NOTICE OF MEETING
PLANNING COMMISSION
CITY OF ST. GEORGE
WASHINGTON COUNTY, UTAH

Public Notice

Notice is hereby given that the Planning Commission of the City of St. George, Washington County, Utah, will hold a **Planning Commission** meeting in the City Council Chambers, 175 East 200 North, St George, Utah, on **Tuesday, May 14, 2022**, commencing at **5:00 p.m**.

The agenda for the meeting is as follows:
Call to Order
Flag Salute

1. **ZONING CHANGE AMENDMENT (ZCA) (*Public Hearing*) Legislative**

   A. Consider a zone change amendment to the Atkinville Interchange Area Planned Development Commercial (PD-C) zone. There will be two requests with this amendment:
      1. The applicant is seeking approval to amend the Atkinville Interchange Area Zone Plan, to change 15.96 acres from Mixed Use to Community Commercial.
      2. The applicant is seeking approval of their design for a grocery store/marketplace and fuel center on approximately 15.96 acres. This property is generally located at the southwest corner of Blue Grass Way and Pioneer Road. The applicant is Sun River Commons, LLC, and the representative is Rick Magness. The project will be known as Smith's Marketplace. Case No. 2022-ZCA-024. (Staff – Carol Davidson)

   B. Consider an amendment to the Villa Highlands at Hidden Valley PD (Planned Development). The application is a request for approval of a zone change amendment to construct the next phase of Villa Highlands at Hidden Valley development. This proposed phase is 5.20 acres. This phase would create 30 townhome units in seven buildings of multi-family housing in the Hidden Valley neighborhood. The location of the proposed pod is along London Lane just west and contiguous to Villa Highlands Phase 2. Case No. 2022-ZCA-021. (Staff – Mike Hadley)

   C. Consider a zone change amendment for the Desert Color PD (Planned Development). The zone change amendment would allow the applicant to construct forty-six (46) residential units on the site. The site is approximately 2.16 acres and is located generally west of the lagoon, north of Akoya Pearl Road. The applicant is Desert Color St. George, LLC and the representative is Bob Hermandson. The project is known as Water's Edge at Desert Color Shores. Case No. 2022-ZCA-022 (Staff – Dan Boles)

   D. Consider a zone change amendment that will address two items.
      1. The first will be to amend the Southern Hills – West Zone Plan. This amendment will remove 0.16 acres from the Open Space (OS) zone bordering White Dome Drive on the south.
      2. The second item will be to rezone the 0.16 acres from OS to Single Family Residential, minimum lot size 10,000 sf (R-1-10) for the purpose of adding land to lots 10 and 11 of Sage Canyon Phase 1.

      This property is generally located south of White Dome Drive and west of Sunshine Circle. The applicant is Mitchell Henderson and Josh and Kelli Cooper, and the representative is Brad Petersen. The project will be known as Sage Canyon Ph 1 Lots 10 & 11 Additional Property Zone Change. Case No. 2022-ZCA-025. (Staff – Carol Davidson)

2. ZONING REGULATION AMENDMENT (ZRA) (*Public Hearing*) Legislative

Consider a request regarding proposed changes to the City Code regarding water usage, connections, conservation, landscaping, and other procedural changes consistent with implementing the water provisions. Proposed City Code changes include changes to Title 8, Chapter 1, regarding water connections and water waste; Title 10, Chapter 1 regarding water acknowledgment statements, permit process, vesting, and requirement of culinary water "will serve" letters; Title 10 Chapter 2 definitions; Title 10, Chapters 4, 5, 7, 8, 11, and 17 regarding landscaping and other conservation measures, certain land uses, special standards for some uses, and infrastructure standards; Title 10, Chapter 23 regarding landscaping provisions; and Title 10, Chapter 25 regarding subdivision requirements and processes. 2022-ZRA-002 (Staff – Scott Taylor)

3. HILLSIDE PERMIT (HS) Administrative

A. Consider a request for a Hillside Development Permit to allow the applicant to develop a proposed single-family development. The applicant has provided a slope analysis, proposed drainage report and site layout for consideration. The property is located at 720 W Indian Hills Drive and is zoned Single Family Residential, minimum lot size 10,000 sf (R-1-10) The representative is Taylor Ricks Case No. 2022-HS-010. (Staff – Wes Jenkins)

B. Consider a request for a hillside development permit at the Divario development. The applicant is proposing to construct in the area shown on the slope map labeled 20-29% and 30-39%. This is specifically in the PA-4 area which is situated in the far south west corner of the Divario development. The property is currently zoned Single-Family Residential, minimum lot size 10,000 square feet (R-1-10). The applicant is 730 St George, LLC. Case No. 2022-HS-003. (Staff – Wes Jenkins)

4. PRELIMINARY PLAT (PP) Administrative

A. Consider a request for a fourteen (14) lot residential subdivision known as Water's Edge at Desert Color located at approximately Akoya Pearl Rd and Alice Blue Lane. The property is 2.27 acres and is zoned PD-R. The applicant is Bush & Gudgell, representative Bob Hermandson. Case No. 2022-PP-028. (Staff – Wes Jenkins)

B. Consider a request for a thirty (30) lot residential subdivision known as Villa Highlands Phase 5 located west of London Lane. The property is 5.20 acres and is zoned PD-R. The applicant is Bush & Gudgell, representative Bob Hermandson. Case No. 2022-PP-022. (Staff – Wes Jenkins)

C. Consider a request for a three (3) lot residential subdivision known as Rilassante at Divario located at approximately Gap Canyon Parkway and Canyon View Drive. The property is 70.46 acres and is zoned R-1-10. The applicant is Rosenberg Associates, representative Rick Rosenberg. Case No. 2022-PP-024. (Staff – Wes Jenkins)

D. Consider a request for a one hundred thirty-one lot residential subdivision known as Lugano Landing (PA-4) located along the future extension of Divario Canyon Parkway south of Alienta Drive and north of the St. George City border. The property is 35.64 acres and is zoned R-1-10. The applicant is L.R. Nelson Consulting Engineers LLC, representative Clayton Neilson. Case No. 2022-PP-018. (Staff – Wes Jenkins)

E. Consider a request for a nineteen (19) lot residential subdivision known as Temple Trail Canyon Phase 1 located at approximately 720 West Indian Hills Drive. The property is 10.65 acres and is zoned R-1-10. The applicant is Mainline Engineering, representative Phil Giles. Case No. 2022-PP-031. (Staff – Wes Jenkins)

F. Consider a request for a two (2) lot commercial subdivision known as Desert Canyons Town Center West Commercial Subdivision located at approximately 3650 S Desert Canyon Parkway. The property is 17.89 acres and is zoned C-2. The applicant is DSG Engineering, representative Ken Miller. Case No. 2022-PP-032. (Staff – Wes Jenkins)

5. MINUTES

Consider a request to approve the meeting minutes from the May 4, 2022, joint work meeting and the May 10, 2022, Planning Commission meeting.

6. CITY COUNCIL ACTIONS

John Willis the Community Development Director will report on the items heard at City Council from the May 19, 2022, and the June 2, 2022, meeting.

1. 2022-CUP-009 Atlas Tower LLC
2. 2022-GPA-006 River Crossing Continued
3. 2022-DA-001 The Point Development Agreement
4. 2022-ZC-019 Divario at St. George Open Space
5. 2022-HS-004 Divario PA-18
6. 2022-ZC-004 Becco Creek PA-18
7. 2022-PP-017 Desert Color CTE Seminary Minor Subdivision
8. 2022-PP-019 Desert Color Sage Haven Phase 13
9. 2022-PP-016 Divario Open Space Dedication Plat
10. 2022-PP-026 Becco Creek @ Divario
11. 2022-HS-011 SG-FORR-120
12. 2022-PP-025 Ascesa at Divario
13. 2022-ZCA-020 Fields Property State Bank Southern Utah
14. 2022-ZCA-009 Rush Fun Center
15. 2022-GPA-005 Dixie Drive Apts
16. 2022-CUP-009 Atlas Tower LLC

Brenda Hatch – Development Office Supervisor

Reasonable Accommodation: The City of St. George will make efforts to provide reasonable accommodations to disabled members of the public in accessing City programs. Please contact the City Human Resources Office at (435) 627-4674 at least 24 hours in advance if you have special needs

St.George
Community Development

ITEM 1A

Zone Change Amendment

PLANNING COMMISSION AGENDA REPORT: 06/14/2022

Smith's Marketplace Zone Change Amendment (Case No. 2022-ZCA-024)		
Request:	The applicant is seeking approval of their design to build a new Smiths Marketplace	
Applicant:	AWA Engineering/ Sun River Commons, LLC	
Representative:	Rick Magness	
Location:	Southwest corner of Bluegrass Way and Pioneer Road	
General Plan:	Mixed Use (MU)	
Existing Zoning:	Planned Development Commercial (PD-C)	
Surrounding Zoning:	North	Planned Development Commercial (PD-C)
	South	Planned Development Commercial (PD-C)
	East	Planned Development Commercial (PD-C)
	West	Planned Development Residential (PD-R)
Land Area:	Approximately 15.96 acres	

BACKGROUND:
This request is for a zone change amendment to build a Smith's Marketplace and fuel center on approximately 15.96 acres located at the southwest corner of Bluegrass Way and Pioneer Road. This location falls in Area 3-1 of the Atkinville Interchange Area Master Plan. However, this has not always been a part of the Atkinville Plan; 9.78 acres were once a part of the Sun River Master Plan but was ultimately transferred to the Atkinville Interchange Area Master Plan on September 22, 2016.

This proposal will have two parts.
1. To amend the Atkinville Interchange Area Plan
2. To approve the concept plan for a new Smith's Marketplace and Fuel Center

To amend the Atkinville Interchange Area Plan, the use will need to be changed for Area 3-1. Right now, it is designated Mixed Use. The applicants are requesting to change this designation to Community Commercial. The Community Commercial designation use list is any use permitted in the C-2 district.

The second part of this amendment is the proposal of a new Smith's Marketplace plus fuel center. The marketplace will be 123,722 square feet. It will be similar to the Dinosaur Crossing Smith's with the exception of having only one entrance. The marketplace will provide retail grocery, clothing, pharmacy, and fuel. The primary hours of operation will be 24 hours but will be adjusted to meet the needs of the neighborhood. The fuel center will provide nine fuel dispensers with an accompanying kiosk.

The far northeast corner of the site will not be developed at this time. This 1.65-acre parcel will be developed in the future and will be required to return to the Planning Commission and City Council for adoption of their plans.

Please see the zoning requirement details below:

Zoning Requirements			
Regulation	**Section Number**	**Proposal**	**Staff Comments**
Setbacks		See attached site plan.	The required setbacks will be: Pioneer Road: 20' Havasu Drive: 20' Bluegrass Way: 20' Arrowhead Canyon Drive: 30' Site plan appears to meet setbacks.
Temporary Buildings, including Cargo Containers	10-8-4	None	N/A
Pedestrian	10-8-6	The site plan provided	This meets requirements.

Circulation Plan		shows pedestrian access on Havasu Dr, Pioneer Rd, and Bluegrass Way.	
Uses	10-8D-2	The applicant has provided a new use list.	The proposed uses are typical uses found in the C-2 district.
Height and Elevation	10-8D-2	The proposed maximum height is 37'8".	The PD-C zone allows for a 50' height. This meets regulations.
Phasing Plan	10-8D-2	No phasing proposed.	N/A
Landscape Plan	10-8D-2	A landscape plan has been provided.	This will require a 15' wide plant strip with the required street trees along all four streets and 5% of the parking lot landscaped.
Utilities	10-8D-2	None shown	All utilities will be determined and designed during the JUC process. We will ensure this is completed during the site plan approval process.
Signs	10-8D-2	The applicant is asking for three free standing signs. They are requesting to amend the Sun River Commons Master Plan to move the location of one of their signs.	The signs meet the approved height and there is not a problem with the movement of the signs.
Lighting	10-8D-2	A photometric plan has been provided.	The lighting will need to be at or below 1.0 foot candles at the property line.
Lot Coverage	10-8D-6	See attached site plan	The PD-C zone allows coverage up to 50%. This meets the zoning regulations.
Solid Waste	10-8D-6	The site plan shows the location for solid waste.	The waste location will be required to have solid wall surrounding it.
Buffer Protection of Residential Property	10-8D-6	The site plan shows a solid wall and landscaping along Arrowhead Canyon Dr	The site plan provided appears to meet regulations.
Overlay Zones	10-13	None	N/A
Parking	10-19-5	Parking provided:	They are required to have 495

		550 vehicle spaces 22 golf cart spaces	parking spaces. This meets requirements.
EVCS And Bike Parking	10-19-6	Shown on site plan: 12 bike spaces Conduit for 10 EVCS	Regulations require 2 bike spaces and conduit for 5 EVCS. This meets regulations.

RECOMMENDATION:
Staff recommends approval of this zone change amendment with the following conditions:

1. The right-of-way easement agreement with the City is amended to allow golf carts to travel on Arrowhead Canyon Drive to access Smiths.
2. The Sun River Master Plan is amended to allow the location change of the 30' pylon sign.

ALTERNATIVES:

1. Recommend approval as presented.
2. Recommend approval with conditions.
3. Recommend denial.
4. Table the proposed zone change amendment to a specific date.

POSSIBLE MOTION:
The Planning Commission recommends approval of the zone change amendment.

FINDINGS FOR APPROVAL:

1. The proposed uses are permitted uses found in the PD-C zone.
2. The proposed zone change meets the initial zone-change application requirements found in Section 10-8D-2A.

Exhibit A
Applicant's Narrative

June 7, 2022 (Revised June 7, 2022)

St. George City
Community Development Department
Attn: Carol Davidson
175 East 200 North
St. George, UT 84770

RE: Commercial Secondary Zone Change for a Smith's Marketplace at the NW corner of Pioneer Road and Havasu Drive in Sun River Commons

Ms. Davidson,

Smith's Food & Drug Center is requesting Commercial Secondary Zone Change consideration for a proposed Smith's Marketplace (123,722 sf) and a nine multi-product dispenser fuel center within the proposed parking area located at the NW corner of Pioneer Road and Havasu Drive. The proposed Site Plan also depicts a future development site area of 1.65 acres at the corner of Pioneer Road and Bluegrass Way.

Background

The current site is vacant and part of the Sun River Commons development.

Overall site area: ± 16.0 acres

Perimeter rights-of-way include Bluegrass Way (north), Havasu Drive (south), Pioneer Road (west), Arrowhead Canyon Drive (east)

General Plan Designation: Commercial

Current Zoning: PD-C (Planned Development – (Mixed Use / Commercial)

Atkinville Interchange Plan Area Overlay

Proposed General Uses / Zoning

The Atkinville Interchange Area Zone Plan zoning designation for this site is currently Mixed-Use, with a maximum 40,000 sf grocery store. The applicant is requesting a change to Community Commercial, as well as proposing a 124,000 sf Smith's Marketplace store. This is also a request to amend the Sun River Master Plan to remove the information referencing "mixed-use" for this parcel.

The proposed Smith's Marketplace will provide retail grocery, clothing, pharmacy, fuel and other related sales consistent with similar Smith's Food & Drug Centers within St. George. Primary hours of operation at opening will be 24 hours with adjustments made once business is established to meet neighborhood needs. This store is proposed with new prototype architectural elevations with modern architectural features and construction materials as shown in the proposed elevations. A fuel center will provide nine fuel dispensers with a kiosk for attendant assistance and some food sales.

The uses for this location will be the C-2 uses according to the Community Commercial designation in the Atkinville Interchange Area Zone Plan.

Per Sun River Commons CC&R's the project shall be devoted to hospitality, retail, food and beverage, entertainment, business, commercial and office uses (Article 10.Use Restrictions).
Site Plan

The store is located adjacent to Arrowhead Canyon Drive, with the front elevation oriented towards Pioneer Road. The parking lot exists between the storefront and Pioneer Road. Employee parking and Neighborhood Electric Vehicle parking are located south of the store; deliveries are located on the west (rear) and grocery pick-up, Electric Vehicle parking and drive through pharmacy are located on the north side of the store. On-site detention areas are located at the northwest corner of the site.

The fuel center will be located at the SW area of the site at Pioneer Road and Havasu Drive, maximizing vehicular accessibility.

The remaining 1.65 acre site will provide additional commercial opportunities.

SMITH"S MARKETPLACE & FUEL CENTER

Site Area: 622,750 sf (14.3 acres)

Landscape Area: 92,060 sf (2.1 acres)

Building Area: 123,886 sf (2.8 acres)

Impervious Area: 406,804 sf (9.4 acres)

FUTURE DEVELOPMENT AREA

Future Site: 72,039 sf (1.65 acres)

OVERALL SITE AREA: ± 16.0 acres

Building / Elevations

Store and fuel center design and elevations feature a combination of materials consistent with Sun River Commons and the surrounding area. Decorative integrally colored split face and smooth CMU's interface with stone veneer, stucco and prefinished metal provide interest and pleasing features. These materials are featured on all four store elevations, as well as the fuel center.

Landscaping

Landscape planning is proposed and will be provided in accordance with current development and city code. A greater landscape area with a 6 ft. screen wall is proposed adjacent to Arrowhead Canyon Drive, providing a larger buffer to existing residential homes.

Transportation / Access

Pioneer Road

A proposed right in/right out mid-property between Havasu Drive and Bluegrass Way

Full accesses at the intersections of Pioneer Road and Havasu Drive as well as Pioneer Road and Bluegrass Way

Havasu Drive

Two full accesses for general parking circulation

Two right in/right out accesses for employee parking and shipping deliveries

One full access for neighborhood electric vehicles

Bluegrass Way

Three full accesses for general parking circulation, drive through pharmacy, electric vehicle parking and grocery pick-up.

A traffic study is provided for city review / approval.

Parking Analysis

	Spaces Required:	Spaces Provided:
Grocery (1/250 s.f.) =	495 spaces	549 spaces
Fuel Center (1:250 s.f.) =	1 space	1 space
Electric Vehicles =	(1%/5 spaces)	10 spaces
Bicycle (2 spaces + 2 per 100 vehicle parking) =	12 spaces	12 spaces
Total Parking:	501 spaces + 12 Bicycle	572 spaces + 12 Bicycle

Note:
Additional Parking Provided:
Grocery Pick up Spaces = 16 spaces
Neighborhood Electric Vehicle (Golf Cart) Spaces = 22 spaces

Signage

The Sun River Commons Master Sign Plan will be incorporated into this development. The Smith's Marketplace development proposes:

- One 30 ft. tall multi-tenant freestanding sign adjacent to Pioneer Road
- One 12ft. tall monument sign with price changers at the NW corner of Pioneer Road and Havasu Drive
- Signage will be located on two off-site pylon signs adjacent to I-15

These signs and locations are part of the master sign plan. Smith's Marketplace reduced the number of allowable signs within the Sun River Commons development, minimizing impacts.

Lighting

Parking lot lighting will be consistent with included information and will provide LED lighting and cut-off optics for both pole and wall pack lighting that will provide sufficient night vision and security lighting without excessive lighting cast beyond the project boundary.

The proposed development meets or exceeds city codes and Sun River Commons CC&R's.

Smith's looks forward to providing grocery services in the Sun River area.

Thanks in advance for your consideration and approval for this project.

Regards,

Rick Magness

Rick Magness, AICP
Entitlement Manager / Land Planner
rickm@awaeng.com
(702) 370-6962

Exhibit B
C-2 Use List

Allowed Uses

	C-1	C-2	C-3	C-4
Alcohol establishments, including the following:				
Bar establishment		C	C	C
Off-premise beer retailer		P	P	P
Microbrewery or micro-winery (with restaurant or bar establishment)		P	P	P
Nightclub, dance hall (with alcohol)		C	C	C
Ambulance service		P	P	
Animal services, including the following:				
Animal boarding/care for small animals only and boarded for less than 30 days a year; provided, conducted completely within enclosed building		P	P	P
Animal hospital and veterinarian clinic, including overnight care of large animals (no boarding)		PS	PS	
Automobile and vehicleservices, limited to the following uses:				
Automobiles and other similar vehicle sales lots		PS	PS	
Automobile parts sales (new parts only); provided, conducted within completely enclosed building		P	P	P
Automobile rental (vehicles up to 26' in length)		P	P	
Automobile repair, storage, including paint, body and fender, brake, muffler, upholstery or transmission work; provided, conducted within completely enclosed building (GVW 14,000 lbs or less)		P	P	P
Tire sales and service; provided, conducted within completely enclosed building		P	P	P
Financial, medical and professional services	P	P	P	P
Food service establishments, including the following and similar uses:				
Catering establishment		P	P	P
Restaurant	P	P	P	P

	C-1	C-2	C-3	C-4
Lodging, temporary, limited to the following uses:				
Bed and breakfast		P	P	P
Hotel/motel		P	P	P
RV parks, long and short term		PS		
Timeshare units		P	P	P
Hospitals			P	P
Counseling center, mental health, alcohol, drugs (nonresidential, less than 24 hours)		P	P	P
Mental health treatment center, with overnight stay		C	C	C
Nursing home		P	P	
Office	P	P	P	P
Religious facility	P	P	P	P
Residential, limited to the following use:				
Living quarters for manager or security personnel for business which requires 24-hour assistance or security – Up to 600 sf with occupancy limited to 4 people		PS	PS	PS
Large floor area building or site (20,000 sf or more ground floor aggregate)		C	C	C
Retail shops:				
Antique store		P	P	P
Athletic and sporting goods store		P	P	P
Department store		P	P	P
Drive-through sales (pharmacy, dairy products, etc.)		P	P	P
Furniture and large appliances sales (used)		P	P	
Furniture sales (new) and repair		P	P	P
Household appliance sales and service		P	P	P
Office supply, office machines sales and service		P	P	P
Paint or wallpaper store		P	P	P
Pawnshop		P	P	

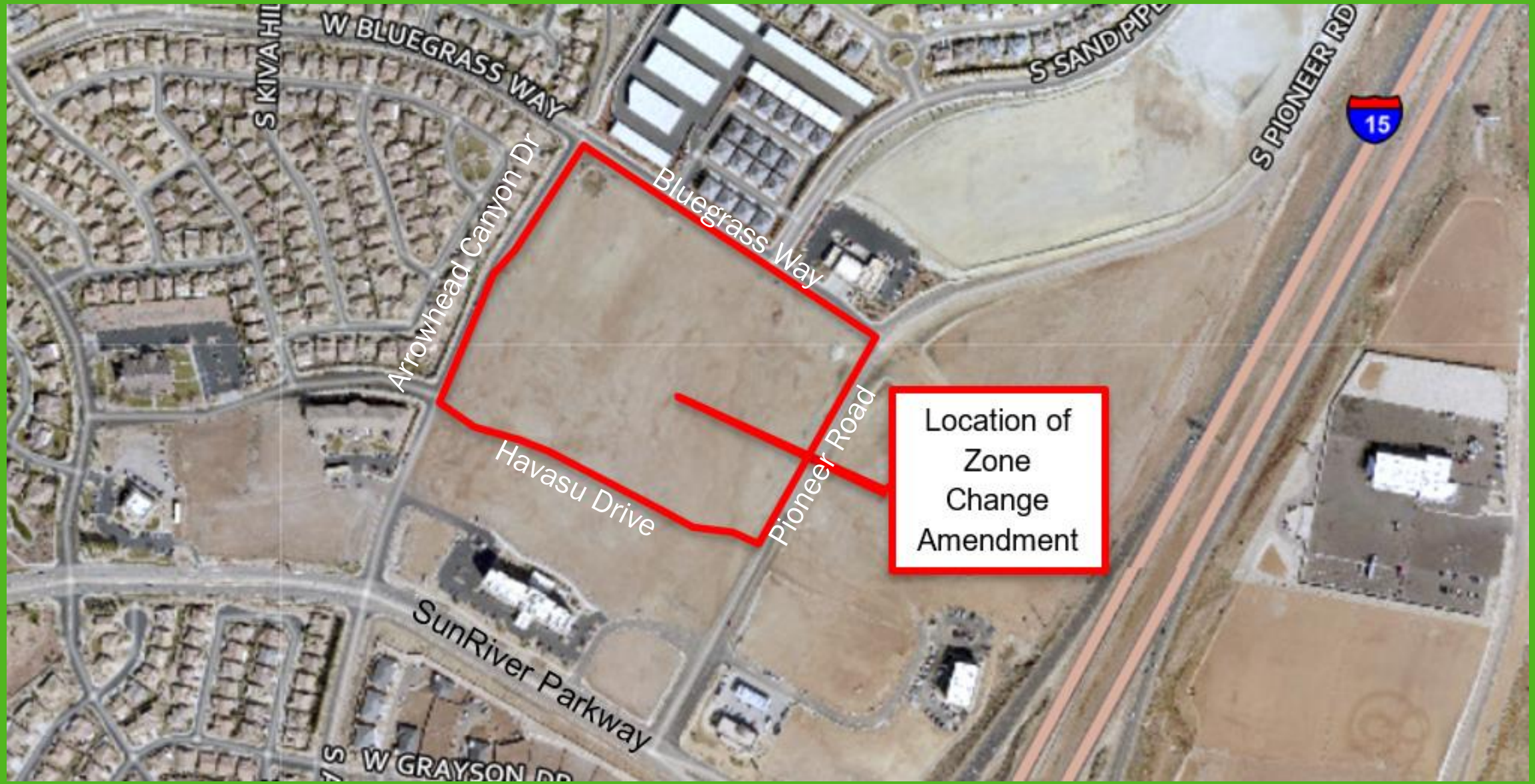
	C-1	C-2	C-3	C-4
Seed and feed store, retail		P	P	
Supermarket/grocery store		P	P	P
Thrift shop/secondhand store/consignment store (no outside storage and no drop-off of items during the hours the business is closed)		P	P	P
Vegetable stand		P	P	P
Payday lending/title loans		P	P	
Retail sale of goods with some operations outdoors, limited to the following uses:				
Building materials sales			P	
Convenience markets with gas pumps/gas station		P	P	
Convenience markets with gas pumps located in the rear of the building				P
Farm implement sales (outdoor display)		P	P	
Fence, sales and service		P	P	
Garden supplies and plant material sales		P	P	
Greenhouse and nursery; soil and lawn service			P	
Landscape rock sales, ancillary to a permitted use			P	
Service businesses, limited to the following uses:				
Body piercing, ancillary to a permitted use		P	P	P
Carpet and rug cleaning		P	P	P
Child care center	P	P	P	P
Communication transmission facilities, including wireless, primary		PS	PS	PS
Communication transmission facilities, including wireless, primary, height over 50'	C	C	C	C
Construction trade services, plumbing shop, electrical shop, etc.			P	
Crematorium, independent human		P	P	
Educational institutions, schools, college, learning centers, trade schools (no residential or 24-hour facilities)		P	P	P
Gunsmith		P	P	P
Janitor service and supply		P	P	P
Locksmith		P	P	P

	C-1	C-2	C-3	C-4
Mortuary		P	P	P
Permanent cosmetics, a secondary use to an establishment employing cosmetologist(s)/barber(s), aesthetician(s), electrologist(s), or nail technician(s) licensed by the state under 58-11a-101 et seq., Utah Code Annotated, 1953, as amended, excluding tattoo establishments and home occupations	P	P	P	P
Personal care service	P	P	P	P
Personal instruction service	P	P	P	P
Pest control and extermination		P	P	P
Pet grooming		P	P	P
Printing, lithographing, publishing or reproduction sales and service			P	P
Psychic, tarot card reader, fortune teller, occult art practitioners, hypnotist		P	P	P
RV storage		PS	PS	
Sign sales		P	P	P
Storage rental units		PS	PS	
Tattoo establishment		P	P	P
Taxidermist		PS	PS	
Transportation, limited to the following uses:				
Bus terminal		P	P	P
Taxi/shuttle		P	P	P
Government, public services and facilities, limited to the following uses:				
City, all facilities	P	P	P	P
Public utility facilities, primary		PS	PS	PS

Exhibit C
PowerPoint Presentation

Smith's Marketplace

Zone Change Amendment (2022-ZCA-024)

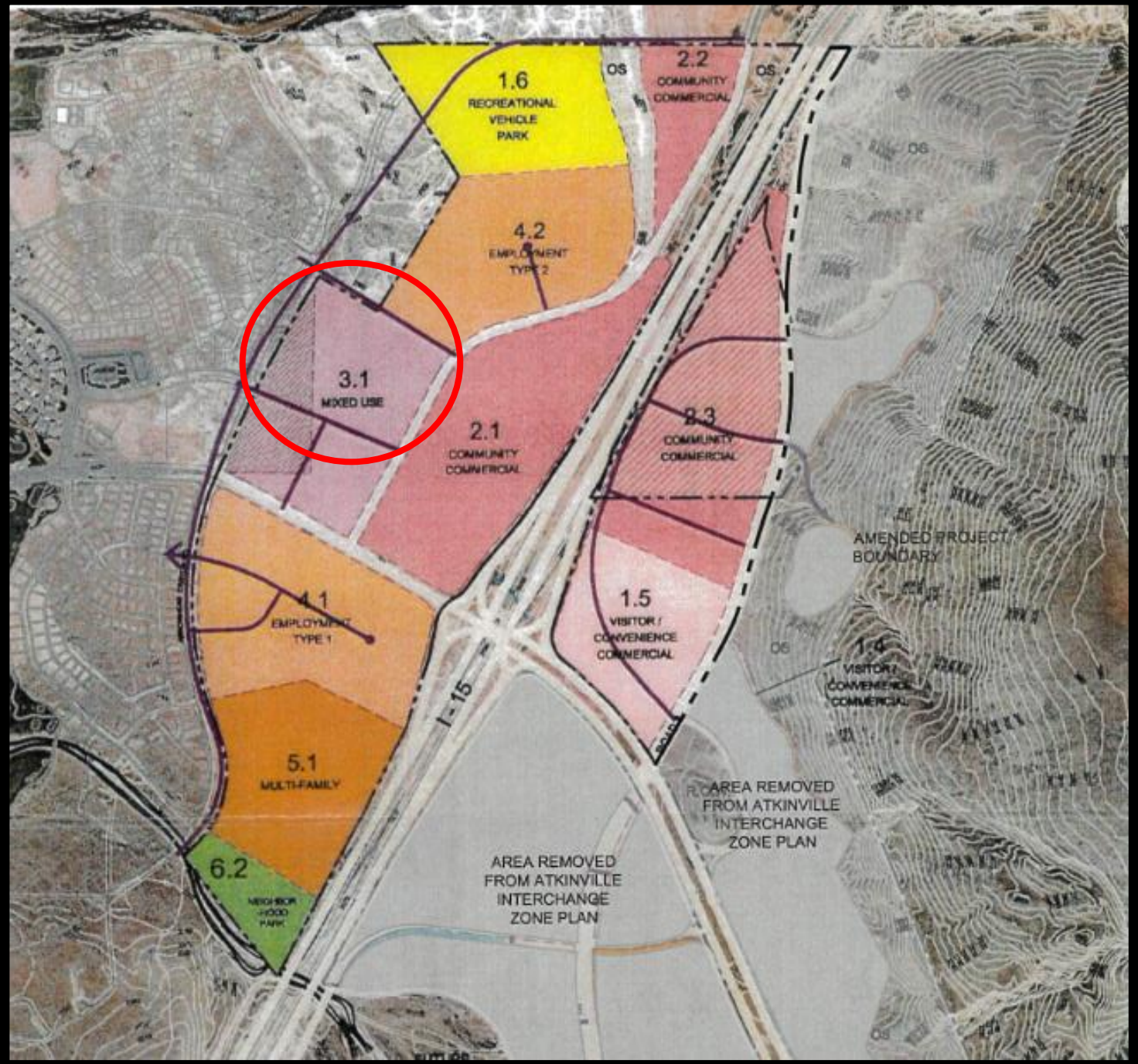

W BLUEGRASS WAY
S KIVA HI
S SAND PIPE
S PIONEER RD
15
Arrowhead Canyon Dr
Bluegrass Way
Havasu Drive
Pioneer Road
Location of Zone Change Amendment
SunRiver Parkway
W GRAYSON DR

General Plan Land Use Map


Arrowhead Canyon Dr
Bluegrass Way
Havasu Drive
Pioneer Road
W BLUEGRASS WAY
S SANDPIPER DR
S PIONEER RD
15
W SUN RIVER PKWY
S IRONWOOD DR
S HIGHPARK DR
S ARROWHEAD CANYON DR
W GRAYSON DR
PD-C
PD-R
Price City Hills 9-19

Zoning Map


ER PKWY
S HIGHPARK DR
S ARROWHEAD CANYO
W GRAYSON DR
S KIVA HILL DR
W BLUEGRASS WAY
Smith's MARKETplace
Pioneer Road
S SANDPIPER DR
S PIONEER RD
15



VISITOR / CONVENIENCE COMMERCIAL

COMMUNITY COMMERCIAL

EMPLOYMENT

MULTIFAMILY

RECREATIONAL VEHICLE PARK

NEIGHBORHOOD PARK

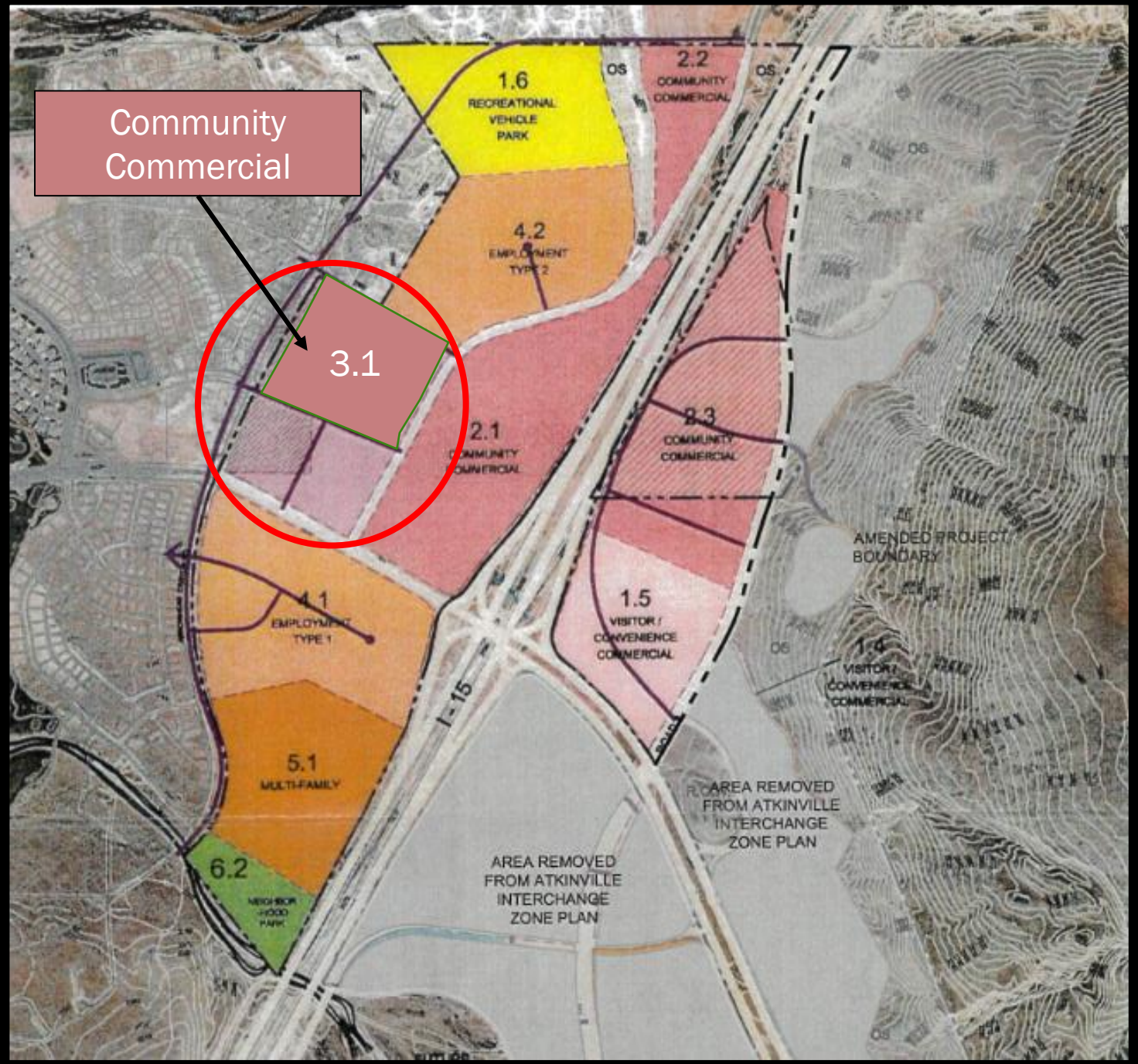
WELCOME CENTER

PROJECT AREA BOUNDARY

ZONE PLAN AREA BOUNDARY

THIS PORTION OF PLANNING AREA 3.1 WAS ZONED PD AS PART OF THE ORIGINAL SUN RIVER PD ZONE PLAN IT IS DESIGNATED FOR MIXED COMMERCIAL AND RESIDENTIAL IN THAT APPROVED ZONE PLAN.

EXISTING WELCOME CENTER PROPERTY PROJECTED TO BE TRANSFERED TO THE CITY OF ST. GEORGE



VISITOR / CONVENIENCE COMMERCIAL

COMMUNITY COMMERCIAL

EMPLOYMENT

MULTIFAMILY

RECREATIONAL VEHICLE PARK

NEIGHBORHOOD PARK

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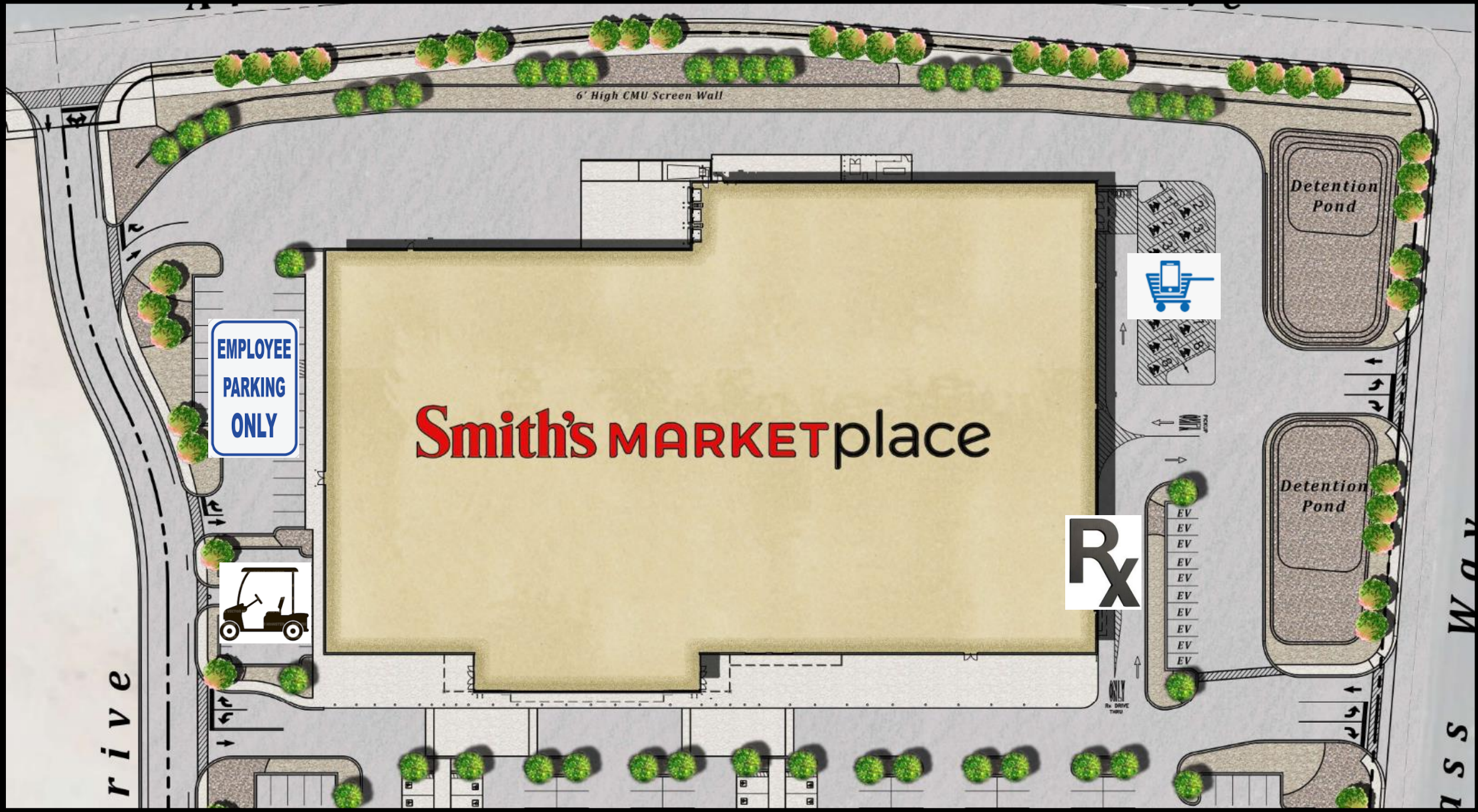
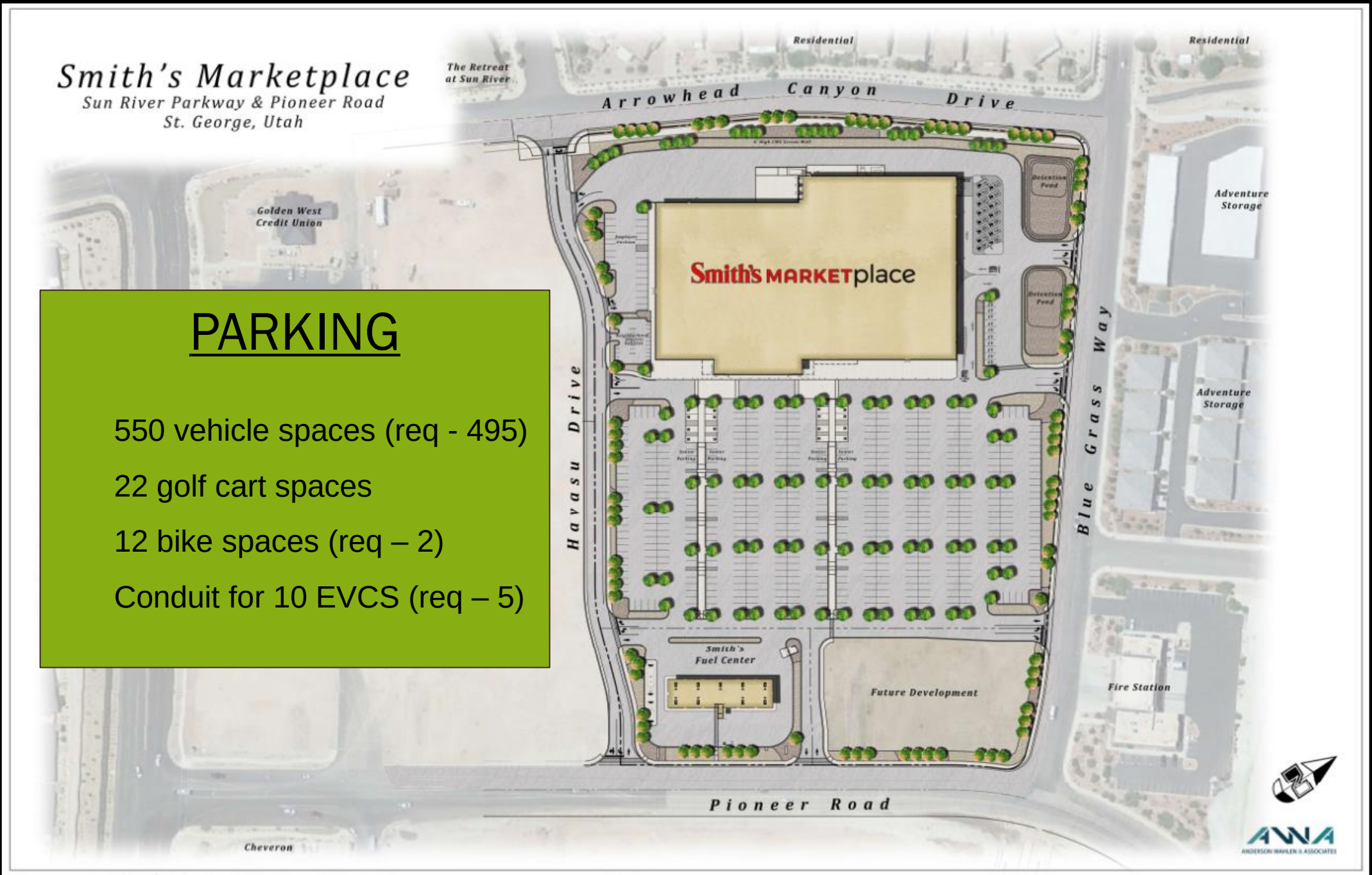
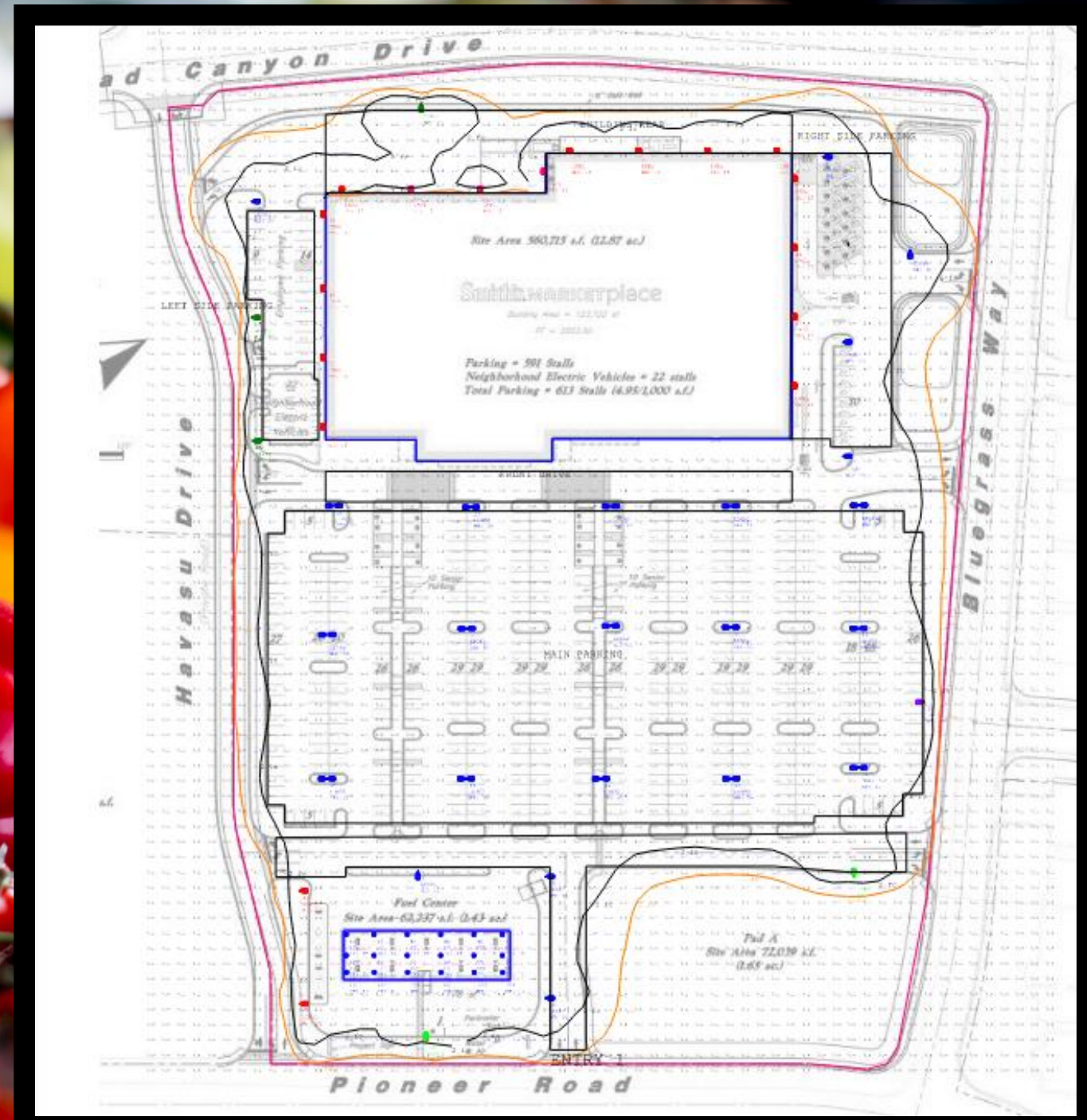
EXISTING WELCOME CENTER PROPERTY PROJECTED TO BE TRANSFERED TO THE CITY OF ST. GEORGE


6' High CMU Screen Wall
Detention Pond
Detention Pond
EMPLOYEE PARKING ONLY
Smith's MARKETplace
Rx
EV
EV
EV
EV
EV
EV
EV
EV
EV
EV
EV
PICKUP ONLY
ONLY Rx DRIVE THRU
rive
ss Way


Smith's Marketplace
Sun River Parkway & Pioneer Road
St. George, Utah
PARKING
550 vehicle spaces (req - 495)
22 golf cart spaces
12 bike spaces (req – 2)
Conduit for 10 EVCS (req – 5)
Residential
Residential
The Retreat at Sun River
Arrowhead Canyon Drive
Golden West Credit Union
Smith's MARKETplace
Detention Pond
Detention Pond
Adventure Storage
Adventure Storage
Havasu Drive
Blue Grass Way
Smith's Fuel Center
Future Development
Fire Station
Pioneer Road
Cheveron
ANA
ANDERSON WAHLEN & ASSOCIATES

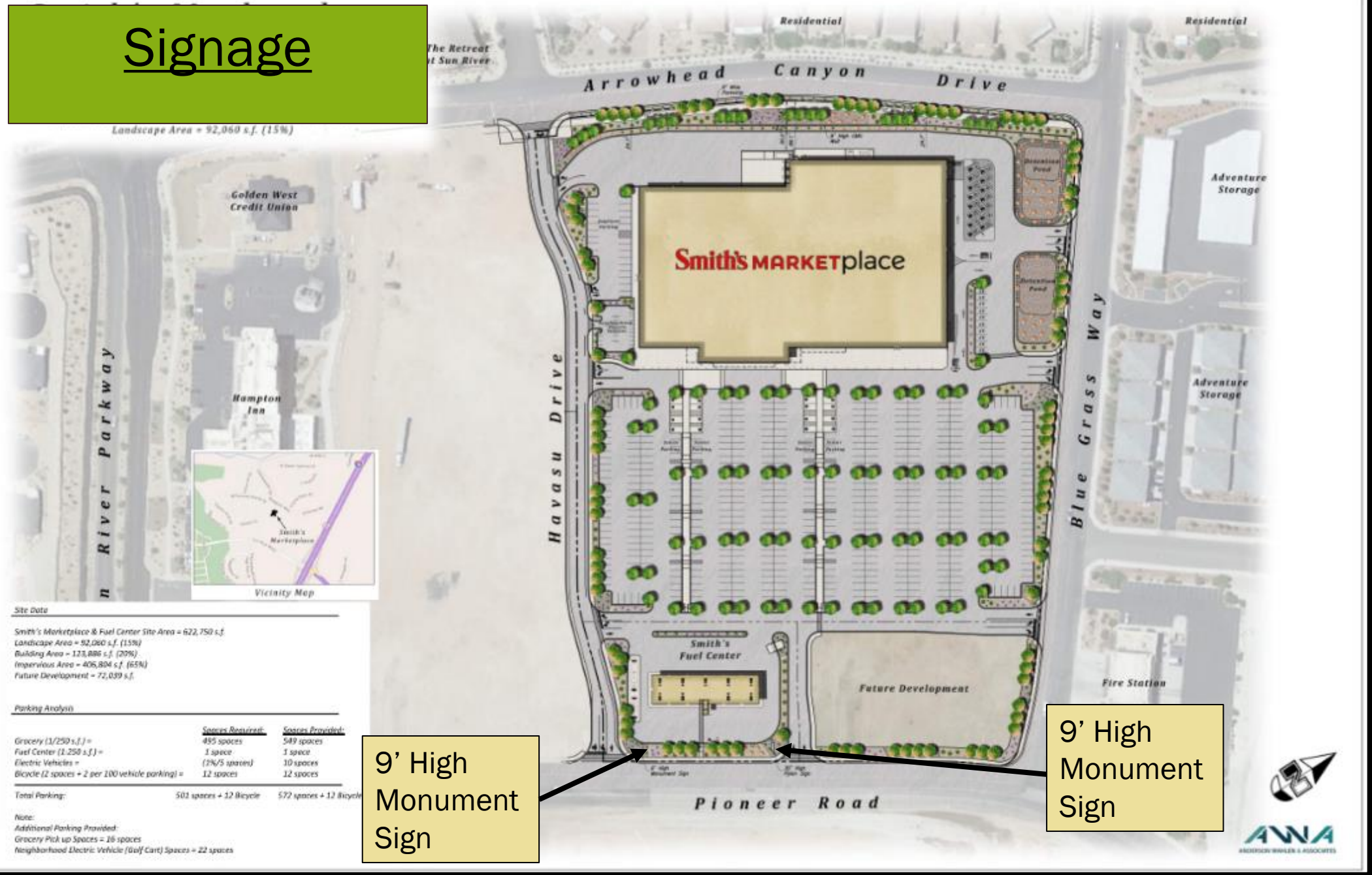
LIGHTING

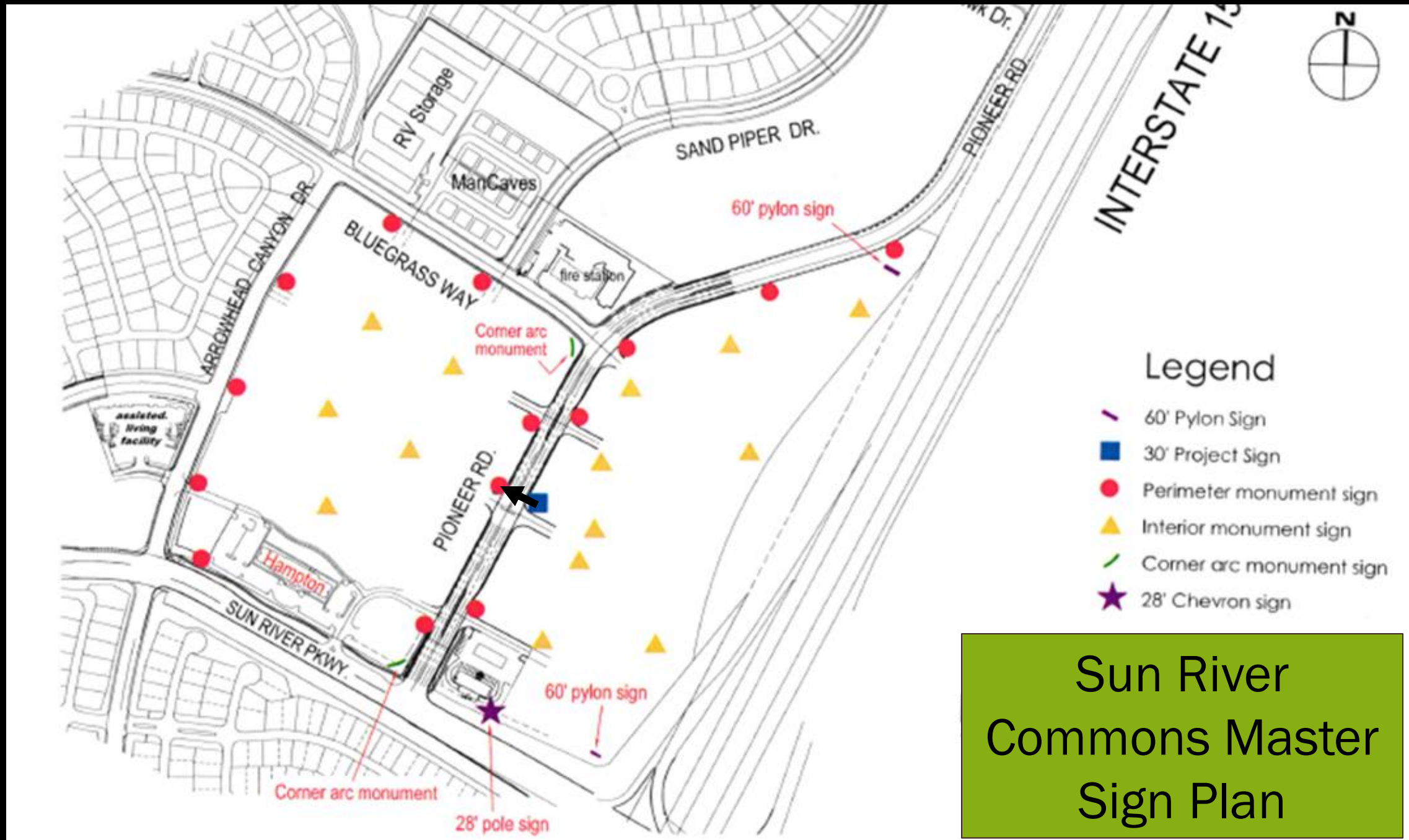

Canyon Drive
Site Area 560,715 s.f. (12.87 ac.)
Parking = 501 Stalls
Neighborhood Electric Vehicles = 22 stalls
Total Parking = 613 Stalls (4.95/1,000 s.f.)
MAIN PARKING
Fuel Center
Site Area-63,337 s.f. (1.45 ac.)
Pad A
Site Area 72,039 s.f.
(1.65 ac.)
ENTRY 1
Havasu Drive
Bluegrass Way
Pioneer Road

Access

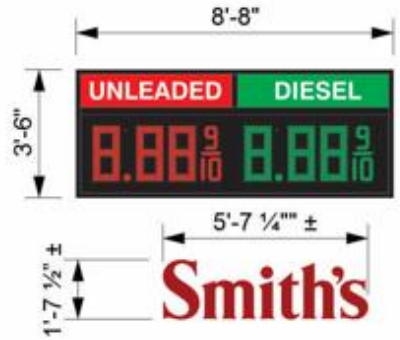

Residential
Residential
The Retreat at Sun River
Arrowhead Canyon Drive
Golden West Credit Union
Hampton Inn
Sun River Parkway
Havasu Drive
Smith's MARKETplace
Detention Pond
Detention Pond
Adventure Storage
Adventure Storage
Blue Grass Way
Smith's Fuel Center
Future Development
Fire Station
Pioneer Road
Cheveron

Signage

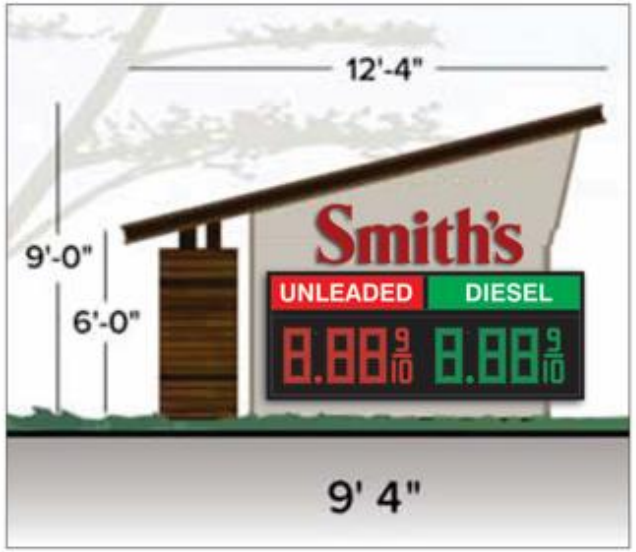

Residential
Residential
Arrowhead Canyon Drive
Golden West Credit Union
Hampton Inn
n River Parkway
Havasu Drive
Blue Grass Way
Smith's MARKETplace
Adventure Storage
Adventure Storage
Smith's Fuel Center
Future Development
Fire Station
Pioneer Road
Landscape Area = 92,060 s.f. (15%)
Vicinity Map
Site Data
Smith's Marketplace & Fuel Center Site Area = 622,750 s.f.
Landscape Area = 92,060 s.f. (15%)
Building Area = 123,886 s.f. (20%)
Impervious Area = 406,804 s.f. (65%)
Future Development = 72,039 s.f.
Parking Analysis
Spaces Required:
Spaces Provided:
Grocery (1/250 s.f.) = 495 spaces 549 spaces
Fuel Center (1,250 s.f.) = 1 space 1 space
Electric Vehicles = (1%/5 spaces) 10 spaces
Bicycle (2 spaces + 2 per 100 vehicle parking) = 12 spaces 12 spaces
Total Parking: 501 spaces + 12 Bicycle 572 spaces + 12 Bicycle
Note:
Additional Parking Provided:
Grocery Pick up Spaces = 16 spaces
Neighborhood Electric Vehicle (Golf Cart) Spaces = 22 spaces
9' High Monument Sign
9' High Monument Sign

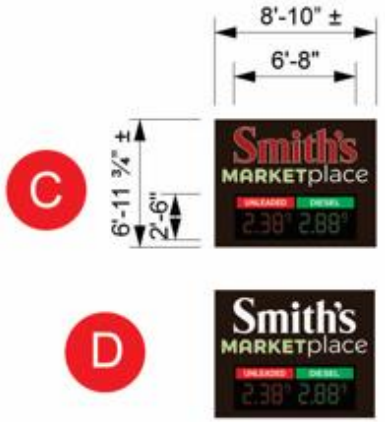

RV Storage
ManCaves
SAND PIPER DR.
PIONEER RD.
INTERSTATE 15
60' pylon sign
BLUEGRASS WAY
fire station
ARROWHEAD CANYON DR.
Corner arc monument
assisted living facility
PIONEER RD.
Hampton
SUN RIVER PKWY.
60' pylon sign
Corner arc monument
28' pole sign
N
Legend
60' Pylon Sign
30' Project Sign
Perimeter monument sign
Interior monument sign
Corner arc monument sign
28' Chevron sign
Sun River Commons Master Sign Plan

60' TENANT PYLON SCALE: 1/8" = 1'-0"



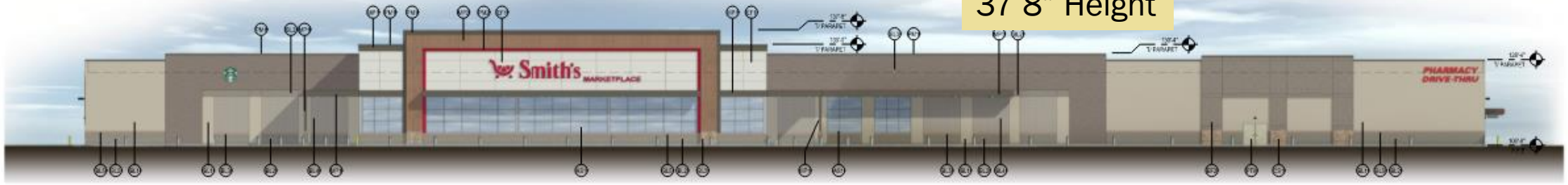
9'-4" TENANT PYLON SCALE: 1/4" = 1'-0"





30' TENANT PYLON SCALE: 1/8" = 1'-0"

37’8” Height

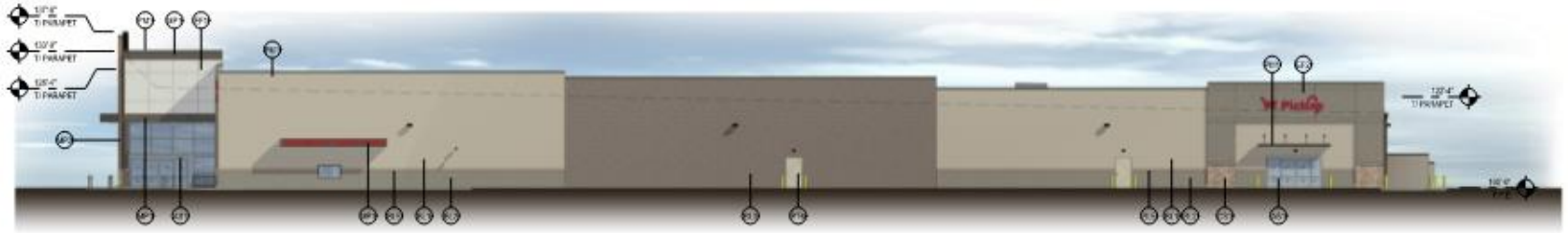


EAST ELEVATION

WEST ELEVATION

EXTERIOR MATERIAL LEGEND

SOUTH ELEVATION



NORTH ELEVATION

Smith's Marketplace

Sun River Parkway & Pioneer Road

St. George, Utah

Perspective #1

Perspective #2

Smith's Marketplace

Havasu Drive & Pioneer Road
St. George, Utah

Perspective #3

Perspective #4

BL1 – Decorative CMU, Smooth Face
Echelon, Precision - Sunburst

BL2 – Decorative CMU, Split Face
Echelon, Split-face – Cocoa Brown

BL3– Decorative CMU, Shot Blast Face
Echelon, Mesastone - Plum

BL4 – Decorative CMU, Smooth Face
Echelon, Precision - Aspen

BL5 – Decorative CMU, Smooth Face
Echelon, Precision – Umber Brown

EF1 – EIFS or Stucco
Color to match SW7002 "Downy"

CS1 – Applied Simulated Stone
Cultured Stone, Pro-Fit Ledgestone - Mojave

MP2 – Extruded Aluminum Panel
Longboard – Light Cherry

MP1/PM1 – Metal Panel / Prefinished Metal
Burnished Slate

EF2 – EIFS or Stucco
Color to match SW7508 "Tavern Taupe"

Smith's FOOD & DRUG STORES

EXTERIOR MATERIAL SAMPLES

Smith's Store SM280 – St. George, UT

May 10, 2022

CR architecture + design

Smith's Marketplace

Recommendation

PLANNING COMMISSION AGENDA REPORT: 06/14/2022

Zone Change Amendment
Villa Highlands Ph. 5
Case No. 2022-ZC-021

Request:	Consider a Zone Change amendment to the Villa Highlands at Hidden Valley PD (Planned Development). The application is a request for approval of a zone change amendment to construct the next phase of Villa Highlands at Hidden Valley development. This proposed phase is on 5.20 acres. This phase would create 30 townhome units in seven buildings of multi-family housing in the Hidden Valley neighborhood. The location of the proposed pod is along London Lane just west and contiguous to Villa Highlands Phase 2
Applicant:	Ivory Southern LLC
Representative:	Rick Myer/Bush & Gudgell
Area:	5.20 Acres
Proposed Density:	7.94 Units per acre
Location:	The property is approximately located at London Lane in the Hidden Valley Development.
Current Zone:	Planned Development Residential (PD-R).
General Plan:	MDR (Medium Density Residential).

Background:

The development has a long history. Originally approved in 1999, the site was approved as a Master Planned Development with 1,510 units approved of various densities in designated areas. Villa Highlands Ph.5 is a townhome project located on London Lane and is part of the Hidden Valley development on 5.20 acres. The property is currently zoned PD-R and the applicant is requesting to build 30 townhouse units.

The proposed site plan depicts five four-unit buildings and two five-unit buildings on 5.20 acres for a density of 7.94 units per acre (Medium Density Residential allows up to nine units per acre).

This density is less than the allowed maximum density for the current pod of the PD-R (Planned Development Residential) zone which is 8 units per acre.

Proposed Site Details:
Parking: Under section 10-19-4(A)(4) of the St. George zoning code, each unit is required to provide two parking stalls, one of which must be covered, plus one stall for every three units for guest parking. With 30 units, this yields a total requirement of 60 stalls plus 10 stalls for guest parking. Each unit will have a two-car garage which will satisfy the requirements for each unit. The site has been designed with 12 guest parking stalls. Each unit will have its own two car garage.

Elevations: As previously discussed, the site depicts four, and five-unit buildings. They will all be two stories. The materials to be used are stucco veneer, and stone veneer with flat tile roofing. The applicant is proposing earth tone colors. There are three different color schemes for these townhomes. The proposed units are consistent and in character with the existing townhome development.

Trail Dedication Area: There is a 100' trail corridor to the north of Villa Highlands Ph.5 that will be dedicated to St George City. Within the corridor there will be a 10' trail. The area dedicated is a total of 1.09 acres.

Recommendation:
Staff recommends approval of this Zone Change Amendment.

Alternatives:
1. Recommend approval as presented.
2. Recommend approval with conditions.
3. Recommend denial.
4. Table the proposed zone change amendment to a specific date.

Possible Motion:
The Planning Commission recommends approval to the City Council of the Zone Change Amendment for the Villa Highlands Townhomes Ph.5 Planned Development

EXHIBIT A
PD-R ZONING NARATIVE

BUSH & GUDGELL, INC.
Engineers • Planners • Surveyors
205 East Tabernacle
St. George, Utah 84770
(435) 673-2337 (ph.)
(435) 673-3161 (fax)

April 18, 2022

RE: PD Secondary Zone Change Application – Villa Highlands, Phase 5

Dear Council / Commission members,

With this Planned Development Secondary Zone Change request, the applicant desires to provide the detailed information regarding the development of 5.20 acres of land (Parcel # SG-5-3-18-433). Currently, the land is owned by Ivory Southern, LLC. The land will be developed as an addition to the Villa Highlands development which lies adjacent to the property. As the site plan shows, Phase 5 will hold a total of 30 townhome units in seven (7) buildings. This will result in a density of 7.94 dwelling units per acre at this location. London Lane will be extended through the center of the phase. We feel that this development will be in great harmony with the adjacent property and the Hidden Valley neighborhood in general. Please see the attached exhibits for reference. The photos on the following pages are of the existing Villa Highlands townhomes, similar to what is planned for these additional phases. Your consideration of this request is greatly appreciated.

Sincerely,

Rick Meyer, PE
Bush and Gudgell

Site


E LONDON LN
E LONDON LN
S ATLANTA LN
S SOCHI LN
S MONTREAL LN
E SYDNEY DR


Villa Highlands Ph.5
2022-ZCA-021

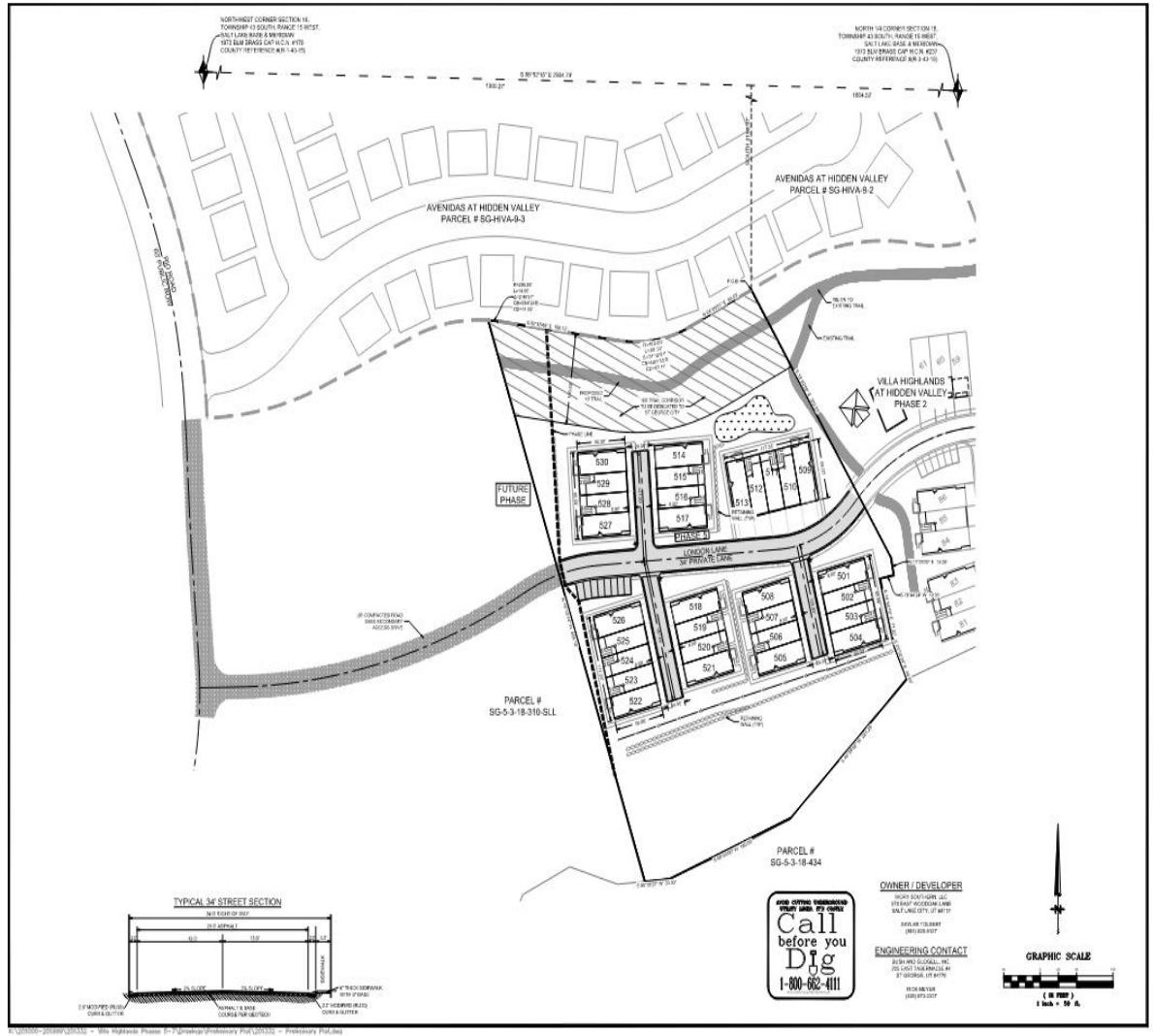
Aerial Map

General Plan Map

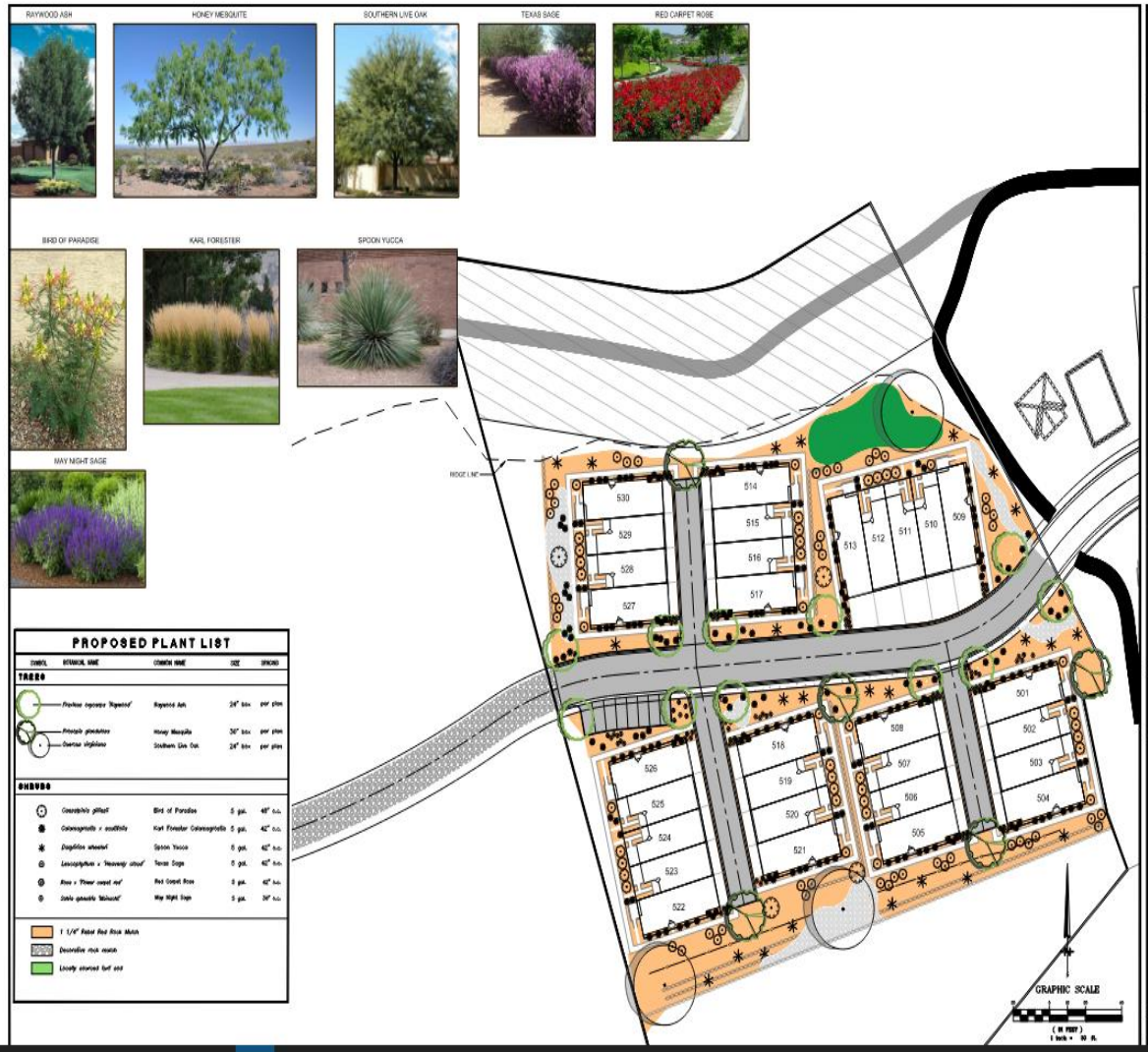
Zoning Map


E DAKAR LN
S TURIN LN
S ATHENS DR
E LONDON LN
E LONDON LN
S ATLANTA LN
S SOCHI LN
S MONTREAL LN
E SYDNEY DR
PD-R
Price City Hills 9-1992 Amended 7-2[illegible]-2005

Site Plan


AVENIDAS AT HIDDEN VALLEY
PARCEL # SG-HIVA-9-3
AVENIDAS AT HIDDEN VALLEY
PARCEL # SG-HIVA-9-2
VILLA HIGHLANDS
AT HIDDEN VALLEY
PHASE 2
FUTURE
PHASE
PHASE 1
LONDON LANE
50' PRIVATE DRIVE
PARCEL #
SG-5-3-18-310-SLL
PARCEL #
SG-5-3-18-434
TYPICAL 34' STREET SECTION
Call
before you
Dig
1-800-662-4111
OWNER / DEVELOPER
ENGINEERING CONTACT
GRAPHIC SCALE

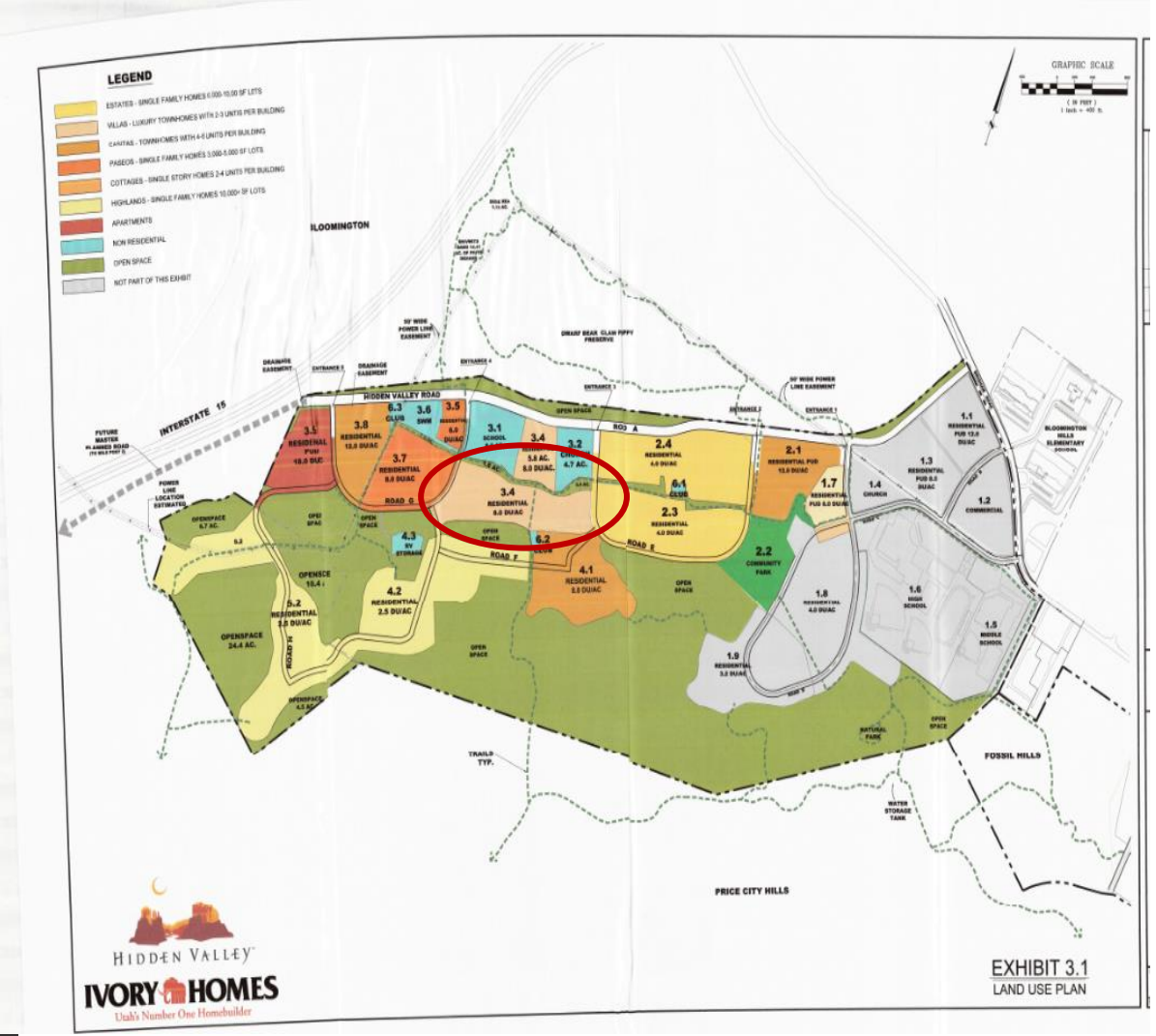
Landscape Plan



Elevations

Elevations

Master Plan Area 3.4



Materials


Roof Tiles: 5808
Rain Gutters
Garage Door: Taupe
Front Door: Sea Serpent SW7615
Windows: Taupe
Stucco Main & Trim: Ivory Putty Grey
IVORYHOMES
Utah's Number One Homebuilder*
Villa Highlands
Exterior Colors A

Materials


Roof Tiles: 5808
TERRA BRONCE
Rain Gutters
Front Door:
Raisin SW7630
Windows: Taupe
Stucco Main & Trim:
Ivory Walden
IVORYHOMES
Utah's Number One Homebuilder®
Villa Highlands
Exterior Colors B

Materials


Roof Tiles: 5808
TERRA BRONZE 34
Rain Gutters
Front Door
Iron Ore SW7069
Windows: Taupe
Stucco Main & Trim:
Ivory Stone
IVORYHOMES
Utah's Number One Homebuilder*
Villa Highlands
Exterior Colors C

St.George
Community Development

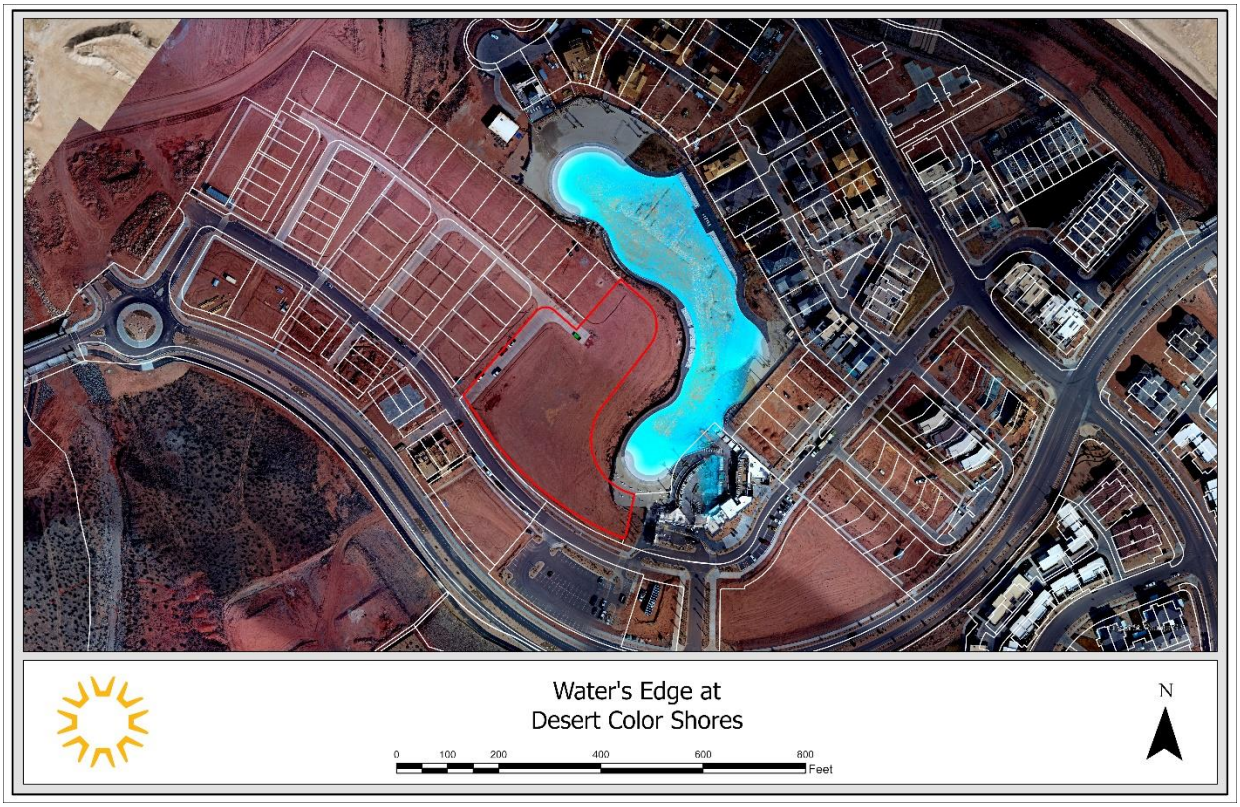
ITEM 1C

ZONE CHANGE AMENDMENT

PLANNING COMMISSION AGENDA REPORT: 06/14/2022

Zone Change Amendment
Water's Edge at Desert Color Shores
Case No. 2022-ZCA-022

Request:	Consider a Zone Change Amendment to the Desert Color PD-R to develop the subject property.
Applicant:	Desert Color St. George, LC
Representative:	Bob Hermandson
Area:	Approximately 2.16 Acres
Location:	Located generally west of the lagoon, north of Akoya Pearl Road
Current Zone:	PD-R - TNZ-Resort (Planned Development Residential, Traditional Neighborhood Zone – Resort)
General Plan:	TC (Town Center)



Background:
The Desert Color development was approved in 2018 after years of refining by the developer, city staff, Planning Commission and City Council. The idea of the resort area is to provide an area that will provide more density and where property owners may rent their homes on a short-term basis if desired. In this area, amenities are centered around the central amenities which in this case is the lagoon with its amenities, the club house, swimming pool, pickleball courts, etc. To compliment these amenities, trails and civic space provide additional recreation and lounging opportunities. This particular phase is on the western edge of the lagoon directly adjacent to Akoya Pearl Road.

The subject property is lot 545 of the Desert Color Resort phase five subdivision, recorded in October of 2021. Lot 545 is 2.16 acres (94,041 sq ft).

Addressing the TNZ-Resort area of the development, the Desert Color zone plan states that the resort area "*is where a mix of primary residential and secondary residential, vacation rentals, hotels, and other hospitality-oriented uses may be located. The PD TNZ Resort neighborhood pattern of development shall adhere to Chapter 8B Traditional Neighborhood Zone ("TNZ") or as modified herein and shall be designated where short term residential rental properties are permitted as outlined in St. George City Ordinances…".* In the resort area, unlike the NG (Neighborhood General) and NE (Neighborhood Edge) designations which require 50% cumulative single-family designations, the resort only requires 15% single family. The resort designation requires three different building forms in addition to the single-family form.

There are a couple of major differences between the resort area and the NG areas. The resort encourages a greater density by allowing for densities that are greater than 20 dwelling units per acre. Secondly, the resort is anchored by a central prominent recreation amenity, lagoon or civic space. In this case, the completed lagoon, clubhouse and soon to be bocce ball and Pickleball courts are those amenities, and all development feeds off of those amenities.

The development standards for TNZ-Resort zones are as follows:

1. **Pattern of development**. The pattern of development is required to follow the Traditional Neighborhood Zone (TNZ) guidelines found in Chapter 7H of the Zoning Regulations. In Section 7H-1-B of the Zoning Regulations, it suggests the traditional block design to be used for the pattern of development. Typically, the traditional block design uses a grid street pattern. The traditional block design also includes street cross-sections that promote pedestrian activity. Off-street parking is to be placed at the rear of the buildings and is designed for pedestrian activity as opposed to creating a car-oriented environment.

   Though this proposal does not use the grid pattern, at two acres, it is unrealistic to meet that demand. That said, the grid pattern is implemented as much as possible when looked at as a whole. The plan makes use of streets, drive-aisles, and sidewalks for access. The street cross-sections found in the preliminary plat depict pedestrian friendly corridors. Sidewalks will connect each building and unit to the rights-of-way.

2. **Civic Space.** The TNZ-Resort, which this property falls into, requires that 5% be dedicated to civic space. The zone plan also allows the required civic space to be spread out through the overall neighborhood, in this case, Desert Color Resort. The applicant has calculated that approximately 14.6% of the site is dedicated to usable civic space. The civic spaces include open space on the south-west corner of the site and a pool and park area adjacent to the lagoon.

3. **Parking.** The parking requirements for Desert Color vary depending on the number of bedrooms with a maximum requirement of two spaces per unit. The applicant has provided the following table:

PARKING STALL NOTE

44 UNITS TOTAL
16 (2 BED) X 1.5 = 24
28 (3 BED) X 2.0 = 56
80 + 9 GUEST = 89 STALLS (TOTAL)

49 STALLS (INTERIOR TO STRUCTURES) PROVIDED
46 STALLS (EXTERIOR TO STRUCTURES) PROVIDED
95 TOTAL STALLS PROVIDED

ADA BASED ON EXTERIOR PARKING:
1 VAN + 1 STANDARD ACCESSIBLE = 2 TOTAL
2 PROVIDED (1 VAN + 1 STANDARD)

Through garages, driveways and surface parking stalls, the applicant has met the requirement for parking.

4. **Building and Streetscapes.** The applicant is proposing five buildings on the site along with two single-family lots. The smaller buildings directly adjacent to the lagoon will each have three units while the larger building on Alice Blue Lane and Akoya Pearl Road will contain 32 units. The Desert Color Design Review Committee has reviewed the buildings and has given preliminary approval.

   There are several architectural guidelines that these units must follow. These items, found in section 3.5 of the zone plan are:

   a. **Guideline A.** Each building that is greater than one story must have a clear delineation between the levels. The proposed buildings all delineate the floor boundaries. Each building is also required to use high quality materials such as brick, stone, stucco, cement clapboard siding or similar materials. The proposed buildings satisfy this guideline by the use of stucco, board and batten siding, stone, shiplap siding and metal accents and will be a desert modern motif.
   b. **Guideline B.** No building can be twice the permitted height of the building adjacent to it or across the street. The buildings across the street are also in the resort area of Desert Color which allows a maximum height of 50'. The proposed buildings are showing a 50' height for the larger building while the buildings adjacent to the lagoon will be a maximum of 40 feet in height.

c. **Guideline C.** All proposed units are required to have a prominent entryway through the use of a porch, stoop or similar feature. Each unit has been designed with a patio area though that area may need to be increased on the larger building and more clearly defined. Each entryway is prominent and clear.
d. **Guideline D.** The streetscape will be required to adhere to Section 3.2, Local and Collector Street Cross Section standards found in the Desert Color Zoning Plan. Additionally, signage and street lighting is outlined in this section.
e. **Guideline E.** Walls and Fencing. Walls and fencing are not proposed at this time.
f. **Guideline F.** The applicant is not proposing any accessory structures in this phase of the development.
g. **Guideline G.** The landscape standards require a 15' wide landscape strip along the right-of-way of any property facing a public street unless it is occupied by a building, driveway, etc. City code requires that five years after planting, all landscape areas are at least 50% covered with foliage of shrubs, and live-vegetative ground cover. A detailed landscape plan will need to be submitted with the construction drawings.

5. **Lighting.** The lighting for these phases will be required to be night-sky friendly fixtures. Pedestrian level lighting is strongly encouraged. A lighting plan has not been submitted with these plans, but staff will ensure that the lighting meets the standards during the site plan process.

Recommendation:
The various departments have reviewed the proposal and have the following comments and conditions:
Planning:
1. The ground floor units in the larger buildings need to show the parch or patio areas more clearly.

Engineering:
1. No comments.

Fire:
1. No comments received.

Parks:
1. No comments.

Power:
1. This project is in the Dixie Power service area. No comments.

Alternatives:
1. Recommend approval as presented.
2. Recommend approval with conditions.
3. Recommend denial.
4. Table the proposed zone change amendment to a specific date.

Possible Motion:

PC 2022-ZCA-022
Water's Edge at Desert Color Shores
"I move that we forward a positive recommendation to the City Council for the zone change amendment for the Water's Edge at Desert Color Shores as presented, case no. 2022-ZCA-022, based on the findings and subject to the conditions listed in the staff report."

Findings for Approval:

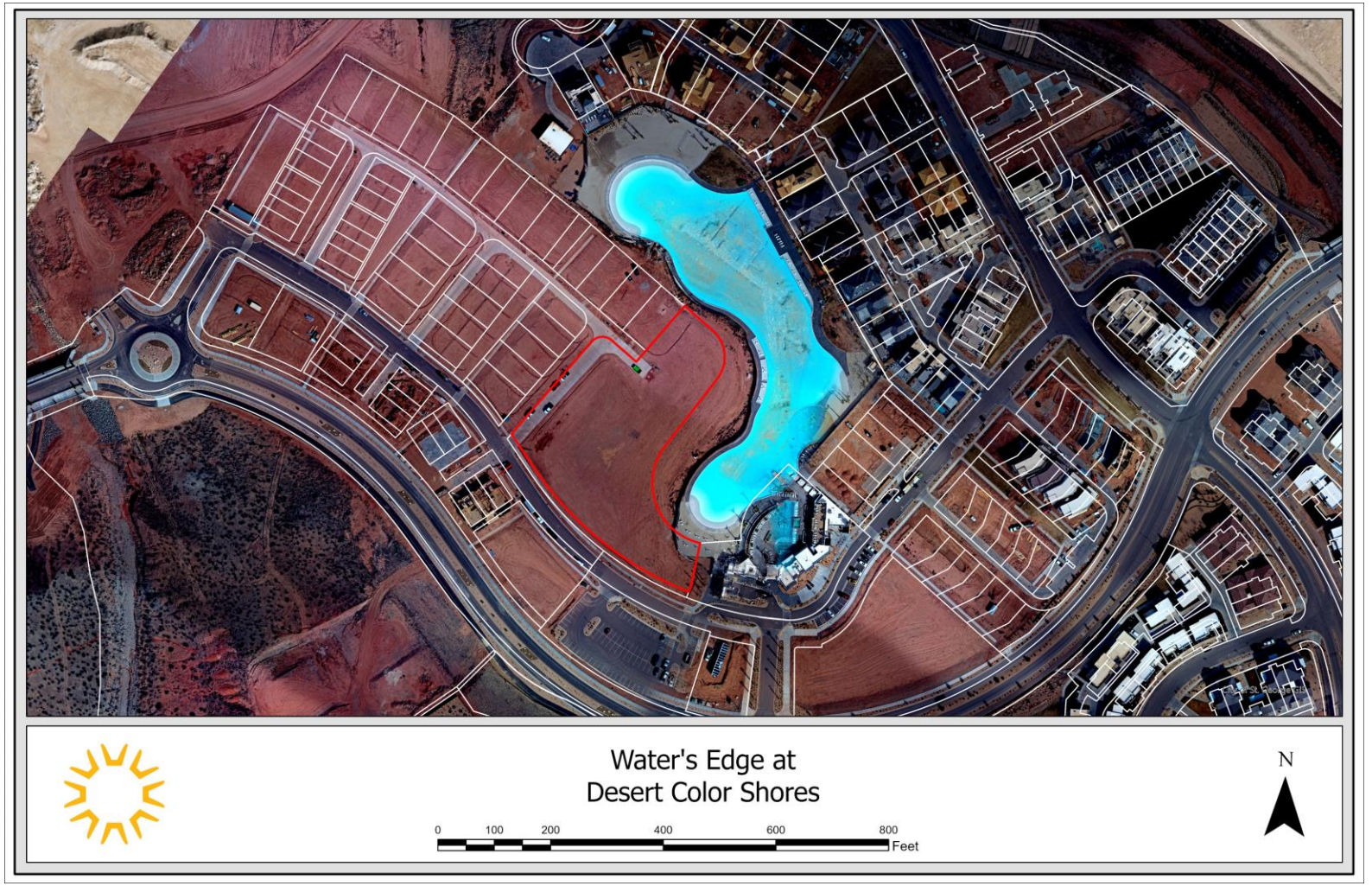
1. The proposed amendment meets the requirements of the Desert Color zoning plan as approved by City Council.
2. There will be adequate parking to facilitate the development.

