of Ridge Run has been restored and winterized. If you would like to see any pictures or need anything else just let us know. We completed the majority of our roads work by September 30th, 2020. Mother nature went easy on us this summer!

Included is the Maintenance Report Tracker, and a few reference maps of the HV USFS Roads network.

Thanks,

Frank G. Papandrea
Environmental Compliance Lead - Lake Tahoe Region
Heavenly | Northstar | Kirkwood

Vail Resorts, Inc.
PO Box 2180 Stateline, NV 89449
Cell: 530-314-9173

The information contained in this message is confidential and intended only for the use of the individual or entity named above, and may be privileged. Any unauthorized review, use, disclosure, or distribution is prohibited. If you are not the intended recipient, please reply to the sender immediately, stating that you have received the message in error, then please delete this e-mail. Thank you.

HEAVENLY 2020 ROAD MAINTENANCE TRACKING

Table 1-1 2020 Heavenly Road Maintenance Tracking

Road Section Name	Forest Service Road #	Distance (Miles)	Description of Work
Nevada			
NV Gate to Titos Corner	13N53B	0.1	Water bar maintenance and road base spot application where needed
Titos	13N53.5	0.2	Water bar maintenance and road base spot application where needed
Chute to Midway Switchbacks	13N53	0.4	Water bar maintenance and road base spot application where needed
Titos to base of NB	13N53C	0.3	Inspect, conduct minor maintenance - no road base needed
Stage switchbacks	13N53	0.6	Water bar maintenance and road base spot application where needed
NV Trail Stage to EP	13N53	0.8	Water bar maintenance and road base spot application where needed
Pepis/Comet to base EP to top NB	13N54	0.5	Water bar maintenance and road base spot application where needed
T7 Road	13N54	0.2	Inspect, conduct minor maintenance - no road base needed
Steve's & Crossover	13N54	0.9	Inspect, conduct minor maintenance - no road base needed
Power Station Road	13N53A	0.4	Inspect - remove fallen tree
Galaxy	13N53E.1	1.2	Water bar maintenance and road base/drain rock spot application where needed
Orion's	13N52B	0.6	Water bar maintenance and road base spot application where needed
Top of Dipper Road	13N52F	0.2	Water bar maintenance and road base application
Total in NV		**6.4**	
California			
Groove RD to Upper Shop	12N41	0.6	Water bar maintenance, sediment pond cleanout and road base spot application where needed
Maggies- Creek to Cal Dam	12N40	0.9	Water bar maintenance, sediment pond cleanout and road base spot application where needed
Cal Dam to Sky Deck	12N40	0.3	Inspect, conduct minor maintenance - no road base needed
Hellwinkle's	12N40	0.4	Apply BMPs, road base, compaction and water
LCT to VS/TOG	12N40	1.4	Water bar maintenance and road base spot application where needed
TOG Tam to Coaster	12N40.5	0.2	Compaction of walking trails. Installed water bar at tube hill
Upper CA- Ridge	13N52	1.2	Water bar maintenance, conduct grade work and apply road base
Upper CA Switchbacks	13N52i	0.33	Apply BMPS, conduct grade work and compact (Woods Trail to Upper Ridge Run)

Roundabout			
Top WC-Pistol	12N40	0.7	Water bar maintenance and road base spot application where needed
Pistol-Cut	12N40	1.1	Water bar maintenance and road base spot application where needed
Cut-Creek	12N40	0.5	Water bar maintenance and road base spot application where needed, V-ditch cleanout
Total in CA		**7.63**	
Total Roads Improved/Maintained		**14.03**	

Table 2-1 2020 Heavenly Road Maintenance Level Tracking

Reporting Category	Maintenance Level (1-5) in miles*				
	ML-1	ML-2	ML-3	ML-4	ML-5
Roads Improved	0	0	0	1.2	0
Roads Maintained	0	0	0	12.83	0
Roads Decommissioned	0	0	0	0	0
Totals	**0**	**0**	**0**	**14.03**	**0**

* Notes:

Roads Improved: Unless rerouted, changed the surface type, or opened a closed road.

Roads maintained: Drainage improvements, blading, ditch cleaning, culvert replacement, etc.

Roads decommissioned: Any road, managed or not, decommissioned.

ML-1 are roads closed or in long term storage until they are upgraded to ML-2 roads.

USFS and Heavenly Designated Roads

Legend

- Heavenly_Roads_20150106
- Roads
- Lifts

13N52.9
13N52.8
13N52H
13N52I
13N52.7
13N52.6
Sky Express
12N40E
12N40C
12N40.3
12N40B
12N40D
12N40.5
12N40
12N41A
12N41
12N41B
12N41.1
Pioneer
12N40.2B
12N40.1
Aerial Tramway
12N40A
Carpet
13N52F
13N52.10
13N52D
Tamarack Express
12N40F
Dipper Express
Comet Express
Big Easy
Red Fir
Mott Canyon
13N52B
13N52A
13N53E
13N52
13N54.1
13N54.2A
13N54.2
Galaxy
13N53E.1
13N53E.1A
13N53
13N54
13N54A
Olympic Express
Gondola
Stagecoach Express
13N53D
North Bowl
13N53.6
13N53.5
13N53C
13N53A
13N53B
Boulder
Carpet

Sources: Esri, DeLorme, NAVTEQ, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL,

Heavenly Mountain Resort—Water Year 2020

APPENDIX F

FACILITIES WATERSHED AWARENESS TRAINING

Appendix F
FACILITIES WATERSHED AWARENESS TRAINING

F.1 June 2020 BMP Breakfast Workshop Sign-In Sheets

F.2 June 2020 BMP Breakfast Workshop Presentation

TOPICS:
- OVERVIEW/AGENCY PARTNERS
- RAW SHUTDOWN PROCEDURES
- TAHOE DRAGA

2020 Watershed Awareness and Facitilies Training Log
Heavenly Operations Staff

Topic: Heavenly BMP's - Facilities and watershed awareness

Date: 6/29/20

The following participants have attended the listed training topic and understand the informa

Participant	Department
Bryan Hickman	MO
Billy Clark	SM
Kyle Ferguson	SM
Jen Menzel	SM
Dave Hager	SM
Jen Kiriwitani	BO
Joel Baker	Lifts
Ian Clark	SM
Will Cam	LO
Kip McCarthy	H&S
Sean Hutchinson	LO
Pat Hogan	LO
Don Abicht	LM
Ryan Smith	BO
Nigel Ayer	APM
Richard Scott	APM
John Lanouette	APM
Tim McCall	APM
Matt Entrup	APM
Matt Lighthart	APM
Dustin	LM
Lupe Barrientos	Trails
Dana Paugh	AP
Rich McAdam	LM

2020 Watershed Awareness and Facitilies Training Log
Heavenly Operations Staff

Topic: Heavenly BMP's - Facilities and watershed awareness

Date: 10/29/20

The following participants have attended the listed training topic and understand the informa

