Memorandum

To: **Planning Commission**
From: **Niall Connolly, Director of Community Development**
Date: **May 1st, 2026**
Re: **Parking Lot expansion, Driftwood Lodge, 1515 Zion Park Blvd**

Introduction

Hans Dunzinger has applied for Design Development Review approval for an extension to his parking facilities at the Driftwood Lodge, 1515 Zion Park Blvd. He is proposing 10 additional parking spaces, that will be used by his guests. The new parking spaces are proposed beside his new building, which is nearing completion. The proposed parking area has already been staked out, but construction cannot commence until approval is received from the Town.

Figure 1. Aerial View showing the area that is currently under construction

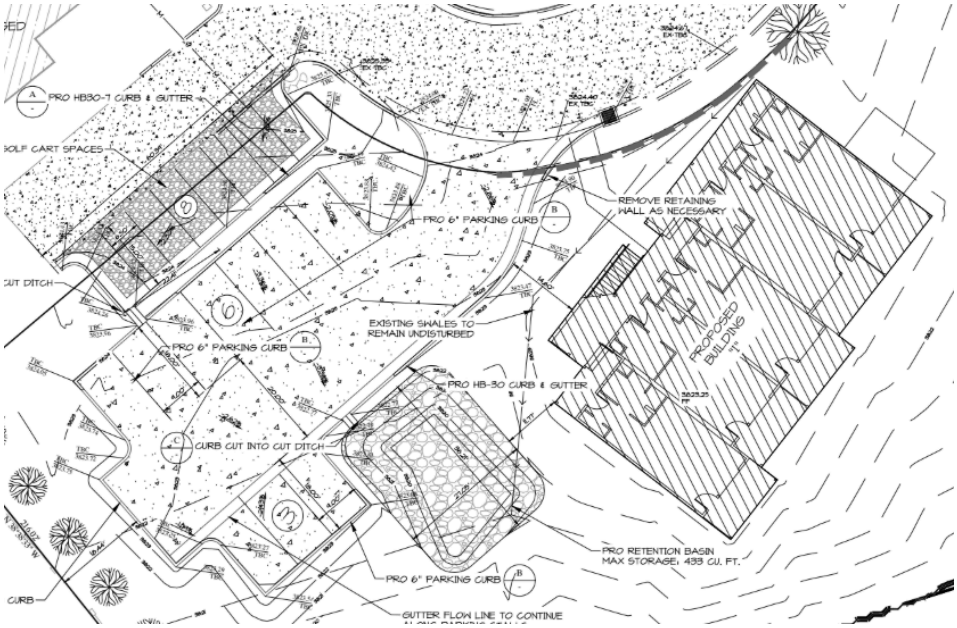


Figure 2. Engineer's Layout showing the proposed new parking spaces, new hotel building on the right-hand side

Development Standards

Code Requirement	Proposal
Section 10-18-4: Minimum of 60% of the property must be landscaped.	The new parking spaces will reduce the overall landscaping on the property. However, approximately 70% of the property will still be landscaped, even with the new parking spaces. Complies.
Section 10-18-6(C): Standards for parking areas with more than 15 spaces.	Only 10 new spaces are proposed, therefore these standards don't strictly apply. Nevertheless, the design does adhere to these standards. There is a four foot gap between the new spaces and existing spaces, where they are head to head. Planting is proposed around the parking area, and there is ample landscaping on this part of the property. Curbs are proposed, which will protect the landscaped area. Complies.
Section 10-23-4: Minimum Parking Spaces Required.	The property is already in compliance with minimum parking standards. By adding ten extra

	spaces, they will still be in compliance. Complies.
Section 10-11B-6: Minimum Setbacks are 30 ft from the front property line, 10 ft from the side, and 20 ft from the rear.	Complies.
Outdoor Lighting must comply with 10-15C of the Town Code.	The proposed parking lot includes ten additional lighting bollards. The proposed fixtures appear to be compliant:  The applicant has stated that each light will be 32 lumens, adding a total of 320 lumens of outdoor lighting to the property. According to the recent application for the new hotel building, the property has a lumen allowance of 200,000 lumens, and 144,000

	lumens of outdoor lighting already exists. Adding 320 lumens will not exceed the maximum. The color temperature of the lights must be in the warmer range (3000 degrees Kelvin or less). Complies.
Plant species - water conserving species must constitute at least 80% of the landscape on a property.	The landscape plan shows a generous amount of planting. The tree planting on the property already exceeds the minimum requirements, and this proposal will increase that. The proposed plant species are generally drought tolerant. Pampas Grass and Gray Leaf Cotoneaster are among the species listed. They are both considered to be non-native and invasive in Utah. Although not specifically prohibited in the code, the applicant should be encouraged to select other, native plants in place of these. Complies - with recommendation to select other plants in place of Pampas Grass and Gray Leaf Cotoneaster.

Engineering Review

The proposed design has been reviewed by the Town Engineer - Sunrise Engineering. The Engineer reviewed the plans, including the drainage details that accompanied the application. The Town Engineer confirmed that the proposal met the Town's construction standards. The retention basin is appropriately sized to accommodate the anticipated amount of water that will drain from the parking area.

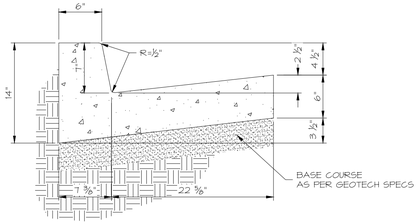
Planning Commission Action

The Commission should review the proposal, and determine to either approve or deny this Design Development Review application. The Commission may wish to use the following sample language as a motion:

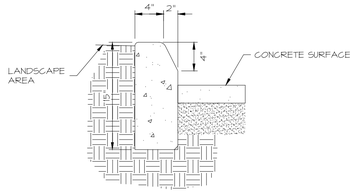
The Planning Commission approves/ denies approval for the Design Development Review application for ten new parking spaces at the Driftwood Lodge, 1515 Zion Park, Blvd. This approval is subject to the following conditions:

1. *The concrete color must be the Town's approved color (Davis Color #5084 2%, 2lbs color per 100 lbs of concrete) or a pre-approved equal alternative.*

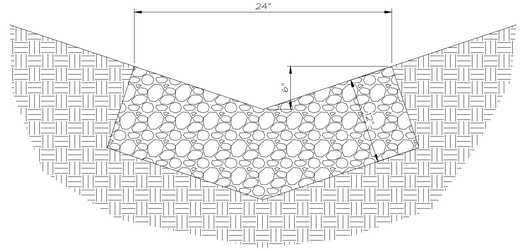
FINDINGS….



A
-
HB30-7 CURB & GUTTER
SCALE: N.T.S.



B
-
6" PARKING CURB
SCALE: N.T.S.



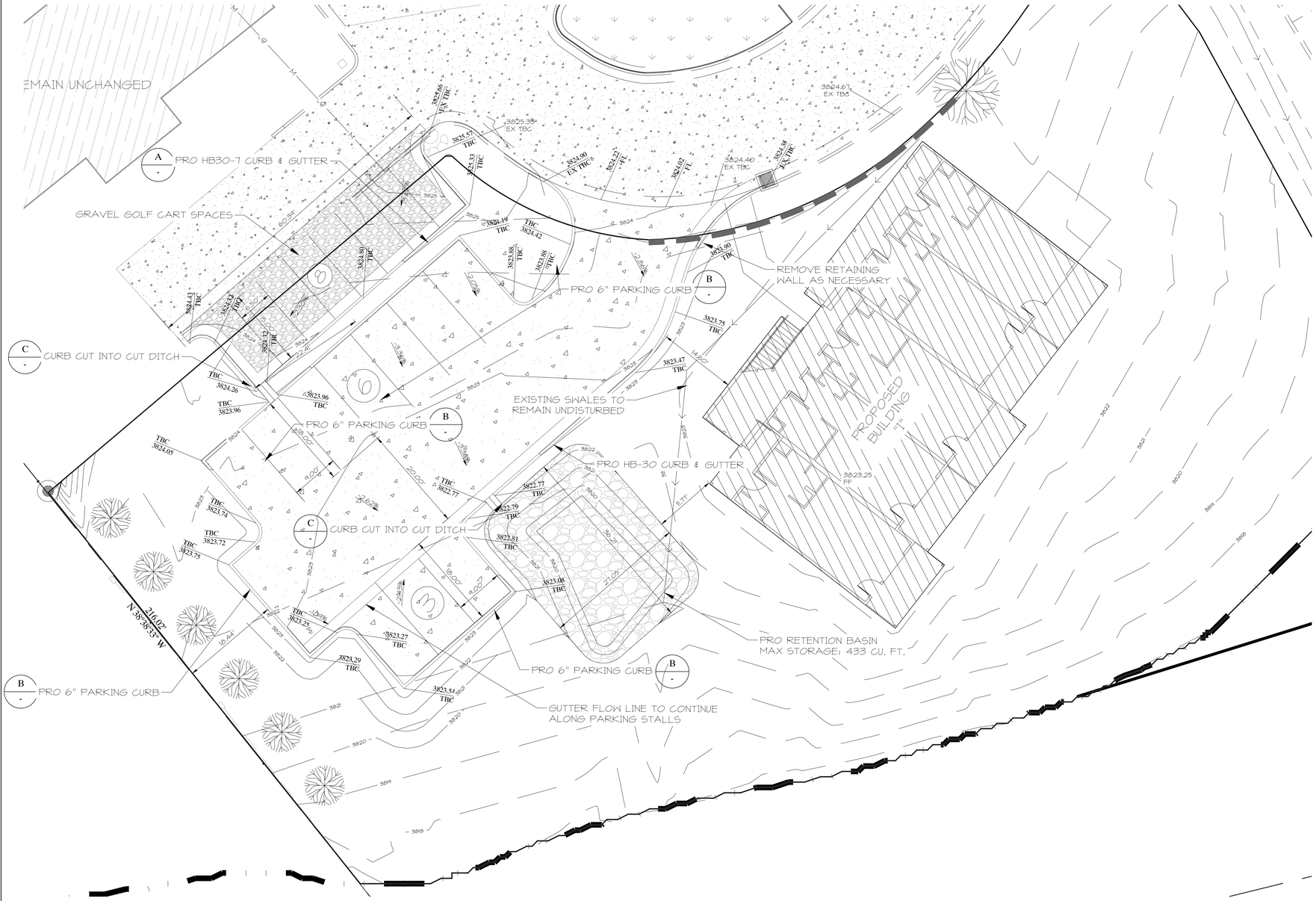
C
-
CUT DITCH WITH RIPRAP
SCALE: 1"=20'

GRADING NOTES:

1. ALL EXCAVATIONS, GRADING, AND FILL OPERATIONS SHALL COMPLY WITH THE RECOMMENDATIONS IN THE GEOTECHNICAL INVESTIGATION FOR DRIFTWOOD LODGE ADDITION BUILDINGS "G", "H" & "I", PREPARED BY APPLIED GEOTECH, DATED FEBRUARY 23, 2015.
2. THE CONTRACTOR SHALL PROVIDE SUITABLE EQUIPMENT TO CONTROL DUST AND AIR POLLUTION CAUSED BY CONSTRUCTION OPERATIONS. THE CONTRACTOR SHALL ALSO PROVIDE SUITABLE MUD AND DIRT CONTAINMENT TO MAINTAIN THE WORK SITE. ACCESS ROADWAYS AND ADJACENT PROPERTIES IN A CLEAN CONDITION.
3. ALL IMPORTED STRUCTURAL FILL SHALL BE APPROVED BY THE GEOTECHNICAL ENGINEER PRIOR TO DELIVERY TO THE SITE. REFER TO GEOTECHNICAL REPORT FOR ALL SOIL REQUIREMENTS.
4. ALL EXCAVATIONS, GRADING AND FILL OPERATIONS WITHIN THE BUILDING AREA SHOULD BE OBSERVED BY THE GEOTECHNICAL ENGINEER TO VERIFY SUB-SOIL CONDITIONS AND DETERMINE ADEQUACY OF SITE PREPARATION, SUITABILITY OF FILL MATERIALS AND COMPLIANCE WITH COMPACTION REQUIREMENTS.
5. UNLESS SHOWN OTHERWISE ON THESE PLANS, AND APPROVED BY THE TOWN OF SPRINGDALE ALL CONSTRUCTION SHALL CONFORM TO THE TOWN OF SPRINGDALE CONSTRUCTION DESIGN STANDARDS AND DETAILS MANUAL LATEST EDITIONS AS ADMINISTERED BY THE TOWN OF SPRINGDALE.
6. A MANDATORY PRE-CONSTRUCTION MEETING WILL BE REQUIRED ON ALL PROJECTS PRIOR TO ANY GRUBBING, GRADING, OR CONSTRUCTION ACTIVITIES. THE PERMIT HOLDER WILL BE REQUIRED TO NOTIFY ALL DEVELOPMENT SERVICES INSPECTORS.
7. OWNER IS RESPONSIBLE FOR ALL ON-SITE DETENTION AND DRAINAGE.
8. STOCK PILE TOPSOIL FOR FINISH GRADING.
9. ASPHALT SECTIONS PER GEOTECHNICAL INVESTIGATION.
10. CONCRETE FLATWORK SECTION PER GEOTECHNICAL INVESTIGATION.
11. BASEMENT GRADING AND DRAINAGE DESIGNED BY OTHERS IN ACCORDANCE WITH REPORT; "SUBSURFACE DRAIN RECOMMENDATIONS - DRIFTWOOD LODGE, BUILDINGS G, H AND I", PREPARED BY AGEC - PROJECT NO. 2150052, DATED MAY 27, 2015.
12. ALL AREAS OUTSIDE OF GRADING LIMITS WILL BE FENCED OR TAPED OFF DURING CONSTRUCTION TO PREVENT ACCIDENTAL OR INCIDENTAL DISTURBANCE OF THESE AREAS.

