TRAPPERS RIDGE AT WOLF CREEK
PHASE 8
PRELIMINARY DRAINAGE REPORT

Eden, Utah

Owner:
Watts Enterprises
5200 S. Highland Drive, Suite 101
Salt Lake City, UT 84117

Prepared by:
Galloway & Company, Inc.
515 South 700 East Suite 3F
Salt Lake City, Utah 84102
Phone (801) 953-1357
Fax (303) 770-3636
Prepared by: Jeremy Toone
Reviewed by: Rich Piggott, P.E.
Utah Licensed Professional Engineer #275990

Contact: Rich Piggott, P.E.
Phone: 801.953.1357

Prepared: March 14, 2016

Project Location and Description

The construction of roadways and utility infrastructure for approximately 18 residential lots is proposed in the open space adjacent to Big Horn Parkway at Wolf Creek in Eden, Utah. The project will be completed in one Phase of construction. The Phase is referred to as Phase 8.

The proposed site is located within the Wolf Creek Development in Weber County. The subject property is zoned for residential, and is currently platted and situated in the SW ¼ of Section 23, Township 7 North, Range 1 East SLCBM. The site is bound by adjacent subdivisions incorporated into the natural contours. The Wolf Creek Country Club golf course also is in the vicinity of the development.

The intent of this report is to show that the development of this site, and the construction of the proposed public roadways, will be in conformance with the requirements of the City of Eden and Weber County Storm Drain Requirements.

Existing Conditions

The subject property is currently undeveloped. Existing on-site vegetation is extremely sparse and is limited to native grasses and shrubs. Existing grades slope to the east at slopes ranging from 6%-12%, falling a total of 71' across the site, with the typical slope of 10%.

According to the FEMA Flood Insurance Rate Map, Map number 49057C0229F, dated June 2, 2015 the proposed site is outside of the identified special flood hazard areas. A copy of this flood plain map has been included in Appendix B of this report.

Site soils are made up of Yeates Hollow very stony loam, classified as Hydrologic Soil Group C by the NRCS. These soils characteristically have slow infiltration rates, and high runoff potential. A copy of the NRCS soil classification map has been included in Appendix C of this report.

Design Methodology & Criteria

Methodology

Storm runoff calculations for the proposed development were performed using the Rational Method.
The Rational Method utilizes the following equation:

Q = CIA
Q = storm runoff in cubic feet per second;
C = runoff coefficient based on surface impermeability;
I = rainfall intensity in inches per hour;
A = drainage basin area in acres.

Runoff coefficients were determined for each sub-basin within the proposed development based on the varying surface types present. Storm intensities were taken from the National Oceanic and Atmospheric Administration (NOAA) database and can be found in Appendix D of this report.

Criteria

Per Weber County, the following criteria were utilized in the design of the stormwater management system for the proposed development.

- The proposed development will utilize on-site detention basins to accommodate the storm runoff volume resulting from the 24-hour duration, 10-year return period design storm and will provide an additional 1' of freeboard above the high water elevation of these basins. Stormwater release rates from the site will be limited to 0.1 cfs per acre during this design storm event.
- On-site storm infrastructure including inlets, pipes and curb-cuts have been designed to accommodate the peak runoff resulting from the 10-year return period design storm.

Existing Major Drainage Basin Description

The existing site currently drains from the North to the West at slopes ranging from 6%-12%, falling a total of 71' across the site. There are limited natural gulleys and depressions throughout the site. The site is impacted by an existing 15" storm drain that discharges to the property from the northeast. The storm water runoff form the discharge pipe and the site flow towards an existing detention pond that, per Weber County, has been sized to incorporate the water from the discharge and the site.

Preliminary storm runoff calculations show that the undeveloped/historic peak stormwater runoff from this site during the 10-year storm event is approximately 2.19 cfs. The allowable release rate from the site would be, per the 0.1 cfs/acre release rate, **0.862 cfs**. Based upon the models provided by the County, the offsite flow that discharges to the site is **11.18 cfs** for the 10 year storm. All assumptions and calculations used to determine the historic runoff rate can be found in the Appendix of this report.

Proposed Major Basin Description

The proposed development will contain the stormwater runoff flows into one major drainage basin, A. A copy of the Proposed Major Drainage Basin Map, EX-2, can be found in the Appendix of this report.

Drainage Basin A contains all of Phase 8 totaling 8.618 acres. This basin will drain via sheet flow, roof drains, curb and gutter, and storm sewer into Teulluride Ridge Lane. The existing Detention Basin will release stormwater to the existing storm drainage canal located adjacent to pond. The required detention volume for this basin is **8,522 CF**. The design detention volume, per Weber County, can incorporate the design volume. Stormwater flows in excess of the design storm event will safely overflow into the right-of-way and flow into the existing storm drainage canal system via existing channels.

Proposed Minor Basin Description and Analysis

The proposed minor basins located within Basins A shown on the Proposed Minor Basin Drainage Map, EX-3 included within Appendix of this report.

