**HURRICANE CITY**
**UTAH**

**Mayor** Nanette Billings

**City Manager** Kaden DeMille

**Planning Commission**

*Mark Sampson, Chair*
*Paul Farthing, Alternate Chair*
*Ralph Ballard*
*Rebecca Broneman*
*Michelle Cloud*
*Shelley Goodfellow*
*Brad Winder*
*Kelby Iverson*

# Hurricane Planning Commission Meeting
# Agenda

January 26, 2023
5:00 PM
Hurricane City Offices 147 N 870 W, Hurricane

Notice is hereby given that the Hurricane City Planning Commission will hold a Regular Meeting commencing at 5:00 p.m. at the Hurricane City Offices 147 N 870 W, Hurricane, UT.

Meeting link:
https://cityofhurricane.webex.com/cityofhurricane/j.php?MTID=me42b4eb65609e35eb0e0664c925c9dbc
Meeting number:2632 882 4836
Password:HCplanning
Host key:730111
Join by phone+1-415-655-0001 US Toll
Access code: 2632 882 4836
Host PIN: 9461
Details on these applications are available in the Planning Department at the City Office, 147 N. 870 West.

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**5:00 p.m. - Planning Commission Business:**

1. Discussion of parking standards in Recreation Resort communities

**6:00 p.m. - Call to Order**

Roll Call

Pledge of Allegiance

Prayer and/or thought by invitation

Declaration of any conflicts of interest

**OLD BUSINESS**

1. 2023-LUCA-01: Discussion and consideration of a recommendation to the City Council on a Land Use Code Amendment request to Title 10 Chapter 32: Landscaping and Screening to make updates to water conservation standards. Hurricane City Applicant.
2. 2022-PP-26: Discussion and consideration of a recommendation to the City Council on a preliminary plat for Desert Sky Estates, a 73 lot residential subdivision located

at 2100 W and 3350 S. Desert Sky Estates Applicant. Ben Wilits and Tony Carter Agents.

3. 2022-PP-20 2022-PSP-38: Discussion and Consideration of a recommendation to the City Council of a preliminary plat for Southern Dunes Townhomes, a recreation resort 345 townhome development located at 2600 W and 4200 S. Southern Dunes Townhomes Applicant. Bush & Gudgell, Inc Agent

**NEW BUSINESS**

1. 2023-PP-01: Discussion and consideration of a recommendation to the City Council on a preliminary plat for Dixie Meadows, a 238 lot single family subdivision, located at approximately 4392 W 2400 S. Western Mortgage and Realty Co-Brent Moser Applicant. ProValue Engineering-Karl Rasmussen Agent.
2. 2023-FSP-02: Discussion and consideration of a possible approval of an amended final site plan for the Car Barn located at 1550 W State St. Jonathan West Applicant.
3. 2023-CUP-03: Discussion and consideration of a possible approval of a conditional use permit for a greater height wall located at 4898 W 3150 S. Dixie Power-Russ Condie Applicant. Alliance Consulting Agent.
4. Presentation and discussion on growth in Hurricane in 2022.

**Adjournment**

**Discussion**

The property owner of Gateway at Sand Hollow Resort has requested to discuss with the Planning Commission our off-site parking standards in the code. They would like to provide a parking plan that would have a parking location near Sand Hollow Reservoir, then provide a shuttle service to transport those who are staying in the resort back and forth from the parking area. This currently would not be permitted by our code to be considered off-site parking.

Hurricane City Off-Site Parking Code:

**Sec. 10-34-5. - Parking Location**

*B. Off site parking. Where practical difficulties exist in providing on site parking or if public safety or convenience, or both, would be better served by locating parking on a separate lot, the Planning Commission may authorize off site parking subject to the following conditions:*

1. *Required parking spaces reserved for persons with disabilities shall not be located in an off site parking lot.*
2. *Off site parking lots shall be located in the same or a more intensive zone which applies to the property where the use served is located.*
3. *No off site parking space shall be located more than 500 feet from a public entrance of the use served, measured along the route of the shortest legal, practical walking distance. Off site parking shall not be separated from a principal use by a street right-of-way with a width of more than 72 feet.*
4. *Availability of each off site parking lot shall be assured by an agreement approved by the City which requires:*
    a. *The parking lot to be continuously available unless an alternative legal parking lot is provided;*
    b. *All spaces to be available without charge; and*
    c. *The Zoning Administrator to be notified 30 days prior to the expiration or termination of the agreement.*

*5. Before approving an off site parking lot, the Planning Commission shall find that such parking is conveniently usable without causing unreasonable:*

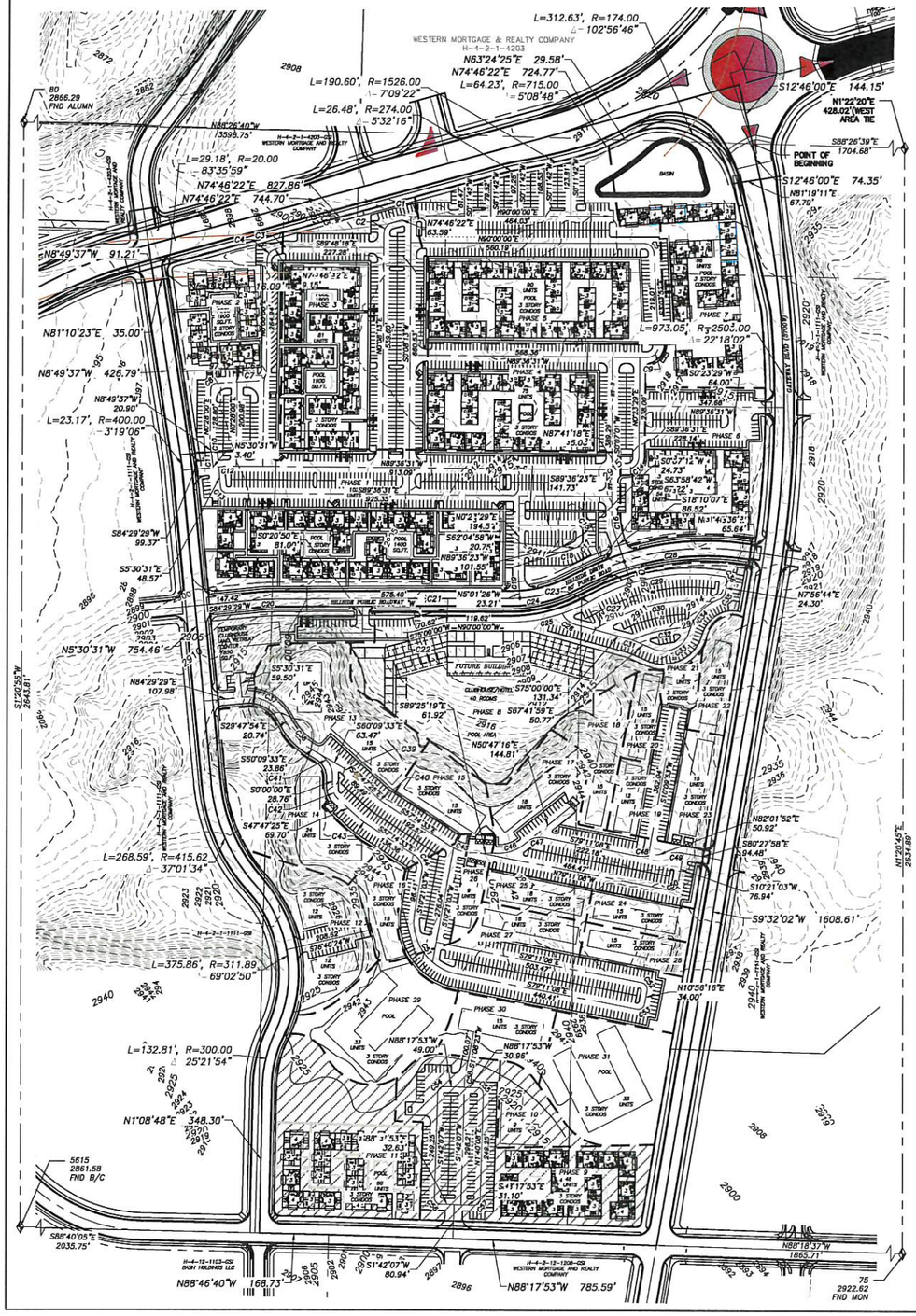
a. *Hazard to pedestrians;*
b. *Hazard to vehicular traffic;*
c. *Traffic congestion;*
d. *Interference with safe and convenient access to other parking areas in the vicinity;*
e. *Detriment to the appropriate use of business property in the vicinity; or*
f. *Detriment to any residential neighborhood.*

**Staff Recommendation:**

Staff recommends that the Planning Commission listen to the applicant's proposal and consider the implications of changing this code for this property and other properties throughout the City. Staff will draft an ordinance based on any recommendations that the Planning Commission may have

# PRELIMINARY PLAT FOR:
# GATEWAY AT SAND HOLLOW RESORT

**LOCATED IN SECTION 1, T42S, R14W, S.L.B.&M.**
**HURRICANE CITY, WASHINGTON COUNTY, UTAH**




## LAND USE SUMMARY (SITE DATA)

TOTAL RR UNITS = 882 (726 3 BED UNITS 126 4 BED UNITS)
TOTAL RM-3 UNITS = 117
TOTAL ALLOWED RR UNITS = 983 (15 UNITSx65.57 ACRES)
TOTAL ALLOWED RM-3 UNITS = 127 (15 UNITSx8.50 ACRES)
TOTAL HOTEL UNITS = 40
TOTAL REQUIRED PARKING = 2,858 (20 RETREAT CENTER, 48 HOTEL, 2790 CONDO)
TOTAL REQUIRED TRAILER PARKING = 194 OF THE 2838 PARKING
PHASE 1 PROVIDED = 396 + 12 (ADA – 8 REGULAR, 4 VAN)
PHASE 2 PROVIDED = 98 + 3 (ADA – 2 REGULAR, 1 VAN)
PHASE 3 PROVIDED = 145 + 9 (ADA – 6 REGULAR, 3 VAN)
PHASE 4-27 PROVIDED = 2,219

TOTAL OUTDOOR PARKING PROVIDED = 1518 NOS
TOTAL INDOOR GARAGE PARKING PROVIDED = 1340 NOS
TOTAL TRAILER/RV PARKING STALLS TO BE SUPPLIED OFF SITE = 189
TOTAL DEVELOPMENT AREA = 3,226,489.20 SQ.FT. (74.07 AC)
TOTAL REQUIRED POOL AREA = 4500 SQ.FT. (4 POOLS)
TOTAL CLUB HOUSE AREA = 4000 SQ.FT. (NON-OFFICE SPACE).

LANDSCAPING REQUIRED: 1 TREE AND 2 SHRUBS FOR EACH UNIT

## NOTES

STORM WATER CAN BE LOCALLY DETAINED AND CONTROLLED USING DETENTION BASINS. WATER WILL BE COLLECTED AND DELIVERED TO THE REGIONAL DETENTION BASIN AT THE PROPOSED PARK THERE ARE NO IRRIGATION FACILITIES.

PROPERTY CAN BE SERVED BY HURRICANE CITY WATER, AND ASH CREEK SPECIAL SERVICE DISTRICT.

THERE ARE NO WELLS, SPRINGS OR SEEPS ON THIS PROPERTY.

OWNER PLANS TO ALLOW PLACEMENT OF COMMUNICATIONS INFRASTRUCTURE AND PLACEMENT OF UTILITY INFRASTRUCTURE ON AND ALONG ALL RIGHTS-OF-WAY AND EASEMENTS.

## DESERT TORTOISE TAKE AREA

THE PROJECT IS NOT LOCATED IN A DESERT TORTOISE TAKE AREA. (PER RED CLIFFS DESERT RESERVE TAKE AREA 7 MAP)

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**SCALE IN FEET**

## LEGEND

- PROPERTY LINE
- ADJACENT PROPERTY LINE
- SECTION LINE
- STREET CENTERLINE
- 10' PUBLIC UTILITY EASEMENT LINE
- PHASE LINE
- SECTION CORNER AS DESCRIBED

NOTE: FOR CURVE TABLE & ROW CROSS-SECTIONS, SEE NEXT SHEET

## GEOLOGICAL SURVEY REPORT

### QBV: VOLCANO MOUNTAIN LAVA FLOW (MIDDLE PLEISTOCENE)

MEDIUM- TO DARK-GRAY TO GRAYISH-BLACK, FINE- TO MEDIUM-GRAINED ALKALI BASALT (QBV) WITH SPARSE OLIVINE PHENOCRYSTS; ERUPTED FROM A VENT AT VOLCANO MOUNTAIN (QBVC) SOUTHWEST OF HURRICANE; DIVISIBLE INTO THREE SEPARATE FLOWS (BIEK, 2003A, 2003B); YOUNGEST AND MIDDLE-LEVEL FLOWS YIELDED 40Ar/39Ar AGES OF 0.258 ± 0.024 MA AND 0.353 ± 0.045 MA, RESPECTIVELY (SANCHEZ, 1995), IN ACCORD WITH K-AR AGES OF 0.289 ± 0.085 AND 0.303 ± 0.30 (BEST AND OTHERS, 1980) ON THE MIDDLE-LEVEL FLOW; MIDDLE-LEVEL FLOW IS DISPLACED ABOUT 240 FEET (73 M) BY THE HURRICANE FAULT AT TIMPOWEAP CANYON AND LOCALLY HAS PILLOW BASALT AT ITS BASE; THE OLDEST LAVA FLOW FLOWED ABOUT 8 MILES (13 KM) DOWN THE VIRGIN RIVER; LAVA FLOWS ARE GENERALLY 35 TO 45 FEET (11-14 M) THICK AND FORM ROUGH, BLOCKY SURFACES, BUT THE MIDDLE-LEVEL FLOW IS AS MUCH AS 170 FEET (50 M) THICK WHERE IT FILLS THE ANCESTRAL VIRGIN RIVER CHANNEL.

### QAE: ALLUVIAL AND EOLIAN DEPOSITS (HOLOCENE TO UPPER PLEISTOCENE)

MODERATELY SORTED GRAVEL, SAND, AND SILT DEPOSITED IN SMALL CHANNELS AND ON ALLUVAL FLATS, AND WELL-SORTED, FINE- TO MEDIUM-GRAINED, REDDISH-BROWN EOLIAN SAND LOCALLY REWORKED BY ALLUVAL PROCESSES; YOUNGER DEPOSITS (QAE) FORM ACTIVE DEPOSITIONAL SURFACES, WHEREAS OLDER DEPOSITS (QAEO) TYPICALLY FORM INCISED, INACTIVE SURFACES; AS MUCH AS ABOUT 20 FEET (6 M) THICK.

## GEOLOGICAL HAZARDS

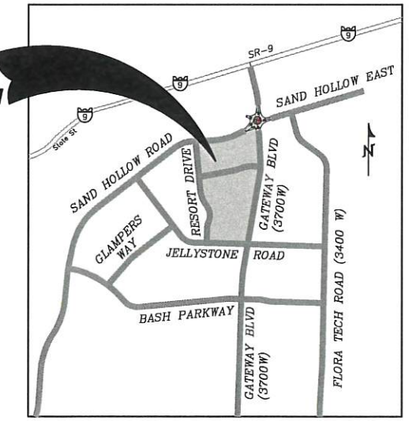
| | |
|---|---|
| FAULTS & SURFACE FAULTING | NONE |
| LIQUEFACTION | H2 – HIGH2–SIMILAR IN TEXTURE TO 'HIGH' CATEGORY, NO GROUND–WATER INFORMATION |
| FLOODING | ZONE X–AREA OF MINIMAL FLOOD HAZARD |
| LANDSLIDE HAZARD | NONE |
| ROCKFALL HAZARD | NONE |
| BRECCIA PIPES AND PALEOKARST | NONE |
| CALICHE | CA – CALICHE |
| COLLAPSIBLE SOIL | CSA–STREAM/TERRACE ALLUVIUM >=3% |
| EXPANSIVE SOIL | ESM–SOILS WITH MODERATE SUSCEPTIBILITY FOR EXPANSION ESL–SOILS WITH LOW SUSCEPTIBILITY FOR EXPANSION |
| GYPSIFEROUS SOIL & ROCK | NONE |
| PIPING & EROSION | P&ES–SOILS SUSCEPTIBLE TO PIPING AND EROSION |
| SHALLOW BEDROCK | BRB–BURIED: AREAS WHERE DEPTH TO BEDROCK IS GENERALLY ≤10 FEET BENEATH SOIL COVER |
| WIND BLOWN SAND | WBSL–LOW: MIXED–UNIT GEOLOGIC DEPOSITS WTH WIND–BLOWN COMPONENT |
| SHALLOW GROUND WATER | SGW3–MODERATLY TO FREELY DRAINING SOILS WITH SEASONAL OR TRANSIENT SHALLOW GROUND WATER |

THE MITIGATION OF POTENTIAL HAZARDS WILL BE RECOMMENDED IN THE FUTURE GEOTECHNICAL REPORT.

## LEGAL DESCRIPTION FOR GATEWAY AT SAND HOLLOW:

BEGINNING AT A POINT LOCATED S88°26'39"E ALONG THE SECTION LINE 1704.68 FEET AND WEST FROM THE EAST QUARTER CORNER OF SECTION 1, TOWNSHIP 42 SOUTH, RANGE 14 WEST, SALT LAKE BASE AND MERIDIAN; THENCE S12°46'00"E 74.35 FEET; THENCE SOUTHERLY ALONG THE ARC OF A 2500.00 FOOT RADIUS CURVE TO THE RIGHT A DISTANCE OF 973.05 FEET, THROUGH A CENTRAL ANGLE OF 22°18'02", (LONG CHORD BEARS: S01°36'59"E 966.92 FEET); THENCE S09°32'02"W 1608.61 FEET; THENCE N88°17'53"W 785.59 FEET; THENCE N88°46'40"W 168.73 FEET; THENCE N01°08'48"E 348.30 FEET; THENCE NORTHERLY ALONG THE ARC OF A 300.00 FOOT RADIUS CURVE TO THE RIGHT A DISTANCE OF 132.81 FEET, THROUGH A CENTRAL ANGLE OF 25°21'54", (LONG CHORD BEARS: N13°49'48"E 131.73 FEET); THENCE NORTHERLY ALONG THE ARC OF A 311.89 FOOT RADIUS REVERSE CURVE TO THE LEFT A DISTANCE OF 375.86 FEET, THROUGH A CENTRAL ANGLE OF 69°02'50", (LONG CHORD BEARS: N08°00'40"W 353.53 FEET); THENCE NORTHWESTERLY ALONG THE ARC OF A 415.62 FOOT RADIUS REVERSE CURVE TO THE RIGHT A DISTANCE OF 268.59 FEET, THROUGH A CENTRAL ANGLE OF 37°01'34", (LONG CHORD BEARS: N24°01'18"W 263.94 FEET); THENCE N05°30'31"W 754.46 FEET; THENCE NORTHERLY ALONG THE ARC OF A 400.00 FOOT RADIUS CURVE TO THE LEFT A DISTANCE OF 23.17 FEET, THROUGH A CENTRAL ANGLE OF 03°19'06", (LONG CHORD BEARS: N07°10'04"W 23.16 FEET); THENCE N08°49'37"W 426.79 FEET; THENCE N08°49'37"W 91.21 FEET; THENCE N74°46'22"E 744.70 FEET; THENCE N74°46'22"E 724.77 FEET; THENCE S12°46'00"E 144.15 FEET TO THE POINT OF BEGINNING. AREA CONTAINS 3226665 SQUARE FEET OR 74.074 ACRES.

**PROJECT LOCATION**




## VICINITY MAP

N.T.S

## OWNERS:

CONTACT REPRESENTATIVE
BRENT MOSER
TELEPHONE: (801)-793-0346
EMAIL:
ENHANCEDHOMESOFUTAH@GMAIL.COM
THEBEACHATSANDHOLLOW@GMAIL.COM

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| REVISIONS | | | |
|---|---|---|---|
| NO | DESCRIPTION | DATE | BY |

PROVALUE ENGINEERING, INC.
Engineers - Land Surveyors - Land Planners
20 South 850 West, Suite 1
Hurricane City, Utah 84737
Phone: (435) 668-0507

PRELIMINARY PLAT FOR:
GATEWAY AT SAND HOLLOW RESORT
LOCATED IN SECTION 1, T42S, R14W, S.L.B.&M.
HURRICANE CITY, WASHINGTON COUNTY, UTAH

DATE: 11/16/2022
SCALE: 1"=150'

JOB NO.
281-012

SHEET NO:
**1 OF 3**

PRELIMINARY PLAT

# PRELIMINARY PLAT FOR:
# GATEWAY AT SAND HOLLOW RESORT

**LOCATED IN SECTION 1, T42S, R14W, S.L.B.&M.**
**HURRICANE CITY, WASHINGTON COUNTY, UTAH**

## SITE DATA

TOTAL UNITS = 945 (849 3 BED UNITS 96 4 BED UNITS)
TOTAL ALLOWED UNITS = 1036 (15 UNITSx69.09 ACRES)
TOTAL HOTEL UNITS = 130
TOTAL REQUIRED PARKING = 3,091 (8 STAFF, 20 RETREAT CENTER, 132 HOTEL, 2931 CONDO)
TOTAL REQUIRED TRAILER PARKING = 189 OF THE 3091 PARKING
PHASE 1 PROVIDED = 396 + 12 (ADA – 8 REGULAR, 4 VAN)
PHASE 2 PROVIDED = 98 + 3 (ADA – 2 REGULAR, 1 VAN)
PHASE 3 PROVIDED = 145 + 9 (ADA – 6 REGULAR, 3 VAN)
PHASE 4–27 PROVIDED = 855

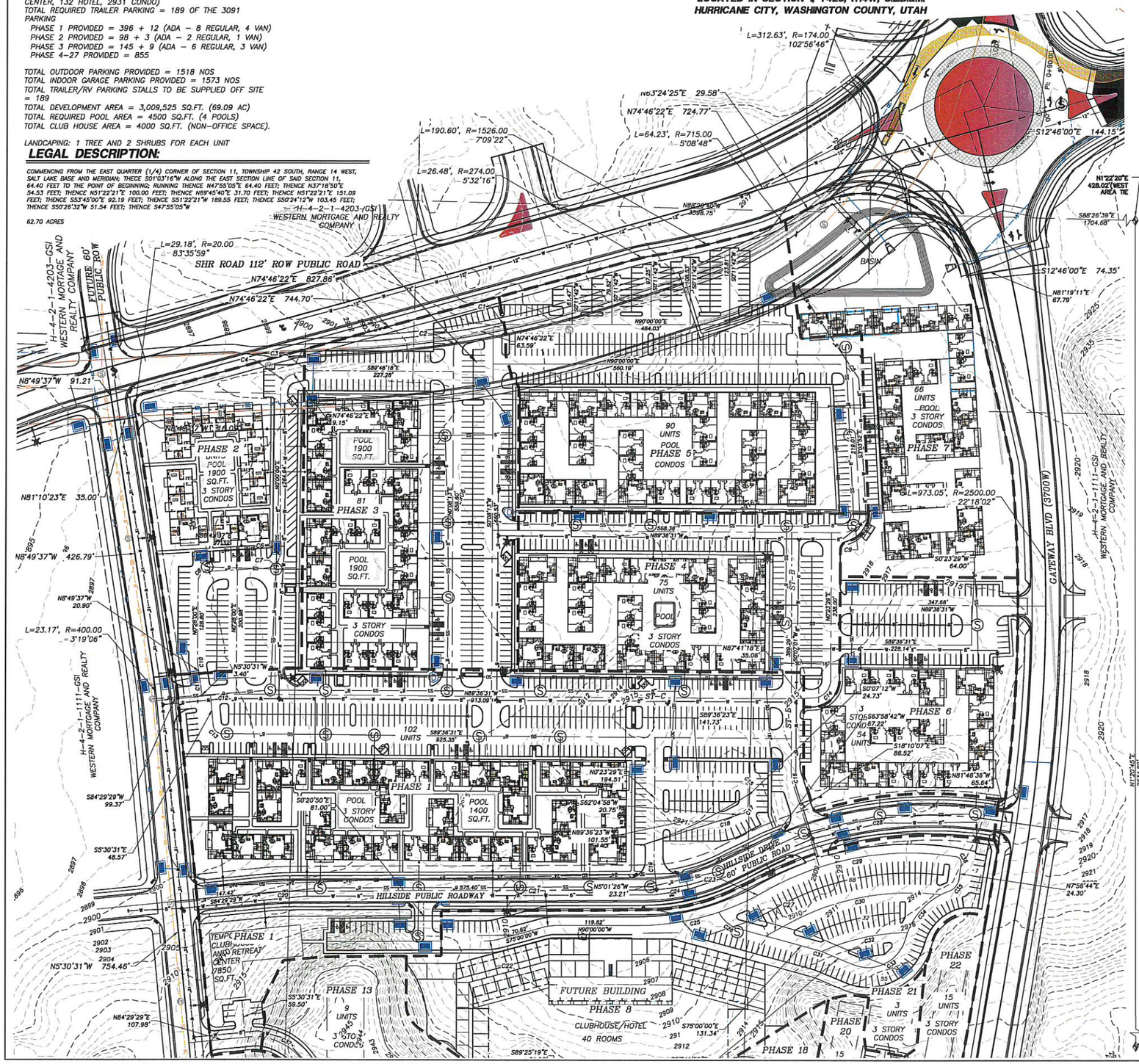
TOTAL OUTDOOR PARKING PROVIDED = 1518 NOS
TOTAL INDOOR GARAGE PARKING PROVIDED = 1573 NOS
TOTAL TRAILER/RV PARKING STALLS TO BE SUPPLIED OFF SITE = 189
TOTAL DEVELOPMENT AREA = 3,009,525 SQ.FT. (69.09 AC)
TOTAL REQUIRED POOL AREA = 4500 SQ.FT. (4 POOLS)
TOTAL CLUB HOUSE AREA = 4000 SQ.FT. (NON–OFFICE SPACE).

LANDCAPING: 1 TREE AND 2 SHRUBS FOR EACH UNIT

## LEGAL DESCRIPTION:

COMMENCING FROM THE EAST QUARTER (1/4) CORNER OF SECTION 11, TOWNSHIP 42 SOUTH, RANGE 14 WEST, SALT LAKE BASE AND MERIDIAN; THECE S01°03'16"W ALONG THE EAST SECTION LINE OF SAID SECTION 11, 64.40 FEET TO THE POINT OF BEGINNING; RUNNING THENCE N47°55'05"E 64.40 FEET; THENCE N37°18'50"E 54.53 FEET; THENCE N51°22'21"E 100.00 FEET; THENCE N89°45'40"E 31.70 FEET; THENCE N51°22'21"E 151.09 FEET; THENCE S53°45'00"E 92.19 FEET; THENCE S51°22'21"W 189.55 FEET; THENCE S50°24'12"W 103.45 FEET; THENCE S50°26'32"W 51.54 FEET; THENCE S47°55'05"W

62.70 ACRES




## LEGEND

- PROPERTY LINE
- ADJACENT PROPERTY LINE
- SECTION LINE
- STREET CENTERLINE
- 10' PUBLIC UTILITY EASEMENT LINE
- EXISTING WATERLINE INSTALLED WITH OTHER PID ROAD (SIZE AS SHOWN)
- PROPOSED WATERLINE (SIZE AS SHOWN)
- PROPOSED VALVE
- PROPOSED HYDRANT
- WATER METER
- THREE WAY CLUSTER VALVE
- SECTION CORNER AS DESCRIBED
- EXISTING STRUCTURE INSTALLED WITH PID ROADS
- PROPOSED SEWER LINE
- PROPOSED MANHOLE
- EXISTING SEWER MAIN INSTALLED WITH PID ROADS

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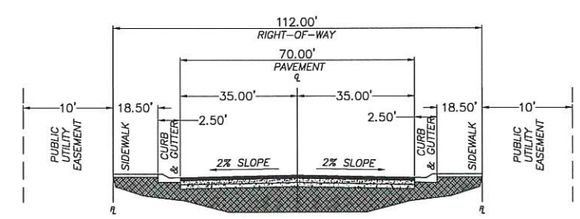
SCALE IN FEET

## CURVE TABLE

| CURVE | LENGTH | RADIUS | CHORD DIST. | CHORD BRG. | DELTA |
|---|---|---|---|---|---|
| C1 | 6.64' | 25.00' | 6.62' | N82°23'11"E | 15°13'38" |
| C2 | 32.57' | 25.00' | 30.31' | N37°27'17"E | 74°38'09" |
| C3 | 26.92' | 100.00' | 26.84' | N82°29'02"E | 15°25'20" |
| C4 | 32.63' | 25.00' | 30.36' | N37°23'11"E | 74°46'22" |
| C5 | 37.93' | 25.00' | 34.40' | S46°31'56"E | 86°56'08" |
| C6 | 14.84' | 25.00' | 14.63' | N17°00'31"E | 34°01'01" |
| C7 | 22.99' | 25.00' | 22.19' | N60°21'49"E | 52°41'36" |
| C8 | 22.58' | 15.00' | 20.51' | N43°35'19"E | 86°14'38" |
| C9 | 47.30' | 29.00' | 42.23' | S43°39'48"W | 93°27'20" |
| C10 | 6.49' | 40.00' | 6.48' | N4°10'49"W | 9°17'37" |
| C11 | 27.45' | 474.00' | 27.45' | N7°10'04"W | 3°19'06" |
| C12 | 20.59' | 200.00' | 20.59' | S87°26'29"W | 5°54'00" |
| C13 | 22.02' | 15.00' | 20.09' | S47°33'31"E | 84°06'00" |
| C14 | 45.55' | 29.00' | 41.01' | N45°23'29"E | 90°00'00" |
| C15 | 15.66' | 10.00' | 14.11' | S44°44'36"E | 89°43'36" |
| C16 | 15.96' | 50.00' | 15.89' | S9°01'33"E | 18°17'08" |
| C17 | 16.70' | 15.00' | 15.85' | S32°00'44"W | 63°47'03" |
| C18 | 24.71' | 50.00' | 24.46' | S76°14'17"W | 28°18'38" |
| C19 | 27.21' | 233.36' | 27.20' | N3°08'36"W | 6°40'55" |
| C20 | 45.05' | 500.00' | 45.03' | S87°04'20"W | 5°09'43" |
| C21 | 26.18' | 100.00' | 26.11' | S82°30'00"W | 15°00'00" |
| C22 | 25.57' | 100.00' | 25.50' | S82°19'35"W | 14°39'10" |
| C23 | 17.58' | 415.00' | 17.57' | S61°36'04"W | 2°25'36" |
| C24 | 145.64' | 300.00' | 144.21' | S75°44'45"W | 27°48'54" |
| C25 | 205.35' | 415.00' | 203.26' | S76°59'23"W | 28°21'02" |
| C26 | 43.28' | 51.22' | 42.01' | S50°27'36"E | 48°25'08" |
| C27 | 32.07' | 479.00' | 32.06' | N62°18'22"E | 3°50'10" |
| C28 | 364.22' | 650.00' | 359.47' | S82°10'16"W | 32°06'17" |
| C29 | 325.22' | 483.68' | 319.13' | S79°39'02"W | 38°31'31" |
| C30 | 267.28' | 419.68' | 262.78' | N78°37'58"E | 36°29'22" |
| C31 | 12.74' | 100.00' | 12.73' | S71°21'00"E | 7°18'01" |
| C32 | 144.37' | 355.68' | 143.38' | S77°44'15"W | 23°15'25" |
| C33 | 107.20' | 63.52' | 94.92' | N64°01'59"E | 96°41'42" |
| C34 | 108.60' | 112.40' | 104.42' | N42°38'12"E | 55°21'28" |
| C35 | 27.21' | 25.00' | 25.89' | N39°07'50"E | 62°22'12" |
| C36 | 15.54' | 10.00' | 14.02' | N36°34'14"W | 89°01'56" |
| C37 | 104.93' | 100.00' | 100.18' | S59°51'28"E | 60°07'08" |




**112' ROW TYPICAL CROSS SECTION**
N.T.S

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| NO | DESCRIPTION | DATE | BY |
|---|---|---|---|
| | | | |

REVISIONS

PROVALUE ENGINEERING, INC.
Engineers - Land Surveyors - Land Planners
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Hurricane City, Utah 84737
Phone 1-435-635-0507