Participant	Department
Kevin Hella	Trails
Neal Punsal	BM
Chris	BM
Katie Alverd	Sign Shop
Dave Bemmer	BM
John Tarney	trails
Roger Tavares	VM
Chris Hansen	trails
Marc Bugg	VM
Eric Bates	VM
Colton Terry	Patrol
Chanel Walker	H:S
Frank Papandrea	Env.
Curtis Veach	LM
Kevin Higgins	LM
Will Baltenberg	Uniform/BO
Ryan Smith	BO
James Grant	MO
Jim	Lower Shop
Gordon	BM
Tom Negueri	Security
Ryan	LM
Dan Schembri	BM
Graeme Grover	LM

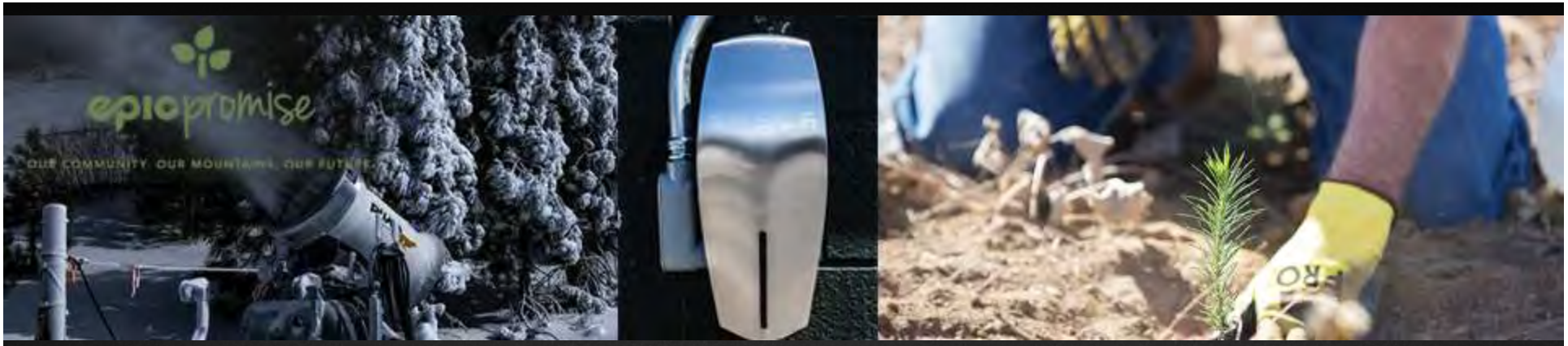
2020 Watershed Awareness and Facitilies Training Log
Heavenly Operations Staff

Topic: Heavenly BMP's - Facilities and watershed awareness

Date: 6/29/20

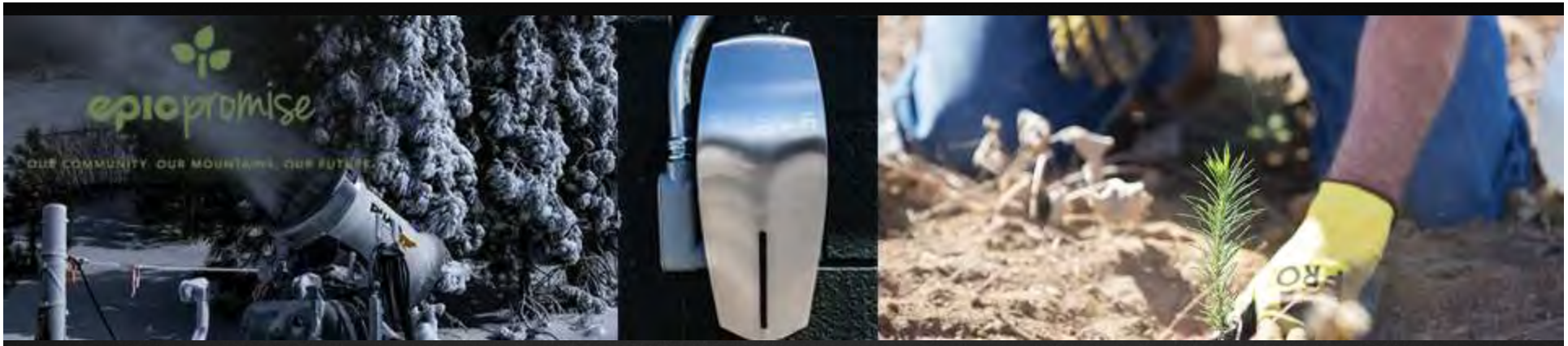
The following participants have attended the listed training topic and understand the informa

Participant	Department
Dean Slater	BM
Andy Nak	IT Trails
Steve Cline	LM
Kyle Nelson	LM
Corey Fitzgerald	LM
Jeff Reid	BM
Matt	LM
Andre Villaret	BM
Damian	LM
Ben Sheets	LM
Chris Williams	



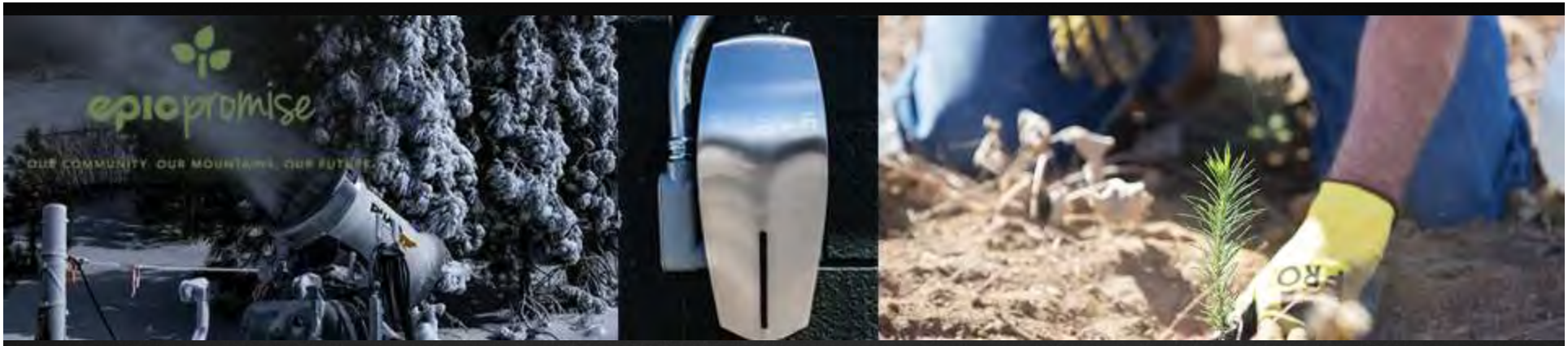
2020 BMP's, Facilities & Watershed Awareness Training