EXHIBIT A
POWERPOINT PRESENTATION

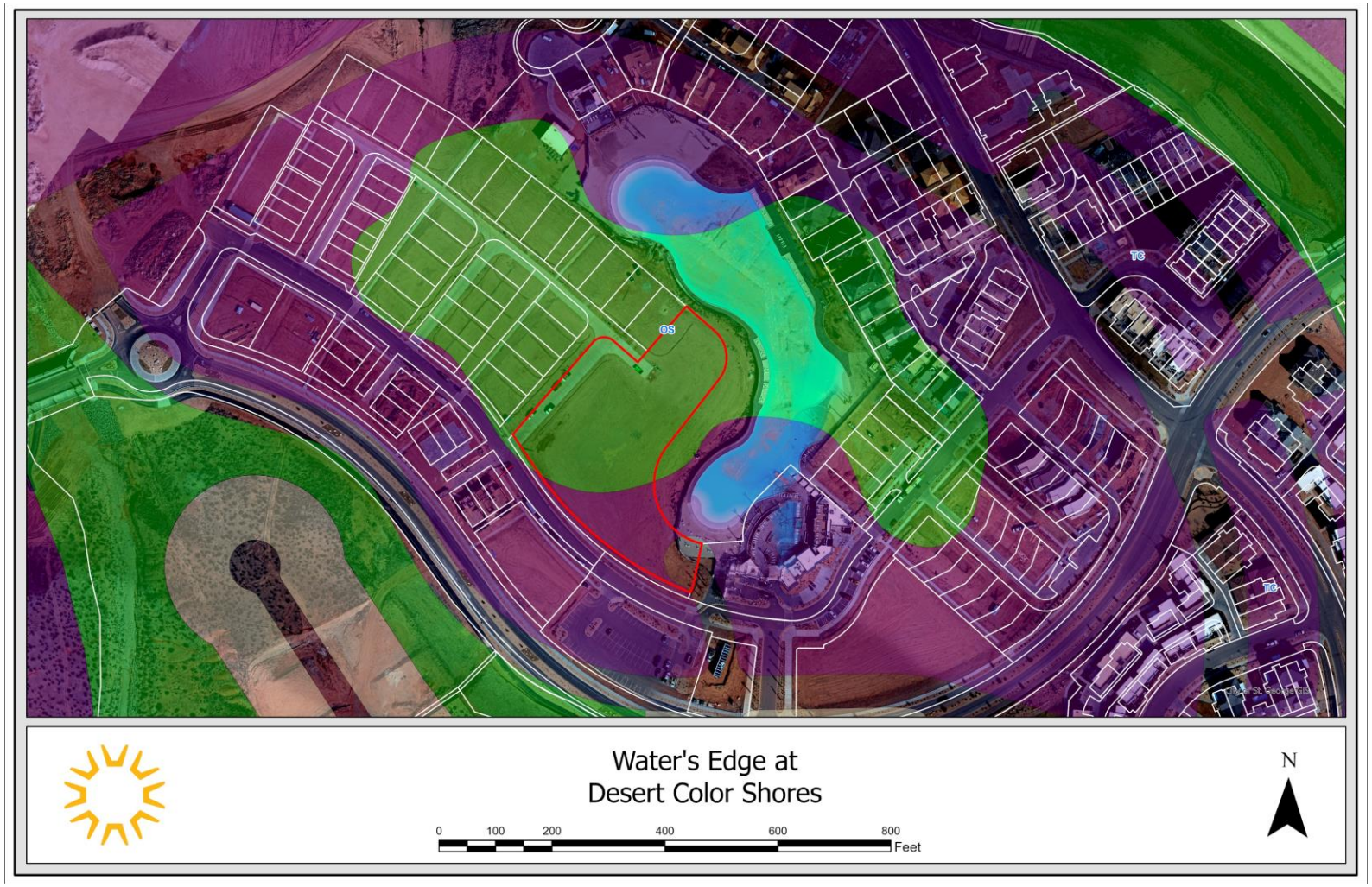
Water's Edge at Desert Color Shores

2022-ZCA-022

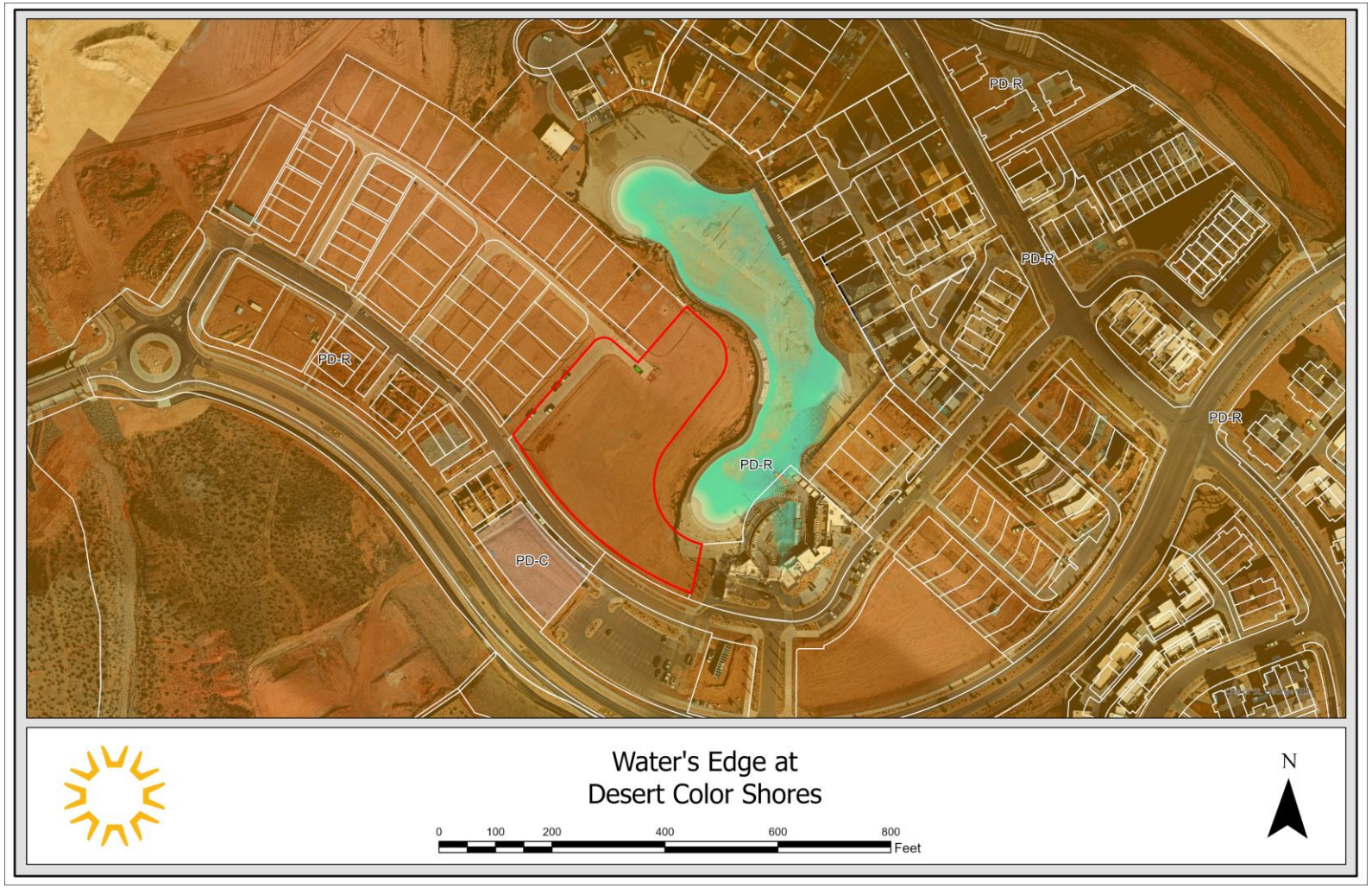
AERIAL MAP


Water's Edge at
Desert Color Shores
0
100
200
400
600
800
Feet
N

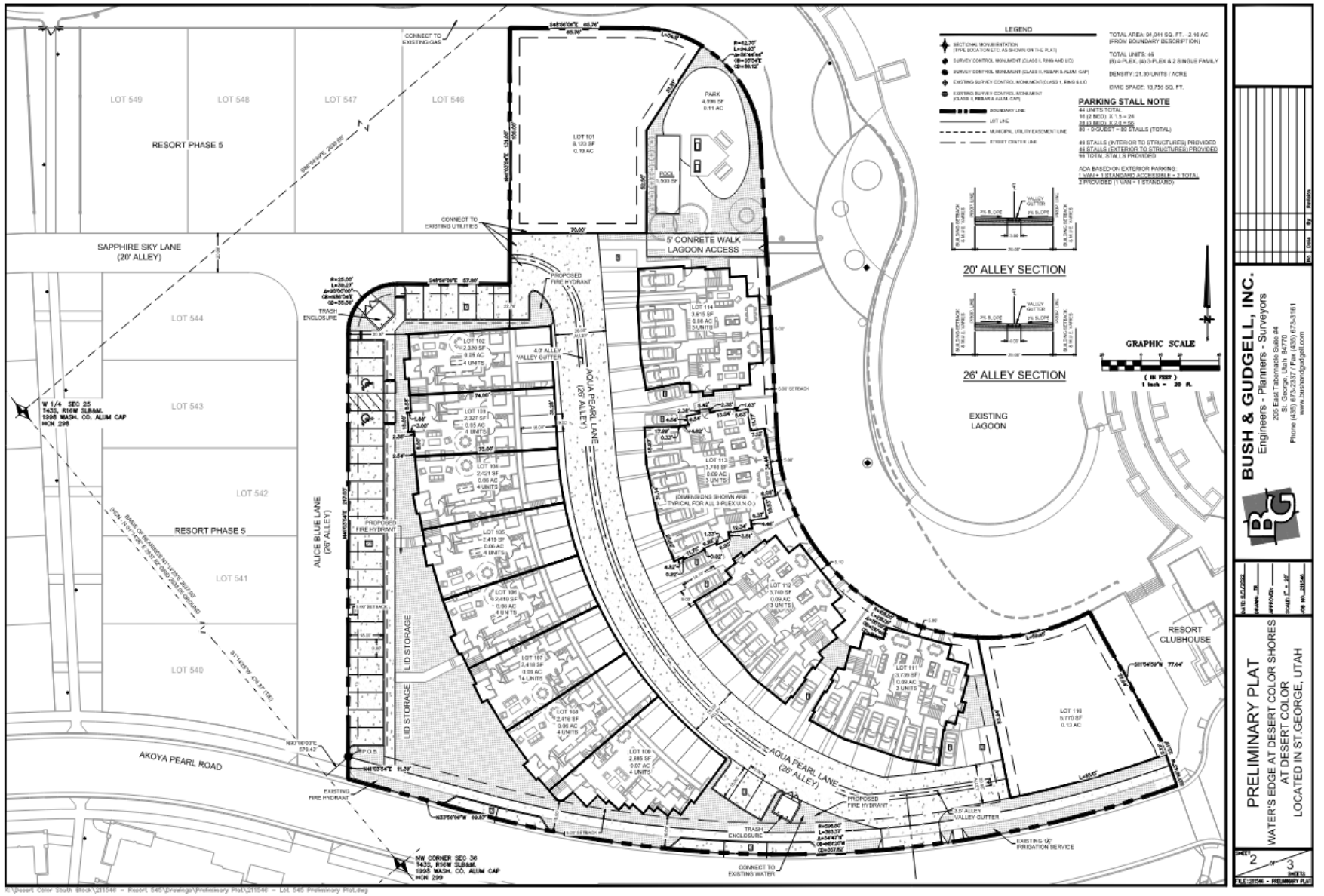
LAND USE MAP


OS
TC
TC
Water's Edge at
Desert Color Shores
0
100
200
400
600
800
Feet
N

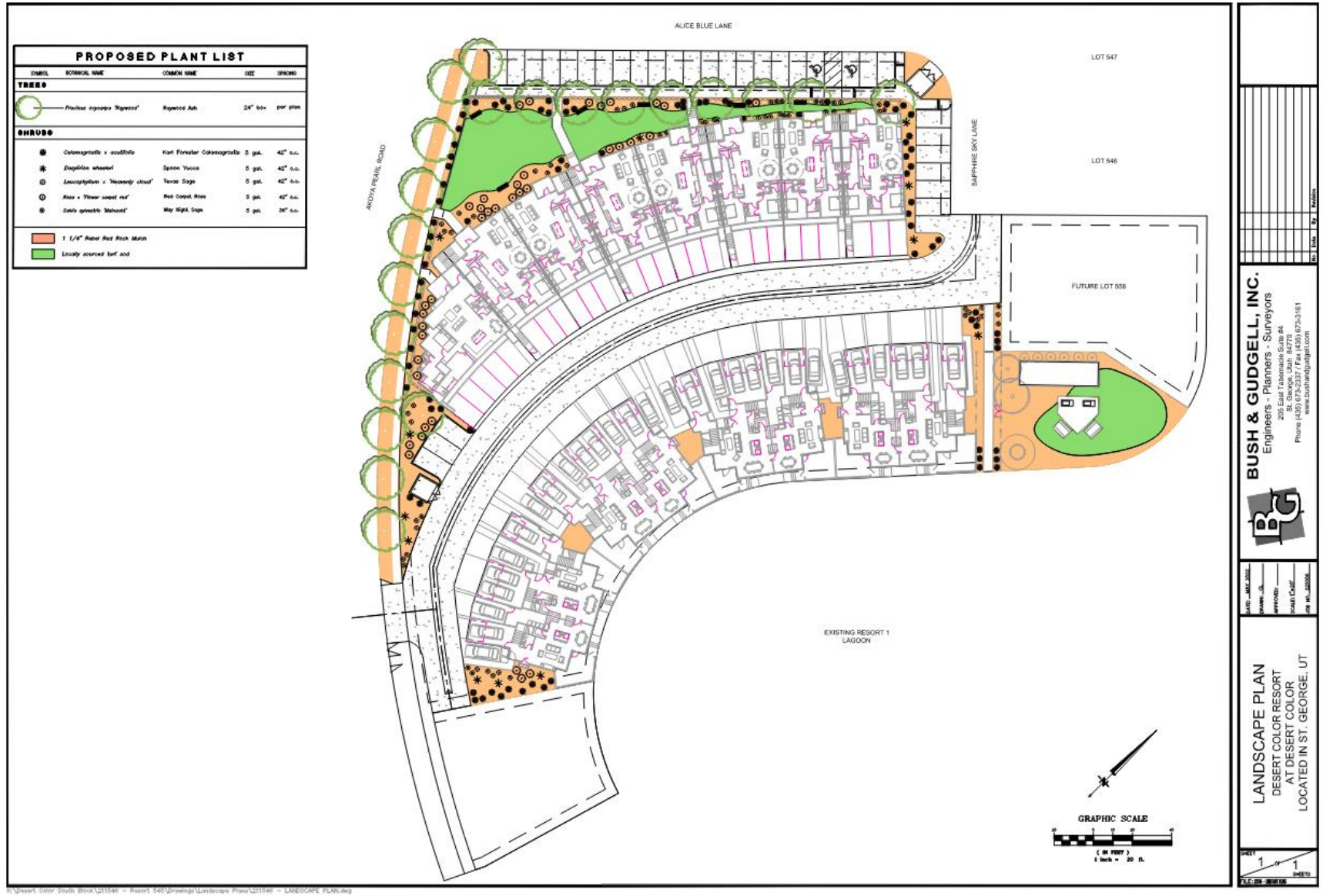
ZONING MAP


PD-R
PD-R
PD-R
PD-R
PD-R
PD-C
Water's Edge at
Desert Color Shores
0
100
200
400
600
800
Feet
N

SITE PLAN


LEGEND
TOTAL AREA: 94,041 SQ. FT. - 2.16 AC (FROM BOUNDARY DESCRIPTION)
TOTAL UNITS: 46
(6) 4-PLEX, (4) 3-PLEX & 2 SINGLE FAMILY
DENSITY: 21.30 UNITS / ACRE
CIVIC SPACE: 13,756 SQ. FT.
PARKING STALL NOTE
44 UNITS TOTAL
16 (2 BED) X 1.5 = 24
28 (3 BED) X 2.0 = 56
80 + 9 GUEST = 89 STALLS (TOTAL)
49 STALLS (INTERIOR TO STRUCTURES) PROVIDED
46 STALLS (EXTERIOR TO STRUCTURES) PROVIDED
95 TOTAL STALLS PROVIDED
ADA BASED ON EXTERIOR PARKING
1 VAN + 1 STANDARD ACCESSIBLE = 2 TOTAL
2 PROVIDED (1 VAN + 1 STANDARD)
20' ALLEY SECTION
26' ALLEY SECTION
GRAPHIC SCALE
1 inch = 20 ft.
RESORT PHASE 5
SAPPHIRE SKY LANE (20' ALLEY)
ALICE BLUE LANE (26' ALLEY)
AQUA PEARL LANE (26' ALLEY)
AKOYA PEARL ROAD
5' CONRETE WALK LAGOON ACCESS
EXISTING LAGOON
RESORT CLUBHOUSE
LID STORAGE
TRASH ENCLOSURE
PROPOSED FIRE HYDRANT
EXISTING FIRE HYDRANT
CONNECT TO EXISTING GAS
CONNECT TO EXISTING UTILITIES
CONNECT TO EXISTING WATER
EXISTING 12" IRRIGATION SERVICE
BUSH & GUDGELL, INC.
Engineers - Planners - Surveyors
PRELIMINARY PLAT
WATER'S EDGE AT DESERT COLOR SHORES
AT DESERT COLOR
LOCATED IN ST.GEORGE, UTAH
SHEET 2 OF 3 SHEETS

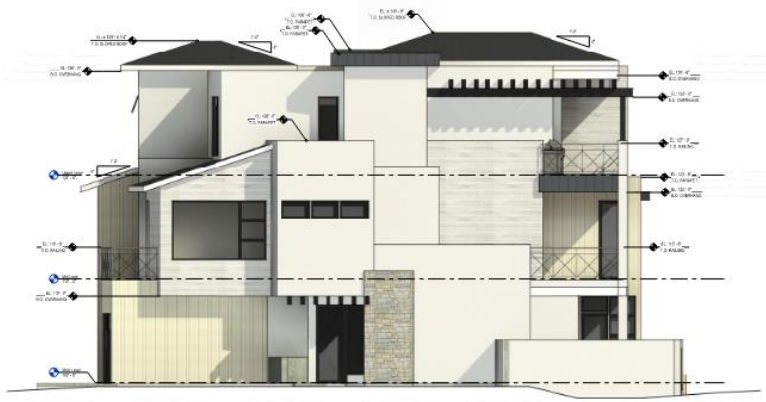
LANDSCAPE PLAN



3 PLEX ELEVATIONS

Elevation Rear

SCALE: 1/4" = 1'-0"



Elevation Left

SCALE: 1/4" = 1'-0"

EXTERIOR MATERIALS

SHIPLAP SIDING

MATERIAL: WOOD
COLOR: WHITE WASH

STUCCO

FINISH: SMOOTH
COLOR: WHITE

METAL @ PITCHED ROOF

MATERIAL: ALUMINUM
COLOR: CHARCOAL GRAY

BOARD & BATTEN SIDING

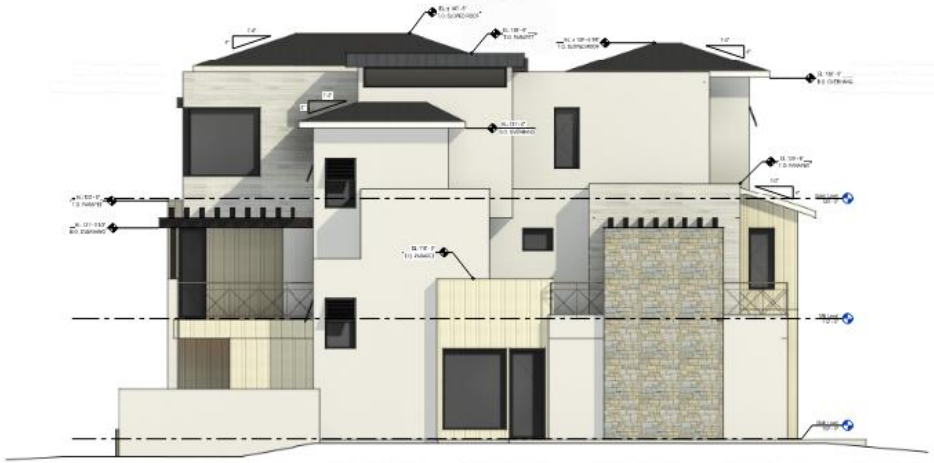
MATERIAL: WOOD COMPOSITE
COLOR: CREAM/OFF WHITE

STONE VENEER

MATERIAL: NATURAL STONE
COLOR: SANDSTONE

Front Elevation

SCALE: 1/4" = 1'-0"



Right Elevation

SCALE: 1/4" = 1'-0"

McQUAY ARCHITECTS, PLLC

Main Level	2,009	
Mid Level	2,369	
TOTAL SQ.FT	4,378	
Garage/Storm	1,253	
Basement	1,944	
TOTAL SQ.FT	2,237	

DESERT COLOR 3 PLEX "BUILDING A"

ST. GEORGE, UT

DESERT COLOR

Project # DCMP DESIGN SET 5.2.2022

A-10

Exterior Elevations

3 PLEX ELEVATIONS

Elevation Rear
SCALE: 1/4" = 1'-0"

Elevation Left
SCALE: 1/4" = 1'-0"

EXTERIOR MATERIALS

METAL SIDING
MATERIAL: CORRUGATED METAL
COLOR: GRAY

STUCCO
FINISH: SMOOTH
COLOR: WHITE

METAL @ PITCHED ROOF
MATERIAL: ALUMINUM
COLOR: CHARCOAL GRAY

BOARD & BATTEN SIDING
MATERIAL: WOOD COMPOSITE
COLOR: CREAMORY WHITE

STONE BLOCK
MATERIAL: MASONARY UNIT
COLOR: WHITE

Front Elevation
SCALE: 1/4" = 1'-0"

Right Elevation
SCALE: 1/4" = 1'-0"

McQUAY ARCHITECTS, PLLC

Main Level	1,365	
Upper Level	2,000	
TOTAL SQ FT	6,559	
Garage/Storm	1,191	
Porches	1,003	
TOTAL SQ FT	2,194	

DESERT COLOR 3 PLEX "BUILDING B"
ST. GEORGE, UT
DESERT COLOR
Project # DCMF
DESIGN SET 5.2.2022

A-10
Exterior Elevations

3 PLEX ELEVATIONS

Elevation Rear
SCALE: 1/4" = 1'-0"

Elevation Left
SCALE: 1/4" = 1'-0"

EXTERIOR MATERIALS

SHIPLAP SIDING
MATERIAL WOOD
COLOR WHITE WASH

STUCCO
FINISH SMOOTH
COLOR WHITE

METAL @ PITCHED ROOF
MATERIAL ALUMINUM
COLOR CHARCOAL GRAY

BOARD & BATTEN SIDING
MATERIAL WOOD COMPOSITE
COLOR CREAMOFF WHITE

STONE VENEER
MATERIAL NATURAL STONE
COLOR SANDSTONE

Front Elevation
SCALE: 1/4" = 1'-0"

Right Elevation
SCALE: 1/4" = 1'-0"

McQUAY ARCHITECTS, PLLC

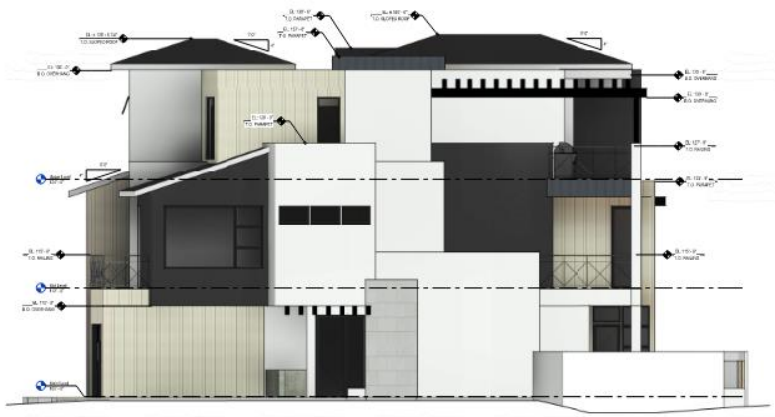
DESERT COLOR 3 PLEX "BUILDING C"
ST. GEORGE, UT
DESERT COLOR
Project # DCMF
DESIGN SET 5.2.2022

A-10
Exterior Elevations

3 PLEX ELEVATIONS

Elevation Rear

SCALE: 1/4" = 1'-0"



Elevation Left

SCALE: 1/4" = 1'-0"

EXTERIOR MATERIALS

METAL SIDING

MATERIAL CORRUGATED METAL

COLOR GRAY

STUCCO

FINISH SMOOTH

COLOR WHITE

METAL @ PITCHED ROOF

MATERIAL ALUMINUM

COLOR CHARCOAL GRAY

BOARD & BATTEN SIDING

MATERIAL WOOD COMPOSITE

COLOR CREAMCITY WHITE

STONE BLOCK

MATERIAL MASONARY UNIT

COLOR WHITE

Front Elevation

SCALE: 1/4" = 1'-0"

Right Elevation

SCALE: 1/4" = 1'-0"

McQUAY ARCHITECTS, PLLC

DESERT COLOR 3 PLEX "BUILDING D"

DESERT COLOR ST. GEORGE, UT

Project # DCMF PROGRESS SET 9.30.2021

A-10

Exterior Elevations

3 PLEX RENDERING

32 PLEX ELEVATIONS

32 PLEX ELEVATIONS

32 PLEX RENDERING

St.George
Community Development

ITEM 1D

Zone Change Amendment

PLANNING COMMISSION AGENDA REPORT: 06/14/2022

Sage Canyon Phase 1 Lots 10 & 11 Zone Change Amendment (Case No. 2022-ZCA-025)		
Request:	The applicant is seeking approval to remove 0.16 acres from the Southern Hills West Masterplan and rezone it from OS to R-1-10 for the purpose of adding this land to lots 10 and 11 of Sage Canyon Phase 1.	
Applicant:	Mitchell Henderson and Josh and Kelli Cooper	
Representative:	Brad Petersen	
Location:	South of White Dome Drive and west of Sunshine Circle	
General Plan:	Medium Density Residential (MDR)	
Existing Zoning:	Open Space (OS)	
Surrounding Zoning:	North	Planned Development Residential (PD-R)
	South	Single Family Residential, minimum lot size 10,000 sf (R-1-10)
	East	Single Family Residential, minimum lot size 10,000 sf (R-1-10)
	West	Open Space (OS)
Land Area:	Approximately 0.16 acres	

BACKGROUND:
This request is for a zone change amendment to remove 0.16 acres of Open Space (OS) from the Southern Hills West Masterplan and add the 0.16 acres to Lots 10 and 11 of the Sage Canyon Phase 1 Final Plat. The Southern Hills West Masterplan has several washes in their development that have been designated as OS. These designated open spaces have not been used to calculate any required OS for the new development occurring in Southern Hills.

On March 4, 2021, the Southern Hills Masterplan was adopted. In the Masterplan there were areas that had a small natural hillside that were separated out and zoned OS. The purpose was to protect the undisturbed hillside and to use this OS as a natural buffer between the existing single-family homes and the Medium Density Residential land that makes up the Southern Hills development. The owners of Lots 10 and 11 are seeking to add this 0.16 acres to their rear yards. This land has already been disturbed and will be a minimal change to the existing OS. If this is approved the applicant will need to amend Lots 10 & 11 of the Sage Canyon Phase 1 Final Plat.

RECOMMENDATION:
Staff recommends approval of this zone change amendment.

ALTERNATIVES:
1. Recommend approval as presented.
2. Recommend approval with conditions.
3. Recommend denial.
4. Table the proposed zone change amendment to a specific date.

POSSIBLE MOTION:
The Planning Commission recommends approval of the zone change amendment.

FINDINGS FOR APPROVAL:
1. The proposed uses are permitted uses found in the PD-C zone.
2. The proposed zone change meets the initial zone-change application requirements found in Section 10-8D-2A.

Exhibit A
Applicant's Narrative

Property Location and Purpose of Sage Canyon – Phase 1, Lots 10 & 11 Zone Change

The subject property is a 0.164 acre parcel west of and adjacent to Sage Canyon – Phase 1, Lots 10 and 11. The purpose of this zone change is to re-zone previously disturbed open space land to R-1-10, which will match the zoning of the Sage Canyon development. This will be done in preparation of submittal to amend the Lots 10 & 11 portion of the Sage Canyon – Phase 1 subdivision to incorporate the disturbed area into and increase the size of said lots.

A. Use of Land

The projected use of the property is to incorporate the vacant land in to the adjacent R-1-10 lots. The current land use designation on the General Plan is MDR, R-1-10 falls within the approved uses.

Exhibit B
PowerPoint Presentation

Sage Canyon Phase Lots 10 & 11

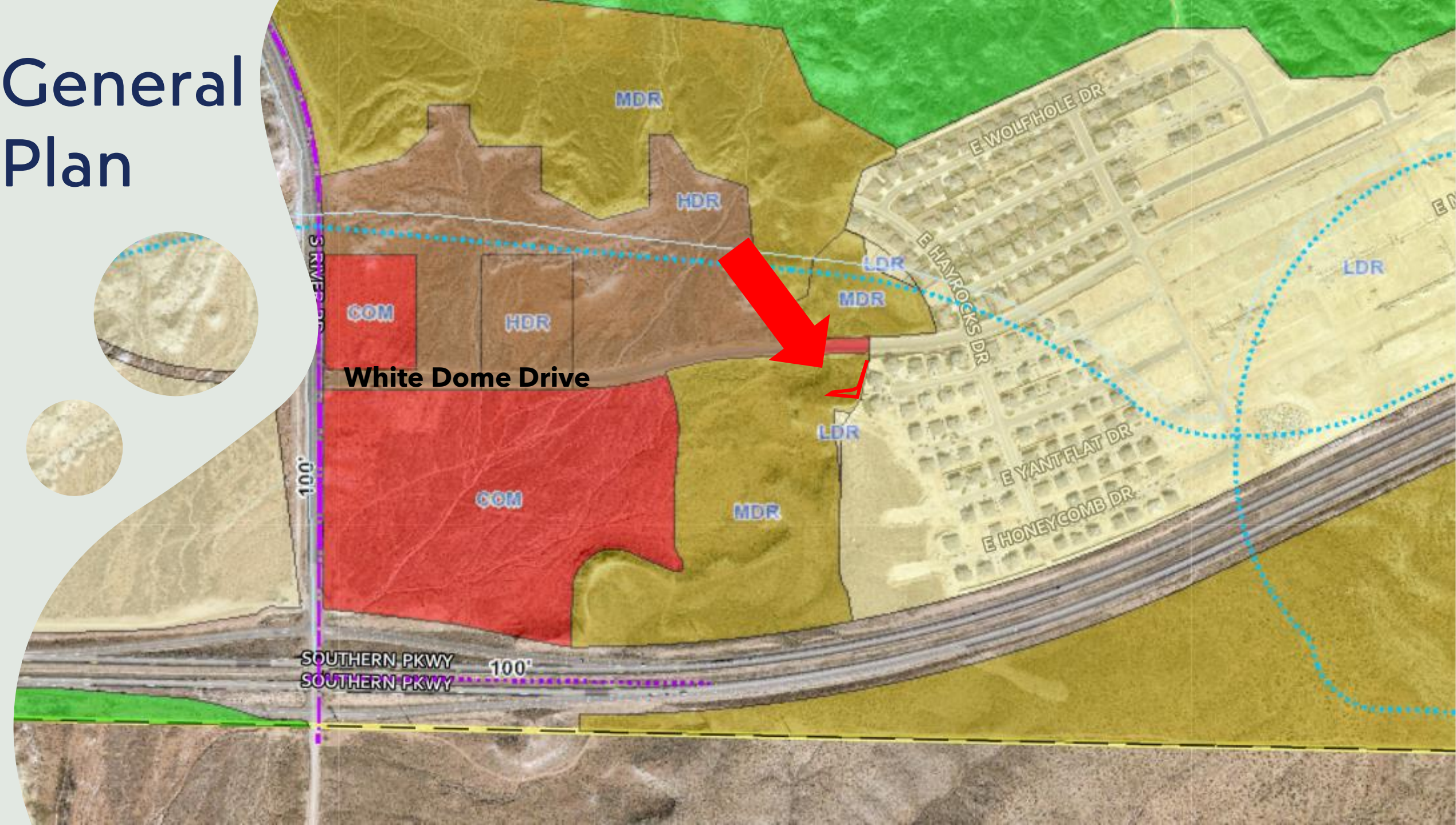
Zone Change Amendment

2022-ZCA-025

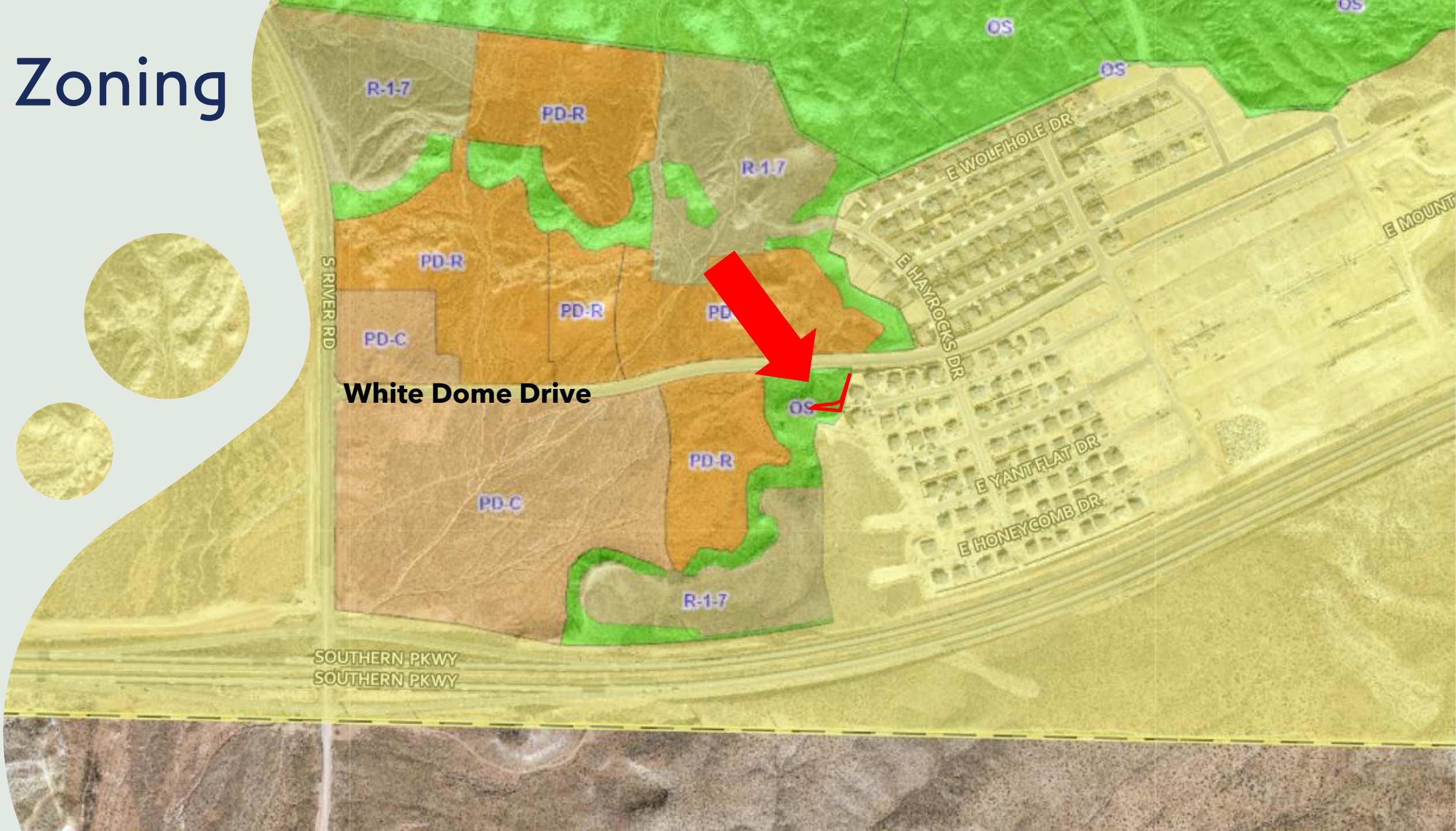
Aerial


White Dome Drive
S RIVER RD
E WOLF HOLE DR
E HAYROCKS DR
E YANT FLAT DR
E HONEYCOMB DR
SOUTHERN PKWY
SOUTHERN PKWY

General Plan

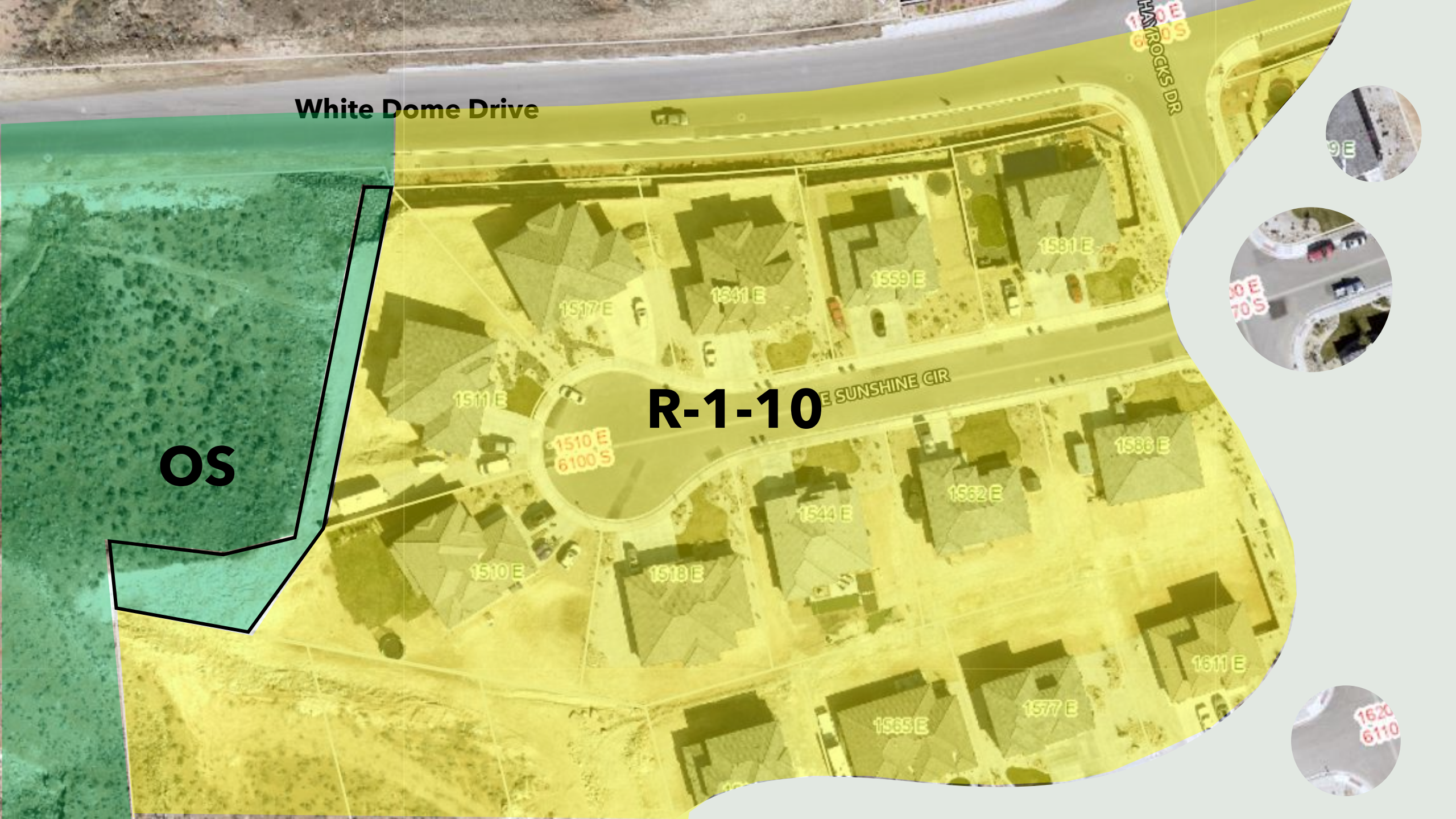


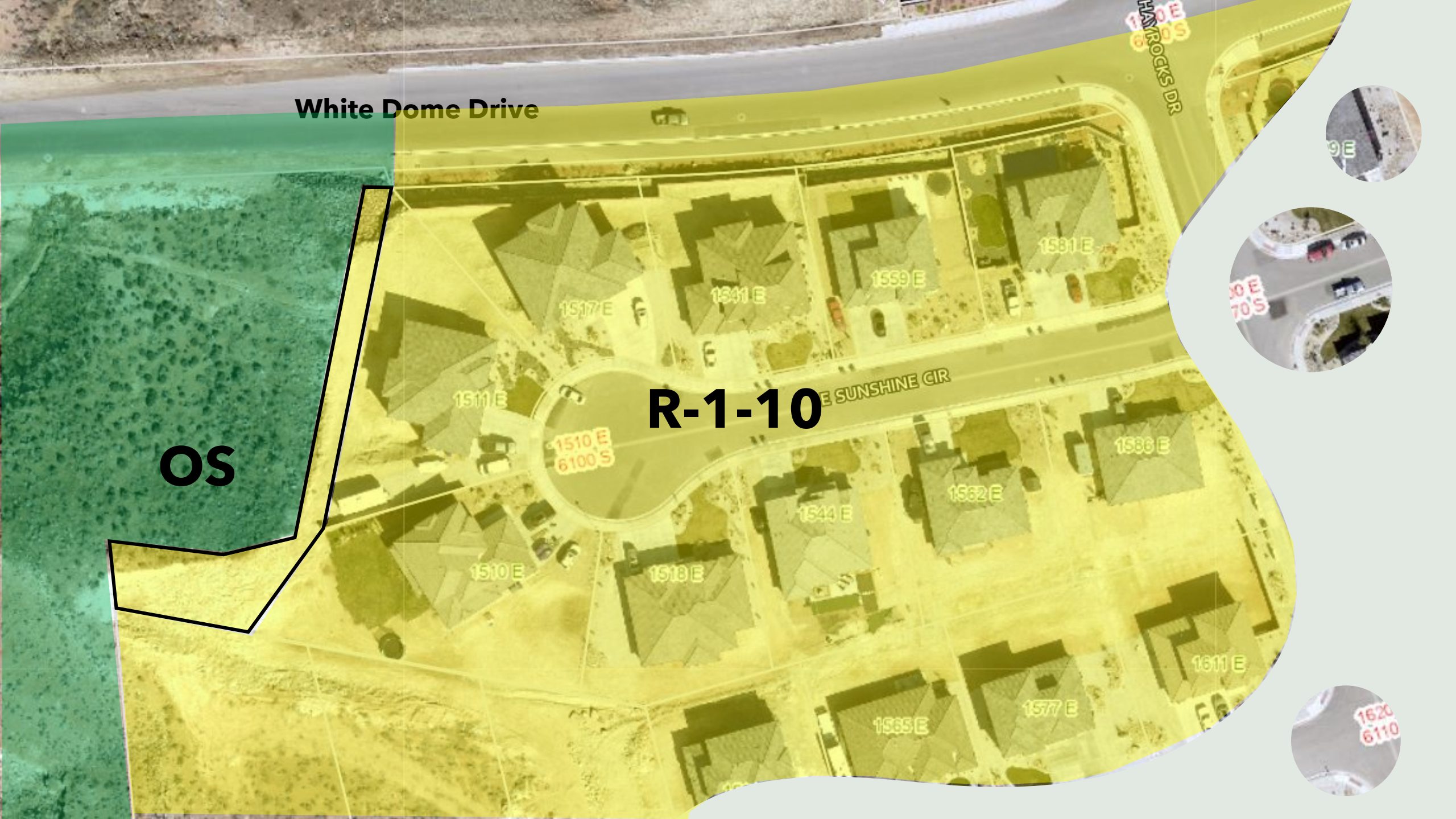
Zoning


R-1-7
PD-R
PD-R
PD-R
PD-C
PD-C
PD-R
R-1-7
OS
OS
OS
OS
S RIVER RD
E WOLFHOLE DR
E HAYROCKS DR
E YANT FLAT DR
E HONEYCOMB DR
E MOUNT
White Dome Drive
SOUTHERN PKWY
SOUTHERN PKWY

Southern Hills West Master Plan


White Dome Drive
E SUNSHINE CIR
1517 E
1541 E
1559 E
1581 E
1511 E
1510 E
6100 S
1586 E
1562 E
1544 E
1510 E
1518 E
1611 E
1577 E
1565 E


White Dome Drive
OS
R-1-10
E SUNSHINE CIR
HAYROCKS DR
1517 E
1541 E
1559 E
1581 E
1511 E
1510 E
6100 S
1586 E
1562 E
1544 E
1510 E
1518 E
1611 E
1577 E
1565 E


White Dome Drive
OS
R-1-10
E SUNSHINE CIR
HAYROCKS DR
1517 E
1541 E
1559 E
1581 E
1511 E
1510 E
6100 S
1586 E
1562 E
1544 E
1510 E
1518 E
1611 E
1577 E
1565 E

Sage Canyon
Phase Lots 10 & 11

Recommendation

St.George
Community Development

ITEM 2

ZONING REGULATION AMENDMENT

PLANNING COMMISSION AGENDA REPORT: 06/14/2022

AMENDMENTS TO TITLE 10 – Water Conservation
Various sections of Title 8 & 10
Case No. 2022-ZRA-002

Request:
The City of St. George is proposing changes to the City Code regarding water usage, connections, conservation, landscaping, and other procedural changes consistent with implementing the water provisions. Proposed City Code changes include changes to Title 8, Chapter 1, regarding water connections and water waste; Title 10, Chapter 1 regarding water acknowledgment statements, permit process, vesting, and requirement of culinary water "will serve" letters; Title 10 Chapter 2 definitions; Title 10, Chapters 4, 5, 7, 8, 11, and 17 regarding landscaping and other conservation measures, certain land uses, special standards for some uses, and infrastructure standards; Title 10, Chapter 23 regarding landscaping provisions; and Title 10, Chapter 25 regarding subdivision requirements and processes.

Applicant: City of St. George

Background:
Starting in the fall of 2021, the Washington County Water Conservancy District along with St. George and surrounding cities began discussions on what could be done to encourage water conservation. From those initial discussions with the district and other municipalities, a model ordinance was drafted. As staff has studied the model ordinance and our own code, it was determined that instead of adopting a stand-alone water conservation code with potential conflicts with current code, staff would propose adapting it and making changes to the city code as needed. See the attached proposed code for details.

Proposed Changes:
The proposed revisions are attached.

Findings:
1. That it is in the best interest of the city to update city zoning regulations periodically; and
2. It is in the interest of the City of St. George to take steps to conserve water; and
3. The proposed code revisions will help in the conservation of water within the city.

Recommendation:
Staff recommends approval of the application as presented.

Possible Motion: "I move that we forward a positive recommendation to the City Council for the changes to title 8 and 10 as proposed by staff and contained in exhibits 'B' and 'C', case no. 2022-ZRA-002, based on the findings listed in the staff report."

EXHIBIT A

BULLET POINT SUMMARY

WATER ORDINANCE BULLET POINTS:

Title 8 (and portions of Title 10):

- Creates water waste provisions

Title 10

Chapter 1: (General Provisions)

- added requirement for water acknowledgement letters
- moved permit process from chapter 25 to chapter 1
- changed landscape bonding
- added vesting and expiration provisions
- requires will-serve letters from District at final site plan, final plat, building permit, and/or construction drawing approval.

Chapter 2: (Definitions)

- added several new terms primarily landscape related

Chapter 4: (Zoning)

- now requires proof of water availability prior to any zone change effect.

Chapter 5: (AG zones)

- added “special water standards” for homes
- added landscape standards for AG zones (they are not included in Chapter 23)
- landscape regs don’t impact pasture, crops or livestock watering.

Chapter 7: (Residential zones)

- added requirement for secondary water system infrastructure
- added special water standards for homes
- added landscape standards
- removed private golf course from use chart

Chapter 8: (Commercial and PD zones)

- In 8B added “Amusement Center (without water activity)” to use chart
- In 8D added effective date of zone change ordinances
- In 8D made preliminary plats at time of zone change required rather than optional.

Chapter 11: (Open Space zones)

- added “active recreation area” to use table

Chapter 17 (Standards) specifically 17A (car washes)

- mandates 35 gallons of water or less per car until 2027 at which time it goes to 25 gallons per car
- makes recycling optional (encouraged) rather than mandatory
- also encourages use of secondary water

Chapter 23 (Landscape standards)

- requires landscape documentation package for commercial or large projects
- refers to water waste in Title 8
- sets forth types of plants, watering schedules, etc.

Chapter 25 (Subdivisions)

- requires compliance with City Code and District standards (if any)
- requires preliminary plat with zone change
- requires will-serve letters from District at final site plan, final plat, building permit, and/or construction drawing approval.
- removes ability to subdivide without plats
- allows only 1 year to complete infrastructure improvements and record plats
- adds a draw down or cash escrow bond to forms of assurance.

EXHIBIT B

PROPOSED CHANGES TO TITLE 8

CHAPTER 1

WATER USE AND SERVICE

8-1-1:

WATERWORKS SYSTEM:

The waterworks constructed under the direction of the city council to supply the city with culinary and secondary irrigation water shall be designated and known as the "~~St. George city~~ waterworks." It shall be the property of the city and shall be under the sole and exclusive control of the city council, who may, from time to time, direct the construction of such reservoirs, water tanks, water mains, service pipes and fire hydrants, as the necessities of the inhabitants of the city may require.

8-1-2:

RULES AND REGULATIONS; AUTHORITY OF CITY COUNCIL:

The city council may enact ordinances, rules and regulations for the management and conduct of the city waterworks system.

8-1-3:

RATES; DELINQUENCY:

A. *Water Rates; Owner Of Premises Liable:* The city shall not be required to furnish water for use in any house, tenement, apartment, building, place, premises or lot, whether such water is for the use of the owner or tenant, unless the application for water shall be made in writing, signed by the owner or a duly authorized agent, in which application the owner shall agree to pay for all water furnished such house, tenement, apartment, building, place, premises or lot according to the ordinances, rules and regulations enacted or adopted by the city. In case an application for furnishing water shall be made by a tenant of the owner, the city may require as a condition of granting the application for furnishing water that the application contain an agreement signed by the owner or duly authorized agent, to the effect that in consideration of granting the

application, the owner will pay for all water furnished the tenant, or any other occupant of the place named in the application, in case the tenant or the occupant fails to pay for the water according to the ordinances, rules and regulations enacted or adopted by the city.

B. *Failure To Pay Service; Termination:* In case the owner, tenant or occupant of any premises, house, tenement, apartment, building, place, or lot fails to pay for water furnished such owner, tenant or occupant, according to such ordinances, rules or regulations enacted or adopted, the city may cause the water to be shut off from such premises, house, tenement, apartment, building, place or lot. The city shall not be required to turn the same on again until all arrears for water furnished shall be paid in full.

~~**8-1-4:**~~

~~**WATER RECORD:**~~

~~The city recorder shall make in a book to be kept for that purpose a water record, showing the number of water shares to the use of which the several owners are entitled, and shall distinguish clearly between water shares which entitle the owner to the use of water from the east springs. (1962 Code § 3-2-23; amd. 2003 Code)~~

~~**8-1-5:**~~

~~**ASSESSMENTS:**~~

~~A. *Water Assessment Roll:*~~

~~1. The city recorder shall by examination of the east city springs water abstract, present to the city council on or before the first Saturday in March of each year a water assessment roll.~~

~~2. Upon receipt of the east city springs assessment roll, the city council, for the purpose of regulating and controlling the east city springs irrigation water, shall during the month of March, by resolution, levy a water assessment upon each and every share. Within two (2) weeks after the adjournment of the city council at which the assessment was made, the city recorder shall compute the assessment against each share. Upon receipt of the water assessment roll, the city treasurer shall proceed to collect the water assessment, and on or before July 1 of each year furnish to the holder of each of the shares or fraction thereof, by mail, postage prepaid, the number of shares of water assessed with the amount of assessment levied and when it becomes due.~~

~~3. All assessments provided for under the provisions of this section shall be due at twelve o'clock (12:00) noon on July 15 in each year, and on August 4 following at twelve o'clock (12:00) noon, all unpaid assessments shall be delinquent. (1962 Code § 3-2-26; amd. 2003 Code)~~

~~B. *Treasurer To Receive Assessments:* The city treasurer shall keep a water assessment account. The city treasurer shall receipt monthly for all water assessments collected, specifying the amount and kinds paid. (1962 Code § 3-2-27; amd. 2003 Code)~~

8-1-~~4~~6:

NO DEVELOPMENT WITHOUT WATER:

A. It shall be unlawful for persons to develop property within the city in excess of one acre for residential, commercial, or industrial purposes unless any and all water rights appurtenant to

or used upon and in connection with said property, or produced and developed on said property, are first offered to the city for purchase of said water rights by the city at the fair market value. Any person seeking to develop property within the city as provided above shall furnish satisfactory evidence to the city that no transfer, sale, lease or disposal of water rights was consummated after June 1, 1987, contrary to the provisions hereof. No person shall sell, transfer, lease or assign water or water rights that are produced or developed on property within the city where such water will be used for the benefit of property that has not previously benefited therefrom, unless it is determined that future development of the property which has historically benefited from such water would not be feasible under any conditions. Determination of the transferability of water shall be made by the water services director in writing after a consideration of 1) the impact development of any such property will have upon the city's ability to reasonably supply water to future occupants of the property; 2) the use to be made of water proposed to be transferred; 3) the most efficient utilization of water within the city; 4) the furtherance of conservation practices; and 5) all other relevant circumstances.

B. Any person not in agreement with the water services director's decision affecting property in which that person has an interest may appeal the decision ~~to the water and energy services board~~ within ~~fifteen (~~ten (10~~15~~) calendar days ~~after receipt~~ of the date of any written ~~such~~ determination. Any appeal must be in writing and submitted in person or email to the City Recorder. The procedure thereafter shall be governed by City Code §1-15-1 *et. seq*. ~~by requesting a hearing and setting forth the basis for appeal. Within thirty (30) days after receipt of an appeal, the water and energy services boardshall afford the property owner a public hearing, at which time said person may present evidence in opposition to that determination, and the water and energy services board may thereafter affirm, modify or reverse the decision of the water services director.~~

C. No plat shall be approved nor building permit issued in furtherance of the development of any property from which water rights have been transferred in violation hereof. Violation shall constitute
an infraction, and upon conviction, subject to penalty as provided in section 1-4-1 of this code, and each day during which a violation exists may be considered a separate offense.

8-1-~~5~~7:
PRIVATE WATER COMPANIES:
A. Any person or entity engaged in the distribution of water for culinary or irrigation purposes within the city shall obtain a permit therefor from the water services director. "Distribution" is defined to mean the delivery of water to three (3) or more customers for a charge in excess of the cost of the water. No permit shall be issued except to persons or entities engaged in the distribution of water prior to the adoption of the ordinance codified herein, or for proposed distribution that is determined by the director to not interfere with or impact the conservation and effective utilization of water resources through the city water system. Reasonable standards for making such determination shall be formulated by the director and adopted by the ~~water and energy services board~~City Council. Permits shall be issued after a submission of such information and data reasonably requested by the director and upon determination by the ~~water and energy services board~~City Council that the requested distribution is consistent

with the standards adopted, the economy and best interests of the city, and the need to regulate water resources within the city. Issuance or denial of a permit shall be made by the ~~board~~ City Council within thirty (30) days after the receipt by it of all requested information. ~~Denial of a permit may be appealed in writing to the city council within fifteen (15) days after receipt of denial from the water and energy services board, and the city council shall afford the appellant a hearing and render a decision approving or reversing the decision of the board within thirty (30) days after receipt of such appeal.~~

B. Any permit issued by the city for private water distribution hereunder shall be upon those conditions set forth in sections 8-3A-4 through 8-3A-10 of this title, substituting "water" for "electric." The fees payable for such a permit shall correspond to those fees set forth in section 8-3A-12 of this title. Failure of a person or entity to comply with the provisions hereof may result in the revocation of a permit and all rights thereunder upon written notice from the city and after the expiration of opportunity as provided in such notice for a hearing before the city council with regard to such violation, failure or default.

8-1-~~6~~8:
RIGHT OF ENTRY ON PREMISES OF WATER USER:
All authorized persons connected with the city waterworks shall have the right to enter upon any premises furnished with water by the city to examine the apparatus, the amount of water used and the manner of use, and to make all necessary shutoffs for vacancy, delinquency or violation of the ordinances, rules or regulations concerning utilities enacted or adopted by the city.

8-1-~~7~~9:
SCARCITY OF WATER:
In the event of a scarcity of water, the mayor may, by proclamation, limit the use of water for any purpose other than domestic purposes to such extent as may be required for the public good in the judgment of the city council.

8-1-~~8~~10:
WATER FLOWING IN STREETS:
Any person who willfully or carelessly obstructs, or injures any street, alley, public place, or sidewalk within the city, by permitting flow or seepage of water or who willfully or carelessly permits water under his control to escape in any manner, so as to injure any street, alley, public place or sidewalk shall be deemed guilty of an infraction and, upon conviction, subject to penalty as provided in section 1-4-1 of this code.

8-1-~~9~~11:
INJURING FIXTURES OR BEFOULING WATER:
A. Any person who shall use the water coming through the water mains without first paying, or shall without authority open any stopcock, valve or other fixtures attached to the system of water supply, or shall in any way injure, deface or impair any part or any appurtenance of the waterworks; or shall bathe in, or cast anything into any reservoir or tank, shall be deemed guilty

of a class B misdemeanor and, upon conviction, subject to penalty as provided in section 1-4-1 of this code.

B. It shall be unlawful for any person to connect to any known water line feeding water from any spring, well or stream to any system which is fed from the city ~~culinary~~ water system.

C. It shall be unlawful for any plumber authorized to make connections in the city under this chapter to connect any private water system to any other system, which is directly connected with any pipes leading directly or indirectly from the city ~~culinary~~ water system.

8-1-102~~2~~:
NONLIABILITY OF CITY:

The city shall not be held liable for damages to any water taker by reason of a stoppage or interruption of the water supply, caused by scarcity of water, accidents to canals, works or mains, alterations, additions, repairs or other unavoidable causes.

8-1-11:
WATER WASTE PROHIBITED.

A. It shall be unlawful for any water user to waste water including, but not limited to:

1~~a~~. Allowing it to be wasted by stops, taps, valves, or leaky joints or pipes, or to allow tanks or watering troughs to leak or overflow;

2~~b~~. Wastefully running water from hydrants, faucets, or stops or through basins, water closets, urinals, sinks, or other apparatus; or

3~~c~~. Watering so that water falls directly onto impervious surfaces to the extent that running water leaves the property and enters gutters, storm drains, ditches, and other conveyances; or

4~~d~~. Watering to the extent that water is allowed to accumulate on the surface of the ground and leave the property and enter gutters, storm drains, ditches, and other conveyances.

B. Notice of Water Waste. The Water Services Director or designee shall identify persons who wastes or may be wasting water.

1. Whenever the Water Services Director or designee find~~s~~ that any person wastes or may be wasting water, he or she may give such person verbal or written notice of that fact, with recommendations as to how the wasting of water can be eliminated. Such recommendations might include, but are not limited to, repairing leaky pipes, valves, or stops, redirection of sprinkler heads, resetting of system timers, addition of devices to prevent water pressure fluctuations, or changes in location of sprinkler systems.

2. Whenever the Water Services Director or designee finds that any person repeatedly or flagrantly wastes water, he or she may serve upon such person a written notice of violation. Such notice shall be served by personal delivery, by mail , or by email, and shall identify the location at which water is being wasted, the manner in which the water is being wasted, and shall specify a time within which the wasting of water shall cease. The notice shall also warn that more severe measures, such as restriction or termination of water service, may be assessed or brought against the person unless the wasting of water ceases within the time provided.

3. The time given to cease wasting water may range from a requirement for immediate compliance up to thirty (30) days, depending upon the facts and circumstances of each case. For instance, if a remedy involves moving a portable hose or sprinkler, immediate compliance may be appropriate; if a remedy involves repairing or replacing a sprinkler head, several days may be required; if the remedy involves more extensive or expensive work, up to thirty (30) days may be necessary.

4. If after receipt of a notice, the user of the City water continues to waste water after the period of time specified in the notice for ceasing such activity, the City may terminate the right of the individual to use City water. Notice of the intention to terminate a water connection shall be given at least fifteen (15) calendar days prior the termination of service. A decision to terminate a water connection may be appealed in writing to the City Manager within 10 calendar days of the date of the notice. Appeals must be in writing and served upon the City Recorder in person or by email. Appeals which are not timely filed will not be heard.

EXHIBIT C

PROPOSED CHANGES TO TITLE 10

CHAPTER 1
GENERAL PROVISIONS

10-1-1:
SHORT TITLE:
This title shall be known as the zoning ordinance of the city of St. George, Utah.

10-1-2:
CONFLICT:
The provisions of this title are in addition to all other city ordinances, the laws of the state of Utah, the laws of the United States, and applicable common law. The city does not enforce private restrictive covenants, nor shall any such covenant modify the regulations herein.

10-1-3:
LAND USE DECISION REQUIRED:
A. *Interpretation of Zoning Ordinance:* Any use of land that is not plainly designated as an allowed use in the zone is prohibited. A specific land use category supersedes one that is more general or broader in scope. For example, if a land use has been specified (e.g., dry cleaners) in this title, and it has not been listed as a permitted use in a zone, it is prohibited in the zone, even if a use that is more general or broader in scope is permitted (e.g., general commercial) in the zone.

B. *Land Use Decision Required:* No development may commence, or land use changed or expanded, without a final land use decision, which determines that the development, or the change or expansion, is allowed in the zone and complies with all land use regulations.

C. *Water Acknowledgement Required*: all new land use applications must submit with the application, an acknowledgement signed by both the applicant developer and the owner(s) of all real property which are part of the application that:

1. The applicant is responsible for ensuring that the project or application has sufficient culinary water service; and

2. Approval of any development application by the city does not guarantee that sufficient water will be available to serve the zone, project, or permit for which the application is submitted; and

3. Prior to receiving final approval for the application, and/or issuing any building permit, the applicant shall provide to the city a guarantee of water service through a Will Serve Letter from the District which verifies that there is a sufficient water supply and guarantee of culinary water for the application.

10-1-4:
SITE PLAN REQUIRED:

10-1-5:
INSPECTION:

10-1-6:
PERMITS, LICENSES TO COMPLY:

A. ~~All applications for any development activity, including the modification or expansion of a land use, shall comply with all applicable regulations.~~ *Compliance with Title:* No city officer or employee shall issue any license or permit for development activity in violation of the provisions of Utah State law, or any other provisions of this Title. Any license or permit issued in conflict with Utah State law, or any other provisions of this Title, is void *ab initio*.

B. All departments, officials, and public employees of the city, vested with authority to make land use decisions and/or issue the permits or licenses provided for herein, shall conform to the Land Use Regulations and shall issue no permit or license for uses, buildings or purposes where the same would be in conflict with any provision of this title. ~~Any permit or license issued that conflicts with any provision of~~

C. *Conditions for Issuance:* In addition to all other conditions required by law, no building, development, or subdivision permit for any development or subdivision shall be issued until the following conditions have been met:

1. The proposed development, structure or use is located on a lawfully created lot or parcel; or ~~The city has approved the preliminary plat, or the lot layout if the property is exempt from platting requirements, and all conditions have been met for the preliminary plat, and for recording of the final subdivision plat, as set forth in Utah Code and as determined by the community development department and the city attorney;~~

2. The final site plan, final subdivision plat, or construction drawings have been formally approved by the city; or

3. The applicant has provided to the city verification that all required impact fees required by the District have been paid and has provided a Will Serve Letter issued by the District; or

4~~3~~. All required improvements under chapter 25 of this title are completed, and the city has conducted a final inspection and issued a final approval of the improvements; or

4~~5~~. The final subdivision plat ~~is~~ has been recorded or approved for recording ~~recorded~~ in the county recorder's office.

D. Notwithstanding the provisions of subsection C above, if the permitting is for the purpose of installing the essential infrastructure for the project, grading permits may be issued upon approval of final construction drawings and prior to the approval or recording of a final plat.

F~~D~~. *Occupancy Permit:* Unless otherwise agreed to in writing by the city and applicant, or unless conditioned as part of a development approval, certificates of occupancy shall be issued under the terms of the adopted building codes. ~~For all subdivisions, occupancy will not be granted, and structures shall not be occupied, until the final subdivision plat is recorded and all required improvements are completed and approved by the city. This includes all required addressing and signs.~~

10-1-7:
PUBLIC NUISANCE:

10-1-8:
CHANGES AND AMENDMENTS:

10-1-9:
RECONSIDERATION OF DENIED AMENDMENTS:

10-1-10:
FEES:

10-1-11:
ANNEXATIONS:

10-1-12:
COMPLETION OF LANDSCAPING AND PUBLIC INFRASTRUCTURE IMPROVEMENTS – PRIVATE SITE DEVELOPMENT IMPROVEMENTS – IMPROVEMENT COMPLETION ASSURANCE:

A. The following infrastructure improvements are deemed essential for the public health and safety and are required for developments for human occupation: all infrastructure improvements required to meet the building code, fire code, flood and storm water management provisions, street and access requirements, and other applicable public safety improvements adopted in city ordinances or St. George standard specifications for design and construction. Failure to complete all essential improvements may result in the suspension of

the building permit. All essential improvements shall be completed prior to recording an approved subdivision plat, or prior to the issuance of a certificate of occupancy, unless the following requirements are met:

1. The applicant has provided a financial assurance for required and uncompleted infrastructure improvements; or

2. The applicant has agreed in a written document to terms acceptable to the city that vary the conditions and timing of issuance of a certificate of occupancy.

B. All required Landscaping improvements shall be completed prior to any Development Activity or the recording of a plat, or issuance of a business license, ~~or~~ unless the applicant ~~shall post~~ has provided a ~~one hundred percent (100%) improvement~~ completion assurance acceptable to the city in an amount representing 110% of the cost of the improvements. The city shall release all but 10% of the assurance once installation has been inspected by the city and shall retain the remaining assurance during the 1 year warranty period.

C. All required private site development improvements shall be completed prior to recording of a plat unless the applicant has entered into a development improvement agreement under terms acceptable to the city and is current in its obligations under that agreement.

D. An improvement completion assurance is required. The two (2) acceptable forms of completion assurance are cash, or an irrevocable letter of credit. Partial release of an improvement completion assurance is permitted only at the following intervals: upon proof by applicant of fifty percent (50%) of improvement completion, and seventy percent (70%) of improvement completion. Final release of the improvement completion assurance shall occur only upon proof by applicant of one hundred percent (100%) of construction completion. The city shall consider applicant's proof of construction completion using objective inspection standards by qualified city employees or appointees knowledgeable in Landscaping, public infrastructure improvements, or private site development improvements, as applicable.

E. Upon the city's acceptance of public infrastructure improvements, the applicant shall execute an improvement warranty for the improvement warranty period. (Ord. 2019-10-002, 10-10-2019)

10-1-13:
LAND USE AUTHORITY:

10-1-14:
PENALTY:

10-1-15
VESTING AND EXPIRATION:

A. Vesting:

1. *Process*: A completed land use application shall be entitled to substantive review and process under the Land Use Regulations in effect at the time the application is complete. A completed application requires that all information necessary for a final decision has been provided to the land use authority and all fees have been paid.

2. *Uses and Density*: A land use application shall not be considered formally approved or vested in that approval until the land use authority has approved the final site plan, final Construction Drawings, or Final Plat.

B. Expiration: Recognizing that the length of the planning, building, and engineering review process will vary with the size and complexity of each proposal, applicants must move their applications either to approval or denial in a reasonably expeditious manner. The city may formally close applications which remain inactive for one (1) year or longer due to acts or omissions of the applicant.

1. When the designated planning, building, or engineering staff member determines an application is inactive, he/she may close the files with respect to the application. No application may be closed on the basis of inaction without giving thirty (30) calendar days' written notice to the applicant. Written notice may be by U.S. mail, or by email when such email is provided with the application. Such notice must state the intent of the respective department to have the project closed because of inaction and what the applicant must submit in order to maintain an active file status.

2. An application shall be deemed inactive and subject to closure on the basis of inactivity if, through the act or omission of the applicant and not the city, one of the following occurs:

a. More than one (1) year has passed since the last meeting of staff and the applicant.

b. More than one (1) year has passed since a request for additional information was made by staff, which request has not been complied with or reasons for noncompliance are not stated or indicated by the applicant.

c. The applicant is more than thirty (30) days in default of the payment of any fee assessed by ordinance.

d. The applicant has stated intent to abandon the project.

3. Delays caused entirely by internal delays of the staff, planning commission, or city council shall not be a cause for file closure.

4. An applicant may appeal the closure of an application for inaction in the same manner as any other land use appeal as found in City Code §10-3-1 *et. seq*.

CHAPTER 2
DEFINITIONS

10-2-1: Definitions

10-2-1:
DEFINITIONS:
The following terms are defined as follows. Terms used in the present tense include the future tense. Terms defined in the singular number include the plural and the plural the singular. Terms that have not been defined herein but are separately defined in the building code shall be construed as defined therein:

ACCESSORY STRUCTURE: A structure that is incidental and subordinate to a main building located on the same lot or parcel, contains no living space, and is not attached to a main building.

ACCESSORY USE: An allowed land use that is subordinate and incidental to the main use on the lot or parcel.

ACTIVE RECREATION AREA: An area that is dedicated to active play where turfgrass may be used as the playing surface. Examples of active recreation areas include sports fields, play areas and other similar uses designated for physical activity.

ADJACENT: Property that is joined, touches, or is directly across a public street, private street, access easement, or alley from the subject property, except a freeway, or a constructed or transportation master planned arterial (eighty-foot (80') right-of-way) street or greater.

ADJOINING PROPERTY OWNERS: All owners within one hundred fifty feet (150') in each direction from the lot or parcel, as determined from the tax records of the county.

AGRICULTURE: Tilling soil or raising and harvesting crops.

ALLEY: A private paved secondary access constructed to city standards.

ALLOWED USE: A use of land that:

A. Is specifically permitted, or permitted with standards, in the zone;

B. Has received a conditional use permit; or

C. Is a valid nonconforming use.

APIARY: A property where one (1) or more bee colonies is kept.

APPEAL AUTHORITY: The administrative hearing officer is the Appeal Authority unless otherwise specified herein.

ARTIFICIAL GRASS: A synthetic grass made to look like natural grass. The grass blades are long and soft. Artificial grass is typically used for lawns and Landscaping.

ARTIFICIAL TURF: A synthetic grass used for sport fields. The grass blades are typically shorter than Artificial Grass.

ARTS DISTRICT: A defined neighborhood or part of the city which the city council has determined to be appropriate for Arts District distinction. Such areas or sites do not have to be contiguous in order to constitute a district.

ATTACHED (STRUCTURE): Sharing a minimum of one (1) common wall and integrated roof, or having portions of a structure, connected with a minimum roof width of twelve feet (12') with the design and materials being consistent.

BACKFLOW PREVENTION ASSEMBLY: A required assembly that prevents the flow of water from the water distribution system back to the culinary water source.

BASEMENT: That portion of a building that is below the first floor.

BED AND BREAKFAST: A building in which a full-time, live-in caretaker resides and serves one (1) or more meals per day, and provides overnight accommodations for short-term guests.

BEE: The common honey bee (Apis millifera), or the mason bee (Osmia lignaria). “Bee” does not include the African honey bee (Apis mellifera scutellate), or any hybrid thereof.

BEE COLONY: All bees in a hive, including queens, workers, or drones.

BEEKEEPER: A person who owns or maintains one (1) or more colonies of bees on their own private property.

BODY PIERCING: Creating a new body opening for jewelry or decoration. This term specifically excludes ear piercing.

BUILDING: Any structure having a roof supported by columns or walls, for the occupancy or enclosure of persons, animals or chattel.

BUILDING HEIGHT: The vertical distance measured from the average of the midpoint of the two (2) tallest elevations, measured from the adjacent grade to the highest point of the coping of a flat roof, the deck line of a mansard roof, or the midpoint between ridge and eaves of a sloped roof, as depicted below:

Flat Roof (One (1) Story) *[illustration not included in this draft]*

Flat Roof (Two (2) Story) *[illustration not included in this draft]*

Sloped Roof (One (1) Story) *[illustration not included in this draft]*

Sloped Roof (Two (2) Story) *[illustration not included in this draft]*

(H1 + H2) / 2 = Building Height

BULK PLANT: Wholesale for Class 1 and 2 flammable or combustible liquids or gases.

CALIPER: The diameter of a tree's trunk, taken about 12" above the ground.

CARGO CONTAINER: Any portable, reusable container generally referred to as a sea cargo container, cargo container or shipping container made as a prefabricated metal structure and primarily designed or used for transporting freight by commercial transportation on ships, by rail or mounted on a chassis for movement by a tractor trailer and built in accordance with the U.S. Department of Transportation Standards. "Cargo container" does not include semi-trailers as defined in Section 41-6a-102 Utah Code Annotated and must be free from damage, rust, and exposed metal, painted in one (1) solid muted earth tone color or similar color as a main structure, with no writing, signs, numbers, or logos.

CARPORT: A private garage not completely enclosed by walls and a door.

CASITA: See "Guesthouse."

CENTRAL BUSINESS DISTRICT: The central business district is defined as that area of St. George City described as follows:

Commencing at a brass cap on a granite stone located at the intersection of Tabernacle St. and Main St. (in the round-a-bout), also known as HCN #247, and running 10.01 feet S 01 °32'16" W, and 1382.44 feet S 88°27'44" E to a point in the middle of Tabernacle Street, said point also being the POINT OF BEGINNING; thence S 01 °34'55" W 175.83 feet; thence N 88°25'25" W 160.66 feet, to the middle of 200 East St.; thence S 01 °33'42" W 442.09 feet, to the middle of 100 South St.; thence N 88°28' 17" W 1,857.10 feet, to the middle of 100 West St.; thence N 01 °36'22" E 176.47 feet; thence N 88°26'00" W 1,240.72 feet, to the middle of 300 West St.; thence N 01 °39'41" E 132.09 feet; thence N 88°23'08" W 213.59 feet; thence N 01 °31 '29" E 308.63 feet, to the middle of Tabernacle St.; thence N 88°27'44" W 97.16 feet; thence N 01 °30'55" E 621.55 feet, to the middle of St. George Blvd.; thence N 88°24'47" W 309.44 feet, to the middle of 400 West St.; thence N 01 °24'43" E 619.73 feet, to the middle of 200 North St.; thence S 88°23'16" E 5,484.17 feet; thence S 01 °32'47" W 398.03 feet; thence S 88°55'11" E 90.24 feet, to the middle of 500 East St.; thence S 01 °34'55" W 837.11 feet, to the middle of Tabernacle St.; thence N 88°27'44" W 1,693.53 feet to the POINT OF BEGINNING.
Containing 8,459,970.70 square feet or 194.2142 acres, more or less.
Basis of Bearings = Between said HCN #247 and HCN #251 (ring and lid at Tabernacle St. and 1000 East St.) South 88°24'58" East, a distance of 6180.73.

CERTIFIED WATER AUDITOR: A person who has been certified by the city of St. George, the Washington County Water Conservancy District, the Irrigation Association, or other city-approved certification program.

CHILD CARE: The provision, day or night, of supplemental parental care, instruction and supervision for a nonrelated child or children, on a regular basis, and for less than twenty-four (24) hours a day. The term does not include babysitting services on a casual, nonrecurring nature or in the child's home, nor cooperative, reciprocate childcare by a group of parents in their respective domiciles.

A. Child Care, In-Home Babysitting: The provision of childcare for four (4) or fewer children within a dwelling;

B. Child Care, Family: The provision of childcare for up to ten (10) children, including the provider's children who are under the age of eighteen (18), within the provider's primary residence.

CHILD CARE CENTER: A structure or building, including outside play areas, used for the provision of childcare for less than twenty-four (24) hours per day.

CHURCH: See "Religious Facility."

CITY FACILITY: Land, right-of-way, easement, structure, or appurtenances owned by the city or by an agency or corporation wholly controlled by the city.

COMMERCIAL CENTER: A commonly owned or developed project that shares parking, internal pedestrian circulation and public street access with a variety of commercial uses.

COMMON AREA: Land within a development not individually owned or dedicated for public use, which is designed and intended for the common use or enjoyment of the residents of the development. May include recreation structures, Landscaping, and improvements.

COMMON AREA, LIMITED: Land within a development not individually owned or dedicated for public use, which is designed and intended for the use or enjoyment of a specified residence of the development. May include driveways, Landscaping, and improvements.

CONDITIONAL USE: A land use that, because of its unique characteristics or potential impact on the municipality, surrounding neighbors, or adjacent land uses, may not be compatible in some areas or may be compatible only if certain conditions are required that mitigate or eliminate detrimental impacts.

CONDOMINIUM OR TOWNHOUSE PROJECT: A development designed and approved for separate ownership of a single unit in a multiple-family development, together with an undivided interest in the Common Area and facilities.

CONSTRUCTION DRAWINGS: All plans, specifications, reports, and studies necessary to meet the requirements of this title and other ordinances of the city of St. George in the approval process of a subdivision, and to obtain a building permit. They include, but are not limited to, floor plans, elevations, site plans, utilities and utility design, roadways, drainage, and other infrastructure and improvements.

CONTROLLER: A device used in irrigation systems to automatically control when and how long sprinklers or drip irrigation systems operate.

CONTROL VALVE: A device used in irrigation systems to turn on and off sprinklers or drip irrigation. Also called an irrigation valve.

COPING: A protective cap, top, or cover of a wall, parapet, or pilaster; often of stone, terra cotta, concrete, metal, or wood.
CREMATORIUM: A business, properly licensed by the state, that is devoted to cremation and/or embalming of the dead, but does not include facilities for burial, internment, body viewing, or funeral services.

CUESTA: A landform that has a steep ascent in one direction and a gentle descent in the opposite direction as designated on the ridgeline map. The steep slope is the cuesta face, an erosion escarpment, and the gentle one is the back slope of the cuesta.

CUESTA CREST: The ridgeline formed by the highest elevations of a cuesta.

CUT: Land surface that is reshaped by man through the removal of soil, rock or other materials.

DAIRY: The processing of milk or milk products (excludes on-site livestock).

DARK SKY: A nighttime sky that is substantially free of interference from artificial light.

DECORATIVE WATER FEATURE: a body of water used for decorative purposes other than human immersion, such as a fountain, fishpond, or waterfall. Decorative water features must comply with the water use limitation of not more than 50 gallons as set forth in this Title.

DEVELOPMENT ACTIVITY:

A. Any construction or expansion of a building or structure;

B. Any change in use of a building or structure that creates additional demand and need for public facilities;

C. Any change in the use of land that creates additional demand and need for public facilities; or

D. Grading, filling, or clearing of land.

DISTRIBUTION UNIFORMITY: The measure of the uniformity of irrigation water over an area.

DISTRICT: The Washington County Water Conservancy District.

DRIP EMITTER: A Drip Irrigation fitting that delivers water slowly at the root zone of the plant, usually measured in gallons per hour.

DRIP IRRIGATION: An irrigation system that delivers water by adding water at the plant's base and root zone, usually measured in gallons per hour. Drip Irrigation exhibits a droplet, trickle, umbrella, or short stream pattern, to reduce evaporation, overspray, and water use, and improves water conservation.

DROUGHT TOLERANT PLANT: A plant that can survive without irrigation for an extended period once established, although supplemental water may be desirable during drought periods for improved appearance and disease resistance. *See* "Water-Conserving Plants"

DWELLING: Any structure, manufactured home, mobile home, or portion thereof that is used for residential purposes, excluding short-term residential rental use.

DWELLING, MULTIPLE-FAMILY: A building arranged or designed to be separately occupied by more than two (2) dwelling units.

DWELLING, SINGLE-FAMILY: A building designed as a single dwelling unit.

DWELLING, TWO (2) FAMILY : A building designed as two (2) dwelling units.

DWELLING UNIT: A building, or separate portion thereof, with sleeping and kitchen facilities for the exclusive use of one (1) family.

DWELLING UNIT, ACCESSORY : A subordinate residential living area created within a single-family dwelling or a detached building on the same residential lot as a single-family dwelling which meets the requirements of chapter 17A of this title.

ELEVATED OPEN FRONT PORCH: An open porch that is at least eight feet (8') wide, four feet (4') deep and extends to at least fifty percent (50%) of the front façade facing any street, is covered by a roof that is integrated into and part of the roof or roof extension and is of the same design and material as the roof, and the floor of which is elevated at least eighteen inches (18") above the sidewalk grade.

EROSION HAZARD: The hazard associated with the natural process, either sudden or gradual, which moves a river channel.

EROSION HAZARD AREA: An area designated by the erosion hazard boundary maps.

EROSION HAZARD BOUNDARY MAPS: Maps designating the boundary of the erosion hazard area.

FAMILY:

A. An individual; or

B. The immediate family members and up to one (1) additional unrelated person living with them as a single housekeeping unit in a dwelling unit; or

C. A group of not more than four (4) persons, who need not be immediate family members, living together as a single housekeeping unit in a dwelling unit; or

D. Two (2) unrelated persons and any children related to either of them living together as a single housekeeping unit.

FENCE: A barrier to limit visibility, provide privacy, define a property line, or prevent ingress or egress, made out of materials such as concrete or masonry block, wood, metal, stone, chain link or vegetation. A retaining wall is not a fence.

FENCE HEIGHT: Fence height is measured vertically, from finished grade to the shortest side of the fence.

FILL: The deposit of soil, rock or other materials placed by man.

FILTER: A device used to screen impurities out of water prior to water being delivered to plants. In Drip Irrigation systems, a filter prevents debris from clogging emitters.

FINANCIAL, MEDICAL AND PROFESSIONAL OFFICE: Financial institutions, medical and professional offices/services, limited to daytime hours of operation, and excludes a hospital, payday loan and sexually oriented business.

FIRST FLOOR: The lowest above-grade story in a structure; provided, the floor level is not more than four feet (4') below final grade for more than fifty percent (50%) of the perimeter. It can include habitable or uninhabitable floor area, as depicted below:

FIXED SPRAY: The pattern of spray from an irrigation head Nozzle, which is fixed and nonchanging.

FLOOD, BASE: The flood event with a one percent (1%) chance of being equaled or exceeded in any given year.

FLOOD INSURANCE RATE MAP (FIRM): The official map on which the Federal Emergency Management Agency has delineated both the areas of special flood hazard and the risk premium zones.

FLOOD INSURANCE STUDY: The official report provided by the Federal Emergency Management Agency that includes flood profiles, the flood boundary floodway map, and the water surface elevation of the base flood.

FLOOD OR FLOODING: A general and temporary condition of partial or complete inundation of normally dry land areas from:

A. The overflow of inland waters; and/or

B. The unusual and rapid accumulation of runoff of surface waters from any source.

FLOOD, SPECIAL FLOOD HAZARD: Land subject to a one percent (1%) or greater chance of flooding in any given year.

FLOODLIGHT: A fixture or lamp designed to “flood” an area with light. A specific form of lamp or fixture designed to direct its output in a specific direction. Such lamps are often designated by the manufacturer and are commonly used for outdoor lighting.

FLOODPLAIN: Land that:

A. Is within the one hundred (100) year floodplain designated by FEMA; or

B. Has not been studied or designated by FEMA but presents a likelihood of experiencing chronic flooding or a catastrophic flood event, because the land has characteristics that are similar to those of a one hundred (100) year floodplain designated by FEMA.

FLOODWAY: The channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than one foot (1').

FLOOR AREA: The sum of the gross horizontal areas of each story of a building measured from the exterior faces of the exterior walls or from the centerline of party walls. Basement floors, interior balconies and mezzanines, elevator shafts, stairwells and enclosed porches are included. Garage area is not included.

FLOW RATE: The rate at which water flows through pipes and valves (gallons per minute or cubic feet per second).

FOOT-CANDLE: A unit of measure of the intensity of light falling on a surface, equal to one (1) lumen per square foot.

FRUIT STAND: A structure that is no more than one thousand (1,000) square feet and is used exclusively for sale during the harvest season of seasonal crops, seedling plants, or garden, farm, or other agricultural produce if the seasonal crops are, seedling plants are, or garden, farm, or other agricultural produce is sold by:

A. The producer of the seasonal crops, seedling plants, or garden, farm, or other agricultural produce;

B. An employee of the producer; or

C. A member of the immediate family of the producer.

FULLY SHIELDED: An outdoor light fixture constructed so in its installed position, all of the light emitted by the fixture is projected below the horizontal plane passing through the lowest light-emitting part of the fixture.

GARAGE, PUBLIC: A building or portion thereof, other than a private garage, designed or used for servicing, repairing, equipping, hiring, selling, or storing motor driven vehicles.

GEOLOGIC OR FLOOD HAZARD AREAS: Any manmade change to improved or unimproved real estate, including, but not limited to, buildings or other structures, mining, dredging, filling, grading, paving, excavation, or drilling operations located within the area of special flood or geologic hazard.

GEOTECHNICAL ENGINEER: A person with a four (4) year degree in civil engineering or engineering geology from an accredited university who, through training and experience, is able to assure that geological factors affecting engineering works are recognized, adequately interpreted, and presented for use in engineering practice and for the protection of the public.

GLARE: Light, originating from a direct artificial light source, or any light reflected off a reflective surface, that causes visual discomfort or reduced visibility.

GRADE:

A. For buildings adjoining one (1) street only, the elevation of the sidewalk at the center of that wall adjoining the street;

B. For buildings adjoining more than one (1) street, the average of the elevations of the sidewalks at the centers of all walls adjoining the street;

C. For buildings having no wall adjoining the street, the average level of the ground (finished surface) adjacent to the exterior walls of the building. All walls approximately parallel to and not more than five feet (5') from a street line are to be considered as adjoining a street.

GRADE, ADJACENT: A reference plane representing the average of finished ground level adjoining the building at exterior walls. Where the finished ground level slopes away from the exterior walls, the reference grade shall be established by the lowest points within the area between the building and the lot line or, where the lot line is more than six feet (6') from the building, between the building and a point six feet (6') from the building.

GRADING PLAN: A grading plan shows all finish grades, spot elevations, drainage (as necessary), and new and existing contours.

GROUND COVER: Live plant material planted in such a way as to form a continuous cover over the ground that can be maintained at a height not more than twelve inches (12").

GUESTHOUSE (CASITA): A detached living quarters located within a building that is subordinate to and located on the same lot or parcel as the primary dwelling. A guesthouse may also be referred to as a “casita”.

HARDSCAPE: Elements of the landscape constructed from nonliving materials such as concrete, boulders, brick, blacktop, and lumber. Includes patios, decks and paths but does not include driveways and sidewalks.

HILLSIDE REVIEW BOARD: The city of St. George hillside review board created under this title.

HIVE: An artificial or natural receptacle used to house bees.

HOLIDAY OR FESTIVE LIGHTING: Any low wattage, seasonal decorative outdoor lighting.

HOME OCCUPATION: A business, transaction or activity conducted entirely within a dwelling, and exclusively by persons residing within the dwelling in a manner that is indiscernible from, and clearly incidental and secondary to, the residential use, without altering the dwelling site or structure, the character of the neighborhood, the demand for public facilities or services, or creating an unsafe condition or short term residential rental.

HOUSEHOLD PETS: Animals ordinarily permitted in the house and kept for personal use and not for commercial purposes, not including goats or pigs.

HYDROZONE: A portion of landscape area where plants with similar water needs and rooting depth are grouped. A hydrozone may be irrigated or non-irrigated. If irrigated, each hydrozone is on a separate valve. ~~The grouping of plants with similar water requirements so each zone can be irrigated with a separate irrigation valve~~.

IMMEDIATE FAMILY: Consists of spouse, parent, children, grandparent or grandchildren and the spouse's parent, children, grandparent, or grandchildren.

IMPROVEMENT COMPLETION ASSURANCE: Means cash, or an irrevocable letter of credit under terms acceptable to the city, to guarantee the proper completion of Landscaping or an infrastructure improvement required as a condition precedent to:

A. Recording a subdivision plat; or

B. Development of any property or project.

IMPROVEMENT WARRANTY: An applicant's unconditional warranty that the applicant's installed and accepted Landscaping or infrastructure improvement:

A. Complies with the municipality's written standards for design, materials, and workmanship; and

B. Will not fail in any material respect, as a result of poor workmanship or materials, within the improvement warranty period.

IMPROVEMENT WARRANTY PERIOD: A period:

A. No later than one (1) year after acceptance of required Landscaping; or

B. No later than one (1) year after acceptance of required infrastructure, unless the city:

1. Determines for good cause that a one (1) year period would be inadequate to protect the public health, safety, and welfare; and

2. Has substantial evidence, on record:

(a) Of prior poor performance by the applicant; or

(b) That the area upon which the infrastructure will be constructed contains suspect soil, and the municipality has not otherwise required the applicant to mitigate the suspect soil.

INFILTRATION RATE: The rate of water entry into the soil expressed as a depth of water per unit of time (inches per hour).

INFRASTRUCTURE IMPROVEMENT: Permanent infrastructure that an applicant must install:

A. Pursuant to published installation and inspection specifications for public improvements; and

B. As a condition of:

1. Recording a subdivision plat; or

2. Development of any property or project.

IRRIGATION CONTRACTOR (IC): A person who has been certified ~~by a city-approved certification program~~ to install irrigation systems, meets state and local license, insurance and bonding requirements, and is able to show proof of such upon demand. An irrigation contractor installs, repairs, designs and maintains irrigation systems.

IRRIGATION DESIGNER: A Landscape architect or a person who has been certified by the Irrigation Association (IA), the city of St. George or other city-approved certification programs to prepare irrigation system designs.

IRRIGATION MAINLINE: Pipe between the point of connection (water source) and irrigation zone Control Valves.

IRRIGATION PLAN: A plan that shows the components of the irrigation system with water meter size, backflow prevention, precipitation rates, flow rate and operating pressure for each irrigation circuit, together with identification of all irrigation equipment.

IRRIGATION RUNOFF: Irrigation water that is not absorbed by the soil or landscape area to which it is applied, and which flows onto other areas.

JOINT UTILITY COMMITTEE (JUC): A committee comprised of city staff and representatives from local utility service providers which meets regularly to discuss the engineering, design, placement, and other issues related to utility improvements within the city.

LAND USE APPLICANT: The property owner, or the property owner's designee, who submits a land use application regarding the property owner's land.

LAND USE APPLICATION:

A. Means an application submitted by a land use applicant to obtain a Land Use Decision; and

B. Does not mean an application to enact, amend, or repeal a Land Use Regulation.

LAND USE AUTHORITY: Unless otherwise provided herein, the community development director or designee is the land use authority for Land Use Decisions required in this title.

LAND USE DECISION: The final action of a land use authority or Appeal Authority regarding:

A. A land use permit;

B. A land use application; or

C. The enforcement of a Land Use Regulation, land use permit, or development agreement.

LAND USE PERMIT: A permit issued by a land use authority.

LAND USE REGULATION:

A. An ordinance, law, code, map, resolution, specification, fee, or rule that governs the use or development of land; and

B. Does not include:

1. The general plan;

2. A Land Use Decision of the city council, even if the decision is expressed in a resolution or ordinance; or

3. A temporary revision to an engineering specification that does not materially:

(a) Increase a land use applicant's cost of development compared to the existing specification; or

(b) Impact a land use applicant's use of land.

LANDMARK BUILDING OR SITE: Any site (including significant trees or other plant life located thereon) or structure of particular historic or aesthetic significance to the city or state. Such significance shall exist where cultural, political, spiritual, economic, social or artistic history of the community is reflected or exemplified by the site or structure, or if it is identified with historic personages or with important events, or if the structure or site embodies distinguishing characteristics of an architectural specimen, inherently valuable for a representation of a period, style or method of construction.

LANDSCAPE ARCHITECT: A person who is professionally licensed to practice landscape architecture in ~~by~~ the state of Utah.

LANDSCAPE OR LANDSCAPING: Any combination of living plants, ~~berms~~, trees, shrubs, vines, Ground Covers, annuals, perennials ~~flowers~~, ornamental grass, turfgrass and other plants that are generally not considered to be weeds or noxious plants; natural features such as rock, stone, or wood chips; nonvegetative permeable Ground Cover; and structural features, including, but not limited to, ~~fountains, reflecting pools,~~ outdoor artwork, screen walls, shade structures, arbors, trellises, retaining walls, berms, fences or benches that create an attractive and pleasing environment.

LANDSCAPE DOCUMENTATION PACKAGE: The documentation of graphic and written criteria, specifications, and detailed plans to arrange and modify the effects of natural features prepared by a landscape architect to comply with the provisions of this ordinance. The landscape documentation package shall include a project data sheet, a site plan, a planting plan, an irrigation plan, construction details, and a grading plan.

LANDSCAPE OR LANDSCAPING MAINTENANCE: Maintaining or keeping any Landscaping or any area required to be landscaped:

A. In a live and thriving condition, with consideration for normal growth and water needs; and

B. Fertilized, mowed, trimmed, edged, mulched and free from weeds, dead plants, litter, refuse, or debris in compliance with regionally accepted horticultural practice.

LANDSCAPE PLAN: A plan that clearly and accurately identifies the location and species of new and existing trees, shrubs, Ground Covers, and other plants on a site, and any other landscape element, and includes an irrigation plan.

LANDSCAPED AREA: An entire parcel of real property less the building footprint, driveways, non-irrigated portions of parking lots, hardscape (such as decks and patios), and other nonporous areas. Small decorative water features are included in the calculation of the Landscaped Area and must comply with the water use limitation of not more than 50 gallons as set forth in this Title.

LIGHT, DIRECT ARTIFICIAL: “Direct artificial light” means any light cast directly to an illuminated area from an artificial light source, as defined by this section, or from any surface on or within the artificial light source’s luminaire that is intended to reflect, refract, or diffuse light from the artificial light source. This does not include light reflected, refracted, or diffused from other surfaces such as nonreflective surfaces on or within the luminaire, or the ground or adjacent walls; provided, those surfaces are not primarily intended for the reflection, refraction, or diffusion of the artificial light source.

LIGHT POLLUTION: Any artificial light that is emitted either directly or indirectly by reflection that alters the appearance of the nighttime sky; interferes with astronomical observations; or interferes with the natural functioning of native wildlife.

LIGHT SOURCE, ARTIFICIAL: “Artificial light source” means the part of a lighting device that produces light.

LIGHT TRESPASS: The projection of any light from a direct artificial light outside the lot or parcel boundary or street right-of-way where the artificial light source is located, unless the projection outside the lot or parcel boundary or street right-of-way is lawfully permitted.

LIGHTING, OUTDOOR: “Outdoor lighting” means the illumination of an outdoor area or object by any indoor or outdoor artificial light source.

LIVESTOCK: Large domesticated animals, which are not ordinarily permitted in the house, such as horses, cattle, goats, sheep, llamas, or ostriches, but not hogs or pigs.

LIVESTOCK FEED YARD: A commercial operation to fatten or maintain livestock prior to their shipment to a stockyard for sale or rendering.

LOT: A tract of land, regardless of any label, that is created by and shown on a subdivision plat that has been recorded in the office of the county recorder. The terms “lot” and “parcel” are used throughout this title interchangeably.

LOT, CORNER: A lot having frontage on two (2) or more improved public or private streets. If Common Area or limited Common Area is located between the lot line and right-of-way, it is considered a corner lot.

LOT DEPTH: The minimum distance measured from the front property line to the rear property line of the same lot.

LOT LINE: Any line defining the boundaries of a lot.

LOT WIDTH: The distance between the side lot lines measured at the front yard setback.

LOW FUEL VOLUME AND HIGH-WATER CONTENT PLANTS: Plants that do not produce excessive amounts of leaves and branches that will fuel fires.

LOWEST FLOOR: The lowest floor of the lowest enclosed area (including basement). An unfinished or flood resistant enclosure, usable solely for parking of vehicles, building access or storage, in an area other than a basement area, is not considered a building’s lowest floor; provided, that such enclosure is not built so as to render the structure in violation of the applicable non-elevation design requirements of this title.

LUMEN: Unit of luminous flux; used to measure the amount of light emitted by lamps.

MANUFACTURING, CUSTOM: An establishment primarily engaged in the on-site production of goods by hand manufacturing which involves only the use of hand tools or domestic mechanical equipment not exceeding two (2) horsepower or a single kiln not exceeding eight (8) kilowatts, and the incidental direct sale to customers of only those goods produced on site. Typical uses include ceramic studios, candle making shops or custom jewelry manufacturing.

MANUFACTURING, HEAVY: The converting of raw or partially processed materials into a product used for further processing or distribution. Examples of heavy manufacturing include lumber and paper mills, sewage treatment plants, stone, clay, glass product manufacturing, asphalt and concrete batch plants, and similar operations. These uses may be conducted partially or wholly outdoors and usually create noxious byproducts such as dust, fumes, hazardous waste products, noise, vibration, and glare.

MANUFACTURING, LIGHT: An establishment engaged in the manufacture, predominantly from previously prepared materials, of finished products or parts, including processing, fabrication, assembly, treatment, and packaging of such products, and incidental storage, sales, and distribution of such products, but excluding basic industrial processing.

MATCH PRECIPITATION RATE (MPR): A term used where the amount of water applied in a given area is uniform. This term is most commonly used in sprinkler applications where all sprinkler heads within an irrigation zone apply water at the same rate.

MULCH: Any organic material such as leaves, bark, wood chips, straw, or inorganic material such as crushed stone or gravel, or other materials left loose and applied to the soil surface for the beneficial purpose of controlling weeds and conserving soil moisture.

NATURAL WATERWAYS: The natural drainage channel along rivers, streams, creeks, springs, gullies, or washes.

NONCOMPLYING BUILDING OR STRUCTURE: A structure that:

A. Legally existed before its current land use designation; and

B. Because of one (1) or more subsequent land use ordinance changes, does not conform to the setback, height restrictions, or other regulations, excluding those regulations which govern the use of land.

NONCONFORMING USE: A use of land that:

A. Legally existed before its current land use designation;

B. Has been maintained continuously since the land use ordinance that created the nonconformity was enacted; and

C. Because of one (1) or more land use ordinance changes, does not conform to the regulations that currently govern the use of the land.

NOZZLE: A device that applies water in a specific pattern and distance at specified water pressures.

NURSING HOME: An institution providing long-term residence and care for the aged or infirm.

PARCEL: Any real property with a separate tax identification number that is not a lot created by and shown on a subdivision plat recorded in the office of the county recorder. The terms “lot” and “parcel” are used throughout this title interchangeably.

PARCEL, CORNER: A parcel having frontage on two (2) or more improved public or private streets.

PARCEL DEPTH: The minimum distance measured from the front property line to the rear property line of the same parcel.

PARCEL LINE: Any line defining the boundaries of a parcel.

PARCEL WIDTH: The distance between the side parcel lines measured at the front yard setback.

PARK STRIP: A narrow Landscaped Area typically located in the right-of-way between the back-of-curb and sidewalk.

PARKING LOT: An area, other than a street, used for parking, whether or not required by ordinance.

PARKING SPACE: Space within a building, lot or parking lot designated for parking or storing one (1) automobile.

PERMANENT COSMETICS: A mark or design made on or under the skin by a process of pricking or ingraining an indelible pigment, dye, or ink in the skin for masking discolorations or cosmetically enhancing facial features which shall follow the natural line of the feature and shall be limited to eyeliner, eyebrows, lip coloring, and medical reconstruction procedures only.