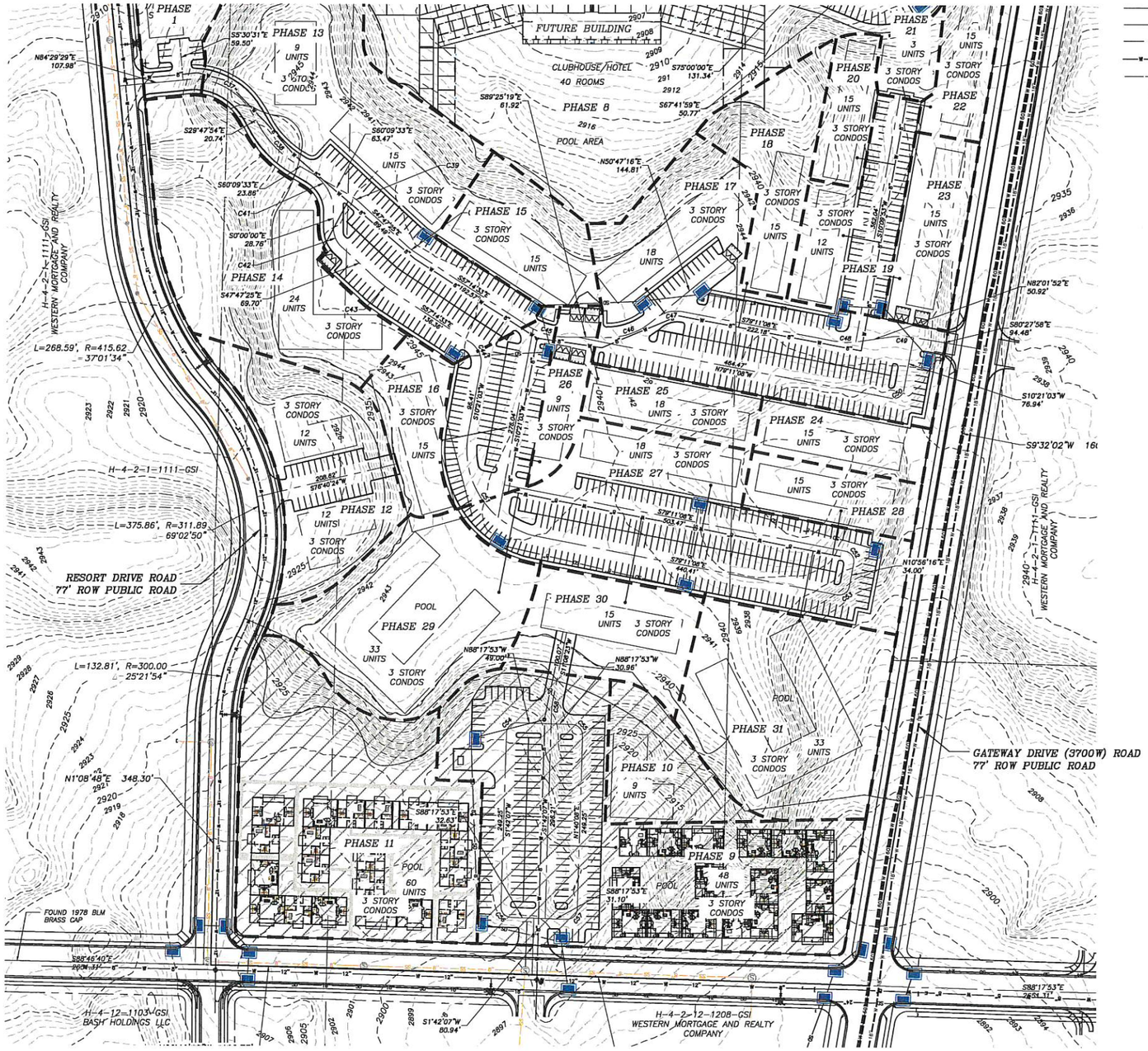
PRELIMINARY PLAT FOR:
GATEWAY AT SAND HOLLOW RESORT
LOCATED IN SECTION 1, T42S, R14W, S.L.B.&M.
HURRICANE CITY, WASHINGTON COUNTY, UTAH

DATE: 11/16/2022
SCALE: 1"=80'
JOB NO. 281-012
SHEET NO. 2 OF 3

PRELIMINARY PLAT

# PRELIMINARY PLAT FOR:
# GATEWAY AT SAND HOLLOW RESORT

**LOCATED IN SECTION 1, T42S, R14W, S.L.B.&M.**
**HURRICANE CITY, WASHINGTON COUNTY, UTAH**




## LEGEND

| | | | |
|---|---|---|---|
| PROPERTY LINE | | PROPOSED SEWER LINE | |
| ADJACENT PROPERTY LINE | | PROPOSED VALVE | |
| SECTION LINE | | PROPOSED HYDRANT | |
| STREET CENTERLINE | | WATER METER | |
| 10' PUBLIC UTILITY EASEMENT LINE | | THREE WAY CLUSTER VALVE | |
| PROPOSED WATERLINE (SIZE AS SHOWN) | | SECTION CORNER AS DESCRIBED | |
| EXISTING SEWER MAIN INSTALLED WITH PID ROADS | | PROPOSED MANHOLE | |
| EXISTING STRUCTURE INSTALLED WITH PID ROADS | | EXISTING WATERLINE INSTALLED WITH OTHER PID ROAD (SIZE AS SHOWN) | |

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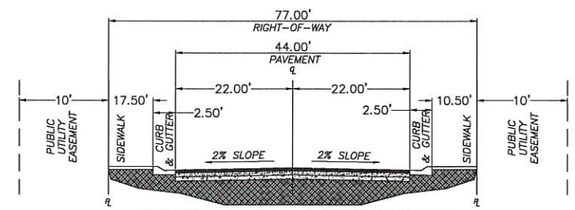
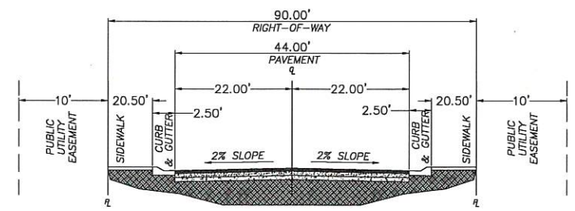
**SCALE IN FEET**

| | | | | | |
|---|---|---|---|---|---|
| C37 | 104.93' | 100.00' | 100.18' | S59°51'28"E | 60°07'08" |
| C38 | 79.48' | 150.00' | 78.56' | S44°58'44"E | 30°21'39" |
| C39 | 21.59' | 100.00' | 21.55' | S53°58'29"E | 12°22'08" |
| C40 | 16.50' | 100.00' | 16.48' | S52°30'59"E | 9°27'08" |
| C41 | 61.69' | 65.00' | 59.40' | S32°12'05"E | 54°22'56" |
| C42 | 30.03' | 36.00' | 29.16' | S23°53'43"E | 47°47'25" |
| C43 | 27.22' | 165.00' | 27.19' | S52°30'59"E | 9°27'08" |
| C44 | 40.11' | 34.00' | 37.82' | S23°26'45"E | 67°35'35" |
| C45 | 56.16' | 100.00' | 55.43' | S73°19'56"E | 32°10'46" |
| C46 | 67.78' | 100.00' | 66.49' | N71°09'35"E | 38°50'13" |
| C47 | 36.69' | 50.00' | 35.88' | N80°57'19"E | 42°02'50" |
| C48 | 32.78' | 100.00' | 32.64' | S88°34'38"E | 18°47'00" |
| C49 | 30.55' | 100.00' | 30.43' | S89°13'03"E | 17°30'10" |
| C50 | 23.68' | 15.00' | 21.30' | N55°34'57"E | 90°27'50" |
| C51 | 199.24' | 127.50' | 179.58' | S34°25'03"E | 89°32'10" |
| C52 | 15.96' | 50.00' | 15.89' | S9°01'33"E | 18°17'08" |
| C52 | 23.59' | 15.00' | 21.24' | N34°07'26"W | 90°07'23" |
| C53 | 23.53' | 15.00' | 21.19' | N55°52'34"E | 89°52'37" |
| C54 | 23.56' | 15.00' | 21.21' | S46°42'07"W | 90°00'00" |
| C55 | 23.55' | 15.00' | 21.21' | N43°18'53"W | 89°58'02" |
| C56 | 23.56' | 15.00' | 21.21' | S43°17'53"E | 90°00'00" |
| C57 | 23.57' | 15.00' | 21.22' | N46°41'07"E | 90°01'58" |
| C58 | 16.47' | 100.00' | 16.45' | S6°25'15"W | 9°26'17" |




**77' ROW TYPICAL CROSS SECTION**
N.T.S




**90' ROW TYPICAL CROSS SECTION**
N.T.S

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REVISIONS

| NO | DESCRIPTION | DATE | BY |
|---|---|---|---|
| | | | |

PROVALUE ENGINEERING, INC.
Engineers - Land Surveyors - Land Planners
20 South 850 West, Suite 1
Hurricane City, Utah 84737
Phone: (435) 668-8587

PRELIMINARY PLAT FOR:
GATEWAY AT SAND HOLLOW RESORT
LOCATED IN SECTION 1, T42S, R14W, S.L.B.&M.
HURRICANE CITY, WASHINGTON COUNTY, UTAH

DATE: 11/16/2022
SCALE: 1"=80'

JOB NO.
281-012

SHEET NO:
**3 OF 3**

PRELIMINARY PLAT

**Discussion**

The Mayor has asked the Planning Commission to consider an update to the Water Conservation section of the City Landscape Code. This allows Hurricane residents to qualify for grants and reimbursement programs by the state and the Washington County Water Conservation District. See the links below:

https://conservewater.utah.gov/grass-removal-rebates/

https://www.wcwcd.org/conservation/rebates/water-efficient-landscape-rebate/

To qualify, the City needs to update the standard on how much percentage of lawn is allowed in residential areas, namely up to 8% or 2,500 sq. ft. max.

Staff has also inserted a couple of other sections for the Planning Commission to consider regarding restricting new golf courses, water parks, lakes and ponds, and car washes.

Staff has also removed a section of landscape code about building frontage landscaping that staff was directed to no longer enforce a few years ago.

# CHAPTER 32. LANDSCAPING AND SCREENING

## Sec. 10-32-1. Purpose.

The purpose of this chapter is to promote public health, safety and welfare by establishing minimum standards for the preservation, installation and maintenance of landscaping and buffering. This chapter is intended to achieve the following objectives:

A. To improve the aesthetic appearance of development by establishing minimum landscaping standards;

B. To promote water conservation by encouraging the use of drought tolerant landscape material; and

C. To maintain and improve environmental conditions by providing groundwater recharge areas and minimizing stormwater runoff, noise and glare.

(Ord. 2004-15, 6-17-2004)

## Sec. 10-32-2 Definitions

The following definitions shall apply to this ordinance:

Active Recreation Area: An area that is dedicated to active play or other recreation purposes where grass may be used as the recreation surface. Examples of active recreation areas include sports fields, play areas, and other similar uses designated for outdoor activity.

Grass~~.~~: A surface layer of earth containing irrigated grass~~ with its roots~~.

Hurricane Canal Company: A Utah non-profit corporation identified as the Hurricane Canal Company that ~~A water users' association that~~ provides secondary water to shareholders within the Hurricane City area.

Irrigation Plan: A plan that shows the components of ~~the~~an irrigation system, including~~ with~~ water meter size, backflow prevention, precipitation rates, flow rate, ~~and~~ operating pressure for each irrigation circuit, and identification of all irrigation equipment.

Landscape Area: Area within a lot, parcel, or development that is not the home footprint, driveway, sidewalk or patio. Areas utilized for agriculture are not Landscaped Areas.

Landscape Plan or Planting Plan: A plan that clearly and accurately identifies the location and species of new and existing trees, shrubs, ground covers, and other plants on a site, and any other landscape element, and includes an irrigation plan.

Park Strip: A typically narrow landscaped area located between the back-of-~~b~~curb and sidewalk.

Secondary Irrigation Water: Non-potable water that is untreated and used for irrigation of outdoor landscaping.

Secondary Irrigation System: A water system designed to deliver Secondary Irrigation Water to property for the purpose of irrigation of outdoor landscaping.

Water Park: A~~n outdoor~~ water play area designed for ~~the use of~~ commercial uses or resort developments with enhanced water features, including but not limited to pools, slides, splash pads, spray grounds, lazy rivers, or similar recreational water related activities. Water Parks are distinguished from pools or splash pads in that they contain ~~several~~ multiple water related features and are larger in impact~~ than a pool or splash pad~~.

## Sec. 10-32-~~2~~3. Scope.

Unless exempted as provided in subsection B of this section, or otherwise specifically provided elsewhere in this title, the standards and requirements for a landscape plan according to this chapter shall apply.

A. *Continuous maintenance.* Landscaping, buffering and site design features required by this chapter shall be continuously maintained as provided in this chapter.

B. *Exemption.* The provisions of this chapter shall not apply to ~~a single family dwelling or~~ any agricultural ~~or residential~~ use ~~in an agricultural zone.~~ Public, civil, and commercial permitted uses in an agricultural zone are not exempt.

(Ord. 2011-11, 12-15-2011)

**Commented [DH1]:** We need to clean up the applicability of the chapter. This section says that the chapter does not apply to single family dwellings. But, we want the water conservation section in the chapter to apply to new single family dwellings outside the canal company service area if they are connected to secondary water. I wanted to discuss before I started moving things around and making those types of changes.

## Sec. 10-32-~~3~~4. Landscaping plan.

A. *Information required.* Whenever a landscaping plan is required by this title, such plan shall demonstrate compliance with the provisions of this chapter and shall show the following information:

1. Landscaping materials;
2. Location and spacing of existing and proposed plantings;
3. Plant sizes;
4. Proposed treatment of ground surfaces;
5. Irrigation ~~or watering~~ plan.

B. *Visual obstructions.* Landscape plans shall conform to the visual obstruction requirements of subsection 10-37-9E of this title.

(Ord. 2004-15, 6-17-2004)

## Sec. 10-32-~~5~~4. Deviation from strict compliance.

A. *Deviations authorized.* ~~Since~~ Recognizing that site conditions and development constraints may vary greatly among sites, the Planning Commission may approve landscape plans that deviate from strict compliance with the provisions of this chapter. Any proposed deviation from the requirements of this chapter shall be:

1. Clearly identified on the proposed landscape plan; and
2. Accompanied by a written description of the proposed deviation showing how the intent of this chapter will be met by the proposed plan.

B. *Findings required.* The Planning Commission may authorize a landscape plan deviation only if it finds the deviation:

1. Is consistent with the intent of this chapter;
2. Is justified by site constraints; and
3. Is of comparable quality to what would otherwise be required without a deviation.

(Ord. 2004-15, 6-17-2004)

## Sec. 10-32-~~6~~5. Required landscaping.

A. *General requirement.* Landscaped areas may include trees, shrubs, vegetative, organic and inorganic ground cover, and other organic and inorganic materials identified in an approved landscaping plan. All required landscape areas shall be occupied by plant material or ground cover.

B. *Landscaping adjacent to a public street.* Except for approved driveways and pedestrian walkways, a landscaped area of ten-foot minimum shall be provided adjacent and parallel to the frontage of a public street as follows:

1. A ten-foot wide landscaped area on any commercial development.
2. At least one tree and three shrubs shall be planted for every 35 feet of street frontage in a required landscaped area. Such trees and shrubs may be clustered, provided that no tree shall be within five feet of another.
3. The slope of any earth berm shall not exceed a vertical to horizontal ratio of one to two and shall be treated with suitable ground cover to prevent soil erosion.

C. *Parking strip landscaping.* All parking strips shall be landscaped.

D. *Parking lot landscaping.*

1. Every parking lot consisting of more than ten spaces and 3,500 square feet of area shall contain internal landscaped areas as follows:
   a. *Multiple-family residential.* A minimum of ten percent of total parking lot area.
   b. *Office and commercial.* A minimum of seven percent of total parking lot area.
   c. *Industrial and warehouse.* A minimum of five percent of total parking lot area.
2. For every ten required parking spaces, or portion thereof, a minimum of two shrubs and one deciduous tree shall be provided within the internal parking area. The species of such trees shall be such that at maturity a tree canopy is provided to shade the parking area below each tree.
3. Landscaped areas shall contain a minimum of 25 square feet and shall have a minimum average width of at least five feet.
4. Landscape islands should be located in the following priority:
   a. To define major drives and accessways;
   b. To delineate ends of parking rows;
   c. At aisle intersections; and
   d. Within parking rows.

~~E. *Foundation landscaping.* Landscaping shall be provided adjacent to the wall of a building which has frontage on a public street as follows:~~

~~1. At least 50 percent of the building frontage shall be landscaped; and~~

~~2. The minimum width of the landscaped area shall be three feet.~~

F. *Landscaping in a multiple residential development.* Open space and common areas within a multiple residential development shall include a minimum of one tree and two shrubs per dwelling unit.

(Ord. 2011-11, 12-15-2011)

## Sec. 10-32-~~6~~7. Plant material standards.

A. *Plant characteristics.* Plant materials used to provide landscaping should be:

1. Drought tolerant;
2. Have noninvasive growth habits;
3. Be non-poisonous and non-toxic to humans and animals;
4. Have low maintenance characteristics; and
5. Be commercially available.

B. *Plant quality.* Plants installed pursuant to this chapter shall conform to or exceed the plant quality standards of the most recent edition of American Standard for Nursery Stock published by the American Nursery and Landscape Association.

C. *Artificial plants.* No artificial plants shall be used to meet any standard of this chapter except by special permission of the Planning Commission.

D. *Tree diameter and height.*

1. Trees planted to satisfy the standards of this chapter shall have a minimum caliper (diameter) of two inches measured at ground level.
2. Evergreen trees planted to satisfy the standards of this chapter shall have a minimum height of four feet.
3. Shrubs planted to satisfy the standards of this chapter shall have a minimum height of 18 inches at the time of planting.

E. *Ground treatment.* Ground area within a required landscape area shall be landscaped and present a finished appearance upon completion of landscaping. Additional ground cover may consist of plant materials characterized by horizontal as well as vertical growth, generally not exceeding 18 inches in height. Up to 85 percent of additional ground cover may consist of inert material such as decomposed granite, gravel, crushed rock, bark chips, or other similar material. Porous landscape fabric shall be required under these types of ground cover.

(Ord. 2004-15, 6-17-2004)

**Commented [DH2]:** This is just a suggestion. Oleander is a common plant that is poisonous to livestock and often kills cattle when it is illegally dumped on BLM land. I think the Planning Commission will like this.

## Sec. 10-32-~~8~~7. Installation, irrigation, and maintenance.

Any required landscaping shall be installed, irrigated, and maintained in accordance with the following standards:

A. *Installation.* All landscaping shall be installed according to accepted nursery practices.

B. *Verification of installation.* Prior to issuing a certificate of occupancy, the Zoning Administrator shall verify that the requirements of this chapter have been met and the required landscaping and screening has been installed in compliance with the approved landscape plan.

C. *Irrigation.* Landscape areas shall be irrigated as necessary to maintain required plant materials in good and healthy condition, while at the same time avoiding water waste through inefficient irrigation.

D. *Maintenance.* Landscape areas, including park strips, shall be maintained in a healthy, neat, and orderly condition as follows:

1. Landscaped areas shall be free of weeds and litter;
2. Landscape structures (e.g. walls, fences) shall be repaired or replaced in a structurally sound condition consistent with original appearance; and
3. The City may require that any dead trees, shrubs and plants be replaced within the current or next planting season.

(Ord. 2004-15, 6-17-2004)

### Sec. 10-32-98. Substitute plant materials.

The Zoning Administrator may approve installation of comparable substitute plant materials to satisfy the requirements of an approved landscape plan when approved materials are unavailable or when other unforeseen conditions prevent the use of materials shown on an approved landscaping plan. Any significant change to approved landscaping plans shall be reviewed and approved by the Planning Commission.

(Ord. 2011-11, 12-15-2011)

### Sec. 10-32-109. Temporary suspension of landscaping installation.

During periods of adverse weather conditions or when plants and landscape materials are not available, the Zoning Administrator may issue a temporary certificate of occupancy, provided the landowner enters into an agreement with the City that requires the installation of required landscaping within a reasonable time.

(Ord. 2011-11, 12-15-2011)

### Sec. 10-32-110. Site feature buffering and screening.

The following site features shall be screened as provided below:

A. *Trash receptacles.* Trash receptacles in a multiple-family residential, commercial, public facility, business/manufacturing park, or professional office zone shall be screened from view by a wall or fence which:
   1. Is at least six feet in height;
   2. Provides complete visual screening of the receptacle; and
   3. Is compatible in material and color with the main building on the lot.

B. *Permitted outdoor storage.* Outdoor storage areas permitted by this title shall be screened from view by an opaque fence or wall. Nonopaque fencing, such as powder or vinyl coated chainlink, may be used to satisfy this requirement in industrial zones if vinyl slats are inserted into the fence.

C. *Ground mounted utility boxes, meters, and mechanical equipment.* Ground mounted utility boxes, meters, and mechanical equipment shall be screened from view by landscaping or architectural elements compatible in material and color with the primary structure(s) on the premises. This requirement shall not apply to:
   1. Rear and rear side yard locations adjacent to other service or mechanical areas not adjacent to a public street; and
   2. Development in agricultural and single-family residential zones.

(Ord. 2004-15, 6-17-2004)

## Sec. 10-32-12~~1~~. Water conservation.

A. Scope and Applicability. The standards of this section shall apply to all new construction and new development as set forth herein. ~~These standards~~The standards of this section shall not apply to residential development in areas historically serviced by the Hurricane Canal Company and connected to a ~~s~~Secondary ~~i~~irrigation ~~S~~system. This section shall not apply to any new or existing agricultural uses in any zone.

B. Commercial, industrial, and civic development. All new construction and new development in all commercial, industrial, and civic development in any zone, shall meet the landscape design standards and irrigation design standards of this section. ~~This section shall not apply to any new or existing agricultural uses in any zone.~~

1. Grass is not permitted outside of an ~~active~~ Active R~~r~~ecreation A~~a~~rea. In addition, grass is prohibited in all L~~l~~andscape A~~a~~reas less than eight feet wide and on any slope that exceeds 15 percent.
2. Landscape and irrigation installers shall follow the plans that have been signed and approved by the ~~city~~City.
3. Each project shall propose and follow an approved P~~p~~lanting P~~p~~lan of a L~~l~~andscaped A~~a~~rea with water-efficient shade trees and bushes adequate in number and configuration to visually enhance the project, prevent heat islands, and prevent soil erosion. Planting P~~p~~lans shall meet the minimum standards within this section.
4. If City-provided S~~s~~econdary ~~i~~irrigation W~~w~~ater is available, each project shall connect to the system for all outdoor water use. The Planning Commission may make minor exceptions, allowing use of treated water for outdoor plantings in small beautification areas, in its sole discretion.
5. Park strips. Grass is prohibited in all P~~p~~ark S~~s~~trips. Parks S~~s~~trips shall be maintained by the adjacent property owner unless otherwise maintained by an owners association. Park S~~s~~trip~~s~~ widths and landscaping shall count towards commercial and industrial landscaping frontage requirements.

B. Residential development. All new residential construction and ~~new~~ development in ~~residential development in~~ any zone~~,~~ shall meet the following landscape design standards and irrigation design standards~~: of this section.~~

1. *Common areas.* If the development has a common area jointly owned and maintained by a homeowners association, grass in a common area is not permitted outside of an active recreation area.
2. *Park strips.* Grass is prohibited in all park strips.
3. *Controllers.* Water-smart irrigation controllers are required.

*1.* 4. *Grass limitations for single family or ~~two family~~two-family dwellings.- Lawn area for single family or two-family dwellings ~~must~~shall not exceed eight percent (8%) of the lot square footage, up to a maximum of two thousand five hundred (2,500) square feet of lawn area ~~in new residential development~~.*

~~For all single-family dwellings and multiple family dwelling projects that contain private yards attached to a dwelling unit, the total grass area of each private yard associated with each lot shall not exceed the following:~~

| ~~Lot size~~ | ~~Maximum grass~~ |
|---|---|
| ~~Up to 6,000 sf~~ | ~~1,500 sf~~ |
| ~~Up to 12,000 sf~~ | ~~2,000 sf~~ |
| ~~Up to 18,000 sf~~ | ~~2,500 sf~~ |
| ~~Up to 24,000 sf~~ | ~~3,000 sf~~ |

| | |
|---|---|
| More than 24,000 sf | 4,000 sf |

C. Other Regulations and Restrictions

1. All carwash projects shall utilize a water recirculation system recirculate and limit the maximum amount of water to 35 gallons per vehicle washed.

2. New exterior, decorative water features are limited to five features per subdivision or site. Each feature shall utilize a recirculation pump system. prohibited, except up to five decorative water features per site or subdivision with 50 gallon or less capacity and maintained recirculating pumps.

3. Golf Course. New golf courses and expansions of existing golf courses or expansion of existing golf courses is are prohibited.

4. The cCreation of artificial ponds, lakes, or wWater pParks as part of new commercial, resort, or residential development using any water supplied by the City, the Washington County Water Conservancy District, or a canal or irrigation company is prohibited.municipal water, district water, or private canal company water supply shall be prohibited.

a. The City may approve a Wwater Ppark in a Recreation Resort development only by consolidating multiple pools or other recreation amenities to meet requirements in Hurricane City Code 10-26.

b. Improvements related to civic, stormwater facilities, and agriculture and livestock use are exempt from these provisions.

(Ord. No. 2022-11 , 7-7-2022)

**To Washington County, Utah:**
**Mayors, City Council Members, City Managers, County Commissioners, Washington County Water Conservancy District, & SUHBA Members**

***SUHBA Position Paper: Water Issues in Washington County***

The Southern Utah Homebuilders Association ("SUHBA") has produced this position paper in response to the recent flurry of new and proposed water measures. Below is a relatively broad outline of our stance on the three main components of local water policy, as well as our comments on two specific items that are working their way toward adoption by some or all of the cities that are municipal customers of the Washington County Water Conservancy District ("WCWCD"). We do not comment herein on the several water bills being considered in this year's state legislative session.

**Issue 1: Allocation of the Existing Water Supply**

1) *Policy Position.*

   We wish to see the creation of a fair, intentional and orderly system for the prioritization of new water connections.

2) *Priorities.*

   a) Establish a common understanding of the ***available*** **supply of water** by clarifying the total amount of water reliably available from existing and readily developable sources, and the **amount of water currently being *used* in aggregate and per equivalent residential unit ("ERU").**

   b) **Create a system for tracking the development pipeline across municipalities** to bring greater clarity to the match (or mismatch) between available water and prospective development.

   c) **Institute an orderly process for the allocation of the existing water supply**, including a fair and predictable procedure for the vesting of water service.
      i) The method and timing of vesting should be based upon the expectation that **any reserved water service is utilized in a timely manner. The hoarding of water connections by way of a vesting "race to the bottom" must be prevented.**
      **ii)** Variables that should be considered include: **the relative water usage of various competing land uses; the role and value of smaller projects and builders; and the feasibility and timing of prospective development.**

**Issue 2: Conservation**

1) *Policy Position.*

   We welcome the new emphasis on conservation. There are numerous measures that can be adopted or improved, however, individual tactics will yield widely varying results. **Focus should be placed on measures where water savings will be greatest.**

2) *Priorities.*

   a) Implement conservation best practices in all new development. See elsewhere herein for additional comments on this subject, including on the draft ordinance currently in the process of adoption.

   b) Regulation should apply the Pareto Principle (the 80/20 rule). **Focus policy on the relatively few measures that will yield the greatest water savings.** Avoid cluttering regulation with minutiae that create a significant administrative burden while providing little or no water savings.

   c) **Emphasize a normative approach geared toward improving freely made decisions rather than a prescriptive approach based on coercion and compliance**. Create more and better pricing feedback loops.
      i) **Both at the time of its allocation and on an ongoing basis, the price of water should better reflect its marginal value.** Building types that use relatively more water should pay a higher impact fee than those that use less. Water rates should increase in a nonlinear manner, i.e. if the cost of *X* gallons of water is *Y*, then the price of 2*X* should be greater than 2*Y*.
      ii) **Improve the transparency and usefulness of information available** to individual water users so they better understand the variables in their behavior that most affect water use. Accelerate the adoption of Advanced Metering Infrastructure.

   d) Conservation-oriented policies currently being considered by the WCWCD which we support include:
      i) Tiered impact fees based upon typical water usage by a range of common building types.
      ii) Creating a "conservation easement" opportunity by which a consumer can opt into a reduced (0.55 AF) water allocation with a punitive surcharge on water use in excess of the stipulated allotment.
      iii) Rebate programs designed to encourage the widespread, voluntary conversion of ornamental lawn to xeriscape.

**Issue 3: New Sources**

1) *Policy Position.*

   We continue to support the Lake Powell Pipeline as an expansion of Washington County's water supply and an alternative to relying solely on water sources from the Virgin River basin. **We also encourage the ongoing development of additional water capacity from sources over which we have greater local control.**

2) *Priorities.*

   a) Expand and accelerate the **development of the secondary water system** (sources and distribution) in order to reduce the use of potable water for irrigation.

   b) Take the next steps in **exploring technological solutions** with the potential to significantly increase the amount of usable water available from the Virgin River.

**The Water Conservation Ordinance Applicable to New Construction**

*General Conditions*

We attended the Water Summit in November 2021 and provided comments at that time in response to the conservation measures being considered. As we said then, we generally accept additional conservation-oriented regulation of new construction. We wish to be clear in our support of wise water management.

In fact, new residential construction already uses considerably less water across the board than was typical even a decade ago. New homes utilize indoor water very efficiently; beautiful, drip-irrigated xeriscaping has become commonplace; and smaller lots and multifamily homes comprise a larger share of new residential development than before. The cumulative impact is remarkable. Total countywide water consumption has remained relatively stable in recent years despite continued growth in tourism and permanent population. **The state of the art in new home construction has helped bend the demand curve for water and will continue to do so going forward.**

Unfortunately, while we accept additional regulation, the proposed ordinance is constructed in exactly the fashion we oppose: **rather than being focused on the few remaining areas that will yield large water savings, it is laden with minutiae that significantly increase administrative costs while providing little or no conservation benefit.**

We have also found the process lacking in transparency and stakeholder inclusion. As far as we can tell, the ordinance has been in the active drafting process for months, but we were not involved in

those deliberations at all. Instead, we were only provided a document once the language was substantially set in stone and its adoption set in motion.

*Specific Policies*

**We support the installation of hot water recirculation systems, and the exclusive use of water-efficient fixtures and appliances.** We support the use of smart irrigation controllers. We support landscaping standards that emphasize shade trees and drought-tolerant plant species. We support ending the practice of placing turf in planter strips and on steep slopes. **We support a turf maximum on new residential construction**, however, we recommend indexing the allowance to lot or yard size (with a reasonable upper limit). We support applying conservation standards uniformly, including in HOAs and areas served by secondary irrigation water. We support accelerating the development of a secondary irrigation water system where feasible. We request that common sense be applied in the implementation of this strategy so that secondary distribution lines and meters are not required in locations that are not realistic candidates for connection to a secondary water system.

**We oppose conservation standards that are more stringent on multifamily building forms than single family.** This includes requiring the individual metering of multifamily homes. We oppose the mandatory landscaping of an entire yard prior to the issuance of a certificate of occupancy. We oppose a requirement of automatic pool covers. (**We strongly support efforts to make evaporation an educational point of emphasis so that pool owners are equipped to make better decisions as they design new pools and mitigate water loss from existing pools.**) In each case, our opposition is predicated on an assessment that the benefits fall well short of justifying the cost.

In analyzing the proposed ordinance, we searched for comparable regulations in Arizona and Nevada, and mostly came up empty. A notable exception was Las Vegas, which has adopted strict water regulations and makes them easy to find. Yet even compared with Las Vegas, the Washington County ordinance proposes several more stringent elements as applied to new residential construction. The landscaping standard for single family homes in Las Vegas allows up to 50% of the side and rear yard area to be turf with a cap of 5,000 square feet, which would equate to around 12-17% of the total lot size. We think that percentage range is about right, but the 5,000 square foot cap is too high. Las Vegas does not micromanage tree size or drip-irrigation design nor require automatic pool covers as part of their conservation mission.