Heavenly Operations Staff



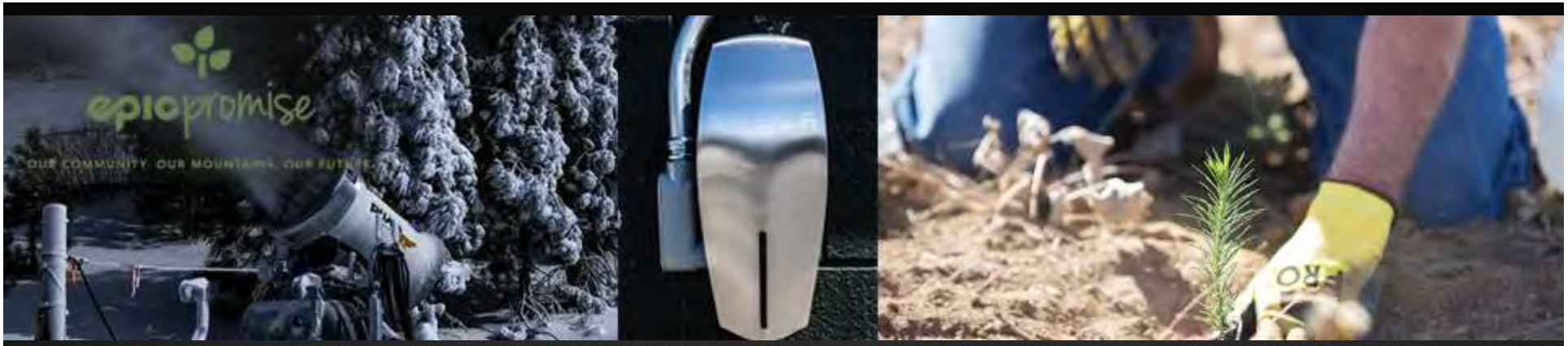
Purpose/Agenda

- Review Heavenly's Watershed Protection Commitment, BMP's & Your Role
- Review the Summer Rules of the Road
- Provide Awareness & understanding
- What to due when weather Is expected
- Operating and disturbance in the Tahoe Basin



Our Commitment

- USDA Forest Service: Our partner in outdoor recreation & resource management
- Tahoe Regional Planning Agency: The Master Plan, Mitigation & Monitoring, Project Permit Conditions
- State of California Regional Water Quality Control Board, Lahontan Region: Waste Discharge Requirements (WDRs) & SWPPP's/Stormwater Requirements.
- NDEP (Nevada Department of Env. Protection) Stormwater requirements



Agency Partners

- TRPA-Taylor Currier (BMP's, code enforcement) and Julie Roll (Senior Planner)
- Lahontan- Dale Payne (Env. Scientist) &
- Liz vanDiepen (Engineering Geologist) Consultant- Jill Sutherland (BMP's 3rd Party Inspectors, w/ RCI)
- LTBMU – Stephanie Heller, Hydrologist US Forest Service


Erosion Control & BMP's

- Hellwinkel's Steeps Road Maintenance, now able to water steeper sections of road with new watering truck. 5MPH, 4WD Low Required
- Snowmaking Projects

Water Bars/Stabilization & Drainage Improvements, Cal Dam Maintenance.

- Maintain effectiveness of ski run BMP's, including maintaining water bars, Culverts and re-vegetation/cover.
- Roads Maintenance and Dust Control

Hellwinkel's - Low & Slow!

Handgrenade Restoration 2017-

Hand Grenade Restoration 2017 VS. 2019

Major Erosion/Rilling:

Restoration Work at Heavenly:

Wattles & Coir Logs

Straw wattle with silt fence

Pine Needle Wattle

Tahoe Draba - Sensitive Plant

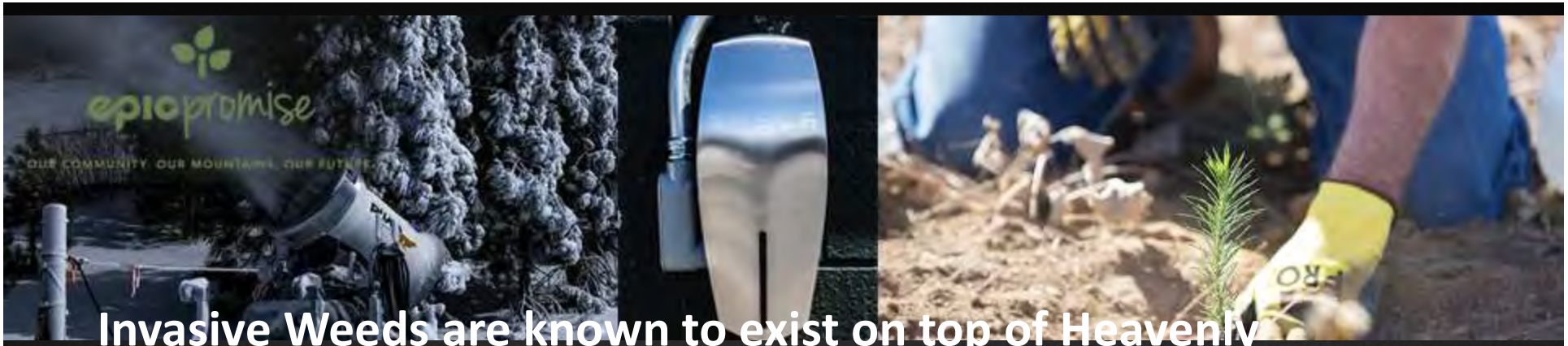
Interpretive Signage at Top of Tamarack Express

Photo of a plant from Heavenly

Protect Tahoe Draba Populations – Do Not Disturb

Full grown plants-Mostly grow above 9,000 Ft. Elevation

Draba like to grow in disturbed areas, & under drip lines of rocks



Invasive Weeds are known to exist on top of Heavenly Mountain. Siting and treatments by the USFS continue annually and Most are now eradicated. 3 remaining treatment sites.

Tall Whitetop Identification: Tall whitetop (also called perennial pepperweed) has many stems. It reproduces from rhizomes (root-like under-ground stems) and from seed. In Truckee, this species is common in many of the round-abouts, as well as, low, wet areas.

Tall Whitetop showing root connection

Tall Whitetop in flower

Bull Thistle

Bull Thistle flower

Canada Thistle

Canada Thistle flowers are smaller than most other thistle flowers

Pine Needle Wattles

Manufacturing by trails crew began in 2013! Now in Year 8

On mountain use for erosion control, and roads materials stockpiles.

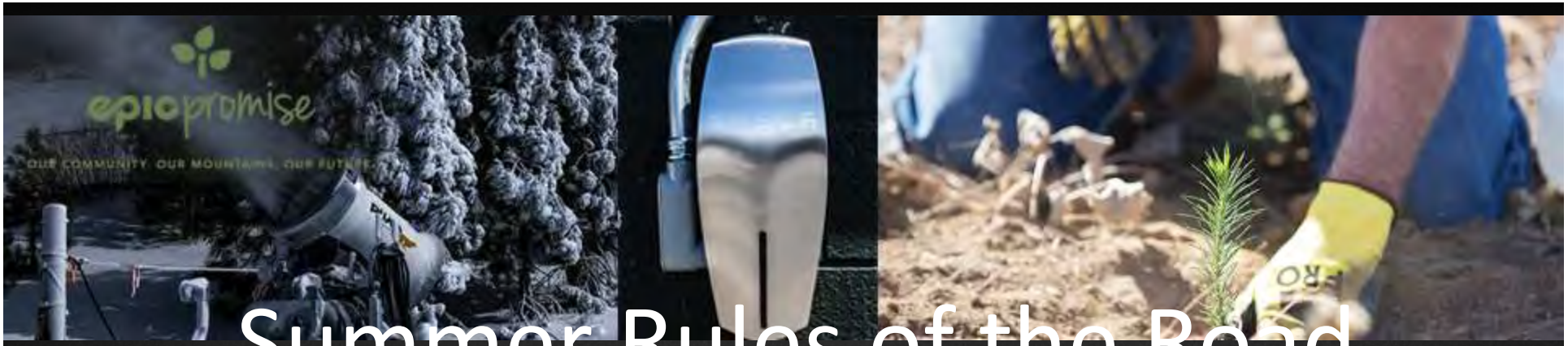

Important takeaways for you to ponder, with regard to BMP's:

- Is it working? (rather than "are we in trouble?")
- Source control – we're trying to stop the "bleeding" at the source rather than chasing it downstream.
- Water flow – its all connected, "Think like a water droplet." Look uphill of problem areas to determine if there is a root cause of the erosion issue…
- Heavenly Prioritization – address the highest risk spot first (e/g/ nearest to creek, most erosive, problem spots)
- Keeping Turbid Stormwater out of the water ways


Be especially aware during Thunderstorm activity and listen to weather updates from Central Dispatch on Radio. Contact dispatch if you hear thunder. Shut downs may impacts operations, work sites, and the mountain might be shelter in place.