LEGEND:

- EXISTING 1' CONTOUR
- 3800 — EXISTING 5' CONTOUR
- PROPOSED 1' CONTOUR
- 3800 — PROPOSED 5' CONTOUR
- PROPOSED DRAINAGE SWALE
- 3800.00 TBC — PROPOSED ELEVATIONS
- 1.00% — GRADING SLOPES
- FLOW DIRECTION
- SD — PROPOSED STORM DRAIN (SIZE INDICATED ON PLANS)
- PROPOSED CATCH BASIN (SIZE INDICATED ON PLANS)
- EXISTING FLOOD PLAIN
- EXISTING FLOODPLAIN BOUNDARY
- EXISTING FLOODWAY BOUNDARY
- EXISTING CONCRETE DRIVEWAY
- PROPOSED CONCRETE PAD/SIDEWALK
- EXISTING CURB AND GUTTER
- PROPOSED CONCRETE DRIVEWAY
- PROPOSED LANDSCAPE WALL (BY OTHERS)
- PROPOSED CONCRETE WALL
- PROJECT LIMITS



NOTICE:
EXISTING UTILITIES ARE SHOWN ON PLANS FOR THE CONVENIENCE OF THE CONTRACTOR ONLY. THE CONTRACTOR IS RESPONSIBLE FOR THE LOCATION AND PROTECTION OF ALL UTILITIES. THE ENGINEER BEARS NO RESPONSIBILITY FOR UTILITIES NOT SHOWN OR SHOWN INCORRECTLY.

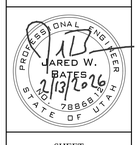
0 10' 20'
SCALE: 1"=10'

DATE:	2/11/26
JOB NO.:	6650-24
DESIGNED BY:	ETY
CHECKED BY:	JWB
DWG:	Construction

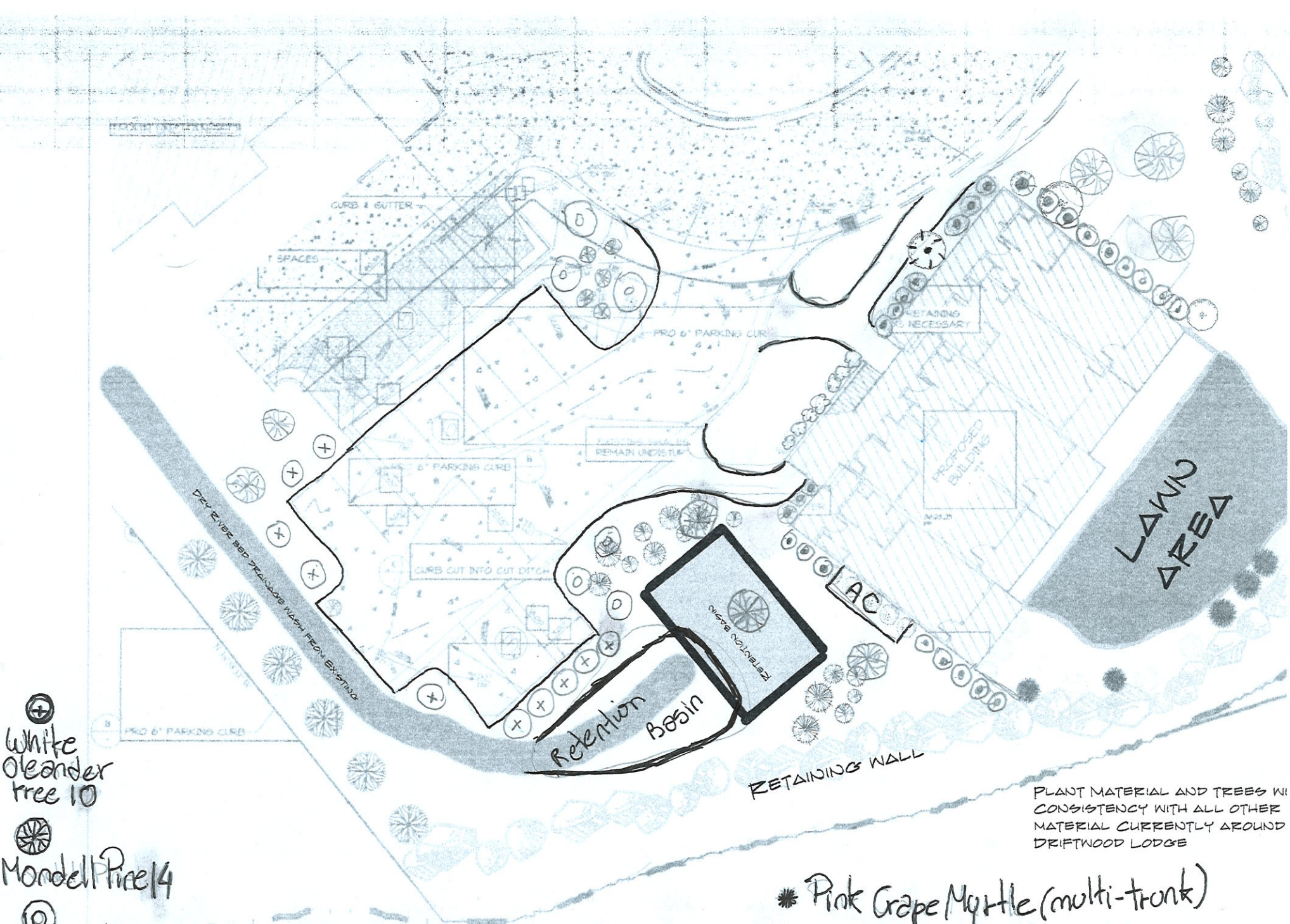
REVISIONS | DATE

ROSENBERG ASSOCIATES
CIVIL ENGINEERS • LAND SURVEYORS
352 East Riverside Drive, Suite A-2
St. George, Utah 84790
Ph (435) 673-8586 Fx (435) 673-8397
www.racivil.com

SITE GRADING PLAN
FOR
DRIFTWOOD LODGEPARKING ADDITION
SPRINGDALE, UTAH



SHEET
1.0
OF SHEETS



White Oleander tree 10

Mondell Pine 14

Chaste tree 6 (multi-trunk)

Blue Point Juniper 1

Gray Leaf Cotoneaster 23

10 Karl Forrester Calamagrostis

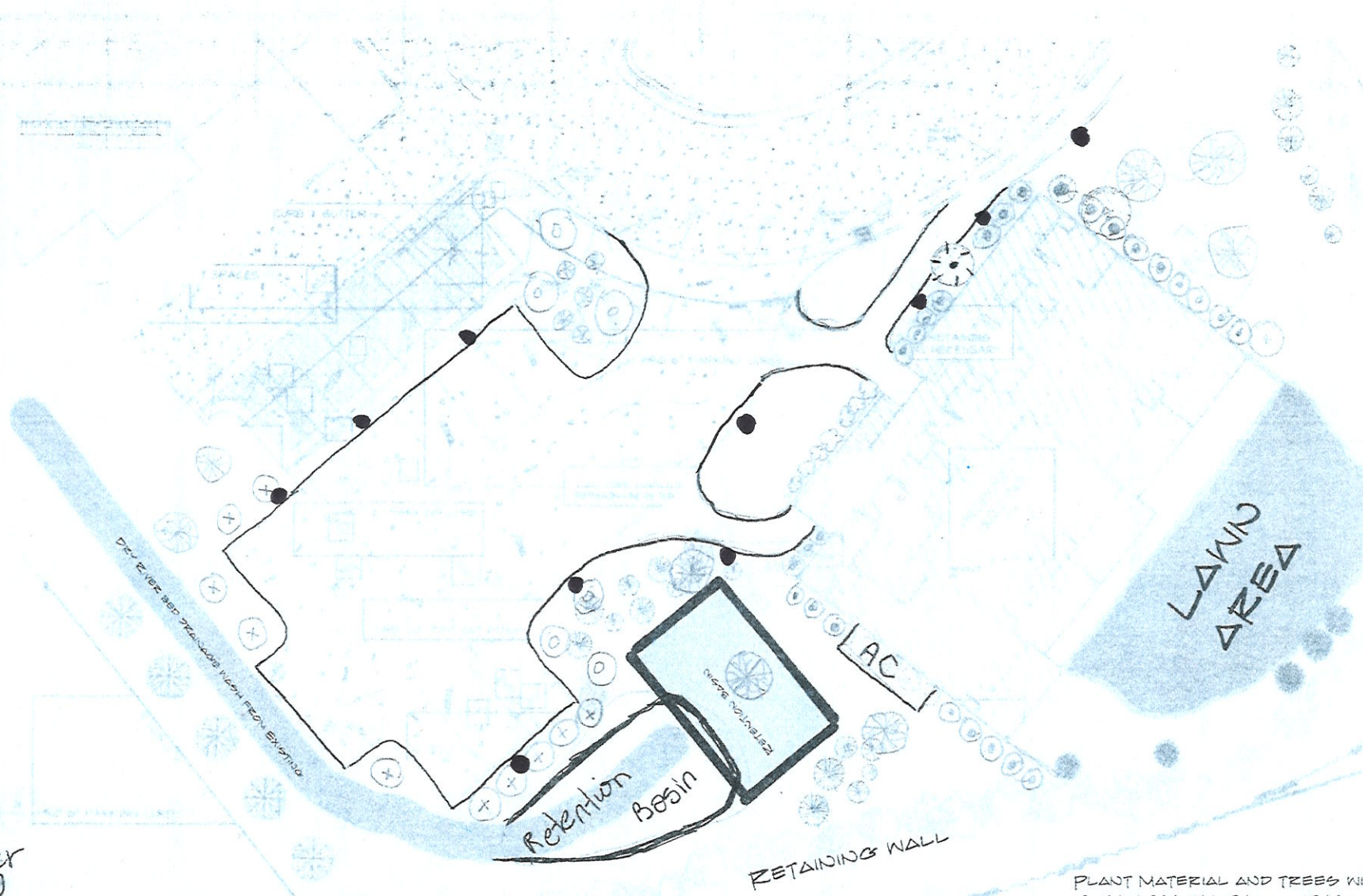
Boxwood 50

Pink Crape Myrtle (multi-trunk)

Pampa Grass alongside ditch

PLANT MATERIAL AND TREES WI CONSISTENCY WITH ALL OTHER MATERIAL CURRENTLY AROUND DRIFTWOOD LODGE

● Light Fixture



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Pampa Grass alongside ditch

PLANT MATERIAL AND TREES WI CONSISTENCY WITH ALL OTHER MATERIAL CURRENTLY AROUND DRIFTWOOD LODGE

Gmail

Niall Connolly <nconnolly@springdale.utah.gov>

Re: Parking and landscape

1 message

Anthony Brooksby <tkoconstruction@me.com>
To: Niall Connolly <nconnolly@springdale.utah.gov>