Minor A Basins

Sub-basins A-1 through A-7, include both the residential lots and roadway. Stormwater from these sub-basins will sheet flow into waterways, curb and gutter, inlets which will direct stormwater runoff into the storm drain system.

Minor basin time of concentration and peak flow rate calculations were estimated to be 10 min. All proposed inlets and storm sewer pipes within these sub-basins have been sized to accommodate the storm runoff flows resulting from the 10-year design storm event using StormCAD software. Results from the StormCAD analysis can be found in Appendix of this report, including HGL and EGL profiles. All proposed inlets and pipes have capacity to accommodate the design storm event.

Conclusion

In conclusion, the proposed development has been designed in compliance with the standards of the City of Eden and the Weber County Drainage Manual. It is anticipated the proposed development will not negatively impact the existing storm sewer system or the regional groundwater system.

If any questions arise, please feel free to contact me directly.

Sincerely,
Galloway

Richard Piggott
Richard@GallowayUS.com

References

Weber County Drainage Manual
NOAA Atlas 14, Volume 1, Version 5 – Eden, Utah

JOINS

4575000mN

p Insurance Program at 1-800-638-6620

MAP SCALE 1" = 500'

250 0 500 1000

FEET

METER

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0229F

FIRM

FLOOD INSURANCE RATE MAP

WEBER COUNTY, UTAH

AND INCORPORATED AREAS

PANEL 229 OF 600

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
WEBER COUNTY	490187	0229	F

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
49057C0229F

MAP REVISED
JUNE 2, 2015

Federal Emergency Management Agency

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Morgan Area, Utah - Morgan County and Part of Weber County

March 15, 2016

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (http://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means

for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the

individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Morgan Area, Utah - Morgan County and Part of Weber County
Survey Area Data: Version 8, Aug 1, 2014

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 8, 2010—Sep 28, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Morgan Area, Utah - Morgan County and Part of Weber County (UT609)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
YcD	Yeates Hollow very stony loam, 10 to 30 percent slopes	7.3	100.0%
Totals for Area of Interest		**7.3**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Morgan Area, Utah - Morgan County and Part of Weber County

YcD—Yeates Hollow very stony loam, 10 to 30 percent slopes

Map Unit Setting

National map unit symbol: k06b
Mean annual precipitation: 18 to 22 inches
Farmland classification: Not prime farmland

Map Unit Composition

Yeates hollow and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Yeates Hollow

Setting

Landform: Alluvial fans, benches, mountainsides
Landform position (three-dimensional): Mountainflank
Down-slope shape: Concave, linear, convex
Across-slope shape: Convex, linear
Parent material: Colluvium and/or slope alluvium over residuum weathered from conglomerate

Typical profile

A1 - 0 to 10 inches: very stony loam
B21t - 10 to 19 inches: very gravelly loam
B22t - 19 to 29 inches: very gravelly clay loam
B23t - 29 to 55 inches: very gravelly clay loam
R - 55 to 59 inches: unweathered bedrock

Properties and qualities

Slope: 10 to 30 percent
Percent of area covered with surface fragments: 13.0 percent
Depth to restrictive feature: 40 to 60 inches to lithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 5.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: C
Ecological site: Mountain Gravelly Loam (Mountain Big Sagebrush) (R047XA406UT)

Minor Components

Henefer

Percent of map unit: 3 percent

Ant flat
Percent of map unit: 3 percent

Holmes
Percent of map unit: 3 percent

Lamondi
Percent of map unit: 2 percent

Yeates hollow
Percent of map unit: 2 percent

Manila
Percent of map unit: 2 percent

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

Project: Fairways at Wolf Creek

Address:

Eden, UT

Date: 12//2015

10-Year Recurrence Interval Storm (Per NOAA Atlas 14)

Site Coordinates: 41.335531, -111.832861

Time (minutes)	Depth (inches)	Intensity (in/hr)
5	0.339	4.07
10	0.517	3.10
15	0.640	2.56
30	0.862	1.72
60	1.070	1.07
120	1.310	0.66
180	1.420	0.47
360	1.830	0.31
720	2.390	0.20
1440	3.090	0.13