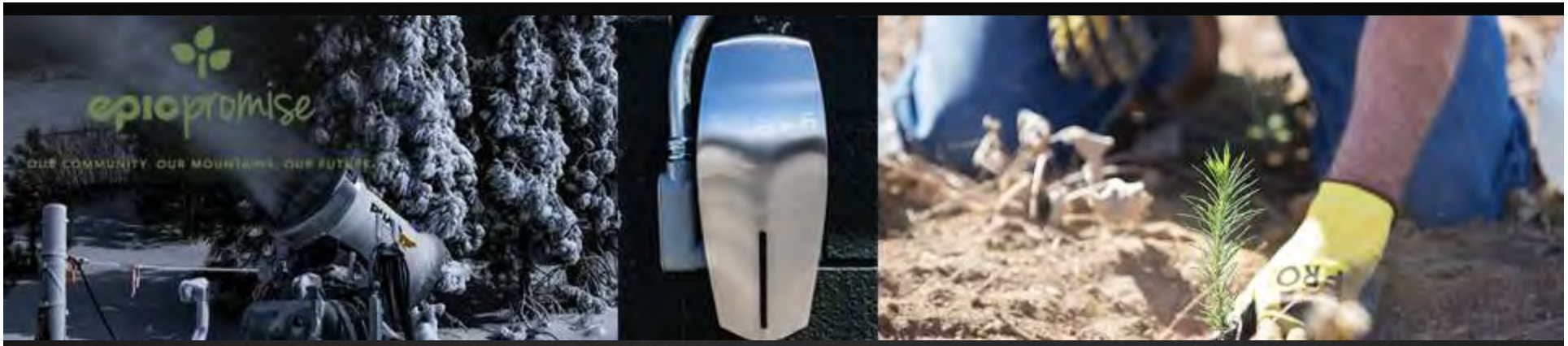
Major weather “Events” can cause environmental damage

If you see damage occurring Call Dispatch. 530-542-6900 Take a picture if possible.



Summer Rules of the Road

- Drive on Designated Roads only, DO NOT Park on Vegetation
- Park only in Designated Parking Areas
- If you see someone not complying, tell your supervisor
- Just because you drive an ATV/Rhino does not mean you can drive, onto a ski slope or down a decommissioned road or Ski Trail. This will create unnecessary disturbance and erosion.
- When accessing the mountain all vehicles MUST be in 4WD to prevent erosion on the roads, and stay at or below 20 mph. Be especially aware of Fugitive Dust.
- All Vehicles must call 530-542-6900 upon entering and exiting through a mountain gates.



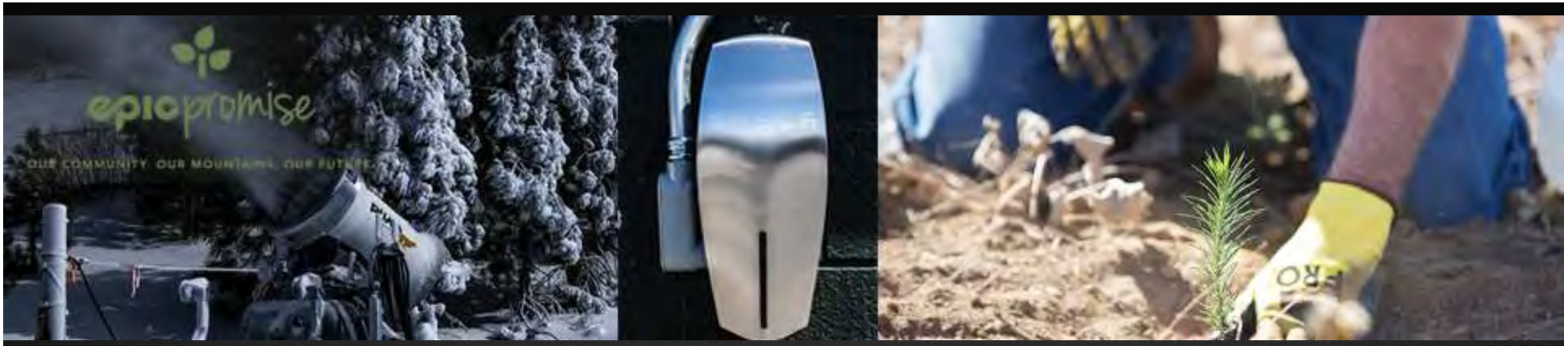
More Summer Rules of the Road

- Stay out of erosion control project areas
- Report anything that looks like an obvious erosion, Water Quality, or sediment problem to your supervisor.
- All outside contractors and vendors must have a Mountain Access Permit issued by the Central Dispatch Dept., except utilities.
- Prior to accessing the mountain roads anyone from outside of the Tahoe Basin will need to spray the bottom of their vehicle to prevent the spread of invasive weeds. Heavenly may require proof.
- If you don’t see a mountain access permit, stop them & ask to see their permit. If you see Utility trucks Like SW Gas or Liberty, ask them if they need any guidance or direction.

Steve's Road - Von Schmitt’s


Summer Rules of the Road

- **Park in Designated Areas only**
- **Stay within footprint of road.**
- **Never Park on Vegetation, don't Idle!**
- **Never pull down ropes unless you have permission from Heavenly Mt. Ops.**
- **Keep speeds to a minimum to reduce dust.**

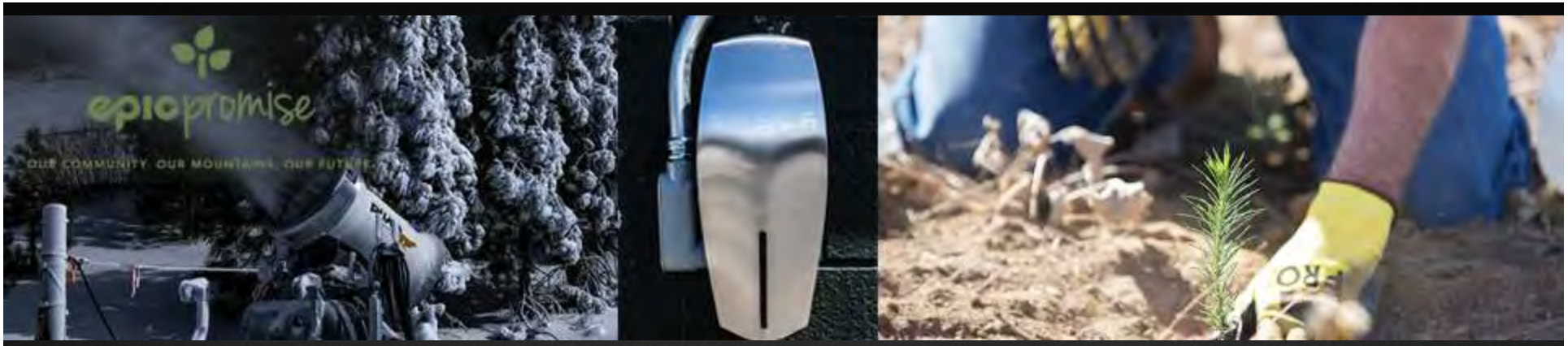


Rain Shut Down Process Information:

- View current custom Weather Forecast and Construction Activity Guidelines. Be sure to listen to Dispatch.
- The weather forecast should be checked daily on the NOAA forecast:
- www.noaa.gov (South Lake Tahoe, CA)
- **Days with 10% - 49% Chance of Rain or a Chance of Thunderstorms – Tier 1, Be prepared to Shut-Down active construction sites w/in 1 Hour**
- **Days with 50% or More Chance of Rain – Tier 2, Be prepared to Shut-Down Site immediately.**


Construction Rain Shut Down Process

- Know the Weather Forecast
- Listen closely to the radio
- Grading Operations and Exposed Soils—Pay attention to your work sites. Button up sites at end of each shift
- Stockpile BMP's supplies
- Vehicle Access-open and closed roads
- BMP Inspections – Pre & Post Storm—Take Pictures!



USFS Wildlife Trash Management and Education Program:

- As a condition of the approved EIS for the Epic Discovery Program a wildlife trash management and education plan is implemented annually and reviewed by Heavenly and the US Forest Service LTBMU. The Heavenly Mountain Resort Master Redevelopment Plan (2015) includes a number of Operations and Maintenance Measures as part of the Mitigation and Monitoring Plan. 7.5-21 BIO 8: Wildlife Trash Management and Education Program.
- A number of the activities at Heavenly Mountain Resort are located at the Top of The Gondola/Adventure Peak. As part of the Epic Discovery Project implementation the resort shall create and implement a trash management and education program. The goal of this program is for timely removal of refuse from deposit points, education of our guests and staff about proper waste management, and to keep any interactions between humans and wildlife to a minimum.
- Animal resistant “bear box” receptacles are in place @ TOG in summer.

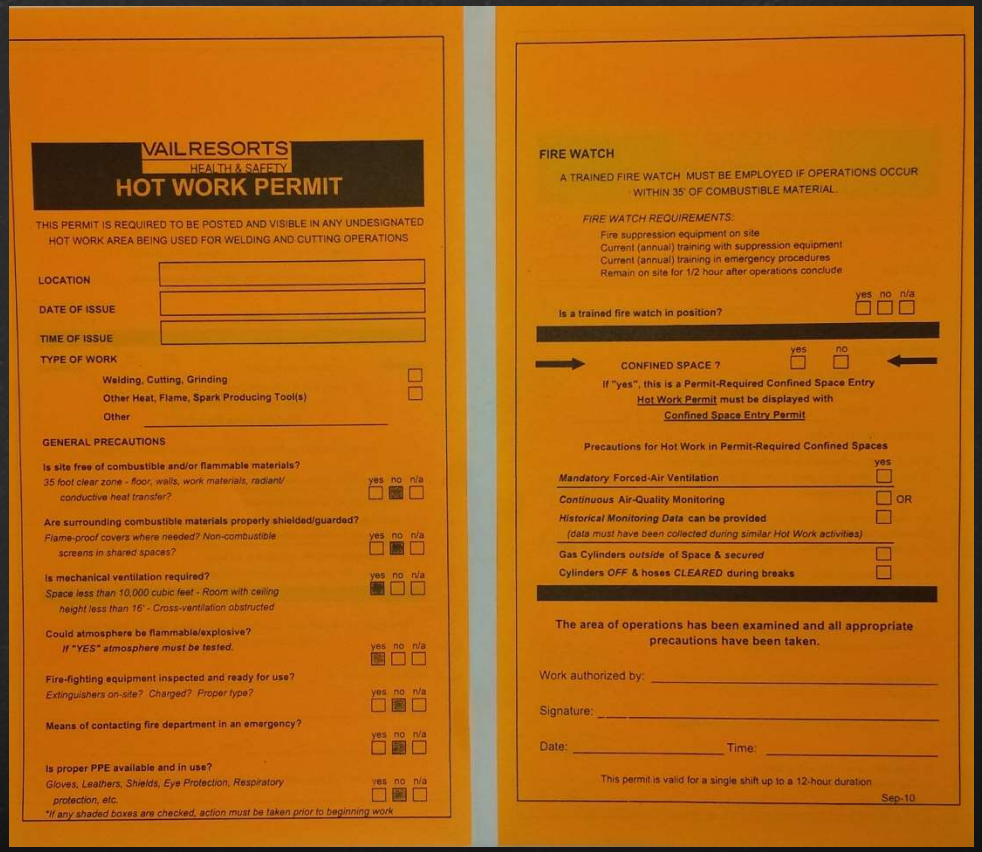
Heavenly Hot Work Permit

Required for any hot work outside of a designated weld shop. Proper tools in trucks, Fire caches on hill.

Know the PAL code for the day.

Issued by Kevin Higgins, Bryan Hickman, David Bammer, & Curtis Kezich.

Must be posted on site.



VAIL RESORTS
HEALTH & SAFETY
HOT WORK PERMIT

THIS PERMIT IS REQUIRED TO BE POSTED AND VISIBLE IN ANY UNDESIGNATED HOT WORK AREA BEING USED FOR WELDING AND CUTTING OPERATIONS

LOCATION

DATE OF ISSUE

TIME OF ISSUE

TYPE OF WORK

- Welding, Cutting, Grinding ☐
- Other Heat, Flame, Spark Producing Tool(s) ☐
- Other _____

GENERAL PRECAUTIONS

	yes	no	n/a
Is site free of combustible and/or flammable materials? *35 foot clear zone - floor, walls, work materials, radiant/ conductive heat transfer?*	☐	■	☐
Are surrounding combustible materials properly shielded/guarded? *Flame-proof covers where needed? Non-combustible screens in shared spaces?*	☐	■	☐
Is mechanical ventilation required? *Space less than 10,000 cubic feet - Room with ceiling height less than 16' - Cross-ventilation obstructed*	■	☐	☐
Could atmosphere be flammable/explosive? *If "YES" atmosphere must be tested.*	■	☐	☐
Fire-fighting equipment inspected and ready for use? *Extinguishers on-site? Charged? Proper type?*	☐	■	☐
Means of contacting fire department in an emergency?	☐	■	☐
Is proper PPE available and in use? *Gloves, Leathers, Shields, Eye Protection, Respiratory protection, etc.*	☐	■	☐

**If any shaded boxes are checked, action must be taken prior to beginning work*

FIRE WATCH

A TRAINED FIRE WATCH MUST BE EMPLOYED IF OPERATIONS OCCUR WITHIN 35' OF COMBUSTIBLE MATERIAL

FIRE WATCH REQUIREMENTS:
- Fire suppression equipment on site
- Current (annual) training with suppression equipment
- Current (annual) training in emergency procedures
- Remain on site for 1/2 hour after operations conclude

	yes	no	n/a
Is a trained fire watch in position?	☐	☐	☐

	yes	no
CONFINED SPACE ?	☐	☐

If "yes", this is a Permit-Required Confined Space Entry
Hot Work Permit must be displayed with
Confined Space Entry Permit

Precautions for Hot Work in Permit-Required Confined Spaces

	yes	
***Mandatory* Forced-Air Ventilation**	☐	
***Continuous* Air-Quality Monitoring**	☐	OR
***Historical Monitoring Data* can be provided** *(data must have been collected during similar Hot Work activities)*	☐	
Gas Cylinders *outside* of Space & *secured*	☐	
Cylinders *OFF* & hoses *CLEARED* during breaks	☐	

The area of operations has been examined and all appropriate precautions have been taken.