PERMANENT COSMETICS ESTABLISHMENT: An establishment engaging in permanent cosmetics as a secondary use to an establishment employing cosmetologist/barber(s), aesthetician(s), electrologist(s), or nail technician(s) licensed by the state under UCA Chapter 58-11a, excluding tattoo establishments and home occupations.

PERSONAL CARE SERVICE: An establishment primarily engaged in the provision of frequently recurring needed services of a personal nature. Typical uses include but are not limited to beauty and barber shops, massage therapy, custom tailoring and seamstress shops, esthetician, portrait studios, shoe repair shops, and tanning and nail salons.

PERSONAL INSTRUCTION SERVICE: An establishment primarily engaged in the provision of informational, instructional, personal improvement and similar services of a nonprofessional nature. Typical uses include but are not limited to art and music schools, driving and computer instruction, handicraft or hobby instruction, health and fitness studios.

PLANNED DEVELOPMENT: A development that is the subject of a zone-change application, submitted to the planning commission and city council, and, when required, presented with a conceptual plan showing the form, manner, layout and other parameters of the planned development prior to the preparation of a preliminary plat.

PLANTING PLAN: A plan that clearly and accurately identifies the type, size, and locations for new and existing trees, shrubs, planting beds, ground covers, grass areas, driveways, sidewalks, hardscape features, landscape structures, and fences.

PLAT, FINAL: A plat prepared in accordance with the provisions of this title, which plat is designed to be ~~placed on record~~ recorded in the office of the Washington County R~~r~~ecorder.

PLAT, PRELIMINARY: A plat prepared in accordance with the provisions of this title which plat, and accompanying plans, reports, diagrams, and text, is made for the purpose of showing the design of a proposed subdivision and the existing conditions in and around it. The preliminary plat is essentially a study plan which, when approved, will serve as a basis for the preparation of the construction drawings and Final Plat.

PLATEAU: A flat or predominantly flat area of land, which is raised sharply above adjacent land on at least one (1) side as designated on the ridgeline map.

PLATEAU EDGE: The junction of the plateau and the sharp vertical rise that separates the plateau from lower adjacent land.

PRECIPITATION RATE: The depth of water applied to a given area, usually measured in inches per hour.

PRESSURE COMPENSATING: In a drip irrigation system, a term used to describe an emitter that maintains the same output of water at varying water inlet pressures.

PRESSURE REGULATING VALVE: A valve installed in an Irrigation mainline that reduces a higher supply pressure at the inlet down to a regulated lower pressure at the outlet.

PRIVATE SITE DEVELOPMENT IMPROVEMENT: A required site feature that an applicant must install:

A. As a condition of development of a commercial, industrial, mixed-use, condominium, or multifamily project; and

B. That is not an infrastructure improvement.

QUALIFYING STUDENT: A student enrolled in spring or fall classes at Dixie State University in classes awarded eight (8) credits or more for each semester.

RECEIVING AREA: An area within a proposed development that is designated to accept density transferred from a designated sending area within the proposed development.

RECREATIONAL VEHICLE: A vehicle that is:

A. Built on a single chassis;

B. Four hundred (400) square feet or less when measured at the largest horizontal projections;

C. Designed to be self-propelled or permanently towable by a light duty truck; and

D. Designed primarily not for use as a permanent dwelling, but as temporary living quarters for recreational, camping, travel, or seasonal use.

REHABILITATED LANDSCAPING: Landscape area in which over 50% percent of existing Landscaping is removed and replaced. Includes all Landscaping funded in part, or completely, by the District's landscape conversion program.

RELIGIOUS FACILITY: A meetinghouse, Church, temple, mosque, synagogue, or other permanent structure, used primarily for regular religious worship.

RESIDENTIAL CENTRAL CITY AREA (RCC): The area located between 100 South to 700 South, and between 700 East to Bluff Street or bounded by Bluff Street on the west, Diagonal Street to Main Street and then to St. George Boulevard on the north, and by Interstate 15 on the south and east.

RESIDENTIAL TREATMENT FACILITY: A residence where more than one (1) person with a disability resides and the residence is licensed with the State Department of Human Services or the Department of Health as a residential facility to care for the disabled.

RESTAURANT/CAFÉ: Preparation and sale of food and drink for on-premises public consumption.

RETAINING WALL: Includes any structure designed to resist the lateral displacement of soil or other materials, not including rockery walls. An example includes block walls, concrete walls, or a segmented wall designed and approved as a retaining wall.

RETAINING WALL HEIGHT: Retaining walls shall be measured from the top of the exposed face to finish grade.

RIDGELINE: The junction of a rising slope and a descending slope, including a cuesta crest and a plateau edge.

ROCK: A natural solid mineral matter occurring in large masses or fragments.

ROCKERY WALL: A system of stacked rocks constructed to retain soil or rock and include rock-faced slopes.

ROTOR: A sprinkler that applies water above ground with a rotating stream of water typically used for large turf areas.

SECONDARY IRRIGATION WATER: Non-potable water that is either untreated or minimally treated and typically used for irrigation of outdoor Landscaping.

SENDING AREA: An area within a proposed development that is designated to transfer density to a designated receiving area within the proposed development.

SETBACK: The minimum distance to a structure from the property lines.

SEXUALLY ORIENTED BUSINESS: See section 3-8-2 which is incorporated by reference herein.

SHORT-TERM GUEST: Guests whose duration of visit is twenty-nine (29) consecutive calendar days or less.

SHORT-TERM RESIDENTIAL RENTAL: Property that is occupied, possessed, or used by any person or entity for transient lodging where the term of occupancy, possession, or use of the property by the person or entity is offered for twenty-nine (29) consecutive calendar days or less, for direct or indirect compensation or other consideration.

SIGNIFICANT HISTORIC BUILDING: A building or structure that is either:

A. A designated landmark site as approved by the city council; or

B. A residential or commercial building that meets the requirements of section 10-13E-4A2; or

C. Any building which meets the criteria for the National Register of Historic Places.

SITE DEVELOPMENT STANDARDS: Minimum lot areas, yard setbacks, exceptions, building height, lot coverage, Landscaping, and open space for each zone.

SLOPE: A vertical rise in feet measured over a horizontal distance, expressed as a percentage, measured generally at right angles to contour lines.

SMALL ANIMAL: An animal that, on average, will reach a mature weight of no more than fifteen (15) pounds and does not include rabbits or urban hens.

SPRAY HEAD: A sprinkler that applies water above ground with a constant spray typically used for small lawn areas.

SPRINKLER: A device that applies water above ground.

~~SPRINKLER, SPRAY: An irrigation head that sprays water through a nozzle.~~

~~SPRINKLER, STREAM: An irrigation head that projects water through a gear rotor in single or multiple streams.~~

STABLE, PRIVATE: A detached building designed and used to care for livestock owned by the residents and not kept for commercial purposes.

STABLE, PUBLIC: A public building designed and used to care for livestock.

STATE AND LOCAL CONSTRUCTION CODES: Regulations adopted in or pursuant to the State Construction and Fire Codes Act, UCA Title 15A.

STORAGE RENTAL UNITS: (Also known as MINISTORAGE or SELF-STORAGE): A building separated into individual spaces for customer storage and retrieval of personal effects, household goods, furniture, or archived materials.

STORY: That portion of a building between the upper surface of a floor and the upper surface of the next floor or roof above.

STREET, PRIVATE: A private thoroughfare that affords access to property consistent with city standards.

STREET, PUBLIC: A public thoroughfare that affords principal means of access to abutting property.

STREET SIDE: An area located between the side of a structure and a public or private street, extending from the front yard setback to the rear yard setback. See also LOT, CORNER, and PARCEL.

STREET TREE: Includes all trees located within the public right-of-way of all streets within the city.

STRUCTURAL ALTERATION: Any change to the support of a structure, such as a bearing wall, column, beam truss or girder.

STRUCTURE: Anything constructed or erected that is attached, on, or below the ground in any manner.

SUBDIVIDER: Any individual, firm, association, syndicate, partnership, corporation, trust, or other legal entity, having legal title to real property for which a subdivision is proposed. A "subdivider" includes an authorized representative of the subdivider who is authorized to represent the subdivider for the purpose of effecting the subdivision of real property, having legal title to real property for which a subdivision is proposed.

SUBDIVIDER'S ENGINEER: A civil engineer licensed in the state of Utah engaged by the subdivider to prepare a conceptual planned development, a preliminary plat, construction drawings, a Final Plat, or to compile such data as may be required in connection therewith or in accordance with the provisions of this title.

SWING JOINT: An irrigation component that provides a flexible, leak free connection between the emission device (sprinkler) and lateral pipe.

TABLELAND: Land where the slope in any direction is less than fifteen percent (15%).

TATTOO ESTABLISHMENT: Any location, place, area, structure, or business used for the practice of tattooing or the instruction of tattooing, excluding permanent cosmetics establishments.

TURFGRASS*:* A surface layer of ~~mowed grass~~ earth containing mowed grass with its roots.

UNDISTURBED: An area that remains in a natural, pristine condition and not subject to grading, excavation, or other similar disturbance.

UNPAVED SURFACE: A parcel of land or portion thereof that is not paved with an approved surfacing material such as asphalt or concrete.

URBAN HENS AND RABBITS: Keeping of chickens (hens only) and rabbits, as an Accessory Use to a single-family dwelling, to produce food for the family residing on the subject property.

VALVE: A device used to control the flow of water in an irrigation system.

VEHICLE: Any form of motorized transport or any trailer.

VESSEL: Every type of watercraft, other than a seaplane on the water, used or capable of being used as a means of transportation on water.

WATER ACTIVITIES: a recreational activity involving the use of water such as swimming pools, slides, rides, wave pools, wave riding, tubing, boating, etc.

WATER-CONSERVING PLANT: A plant that can generally survive with available rainfall once established, with possible minimal supplemental irrigation needed or desirable during spring and summer months or during drought periods.

WATER METER: A device that measures the amount of water being used at a specific location.

WATER PERFORMANCE AUDIT: A water performance audit is an on-site survey and measurement of irrigation equipment and management efficiency performed by a Certified Water Auditor.

WILL SERVE LETTER: A letter or other written documentation issued by the District that assures culinary water will be provided through a culinary water system.

YARD, FRONT: On a lot or parcel with a building, the area that includes the full width of the lot or parcel from the main building to any lot line abutting a street, or private right of access. On a vacant lot or parcel, the area that includes the full width of the lot from the depth of the minimum setback to any lot line abutting any street. A corner lot or parcel has two (2) front yards.

YARD, REAR: On a lot with a building, the area that includes the full width of the lot from the rear façade of the building to the rear lot line. On a vacant lot, the area that includes the full width of the lot from the rear setback to the rear lot line.

YARD, SIDE: On a lot with a building, the areas between the side lines of the building and the sideline of the lot and extending from the front yard line to the rear yard line. On a vacant lot, the areas between the front and rear setback lines, from each side yard setback line to its closest side lot line.

CHAPTER 3
APPEALS AND VARIANCES

[Not included]

CHAPTER 4
ZONES

10-4-1:
CITYWIDE ZONING:
All property within the city is subject to the city's zoning districts. If such zoning is invalidated for any reason, no building permit, subdivision, or approval for any Development Activity may be applied for until the city establishes valid zoning for the property.

10-4-2:
ZONE CHANGES – WATER AND UTILITY SOURCES, ACCESS REQUIRED:
Zone changes shall not be approved unless the applicant can show that the property is served by approved sources and facilities for culinary and secondary irrigation water, power, sewer, and access to a dedicated public street. ~~Alternatively~~, It is the property owner's responsibility to construct and connect to such approved sources and facilities and to provide proof of adequate culinary and secondary water service.

CHAPTER 5
AGRICULTURAL ZONES (A-0.5, A-1, A-5, A-10, A-20)

10-5-1:
ALLOWED USES:

10-5-2:
HEIGHT REGULATIONS:

10-5-3:
AREA, WIDTH AND YARD REQUIREMENTS:

The minimum area, width and yard requirements for each zone are as indicated below:

District	Area Minimum	Minimum Lot Width	Minimum Yard Setbacks		
			Front and Street Side	Side	Rear
A-0.5	20,000 square feet	80 feet	25 feet	10 feet	10 feet
A-1	40,000 square feet	100 feet	25 feet	10 feet	10 feet
A-5	5 acres	100 feet	25 feet	25 feet	25 feet
A-10	10 acres	500 feet	25 feet	25 feet	25 feet
A-20	20 acres	500 feet	25 feet	25 feet	25 feet

(Ord. 2019-10-002, 10-10-2019)

10-5-4:
DESIGN CRITERIA:
A complete application for single-family occupancy must include a site plan, architectural plans and construction drawings of one-quarter (¼) scale, that show building materials, exterior elevations and floor plans of all proposed structures that meet the following criteria:

A. *HUD Standards, Construction Codes:* All development must comply with the construction codes and, as applicable, the national manufactured housing construction and safety standards and ICC guidelines for manufactured housing installations, that are capable of transferring design dead loads and live loads, and other design loads unique to local home sites, due to wind, seismic, soil and water conditions, that are imposed by or upon the structure into the underlying soil or bedrock without failure.

B. Perimeter footings at least twelve inches (12") below grade.

C. For all dwellings:

1. Space beneath the structure must be enclosed at the perimeter of the dwelling in accordance with ICC guidelines and constructed of weather resistant materials aesthetically consistent with concrete or masonry type foundation materials.

2. A minimum landing of thirty-six inches by thirty-six inches (36" x 36") at each exit.

3. All manufactured home running gear, tongues, axles and wheels must be removed and stored off site or in a separately enclosed structure.

D. *Exterior Materials:* Each dwelling shall have exterior materials of wood, hardwood, brick, concrete, stucco, glass, metal lap, vinyl lap, tile or stone.

E. *Width of Dwelling:* The width of each dwelling shall not be less than twenty feet (20') at the narrowest point of its first floor, exclusive of any garage, bay window, or appendages.

F. *Minimum Floor Area:* Each dwelling shall have a minimum floor area, exclusive of garage and basement, of one thousand (1,000) square feet.

G. *Special Water Standards:* The following standards shall apply to all new or remodeled single-family units:

1. Single-family residential dwelling units shall install hot water recirculation systems unless hot water delivery can be demonstrated to occur without first displacing more than 0.6 gallons of system water.

2. Single-family-family residential dwelling units shall install WaterSense labeled fixtures, including, but not limited to faucets, showerheads, toilets, and urinals.

3. Single-family-family residential dwelling units shall install Energy Star qualified appliances.

10-5-5:
LANDSCAPE STANDARDS:

All new or remodeled construction or development shall meet the following standards:

A. The total turfgrass area shall not exceed 8% of the total lot size, regardless of zoning and in no case shall turfgrass exceed 1,500 square feet on any given lot or parcel. This does not include any pasture or other types of grasses that are not part of landscaping.

B. Turfgrass shall be prohibited in park strips, all landscape areas less than eight feet wide and on any slope that exceeds 15%. Areas with soil slopes greater than 15% shall have erosion control measures and may be landscaped with deep-rooting, water-conserving plants that do not include grass.

C. Each single-family dwelling shall have a minimum of two water-efficient shade trees with a minimum of one-and-one-half inch (1½") Caliper trunk.

D. The area (square footage) of any pool will be included in the allowed amount of turfgrass.

E. Exterior, Decorative Water Features are limited to one Decorative Water Feature with a 50 gallon or less capacity and maintained recirculating pumps.

F. Exceptions: The irrigation of crops and watering of livestock are not included in the landscape regulations.

10-5-~~5~~6:
YARDS UNOBSTRUCTED – EXCEPTIONS:

10-5-~~6~~7:
CURB, GUTTER, SIDEWALK AND DRIVEWAY:

10-5-~~7~~8:
UTILITY REQUIREMENTS:

10-5-~~8~~9:
TEMPORARY BUILDINGS:

10-5-~~9~~10:
SETBACKS ALONG STREETS:

10-5-~~10~~11:
RELATED PROVISIONS:

CHAPTER 6
GRAVEL AND GRAZING ZONE (G-G)

[Not included]

CHAPTER 7
RESIDENTIAL ZONES
Residential Estate (RE), Single-Family, Multiple-Family, Mobile Home (MH), Residential Central City (RCC), and Planned Development Zones (PD-R, PD-SH and PD-TNZ)

10-7-1:
YARDS UNOBSTRUCTED – EXCEPTIONS:

10-7-2:
CURB, GUTTER AND SIDEWALK – WHEN REQUIRED:

10-7-3:
UTILITY REQUIREMENTS:
In all areas of the city, connection shall be made to public culinary and secondary irrigation water, electrical and sewer facilities~~, unless waived by the city engineer or designee upon a demonstration of an equivalent alternative acceptable to the city.~~ All utilities shall be located underground, unless specifically approved by the city engineer or designee. All construction shall comply with state building codes and all city standards.

10-7-4:
TEMPORARY BUILDINGS:

10-7-5:
SETBACKS ALONG STREETS:

10-7-6:
DESIGN CRITERIA:

A complete application for single-family occupancy must include a site plan, architectural plans and construction drawings of one-quarter (¼) scale, that show building materials, exterior elevations and floor plans of all proposed structures that meet the following criteria:

A. *HUD Standards, Construction Codes:* All development must comply with the construction codes and, as applicable, the national manufactured housing construction and safety standards and ICC guidelines for manufactured housing installations, that are capable of transferring

design dead loads and live loads, and other design loads unique to local home sites, due to wind, seismic, soil and water conditions, that are imposed by or upon the structure into the underlying soil or bedrock without failure.

B. Perimeter footings at least twelve inches (12") below grade.

C. For all dwellings:

1. Space beneath the structure must be enclosed at the perimeter of the dwelling in accordance with ICC guidelines and constructed of weather-resistant materials aesthetically consistent with concrete or masonry type foundation materials.

2. A minimum landing of thirty-six inches by thirty-six inches (36" x 36") at each exit.

3. All manufactured home running gear, tongues, axles and wheels must be removed and stored off site or in a separately enclosed structure.

D. *Prohibited Exterior Materials:*

1. Plain concrete block, slump block, weeping mortar.

2. Colored or architectural concrete block.

3. Plywood siding.

4. Metal siding, sheet metal.

5. Untreated metal, or reflective roofing.

E. *Width of Dwelling:* The width of each dwelling shall not be less than twenty feet (20') at the narrowest point of its first floor, exclusive of any garage, bay window, or appendages.

F. *Minimum Floor Area:*

1. Each dwelling located on a lot of seven thousand (7,000) square feet or less in size shall have a minimum floor area, exclusive of garages and basement, of nine hundred (900) square feet.

2. Each dwelling located on a lot greater than seven thousand (7,000) square feet in size shall have a minimum floor area, exclusive of garage and basement, of one thousand (1,000) square feet.

G. Any addition to the main structure shall be constructed using the same design, finishes, materials, and colors.

~~H. *Access:* A dead-end street system may not serve more than thirty (30) single-family lots or dwellings, or more than one hundred (100) multifamily dwellings. A second access, compliant with all fire and building codes and all engineering standards as currently adopted by the city,~~

~~shall be provided for additional lots or dwelling units.~~ *Access:* There shall be a minimum of one point of access to a dedicated public road. All other access requirements shall comply with the current Fire Code as approved by the Fire Marshal.

I. *Special Water Standards:* The following construction standards shall apply to all new or remodeled single or multiple-family units:

1. Single-family or multiple family residential dwelling units shall install hot water recirculation systems unless hot water delivery can be demonstrated to occur without first displacing more than 0.6 gallons of system water.

2. Single-family or multiple-family residential dwelling units shall install WaterSense labeled fixtures, including, but not limited to faucets, showerheads, toilets, and urinals.

3. Single-family or multiple-family residential dwelling units shall install Energy Star qualified appliances.

4. All individually platted multiple-family units which are accessed from the ground floor shall be separately metered, sub-metered, or equipped with alternative technology capable of tracking the water use of the individual unit. The separate metering of all multi-family units is encouraged where possible. If not otherwise billed directly to the resident of each unit, if possible, the monthly usage ~~i~~nformation shall be made available to the resident of each unit to monitor water usage. All multiple-family projects shall require separate water meters for all outdoor (irrigation) water usage, including Landscaping.

10-7-7:
LANDSCAPE STANDARDS:
All new or remodeled construction or development shall meet the following standards:

A. The total turfgrass area shall not exceed 8% of the total lot size, or common/limited common areas associated with a private pad, regardless of zoning and in no case shall turfgrass exceed 1,500 square feet on any given lot or attached unit project.

B. Turfgrass shall be prohibited in park strips, all landscape areas less than eight feet wide and on any slope that exceeds 15%. Areas with soil slopes greater than 15% shall have erosion control measures and may be landscaped with deep-rooting, water-conserving plants that do not include grass.

C. Each single-family dwelling shall have a minimum of two water-efficient shade trees with a minimum of one-and-one-half inch (1½") caliper trunk. Each multiple-family or mixed-use development shall comply with Chapter 23 of this title as it relates to number of trees and shrubs required on site.

D. The area (square footage) of any pool will be included in the allowed amount of turfgrass.

E. Exterior decorative water features are limited to one with a 50 gallon or less capacity and maintained recirculating pump.

10-7-7:
RELATED PROVISIONS:

ARTICLE A.RESIDENTIAL ESTATE ZONES
(RE-5, RE-12.5, RE-20, RE-37.5)
[Not Included]

ARTICLE B.SINGLE-FAMILY RESIDENTIAL ZONES
(R-1-6, R-1-7, R-1-8, R-1-10, R-1-12, R-1-20, R-1-40)
[Not Included]

ARTICLE C.MULTIPLE-FAMILY RESIDENTIAL ZONES
(R-2, R-3, R-4)

10-7C-1:
ALLOWED USES:
Any use not specifically permitted, permitted with standards, or conditionally permitted is prohibited. Only the following uses are allowed:

A. Uses indicated by the letter "P" below are permitted in the designated zone.

B. Uses indicated by the letters "PS" are permitted uses with required standards in this zone. Uses must comply with the standards and evaluation criteria established in chapter 17 of this title.

C. Uses indicated by the letter "C" are conditional uses in the designated zone.

Allowed Uses

		RE-5	RE-12.5	RE-20	RE-37.5
City facility, primary		P	P	P	P
City facility accessory uses; accessory structure and use		P	P	P	P
Commercial agriculture or livestock business		P	P	P	P
Communication transmission facilities, including wireless, primary		PS	PS	PS	PS
Communication transmission facilities, including wireless, primary, height over 50'		C	C	C	C
Lot size averaging				P	P
Private country club~~, golf course~~ and park		P	P	P	P
Public utility facilities, primary		PS	PS	PS	PS
Public utility facilities accessory uses; accessory structures		P	P	P	P
Religious facility, primary		P	P	P	P
School, public or charter, primary		P	P	P	P
Short-term residential rental		PS	PS	PS	PS
Single-family dwelling, primary		P	P	P	P
Single-family dwelling accessory uses:	Accessory structure and use	P	P	P	P
	Accessory dwelling unit	PS	PS	PS	PS
	Agriculture	P	P	P	P
	Apiaries/beekeeping	PS	PS	PS	PS
	Barns and corrals for agriculture and livestock – At least 50' from any dwelling	PS			
	Barns and corrals for agriculture and livestock – At least 100' from any dwelling	PS	PS	PS	PS
	Child care, in-home babysitting	P	P	P	P
	Child care, family	P	P	P	P
	Greenhouse, high tower or plant nurseries (no retail)	P	P	P	P
	Guesthouse	PS	PS	PS	PS
	Home occupation	P	P	P	P
	Livestock – 1 animal per 12,000 sf; 2 per 20,000 sf; 1 additional animal for each additional 10,000 sf over 20,000 sf	P	P	P	P
	Hogs to be raised by resident for purposes of meeting requirements of a youth club - maximum of 2 hogs per 37,500 sf for a maximum of 6 months				PS

		RE-5	RE-12.5	RE-20	RE-37.5
	Hog pen/shelter – Up to 8' tall and 100 sf – Allowed only in rear yard at least 100' from any dwelling; required effective manure management				PS
	Small animals (not produced for food) up to 8 animals	P	P	P	P
	Sale of homegrown eggs and produce from the residence, subject to the provisions and restrictions in the home occupation ordinance	P	P	P	P
	Urban hens and rabbits – Up to 6 adult hens and 4 adult rabbits per 1,000 sf of lot area – No more than 16 animals per lot, up to 10 rabbits, and up to 1 rooster per 37,500 sf kept at least 50' from any residential zone	PS	PS	PS	PS
	Urban hen/rabbit coop, pen or cage – Up to 8' tall and 200 sf – Allowed only in rear yard, at least 20' from lot line (unless solid perimeter fence); required effective manure management	P	P	P	P

10-7C-2:
HEIGHT REGULATIONS:

10-7C-3:
DENSITY REGULATIONS:

10-7C-4:
AREA, WIDTH AND YARD REQUIREMENTS:

10-7C-5:
MINIMUM REQUIRED BUILDING SEPARATION:

10-7C-6:
LANDSCAPED AREA AND AMENITY REQUIREMENTS:

A. At a minimum, all developments with five (5) or more units shall provide usable recreation or playground areas in a central location as follows:

1. One thousand (1,000) square feet for the first five (5) units;

2. An additional two hundred (200) square feet for each unit over five (5) units;

3. The average width and length of each usable recreation or playground area shall not be less than twenty feet (20'); and

4. All of the required area shall be usable common space accessible to the entire community.

5. Of the required amenity area, up to 8% of the amenity requirement may be used as an active recreation area.

B. The number of amenities required depends on the size of the development. All amenities shall be approved by the land use authority in accordance with the following:

Units	Amenities
0 – 4	0
5 – 50	1
51 – 100	2
101 – 200	3
201 – 300	4
Add 1 amenity for each 50 additional units or fraction thereof.	

C. The type of amenities required depends on the nature, size, and density of the development. If multiple amenities are required, the type shall vary. All amenities shall be approved by the land use authority in accordance with the following:

1. All required amenities shall be fully constructed, prior to construction of fifty percent (50%) of the total project units, or in accordance with an executed development agreement with terms acceptable to the city;

2. In addition to amenities, a minimum of thirty percent (30%) of the lot area shall be maintained in Landscaped Area, and at least fifty percent (50%) of the front setback area shall be maintained as Landscaped Area.

D. *Table of Amenities:*

Recreation and Enrichment Amenities

Pool – At least 400 square feet
Internal health or fitness facilities
Secured, programmed, children's play areas
In-ground hot tub
Community garden
Perimeter trail

Sport court
Indoor, keyed, bicycle storage for units
Community library, office, or meeting facilities
Exterior social area – At least 400 square feet
Active recreation area

E. *Detached or Pad Units*: Multi-family projects which involve detached housing or pad development shall comply with the landscape standards in Chapter 23.

~~**10-7C-7:**~~
~~**ACCESS TO MULTIPLE-FAMILY:**~~
~~A multiple-family development with a density of twelve (12) dwelling units per acre or more shall have two (2) separate accesses for ingress and egress via collector or arterial roads, or via a local access road (fifty-foot (50') minimum right-of-way). (Ord. 2019-10-002, 10-10-2019)~~

10-7C-8:
MISCELLANEOUS:

ARTICLE D.MOBILE HOME ZONES
(MH-6, MH-8, MH-10, MH-12, MH-20, MH-40)

[Not Included]

ARTICLE E.RESIDENTIAL CENTRAL CITY ZONE
(RCC, R-1-C)

[Not Included]

ARTICLE F. PLANNED DEVELOPMENT RESIDENTIAL ZONE
(PD-R)

10-7F-1:
ALLOWED USES:

10-7F-2:
GENERAL REQUIREMENTS:

A. *Application Requirements:* Each application submitted pursuant to this chapter shall include the following:

1. *Documents Required:* All requests shall be accompanied by a colored site development plan, materials, and a written text for the entire property proposed to be developed.

2. *Description of the Proposed Use of Land:* The projected use of land, including percentages of land devoted to various types of land use, such as building coverage, parking area, Landscaped Area, etc.

3. *Height and Elevations:* The type, character, and proposed height of all buildings.

4. *Density:* The proposed density in terms of dwelling units per gross acre of land and proposed floor area of nonresidential uses per acre.

5. *Schools, Churches and Open Spaces:* The location and boundaries of any proposed school site, Church, park or other common or open spaces.

6. *Phasing Plan:* A phasing plan if the development is proposed to be developed in phases.

7. *Topography:* Topography at contour intervals of two feet (2').

8. *Landscape Plan:* A landscape plan showing the general location of lawn area and trees (this may be a part of the site or plot plan).

9. *Area Reserved for Landscaping:* The location and amount of land area reserved for Landscaping.

10. *Utilities:* Demonstration that all utilities are underground and transformer equipment is screened from streets and from adjacent properties.

11. *Refuse Storage Areas:* Refuse storage areas screened so that materials stored within these areas are not visible from access streets, freeways, and adjacent properties.

12. *Lighting Plan:* A general lighting plan indicating location and luminosity of lights to be installed on the site.

13. *Turning Space:* Safe and convenient turning space for cars, sewer vehicles, refuse collection vehicles, firefighting equipment, etc., at the end of private drives and dead-end streets.

14. *Signs:* All signs shall be submitted and approved as part of the PD approval.

B. *Signs and Advertising:* The requirements of the sign ordinance set forth in title 9, chapter 13 of this code apply, unless a variation is specifically approved, and shall not exceed the following:

1. *Freestanding Signs:* Freestanding signs shall be monuments and limited to seventy-five (75) square feet. Monument signs shall be limited to ten feet (10') in height. Only one (1) sign per street frontage is permitted.

2. *Wall Signs:* One (1) wall sign on a multiple-family project limited to one hundred twenty (120) square feet.

C. *Time Limitation:* For single lot multi-family projects, approval of a final site plan, construction drawings, and/or b~~B~~uilding permits for construction within planned development zones must be approved and obtained within ~~thirty-six (36)~~ one year of the approval of a zone change to planned development. For all other multi-family projects on more than one lot or parcel requiring a subdivision of land,, the final plat must be recorded within one year of the effective date of any zone change. The effective date of any zone change under this Article shall be the date of Final Plat recordation and/or final construction drawing approval. ~~If thirty-six (36) months elapse without the issuance of building permits for the construction of the approved plans within the planned development zone, the zone shall automatically revert back to the previous zone before the zone change to planned development was approved.~~

D. *Special Water Standards:* The following standards shall apply to all new or remodeled single-family units:

1. Single-family residential dwelling units shall install hot water recirculation systems unless hot water delivery can be demonstrated to occur without first displacing more than 0.6 gallons of system water.

2. Single-family-family residential dwelling units shall install WaterSense labeled fixtures, including, but not limited to faucets, showerheads, toilets, and urinals.

3. Single-family-family residential dwelling units shall install Energy Star qualified appliances.

4. All individually platted multiple-family units which are accessed from the ground floor shall be separately metered, sub-metered, or equipped with alternative technology capable of tracking the water use of the individual unit. The separate metering of all multi-family units is encouraged where possible. If not otherwise billed directly to the resident of each unit, if possible, the monthly usage ~~i~~nformation shall be made available to the

resident of each unit to monitor water usage. All multiple-family projects shall require separate water meters for all outdoor (irrigation) water usage, including landscaping

10-7F-3:
LANDSCAPE STANDARDS:

All new or remodeled construction or development shall meet the following standards:

1. The total turfgrass area shall not exceed 8% of the total lot size, regardless of zoning and in no case shall turfgrass exceed 1,500 square feet on any given lot or parcel.

2. Turfgrass shall be prohibited in Park Strips, all landscape areas less than eight feet wide and on any slope that exceeds 15%. Areas with slopes greater than 15% shall be landscaped with deep-rooting, water-conserving plants that do not include grass.

3. Each single-family dwelling shall have a minimum of two water-efficient shade trees with a minimum of one-and-one-half inch (1½") caliper trunk. Each multiple-family development shall comply with Chapter 23 of this title as it relates to number of trees and shrubs required on site.

4. The area (square footage) of any pool will be included in the allowed amount of turfgrass.

5. Exterior decorative water features are limited to one with a 50 gallon or less capacity and maintained recirculating pump.

10-7F-~~3~~4:
PRELIMINARY PLAT:

10-7F-4~~5~~:
PD-R PLANNED RESIDENTIAL DEVELOPMENT STANDARDS:

10-7F-5~~6~~:
LANDSCAPED AREA AND AMENITY REQUIREMENTS:

ARTICLE G.PLANNED DEVELOPMENT – STUDENT HOUSING ZONE (PD-SH)

10-7G-1:
ALLOWED USES:

10-7G-2:
GENERAL REQUIREMENTS:

A. *Application Requirements:* Each application submitted pursuant to this chapter shall include the following:

1. *Documents Required:* All requests shall be accompanied by a colored site development plan, materials, and a written text for the entire property proposed to be developed.

2. *Description of the Proposed Use of Land:* The projected use of land, including percentages of land devoted to various types of land use, such as building coverage, parking area, Landscaped Area, etc.

3. *Height and Elevations:* The type, character and proposed height of all buildings.

4. *Density:* The proposed density in terms of dwelling units per gross acre of land and proposed floor area of residential and nonresidential uses per acre.

5. *Common Spaces:* The location and boundaries of any proposed common, open, recreation, or amenity areas.

6. *Phasing Plan:* A phasing plan, if the development is proposed to be developed in phases.

7. *Topography:* Topography at contour intervals of two feet (2').

8. *Landscape Plan:* A landscape plan showing the general location of lawn area and trees (this may be a part of the site or plot plan).

9. *Area Reserved for Landscaping:* The location and amount of land area reserved for Landscaping.

10. *Utilities:* Demonstration that all utilities are underground and transformer equipment is screened from streets and from Adjacent properties.

11. *Refuse Storage Areas:* Refuse storage areas screened so that materials stored within these areas are not visible from access streets, freeways and Adjacent properties.

12. *Lighting Plan:* A general lighting plan indicating location and luminosity of lights to be installed on the site.

13. *Turning Space:* Safe and convenient turning space for cars, sewer vehicles, refuse collection vehicles, firefighting equipment, etc.
14. *Signs:* All signs shall be submitted and approved as part of the PD approval.

B. *Signs and Advertising:* The requirements of the sign ordinance set forth in title 9, chapter 13 of this code apply, unless a variation is specifically approved, and shall not exceed the following:

1. *Freestanding Signs:* Freestanding signs shall be monuments and limited to seventy-two (72) square feet. Monument signs shall be limited to ten feet (10') in height. One (1) sign per street frontage.

2. *Wall Signs:* One (1) wall sign on a multiple-family project limited to one hundred and twenty (120) square feet.

C. *Time Limitation:* ~~Building permits for construction within planned development student housing zones must be obtained within thirty-six (36) months of the approval of a zone change to planned development. If thirty-six (36) months elapse without the issuance of building permits for the construction of the approved plans within the planned development zone, the zone shall automatically revert back to the previous zone before the zone change to planned development was approved. (Ord. 2019-10-002, 10-10-2019)~~ For single lot projects, a final site plan, construction drawings, and b~~B~~uilding permits for construction within any planned development zone~~s~~ must be approved and obtained within ~~thirty-six (36) months~~ one year of the effective date ~~approval~~ of a zone change to planned development. For all other student housing projects the Final Plat must be recorded within one year of approval. The effective date of any zone change under this Article shall be the date of Final Plat recordation, building permit issuance, and/or final construction drawing approval. ~~If thirty-six (36) months elapse without the issuance of building permits for the construction of the approved plans within the planned development zone, the zone shall automatically revert back to the previous zone before the zone change to planned development was approved.~~

10-7G-3:
PRELIMINARY PLAT:

10-7G-4:
PD-SH STUDENT HOUSING DEVELOPMENT STANDARDS:

A. *Minimum Zone Requirements:* Each planned student housing development zone application shall contain a minimum of one (1) acre within the student pedestrian emphasis area.

B. *Height Regulations:* No residential dwelling shall be erected to a height less than ten feet (10') and no structure shall be greater than fifty-five feet (55'). The city council, after recommendation from the planning commission, may approve increased building height up to seventy feet (70') upon making a finding, as part of a zone change approval, that the increase in height will fit harmoniously into the neighborhood, minimizing any negative impacts, after

considering the following:

1. Proposed setbacks provide an appropriate buffer to neighboring properties;

2. Increased Landscaping enhances the project and reduces any negative impacts;

3. Site layout and design enhance the project and reduce any negative impacts;

4. The massing and building scale is appropriate for the location;

5. The proposed height increase is appropriate for the area; and

6. The increase in height is consistent with any applicable master plan.

C. *Area – Coverage – Density – Yard – Common Area and Landscaping Requirements:* The minimum lot area, maximum density, maximum lot coverage, yard and common open space/Landscaping requirements are as follows:

[table not included]

D. *Landscape Area and Amenity Requirements:* At a minimum, all developments shall provide usable amenity areas in a central location:

1. Student housing projects shall provide usable amenity and recreation areas outside the front setback, with a total minimum area of one hundred (100) square feet for each unit. Fifty percent (50%) of the required area may be in the form of interior recreation facilities;

2. The average width and length of each usable recreation area shall not be less than twenty feet (20');

3. All of the required area shall be usable common space accessible to the entire community; and

4. The number of amenities required depends on the size of the development, and shall be approved by the land use authority in accordance with the following:

[table not included]

5. The type of amenities required depends on the nature, size, and density of the development. If multiple amenities are required, the type shall vary. All amenities shall be approved by the land use authority in accordance with the following:

a. All required amenities shall be fully constructed in the first phase of the project, in accordance with an approved PD phasing plan, or in accordance with an executed development agreement with terms acceptable to the city. In every case, all required

amenities shall be fully constructed before fifty percent (50%) of the total project units are constructed;

b. In addition to the amenity and recreation requirement, a minimum of thirty percent (30%) of the lot area shall be maintained in open green space or Landscaped Area, and at least fifty percent (50%) of the front setback area shall be maintained as Landscaped Area;

c. *Table of Amenities:*

Recreation and Enrichment Amenities

Pool – At least 400 square feet
Internal health or fitness facilities
Secured, programmed, children's play areas
In-ground hot tub
Community garden
Perimeter trail
Sport court
Indoor, keyed, bicycle storage for units
Community library, office, or meeting facilities
Exterior social area – At least 400 square feet
Active Recreation Area

E. *Standards:* The standards set forth in chapter 7 of this title shall also apply unless otherwise provided in this section.

F. *Design Standards:* Building façades shall have architectural variations such as:

1. Contrasting building materials and textures;

2. Variations in rooflines, colors, reveals and belt courses;

3. Recessed windows and doors, strongly expressed window mullions, and awnings;

4. Varying building setbacks from property lines and alcoves, outdoor sitting areas, and

small public plazas;

5. Corner towers, cupolas, corner clock towers, corner spires, balconies and colonnades;

6. Buildings located on street corners shall have the front façade wrap around the corner to the full depth of the building.

G. *Number of Students – Enforcement:* A minimum of seventy-five percent (75%) of the occupants must be enrolled in Dixie State University as qualifying students. The property owner shall enter into an agreement with the city in which the property owner acknowledges its responsibility to ensure and monitor compliance for qualified student occupancy. The property owner is responsible for entering into an agreement with the tenant that allows verification and compliance with this section, including waiving any FERPA restrictions for verification purposes. Monitoring requires the property owner to obtain verifiable information from Dixie State University, with evidence that seventy-five percent (75%) of the property occupants are qualifying students. The property owner must provide a semiannual (spring and fall) report to the city indicating the number and percentage of tenants who are qualifying students at the university. Reporting must be submitted to the city no later than thirty (30) days after the commencement of the associated reporting semester. In addition to those penalties provided in section 10-1-14, if the property owner fails to meet the minimum student occupant requirement for one (1) semiannual report, quarterly reports will be required. If the property owner fails to meet the minimum student occupant requirement at the next quarterly report, such failure will result in a fifty percent (50%) reduction in unit occupancy effective at the following quarterly report. Thereafter, if the property owner can show four (4) consecutive quarterly reports with evidence that seventy-five percent (75%) of property occupants are qualifying students, the fifty percent (50%) reduction in unit occupancy will be lifted, and semiannual reporting will be reinstated. It is the duty of the property owner to market and lease to, and maintain the required percentage of, qualified student occupants.

H. *Commercial:* Commercial uses may be considered during the PD-SH approval on the ground floor, and no minimum or maximum commercial use is required in accordance with section 10-8D-8; it must comply with all other mixed-use standards therein.

ARTICLE H.PLANNED DEVELOPMENT – TRADITIONAL NEIGHBORHOOD ZONE (PD-TNZ)

[Not Included]

CHAPTER 8
ADMINISTRATIVE PROFESSIONAL (AP), COMMERCIAL (C), AND MANUFACTURING ZONES (M), AND PLANNED DEVELOPMENT ZONES (PD-AP, PD-C, PD-M AND PD-MU)

10-8-1:
YARDS UNOBSTRUCTED – EXCEPTIONS:

10-8-2:
CURB, GUTTER AND SIDEWALK – WHEN REQUIRED:

10-8-3:
UTILITY REQUIREMENTS:
In all areas of the city, connection shall be made to public culinary and secondary irrigation water, electrical and sewer facilities, ~~unless waived by the city engineer or designee upon a demonstration of an equivalent alternative acceptable to the city~~. All utilities shall be located underground, unless specifically approved by the city engineer or designee. All construction shall comply with state building codes and all city standards.

10-8-4:
TEMPORARY BUILDINGS:

10-8-5:
TEMPORARY OUTDOOR EVENTS:

10-8-6:
PEDESTRIAN CIRCULATION PLAN:

10-8-7:
CONFLICT:
10-8-8:
RELATED PROVISIONS:

ARTICLE (8)A.ADMINISTRATIVE PROFESSIONAL ZONE AP

ARTICLE (8)B.COMMERCIAL ZONES C-1 (Neighborhood Commercial),C-2 (Highway Commercial),C-3 (General Commercial),C-4 (Central Business District Commercial)

10-8B-1:

ALLOWED USES:

Any use not specifically permitted, permitted with standards, or conditionally permitted is prohibited. Only the following uses are allowed:

A. Uses indicated by the letter "P" below are permitted in the designated zone.

B. Uses indicated by the letters "PS" are permitted uses with required standards in this zone. Uses must comply with the standards and evaluation criteria established in chapter 17 of this title.

C. Uses indicated by the letter "C" are conditional uses in the designated zone.

Allowed Uses

	C-1	C-2	C-3	C-4
Alcohol establishments, including the following:				
Bar establishment		C	C	C
Off-premise beer retailer		P	P	P
Microbrewery or micro-winery (with restaurant or bar establishment)		P	P	P
Nightclub, dance hall (with alcohol)		C	C	C
Ambulance service		P	P	
Amusement Centers (with no water activity)				
Indoor		P	P	
Outdoor		C	C	
Animal services, including the following:				
Animal boarding/care for small animals only and boarded for less than 30 days a year; provided, conducted completely within enclosed building		P	P	P
Animal hospital and veterinarian clinic, including overnight care of large animals (no boarding)		PS	PS	
Automobile and vehicle services, limited to the following uses:				
Automobiles and other similar vehicle sales lots		PS	PS	
Automobile parts sales (new parts only); provided, conducted within completely enclosed building		P	P	P
Automobile rental (vehicles up to 26' in length)		P	P	
Automobile repair, storage, including paint, body and fender, brake, muffler, upholstery or transmission work; provided, conducted within completely enclosed building (GVW 14,000 lbs or less)		P	P	P
Tire sales and service; provided, conducted within completely enclosed building		P	P	P

Financial, medical and professional services	P	P	P	P
Food service establishments, including the following and similar uses:				
Catering establishment		P	P	P
Restaurant	P	P	P	P
Lodging, temporary, limited to the following uses:				
Bed and breakfast		P	P	P
Hotel/motel		P	P	P
RV parks, long and short term		PS		
Timeshare units		P	P	P
Hospitals			P	P
Counseling center, mental health, alcohol, drugs (nonresidential, less than 24 hours)		P	P	P
Mental health treatment center, with overnight stay		C	C	C
Nursing home		P	P	
Office	P	P	P	P
Religious facility	P	P	P	P
Residential, limited to the following use:				
Living quarters for manager or security personnel for business which requires 24-hour assistance or security – Up to 600 sf with occupancy limited to 4 people		PS	PS	PS
Large floor area building or site (20,000 sf or more ground floor aggregate)		C	C	C
Retail shops:				
Antique store		P	P	P
Athletic and sporting goods store		P	P	P
Department store		P	P	P
Drive-through sales (pharmacy, dairy products, etc.)		P	P	P
Furniture and large appliances sales (used)		P	P	
Furniture sales (new) and repair		P	P	P
Household appliance sales and service		P	P	P
Office supply, office machines sales and service		P	P	P
Paint or wallpaper store		P	P	P
Pawnshop		P	P	
Seed and feed store, retail		P	P	
Supermarket/grocery store		P	P	P
Thrift shop/secondhand store/consignment store (no outside storage and no drop-off of items during the hours the business is closed)		P	P	P

Vegetable stand		P	P	P
Payday lending/title loans		P	P	
Retail sale of goods with some operations outdoors, limited to the following uses:				
Building materials sales			P	
Convenience markets with gas pumps/gas station		P	P	
Convenience markets with gas pumps located in the rear of the building				P
Farm implement sales (outdoor display)		P	P	
Fence, sales and service		P	P	
Garden supplies and plant material sales		P	P	
Greenhouse and nursery; soil and lawn service			P	
Landscape rock sales, ancillary to a permitted use			P	
Service businesses, limited to the following uses:				
Body piercing, ancillary to a permitted use		P	P	P
Carpet and rug cleaning		P	P	P
Child care center	P	P	P	P
Communication transmission facilities, including wireless, primary		PS	PS	PS
Communication transmission facilities, including wireless, primary, height over 50'	C	C	C	C
Construction trade services, plumbing shop, electrical shop, etc.			P	
Crematorium, independent human		P	P	
Educational institutions, schools, college, learning centers, trade schools (no residential or 24-hour facilities)		P	P	P
Gunsmith		P	P	P
Janitor service and supply		P	P	P
Locksmith		P	P	P
Mortuary		P	P	P
Permanent cosmetics, a secondary use to an establishment employing cosmetologist(s)/barber(s), aesthetician(s), electrologist(s), or nail technician(s) licensed by the state under 58-11a-101 et seq., Utah Code Annotated, 1953, as amended, excluding tattoo establishments and home occupations	P	P	P	P
Personal care service	P	P	P	P
Personal instruction service	P	P	P	P
Pest control and extermination		P	P	P
Pet grooming		P	P	P
Printing, lithographing, publishing or reproduction sales and service			P	P
Psychic, tarot card reader, fortune teller, occult art practitioners, hypnotist		P	P	P

RV storage		PS	PS	
Sign sales		P	P	P
Storage rental units		PS	PS	
Tattoo establishment		P	P	P
Taxidermist		PS	PS	
Transportation, limited to the following uses:				
Bus terminal		P	P	P
Taxi/shuttle		P	P	P
Government, public services and facilities, limited to the following uses:				
City, all facilities	P	P	P	P
Public utility facilities, primary		PS	PS	PS

10-8B-2:
AREA, SETBACK AND HEIGHT REQUIREMENTS:

10-8B-3:
SPECIAL PROVISIONS:

ARTICLE (8)C. MANUFACTURING ZONES
(M-1, M-2, M-C)
[Not Included]

ARTICLE (8)D.PLANNED DEVELOPMENT ZONES
(PD-AP, PD-C, PD-M AND PD-MU)

10-8D-1:
ALLOWED USES:

10-8D-2:
GENERAL REQUIREMENTS:

Planned development AP, C and M shall comply with subsection A of this section, at the time of the initial zone-change application. Planned development MU shall comply with subsections A and B of this section concurrently at the time of its first submittal of an application.

A. *Planned Development Initial Zone-Change Application Requirements:* Each zone-change application submitted pursuant to this subsection shall ~~An applicant may request the planning commission and city council to consider an initial planned development zone-change application under this subsection which is not accompanied by the secondary application requirements in subsection B of this section, with a development agreement under terms acceptable to the city. Each zone-change application submitted pursuant to subsection A of this section shall~~ include the following:

1. A detailed narrative of the proposed development of the entire property.

2. A detailed list of proposed land uses and proposed densities.

3. A preliminary site plan showing the location of the roads, development areas, open spaces, and phasing plan (if any).

B. *Planned Development Secondary Zone-Change Application Requirements:* Each zone-change application submitted pursuant to this subsection shall include the following:

1. *Initial Documents Required:* All requests shall be accompanied by a colored site development plan, materials, and a written text for the entire property proposed to be developed.

2. *Description of the Proposed Use of Land:* The projected use of land, including percentages of land devoted to various types of land use, such as building coverage, parking area, Landscaped Area, etc.

3. *Height and Elevations:* The type, character and proposed height of all buildings.

4. *Density:* The proposed density in terms of dwelling units per gross acre of land and proposed floor area of nonresidential uses per acre.

5. *Schools, Churches and Open Spaces:* The location and boundaries of any proposed school site, Church, park or other common or open spaces.

6. *Phasing Plan:* A phasing plan, if the development is proposed to be developed in phases.

7. *Topography:* Topography at contour intervals of two feet (2').

8. *Landscape Plan:* A landscape plan showing the general location of lawn area and trees (this may be a part of the site or plot plan).

9. *Area Reserved for Landscaping:* The location and amount of land area reserved for Landscaping.

10. *Utilities:* Demonstration that all utilities are underground and transformer equipment is screened from streets and from Adjacent properties.

11. *Refuse Storage Areas:* Refuse storage areas screened so that materials stored within these areas are not visible from access streets, freeways and Adjacent properties.

12. *Lighting Plan:* A general lighting plan indicating location and luminosity of lights to be installed on the site, to be more than the lighting ordinance set forth in this title allows.

13. *Turning Space:* Safe and convenient turning space for cars, sewer vehicles, refuse collection vehicles, firefighting equipment, etc., at the end of private drives and dead-end streets.

14. *Signs:* All signs shall be submitted and approved as part of the PD approval.

C. *Signs and Advertising:* The requirements of the sign ordinance set forth in title 9, chapter 13 of this code apply, unless a variation is specifically approved, and shall not exceed the following:

1. *Freestanding Signs:* Freestanding signs shall be limited to the standards set forth in section 9-13-4B for major commercial projects within one thousand five hundred feet (1,500') of a freeway exit.

2. *Monument Signs:* Limited to one (1) monument per building.

D. Lighting shall comply with the lighting ordinance set forth in this title. Variations may be approved if located along the I-15 freeway and not Adjacent to a residential zone. A variation may be considered for properties Adjacent to a residential zone if, in the opinion of the city council, additional lighting is needed for security, and any impacts to residential are mitigated.

E. Any zone change shall be approved by the adoption of an ordinance by the city council, which ordinance shall not be effective until the recording of a Final Plat for projects which involve a subdivision of land, or the approval of a final site plan, construction drawings and issuance of a building permit for single lot projects.

10-8D-3:

PRELIMINARY PLAT:

For all planned development projects that are proposed to be subdivided, applicant ~~may~~ shall prepare and submit a preliminary plat at the same time as the zone-change application for the planned development. In order to be considered for concurrent review, the application must contain all preliminary plat requirements set forth in chapter 25 of this title, as amended.

10-8D-4:

CONFLICT:

10-8D-5:

PD-AP – PLANNED DEVELOPMENT – ADMINISTRATIVE PROFESSIONAL STANDARDS:

10-8D-6:

PD-C – PLANNED DEVELOPMENT – COMMERCIAL STANDARDS:

10-8D-7:

PD-M – PLANNED DEVELOPMENT – MANUFACTURING STANDARDS:

10-8D-8:
PD-MU – PLANNED DEVELOPMENT – MIXED-USE STANDARDS:

CHAPTER 9 RESERVED

CHAPTER 10
AIRPORT VICINITY ZONES
(ASBP, AVI, C-RM)

[Not Included]

CHAPTER 11
OPEN SPACE
(OS)

10-11-1:
ALLOWED USES:

Any use not specifically permitted, permitted with standards, or conditionally permitted is prohibited. Only the following uses are allowed:

A. Uses indicated by the letter "P" below are permitted in the designated zone.

B. Uses indicated by the letters "PS" are permitted uses with required standards in this zone. Uses must comply with the standards and evaluation criteria established in chapter 17 of this title.

C. Uses indicated by the letter "C" are conditional uses in the designated zone.

Allowed Uses

	OS
Agriculture	P
Barns and corrals for Agriculture and livestock – At least 100' from any dwelling	P
Cemetery	P
Urban hens and rabbits – Up to 20 animals per acre (min 1 acre parcel); provided, the coop or pen is at least 100' from any dwelling and up to 1 rooster per acre is kept at least 50' from any residential zone	P
City Facility	P
Communication transmission facilities, including wireless, primary	PS
Communication transmission facilities, including wireless, primary, height over 50'	C
Hogs to be raised by resident for purposes of meeting requirements of a youth club – Maximum of 2 hogs per 37,500 sf for a maximum of 6 months	PS
Hog pen/shelter – Up to 8' tall and 100 sf – Allowed only in rear yard at least 100' from any dwelling; required effective manure management	PS
Livestock grazing limited to 4 weaned animals per acre or 8 weaned animals per acre for no more than 30 days per year	P
Active recreation area	P

10-11-2:
HEIGHT REGULATIONS:

10-11-3:
AREA, WIDTH AND YARD REQUIREMENTS:

10-11-4:
RELATED PROVISIONS:

CHAPTER 12 RESERVED

CHAPTER 13
OVERLAY ZONES

[Not Included]

CHAPTER 14
OUTDOOR LIGHTING

[Not Included]

CHAPTER 15 RESERVED

[Not Included]

CHAPTER 16
NONCONFORMING USES AND NONCOMPLYING STRUCTURES

[Not Included]

CHAPTER 17
PERMITTED WITH STANDARDS AND CONDITIONAL USES

ARTICLE A.PERMITTED WITH STANDARDS – GENERAL PROVISIONS

10-17A-1:
APPLICATION REQUIREMENTS:

10-17A-2:
GENERAL STANDARDS:

10-17A-3:
ACCESSORY DWELLING UNIT – SPECIFIC STANDARDS:

10-17A-4:
APIARIES/BEEKEEPING – SPECIFIC STANDARDS:

10-17A-5:
AUTOMOBILES AND OTHER SIMILAR VEHICLE SALES LOTS – SPECIFIC STANDARDS:

10-17A-6:
COMMUNICATION TRANSMISSION FACILITIES, INCLUDING WIRELESS, PRIMARY – SPECIFIC STANDARDS:

10-17A-7:
GUESTHOUSE – SPECIFIC STANDARDS:

10-17A-8:
INDOOR SHOOTING RANGE – SPECIFIC STANDARDS:

10-17A-9:
PUBLIC UTILITY FACILITIES – SPECIFIC STANDARDS:

10-17A-10:
RESIDENTIAL TREATMENT FACILITY – SPECIFIC STANDARDS:

Residential treatment facilities shall meet the following additional standards:

A. The facility is licensed by the Utah Department of Human Services.

B. The facility operator must provide prior written notice to the police department of each convicted felon to be treated in such facility.

C. Provide at least thirty percent (30%) of the area as open ~~green~~ space or playground and one (1) parking space per staff member on the highest shift plus one (1) parking space for each five (5) persons housed in the facility. (Ord. 2019-10-002, 10-10-2019)

10-17A-11:
RV PARKS, LONG AND SHORT TERM:

10-17A-12:
RV STORAGE – SPECIFIC STANDARDS:

10-17A-13:
SHORT-TERM RESIDENTIAL RENTAL – SPECIFIC STANDARDS:

10-17A-14:
STORAGE RENTAL UNITS – SPECIFIC STANDARDS:

10-17A-15:
CAR WASH – SPECIFIC STANDARDS:
In order to preserve the limited water resources within the City of St. George, Car washes shall meet the following additional standards:

A. In addition to the applicable Landscaping requirements of chapter 23 of this title, Landscaping for all car washes shall double the number of plantings required in areas Adjacent to the stacking and drive-through areas.

B. Car washes~~, full or self-service,~~ shall use façade materials that produce texture. Such materials include, but are not limited to, split-face block, brick, or stucco and shall utilize more than one such material. All colors shall be muted. Bright or reflective colors shall not be allowed except as an accent, up to ten percent (10%) of each façade. No long, continuous rooflines without a horizontal break shall be permitted.

C. Sides of car wash bays or tunnels facing a residential use or neighborhood zoning district shall be completely enclosed by a wall. Solid windows that do not open, glass block, or other closed material may be used for the wall.

D. Vacuum stations and related equipment shall comply with the setbacks for the principal structure.

E. Vacuum stations and related equipment are prohibited along any side of a building facing a residential use or residential zoning district.

~~F. Recycling of water used for vehicle washing is required to be installed and used in perpetuity. The use of recycling water systems and the disposal of water fluids and solids shall comply with applicable state and federal laws, guidelines and/or standards.~~

F. Recycling of all water used in a car wash is encouraged to reduce the amount of fresh culinary water used. All car washes must be plumbed at the time of construction, to provide for water recycling systems for both wash water and reverse osmosis rinse water systems whether installed or not.

G. The site shall provide space sufficient to allow a minimum of five vehicles to stack while waiting to access the car wash prior to reaching the payment area. All stacking shall be maintained on site and shall not back onto any public right-of-way.

H. *Water Limitations*:

1. All car washes must install systems and equipment sufficient to limit the amount of fresh culinary water used on a per vehicle basis. From July 1, 2022 until June 30, 2027, no car wash shall be permitted unless it can demonstrate that the system shall not use more than 35 gallons of culinary water per car. Effective July 1, 2027, no car wash shall be permitted unless it can demonstrate that the system shall not use more than 25 gallons of culinary water per car.

2. Systems which recycle water used for vehicle washing and recycle reverse osmosis reject water are required to be installed and used in perpetuity.

3. The use of secondary water in the wash cycle may be permitted in lieu of some recycling requirements if approved by the St. George City water department. The use of recycling water systems and the disposal of water fluids and solids shall comply with applicable state and federal laws, guidelines, and standards. Larger storage tanks may be permitted on site in order to capture and reuse water.

ARTICLE B.CONDITIONAL USE PERMIT REVIEW

[Not Included]

CHAPTER 18
WALLS, FENCES AND HEDGES

[Not Included]

CHAPTER 19
OFF-STREET PARKING REQUIREMENTS

[Not Included]

CHAPTER 20
MOTOR VEHICLE ACCESS AND LOADING

[Not Included]

CHAPTERS 21 AND 22 RESERVED

CHAPTER 23
LANDSCAPE STANDARDS

10-23-1:
MINIMUM LANDSCAPING STANDARDS:

Minimum landscaping standards are required for development within all zones except agriculture, gravel and grazing, open space, and single-family residential, as follows:

A. *Application:* The requirements of this section apply to all new development and to the remodeling of existing development where there is an increase in the building's footprint.

B. *Design:*

1. All landscape and irrigation designers ~~and installers~~ shall have all required state and local licenses, insurance, ~~bonding requirements,~~ and be able to show proof of such.

2. Landscape plans shall make provisions for erosion control on all graded sites. Areas with soil slopes greater than 15% shall have erosion control measures and may be landscaped with deep-rooting, water-conserving plants that do not include turfgrass. ~~Areas with slopes greater than 15% shall be landscaped with deep-rooting, water-conserving plants (not turfgrass) to prevent erosion. No turf shall be planted on slopes greater than thirty percent (30%). Turf should be reserved for areas where it is functional, including high traffic play areas, or areas needing erosion mitigation. Choose turf species with lower water requirements. Choose turf configurations for irrigation efficiency.~~

3. A landscape document package ~~landscape and irrigation plan~~ prepared by a Utah-licensed ~~landscape contractor or~~ Landscape architect shall be submitted to the city for review at the same time as the drawings and plans are submitted for development of the site. The landscape document package must be approved prior to the issuance of any building permit. A copy of the approved Landscape Document Package shall be provided to the property owner or site manager. *See* landscape document package submission checklist for what is to be included in the package. This checklist is to be submitted with the landscape document package.

4. Water-conserving plants that are well adapted to the St. George-area climate zone shall be used.

5. Plants with similar water needs shall be grouped together in "hydrozones." Sprinklers ~~Spray heads~~ and drip emitters shall not be connected to the same irrigation valve.

6. ~~Drought-tolerant~~ Water-conserving plants with low fuel volume or high moisture content that will blend with the native vegetation shall be used for projects located at the interface between urban areas and natural (non-irrigated) open space.

7. Open ~~S~~stormwater detention and retention basins shall be landscaped however, such Landscaping shall not include turfgrass.

8. Landscape plans for projects proposed for development in multiple phases shall clearly specify the landscape improvements required in conjunction with each phase.

9. At least fifty percent (50%) of the required landscaped area shall be covered with a combination of foliage of shrubs, permitted turfgrass and live-vegetative ground cover within five (5) years of planting. Trees and the tree canopy shall not be counted in this fifty percent (50%) requirement. Turfgrass is limited to 8% of the landscaped area. In addition to the shrubs, grass, and ground cover, one (1) tree with a minimum one-and-one-half-inch (1½") caliper trunk shall be planted for every four thousand (4,000) square feet of landscaped area with a minimum of one (1) tree per property. The trees may be arranged by the landscape architect as best fits the plan either in rows or clusters. Tree species suitable for desert landscapes are ~~acceptable~~ required to meet this requirement.

10. A plan for ongoing maintenance of right-of-way areas shall be included when landscape and irrigation plans are submitted.

11. Ten percent (10%) of a proposed project's required landscaping may be located on a rooftop or rooftops

12. Turfgrass is not permitted outside of an active recreation area. In addition, turfgrass is prohibited in park strips, all landscape areas less than eight feet wide. No turfgrass shall be planted on slopes greater than fifteen percent (15%). Turfgrass should be reserved for areas where it is functional, including active recreation areas. Choose turfgrass species with lower water requirements. Choose turfgrass configurations for irrigation efficiency.

13. Park strips and other landscaped areas less than eight (8) feet wide shall be landscaped with water-conserving plants and/or mulch.

14. All individually platted multiple-family or commercial units shall be separately metered, sub-metered or equipped with alternative technology capable of tracking the water use of the individual unit, and the information shall be made available to the resident of each unit. Individually platted condominium units are excepted if a property owners' association owns and maintains the water lines and meters. All multiple-family projects require separate water meters for all outdoor water usage, including Landscaping.

15. Outside misting systems shall only operate during the May through September time period where the daily high temperature is 90 degrees Fahrenheit or greater.

16. If secondary irrigation water is available, each project shall connect to the system for all outdoor water use. A city may make minor exceptions, allowing use of treated water for outdoor plantings in small beautification areas, in its sole discretion.

C. *Installation:*

1. All landscape and irrigation installers shall have all required state and local licenses, insurance, bonding requirements, and be able to show proof of such upon request.

~~1~~2. Landscaping and irrigation installation shall be completed as outlined in section 10-1-12.

~~2~~3. Landscape and irrigation installers shall follow the plans found in the project's landscape documentation package that have been signed and approved by the city.

~~3~~4. Landscaping shall follow the city of St. George access management policy to properly define the safe-sight distances for intersections or driveways and follow height limitations and zoning requirements.

~~4~~5. The city may inspect landscaping improvements and require corrective measures regarding the installation of site landscaping and irrigation-system improvements found not to comply with the approved plan.

~~5~~6. Soil preparation shall be provided to assure healthy growing conditions for the plants.

~~6~~7. The landscape contractor or irrigation contractor shall provide the city with a letter certifying that all improvements have been installed in accordance with the approved landscape documentation package ~~plan~~ and specifications prior to issuance of a certificate of occupancy.

~~7~~8. All irrigation installers shall be supervised by an irrigation contractor.

D. *Irrigation:*

1. Landscape areas shall be provided with a permanent, fixed automatic irrigation system installed by a licensed landscape contractor.

2. The distribution uniformity shall be sixty percent (60%) for all fixed-spray systems and seventy percent (70%) for all rotor systems.

3. Decorative water features ~~such as pools, ponds and waterfalls~~ used in Landscaped Areas shall have a water recirculation system and shall use no more than 50 gallons of water.

4. A water performance audit shall be conducted by a certified water auditor within thirty (30) days following the installation of the irrigation system. A minimum of ten percent (10%) of the irrigation zones shall be audited at the discretion of the auditor.

5. A backflow-prevention assembly shall be properly installed and tested to meet city requirements and meet all state and local health safety laws and ordinances.

6. Pressure Regulation. A pressure regulating valve shall be installed by the builder or developer, and maintained by the owner, if the static service pressure exceeds 90 pounds per square inch (psi). The pressure-regulating valve shall be located between the water meter and the first point of water use, or first point of division in the pipe, and shall be set at the manufacturer's recommended pressure for the irrigation system.

7. Irrigation controller. It is required that Landscaped Areas use a WaterSense labeled smart irrigation controller, which automatically adjusts the frequency and/or duration of irrigation events in response to changing weather conditions. All controllers shall be equipped with automatic rain delay or rain shut-off capabilities and have memory retention capability to retain pre-programmed irrigation schedules. Sites are not exempt from water waste prohibitions.

8. Each Control Valve shall irrigate a landscape area, or hydrozone, with a similar site, slope and soil conditions, and plant materials with similar watering needs. Turfgrass, trees and plants in non-grass areas shall be irrigated on separate valves. Drip emitters and sprinklers shall be placed on separate valves.

9. Low-volume irrigation equipment (i.e., drip emitters, bubblers) shall be provided for each tree with the appropriate distribution for healthy tree growth.

10. Drip irrigation shall be used to irrigate plants in non-grass areas. Spray head to drip conversion for rehabilitated landscape sites may be acceptable with city approval of the landscape documentation package.

11. High conservation efficiency spray nozzles are required for sprinkler applications.

12. Sprinkler heads shall have matched precipitation rates with each control valve circuit.

13. Sprinkler heads shall be attached to rigid lateral lines with flexible material (swing joints) to reduce potential for breakage.

14. Check valves are required. Pressure compensating valves and sprinklers are required where a significant variation in water pressure occurs within the irrigation system due to elevation differences.

15. Filters and end-flush valves shall be provided for drip Irrigation lines.

16. Landscape watering with potable (treated) water is prohibited from 10 a.m. to 8 p.m., from June 1 to September 1 , to maximize irrigation efficiency.

17. Water waste prohibited. Waste includes overwatering, irrigating during a precipitation event, water that sprays or flows off your property, failure to comply with drought restrictions and/or a failure to repair irrigation system leaks and/or malfunctions in a timely manner. The city shall notify any person or entity believed to be wasting water pursuant to the provisions of title 8, chapter 1 of this code (which is incorporated by reference herein).

Overwatering can be avoided by following this schedule:

- Winter (Nov – Feb) – sprinkler and drip Irrigation up to 1 day a week. irrigation is typically not needed in December and January
- Spring (Mar – April) – sprinkler irrigation up to 2 days a week and drip irrigation up to 2 days a week
- Summer (May – Aug) – sprinkler irrigation up to 3 days a week and drip irrigation up to 3 days a week
- Fall (Sept – Oct) – sprinkler irrigation up to 3 days a week and drip irrigation up to 2 days a week

18. Program valves for multiple repeat cycles as required to reduce runoff on slopes and for soils with slow infiltration rates.

E. *Trees:*

1. All street trees shall be planted and maintained in accordance with title 7, chapter 4 of this code.

2. All healthy trees within ten feet (10') of the right-of-way having a trunk caliper of at least four inches (4") at one foot (1') above the ground shall be preserved during construction unless removal is approved by the shade tree board.

3. Preserved trees shall be credited toward the satisfaction of the tree planting requirements.

4. Trees to be preserved shall be protected and watered during construction with the following:

a. A tree-protection barrier (fence) shall be installed before any demolition, grading or construction begins, and shall not be removed until final completion of the project.

b. The tree-protection barrier shall be erected around the tree with a radius of no less than seven feet (7') unless otherwise directed or approved by the land use authority.

c. The tree-protection barrier shall be constructed of any material substantial enough to protect the roots, trunk, and the crown of the tree, such as:

(1) Three-foot (3') high orange safety fencing on metal posts.

(2) Three-foot (3') high silt fencing staked with flagging.

5. Trees or shrubs that are planted under or near power lines shall not grow above twenty-five feet (25') in height at maturity. Tree trunks and branches shall not encroach within ten feet (10') of power lines when fully grown as required by applicable state and federal regulations.

6. Trees shall not be planted within three feet (3') horizontal distance of electric or gas lines.

7. The city may remove any tree that is interfering with power lines.

8. Trees in ~~on~~ the approved landscape documentation package shall not be removed without permission from the city.

9. Tree species shall be selected based on growth characteristics and site conditions, including available space, overhead clearance, soil conditions, exposure, and desired color and appearance. Trees shall be suited for water-efficient landscapes. Trees shall be selected and planted in accordance with the following city guidance:

a. Broad canopy trees shall be selected where shade or screening of tall objects is desired;
b. Select trees from which lower branches can be trimmed to maintain a healthy growth habit where visual clearance and natural surveillance is a concern;
c. Narrow or columnar trees shall be selected for small spaces, or where awnings or other building features limit growth, or where greater visibility is desired between buildings and the street for natural surveillance;
d. Tree placement shall provide canopy cover (shade) and avoid conflicts with existing trees, retaining walls, foundations, flatwork, above and below ground utilities, lighting, and other obstructions;
e. One (1) tree with a minimum one-and-one-half-inch (1-1/2") Caliper trunk shall be planted for every four thousand (4,000) square feet of landscaped area;
f. Where applicable, must meet title 7, chapter 4 of this code which is incorporated by reference herein; and
g. Trees shall be irrigated on a separate Hydrozone as needed for efficient irrigation and allow for watering under water-shortage conditions when other plant material may not be watered due to drought conditions.

F. *Maintenance:*

1. Landscaping of detention/retention basins shall be maintained by the property owner. If the detention/retention basin is in a common area, then an owners' association (OA) shall own and maintain the detention/retention basin. If an owners' association is dissolved, maintenance becomes the joint and several responsibility of the individual property owners.

2. An owners' association shall own and maintain all common areas including park strips between the street and any privacy walls. If an owners' association is dissolved, maintenance becomes the joint and several responsibility of the individual property owners.

3. It shall be unlawful for any person owning real property within the city to:

a. Fail to provide landscaping and irrigation in all areas where it is required to exist. This shall apply to all real property throughout the city regardless of the age of the development, zone or status.

b. Fail to install, maintain, replace or repair Landscaping and irrigation systems in all areas where it is required to exist or does exist.

c. Modify an approved landscape and irrigation plan, landscape document package, or approved site plan without permission from the city. “Modifying the plan” means changing the type of large plant greater than six feet (6') tall at maturity; or decreasing the plant quantities or the size of the landscape area. Minor adjustments required to suit field conditions are permitted. Replacing a plant with the same type of plant is considered maintenance, not modification.

10-23-2:
ADDITIONAL REQUIREMENTS FOR NONRESIDENTIAL DEVELOPMENTS:

10-23-3:
LANDSCAPING COMPLETION AND MAINTENANCE REQUIREMENTS FOR SINGLE-FAMILY RESIDENTIAL ZONES, RESIDENTIAL ESTATE ZONES, AND SINGLE-FAMILY RESIDENCES:

A. *Applicability:* The requirements of this section ~~to complete the front yard and street-side yard and install landscaping~~ shall apply to all new development, and to the remodeling of existing dwelling units when a dwelling unit’s footprint increases for single-family residential zones, residential estate zones, and all other single-family residences. Completion and maintenance of landscaping shall apply to all residential properties.

B. *Landscaping Requirements:*

1. A minimum of thirty percent (30%) of the overall front yard area shall be landscaped. At least one-half (½) of the landscaped area shall contain live vegetation.

2. Total turfgrass area on a residential lot shall not exceed 8% of the total gross lot size and in no case shall cumulative turfgrass areas exceed 1,500 square feet. The area of any pool will be counted towards the allowed amount of turfgrass.

3. Turfgrass shall be prohibited in park strips, all landscape areas less than eight feet wide, and on any slope that exceeds 15%.

4. Each single-family dwelling shall have a minimum of two water-efficient shade trees with a minimum one-and-one-half-inch (1½") caliper trunk.

C. *Completion Requirements:* Landscaping shall be completed within one (1) year of the issuance of a certificate of occupancy, or the final inspection of a remodeled dwelling unit.

D. A minimum of one (1) tree with at least a one-and-one-half-inch (1½") Caliper shall be planted in the front yard. The tree may be a desert tree variety.

E. The use of native plants and other ~~low-water-use~~ water-conserving plants ~~plants (xeriscape)~~ is required ~~encouraged~~ to promote water conservation.

F. *Requests for Modification of Landscaping Requirement:* The community development director or designee may approve “landscaping,” as defined in this section, that covers less than thirty

percent (30%) of the front yard area in landscape where the shape of the lot imposes a hardship in meeting the thirty percent (30%) requirement. If such a modification is granted, all other Landscaping requirements outlined in this section shall still apply and may not be waived or modified.

G. *Maintenance of Owners' Association Property:* A property owners' association shall own and diligently maintain all common areas, including park strips between the street and any privacy walls. If a property owners' association is dissolved, maintenance of the common area becomes the joint and several responsibility of the individual owners of property that once formed the dissolved property owners' association.

H. It shall be unlawful for any person owning a single-family residence to:

1. Fail to provide landscaping and irrigation in all areas where landscaping is required or exists, regardless of the age of the development, zone, or status.

2. Fail to install, maintain, replace, or repair landscaping and irrigation systems in all areas where it is required to exist or does exist.

3. Modify an approved landscape and irrigation plan, landscape documentation package, or approved site plan without prior written permission from the city. "Modifying an approved landscape and irrigation plan or approved site plan" means changing the type of large plant (greater than six feet (6') tall at maturity), decreasing the plant quantities, or decreasing the size of the landscape area. Minor adjustments required to suit field conditions are permitted. Replacing a plant with the same type of plant is considered maintenance and not modification.

CHAPTER 24 RESERVED

CHAPTER 25
SUBDIVISION REGULATIONS

ARTICLE A.GENERAL PROVISIONS

[Not Included]

ARTICLE B.ADMINISTRATION AND ENFORCEMENT

10-25B-1:
CONFORMANCE TO APPLICABLE RULES AND REGULATIONS:
In addition to the requirements established herein, all subdivision plats shall comply with the applicable laws, plans and regulations, including, but not limited to:

A. The zoning ordinance of the city of St. George, standard specifications for design and construction and all other applicable ordinances of the city.

B. The official city general plan, including all streets, drainage and utility systems and parks shown in the general plan, as adopted.

C. Requirements of the Utah Department of Transportation, Utah Department of Health and other appropriate state agencies.

D. The standards, regulations and policies adopted by the city, including all boards, commissions, agencies, and officials of the city who may be authorized to adopt the same.

E. The standards and requirements for culinary water service imposed by the District.

10-25B-2:
SELF-IMPOSED RESTRICTIONS:

10-25B-3:
SPECIAL CONDITIONS:

10-25B-4:
COORDINATION OF PLANNED DEVELOPMENT APPLICATIONS:
A. At the time an application for a planned development (PD) project is submitted to the city, the owner or subdivider shall submit an application to change the proposed development

property's zoning designation to planned development (PD). Simultaneous with filing a planned development application, the subdivider or subdivider's authorized representative shall:

1~~A~~. Apply to change the zoning designation to planned development (PD) for the real property on which the proposed development will be located;

2~~B~~. Submit all information required by this code for a planned development (PD) zone, including, but not limited to, a general conceptual plan if it is anticipated to be built in phases, a, preliminary plat for one or more phases, and construction drawings when required; and

3~~C~~. Meet with city staff to discuss the proposed development.

B. No change to the zoning designation shall be made without the simultaneous approval of a preliminary plat.

10-25B-5:
BUILDING ON SINGLE LOTS – MERGING LOTS:

10-25B-6:
FEES:

10-25B-7:
ENFORCEMENT:

~~**10-25B-8:**~~
~~**PERMITS AND CERTIFICATES:**~~
~~A. *Compliance with Title:* No city officer or employee shall issue any license or permit for the use of any land, or the construction or alteration of any building or structure, in violation of the provisions of Utah State law, or any other provisions of this title. Any license or permit issued in conflict with Utah State law, or any other provisions of this title, is void.~~

~~B. *Building Permits – Conditions for Issuance:* In addition to all other conditions required by law for the issuance of a building permit, no building permit for any development or subdivision shall be issued until the following conditions have been met:~~

~~1. The city has approved the preliminary plat, or the lot layout if the property is exempt from platting requirements, and all conditions have been met for the preliminary plat, and for recording of the final subdivision plat, as set forth in Utah Code and as determined by the community development department and the city attorney;~~

~~2. The construction drawings are stamped "approved for construction" by the city;~~

~~3. All required improvements under chapter 25 of this title are completed, and the city has conducted a final inspection and issued a final approval of the improvements;~~

4. The final subdivision plat is recorded in the county recorder's office.

C. Occupancy Permit: For all subdivisions, occupancy will not be granted, and structures shall not be occupied, until the final subdivision plat is recorded and all required improvements are completed and approved by the city. This includes all required addressing and signs.

10-25B-9:
COMPLIANCE WITH TITLE:

10-25B-10:
SUBDIVISION CREATED PURSUANT TO PROVISIONS:

10-25B-11:
RECORDING WITHOUT APPROVAL VOID:

10-25B-12:
METES AND BOUNDS' DESCRIPTION APPLICABLE:

10-25B-13:
FINAL SUBDIVISION PLAT RECORDED PRIOR TO APPROVAL UNLAWFUL:

10-25B-14:
PENALTY:

ARTICLE C.PLATS AND PLANS

10-25C-1:
GENERAL PROCEDURES:

10-25C-2:
PLANNING DISCUSSION:
Prior to submitting a planned development zone-change application or a preliminary plat for any type of development or zone, the subdivider shall meet with the city.

10-25C-3:
PRELIMINARY PLAT:

A. Preparation of Preliminary Plat: It is anticipated that as long as the preliminary plat complies with all requirements under this title, upon final approval of the preliminary plat, the preliminary plat shall be the basis for the construction drawings and Final Plat. Prior to preparing the preliminary plat, the subdivider shall meet with the planning staff to discuss the subdivision proposal and review the preliminary plat and the requirements for the required plans, construction drawings, studies, and reports. The general requirements as to the layout of streets, street improvements, traffic impact studies, drainage, sewerage, fire protection, availability of existing services, and similar matters shall be discussed. The planning staff may also advise or direct the subdivider, when appropriate, to discuss the proposed subdivision or portions thereof with those officials who must eventually approve certain aspects of the subdivision plat or portions thereof within their jurisdiction, including, but not limited to, the fire marshal, joint utility committee, hillside review board, and city staff. Where special issues or conditions exist which require resolution by the commission or city council, resolution of such matters shall be obtained prior to consideration of the preliminary plat by the planning staff.

B. *Preliminary Plat Requirements:* The preliminary plat shall be clear and legible, be labeled and dimensioned, and be of sufficient scale to adequately describe the conditions of this title. The preliminary subdivision plat and plan shall be accompanied by a completed application form provided by the city, and show the following information:

1. *Title Block:*

    a. The name and type of subdivision, which name the subdivider must have approved by the county recorder and community development director or designee.

    b. The location and dimensions of the subdivision.

    c. The name of the subdivider.

2. *General Plans:*

    a. North arrow and scale.

    b. The boundary and phasing plan of the subdivision.

    c. Existing and proposed contour lines at vertical intervals of not greater than five feet (5') when requested by the city engineer or designee.

3. *Existing Conditions:*

    a. Location, width and names of all streets and driveways within two hundred feet (200') of the subdivision.

    b. All public streets, rights-of-way, easements, parks, other public open spaces, and all section and city boundary lines within or Adjacent to the proposed subdivision.

c. Sewers, water mains, power lines, storm drains, or other facilities within and Adjacent within one hundred feet (100') of the proposed subdivision.

d. Ditches, drainage channels, waterways, and major washes.

e. The location of the floodplain and floodway, and elevations as designated by FEMA. Also, the location of the erosion hazard boundary for property Adjacent to the Virgin and Santa Clara Rivers and Ft. Pearce Wash.

f. Exceptional topography.

g. Air traffic approaches when requested by the city engineer or designee.

h. Information required by the ordinance, if the proposed subdivision is within the hillside overlay area, a geologic hazard area, an adverse construction condition area, or flood or erosion hazard area.

i. Vicinity map.

4. *Proposed Plan:*

a. The layout of streets, driveways, public parks and trails, and utility easements showing identification and dimensions. Where double frontage lots are proposed, the general design of the privacy wall shall be shown.

b. The layout, number, and typical dimensions of lots. The following shall apply to numbering lots:

(i) Lots shall be numbered consecutively under a definite system. Numbering shall continue throughout the subdivision with no omissions or duplications.

(ii) Multiple phases within the same subdivision name shall be identified as phase 1, then phase 2 and so forth. Lots within different phases shall also be distinctly numbered as 101, 102, 103 (within phase 1), and 201, 202, 203 (within phase 2), and so forth.

(iii) Lettering of building lots is not permitted.

(iv) Areas not designated as a building lot or right-of-way on the plat shall be designated by capital letters and be designated in sequence within a subdivision starting with the letter “A.”

(v) Plat amendments shall be named and numbered in a form acceptable to the office of the Washington County recorder and Utah State Code as amended.

c. Parcels of land intended to be dedicated for public use or set aside for use of property owners in the subdivision as common or limited Common Areas.

d. A drainage plan by which the subdivider proposes to handle storm water drainage for the subdivision, including proposed realignment or regrading of existing drainageways upstream, within and downstream of the subdivision. All residential drainage shall be conveyed from each lot to the street. Shared drainage is not permitted unless it is located in common or limited common area, owned and maintained by a property owners' association.

e. A general plan for primary water, secondary water, sewer, power systems, and related utilities.

f. A grading plan by which the subdivider proposes to handle elevation changes, retaining walls, and other related design issues as requested by the city.

C. *Application Procedure and Requirements:*

1. The subdivider shall file the preliminary plat along with a preliminary plat review application on forms provided by the city.

2. At the time of filing the application, the subdivider shall schedule an appointment with the city. The city shall review the application for completeness and ~~may~~ shall require ~~request~~ that the subdivider provide an acknowledgement that they are responsible for obtaining culinary water service from the District as set forth in chapter 1 of this title. The city may request that the subdivider also present additional information to assist in determining the adequacy, quality, and characteristics of the subdivision proposal.

3. Once the application has been considered and determined to be complete, the application shall be reviewed according to the procedure set forth in this section. If the city finds that the application is not complete, the application shall be rejected, returned to the subdivider, and the subdivider shall submit a complete application.

4. *Approval Procedure:*

a. The community development department shall concurrently transmit the preliminary plat, and preliminary plat review application, along with all accompanying plans, reports, and studies to the appropriate city officials and other official agencies or bodies as deemed necessary or as required by law, to allow such persons to review the preliminary plat and preliminary plat review application.

b. After the preliminary plat review application is found to meet the requirements of this title, and all comments have been received from those to whom a request to review was made, the community development director or designee shall cause the preliminary plat to be placed on the next available planning commission agenda, and shall notify the subdivider of the date, time, and place of the meeting at which the preliminary plat shall be reviewed.

c. The planning commission shall only approve a preliminary plat which it finds to be in accordance with the standards and criteria set forth by the city in this title and all other

ordinances, plans, and policies of the city. The planning commission may conditionally approve a preliminary plat, imposing such conditions as it may require in order to bring the preliminary plat into compliance with the requirements of the city's ordinances, plans, and policies.

d. After reviewing the preliminary plat, the planning commission shall make a recommendation to the city council that the preliminary plat be approved, conditionally approved, or disapproved. The preliminary plat will then be placed on the next available city council agenda, after all legally required notification requirements have been complied with, and the city shall advise the subdivider of the date, time, and place of the meeting at which the preliminary plat shall be reviewed. After review, the city council shall approve, conditionally approve, or disapprove the preliminary plat.

e. Upon approval of the preliminary plat, and approval of construction drawings, a permit may be issued which allows the applicant to begin construction at their own risk, of the infrastructure improvements necessary for the subdivision prior to the final plat approval. Issuance of a permit to construct infrastructure prior to final plat approval does not constitute a vesting of development rights.

f~~e~~. If the final subdivision plat, or phase thereof, is not approved by the city within one (1) year after city council approval of the preliminary plat, all approvals shall be deemed expired and void. If eligible, the subdivider may ~~shall~~ submit for approval a new preliminary plat in accordance with this subsection, ~~unless it~~. If it is determined by the community development director or designee that substantial progress toward completion of the final subdivision plat has been done, and the Final Plat cannot be submitted due to reasons beyond the control of the subdivider, ~~In such case,~~ the community development director or designee may agree to a single reasonable extension of time to complete the final subdivision plat, but no longer than one (1) year.

g~~f~~. Approval of the preliminary plat does not constitute full approval of the development nor vest any development rights as additional requirements may be imposed that are a result of more detailed and thorough review of all plans, specifications, reports, investigations, etc.

10-25C-4:
FINAL SUBDIVISION PLAT:

A. After the preliminary plat has been approved by the city council, and all conditions are complied with, a final subdivision plat shall be prepared and submitted to the community development department. The land use authority shall approve the final plat upon a finding that:

1. The development has received written approval from the District indicating that water will be available to all lots and parcels within the subdivision; and

2. The final plat conforms to all prior approvals, conditions, and regulations imposed by the city.

The Final Plat shall be signed by the community development director or designee, the city attorney or designee, the city engineer or designee, the land use authority, and the county treasurer prior to the Final Plat being recorded. The Final Plat shall be recorded within one (1) year of final approval by the community development department, or the plat is void.

B. All applications to subdivide real property shall comply with the requirements of Utah Code Title 10, Chapter 9a, of the Utah Land Use and Development Management Act, as amended.

C. A final plat must be recorded with the office of the County Recorder within one year of the date of city approval. A final plat which has not been recorded within one year, shall be deemed void and all land use approvals associated with the final plat shall be considered void *ab initio*. Prior to expiration, a subdivider may request a one-time six-month extension of the approval from the Community Development Director. No extension will be granted unless an assurance that culinary water service from the District is still available and may require a new "will serve" letter from the District. The city shall give written notice to the District of any final plat which has been voided prior to recordation under this section.

~~**10-25C-5:**~~
~~**EXEMPTION FROM PLAT REQUIREMENT:**~~
~~If the requirements of Utah Code Title 10, Chapter 9a, as amended, this title, and all other applicable laws and regulations are satisfied, and the subdivider has obtained written approval from the city council, following the planning commission's recommendation, a person may submit to the county recorder's office for recording a document that subdivides property by metes and bounds into less than ten (10) lots, without the necessity of recording a plat. (Ord. 2019-10-002, 10-10-2019)~~

10-25C-6:
VACATING, ALTERING OR AMENDING A SUBDIVISION PLAT:

A. *Vacating, Altering or Amending Subdivision Plat:* All applications for vacating, altering or amending a subdivision plat shall comply with the requirements of Utah Code Title 10, Chapter 9A, as amended.

B. *Lot Mergers:* All applications seeking to merge lots, parcels, sites, units, plots or other division of land shall comply with the requirements for the adjustment of lot lines as set forth in Utah Code Title 10, Chapter 9A, as amended.

C. *Vacating a Street, Right-of-Way, or Easement:* All applications for vacating a platted street, right-of-way, or easement shall comply with the requirements of Utah Code Title 10, Chapter 9A, as amended.

ARTICLE D.IMPROVEMENTS

10-25D-1:
DRAWINGS:

10-25D-2:
COMPLETION OR IMPROVEMENT COMPLETION ASSURANCE PRIOR TO RECORDING FINAL SUBDIVISION PLAT OR DEVELOPING REAL PROPERTY – ACCEPTANCE PROCESS:

10-25D-3:
IMPROVEMENTS REQUIRED:

The design, installation, connection, and construction of all improvements required by this section shall comply with the city of St. George standard specifications for design and construction and shall be approved by the city before work begins. The improvements required to be completed before issuance of a building permit under this title shall include, but are not limited to, the following:

A. *Utilities and Services:*

1. Required utilities and services include, but are not limited to, the following: power, culinary water, secondary irrigation water, sewer, fire protection, lighting, telephone, and cable conduits, signing and addressing, all-weather fire and emergency access, and other utilities and services as required by the city or by law.

2. All subdivision lots shall be served by ~~the~~ public utility systems. Proof of water service from the District shall be required at the time of final plat recordation. ~~of the city unless otherwise approved by the city council.~~

3. All utility improvements, including street lighting, shall comply with all official standards of the city.

4. All electrical, telephone, and television cable shall be installed underground, except as otherwise directed by the city council.

B. *Storm Drainage and Nuisance Water Control:* A storm or nuisance water drainage system shall be provided and shall be separate and independent from the sanitary sewer system. Drainage, flood control, and adequate erosion protection shall be designed in conformance with the city

flood control master plan and drainage guidelines and hydrology manual as detailed in the city of St. George standard specifications for design and construction.

C. *Street Improvements:*

1. *Required – Exception:* All streets within the city shall be improved with streetlights and pavement bounded by integral concrete curbs, gutters and sidewalks, handicapped ramps, etc. The sole exception shall be in large lot rural subdivisions where street construction shall conform to large lot requirements as detailed in the city of St. George standard specifications for design and construction. Property owners of large lot rural subdivisions shall acknowledge by a recorded certificate that any further subdividing will require full compliance with standard lot improvement requirements, including streetlights, curb and gutter, sidewalks, and roadway width, etc. Said acknowledgment shall waive the property owners' rights to oppose a special improvement district where necessary to comply with this requirement.

2. *Continuation of Streets:* The arrangement of streets in new subdivisions shall make provision for the continuation of the streets in adjoining areas insofar as such continuation or access shall be deemed necessary by the city engineer or designee. All access roads leading to any subdivision shall be improved as may be determined by the city engineer or designee.

3. *Traffic-Control and Street-Name Signs:* All traffic-control and street-name signs, conforming to the city of St. George standard specifications for design and construction and approved by the city engineer or designee, shall be provided by the subdivider. When required by the city, mitigation of off-site impacts will be the responsibility of the developer. A traffic impact study may be required to help determine project impacts.

4. *Frontage:* All subdivision lots shall have frontage on a dedicated public street improved to city standards unless the use of a private street has been approved by the council. Private streets, Alleys, or ways shall not be approved except when the city engineer or designee finds that public dedication is not necessary. Where determined that public streets are needed for area circulation, property access, or the overall benefit of the driving public, private streets shall not be used. Master-planned roads cannot be private.

5. *Private Streets and Improvements:*

a. In the event private streets are used, they shall conform to the city of St. George standard specifications for design and construction as to the quality of construction. Private streets shall include curb, gutter, sidewalks, or adequate pedestrian facilities, etc. Street width may be adjusted based upon traffic needs and information provided in a traffic impact study (TIS) when required.

b. The city may observe the construction of private streets. However, in all cases, the developer shall retain the services of a professional engineer and testing firm to provide adequate inspection services and to submit the proper reports and certifications to the city. All private developments shall be required to submit to the

city the private development improvements certification, on the approved form prior to certificate of occupancy and acceptance of the development.

c. *Continuation of Principal Streets:* The arrangement of streets shall provide for the continuation of principal streets between Adjacent properties when such continuation is necessary for convenient movement of traffic, effective fire protection, and efficient continuation of utilities and where such continuation is in accordance with the transportation element of the city's general plan. If the Adjacent property is undeveloped and the street must be a dead-end street temporarily, the right-of-way shall be extended to the property line and a temporary turnaround shall be provided.

d. *Intersections:* Intersections shall comply with city specifications and access management requirements.

D. *Access to City Street:* No subdivision shall be approved which does not have access to an improved and dedicated city street. Where a subdivision obtains access from a street which does not meet minimum city standards, the access road shall be improved to a minimum width of twenty-five feet (25'), meeting applicable safety standards, including shoulders, and constructed to final grade. Additional road width may be required to meet safety standards.

E. *Improvements to Full Length of Project:* Where a subdivision abuts a master-planned road, utilities or drainage system, the subdivider shall complete his portion of such improvements the full length of his project in conformance with the approved city plans, including the general plan.

F. *Mitigation of Off-Site Impacts:* When required by the city, mitigation of off-site impacts, as well as providing adequate public infrastructure to the development, will be the responsibility of the developer. A traffic impact study (TIS) will be required unless otherwise approved by the city engineer or designee. The TIS may aid in the determination of off-site impact mitigation. (Ord. 2019-10-002, 10-10-2019)

10-25D-4:
LAYOUT OF LOTS:

10-25D-5:
IMPROVEMENT COMPLETION ASSURANCE AND WARRANTY:

A. *Improvement Completion Assurance:*

1. *When Required:* The city, in its discretion, may allow a subdivider to record the Final Plat if the subdivider guarantees the installation and construction of the required improvements free from defects in material and workmanship and in compliance with all city standards, by providing ~~a~~an financial improvement completion assurance and agreement which guarantees completion of the improvements within 1 year of the date of final plat approval.

2. *Form – Amount:* The improvement completion assurance required under this subsection shall be in the form of cash, cash escrow (draw down) or an irrevocable letter of credit, in a form acceptable to the city, for an amount equal to one hundred percent (100%) of the cost of improvements not previously accepted. The cost of improvements shall be approved by the city. All improvements not completed within one (1) year shall thereafter require an improvement completion assurance.

3. *Release:* The city shall release the improvement completion assurance under this subsection once all improvements are inspected and approved by the city as required by this title and the subdivider has submitted to the city a warranty in a form acceptable to the city.

B. *Warranty of Improvements:*

1. *Required:* Each subdivider shall warrant that all improvements required under sections 10-25D-3 and 10-25D-4 shall be free from defects in material and workmanship and that the improvements are in compliance with all city standards. The warranty period shall start on the date the city approves all of the improvements pursuant to section 10-25D-2, and the subdivider provides the city with a warranty in a form approved by the city.

2. *Form – Amount:* The warranty required by this chapter shall be in the form of cash~~,~~ or an irrevocable letter of credit, ~~or a surety bond acceptable to the city for an amount equal to at least ten percent (10%) of the total improvement value for the warranty period. Any proposed surety bond shall be from a company licensed in Utah with a AAA, AA+, AA, or AA- (Aaa, Aa1, Aa2, Aa3) credit rating or equivalent,~~ under terms acceptable to city.

3. *Release:* After the expiration of the warranty period, the city shall release the warranty held by the city under this chapter after the final inspection and acceptance of the improvements pursuant to section 10-25D-2.

C. *Approval of City Attorney:* The form of any improvement completion assurance, agreement, or warranty submitted under this section shall be reviewed and approved by the city attorney or designee before acceptance by the city.

St.George
Community Development

Item 3A

Hillside Permit

HILLSIDE REVIEW BOARD AGENDA REPORT: 04/27/2022
PLANNING COMMISSION AGENDA REPORT: 06/14/2022

HILLSIDE DEVELOPMENT PERMIT
Indian Hills Temple Trail
Case No. 2022-HS-010

Request: This is a request for a Hillside Development Permit to allow the applicant to develop a proposed single-family development. The applicant has provided a slope analysis, proposed drainage report and site layout for consideration.

Exhibits Provided

1) Exhibit A - Slope Analysis Maps & Site Plan
"Exhibit A" in the packet shows the overall slope analysis for the site under review. The proposed site plan for the single-family residential development.

2) Exhibit B – Rockfall Study Exhibit:
A rock fall study exhibit for the proposed development.

3) Exhibit C – Geotech Report.
Geotech Report.

4) Exhibit D – Drainage Report
Drainage report for the proposed development

Background: This is a request from the property owners at 720 W Indian Hills Drive for the Hillside Review Board to determine the location of the buildable land and any measures that are needed to mitigate the hillside. The owner is coming before the Hillside Review Board for the purpose of reviewing the slopes and to determine what needs to be done to develop the proposed single family residential subdivision on this vacant land.

Owner: Gary Carter LP

Representative: Taylor Ricks

Engineer: Mainline

APN: SG-6-2-36-40002

Location: The property is located at 720 W Indian Hills Drive.

Acreage: Approximately +/- 50 Acres
Zoning: Single Family Residential, minimum lot size 10,000 sf (R-1-10)
General Plan: LDR (Low Density Residential) & Open Space (OS)

Adjacent zones: North-R-1-10, South & East Open Space, and West-Washington County property.

Powers & Duties: Section 10-13A-8. B.1 of the "Hillside Review Board Powers and Duties" states that the hillside board can make recommendations to "adopt, modify or reject a proposal" to the Planning Commission (PC).

Permit required: Section 10-13A-7 requires that all major development (i.e., cut greater than 4', etc.) on slopes above 20% requires a 'hillside development permit' granted by the City Council upon recommendation from the Hillside Review Board and the Planning Commission.

Analysis: The Hillside Review Board will need to determine whether or not the areas to be disturbed are "significant" or not. If so, are there conditions that can be placed on the request to mitigate the impacts or is it just not feasible and warrants a denial? Applicable ordinances which may help the board in their review can be found below.

Applicable Ordinance(s):
(Selected portions)

10-13A-1: Density and Disturbance Standards

A. The hillside development overlay zone (HDOZ) limits development densities and provides specific development incentives to transfer underlying zone densities from hillsides (sending areas), to less steep slopes or more safe development areas (receiving areas), within a development.

Percent Natural Slope	Dwelling Units (DU) / Acre
0-19	See underlying zone
20-29	2 DU/acre, provided the units are clustered on 30 percent (30%) or less of the land area within this slope category. 70 percent of this slope category shall remain undisturbed. The 70 percent area is based upon the overall area/development rather than per lot. Also see subsections A1, A2, and A3 of this section.
30-39	1 DU/10 acres, provided no more than 5 percent (5%) of the site is disturbed, and 95 percent of the site remains undisturbed. If the cumulative area is at least 1 acre but less than 10 acres, the cumulative area shall be allowed 1 DU.

40	Development is not permitted (0%), **except** as provided for in subsection A4 of this section.

Section 10-13A-1: Density and Disturbance Standards

F. The applicant may:

1. Transfer all development density from steeper slope categories (sending areas), to areas within the development with natural slopes of twenty percent (20%) or less (receiving areas); and
2. Develop additional bonus density, calculated from each slope category, as follows:
    a. Natural slopes twenty percent (20%) or less transferred on a one-to-one (1:1) unit basis; plus
    b. One (1) additional density unit for each density unit transferred from natural slopes of twenty-one percent (21%) to thirty percent (30%); plus
    c. Two (2) additional density units for each density unit transferred from natural slopes of thirty-one percent (31%) to forty percent (40%).
3. Unit calculation for the receiving area shall be based on the requirements of the sending area zone.

G. Density transfers to the receiving area may occur without a zone change within the receiving area even though the resulting density or configuration may exceed the density limits of the receiving area zone. Other than density, the receiving area's zoning requirements apply to development in the receiving area. For instance, lot sizes may vary, but single-family zoning districts only allow single-family detached dwellings.