PDS-based precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)								
	1	2	5	10	25	50	100	200	500	1000
5-min	0.160 (0.140-0.184)	0.203 (0.180-0.233)	0.275 (0.241-0.315)	0.339 (0.296-0.390)	0.442 (0.377-0.512)	0.536 (0.444-0.626)	0.647 (0.520-0.765)	0.778 (0.603-0.940)	0.992 (0.726-1.24)	1.19 (0.831-1.53)
10-min	0.244 (0.214-0.280)	0.308 (0.274-0.355)	0.418 (0.367-0.479)	0.517 (0.450-0.594)	0.673 (0.573-0.778)	0.815 (0.676-0.953)	0.984 (0.791-1.17)	1.18 (0.917-1.43)	1.51 (1.10-1.88)	1.82 (1.26-2.33)
15-min	0.302 (0.265-0.347)	0.382 (0.339-0.440)	0.518 (0.455-0.594)	0.640 (0.558-0.735)	0.834 (0.711-0.965)	1.01 (0.837-1.18)	1.22 (0.980-1.44)	1.47 (1.14-1.77)	1.87 (1.37-2.33)	2.25 (1.57-2.88)
30-min	0.407 (0.357-0.467)	0.514 (0.457-0.593)	0.697 (0.613-0.800)	0.862 (0.751-0.991)	1.12 (0.957-1.30)	1.36 (1.13-1.59)	1.64 (1.32-1.94)	1.98 (1.53-2.39)	2.52 (1.84-3.14)	3.03 (2.11-3.88)
60-min	0.503 (0.442-0.578)	0.637 (0.565-0.734)	0.863 (0.758-0.991)	1.07 (0.930-1.23)	1.39 (1.18-1.61)	1.68 (1.40-1.97)	2.03 (1.63-2.41)	2.44 (1.90-2.96)	3.12 (2.28-3.89)	3.75 (2.61-4.81)
2-hr	0.671 (0.599-0.761)	0.842 (0.750-0.954)	1.08 (0.961-1.23)	1.31 (1.15-1.49)	1.68 (1.45-1.93)	2.02 (1.70-2.33)	2.42 (1.97-2.83)	2.89 (2.27-3.46)	3.65 (2.70-4.50)	4.36 (3.08-5.50)
3-hr	0.774 (0.696-0.864)	0.959 (0.865-1.07)	1.20 (1.07-1.33)	1.42 (1.26-1.59)	1.77 (1.55-2.00)	2.10 (1.80-2.40)	2.50 (2.09-2.89)	2.96 (2.40-3.49)	3.72 (2.86-4.50)	4.41 (3.26-5.56)
6-hr	1.07 (0.983-1.18)	1.31 (1.20-1.44)	1.58 (1.44-1.74)	1.83 (1.65-2.02)	2.19 (1.96-2.44)	2.50 (2.21-2.81)	2.85 (2.48-3.24)	3.25 (2.76-3.73)	4.02 (3.30-4.72)	4.71 (3.77-5.66)
12-hr	1.40 (1.28-1.54)	1.72 (1.57-1.89)	2.07 (1.89-2.29)	2.39 (2.16-2.64)	2.86 (2.55-3.18)	3.25 (2.86-3.65)	3.67 (3.17-4.16)	4.11 (3.49-4.73)	4.80 (3.96-5.64)	5.35 (4.30-6.42)
24-hr	1.85 (1.67-2.05)	2.27 (2.05-2.51)	2.72 (2.45-3.01)	3.09 (2.79-3.42)	3.61 (3.24-3.99)	4.01 (3.58-4.43)	4.42 (3.94-4.89)	4.84 (4.29-5.35)	5.41 (4.76-6.00)	5.85 (5.11-6.50)
2-day	2.23 (2.02-2.49)	2.74 (2.48-3.06)	3.28 (2.96-3.66)	3.73 (3.36-4.15)	4.34 (3.90-4.83)	4.82 (4.30-5.37)	5.31 (4.72-5.91)	5.80 (5.13-6.47)	6.46 (5.67-7.22)	6.96 (6.07-7.81)
3-day	2.53 (2.29-2.82)	3.11 (2.81-3.46)	3.74 (3.38-4.16)	4.26 (3.84-4.74)	4.99 (4.47-5.54)	5.55 (4.95-6.17)	6.13 (5.45-6.81)	6.72 (5.94-7.49)	7.52 (6.59-8.40)	8.14 (7.06-9.12)
4-day	2.83 (2.56-3.15)	3.48 (3.15-3.87)	4.20 (3.79-4.66)	4.80 (4.32-5.33)	5.63 (5.04-6.24)	6.28 (5.60-6.97)	6.95 (6.17-7.72)	7.64 (6.75-8.51)	8.58 (7.50-9.58)	9.31 (8.08-10.4)
7-day	3.53 (3.17-3.96)	4.34 (3.90-4.88)	5.23 (4.68-5.87)	5.96 (5.33-6.70)	6.97 (6.22-7.83)	7.76 (6.90-8.73)	8.58 (7.58-9.65)	9.41 (8.27-10.6)	10.5 (9.18-11.9)	11.4 (9.86-13.0)
10-day	4.04 (3.64-4.54)	4.97 (4.48-5.58)	5.96 (5.35-6.68)	6.75 (6.05-7.57)	7.80 (6.98-8.74)	8.59 (7.66-9.63)	9.38 (8.34-10.5)	10.2 (9.00-11.4)	11.2 (9.85-12.6)	12.0 (10.5-13.6)
20-day	5.34 (4.82-5.93)	6.57 (5.92-7.29)	7.79 (7.02-8.65)	8.74 (7.86-9.70)	9.96 (8.94-11.0)	10.8 (9.71-12.0)	11.7 (10.5-13.0)	12.5 (11.2-13.9)	13.6 (12.0-15.1)	14.3 (12.7-16.0)
30-day	6.54 (5.94-7.24)	8.03 (7.29-8.89)	9.47 (8.60-10.5)	10.6 (9.60-11.7)	12.0 (10.9-13.3)	13.1 (11.8-14.5)	14.1 (12.7-15.7)	15.1 (13.6-16.8)	16.3 (14.6-18.2)	17.2 (15.3-19.3)
45-day	8.23 (7.48-9.05)	10.1 (9.16-11.1)	11.9 (10.8-13.0)	13.3 (12.0-14.6)	15.1 (13.6-16.6)	16.4 (14.8-18.0)	17.7 (15.9-19.5)	19.0 (17.0-20.9)	20.6 (18.3-22.7)	21.7 (19.3-24.1)
60-day	9.62 (8.77-10.5)	11.8 (10.8-12.9)	13.9 (12.6-15.2)	15.5 (14.1-16.9)	17.5 (15.9-19.2)	18.9 (17.2-20.8)	20.4 (18.4-22.4)	21.7 (19.6-23.9)	23.4 (21.0-25.8)	24.6 (22.0-27.2)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

