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, April 11, 2023,** commencing at **5:00 p.m**.

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

1. **CONTINUED ITEMS**

   A. Consider a request to amend the Desert Color Planned Development (PD). This PD amendment would adjust the boundary of the TNZ Resort Overlay to the south of the existing boundary line including approximately 1.9 acres. This would place the entire subject parcel into the resort overlay. Additionally, the city has received a request for a PD amendment to allow a hotel resort on an approximately 17.49-acre site. The site is located just south of the Lagoon Parkway and Painted Ridge Parkway intersection on the east side of Pained Ridge Parkway at approximately 5560 South. The applicant is Desert Color and the representative is Craig Coats, Alliance Consulting. The project will be known as Atara Resort at Desert Color. Case No. 2023-PDA-002. (Staff – Dan Boles)

   B. Consider a request for a preliminary plat to create seven pads for a hotel resort to be known as Atara Resort At Desert Color located south of the Lagoon Pkwy and Painted Ridge Pkwy intersection on the east side of Painted Ridge Pkwy at approximately 5560 South. The property is 76.04 acres and is zoned PD-R TNZ Resort. The applicant is Desert Color St. George, LLC, and the representative is Craig Coats. Case No. 2023-PP-008 (Staff – Dan Boles)

   C. Consider a request to change the zone from R-1-8 (Single Family Residential minimum 8,000 sq ft lot size), R-1-10 (Single Family Residential minimum 10,000 sq ft lot size) to PD-R (Planned Development Residential). The applicant is seeking approval to change the zone on 14.99 acres to build a townhome development consisting of 134 units. The property is generally located at 1100 W Curley Hollow Dr. The applicant is Tonaquint Inc, and the representative is Tim Stewart. The project will be known as Rosewood Townhomes. Case No. 2023-ZC-001. (Staff – Mike Hadley)

   D. Consider a request for a hillside development permit to build a new townhome development on the property that is generally located at 1100 W Curly Hollow Dr. The applicant is Tim Stewart, and the representative is Jared Bates. Case No. 2023-HS-001 (Staff – Mike Hadley)

   E. Consider a request for a one hundred thirty-four (134) lot residential subdivision known as Rosewood Townhomes located at approximately 1100 Curly Hollow Dr. The property is 14.99 acres and is zoned R-1-8 and R-1-10. The applicant is Tim Stewart, and the representative is Jared Bates. Case No. 2023-PP-006 (Staff – Mike Hadley)

2. **GENERAL PLAN AMENDMENT (GPA) (*Public Hearing)* Legislative**

   A. Consider a request for a general plan amendment to change the land-use map from LDR (Low Density Residential) to MDR (Medium Density Residential) on approximately 4.51 acres generally

located on West Canyon View Drive, west of Dixie Drive. The applicants are Robert and Roseann Campbell. The project will be known as GV-5 GPA Case No. 2022-GPA-011. (Staff – Carol Davidson)

B. Consider a request to change the General Plan from OS (Open Space) to Low Density Residential (LDR) on approximately 74.098 acres generally located south of Tonaquint Terrace and west of Tonaquint Heights subdivisions. The proposal is for Low Density Single Family Residential lots. The applicant is Utah State Trust Lands Quality development LLC and representative is Logan Blake. The project will be known as Tonaquint Heights General Plan Amendment. Case No. 2023-GPA-001. (Staff – Mike Hadley)

C. Consider a request to change the General Plan from RES (Residential), COM (Commercial), & PK (Park) to M-1 (Manufacturing) on approximately 51.97 acres generally located north of exit 7 off Southern Parkway. The applicant is Desert Canyons Development LC and representative is Curt Gordon. The project will be known as Desert Canyons Business Park General Plan Amendment. Case No. 2023-GPA-002. (Staff – Mike Hadley)

3. DEVELOPMENT AGREEMENT (DA) *(Public Hearing)* Legislative

Consider a request to adopt a development agreement for the purpose of redesigning the layout and elevations of an approved but not yet developed storage rental unit facility which is generally located at approximately 3425 S. River Road. The applicant is Devin Sullivan – Pioneer Boys LLC, and the representative is Adam Allen. The project name will be known as STG Storage Facility. Case No. 2022-2023-DA-002. (Staff – Carol Davidson)

4. PLANNED DEVELOPMENT AMENDMENT (PD-A) *(Public Hearing)* Legislative

A. Consider a request to amend the PD-C (Planned Development Commercial) zone for the purpose of redesigning the layout and elevations of an approved but not yet developed storage rental unit facility which is generally located at approximately 3425 S. River Road. The applicant is Devin Sullivan – Pioneer Boys LLC, and the representative is Adam Allen. The project name will be known as STG Storage Facility. Case No. 2022-PDA-052 (Staff – Carol Davidson)

B. Consider a request to amend the Fields at Mall Drive Phase 2 Planned Development Commercial (PD-C) zone. The applicant is seeking approval in order to build a new office building on approximately 1.17 acres. This property is located at 2939 E Mall Drive. The applicant/representative is Tucker Nipko. The project will be known as Mall Drive Professional Office. Case No. 2023-PDA-005. (Staff – Dan Boles)

5. MINUTES

Consider a request to approve the meeting minutes from the March 28, 2023, meeting.

6. CITY COUNCIL ACTIONS

Report on items heard at the April 6, 2023, City Council meeting.

1. 2023-PP-005 Old Farm

2. 2023-HS-004 Flowers Way
3. 2023-PP-009 Smith's Marketplace Sun River
4. 2023-PP-010 Leslie Dunbar Trust
5. 2023-PP-007 White Trails Ph 4-6

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

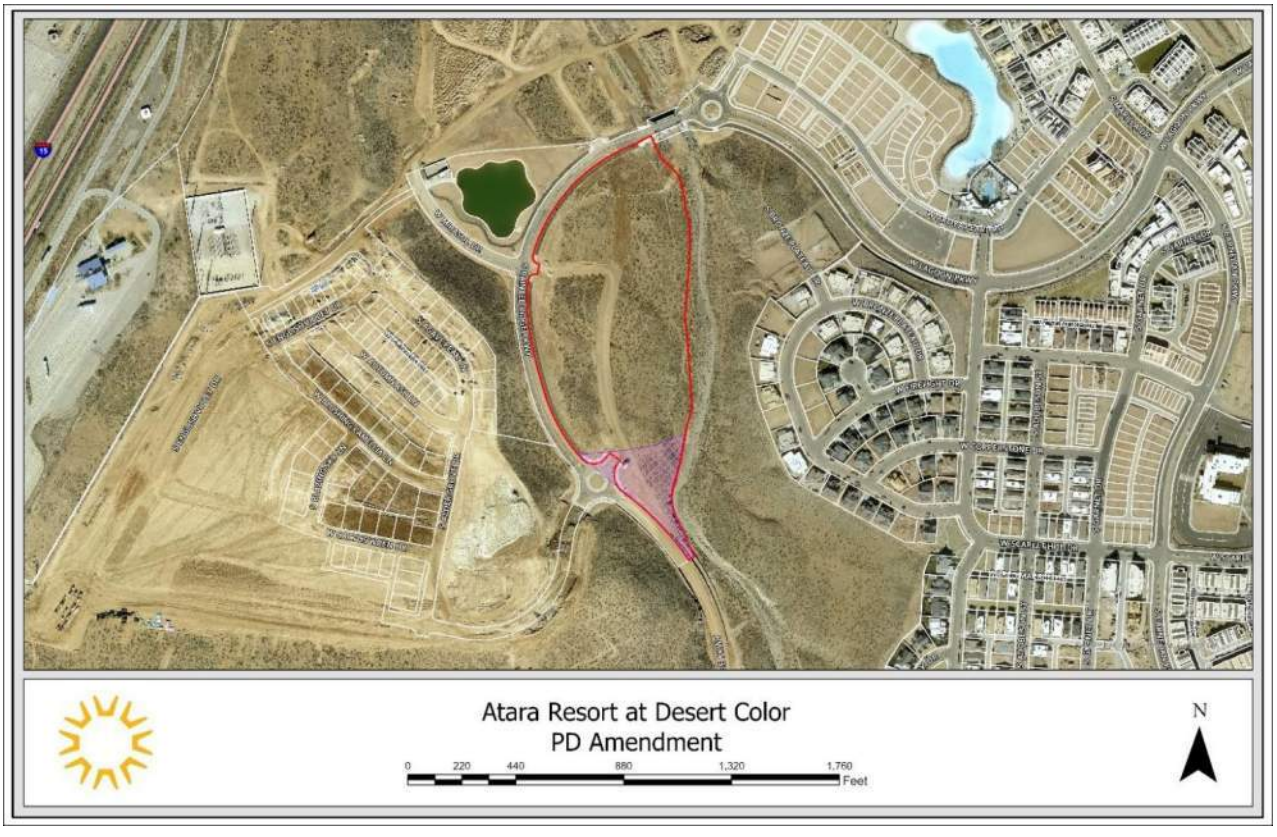
ITEM 1A

PLANNED DEVELOPMENT AMENDMENT

PLANNING COMMISSION AGENDA REPORT: 03/28/2023
PLANNING COMMISSION AGENDA REPORT: 04/11/2023

Planned Development (PD) Amendment
Atara Resort at Desert Color
Case No. 2023-PDA-002

Request:	Consider a PD Amendment extending the resort overlay on the subject and reviewing plans in order to develop the subject property into a hotel.
Applicant:	Desert Color St. George, LLC
Representative:	Craig Coats
Area:	Approximately 17.49 Acres
Location:	South of the Lagoon Parkway and Painted Ridge Parkway intersection on the east side of Pained Ridge Parkway at approximately 5560 South.
Current Zone:	Planned Development Residential (PD-R TNZ Resort) (The Resort Overlay is being adjusted on this property)
General Plan:	Town Center (TC)



Update:
On March 28, 2023, the Planning Commission held a public hearing to receive public input on the proposed PD Amendment and review the application. The public came out and provided considerable feedback concerning the use itself, height, views, safety, traffic and a number of other topics. The applicant requested a continuation of the meeting which the Planning Commission granted. The Commission requested further details on the height of the building and how that was measured. Staff has since met with the applicant and after further review of the Desert Color zone plan determined that the structure needs to cap at 50 feet as opposed to 55 feet. The St. George city code states that building height for a flat roofed structure is *"[t]he 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..."* Using this methodology for measuring height, the applicant made some adjustments to the building to make sure that it would comply with the requirement of 50 feet and has produced two new exhibits to demonstrate compliance. These exhibits are attached to the end of the attached presentation. This is pertinent only to the main hotel building and not to the Villas. No changes to grading were made to the site.

Background and Request:

The Desert Color development was approved in 2018 after years of refining by the developer, city staff, Planning Commission and City Council. This property is in the Planned Development Residential (PD-R) area. Part of this application is to adjust the boundary of the "Resort Overlay" area which occupies approximately 89% of the site. The resort area needs to be applied to the southern-most portion of the property in order to cover the entire site. With the resort overlay in place, the hotel use is permitted per the Desert Color zone plan. This overlay area does allow a hotel project and is intended to be the area which allows short term rentals. The zone plan booklet states *"[t]he areas proposed within the Desert Color Community designated as Planned Development Traditional Neighborhood Zone-Resort ("PD TNZ-Resort") is where a mix of primary residential and secondary residential, vacation rentals, hotels, and other hospitality-oriented uses may be located."* In the attached presentation are the maps showing where the overlay is being applied.

The hotel is a unique concept which is growing in popularity in that it will be condominiumized so that individuals may own units that would then be rented out. It's important to note that an owner of a unit is still required to check in at the hotel desk, reserve their time and will be restricted on the amount of time they can stay per year. In every way, this resort functions as a hotel and not a standard residential condominium. It is also important to understand that the PD TNZ Resort zone allows all types of residential and many commercial uses whether that be long term or short term rentals, single or multi-family or even a hotel/resort.

The applicant is providing many amenities specifically for this development such as two pools, a restaurant, a spa, and event space. It is fully intended for this resort hotel to be self-sufficient and

that it will serve visitors and not residents of Desert Color (unless those residents wish to rent a room).

The site is designed with the main structure, which is where the hotel lobby, spa, event space and restaurant will be located, located in the center of the project. It will contain an underground parking structure which will have 150 stalls. There will also be 138 units in the main structure. There will be a series of buildings surrounding the main hotel structure called villas, three on the north end of the site and three on the south. There are two different villa building designs which can contain 20-24 units. In all, the applicant is proposing a total of 136 units in the villas. This will provide a total of 274 units in all.

There is a small portion of the project (approximately 1.9 acres or 11%) of the site that is not currently covered by the Resort overlay. Extending that resort overlay on the remaining portion of the property is part of this request. That said, the narrative of the project is reviewed against the standards of the PD-R TNZ-Resort zone.

Please see update on page 2. The Desert Color zone plan allows commercial buildings to be a maximum of 55'. The main hotel structure has been designed at 55' to it's highest point while the Villas (both designs) will maintain a 44' height.

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

1. **Pattern of development**. The pattern of development should 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. This particular design criteria is a bit of a departure from that idea as it is a pod that is mainly self-sufficient and to some degree, removed from the other parts of the resort. That said, to the greatest extent possible, the site has been designed with the buildings facing streets and open space, but given the double fronting design of the buildings, many of the units are facing the parking area. This is allowed in the overlay zone.

2. **Civic Space and Amenities.** Civic space is required if the project is residential and only if it is over five dwelling units per acre. Because this development will be commercial, there is no civic space required. Additionally, there are no specific requirements for amenities given that it is not a residential development. However, the site is designed with two pools, event space, a spa, a pavilion, cabanas, courtyard, restaurant, etc. These amenities will be available to the guests.

3. **Parking.** The St. George zoning code requires that a hotel provide one parking stall per room plus two stalls for staff. With 274 rooms (keys), this would require a total of 276 parking stalls for the hotel use. The other three uses that are specifically called out in the code are restaurant, shops and the spa. Altogether, the site is required to provide 351 parking stalls. The applicant has provided 382 parking stalls. Thirty-one of those parking

stalls will be tandem stalls in the underground parking garage. The applicant will implement valet parking for those underground stalls. All tandem stalls are above and beyond what is required by code and the Desert Color zone plan.

4. **Building and Streetscapes.** The applicant is proposing seven buildings on the site as described above. The Desert Color Design Review Committee has reviewed the building 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, metal siding, stone and aluminum accents.
   b. **Guideline B.** No building can be twice the height of the building adjacent to it or across the street. Because this site is somewhat of an island away from other development, there aren't buildings nearby to compare the proposed buildings to. Compared to each other, these buildings are in line with this standard.
   c. **Guideline C.** All of the 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. Each entryway is clearly defined.
   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 other than the structures shown on the site plan.
   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. All units will meet the required parking standards whether on street or on-site.
2. Each unit must be accompanied by a stoop or porch as required by the zoning plan.

3. Any signage will need to obtain a building permit. No signage has been submitted with this application.
4. No structure may exceed 50 feet in height as measured by the St. George City Code.

Engineering:

1. Review drive aisle widths and make sure that they all meet the required widths and standards in St. George City code.

Fire:

1. No comments received.

Parks:

1. No comments received.

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. Continue the proposed PD amendment to a specific date.

Model Motion:

"I move that we forward a positive recommendation to the City Council for the PD amendment for Atara at Desert Color as presented, case no. 2023-PDA-002, 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.
3. Approval of the Planned Development Amendment is in the best interest of the health, safety and welfare of the City of St. George.
4. The site was anticipated to contain uses that are typical of a resort such as short-term rentals and hotels and has the resort overlay on 90% of the site.
5. That the resort overlay is being applied to additional 10% of the property to be consistent with the site as a resort type use.

EXHIBIT A

APPLICANT NARRATIVE

ALLIANCE CONSULTING
A Planning and Engineering Firm

February 27, 2023

City of St. George
175 E 200 N
St. George, UT 84770

RE: Atara Resort at Desert Color

City of St. George Planning Department

We are requesting that the City of St. George consider the application for the next phase of Desert Color, This is the Atara Resort at Desert Color. The current zoning is TNZ-Resort and we are presenting the elevation for the Hotel Resort Site.

Best regards,

Craig Coats
Alliance Consulting, LLC

2303 N. Coral Canyon Blvd., Suite 201, Washington, UT 84780
P) 435.673.8060

EXHIBIT B

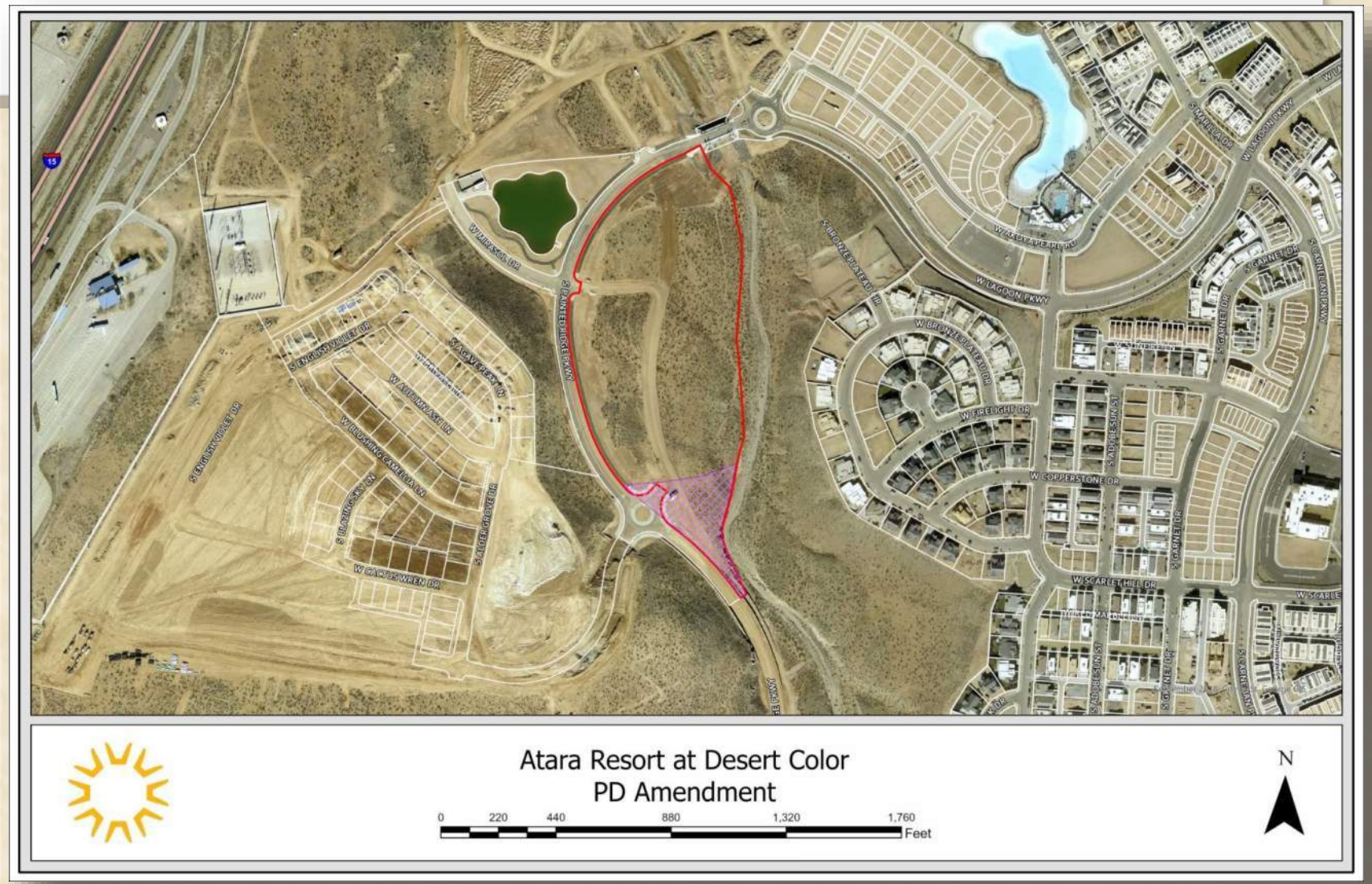
POWERPOINT PRESENTATION

Atara at Desert Color

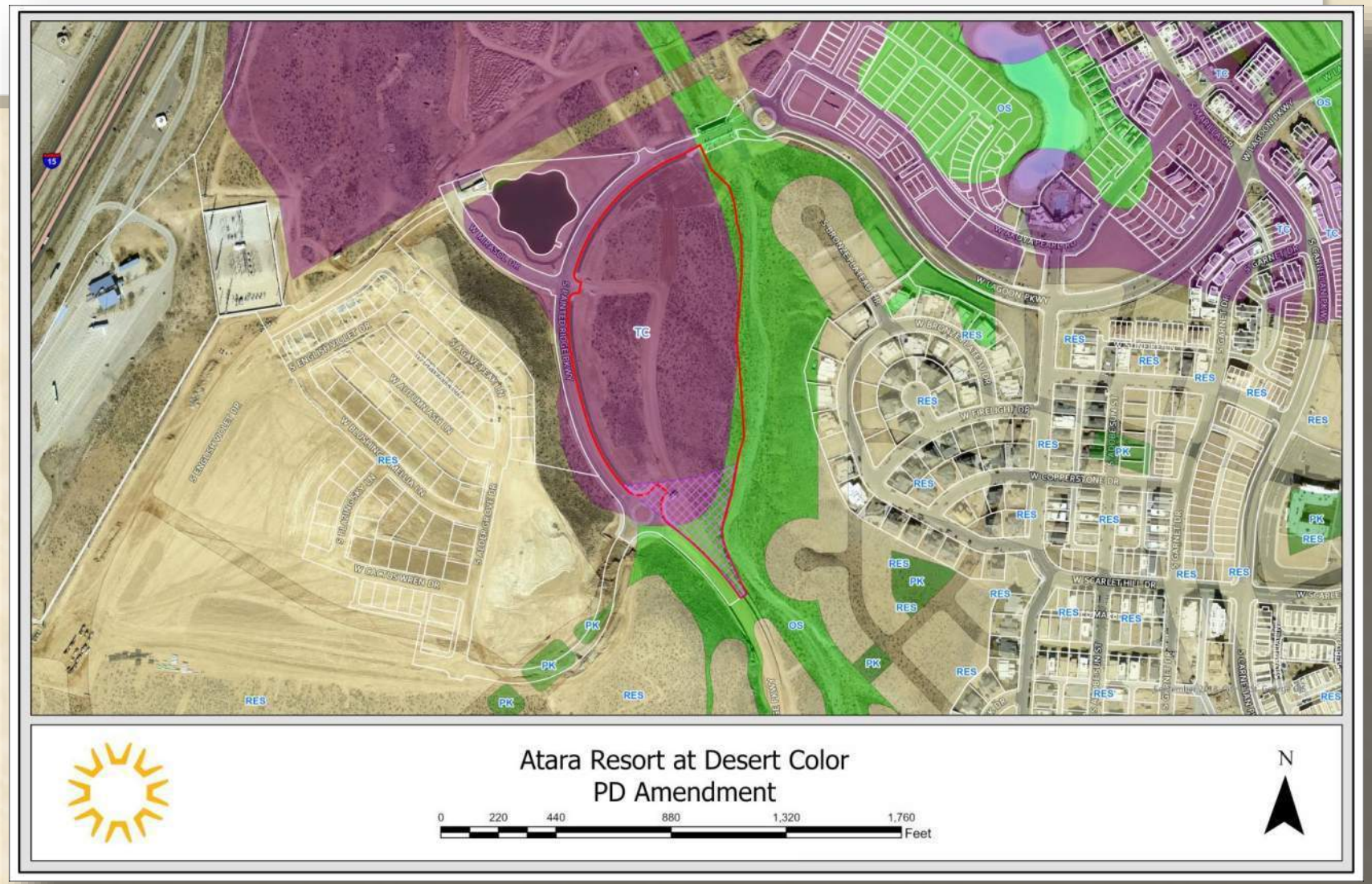
Planned Development Amendment

2023-PDA-002

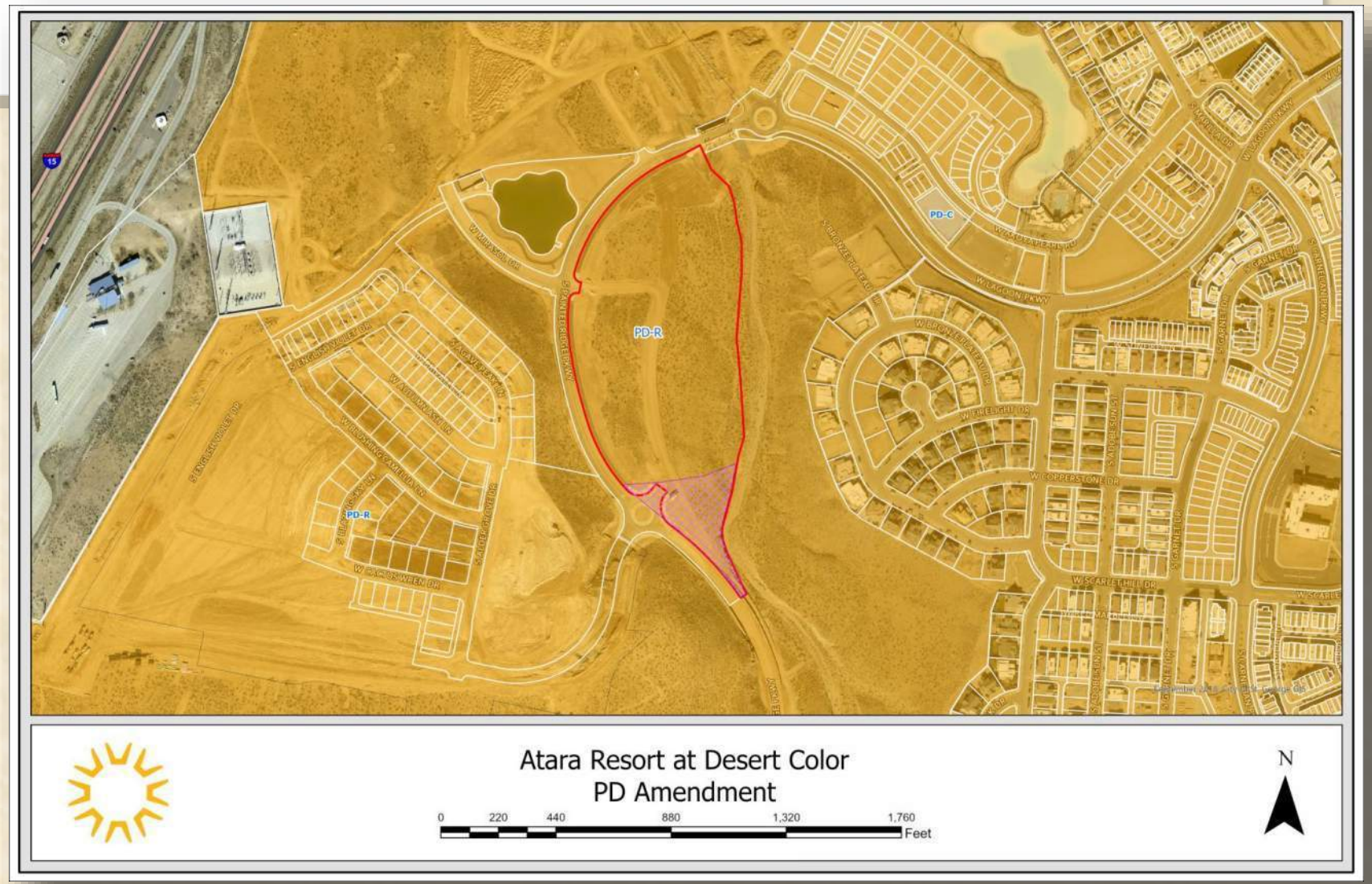
Aerial Map


Atara Resort at Desert Color
PD Amendment
0 220 440 880 1,320 1,760
Feet
N

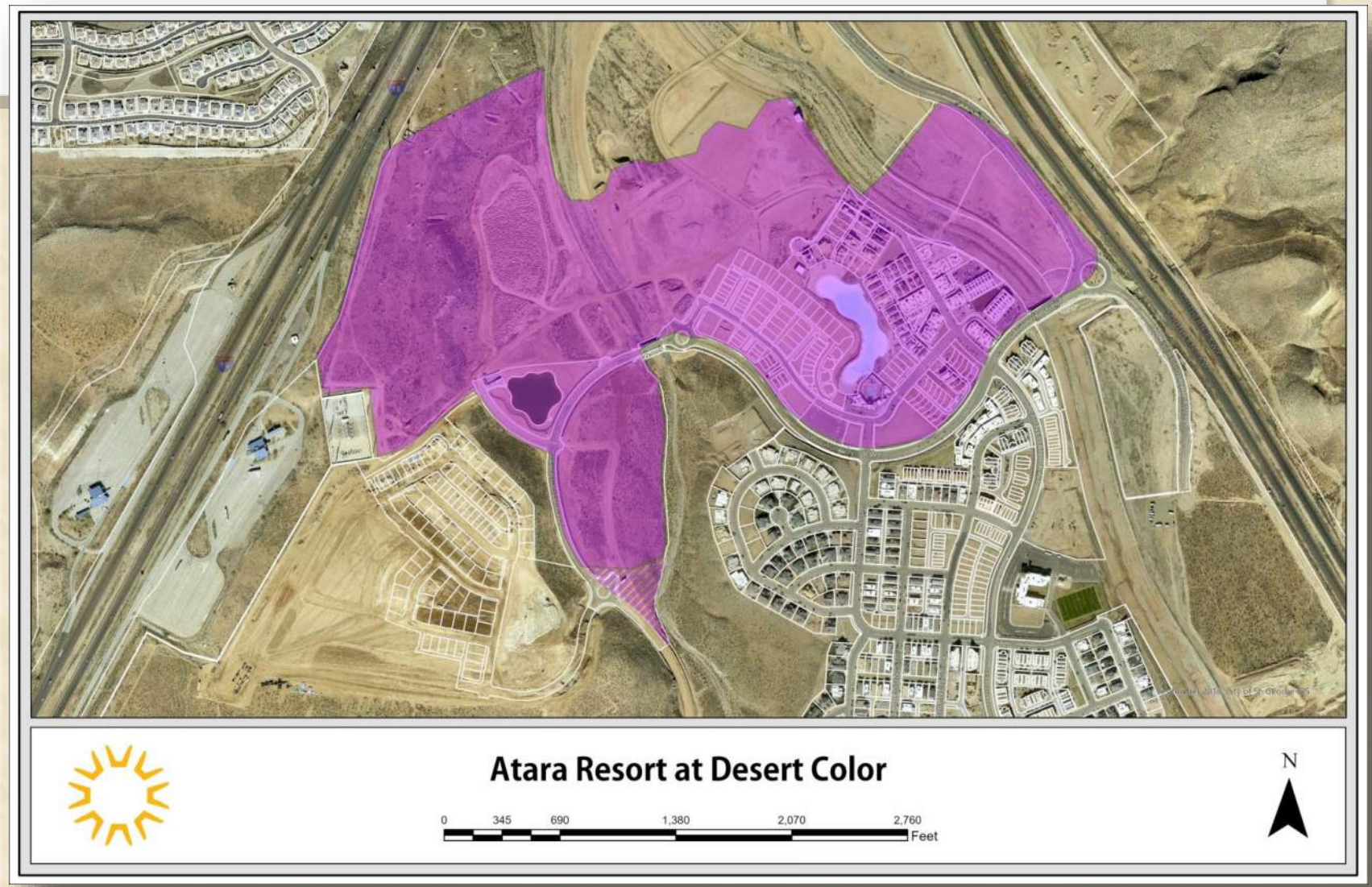
Land Use Map


TC
OS
RES
PK
Atara Resort at Desert Color
PD Amendment
0
220
440
880
1,320
1,760
Feet
N

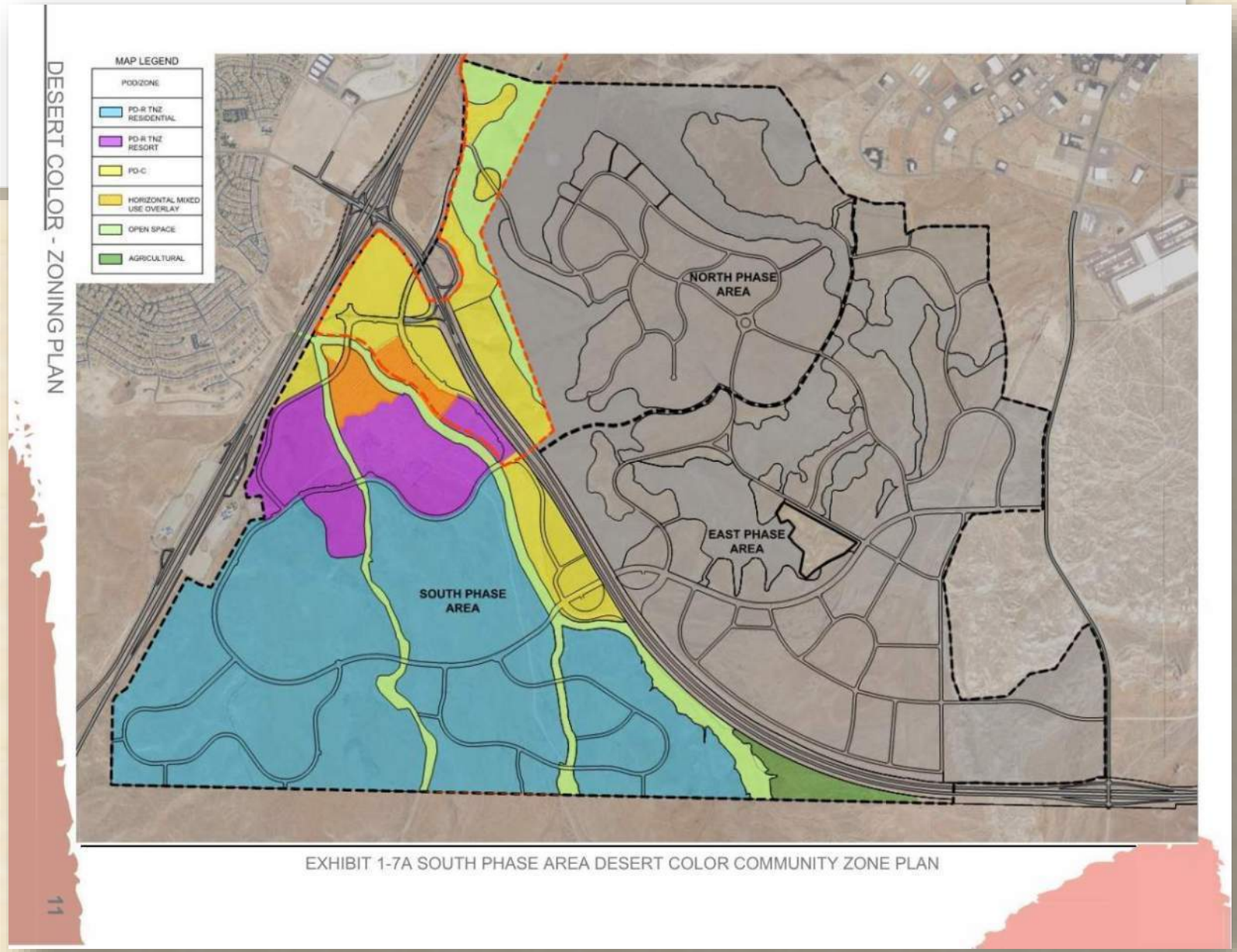
Zoning Map


PD-R
PD-C
PD-R
Atara Resort at Desert Color
PD Amendment
0
220
440
880
1,320
1,760
Feet
N

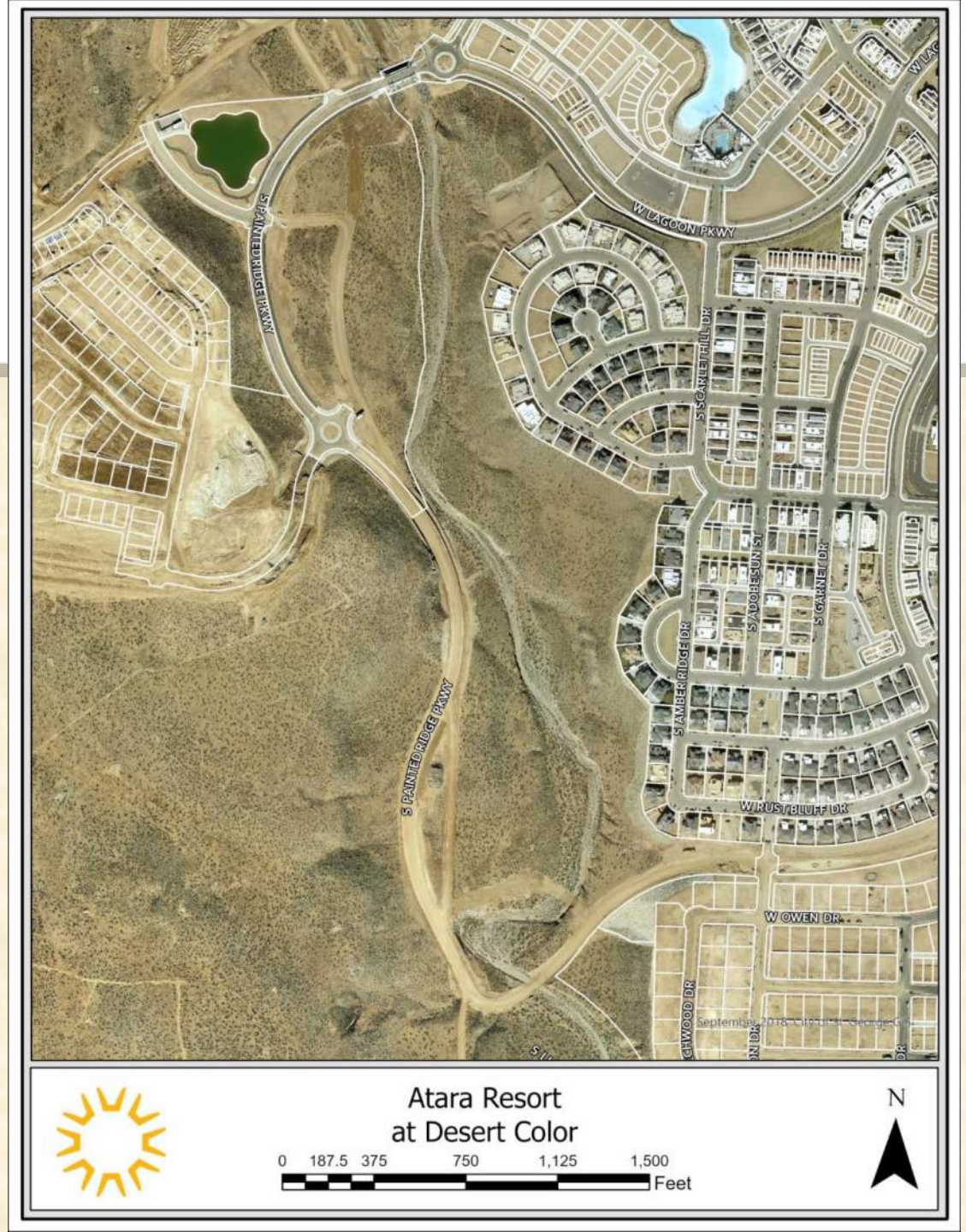
Resort Area



Resort Area

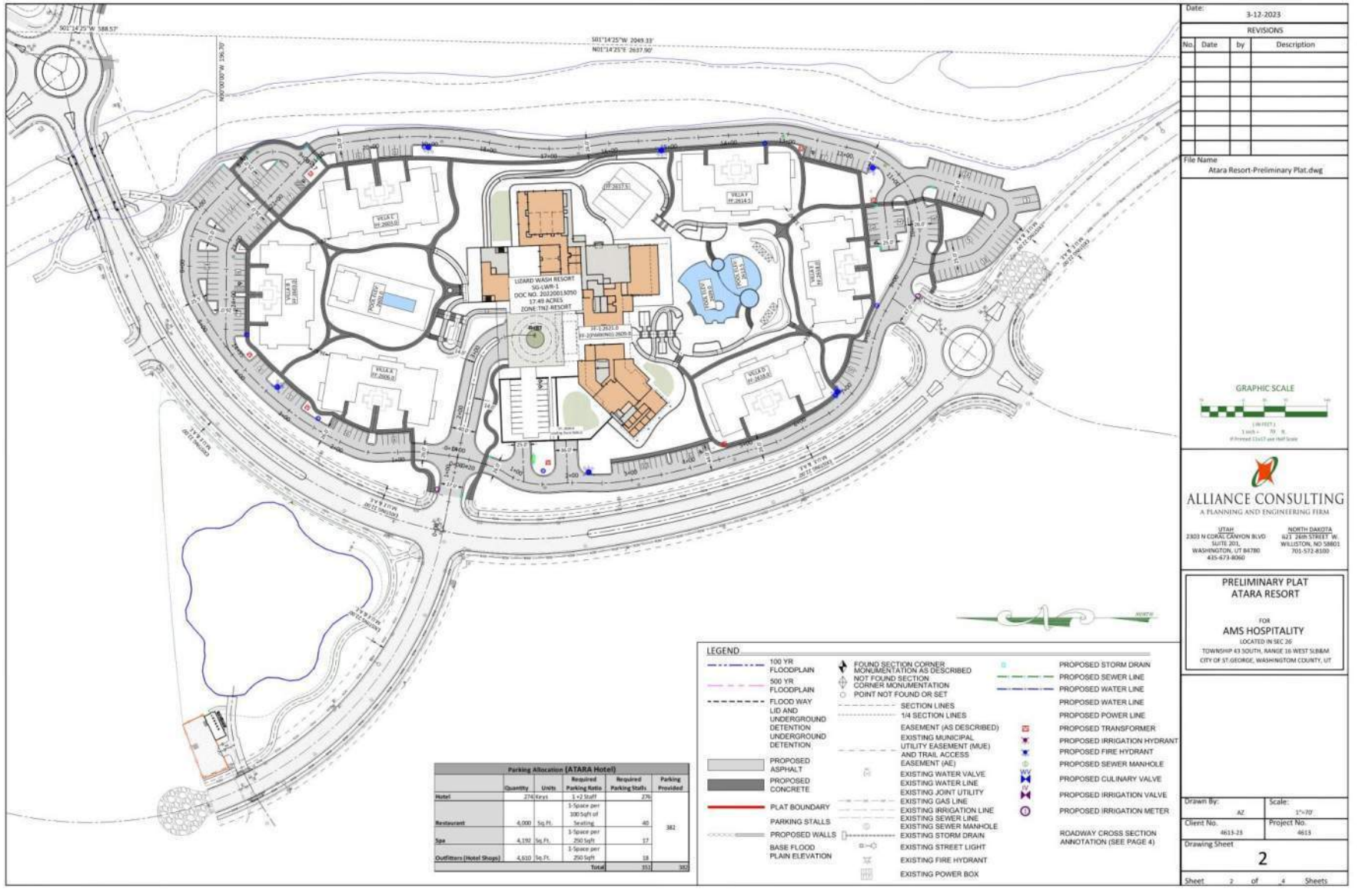

DESERT COLOR - ZONING PLAN
MAP LEGEND
POD/ZONE
PD-R TNZ RESIDENTIAL
PD-R TNZ RESORT
PD-C
HORIZONTAL MIXED USE OVERLAY
OPEN SPACE
AGRICULTURAL
NORTH PHASE AREA
EAST PHASE AREA
SOUTH PHASE AREA
EXHIBIT 1-7A SOUTH PHASE AREA DESERT COLOR COMMUNITY ZONE PLAN
11

Aerial Map


S PAINTED RIDGE PKWY
W LAGOON PKWY
S SCARLET HILL DR
S ADOBE SUN ST
S GARNET DR
S AMBER RIDGE DR
W RUST BLUFF DR
W OWEN DR
S PAINTED RIDGE PKWY
Atara Resort
at Desert Color
0 187.5 375 750 1,125 1,500
Feet
N

Illustrative Site Plan

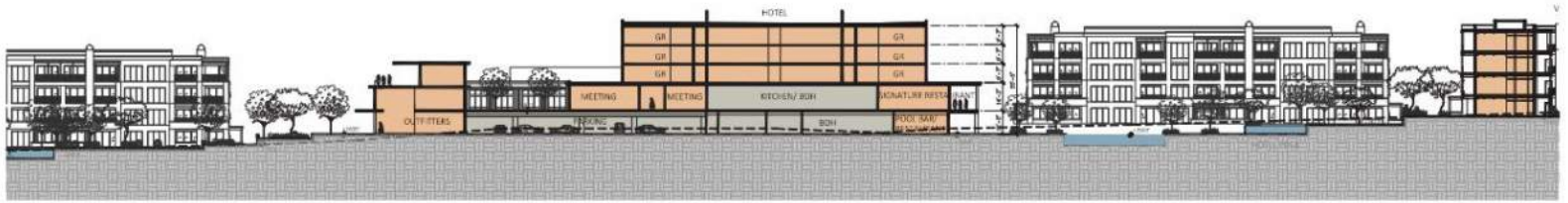
Plat


Date: 3-12-2023
REVISIONS
No. Date by Description
File Name
Atara Resort-Preliminary Plat.dwg
GRAPHIC SCALE
ALLIANCE CONSULTING
A PLANNING AND ENGINEERING FIRM
UTAH
2302 N CORAL CANYON BLVD SUITE 201, WASHINGTON, UT 84780 435-673-8060
NORTH DAKOTA
621 24th STREET W. WILLISTON, ND 58801 701-572-8100
PRELIMINARY PLAT
ATARA RESORT
FOR
AMS HOSPITALITY
LOCATED IN SEC 26
TOWNSHIP 43 SOUTH, RANGE 16 WEST SLB&M
CITY OF ST.GEORGE, WASHINGTON COUNTY, UT
Drawn By: AZ
Scale: 1"=70'
Client No. 4613-23
Project No. 4613
Drawing Sheet 2
Sheet 2 of 4 Sheets
LIZARD WASH RESORT
SG-LWR-1
DOC NO. 20220013050
17.49 ACRES
ZONE-TNZ-RESORT
Parking Allocation (ATARA Hotel)
Quantity Units Required Parking Ratio Required Parking Stalls Parking Provided
Hotel 274 Keys 1 +2 Staff 276
Restaurant 4,000 Sq.Ft. 1-Space per 100 Sqft of Seating 40 382
Spa 4,192 Sq.Ft. 1-Space per 250 Sqft 17
Outfitters (Hotel Shops) 4,610 Sq.Ft. 1-Space per 250 Sqft 18
Total 353 382
LEGEND
100 YR FLOODPLAIN
500 YR FLOODPLAIN
FLOOD WAY
LID AND UNDERGROUND DETENTION
UNDERGROUND DETENTION
PROPOSED ASPHALT
PROPOSED CONCRETE
PLAT BOUNDARY
PARKING STALLS
PROPOSED WALLS
BASE FLOOD PLAIN ELEVATION
FOUND SECTION CORNER MONUMENTATION AS DESCRIBED
NOT FOUND SECTION CORNER MONUMENTATION
POINT NOT FOUND OR SET
SECTION LINES
1/4 SECTION LINES
EASEMENT (AS DESCRIBED)
EXISTING MUNICIPAL UTILITY EASEMENT (MUE) AND TRAIL ACCESS EASEMENT (AE)
EXISTING WATER VALVE
EXISTING WATER LINE
EXISTING JOINT UTILITY
EXISTING GAS LINE
EXISTING IRRIGATION LINE
EXISTING SEWER LINE
EXISTING SEWER MANHOLE
EXISTING STORM DRAIN
EXISTING STREET LIGHT
EXISTING FIRE HYDRANT
EXISTING POWER BOX
PROPOSED STORM DRAIN
PROPOSED SEWER LINE
PROPOSED WATER LINE
PROPOSED WATER LINE
PROPOSED POWER LINE
PROPOSED TRANSFORMER
PROPOSED IRRIGATION HYDRANT
PROPOSED FIRE HYDRANT
PROPOSED SEWER MANHOLE
PROPOSED CULINARY VALVE
PROPOSED IRRIGATION VALVE
PROPOSED IRRIGATION METER
ROADWAY CROSS SECTION ANNOTATION (SEE PAGE 4)

Elevations - Hotel

HOTEL

SECTION



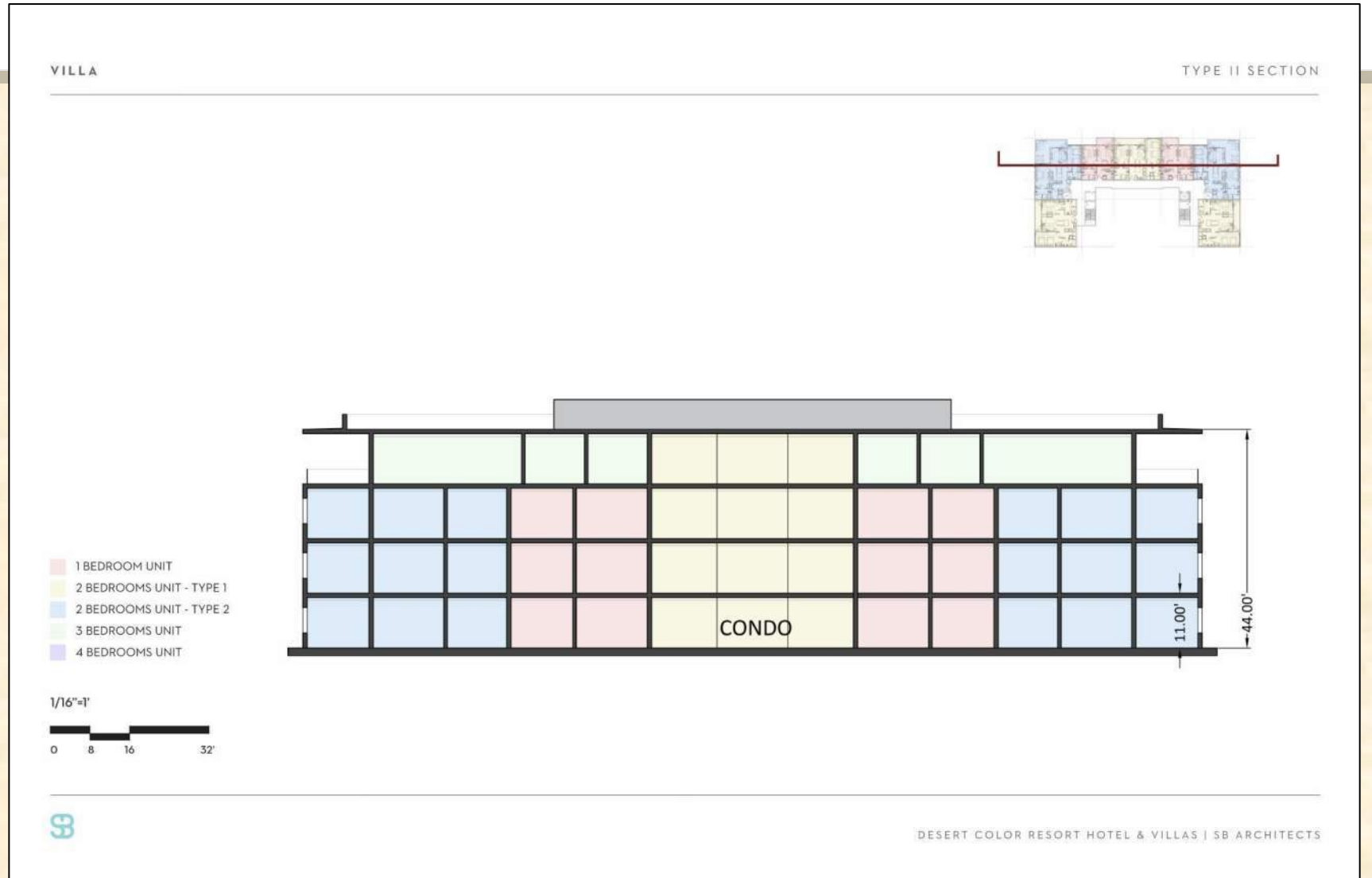
1"=50'

0 25 50 100'

Hotel Renderings

Hotel Renderings

Villas


VILLA
TYPE II SECTION
1 BEDROOM UNIT
2 BEDROOMS UNIT - TYPE 1
2 BEDROOMS UNIT - TYPE 2
3 BEDROOMS UNIT
4 BEDROOMS UNIT
1/16"=1'
0
8
16
32'
CONDO
11.00'
44.00'
DESERT COLOR RESORT HOTEL & VILLAS | SB ARCHITECTS

Renderings – Villas Type I

RENDERING VIEW

TYPE I 3D VIEW

MATERIAL LEGEND

A	B	C	D	E	F
3-PART STUCCO WHITE	SAWN-CUT ARCHITECTURAL DRY-STACK LIMESTONE	THERMALLY TREATED ASH STAINED	ALUMINUM WINDOW/ DOOR SYSTEM DARK BRONZE	METAL PLATE	STEEL GUARDRAIL WITH IPE WOOD TOP RAIL

Renderings – Villas Type II

Renderings

RENDERING VIEW

AERIAL

Renderings

RENDERING VIEW

HOTEL ARRIVAL

Renderings

RENDERING VIEW

HOTEL ARRIVAL

Renderings

RENDERING VIEW

POOL VIEW

Renderings

RENDERING VIEW

POOL VIEW

Renderings

RENDERING VIEW

OUTITTERS

Renderings

RENDERING VIEW

VILLA POOL & SNACK BAR

Materials Board

Materials Board

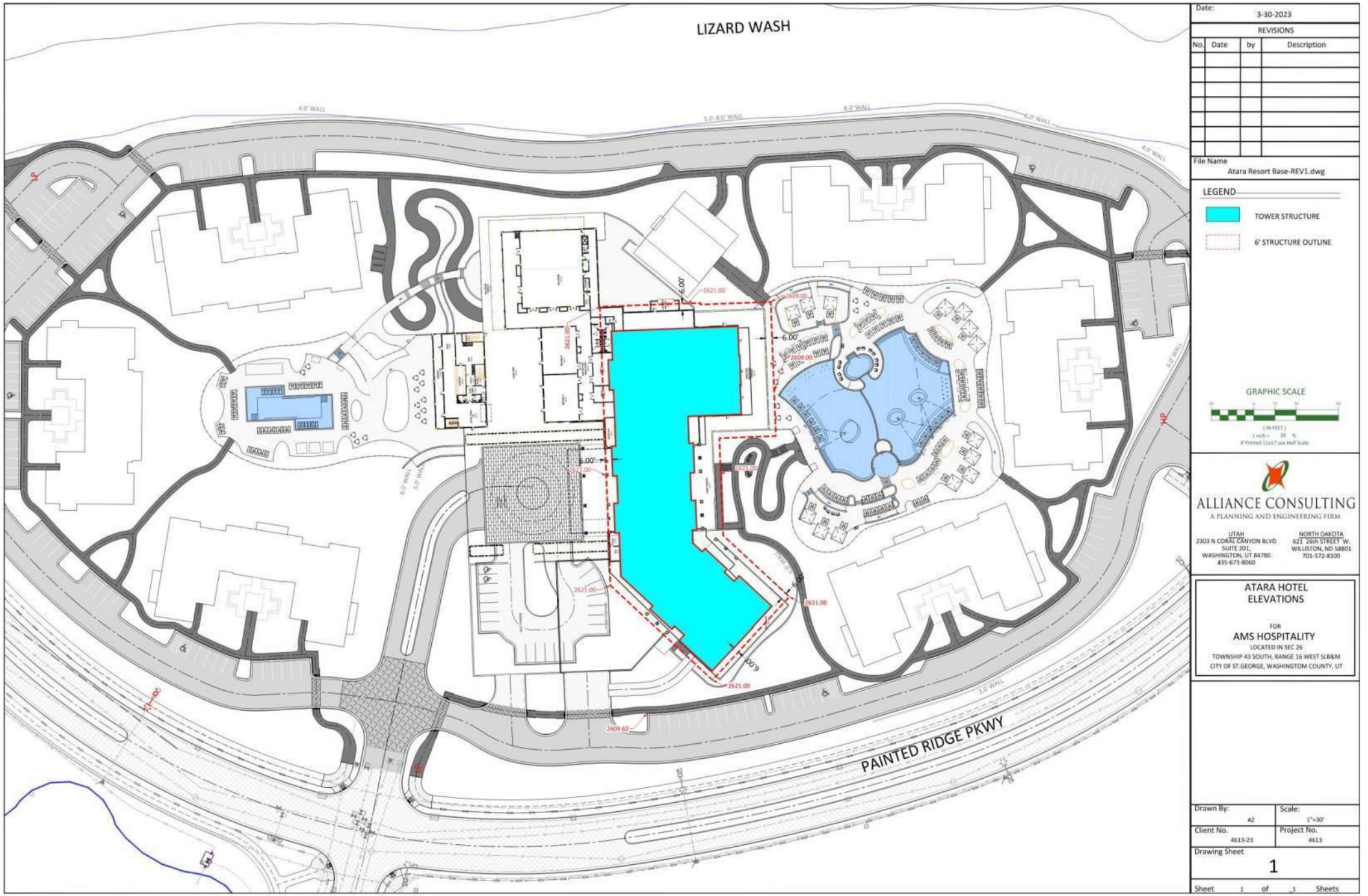
Site Photos

Photos of Site

Photos of Site

Photos of Site

Updated Height Information



Date: 3-30-2023

REVISIONS

No.	Date	by	Description

File Name: Atara Resort Base-REV1.dwg

LEGEND

TOWER STRUCTURE

6' STRUCTURE OUTLINE

GRAPHIC SCALE

(IN FEET)

1 inch = 30 ft.

If Printed 11x17 use Half Scale

ALLIANCE CONSULTING

A PLANNING AND ENGINEERING FIRM

UTAH
2303 N CORAL CANYON BLVD
SUITE 201,
WASHINGTON, UT 84780
435-673-8060

NORTH DAKOTA
621 26th STREET W.
WILLISTON, ND 58801
701-572-8100

ATARA HOTEL ELEVATIONS

FOR

AMS HOSPITALITY

LOCATED IN SEC 26
TOWNSHIP 43 SOUTH, RANGE 16 WEST SLB&M
CITY OF ST.GEORGE, WASHINGTOM COUNTY, UT

Drawn By:	Scale:
AZ	1"=30'
Client No. 4613-23	Project No. 4613

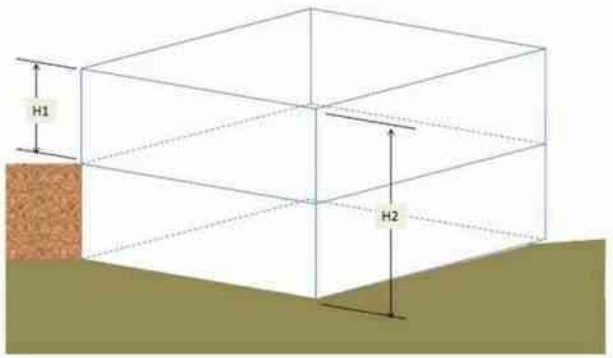
Drawing Sheet 1

Sheet 1 of 1 Sheets

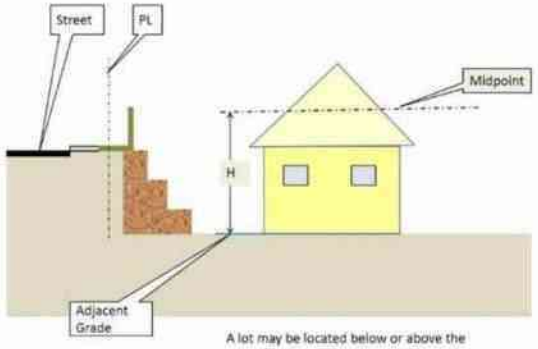
ATARA DESERT COLOR - HEIGHT DIAGRAM

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 (Two (2) Story)



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.



A lot may be located below or above the street level, but the height is measured from adjacent grade

St.George
Community Development

Item 1B

Preliminary Plat

PLANNING COMMISSION AGENDA REPORT: 03/28/2023
PLANNING COMMISSION AGENDA REPORT: 04/11/2023

Preliminary Plat
Atara at Desert Color Preliminary Plat
Case No. 2023-PP-008

Request: The applicant is requesting approval of a preliminary plat to divide the property into common and private areas in order set up a final plat to condominiumize the buildings.

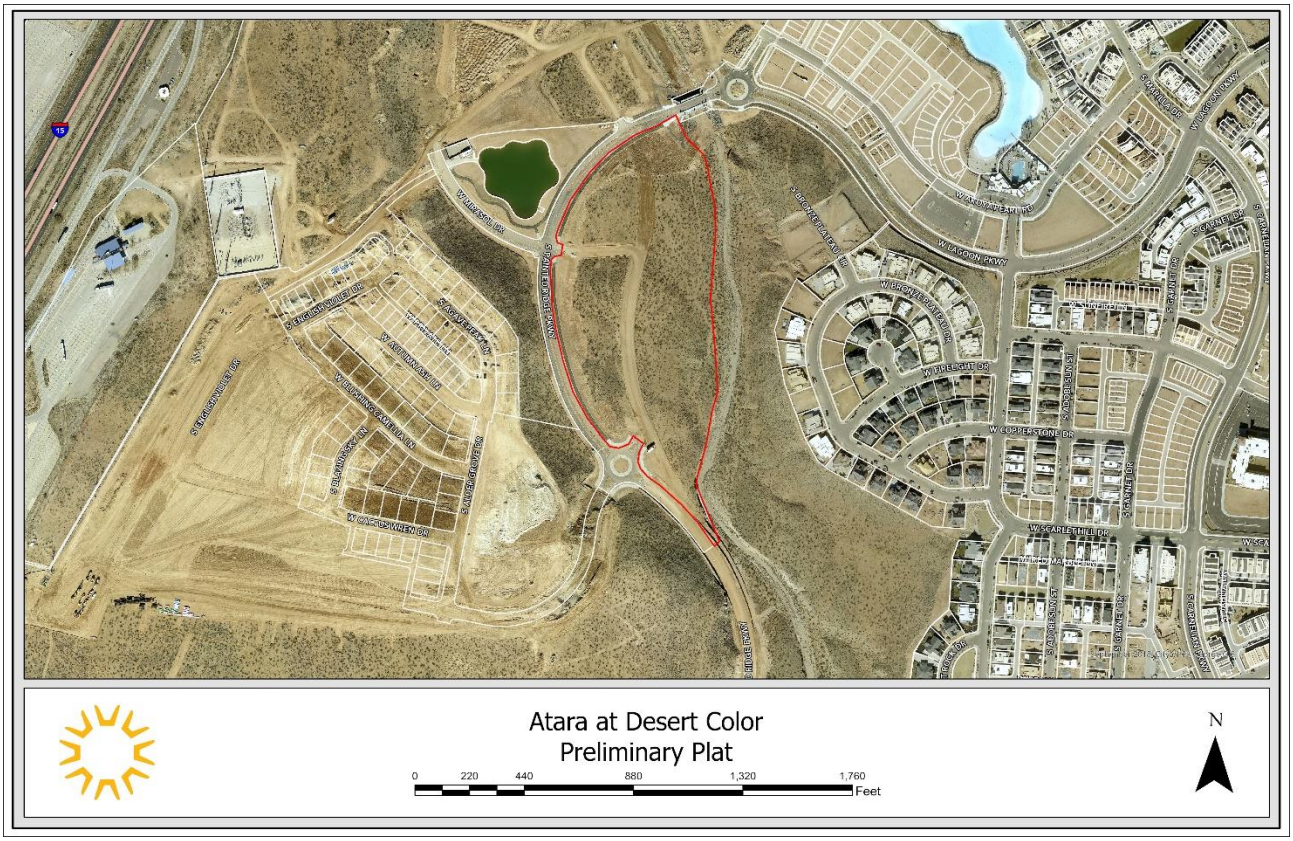
Representative: Craig Coats (Alliance Consulting)

Parcel Number: SG-LWR-1

Location: South of the Lagoon Parkway and Painted Ridge Parkway intersection on the east side of Pained Ridge Parkway at approximately 5560 South.

Total Acreage: Approximately 76.04 acres

Existing Zoning: Planned Development Residential (PD-R TNZ Resort)



General Plan: TC (Town Center)

Adjacent zones: All sides are surrounded by PD-R (Planned Development Residential) with the Resort Overlay extending from the subject property to the north.

***Update:** This was part two of the PDA amendment that went to the Planning Commission on March 28, 2023. That application was amended and with this request. No changes have been made to the proposed plat.

Background & Analysis: In conjunction with this application for a preliminary plat, the Planning Commission heard a request to amend the Desert Color PD in order to approve the Atara at Desert Color Resort.

The proposed plat shows that there are seven building pads (the main hotel structure in the center of the site and six surrounding villas around the perimeter). Each of these buildings will be private area the hotel with surrounding property shown as common. During final plat, each building pad will be further divided into condominium units which will be sold to individuals and then rented out as hotel units. In every way it will function as a hotel/resort but will give individuals the opportunity to invest in the hotel.

The pads range in size from approximately 89,000 ft² for the hotel and approximately 13,700 ft² and 16,500 ft² for villas B/C and A/C/D/F respectively.

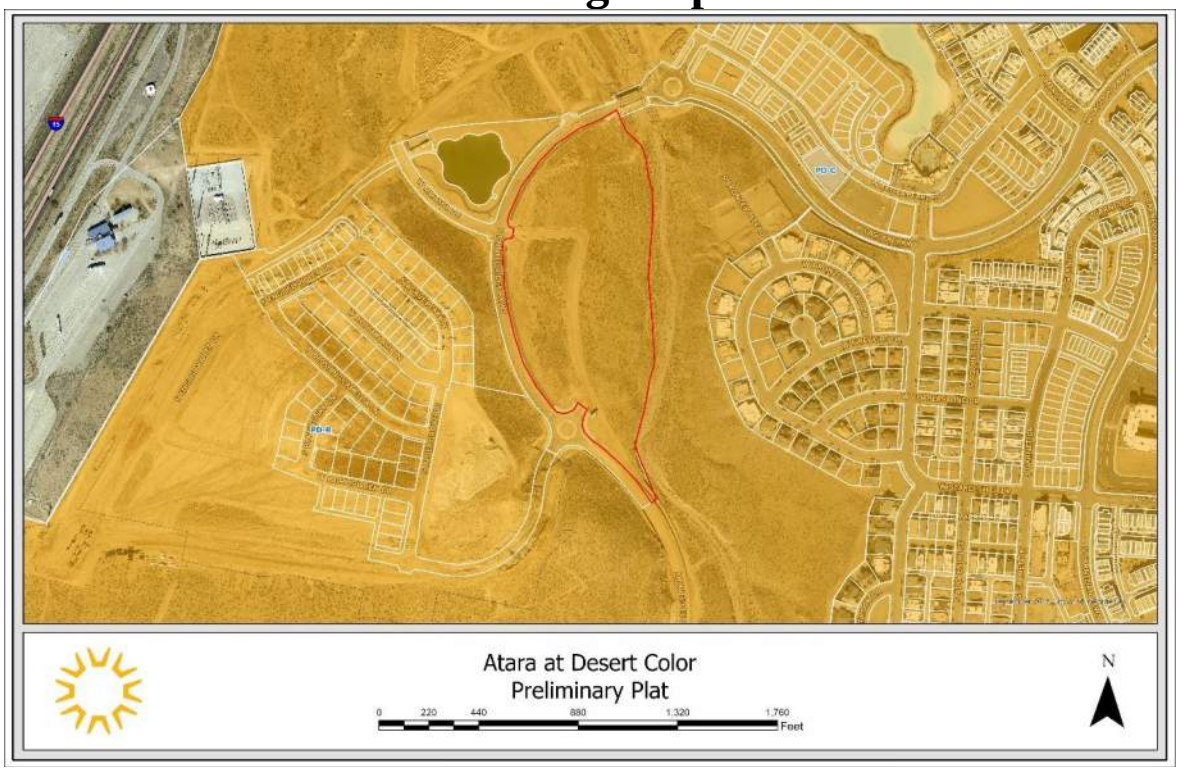
Recommendation: Staff recommends approval of this preliminary plat.

Alternatives:
1. Recommend approval as presented.
2. Recommend denial.
3. Continue the proposed preliminary plat into the future.

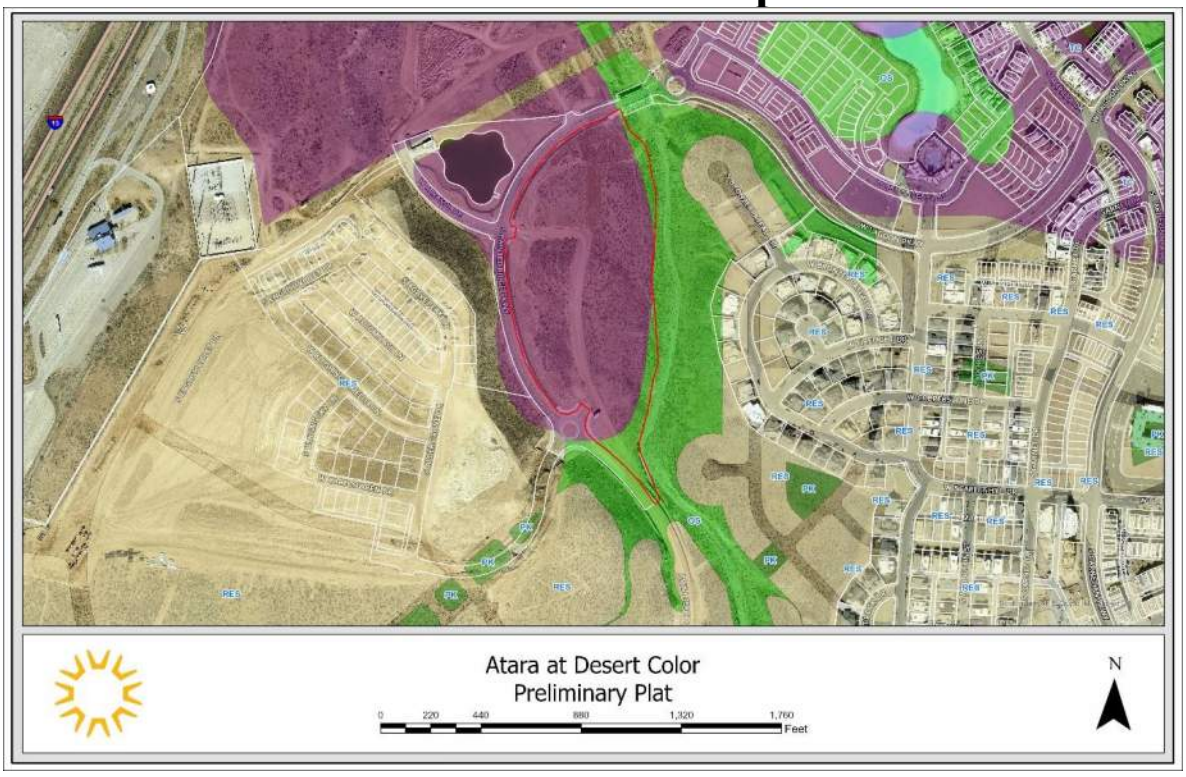
Sample Motion: I move that we forward a positive recommendation to the City Council for the Atara Preliminary Plat request, application number 2023-PP-008, based on the findings noted in the staff report.

Possible Findings:
1. That the plat is consistent with and compliant to the zoning on the property.
2. That the plat will not leave any remnant property unaccounted for.
3. That development in the plat is consistent with the PD amendment previously proposed by the applicant.