H. If the applicant proposes to develop within the twenty-one percent (21%) to forty percent (40%) slope area, the applicant cannot employ partial density transfers from the sending area and must propose a design, site development plans, and a grading plan that blends and harmonizes all aspects of the proposed development into the natural topography, and that minimizes road cuts and fills.

I. Non-disturb areas within a residential lot as shown on the slope analysis map shall not be used to calculate minimum lot size.

J. Disturbance standards do not apply to the city for limited city facilities: trails, parks, and utilities.

10-13A-2: Density and Disturbance Standards

A. Slope shall be determined for each significant portion of a development parcel.

B. *Procedure:* The applicant shall map the location of the natural slope by using the following procedure:

1. *Preparation of Contour Maps:* The applicant shall submit an accurate, current contour map, prepared and certified by a licensed professional engineer or surveyor, which shows all land contours at intervals no greater than five feet (5'), drawn at a one inch equals one hundred feet (1" = 100') scale maximum.
2. *Verification through Field Surveys:* The city engineer or designee may require the applicant to submit a field survey to verify the accuracy of the contour map.

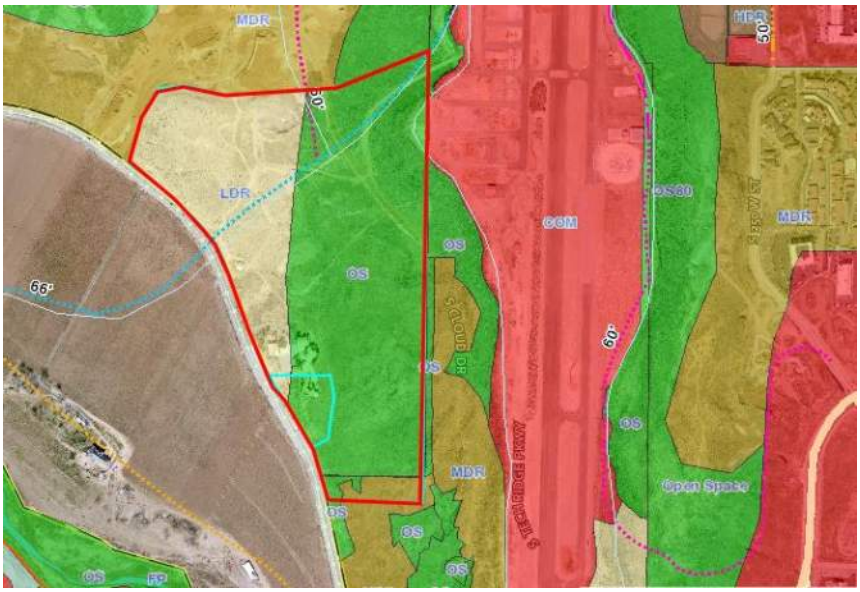
C. *Determination of Slope Areas:* Using the contour map, natural slopes shall be calculated using points identified as natural slopes of twenty percent (20%), thirty percent (30%), and forty percent (40%), and shall be located on the contour map and connected by a continuous line. That area bounded by said lines and intersecting property lines shall be used for determining project density. Small washes or outcrops, which have slopes distinctly different from surrounding property, and are not part of the contiguous topography, may be excluded from the slope determination.

Hillside Review: The Hillside committee reviewed the proposal and recommended approval with the following recommendation:
MOTION: Dave Black made a motion to recommend for approval phase 1 of the Temple Trail subdivision as presented and in our opinion the interior slopes that are 40% or greater are noncontiguous and they could be disturbed, the slopes around the perimeter of the subdivision are graveled slopes with no natural bedrock outcrops and it would support dressing those with decorative stacked rock or block that matches the natural colors of the area and to dress those up and make those look better and that any retaining walls of the subdivision as well be matched in color to the surrounding natural environment.

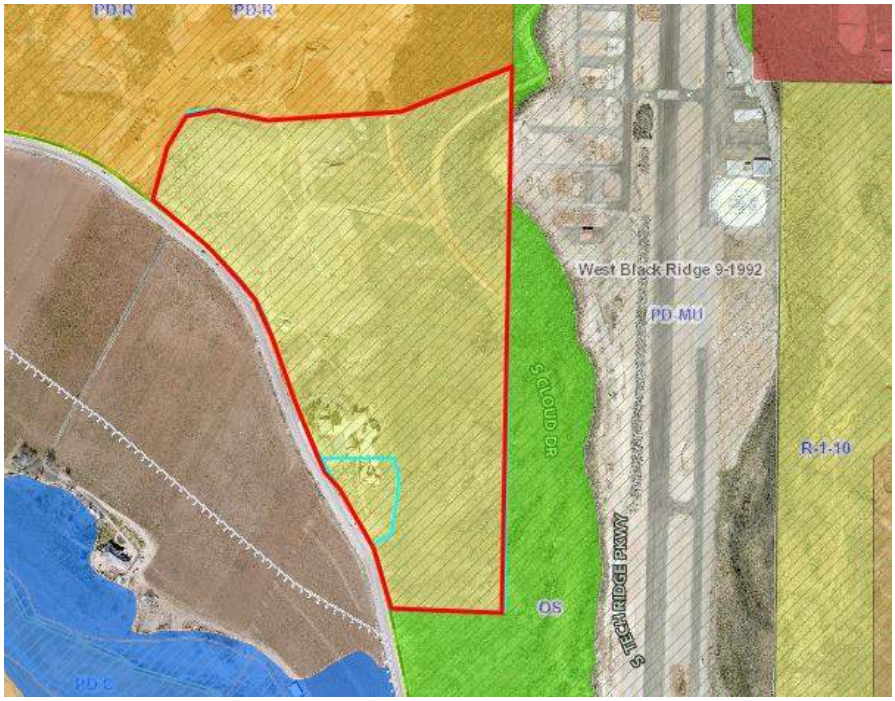
Recommendation: The applicant is requesting development of a Temple Trail single family residential subdivision.

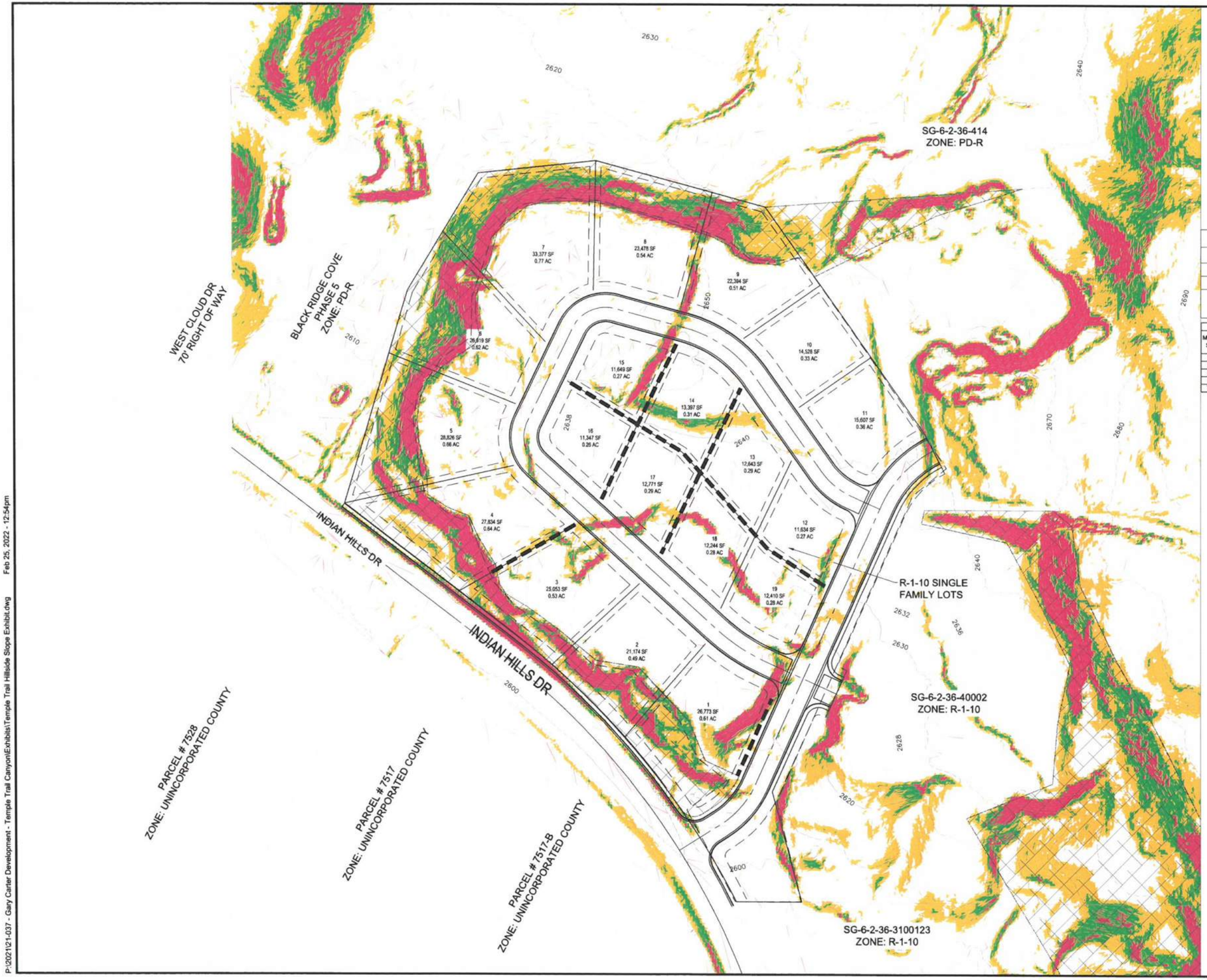
Vicinity Map

General Plan – LDR & OS



Zoning – Open Space & R-3





LEGEND

- SLOPES 20% - 30%
- SLOPES 30% - 40%
- SLOPES > 40%

AVERAGE GRADE ACROSS ENTIRE PARCEL NORTH TO SOUTH = 1.80%

AVERAGE GRADE ACROSS ENTIRE PARCEL EAST TO WEST = 2.20%

SITE DATA

DATA TYPE	VALUE
PARCEL	H-3-1-34-4400
EXIST. ZONING	R-1-10
GENERAL PLAN	R-1-10

TEMPLE TRAIL SLOPE TABLE

MINIMUM SLOPE	MAXIMUM SLOPE	AREA SQ FT	AREA ACRE	PERCENT OF TOTAL	PERCENT DISTURBED	COLOR
0.0%	19.9%	326,072	7.49	70%	95%	
20.0%	29.9%	50,573	1.16	11%	80%	
30.0%	39.9%	38,469	0.88	8%	50%	
> 40%	–	48,105	1.10	10%	10%	
TOTAL		463,219	10.63	100%	81%	

811 Know what's below. Call before you dig.

GRAPHIC SCALE
60 0 60 120
(IN FEET)

NO.	REVISIONS	BY	DATE

MAINLINE ENGINEERING
GARY W CARTER LP
2230 WEST INDIAN HILLS DRIVE
ST. GEORGE, UT 84770

MAINLINE ENGINEERING
2230 WEST INDIAN HILLS DRIVE
SUITE 1101
ST. GEORGE, UT 84790

PROJECT	TEMPLE TRAIL
CLIENT PROJ. #	N/A
MAINLINE PROJ. #	21-037
SHEET NAME	HILLSIDE REVIEW SLOPE EXHIBIT
DATE	2/25/22
DRAWN BY	TAR
CHECKED BY	PBG

Taylor Graves
PROFESSIONAL ENGINEER

SHEET EXHIBIT

P:\2021\21-037 - Gary Carter Development - Temple Trail Canyon\Exhibits\Temple Trail Hillside Slope Exhibit.dwg Feb 25, 2022 - 12:54pm

LEGEND

ANTICIPATED RETAINING WALL (HEIGHT VARIES 3'-8')

MINIMUM ROAD GRADE	0.50%
MAXIMUM ROAD GRADE (1150 WEST)	<8.00%

Know what's below. Call before you dig.

NO.	REVISIONS	BY	DATE

MAINLINE ENGINEERING

MAINLINE ENGINEERING
321 NORTH MALL DRIVE
SUITE 1101
ST. GEORGE, UT 84790

GARY W CARTER LP
720 KESTREL HILLS DRIVE
ST. GEORGE, UT 84770

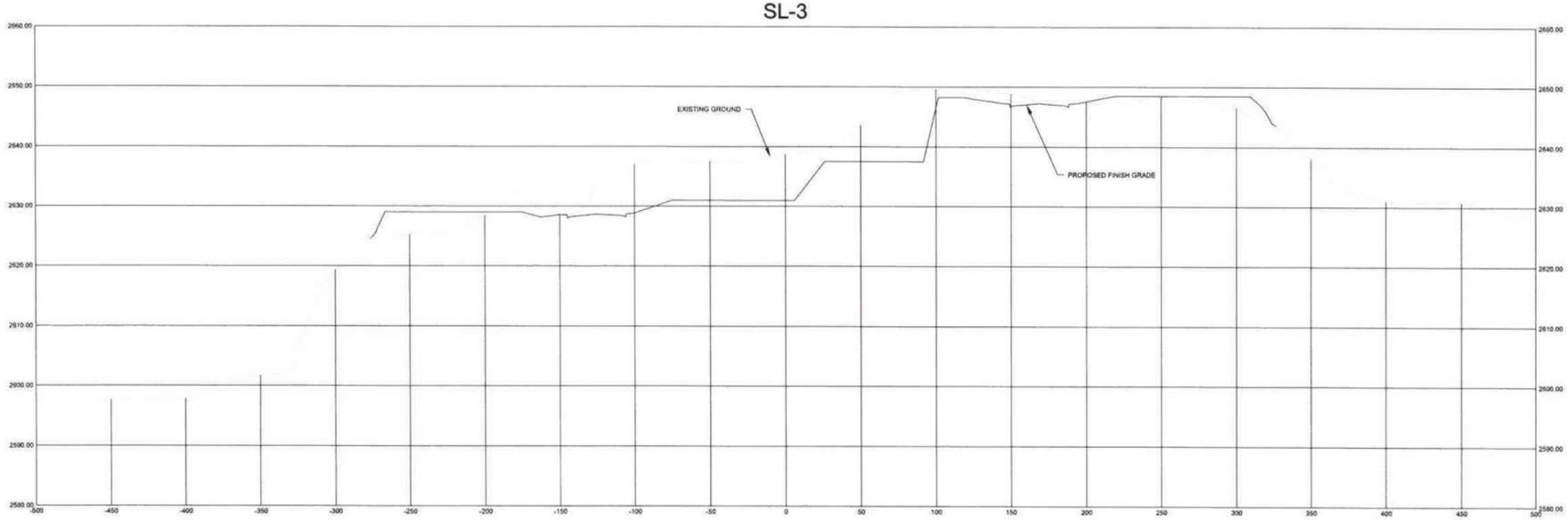
PROJECT	TEMPLE TRAIL
CLIENT PROJ.#	N/A
MAINLINE PROJ.#	21-037
SHEET NAME	HILLSIDE REVIEW SLOPE EXHIBIT
SHEET	EXHIBIT

DATE	DRAWN BY	CHECKED BY
2/25/22	TAR	PBG

Jaylon Peeples
PROFESSIONAL ENGINEER

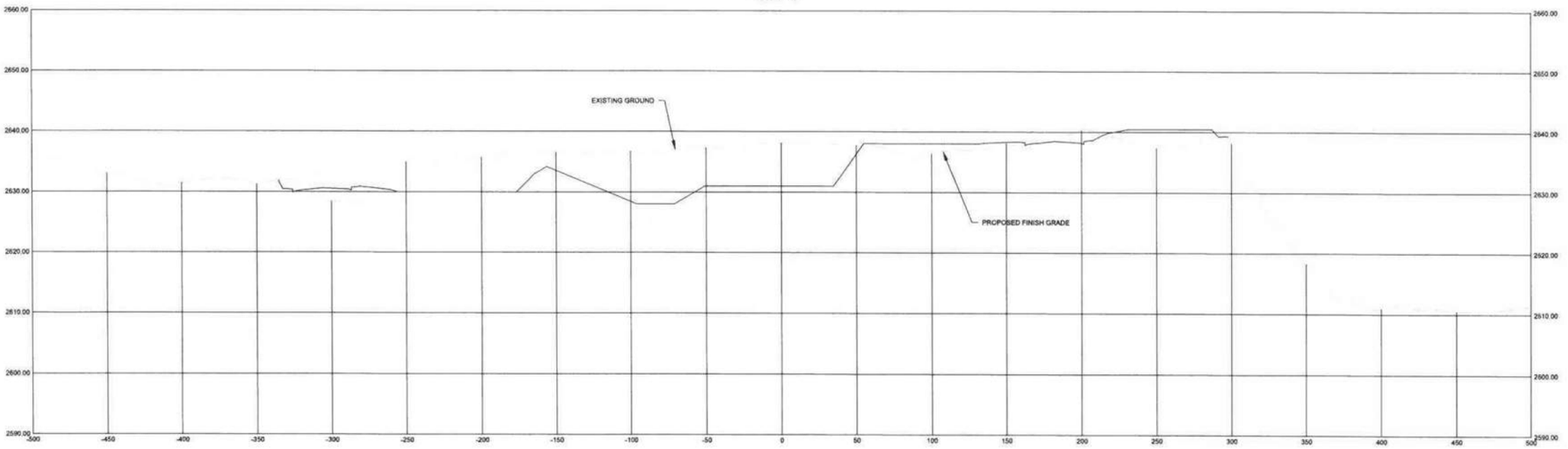
P:\202121-037 - Gary Carter Development - Temple Trail Canyon\Exhibits\Temple Trail Grading Exhibit.dwg Feb 25, 2022 - 12:56pm

SL-3



SECTION A-A

SL-4



SECTION B-B

Know what's below. Call before you dig.

GRAPHIC SCALE

40 0 40 80

(IN FEET)

NO.	REVISIONS	BY	DATE

MAINLINE ENGINEERING

MAINLINE ENGINEERING
321 NORTH MALL DRIVE
SUITE T101
ST. GEORGE, UT 84790

GARY W CARTER LP
720 WEST INDIAN HILLS DRIVE
ST. GEORGE, UT 84770

DRAWN BY	TAR
CHECKED BY	PBG
DATE	2/25/22

Jaydon Parkes
PROFESSIONAL ENGINEER

PROJECT	TEMPLE TRAIL
CLIENT PROJ. #	N/A
MAINLINE PROJ. #	21-037
SHEET NAME	HILLSIDE REVIEW CROSS SECTION EXHIBIT
SHEET	EXHIBIT

P:\2021\21-037 - Gary Carter Development - Temple Trail Canyon\Exhibits\Temple Trail Grading Exhibit.dwg Feb 25, 2022 - 12:47pm

March 24, 2022

Feller Enterprises
708 East 1100 South
St George, Utah 84790

Attention: Tyson Feller
EMAIL: tyson@fellerent.com

Subject: Rockfall Hazard Assessment
Temple Trail Canyon Subdivision
Indian Hills Drive
St George, Utah
Project No. 2220105

Mr. Feller:

Applied Geotechnical Engineering Consultants, Inc. (AGEC) was requested to evaluate potential rockfall hazard for the proposed Temple Trail Canyon Subdivision located on the north side of Indian Hills Drive across from Gubler Lane in St George, Utah.

PROPOSED CONSTRUCTION

We understand the area is planned for single-family residences.

GEOLOGY

The geology of the site is mapped by Hayden and Willis (2011) to consist predominantly of Quaternary alluvium, some colluvium and some areas of bedrock. The bedrock underlying the site is mapped as the Triassic Petrified Member of the Chinle Formation. The nearest outcrops that would produce rockfall material is the Quaternary Cedar Bench Lava Flow exposed near the top of the airport bluff east of the site.

SITE DESCRIPTION

Much of the site appears to have been mined for gravel. It is currently undeveloped land.

Vegetation at the site consists of a sparse coverage of grass and brush.

The general topography of the site consists of relatively level ground through the middle and moderate slopes along the north, south and west sides.

There is residential development under construction to the north and west and undeveloped land to the south and east. Indian Hills Drive borders the south side of the property.

ROCKFALL EVALUATION

A site visit was performed and finds no evidence of rockfall source close enough to the site to be a hazard for the proposed development. The closest cliffs with rock outcrops that could produce rockfall material are located approximately 780 feet east of the east side of the development. Assuming a conservative shadow angle of 20 degrees from the cliff base, the proposed subdivision is at least 400 feet beyond the potential rock-runout zone. Rockfall is not considered to be a hazard for the proposed development.

LIMITATIONS

This letter has been prepared in accordance with generally accepted geologic engineering practices in the area for the use of the client. The conclusions included in the letter are based on conditions observed during our site visit and the topographic information obtained from the Utah AGRC website.

If you have questions or if we can be of further service, please call.

Sincerely,

APPLIED GEOTECHNICAL ENGINEERING CONSULTANTS, INC.

Douglas R. Hawkes, P.E., P.G.

Reviewed by JEN, P.E.

DRH/rs

Reference:

Hayden, J.M. and Willis, G.C. 2011; Geologic map of the St George quadrangle, Washington County, Utah, Utah Geological Survey Map 251DM.

AGEC
Applied GeoTech

GEOTECHNICAL INVESTIGATION

TEMPLE TRAIL SUBDIVISION
APPROXIMATELY 720 WEST INDIAN HILLS DRIVE
ST. GEORGE, UTAH

PREPARED FOR:

FELLER ENTERPRISES

706 EAST 1100 SOUTH
ST. GEORGE, UTAH 84790

ATTENTION: TYSON FELLER

PROJECT NO. 2220105

APRIL 21, 2022

1420 South 270 East • St. George, Utah 84790 • (435) 673-6850 • FAX (435) 673-1044

TABLE OF CONTENTS

SUMMARY

1. The subsurface soils were evaluated during a previous study by AGEC (formerly Southwest Testing Inc.) In 1996. AGEC has utilized the previous data along with review of the property for geologic hazards review. AGEC has also conducted the study for the Blackridge Cove and Cloud Drive projects adjacent to the property. The data from these studies was reviewed as a part of our evaluation.

   The subsurface profile observed within the test pits excavated varied across the site with the majority of the site containing silty gravel overlying mudstone bedrock. Silty sand, clayey sand and lean clay was encountered. The mudstone is known in the area as "blue clay" and is moderately to highly expansive when wetted and is anticipated to exist below the entire site. The gravels varied from non to moderately cemented (conglomerate like).

2. Groundwater was not encountered within the test pits to the depths investigated. AGEC has found groundwater to the north and northwest of the site within the Black Ridge Cove development. The groundwater is generally perched over the underlying mudstone. The mudstone to the north is a significantly lower depths. The groundwater generally follows the wash adjacent the north and west sides of the property.

3. The site consists of a previous ridge that has been partially excavated and terraced with slopes down to the west, north and south along Indian Hills Drive. The site has been mined for gravel purposes in the past. The ridge continues up to the east. Based on the proposed grading, cuts and fills from 1 to 6 feet. Larger fills may be needed along the perimeter of the lots.

4. AGEC has reviewed the geologic literature (See Figure 3 for geologic map of the site) and has visited the site to review the potential hazards on the site. The potential hazards identified consist of expansive mudtsone (blue clay), rockfall and landslides.

   The landslide hazard map indicates the hillside to the east is part of a larger landslide (See Figure 3a). AGEC has previously evaluated the landslide as a part of the Cloud Drive evaluation. Based on our evaluation, the proposed subdivision is outside the limits of the landslide.

   AGEC has also evaluated the site for the Rockfall Hazard that the property is mapped within a high rockfall zone (See Figure 3b). AGEC has also evaluated the potential for rockfall on the property and has previously submitted our findings in a report dated, March 24, 2022. Our evaluation indicates that the potential for rockfall hazard on the site is very low.

5. The proposed residential structures may be supported on conventional spread footings bearing on properly compacted structural fill. Due to the expansive mudstone, we recommend to provide at least 15 feet of separation between the expansive mudstone and pad grade. The pads may be raised to provide the necessary separation. Alternatively, the residences may be supported on a deep foundation system. These recommendations are not provided within this report. We understand it is planned to overexcavate and/or raise

the building pads to provide the recommended separation. If deep foundations are desired, AGEC can provide detailed recommendations in the future.

6. The on-site non-mudstone soils free of organics and debris, are suitable for use as structural fill, site grading fill, and utility trench backfill. The on-site mudstone is not suitable for use as structural fill. The mudstone may be used as trench backfill, provided it is properly moisture conditioned and placed at least 4 feet below grade. The mudstone may also be considered to be used by mixing with non expansive soils and placed in the deeper portion of the pad overexcavations.

7. The cemented gravels will be difficult to excavate and may require heavy duty equipment or the use of a hammer-hoe if thicker zones of the cemented gravel are encountered.

8. Detailed recommendations for subgrade preparation, pavements, materials, foundations, and drainage are included in the report.

9. The information provided in this summary should not be used independent of that provided within the body of this report.

SCOPE

This report presents the results of a geotechnical investigation for the proposed Temple Trail Subdivision to be located in St. George, Utah, as shown in Figure 1. This report presents the subsurface conditions encountered, laboratory test results, and recommendations for the project. AGEC has utilized previous studies conducted on or adjacent the project including along with the available geologic literature and grading plan:

1. Geotechnical Investigation, Temple Trail Subdivision, by AGEC for Gary Carter, Project No. 960037, dated March 5, 1997. Includes the property.

2. Geotechnical Investigation, by AGEC, “Indian Hills Drive Widening”, - In 2013, St. George City with UDOT widened and reconstructed portions of Indian Hills Drive.

3. Geotechnical Investigation and Hillside Review, Black Ridge Cove (formerly Temple Trail Subdivision), prepared for Tech Ridge, LLC. Report dated September 21, 2018, Project No. 2180672. Located adjacent and to the north of the project site.

4. Addendum to Geotechnical Investigation, Black Ridge Cove, prepared for Tech Ridge, LLC, Report dated December 23, 2019, Project No. 2180672.

5. Slope Evaluation, Cloud Drive (Tech Ridge South Access Road), Project No. 2180295, Report dated October 19, 2018, Clarification Report dated December 17, 2008.

6. Utah Geological Survey, Special Study 127, “Geologic hazrds and Adverse Construction Conditions, St. George-Hurricane metropolitan area, Washington County, Utah, Lund et al, 2008.

7. Utah Geologic Survey, Map 251DM, Geologic Map of the St. George 7.5" Quadrangel, Washington County, Utah, Hayden and Willis, 2011.

8. Grading Plan, prepared by Mainline Engineering, dated 2022.

In addition to the review of these references, AGEC has utilized the subsurface information from Reference No. 1 above that was conducted on this site in 1996. During this study, the data from the field exploration was used to obtain information on the subsurface conditions and to obtain samples for laboratory testing. Information obtained from the field and laboratory was used to define conditions at the site and to develop recommendations for the proposed development.

This report has been prepared to summarize the data obtained during the study and to present our conclusions and recommendations based on the proposed construction and the subsurface conditions encountered. Design parameters and a discussion of geotechnical engineering considerations related to construction are included in this report.

SITE CONDITIONS

The property is located at the toe of the west side of the West Black Ridge in St. George, Utah as shown on Figure 1. The property is located north and slightly east of Indian Hills Drive. To the north of the property is the recently completed Black Ridge Cove project. Located to the east is a partially graded hillside or the west slope of the west Black Ridge. Cloud Drive that extends from Indian Hills drive through Black Ridge Cove and up the ridge to the east and southeast. Indian Hills Drive is located to the south. Across Indian Hills Drive to the south are agricultural fields. There is also vacant property to the southeast east of Indian Hills Drive with a residence further to the south.

The area of the proposed subdivision has been partially graded while being used as a borrow site. The majority of the site is relatively flat with terraced areas. There are slopes down to the west, south and north around the perimeter of the site. The topography of the site is shown on Figure 2.

There are sparse amounts of vegetation consisting of desert brush and weeds and grasses. Several photos of the site are included in the Appendix section of this report.

FIELD STUDY

On January 8 and August 26, 1996, a representative from AGEC (formerly Southwest Testing, Inc.) visited the site and observed the excavation of 13 test pits at the approximate locations shown on the Site Plan, Figure 2. The test pits were excavated with a rubber tire backhoe. The subsurface soil profile was logged and soil samples were obtained at this time for laboratory testing.

SUBSURFACE SOIL CONDITIONS

The site was evaluated by excavating 13 test pits at the locations shown on Figure 2. The locations and elevations of the test pits were measured by pacing from existing land features and the elevations were determined from interpolation between contours on the site plan provided by Mainline Engineering..

The subsurface profile observed within the test pits excavated varied across the site with the majority of the site containing silty gravel overlying mudstone bedrock. Silty sand, clayey sand and lean clay was encountered along the eastern portion of the site. The mudstone is known in the area as “blue clay” and is moderately to highly expansive when wetted. The gravels varied from non to moderately cemented (conglomerate like).

Descriptions of the soil and bedrock types encountered follow:

Sand and Gravel: The sand and gravel contained varied amounts of silt and clay. The gravel contained cobbles to occasional small boulders. The gravel was generally subrounded and was dense to very dense. Portions of the gravel was moderately cemented and practical refusal was encountered in several of the test pits.

Lean Clay - The lean clay contains varied amounts of sand and is medium stiff to very stiff, moist and red to brown in color.

Mudstone Bedrock - The mudstone bedrock is soft to moderately hard, moist and is purple to grey to red in color.

The Logs of Test Pits are shown on Figures 3 and 4. The Legend and Notes of Test Pits are shown on Figure 4. Laboratory test results are also shown on test pit logs.

SUBSURFACE WATER

Groundwater was not encountered within the test pits to the depths investigated. During previous studies, groundwater was encountered within the Black Ridge Cove subdivision to the north. It appears that the groundwater is perched on the underlying mudstone bedrock. We anticipate fluctuations in the groundwater level will occur over time. Our study does not include an evaluation of the fluctuations.

PROPOSED CONSTRUCTION

The proposed Temple Trail Subdivision is proposed as shown on Figures 2 and 2A. The project will include 19 single family lots. The site is proposed to be graded by cutting and filling on the order of 1 to 6 feet with larger fills possible around the perimeter of the site. The perimeter of the slopes will remain undisturbed. We anticipate some retaining may be provided at the top of the slope areas.

We anticipate that the residential structures will be single-family, slab on grade residences We anticipate the residences will be constructed using conventional spread footings with slab-on-grade floors, and will likely be constructed with wood framing, stucco or rock veneer, and tile roofs.

For design purposes, we have assumed wall loads of up to 2 kips per linear foot and column loads of up to 30 kips. As part of the development, we understand that roadways, utilities and city improvements will also be included. For design purposes, we have utilized a traffic index (TI) of 5 for the interior roads in accordance with the St. George City standards.

If the proposed construction, or building loads are significantly different from those listed, we should be notified so that we can reevaluate our recommendations.

GEOLOGIC HAZARDS

Based on our review of the literature (Ref No.'s 6 and 7) and our site observations, AGEC identified the site as having 3 potential geologic hazards. These included:

1. **Landslide** - The slope of the west facing side of the Black Ridge has been mapped as a landslide. AGEC has conducted a previous study (Ref No. 5) that concluded that the hillside has a potential for future movement. The study and subsequent studies on the east side of the Black Ridge have shown that the factor of safety is generally less than 1.5. The mapping (See Figure 3a) shows the site is not a part of the overall landslide and that the potential movement of the slide should not affect the residences within the development.

2. **Rockfall** - AGEC has previously evaluated the potential rockfall. Our conclusions are included in Appendix A.

3. **Expansive Mudstone** - The investigation has noted that expansive mudstone is encountered within the majority of the explorations and is anticipated to exist through out the property at some depth. Recommendations are provided for mitigation of structures and improvements by treatment of overexcavation and replacement.

RECOMMENDATIONS

Based on our experience in the area, the subsurface conditions encountered, our engineering analysis, and the proposed construction, the following recommendations are provided:

A. Site Grading

Based on the subsurface conditions and proposed grading provided by Kuma Engineering, the following recommendations are provided:

1. Subgrade Preparation

General: Prior to placing structural fill, site grading fill or concrete, the site should be grubbed to remove vegetation and soil containing roots and organics.

Roadways - As a minimum, we recommend the depth of overexcavation (beneath roadways, flatwork or other surface improvements) should extend at least 1 foot below the existing ground surface or 1 foot below the bottom of the proposed subgrade elevation whichever is greater. If mudstone is encountered within 3 feet of the proposed subgrade, the subgrade should be overexcavated to a depth of 3 feet and replaced with low permeable fill . The limits of overexcavation should extend at least 2 feet beyond the limits of the proposed improvements.

Subsequent to overexcavation of the right-of-ways and prior to placing site grading fill, the exposed subgrade should be scarified to a depth of at least 6 inches, properly moisture conditioned, and compacted. The removed soil may then be replaced in properly moisture conditioned and compacted lifts.

Expansive Mudstone/Clay Soil - (Residences): In areas where the expansive mudstone is encountered within 15 feet of pad grade, the mudstone should be removed by overexcavation. We anticipate the majority of the residences will require removal of mudstone.

Construction of pools or below grade structures has not been evaluated. If a pool or below grade structure is desired, further subsurface investigation, laboratory testing and engineering analysis is recommended. Typically, a similar separation is recommended for below grade structures and pools.

2. Excavation/Slopes

Permanent cut slopes excavated into the overburden soils cut no steeper than 2:1 (horizontal to vertical). Cut slopes excavated in the underlying bedrock should be excavated no steeper than 1:1 (horizontal to vertical). The bedrock cut slopes will

remain stable irrespective of height, but the total height of the exposed bedrock cut slopes may be limited by building codes, zoning or subdivision regulations.

Erosion/raveling of the exposed bedrock cut face should be anticipated due to weathering processes. The mudstone will dry, shrink and shallow slumps may occur. This could result in accumulation of soil deposits at the toe of the cut slope and will require maintenance to remove the deposits over time.

To control erosion and weathering, the bedrock cut slopes should be faced with rockery facing backfilled with angular, crushed stone or reinforced gunnite facing attached with soil nails. This would be particularly critical where softer mudstone is exposed. Benches may also be cut into the slopes to assist in controlling drainage and erosion. Benches should be at least 5 feet in width and should be constructed at intervals in accordance with the 2018 IBC. In lieu of facing shale or mudstone cuts, they could be flattened to a 3:1 (horizontal to vertical) slope.

Fill slopes constructed with on-site granular soils should be constructed no steeper than 2:1 (horizontal to vertical). Fill slopes should be constructed by overbuilding the slope and then cutting back the slope face to the desired grade to provide a properly compacted slope face. Fill placed on existing slopes steeper than 3:1 (horizontal to vertical) should be keyed into the existing slope using a benching procedure. Benches should be of sufficient width to allow for operation of compaction equipment.

Steeper cut and fill slopes may be necessary with the granular soils. Steeper slopes should be properly retained or reinforced. Additional analysis and design will be necessary to properly support the taller slopes and to ensure stability.

Water should be directed around slopes using drainage swales to reduce potential erosion in accordance with a site specific drainage plan. Soil slopes may also be protected from erosion with an appropriate geotextile or riprap underlain with filter fabric. More detailed recommendations for riprap erosion control can be provided

if requested. A lot specific drainage study should be conducted on lots adjacent to the hillside.

Utility trenches excavated in the on-site soils should be excavated in accordance with OSHA requirements using a OSHA Soil Class C (1½:1 Horizontal:Vertical) for overburden soils and Soil Class A (½:1) for trenches excavated into the bedrock. Steeper trenches may require the use of shoring or a trench box to provide as safe work environment. Safe trench excavation is the responsibility of the contractor.

3. Materials

Import materials should be non-expansive, non-gypsiferous, granular soil. Listed below are the materials recommended for imported fill.

Area	Fill Type	Recommendations
Pads/Foundations/slabs	Site grading/ structural fill	**-200** <35%, **LL** <30% Maximum size: 4 inches Solubility < 1%
Roadways	Base course	CBR>50%, **200** <12% Maximum size: ¾ inch
Underslab	Base course	**-200** <12% Maximum size: 1 inch

-200 = Percent Passing the No. 200 Sieve
LL = Liquid Limit

The on-site sandy lean clay, sand and gravel soils free of organics and debris, are suitable for use as structural fill, site grading fill, and utility trench backfill. The on-site mudstone is suitable for use as utility trench backfill, provided it is placed at least 3 feet below subgrade. The mudstone may be considered to be mixed and placed in the lower 5 feet of the pad overexcavation zone. The mix ratio will depend on the type of non-expansive material use as a the mixture. Typical ratios are 2:1 (non expansive to mudstone) and should be verified by testing prior to use.

4. Compaction

Compaction of fill materials placed at the site should equal or exceed the following percentages when compared to the maximum dry density as determined by ASTM D-698 or ASTM D-1557:

Area	Percent Compaction ASTM D-1557
Subgrade	90
Footings/foundations	95
Slabs/Pad Fill (over excavation)	95
Utility trench backfill (Structural Areas)	95
Wall Backfill (Structural Areas)	95

Fill should be placed in lifts which do not exceed the capability of the equipment used. Generally 6 to 8 inch lifts are adequate for heavy rubber tire equipment. Lift thicknesses should be reduced to 4 inches for hand compaction equipment. Fill placed at the site should be properly moisture conditioned prior to placement and should be tested to verify proper compaction.

Fill materials should be properly moisture conditioned prior to placement. Fine-grained, low permeable fill should be moisture conditioned to 2 to 4 percentage points over the optimum moisture content as determined by ASTM D-698. Granular soil should be moisture conditioned to within 2 percentage points of the optimum moisture content as determined by ASTM D-1557.

5. Drainage

The following drainage recommendations should be implemented:

- Positive site drainage should be maintained during the course of construction. In no case should water be allowed to pond adjacent to buildings/foundations.

- After construction has been completed, positive drainage of surface water away from the structures should be maintained throughout the life of the structures. We recommend a minimum slope of 6 inches in the first 10 feet from the perimeter of the structures. Hard or impermeable surfaces may be used to direct water away from buildings.

- Roof gutters should also be utilized with downspouts which extend out away and down slope from buildings. Preferably, downspouts should discharge off-site.

- We also recommend that desert landscaping, which requires no water, be used adjacent to concrete or masonry walls which will be backfilled to reduce salt migration of soluble salts and the subsequent salt weathering on cement containing elements. Further, the below grade portions of walls/fences which are backfilled with soil should be protected with an impermeable membrane and a subsurface drain. A gravel covered, perforated PVC pipe should also be placed at the base of the wall to carry water to a discharge point. This is intended to reduce the potential for salt weathering and sulfate attack on concrete/masonry.

6. Low Impact Development (LID)

AGEC has reviewed the planned areas for surface infiltration areas shown as LID on the grading plans and the Dixie Storm Water Coalition Guide (DSWCG) for Low Impact Development (Dixie Storm Water Coalition Guide, June 20, 2020) and provided the following evaluation:

Using the USDA, Natural Resources Conservation Services, Web Soil Survey, (https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm) for determining the USDA mapped soil, the soil types vary across the site with a GP - Gravel Pit for 80% of the parcel and IAF - Isom cobbly sand loam, 3 -30% slopes on the southeast portion of the site and SY- Stony colluvial land on the northeast portion of the site. Each of the mapped units have a have a Hydrologic Soil Group of A.

Our evaluation Geotech evaluation has shown that the near surface soils are primarily sand and gravel as mapped by the USDA, however the underlying mudstone is significantly different in hyrdologic properties.

Using the DSWCG, Figure 2 (flow chart), and based on the soil types and conditions, Steps- 1-3 are “No” due to the shallow mudstone bedrock on the site. Based on the rock conditions, we do not recommend using any of the Best Method Practices (BMP’s) within Reference No. 1.

The following parameters may be used in the application form:

Subsurface Information	
Groundwater	
Depth to Groundwater (ft)	>15 ft
Historical High Depth to Groundwater if known (ft)	>15 ft
Source	Geotech Study
Groundwater Contamination at Site:	N/A
Soil Information	
Infiltration Rate (in/hr) (Source = UCEA.net)	<1*
Hydrologic Soil Group/Map Unit Symbol:	D
Source:	USDA Web Soil Survey
Soil Contamination at Site:	N/A

The underlying bedrock consists primarily of mudstone which may result in the perching of groundwater and heave of the surface soils. It will also result in weakened lateral strength and reduced slope stability. The perching may result in lateral movement of water and resulting in the introduction of water to locations that may be a concern, such as utility trenches, next to slopes that would reduce stability

and cause seepage concerns. We would recommend that infiltration be limited and that the basin areas be allowed to overflow into storm drainage that allows water to leave the property to regional drainage, particularly to the west to the Black Ridge Cove Drainage system.

B. Foundation Recommendations

Based on the subsurface conditions and proposed grading provided Kuma Engineering, the following foundation recommendations are provided for support of slab on grade homes.

1. Foundations

   The proposed residences may be supported on conventional spread footings with slab-on-grade floors supported on a properly prepared subgrade as indicated in the Subgrade Preparation section of this report.

2. Bearing Material

   Footings should bear on properly compacted structural fill as recommended in the Subgrade Preparation section of this report.

3. Bearing Pressure

   Spread footings bearing on properly compacted structural fill may be designed for a net allowable bearing pressure of 2,000 psf.

4. Temporary Loading Conditions

   The bearing pressure indicated above may be increased by one-half for temporary wind and seismic loads.

5. Footing Width and Embedment

Spread footings should have a minimum width of 18 inches and exterior or unheated footings should be embedded at least 12 inches below the lowest adjacent grade.

6. Settlement/Heave

Based on the subsoil conditions encountered and the anticipated building loads, we estimate a total settlement/heave for the foundation designed as indicated above to be up to approximately 1 inch. Differential settlement is estimated to be approximately ½ inch.

C. Concrete Slab-on-Grade

1. Slab Support

Concrete slabs may be supported on a properly compacted subgrade. Fill placed in slab areas should be tested to verify compaction meets the recommendations provided within this report.

2. Underslab Base Course

A 4-inch layer of properly compacted base course should be placed below slabs to provide a firm and consistent subgrade and promote even curing of the concrete.

3. Vapor Barrier

A vapor barrier may be placed below slabs in areas which will receive floor coverings sensitive to moisture or coverings which are impermeable.

D. Lateral Earth Pressures

1. Lateral Resistance for Footings

Lateral resistance for spread footings is controlled by sliding resistance developed between the footing and the subgrade soil. An ultimate friction value of 0.45 may

be used in design for ultimate lateral resistance of footings bearing on on-site granular soils.

2. Retaining Structures

The following equivalent fluid weights are given for design of subgrade walls and retaining structures. The active condition is where the wall moves away from the soil. The passive condition is where the wall moves into the soil and the at-rest condition is where the wall does not move. We recommend the basement walls be designed in an at-rest condition.

The values listed below assume a horizontal surface adjacent the top and bottom of the wall.

Description	Active	At-Rest	Passive
Granular backfill (sand or gravel)	35 pcf	50 pcf	350 pcf
Fine Grained soil - silt and clay	40 pcf	55 pcf	300 pcf

The above values account for the lateral earth pressures due to the soil and level backfill conditions and do not account for hydrostatic pressures or surcharge loads.

Lateral loading should be increased to account for surcharge loading using the appropriate earth pressure coefficient and a rectangular distribution if structures are placed above the wall and are within a horizontal distance equal to the height of the wall. If the ground surface slopes up away from the wall, the equivalent fluid weights should also be increased.

Care should be taken to prevent percolation of surface water into the backfill material adjacent to the retaining walls. The risk of hydrostatic buildup can be reduced by placing a subdrain behind the walls consisting of free-draining gravel wrapped in a filter fabric.

3. Seismic Conditions

Under seismic conditions, the equivalent fluid weight should be modified as follows according to the Mononobe-Okabe method assuming a level backfill condition:

Lateral Earth Pressure Condition	Seismic Modification (2% PE in 50 yrs)	
	Granular Backfill	Fine-Grained Backfill
Active	9 pcf increase	10 pcf increase
At-rest	no increase	no increase
Passive	22 pcf decrease	16 pcf decrease

The resultant of the seismic increase should be placed up ½ the distance up from the base of the wall.

4. Safety Factors

The values recommended assume mobilization of the soil to achieve the assumed soil strength. Conventional safety factors used for structural analysis for such items as overturning and sliding resistance should be used in design.

E. Seismicity, Liquefaction and Faulting

1. Listed below is a summary of the site parameters as required by the 2018 International Building Code and ASCE 7-16:

Description	Seismic Parameter
	2,500 yr event (≈2% PE in 50 yrs)
Site Class	C
Ss (0.2 second period)	0.5g
S1 (1 second period)	0.16g
PGA	0.22g
F_a	1.3
Fv	1.5
F_{pga}	1.2

The values provided above were generated using the ASCE 7-16 Seismic Hazard Tool. Based on the observed subsurface conditions, a ground motion hazard analysis (GMHA) as per ASCE 7-16 is not required by the 2018 International Building Code.

2. Liquefaction

Based on subsurface conditions encountered in the borings and the test pits, the subsurface soils and bedrock observed are non-liquefiable during a seismic event.

3. Faulting

Based on a review of available geologic literature, there are no mapped faults extending near or through the site.

F. Soil Corrosion

Based upon our experience in the area, the on-site soils, bedrock, and many imported sources may contain sulfates in sufficient concentration to be corrosive to concrete. Therefore, we recommend concrete elements that will be exposed to the on-site soils be designed in accordance with provisions provided in the American Concrete Institute Manual of Concrete Practice (ACI) 318-14. Tables 19.3.1.1 and 19.3.2.1 of ACI 318-14 should be referenced for design of concrete elements utilizing a Sulfate Exposure Class of S2.

Consideration should also be given to cathodic protection of buried metal pipes. We recommend utilizing PVC pipes where local building codes allow.

G. Pavement

Based on the subsoil conditions encountered and the laboratory test results, the following recommendations are given:

1. Analysis

   Asphaltic Concrete: The flexible pavement analysis is based on UDOT and AASHTO design methods and a 20 year design life. The following parameters were considered for our analysis:

   - Base course that meets specifications which would correspond to a Structural Coefficient (a_2) of at least 0.12. Asphalt that provides a Structural Coefficient (a_1) of at least 0.40.
   - Drainage Coefficient = 1.0.
   - The subgrade support soils consists generally a low permeable fill or granular soils. Based on the on-site soils, a M_R value of 7,500 psi was used for the subgrade based upon an estimated CBR value of 5 percent and the relationship between CBR and Resilient Modulus (M_R).
   - Serviceability Index: P_o=4.2, P_t=2.5.
   - Reliability of 90 percent.
   - Standard Deviation (S_o) = 0.45.

2. Subgrade Support

   We anticipate the subgrade materials will consist of compacted sandy lean clay or on site granular materials. Our design assumes a properly compacted subgrade. Prior to placing base course or pavement area grading fill, the subgrade should be prepared as recommended in the Subgrade Preparation section of this report.

3. Pavement Thickness

Based on the anticipated traffic, a 20 year design life, PCC and AASHTO design methods, the following pavement sections are recommended.

	Flexible Pavement	
Area	Asphaltic concrete (inches)	Base Course (inches)
Interior roadways (TI=5)	2½	8

4. Pavement Materials

The pavement materials should meet AASHTO and St. George City Specifications for gradation and quality. The pavement thicknesses indicated above assume that the base course is high quality material with a CBR of at least 60 percent. Asphalt material should have a Marshall stability of at least 1,800 pounds.

5. Drainage

The collection and diversion of drainage away from the pavement surface is extremely important to the satisfactory performance of the pavement section. Proper drainage should be provided. We further recommend a yearly maintenance program including crack sealing and a surface treatment such as a “slurry seal” to extend the pavement life and reduce water infiltration into the subsurface soils.

H. Construction Testing and Observations

We recommend testing fill, concrete, and asphalt materials at a frequency which meets or exceeds St. George City minimum testing frequency requirements for city improvements. We also recommend the following testing and observations be done as a minimum:

1. Verify the subgrade is properly prepared/compacted in accordance with the recommendations provided in the Subgrade Preparation section of this report. The building pad overexcavation limits should be determined by the contractor by survey

and documented. The base of the excavation should be verified by AGEC. The replacement fill in each excavation should be tested on a periodic basis. We recommend each foot of fill placed be tested.

2. Verify that foundation subgrade is properly compacted prior to placement of concrete.
3. Conduct construction materials testing of soils, concrete and asphalt materials as required for the proposed construction by St. George City.

I. Geotechnical Recommendation Review

The client should familiarize themselves with the information contained in this report. If specific questions arise or if the client does not fully understand the conclusions/recommendations provided, AGEC should be contacted to provide clarification.

LIMITATIONS

This report has been prepared in accordance with generally accepted soil and foundation engineering practices in the area for the use of the client for design purposes. The conclusions and recommendations included within the report are based on the information obtained from the subsurface study, laboratory test results and our experience in the area. Variations in the subsurface conditions may not become evident until excavation is conducted. If the subsurface conditions or groundwater level are found to be significantly different from those described above, we should be notified to reevaluate our recommendations.

APPLIED GEOTECHNICAL ENGINEERING CONSULTANTS, INC.

G. Wayne Rogers, P.E.

Reviewed by: JE, P.E.

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LIMITATIONS

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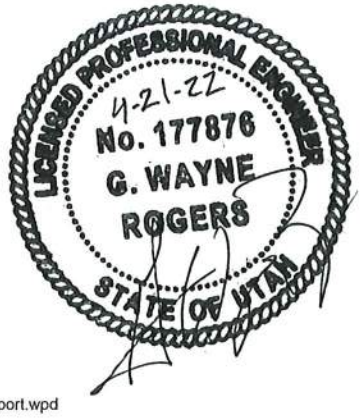
APPLIED GEOTECHNICAL ENGINEERING CONSULTANTS, INC.



G. Wayne Rogers, P.E.

Reviewed by: JE, P.E.

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TEMPLE TRAIL SUBDIVISION
ST. GEORGE, UTAH

N

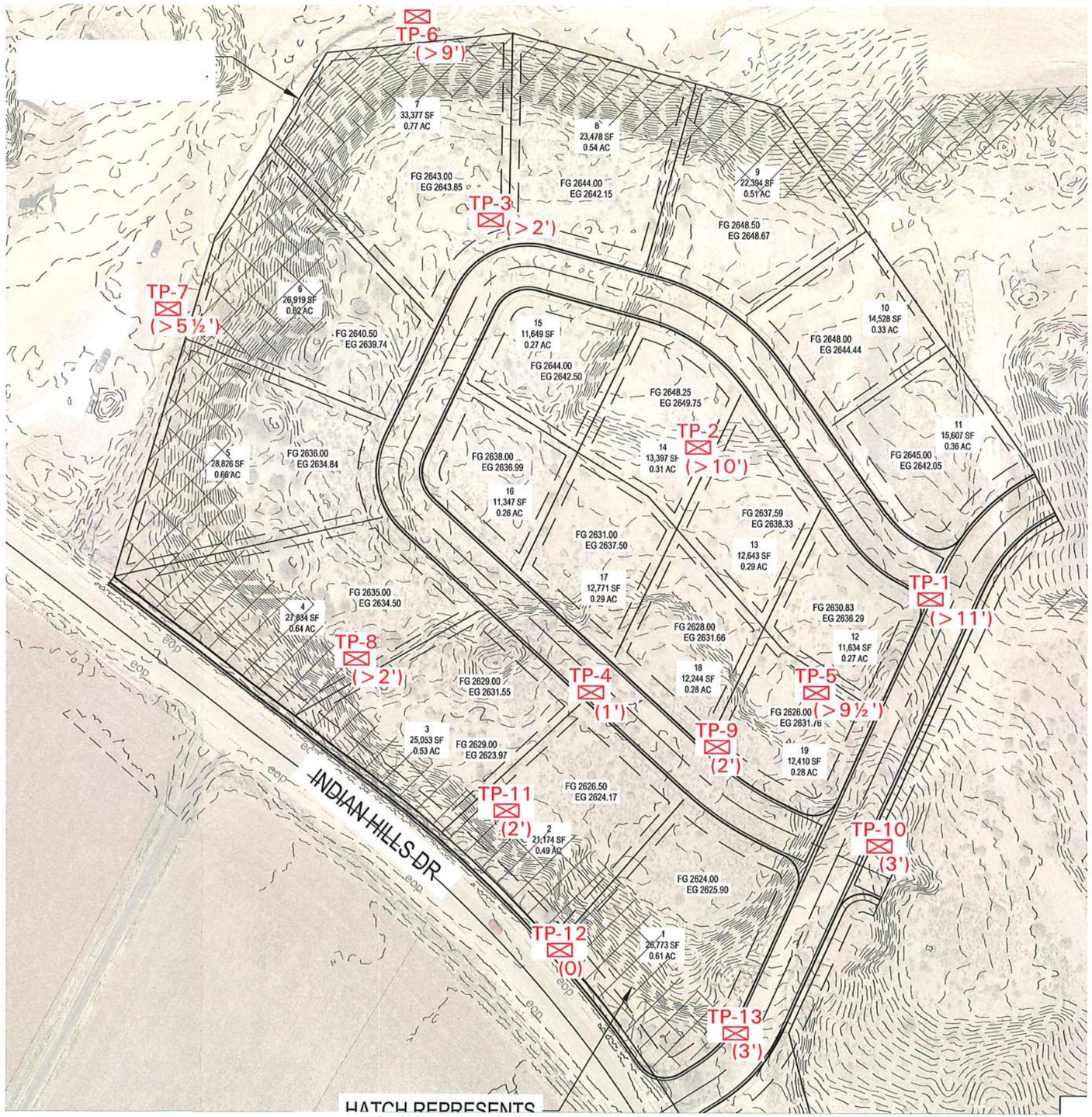
Not to Scale

2220105	AGEC	Vicinity Map	Figure 1

TEMPLE TRAIL SUBDIVISION
ST. GEORGE, UTAH

⊠ Approximate test pit location

(#') Approximate depth to mudstone bedrock



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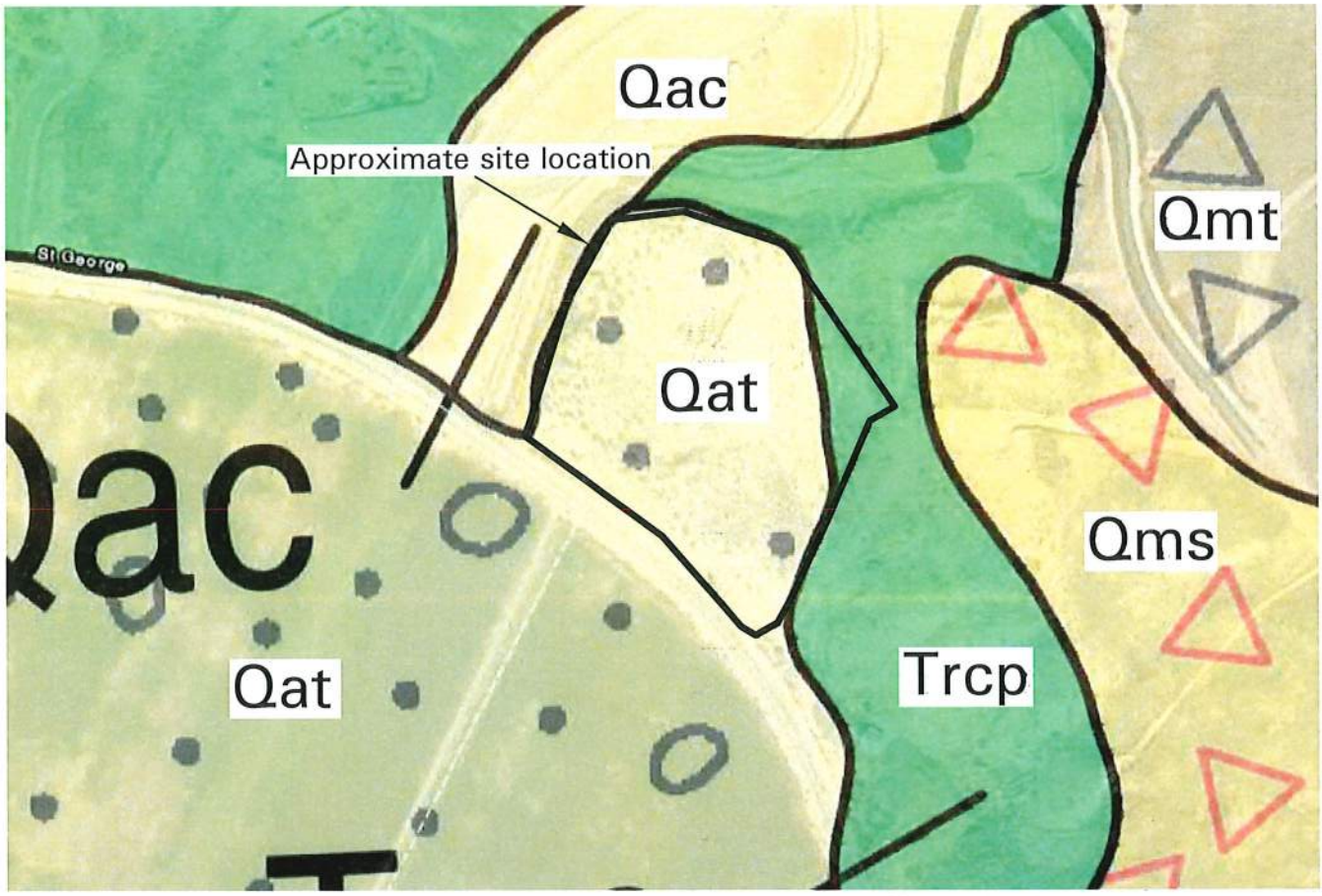
Not to Scale

2220105	AGEC	Site Plan	Figure 2



Geologic Map of the St. 7.5' Quadrangle, Washington County, Utah, UGS Map 251DM, 2011, Janice M. Haden and Grant C. Willis

Key:

TRcp: Petrified Forest Member (Upper Triassic); Varicolored, typically gray to purple mudstone, claystone, and siltstone,

Qat: Old river and stream deposits (Holocene to middle Pleistocene); Stratified, moderately to well-sorted alluvial gravel, sand, silt, and minor clay that forms level to gently sloping terraces above modern drainages;

Qms: Landslide deposits (Holocene to middle[?] Pleistocene); Poorly sorted, clay- to boulder-size, locally derived material deposited by rotational and translational landslide movement; characterized by hummocky topography and small ponds

Qmt: Talus (Holocene to upper Pleistocene); Poorly sorted, angular boulders and finer-grained interstitial sediment deposited principally by rock fall on and at the base of steep slopes; typically grades downslope into colluvial deposits and may include colluvial deposits where impractical to differentiate the two;

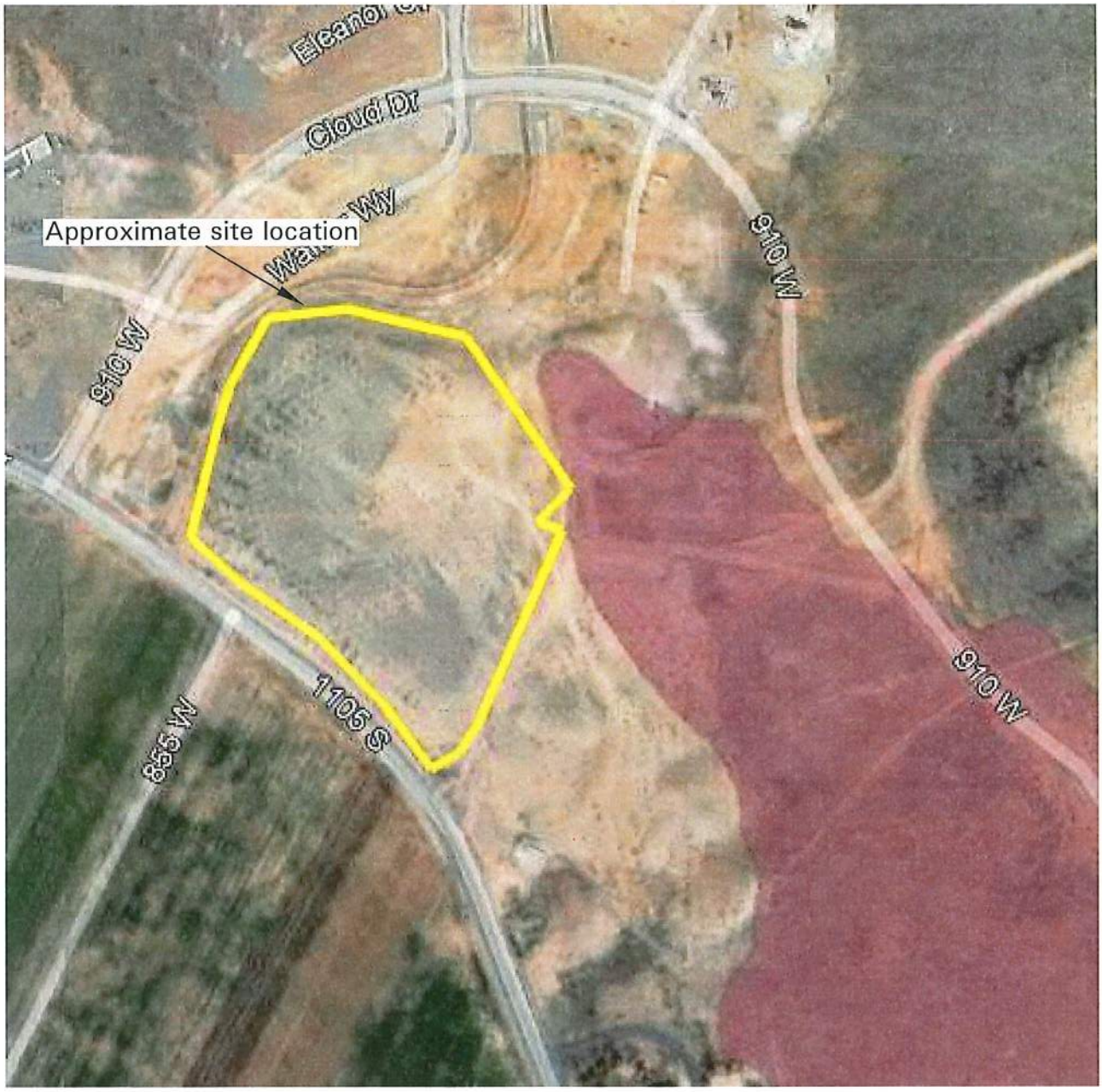
Qac: Alluvial and colluvial deposits (Holocene to upper Pleistocene); Poorly to moderately sorted, generally poorly stratified, clay- to boulder-size, locally derived sediment deposited principally in swales, small drainages, and the upper reaches of large streams by fluvial, slope-wash, and creep processes;

TEMPLE TRAIL SUBDIVISION
ST. GEORGE, UTAH

N

Not to Scale

2220105	AGEC	Geology Map	Figure 3



Landslide-Hazard Map for the St. George-Hurricane Metropolitan Area, Washington County, Utah, UGS Special Study 127 2008, W.R. Lund, T.R. Knudson, G.S. Vice and L.M. Shaw

Key

Very High: existing landslides (Category A)

N

Not to Scale

TEMPLE TRAIL SUBDIVISION
ST. GEORGE, UTAH

2220105	AGEC	Landslide Map	Figure 3a

Rock-Fall-Hazard Map for the St. George-Hurricane Metropolitan Area, Washington County, Utah, UGS Special Study 127 2008, W.R. Lund, T.R. Knudson, G.S. Vice and L.M. Shaw

Key

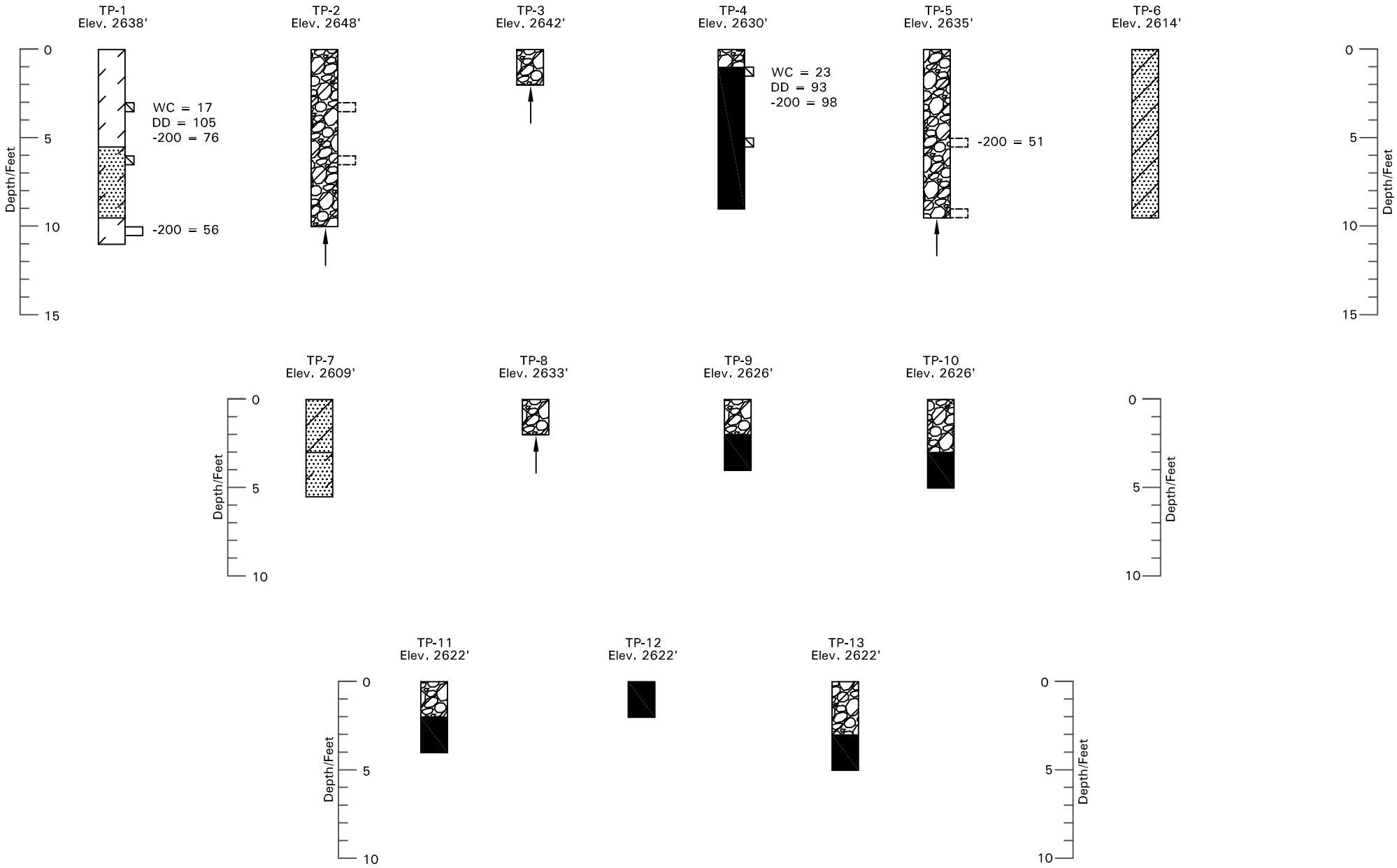
High Hazard

TEMPLE TRAIL SUBDIVISION
ST. GEORGE, UTAH

N

Not to Scale

2220105	AGEC	Rock-Fall Hazard Map	Figure 3b



2220105	AGEC	Logs of Test Pits	Figure 4

LEGEND:

Sandy Lean Clay (CL); soft to medium stiff, dry to slightly moist, red to purple.

Clayey Sand with Gravel (SC); medium dense, slightly moist, red-brown.

Silty Sand (SM); medium dense, moist, light brown in color.

Silty Gravel with Sand (GM); dense to hard, zones of high cementation, cobbles and occasional boulders, dry to slightly moist, grey-brown.

Mudstone Bedrock (Blue Clay); soft to medium hard, slightly moist, purple to red and grey.

Indicates relatively undisturbed hand drive sample taken.

Indicates disturbed sample taken.

Indicates practical backhoe refusal on cemented gravel.

NOTES:

1. The test pits were excavated on January 8 and August 26, 1996 with a mini excavator.
2. The locations of the test pits were measured by pacing from features shown on the site plan provided.
3. The elevations of the test pit were estimated by interpolating between the contours shown on the site plan provided.
4. The test pit locations and elevations should be considered accurate only to the degree implied by the method used.
5. The lines between the materials shown on the test pit logs represent the approximate boundaries between material types and the transitions may be gradual.
6. Free water was not encountered in the test pits at the time of excavation.
7. WC = water content (%);
   DD = dry density (pcf);
   -200 = percent passing No. 200 sieve.

APPENDIX A

Rockfall Hazard Evaluation Report

March 24, 2022

Feller Enterprises
708 East 1100 South
St George, Utah 84790

Attention: Tyson Feller
EMAIL: tyson@fellerent.com

Subject: Rockfall Hazard Assessment
Temple Trail Canyon Subdivision
Indian Hills Drive
St George, Utah
Project No. 2220105

Mr. Feller:

Applied Geotechnical Engineering Consultants, Inc. (AGEC) was requested to evaluate potential rockfall hazard for the proposed Temple Trail Canyon Subdivision located on the north side of Indian Hills Drive across from Gubler Lane in St George, Utah.

PROPOSED CONSTRUCTION

We understand the area is planned for single-family residences.

GEOLOGY

The geology of the site is mapped by Hayden and Willis (2011) to consist predominantly of Quaternary alluvium, some colluvium and some areas of bedrock. The bedrock underlying the site is mapped as the Triassic Petrified Member of the Chinle Formation. The nearest outcrops that would produce rockfall material is the Quaternary Cedar Bench Lava Flow exposed near the top of the airport bluff east of the site.

SITE DESCRIPTION

Much of the site appears to have been mined for gravel. It is currently undeveloped land.

Vegetation at the site consists of a sparse coverage of grass and brush.

The general topography of the site consists of relatively level ground through the middle and moderate slopes along the north, south and west sides.

There is residential development under construction to the north and west and undeveloped land to the south and east. Indian Hills Drive borders the south side of the property.

ROCKFALL EVALUATION

A site visit was performed and finds no evidence of rockfall source close enough to the site to be a hazard for the proposed development. The closest cliffs with rock outcrops that could produce rockfall material are located approximately 780 feet east of the east side of the development. Assuming a conservative shadow angle of 20 degrees from the cliff base, the proposed subdivision is at least 400 feet beyond the potential rock-runout zone. Rockfall is not considered to be a hazard for the proposed development.

LIMITATIONS

This letter has been prepared in accordance with generally accepted geologic engineering practices in the area for the use of the client. The conclusions included in the letter are based on conditions observed during our site visit and the topographic information obtained from the Utah AGRC website.

If you have questions or if we can be of further service, please call.

Sincerely,

APPLIED GEOTECHNICAL ENGINEERING CONSULTANTS, INC.

Douglas R. Hawkes, P.E., P.G.

Reviewed by JEN, P.E.

DRH/rs

Reference:

Hayden, J.M. and Willis, G.C. 2011; Geologic map of the St George quadrangle, Washington County, Utah, Utah Geological Survey Map 251DM.

APPENDIX B

Site Photos

Photo No. 1, View of northeast portion of the site looking west.

Photo No. 2, View of east edge of site looking south along proposed access road.

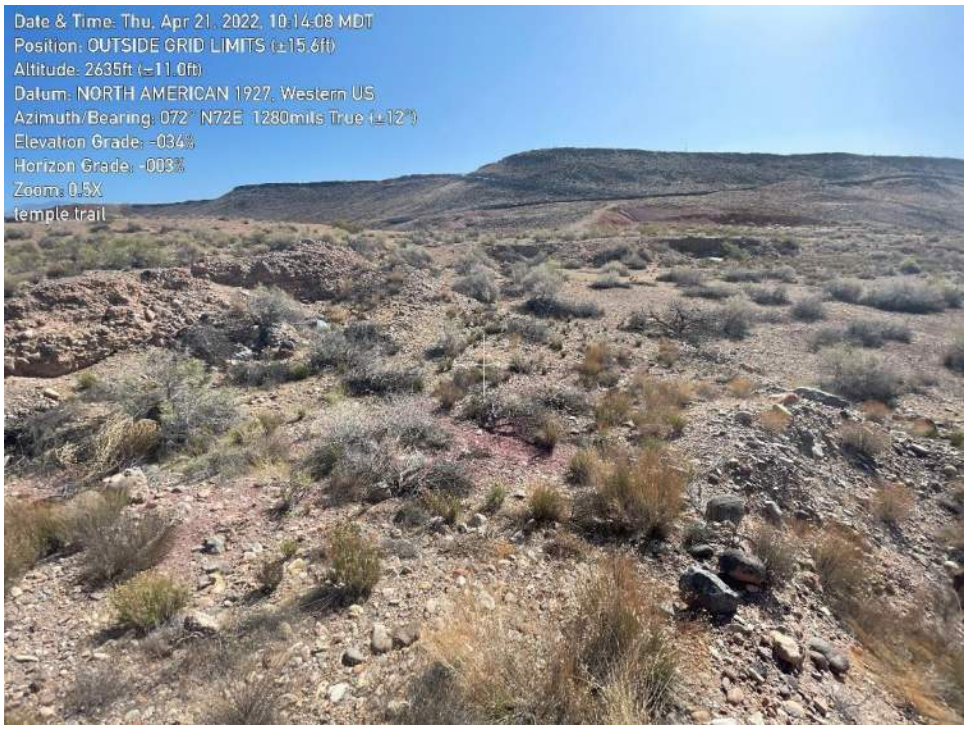


Photo No. 3, View of site looking east, from near west edge of the site.

Photo No. 4, View of south edge of site near SWC, looking southeast along Indian Hills Drive.

Photo No. 5, View of west edge of site looking north.

Photo No. 6, View of northwest corner of the site looking west.

Photo No. 7, View of site looking south from near north center of the site.

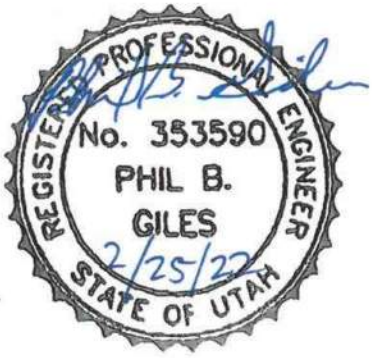
Photo No. 8, View of east edge of site looking south.

Preliminary
Drainage Study Report

Temple Trail Canyon Subdivision – Phase 1

Owner:
Gary W Carter LP

Prepared by:
Mainline Engineering LLC
Phil Giles, PE
321 N. Mall Drive, Ste. T101
St. George, UT 84790
435-669-4810



Prepared February, 2022

Table of Contents

Section 1: Introduction

1.1 Background

The following Drainage Control Plan and Report is submitted in support of the proposed Temple Trail Canyon Subdivision – Phase 1, located in St. George, Utah in the southwest 1/4 of the northwest 1/4 and the southeast 1/4 of the northwest 1/4 of Section 36, Township 42 South, Range 16 West, Salt Lake Base and Meridian.

1.2 Purpose and Need

This report has been prepared to evaluate the drainage needs affecting the proposed construction of the project site. The 10+ acre subdivision with a R-1-10-Overlay will consist of 19 residential lots and associated streets. The purpose of this study is to:

- determine the drainage patterns of the stormwater within the proposed site improvements, both prior to, and following, project construction;
- estimate peak runoff amounts and subsequent storage capacity for stormwater detention; and
- design hydraulic improvements as required by Hurricane City Standards.

1.3 Reference Materials

This study references and demonstrates compliance with the following published documents:

- St. George City General Plan adopted July 11, 2002 – publicly available on St. George City's website.
- St. George Stormwater Management Plan 2.0 Update January 2020 – publicly available on St. George City's website.
- St. George City Drainage Manual May 2009 – publicly available on St. George City's website.

Additional reference materials prepared as part of this report can be found in the following appendices:

- Appendix A, Figures, Maps, and Calculations

Section 2: Property Description

2.1 Existing Property Description

The undeveloped site is covered in native vegetation with varying slopes draining from northeast to southwest. There is a natural drainage to the north of the proposed subdivision. No impacts are proposed for the existing wash. The site consists primarily of gravelly and rocky soils with shallow clay. The site discharges to the existing Indian Hills Drive. See Appendix A, Figure 2 for existing watershed boundary and topographic information. The site is relatively flat with some steeper slopes ranging from 5% to 50%.

Bordering properties including Indian Hills Drive to the west, Black Ridge Cove to the north, and the remaining area is surrounded by the owners' private property.

2.2 Proposed Property Improvements

The proposed Temple Trail Canyon Subdivision – Phase 1 has a R-1-10 Overlay consisting of 19 residential lots. The subdivision includes 10.6 acres but on 8.64 acres will be improved. The remaining area will be left undisturbed. These lot sizes and the planned roadways comply with St. George's current General Plan. There are no existing irrigation facilities on the site and no downstream irrigation facilities that will be negatively impacted by modification of the drainage patterns within the local site.

Roadways within the proposed development and adjacent to the proposed development include the following:

- Indian Hills Drive collector roadway (66' ROW) running north/south along the west boundary of the proposed subdivision. It will be widened along the proposed project frontage.
- All proposed roadways within the subdivision will be 50' ROW local public roadways.

Existing private property owned by the owner borders the project to the east and south. Neither of these properties will be improved with this project. The proposed site grading plan will convey water through the subdivision by a combination of lot grading and street improvements to a detention facility located at the low point of the subdivision at the southwest corner of the property. All streets will have a minimum running slope of 0.5% and a cross slope of 2%. Detention will be used to limit offsite discharges which will outfall to the existing drainage system in Indian Hills Drive.

Refer to Appendix A, Figure A3 for developed conditions.

Section 3: Off-Site Drainage Description

Due to the existing topography, there are no offsite sheet flow or point discharges onto the proposed subdivision. There is an existing drainage channel on the northwest side of the project that will not be impacted by the improvements. The undeveloped portion of the subdivision will continue to drain into the existing wash. All drainage leaves the developed portion of the project to the south and west. There are no other storm drain systems, washes, or conveyance that need to be considered with the project.

Section 4: On-Site Drainage Description

The undeveloped site drains to the south and west boundaries. There is no existing storm infrastructure adjacent to the project site and all storm water from the project site surface flows down to Indian Hills Drive.

The proposed site grading plan will continue to convey water to the south and west through the subdivision by a combination of lot grading, street improvements, and a storm drain system. Both the existing site and the developed site were modeled using the area determined from the proposed developed areas. A composite curve number was used to represent the developed site.

Section 5: Master Planned Drainage

The FPBP has been developed and approved through the City and meets the Master Planned Drainage requirements. This project will comply with providing detention for any increased flow from the developed conditions.

Section 6: FEMA Floodplain Requirements

According to the FEMA Flood Insurance Rate Map number 49053C0845G, dated April 2, 2009 the site is located in Zone X. Zone X is defined as "Area of Minimal Flood Hazard" or "Areas Determined to be Outside the 0.2% Annual Chance Floodplain". The web-based dynamic FIRM is located in Appendix A as Figure A4. This site is not located in any floodplain or floodways as designated by FEMA.

Section 7: Other Drainage Studies Affecting the Property

There are no other drainage studies that are specific to the subject site that would need to be considered as part of the evaluation herein.

Section 8: Description of Proposed Drainage Facilities

The proposed project drainage improvements will include site grading and roadway improvements. All proposed interior drainage improvements were designed in accordance with the City of St. George Drainage Manual using the 10-year, 3-hour storm event runoff values for the minimum initial system (storm drain) and the Farmer Fletcher distribution for the 3-hour 10-year and 100-year events, and the SCS Type II distribution for the 24-hour, 10-yr and 100-year storm event runoff values for the major system (site improvements). The 100-year, 24-hr event was used to calculate the discharge. The design complies with the Drainage Manual for site improvements, open channel, culvert, and detention analyses. Detention was designed for the 100-year, 3-hour event. This event produced the greatest discharge from the site. No emergency spillway will be provided due to the small basin size and the fact that it is adjacent to the existing roadway. The basin will include 1 foot of freeboard to offset any potential increased volume. Refer to Appendix A for output tables and worksheets.

8.1 Grading

The proposed grading plans include the establishment of proposed building pads to be above the street flow lines in accordance with St. George City requirements.

8.2 Roadway Improvements

There are currently no roadways within the proposed site. Planned roads will be built to convey the 100-year, 3-hour storm event inside the right-of-way.

8.3 Conveyance Improvements

No significant conveyance improvements will be constructed with this project.

Section 9: Compliance with Local and FEMA Requirements

The hydrologic calculations, hydraulic design, and construction recommendations summarized in this report were performed in accordance with standard and accepted engineering practice. Other calculations, design methods, and assumptions utilized in this report not specifically addressed in the Hydrology Manual or by FEMA were based on civil engineering practices acceptable to the industry, with specific references cited in the report. No part of this project is located within, or adjacent to, a floodplain designated by FEMA.

The only deviation from the St. George City Drainage Manual was to use site-specific rainfall data from the NOAA Atlas 14 rather than a generic city-wide rainfall event. No other deviations from the processes approved in the Drainage Manual were made during the analysis of the subject site or preparation of this report.

Section 10: Design Runoff Computations

10.1 Selection of Hydrologic Model

Storm run-off (or discharge) resulting from a precipitation event is the portion of the rainfall that remains after losses from reservoir storage, interception by vegetation, and infiltration into the soil. The amount of rainfall that is lost depends on soil type and moisture content, vegetation type and cover density, rainfall rate and duration, and amount and location of impervious surfaces. Several methods have been developed for estimating the run-off rate and volume from a watershed in response to rainfall when statistical information is not available. The NRCS WinTR-55 software was used for the evaluation in this study.

10.2 Model Input Parameters

The input parameters selected for computing discharge were derived in accordance with procedures developed by the City of Hurricane. The model uses the following input parameters to compute peak flow runoff values for each sub-area evaluated:

- SCS Curve number, used to estimate loss rates and resulting storm water run-off excess, based on soil type, land use and vegetation type and cover density.
- Watershed area
- SCS Lag Time, the time required for a particle of water to flow hydraulically from the most distant point in the watershed to the outlet or design point.
- Rainfall depth for a given storm duration.
- Time distribution of rainfall, describes how the total rainfall depth is distributed over the storm duration.

10.3 Curve Number

Table 10-1 lists the estimated SCS run-off curve number for the pre- and post-developed site, which is based upon soil type, land use, vegetation type, and vegetation cover density. Site soil type was identified as Soil Group C using the NRCS Soils Hydrologic Soil Group (HSG) county map. The majority of the project was listed as gravel pit without a hydrologic soil group list, but based on preliminary geotechnical investigations, the gravel is underlayne by clayey material. Therefore a Soil Group C was

used to better reflect the native material. The post-developed site consists of residential development of single-family residential lots.

10.4 Watershed Area

The watershed boundary was delineated for both the existing site and the proposed developed site, and is illustrated in Appendix A, Figures A2 and A3, and summarized in Table 10-2.

10.5 SCS Lag Time

Watershed lag time (t_p) is the time from the center of mass of rainfall excess to the peak of the storm runoff hydrograph. This was determined using the SCS lag equation and are summarized in Table 10-2. Watershed calculations can be found in Appendix A. For this model, the kinematic wave method was used to simulate rainfall runoff routing. This method simulates the travel time for overland flow, gutter flow and collector pipe flow. Utilizing this method in WinTR-55 will attenuate and translate basin rainfall to runoff.

10.6 Rainfall Depth

A 100-year, 3-hour cloudburst design storm was used to determine peak flows at the site. 10-year and 100-year, 24-hour design storms were calculated to evaluate storm runoff detention volumes. The NOAA Atlas 14 was used to obtain site-specific precipitation for the 3-hour, 100-year rainfall depth of 1.64 inches, the 24-hour, 10-year rainfall depth of 1.51 inches, and the 24-hour, 100-year rainfall depth of 2.21 inches.

10.7 Time Distribution of Rainfall

The Farmer-Fletcher distribution was used for the 3-hour 10-year and 100-year events. The SCS Type II distribution was used for the 24-hour, 100-year event. Table 10-2 summarizes additional model input data that was used to calculate the storm data.

TABLE 10-1 - CURVE NUMBER DEVELOPMENT

Cover Type	CN	Pre-Development		Post-Development	
		Area (SF)	% Area	Area (SF)	% Area
Undeveloped (Desert, good)	81	376,460	100%		
Natural Desert Landscaping	88			132,960	35.3%
Lawn	80			76,000	20.2%
Impervious Area	98			167,500	44.5%
Total (Sq Ft)		**376,460**	**100%**	**376,460**	**100%**
Total (Ac)		**8.64**		**8.64**	
Composite CN			**81**		**89**

TABLE 10-2 - SUB-BASIN CHARACTERISTICS AND MODEL INPUT

Basin Name	Area		Avg Slope	SCS Curve #	Longest Length	t_c
	(ac)	(sq mi)	%		L_o (Feet)	(min)
Pre-Development	8.64	0.014	5.3%	81	852	15.7
Post-Development	8.64	0.014	4.2%	89	1,385	23.0

10.8 Model Output

Table 10-3 provides detail for the model output including maximum discharge rates, piped flow rates, and detention discharge rates. The routing of 24-hour flows (10 year & 100 year) was performed in Microsoft Excel using time-data output from the WinTR-55 model for post-developed flows and is shown in the appendices.

TABLE 10-3 - PEAK FLOWS			
		POST-DEVELOPMENT	
STORM EVENT	PRE-DEVELOPMENT PEAK FLOW (CFS)	ENTERING DETENTION BASIN (CFS)	LEAVING DETENTION BASIN (CFS)
10-YR, 24-HR	2.83	5.06	2.80
100-YR, 3-HR	7.96	15.53	7.10
100-YR, 24-HR	7.42	10.50	7.10

The post-development flow leaving the detention basin was calculated as 7.10 cfs.

See calculation sheets in the appendix.

Section 11: Drainage Facility Design Calculations

11.1 Storm Improvements

Onsite runoff from the 10-year, 24-hour storm event will be contained within the streets without overtopping the curb and will be captured by a pipe/catch basin system and conveyed to the onsite detention basin.

All storm drain improvements will be maintained through public right of way and maintenance access easements.

11.2 Roadway Improvements

Runoff from the 100-year, 24-hour storm event will be contained in the interior streets without overtopping the curb.

11.3 Detention Requirements

The 10-year, 24-hour storm event will be discharged from the detention basin using appropriately sized orifices. The 100-year, 24-hour storm event requires 3,034 cubic feet of detention. This detention will be accommodated by a newly developed detention basin located at the southwest corner of the subdivision. To control the discharge from the detention basin area, an outlet structure will be constructed including accommodations for initial discharge, overflow discharge, and emergency overflow. A circular 18-inch pipe outlet will accommodate discharge flows from each detention basin. Calculation sheets are included in the appendix.

Access to the detention basin for maintenance of the facilities will be from Indian Hills Drive which borders the proposed basins on the west side.

Section 12: Required Drainage Easement and Rights-of-Way

No easements or rights-of-way will be required beyond the use of public street rights-of-way for storm drainage collection and conveyance.

Section 13: FEMA Floodway and Floodplain Calculations

This site is not located in or next to any floodplain or floodways as designated by FEMA. Refer to Sections 6 and 9 for a detailed description.

Section 14: Low Impact Development

Low impact development will be accomplished by providing a retention/infiltration basin as part of the detention basin. The water level of the retention basin will be controlled by installing 2 - 6" orifices at an elevation that will allow retention in the basin. The details of these Water Quality BMPs are included in the Appendices as part of the "Improved Analysis..." worksheet and the Storm Water Quality Report.

Section 15: Conclusions and Statement of Compliance

14.1 Conclusions

The following conclusions summarize the recommendations proposed for this development:

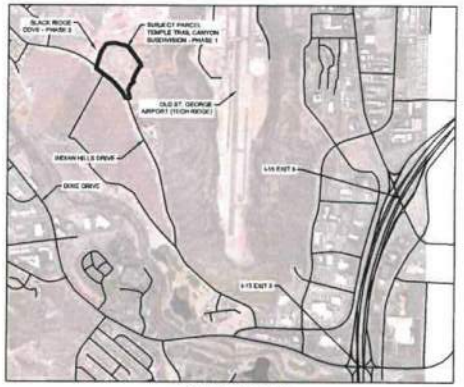
A. Offsite Drainage: No offsite drainage will be considered with this project.
B. Onsite Drainage: Storm water will be collected in interior streets. Runoff from the subdivided lots will run southwesterly through the public rights-of-way and pipes/catch basin system to the southwest corner of the subdivision where it will be discharged into the detention/retention basin. The detention basin will be discharged at pre-development rates to the Indian Hills Drive existing 30" storm drain system.
C. Detention and Retention Requirements: Total volume for the project was calculated as 3,034 cubic feet. Additional capacity will be provided for freeboard and an emergency spillway.
D. FEMA Floodplain: This site is not located inside any floodplains designated by FEMA.

Appendix A – Figures, References & Calculations

LOCATION MAP FOR

TEMPLE TRAIL CANYON SUBDIVISION - PHASE 1

IN ST. GEORGE CITY



VICINITY MAP

MAINLINE ENGINEERING

MAINLINE ENGINEERING
331 NORTH MAIN, DRIVE
SUITE 1101
ST. GEORGE, UT 84770

GARY W. CARTER LP
726 WEST INDIAN HILLS DRIVE
ST. GEORGE, UT 84770

NO	REVISIONS	BY	DATE

DRAWN BY: TAR
CHECKED BY: PBG
DATE: 1/28/22

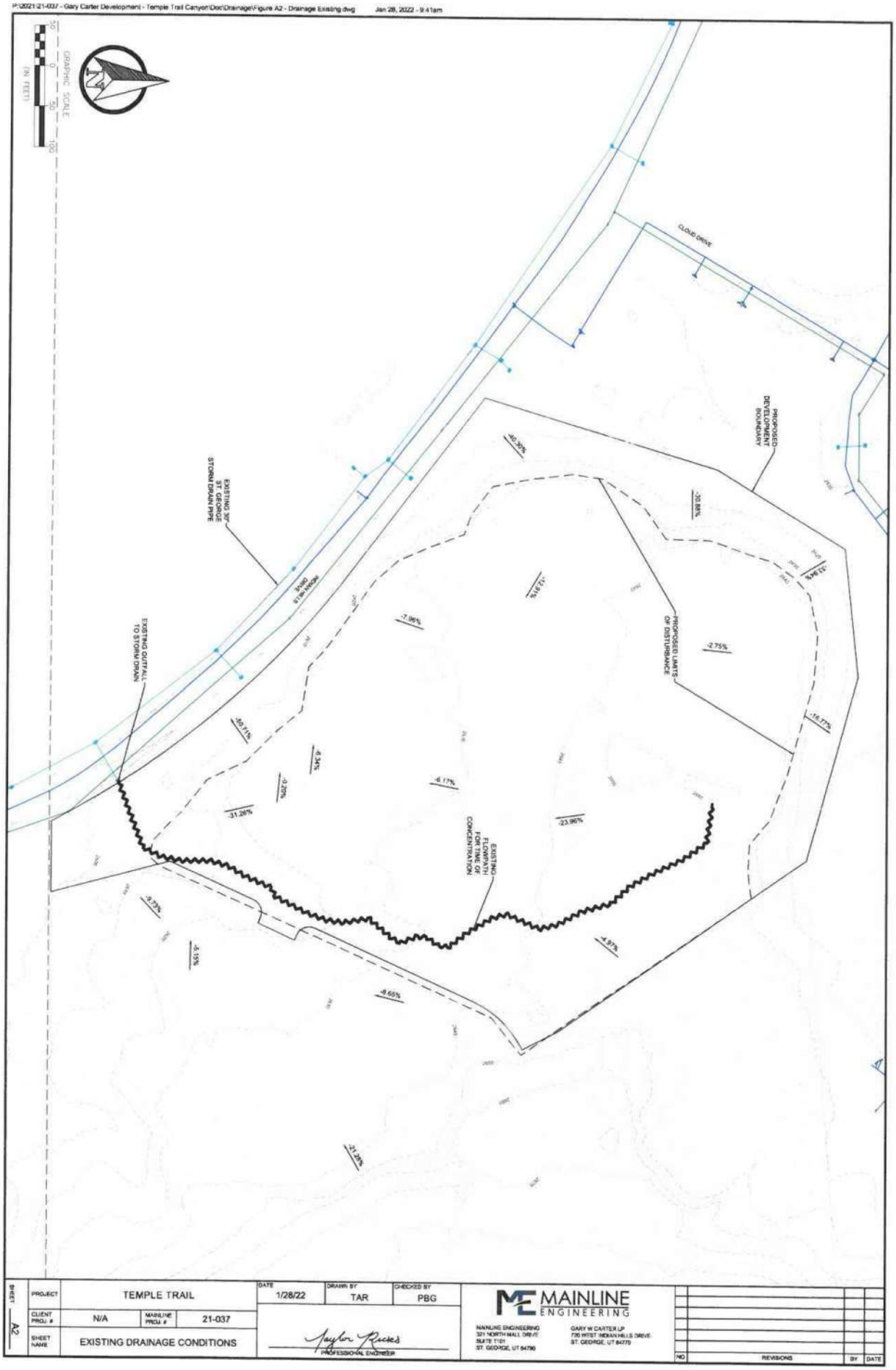
PROFESSIONAL ENGINEER

PROJECT	TEMPLE TRAIL
CLIENT PROJ. #	N/A
MAINLINE PROJ. #	21-037
SHEET NAME	PROJECT LOCATION MAP

SHEET: A1

P:\2021\21-037 - Gary Carter Development - Temple Trail Canyon\Doc\Dra ngs\Figure A1 - Location Map.dwg Jan 28, 2022 - 9:03am

P:\2021\21-037 - Gary Carter Development - Temple Trail Canyon\Doc\Drainage\Figure A2 - Drainage Existing.dwg Jan 28, 2022 - 9:41am



SHEET A2	PROJECT	TEMPLE TRAIL	DATE 1/28/22	DRAWN BY TAR	CHECKED BY PBG
	CLIENT PROJ. #	N/A	MAINLINE PROJ. #	21-037	
	SHEET NAME	EXISTING DRAINAGE CONDITIONS			

Taylor Ricks
PROFESSIONAL ENGINEER

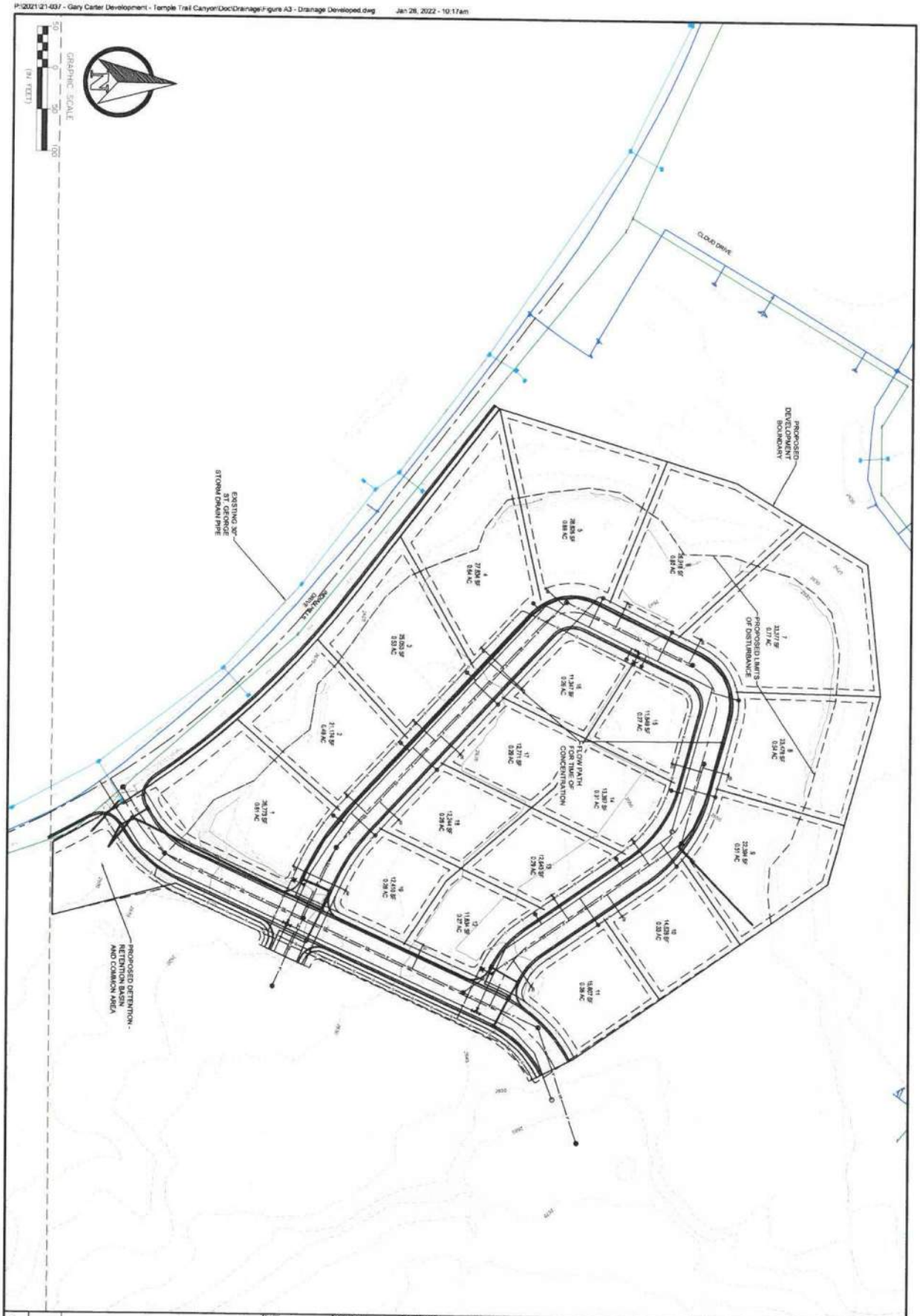
MAINLINE ENGINEERING

MAINLINE ENGINEERING
321 NORTH MALL DRIVE
SUITE T101
ST. GEORGE, UT 84790

GARY W CARTER LP
730 WEST INDIAN HILLS DRIVE
ST. GEORGE, UT 84770

NO.	REVISIONS	BY	DATE

P:\2021\21-037 - Gary Carter Development - Temple Trail Canyon\Doc\Drainage\Figure A3 - Drainage Developed.dwg Jan 28, 2022 - 10:17am



SHEET A2	PROJECT	TEMPLE TRAIL		DATE 1/28/22	DRAWN BY TAR	CHECKED BY PBG	
	CLIENT PROJ. #	N/A	MAINLINE PROJ. # 21-037				
	SHEET NAME	DEVELOPED DRAINAGE CONDITIONS		Taylor Rocks PROFESSIONAL ENGINEER			

MAINLINE ENGINEERING
321 NORTH MALL DRIVE
SUITE T101
ST. GEORGE, UT 84790

GARY W CARTER LP
730 WEST INDIAN HILLS DRIVE
ST. GEORGE, UT 84770

NO	REVISIONS	BY	DATE

National Flood Hazard Layer FIRMette

FEMA

113°36'22"W 37°5'37"N

0 250 500 1,000 1,500 2,000 Feet 1:6,000

113°35'44"W 37°5'8"N

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 1/27/2022 at 12:38 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

Soil Map—Washington County Area, Utah

Map Scale: 1:2,560 if printed on A portrait (8.5" x 11") sheet.