Estimates from the table in csv format: precipitation frequency estimates ▾ Submit

Project: Fairways at Wolf Creek

Address:

Eden, UT

Date: 12//2015

100-Year Recurrence Interval Storm (Per NOAA Atlas 14)

Site Coordinates: 41.335531, -111.832861

Time (minutes)	Depth (inches)	Intensity (in/hr)
5	0.647	7.76
10	0.984	5.90
15	1.220	4.88
30	1.640	3.29
60	2.030	2.03
120	2.420	1.21
180	2.500	0.83
360	2.850	0.48
720	3.670	0.30
1440	4.420	0.18

PDS-based precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.160 (0.140-0.184)	0.203 (0.180-0.233)	0.275 (0.241-0.315)	0.339 (0.296-0.390)	0.442 (0.377-0.512)	0.536 (0.444-0.626)	0.647 (0.520-0.765)	0.778 (0.603-0.940)	0.992 (0.726-1.24)	1.19 (0.831-1.53)
10-min	0.244 (0.214-0.280)	0.308 (0.274-0.355)	0.418 (0.367-0.479)	0.517 (0.450-0.594)	0.673 (0.573-0.778)	0.815 (0.676-0.953)	0.984 (0.791-1.17)	1.18 (0.917-1.43)	1.51 (1.10-1.88)	1.82 (1.26-2.33)
15-min	0.302 (0.265-0.347)	0.382 (0.339-0.440)	0.518 (0.455-0.594)	0.640 (0.558-0.735)	0.834 (0.711-0.965)	1.01 (0.837-1.18)	1.22 (0.980-1.44)	1.47 (1.14-1.77)	1.87 (1.37-2.33)	2.25 (1.57-2.88)
30-min	0.407 (0.357-0.467)	0.514 (0.457-0.593)	0.697 (0.613-0.800)	0.862 (0.751-0.991)	1.12 (0.957-1.30)	1.36 (1.13-1.59)	1.64 (1.32-1.94)	1.98 (1.53-2.39)	2.52 (1.84-3.14)	3.03 (2.11-3.88)
60-min	0.503 (0.442-0.578)	0.637 (0.565-0.734)	0.863 (0.758-0.991)	1.07 (0.930-1.23)	1.39 (1.18-1.61)	1.68 (1.40-1.97)	2.03 (1.63-2.41)	2.44 (1.90-2.96)	3.12 (2.28-3.89)	3.75 (2.61-4.81)
2-hr	0.671 (0.599-0.761)	0.842 (0.750-0.954)	1.08 (0.961-1.23)	1.31 (1.15-1.49)	1.68 (1.45-1.93)	2.02 (1.70-2.33)	2.42 (1.97-2.83)	2.89 (2.27-3.46)	3.65 (2.70-4.50)	4.36 (3.08-5.50)
3-hr	0.774 (0.698-0.864)	0.959 (0.865-1.07)	1.20 (1.07-1.33)	1.42 (1.26-1.59)	1.77 (1.55-2.00)	2.10 (1.80-2.40)	2.50 (2.09-2.89)	2.96 (2.40-3.49)	3.72 (2.86-4.50)	4.41 (3.26-5.56)
6-hr	1.07 (0.983-1.18)	1.31 (1.20-1.44)	1.58 (1.44-1.74)	1.83 (1.65-2.02)	2.19 (1.96-2.44)	2.50 (2.21-2.81)	2.85 (2.48-3.24)	3.25 (2.76-3.73)	4.02 (3.30-4.72)	4.71 (3.77-5.66)