Zoning Map



General Plan Map



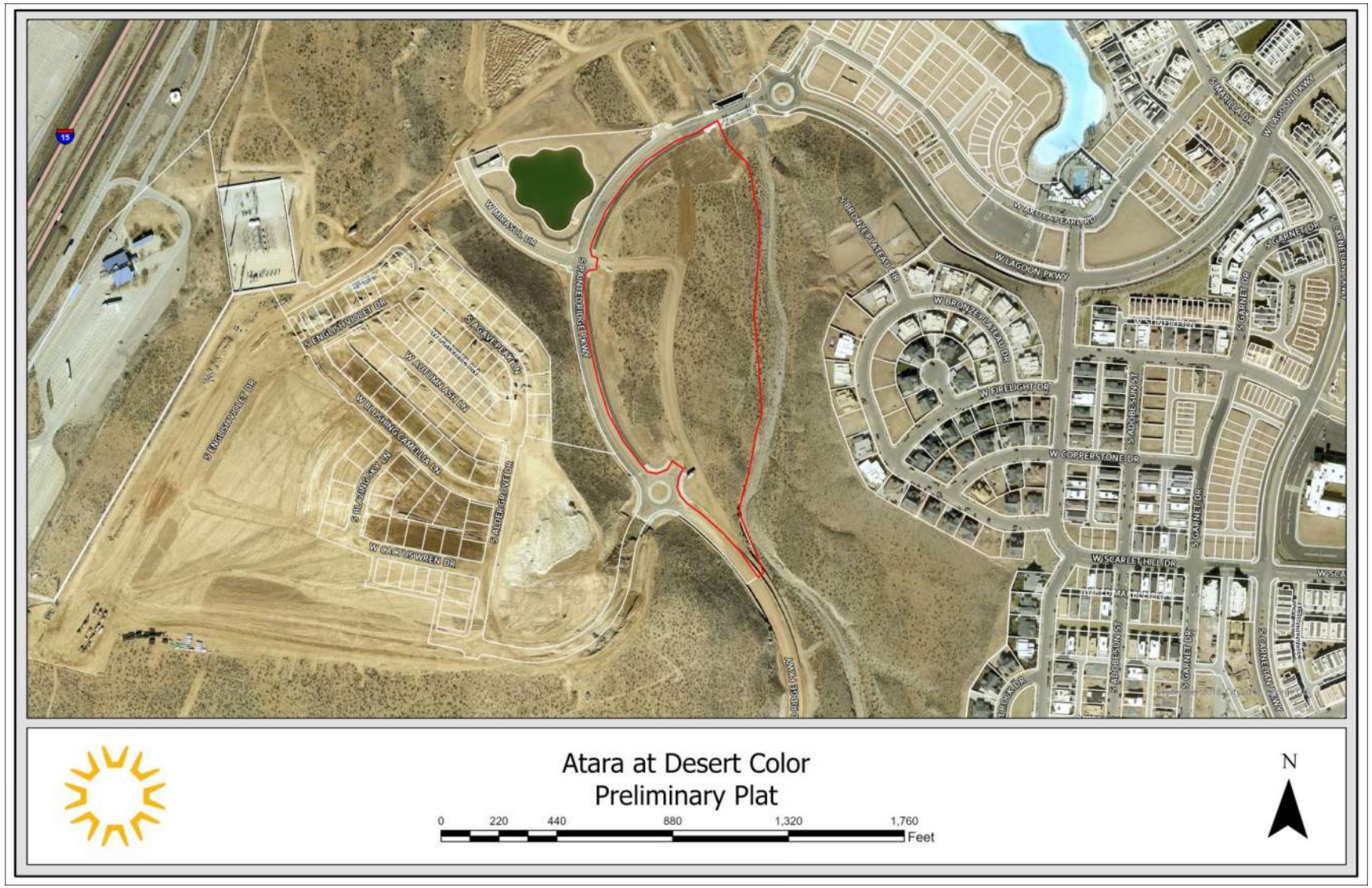
Presentation

Atara at Desert Color

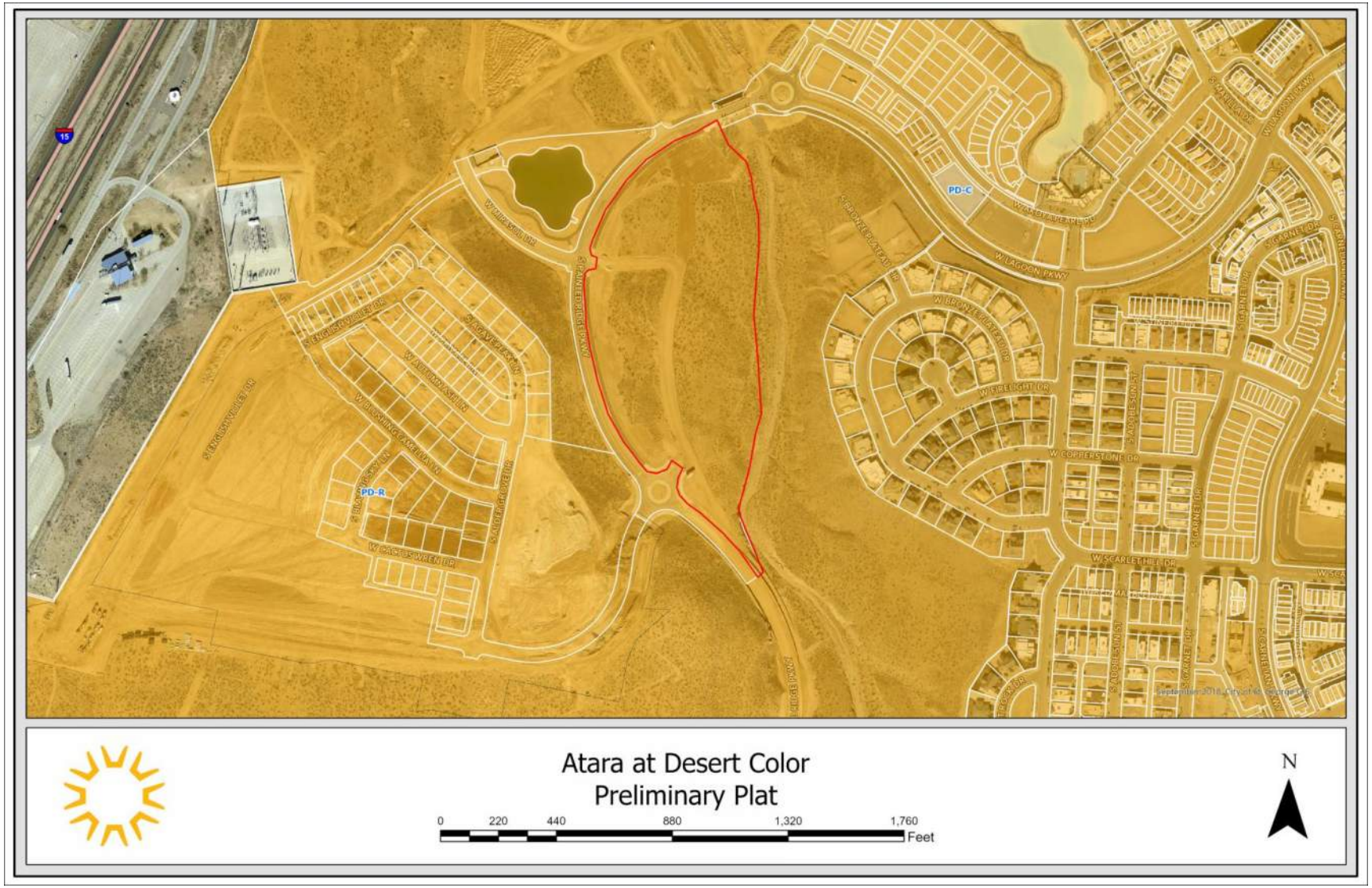
Preliminary Plat

2023-PP-008

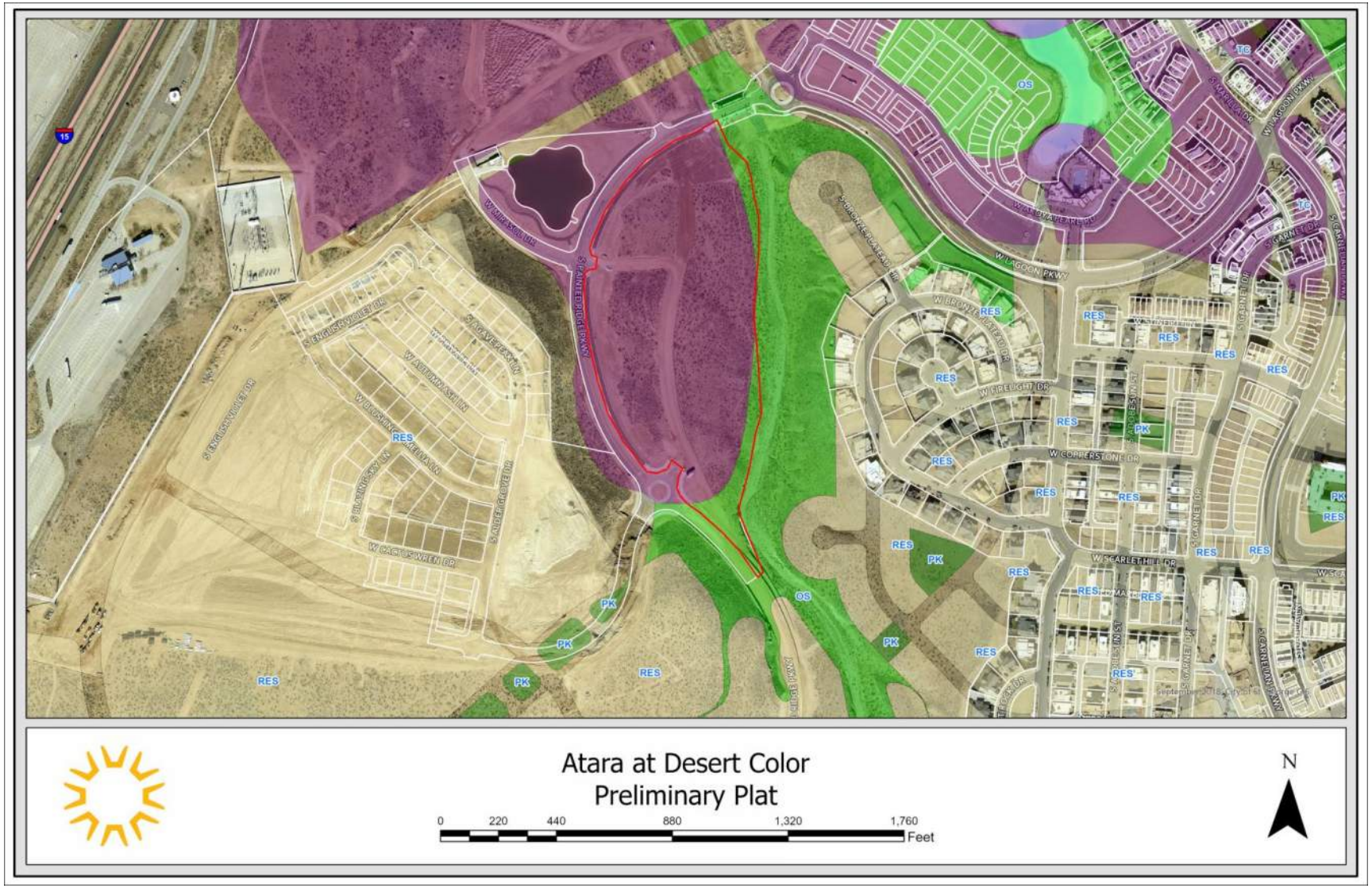
Aerial Map


Atara at Desert Color
Preliminary Plat
0
220
440
880
1,320
1,760
Feet
N

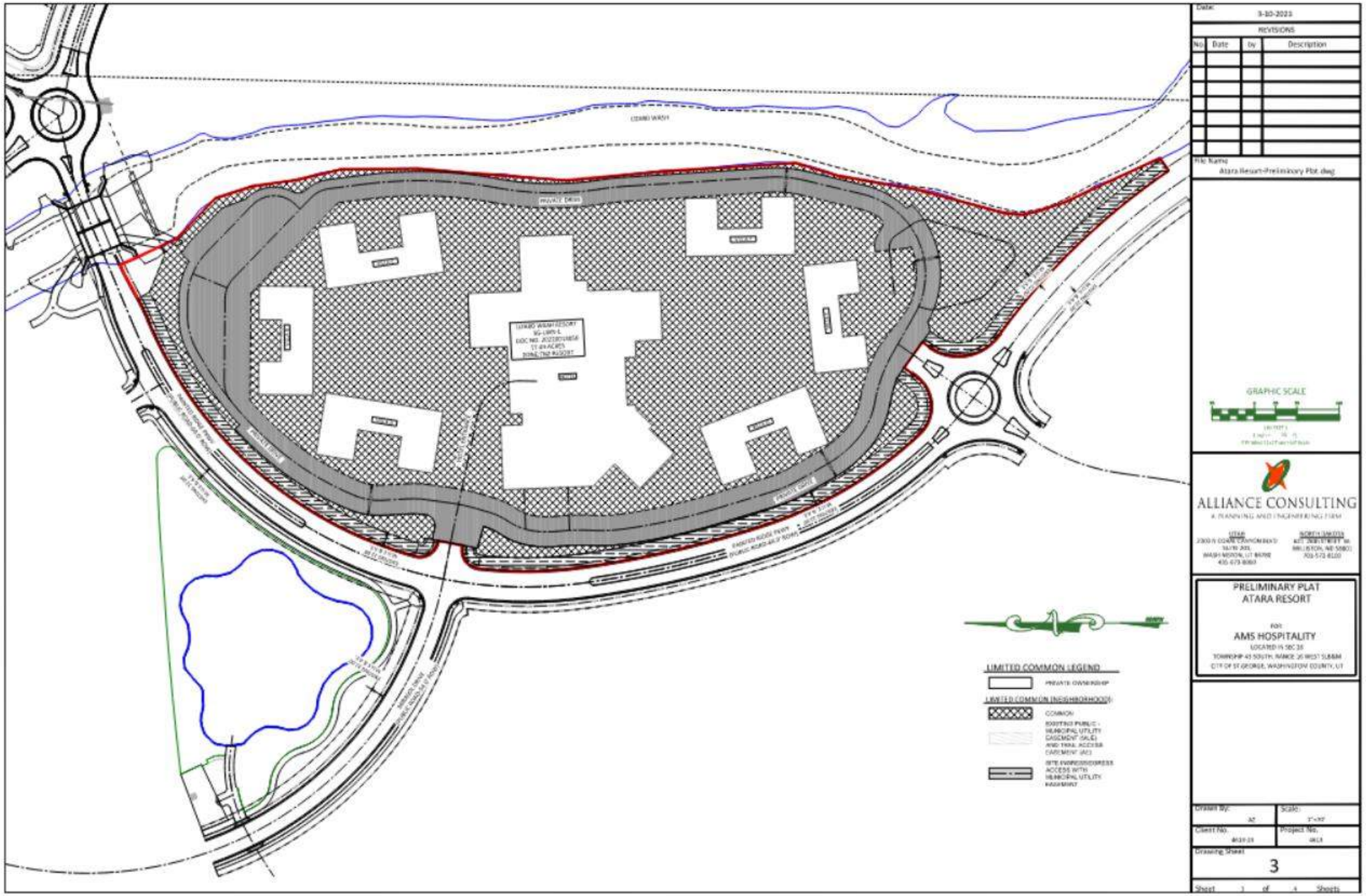
Zoning Map


PD-C
PD-R
W. LAGOON PKWY
S. GARNET DR
W. SCARLET HILT DR
W. COPPERSTONE DR
W. BRONZE BLAZE DR
W. EIRE LIGHT DR
S. ADDISON ST
W. CACTUS WREN DR
Atara at Desert Color
Preliminary Plat
0 220 440 880 1,320 1,760
Feet
N

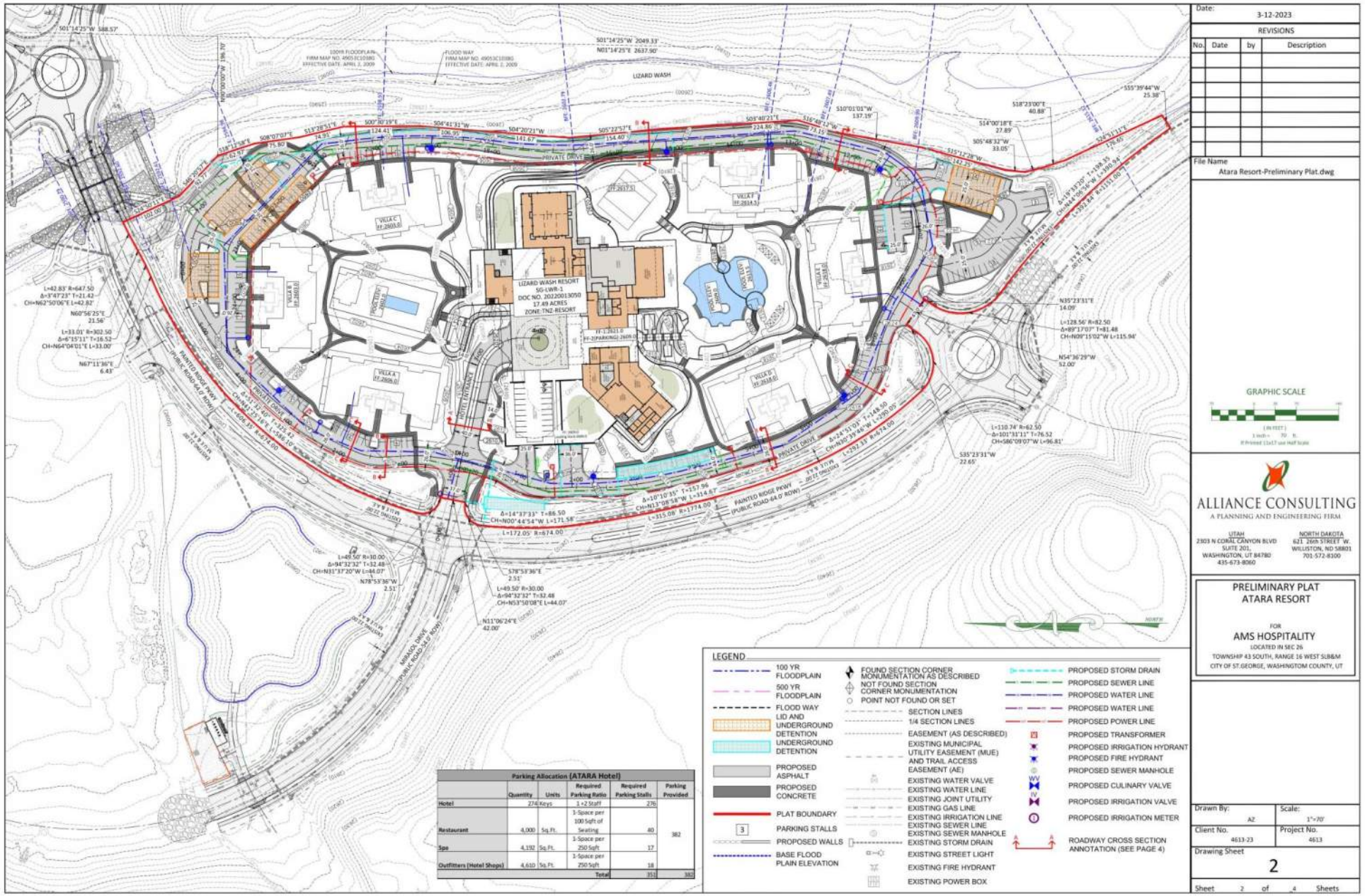
Land Use Map


Atara at Desert Color
Preliminary Plat
0
220
440
880
1,320
1,760
Feet
N
RES
PK
OS
TC

Plat


Date:
3-30-2023
REVISIONS
No. Date By Description
File Name:
Atara Resort-Preliminary Plat.dwg
GRAPHIC SCALE
ALLIANCE CONSULTING
A PLANNING AND ENGINEERING FIRM
PRELIMINARY PLAT
ATARA RESORT
FOR:
AMS HOSPITALITY
LIMITED COMMON LEGEND
PRIVATE OWNERSHIP
LIMITED COMMON (NEIGHBORHOOD)
COMMON
Drawn By:
AZ
Scale:
Client No.
Project No.
Drawing Sheet
3
Sheet 1 of 1 Sheets

Plat


LIZARD WASH RESORT
SG-LWR-1
DOC.NO. 20220013050
17.49 ACRES
ZONE-TNZ-RESORT
PAINTED RIDGE PKWY
(PUBLIC ROAD-64.0' ROW)
MIMOSA DRIVE
(PUBLIC ROAD-64.0' ROW)
LIZARD WASH
PRIVATE DRIVE
Parking Allocation (ATARA Hotel)
Quantity
Units
Required Parking Ratio
Required Parking Stalls
Parking Provided
Hotel
274 Keys
1 +2 Staff
276
Restaurant
4,000 Sq.Ft.
1-Space per 100 Sqft of Seating
40
382
Spa
4,192 Sq.Ft.
1-Space per 250 Sqft
17
Outfitters (Hotel Shops)
4,610 Sq.Ft.
1-Space per 250 Sqft
18
Total
351
382
LEGEND
100 YR FLOODPLAIN
500 YR FLOODPLAIN
FLOOD WAY
LID AND UNDERGROUND DETENTION
UNDERGROUND DETENTION
PROPOSED ASPHALT
PROPOSED CONCRETE
PLAT BOUNDARY
PARKING STALLS
PROPOSED WALLS
BASE FLOOD PLAIN ELEVATION
FOUND SECTION CORNER MONUMENTATION AS DESCRIBED
NOT FOUND SECTION CORNER MONUMENTATION
POINT NOT FOUND OR SET
SECTION LINES
1/4 SECTION LINES
EASEMENT (AS DESCRIBED)
EXISTING MUNICIPAL UTILITY EASEMENT (MUE) AND TRAIL ACCESS EASEMENT (AE)
EXISTING WATER VALVE
EXISTING WATER LINE
EXISTING JOINT UTILITY
EXISTING GAS LINE
EXISTING IRRIGATION LINE
EXISTING SEWER LINE
EXISTING SEWER MANHOLE
EXISTING STORM DRAIN
EXISTING STREET LIGHT
EXISTING FIRE HYDRANT
EXISTING POWER BOX
PROPOSED STORM DRAIN
PROPOSED SEWER LINE
PROPOSED WATER LINE
PROPOSED WATER LINE
PROPOSED POWER LINE
PROPOSED TRANSFORMER
PROPOSED IRRIGATION HYDRANT
PROPOSED FIRE HYDRANT
PROPOSED SEWER MANHOLE
PROPOSED CULINARY VALVE
PROPOSED IRRIGATION VALVE
PROPOSED IRRIGATION METER
ROADWAY CROSS SECTION ANNOTATION (SEE PAGE 4)
Date: 3-12-2023
REVISIONS
No. Date by Description
File Name
Atara Resort-Preliminary Plat.dwg
GRAPHIC SCALE
ALLIANCE CONSULTING
A PLANNING AND ENGINEERING FIRM
UTAH
2303 N CORAL CANYON BLVD SUITE 201, WASHINGTON, UT 84780
435-673-8060
NORTH DAKOTA
621 26th STREET W. WILLISTON, ND 58801
701-572-8100
PRELIMINARY PLAT
ATARA RESORT
FOR
AMS HOSPITALITY
LOCATED IN SEC 26
TOWNSHIP 43 SOUTH, RANGE 16 WEST SLB&M
CITY OF ST.GEORGE, WASHINGTON COUNTY, UT
Drawn By: AZ
Scale: 1"=70'
Client No. 4613-23
Project No. 4613
Drawing Sheet 2
Sheet 2 of 4 Sheets

St.George
Community Development

ITEM 1C
Zone Change

PLANNING COMMISSION AGENDA REPORT: 02/28/2023
CONTINUED: 04/11/2023

Rosewood Townhomes Zone Change (Case No. 2023-ZC-001)		
Request:	This is a request to change the zone from R-1-8 (Single Family Residential minimum 8,000 sq ft lot size), R-1-10 (Single Family Residential minimum 10,000 sq ft lot size) to PD-R (Planned Development Residential).	
Applicant:	Tonaquint Inc.	
Representative:	Tim Stewart/Jared Bates	
Location:	The property is located at 1100 W Curley Hollow Dr.	
General Plan:	MDR (Medium Density Residential)	
Existing Zoning:	R-1-8 (Single Family Residential 8,000 minimum lot size & R-1-10 (Single Family Residential 10,000 minimum lot size)	
Surrounding Zoning:	North	R-1-8 (Single Family Residential 8,000 minimum lot size)
	South	R-1-10 (Single Family Residential 10,000 minimum lot size) & R-3 (Multi-Family).
	East	R-1-10 (Single Family Residential 10,000 minimum lot size)
	West	R-1-8 (Single Family Residential 8,000 minimum lot size)
Land Area:	Approximately 14.99 acres	

Location of Zone Change Amendment

UPDATE TO THE REPORT:
This item came before the Planning Commission on February 28, 2023. At the meeting there was discussion about the landscaping between the buildings, due to the recommendations in the Geotech report. There was concern that there would not be any landscaping between buildings. The applicant has worked with a landscape architect and has submitted a landscape plan for review by the Planning Commission to address the Commissioners concerns.

BACKGROUND:
The Rosewood Townhomes project is requesting to change the zone from R-1-8 (Single Family Residential minimum 8,000 sq ft lot size), R-1-10 (Single Family Residential minimum 10,000 sq ft lot size) to PD-R (Planned Development Residential). The applicant is seeking approval to change the zone on 14.99 acres to build a townhome development consisting of 134 units. The property is generally located at 1100 W Curley Hollow Dr. The General Plan designation is MDR (Medium Density Residential) which fits the proposed development.

Please see the all the zoning requirements below:

Zoning Requirements			
Regulation	**Section Number**	**Proposal**	**Staff Comments**
Setbacks	10-7F-5	The applicants have not provided setbacks.	The required setbacks will be: Front: 15' Side: 10' ' Rear: 20'
Pedestrian Circulation Plan		The site plan provided shows exterior and interior sidewalks for pedestrian circulation	Staff will review the finalized site plan to ensure the circulation is adequate.
Height and Elevation	10-7F-2	The highest point is 27.5'	The PD-R zone allows for a 40' height. The applicant is under the maximum height.
Phasing Plan		There will be three phases	N/A
Landscape Plan	10-7F-6	A concept landscape plan showing where landscape will be has been included on the site plan map.	Staff will review the finalized site plan to make sure the parking lots will have 5% landscaping and the remaining landscaping meets the landscaping and street tree policies and the amenities required.
Utilities	10-7F-2	None shown	All utilities will be required to be

			underground, and all transformer equipment must be screened. We will ensure this is completed during site plan approval process.
Signs	10-7F-2	No signage has been provided.	The applicants will be required to pull a sign permit when they are ready to put in their signs.
Lighting	10-7F-2	A photometric plan has not been provided.	The parking lot lighting will be required to meet the regulations and be 1.0 foot candle or less at the property line. Staff will ensure it meets the regulations during the site plan process.
Lot Coverage	10-8D-4	No information given	The PD-R zone allows building coverage up to 50%. This will be verified during the site plan review process.
Solid Waste	10-7F-2	The site plan does not show the location of solid waste.	During site plan review, staff will ensure the solid waste receptacles are properly screened and meets all other requirements.
Overlay Zones	10-13	None	N/A
Parking	10-19-5	Parking provided: **356** stalls.	The proposal exceeds the required parking of 313 stalls for unit & guest parking.
EVCS And Bike Parking	10-19-6	No bike parking is shown. No EVCS conduit is shown	They will be required to provide bike racks for at least 2 bicycles. They will be required to provide conduit for future electrical charging station for at least 3 parking stalls.

Preliminary Plat:
A preliminary plat is included with this submittal. The preliminary plat shows the proposed layout of the lots, roads, open space and road cross sections. This proposal is for 134 townhomes on 14.99 acres for a density of 8.93 units and acre. The units consist of 4,5 and 6 plex units ranging in size from 4682 sq ft to 7009 sq ft. The proposal went to Hillside committee and the committee recommended approval of the project with no conditions.

RECOMMENDATION ZONE CHANGE:
Staff recommends approval of this Zone Change Amendment with the following conditions:

1. The applicant meets all requirements found in Section 10-7F of the Zoning Regulations.

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 Rosewood Townhomes zone change from Single Family Residential to PD-R (Planned Development Residential) to develop a 134-unit townhome community.

FINDINGS FOR APPROVAL:

1. The proposed zone change meets the requirements of the city ordinance.
2. There will be adequate parking on site to facilitate the development.

Narrative

Zone Change – Rosewood Townhomes

The purpose of this zone change is to revise the land use designation for 14.99 acres of Parcel #SG-6-3-2-2001 to allow for townhome units.

A. 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.:

It is proposed to develop the Rosewood Townhome project consisting of 27 buildings and a total of 134 units located northeast of the intersection of Curley Hollow Drive and 1150 West. Project summary tables are shown on the attached Site Plan including building coverage, parking, landscaped areas, and amenity areas.

B. Height and Elevations: The text shall indicate the type, character and proposed height of all buildings. The plot plan, elevations and perspective drawings may be prepared as necessary by the applicant to help the planning commission and city council to better understand the proposal.

The maximum building height for the Rosewood Townhomes will be 27.5 feet. Elevation views along with colored renderings of the buildings have been included to illustrate the proposed project.

C. Density: The density in terms of dwelling units per gross acre of land shall be indicated.

The Rosewood Townhome project proposes 134 units on 14.99 acres for a density of 8.93 units per acre.

D. Schools, Churches and Open Spaces: The location of any proposed school sites, churches, parks or other common or open spaces shall be identified.

There are no school sites, parks, or churches planned within this project. The closest church is 600 feet and the closest school is 200 feet away from the project boundary. The closest park is approximately 0.5’ miles from the project boundary.

E. Phasing Plan: A phasing plan, if the development is proposed to be developed in phases, shall be submitted.

The project will be constructed in 3 phases as shown in attached Site Plan.

F. Topography: Topography at contour intervals of two feet (2') shall be submitted unless waived by the planning staff.

Topographical information is provided with the Site Plan. Generally, the site slopes towards the southeast to Curley Hollow Dr.

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

A color project site plan has been provided showing the general location of turf and planting areas.

H. Area Reserved for Landscaping: The amount of land area reserved for landscaping shall be indicated.

Approximately 8.55 acres of the project are reserved for landscaping or open spaec.

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

The townhome project will utilize individual containers.

K. Lighting Plan: The plans submitted shall include a general lighting plan indicating location of lights to be installed on the site.

All lighting shall be demonstrated to be 'dark sky style' friendly. Street light locations will be included on the Site Plan.

L. Turning Space: Safe and convenient turning space shall be provided for cars, sewer vehicles, refuse collection vehicles, firefighting equipment, etc., at the end of private drives and dead end streets. (1998 Document § 17-4; amd. 2003 Code)

The Rosewood Townhome project will be accessed by 42' wide public streets. Safe and convenient turning space is provided for cars, trucks, sewer vehicles, refuse collection vehicles, firefighting equipment, etc.

M. Signs: Overall sign program if proposed signage differs from what is allowed as outlined in the sign ordinance set forth in title 9, chapter 13 of this code. (Ord. 1-3-2000, 1-20-2000)

Project entry signs shall comply with the sign ordinance.

Public Letters

23 February 2023

RE: Case No. 2023-ZC-001

Mike Hadley, GISP Senior Planner

Dear Mr. Hadley,

I'm writing in response to your notice regarding a zoning change to accommodate 134 T.H.'s near 110 Curley Hollow Dr. As an owner at Blackhawk my concerns are increased congestion, safety, long term neighborhood desirability, environmental and water-Sewer demands. Everyone is aware of drought conditions, water use issues and its shrinking availability. Standards for clean air and pollution (+/- electric vs. combustion engine) will persist many years into the future. Mass transit doesn't appear a current fit, everyone will continue driving to reach multiple services, (e.g. med/dental, church and school activities, etc.). With the rapid growth and increased housing demands, I understand the need for increased density, yet at what expense to avoid a "concentrated" overcrowding and continued expectations towards livability. It's a beautiful city and area with many amenities to enjoy.

I simply recommend some caution with a long look forward. Would it be reasonable to ask for fewer units for approval?

Thank you Mr. Hadley for reading. I've attempted to be concise.

Respectfully submitted,

William K. Knudson

[redacted]

St.George
THE BRIGHTER SIDE

Michael Hadley <michael.hadley@sgcity.org>

Rosewood Townhomes Case No. 2023-ZC-001.

1 message

Adam Meyer [redacted] Sat, Feb 25, 2023 at 10:46 AM
To: michael.hadley@sgcity.org

Mr. Hadley,

This letter is regarding the proposal to change the zoning at 110 W Curley Hollow Drive to PD-R for the Rosewood Townhomes Case No. 2023-ZC-001.

My apologies for not being able to attend in person, but I will be out of the Country at this time. I do have to express the frustration and deceitful appearance of receiving a letter of this nature dated February 17th that I actually received less than three business days before the scheduled hearing.

In short, this proposal is nothing more than a way for a builder to multiply profits and a tax grab for the City. This area is already congested to the point it may take 10 minutes or more for me to be able to pull out of my neighborhood onto Dixie Drive. Adding 134 Units, and at least double that in vehicles, will no doubt make it a traffic nightmare on an already busy and dangerous road, but the traffic issues are nothing compared to the lack of water we already face as a community. As a Senior Planner I know you must understand that for a community to be sustainable you have to have the natural resources to support the population. We clearly don't have that here, but yet you continue to stamp building permits left and right for the sake of financial gain.

For the City to approve this request may be fiscally beneficial for you, but completely irresponsible from a congestion and natural resources perspective. Please note my vote is to reject this proposal.

Bigger is not always better! Keep St. George sustainable!

Adam Meyer
[redacted]

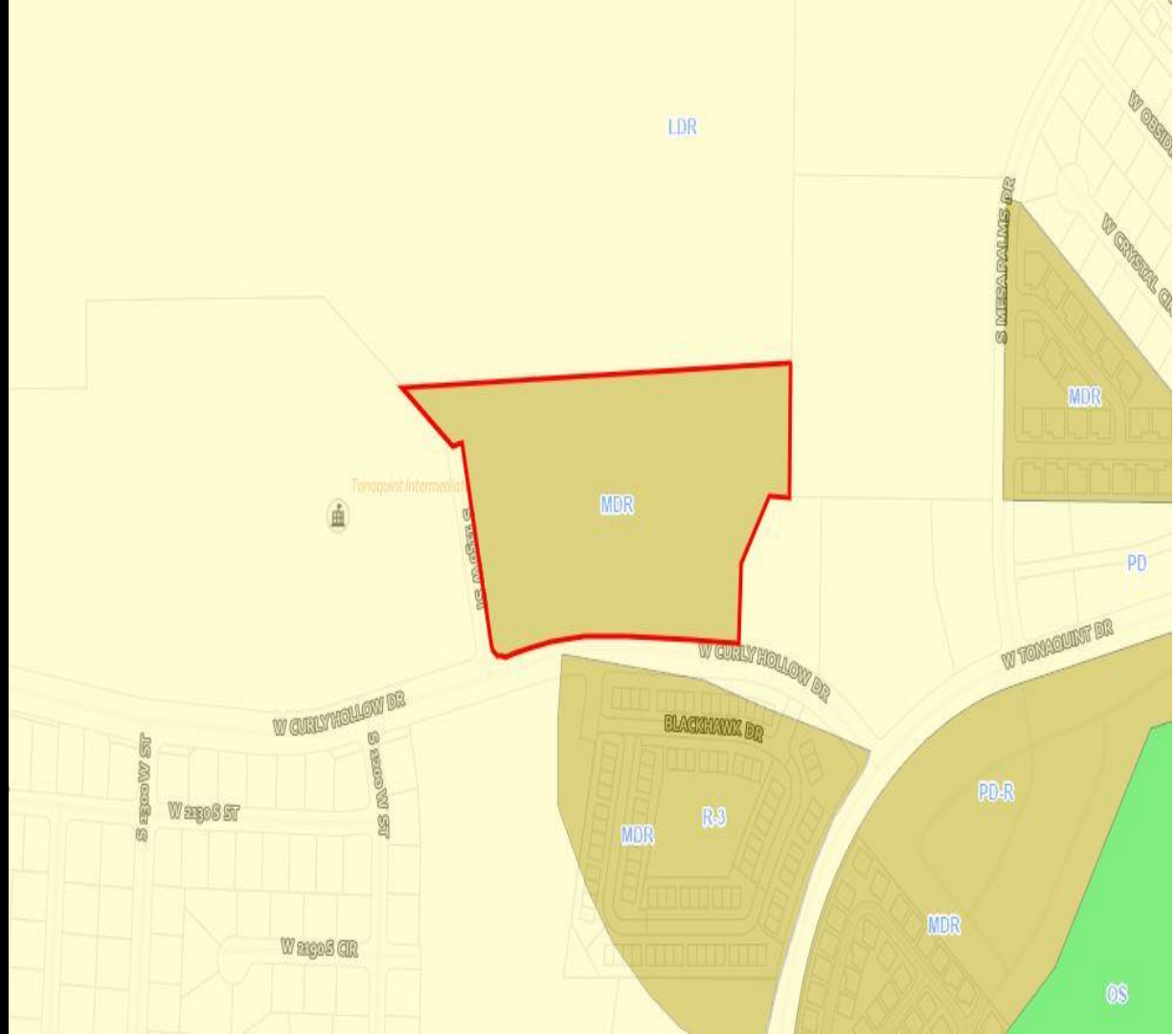
PowerPoint Presentation

Rosewood Townhomes 2023-ZC-001

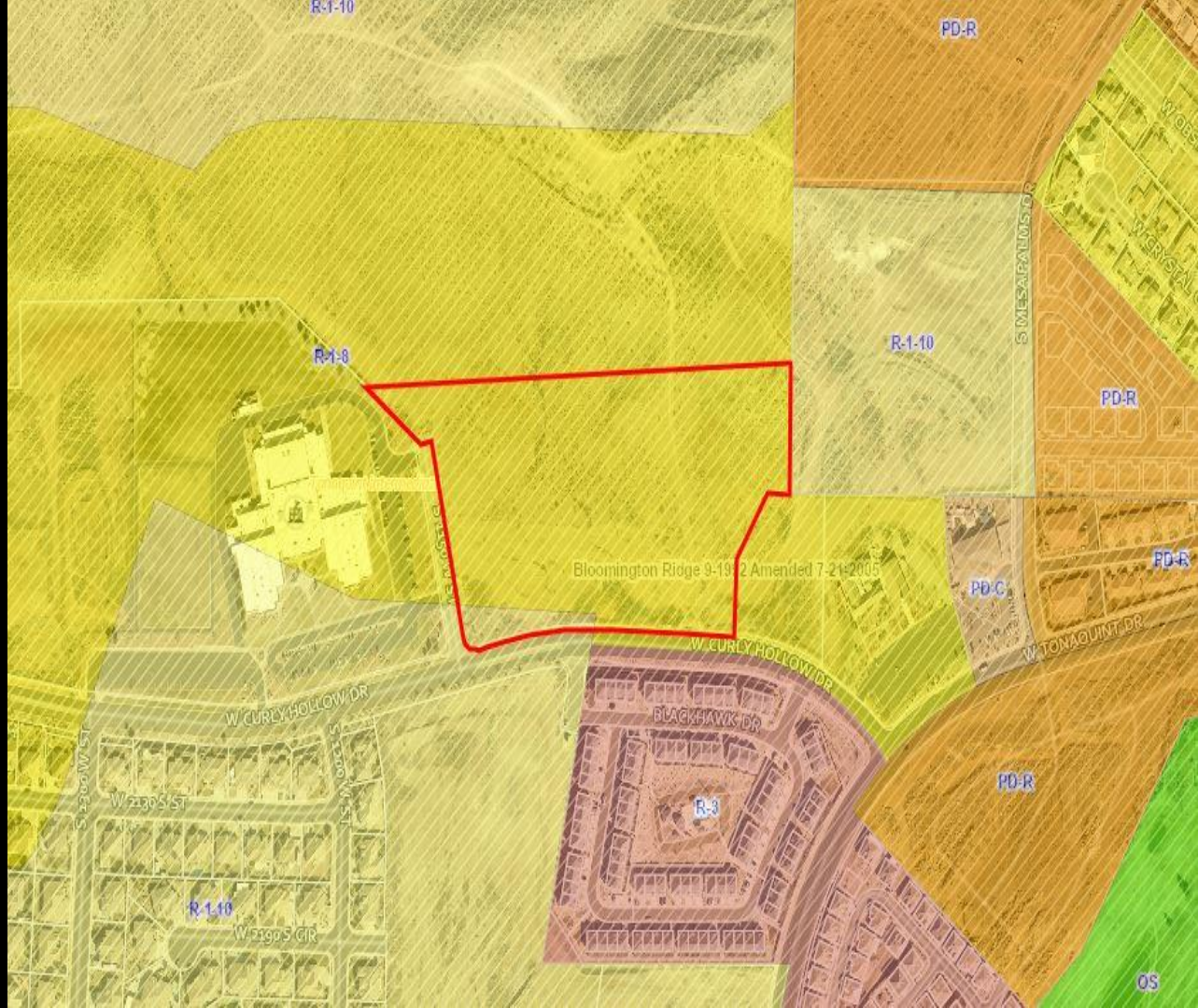
Aerial Map


W CURLY HOLLOW DR
S 1350 W ST
S MESA PALMS DR
BLACKHAWK DR
S 1300 W ST
W 2130 S ST
S 1200 W ST
W 2190 S CIR

General Plan Map



Zoning Map


R-1-10
PD-R
R-1-8
R-1-10
S MESA PALMS DR
PD-R
Bloomington Ridge 9-19-2 Amended 7-21-2005
PD-C
PD-R
W CURLY HOLLOW DR
W TONAQUINT DR
W CURLY HOLLOW DR
BLACK HAWK DR
PD-R
S 2130 W ST
W 2130 S ST
S 2200 W ST
R-3
R-1-10
W 2199 S CIR
OS

Updated Site Plan/Open Space/Landscape Plan

Elevations

ROSEWOOD PASEO TOWNHOMES
FRONT CONCEPTUAL ELEVATION

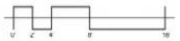
ROSEWOOD PASEO TOWNHOMES
REAR CONCEPTUAL ELEVATION

DESERT EDGE architecture

Elevations

ROSEWOOD PASEO TOWNHOMES

LEFT CONCEPTUAL ELEVATION



ROSEWOOD PASEO TOWNHOMES

RIGHT CONCEPTUAL ELEVATION

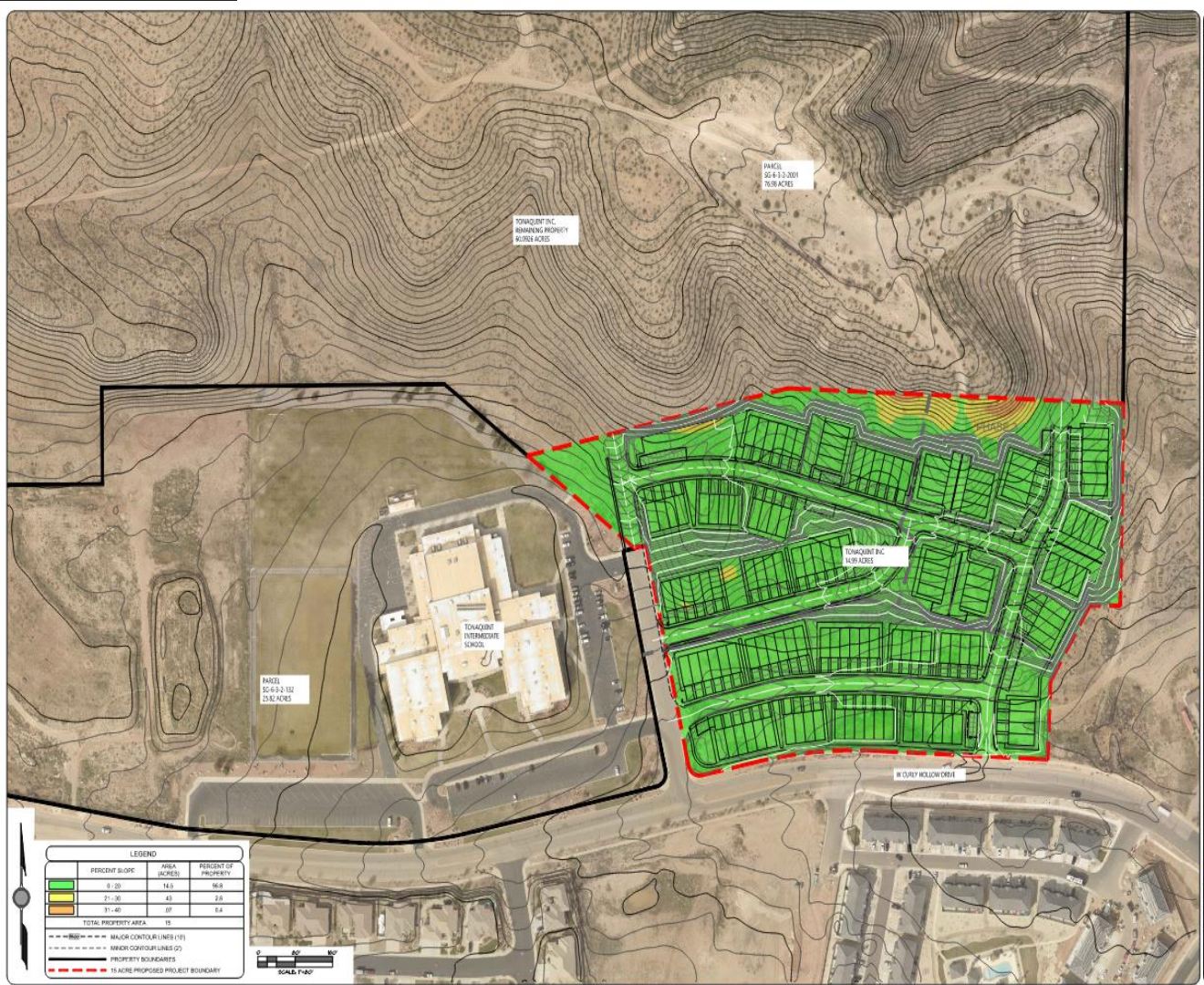
DESERT EDGE architecture

Elevations

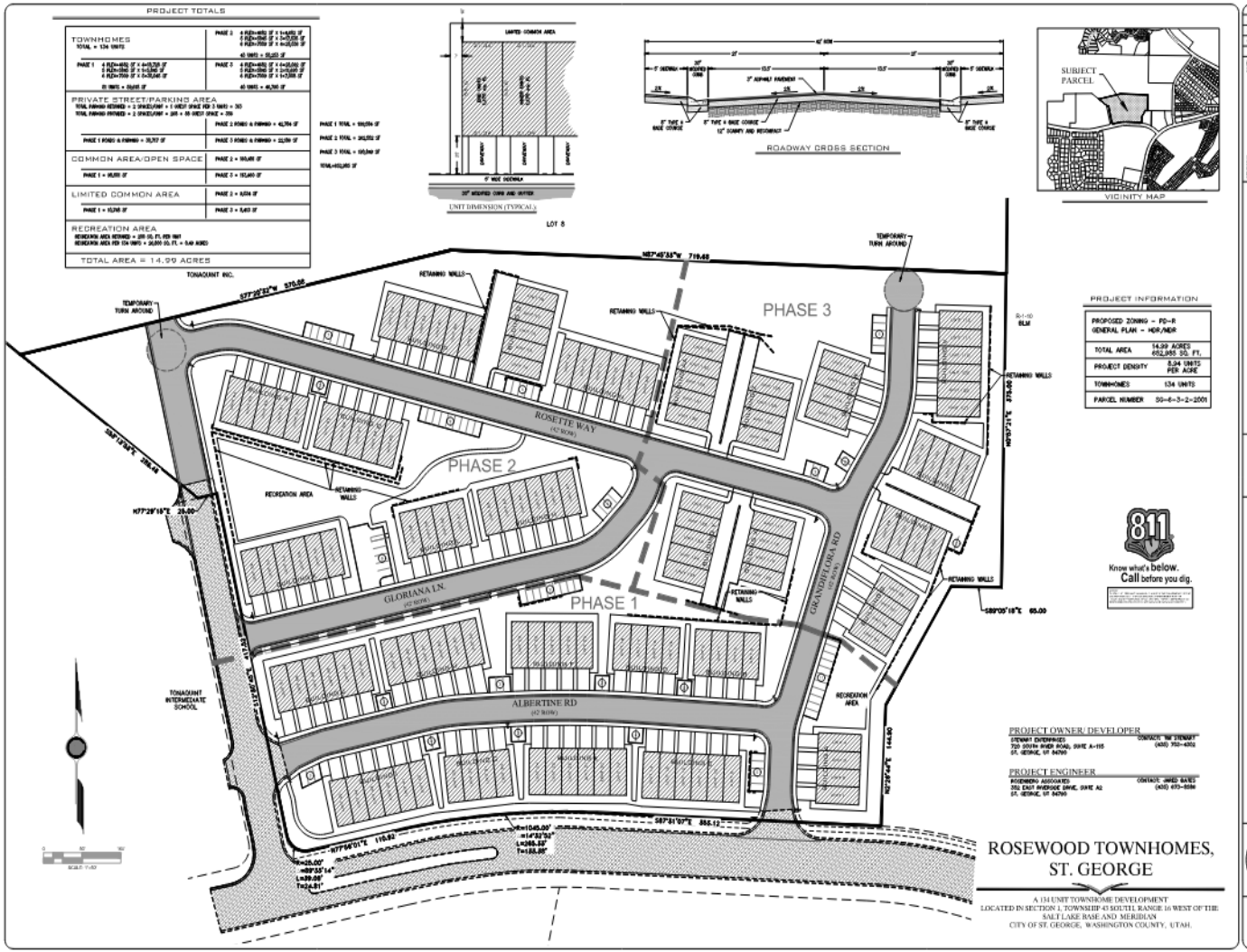
Elevations

Elevations

Hillside


PARCEL
SG-6-3-2-2001
76.98 ACRES
TONAQUINT INC.
REMAINING PROPERTY
80.09 ACRES
TONAQUINT INC.
14.99 ACRES
TONAQUINT
INTERMEDIATE
SCHOOL
PARCEL
SG-6-3-2-152
23.62 ACRES
W CURLY HOLLOW DRIVE
LEGEND
PERCENT SLOPE
AREA (ACRES)
PERCENT OF PROPERTY
0 - 20
14.9
96.8
21 - 30
.43
2.8
31 - 40
.07
0.4
TOTAL PROPERTY AREA
15
MAJOR CONTOUR LINES (10')
MINOR CONTOUR LINES (2')
PROPERTY BOUNDARIES
15 ACRE PROPOSED PROJECT BOUNDARY
SCALE: 1"=80'
ROSENBERG
ASSOCIATES
CIVIL ENGINEERS • LAND SURVEYORS
SLOPE ANALYSIS WITH SITE AND GRADING
FOR
ROSEWOOD TOWNHOMES
ST. GEORGE
UTAH
SHEET
1

Preliminary Plat

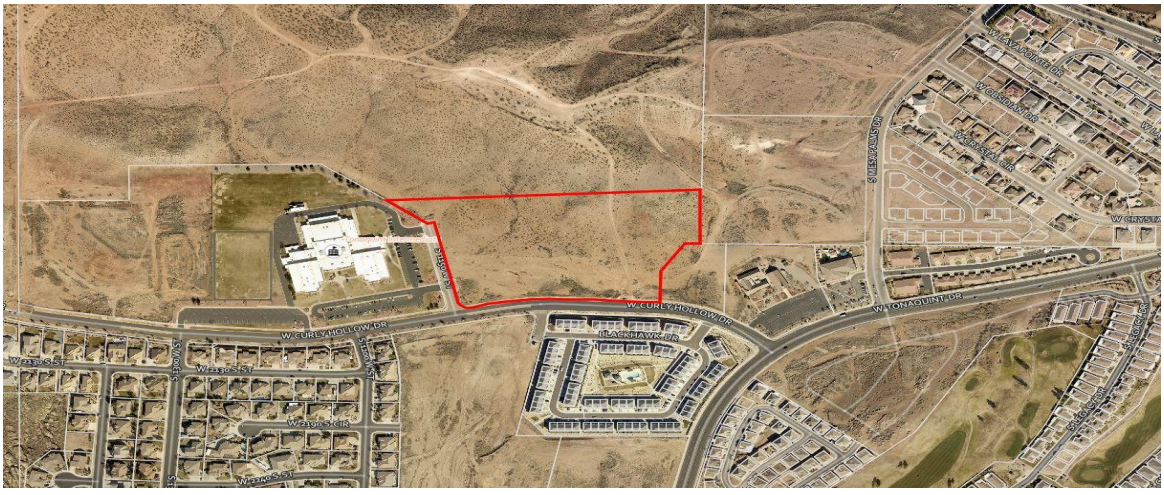


St.George
Community Development

ITEM 1D
Hillside Permit

HILLSIDE REVIEW BOARD AGENDA REPORT: **01/25/2022**
PLANNING COMMISSION AGENDA REPORT: **02/28/2023**
CONTINUED: **04/11/2023**

Rosewood Townhomes Hillside Development Permit (Case No. 2023-HS-001)		
Request:	A Hillside Development Permit to allow disturbance of areas in the 20-30%, 30-40% and 40% and above slope areas. This application is in anticipation of the construction of Rosewood Townhomes.	
Applicant:	Tim Stewart	
Representative:	Jared Bates	
Location:	1100 W Curly Hollow Dr	
General Plan:	MDR (Multi-Family Residential)	
Existing Zoning:	R-1-8, R-1-10	
Surrounding Zoning:	North	R-1-10 (Single Family Residential 10,000 sq ft lot)
	South	R-1-10 (Single Family Residential 10,000 sq ft lots) & R-3 (Multi-Family)
	East	R-1-10 (Single Family Residential 10,000 sq ft lots), PD-R (Planned Development Residential)
	West	R-1-8 (Single Family residential 8,000 sq ft lots)
Land Area:	Approximately 14.99 acres	



BACKGROUND

This is a request to obtain a hillside permit for the property located at 1100 W Curly Hollow Dr. The applicants are proposing to build a new townhome development on this property. This property is in the hillside overlay. Section 10-13A-7 of the Zoning Regulations 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.

B. For those portions of a proposed development with natural slopes twenty percent (20%) or less, development density follows the density and development standards in the underlying zone.

C. For those portions of a proposed development with natural slopes from twenty-one percent (21%) to thirty percent (30%), development activity shall not disturb more than thirty percent (30%) of the parcel within this slope category.

D. For those portions of a proposed development with natural slopes from thirty-one percent (31%) to forty percent (40%), development activity shall not disturb more than five percent (5%) of the area within this slope category.

E. A proposed development may not disturb slopes in excess of forty percent (40%).

10-13A-2: Slope and Slope Areas Determined

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.

EXHIBITS PROVIDED

1. Exhibit A – Site Plan
   "Exhibit A" in the packet shows the location of the new commercial development.

2. Exhibit B –Grading Plan
   "Exhibit B" in the packet shows the proposed preliminary grading plan.

3. Exhibit C – Slope Analysis Map
   "Exhibit C" in the packet shows the overall slope analysis for the area to be disturbed.

4. Exhibit D – Geotechnical Report
   "Exhibit D" – This is the Geotechnical report for Rosewood Townhomes.

5. Exhibit E – Drainage Report
   "Exhibit E – This is the Drainage Report for Rosewood Townhomes.

RECOMMENDATION

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).

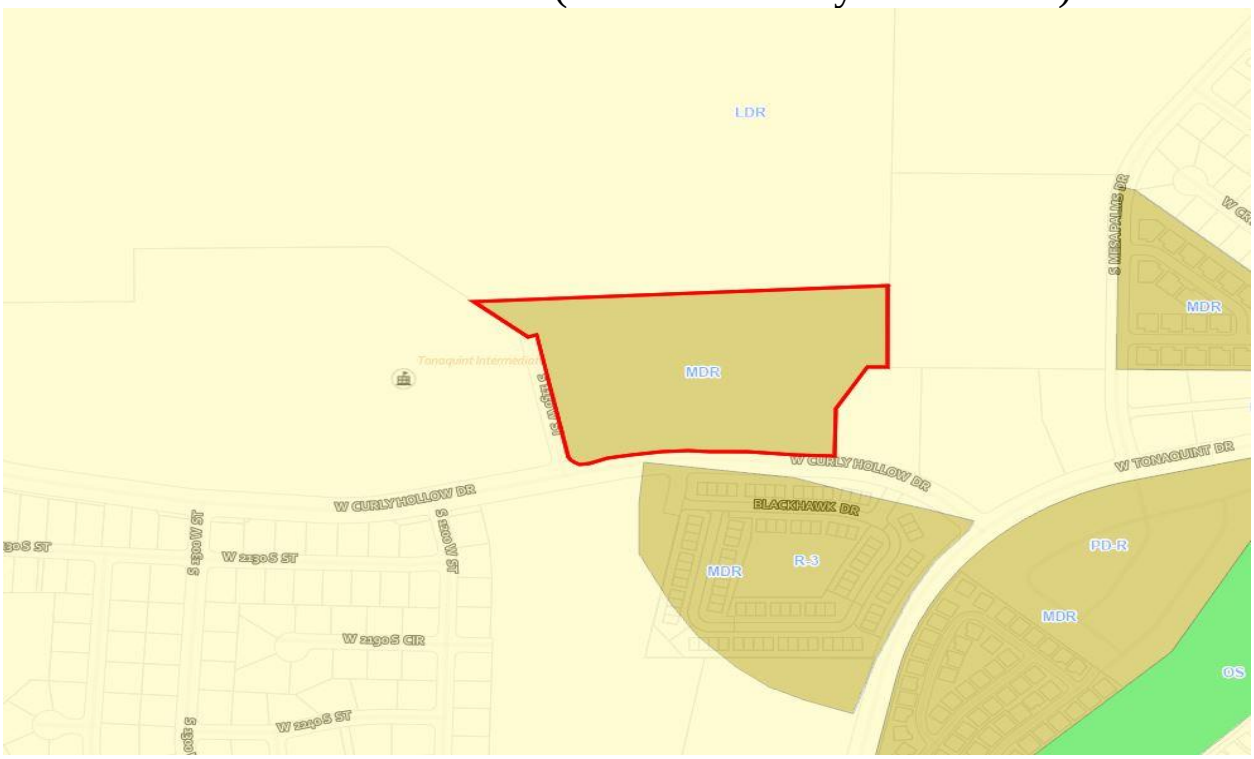
HILLSIDE:

The Hillside committee meet and reviewed the proposed hillside permit and recommended approval to the Planning Commission with no conditions.

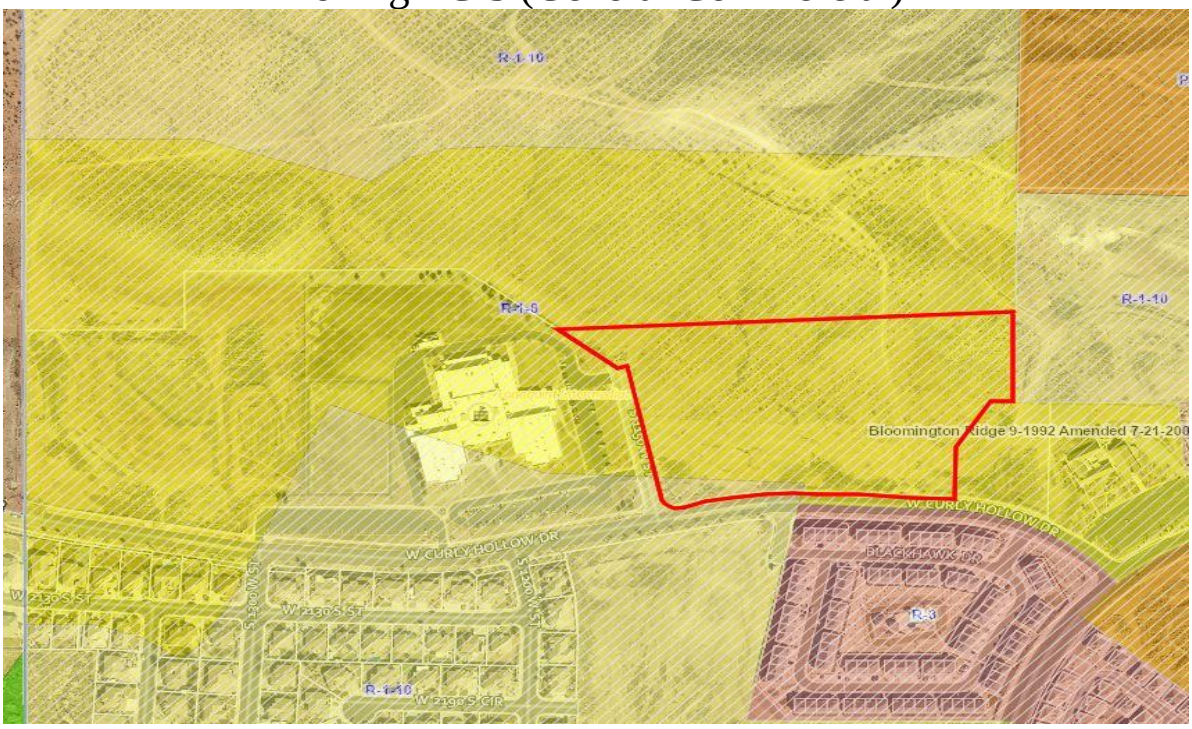
POSSIBLE MOTION:

The Planning Commission rec commends approval to the City Council for the Hillside permit for the Rosewood Townhomes with no conditions.

General Plan – MDR (Medium Density Residential)



Zoning - C-3 (General Commercial)



PHASE	BLDG #	PRIVATE STREET/PARKING	LIMITED COMMON	COMMON AREA/OPENSPACE
1	6 PLEX=42,054 SF 4 PLEX=18,728 SF TOTALS=60,782 SF	38,547 SF	6 PLEX= 7,560 SF 4 PLEX= 3,368 SF TOTALS=10,928 SF	87,850 SF
2	6 PLEX=28,036 SF 4 PLEX=23,410 SF TOTALS=51,446 SF	62,197 SF	6 PLEX= 5,040 SF 4 PLEX= 4,210 SF TOTALS= 9,250 SF	139,412 SF
3	6 PLEX= 7,009 SF 4 PLEX=37,456 SF TOTALS=44,465 SF	30,856 SF	6 PLEX= 1,260 SF 4 PLEX= 6,736 SF TOTALS= 7,996 SF	109,256 SF
TOTALS	6 PLEX= 77,099 SF 4 PLEX= 79,594 SF TOTALS=156,693 SF	131,600 SF	28,174 SF	336,518 SF

PROJECT TOTAL = 652,985 SQ. FT.

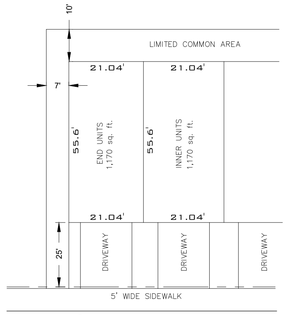
PROJECT INFORMATION

PROPOSED ZONING – PD GENERAL PLAN – HDR/MDR	
TOTAL AREA	14.99 ACRES 652,985 SQ. FT.
PROJECT DENSITY	8.94 UNITS PER ACRE
TOWNHOMES	134 UNITS
PARCEL NUMBER	SG-6-3-2-2001

RECREATION AREA REQUIRED = 200 SQ. FT. PER UNIT
RECREATION AREA PER 134 UNITS = 26,800 SQ. FT. = 0.49 ACRES

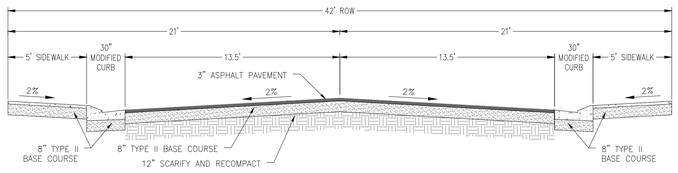
CUT/FILL

CUT = 41,849 CY
FILL = 35,035 CY
NET(CUT) = 6,814 CY

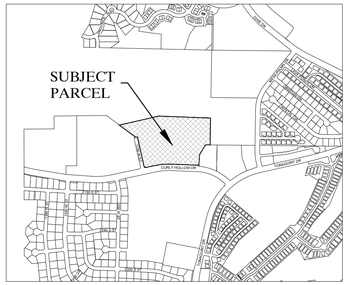


30" MODIFIED CURB AND GUTTER

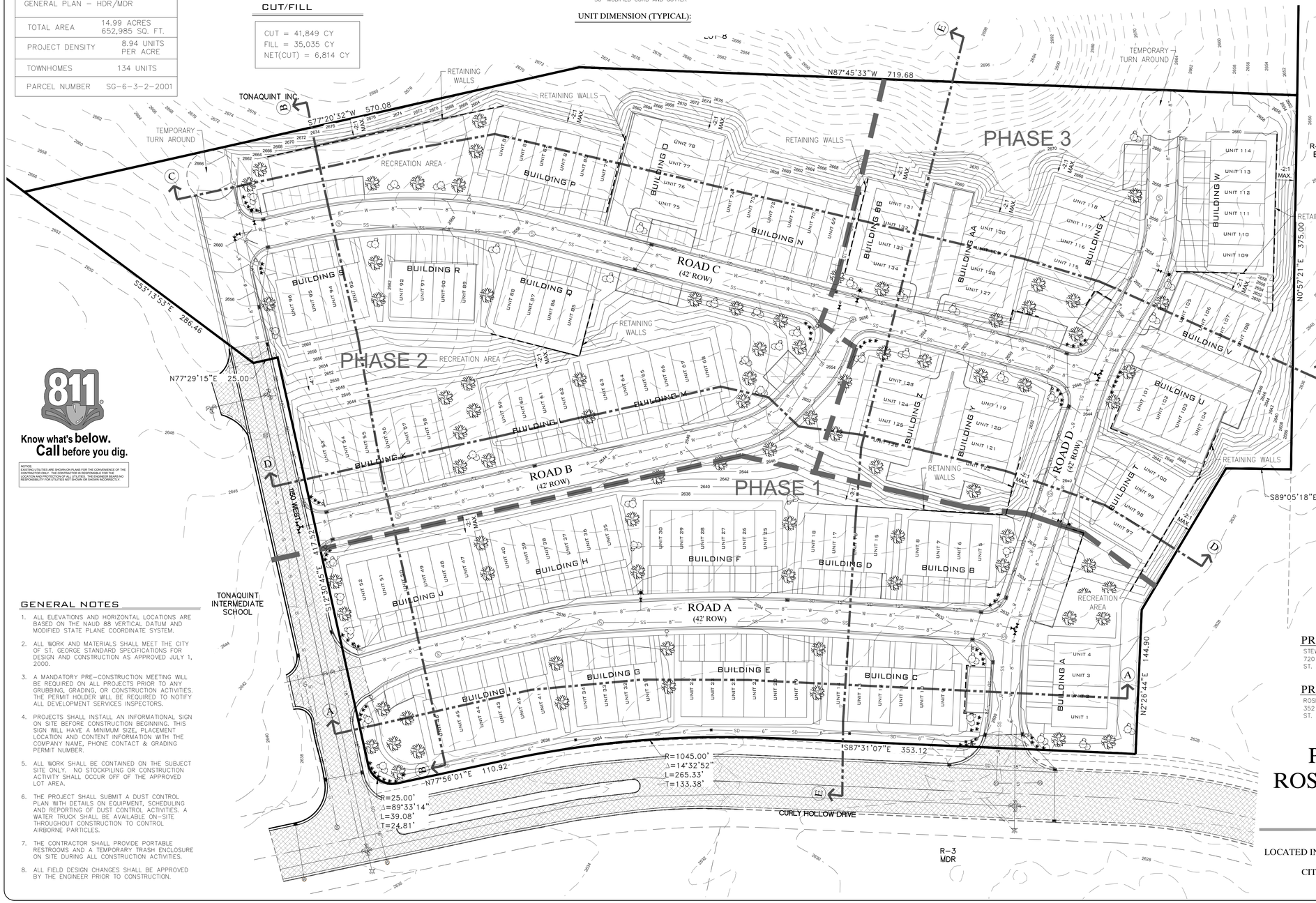
UNIT DIMENSION (TYPICAL):



ROADWAY CROSS SECTION



VICINITY MAP



LEGEND

- EXISTING 1' CONTOUR
- EXISTING 5' CONTOUR
- PROPOSED 1' CONTOUR
- PROPOSED 5' CONTOUR
- EXISTING ASPHALT PAVEMENT
- PROPOSED ASPHALT PAVEMENT
- PROPOSED BLOCK WALL
- EXISTING WATER
- EXISTING SANITARY SEWER
- EXISTING IRRIGATION
- EXISTING STORM DRAIN
- PROPOSED WATER
- PROPOSED SANITARY SEWER
- PROPOSED STORM DRAIN
- PROPOSED SEWER MANHOLE
- PROPOSED FIRE HYDRANT
- PROPOSED CATCH BASIN

0 50' 100'
SCALE: 1"=50'

GENERAL NOTES

1. ALL ELEVATIONS AND HORIZONTAL LOCATIONS ARE BASED ON THE NAUD 88 VERTICAL DATUM AND MODIFIED STATE PLANE COORDINATE SYSTEM.
2. ALL WORK AND MATERIALS SHALL MEET THE CITY OF ST. GEORGE STANDARD SPECIFICATIONS FOR DESIGN AND CONSTRUCTION AS APPROVED JULY 1, 2000.
3. A MANDATORY PRE-CONSTRUCTION MEETING WILL BE REQUIRED ON ALL PROJECTS PRIOR TO ANY GRUBBING, GRADING, OR CONSTRUCTION ACTIVITIES. THE PERMIT HOLDER WILL BE REQUIRED TO NOTIFY ALL DEVELOPMENT SERVICES INSPECTORS.
4. PROJECTS SHALL INSTALL AN INFORMATIONAL SIGN ON SITE BEFORE CONSTRUCTION BEGINNING. THIS SIGN WILL HAVE A MINIMUM SIZE, PLACEMENT LOCATION AND CONTENT INFORMATION WITH THE COMPANY NAME, PHONE CONTACT & GRADING PERMIT NUMBER.
5. ALL WORK SHALL BE CONTAINED ON THE SUBJECT SITE ONLY. NO STOCKPILING OR CONSTRUCTION ACTIVITY SHALL OCCUR OFF OF THE APPROVED LOT AREA.
6. THE PROJECT SHALL SUBMIT A DUST CONTROL PLAN WITH DETAILS ON EQUIPMENT, SCHEDULING AND REPORTING OF DUST CONTROL ACTIVITIES. A WATER TRUCK SHALL BE AVAILABLE ON-SITE THROUGHOUT CONSTRUCTION TO CONTROL AIRBORNE PARTICLES.
7. THE CONTRACTOR SHALL PROVIDE PORTABLE RESTROOMS AND A TEMPORARY TRASH ENCLOSURE ON SITE DURING ALL CONSTRUCTION ACTIVITIES.
8. ALL FIELD DESIGN CHANGES SHALL BE APPROVED BY THE ENGINEER PRIOR TO CONSTRUCTION.

811 Know what's below. Call before you dig.

NOTICE:
EXISTING UTILITIES ARE SHOWN ON PLANS FOR THE CONVENIENCE OF THE CONTRACTOR. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY FOR LOCATION AND PROTECTION OF ALL UTILITIES. THE ENGINEER BEARS NO RESPONSIBILITY FOR UTILITIES NOT SHOWN OR SHOWN INCORRECTLY.

PROJECT OWNER/ DEVELOPER

STEWART ENTERPRISES
720 SOUTH RIVER ROAD, SUITE A-115
ST. GEORGE, UT 84790
CONTACT: TIM STEWART
(435) 703-4302

PROJECT ENGINEER

ROSENBERG ASSOCIATES
352 EAST RIVERSIDE DRIVE, SUITE A2
ST. GEORGE, UT 84790
CONTACT: JARED BATES
(435) 673-8586

PRELIMINARY PLAT ROSEWOOD TOWNHOMES, ST. GEORGE

A 134 UNIT TOWNHOME DEVELOPMENT
LOCATED IN SECTION 1, TOWNSHIP 43 SOUTH, RANGE 16 WEST OF THE SALT LAKE BASE AND MERIDIAN
CITY OF ST. GEORGE, WASHINGTON COUNTY, UTAH.

DATE: 05/05/2022
JOB NO.: 13231-22
DESIGNED BY: ALN
CHECKED BY: JWB
DWG: CON PLANS

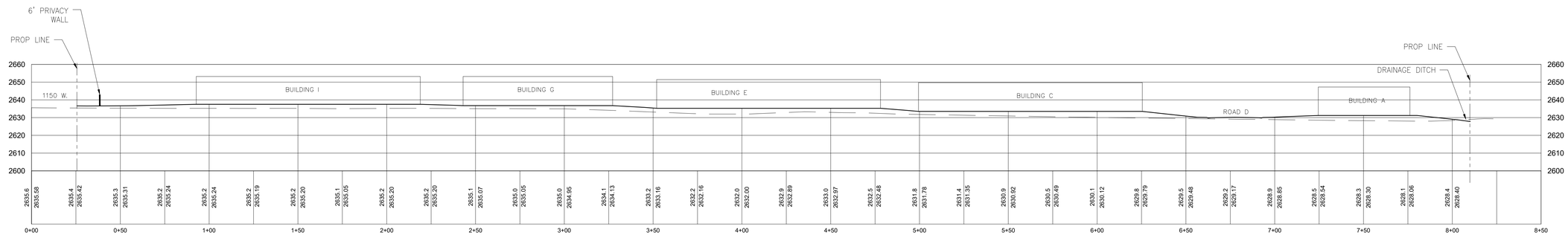
DATE | REVISIONS

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.racivil.com

PRELIMINARY PLAT
FOR
ROSEWOOD TOWNHOMES
ST GEORGE
UTAH

PROFESSIONAL ENGINEER
JARED W. BATES
12/9/2022
7865879
STATE OF UTAH

SHEET
1
1 OF 3 SHEETS



SECTION A-A

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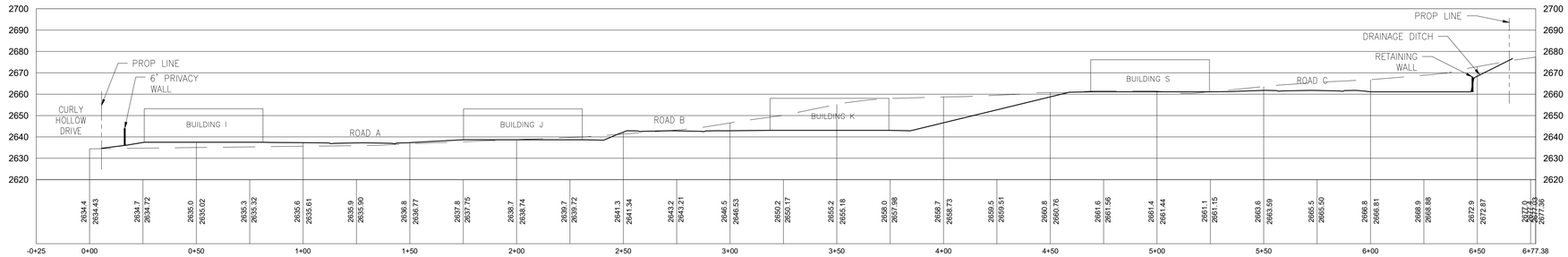
VERT. SCALE = 1" = 40'



SECTION B-B

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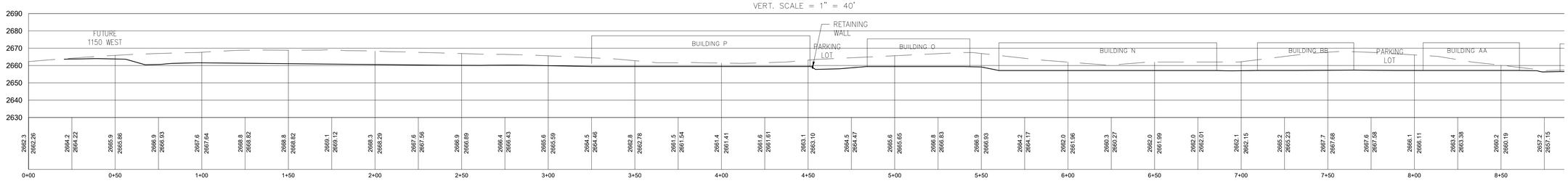

SECTION C-C

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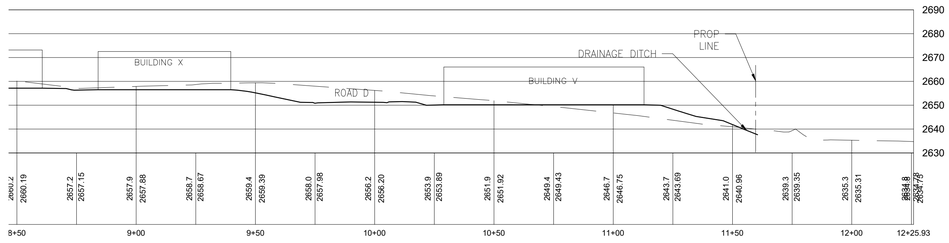

SECTION C-C (CONT.)