**City Disclaimer of Water Availability for Pending Development Applications**

Last week, St. George City adopted a temporary ordinance requiring that new development applications include a disclaimer of water availability. We understand the intent of the ordinance is to clarify the status quo as it pertains to the vesting of water availability: while land use vests earlier, there is currently no "guarantee" of water service until the impact fee is paid and a building permit is issued.

As discussed at greater length above, we endorse an intentional approach to the reservation of water connections so that all participants in the development process have sufficient predictability to make sound decisions relative to development activities which will span many years and entail the investment of many millions of dollars.

**Closing Statement**

We desire to be good community partners and a willing resource. We believe in the power of working together across institutional lines to address current and future growth-related issues.

Sincerely,

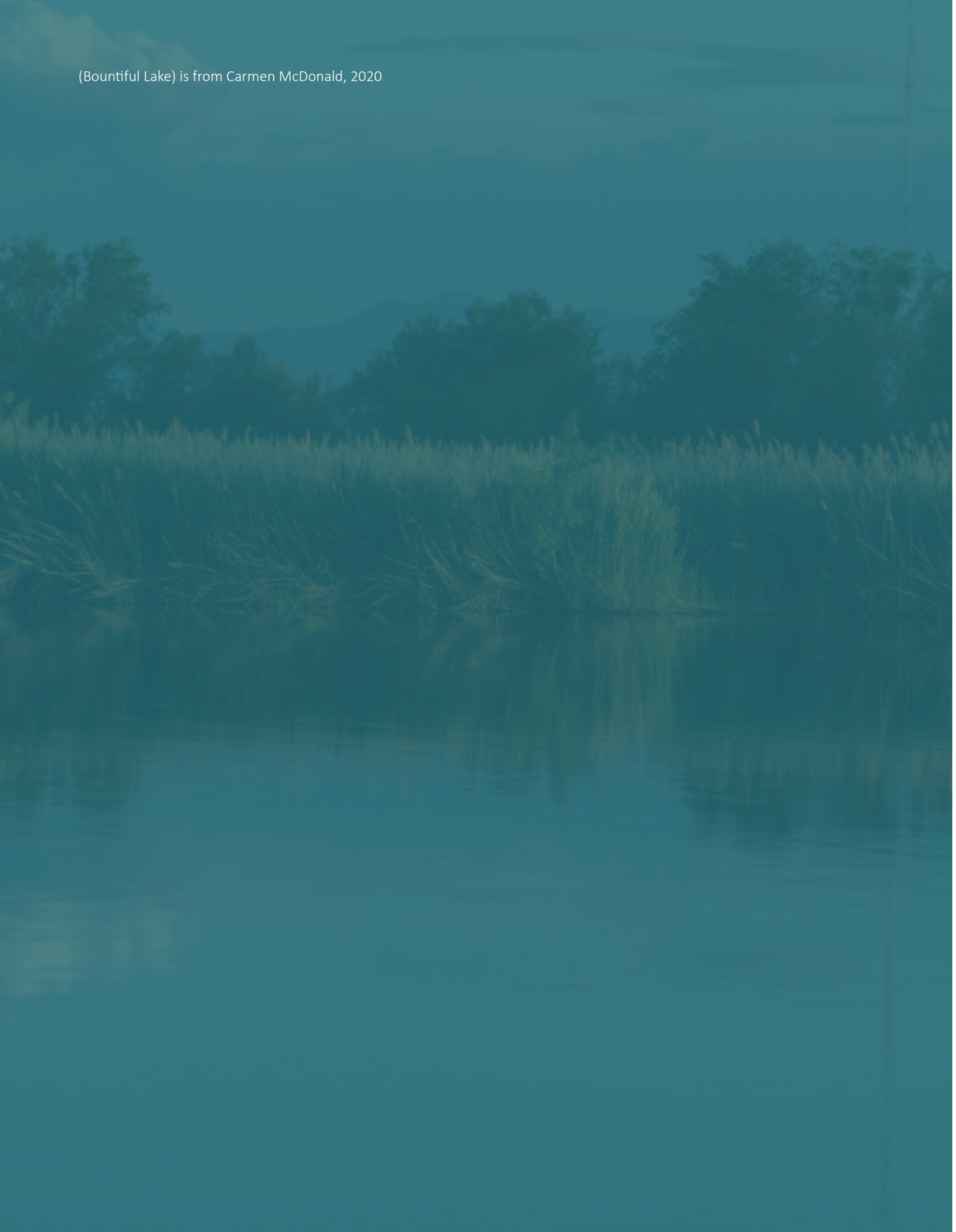
2022 Southern Utah Home Builders Association Board of Directors
February 9, 2022

2022

# UTAH GROWING WATER SMART

## The Water-Land Use Integration Guidebook

Ensuring a Prosperous Future and Healthy Watersheds Through the Integration of Water Resources and Land Use Planning



(Bountiful Lake) is from Carmen McDonald, 2020

# ACKNOWLEDGEMENTS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Lawrence T. & Janet T. Dee Foundation

**Growing Water Smart Program**

Growing Water Smart is a joint program between the Babbitt Center for Land and Water Policy, a Center of the Lincoln Institute of Land Policy and the Sonoran Institute. See www.growingwatersmart.org for information.

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Wayne Wurtsbaugh, Professor Emeritus, Utah State University


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# PREFACE

## Utah Growing Water Smart

The Utah Growing Water Smart workshop brings key community staff and decision-makers on water and land use planning together to collaborate to help build a more resilient and sustainable water future. The workshop uses a range of public engagement, planning, communication, and policy implementation tools to help community teams realize their water efficiency, smart growth, watershed health, and water resiliency goals.

About the Utah Growing Water Smart partner organizations:

***Utah Division of Water Resources***
The Utah Division of Water Resources is one of the seven divisions housed within the Department of Natural Resources. Tasked with Planning, Conserving, Developing and Protecting Utah's water resources, the Division earnestly strives to be Utah's water steward. It is our belief that we will meet the future water needs through a combination of multi-faceted solutions that include conservation, efficiency, optimization, agriculture conversion and water development. Such an approach will help us prepare, plan and sustain Utah's water future.

***Babbitt Center for Land and Water Policy***
The Babbitt Center for Land and Water Policy, a center of the Lincoln Institute of Land Policy, seeks to advance the integration of land and water management to meet the current and future water needs of communities, economies, and the environment. The Babbitt Center develops tools and best practices to guide decisions through research, training, and partnerships for management of land and water resources. We recognize that water is the lifeblood of the American West and land use decisions are made every day that shape our water future. Coordination of these land and water use decisions is critical for ensuring resilient and sustainable communities.

***Western Resource Advocates***
Western Resource Advocates (WRA) fights climate change and its impacts in order to sustain the environment, economy, and people of the West. Our team of policy experts, scientists, economists, and attorneys has a 30-year history of working where decisions are made, sweating the details, creating evidence-based solutions, and holding decision-makers accountable. This on-the-ground work advances clean energy, protects air, land, water, and wildlife—and sustains the lives and livelihoods of the West. WRA brings a unique set of skills, knowledge, relationships, and leadership to solving conservation issues in the West.



***Utah State University's Center for Water Efficient Landscaping***
The Center for Water Efficient Landscaping (CWEL) at Utah State University is a research and outreach center designed to improve and optimize the efficient use of water for landscape irrigation. Our team conducts research in the areas of irrigation technology and management, plant water use and drought, water wise and native plants, sustainable turfgrass management, and urban water conservation. The Center also delivers Utah's Qualified Water Efficient Landscaper (QWEL) certificate training program, hosts a monthly "Water Well with CWEL" webinar, and is the home of the Water Check and WaterMAPS™ programs. The Center's overall mission is to promote water conservation through environmentally, socially, and economically sound landscape management practices.

## MESSAGE FROM UTAH GOVERNOR SPENCER J. COX

"Welcome, Growing Water Smart Workshop participants! Thank you for dedicating your time and energy to address such an important topic for our state. As you all know, Utah is facing immense challenges with our water resources. The extreme drought is causing us to think hard about where and how we can best use and conserve water. We also know that water conservation requires all Utahns to do their part, including all of you - who represent our growing towns, cities, and counties. Your participation in this workshop is essential to making our state more resilient by identifying ways to integrate water and land use planning–two vital and connected efforts in one of the fastest growing states in the country. These next few days will be a lot of work, but I have no doubt that the action plans you develop will put your communities on the path to a more sustainable water future."

Wayne Wurtsbaugh, Utah State University, 2013

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# Introduction

Utah faces a formidable challenge. We have the distinction of being among the driest states in the nation *and* one of the fastest growing. At the convergence of these two realities lies the challenge of providing a secure water supply for our growing population – projected to reach 6 million by 2065[1] – while maintaining the environment, the economy, and agricultural production.

The fragility of a secure water supply is evident today. In the summer of 2022, the U.S. Drought Monitor showed most of Utah in either the "Exceptional Drought" (most severe) category or "Extreme Drought" (second most severe) category for extended periods of time, with drought conditions persisting through the fall. The eastern and southwestern part of Utah lie in the Colorado River Basin, which is in crisis with reservoir levels declining and mandatory water shortages affecting users in the Lower Basin states. Most of the western and northern part of Utah lies in the Great Basin, where the Great Salt Lake has reached historic low elevation levels. This has led to fears over ecosystem, economic, and public health risks from the Lake's decline. The exposure of large expanses of lakebed to wind storms can disperse toxic dust throughout the watershed and region.

While these conditions represent only a snapshot in time, Utah and other western states are experiencing the most persistent and driest conditions in recorded history. Nevertheless, many people remain optimistic that droughts will be short-lived, and that snowpack, rain, and soil moisture will return to "normal." However, as we face a changing climate coupled with population and economic growth, we must build resiliency into our water and land use planning by taking immediate steps to adjust habits that contribute to growing water scarcity. We must also implement measures to support responsible and sustainable growth.

There is broad consensus that optimizing water use and reducing demand for municipal, commercial, institutional, industrial (M&I), and agricultural water is critical to ensure that Utah's limited water supply can equitably meet the needs of people, agriculture, the economy, and the environment. However, the pathway to achieving substantial water conservation includes many challenges as well as opportunities.

One significant opportunity for reducing water consumption lies with integrating water use into land use planning. Too often, land use planning is undertaken independently of water use planning efforts, even though the two can and should inform one another. Traditionally, responsibilities for water resource management and land use planning have been siloed in different levels of government, departments, and management entities. The way that new development occurs, however, can have a major impact on municipal water demand, as well as the health of the communities and watersheds in which it happens. Land use planning that incorporates water use considerations can lead to a more sustainable urban design in terms of the built environment, urban ecology, and lifestyle patterns of cities and towns.

[1] Hollingshaus, M., M. Hogue, E. Harris, M. Bateman, M. Backlund, and E. Albers. 2022. Utah Long-Term Planning Projections: A Baseline Scenario of Population and Employment Change in Utah and its Counties. Kem C. Gardner Policy Institute. University of Utah.

Another significant opportunity lies in integrating land use considerations into water planning. This opportunity recognizes that the earth's water cycle is a closed loop that circulates water between oceans, the atmosphere, and land via precipitation, drainage, and evaporation. Just as the natural environment treats water as a cycle, it is important that communities view their water supply, including wastewater and storm water, as interconnected and part of their larger watershed. Integrated Water Resource Management (IWRM) coordinates the development and management of water, land, and related resources, while maximizing economic and social benefits, and minimizing impacts on the environment. A key step in this process is to change institutional structures to strengthen the coordination and collaboration between water supply and wastewater managers, land use planners, economic development managers, and other community and regional officials.

National organizations of water and land professionals recognize the urgent need to integrate water and land use planning, policies, and management.[2] In 2021, the American Water Resources Association along with the Babbitt Center for Land and Water Policy, the American Planning Association's Water and Planning Network, and the American Water Works Association issued a Findings Statement and Call to Action resulting from the Specialty Conference on Connecting Land and Water for Healthy Communities. The findings synthesize observations from conference participants about the reasons for and consequences of fragmentation between water and land planning. The call to action includes a set of guiding principles to aid land-water integration efforts.

**For additional information on the call to action:** https://www.awra.org/Members/Publications/Policy_Statements/Connecting_Land_and_Water.aspx

Notable key stakeholder processes, authorities, and studies have advocated for the integration of land use and water planning in Utah, including, but not limited to the:

- Recommended State Water Strategy (2017)
- Water Resources Plan (2021)
- Utah's Coordinated Action Plan for Water (2022)
- Utah's Division of Water Resources Conservation Programs and Integration of Water and Land Planning,
- Utah's Division of Water Quality Watershed Programs,
- Great Salt Lake HCR10 Steering Group Recommendations to help maintain adequate flows to Great Salt Lake (2020), and
- Reports and studies commissioned by the Great Salt Lake Advisory Committee.

This guidebook provides resources to bring water resource management and land use planning in line with one another. By doing so, Utah's communities—regardless of their size or geographic location—can shift their focus from supply- to demand-side water management, promote cooperation to enhance watershed health, and seek opportunities to implement integrated water and land use planning.

[2] Endter-Wada, J. L., Sternlieb, F., Church, S. P., & Stoker, P. 2022. Featured Collection Introduction: "Connecting Land and Water for Healthy Communities." Journal of the American Water Resources Association, 58(3):313-318. https://doi.org/10.1111/1752-1688.13042



## FOCUSING ON DEMAND-SIDE WATER MANAGEMENT

*Instead of making costly investments to increase water supply, communities increasingly are reducing demand for water by using existing supplies more efficiently.* A growing population can escalate the costs of operating local utilities, the need for enhanced and expanded infrastructure, and if the water supply is constrained, the cost of acquiring new sources. In the past, water resource managers and water providers turned to supply side management to meet growing demand by investing in water acquisition, treatment, and storage and distribution projects. However, these options come with a significant price tag and can be time and resource intensive. Recent and projected warming throughout the region also makes the availability and reliability of new supplies less predictable. An alternative to these costly investments is more efficient use of existing supplies. Increasingly, communities are turning to demand side management—an approach that seeks to reduce the demand for water. A demand side approach generally includes:

- **Water Conservation**: Encouraging water users to reduce how much water they use.
- **Water Efficiency**: Encouraging or requiring the use of technology, building, or site designs that use less water.
- **Water Reuse**: Treating or converting gray and black water to replace or augment water supply.

One particularly impactful demand side management strategy is the integration of water conservation, efficiency, and reuse into land use planning. Communities throughout the West have found that by increasing development density, utilizing technological efficiencies, and enacting aggressive conservation programs, they have been able to continue to grow without acquiring new water supplies. Water-smart land use planning can reduce the negative financial impacts of increased water demand through efficiency and conservation measures implemented prior to, during, and after building construction. The demand side management approach to water resources is also good for the triple bottom line of financial, social, and environmental outcomes. It increases the cost-benefit ratio of capital investments by using the same amount of water and infrastructure to serve more people per dollar spent, benefits the environment by balancing ecosystem and human needs, and ensures a more sustainable future for our communities through a more resilient and long-lasting water supply.

## PROMOTING WATERSHED COOPERATION

*Every community lives within a watershed—a land area that channels rainfall and snowmelt to creeks, streams, rivers, and underlying groundwater aquifers.* The amount and quality of water in rivers, streams, and groundwater aquifers depend on activities in the land areas upstream from those sources. Water and land are connected through the geography and hydrology of watersheds, as are the people who use the water and land and share in the benefits and risks that their collective actions have on watershed health. For instance, the dwindling Great Salt Lake

Wayne Wurtsbaugh, Utah State University, 2022

lies at the bottom of its large watershed; cooperation within and between upstream communities is required to help secure its future.

Watersheds integrate natural terrestrial and aquatic ecosystems with human water and land uses. Tensions often exist between preserving the natural environment and developing land for residential, commercial, or industrial uses to house a growing population and promote economic growth. While degradation of land within a watershed comes with societal and environmental costs, careful management yields significant benefits. Holistically managed watersheds can store water supplies; reduce erosion and channel incision; increase infiltration into local floodplains and regional aquifers; reduce water treatment costs; and provide habitat, biodiversity, recreation, and aesthetic values. Healthy watersheds and resilient natural systems can also help communities cope with increasingly extreme weather events such as droughts, high temperatures, and severe wildfires.

Fortunately, many measures can be taken to maintain and improve watershed health, both for existing and future development. Factors such as residential lot size, housing density, water conservation measures, vegetation management and habitat protection, and storm water management all influence the health of a watershed and impact water quality and stream flows. However, to realize the benefits of such measures, communities located within the same watershed must cooperate and work together toward shared goals.

## WATER AND LAND USE INTEGRATION OPPORTUNITIES

Utah communities are faced with the challenge of accommodating growing populations, supporting economic development, and maintaining or enhancing quality of life, all while managing increasingly variable and scarce water supplies, infrastructure challenges related to growth, and the impacts of land and habitat degradation.

Regionally shared risks of extreme weather and wildfires also make understanding the interconnectedness of water and land particularly urgent. Across Utah, communities have experienced record heat, devastating fires, dry soils, ongoing drought, and damaging floods, alongside recent health and economic impacts associated with the COVID-19 pandemic which, in some places, were exacerbated by limited access to safe and reliable water. These conditions have highlighted the need to act now to build community, economic, and environmental resiliency within communities and across regions and watersheds.

At the community level, each planning and regulatory mechanism guiding how and where a community develops provides an opportunity to consider how to better integrate water and land use with a view toward reducing future risks and strengthening resiliency. Potential points



of intervention to enhance land-water integration are described in Table 1. Determining how and where to intervene will depend on a community's political motivation and capacity, the demand side management initiatives that have been implemented to date, and their water-saving goals. The vision and goals defined in general and master plans will guide opportunities in other elements of a local government's water and land use policies and programs.

*Table 1. Intervention points, tools, and their purpose for strengthening integration between water and land use.*

| Point of Intervention | Tool | Purpose |
|---|---|---|
| Planning & Goal Setting | • General Plans<br>• Water Conservation Plans<br>• Storm Water Management Plans<br>• Capital Improvement Plans<br>• Hazard Mitigation, Response, & Recovery Plans | Evaluates local water supplies, current and future demands, and related community and economic values. Establishes goals and objectives for managing the intersection of natural resources and the built environment. |
| Development Policies | • Zoning Ordinances, Subdivision Regulations, & Planned Development Policies<br>• Water Budgets<br>• Demand Offset Programs<br>• Building and Design Codes<br>• Water Efficient Landscaping | Links new development to water supply planning. Determines the requirements applied to new development for water resource management, conservation, and efficiency. |
| Watershed Resilience & Water Smart Infrastructure | • Watershed Planning for Resilience<br>• Green Infrastructure and Low Impact Development | An integrated water resource management approach helps mitigate the factors that can degrade ground and surface water quality and quantity. Green infrastructure can support these efforts. |
| Water Conservation and Efficiency Tools | • Conservation Rate Structuring<br>• Post-Occupancy Incentives and Educational Programs<br>• Consumer Educational Messaging | Empowers and incentivizes landowners and renters to reduce water consumption. Links community-wide programs to water supply planning. |

## THE INTEGRATION OF WATER AND LAND USE PLANNING GUIDEBOOK

This workshop guidebook is intended to help your community identify the most appropriate actions related directly to land use that will help you achieve your community's water resource management goals. It is divided into four sections.

Section 1: Planning and Goal Setting
Summarizes opportunities provided by integrating water and land use during planning processes for new and existing areas.
Section 2: Water Smart Land Use and Development Policies
Provides a review of policies and requirements that can make a community's development pattern water smart.
Section 3: Watershed Resilience and Water Smart Infrastructure
Describes water smart infrastructure approaches that can protect watersheds, support vegetation and wildlife, recharge local floodplains, and provide community amenities and open space.
Section 4: Water Conservation & Efficiency Tools
Summarizes water conservation and efficiency tools for managing existing community water demands.

Each section includes:

1. An overview case statement that provides justification for each approach and the water saving impacts that can be expected.
2. Toolboxes of specific policy or management actions a community can take to achieve water conservation and efficiency outcomes for each approach.
3. Case studies that illustrate how Utah communities and institutions have implemented one or more of these tools to integrate their water and land use planning efforts.
4. Approaches and strategies for implementation of the tools and model policies.

The Growing Water Smart Resource Appendix at the end of the Guidebook provides resources for more information and will be updated as more resources become available.

Center for Water Efficient Landscaping, Utah State University

# Section 1: **PLANNING AND GOAL SETTING**

### OVERVIEW

Traditionally, water planning and land use planning processes have been conducted in separate departments or agencies with different mandates and responsibilities. Land use planners have focused on how much and what type of growth may take place in their communities, while water resource managers have focused on ensuring adequate water availability.

Comprehensive land use planning, water planning, and capital improvement planning are all interrelated, however, and integrating them requires breaking down traditional planning and operational silos. Done successfully, an integrated water resource and land use management plan can ensure the following:

- A community's vision for the future considers water and growth together.
- Plans for water resource management, community health, capital improvement, and economic development are consistent with both the community's vision for future land use and its goals for sustainability and resilience.
- Development occurs in a way that protects watersheds, including ecological functions, and the quality and quantity of water supplies

Planning is a continuous process and includes developing and adopting written plans as well as a series of actions to implement, monitor and review, and update those plans. Current best practices in planning encourage collaboration among staff in various departments within a jurisdiction, partnerships with other jurisdictions, and robust engagement of all segments of a community to gather input from residents, community organizations, and private sector and non-profit groups and to build public support for the plans and their implementation.

Goal setting is an important purpose and component of a comprehensive planning process. A community's future goals are generally shaped by its historical context, affected by current trends and issues that need to be addressed, and guided by its shared values and aspirations. A variety of collaborative processes can be used to create a future vision, define guiding principles, and set goals that will direct and guide community actions toward integrated water and land planning. Tools such as scenario planning are particularly useful for imaging and choosing between different community futures, offering communities pathways toward more sustainable alternatives in how they use and integrate water and land.

### TOOLBOX: GENERAL PLANS

General plans, sometimes referred to as master plans, are required of municipalities in Utah and guide how a community will manage future land use and its implications for a wide variety

of functions, including transportation networks, parks and open space, natural resources, housing, economic development, and future infrastructure needs (Utah Code § 10-9a-401). *One of the greatest values of a general planning process is that it provides opportunities for a communitywide dialogue about the future.*

In 2022, the state legislature passed Senate Bill (S.B.) 110, which amended the municipal and county Land Use, Development, and Management Acts to require municipalities (but not cities of the fifth class or towns) to include a water use and preservation element in their general plans by December 31, 2025. The legislation includes specific requirements on what the water use and preservation element must address and requires general plans to account for the effect of land use on water demand and to coordinate the general plan's land use and water use elements.

S.B. 110 also directs planning commissions to consult with relevant public water systems and to consider regional water conservation goals, applicable municipal water conservation plans, and principles of sustainable landscaping. The planning commission must also make numerous water conservation-related recommendations to the municipal or county legislative body.

Through S.B. 110 in 2022, Utah joined several other states whose statutes require water as an element in comprehensive/general plans (Rugland 2022:19). Integrating water-related goals into one holistic plan or across plan elements ensures that the complex interrelationships between water systems, human systems, and ecological processes are considered together in relation to the land. General plans also offer an excellent educational opportunity for helping a community understand:

- Projections for future population and drivers of growth.
- The type and location of development occurring in the community.
- The source, capacity, and conditions of a community's water supply, distribution systems, and water-related infrastructure.
- Adequacy, sustainability, and vulnerability of the water supply.
- Health conditions of the watershed in which the community is located.
- Current community programs and projects.
- Tradeoffs that may be involved in achieving the community's long-term goals.

A general plan can also help a community identify opportunities to integrate water into traditionally land use-focused general plans by including goals for:

- Water supply and demand management.
- Wastewater treatment and disposal.
- Watershed processes and health.
- Floodplain and storm water management.
- Interagency coordination and collaboration.

Water-related goals and policies may arise in a variety of ways in different general plan elements. The most obvious is through inclusion of a water resources element. Examples of water resource elements include: (1) the known legally and physically available surface water, groundwater and effluent supplies; (2) the total demand for water that likely will result from future growth projected in the general plan in addition to existing uses; and (3) an analysis of how projected future demand for water will be served by the identified water supplies or plans to obtain additional necessary water supplies.



Water resource elements leave significant room for exploring various approaches to securing and preserving community water supplies outside of the state's regulatory roles (e.g., administering water rights and allowable uses, and permitting wells). A water resource plan element could, for example:

- Address concerns about sustainability of the water resource as part of the discussion of necessary water supplies.
- Evaluate conservation as a planning factor in demand modeling, among other things.
- Identify goals and approaches for coordinating and consulting among departments and with other relevant entities to secure and preserve community water supplies through a variety of approaches and authorities.

Water-related goals and policies may also arise in other plan elements, depending on the planning and development concerns and priorities of the community or municipality. Water resources considerations may also influence policies developed for environmental planning, cost of development, and other elements.

### TOOLBOX: WATER CONSERVATION PLANS

Separate from general plans, the state requires water providers with more than 500 connections to submit a water conservation plan to the Division of Water Resources to comply with the state's Water Conservation Act (Utah Code § 73-10-32). Providers with fewer than 500 connections may also submit plans for review, although they are not required. These plans describe existing and proposed water conservation measures that outline how water providers and the end users of culinary water will conserve water so that adequate supplies are available for future needs. The plans also describe measures that will enable the water provider to meet the state's Regional Water Conservation Goals.

### TOOLBOX: STORM WATER MANAGEMENT PLANS

The state's Division of Water Quality also requires storm water management plans from communities to meet the requirements of the Utah Pollutant Discharge Elimination System (UPDES) permit system which is mandated by the U.S. Environmental Protection Agency's Clean Water Act. Utah's Storm Water Program regulates storm water discharges from municipal storm sewer systems (MS4s), as well as industrial and construction activities, and operators of these systems may be required to obtain a UPDES permit before they can discharge storm water runoff that has the potential for delivering harmful pollutants into local surface waters such as streams, rivers, or lakes. This is an important mechanism for protecting water resources in the state because water sources with impaired quality may no longer be available for beneficial uses, effectively reducing available water supplies.

### TOOLBOX: CAPITAL IMPROVEMENT PLANS

Capital Improvement Plans (CIPs) forecast and match a community's projected revenues and its capital needs over a multi-year period. Planning departments, parks, public works, and water and wastewater utilities often rely on grants and bonds to invest in green and gray infrastructure improvements or new construction. By creating a long-term investment strategy for the infrastructure improvements identified in a general plan or water conservation plan, a CIP ensures that financial resources match community priorities and further water infrastructure that is resilient to climate change and other future scenarios.

### TOOLBOX: HAZARD MITIGATION, RESPONSE, & RECOVERY PLANS

Hazard mitigation plans identify specific hazards likely to impact a community, including acute shocks such as wildfire or flooding, as well as long-term stressors such as drought. These plans identify pre-disaster risk reduction as well as post-disaster response activities. Planning should include determination of how hazards can impact water infrastructure and plans for reducing vulnerability and risks.

### TOOLBOX: SETTING THE FOUNDATION FOR STRONG PLANS

Planning provides the roadmap for a community's policies, programs, and regulations. Processes such as visioning, information sharing, data alignment, public education and engagement, and regional partnerships serve as the foundation for creating scientifically sound, publicly understood, and community-supported plans.

Land use and water departments often use different data sets and analysis methods in their decision-making processes, such as growth rates to inform future land use or water demand projections. Identifying the discrepancies and understanding the implications of different projection methods can help communities estimate the extent of uncertainty and error in results. Coordinating around these issues, sharing information, and looking for ways to align data sets and methods will promote consistency and mutual understanding across departments and lead to better decision-making.

### *COMMUNITY ENGAGEMENT AND EDUCATION*

The support of community members and organizations is critical for integrated water and land use planning and implementation. Engaging in planning and goal setting provides people with opportunities to provide important feedback, learn from information provided during the process, and build a common understanding of how climate change and land use patterns are impacting water availability and quality. Education or training programs for staff, elected officials, and public stakeholders strengthen support for perspectives and strategies that incorporate water-saving measures into land use.



### ***Case Study:*** *Salt Lake City Department of Public Utilities - Civic Engagement*

Contributors: Laura Briefer, Director and Stephanie Duer, Water Conservation Program Manager, Salt Lake City Department of Public Utilities

Salt Lake City is committed to and actively encourages civic engagement. Community outreach and equity and inclusion are high priorities of Mayor Erin Mendenhall. The city has a Civic Engagement Team that facilitates best practices for public participation and works with city departments to build their civic engagement capacity. The city uses a variety of means for people to get involved (e.g., community councils, community action teams, boards, commission, internships, and community programs). Its community outreach efforts include Community Office Hours where people can talk to one of Mayor Mendenhall's liaison team out in the community, translation of community documents and communications into different languages, community outreach newsletters, and many more informal means of engagement.

This city-wide platform for Civic Engagement is utilized by departments throughout the city. The Salt Lake City Department of Public Utilities (SLCDPU) is especially active and responsive in interacting with its customers, including residential, commercial, industrial, and institutional entities in Salt Lake City, eight other municipalities, and unincorporated areas of Salt Lake County. The city provides drinking water, manages flood control and storm water, and collects and treats wastewater. It engages with the communities and people it serves in the processes of planning, policy development, program delivery, and project implementation in all of these water service areas.

Laura Briefer, the Director of the Department, stresses the importance of public engagement. She establishes personal connections with the mayors and key staff in the communities they serve, and coordinates with them about activities like land planning and establishing rate structures. She also coordinates with a wide range of constituencies on state-level water issues such as drought management and the Great Salt Lake. As a result of integrating public engagement into their operations and capital improvement activities, the utility spent a long time working with the public to implement an ordinance prohibiting new commercial or industrial land use that consumes more than 200,000 gallons per day, the rebuild of the sewer treatment plant, and reconstruction of the Fourth Avenue Well in Memory Grove. Public engagement is invaluable in these processes and helps them to better serve their member cities.

SLCPU's public engagement was critical during development of its 2020 Water Conservation Master Plan. Stephanie Duer, Salt Lake City's Water Conservation Program Manager, organized a suite of public engagement activities that included giving presentations about the plan in various municipalities, utilizing social media, and soliciting public feedback in person and through an online survey. After this public engagement, the utility's plan exceeded the state's basic requirements for a water conservation master plan. It provides a good example of issue framing, articulation of conservation goals, data analysis, identification of conservation programs and practices to implement, and includes an ongoing public outreach and communication plan.

### *REGIONAL COLLABORATION AND PARTNERSHIPS*

Some goals are attainable within a single governmental jurisdiction while others may require engaging in collaboration between jurisdictions and partnerships with regional organizations, the private sector and non-profit organizations. Adding partners and coordinating across jurisdictions can identify shared interests, expand resources, and result in coordinated action strategies with larger impact. Regional committees and partnerships can provide an opportunity for cross-jurisdictional planning around shared water resources. They offer a way for county, municipal, water district staff, and stakeholders to collaboratively study local and regional issues, define desired future conditions, evaluate potential paths forward, and partner on implementation.

*Approaches for Setting Strong Foundations for Integrated Land-Water Planning*

- Link water supply and demand to projected land use patterns in both general plans as well as water conservation plans for a more granular understanding of water use by land use type.
- Reference general plan goals and strategies in the establishment or update of associated land use policies.
- Meaningfully address water throughout the community's general plan elements, as well as thoroughly in the water resources element.
- Link water supply and demand, conservation, and recharge priorities and policies across related plans—including storm water management plans—to address common resource concerns through a variety of approaches and authorities.
- Set aside land for water-related infrastructure, such as recharge basins and treatment and recovery wells, in future land use maps.
- Use capital improvement plans to ensure investments are made in the physical infrastructure needed for water management, such as treatment facilities and water reuse infrastructure, or in projects that manage storm water through green infrastructure, infill development, hazard risk reduction, and watershed restoration.
- Increase the strength of your plans with consistency requirements, which require that future plans and zoning codes be consistent with the comprehensive plan.
- Look for confusing or conflicting language, goals, policies, processes, or regulations and take steps to clarify and align them.



# Section 2: **WATER SMART LAND USE AND DEVELOPMENT POLICIES**

### OVERVIEW

Urban water demand is both a function of household size, income, and lifestyle habits, as well as how we plan, design, and maintain our communities, including their commercial, industrial and institutional sectors. When it comes to saving water, where and how we grow and build truly matters.