12-hr	1.40 (1.28-1.54)	1.72 (1.57-1.89)	2.07 (1.89-2.29)	2.39 (2.16-2.64)	2.86 (2.55-3.18)	3.25 (2.86-3.65)	3.67 (3.17-4.16)	4.11 (3.49-4.73)	4.80 (3.96-5.64)	5.35 (4.30-6.42)
24-hr	1.85 (1.67-2.05)	2.27 (2.05-2.51)	2.72 (2.45-3.01)	3.09 (2.79-3.42)	3.61 (3.24-3.99)	4.01 (3.58-4.43)	4.42 (3.94-4.89)	4.84 (4.29-5.35)	5.41 (4.76-6.00)	5.85 (5.11-6.50)
2-day	2.23 (2.02-2.49)	2.74 (2.48-3.06)	3.28 (2.96-3.66)	3.73 (3.36-4.15)	4.34 (3.90-4.83)	4.82 (4.30-5.37)	5.31 (4.72-5.91)	5.80 (5.13-6.47)	6.46 (5.67-7.22)	6.96 (6.07-7.81)
3-day	2.53 (2.29-2.82)	3.11 (2.81-3.46)	3.74 (3.38-4.16)	4.26 (3.84-4.74)	4.99 (4.47-5.54)	5.55 (4.95-6.17)	6.13 (5.45-6.81)	6.72 (5.94-7.49)	7.52 (6.59-8.40)	8.14 (7.08-9.12)
4-day	2.83 (2.56-3.15)	3.48 (3.15-3.87)	4.20 (3.79-4.66)	4.80 (4.32-5.33)	5.63 (5.04-6.24)	6.28 (5.60-6.97)	6.95 (6.17-7.72)	7.64 (6.75-8.51)	8.58 (7.50-9.58)	9.31 (8.08-10.4)
7-day	3.53 (3.17-3.96)	4.34 (3.90-4.88)	5.23 (4.68-5.87)	5.96 (5.33-6.70)	6.97 (6.22-7.83)	7.76 (6.90-8.73)	8.58 (7.58-9.65)	9.41 (8.27-10.6)	10.5 (9.18-11.9)	11.4 (9.86-13.0)
10-day	4.04 (3.64-4.54)	4.97 (4.48-5.58)	5.96 (5.35-6.68)	6.75 (6.05-7.57)	7.80 (6.98-8.74)	8.59 (7.66-9.63)	9.38 (8.34-10.5)	10.2 (9.00-11.4)	11.2 (9.85-12.6)	12.0 (10.5-13.6)
20-day	5.34 (4.82-5.93)	6.57 (5.92-7.29)	7.79 (7.02-8.65)	8.74 (7.86-9.70)	9.96 (8.94-11.0)	10.8 (9.71-12.0)	11.7 (10.5-13.0)	12.5 (11.2-13.9)	13.6 (12.0-15.1)	14.3 (12.7-16.0)
30-day	6.54 (5.94-7.24)	8.03 (7.29-8.89)	9.47 (8.60-10.5)	10.6 (9.60-11.7)	12.0 (10.9-13.3)	13.1 (11.8-14.5)	14.1 (12.7-15.7)	15.1 (13.6-16.8)	16.3 (14.6-18.2)	17.2 (15.3-19.3)
45-day	8.23 (7.48-9.05)	10.1 (9.16-11.1)	11.9 (10.8-13.0)	13.3 (12.0-14.6)	15.1 (13.6-16.6)	16.4 (14.8-18.0)	17.7 (15.9-19.5)	19.0 (17.0-20.9)	20.6 (18.3-22.7)	21.7 (19.3-24.1)
60-day	9.62 (8.77-10.5)	11.8 (10.8-12.9)	13.9 (12.6-15.2)	15.5 (14.1-16.9)	17.5 (15.9-19.2)	18.9 (17.2-20.8)	20.4 (18.4-22.4)	21.7 (19.6-23.9)	23.4 (21.0-25.8)	24.6 (22.0-27.2)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