N

0 35 70 140 210 Meters

0 100 200 400 600 Feet

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 12N WGS84

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 15, Sep 7, 2021

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

Date(s) aerial images were photographed: Jun 1, 2018—Aug 1, 2018

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
GA	Gullied land	1.4	7.6%
GP	Gravel pits	8.4	46.0%
IAF	Isom cobbly sandy loam, 3 to 30 percent slopes	3.9	21.2%
LeB	Leeds silty clay loam, 1 to 2 percent slopes	0.7	3.6%
SY	Stony colluvial land	3.9	21.5%
Totals for Area of Interest		**18.3**	**100.0%**

NOAA Atlas 14, Volume 1, Version 5
Location name: Ephraim, Utah, USA*
Latitude: 39.4°, Longitude: -111.6°
Elevation: 5445.64 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	0.101 (0.091-0.114)	0.130 (0.116-0.149)	0.182 (0.163-0.206)	0.226 (0.199-0.257)	0.297 (0.255-0.339)	0.359 (0.303-0.411)	0.431 (0.355-0.498)	0.512 (0.411-0.599)	0.641 (0.491-0.765)	0.751 (0.557-0.907)
10-min	0.153 (0.138-0.174)	0.198 (0.176-0.226)	0.277 (0.248-0.314)	0.344 (0.303-0.392)	0.452 (0.388-0.515)	0.547 (0.461-0.626)	0.655 (0.540-0.758)	0.780 (0.625-0.913)	0.975 (0.747-1.16)	1.14 (0.847-1.38)
15-min	0.190 (0.171-0.215)	0.245 (0.218-0.280)	0.344 (0.307-0.389)	0.426 (0.376-0.486)	0.560 (0.481-0.639)	0.678 (0.571-0.777)	0.812 (0.670-0.940)	0.967 (0.775-1.13)	1.21 (0.926-1.44)	1.42 (1.05-1.71)
30-min	0.256 (0.230-0.290)	0.330 (0.293-0.377)	0.463 (0.414-0.524)	0.574 (0.506-0.654)	0.754 (0.648-0.861)	0.913 (0.769-1.05)	1.09 (0.902-1.27)	1.30 (1.04-1.52)	1.63 (1.25-1.94)	1.91 (1.42-2.31)
60-min	0.317 (0.285-0.359)	0.409 (0.363-0.467)	0.573 (0.512-0.648)	0.710 (0.626-0.810)	0.933 (0.802-1.07)	1.13 (0.951-1.29)	1.35 (1.12-1.57)	1.61 (1.29-1.89)	2.02 (1.54-2.40)	2.36 (1.75-2.85)
2-hr	0.389 (0.350-0.435)	0.490 (0.444-0.553)	0.653 (0.593-0.730)	0.804 (0.720-0.897)	1.03 (0.900-1.15)	1.23 (1.06-1.39)	1.46 (1.22-1.67)	1.73 (1.41-1.99)	2.15 (1.67-2.52)	2.52 (1.89-3.00)
3-hr	0.445 (0.407-0.493)	0.555 (0.510-0.612)	0.720 (0.662-0.799)	0.864 (0.784-0.957)	1.08 (0.964-1.20)	1.26 (1.11-1.41)	1.48 (1.27-1.69)	1.74 (1.47-2.00)	2.16 (1.74-2.53)	2.53 (1.98-3.03)
6-hr	0.581 (0.533-0.637)	0.724 (0.669-0.790)	0.897 (0.830-0.983)	1.04 (0.959-1.14)	1.25 (1.13-1.38)	1.42 (1.27-1.58)	1.62 (1.42-1.82)	1.83 (1.58-2.07)	2.25 (1.89-2.60)	2.61 (2.14-3.06)
12-hr	0.733 (0.677-0.792)	0.897 (0.833-0.970)	1.09 (1.01-1.18)	1.25 (1.15-1.35)	1.46 (1.34-1.59)	1.63 (1.48-1.78)	1.80 (1.62-1.98)	1.99 (1.77-2.21)	2.28 (1.98-2.62)	2.62 (2.24-3.09)
24-hr	0.886 (0.816-0.974)	1.09 (1.01-1.20)	1.33 (1.22-1.46)	1.52 (1.39-1.66)	1.77 (1.62-1.94)	1.97 (1.80-2.15)	2.17 (1.96-2.38)	2.37 (2.13-2.61)	2.64 (2.35-2.91)	2.84 (2.51-3.15)
2-day	0.992 (0.919-1.08)	1.22 (1.13-1.33)	1.48 (1.37-1.61)	1.69 (1.56-1.84)	1.98 (1.82-2.15)	2.20 (2.02-2.40)	2.43 (2.22-2.65)	2.67 (2.42-2.92)	2.98 (2.67-3.28)	3.22 (2.86-3.56)
3-day	1.07 (0.986-1.17)	1.31 (1.21-1.44)	1.59 (1.47-1.74)	1.82 (1.68-1.98)	2.13 (1.96-2.32)	2.38 (2.17-2.59)	2.64 (2.39-2.88)	2.90 (2.61-3.17)	3.25 (2.89-3.57)	3.52 (3.11-3.90)
4-day	1.14 (1.05-1.25)	1.41 (1.30-1.54)	1.70 (1.57-1.86)	1.95 (1.79-2.12)	2.29 (2.09-2.49)	2.56 (2.33-2.79)	2.84 (2.56-3.10)	3.13 (2.81-3.42)	3.52 (3.12-3.87)	3.82 (3.36-4.23)
7-day	1.34 (1.24-1.46)	1.65 (1.53-1.81)	1.99 (1.84-2.17)	2.27 (2.10-2.46)	2.64 (2.43-2.87)	2.93 (2.68-3.18)	3.21 (2.94-3.50)	3.50 (3.18-3.83)	3.88 (3.50-4.27)	4.17 (3.72-4.60)
10-day	1.50 (1.39-1.64)	1.85 (1.72-2.02)	2.23 (2.06-2.42)	2.53 (2.34-2.74)	2.93 (2.70-3.16)	3.23 (2.97-3.49)	3.53 (3.23-3.82)	3.82 (3.47-4.15)	4.20 (3.78-4.58)	4.47 (4.01-4.91)
20-day	1.93 (1.79-2.09)	2.37 (2.19-2.57)	2.85 (2.64-3.08)	3.23 (2.99-3.48)	3.70 (3.42-4.00)	4.06 (3.74-4.38)	4.40 (4.05-4.75)	4.72 (4.33-5.12)	5.14 (4.68-5.60)	5.43 (4.92-5.93)
30-day	2.28 (2.11-2.46)	2.81 (2.60-3.04)	3.37 (3.12-3.63)	3.80 (3.51-4.09)	4.36 (4.03-4.69)	4.77 (4.40-5.15)	5.18 (4.76-5.59)	5.57 (5.10-6.03)	6.06 (5.51-6.60)	6.41 (5.80-7.02)
45-day	2.85 (2.65-3.07)	3.50 (3.25-3.77)	4.16 (3.87-4.48)	4.67 (4.34-5.01)	5.31 (4.93-5.69)	5.77 (5.36-6.17)	6.20 (5.75-6.64)	6.59 (6.11-7.07)	7.04 (6.52-7.58)	7.34 (6.78-7.93)
60-day	3.37 (3.14-3.62)	4.14 (3.86-4.45)	4.92 (4.60-5.27)	5.52 (5.15-5.89)	6.27 (5.85-6.68)	6.80 (6.33-7.25)	7.30 (6.78-7.80)	7.76 (7.19-8.31)	8.30 (7.67-8.92)	8.66 (7.98-9.32)

[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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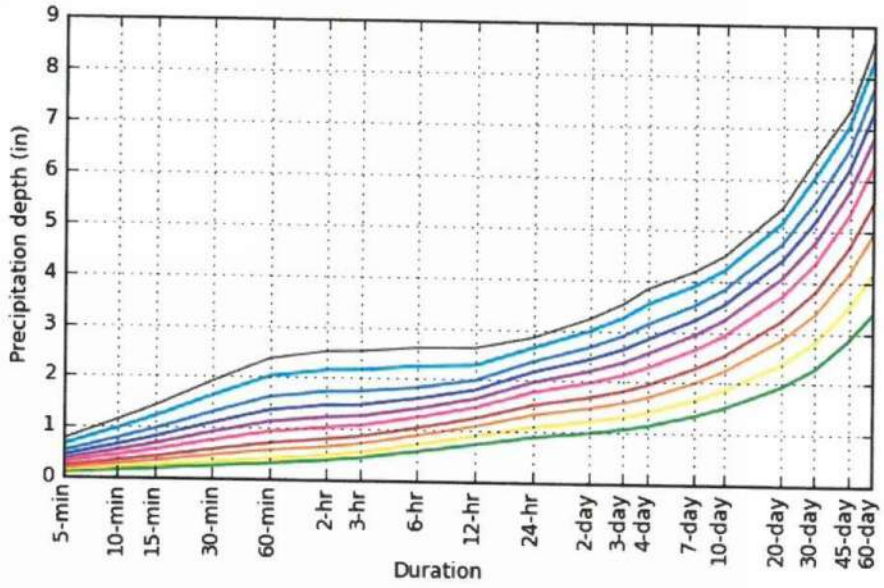
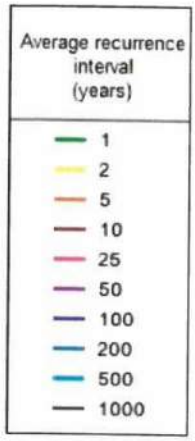
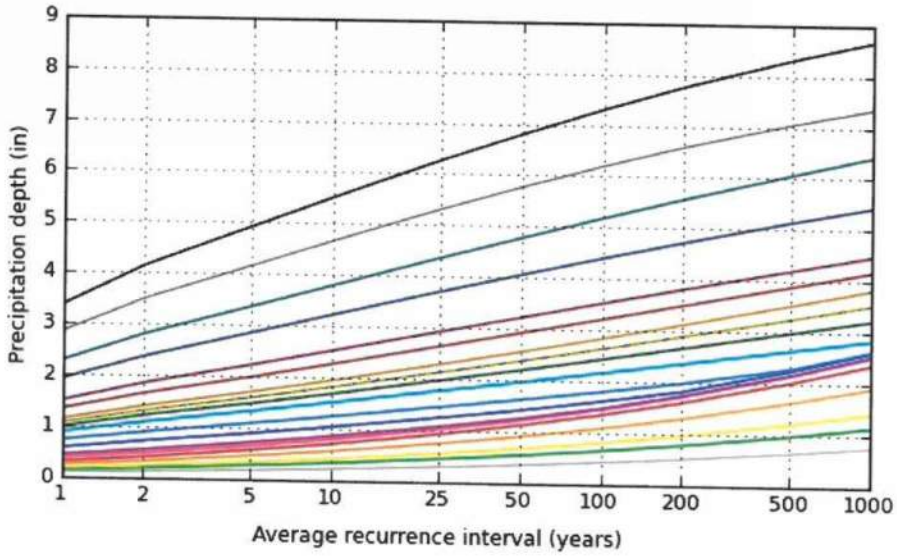
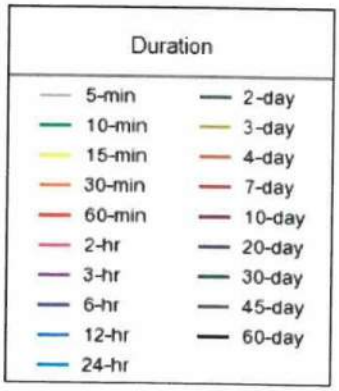
PF graphical

PDS-based depth-duration-frequency (DDF) curves
Latitude: 39.4000°, Longitude: -111.6000°









NOAA Atlas 14, Volume 1, Version 5

Created (GMT): Thu Jan 27 17:42:58 2022

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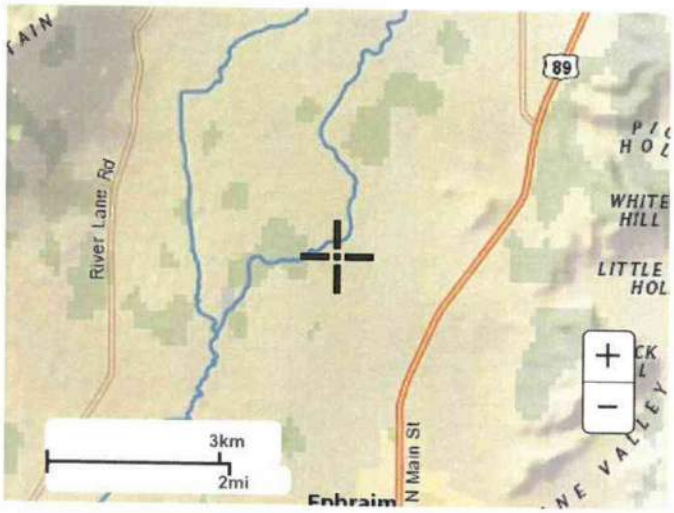
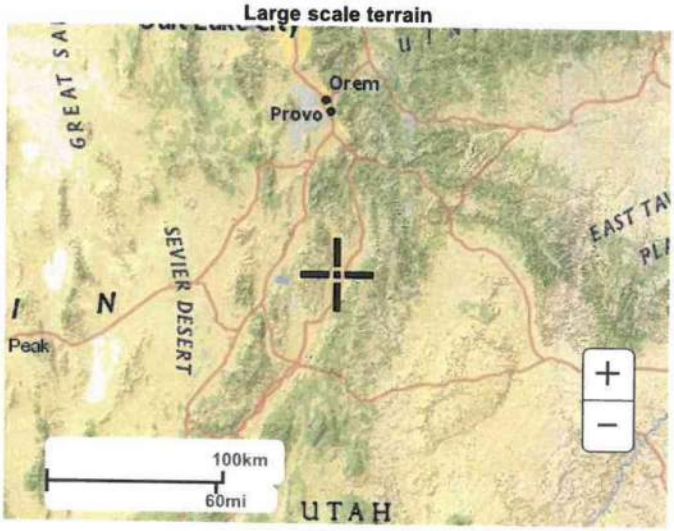
Maps & aerials

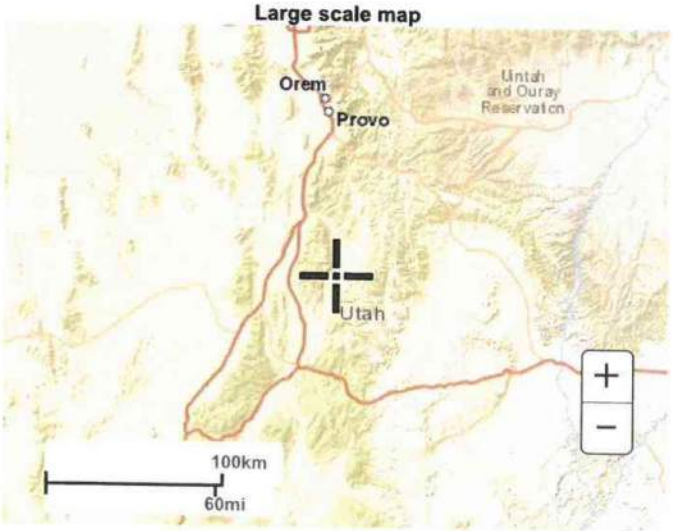
Small scale terrain



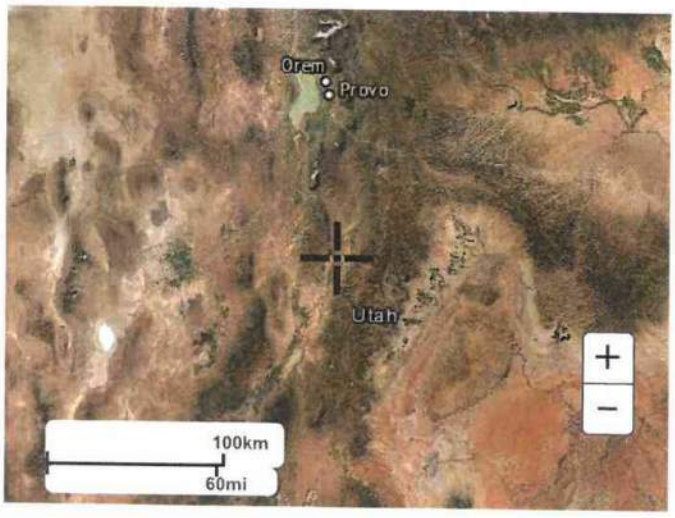
Large scale terrain



Large scale map



Large scale aerial



Back to Top

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

Disclaimer

NOAA Atlas 14, Volume 1, Version 5
Location name: Ephraim, Utah, USA*
Latitude: 39.4°, Longitude: -111.6°
Elevation: 5445.64 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/hour)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	1.21 (1.09-1.37)	1.56 (1.39-1.79)	2.18 (1.96-2.47)	2.71 (2.39-3.08)	3.56 (3.06-4.07)	4.31 (3.64-4.93)	5.17 (4.26-5.98)	6.14 (4.93-7.19)	7.69 (5.89-9.18)	9.01 (6.68-10.9)
10-min	0.918 (0.828-1.04)	1.19 (1.06-1.36)	1.66 (1.49-1.88)	2.06 (1.82-2.35)	2.71 (2.33-3.09)	3.28 (2.77-3.76)	3.93 (3.24-4.55)	4.68 (3.75-5.48)	5.85 (4.48-6.98)	6.86 (5.08-8.28)
15-min	0.760 (0.684-0.860)	0.980 (0.872-1.12)	1.38 (1.23-1.56)	1.70 (1.50-1.94)	2.24 (1.92-2.56)	2.71 (2.28-3.11)	3.25 (2.68-3.76)	3.87 (3.10-4.52)	4.84 (3.70-5.77)	5.67 (4.20-6.84)
30-min	0.512 (0.460-0.580)	0.660 (0.586-0.754)	0.926 (0.828-1.05)	1.15 (1.01-1.31)	1.51 (1.30-1.72)	1.83 (1.54-2.09)	2.19 (1.80-2.53)	2.60 (2.09-3.05)	3.26 (2.49-3.89)	3.82 (2.83-4.61)
60-min	0.317 (0.285-0.359)	0.409 (0.363-0.467)	0.573 (0.512-0.648)	0.710 (0.626-0.810)	0.933 (0.802-1.07)	1.13 (0.951-1.29)	1.35 (1.12-1.57)	1.61 (1.29-1.89)	2.02 (1.54-2.40)	2.36 (1.75-2.85)
2-hr	0.194 (0.175-0.218)	0.245 (0.222-0.276)	0.326 (0.296-0.365)	0.402 (0.360-0.448)	0.516 (0.450-0.577)	0.615 (0.529-0.692)	0.732 (0.612-0.834)	0.866 (0.704-0.996)	1.08 (0.836-1.26)	1.26 (0.943-1.50)
3-hr	0.148 (0.136-0.164)	0.185 (0.170-0.204)	0.240 (0.220-0.266)	0.288 (0.261-0.319)	0.360 (0.321-0.398)	0.420 (0.368-0.470)	0.492 (0.424-0.561)	0.581 (0.488-0.665)	0.720 (0.581-0.841)	0.842 (0.659-1.01)
6-hr	0.097 (0.089-0.106)	0.121 (0.112-0.132)	0.150 (0.139-0.164)	0.174 (0.160-0.191)	0.209 (0.189-0.230)	0.237 (0.213-0.264)	0.270 (0.238-0.303)	0.305 (0.264-0.346)	0.375 (0.315-0.433)	0.435 (0.357-0.511)
12-hr	0.061 (0.056-0.066)	0.074 (0.069-0.081)	0.091 (0.084-0.098)	0.104 (0.096-0.112)	0.121 (0.111-0.132)	0.135 (0.123-0.148)	0.149 (0.134-0.164)	0.165 (0.146-0.183)	0.189 (0.164-0.218)	0.218 (0.186-0.256)
24-hr	0.037 (0.034-0.041)	0.045 (0.042-0.050)	0.055 (0.051-0.061)	0.063 (0.058-0.069)	0.074 (0.068-0.081)	0.082 (0.075-0.090)	0.090 (0.082-0.099)	0.099 (0.089-0.109)	0.110 (0.098-0.121)	0.118 (0.105-0.131)
2-day	0.021 (0.019-0.022)	0.025 (0.024-0.028)	0.031 (0.028-0.034)	0.035 (0.033-0.038)	0.041 (0.038-0.045)	0.046 (0.042-0.050)	0.051 (0.046-0.055)	0.056 (0.050-0.061)	0.062 (0.056-0.068)	0.067 (0.060-0.074)
3-day	0.015 (0.014-0.016)	0.018 (0.017-0.020)	0.022 (0.020-0.024)	0.025 (0.023-0.028)	0.030 (0.027-0.032)	0.033 (0.030-0.036)	0.037 (0.033-0.040)	0.040 (0.036-0.044)	0.045 (0.040-0.050)	0.049 (0.043-0.054)
4-day	0.012 (0.011-0.013)	0.015 (0.013-0.016)	0.018 (0.016-0.019)	0.020 (0.019-0.022)	0.024 (0.022-0.026)	0.027 (0.024-0.029)	0.030 (0.027-0.032)	0.033 (0.029-0.036)	0.037 (0.033-0.040)	0.040 (0.035-0.044)
7-day	0.008 (0.007-0.009)	0.010 (0.009-0.011)	0.012 (0.011-0.013)	0.014 (0.012-0.015)	0.016 (0.014-0.017)	0.017 (0.016-0.019)	0.019 (0.017-0.021)	0.021 (0.019-0.023)	0.023 (0.021-0.025)	0.025 (0.022-0.027)
10-day	0.006 (0.006-0.007)	0.008 (0.007-0.008)	0.009 (0.009-0.010)	0.011 (0.010-0.011)	0.012 (0.011-0.013)	0.013 (0.012-0.015)	0.015 (0.013-0.016)	0.016 (0.014-0.017)	0.017 (0.016-0.019)	0.019 (0.017-0.020)
20-day	0.004 (0.004-0.004)	0.005 (0.005-0.005)	0.006 (0.006-0.006)	0.007 (0.006-0.007)	0.008 (0.007-0.008)	0.008 (0.008-0.009)	0.009 (0.008-0.010)	0.010 (0.009-0.011)	0.011 (0.010-0.012)	0.011 (0.010-0.012)
30-day	0.003 (0.003-0.003)	0.004 (0.004-0.004)	0.005 (0.004-0.005)	0.005 (0.005-0.006)	0.006 (0.006-0.007)	0.007 (0.006-0.007)	0.007 (0.007-0.008)	0.008 (0.007-0.008)	0.008 (0.008-0.009)	0.009 (0.008-0.010)
45-day	0.003 (0.002-0.003)	0.003 (0.003-0.003)	0.004 (0.004-0.004)	0.004 (0.004-0.005)	0.005 (0.005-0.005)	0.005 (0.005-0.006)	0.006 (0.005-0.006)	0.006 (0.006-0.007)	0.007 (0.006-0.007)	0.007 (0.006-0.007)
60-day	0.002 (0.002-0.003)	0.003 (0.003-0.003)	0.003 (0.003-0.004)	0.004 (0.004-0.004)	0.004 (0.004-0.005)	0.005 (0.004-0.005)	0.005 (0.005-0.005)	0.005 (0.005-0.006)	0.006 (0.005-0.006)	0.006 (0.006-0.006)

[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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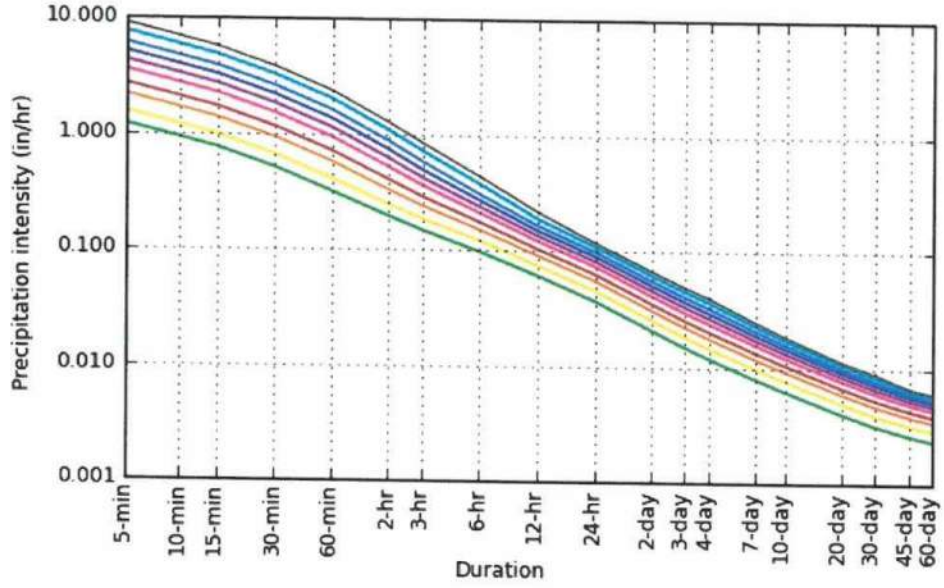
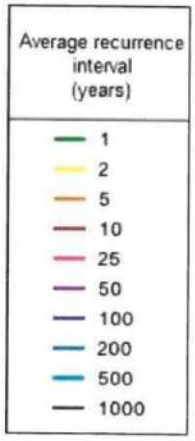
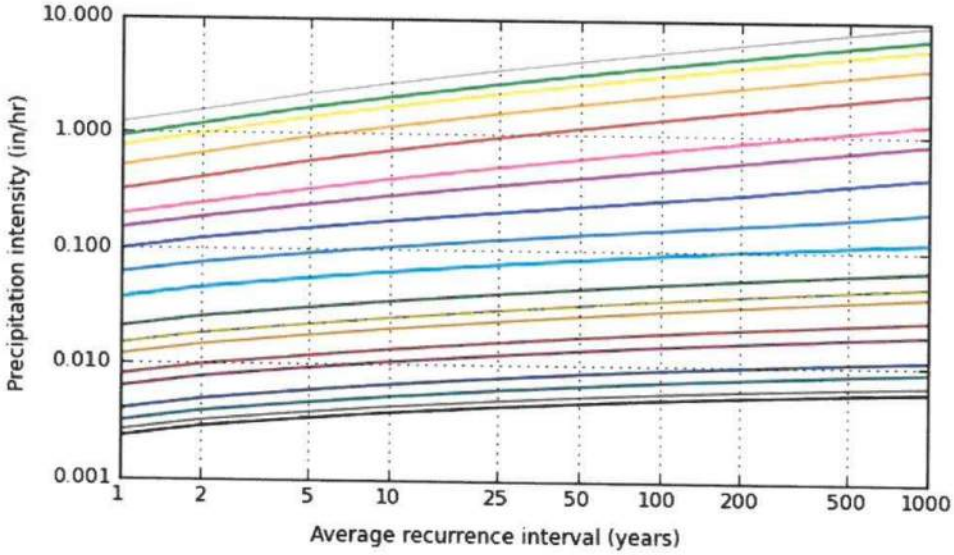
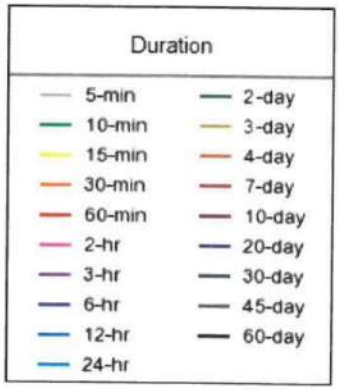
PF graphical

PDS-based intensity-duration-frequency (IDF) curves
Latitude: 39.4000°, Longitude: -111.6000°









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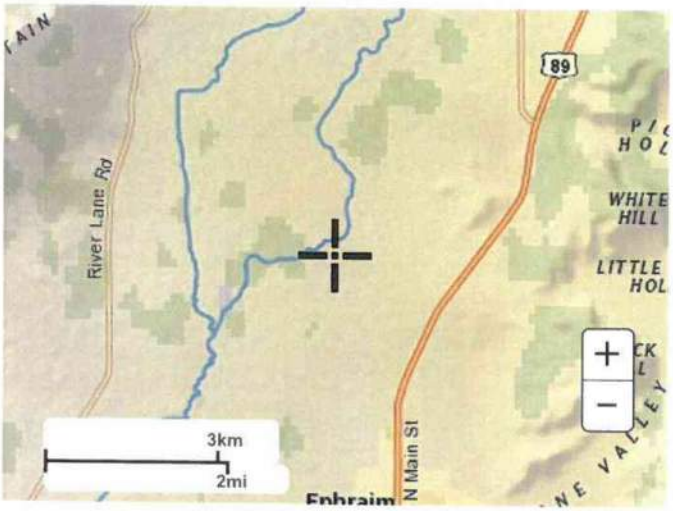
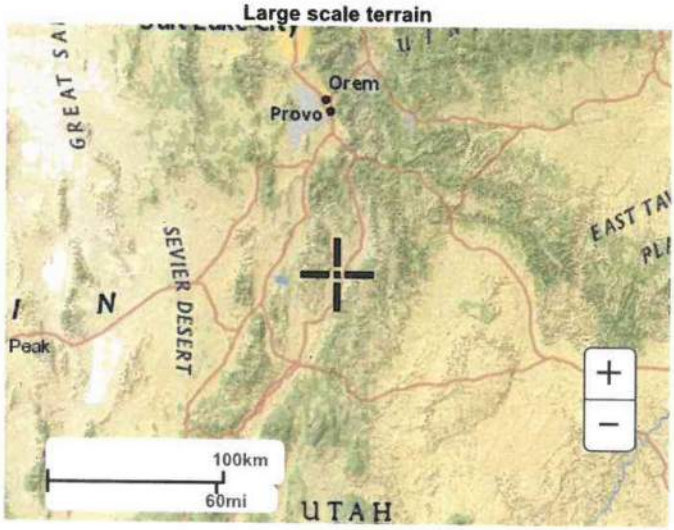
Maps & aerials

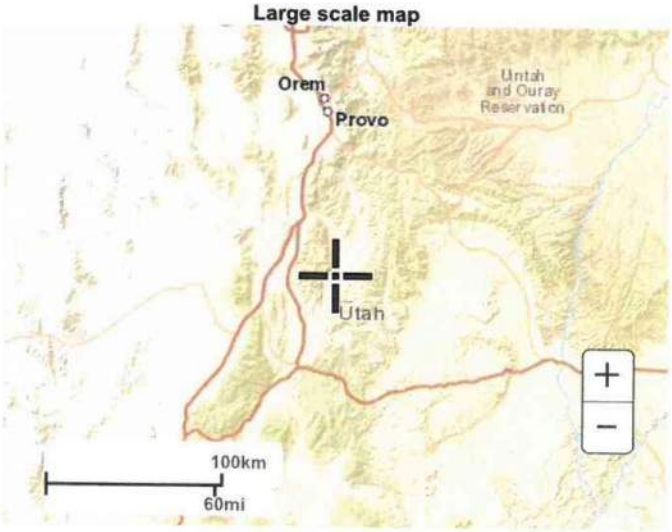
Small scale terrain



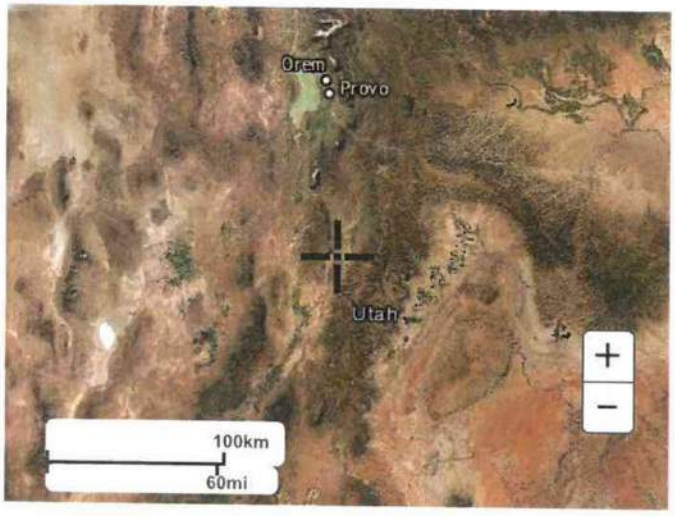
Large scale terrain



Large scale map



Large scale aerial



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Questions?: HDSC.Questions@noaa.gov

Disclaimer

UNIMPROVED ANALYSIS FOR

Temple Trail Canyon Subdivision - Phase 1

UNIMPROVED CONDITION (TR-55)

Description of Area	*Area (SF)*	*Area (Ac)*	*Curve No.*	*% of Area*
Undeveloped (Desert, fair)	376,460	8.64	81	100.0%
Natural Desert Landscaping			85	0.0%
Lawn			74	0.0%
Impervious Area			98	0.0%
Total Area (SF) & Composite CN	**376,460**	**8.64**	**81**	**100.0%**

Max Retention (S)	2.35	inches
Initial Abstraction	0.47	inches
Time of Concentration	15.7	min

Storm --->	**10y 24hr**	**100y 24hr**	**10y 3hr**	**100y 3hr**
Runoff Depth (in)	0.33	0.71	0.06	0.30
Runoff Vol (CF)	10,200	22,428	1,785	9,551
Runoff Vol (Gal)	76,295	167,762	13,351	71,439
Ia/P	0.30	0.20		
Unit Discharge	613.8	663.4		
Theoretical Peak Discharge (cfs)	2.7	6.4		
Calc'd Peak Discharge (cfs)	2.83	7.42	1.5	8.0

Time of Conc. Calc	**Lenth (ft)**	**Slope**	**Manning n**
Sheet	100	3.30%	0.13
Shallow Concentrated	752	6.00%	Unpaved

IMPROVED ANALYSIS FOR

Temple Trail Canyon Subdivision - Phase 1

DEVELOPED CONDITION (TR-55)

Description of Area	*Area (SF)*	*Area (Ac)*	*Curve No.*	*% of Area*
Undeveloped (Desert, fair)			81	0.0%
Natural Desert Landscaping	132,960	3.052	85	35.3%
Lawn	76,000	1.745	74	20.2%
Impervious Area	167,500	3.845	98	44.5%
Total Area (SF) & Composite CN	**376,460**	**8.642**	**89**	**100.0%**

Max Retention (S)	1.29	inches
Initial Abstraction	0.26	inches
Time of Concentration	23.0	min

Storm --->	**10y 24hr**	**100y 24hr**	**10y 3hr**	**100y 3hr**
Runoff Depth (in)	0.62	1.14	0.19	0.59
Runoff Vol (CF)	19,562	35,795	6,068	18,633
Runoff Vol (Gal)	146,322	267,748	45,385	139,376
Ia/P	0.15	0.10		
Unit Discharge	577.3	603.4		
Theoretical Peak Discharge (cfs)	4.9	9.3		
Calc'd Peak Discharge (cfs)	5.42	10.5	5.1	15.5

Time of Conc. Calc	**Lenth (ft)**	**Slope**	**Manning n**	
Sheet	100	0.80%	0.13	
Shallow Concentrated	85	1.76%	Unpaved	
Channel	800	1.02%	0.012	
Channel Addt'l	Area	1.68	WP	12.4

Retention Analysis

% Impervious	**44%**	
R_{new} (Runoff Coefficient)	**0.150**	
$P_{80\%}$ (80th Perc. Precip.)	**0.44**	in
WQRV (Retention Volume)	**0.048**	ac-ft
WQRV (Retention Volume)	**2,072**	cu-ft
# Lots	**23**	
WQRV per Lot	**90.1**	cu-ft
Reduction Factor (Table 3 LID)	**0.45**	
Reduced WQRV	**933**	cu-ft

Volumetric Summary

Description	*Required*	*Provided*	*Units*
Total Detention	2,101	3,996	CF
Total Retention	933	1,053	CF
Total Detention + Retention	3,034	5,049	CF

Site-Specific Modified Type II Storm 3-Hour Rainfall Data
Farmer Fletcher Distribution

						Qmax							
								1.49	7.96			5.06	15.53
		Precip.				Runoff Pre-dev (delay timestep by Tc)				Runoff Post-dev (delay timestep by Tc)			
		Cumulative		Incremental		Cumulative		Incremental		Cumulative		Incremental	
Minutes	Distribution (%)	10y3h	100y3h	10y3h	100y3h	10y3h (CF)	100y3h (CF)	10y3h (CF)	100y3h (CF)	10y3h (CF)	100y3h (CF)	10y3h (CF)	100y3h (CF)
5	0	0.000	0.000	0.000	0.000	0	0	0	0	0	0	0	0
10	0	0.000	0.000	0.000	0.000	0	0	0	0	0	0	0	0
15	1	0.009	0.015	0.009	0.015	18	96	18	96	61	186	61	186
20	1	0.009	0.015	0.000	0.000	18	96	0	0	61	186	0	0
25	2	0.017	0.030	0.009	0.015	36	191	18	96	121	373	61	186
30	2	0.017	0.030	0.000	0.000	36	191	0	0	121	373	0	0
35	3	0.026	0.044	0.009	0.015	54	287	18	96	182	559	61	186
40	28	0.242	0.414	0.216	0.370	500	2,674	446	2,388	1,699	5,217	1,517	4,658
45	48	0.415	0.710	0.173	0.296	857	4,584	357	1,910	2,912	8,944	1,214	3,727
50	62	0.536	0.918	0.121	0.207	1,107	5,921	250	1,337	3,762	11,553	849	2,609
55	71	0.613	1.051	0.078	0.133	1,267	6,781	161	860	4,308	13,229	546	1,677
60	77	0.665	1.140	0.052	0.089	1,374	7,354	107	573	4,672	14,347	364	1,118
65	81	0.700	1.199	0.035	0.059	1,446	7,736	71	382	4,915	15,093	243	745
70	84	0.726	1.243	0.026	0.044	1,499	8,023	54	287	5,097	15,652	182	559
75	86	0.743	1.273	0.017	0.030	1,535	8,214	36	191	5,218	16,024	121	373
80	88	0.760	1.302	0.017	0.030	1,571	8,405	36	191	5,339	16,397	121	373
85	90	0.778	1.332	0.017	0.030	1,606	8,596	36	191	5,461	16,770	121	373
90	91	0.786	1.347	0.009	0.015	1,624	8,691	18	96	5,521	16,956	61	186
95	92	0.795	1.362	0.009	0.015	1,642	8,787	18	96	5,582	17,142	61	186
100	93	0.804	1.376	0.009	0.015	1,660	8,882	18	96	5,643	17,329	61	186
105	93	0.804	1.376	0.000	0.000	1,660	8,882	0	0	5,643	17,329	0	0
110	94	0.812	1.391	0.009	0.015	1,678	8,978	18	96	5,704	17,515	61	186
115	94	0.812	1.391	0.000	0.000	1,678	8,978	0	0	5,704	17,515	0	0
120	94	0.812	1.391	0.000	0.000	1,678	8,978	0	0	5,704	17,515	0	0
125	95	0.821	1.406	0.009	0.015	1,696	9,073	18	96	5,764	17,701	61	186
130	95	0.821	1.406	0.000	0.000	1,696	9,073	0	0	5,764	17,701	0	0
135	96	0.829	1.421	0.009	0.015	1,713	9,169	18	96	5,825	17,888	61	186
140	96	0.829	1.421	0.000	0.000	1,713	9,169	0	0	5,825	17,888	0	0
145	97	0.838	1.436	0.009	0.015	1,731	9,264	18	96	5,886	18,074	61	186
150	97	0.838	1.436	0.000	0.000	1,731	9,264	0	0	5,886	18,074	0	0
155	97	0.838	1.436	0.000	0.000	1,731	9,264	0	0	5,886	18,074	0	0
160	98	0.847	1.450	0.009	0.015	1,749	9,360	18	96	5,946	18,260	61	186
165	98	0.847	1.450	0.000	0.000	1,749	9,360	0	0	5,946	18,260	0	0
170	99	0.855	1.465	0.009	0.015	1,767	9,455	18	96	6,007	18,447	61	186
175	99	0.855	1.465	0.000	0.000	1,767	9,455	0	0	6,007	18,447	0	0
180	100	0.864	1.480	0.009	0.015	1,785	9,551	18	96	6,068	18,633	61	186
185	100	0.864	1.480	0.000	0.000	1,785	9,551	0	0	6,068	18,633	0	0
190	100	0.864	1.480	0.000	0.000	1,785	9,551	0	0	6,068	18,633	0	0
195	100	0.864	1.480	0.000	0.000	1,785	9,551	0	0	6,068	18,633	0	0
200	100	0.864	1.480	0.000	0.000	1,785	9,551	0	0	6,068	18,633	0	0
205	100	0.864	1.480	0.000	0.000	1,785	9,551	0	0	6,068	18,633	0	0
210	100	0.864	1.480	0.000	0.000	1,785	9,551	0	0	6,068	18,633	0	0
215	100	0.864	1.480	0.000	0.000	1,785	9,551	0	0	6,068	18,633	0	0
220	100	0.864	1.480	0.000	0.000	1,785	9,551	0	0	6,068	18,633	0	0
225	100	0.864	1.480	0.000	0.000	1,785	9,551	0	0	6,068	18,633	0	0
230	100	0.864	1.480	0.000	0.000	1,785	9,551	0	0	6,068	18,633	0	0
235	100	0.864	1.480	0.000	0.000	1,785	9,551	0	0	6,068	18,633	0	0
240	100	0.864	1.480	0.000	0.000	1,785	9,551	0	0	6,068	18,633	0	0
245	100	0.864	1.480	0.000	0.000	1,785	9,551	0	0	6,068	18,633	0	0
250	100	0.864	1.480	0.000	0.000	1,785	9,551	0	0	6,068	18,633	0	0
255	100	0.864	1.480	0.000	0.000	1,785	9,551	0	0	6,068	18,633	0	0
260	100	0.864	1.480	0.000	0.000	1,785	9,551	0	0	6,068	18,633	0	0
265	100	0.864	1.480	0.000	0.000	1,785	9,551	0	0	6,068	18,633	0	0
270	100	0.864	1.480	0.000	0.000	1,785	9,551	0	0	6,068	18,633	0	0
275	100	0.864	1.480	0.000	0.000	1,785	9,551	0	0	6,068	18,633	0	0
280	100	0.864	1.480	0.000	0.000	1,785	9,551	0	0	6,068	18,633	0	0
285	100	0.864	1.480	0.000	0.000	1,785	9,551	0	0	6,068	18,633	0	0
290	100	0.864	1.480	0.000	0.000	1,785	9,551	0	0	6,068	18,633	0	0
295	100	0.864	1.480	0.000	0.000	1,785	9,551	0	0	6,068	18,633	0	0
300	100	0.864	1.480	0.000	0.000	1,785	9,551	0	0	6,068	18,633	0	0
305	100	0.864	1.480	0.000	0.000	1,785	9,551	0	0	6,068	18,633	0	0
310	100	0.864	1.480	0.000	0.000	1,785	9,551	0	0	6,068	18,633	0	0
315	100	0.864	1.480	0.000	0.000	1,785	9,551	0	0	6,068	18,633	0	0
320	100	0.864	1.480	0.000	0.000	1,785	9,551	0	0	6,068	18,633	0	0
325	100	0.864	1.480	0.000	0.000	1,785	9,551	0	0	6,068	18,633	0	0
330	100	0.864	1.480	0.000	0.000	1,785	9,551	0	0	6,068	18,633	0	0
335	100	0.864	1.480	0.000	0.000	1,785	9,551	0	0	6,068	18,633	0	0
340	100	0.864	1.480	0.000	0.000	1,785	9,551	0	0	6,068	18,633	0	0
345	100	0.864	1.480	0.000	0.000	1,785	9,551	0	0	6,068	18,633	0	0
350	100	0.864	1.480	0.000	0.000	1,785	9,551	0	0	6,068	18,633	0	0
355	100	0.864	1.480	0.000	0.000	1,785	9,551	0	0	6,068	18,633	0	0
360	100	0.864	1.480	0.000	0.000	1,785	9,551	0	0	6,068	18,633	0	0

Site-Specific SCS Type II Storm

Allowable Rate Discharge: 7.42 cfs

Allowable Vol. Discharge: 2671.2 cf in 0.1 hrs

Time (hours)	Distribution (%)	Cumulative (in)		Incremental (in)		100y24h Cum. Inflow (CF)	100y24h Incremental Inflow (CF)	Detained in Period (CF)	Cum Detained (CF)
		10y24h	100y24h	10y24h	100y24h				
0	0.00%	0.000	0.000	0.000	0.000	0	0	0	0
0.1	0.10%	0.002	0.002	0.002	0.002	36	36	0	0
0.2	0.20%	0.003	0.004	0.002	0.002	72	36	0	0
0.3	0.31%	0.005	0.007	0.002	0.002	109	37	0	0
0.4	0.41%	0.006	0.009	0.002	0.002	146	37	0	0
0.5	0.51%	0.008	0.011	0.002	0.002	184	38	0	0
0.6	0.62%	0.009	0.013	0.002	0.002	221	38	0	0
0.7	0.73%	0.011	0.016	0.002	0.002	260	38	0	0
0.8	0.83%	0.013	0.018	0.002	0.002	298	38	0	0
0.9	0.94%	0.014	0.020	0.002	0.002	337	39	0	0
1	1.05%	0.016	0.023	0.002	0.002	376	39	0	0
1.1	1.16%	0.018	0.025	0.002	0.002	416	40	0	0
1.2	1.27%	0.019	0.028	0.002	0.002	455	40	0	0
1.3	1.39%	0.021	0.030	0.002	0.002	496	40	0	0
1.4	1.50%	0.023	0.033	0.002	0.002	536	40	0	0
1.5	1.61%	0.025	0.035	0.002	0.002	577	41	0	0
1.6	1.73%	0.026	0.037	0.002	0.002	619	41	0	0
1.7	1.85%	0.028	0.040	0.002	0.003	660	42	0	0
1.8	1.96%	0.030	0.043	0.002	0.003	702	42	0	0
1.9	2.08%	0.032	0.045	0.002	0.003	745	43	0	0
2	2.20%	0.033	0.048	0.002	0.003	787	43	0	0
2.1	2.32%	0.035	0.050	0.002	0.003	831	43	0	0
2.2	2.44%	0.037	0.053	0.002	0.003	874	43	0	0
2.3	2.57%	0.039	0.056	0.002	0.003	918	44	0	0
2.4	2.69%	0.041	0.058	0.002	0.003	962	44	0	0
2.5	2.81%	0.043	0.061	0.002	0.003	1,007	45	0	0
2.6	2.94%	0.045	0.064	0.002	0.003	1,052	45	0	0
2.7	3.07%	0.047	0.067	0.002	0.003	1,097	45	0	0
2.8	3.19%	0.049	0.069	0.002	0.003	1,143	45	0	0
2.9	3.32%	0.050	0.072	0.002	0.003	1,189	46	0	0
3	3.45%	0.052	0.075	0.002	0.003	1,235	46	0	0
3.1	3.58%	0.054	0.078	0.002	0.003	1,282	47	0	0
3.2	3.71%	0.056	0.081	0.002	0.003	1,329	47	0	0
3.3	3.85%	0.058	0.083	0.002	0.003	1,376	48	0	0
3.4	3.98%	0.060	0.086	0.002	0.003	1,424	48	0	0
3.5	4.11%	0.063	0.089	0.002	0.003	1,472	48	0	0
3.6	4.25%	0.065	0.092	0.002	0.003	1,521	48	0	0
3.7	4.39%	0.067	0.095	0.002	0.003	1,570	49	0	0
3.8	4.52%	0.069	0.098	0.002	0.003	1,619	49	0	0
3.9	4.66%	0.071	0.101	0.002	0.003	1,668	50	0	0
4	4.80%	0.073	0.104	0.002	0.003	1,718	50	0	0
4.1	4.94%	0.075	0.107	0.002	0.003	1,769	50	0	0

Site-Specific SCS Type II Storm

Allowable Rate Discharge: 7.42 cfs

Allowable Vol. Discharge: 2671.2 cf in 0.1 hrs

Time (hours)	Distribution (%)	Cumulative (in)		Incremental (in)		100y24h Cum. Inflow (CF)	100y24h Incremental Inflow (CF)	Detained in Period (CF)	Cum Detained (CF)
		10y24h	100y24h	10y24h	100y24h				
4.2	5.08%	0.077	0.110	0.002	0.003	1,820	51	0	0
4.3	5.23%	0.079	0.113	0.002	0.003	1,872	52	0	0
4.4	5.38%	0.082	0.117	0.002	0.003	1,924	53	0	0
4.5	5.53%	0.084	0.120	0.002	0.003	1,978	53	0	0
4.6	5.68%	0.086	0.123	0.002	0.003	2,032	54	0	0
4.7	5.83%	0.089	0.126	0.002	0.003	2,087	55	0	0
4.8	5.98%	0.091	0.130	0.002	0.003	2,142	55	0	0
4.9	6.14%	0.093	0.133	0.002	0.003	2,198	56	0	0
5	6.30%	0.096	0.137	0.002	0.003	2,255	57	0	0
5.1	6.46%	0.098	0.140	0.002	0.003	2,313	58	0	0
5.2	6.62%	0.101	0.144	0.002	0.004	2,371	58	0	0
5.3	6.79%	0.103	0.147	0.003	0.004	2,430	59	0	0
5.4	6.96%	0.106	0.151	0.003	0.004	2,490	60	0	0
5.5	7.13%	0.108	0.155	0.003	0.004	2,550	60	0	0
5.6	7.30%	0.111	0.158	0.003	0.004	2,612	61	0	0
5.7	7.47%	0.114	0.162	0.003	0.004	2,674	62	0	0
5.8	7.64%	0.116	0.166	0.003	0.004	2,736	63	0	0
5.9	7.82%	0.119	0.170	0.003	0.004	2,800	63	0	0
6	8.00%	0.122	0.174	0.003	0.004	2,864	64	0	0
6.1	8.18%	0.124	0.178	0.003	0.004	2,928	65	0	0
6.2	8.36%	0.127	0.181	0.003	0.004	2,994	66	0	0
6.3	8.55%	0.130	0.186	0.003	0.004	3,060	66	0	0
6.4	8.74%	0.133	0.190	0.003	0.004	3,127	67	0	0
6.5	8.93%	0.136	0.194	0.003	0.004	3,195	68	0	0
6.6	9.12%	0.139	0.198	0.003	0.004	3,263	68	0	0
6.7	9.31%	0.141	0.202	0.003	0.004	3,332	69	0	0
6.8	9.50%	0.144	0.206	0.003	0.004	3,402	70	0	0
6.9	9.70%	0.147	0.211	0.003	0.004	3,472	71	0	0
7	9.90%	0.150	0.215	0.003	0.004	3,544	71	0	0
7.1	10.10%	0.154	0.219	0.003	0.004	3,616	72	0	0
7.2	10.30%	0.157	0.224	0.003	0.004	3,688	73	0	0
7.3	10.51%	0.160	0.228	0.003	0.004	3,762	73	0	0
7.4	10.72%	0.163	0.233	0.003	0.004	3,836	74	0	0
7.5	10.93%	0.166	0.237	0.003	0.005	3,911	75	0	0
7.6	11.14%	0.169	0.242	0.003	0.005	3,986	76	0	0
7.7	11.35%	0.173	0.246	0.003	0.005	4,062	76	0	0
7.8	11.56%	0.176	0.251	0.003	0.005	4,139	77	0	0
7.9	11.78%	0.179	0.256	0.003	0.005	4,217	78	0	0
8	12.00%	0.182	0.260	0.003	0.005	4,295	78	0	0
8.1	12.23%	0.186	0.265	0.003	0.005	4,376	81	0	0
8.2	12.46%	0.189	0.270	0.004	0.005	4,460	84	0	0
8.3	12.71%	0.193	0.276	0.004	0.005	4,548	88	0	0

Site-Specific SCS Type II Storm

Allowable Rate Discharge: 7.42 cfs

Allowable Vol. Discharge: 2671.2 cf in 0.1 hrs

Time (hours)	Distribution (%)	Cumulative (in)		Incremental (in)		100y24h Cum. Inflow (CF)	100y24h Incremental Inflow (CF)	Detained in Period (CF)	Cum Detained (CF)
		10y24h	100y24h	10y24h	100y24h				
8.4	12.96%	0.197	0.281	0.004	0.006	4,639	91	0	0
8.5	13.23%	0.201	0.287	0.004	0.006	4,734	95	0	0
8.6	13.50%	0.205	0.293	0.004	0.006	4,832	98	0	0
8.7	13.79%	0.210	0.299	0.004	0.006	4,934	102	0	0
8.8	14.08%	0.214	0.306	0.004	0.006	5,040	106	0	0
8.9	14.39%	0.219	0.312	0.005	0.007	5,149	109	0	0
9	14.70%	0.223	0.319	0.005	0.007	5,262	113	0	0
9.1	15.02%	0.228	0.326	0.005	0.007	5,376	115	0	0
9.2	15.34%	0.233	0.333	0.005	0.007	5,491	115	0	0
9.3	15.66%	0.238	0.340	0.005	0.007	5,606	115	0	0
9.4	15.98%	0.243	0.347	0.005	0.007	5,720	115	0	0
9.5	16.30%	0.248	0.354	0.005	0.007	5,835	115	0	0
9.6	16.63%	0.253	0.361	0.005	0.007	5,952	117	0	0
9.7	16.97%	0.258	0.368	0.005	0.007	6,075	123	0	0
9.8	17.33%	0.263	0.376	0.005	0.008	6,204	129	0	0
9.9	17.71%	0.269	0.384	0.006	0.008	6,339	135	0	0
10	18.10%	0.275	0.393	0.006	0.009	6,479	140	0	0
10.1	18.51%	0.281	0.402	0.006	0.009	6,626	147	0	0
10.2	18.95%	0.288	0.411	0.007	0.009	6,782	156	0	0
10.3	19.41%	0.295	0.421	0.007	0.010	6,947	165	0	0
10.4	19.89%	0.302	0.432	0.007	0.011	7,120	173	0	0
10.5	20.40%	0.310	0.443	0.008	0.011	7,302	182	0	0
10.6	20.94%	0.318	0.454	0.008	0.012	7,496	193	0	0
10.7	21.52%	0.327	0.467	0.009	0.013	7,703	208	0	0
10.8	22.14%	0.337	0.480	0.009	0.013	7,925	222	0	0
10.9	22.80%	0.347	0.495	0.010	0.014	8,161	236	0	0
11	23.50%	0.357	0.510	0.011	0.015	8,412	251	0	0
11.1	24.27%	0.369	0.527	0.012	0.017	8,687	275	0	0
11.2	25.13%	0.382	0.545	0.013	0.019	8,996	309	0	0
11.3	26.09%	0.397	0.566	0.015	0.021	9,340	344	0	0
11.4	27.15%	0.413	0.589	0.016	0.023	9,718	378	0	0
11.5	28.30%	0.430	0.614	0.018	0.025	10,130	412	0	0
11.6	30.68%	0.466	0.666	0.036	0.052	10,983	853	0	0
11.7	35.44%	0.539	0.769	0.072	0.103	12,684	1,701	0	0
11.8	43.08%	0.655	0.935	0.116	0.166	15,420	2,736	65	65
11.9	56.79%	0.863	1.232	0.208	0.297	20,327	4,906	2,235	2,300
12	66.30%	1.008	1.439	0.145	0.206	23,732	3,406	734	3,034
12.1	68.20%	1.037	1.480	0.029	0.041	24,411	679	0	3,034
12.2	69.86%	1.062	1.516	0.025	0.036	25,008	597	0	3,034
12.3	71.30%	1.084	1.547	0.022	0.031	25,523	515	0	3,034
12.4	72.52%	1.102	1.574	0.018	0.026	25,957	434	0	3,034
12.5	73.50%	1.117	1.595	0.015	0.021	26,309	352	0	3,034

Site-Specific SCS Type II Storm

Allowable Rate Discharge: 7.42 cfs

Allowable Vol. Discharge: 2671.2 cf in 0.1 hrs

Time (hours)	Distribution (%)	Cumulative (in)		Incremental (in)		100y24h Cum. Inflow (CF)	100y24h Incremental Inflow (CF)	Detained in Period (CF)	Cum Detained (CF)
		10y24h	100y24h	10y24h	100y24h				
12.6	74.34%	1.130	1.613	0.013	0.018	26,612	302	0	3,034
12.7	75.14%	1.142	1.630	0.012	0.017	26,895	283	0	3,034
12.8	75.88%	1.153	1.647	0.011	0.016	27,160	265	0	3,034
12.9	76.56%	1.164	1.661	0.010	0.015	27,406	246	0	3,034
13	77.20%	1.173	1.675	0.010	0.014	27,634	228	0	3,034
13.1	77.80%	1.182	1.688	0.009	0.013	27,847	213	0	3,034
13.2	78.36%	1.191	1.700	0.009	0.012	28,051	203	0	3,034
13.3	78.90%	1.199	1.712	0.008	0.012	28,244	193	0	3,034
13.4	79.42%	1.207	1.723	0.008	0.011	28,427	183	0	3,034
13.5	79.90%	1.214	1.734	0.007	0.011	28,600	173	0	3,034
13.6	80.36%	1.221	1.744	0.007	0.010	28,765	165	0	3,034
13.7	80.80%	1.228	1.753	0.007	0.010	28,923	157	0	3,034
13.8	81.22%	1.235	1.762	0.006	0.009	29,073	150	0	3,034
13.9	81.62%	1.241	1.771	0.006	0.009	29,216	143	0	3,034
14	82.00%	1.246	1.779	0.006	0.008	29,352	136	0	3,034
14.1	82.37%	1.252	1.787	0.006	0.008	29,483	131	0	3,034
14.2	82.73%	1.257	1.795	0.005	0.008	29,612	129	0	3,034
14.3	83.08%	1.263	1.803	0.005	0.008	29,738	126	0	3,034
14.4	83.42%	1.268	1.810	0.005	0.007	29,862	123	0	3,034
14.5	83.76%	1.273	1.818	0.005	0.007	29,983	121	0	3,034
14.6	84.09%	1.278	1.825	0.005	0.007	30,102	118	0	3,034
14.7	84.42%	1.283	1.832	0.005	0.007	30,218	116	0	3,034
14.8	84.74%	1.288	1.839	0.005	0.007	30,331	113	0	3,034
14.9	85.05%	1.293	1.846	0.005	0.007	30,443	111	0	3,034
15	85.35%	1.297	1.852	0.005	0.007	30,551	108	0	3,034
15.1	85.65%	1.302	1.859	0.005	0.006	30,658	106	0	3,034
15.2	85.94%	1.306	1.865	0.004	0.006	30,761	103	0	3,034
15.3	86.22%	1.311	1.871	0.004	0.006	30,862	101	0	3,034
15.4	86.49%	1.315	1.877	0.004	0.006	30,961	98	0	3,034
15.5	86.76%	1.319	1.883	0.004	0.006	31,057	96	0	3,034
15.6	87.02%	1.323	1.888	0.004	0.006	31,150	93	0	3,034
15.7	87.28%	1.327	1.894	0.004	0.006	31,242	91	0	3,034
15.8	87.53%	1.330	1.899	0.004	0.005	31,330	88	0	3,034
15.9	87.77%	1.334	1.905	0.004	0.005	31,416	86	0	3,034
16	88.00%	1.338	1.910	0.004	0.005	31,500	83	0	3,034
16.1	88.23%	1.341	1.915	0.003	0.005	31,582	82	0	3,034
16.2	88.46%	1.345	1.919	0.003	0.005	31,663	81	0	3,034
16.3	88.68%	1.348	1.924	0.003	0.005	31,743	80	0	3,034
16.4	88.90%	1.351	1.929	0.003	0.005	31,822	79	0	3,034
16.5	89.12%	1.355	1.934	0.003	0.005	31,900	78	0	3,034
16.6	89.34%	1.358	1.939	0.003	0.005	31,978	77	0	3,034
16.7	89.55%	1.361	1.943	0.003	0.005	32,054	77	0	3,034

Site-Specific SCS Type II Storm

Allowable Rate Discharge: 7.42 cfs

Allowable Vol. Discharge: 2671.2 cf in 0.1 hrs

Time (hours)	Distribution (%)	Cumulative (in)		Incremental (in)		100y24h Cum. Inflow (CF)	100y24h Incremental Inflow (CF)	Detained in Period (CF)	Cum Detained (CF)
		10y24h	100y24h	10y24h	100y24h				
16.8	89.76%	1.364	1.948	0.003	0.005	32,130	76	0	3,034
16.9	89.97%	1.368	1.952	0.003	0.005	32,205	75	0	3,034
17	90.18%	1.371	1.957	0.003	0.004	32,278	74	0	3,034
17.1	90.38%	1.374	1.961	0.003	0.004	32,351	73	0	3,034
17.2	90.58%	1.377	1.966	0.003	0.004	32,423	72	0	3,034
17.3	90.78%	1.380	1.970	0.003	0.004	32,495	71	0	3,034
17.4	90.98%	1.383	1.974	0.003	0.004	32,565	70	0	3,034
17.5	91.17%	1.386	1.978	0.003	0.004	32,634	69	0	3,034
17.6	91.36%	1.389	1.983	0.003	0.004	32,703	68	0	3,034
17.7	91.55%	1.392	1.987	0.003	0.004	32,770	68	0	3,034
17.8	91.74%	1.394	1.991	0.003	0.004	32,837	67	0	3,034
17.9	91.92%	1.397	1.995	0.003	0.004	32,903	66	0	3,034
18	92.10%	1.400	1.999	0.003	0.004	32,967	65	0	3,034
18.1	92.28%	1.403	2.002	0.003	0.004	33,031	64	0	3,034
18.2	92.46%	1.405	2.006	0.003	0.004	33,094	63	0	3,034
18.3	92.63%	1.408	2.010	0.003	0.004	33,157	62	0	3,034
18.4	92.80%	1.411	2.014	0.003	0.004	33,218	61	0	3,034
18.5	92.97%	1.413	2.017	0.003	0.004	33,278	60	0	3,034
18.6	93.14%	1.416	2.021	0.003	0.004	33,338	59	0	3,034
18.7	93.30%	1.418	2.025	0.002	0.004	33,397	59	0	3,034
18.8	93.46%	1.421	2.028	0.002	0.003	33,454	58	0	3,034
18.9	93.62%	1.423	2.032	0.002	0.003	33,511	57	0	3,034
19	93.78%	1.425	2.035	0.002	0.003	33,567	56	0	3,034
19.1	93.93%	1.428	2.038	0.002	0.003	33,622	55	0	3,034
19.2	94.08%	1.430	2.042	0.002	0.003	33,676	54	0	3,034
19.3	94.23%	1.432	2.045	0.002	0.003	33,729	53	0	3,034
19.4	94.38%	1.435	2.048	0.002	0.003	33,782	52	0	3,034
19.5	94.52%	1.437	2.051	0.002	0.003	33,833	52	0	3,034
19.6	94.66%	1.439	2.054	0.002	0.003	33,884	50	0	3,034
19.7	94.80%	1.441	2.057	0.002	0.003	33,934	50	0	3,034
19.8	94.94%	1.443	2.060	0.002	0.003	33,982	49	0	3,034
19.9	95.07%	1.445	2.063	0.002	0.003	34,030	48	0	3,034
20	95.20%	1.447	2.066	0.002	0.003	34,077	47	0	3,034
20.1	95.33%	1.449	2.069	0.002	0.003	34,124	47	0	3,034
20.2	95.46%	1.451	2.071	0.002	0.003	34,170	46	0	3,034
20.3	95.59%	1.453	2.074	0.002	0.003	34,216	46	0	3,034
20.4	95.72%	1.455	2.077	0.002	0.003	34,262	46	0	3,034
20.5	95.84%	1.457	2.080	0.002	0.003	34,308	46	0	3,034
20.6	95.97%	1.459	2.083	0.002	0.003	34,353	45	0	3,034
20.7	96.10%	1.461	2.085	0.002	0.003	34,399	45	0	3,034
20.8	96.22%	1.463	2.088	0.002	0.003	34,444	45	0	3,034
20.9	96.35%	1.465	2.091	0.002	0.003	34,489	45	0	3,034

Site-Specific SCS Type II Storm

Allowable Rate Discharge 7.42 cfs

Allowable Vol. Discharge 2671.2 cf in 0.1 hrs

Time (hours)	Distribution (%)	Cumulative (in)		Incremental (in)		100y24h Cum. Inflow (CF)	100y24h Incremental Inflow (CF)	Detained in Period (CF)	Cum Detained (CF)
		10y24h	100y24h	10y24h	100y24h				
21	96.48%	1.466	2.094	0.002	0.003	34,533	45	0	3,034
21.1	96.60%	1.468	2.096	0.002	0.003	34,578	45	0	3,034
21.2	96.72%	1.470	2.099	0.002	0.003	34,623	44	0	3,034
21.3	96.85%	1.472	2.102	0.002	0.003	34,667	44	0	3,034
21.4	96.97%	1.474	2.104	0.002	0.003	34,711	44	0	3,034
21.5	97.09%	1.476	2.107	0.002	0.003	34,755	44	0	3,034
21.6	97.22%	1.478	2.110	0.002	0.003	34,799	44	0	3,034
21.7	97.34%	1.480	2.112	0.002	0.003	34,842	44	0	3,034
21.8	97.46%	1.481	2.115	0.002	0.003	34,886	43	0	3,034
21.9	97.58%	1.483	2.117	0.002	0.003	34,929	43	0	3,034
22	97.70%	1.485	2.120	0.002	0.003	34,972	43	0	3,034
22.1	97.82%	1.487	2.123	0.002	0.003	35,015	43	0	3,034
22.2	97.94%	1.489	2.125	0.002	0.003	35,057	43	0	3,034
22.3	98.06%	1.490	2.128	0.002	0.003	35,100	43	0	3,034
22.4	98.18%	1.492	2.130	0.002	0.003	35,142	42	0	3,034
22.5	98.29%	1.494	2.133	0.002	0.003	35,185	42	0	3,034
22.6	98.41%	1.496	2.136	0.002	0.003	35,226	42	0	3,034
22.7	98.53%	1.498	2.138	0.002	0.003	35,268	42	0	3,034
22.8	98.64%	1.499	2.141	0.002	0.003	35,310	42	0	3,034
22.9	98.76%	1.501	2.143	0.002	0.003	35,351	42	0	3,034
23	98.88%	1.503	2.146	0.002	0.002	35,393	41	0	3,034
23.1	98.99%	1.505	2.148	0.002	0.002	35,434	41	0	3,034
23.2	99.10%	1.506	2.151	0.002	0.002	35,475	41	0	3,034
23.3	99.22%	1.508	2.153	0.002	0.002	35,515	41	0	3,034
23.4	99.33%	1.510	2.155	0.002	0.002	35,556	40	0	3,034
23.5	99.44%	1.512	2.158	0.002	0.002	35,596	40	0	3,034
23.6	99.56%	1.513	2.160	0.002	0.002	35,636	40	0	3,034
23.7	99.67%	1.515	2.163	0.002	0.002	35,676	40	0	3,034
23.8	99.78%	1.517	2.165	0.002	0.002	35,716	40	0	3,034
23.9	99.89%	1.518	2.168	0.002	0.002	35,756	40	0	3,034
24	100.00%	1.520	2.170	0.002	0.002	35,795	39	0	3,034

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.

Report—Engineering Properties

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*
IAF—Isom cobbly sandy loam, 3 to 30 percent slopes														
Isom	90	A	0-2	Very cobbly sandy loam	SM, GM	A-1-b, A-2	0- 0- 0	40-45-50	55-60-65	50-55-60	30-35-40	20-25-30	15-20-25	NP-3 -5
			2-10	Very cobbly sandy loam	SM	A-1-b	0- 0- 0	30-35-40	65-73-80	60-68-75	35-45-50	20-25-30	15-20-25	NP-3 -5
			10-22	Very cobbly sandy loam	SM, GM	A-2, A-1-b	0- 0- 0	40-45-50	55-60-65	50-55-60	30-35-40	20-25-30	15-20-25	NP-3 -5
			22-60	Extremely cobbly sandy loam	GM	A-1-b	0- 0- 0	50-60-70	40-48-55	35-43-50	20-25-30	10-15-20	15-20-25	NP-3 -5
LeB—Leeds silty clay loam, 1 to 2 percent slopes														
Leeds	85	C	0-8	Silty clay loam	CL	A-6	0- 0- 0	0- 0- 0	100-100-100	100-100-100	90-95-100	80-85-90	30-35-40	10-15-20
			8-15	Silty clay loam	CL	A-6	0- 0- 0	0- 0- 0	100-100-100	100-100-100	90-95-100	80-85-90	30-35-40	10-15-20
			15-23	Sandy loam	SC	A-4, A-2-4	0- 0- 0	0- 0- 0	100-100-100	95-98-100	60-65-70	30-35-40	15-20-25	5-8 -10
			23-60	Silt loam	CL-ML, CL	A-6, A-4	0- 0- 0	0- 0- 0	100-100-100	100-100-100	90-95-100	70-80-90	20-25-30	5-10-15

Data Source Information

Soil Survey Area: Washington County Area, Utah
Survey Area Data: Version 15, Sep 7, 2021

Hydrologic Soil Group and Surface Runoff

This table gives estimates of various soil water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

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.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas.

Surface runoff refers to the loss of water from an area by flow over the land surface. Surface runoff classes are based on slope, climate, and vegetative cover. The concept indicates relative runoff for very specific conditions. It is assumed that the surface of the soil is bare and that the retention of surface water resulting from irregularities in the ground surface is minimal. The classes are negligible, very low, low, medium, high, and very high.

Report—Hydrologic Soil Group and Surface Runoff

Absence of an entry indicates that the data were not estimated. The dash indicates no documented presence.

Hydrologic Soil Group and Surface Runoff–Washington County Area, Utah			
Map symbol and soil name	**Pct. of map unit**	**Surface Runoff**	**Hydrologic Soil Group**
GA—Gullied land			
Gullied land	100	—	—

Hydrologic Soil Group and Surface Runoff–Washington County Area, Utah			
Map symbol and soil name	**Pct. of map unit**	**Surface Runoff**	**Hydrologic Soil Group**
GP—Gravel pits			
Gravel pit	100	—	—
IAF—Isom cobbly sandy loam, 3 to 30 percent slopes			
Isom	90	Low	A
SY—Stony colluvial land			
Stony colluvial land	100	—	—

Data Source Information

Soil Survey Area: Washington County Area, Utah
Survey Area Data: Version 15, Sep 7, 2021

Physical Soil Properties

This table shows estimates of some physical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

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

Particle size is the effective diameter of a soil particle as measured by sedimentation, sieving, or micrometric methods. Particle sizes are expressed as classes with specific effective diameter class limits. The broad classes are sand, silt, and clay, ranging from the larger to the smaller.

Sand as a soil separate consists of mineral soil particles that are 0.05 millimeter to 2 millimeters in diameter. In this table, the estimated sand content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Silt as a soil separate consists of mineral soil particles that are 0.002 to 0.05 millimeter in diameter. In this table, the estimated silt content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of sand, silt, and clay affects the physical behavior of a soil. Particle size is important for engineering and agronomic interpretations, for determination of soil hydrologic qualities, and for soil classification.

The amount and kind of clay affect the fertility and physical condition of the soil and the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, saturated hydraulic conductivity (Ksat), plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3- or 1/10-bar (33kPa or 10kPa) moisture tension. Weight is determined after the soil is dried at 105 degrees C. In the table, the estimated moist bulk density of each soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute linear extensibility, shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. Depending on soil texture, a bulk density of more than 1.4 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Saturated hydraulic conductivity (Ksat) refers to the ease with which pores in a saturated soil transmit water. The estimates in the table are expressed in terms of micrometers per second. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Saturated hydraulic conductivity (Ksat) is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each soil layer. The capacity varies, depending on soil properties that affect retention of water. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Linear extensibility refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. It is an expression of the volume change between the water content of the clod at 1/3- or 1/10-bar tension (33kPa or 10kPa tension) and oven dryness. The volume change is reported in the table as percent change for the whole soil. The amount and type of clay minerals in the soil influence volume change.

Linear extensibility is used to determine the shrink-swell potential of soils. The shrink-swell potential is low if the soil has a linear extensibility of less than 3 percent; moderate if 3 to 6 percent; high if 6 to 9 percent; and very high if more than 9 percent. If the linear extensibility is more than 3, shrinking and swelling can cause damage to buildings, roads, and other structures and to plant roots. Special design commonly is needed.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In this table, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter. The content of organic matter in a soil can be maintained by returning crop residue to the soil.

Organic matter has a positive effect on available water capacity, water infiltration, soil organism activity, and tilth. It is a source of nitrogen and other nutrients for crops and soil organisms.

Erosion factors are shown in the table as the K factor (Kw and Kf) and the T factor. Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and Ksat. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor Kw indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

Erosion factor Kf indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind and/or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible. The groups are described in the "National Soil Survey Handbook."

Wind erodibility index is a numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion. There is a close correlation between wind erosion and the texture of the surface layer, the size and durability of surface clods, rock fragments, organic matter, and a calcareous reaction. Soil moisture and frozen soil layers also influence wind erosion.

Reference:
United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. (http://soils.usda.gov)

Report—Physical Soil Properties

Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Physical Soil Properties–Washington County Area, Utah														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
GA—Gullied land														
Gullied land	—	—	—	—	—	—	—	—	—					
GP—Gravel pits														
Gravel pit	—	—	—	—	—	—	—	—	—					
IAF—Isom cobbly sandy loam, 3 to 30 percent slopes														
Isom	0-2	-68-	-24-	5- 9- 12	1.35-1.43 -1.50	14.11-28.23-42. 34	0.05-0.06-0. 07	0.0- 1.5- 2.9	0.5- 0.8- 1.0	.05	.17	5	6	48
	2-10	-68-	-24-	5- 9- 12	1.40-1.48 -1.55	14.11-28.23-42. 34	0.05-0.07-0. 08	0.0- 1.5- 2.9	0.0- 0.5- 1.0	.10	.28			
	10-22	-68-	-24-	5- 9- 12	1.40-1.48 -1.55	14.11-28.23-42. 34	0.05-0.06-0. 07	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.10	.28			
	22-60	-68-	-24-	5- 9- 12	1.40-1.48 -1.55	14.11-28.23-42. 34	0.04-0.05-0. 06	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.05	.28			

Physical Soil Properties–Washington County Area, Utah														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
LeB—Leeds silty clay loam, 1 to 2 percent slopes														
Leeds	0-8	-18-	-51-	27-31- 35	1.15-1.23 -1.30	0.42-0.92-1.41	0.16-0.17-0. 18	3.0- 4.5- 5.9	1.0- 1.5- 2.0	.37	.37	5	4L	86
	8-15	-18-	-51-	27-31- 35	1.15-1.23 -1.30	0.42-0.92-1.41	0.16-0.17-0. 18	3.0- 4.5- 5.9	0.5- 1.3- 2.0	.43	.43			
	15-23	-66-	-19-	10-15- 20	1.30-1.38 -1.45	14.11-28.23-42. 34	0.10-0.11-0. 12	0.0- 1.5- 2.9	0.5- 0.8- 1.0	.24	.24			
	23-60	-22-	-55-	18-23- 27	1.25-1.33 -1.40	4.23-9.17-14.11	0.17-0.18-0. 19	3.0- 4.5- 5.9	0.0- 0.5- 1.0	.43	.43			
SY—Stony colluvial land														
Stony colluvial land	—	—	—	—	—	—	—	—	—					

Data Source Information

Soil Survey Area: Washington County Area, Utah
Survey Area Data: Version 15, Sep 7, 2021

Figure A12 - Orifice Size Calculation

(Initial Discharge - 10 Year, 24 Hour)		
Orifice Discharge Coefficient (C)	0.51	Borda
Depth of reservoir (h)	3	ft (vertical distance from center of orifice to liquid surface)
Q (max flow rate)	2.83	cfs
Q (use for orifice)	2.8	cfs
Gravitation Constant (g)	32.2	ft/s^2
Orifice Diameter (d)	8.5	inches
Equiv. Two Orifice Diameter (d)	6	inches (diameter of 2 orifices with equivalent area)

(Staged Discharge - 100 Year, 24 Hour)		
Orifice Discharge Coefficient (C)	0.51	Borda
Depth of reservoir (h)	1	ft (vertical distance from center of orifice to liquid surface)
Q (max flow rate)	7.1	cfs
Q (actual flow rate)	4.3	cfs (after subtracting 10 year discharge)
Gravitation Constant (g)	32.2	ft/s^2
Orifice Diameter (d)	13.9	inches
Equiv. Two Orifice Diameter (d)	9.8	inches (diameter of 2 orifices with equivalent area)
Equiv. Three Orifice Diameter (d)	8	inches (diameter of 3 orifices with equivalent area)

Figure A13 - Manning Flow Calculator

Detention Discharge - Peak Discharge = 7.42 CFS

Units =	CFS	(Drop-down)		
Level =	9.60	inches		
Diameter =	12.00	inches		
Slope =	0.0200	ft./ft.	*(1%=.01 ft./ft.)*	
Pipe Material =	Plastic	(Drop-down)		
n =	0.009	(Manning coefficient)		
d/D =	0.8			
A/D^2 =	0.6736		**R/D =**	0.3042
A =	0.6736	$ft.^2$	**R =**	0.3042 ft.

$$Q = \frac{1.49\ A\ R^{2/3}\ S^{1/2}}{n}$$

$$Q = \frac{1.49 \times 0.6736 \times 0.3042^{\,2/3}\ 0.0200^{\,1/2}}{0.009}$$

Q =	**7.13 CFS**	<-- Capacity
	7.4 CFS	<-- Modeled Flow

St.George
Community Development

ITEM 3B

Hillside Permit

HILLSIDE REVIEW BOARD AGENDA REPORT: **01/26/2022**
HILLSIDE REVIEW BOARD AGENDA REPORT: **02/23/2022**
PLANNING COMMISSION AGENDA REPORT: **06/14/2022**

HILLSIDE DEVELOPMENT PERMIT
Divario (Formerly "The Lakes") PA-4
Case No. 2022-HS-003

Background: On January 26, 2022, the Hillside Review Board (HRB) met on site to review the request for a Hillside permit for Divario PA-4. While on site, the HRB identified a wash that they felt was important to preserve. The applicant agreed and the application was tabled to the next meeting to give the applicant the chance to revise the plans. He has done so, and the revised plans have been attached to this report as Exhibit 'B'.

Request: This is a request for a Hillside Development Permit to allow the applicant to construct in the area shown on the slope map labeled 20-29% and 30-39%. This is specifically in the PA-4 area which is situated in the far south west corner of the Divario development.

Hillside History:

1) 2005 - Case No. 2005-HS-013 "The Lakes" (7/21/2005 - agenda item #2) – An overall conceptual hillside development permit review for 730 acres. Rosenberg Associates.

2) 2008 - Case No. 2008-HS-006 "PA-17" The Lakes (7/16/2008) – 12.30 acres. Rosenberg Associates.

3) 2008 - Case No. 2008-HS-012 (10/30/2008) Determine which PA areas have sensitive slopes and will require future hillside meetings for subdivisions; being PA-3, PA-4, PA-12, PA-13, PA-14, PA-15, PA-16, and PA-17 will require HS review (*Note: PA's # 1, 2, 4, 5, 6, 7, 8, 9 (if less than 10 ft.), 10, 11, & 18 will not require hillside review*).

4) 2016 - Case No. 2016-HS-001 (1/20/2016) – Approx. 45.73 acres. The Hillside Review Board met and reviewed PA-14 and PA-16 and at that time approved the exclusion of washes and rock outcroppings in these 2 areas. However, following that review meeting, Rosenberg Associates met with City staff to revisit two additional rock outcroppings that were not looked at as closely by the board. One of these was located in PA-14, labeled as Item #1. Following the meeting with City staff it was determined to re-design the lot layout and grading around the feature and preserve it as a subdivision amenity in order to avoid scheduling another hillside review board meeting. The project design proceeded with that feature preserved.

5) 2021 – Case No. 2021-001 (01/27/2021) – Approx. 19.78 acres. The Hillside Review Board reviewed a request for PA-9 to allow cuts and fills in excess of 10 feet in height. This was a requirement from the original hillside review in 2008. This was ultimately approved by the City Council.

Exhibits Provided:

1) Exhibit A - Overall Slope Analysis – Sheet 1
"Exhibit 1" in the packet shows the overall slope analysis for the entire PA (Planning Areas). *Note: There is a chart "Hillside Review" on the sheet that shows which PA areas will require a hillside review and which will not.*

2) Exhibit B – Preliminary Plat
"Exhibit B" depicts the proposed grading and layout for PA-4 at Divario. Additionally, Grading and Cross Sections pages are attached.

3) Exhibit C - Drainage Report
August 2016 – Drainage report produce by Rosenberg Associates.

4) Exhibit D – Executive Geotechnical Report
July 2005 – This was produced during the initial review of the Lakes development in 2005. Produced by Rosenberg Associates.

Background:

Open Space - The total proposed undisturbed open space and improved open space area for "The Lakes" will be approximately 202 acres (*which is about 28 % of the total project area*).

Manmade Slopes - Manmade slopes were identified and excluded (see blue area in "Exhibit A")

Exclusions - The hillside board allowed exclusions for small washes and rock outcroppings (see pink area in "Exhibit A")

Future Hillside Review - In 2008 the Hillside Board didn't visit all the small washes and outcroppings but left them for future consideration as plans would be submitted (with subdivisions). It was determined that some would require further review by the Hillside Board. PA-4 was one of those areas that require further review.

Owner: 730 St George, LLC

Engineer: Rosenberg Associates

Location: PA-4 is generally located south-west of Gap Canyon Parkway approximately 1,200 feet.

Acreage: 35.64 Acres

Zoning: R-1-8

Powers & Duties: Section 10-13A-8.B.1 of the "Hillside Review Board Powers and Duties" states that the hillside board can make recommendations to "adopt, modify or reject a proposal" to the Planning Commission (PC).

Permit required: Section 10-13A-7 requires that all major development (i.e., cut greater than 4', etc.) on slopes above 20% requires a 'hillside development permit' granted by the City Council upon recommendation from the Hillside Review Board and the Planning Commission.

Applicable Ordinance(s):

(Selected portions)

10-13A-1: Density and Disturbance Standards

A. The hillside development overlay zone (HDOZ) limits development densities and provides specific development incentives to transfer underlying zone densities from hillsides (sending areas), to less steep slopes or more safe development areas (receiving areas), within a development.

Percent Natural Slope	Dwelling Units (DU) / Acre
0-19	See underlying zone
20-29	2 DU/acre, provided the units are clustered on 30 percent (30%) or less of the land area within this slope category. 70 percent of this slope category shall remain undisturbed. The 70 percent area is based upon the overall area/development rather than per lot. Also see subsections A1, A2, and A3 of this section.
30-39	1 DU/10 acres, provided no more than 5 percent (5%) of the site is disturbed, and 95 percent of the site remains undisturbed. If the cumulative area is at least 1 acre but less than 10 acres, the cumulative area shall be allowed 1 DU.
40	Development is not permitted (0%), **except** as provided for in subsection A4 of this section.

Section 10-13A-1: Density and Disturbance Standards

F. The applicant may:

1. Transfer all development density from steeper slope categories (sending areas), to areas within the development with natural slopes of twenty percent (20%) or less (receiving areas); and
2. Develop additional bonus density, calculated from each slope category, as follows:
    a. Natural slopes twenty percent (20%) or less transferred on a one-to-one (1:1) unit basis; plus
    b. One (1) additional density unit for each density unit transferred from natural slopes of twenty-one percent (21%) to thirty percent (30%); plus

c. Two (2) additional density units for each density unit transferred from natural slopes of thirty-one percent (31%) to forty percent (40%).

3. Unit calculation for the receiving area shall be based on the requirements of the sending area zone.

G. Density transfers to the receiving area may occur without a zone change within the receiving area even though the resulting density or configuration may exceed the density limits of the receiving area zone. Other than density, the receiving area's zoning requirements apply to development in the receiving area. For instance, lot sizes may vary, but single-family zoning districts only allow single-family detached dwellings.

H. If the applicant proposes to develop within the twenty-one percent (21%) to forty percent (40%) slope area, the applicant cannot employ partial density transfers from the sending area and must propose a design, site development plans, and a grading plan that blends and harmonizes all aspects of the proposed development into the natural topography, and that minimizes road cuts and fills.

I. Non-disturb areas within a residential lot as shown on the slope analysis map shall not be used to calculate minimum lot size.

J. Disturbance standards do not apply to the city for limited city facilities: trails, parks, and utilities.

HSRB Meeting: On January 26, 2022, the Hillside Review Board met on site and discussed the proposal. After walking the property and discussing the proposal, the HSRB asked for a plan revision and the property to be re-staked. The Board reconvened on February 23, 2022 and forwarded a positive recommendation on the revised plan. The recommendation was based on the following conditions:

1. the west corner of lot 3 needs to move up past the edge of the ridge to the southwest corner,
2. the corners between lots 3 and 2 need to move back away from the wash edge
3. and the corner between lots 2 and 1 need to come back maybe 5 feet.
4. On the north side of the wash the corners between lots 35 and 56 against the wash move back and that the corner between lots 56 and 57 move back. The overall guiding principle needs to be the defined rock edge of the top of the wash shall not be affected by any new development.

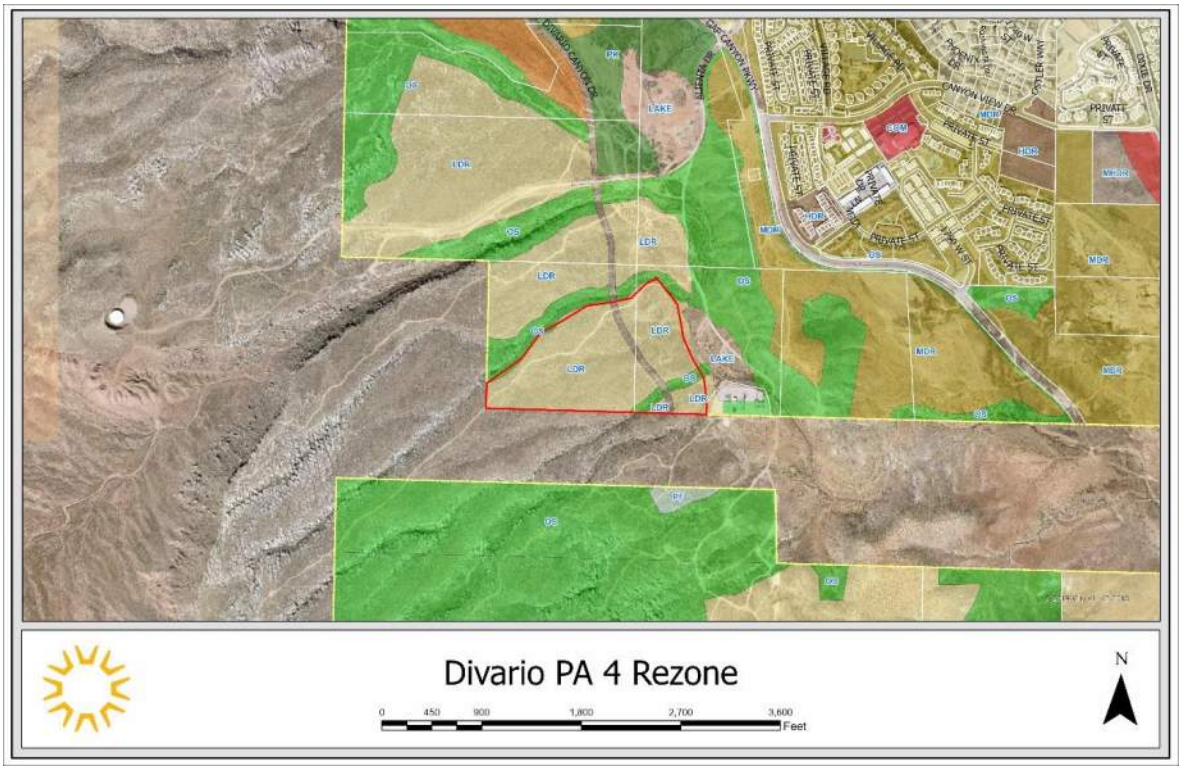
PC Options: The Planning Commission may recommend several different options to the City Council:

1. Denial
2. Approval as presented
3. Approval with specific conditions and comments added as required.

Example Motion: "I move that we forward a positive recommendation to the City Council for the hillside permit for Divario PA-4 as presented, case no. 2022-HS-003, based on the findings listed in the staff report."

Vicinity Map

General Plan = LDR



Zoning = R-1-8 (Not reflected on the map)

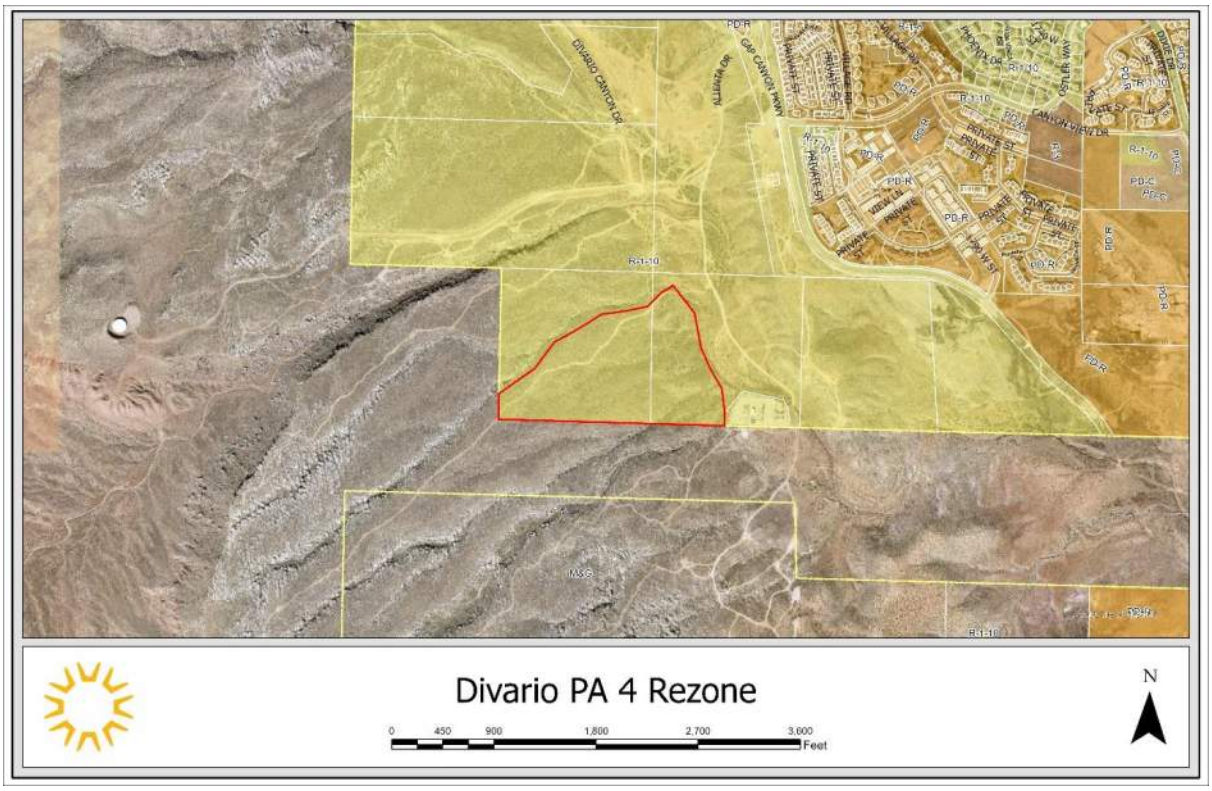
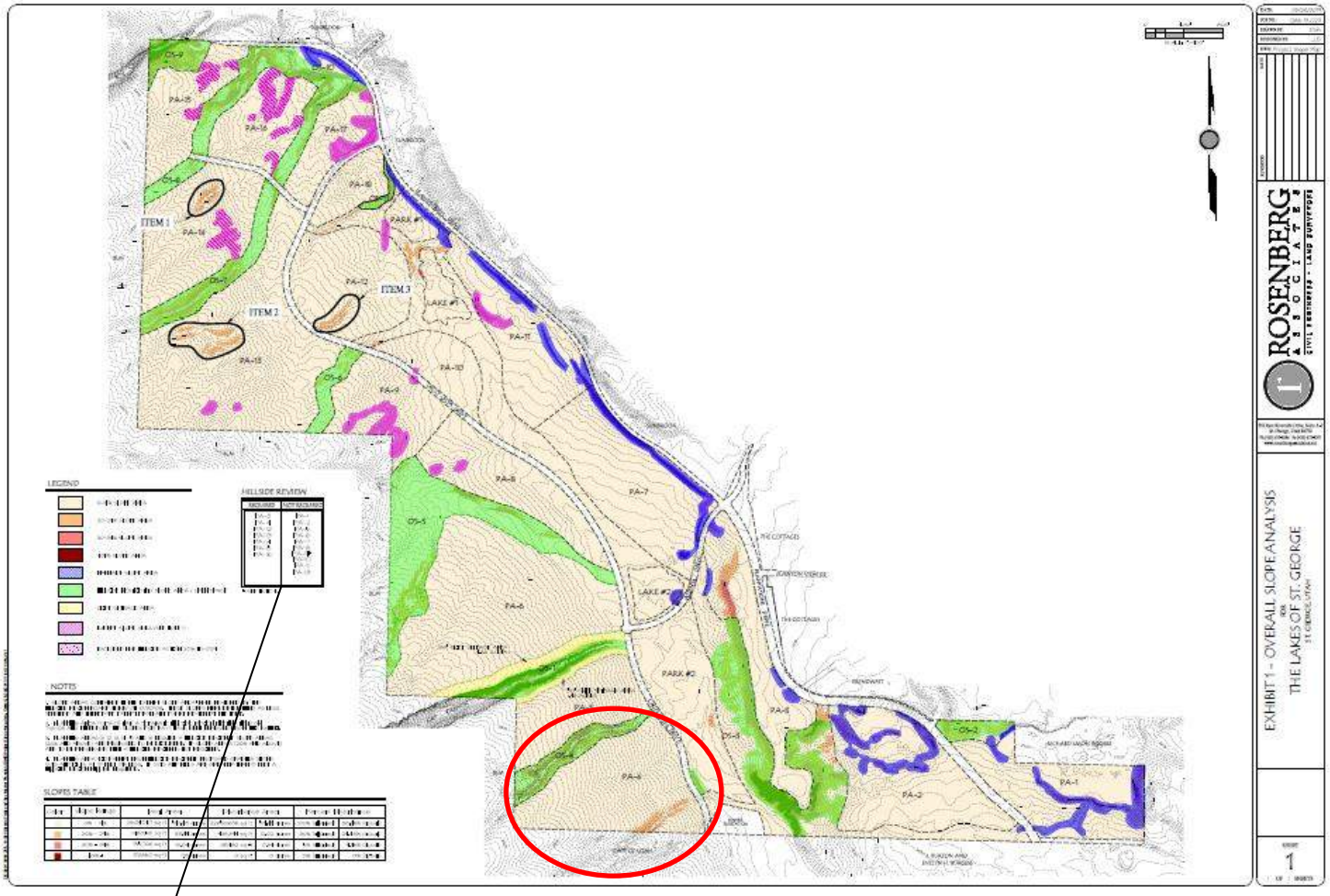


Exhibit A

Slope Map



HILLSIDE REVIEW

REQUIRED	NOT REQUIRED
PA-3	PA-1
PA-4	PA-2
PA-12	PA-5
PA-13	PA-6
PA-14	PA-7
PA-15	PA-8
PA-16	PA-9*
	PA-10
	PA-11
	PA-18

* SEE NOTE 4.

NOTES

1. SLOPE AREAS CONTAINED IN THE 'EXEMPT SLOPE AREA' WERE REVIEWED BY THE HILLSIDE REVIEW BOARD (HSRB) ON 10/30/08. THESE SLOPES WERE DETERMINED AS LESS SENSITIVE AND THEREFORE EXEMPT FROM ANY FUTURE REVIEW BY THE HSRB.

2. PLANNING AREA 17 (PA-17) HAD A SEPARATE HILLSIDE REVIEW MEETING HELD ON 7-16-08 AND THEREFORE THE SLOPES FOR PA-17 HAVE BEEN REMOVED FROM THIS EXHIBIT.

3. PLANNING AREAS 3, 12, 13, 14, 15 AND 16 REQUIRE A HILLSIDE REVIEW IF SLOPE AREAS (20% AND ABOVE) ARE PROPOSED TO BE DISTURBED. IF SLOPE AREAS (20% AND ABOVE) ARE TO BE PRESERVED, THEN A HILLSIDE REVIEW IS NOT REQUIRED.

4. PLANNING AREA 9 IS EXEMPT FROM HILLSIDE REVIEW IF PROPOSED GRADING SHOWS CUTS AND FILLS AT 10 FEET OR LESS. IF CUTS AND FILLS ARE GREATER THAN 10 FEET A HILLSIDE REVIEW WILL BE REQUIRED.