Efficiencies may be found in cluster development patterns and in the design of buildings, sites, and infrastructure systems, especially for urban irrigation systems and landscaping. We also know that:

- Higher density and cluster developments consume less water than other development patterns.
- Some residential land use types consume less water than others.
- High-performing, water-efficient plumbing and building standards contribute to community water savings.
- Newer appliances and plumbing fixtures are more efficient than older ones.
- Water-saving and climate-appropriate plantings, landscaping standards, and maintenance practices consume less and conserve more water.
- Households that conserve water save money for themselves and their water provider, while conserving water for other people and nature.

To use less water, the best development policy is to make water smart development the easiest and most incentivized type of development to build by:

- Promoting higher density and cluster development, especially where infrastructure already exists.
- Promote high efficiency, water efficient plumbing and building standards.
- Promote water saving and climate appropriate landscaping standards and maintenance practices.

### TOOLBOX: ZONING ORDINANCES, OVERLAY ZONES, AND CLUSTER DEVELOPMENT

Zoning ordinances are often the cornerstone of local land-use planning and are effective tools that municipalities and counties have to conserve and promote public health, safety, convenience, and general welfare.

### *OVERLAY DISTRICTS/ZONES*

Overlay districts are special zoning districts that modify the regulations applicable in an underlying zoning district. Overlay districts may overlay one or more underlying zones. They cannot be used to require a use permit that would otherwise be allowable in the underlying district, but they may be used to apply additional requirements for uses permitted on a conditional basis in the underlying zone.

Overlay zones add an additional "layer" that increases or modifies regulations to the existing zoning of a particular geographic area. Though typically used to guide development in specific areas like central business and historic districts, overlay zones are also effective tools for natural resource protection and the preservation of other critical areas. For example, overlay zones may be used to protect working farms and ranches, ridgelines, riparian areas, and groundwater recharge areas, to name a few.

Some notable overlay zones in Utah include the following examples from Lehi City:

Lehi City Jordan River Protection Overlay Zone: www.lehi-ut.gov/wp-content/uploads/2013/09/Chapter-36-B-Jordan-River-Protection-Overlay-Zone.pdf

Lehi City Utah Lake Shoreline Protection Overlay Zone: www.lehi-ut.gov/wp-content/uploads/2018/11/Chapter-36-Utah-Lake-Shoreline-Protection.pdf

### *CLUSTER/CONSERVATION DEVELOPMENT*

While most water conservation and efficiency efforts related to land use have focused on outdoor watering and indoor plumbing fixtures, there are considerable benefits to encouraging more clustered development patterns. Water usage studies have consistently demonstrated that in urban areas, the largest consumption of water is by large-lot, single- family homes where most of the water consumed is used outdoors during spring and summer. Alternatively, higher density development can result in reduced water consumption. Research has demonstrated that developments between 3-8 units per acre achieve the most water reductions and that even small adjustments to development density can yield large water savings for cities.

Promoting water-efficient land use patterns provides many benefits in addition to saving water. It can also support the more efficient use of existing infrastructure, protect other natural resources, promote walkability, control flooding, and enhance neighborhood or community vibrancy. Another significant benefit to clustered development is the preservation of larger tracts of agricultural lands and open space through easement, covenant, or deed restrictions.

#### *STRATEGIES FOR PROMOTING CLUSTER DEVELOPMENT*

- At pre-development review, make rezoning, annexations, and Planned Unit Development (PUD) applications conditional on meeting water conservation standards. For PUDs, this can include requiring a meter at each connection within the development and that standards within PUDs are the same as the requirements for the public utility distribution system.



Planned unit development is a distinct category of conditional use that is intended to promote the efficient use of land and resources, promoting greater efficiency in public and utility services, preservation of open space, efficient use of alternative transportation and encouraging innovation in the planning and building of all types of development.

- Develop future land use plans that establish designated future growth areas, both infill and greenfield, where adequate infrastructure exists for accommodating growth at higher and/or more urban densities.

Infill describes the construction of buildings on urban lands. Usually, these lands have not previously been built upon. Greenfield development occurs on land that has not been previously developed for any purpose.

- Change the zoning code to permit smaller lot sizes and higher densities by right in designated districts.

Zoning code is considered "by right" if the approvals process is simplified and projects receive approval without a discretionary review process, having met required zoning standards.

- Reduce or remove development standard barriers to cluster development, such as parking requirements, minimum lot sizes, and lot setbacks.
- Add height limitations to limit cooling towers and the associated water demand increases.
- Change zoning code to permit multiple types of residential development (e.g., multiplex, townhomes, apartments, accessory dwelling units) by right in designated growth areas to provide a diversity of housing options.

Accessory dwelling units are smaller, independent residential housing units located on the same size lot as single-family residences.

- Change zoning code to permit cluster and mixed-use development by right in designated growth areas.
- In exurban and rural areas, change zoning code to permit and incentivize cluster and conservation development by right.
- Manage commercial uses by making water-intensive uses, such as canning and bottling plants, data centers, etc., conditional instead of by right. Issue permits based on standards to meet water conservation and efficiency standards such as water recycling.

By code, Salt Lake City prohibits commercial and industrial uses of water that exceed 200,000 gallons per day (Salt Lake City § 21A.33.010). The ordinance was developed in response to ongoing drought conditions and the potential for water-intensive industries such as bottling plants and data centers relocating to the city.

- Provide incentives for increased densities using development or utility fee reductions/ waivers and density bonuses for developers.

## TOOLBOX: WATER BUDGETS

A foundational element of water supply planning is the development of a water budget—an estimation of water flows into and out of a system. Water budgets can be applied at various scales: to a single home, to a development, to a single water provider, or to a local government with multiple water providers. At development planning stages, calculating a water budget for buildout can allow a community to carefully craft a vision within the constraints of its anticipated water supplies.

Like financial budgeting, every line item of water supply and demand should be accounted for in water budgeting, and tradeoffs and opportunity costs should be carefully considered in planning for and managing water resources. For instance, such a budget provides guidance for evaluating water demand at the development or site scale. A community that adds water budgets to development review processes and site plans optimizes site performance, conformance with the community's vision, and stewardship of the overall water budget for buildout.

### *APPROACHES FOR DEVELOPING A WATER BUDGET*

- Examine and tailor calculation methodology. The state has developed a water budget model to estimate water budgets at the state and basin level for planning purposes and basin level budgets may be used by counties for planning purposes. The information is used to formulate plans for conservation, demand reduction, repurposing of water use, inter-basin transfers and other planning activities and may provide a basis for smaller-scale water budgeting.
- Align methodologies and data sources across departments and communities. Different departments or water providers may use disparate data sources or methodologies. Communities that compare and coordinate data and information build a mutual understanding, improve communication, and reduce uncertainty in their projections.
- Connect water billing and actual land use data using GIS. Granularity and accuracy of estimations inform rate structuring and advance efficiency programs. This approach helps communities better understand how a rezoning proposal could impact water demand. It also helps them understand and compare the water use patterns and trends of different land uses and densities.
- Shift units of demand measurement to account for density. Moving from a *per-acre* scale to a *per-unit* or *per-square-foot-of-building-area* scale can help account for increasing density in residential and commercial developments.
- Utilize water budgeting to set maximum amounts for use on outdoor landscaping. A landscaping allocation allows a developer to select plant materials that require watering in amounts at or below the total amount of water budgeted.

(Water Feature) is by Todd Stonely 2022

## TOOLBOX: DEMAND OFFSET PROGRAMS

Water demand offset programs require new development to offset projected water demand either through water conservation in existing development or transfer of water rights. The goal is to have all new development, including the expansion of existing homes or businesses, be "water neutral" in the water supply system. Some communities provide an in-lieu fee alternative. This concept can also apply to offsetting energy, wastewater, air quality, historic preservation, or watershed health impacts.

### *APPROACHES FOR MANAGING A WATER DEMAND OFFSET PROGRAM*

- Establish an authority to monitor and administer the program.
- Determine the offset ratio. A ratio of 1:1 will maintain the current water supply and demand balance, and a 2:1 mitigation ratio will reduce the ratio of demand relative to supply. Wastewater reclamation projects are more reliable and are given a 1:1 offset value, and supplies created through demand management are considered temporary and are given a 2:1 ratio.
- If fee-based, ensure the charge reflects the costs of implementing the offset as well as administrative costs. Costs of developing new supplies are borne by the entity needing to offset demand. Fee schedules can be a flat rate or based on a percentage.
- Require verification of sufficient water supplies and water budgets. Work completed by developers must include documentation and verification by local program administrators.
- Consider the timing of the offset fee payment to allow enough time to procure supplies with those fees by the time the new demand is created by the development.
- Promote infill development by giving priority access for new water supplies to new demands within the existing service area boundary. Consider maximizing development opportunities within the target area before approving development in new regions.

### ***Case Study:*** *Water Demand Offset Program, Santa Fe, NM*

*Case study reprinted from the Sonoran Institute's Growing Water Smart: The Water-Land Use Guidebook for Colorado (2021).*

The City of Santa Fe, New Mexico began a Water Conservation Program in 1997 that has contributed to a per capita water use reduction of more than 50% since 1995 bringing demand down to 56 gallons per capita per day (GPCD).

A 2002 drought caused the City's demand to exceed supply. The City took aggressive action initiating a rate structure increase, a rebate program, and a water demand offset program. Their water demand offset program gained national recognition demonstrating its effectiveness as a way to meet future demand. The program set requirements for all new development to offset water demand either through conservation in existing development or transfer of water rights to the City. The requirements are:

- For residential development requiring under 10 acre feet/yr and commercial development requiring under 5 acre feet/yr, the water demand offset could be met through conservation;
- For new development requiring greater than this demand, water rights would be required to offset new demand. To help developers offset demand, the City developed a toilet retrofits program.

The program connected willing homeowners who desired a retrofit to developers who could either buy credits from a qualified broker or do it themselves.

This program was so successful that the City nearly maximized its conservation potential. In response, the City updated its water demand offset program. The program includes the creation of a water bank to hold conservation credits for future development and a Water Conservation Credit Program. This program includes:

- The addition of rebates for more types of water use efficient appliances or retrofits of older ones and for outdoor watering equipment;
- A water budget program where a water user enters into an agreement to use less water and the City monitors the usage and pays the customer for the reduction in use; and
- A "free stuff" program including low-flow faucet and shower heads.

The water demand offset program applies to commercial projects that require 5 acre-feet per year (AFY) or more, residential projects that require 10 AFY or more, and mixed use projects that require 7.5 AFY or more.

## TOOLBOX: BUILDING AND DESIGN CODES (PLUMBING, BUILDING EFFICIENCY, & GRAYWATER STANDARDS)

Reducing indoor water use in residences and businesses can be accomplished through water efficiency standards for indoor plumbing fixtures. These standards are important for managing long-term water demand because fixtures installed today will likely last 20-30 years and have the potential to require higher water use during that time. Utah's maximum flow rates for indoor plumbing fixtures are comparable to federal standards in some instances, but higher



than Environmental Protection Agency (EPA) WaterSense product standards. Currently, WaterSense labeled products are not legally required to be installed by new development in Utah. However, local jurisdictions may incentivize water-efficient plumbing in local ordinances and in retrofit programs.

*Table 2. Water efficiency standards comparison.*

| | Utah Statutes | Federal Standards | E.P.A. WaterSense Products |
|---|---|---|---|
| Residential Toilets | 1.6 gallons/flush | 1.6 gallons/flush | 1.28 gallons/flush |
| Bathroom Faucets | 2.2 gallons/minute @ 60 psi* | 3.0 gallons/minute | 1.5 gallons/minute |
| Showerheads | 2.5 gallons/minute @ 80 psi | 2.5 gallons/minute | 2.5 gallons/minute |

### *STRATEGIES FOR PLUMBING FIXTURES AND BUILDING EFFICIENCY STANDARDS*

- Use green plumbing codes as a guide or adopt a green plumbing code requiring high-efficiency faucets, showerheads, and toilets in the plumbing code.

Green plumbing codes supplement the Uniform Plumbing Code or the International Plumbing Code in an effort to encourage sustainable construction practices. There are currently two organizations leading the development of green plumbing codes, the International Code Council and the International Association of Plumbing and Mechanical Officials.

- Adopt building code standards that permit the use of water recycling systems.
- Adopt building code standards for the submetering of multifamily units.
- Incentivize the replacement of less-efficient toilet and faucet technologies with water efficient ones through rebates or replacement fixture programs.
- Create incentives for developers to receive lower impact fees for meeting water efficiency standards that go beyond requirements of the building code.
- Link impact fees to water budgets to guarantee that the low demands projected when impact fees are paid will be realized over time.

In response to drought, the Utah Water Quality Board adopted a graywater rule in 2004. However, the initial rule was very restrictive and was revised in 2020 to allow simple gravity-fed systems and expanded application to include multi-family and commercial properties. Utah Code § R317-401 defines graywater and places authority for administration with local health departments that may or may not permit graywater systems and use. Where permitted, systems must be designed by a certified professional.

## TOOLBOX: DEVELOPMENT REVIEW PROCESSES

The development review process encompasses all the procedures necessary to ensure development applications meet a community's land use regulations. Communities' development review processes vary slightly but engaging water providers in the process is an important strategy for integrating water and land and can support water resilient outcomes.

*APPROACHES FOR INTEGRATED DEVELOPMENT REVIEW*

- Document the development review process. Identify opportunities to add water conservation managers and include other sustainability or resilience experts to the land review process to identify and resolve water-related challenges or opportunities.
- Promote collaboration and build relationships between water and land professionals through regular meetings that maintain a shared understanding of the community's strategic vision and priorities.
- Ensure that water-related compliance challenges are addressed and alternative approaches are considered early by involving water managers at pre-application and preliminary plat review meetings.
- Seek review and agreement from water resource departments on final approval of land use decisions.
- Ensure that a development is built, operated, and maintained as stated in the proposal by training site inspectors to recognize and enforce compliance on water-efficient design elements.
- Shape development agreements or planned unit developments (PUDs) to include water efficiency standards, alternative water use, and watershed protection efforts.
- Integrate low-impact development design recommendations into the site planning review.
- Use connection charges, such as impact and other fees, as incentives to guide development to areas with existing or planned infrastructure. Connection charges can reflect water budgets and allocation policies.
- Promote voluntary, incentive-based programs to implement creative plat designs with open space, water-use offsets, and water efficient plumbing, landscaping, and rainwater harvesting systems (in new builds and/or retrofits). Incentives may encourage developers to exceed the required water efficiency standards.
- Develop guidance to help residents and builders understand and comply with building and design codes and to learn about alternative codes being developed to promote sustainability innovations.



## TOOLBOX: WATER EFFICIENT LANDSCAPING

In Utah, landscape irrigation accounts for 50-70% of per capita water use and represents a significant water conservation opportunity (Utah Water Resources Plan, 2021). Related, the legislature enacted Utah Code § 10-91-536 in 2022 which defined water wise landscaping for the first time in the state's history.

This Utah code broadly defined water wise landscapes as being suited to the microclimate and soil conditions of a given location, having the ability to remain healthy with minimum amount of irrigation once established, and using proper and efficient irrigation system design. In addition, the code prohibited municipalities from enacting or enforcing "an ordinance, resolution, or policy that prohibits, or has the effect of prohibiting, a property owner from incorporating water wise landscaping on the property owner's property."

Municipalities may still require property owners to comply with review processes before installing water wise landscaping, to maintain plant material in a healthy condition, or to follow water wise design requirements adopted by the municipality. Importantly, the code states that a municipality may no longer require a property owner to install or keep in place lawn or turfgrass in areas less than 8 feet wide (enabling property owners to change landscaping in parking strips, which are hard to water efficiently).

The legislature also addressed water efficient landscaping by homeowners' associations (HOAs) in 2022 by enacting Utah Code § 57-8a-218. This code requires HOAs to adopt rules that support water efficient landscaping, including allowances for reducing irrigation to lawns during drought conditions (making grass dormancy acceptable). It also prevents HOAs from prohibiting or restricting the conversion of existing water-intensive park strips to water efficient landscaping.

Communities working to make landscaping water smart should integrate tools to reduce water demand at the time of new construction. Many such tools that integrate best practices into development codes for water conservation and efficiency are available to local governments. These best practices may include requirements for:

- Plant materials that are best suited for the local climate and soil conditions.
- Grouping of plants into hydrozones.

Hydrozones are areas of the landscape where plants with similar water requirements are grouped.

- Limited use of turfgrasses to practical and functional applications.
- Low-flow and efficient irrigation technologies, including drip irrigation, smart irrigation controllers, and pressure-regulating irrigation valves and sprinkler heads.
- Water efficiency standards for landscapes.
- Rain sensors with a shutoff mechanism to prevent irrigation during natural rainfall events.
- Soil enhancements and mulching to optimize moisture holding capacity.
- Training for landscape contractors and professionals on water-efficient landscaping

Wayne Wurtsbaugh, Utah State University, 2018

techniques and irrigation water budgeting, like the Qualified Water Efficient Landscaper (QWEL) training program.
- Model maintenance standards and agreements for HOAs and others to use in contracting landscape services.
- A total amount of landscaped area permitted based on lot size percentage or square footage.
- A water budget for outdoor water use, ideally tied to tiered water rate structuring, that sends a price signal to ratepayers.

Since mandatory requirements significantly increase water savings, the goal of a community committed to water conservation should be to require all new developments and retrofits to meet robust water efficiency standards.

*STRATEGIES FOR PROMOTING WATER EFFICIENT LANDSCAPING*

- Develop landscaping guidelines that provide specific recommendations to individuals and developers on water-efficient plant materials, soil enhancement, mulching, and irrigation scheduling appropriate for local climates.
- Promote and/or incentivize the use of individual household rainwater harvesting for outdoor irrigation.
- Adopt community water efficiency standards that allow residents to take advantage of rebate programs offered by the state.
- Provide incentives for developers to install water-efficient landscapes through reduction of impact fees.
- Change subdivision codes to include residential, commercial, and public landscaping standards that reduce the use of water for irrigation by regulating:
    - Irrigated system efficiency and irrigated area;
    - Plant materials;
    - Rain sensors and/or smart irrigation controllers that adjust irrigation in accordance with local weather conditions;
    - Irrigation scheduling (frequency and depth);
    - Soil amendments;
    - Water loss limits.
- Non-regulatory options include changing property owner behavior through conservation and education programs implemented by the water provider, such as:
    - Rebate programs for water-efficient plumbing fixtures such as low-flow toilets and showerheads, and water-efficient washing machines;
    - Rebate programs for the replacement of water-intensive landscapes with water efficient landscaping;
    - Education about water efficient landscaping and efficient irrigation systems;
    - Irrigation audits/evaluations that educate homeowners and landscape managers on landscape irrigation efficiency.



## ***Case Study**: Herriman City Water Efficiency Standards*

Contributor: Justun Edwards, Director of Public Works, Herriman City

Herriman City, a fast-growing city in southwestern Salt Lake County, receives 65% of its water from Jordan Valley Water Conservancy District (JVWCD). City officials estimate that Herriman's population will double by 2040. Beginning in 2019, Jordan Valley Water Conservancy District developed Water Efficiency Standards in order to help their member agencies use water more efficiently. JVWCD requires member agencies to adopt the standards when updating their water contracts. The standards include specific criteria for landscapes in new commercial and residential developments that use significantly less water than prior development. Setting water efficiency standards for landscapes is an effective tool to ensure efficient outdoor water use in new developments or redevelopments. Water providers want to make sure water is used efficiently and city planning departments want to make sure they have sufficient water supplies to continue to grow, ensure future water security, and protect their watersheds.

As part of the renegotiation of its contract with JVWCD, Herriman City decided to become the first of JVWCD's member agencies to adopt its new Water Efficiency Standards in December 2020. The standards include setting a limit on the amount of turf allowed in landscapes, and requiring drip irrigation and 3-4 inches of mulch in planting beds. All new developments need to follow the standards in order to be approved. To mitigate conflicting code, Herriman changed part of its land use code in order to adopt the standards. They implemented a plan review and inspection process, and hired a full-time conservation staff member to ensure compliance. New landscapes are inspected by the city after installation to ensure that the water efficiency standards have been followed.

To ensure landscapes for new residential and commercial developments meet the intent and requirements of the Water Efficiency Standards, Herriman implemented a landscape review and inspection process. Builders and developers must submit a detailed landscape plan to be reviewed for compliance. As part of the plan submittal, they must complete a table that identifies lot size, impervious area, and landscape areas listing the total sod area which cannot exceed 35% for residential lots and 20% in commercial developments. Once the landscapes are installed an inspection must be performed to ensure compliance with the approved plan.

The reaction of developers to the standards has been generally positive. Herriman City initially wanted to keep a 75% living plant cover requirement, but reduced that standard to meet the Jordan Valley Water Efficiency Standards of 50% living plant cover to eliminate confusion, address developer cost concerns, and to further reduce water consumption. However, some issues have arisen during the implementation of the Water Efficiency Standards. Developers are finding that it is costlier to install water efficient landscapes than to install a traditional turf grass landscape. There has also been some pushback against the standards by developers with neighborhoods that were partially built-out when the new standards came into effect creating landscape inconsistency throughout the development. The homes built before the standards were implemented have a more traditional landscaping style; now the developers will have to navigate building new homes with the updated standards in those neighborhoods.

*Case Study Continued*

Herriman City was the first of the Jordan Valley Conservancy District's member agencies to adopt their Water Efficiency Standards and has since been approached by other member agencies for advice on adopting the standards, and by cities in other parts of Utah who are looking to develop their own standards. Herriman City has approved a handful of commercial projects that follow the standards, and are beginning to see residential projects follow the standards in 2022. They will have more data available on the program's progress in 2023. Beyond implementing the efficiency standards, Herriman City has initiated a process to consider how to implement the requirements of SB 110, which was passed by the state legislature in 2022. This bill requires that water use and preservation elements be integrated into a city's General Plan. Herriman City has taken an important first step on the path to a more water efficient future, and is making plans to do even more to achieve it.

Jake Powell, Utah State University, 2022

## ***Case Study**: Cedar City Water Wise Demonstration Street*

Contributors: Candace Schaible, Extension Assistant Professor of Horticulture and Water Wise Landscaping and Jake Powell, Extension Landscape Architecture and Environmental Planning Specialist, Utah State University

Cedar City is the largest city in Iron County, Utah. Located 250 miles south of the state capital, it is the home of Southern Utah University, the Utah Shakespeare Festival, and the Utah Summer Games. The city has a population of approximately 36,000 and encompasses roughly 20 square miles on the western edge of the Markagunt Plateau in the Cedar Valley. Although the Cedar Valley rests on top of a natural aquifer, the city does not have access to sufficient water supplies at current levels of use.

Rural communities are often physically distanced from the water conservation and demonstration gardens located along the Wasatch Front. However, these demonstration gardens provide tangible examples of how water wise landscapes can look and feel and provide an opportunity for homeowners to gather landscape ideas and inspiration. In 2019, Iron County Extension Assistant Professor, Candace Schaible, wanted to make access to such demonstrations easier for Cedar City residents by installing water wise landscapes in a new suburban neighborhood.

To make this goal a reality, she collaborated with Utah State University Landscape Architecture and Environmental Planning Specialist, Jake Powell, on an Extension Water Initiative grant to help design, fund, and install a water-wise demonstration street in the city. The two brought the idea to the Iron County Home Builders Association and one builder volunteered to take on the project.

Working with local real estate developer, Alex Meisner Construction, the team created a series of front yard designs showcasing water-wise landscape design principles and techniques and these designs were then installed at nine model home sites. Demonstrating water wise landscape design principles at the model homes has worked to provide homebuyers with an immediate connection to water wise landscape construction ideas and principles that they may then apply on their own properties.

The nine home landscapes are a tangible focus for the partnership that is helping to change the vernacular landscape of Cedar City and more water wise landscapes continue to be installed in the neighborhood. The project includes a website that details the landscape designs and will also share water use data from the demonstration landscapes over time. A series of associated courses and resources teaching and reinforcing the principles displayed at the homes is also planned.

***Case Study**: Utah Department of Facilities Construction and Maintenance*

Contributor: Andy Marr, Assistant Director of Facilities, Utah Department of Facilities Construction Management

The mission of the Utah Department of Facilities Construction and Management (DFCM) is to provide professional services to assist State entities in meeting their facility needs for the benefit of the public. This includes jurisdiction over nearly 4000 properties and landscapes across the state such as universities, community and technical colleges, the Utah State Fair Park, and other state agencies.

In 2021, in response to the ongoing drought, Governor Spencer Cox issued Executive Order 2021-10 requiring state agencies to follow the Utah Division of Water Resources' weekly lawn watering guide. All DFCM facilities complied with the executive order, but the public still saw sprinklers running and green grass on state facilities, which presented a public relations challenge. In 2022, the state legislature passed H.B. 121, adding more robust guidance to the executive order to require turfgrass dormancy to help conserve water. To meet the requirements of the new legislation, Andrew Marr, Assistant Director of Facilities, DFCM, consulted with Utah State University's Center for Water Efficient Landscaping.

Quantitative guidelines for irrigation of state facilities were developed, including only allowing ½ inch of irrigation water applied weekly during shoulder seasons and 1 inch applied during the hottest weeks of the summer. Slightly higher irrigation amounts were allowed in southern Utah to accommodate a longer growing season and higher temperatures. These guidelines were brought to the Governor's cabinet and received their approval, and the new requirements were issued to all delegated facilities falling under DFCM jurisdiction. In addition to the new irrigation requirements, all grounds supervisory staff of DFCM were required to complete training through the Qualified Water Efficient Landscaper program to learn how to install and maintain their landscapes and irrigation systems for water efficiency.

DFCM has also implemented other processes to facilitate the success of their response to the Governor's executive order and H.B. 121. A database is now maintained for all managers to indicate their compliance with the reporting requirements of H.B. 121 and any factors that may prevent that compliance (e.g., local city or water district requirements). Monthly meetings provide an opportunity for managers and stakeholders to discuss questions regarding the new irrigation practices and to request funding for water meters, smart irrigation control technologies, rezoning of irrigation systems, and water efficient landscaping to bring facilities into compliance.

Andrew Marr describes DFCM's efforts as an ongoing progression of learning and implementation that is just beginning. "It's time to figure out our process and in the coming seasons our managers will know what to do," he says. "It's more about the buy-in, the common goal and common mission. It's hard to turn the ship around but (by) providing incentives and recognition…we're getting there."



# Section 3: **WATERSHED RESILIENCE & WATER SMART INFRASTRUCTURE**

## OVERVIEW

How we manage all forms of water, from storm water to wastewater, impacts both the built and natural environment. Approaches that incorporate an Integrated Water Resource Management (IWRM) methodology into building, site, subdivision, and infrastructure standards can protect ecosystems, enhance watershed resilience, and harness the utility of all forms of water. An IWRM approach can help to mitigate the factors that can degrade ground and surface water quality and quantity including:

- Pollution from urban and agricultural runoff and natural disasters like floods and wildfires;
- Sedimentation due to soil disturbances, vegetation loss, and erosion from road construction and new development;
- Destruction of riparian areas due to development and changes in climate;
- Increased amounts of storm water due to increases in impervious surface area from development;
- Decreased or lost water infiltration resulting from increases in impervious surface area and more rapid runoff; and,
- Variability in water supplies caused by periodic droughts.

Municipal and county governments are also tasked with providing necessary public services within their jurisdictions, which may involve community-scale water, wastewater, sewer, and other infrastructure and improvements. Such infrastructure development usually occurs over many years and depends on local goals, development and buildout needs, and sufficient revenue and financing. Water smart approaches like green infrastructure can provide several additional benefits to traditional 'gray' infrastructure, like recharging local floodplains, supporting vegetation and wildlife, providing community amenities and open space, mitigating urban heat island effects, and protecting watershed health and resilience.

**Green infrastructure** describes a range of measures that use permeable surfaces, plants, and soils to keep storm water onsite, thereby reducing flows into community sewer systems or to nearby surface waters.

**Gray infrastructure** describes systems designed to move storm water away from the built environment.

## TOOLBOX: WATERSHED PLANNING FOR RESILIENCE

Landscape scale changes resulting from both human and natural forces have a significant impact on natural ecosystems and water resource availability. Safeguarding available water resources through watershed protection standards and policies is an important but often overlooked goal in Western communities. Watershed planning and protection has often been considered a function of collaboratives and nonprofits working with local, state, and federal agencies to restore ecological processes and functions. However, the way communities develop and redevelop can either escalate the threat to our watersheds or nurture nature and enhance the returns.

Watershed planning for resilience focuses on minimizing negative impacts as new development occurs. Watershed protection goals are included in a wide variety of community plans, such as comprehensive plans, emergency management plans, watershed plans, water resource management plans, and open space plans. Converting these goals into concrete policy in development code is essential to prevent watershed degradation and enhance community resilience.

### *APPROACHES FOR ENHANCING WATERSHED RESILIENCE*

- Map all sensitive areas including wetlands, riparian corridors, infiltration zones, water supply watersheds, groundwater basins, and natural disaster-prone areas, such as flood, drought, and wildfire areas.
- Adopt plans for wildfire mitigation, watershed management, storm water management, and floodplain management that designate sensitive areas and goals for mitigation. These plans should reference other plans so that priorities and objectives build on and reinforce each other and the environment is viewed holistically.
- Limit development in sensitive areas by clustering homes within a smaller geographic zone, incentivizing infill development in less sensitive areas, and providing low impact design standards/guidelines.
- Create zoning districts with lower densities and/or cluster development to protect surface and groundwater sensitive areas.
- Adopt development standards for stream buffers and setbacks to protect water quality. Adopt vegetation protection standards that minimize disturbance to vegetation within the riparian corridor.
- Adopt storm water management and site design standards that utilize best practices for low impact design reducing storm event runoff and increasing water infiltration.
- Adopt site level soil erosion mitigation standards for new development to reducesedimentation and run-off and protect water quality from land disturbance.



- Adopt surface and/or groundwater districts with standards to minimize contamination of streams and shallow aquifers that will protect existing and potential sources of drinking water supplies.
- Participate in collaborative efforts to restore watershed functions through watershed restoration projects.

Communities should identify the top multi-benefit and integrated strategies and projects, then implement these projects ahead of less integrated proposals (unless crucial urgency demands otherwise). Policies, plans, programs, and projects should be monitored and evaluated to determine if the expected results are achieved, and to improve future practices.

## TOOLBOX: GREEN INFRASTRUCTURE & LOW-IMPACT DEVELOPMENT

Green infrastructure uses the natural ability of permeable surfaces to absorb storm water. Low-impact development (LID) is the retention or restoration of natural hydrologic patterns by using landscape and site design to keep as much rainwater as possible from leaving the site. Instead of designing a site or streetscape to funnel storm water off-site as fast as possible, green infrastructure and LID approaches use vegetation, porous materials, rain gardens, and detention basins to reduce storm water runoff and encourage the onsite infiltration of storm water.

**Common Water Smart Infrastructure Techniques**

| Application | Description |
|---|---|
| Bioretention basins, storm water harvesting basins and rain gardens | Small to large scale planting areas within the hardscape containing shrubs, trees and grasses. |
| Bioswales | Shallow and uncovered channels that induce meandering and are placed inline within a drainage channel. |
| Curb extensions and chichanes | Traffic calming measures which widen the sidewalk and/or narrow the street for a short distance. |
| Curb openings | Drainage inlets that divert storm water into bioretention basins. |
| Detention ponds | Basins that provide flow control by collecting storm water runoff. |
| Permeable pavement, gravel, or pavers | Methods of paving that allow infiltration and can be used in low to moderately trafficked areas like sidewalks and parking lots. |

Benefits of green infrastructure include:

- Reducing the need for outdoor irrigation; native and adapted plants may be used to revegetate channels and basins and survive with naturally occurring rainfall once established.

- Storm water that is not used by plants is cleaned as it recharges into the ground, thus reducing peak flooding, reducing pollutant loads downstream, and lowering the risk of sewer overflow.

- Additional vegetated areas in a community can help to mitigate heat impacts by providing shade, sequestering carbon, and absorbing solar radiation in urban neighborhoods.

- Relative to other types of traditional or gray infrastructure for storm water management, green infrastructure is more affordable to install and maintain.

- Particularly in shallow groundwater areas or near riparian areas, increased storm water infiltration can improve water quality and restore watershed health and other natural hydrologic functions in urban areas.

- Indirect benefits include:

    - Increased public safety due to reduced flooding, improved emergency vehicle access, and reduced property damage;
    - Expanded landscaped areas that produce more oxygen, cool neighborhoods, and reduce energy consumption;
    - More attractive neighborhoods that foster pedestrian and cycling activity, reduce traffic speeds, and enhance feelings of safety;
    - Job creation through installation and maintenance of LID and, indirectly, landscape industry jobs (plant production and sales).