HORIZ. SCALE = 1" = 40'
VERT. SCALE = 1" = 40'

DATE: 05/05/2022
JOB NO.: 13231-22
DESIGNED BY: ALN
CHECKED BY: JWB
DWG: CON PLANS
DATE
REVISIONS

ROSENBERG ASSOCIATES
CIVIL ENGINEERS • LAND SURVEYORS

352 East Riverside Drive, Suite A-2 St. George, Utah 84790
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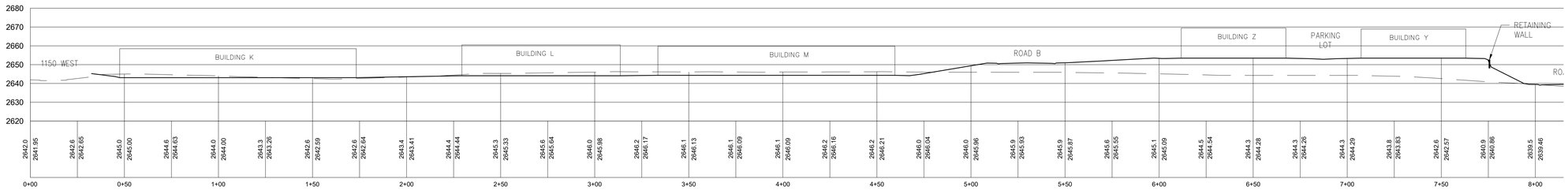
CROSS SECTIONS FOR ROSEWOOD TOWNHOMES

ST GEORGE UTAH

PROFESSIONAL ENGINEER
JARED W. BATES
12/20/2022
STATE OF UTAH

SHEET
2
2 OF 3 SHEETS



SECTION D-D

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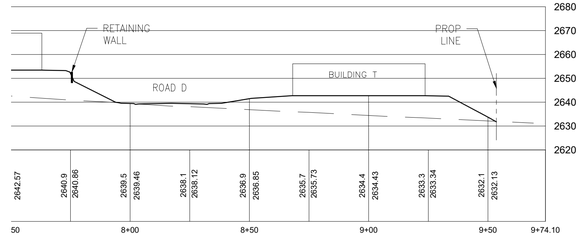
VERT. SCALE = 1" = 40'



SECTION D-D (CONT.)

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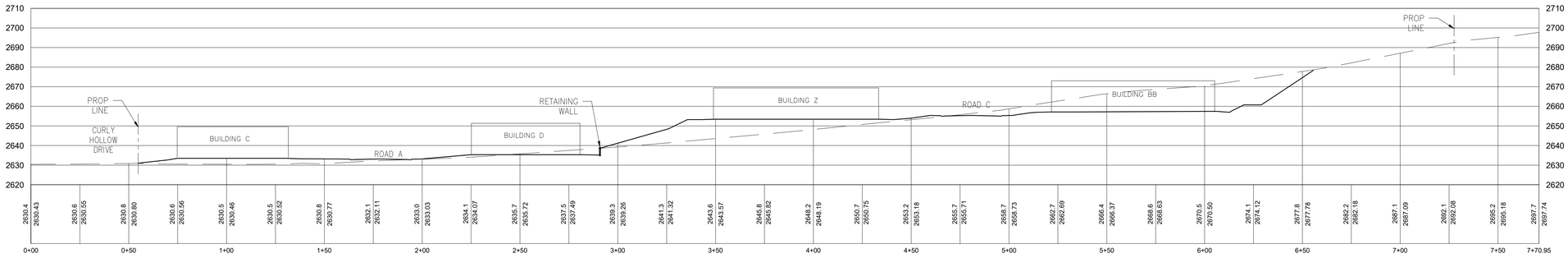

SECTION E-E

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VERT. SCALE = 1" = 40'

DATE:	05/05/2022
JOB NO.:	13231-22
DESIGNED BY:	ALN
CHECKED BY:	JWB
DWG:	CON PLANS

REVISIONS DATE:

ROSENBERG ASSOCIATES
CIVIL ENGINEERS • LAND SURVEYORS

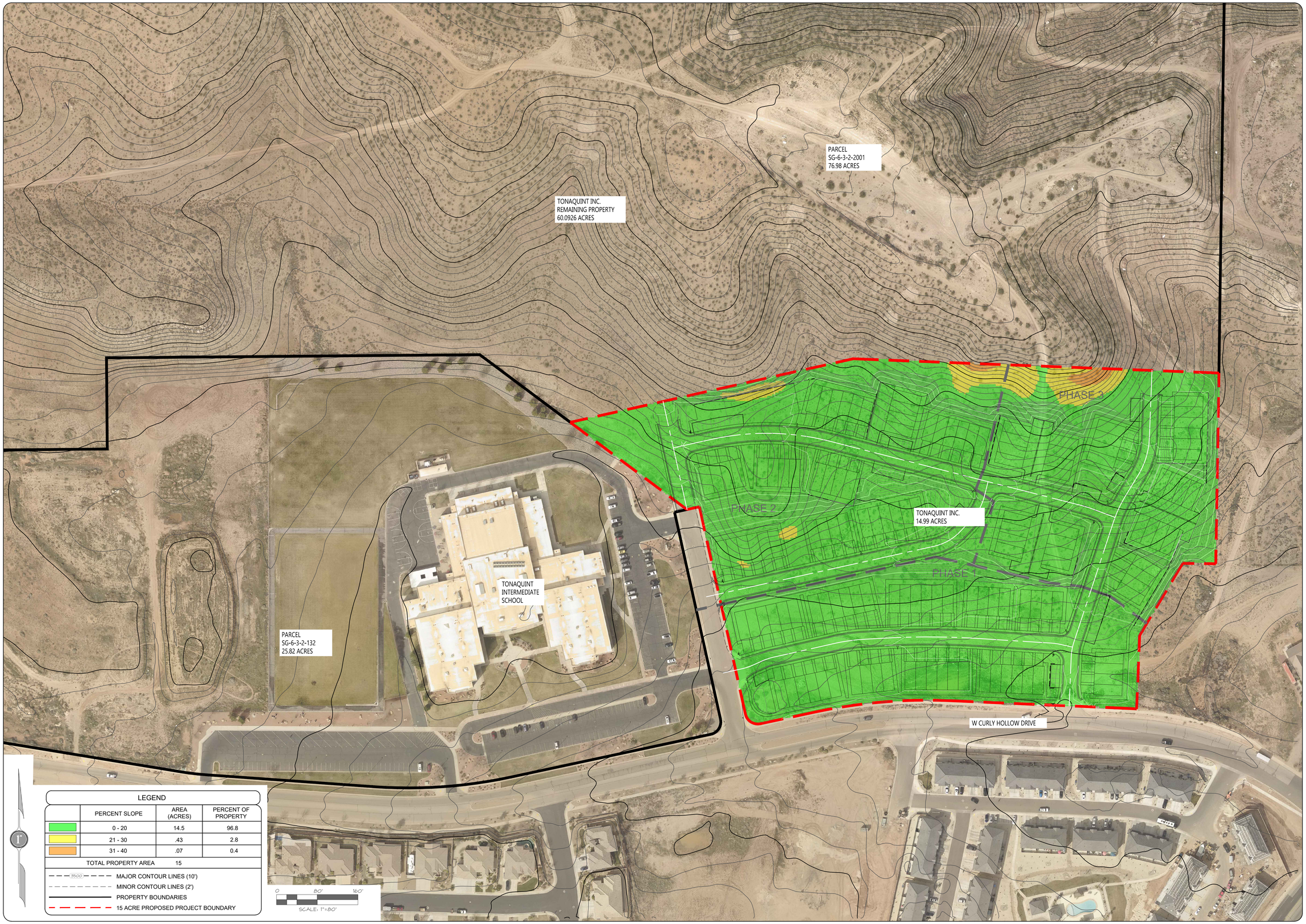
352 East Riverside Drive,
Suite A-2 St. George, Utah
84790
Ph (435) 673-8586 Fx (435)
673-8397 www.racivil.com

CROSS SECTIONS FOR ROSEWOOD TOWNHOMES

ST GEORGE
UTAH

PROFESSIONAL ENGINEER
JARED W. BATES
7/20/2022
STATE OF UTAH

SHEET
3
3 OF 3 SHEETS



DATE: 4/4/2022
JOB NO.: 13231-22
DESIGNED BY: WJP
CHECKED BY: JWB
DWG: SLOPE

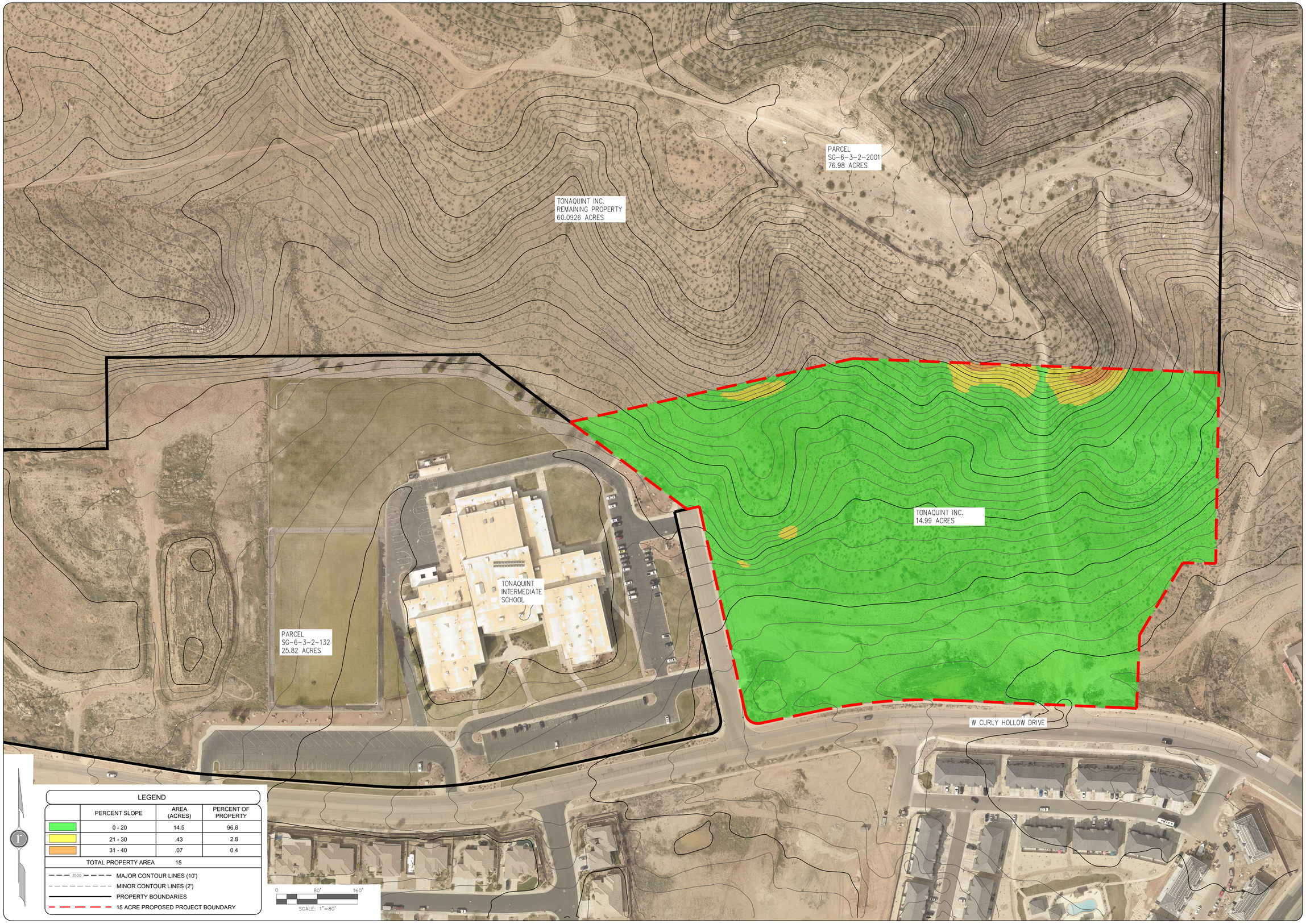
REVISIONS
DATE

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

SLOPE ANALYSIS WITH SITE AND GRADING
FOR
ROSEWOOD TOWNHOMES
ST. GEORGE
UTAH

PROFESSIONAL ENGINEER
JARED W. BATES
12/9/2022
7868574
STATE OF UTAH

SHEET
1
1 OF 1 SHEETS



DATE:	4/4/2022
JOB NO.:	13231-22
DESIGNED BY:	WJP
CHECKED BY:	JWB
DWG:	SLOPE

REVISIONS

DATE

ROSENBERG ASSOCIATES
CIVIL ENGINEERS • LAND SURVEYORS

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www.racivil.com

SLOPE ANALYSIS
FOR
ROSEWOOD TOWNHOMES
ST. GEORGE
UTAH

PROFESSIONAL ENGINEER
JARED W. BATES
7868579
STATE OF UTAH
1/20/2023

SHEET
1
1 OF 1 SHEETS

AGEC

Applied GeoTech

GEOTECHNICAL INVESTIGATION

ROSEWOOD TOWNHOMES

ST. GEORGE, UTAH

PREPARED FOR:

STEWART ENTERPRISES, LC
720 SOUTH RIVER ROAD, SUITE A115
ST. GEORGE, UTAH 84791-1591

ATTENTION: TIM STEWART

PROJECT NO. 2221859

DECEMBER 2, 2022

1420 South 270 East • St. George, Utah 84790 • (435) 673-6850 • FAX (435) 673-1044

TABLE OF CONTENTS

SUMMARY

1. AGEC was requested to conduct a geotechnical investigation and to provide geotechnical recommendations for the proposed Rosewood Apartments project located north of Curly Hollow Drive and east of 1150 West in St. George, Utah. Our investigation included the excavation of 14 test pits at the approximate locations shown on Figure 2.

2. The existing site topography consists of level area along Curly Hollow Drive on the south then slopes up moderately to the north with approximately 40 feet across the property. The proposed grading indicates cuts and fills along each row of buildings that will also require retaining slopes. We anticipate the retaining will be accomplished with rock walls.

3. The subsurface conditions generally consist of near surface bedrock with a layer of sandy lean clay to clayey sand overlying mudstone bedrock throughout the site. There was clayey gravel with sand near the southeast portion of the site above the mudstone bedrock. In addition, sandstone bedrock was encountered below the mudstone within Test Pit TP-5 at a depth of approximately 6 feet. The mudstone was encountered at depths of approximately 1 to 6 feet below the existing surface and extended to the maximum depths investigated, approximately 15 feet. The mudstone is known as "blue clay" and is moderately to highly expansive when wetted.

4. The depth to mudstone is critical for limiting the potential amount of surface heave. Our experience has shown that approximately 15 feet of separation is necessary to limit surface heave to less than 1 inch. The separation is determined from the pad grade to the depth of the mudstone and may be achieved by overexcavation or raising pad grades to provide the separation. If the overexcavation alternative is used, we recommend a depth of removal of 15 feet and 2 feet of additional removal and replacement of the mudstone that processed (moisture conditioned) and recompacted at the based of the excavation. Use of various materials and grading recommendations are provided in the report.

   The on-site non-mudstone materials may be re-used as structural fill. The removed mudstone should be placed in non-structural areas or discarded off site. Consideration may also be given to mixing the mudstone with non-expansive materials for re-use. Our experience has shown that mix ratios of 2 parts (non expansive) to 1 part mudstone (expansive) may be used up to within 5 feet of the pad grade. AGEC should verify through additional laboratory testing proper mixing ratios.

5. We also recommend the use of micro piles (deep foundation system) may also be used if the alternative of overexcavation described in No. 4 above is not used. Micro piles typically extend into the mudstone approximately 20 feet and support a grade beam system that allows the structure to be supported below the "active zone" of the mudstone estimated to be approximately 10 feet within the upper portion of the mudstone. Our experience has shown either alternative has been proven as a reliable foundation support. Various factors of costs associated with each alternative may also be evaluated to determine the appropriate foundation support (overexcavation or micro-piles).

6. Portions of the bedrock is generally moderately hard and may be difficult to excavate, particularly in utility trenches.

7. Due to the expansive mudstone throughout the site, we do not recommend using retention to meet the Low Impact Drainage (LID) requirements. Site drainage recommendations should be implemented as recommended in the site drainage section of this report.

8. Detailed recommendations for subgrade preparation, materials, foundations, drainage and pavement are included in the report.

9. This summary should not be used independent of the information presented in the body of this report.

SCOPE OF WORK

AGEC was requested to conduct a geotechnical investigation and to provide geotechnical recommendations for the proposed Rosewood Apartments project to be located north of Curly Hollow Drive and east of 1150 West in St. George, Utah as shown on Figure 1. The study has included the excavation of 14 test pits to evaluate the subsurface conditions at the site. The locations of the explorations are shown on Figure 2. This report summarizes the subsurface conditions for the project.

AGEC has reviewed the grading plans prepared by Rosenberg Associates. The recommendations are for grading, foundations, pavement and drainage are included within this report.

Our scope of work was conducted in general accordance with our proposal dated August 27, 2022.

SITE CONDITIONS

The project site consists of the property shown on Figure 1. The existing site topography consists of level area along Curly Hollow Drive on the south end of the site and then slopes up to the north with an elevation change of approximately 40 feet. Adjacent to the north and east is undeveloped property. To the west is the existing Tonaquint Intermediate School. Across Curly Hollow Drive to the south is the Blackhawk Townhomes and the Tonaquint Residential development.

The property contains a sparce amount of vegetation consisting of small grass and bushes. Several site photos are included in the Appendix.

FIELD STUDY

The field study was conducted on September 12, 2022. The exploration locations were determined using a hand held Global Positioning Survey (GPS) and the exploration elevations were determined using the provided contours on the Rosenberg Associates grading plan. The approximate locations of the explorations are shown on Figure 2. The test pits were excavated with a track mounted excavator. The explorations were logged by a representative of AGEC and samples were obtained for laboratory testing.

SUBSURFACE SOIL AND BEDROCK CONDITIONS

The subsurface conditions generally consist of sandy lean clay to clayey sand overlying mudstone bedrock throughout the site. Clayey gravel with sand was encountered near the southeast portion of the site above the mudstone bedrock. In addition, sandstone bedrock was encountered below the mudstone within Test Pit TP-5 at a depth of approximately 6 feet. The mudstone was encountered at depths of approximately 1 to 6 feet below the existing surface and extended to the maximum depths investigated, approximately 15 feet. The mudstone is known as "blue clay" and is moderately to highly expansive when wetted.

Descriptions of each soil and bedrock type observed follow:

Sandy Lean Clay (CL) - The sandy lean clay is generally weathered mudstone mixed with varied amounts of sand and gravel. The sandy lean clay is stiff to very stiff, generally dry to slightly moist, and brown to grey in color.

Laboratory tests conducted on samples of the sandy lean clay indicates moisture contents of 1 to 7 percent with and in-place dry density of 116 pounds per cubic foot (pcf) and a fines (percent passing the No. 200 sieve) content ranging from 54 to 93 percent. Atterberg Limits tests indicate liquid limits of 27 to 39 percent and plasticity indexes of 11 to 25 percent.

Moisture-Density relationship tests (proctors) indicate the maximum dry density varies from 124.0 to 137.5 pcf and an optimum moisture content varying from 6.5 to 10.5 percent.

Clayey Sand (SC) - The clayey sand contains occasional gravel that is subrounded and has occasional cobble size material. The clayey sand varies from loose to medium dense, dry to slightly moist and brown in color.

Laboratory tests conducted on samples of the clayey sand indicate in-place moisture contents ranging from 1 to 4 percent, in-place dry densities ranging from 101 to 117 pcf and fines contents ranging from 23 to 45 percent.

Clayey Gravel (GC) - The clayey gravel contains varied amounts of sand with occasional cobbles. The clayey gravel is medium dense to dense, dry to slightly moist and brown in color.

Laboratory tests indicate a moisture content of 3 percent and fines content of 32 percent.

Mudstone Bedrock - The mudstone is known in the area as blue clay and is soft to moderately hard, slightly moist and is gray to red to purple in color. The mudstone is generally medium to highly plastic.

Laboratory tests conducted on samples of the mudstone bedrock indicate in-place moisture contents ranging from 4 to 10 percent, fines contents ranging from 68 to 90 percent. Atterberg Limits tests indicate liquid limits ranging from 28 to 46 percent and plasticity indexes ranging from 14 to 27 percent.

Sandstone Bedrock- The sandstone is generally moderately hard, dry and gray in color.

The Logs, Legend and Notes of Test Pits are shown on Figures 3-4. The laboratory test results are also shown on Figures 3 and 4 and are summarized in the Summary of Laboratory Testing, Table 1. Figures 5 and 6 provide the moisture-density relation (proctor) test results. Several photos of the test pits are included in the Appendix of this report.

SUBSURFACE WATER

Groundwater was not encountered within the explorations to the depths investigated. Fluctuations in groundwater may occur over time. An evaluation of such fluctuations was beyond the scope of this report.

PROPOSED CONSTRUCTION

This project includes the development of approximately 15 acres and is planned to be developed into 136 townhomes as shown on Figure 2. The townhomes are grouped within 31 buildings of approximately 4 to 6 units per building. There area various streets and public improvements throughout the planned development.

We anticipate that buildings will be slab on grade, wood-framed structures likely 2 to 3 stories in height. We anticipate walls loads of up to 3 to 4 kips per lineal foot and column loads up to 50 kips.

Based on the grading plan, we anticipate cuts and fills may be up to 10 feet. We also anticipate the need for retaining.

If the proposed construction is significantly different than described, AGEC should be contacted to further evaluate our recommendations.

RECOMMENDATIONS

Based on subsurface soil conditions, engineering analysis, and the proposed construction, the following recommendations are provided:

A. Grading Recommendations

Based on the existing topography and the proposed grading plan, a moderate amount of grading will likely occur. We anticipate that cuts and fills will be on the order of 5 to 10 feet. The majority of the grading will comprise excavation of the near surface sand and clay along with deeper mudstone bedrock materials.

1. Subgrade Preparation

General: Prior to placing fill, the non-graded portion of the site should be grubbed to remove vegetation and soil containing roots and organics. The amount of material should be limited to primarily vegetation. These materials should be disposed off site.

Subsequent to grubbing and prior to placing fill, the subgrade should be prepared by scarifying approximately 12 inches and compacting the subgrade. If the subgrade consists of bedrock, scarification is not necessary. The existing soils are generally dry and will require significant amounts of moisture to achieve the compaction.

Roadways: The subgrade is anticipated to vary from silty sand to lean clay to clayey sand materials. If during the grading, mudstone is encountered within 3 feet of the subgrade surface, the mudstone should be removed to 3 feet below subgrade and replaced with suitable non-expansive materials.

Building Pads: Pads that are located where expansive mudstone is encountered within 15 feet of the pad grade, the pad should be overexcavated to remove the mudstone down to at least 17 feet below pad grade. The bottom two feet of the removal and replacement may consist of re-using the mudstone following moisture conditioning. We recommend the mudstone be moisture conditioned 0 to 4 percent over the optimum moisture content and properly recompacted. The contractor should provide verification of the limits and depths by survey.

2. Excavation

In general, we anticipate that excavation of the bedrock at the site will likely require heavy duty excavation equipment. The bedrock material is known to be difficult to excavate.

3. Grading Slopes and Trenches

The following table provides the maximum recommended slope steepness for a given slope condition. Slopes should include benches in accordance with the 2018 IBC.

Slope Condition	Maximum Slope (Horizontal:Vertical)
Permanent Cut Slopes in Overburden Soils	2:1
Unretained, Properly Compacted Fill	2:1
Permanent Cut Slopes in Moderately Hard Bedrock	1/4:1
Utility Trenches in Bedrock (OSHA Soil Class A)	½:1

Fill slopes should be graded by overbuilding and then cutting back to the desired grade to provide a compacted slope face. Fill placed on existing slopes steeper than 3:1 should be placed using a benching procedure to key the fill into the existing slope. Benches should be of sufficient width to allow adequate area for the compaction equipment.

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.

4. Materials

The on site, non-mudstone materials may be re-used as site grading fill. The mudstone may be re-used in the 15 to 17 feet range within deeper overexcavations. The removed mudstone may also be placed in non-structural areas or discarded off site. Consideration may also be given to mixing the mudstone with non-expansive materials for re-use. Our experience has shown that mix ratios of 2 parts (non expansive) to 1 part mudstone (expansive) may be used up to within 5 feet of the pad grade. AGEC should be contacted to provide additional laboratory testing for proper mixing ratios.

If additional materials are imported, the materials should be non-expansive, non-gypsiferous, granular soil. Listed below are the materials recommended for imported fill.

Area	Fill Type	Recommendations
Foundations/slabs	Site grading/ structural fill	**-200** <35%, **LL** <30% Maximum size: 4 inches Solubility < 1%
Underslab (upper 4 inches)	Base Course	-200 <12% Maximum size: 1 inch Solubility < 1%

-200 = Percent Passing the No. 200 Sieve

LL = Liquid Limit

5. Compaction

Compaction of materials placed at the site should equal or exceed the following minimum densities when compared to the maximum dry density as determined by ASTM D-1557:

Area	Percent Compaction
Subgrade	90
Footings/building pad	95
Site grading	95
Utility trenches	95
Wall backfill	95

To facilitate the compaction process, the overburden soil and processed, non-expansive bedrock should be moisture conditioned to within 2 percentage points of the optimum moisture content as determined by ASTM D-1557 prior to placement.

Fill should be placed in loose lift thicknesses which do not exceed the capacity of the equipment being utilized. Generally, 6 to 8-inch loose lifts are adequate. Lift thicknesses should be reduced to 4-inches for hand compaction equipment.

6. Surface Drainage General Recommendations

Positive site drainage should be maintained during the course of construction. After construction has been completed, positive drainage of the surface water away from the buildings in each direction must be maintained. To reduce infiltration adjacent to foundations we recommend the following:

a. A minimum slope of 6 inches in the first 10 feet from the perimeters of the structures should be provided.

b. Roof gutter systems should be installed around the perimeters of the structures. Roof downspouts should discharge away from the buildings so as to prevent ponding adjacent to foundations. We recommend piping roof gutter downspouts of site directly into the adjacent curb and gutter.

c. Placement of 3 to 4 foot wide concrete aprons around the perimeters of the structures.

d. Landscaping requiring water should not be placed adjacent to foundations or within 10 feet of foundations.

e. Due to the presence of the underlying expansive layers, we recommend protection of the underlying foundation support soils with a 10 mil impermeable PVC membrane. The membrane should be attached to the perimeter foundation of the residence and slope away from the residence at a 5 percent slope into a perimeter drain trench to collect and discharge water off site. The drain trench should include gravel and a 4-inch perforated PVC pipe to collect and transport water off site. It is critical the line extend into line both sides and the bottom of the trench.

f. Below grade portions of walls/fences which are backfilled with soil should be protected with an impermeable membrane and a subsurface drain on the backfilled side. 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.

7. Surface Drainage- Low Impact Development (LID)

AGEC has reviewed the Dixie Storm Water Coalition Guide for the Low Impact Development (LID) dated June 20, 2020. The following evaluation is provided:

Using Figure 2 (flow chart), Step 2 indicates a "NO" for acceptable native soils. Using Table 3 (matrix) the shallow bedrock and expansive mudstone prohibits the use of the majority of the BMP's. BMP's BR-1 (Rain Garden), BR-2 (Bioretention Cell), BR-4 (Vegetated Strip), BR-5 (Tree Box Filter), D-3 (Dry Well) and HR-1 (Harvest and Reuse) are noted as "any" or these matrix options available, while the others have been eliminated through the matrix flow chart. Although, these options are available, due to the expansive and shallow bedrock on the site, the use of these BMP's would be detrimental to the project.

As an alternative, we recommend the use of a site drainage plan to allow water to drain to regional storm drainages or to off site detention or locations.

We recommend that structures with rain gutters and site drains exit to the curb and surface flow to the storm drains.

Based on the evaluation for use of on-site retention, it is our recommendation that BMP's with surface infiltration that will potentially wet the expansive mudstone/clay or may perch and flow laterally on shallow bedrock not be used.

The infiltration from this type of drainage may result in surface heave and damage to infrastructure and structures.

B. Foundations (Conventional and Deep/Micropiles)

1. **Conventional spread and spot footings:** For lots/pads where the subgrade was overexcavated and/or raised to provide a separation of 15 feet between the pad grade and the expansive mudstone, the following foundations recommendations may be used:

a. Bearing Material

The proposed residences may be supported on conventional spread footings bearing on properly compacted structural fill underlain by a properly prepared subgrade. Specifically, the subgrade should be prepared during site grading by overexcavating the building pads to remove unsuitable soils and bedrock as recommended in the Subgrade Preparation section of this report.

b. Bearing Pressures

Footings bearing on properly compacted structural fill may be designed for the following net allowable bearing pressures.

Load Condition	Net Allowable Bearing Pressure (psf)
Walls	2,000
Spots/Columns	2,500

c. Footing Width and Embedment

Footings should have a minimum width of 18 inches and should be embedded at least 12 inches below the lowest adjacent grade.

d. Temporary Loading Conditions

The allowable bearing pressures may be increased by one-half for temporary loading conditions such as wind or seismic loads.

e. Settlement

We estimate that settlement will be approximately 1 inch for footings designed as indicated above due to the load of the structure. Differential settlement is estimated to be approximately ½ inch.

f. Foundation Base

The base of excavations should be cleared of loose or deleterious material prior to placement of fill or concrete.

g. Foundation Setback

Foundations should be set back from the top crest of slopes or retaining structures. For fill slopes, foundations should be setback a horizontal distance equal to are greater than ⅓ the total slope height.

2. **Deep Foundations /Micropiles:** Where the lots/pads have expansive mudstone within 15 feet of the pad grade and the pad was not raised or overexcavated to provide the minimum 15 feet separation, the following foundation recommendations are provided below. The use of deep foundation elements (micropiles) incorporates that grade beams span the distance between piers and support a structural floor with a crawl space below.

a. The deep foundations (proposed to be micropiles) should extend at least 20 feet into the underlying expansive mudstone with a minimum total length of 25 feet.

b. End bearing should not be considered for micropile capacity. Micropiles should be of sufficient diameter to allow for placement of grout around reinforcing steel.

c. Micropiles should be designed using the parameters provided in the attached Table 2, Drilled Micropile Design Parameters.

d. The piles should be structurally reinforced to resist tensile forces on the pile due to negative skin friction. The tensile force may be calculated utilizing at least 10 feet of pier length with an ultimate skin friction of 1,000 pounds per square foot (psf). A greased PVC bond breaker may also be considered to reduce uplift forces on the micropiles. Bond breakers should be verified by load testing.

e. Piles should be placed as far apart as practical in order to achieve minimum dead load recommendations and a minimum of three diameters apart center to center.

f. Care should be taken to assure the micropiles are not over-sized (mushroomed) at the ground surface, which could provide an area where swelling soil/rock could exert uplift forces on the piles. A PVC bond breaker or a steel pipe may be placed at the surface to provide a straight pile.

g. Grout should be placed using a tremmie extended to near the bottom of the drill hole to ensure the drill hole is filled without voids. The tremmie should be raised as the grout is pumped.

h. The water cement ratio of the grout should be on the order of 0.45 to 0.50. This should be verified during construction using a grout scale to verify the grout has a specific gravity on the order of 1.8 to 1.9. The grout volume should be recorded for each micropile constructed to ensure the appropriate volume is placed.

i. If water enters the micropile holes, it would be necessary to place grout immediately after the hole is completed using a tremmie. The tremmie will also displace water out of the hole as grout is placed. Failure to place grout the day of drilling may require re-drilling for additional bedrock penetration.

j. Micropile holes should also be inspected to verify caving does not occur below the ground surface which could also result in additional uplift forces. Casing the drill hole may be necessary if the caving occurs to ensure a straight shaft with a consistent diameter

k. Centralizers should be used on the steel reinforcing bar at approximately a 7 to 10 foot spacing to ensure the appropriate grout cover on the reinforcing.

C. **Concrete Slab-on-Grade**

1. Slab Support

Concrete slabs may be supported on a zone of properly prepared (overexcavated) and compacted fill as stated in the Subgrade Preparation and Materials sections.

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 should be placed below slabs in areas which will receive sensitive floor coverings or coverings which are impermeable. Vapor barriers also provide protection from salt and sulfate attack.

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 0.40 may be used in design for ultimate lateral resistance of footings bearing on properly compacted on-site soils. The friction value may be increased to 0.45 if the foundations bear on imported structural fill.

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 - Equivalent Fluid Weight	35 pcf	55 pcf	325 pcf
Granular Backfill- Earth Pressure Coefficient	0.28	0.44	-
Fine-Grained Backfill, (Processed/mixed mudstone) - Equivalent Fluid Weight	50 pcf	65 pcf	190 pcf
Fine-Grained backfill - Earth Pressure Coefficient	0.36	0.55	-

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
S_s (0.2 second period)	0.50g
S_1 (1 second period)	0.16g
PGA	0.22g
F_a	1.30
F_v	1.50
F_{pga}	1.20

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. Roadway-Pavements

1. Subgrade Support

We anticipate that the subgrade materials beneath the pavement areas will consist of clayey sand and sandy lean clay. A California Bearing Ratio (CBR) of 5 percent was assumed for a properly compacted subgrade for purposes of design.

2. Pavement Thickness

Based on the assumed traffic loadings and St. George City traffic indexes, a 20-year design life, and AASHTO design methods, the following pavement sections are recommended.

Pavement Section		
Location	**Asphaltic Concrete (inches)**	**Base Course (inches)**
Interior Roads/Parking	2.5	8
Dumpster Pad*	3	8
Entry Area (focused traffic) **	3	8

* We also recommend that 5 inches of Portland Cement Concrete (PCC) overlying 8 inches of base course be considered in the dumpster pad area.
** AGEC recommends that the entry and areas of focused traffic be increased to 3 inches of asphaltic concrete.

3. Pavement Materials

The pavement materials should meet City of St. George specifications for gradation and quality. The pavement thicknesses indicated above assume that the base course is a high quality material with a CBR of at least 50 percent and the asphaltic concrete has a minimum Marshall stability of 1,800 pounds. Other materials may be considered for use in the pavement section. The use of other materials may result in other pavement material thicknesses.

4. 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.

H. Construction Testing and Observations

We recommend the following testing and observations be done as a minimum as required by the City of St. George.

1. Observe grubbing and verify removal of soil containing roots and organics.

2. Observe that recommended overexcavation depths are achieved in the building pads and beneath roadways. The lateral extent of the building pad should be located by survey (not included in AGEC's Scope of Services) and include the area which extends at least 5 feet beyond the buildable area as per city set-back requirements. Additional test pits and engineering observation may be necessary during site/pad grading to assist in locating and defining the potentially expansive layers of mudstone bedrock.

3. Observe that recommended structural fill depths are provided below foundations and slabs.

4. Conduct compaction testing on fill placed below foundations and in building pads. We recommend testing each foot of fill placed.

5. Conduct construction materials testing on city improvements at a frequency which meets or exceeds St. George City requirements.

6. If deep foundations are used, provide special inspections per the IBC or structural engineer requirements.

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 field and laboratory testing, the information from the referenced studies and our experience in the area. Variations in the subsurface conditions may not become evident until excavation is conducted. If the subsurface conditions are found to be significantly different from those described above, we should be notified to reevaluate our recommendations.

If you have any questions or if we can be of further service please call.

APPLIED GEOTECHNICAL ENGINEERING CONSULTANTS, INC.

G. Wayne Rogers, P.E.

Reviewed by JRH, P.E.

P:\2022 Project Files\2221800\2221859 - GT - Rosewood To rt.wpd

ROSEWOOD TOWNHOMES
ST. GEORGE, UTAH

N

Not to Scale

2221859	AGEC	Vicinity Map	Figure 1

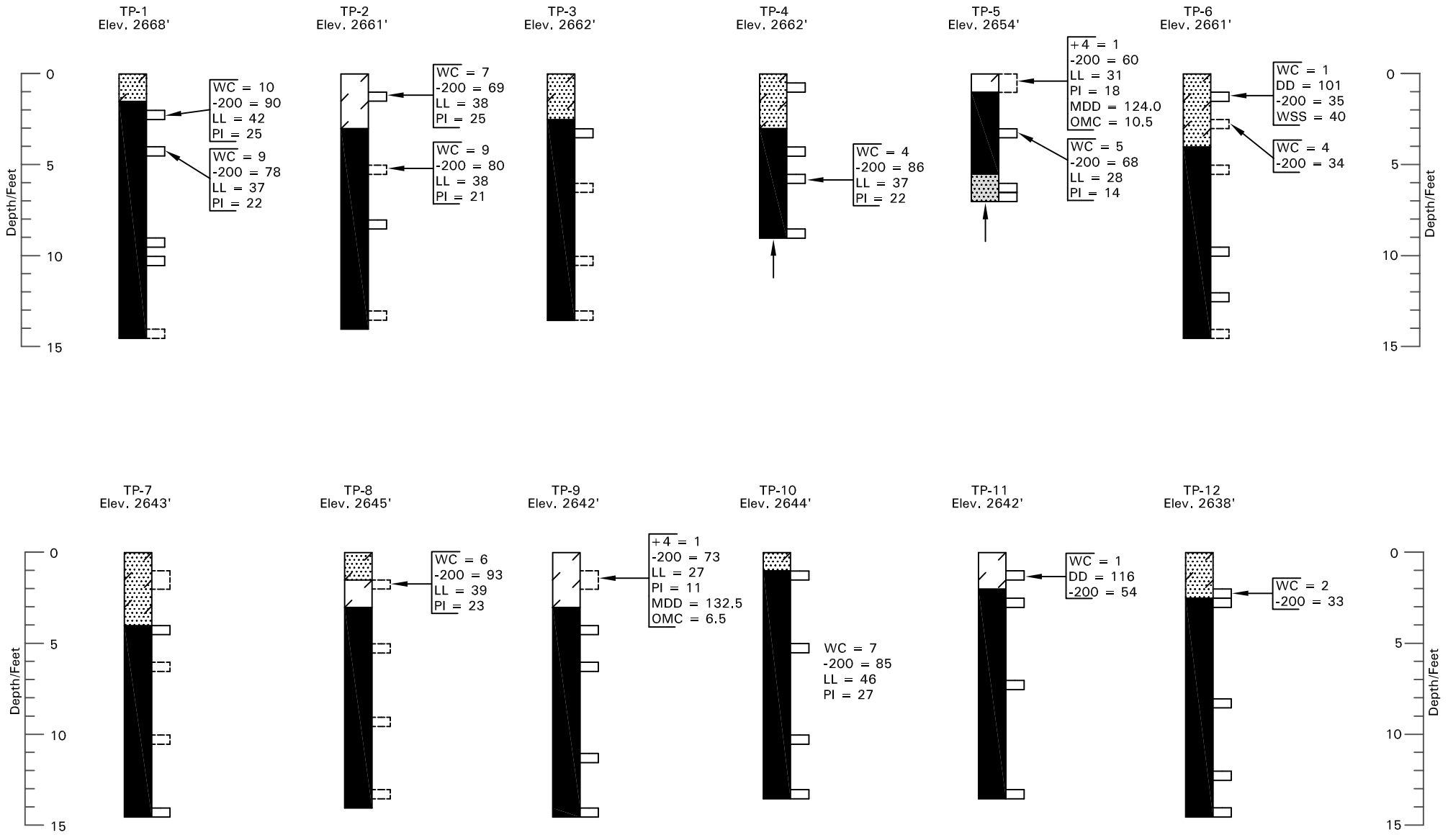
ROSEWOOD TOWNHOMES
ST. GEORGE, UTAH

Approximate test pit location

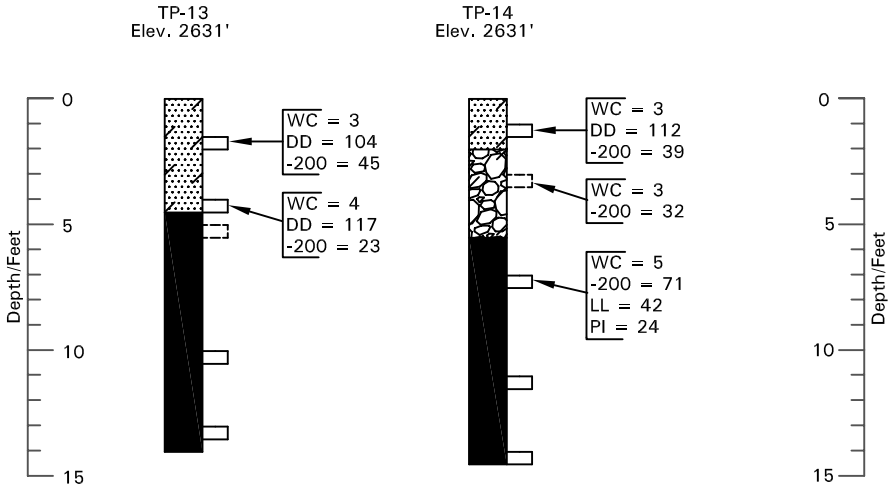
N

0 100 200 feet

2221859	AGEC	Site Plan	Figure 2



2221859	AGEC	Logs of Test Pits	Figure 3



LEGEND:

Sandy Lean Clay (CL); consists of weathered mudstone mixed with varied amounts of sand and gravel, stiff to very stiff, dry to slightly moist, brown to grey in color.

Clayey Sand (SC); occasional gravel, subrounded, some cobbles, loose to medium dense, dry to slightly, brown in color.

Clayey Gravel with Sand (GC); contains varied amounts of sand with occasional cobbles, medium dense to dense, dry to slightly moist, brown in color.

Mudstone Bedrock; soft to moderately hard, slightly moist, medium to highly plastic, grey to red to purple in color.

Sandstone Bedrock; moderately hard, dry, grey in color.

Indicates relatively undisturbed block sample taken.

Indicates disturbed sample taken.

Indicates practical excavator refusal on bedrock.

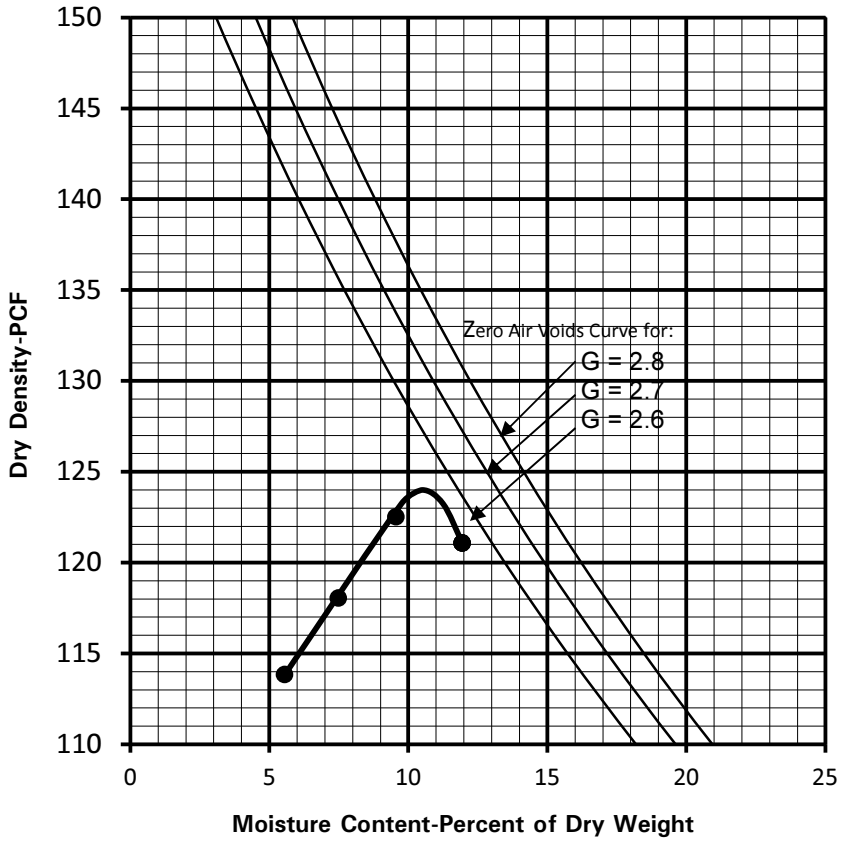
NOTES:

1. The test pits were excavated on September 12, 2022 with a track mounted excavator.
2. The locations of the test pits were measured by a hand held GPS as shown on the site plan, Figure 2.
3. The elevations of the test pits were determined by interpolation between the contours of 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);
   +4 = percent retained on the No. 4 sieve;
   -200 = percent passing No. 200 sieve;
   LL = liquid limit (%);
   PI = plasticity index (%);
   MDD = maximum dry density (pcf);
   OMC = optimum moisture content (%);
   WSS = water soluble sulfates (ppm).

AGEC

Applied GeoTech

Project: Rosewood Townhomes



Sample Date:	10/12/22
Sample No.	221013B
Maximum Dry Density:	124.0
Optimum Moisture:	10.5

Atterberg Limits

Liquid Limit:	31%
Plasticity Index:	18%

Gradation

Gravel:	1%
Sand:	39%
Silt & Clay:	60%

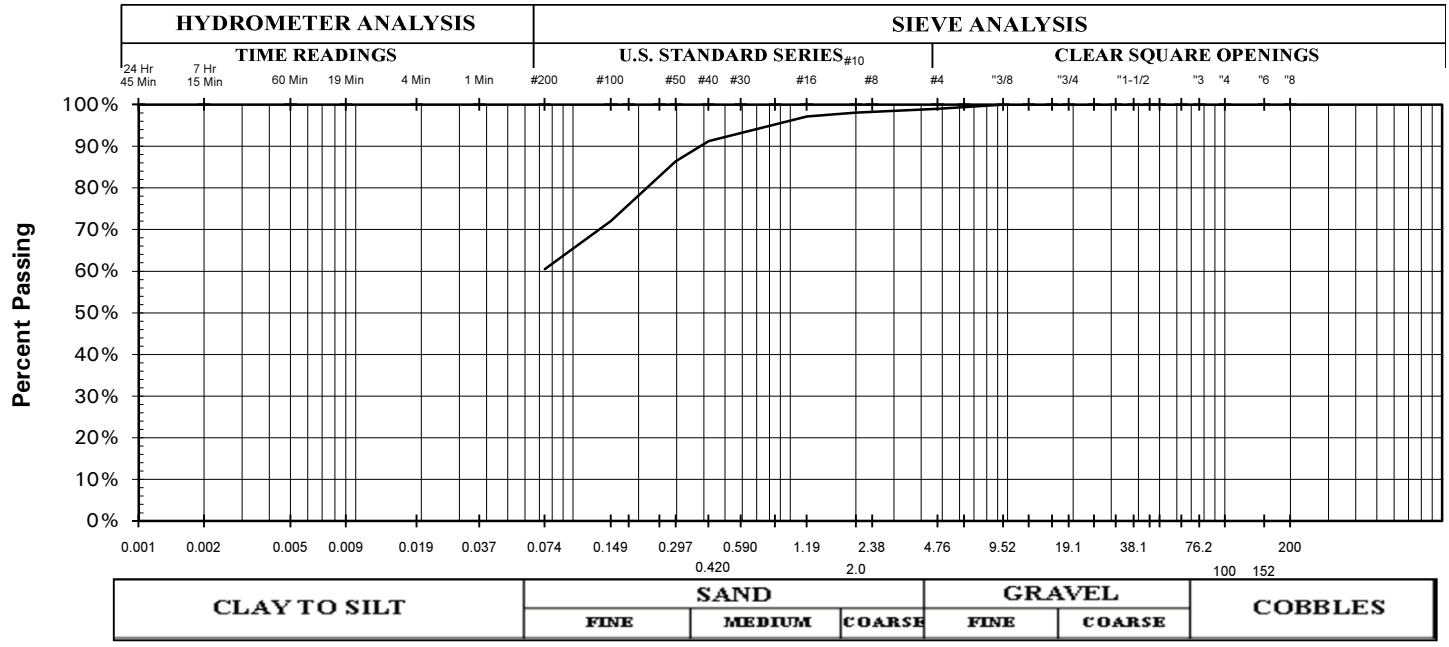
Moisture - Density Relationship Test Procedure: ASTM D-1557 B

Reviewed By: TT

USCS Classification: sandy lean clay (CL)

AASHTO Classification: A-6

Sample Location: TP-5 @ 0-1'



GRADATION AND MOISTURE-DENSITY RELATIONSHIP RESULTS

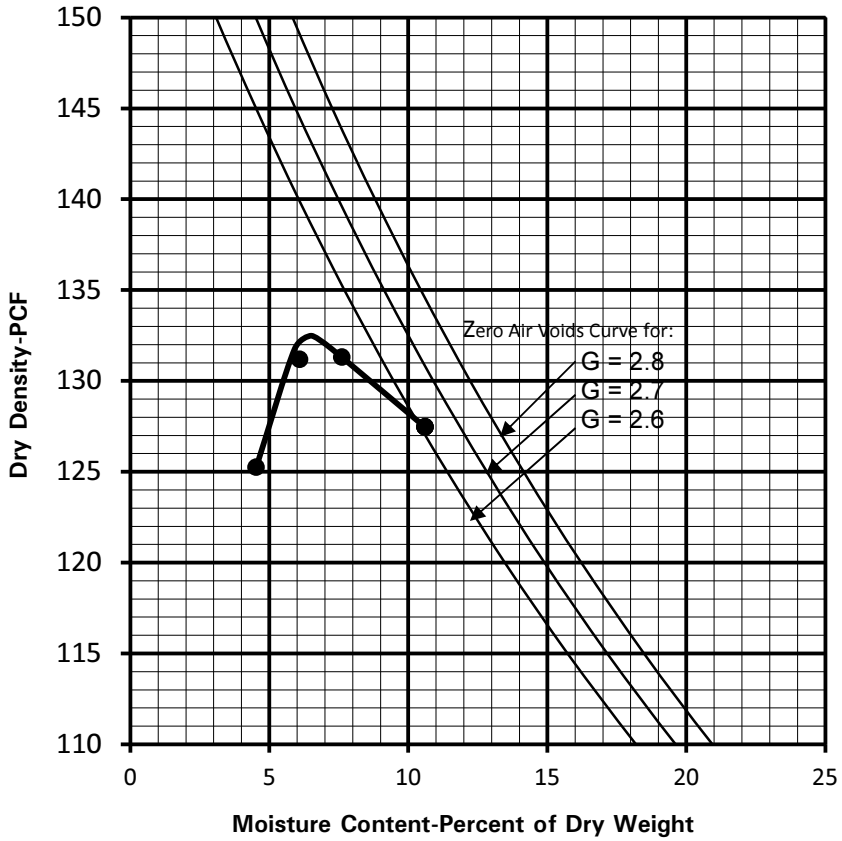
Project No.: 2221859

Figure: 5

AGEC

Applied GeoTech

Project: Rosewood Townhomes



Sample Date:	10/12/22
Sample No.	221013C
Maximum Dry Density:	132.5
Optimum Moisture:	6.5

Atterberg Limits

Liquid Limit:	27%
Plasticity Index:	11%

Gradation

Gravel:	1%
Sand:	26%
Silt & Clay:	73%

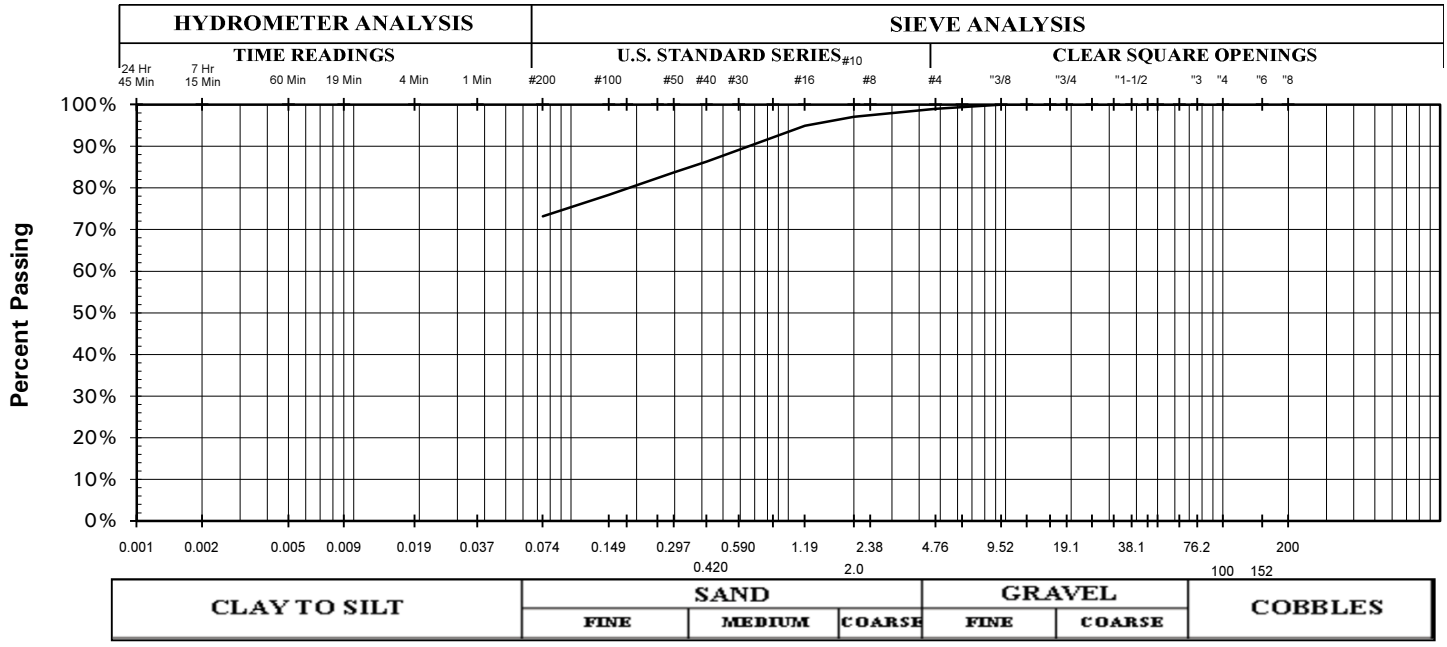
Moisture - Density Relationship Test Procedure: ASTM D-1557 B

Reviewed By: TT

USCS Classification: lean clay with sand (CL)

AASHTO Classification: A-6

Sample Location: TP-9 @ 1-2'



GRADATION AND MOISTURE-DENSITY RELATIONSHIP RESULTS

Project No.: 2221859

Figure: 6

Applied Geotechnical Engineering Consultants, Inc.

Table 1 - Summary of Laboratory Test Results

Rosewood Townhomes

Project No. 2221859

Sample Location				Gradation			Atterberg Limits		Moisture-Density Relationship			
Test Pit No.	Depth (ft)	Natural Moisture Content (%)	Natural Dry Density (pcf)	Gravel (%)	Sand (%)	Silt/Clay (%)	Liquid Limit (%)	Plastic Index (%)	Maximum Dry Density (pcf)	Optimum Moisture Content (%)	Water Soluble Sulfates (ppm)	Soil Type
TP-1	2	10				90	42	25				Mudstone Bedrock
TP-1	8	9				78	37	22				Mudstone Bedrock
TP-2	1	7				69	38	25				Sandy Lean Clay (CL)
TP-2	5	9				80	38	21				Mudstone Bedrock
TP-4	6	4				86	37	22				Mudstone Bedrock
TP-5	0-1			1	39	60	31	18	124.0	10.5		Sandy Lean Clay (CL)
TP-5	3	5				68	28	14				Mudstone Bedrock
TP-6	1	1	101			35					40	Clayey Sand (SC)
TP-6	2½	4				34						Clayey Sand (SC)
TP-8	1½	6				93	39	23				Lean Clay (CL)
TP-9	1-2			1	26	73	27	11	132.5	6.5		Sandy Lean Clay (CL)
TP-10	5	7				85	46	27				Mudstone Bedrock
TP-11	1	1	116			54						Sandy Lean Clay (CL)
TP-12	2	2				33						Clayey Sand (SC)
TP-13	1½	3	104			45						Clayey Sand (SC)

Applied Geotechnical Engineering Consultants, Inc.

Table 1 - Summary of Laboratory Test Results

Rosewood Townhomes

Project No. 2221859

Sample Location				Gradation			Atterberg Limits		Moisture-Density Relationship			
Test Pit No.	Depth (ft)	Natural Moisture Content (%)	Natural Dry Density (pcf)	Gravel (%)	Sand (%)	Silt/Clay (%)	Liquid Limit (%)	Plastic Index (%)	Maximum Dry Density (pcf)	Optimum Moisture Content (%)	Water Soluble Sulfates (ppm)	Soil Type
TP-13	4	4	117			23						Clayey Sand (SC)
TP-14	1	3	112			39						Clayey Sand (SC)
TP-14	3	3				32						Clayey Gravel (GC)
TP-14	7	5				71	42	24				Mudstone Bedrock

APPLIED GEOTECHNICAL ENGINEERING CONSULTANTS, INC.

TABLE 2
DRILLED MICROPILE DESIGN PARAMETERS

Rosewood Townhomes Project No. 2221859

Soil Type	Soil Properties				Lateral Design Parameters			Axial Design Parameters	
	Effective Unit Weight (pcf)	Unconfined Compressive Strength (psf)	Cohesion (psf)	Friction Angle (Degrees)	Horizontal Modulus (pci)	Ultimate Passive Resistance (psf)	Strain @ 50% Yield (k_{rm})	Ultimate Skin Friction (psf)	Ultimate Uplift Skin Friction (psf)
Active Mudstone (upper 10 feet)	100	6,000	3,000	0	2,000	27,000	0.006	1,500	1,000
Firm Mudstone (> 10 feet)	130	12,000	6,000	0	3,000	54,000	0.004	2,000	1,350

APPENDIX

SITE AND TEST PIT PHOTOS

Photo No. 1, View of property from near SEC looking NW.

Photo No. 2, View of property from near SWC, looking east along Curly Hollow Drive

Photo No. 3, View of property from SWC looking north along 1150 West Street

Photo No. 4, View of property from near NEC looking south.

Photo No. 5, View of property from near NEC looking SW.

Photo No. 6, view of Test Pit TP-1

Photo No. 7, View of Test Pit TP-1, Arrow indicates approximate boundary or top of mudstone/blue clay

Photo No. 8, View of Test Pit TP-1, excavated material.

Photo No. 9, View of Test Pit TP-13

Photo No. 10, View of Test Pit, TP-13 excavated material

Photo No. 11, View of Test Pit, TP-14

Photo No. 12, View of Test Pit, TP-14 excavated material

DRAINAGE CONTROL REPORT- DRAFT

Rosewood Townhomes
St. George, Utah

Prepared For:
Stewart Enterprises
720 South River Road, Suite A-115
St. George, UT 84790
(435) 703-4302

Rosenberg Associates
Project No: 13231-22

January 3, 2023

This report for the drainage design of Rosewood Townhomes was prepared by me (or 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.

ROSENBERG ASSOCIATES™
CIVIL ENGINEERS LAND SURVEYORS

TABLE OF CONTENTS

APPENDICIES

1.0 PROJECT LOCATION

The proposed Rosewood Townhomes project includes construction of 136 townhomes and street improvements in St. George, Utah. Proposed improvements are located north of Curly Hollow Drive and east of 1150 Street, within Section 2, Township 43 South, Range 16 West, Salt Lake Base and Meridian.

See Figure 1 in Appendix, *Vicinity Map*

2.0 EXISTING DRAINAGE CONDITIONS

2.1 EXISTING ON-SITE DRAINAGE

The 14.99 acre project area is comprised of natural desert vegetation, with slopes ranging from 5.0 – 24.4% to the south. Onsite soils are mostly comprised of *Eroded land-Shalet complex (EB)* – hydrologic soil type "D", with *Junction fine sandy loam (JaC)* – hydrologic soil type "A" within the southern section of the property. Stormwater generated within the site generally sheet flows to the south towards Curly Hollow Road.

2.2 EXISTING OFF-SITE DRAINAGE

Runoff generated from areas north of the project area currently sheet flows to the south and enters the site. Runoff from areas west of the site is routed south along 1150 W Street and does not enter the site. Runoff generated within areas east and south of the site do not enter the site as these areas are lower in elevation than the project area.

See Figure 2 in Appendix, *Existing Drainage Conditions*

2.3 PREVIOUS DRAINAGE STUDIES/RELATED DRAINAGE STUDIES

No previous drainage studies were referenced for this project.

2.4 MASTER PLANNING INFORMATION

As per the City of St. George Storm Water Master Plan (2009), a 42" storm drain system is to be installed along the south side of W Curly Hollow Drive. Since 2009, an elliptical RCP line has been installed at this location. No further proposed improvements are recommended with this project's vicinity per the City of St. George Storm Water Master Plan (2009). Upsizing of the lines that run east and then south at the intersection of Road D and W Curly Hollow Drive is required to accommodate flows exiting the project area.

2.5 FLOODPLAIN AND EROZION HAZARD INFORMATION

According to the FEMA Flood Insurance Rate Map[1] numbered 49053C1028G, dated April 2, 2009, the site is located in Zone X.

See Figure 4 in Appendix, *Excerpt from FEMA Flood Insurance Rate Map.*

[1] National Flood Insurance Program, Flood Insurance Rate Map, Washington County, Utah Map Number 49053C 1028G, Effective Date April 2, 2009.

2.6 REQUIRED PERMITS/PLANS

Proposed earthwork will require a Grading Permit and the proposed Storm Water Pollution Prevention Plan (SWPPP) should comply with the City of St. George established best management practices. The grading plan and SWPPP (including NOI and NOT) will be submitted independent of this study prior to construction.

2.7 HILLSIDE CONCERNS

The proposed project falls within hillside overlay ordinance Bloomington Ridge 9-1992. The project will be presented to the hillside committee for review and approval.

3.0 DEVELOPED DRAINAGE CONDITIONS

3.1 DEVELOPED ON-SITE DRAINAGE

Runoff generated in the eastern section of Subarea A sheet flows into curb and gutter and is routed south to be intercepted by storm drain inlets along 1150 W Street or Road C. Runoff generated in the western section of Subarea A flows to the east and does not enter the site. Runoff generated in Subarea B flows south to be intercepted by a storm drain inlet along Road C. Runoff generated in Subarea C flows south into curb and gutter and is routed east to be intercepted by storm drain inlets along Road C. Runoff generated in the northern section of Subarea D flows north to curb and gutter and is routed east and then west to be intercepted by storm drain inlets along Road B. Runoff generated in the southern section of Subarea D flows south to curb and gutter and is routed west to be intercepted by storm drain inlets along Road B. Runoff generated in Subarea E flows east to curb and gutter and is routed south to be intercepted by storm drain inlets along Road D. Runoff generated in Subarea F flows east to be intercepted by a drainage swale that routes flows south to W Curly Hollow Drive. Runoff generated in the eastern portion of Subarea G flows north to curb and gutter and is routed east to be intercepted by storm drain inlets along Road B. Runoff generated in the western portion of Subarea G flows north to curb and gutter and is routed west to be intercepted by storm drain inlets along Road B. Runoff generated in Subarea H flows south to curb and gutter and is routed east to be intercepted by storm drains along Road A or Road D. Runoff generated in Subarea I flows north to curb and gutter and is routed east to be intercepted by storm drain inlets along Road A. Runoff generated in Subarea J flows south to landscape drains and is routed east to storm drain inlets along Road D.

Building finished floor elevations shall be at or above elevations shown on the construction plans to enable runoff to drain from the structures to the roadways.

3.2 DEVELOPED OFF-SITE DRAINAGE

Runoff generated in Subarea off A flows south into proposed drainage swales and is routed west or east to be intercepted by a 2X2 catch basin north of Road C.

See Figure 3 in Appendix, *Developed Drainage Conditions*

4.0 HYDROLOGIC ANALYSIS

4.1 HYDROLOGIC CALCULATIONS

HEC-HMS[2] Version 4.9 was used to perform the hydrologic analysis for this study. Curve numbers for existing and developed conditions were calculated using a custom Natural Resources Conservation Service (NRCS) Soil Report and the TR-55 Table 2-2a, which assumes directly connected impervious areas. Time of concentration (T_c) was calculated as 0.6 times the Travel Time (T_t) as included in TR-55 which is based on the summation of sheet flow, shallow concentrated flow, and channel flow for each subarea (TR-55 eqs. 3-1 through 3-4). A modified Farmer-Fletcher distribution is used for the 3-hour storm events (the distribution is modified based on the local 1 hour and 3 hour rainfall depths) and the SCS Type II distribution is used for the 24-hour storm events. Simulated precipitation values were determined using the Point Precipitation Frequency Estimates (Latitude: 37.1029˚, Longitude: -113.6465˚) from the NOAA Atlas 14[3]. Utilizing the model input values listed in Tables 1 & 2, the HEC-HMS model yielded the design storm peak flow values summarized in Tables 3 & 4.

TABLE 1 – HYDRAULIC MODEL INPUT – EXISTING CONDITIONS

Subarea		Area		SCS	Flow Length	Average Slope	Lag Time	
Name	Description	(acre)	(sq mi)	CN	(ft.)	S (%)	(hr.)	(min)
SUB A	Site	14.99	0.02342	81	842	4.6%	0.06	3.709
OFF A	North of site	5.79	0.00905	88	457	10.4%	0.03	1.728

TABLE 2 – HYDRAULIC MODEL INPUT – DEVELOPED CONDITIONS

Subarea		Area		SCS	Flow Length	Average Slope	Lag Time	
Name	Description	(acre)	(sq mi)	CN	(ft.)	S (%)	(hr.)	(min)
SUB A	Northwest of townhomes	0.64	0.00100	94	194	6.6%	0.00	0.165
SUB B	Northwest portion north of Road C	0.32	0.00050	94	300	4.2%	0.02	1.341
SUB C	North of Road C	3.83	0.00598	94	796	3.2%	0.06	3.370
SUB D	In between Road C and Road B	1.76	0.00275	95	1,026	1.3%	0.03	2.100
SUB E	East of Road D, flows west	1.40	0.00218	95	714	4.1%	0.02	1.070
SUB F	East of Road D, flows east	0.90	0.00140	85	172	3.3%	0.01	0.776
SUB G	South of Road B, flows north	1.53	0.00238	97	592	1.2%	0.03	1.761
SUB H	North of Road A, flows south	2.91	0.00455	90	735	2.9%	0.05	2.982
SUB I	South of Road A, flows north	1.05	0.00165	97	653	1.1%	0.03	1.924
SUB J	South of Road A, flows south	0.66	0.00103	76	99	3.2%	0.01	0.712
OFF A	North of site	5.79	0.00905	88	457	10.4%	0.03	1.728

[2] U.S. Army Corps of Engineers, Hydraulic Engineering Circular Hydrologic Modeling System (HEC-HMS) software, Version 4.9

[3] NOAA's National Weather Service. Precipitation Frequency Data Server. Retrieved November 30, 2022

TABLE 3 – HYDRAULIC MODEL OUTPUT – EXISTING CONDITIONS

Subarea		3-Hour Storm		24-Hour Storm	
		Existing		Existing	
Name	Description	10-Year (cfs)	100-Year (cfs)	10-Year (cfs)	100-Year (cfs)
SUB A	Site	1.6	11.1	2.7	7.6
OFF A	North of Site	2.3	8.7	2.3	4.8
SITE	Site Outfall	3.8	18.7	5.0	12.4

TABLE 4 – HYDRAULIC MODEL OUTPUT – DEVELOPED CONDITIONS

Subarea		3-Hour Storm		24-Hour Storm	
		Developed		Developed	
Name	Description	10-Year (cfs)	100-Year (cfs)	10-Year (cfs)	100-Year (cfs)
SUB A	Northwest of townhomes	0.6	1.6	0.4	0.7
SUB B	Northwest portion north of Road C	0.3	0.8	0.2	0.4
SUB C	North of Road C	3.6	9.1	2.6	4.4
SUB D	In between Road C and Road B	1.9	4.7	1.3	2.1
SUB E	East of Road D, flows west	1.6	3.8	1.0	1.7
SUB F	East of Road D, flows east	0.2	1.0	0.3	0.6
SUB G	South of Road B, flows north	2.3	5.1	1.3	2.0
SUB H	North of Road A, flows south	1.6	5.2	1.4	2.8
SUB I	South of Road A, flows north	1.5	3.4	0..9	1.3
SUB J	South of Road A, flows south	<0.1	0.3	<0.1	0.2
OFF A	North of site	2.3	8.7	2.3	4.8
SITE	Site Outfall	15.7	42.0	11.8	21.0

4.2 COMPARISON OF PEAK FLOW VALUES

Based on information shown in Tables 3 and 4, the proposed development increases runoff within the site 21 CFS [Post (SITE) - Pre (SITE)] during the 100-year 3-hour event.

5.0 PROPOSED DRAINAGE IMPROVEMENTS

5.1 STORMDRAIN DESIGN

The runoff generated within the proposed development is generally routed to the south, with flows intercepted by inlets on grade or in sag as mentioned in the Developed Onsite Drainage section. All flow is routed through poly pipes ranging in size from 12" to 24". See the construction plans for pipe sizes and locations. The existing storm drain pipe that runs east and then south at the intersection of Road D and Curly Hollow Drive is to be removed and replaced to accommodate proposed flow volumes.

The proposed storm drain is designed to convey the onsite and offsite 100-year 3-hour event. See the Appendix for hydraulic calculations.

5.2 DETENTION & RETENTION

The City of St. George Drainage Manual requires the peak storm runoff exiting a site not be increased by new development. Detention facilities are to be designed to attenuate the peak from the 100-year, 24-hour storm, 10-year, 24-hour storm, or the 100-year, 3-hour storm, whichever case requires the largest storage volume. For this site, the 100-year 3-hour storm controlled, producing a required detention of 18,450 cubic feet. Detention facilities are not recommended for this project as improvements reduce overall site runoff.

The Small Municipal Separate Storm Sewer System (MS4) General Permit requires new development to prevent the off-site discharge of the precipitation from all rainfall events less than or equal to the 80th percentile rainfall event or a predevelopment hydrologic condition, whichever is less. The 80th percentile depth for the Dixie Storm Water Coalition Region is 0.44-inches. Based on the retention volume equation #1, the Water Quality Retention Volume (WQRV) required for this site is 12,210.43 ft^3. For this site, no retention options are available due to technical infeasibilities as listed in the Geotech report.

The proposed Low Impact Development (LID) Best Management Practices (BMPs) proposed with this development are consistent with the findings and recommendations provided with the Geotechnical Investigation – Rosewood Townhomes document prepared by AGEC, December 2, 2022.