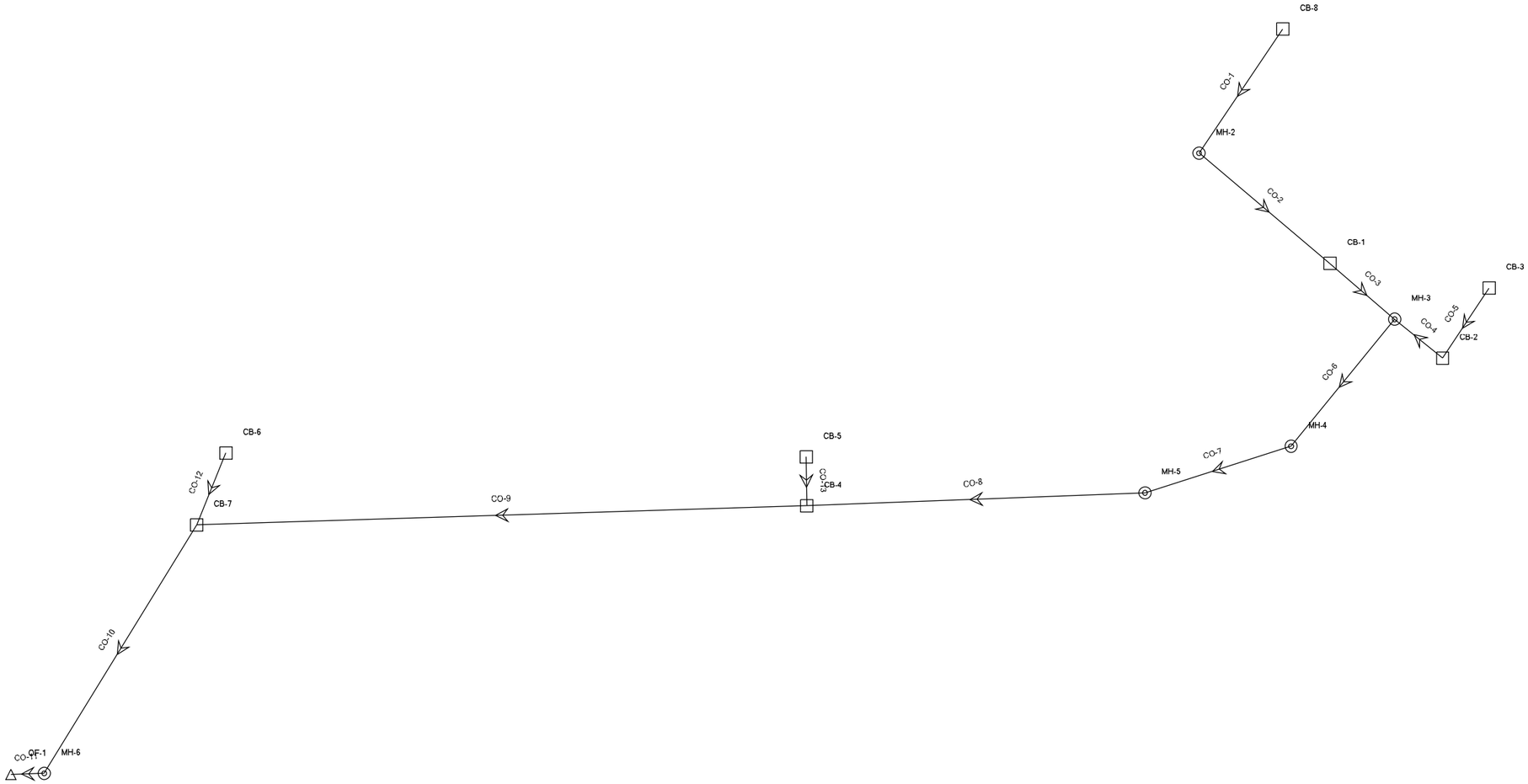
Estimates from the table in csv format: precipitation frequency estimates ▾ Submit

Project: Fairways at Wolf Creek
Address:
Eden, UT
Date: 12//2015

Site Percent Impervious and Runoff Coefficients

Basin	Land Use	Percent Impervious	Area (FT^2)	Area (Ac.)	Soil Type	Composite C_2	Composite C_5	Composite C_{10}	Composite C_{100}
A1	Paved Areas	100%	82,407	1.89		0.87	0.88	0.90	0.93
	Roofs	90%	66,000	1.52		0.80	0.85	0.90	0.90
	Landscape	2%	264,281	6.07		0.10	0.11	0.13	0.15
	TOTAL	**36%**	**412,688**	**9.474**	**B**	**0.37**	**0.38**	**0.41**	**0.43**
B1	Paved Areas	100%	69,000	1.58		0.87	0.88	0.90	0.93
	Roofs	90%	51,000	1.17		0.80	0.85	0.90	0.90
	Landscape	2%	155,838	3.58		0.10	0.11	0.13	0.15
	TOTAL	**43%**	**275,838**	**6.332**	**B**	**0.42**	**0.44**	**0.46**	**0.48**

Scenario: Base



FlexTable: Catch Basin Table (Untitled1.stc)

Label	Station (Calculated) (ft)	Elevation (Ground) (ft)	Set Rim to Ground Elevation?	Elevation (Rim) (ft)	Elevation (Invert) (ft)	Inlet Drainage Area (acres)
CB-1	8+26	55.07	True	55.07	48.70	(N/A)
CB-2	8+14	54.50	True	54.50	48.58	(N/A)
CB-3	8+55	54.50	True	54.50	48.73	(N/A)
CB-4	4+60	29.36	True	29.36	23.29	(N/A)
CB-5	4+84	29.36	True	29.36	23.75	(N/A)
CB-6	1+97	12.79	True	12.79	9.00	(N/A)
CB-7	1+59	12.79	True	12.79	8.00	(N/A)
CB-8	9+84	70.18	True	70.18	51.94	(N/A)