### *STRATEGIES FOR IMPLEMENTING WATER SMART INFRASTRUCTURE*

- Map all sensitive areas including wetlands, riparian corridors, infiltration zones, water supply watersheds, groundwater basins, and natural disaster-prone areas, such as flood, drought, and wildfire prone areas.

- Limit development in sensitive areas by clustering homes within a smaller geographic zone, incentivizing infill development in less sensitive areas, and providing LID standards or guidelines.

- Preserve regional open space by clustering development, maximizing unpaved areas for storm water retention.



- Consider the potential to use storm water recapture for a centralized urban natural open space. Conveying this water to a common area or neighborhood park may enhance the vision of your community or neighborhood.

- Incorporate water holding areas into the landscape, such as creek beds, recessed athletic fields, ponds, cisterns, and other features.

- Adopt development standards for stream buffers and setbacks to protect water quality.

- Design all aspects of landscaping—from the selection of plants to soil preparation and installation of irrigation systems—to reduce water demand, retain runoff, decrease flooding, and recharge groundwater.

- Use permeable surfaces for hardscapes whenever possible.

- Work with transportation and civil engineers to update development standards and to map streets and areas that have the highest flood potential, as well as the widest setbacks where there will be room for tree plantings.

- Use green infrastructure for traffic calming, beautification, and placemaking. Consider placing green infrastructure along areas where vehicle speeds need reducing or where bicycle and pedestrian traffic is more concentrated.

Placemaking is the participatory process of creating places where people want to live, work, play, and learn.

- Adopt plans for wildfire mitigation, watershed management, storm water management, and floodplain management that designate sensitive areas and goals for mitigation. These plans should reference other plans so that priorities and objectives build on each other and the environment is viewed holistically.

- Connect infrastructure and improvements in the capital improvement plan with relevant goals and policies adopted in the general plan.

(Succulents) is by Shelby Ericksen 2020.

## ***Case Study**: Green Infrastructure at Our Village Community Center in Moab*

Contributor: Jeff Adams, Founder and Principal, TerraSophia LLC

On August 20, 2022, Moab, Utah experienced an unprecedented rainstorm that led to a 100-year flood. The total amount of rainfall attributed to the storm ranged from 1 to 1.5 inches, but close to 1 inch of that amount fell within a 20-minute span that evening. The rain fell southeast of town, draining county and Bureau of Land Management land into Mill Creek, a typically small creek that originates in the nearby La Sal Mountains and meanders through the heart of town.

Moab was unprepared for the amount of destruction and property damage that a storm of this magnitude would cause. In some cases, detention ponds that had been designed to blow out under previously approved plans and flood neighbors did so and in other cases, detention ponds that had been designed to retain storm water blew out and flooded neighboring properties.. A wall of water rushed down Main Street, flooding businesses, resulting in desperate clean-up efforts as Labor Day and the busiest tourism weekend of the year quickly approached. A lack of integrated land and water use planning was on display.

Though many neighborhoods and businesses were devastated by the flood, others not only survived the storm, but did so without any damage. One of these was Moab's Our Village Community Center. The Center, a local non-profit located on a 5.5 acre farm in the heart of town, runs a pre-school and childcare center as well as many other community-focused programs.

In the spring of 2020, Annie Thomas, director of the Center, reached out to Jeff Adams, founder and principal of TerraSophia LLC, to address a legacy of storm water runoff from an adjacent property, a tourism-related business. Drainage from that business's roofs and parking lot had often flooded the farm buildings now occupied by the Center. The Center had recently completed an extensive remodeling project to bring its facilities up to code to be used as a daycare center and the continued flooding put its mission and goals at risk.

Annie and Jeff developed a project to intercept the sheet flow of storm water using three basins and swales that intercepted that flow and then poured from one basin into the next. A shallow rolling dip in the Center's access road allowed overflow from the basins to cross the road and enter another series of basins on the other side, ultimately draining to one of the farm's fields.

Backhoe work finished two days before the Covid pandemic shut the project down, putting plans to involve the community in the project on hold. TerraSophia staff were able to return to complete the rock work and volunteers transplanted plants salvaged from the local middle school renovation. In all, the project required 3 or 4 days of machine work, 5 or 6 days of rock work, and hours of planting, mulching, and irrigation work. Bee-Inspired gardens and shrubs were also installed to add beauty and privacy.

The Center's green infrastructure system has served its purpose well, even during the August 20, 2022 flood. Storm water has been redirected to soak into the Center's grounds, and most of the donated plants are still thriving. Ongoing maintenance is the new focus; some puddling that has started to occur on the access road will be addressed by the addition of gravel and cobblestones.

In the spring of 2022, a second phase of the project installed gentle earthworks around a new heritage tree orchard on the property. Now, when one of the city's nearby storm ditches overflows and floods the property, the water is directed around the orchard, successfully joining with the initial green infrastructure project to move excess water offsite.

One month after the 100-year flood shocked the Town of Moab, there were still large debris piles and layers of sand and mud in some areas. However, the Moab community rallied, and the city and state have worked effectively together to support the citizens and businesses affected by this historic event.

Though catastrophic, the storm in August 2022 highlighted weak areas in the city's planning processes and a lack of water and land use integration. The county has since begun reviewing storm water management codes, specifically maintenance practices, to ensure that storm water infrastructure is appropriately sized, built and maintained, and that existing code is enforced.

Jeff Adams/TerraSophia

# Section 4: **WATER CONSERVATION AND EFFICIENCY TOOLS**

## OVERVIEW

Establishing water conservation, efficiency, and reuse in new development enables a community to grow water-smart from the start. Programs that incentivize or assist consumers in reducing water demand also serve an important role in retrofitting existing development and promoting a continued focus on wise water use.

Incentive programs and conservation rate structures can promote efficient water use by:

- Sending a price signal to encourage water conservation.
- Helping consumers invest in and manage efficient fixtures, appliances, and irrigation systems.
- Monitoring and communicating data about water usage to consumers.

## TOOLBOX: CONSERVATION RATE STRUCTURING

Water providers set rates to collect the revenue they need for operations, invest in infrastructure, and protect public health. With a revenue goal identified, providers can develop a rate structure to meet additional objectives, including water conservation and acquisition of supplies. The state legislature also codified support for conservation rate structures (Utah Code § 73-10-32.5) in 2016 by requiring water retailers to establish increasing block rates for water as use increases. Prioritizing conservation and mitigating water demand can reduce water provider expenses by sizing water supply acquisition or storage to the lower level of demand.

Water rates are determined by two factors: fixed and variable costs. The fixed costs of water are determined by the costs of water acquisitions and the costs to establish, operate, and maintain the infrastructure to convey the water. The variable costs are based on the amount of water that consumers use.

Common goals for adopting water conservation rate structures include:

- Reducing daily peak usage.
- Reducing seasonal peak usage.
- Reducing total system demand.

Consumer water conservation does not create financial strain for a utility if the offset demand



allows new customers to be added to the system while maintaining overall water use with existing supplies. If it is possible that customer conservation may exceed the point where it would present a revenue challenge with the current price of water, consider having a public dialogue to design solutions and rate structures that reflect the community's values and needs. Keep in mind that less demand pressure can result in considerable cost savings over time by reducing strain on water system infrastructure, thus delaying the need for maintenance, retrofitting, or expanding infrastructure.

There are a variety of conservation-oriented rate structuring options:

- Drought demand pricing: rates are higher during drought periods;
- Excess use: rates are higher for above-average water use;
- Inclining block: rate per block increases as water use increases;
- Indoor/outdoor: with separate meters, rates for indoor use are lower than rates for outdoor use;
- Penalties: customers are charged for exceeding allowable water usage limits;
- Scarcity pricing: the costs of developing new supplies is added to bills;
- Seasonal pricing: water rates are higher during the season with the most demand;
- Sliding scale: the unit price increases based on an average consumption;
- Spatial pricing: water rates are determined by the actual costs to supply water to specific locations;
- Time-of-use: water rates are higher during peak days or specific hours of the week;
- Water Budget: block rate is defined for each individual customer based on efficiency projections/expectations for that customer.

### *APPROACHES TO CONSERVATION RATE STRUCTURES*

- Develop a utility water conservation plan to clarify water conservation goals.
- Conduct a rate assessment to determine options for rate structuring.
- Develop a rate structuring plan and conduct community education and outreach to minimize opposition to potential rate increases.
- Adopt a conservation rate structuring strategy.

## TOOLBOX: POST-OCCUPANCY INCENTIVES AND EDUCATIONAL PROGRAMS

Both land use planning programs and water providers can engage consumers and provide incentives and education on the benefits of using water efficiently in their homes and businesses. Using technology like advanced water meters and sub-metering helps tailor these post-occupancy interventions.

### *CONSERVATION REBATE PROGRAMS*

Incentive programs can be a useful way to reduce current water demands for both residential and commercial properties/water users. They can serve as a complementary way to involve current residents/post-occupancy developments in implementing water smart building and design features. Providing rebates for homeowners and businesses to remove water-intensive landscaping and retrofit water-smart plumbing fixtures is a well-tested tool that can generate meaningful water savings.

#### *APPROACHES FOR CONSERVATION REBATE PROGRAMS*

- Offer rebates to residents for installation of low flow plumbing fixtures such as toilets and showerheads, appliances such as high efficiency washing machines, and “smart” home water monitors to reduce indoor water use.
- Offer rebates to residents and commercial customers for “smart” irrigation controllers and other elements of water efficient landscaping to reduce outdoor water use.
- Use rebates or grants to incentivize HOAs to install water efficient landscapes, irrigation systems, and controllers.
- Establish a rebate program for multi-family residential buildings that have cooling towers to upgrade their conductivity controllers.

Cooling tower conductivity controllers monitor the electrical conductivity of the water in the tower. If the water’s conductivity exceeds a set point, a “blowdown” process is activated and water is released. Carefully controlling the quantity of blowdown water provides a significant opportunity for water conservation in these systems.

### *WATER METERING, AUDITS, & LEAK DETECTION*

Water customers, including commercial, industrial, and residential users, may not be aware that water leaks and inefficient fixtures may be unnecessarily increasing their water use. While water providers may perform their own system-wide water loss audits, they can also support and incentivize customers to do the same.

Water metering is a method of measuring water consumption. Advanced metering technology, also known as “smart metering,” eases the data collection process and increases the specificity and frequency of the data. This increased granularity of information creates the opportunity for easily justifiable rate structures, rapid leak detection, and customized demand management programs. Utilities that pair metering and commodity rate structures report a 15% to 30% reduction in water consumption.



Privately purchased metering devices are also growing in popularity because they connect consumers to their water data in real time. In the absence of utility-wide advanced metering infrastructure (AMI), encouraging consumers to purchase their own meters may achieve similar water demand reductions at individual properties.

Furthermore, sub-metering multi-family, commercial, and outdoor uses can provide data granularity to empower refinement and optimization of water policies, rates, and fees. The value of this information may be worth more than the cost of installing extra meters.

Metering and the corresponding audits and interpretation can identify opportunities to modify water-consumptive behaviors. They can also detect leaks in the system and signal when infrastructural updates are necessary to mitigate water loss.

#### *APPROACHES FOR WATER METERING, AUDITS, & LEAK DETECTION*

- Deploy leak detection equipment, such as specialized meters temporarily attached to the main meter, in scenarios where low staff capacity limits on-site visits.
- Offer landscape audits that recommend watering schedules, infrastructure upgrades,and drought-tolerant plants.
- Offer audits at no cost to customers or pair it with an incentive, like a free fixture.
- Encourage community participation by providing water audit results of public buildings as examples that demonstrate potential water saving outcomes.
- Use the aggregated analysis of audit results to identify potential code and policy changes.
- Update your codes to allow individuals to install privately purchased metering devices on the utility meter and provide guidance on how to attach them in a way that avoids disturbance to utility operations.

Wayne Wurtsbaugh, Utah State University, 2021

## ***Case Study:*** *Secondary Water Metering: Finding New Water Supplies Through Waste Reduction*

Contributors: Darren Hess, Assistant General Manager for Operations and Jon Parry, Assistant General Manager for Strategic Initiatives, Weber Basin Water Conservancy District

In 2022, the Utah Legislature passed H.B. 242 which requires water meters be installed by 2030 on all new and existing pressurized secondary water systems. They also appropriated $250 million for grants to help operators of those systems comply. The Legislature took this action based on documented success of water savings from metering secondary water.

Utah has approximately 260,000 locations statewide that use secondary, untreated (non-potable) water for irrigation of lawns, gardens, parks and landscapes. In many areas, this secondary water is attached to urban properties that previously were agricultural land. In the land transition process, treated culinary water was provided for indoor use, but untreated irrigation water was provided through secondary systems for use on outdoor landscapes, primarily as a cost saving measure to the providers and users. In Utah, secondary water often comes from Bureau of Reclamation storage projects. Properties receiving secondary water have water allotments for the amount they can use and property owners are assessed fees for these allotments on their property bills. Approximately 85% of all locations with access to secondary water were unmetered in 2022.

The success of secondary metering as a water conservation strategy was originally demonstrated by Weber Basin Water Conservancy District (WBWCD), which has the largest contiguous secondary water system in the United States. Many areas with secondary water had piped and pressurized delivery systems for years, but the district's challenge was finding the right technology to meter "raw" (untreated) water. When meters that could work became available in 2009, WBWCD planned and implemented their first retrofit projects, installing approximately 1,100 meters between 2011-2013 in three neighborhoods where they retail secondary water. The aim of WBWCD was to determine if water use was within the property allocations, educate users on how much they were using, educate users on the water needs and efficient application of the needed water for their landscapes, and eventually charge people for water use including a tiered water rate structure to incentivize conservation. By 2022, the district had metered approximately 14,000 locations and had documented reductions in use of approximately 20-30% compared to unmetered areas and compared to use when meters were first installed, according to Jon Parry, WBWCD's Assistant General Manager for Strategic Initiatives.

The key to WBWCD's conservation success in metering secondary systems is its approach to sharing meter information with users through secondary water use reports and near real time access to their water usage via the District's Customer Portal. Developed in conjunction with the WaterMAPS™ program in the Center for Water Efficient Landscaping at Utah State University, the reports use a landscape water budgeting approach to show water users how much water they are applying to their landscapes in comparison to how much water their



landscapes need. This information, individualized to each property, informs water users of their ability to reduce overuse or waste, which has been a powerful educational motivator for landscape water conservation. WBWCD provides these reports monthly from May-October to help users track the efficiency of their water use and conservation success.

"We learned you can't just meter the water, you have to educate the consumer, and we are seeing some significant water savings as a result," said Darren Hess, WBWCD's Assistant General Manager for Operations. He noted, "This is really the largest water supply project we have. Every gallon we save is another gallon that can be stored in our existing reservoirs for the next season, which helps with future uncertainty in water supply." Saved secondary water has also helped WBWCD delay additional water supply projects and provide water for environmental flows to Great Salt Lake.

Other cities in Utah that implemented secondary metering prior to the recent legislation and availability of grant funding showed similar success in reducing water use. Saratoga Springs implemented secondary metering to address overwatering of landscapes serious enough to cause flooded basements and damages to homes, as well as to be fiscally responsible in avoiding costs of other more expensive water supply infrastructure. Saratoga Springs, Spanish Fork, and Santaquin have seen water savings of 25-50% through metering. They provided implementation advice to other communities undertaking metering in a spring 2022 Utah League of Cities and Towns training session.

WBWCD is realizing additional conservation programming benefits from secondary metering. Programs for indoor and outdoor water efficiency are somewhat distinct, and metering on dual systems helps them determine an appropriate amount for each type of use and refine the delivery and assessment of their water conservation programs. The secondary meters also enable WBWCD to monitor for leaks and use of seasonal allocations and alert customers, provide flexibility in implementing watering restrictions, and open up opportunities to financially incentivize customers to use less than their full allocations. WBWCD is promoting low water landscape alternatives on new development throughout the District's secondary retail service area, which would result in lesser allocation volumes being contracted and lower annual assessments for that water. In West Haven City, WBWCD is incentivizing developers to adopt low water landscapes by reducing the amount of water they have to turn over to be served through secondary systems.

In response to its first call for applications, the Utah Board of Water Resources on August 4, 2022 approved $190 million in grants to about 70 water conservancy districts, irrigation companies, municipalities and other water users for up to 70% of the costs of secondary metering projects.

## TOOLBOX: CONSUMER EDUCATIONAL MESSAGING

There are many ways for planners and water providers to reach consumers with conservation messaging. Utility bills often include an educational insert or other content to inform the reader about policy changes and to encourage water savings with tips and tricks. Some may include warnings and fear-inducing messages designed to curb water use. However, these messages often miss the mark because people tend to defend themselves from fear or negative self-images by ignoring these messages or rationalizing why the new information does not apply to them. Instead, studies show that messaging techniques that promote a sense of control, offer social incentives, provide immediate rewards, and are framed positively are more effective in changing behavior.

### *APPROACHES FOR COMPELLING CONSERVATION MESSAGING*

- Help your customers feel they have control or influence. Provide tangible acts or decisions they can make to "move the needle" toward a goal.

- People generally want to be either the same or better than their peers. Offer comparisons or share high compliance figures (e.g., "Nine out of ten residents follow these irrigation best practices to save water.").

- Near-term rewards make people feel good. This reward structure can even motivate behavior changes that relate to long-term goals or outcomes that are not immediately visible. The reward can be external or intrinsic.

- People are more likely to believe and act on positive rather than negative information. So, when given an opportunity to describe a trend, note progress toward goals.

## ***Case Study**: Slow the Flow Consumer Messaging*

Contributor: Shelby Ericksen, Water Conservation Manager, Utah Division of Water Resources

In the early 2000's, Utah Governor Mike Leavitt brought together a water conservation team composed of the state's Division of Water Resources and the five largest water conservancy districts in the state. Each member of the team contributed funding to create the state's first water conservation consumer messaging campaign, "Slow the Flow. Save $H_2O$". Now commonly known as "Slow the Flow", this consumer messaging campaign has a permanent home on the internet at slowtheflow.org and serves as a "one stop shop" for water conservation and drought resources for any community (or individual) in the state.

The Slow the Flow website displays several consumer messages that are also displayed on billboards across the state. These messages change over time and include:

"Save for the future, water less today,"
"Utah is in a drought, use less water,"
"Rain delay, don't water,"
"Protect tomorrow, water less today," and
"Cooler temps=less watering."

In addition, the website provides simple water conservation tips for consumers for both indoor and outdoor use, drought actions that consumers can take, and a list of tools and resources including links to rebate programs, the Division of Water Resource's Weekly Lawn Watering Guide, the Water Check program, water wise plant lists and gardens, and more. Printable materials are also available on the site and include fliers as well as lawn signs.

The Slow the Flow consumer messaging campaign also utilizes social media to get messages out including Facebook, Instagram (@slowtheflowutah), and YouTube and encourages communities to follow and share their water conservation messaging across the state.

If you have consumer messaging needs (infographics, educational materials), contact the Slow the Flow campaign at waterwise@utah.gov.

# Conclusion

The toolboxes outlined in this workbook highlight some of the most effective strategies communities can employ to manage local water demand. By implementing these tools and strategies, Utah communities can help meet the state's need for clean and affordable water "to sustain thriving communities and businesses, robust agriculture, ample recreation, and a healthy and resilient natural environment" as our population grows and we face an uncertain climate future. Of course, measuring and tracking progress toward integrating water and land use will help to ensure your community's success.

***Measuring and Tracking Progress***

Measuring and tracking the results of water and land use integration is vital to determining whether your community's plans and goals are being met. Growing Water Smart Metrics: Tracking the Integration of Water and Land Use Planning offers a set of indicators that can be assessed for year-over-year trends to demonstrate achievement of water savings through land use planning. Ten *progress* metrics track whether: the community's land use plan integrates water efficiency and its water plan integrates land use strategies; conservation-oriented system development charges and pricing structures are being used; indoor and outdoor water efficiency measures are being utilized; and collaboration around development proposals is occurring. Fourteen *impact* metrics measure increasing or decreasing trends in water demand and use and trends in development patterns and land use.

Wayne Wurtsbaugh, Utah State University, 2021

# Additional Resources

## Water Supply & Demand, Planning

| Title | Theme | Source | Type of Resource |
|---|---|---|---|
| State Water Plan (2021) | Water Supply and Demand | Utah Division of Water Resources | Plan |
| Utah's Regional M&I Conservation Goals | Water Supply and Demand | Utah Division of Water Resources | Report |
| Public Water Supplier 40 Year Water Requirement Plan Standards | Water Supply and Demand Planning | State of Utah, Division of Water Rights | Policy Document |
| City of Orem Water Master Plan (2017) | Water Supply and Demand Planning | City of Orem | Plan |
| Salt Lake City Water Conservation Master Plan | Water Supply and Demand Planning | Salt Lake City Department of Public Utilities | Plan |
| Salt Lake City's Storm Water Management Plan | Water Supply and Demand Planning | Salt Lake City Department of Public Utilities | Plan |
| South Jordan Water Conservation Plan | Water Supply and Demand Planning | South Jordan City | Plan |
| Genoa Water Conservation Plan | Water Supply and Demand Planning | Town of Genoa | Plan |
| Salt Lake City Water Shortage Contingency Plan | Water Supply and Demand Planning | Salt Lake City Department of Public Utilities | Plan |
| Park City's Storm Water Management Program | Storm Water Planning | Park City Public Utilities | Plan |
| City of Logan Drinking Water System Master Plan (2016) | Water Supply and Demand Planning | City of Logan | Plan |
| Community Solutions for Voluntary Long-Term Storm Water Planning | Storm Water Planning | U.S. Environmental Protection Agency | Guide, Toolkit, Technical Assistance |
| Millcreek Community Wildfire Preparedness Plan | Wildfire Planning | State of Utah | Plan |

| Title | Theme | Source | Type of Resource |
|---|---|---|---|
| WRA Water System Development Charge Guidebook | Water Supply and Demand | Western Resource Advocates | Guidebook |
| Net Blue: Water-Neutral Growth | Water Supply and Demand | Alliance for Water Efficiency | User Guide, Model Ordinance, Offset Methodology |
| Conservation Plan Resources | Water Supply and Demand, Water Conservation | Utah Division of Water Resources | Website |
| Great Salt Lake Integrated Model (2019) | Water Supply and Demand, Water Conservation | Great Salt Lake Advisory Council | Report |

## Land Use-Water Integration

| Title | Theme | Source | Type of Resource |
|---|---|---|---|
| Integrating Water Efficiency into Land Use Planning in the Interior West: A Guidebook for Local Planners | Water Conservation, Land Use-Water Integration | Western Resource Advocates | Guidebook |
| Great Salt Lake Advisory Council Conservation Impacts Assessment | Water Conservation, Land Use-Water Integration | Northern Utah | Study |
| Incorporating Water into Comprehensive Planning | Land Use-Water Integration | Lincoln Institute of Land Policy | Manual |
| Incorporating Water into Comprehensive Plans in Utah | Land Use-Water Integration | Western Resource Advocates | Website - Webinars |
| Guiding Principles for Equitable Management in Coordinated Planning | Land Use-Water Integration | Local Government Commission | Guiding Principles |
| Salt Lake City Sustainability Plan | Land Use-Water Integration | Salt Lake City | Plan |
| City of Bluffdale Floodplain Management Plan | Land Use-Water Integration | City of Bluffdale | Plan |

| Title | Theme | Source | Type of Resource |
|---|---|---|---|
| Assured Water Supplies in Western States | Land Use-Water Integration | Colorado Natural Resources, Energy & Environmental Review | Legal research |
| Growing Water Smart: The Water-Land Use Guidebook (Arizona) | Land Use-Water Integration | Babbitt Center for Land and Water Policy and Sonoran Institute | Arizona Growing Water Smart Guidebook |
| Growing Water Smart: The Water-Land Use Nexus Guidebook (Colorado) | Land Use-Water Integration | Babbitt Center for Land and Water Policy and Sonoran Institute | Colorado Growing Water Smart Guidebook |
| A Guide to Low Impact Development within Utah | Land Use-Water Integration | Utah Department of Environmental Quality, Division of Water Quality | Guidebook |
| Model Landscape Ordinance | Land Use-Water Integration | South Metro Water Supply Authority, Colorado | Website - Model Code |
| Water Efficient Landscape Design and Development Standards | Land Use-Water Integration | Salt Lake County, UT | Website - Code |
| Model Water Efficient Landscape Ordinance | Land Use-Water Integration | California Department of Water Resources | Website - Model Code |
| Landscaping Standards | Land Use-Water Integration | Sandy City | Website - Code |
| Water Efficiency Standards | Land Use-Water Integration | Herriman City | Website - Code |
| Rule R317-401-Graywater Systems | Land Use-Water Integration | State of Utah | Website - Code |
| Ch. 13.04.260 Waste Prohibited | Land Use-Water Integration | South Jordan City | Website - Code |
| Strengthening Collaboration | Land Use-Water Integration | Sonoran Institute | Video |

## Water Conservation

| Title | Theme | Source | Type of Resource |
|---|---|---|---|
| Conservewater.utah.gov | Water Conservation | Utah Division of Water Resources | Website |

| Title | Theme | Source | Type of Resource |
|---|---|---|---|
| Drought Management Toolkit for Public Water Suppliers | Water Conservation | Utah Department of Environmental Quality/Division of Drinking Water | Toolkit |
| Conservation Tracking Tool | Water Conservation | Alliance for Water Efficiency | Excel-Based Model |
| Water & Energy Efficiency Grants and Small-Scale Water Efficiency Grants | Water Conservation | Bureau of Reclamation | Federal Grants Program |
| Utah Water Savers | Water Conservation | Utah Division of Water Resources | Website - Programs and Rebates |
| Central Utah Water Conservancy District Rebates | Water Conservation | Central Utah Water Conservancy District | Website - Programs and Rebates |
| Water Smart So Jo | Water Conservation | South Jordan City | Website - Programs and Rebates |
| Tap Into Resilience | Water Conservation | Spanish Fork in partnership with Water Now Alliance | Website - Case Studies |
| Slow the Flow | Water Conservation | Utah DWR | Website - Guide, Rebates, and Monitoring |
| Preparing for Drought in the Home | Water Conservation | Utah State University Extension | Website - Guide |
| H2OATH | Water Conservation | Utah Division of Water Resources | Pledge |
| Home Water Works Calculator | Water Conservation | Alliance for Water Efficiency | Home Water Use Calculator |
| EPA WaterSense Water Budget Tool | Water Conservation | U.S. Environmental Protection Agency | Excel-Based Tool |
| Rain Barrels in Utah | Water Conservation | Utah State University Extension | Factsheet |
| Water Amendments | Water Conservation | State of Utah | Website - Law |
| A Guide to Municipal Water Conservation Pricing in Utah | Water Conservation | Utah State University Extension | Guidebook |
| Water Rate Structures in Utah | Water Conservation | Western Resource Advocates | Guidebook |



| Title | Theme | Source | Type of Resource |
|---|---|---|---|
| Financing Sustainable Water | Water Conservation | Alliance for Water Efficiency | Handbook and Model |
| Sandy City Water Conservation Rate Structure | Water Conservation | Sandy City | Website |
| Summit County Graywater Administration and Permitting | Water Conservation | Summit County | Website-Permitting and Information |
| Gray Water Use and Regulations in Utah (Webinar) | Water Conservation | Utah State University's Center for Water Efficient Landscaping | Webinar |
| Gray Water Systems Permitting, Moab | Water Conservation | Moab City | Website-City Regulations |

## Landscape Water Conservation

| Title | Theme | Source | Type of Resource |
|---|---|---|---|
| Center for Water Efficient Landscaping | Landscape Water Conservation | Utah State University Extension | Website, Fact Sheets, Reports, Publications, Webinars |
| Preparing for Drought in the Landscape | Landscape Water Conservation | Utah State University Extension | Website - Guide |
| Localscapes | Landscape Water Conservation | Jordan Valley Water Conservancy District | Guides, Landscape Designs, Classes |
| Water Wise Plants for Utah Landscapes | Landscape Water Conservation | Utah State University's Center for Water Efficient Landscaping | Water Wise Plant List |
| Gardenwise SLC | Landscape Water Conservation | Salt Lake City Department of Public Utilities | Water Wise Plant List, Management<br><br>Guidelines, Plant Watering Guidelines |
| Sego Lily Gardens Plant Guide | Landscape Water Conservation | Sandy City | Water Wise Plant List |
| Native Plants for the Intermountain West | Landscape Water Conservation | Utah State University's Center for Water Efficient Landscaping | Intermountain West Native Plant List |

| Title | Theme | Source | Type of Resource |
|---|---|---|---|
| Conservation Garden Park Plant Database | Landscape Water Conservation | Jordan Valley Water Conservancy District | Water Wise Plant List |
| Utah State University Tree Browser | Landscape Water Conservation | Utah State University Extension | Online Tool for Tree Selection |
| USU Botanical Garden Water Wise Plant List | Landscape Water Conservation | Utah State University Extension | Water Wise Plant List |
| Weber Basin's Water Conservation Learning Garden Plant Database | Landscape Water Conservation | Weber Basin Water Conservancy District | Water Wise Plant List |
| Red Hills Desert Garden Plant List | Landscape Water Conservation | Washington County Water Conservancy District, St. George City, Virgin River Project | Water Wise Plant List for Desert Landscapes |
| Firewise Landscaping | Landscaping for the Wildland Urban Interface | Utah State University Extension | Guidebook |
| Weekly Lawn Watering Guide | Landscape Water Conservation | Utah Division of Water Resources | Website - Guide |
| Smart Controller Project | Landscape Water Conservation | Spanish Fork | Website |
| Learning Landscapes: Outdoor Water Efficiency and Conservation Lessons | Landscape Water Conservation | Alliance for Water Efficiency | Educator Resource (Grades 3-8) |
| Landscape Transformation: Assessment of Water Utility Programs and Market Readiness Evaluation | Landscape Water Conservation | Alliance for Water Efficiency | Report |
| Utah Public Garden Network | Landscape Water Conservation | Utah State University Extension | Website |
| Design 4 Everyone: Advanced Landscape Design Process | Landscape Water Conservation | Utah State University Extension | Online Course |
| How to Have a Water Efficient Landscape | Landscape Water Conservation | Utah State University Extension | Online Course |



## Climate Resources

| Title | Theme | Source | Type of Resource |
|---|---|---|---|
| Salt Lake City Climate Plan | Climate | Salt Lake City | Website, Plan, Video |
| UT DWR Climate Change, Water Resources, and Potential Adaptation Strategies in Utah | Climate | State of Utah | Report |
| Utah Climate Data | Climate | Utah Climate Center | Website |
| Western Regional Climate Center | Climate | Western Regional Climate Center | Website |
| U.S. Climate Resilience Toolkit-Southwest | Climate | U.S. Climate Resilience Toolkit | Website |
| Climate Change Science Essentials | Climate Science | Utah State University Extension | Online Course |

water.utah.gov/integrated-water-land-planning

UTAH DNR 75th ANNIVERSARY WATER RESOURCES

BABBITT CENTER FOR LAND AND WATER POLICY
A Center of the Lincoln Institute of Land Policy

WESTERN RESOURCE ADVOCATES

CWEL Center for Water-Efficient Landscaping

# Conserving water and lowering overall temperature through landscaping

Landscaping in our community is necessary and vital to our communities overall quality of living. There is a large benefit to having trees and less of a need to push for grass to conserve water. Trees conserve more water and help our community more than just rock by lowering the overall temperature and working to keep humidity and moisture in our area.