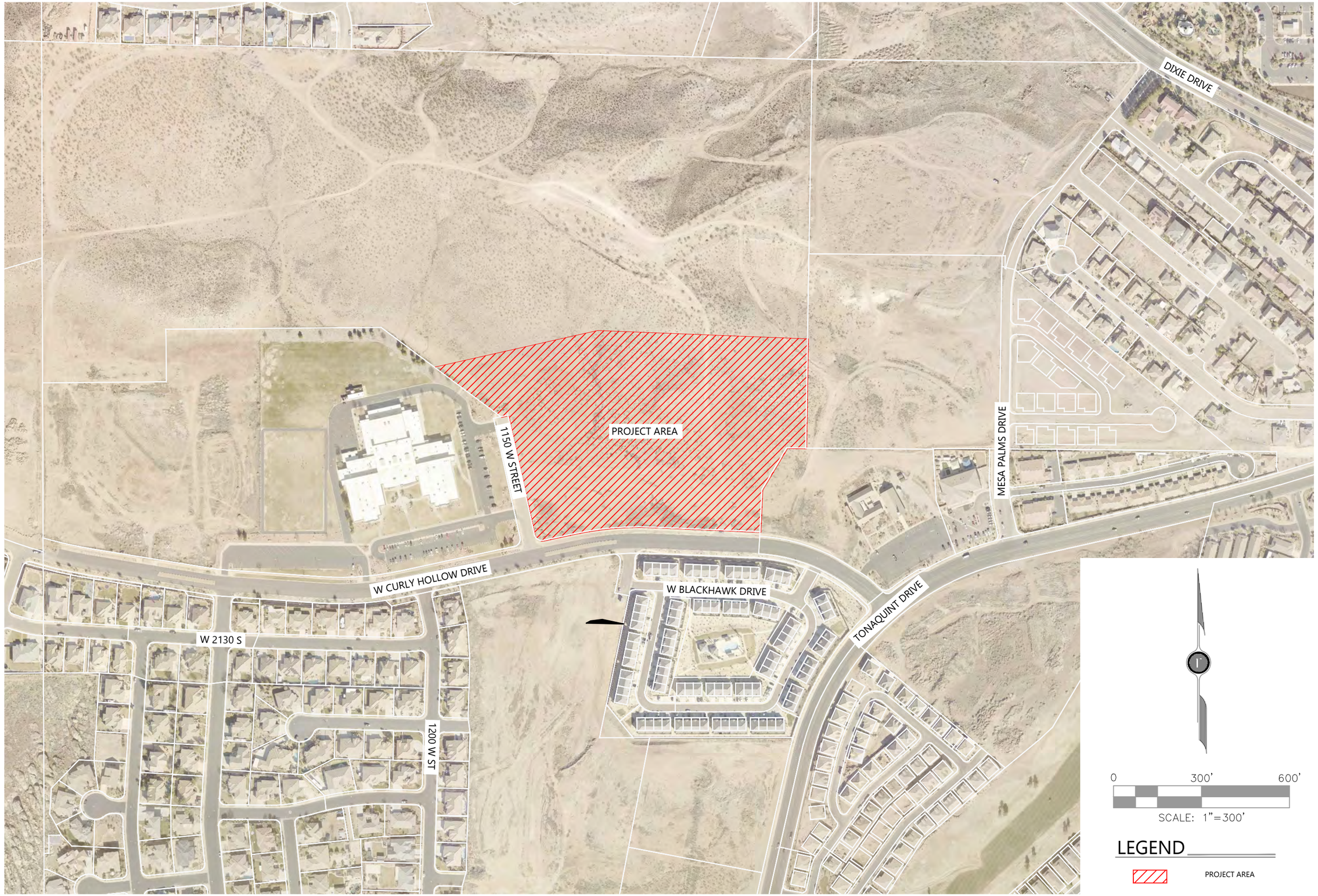
A copy of the Stormwater Quality Report is included with the Appendix.

6.0 CONCLUSIONS

It is the opinion of Rosenberg Associates that the proposed recommendations and drainage improvements included in this study and shown in the improvement plans will effectively convey storm water through the site. Drainage improvement designs are intended to be compliant with the City of St. George drainage requirements and computations/methods used to create designs were completed using the current standard of care.

APPENDIX A

Figure 1 – *Vicinity Map*
Figure 2 – *Existing Conditions*
Figure 3 – *Developed Conditions*
Figure 4 – *FEMA - Flood Insurance Rate Map*
NRCS Custom Soil Resource Report
NOAA Atlas 14 – Point Precipitation Frequency Estimate
Farmer-Fletcher Modified 3-hour Distribution Table



DATE:	11/30/2022
JOB NO.:	13231-22
DESIGNED BY:	WJP
CHECKED BY:	JWB
DWG:	VICINITY

REVISIONS DATE

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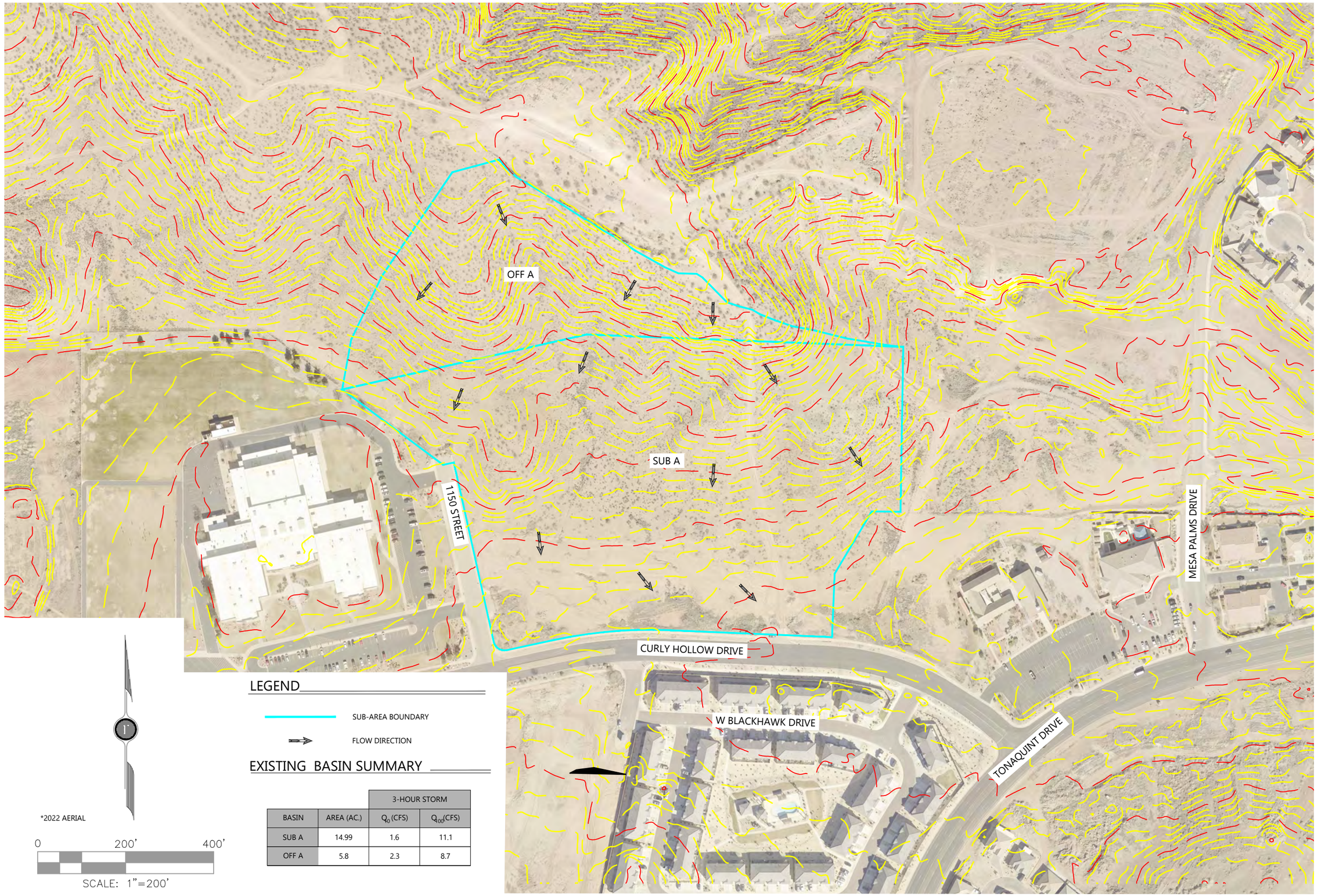
VICINITY MAP
FOR
ROSEWOOD TOWNHOMES
ST. GEORGE
UTAH

SHEET
1
1 OF 4 SHEETS



*2022 AERIAL

0 200’ 400’

SCALE: 1”=200’

LEGEND

SUB-AREA BOUNDARY

FLOW DIRECTION

EXISTING BASIN SUMMARY

		3-HOUR STORM	
BASIN	AREA (AC.)	Q_{10} (CFS)	Q_{100}(CFS)
SUB A	14.99	1.6	11.1
OFF A	5.8	2.3	8.7

DATE: 11/30/2022
JOB NO.: 13231-22
DESIGNED BY: WJP
CHECKED BY: JWB
DWG: EXISTING COND

REVISIONS DATE

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EXISTING CONDITIONS
FOR
ROSEWOOD TOWNHOMES
ST. GEORGE
UTAH

LEGEND

SUB-AREA BOUNDARY

FLOW DIRECTION

PROPOSED BASIN SUMMARY

		3-HOUR STORM	
BASIN	AREA (AC.)	Q_{10} (CFS)	Q_{100} (CFS)
SUB A	0.64	0.6	1.6
SUB B	0.32	0.3	0.8
SUB C	3.83	3.6	9.1
SUB D	1.76	1.9	4.7
SUB E	1.40	1.6	3.8
SUB F	0.90	0.2	1.0
SUB G	1.53	2.3	5.1
SUB H	2.91	1.6	5.2
SUB I	1.05	1.5	3.4
SUB J	0.66	0.0	0.3
OFF A	5.79	2.3	8.7

*2022 AERIAL

0 100' 200'

SCALE: 1"=100'

OFF A

DRAINAGE SWALE 1 (TYP.)
18" DEPTH
2:1 SIDE SLOPES
1' BOTTOM WIDTH
0.5% LONGITUDINAL SLOPE MIN.

DRAINAGE SWALE 2 (TYP.)
2:1 SIDE SLOPES
12" DEPTH
1' BOTTOM WIDTH
0.5% LONGITUDINAL SLOPE MIN.

SDP1 18" POLY @ 0.6% MIN.

2X2 DROP INLET

SUB A

SUB B

SUB C

SUB D

SUB E

SUB F

SUB G

SUB H

SUB I

SUB J

SDP2 12" POLY @ 0.5% MIN.

SDP3 12" POLY @ 0.5% MIN

SDP4 18" POLY @ 0.7% MIN.

SDP5 12" POLY @ 0.5% MIN.

SDP6 12" POLY @ 0.5% MIN.

SDP7 12" POLY @ 1.0% MIN.

SDP8 12" POLY @ 2.7% MIN.

SDP9 15" POLY @ 2.0% MIN.

SDP10 15" POLY @ 3.3% MIN.

SDP11 15" POLY @ 4.0% MIN.

SDP12 18" POLY @ 1.6% MIN.

SDP13 12" POLY @ 0.5% MIN.

SDP14 18" POLY @ 2.6% MIN.

SDP15 18" POLY @ 3.3% MIN.

SDP16 24" POLY @ 0.8% MIN.

SDP17 24" POLY @ 0.8% MIN.

SDP18 24" POLY @ 1.0% MIN.

SDP19 24" POLY @ 1.1% MIN.

SDP20 18" POLY @ 0.54% MAX (FOR COVER)

SDP21 15" POLY @ 1.0% MIN.

EXISTING CHECK 1 18" POLY @ 5.3%

EX SD1

EX SD2 (REMOVE AND REPLACE)

EX SD3 (REMOVE AND REPLACE)

EX SD4

SD1 SD2 SD3 SD4 SD5 SD6 SD7 SD8 SD9 SD10 SD11 SD12 SD13 SD14 SD15 SD16 SD17 SD18

ROAD A

ROAD B

ROAD C

ROAD D

1150 STREET

CURLY HOLLOW DRIVE

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JOB NO.: 13231-22
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DWG: PROPOSED COND

DATE
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PROPOSED CONDITIONS
FOR
ROSEWOOD TOWNHOMES
ST. GEORGE
UTAH

SHEET
3
3 OF 4 SHEETS

National Flood Hazard Layer FIRMette

FEMA

113°36'41"W 37°4'39"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

113°36'3"W 37°4'10"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 / 17.5 Cross Sections with 1% Annual Chance 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 11/29/2022 at 1:25 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.

LEGEND

PROJECT AREA

1"

DATE:	11/30/2022
JOB NO.:	13231-22
DESIGNED BY:	WJP
CHECKED BY:	JWB
DWG:	FIRM

DATE / REVISIONS

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SHEET
4
4 OF 4 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

November 30, 2022

Preface

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

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

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

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

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

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

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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.


113° 36' 45" W
113° 36' 1" W
37° 4' 39" N
37° 4' 16" N
267800
267900
268000
268100
268200
268300
268400
268500
268600
268700
268800
4106600
4106500
4106400
4106300
4106200
4106100
4106000
EB
WBD
GP
EB
JaC
2370 S
Tonaquint
EB
Soil Map may not be valid at this scale.
Map Scale: 1:4,980 if printed on A landscape (11" x 8.5") sheet.
N
Meters
0 50 100 200 300
Feet
0 200 400 800 1200
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 16, Aug 31, 2022

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
EB	Eroded land-Shalet complex, warm	66.3	52.6%
GP	Gravel pits	6.1	4.8%
JaC	Junction fine sandy loam, 2 to 5 percent slopes	35.9	28.5%
WBD	Winkel gravelly fine sandy loam, 1 to 8 percent slopes	17.7	14.0%
Totals for Area of Interest		**126.0**	**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

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
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 content: 20 percent
Gypsum, maximum content: 10 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 5.0
Available water supply, 0 to 60 inches: 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: R030XY134UT - Desert Shallow Loam (Creosotebush)
Hydric soil rating: No

Minor Components

Badland
Percent of map unit: 2 percent

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

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
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 content: 20 percent
Gypsum, maximum content: 7 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 7.2 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Ecological site: R030XY110UT - Desert Loam (Creosotebush)
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

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
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 content: 30 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 5.0
Available water supply, 0 to 60 inches: 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: R030XY134UT - Desert Shallow Loam (Creosotebush)
Hydric soil rating: No

Minor Components

Harrisburg

Percent of map unit: 5 percent

Lava flows

Percent of map unit: 5 percent

Bermesa

Percent of map unit: 5 percent

Soil Information for All Uses

Soil Reports

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

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

Soil Physical Properties

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

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)

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*					
EB—Eroded land-Shalet complex, warm														
Eroded land	—	—	—	—	—	—	—	—	—					
Shalet	0-4	-35-	-34-	27-31- 35	1.10-1.15-1.20	0.42-0.92-1.41	0.16-0.18-0.20	0.0- 1.5- 2.9	0.5- 0.8-1.0	.28	.28	2	4L	86
	4-12	-35-	-34-	27-31- 35	1.10-1.15-1.20	0.42-0.92-1.41	0.16-0.18-0.20	0.0- 1.5- 2.9	0.0- 0.5-1.0	.32	.32			
	12-16	—	—	—	—	0.00-0.71-1.41	—	—	—					
GP—Gravel pits														
Gravel pit	—	—	—	—	—	—	—	—	—					
JaC—Junction fine sandy loam, 2 to 5 percent slopes														
Junction	0-2	-70-	-22-	3- 8- 12	1.50-1.60-1.70	14.11-28.23-42.34	0.10-0.12-0.14	0.0- 1.5- 2.9	0.5- 0.8-1.0	.24	.24	5	3	86
	2-9	-70-	-22-	3- 8- 12	1.45-1.55-1.65	14.11-28.23-42.34	0.10-0.12-0.14	0.0- 1.5- 2.9	0.5- 0.8-1.0	.32	.32			
	9-21	-70-	-22-	3- 8- 12	1.45-1.55-1.65	14.11-28.23-42.34	0.10-0.12-0.14	0.0- 1.5- 2.9	0.0- 0.5-1.0	.32	.32			
	21-32	-70-	-22-	3- 8- 12	1.45-1.55-1.65	14.11-28.23-42.34	0.10-0.12-0.14	0.0- 1.5- 2.9	0.0- 0.5-1.0	.32	.32			
	32-60	-70-	-22-	3- 8- 12	1.45-1.55-1.65	14.11-28.23-42.34	0.10-0.12-0.14	0.0- 1.5- 2.9	0.0- 0.5-1.0	.32	.32			

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*					
WBD—Winkel gravelly fine sandy loam, 1 to 8 percent slopes														
Winkel	0-1	-70-	-22-	3- 8- 12	1.35-1.43-1.50	14.11-28.23-42.34	0.07-0.08-0.09	0.0- 1.5- 2.9	0.0- 0.5-1.0	.20	.32	1	5	56
	1-6	-70-	-22-	3- 8- 12	1.35-1.43-1.50	14.11-28.23-42.34	0.07-0.08-0.09	0.0- 1.5- 2.9	0.0- 0.5-1.0	.24	.37			
	6-12	-70-	-22-	3- 8- 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	0.0- 0.5-1.0	.15	.37			
	12-16	-70-	-22-	3- 8- 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- 0.5-1.0	.10	.37			
	16-20	—	—	—	—	0.00-2.12-4.23	—	—	—					
	20-24	—	—	—	—	0.07-70.61-141.14	—	—	—					

Engineering Properties

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

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

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

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

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

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

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

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

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

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

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

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

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

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

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

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

References:

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

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

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

Engineering Properties–Washington County Area, Utah														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			In				*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*
EB—Eroded land-Shalet complex, warm														
Shalet	20	D	0-4	Clay loam	CL	A-6	0- 0- 0	0- 0- 0	90-95-100	85-93-100	80-90-100	55-63-70	30-35-40	10-15-20
			4-12	Clay loam	CL	A-6	0- 0- 0	0- 0- 0	90-95-100	85-93-100	80-90-100	55-63-70	30-35-40	10-15-20
			12-16	Weathered bedrock	—	—	—	—	—	—	—	—	—	—
JaC—Junction fine sandy loam, 2 to 5 percent slopes														
Junction	85	A	0-2	Fine sandy loam	SC-SM, SM	A-4	0- 0- 0	0- 0- 0	100-100-100	90-95-100	75-80-85	35-43-50	15-20-25	NP-3 -5
			2-9	Fine sandy loam	SC-SM, SM	A-4	0- 0- 0	0- 0- 0	100-100-100	90-95-100	75-80-85	35-43-50	15-20-25	NP-3 -5
			9-21	Fine sandy loam	SC-SM, SM	A-4	0- 0- 0	0- 0- 0	100-100-100	90-95-100	75-80-85	35-43-50	15-20-25	NP-3 -5
			21-32	Fine sandy loam	SC-SM, SM	A-4	0- 0- 0	0- 0- 0	100-100-100	90-95-100	75-80-85	35-43-50	15-20-25	NP-3 -5
			32-60	Fine sandy loam	SC-SM, SM	A-4	0- 0- 0	0- 0- 0	100-100-100	90-95-100	75-80-85	35-43-50	15-20-25	NP-3 -5

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*
WBD—Winkel gravelly fine sandy loam, 1 to 8 percent slopes														
Winkel	85	D	0-1	Gravelly fine sandy loam	SM	A-4, A-2-4	0- 0- 0	0- 5- 10	75-80-85	70-75-80	50-55-60	30-35-40	15-20-25	NP-3 -5
			1-6	Gravelly fine sandy loam	SM	A-4, A-2-4	0- 0- 0	0- 5- 10	75-80-85	70-75-80	50-55-60	30-35-40	15-20-25	NP-3 -5
			6-12	Very gravelly fine sandy loam	GM	A-1-b	0- 0- 0	10-15-20	40-45-50	35-40-45	25-30-35	15-20-25	15-20-25	NP-3 -5
			12-16	Extremely cobbly fine sandy loam	GM, GC-GM	A-1-b, A-2	0- 0- 0	50-55-60	40-45-50	35-40-45	30-35-40	15-23-30	15-20-25	NP-3 -5
			16-20	Indurated	—	—	—	—	—	—	—	—	—	—
			20-24	Unweathered bedrock	—	—	—	—	—	—	—	—	—	—

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NOAA Atlas 14, Volume 1, Version 5
Location name: Saint George, Utah, USA*
Latitude: 37.0734°, Longitude: -113.6062°
Elevation: 2635.88 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	**0.125** (0.107-0.146)	**0.160** (0.139-0.189)	**0.217** (0.186-0.253)	**0.266** (0.227-0.312)	**0.343** (0.289-0.401)	**0.410** (0.340-0.480)	**0.487** (0.395-0.574)	**0.574** (0.452-0.679)	**0.707** (0.535-0.853)	**0.822** (0.605-0.999)
10-min	**0.190** (0.164-0.222)	**0.243** (0.212-0.287)	**0.330** (0.284-0.385)	**0.404** (0.346-0.475)	**0.522** (0.440-0.611)	**0.624** (0.517-0.732)	**0.742** (0.601-0.874)	**0.874** (0.688-1.03)	**1.08** (0.815-1.30)	**1.25** (0.922-1.52)
15-min	**0.236** (0.203-0.275)	**0.301** (0.263-0.355)	**0.408** (0.352-0.477)	**0.501** (0.429-0.589)	**0.648** (0.545-0.757)	**0.774** (0.642-0.907)	**0.920** (0.745-1.08)	**1.08** (0.853-1.28)	**1.34** (1.01-1.61)	**1.55** (1.14-1.89)
30-min	**0.317** (0.273-0.371)	**0.406** (0.353-0.478)	**0.550** (0.473-0.643)	**0.675** (0.578-0.794)	**0.872** (0.734-1.02)	**1.04** (0.864-1.22)	**1.24** (1.00-1.46)	**1.46** (1.15-1.73)	**1.80** (1.36-2.17)	**2.09** (1.54-2.54)
60-min	**0.392** (0.338-0.459)	**0.502** (0.437-0.592)	**0.680** (0.586-0.796)	**0.836** (0.715-0.982)	**1.08** (0.909-1.26)	**1.29** (1.07-1.51)	**1.53** (1.24-1.81)	**1.81** (1.42-2.13)	**2.22** (1.68-2.68)	**2.59** (1.90-3.14)
2-hr	**0.475** (0.419-0.544)	**0.590** (0.523-0.682)	**0.772** (0.683-0.888)	**0.934** (0.819-1.07)	**1.19** (1.02-1.36)	**1.39** (1.18-1.60)	**1.63** (1.35-1.88)	**1.90** (1.54-2.22)	**2.31** (1.80-2.73)	**2.66** (2.02-3.18)
3-hr	**0.526** (0.470-0.596)	**0.656** (0.588-0.747)	**0.843** (0.755-0.957)	**1.00** (0.891-1.13)	**1.24** (1.09-1.41)	**1.44** (1.24-1.64)	**1.67** (1.41-1.90)	**1.91** (1.59-2.24)	**2.31** (1.86-2.76)	**2.67** (2.08-3.21)
6-hr	**0.653** (0.587-0.735)	**0.816** (0.739-0.922)	**1.04** (0.935-1.17)	**1.22** (1.09-1.38)	**1.49** (1.31-1.68)	**1.71** (1.49-1.94)	**1.95** (1.67-2.23)	**2.22** (1.87-2.56)	**2.63** (2.14-3.07)	**2.97** (2.37-3.52)
12-hr	**0.785** (0.710-0.874)	**0.985** (0.889-1.10)	**1.24** (1.11-1.38)	**1.45** (1.30-1.61)	**1.73** (1.54-1.93)	**1.95** (1.71-2.18)	**2.18** (1.89-2.45)	**2.42** (2.07-2.75)	**2.76** (2.31-3.17)	**3.06** (2.51-3.56)
24-hr	**0.898** (0.835-0.962)	**1.12** (1.04-1.20)	**1.39** (1.30-1.49)	**1.61** (1.51-1.72)	**1.91** (1.78-2.04)	**2.14** (1.98-2.29)	**2.38** (2.19-2.54)	**2.61** (2.39-2.80)	**2.93** (2.66-3.20)	**3.18** (2.86-3.59)
2-day	**0.978** (0.919-1.04)	**1.22** (1.14-1.30)	**1.51** (1.42-1.61)	**1.74** (1.64-1.85)	**2.05** (1.92-2.18)	**2.29** (2.14-2.43)	**2.53** (2.35-2.69)	**2.77** (2.57-2.96)	**3.09** (2.84-3.31)	**3.34** (3.05-3.62)
3-day	**1.04** (0.979-1.10)	**1.29** (1.22-1.37)	**1.60** (1.51-1.69)	**1.84** (1.74-1.94)	**2.16** (2.04-2.28)	**2.41** (2.26-2.55)	**2.66** (2.49-2.81)	**2.91** (2.71-3.09)	**3.24** (2.99-3.45)	**3.49** (3.20-3.75)
4-day	**1.10** (1.04-1.16)	**1.36** (1.29-1.45)	**1.69** (1.60-1.78)	**1.93** (1.83-2.03)	**2.27** (2.15-2.38)	**2.53** (2.39-2.66)	**2.79** (2.62-2.94)	**3.05** (2.85-3.22)	**3.39** (3.14-3.59)	**3.65** (3.36-3.88)
7-day	**1.25** (1.18-1.33)	**1.55** (1.46-1.65)	**1.91** (1.81-2.02)	**2.19** (2.07-2.30)	**2.55** (2.41-2.68)	**2.82** (2.66-2.96)	**3.08** (2.90-3.24)	**3.34** (3.13-3.51)	**3.66** (3.42-3.87)	**3.89** (3.62-4.13)
10-day	**1.38** (1.29-1.47)	**1.72** (1.62-1.83)	**2.12** (2.00-2.25)	**2.43** (2.29-2.57)	**2.84** (2.67-2.99)	**3.13** (2.95-3.31)	**3.43** (3.21-3.62)	**3.71** (3.47-3.94)	**4.07** (3.79-4.33)	**4.33** (4.01-4.63)
20-day	**1.71** (1.60-1.82)	**2.13** (2.00-2.27)	**2.61** (2.46-2.77)	**2.96** (2.79-3.14)	**3.39** (3.19-3.59)	**3.69** (3.47-3.91)	**3.98** (3.73-4.21)	**4.23** (3.96-4.49)	**4.54** (4.24-4.82)	**4.73** (4.42-5.03)
30-day	**2.02** (1.89-2.16)	**2.52** (2.36-2.69)	**3.09** (2.90-3.29)	**3.51** (3.30-3.73)	**4.03** (3.79-4.28)	**4.40** (4.13-4.67)	**4.75** (4.45-5.04)	**5.07** (4.74-5.39)	**5.46** (5.09-5.81)	**5.72** (5.31-6.11)
45-day	**2.41** (2.24-2.59)	**3.01** (2.81-3.24)	**3.72** (3.47-3.98)	**4.24** (3.95-4.52)	**4.88** (4.56-5.19)	**5.34** (4.98-5.66)	**5.76** (5.37-6.11)	**6.14** (5.72-6.53)	**6.58** (6.13-7.00)	**6.85** (6.39-7.32)
60-day	**2.73** (2.53-2.93)	**3.41** (3.17-3.67)	**4.20** (3.91-4.50)	**4.78** (4.45-5.10)	**5.50** (5.12-5.87)	**6.00** (5.58-6.41)	**6.48** (6.01-6.92)	**6.91** (6.41-7.39)	**7.41** (6.86-7.95)	**7.72** (7.14-8.31)

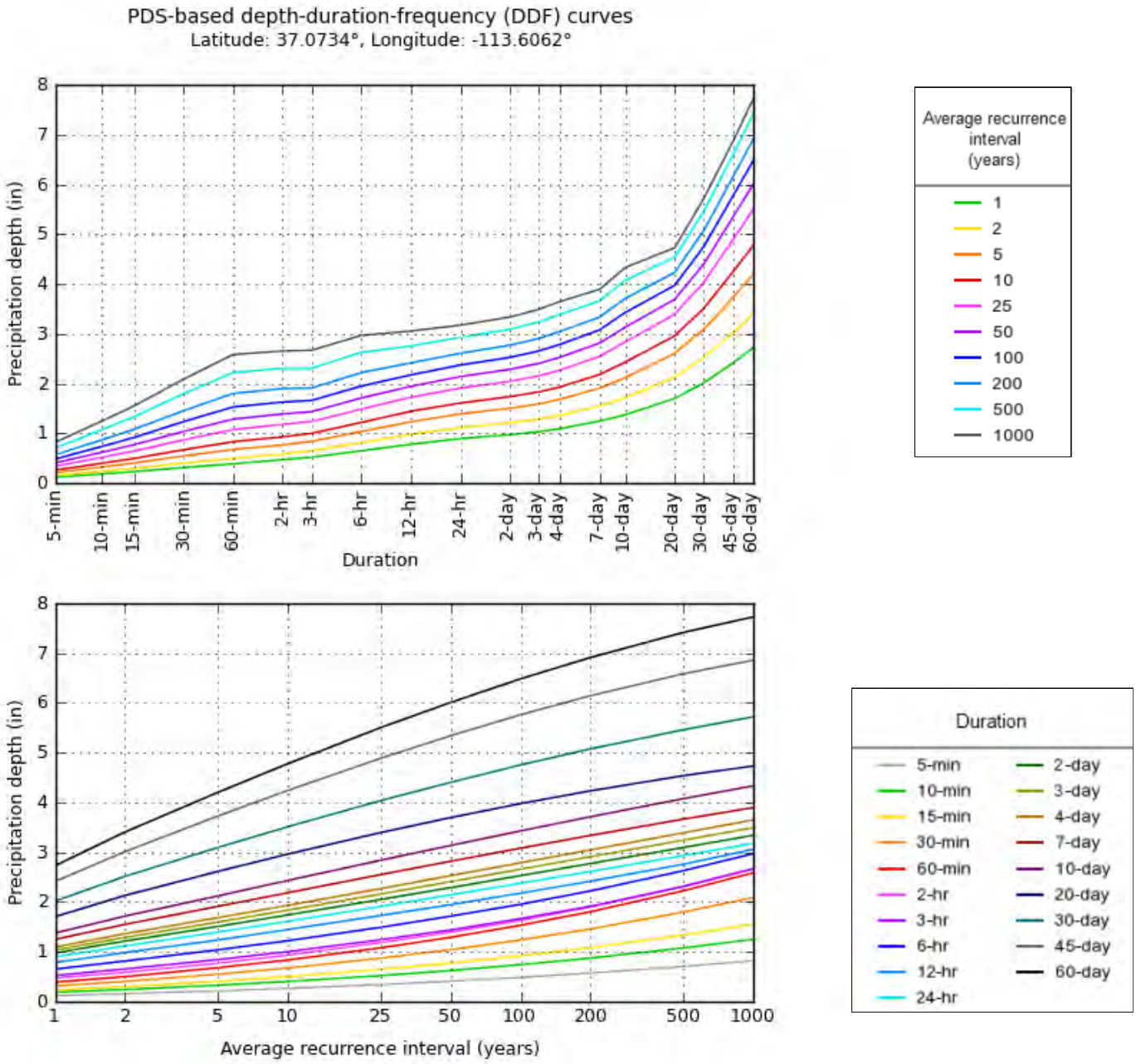
[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

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.

Back to Top

PF graphical



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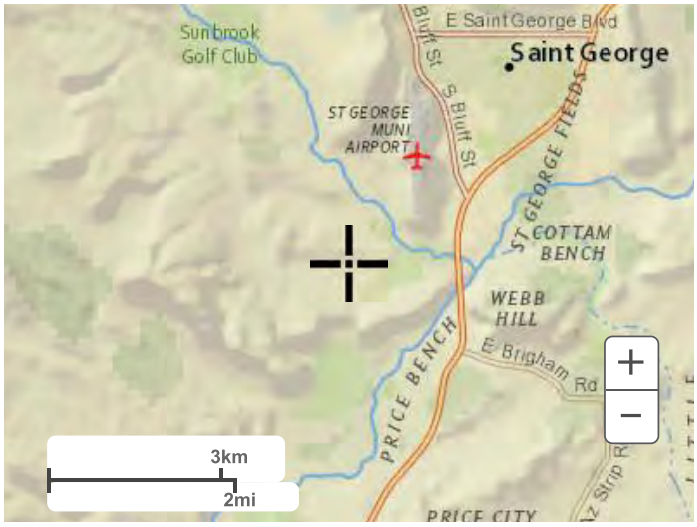
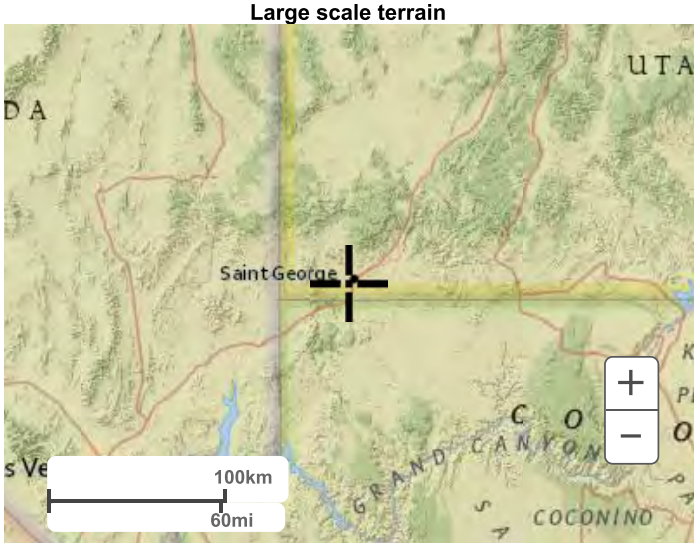
Back to Top

Maps & aerials

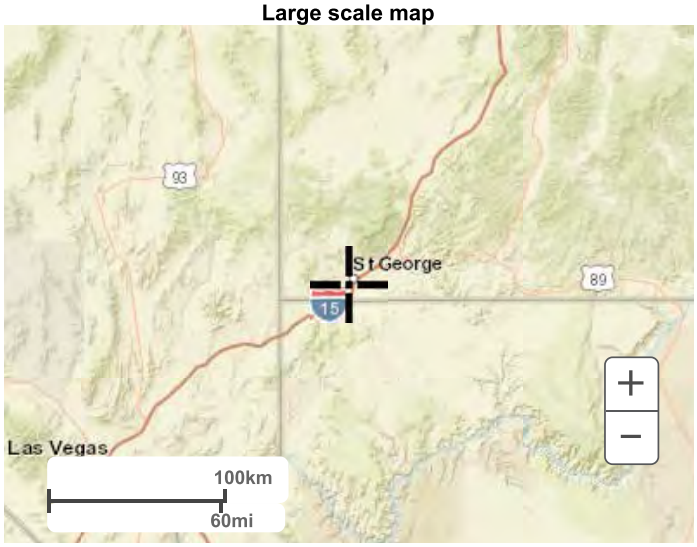
Small scale terrain



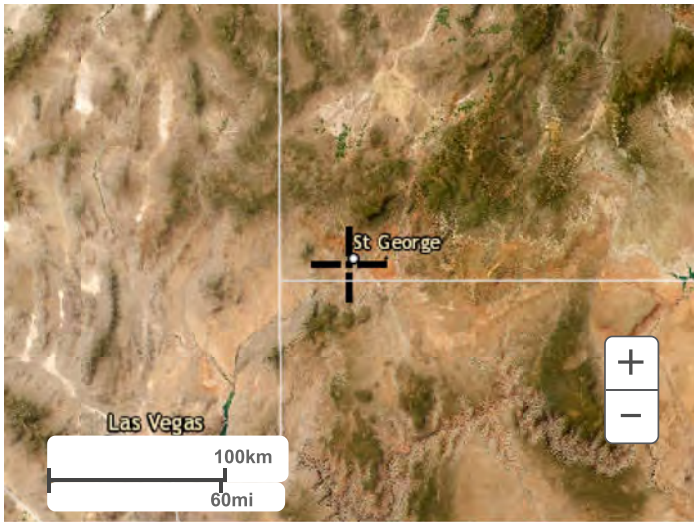
Large scale terrain



Large scale map



Large scale aerial



Back to Top

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Questions?: HDSC.Questions@noaa.gov

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PROJECT NO. 13231-22

PROJECT: Rosewood Townhomes BY: WJP DATE: 11/30/2022

SUBJECT: 3-hr Distribution Table CHKD: JWB DATE: 11/30/2022

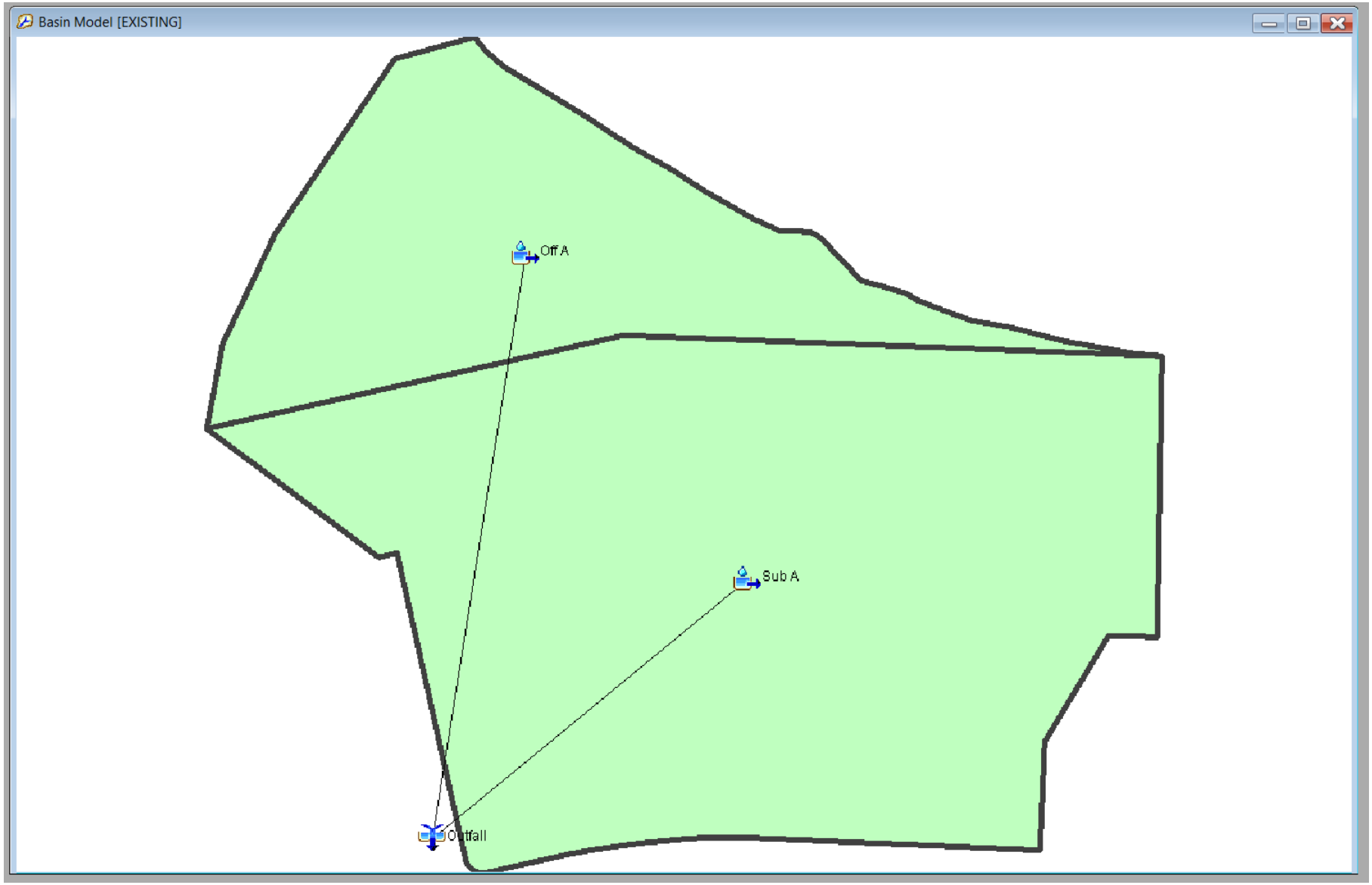
Farmer-Fletcher Modified 3-hour Storm Distribution

	10 Year Storm		100 Year Storm	
1 hour Depth	0.836 (in)		1.53 (in)	
3 Hour Depth	1 (in)		1.67 (in)	

Time (min)		Incr.	Cumulative	Incr.	Cumulative
0		0	0	0	0
5		0.006833	0.006833	0.005833	0.005833
10		0.006833	0.013667	0.005833	0.011667
15		0.006833	0.020500	0.005833	0.017500
20		0.006833	0.027333	0.005833	0.023333
25		0.006833	0.034167	0.005833	0.029167
30		0.006833	0.041000	0.005833	0.035000
35	0.285	0.238260	0.279260	0.436050	0.471050
40	0.225	0.188100	0.467360	0.344250	0.815300
45	0.157	0.131252	0.598612	0.240210	1.055510
50	0.100	0.083600	0.682212	0.153000	1.208510
55	0.060	0.050160	0.732372	0.091800	1.300310
60	0.046	0.038456	0.770828	0.070380	1.370690
65	0.034	0.028424	0.799252	0.052020	1.422710
70	0.026	0.021736	0.820988	0.039780	1.462490
75	0.020	0.016720	0.837708	0.030600	1.493090
80	0.018	0.015048	0.852756	0.027540	1.520630
85	0.016	0.013376	0.866132	0.024480	1.545110
90	0.013	0.010868	0.877000	0.019890	1.565000
95		0.006833	0.883833	0.005833	1.570833
100		0.006833	0.890667	0.005833	1.576667
105		0.006833	0.897500	0.005833	1.582500
110		0.006833	0.904333	0.005833	1.588333
115		0.006833	0.911167	0.005833	1.594167
120		0.006833	0.918000	0.005833	1.600000
125		0.006833	0.924833	0.005833	1.605833
130		0.006833	0.931667	0.005833	1.611667
135		0.006833	0.938500	0.005833	1.617500
140		0.006833	0.945333	0.005833	1.623333
145		0.006833	0.952167	0.005833	1.629167
150		0.006833	0.959000	0.005833	1.635000
155		0.006833	0.965833	0.005833	1.640833
160		0.006833	0.972667	0.005833	1.646667
165		0.006833	0.979500	0.005833	1.652500
170		0.006833	0.986333	0.005833	1.658333
175		0.006833	0.993167	0.005833	1.664167
180		0.006833	1.000000	0.005833	1.670000
Total:		1		1.67	

APPENDIX B

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


Basin Model [EXISTING]
Off A
Sub A
Outfall

ROSENBERG ASSOCIATES
CIVIL ENGINEERS • LAND SURVEYORS

PROJECT NO. 13231-22

PROJECT: Rosewood Townhomes BY: WJP DATE: 11/30/2022

SUBJECT: Existing Site Hydrology Information CHKD: JWB DATE: 11/30/2022

Subarea		Flow Length	Average Slope	Area		
Name	*Description*	*(ft)*	*S (%)*	*ft^2*	*Acres*	*mi^2*
SUB A	Site	842	4.6%	652,985	14.99	0.02342
OFF A	North of site	457	10.4%	252,272	5.79	0.00905

ROSENBERG ASSOCIATES
CIVIL ENGINEERS • LAND SURVEYORS

PROJECT NO. 13231-22

PROJECT: Rosewood Townhomes BY: WJP DATE: 11/30/2022

SUBJECT: NRCS Curve Number CHKD: JWB DATE: 11/30/2022

NRCS CURVE NUMBER CHART

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

SUB A 81 Weighted Average

OFF A 88 Natural Desert Vegetation (Pervious Areas Only)

ROSENBERG ASSOCIATES
CIVIL ENGINEERS LAND SURVEYORS

SHEET 2 OF _____

PROJECT NO. _____

PROJECT: Rosewood Townhomes BY: WJP DATE: 11/30/22

SUBJECT: Existing NRCS Curve Number CHECKED BY: _____ DATE: _____

Sub A total area = 14.99 ac

~~WBP A~~ EB - Soil Group D - area = 10.5 ac

88 : Natural desert veg - 10.5 ac / .7

JaC - soil group A - area = 4.49 ac

63 - Natural Desert veg - 4.49 ac / .3

$(88 * .7) + (63 * .3) :$ **81**

off A - total area = 5.79 ac - Group D

~~EB Soil group D - area = 3.7 ac~~

~~88 = Natural desert veg = 3.7 ac /~~

natural desert veg = **88**

ROSENBERG ASSOCIATES
CIVIL ENGINEERS • LAND SURVEYORS

PROJECT NO. 13231-22

PROJECT: Rosewood Townhomes BY: WJP DATE: 11/30/2022

SUBJECT: TR 55 Worksheet CHKD: JWB DATE: 11/30/2022

X Pre-developed ___ Post-developed

Subarea: SUB A

Sheet Flow

Surface Description	Mannings 'n' n	Flow Length L (ft) ≤100ft	2-yr 24-hr P_2 (in)	Average slope s (ft/ft)
	0.05	50	1.12	0.0460

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

T_t 0.05 hr
2.831 min

Shallow Concentrated Flow

	Ground Type	Flow Length L (ft)	Average Velocity V(ft/s)	Average slope s (ft/ft)
	G	100.800	3.46	0.0460

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

T_t 0.0081 hr
0.485 min

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

Channel Flow

Mannings 'n' n	x-sectional flow area, a (ft^2)	Wetted Perimeter P_w	Average slope s (ft/ft)	Flow Length L (ft)
0.05	15.00	30.07	0.0460	691.00

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

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

Hydraulic radius r=a/Pw	Average Velocity V(ft/s)
0.50	4.02

T_t 0.04775 hr
2.865 min

Watershed or sub area T_c add up T_t

Lag time =tc*.6

Subarea:	T_c	0.06	hr
SUB A		3.709	min

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PROJECT NO. 13231-22

PROJECT: Rosewood Townhomes BY: WJP DATE: 11/30/2022

SUBJECT: TR 55 Worksheet CHKD: JWB DATE: 11/30/2022

X Pre-developed ___ Post-developed

Subarea: OFF A

Sheet Flow

Surface Description	Mannings 'n' n	Flow Length L (ft) ≤100ft	2-yr 24-hr P_2 (in)	Average slope s (ft/ft)
	0.05	40.00	1.12	0.1040

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

T_t 0.03 hr
1.709 min

Shallow Concentrated Flow

	Ground Type	Flow Length L (ft)	Average Velocity V(ft/s)	Average slope s (ft/ft)
	G	50.00	5.20	0.1040

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

T_t 0.0027 hr
0.160 min

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

Channel Flow

Mannings 'n' n	x-sectional flow area, a (ft^2)	Wetted Perimeter P_w	Average slope s (ft/ft)	Flow Length L (ft)
0.05	15.00	30.07	0.1040	366.70

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

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

Hydraulic radius r=a/Pw	Average Velocity V(ft/s)
0.50	6.04

T_t 0.01685 hr
1.011 min

Watershed or sub area T_c add up T_t

Lag time =tc*.6

Subarea:	T_c	0.03	hr
OFF A		1.728	min

Project: Rosewood Townhomes Simulation Run: PRE 10-3

Start of Run: 01Jan2000, 00:00 Basin Model: EXISTING
End of Run: 01Jan2000, 04:00 Meteorologic Model: 10-3
Compute Time: 12Dec2022, 10:17:47 Control Specifications: 10YR-3HR

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
Sub A	0.0234	1.6	01Jan2000, 00:55	0.10
Off A	0.0090	2.3	01Jan2000, 00:45	0.25
Outfall	0.0324	3.8	01Jan2000, 00:50	0.14

Project: Rosewood Townhomes Simulation Run: PRE 10-24

Start of Run: 01Jan2000, 00:00 Basin Model: EXISTING
End of Run: 02Jan2000, 05:00 Meteorologic Model: 10-24
Compute Time: 12Dec2022, 10:17:46 Control Specifications: 24HR

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
Sub A	0.0234	2.7	01Jan2000, 12:00	0.37
Off A	0.0090	2.3	01Jan2000, 12:00	0.66
Outfall	0.0324	5.0	01Jan2000, 12:00	0.45

Project: Rosewood Townhomes Simulation Run: PRE 100-3

Start of Run: 01Jan2000, 00:00 Basin Model: EXISTING
End of Run: 01Jan2000, 04:00 Meteorologic Model: 100-3
Compute Time: 12Dec2022, 10:17:49 Control Specifications: 100YR-3HR

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
Sub A	0.0234	11.1	01Jan2000, 00:50	0.41
Off A	0.0090	8.7	01Jan2000, 00:45	0.71
Outfall	0.0324	18.7	01Jan2000, 00:45	0.49

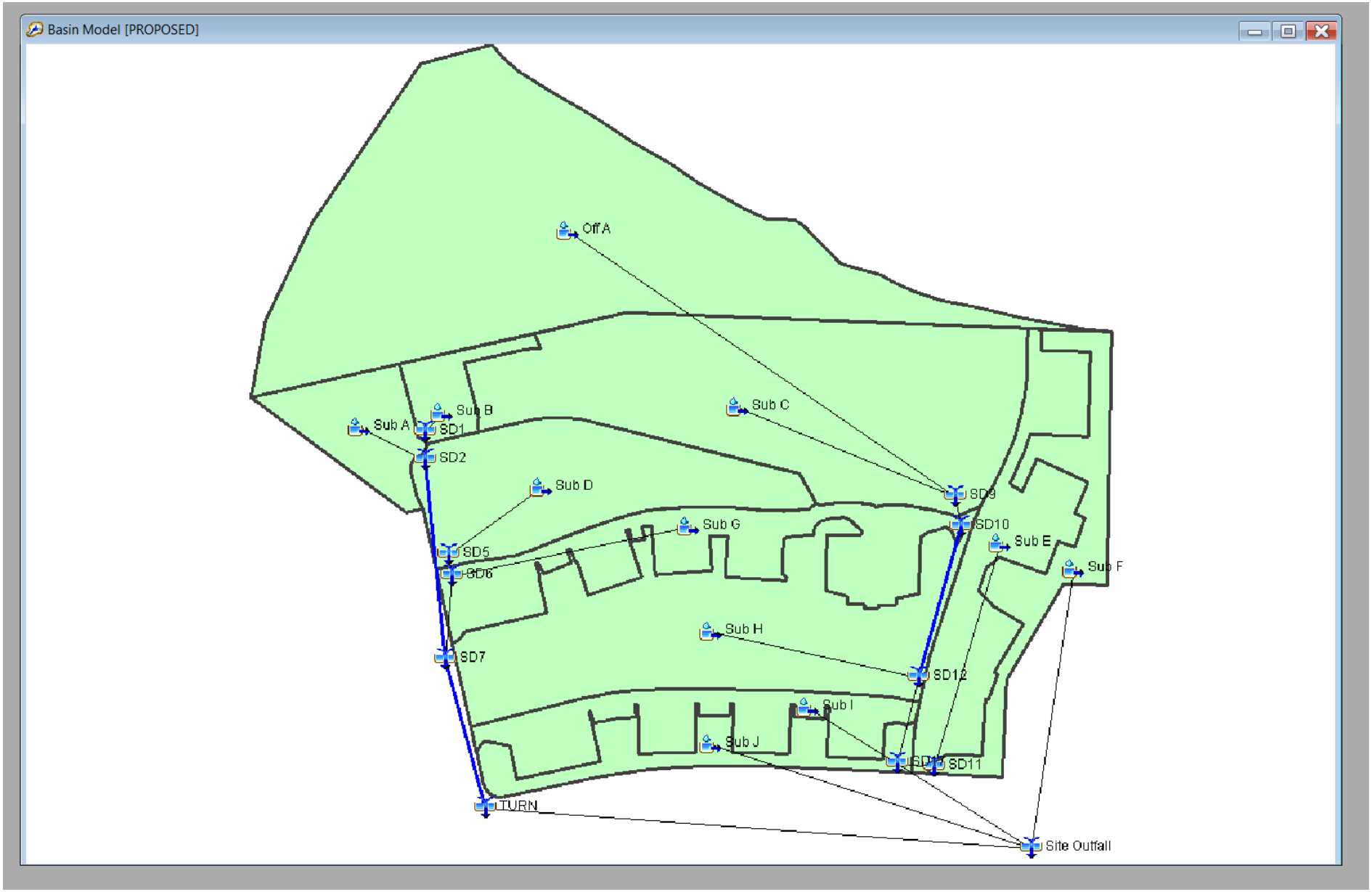
Project: Rosewood Townhomes Simulation Run: PRE 100-24

Start of Run: 01Jan2000, 00:00 Basin Model: EXISTING
End of Run: 02Jan2000, 05:00 Meteorologic Model: 100-24
Compute Time: 12Dec2022, 10:17:48 Control Specifications: 24HR

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
Sub A	0.0234	7.6	01Jan2000, 12:00	0.86
Off A	0.0090	4.8	01Jan2000, 12:00	1.28
Outfall	0.0324	12.4	01Jan2000, 12:00	0.97

APPENDIX C

HEC-HMS Model Diagram
Developed Watershed Hydrology Model Input Spreadsheets
Hand scan – SCS Curve # for Proposed Conditions Subarea A
Developed Conditions HEC-HMS Model and Output Tables
Detention Calculations
Flow Master Worksheet output
MS4 Retention Volume Calculation


Basin Model [PROPOSED]
Off A
Sub A
Sub B
SD1
SD2
Sub C
Sub D
SD9
SD10
Sub E
Sub F
Sub G
SD5
SD6
Sub H
SD7
SD12
Sub I
Sub J
SD11
TURN
Site Outfall

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PROJECT NO. 13231-22

PROJECT: Rosewood Townhomes BY: WJP DATE: 12/1/2022

SUBJECT: Proposed Site Hydrology Information CHKD: JWB DATE: 12/1/2022

Subarea		Flow Length	Average Slope	Area		
Name	*Description*	*(ft)*	*S (%)*	*ft^2*	*Acres*	*mi^2*
SUB A	Northwest of townhomes	194	6.6%	27,817	0.64	0.00100
SUB B	Northwest portion north of Road C	300	4.2%	13,849	0.32	0.00050
SUB C	North of Road C	796	3.2%	166,759	3.83	0.00598
SUB D	Inbetween Road C and Road B	1,026	1.3%	76,612	1.76	0.00275
SUB E	East of Road D, flows west	714	4.1%	60,894	1.40	0.00218
SUB F	East of Road D, flows east	172	3.3%	39,017	0.90	0.00140
SUB G	South of Road B, flows north	592	1.2%	66,438	1.53	0.00238
SUB H	North of Road A, flows south	735	2.9%	126,840	2.91	0.00455
SUB I	South of Road A, flows north	653	1.1%	45,862	1.05	0.00165
SUB J	South of Road A, flows south	99	3.2%	28,657	0.66	0.00103
OFF A	North of site	457	10.4%	252,272	5.79	0.00905

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PROJECT NO. 13231-22

PROJECT: Rosewood Townhomes BY: WJP DATE: 12/1/2022

SUBJECT: NRCS Curve Number CHKD: JWB DATE: 12/1/2022

NRCS CURVE NUMBER CHART

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

SUB A	94	Weighted Average
SUB B	94	Weighted Average
SUB C	94	Weighted Average
SUB D	95	Weighted Average
SUB E	95	Weighted Average
SUB F	85	Weighted Average
SUB G	97	Weighted Average
SUB H	90	Weighted Average
SUB I	97	Weighted Average
SUB J	76	Weighted Average
OFF A	88	Natural Desert Vegetation

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CIVIL ENGINEERS LAND SURVEYORS

SHEET 4 OF _____

PROJECT NO. _____

PROJECT: Rosewood Townhomes BY: WJP DATE: 12/1/22

SUBJECT: Proposed NRCS Curve Number CHECKED BY: _____ DATE: _____

NDV = natural desert veg

Sub A - .64 acres

88 - Natural desert veg - .29 ac / .45

98 - Imp - .35 ac / .55

(88 * .45) + (98 * .55) = 94

Sub B - .32 ac

88 - NDV - .13 ac / .4

98 - Imp - .19 ac / .6

(88 * .4) + (98 * .6) = 94

Sub C - 3.83 ac

88 - NVD - 1.63 ac / .43

98 - Imp - 2.2 ac / .57

(88 * .43) + (98 * .6) = 94

Sub d - 1.76 ac

88 - NVD - .53 ac / .3

98 - Imp - 1.23 ac / .7

(88 * .3) + (98 * .7) = 95

Sub e - 1.4 ac

- Group D - .9 ac

88 - NVD - .07 ac / .077

98 - Imp - .83 ac / .92

(88 * .077) + (98 * .92) = 97

- Group A - .5 ac

63 - NVD - .08 ac / .16

98 - Imp - .42 ac / .84

(63 * .16) + (98 * .84) = 92

Total = (97 * .64) + (92 * .36) = 95

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CIVIL ENGINEERS LAND SURVEYORS

SHEET 5 OF _____

PROJECT NO. _____

PROJECT: Rosewood Townhomes BY: WSP DATE: 12/2/22

SUBJECT: Proposed NRCS Curve Number CHECKED BY: _____ DATE: _____

Sub f - .9 ac

Group D - .52 ac

88 - NVD - .38 ac / .73

98 - Imp - .14 ac / .27

(88 * .73) + (98 * .27) = 91

Group A - .38 ac

63 - NVD - .23 ac / .6

98 - Imp - .15 ac / .4

(63 * .6) + (98 * .4) = 77

Total = (91 * .58) + (77 * .42) = 85

Sub g - 1.53 ac

Group D - 1.34 ac

88 - NVD - .07 ac / .05

98 - Imp - 1.27 ac / .95

(88 * .05) + (98 * .95) = 97

Group A - .19 ac

63 - NVD - .006 ac / .03

98 - Imp - .184 ac / .97

(63 * .03) + (98 * .97) = 97

total = 97

ROSENBERG ASSOCIATES™
CIVIL ENGINEERS LAND SURVEYORS

SHEET 6 OF _____

PROJECT NO. _____

PROJECT: Rosewood Townhomes BY: WJP DATE: 12/2/22

SUBJECT: Proposed NRCS Curve Number CHECKED BY: _____ DATE: _____

Sub H - 2.91 ac

Group D - 1.15 ac

88 - NDV - .67 ac / .58

98 - Imp .48 ac / .42

(88 * .58) + (98 * .42) = 92

Group A - 1.76

63 - NDV - .51 - .29

98 - Imp - 1.29 ac - .71

(63 * .29) + (98 * .71) = 88

Total = (92 * .4) + (88 * .6) = 90

Sub I - 1.05

63 - NDV - .06 ac / .06

98 Imp - .99 ac / .94

(63 * .06) + (98 * .94) = 96

Sub J - .66 ac

83 - NDV - .42 ac / .64

98 - Imp - .24 ac / .36

(63 * .64) + (98 * .36) = 76

ROSENBERG ASSOCIATES
CIVIL ENGINEERS • LAND SURVEYORS

PROJECT NO. 13231-22

PROJECT: Rosewood Townhomes BY: WJP DATE: 12/1/2022

SUBJECT: TR 55 Worksheet CHKD: JWB DATE: 12/1/2022

____ Pre-developed X Post-developed

Subarea: SUB A

Sheet Flow

Surface Description	Mannings 'n' n	Flow Length L (ft) ≤100ft	2-yr 24-hr P_2 (in)	Average slope s (ft/ft)
	0.01	0	1.12	0.0660

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

T_t 0.00 hr
0.000 min

Shallow Concentrated Flow

	Ground Type	Flow Length L (ft)	Average Velocity V(ft/s)	Average slope s (ft/ft)
	P	0.000		0.0660

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

T_t 0 hr
0.000 min

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

Channel Flow

Mannings 'n' n	x-sectional flow area, a (ft^2)	Wetted Perimeter P_w	Average slope s (ft/ft)	Flow Length L (ft)
0.01	2.87	16.89	0.0660	194.10

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

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

Hydraulic radius r=a/Pw	Average Velocity V(ft/s)
0.17	11.74

T_t 0.00459 hr
0.276 min

Watershed or sub area T_c add up T_t

Lag time =tc*.6

Subarea:	T_c	0.00	hr
SUB A		0.165	min

ROSENBERG ASSOCIATES
CIVIL ENGINEERS • LAND SURVEYORS

PROJECT NO. 13231-22

PROJECT: Rosewood Townhomes BY: WJP DATE: 12/1/2022

SUBJECT: TR 55 Worksheet CHKD: JWB DATE: 12/1/2022

____ Pre-developed X Post-developed

Subarea: SUB B

Sheet Flow

Surface Description	Mannings 'n' n	Flow Length L (ft) ≤100ft	2-yr 24-hr P_2 (in)	Average slope s (ft/ft)
	0.05	20.00	1.12	0.0420

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

T_t 0.02 hr
1.410 min

Shallow Concentrated Flow

	Ground Type	Flow Length L (ft)	Average Velocity V(ft/s)	Average slope s (ft/ft)
	G	100.00	3.31	0.0420

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

T_t 0.0084 hr
0.504 min

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

Channel Flow

Mannings 'n' n	x-sectional flow area, a (ft^2)	Wetted Perimeter P_w	Average slope s (ft/ft)	Flow Length L (ft)
0.01	2.87	16.89	0.0420	180.40

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

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

Hydraulic radius r=a/Pw	Average Velocity V(ft/s)
0.17	9.37

T_t 0.00535 hr
0.321 min

Watershed or sub area T_c add up T_t

Lag time =tc*.6

Subarea:	T_c	0.02	hr
SUB B		1.341	min

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PROJECT NO. 13231-22

PROJECT: Rosewood Townhomes BY: WJP DATE: 12/1/2022

SUBJECT: TR 55 Worksheet CHKD: JWB DATE: 12/1/2022

____ Pre-developed X Post-developed

Subarea: SUB C

Sheet Flow

Surface Description	Mannings 'n' n	Flow Length L (ft) ≤100ft	2-yr 24-hr rainfall P_2 (in)	Average slope s (ft/ft)
	0.05	63.00	1.12	0.0320

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

T_t 0.07 hr
3.938 min

Shallow Concentrated Flow

	Ground Type	Flow Length L (ft)	Average Velocity V(ft/s)	Average slope s (ft/ft)
	P	72.90	3.64	0.0320

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

T_t 0.0056 hr
0.334 min

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

Channel Flow

Mannings 'n' n	x-sectional flow area, a (ft^2)	Wetted Perimeter P_w	Average slope s (ft/ft)	Flow Length L (ft)
0.01	2.87	16.89	0.0320	660.00

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

$$r = \frac{a}{P_w}$$

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

Hydraulic radius r=a/Pw	Average Velocity V(ft/s)
0.17	8.18

T_t 0.02242 hr
1.345 min

Watershed or sub area T_c add up T_t

Lag time =tc*.6

Subarea:	T_c		
SUB C		0.06	hr
		3.370	min

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PROJECT NO. 13231-22

PROJECT: Rosewood Townhomes BY: WJP DATE: 12/1/2022

SUBJECT: TR 55 Worksheet CHKD: JWB DATE: 12/1/2022

____ Pre-developed X Post-developed

Subarea: SUB D

Sheet Flow

Surface Description	Mannings 'n' n	Flow Length L (ft) ≤100ft	2-yr 24-hr rainfall P_2 (in)	Average slope s (ft/ft)
	0.01	6.00	1.12	0.0130

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

T_t 0.00 hr
0.237 min

Shallow Concentrated Flow

	Ground Type	Flow Length L (ft)	Average Velocity V(ft/s)	Average slope s (ft/ft)
	G	0.00		0.0130

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

T_t 0 hr
0.000 min

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

Channel Flow

Mannings 'n' n	x-sectional flow area, a (ft^2)	Wetted Perimeter P_w	Average slope s (ft/ft)	Flow Length L (ft)
0.01	2.87	16.89	0.0130	1,020.00

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

$$r = \frac{a}{P_w}$$

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

Hydraulic radius r=a/Pw	Average Velocity V(ft/s)
0.17	5.21

T_t 0.05437 hr
3.262 min

Watershed or sub area T_c add up T_t

Lag time =tc*.6

Subarea:	T_c	0.03	hr
SUB D		2.100	min

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PROJECT NO. 13231-22

PROJECT: Rosewood Townhomes BY: WJP DATE: 12/1/2022

SUBJECT: TR 55 Worksheet CHKD: JWB DATE: 12/1/2022

____ Pre-developed X Post-developed

Subarea: SUB E

Sheet Flow

Surface Description	Mannings 'n' n	Flow Length L (ft) ≤100ft	2-yr 24-hr rainfall P_2 (in)	Average slope s (ft/ft)
	0.01	20	1.12	0.0410

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

T_t 0.01 hr
0.393 min

Shallow Concentrated Flow

	Ground Type	Flow Length L (ft)	Average Velocity V(ft/s)	Average slope s (ft/ft)
	P	62.00	4.12	0.041

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

T_t 0.0042 hr
0.251 min

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

Channel Flow

Mannings 'n' n	x-sectional flow area, a (ft^2)	Wetted Perimeter P_w	Average slope s (ft/ft)	Flow Length L (ft)
0.01	2.87	16.89	0.0410	632.40

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

$$r = \frac{a}{P_w}$$

Hydraulic radius r=a/Pw	Average Velocity V(ft/s)
0.17	9.25

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

T_t 0.01898 hr
1.139 min

Watershed or sub area T_c add up T_t

Lag time =tc*.6

Subarea:	T_c		
SUB E		1.070	min

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PROJECT NO. 13231-22

PROJECT: Rosewood Townhomes BY: WJP DATE: 12/1/2022

SUBJECT: TR 55 Worksheet CHKD: JWB DATE: 12/1/2022

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Subarea: SUB F

Sheet Flow

Surface Description	Mannings 'n' n	Flow Length L (ft) ≤100ft	2-yr 24-hr rainfall P_2 (in)	Average slope s (ft/ft)
	0.01	20	1.12	0.0330

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

T_t 0.01 hr
0.429 min

Shallow Concentrated Flow

	Ground Type	Flow Length L (ft)	Average Velocity V(ft/s)	Average slope s (ft/ft)
	G	152.00	2.93	0.0330

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

T_t 0.0144 hr
0.864 min

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

Channel Flow

Mannings 'n' n	x-sectional flow area, a (ft^2)	Wetted Perimeter P_w	Average slope s (ft/ft)	Flow Length L (ft)
0.01	2.87	16.89	0.03	0.00

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

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

Hydraulic radius r=a/Pw	Average Velocity V(ft/s)
0.17	8.30

T_t 0 hr
0.000 min

Watershed or sub area T_c add up T_t

Lag time =tc*.6

Subarea:	T_c	0.01	hr
SUB F		0.776	min

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PROJECT NO. 13231-22

PROJECT: Rosewood Townhomes BY: WJP DATE: 12/1/2022

SUBJECT: TR 55 Worksheet CHKD: JWB DATE: 12/1/2022

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Subarea: SUB G

Sheet Flow

Surface Description	Mannings 'n' n	Flow Length L (ft) ≤100ft	2-yr 24-hr rainfall P_2 (in)	Average slope s (ft/ft)
	0.01	25	1.12	0.0120

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

T_t 0.01 hr
0.768 min

Shallow Concentrated Flow

	Ground Type	Flow Length L (ft)	Average Velocity V(ft/s)	Average slope s (ft/ft)
	P	67.20	2.23	0.0120

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

T_t 0.0084 hr
0.503 min

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

Channel Flow

Mannings 'n' n	x-sectional flow area, a (ft^2)	Wetted Perimeter P_w	Average slope s (ft/ft)	Flow Length L (ft)
0.01	2.87	16.89	0.0120	500.00

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

$$r = \frac{a}{P_w}$$

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

Hydraulic radius r=a/Pw	Average Velocity V(ft/s)
0.17	5.01

T_t 0.02774 hr
1.664 min

Watershed or sub area T_c add up T_t

Lag time =tc*.6

Subarea:	T_c	0.03	hr
SUB G		1.761	min

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PROJECT NO. 13231-22

PROJECT: Rosewood Townhomes BY: WJP DATE: 12/1/2022

SUBJECT: TR 55 Worksheet CHKD: JWB DATE: 12/1/2022

____ Pre-developed X Post-developed

Subarea: SUB H

Sheet Flow

Surface Description	Mannings 'n' n	Flow Length L (ft) ≤100ft	2-yr 24-hr rainfall P_2 (in)	Average slope s (ft/ft)
	0.05	50	1.12	0.0290

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

T_t 0.06 hr
3.404 min

Shallow Concentrated Flow

	Ground Type	Flow Length L (ft)	Average Velocity V(ft/s)	Average slope s (ft/ft)
	G	25.00	2.75	0.029

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

T_t 0.0025 hr
0.152 min

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

Channel Flow

Mannings 'n' n	x-sectional flow area, a (ft^2)	Wetted Perimeter P_w	Average slope s (ft/ft)	Flow Length L (ft)
0.01	2.87	16.89	0.03	660.00

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

$$r = \frac{a}{P_w}$$

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

Hydraulic radius r=a/Pw	Average Velocity V(ft/s)
0.17	7.78

T_t 0.02356 hr
1.413 min

Watershed or sub area T_c add up T_t

Lag time =tc*.6

Subarea:	T_c		
SUB H		2.982	min

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PROJECT NO. 13231-22

PROJECT: Rosewood Townhomes BY: WJP DATE: 12/1/2022

SUBJECT: TR 55 Worksheet CHKD: JWB DATE: 12/1/2022

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Subarea: SUB I

Sheet Flow

Surface Description	Mannings 'n' n	Flow Length L (ft) ≤100ft	2-yr 24-hr rainfall P_2 (in)	Average slope s (ft/ft)
	0.01	25	1.12	0.0110

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

T_t 0.01 hr
0.795 min

Shallow Concentrated Flow

	Ground Type	Flow Length L (ft)	Average Velocity V(ft/s)	Average slope s (ft/ft)
	P	52.70	2.13	0.011

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

T_t 0.0069 hr
0.412 min

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

Channel Flow

Mannings 'n' n	x-sectional flow area, a (ft^2)	Wetted Perimeter P_w	Average slope s (ft/ft)	Flow Length L (ft)
0.01	2.87	16.89	0.01	575.00

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

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

Hydraulic radius r=a/Pw	Average Velocity V(ft/s)
0.17	4.79

T_t 0.03332 hr
1.999 min

Watershed or sub area T_c add up T_t

Lag time =tc*.6

Subarea:	T_c		
SUB I		1.924	min

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PROJECT NO. 13231-22

PROJECT: Rosewood Townhomes BY: WJP DATE: 12/1/2022

SUBJECT: TR 55 Worksheet CHKD: JWB DATE: 12/1/2022

____ Pre-developed X Post-developed

Subarea: SUB J

Sheet Flow

Surface Description	Mannings 'n' n	Flow Length L (ft) ≤100ft	2-yr 24-hr rainfall P_2 (in)	Average slope s (ft/ft)
	0.01	50	1.12	0.0320

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

T_t 0.02 hr
0.903 min

Shallow Concentrated Flow

	Ground Type	Flow Length L (ft)	Average Velocity V(ft/s)	Average slope s (ft/ft)
	G	49.00	2.89	0.032

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

T_t 0.0047 hr
0.283 min

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

Channel Flow

Mannings 'n' n	x-sectional flow area, a (ft^2)	Wetted Perimeter P_w	Average slope s (ft/ft)	Flow Length L (ft)
0.01	2.87	16.89	0.03	0.00

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

$$r = \frac{a}{P_w}$$

Hydraulic radius r=a/Pw	Average Velocity V(ft/s)
0.17	8.18

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

T_t 0 hr
0.000 min

Watershed or sub area T_c add up T_t

Lag time =tc*.6

Subarea:	T_c	0.01	hr
SUB J		0.712	min

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PROJECT NO. 13231-22

PROJECT: Rosewood Townhomes BY: WJP DATE: 12/1/2022

SUBJECT: TR 55 Worksheet CHKD: JWB DATE: 12/1/2022

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Subarea: OFF A

Sheet Flow

Surface Description	Mannings 'n' n	Flow Length L (ft) ≤100ft	2-yr 24-hr rainfall P_2 (in)	Average slope s (ft/ft)
	0.05	40	1.12	0.1040

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

T_t 0.03 hr
1.709 min

Shallow Concentrated Flow

	Ground Type	Flow Length L (ft)	Average Velocity V(ft/s)	Average slope s (ft/ft)
	G	50.00	5.20	0.104

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

T_t 0.0027 hr
0.160 min

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

Channel Flow

Mannings 'n' n	x-sectional flow area, a (ft^2)	Wetted Perimeter P_w	Average slope s (ft/ft)	Flow Length L (ft)
0.05	15.00	30.07	0.10	366.70

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

$$r = \frac{a}{P_w}$$

Hydraulic radius r=a/Pw	Average Velocity V(ft/s)
0.50	6.05

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

T_t 0.01685 hr
1.011 min

Watershed or sub area T_c add up T_t

Lag time =tc*.6

Subarea:	T_c		
OFF A		0.03	hr
		1.728	min

Project: Rosewood Townhomes Simulation Run: POST 10-3

Start of Run: 01Jan2000, 00:00 Basin Model: PROPOSED
End of Run: 01Jan2000, 04:00 Meteorologic Model: 10-3
Compute Time: 12Dec2022, 10:17:39 Control Specifications: 10YR-3HR

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
Off A	0.0090	2.3	01Jan2000, 00:45	0.25
Sub A	0.0010	0.6	01Jan2000, 00:45	0.50
Sub B	0.0005	0.3	01Jan2000, 00:45	0.50
Sub C	0.0060	3.6	01Jan2000, 00:45	0.50
Sub D	0.0027	1.9	01Jan2000, 00:45	0.56
Sub E	0.0022	1.6	01Jan2000, 00:45	0.56
Sub F	0.0014	0.2	01Jan2000, 00:50	0.17
Sub G	0.0024	2.3	01Jan2000, 00:40	0.71
Sub H	0.0046	1.6	01Jan2000, 00:45	0.32
Sub I	0.0016	1.5	01Jan2000, 00:40	0.71
Sub J	0.0010	0.0	01Jan2000, 01:05	0.04
SD1	0.0005	0.3	01Jan2000, 00:45	0.50
SD2	0.0015	0.9	01Jan2000, 00:45	0.50
Reach 1 (SD1 to EX SD1)	0.0015	0.9	01Jan2000, 00:45	0.50
SD5	0.0027	1.9	01Jan2000, 00:45	0.56
SD6	0.0051	4.1	01Jan2000, 00:40	0.63
SD7	0.0051	4.1	01Jan2000, 00:40	0.63
EX SD1	0.0015	0.9	01Jan2000, 00:45	0.50
Reach 2 (EX SD1 to EX SD4)	0.0066	5.0	01Jan2000, 00:45	0.60
SD9	0.0150	6.0	01Jan2000, 00:45	0.35
SD10	0.0150	6.0	01Jan2000, 00:45	0.35
Reach 3 (SD7 to SD8)	0.0150	5.9	01Jan2000, 00:45	0.35
SD12	0.0196	7.5	01Jan2000, 00:45	0.35
SD11	0.0022	1.6	01Jan2000, 00:45	0.56
SD17	0.0234	10.5	01Jan2000, 00:45	0.39
TURN	0.0066	5.0	01Jan2000, 00:45	0.60
Site Outfall	0.0324	15.7	01Jan2000, 00:45	0.41