Inlet C	Local CA (acres)	Local Flow Time (min)	External CA (acres)	External Tc (min)	Flow (Additional) (ft³/s)	Carryover Additional Flow (ft³/s)	Flow (Known) (ft³/s)
(N/A)	0.000	5.000	0.000	0.000	0.00	0.00	12.48
(N/A)	0.000	5.000	0.000	0.000	0.00	0.00	2.32
(N/A)	0.000	5.000	0.000	0.000	0.00	0.00	2.12
(N/A)	0.000	5.000	0.000	0.000	0.00	0.00	16.28
(N/A)	0.000	5.000	0.000	0.000	0.00	0.00	0.74
(N/A)	0.000	5.000	0.000	0.000	0.00	0.00	1.40
(N/A)	0.000	5.000	0.000	0.000	0.00	0.00	19.32
(N/A)	0.000	5.000	0.000	0.000	0.00	0.00	11.18

Inlet Type	Maximum Inflow (ft³/s)	Capture Efficiency (%)	Inlet	Inlet Location	Design Inlet Opening?
Percent Capture	0.00	100.0	<None>	On Grade	True
Percent Capture	0.00	100.0	<None>	On Grade	True
Percent Capture	0.00	100.0	<None>	On Grade	True
Percent Capture	0.00	100.0	<None>	On Grade	True
Percent Capture	0.00	100.0	<None>	On Grade	True
Percent Capture	0.00	100.0	<None>	On Grade	True
Percent Capture	0.00	100.0	<None>	On Grade	True
Percent Capture	0.00	100.0	<None>	On Grade	True

Desired Sump Depth (ft)	Design Structure Elevation?	Depth (In) (ft)	Depth (Out) (ft)	System CA (acres)	Headloss (ft)
0.00	True	2.24	2.24	0.000	0.00
0.00	True	1.79	1.79	0.000	0.00
0.00	True	1.78	1.78	0.000	0.00
0.00	True	2.00	1.45	0.000	0.55
0.00	True	1.55	1.55	0.000	0.00
0.00	True	0.47	0.47	0.000	0.00
0.00	True	1.58	1.58	0.000	0.00
0.00	True	1.28	1.28	0.000	0.00

Headloss Method	Local Rational Flow (ft³/s)
Absolute	0.00
Absolute	0.00
Standard	0.00

FlexTable: Catch Basin Table (Untitled1.stc)

Headloss Method	Local Rational Flow (ft³/s)
Standard	0.00
Absolute	0.00
Absolute	0.00
Absolute	0.00
Absolute	0.00

Conduit FlexTable: Combined Pipe/Node Report (Untitled1.stc)

Label	Start Node	Stop Node
CO-13	CB-5	CB-4
CO-1	CB-8	MH-2
CO-2	MH-2	CB-1
CO-3	CB-1	MH-3
CO-5	CB-2	CB-3
CO-4	MH-3	CB-2
CO-6	MH-3	MH-4
CO-7	MH-4	MH-5
CO-8	MH-5	CB-4
CO-9	CB-4	CB-7
CO-12	CB-6	CB-7
CO-10	CB-7	MH-6
CO-11	MH-6	OF-1

Branch ID	Branch Element ID	Length (Unified) (ft)	Upstream Inlet C	Upstream Intensity (in/h)	Upstream Inlet Area (acres)
4	1	24.0	(N/A)	8.000	(N/A)
3	1	74.0	(N/A)	8.000	(N/A)
3	2	84.0	(N/A)	8.000	(N/A)
3	3	42.0	(N/A)	8.000	(N/A)
2	1	41.0	(N/A)	8.000	(N/A)
2	2	30.0	(N/A)	8.000	(N/A)
2	3	81.0	(N/A)	8.000	(N/A)
2	4	76.0	(N/A)	8.000	(N/A)
2	5	167.0	(N/A)	8.000	(N/A)
2	6	301.0	(N/A)	8.000	(N/A)
1	1	38.0	(N/A)	8.000	(N/A)
1	2	143.0	(N/A)	8.000	(N/A)
1	3	16.0	(N/A)	8.000	(N/A)

Upstream Structure Flow (Total Surface) (ft^3/s)	System CA (acres)	System Intensity (in/h)	System Rational Flow (ft^3/s)	Total Flow (ft^3/s)	Rise (Unified) (in)
0.00	0.000	8.000	0.00	0.74	15.0
0.00	0.000	8.000	0.00	11.18	18.0
0.00	0.000	8.000	0.00	11.18	18.0
0.00	0.000	8.000	0.00	12.48	18.0
0.00	0.000	8.000	0.00	2.12	12.0
0.00	0.000	8.000	0.00	2.32	18.0
0.00	0.000	8.000	0.00	14.80	24.0
0.00	0.000	8.000	0.00	14.80	24.0
0.00	0.000	8.000	0.00	14.80	24.0
0.00	0.000	8.000	0.00	16.28	24.0
0.00	0.000	8.000	0.00	1.40	15.0
0.00	0.000	8.000	0.00	19.32	24.0
0.00	0.000	8.000	0.00	19.32	24.0