Exhibit B

Preliminary Plat

125 LOTS

LOT 1 11884 S.F. 0.27 AC.
LOT 2 10522 S.F. 0.24 AC.
LOT 3 17986 S.F. 0.41 AC.
LOT 4 12024 S.F. 0.28 AC.
LOT 5 12590 S.F. 0.29 AC.
LOT 6 8077 S.F. 0.19 AC.
LOT 7 8027 S.F. 0.18 AC.
LOT 8 10229 S.F. 0.23 AC.
LOT 9 11180 S.F. 0.26 AC.
LOT 10 8009 S.F. 0.18 AC.
LOT 11 7551 S.F. 0.17 AC.
LOT 12 7553 S.F. 0.17 AC.
LOT 13 8018 S.F. 0.18 AC.
LOT 14 8014 S.F. 0.18 AC.
LOT 15 8802 S.F. 0.20 AC.
LOT 16 12421 S.F. 0.29 AC.
LOT 17 12306 S.F. 0.28 AC.
LOT 18 9287 S.F. 0.21 AC.
LOT 19 8421 S.F. 0.19 AC.
LOT 20 8398 S.F. 0.19 AC.
LOT 21 8366 S.F. 0.19 AC.
LOT 22 8683 S.F. 0.20 AC.
LOT 23 9983 S.F. 0.23 AC.
LOT 24 8754 S.F. 0.20 AC.
LOT 25 8000 S.F. 0.18 AC.
LOT 26 7995 S.F. 0.18 AC.
LOT 27 8018 S.F. 0.18 AC.
LOT 28 8039 S.F. 0.18 AC.
LOT 29 10002 S.F. 0.23 AC.
LOT 30 8004 S.F. 0.18 AC.
LOT 31 8000 S.F. 0.18 AC.
LOT 32 8777 S.F. 0.20 AC.
LOT 33 8000 S.F. 0.18 AC.
LOT 34 8000 S.F. 0.18 AC.
LOT 35 8019 S.F. 0.18 AC.
LOT 36 12996 S.F. 0.30 AC.
LOT 37 17021 S.F. 0.39 AC.
LOT 38 12223 S.F. 0.28 AC.
LOT 39 11351 S.F. 0.26 AC.
LOT 40 9437 S.F. 0.22 AC.
LOT 41 17307 S.F. 0.40 AC.
LOT 42 13657 S.F. 0.31 AC.
LOT 43 10122 S.F. 0.23 AC.
LOT 44 8531 S.F. 0.20 AC.
LOT 45 8000 S.F. 0.18 AC.
LOT 46 8000 S.F. 0.18 AC.
LOT 47 8000 S.F. 0.18 AC.
LOT 48 8000 S.F. 0.18 AC.
LOT 49 8000 S.F. 0.18 AC.
LOT 50 8000 S.F. 0.18 AC.
LOT 51 8000 S.F. 0.18 AC.
LOT 52 8095 S.F. 0.19 AC.
LOT 53 10878 S.F. 0.25 AC.
LOT 54 8006 S.F. 0.18 AC.
LOT 55 8000 S.F. 0.18 AC.
LOT 56 8024 S.F. 0.18 AC.
LOT 57 8031 S.F. 0.18 AC.
LOT 58 8740 S.F. 0.20 AC.
LOT 59 10719 S.F. 0.25 AC.
LOT 60 8055 S.F. 0.18 AC.
LOT 61 8028 S.F. 0.18 AC.
LOT 62 8000 S.F. 0.18 AC.
LOT 63 9142 S.F. 0.21 AC.
LOT 64 8006 S.F. 0.18 AC.
LOT 65 8000 S.F. 0.18 AC.
LOT 66 8438 S.F. 0.19 AC.
LOT 67 8935 S.F. 0.21 AC.
LOT 68 9886 S.F. 0.23 AC.
LOT 69 10650 S.F. 0.24 AC.
LOT 70 11096 S.F. 0.25 AC.
LOT 71 8399 S.F. 0.19 AC.
LOT 72 8539 S.F. 0.20 AC.
LOT 73 8184 S.F. 0.19 AC.
LOT 74 8000 S.F. 0.18 AC.
LOT 75 8339 S.F. 0.19 AC.
LOT 76 8032 S.F. 0.18 AC.
LOT 77 8190 S.F. 0.19 AC.
LOT 78 8078 S.F. 0.19 AC.
LOT 79 8112 S.F. 0.19 AC.
LOT 80 8154 S.F. 0.19 AC.
LOT 81 8099 S.F. 0.19 AC.
LOT 82 8212 S.F. 0.19 AC.
LOT 83 8345 S.F. 0.19 AC.
LOT 84 10539 S.F. 0.24 AC.
LOT 85 9512 S.F. 0.22 AC.
LOT 86 8103 S.F. 0.19 AC.
LOT 87 8769 S.F. 0.20 AC.
LOT 88 8000 S.F. 0.18 AC.
LOT 89 8147 S.F. 0.19 AC.
LOT 90 8073 S.F. 0.19 AC.
LOT 91 8516 S.F. 0.20 AC.
LOT 92 8073 S.F. 0.19 AC.
LOT 93 8025 S.F. 0.18 AC.
LOT 94 8345 S.F. 0.19 AC.
LOT 95 7914 S.F. 0.18 AC.
LOT 96 8875 S.F. 0.20 AC.
LOT 97 8201 S.F. 0.19 AC.
LOT 98 9501 S.F. 0.22 AC.
LOT 99 9412 S.F. 0.22 AC.
LOT 100 8275 S.F. 0.19 AC.
LOT 101 8210 S.F. 0.19 AC.
LOT 102 8196 S.F. 0.19 AC.
LOT 103 8503 S.F. 0.20 AC.
LOT 104 7773 S.F. 0.18 AC.
LOT 105 8137 S.F. 0.19 AC.
LOT 106 8023 S.F. 0.18 AC.
LOT 107 8583 S.F. 0.20 AC.
LOT 108 8024 S.F. 0.18 AC.
LOT 109 10659 S.F. 0.24 AC.
LOT 110 8974 S.F. 0.21 AC.
LOT 111 8285 S.F. 0.19 AC.
LOT 112 8463 S.F. 0.19 AC.
LOT 113 8326 S.F. 0.19 AC.
LOT 114 8315 S.F. 0.19 AC.
LOT 115 8462 S.F. 0.19 AC.
LOT 116 8769 S.F. 0.20 AC.
LOT 117 8423 S.F. 0.19 AC.
LOT 118 9233 S.F. 0.21 AC.
LOT 119 12168 S.F. 0.28 AC.
LOT 120 8255 S.F. 0.19 AC.
LOT 121 8717 S.F. 0.20 AC.
LOT 122 8610 S.F. 0.20 AC.
LOT 123 9088 S.F. 0.21 AC.
LOT 124 8472 S.F. 0.19 AC.
LOT 125 9944 S.F. 0.23 AC.

50.00' WASH

Exhibit C

Drainage Report

TECHNICAL DRAINAGE CONTROL REPORT

Project Land Use Planning, Offsite Road Construction, and Mass Grading
The Lakes Master Plan Community
St. George, Utah

Prepared For:

730 St. George, LLC
1636 Indian Wells Drive
Boulder City, Nevada 89005

Rosenberg Associates
352 East Riverside Drive, Suite A-2
St. George, Utah 84790

August 30, 2016

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ROSENBERG ASSOCIATES
CIVIL ENGINEERS LAND SURVEYORS

TABLE OF CONTENTS

1.0 PROJECT LOCATION

The following Drainage Control Plan and Report is submitted in support of The Lakes at St. George Master Plan Community, a proposed project, located along Plantations Drive in western St. George, Utah, spanning the distance between the Sunbrook Community at the end of Sunbrook Drive to the north, and near the Tonaquint Business Park to the South. The site is located within Sections 27, 28, 34 and 35 in Township 42 South, Range 16 West, Salt Lake Base and Meridian.

This report has been prepared to evaluate regional storm flows at key locations within the project area in order to perform mass grading operations, and to construct the following proposed off-site roadways to access the proposed development/planning areas:

- Plantations Drive
- Lago Vista Drive
- Alienta Drive
- Sentieri Vista Drive

This report has been prepared in accordance with the requirements and procedures outlined in the *Washington County Flood Control Authority Storm Drainage Systems Design and Management Manual*[1]. Conclusions and recommendations are made herein regarding drainage improvements required, floodplain impacts, and general conformance to city ordinances. Separate drainage studies will be prepared for each specific planning area to address localized drainage concerns and compliance with the city's drainage requirements.

The following supplemental figures have been prepared and included in the Appendix for reference and illustration information:

- *Figure 1 – Land Use Plan for The Lakes at St. George*, illustrating project location, project planning areas, and proposed planning area land uses and densities.
- *Figure 2 – Watershed Map for The Lakes at St. George*, illustrating the major watershed boundaries impacting the site.
- *Figure 3 – FEMA Regulatory 100-Year Floodplain Exhibit Map*, illustrating the drainage channels subject to the regulatory requirements of the Federal Emergency Management Agency (FEMA).
- *Figure 4 –Culvert Crossings*, showing the approximate location, minimum pipe diameter, and minimum slope requirements of culvert crossings and storm drain pipelines for the offsite roads including Plantations Drive, Lago Vista Drive, Alienta Drive, and Sentieri Vista Drive.
- *Figure 5 – Custom Soil Resource Report for Washington County Area*, showing soils and soil properties on the subject property.

[1] Bowen, Collins and Associates, Washington County Flood Control Authority Storm Drainage Design and Management Manual, Draft v0.3.

2.0 PROPERTY DESCRIPTION

The proposed Lakes at St. George is a 731-acre master plan community that is planned to be comprised of single-family residences, multi-family residences, parks and open spaces, commercial areas, public buildings such as churches, and associated streets of various right-of-way widths. *Figure 1 – Land Use Plan*, shows an overall view of the property. The proposed project is divided into 16 individual planning areas noted as PA-1, PA-2, etc. A legend on Figure 1 lists the master planned land uses and densities proposed for each planning area as follows:

- Low Density Residential: up to 4 units per acre, includes PA-4, PA-5, PA-6, PA-14, PA-15, and PA-16 covering approximately 174 acres.
- Medium Density Residential: up to 9 units per acre, includes PA-2, PA-3, PA-7, PA-9, PA-10, PA-11, PA-12, and PA-13 covering approximately 236 acres.
- High Density Residential: up to 15 units per acre, includes PA-1, PA-17, and PA-18 covering approximately 48 acres.
- Commercial/Mixed Use: includes PA-8 covering approximately 27 acres.

The remainder of the property will remain as undisturbed or improved open spaces to consist of parks, trails and other recreational facilities. These open spaces provide a natural break between each planning area, and most of them are located to accommodate the existing naturally flowing drainage patterns. The focal point of the open spaces will be two 5-acre lakes that will be used for detention, and to provide storage facilities for the City of St. George re-use water network.

3.0 EXISTING OFF-SITE DRAINAGE DESCRIPTION

3.1 UPSTREAM DRAINAGE

Storm water impacting the project from upstream sources generally originates on undeveloped desert land and drain in a sheet flow manner towards ephemeral washes that carry the concentrated water to the project property from the west and south.

The watershed impacting the proposed Lakes at St. George is illustrated in *Figure 2 – Watershed Map*. As seen in the exhibit, the total watershed area has been divided into a number of subareas to better pinpoint runoff amounts at specific locations within the project. Most off-site storm water enters the project from property belonging to the Bureau of Land Management (BLM). A small amount of off-site storm water enters the project along Plantations Drive from property belonging to the Sunbrook master plan community.

3.2 DOWNSTREAM DRAINAGE

In both the existing and proposed developed condition, storm water will exit the property in either the Box Canyon Wash, draining the northern portion of the property consisting of subarea Groups X, Y, A and B; or the Gap Wash, draining the rest of the property to the south and east. Flows leaving the project in the Box Canyon Wash travel through the Sunbrook Golf Course a distance of approximately 6,000 feet before discharging to the Santa Clara River just upstream of the Dixie Drive crossing at Mathis Park. Flows leaving the project in the Gap Wash travel eastward toward the Tonaquint Business Park, covering a total distance of approximately 4,800 feet before discharging to the Santa Clara River just north of the City of St. George Tonaquint Cemetery.

4.0 EXISTING ON-SITE DRAINAGE DESCRIPTION

In the undeveloped condition, the study area drains by sheet flow and washes to the Box Canyon Wash and the Gap Wash as shown in Figure 2. In the developed condition, storm water runoff will drain to the same major washes preserved in the designated open space corridors, as in the undeveloped condition.

5.0 MASTER PLANNED DRAINAGE CONSIDERATIONS

5.1 MASTER PLAN HYDROLOGIC MODEL

The Lakes property has been included in the hydrologic model prepared for the city's drainage master plan summarized in the *City of St. George Storm Drain Master Plan Update*[2]. Referencing Figure 2, Subareas A1, A2, A3, B1, B2, B3, B4, X1, X2, Y1, and Y2 in this report are part of the Box Canyon Wash BC100 master plan subarea. Subareas C1, C2, C3, C4, C5, D1, D2 in this report are part of the Gap Wash G20 master plan subarea. Subareas E1, E2, E3, E4, F1, F2, G1, G2, and H1 are part of the Gap Wash watershed G40 master plan subarea.

5.2 MASTER PLAN DRAINAGE INFRASTRUCTURE

Existing master planned drainage infrastructure impacting The Lakes project is limited to one 36-inch diameter pipe, labeled Pipe G50-2 in the city master plan and noted to carry a design flow of 65 cubic feet per second (cfs). This pipe conveys drainage from the Las Palmas and Worldmark Resort properties along 1790 West Street, discharging into the project property along the Plantations Drive right-of-way.

Proposed master planned drainage infrastructure impacting The Lakes project includes two proposed pipes linking to Pipe G50-2:

[2] Bowen, Collins and Associates and John H. Humphrey, City of St. George Storm Drain Master Plan Update, July, 2009.

- Pipe G50-1, a proposed 30-inch diameter pipe noted to carry a design flow of 65 cfs, to convey storm water along the Plantations Drive right-of-way along the Worldmark Resort frontage, and connecting to existing Pipe G50-2 at the intersection of 1790 West Street.
- Pipe G50-3, a proposed 42-inch diameter pipe noted to carry a design flow of 196 cfs, to combine flows from G50-1 and G50-2 and convey storm water south and eastward along the future Plantations Drive right-of-way.

The above existing and proposed pipelines were factored into this report analysis with some modifications to suit the drainage patterns and open space corridors proposed in The Lakes land use plan.

6.0 FEMA AND OTHER REGULATORY REQUIREMENTS

6.1 FEMA 100-YEAR FLOODPLAIN DELINEATION

Two drainage washes are located within the 100-year floodplain that are subject to the regulatory requirements of the Federal Emergency Management Agency (FEMA) including the Box Canyon Wash and the Gap Wash, as noted on the current FEMA Flood Insurance Rate Maps[3]. The 100-year floodplain boundaries for these two washes are shown in *Figure 3 – FEMA Regulatory 100-Year Floodplain Exhibit Map*.

Box Canyon Wash clips the north side of the property and receives drainage from Subareas A1, A2, A3, B1, B2, B3, Y1, Y2, X1, and X2. The remaining Subareas drain to the Gap Wash. Figure 3 illustrates the location of regulatory Zone A for both the Box Canyon and Gap washes, which is defined as the 100-year floodplain Special Flood Hazard Area with no base flood elevations established. All areas noted as Zone A are located within the designated open spaces for The Lakes master plan community. Areas proposed for development are all located within Zone X, which is defined to be outside the 0.2% annual floodplain.

6.2 EROSION HAZARD ZONE

The subject property is not located within an "Erosion Hazard Zone" as defined by the City of St. George.

[3] Federal Emergency Management Agency (FEMA) National Flood Insurance Program, Flood Insurance Rate Map, Washington County, Utah Map Numbers 49053C1007G and 49053C1009G, Effective Date April 2, 2009.

7.0 OTHER DRAINAGE STUDIES IMPACTING THE SITE

The following studies were referenced in preparing this report:

- The Lakes at St. George Hydrology Report, prepared by Rosenberg Associates, dated May 15, 2008. This report is a general overview of major drainage patterns encompassing the entire Lakes planned development property boundary. This report updates the earlier report to current city analysis and drainage design standards.
- Four Dams at The Lakes Preliminary Drainage Evaluation, prepared by Rosenberg Associates, dated September 14, 2005. This report is a hydrologic analysis of the proposed "lakes" to be constructed in the master plan community open space.
- Box Canyon Wash Hydraulic Modeling, performed by Rosenberg Associates in 2008. This work resulted in the delineation of the 100-year floodplain along the Box Canyon Wash.

8.0 PROPOSED DRAINAGE FACILITIES

Drainage facilities proposed for The Lakes master plan community will convey water through the planning areas and connecting roads by a combination of grading, street improvements, and storm drain infrastructure. Specific routing, sizing, and placement of storm drain infrastructure will be proposed during the detailed design stage of each planning area; however, this report has been prepared to evaluate regional storm flows at key locations within the project area in order to perform mass grading operations, and to construct the following proposed off-site roadways to access the proposed development/planning areas:

- Plantations Drive: Extending from the north property boundary and heading in a southeasterly direction approximately 12,400 feet to the southeastern property boundary.
- Lago Vista Drive: Extending from the point of intersection with Plantations Drive on the northwest side of the parcel, and extending in a southeasterly direction approximately 8,900 feet to the southwestern property boundary.
- Alienta Drive: Extending from Lago Vista Drive northward approximately 2,400 feet where it ties to the existing Alienta Drive.
- Sentieri Vista Drive: Extending from Lago Vista Drive in the northwest area of the project and heading in a westward direction approximately 1,300 feet through planning areas PA-14, Pa-16, and terminating in PA-15.

8.1 MASS GRADING

It is the desire of the project developers to conduct mass grading operations on portions of the master plan project. The purpose of this is to be able to move earth materials between the planning areas. Planning areas with an abundance of quality material that can be used for general fill, structural fill, and/or utility trench bedding will be mined and the excess material moved to planning areas where additional fill material is needed.

Limited grading design will be performed for various phases of mass grading. Plans will be submitted to the City of St. George engineering department and processed for a grading permit before any grading operations begin. Mass grading design will focus on maintaining the existing drainage patterns by picking up storm water offsite flows, routing storm water through the mass graded planning area to be discharged back into the open space areas as close as practicable to the historic point of discharge.

8.2 DETAIL GRADING

Detailed grading plans will be submitted with the project development plans for each planning area to include individual lot and/or building pad grading, interior road plan and profile drawings, and underground storm drain plan and profile where needed.

A detailed drainage study will be prepared for the proposed development and submitted with the project construction plans for each individual planning area.

8.3 OFFSITE ROADWAYS

Construction of the offsite roadways including Plantations Drive, Lago Vista Drive, Alienta Drive, and Sentieri Vista Drive, as noted above, will occur in phases as needed to service the development of the planning areas. The peak storm water runoff values in this drainage study were used to evaluate roadway cross section conveyance capacity, to size in-line underground storm water pipelines, and to locate and size offsite roadway culvert crossings. The approximate location, minimum pipe diameter sizing, and minimum slope requirements of culvert crossings and storm drain pipelines are illustrated in *Figure 4 – Proposed Offsite Road Culvert Crossing and Storm Drain Facilities*. Detailed construction plans for all offsite roadway drainage improvements will be submitted with the applicable planning area construction plans.

8.4 OPEN CHANNELS

Construction of open channels are proposed to convey storm water through the disturbed open space areas. The proposed routing location, size, minimum design slope and capacity of these channels will be addressed with the detailed drainage design of the adjacent planning areas or design of open space area. The channels are generally located as follows:

- Between Lake 1 and Lake 2 adjacent to Lago Vista Drive
- Routing the Gap Wash through Park 2 adjacent to Lago Vista Drive, between Lake 2 and the power substation.
- Routing the Gap Wash through planning areas PA-1 and PA-2 inside the boundaries of the delineated floodplain.

Additional temporary man-made open channels may need to be constructed to route storm water through mass-graded planning areas, then directed back into the natural drainages located in the adjacent open space areas. The peak flow values of this report will be used to

size these temporary channels, which will be called out as needed on the individual mass grading construction plans. Once the planning area goes into final design, these channels will be replaced with improved streets, storm drains, or culverts.

8.5 REGIONAL DETENTION

It is the desire of the project developers to detain increased storm water caused by development. Rather than design numerous smaller detention facilities for each planning area, storm water will be routed into regional facilities adjacent to the two 5-acre lake amenities, as discussed below. Storm water won't be routed directly in the lake amenities, but into a containment area next to the lake to help maintain the quality of the city's re-use water that will be stored in the lake facilities. Master Plan Model results indicate that detention may be minimal or not required. Finalization of detention needs will be addressed with detailed drainage design of each planning area.

- Lake 1 Detention Basin: Increased storm water runoff generated in Subareas B2 and B3 will be routed directly into a detention basin adjacent to Lake 1, then discharged into the Box Canyon Wash. Additional capacity and outlet control facilities will be installed in this detention basin to also detain the total combined increase from Subareas A2, A3, X2, and Y2. This will allow the increase from these subareas to discharge directly to Box Canyon Wash while limiting the total peak flow discharging from the property to the peak "pre-developed" design condition.
- Lake 2 Detention Basin: Increased storm water runoff generated in Subareas C2, C3 and D2 will be routed directly into a detention basin adjacent to Lake 2, then discharged into the Gap Wash. Additional capacity and outlet control facilities will be installed in this detention basin to also detain the total combined increase from Subareas E2, E3, E4, F2 and G2. This will allow the increase from these subareas to discharge directly to the Gap Wash while limiting the total peak flow discharging from the property to the peak "pre-developed" design condition.

9.0 PROPOSED DRAINAGE FACILITIES COMPLIANCE

The hydrologic and hydraulic analysis utilized for design of The Lakes master plan community storm water drainage facilities were performed in accordance with the requirements of the Washington County Flood Control Authority (WCFCA) *Storm drainage Systems Design and Management Manual*. Specific compliance measures were as follows:

- Hydrologic Analysis: The hydraulic analyses performed for The Lakes off-site and on-site watershed was performed in accordance with Section 4 of the drainage manual utilizing the US Army Corps of Engineers HEC-HMS Version 4.1[4] modeling software. The hydrologic

[4] U.S. Army Corps of Engineers, Hydraulic Engineering Circular Hydrologic Modeling System (HEC-HMS) software, Version 3.5.

analysis is discussed in greater detail in Section 10 of this report, with detailed information included in the appendix.

- Street Design: Street drainage design was performed in accordance with Section 3 of the drainage manual assuming that Sentieri Vista Drive is a minor collector, Lago Vista Drive and Alienta Drive are major collectors, and Plantations Drive is a major arterial in accordance with Table 3-1.
- Storm Drain Design: Storm drain design for Sentieri Vista Drive, Lago Vista Drive, Alienta Drive, and Plantations Drive was performed in accordance with Section 3 of the drainage manual assuming an open-channel flow condition.
- Culvert Design: Culverts for the offsite road system were designed in accordance with Section 3 of the drainage manual to fully convey the 100-year design storm event in an open channel flow condition.
- Open Channel Design: Open channels conveying storm water from detention areas to the Box Canyon Wash and Gap Wash, and conveying flows adjacent to Lago Vista Drive, will be designed with future phases. Open channels will be designed to match the natural channel flow characteristics of the existing channels.
- Storage Facilities Design: The two regional detention facilities have been sited and will designed with future phases as needed.

10.0 DESIGN RUNOFF COMPUTATIONS

10.1 HYDROLOGIC CALCULATIONS

The US Army Corps of Engineers HEC-HMS Version 4.1 was used to perform the hydrologic analysis for this study. The Farmer-Fletcher distribution is used for the 3-hour storm events and the SCS Type II distribution is used for the 24-hour storm events. The SCS Composite Curve Number method was utilized to determine the runoff curve number since all areas within the watershed evaluated are currently undeveloped.

Tables summarizing model input for the following values have been included in the appendix:

- Watershed areas, longest length, and average slope for the pre-developed and proposed post-developed condition.
- SCS composite curve number values for the pre-developed and proposed post-developed condition.
- Hydrologic model junction and routing characteristics.
- Calculated times of concentration and lag time.

10.2 COMPARISON OF PEAK FLOW VALUES

Modeling for The Lakes master plan development considered both the existing pre-developed condition and the assumed post-developed condition, in order to size storm drainage facilities and to compare impacts to storm water peak flow values caused by proposed development. HEC-HMS model peak storm values for all subareas, junctions, and routing conditions for the pre-developed and proposed post-developed condition are included in the appendix.

Post-developed conditions were assumed to match the proposed uses and densities described in Section 2 of this report and illustrated in *Figure 1 – Land Use Plan*. Since exact layout for each of the 16 individual planning areas is not known at this point, detailed drainage study update reports will be submitted with the development of each planning area.

11.0 PROPOSED DRAINAGE FACILITIES DESIGN COMPUTATIONS

Computations for the hydraulic design of The Lakes master plan community storm water drainage facilities were performed in accordance with the requirements of the Washington County Flood Control Authority *Storm Drainage Systems Design and Management Manual*. Output tables for calculations are included in the appendix.

11.1 CULVERT AND CHANNEL CAPACITY DESIGN

Culvert and channel capacities utilized Manning's equation for open channel flow:[5]

$$Q = \frac{1.49\,(A)^{5/3}(S)^{1/2}}{n(P)^{2/3}}$$

Where
- Q = Hydraulic Capacity, in cubic feet per second (cfs)
- A = Cross Sectional Flow Area, in square feet
- S = Average Slope, in feet per foot
- n = Manning's Roughness Coefficient
- P = Wetted Perimeter, in feet

[5] Flammer, Jeppson, and Keedy, Fundamental Principles and Applications of Fluid Mechanics, Utah State University, 1986, p. 289.

Table 11-1 lists the Manning's roughness coefficients used in the model evaluation:

TABLE 11-1: MANNING'S ROUGHNESS COEFFICIENTS

Surface Description	Manning's n Value
High Density Polyethylene Pipe (HDPE)	0.010
Concrete Pipe (RCP)	0.013
Open Channels	0.078
Asphalt Pavement	0.015

The following parameters were assumed for each evaluation:

- All culvert capacities were evaluated as flowing full in the open channel flow condition, assuming no surcharge.
- The slope of each culvert was assumed to be the average slope of the drainage basin or routing, unless additional information was known to justify a different value.
- If existing drainage or future road drainage infrastructure was determined to be inadequate to accommodate the modeled design storm, the culvert or open channel was sized to accommodate the full modeled design storm value.

11.2 STREET CAPACITY DESIGN

Street capacities were modeled using Manning's equation for open channel flow based on the master planned street cross-section, assuming full street improvements were constructed. Minimum slopes for all street sections were assumed to be at 0.5%.

11.3 STORAGE FACILITIES DESIGN

The two regional detention facilities are proposed, as discussed in Section 8.5. The master plan calculations summarized in this report do not include a proposed size for these two facilities, since overall post-development values do not exceed the pre-development values. If localized post-developed drainage values are determined to exceed pre-developed values during detailed drainage design of the planning areas, the storage facilities will be designed utilizing HEC-HMS output files, sizing for the 10-year 24-hour design storm, and sizing for the worst-case condition (whichever yielded the greatest volume) of the 100-year 3-hour design storm or the 100-year 24-hour design storm. Since not all subareas will be able to be routed directly through one of the detention basins, it is assumed that the regional facilities may need to be oversized to compensate for the total increased flow where storm water exits the property in the Box Canyon Wash for Lake 1, or in the Gap Wash for Lake 2, as discussed in Section 8.5 of this report.

12.0 REQUIRED EASEMENTS AND RIGHTS-OF-WAY

No additional easements or rights-of-way are being proposed for storm water drainage with the master plan, mass grading, or construction of offsite roadways. Major drainage channels within the proposed project are to remain in the open space areas shown in Figure 1, the master land use plan. Specific drainage easements, if needed within the individual planning areas, will be noted with the submittal of the planning area detailed drainage study report and project construction plans.

13.0 FEMA FLOODWAY AND FLOODPLAIN CALCULATIONS

No additional hydrologic or hydraulic calculations were performed for the purposes of modifying the existing floodplain as delineated on the FEMA flood insurance rate maps. It is the intention of the project developer to leave all designated floodplain areas for the Box Canyon Wash and Gap Wash out of the residential development areas.

14.0 CONCLUSIONS AND STATEMENT OF COMPLIANCE

This report for the drainage design of The Lakes Master Plan was prepared under my direct supervision in accordance with the provisions of Washington County Flood Control Authority (WCFCA) Storm Drainage Systems Design and Management Manual, and was designed to comply with the provisions thereof. I understand that the City of St. George and WCFCA do not and will not assume liability for drainage facilities design.

APPENDIX

Figure 1 – Land Use Plan for The Lakes at St. George
Figure 2 – Watershed Map for The Lakes at St. George
Figure 3 – FEMA Regulatory 100-Year Floodplain
Figure 4 – Proposed Culvert Crossing Calculations
Figure 5 – Custom Soil Resource Report for Washington County Area

Watershed Hydrology Model Input Spreadsheets
Watershed Hydrology Model Hydraulic Routing Spreadsheets
Watershed Hydrology Model Curve Number Spreadsheets
Watershed Hydrology Model Lag Time Spreadsheets
HEC-HMS Model and Output Tables
Culvert Calculation Worksheets

AREA TOTALS

	= 173.80 ACRES	23.8%
	= 236.12 ACRES	32.3%
	= 48.43 ACRES	6.6%
	= 27.04 ACRES	3.7%
	= 202.84 ACRES	27.8%
	= 42.48 ACRES	5.8%
TOTAL	= 730.71 ACRES	100%

NOTE

THE BOUNDARIES DESIGNATED FOR LAKES AND PARKS ARE SUBJECT TO CHANGE AT THE DEVELOPERS DISCRETION.

LEGEND

- LOW DENSITY RESIDENTIAL (UP TO 4 UNITS PER ACRES)
- MEDIUM DENSITY RESIDENTIAL (UP TO 9 UNITS PER ACRE)
- HIGH DENSITY RESIDENTIAL (UP TO 15 UNITS PER ACRE)
- COMMERCIAL/MIXED USE
- OPEN SPACE / PARKS / LAKES (SEE NOTE BELOW)
- ROADWAYS / CITY PROPERTY
- MAJOR ARTERIALS
- MINOR ARTERIALS
- REGIONAL TRAILS (PAVED)
- LOCAL TRAILS (PAVED)
- RECREATION TRAILS (DIRT)
- FUTURE ROADWAYS
- PROPERTY LINE
- WASHES
- TRAILHEAD SITE

PLANNING AREAS

AREA	ZONE	ACRES	DENSITY
P.A.-1	HDR	28.09	UP TO 15 UNITS/ACRE
P.A.-2	MDR	35.96	UP TO 9 UNITS/ACRE
P.A.-3	MDR	24.10	UP TO 9 UNITS/ACRE
P.A.-4	LDR	33.52	UP TO 4 UNITS/ACRE
P.A.-5	LDR	19.37	UP TO 4 UNITS/ACRE
P.A.-6	LDR	59.74	UP TO 4 UNITS/ACRE
P.A.-7	MDR	35.93	UP TO 9 UNITS/ACRE
P.A.-8	MIXED USE	27.04	UP TO 10 UNITS/ACRE
P.A.-9	MDR	13.30	UP TO 9 UNITS/ACRE
P.A.-10	MDR	11.33	UP TO 9 UNITS/ACRE
P.A.-11	MDR	27.17	UP TO 9 UNITS/ACRE
P.A.-12	MDR	26.88	UP TO 9 UNITS/ACRE
P.A.-13	MDR	61.45	UP TO 9 UNITS/ACRE
P.A.-14	LDR	28.44	UP TO 4 UNITS/ACRE
P.A.-15	LDR	16.35	UP TO 4 UNITS/ACRE
P.A.-16	LDR	16.38	UP TO 4 UNITS/ACRE
P.A.-17	HDR	12.31	UP TO 15 UNITS/ACRE
P.A.-18	HDR	8.03	UP TO 15 UNITS/ACRE

BLM
SANTA CLARA CITY

FUTURE CONNECTION TO WESTERN CORRIDOR

SUNBROOK DR.

BOX CANYON WASH

OPEN SPACE 4.29 ACRES

P.A.-15 16.35 ACRES

P.A.-16 16.38 ACRES

P.A.-17 12.31 ACRES

P.A.-18 8.03 ACRES

OPEN SPACE 2.44 ACRES

P.A.-14 28.44 ACRES

BLM
(NON-INCORPORATED)

PARK #1 4.29 ACRES

PLANTATIONS DR.

P.A.-12 26.88 ACRES

LAKE #1 5.00 ACRES

OPEN SPACE 8.84 ACRES

P.A.-13 61.45 ACRES

OPEN SPACE 3.92 ACRES

P.A.-9 13.30 ACRES

P.A.-10 11.33 ACRES

P.A.-11 27.17 ACRES

PARK #3 2.75 ACRES

P.A.-8 27.04 ACRES

SUNBROOK

SUNBROOK DR.

LUCE DEL SOL DR.

ALIENTA DR.

HIGHLANDS

ALIENTA DR.

OPEN SPACE 0.33 ACRES

P.A.-7 35.93 ACRES

OPEN SPACE 1.92 ACRES

PROPOSED FIRE STATION

COTTAGES NORTH

SALES CENTER

CANYON VIEW DR.

(FUTURE)

OPEN SPACE 29.01 ACRES

P.A.-6 59.74 ACRES

LAKE #2 5.07 ACRES

P.A.-3 24.10 ACRES

COTTAGES SOUTH

OPEN SPACE 1.79 ACRES

EXISTING SUBSTATION (TO BE REMOVED)

EXISTING BLM TRAILHEAD

OPEN SPACE 12.41 ACRES

PARK #2 25.00 ACRES

OPEN SPACE 40.44 ACRES

LAS PALMAS

TRENDWEST

P.A.-5 19.37 ACRES

OPEN SPACE 3.43 ACRES

RICHARD JASON ROGERS

DIXIE DR.

OPEN SPACE 6.82 ACRES

P.A.-4 33.52 ACRES

P.A.-2 35.96 ACRES

PLANTATIONS DR.

P.A.-1 28.09 ACRES

SUBSTATION 3.24 ACRES

TRAILHEAD

J. BURTON & EVELYN H. BURGESS

(FUTURE)

HWY. 18 TO VEYO

PINE VALLEY

DIXIE DOWNS RD.

SUNSET BLVD.

VIEW DR.

VALLEY

GREEN VALLEY

DIXIE DR.

ST. GEORGE BLVD.

DOWNTOWN

BLUFF ST.

INTERSTATE I-15 TO SALT LAKE CITY

DIXIE

VIRGIN RIVER

BLOOMINGTON

BLOOMINGTON HILLS

INTERSTATE I-15 TO LAS VEGAS, NEV.

The Lakes at St. George

NORTH

LOCATION MAP
ST. GEORGE, UTAH

DATE: 8/31/2016
JOB NO.: 1286-14-014
DESIGNED BY: JLN
CHECKED BY: RMA
DWG: Land Use Plan

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

Land Use Plan
FOR
The Lakes at St. George
St. George, Utah

SHEET
Fig. 1
1 OF 1 SHEETS

Q= 2,950 CFS
AS PER FEMA
AUGUST 2006

Q= 650 CFS
AS PER FEMA
AUGUST 2006

Box Canyon

Stucki Spring

Mojave Desert

The Gap

Cove Wash

Halfway Wash

Halfway Wash

Santa Clara River

CANYON RIDGE RD

EMERAUD

W SUNBROOK DR

W RIVERS EDGE LN

S VALLEY VIEW DR

S DIXIE DR

SOL TOMASO VISTA DEL

SOLUCE DEL SOL DR

PLANTATIONS DR.

LAGO VISTA DR.

ALIENTA DR.

S VILLAGE RD

ALIENTA DR.

X2 A3 X1 Y2 Y1 A2 A1 B4 B3 B2 B1 C4 C3 C2 C1 D1 D2 E2 E3 F2 G2 E4 F1 E1 G1 H1

3000 3200 2800 2700

0 1400' 2800'

SCALE: 1"=1400'

DATE: 4-14-08
JOB NO.: 1286-PDA
DRAWN BY: JRH
DESIGNED BY:
DWG: WATERSHED MAP

REVISIONS DATE

ROSENBERG ASSOCIATES
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FIGURE 2 WATERSHED MAP
FOR
THE LAKES AT ST. GEORGE
ST. GEORGE, UTAH

SHEET
Fig. 2
1 OF 1 SHEETS

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Floodway Data table shown on this FIRM.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) Zone 12N. **Horizontal datum** was NAD 83, GRS80 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, NNGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242**, or visit its website at http://www.ngs.noaa.gov/.

Base map information shown on this FIRM was provided in digital format by the U.S. Farm Service National Agriculture Imagery Program (NAIP), dated summer 2004, and by the U.S. Geological Survey Digital Orthophoto Quadrangles, dated 1993 and later, produced at a scale of 1:24000. The data was obtained from the State Geographic Information Dataset (SGID) maintained by the Automated Geographic Reference Center (AGRC).

Based on updated topographic information, this map reflects more detailed and up-to-date **stream channel configurations and floodplain delineations** than those shown on the previous FIRM for this jurisdiction. As a result, the Flood Profiles and Floodway Data tables may reflect stream channel distances that differ from what is shown on the map. Also, the road to floodplain relationships for unrevised streams may differ from what is shown on previous maps.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at http://msc.fema.gov/.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/business/nfip/.

NFIP — NATIONAL FLOOD INSURANCE PROGRAM

PANEL 1007G

FIRM
FLOOD INSURANCE RATE MAP

WASHINGTON COUNTY, UTAH
AND INCORPORATED AREAS

PANEL 1007 OF 1225
(SEE LOCATOR DIAGRAM OR MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
SANTA CLARA, CITY OF	490178	1007	G
ST. GEORGE, CITY OF	490177	1007	G
WASHINGTON COUNTY	490224	1007	G

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
49053C1007G
EFFECTIVE DATE
APRIL 2, 2009

Federal Emergency Management Agency

NFIP — NATIONAL FLOOD INSURANCE PROGRAM

PANEL 1009G

FIRM
FLOOD INSURANCE RATE MAP

WASHINGTON COUNTY, UTAH
AND INCORPORATED AREAS

PANEL 1009 OF 1225
(SEE LOCATOR DIAGRAM OR MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
ST. GEORGE, CITY OF	490177	1009	G
WASHINGTON COUNTY	490224	1009	G

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
49053C1009G
EFFECTIVE DATE
APRIL 2, 2009

Federal Emergency Management Agency

NFIP — NATIONAL FLOOD INSURANCE PROGRAM

PANEL 1028G

FIRM
FLOOD INSURANCE RATE MAP

WASHINGTON COUNTY, UTAH
AND INCORPORATED AREAS

PANEL 1028 OF 1225
(SEE LOCATOR DIAGRAM OR MAP INDEX FOR FIRM PANEL LAYOUT)

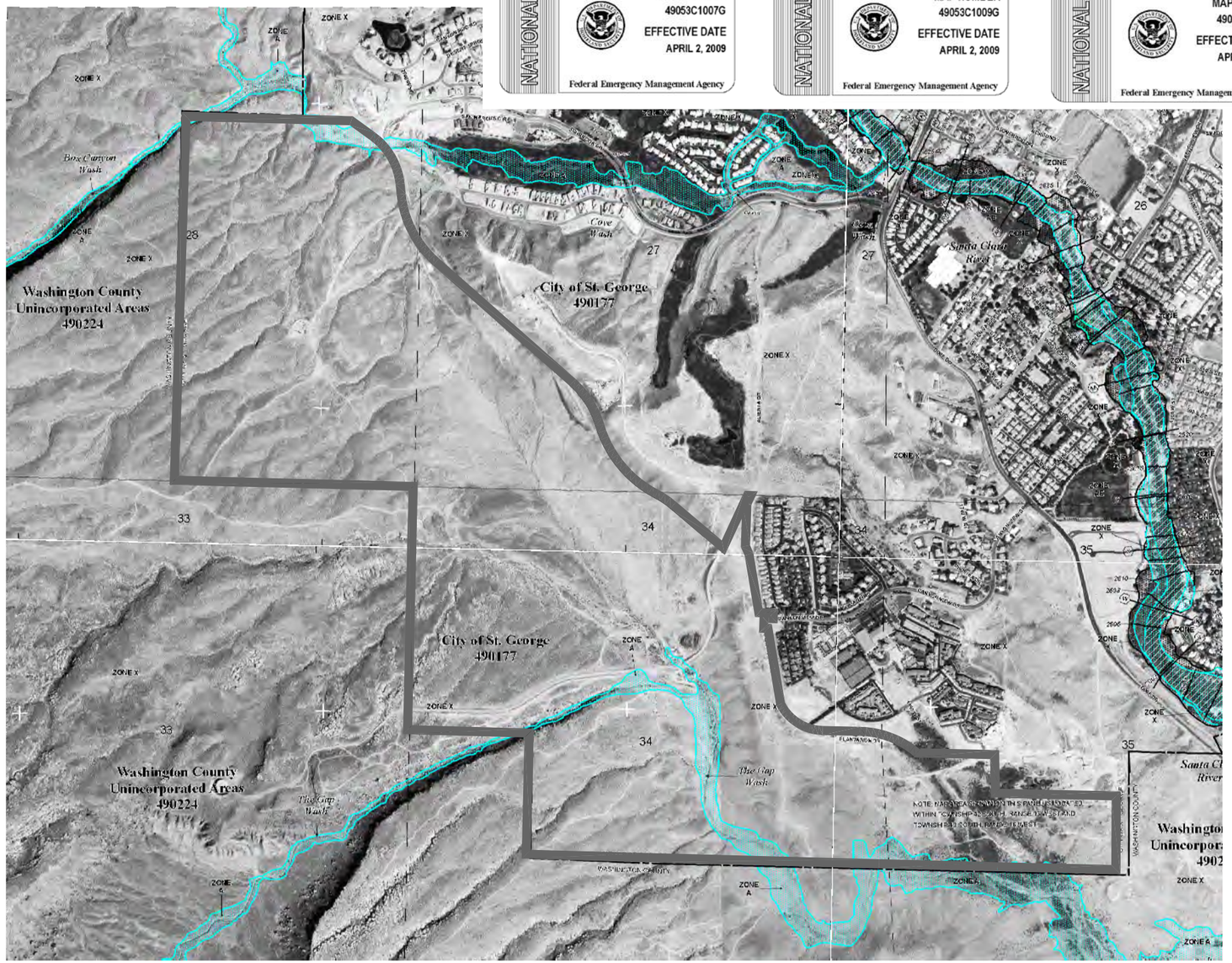
CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
ST. GEORGE, CITY OF	490177	1028	G
WASHINGTON COUNTY	490224	1028	G

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
49053C1028G
EFFECTIVE DATE
APRIL 2, 2009

Federal Emergency Management Agency



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

- **ZONE A** No Base Flood Elevations determined.
- **ZONE AE** Base Flood Elevations determined.
- **ZONE AH** Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
- **ZONE AO** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- **ZONE AR** Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
- **ZONE A99** Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
- **ZONE V** Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
- **ZONE VE** Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

- **ZONE X** Area of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

- **ZONE X** Areas determined to be outside the 0.2% annual chance floodplain.
- **ZONE D** Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAS)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL. 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

- (A) — (A) Cross section line
- (27) — (27) Transect line
- 87°07'45", 32°22'30" Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
- 4376 000 m E — 1000-meter Universal Transverse Mercator grid values, zone 12
- 600000 FT — 5000-foot grid ticks: Utah State Plane coordinate system, south zone (FIPSZONE 4302), Lambert Conformal Conic projection
- DK5510 x — Bench mark (See explanation in Notes to Users section of this FIRM panel)
- M1.5 — River Mile

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
APRIL 2, 2009

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

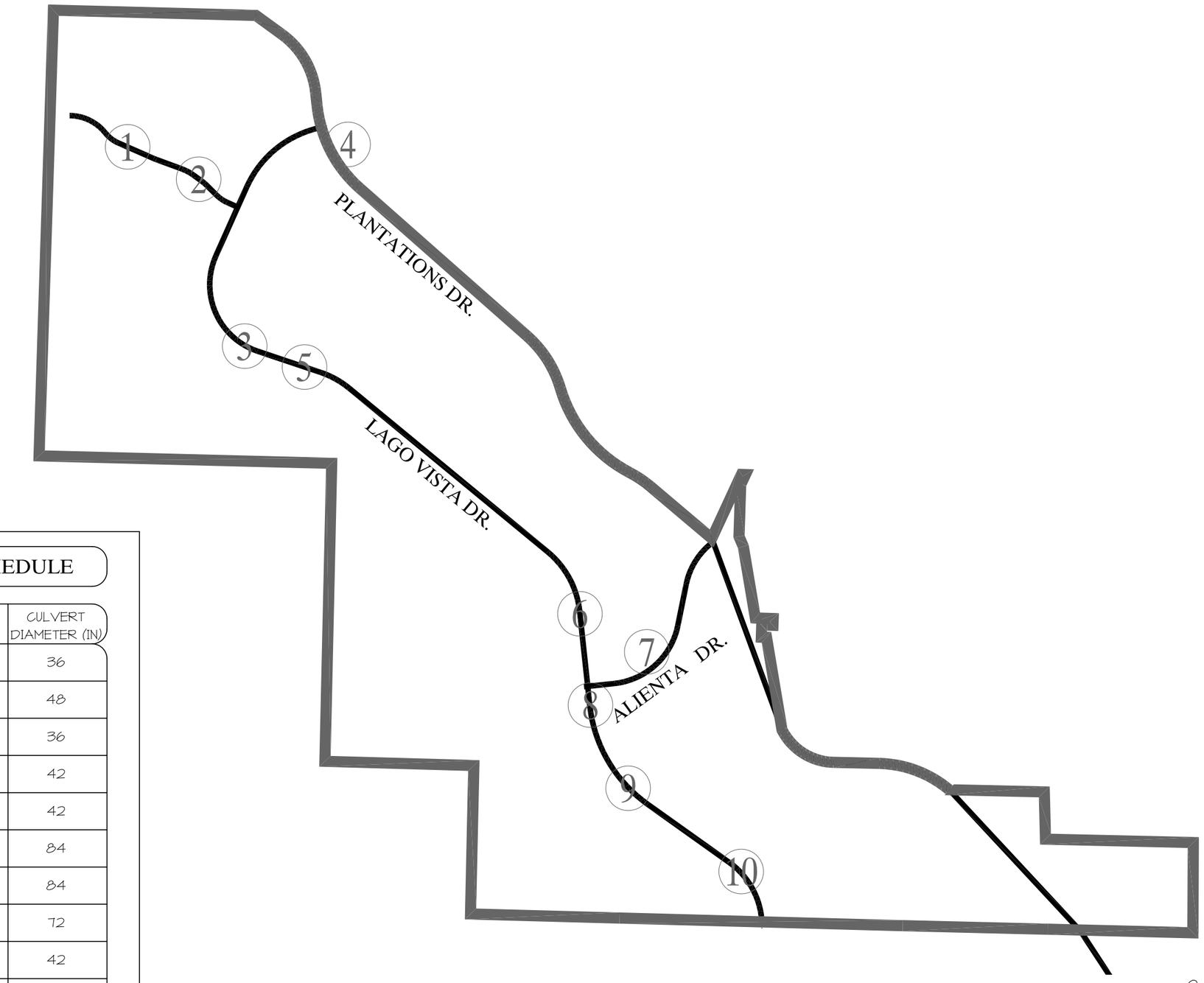
MAP SCALE 1" = 500'
250 0 500 1000 FEET
150 0 150 300 METERS

DATE: 4-14-08
JOB NO.: 1286-PDA
DRAWN BY: JRH
DESIGNED BY:
DWG: WATERSHED MAP
DATE
REVISIONS

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.rosenbergassociates.net

FIGURE 3- FEMA Regulatory 100-YR Floodplain
FOR
The Lakes at St. George
St. George, Utah

SHEET
Fig. 3
1 OF 1 SHEETS



CULVERT SCHEDULE

CULVERT ID	100-YR FLOW (CFS)	CULVERT DIAMETER (IN)
1	80.7	36
2	191.9	48
3	88.1	36
4	139.9	42
5	104.5	42
6	654.3	84
7	810.0	84
8	456.7	72
9	134.7	42
10	249.4	60

NOTE
CULVERT DIAMETER CALCULATIONS ASSUME 1.0% SLOPE.

0 1000' 2000'

SCALE: 1"=1000'

DATE: 4-14-08
JOB NO.: 1286-PDA
DRAWN BY: JLN
DESIGNED BY: RMA
DWG: WATERSHED MAP

REVISIONS DATE

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FIGURE 4 CULVERT CROSSINGS FOR THE LAKES AT ST. GEORGE

ST. GEORGE, UTAH

SHEET
Fig. 4
1 OF 1 SHEETS

United States Department of Agriculture

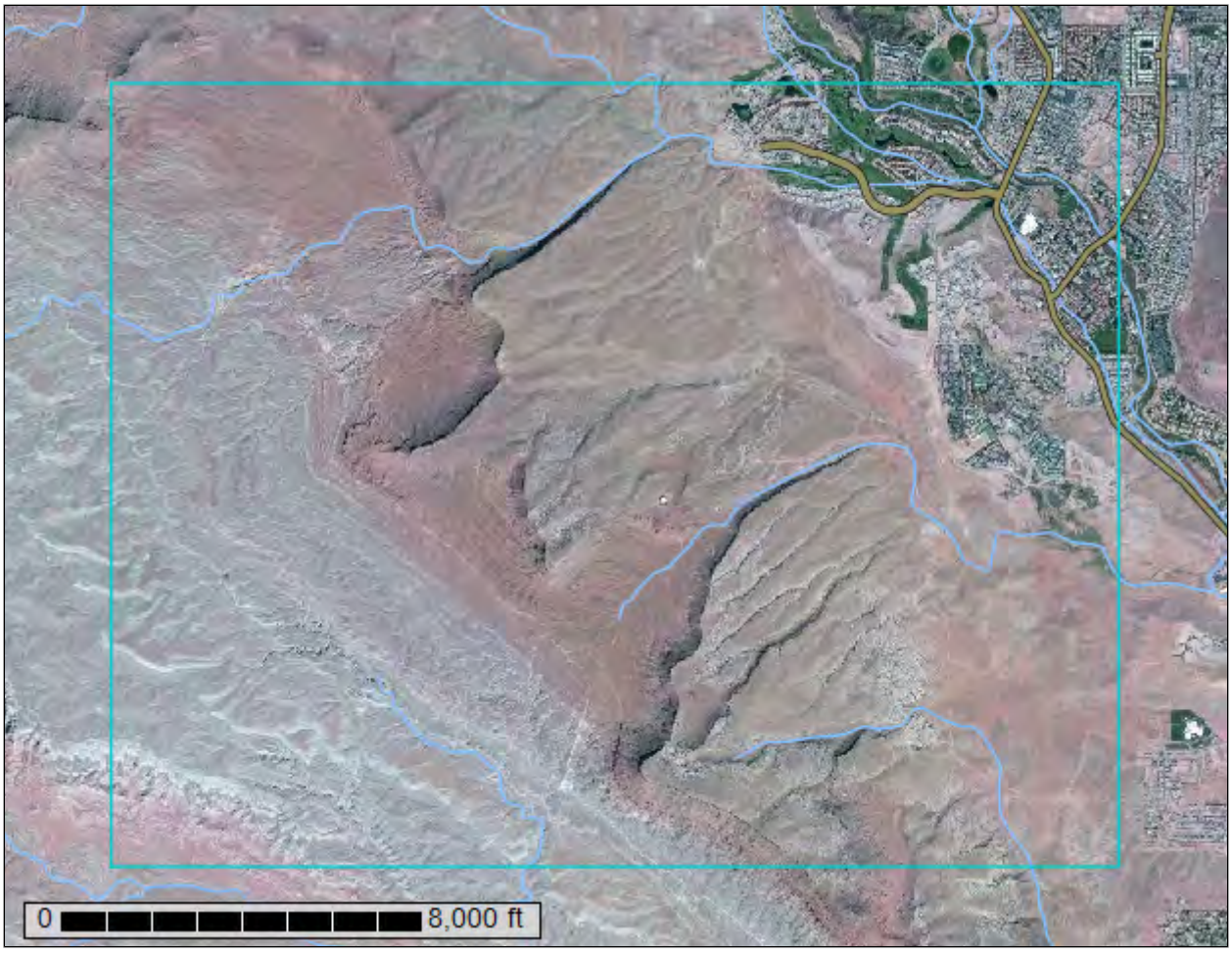
NRCS

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

The Lakes



August 19, 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.

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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.

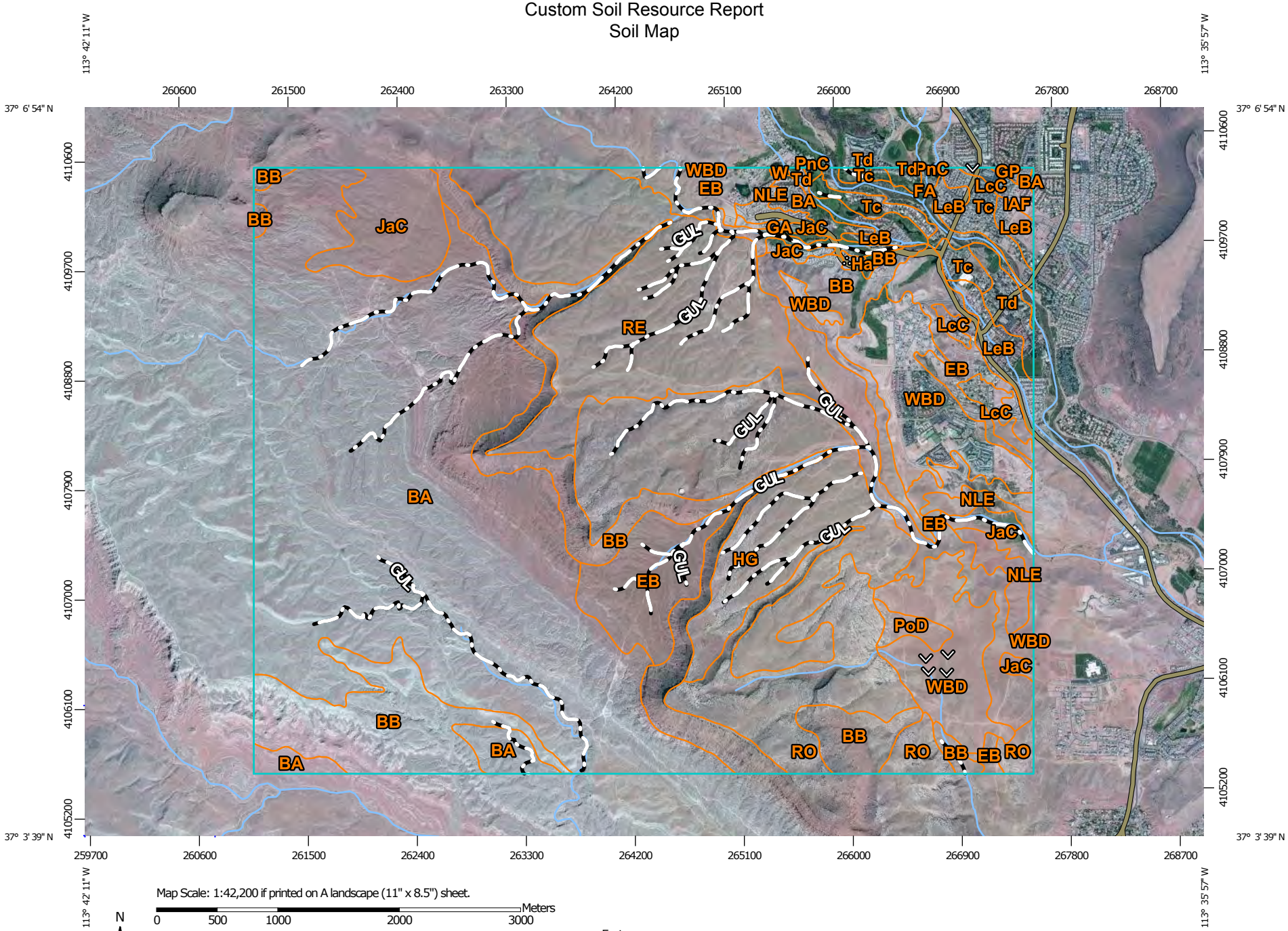
Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree 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.

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: Washington County Area, Utah
Survey Area Data: Version 9, Sep 23, 2015

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

Date(s) aerial images were photographed: Aug 11, 2010—Nov 3, 2010

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

Washington County Area, Utah (UT641)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
BA	Badland	2,583.6	32.5%
BB	Badland, very steep	1,031.7	13.0%
EB	Eroded land-Shalet complex, warm	727.4	9.1%
FA	Fluvaquents and torrifluvents, sandy	63.4	0.8%
GA	Gullied land	35.1	0.4%
GP	Gravel pits	4.1	0.1%
Ha	Hantz silty clay loam	9.7	0.1%
HG	Hobog-Rock land association	870.7	10.9%
IAF	Isom cobbly sandy loam, 3 to 30 percent slopes	15.6	0.2%
JaC	Junction fine sandy loam, 2 to 5 percent slopes	250.5	3.1%
LcC	Laverkin fine sandy loam, 2 to 5 percent slopes	49.5	0.6%
LeB	Leeds silty clay loam, 1 to 2 percent slopes	142.6	1.8%
NLE	Nikey sandy loam, 3 to 15 percent slopes	100.1	1.3%
PnC	Pintura loamy fine sand, 1 to 5 percent slopes	3.1	0.0%
PoD	Pintura loamy fine sand, hummocky, 1 to 10 percent slopes	30.4	0.4%
RE	Renbac-Rock land association	893.1	11.2%
RO	Rock land	431.7	5.4%
Tc	Tobler fine sandy loam	129.0	1.6%
Td	Tobler silty clay loam	71.5	0.9%
W	Water	2.7	0.0%
WBD	Winkel gravelly fine sandy loam, 1 to 8 percent slopes	507.9	6.4%
Totals for Area of Interest		**7,953.3**	**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.

Washington County Area, Utah

BA—Badland

Map Unit Composition

Badland: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Badland

Setting

Landform: Escarpments, hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Free face, side slope
Down-slope shape: Convex
Across-slope shape: Convex

BB—Badland, very steep

Map Unit Composition

Badland: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Badland

Setting

Landform: Escarpments, hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Free face, side slope
Down-slope shape: Convex
Across-slope shape: Convex

EB—Eroded land-Shalet complex, warm

Map Unit Setting

National map unit symbol: j8ds
Elevation: 3,600 to 5,550 feet
Mean annual precipitation: 10 to 13 inches
Mean annual air temperature: 52 to 56 degrees F
Frost-free period: 165 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

Eroded land: 78 percent
Shalet and similar soils: 20 percent
Minor components: 2 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Eroded Land

Setting

Landform: Erosion remnants
Parent material: Residuum weathered from shale

Description of Shalet

Setting

Landform: Swales
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Residuum weathered from shale

Typical profile

H1 - 0 to 4 inches: clay loam
H2 - 4 to 12 inches: clay loam
H3 - 12 to 16 inches: weathered bedrock

Properties and qualities

Slope: 2 to 20 percent
Depth to restrictive feature: 4 to 15 inches to paralithic bedrock
Natural drainage class: Well drained
Runoff class: High
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
Calcium carbonate, maximum in profile: 20 percent
Gypsum, maximum in profile: 10 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 5.0
Available water storage in profile: Very low (about 2.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: Desert Shallow Loam (Creosotebush) (R030XY134UT)
Hydric soil rating: No

Minor Components

Badland

Percent of map unit: 2 percent

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
Natural 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 in profile: 20 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 10.0
Available water storage in profile: 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: Loamy Bottom (Basin Big Sagebrush) (R035XY011UT)

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
Natural 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 in profile: 20 percent
Salinity, maximum in profile: Nonsaline to moderately saline (0.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 5.0
Available water storage in profile: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: A
Ecological site: Loamy Bottom (Basin Big Sagebrush) (R035XY011UT)
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

GA—Gullied land

Map Unit Composition

Gullied land: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

GP—Gravel pits

Map Unit Composition

Gravel pit: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Gravel Pit

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8s

Hydric soil rating: No

Ha—Hantz silty clay loam

Map Unit Setting

National map unit symbol: j8dy

Elevation: 2,700 to 3,300 feet

Mean annual precipitation: 8 to 11 inches

Mean annual air temperature: 57 to 65 degrees F

Frost-free period: 190 to 195 days

Farmland classification: Prime farmland if irrigated

Map Unit Composition

Hantz and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hantz

Setting

Landform: Alluvial fans

Down-slope shape: Concave

Across-slope shape: Convex

Parent material: Mixed alluvium derived from limestone, sandstone, and shale

Typical profile

H1 - 0 to 9 inches: silty clay loam

H2 - 9 to 19 inches: silty clay
H3 - 19 to 47 inches: silty clay
H4 - 47 to 70 inches: silty clay

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 20 percent
Gypsum, maximum in profile: 5 percent
Salinity, maximum in profile: Very slightly saline to slightly saline (2.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 5.0
Available water storage in profile: High (about 10.8 inches)

Interpretive groups

Land capability classification (irrigated): 3s
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Leeds

Percent of map unit: 5 percent

Tobler

Percent of map unit: 5 percent

St. george, moderately saline

Percent of map unit: 5 percent

HG—Hobog-Rock land association

Map Unit Setting

National map unit symbol: j8dx
Elevation: 2,600 to 3,800 feet
Mean annual precipitation: 8 to 11 inches
Mean annual air temperature: 57 to 67 degrees F
Frost-free period: 190 to 195 days
Farmland classification: Not prime farmland

Map Unit Composition

Hobog and similar soils: 50 percent
Rock land: 40 percent

Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hobog

Setting

Landform: Mesas
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Material weathered from sandstone

Typical profile

H1 - 0 to 4 inches: very cobbly loam
H2 - 4 to 13 inches: very flaggy loam
H3 - 13 to 17 inches: unweathered bedrock

Properties and qualities

Slope: 3 to 40 percent
Depth to restrictive feature: 8 to 20 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Very high
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
Calcium carbonate, maximum in profile: 25 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 5.0
Available water storage in profile: Very low (about 0.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: Desert Shallow Loam (Creosotebush) (R030XY134UT)
Hydric soil rating: No

Description of Rock Land

Setting

Landform: Ridges
Down-slope shape: Convex
Across-slope shape: Convex

Minor Components

Rock outcrop

Percent of map unit: 5 percent

Renbac

Percent of map unit: 5 percent

IAF—Isom cobbly sandy loam, 3 to 30 percent slopes

Map Unit Setting

National map unit symbol: j8f0
Elevation: 2,700 to 3,900 feet
Mean annual precipitation: 8 to 11 inches
Mean annual air temperature: 57 to 67 degrees F
Frost-free period: 175 to 195 days
Farmland classification: Not prime farmland

Map Unit Composition

Isom and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Isom

Setting

Landform: Alluvial fans
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Cobbly alluvium derived from limestone, sandstone, and shale

Typical profile

H1 - 0 to 2 inches: very cobbly sandy loam
H2 - 2 to 10 inches: very cobbly sandy loam
H3 - 10 to 22 inches: very cobbly sandy loam
H4 - 22 to 60 inches: extremely cobbly sandy loam

Properties and qualities

Slope: 3 to 30 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 60 percent
Gypsum, maximum in profile: 10 percent
Salinity, maximum in profile: Very slightly saline to slightly saline (2.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 5.0
Available water storage in profile: Low (about 3.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A

Ecological site: Desert Shallow Loam (Creosotebush) (R030XY134UT)
Hydric soil rating: No

Minor Components

Shallow soils
Percent of map unit: 5 percent

Nickey
Percent of map unit: 5 percent

JaC—Junction fine sandy loam, 2 to 5 percent slopes

Map Unit Setting
National map unit symbol: j8f4
Elevation: 2,700 to 3,400 feet
Mean annual precipitation: 8 to 11 inches
Mean annual air temperature: 57 to 67 degrees F
Frost-free period: 190 to 195 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition
Junction and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Junction

Setting
Landform: Alluvial fans, hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave, convex
Across-slope shape: Convex

Typical profile
H1 - 0 to 2 inches: fine sandy loam
H2 - 2 to 9 inches: fine sandy loam
H3 - 9 to 21 inches: fine sandy loam
H4 - 21 to 32 inches: fine sandy loam
H5 - 32 to 60 inches: fine sandy loam

Properties and qualities
Slope: 1 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

Calcium carbonate, maximum in profile: 20 percent
Gypsum, maximum in profile: 7 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Moderate (about 7.2 inches)

Interpretive groups
Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Ecological site: Desert Loam (Creosotebush) (R030XY110UT)
Hydric soil rating: No

Minor Components

Tobler
Percent of map unit: 5 percent

Harrisburg
Percent of map unit: 5 percent

Junction
Percent of map unit: 5 percent

LcC—Laverkin fine sandy loam, 2 to 5 percent slopes

Map Unit Setting
National map unit symbol: j8fg
Elevation: 2,550 to 3,300 feet
Mean annual precipitation: 8 to 11 inches
Mean annual air temperature: 57 to 67 degrees F
Frost-free period: 190 to 195 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition
Laverkin and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Laverkin

Setting
Landform: Alluvial fans, stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Concave, linear
Across-slope shape: Convex, concave
Parent material: Alluvium derived from limestone, sandstone, and shale

Typical profile
H1 - 0 to 3 inches: fine sandy loam
H2 - 3 to 16 inches: fine sandy loam
H3 - 16 to 30 inches: sandy clay loam
H4 - 30 to 42 inches: sandy clay loam

H5 - 42 to 60 inches: sandy clay loam

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 30 percent
Gypsum, maximum in profile: 5 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water storage in profile: High (about 9.4 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: Desert Loam (Creosotebush) (R030XY110UT)
Hydric soil rating: No

Minor Components

Tobler

Percent of map unit: 5 percent

Nikey

Percent of map unit: 5 percent

LeB—Leeds silty clay loam, 1 to 2 percent slopes

Map Unit Setting

National map unit symbol: j8fk
Elevation: 2,550 to 3,300 feet
Mean annual precipitation: 8 to 11 inches
Mean annual air temperature: 57 to 67 degrees F
Frost-free period: 190 to 200 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

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

Description of Leeds

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 8 inches: silty clay loam
H2 - 8 to 15 inches: silty clay loam
H3 - 15 to 23 inches: sandy loam
H4 - 23 to 60 inches: silt loam

Properties and qualities

Slope: 1 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 20 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 5.0
Available water storage in profile: High (about 10.1 inches)

Interpretive groups

Land capability classification (irrigated): 3s
Hydrologic Soil Group: C
Ecological site: Desert Loam (Creosotebush) (R030XY110UT)
Hydric soil rating: No

Minor Components

Hantz

Percent of map unit: 4 percent

St george

Percent of map unit: 4 percent

Leeds

Percent of map unit: 4 percent

Tobler

Percent of map unit: 3 percent

NLE—Nikey sandy loam, 3 to 15 percent slopes

Map Unit Setting

National map unit symbol: j8fw
Elevation: 2,650 to 3,350 feet
Mean annual precipitation: 8 to 11 inches

Mean annual air temperature: 59 to 62 degrees F
Frost-free period: 180 to 195 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Nikey

Setting

Landform: Alluvial fans
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Gravelly alluvium derived from limestone, sandstone, and shale

Typical profile

H1 - 0 to 3 inches: sandy loam
H2 - 3 to 26 inches: fine sandy loam
H3 - 26 to 38 inches: very gravelly loam
H4 - 38 to 46 inches: very gravelly loam
H5 - 46 to 60 inches: very gravelly loam

Properties and qualities

Slope: 3 to 15 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 30 percent
Gypsum, maximum in profile: 10 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Moderate (about 6.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: Desert Loam (Creosotebush) (R030XY110UT)
Hydric soil rating: No

Minor Components

Harrisburg

Percent of map unit: 5 percent

Isom

Percent of map unit: 5 percent

Nikey

Percent of map unit: 5 percent

PnC—Pintura loamy fine sand, 1 to 5 percent slopes

Map Unit Setting

National map unit symbol: j8g9
Elevation: 2,600 to 3,600 feet
Mean annual precipitation: 8 to 11 inches
Mean annual air temperature: 57 to 67 degrees F
Frost-free period: 190 to 195 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

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

Description of Pintura

Setting

Landform: Mountain slopes
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Eolian sands derived from sandstone

Typical profile

H1 - 0 to 3 inches: loamy fine sand
H2 - 3 to 65 inches: fine sand

Properties and qualities

Slope: 1 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively 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: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 10 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Ecological site: Desert Sand (Indian ricegrass) (R030XY120UT)
Hydric soil rating: No

Minor Components

Toquerville
Percent of map unit: 4 percent

Harrisburg
Percent of map unit: 4 percent

Tobler
Percent of map unit: 4 percent

Ivins
Percent of map unit: 3 percent

PoD—Pintura loamy fine sand, hummocky, 1 to 10 percent slopes

Map Unit Setting
National map unit symbol: j8gb
Elevation: 2,600 to 3,600 feet
Mean annual precipitation: 7 to 8 inches
Mean annual air temperature: 57 to 67 degrees F
Frost-free period: 190 to 195 days
Farmland classification: Not prime farmland

Map Unit Composition
Pintura and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pintura

Setting
Landform: Mountain slopes
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Hummocky eolian sands derived from sandstone

Typical profile
H1 - 0 to 3 inches: loamy fine sand
H2 - 3 to 65 inches: fine sand

Properties and qualities
Slope: 1 to 10 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively drained
Runoff class: 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: More than 80 inches
Frequency of flooding: None

Frequency of ponding: None
Calcium carbonate, maximum in profile: 10 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): 3s
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Ecological site: Desert Sand (Indian ricegrass) (R030XY120UT)
Hydric soil rating: No

Minor Components

Dune land

Percent of map unit: 5 percent

Pintura

Percent of map unit: 5 percent

Toquerville

Percent of map unit: 5 percent

RE—Renbac-Rock land association

Map Unit Setting

National map unit symbol: j8gd
Elevation: 2,800 to 4,000 feet
Mean annual precipitation: 8 to 11 inches
Mean annual air temperature: 57 to 61 degrees F
Frost-free period: 190 to 195 days
Farmland classification: Not prime farmland

Map Unit Composition

Renbac and similar soils: 60 percent
Rock land: 25 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Renbac

Setting

Landform: Mountain slopes
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Material weathered from sandstone, conglomerate, and shale

Typical profile

H1 - 0 to 2 inches: channery clay loam
H2 - 2 to 5 inches: very channery clay
H3 - 5 to 9 inches: very channery clay

H4 - 9 to 12 inches: very flaggy sandy loam
H5 - 12 to 16 inches: unweathered bedrock

Properties and qualities

Slope: 2 to 30 percent
Depth to restrictive feature: 8 to 17 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 25 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Very low (about 1.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: Semidesert Shallow Hardpan (Blackbrush) (R030XY230UT)
Hydric soil rating: No

Minor Components

Hobog

Percent of map unit: 5 percent

RO—Rock land

Map Unit Composition

Rock land: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rock Land

Setting

Landform: Mountain slopes
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex

Minor Components

Shallow soils

Percent of map unit: 20 percent

Tc—Tobler fine sandy loam

Map Unit Setting

National map unit symbol: j8h2
Elevation: 2,500 to 3,500 feet
Mean annual precipitation: 10 to 13 inches
Mean annual air temperature: 48 to 57 degrees F
Frost-free period: 160 to 170 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

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

Description of Tobler

Setting

Landform: Alluvial fans, hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave, convex
Across-slope shape: Convex
Parent material: Alluvium derived from sandstone and shale

Typical profile

H1 - 0 to 4 inches: fine sandy loam
H2 - 4 to 13 inches: fine sandy loam
H3 - 13 to 38 inches: fine sandy loam
H4 - 38 to 60 inches: fine sandy loam

Properties and qualities

Slope: 1 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 10 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Moderate (about 7.2 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Ecological site: Desert Loam (Creosotebush) (R030XY110UT)
Hydric soil rating: No

Minor Components

Harrisburg
Percent of map unit: 4 percent

Ivins
Percent of map unit: 4 percent

Pintura
Percent of map unit: 4 percent

Junction
Percent of map unit: 3 percent

Td—Tobler silty clay loam

Map Unit Setting
National map unit symbol: j8h3
Elevation: 2,500 to 3,500 feet
Mean annual precipitation: 10 to 13 inches
Mean annual air temperature: 48 to 57 degrees F
Frost-free period: 160 to 170 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition
Tobler and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Tobler

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

Typical profile
H1 - 0 to 10 inches: silty clay loam
H2 - 10 to 13 inches: fine sandy loam
H3 - 13 to 38 inches: fine sandy loam
H4 - 38 to 60 inches: fine sandy loam

Properties and qualities
Slope: 1 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural 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 in profile: 10 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Moderate (about 7.6 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Ecological site: Desert Loam (Creosotebush) (R030XY110UT)
Hydric soil rating: No

Minor Components

Tobler

Percent of map unit: 3 percent

Leeds

Percent of map unit: 3 percent

Leeds

Percent of map unit: 2 percent

Leeds

Percent of map unit: 2 percent

W—Water

Map Unit Composition

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

WBD—Winkel gravelly fine sandy loam, 1 to 8 percent slopes

Map Unit Setting

National map unit symbol: j8h9
Elevation: 2,800 to 4,000 feet
Mean annual precipitation: 8 to 11 inches
Mean annual air temperature: 57 to 61 degrees F
Frost-free period: 190 to 195 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Winkel

Setting

Landform: Mesas
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Calcareous material weathered from basalt, limestone, and wind-deposited sand.

Typical profile

H1 - 0 to 1 inches: gravelly fine sandy loam
H2 - 1 to 6 inches: gravelly fine sandy loam
H3 - 6 to 12 inches: very gravelly fine sandy loam
H4 - 12 to 16 inches: extremely cobbly fine sandy loam
H5 - 16 to 20 inches: indurated
H6 - 20 to 24 inches: unweathered bedrock

Properties and qualities

Slope: 1 to 8 percent
Depth to restrictive feature: 11 to 19 inches to petrocalcic; 14 to 24 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 30 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 5.0
Available water storage in profile: Very low (about 1.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: Desert Shallow Loam (Creosotebush) (R030XY134UT)
Hydric soil rating: No

Minor Components

Lava flows

Percent of map unit: 5 percent

Harrisburg

Percent of map unit: 5 percent

Bermesa

Percent of map unit: 5 percent

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Hydrologic Soil Group (The Lakes)

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

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.

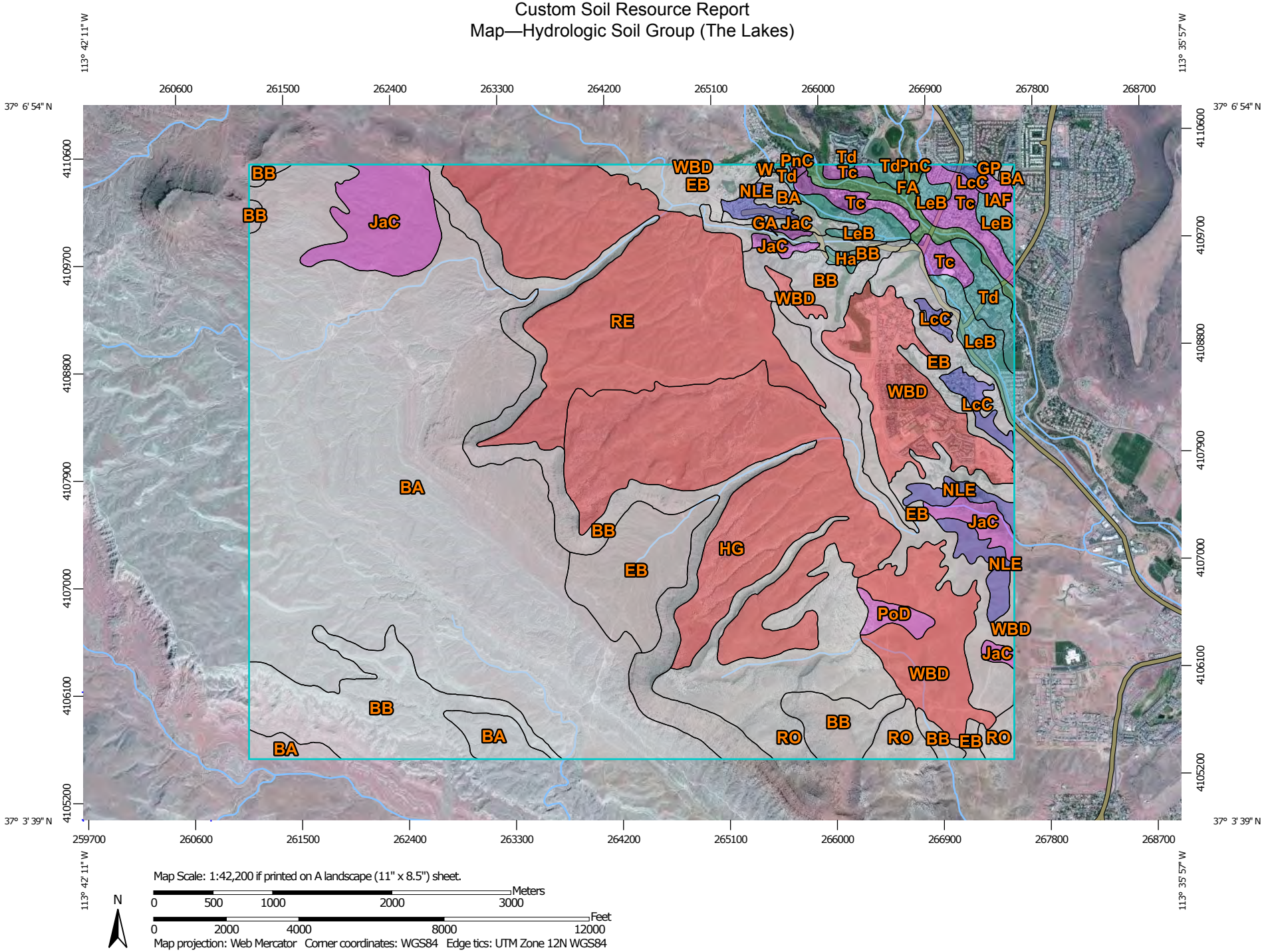
Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

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.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Custom Soil Resource Report
Map—Hydrologic Soil Group (The Lakes)



MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

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.

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: Washington County Area, Utah
Survey Area Data: Version 9, Sep 23, 2015

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

Date(s) aerial images were photographed: Aug 11, 2010—Nov 3, 2010

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.

Table—Hydrologic Soil Group (The Lakes)

Hydrologic Soil Group— Summary by Map Unit — Washington County Area, Utah (UT641)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
BA	Badland		2,583.6	32.5%
BB	Badland, very steep		1,031.7	13.0%
EB	Eroded land-Shalet complex, warm		727.4	9.1%
FA	Fluvaquents and torrifluvents, sandy	A/D	63.4	0.8%
GA	Gullied land		35.1	0.4%
GP	Gravel pits		4.1	0.1%
Ha	Hantz silty clay loam	C	9.7	0.1%
HG	Hobog-Rock land association	D	870.7	10.9%
IAF	Isom cobbly sandy loam, 3 to 30 percent slopes	A	15.6	0.2%
JaC	Junction fine sandy loam, 2 to 5 percent slopes	A	250.5	3.1%
LcC	Laverkin fine sandy loam, 2 to 5 percent slopes	B	49.5	0.6%
LeB	Leeds silty clay loam, 1 to 2 percent slopes	C	142.6	1.8%
NLE	Nikey sandy loam, 3 to 15 percent slopes	B	100.1	1.3%
PnC	Pintura loamy fine sand, 1 to 5 percent slopes	A	3.1	0.0%
PoD	Pintura loamy fine sand, hummocky, 1 to 10 percent slopes	A	30.4	0.4%
RE	Renbac-Rock land association	D	893.1	11.2%
RO	Rock land		431.7	5.4%
Tc	Tobler fine sandy loam	A	129.0	1.6%
Td	Tobler silty clay loam	C	71.5	0.9%
W	Water		2.7	0.0%
WBD	Winkel gravelly fine sandy loam, 1 to 8 percent slopes	D	507.9	6.4%
Totals for Area of Interest			**7,953.3**	**100.0%**

Rating Options—Hydrologic Soil Group (The Lakes)

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

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ROSENBERG ASSOCIATES
CIVIL ENGINEERS • LAND SURVEYORS

PROJECT NO. 1286-14-014

PROJECT: The Lakes - Master Plan BY: JLW DATE: 30-Aug-16

SUBJECT: Drainage Study Hydrology Information CHKD: RMA DATE: 30-Aug-16

EXISTING PRE-DEVELOPMENT CONDITION

Hydraulic Element		Area			Hydraulic Properties	
(label)	*(notes)*	*(sq ft)*	*(acre)*	*(sq mi)*	*Lo (ft)*	*S (%)*
X1	Subarea X - Offiste	625,298	14.35	0.02243	1,480	9.00
X2	Subarea X - Onsite to Plantations	908,340	20.85	0.03258	1,205	8.00
Y1	Subarea Y - Offsite	1,925,866	44.21	0.06908	3,500	9.00
Y2	Subarea Y - Onsite to Sentieri	400,265	9.19	0.01436	802	8.00
A1	Subarea A - Offiste	3,962,682	90.97	0.14214	3,779	7.00
A2	Subarea A - Onsite to Sentieri	2,138,492	49.09	0.07671	2,951	7.00
A3	Subarea A - Onsite to Plantations	1,627,354	37.36	0.05837	1,870	4.45
B1	Subarea B - Offsite	476,820	10.95	0.01710	450	7.80
B2	Subarea B - Onsite to Lago Vista	1,670,183	38.34	0.05991	1,495	7.80
B3	Subarea B - Onsite to Plantations	2,149,110	49.34	0.07709	1,943	5.60
B4	Subarea B - Offsite to Plantations	528,071	12.12	0.01894	1,880	2.00
C1	Subarea C - Offsite	465,481	10.69	0.01670	878	11.67
C2	Subarea C - Onsite to Lago Vista	1,748,993	40.15	0.06274	1,190	6.72
C3	Subarea C - Onsite to Alienta	4,733,374	108.66	0.16979	4,503	2.67
C4	Subarea C - Offsite to Plantations	435,932	10.01	0.01564	1,504	2.00
C5	Subarea C - Offsite to Plantations	979,960	22.50	0.03515	2,040	3.00
D1	Sunarea D - Offsite	16,555,867	380.07	0.59386	4,694	7.48
D2	Subarea D - Onsite to Lago Vista	4,179,275	95.94	0.14991	3,297	7.80
E1	Subarea E - Offsite (Gap Wash)	36,853,282	846.03	1.32193	14,986	2.25
E2	Subarea E - Onsite (Gap Wash) to Lago Vista	894,958	20.55	0.03210	1,303	4.27
E3	Subarea E - Onsite (Gap Wash) to Plantations	3,288,611	75.50	0.11796	3,501	4.47
E4	Subarea E - Onsite (Gap Wash) to Plantations	2,126,723	48.82	0.07629	2,949	9.50
F1	Subarea F - Offsite	1,869,681	42.92	0.06707	3,213	8.42
F2	Subarea F - Onsite to Lago Vista	991,181	22.75	0.03555	1,764	8.80
G1	Subarea G - Offsite	8,038,729	184.54	0.28835	7,531	9.56
G2	Subarea G - Onsite to Lago Vista	1,486,884	34.13	0.05333	561	3.56
H1	Subarea H - Offsite to Plantations	590,142	13.55	0.02117	1,924	4.20

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PROJECT NO. 1286-14-014

PROJECT: The Lakes - Master Plan BY: JLW DATE: 30-Aug-16

SUBJECT: Drainage Study Hydrology Information CHKD: RMA DATE: 30-Aug-16

PROPOSED POST-DEVELOPMENT CONDITION

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(label)	*(notes)*	*(sq ft)*	*(acre)*	*(sq mi)*	*Lo (ft)*	*S (%)*
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Y2	Subarea Y - Onsite to Sentieri	400,265	9.19	0.01436	802	8.00
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B4	Subarea B - Offsite to Plantations	528,071	12.12	0.01894	1,880	2.00
C1	Subarea C - Offsite	465,481	10.69	0.01670	878	11.67
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E2	Subarea E - Onsite (Gap Wash) to Lago Vista	894,958	20.55	0.03210	1,303	4.27
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F1	Subarea F - Offsite	1,869,681	42.92	0.06707	3,213	8.42
F2	Subarea F - Onsite to Lago Vista	991,181	22.75	0.03555	1,764	8.80
G1	Subarea G - Offsite	8,038,729	184.54	0.28835	7,531	9.56
G2	Subarea G - Onsite to Lago Vista	1,486,884	34.13	0.05333	561	3.56
H1	Subarea H - Offsite to Plantations	590,142	13.55	0.02117	1,924	4.20

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PROJECT NO. 1286-14-014

PROJECT: The Lakes - Master Plan BY: JLW DATE: 30-Aug-16

SUBJECT: Hydraulic Links and Routing CHKD: RMA DATE: 30-Aug-16

JUNCTIONS FOR EXISTING PRE-DEVELOPMENT CONDITION

Hydraulic Element	
J-A	Collecting A1, A2
J-Y	Collecting Y1, Y2
J-AY	Collecting CulvertY, Culvert A, A3
J-B	Collecting B1, B2
J-B3	Collecting J-B, B3, B4
Box Canyon	Collecting J-AY, J-B3, X1, X2
J-C2	Collecting C1, C2
J-C5	Collecting C4, C5
J-C3	Collecting J-C2, J-C5
J-D2	Collecting D1, D2
J-CD	Collecting J-C3, J-D2
J-E2	Collecting E1, E2
J-F2	Collecting F1, F2
J-G2	Collecting G1, G2
J-E3	Collecting J-E2, J-F2, J-G2, E3, H1
Gap Wash	Collecting J-E3, E4

JUNCTIONS FOR PROPOSED POST-DEVELOPMENT CONDITION

Hydraulic Element	
J-A	Collecting A1, A2
J-Y	Collecting Y1, Y2
J-AY	Collecting CulvertY, Culvert A, A3
J-B	Collecting B1, B2
J-B3	Collecting J-B, B3, B4
Box Canyon	Collecting J-AY, J-B3, X1, X2
J-C2	Collecting C1, C2
J-C5	Collecting C4, C5
J-C3	Collecting J-C2, J-C5
J-D2	Collecting D1, D2
J-CD	Collecting J-C3, J-D2
J-E2	Collecting E1, E2
J-F2	Collecting F1, F2
J-G2	Collecting G1, G2
J-E3	Collecting J-E2, J-F2, J-G2, E3, H1
Gap Wash	Collecting J-E3, E4

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PROJECT NO. 1286-14-014

PROJECT: The Lakes - Master Plan BY: JLW DATE: 30-Aug-16

SUBJECT: Hydraulic Links and Routing CHKD: RMA DATE: 30-Aug-16

ROUTING CONDUITS

Hydraulic Element		Routed Length (ft)	Average Slope (%)	Manning's Roughness (n)	Culvert Diameter (in)	Bottom Width (ft)	Side Slopes (H:1V)
X to Box	Routing X1 to Box Canyon	855	2.9	0.023	N/A	N/A	6.50
Y1 to Y2	Routing Y1 to J-Y	549	3.1	0.023	N/A	N/A	6.50
Culvert Y	Routing J-Y to J-AY	900	4.5	0.023	N/A	N/A	6.50
A1 to A2	Routing A1 to J-A	2,951	7.0	0.023	N/A	N/A	6.50
Culvert A	Routing J-A to J-AY	100	5.0	0.010	48	N/A	N/A
A to Box	Routing J-AY to Box Canyon	855	2.9	0.023	N/A	N/A	6.50
B1 to B2	Routing B1 to J-B	1,495	7.8	0.023	N/A	N/A	6.50
B to B3	Routing J-B to J-B3	1,943	5.6	0.023	N/A	N/A	6.50
Culvert B	Routing J-B3 to Box Canyon	855	2.9	0.023	N/A	N/A	6.50
C to C2	Routing C1 to J-C2	1,189	6.7	0.023	N/A	N/A	6.50
C2 to C3	Routing J-C2 to J-C3	4,503	2.7	0.023	N/A	N/A	6.50
C4 to C5	Routing C4 to J-C5	2,043	2.0	0.023	N/A	N/A	6.50
C5 to C3	Routing J-C5 to J-C3	1,170	7.0	0.023	N/A	N/A	6.50
C to D	Routing J-C3 to J-CD	3,088	2.0	0.023	N/A	N/A	6.50
D1 to D2	Routing D1 to J-D2	2,390	7.8	0.023	N/A	N/A	6.50
D to E3	Routing J-D2 to J-CD	120	2.0	0.023	N/A	N/A	6.50
C to E3	Routing J-CD to J-E3	577	2.0	0.023	N/A	N/A	6.50
E1 to E2	Routing JE1 to J-E2	1,303	4.3	0.023	N/A	N/A	6.50
E2 to E3	Routing J-E2 to J-E3	3,501	2.0	0.023	N/A	N/A	6.50
F1 to F2	Routing F1 to J-F2	1,764	8.8	0.023	N/A	N/A	6.50
F to F3	Routing J-F2 to J-E3	2,651	2.0	0.023	N/A	N/A	6.50
G1 to G2	Routing G1 to J-G2	561	2.3	0.023	N/A	N/A	6.50
G to E3	Routing J-G2 to J-E3	883	2.0	0.023	N/A	N/A	6.50
E3 to E4	Routing J-E3 to Gap Wash	2,951	2.0	0.023	N/A	N/A	6.50

TYPICAL MANNING'S n VALUES

0.013 - Poly Pipe	0.023 - Dirt
0.017 - CM Pipe	0.026 - Grass
0.015 - Concrete	0.035 - Gravel
0.016 - Asphalt	0.040 - Riprap

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PROJECT NO. 1286-14-014

PROJECT: The Lakes - Master Plan BY: JLW DATE: 30-Aug-16

SUBJECT: NRCS Curve Number CHKD: RMA DATE: 30-Aug-16

NRCS CURVE NUMBER (CN) CHART

Land Use Description	SCS Curve Number (CN) Values							
	Group A		Group B		Group C		Group D	
	CN	%	CN	%	CN	%	CN	%
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	

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SUBJECT: NRCS Curve Number CHKD: RMA DATE: 30-Aug-16

NRCS WEIGHTED AVERAGE CN VALUES **EXISTING PRE-DEVELOPMENT CONDITION**

Land Use Description	SCS Curve Number (CN) Values									
	Group A		Group B		Group C		Group D		Totals	
	CN	%	CN	%	CN	%	CN	%	CN	%
X1, X2, Y1, Y2, A1, A2, A3, B1, B2, C1, C2, D1, D2, E1, E2, F1, F2, G1, G2, H1									93	100
Natural Desert Vegetation (RO Rock Outcropping, mostly impervious)	98		98		98		98	50	49	50
Natural Desert Vegetation	63		77		85		88	50	44	50
B3, B4, C3, C4, C5 E3									88	100
Natural Desert Vegetation	63		77		85		88	100	88	100
E4									79	100
Natural Desert Vegetation	63	20	77	35	85		88	45	79.2	100

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NRCS WEIGHTED AVERAGE CN VALUES **PROPOSED POST-DEVELOPMENT CONDITION**

Land Use Description	SCS Curve Number (CN) Values									
	Group A		Group B		Group C		Group D		Totals	
	CN	%	CN	%	CN	%	CN	%	CN	%
X1, Y1, A1,B1, C1, D1, E1 F1, G1, H1									93	100
Natural Desert Vegetation (RO Rock Outcropping, mostly impervious)	98		98		98		98	50	49	50
Natural Desert Vegetation	63		77		85		88	50	44	50
X2, Y2									89	100
Natural Desert Vegetation (RO Rock Outcropping, mostly impervious)	98		98		98		98	13	12	13
Residential Districts; 1/4 Acre; Average 38% Impervious	61		75		83		87	75	65	75
Natural Desert Vegetation	63		77		85		88	12.5	11	12.5
A2									90	100
Natural Desert Vegetation (RO Rock Outcropping, mostly impervious)	98		98		98		98	10	10	10
Residential Districts; 1/8 Acre (Town Houses); Average 65% Impervious	77		85		90		92	35	32	35
Residential Districts; 1/4 Acre; Average 38% Impervious	61		75		83		87	45	39	45
Natural Desert Vegetation	63		77		85		88	10	8.8	10
A3									91	100
Natural Desert Vegetation (RO Rock Outcropping, mostly impervious)	98		98		98		98	13	12	13
Residential Districts; 1/4 Acre; Average 38% Impervious	61		75		83		87	40	35	40
Urban Districts; Commercial and Business; Average 85% Impervious	89		92		94		95	35	33.3	35
Natural Desert Vegetation	63		77		85		88	12.5	11	12.5
B2									92	100
Residential Districts; 1/8 Acre (Town Houses); Average 65% Impervious	77		85		90		92	100	92	100
B3									88	100
Urban Districts; Commercial and Business; Average 85% Impervious	89		92		94		95	15	14.3	15
Residential Districts; 1/4 Acre; Average 38% Impervious	61		75		83		87	55	48	55
Open Space; Good Condition; Grass Cover > 75%	39		61		74		80	10	8	10
Natural Desert Vegetation	63		77		85		88	20	17.6	20
B4, C4. C5									87	100
Residential Districts; 1/4 Acre; Average 38% Impervious	61		75		83		87	100	87	100
C2									94	100
Natural Desert Vegetation (RO Rock Outcropping, mostly impervious)	98		98		98		98	10	10	10
Urban Districts; Commercial and Business; Average 85% Impervious	89		92		94		95	45	42.8	45
Residential Districts; 1/8 Acre (Town Houses); Average 65% Impervious	77		85		90		92	45	41	45
C3									91	100
Natural Desert Vegetation (NaC Naplene Silt Loam)	63		77		85		88	32	28	32
Residential Districts; 1/8 Acre (Town Houses); Average 65% Impervious	77		85		90		92	68	63	68

ROSENBERG ASSOCIATES
CIVIL ENGINEERS • LAND SURVEYORS

PROJECT NO. 1286-14-014

PROJECT: The Lakes - Master Plan BY: JLW DATE: 30-Aug-16

SUBJECT: NRCS Curve Number CHKD: RMA DATE: 30-Aug-16

Land Use Description	SCS Curve Number (CN) Values									
	Group A		Group B		Group C		Group D		Totals	
	CN	%	CN	%	CN	%	CN	%	CN	%
D2									91	100
Natural Desert Vegetation (RO Rock Outcropping, mostly impervious)	98		98		98		98	30	29	30
Urban Districts; Commercial and Business; Average 85% Impervious	89		92		94		95	10	9.5	10
Residential Districts; 1/4 Acre; Average 38% Impervious	61		75		83		87	60	52	60
E2									92	100
Natural Desert Vegetation (RO Rock Outcropping, mostly impervious)	98		98		98		98	45	44	45
Residential Districts; 1/4 Acre; Average 38% Impervious	61		75		83		87	55	48	55
E3									87	100
Residential Districts; 1/8 Acre (Town Houses); Average 65% Impervious	77		85		90		92	32	29	32
Open Space; Good Condition; Grass Cover > 75%	39		61		74		80	31	25	31
Natural Desert Vegetation (NaC Naplene Silt Loam)	63		77		85		88	37	32.6	37
E4									84	100
Residential Districts; 1/8 Acre (Town Houses); Average 65% Impervious	77	5	85	35	90		92	45	75	85
Natural Desert Vegetation (NaC Naplene Silt Loam)	63	15	77		85		88		9.45	15
F2									90	100
Natural Desert Vegetation (RO Rock Outcropping, mostly impervious)	98		98		98		98	29	28	29
Residential Districts; 1/4 Acre; Average 38% Impervious	61		75		83		87	71	62	71
G2									87	100
Residential Districts; 1/4 Acre; Average 38% Impervious	61		75		83		87	100	87	100

ROSENBERG ASSOCIATES
CIVIL ENGINEERS • LAND SURVEYORS

PROJECT NO. 1286-14-014

PROJECT: The Lakes - Master Plan BY: JLW DATE: 30-Aug-16

SUBJECT: SCS Lag Time CHKD: RMA DATE: 30-Aug-16

TIME OF CONCENTRATION

$$t_c = \frac{1.67\, L_O^{\,0.8} \left(\frac{1000}{CN} - 9 \right)^{0.7}}{1900 \sqrt{S_{percent}}}$$

Where: CN = SCS runoff curve number
S = Average slope in percent
Lo = Length in ft

SCS LAG TIME

13.46 SCS Lag = 0.6*t_c

EXISTING PRE-DEVELOPMENT CONDITION

Hydrologic Element	SCS CN	Longest Length Lo (ft)	Average Slope S (%)	t_c (hr)	Lag Time (hr)	Lag Time (min)
X1	93	1,480	9.00	0.149	0.089	5.37
X2	93	1,205	8.00	0.134	0.081	4.83
Y1	93	3,500	9.00	0.297	0.178	10.69
Y2	93	802	8.00	0.097	0.058	3.49
A1	93	3,779	7.00	0.358	0.215	12.89
A2	93	2,951	7.00	0.294	0.176	10.58
A3	93	1,870	4.45	0.256	0.153	9.21
B1	93	450	7.80	0.062	0.037	2.23
B2	93	1,495	7.80	0.162	0.097	5.81
B3	88	1,943	5.60	0.290	0.174	10.43
B4	88	1,880	2.00	0.472	0.283	17.01
C1	93	878	11.67	0.086	0.052	3.11
C2	93	1,190	6.72	0.145	0.087	5.22
C3	88	4,503	2.67	0.822	0.493	29.60
C4	88	1,504	2.00	0.395	0.237	14.23
C5	88	2,040	3.00	0.412	0.247	14.82
D1	93	4,694	7.48	0.412	0.247	14.83
D2	93	3,297	7.80	0.304	0.182	10.95
E1	93	14,986	2.25	1.901	1.141	68.44
E2	93	1,303	4.27	0.196	0.117	7.04
E3	88	3,501	4.47	0.520	0.312	18.71
E4	79	2,949	9.50	0.420	0.252	15.12
F1	93	3,213	8.42	0.287	0.172	10.32
F2	93	1,764	8.80	0.174	0.104	6.25
G1	93	7,531	9.56	0.532	0.319	19.15
G2	93	561	3.56	0.109	0.065	3.93
H1	93	1,924	4.20	0.269	0.162	9.70