Niall
These are the lights we will be putting in the Ballards , Ten lights at 32 lumens for a total of 320 lumen s for sidewalk and parking.
Thanks Tony


Watchman

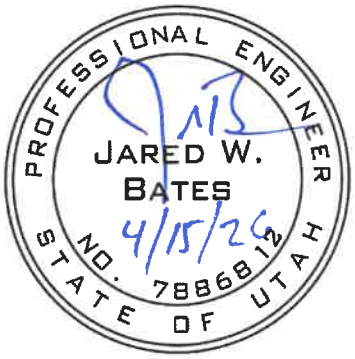
ROSENBERG ASSOCIATES™
CIVIL ENGINEERS LAND SURVEYORS

DRAINAGE ANALYSIS - TECHNICAL MEMORANDUM

Date: April 15, 2026

Prepared For: TKO Construction
PO Box 912080
St. George, UT 84791

Prepared By: Jared Bates – Principal Engineer
Rosenberg Associates
352 E Riverside Drive, STE A2
St. George, Utah 84790



Subject: **Drainage Analysis – Driftwood Lodge Parking Addition**
Section 32, Township 41 South, Range 10 West, Salt Lake Base and Meridian, RA Project No. 6650-24-005

Introduction

Rosenberg Associates has performed a drainage evaluation for the proposed improvements associated with the parking addition adjacent to Driftwood Lodge in Springdale, Utah. The project includes construction of a parking lot and associated site grading. The proposed improvements are located south of SR-9 and north of the North Fork of the Virgin River, within Section 32, Township 41 South, Range 10 West, Salt Lake Base and Meridian. The following figures are included in the Appendix of this memorandum for reference, with additional references, exhibits, and calculations as noted in the individual Appendix headings:

- *Figure 1 – Existing Conditions*, for topography, drainage subbasin delineation, flow paths, peak flow rates for each subbasin (10, and 100-year return intervals), etc.
- *Figure 2 – Proposed Conditions*, for topography, drainage subbasin delineation, flow paths, basin sizing, peak flow rates for each subbasin (10, and 100-year return intervals), etc.

Offsite Runoff Analysis

Runoff generated from areas north of the site are managed by existing infrastructure that routes flows towards an existing storm drain inlet along the Private Drive. Runoff generated from areas to the east, west and south of the site do not enter the site as these areas are lower in elevation than the project area.

Existing Conditions - The 0.19-acre proposed parking lot area was previously developed to varying extents and is primarily composed of an old agricultural field that is no longer in use, native desert vegetation, and bare earth. Slopes within the parking lot area range from 4.0 to 9.0% to the southeast. Onsite soils are comprised of *Naplene silt loam, 2 to 6 percent slopes* – hydrologic soil group "C". Stormwater generated within the site generally flows to the southeast towards the North Fork of the Virgin River.

Proposed Conditions – Runoff generated within the site flows to the southeast to be intercepted by a retention basin.

Hydrologic Calculations

HEC-HMS Version 4.10 was used to perform the hydrologic analysis for this study. Curve numbers for existing and developed conditions were calculated using a custom Natural Resources Conservation Service (NRCS) Soil Report and the TR-55 Table 2-2a, which assumes directly connected impervious areas. Time of concentration (Tc) was calculated as 0.6 times the Travel Time (Tt) as included in TR-55 which is based on the summation of sheet flow, shallow concentrated flow, and channel flow for each subarea (TR-55 eqs. 3-1 through 3-4). A modified Farmer-Fletcher distribution is used for the 3-hour storm events (the distribution is modified based on the local 1 hour and 3 hour rainfall depths) and the SCS Type II distribution is used for the 24-hour storm events. Simulated precipitation values were determined using the Point Precipitation Frequency Estimates (Latitude: 37.1029°, Longitude: -113.6465°) from the NOAA Atlas 14. Utilizing the model input values listed in Tables 1 & 2, the HEC-HMS model yielded the design storm peak flow values summarized in Tables 3 & 4.

TABLE 1 – HYDRAULIC MODEL INPUT – EXISTING CONDITIONS

Subarea		Area		SCS	Flow Length	Average Slope	Lag Time	
Name	Description	(acre)	(sq mi)	CN	(ft.)	S (%)	(hr.)	(min)
Sub A	Proposed Parking Lot	0.19	0.00030	87	104.9	6.0	0.01	0.605

TABLE 2 – HYDRAULIC MODEL INPUT – DEVELOPED CONDITIONS

Subarea		Area		SCS	Flow Length	Average Slope	Lag Time	
Name	Description	(acre)	(sq mi)	CN	(ft.)	S (%)	(hr.)	(min)
Sub A	Proposed Parking Lot	0.19	0.00030	93	106.3	3.6	0.03	0.557

TABLE 3 – HYDRAULIC MODEL OUTPUT – EXISTING CONDITIONS

Subarea		3-Hour Storm		24-Hour Storm	
		Existing		Existing	
Name	Description	10-Year (cfs)	100-Year (cfs)	10-Year (cfs)	100-Year (cfs)
Sub A	Proposed Parking Lot	0.1	0.3	0.1	0.2

TABLE 4 – HYDRAULIC MODEL OUTPUT – PROPOSED CONDITIONS

Subarea		3-Hour Storm		24-Hour Storm	
		Proposed		Proposed	
Name	Description	10-Year (cfs)	100-Year (cfs)	10-Year (cfs)	100-Year (cfs)
Sub A	Proposed Parking Lot	0.2	.05	0.2	0.3

Based on the information shown in Tables 3 and 4, the proposed development increases runoff within the site 0.2 cfs [Post (Site) – Pre (Site)], during the 100-year 3-hour event.

Detention/Retention/LID

Detention facilities are to be designed to attenuate the peak from the 100-year, 24-hour storm or the 100-year, 3-hour storm, whichever case requires the largest storage volume. For this analysis, the 100-year, 3-hour peak flow event produced a required detention volume of 150 cubic feet.

Due to site constraints, required detention volumes for the 100-year 3-hour event are to be retained via a retention basin within the southeastern portion of the project area. The retention basin will provide a storage volume of 204 cubic feet. This storage will be located in the bottom 0.5' of the proposed basin. An emergency spillway will be located 1.50' above the bottom of the basin, providing the 1' of freeboard above the design storm (100-year 3-hour) water elevation required by design standards.

Based on the Custom Soil Resource Report for the project area, the soil type located within the basin footprint is *Naplene silt loam, 2 to 6 percent slopes* – hydrologic soil group "C". The table shown below was used for infiltration rates (Utah City Engineers Association – Saturated Hydraulic Conductivity Rates) for NRCS Hydrologic Soil Group C.

Retention is a feasible option when the soil where the retention is planned has "saturated infiltration rate" such that the volume of the 1%, 24-hour chance of occurrence storm can be drained in 48-hours or less. For a retention basin the following condition application must be met.

Infiltration Test Results

Planned retention basins must have the native soil below the proposed basin identified according to (USCS) (ASTM D4318). Use the table below for the design infiltration rate. Provide hydraulic conductivity testing of in situ soils according to ASTM D5856 if applicant believes in situ soils differ from this table. The results must be accepted by the city engineer. A Safety Factor of 2.5 is required for the infiltration rates listed in this table.

NRCS Hydrologic Soil Group	Typical Soil Texture	Saturated Infiltration Rate (mm/h)*	Saturated Infiltration Rate (in/h)*	Porosity	Field Capacity
A	Sand	200	8.0	0.437	0.062
A	Loamy Sand	50	2.0	0.437	0.105
B	Sandy Loam	25	1.0	0.453	0.190
B	Loam	12.7*	0.5	0.463	0.232
C	Silt Loam	6.3*	0.25	0.501	0.284
C	Sandy Clay Loam	3.8*	0.15	0.398	0.244
D	Clay Loam & Silty Clay Loam	<2.3	<0.09	0.465	0.325
D	Clay	<1.3	<0.05	0.475	0.378

Soils must meet drain time requirements of the City Storm Water Design Standards

To determine the volume of water that will infiltrate within the retention basin in a 24-hour period, 0.25 (in/hr) was converted to ft/hr and then multiplied by 24.

a) 0.25 (in/hr) = 0.0208 (ft/hr) * 24 = 0.5 ft or 6 in

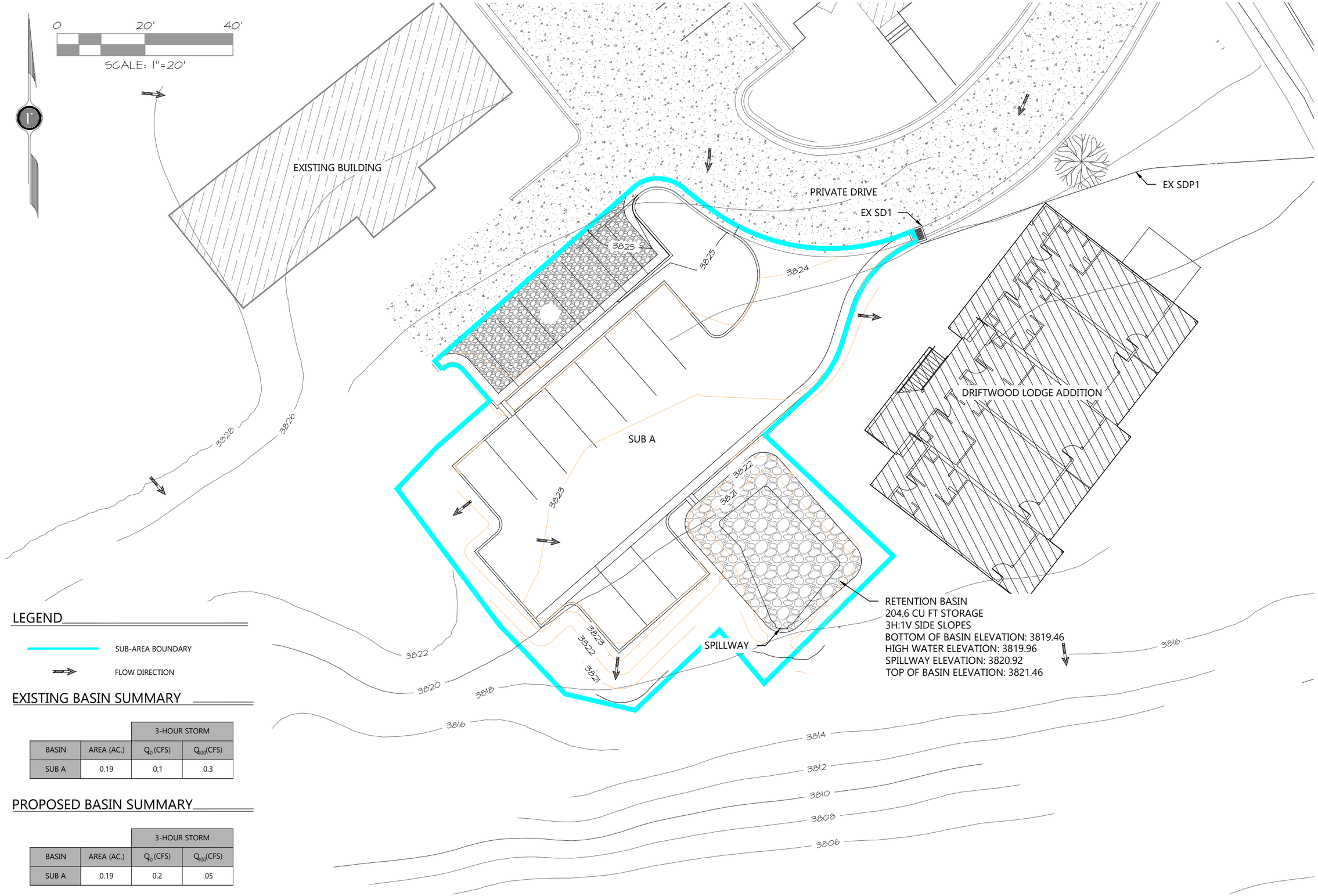
As the elevation of the top of the water surface during the 100-year 3-hour event is 0.5 ft above the bottom of the pond, and the infiltration rate is 0.5 ft/ 24 hours, the retention basin will empty within 24 hours.

