EXHIBIT 4

TALISMAN CIVIL CONSULTANTS

To: Weber County Engineering
From: Talisman Civil Consultants
Subject: Nordic Valley Ski Resort Base Development Feasibility Study: Stormwater Runoff Mitigation
Date: 2021-10-05
Attachments: Exhibit 1 – Nordic Valley Ski Resort Base Master Plan

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1.0 - INTRODUCTION

On behalf of Skyline Mountain Base, Talisman Civil Consultants (TCC) has prepared a feasibility study to discuss the mitigation of storm water runoff for two phases of future development at Nordic Valley Ski Resort. The purpose of this narrative is to provide a preliminary understanding of stormwater volumes, and to develop a strategy to manage runoff and detention.

2.0 - Existing Conditions

The Existing storm drain infrastructure at Nordic Valley Ski Resort Base is limited. The resort currently has a small number of buildings for ski resort and maintenance use. Current stormwater mitigation techniques rely on infiltration, existing runoff ponds, and snowmaking. The existing pond is approximately 1 million gallons and is being used for snowmaking purposes. Runoff from existing drainages is assumed to supply this snowmaking pond and is pumped to the mountain during winter months. Existing storm drain infrastructure at Nordic Valley Ski Resort is limited.

3.0 - Precipitation Data.

Nordic Valley Ski Resort is located within the central west side of the Ogden Valley, at 3567 Nordic Valley Way, Eden, UT 84310. See *Table 1* below for the precipitation estimate per the National Oceanic and Atmospheric Administration (NOAA).

Table 1 – NOAA Precipitation Data: Nordic Valley

	Storm Depth (in)
10 Year - 24 Hour storm	3.31
100 Year - 24 hour storm	4.74

4.0 - Methodology

The storm drain hydraulic model was produced using Bentley Haestad's SewerGEMS modeling software using SCS Curve Number Methodology which considers:

- Delineated drainage basins based on topography
- Existing soil types
- Existing pervious/impervious area
- Vegetation type and density
- Time of concentration
- NOAA Atlas 14 Precipitation Data corresponding to Nordic Valley
- SCS Type II Storm Hyetograph

Using precipitation data, mass rainfall is converted to mass runoff by using a runoff curve number (CN) based on the criteria mentioned above. A higher curve number equates to more runoff.

The base for the analysis is the Weber County Code of Ordinances: Title 40 – Storm Drainage; and the Weber County Engineering Design Standards for Stormwater. See *Table 2* below.

Table 2 – Weber County Engineering Design Standards for Stormwater

Condition	Requirement
Small Watershelds of 30 acres or less	Rational Method
Small or Large Watersheds	SCS Curve number method and SCS Unit Hydrograph method (1)
Precipitation return periods initial collection and conveyance	10 year(2)
Major collection of multiple initial systems	100 year (2)
Conveyance of rivers, streams, or any large drainage	100 year or maximum
Maximum post development runoff	0.1 cfs/acre (1)
Footnotes	
1	Or as approved by the County Engineer.
2	Precipitation estimates may be found on the NOAA webiste. You may also want to visit the USGS Site for a very useful tool.

We are specifically investigating the feasibility of:

- Designing the conveyance infrastructure necessary to accommodate a 10-year storm.
- Designing the detention facilities necessary to accommodate a 100-year storm.
    - Limiting discharge rate to 0.1 cfs per acre.

5.0 - Conveyance Infrastructure

Most notably among other factors, the capacity of a storm drain pipe is dependent on the diameter of the pipe, and its slope. Specifically sizing the diameter of the storm drain lines at Nordic Valley is infeasible for this level of analysis. However, based on storm water infrastructure we have designed in similar mountainous developments such as Powder Mountain (Eden, Utah), Snowbasin (Huntsville, Utah), and Canyons (Park City, Utah) storm drain main lines will typically be no smaller than 12" in diameter and may be required to be 36" in diameter or greater to adequately mitigate the 10-year, 24-hour storm flows.

6.0 - Detention Facilities

Stormwater detention facilities are typically open ponds with an outlet structure (orifice, weir, or standpipe) to control outflow to a desired discharge rate. However, because ponds tend to be unsightly, and take up a significant amount of surface area, it is not uncommon that detention facilities implemented underground by means stormwater detention chambers. Underground detention systems are more expensive, however are just as versatile as traditional open ponds in terms flexible solutions for retention, water quality control, and infiltration. It is anticipated that Nordic Valley Ski Resort Base Development will use a combination of mostly above ground and underground storage for storm water.

The proposed development at Nordic Valley Ski Resort Base can be separated to 4 "Development Areas". Please see Exhibit 1 attached with this narrative. Runoff for each Development Area will be calculated via an SCS curve number which considerations include but are not limited:

- Hydrologic Soil Type (A – D with Soil Type A being more pervious, and Soil Type D being more impervious)
- Vegetation Type

Per the USDA web soil survey, Nordic Valley Soils are Hydrologic Soil Type B, and assumed to be between good and fair. An arid and semiarid rangeland vegetation profile with a mountain brush mixture cover type (Oak brush, aspen, mountain mahogany, bitter brush, and other brush) was assumed. This results in a pre-developed runoff curve number of 39. Any impervious areas generated by development would be given a runoff curve number of 98, which generates the maximum amount of runoff.