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PROJECT NO. 1286-14-014

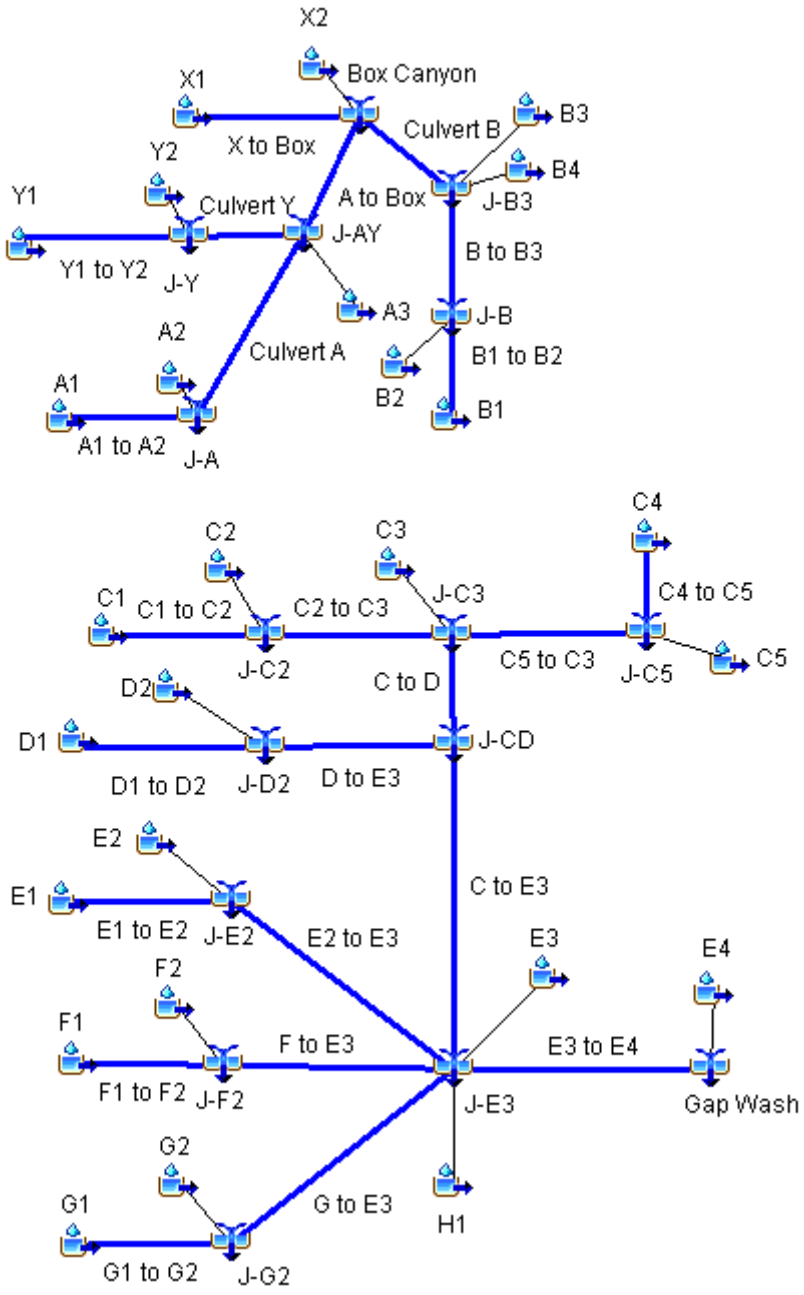
PROJECT: The Lakes - Master Plan BY: JLW DATE: 30-Aug-16

SUBJECT: SCS Lag Time CHKD: RMA DATE: 30-Aug-16

PROPOSED POST-DEVELOPMENT CONDITION

Hydrologic Element	SCS CN	Longest Length Lo (ft)	Average Slope S (%)	t_c (hr)	Lag Time (hr)	Lag Time (min)
X1	93	1,480	9.00	0.149	0.089	5.37
X2	89	1,205	8.00	0.162	0.097	5.84
Y1	93	3,500	9.00	0.297	0.178	10.69
Y2	89	802	8.00	0.117	0.070	4.22
A1	93	3,779	7.00	0.358	0.215	12.89
A2	90	2,951	7.00	0.335	0.201	12.07
A3	91	1,870	4.45	0.276	0.166	9.93
B1	93	450	7.80	0.062	0.037	2.23
B2	92	1,495	7.80	0.169	0.101	6.08
B3	88	1,943	5.60	0.293	0.176	10.55
B4	87	1,880	2.00	0.490	0.294	17.66
C1	93	878	11.67	0.086	0.052	3.11
C2	94	1,190	6.72	0.139	0.083	4.99
C3	91	4,503	2.67	0.737	0.442	26.55
C4	87	1,504	2.00	0.410	0.246	14.77
C5	87	2,040	3.00	0.428	0.257	15.39
D1	93	4,694	7.48	0.412	0.247	14.83
D2	91	3,297	7.80	0.331	0.198	11.91
E1	93	14,986	2.25	1.901	1.141	68.44
E2	92	1,303	4.27	0.205	0.123	7.38
E3	87	3,501	4.47	0.544	0.326	19.57
E4	84	2,949	9.50	0.353	0.212	12.72
F1	93	3,213	8.42	0.287	0.172	10.32
F2	90	1,764	8.80	0.196	0.118	7.06
G1	93	7,531	9.56	0.532	0.319	19.15
G2	87	561	3.56	0.140	0.084	5.03
H1	93	1,924	4.20	0.269	0.162	9.70

HEC-HMS Model



Project: The Lakes Master Simulation Run: N Pre 10 3hr

Start of Run: 01Jan2000, 12:00 Basin Model: Pre
End of Run: 01Jan2000, 20:00 Meteorologic Model: 10-3
Compute Time: 30Aug2016, 13:54:22 Control Specifications: 10-3

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
A to Box	0.36066	148.6	01Jan2000, 13:00	0.45
A1	0.14214	59.6	01Jan2000, 12:55	0.45
A1 to A2	0.14214	59.4	01Jan2000, 13:00	0.45
A2	0.07671	35.5	01Jan2000, 12:55	0.45
A3	0.05837	27.7	01Jan2000, 12:55	0.45
Box Canyon	0.58871	223.2	01Jan2000, 12:55	0.41
B to B3	0.07701	40.7	01Jan2000, 12:50	0.45
B1	0.01710	10.5	01Jan2000, 12:45	0.45
B1 to B2	0.01710	9.9	01Jan2000, 12:50	0.45
B2	0.05991	32.5	01Jan2000, 12:50	0.45
B3	0.07709	18.1	01Jan2000, 12:55	0.25
B4	0.01894	0.0	01Jan2000, 12:00	0.00
Culvert A	0.21885	91.0	01Jan2000, 13:00	0.45
Culvert B	0.17304	56.5	01Jan2000, 12:55	0.31
Culvert Y	0.08344	35.4	01Jan2000, 12:55	0.45
C to D	0.30002	0.0	01Jan2000, 12:00	0.00
C to E3	1.04382	0.0	01Jan2000, 12:00	0.00
C1	0.01670	0.0	01Jan2000, 12:00	0.00
C1 to C2	0.01670	0.0	01Jan2000, 12:00	0.00
C2	0.06274	0.0	01Jan2000, 12:00	0.00
C2 to C3	0.07944	0.0	01Jan2000, 12:00	0.00
C3	0.16979	0.0	01Jan2000, 12:00	0.00
C4	0.01564	0.0	01Jan2000, 12:00	0.00
C4 to C5	0.01564	0.0	01Jan2000, 12:00	0.00
C5	0.03515	0.0	01Jan2000, 12:00	0.00
C5 to C3	0.05079	0.0	01Jan2000, 12:00	0.00
D1	0.59389	0.0	01Jan2000, 12:00	0.00

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
D1 to D2	0.59389	0.0	01Jan2000, 12:00	0.00
D2	0.14991	0.0	01Jan2000, 12:00	0.00
D2 to C3	0.74380	0.0	01Jan2000, 12:00	0.00
E1	1.32193	0.0	01Jan2000, 12:00	0.00
E1 to E2	1.32193	0.0	01Jan2000, 12:00	0.00
E2	0.03210	0.0	01Jan2000, 12:00	0.00
E2 to E3	1.35403	0.0	01Jan2000, 12:00	0.00
E3	0.11796	0.0	01Jan2000, 12:00	0.00
E3 to E4	3.02244	0.0	01Jan2000, 12:00	0.00
E4	0.07629	0.0	01Jan2000, 12:00	0.00
F to E3	0.14378	0.0	01Jan2000, 12:00	0.00
F1	0.06707	0.0	01Jan2000, 12:00	0.00
F1 to F2	0.06707	0.0	01Jan2000, 12:00	0.00
F2	0.07671	0.0	01Jan2000, 12:00	0.00
Gap Wash	3.02244	0.0	01Jan2000, 12:00	0.00
G to E3	0.34168	0.0	01Jan2000, 12:00	0.00
G1	0.28835	0.0	01Jan2000, 12:00	0.00
G1 to G2	0.28835	0.0	01Jan2000, 12:00	0.00
G2	0.05333	0.0	01Jan2000, 12:00	0.00
H1	0.02117	0.0	01Jan2000, 12:00	0.00
J-A	0.21885	91.0	01Jan2000, 13:00	0.45
J-AY	0.36066	149.0	01Jan2000, 12:55	0.45
J-B	0.07701	42.4	01Jan2000, 12:50	0.45
J-B3	0.17304	57.2	01Jan2000, 12:55	0.31
J-CD	1.04382	0.0	01Jan2000, 12:00	0.00
J-C2	0.07944	0.0	01Jan2000, 12:00	0.00
J-C3	0.30002	0.0	01Jan2000, 12:00	0.00
J-C5	0.05079	0.0	01Jan2000, 12:00	0.00
J-D2	0.74380	0.0	01Jan2000, 12:00	0.00
J-E2	1.35403	0.0	01Jan2000, 12:00	0.00
J-E4	3.09873	0.0	01Jan2000, 12:00	0.00

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
J-F2	0.14378	0.0	01Jan2000, 12:00	0.00
J-G2	0.34168	0.0	01Jan2000, 12:00	0.00
J-Y	0.08344	36.3	01Jan2000, 12:55	0.45
X to Box	0.02243	12.0	01Jan2000, 12:50	0.45
X1	0.02243	12.3	01Jan2000, 12:50	0.45
X2	0.03258	18.0	01Jan2000, 12:50	0.45
Y1	0.06908	31.9	01Jan2000, 12:55	0.45
Y1 to Y2	0.06908	30.9	01Jan2000, 12:55	0.45
Y2	0.01436	8.4	01Jan2000, 12:45	0.45

Project: The Lakes Master Simulation Run: N Pre 10 24hr

Start of Run: 01Jan2000, 12:00 Basin Model: Pre
End of Run: 03Jan2000, 00:30 Meteorologic Model: 10-24hr
Compute Time: 30Aug2016, 13:54:14 Control Specifications: 24-Hour

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
A to Box	0.36066	141.2	02Jan2000, 00:00	1.03
A1	0.14214	61.6	02Jan2000, 00:00	1.03
A1 to A2	0.14214	54.7	02Jan2000, 00:00	1.03
A2	0.07671	33.2	02Jan2000, 00:00	1.03
A3	0.05837	25.3	02Jan2000, 00:00	1.03
Box Canyon	0.58871	218.4	02Jan2000, 00:00	0.98
B to B3	0.07701	29.7	02Jan2000, 00:00	1.03
B1	0.01710	7.4	02Jan2000, 00:00	1.03
B1 to B2	0.01710	6.7	02Jan2000, 00:00	1.03
B2	0.05991	26.0	02Jan2000, 00:00	1.03
B3	0.07709	22.0	02Jan2000, 00:00	0.71
B4	0.01894	5.1	02Jan2000, 00:00	0.71
Culvert A	0.21885	87.8	02Jan2000, 00:00	1.03
Culvert B	0.17304	54.1	02Jan2000, 00:00	0.86
Culvert Y	0.08344	33.3	02Jan2000, 00:00	1.03
C to D	0.30002	65.9	02Jan2000, 00:30	0.80
C to E3	1.04382	350.4	02Jan2000, 00:00	0.97
C1	0.01670	7.2	02Jan2000, 00:00	1.03
C1 to C2	0.01670	6.7	02Jan2000, 00:00	1.03
C2	0.06274	27.2	02Jan2000, 00:00	1.03
C2 to C3	0.07944	23.6	02Jan2000, 00:00	1.03
C3	0.16979	34.1	02Jan2000, 00:30	0.71
C4	0.01564	4.5	02Jan2000, 00:00	0.71
C4 to C5	0.01564	3.3	02Jan2000, 00:00	0.72
C5	0.03515	10.0	02Jan2000, 00:00	0.71
C5 to C3	0.05079	12.4	02Jan2000, 00:00	0.72
D1	0.59389	257.3	02Jan2000, 00:00	1.03

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
D1 to D2	0.59389	241.9	02Jan2000, 00:00	1.03
D2	0.14991	65.0	02Jan2000, 00:00	1.03
D2 to C3	0.74380	305.4	02Jan2000, 00:00	1.03
E1	1.32193	266.6	02Jan2000, 01:00	1.03
E1 to E2	1.32193	264.1	02Jan2000, 01:00	1.03
E2	0.03210	13.9	02Jan2000, 00:00	1.03
E2 to E3	1.35403	258.5	02Jan2000, 01:00	1.03
E3	0.11796	29.7	02Jan2000, 00:00	0.71
E3 to E4	3.02244	596.6	02Jan2000, 00:30	1.00
E4	0.07629	7.5	02Jan2000, 00:00	0.35
F to E3	0.14378	50.3	02Jan2000, 00:00	1.03
F1	0.06707	29.1	02Jan2000, 00:00	1.03
F1 to F2	0.06707	26.9	02Jan2000, 00:00	1.03
F2	0.07671	33.2	02Jan2000, 00:00	1.03
Gap Wash	3.02244	644.2	02Jan2000, 00:00	0.99
G to E3	0.34168	124.3	02Jan2000, 00:00	1.03
G1	0.28835	109.3	02Jan2000, 00:00	1.03
G1 to G2	0.28835	106.8	02Jan2000, 00:00	1.03
G2	0.05333	23.1	02Jan2000, 00:00	1.03
H1	0.02117	9.2	02Jan2000, 00:00	1.03
J-A	0.21885	88.0	02Jan2000, 00:00	1.03
J-AY	0.36066	146.4	02Jan2000, 00:00	1.03
J-B	0.07701	32.7	02Jan2000, 00:00	1.03
J-B3	0.17304	56.7	02Jan2000, 00:00	0.86
J-CD	1.04382	358.2	02Jan2000, 00:00	0.96
J-C2	0.07944	33.9	02Jan2000, 00:00	1.03
J-C3	0.30002	66.6	02Jan2000, 00:30	0.80
J-C5	0.05079	13.3	02Jan2000, 00:00	0.72
J-D2	0.74380	306.9	02Jan2000, 00:00	1.03
J-E2	1.35403	267.1	02Jan2000, 01:00	1.03
J-E4	3.09873	602.2	02Jan2000, 00:30	0.98

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
J-F2	0.14378	60.2	02Jan2000, 00:00	1.03
J-G2	0.34168	129.9	02Jan2000, 00:00	1.03
J-Y	0.08344	34.9	02Jan2000, 00:00	1.03
X to Box	0.02243	9.0	02Jan2000, 00:00	1.03
X1	0.02243	9.7	02Jan2000, 00:00	1.03
X2	0.03258	14.1	02Jan2000, 00:00	1.03
Y1	0.06908	29.9	02Jan2000, 00:00	1.03
Y1 to Y2	0.06908	28.7	02Jan2000, 00:00	1.03
Y2	0.01436	6.2	02Jan2000, 00:00	1.03

Project: The Lakes Master Simulation Run: N Pre 100 3hr

Start of Run: 01Jan2000, 12:00 Basin Model: Pre
End of Run: 01Jan2000, 18:30 Meteorologic Model: 100-3
Compute Time: 30Aug2016, 13:54:38 Control Specifications: 100-3

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
A to Box	0.36066	344.2	01Jan2000, 12:55	0.99
A1	0.14214	139.2	01Jan2000, 12:55	0.99
A1 to A2	0.14214	135.5	01Jan2000, 13:00	0.99
A2	0.07671	80.3	01Jan2000, 12:55	0.99
A3	0.05837	64.4	01Jan2000, 12:50	0.99
Box Canyon	0.58871	541.9	01Jan2000, 12:55	0.94
B to B3	0.07701	94.8	01Jan2000, 12:50	0.99
B1	0.01710	23.5	01Jan2000, 12:40	0.99
B1 to B2	0.01710	23.4	01Jan2000, 12:45	0.99
B2	0.05991	73.1	01Jan2000, 12:45	0.99
B3	0.07709	53.9	01Jan2000, 12:55	0.68
B4	0.01894	10.6	01Jan2000, 13:05	0.68
Culvert A	0.21885	208.0	01Jan2000, 12:55	0.99
Culvert B	0.17304	145.8	01Jan2000, 12:55	0.82
Culvert Y	0.08344	82.4	01Jan2000, 12:55	0.99
C to D	0.30002	152.5	01Jan2000, 13:05	0.76
C to E3	1.04382	815.0	01Jan2000, 13:00	0.93
C1	0.01670	22.7	01Jan2000, 12:45	0.99
C1 to C2	0.01670	22.1	01Jan2000, 12:45	0.99
C2	0.06274	79.6	01Jan2000, 12:45	0.99
C2 to C3	0.07944	98.2	01Jan2000, 12:55	0.98
C3	0.16979	71.3	01Jan2000, 13:20	0.68
C4	0.01564	9.6	01Jan2000, 13:00	0.68
C4 to C5	0.01564	9.4	01Jan2000, 13:05	0.69
C5	0.03515	21.3	01Jan2000, 13:00	0.68
C5 to C3	0.05079	29.4	01Jan2000, 13:05	0.69
D1	0.59389	540.9	01Jan2000, 13:00	0.99

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
D1 to D2	0.59389	537.5	01Jan2000, 13:00	0.99
D2	0.14991	156.1	01Jan2000, 12:55	0.99
D2 to C3	0.74380	671.7	01Jan2000, 13:00	0.99
E1	1.32193	456.4	01Jan2000, 14:00	0.99
E1 to E2	1.32193	456.3	01Jan2000, 14:00	0.99
E2	0.03210	38.3	01Jan2000, 12:50	0.99
E2 to E3	1.35403	456.8	01Jan2000, 14:05	0.99
E3	0.11796	63.8	01Jan2000, 13:05	0.68
E3 to E4	3.02244	1331.1	01Jan2000, 13:05	0.95
E4	0.07629	19.5	01Jan2000, 13:05	0.33
F to E3	0.14378	152.6	01Jan2000, 12:55	0.99
F1	0.06707	70.4	01Jan2000, 12:55	0.99
F1 to F2	0.06707	69.9	01Jan2000, 12:55	0.99
F2	0.07671	92.3	01Jan2000, 12:50	0.99
Gap Wash	3.02244	1353.9	01Jan2000, 13:00	0.96
G to E3	0.34168	255.8	01Jan2000, 13:05	0.99
G1	0.28835	232.1	01Jan2000, 13:05	0.99
G1 to G2	0.28835	231.6	01Jan2000, 13:05	0.99
G2	0.05333	71.5	01Jan2000, 12:45	0.99
H1	0.02117	22.7	01Jan2000, 12:50	0.99
J-A	0.21885	208.4	01Jan2000, 12:55	0.99
J-AY	0.36066	351.9	01Jan2000, 12:55	0.99
J-B	0.07701	96.5	01Jan2000, 12:45	0.99
J-B3	0.17304	148.6	01Jan2000, 12:50	0.82
J-CD	1.04382	821.0	01Jan2000, 13:00	0.92
J-C2	0.07944	101.7	01Jan2000, 12:45	0.99
J-C3	0.30002	153.6	01Jan2000, 13:00	0.76
J-C5	0.05079	29.6	01Jan2000, 13:00	0.68
J-D2	0.74380	672.3	01Jan2000, 13:00	0.99
J-E2	1.35403	457.9	01Jan2000, 14:00	0.99
J-E4	3.09873	1350.6	01Jan2000, 13:05	0.94

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
J-F2	0.14378	154.2	01Jan2000, 12:50	0.99
J-G2	0.34168	256.5	01Jan2000, 13:05	0.99
J-Y	0.08344	82.6	01Jan2000, 12:55	0.99
X to Box	0.02243	27.5	01Jan2000, 12:50	0.99
X1	0.02243	28.2	01Jan2000, 12:45	0.99
X2	0.03258	42.3	01Jan2000, 12:45	0.99
Y1	0.06908	72.2	01Jan2000, 12:55	0.99
Y1 to Y2	0.06908	71.6	01Jan2000, 12:55	0.99
Y2	0.01436	19.4	01Jan2000, 12:45	0.99

Project: The Lakes Master Simulation Run: N Pre 100 24hr

Start of Run: 01Jan2000, 12:00 Basin Model: Pre
End of Run: 03Jan2000, 00:30 Meteorologic Model: 100-24hr
Compute Time: 30Aug2016, 13:54:31 Control Specifications: 24-Hour

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
A to Box	0.36066	251.4	02Jan2000, 00:00	1.80
A1	0.14214	107.9	02Jan2000, 00:00	1.79
A1 to A2	0.14214	97.7	02Jan2000, 00:00	1.80
A2	0.07671	58.2	02Jan2000, 00:00	1.79
A3	0.05837	44.3	02Jan2000, 00:00	1.79
Box Canyon	0.58871	396.1	02Jan2000, 00:00	1.73
B to B3	0.07701	52.9	02Jan2000, 00:00	1.80
B1	0.01710	13.0	02Jan2000, 00:00	1.79
B1 to B2	0.01710	12.0	02Jan2000, 00:00	1.80
B2	0.05991	45.5	02Jan2000, 00:00	1.79
B3	0.07709	44.8	02Jan2000, 00:00	1.39
B4	0.01894	10.3	02Jan2000, 00:00	1.39
Culvert A	0.21885	155.7	02Jan2000, 00:00	1.80
Culvert B	0.17304	104.0	02Jan2000, 00:00	1.58
Culvert Y	0.08344	59.2	02Jan2000, 00:00	1.80
C to D	0.30002	124.8	02Jan2000, 00:30	1.51
C to E3	1.04382	637.6	02Jan2000, 00:00	1.71
C1	0.01670	12.7	02Jan2000, 00:00	1.79
C1 to C2	0.01670	11.8	02Jan2000, 00:00	1.80
C2	0.06274	47.6	02Jan2000, 00:00	1.79
C2 to C3	0.07944	44.4	02Jan2000, 00:00	1.80
C3	0.16979	68.0	02Jan2000, 00:30	1.39
C4	0.01564	9.1	02Jan2000, 00:00	1.39
C4 to C5	0.01564	7.2	02Jan2000, 00:00	1.40
C5	0.03515	20.4	02Jan2000, 00:00	1.39
C5 to C3	0.05079	26.2	02Jan2000, 00:00	1.40
D1	0.59389	451.0	02Jan2000, 00:00	1.79

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
D1 to D2	0.59389	428.0	02Jan2000, 00:00	1.80
D2	0.14991	113.8	02Jan2000, 00:00	1.79
D2 to C3	0.74380	539.6	02Jan2000, 00:00	1.79
E1	1.32193	466.2	02Jan2000, 01:00	1.79
E1 to E2	1.32193	462.8	02Jan2000, 01:00	1.79
E2	0.03210	24.4	02Jan2000, 00:00	1.79
E2 to E3	1.35403	455.8	02Jan2000, 01:00	1.79
E3	0.11796	60.9	02Jan2000, 00:00	1.39
E3 to E4	3.02244	1088.8	02Jan2000, 00:00	1.75
E4	0.07629	23.8	02Jan2000, 00:00	0.84
F to E3	0.14378	91.3	02Jan2000, 00:00	1.80
F1	0.06707	50.9	02Jan2000, 00:00	1.79
F1 to F2	0.06707	47.8	02Jan2000, 00:00	1.80
F2	0.07671	58.2	02Jan2000, 00:00	1.79
Gap Wash	3.02244	1182.9	02Jan2000, 00:00	1.75
G to E3	0.34168	220.4	02Jan2000, 00:00	1.79
G1	0.28835	192.0	02Jan2000, 00:00	1.79
G1 to G2	0.28835	188.3	02Jan2000, 00:00	1.79
G2	0.05333	40.5	02Jan2000, 00:00	1.79
H1	0.02117	16.1	02Jan2000, 00:00	1.79
J-A	0.21885	155.9	02Jan2000, 00:00	1.80
J-AY	0.36066	259.2	02Jan2000, 00:00	1.80
J-B	0.07701	57.5	02Jan2000, 00:00	1.79
J-B3	0.17304	108.1	02Jan2000, 00:00	1.57
J-CD	1.04382	649.6	02Jan2000, 00:00	1.71
J-C2	0.07944	59.5	02Jan2000, 00:00	1.79
J-C3	0.30002	125.6	02Jan2000, 00:00	1.50
J-C5	0.05079	27.7	02Jan2000, 00:00	1.39
J-D2	0.74380	541.8	02Jan2000, 00:00	1.79
J-E2	1.35403	467.8	02Jan2000, 01:00	1.79
J-E4	3.09873	1112.6	02Jan2000, 00:00	1.73

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
J-F2	0.14378	106.0	02Jan2000, 00:00	1.79
J-G2	0.34168	228.8	02Jan2000, 00:00	1.79
J-Y	0.08344	61.5	02Jan2000, 00:00	1.79
X to Box	0.02243	16.0	02Jan2000, 00:00	1.79
X1	0.02243	17.0	02Jan2000, 00:00	1.79
X2	0.03258	24.7	02Jan2000, 00:00	1.79
Y1	0.06908	52.5	02Jan2000, 00:00	1.79
Y1 to Y2	0.06908	50.6	02Jan2000, 00:00	1.79
Y2	0.01436	10.9	02Jan2000, 00:00	1.79

Project: The Lakes Master Simulation Run: Post 10-3

Start of Run: 01Jan2000, 12:00 Basin Model: Post
End of Run: 01Jan2000, 20:00 Meteorologic Model: 10-3
Compute Time: 30Aug2016, 13:54:54 Control Specifications: 10-3

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
A to Box	0.36066	132.3	01Jan2000, 13:00	0.40
A1	0.14214	59.6	01Jan2000, 12:55	0.45
A1 to A2	0.14214	59.4	01Jan2000, 13:00	0.45
A2	0.07671	22.3	01Jan2000, 13:00	0.32
A3	0.05837	21.3	01Jan2000, 12:55	0.36
Box Canyon	0.58871	199.4	01Jan2000, 13:00	0.37
B to B3	0.07701	35.9	01Jan2000, 12:50	0.41
B1	0.01710	10.5	01Jan2000, 12:45	0.45
B1 to B2	0.01710	9.9	01Jan2000, 12:50	0.45
B2	0.05991	28.5	01Jan2000, 12:50	0.40
B3	0.07709	18.0	01Jan2000, 12:55	0.25
B4	0.01894	3.1	01Jan2000, 13:05	0.22
Culvert A	0.21885	81.6	01Jan2000, 13:00	0.40
Culvert B	0.17304	54.4	01Jan2000, 12:55	0.32
Culvert Y	0.08344	33.9	01Jan2000, 12:55	0.42
C to D	0.30002	76.2	01Jan2000, 13:10	0.37
C to E3	1.04382	346.1	01Jan2000, 13:05	0.42
C1	0.01670	10.0	01Jan2000, 12:45	0.45
C1 to C2	0.01670	9.5	01Jan2000, 12:50	0.45
C2	0.06274	39.0	01Jan2000, 12:45	0.50
C2 to C3	0.07944	48.0	01Jan2000, 12:55	0.49
C3	0.16979	39.4	01Jan2000, 13:15	0.36
C4	0.01564	2.8	01Jan2000, 13:05	0.22
C4 to C5	0.01564	2.8	01Jan2000, 13:10	0.22
C5	0.03515	6.2	01Jan2000, 13:05	0.22
C5 to C3	0.05079	8.6	01Jan2000, 13:10	0.22
D to E3	0.74380	280.4	01Jan2000, 13:00	0.43

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
D1	0.59389	238.8	01Jan2000, 13:00	0.45
D1 to D2	0.59389	231.9	01Jan2000, 13:00	0.45
D2	0.14991	52.7	01Jan2000, 12:55	0.36
E1	1.32193	204.8	01Jan2000, 14:00	0.45
E1 to E2	1.32193	204.2	01Jan2000, 14:00	0.45
E2	0.03210	14.7	01Jan2000, 12:50	0.40
E2 to E3	1.35403	204.7	01Jan2000, 14:05	0.45
E3	0.11796	19.2	01Jan2000, 13:10	0.22
E3 to E4	3.02244	551.9	01Jan2000, 13:10	0.42
E4	0.07629	8.7	01Jan2000, 13:05	0.15
F to E3	0.14378	55.0	01Jan2000, 13:00	0.38
F1	0.06707	31.3	01Jan2000, 12:55	0.45
F1 to F2	0.06707	30.0	01Jan2000, 12:55	0.45
F2	0.07671	27.8	01Jan2000, 12:50	0.32
Gap Wash	3.09873	560.5	01Jan2000, 13:10	0.41
G to E3	0.34168	107.2	01Jan2000, 13:05	0.42
G1	0.28835	102.5	01Jan2000, 13:05	0.45
G1 to G2	0.28835	101.5	01Jan2000, 13:05	0.45
G2	0.05333	14.2	01Jan2000, 12:50	0.22
H1	0.02117	10.0	01Jan2000, 12:55	0.45
J-A	0.21885	81.7	01Jan2000, 13:00	0.40
J-AY	0.36066	133.7	01Jan2000, 13:00	0.40
J-B	0.07701	38.4	01Jan2000, 12:50	0.41
J-B3	0.17304	55.9	01Jan2000, 12:55	0.32
J-CD	1.04382	346.3	01Jan2000, 13:05	0.42
J-C2	0.07944	48.1	01Jan2000, 12:50	0.49
J-C3	0.30002	77.0	01Jan2000, 13:00	0.37
J-C5	0.05079	8.6	01Jan2000, 13:10	0.22
J-D2	0.74380	281.4	01Jan2000, 13:00	0.43
J-E2	1.35403	205.1	01Jan2000, 14:00	0.45
J-E3	3.02244	561.0	01Jan2000, 13:05	0.42

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
J-F2	0.14378	55.5	01Jan2000, 12:55	0.38
J-G2	0.34168	109.4	01Jan2000, 13:05	0.42
J-Y	0.08344	35.1	01Jan2000, 12:55	0.42
X to Box	0.02243	12.0	01Jan2000, 12:50	0.45
X1	0.02243	12.3	01Jan2000, 12:50	0.45
X2	0.03258	10.5	01Jan2000, 12:50	0.28
Y1	0.06908	31.9	01Jan2000, 12:55	0.45
Y1 to Y2	0.06908	31.1	01Jan2000, 12:55	0.45
Y2	0.01436	5.0	01Jan2000, 12:50	0.28

Project: The Lakes Master Simulation Run: Post 10-24

Start of Run: 01Jan2000, 12:00 Basin Model: Post
End of Run: 02Jan2000, 12:00 Meteorologic Model: 10-24hr
Compute Time: 30Aug2016, 13:54:45 Control Specifications: 24hr

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
A to Box	0.36066	129.3	02Jan2000, 00:00	0.95
A1	0.14214	61.6	02Jan2000, 00:00	1.02
A1 to A2	0.14214	54.7	02Jan2000, 00:00	1.02
A2	0.07671	26.1	02Jan2000, 00:00	0.82
A3	0.05837	21.6	02Jan2000, 00:00	0.88
Box Canyon	0.58871	200.2	02Jan2000, 00:00	0.90
B to B3	0.07701	27.8	02Jan2000, 00:00	0.97
B1	0.01710	7.4	02Jan2000, 00:00	1.02
B1 to B2	0.01710	6.7	02Jan2000, 00:00	1.02
B2	0.05991	24.0	02Jan2000, 00:00	0.95
B3	0.07709	22.0	02Jan2000, 00:00	0.71
B4	0.01894	4.5	02Jan2000, 00:00	0.65
Culvert A	0.21885	80.7	02Jan2000, 00:00	0.95
Culvert B	0.17304	51.8	02Jan2000, 00:00	0.82
Culvert Y	0.08344	31.9	02Jan2000, 00:00	0.98
C to D	0.30002	75.9	02Jan2000, 00:30	0.90
C to E3	1.04382	350.7	02Jan2000, 00:00	0.96
C1	0.01670	7.2	02Jan2000, 00:00	1.02
C1 to C2	0.01670	6.7	02Jan2000, 00:00	1.02
C2	0.06274	29.3	02Jan2000, 00:00	1.09
C2 to C3	0.07944	25.4	02Jan2000, 00:00	1.08
C3	0.16979	42.8	02Jan2000, 00:30	0.88
C4	0.01564	4.1	02Jan2000, 00:00	0.66
C4 to C5	0.01564	3.0	02Jan2000, 00:00	0.66
C5	0.03515	9.0	02Jan2000, 00:00	0.66
C5 to C3	0.05079	11.2	02Jan2000, 00:00	0.66
D to E3	0.74380	295.9	02Jan2000, 00:00	0.99

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
D1	0.59389	257.3	02Jan2000, 00:00	1.02
D1 to D2	0.59389	241.9	02Jan2000, 00:00	1.02
D2	0.14991	55.4	02Jan2000, 00:00	0.88
E1	1.32193	266.6	02Jan2000, 01:00	1.00
E1 to E2	1.32193	264.1	02Jan2000, 01:00	1.00
E2	0.03210	12.9	02Jan2000, 00:00	0.95
E2 to E3	1.35403	258.3	02Jan2000, 01:00	1.00
E3	0.11796	27.0	02Jan2000, 00:00	0.65
E3 to E4	3.02244	590.6	02Jan2000, 00:30	0.97
E4	0.07629	14.5	02Jan2000, 00:00	0.52
F to E3	0.14378	44.0	02Jan2000, 00:00	0.92
F1	0.06707	29.1	02Jan2000, 00:00	1.02
F1 to F2	0.06707	26.9	02Jan2000, 00:00	1.02
F2	0.07671	26.1	02Jan2000, 00:00	0.82
Gap Wash	3.09873	599.6	02Jan2000, 00:30	0.95
G to E3	0.34168	115.3	02Jan2000, 00:00	0.96
G1	0.28835	109.3	02Jan2000, 00:00	1.01
G1 to G2	0.28835	106.8	02Jan2000, 00:00	1.02
G2	0.05333	13.8	02Jan2000, 00:00	0.66
H1	0.02117	9.2	02Jan2000, 00:00	1.02
J-A	0.21885	80.8	02Jan2000, 00:00	0.95
J-AY	0.36066	134.2	02Jan2000, 00:00	0.94
J-B	0.07701	30.7	02Jan2000, 00:00	0.96
J-B3	0.17304	54.3	02Jan2000, 00:00	0.82
J-CD	1.04382	358.5	02Jan2000, 00:00	0.96
J-C2	0.07944	36.0	02Jan2000, 00:00	1.08
J-C3	0.30002	76.1	02Jan2000, 00:00	0.89
J-C5	0.05079	12.0	02Jan2000, 00:00	0.66
J-D2	0.74380	297.4	02Jan2000, 00:00	0.99
J-E2	1.35403	267.0	02Jan2000, 01:00	1.00
J-E3	3.02244	625.5	02Jan2000, 00:00	0.96

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
J-F2	0.14378	53.0	02Jan2000, 00:00	0.91
J-G2	0.34168	120.6	02Jan2000, 00:00	0.96
J-Y	0.08344	33.4	02Jan2000, 00:00	0.97
X to Box	0.02243	9.0	02Jan2000, 00:00	1.02
X1	0.02243	9.7	02Jan2000, 00:00	1.02
X2	0.03258	10.2	02Jan2000, 00:00	0.76
Y1	0.06908	29.9	02Jan2000, 00:00	1.02
Y1 to Y2	0.06908	28.9	02Jan2000, 00:00	1.02
Y2	0.01436	4.5	02Jan2000, 00:00	0.76

Project: The Lakes Master Simulation Run: Post 100-3

Start of Run: 01Jan2000, 12:00 Basin Model: Post
End of Run: 01Jan2000, 18:30 Meteorologic Model: 100-3
Compute Time: 30Aug2016, 13:55:09 Control Specifications: 100-3

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
A to Box	0.36066	311.8	01Jan2000, 13:00	0.92
A1	0.14214	139.2	01Jan2000, 12:55	0.99
A1 to A2	0.14214	135.5	01Jan2000, 13:00	0.99
A2	0.07671	60.1	01Jan2000, 12:55	0.79
A3	0.05837	52.7	01Jan2000, 12:55	0.86
Box Canyon	0.58871	498.1	01Jan2000, 12:55	0.87
B to B3	0.07701	88.1	01Jan2000, 12:50	0.93
B1	0.01710	23.5	01Jan2000, 12:40	0.99
B1 to B2	0.01710	23.4	01Jan2000, 12:45	0.99
B2	0.05991	67.0	01Jan2000, 12:50	0.92
B3	0.07709	53.8	01Jan2000, 12:55	0.68
B4	0.01894	9.6	01Jan2000, 13:05	0.63
Culvert A	0.21885	191.9	01Jan2000, 13:00	0.92
Culvert B	0.17304	139.9	01Jan2000, 12:55	0.79
Culvert Y	0.08344	80.7	01Jan2000, 12:55	0.95
C to D	0.30002	182.0	01Jan2000, 13:05	0.87
C to E3	1.04382	820.9	01Jan2000, 13:00	0.94
C1	0.01670	22.7	01Jan2000, 12:45	0.99
C1 to C2	0.01670	22.1	01Jan2000, 12:45	0.99
C2	0.06274	88.4	01Jan2000, 12:45	1.06
C2 to C3	0.07944	104.5	01Jan2000, 12:55	1.04
C3	0.16979	97.0	01Jan2000, 13:15	0.86
C4	0.01564	8.7	01Jan2000, 13:00	0.63
C4 to C5	0.01564	8.4	01Jan2000, 13:05	0.63
C5	0.03515	19.1	01Jan2000, 13:00	0.63
C5 to C3	0.05079	26.6	01Jan2000, 13:05	0.63
D to E3	0.74380	654.3	01Jan2000, 13:00	0.96

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
D1	0.59389	540.9	01Jan2000, 13:00	0.99
D1 to D2	0.59389	537.5	01Jan2000, 13:00	0.99
D2	0.14991	132.9	01Jan2000, 12:55	0.86
E1	1.32193	456.4	01Jan2000, 14:00	0.99
E1 to E2	1.32193	456.3	01Jan2000, 14:00	0.99
E2	0.03210	35.4	01Jan2000, 12:50	0.92
E2 to E3	1.35403	456.7	01Jan2000, 14:05	0.99
E3	0.11796	58.6	01Jan2000, 13:05	0.63
E3 to E4	3.02244	1317.2	01Jan2000, 13:05	0.94
E4	0.07629	31.7	01Jan2000, 13:00	0.50
F to E3	0.14378	134.7	01Jan2000, 12:55	0.89
F1	0.06707	70.4	01Jan2000, 12:55	0.99
F1 to F2	0.06707	69.9	01Jan2000, 12:55	0.99
F2	0.07671	73.2	01Jan2000, 12:50	0.79
Gap Wash	3.09873	1348.4	01Jan2000, 13:05	0.93
G to E3	0.34168	249.4	01Jan2000, 13:05	0.94
G1	0.28835	232.1	01Jan2000, 13:05	0.99
G1 to G2	0.28835	231.6	01Jan2000, 13:05	0.99
G2	0.05333	41.6	01Jan2000, 12:50	0.63
H1	0.02117	22.7	01Jan2000, 12:50	0.99
J-A	0.21885	191.9	01Jan2000, 13:00	0.92
J-AY	0.36066	321.4	01Jan2000, 12:55	0.92
J-B	0.07701	88.1	01Jan2000, 12:45	0.94
J-B3	0.17304	140.3	01Jan2000, 12:50	0.79
J-CD	1.04382	828.6	01Jan2000, 13:00	0.94
J-C2	0.07944	110.5	01Jan2000, 12:45	1.05
J-C3	0.30002	182.6	01Jan2000, 13:00	0.87
J-C5	0.05079	26.8	01Jan2000, 13:05	0.63
J-D2	0.74380	655.1	01Jan2000, 13:00	0.96
J-E2	1.35403	457.8	01Jan2000, 14:00	0.99
J-E3	3.02244	1331.5	01Jan2000, 13:00	0.95

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
J-F2	0.14378	135.0	01Jan2000, 12:50	0.89
J-G2	0.34168	250.6	01Jan2000, 13:05	0.93
J-Y	0.08344	81.3	01Jan2000, 12:55	0.95
X to Box	0.02243	27.5	01Jan2000, 12:50	0.99
X1	0.02243	28.2	01Jan2000, 12:45	0.99
X2	0.03258	29.0	01Jan2000, 12:50	0.74
Y1	0.06908	72.2	01Jan2000, 12:55	0.99
Y1 to Y2	0.06908	71.7	01Jan2000, 12:55	0.99
Y2	0.01436	13.3	01Jan2000, 12:45	0.74

Project: The Lakes Master Simulation Run: Post 100-24

Start of Run: 01Jan2000, 12:00 Basin Model: Post
End of Run: 03Jan2000, 00:30 Meteorologic Model: 100-24hr
Compute Time: 30Aug2016, 13:55:01 Control Specifications: 24-Hour

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
A to Box	0.36066	237.5	02Jan2000, 00:00	1.70
A1	0.14214	107.9	02Jan2000, 00:00	1.79
A1 to A2	0.14214	97.7	02Jan2000, 00:00	1.80
A2	0.07671	50.0	02Jan2000, 00:00	1.54
A3	0.05837	40.1	02Jan2000, 00:00	1.62
Box Canyon	0.58871	374.8	02Jan2000, 00:00	1.65
B to B3	0.07701	50.9	02Jan2000, 00:00	1.73
B1	0.01710	13.0	02Jan2000, 00:00	1.79
B1 to B2	0.01710	12.0	02Jan2000, 00:00	1.80
B2	0.05991	43.3	02Jan2000, 00:00	1.70
B3	0.07709	44.8	02Jan2000, 00:00	1.39
B4	0.01894	9.5	02Jan2000, 00:00	1.32
Culvert A	0.21885	147.5	02Jan2000, 00:00	1.71
Culvert B	0.17304	101.2	02Jan2000, 00:00	1.54
Culvert Y	0.08344	57.5	02Jan2000, 00:00	1.74
C to D	0.30002	136.8	02Jan2000, 00:30	1.65
C to E3	1.04382	640.6	02Jan2000, 00:00	1.73
C1	0.01670	12.7	02Jan2000, 00:00	1.79
C1 to C2	0.01670	11.8	02Jan2000, 00:00	1.80
C2	0.06274	49.9	02Jan2000, 00:00	1.88
C2 to C3	0.07944	46.4	02Jan2000, 00:00	1.88
C3	0.16979	78.0	02Jan2000, 00:30	1.62
C4	0.01564	8.6	02Jan2000, 00:00	1.32
C4 to C5	0.01564	6.8	02Jan2000, 00:00	1.33
C5	0.03515	19.0	02Jan2000, 00:00	1.32
C5 to C3	0.05079	24.4	02Jan2000, 00:00	1.33
D to E3	0.74380	528.7	02Jan2000, 00:00	1.76

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
D1	0.59389	451.0	02Jan2000, 00:00	1.79
D1 to D2	0.59389	428.0	02Jan2000, 00:00	1.80
D2	0.14991	103.0	02Jan2000, 00:00	1.62
E1	1.32193	466.2	02Jan2000, 01:00	1.79
E1 to E2	1.32193	462.8	02Jan2000, 01:00	1.79
E2	0.03210	23.2	02Jan2000, 00:00	1.70
E2 to E3	1.35403	455.6	02Jan2000, 01:00	1.79
E3	0.11796	57.3	02Jan2000, 00:00	1.32
E3 to E4	3.02244	1069.7	02Jan2000, 00:00	1.74
E4	0.07629	34.5	02Jan2000, 00:00	1.12
F to E3	0.14378	83.8	02Jan2000, 00:00	1.67
F1	0.06707	50.9	02Jan2000, 00:00	1.79
F1 to F2	0.06707	47.8	02Jan2000, 00:00	1.80
F2	0.07671	50.0	02Jan2000, 00:00	1.54
Gap Wash	3.09873	1104.2	02Jan2000, 00:00	1.73
G to E3	0.34168	209.4	02Jan2000, 00:00	1.72
G1	0.28835	192.0	02Jan2000, 00:00	1.79
G1 to G2	0.28835	188.3	02Jan2000, 00:00	1.79
G2	0.05333	29.2	02Jan2000, 00:00	1.32
H1	0.02117	16.1	02Jan2000, 00:00	1.79
J-A	0.21885	147.6	02Jan2000, 00:00	1.71
J-AY	0.36066	245.0	02Jan2000, 00:00	1.70
J-B	0.07701	55.3	02Jan2000, 00:00	1.72
J-B3	0.17304	105.2	02Jan2000, 00:00	1.53
J-CD	1.04382	652.6	02Jan2000, 00:00	1.73
J-C2	0.07944	61.8	02Jan2000, 00:00	1.86
J-C3	0.30002	145.1	02Jan2000, 00:00	1.64
J-C5	0.05079	25.8	02Jan2000, 00:00	1.32
J-D2	0.74380	530.9	02Jan2000, 00:00	1.76
J-E2	1.35403	467.6	02Jan2000, 01:00	1.79
J-E3	3.02244	1162.8	02Jan2000, 00:00	1.74

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
J-F2	0.14378	97.7	02Jan2000, 00:00	1.66
J-G2	0.34168	217.5	02Jan2000, 00:00	1.72
J-Y	0.08344	59.8	02Jan2000, 00:00	1.74
X to Box	0.02243	16.0	02Jan2000, 00:00	1.79
X1	0.02243	17.0	02Jan2000, 00:00	1.79
X2	0.03258	20.1	02Jan2000, 00:00	1.46
Y1	0.06908	52.5	02Jan2000, 00:00	1.79
Y1 to Y2	0.06908	51.0	02Jan2000, 00:00	1.79
Y2	0.01436	8.8	02Jan2000, 00:00	1.46

Worksheet for Culvert 1

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.010	
Channel Slope	0.01000	ft/ft
Diameter	36	in
Discharge	80.70	ft^3/s

Results

Normal Depth	2.29	ft
Flow Area	5.79	ft^2
Wetted Perimeter	6.38	ft
Hydraulic Radius	0.91	ft
Top Width	2.55	ft
Critical Depth	2.78	ft
Percent Full	76.4	%
Critical Slope	0.00750	ft/ft
Velocity	13.93	ft/s
Velocity Head	3.02	ft
Specific Energy	5.31	ft
Froude Number	1.63	
Maximum Discharge	93.27	ft^3/s
Discharge Full	86.70	ft^3/s
Slope Full	0.00866	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	76.36	%
Downstream Velocity	Infinity	ft/s

Worksheet for Culvert 1

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	2.29	ft
Critical Depth	2.78	ft
Channel Slope	0.01000	ft/ft
Critical Slope	0.00750	ft/ft

Worksheet for Culvert 2

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.010	
Channel Slope	0.01000	ft/ft
Diameter	48	in
Discharge	191.90	ft^3/s

Results

Normal Depth	3.39	ft
Flow Area	11.35	ft^2
Wetted Perimeter	9.35	ft
Hydraulic Radius	1.21	ft
Top Width	2.88	ft
Critical Depth	3.82	ft
Percent Full	84.7	%
Critical Slope	0.00917	ft/ft
Velocity	16.91	ft/s
Velocity Head	4.44	ft
Specific Energy	7.83	ft
Froude Number	1.50	
Maximum Discharge	200.86	ft^3/s
Discharge Full	186.73	ft^3/s
Slope Full	0.01056	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	84.70	%
Downstream Velocity	Infinity	ft/s

Worksheet for Culvert 2

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	3.39	ft
Critical Depth	3.82	ft
Channel Slope	0.01000	ft/ft
Critical Slope	0.00917	ft/ft

Worksheet for Culvert 3

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.010	
Channel Slope	0.01000	ft/ft
Diameter	36	in
Discharge	88.10	ft³/s

Results

Normal Depth	2.50	ft
Flow Area	6.31	ft²
Wetted Perimeter	6.91	ft
Hydraulic Radius	0.91	ft
Top Width	2.23	ft
Critical Depth	2.83	ft
Percent Full	83.5	%
Critical Slope	0.00893	ft/ft
Velocity	13.97	ft/s
Velocity Head	3.03	ft
Specific Energy	5.54	ft
Froude Number	1.46	
Maximum Discharge	93.27	ft³/s
Discharge Full	86.70	ft³/s
Slope Full	0.01032	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	83.50	%
Downstream Velocity	Infinity	ft/s

Worksheet for Culvert 3

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	2.50	ft
Critical Depth	2.83	ft
Channel Slope	0.01000	ft/ft
Critical Slope	0.00893	ft/ft

Worksheet for Culvert 4

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.010	
Channel Slope	0.01000	ft/ft
Diameter	42	in
Discharge	139.90	ft^3/s

Results

Normal Depth	3.18	ft
Flow Area	9.18	ft^2
Wetted Perimeter	8.85	ft
Hydraulic Radius	1.04	ft
Top Width	2.01	ft
Critical Depth	3.35	ft
Percent Full	90.9	%
Critical Slope	0.00995	ft/ft
Velocity	15.23	ft/s
Velocity Head	3.61	ft
Specific Energy	6.79	ft
Froude Number	1.26	
Maximum Discharge	140.69	ft^3/s
Discharge Full	130.79	ft^3/s
Slope Full	0.01144	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	90.89	%
Downstream Velocity	Infinity	ft/s

Worksheet for Culvert 4

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	3.18	ft
Critical Depth	3.35	ft
Channel Slope	0.01000	ft/ft
Critical Slope	0.00995	ft/ft

Worksheet for Culvert 5

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.010	
Channel Slope	0.01000	ft/ft
Diameter	42	in
Discharge	104.50	ft³/s

Results

Normal Depth	2.37	ft
Flow Area	6.92	ft²
Wetted Perimeter	6.76	ft
Hydraulic Radius	1.02	ft
Top Width	3.28	ft
Critical Depth	3.12	ft
Percent Full	67.6	%
Critical Slope	0.00567	ft/ft
Velocity	15.10	ft/s
Velocity Head	3.54	ft
Specific Energy	5.91	ft
Froude Number	1.83	
Maximum Discharge	140.69	ft³/s
Discharge Full	130.79	ft³/s
Slope Full	0.00638	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	67.60	%
Downstream Velocity	Infinity	ft/s

Worksheet for Culvert 5

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	2.37	ft
Critical Depth	3.12	ft
Channel Slope	0.01000	ft/ft
Critical Slope	0.00567	ft/ft

Worksheet for Culvert 6

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.010	
Channel Slope	0.01000	ft/ft
Diameter	84	in
Discharge	654.30	ft³/s

Results

Normal Depth	4.68	ft
Flow Area	27.37	ft²
Wetted Perimeter	13.41	ft
Hydraulic Radius	2.04	ft
Top Width	6.59	ft
Critical Depth	6.43	ft
Percent Full	66.9	%
Critical Slope	0.00539	ft/ft
Velocity	23.91	ft/s
Velocity Head	8.88	ft
Specific Energy	13.57	ft
Froude Number	2.07	
Maximum Discharge	893.31	ft³/s
Discharge Full	830.44	ft³/s
Slope Full	0.00621	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	66.91	%
Downstream Velocity	Infinity	ft/s

Worksheet for Culvert 6

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	4.68	ft
Critical Depth	6.43	ft
Channel Slope	0.01000	ft/ft
Critical Slope	0.00539	ft/ft

Worksheet for Culvert 7

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.010	
Channel Slope	0.01000	ft/ft
Diameter	84	in
Discharge	810.00	ft³/s

Results

Normal Depth	5.59	ft
Flow Area	32.94	ft²
Wetted Perimeter	15.47	ft
Hydraulic Radius	2.13	ft
Top Width	5.62	ft
Critical Depth	6.73	ft
Percent Full	79.8	%
Critical Slope	0.00830	ft/ft
Velocity	24.59	ft/s
Velocity Head	9.40	ft
Specific Energy	14.99	ft
Froude Number	1.79	
Maximum Discharge	893.31	ft³/s
Discharge Full	830.44	ft³/s
Slope Full	0.00951	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	79.83	%
Downstream Velocity	Infinity	ft/s

Worksheet for Culvert 7

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	5.59	ft
Critical Depth	6.73	ft
Channel Slope	0.01000	ft/ft
Critical Slope	0.00830	ft/ft

Worksheet for Culvert 8

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.010	
Channel Slope	0.01000	ft/ft
Diameter	72	in
Discharge	456.70	ft³/s

Results

Normal Depth	4.17	ft
Flow Area	20.98	ft²
Wetted Perimeter	11.83	ft
Hydraulic Radius	1.77	ft
Top Width	5.52	ft
Critical Depth	5.55	ft
Percent Full	69.5	%
Critical Slope	0.00596	ft/ft
Velocity	21.77	ft/s
Velocity Head	7.37	ft
Specific Energy	11.54	ft
Froude Number	1.97	
Maximum Discharge	592.21	ft³/s
Discharge Full	550.53	ft³/s
Slope Full	0.00688	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	69.51	%
Downstream Velocity	Infinity	ft/s

Worksheet for Culvert 8

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	4.17	ft
Critical Depth	5.55	ft
Channel Slope	0.01000	ft/ft
Critical Slope	0.00596	ft/ft

Worksheet for Culvert 9

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.010	
Channel Slope	0.01000	ft/ft
Diameter	42	in
Discharge	134.70	ft^3/s

Results

Normal Depth	2.97	ft
Flow Area	8.71	ft^2
Wetted Perimeter	8.21	ft
Hydraulic Radius	1.06	ft
Top Width	2.50	ft
Critical Depth	3.33	ft
Percent Full	84.9	%
Critical Slope	0.00919	ft/ft
Velocity	15.46	ft/s
Velocity Head	3.72	ft
Specific Energy	6.69	ft
Froude Number	1.46	
Maximum Discharge	140.69	ft^3/s
Discharge Full	130.79	ft^3/s
Slope Full	0.01061	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	84.95	%
Downstream Velocity	Infinity	ft/s

Worksheet for Culvert 9

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	2.97	ft
Critical Depth	3.33	ft
Channel Slope	0.01000	ft/ft
Critical Slope	0.00919	ft/ft

Worksheet for Culvert 10

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.010	
Channel Slope	0.01000	ft/ft
Diameter	60	in
Discharge	249.40	ft^3/s

Results

Normal Depth	3.19	ft
Flow Area	13.23	ft^2
Wetted Perimeter	9.25	ft
Hydraulic Radius	1.43	ft
Top Width	4.81	ft
Critical Depth	4.42	ft
Percent Full	63.8	%
Critical Slope	0.00486	ft/ft
Velocity	18.85	ft/s
Velocity Head	5.52	ft
Specific Energy	8.72	ft
Froude Number	2.00	
Maximum Discharge	364.19	ft^3/s
Discharge Full	338.56	ft^3/s
Slope Full	0.00543	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	63.82	%
Downstream Velocity	Infinity	ft/s

Worksheet for Culvert 10

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	3.19	ft
Critical Depth	4.42	ft
Channel Slope	0.01000	ft/ft
Critical Slope	0.00486	ft/ft

Exhibit D

Executive Geotechnical Summary

July 5, 2005 1286-04-ZC

City of St. George
175 East 200 North
St. George, Utah 84790

Attn: Hillside Review Committee

Subject: Executive Summary
Geotechnical Site Evaluation
Lakes At St. George Development

Gentlemen:

Introduction

The purpose of this letter is to provide a summary of the general geologic and soil conditions at the subject site, and general geotechnical requirements for development. The project site (previously known as the Plantations Development site), is approximately 730 acres in area and is located within and along a relatively small valley west of the Green Valley and Sunbrook developments in St. George, Utah. Development of the site will be in phases and will consist of a 9-hole golf course, three to four lakes, and residential construction.

Previous geotechnical investigations conducted on the project site were referenced for this summary. The following geotechnical reports were reviewed.

2001 Geotechnical Investigation
Plantations at St. George, Phase 1
Residential Pods 12A, 12B & 15
Rosenberg Associates Project No. 95-1198-01

1995 Geotechnical Investigation
The Plantations, Phase 1
Black, Miller & Associates Project No. 95-1198-01

1992 Preliminary Geotechnical Site Assessment
730-Acre Plantations Project
Kleinfelder Project No. 31-800570

General Geologic Conditions

The majority of the site consists of a northwest trending valley flanked by a broad, shallow dip slope to the west and a plateau to the east. The southern-most portion of the site occupies a smaller, east-west trending valley separated from the remaining portion of the site by a south trending spur. The northern third of the site drains to the northeast through a series of subparallel tributary washes that join and exit the site in the northeast corner. The southern two-thirds of the site drains to the southwest from the west through a major tributary wash which enters the site through a feature known as "The Gap". The main wash flows to the south and then to the east, meandering back and forth across the southern site boundary.

Geologic deposits ranging in age from Triassic to Recent are found at the site (see Drawing No. 1 enclosed at the end of this letter). Bedrock consists chiefly of the Triassic Chinle Formation. The lower Shinarump Member consisting of sandstones and conglomerates outcrops extensively on the western portion of the site. The upper Petrified Forest Member (locally known as "Blue Clay"), underlies most of the central alluvial basin deposits and which outcrops on the eastern side of the site. Quaternary deposits consisting of Older gravels, Recent alluvial deposits, and possible landslide deposits are also present on the site as shown on Drawing No. 1 (Christenson and Deen, 1983).

General Subsurface Soil Conditions

For the purpose of this letter, we have separated the subject site into the four (4) general areas based on soil type (see Drawing No. 1). The subsurface conditions encountered on the western portion of the site (see orange colored area on Drawing No. 1), generally consisted of ½ to 1½ feet of loose, surficial silty sand or soft sandy clay soils overlying moderately hard to hard sandstone bedrock. Although generally jointed and fractured, the sandstones have a high shear strength, are relatively incompressible, and provide favorable foundation support characteristics.

The subsurface conditions at the base of the western slopes in the central and along the low ridges of the eastern portion of the site generally consist of varying thicknesses of alluvial soils (soft to stiff clayey soils, or loose to medium dense gravelly soils) overlying red-brown and green-gray highly plastic clays and mudstone bedrock associated with the Petrified Forest Member of the Chinle Formation (see the purple areas on Drawing No. 1). The Petrified Forest Member, or clay soils derived from erosion of this unit, generally have a high to critical swell potential with changes in moisture content, are of relatively low strength, and experience considerable reductions in strength when exposed to moisture.

In the northern portion of the site (see gray colored area on Drawing No. 1), the subsurface conditions generally consist predominantly of green-gray shales. The red-brown and purple mudstones, locally known as "Blue Clay" were not encountered within this area.. Clayey soils derived from the green-gray shales generally have low to moderate swell potentials.

On the plateau area to the east, the subsurface conditions are expected to consist of slightly to very well indurated (naturally cemented) sands, gravels, and cobbles associated with an Older Quaternary gravel formation. The sand and gravel deposits (see the green area on Drawing No. 2) generally provide favorable subgrade characteristics.

Groundwater was encountered during the 1992 preliminary assessment performed by Kleinfelder in the southeastern portion of the property at depths of about 4 to 12½ feet below the existing ground surface.

General Geotechnical Requirements

Based on the subsurface conditions encountered during at the site, and our experience with similar soil conditions, it is our opinion (from a geotechnical view point) that with proper preparation and design the subject site can be utilized for the proposed developments.

In the northern and western portions of the site (see orange and gray colored areas on Drawing No. 1), site grading will generally consist of reworking the existing surficial soils. The proposed structures should receive adequate support from conventional spread footings founded on competent undisturbed medium dense to dense native soils, on properly placed and compacted structural fill, or entirely on undisturbed non-expansive bedrock. The main geotechnical constraint within this area is the presence of moderately hard to hard bedrock. Rock excavating techniques should be anticipated where these materials are encountered during site grading and utility trench excavation. Steel reinforcing is recommended for footings and floor slabs constructed within the gray area due to the localized presence of low to moderately expansive soils.

Where the Petrified Forest Member of the Chinle Formation is present (see purple colored areas on Drawing No. 1), the most significant constraints to the development are related to the overall instability and generally poor foundation support characteristics this formation. Where this formation is present within slopes, the integrity of the slopes can be impaired by grading activities as well as loading and the introduction of water. Special grading and foundation considerations will be required where the Petrified Forest Member will be present within 15 feet of the planned rough pad elevations. We recommend that the structures be supported by a deep foundation systems with grade beams to support wall loads, and a raised structural floor system. Where conventional foundation systems are desired within expansive clay areas, any expansive clay soils or bedrock located within 15 feet of the final building pad elevations would require overexcavation and replacement with approved structural fill materials. Within exterior flatwork and street improvement areas, expansive native materials present within 3 feet of the planned subgrade elevation should be overexcavated and replaced with structural fill.

Older Quaternary gravels at the site (see green colored areas in the southeast portion of the site) occur primarily as a cap overlying the Petrified Forest Member in the plateau areas to the east. These materials consist of slightly to very well cemented sands, gravels, and cobbles. The sand and gravel deposits are generally anticipated to provide favorable foundation support

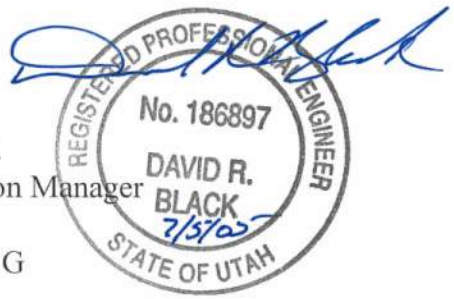
characteristics. However, in the vicinity of slopes, overall stability anticipated to be a consideration for portions of the development within this area due to the underlying presence of the Petrified Forest Member.

Closure

It is our pleasure to be of continued service on this project. If you have any questions concerning the information contained in this letter, please contact us at your convenience.

Sincerely,

ROSENBERG ASSOCIATES

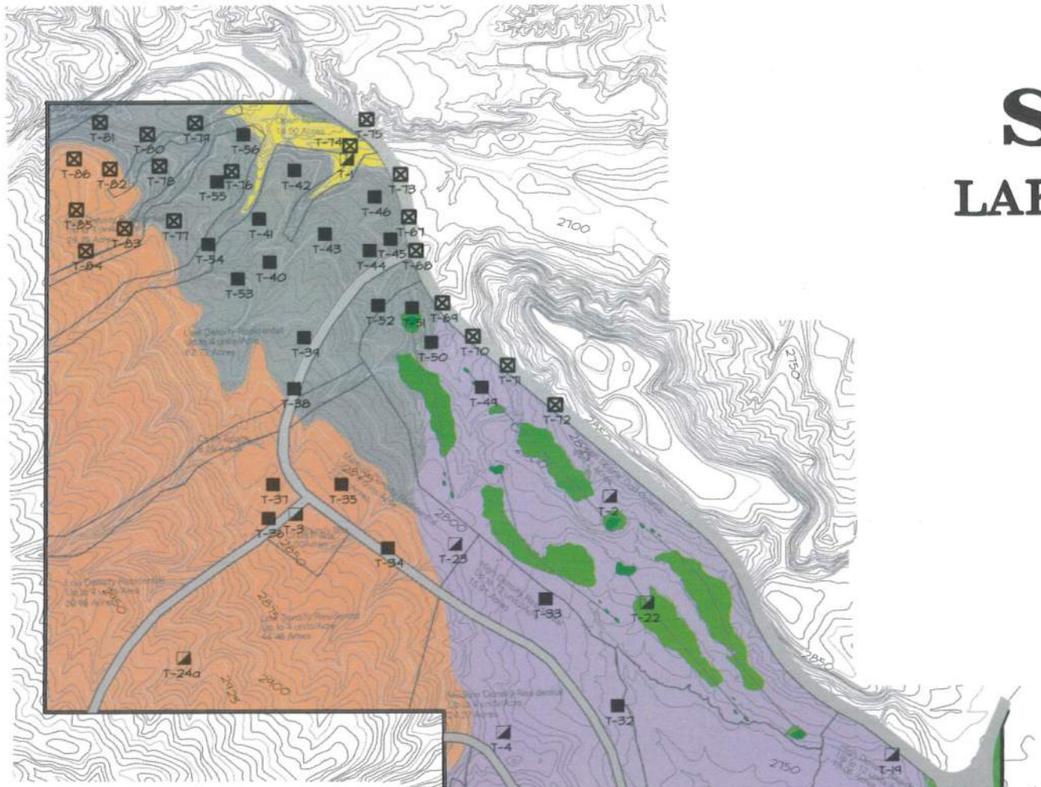


David R. Black, P.E.
Geotechnical Division Manager

DRB/RTR/05R-137.G

SOILS MAP

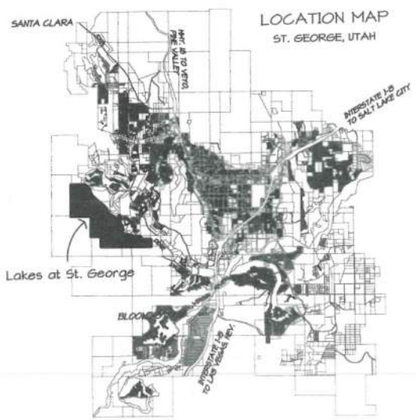
LAKES AT ST. GEORGE



SCALE: 1" = 500'

CONTOUR INTERVAL = 5'

LOCATION MAP
ST. GEORGE, UTAH



LEGEND

- Qal — RECENT ALLUVIAL SANDS AND GRAVELS
- Qls — LANDSLIDE DEBRIS
- Qog — OLDER ALLUVIAL GRAVEL
- TRcp — CHINLE FORMATION, PETRIFIED FOREST MEMBER (WITHIN 12 FEET)
- TRc — CHINLE FORMATION, GREEN/GRAY SHALE BEDS
- TRcs — CHINLE FORMATION, SHINARUMP MEMBER
- TRmk — MOENKOPI FORMATION, UPPER RED MEMBER
- Landfill Area
- Gravel Pit Area
- Fissure Area
- T-1 to T-24a — Approximate Trench Locations (1992 Kleinfelder Preliminary Site Assessment)
- T-24b to T-56 — Approximate Trench Locations (1995 Rosenberg Phase I Geotechnical Investigation)
- T-57 to T-86 — Approximate Trench Locations (2000 Rosenberg Plantations Drive Investigation)
- B-1 — Boring Location (2000 Rosenberg Plantations Drive Investigation)

04-24-04
DATE:

1286-04
JOB NUMBER:

1" = 500'
SCALE:

T.J.F.
DRAWN BY:

CHECKED BY:

REVISIONS DATE

ROSENBERG ASSOCIATES
CONSULTING ENGINEERS AND LAND SURVEYORS
352 East Riverside Drive, Suite A2
St. George, Utah 84790 - (435) 673-8586

SOILS MAP
PLANTATIONS AT ST. GEORGE
CITY OF ST. GEORGE
WASHINGTON COUNTY, UTAH

DRAWING NAME:
1286SoilTyp

SHEET
1
OF 1 SHEETS

PLANNING COMMISSION AGENDA REPORT: **06/14/2022**

PRELIMINARY PLAT
Water's Edge at Desert Color
Case No. 2022-PP-028

Request:	To approve a preliminary plat for a fourteen (14) lot residential subdivision.
Location:	The site is located at approximately Akoya Pearl Rd and Alice Blue Lane
Property:	2.27 acres
Number of Lots:	14
Density:	6.17 DU/AC
Zoning:	PD-R
Adjacent zones:	This plat is surrounded by the following zones: North – PD–R South – PD-C East – PD–R West – PD–R
General Plan:	TC (Town Center)
Applicant:	Bush & Gudgell
Representative:	Bob Hermandson

Comments:

Preliminary Plat – Water's Edge at Desert Color

B&G PROJECT NUMBER 211546

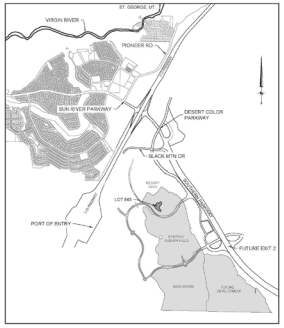
WATER'S EDGE AT DESERT COLOR SHORES

AT DESERT COLOR

PRELIMINARY PLAT

LOCATED IN ST. GEORGE, UTAH

SOUTHWEST 1/4 OF SECTION 25,
TOWNSHIP 43 SOUTH, RANGE 16 WEST, SALT LAKE BASE AND MERIDIAN

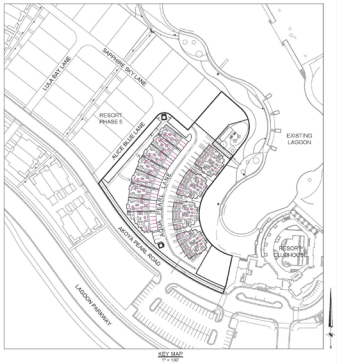


VICINITY MAP
N.T.S.

WATER'S EDGE AT DESERT COLOR SHORES

BEGINNING AT A POINT THAT LIES SOUTH 00°14'25" WEST ALONG THE SECTION LINE 474.97 FEET, AND DUE EAST 570.42 FEET, FROM THE WEST QUARTER CORNER OF SAID SECTION 25, SAID POINT BEING THE SOUTHWEST CORNER OF LOT M5, DESERT COLOR RESORT PHASE 5, DOCUMENT NO. 20210069545, OFFICIAL RECORDS, WASHINGTON COUNTY, UTAH, AND RUNNING THENCE ALONG SAID LOT THE FOLLOWING TEN (10) COURSES: 1) NORTH 41°33'54" EAST 217.03 FEET; 2) EASTERLY ALONG A 25.00 FOOT RADIUS CURVE TO THE RIGHT, (LONG CHORD BEARS NORTH 86°03'54" EAST A DISTANCE OF 35.36 FEET), CENTER POINT LIES SOUTH 48°56'06" EAST THROUGH A CENTRAL ANGLE OF 90°00'00", A DISTANCE OF 39.27 FEET; 3) SOUTH 48°56'06" EAST 57.83 FEET; 4) NORTH 41°03'54" EAST 131.03 FEET; 5) SOUTH 48°56'06" EAST 66.76 FEET; 6) SOUTHERLY ALONG A 62.70 FOOT RADIUS CURVE TO THE RIGHT, (LONG CHORD BEARS SOUTH 03°39'44" EAST A DISTANCE OF 85.12 FEET), CENTER POINT LIES SOUTH 41°03'54" WEST THROUGH A CENTRAL ANGLE OF 85°14'40", A DISTANCE OF 94.93 FEET; 7) SOUTH 37°46'36" WEST 150.76 FEET; 8) SOUTHERLY ALONG A 109.50 FOOT RADIUS CURVE TO THE LEFT, (LONG CHORD BEARS SOUTH 19°48'02" EAST A DISTANCE OF 183.17 FEET), CENTER POINT LIES SOUTH 52°11'21" EAST THROUGH A CENTRAL ANGLE OF 115°09'21", A DISTANCE OF 219.96 FEET; 9) SOUTH 11°54'59" WEST 77.64 FEET AND; 10) SOUTH 21°16'43" WEST 22.19 FEET TO A POINT ON THE NORTH RIGHT OF WAY LINE OF AKOYA PEARL ROAD, THENCE ALONG SAID LINE THE FOLLOWING TWO (2) COURSES: 1) NORTH-WESTERLY ALONG A 598.50 FOOT RADIUS NON-TANGENT CURVE TO THE RIGHT, (LONG CHORD BEARS NORTH 51°16'49" WEST A DISTANCE OF 351.62 FEET), CENTER POINT LIES NORTH 21°16'43" EAST THROUGH A CENTRAL ANGLE OF 34°40'11", A DISTANCE OF 363.37 FEET AND 2) NORTH 33°56'59" WEST 69.87 FEET, THENCE NORTH 41°03'54" EAST 11.39 FEET TO THE POINT OF BEGINNING.

CONTAINING 98,766 SQUARE FEET OR 2.27 ACRES.



KEY MAP
1" = 100'

OWNER / DEVELOPER

DESERT COLOR ST. GEORGE, LLC
PROJECT CONT ACT: DANIEL LIMHOI
(435) 313-4140
205 EAST TABERNACLE #2
ST. GEORGE, UT 84770

BUSH AND GUDGELL, INC.
PROJECT MANAGER: BOB HERMANSON
(435) 673-2337
205 EAST TABERNACLE #4
ST. GEORGE, UT 84770

AGEC APPLIED GEOTECH
GEOTECHNICAL ENGINEER: G. WAYNE ROGERS
(435) 673-8950
1400 SOUTH 270 EAST
ST. GEORGE, UT 84790

May 2022

BUSH & GUDGELL, INC.
Engineers - Planners - Surveyors
205 East Tabernacle #4
St. George, Utah 84770
Phone (435) 673-2337

AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY.
Call before you Dig
1-800-662-4111
BLUE STAKES LOCATION CENTER (Utah)

K:\Desert Color South Block\211546 – Resort 545\Drawings\Preliminary Plat\211546 – Lot 545 Cover.dwg

BUSH & GUDGELL, INC.
Engineers - Planners - Surveyors
205 East Tabernacle Suite #4
St. George, Utah 84770
Phone (435) 673-3161
www.bushandgudgell.com

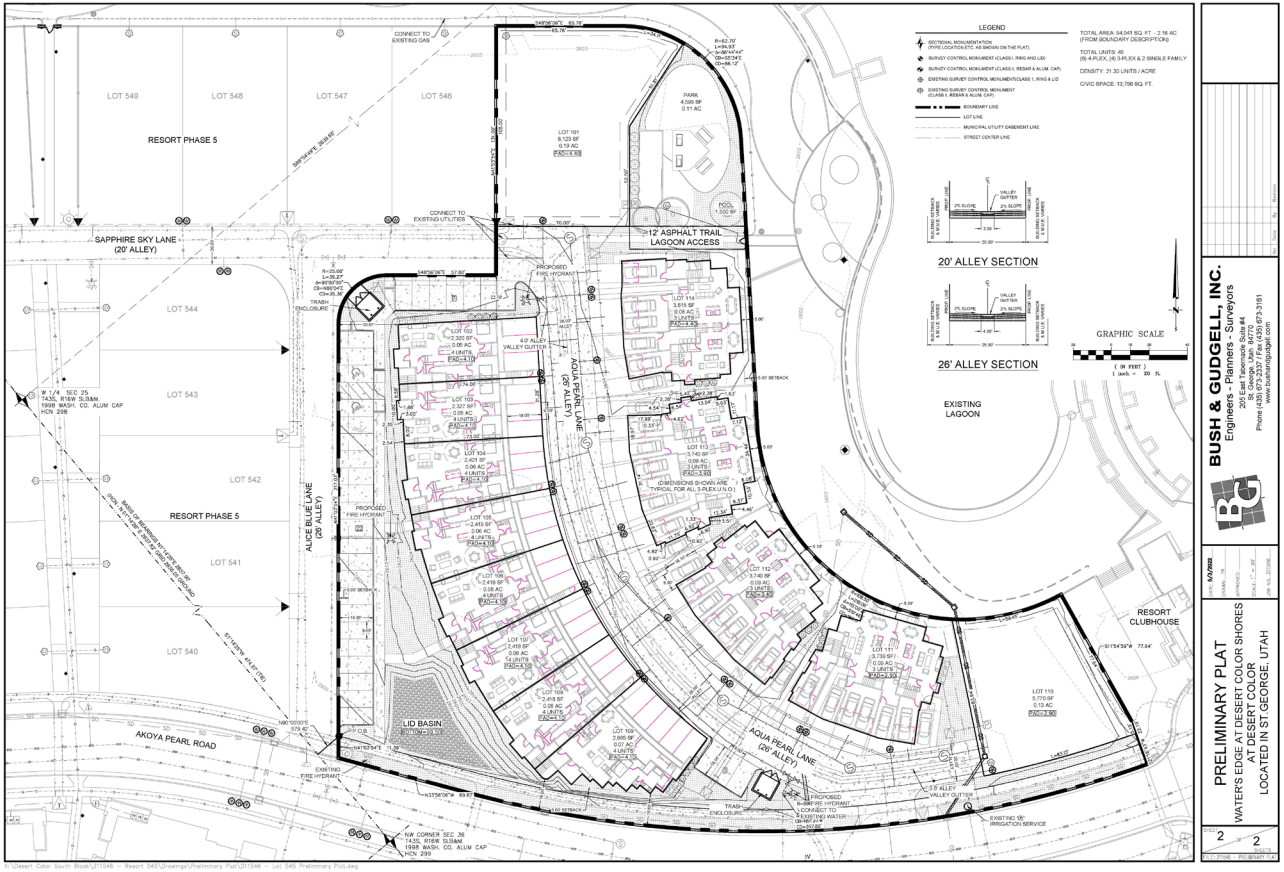
DATE: 5/5/2022
DRAWN: JS
APPROVED:
SCALE: N/S
JOB NO.: 211546

COVER SHEET
WATER'S EDGE AT DESERT COLOR SHORES
AT DESERT COLOR
LOCATED IN ST.GEORGE, UTAH

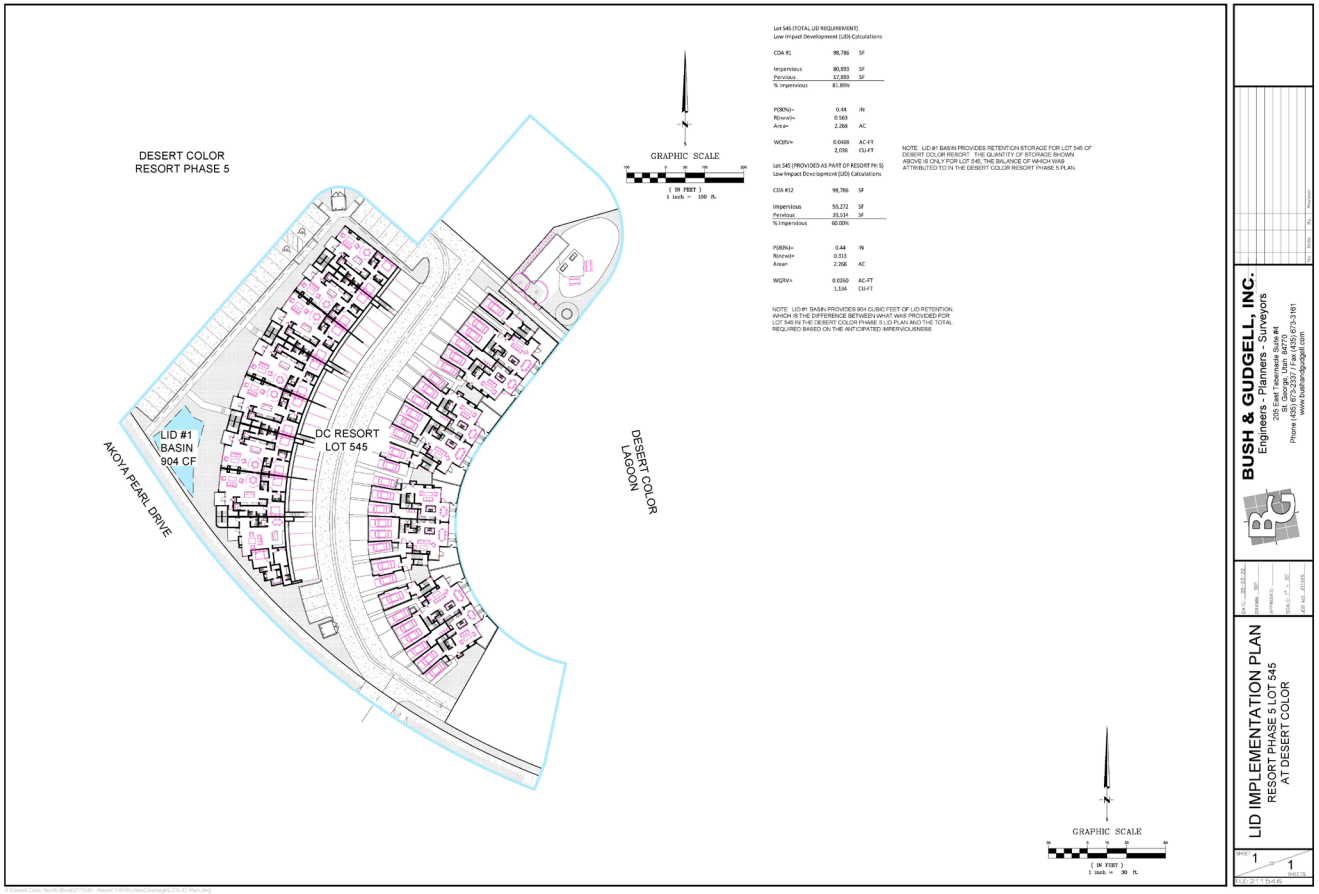
SHEET 1 OF 2

FILE: 21546 - PRELIMINARY PLAT

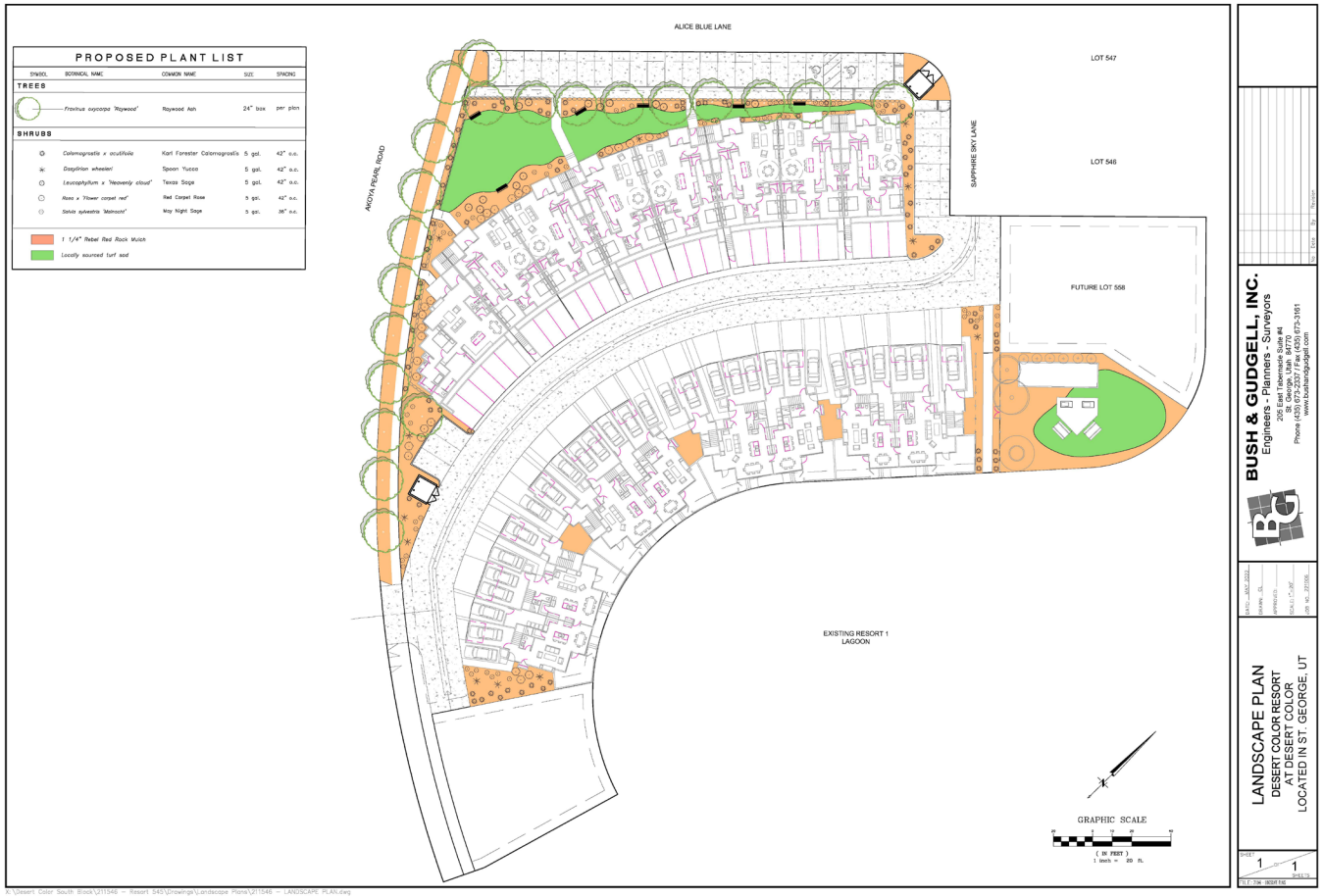
Preliminary Plat – Water's Edge at Desert Color



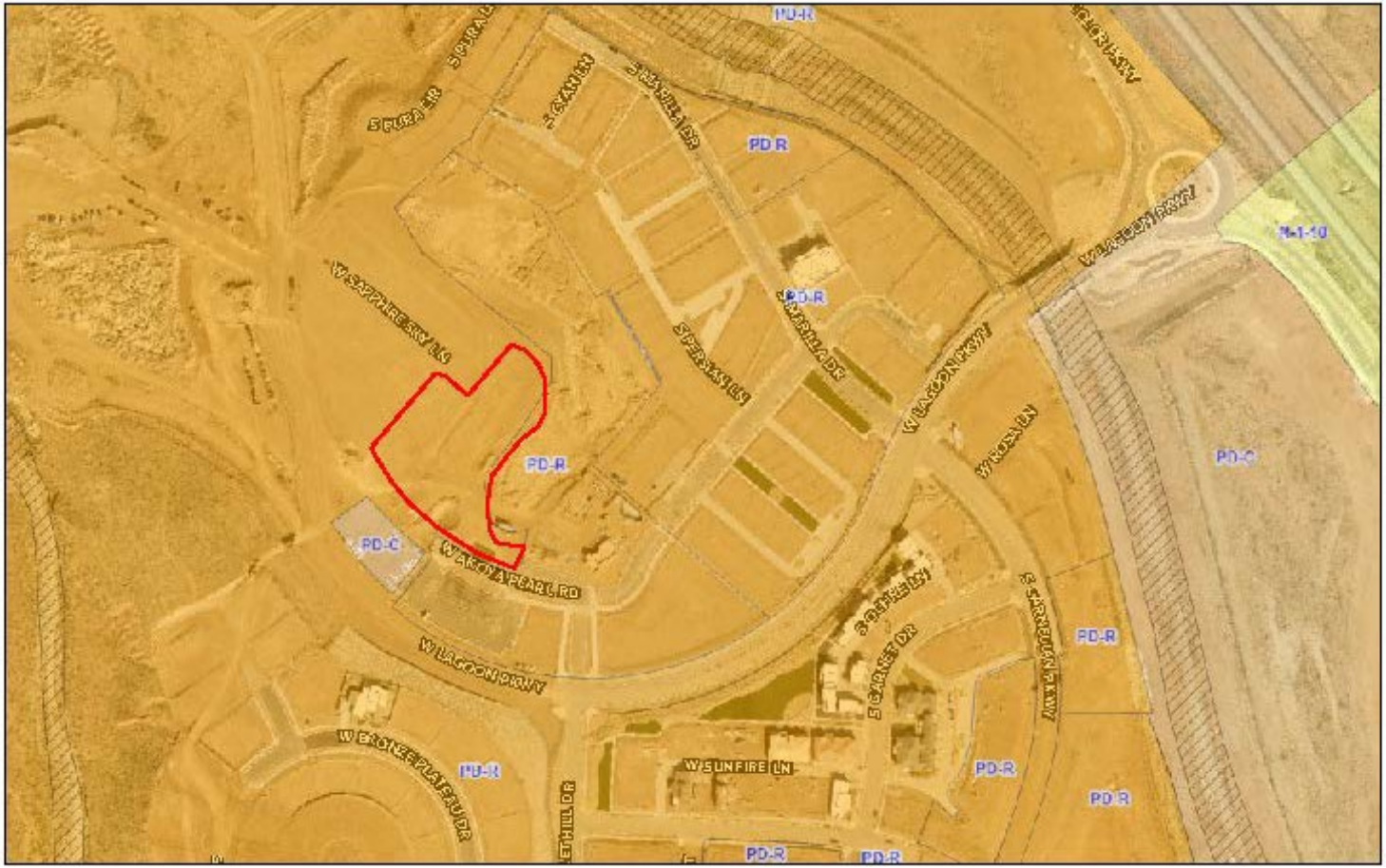
Preliminary Plat – Water's Edge at Desert Color



Preliminary Plat – Water's Edge at Desert Color



Preliminary Plat – Water's Edge at Desert Color



Preliminary Plat – Water's Edge at Desert Color

PLANNING COMMISSION AGENDA REPORT: **06/14/2022**

PRELIMINARY PLAT
Villa Highlands Phase 5
Case No. 2022-PP-022

Request:	To approve a preliminary plat for a thirty (30) lot residential subdivision.
Location:	The site is located at west of London Lane
Property:	5.20 acres
Number of Lots:	30
Density:	7.692 DU/AC
Zoning:	PD-R
Adjacent zones:	This plat is surrounded by the following zones: North – PD–R South – PD-R East – PD–R West – PD–R
General Plan:	MDR
Applicant:	Bush & Gudgell
Representative:	Bob Hermandson
Comments:	

Preliminary Plat – Villa Highlands Phase 5

B&G PROJECT NUMBER 201332

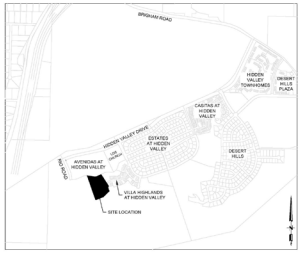
VILLA HIGHLANDS PHASE 5

PRELIMINARY PLAT

LOCATED IN ST GEORGE, UTAH

SECTION 18, T 43 S, R 15 W, SLB&M

PARCEL # SG-5-3-18-310-SLL



VICINITY MAP

BOUNDARY DESCRIPTION

BEGINNING AT A POINT THAT LIES NORTH 88°52'18" WEST 1604.52 FEET AND SOUTH 2156.97 FEET FROM THE NORTH QUARTER CORNER OF SECTION 18, TOWNSHIP 43 SOUTH, RANGE 15 WEST, SALT LAKE BASE AND MERIDIAN; THENCE SOUTH 83°03'00" EAST 352.20 FEET; THENCE SOUTH 11°28'00" EAST 19.59 FEET; THENCE SOUTH 78°44'24" WEST 19.35 FEET; THENCE SOUTH 14°44'19" EAST 77.20 FEET; THENCE SOUTH 25°02'34" EAST 40.00 FEET; THENCE SOUTH 46°38'52" WEST 221.25 FEET; THENCE SOUTH 68°03'06" WEST 180.05 FEET; THENCE SOUTH 85°36'27" WEST 33.03 FEET; THENCE NORTH 19°10'14" WEST 655.18 FEET; THENCE EASTERLY ALONG A 299.83 FOOT RADIUS NON-TANGENT CURVE TO THE RIGHT, (LONG CHORD BEARS SOUTH 84°24'01" EAST A DISTANCE OF 14.55 FEET), CENTER POINT LIES SOUTH 03°28'51" WEST THROUGH A CENTRAL ANGLE OF 02°46'51", A DISTANCE OF 14.55 FEET; THENCE SOUTH 82°45'48" EAST 166.12 FEET; THENCE EASTERLY ALONG A 180.00 FOOT RADIUS CURVE TO THE LEFT, (LONG CHORD BEARS NORTH 81°35'11" EAST A DISTANCE OF 97.11 FEET), CENTER POINT LIES NORTH 07°14'12" EAST THROUGH A CENTRAL ANGLE OF 31°18'01", A DISTANCE OF 98.33 FEET; THENCE NORTH 64°03'01" EAST 95.53 FEET TO THE POINT OF BEGINNING.

CONTAINING 226,512 SQUARE FEET OR 5.20 ACRES.

CONTENTS	
1	COVER SHEET
2	PRELIMINARY PLAT
3	GRADING PLAN
4	UTILITY PLAN
5	LANDSCAPE PLAN

PROJECT MAP

PROJECT INFORMATION	
ZONING	PD-R
TOTAL AREA	5.20 ACRES
PHASE 5 AREA	3.78 ACRES
TRAIL DEDICATION AREA	1.09 ACRES
TOTAL UNITS	30
DENSITY	7.94 D.U./ ACRE

GENERAL NOTES

1) CONTRACTOR IS RESPONSIBLE TO VERIFY LOCATIONS OF ALL UTILITIES PRIOR TO COMMENCEMENT OF WORK IN ANY ZONE.
2) ALL WORK AND MATERIALS SHALL COMPLY WITH ST. GEORGE CITY STANDARD SPECIFICATIONS.
3) PROJECTS SHALL INSTALL AN INFORMATIONAL SIGN ON SITE BEFORE CONSTRUCTION BEGINS. THIS SIGN WILL HAVE A MINIMUM SIZE, PLACEMENT LOCATION, AND CONTENT INFORMATION WITH THE COMPANY NAME, PHONE CONTACT AND GRADING PERMIT NUMBER.
4) PROJECTS SHALL SUBMIT A DUST CONTROL PLAN WITH DETAILS ON EQUIPMENT, SCHEDULING AND REPORTING OF DUST CONTROL ACTIVITIES.
5) 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 SERVICE INSPECTORS.
6) FOLLOW APPENDIX J STANDARDS FOUND IN THE IBC.
7) ALL OBJECTS SHALL BE KEPT OUT OF THE SIGHT DISTANCE CORRIDORS THAT MAY OBSTRUCT THE DRIVER'S VIEW.

DUST CONTROL

THESE DUST CONTROL MEASURES MUST BE OBSERVED AT ALL TIMES.

EARTH MOVING ACTIVITIES:
1) APPLY WATER BY MEANS OF TRUCKS, HOSES AND/OR SPRINKLERS AT SUFFICIENT FREQUENCY AND QUANTITY, PRIOR TO CONDUCTING, DURING AND AFTER EARTH-MOVING ACTIVITIES.
2) PRE-APPLY WATER TO THE DEPTH OF THE PROPOSED CUTS OR EQUIPMENT PENETRATION.
3) APPLY WATER AS NECESSARY AND PRIOR TO EXPECTED WIND EVENTS.
4) OPERATE HAUL VEHICLES APPROPRIATELY IN ORDER TO MINIMIZE FUGITIVE DUST AND APPLY WATER AS NECESSARY DURING LOADING OPERATIONS.

DISTURBED SURFACE AREAS OR INACTIVE CONSTRUCTION SITES:
1) APPLY WATER TO SURFACE AREAS AT SUFFICIENT FREQUENCY AND QUANTITY TO KEEP SURFACE CRUSTY AND PREVENT DUST FROM BECOMING AIRBORNE. APPLY WATER AT SUFFICIENT FREQUENCY AND QUANTITY TO DEVELOP A SURFACE CRUST AND PRIOR TO EXPECTED WIND EVENTS.
2) INSTALL FENCE BARRIER AND/OR "NO TRESPASSING" SIGNS TO PREVENT ACCESS TO DISTURBED SURFACE AREAS.