Conclusions

It is the opinion of Rosenberg Associates that the proposed recommendations and drainage improvements included in this study and shown in the improvement plans will effectively retain flows from the 100-year 3-hour storm event. Drainage improvement designs are intended to be compliant with the Town of Springdale's drainage requirements and computations/methods used to create designs were completed using the current standard of care.

Appendix A

Figure 1 –*Drainage Conditions*
NRCS Soil Report
NOAA Atlas 14 – Point Precipitation Frequency Estimates
Farmer-Fletcher Modified 3-hour Distribution Table



LEGEND

SUB-AREA BOUNDARY

FLOW DIRECTION

EXISTING BASIN SUMMARY

		3-HOUR STORM	
BASIN	AREA (AC.)	Q_0 (CFS)	Q_{100}(CFS)
SUB A	0.19	0.1	0.3

PROPOSED BASIN SUMMARY

		3-HOUR STORM	
BASIN	AREA (AC.)	Q_0 (CFS)	Q_{100}(CFS)
SUB A	0.19	0.2	.05

DATE: 4/14/2026
JOB NO.: 6650-24-005
DESIGNED BY: WJP
CHECKED BY: JWB
DWG: EXHIBIT

REVISIONS
DATE

ROSENBERG ASSOCIATES
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St. George, Utah 84790
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DRAINAGE CONDITIONS FOR DRIFTWOOD LODGE ADDITION

SPRINGDALE
UTAH

SHEET
1
1 OF 1 SHEETS

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 Washington County Area, Utah

February 4, 2026

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 (https://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

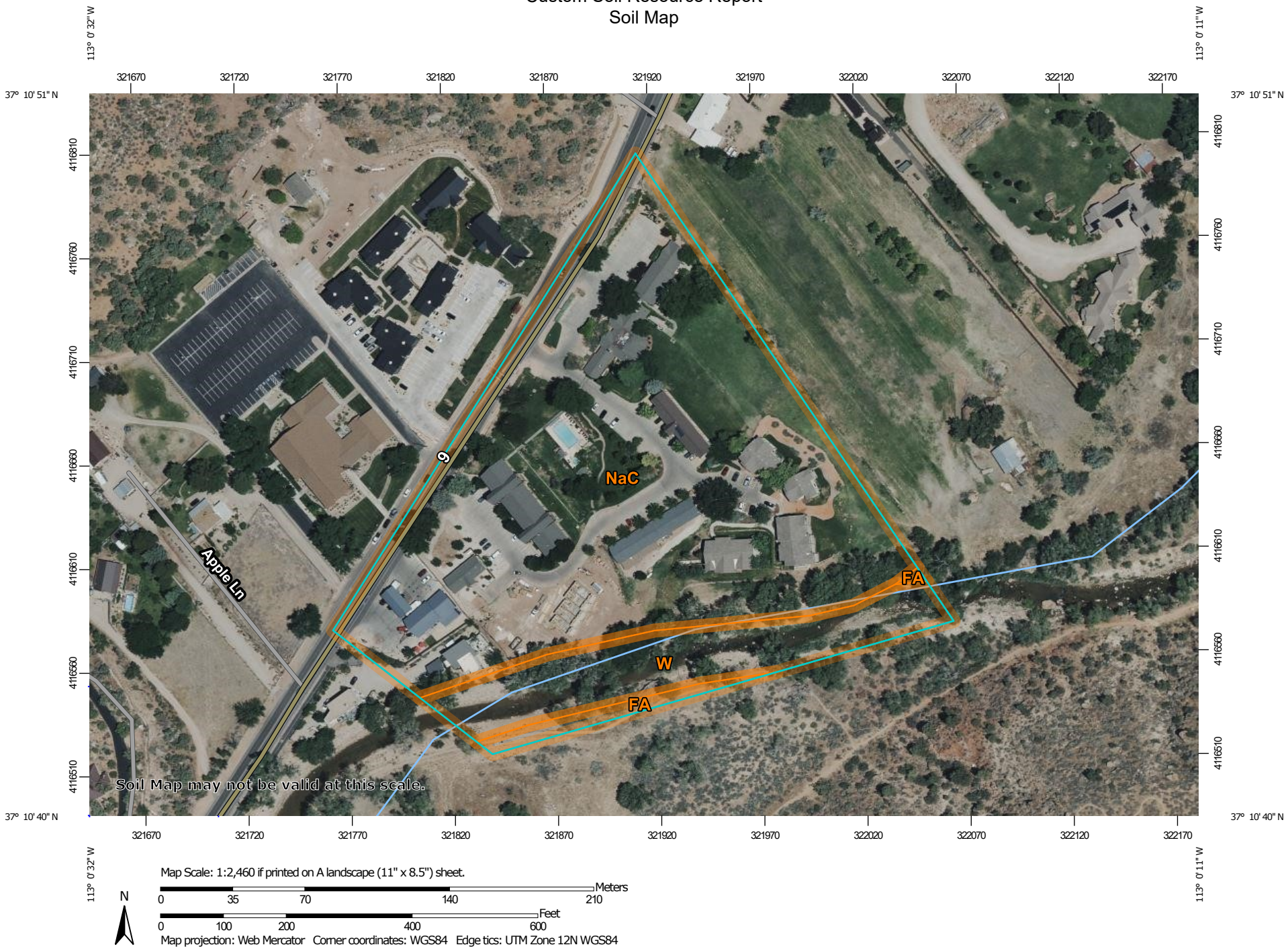
alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington,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

Contents

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:
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: Washington County Area, Utah
Survey Area Data: Version 19, Aug 27, 2025

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

Date(s) aerial images were photographed: May 30, 2025—Jun 19, 2025

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

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
FA	Fluvaquents and torrifluvents, sandy	0.2	2.1%
NaC	Naplene silt loam, 2 to 6 percent slopes	8.9	82.7%
W	Water	1.6	15.2%
Totals for Area of Interest		**10.8**	**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.

Washington County Area, Utah

FA—Fluvaquents and torrifluvents, sandy

Map Unit Setting

National map unit symbol: j8dt
Elevation: 2,500 to 3,000 feet
Mean annual precipitation: 8 to 11 inches
Mean annual air temperature: 57 to 67 degrees F
Frost-free period: 190 to 205 days
Farmland classification: Not prime farmland

Map Unit Composition

Fluvaquents and similar soils: 55 percent
Torrifluvents and similar soils: 35 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Fluvaquents

Setting

Landform: Swales
Landform position (three-dimensional): Talf
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Sandy alluvium derived from limestone, sandstone, and shale

Typical profile

H1 - 0 to 5 inches: fine sand
H2 - 5 to 60 inches: stratified fine sand to silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: About 6 to 24 inches
Frequency of flooding: Frequent
Frequency of ponding: Rare
Calcium carbonate, maximum content: 20 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 10.0
Available water supply, 0 to 60 inches: Low (about 4.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: A/D
Ecological site: R035XY011UT - Loamy Bottom (Basin Big Sagebrush)
Hydric soil rating: Yes

Description of Torrifluvents

Setting

Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from limestone, sandstone, and shale

Typical profile

H1 - 0 to 5 inches: loamy fine sand
H2 - 5 to 60 inches: stratified loamy fine sand to silt loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: About 42 to 72 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Calcium carbonate, maximum content: 20 percent
Maximum salinity: Nonsaline to moderately saline (0.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum: 5.0
Available water supply, 0 to 60 inches: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: A
Ecological site: R035XY011UT - Loamy Bottom (Basin Big Sagebrush)
Other vegetative classification: Loamy Bottom (Basin Big Sagebrush) (035XY011UT)
Hydric soil rating: No

Minor Components

Riverwash

Percent of map unit: 4 percent
Landform: Flood plains
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

Tobler, fine sandy loam

Percent of map unit: 3 percent

Tobler, silty clay loam

Percent of map unit: 3 percent

NaC—Naplene silt loam, 2 to 6 percent slopes

Map Unit Setting

National map unit symbol: j8fz
Elevation: 3,600 to 5,300 feet
Mean annual precipitation: 14 to 15 inches
Mean annual air temperature: 44 to 52 degrees F
Frost-free period: 140 to 160 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Naplene and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Naplene

Setting

Landform: Alluvial fans, Valleys
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Alluvium derived from igneous and sedimentary rock

Typical profile

H1 - 0 to 2 inches: silt loam
H2 - 2 to 7 inches: silt loam
H3 - 7 to 15 inches: silt loam
H4 - 15 to 22 inches: silty clay loam
H5 - 22 to 39 inches: silt loam
H6 - 39 to 60 inches: silt loam

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 20 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 10.8 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 6e

Hydrologic Soil Group: C
Ecological site: R035XY306UT - Upland Loam (Basin Big Sagebrush)
Hydric soil rating: No

Minor Components

Chilton
Percent of map unit: 5 percent

Redbank
Percent of map unit: 5 percent

Mespun
Percent of map unit: 5 percent

Clovis
Percent of map unit: 5 percent

Schmutz
Percent of map unit: 5 percent

W—Water

Map Unit Composition
Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Soil Information for All Uses

Soil Reports

The Soil Reports section includes various formatted tabular and narrative reports (tables) containing data for each selected soil map unit and each component of each unit. No aggregation of data has occurred as is done in reports in the Soil Properties and Qualities and Suitabilities and Limitations sections.

The reports contain soil interpretive information as well as basic soil properties and qualities. A description of each report (table) is included.

Soil Physical Properties

This folder contains a collection of tabular reports that present soil physical properties. The reports (tables) include all selected map units and components for each map unit. Soil physical properties are measured or inferred from direct observations in the field or laboratory. Examples of soil physical properties include percent clay, organic matter, saturated hydraulic conductivity, available water capacity, and bulk density.

Engineering Properties

This table gives the engineering classifications and the range of engineering properties for the layers of each soil in the survey area.

Hydrologic soil group is a group of soils having similar runoff potential under similar storm and cover conditions. The criteria for determining Hydrologic soil group is found in the National Engineering Handbook, Chapter 7 issued May 2007(http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17757.wba). Listing HSGs by soil map unit component and not by soil series is a new concept for the engineers. Past engineering references contained lists of HSGs by soil series. Soil series are continually being defined and redefined, and the list of soil series names changes so frequently as to make the task of maintaining a single national list virtually impossible. Therefore, the criteria is now used to calculate the HSG using the component soil properties and no such national series lists will be maintained. All such references are obsolete and their use should be discontinued. Soil properties that influence runoff potential are those that influence the minimum rate of infiltration for a bare soil after prolonged wetting and when not frozen. These properties are depth to a seasonal high water table, saturated hydraulic conductivity after prolonged wetting, and depth to a layer with a very slow water transmission

rate. Changes in soil properties caused by land management or climate changes also cause the hydrologic soil group to change. The influence of ground cover is treated independently. There are four hydrologic soil groups, A, B, C, and D, and three dual groups, A/D, B/D, and C/D. In the dual groups, the first letter is for drained areas and the second letter is for undrained areas.

The four hydrologic soil groups are described in the following paragraphs:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Depth to the upper and lower boundaries of each layer is indicated.

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is 15 percent or more, an appropriate modifier is added, for example, "gravelly."

Classification of the soils is determined according to the Unified soil classification system (ASTM, 2005) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO, 2004).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to particle-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of particle-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group

index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Percentage of rock fragments larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage. Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field. Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination. Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

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.