## Tree Basics

- Absorb rainwater
- Absorb tailpipe emissions
- Provide UV protection
- Help reduce the effects of wind
- Increase property value
- Shown to slow down traffic
- Reduce the ambient temperature in hot weather

*Figure 2.15. Thermal image (right) taken in Las Cruces, New Mexico, showing hotter areas in brighter colors with cooler areas in darker colors, with temperatures displayed in Fahrenheit (Dave DuBois/U.S. NOAA)*

**112** gal per year

VS

**96** gal per year per sq ft

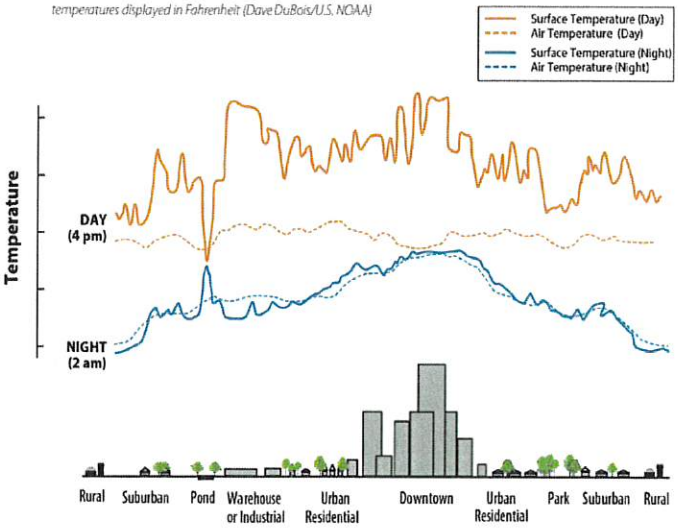
## Now What?

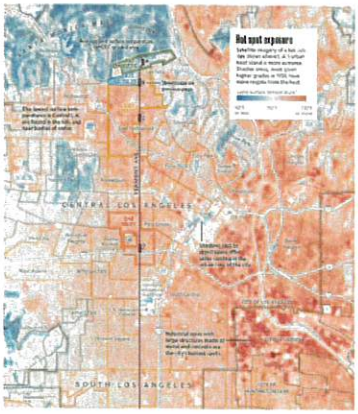
City Tree Booklet by WCWCD

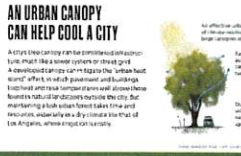
Localscapes.com

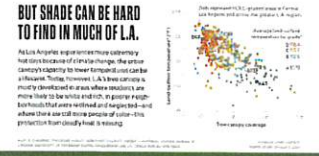
StrongTowns.org

American Planning Association





| Lot Size | Lawn Area 8% | Lawn Area 15% |
|---|---|---|
| 6,000 | 480 | 900 |
| 8,000 | 640 | 1,200 |
| 10,000 | 800 | 1,500 |
| 15,000 | 1,200 | 2,250 |
| 20,000 | 1,600 | 3,000 |
| 30,000 | 2,400 | 4,500 |
| 40,000 | 2,500 | 6,000 |

PLANNING & ZONING
HURRICANE CITY
UTAH
147 N 870 W Hurricane UT
PHONE: 435.635.2811 FAX: 435.635.2184

# PRELIMINARY PLAT APPLICATION

*For office use only: $150.00 Fee*
File No. 2022-PP-26
Receipt No. 8-462195

Name: Desert Sky Estates Telephone: 435-773-0707

Address: 2712 Rio Vista Drive, St. George, UT 84790 Fax No.

Email: ty@beathomeutah.com Agent Email: bwillits@horrocks.com -or- tcarter@horrocks.com

Agent (If Applicable): Ben Willits & Tony Carter Telephone: Ben: 435-599-7372 Tony:435-599-7368

Address/Location of Subject Property: South of 2100 W. & 3000 S.

Tax ID of Subject Property: H-3386-B (PARCEL "B") Zone District: R1-10

Proposed Use: (Describe, use extra sheet if necessary. Include total number of lots) The proposed use is for 73 single family residential lots to be constructed on 21.087 acres. The west side of 2100 west will be improved.

Submittal Requirements: The preliminary plat application shall provide the following:

✓ 1. Description: In a title block located in the lower right-hand corner of the sheet the following is required:
- ✓ a. The proposed name of the subdivision.
- ✓ b. The location of the subdivision, including the address and section, township and range.
- ✓ c. The names and addresses of the owner or subdivider, if other than the owner.
- ✓ d. Date of preparation, and north point.
- ✓ e. Scale shall be of sufficient size to adequately describe in legible form, all required conditions of Chapter 39, City Subdivision regulations.

✓ 2. Existing Conditions: The preliminary plat shall show:
- ✓ a. The location of the nearest monument.
- ✓ b. The boundary of the proposed subdivision and the acreage included.
- ✓ c. All property under the control of the subdivider, even though only a portion is being subdivided. (Where the plat submitted covers only a part of the subdivider's tract, a sketch of the prospective street system of the unplatted parts of the subdivider's land shall be submitted, and the street system of the part submitted shall be considered in light of existing Master Street Plan or other Commission studies.)
- ✓ d. The location, width, and names/numbers of all existing streets within two hundred (200) feet of the subdivision and of all prior streets or other public ways, utility rights of way, parks and other public open spaces, within and adjacent to the tract.
- ✓ e. The location of all wells and springs or seeps, proposed, active and abandoned, and of all reservoirs or ponds within the tract and at a distance of at least one hundred feet (100') beyond the tract boundaries.
- ✓ f. Existing sewers, water mains, culverts, or other underground facilities within the tract, indicating the pipe sizes, grades, manholes and the exact locations.
- ✓ g. Existing Hurricane Canal Company facilities; other ditches, canals, natural drainage channels and open waterways and any proposed realignments.

PLANNING & ZONING
HURRICANE CITY
UTAH

**STAFF COMMENTS**

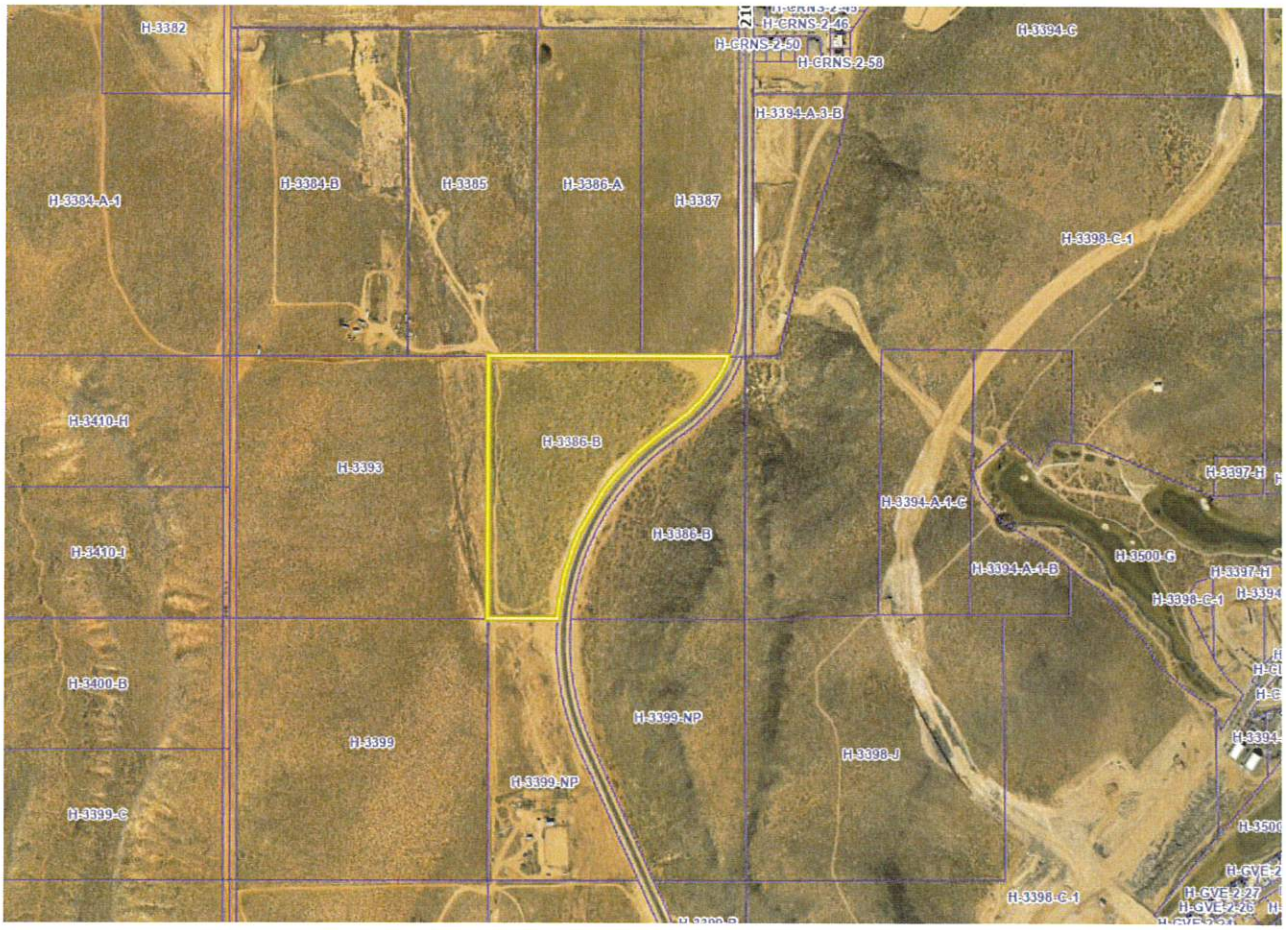
| | |
|---|---|
| **Agenda Date:** | **01/26/2022** |
| **Application Number:** | 2022-PP-26 |
| **Type of Application:** | Preliminary Plat Application |
| **Action Type:** | Administrative |
| **Applicant:** | Desert Sky Estates |
| **Agent:** | Ben Willits and Tony Carter |
| **Request:** | Approval of a Preliminary Plat |
| **Location:** | South of 2100 W and 3000 S |
| **Zoning:** | R1-8 PDO[1] |
| **General Plan Map:** | Planned Community |

**Update 01/26/2023:** The City Council voted to allow this application to reapply for preliminary plat approval. The City Council's rationale was that by the time construction drawings were completed then power will be sufficient in the area. However, this would only resolve one of the issues with this application. Staff encourages the Planning Commission to reread through our original report below and evaluate this application under the standards of the Hurricane City Code. Staff still recommends denial of this application for the reasons listed below.

**Update 10/27/2022:** No updates have been received at the time of this writing. Staff recommends tabling this application.

**Discussion:** The applicant is proposing a 73 lot single family subdivision located along 2100 West. The zone change for this property was approved in 2021 under the name "Spendlove 37 PDO" conditioned on a development agreement being signed that limits their unit count and ability to move forward until utilities are available to the site. This development agreement has been recently signed by the applicant and recorded with the county recorder on September 23, 2022.

[1] The Zone Map shows this as property as R1-10. This is an error per the November 18, 2021, Hurricane City Council minutes




**JUC Comments**

**Public Works:** Needs second access. Needs to complete improvements on 2100 West. No power to location at present.

**Water:** The City's water system distribution capacity is limited in this area due to substantial growth and limited connectivity between existing water tanks and pipelines. The areas with limited distribution capacity are shown on the attached exhibit. Prior to any additional plats or site plans being approved in this area, the Water Department recommends that the developer be required to provide an analysis to determine whether adequate public water facilities are available to service the development, and whether the development will change existing levels of service or create a demand that exceeds acceptable levels of service for water flow, water lines, and water pressure. The Water Department also requests an opportunity to have its own engineer review the analysis or study prior to any approvals. Requiring this type of water study prior to approval of a development is authorized by City Code sections 10-37-4 and 9-6-3.

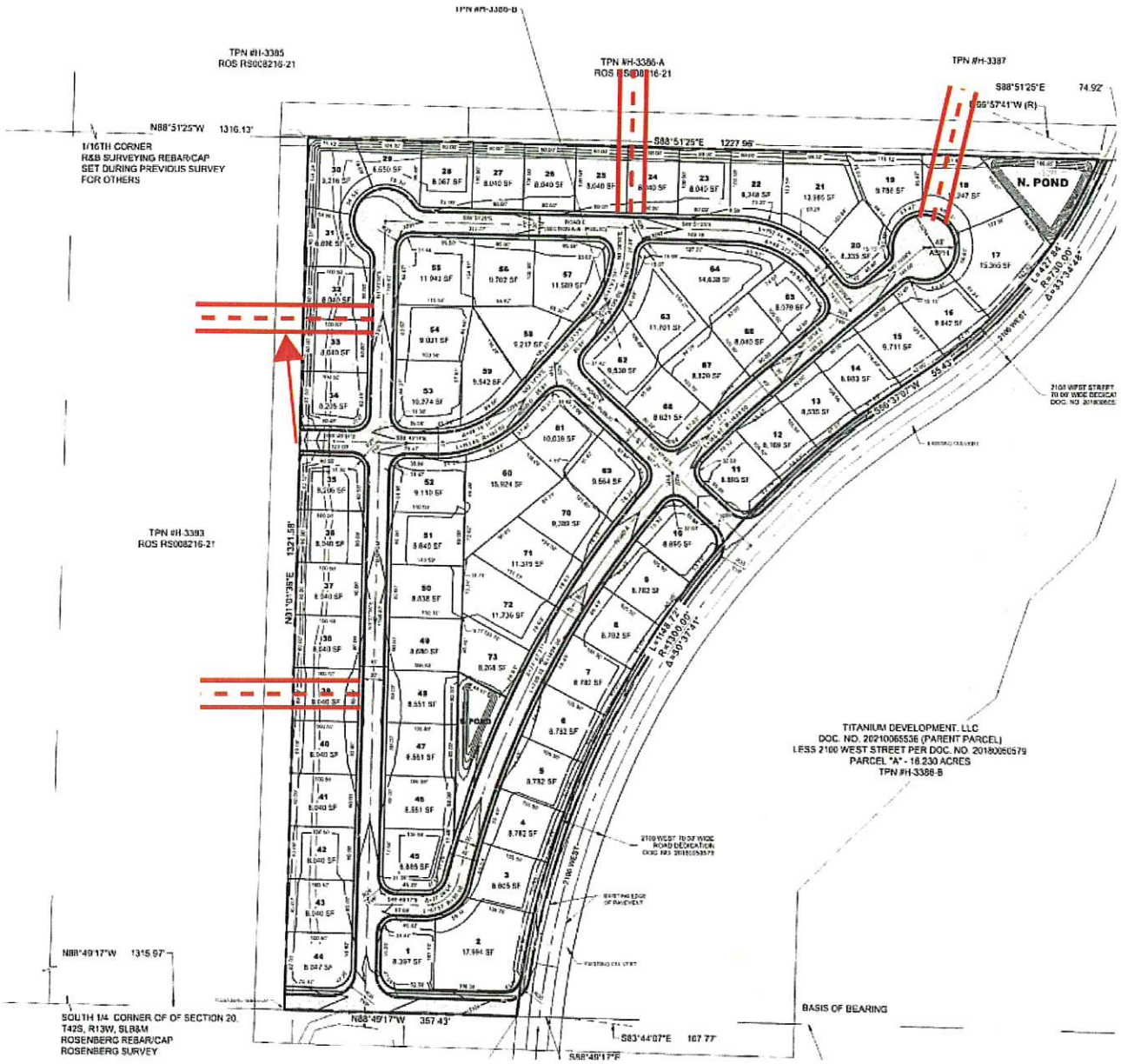
**Cable:** No comments.

**Power:** At this time, the City's power grid is inadequate to support all of the development planned in the area south of 2700 South Street. Although the Power Department has plans to expand and enhance its system to supply adequate power to this area, those plans are subject to funding limitations, the City's acquisition of easements and rights-of-way, the availability of materials, and other limitations. Therefore, the Power Department cannot presently guarantee that it can provide power to all of the development planned in this area, which includes this proposed development. Developers must fill out a

construction application and meet with the power department before proceeding to JUC. Overhead powerline on 2100 West will need to be upgraded and moved to the west side of the road at developers' cost. Necessary easements must be obtained by the developer.
**Sewer:** Sewer is in 2100 West and will need to be stubbed to the next property over on the southern roadway.
**Engineering:** Where will the proposed basin outlet to? An open storm drain channel is shown crossing the property on page 36 of the Hurricane Storm Drain Master Plan. It appears stormwater is semi-channelised by existing conditions near the property's southwest corner. 2100 W is a planned 77' ROW with a 12' trail on the west side. It appears the developer will need to transfer an additional 7' wide strip along 2100 W to the City after providing curb, gutter and trail improvements. Full movement intersections on 2100 W and the other master planned road (3500 S?) must be separated 250' or offset 200' minimum. Stormwater from existing culverts must be conveyed to the next logical outfall. Southern roadway is a master planned major collector with a 12' sidepath on both sides. Storm drain between lots should be protected by a public ROW or common area. It appears the proposed road network is inconsistent with design standards 3.2.4.2.E and 3.2.4.2.F. A roadway should be stubbed to the northern property.
**Streets:** Improvements on 2100 West. Are detention ponds sufficient for this size of development?
**Fire:** Need second access.

**Staff Comments: Preliminary Plat**

1. **Density:** The applicant is proposing 73 units over 21.087 acres for a density of 3.46 units per acre. The development agreement guarantees a total of 129 units for the development. This will leave a total of 56 units remaining, which is planned to be townhomes located to the east of 2100 West.
2. **Connectivity:** Hurricane City Code states:
    a. *Sec. 10-39-11. - Subdivision streets and fencing.*
    b. *Relation to adjoining street systems.*
        i. *The arrangements of streets in new subdivisions shall make provision for the continuation of the existing streets to adjoining areas insofar as such may be deemed necessary by the Planning Commission for public requirements. New streets within subdivisions shall not preclude future access to adjoining properties.*
    c. Staff recommends the Planning Commission require additional roadway connections to the property to the west and any connection to the property to the north. Where there are no proposed developments to the north or west, putting in appropriate and well-spaced street connections is vital for future development in this area. Engineering has provided an example of possible alignments that comply with block length below.
    d. The block length on Road B and Road A appears to be over 800'. The block length on Road A may be acceptable to Engineering to limit access on 2100 W.




3. **Second access:** The requirement for developments to have a second access if they have more than 30 units is adjudicated by the Hurricane Valley Fire District. The plan shows all of the property's access being off 2100 W. At this time there are almost no other roadways in the area. Cordero has put in 2600 W up to 3000 S for their fire access and this may be usable for this development as well and needs additional review by the fire marshal.
4. Hurricane City Code 10-37-4 states:
    a. *Land shall be developed only where existing infrastructure is in place or will be timely provided to service proposed development. The City may require an analysis to be completed to determine whether adequate public facilities are available to service a development and whether such development will change existing levels of service or will create a demand which exceeds acceptable levels of service for roadways, intersections,*

*bridges, storm drainage facilities, water lines, water pressure, sewer lines, fire and emergency response times, and other similar public services. The City may disapprove a proposed development if demand for public services exceeds accepted levels of service. No subsequent approval of such development shall be given until either the developer or the City installs improvements calculated to raise service levels to the standard adopted by the City.*

b. The Power Department has indicated that there is no more power capacity for additional units in this area in light of other developments that have already obtained signed construction drawings. There is also a question regarding the sufficiency of water in the area.

5. Will serve letters have been provided from the culinary and sanitary water providers

6. A note has not been added to the plat indicating whether the property is in a tortoise take area

7. The Development Agreement governing the property includes the following language:

a. Developer understands, acknowledges and specifically agrees that: (a) power, water, and other utility services to the Property are not currently available and have not been extended to the Property, (b) the granting of this zone change does not in any way guarantee or warrant the availability and extension of power and water utility services to the Property, (c) no application for any permit requiring the availability or extension of power or water service, and no other request requiring the availability and extension of power or water services, shall be filed or made until such time that such services are available and have been extended to the Property, and (d) Developer assumes all risk and liability associated with any development activity on the Property, including but not limited to all costs incurred for engineering, feasibility studies, etc., in the event that such services do not become available and are not extended to the Property.

b. Adequate Public Facilities. The City may deny any land use application for any development on the Property, including but not limited to preliminary plats, building permits, zone changes, and preliminary site plans by finding that utilities and roadways are (1) inadequate to support the proposed development or (2) services are not in the vicinity of the proposed application. The City may consider approval of a project if the applicant can show that current utility and roadway systems are adequate to meet the demand for the project and the applicant can provide a plan on how to reasonably connect utilities and roadways to the proposed development according to Hurricane City standards.

The development agreement prohibits the filing of an application that requires the availability power until the services are available.

## LEGAL COMMENTS ON APPLICATION

**Applying the Ordinances**:

The approval or denial of a preliminary plat application is an administrative decision in which the City's ordinances are applied to the application, so the City's ordinances should dictate whether a preliminary plat application is approved or denied. There are two City ordinances that are relevant to this application: Hurricane City Code ("HCC") sections 9-6-3 and 10-37-4.

HCC section 10-37-4 states that: "Land shall be developed only where existing infrastructure is in place or will be timely provided to service proposed development. ... The City may disapprove a proposed development if demand for public services exceeds accepted levels of service. No subsequent approval of such development shall be given until either the developer or the City installs improvements calculated to raise service levels to the standard adopted by the City."

HCC section 9-6-3 states that: "Land shall be developed only where public facilities are in place or will be timely provided to serve proposed development at a level of service which meets the City's adopted level of service standards. ... A proposed development shall not be approved if demand for a public facility will exceed adopted level of service standards unless public facility improvements, reasonably calculated to raise service levels to adopted level of service standards, will be available to serve the development.

When considering an application for development in an area where City staff have found that public facilities are inadequate to serve the development at the established level of service, the question for the Planning Commission and City Council is whether the necessary public facilities "will be timely provided" to serve the development at adopted levels of service. If the City Council cannot find (determine) that the necessary public facilities "will be timely provided" to provide for the new development, then the City's ordinances require that the development be denied.

**Basis and Support for Decision**:

An approval or denial of a preliminary plat application needs to be supported by evidence in the record. City staff's recommendation of denial is based on the following evidence: (1) a report prepared by Intermountain Consumer Professional Engineers, Inc., together with the Power Department's analysis, concluding that "addition of load without improvements is not recommended as voltage will be further reduced and existing customers will experience substandard voltage levels"; (2) a Limited Distribution Capacity analysis for water service levels in the area prepared by Alpha Engineering; and (3) the uncertainty and unknown timeline as to when power and water infrastructure will be installed to raise service levels to acceptable standards. If the Planning Commission or City Council finds (determines)

that the necessary public facilities "will be timely provided" to address the inadequate facilities, that finding needs to be supported by evidence in the record.

**Understanding the Process**:

After a preliminary plat is approved by the City Council, the development typically never returns to the Council for further approval. After preliminary plat approval, the next phase is the preparation of detailed construction drawings, which are reviewed and approved by members of the city's Joint Utility Committee. After construction drawings are approved and a final plat application is filed with staff, the developer is permitted to move forward with actual construction of the development. The recording of a final plat is the final step and is approved by the City Engineer, the Mayor, and the City Attorney. If a development that lacks adequate public facilities is approved at the preliminary plat stage, then it leaves members of staff to determine whether construction drawings should be approved to allow the development to be begin construction. When reviewing construction drawings, members of staff are also constrained by the requirements of HCC sections 9-6-3 and 10-37-4. Therefore, it would be ideal if the City Council and staff were aligned on when development with inadequate public facilities should be permitted to proceed. If a proposed development cannot be approved pursuant to City ordinances, the City Council would be the preferred body to make that determination—instead of letting it fall to individual utility departments and staff members.

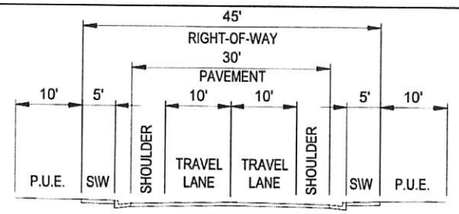
**Policy Behind the Ordinances**:

The adequacy of public facilities is a factor at every phase of development, beginning with zone change applications. A key policy driving this approach is to avoid a situation where a developer believes that a development is entitled to proceed, but the City is unable to provide the necessary services to the development without jeopardizing service to existing residents. Also, developers invest additional funds into a project at each phase of development. Therefore, the further along that the City allows development to occur without adequate public facilities, the larger the potential legal claim against the City if the developer ultimately cannot connect to the City's utility systems for lack of capacity. If the City Council determines that the necessary public facilities are not currently available but "will be timely provided" to serve the development, the City Council should only approve the preliminary plat on the condition that the owner execute a development agreement limiting the developer's rights and outlining the procedure for handling the project, all in a form approved by the City Attorney.

**Recommendation:** Staff recommends the Planning Commission review this application based on standards within the Hurricane City Code and the terms listed within the Development Agreement. Staff

recommends that the application for a preliminary plat be denied or tabled for the reasons listed in this report, including:

1. Lack of required second access.
2. Lack of adequate public facilities and infrastructure, including power capacity.
3. Failure to comply with the terms of the development agreement governing the development of this property.
4. Failure to provide connectivity to adjoining properties.
5. Failure to comply with 800' maximum block length requirement.

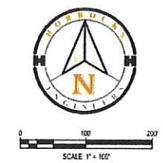


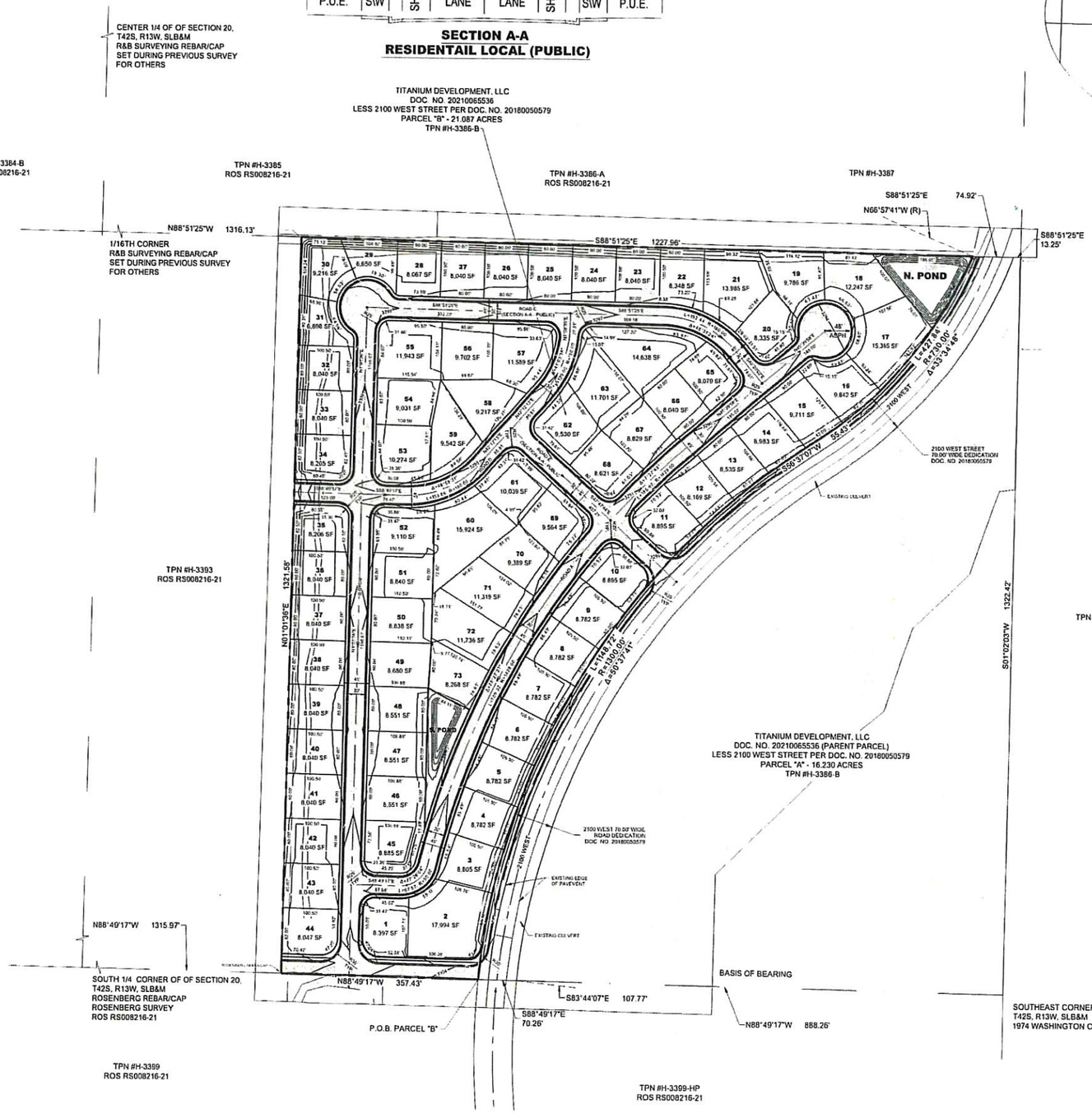

**SECTION A-A**
**RESIDENTAIL LOCAL (PUBLIC)**


**ENGINEER:**
HORROCKS ENGINEERS
555 South Bluff St., Suite 101
St. George, UT 84770
(435) 599-7368
CONTACT: TONY CARTER, PE

**APPLICANT/OWNER:**
TYTANIUM DEVELOPMENT, LLC
2712 RIO VISTA DRIVE
ST. GEORGE, UTAH 84790
(435) 773-0707
CONTACT: TY MEYERS

**VICINITY MAP**




## BOUNDARY DESCRIPTIONS

DEED DESCRIPTION (DOC. NO. 20210065536):
THE SOUTHEAST ¼ OF THE SOUTHEAST ¼ OF SECTION 20, TOWNSHIP 42 SOUTH, RANGE 13 WEST OF THE SALT LAKE MERIDIAN, COUNTY OF WASHINGTON

PARCEL "B":
BEGINNING AT A POINT N88°49'17"W, 958.53 FEET ALONG THE SECTION LINE FROM THE SOUTHEAST CORNER OF SECTION 20, T42S, R13W, SLB&M, SAID POINT BEING ON THE WESTERLY RIGHT OF WAY LINE OF 2100 WEST STREET, A 70.00 FOOT WIDE PUBLIC ROADWAY DEDICATED BY DOCUMENT NO. 20180050579 AS FILED IN THE OFFICE OF THE WASHINGTON COUNTY RECORDER, RUNNING THENCE N88°49'17"W, 357.43 FEET ALONG THE SECTION LINE TO THE EAST 1/16TH CORNER; THENCE N1°01'36"E, 1321.58 FEET TO A POINT ON THE 1/16TH LINE; THENCE S88°51'25"E, 1227.96 FEET ALONG THE 1/16TH LINE TO SAID WESTERLY RIGHT OF WAY LINE OF 2100 WEST STREET, SAID POINT BEING ON A 730.00 FOOT RADIUS NON-TANGENT CURVE TO THE RIGHT, RADIUS POINT BEARS N66°57'41"W; THENCE SOUTHWESTERLY 427.84 FEET ALONG THE ARC OF SAID CURVE THROUGH A CENTRAL ANGLE OF 33°34'48"; THENCE S56°37'07"W, 55.43 FEET TO THE POINT OF CURVE OF A 1300.00 FOOT RADIUS CURVE TO THE LEFT; THENCE SOUTHWESTERLY 1148.72 FEET ALONG THE ARC OF SAID CURVE THROUGH A CENTRAL ANGLE OF 50°37'41" TO THE POINT OF BEGINNING.

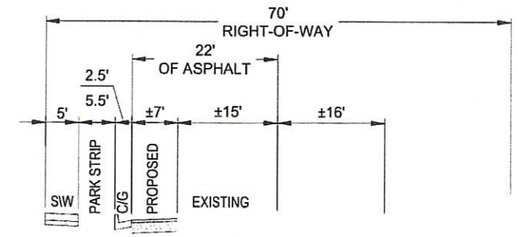
CONTAINING 21.087 ACRES.

## BASIS OF BEARING

THE BASIS OF BEARING FOR THIS SURVEY IS N88°49'17"W ALONG THE SECTION LINE BETWEEN THE SOUTHEAST CORNER AND THE SOUTH QUARTER OF SECTION 20, T42S, R13W, SLB&M AS SHOWN AND NOTED HEREON.