Pre-development and post-development analysis will then be performed via hydraulic model to estimate how much volume would be required to adequately detain the 100-year storm at a discharge rate if 0.1 cfs per acre.

7.0 - Stormwater and Secondary Reuse

As the mountain development grows, snowmaking demands are expected to grow with it. It is anticipated that that the Nordic Valley Ski Area Base will continue the use of stormwater runoff for snowmaking purposes. However, as snowmaking demands increase, Skyline Mountain Base is open to utilizing secondary water as an alternative re-use strategy. These strategies will be further evaluated as planning and design progresses.

8.0 - Conclusion

The general strategy for Stormwater mitigation at Nordic Valley will be that typical of similar mountainous developments in Utah. Being on a mountain with slope abundantly available, available pipe capacities for storm water aren't anticipated to be problem. However, because Nordic Valley wants to maximize the areas for development, space for detention facilities may be limited, and thus we anticipate creative solutions for detention volume mitigation, stormwater reuse, and a combination of above and underground solutions to be used.

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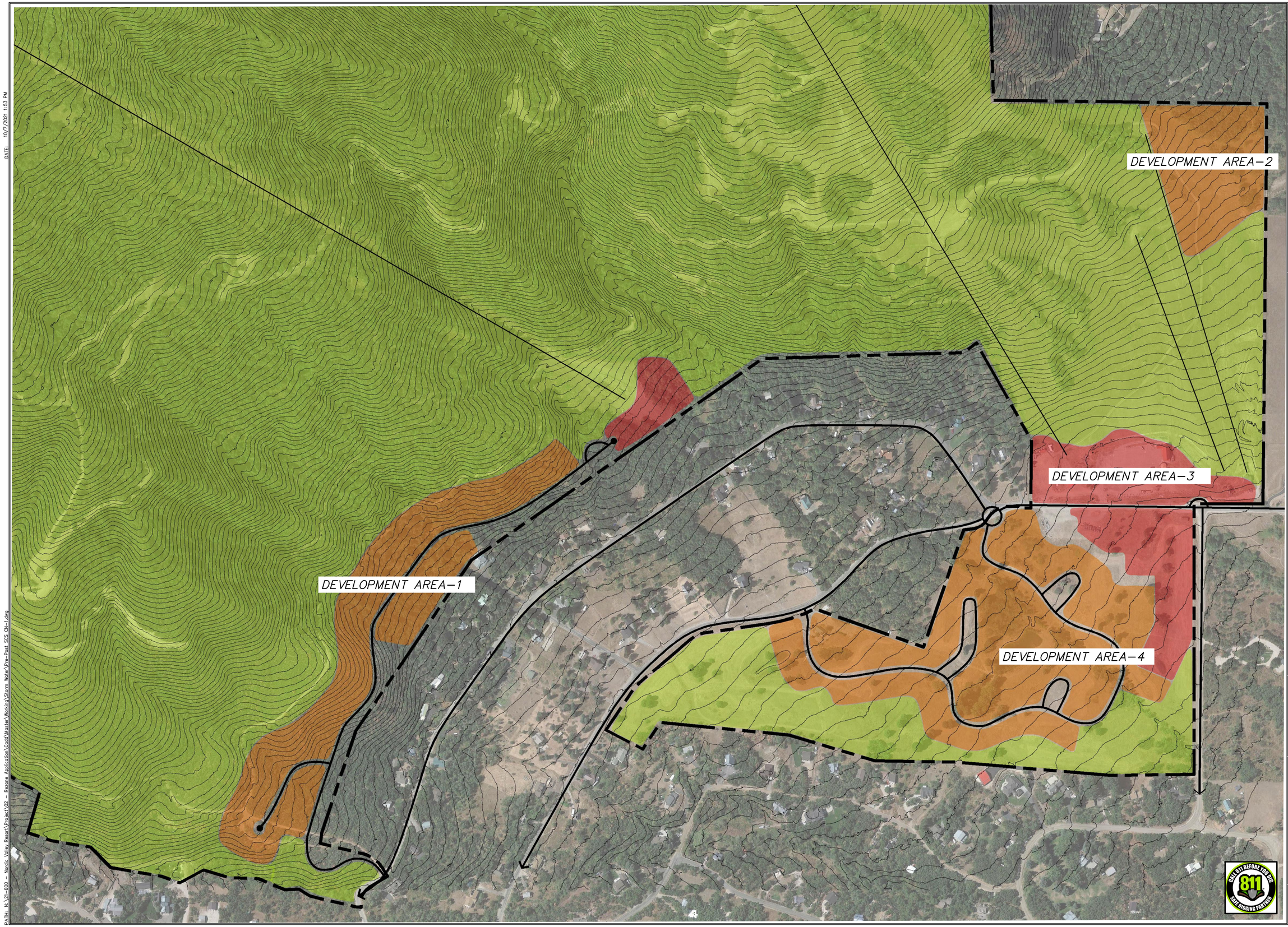

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NO.	BY	DATE	REVISIONS:

NORDIC VALLEY RESORT

STORM WATER MITIGATION
DEVELOPMENT AREAS

DATE: 10.06.2021

TCC JOB NUMBER: 21-600.01

SCALE
HORIZONTAL: 1" = 200'
0 50' 100' 200' 300'

SHEET NUMBER
EX01
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