Absence of an entry indicates that the data were not estimated. The asterisk '*' denotes the representative texture; other possible textures follow the dash. The criteria for determining the hydrologic soil group for individual soil components is found in the National Engineering Handbook, Chapter 7 issued May 2007(http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17757.wba). Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Engineering Properties–Washington County Area, Utah														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			In				*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*
FA—Fluvaquents and torrifluvents, sandy														
Fluvaquents	55	A/D	0-5	Fine sand	SM	A-2-4	0- 0- 0	0- 0- 0	100-100-100	100-100-100	65-73-80	20-28-35	0-7 -14	NP
			5-60	Stratified fine sand to silt loam	SM	A-2-4	0- 0- 0	0- 0- 0	100-100-100	95-98-100	65-73-80	20-28-35	15-20-25	NP-3 -5
Torrifluvents	35	A	0-5	Loamy fine sand	SM	A-4	0- 0- 0	0- 0- 0	100-100-100	100-100-100	75-83-90	35-43-50	0-7 -14	NP
			5-60	Stratified loamy fine sand to silt loam	SM	A-2-4	0- 0- 0	0- 0- 0	100-100-100	95-98-100	50-63-75	10-20-30	15-20-25	NP-3 -5
NaC—Naplene silt loam, 2 to 6 percent slopes														
Naplene	75	C	0-2	Silt loam	CL-ML, CL	A-4, A-6	0- 0- 0	0- 0- 0	100-100-100	95-98-100	85-93-100	65-78-90	25-30-35	5-10-15
			2-7	Silt loam	CL-ML, CL	A-4, A-6	0- 0- 0	0- 0- 0	100-100-100	95-98-100	85-93-100	65-78-90	25-30-35	5-10-15
			7-15	Silt loam	CL-ML, CL	A-4, A-6	0- 0- 0	0- 0- 0	100-100-100	95-98-100	85-93-100	65-78-90	25-30-35	5-10-15
			15-22	Silty clay loam	CL	A-6	0- 0- 0	0- 0- 0	100-100-100	95-98-100	85-93-100	80-88-95	30-35-40	10-13-15
			22-39	Silt loam	CL-ML, CL	A-4, A-6	0- 0- 0	0- 0- 0	100-100-100	95-98-100	85-93-100	65-78-90	25-30-35	5-10-15
			39-60	Silt loam	CL-ML, CL	A-4, A-6	0- 0- 0	0- 0- 0	100-100-100	95-98-100	85-93-100	65-78-90	25-30-35	5-10-15

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.

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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

NOAA Atlas 14, Volume 1, Version 5
Location name: Springdale, Utah, USA*
Latitude: 37.1788°, Longitude: -113.0067°
Elevation: 3823 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point 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	0.138 (0.118-0.163)	0.177 (0.152-0.211)	0.244 (0.207-0.290)	0.304 (0.255-0.361)	0.398 (0.328-0.472)	0.479 (0.389-0.570)	0.575 (0.456-0.688)	0.686 (0.528-0.827)	0.859 (0.634-1.05)	1.01 (0.723-1.26)
10-min	0.209 (0.179-0.248)	0.269 (0.230-0.321)	0.372 (0.316-0.442)	0.463 (0.389-0.550)	0.605 (0.499-0.719)	0.730 (0.592-0.867)	0.876 (0.694-1.05)	1.04 (0.803-1.26)	1.31 (0.966-1.60)	1.54 (1.10-1.91)
15-min	0.259 (0.222-0.307)	0.334 (0.286-0.398)	0.461 (0.392-0.548)	0.574 (0.482-0.681)	0.750 (0.619-0.891)	0.905 (0.734-1.08)	1.08 (0.860-1.30)	1.29 (0.996-1.56)	1.62 (1.20-1.98)	1.91 (1.36-2.37)
30-min	0.349 (0.299-0.414)	0.449 (0.385-0.536)	0.621 (0.527-0.738)	0.773 (0.649-0.918)	1.01 (0.833-1.20)	1.22 (0.989-1.45)	1.46 (1.16-1.75)	1.74 (1.34-2.10)	2.18 (1.61-2.67)	2.57 (1.84-3.19)
60-min	0.432 (0.369-0.512)	0.556 (0.476-0.663)	0.768 (0.653-0.913)	0.957 (0.804-1.14)	1.25 (1.03-1.48)	1.51 (1.22-1.79)	1.81 (1.43-2.16)	2.16 (1.66-2.60)	2.70 (2.00-3.31)	3.18 (2.28-3.95)
2-hr	0.525 (0.456-0.608)	0.664 (0.576-0.770)	0.885 (0.766-1.02)	1.08 (0.927-1.25)	1.39 (1.17-1.60)	1.65 (1.37-1.92)	1.97 (1.59-2.30)	2.33 (1.83-2.75)	2.89 (2.18-3.46)	3.39 (2.48-4.13)
3-hr	0.586 (0.519-0.671)	0.739 (0.653-0.848)	0.964 (0.849-1.10)	1.16 (1.01-1.32)	1.45 (1.25-1.66)	1.70 (1.44-1.96)	2.00 (1.67-2.32)	2.35 (1.92-2.75)	2.90 (2.28-3.50)	3.40 (2.60-4.17)
6-hr	0.736 (0.659-0.833)	0.922 (0.825-1.04)	1.17 (1.05-1.33)	1.38 (1.23-1.57)	1.69 (1.48-1.92)	1.94 (1.68-2.21)	2.22 (1.90-2.55)	2.57 (2.15-2.97)	3.13 (2.56-3.68)	3.63 (2.89-4.32)
12-hr	0.918 (0.825-1.03)	1.15 (1.03-1.29)	1.44 (1.29-1.62)	1.68 (1.50-1.89)	2.01 (1.78-2.25)	2.27 (1.98-2.55)	2.53 (2.20-2.87)	2.83 (2.43-3.23)	3.28 (2.75-3.79)	3.75 (3.09-4.38)
24-hr	1.19 (1.11-1.29)	1.49 (1.38-1.61)	1.85 (1.72-2.00)	2.15 (1.99-2.33)	2.56 (2.36-2.78)	2.89 (2.65-3.13)	3.23 (2.93-3.51)	3.57 (3.22-3.91)	4.05 (3.61-4.46)	4.42 (3.90-4.91)
2-day	1.34 (1.25-1.45)	1.67 (1.56-1.80)	2.08 (1.94-2.24)	2.42 (2.25-2.60)	2.88 (2.67-3.10)	3.24 (2.99-3.49)	3.61 (3.30-3.90)	4.00 (3.64-4.34)	4.52 (4.05-4.95)	4.93 (4.37-5.43)
3-day	1.45 (1.35-1.56)	1.80 (1.68-1.94)	2.25 (2.10-2.41)	2.61 (2.43-2.79)	3.10 (2.88-3.33)	3.50 (3.23-3.76)	3.90 (3.58-4.21)	4.32 (3.93-4.69)	4.90 (4.39-5.36)	5.35 (4.74-5.90)
4-day	1.55 (1.45-1.67)	1.94 (1.81-2.08)	2.41 (2.25-2.58)	2.80 (2.61-2.99)	3.33 (3.09-3.56)	3.76 (3.46-4.03)	4.20 (3.85-4.52)	4.65 (4.23-5.04)	5.27 (4.73-5.77)	5.77 (5.11-6.36)
7-day	1.79 (1.66-1.94)	2.24 (2.08-2.42)	2.80 (2.60-3.02)	3.25 (3.01-3.50)	3.85 (3.56-4.16)	4.33 (3.98-4.68)	4.82 (4.41-5.22)	5.31 (4.82-5.79)	5.98 (5.37-6.58)	6.50 (5.77-7.20)
10-day	1.97 (1.82-2.13)	2.47 (2.29-2.67)	3.12 (2.88-3.36)	3.64 (3.36-3.91)	4.35 (3.99-4.69)	4.91 (4.48-5.31)	5.49 (4.97-5.97)	6.08 (5.46-6.65)	6.90 (6.11-7.61)	7.54 (6.61-8.39)
20-day	2.50 (2.32-2.69)	3.12 (2.90-3.36)	3.86 (3.59-4.14)	4.44 (4.13-4.76)	5.22 (4.83-5.58)	5.80 (5.36-6.23)	6.40 (5.87-6.88)	6.99 (6.37-7.55)	7.76 (6.99-8.46)	8.34 (7.45-9.15)
30-day	3.03 (2.81-3.26)	3.78 (3.51-4.07)	4.66 (4.34-5.02)	5.34 (4.96-5.74)	6.22 (5.76-6.68)	6.87 (6.34-7.40)	7.52 (6.90-8.13)	8.15 (7.42-8.84)	8.96 (8.09-9.78)	9.55 (8.56-10.5)
45-day	3.62 (3.35-3.92)	4.53 (4.19-4.89)	5.65 (5.23-6.10)	6.52 (6.02-7.03)	7.67 (7.06-8.29)	8.54 (7.82-9.23)	9.40 (8.57-10.2)	10.3 (9.30-11.2)	11.4 (10.2-12.5)	12.2 (10.9-13.5)
60-day	4.22 (3.89-4.60)	5.29 (4.87-5.76)	6.62 (6.09-7.20)	7.66 (7.04-8.32)	9.04 (8.27-9.83)	10.1 (9.21-11.0)	11.2 (10.1-12.2)	12.2 (11.0-13.4)	13.6 (12.1-15.1)	14.7 (12.9-16.3)

[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.

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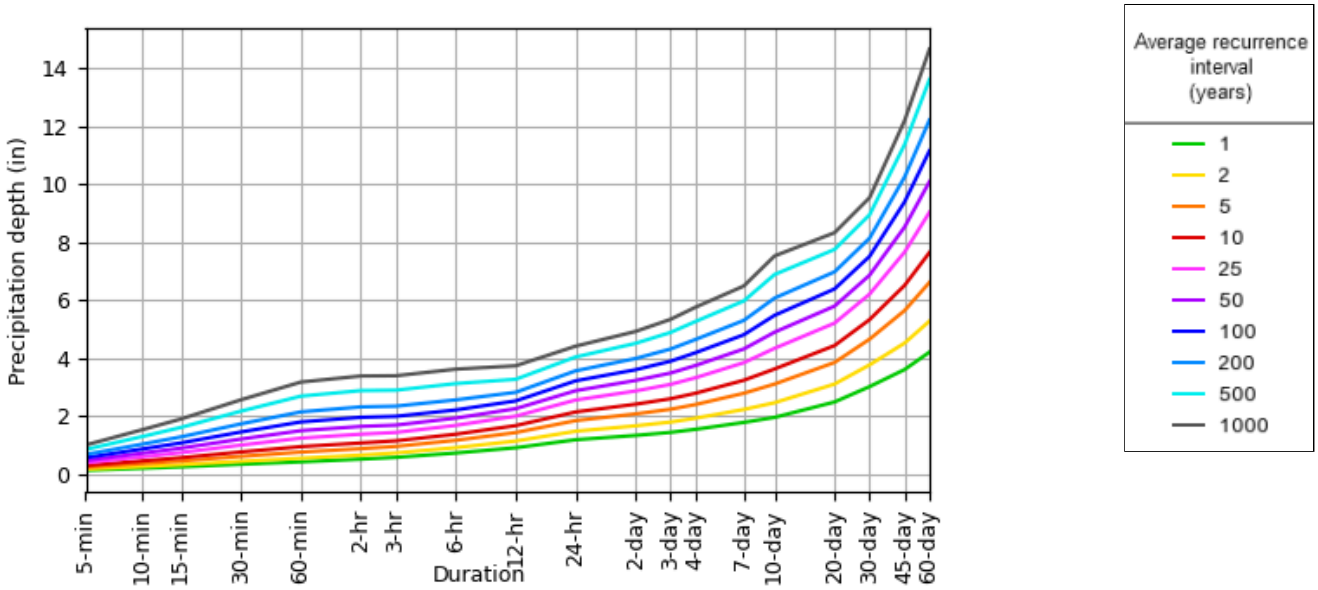
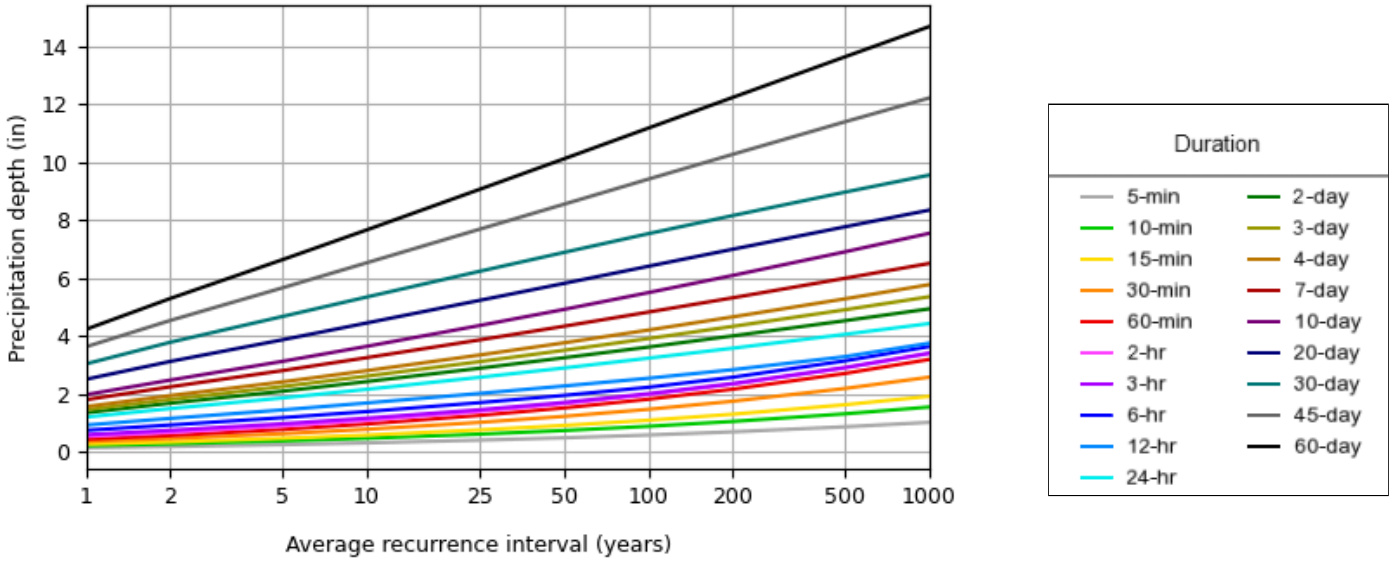
PF graphical