Capacity (Full Flow) (ft^3/s)	Velocity (Average) (ft/s)	Invert (Upstream) (ft)	Invert (Downstream) (ft)	Slope (ft/ft)	Notes
8.94	0.60	23.75	23.29	0.019	

Conduit FlexTable: Combined Pipe/Node Report (Untitled1.stc)

Capacity (Full Flow) (ft³/s)	Velocity (Average) (ft/s)	Invert (Upstream) (ft)	Invert (Downstream) (ft)	Slope (ft/ft)	Notes
20.47	11.84	51.94	49.13	0.038	
7.52	6.33	49.13	48.70	0.005	
7.94	7.06	48.70	48.46	0.006	
-2.15	2.70	48.58	48.73	-0.004	
-6.64	1.31	48.46	48.58	-0.004	
64.52	16.66	48.46	41.87	0.081	
56.43	15.13	41.87	37.14	0.062	
65.15	16.78	37.14	23.29	0.083	
50.98	14.43	23.29	8.00	0.051	
10.48	5.94	9.00	8.00	0.026	
42.30	13.16	8.00	3.00	0.035	
79.98	20.96	3.00	1.00	0.125	

Manning's n	Flow (Downstream Conduit) (ft³/s)	Upstream Rational Flow (ft³/s)
0.013	(N/A)	0.00
0.013	(N/A)	0.00
0.013	(N/A)	0.00
0.013	(N/A)	0.00
0.013	(N/A)	0.00
0.013	(N/A)	0.00
0.013	(N/A)	0.00
0.013	(N/A)	0.00
0.013	(N/A)	0.00
0.013	(N/A)	0.00
0.013	(N/A)	0.00
0.013	(N/A)	0.00
0.013	(N/A)	0.00
0.013	(N/A)	0.00

Profile Report
Profile: Profile - 1

ID\Label	29 \ CO-1	30 \ CO-2	31 \ CO-3	34 \ CO-6	35 \ CO-7	36 \ CO-8	37 \ CO-9	38 \ CO-10	39 \ CO-11
Link Length (ft)	71.0	81.0	39.0	78.0	73.0	164.0	298.0	140.0	13.0
Rise (in)\Material	18.0 \	18.0 \	18.0 \	24.0 \	24.0 \	24.0 \	24.0 \	24.0 \	24.0 \
Flow (ft³/s)	11.18	11.18	12.48	14.80	14.80	14.80	16.28	19.32	19.32
Slope (ft/ft)	0.038	0.005	0.006	0.081	0.062	0.083	0.051	0.035	0.125

ID\Label	46 \ CB-8	16 \ MH-2	18 \ CB-1	17 \ MH-3	21 \ MH-4	22 \ MH-5	23 \ CB-4	26 \ CB-7	27 \ MH-OF-1
Ground (ft)	70.18	55.60	55.07	54.50	47.24	42.67	29.36	12.79	8.00
Invert (ft)	51.94	49.13	48.70	48.46	41.87	37.14	23.29	8.00	3.00
Station (ft)	0.0	74.0	153.0	200.0	281.0	357.0	524.0	825.0	964.0

Galloway
Planning. Architecture. Engineering.

Project: Fairways at Wolf Creek
Address:
Eden, UT
Date: 12//2015

Basin A - 10 year

Site Area = 8.624 Acres
Runoff Coefficient = 0.350
Allowable Release = 0.862 cfs

10-Year Storm: NOAA				Maximum Allowable Discharge =			0.862cfs
Time (min)	Rate (in/hr)	Rainfall (Inches)	Q in (cfs)	Add. Q in (cfs)	Total Q in (cfs)	Q out (cfs)	Storage (cf)
5	4.068	0.339	12.279	0.00	12.279	0.862	3,424.9
10	3.102	0.517	9.363	0.00	9.363	0.862	5,100.4
15	2.560	0.640	7.727	0.00	7.727	0.862	6,178.2
30	1.724	0.862	5.204	0.00	5.204	0.862	7,814.4
60	1.070	1.070	3.230	0.00	3.230	0.862	8,522.2
120	0.655	1.310	1.977	0.00	1.977	0.862	8,025.5
180	0.473	1.420	1.429	0.00	1.429	0.862	6,116.1
360	0.305	1.830	0.921	0.00	0.921	0.862	1,257.4
720	0.199	2.390	0.601	0.00	0.601	0.862	-11,285.4
1440	0.129	3.090	0.389	0.00	0.389	0.862	-40,934.7

Required Storage = **8,522 C.F.**
Provided Storage = **8,600 C.F.**