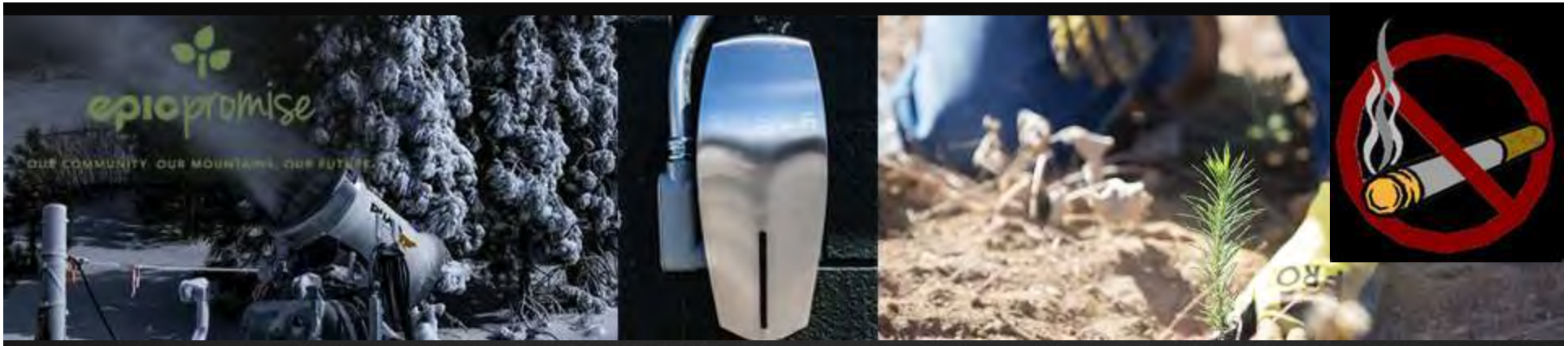
Work authorized by: _____

Signature: _____

Date: _____ Time: _____

This permit is valid for a single shift up to a 12-hour duration

Sep-10



Absolutely NO SMOKING

- Due to EXTREME fire danger, smoking is prohibited on the mountain.
- This includes Smoking in Heavenly company or 3rd Party vehicles.


Wildland Fire Awareness- Be alert and aware / report any smoke to Dispatch.


epicpromise
OUR COMMUNITY. OUR MOUNTAINS. OUR FUTURE.

Heavenly Mountain Resort—Water Year 2020

APPENDIX G

ON-MOUNTAIN MONITORING (FOURTH QUARTER)

Appendix G
On-Mountain Monitoring (Fourth Quarter)

G.1 2020 Fourth Quarter Erosion Control and Facilities Monitoring Inspection Report

G.2 CA Dam Sediment Removal Project 2020

Heavenly Mountain Resort Quarter Fourth Year 2020

Erosion Control and Facilities Maintenance Monitoring Inspection Log, by: Bryan Hickman & Frank Papandrea

Location*	Date Inspected	Inspector's Name	Notes/Observations/ Any Problems Identified	Corrective Measures Taken	Schedule for Completion of Corrective Measures
a.	9/16/2020	B. Hickman	Hand grenade Corner in great condition on Roundabout restoration. CA Dam for 2020 sediment removal at the Promenade 4,000 yards of sediment relocated and restored. SWPPP terminated with Lahontan Water Board.	SWPPP still open, request for closure submitted to Water Board.	Final Grade and Stabilization completed in September 2020.
b.	9/16/2020	B. Hickman	All 12", 24", and 36" culverts inspected clear and free of any obstructions. Maggie's, HV Creek, and High Five Area Clear and unobstructed.	None	N/A

Location*	Date Inspected	Inspector's Name	Notes/Observations/ Any Problems Identified	Corrective Measures Taken	Schedule for Completion of Corrective Measures
c.	9/18/2020	B. Hickman	Designated roadways are being used by employee vehicles and 3rd party vehicles.	Roads maintenance with Trails Crew ongoing, tracked, and shared with USFS. 1.2 Miles of roadways improved and 14.03 Miles of roadway network maintained in 2020.	2020 USFS Road Report
d.	9/18/2020	B. Hickman	Rope closure BMP's in place. Irrigation equipment in use at TOG (Tamarack), and Hand grenade at RB.	N/A	To be removed after 10/1/2020
e.	9/18/2020	B. Hickman	Energy dissipater condition acceptable. Numerous Maggie's Pits maintained and cleaned out and maintenance completed after storm events.	N/A	Ready for Winter

Location*	Date Inspected	Inspector's Name	Notes/Observations/ Any Problems Identified	Corrective Measures Taken	Schedule for Completion of Corrective Measures
f.	9/18/2020	B. Hickman	Sediment Basins have adequate capacity.	N/A	Ready for Winter
g.	9/18/2020	B. Hickman	Rock Lined channels are in good shape. Rock Lined ditch at Groove chair has plenty of remaining sediment holding capacity.	N/A	N/A
h.	9/18/2020	B. Hickman	Rip Rap at various locations on the mountain in great shape.	N/A	N/A
i.	9/18/2020	B. Hickman	No water bar failures observed on the CA side of the mountain. NV Side good with a few erosion hotspots to be addressed and maintained at Lower Olympic Run near Maloney Vault and Big Dipper Run.	7/2020 - Water Bar added on Lower Olympic Downhill Run to direct flows off of the ski trail. 7/2020 – All Big Dipper Run Water Bars repaired and improved.	Completed Summer 2020

Location*	Date Inspected	Inspector's Name	Notes/Observations/ Any Problems Identified	Corrective Measures Taken	Schedule for Completion of Corrective Measures
j.	9/18/2020	B. Hickman	All Infrastructure utility lines on the mountain performing ok. Sewer line camera being utilized by Building Maintenance Department to observe current condition of sewer lines and culverts when needed.	N/A	N/A
k.	9/18/2020	B. Hickman	Stockpiles of soils or road base materials observed on the mountain have proper BMP's.	N/A	N/A
l.	9/18/2020	B. Hickman	Infiltration trenches functioning properly.	N/A	N/A
m.	9/18/2020	B. Hickman	Gullies and rills on slopes and roadways ok. After any major rain events our Trails Maintenance Crews and Heavy Equipment Operators address any problems right away.	N/A	N/A