PDS-based depth-duration-frequency (DDF) curves
Latitude: 37.1788°, Longitude: -113.0067°





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Created (GMT): Wed Feb 4 17:15:23 2026

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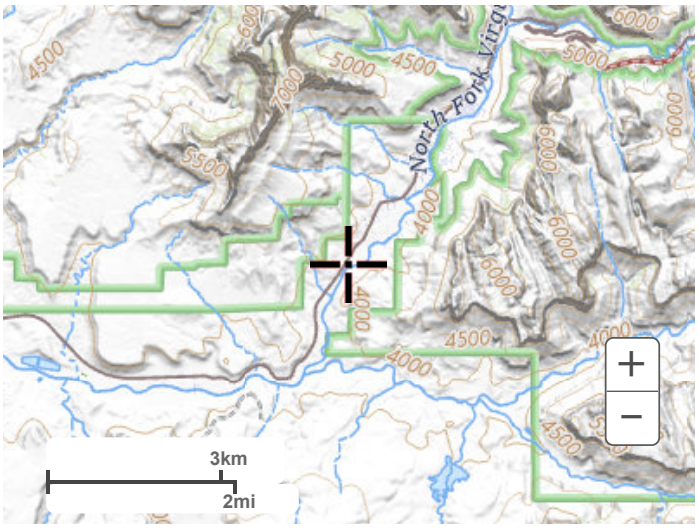
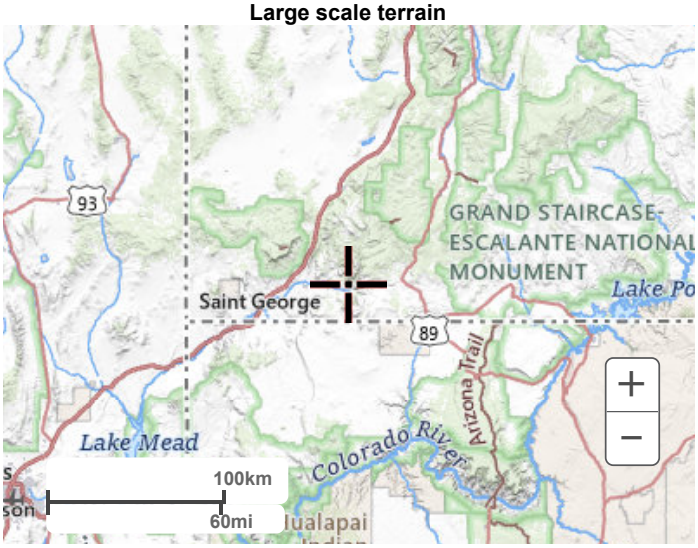
Maps & aerials

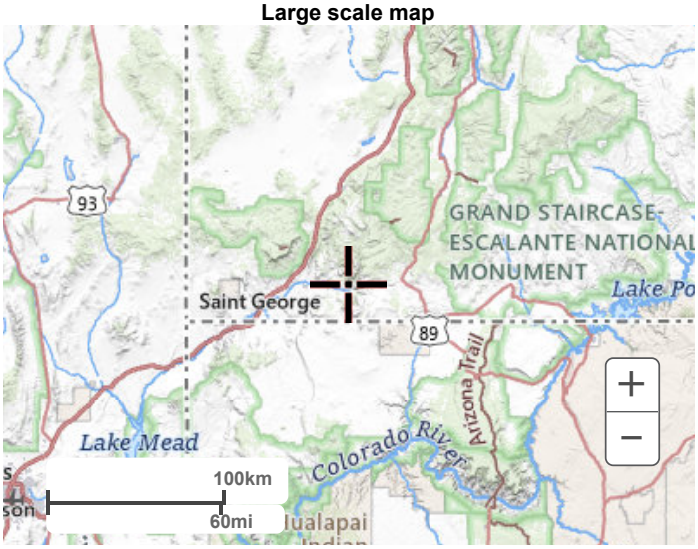
Small scale terrain



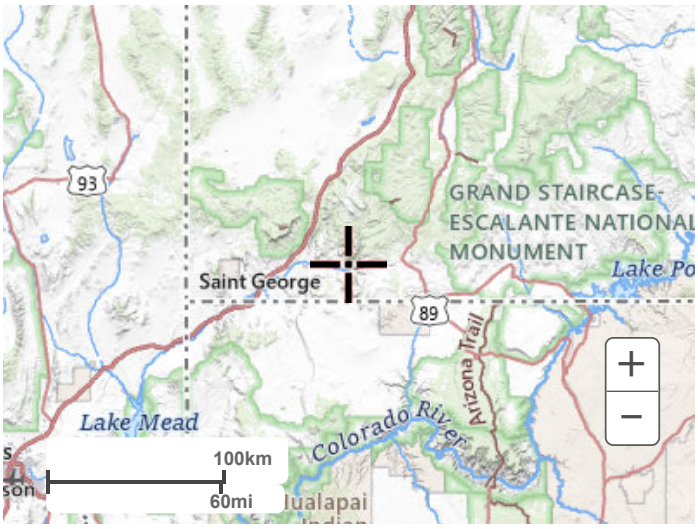
Large scale terrain



Large scale map



Large scale aerial



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National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

ROSENBERG ASSOCIATES
CIVIL ENGINEERS • LAND SURVEYORS

PROJECT NO. 6650-24-005

PROJECT: Driftwood Parking BY: WJP 4/14/2026

SUBJECT: 3-hr Distribution Table CHKD: JWB DATE: 4/14/2026

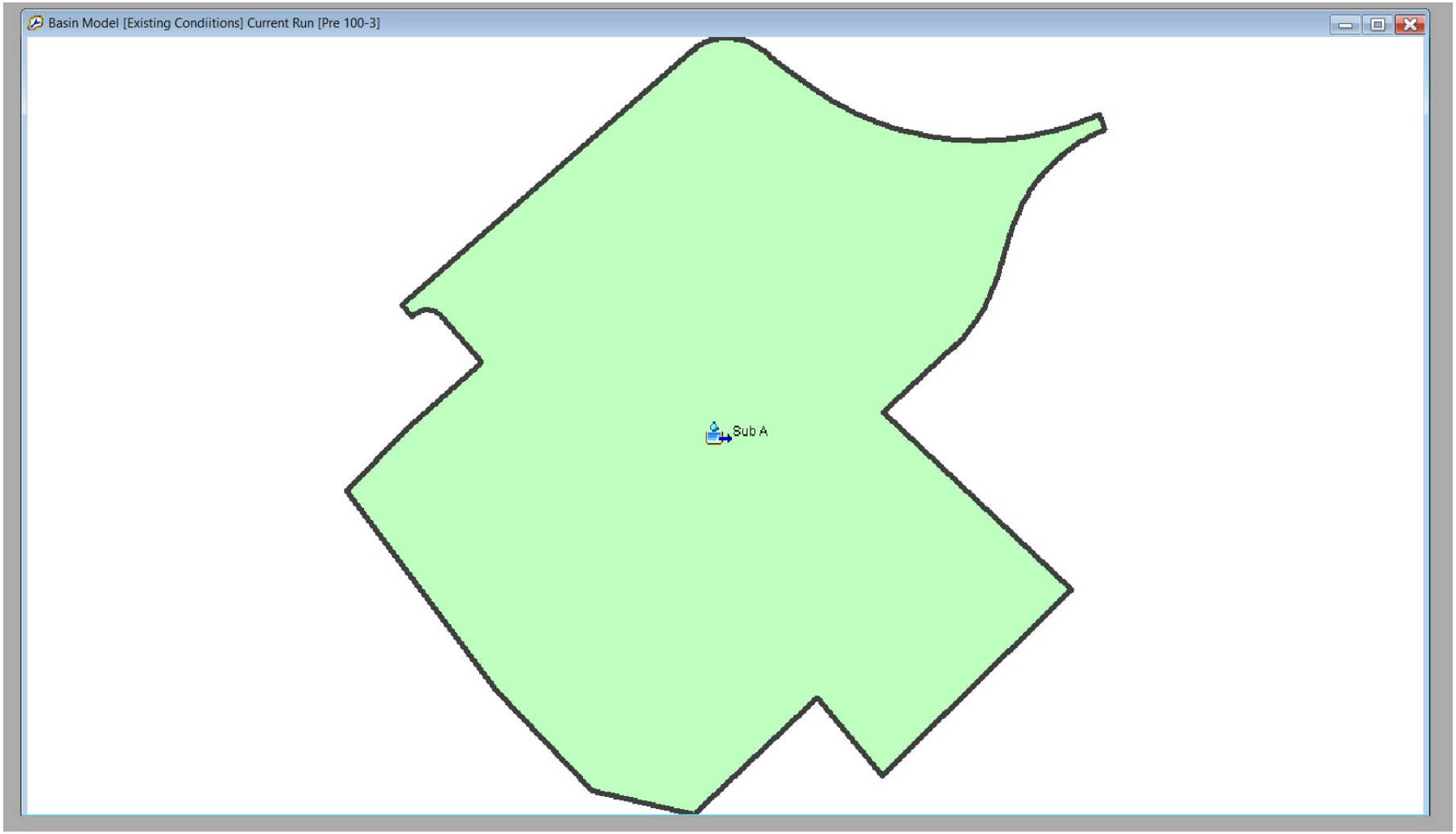
Farmer-Fletcher Modified 3-hour Storm Distribution

	10 Year Storm		100 Year Storm	
1 hour Depth	0.957	(in)	1.81	(in)
3 Hour Depth	1.16	(in)	2	(in)

Time (min)		Incr.	Cumulative	Incr.	Cumulative
0		0	0	0	0
5		0.008458	0.008458	0.007917	0.007917
10		0.008458	0.016917	0.007917	0.015833
15		0.008458	0.025375	0.007917	0.023750
20		0.008458	0.033833	0.007917	0.031667
25		0.008458	0.042292	0.007917	0.039583
30		0.008458	0.050750	0.007917	0.047500
35	0.285	0.272745	0.323495	0.515850	0.563350
40	0.225	0.215325	0.538820	0.407250	0.970600
45	0.157	0.150249	0.689069	0.284170	1.254770
50	0.100	0.095700	0.784769	0.181000	1.435770
55	0.060	0.057420	0.842189	0.108600	1.544370
60	0.046	0.044022	0.886211	0.083260	1.627630
65	0.034	0.032538	0.918749	0.061540	1.689170
70	0.026	0.024882	0.943631	0.047060	1.736230
75	0.020	0.019140	0.962771	0.036200	1.772430
80	0.018	0.017226	0.979997	0.032580	1.805010
85	0.016	0.015312	0.995309	0.028960	1.833970
90	0.013	0.012441	1.007750	0.023530	1.857500
95		0.008458	1.016208	0.007917	1.865417
100		0.008458	1.024667	0.007917	1.873333
105		0.008458	1.033125	0.007917	1.881250
110		0.008458	1.041583	0.007917	1.889167
115		0.008458	1.050042	0.007917	1.897083
120		0.008458	1.058500	0.007917	1.905000
125		0.008458	1.066958	0.007917	1.912917
130		0.008458	1.075417	0.007917	1.920833
135		0.008458	1.083875	0.007917	1.928750
140		0.008458	1.092333	0.007917	1.936667
145		0.008458	1.100792	0.007917	1.944583
150		0.008458	1.109250	0.007917	1.952500
155		0.008458	1.117708	0.007917	1.960417
160		0.008458	1.126167	0.007917	1.968333
165		0.008458	1.134625	0.007917	1.976250
170		0.008458	1.143083	0.007917	1.984167
175		0.008458	1.151542	0.007917	1.992083
180		0.008458	1.160000	0.007917	2.000000
Total:		1.16		2	