## LEGEND:

- EXISTING 8" SANITARY SEWER
- EXISTING 8" WATER
- EXISTING SEWER MANHOLE
- EXISTING WATER VALVE
- EXISTING FIRE HYDRANT
- PROPOSED STORM DRAIN INLET
- PROPOSED STORM DRAIN
- SECTION LINE
- FOUND SECTION CORNER
- LOT LINE
- PHASE LINE
- EXISTING STORM DRAIN
- PROPERTY BOUNDRY
- PROPOSED 8" SANITARY SEWER
- PROPOSED 8" WATER
- PROPOSED SEWER MANHOLE
- PROPOSED WATER/IRRIGATION VALVE
- PROPOSED FIRE HYDRANT
- PROPOSED CURB & GUTTER
- EXISTING MAJOR CONTOURS
- EXISTING MINOR CONTOURS
- PROPOSED DETENTION POND
- PROPOSED ROADWAY PAVEMENT




**2100 WEST STREET**
**MAJOR COLLECTOR (PUBLIC)**


HORROCKS ENGINEERS
2162 West Grove Pkwy, Suite 400
Pleasant Grove, UT 84062
(801) 763-5100
www.horrocks.com


WARNING
0 1 2
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

REVISIONS
REV # | DATE

*SEE GENERAL NOTES SHEET

DRAWING INFO
DATE 08/31/2022
DESIGNED TC
DRAWN CC
CHECKED TC
PROJECT UT-617-22

REGISTERED PROFESSIONAL ENGINEER No. 12982889-2202 TONY CARTER STATE OF UTAH 11-14-22

# DESERT SKY ESTATES

HURRICANE CITY, UTAH

PRELIMINARY PLAT

R-1-10 SINGLE FAMILY SUBDIVISION

**PP-01**

# Hurricane City Power

## Clifton Wilson Substation
## Circuit CW-101 Analysis
## Report

October 2021

**Intermountain Consumer**
**Professional Engineers, Inc.**
**1145 East South Union Avenue**
**Midvale, Utah 84047**
**(801) 255-1111**

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Bench Lake Regulator Data
System Model – SKM
Model Input Data
Model impedance Data

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# INTRODUCTION

As requested by Hurricane City Power, Intermountain Consumer Professional Engineers ("ICPE") performed a study on Clifton Wilson substation circuit CW-101 to determine electrical conditions during peak loading and to evaluate loading capacity.

As a part of the study ICPE's Scope included:

**System Modelling**

1. Develop circuit line impedance for circuit modeling.
2. Develop a circuit model for computer simulation on SKM software.
3. Develop load distribution across circuit CW-101 for circuit modeling.
4. Develop an expanded circuit model with proposed system additions.

**Study & Report**

1. Perform circuit load flow studies under existing conditions and historic peak loading.
2. Determine maximum 3 phase loading as to not cause greater than industry standard voltage drop and in accordance with IEEE C84.1 Range-A.
3. Develop study report on study finding.

This Report consists of the Introduction section, Summary section, Services Standard section, Study Finding section and Appendix.

General findings of the Study are presented in the Summary Section of this Report.

The Level of Service Standard Section covers voltage criteria as set forth in the IEEE C84.1 Standard and which represents Standard Utility Practice.

The Study Finding section contains a Circuit Description section, Substation Capacity section, Circuit CW-101 Loading Section and a Load Flow Analysis Section.. Sections generally contain supporting data for conclusions.

# SUMMARY

This study considers the existing electrical system condition and impact of electrical load addition to Clifton Wilson Circuit CW101. Circuit CW 101 generally extends southward from Clifton Wilson 7.1 circuit miles. New development contemplated extension of CW101 and additional 4.5 miles southward.

***Level of Service***
IEEE Standard C84.1 requires that minimum service entrance voltage during normal operation do not fall below 95% of base voltage and that utilization voltage should not fall below 90% of base voltage. Service Entrance voltage is measured at the point of delivery; Utilization voltage is measured at the terminals of the utilization equipment. To meet the Standard, a value of 97% - 98% per unit distribution voltage, at the high side of distribution transformers is considered necessary and adopted for the study.

***Substation Capacity***
In assessing and planning electrical systems loading levels of all system equipment should be evaluated. Typically, transformers, voltage regulation, circuit breakers, reclosers, power lines, and system protection are considered.

Evaluation of substation are performed to determine existing loading conditions, ability for future load addition, ability to backup adjacent substation, and to determine the need for new substations.

From review, it was determined that the existing Clifton Wilson substation serving circuit CW-101 is a heavily loaded substation but could provide some additional load to CW-101 assuming completion of the Sky Mountain substation and some load transfer from Clifton Wilson to Sky Mountain Substations.

***Voltage Regulation***
Clifton Wilson substation is equipped with voltage regulator banks that regulate voltage to distribution circuits. The Clifton Wilson regulators are set for 122.5 V output (secondary) with a 3 volt bandwidth (voltage range from 121 to 124V).

***Circuit Loading***
Clifton Wilson circuit CW-101was determined to have peak loading at 3.8 MW (4.1 MVA) with 1.7 MVA of the 4.1 MVA flowing through the Bench Lake regulators

Circuit CW-101 is equipped with a three phase inline regulator bank (Bench Lake regulators) and are rated 114.3/128.0 kVA (150/168) amp thru current. Regulator output is set for 122 V (secondary) with a 2 volt band width.

***Load Flow Analysis***
Circuit CW-101 was studied using real time regulator load data and through computer modeling using SKM software. Study shows that the existing circuit does not have overloading conditions but is voltage limited. It was determined that:

1. Areas of the existing circuit does experience voltage drop below Level of Service criteria under peak loading.
2. Addition of load without improvements is not recommended as voltage will be further reduced and existing customers will experience substandard voltage levels.

Potential short term solutions for some load addition would be:

1. Optimize voltage regulator bank position.
2. Add another in line regulator bank.
3. Add capacitor banks to maintain a high power factor during peak loading.
4. If possible, move existing load to another circuit to allow new load.

Additional work is needed to determine potential loading with equipment addition and or load transfer; noting the limitations of the existing Bench Lake regulators (1.9 MVA margin) and line conductors.

# SERVICE STANDARD

To provide reliable power delivery, and equitably to all it customers; utilities strives to operates the power system to obtain a uniform level of service throughout. Below is a typical utility Level of Service Standard.

***Level of Service Standard***

- The system must be able to adequately serve load under single contingency (N-1) situations, where "N" is a power system elements such as a transformer or non-radial line.
- System switching required under an N-1 contingency should remain as simplified as possible to ensure that switching orders are not unnecessarily complex.
- Distribution circuit loading must remain below 90% of its maximum current rating.
- Distribution circuit voltage must remain between 98% and 105% (at loads) of its nominal value; and
- Distribution circuit mains must be able to serve additional load under N-1 contingencies.
- System to Meet IEEE C84.1 Voltage limits.

In preforming the study, criteria as set forth in the Level of Service Standard, was utilized. Of primary concern was meeting IEEE C84.1 normal voltage requirements as listed in Table 1. As seen the Standard requires that minimum service entrance voltage during normal operation do not fall below 95% of base voltage. Utilization voltage should not fall below 90% of base voltage. Service Entrance voltage is measured at the point of delivery; Utilization voltage is measured at the terminals of the utilization equipment. The difference between the minimum service and minimum utilization voltage is intended to allow for voltage drop in the customer's wiring system. The difference between distribution circuit voltage and service entrance voltage is to allow for voltage drop across distribution transformers and secondary wire to the service entrance.

**TABLE 1**

| **Voltage Point of Measurement** | **Standard Voltages**<br>**120, 208, 240, 277, 480, 600, 660** | **Percent of Nominal** |
|---|---|---|
| Service Entrance Voltage High Range - A | 126, 218, 252, 291, 504, 630,720 | 105.0% |
| Service Entrance Voltage Low Range - A | 114, 197, 228, 263, 456, 570, 655 | 95% |
| | | |
| Utilization High Voltage Range - A | 126, 218, 252, 291, 504, 630, 720 | 105.0% |
| Utilization Low Voltage Range - A | 108, 187, 249, 432, 540, 630 | 90% |

## *Study Findings*

### *Circuit Description*

Clifton Wilson circuit CW-101 is a long three phase branched 12.47kV distribution circuits, approximately 7 miles long, that serves load through Clifton Wilson substation and extends from 600 North and southward to approximately 4500 south. The circuit is equipped with an inline 3-phase voltage regulator bank (Lake Bench regulator bank) located at approximately 2300 South and 1000 west (approx. 4.6 miles from Clifton Wilson substation). Proposed circuit addition would extend the circuit another 4.8 mile beyond the southern end of the circuit.

Existing circuit conductors and associated nominal published thermal rating is indicated in Table 2.

**Table 2**
**Circuit Conductor**

| Line Section | Length (Miles) | Conductor | Thermal Rating (amp)[1] | MVA Rating at Nominal Amp and 100% Voltage |
|---|---|---|---|---|
| Clifton Wilson Sub to 1500 So 700W | 3.6 | 336 ACSR | 514 | 11.1 |
| 1500 South to 1750 South | 0.27 | 750 MCM AL URD | 497 | 10.7 |
| 1750 South to approx. 2070 So | 0.44 | 4/0 AL URD | 248 | 5.35 |
| 2070 So to Bench Lake Regulators | 0.27 | 1/0 ACSR | 242 | 5.22 |
| Bench Lake Regulators to 3000 South | 1.28 | 1/0 ACSR | 242 | 5.22 |
| 3000 So 1100W to approx. 3300 So. 1100 West | 0.77 | 336 ACSR | 514 | 11.1 |
| Approx. 3300 So. 1100 West to Circuit End | 0.59 | 750 MCM AL URD | 497 | 10.7 |
| (tap) 3000 So 1100W to approx. 3100 So. 2100 West (circuit end) | 1.45 | 336 ACSR | 514 | 11.1 |
| 3100 So. 2100 West to 3300 So 2100 West (circuit end) | 0.26 | #2 ACSR | 180 | 3.9 |
| New Circuit Extension 3300 So. 2100 West (circuit end) to pump station | 4.8 | 336 ACSR | 514 | 11.1 |

1. Thermal ratings are at nominal publish values. De-rate value may apply for high ambient temperatures.

From a thermal prospective conductor ratings are adequate for some load addition; however, as discussed below, the circuit is voltage limited. Without voltage limitation, the circuit is next limited by Bench Lake regulator Bank size, 1/0 ACSR and #2 ACSR ratings.

### *Substation Capacity*

In assessing and planning electrical systems loading levels all system equipment are evaluated. Typically; transformers, regulators, circuit breakers, reclosers, power lines, and system protection are evaluated. Evaluation of substations are performed to determine existing loading conditions, ability for future load addition, ability to backup adjacent substations, and to determine the need for new substations.
The Clifton Wilson substation has two power transformer bays and several distribution circuits. Both power transformer are rated 12/16/22 MVA with 667//994 FA (1303 A) kva regulators. During normal operation power transformers are not paralleled. For summer 2021 load behind the Clifton Wilson substation was 28.6 MW, with 7.2 MW provided by local generation. With consideration for an N-1 contingency ( loss of one power transformer) transformer capacity at Clifton Wilson substation is questionable for allowing additional loading. However, with the addition of the Sky Mountain Substation transformer, loading at Clifton Wilson substation can be reduced by load

transfers to Sky Mountain substation. Load transfer to Sky Mountain would allow for other loads to be added to Clifton Wilson transformers. Generally transformer capacity is not an initial limiting factor for load addition in the rage of two to three megawatt to CW-101.

### *Circuit CW-101 Loading*

To preform circuit analysis circuit peak loading information is necessary. Circuit peak loading data was provided by Hurricane City Power personnel and included indication of circuit maximum load level at the substation circuit recloser and load through the Bench Lake regulator bank. Overall circuit peak loading was indicated to be 3.8 MW during summer 2021 peak load period. Approximately 1.7 MW of the 3.8 MW circuit load flowed through the Bench Lake Regulators.

Table 3 contains overall circuit loading data as provide and used in the circuit analysis.

**Table 3**
**Circuit Load Data**

| CW-101 Loading -- 7/09/2021 | | | | | |
|---|---|---|---|---|---|
| Circuit | Max MW | Assumed load power factor | MVA | Circuit Capacitors | MVA |
| CW-101 | 3.8 MW | 0.92 | 4.13 | 2- 150 KVAR Banks | 4.02 |

Table 4 contains select data that was provided by Hurricane City Power personnel and as obtained from the Lake Bench regulator bank controller. Additional regulator load data is provided in the appendix for review.

**Table 4**
**Lake Bench Regulator Data**

| **Regulator Max Data - Report** | | | | |
|---|---|---|---|---|
| **Regulator** | **Max Amp (Inst.)** | **Max Load (kW) (Inst)** | **Time** | **Tap Position** |
| A - Phase | 102.8 | 739 | 7-9-21 18:38 | --- |
| B - Phase | 95.0 | 682 | 7-9-21 18:43 | --- |
| C- Phase | 93.9 | 677 | 7-9-21 16:30 | --- |
| | | | | |
| **Regulator 15 Minute Max Reading** | | | | |
| **Regulator** | **Max Amp** | **Max Load (kW)** | **Time** | |
| A - Phase | 68.7 | 499 | 7-9-21 18:15 | 7[1] |
| B - Phase | 92.1 | 666 | 7-9-21 16:30 | 13 |
| C- Phase | 84.5 | 611 | 7-9-21 16:30 | 9[1] |
| | | | | |
| A - Phase | 70.0 | 508 | 9-7-21 15:30 | 10 |
| B - Phase | ---- | ---- | ---- | ---- |
| C- Phase | ---- | ---- | ---- | ---- |
| | | | | |

1. Tap to position 10 at 14:00 to 15:00 hr

From regulator data it can be concluded that the circuit is near or below the lower distribution voltage limits (0.97-0.98) north of the regulator bank during heavy loading periods. The regulators allow for a +/- 10 % regulation over 32 steps

with maximum regulation at +/- step 16, each step correlates to a 0.625% voltage change. B phase regulator is shown to have move to position +13 under high loading, A phase and C phase regulator data shows the regulators tapped to position 10 at 14:30 hr. Bench Lake regulator setting were indicated to be at 122 volts with a 2 volt bandwidth (121 to 123 range); for a tap position of +13 with load voltage at 122 V (represent 1.67% above nominal) source voltage would be at 93.5% of nominal; for a tap position of +10 source voltage would be at 95.5% of nominal. Regulator data indicates that the circuit has some imbalance during peak; however, noting that exact balancing is generally not possible.

Bench Lake regulator are rated 114.3/128.0 kVA (150/168 amp thru current); Assuming balanced loading, maximum through load at 168 amps is 3.6 MVA, the bank is currently load at 1.7 MVA. Assuming balanced loading, maximum additional loading through the regulators is 1.9 MVA.

***Load Flow Analysis***

To determine circuit electrical conditions during peak loading and to evaluate the circuits ability for additional loading circuit impedances were determined and a circuit model was developed on SKM Software for computer simulations.

The circuit was studied for:

1. Voltage drop under peak loading.
2. Line loading under peak loading.
3. Equipment loading under peak loading.
4. Effect of power factor improvements.
5. Additional loading capabilities.

Table 5 contains results of select load flows under varying conditions, additional load flow results are in the Appendix. .

**Table 5**
**Load Flow Results**

| | | | Location Voltage (per unit) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Case** | **Case Description** | **Case Load** | Clifton Low Side 12.47 kV | Bus - 004 (1300 So.) | Bus - 009 (2050 So.) | Bus - 011 (Bench Lake Reg.) | Bus - 012 (Bench Lake Reg.) | Bus -014 (3000 So.) | Bus - 017 3300 So 2100W | Bus - 020 (approx 3800 So.) | Bus -022 (RMP Tap end) | Bus -033 (Pump Sta..) |
| **1** | 2021 Loading w/100 Amps thru Bench Lake Regs. | CW101 Recloser: 4.11 MVA (3.8MW) Bench Lake Reg: 2.127 MVA | 1.007 | **0.964** | **0.958** | **0.95** | 1.01 | 1.0 | 1.0 | 1.0 | 0.99 | N/A |
| **2** | 2021 Loading w/70 Amps thru Bench Lake Reg. | CW101 Recloser: 4.135 MVA (3.8MW) Bench Lake Reg: 1.5 MVA | 1.008 | **0.976** | **0.97** | **0.964** | 1.017 | 1.004 | 1.0 | 1.004 | 0.996 | **N/A** |
| 3 | 2021 Loading w/100 Amps thru Bench Lake Reg. and 700 kvar capacitor add. | CW101 Recloser: 3.872 MVA (3.8MW) Bench Lake Reg: 2.08 MVA | 1.008 | **0.976** | **0.97** | **0.964** | 1.01 | 1.0 | 1.0 | 1.0 | 0.99 | **N/A** |
| **4** | 2021 Loading w/load (550KW) addition over 100 Amps thru Bench Lake Reg. | CW101 Recloser: 4.7 MVA Bench Lake Reg: 2.6 MVA | 1.008 | **0.96** | **0.954** | **0.947** | 1.016 | 1.0 | 0.99 | 1.0 | 0.99 | **0.99** |

To meet "Service Entrance Voltage Low Range – A" requirements , as covered in the Service Standard section, a minimum of 0.97 pu voltage (preferable 0.98) is necessary to allow for voltage drop across distribution transformers and secondary cabling to the service entrance.

Case 1 represents the existing system with 2021 loading and load distributed to have 98 amps of overall circuit load following through the Bench Lake regulators. The study was performed with an overall circuit loading of 4.1 MVA (Summer 2021 loading) and with 2.1 MVA (98 amps) of the 4.1MVA through the Lake Bench regulators. For all cases voltage at Clifton Wilson substation was held at 1.008 p.u. (121V), noting that the regulator set point is 122.5V with a 3 volt band width (121 -124 volt range).

Study results indicate that there are no overload conditions; however, the study indicates that the circuit is voltage limited. Voltage from 1300 South to the Bench Lake regulator bank is below 0.97 p.u. Results correlated to regulator data.

Case 2 represents the existing system with 2021 loading. The study was performed with an overall circuit loading of 4.1 MVA (Summer 2021 loading) and with loads redistributed for 1.5 MVA (70 amps) of the 4.1MVA to flow through the Lake Bench regulators. Results indicate that there are no overload conditions; however, the study indicates that circuit remains voltage limited with the reduced flow through the regulators. Voltage from 1300 South to the Bench Lake regulator bank is at or below 0.97 p.u.

Case 3 is equivalent to Case 1 and includes the addition of 700 kvar capacitance for power factor correction to 0.98. Through the addition of capacitors some marginal voltage improvements is obtained but voltage is still near 0.97p.u. and under 0.98pu.

Case 4 is equivalent to Case 1 with the addition of approximately 4.5 miles of 336 ACSR circuit to the end of the existing circuit and the addition of 550 kW past the Bench Lake regulators. Results show that there is no over loading but voltage drops are increased.

Computer studies and real time voltage regulator data show that the circuit is voltage limited with voltage at or below criteria of 0.97-0.98 per unit at the distribution voltage. With consideration for normal load growth along the length of the existing circuit large load addition is not recommended.

Potential short term solutions for some load addition would be:

5. Optimize voltage regulator bank position.
6. Add another in line regulator bank.
7. Add capacitor banks to maintain a high power factor during peak loading.
8. If possible, move some existing load to another circuit to allow new load to CW-101.

Additional work is needed to determine potential loading with equipment addition and or load transfer; it is noted that with voltage limitation reduced other limitation will arise. Specifically, the existing Bench Lake regulator (1.9 MVA margin) and 1/0 and #2 ACSR line conductors. The optimum solution is a new substation in the vicinity of major load growth.

# APPENDIX

APPENDIX

System Load Flow Summary
Bench Lake Regulator Data
System Model – SKM
Model Input Data
Model impedance Data

| Hurricane City - Clifton Wilson CW101 Circuit Load Flow Results | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Case Description** | **Power Flow** | **Regulator (600 North)** | **Bus-004 (1300 South)** | **Bus-009 (2050 South)** | **Bench Lake Non Reg Bus-011** | **Bench Lake Reg Bus-012** | **Bus-014 (3000 South)** | **Bus-017 (2100 West)** | **Bus-018 (1100 West) RMP TAP** | **Bus-020 (3800 S)** | **Bus-022 (4370 S) So. end skypark** | **Bus-033 -- New Development pumps** |
| 2021 Load | Recloser 4.111 MVA, 1.543 MVAR, 3.812 MW<br>Bench Lake Reg: 2.127 MVA, .693 MVAR, 2.013 MW | Voltage: 12,551 V (1.007pu)<br>Voltage Drop: -0.7% | Voltage: 12,027 V<br>(0.964pu)<br>Voltage Drop: 3.6% | Voltage: 11,952 V<br>(0.958pu)<br>Voltage Drop: 4.2% | Voltage: 11,867 V<br>(0.952pu)<br>Voltage Drop: 4.8% | Voltage: 12,669 V (1.016pu)<br>Voltage Drop: -1.6% | Voltage: 12,502 V<br>(1.003pu)<br>Voltage Drop: -0.3% | Voltage: 12,460 V<br>(0.999pu)<br>Voltage Drop: 0.1% | Voltage: 12,494 V<br>(1.002pu)<br>Voltage Drop: -0.2% | Voltage: 12,492 V<br>(1.002)<br>Voltage Drop: -0.2% | Voltage: 12,395 V<br>(0.994pu)<br>Voltage Drop: 0.6% | N/A |
| Flat Build with 250 kVA Load + 350 hp | Recloser: 4.723 MVA, 1.777 MVAR, 4.377 MW<br>Bench Lake Reg: 2.645 MVA, .798 MVAR, 2.522 MW | Voltage: 12,544 V<br>Voltage Drop: -0.6% | Voltage: 11,936 V<br>Voltage Drop: 4.3% | Voltage: 11,847 V<br>Voltage Drop: 5.0% | Voltage: 11,740 V<br>Voltage Drop: 5.9% | Voltage: 12,687 V<br>Voltage Drop: -1.7% | Voltage: 12,476 V<br>Voltage Drop: -0.1% | Voltage: 12,365 V<br>Voltage Drop: 0.8% | Voltage: 12,468 V<br>Voltage Drop: 0.0% | Voltage: 12,466V<br>Voltage Drop: 0.0% | Voltage: 12,369 V<br>Voltage Drop: 0.8% | Voltage: 12,327 V<br>Voltage Drop: 1.2% |
| Flat Build with 500 kVA Load + 350 hp | Recloser: 5.046 MVA, 1.959 MVAR, 4.651 MW<br>Bench Lake Reg: 2.910 MVA, .906 MVAR, 2.765 MW | Voltage: 12,587 V<br>Voltage Drop: -0.9% | Voltage: 11,930 V<br>Voltage Drop: 4.3% | Voltage: 11,833 V<br>Voltage Drop: 5.1% | Voltage: 11,714 V<br>Voltage Drop: 6.1% | Voltage: 12,678 V<br>Voltage Drop: -1.7% | Voltage: 12,442 V<br>Voltage Drop: 0.2% | Voltage: 12,294 V<br>Voltage Drop: 1.4% | Voltage: 12,434 V<br>Voltage Drop: 0.3% | Voltage: 12,432 V<br>Voltage Drop: 0.3% | Voltage: 12,335 V<br>Voltage Drop: 1.1% | Voltage: 12,249 V<br>Voltage Drop: 1.8% |
| Flat Build with 1000 kVA load + 350 hp | Recloser: 5.735 MVA, 2.370 MVAR, 5.223 MW<br>Bench Lake Reg: 3.450 MVA, 1.13 MVAR, 3.26 MW | Voltage: 12,581 V<br>Voltage Drop: -0.9% | Voltage: 11,809 V<br>Voltage Drop: 5.3% | Voltage: 11,695 V<br>Voltage Drop: 6.2% | Voltage: 11,550 V<br>Voltage Drop: 7.4% | Voltage: 12,636 V<br>Voltage Drop: -1.3% | Voltage: 12,349 V<br>Voltage Drop: 1.0% | Voltage: 12,125 V<br>Voltage Drop: 2.8% | Voltage: 12,341 V<br>Voltage Drop: 1.0% | Voltage: 12,338 V<br>Voltage Drop: 1.1% | Voltage: 12,241 V<br>Voltage Drop: 1.8% | Voltage: 12,066 V<br>Voltage Drop: 3.2% |
| 2021 Load w/ added capacitors | Recloser: 3.872 MVA, .761 MVAR, 3.797 MW<br>Bench Lake Reg: 2.084 MVA, .545 MVAR, 2.011 MW<br>Capacitors: 1.038 MVAR | Voltage: 12,566 V<br>Voltage Drop: -0.8% | Voltage: 12,170 V<br>Voltage Drop: 2.4% | Voltage: 12,100 V<br>Voltage Drop: 3.0% | Voltage: 12,019 V<br>Voltage Drop: 3.6% | Voltage: 12,680 V<br>Voltage Drop: -1.7% | Voltage: 12,522 V<br>Voltage Drop: -0.4% | Voltage: 12,479 V<br>Voltage Drop: -0.1% | Voltage: 12,516 V<br>Voltage Drop: -0.4% | Voltage: 12,517 V<br>Voltage Drop: -0.4% | Voltage: 12,417 V<br>Voltage Drop: 0.4% | N/A |
| **70A at Bench Lake Reg** | | | | | | | | | | | | |
| 2021 Load w/ 70A at Bench Lake Reg | Recloser: 4.045 MVA, 1.46 MVAR, 3.772 MW<br>Bench Lake Reg: 1.47 MVA, .456 MVAR, 1.397 MW | Voltage: 12,557 V (1.007pu)<br>Voltage Drop: -0.7% | Voltage: 12,064 V<br>(0.967pu)<br>Voltage Drop: 3.25% | Voltage: 12,002 V<br>(0.9625pu)<br>Voltage Drop: 3.75% | Voltage: 11,944 V<br>(0.958pu)<br>Voltage Drop: 4.21% | Voltage: 12,670 V<br>(1.016pu)<br>Voltage Drop: -1.6% | Voltage: 12,558 V<br>(1.007pu)<br>Voltage Drop: -0.71% | Voltage: 12,529 V<br>(1.004pu)<br>Voltage Drop: -0.48% | Voltage: 12,553 V<br>(1.006pu)<br>Voltage Drop: -0.67% | Voltage: 12,553 V<br>(1.006pu)<br>Voltage Drop: -0.67% | Voltage: 12,485 V<br>(1.001)<br>Voltage Drop: -0.13% | N/A |
| 2021 Load 250 kVA Load + 350 hp | Recloser: 4.733 MVA, 1.738 MVAR, 4.404 MW<br>Bench Lake Reg: 2.229 MVA, .630 MVAR, 2.137 MW | Voltage: 12,575 V<br>Voltage Drop: -0.8% | Voltage: 11,983 V<br>Voltage Drop: 3.9% | Voltage: 11,902 V<br>Voltage Drop: 4.6% | Voltage: 11,813 V<br>Voltage Drop: 5.3% | Voltage: 12,675 V<br>Voltage Drop: -1.6% | Voltage: 12,498 V<br>Voltage Drop: -0.2% | Voltage: 12,395 V<br>Voltage Drop: 0.6% | Voltage: 12,491 V<br>Voltage Drop: -0.2% | Voltage: 12,490V<br>Voltage Drop: -0.2% | Voltage: 12,411 V<br>Voltage Drop: 0.5% | Voltage: 12,356 V<br>Voltage Drop: 0.9% |
| 2021 Load 500 kVA Load + 350 hp | Recloser: 5.051 MVA, 1.915 MVAR, 4.674 MW<br>Bench Lake Reg: 2.490 MVA, .737 MVAR, 2.379 MW | Voltage: 12,578V<br>Voltage Drop: -0.9% | Voltage: 11,935 V<br>Voltage Drop: 4.3% | Voltage: 11,846 V<br>Voltage Drop: 5.0% | Voltage: 11,745 V<br>Voltage Drop: 5.8% | Voltage: 12,680 V<br>Voltage Drop: -1.7% | Voltage: 12,478 V<br>Voltage Drop: -0.1% | Voltage: 12,339 V<br>Voltage Drop: 1.1% | Voltage: 12,472 V<br>Voltage Drop: -0.0% | Voltage: 12,470V<br>Voltage Drop: -0.0% | Voltage: 12,391 V<br>Voltage Drop: 0.6% | Voltage: 12,294 V<br>Voltage Drop: 1.4% |
| 2021 Load 1000 kVA Load + 350 hp | Recloser: 5.720 MVA, 2.303 MVAR, 5.236 MW<br>Bench Lake Reg: 3.024 MVA, .957 MVAR, 2.869 MW | Voltage: 12,571V<br>Voltage Drop: -0.8% | Voltage: 11,819 V<br>Voltage Drop: 5.2% | Voltage: 11,713 V<br>Voltage Drop: 6.1% | Voltage: 11,588 V<br>Voltage Drop: 7.1% | Voltage: 12,675 V<br>Voltage Drop: -1.6% | Voltage: 12,424 V<br>Voltage Drop: 0.4% | Voltage: 12,209 V<br>Voltage Drop: 2.1% | Voltage: 12,417 V<br>Voltage Drop: 0.4% | Voltage: 12,415V<br>Voltage Drop: 0.4% | Voltage: 12,336 V<br>Voltage Drop: 1.1% | Voltage: 12,150 V<br>Voltage Drop: 2.6% |

# Min/Max Metering Values

SEL-2431 Date: 09/14/2021 Time: 10:58:08
Voltage Reg

Forward

| | MAX | DATE | TIME | MIN | DATE | TIME |
|---|---|---|---|---|---|---|
| IL (A pri) | 102.8 | 07/09/2021 | 18:38:24 | 5.7 | 03/25/2021 | 22:11:35 |
| VS (kV) | 7.55 | 05/08/2018 | 16:34:20 | 6.76 | 11/16/2018 | 09:10:37 |
| VS (V sec) | 125.9 | 05/08/2018 | 16:34:20 | 112.6 | 11/16/2018 | 09:10:37 |
| VL (kV) | 7.55 | 05/08/2018 | 16:34:20 | 6.76 | 11/16/2018 | 09:10:37 |
| VL (V sec) | 125.9 | 05/08/2018 | 16:34:20 | 112.6 | 11/16/2018 | 09:10:37 |
| VCMP (kV) | 7.55 | 05/08/2018 | 16:34:20 | 6.76 | 11/16/2018 | 09:10:37 |
| VCMP (V sec) | 125.9 | 05/08/2018 | 16:34:20 | 112.6 | 11/16/2018 | 09:10:37 |
| P (kW) | 739 | 07/09/2021 | 18:38:24 | 40 | 03/25/2021 | 22:11:35 |
| Q (kVAr) | 212 | 07/07/2017 | 12:55:57 | -92 | 02/11/2020 | 13:58:27 |
| S (kVA) | 749 | 07/09/2021 | 18:38:24 | 41 | 03/25/2021 | 22:11:35 |
| PF @ S Max/Min | 0.99 | 07/09/2021 | 18:38:24 | 0.96 | 03/25/2021 | 22:11:35 |
| Freq (Hz) | 60.12 | 09/18/2018 | 09:52:34 | 59.71 | 06/16/2017 | 04:15:54 |
| Tap Pos | +16 | 02/20/2017 | 11:42:24 | -16 | 02/20/2017 | 11:48:16 |

Reverse

| | MAX | DATE | TIME | MIN | DATE | TIME |
|---|---|---|---|---|---|---|
| IL (A pri) | $$$$$$ | (Reset) | | $$$$$$ | (Reset) | |
| VS (kV) | $$$$$ | (Reset) | | $$$$$ | (Reset) | |
| VS (V sec) | $$$$$ | (Reset) | | $$$$$ | (Reset) | |
| VL (kV) | $$$$$ | (Reset) | | $$$$$ | (Reset) | |
| VL (V sec) | $$$$$ | (Reset) | | $$$$$ | (Reset) | |
| VCMP (kV) | $$$$$ | (Reset) | | $$$$$ | (Reset) | |
| VCMP (V sec) | $$$$$ | (Reset) | | $$$$$ | (Reset) | |
| P (kW) | $$$$$$ | (Reset) | | $$$$$$ | (Reset) | |
| Q (kVAr) | $$$$$$ | (Reset) | | $$$$$$ | (Reset) | |
| S (kVA) | $$$$$$ | (Reset) | | $$$$$$ | (Reset) | |
| PF @ S Max/Min | $$$$$ | (Reset) | | $$$$$ | (Reset) | |
| Freq (Hz) | $$$$$ | (Reset) | | $$$$$ | (Reset) | |
| Tap Pos | $$$ | (Reset) | | $$$ | (Reset) | |