Location*	Date Inspected	Inspector's Name	Notes/Observations/ Any Problems Identified	Corrective Measures Taken	Schedule for Completion of Corrective Measures
n.	7/30/2020	F. Papandrea	Annual Boulder Base and CA Base BMP's System Routine Maintenance.	3rd party Annual BMP Routine maintenance completed in July 2020. All Drop Inlets at CA Base and Boulder Base were cleaned out with a vacuum truck and oil booms were replaced by Clean Harbors. The CA Base storm filter vaults maintenance work was completed In July 2020 by Pacific Stormwater BMP Solutions. All filter vaults cleaned of loose sediment, and replaced over 110 Filters cartridges in 3 of the vaults.	Completed July 2020

* Location Notes:

a. Re-vegetated Areas
b. Culverts and Drainage Crossing (all culverts > 36” should be inspected annually at a minimum)
c. Designated Roadways
d. Closures and use controls on closed roadways
e. Energy Dissipaters on culverts
f. Sediment basins/irrigation ponds
g. Rock-Lined Channels
h. Mechanical stabilization measures (i.e. Riprap and gabions)
i. Water Bars
j. Water Supply, sewer, snowmaking, and irrigation water line and holding tanks
k. Unprotected soil piles
l. Infiltration trenches
m. Gully/Rill erosion on slopes
n. Other erosion control and storm water runoff facilities


Heavenly Mt. Resort, CA Dam Sediment Removal `
Aug./Sept. 2020 – Billy Clark Snowmaking Supv.

Images from 2016 (Frank & Billy) Sediment sampled for Analysis

2020 Images

VAIL RESORTS

VAIL ▲ BEAVER CREEK ▲ WHISTLER BLACKCOMB ▲ BRECKENRIDGE ▲ PARK CITY ▲ KEYSTONE ▲ CRESTED BUTTE ▲ HEAVENLY ▲ NORTHSTAR
KIRKWOOD ▲ STEVENS PASS ▲ STOWE ▲ OKEMO ▲ MOUNT SUNAPEE ▲ WILMOT ▲ AFTON ALPS ▲ MT. BRIGHTON ▲ PERISHER ▲ FALLS CREEK
HOTHAM ▲ MOUNT SNOW ▲ HUNTER ▲ ATTITASH ▲ WILDCAT ▲ CROTCHED ▲ LIBERTY ▲ ROUNDTOP ▲ WHITETAIL ▲ JACK FROST ▲ BIG BOULDER
ALPINE VALLEY ▲ BOSTON MILLS ▲ BRANDYWINE ▲ MAD RIVER MOUNTAIN ▲ HIDDEN VALLEY ▲ SNOW CREEK ▲ PAOLI PEAKS

2020 Images

July 20, 2020 On Site with RCI Consultant

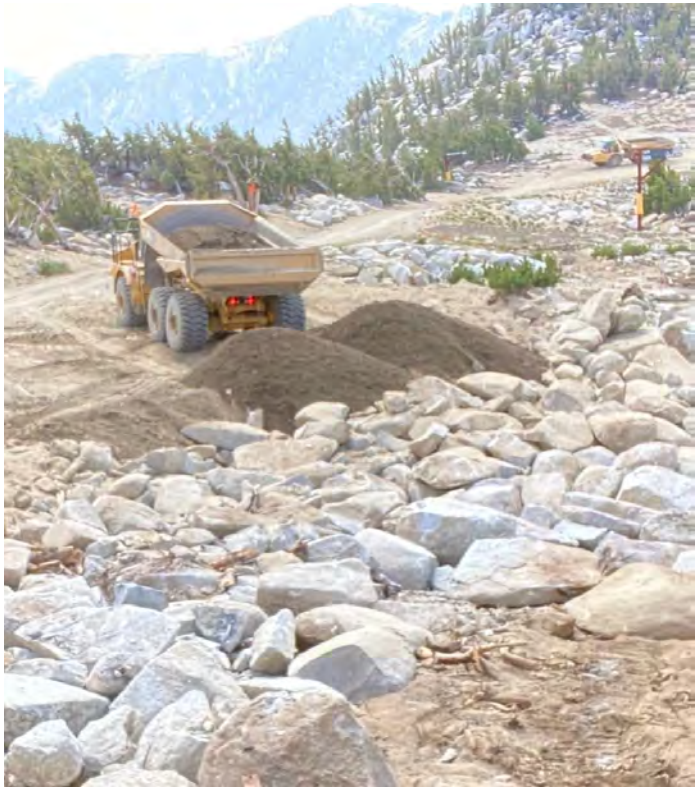
Prior to Dredging in Early August, Diversion all set up.

Diversion Point before and during

Southern Long Toed Salamander Larvae were relocated into CA Dam Pump House Wet Well by USFS & Biologist. 210 larva were put in the pit at the start of the project by HV. 182 turn into adults and survived! The Staff were awesome!

Salamander's lack lungs and breath through their skin, which must be kept moist at all times. If they were relocated anywhere else (Like to our other Reservoir) there would have been no survival verification.

>4,000 Cubic Yards of Sediment relocated to Upper Ridge Run Ski Trail 1,200 Vertical Feet Above.



VAIL RESORTS

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Before and After

VAIL RESORTS

VAIL ▲ BEAVER CREEK ▲ WHISTLER BLACKCOMB ▲ BRECKENRIDGE ▲ PARK CITY ▲ KEYSTONE ▲ CRESTED BUTTE ▲ HEAVENLY ▲ NORTHSTAR
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Top of Ridge Run Promenade, Looking Uphill, Near 10,000 Ft.

CA Dam & Heavenly are ready for Snowmaking 2020!

Heavenly Mountain Resort—Water Year 2020

APPENDIX H

TRACTION SAND ANALYSIS (MAY 2020)

Appendix H
Traction Sand Analysis

H.1 El Dorado County Traction Sand Analysis (May 2020)

To: Frank Papandrea, Heavenly

From: Russell Wigart, Stormwater Coordinator - Tahoe Basin

Regarding: Spec H Traction Sand

Frank,

Below find the analysis for Spec H traction samples taken from Heavenly Valley Ski Area in May 2020.

El Dorado County developed and utilizes the spec H aggregate used for traction control in the Tahoe Basin. In May 2020, El Dorado County staff analyzed samples taken from Heavenly in South Lake Tahoe, CA. The Spec H material is supplied by cinderlite and meets both the California DOT and El Dorado County traction sand specification. The County performed gradation, fine sediment particle analysis and turbidity tests on the traction sand material. The results of the sampled gradation were as follows.

COUNTY OF EL DORADO

COMMUNITY DEVELOPMENT DEPARTMENT: TRANSPORTATION DIVISION

Aggregate Sample Gradation

PROJECT:	Lake Tahoe (Washoe Sand)		
SAMPLE #:	Washoe Sand	CONTRACT NO:	99230 Index 346000
MATERIAL:	Sand		
DATE SAMPLED:	5/14/2020		

Sieve Size	mm	Wt. Retained	% Retained	% Passing	Spec. Limit Lower	Spec. Limit Upper	Sand Equivalent		
2"	50	0	0	100			**Sand**	**Clay**	
1.5"	38	0	0	100					
1"	25	0	0	100					
3/4"	19	0	0	100					
1/2"	12.5	0	0	100					
3/8"	9.5	0	100	0					
#4	4.75	48	10	90.0					
#8	2.36	269	54	46.0					
#16	1.18	421	85	15.0					
#30	0.6	466	94	6.0					
#50	0.3	480	97	3.0					
#100	0.15	486	98	2.0			**Total Sample Weight:**		494
#200	0.075	489	99	1.0					

The Spec H traction sand met all allowable criteria for traction sand specifications designed to protect water quality and improve public safety.