Appendix B

Existing HEC-HMS Model Diagram
Existing Watershed Hydrology Model Input Spreadsheets
Existing Conditions HEC-HMS Model Output Tables


Basin Model [Existing Condiitions] Current Run [Pre 100-3]
Sub A

ROSENBERG ASSOCIATES
CIVIL ENGINEERS • LAND SURVEYORS

PROJECT NO. 6650-24-005

PROJECT: Driftwood Parking BY: WJP DATE: 4/14/2026

SUBJECT: Existing Site Hydrology Information CHKD: JWB DATE: 4/14/2026

Subarea		Flow Length	Average Slope	Area		
Name	***Description***	***(ft)***	***S (%)***	***ft^2***	***Acres***	***mi^2***
Sub A	Proposed parking lot	105	6.0%	8,480	0.19	0.00030

ROSENBERG ASSOCIATES
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PROJECT NO. 6650-24-005

PROJECT: Driftwood Parking BY: WJP DATE: 4/14/2026

SUBJECT: NRCS Curve Number CHKD: JWB DATE: 4/14/2026

NRCS CURVE NUMBER CHART

Land Use Description	SCS Curve Number (CN) Values			
	Group A	Group B	Group C	Group D
Cultivated Land				
Cultivated Land; Without Conservation Treatment	72	81	88	91
Cultivated Land; With Conservation Treatment	62	71	78	81
Pasture or Range Land				
Pasture or Range Land; Poor Condition	68	79	86	89
Pasture or Range Land; Good Condition	39	61	74	80
Open Spaces (Lawns, Parks, etc.)				
Open Space; Poor Condition; Grass Cover < 50%	68	79	86	89
Open Space; Fair Condition; Grass Cover 50% to 75%	49	69	79	84
Open Space; Good Condition; Grass Cover > 75%	39	61	74	80
Impervious Areas				
Impervious Areas; Paved Parking Lots, Roofs, Driveways	98	98	98	98
Impervious Areas; Streets and Roads; Paved; Curbs and Storm Sewers	98	98	98	98
Impervious Areas; Streets and Roads; Paved; Open Ditches (w/ Right-of-Way)	83	89	92	93
Impervious Areas; Streets and Roads; Gravel (w/ Right-of-Way)	76	85	89	91
Impervious Areas; Streets and Roads; Dirt (w/ Right-of-Way)	72	82	87	89
Urban Commercial and Industrial Districts				
Urban Districts; Commercial and Business; Average 85% Impervious	89	92	94	95
Urban Districts; Industrial; Average 72% Impervious	81	88	91	93
Residential Districts				
Residential Districts; 1/8 Acre (Town Houses); Average 65% Impervious	77	85	90	92
Residential Districts; 1/4 Acre; Average 38% Impervious	61	75	83	87
Residential Districts; 1/3 Acre; Average 30% Impervious	57	72	81	86
Residential Districts; 1/2 Acre; Average 25% Impervious	54	70	80	85
Residential Districts; 1 Acre; Average 20% Impervious	51	68	79	84
Residential Districts; 2 Acre; Average 12% Impervious	46	65	77	82
Western Desert Urban Areas				
Natural Desert Vegetation (Pervious Areas Only)	63	77	85	88
Artificial Desert Landscaping	96	96	96	96
Developing Urban Area (No Vegetation)				
Newly Graded Area (Pervious Only)	77	86	91	94

Sub A 87

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SHEET 1 OF 1

PROJECT NO.

PROJECT: Driftwood Lodge Addition BY: VTP DATE: 4/14/26

SUBJECT: Existing/Prop Conditions CHECKED BY: DATE:

Existing Curve Number

Sub A = .99 ac

Hydrologic soil group C

98 - Imp areas - .02/.12

84/9.97 (98 * .12) + (86 * .88) = 87.44 → 87

Proposed Curve Number = .19 ac

Hydrologic soil group C

98 - Imp areas - .09/.47

86 - Open Space Poor Condition - .04/.21

89 - Imp areas gravel - .04/.21

89 - Artificial Turf landscaping - .02/.11

(98 * .47) + (86 * .21) + (89 * .21) + (89 * .11) = 93.37 → 93

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PROJECT NO. 6650-24-005

PROJECT: Driftwood Parking BY: WJP DATE: 4/14/2026

SUBJECT: TR 55 Worksheet CHKD: JWB DATE: 4/14/2026

X Pre-developed ____ Post-developed

Subarea: Sub A

Sheet Flow

Surface Description	Mannings 'n' n	Flow Length L (ft) ≤100ft	2-yr 24-hr P_2 (in)	Average slope s (ft/ft)
	0.05	10	1.49	0.0600

$$T_t = \frac{0.007\,(nL)^{0.8}}{P_2^{0.5}\, s^{0.4}}$$

T_t 0.01 hr
0.609 min

Shallow Concentrated Flow

	Ground Type	Flow Length L (ft)	Average Velocity V(ft/s)	Average slope s (ft/ft)
	G	94.900	3.95	0.0600

P - (paved) Pavement and small upland gullies
G - (unpaved) Grassed waterways
N - nearly bare and untilled (overland flow); and alluvial fans western mountain regions
C - Cultivated straight row crops
S - Short-grass pasture
M - Minimum tillage cultivation, contour or strip-cropped, and woodlands
F - Forest with heavy ground litter and hay meadows

T_t 0.0067 hr
0.400 min

$$T_t = \frac{L}{3600\ V}$$

Channel Flow

Mannings 'n' n	x-sectional flow area, a (ft^2)	Wetted Perimeter P_w	Average slope s (ft/ft)	Flow Length L (ft)
0.05	15.00	30.07	0.0600	

$$V = \frac{1.49\, r^{2/3}\, s^{1/2}}{n} \qquad r = \frac{a}{P_w}$$

$$T_t = \frac{L}{3600\ V}$$

Hydraulic radius r=a/Pw	Average Velocity V(ft/s)
0.50	4.59

T_t 0 hr
0.000 min

Watershed or sub area T_c add up T_t

Lag time =tc*.6

Subarea:	T_c	0.01	hr
Sub A		0.605	min

Project: Driftwood Simulation Run: Pre 10-3

Start of Run: 01Jan2000, 12:00 Basin Model: Existing Condiiti
End of Run: 01Jan2000, 20:00 Meteorologic Model: 10YR-3HR
Compute Time: 14Apr2026, 11:08:30 Control Specifications: 10-3

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
Sub A	0.0003	0.1	01Jan2000, 12:45	0.31

Project: Driftwood Simulation Run: Pre 10-24

Start of Run: 01Jan2000, 12:00 Basin Model: Existing Condiiti
End of Run: 03Jan2000, 00:30 Meteorologic Model: 10YR-24HR
Compute Time: 14Apr2026, 11:08:30 Control Specifications: 24-HOUR

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
Sub A	0.0003	0.1	02Jan2000, 00:30	1.02

Project: Driftwood Simulation Run: Pre 100-3

Start of Run:	01Jan2000, 12:00	Basin Model:	Existing Condiiti
End of Run:	01Jan2000, 20:00	Meteorologic Model:	100YR-3HR
Compute Time:	14Apr2026, 11:08:31	Control Specifications:	100-3

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
Sub A	0.0003	0.3	01Jan2000, 12:45	0.91

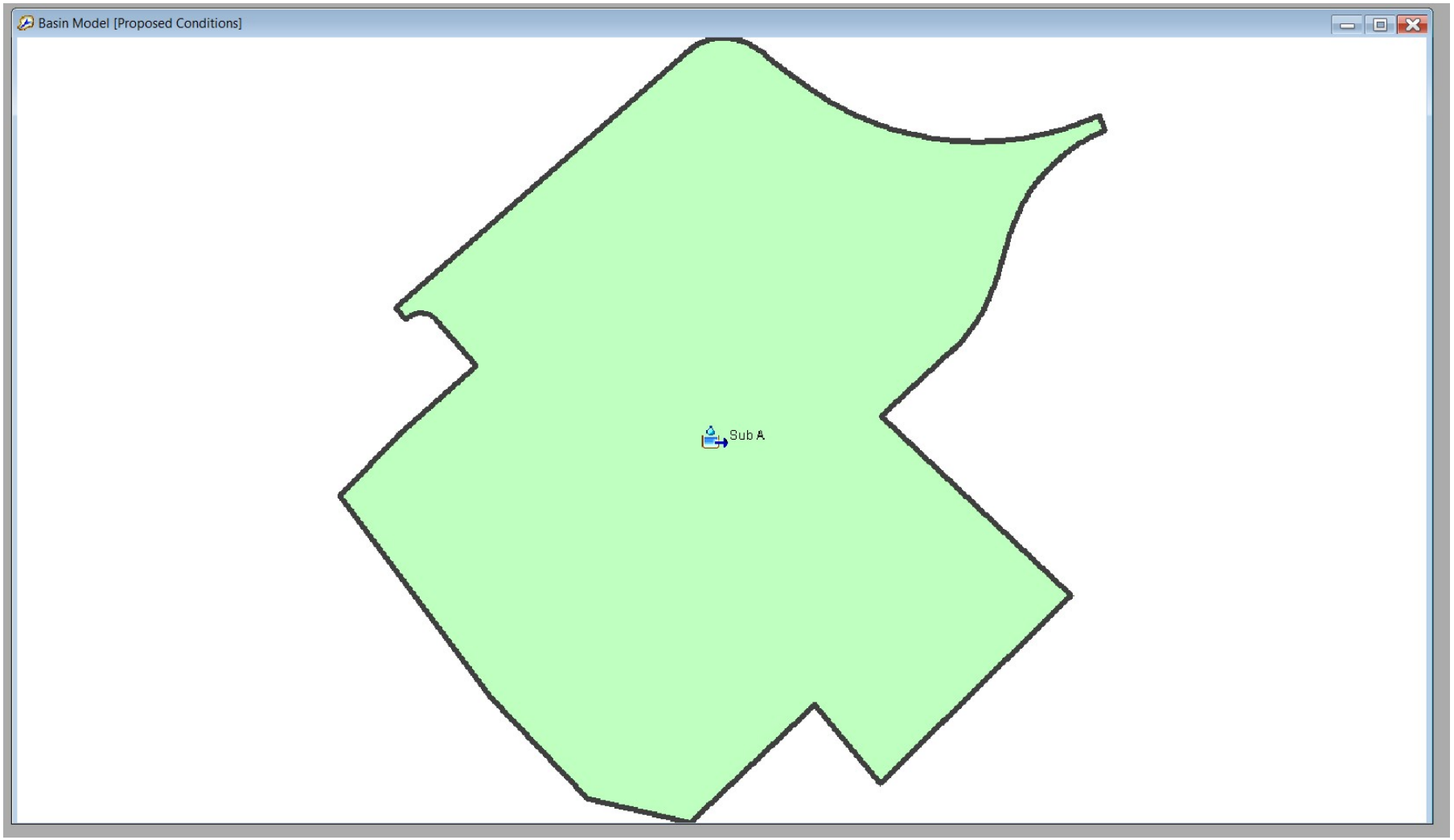
Project: Driftwood Simulation Run: Pre 100-24

Start of Run:	01Jan2000, 12:00	Basin Model:	Existing Condiiti
End of Run:	03Jan2000, 00:30	Meteorologic Model:	100YR-24HR
Compute Time:	14Apr2026, 11:08:31	Control Specifications:	24-HOUR

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
Sub A	0.0003	0.2	02Jan2000, 00:30	1.94

Appendix C

Proposed HEC-HMS Model Diagram
Developed Watershed Hydrology Model Input Spreadsheets
Developed Conditions HEC-HMS Model Output Tables
Detention Calculations