Project: Rosewood Townhomes Simulation Run: POST 10-24

Start of Run: 01Jan2000, 00:00 Basin Model: PROPOSED
End of Run: 02Jan2000, 05:00 Meteorologic Model: 10-24
Compute Time: 12Dec2022, 10:17:36 Control Specifications: 24HR

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
Off A	0.0090	2.3	01Jan2000, 12:00	0.66
Sub A	0.0010	0.4	01Jan2000, 12:00	1.04
Sub B	0.0005	0.2	01Jan2000, 12:00	1.04
Sub C	0.0060	2.6	01Jan2000, 12:00	1.04
Sub D	0.0027	1.3	01Jan2000, 12:00	1.11
Sub E	0.0022	1.0	01Jan2000, 12:00	1.11
Sub F	0.0014	0.3	01Jan2000, 12:00	0.52
Sub G	0.0024	1.3	01Jan2000, 12:00	1.29
Sub H	0.0046	1.4	01Jan2000, 12:00	0.77
Sub I	0.0016	0.9	01Jan2000, 12:00	1.29
Sub J	0.0010	0.0	01Jan2000, 12:00	0.23
SD1	0.0005	0.2	01Jan2000, 12:00	1.04
SD2	0.0015	0.7	01Jan2000, 12:00	1.04
Reach 1 (SD1 to EX SD1)	0.0015	0.7	01Jan2000, 12:00	1.04
SD5	0.0027	1.3	01Jan2000, 12:00	1.11
SD6	0.0051	2.6	01Jan2000, 12:00	1.20
SD7	0.0051	2.6	01Jan2000, 12:00	1.20
EX SD1	0.0015	0.7	01Jan2000, 12:00	1.04
Reach 2 (EX SD1 to EX SD4)	0.0066	3.2	01Jan2000, 12:00	1.16
SD9	0.0150	5.0	01Jan2000, 12:00	0.81
SD10	0.0150	5.0	01Jan2000, 12:00	0.81
Reach 3 (SD7 to SD8)	0.0150	4.9	01Jan2000, 12:00	0.81
SD12	0.0196	6.4	01Jan2000, 12:00	0.80
SD11	0.0022	1.0	01Jan2000, 12:00	1.11
SD17	0.0234	8.3	01Jan2000, 12:00	0.87
TURN	0.0066	3.2	01Jan2000, 12:00	1.16
Site Outfall	0.0324	11.8	01Jan2000, 12:00	0.89

Project: Rosewood Townhomes Simulation Run: POST 100-3

Start of Run: 01Jan2000, 00:00 Basin Model: PROPOSED
End of Run: 01Jan2000, 04:00 Meteorologic Model: 100-3
Compute Time: 12Dec2022, 10:17:44 Control Specifications: 100YR-3HR

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
Off A	0.0090	8.7	01Jan2000, 00:45	0.71
Sub A	0.0010	1.6	01Jan2000, 00:40	1.09
Sub B	0.0005	0.8	01Jan2000, 00:40	1.09
Sub C	0.0060	9.1	01Jan2000, 00:45	1.09
Sub D	0.0027	4.7	01Jan2000, 00:40	1.17
Sub E	0.0022	3.8	01Jan2000, 00:40	1.17
Sub F	0.0014	1.0	01Jan2000, 00:45	0.56
Sub G	0.0024	5.1	01Jan2000, 00:40	1.35
Sub H	0.0046	5.2	01Jan2000, 00:45	0.82
Sub I	0.0016	3.4	01Jan2000, 00:40	1.35
Sub J	0.0010	0.3	01Jan2000, 00:50	0.26
SD1	0.0005	0.8	01Jan2000, 00:40	1.09
SD2	0.0015	2.3	01Jan2000, 00:40	1.09
Reach 1 (SD1 to EX SD1)	0.0015	2.3	01Jan2000, 00:40	1.09
SD5	0.0027	4.7	01Jan2000, 00:40	1.17
SD6	0.0051	9.7	01Jan2000, 00:40	1.25
SD7	0.0051	9.7	01Jan2000, 00:40	1.25
EX SD1	0.0015	2.3	01Jan2000, 00:40	1.09
Reach 2 (EX SD1 to EX SD4)	0.0066	11.6	01Jan2000, 00:40	1.22
SD9	0.0150	17.8	01Jan2000, 00:45	0.86
SD10	0.0150	17.8	01Jan2000, 00:45	0.86
Reach 3 (SD7 to SD8)	0.0150	17.8	01Jan2000, 00:45	0.86
SD12	0.0196	22.9	01Jan2000, 00:45	0.85
SD11	0.0022	3.8	01Jan2000, 00:40	1.17
SD17	0.0234	29.5	01Jan2000, 00:45	0.92
TURN	0.0066	11.6	01Jan2000, 00:40	1.22
Site Outfall	0.0324	42.0	01Jan2000, 00:45	0.94

Project: Rosewood Townhomes Simulation Run: POST 100-24

Start of Run: 01Jan2000, 00:00 Basin Model: PROPOSED
End of Run: 02Jan2000, 05:00 Meteorologic Model: 100-24
Compute Time: 12Dec2022, 10:17:41 Control Specifications: 24HR

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
Off A	0.0090	4.8	01Jan2000, 12:00	1.28
Sub A	0.0010	0.7	01Jan2000, 12:00	1.75
Sub B	0.0005	0.4	01Jan2000, 12:00	1.75
Sub C	0.0060	4.4	01Jan2000, 12:00	1.75
Sub D	0.0027	2.1	01Jan2000, 12:00	1.85
Sub E	0.0022	1.7	01Jan2000, 12:00	1.85
Sub F	0.0014	0.6	01Jan2000, 12:00	1.08
Sub G	0.0024	2.0	01Jan2000, 12:00	2.05
Sub H	0.0046	2.8	01Jan2000, 12:00	1.42
Sub I	0.0016	1.3	01Jan2000, 12:00	2.05
Sub J	0.0010	0.2	01Jan2000, 12:00	0.62
SD1	0.0005	0.4	01Jan2000, 12:00	1.75
SD2	0.0015	1.1	01Jan2000, 12:00	1.75
Reach 1 (SD1 to EX SD1)	0.0015	1.1	01Jan2000, 12:00	1.76
SD5	0.0027	2.1	01Jan2000, 12:00	1.85
SD6	0.0051	4.1	01Jan2000, 12:00	1.94
SD7	0.0051	4.1	01Jan2000, 12:00	1.94
EX SD1	0.0015	1.1	01Jan2000, 12:00	1.76
Reach 2 (EX SD1 to SD4)	0.0066	5.2	01Jan2000, 12:00	1.90
SD9	0.0150	9.2	01Jan2000, 12:00	1.47
SD10	0.0150	9.2	01Jan2000, 12:00	1.47
Reach 3 (SD7 to SD8)	0.0150	9.2	01Jan2000, 12:00	1.47
SD12	0.0196	11.9	01Jan2000, 12:00	1.46
SD11	0.0022	1.7	01Jan2000, 12:00	1.85
SD17	0.0234	15.0	01Jan2000, 12:00	1.54
TURN	0.0066	5.2	01Jan2000, 12:00	1.90
Site Outfall	0.0324	21.0	01Jan2000, 12:00	1.56

ROSENBERG ASSOCIATES
CIVIL ENGINEERS • LAND SURVEYORS

PROJECT NO: 13231-22

PROJECT: Rosewood Townhomes BY: WJP DATE: 12/1/2022

SUBJECT: Detention Calculations CHKD: JWB DATE: 12/1/2022

DETENTION FOR 100-YEAR, 3-HOUR STORM
Pre-Developed Peak Flow: 18.7 cfs

Date	Time	Peak Flow Exist LOT (cfs)	Peak Flow Pro LOT (cfs)	Detention Volume (cu ft)
1-Jan-00	12:00	0	0	0
1-Jan-00	12:05	0	0	0
1-Jan-00	12:10	0	0	0
1-Jan-00	12:15	0	0	0
1-Jan-00	12:20	0	0	0
1-Jan-00	12:25	0	0	0
1-Jan-00	12:30	0	0	0
1-Jan-00	12:35	1.3	15.9	0
1-Jan-00	12:40	11.6	39	6,090
1-Jan-00	12:45	18.7	42	6,990
1-Jan-00	12:50	18.3	33	4,290
1-Jan-00	12:55	13.9	22.3	1,080
1-Jan-00	13:00	10.7	16.2	0
1-Jan-00	13:05	8.3	12	0
1-Jan-00	13:10	6.4	9.2	0
1-Jan-00	13:15	5	7.1	0
1-Jan-00	13:20	4.3	6	0
1-Jan-00	13:25	3.8	5.3	0
1-Jan-00	13:30	3.2	4.5	0
1-Jan-00	13:35	1.7	2.2	0
1-Jan-00	13:40	1.1	1.4	0
1-Jan-00	13:45	0.9	1.3	0
1-Jan-00	13:50	0.9	1.2	0
1-Jan-00	13:55	0.9	1.2	0
1-Jan-00	14:00	0.9	1.2	0
1-Jan-00	14:05	0.9	1.2	0
1-Jan-00	14:10	0.9	1.2	0
1-Jan-00	14:15	0.9	1.2	0
1-Jan-00	14:20	0.9	1.2	0
1-Jan-00	14:25	0.9	1.2	0
1-Jan-00	14:30	0.9	1.2	0
1-Jan-00	14:35	0.9	1.2	0
1-Jan-00	14:40	0.9	1.2	0
1-Jan-00	14:45	0	1.2	0
1-Jan-00	14:50	0	1.2	0
1-Jan-00	14:55	0	1.2	0

1-Jan-00	15:00	0	1.2	0
1-Jan-00	15:05	0	0.4	0
1-Jan-00	15:10	0	0.1	0
1-Jan-00	15:15	0	0	0
1-Jan-00	15:20	0	0	0
1-Jan-00	15:25	0	0	0
1-Jan-00	15:30	0	0	0
1-Jan-00	15:35	0	0	0
1-Jan-00	15:40	0	0	0
1-Jan-00	15:45	0	0	0
1-Jan-00	15:50	0	0	0
1-Jan-00	15:55	0	0	0
1-Jan-00	16:00	0	0	0
Total				**18,450**

ROSENBERG ASSOCIATES
CIVIL ENGINEERS • LAND SURVEYORS

PROJECT NO: 13231-22

PROJECT: Rosewood Townhomes BY: WJP DATE: 12/1/2022

SUBJECT: Detention Calculations CHKD: JWB DATE: 12/1/2022

DETENTION FOR 100-YEAR, 24-HOUR STORM
Pre-Developed Peak Flow: 12.4 cfs

Date	Time	Peak Flow Exist LOT (cfs)	Peak Flow Pro LOT (cfs)	Detention Volume (cu ft)
1-Jan-00	12:00	0	0	0
1-Jan-00	12:30	0	0.1	0
1-Jan-00	13:00	0	0.1	0
1-Jan-00	13:30	0	0.1	0
1-Jan-00	14:00	0	0.1	0
1-Jan-00	14:30	0	0.2	0
1-Jan-00	15:00	0	0.2	0
1-Jan-00	15:30	0	0.2	0
1-Jan-00	16:00	0	0.3	0
1-Jan-00	16:30	0	0.4	0
1-Jan-00	17:00	0	0.5	0
1-Jan-00	17:30	0.1	0.7	0
1-Jan-00	18:00	0.1	0.9	0
1-Jan-00	18:30	0.3	1.4	0
1-Jan-00	19:00	0.7	2.3	0
1-Jan-00	19:30	12.4	21	2,580
1-Jan-00	20:00	6.7	10.3	0
1-Jan-00	20:30	3.3	4.7	0
1-Jan-00	21:00	2.1	2.8	0
1-Jan-00	21:30	1.5	2	0
1-Jan-00	22:00	1.3	1.6	0
1-Jan-00	22:30	1.1	1.4	0
1-Jan-00	23:00	1	1.3	0
1-Jan-00	23:30	0.9	1.2	0
1-Jan-00	0:00	0.8	1	0
1-Jan-00	0:30	0.8	1	0
1-Jan-00	1:00	0.7	0.9	0
1-Jan-00	1:30	0.6	0.8	0
1-Jan-00	2:00	0.6	0.8	0
1-Jan-00	2:30	0.6	0.7	0
1-Jan-00	3:00	0.5	0.6	0
1-Jan-00	3:30	0.5	0.6	0
1-Jan-00	4:00	0.5	0.6	0
1-Jan-00	4:30	0.5	0.6	0
1-Jan-00	5:00	0.4	0.6	0
1-Jan-00	5:30	0.4	0.5	0

1-Jan-00	6:00	0.4	0.5	0
1-Jan-00	6:30	0.4	0.5	0
1-Jan-00	7:00	0.4	0.5	0
1-Jan-00	7:30	0.4	0.5	0
1-Jan-00	8:00	0.4	0.4	0
1-Jan-00	8:30	0.1	0.1	0
1-Jan-00	9:00	0	0	0
1-Jan-00	9:30	0	0	0
1-Jan-00	10:00	0	0	0
1-Jan-00	10:30	0	0	0
1-Jan-00	11:00	0	0	0
1-Jan-00	11:30	0	0	0
1-Jan-00	12:00	0	0	0
Total				**2,580**

Worksheet for Combination Inlet In Sag - SD5

Project Description

Solve For	Spread

Input Data

Discharge	1.31	cfs
Gutter Width	2.00	ft
Gutter Cross Slope	0.110	ft/ft
Road Cross Slope	0.020	ft/ft
Local Depression	1.0	in
Local Depression Width	24.0	in
Grate Width	2.00	ft
Grate Length	3.1	ft
Grate Type	P-50 mm (P-1 -7/8")	
Clogging	50.0	%
Curb Opening Length	3.1	ft
Opening Height	0.5	ft
Curb Throat Type	Horizontal	
Throat Incline Angle	90.00	degrees

Options

Calculation Option	Use Both

Results

Spread	5.8	ft
Depth	3.5	in
Gutter Depression	2.2	in
Total Depression	3.2	in
Open Grate Area	2.8	ft²
Active Grate Weir Length	5.1	ft

Worksheet for Combination Inlet In Sag - SD9

Project Description

Solve For	Spread

Input Data

Discharge	5.40	cfs
Gutter Width	2.00	ft
Gutter Cross Slope	0.110	ft/ft
Road Cross Slope	0.020	ft/ft
Local Depression	1.0	in
Local Depression Width	24.0	in
Grate Width	2.00	ft
Grate Length	3.1	ft
Grate Type	P-50 mm (P-1 -7/8")	
Clogging	50.0	%
Curb Opening Length	3.1	ft
Opening Height	0.5	ft
Curb Throat Type	Horizontal	
Throat Incline Angle	90.00	degrees

Options

Calculation Option	Use Both

Results

Spread	16.7	ft
Depth	6.2	in
Gutter Depression	2.2	in
Total Depression	3.2	in
Open Grate Area	2.8	ft²
Active Grate Weir Length	5.1	ft

Worksheet for Combination Inlet In Sag - SD14

Project Description

Solve For	Spread

Input Data

Discharge	1.76	cfs
Gutter Width	2.00	ft
Gutter Cross Slope	0.110	ft/ft
Road Cross Slope	0.020	ft/ft
Local Depression	1.0	in
Local Depression Width	24.0	in
Grate Width	2.00	ft
Grate Length	3.1	ft
Grate Type	P-50 mm (P-1 -7/8")	
Clogging	50.0	%
Curb Opening Length	3.1	ft
Opening Height	0.5	ft
Curb Throat Type	Horizontal	
Throat Incline Angle	90.00	degrees

Options

Calculation Option	Use Both

Results

Spread	7.3	ft
Depth	3.9	in
Gutter Depression	2.2	in
Total Depression	3.2	in
Open Grate Area	2.8	ft²
Active Grate Weir Length	5.1	ft

Worksheet for Combination Inlet On Grade - EX SD 2

Project Description

Solve For	Efficiency

Input Data

Discharge	0.08	cfs
Slope	0.045	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.110	ft/ft
Road Cross Slope	0.020	ft/ft
Roughness Coefficient	0.013	
Local Depression	1.0	in
Local Depression Width	24.0	in
Grate Width	2.00	ft
Grate Length	3.1	ft
Grate Type	P-50 mm (P-1 -7/8")	
Clogging	50.0	%
Curb Opening Length	3.1	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	100.00	%
Intercepted Flow	0.08	cfs
Bypass Flow	0.00	cfs
Spread	0.7	ft
Depth	0.9	in
Flow Area	0.0	ft²
Gutter Depression	2.2	in
Total Depression	3.2	in
Velocity	3.20	ft/s
Splash Over Velocity	7.11	ft/s
Frontal Flow Factor	1.000	
Side Flow Factor	0.043	
Grate Flow Ratio	1.000	
Equivalent Cross Slope	0.152	ft/ft
Active Grate Length	1.6	ft
Length Factor	0.451	
Total Interception Length	3.4	ft

Worksheet for Combination Inlet On Grade - EX SD1

Project Description

Solve For	Efficiency

Input Data

Discharge	0.06	cfs
Slope	0.020	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.110	ft/ft
Road Cross Slope	0.020	ft/ft
Roughness Coefficient	0.013	
Local Depression	1.0	in
Local Depression Width	24.0	in
Grate Width	2.00	ft
Grate Length	3.1	ft
Grate Type	P-50 mm (P-1 -7/8")	
Clogging	50.0	%
Curb Opening Length	3.1	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	100.00	%
Intercepted Flow	0.06	cfs
Bypass Flow	0.00	cfs
Spread	0.7	ft
Depth	0.9	in
Flow Area	0.0	ft²
Gutter Depression	2.2	in
Total Depression	3.2	in
Velocity	2.20	ft/s
Splash Over Velocity	7.11	ft/s
Frontal Flow Factor	1.000	
Side Flow Factor	0.081	
Grate Flow Ratio	1.000	
Equivalent Cross Slope	0.152	ft/ft
Active Grate Length	1.6	ft
Length Factor	0.649	
Total Interception Length	2.4	ft

Worksheet for Combination Inlet On Grade - SD2

Project Description

Solve For	Efficiency

Input Data

Discharge	0.23	cfs
Slope	0.020	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.110	ft/ft
Road Cross Slope	0.020	ft/ft
Roughness Coefficient	0.013	
Local Depression	1.0	in
Local Depression Width	24.0	in
Grate Width	2.00	ft
Grate Length	3.1	ft
Grate Type	P-50 mm (P-1 -7/8")	
Clogging	50.0	%
Curb Opening Length	3.1	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	100.00	%
Intercepted Flow	0.23	cfs
Bypass Flow	0.00	cfs
Spread	1.2	ft
Depth	1.5	in
Flow Area	0.1	ft²
Gutter Depression	2.2	in
Total Depression	3.2	in
Velocity	3.07	ft/s
Splash Over Velocity	7.11	ft/s
Frontal Flow Factor	1.000	
Side Flow Factor	0.046	
Grate Flow Ratio	1.000	
Equivalent Cross Slope	0.152	ft/ft
Active Grate Length	1.6	ft
Length Factor	0.370	
Total Interception Length	4.2	ft

Worksheet for Combination Inlet On Grade - SD3

Project Description

Solve For	Efficiency

Input Data

Discharge	2.40	cfs
Slope	0.005	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.110	ft/ft
Road Cross Slope	0.020	ft/ft
Roughness Coefficient	0.013	
Local Depression	1.0	in
Local Depression Width	24.0	in
Grate Width	2.00	ft
Grate Length	3.1	ft
Grate Type	P-50 mm (P-1 -7/8")	
Clogging	50.0	%
Curb Opening Length	3.1	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	85.06	%
Intercepted Flow	2.04	cfs
Bypass Flow	0.36	cfs
Spread	8.9	ft
Depth	4.3	in
Flow Area	1.0	ft^2
Gutter Depression	2.2	in
Total Depression	3.2	in
Velocity	2.48	ft/s
Splash Over Velocity	7.11	ft/s
Frontal Flow Factor	1.000	
Side Flow Factor	0.066	
Grate Flow Ratio	0.682	
Equivalent Cross Slope	0.110	ft/ft
Active Grate Length	1.6	ft
Length Factor	0.172	
Total Interception Length	9.0	ft

Worksheet for Combination Inlet On Grade - SD4

Project Description

Solve For	Efficiency

Input Data

Discharge	1.16 cfs
Slope	0.005 ft/ft
Gutter Width	2.00 ft
Gutter Cross Slope	0.110 ft/ft
Road Cross Slope	0.020 ft/ft
Roughness Coefficient	0.013
Local Depression	1.0 in
Local Depression Width	24.0 in
Grate Width	2.00 ft
Grate Length	3.1 ft
Grate Type	P-50 mm (P-1 -7/8")
Clogging	50.0 %
Curb Opening Length	3.1 ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	99.24 %
Intercepted Flow	1.15 cfs
Bypass Flow	0.01 cfs
Spread	5.7 ft
Depth	3.5 in
Flow Area	0.5 ft²
Gutter Depression	2.2 in
Total Depression	3.2 in
Velocity	2.32 ft/s
Splash Over Velocity	7.11 ft/s
Frontal Flow Factor	1.000
Side Flow Factor	0.074
Grate Flow Ratio	0.878
Equivalent Cross Slope	0.136 ft/ft
Active Grate Length	1.6 ft
Length Factor	0.265
Total Interception Length	5.8 ft

Worksheet for Combination Inlet On Grade - SD6

Project Description

Solve For	Efficiency

Input Data

Discharge	3.30	cfs
Slope	0.060	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.110	ft/ft
Road Cross Slope	0.020	ft/ft
Roughness Coefficient	0.013	
Local Depression	1.0	in
Local Depression Width	24.0	in
Grate Width	2.00	ft
Grate Length	3.1	ft
Grate Type	P-50 mm (P-1 -7/8")	
Clogging	50.0	%
Curb Opening Length	3.1	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	90.00	%
Intercepted Flow	2.97	cfs
Bypass Flow	0.33	cfs
Spread	4.8	ft
Depth	3.3	in
Flow Area	0.4	ft²
Gutter Depression	2.2	in
Total Depression	3.2	in
Velocity	7.99	ft/s
Splash Over Velocity	7.11	ft/s
Frontal Flow Factor	0.921	
Side Flow Factor	0.009	
Grate Flow Ratio	0.925	
Equivalent Cross Slope	0.142	ft/ft
Active Grate Length	1.6	ft
Length Factor	0.083	
Total Interception Length	18.6	ft

Worksheet for Combination Inlet On Grade - SD7

Project Description

Solve For	Efficiency

Input Data

Discharge	0.03	cfs
Slope	0.045	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.110	ft/ft
Road Cross Slope	0.020	ft/ft
Roughness Coefficient	0.013	
Local Depression	1.0	in
Local Depression Width	24.0	in
Grate Width	2.00	ft
Grate Length	3.1	ft
Grate Type	P-50 mm (P-1 -7/8")	
Clogging	50.0	%
Curb Opening Length	3.1	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	100.00	%
Intercepted Flow	0.03	cfs
Bypass Flow	0.00	cfs
Spread	0.5	ft
Depth	0.6	in
Flow Area	0.0	ft²
Gutter Depression	2.2	in
Total Depression	3.2	in
Velocity	2.50	ft/s
Splash Over Velocity	7.11	ft/s
Frontal Flow Factor	1.000	
Side Flow Factor	0.066	
Grate Flow Ratio	1.000	
Equivalent Cross Slope	0.152	ft/ft
Active Grate Length	1.6	ft
Length Factor	0.680	
Total Interception Length	2.3	ft

Worksheet for Combination Inlet On Grade - SD8

Project Description

Solve For	Efficiency

Input Data

Discharge	4.50 cfs
Slope	0.027 ft/ft
Gutter Width	2.00 ft
Gutter Cross Slope	0.110 ft/ft
Road Cross Slope	0.020 ft/ft
Roughness Coefficient	0.013
Local Depression	1.0 in
Local Depression Width	24.0 in
Grate Width	2.00 ft
Grate Length	3.1 ft
Grate Type	P-50 mm (P-1 -7/8")
Clogging	50.0 %
Curb Opening Length	3.1 ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	81.70 %
Intercepted Flow	3.68 cfs
Bypass Flow	0.82 cfs
Spread	7.9 ft
Depth	4.1 in
Flow Area	0.8 ft²
Gutter Depression	2.2 in
Total Depression	3.2 in
Velocity	5.62 ft/s
Splash Over Velocity	7.11 ft/s
Frontal Flow Factor	1.000
Side Flow Factor	0.016
Grate Flow Ratio	0.740
Equivalent Cross Slope	0.117 ft/ft
Active Grate Length	1.6 ft
Length Factor	0.083
Total Interception Length	18.7 ft

Worksheet for Combination Inlet On Grade - SD10

Project Description

Solve For	Efficiency

Input Data

Discharge	1.40	cfs
Slope	0.054	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.110	ft/ft
Road Cross Slope	0.020	ft/ft
Roughness Coefficient	0.013	
Local Depression	1.0	in
Local Depression Width	24.0	in
Grate Width	2.00	ft
Grate Length	3.1	ft
Grate Type	P-50 mm (P-1 -7/8")	
Clogging	50.0	%
Curb Opening Length	3.1	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	100.00	%
Intercepted Flow	1.40	cfs
Bypass Flow	0.00	cfs
Spread	1.9	ft
Depth	2.5	in
Flow Area	0.2	ft²
Gutter Depression	2.2	in
Total Depression	3.2	in
Velocity	7.02	ft/s
Splash Over Velocity	7.11	ft/s
Frontal Flow Factor	1.000	
Side Flow Factor	0.011	
Grate Flow Ratio	1.000	
Equivalent Cross Slope	0.152	ft/ft
Active Grate Length	1.6	ft
Length Factor	0.128	
Total Interception Length	12.1	ft

Worksheet for Combination Inlet On Grade - SD11

Project Description

Solve For	Efficiency

Input Data

Discharge	3.80	cfs
Slope	0.050	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.110	ft/ft
Road Cross Slope	0.020	ft/ft
Roughness Coefficient	0.013	
Local Depression	1.0	in
Local Depression Width	24.0	in
Grate Width	2.00	ft
Grate Length	3.1	ft
Grate Type	P-50 mm (P-1 -7/8")	
Clogging	50.0	%
Curb Opening Length	3.1	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	90.64	%
Intercepted Flow	3.44	cfs
Bypass Flow	0.36	cfs
Spread	5.8	ft
Depth	3.6	in
Flow Area	0.5	ft²
Gutter Depression	2.2	in
Total Depression	3.2	in
Velocity	7.36	ft/s
Splash Over Velocity	7.11	ft/s
Frontal Flow Factor	0.978	
Side Flow Factor	0.010	
Grate Flow Ratio	0.869	
Equivalent Cross Slope	0.134	ft/ft
Active Grate Length	1.6	ft
Length Factor	0.080	
Total Interception Length	19.3	ft

Worksheet for Combination Inlet On Grade - SD12

Project Description

Solve For	Efficiency

Input Data

Discharge	0.41	cfs
Slope	0.054	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.110	ft/ft
Road Cross Slope	0.020	ft/ft
Roughness Coefficient	0.013	
Local Depression	1.0	in
Local Depression Width	24.0	in
Grate Width	2.00	ft
Grate Length	3.1	ft
Grate Type	P-50 mm (P-1 -7/8")	
Clogging	50.0	%
Curb Opening Length	3.1	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	100.00	%
Intercepted Flow	0.41	cfs
Bypass Flow	0.00	cfs
Spread	1.2	ft
Depth	1.6	in
Flow Area	0.1	ft²
Gutter Depression	2.2	in
Total Depression	3.2	in
Velocity	5.16	ft/s
Splash Over Velocity	7.11	ft/s
Frontal Flow Factor	1.000	
Side Flow Factor	0.019	
Grate Flow Ratio	1.000	
Equivalent Cross Slope	0.152	ft/ft
Active Grate Length	1.6	ft
Length Factor	0.215	
Total Interception Length	7.2	ft

Worksheet for Combination Inlet On Grade - SD13

Project Description

Solve For	Efficiency

Input Data

Discharge	3.90	cfs
Slope	0.013	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.110	ft/ft
Road Cross Slope	0.020	ft/ft
Roughness Coefficient	0.013	
Local Depression	1.0	in
Local Depression Width	24.0	in
Grate Width	2.00	ft
Grate Length	3.1	ft
Grate Type	P-50 mm (P-1 -7/8")	
Clogging	50.0	%
Curb Opening Length	3.1	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	78.66	%
Intercepted Flow	3.07	cfs
Bypass Flow	0.83	cfs
Spread	9.0	ft
Depth	4.3	in
Flow Area	1.0	ft²
Gutter Depression	2.2	in
Total Depression	3.2	in
Velocity	3.96	ft/s
Splash Over Velocity	7.11	ft/s
Frontal Flow Factor	1.000	
Side Flow Factor	0.030	
Grate Flow Ratio	0.677	
Equivalent Cross Slope	0.109	ft/ft
Active Grate Length	1.6	ft
Length Factor	0.106	
Total Interception Length	14.7	ft

Worksheet for Combination Inlet On Grade - SD15

Project Description

Solve For	Efficiency

Input Data

Discharge	3.30 cfs
Slope	0.013 ft/ft
Gutter Width	2.00 ft
Gutter Cross Slope	0.110 ft/ft
Road Cross Slope	0.020 ft/ft
Roughness Coefficient	0.013
Local Depression	1.0 in
Local Depression Width	24.0 in
Grate Width	2.00 ft
Grate Length	3.1 ft
Grate Type	P-50 mm (P-1 -7/8")
Clogging	50.0 %
Curb Opening Length	3.1 ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	83.20 %
Intercepted Flow	2.75 cfs
Bypass Flow	0.55 cfs
Spread	8.2 ft
Depth	4.1 in
Flow Area	0.9 ft²
Gutter Depression	2.2 in
Total Depression	3.2 in
Velocity	3.88 ft/s
Splash Over Velocity	7.11 ft/s
Frontal Flow Factor	1.000
Side Flow Factor	0.031
Grate Flow Ratio	0.721
Equivalent Cross Slope	0.115 ft/ft
Active Grate Length	1.6 ft
Length Factor	0.117
Total Interception Length	13.3 ft

Worksheet for Combination Inlet On Grade - SD16

Project Description

Solve For	Efficiency

Input Data

Discharge	0.65	cfs
Slope	0.005	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.110	ft/ft
Road Cross Slope	0.020	ft/ft
Roughness Coefficient	0.013	
Local Depression	1.0	in
Local Depression Width	24.0	in
Grate Width	2.00	ft
Grate Length	3.1	ft
Grate Type	P-50 mm (P-1 -7/8")	
Clogging	50.0	%
Curb Opening Length	3.1	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	100.00	%
Intercepted Flow	0.65	cfs
Bypass Flow	0.00	cfs
Spread	3.2	ft
Depth	2.9	in
Flow Area	0.3	ft^2
Gutter Depression	2.2	in
Total Depression	3.2	in
Velocity	2.29	ft/s
Splash Over Velocity	7.11	ft/s
Frontal Flow Factor	1.000	
Side Flow Factor	0.076	
Grate Flow Ratio	0.988	
Equivalent Cross Slope	0.150	ft/ft
Active Grate Length	1.6	ft
Length Factor	0.359	
Total Interception Length	4.3	ft

Worksheet for Combination Inlet On Grade - SD17

Project Description

Solve For	Efficiency

Input Data

Discharge	0.01	cfs
Slope	0.005	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.110	ft/ft
Road Cross Slope	0.020	ft/ft
Roughness Coefficient	0.013	
Local Depression	1.0	in
Local Depression Width	24.0	in
Grate Width	2.00	ft
Grate Length	3.1	ft
Grate Type	P-50 mm (P-1 -7/8")	
Clogging	50.0	%
Curb Opening Length	3.1	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	100.00	%
Intercepted Flow	0.01	cfs
Bypass Flow	0.00	cfs
Spread	0.5	ft
Depth	0.6	in
Flow Area	0.0	ft²
Gutter Depression	2.2	in
Total Depression	3.2	in
Velocity	0.83	ft/s
Splash Over Velocity	7.11	ft/s
Frontal Flow Factor	1.000	
Side Flow Factor	0.336	
Grate Flow Ratio	1.000	
Equivalent Cross Slope	0.152	ft/ft
Active Grate Length	1.6	ft
Length Factor	2.086	
Total Interception Length	0.7	ft

Worksheet for Combination Inlet On Grade - SD18

Project Description

Solve For	Efficiency

Input Data

Discharge	0.16	cfs
Slope	0.040	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.110	ft/ft
Road Cross Slope	0.020	ft/ft
Roughness Coefficient	0.013	
Local Depression	1.0	in
Local Depression Width	24.0	in
Grate Width	2.00	ft
Grate Length	3.1	ft
Grate Type	P-50 mm (P-1 -7/8")	
Clogging	50.0	%
Curb Opening Length	3.1	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	100.00	%
Intercepted Flow	0.16	cfs
Bypass Flow	0.00	cfs
Spread	0.9	ft
Depth	1.2	in
Flow Area	0.0	ft²
Gutter Depression	2.2	in
Total Depression	3.2	in
Velocity	3.64	ft/s
Splash Over Velocity	7.11	ft/s
Frontal Flow Factor	1.000	
Side Flow Factor	0.034	
Grate Flow Ratio	1.000	
Equivalent Cross Slope	0.152	ft/ft
Active Grate Length	1.6	ft
Length Factor	0.349	
Total Interception Length	4.4	ft

Worksheet for Ditch Inlet In Sag - (2X2 Drop Inlet)

Project Description

Solve For	Spread

Input Data

Discharge	8.60 cfs
Left Side Slope	2.000 H:V
Right Side Slope	2.000 H:V
Bottom Width	2.00 ft
Grate Width	2.00 ft
Grate Length	2.0 ft
Local Depression	1.0 in
Local Depression Width	24.0 in
Grate Type	P-50 mm (P-1 -7/8")
Clogging	50.0 %

Results

Spread	4.8 ft
Depth	8.5 in
Wetted Perimeter	5.2 ft
Top Width	4.83 ft
Open Grate Area	1.8 ft²
Active Grate Weir Length	6.0 ft

Worksheet for Draiange Swale - 2

Project Description	
Friction Method	Manning Formula
Solve For	Discharge

Input Data		
Roughness Coefficient	0.041	
Channel Slope	0.005	ft/ft
Normal Depth	12.0	in
Left Side Slope	2.000	H:V
Right Side Slope	2.000	H:V
Bottom Width	1.00	ft

Results		
Discharge	5.15	cfs
Flow Area	3.0	ft²
Wetted Perimeter	5.5	ft
Hydraulic Radius	6.6	in
Top Width	5.00	ft
Critical Depth	7.6	in
Critical Slope	0.037	ft/ft
Velocity	1.72	ft/s
Velocity Head	0.05	ft
Specific Energy	1.05	ft
Froude Number	0.391	
Flow Type	Subcritical	

GVF Input Data		
Downstream Depth	0.0	in
Length	0.0	ft
Number Of Steps	0	

GVF Output Data		
Upstream Depth	0.0	in
Profile Description	N/A	
Profile Headloss	0.00	ft
Downstream Velocity	0.00	ft/s
Upstream Velocity	0.00	ft/s
Normal Depth	12.0	in
Critical Depth	7.6	in
Channel Slope	0.005	ft/ft
Critical Slope	0.037	ft/ft

Worksheet for Drainage Swale- 1

Project Description	
Friction Method	Manning Formula
Solve For	Discharge

Input Data		
Roughness Coefficient	0.041	
Channel Slope	0.005	ft/ft
Normal Depth	18.0	in
Left Side Slope	2.000	H:V
Right Side Slope	2.000	H:V
Bottom Width	1.00	ft

Results		
Discharge	13.01	cfs
Flow Area	6.0	ft²
Wetted Perimeter	7.7	ft
Hydraulic Radius	9.3	in
Top Width	7.00	ft
Critical Depth	11.9	in
Critical Slope	0.033	ft/ft
Velocity	2.17	ft/s
Velocity Head	0.07	ft
Specific Energy	1.57	ft
Froude Number	0.413	
Flow Type	Subcritical	

GVF Input Data		
Downstream Depth	0.0	in
Length	0.0	ft
Number Of Steps	0	

GVF Output Data		
Upstream Depth	0.0	in
Profile Description	N/A	
Profile Headloss	0.00	ft
Downstream Velocity	0.00	ft/s
Upstream Velocity	0.00	ft/s
Normal Depth	18.0	in
Critical Depth	11.9	in
Channel Slope	0.005	ft/ft
Critical Slope	0.033	ft/ft

Worksheet for Existing Check 1

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.010
Channel Slope	0.053 ft/ft
Normal Depth	18.0 in
Diameter	18.0 in
Discharge	31.44 cfs

Results

Discharge	31.44 cfs
Normal Depth	18.0 in
Flow Area	1.8 ft²
Wetted Perimeter	4.7 ft
Hydraulic Radius	4.5 in
Top Width	0.00 ft
Critical Depth	17.9 in
Percent Full	100.0 %
Critical Slope	0.050 ft/ft
Velocity	17.79 ft/s
Velocity Head	4.92 ft
Specific Energy	6.42 ft
Froude Number	(N/A)
Maximum Discharge	33.82 cfs
Discharge Full	31.44 cfs
Slope Full	0.053 ft/ft
Flow Type	Supercritical

GVF Input Data

Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	100.0 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	18.0 in
Critical Depth	17.9 in
Channel Slope	0.053 ft/ft
Critical Slope	0.050 ft/ft

Worksheet for Existing Check 2

Project Description	
Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data		
Roughness Coefficient	0.010	
Channel Slope	0.005	ft/ft
Normal Depth	18.0	in
Diameter	18.0	in
Discharge	10.03	cfs

Results		
Discharge	10.03	cfs
Normal Depth	18.0	in
Flow Area	1.8	ft²
Wetted Perimeter	4.7	ft
Hydraulic Radius	4.5	in
Top Width	0.00	ft
Critical Depth	14.7	in
Percent Full	100.0	%
Critical Slope	0.005	ft/ft
Velocity	5.68	ft/s
Velocity Head	0.50	ft
Specific Energy	2.00	ft
Froude Number	(N/A)	
Maximum Discharge	10.79	cfs
Discharge Full	10.03	cfs
Slope Full	0.005	ft/ft
Flow Type	Critical	

GVF Input Data		
Downstream Depth	0.0	in
Length	0.0	ft
Number Of Steps	0	

GVF Output Data		
Upstream Depth	0.0	in
Profile Description	N/A	
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.0	%
Normal Depth Over Rise	100.0	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	18.0	in
Critical Depth	14.7	in
Channel Slope	0.005	ft/ft
Critical Slope	0.005	ft/ft

Worksheet for Existing Check 3

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.010
Channel Slope	0.005 ft/ft
Normal Depth	24.0 in
Diameter	24.0 in
Discharge	20.79 cfs

Results

Discharge	20.79 cfs
Normal Depth	24.0 in
Flow Area	3.1 ft²
Wetted Perimeter	6.3 ft
Hydraulic Radius	6.0 in
Top Width	0.00 ft
Critical Depth	19.6 in
Percent Full	100.0 %
Critical Slope	0.005 ft/ft
Velocity	6.62 ft/s
Velocity Head	0.68 ft
Specific Energy	2.68 ft
Froude Number	(N/A)
Maximum Discharge	22.37 cfs
Discharge Full	20.79 cfs
Slope Full	0.005 ft/ft
Flow Type	Critical

GVF Input Data

Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	100.0 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	24.0 in
Critical Depth	19.6 in
Channel Slope	0.005 ft/ft
Critical Slope	0.005 ft/ft

Worksheet for Gutter along east side of Road D-1

Project Description	
Solve For	Spread

Input Data	
Channel Slope	0.054 ft/ft
Discharge	1.52 cfs
Gutter Width	2.0 ft
Gutter Cross Slope	0.110 ft/ft
Road Cross Slope	0.020 ft/ft
Roughness Coefficient	0.013

Results	
Spread	2.0 ft
Flow Area	0.2 ft²
Depth	2.6 in
Gutter Depression	2.2 in
Velocity	7.15 ft/s

Worksheet for Gutter along east side of Road D-2

Project Description	
Solve For	Spread

Input Data	
Channel Slope	0.005 ft/ft
Discharge	3.80 cfs
Gutter Width	2.0 ft
Gutter Cross Slope	0.110 ft/ft
Road Cross Slope	0.020 ft/ft
Roughness Coefficient	0.013

Results	
Spread	11.2 ft
Flow Area	1.4 ft²
Depth	4.8 in
Gutter Depression	2.2 in
Velocity	2.66 ft/s

Worksheet for Gutter along north side of Road B- 2

Project Description	
Solve For	Spread

Input Data	
Channel Slope	0.005 ft/ft
Discharge	2.40 cfs
Gutter Width	2.0 ft
Gutter Cross Slope	0.110 ft/ft
Road Cross Slope	0.020 ft/ft
Roughness Coefficient	0.013

Results	
Spread	8.9 ft
Flow Area	1.0 ft²
Depth	4.3 in
Gutter Depression	2.2 in
Velocity	2.48 ft/s

Worksheet for Gutter along north side of Road A-1

Project Description	
Solve For	Spread

Input Data	
Channel Slope	0.013 ft/ft
Discharge	3.90 cfs
Gutter Width	2.0 ft
Gutter Cross Slope	0.110 ft/ft
Road Cross Slope	0.020 ft/ft
Roughness Coefficient	0.013

Results	
Spread	8.9 ft
Flow Area	1.0 ft²
Depth	4.3 in
Gutter Depression	2.2 in
Velocity	4.00 ft/s

Worksheet for Gutter along south side of Road B- 2

Project Description	
Solve For	Spread

Input Data	
Channel Slope	0.005 ft/ft
Discharge	2.00 cfs
Gutter Width	2.0 ft
Gutter Cross Slope	0.110 ft/ft
Road Cross Slope	0.020 ft/ft
Roughness Coefficient	0.013

Results	
Spread	8.0 ft
Flow Area	0.8 ft²
Depth	4.1 in
Gutter Depression	2.2 in
Velocity	2.43 ft/s

Worksheet for Gutter along south side of Road A-1

Project Description	
Solve For	Spread

Input Data	
Channel Slope	0.013 ft/ft
Discharge	2.60 cfs
Gutter Width	2.0 ft
Gutter Cross Slope	0.110 ft/ft
Road Cross Slope	0.020 ft/ft
Roughness Coefficient	0.013

Results	
Spread	7.1 ft
Flow Area	0.7 ft²
Depth	3.9 in
Gutter Depression	2.2 in
Velocity	3.83 ft/s

Worksheet for Gutter along west side of Road D-1

Project Description	
Solve For	Spread

Input Data	
Channel Slope	0.054 ft/ft
Discharge	1.82 cfs
Gutter Width	2.0 ft
Gutter Cross Slope	0.110 ft/ft
Road Cross Slope	0.020 ft/ft
Roughness Coefficient	0.013

Results	
Spread	2.6 ft
Flow Area	0.2 ft²
Depth	2.8 in
Gutter Depression	2.2 in
Velocity	7.42 ft/s

Worksheet for Gutter along west side of Road D-2

Project Description	
Solve For	Spread

Input Data	
Channel Slope	0.005 ft/ft
Discharge	0.01 cfs
Gutter Width	2.0 ft
Gutter Cross Slope	0.110 ft/ft
Road Cross Slope	0.020 ft/ft
Roughness Coefficient	0.013

Results	
Spread	0.5 ft
Flow Area	0.0 ft²
Depth	0.6 in
Gutter Depression	2.2 in
Velocity	0.83 ft/s

Worksheet for Combination Inlet In Sag - SD1

Project Description

Solve For	Spread

Input Data

Discharge	1.05	cfs
Gutter Width	2.00	ft
Gutter Cross Slope	0.110	ft/ft
Road Cross Slope	0.020	ft/ft
Local Depression	1.0	in
Local Depression Width	24.0	in
Grate Width	2.00	ft
Grate Length	3.1	ft
Grate Type	P-50 mm (P-1 -7/8")	
Clogging	50.0	%
Curb Opening Length	3.1	ft
Opening Height	0.5	ft
Curb Throat Type	Horizontal	
Throat Incline Angle	90.00	degrees

Options

Calculation Option	Use Both

Results

Spread	4.8	ft
Depth	3.3	in
Gutter Depression	2.2	in
Total Depression	3.2	in
Open Grate Area	2.8	ft²
Active Grate Weir Length	5.1	ft

Worksheet for SDP1 (future development)

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.010
Channel Slope	0.006 ft/ft
Normal Depth	18.0 in
Diameter	18.0 in
Discharge	10.58 cfs

Results

Discharge	10.58 cfs
Normal Depth	18.0 in
Flow Area	1.8 ft²
Wetted Perimeter	4.7 ft
Hydraulic Radius	4.5 in
Top Width	0.00 ft
Critical Depth	15.0 in
Percent Full	100.0 %
Critical Slope	0.006 ft/ft
Velocity	5.99 ft/s
Velocity Head	0.56 ft
Specific Energy	2.06 ft
Froude Number	(N/A)
Maximum Discharge	11.38 cfs
Discharge Full	10.58 cfs
Slope Full	0.006 ft/ft
Flow Type	Undefined

GVF Input Data

Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	100.0 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	18.0 in
Critical Depth	15.0 in
Channel Slope	0.006 ft/ft
Critical Slope	0.006 ft/ft

Worksheet for SDP2 (SD1 to SD18)

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.010
Channel Slope	0.005 ft/ft
Normal Depth	12.0 in
Diameter	12.0 in
Discharge	3.27 cfs

Results

Discharge	3.27 cfs
Normal Depth	12.0 in
Flow Area	0.8 ft²
Wetted Perimeter	3.1 ft
Hydraulic Radius	3.0 in
Top Width	0.00 ft
Critical Depth	9.3 in
Percent Full	100.0 %
Critical Slope	0.006 ft/ft
Velocity	4.17 ft/s
Velocity Head	0.27 ft
Specific Energy	1.27 ft
Froude Number	(N/A)
Maximum Discharge	3.52 cfs
Discharge Full	3.27 cfs
Slope Full	0.005 ft/ft
Flow Type	Undefined

GVF Input Data

Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	100.0 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	12.0 in
Critical Depth	9.3 in
Channel Slope	0.005 ft/ft
Critical Slope	0.006 ft/ft

Worksheet for SDP3 (SD18 to SD2)

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.010
Channel Slope	0.005 ft/ft
Normal Depth	12.0 in
Diameter	12.0 in
Discharge	3.27 cfs

Results

Discharge	3.27 cfs
Normal Depth	12.0 in
Flow Area	0.8 ft²
Wetted Perimeter	3.1 ft
Hydraulic Radius	3.0 in
Top Width	0.00 ft
Critical Depth	9.3 in
Percent Full	100.0 %
Critical Slope	0.006 ft/ft
Velocity	4.17 ft/s
Velocity Head	0.27 ft
Specific Energy	1.27 ft
Froude Number	(N/A)
Maximum Discharge	3.52 cfs
Discharge Full	3.27 cfs
Slope Full	0.005 ft/ft
Flow Type	Undefined

GVF Input Data

Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	100.0 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	12.0 in
Critical Depth	9.3 in
Channel Slope	0.005 ft/ft
Critical Slope	0.006 ft/ft

Worksheet for SDP4 (SD2 TO EX SD1)

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.010
Channel Slope	0.007 ft/ft
Normal Depth	18.0 in
Diameter	18.0 in
Discharge	11.42 cfs

Results

Discharge	11.42 cfs
Normal Depth	18.0 in
Flow Area	1.8 ft²
Wetted Perimeter	4.7 ft
Hydraulic Radius	4.5 in
Top Width	0.00 ft
Critical Depth	15.5 in
Percent Full	100.0 %
Critical Slope	0.006 ft/ft
Velocity	6.46 ft/s
Velocity Head	0.65 ft
Specific Energy	2.15 ft
Froude Number	(N/A)
Maximum Discharge	12.29 cfs
Discharge Full	11.42 cfs
Slope Full	0.007 ft/ft
Flow Type	Undefined

GVF Input Data

Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	100.0 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	18.0 in
Critical Depth	15.5 in
Channel Slope	0.007 ft/ft
Critical Slope	0.006 ft/ft

Worksheet for SDP5 (SD3 to SD4)

Project Description	
Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data	
Roughness Coefficient	0.010
Channel Slope	0.005 ft/ft
Normal Depth	12.0 in
Diameter	12.0 in
Discharge	3.27 cfs

Results	
Discharge	3.27 cfs
Normal Depth	12.0 in
Flow Area	0.8 ft²
Wetted Perimeter	3.1 ft
Hydraulic Radius	3.0 in
Top Width	0.00 ft
Critical Depth	9.3 in
Percent Full	100.0 %
Critical Slope	0.006 ft/ft
Velocity	4.17 ft/s
Velocity Head	0.27 ft
Specific Energy	1.27 ft
Froude Number	(N/A)
Maximum Discharge	3.52 cfs
Discharge Full	3.27 cfs
Slope Full	0.005 ft/ft
Flow Type	Undefined

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	100.0 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	12.0 in
Critical Depth	9.3 in
Channel Slope	0.005 ft/ft
Critical Slope	0.006 ft/ft

Worksheet for SDP6 (SD4 to SD5)

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.010
Channel Slope	0.005 ft/ft
Normal Depth	12.0 in
Diameter	12.0 in
Discharge	3.27 cfs

Results

Discharge	3.27 cfs
Normal Depth	12.0 in
Flow Area	0.8 ft²
Wetted Perimeter	3.1 ft
Hydraulic Radius	3.0 in
Top Width	0.00 ft
Critical Depth	9.3 in
Percent Full	100.0 %
Critical Slope	0.006 ft/ft
Velocity	4.17 ft/s
Velocity Head	0.27 ft
Specific Energy	1.27 ft
Froude Number	(N/A)
Maximum Discharge	3.52 cfs
Discharge Full	3.27 cfs
Slope Full	0.005 ft/ft
Flow Type	Undefined

GVF Input Data

Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	100.0 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	12.0 in
Critical Depth	9.3 in
Channel Slope	0.005 ft/ft
Critical Slope	0.006 ft/ft

Worksheet for SDP7 (SD5 to SD6)

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.010
Channel Slope	0.010 ft/ft
Normal Depth	12.0 in
Diameter	12.0 in
Discharge	4.63 cfs

Results

Discharge	4.63 cfs
Normal Depth	12.0 in
Flow Area	0.8 ft²
Wetted Perimeter	3.1 ft
Hydraulic Radius	3.0 in
Top Width	0.00 ft
Critical Depth	10.7 in
Percent Full	100.0 %
Critical Slope	0.009 ft/ft
Velocity	5.90 ft/s
Velocity Head	0.54 ft
Specific Energy	1.54 ft
Froude Number	(N/A)
Maximum Discharge	4.98 cfs
Discharge Full	4.63 cfs
Slope Full	0.010 ft/ft
Flow Type	Undefined

GVF Input Data

Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	100.0 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	12.0 in
Critical Depth	10.7 in
Channel Slope	0.010 ft/ft
Critical Slope	0.009 ft/ft

Worksheet for SDP8 (SD6 to SD7)

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.010
Channel Slope	0.026 ft/ft
Normal Depth	12.0 in
Diameter	12.0 in
Discharge	7.47 cfs

Results

Discharge	7.47 cfs
Normal Depth	12.0 in
Flow Area	0.8 ft²
Wetted Perimeter	3.1 ft
Hydraulic Radius	3.0 in
Top Width	0.00 ft
Critical Depth	11.8 in
Percent Full	100.0 %
Critical Slope	0.023 ft/ft
Velocity	9.51 ft/s
Velocity Head	1.41 ft
Specific Energy	2.41 ft
Froude Number	(N/A)
Maximum Discharge	8.03 cfs
Discharge Full	7.47 cfs
Slope Full	0.026 ft/ft
Flow Type	Undefined

GVF Input Data

Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	100.0 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	12.0 in
Critical Depth	11.8 in
Channel Slope	0.026 ft/ft
Critical Slope	0.023 ft/ft

Worksheet for SDP9 (SD8 to SD9)

Project Description	
Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data		
Roughness Coefficient	0.010	
Channel Slope	0.020	ft/ft
Normal Depth	15.0	in
Diameter	15.0	in
Discharge	11.88	cfs

Results		
Discharge	11.88	cfs
Normal Depth	15.0	in
Flow Area	1.2	ft²
Wetted Perimeter	3.9	ft
Hydraulic Radius	3.8	in
Top Width	0.00	ft
Critical Depth	14.6	in
Percent Full	100.0	%
Critical Slope	0.018	ft/ft
Velocity	9.68	ft/s
Velocity Head	1.46	ft
Specific Energy	2.71	ft
Froude Number	(N/A)	
Maximum Discharge	12.77	cfs
Discharge Full	11.88	cfs
Slope Full	0.020	ft/ft
Flow Type	Undefined	

GVF Input Data		
Downstream Depth	0.0	in
Length	0.0	ft
Number Of Steps	0	

GVF Output Data		
Upstream Depth	0.0	in
Profile Description	N/A	
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.0	%
Normal Depth Over Rise	100.0	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	15.0	in
Critical Depth	14.6	in
Channel Slope	0.020	ft/ft
Critical Slope	0.018	ft/ft

Worksheet for SDP10 (SD9 to SD10)

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.010
Channel Slope	0.033 ft/ft
Normal Depth	15.0 in
Diameter	15.0 in
Discharge	15.25 cfs

Results

Discharge	15.25 cfs
Normal Depth	15.0 in
Flow Area	1.2 ft²
Wetted Perimeter	3.9 ft
Hydraulic Radius	3.8 in
Top Width	0.00 ft
Critical Depth	14.8 in
Percent Full	100.0 %
Critical Slope	0.030 ft/ft
Velocity	12.43 ft/s
Velocity Head	2.40 ft
Specific Energy	3.65 ft
Froude Number	(N/A)
Maximum Discharge	16.41 cfs
Discharge Full	15.25 cfs
Slope Full	0.033 ft/ft
Flow Type	Undefined

GVF Input Data

Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	100.0 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	15.0 in
Critical Depth	14.8 in
Channel Slope	0.033 ft/ft
Critical Slope	0.030 ft/ft

Worksheet for SDP11 (SD10 to SD12)

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.010
Channel Slope	0.040 ft/ft
Normal Depth	15.0 in
Diameter	15.0 in
Discharge	16.79 cfs

Results

Discharge	16.79 cfs
Normal Depth	15.0 in
Flow Area	1.2 ft²
Wetted Perimeter	3.9 ft
Hydraulic Radius	3.8 in
Top Width	0.00 ft
Critical Depth	14.9 in
Percent Full	100.0 %
Critical Slope	0.037 ft/ft
Velocity	13.69 ft/s
Velocity Head	2.91 ft
Specific Energy	4.16 ft
Froude Number	(N/A)
Maximum Discharge	18.07 cfs
Discharge Full	16.79 cfs
Slope Full	0.040 ft/ft
Flow Type	Undefined

GVF Input Data

Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	100.0 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	15.0 in
Critical Depth	14.9 in
Channel Slope	0.040 ft/ft
Critical Slope	0.037 ft/ft

Worksheet for SDP12 (SD12 to SD14)

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.010
Channel Slope	0.016 ft/ft
Normal Depth	18.0 in
Diameter	18.0 in
Discharge	17.27 cfs

Results

Discharge	17.27 cfs
Normal Depth	18.0 in
Flow Area	1.8 ft²
Wetted Perimeter	4.7 ft
Hydraulic Radius	4.5 in
Top Width	0.00 ft
Critical Depth	17.3 in
Percent Full	100.0 %
Critical Slope	0.014 ft/ft
Velocity	9.77 ft/s
Velocity Head	1.48 ft
Specific Energy	2.98 ft
Froude Number	(N/A)
Maximum Discharge	18.58 cfs
Discharge Full	17.27 cfs
Slope Full	0.016 ft/ft
Flow Type	Undefined

GVF Input Data

Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	100.0 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	18.0 in
Critical Depth	17.3 in
Channel Slope	0.016 ft/ft
Critical Slope	0.014 ft/ft

Worksheet for SDP13 (SD13 to SD14)

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.010
Channel Slope	0.005 ft/ft
Normal Depth	12.0 in
Diameter	12.0 in
Discharge	3.27 cfs

Results

Discharge	3.27 cfs
Normal Depth	12.0 in
Flow Area	0.8 ft²
Wetted Perimeter	3.1 ft
Hydraulic Radius	3.0 in
Top Width	0.00 ft
Critical Depth	9.3 in
Percent Full	100.0 %
Critical Slope	0.006 ft/ft
Velocity	4.17 ft/s
Velocity Head	0.27 ft
Specific Energy	1.27 ft
Froude Number	(N/A)
Maximum Discharge	3.52 cfs
Discharge Full	3.27 cfs
Slope Full	0.005 ft/ft
Flow Type	Undefined

GVF Input Data

Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	100.0 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	12.0 in
Critical Depth	9.3 in
Channel Slope	0.005 ft/ft
Critical Slope	0.006 ft/ft

Worksheet for SDP14 (SD14 to SD15)

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.010
Channel Slope	0.026 ft/ft
Normal Depth	18.0 in
Diameter	18.0 in
Discharge	22.02 cfs

Results

Discharge	22.02 cfs
Normal Depth	18.0 in
Flow Area	1.8 ft²
Wetted Perimeter	4.7 ft
Hydraulic Radius	4.5 in
Top Width	0.00 ft
Critical Depth	17.7 in
Percent Full	100.0 %
Critical Slope	0.024 ft/ft
Velocity	12.46 ft/s
Velocity Head	2.41 ft
Specific Energy	3.91 ft
Froude Number	(N/A)
Maximum Discharge	23.68 cfs
Discharge Full	22.02 cfs
Slope Full	0.026 ft/ft
Flow Type	Critical

GVF Input Data

Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	100.0 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	18.0 in
Critical Depth	17.7 in
Channel Slope	0.026 ft/ft
Critical Slope	0.024 ft/ft

Worksheet for SDP15 (SD15 to SD16)

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.010
Channel Slope	0.033 ft/ft
Normal Depth	18.0 in
Diameter	18.0 in
Discharge	24.81 cfs

Results

Discharge	24.81 cfs
Normal Depth	18.0 in
Flow Area	1.8 ft²
Wetted Perimeter	4.7 ft
Hydraulic Radius	4.5 in
Top Width	0.00 ft
Critical Depth	17.8 in
Percent Full	100.0 %
Critical Slope	0.030 ft/ft
Velocity	14.04 ft/s
Velocity Head	3.06 ft
Specific Energy	4.56 ft
Froude Number	(N/A)
Maximum Discharge	26.68 cfs
Discharge Full	24.81 cfs
Slope Full	0.033 ft/ft
Flow Type	Critical

GVF Input Data

Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	100.0 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	18.0 in
Critical Depth	17.8 in
Channel Slope	0.033 ft/ft
Critical Slope	0.030 ft/ft

Worksheet for SDP16 (SD16 to SD17)

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.010
Channel Slope	0.008 ft/ft
Normal Depth	24.0 in
Diameter	24.0 in
Discharge	26.30 cfs

Results

Discharge	26.30 cfs
Normal Depth	24.0 in
Flow Area	3.1 ft²
Wetted Perimeter	6.3 ft
Hydraulic Radius	6.0 in
Top Width	0.00 ft
Critical Depth	21.5 in
Percent Full	100.0 %
Critical Slope	0.007 ft/ft
Velocity	8.37 ft/s
Velocity Head	1.09 ft
Specific Energy	3.09 ft
Froude Number	(N/A)
Maximum Discharge	28.29 cfs
Discharge Full	26.30 cfs
Slope Full	0.008 ft/ft
Flow Type	Critical

GVF Input Data

Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	100.0 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	24.0 in
Critical Depth	21.5 in
Channel Slope	0.008 ft/ft
Critical Slope	0.007 ft/ft

Worksheet for SDP17 (SD17 to SD11)

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.010
Channel Slope	0.008 ft/ft
Normal Depth	24.0 in
Diameter	24.0 in
Discharge	26.30 cfs

Results

Discharge	26.30 cfs
Normal Depth	24.0 in
Flow Area	3.1 ft²
Wetted Perimeter	6.3 ft
Hydraulic Radius	6.0 in
Top Width	0.00 ft
Critical Depth	21.5 in
Percent Full	100.0 %
Critical Slope	0.007 ft/ft
Velocity	8.37 ft/s
Velocity Head	1.09 ft
Specific Energy	3.09 ft
Froude Number	(N/A)
Maximum Discharge	28.29 cfs
Discharge Full	26.30 cfs
Slope Full	0.008 ft/ft
Flow Type	Critical

GVF Input Data

Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	100.0 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	24.0 in
Critical Depth	21.5 in
Channel Slope	0.008 ft/ft
Critical Slope	0.007 ft/ft

Worksheet for SDP18 (SD17 to SD18)

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.010
Channel Slope	0.010 ft/ft
Normal Depth	24.0 in
Diameter	24.0 in
Discharge	29.11 cfs

Results

Discharge	29.11 cfs
Normal Depth	24.0 in
Flow Area	3.1 ft²
Wetted Perimeter	6.3 ft
Hydraulic Radius	6.0 in
Top Width	0.00 ft
Critical Depth	22.2 in
Percent Full	100.0 %
Critical Slope	0.008 ft/ft
Velocity	9.27 ft/s
Velocity Head	1.33 ft
Specific Energy	3.33 ft
Froude Number	(N/A)
Maximum Discharge	31.32 cfs
Discharge Full	29.11 cfs
Slope Full	0.010 ft/ft
Flow Type	Critical

GVF Input Data

Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	100.0 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	24.0 in
Critical Depth	22.2 in
Channel Slope	0.010 ft/ft
Critical Slope	0.008 ft/ft

Worksheet for SDP19 (EX SD3 to EX SD2)

Project Description	
Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data		
Roughness Coefficient	0.010	
Channel Slope	0.011	ft/ft
Normal Depth	24.0	in
Diameter	24.0	in
Discharge	30.84	cfs

Results		
Discharge	30.84	cfs
Normal Depth	24.0	in
Flow Area	3.1	ft²
Wetted Perimeter	6.3	ft
Hydraulic Radius	6.0	in
Top Width	0.00	ft
Critical Depth	22.5	in
Percent Full	100.0	%
Critical Slope	0.010	ft/ft
Velocity	9.82	ft/s
Velocity Head	1.50	ft
Specific Energy	3.50	ft
Froude Number	(N/A)	
Maximum Discharge	33.18	cfs
Discharge Full	30.84	cfs
Slope Full	0.011	ft/ft
Flow Type	Critical	

GVF Input Data		
Downstream Depth	0.0	in
Length	0.0	ft
Number Of Steps	0	

GVF Output Data		
Upstream Depth	0.0	in
Profile Description	N/A	
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.0	%
Normal Depth Over Rise	100.0	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	24.0	in
Critical Depth	22.5	in
Channel Slope	0.011	ft/ft
Critical Slope	0.010	ft/ft

Worksheet for SDP20 (EX SD3 to EX SD4)

Project Description	
Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data		
Roughness Coefficient	0.010	
Channel Slope	0.005	ft/ft
Normal Depth	18.0	in
Diameter	18.0	in
Discharge	10.03	cfs

Results		
Discharge	10.03	cfs
Normal Depth	18.0	in
Flow Area	1.8	ft²
Wetted Perimeter	4.7	ft
Hydraulic Radius	4.5	in
Top Width	0.00	ft
Critical Depth	14.7	in
Percent Full	100.0	%
Critical Slope	0.005	ft/ft
Velocity	5.68	ft/s
Velocity Head	0.50	ft
Specific Energy	2.00	ft
Froude Number	(N/A)	
Maximum Discharge	10.79	cfs
Discharge Full	10.03	cfs
Slope Full	0.005	ft/ft
Flow Type	Critical	

GVF Input Data		
Downstream Depth	0.0	in
Length	0.0	ft
Number Of Steps	0	

GVF Output Data		
Upstream Depth	0.0	in
Profile Description	N/A	
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.0	%
Normal Depth Over Rise	100.0	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	18.0	in
Critical Depth	14.7	in
Channel Slope	0.005	ft/ft
Critical Slope	0.005	ft/ft

Worksheet for SDP21 (2 X 2 Drop Inlet to SD8)

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.010	
Channel Slope	0.010	ft/ft
Normal Depth	15.0	in
Diameter	15.0	in
Discharge	8.40	cfs

Results

Discharge	8.40	cfs
Normal Depth	15.0	in
Flow Area	1.2	ft²
Wetted Perimeter	3.9	ft
Hydraulic Radius	3.8	in
Top Width	0.00	ft
Critical Depth	13.6	in
Percent Full	100.0	%
Critical Slope	0.009	ft/ft
Velocity	6.84	ft/s
Velocity Head	0.73	ft
Specific Energy	1.98	ft
Froude Number	(N/A)	
Maximum Discharge	9.03	cfs
Discharge Full	8.40	cfs
Slope Full	0.010	ft/ft
Flow Type	Critical	

GVF Input Data

Downstream Depth	0.0	in
Length	0.0	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.0	in
Profile Description	N/A	
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.0	%
Normal Depth Over Rise	100.0	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	15.0	in
Critical Depth	13.6	in
Channel Slope	0.010	ft/ft
Critical Slope	0.009	ft/ft

Dixie Storm Water Coalition
St. George, Washington, Ivins, Santa Clara

Storm Water Quality Report

Date: 1/3/23

Project Name: Rosewood Townhomes

Project ID: 13231-22

Design Engineer: WJP

Is the project within a watershed that is 303(d) listed? YES

If yes:

Name of receiving water(s): SANTA CLARA-1 LOWER COLORADO RIVER

Listed Impairment(s): SELENIUM, TDS, TEMPERATURE

Does the watershed have an approved TMDL? NO

If yes:

Approved TMDL(s): 1,200 MG/L TDS, 4.6µg/L SELENIUM, TEMP TDML NOT SET

I have reviewed the storm water quality design and find this report to be complete, accurate, and current.

JARED BATES P.E. , Project Manager

PROFESSIONAL ENGINEER
JARED W. BATES
NO. 7886812
STATE OF UTAH
1/3/2023

Dixie Storm Water Coalition
St. George, Washington, Ivins, Santa Clara

Project Information

Type of Project (New Development, Redevelopment): NEW DEVELOPMENT

Area of Land Disturbance (ac): 14.99

Project Impervious Area (ac): 11.62

Project Imperviousness (%): 77.5

Project Volumetric Runoff Coefficient, R_V: 0.51

80th Storm Depth (in): 0.44

Project 80th Percentile Volume, V_{goal} (cf): 12,210

Subsurface Information

Groundwater

Depth to Groundwater (ft): >15 FT

Historical High Depth to Groundwater if known (ft): >15 FT

Source: GEOTECHNICAL INVESTIGATION ROSEWOOD TOWNHOMES AGEC (12/2/2022)

Groundwater Contamination at Site: NO

Soil Information

Infiltration Rate (in/hr): <0.000142

Hydrologic Soil Group: D

Source: NRCS SOIL SURVEY

Soil Contamination at Site: NO

Drinking Water

Within Drinking Water Source Area Protection: NO

Additional Relevant Site Information

Dixie Storm Water Coalition
St. George, Washington, Ivins, Santa Clara

LID Drainage Areas

Add additional rows as needed.

Contributing Drainage Area	Area (ac)	Impervious Area (ac)	Imperviousness (%)	Volumetric Runoff Coefficient, R_V	Water Quality Volume, WQV (cf)
CDA 1	14.99	11.62	77.52	0.51	12,210.43
CDA 2					
CDA 3					
CDA 4					
				Total WQV (cf)	12,210.4

LID BMP Design

Add additional rows as needed.

Contributing Drainage Area	LID BMP Type	Water Quality Volume, WQV (cf)	Runoff Retained (cf)	Percent of Runoff Captured (%)
CDA1	LOT BENCHING	12,210.43	0.0	0.0
CDA 2			0.0	
CDA 3				
CDA 4				
		Total Volume Retained (cf)	0.0	0.0

Percent of V_{goal} captured by LID BMPs: 0.0__%

If 100% of V_{goal} is not captured, document and provide narrative of technical infeasibilities and/or alternate compliance measures below:

Due to shallow bedrock and soil conditions , capturing 100% of V_goal is technically infeasible. See Geo-technical Report "GEOTECHNICAL INVESTIGATION ROSEWOOD TOWNHOMES AGEC (12/2/2022)" for additional information.

Describe additional storm water quality measures incorporated into the site:

The proposed project will be graded to developed benched lots; which will create longer travel distances for stormwater to travel throughout the site prior to being intercepted by storm drain inlets. The increase in travel distances results in reduced peak flows compared to the pre-project conditions.

Dixie Storm Water Coalition
St. George, Washington, Ivins, Santa Clara

Narrative of technical infeasibilities and/or alternate compliance measures below:

AGEC has reviewed the Dixie Storm Water Coalition Guide for the Low Impact Development (LID) dated June 20, 2020 and provided the evaluation:

• Using Figure 2 (flow chart), Step 2 indicates a "NO" for acceptable native soils.

• Using Table 3 (matrix) the shallow bedrock and expansive mudstone prohibits the use of the majority of the BMP's. BMP's BR-1 (Rain Garden), BR-2 (Bioretention Cell), BR-4 (Vegetated Strip), BR-5 (Tree Box Filter), D-3 (Dry Well) and HR-1 (Harvest and Reuse) are noted as "any" or these matrix options available, while the others have been eliminated through the matrix flow chart.

• Although, these options are available, due to the expansive and shallow bedrock on the site, the use of these BMP's would be detrimental to the project.

• As an alternative, we recommend the use of a site drainage plan to allow water to drain to localized drainages or to off site detention or retention locations.

• We recommend that residences pipe rain gutters and yard drains to the curb and surface flowing to the storm drains.

Based on the evaluation for use of on-site retention, it is our recommendation that BMP's with surface infiltration that will potentially wet the expansive mudstone/clay or may perch and flow laterally on shallow bedrock not be used. The infiltration from this type of drainage may result in surface heave and damage to infrastructure and structures.

St.George
Community Development

Item 1E Preliminary Plat

PLANNING COMMISSION AGENDA REPORT: **2/28/2023**
CONTINUED: **4/11/2023**
Rosewood Townhomes
Case No. 2023-PP-006

Request: To approve a preliminary plat for (134) Townhome Units

Location: The site is located at located at 1100 W Curley Hollow Dr.

Property: 14.99 acres

Number of Lots: 134

Density: 8.93 DU/AC

Zoning: PDR

Adjacent zones: This plat is surrounded by the following zones:
North – R-1-8
South – R-1-10 & R-3
East – R-1-10
West – R-1-8

General Plan: MDR

Applicant: Tonaquint Inc.

Representative: Tim Stewart

Comments: No Comments from staff departments.

RECOMMENDATION PRELIMINARY PLAT:
Staff recommends approval of the Preliminary Plat for the Rosewood Townhomes Development with no conditions:

POSSIBLE MOTION:
The Planning Commission recommends approval of the Rosewood Townhomes preliminary plat with no condition.

PLANNING COMMISSION AGENDA REPORT: 04/11/2023

GV-5 General Plan Amendment (Case No. 2022-GPA-011)	
Request:	Consider approval of an ordinance changing the general plan future land-use map from LDR (Low Density Residential to MDR (Medium Density Residential) on 4.51 acres located on West Canyon View Drive, west of Dixie Drive for a project to be known as GV-5.
Applicant:	Robert and Roseann Campbell
Representative:	Roseann Campbell
Location:	West Canyon View Drive, west of Dixie Drive
Existing General Plan:	Open Space (OS)
Proposed General Plan:	Commercial (COM)
Existing Zoning:	R-1-10 (Single Family residential, minimum lot size 10,000 sf)
Land Area:	Approximately 4.51 acres

BACKGROUND:
The General Plan is a guide for land-use decisions and contains various policies to help direct decisions related to land use and development of the City. This General Plan Amendment is for land generally located on Canyon View Drive, just west of Dixie Drive. This property sits just below the Las Palmas resort area. Canyon View Drive is classified as a minor collector road which gives residents access from the Las Palmas area to Dixie Drive which is considered a minor arterial road.

The purpose of this request is to change the land use designation from LDR (Low Density Residential) to MDR (Medium Density Residential). The land area for this request is 4.51 acres that is split into 10 residential lots. Six of the lots have existing single-family homes on them and four of the lots are vacant. The applicant is seeking this General Plan Amendment to give the owners an option to increase the density of their properties which in turn could possibly increase the value of their properties (please refer to **Exhibit A** for the Applicant's Narrative). If approved, the applicant would like to eventually change these same properties from the R-1-10 (Single Family Residential, minimum lot size 10,000 square feet) to the R-2 (Multiple Family) zoning designation which would match the newest development on this street located at 1731-1757 W. Canyon View Drive. The R-2 zone allows for single-family and twin-home developments.

RECOMMENDATION:
Staff recommends approval of this general plan amendment.

ALTERNATIVES:
1. Recommend approval of this General Plan Amendment.
2. Recommend denial of this General Plan Amendment
3. Table the proposed General Plan Amendment to a specific date.

POSSIBLE MOTION:
The Planning Commission recommends approval of this General Plan Amendment for Car Lot Medical Office Condominium.