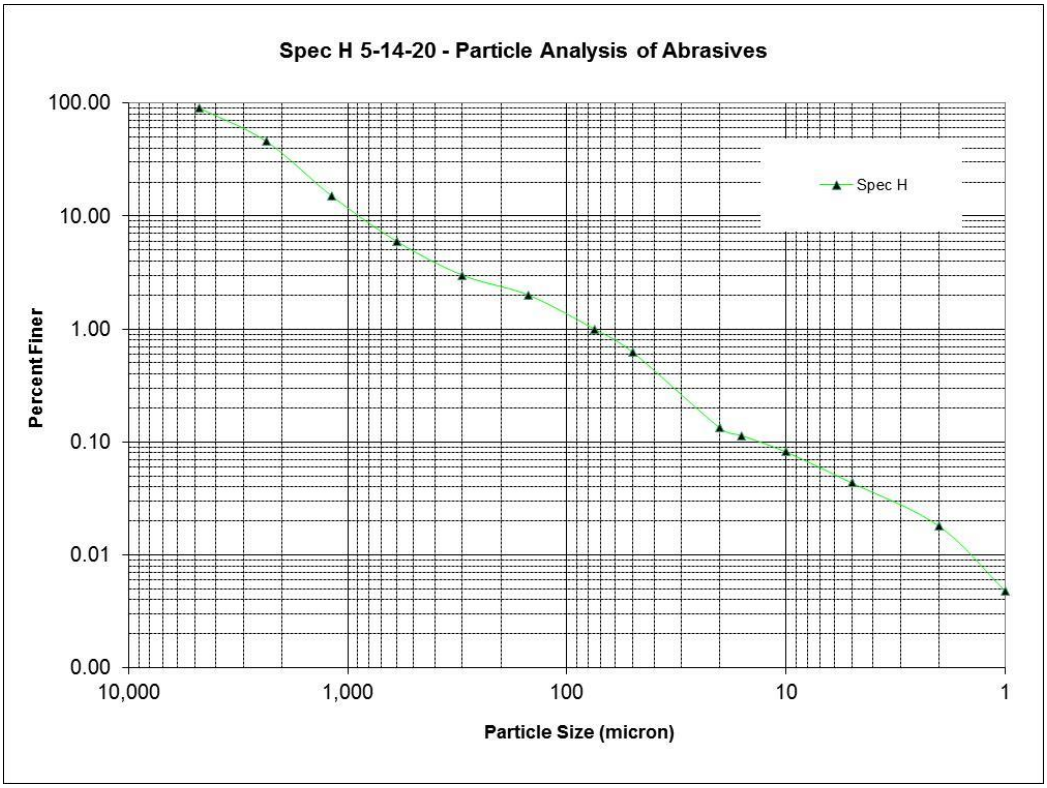
Turbidity Tests of this material were run using the County traction sand protocol with material meeting design sepcifications.

County Abrasive	
30 Grams / 1 Liter H2O	
5/14/2020	Turbidity (ntu)
Result	75
Spec	150
Specification Met	
Turbidity	**Yes**

Fine Sediment Particle Analysis

5 grams of 200 sieve material (<74 microns) was diluted in water and sent to WETlab for fine sediment particle and nutrient analysis. See table / graphs below. The County gradation samples measured 1% of the total sample to be <200 sieve with the <16um portions being 11.42% of that amount. Therefore the total mass of <16um particle equaled 0.11% of the total mass of all traction sand. For instance if 100 ton of sand were used as traction abrasives for a winter then approximately .11 ton of the total material would be <16um in diameter.

5/14/2020	Washoe Sand (5 grams 200 mesh)			
Sieve #	Sieve Size	Sieve Size (micron)	Cumulative % retained	% finer
			sum Rn	100-sumRn
4	4.750	4750	9.7	90.28
8	2.360	2360	54.0	46.00
16	1.180	1180	85.0	15.00
30	0.600	600	94.0	6.00
50	0.300	300	97.0	3.00
100	0.150	150	98.0	2.00
200	0.075	75	99.0	1.00
50 micron	0.050	50	99.6	0.62
20 micron	0.020	20	99.8	0.13
16 micron	0.016	16	99.9	0.11
10 micron	0.010	10	100.0	0.08
5 micron	0.005	5	100.0	0.04
2 micron	0.002	2	100.0	0.02
1 micron	0.001	1	100.0	0.005
	% finer			
TSS				um
<100 micron	91.7%	91.65		100
<50 micron	62.3%	62.26		50
<20 micron	13.3%	13.28		20
<16 micron	11.4%	11.42		16
<10 micron	8.2%	8.16		10
<5 micron	4.3%	4.34		5
<2 micron	1.8%	1.8		2
<1 micron	0.5%	0.48		1



Discussion

Altering abrasives application material type is a critical component of meeting the TMDL. Previous studies conducted by El Dorado County (EDOT 15_01) indicated that the total load generated by El Dorado County in the Tahoe Basin could be reduced by greater than 5%. Based on the analysis of the data and the distribution of material in various size classes from this material, the data indicates a reduction of a factor of 10 in fine particle aggregates <16 micron by switching from the Volcanic cinders to the Washoe Sand (DG). This equates to an approximate 90% load reduction compared to baseline conditions pre 2004 when evaluating cinders vs. granite (spec H). The fine particles associated with the Spec H DG are a denser particle; settle out quicker and breakdown less into fine fractions. The density and hardness of the material indicate it will last longer on the road, breakdown less and be easier to sweep up once conditions permit. Cal Trans conducted a study on many different aggregates for possible road abrasives and determined Washoe Sand (DG) to be ranked #2 out of the 22 materials tested for ultrafine particles (Cal Trans 2010).

The County along with its local partners will continue to refine this specification as needed in the interest of the environment and public safety. To date the modification to this winter management practice has resulted in large fine sediment load reductions when compared to previously used traction control materials. The material reported above meets required specifications for environmental protection as well as public safety requirements / standards.

Please Respect the Environment

About Cardno

Cardno is an ASX-200 professional infrastructure and environmental services company, with expertise in the development and improvement of physical and social infrastructure for communities around the world. Cardno's team includes leading professionals who plan, design, manage, and deliver sustainable projects and community programs. Cardno is an international company listed on the Australian Securities Exchange [ASX:CDD].

Cardno Zero Harm

Cardno ZERO HARM EVERY JOB. EVERY DAY.

At Cardno, our primary concern is to develop and maintain safe and healthy conditions for anyone involved at our project worksites. We require full compliance with our Health and Safety Policy Manual and established work procedures and expect the same protocol from our subcontractors. We are committed to achieving our Zero Harm goal by continually improving our safety systems, education, and vigilance at the workplace and in the field. Safety is a Cardno core value and through strong leadership and active employee participation, we seek to implement and reinforce these leading actions on every job, every day.

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