Basin Model [Proposed Conditions]
Sub A

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PROJECT NO. 6650-24-005

PROJECT: Driftwood Parking BY: WJP DATE: 4/14/2026

SUBJECT: Proposed Site Hydrology Information CHKD: JWB DATE: 4/14/2026

Subarea		Flow Length	Average Slope	Area		
Name	*Description*	*(ft)*	*S (%)*	*ft^2*	*Acres*	*mi^2*
Sub A	Proposed parking lot	106	3.6%	8,480	0.19	0.00030

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PROJECT NO. 6650-24-005

PROJECT: Driftwood Parking BY: WJP DATE: 4/14/2026

SUBJECT: NRCS Curve Number CHKD: JWB DATE: 4/14/2026

NRCS CURVE NUMBER CHART

Land Use Description	SCS Curve Number (CN) Values			
	Group A	Group B	Group C	Group D
Cultivated Land				
Cultivated Land; Without Conservation Treatment	72	81	88	91
Cultivated Land; With Conservation Treatment	62	71	78	81
Pasture or Range Land				
Pasture or Range Land; Poor Condition	68	79	86	89
Pasture or Range Land; Good Condition	39	61	74	80
Open Spaces (Lawns, Parks, etc.)				
Open Space; Poor Condition; Grass Cover < 50%	68	79	86	89
Open Space; Fair Condition; Grass Cover 50% to 75%	49	69	79	84
Open Space; Good Condition; Grass Cover > 75%	39	61	74	80
Impervious Areas				
Impervious Areas; Paved Parking Lots, Roofs, Driveways	98	98	98	98
Impervious Areas; Streets and Roads; Paved; Curbs and Storm Sewers	98	98	98	98
Impervious Areas; Streets and Roads; Paved; Open Ditches (w/ Right-of-Way)	83	89	92	93
Impervious Areas; Streets and Roads; Gravel (w/ Right-of-Way)	76	85	89	91
Impervious Areas; Streets and Roads; Dirt (w/ Right-of-Way)	72	82	87	89
Urban Commercial and Industrial Districts				
Urban Districts; Commercial and Business; Average 85% Impervious	89	92	94	95
Urban Districts; Industrial; Average 72% Impervious	81	88	91	93
Residential Districts				
Residential Districts; 1/8 Acre (Town Houses); Average 65% Impervious	77	85	90	92
Residential Districts; 1/4 Acre; Average 38% Impervious	61	75	83	87
Residential Districts; 1/3 Acre; Average 30% Impervious	57	72	81	86
Residential Districts; 1/2 Acre; Average 25% Impervious	54	70	80	85
Residential Districts; 1 Acre; Average 20% Impervious	51	68	79	84
Residential Districts; 2 Acre; Average 12% Impervious	46	65	77	82
Western Desert Urban Areas				
Natural Desert Vegetation (Pervious Areas Only)	63	77	85	88
Artificial Desert Landscaping	96	96	96	96
Developing Urban Area (No Vegetation)				
Newly Graded Area (Pervious Only)	77	86	91	94

Sub A 93

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SHEET 1 of 1

PROJECT NO. 6650-24-005

PROJECT: Driftwood Parking BY: WJP DATE: 4/14/2026

SUBJECT: TR 55 Worksheet CHKD: JWB DATE: 4/14/2026

X Pre-developed ____ Post-developed

Subarea: Sub A

Sheet Flow

Surface Description	Mannings 'n' n	Flow Length L (ft) ≤100ft	2-yr 24-hr P_2 (in)	Average slope s (ft/ft)
	0.01	50	1.49	0.0360

$$T_t = \frac{0.007\,(nL)^{0.8}}{P_2^{0.5}\, s^{0.4}}$$

T_t 0.01 hr
0.747 min

Shallow Concentrated Flow

	Ground Type	Flow Length L (ft)	Average Velocity V(ft/s)	Average slope s (ft/ft)
	P	30.300	3.86	0.0360

P - (paved) Pavement and small upland gullies
G - (unpaved) Grassed waterways
N - nearly bare and untilled (overland flow); and alluvial fans western mountain regions
C - Cultivated straight row crops
S - Short-grass pasture
M - Minimum tillage cultivation, contour or strip-cropped, and woodlands
F - Forest with heavy ground litter and hay meadows

T_t 0.0022 hr
0.131 min

$$T_t = \frac{L}{3600\ V}$$

Channel Flow

Mannings 'n' n	x-sectional flow area, a (ft^2)	Wetted Perimeter P_w	Average slope s (ft/ft)	Flow Length L (ft)
0.01	2.87	16.89	0.0360	26.00

$$V = \frac{1.49\, r^{2/3}\, s^{1/2}}{n} \qquad r = \frac{a}{P_w}$$

$$T_t = \frac{L}{3600\ V}$$

Hydraulic radius r=a/Pw	Average Velocity V(ft/s)
0.17	8.67

T_t 0.00083 hr
0.050 min

Watershed or sub area T_c add up T_t

Lag time =tc*.6

Subarea:	T_c	0.01	hr
Sub A		0.557	min

Project: Driftwood Simulation Run: Post 10-3

Start of Run: 01Jan2000, 12:00 Basin Model: Proposed Cond
End of Run: 01Jan2000, 20:00 Meteorologic Model: 10YR-3HR
Compute Time: 14Apr2026, 11:08:29 Control Specifications: 10-3

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
Sub A	0.0003	0.2	01Jan2000, 12:45	0.58

Project: Driftwood Simulation Run: Post 10-24

Start of Run: 01Jan2000, 12:00
End of Run: 03Jan2000, 00:30
Compute Time: 14Apr2026, 11:08:29

Basin Model: Proposed Cond
Meteorologic Model: 10YR-24HR
Control Specifications: 24-HOUR

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
Sub A	0.0003	0.2	02Jan2000, 00:30	1.45

Project: Driftwood Simulation Run: Post 100-3

Start of Run: 01Jan2000, 12:00
End of Run: 01Jan2000, 20:00
Compute Time: 14Apr2026, 11:08:30

Basin Model: Proposed Cond
Meteorologic Model: 100YR-3HR
Control Specifications: 100-3

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
Sub A	0.0003	0.5	01Jan2000, 12:40	1.31

Project: Driftwood Simulation Run: Post 100-24

Start of Run: 01Jan2000, 12:00 Basin Model: Proposed Cond
End of Run: 03Jan2000, 00:30 Meteorologic Model: 100YR-24HR
Compute Time: 14Apr2026, 11:08:29 Control Specifications: 24-HOUR

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
Sub A	0.0003	0.3	02Jan2000, 00:30	2.47

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PROJECT NO: 6650-24-005

PROJECT: Driftwood Parking BY: WJP DATE: 4/14/2026

SUBJECT: Detention Calculations CHKD: JWB DATE: 4/14/2026

DETENTION FOR 100-YEAR, 3-HOUR STORM

Pre-Developed Peak Flow: **0.3** **cfs**

Date	Time	Peak Flow Exist LOT (cfs)	Peak Flow Pro LOT (cfs)	Detention Volume (cu ft)
1-Jan-00	12:00	0	0	0
1-Jan-00	12:05	0	0	0
1-Jan-00	12:10	0	0.2	0
1-Jan-00	12:15	0	0.5	60
1-Jan-00	12:20	0.1	0.5	60
1-Jan-00	12:25	0.3	0.4	30
1-Jan-00	12:30	0.3	0.2	0
1-Jan-00	12:35	0.3	0.2	0
1-Jan-00	12:40	0.2	0.1	0
1-Jan-00	12:45	0.1	0.1	0
1-Jan-00	12:50	0.1	0.1	0
1-Jan-00	12:55	0.1	0.1	0
1-Jan-00	13:00	0.1	0.1	0
1-Jan-00	13:05	0.1	0	0
1-Jan-00	13:10	0	0	0
1-Jan-00	13:15	0	0	0
1-Jan-00	13:20	0	0	0
1-Jan-00	13:25	0	0	0
1-Jan-00	13:30	0	0	0
1-Jan-00	13:35	0	0	0
1-Jan-00	13:40	0	0	0
1-Jan-00	13:45	0	0	0
1-Jan-00	13:50	0	0	0
1-Jan-00	13:55	0	0	0
1-Jan-00	14:00	0	0	0
1-Jan-00	14:05	0	0	0
1-Jan-00	14:10	0	0	0
1-Jan-00	14:15	0	0	0
1-Jan-00	14:20	0	0	0
1-Jan-00	14:25	0	0	0
1-Jan-00	14:30	0	0	0
1-Jan-00	14:35	0	0	0
1-Jan-00	14:40	0	0	0
1-Jan-00	14:45	0	0	0
1-Jan-00	14:50	0	0	0
1-Jan-00	14:55	0	0	0

1-Jan-00	15:00	0	0	0
1-Jan-00	15:05	0	0	0
1-Jan-00	15:10	0	0	0
1-Jan-00	15:15	0	0	0
1-Jan-00	15:20	0	0	0
1-Jan-00	15:25	0	0	0
1-Jan-00	15:30	0	0	0
1-Jan-00	15:35	0	0	0
1-Jan-00	15:40	0	0	0
1-Jan-00	15:45	0	0	0
1-Jan-00	15:50	0	0	0
1-Jan-00	15:55	0	0	0
1-Jan-00	16:00	0	0	0
Total				**150**

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PROJECT NO: 6650-24-005

PROJECT: Driftwood Parking BY: WJP DATE: 4/14/2026

SUBJECT: Detention Calculations CHKD: JWB DATE: 4/14/2026

DETENTION FOR 100-YEAR, 24-HOUR STORM

Pre-Developed Peak Flow: **0.2** **cfs**

Date	Time	Peak Flow Exist Sub Area A (cfs)	Peak Flow Pro Sub Area A (cfs)	Detention Volume (cu ft)
1-Jan-00	12:00	0	0	0
1-Jan-00	12:30	0	0	0
1-Jan-00	13:00	0	0	0
1-Jan-00	13:30	0	0	0
1-Jan-00	14:00	0	0	0
1-Jan-00	14:30	0	0	0
1-Jan-00	15:00	0	0	0
1-Jan-00	15:30	0	0	0
1-Jan-00	16:00	0	0	0
1-Jan-00	16:30	0	0	0
1-Jan-00	17:00	0.2	0.3	30
1-Jan-00	17:30	0.1	0.1	0
1-Jan-00	18:00	0.1	0.1	0
1-Jan-00	18:30	0	0	0
1-Jan-00	19:00	0	0	0
1-Jan-00	19:30	0	0	0
1-Jan-00	20:00	0	0	0
1-Jan-00	20:30	0	0	0
1-Jan-00	21:00	0	0	0
1-Jan-00	21:30	0	0	0
1-Jan-00	22:00	0	0	0
1-Jan-00	22:30	0	0	0
1-Jan-00	23:00	0	0	0
1-Jan-00	23:30	0	0	0
1-Jan-00	0:00	0	0	0
1-Jan-00	0:30	0	0	0
1-Jan-00	1:00	0	0	0
1-Jan-00	1:30	0	0	0
1-Jan-00	2:00	0	0	0
1-Jan-00	2:30	0	0	0
1-Jan-00	3:00	0	0	0
1-Jan-00	3:30	0	0	0
1-Jan-00	4:00	0	0	0
1-Jan-00	4:30	0	0	0
1-Jan-00	5:00	0	0	0
1-Jan-00	5:30	0	0	0

1-Jan-00	6:00	0	0	0
1-Jan-00	6:30	0	0	0
1-Jan-00	7:00	0	0	0
1-Jan-00	7:30	0	0	0
1-Jan-00	8:00	0	0	0
1-Jan-00	8:30	0	0	0
1-Jan-00	9:00	0	0	0
1-Jan-00	9:30	0	0	0
1-Jan-00	10:00	0	0	0
1-Jan-00	10:30	0	0	0
1-Jan-00	11:00	0	0	0
1-Jan-00	11:30	0	0	0
1-Jan-00	12:00	0	0	0
Total				**30**

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PROJECT NO. 14142-24

PROJECT: Driftwood Parking BY: WJP DATE: 4/14/2026
SUBJECT: Retention Basin Calculation CHKD: JWB DATE: 4/14/2026

Contour	Area	Previous Area	Area (A+√(A*B)+B)/3	Contour Interval	Area between Contours	Culmative Volume (Cubic Feet)
3819.46	320	0	0.00	0	0.00	0.00
3820	441	320	378.89	0.54	204.60	204.60