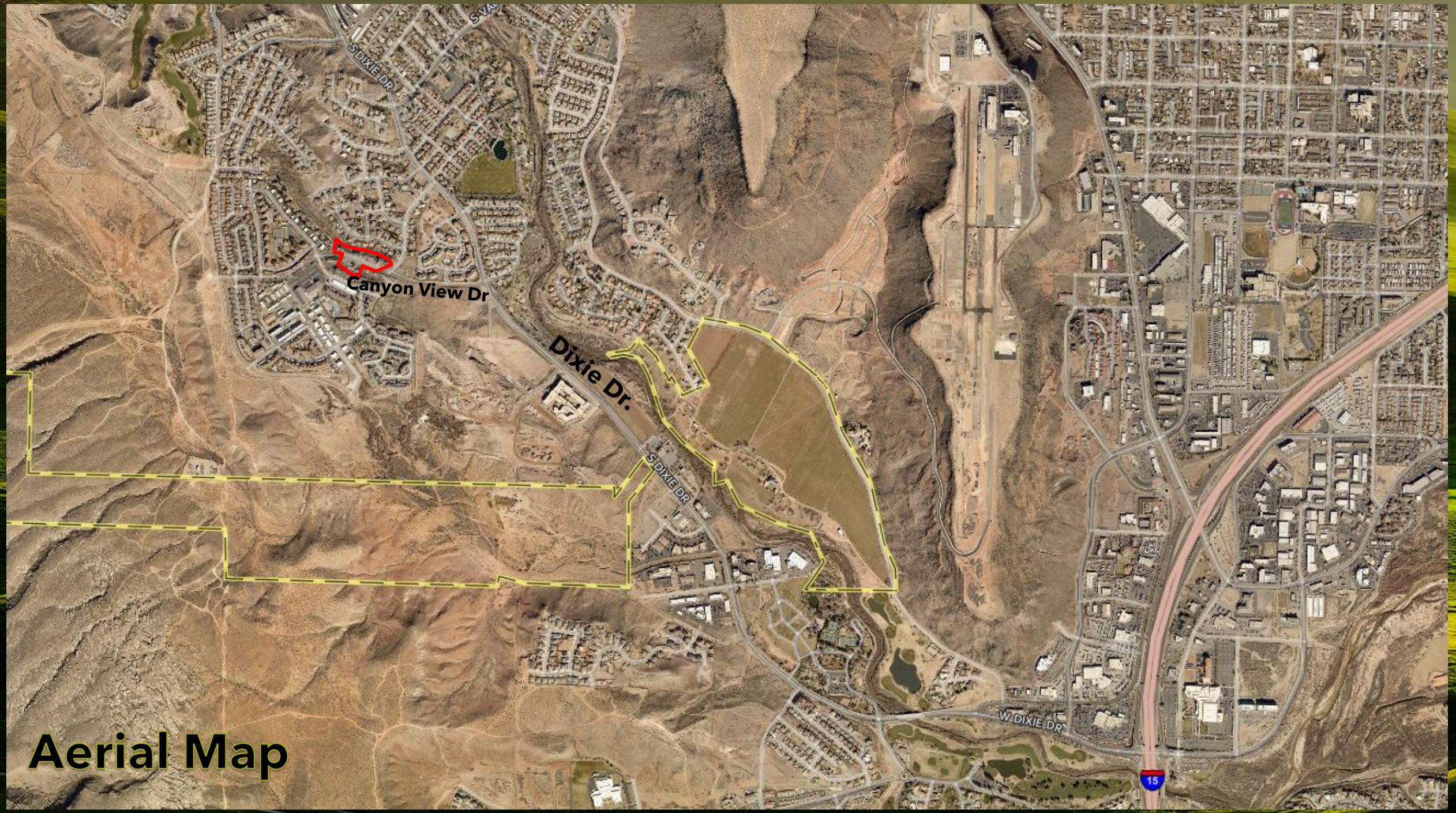
FINDINGS FOR APPROVAL:
1. The proposed land-uses are compatible with the surrounding land uses in this area.
2. This land use amendment will not be harmful to the health, safety and general welfare of residences and businesses in the area.

Exhibit A
Applicant's Narrative

1. The FACE of the neighborhood (meaning lots 2-14, GV5) has changed dramatically over the last few years due to: 1. a dramatic increase in volume and speed of traffic, and 2. The increase in the surrounding area of multi-family properties and overnight rentals.
2. Therefore, the FUNCTION of the neighborhood must also change to keep up both value and viability on pace with the surrounding area
3. Our proposal will allow the neighborhood to continue to have value and contribute in a positive way to the overall health of the area rather than allow it to deteriorate due to lack of value.

Exhibit B
PowerPoint Presentation

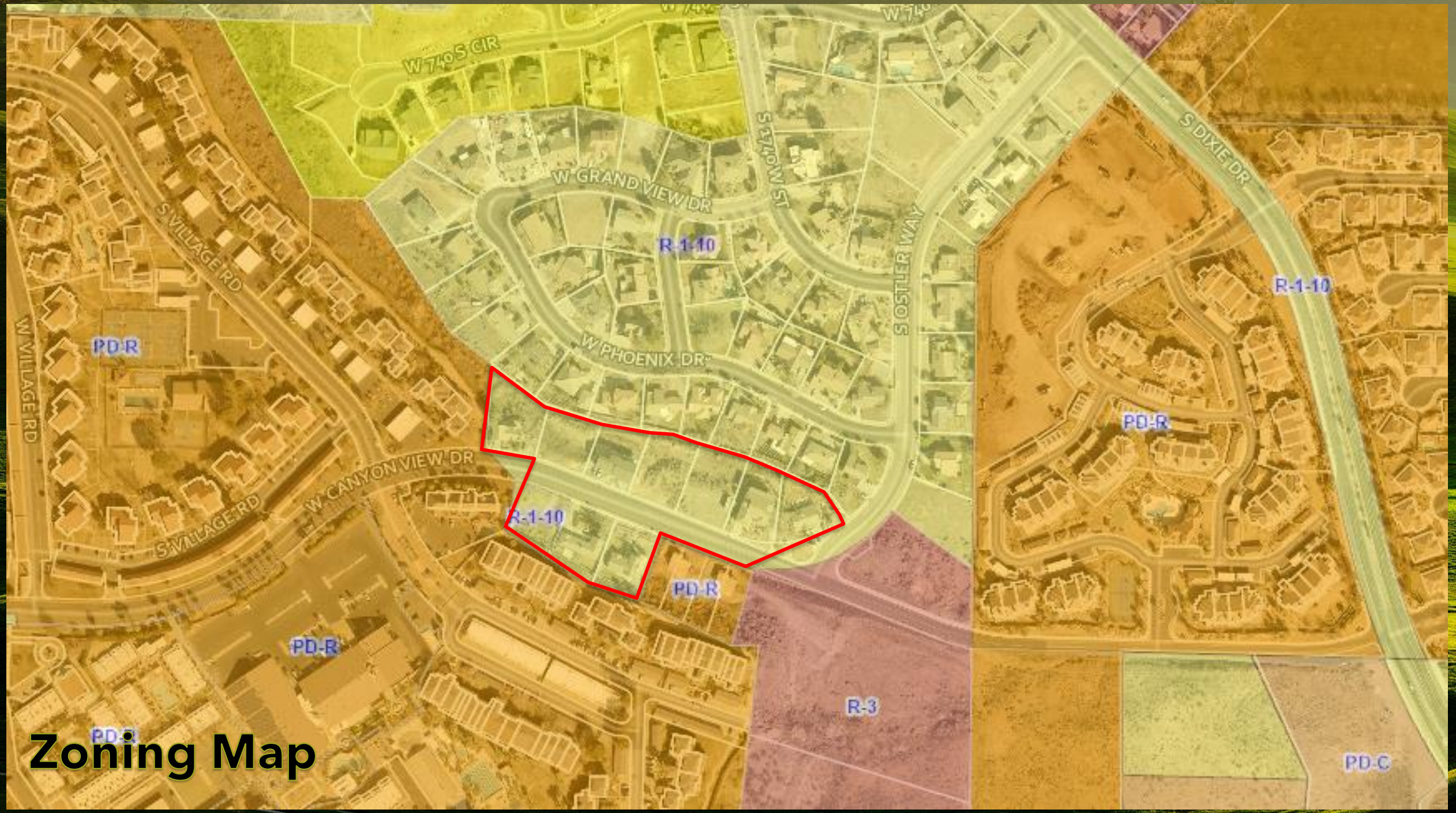

GV-5
GENERAL PLAN AMENDMENT
2022-GPA-011



Aerial Map


W 740 S CIR
W GRAND VIEW DR
S 1740 W ST
S OSTLER WAY
S DIXIE DR
S VILLAGE RD
W PHOENIX DR
W CANYON VIEW DR
S VILLAGE RD
S DIXIE

Aerial Map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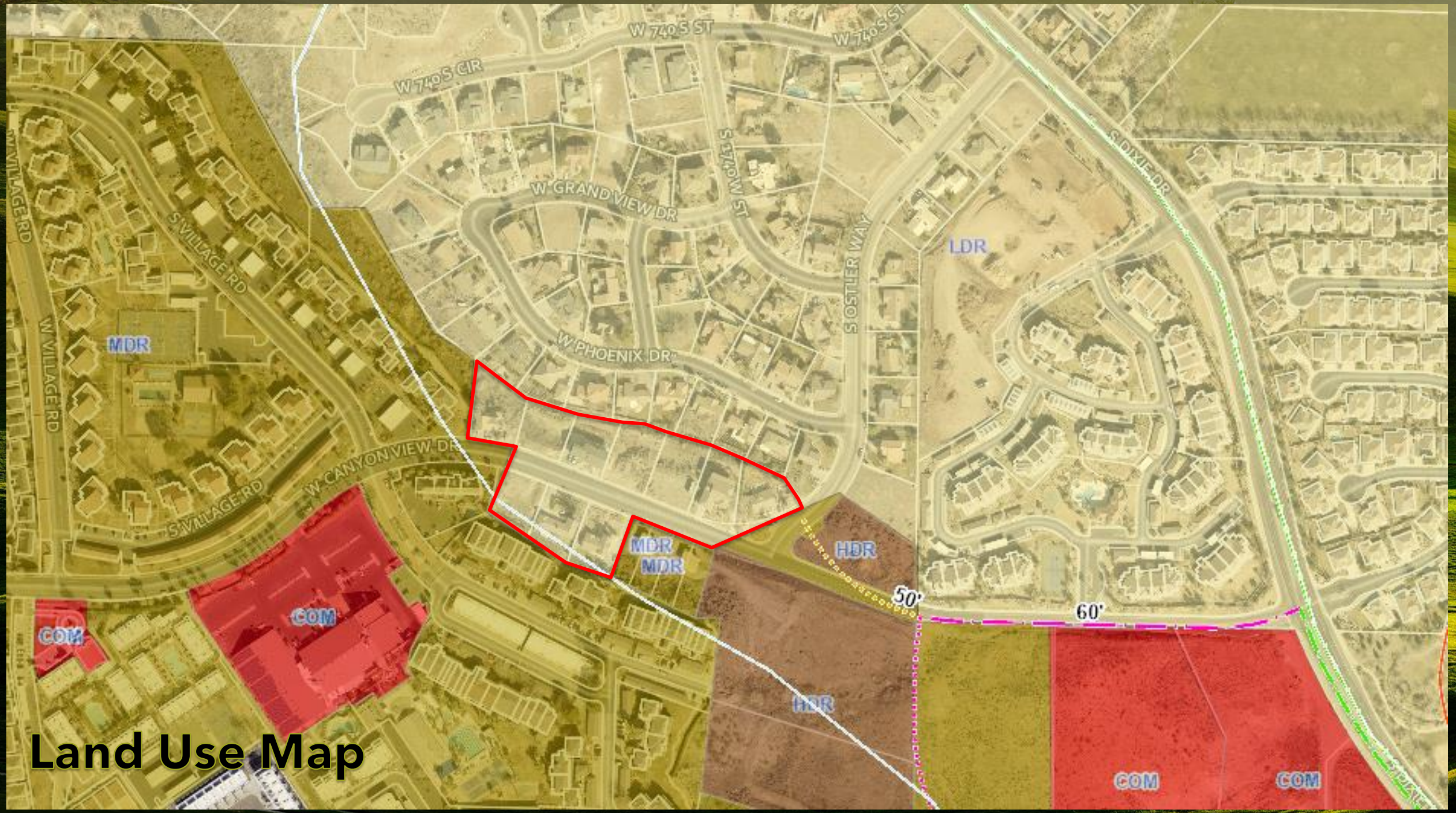
S 1740 W ST
S OSTLER WAY
S DIXIE DR
R-1-10
W PHOENIX DR
S VILLAGE RD
W VILLAGE RD
PD-R
W CANYON VIEW DR
R-1-10
PD-R
PD-R
R-3
PD-C
R-1-10
PD-R
PD-C

Zoning Map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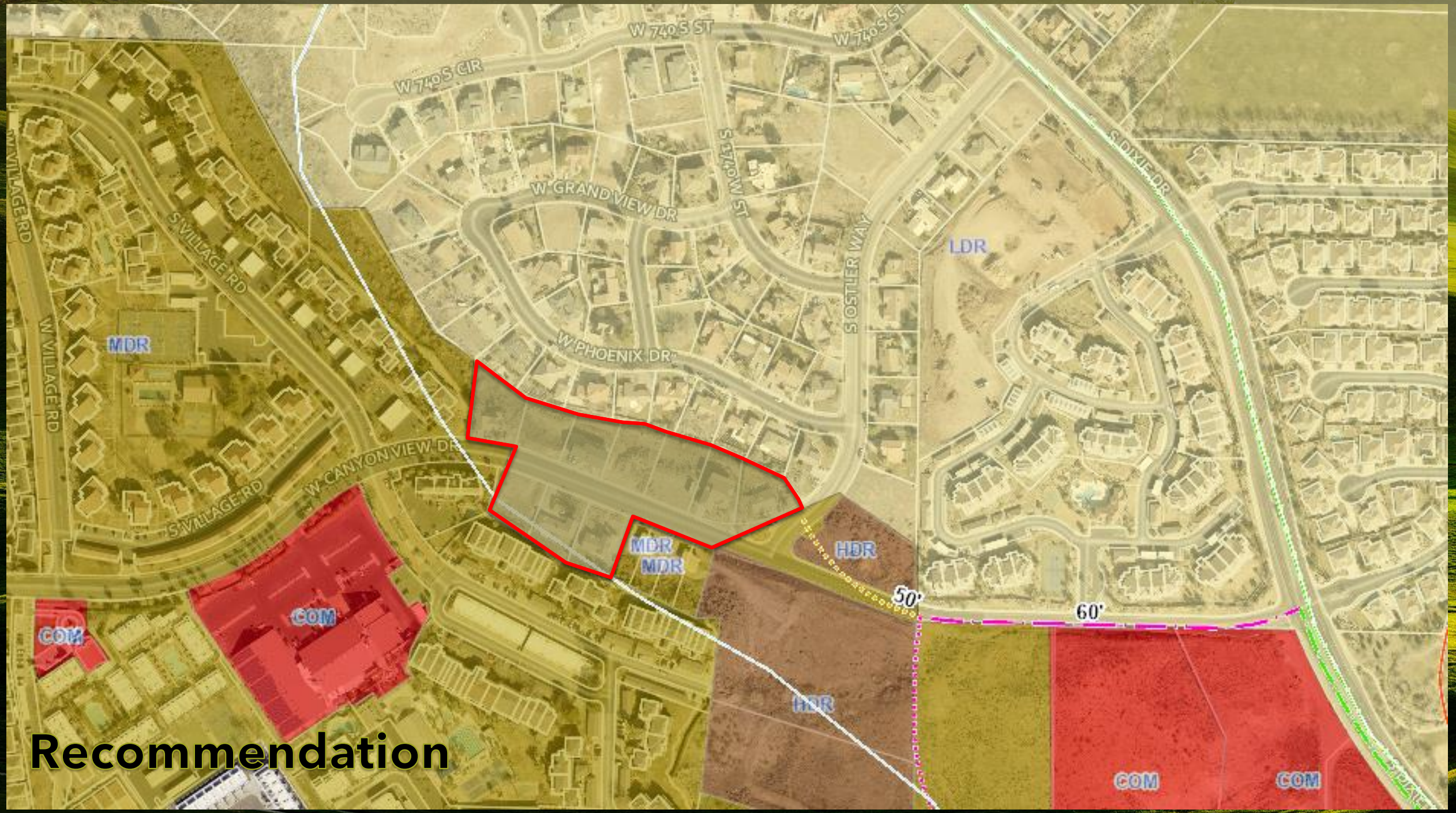
W 740 S ST
W GRAND VIEW DR
S 570 W ST
S OSTLER WAY
S DIXIE DR
W VILLAGE RD
S VILLAGE RD
W VILLAGE RD
W PHOENIX DR
W CANYON VIEW DR
S VILLAGE RD
LDR
MDR
MDR
MDR
HDR
HDR
50'
60'
COM
COM
COM
COM
Land Use Map


W PHOENIX DR
1770 W
870 S
S OSTLER WAY
1685 W
890 S
W CANYON VIEW DR
1710 W
950 S
1803 W
1744 W
1728 W
1716 W
1702 W
1791 W
1785 W
1773 W
1751 W
1735 W
1723 W
1711 W
1697 W
1822 W
1788 W
1736 W
1714 W
1793 W
1775 W
1757 W
1745 W
1739 W
1731 W
1839 W Unit 201
1839 W Unit 102
1839 W Unit 203
1839 W Unit 104
1845 W Unit 110
1845 W Unit 111
1845 W Unit 105
1845 W Unit 126
1845 W Unit 109
1845 W Unit 210
1845 W Unit 211
1845 W Unit 209
1845 W Unit 208
1845 W Unit 201
1845 W Unit 203
1845 W Unit 212
1845 W Unit 221
860 S Unit X6
860 S Unit X5
860 S Unit X4
860 S Unit X3
841 S
870 S
895 S
913 S

Aerial Map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W PHOENIX DR
W VILLAGE RD
S VILLAGE RD
W VILLAGE RD
W CANYON VIEW DR
S VILLAGE RD
MDR
LDR
MDR
MDR
HDR
50'
60'
COM
COM
HDR
COM
COM
Recommendation

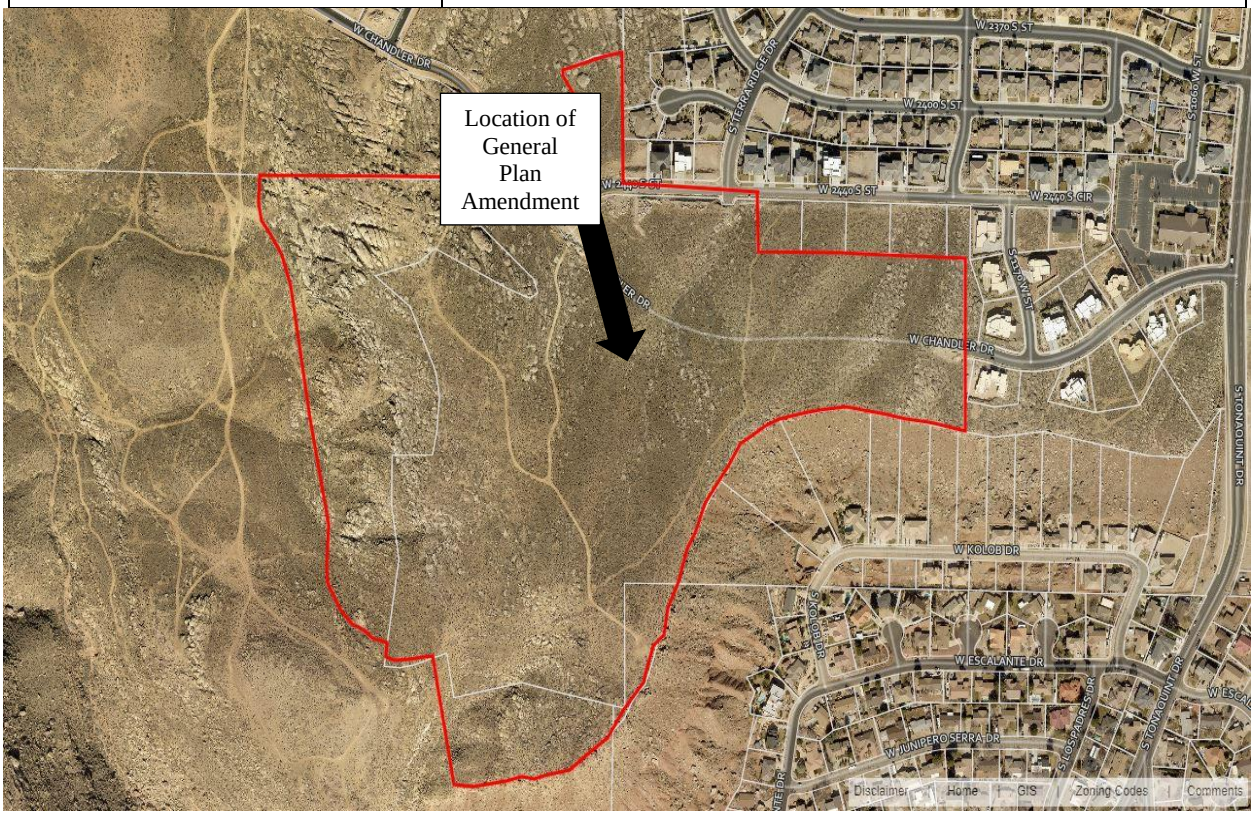
St.George
Community Development

ITEM 2B

General Plan Amendment

PLANNING COMMISSION AGENDA REPORT: 04/11/2023

Tonaquint Heights Ph. 4-7 General Plan Amendment (Case No. 2023-GPA-001)	
Request:	Consider approval of an ordinance changing the general plan future land-use map from OS (Open Space) to LDR (Low Density Residential) on approximately 74.098 acres located south of the Tonaquint Terrace subdivision for a project to be known as Tonaquint Heights Ph 4-7.
Applicant:	Utah State Trust Lands C/O Quality Development LLC
Representative:	Logan Blake
Location:	South of the existing Tonaquint Terrace subdivision.
Existing General Plan:	OS (Open Space)
Proposed General Plan:	LDR (Low Density Residential).
Existing Zoning:	R-1-40 (Single Family Residential, minimum lot size 40,000 sf).
Land Area:	Approximately 74.098 acres



BACKGROUND:
The General Plan is a guide for land-use decisions and contains various policies to help direct decisions related to land use and development of the City. This General Plan Amendment is for land generally located at the south of the existing Tonaquint Terrace subdivision and west of Tonaquint Heights Ph 1-3 subdivision. The property is zoned R-1-40. This application is to change the General Plan from OS (Open Space) to LDR (Low Density Residential) to build single family residential lots. There is LDR to the north, south and open space to the west.

RECOMMENDATION:
Staff recommends approval of this general plan amendment.

ALTERNATIVES:
1. Recommend approval of this General Plan Amendment.
2. Recommend denial of this General Plan Amendment
3. Table the proposed General Plan Amendment to a specific date.

POSSIBLE MOTION:
The Planning Commission recommends approval of this General Plan Amendment for Tonaquint Heights Ph. 4-7.

FINDINGS FOR APPROVAL:
1. The proposed land-uses are compatible with the surrounding land uses in this area.
2. This land use amendment will not be harmful to the health, safety and general welfare of residences and businesses in the area.

Exhibit A
Applicant's Narrative

Property Location and Purpose of Tonaquint Heights General Plan Amendment.

The subject property is a 74.098-acre parcel south of the Tonaquint Terrae – Phases 1-4 subdivisions and west of the Tonaquint Heights – Phase 1-3 subdivisions. The purpose of this general plan amendment is for the improvement of the property for residential single-family homes.

A. Use of Land

The projected use of the property is to create Low Density Residential lots. The current designation on the property is Open Space (74.098 acres).

Public Comment

St.George
THE BRIGHTER SIDE

Michael Hadley <michael.hadley@sgcity.org>

Case No. 2023-GPA-001
2 messages

Mary Ann Harvey [redacted]
To: "michael.hadley@sgcity.org" <michael.hadley@sgcity.org>

Wed, Apr 5, 2023 at 3:36 PM

We would like to express our concern for the destabilization of the hill behind us that could occur due to building. The lot sizes directly behind us don't seem to be that big, which means the homes could be built close to the edge of the back property line. There are big rocks that hang out and heavy equipment, blasting etc. could lend to them dislodging and causing issues (property damage, etc.) There is watershed issues, as we are downhill. We already have issues we are working to manage. Also, water pressure is at a minimum as it is and with further demand, it is not going to get better.

Thank you for consideration of these concerns.

Sincerely,

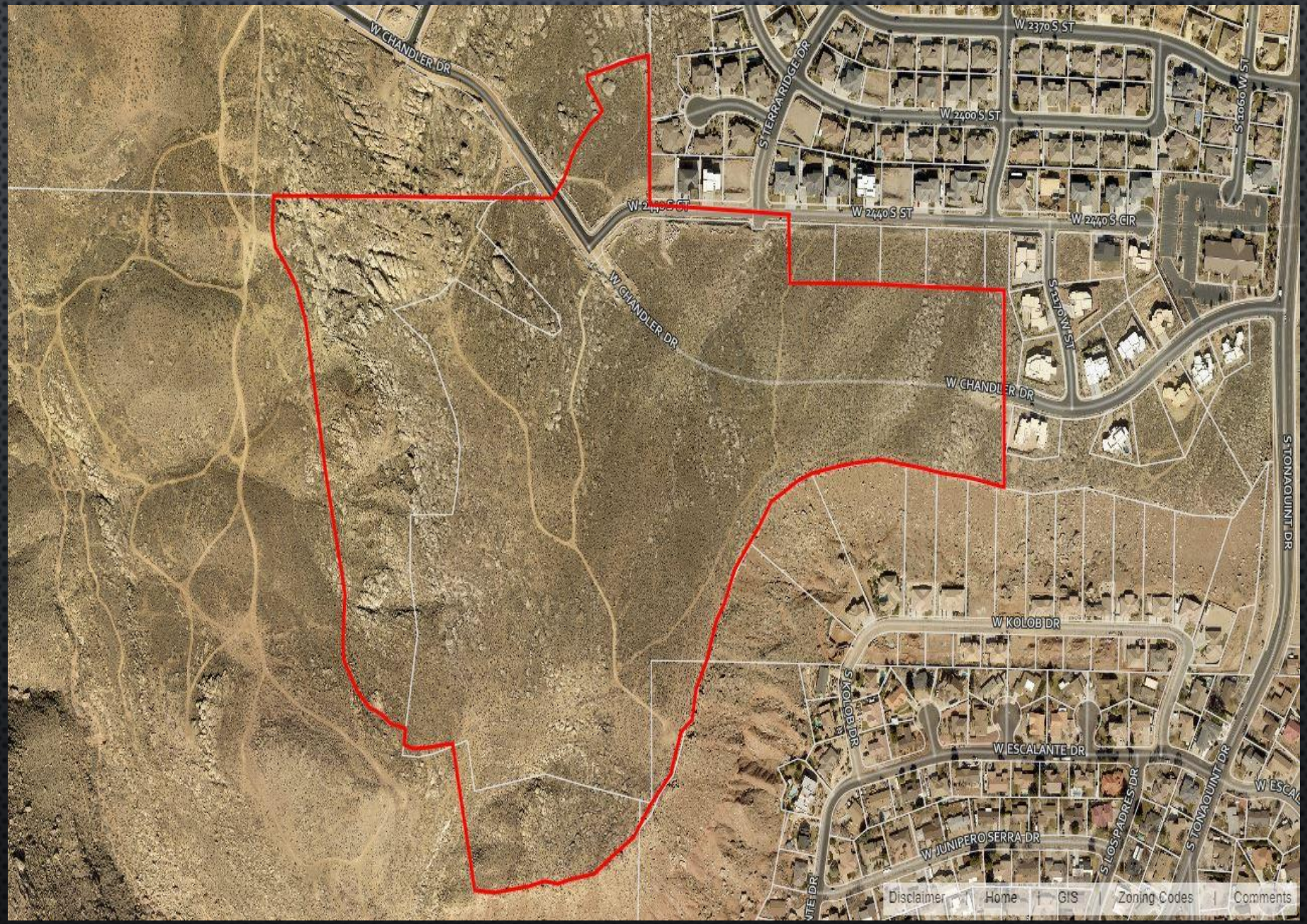
Kirk & Mary Ann Harvey

--
Mary Ann Harvey
[redacted]

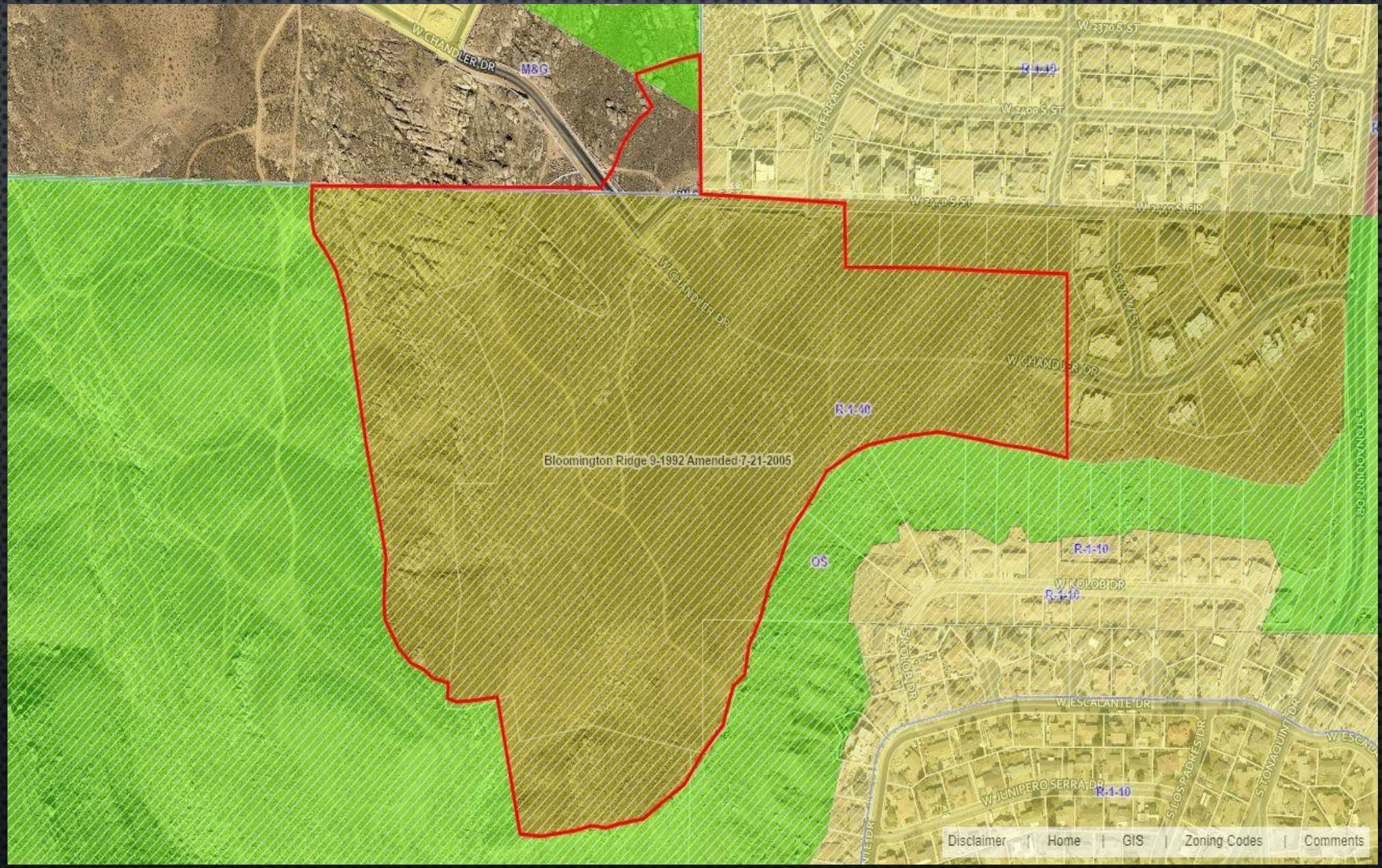
TONAQUINT HEIGHTS PH. 4-7

CASE NO. 2023-GPA-001

LOCATION


W CHANDLER DR
W 2370 S ST
S TERRA RIDGE DR
W 2400 S ST
S 1060 W ST
W 2440 S ST
W 2440 S CIR
S 1270 W ST
W CHANDLER DR
S TONAQUINT DR
W KOLOB DR
S KOLOB DR
W ESCALANTE DR
W JUNIPERO SERRA DR
S LOS PADRES DR
S TONAQUINT DR
Disclaimer
Home
GIS
Zoning Codes
Comments

ZONING


W CHANDLER DR
M&G
W 2370 S ST
R-1-40
W 2200 S ST
S TERRA RIDGE DR
S 3060 W ST
W 2440 S ST
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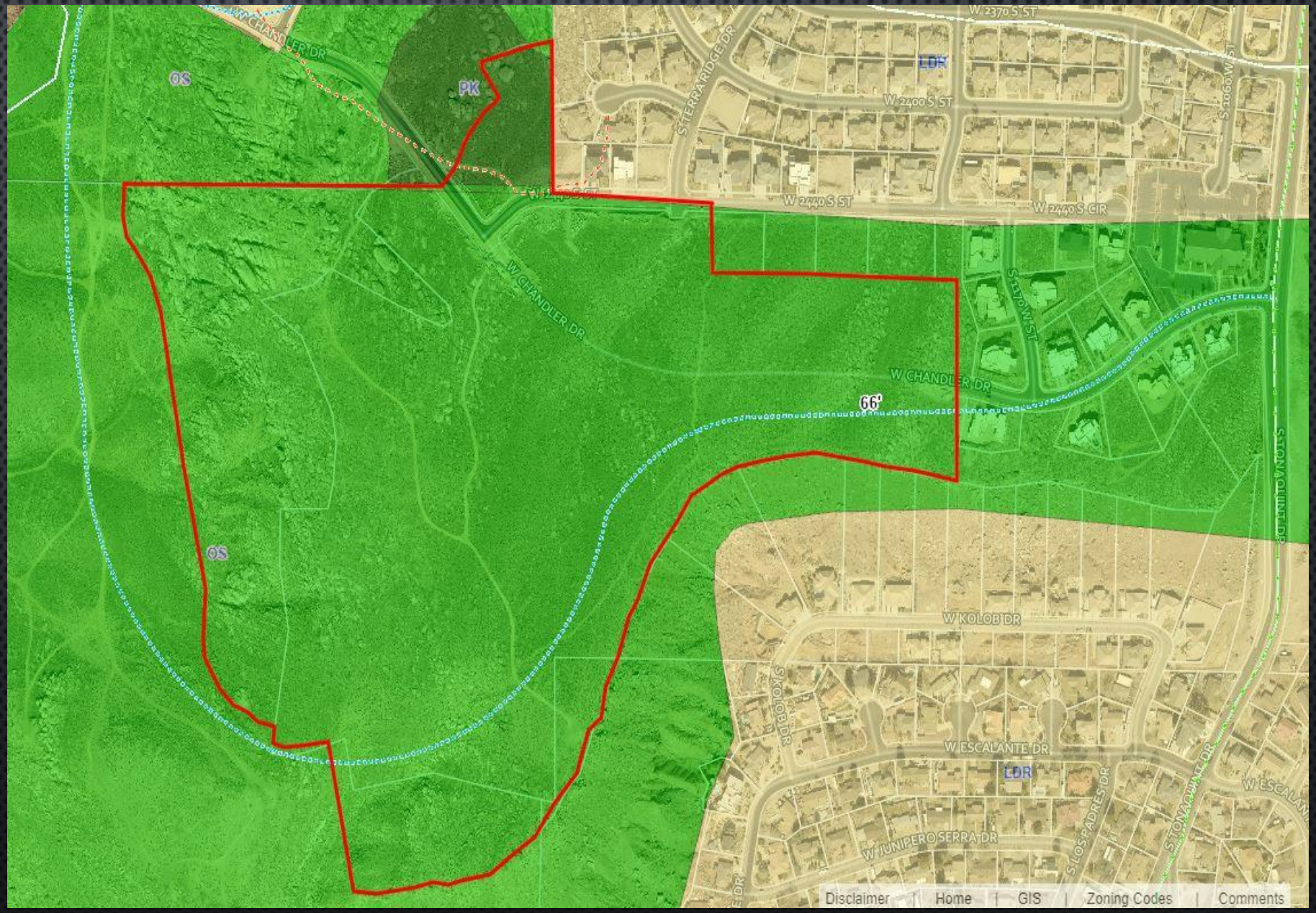
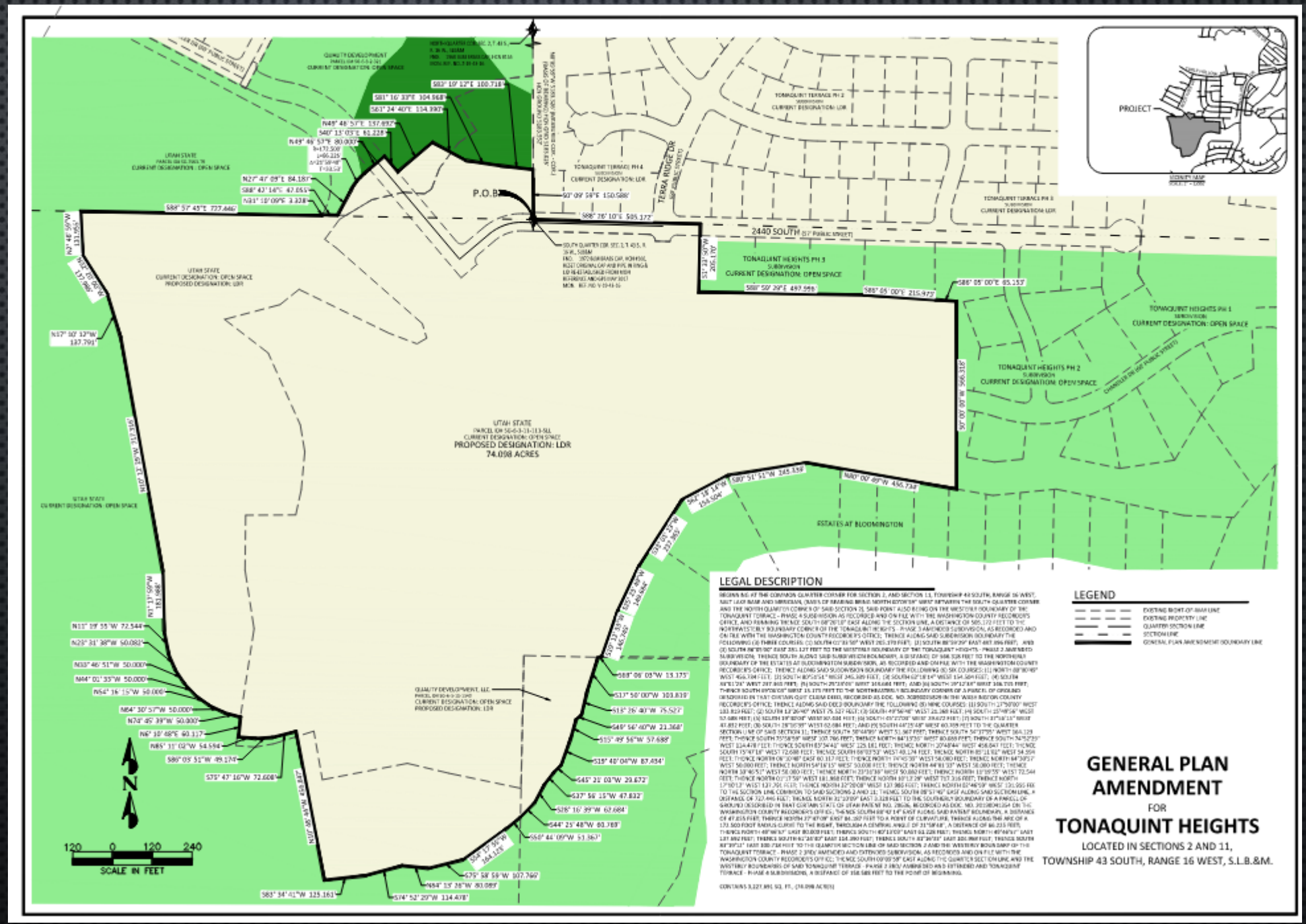
S 2970 W ST
W CHANDLER DR
W CHANDLER DR
R-1-40
Bloomington Ridge 9-1992 Amended 7-21-2005
S TONAQUINT DR
OS
R-1-10
W KOLOB DR
R-1-10
S KOLOB DR
W ESCALANTE DR
S LOS PADRES DR
S TONAQUINT DR
W JUNIPERO SERRA DR
R-1-10
Disclaimer | Home | GIS | Zoning Codes | Comments

GENERAL PLAN LAND USE DESIGNATION

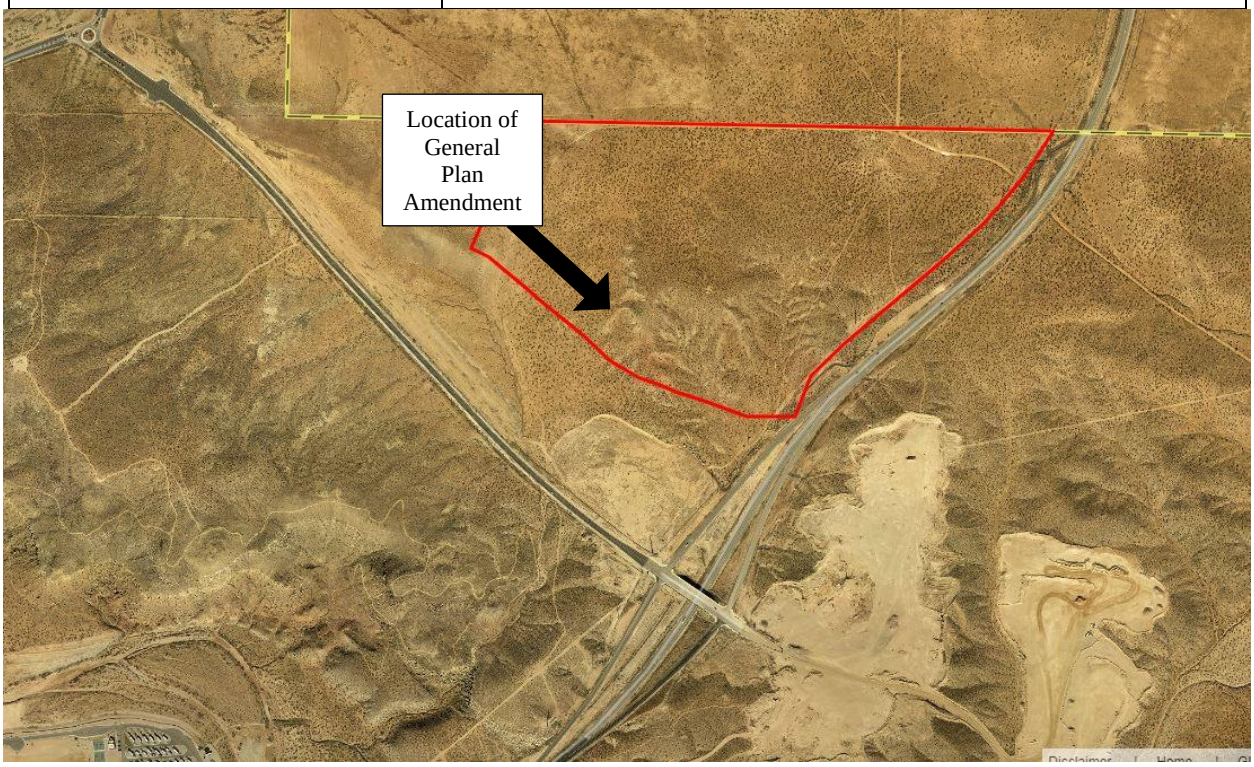


PROPOSED SITE



PLANNING COMMISSION AGENDA REPORT: 04/11/2023

Desert Canyons Business Park General Plan Amendment (Case No. 2023-GPA-002)	
Request:	Consider approval of an ordinance changing the General Plan future land-use map from RES (Residential) and OS (Open Space) to IND (Industrial) on 51.97 acres located North and Northwest area off exit 7 Southern Pkwy for a project to be known as Desert Canyons Business Park.
Applicant:	Desert Canyons Development, LLC
Representative:	Curt Gordon
Location:	North and Northwest area of Exit 7, Southern Pkwy
Existing General Plan:	RES (Residential), OS (Open Space).
Proposed General Plan:	IND (Industrial)
Existing Zoning:	Single Family Residential, minimum lot size 10,000 sf (R-1-10)
Land Area:	Approximately 51.97 acres



BACKGROUND:
The General Plan is a guide for land-use decisions and contains various policies to help direct decisions related to land use and development of the City. This General Plan Amendment is for land generally located north and northwest of Southern Pkwy off exit 7. To the east, the land use map has RES (Residential) and to the south it is COM (Commercial) and RES (Residential).

The purpose of this General Plan amendment is to change 51.97 acres of RES (Residential) to IND (Industrial) to develop the Desert Canyons Business Park in the future with the M-1 zoning. The applicant is transferring the 51.97 acres of Residential to southern portion of Southern Pkwy where there is the existing residential development.

RECOMMENDATION:
Staff recommends approval of this general plan amendment.

ALTERNATIVES:
1. Recommend approval of this General Plan Amendment.
2. Recommend denial of this General Plan Amendment
3. Table the proposed General Plan Amendment to a specific date.

POSSIBLE MOTION:
The Planning Commission recommends approval of this General Plan Amendment for Desert Canyons Business Park.

FINDINGS FOR APPROVAL:
1. The proposed land-uses are compatible with the surrounding land uses in this area.
2. This land use amendment will not be harmful to the health, safety and general welfare of residences and businesses in the area.

Exhibit A
Applicant's Narrative

DESERT CANYONS BUSINESS PARK
GENERAL PLAN AMENDMENT NARRATIVE
3/20/2023

The purpose of this general plan application is to request a conversion of 51.97 acres from PD-R to M-1 on the property NE of Southern Parkway and transfer the 51.97 acre PD-R designation to the other side of Southern Parkway adjacent to the existing PD-R area, as indicated. The property is located approximately 16 miles East of I-15 along the Southern Parkway (See the attached vicinity map Exhibit A). The property to be converted to M-1 is bounded on the South by CRM-zoned property adjacent to Airport Parkway, to the East by Southern Parkway, to the North by Washington City, and to the West by ASBP-zoned property. The PD-R -designated property will occupy the current NW corner of Desert Canyons.

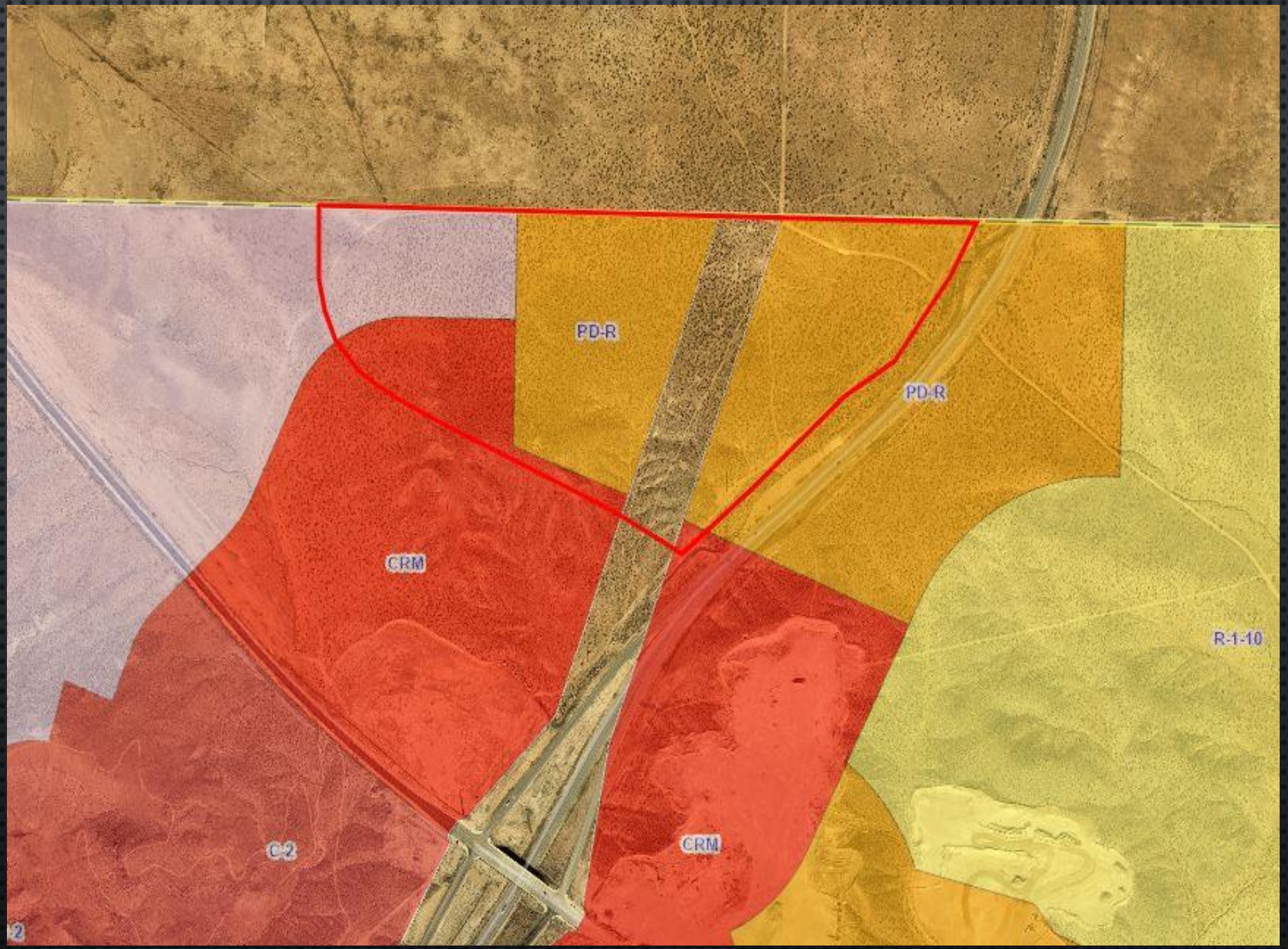
Access to the M-1 site will be provided off Airport Parkway, with a 66' future road connection into Washington City. The PD-R property will connect to Desert Canyons Parkway which connects to the Southern Parkway at two major existing access points, namely Interchange #6 (Desert Canyons Parkway) and Interchange #7 (Airport Parkway). As development in this area occurs, Desert Canyons Parkway will be extended to connect to Interchange #7. The areas will be served by all utilities which currently exist in Desert Canyons Parkway and will be extended to accommodate new development. Utility extensions will include sanitary sewer, water, power, gas, and telecommunications.

DESERT CANYONS BUSINESS PARK

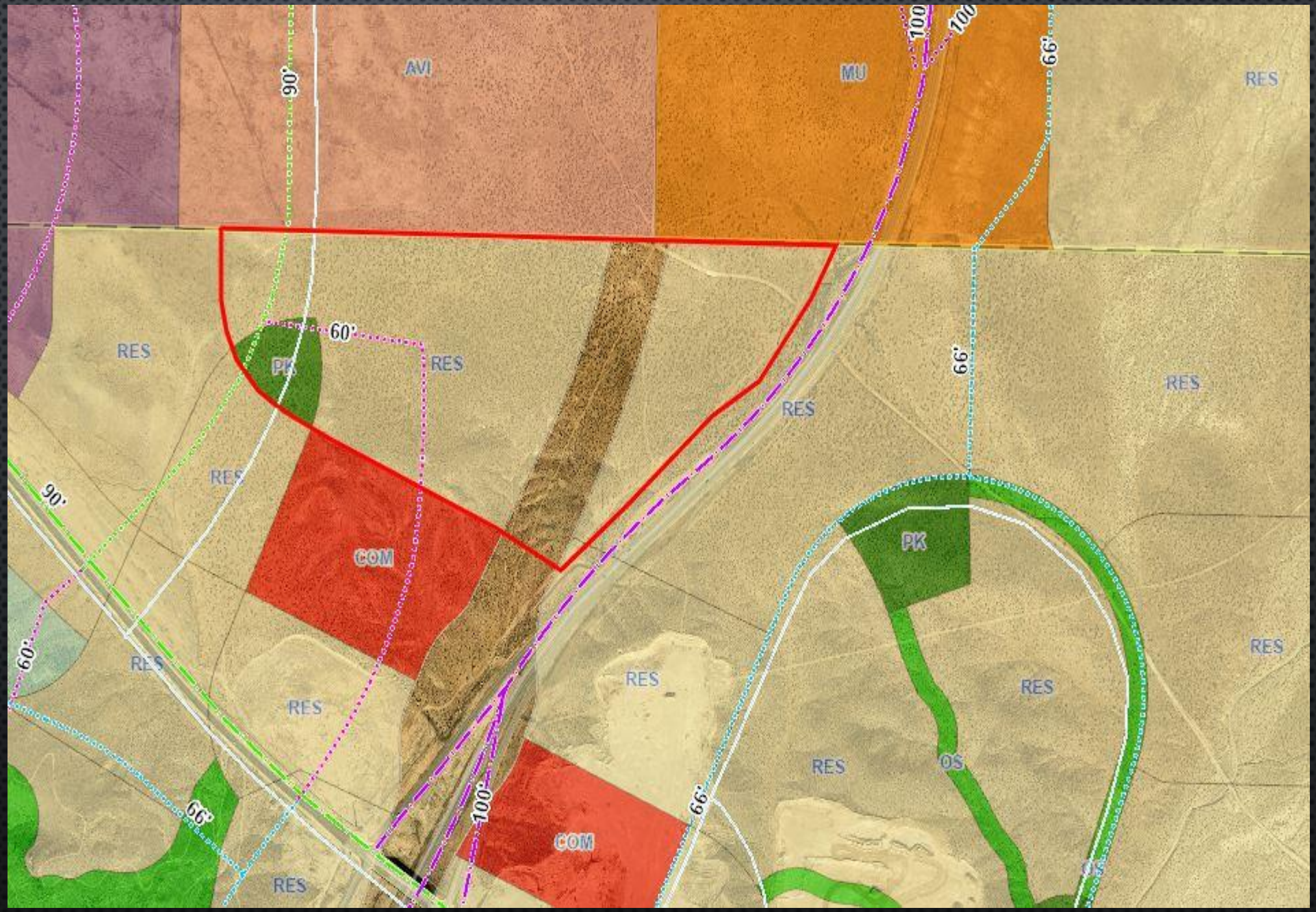
CASE NO. 2023-GPA-002

LOCATION

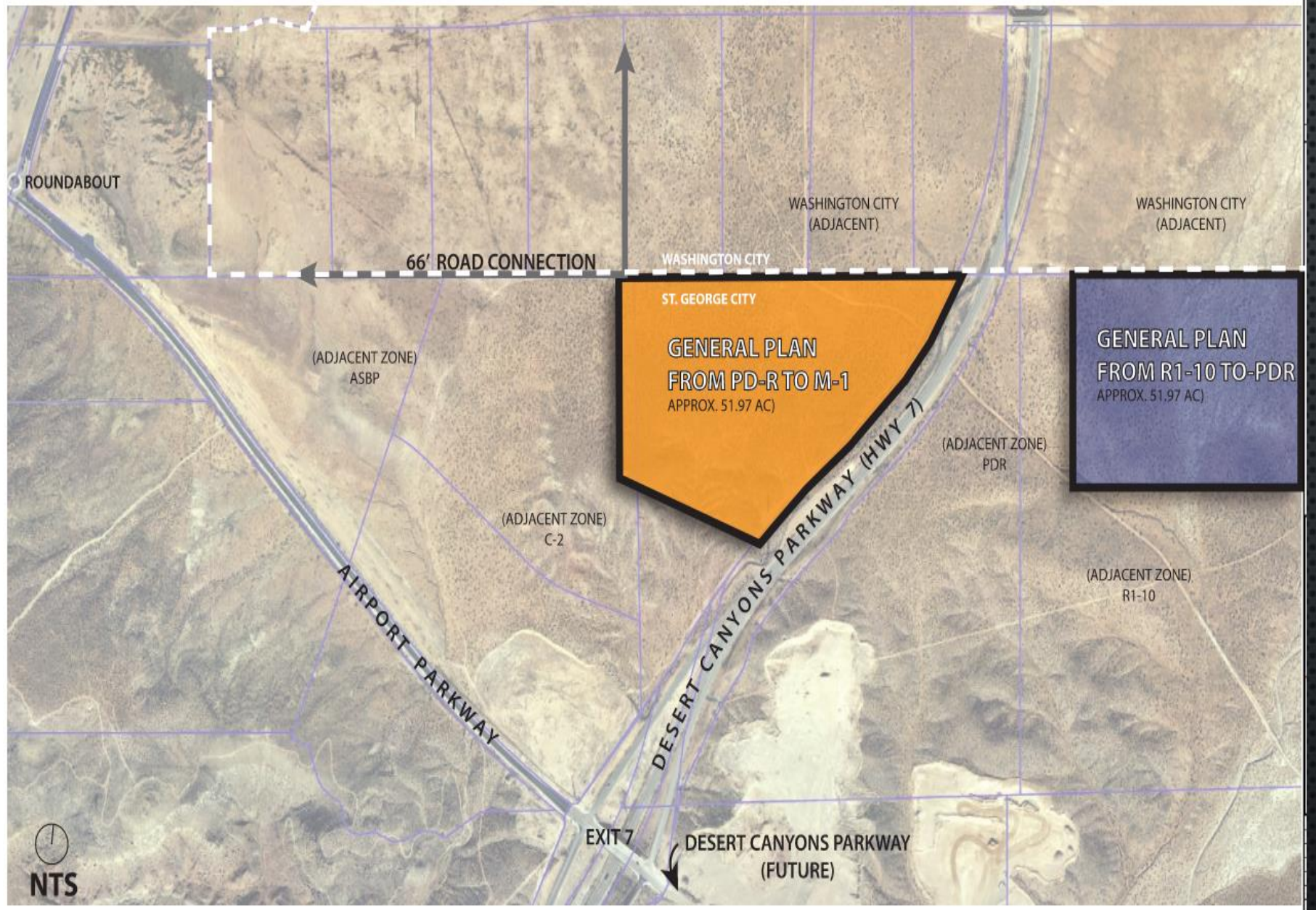
ZONING



GENERAL PLAN LAND USE DESIGNATION



PROPOSED SITE



GENERAL PLAN AMENDMENT FOR DESERT CANYONS BUSINESS PARK, ST. GEORGE, UT

3/20/2023

PLANNING COMMISSION AGENDA REPORT: 04/11/2023

Development Agreement STG Storage Facility Development Agreement (Case No. 2023-DA-002)		
Request:	Consider approval of a development agreement for the STG Storage Facility Development	
Applicant:	Devin Sullivan – Pioneer Boys LLC	
Representative:	Adam Allen	
Location:	Located at approximately 3425 S. River Road	
General Plan:	COM (Commercial)	
Existing Zoning:	PD-C (Planned Development Commercial)	
Surrounding Zoning:	North	PD-R (Planned Development Residential)
	South	M-1 (Manufacturing)
	East	PD-R (Planned Development Residential)
	West	PD-R (Planned Development Residential)
Land Area:	Approximately 4.17 acres	

BACKGROUND:

This development agreement is to accompany the proposed development of storage rental units to be located at 3475 S. River Road for a project to be known as STG Storage Facility (Case No. 2022-PDA-002). On January 10, 2023, this planned development amendment was presented to the Planning Commission. However, the development agreement was not complete, and therefore was not presented to the Planning Commissioners. State code requires development agreements to follow the same regulations as the land use regulations including a recommendation and public hearing from the Planning Commission (State Code 10-9a-532). The development agreement is now complete and ready to be presented along with the planned development amendment.

The development agreement addresses the total number of storage rental units permitted, design conditions, screening conditions, previous approval, and the design and installation of roads. Below are the sections that regulate the specific items mentioned above:

1. In Section 2.2 it reads:
   2.2 Approved Use, Density & Configuration. The Project shall consist of a total of 380 storage rental units along with an office. All storage rental units shall be single level, and access to each unit shall be provided by interior private drives.

2. In Section 2.4 it reads:
   2.4 Specific Design Conditions. The back of the buildings may serve in lieu of the required 6' 4" block wall for the buffer along the north and west sides; however, in areas where no building wall is proposed, a 6' 4" block wall will be required.

3. In Section 3.1.3 it reads:
   3.1.3 C. This Agreement has been reviewed and considered in accordance with the provisions of the Code and meets all applicable requirements of that Section with the exception that the property is not screened from the public street behind other property or structures, which requirement shall be waived by this Agreement.

4. In Section 3.1.4 it reads:
   3.1.4 Approval Motions.
      A. The prior Motion and approval of the rezone to PD-C on February 15, 2018, through Ordinance No. 2018-02-011 remain in effect.

5. In Section 4.1.1 it reads:
   4.1.1 Roads. Developer shall construct or cause to be constructed any roads, curb, gutter, sidewalk, and secondary access not otherwise constructed which are necessary to serve the Project in connection with the development.

6. In Section 4.1.2 it reads:
   4.1.2 Traffic Mitigation. In order to mitigate the impacts of the Project and Development Plan, Developer has agreed to implement certain traffic control measures necessary to mitigate the impacts of the Project, and to generally improve the flow of traffic within the Project vicinity. Those measures include: dedication of a thirty (30) foot right-of-way on the southern border for a future 60' public road.

RECOMMENDATION:
Staff recommends approval of this development agreement as written.

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

POSSIBLE MOTION:
The Planning Commission recommends approval of the development agreement for the STG Storage Facility as presented.

FINDINGS FOR APPROVAL:
1. The proposed uses are permitted uses found in the PD-C zone.
2. The proposed project meets the Planned Development Commercial general requirements found in Section 10-8D-2.

Exhibit A
Development Agreement

When Recorded Return to:
St. George City Attorney
175 North 200 East
St. George, Utah 84770

STG STORAGE FACILITY
DEVELOPMENT AGREEMENT

THIS DEVELOPMENT AGREEMENT ("Agreement") is entered into this ___ day of _____ 20___, (“Effective Date”) by and between Pioneer Boys LLC, and/or assigns ("Developer") for land to be included in or affected by the project located or described as STG Storage Facility, and the City of St. George, a municipal corporation of the State of Utah and political subdivision of the State of Utah ("City") by and through the City Council as the legislative body. Developer and the City are individually referred to herein as a “Party” or collectively as the “Parties”.

RECITALS

A. Developer owns or controls approximately 4.17 acres of real property located within the jurisdictional limits of the City of St. George, Utah which is more particularly described in **Exhibit A** ("Property"), on which the Developer has proposed and/or received development approval for the development of a Planned Development Commercial (“PD-C”) known as STG Storage Facility ("Project").

B. As a condition of approval of the Project, the Developer is entering into this Agreement to set forth the terms and conditions of the approval, and specifically the elimination of the storefront and three-story commercial building located at the southwest corner of the site.

C. Developer has designed and shall develop the Project in a manner that is consistent with the objectives of the City's General Plan and long-range development objectives; and

D. Developer has proposed, and the City has accepted the plan for STG Storage Facility contained herein (“Development Plan”) which addresses and satisfies the condition of approval placed on the Project by the City Council.

E. The City, acting pursuant to its authority under UTAH CODE § 10-9-101, et seq. and its ordinances, resolutions, and regulations and in furtherance of its land use policies, has made certain determinations with respect to the proposed Project, and, in the exercise of its legislative discretion, has elected to approve this Agreement.

F. Developer has accepted the conditions of approval and the terms set forth in this Agreement and has agreed to abide by each and every term.

AGREEMENT

NOW, THEREFORE, in consideration of the mutual covenants and conditions contained herein, the parties agree as follows:

SECTION 1: DEFINITIONS

1.1 "Administrative Amendments" has the meaning set forth in Section 2.8.2

1.2 "Allowed Uses" means the allowed, low-impact permit, conditional, and temporary uses provided for in Section 2.2 herein below.

1.3 "Amenity Package" means the public spaces, facilities, and other amenities that the Developer will build as part of the development of the Project as more particularly described in Section 4.2 below. The Amenity Package also includes (state if any). Additional amenities may be added if deemed appropriate by the Developer and approved by the City.

1.4 "Architectural Design Standards" means those requirements governing the architectural design of the structures and development of other improvements on the Property.

1.5 "Building Permit" means a permit issued by the City pursuant to the requirements of the Code, Uniform Building Code, and related building codes as applicable, including permits for grading, footings and foundations, and construction of other improvements.

1.6 "City" means the City of St. George, a municipal corporation of the State of Utah. The City has entered into this Agreement as a Party acting by and through its City Council.

1.7 "City Council" means the City Council of the City of St. George which is a six-member Council comprised of the Mayor and five Council members.

1.8 "Code" means Chapter 10 of the City Code. All references to sections of the Code shall mean those relevant sections within the codified City Code.

1.9 "Construction Plan" means the maps or drawings accompanying a final Plat or Final Site Plan and showing the specific location and design of improvements to be installed on the site of the Project in accordance with the conditions of approval of the Final Site Plan or Plat.

1.10 "Developer" means (Pioneer Boys LLC) a Utah (Limited Liability Company), its affiliate entities, and its successors, assignees, or transferees.

1.11 "Director" means the Community Development Director.

1.12 "Effective Date" means the effective date of the City Ordinance that approves this

Agreement.

1.13 Event of Default" has the meaning set forth in Section 5.

1.15 "Land Use Laws" shall mean Title 10, Chapter 9a of the Utah Code, and Title 10 of the City Code collectively along with all relevant federal and state case law.

1.16 "Open Space" means land which is unoccupied or unobstructed by any above-ground buildings including, slope areas, landscaped areas, or strips of land between buildings and between paved parking areas and access lanes, areas left or replanted in natural vegetation, setback areas that are not used for actual parking and other similar open and unobstructed areas.

1.17 "Planning Commission" means the St. George City Planning Commission.

1.18 "Project" means the STG Storage Facility approved (state when approved).

1.19 "Property" means that real property referenced in Section 2.1

1.20 "Public Facilities" means the arterial and access roads which have been or will be dedicated to the City as public roads, and the other public infrastructure or public service facilities serving the Property.

1.21 "Staff" means the planning, engineering, survey, and legal staff of the City which may have a part in development approval.

1.22 "Substantial Amendment" has the meaning set forth in Section 2.8.1.

SECTION 2: APPROVED USE, DENSITY, GENERAL CONFIGURATION, AND DEVELOPMENT STANDARDS AFFECTING THE PROJECT

2.1 The Property. The legal description of the Property contained within the Project boundaries, and which is subject to this Agreement is attached hereto as **Exhibit A** and incorporated by reference herein. No additional property may be added to this description for the purposes of this Agreement except by written amendment to this Agreement executed and approved by the Developer and the City.

2.2 Approved Use, Density & Configuration. The Project shall consist of a total of 380 storage rental units along with an office. All storage rental units shall be single level, and access to each unit shall be provided by interior private drives.

2.3 Development Plan. The Developer shall follow the conceptual site plan as approved by City Council on (Date PDA is approved) and as attached hereto as **Exhibit B**. The Parties understand and agree that this layout is conceptual in nature and the final layout shall be approved through the regular site plan approval process.

2.4 Specific Design Conditions. The back of the buildings may serve in lieu of the required 6' 4" block wall for the buffer along the north and west sides; however, in areas where no building wall is proposed, a 6' 4" block wall will be required.

2.5 Compliance with City Design and Construction Standards. Developer acknowledges and agrees that unless expressly stated otherwise in this Agreement, nothing in this Agreement shall be deemed to relieve Developer from the obligation to comply with all applicable laws and requirements of the City necessary for the development of the Project, including the payment of fees and compliance with the City's design and construction standards.

2.6 Compliance with PD-C. Developer acknowledges and agrees that nothing in this Agreement shall be deemed to relieve it from the obligation to comply with the Planned Development Commercial as presented and approved by the St. George City Council.

2.7 Conflicts.

2.7.1 To the extent there is any ambiguity in or conflict with the provisions of this Agreement, the more specific provision or language shall take precedence over more general provisions or language.

2.7.2 The City has reviewed the Code, General Plan, and Rezone Ordinance and has determined that the Developer has substantially complied with the provisions thereof and hereby finds that the Project is consistent with the purpose and intent of the relevant provisions of the City Code and General Plan and the PD-C Zone. The parties further agree that the omission of a limitation or restriction herein shall not relieve the Developer of the necessity of complying with all applicable City Ordinances and Resolutions not in conflict with the provisions of this Agreement, along with all applicable state and federal laws.

2.8 Amendments.

2.8.1 Substantial Amendments. Unless otherwise addressed or allowed in this Agreement, any amendment to this Agreement that alters or modifies a Term creates a substantive change to the text of this Agreement, alters the approved development or Development Plan in a manner not provided for herein, alters the Allowed Uses, increases the approved Density, or results in a material increase in the intensity of use shall be considered a Substantial Amendment and shall be processed as a legislative land use regulation consistent with the requirements of the City Code and the Utah Code. Any change to (i) the requirement of any material amenity described herein that is available to the public; (ii) provisions for reservation and dedication of necessary or substantial portions of land; or (iii) a substantive change to the terms of this

Agreement; or (iv) any approved mechanism that imposes financial obligations on Developer or the property owners within Project (including a substantive increase in the assessments through any association of owners within the Project) shall be deemed a "Substantial Amendment". Substantial Amendments shall be in writing, approved by Ordinance, and recorded with the Washington City Recorder.

2.8.2 Administrative Amendments. Unless otherwise provided by law, all amendments to this Agreement that are not Substantial Amendments shall be deemed "Administrative Amendments" and, when approved, shall be approved, and executed by the Director. The City Council hereby designates the Director as the authorized administrative authority and empowers that official to make all final Administrative Amendment decisions. Administrative Amendments shall be reflected in a written approval by the Director which shall be recorded with the Washington City Recorder.

2.8.3 Effect of Amendment. Any amendment to this Agreement shall be operative only as to those specific portions of this Agreement expressly subject to the amendment, with all other terms and conditions remaining in full force and effect without interruption.

SECTION 3: SUMMARY OF CITY DETERMINATIONS RELATING TO PROJECT

3.1 City Approvals Relating to the Project.

3.1.1 Applications. Developer submitted an appropriate application for the approval of this Agreement to authorize and regulate the Project.

3.1.2 Approval Process. Following lawfully advertised public hearings before the City Planning Commission on (date), the Application received a (positive/negative) recommendation by Motion of the Planning Commission taken on (date), with a ___ vote. The matter thereafter came before the City Council which considered and deliberated regarding the matter at appropriately noticed public meetings on (list all dates). The City Council thereafter approved the Project on _____, under the processes and procedures set forth in the Code and General Plan. With respect to the terms and conditions of approval, the City Council made such findings of fact and conclusions of law as are required as a condition to the approvals, as reflected in the staff recommendation and adopted with any modifications, as reflected in the minutes of the above referenced public meetings, and as reflected by the other enumerated findings herein.

3.1.3 Compliance with Requirements. The following is an analysis of the Project's compliance with the requirements of the General Plan and the

Code that was utilized by the City Council in making its final approval of the Amendment Application.

A. (PD-C) Zone. The provisions of the PD-C Zone, are met by the Project, as reflected in and regulated by this Agreement.

B Development Agreement Approval Requirements. The development requirements of Title 10, Chapter 8 as well as Title 10, Chapter 17 of the Code are met, which constitute all of the requirements for the approval of this Agreement:

C. This Agreement has been reviewed and considered in accordance with the provisions of the Code and meets all applicable requirements of that Section with the exception that the property is not screened from the public street behind other property or structures, which requirement shall be waived by this Agreement.

D. This Agreement includes the written consent of each landowner whose properties are included within the boundaries of the Property.

E. This Agreement advances policies, implements goals, and achieves other desired results not generally available under the other implementation strategies of the City.

F. The Project as reflected in and conditioned by the terms and conditions of this Agreement, is in conformity and compliance with the General Plan, any existing capital improvements programs, the provisions of the Code (including concurrency and infrastructure requirements), and all other development requirements of the City.

G. Developer has committed to comply with all appropriate water and infrastructure requirements of the Code, and all appropriate criteria and standards described in this Agreement.

H. The Project meets or exceeds the development quality and aesthetic objectives of the General Plan, and the Code is consistent with the goal of orderly growth in the City and minimizes construction impacts on public infrastructure within the City.

I. The proposed development reasonably assures life and property within the City and the community is protected from any adverse impact of this development.

J. This Agreement is consistent with the (PD-C) Zone.

K. Other than the exception stated in paragraph C above, the Project is

consistent with the findings required in Code for approval.

3.1.4 Approval Motions.

A. The prior Motion and approval of the rezone to PD-C on February 15, 2018, through Ordinance No. 2018-02-011 remain in effect.

B. Motion for Approval of Agreement for the Project. The City Council found that this Agreement meets all applicable requirements of the Code for a development agreement that would authorize and regulate the Project and approved this Agreement for the Project for the purposes of allowing the development of the proposed Project as permitted by the General Plan and the Code on the terms and conditions incorporated into this Agreement.

C. Designated City Planning Official. The designated City planning official that is designated to interpret this Agreement, determine, and approve Administrative Amendments, and otherwise, administer certain provisions of this Agreement is the Director, as that position is filled from time to time. The City may designate another person or the holder of another position by a separate resolution of the City Council without a required amendment to this Agreement.

3.2 Vested Rights and Reserved Legislative Powers.

3.2.1 Vested Rights and Vested Projects. As of the Effective Date, the Developer has the vested right to develop and construct the Project, and to develop and construct necessary infrastructure and other improvements in accordance with the uses, densities, or intensities permitted to be constructed consistent with the application of the other provisions of this Agreement.

3.2.2 Compelling, Countervailing Public Interest. Nothing in this Agreement shall limit the future exercise of the police power of the City in enacting generally applicable Land Use Laws after the Effective Date. Notwithstanding the retained power of the City to enact such legislation under the police powers, such legislation shall only be applied to modify the rights described in Section 3.2.1 based upon policies, facts, and circumstances meeting the compelling, countervailing public interest exception to the vested rights doctrine in the State of Utah. (*Western Land Equities. Inc. v. City of Logan*, 617 P.2d 388 (Utah 1980) or successor case and statutory law). Any such proposed change affecting the vested rights of the Project shall be of general application to all development activity in City; and unless the City declares an emergency, the Developer shall be entitled to prior written notice and an opportunity to be heard with respect to the proposed change and its applicability to the Project under the

compelling, countervailing public policy exception to the vested rights doctrine. The regulations, ordinances, policies, and plans governing the permitted uses, densities, or intensities permitted to be constructed consistent with the other provisions of this Agreement shall be the terms and conditions of this Agreement, and those Land Use Laws in effect on the Effective Date that are not inconsistent with the terms and conditions of this Agreement.

