Snowbasin Resort
2023 Parking Improvements
Stormwater Report

Prepared for

Snowbasin Resort

Prepared by

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1.0 INTRODUCTION

Snowbasin Resort's Parking Improvements are a part of the initial phases of the Resort's Master Plan. The purpose of this document is to provide information that can be utilized to design key aspects for proposed improvements and how they apply to the Snowbasin Stormwater Master Plan to ensure the system will have adequate capacity to convey the 10-year storm event without flooding, as well as the 100-year storm event safely. Ponds or underground storage shall be designed such that peak discharge from the 10-year and 100-year storm events do not exceed the peak discharge rate of pre-developed conditions. As more information and decisions are available for the parking improvements, the Snowbasin Stormwater Master Plan shall be updated to reflect any changes.

2.0 METHODOLOGY

2.1 Overview

The documentation that was used for the stormwater runoff calculations was an assortment of surveyed utility information, topographic information from AGRC, and precipitation data from the National Oceanographic and Atmospheric Administration (NOAA).

2.2 Master Plan General Concept

The parameters used to evaluate the present and future capacity requirements of the storm drain conveyance system are based on the *Weber County Municipal Code Title 40 – Storm Drainage.* For simplicity, each parking improvement area was delineated to determine pre/post runoff volumes. These areas were then compared to the overall Stormwater Master Plan to develop alternatives for conveyance and storage.

Analysis was conducted to provide alternatives for conveyance and storage for these initial improvements and how they would affect the overall Stormwater Master Plan.

The criteria used to evaluate the storm drain design are identified by the Weber County Storm Water Runoff Design Standards. Significant elements from this document include, but are not limited to:

- Drainage design of small watersheds, 30 acres or less, shall use the Rational Method, SCS Curve Number Method or SCS Unit Hydrograph Method.
- Initial collection shall be designed to sufficiently convey storm flows generated by the 10-year, 24-hour storm.
- Major collection systems shall be designed to sufficiently detain or retain storm flows generated by the 100-year, 24-hour storm.

2.3 Soil Conservation Service Method (SCS)

The stormwater calculations utilize SCS curve number methodology.

2.4 Precipitation Data

Precipitation depth and intensity from NOAA Atlas 14 using a latitude and longitude corresponding to Area A at Snowbasin Resort, Utah. The precipitation data was used to create SCS Type II storm distribution hydrograph curves. The NOAA precipitation data and hydrographs utilized in the calculations can be found in the Appendix.

3.0 ANALYSIS & RESULTS

Existing & Proposed Conditions

The Canyon Rim Elbow Parking Lot disturbs approximately 43,013 square feet, 34,906 of which will be asphalt paving. The existing topography slopes southwest at slopes between 10.0% and 30.0% to an existing drainage swale and small detention pond.

The proposed topography slopes southwest at slopes between 3.5% and 5.25% across the existing Canyon Rim Parking Lot to the existing detention pond. An 8 feet rockery wall will border the northeast portion of the lot, north of the proposed drainage swale, to mitigate the steep existing slopes. A catch basin is proposed in the low point of the northern swale which will connect to an existing 18" pipe which drains to the existing detention pond.

The proposed stormwater mitigation plan is a temporary solution which will be addressed in the full Snowbasin Area A Master Plan.

Stormwater Detention Volumes

The pre vs. post stormwater volumes were calculated using the SCS Curve Number method and will produce approximately 550 cubic feet of excess stormwater runoff. Please see the Appendix for calculations.

The existing detention pond was re-excavated for the 2021 Canyon Rim Parking Expansion Project, providing 2,767 cubic feet of additional storage, and therefore will be sufficient with the additional runoff produced by this project.

STORM DRAINAGE CALCULATIONS

Canyon Rim Elbow Parking Lot

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PRE DEVELOPMENT VOLUME - SCS CURVE NUMBER METHOD

Tributary Drainage Area (A)	sf	CN	CN*A
Landscaping/Natural Groun	43,016	88.6	3811218 S.F.
Sum:	43016 S.F.	Sum:	3811218 S.F.

NOAA ATLAS 14 (100 YEAR STORM)				Allowable Discharge = .10cfs/acre	
Storm Duration (min)	Intensity (in/hr)	Rainfall (inches)	Rainfall Excess (cu.ft.)	Allowed Discharge (cu.ft)	Volume to Detain (cu.ft)
15	5.37	1.343	1780	89	1691
30	3.62	1.810	3044	178	2866
60	2.24	2.240	4310	356	3955
120	1.32	2.640	5546	711	4835
180	0.91	2.739	5858	1067	4792
360	0.53	3.162	7216	2133	5083
720	0.35	4.164	10534	4266	**6268**
1440	0.22	5.208	14086	8532	5554

Req. Storage = **6,268 cf**

STORM DRAINAGE CALCULATIONS

Canyon Rim Elbow Parking Lot

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POST DEVELOPMENT VOLUME - SCS CURVE NUMBER METHOD

Tributary Drainage Area (A)	sf	CN	CN*A
Landscape	8,110	88.6	718546 S.F.
Asphalt Pavment =	34,906	90.6	3162484 S.F.
Sum:	43016 S.F.	Sum:	3881030 S.F.

NOAA ATLAS 14 (100 YEAR STORM)				Allowable Discharge = .10cfs/acre	
Storm Duration (min)	Intensity (in/hr)	Rainfall (inches)	Rainfall Excess (cu.ft.)	Allowed Discharge (cu.ft)	Volume to Detain (cu.ft)
15	5.37	1.343	2056	89	1967
30	3.62	1.810	3399	178	3222
60	2.24	2.240	4723	356	4368
120	1.32	2.640	6002	711	5291
180	0.91	2.739	6324	1067	5258
360	0.53	3.162	7718	2133	5585
720	0.35	4.164	11102	4266	**6836**
1440	0.22	5.208	14700	8532	6168

Req. Storage = **6,836 cf**