APRIL 2022

BUSH & GUDGELL, INC.
Engineers - Planners - Surveyors
205 East Tabernacle #4
St. George, Utah 84770
Phone (435) 673-2337

AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S CUTTIE

Call before you Dig 1-800-662-4111

OWNER / DEVELOPER
IVORY SOUTHERN, LLC
978 EAST WOODOAK LANE
SALT LAKE CITY, UT 84117

SKYLAR TOLBERT
(801) 520-9127

ENGINEERING CONTACT
BUSH AND GUDGELL, INC.
205 EAST TABERNACLE #4
ST. GEORGE, UT 84770

RICK HEYER
(435) 673-2337

BUSH & GUDGELL, INC.
Engineers - Planners - Surveyors
205 East Tabernacle Suite #4
St. George, Utah 84770
Phone (435) 673-2337 Fax (435) 673-3161
www.bushandgudgell.com

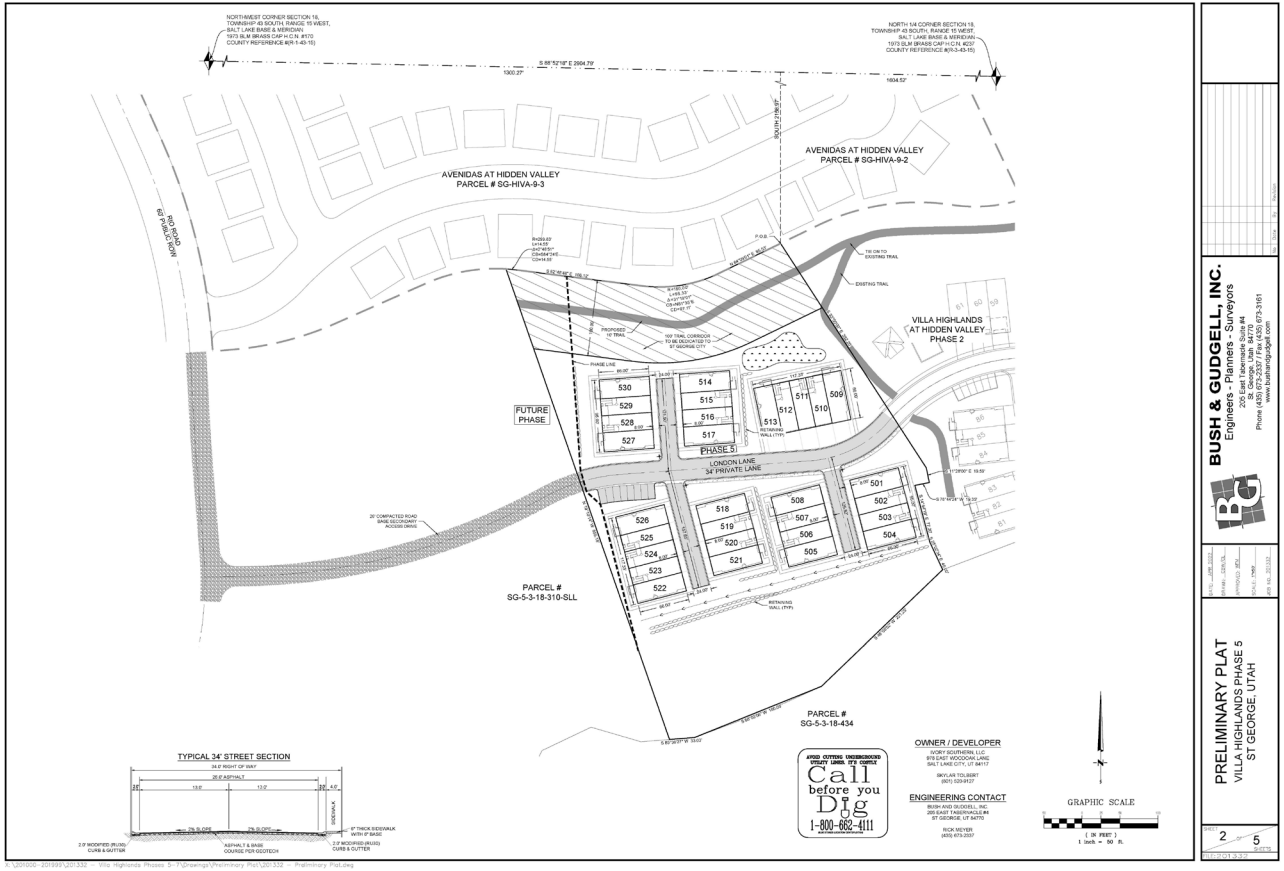
COVER SHEET
VILLA HIGHLANDS PHASE 5
ST GEORGE, UTAH

SHEET 1 OF 5 SHEETS

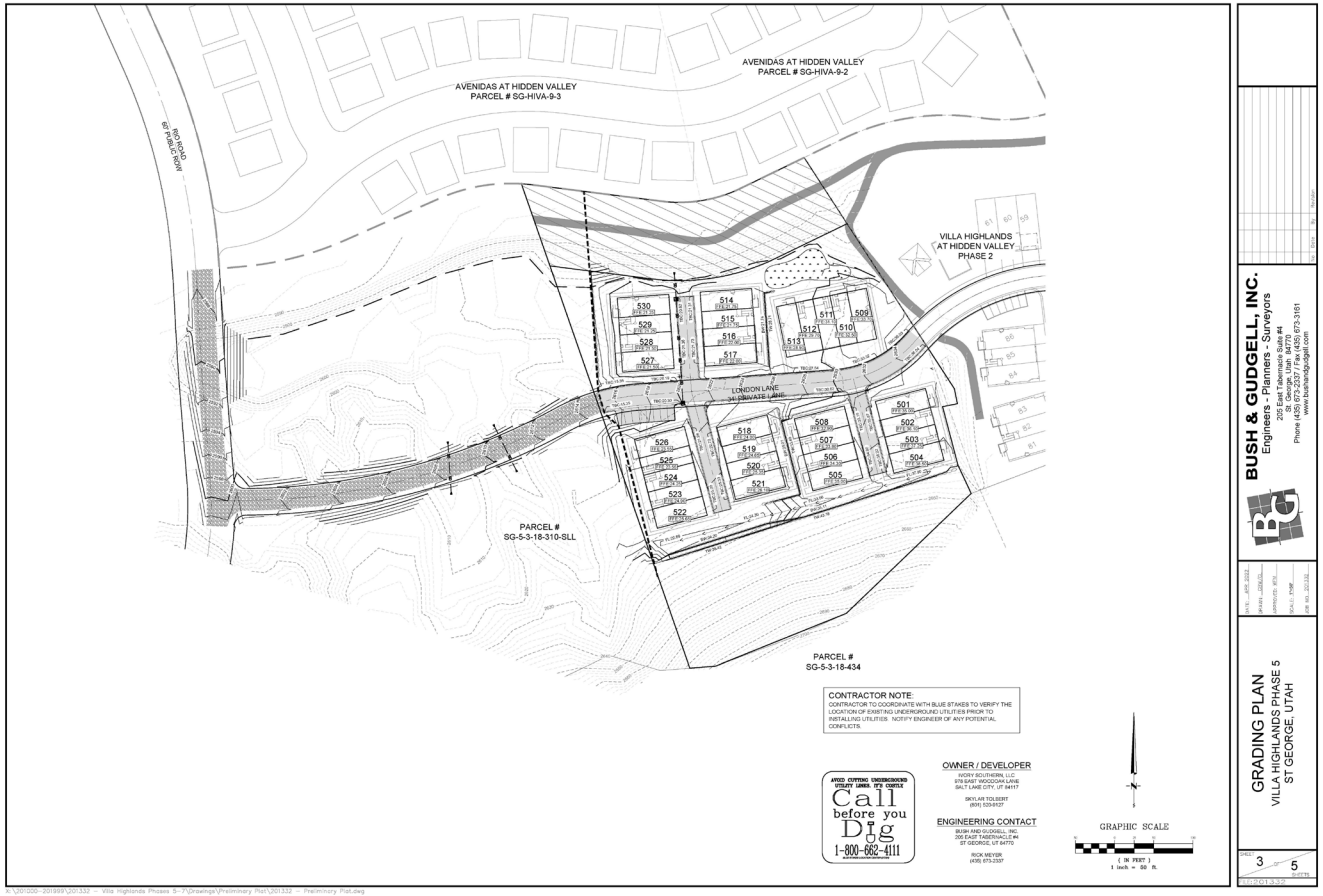
B&G 201-332

A:\201000-201999\201332 - Villa Highlands Phases 5-7\Drawings\Preliminary Plat\201332 - Preliminary Plat.dwg

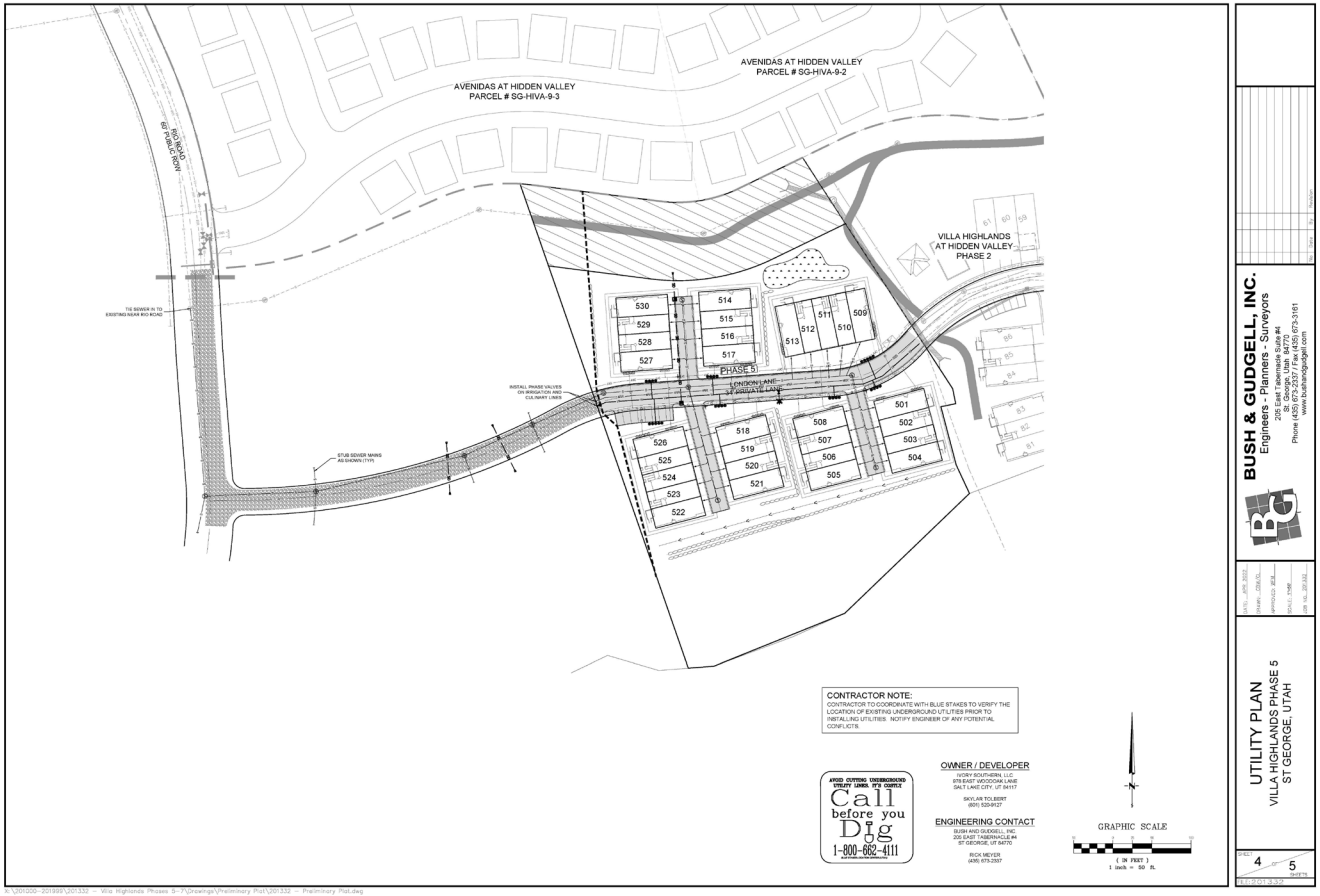
Preliminary Plat – Villa Highlands Phase 5



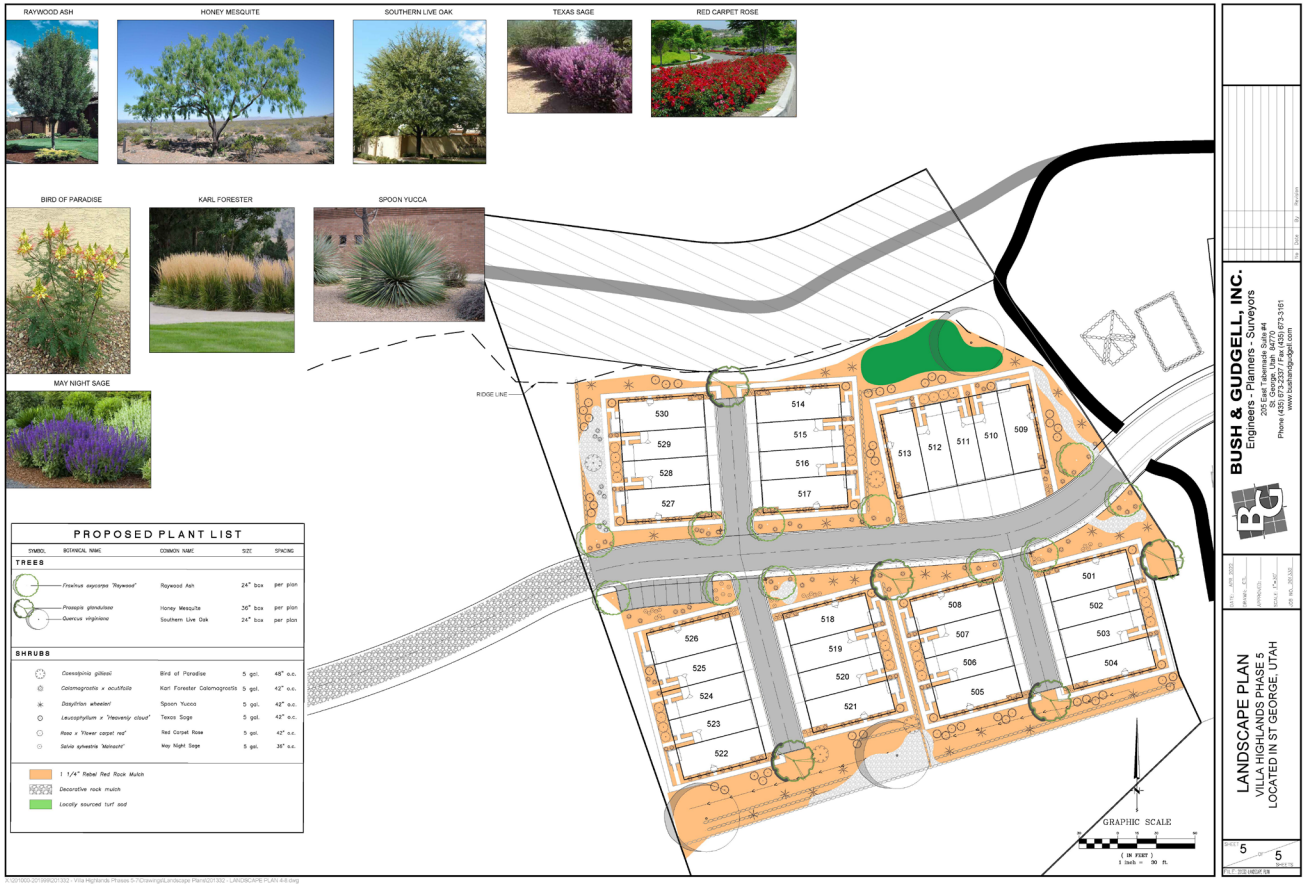
Preliminary Plat – Villa Highlands Phase 5



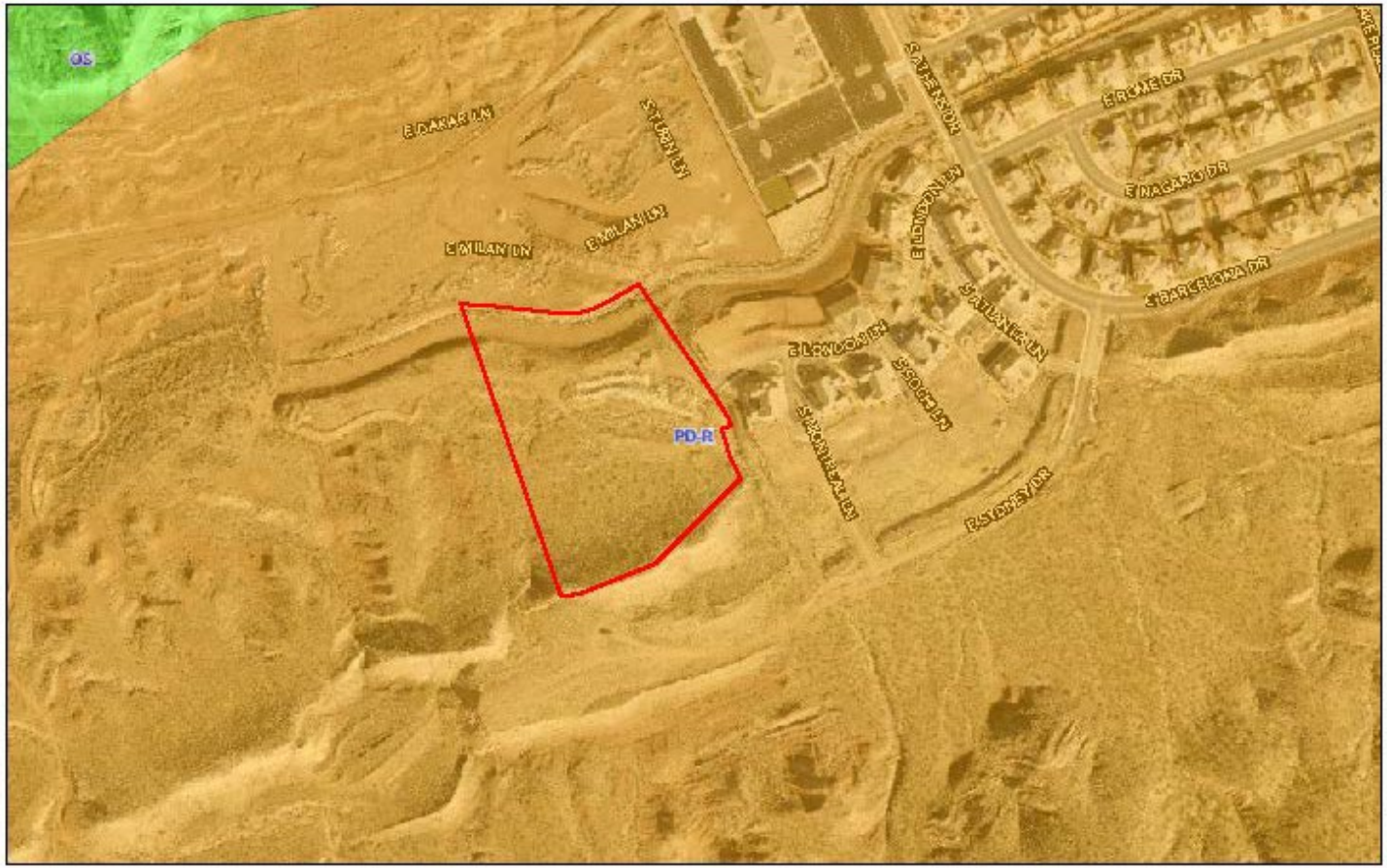
Preliminary Plat – Villa Highlands Phase 5



Preliminary Plat – Villa Highlands Phase 5



Preliminary Plat – Villa Highlands Phase 5



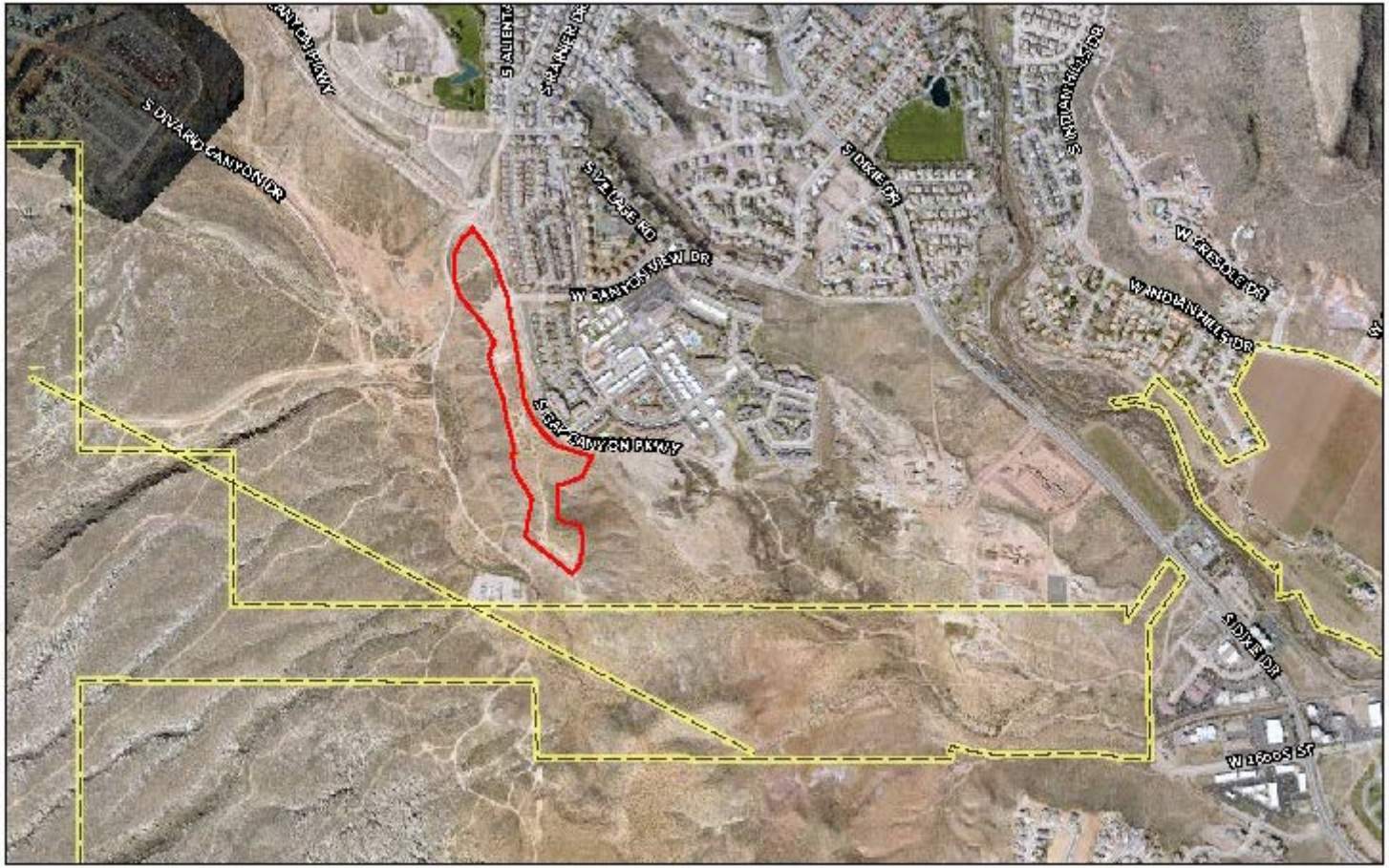
Preliminary Plat – Villa Highlands Phase 5

PLANNING COMMISSION AGENDA REPORT: **06/14/2022**

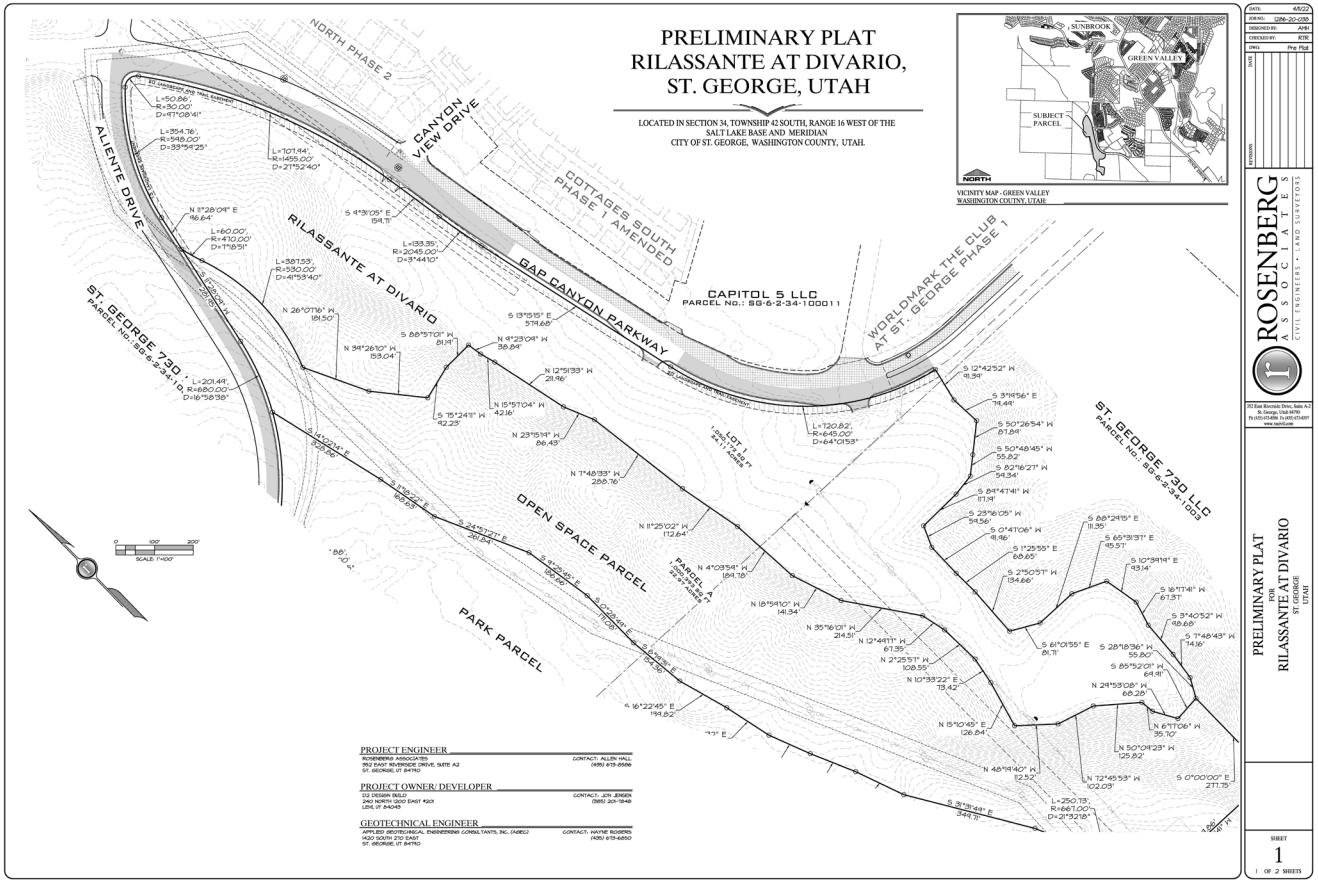
PRELIMINARY PLAT
Rilassante at Divario
Case No. 2022-PP-024

Request:	To approve a preliminary plat for a one (1) lot/two (2) parcel subdivision.
Location:	The site is located at approximately Gap Canyon Parkway and Canyon View Drive
Property:	Lot 1 (24.11 acres), Parcel A (22.97 acres), Parcel B (23.38 acres)
No. of Lots/Parcels:	3
Density:	**N/A**
Zoning:	R-1-10
Adjacent zones:	This plat is surrounded by the following zones: North – R-1-10 South – R-1-10 East – PD-R/R-1-10 West – R-1-10
General Plan:	MDR
Applicant:	Rosenberg Associates
Representative:	Rick Rosenberg

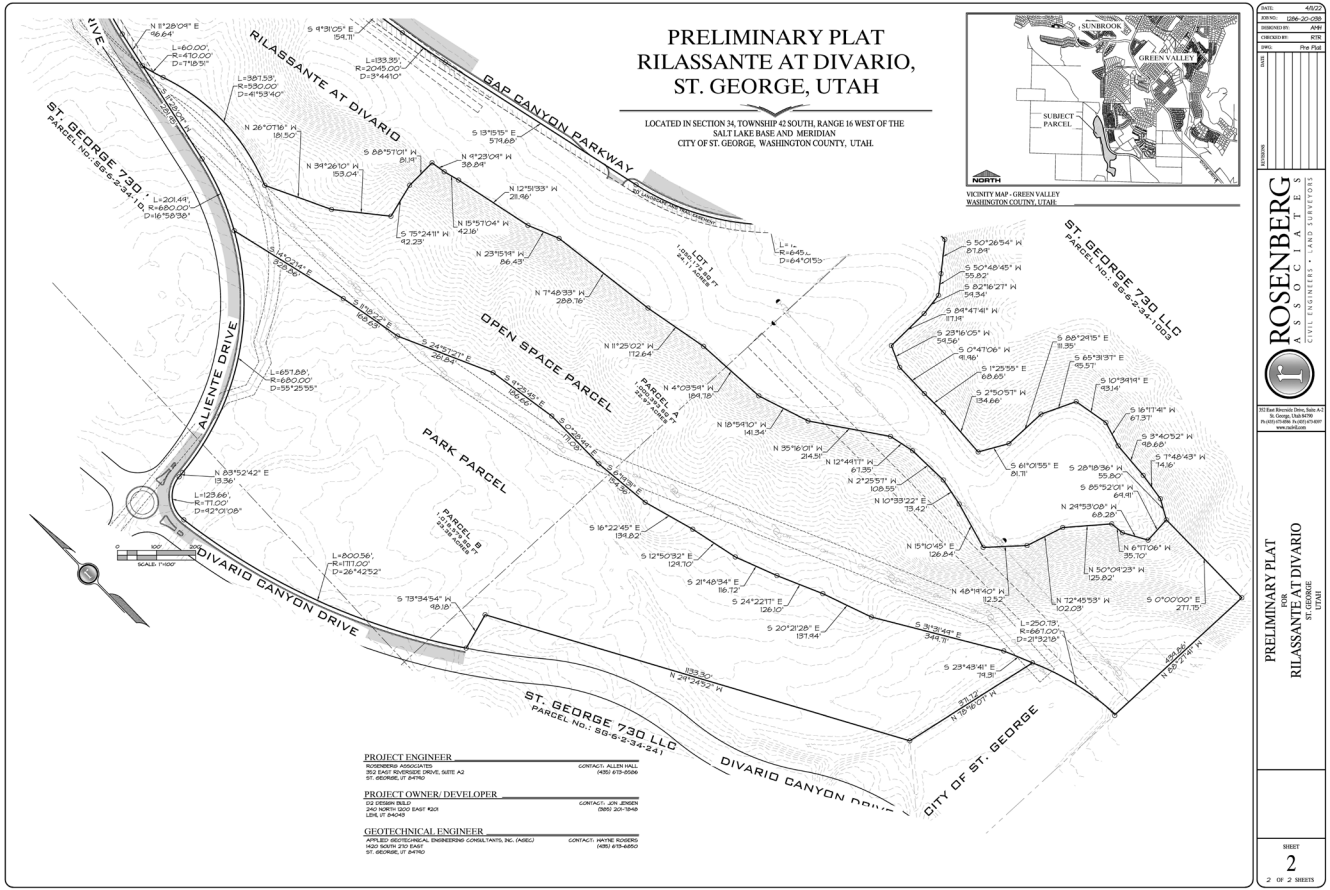
Comments:



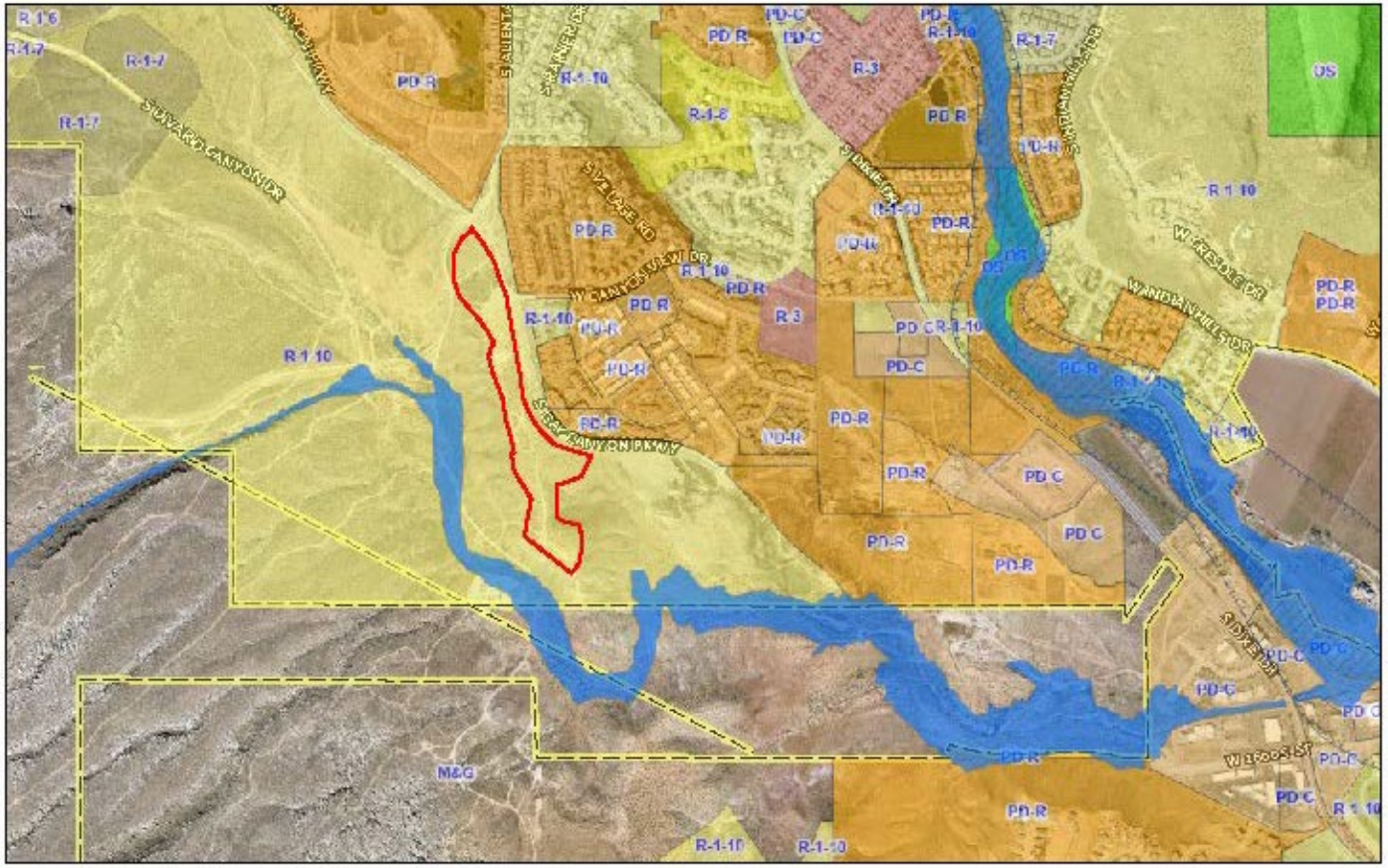
Preliminary Plat – Rilassante at Divario



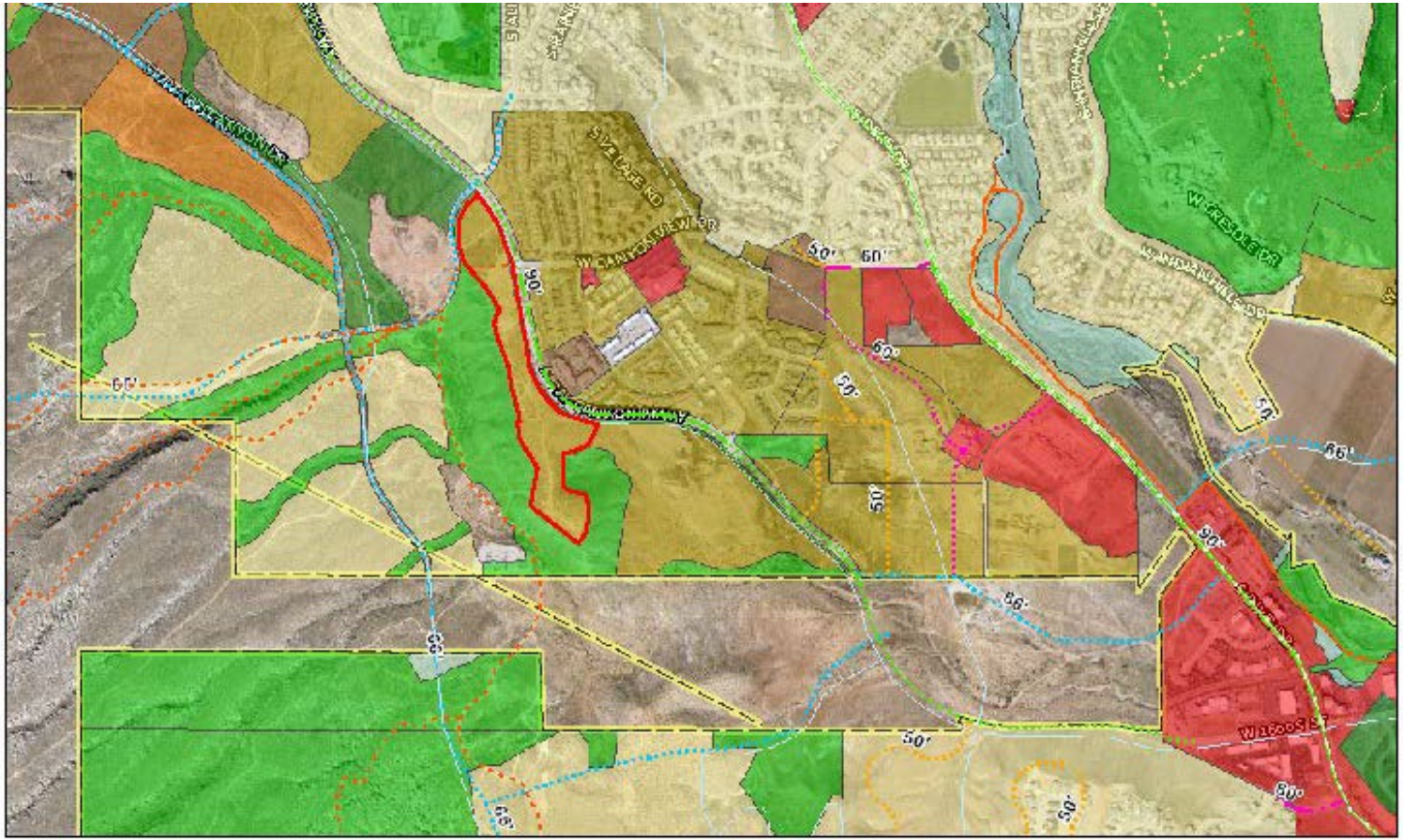
Preliminary Plat – Rilassante at Divario



Preliminary Plat – Rilassante at Divario



Preliminary Plat – Rilassante at Divario



Preliminary Plat – Rilassante at Divario

St.George
Community Development

ITEM 4D

PRELIMINARY PLAT

PLANNING COMMISSION AGENDA REPORT: **06/14/2022**

PRELIMINARY PLAT
Lugano Landing (PA-4)
Case No. 2022-PP-018

Request:	To approve a preliminary plat for a one hundred twenty four (124) lot residential subdivision.
Location:	The site is located along the future extension of Divario Canyon Parkway south of Alienta Drive and north of the St. George City border.
Property:	35.64 acres
Number of Lots:	124
Density:	3.48 DU/AC
Zoning:	R-1-8
Adjacent zones:	This plat is surrounded by the following zones: North – R-1-10 South – Washington County East – R-1-10 West – Washington County
General Plan:	LDR
Applicant:	L.R. Nelson Consulting Engineers LLC
Representative:	Clayton Neilson

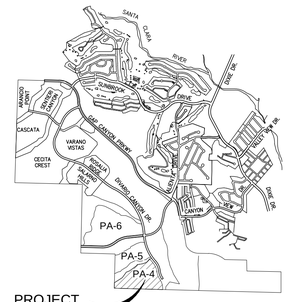
Comments:

Preliminary Plat – Lugano Landing (PA 4)

DIVARIO MASTER PLANNED COMMUNITY

PA-4 - LUGANO LANDING

LOCATED IN SECTION XX, TOWNSHIP XX XXXXX, RANGE XX XXXX OF THE
SALT LAKE BASE AND MERIDIAN
CITY OF ST. GEORGE, WASHINGTON COUNTY, UTAH



PROJECT LOCATION

VICINITY MAP ST. GEORGE, UTAH

NORTH

SCALE: NTS

OWNER / DEVELOPER / CONTACT

THE DEVELOPER OF THIS PROJECT IS
730 ST. GEORGE, LLC
CONTACT: MARK TEEPEN
8716 SPANISH RIDGE AVE. #120
LAS VEGAS, NEVADA 89148
(702) 232-5799

PROJECT LOCATION

THE PROJECT IS LOCATED AT:
DIVARIO CANYON DRIVE

PROJECT ENGINEER

L.R. NELSON CONSULTING ENGINEERS, INC.
6765 WEST RUSSELL ROAD, SUITE 200
LAS VEGAS, NEVADA 89118-1811
CONTACT: CLAYTON L. NEILSEN
PHONE: (702)798-7978

GEOTECHNICAL ENGINEER

APPLIED GEOTECHNICAL ENGINEERING
CONSULTANTS, INC.
CONTACT: WAYNE ROGERS
158 WEST 1600 SOUTH
ST. GEORGE, UTAH 84770
(435) 673-6850

SITE DEVELOPMENT DATA

ACRES: 35.64
NUMBER OF LOTS: 124
DENSITY: 3.48 UNITS PER ACRES
66', 50' & 45' PUBLIC STREETS
ZONING: R-1-8
MIN LOT SIZE: 5,859 SF
SETBACKS:
25' FRONT
8' & 8' SIDES
10' REAR

NUMBER OF LOTS MORE THAN 10,000 SF - 25
NUMBER OF LOTS 9,000 SF - 9,999 SF - 10
NUMBER OF LOTS 8,000 SF - 8,999 SF - 80
NUMBER OF LOTS 5,800 SF - 7,999 SF - 9
TOTAL LOTS: 124 LOTS

PLATTED LOTS DATA

ALLOWED # OF UNITS: 3,196
UNITS PLATTED: 197
UNITS PENDING PLATTING: 52
UNITS PROPOSED FOR PLATTING - PA-6: 189
UNITS PROPOSED FOR PLATTING - PA-5: 67
UNITS PROPOSED FOR PLATTING - PA-4: 124
UNITS REMAINING: 2,567

POWER

ST. GEORGE POWER SERVICES
175 EAST 200 NORTH
ST. GEORGE, UTAH 84790
(435) 674-4213

NATURAL GAS

DOMINION ENERGY
1155 EAST 350 NORTH
ST. GEORGE, UTAH 84770
(435) 673-7514

WATER

ST. GEORGE WATER SERVICES
175 EAST 200 NORTH
ST. GEORGE, UTAH 84790
(435) 674-4213

CATV SERVICE

TDS TELECOM
111 WEST 700 SOUTH
ST. GEORGE, UTAH 84770
(435) 628-3681

TELEPHONE

CENTURY LINK
596 N. 1400 E. (TRAILER)
ST. GEORGE, UTAH 84770
(435) 673-9639

DESIGNED BY: CLN | DRAWN BY: CA | CHKD BY: CLN
JOB NUMBER: 2572-001-211 | DATE: May 18, 2022
NO. | REVISION | DATE | APPR.

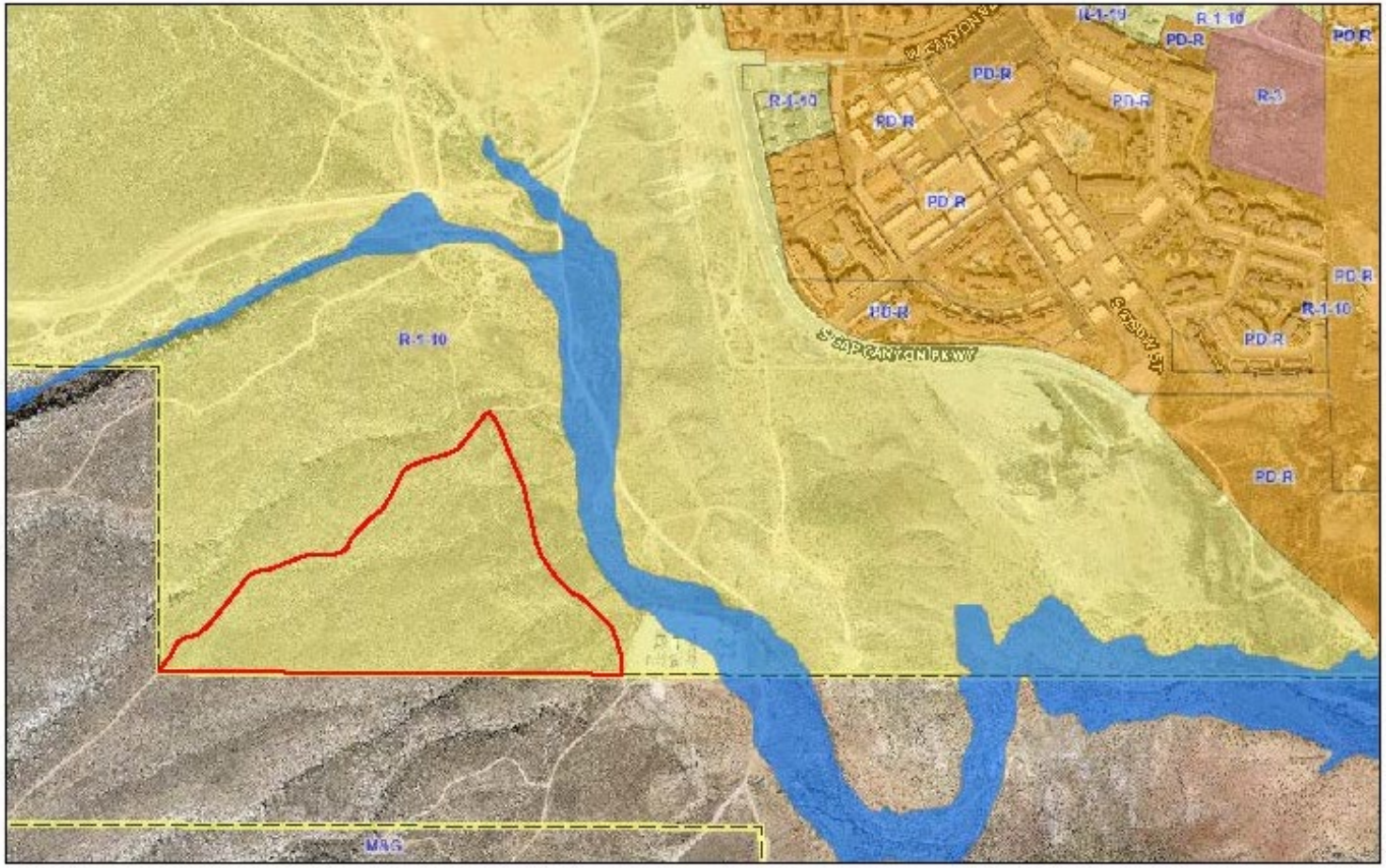
L. R. NELSON CONSULTING ENGINEERS, LLC
STRUCTURAL
CIVIL
PLANNING
SURVEY
6765 West Russell Road, Suite 200
Las Vegas, Nevada 89118
(702) 798-7978
(702) 451-2296 FAX

OVERALL SITE PLAN
FOR
DIVARIO MASTER PLANNED COMMUNITY
PA-4 LUGANO LANDING
ST. GEORGE UTAH

PROFESSIONAL ENGINEER
No. 265694
CLAYTON LEE NEILSEN
STATE OF UTAH

SHEET NUMBER
01
OF 8 SHEETS

I:\Land Projects\2572001 Divario Master Planned Community\DWG Preliminary Plat\2572001_PA-4 SITE.dwg (COMY SUBYSS) 5/18/2022 (9:08:53 AM)



Preliminary Plat – Lugano Landing (PA 4)

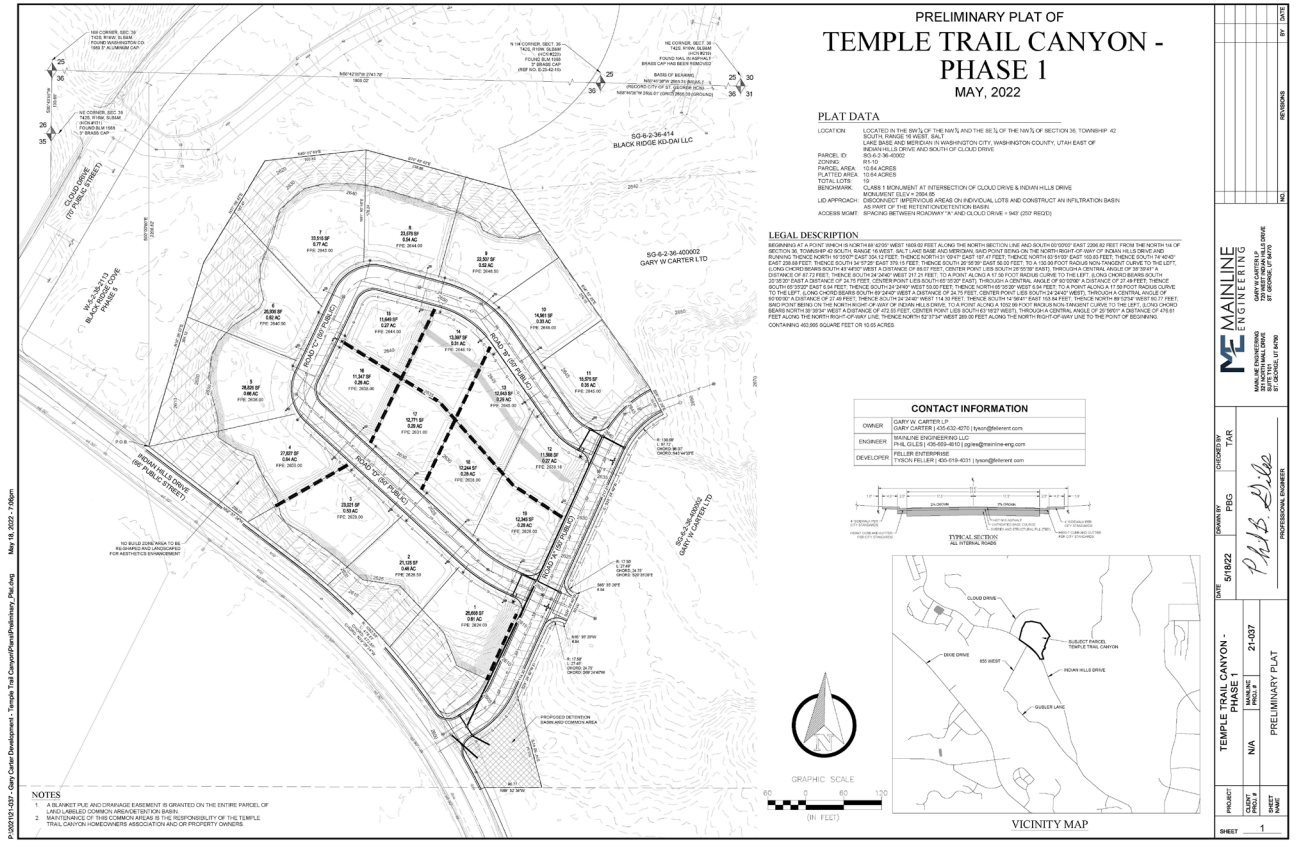
PLANNING COMMISSION AGENDA REPORT: **06/14/2022**

PRELIMINARY PLAT
Temple Trail Canyon Phase 1
Case No. 2022-PP-031

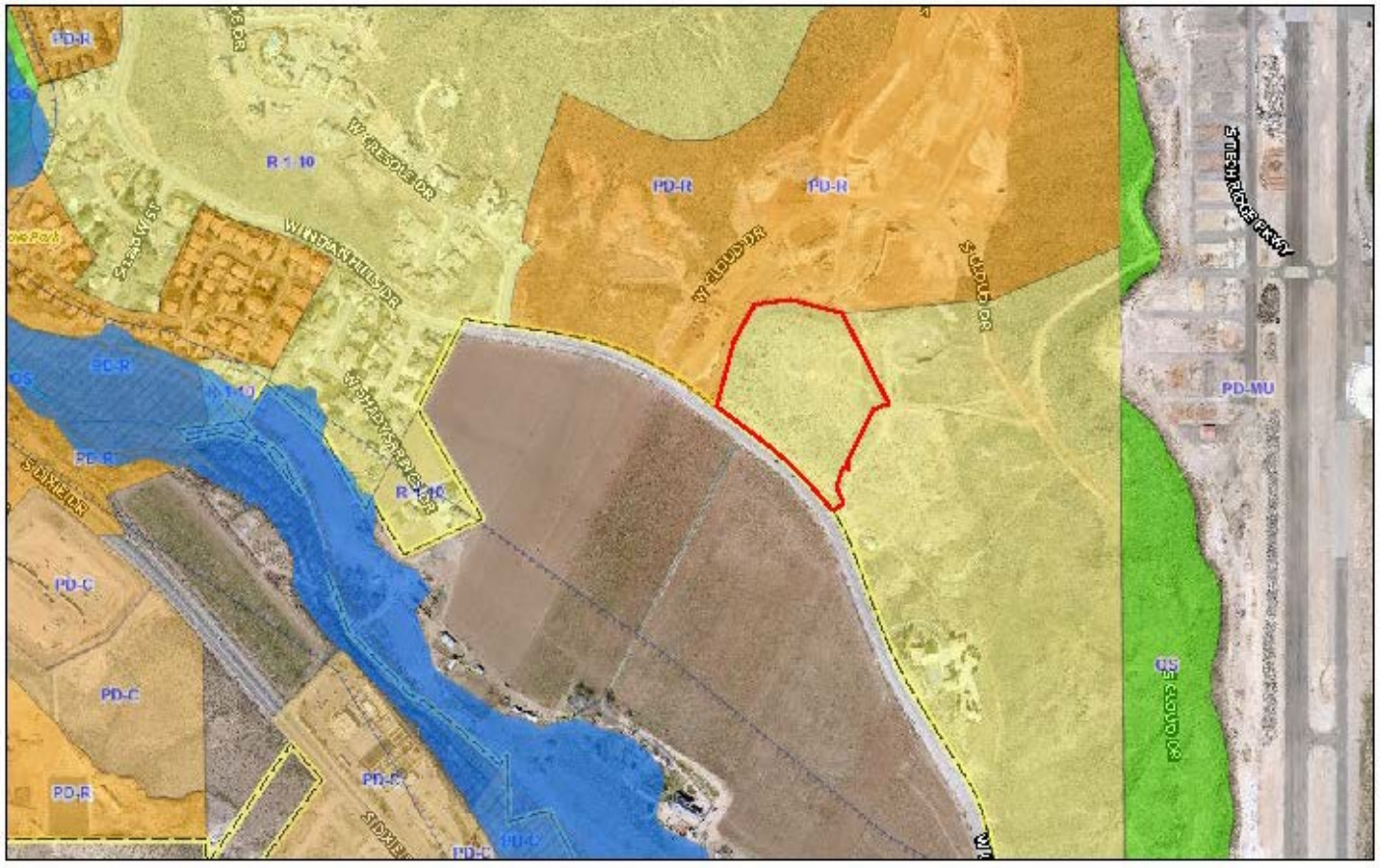
Request:	To approve a preliminary plat for a nineteen (19) lot residential subdivision.
Location:	The site is at approximately 720 West Indian Hills Drive
Property:	10.65 acres
Number of Lots:	19
Density:	1.78 DU/AC
Zoning:	R-1-10
Adjacent zones:	This plat is surrounded by the following zones: North – PD-R South – R-1-10 East – R-1-10 West – PD-R
General Plan:	LDR
Applicant:	Mainline Engineering
Representative:	Phil Giles

Comments:

Preliminary Plat – Temple Trail Canyon Phase 1



Preliminary Plat – Temple Trail Canyon Phase 1



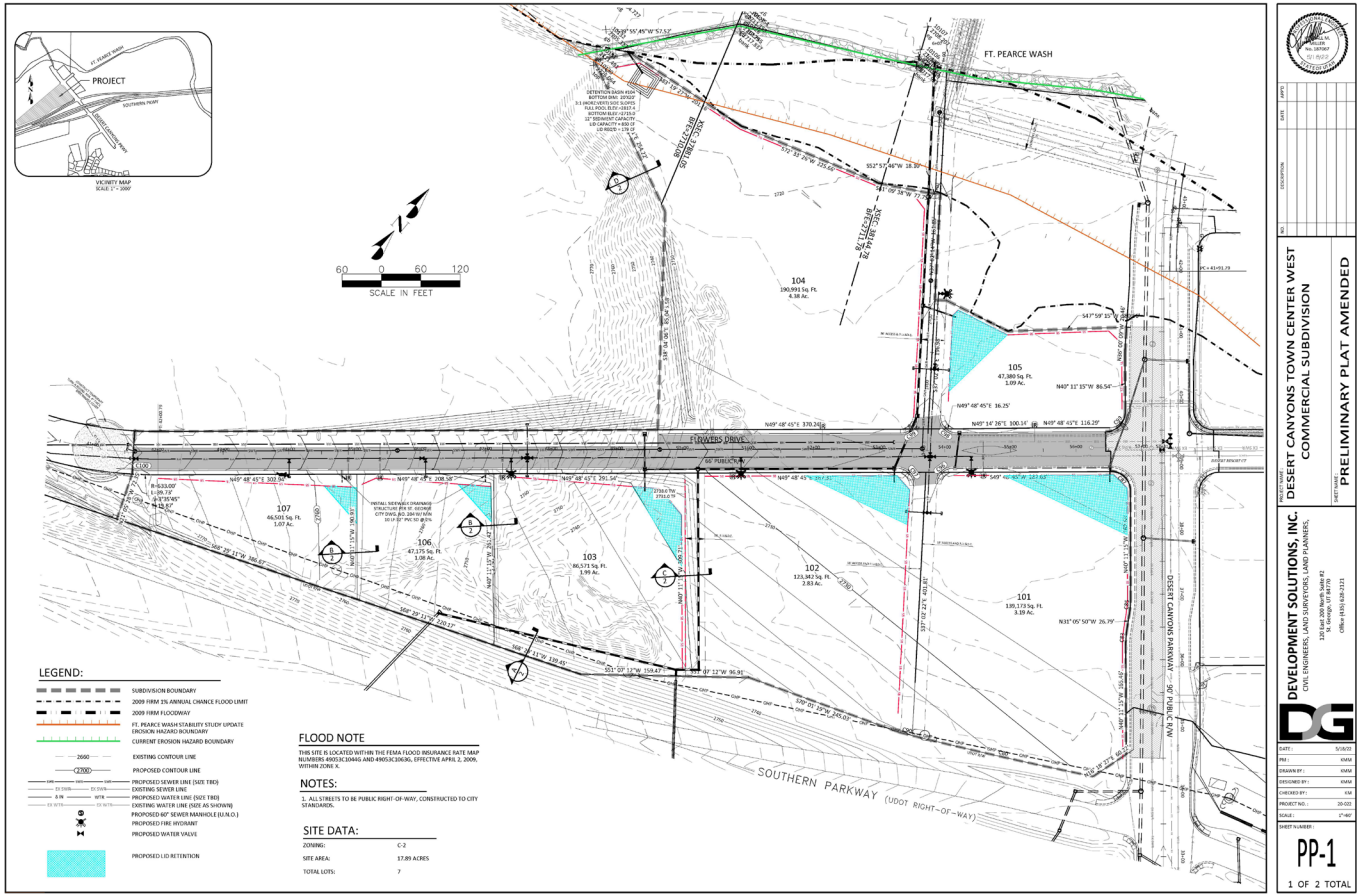
Preliminary Plat – Temple Trail Canyon Phase 1

PLANNING COMMISSION AGENDA REPORT: **06/14/2022**

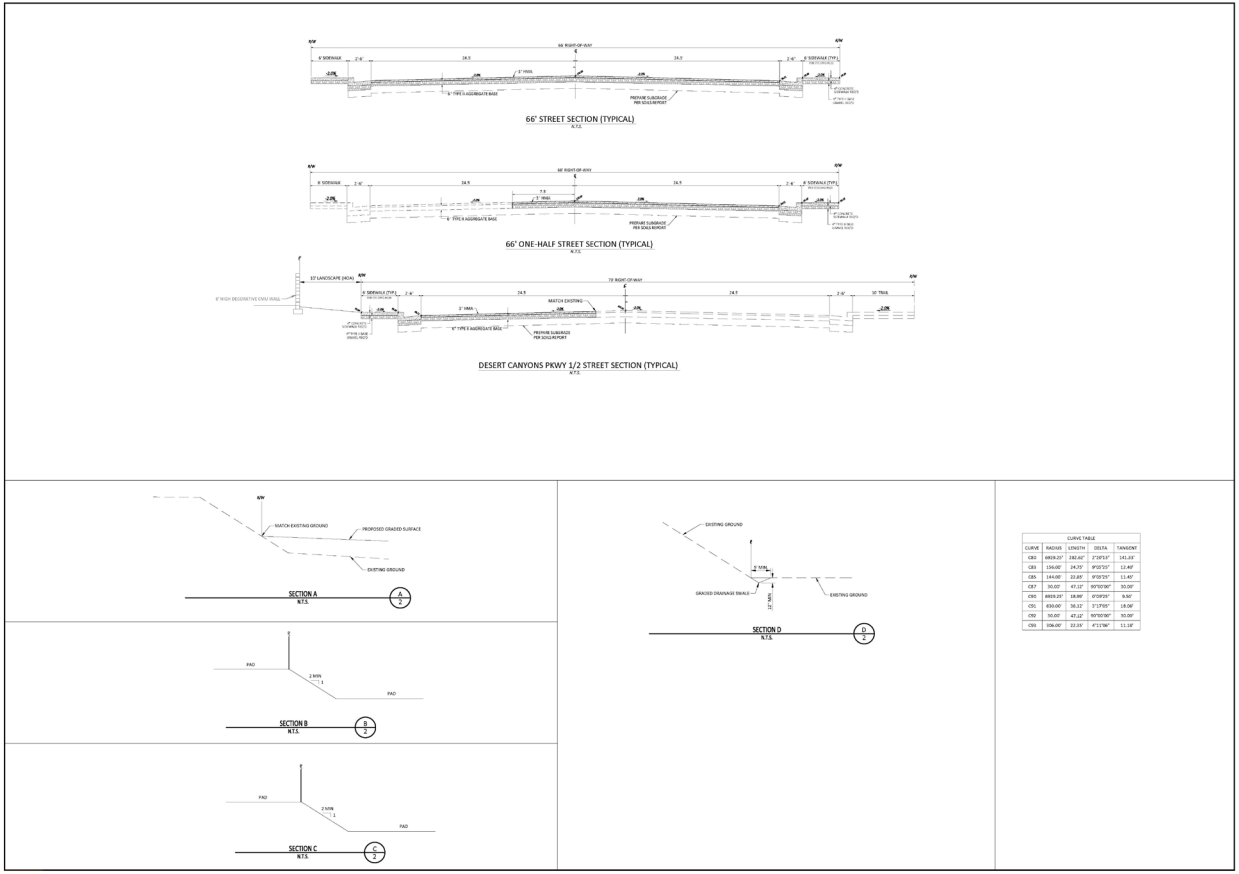
PRELIMINARY PLAT
Desert Canyons Town Center West Commercial Subdivision
Case No. 2022-PP-032

Request:	To approve a preliminary plat for a two (2) lot commercial subdivision.
Location:	The site is located at approximately 3650 S Desert Canyon Parkway
Property:	17.89 acres
Number of Lots:	2
Density:	N/A
Zoning:	C-2
Adjacent zones:	This plat is surrounded by the following zones: North – C-2 South – PD-R/C-2 East – C-2 West – ASBP
General Plan:	COM
Applicant:	DSG Engineering
Representative:	Ken Miller
Comments:	

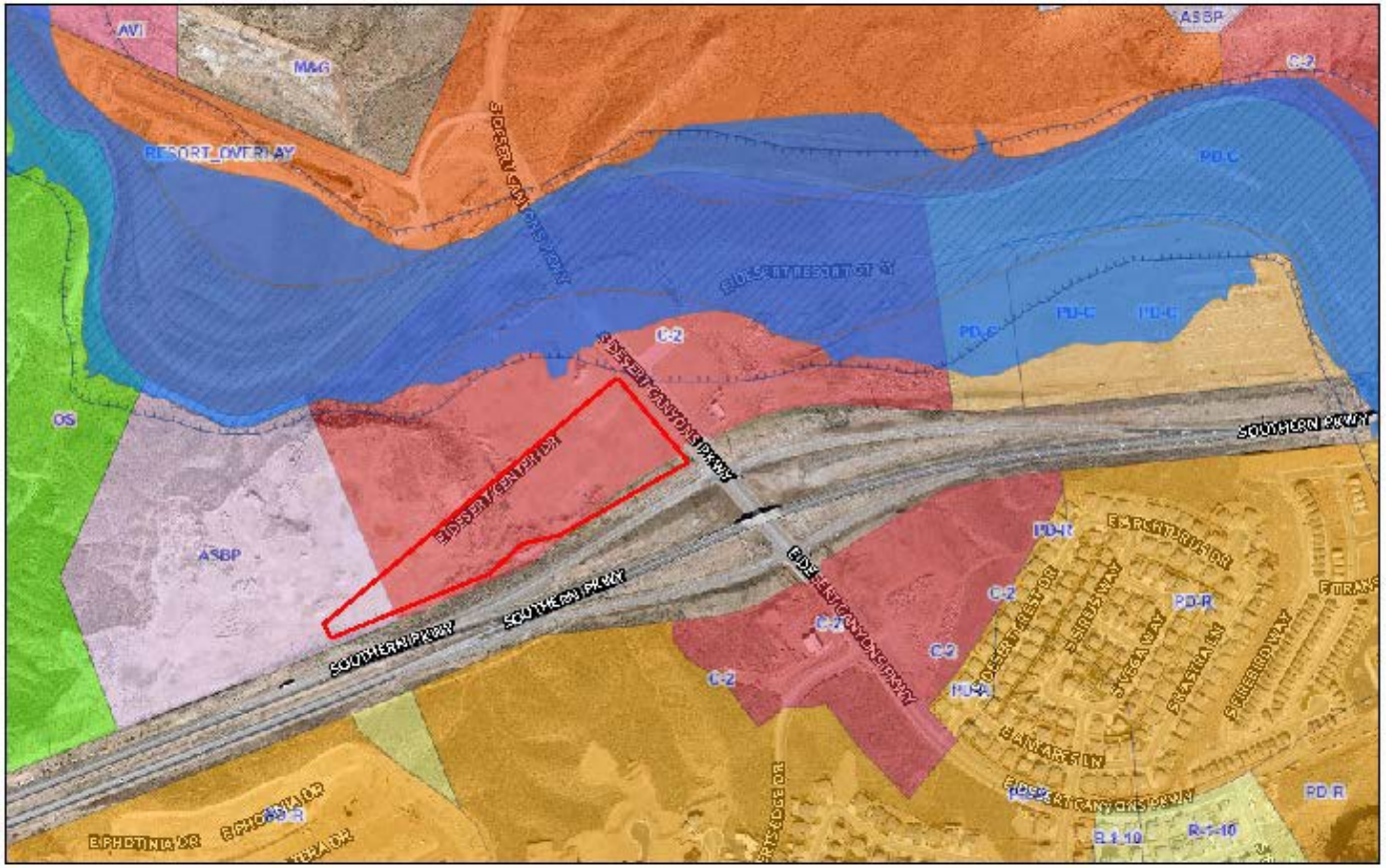
Preliminary Plat – Desert Canyons Town Center West



Preliminary Plat – Desert Canyons Town Center West



Preliminary Plat – Desert Canyons Town Center West



Preliminary Plat – Desert Canyons Town Center West

JOINT ST. GEORGE CITY COUNCIL
AND PLANNING COMMISSION MINUTES
WORK MEETING
MAY 4, 2022 4:00 P.M.
DESERT COLOR WELCOME CENTER

PRESENT:

Mayor Pro Tem Jimmie Hughes
Councilmember Gregg McArthur
Councilmember Dannielle Larkin
Councilmember Natalie Larsen
Councilmember Michelle Tanner
Planning Commission Member Ray Draper
Planning Commission Member Elise West
Planning Commission Member Lori Chapman
Planning Commission Member Nathan Fisher
Planning Commission Member Steve Kemp

EXCUSED:

Mayor Michele Randall
Planning Commission Member Emily Andrus
Planning Commission Member Austin Anderson

STAFF MEMBERS PRESENT:

City Manager Adam Lenhard
City Recorder Christina Fernandez
City Attorney Tani Pack Downing
Deputy City Attorney Jami Brackin
Government Affairs Director Shawn Guzman
Leisure Services Director Shane Moore
Community Development Director John Willis
Planner Dan Boles
Community Development Office Manager Brenda Hatch
Communications and Marketing Director David Cordero
Economic Vitality & Housing Director Shirlayne Quayle
Police Chief Kyle Whitehead
Executive Assistant Emilie Pinkelman
Water Services Special Projects Manager Kade Bringhurst

OTHERS PRESENT:

Rob Behunin
Bob Hermandson
Justin Kalling
Stetson Harris
Daniel Lemich
Ryan Coates
Kyle Paisley
Mckenzie Jeffs

CALL TO ORDER:

Mayor Pro Tem Hughes called the meeting to order and welcomed all in attendance.

Link to Call to Order: 00:00:00

DRAFT

SITE VISIT AND DISCUSSION REGARDING THE DESERT COLOR MASTER PLAN:

Link to the discussion regarding the Desert Color Master Plan: 00:01:13

Following the discussion regarding the Desert Color Master Plan, the Council and Planning Commission toured the Desert Color development.

ADJOURN:

The meeting adjourned following the site tour.

_____

Christina Fernandez, City Recorder

DRAFT

NOTICE OF WORK MEETING
PLANNING COMMISSION
CITY OF ST. GEORGE
WASHINGTON COUNTY, UTAH

Public Notice

Notice is hereby given that the Planning Commission of the City of St. George, Washington County, Utah, will hold a **work** meeting in the City Council Chambers, 175 East 200 North, St George, Utah, on **Tuesday, May 10, 2022**, commencing at **4:00 p.m**.

The agenda is as follows:

PRESENT: Chairman Ray Draper
Commissioner Emily Andrus
Commissioner Steve Kemp
Commissioner Nathan Fisher
Commissioner Lori Chapman
Commissioner Elise West

CITY STAFF: Community Development Director John Willis
Assistant Public Works Director Wes Jenkins
Deputy City Attorney Jami Bracken
Planner III Dan Boles
Planner III Michael Hadley
Planner III Carol Davidson
Development Office Supervisor Brenda Hatch

EXCUSED: Commissioner Austin Anderson

Chair Draper called the meeting to order at 4:05 pm.

1. PLANNING COMMISSION TRAINING

Training will be presented by Jami Bracken Deputy City Attorney.

Jami Bracken – We will do these trainings quarterly, there is an outline in the packet. We will start with the basics. When you are reviewing applications it is critical that there is substantial evidence in the record to support the decision that was made. We want to make sure you guys can articulate that. Most applicants are entitled to have a recommendation on the application that they bring before you. If you want to pose conditions, they have to be reasonable, related to the application itself. When you look at applications you have to look to see if it complies, if it is an administrative application and it complies with the code the application is entitled to an approval.

Discussion continued on what their decisions should be based on.

Discussion on Ex Partee.

Discussion on Conflicts of Interest.

Discussion on Findings and Conclusions.

NOTICE OF REGULAR MEETING
PLANNING COMMISSION
CITY OF ST. GEORGE
WASHINGTON COUNTY, UTAH

Public Notice

Notice is hereby given that the Planning Commission of the City of St. George, Washington County, Utah, will hold a **Planning Commission** meeting in the City Council Chambers, 175 East 200 North, St George, Utah, on **Tuesday, May 10, 2022**, commencing at **5:00 p.m**.

PRESENT: Chairman Ray Draper
Commissioner Emily Andrus
Commissioner Steve Kemp
Commissioner Nathan Fisher
Commissioner Lori Chapman
Commissioner Elise West

CITY STAFF: Community Development Director John Willis
Assistant Public Works Director Wes Jenkins
Deputy City Attorney Jami Bracken
Planner III Dan Boles
Planner III Michael Hadley
Planner III Carol Davidson
Development Office Supervisor Brenda Hatch

EXCUSED: Commissioner Austin Anderson

Chair Draper called the meeting to order at 5:00 pm. Commissioner Andrus led us in the Pledge of Allegiance.

1. **CONTINUED ITEMS**

Consider a request for a general plan amendment to change the land-use map from Commercial (COM) to High Density Residential (HDR) to on approximately 10.13 acres generally located on the west side of Dixie Drive just south of Gap Canyon Parkway. The applicant is Tonaquint Inc, and the representative is Tim Stewart. The project will be known as Dixie Drive Apartments Case No. 2022-GPA-005. (Staff – Carol Davidson)

Carol Davidson presented the following:

Carol Davidson – The applicant did make some changes; they have increased the size of the commercial and kept the HDR.

Commissioner Chapman – Right now it's currently zoned commercial, correct? I do appreciate that they have wider commercial in the front. But I think this piece should remain commercial. I think that is a better use for the piece.

Commissioner Kemp – I think for this piece to work you would need to get the other piece on the corner into commercial, then it would have access off of Dixie Drive.

Commissioner Fisher – I like the addition, it would be nice to have more commercial on the busy street and then the high density back behind it. Again, I think there's challenges there physically for them.

Chair Draper – I think we need commercial over there, I don't mind the HDR in the back.

Commissioner Fisher – One thing that came up before was the medium high density or medium density, I would like to know people's thoughts on that. High density verses medium high.

Discussion on the differences between densities.

Carol Davidson – Staff did recommend medium density. The applicant felt high density would work. What they are proposing now with the commercial in front it would equal to medium high density across the entire parcel.

Commissioner Andrus – I like commercial better than medium high density. I like this. It sounds to me like the commercial is an important piece of that parcel. I don't mind the high density; I think it makes sense with the hillside there. I like this new plan that is being proposed.

Commissioner Fisher – I am a little concerned with the high density.

Carol Davidson – The way this is proposed you could fit about 120 units.

Discussion continued on what the unit counts would be.

Commissioner Chapman – At this point the option is to approve or deny as proposed, not recommend changes?

Jami Bracken – Yes, this is a general plan amendment and are deciding if this meets the vision of the general plan.

Discussion on approving or denying with or without conditions.

MOTION: Commissioner Andrus made a motion to recommend approval of item 1 Dixie Drive Apartments based upon the findings that high density residential and commercial are an acceptable use in this area.
SECOND: Commissioner Kemp
ROLL CALL VOTE:
AYES (4)
Chairman Ray Draper
Commissioner Steve Kemp
Commissioner Emily Andrus
Commissioner Elise West
NAYS (2)
Commissioner Nathan Fisher
Commissioner Lori Chapman

Motion Carries recommend approval

2. <u>GENERAL PLAN AMENDMENT (GPA) *(Public Hearing)* Legislative</u>

A request to change the General Plan from Low Density Residential (LDR) to High Density Residential (HDR) on approximately 13 acres generally located at 1295 N Bluff Street. The applicant and representative is Jon Walter. The project will be known as Dodge Springs General Plan Amendment. Case No. 2022-GPA-004. (Staff – Mike Hadley)

Dan Boles presented the following:

Dan Boles – They are currently zoned R-20, the general plan today calls for low density residential. They are proposing to change it to high density residential over the entire site. Staff has some concerns with high density over the entire site. Staff felt that high density might be appropriate along Bluff Street and then medium density along 1250 North with some open space to protect the hillside. As the application stands, staff would not recommend approval. We felt like that was maybe a little too much density in that space. We would like to see it master planned better with open space, medium density, and high density.

Commissioner West – So the original concept plan includes on that hillside those units so the revised is taking away all of that and just staying with the 220 units then?

Commissioner Fisher – What we're seeing in front of us is what the applicant has presented as far as what he wants for the general plan? Or what you're saying that rectangle should be open space?

Dan Boles – No, this is more in line with what we had discussed as staff. The application just says high density. And I know that they have been amenable to preserving that hillside area. They did say that, but how you do that in the general plan and get the densities they want, that is where we are at an impasse.

John Willis – There are 14 acres for the entire site you would be roughly 300 units, with the challenges on this site they would cluster all of the units in this area here (near Bluff Street). That is why we are concerned with the HDR over the entire site.

Commissioner Fisher – Could they cut into the hillside?

John Willis – This is not in the hillside overlay, so they could cut into the hillside. The nice thing about the hillside is that it creates a natural buffer between the residential. Again, there are water pressure issues, access issues so the layouts are just conceptual at this point.

Commissioner Fisher – Do you see that hillside getting knocked down to be able to build this?

John Willis – With what we've seen they have proposed leaving the hillside as it is. The reasoning of wanting HDR on the entire site is so they can essentially cluster and take those units off and put them along the front, which then makes the area located along Bluff Street and 1250 with a lot of units.

Commissioner West – That is what I was saying before the original plan shows all of those units on the top of the hillside, but the revised is showing clustering those down below.

John Willis – Mind you that this is a general plan, they did provide a concept, which is very helpful, we cannot hold them to the concept.

Jon Walter – I also have Sky Hazlehurst, who will be the developer of this project. I want to provide a bit of history and context. This site was Dodge Pond, it was a place where the community would come and recreate. There was an actual pond on the site. The corner piece where the church is, is a piece that they donated to the church. In 2005 they had a proposal from a developer to do something like Sunset Corner, staff said that wouldn't go very well here. That deal didn't go through. One of the significant things that happened was the overpass. UDOT came in and took away both access points and then gave a right in right out only. In the fall the City of St. George had an interest in the property and had it appraised. Once we knew that wasn't going to happen then we made application for commercial on this property. Staff had concerns about commercial because of the right in right out on Bluff Street. Based on that feedback we saw other opportunities for the property. It was at that point that the use of this high density really came forward as the best use for the property. Backing low density residential up against one of the busiest streets in Washington County doesn't seem like a good use for the property. In this case the intent has been that high density would be a much better fit. I want to give Sky the opportunity to go into the details of the proposal, but I think there are two things that are important to note in the details. Under the plan that is being contemplated, there is no intent to develop up on the hillside. The intent today is to develop the lower portion. There is a lot of history with this site and there is an intent to seek to preserve Dodge Pond as well as some of the aesthetic beauty on the hillside.

Commissioner Fisher – Where is the pond located?

Jon Walter – I don't know right where it was but based on the Historical Society map it was right where you the church is. According to the current concept plan, the ponds would be in that same general area.

Commissioner Fisher – Can you give us an idea as far as elevation change on the furthest north portion of this property and the elevated roadway? There has to be at least a 10 – 15-foot difference between your property and the road, the elevated road.

Jon Walter – There is a distance, but I don't think I could guess it.

Sky Hazlehurst – Jon did a good job of summarizing the history on the property. That's kind of why we're here today, the challenges of a family wanting to sell this and struggling to get correct zoning that would work. We looked again at commercial we think that residential is a good fit here, high density works well higher traffic roads. It's something that is easily mitigated that we have done in other projects. I am hoping to get a motion that will be correct here. We would be fine with HDR on this site, making the hill open space, it's roughly 4 acres. It gives us room in the toe to get parking, amenities, and fire turnaround. We would like to bring back the history of Dodge Ponds. We planned on connecting the City trail to this site. The hill is a good natural buffer to any single-family residents. High Density makes sense, you are not up tight against any single-family homes. We are fine agreeing to medium density along 1250 North and keeping it lower than 3 stories.

Commissioner Kemp -What will your unit count be if you had the open space and the medium density residential?

Sky Hazlehurst – 220.

Discussion continued on the number of units that could be built according to the general plans proposed.

Chair Draper opened the public hearing.

John Bowler – I am across the street at 1250 North. The whole access of this project has got me concerned. The drainage has got me concerned. They think we don't have any 100-year floods in that area, but we've had several in the last 62 years and it has come over the road on 1250 North, so I don't know how they're going to plan their drainage. There is a steep incline from Snow Canyon Parkway to this property and it rushes all that water down there. We have left our wash open; we have not filled it in on our property all these years. Everyone down below us has filled it in so it goes clear to Sunset when the flood comes down. That will all go onto Bluff Street in my opinion. This high density is just going to be chaos in that area. We have commercial right now at Sunset Corner. In the mornings or the early evenings, I can't get out of my driveway. The subdivision across north Bluff Street only has one access. I would like to see the Phillips sell the property, a lot of things have happened in the family, and I understand the importance of selling it. I think you have to consider the drainage, the traffic flow and all those things for that many units.

Chair Draper closed the public hearing.

Commissioner Andrus – The application is for all HDR, is that right?

Commissioner Kemp – How many trips would 220 units create and how does it compare with commercial?

Commissioner Andrus – Service Commercial would be lower, with a drive thru would be higher.

Dan Boles – The application is for HDR over the entire site.

Commissioner Kemp – I agree with Mr. Bowler, the traffic is going to be 44:48.

Discussion on what traffic would be like on those roads.

Chair Draper – I think high density is too high.

Commissioner Fisher – I am cautious about high density. The north part of it you sit up higher, if there were going to be a place for high density it would be against that.

Commissioner Andrus – I agree this is a good spot for high density along Bluff Street. I am also concerned about the hillside that is not in the overlay.

Commissioner Kemp – It is a great location for a high density use but with the access it has 220 units will be too many trips.

John Willis – The applicant would like to modify the application for the hillside to be open space and then high density on the rest of the property.

Commissioner Chapman – I think that is a lot of an awfully lot of people trying to get in and out of there with all of that already going on. However, considering they've tried several other uses, I'm not objectionable to some of that as long as drainage is handled. I think that's a lot happening out there when it comes to those numbers, 220 units.

Commissioner Fisher – When it comes to drainage development will resolve that issue. It is a requirement. I would like to see it developed this way. Maybe we ask Jon and his client explore if we could capitalize on high density on Bluff Street and then something else on the south side. Not developing is the only way to not have traffic there and I don't like that idea either.

Commissioner Andrus – Here is the thing about traffic, it kind of resolves itself if there are other connections. I in my mind if I wanted to go left I would just go to Sunset Corner and use the roundabout and the light to turn left. If I want to turn right I would use the right in right out.

Discussion continued on traffic and the effects of that many units.

Commissioner Andrus – So going back to the actual application, does that mean that now the application before us is the modified one?

Jami Bracken – It sounds like it's even modified further from what is being presented.

John Willis – Essentially they are proposing this hillside being open space and the remaining of the property high density residential.

Commissioner Fisher – I like the idea of 4 or 5 acres, it is a bubble, so that gives a little flexibility. The 5 acres on top and then we have the rest a bubble that they can creep into that 5 acres if it were necessary.

John Willis – If there were to be a motion to provide a little bit of guidance of what that looks like and then staff could verify that an exhibit is updated, when it goes to City Council that reflects what the potential motion is. That would be staff's request.

MOTION: Commissioner Fisher made a motion to recommend approval of the modified plan, essentially a parcel of 5 acre, general plan amendment for 5 acres of open space as indicated on the first slide that Dan showed us that was in rectangular form that sits up on top of the hillside and also includes part of the slope of that hillside and then general plan for medium density on the south end of that project along all that fronts 1250 North of approximately and acre and the remaining portion not including those two areas as high density in the general plan.
SECOND: Commissioner West
ROLL CALL VOTE:
AYES (6)
Chairman Ray Draper
Commissioner Steve Kemp
Commissioner Emily Andrus
Commissioner Nathan Fisher
Commissioner Elise West

Commissioner Lori Chapman
NAYS (0)
Motion Carries unanimous recommend approval

3. DEVELOPMENT AGREEMENT (DA) (*Public Hearing)* Legislative

Consider a Development Agreement for The Point, a residential housing project located at 999 East Red Hills Parkway, Parcel ID SG-1328-A-3-N. Case No. 2022-DA-001 (Staff – Carol Davidson)

Carol Davidson presented the following:

Carol Davidson – There isn't a formal presentation, but I wanted to show you on the map where this is located. This is on behalf of the friends at Switchpoint. I am sure you are all familiar with the Switchpoint organization and what they do for our community. The idea is to take this property and turn it into affordable housing. The plan is to have 110 units. The second phase will build into the north area. The first phase will be 50 studio units. There will be an office that is 300 sq. ft. The second phase would add in another 60 units with 1 bedroom and another 300 sq ft. office. This location is close to 3 of our bus routes, it is close to the Switchpoint boutique. Because of that and because of limited space they are asking for a reduction in parking to be ½ space for every unit and then 1 per 250 sq ft for the office space. I did count the parking there are 53, with the first 50 units they would be required to have 23, so they are definitely meeting it with that. This determination that you will be making is this project consistent with the purpose and intent of the relevant provisions of the City Code and general plan and this can occur in the general commercial district. This is a C-3 zone so typically, we do not allow places to live in the C-3 zone only hotels and short-term stays, that's why this development agreement is before you. We will be changing the land use with the development agreement.

Chair Draper – The parking, is that an issue?

Carol Davidson – Most of the people will not have vehicles. Staff looked at what accessibility is there. There are 3 bus lines that are within 3 blocks of here, that helps. It helps that there are places to work nearby.

Commissioner Kemp – Is the purpose of a development agreement to short circuit the whole process of going through the general plan and a zone change?

Jami Bracken – There is not a zone change that is needed but because of the nature of this project and the people that are housed there, we do need to establish land use regulations for this project that may differ from others in the same zone which is what makes this development a new land use regulation and why it is before you. This is a unique project where the rules of that zone need to be tweaked a little bit, so we are creating a new land use regulation for that project.

John Willis – We don't have a use that would fit this. We don't have a residential zone that would allow for the office and the other types of uses they need. This is a unique population, it unique in regard to the parking requirement. We could change the ordinance but, we are hesitant to change the ordinance and open this up for all areas in this zone, that's why a development agreement is the best

way to do that, to ensure we are addressing all the needs and to make sure we're not opening it up for every area around the City.

Commissioner Kemp – So are there deed restrictions?

Jami Bracken – Yes, they are actually recorded against the property that talk about how it has to be managed, the incomes allowed all of those specifications. They have already been recorded and are in place for 50 years, then it would revert to be compliant with the current City ordinance.

John Willis – After 50 years it would revert back and have to meet the requirements of the current zone.

Commissioner Fisher – Right now, we are looking at it because Switchpoint is doing it and there is a particular purpose. What if this property was sold to someone else?

Jami Bracken – They would be subject to the Development agreement that is recorded against the property as well as the deed restrictions recorded against the property. They would be subject to those limitations.

Commissioner Kemp – I have worked with some charities that have done a financing mechanism, where they would sell the property and then lease it back to them for a period of time. Does this development agreement allow that?

Jami Bracken – In terms of how this is going to work it doesn't really matter who owns it or how the ownership is structured. Because this document and the deed restriction will be recorded against the property the ownership structure doesn't really matter.

John Willis – The agreement runs with the land as a zoning ordinance of its own.

Commissioner Kemp – I wanted to make sure that if they wanted to use that as an ownership structure this wouldn't prohibit them from doing it.

Carol Hollowell – This is a special population that we serve. There just isn't a lot of housing. We have a lot of clients with mental illness, we have staff on site 24/7. We have that so we can provide for their needs. The addition in back would be to provide for low-income seniors 62 and older. We don't have very many clients who can afford a vehicle. We don't have a need for the parking. At Riverwalk we complied with parking but anytime you drive through there it is pretty empty.

Chair Draper – Are these for a family or one person?

Carol Hollowell – The existing will be single, the addition could be couples but not families.

Discussion on ADA compliance.

Chair Draper opened the public hearing.

Chair Draper closed the public hearing.

Commissioner Fisher – I think it's great.

Chair Draper – I think the City needs it drastically.

Commissioner West – Switchpoint and Carol have been recognized nationally. Switchpoint raises the bar.

MOTION: Commissioner West made a motion to recommend for approval the development agreement for The Point.
SECOND: Commissioner Fisher
ROLL CALL VOTE:
AYES (6)
Chairman Ray Draper
Commissioner Steve Kemp
Commissioner Emily Andrus
Commissioner Nathan Fisher
Commissioner Elise West
Commissioner Lori Chapman
NAYS (0)
Motion Carries unanimous recommend approval

4. ZONE CHANGE AMENDMENT (ZCA) *(Public Hearing)* Legislative

A. Consider request to amend the Desert Color zone plan. This zone change amendment allow the construction of a new commercial building on an approximately 5.77-acre site. The site is located on Desert Color Parkway between Southern Parkway and Black Mountain Drive. The applicant is Woodbury Corporation and the representative is Bob Hermandson. The project will be known as Rush Fun Center. Case No. 2022-ZCA-009 (Staff –Dan Boles)

Dan Boles presented the following:

Dan Boles – This is commercial zoned; the general plan is town center. The building itself is about 77,000 sq. ft. There is a pad to the northeast that is positioned for a future building, we are saying restaurant so that it will be parked sufficiently. There will be bowling alleys, laser tag, the works. We will be seeing a little more in the way of commercial in Desert Color. They are actually over parked by a little over 50 stalls. The building will be 44 ft at the highest point. There will be CMU and stacked stone, there will be a canopy in the front with the Desert Color logo Colors. They are showing quite a bit of landscaping. They are trying to soften the building with landscaping and those bump outs. This is near Big Shots. A lot of the stalls in here will be shared with the potential restaurant. Staff is recommending approval.

Bob Hermandson – There will be interaction points, benches, and shade structures all the way through here to Black Mountain. The canopies are not part of the building itself, but they are to interact with the buildings. The intent is to come here and sit, stay awhile. The renderings are not showing the banners that are inset in the side of the building, it illustrates what is going on in the building.

Commissioner Chapman – With all the houses down there the big concern will be lighting and noise.

Bob Hermandson – All of the activity takes place inside the building. The lighting is standard for all of our parking lots and the lighting is pointed downward.

Commissioner Kemp – It is really important with all the rooftops out there people will need service commercial, people will need to buy a loaf of bread.

Bob Hermandson – Bob described the entire commercial area site plan.

Chair Draper opened the public hearing.

Chair Draper closed the public hearing.

MOTION: Commissioner Fisher made a motion to recommend approval of item 4A a Desert Color Zone Plan Change for the 5.77-acre site.
SECOND: Commissioner West
ROLL CALL VOTE:
AYES (6)
Chairman Ray Draper
Commissioner Steve Kemp
Commissioner Emily Andrus
Commissioner Nathan Fisher
Commissioner Elise West
Commissioner Lori Chapman
NAYS (0)
Motion Carries unanimous recommend approval

B. Consider a request for a zone change amendment to the Fields at Mall Drive Phase 2 Planned Development Commercial (PD-C) zone. The applicant is seeking approval to build a new bank on approximately 1.41 acres. This property is generally located at the northwest corner of Mall Drive and 3000 East Street. The applicant is State Bank of Southern Utah, and the representative is Evan Thomas. The project will be known as Fields Property – State Bank Office. Case No. 2022-ZCA-020. (Staff- Carol Davidson)

Carol Davidson presented the following:

Carol Davidson – Carol described where the property is located. This was the first item on the use list, bank. The building will be approximately 12,500 sq ft. It will be 2 story and all of it will be used by the bank. They meet the parking requirements. They will have full access on Sandia, on Mall Drive they will have a right in right out. They will share an access with the property next door. They are proposing a pedestrian access to Mall Drive. Staff recommends approval with the shared access requirements.

Ben Rogers – We are the architectural firm that State Bank is working with.

Chair Draper opened the public hearing.

Chair Draper closed the public hearing.

MOTION: Commissioner West made a motion for recommendation to city council for item 4B a zone change amendment for State Bank of Southern Utah and also with the findings and conditions from staff report.
SECOND: Commissioner Kemp
ROLL CALL VOTE:
AYES (6)
Chairman Ray Draper
Commissioner Steve Kemp
Commissioner Emily Andrus
Commissioner Nathan Fisher
Commissioner Elise West
Commissioner Lori Chapman
NAYS (0)
Motion Carries unanimous recommend approval

5. HILLSIDE PERMIT (HS) Administrative

A. Consider a request to revisit and determine if the proposed location of a house on Lot 120 of Foremaster Ridge meets the 30' ridgeline setback requirement. The applicant is requesting the Hillside Review Board return to this location to determine if the proposed location of the home, setback at 33' from the rear property line, (as opposed to the recommended 35' setback from the rear property line) meets the requirement of the 30' ridgeline setback. The property is generally located at 445 S. Five Sisters Drive and is currently zoned Single Family Residential, minimum lot size 10,000 sf (R-1-10). The applicant is John Wilson. Case No. 2022-HS-011. (Staff – Wes Jenkins)

Wes Jenkins presented the following:

Wes Jenkins – When Foremaster was platted the final plat had a note that said they had to be set back 30 ft from the abrupt edge. The line shown on the plat didn't really match the abrupt edge. We had to go out and meet with the to determine the abrupt edge. They hired a surveyor, the slope of the property is steeper than 15% and there is a caveat in the ordinance that allows you to request a 5-foot reduction in your front setback, which they did.

Commissioner Andrus – Is this the same one we saw before?

Wes Jenkins – Yes, when it went to hillside, basically their recommendation was, ok if you get that 5-foot reduction then we're comfortable that your 30 feet from the abrupt edge, with that reduction. The applicant didn't want to go the full 5 feet, they only wanted to go 3 but the recommendation at the time was for the 5 feet. So, we took hillside back out there we roughly staked where the 30-foot setback line from the property line was just to give them a reference point. Basically, then the house would sit 3 feet this side of that. That gave the hillside the opportunity to look at it and see if it still met the criteria of being 30 feet from the abrupt edge. The hillside recommended approval that with their opinion it would still meet the criteria.

Chair Fisher – So the hillside says its ok to go through.

Wes Jenkins – They were comfortable with the 3 foot.

Carol Davidson – I did put in the original motion and the reason they are coming back is that they didn't like that original motion.

MOTION: Commissioner Kemp made a motion to forward a positive recommendation to City Council based on the findings of the Hillside Review Board and the staff report for a hillside permit at lot 120 Foremaster Ridge.
SECOND: Commissioner Fisher
ROLL CALL VOTE:
AYES (6)
Chairman Ray Draper
Commissioner Steve Kemp
Commissioner Emily Andrus
Commissioner Nathan Fisher
Commissioner Elise West
Commissioner Lori Chapman
NAYS (0)
Motion Carries unanimous recommend approval

B. Consider a request for a hillside development permit at the Divario development. The applicant is proposing to construct in the area shown on the slope map labeled 20-29% and 30-39%. This is specifically in the PA-4 area which is situated in the far south west corner of the Divario development. The property is currently zoned Single-Family Residential, minimum lot size 10,000 square feet (R-1-10). The applicant is 730 St George, LLC. Case No. 2022-HS-003. (Staff – Wes Jenkins)

THIS ITEM WAS PULLED FROM THE AGENDA

Wes Jenkins presented the following:

MOTION: Commissioner
SECOND: Commissioner
ROLL CALL VOTE:
AYES (6)
Chairman Ray Draper
Commissioner Steve Kemp
Commissioner Emily Andrus
Commissioner Nathan Fisher
Commissioner Elise West
Commissioner Lori Chapman
NAYS (0)
Motion Carries unanimous recommend approval

6. <u>PRELIMINARY PLAT (PP) Administrative</u>

A. Consider a request for a one hundred and thirty-one (131) lot residential subdivision known as Lugano Landing (PA-4) located along the future extension of Divario Canyon Parkway south of Alienta Drive and north of the St. George City border. The property is 35.64 acres and is zoned R-1-10. The applicant is LR Nelson Consulting Engineers LLC, representative Clayton Neilson. Case No. 2022-PP-018. (Staff – Wes Jenkins)

Wes Jenkins presented the following:

THIS ITEM WAS REMOVED FROM THE AGENDA BY THE APPLICANT.

MOTION: Commissioner
SECOND: Commissioner
ROLL CALL VOTE:
AYES (6)
Chairman Ray Draper
Commissioner Steve Kemp
Commissioner Emily Andrus
Commissioner Nathan Fisher
Commissioner Elise West
Commissioner Lori Chapman
NAYS (0)
Motion Carries unanimous recommend approval

B. Consider a request for a two (2) lot subdivision known as Desert Color CTE Seminary Minor Subdivision located west of the intersection of River Road and White Dome Drive on the west side of the new CTE High School. The property is zoned R-1-10. The applicant is Alliance Consulting, representative Craig Coats. Case No. 2022-PP-017. (Staff – Wes Jenkins)

Wes Jenkins presented the following:

Wes Jenkins – The bigger lot is to create a parcel so they can build a seminary building next to the CTE school. The second parcel will be used for something else maybe a utility.

MOTION: Commissioner Andrus made a motion to recommend approval for the preliminary plat for the Desert Color CTE Seminary Minor Subdivision.
SECOND: Commissioner Fisher
ROLL CALL VOTE:
AYES (6)
Chairman Ray Draper
Commissioner Steve Kemp
Commissioner Emily Andrus
Commissioner Nathan Fisher
Commissioner Elise West
Commissioner Lori Chapman
NAYS (0)
Motion Carries unanimous recommend approval

C. Consider a request for a two (2) lot residential subdivision known as Desert Color Sage Haven Phase 13 located at the southwest corner of the intersection of Jasper Ridge Drive and Carnelian Parkway. The property is 4.9 acres and is zoned PD-R. The applicant is Bush and Gudgell, representative Bob Hermandson. Case No. 2022-PP-019. (Staff – Wes Jenkins)

Wes Jenkins presented the following:

Wes Jenkins – This is to create the two lots so they can be subdivided and sold so they may be subdivided further.

MOTION: Commissioner Chapman made a motion to forward a positive recommendation to approve 6C which is 4.9 acres to subdivide into 2 lots Sage Haven based on staff report and the presentation data.
SECOND: Commissioner Kemp
ROLL CALL VOTE:
AYES (6)
Chairman Ray Draper
Commissioner Steve Kemp
Commissioner Emily Andrus
Commissioner Nathan Fisher
Commissioner Elise West
Commissioner Lori Chapman
NAYS (0)
Motion Carries unanimous recommend approval

D. Consider a request for a two (2) lot residential subdivision known as Divario (PA-2) located on the west side of the future extension of Gap Canyon Parkway at the intersection of 1790 West. The property is 52.05 acres and is zoned R-1-10. The applicant is Rosenberg Associates, representative Mark Teepen. Case No. 2022-PP-027. (Staff – Wes Jenkins)

Wes Jenkins presented the following:

Wes Jenkins – One parcel is for development and then parcel A will be an open space parcel dedicated to the City.

Commissioner Kemp – When will Gap Canyon be done?

Wes Jenkins – I don't know.

MOTION: Commissioner Andrus made a motion to recommend approval for the preliminary plat for Divario PA-2.
SECOND: Commissioner Fisher
ROLL CALL VOTE:
AYES (6)
Chairman Ray Draper

Commissioner Steve Kemp
Commissioner Emily Andrus
Commissioner Nathan Fisher
Commissioner Elise West
Commissioner Lori Chapman
NAYS (0)
Motion Carries unanimous recommend approval

E. Consider a request for a two (2) lot residential subdivision known as Ascesa at Divario located at the northwest corner of the intersection of Gap Canyon Parkway and Divario Canyon Drive. The property is 12.24 acres and is zoned PD-R. The applicant is Rosenberg Associates, representative Rick Rosenberg. Case No. 2022-PP-025. (Staff – Wes Jenkins)

Wes Jenkins presented the following:

Wes Jenkins – This is to create a 2-lot subdivision where one will be development and the other will be open space.

MOTION: Commissioner Kemp made a motion to recommend approval of Item 6E a 2-lot subdivision known as Ascesa at Divario.
SECOND: Commissioner Andrus
ROLL CALL VOTE:
AYES (6)
Chairman Ray Draper
Commissioner Steve Kemp
Commissioner Emily Andrus
Commissioner Nathan Fisher
Commissioner Elise West
Commissioner Lori Chapman
NAYS (0)
Motion Carries unanimous recommend approval

F. Consider a request for an eighty-one (81) lot residential subdivision known as Becco Creek at Divario located at the southwest corner of the intersection of Gap Canyon Parkway and Divario Canyon Drive. The property is 9.43 acres and is zoned R-1-10. The applicant is Rosenberg Associates, representative Rick Rosenberg. Case No. 2022-PP-026. (Staff – Wes Jenkins)

Wes Jenkins presented the following:

Wes Jenkins – This is subdividing it into public streets, private areas and the common space. There is a change from what is in your packet. When we reviewed this we realized that the 45-foot road cross section they showed didn't provide sidewalk on both sides. Staff told them they had to have sidewalk on the perimeter. They have added a sidewalk on the interior by shifting these lots closer to Divario Canyon Drive and the others closer to the open space to provide the sidewalk on the

interior. It made the open space slightly smaller and the rear yards along Divario Canyon Drive decreased in size as well.

MOTION: Commissioner Kemp made a motion to recommend approval to City Council of Item 6F an eighty-one (81) lot residential subdivision known as Becco Creek at Divario.
SECOND: Commissioner
ROLL CALL VOTE:
AYES (6)
Chairman Ray Draper
Commissioner Steve Kemp
Commissioner Emily Andrus
Commissioner Nathan Fisher
Commissioner Elise West
Commissioner Lori Chapman
NAYS (0)
Motion Carries unanimous recommend approval

7. MINUTES

Consider a request to approve the meeting minutes from the April 26, 2022, meeting.

MOTION: Commissioner Kemp made a motion to recommend approval of the minutes of the April 26, 2022, meeting.
SECOND: Commissioner Chapman
ROLL CALL VOTE:
AYES (6)
Chairman Ray Draper
Commissioner Steve Kemp
Commissioner Emily Andrus
Commissioner Nathan Fisher
Commissioner Elise West
Commissioner Lori Chapman
NAYS (0)
Motion Carries unanimous recommend approval

8. CITY COUNCIL ACTIONS

John Willis the Community Development Director will report on the items heard at City Council from the May 5, 2022, meeting.

1. 2022-ZCA-014 Target Drive up
2. 2022-ZCA-015 Regency at Desert Color Amenity Area
3. 2022-ZCA-016 Desert Color Resort Clubhouse Recreation Area
4. 2022-ZCA-013 Hillside Overlay Amendment
5. 2022-ZCA-017 Desert Color Sage Haven Plat C phase 12

6. 2022-ZRA-001 Landmark Designation
7. 2022-ZCA-012 Moto United Business Park
8. 2022-ZCA-018 Humane Society Medical Clinic
9. 2022-PP-011 Stonebridge Estates
10. 2022-PP-012 Tonaquint Ridge Phases 4-6
11. 2022-PP-013 Desert Color Sage Haven Phase 12
12. 2022-PP-014 Kipp/Seint Commercial Condominium
13. 2022-PP-015 Glenview
14. 2022-PP-016 Divario Open Space Dedication Plat
15. 2022-PP-023 Staybridge

9. ADJOURN

MOTION: Commissioner Fisher made a motion to adjourn at 7:05 pm.
SECOND: Commissioner Kemp
ROLL CALL VOTE:
AYES (6)
Chairman Ray Draper
Commissioner Steve Kemp
Commissioner Emily Andrus
Commissioner Nathan Fisher
Commissioner Elise West
Commissioner Lori Chapman
NAYS (0)
Motion Carries unanimous recommend approval