3.2.3 Duration. The term of this Agreement shall commence on the Effective Date and shall extend for a period of five(5) years thereafter unless this Agreement is earlier terminated or modified by a written amendment signed and duly adopted by the Parties (the "Term").

3.2.4 Governing Land Use Laws. The respective rights of the parties in the event the City seeks to apply or enforce Land Use Laws to the Project in a manner that is inconsistent with the terms and conditions of this Agreement shall be governed by the existing state and federal land use case law and statutes.

3.3 Fees and Exactions.

3.3.1 Development Application and Review Fees. Developer has paid all City required application and review fees for the approval of this Agreement and nothing herein shall obligate the City to pay any third-party fees, costs, and/or expenses incurred by the Developer for the application, processing, and negotiation of this Agreement, as Developer is solely responsible, therefore. No further City required fees or engineering expenses shall be charged to the Developer for the review and approval of this Agreement. All application and review fees for the Sketch Plans, Building Permits, Plats, and Final Site Plans for the Project shall be paid at the time of application for any such approval.

3.3.2 Plan Engineering Review Fees. The City shall have the right to charge and collect such standard engineering review fees for Final or amended Final Site Plans, development, or construction approvals for the Project or a Project Area as are generally applicable on a non-discriminatory basis at the time of application for any such approval.

3.3.3 Other Fees. The City may charge other fees that are generally applicable, including but not limited to standard Building Permit review fees for improvements to be constructed on improved parcels.

3.3.4 Impact Fees. Developer agrees that the Project shall be subject to all impact fees, which are (1) imposed at the time of issuance of Building Permits, and (2) generally applicable to other properties in the City; and Developer waives its position with respect to any vested rights to the imposition of

such fees but shall be entitled to similar treatment afforded other vested projects if the impact fee ordinance makes any such distinction. If fees are properly imposed under the preceding tests, the fees shall be payable in accordance with the payment requirements of the particular impact fee ordinance and implementing resolution. Notwithstanding the agreement of the Developer to subject the Project to impact fees under the above-stated conditions, the Developer does not waive the Developer's rights under any applicable law to challenge the reasonableness of or the amount of the fees within the time frame(s) set forth in Utah Code §11-36a-702.

3.3.5 Rough Proportionality Test. For purposes of this Agreement, the "Rough Proportionality Test" means and refers to a standard of reasonableness whereby the Property and/or Project shall not bear more than an equitable share of the capital costs financed by an impact fee or exaction in relation to the benefits conferred on and impacts of the Project. The interpretation of "rough proportionality" shall be governed by the federal or Utah case law and statutes in effect at the time of any challenge to an impact fee or exaction imposed as provided herein including, but not limited to, the standards of Utah Code § 0-9a-508(1), and *Nollan v. California Coastal Comm'n,* 483 U.S. 825 (1987), and *Dolan v. City of Tigard*, 512 U.S 374 (1994), and cases arising therefrom including B.*A.M. Development, LLC v. Salt Lake City*, 2008 UT 74, or its successor case law. The Parties agree that the mitigations, amenities, and benefits required of and provided by the Developer in this Agreement shall meet the Rough Proportionality Test.

SECTION 4: SPECIFIC PROJECT REQUIREMENTS AND AMENITIES

4.1 Essential Project Infrastructure. If not otherwise completed, the Developer agrees to design and obtain all necessary approvals and construct the infrastructure necessary for the operation of the Project as provided in the following subsections of this Section [3.2]. All infrastructure shall be constructed to City engineering and planning standards as set forth in the Code.

4.1.1 Roads. Developer shall construct or cause to be constructed any roads, curb, gutter, sidewalk, and secondary access not otherwise constructed which are necessary to serve the Project in connection with the development.

4.1.2 Traffic Mitigation. In order to mitigate the impacts of the Project and Development Plan, Developer has agreed to implement certain traffic control measures necessary to mitigate the impacts of the Project, and to generally improve the flow of traffic within the Project vicinity. Those measures include: dedication of a thirty (30) foot right-of-way on the southern border for a future 60' public road.

4.1.3 Water, Fire Flow, and Public Safety. Developer has acquired a "Will

Serve" or equivalent certification from Washington County Water Conservancy District sufficient to meet the culinary and irrigation requirements for the Project, and (ii) designed and obtained all necessary approvals for the construction and operation of water systems with sufficient fire flow and storage to meet the culinary, irrigation and public safety standards for development in accordance with the Development Standards. Developer shall be required to comply with the City's regulations regarding water, landscaping, and secondary water systems in connection with the issuance of all Building Permits.

4.1.4 Other Infrastructure. In connection with or prior to the approval of the next Final Site Plan within the Project, the Developer shall have designed and obtained all necessary approvals for the construction and operation of any other onsite and any necessary offsite utility infrastructure with sufficient capacity to meet the requirements of the next phase of development. Developer shall thereafter construct or cause to be constructed any such other utility infrastructure necessary to serve a Project in connection with the development and improvement of each subsequent Final Site Plan.

4.1.5 Drainage and Flood Control. Drainage and flood control facilities or infrastructure not already constructed shall be constructed by the Developer as a part of the completion of other major facilities and development of the Project in accordance with the City and State Storm Water permits and requirements. Developer shall not be required to accommodate additional stormwater drainage caused by the development of any adjoining lands outside of the Project. Major infrastructure and retention facilities, where appropriate, will be owned and maintained by the Developer who shall provide the City with the appropriate long-term stormwater management plan upon completion. The City shall conduct annual inspections to ensure compliance with the management plan.

4.1.6 Reimbursements. To the extent that the Developer is required by the City to construct improvements of any kind within or outside of the Property that is properly classified as "system improvements" pursuant to the Utah Impact Fees Act, including but not limited to oversizing of facilities, Developer and the City will enter into such reimbursement agreements as are necessary for Developer to be reimbursed for the costs associated with constructing such improvements.

SECTION 5: DEFAULT, TERMINATION, AND DISPUTES

5.1 Events of Default. Developer is in default under this Agreement upon the happening of one or more of the following events or conditions.

5.1.1 If a warranty, representation, or statement made or furnished by the Developer to the City is false or proves to have been false in any

material respect when it was made.

5.1.2 A finding and determination made by the City that, upon the basis of substantial evidence, the Developer has not complied with one or more of the material terms or conditions of the development approvals or this Agreement.

5.1.3 Any other event, condition, act, or omission which materially interferes with the intent and objectives of this Agreement.

5.2 Procedure Upon Default.

5.2.1 After the occurrence of a default under Section 5.1, the City Council may exercise a right to declare an "Event of Default" by authorizing the City Manager to give the Developer written notice specifying the nature of the alleged default. Developer shall have sixty (60) days after receipt of written notice to cure the Event of Default. In the event the nature of the Event of Default reasonably requires more than sixty (60) days to cure and provided the Developer has commenced actions reasonably designed to cure the Event of Default within the sixty (60) day cure period and thereafter diligently proceeds to cure the alleged default, the cure period shall be extended for one additional sixty (60) day period or for such other time period agreed to by the City, for Developer to cure the Event of Default to completion. If the Event of Default is not cured within the cure period described above, the City may terminate this Agreement and the associated development approvals by giving written notice to the Developer. Failure or delay in declaring or giving notice of an Event of Default shall not constitute a waiver of any Event of Default under Section 10, nor shall it change the time of such default. In the event the City extends the cure period beyond the initial sixty (60) days, the City may suspend all permitting and approval processes under this Agreement and place stop-work orders on continuing construction, and otherwise use all means available to mitigate and address any such Event of Default.

5.2.2 The City does not waive any claim of default in performance by the Developer if on periodic review the City does not propose to modify or terminate this Agreement

5.2.3 Any default or inability to cure a default caused by strikes, lockouts, pandemics or health-related crises, labor disputes, acts of God, inability to obtain labor or materials or reasonable substitutes therefore, governmental restrictions, governmental regulations, governmental controls, enemy or hostile governmental action, civil commotion, fire or other casualties, and other similar causes

beyond the reasonable control of the Party obligated to perform, shall excuse the performance by such Party for a period equal to the period during which any such event prevented, delayed, or stopped any required performance or effort to cure a default.

5.2.4 Adoption of law or other governmental activity making performance by the Developer unprofitable or more difficult or more expensive does not excuse the performance of the obligation by the Developer.

5.2.5 All other remedies at law or in equity that are not inconsistent with the provisions of this Agreement are available to the Parties to pursue in the event there is an incurred Event of Default.

SECTION 6: RELATIONSHIP BETWEEN THE PARTIES; NO CITY FINANCIAL RESPONSIBILITY

6.1 Relationship between Parties. The contractual relationship between the City and Developer arising out of this Agreement is one of the independent contractors and not agency. This Agreement does not create any third-party beneficiary rights. It is specifically understood by the Parties that: (a) the Project is a private development; (b) the City has no interest in or responsibilities for or duty to third parties concerning any improvements Property until the City accepts dedication, ownership, or maintenance of the improvements pursuant to a specific written agreement providing for acceptance of dedication, ownership or maintenance; and (c) Developer shall have the full power and exclusive control of the Property subject to the terms, conditions, limitations, restrictions, and obligations of Developer set forth in this Agreement.

6.2 Mutual Releases. At the time of, and subject to, (i) the expiration of any applicable appeal period with respect to the approval of this Agreement without an appeal having been filed or (ii) the final determination of any court upholding this Agreement, whichever occurs later, and excepting the Parties' respective rights and obligations under this Agreement, Developer, on behalf of itself and Developer's partners, officers, directors, employees, agents, attorneys and consultants, hereby releases the City and the City's board members, council members, officials, employees, agents, attorneys and consultants, and the City, on behalf of itself and the City's board members, officials, employees, agents, attorneys and consultants, hereby releases Developer and Developer's partners, officers, directors, employees, agents, attorneys and consultants, from and against any and all claims, demands, liabilities, costs, expenses of whatever nature, whether known or unknown, and whether liquidated or contingent, arising on or before the Effective Date in connection with the application, processing or approval of applications relating to the Project or any Project Area, to include any past claims for vested development rights that are not provided for in this Agreement.

6.3 Hold Harmless.

6.3.1 Agreement of Developer. Developer agrees to and shall hold the City, its officers, elected officials, agents, employees, consultants, attorneys, special counsel, and representatives harmless from liability for damages, just compensation, restitution, judicial or equitable relief arising out of claims for personal injury, including health, and claims for property damage which may arise from the direct or indirect operations of Developer or its contractors, subcontractors, agents, employees or other persons acting on their behalf which relates to the Project or the actions of Developer taken pursuant to or the failure of Developer to comply with the terms of this Agreement. Any such action shall be referred to as an "indemnified claim." Developer agrees to pay all costs for the defense of the City and its officers, agents, employees, consultants, attorneys, special counsel, and representatives regarding any indemnified claim. This hold harmless agreement applies to all claims for damages, just compensation, restitution, judicial or equitable relief suffered or alleged to have been suffered by reason of the events referred to in this section regardless of whether or not the City prepared, supplied, or approved this Agreement, plans or specifications, or both, for the Project or any Project Area. City may make all reasonable decisions with respect to its representation in any legal proceeding relating to an indemnified claim.

6.3.2 Exceptions to Hold Harmless. The agreements of Developer in this Section 6 shall not be applicable to (i) any claim arising by reason of the gross negligence or intentional misconduct of the City, or (ii) any claim reserved by Developer for itself or any owner of any portion of the Property under the terms of this Agreement for just compensation or attorney fees.

6.3.3 Hold Harmless Procedures. Except in the Event of Default, the City shall give written notice of any claim, demand, action, or proceeding which is the subject of the Developer's hold harmless agreement as soon as practicable but not later than 10 business days after the assertion or commencement of the claim, demand, action or proceeding; provided, however, the City's inadvertent failure to provide such notice within such time period shall not be a breach of this Agreement unless such failure materially impairs Developer's defenses in such action. In the event any such notice is given; the City shall be entitled to participate in the defense of such claim. Each Party agrees to cooperate with the other in the defense of any claim and to minimize duplicative costs and expenses.

SECTION 7: GENERAL TERMS AND CONDITIONS

7.1 Agreements to Run with the Land. This Agreement and its accompanying Exhibit(s) shall be recorded against the Property described in **Exhibit A**. The terms contained herein shall be deemed to run with the land and shall be binding on and shall inure to the benefit of all successors in ownership of the Property. As used herein, the Developer shall include the Parties signing this Agreement and identified as "Developer," and all successor owners of any part of the Property.

7.2 Construction of Agreement. This Agreement should be construed so as to effectuate the public purpose of implementing long-range planning objectives, obtaining public benefits, and protecting any compelling, countervailing public interest while providing reasonable assurances of continuing vested development rights. Where there is a conflict between the terms of this Agreement and any Exhibit, the more specific provision shall be controlling.

7.3 Laws of General Applicability. Where this Agreement refers to laws of general applicability to the Project and other properties, this Agreement shall be deemed to refer to laws that apply to other developed and subdivided properties in St. George, Utah.

7.4 State and Federal Law. The Parties agree, intend, and understand that the obligations imposed by this Agreement are consistent with state and federal law. The Parties further agree that if any provision of this Agreement becomes, in its performance, inconsistent with state or federal law or is declared invalid, Section 7.13 below is applicable. Consistent with the provisions of Section 7.13 below, this Agreement shall be deemed amended to the extent necessary to make it consistent with state or federal law, as the case may be, and the balance of this Agreement shall remain in full force and effect.

7.5 No Waiver. Failure of a Party hereto to exercise any right hereunder shall not be deemed a waiver of any such right and shall not affect the right of such Party to exercise at some future time said right or any other right it may have hereunder. Unless this Agreement is amended by vote of the City Council taken with the same formality as the vote approving this Agreement, no officer, official, or agent of the City has the power to amend, modify or alter this Agreement or waive any of its conditions as to bind the City by making any promise or representation not contained herein.

7.6 Entire Agreement. This Agreement constitutes the entire agreement between the Parties and supersedes all prior agreements, whether oral or written, covering the same subject matter. This Agreement may not be modified or amended except as anticipated in this Agreement or except in writing mutually agreed to and accepted by the Parties.

7.7 Notices. All notices hereunder shall be given in writing by certified mail, postage prepaid, at the following addresses:

To the City:
St. George City Manager
175 E. 200 North
St. George, UT 84770

With a copy to:
City Attorney's Office
175 E. 200 North
St. George, UT 84770

To Developer:
Pioneer Boys LLC
1363 East 170 South Suite-303
St. George, Utah 84790

With copies to:
(Attorney – if any)

(address)

Any change of address in this noticing provision shall be made as soon as practicable and shall not be considered an amendment to this Agreement.

7.8 Applicable Law. This Agreement is entered into under and pursuant to and is to be construed and enforceable in accordance with, the laws of the State of Utah.

7.9 Rights of Third Parties. This Agreement is not intended to affect or create any additional rights or obligations on the part of third parties.

7.10 Third-Party Legal Challenges. In those instances where, in this Agreement, the Developer has agreed to waive a position with respect to the applicability of current City policies and requirements, or where the Developer has agreed to comply with current City policies and requirements, Developer further agrees not to participate either directly or indirectly in any legal challenges to such City policies and requirements by third parties, including but not limited to appearing as a witness, amicus, making a financial contribution thereto, or otherwise assisting in the prosecution of the action.

7.11 Computation of Time. Unless otherwise specified, in computing any period of time pursuant to this Agreement, the day of the act, event, or default from which the designated period of time begins to run shall be included, and the time shall be computed on a calendar, not work-day, basis.

7.12 Titles and Captions. All section titles or captions contained in this Agreement are for convenience only and shall not be deemed part of the context nor affect the interpretation hereof.

7.13 Severability. If any provision of this Agreement, or the application of such provision to any person or circumstance, is held invalid, void, or unenforceable, but the remainder of this Agreement can be enforced without failure of material consideration to any Party, then the remainder of this Agreement shall not be affected thereby, and it shall remain in full force and effect unless amended or modified by mutual consent of the Parties. If any material provision of this Agreement is held invalid, void, or unenforceable, or if consideration is removed or destroyed, the Developer or the City shall have the right in their sole and absolute discretion to terminate this Agreement by providing written notice of such termination to the other Party.

7.14 Recordation of Agreement. The City shall record this Agreement its Exhibits and the adopting Ordinance with the Washington County Recorder (the "Recorder"). The costs associated with this recording shall be borne by the Developer.

7.15 Exhibits Incorporated. All Exhibits to this Agreement are incorporated by reference as if fully set forth herein.

7.16 Execution of Agreement. This Agreement may be signed in counterparts and each such

counterpart shall constitute an original document. All such counterparts, taken together, shall constitute one and the same instrument. Any signature on this Agreement transmitted by facsimile, electronically in PDF format, or by other generally accepted means of conveying digital signatures (e.g. DocuSign) shall be deemed an original signature for all purposes, and the exchange of copies of this Agreement and signature pages by any such transmission, or by a combination of such means, shall constitute effective execution and delivery of this Agreement as to the Parties and may be used in lieu of the original for all purposes.

IN WITNESS WHEREOF, this Agreement has been executed by the Mayor, acting by and through the City Council pursuant to Ordinance No. XX, authorizing such execution, and by a duly authorized representative of the Developer as of the above-stated date.

[signatures to follow]

[CITY SIGNATURE PAGE]

CITY of ST. GEORGE:

_____
Michele Randall, Mayor

ATTEST:

[seal]

_____
Christina Fernandez, City Recorder

APPROVED AS TO FORM:
St. George City Attorney

By: _____
(name)(title)

STATE OF UTAH)
: ss.
COUNTY OF WASHINGTON)

The foregoing instrument was acknowledged before me this ____ day of _____, 2023, by Mayor Michele Randall as authorized.

NOTARY PUBLIC

_____

Residing at:
My Commission Expires:
_____

[DEVELOPER SIGNATURE PAGE]

Developer:
Pioneer Boys LLC

By:_____
Devin Sullivan, Owner

STATE OF UTAH)
: ss.
COUNTY OF WASHINGTON)

The foregoing instrument was acknowledged before me this ____ day of _____, 2023, by _____ the _____(title) of _____(Developer).

NOTARY PUBLIC

_____

Residing at:
My Commission Expires:
_____

EXHIBIT A

LEGAL DESCRIPTION

STG STORAGE ZONE CHANGE legal description

Beginning at a point that lies South 01°11'22" West 1,056.76 feet along the Section Line and West 1,321.06 feet from the Northeast Corner of Section 17, Township 43 South, Range 15 West, Salt Lake Base and Meridian; Running thence South 01°11'27" West 502.07 feet; thence North 88°29'05" West 400.86 feet to the Easterly Right of Way Line of River Road, as on file in the Washington County Recorder's Office; thence North 01°49'32" West along said Easterly Line 355.83 feet; thence North 82°31'11" East 43.94 feet; thence North 60°57'21" East 82.89 feet; thence North 84°54'27" East 7.56 feet; thence North 64°44'18" East 171.56 feet; thence North 83°42'10" East 144.65 feet to the point of beginning.

Containing 181,490 Square Feet or 4.17 Acres.

Basis of bearings for this description is South 01°11'03" West 5277.81 feet between the Northeast Corner and the Southeast Corner of Section 17, Township 43 South, Range 15 West, Salt Lake Base and Meridian

Closure:
Northing Diff: 0.000925
Easting Diff: 0.003490
Azimuth: 255°09'09"
Error Distance 0.003611
Total Distance 1709.360
Ratio: 1/473402

EXHIBIT B

CONCEPTUAL SITE PLAN

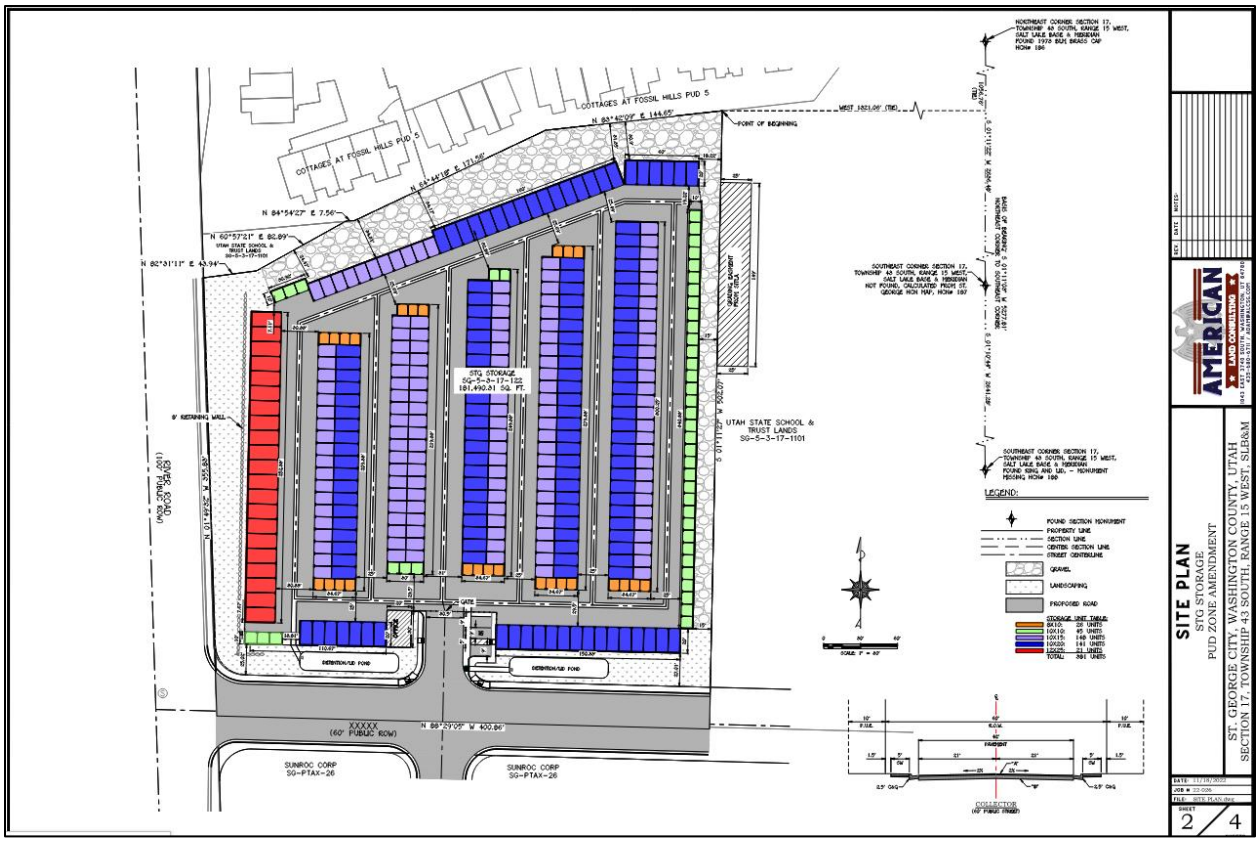
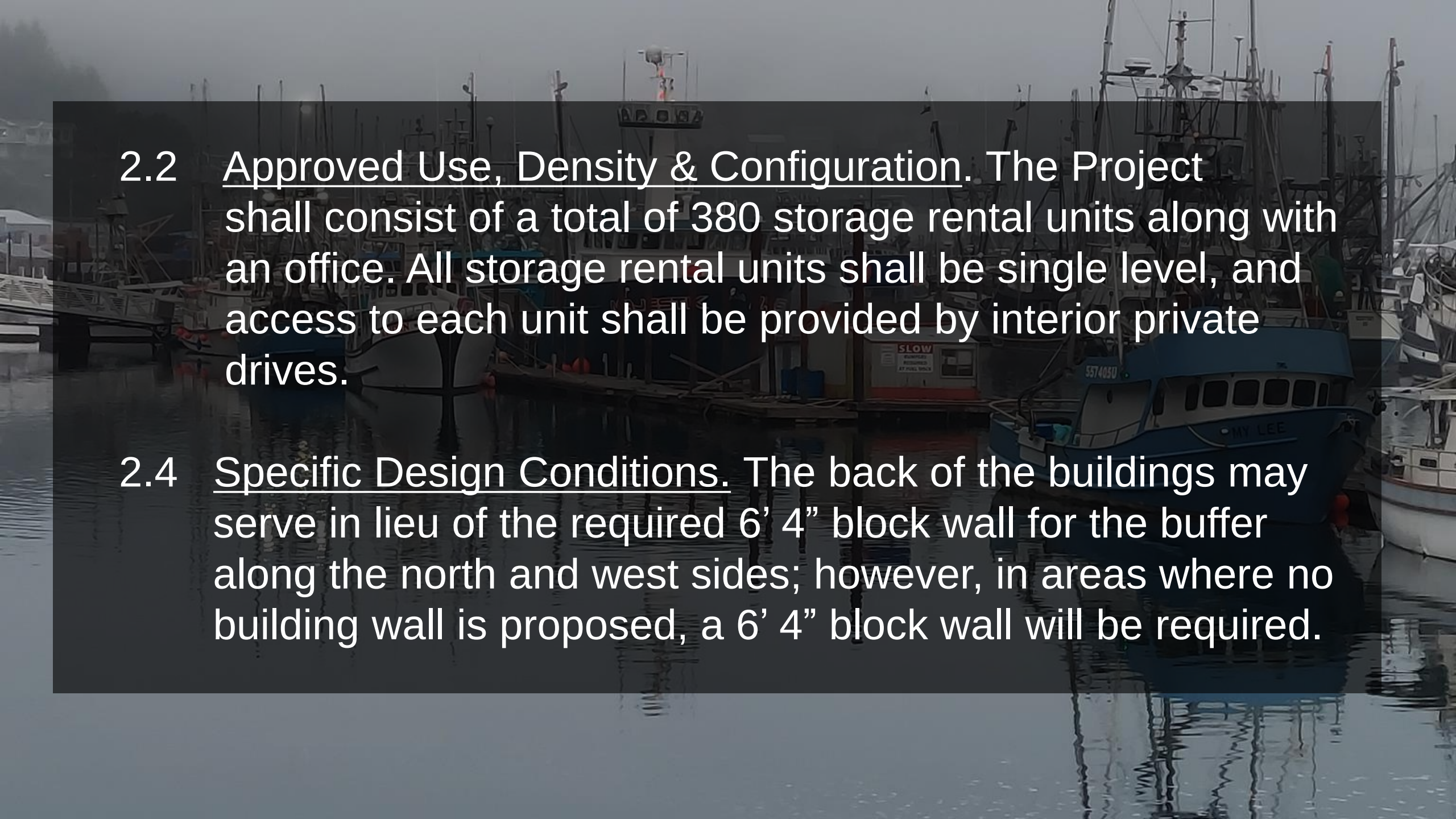


Exhibit B
PowerPoint Presentation

Development Agreement

STG Storage Facility

2023-DA-002



2.2 Approved Use, Density & Configuration. The Project shall consist of a total of 380 storage rental units along with an office. All storage rental units shall be single level, and access to each unit shall be provided by interior private drives.

2.4 Specific Design Conditions. The back of the buildings may serve in lieu of the required 6’ 4” block wall for the buffer along the north and west sides; however, in areas where no building wall is proposed, a 6’ 4” block wall will be required.

3.1.3 C. This Agreement has been reviewed and considered in accordance with the provisions of the Code and meets all applicable requirements of that Section with the exception that the property is not screened from the public street behind other property or structures, which requirement shall be waived by this Agreement.

3.1.4 Approval Motions.

A. The prior Motion and approval of the rezone to PD-C on February 15, 2018, through Ordinance No. 2018-02-011 remain in effect.

4.1.1 Roads. Developer shall construct or cause to be constructed any roads, curb, gutter, sidewalk, and secondary access not otherwise constructed which are necessary to serve the Project in connection with the development.

4.1.2 Traffic Mitigation. In order to mitigate the impacts of the Project and Development Plan, Developer has agreed to implement certain traffic control measures necessary to mitigate the impacts of the Project, and to generally improve the flow of traffic within the Project vicinity. Those measures include: dedication of a thirty (30) foot right-of-way on the southern border for a future 60’ public road.

PLANNING COMMISSION AGENDA REPORT: 04/11/2023

STG Storage Facility Planned Development Amendment (Case No. 2022-PDA-052)		
Request:	Consider approval of a planned development amendment to the PD-C (Planned Development Commercial) zone for the purpose of redesigning the layout and elevations of an approved but not yet developed storage rental unit facility.	
Applicant:	Devin Sullivan – Pioneer Boys LLC	
Representative:	Adam Allen	
Location:	Located at approximately 3425 S. River Road	
General Plan:	COM (Commercial)	
Existing Zoning:	PD-C (Planned Development Commercial)	
Surrounding Zoning:	North	PD-R (Planned Development Residential)
	South	M-1 (Manufacturing)
	East	PD-R (Planned Development Residential)
	West	PD-R (Planned Development Residential)
Land Area:	Approximately 4.17 acres	

BACKGROUND:
On January 10, 2023, this planned development amendment was presented at the Planning Commission meeting, and the Planning Commission recommended approval with specific conditions. One of the conditions was the approval of a development agreement. However, the development agreement was not yet complete at the time of the staff meeting. State code requires development agreements to follow the same regulations as the land use regulations including receiving a recommendation and having a public hearing from the Planning Commission (State Code 10-9a-532). With the development agreement now complete, staff will present this item again.

The following staff report is the exact report that was presented to this Planning Commission on January 10, 2023. The applicants have not changed their proposal:

In 2018 (Case No. 2018-ZC-002), the zoning on this property was changed from PD-R (Planned Development Residential) to PD-C (Planned Development Commercial) for the purpose of putting in storage rental units. The site was to contain 263 single story storage rental units along with a three-story climate-controlled building for additional storage units, office space, and living space for the on-site property manager. This project was approved under a six-month temporary ordinance (2017-09-004) for storage rental units; however, the project was never developed, and the land has changed ownership.

The new owners are requesting to amend this existing PD-C zone for the purpose of redesigning the layout. The proposed changes are to remove the three-story building, change the mix and sizes of the storage units, and update the building elevations for the entire project. This proposal is for a total of 380 units ranging in sizes from 8’x10’ to 12’x25’.

With this proposal, the applicant is asking to use the back of the buildings to count as the required block wall along River Road and on the north side of the property, buffering this project from the Fossil Hills Townhomes project. In 2018, a similar request was made for the Pioneer Storage development (2018-ZC-006). That development was approved to use the back of the buildings as the buffer wall except where there was no building, the block wall could not exceed six feet.

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: River Road: 20’ North: 10’ South:20’

			East: 10’ Site plan appears to meet setbacks.
Temporary Buildings, including Cargo Containers	10-8-4	None	N/A
Pedestrian Circulation Plan	10-8-6	The site plan provided shows pedestrian connectivity to the right-of-way	The applicant will be required to install a sidewalk along River Road and the 60’ new road on the south.
Uses	10-8D-2	The use for this development has been established as storage rental units with ancillary retail use.	N/A
Height and Elevation	10-8D-2	The proposed maximum height is under 10’	This meets the regulations
Phasing Plan	10-8D-2	Phasing is proposed.	N/A
Landscape Plan	10-8D-2	A conceptual landscape plan has been included.	This will require a 15’ wide plant strip including street trees along River Road and the south public road. This will also require a 10’ landscape buffer along the north and the east property lines. The buffer is required to have shrubs and trees planted at least 5’ on center.
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	None shown	The signs will need to meet the sign regulations found in Title 9-13.
Lighting	10-8D-2	The applicant is not requesting greater lighting than what is allowed. A photometric plan has not been provided.	The lighting will need to be at or below 1.0 foot candles at the property line.

Lot Coverage	10-8D-6	None shown	The PD-C zone allows building coverage up to 50%.
Solid Waste	10-8D-6	The site plan does not show 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 applicants are proposing the wall of the units to count as the buffer wall.	If approved to use the walls of the building as the outside wall, staff recommends that any gaps be filled with a solid wall not to exceed 6'4".
Overlay Zones	10-13	None	N/A
Parking	10-19-5	3 parking spaces are provided.	Parking required: 2 spaces. This meets the parking requirements.
EVCS And Bike Parking	10-19-6	There are no bike racks or Conduit for future EVCS shown on the site plan	Regulations will require 2 bike spaces and conduit for 1 EVCS.
Colors	10-17A-14	The plans show the buildings to be a grey color scheme.	The code allows for natural muted tones that emulate the local geologic formations common to the area and blend with the predominant colors of the natural surroundings.

RECOMMENDATION:

Staff recommends approval of this planned development amendment with the following conditions:

1. The applicant is to dedicate 30' of right-of-way for the future 60' public road on the south side of this property.
2. The property to the south is to dedicate 30' of right-of-way for a future 60' public road on the north side of their property.
3. At least 32' of pavement of the 60' public road is completed along with the associated curb, gutter, and sidewalk on the north side before a certificate of occupancy is issued for this new development.
4. The back of the buildings may serve in lieu of the required 6' 4" block wall for the buffer; however, in areas where no building wall is proposed, a 6' 4" block wall will be required.
5. An approved and recorded development agreement accompanies this request.
6. The required 10' landscape buffer along the north and east property lines will have the trees and shrubs planted 5' on center.

ALTERNATIVES:

1. Recommend approval as presented.
2. Recommend approval with conditions.
3. Recommend denial.
4. Table or Continue the proposed planned development amendment to a specific date.

POSSIBLE MOTION:

The Planning Commission recommends approval of the planned development amendment with the conditions mentioned in the staff report.

FINDINGS FOR APPROVAL:

1. The proposed uses are permitted uses found in the PD-C zone.
2. The proposed project meets the Planned Development Commercial general requirements found in Section 10-8D-2.

Exhibit A
Applicant's Narrative

AMERICAN
LAND CONSULTING

11/18/2022

Re: STG Storage Units

To whom it may concern,

The purpose of this submittal is to reduce the overall approved number of storage units in the project by removing the 3-story interior storage unit building, to change the mix of sizes of units and update the building elevations, colors and styles for this project.

Thank You for your consideration,

Adam Allen, President – American Land Consulting

Exhibit B
PowerPoint Presentation

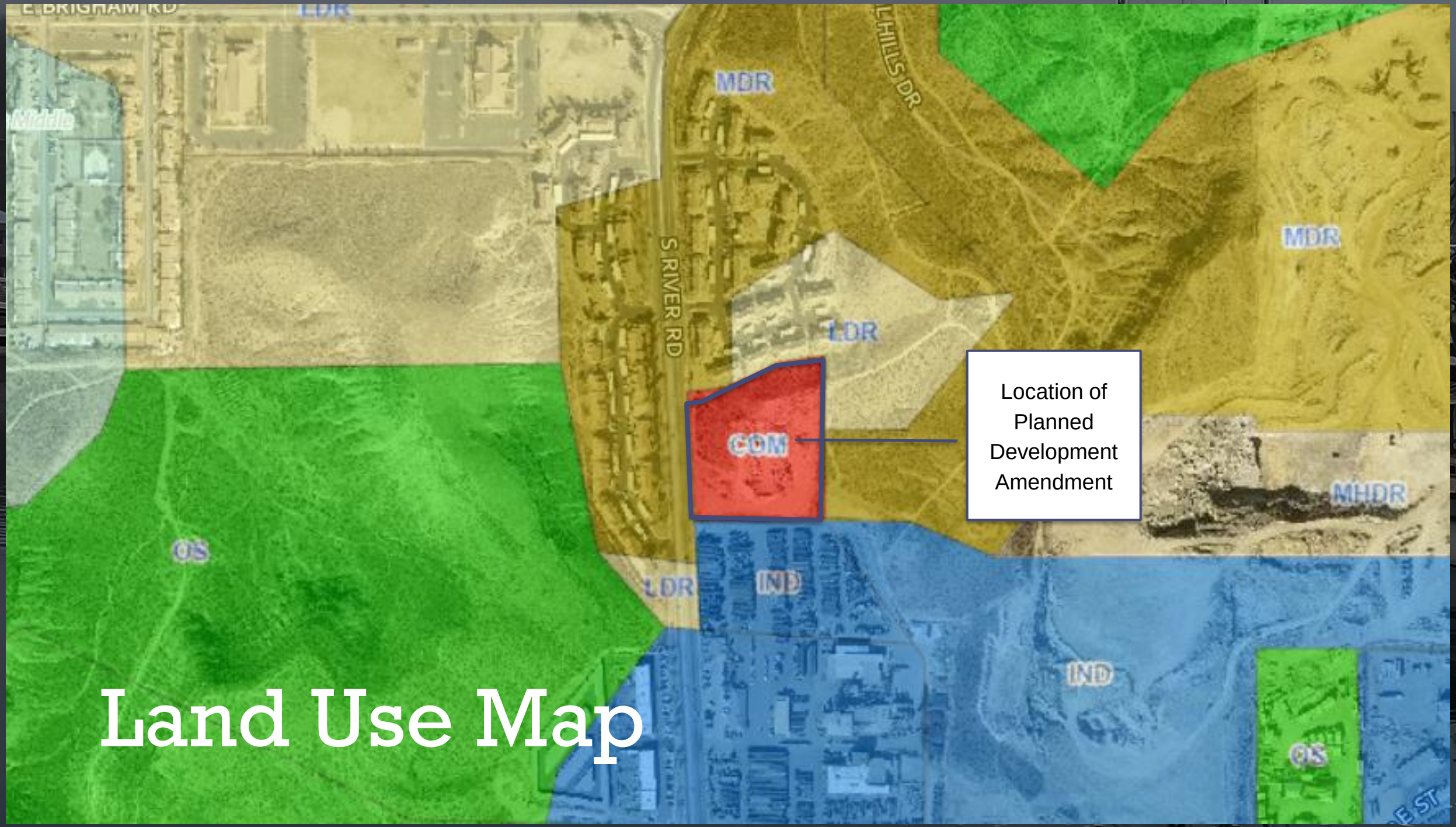
STG Storage Facility

Zone Change Amendment

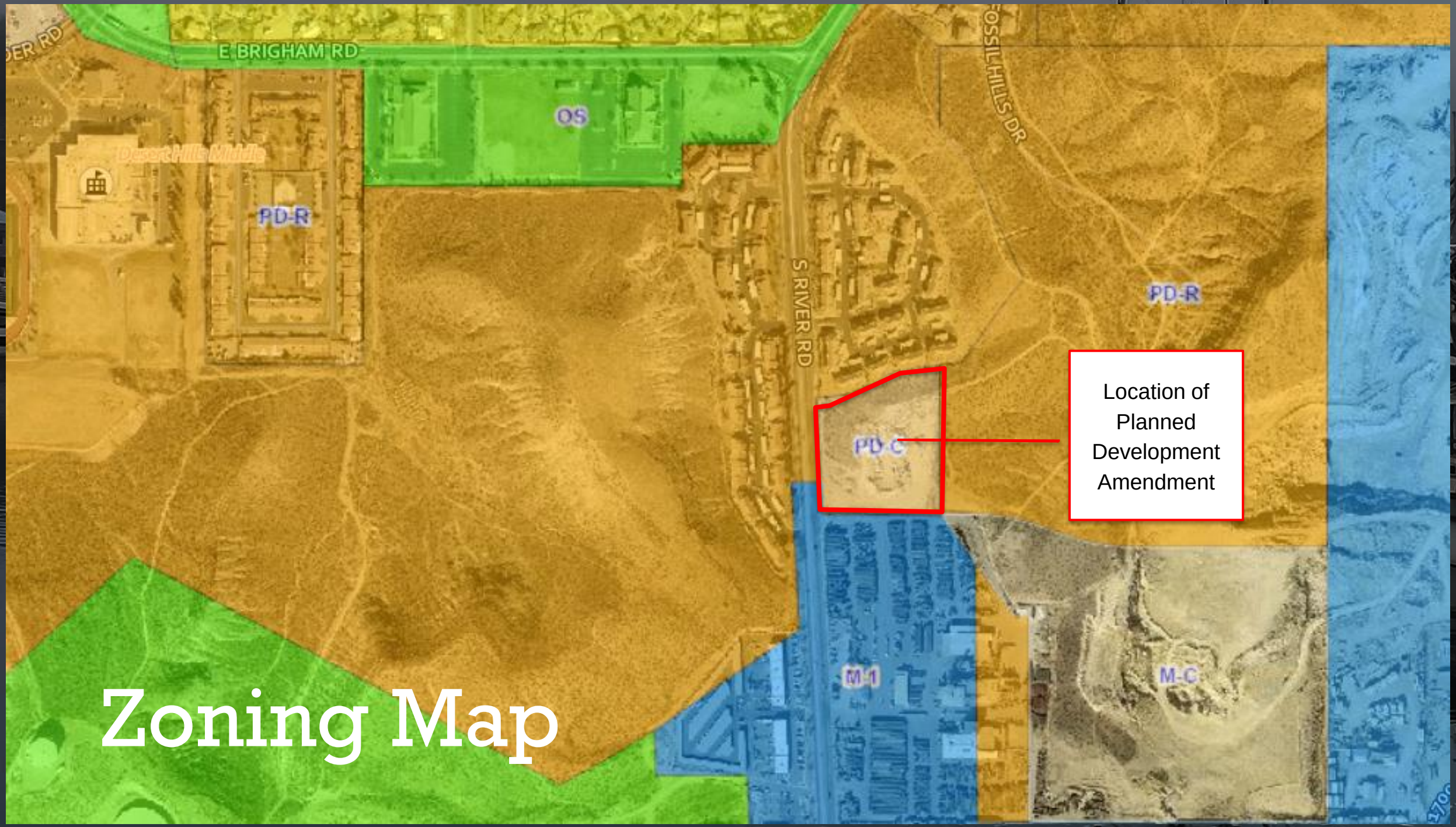
2022-PDA-052


Fossil Hills
Townhomes
Location of
Planned
Development
Amendment
Sunroc

Location

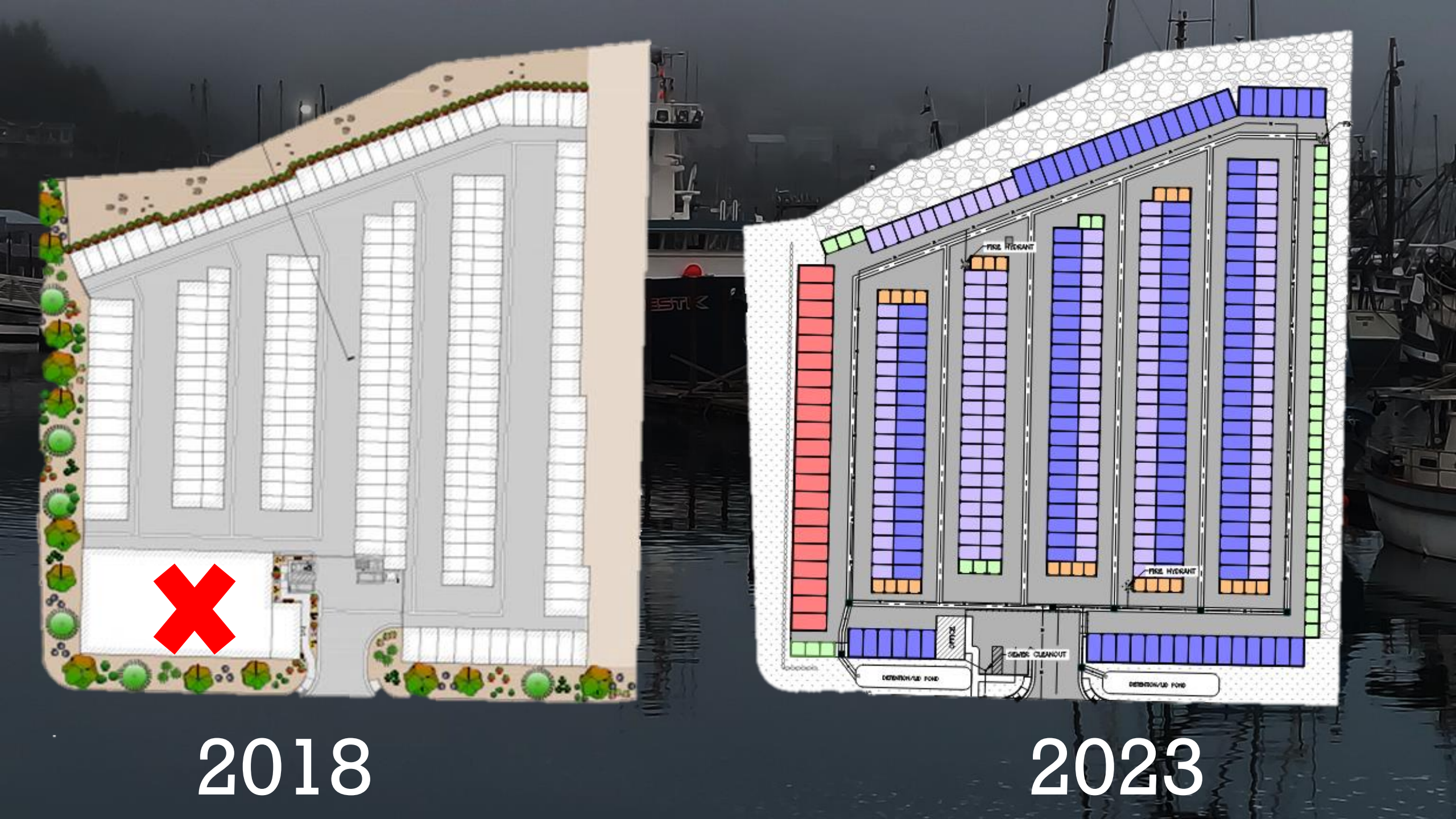

E BRIGHAM RD
LDR
MDR
S RIVER RD
LDR
COM
Location of Planned Development Amendment
MDR
MHDR
OS
LDR
IND
IND
OS

Land Use Map


E BRIGHAM RD
OS
FOSSIL HILLS DR
PD-R
S RIVER RD
PD-R
PD-C
Location of Planned Development Amendment
M-1
M-C

Zoning Map

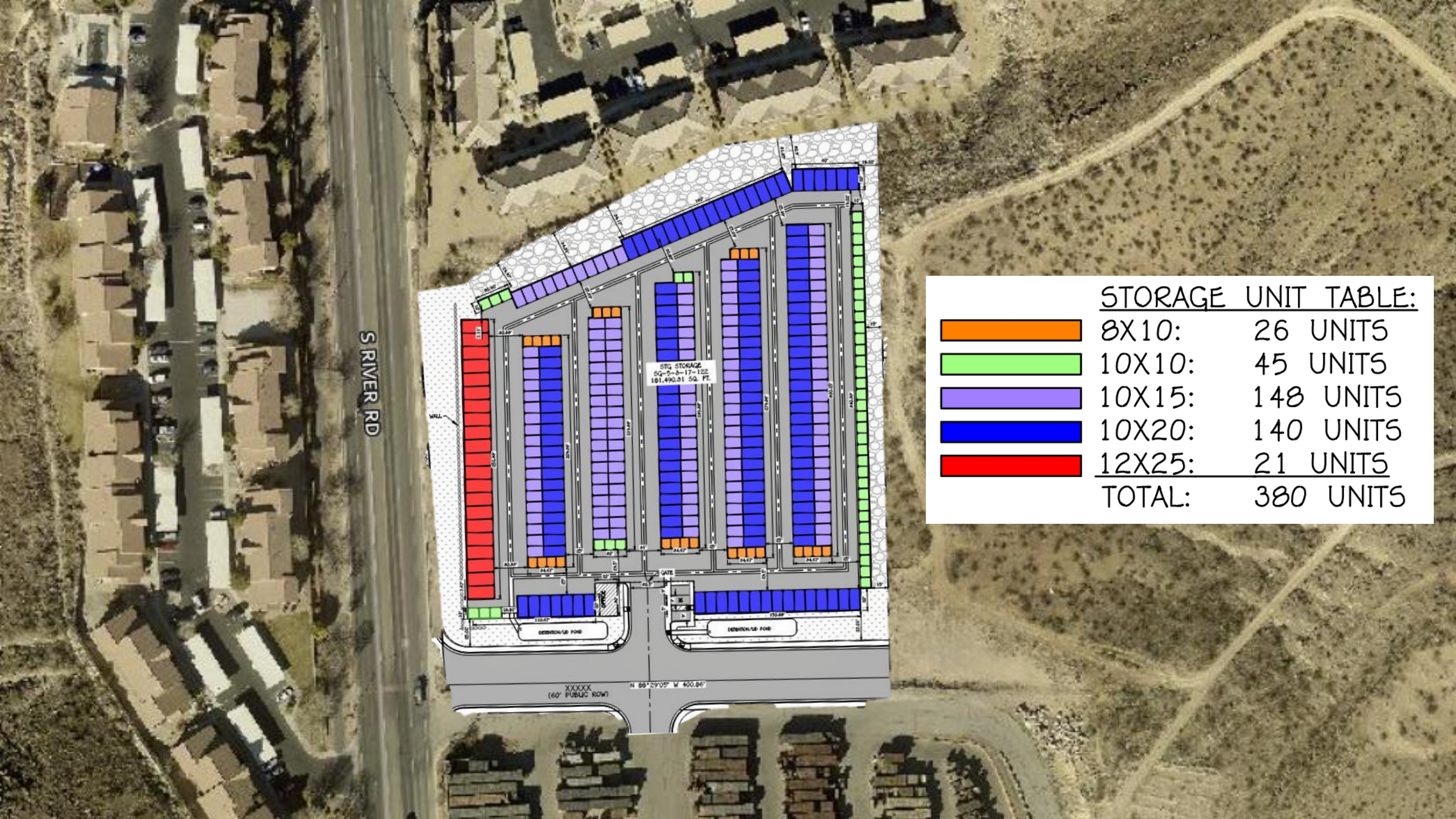
Site Plan Approved in 2018

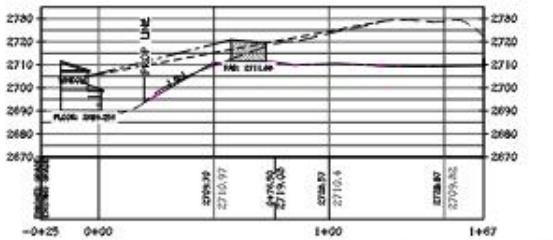

FIRE HYDRANT
FIRE HYDRANT
SEWER CLEANOUT
DETENTION/SD POND
DETENTION/SD POND

2018

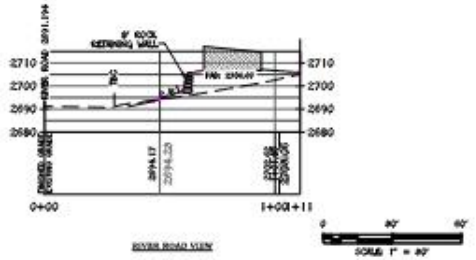
2023


S RIVER RD


S RIVER RD
STG STORAGE
SQ-5-3-17-122
181,490.31 SQ. FT.
WALL
GATE
DETENTION/LID POND
DETENTION/LID POND
XXXXX
(60' PUBLIC ROW)
N 88°29'05" W 400.86'
STORAGE UNIT TABLE:
8X10: 26 UNITS
10X10: 45 UNITS
10X15: 148 UNITS
10X20: 140 UNITS
12X25: 21 UNITS
TOTAL: 380 UNITS



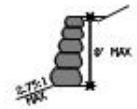
SECTION D



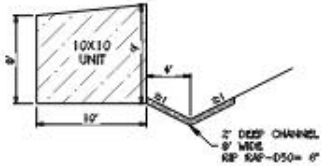
SECTION C

LEGEND:

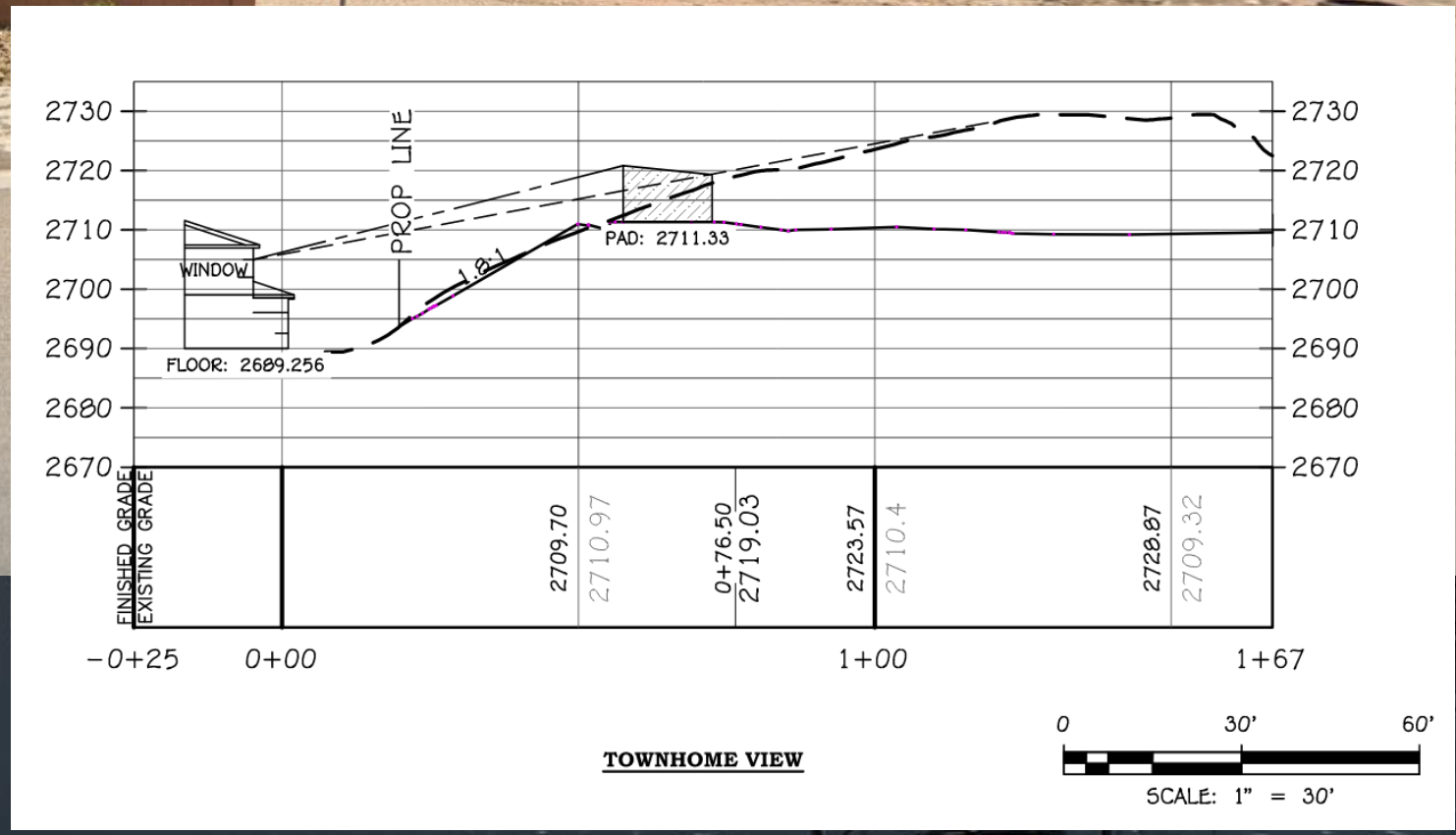
- PROPOSED MINOR CONTOUR
- PROPOSED MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- EXISTING MAJOR CONTOUR
- PROPOSED STORM DRAIN LINES
- PROPOSED PAD ELEVATION
- DRAINAGE DIRECTION ARROW
- CURB INLET
- BOX INLET



SECTION A: ROCK RETAINING WALL
N.T.S.

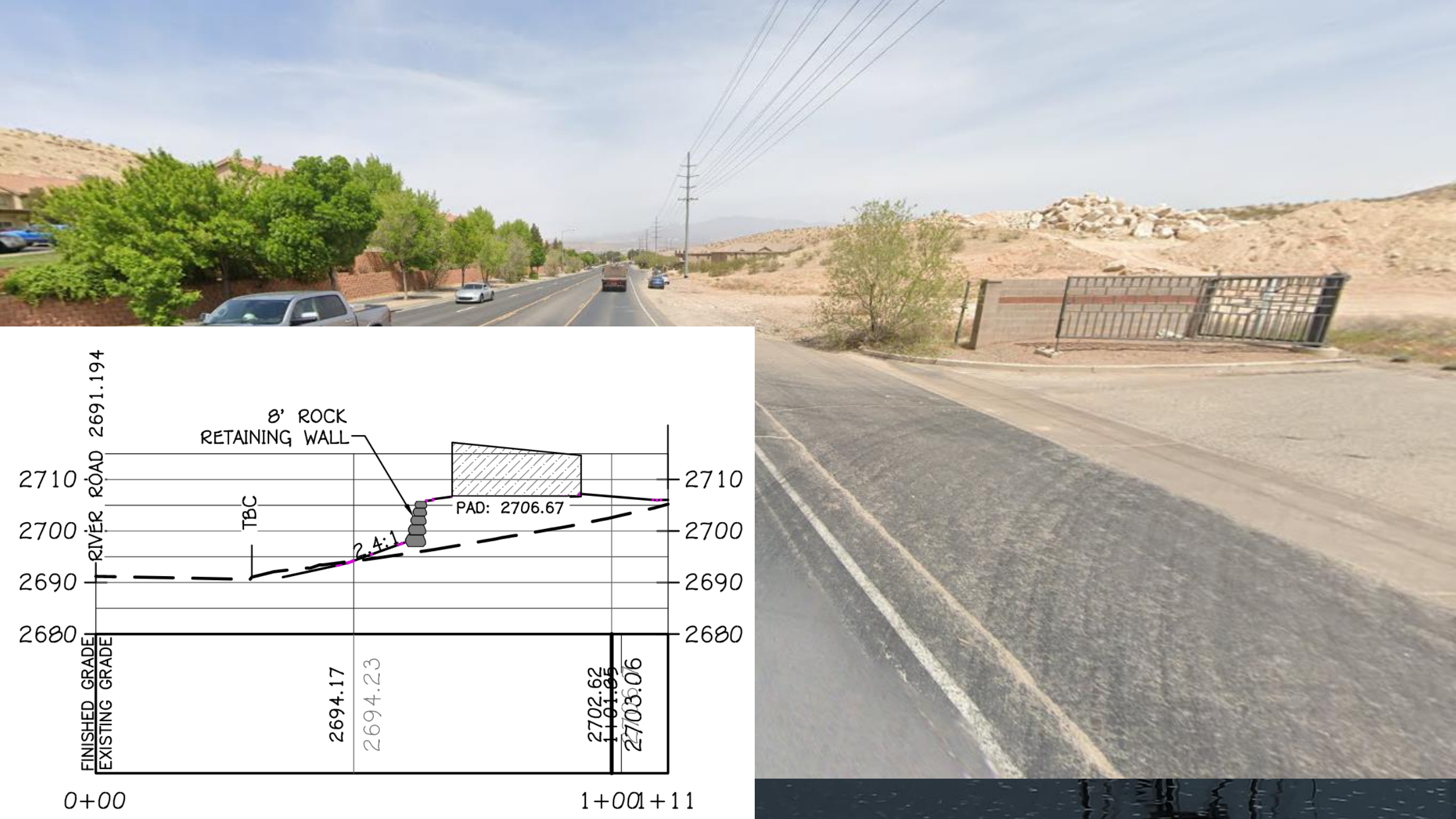


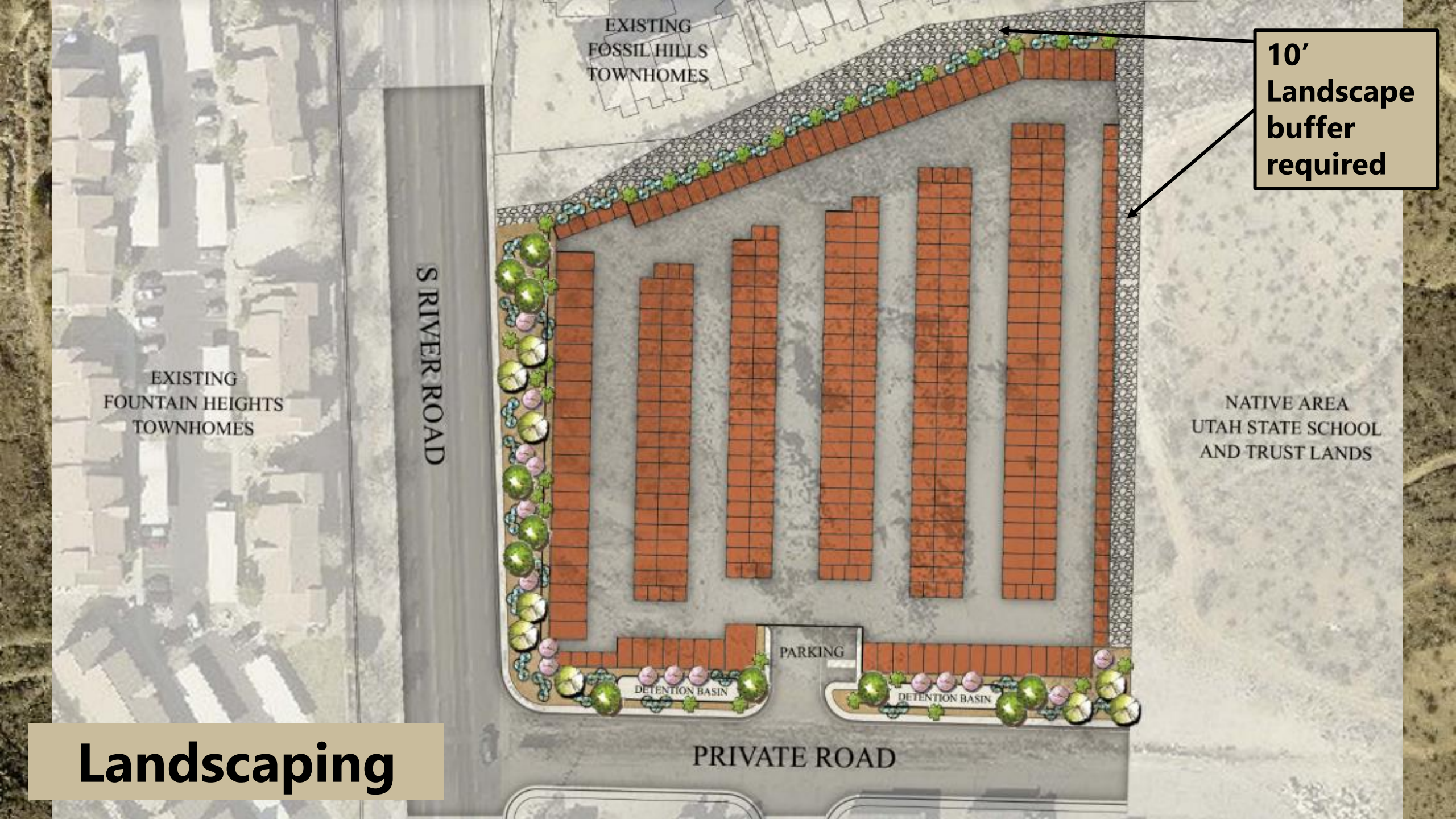
SECTION B: RIP RAP CHANNEL
N.T.S.



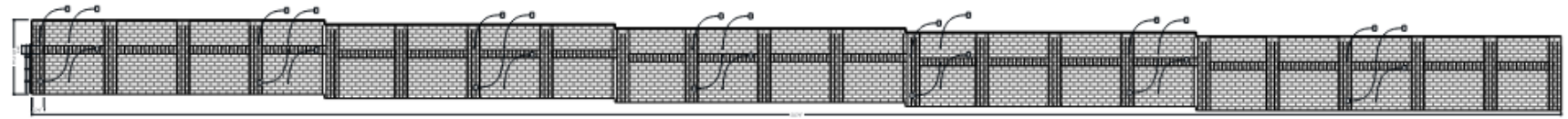
TOWNHOME VIEW

SCALE: 1" = 30'


8' ROCK
RETAINING WALL
RIVER ROAD 2691.194
TBC
PAD: 2706.67
2:4:1
2710
2700
2690
2680
FINISHED GRADE
EXISTING GRADE
2694.17
2694.23
2702.62
2703.06
0+00
1+00
1+11



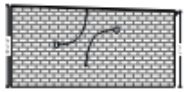
Landscaping



1 A202 A West Elevation

4 A202 A East Elevation

2 A202 A North Elevation



3 A202 A South Elevation

7 A202 B East Elevation

8 A202 B West Elevation

5 A202 B North Elevation (1)

6 A202 B South Elevation

9 A202 C South Elevation

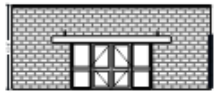
10 A202 C North Elevation

11 A202 D West Elevation

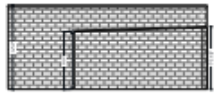
18 A202 D East Elevation

12 A202 D South Elevation

13 A202 D North Elevation

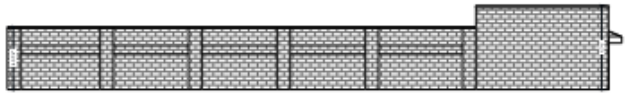


15 A202 E East Elevation



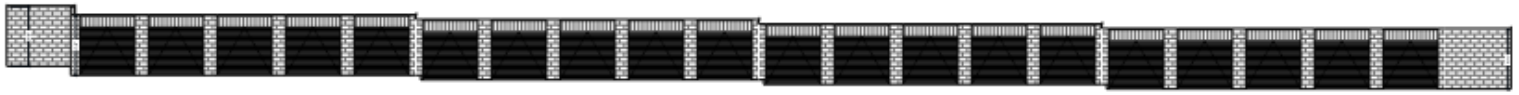
16 A202 E West Elevation

14 A202 E North Elevation



17 A202 E South Elevation

4 A203 F East Elevation



3 A203 F West Elevation

1 A203 F South Elevation

2 A203 F North Elevation

6 A203 G South Elevation

7 A203 G North Elevation

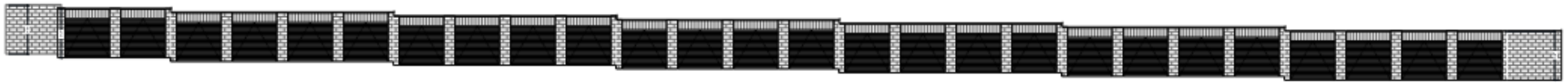
5 A203 G East Elevation

8 A203 G West Elevation

9 A203 H North Elevation

10 A203 H South Elevation

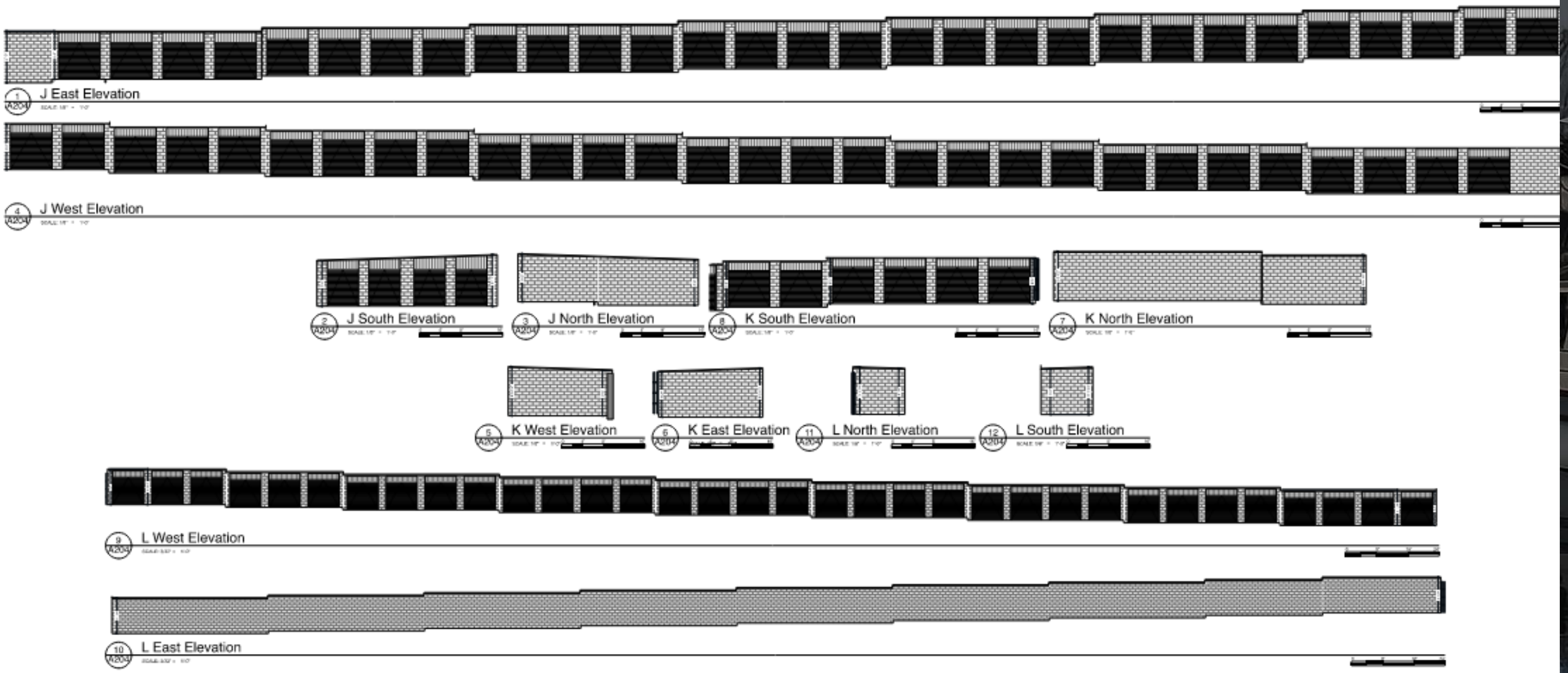
11 A203 I East Elevation

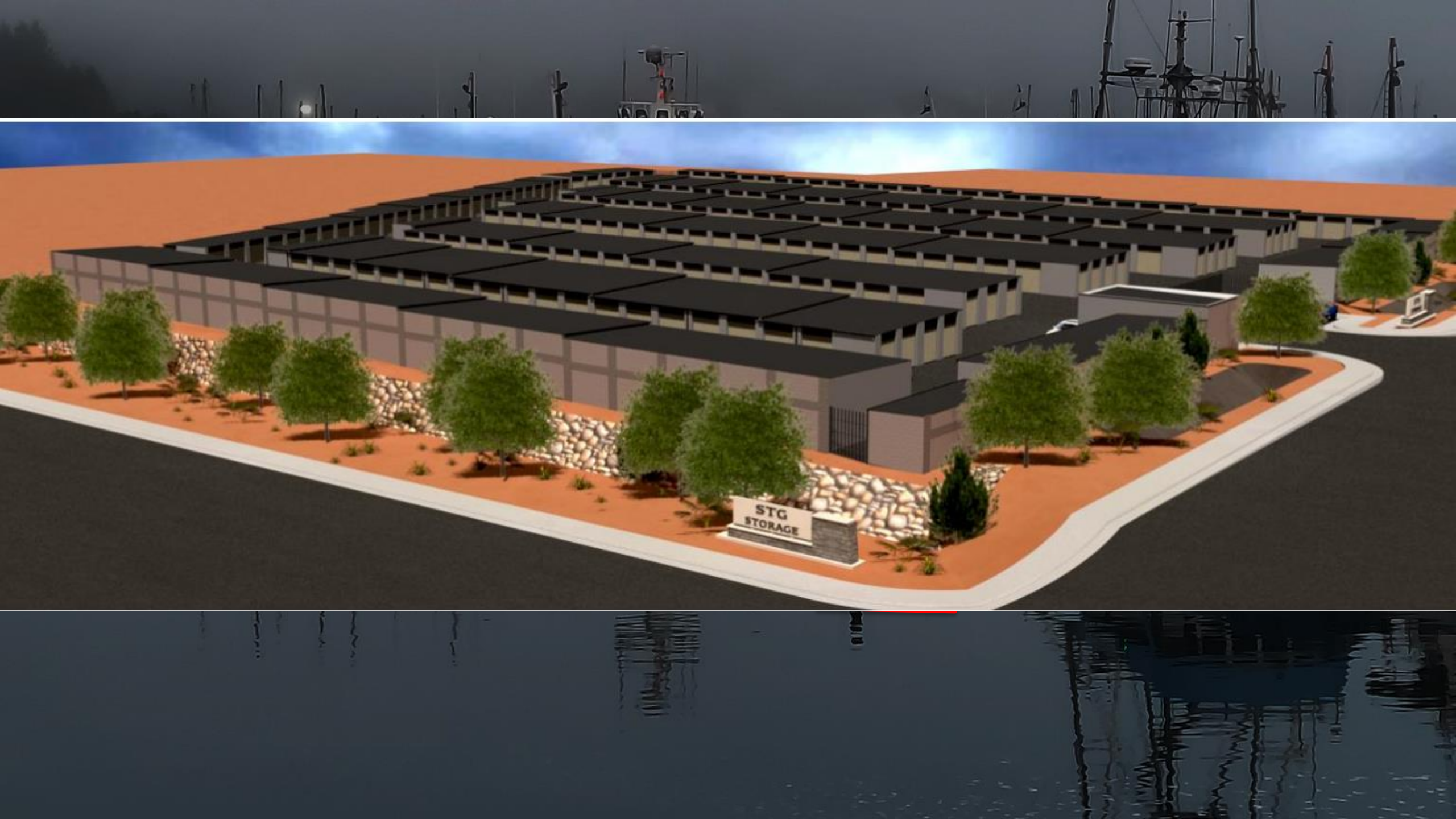


14 A203 I West Elevation

12 A203 I South Elevation

13 A203 I North Elevation


1 A204
J East Elevation
4 A204
J West Elevation
2 A204
J South Elevation
3 A204
J North Elevation
8 A204
K South Elevation
7 A204
K North Elevation
5 A204
K West Elevation
6 A204
K East Elevation
11 A204
L North Elevation
12 A204
L South Elevation
9 A204
L West Elevation
10 A204
L East Elevation


STG
STORAGE


STG
STORAGE


STG
STORAGE

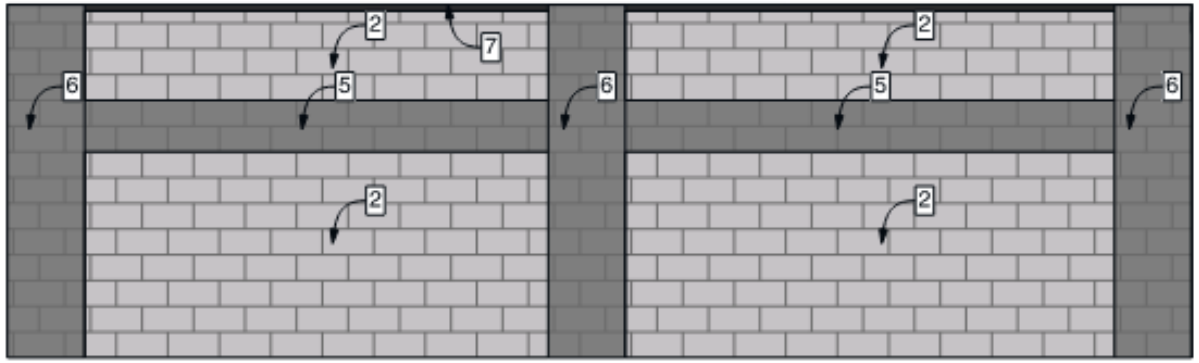

STG
STORAGE
STG
STORAGE


STG
STORAGE

RIVER RD

Max Height 10’

1 A201 ELEVATION



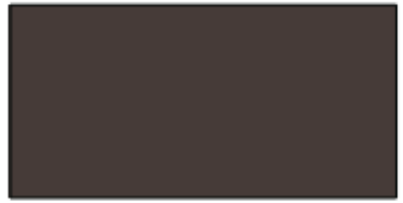
2 A201 ELEVATION

PROPOSED MATERIALS

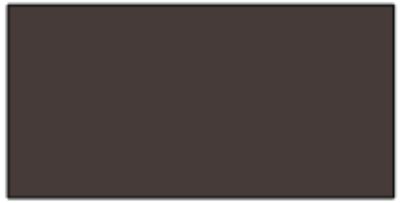
MATERIAL 1
GARAGE DOOR
COLOR: ASH GREY
BRAND: SHERWIN WILLIAMS

MATERIAL 2
CMU BLOCK
COLOR: DESERT SANDSTONE
BRAND: SUNROC

MATERIAL 3
RAIN GUTTER
COLOR: BURNISHED SLATE
BRAND: OLYMPIA STEEL BUILDINGS



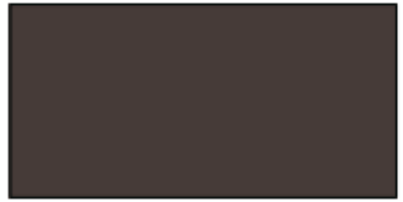
MATERIAL 4
DOWNSPOOT
COLOR: BURNISHED SLATE
BRAND: OLYMPIA STEEL BUILDINGS



MATERIAL 5
8" CMU BLOCK
COLOR: HONED JAVA
BRAND: SUNROC

MATERIAL 6
CMU BLOCK
COLOR: SPLIT FACE JAVA
BRAND: SUNROC

MATERIAL 3
PRE FINISHED METAL
COLOR: DARK BRONZE



RECOMMENDATION:

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

1. ~~The applicant is to dedicate 30’ of right-of-way for the future 60’ public road on the south side of this property.~~
2. ~~The property to the south is to dedicate 30’ of right-of-way for a future 60’ public road on the north side of their property.~~
3. At least 32’ of pavement of the 60’ public road is completed along with the associated curb, gutter, and sidewalk on the north side before a certificate of occupancy is issued for this new development.
4. ~~The back of the buildings may serve in lieu of the required 6’ 4” block wall for the buffer; however, in areas where no building wall is proposed, a 6’ 4” block wall will be required.~~
5. An approved and recorded development agreement accompanies this request.
6. The required 10’ landscape buffer along the north and east property lines will have the trees and shrubs planted 5’ on center.

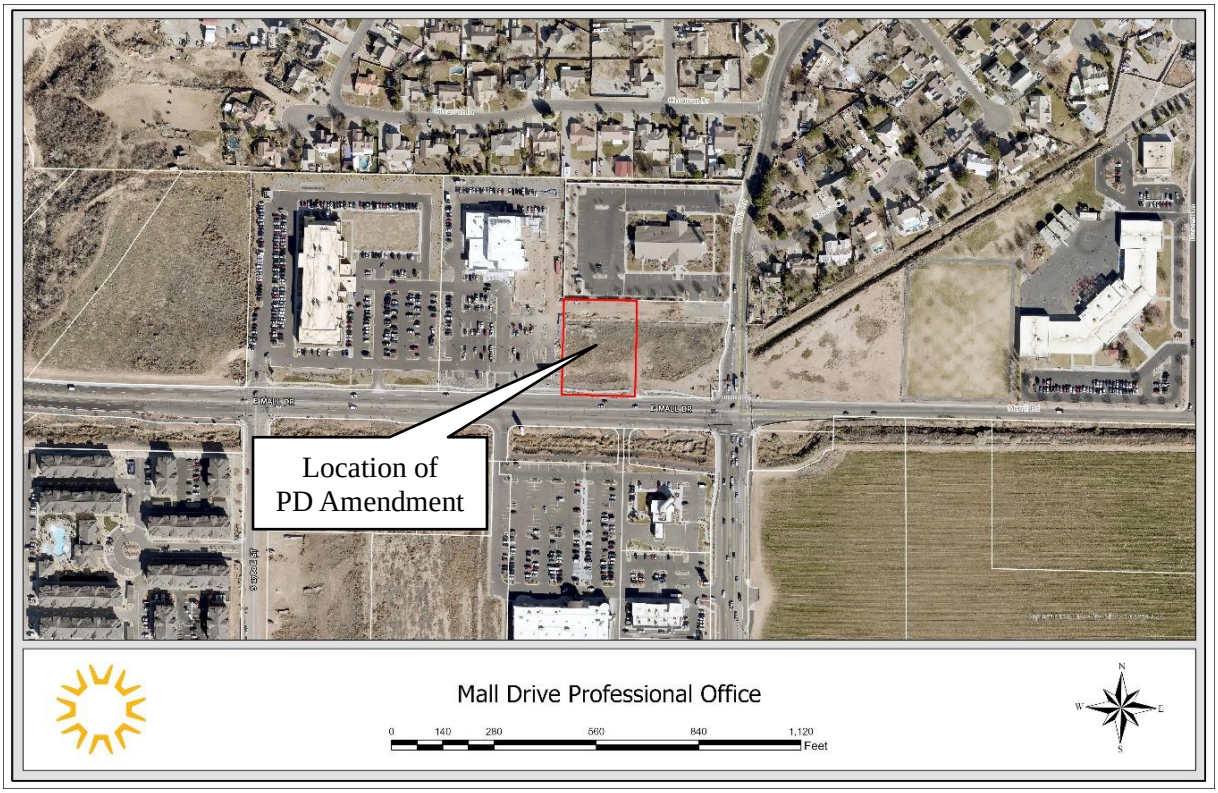
St.George
Community Development

ITEM 4B

PD Amendment

PLANNING COMMISSION AGENDA REPORT: 04/11/2023

Mall Drive Professional Office PDA Zone Change (Case No. 20232-PDA-005)		
Request:	The applicant is seeking approval of their design for their new office building on approximately 1.17 acres (51,152 ft²).	
Applicant:	Tucker Nipko	
Location:	The property is located at 2939 E Mall Drive	
General Plan:	Commercial (COM)	
Existing Zoning:	Planned Development Commercial (PD-C)	
Surrounding Zoning:	North	Agricultural, minimum lot size 20 acres (A-20)
	South	Agricultural, minimum lot size 20 acres (A-20)
	East	Planned Development Commercial (PD-C)
	West	Planned Development Commercial (PD-C)
Land Area:	Approximately 1.17 acres (51,152 ft²).	



BACKGROUND:

The applicant is proposing to build a new office building on the property which is located at approximately 2939 East and Mall Drive, across from Lin's and next door to the State Bank of Southern Utah to the east. The building will be a two-story building with a total of 16,174 ft^2. The footprint is approximately 8,111 ft^2. It is anticipated that the office will be used for medical purposes though really, any professional office may occupy space.

This location is in the Fields at Mall Drive Phase 2 Commercial Planned Development (PD-C). Phase 2 of the Fields at Mall Drive PD-C was originally approved on March 2, 2017, when it was rezoned from Agricultural, minimum lot size 20 acres to PD-C. There have been several amendments adding new buildings to this PD-C since 2017.

Please see the zoning requirement details below:

Zoning Requirements			
Regulation	**Section Number**	**Proposal**	**Staff Comments**
Setbacks	10-8D-6	See attached site plan	The required setbacks will be: Front: 20' (on Mall Dr) Side: 10' Rear: 10' Site plan appears to meet setbacks
Temporary Buildings, including Cargo Containers	10-8-4	None	N/A
Pedestrian Circulation Plan	10-8-6	The site plan shows a pedestrian connection from Mall Drive to their building	There is an existing sidewalk on Mall Drive.
Uses	10-8D-2	Professional/Medical Office	The proposed use is allowed in this PD-C
Height and Elevation	10-8D-2	The proposed height is 32 feet	The PD-C zone allows for a 50' height. This meets regulations.
Phasing Plan	10-8D-2	N/A	N/A
Landscape Plan	10-8D-2	The site plan indicates the location of the landscaping.	This will require a 15' wide plant strip along Mall Dr and Sandia Rd, and we will require street trees to be planted in the plant strip.
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	Signage has not been provided. A master sign plan has been approved for this location.	The applicants will be required to pull a sign permit when they are ready to put in their signs.
Lighting	10-8D-2	A photometric plan has been provided.	The lighting will be required to meet the foot candle requirement during site plan review.
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 a dumpster.	The waste location indicates a 6' solid fence around it which meets regulations.
Buffer Protection of Residential Property	10-8D-6	N/A	N/A
Overlay Zones	10-13	None	N/A
Parking	10-19-5	Parking provided: The site plan shows: **68 stalls**	With 16,174 ft² of floor area, the parking requirement (1 space for every 250 sf) will be: **65 stalls** They will be overparked by: **3 stalls**
EVCS And Bike Parking	10-19-6	Bike parking and EVCS conduit are both shown.	They will be required to install at least one bike rack to hold at least 2 bikes and conduit for at least one future charging station. These are shown on the site plan.

RECOMMENDATION:

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

1. A shared access easement is established with lot 1 of The Fields at Mall Drive Phase 2 Final Plat (the bank site to the east).

ALTERNATIVES:

1. Recommend approval as presented.
2. Recommend approval with conditions.
3. Recommend denial.
4. Continue the proposed PD amendment to a specific date.

POSSIBLE MOTION:
"I move that we forward a positive recommendation to the City Council for the PD amendment for Mall Drive Professional Office as presented, case no. 2023-PDA-005, based on the findings and subject to the conditions listed in the staff report."

FINDINGS FOR APPROVAL:

1. The proposed uses are permitted uses found in the PD-C zone.
2. The proposed zone change meets the initial application requirements found in Section 10-8D-2A.
3. A professional office use is in harmony with the other uses on the north side of Mall Drive and the other uses in the area in general.

Exhibit A
Applicant's Narrative

Mall Drive MOB

Proposed Uses:

- Professional/Medical Office

The building will be subdivided into office condominiums based on the final users. At this point we have 2 users and we anticipate that the final mix will be between 5 and 6 occupants in the building.

The lot is 51,152 sq ft. Building footprint is 8,111 sq ft (15.8%). It will be a 2 story building with a total square footage of 16,174. The total number of parking stalls is 69 four more than the required 65. Landscaping will take up 10,211 sq ft (19.96%).

Exhibit B
Approved Use List

THE FIELDS AT MALL DRIVE PHASE 2

Proposed Commercial Use Lists

Proposed Commercial Uses for Lot 1 and Lot 2

Category	Specific Use
Business and financial services	Bank or financial institution
	Professional or business office
Food service establishments	Bakery
	Catering establishment
	Delicatessen
	Ice cream parlor
	Restaurant, drive-in
	Restaurant, sit down
Medical, dental, counseling services	Laboratory, medical or dental
	Medical/dental office or clinic
	Optometrist, optician
Meeting and assembly uses	Church
	Lodge, fraternal organization, senior center
	Reception center
Retail sale of goods with all operations conducted in an enclosed building	Antique store
	Athletic and sporting goods store
	Bookstore
	Department store
	Florist shop
	Furniture and large appliances sales
	Household appliance sales and service
	Hunting and Sporting goods sales
	Office supply, office machines sales and service
	Paint or wallpaper store
	Pharmacy
	Retail goods establishments (indoor sales)
Retail sale of goods with some operations outdoors	Convenience markets with gas pumps
	Gas station
	Hardware sales and supplies
Service businesses	Barbershop/beauty shop
	Carpet and rug cleaning

Category	Specific Use
	Child nursery, daycare, preschool
	Educational institutions, schools, college, learning centers, trade schools (no residential or 24 hour facilities)
	Gunsmith
	Janitor service and supply
	Laundry or dry cleaners, laundromat
	Locksmith
	Mail services
	Massage establishment
	Mortuary
	Newsstand
	Pest control and extermination
	Pet grooming
	Plumbing and electrical fixture sales
	Printing, lithographing, publishing or reproduction sales and service
	Retail services establishments
Utility, government, public services and facilities	Cable television and satellite dish provider
	Government buildings or uses, nonindustrial
	Museum
	Television or radio station

Exhibit C
PowerPoint Presentation

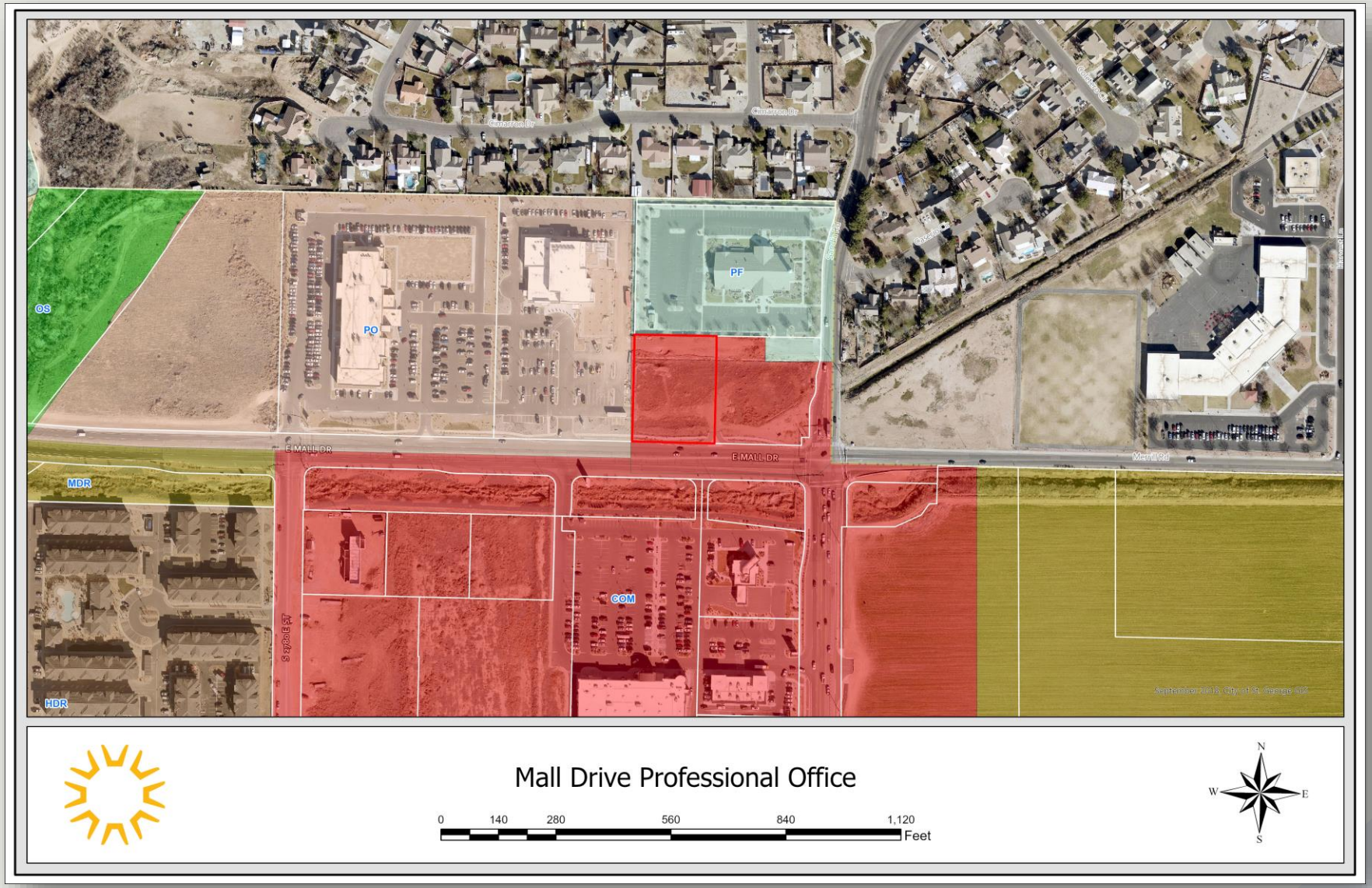
Mall Drive Professional Office

2023-PDA-005

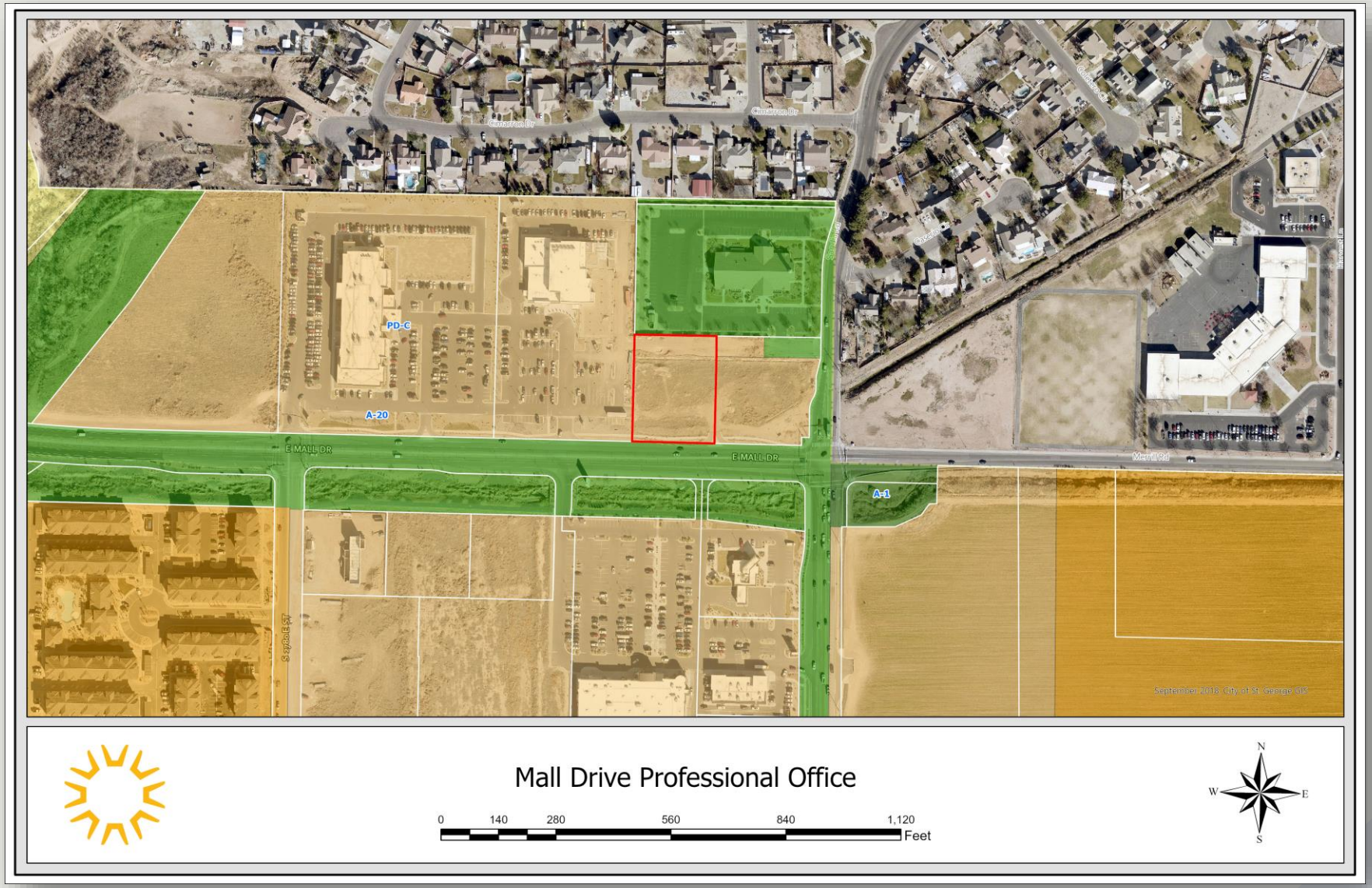
Aerial Map


E MALL DR
E MALL DR
S Rogers St
Merrill Rd
Mall Drive Professional Office
0
140
280
560
840
1,120
Feet
N
W
E
S

General Plan Map



Zoning Map


PD-C
A-20
E MALL DR
E MALL DR
A-1
Merrill Rd
Mall Drive Professional Office
0
140
280
560
840
1,120
Feet
N
W
E
S

THE FIELDS AT MALL DRIVE PHASE 2

Proposed Commercial Use Lists

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	Bookstore
	Department store
	Florist shop
	Furniture and large appliances sales
	Household appliance sales and service
	Hunting and Sporting goods sales
	Office supply, office machines sales and service
	Paint or wallpaper store
	Pharmacy
Retail sale of goods with some operations outdoors	Convenience markets with gas pumps
	Gas station
	Hardware sales and supplies
Service businesses	Barbershop/beauty shop
	Carpet and rug cleaning
	Child nursery, daycare, preschool

Approved Uses

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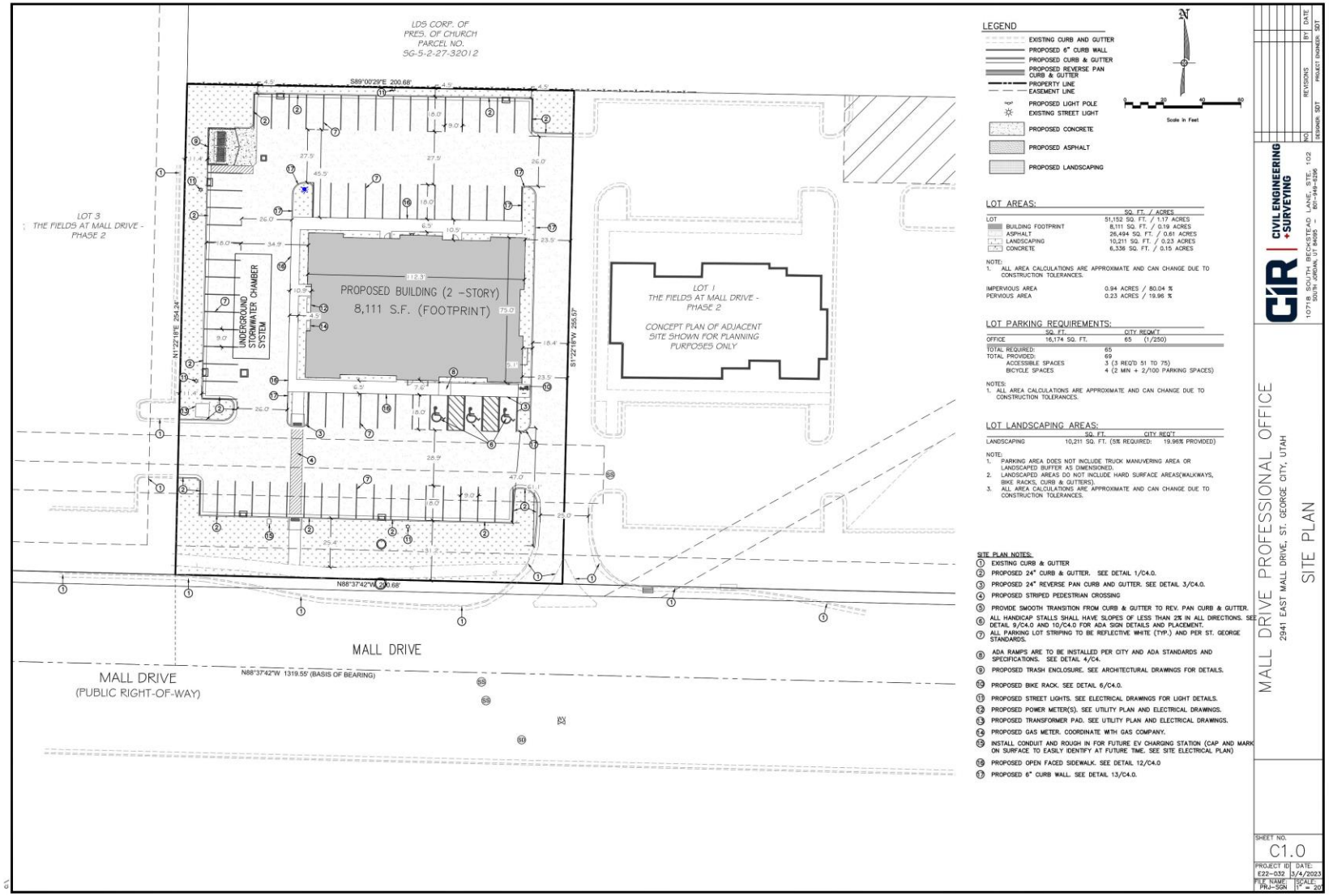
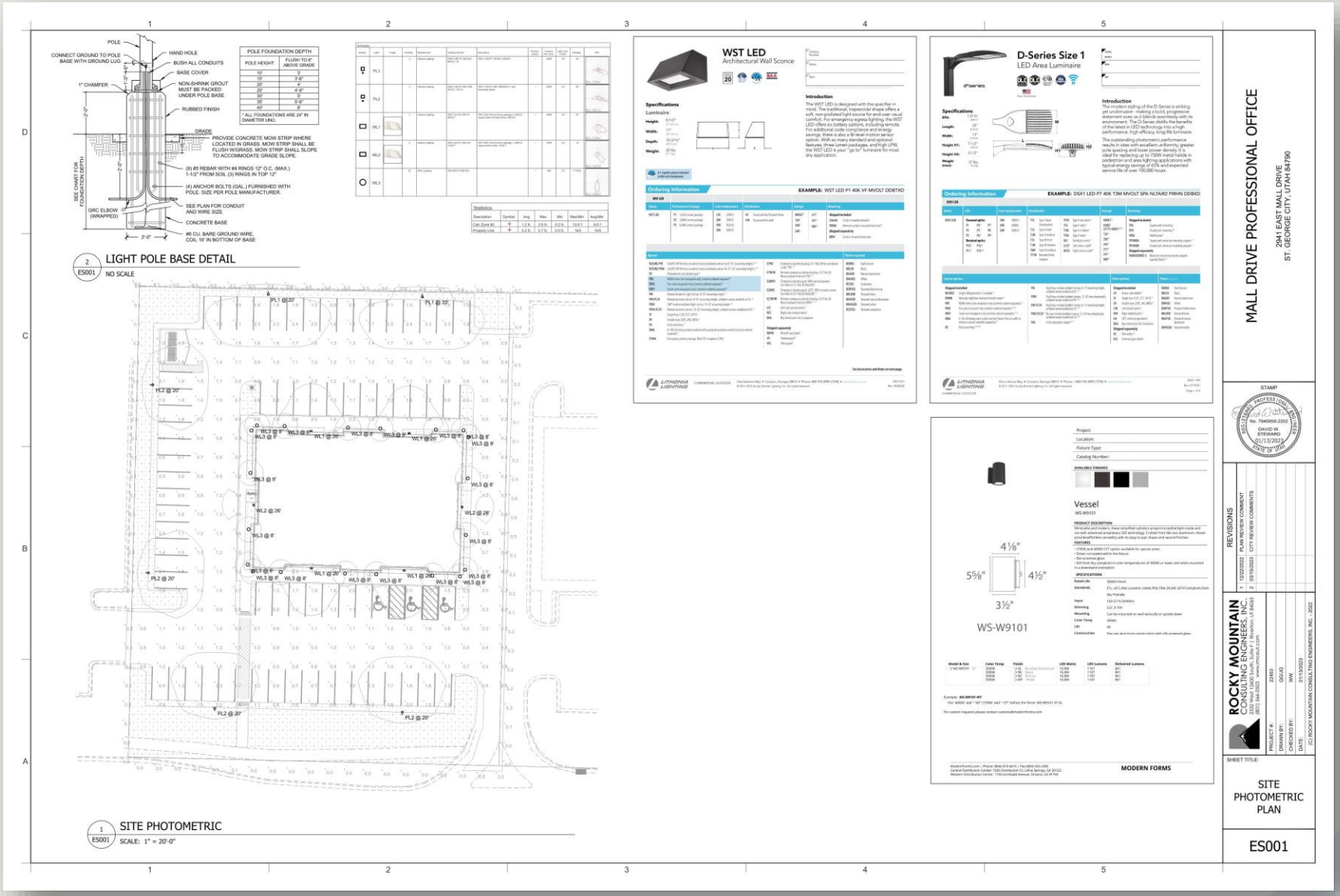
	Locksmith
	Mail services
	Massage establishment
	Mortuary
	Newsstand
	Pest control and extermination
	Pet grooming
	Plumbing and electrical fixture sales
	Printing, lithographing, publishing or reproduction sales and service
Utility, government, public services and facilities	Cable television and satellite dish provider
	Government buildings or uses, nonindustrial
	Museum
	Television or radio station

Proposed Site Plan



Landscape Plan

Photometric Plan



Elevations

NORTH ELEVATION

SOUTH ELEVATION

FINISH SCHEDULE

MATERIAL	MANUFACTURER	COLOR
STONE VENEER	MERRILSTONE	CASTLE COVE
WOOD PLANK CLADDING	PARKLEX PRODEMA	CINDER
WOOD PLANK CLADDING	PARKLEX PRODEMA	STONEGREY
WOOD PLANK CLADDING	PARKLEX PRODEMA	GREY
EIFS STUCCO FINISH	STOLIT MILANO	STO 16279
EIFS STUCCO FINISH	STOLIT MILANO	STO 16005
METAL CAP	DEXEL METALS	CHARCOAL GRAY SR.27
CANOPY SUPPORT STEEL (PAINTED)	SHERWIN WILLIAMS	MATCH METAL CAP COLOR
ALUMINUM STOREFRONT	KAWNEER	DARK BRONZE
EXTERIOR GLASS	GUARDIAN GLASS	SUPERNEUTRAL 68 ON GRAY

NOTE:
PROVIDE ADDRESS SIGNAGE TO MEETS 2018 IBC 502.1 REQ'S. OF MIN. 6" HIGH AND MIN. .5" WIDE AND SHALL BE ARABIC NUMBERS OR ALPHABETIC LETTERS AND SHALL BE CONTRASTING COLOR OF THE BACKGROUND.

sba

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1/16/23

2941 EAST MALL DRIVE

ST. GEORGE, UT

ST. GEORGE PROFESSIONAL OFFICE

EXTERIOR ELEVATIONS

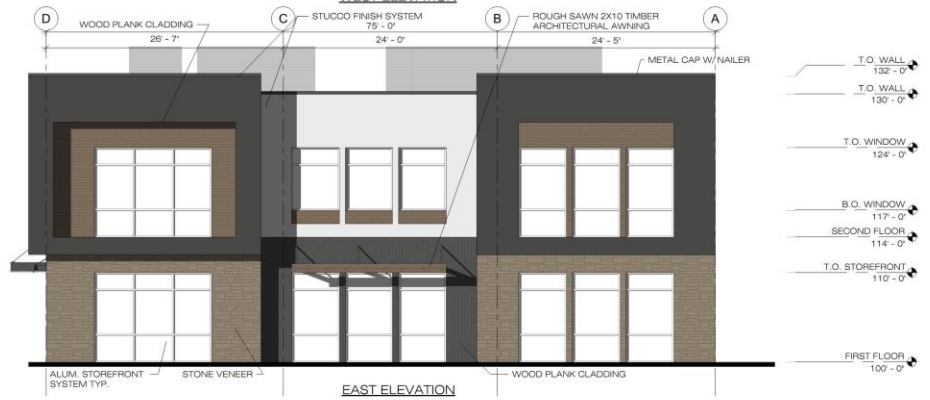
SCALE: 3/16"=1'-0"
JANUARY 16, 2023
2283901

A3.1

Elevations

NOTE:
PROVIDE ADDRESS SIGNAGE TO MEETS 2018 IBC 502.1 REQ'S. OF MIN. 6" HIGH AND MIN. .5" WIDE AND SHALL BE ARABIC NUMBERS OR ALPHABETIC LETTERS AND SHALL BE CONTRASTING COLOR OF THE BACKGROUND.

WEST ELEVATION



EAST ELEVATION

FINISH SCHEDULE

MATERIAL	MANUFACTURER	COLOR
STONE VENEER	MERRILSTONE	CASTLE COVE
WOOD PLANK CLADDING	PARKLEX PRODEMA	CINDER
WOOD PLANK CLADDING	PARKLEX PRODEMA	STONEGREY
WOOD PLANK CLADDING	PARKLEX PRODEMA	GREY
EIFS STUCCO FINISH	STOLIT MILANO	STO 16279
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SCALE: 3/16"=1'-0"
JANUARY 16, 2023
2283901

A3.2

Rendering

Materials Board

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

Public Notice

PRESENT: Chair Steve Kemp
Commissioner Austin Anderson
Commissioner Lori Chapman
Commissioner Emily Andrus
Commissioner Ben Rogers
Commissioner Nathan Fisher

CITY STAFF:
Public Works Assistant Director Wes Jenkins
Deputy City Attorney Jami Bracken
Planner III Carol Davidson
Planner III Mike Hadley
Planner III Dan Boles
Development Office Supervisor Brenda Hatch

EXCUSED:

Chair Kemp called the meeting to order. Commissioner Chapman led us in the Pledge of Allegiance. We are amending the agenda Item order, Item 2A will be heard after Item 1A.

1. **PLANNED DEVELOPMENT AMENDMENT (PD-A) *(Public Hearing)* Legislative**

A. Consider a request to amend the Desert Color Planned Development (PD). This PD amendment would adjust the boundary of the TNZ Resort Overlay to the south of the existing boundary line including approximately 1.9 acres. This would place the entire subject parcel into the resort overlay. Additionally, the city has received a request for a PD amendment to allow a hotel resort on an approximately 17.49-acre site. The site is located just south of the Lagoon Parkway and Painted Ridge Parkway intersection on the east side of Pained Ridge Parkway at approximately 5560 South. The applicant is Desert Color and the representative is Craig Coats, Alliance Consulting. The project will be known as Atara Resort at Desert Color. Case No. 2023-PDA-002. (Staff – Dan Boles)

Dan Boles presented the following:

Dan Boles – As a house keeping note, we have started referring to these as PD amendments instead of Zone Change amendments because you are not actually amending the zone. The zoning itself will remain PD-R as it is now, they are asking to extend the resort overlay to 17.49 acres. It is already overlaying the rest of the site. There will be two entrances one from the parkway and one from the south. Dan showed pictures of the plat and described what is proposed and shown in the packet. The villas are about 44 ft in height.

Chair Kemp – So these photos were taken today?

Dan Boles – Yes, today.

Commissioner Fisher – So the site is below the elevation of the homes?

12:00

Chair Kemp – Do you know when the development agreement between Desert Color and the City was agreed upon?

Jami Brackin – It was December 2018.

Commissioner Anderson – How much of Desert Color is zoned today?

Dan Boles – Around 1300 Acres, this slide is what was originally approved in the development agreement.

Commissioner Anderson – So what they are asking to add to the resort layer is 1.9 acres? And are buildings in that?

Chair Kemp – No it looks like a parking lot in that area.

Commissioner Anderson – What is the allowable height in the resort overlay?

Dan Boles – 55 ft.

Commissioner Chapman – Has that space always been designated resort overlay?

Dan Boles – Yes.

Craig Coats – That south part that isn't designated was a pinch point where the road got designed. It was a leftover area and it is a cleanup item to get it all into one lot.

Commissioner Chapman – Will you not have the right amount of parking without that 1.9 acres?

Dan Boles – That is required parking, they will need that parking for the project.

Chair Kemp – They're only having one 1 parking stall per key and then 2 parking stalls for employees?

Dan Boles – That is how City Code reads.

Mickey Mazerac – On top of the hotel we would have screened walls to obscure views of any mechanical.

Commissioner Anderson – So the top of the parapet would be 55 ft max?

Mickey Mazerac – Yes.

Commissioner Fisher – So the high side is the north end?

Craig Coats – No, the north side is the high end.

Commissioner Anderson – So I want to know where will it be from the road?

Craig Coats – From the public road it will be under the 55 ft. On the south end we will be cutting and on the north end we will be filling to be making a more balanced site.

Discussion continued regarding the height of the buildings from different viewpoints.

Chair Kemp opened the public hearing.

Carl Formato – I made a couple adjustments to my letter; the notification came to us on Saturday. I have some prepared remarks. We moved from Southern California, we have lived in master planned communities for about 14 years. When we were sold this particular lot we were told nothing would be built back here except for a pool or a lagoon. The original map showed a lagoon here. Everybody at Desert Color assured us that this was going to be an open area and that this was going to be a lagoon. They were all under the impression that this was going to be a lagoon. The resort area was going to be near this lagoon where there would be non-owner-occupied rentals. I personally feel like we were lied to, that it was a bait and switch. I am extremely frustrated that we found out about this a few days before this was going to happen. For us to spend over a million dollars plus and now we are hearing this will be a resort and a parking lot it's mind blowing. The noise pollution, the additional smells, the blocked sunlight in the afternoon. This is creating an unreasonable hardship for myself and my family. This was our forever home, this is going to kill our property values. I don't know who would spend over a million dollars to be near nightly rentals. We will have nightly renters in here partying after a race weekend. This whole area here is part of the hazard flood area zone according to FEMA. We have redtail hawks that live back there, my understanding is that they are a protected species. I am thoroughly disappointed. We are the ones that live here, we are the ones that vote here. I thought this was a meeting to discuss having this area for a resort and now I find out it is just for a parking lot.

Commissioner Anderson – This is a tough spot for me. I did build most of these homes. I do own those two lots. With the Desert Color overlay it has been ever changing, and I don't know if my people said that, but I think it could have been easily misunderstood. I will abstain from the vote.

Commissioner Fisher – On the issue of what you might have been told by your sales agent or anybody else. I understand, certainly, that is an issue you can deal with, this just isn't the forum for it. We can't address that concern; we can't address that issue. There is another forum for that, but this isn't it. It can't be relevant to our decision. We are obligated to look at the use, to which this area is going to be put and determine whether it makes sense in this area to do it and they have to do it within the guidelines of the ordinances and the development agreement that has already been established and the zoning that has already been established.

Brock Beckstrom – I would agree with everything that has been said by Mr. Formato. I don't think a hotel was always planned for this location. These are brochures that I picked up in the welcome center and it shows that it was designated as a lagoon. It might not be a lagoon but it was designated as a water amenity for the community. Originally the hotel was planned for where you first come off the freeway. I also know there was a park designated. My understanding is there is now a big

retention pond designated where the park was supposed to be. To me the answers seem evasive. Where it was represented as a park it is now a retention pond.

Darryl Osborne – I too wrote a letter. I and my family moved to Desert Color last year. We built the parade home that AJ Construction built. We were drawn to the 3 lagoons that were slated to be built. We bought here because there was nothing behind us. We were told by Austin, by Amy, by Tyler that nothing would be behind our house to Painted Ridge Drive. We are shocked. Having a hotel in that area brings all sorts of issues. Carl did an excellent job explaining what those are. We will be right above those parking lots. The car alarms going off in the middle of the night, the car pollution, the noise pollution, the light pollution. I had a stairway and gate built at my house; they built the gates around the lagoons. I asked if they were building the gates for the other lagoons and he asked what other lagoons? Even the builders know that there aren't going to be any other lagoons. The additional traffic that will be on these roads, the road they will be using are single lanes each way. There will be commercial trucks going there each day. There will be an enormous amount of traffic. There will be a restaurant and bar in the hotel. I'm concerned about that behind my home. We will lose if this gets approved. I hope that you will not approve this and reject this request.

Agata Formato – I have severe emotional distress from this. We uprooted our entire lives from California to come out here. We did our research before moving out here. We spoke with the Desert Color front office. We spoke with Ty, we spoke with Amy. We drilled them as to what exactly was gonna go into the backyard. Based on the brochures and the information they provided us we thought we were making the right choice by moving out here where we knew there was nothing going to be built in the back of our house. The reason why I have emotional distress is that I have a 9 year old daughter and it sounds like those buildings are going to be so high they are going to have a clear view of what is going on in our bedroom. And it brings me back to when I was in high school and living with my parents. We were living in a community and they decided to build apartments right behind our house. I was taking a little nap in the backyard, and someone saw me because they had a clear view of what was going on in the backyard. They hopped the fence and I almost got raped. We only moved to this very lot because we were assured that nothing was going to be built and no additional eyes were going to go into our house or our backyard. We were lied to.

Allan Peterson – As a homeowner in Desert Color my concern is the one entryway into our complex. Even though you have widened it, it is still a nightmare. My other big concern is the one stop sign for the 4-way stop. We need a light or something. It is a zoo, it's scary. No one stops for that stop sign. When you have all these people coming in besides us it is a nightmare. Desert Color should have either been a resort or a neighborhood.

Kallie Davis – I wanted to come and represent the young families in Desert Color. I have a 3-year-old, I'm pregnant. We walk around that pond, we play by it. To have a lot of traffic coming around here stresses us out. We live in the residential but off of that same street, we are walking to the lagoon and having more traffic in that direction, I want to express my concern for that. We love Desert Color. They have mentioned the lagoons and that is frustrating. We would love to see more splash pads and parks.

Chair Kemp – For clarification, is that pond the irrigation pond that the City owns?

Jami Brackin – Yes, that is for irrigation, that's owned by the City for secondary irrigation.

Lisa Osborne – I think you need to be aware of what is going on in our neighborhood. I went to the HOA yesterday to see if anyone was going to be here tonight to represent us as homeowners. I was told that wasn't their job. I went to the sales center the other day to get clarification on what is being sold to residents that are coming in now versus when we came in. We were told 3 lagoons, parks behind us and soccer fields down, which I guess they are still going to have it designated as park, which is good. But even yesterday at the HOA they are still telling me that yes, we have lagoons coming in. There is a possibility of an owner's pool. If you go to the sales center none of that is happening, it's not on the boards anymore at the sales center, but at the HOA level that is still the lies that are being told. I just think that you guys should be aware of not only this issue but, that it's still going on at the HOA as of yesterday. They are still promising things that are not happening anymore.

Jeff Zemke – My concern is very few people knew that this was going on. I didn't know anything about it. I got a return from Mr. Boles he said that only people within 500 ft were contacted.

Commissioner Fisher – St. George actually exceeds what the statute requires for notice.

Brighton Wahlen – I've heard that people who are staying at the hotel have access to our amenities. It is already crowded with the people who live in the neighborhood. I don't understand why it is in that location and not by the freeway.

Shawn Crawley – I know, it seems to me, the discussion is about this specific parcel being reallocated. What should be our next steps if this is not the forum for us to get some resolution.

Chair Kemp – We have made note of that question and we can talk about it later.

Carl Formato – Has the hotel been approved to build here?

Commissioner Fisher – That is part of tonight's consideration.

Chair Kemp – As it currently stands, hotel is a use that is permitted as a use on that property.

Discussion continued on what is being considered tonight.

Gary Temme – I don't believe that the developers or realtors have intentions to misrepresent anything to the homeowners here. What seems to be the misrepresentation is Desert Color as a developer. We purchased at the end of 2020 and at that time, Painted Ridge Road did not exist, the main lagoon road did exist. What was represented by the developer was that everything to the south of this street was purely residential and everything to the north of this street was zoned for vacation rentals that would a minimum 4 day stay. What we're now hearing is that this parcel of land in 2018 was in fact zoned for vacation rentals. So we are walking this gray fuzzy line between a vacation rental with a 4 day minimum to what has now become a hotel which could be a single evening and many people coming and going. I guess what I would ask of this committee is a recommendation to go back and look at the decision of the decision of the zoning around these 17 acres as a vacation rental property. I would ask that you guys recommend that this be reassessed and considered to be full time residential as was represented by the Desert Color Developer in 2020.

Laura Jacobs – I am a resident of Alpine Utah. My second home is here. I walk in Desert Color all the time. I do think it is really important to invite you to experience the bottleneck that is the entrance to this community and to understand the foot traffic that traverses the one and single road in which you would allow this hotel traffic to enter and to depart. It would be considered entirely inadequate by any single person with any level of IQ. There is no reason on God's green earth that anyone would say yes to this project understanding the nature of that one single passageway and the human beings that apparently we all care about more than anything else, right, people?

Chair Kemp closed the public hearing.

Commissioner Anderson – The maps do show a lagoon and some kind of structures around the lagoon. With the TNZ zone it could have been anything, a hotel, a house, nightly rentals or any of those things.

Chair Kemp – I appreciate the request to go out and look at it again. The pond, the heights of the building, the traffic, those are all going to have to go through staff.

Commissioner Chapman – Is it in our purview to put a stipulation that they put a second entrance into there?

Wes Jenkins – It is already addressed. When they reach a certain unit count it triggers that second access.

Commissioner Andrus – It is done as a whole model.

Jami Brackin – Do we know what the trigger is?

Bob Hermandson – It is 2501. We have about 700 actually built. About 1400 are approved.

Chair Kemp – Is Painted Ridge going to connect further south into the rest of the subdivision?

Bob Hermandson – Initially with the zone plan and the overall development agreement there was an entire road network that illustrates and diversifies all of the densities for the entire project that is utilities and roads for this whole area. It will continue to give access to the second irrigation pond and the City park and then connects on down to another round about and connects into Sage Haven and Auburn Hills. The hatched area is where the road was originally going to be. Based on the master plan at the time, the roads are changing all the time, the zoning and the intent have been 95% close to what they have been all this time. One item I would like to point out is that the large roadway wasn't included in that area to begin with. So it was actually reduced because of that.

Commissioner Anderson – Bob you have seen these brochures, right? There have been a lot of things said tonight that are personal to me. How many lagoons are going to go in?

Bob Hermandson – At this time we are considering a second lagoon. However, we have no schedule. There is no time frame on it at this time.

Commissioner Anderson – To me I think it's reasonable for someone buying in Desert Color when they see this that they would see the brochure, they would think that is what will be there. I think it

is important that the Developer understands that when people sees the brochures that it looks like there might be a lagoon there with buildings around it.

Bob Hermandson – Yes, sure. I appreciate to hear that comment and to hear that comment from everybody else. We tried to have a map that displayed what could potentially be out in the community. We labeled it very clearly, obviously the map hasn't changed since 2018, we actually did that map in 2016. In the clubhouse, if you go in there it's in as large of text as I could put on there, a disclaimer that says "this is just a representation of what could be built there" it is very specific about that.

Commissioner Anderson – I don't think it's on the brochures that we were handing out.

Bob Hermandson – I'm sorry, I haven't looked through this recently.

Commissioner Anderson – I just want you to recognize that, that was a tough spot.

Ben Rogers – I would like to ask for some clarification on what it's showing around the current lagoon, around the lagoon it's showing open space, has that been amended?

Bob Hermandson – No, the open space, the zoning agreement allows for the amenities, open space can include the lagoon.

Ben Rogers – In our drawings it shows that open space has been platted. For residences.

Dan Boles – This is the general plan map, they are bubbles. The zoning is more specific.

Jami Brackin – The zoning is PD-R and that would not allow for hotel.

Dan Boles – Yes but with the resort overlay in TNZ.

Jami Brackin – Yes, so that is confusing for the public because this application is asking for that to be expanded into the area that is open space which is zoned PD-R.

Commissioner Chapman – You are asking for a change of a portion from open space to the PD-R TNZ from open space?

Bob Hermandson – Yes, correct, because of the way we aligned the roads. It created this remnant.

Commissioner Andrus – Excused herself from the meeting at 7:06 pm.

Discussion continued on the alignment of the road and the island of open space.

Chair Kemp – One of the comments were in relation to where this property is in relation to the flood plain, what has been done with that?

Craig Coats – This is out of the 100-year flood way. The legal boundary is out of the 100-year flood plain. We will do an erosion hazard study with the building permit.

Chair Kemp – Do you plan on rip wrapping the wash?

Craig Coats – Yes. Also, they are not building a second retention pond, it is a second irrigation pond for secondary water.

Bob Hermandson – Another thing I wanted to bring up (on the brochure) is that keep in mind that we redesigned this literally hundreds of times. This specific depiction is what we landed on when everything was approved. These are condo buildings shown in this area, a condo hotel depicted on this map, which is being presented this is the configuration, the lagoon itself is not as large, there are two small, they're not small by any means, they are normal size pools for a hotel. But that is a condo hotel that is being depicted with the same heights the same options, exactly what is being presented today.

Chair Kemp – Can you make sure that Brenda has those when you are done with them?

Bob Hermandson – Yes.

Commissioner Fisher – The City has really tried to handle it as well as possible, but the City is not really the policing agency for it. Many years ago in the last downturn many developments were started and amenities were not put in. One thing the City did put in is that with a certain amount of lots they have to put in amenities. Once the approval is given the City can't retract that. There is flexibility built into this ordinance. If there is misrepresentation that is something that you can talk to legal counsel about, it's not something we can solve here. We are bound by what has been approved by the ordinance that the developer is vested in.

Jami Brackin – I can read the provisions from Utah State Code, the State has tied our hands. Jami read from the State Code.

Commissioner Rogers – As far as an adjustment of the land, I think that is cleanup. As far as the height, I'm not satisfied with the height and the documents that they have provided showing that.

Jami Brackin – You can recommend that they stay at 55 feet also.

Commissioner Anderson – I think it needs to be clear as what the 55 feet is measuring to.

Commissioner Rogers – It is to the highest point of construction. I have concerns of the proposed height as represented.

Chair Kemp – Do you have any concerns about moving that triangle portion from open space to the TNZ?

Commissioner Rogers – No, I have concerns about the building height and the way it is represented.

Chair Kemp – Now Commissioner Andrus has left, and Commissioner Anderson has abstained from the vote we give the applicant the opportunity to continue the item to another meeting because the vote must be unanimous.

Craig Coats – We have discussed and decided that it may be best if we continue this until we have a full quorum.

Chair Kemp – Ok, so you are requesting to continue the item until you have a full contingency of commissioners?

Craig Coats – To the next agenda.

Commissioner Fisher – I want to make sure we do this right, since the public hearing is closed. Do we need to continue it to a specific date?

Jami Brackin – No, you can have a motion to continue and then Brenda will put it on as soon as she can.

MOTION: Commissioner Fisher made a motion to continue item 1A and 2A to another meeting.
SECOND: Commissioner Chapman
Commissioner Rogers – Can we request additional information regarding the height of the structure?
Commissioner Fisher – I am happy to do that if they can present additional information in advance of the next meeting and would be included in the next packet for the next meeting.
ROLL CALL VOTE:
AYES (4)
Chair Kemp
Commissioner Chapman
Commissioner Rogers
Commissioner Nathan Fisher
NAYS (0)
ABSTAIN (1)
Commissioner Anderson
Motion Carries unanimous vote

Commissioner Kemp – We will take a 10-minute recess.

B. Consider a request to amend the PD-C (Planned Development Commercial) zone for the purpose of adding two new commercial buildings, Cascade Collision at 21,120 square feet and Big O Tires at 7,529 square feet, to this 3.52-acre site which is generally located at approximately 1580 and 1606 E. Gateway Drive in St. George Utah. The applicant is Silver Fox Construction, LLC, and the representative is Trevor Sharp. The project name will be known as Cascade Collision and Big O Tires. Case No. 2023-PDA-003. (Staff – Carol Davidson)

Carol Davidson presented the following:

Carol Davidson – This is not necessarily going to be a Big O Tires, but it will have a tire shop. I included a shot here from I-15. These are approved uses on the use list for this PD. I did want to give you some information on the plat that was recorded for these properties. Carol described the requirements recorded on the plat that are included in the packet, she stated that the site plan meets these requirements. They are required to have 79 parking spaces and they are providing 88. There

are an additional 60 behind Cascade that will be solidly fenced behind Cascade Collision and will not be accessed by the public. It will be a single-story building. They are using earth tones. The entire area will be enclosed with a solid block wall with two access gates where they will be storing the cars. None of the repairs will be happening outside, they will all happen inside the building. The overall height of the tire store is 26 feet. The stores will be similar in color. The tire shop will have ROW on 3 sides. They are proposing an outdoor storage for tires, it will look just like a trash structure, it will be completely enclosed on all sides. The tires will not be able to be above the walls. From what I can tell it meets what is needed as shown. One of the recommendations is to have a shared parking easement. They have shown the parking as combined. There is a cross access easement in the subdivision but not the parking.
Commissioner Chapman – The tire store won't have any vehicles have any vehicles parked overnight?

Carol Davidson – There may be a situation where they may have someone drop it off at night and they will work on it the next day.

Commissioner Anderson – They would be operating vehicles so I think that would be ok.

Carol Davidson – They did provide photometrics. It appears to meet the codes.

Commissioner Anderson – Are we doing nighttime sky? Will they have to turn them off at night as they are not operating?

Commissioner Fisher – I doubt they will turn them off because of liability, but it is zero-foot candles at the lot line.

Chair Kemp – My concern is that the tire shop will not have enough room to store all the tires.

Trevor Sharp – These are both Class A companies, we will have the tires picked up more often, I'm not sure what the other tire shops are doing but we are working with companies that have been in business for a long time, we have no desire to have this area look bad.

Chair Kemp opened the public hearing.

Bob Hermandson – I am the HOA president for Twin Lakes, understanding that this is an allowed use, just a couple of comments in general. I'm wondering if there is any ability to limit the time of use or just have the doors closed at 5:00 am or 6:00 am. Along Gateway Drive, this would be where we would be directly viewing, I saw the landscape plan and was wondering if they could take a look at the trees to be more substantial to screen it from the residential side of it. I appreciate the comment from the developer that they will remove the used tires more often, I would ask that it is made as part of their approval and that no larger part could be added to the site. The lighting, we want it to be secure and safe, but if there is any way there could be a reduction after 10:00 pm if that is possible, and totally respect their safety and security. I know there will be smells and things but as long as the doors are closed that should mitigate that.

Chair Kemp closed the public hearing.

Commissioner Rogers – Zoning is pretty specific on caliper of trees, sizes and separation, correct?

Carol Davidson – Yes, that is correct.

Chair Kemp – The goal being to screen but not affect traffic views. I think it is good to have all-cross parking and cross access. My only concern is the used tires.

Commissioner Fisher – As far as lights go, I wouldn't want to impose any restrictions with that as to cause liability.

Jami Brackin – Again we cannot impose anything that has not been adopted into our code.
Commissioner Rogers – I am concerned about salvaged cars; this is the gateway to our City. I would encourage increasing the trees on Red Hills Parkway.

Commissioner Fisher – I have the same concern. Is there anything we can do to limit the view of those vehicles. I do share the concern with the chairman on the tire area. The real question is will the City be out there policing it? The 6ft wall is not going to do anything to obscure the view of those vehicles.

Commissioner Rogers – My only concern is the visible salvaged vehicles; I think there might be a couple of things they could do to screen it.

Commissioner Fisher – I would put out there that we do require covered stalls there, we will be able to see that area. I don't want to add any cost to development but there have been too many approved that we regret.

Commissioner Rogers – I like the consideration of the covered parking and the addition of the trees around the storage area.

Trevor Sharp – We could mix it with evergreens, you would have to look pretty hard to see that.

Commissioner Rogers – I am mindful of the covered parking, that would be difficult, they would be double stacked, and taking them off the tow truck would be difficult. You could berm it and put the wall on top of the berm.

Commissioner Fisher – I am just putting it out there because we have approved other things along this freeway that I don't like seeing.

Discussion continued regarding what will be seen from the freeway and what kind of screening may be needed.

MOTION: Commissioner Rogers made a motion to recommend approval of Item 1B with a recommendation of an addition of a 4 ft berm with a 6 ft wall and increased planting for screening trees to provide additional screening of the storage area on lot 7.
SECOND: Commissioner Chapman
Commissioner Anderson – Will you add cross access and parking on lots 6 and 7?
Commissioner Rogers – Yes.
Carol Davidson – Can I get clarification on where this berm is that you're talking about?

Commissioner Rogers – The west property line and the south to the gate on the freeway side.
Carol Davidson – I'm just not sure there is room for a berm there landscape wise.
RESTATED MOTION – Commissioner Rogers made a motion to recommend approval of Item 1B with a recommendation of adding a 4 ft berm along the west side and the south side along I-15 to the location of the gate with a 6 ft wall on top of the berm, additional screening trees and evergreens and the inclusion of a cross parking and access agreement between lots 6 and 7.
SECOND – Commissioner Chapman
Commissioner Fisher – We want to clarify that the cross access and the cross parking does not include the enclosed area behind the building on lot number 7.
Chair Kemp – Would you agree to make that amendment to your motion?
Commissioner Rogers – Agreed
Chair Kemp – Do you still Second?
Commissioner Chapman – Yes.
ROLL CALL VOTE:
AYES (1)
Chair Kemp
Commissioner Anderson
Commissioner Chapman
Commissioner Rogers
NAYS (1)
Commissioner Nathan Fisher
Motion Carries

2. PRELIMINARY PLATS (PP) Administrative

A. Consider a request for a preliminary plat to create seven pads for a hotel resort to be known as Atara Resort At Desert Color located south of the Lagoon Pkwy and Painted Ridge Pkwy intersection on the east side of Painted Ridge Pkwy at approximately 5560 South. The property is 76.04 acres and is zoned PD-R TNZ Resort. The applicant is Desert Color St. George, LLC, and the representative is Craig Coats. Case No. 2023-PP-008 (Staff – Dan Boles)

Dan Boles presented the following:

This item was continued with item 1A

MOTION: Commissioner
SECOND: Commissioner
ROLL CALL VOTE:
AYES (5)
Chair Kemp
Commissioner Anderson
Commissioner Chapman
Commissioner Rogers
Commissioner Nathan Fisher
NAYS (0)
Motion Carries unanimous vote

B. Consider a request for a four (4) lot commercial subdivision known as Smith's Marketplace Sun River located at approximately 4582 S Pioneer Road. The property is 15.96 acres and is zoned PD-C. The applicant is AWA Engineering, and the representative is Shaun Young. Case No. 2023-PP-009 (Staff – Carol Davidson)

Carol Davidson presented the following:

Carol Davidson – There are 4 lots, where the actual store is going is the biggest lot. There will be a fuel center and then 2 vacant lots for future developments. Something to point out, we have 3 right of ways and then the 4th side that is Havasu Drive and that will be a private drive not a public street.

Chair Kemp – Will there be any CCRs or any deed restrictions on these lots?

Carol Davidson – As far as?

Chair Kemp – Most of the commercial projects that I have been involved with, they will deed restrict them from being able to or have CCRs on the project that says you can't do certain uses on them.

Discussion continued on whether these lots would have CCRs or deed restrictions on uses.

Commissioner Fisher – When it comes to the uses the PD-C has the uses.

MOTION: Commissioner Fisher made a motion to recommend approval of item 2B a preliminary plat.
SECOND: Commissioner Anderson
ROLL CALL VOTE:
AYES (5)
Chair Kemp
Commissioner Anderson
Commissioner Chapman
Commissioner Rogers
Commissioner Nathan Fisher
NAYS (0)
Motion Carries unanimous vote

C. Consider a request for an eighty-five (85) lot residential subdivision known as White Trails Phases 4-6 located the north of White Dome Drive and east of River Road. The property is 12.87 acres and is zoned PD-R. The applicant is Prime Directive Holdings LLC, and the representative is Mike Terry, DSG Engineering. Case No. 2023-PP-007 (Staff – Carol Davidson)

Carol Davidson presented the following:

Carol Davidson – It looks like it's going to be an island, but it does have developments approved around it but by the time they get around to developing it there will be access.

Chair Kemp – Will the open space be deeded to the City?

Mike Terry – We will deed it to the HOA for White Dome Apartments.

MOTION: Commissioner Anderson made a motion to recommend approval of item 2C to City Council.
SECOND: Commissioner Rogers
ROLL CALL VOTE:
AYES (5)
Chair Kemp
Commissioner Anderson
Commissioner Chapman
Commissioner Rogers
Commissioner Nathan Fisher
NAYS (0)
Motion Carries unanimous vote

D. Consider a request for a two (2) lot residential subdivision known as the Leslie Dunbar Trust Preliminary Plat. The property is 6.94 acres and is zoned A-1. The applicant is Civil Science, and the representative is Brandee Walker. Case No. 2023-PP-010 (Staff – Dan Boles)

Dan Boles presented with no further comment.

MOTION: Commissioner Anderson made a motion to recommend approval to City Council of Item 2D.
SECOND: Commissioner Rogers
ROLL CALL VOTE:
AYES (5)
Chair Kemp
Commissioner Anderson
Commissioner Chapman
Commissioner Rogers
Commissioner Nathan Fisher
NAYS (0)
Motion Carries unanimous vote

3. MINUTES

Consider a request to approve the meeting minutes from the March 14, 2023, meeting.

MOTION: Commissioner Rogers made a motion to approve the minutes.
SECOND: Commissioner Anderson
ROLL CALL VOTE:
AYES (5)
Chair Kemp
Commissioner Anderson
Commissioner Chapman
Commissioner Rogers
Commissioner Nathan Fisher

NAYS (0)
Motion Carries unanimous vote

4. CITY COUNCIL ACTIONS

Report on items heard at the March 16, 2023, City Council meeting.

1. 2023-ZC-002 Old Farm

5. ADJOURN

MOTION: Commissioner Fisher made a motion to adjourn at 8:47 pm.
SECOND: Commissioner Rogers
ROLL CALL VOTE:
AYES (5)
Chair Kemp
Commissioner Anderson
Commissioner Chapman
Commissioner Rogers
Commissioner Nathan Fisher
NAYS (0)
Motion Carries unanimous vote

Letter to City of Saint George

Atara Resort at Desert Color. Case No. 2023-PDA-002

Mr. Boles, and to the City of Saint George, its Planning Commission and Board of Directors.

My name is Carl Formato and I am speaking today in reference to Desert Color's request to amend the Desert Color Planned Development (PD), also known as Atara Resort at Desert Color, Case No. 2023-PDA-002, in opposition to this project request/PD Amendment.

I am a current homeowner in Desert Color residing at 5634 S. Ruby Dr, where my back yard directly faces the area where Desert Color wants to now build the Atara hotel, directly at and on Lizard Wash.

I, along with my neighbors who also back up to Lizard Wash where the proposed hotel site is to be built (and other homeowners, some who are here today), are quite upset and angry for a variety of reasons.

First off and most importantly, we were told the hotel would not be built there, but rather a small pool. We purchased one of most expensive owner occupied residential homes in Desert Color through AJ construction, and the deciding factor on us spending so much money on this house was specifically because we were told only the small pool would be built behind us near (not on top of) the Lizard Wash area. We were told this from the builder's realtor, the builder, and everyone else we spoke with at Desert Color. We were specifically told that the hotel would be built at the retail and commercial areas as originally planned.

In addition to the fact that we feel we were lied to, we are concerned that having this commercial property in a currently residential zoned location will create the following negative effects:

- Environmental, Agriculture, and Topography effects (surface soil, erosion or compaction caused by construction activities or disruption of natural waterway flows and drainage patterns).
  - Are you aware the new proposed hotel site and Lizard Wash is listed and protected under FEMAs current special flood hazard areas.
    - Has an environmental study been conducted and reviewed by independent auditors? Or the Army Corp of Engineers? What will happen to the natural water flows, sustainability of current animals, plants and vegetation? Is this committee aware there is a family of red tailed hawks who live and feed in that area? As you are probably aware, the Red Tailed Hawk is federally protected under the Migratory Bird Treaty Act. Have the US Department of Agriculture or the US Fish and Wildlife been contacted regarding this proposal?

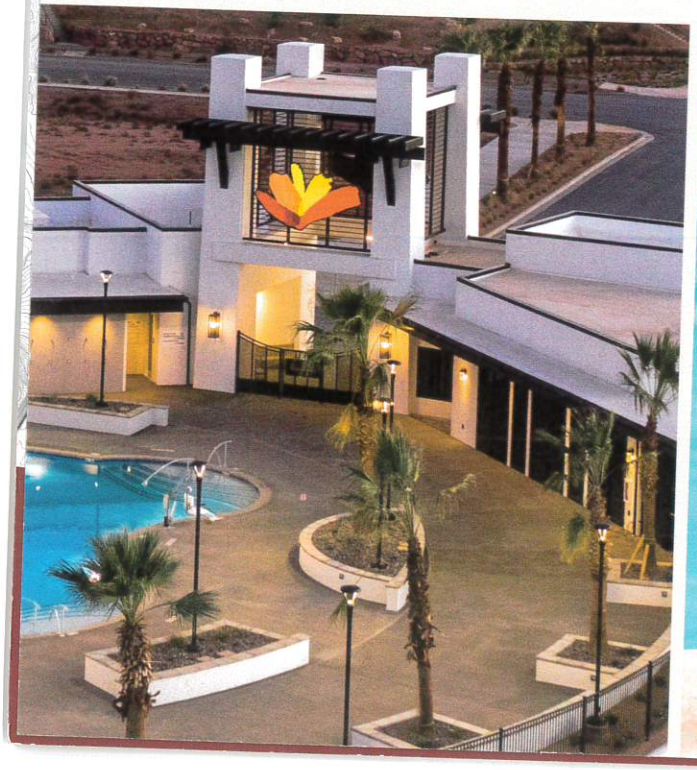
RESORT LIVING AT

DESERT COLOR

WELCOME TO DESERT COLOR

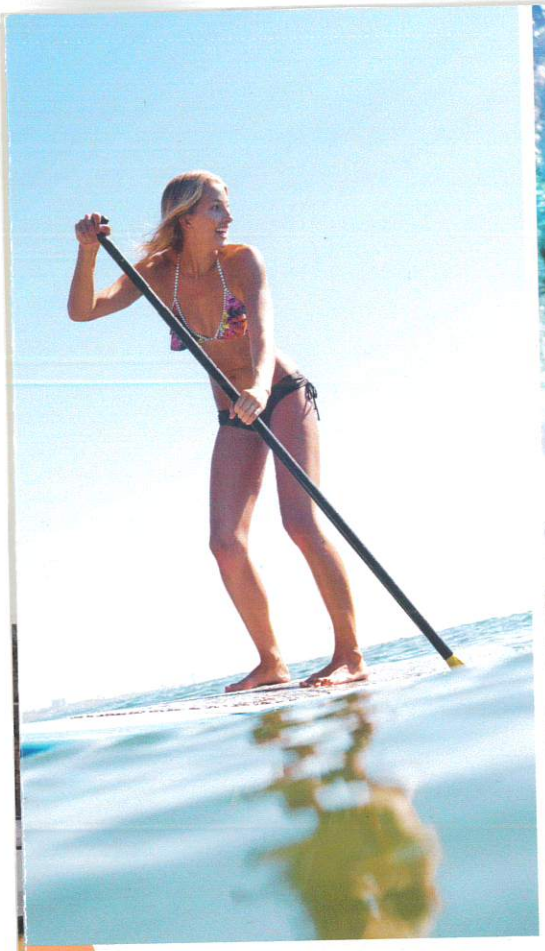
Desert Color is an amenity-rich master-planned community unlike any other. Created and built around a vision that has been thoughtfully designed and sustainably resourced, Desert Color's residential neighborhoods, resort and recreation areas, and town center will feature primary and secondary/vacation residences, shopping, dining, businesses, entertainment, hospitality and never-before-seen amenities.

There is something for everyone at Desert Color.



THE SHORES RESORT HAS IT ALL

The Shores Resort has a welcome center for nightly-rental check-in and visitors, a full-service restaurant, a pool-side bar flanked by lounge areas for private gatherings, pool-side cabanas where people can relax in the sun before and after a refreshing swim in the pool, and a roof-top sun deck for sunning or enjoying the stunning southern Utah landscape.



THE SHORES RESORT LAGOON

At roughly 2.5 acres of surface area and a half-mile of white-sand shoreline, The Shores Resort lagoon is the largest private body of water in the St. George area. The crystal clear waters will be the perfect place to swim, kayak, paddle-board and much more. Resort pools, beaches, nightly-rentals and homes surrounding the lagoon offer a lifestyle of relaxation and recreation.

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BIGSHOTS GOLF

Come out swinging at BigShots Golf, a tech-driven entertainment and culinary experience that is leveling up the dining and golf entertainment industry.

BigShots' far-reaching games and virtual courses are introducing 3D augmented reality to the game of golf like never before – perfect for those new to the game as well as seasoned pros. Here, we're all about bringing people together – whether to enjoy a shareable feast with locally-sourced menu options or just to kick back and hang out.

Come take your BigShot!


Close to:
St. George Airport—9 miles
Snow Canyon—10 miles
Zion Canyon—41 miles
Cedar Breaks—72 miles
Las Vegas—120 miles
Exit 2
Southern Parkway
I-15
1
2
3
4
5
6
7
8
1. BigShots Golf
2. Town Center
3. Lagoon
4. The Shores at Desert Color Neighboorhood
5. The Shores Resort
6. Auburn Hills Residential Neighborhood
7. Charter School
8. Active Adult Residential Neighborhood
DESERT COLOR
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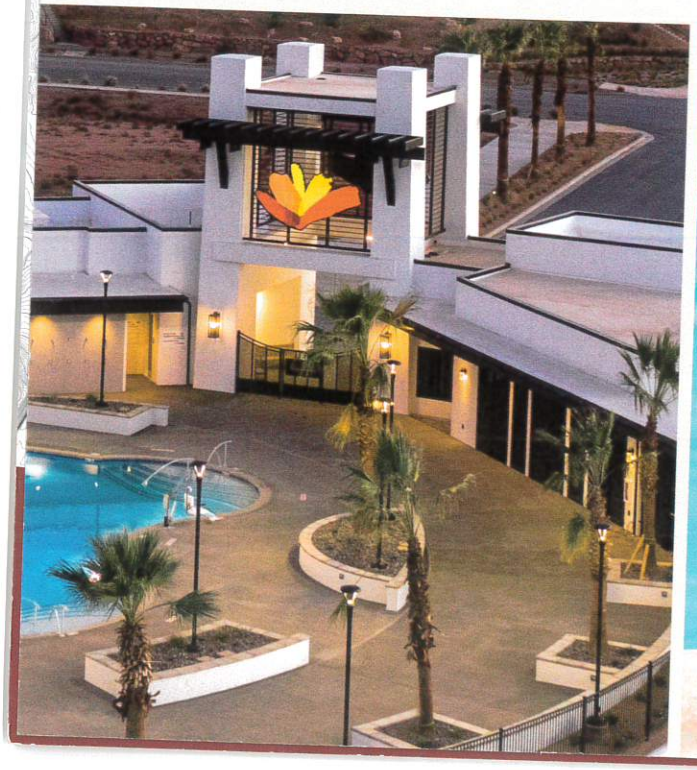

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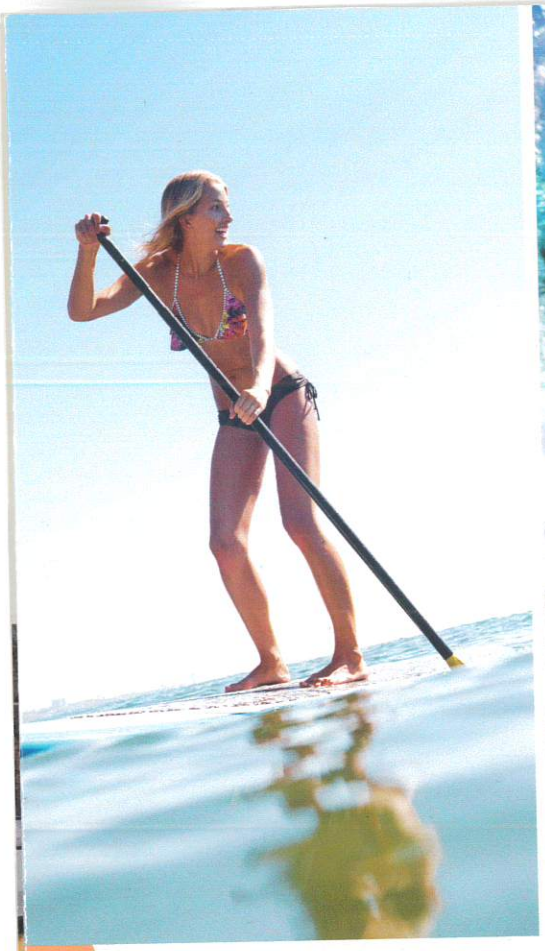

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