Last MaxMin Reset 02/14/2017 19:55:55

# Demand/Peak

```
SEL-2431                                    Date: 09/14/2021   Time: 10:55:40
Voltage Reg

Line Current (IL)
          DEMAND     PEAK        DATE      TIME
          (A pri)   (A pri)
Forward        49        95  07/09/2021 18:43:19
Reverse         0         0  03/15/2017 12:33:51

Real Power (P)
          DEMAND     PEAK        DATE      TIME
           (kW)      (kW)
Forward       353       682  07/09/2021 18:43:19
Reverse         0         0  03/15/2017 12:33:50

Reactive Power (Q)
             DEMAND     PEAK        DATE      TIME
             (kVAr)    (kVAr)
Forward OUT       58       126  07/30/2020 14:12:27
Forward IN         0        85  04/10/2020 23:40:33
Reverse OUT        0         0  (Reset)
Reverse IN         0         0  03/15/2017 12:33:51

Apparent Power (S)
          DEMAND     PEAK        DATE      TIME
           (kVA)     (kVA)
Forward       357       691  07/09/2021 18:43:19
Reverse         0         0  03/15/2017 12:33:51

Last Demand Reset  07/07/2021 17:23:17
Last Peak Reset    02/14/2017 19:55:55
```

Snipping Tool
New Mode
Select the snip mode usin
button.
Snipping Tool
In a future update,
home. Try improve
& Sketch (or try th
Windows logo key
Try Snip & Sketch

# Min/Max Metering Values

SEL-2431 Date: 09/20/2021 Time: 12:58:53
Voltage Reg

Forward

| | MAX | DATE | TIME | MIN | DATE | TIME |
|---|---|---|---|---|---|---|
| IL (A pri) | 93.9 | 07/09/2021 | 16:30:55 | 0.8 | 05/20/2019 | 11:37:00 |
| VS (kV) | 7.52 | 05/08/2018 | 16:33:45 | 6.79 | 11/16/2018 | 09:10:00 |
| VS (V sec) | 125.3 | 05/08/2018 | 16:33:45 | 113.2 | 11/16/2018 | 09:10:00 |
| VL (kV) | 7.52 | 05/08/2018 | 16:33:45 | 6.79 | 11/16/2018 | 09:10:00 |
| VL (V sec) | 125.3 | 05/08/2018 | 16:33:45 | 113.2 | 11/16/2018 | 09:10:00 |
| VCMP (kV) | 7.52 | 05/08/2018 | 16:33:45 | 6.79 | 11/16/2018 | 09:10:00 |
| VCMP (V sec) | 125.3 | 05/08/2018 | 16:33:45 | 113.2 | 11/16/2018 | 09:10:00 |
| P (kW) | 677 | 07/09/2021 | 16:30:55 | -8 | 03/09/2020 | 11:44:34 |
| Q (kVAr) | 205 | 02/07/2019 | 09:21:23 | -95 | 10/07/2020 | 01:35:10 |
| S (kVA) | 683 | 07/09/2021 | 16:30:55 | 5 | 05/20/2019 | 11:37:00 |
| PF @ S Max/Min | 0.99 | 07/09/2021 | 16:30:55 | 0.93 | 05/20/2019 | 11:37:00 |
| Freq (Hz) | 60.12 | 09/18/2018 | 09:42:58 | 59.71 | 06/16/2017 | 04:15:37 |
| Tap Pos | +15 | 07/07/2021 | 17:30:28 | -07 | 11/16/2018 | 10:08:06 |

Reverse

| | MAX | DATE | TIME | MIN | DATE | TIME |
|---|---|---|---|---|---|---|
| IL (A pri) | 2.9 | 03/17/2020 | 13:52:53 | 2.3 | 03/26/2020 | 12:44:45 |
| VS (kV) | 7.32 | 03/26/2020 | 12:44:53 | 7.28 | 03/17/2020 | 13:52:52 |
| VS (V sec) | 122.0 | 03/26/2020 | 12:44:53 | 121.4 | 03/17/2020 | 13:52:52 |
| VL (kV) | 7.32 | 03/26/2020 | 12:44:53 | 7.28 | 03/17/2020 | 13:52:52 |
| VL (V sec) | 122.0 | 03/26/2020 | 12:44:53 | 121.4 | 03/17/2020 | 13:52:52 |
| VCMP (kV) | 7.32 | 03/26/2020 | 12:44:53 | 7.28 | 03/17/2020 | 13:52:52 |
| VCMP (V sec) | 122.0 | 03/26/2020 | 12:44:53 | 121.4 | 03/17/2020 | 13:52:52 |
| P (kW) | 8 | 03/17/2020 | 13:52:53 | -6 | 03/17/2020 | 13:52:09 |
| Q (kVAr) | -17 | 03/26/2020 | 12:44:46 | -20 | 03/17/2020 | 13:51:21 |
| S (kVA) | 21 | 03/17/2020 | 13:52:53 | 17 | 03/26/2020 | 12:44:46 |
| PF @ S Max/Min | 0.42 | 03/17/2020 | 13:52:53 | -0.05 | 03/26/2020 | 12:44:46 |
| Freq (Hz) | 60.04 | 03/17/2020 | 13:51:23 | 59.99 | 03/26/2020 | 12:46:10 |
| Tap Pos | -02 | 03/26/2020 | 12:44:14 | -03 | 03/17/2020 | 13:50:55 |

Last MaxMin Reset 02/14/2017 18:46:47

SEL-2431 Date: 09/28/21 Time: 4:14:42

Bench Lake Voltage Reg A

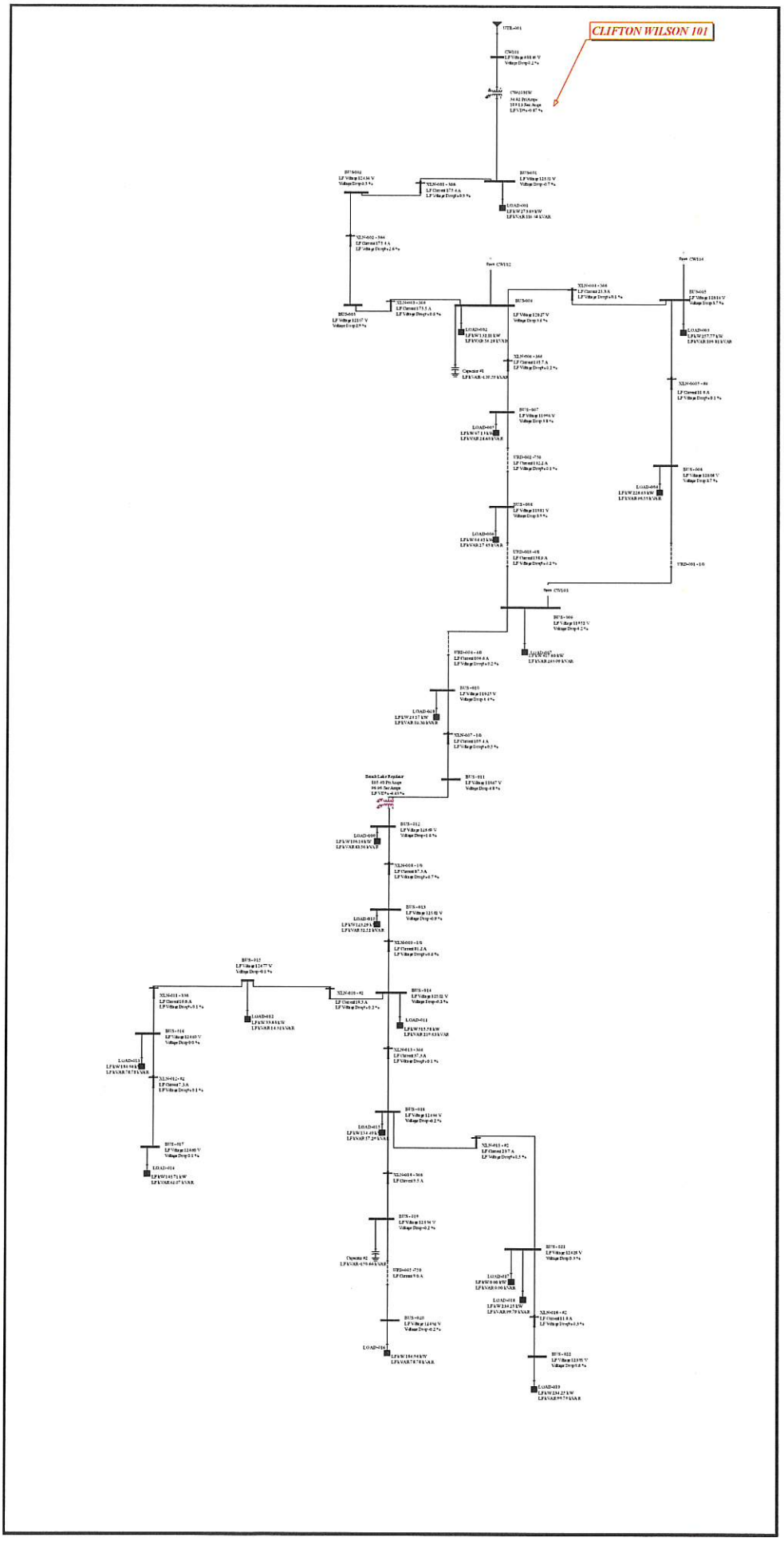
| # | DATE | TIME | IL | VSSEC | VLSEC | VCMPSEC | TAP_POS | ILFDEM | PFDEM | QFODEM | QFIDEM | SFDEM | ILRDEM | PRDEM | QRODEM | QRIDEM | SRDEM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7698 | 7/9/2021 | 23:45:01 | 42.85 | 122.225 | 122.235 | 122.235 | 2 | 41.62 | 304.981 | 12.165 | 0 | 305.255 | 0 | 0 | 0 | 0 | 0 |
| 7699 | 7/9/2021 | 23:30:01 | 42.5 | 122.255 | 122.265 | 122.265 | 2 | 41.707 | 305.811 | 11.815 | 0 | 306.072 | 0 | 0 | 0 | 0 | 0 |
| 7700 | 7/9/2021 | 23:15:00 | 41.25 | 122.61 | 122.625 | 122.625 | 3 | 43.497 | 319.275 | 17.316 | 0 | 319.766 | 0 | 0 | 0 | 0 | 0 |
| 7701 | 7/9/2021 | 23:00:00 | 44.25 | 122.77 | 122.785 | 122.785 | 3 | 45.388 | 333.435 | 15.89 | 0 | 333.834 | 0 | 0 | 0 | 0 | 0 |
| 7702 | 7/9/2021 | 22:45:00 | 44.55 | 122.59 | 122.6 | 122.6 | 3 | 46.764 | 342.847 | 20.861 | 0 | 343.495 | 0 | 0 | 0 | 0 | 0 |
| 7703 | 7/9/2021 | 22:30:00 | 45.65 | 122.295 | 122.305 | 122.305 | 3 | 46.288 | 338.962 | 20.379 | 0 | 339.587 | 0 | 0 | 0 | 0 | 0 |
| 7704 | 7/9/2021 | 22:15:01 | 47.3 | 122.42 | 122.435 | 122.435 | 3 | 47.446 | 347.99 | 21.345 | 0 | 348.691 | 0 | 0 | 0 | 0 | 0 |
| 7705 | 7/9/2021 | 22:00:01 | 47.7 | 122.33 | 122.345 | 122.345 | 4 | 51.315 | 374.444 | 24.296 | 0 | 375.247 | 0 | 0 | 0 | 0 | 0 |
| 7706 | 7/9/2021 | 21:45:01 | 51 | 122.035 | 122.05 | 122.05 | 4 | 52.793 | 385.514 | 26.362 | 0 | 386.429 | 0 | 0 | 0 | 0 | 0 |
| 7707 | 7/9/2021 | 21:30:00 | 49.95 | 122.245 | 122.255 | 122.255 | 4 | 52.308 | 383.185 | 31.125 | 0 | 384.462 | 0 | 0 | 0 | 0 | 0 |
| 7708 | 7/9/2021 | 21:15:01 | 51.25 | 121.74 | 121.75 | 121.75 | 5 | 51.381 | 374.692 | 26.424 | 0 | 375.656 | 0 | 0 | 0 | 0 | 0 |
| 7709 | 7/9/2021 | 21:00:00 | 55.35 | 121.94 | 121.95 | 121.95 | 4 | 54.655 | 398.267 | 36.084 | 0 | 399.907 | 0 | 0 | 0 | 0 | 0 |
| 7710 | 7/9/2021 | 20:45:01 | 53.65 | 122 | 122.015 | 122.015 | 4 | 55.166 | 400.687 | 36.84 | 0 | 402.393 | 0 | 0 | 0 | 0 | 0 |
| 7711 | 7/9/2021 | 20:30:01 | 56.75 | 121.43 | 121.435 | 121.435 | 4 | 58.317 | 426.218 | 37.191 | 0 | 427.853 | 0 | 0 | 0 | 0 | 0 |
| 7712 | 7/9/2021 | 20:15:01 | 57.55 | 122.175 | 122.19 | 122.19 | 5 | 58.246 | 425.034 | 34.874 | 0 | 426.498 | 0 | 0 | 0 | 0 | 0 |
| 7713 | 7/9/2021 | 20:00:01 | 54.45 | 122.25 | 122.26 | 122.26 | 5 | 57.431 | 418.045 | 38.481 | 0 | 419.831 | 0 | 0 | 0 | 0 | 0 |
| 7714 | 7/9/2021 | 19:45:00 | 56.35 | 122.4 | 122.415 | 122.415 | 5 | 57.837 | 423.124 | 30.756 | 0 | 424.255 | 0 | 0 | 0 | 0 | 0 |
| 7715 | 7/9/2021 | 19:30:00 | 57.95 | 122.205 | 122.215 | 122.215 | 5 | 59.767 | 435.646 | 35.251 | 0 | 437.087 | 0 | 0 | 0 | 0 | 0 |
| 7716 | 7/9/2021 | 19:15:00 | 58.95 | 122.22 | 122.235 | 122.235 | 5 | 60.252 | 440.462 | 37.614 | 0 | 442.103 | 0 | 0 | 0 | 0 | 0 |
| 7717 | 7/9/2021 | 19:00:01 | 62.05 | 122.51 | 122.515 | 122.515 | 6 | 62.898 | 459.502 | 44.922 | 0 | 461.714 | 0 | 0 | 0 | 0 | 0 |
| 7718 | 7/9/2021 | 18:45:01 | 65.1 | 121.8 | 121.81 | 121.81 | 6 | 63.91 | 465.648 | 55.094 | 0 | 468.909 | 0 | 0 | 0 | 0 | 0 |
| 7719 | 7/9/2021 | 18:30:01 | 69.35 | 121.865 | 121.875 | 121.875 | 6 | 67.674 | 493.475 | 60.032 | 0 | 497.125 | 0 | 0 | 0 | 0 | 0 |
| 7720 | 7/9/2021 | 18:15:01 | 67.35 | 122.07 | 122.08 | 122.08 | 7 | 68.726 | 499.865 | 60.452 | 0 | 503.528 | 0 | 0 | 0 | 0 | 0 |
| 7721 | 7/9/2021 | 18:00:00 | 67.6 | 122.01 | 122.025 | 122.025 | 7 | 65.778 | 480.141 | 49.162 | 0 | 482.685 | 0 | 0 | 0 | 0 | 0 |
| 7722 | 7/9/2021 | 17:45:00 | 63 | 122.88 | 122.885 | 122.885 | 7 | 61.681 | 451.21 | 40.697 | 0 | 453.054 | 0 | 0 | 0 | 0 | 0 |
| 7723 | 7/9/2021 | 17:30:00 | 63.25 | 122.885 | 122.895 | 122.895 | 8 | 64.412 | 471.369 | 44.064 | 0 | 473.453 | 0 | 0 | 0 | 0 | 0 |
| 7724 | 7/9/2021 | 17:15:00 | 63.9 | 121.795 | 121.81 | 121.81 | 8 | 63.973 | 466.163 | 39.828 | 0 | 467.887 | 0 | 0 | 0 | 0 | 0 |
| 7725 | 7/9/2021 | 17:00:00 | 61.2 | 122.585 | 122.595 | 122.595 | 9 | 62.759 | 459.415 | 38.827 | 0 | 461.064 | 0 | 0 | 0 | 0 | 0 |
| 7726 | 7/9/2021 | 16:45:01 | 62.05 | 122.125 | 122.135 | 122.135 | 9 | 64.289 | 468.296 | 42.3 | 0 | 470.211 | 0 | 0 | 0 | 0 | 0 |
| 7727 | 7/9/2021 | 16:30:01 | 65.85 | 121.525 | 121.535 | 121.535 | 9 | 65.723 | 478.175 | 44.564 | 0 | 480.256 | 0 | 0 | 0 | 0 | 0 |
| 7728 | 7/9/2021 | 16:15:01 | 64.6 | 122.24 | 122.255 | 122.255 | 9 | 62.989 | 460.262 | 40.106 | 0 | 462.025 | 0 | 0 | 0 | 0 | 0 |
| 7729 | 7/9/2021 | 16:00:00 | 62.05 | 122.77 | 122.78 | 122.78 | 10 | 64.149 | 468.181 | 42.989 | 0 | 470.177 | 0 | 0 | 0 | 0 | 0 |
| 7730 | 7/9/2021 | 15:45:01 | 65.05 | 121.735 | 121.745 | 121.745 | 9 | 62.577 | 455.07 | 42.648 | 0 | 457.075 | 0 | 0 | 0 | 0 | 0 |
| 7731 | 7/9/2021 | 15:30:01 | 64.35 | 121.485 | 121.5 | 121.5 | 9 | 63.721 | 463.309 | 42.081 | 0 | 465.229 | 0 | 0 | 0 | 0 | 0 |
| 7732 | 7/9/2021 | 15:15:01 | 62.8 | 122.545 | 122.555 | 122.555 | 10 | 61.991 | 453.815 | 38.204 | 0 | 455.428 | 0 | 0 | 0 | 0 | 0 |
| 7733 | 7/9/2021 | 15:00:00 | 59.25 | 122.465 | 122.475 | 122.475 | 10 | 61.818 | 451.679 | 41.527 | 0 | 453.591 | 0 | 0 | 0 | 0 | 0 |
| 7734 | 7/9/2021 | 14:45:00 | 61.25 | 122.21 | 122.22 | 122.22 | 10 | 60.642 | 443.076 | 43.738 | 0 | 445.243 | 0 | 0 | 0 | 0 | 0 |
| 7735 | 7/9/2021 | 14:30:01 | 60 | 122.425 | 122.43 | 122.43 | 10 | 59.798 | 436.841 | 42.002 | 0 | 438.861 | 0 | 0 | 0 | 0 | 0 |
| 7736 | 7/9/2021 | 14:15:01 | 61.2 | 122.885 | 122.9 | 122.9 | 10 | 59.257 | 432.559 | 40.007 | 0 | 434.409 | 0 | 0 | 0 | 0 | 0 |
| 7737 | 7/9/2021 | 14:00:01 | 59.6 | 121.09 | 121.1 | 121.1 | 9 | 56.451 | 409.574 | 35.74 | 0 | 411.142 | 0 | 0 | 0 | 0 | 0 |
| 7738 | 7/9/2021 | 13:45:00 | 59.15 | 121.64 | 121.65 | 121.65 | 9 | 58.938 | 427.895 | 43.956 | 0 | 430.161 | 0 | 0 | 0 | 0 | 0 |
| 7739 | 7/9/2021 | 13:30:00 | 58.4 | 122.045 | 122.06 | 122.06 | 9 | 57.375 | 418.16 | 41.321 | 0 | 420.214 | 0 | 0 | 0 | 0 | 0 |
| 7740 | 7/9/2021 | 13:15:01 | 57.05 | 121.055 | 121.06 | 121.06 | 9 | 56.927 | 413.7 | 37.848 | 0 | 415.451 | 0 | 0 | 0 | 0 | 0 |
| 7741 | 7/9/2021 | 13:00:00 | 54.05 | 121.805 | 121.815 | 121.815 | 9 | 55.205 | 402.069 | 36.192 | 0 | 403.728 | 0 | 0 | 0 | 0 | 0 |
| 7742 | 7/9/2021 | 12:45:00 | 56.6 | 122.115 | 122.135 | 122.135 | 9 | 55.975 | 407.425 | 39.779 | 0 | 409.611 | 0 | 0 | 0 | 0 | 0 |
| 7743 | 7/9/2021 | 12:30:01 | 53.55 | 122.24 | 122.25 | 122.25 | 9 | 55.352 | 398.194 | 77.594 | 0 | 405.699 | 0 | 0 | 0 | 0 | 0 |
| 7744 | 7/9/2021 | 12:15:01 | 56.9 | 121.55 | 121.56 | 121.56 | 9 | 54.575 | 392.426 | 76.152 | 0 | 399.764 | 0 | 0 | 0 | 0 | 0 |
| 7745 | 7/9/2021 | 12:00:01 | 59.35 | 121.625 | 121.635 | 121.635 | 9 | 58.876 | 421.215 | 84.668 | 0 | 429.663 | 0 | 0 | 0 | 0 | 0 |
| 7746 | 7/9/2021 | 11:45:00 | 54.15 | 122.195 | 122.205 | 122.205 | 9 | 58.007 | 415.814 | 80.254 | 0 | 423.52 | 0 | 0 | 0 | 0 | 0 |
| 7747 | 7/9/2021 | 11:30:00 | 57.3 | 121.93 | 121.94 | 121.94 | 8 | 56.712 | 407.312 | 77.086 | 0 | 414.597 | 0 | 0 | 0 | 0 | 0 |
| 7748 | 7/9/2021 | 11:15:00 | 53.2 | 121.83 | 121.845 | 121.845 | 8 | 53.835 | 387.229 | 72.478 | 0 | 393.975 | 0 | 0 | 0 | 0 | 0 |
| 7749 | 7/9/2021 | 11:00:00 | 56.25 | 121.51 | 121.52 | 121.52 | 8 | 55.434 | 396.304 | 77.515 | 0 | 403.89 | 0 | 0 | 0 | 0 | 0 |
| 7750 | 7/9/2021 | 10:45:00 | 56.05 | 121.07 | 121.085 | 121.085 | 7 | 52.997 | 380.447 | 66.635 | 0 | 386.25 | 0 | 0 | 0 | 0 | 0 |
| 7751 | 7/9/2021 | 10:30:01 | 52.55 | 121.6 | 121.615 | 121.615 | 7 | 51.982 | 373.008 | 66.761 | 0 | 378.95 | 0 | 0 | 0 | 0 | 0 |
| 7752 | 7/9/2021 | 10:15:01 | 51.45 | 121.825 | 121.84 | 121.84 | 7 | 53.105 | 380.71 | 71.184 | 0 | 387.328 | 0 | 0 | 0 | 0 | 0 |
| 7753 | 7/9/2021 | 10:00:00 | 48.4 | 121.79 | 121.8 | 121.8 | 7 | 52.73 | 377.202 | 73.317 | 0 | 384.293 | 0 | 0 | 0 | 0 | 0 |
| 7754 | 7/9/2021 | 9:45:01 | 52.2 | 121.06 | 121.075 | 121.075 | 5 | 50.763 | 363.689 | 69.285 | 0 | 370.291 | 0 | 0 | 0 | 0 | 0 |
| 7755 | 7/9/2021 | 9:30:01 | 52.25 | 121.8 | 121.81 | 121.81 | 5 | 50.205 | 362.448 | 67.878 | 0 | 368.763 | 0 | 0 | 0 | 0 | 0 |
| 7756 | 7/9/2021 | 9:15:01 | 49.05 | 122.435 | 122.455 | 122.455 | 6 | 50.029 | 360.775 | 63.715 | 0 | 366.371 | 0 | 0 | 0 | 0 | 0 |
| 7757 | 7/9/2021 | 9:00:00 | 48.75 | 121.675 | 121.69 | 121.69 | 6 | 48.904 | 350.889 | 62.971 | 0 | 356.515 | 0 | 0 | 0 | 0 | 0 |
| 7758 | 7/9/2021 | 8:45:00 | 50.9 | 121.655 | 121.67 | 121.67 | 6 | 48.796 | 351.697 | 62.077 | 0 | 357.147 | 0 | 0 | 0 | 0 | 0 |
| 7759 | 7/9/2021 | 8:30:01 | 46.05 | 122.07 | 122.085 | 122.085 | 6 | 46.001 | 331.534 | 62.304 | 0 | 337.354 | 0 | 0 | 0 | 0 | 0 |
| 7760 | 7/9/2021 | 8:15:00 | 47 | 122.415 | 122.425 | 122.425 | 7 | 48.168 | 346.538 | 62.899 | 0 | 352.223 | 0 | 0 | 0 | 0 | 0 |
| 7761 | 7/9/2021 | 8:00:00 | 47.75 | 121.17 | 121.18 | 121.18 | 5 | 46.666 | 335.742 | 57.225 | 0 | 340.594 | 0 | 0 | 0 | 0 | 0 |
| 7762 | 7/9/2021 | 7:45:00 | 45.75 | 121.84 | 121.85 | 121.85 | 5 | 47.386 | 340.322 | 59.627 | 0 | 345.532 | 0 | 0 | 0 | 0 | 0 |
| 7763 | 7/9/2021 | 7:30:00 | 43.95 | 121.745 | 121.755 | 121.755 | 5 | 43.107 | 310.641 | 54.221 | 0 | 315.356 | 0 | 0 | 0 | 0 | 0 |
| 7764 | 7/9/2021 | 7:15:01 | 45.6 | 121.94 | 121.95 | 121.95 | 5 | 42.651 | 308.525 | 51.029 | 0 | 312.753 | 0 | 0 | 0 | 0 | 0 |
| 7765 | 7/9/2021 | 7:00:00 | 42.45 | 122.03 | 122.045 | 122.045 | 5 | 40.691 | 293.319 | 44.553 | 0 | 296.713 | 0 | 0 | 0 | 0 | 0 |
| 7766 | 7/9/2021 | 6:45:01 | 42.8 | 121.43 | 121.44 | 121.44 | 4 | 40.712 | 293.052 | 48.345 | 0 | 297.035 | 0 | 0 | 0 | 0 | 0 |
| 7767 | 7/9/2021 | 6:30:00 | 37.95 | 121.98 | 121.99 | 121.99 | 4 | 37.052 | 268.515 | 39.782 | 0 | 271.491 | 0 | 0 | 0 | 0 | 0 |
| 7768 | 7/9/2021 | 6:15:00 | 34.9 | 122.17 | 122.18 | 122.18 | 4 | 36.502 | 263.596 | 37.844 | 0 | 266.351 | 0 | 0 | 0 | 0 | 0 |
| 7769 | 7/9/2021 | 6:00:00 | 36.05 | 121.475 | 121.49 | 121.49 | 3 | 35.918 | 259.178 | 35.082 | 0 | 261.569 | 0 | 0 | 0 | 0 | 0 |
| 7770 | 7/9/2021 | 5:45:00 | 38.45 | 121.555 | 121.565 | 121.565 | 2 | 36.712 | 264.822 | 36.016 | 0.001 | 267.286 | 0 | 0 | 0 | 0 | 0 |
| 7771 | 7/9/2021 | 5:30:01 | 32.45 | 121.415 | 121.43 | 121.43 | 1 | 32.879 | 238.278 | 27.867 | 0.008 | 239.917 | 0 | 0 | 0 | 0 | 0 |
| 7772 | 7/9/2021 | 5:15:00 | 33.75 | 121.63 | 121.64 | 121.64 | 1 | 33.625 | 242.925 | 31.703 | 0.077 | 245.011 | 0 | 0 | 0 | 0 | 0 |
| 7773 | 7/9/2021 | 5:00:00 | 32.15 | 121.325 | 121.345 | 121.345 | 0 | 32.171 | 233.02 | 26.159 | 0.766 | 234.614 | 0 | 0 | 0 | 0 | 0 |
| 7774 | 7/9/2021 | 4:45:01 | 31.55 | 121.755 | 121.77 | 121.77 | 0 | 31.555 | 230.131 | 11.542 | 7.664 | 231.103 | 0 | 0 | 0 | 0 | 0 |
| 7775 | 7/9/2021 | 4:30:01 | 28 | 122.415 | 122.425 | 122.425 | 0 | 28.338 | 207.732 | 0.03 | 15.92 | 208.398 | 0 | 0 | 0 | 0 | 0 |
| 7776 | 7/9/2021 | 4:15:00 | 30.65 | 122.475 | 122.49 | 122.49 | 1 | 30.116 | 220.873 | 0.016 | 15.143 | 221.41 | 0 | 0 | 0 | 0 | 0 |
| 7777 | 7/9/2021 | 4:00:00 | 32.1 | 122.355 | 122.37 | 122.37 | 1 | 29.75 | 217.824 | 0.046 | 13.408 | 218.274 | 0 | 0 | 0 | 0 | 0 |
| 7778 | 7/9/2021 | 3:45:00 | 30.4 | 122.385 | 122.395 | 122.395 | 1 | 29.6 | 216.604 | 0.137 | 17.934 | 217.418 | 0 | 0 | 0 | 0 | 0 |
| 7779 | 7/9/2021 | 3:30:00 | 27.8 | 122.725 | 122.735 | 122.735 | 1 | 30.861 | 225.904 | 1.286 | 13.247 | 226.47 | 0 | 0 | 0 | 0 | 0 |
| 7780 | 7/9/2021 | 3:15:00 | 34.95 | 121.775 | 121.79 | 121.79 | 1 | 32.54 | 238.274 | 3.866 | 2.466 | 238.398 | 0 | 0 | 0 | 0 | 0 |
| 7781 | 7/9/2021 | 3:00:00 | 34.1 | 121.825 | 121.835 | 121.835 | 1 | 33.139 | 242.178 | 2.109 | 1.72 | 242.228 | 0 | 0 | 0 | 0 | 0 |
| 7782 | 7/9/2021 | 2:45:00 | 32.45 | 122.04 | 122.05 | 122.05 | 1 | 33.142 | 242.641 | 0.959 | 3.153 | 242.69 | 0 | 0 | 0 | 0 | 0 |
| 7783 | 7/9/2021 | 2:30:00 | 30.75 | 122.855 | 122.865 | 122.865 | 1 | 34.402 | 252.623 | 5.557 | 0.386 | 252.725 | 0 | 0 | 0 | 0 | 0 |
| 7784 | 7/9/2021 | 2:15:01 | 34.1 | 122.33 | 122.34 | 122.34 | 1 | 33.558 | 246.466 | 0.714 | 1.976 | 246.488 | 0 | 0 | 0 | 0 | 0 |
| 7785 | 7/9/2021 | 2:00:00 | 31.95 | 122.09 | 122.105 | 122.105 | 1 | 33.922 | 248.28 | 2.285 | 1.279 | 248.321 | 0 | 0 | 0 | 0 | 0 |
| 7786 | 7/9/2021 | 1:45:00 | 35.85 | 121.945 | 121.955 | 121.955 | 1 | 36.465 | 266.564 | 6.696 | 0.057 | 266.667 | 0 | 0 | 0 | 0 | 0 |
| 7787 | 7/9/2021 | 1:30:00 | 36.3 | 122.05 | 122.065 | 122.065 | 1 | 35.876 | 263.216 | 2.092 | 0.57 | 263.237 | 0 | 0 | 0 | 0 | 0 |
| 7788 | 7/9/2021 | 1:15:01 | 35.2 | 121.9 | 121.91 | 121.91 | 1 | 35.423 | 259.322 | 4.126 | 0.223 | 259.371 | 0 | 0 | 0 | 0 | 0 |
| 7789 | 7/9/2021 | 1:00:00 | 31.85 | 122.495 | 122.51 | 122.51 | 1 | 34.563 | 253.297 | 2.935 | 1.475 | 253.346 | 0 | 0 | 0 | 0 | 0 |
| 7790 | 7/9/2021 | 0:45:00 | 39.65 | 121.86 | 121.87 | 121.87 | 1 | 37.582 | 274.931 | 5.24 | 0.009 | 275.005 | 0 | 0 | 0 | 0 | 0 |
| 7791 | 7/9/2021 | 0:30:01 | 36.1 | 121.955 | 121.96 | 121.96 | 1 | 36.365 | 265.965 | 4.432 | 0.063 | 266.015 | 0 | 0 | 0 | 0 | 0 |
| 7792 | 7/9/2021 | 0:15:01 | 34.5 | 121.6 | 121.61 | 121.61 | 1 | 36.984 | 270.374 | 5.904 | 0.368 | 270.489 | 0 | 0 | 0 | 0 | 0 |
| 7793 | 7/9/2021 | 0:00:01 | 38.4 | 121.745 | 121.755 | 121.755 | 1 | 38.816 | 283.673 | 11.647 | 0.001 | 283.955 | 0 | 0 | 0 | 0 | 0 |

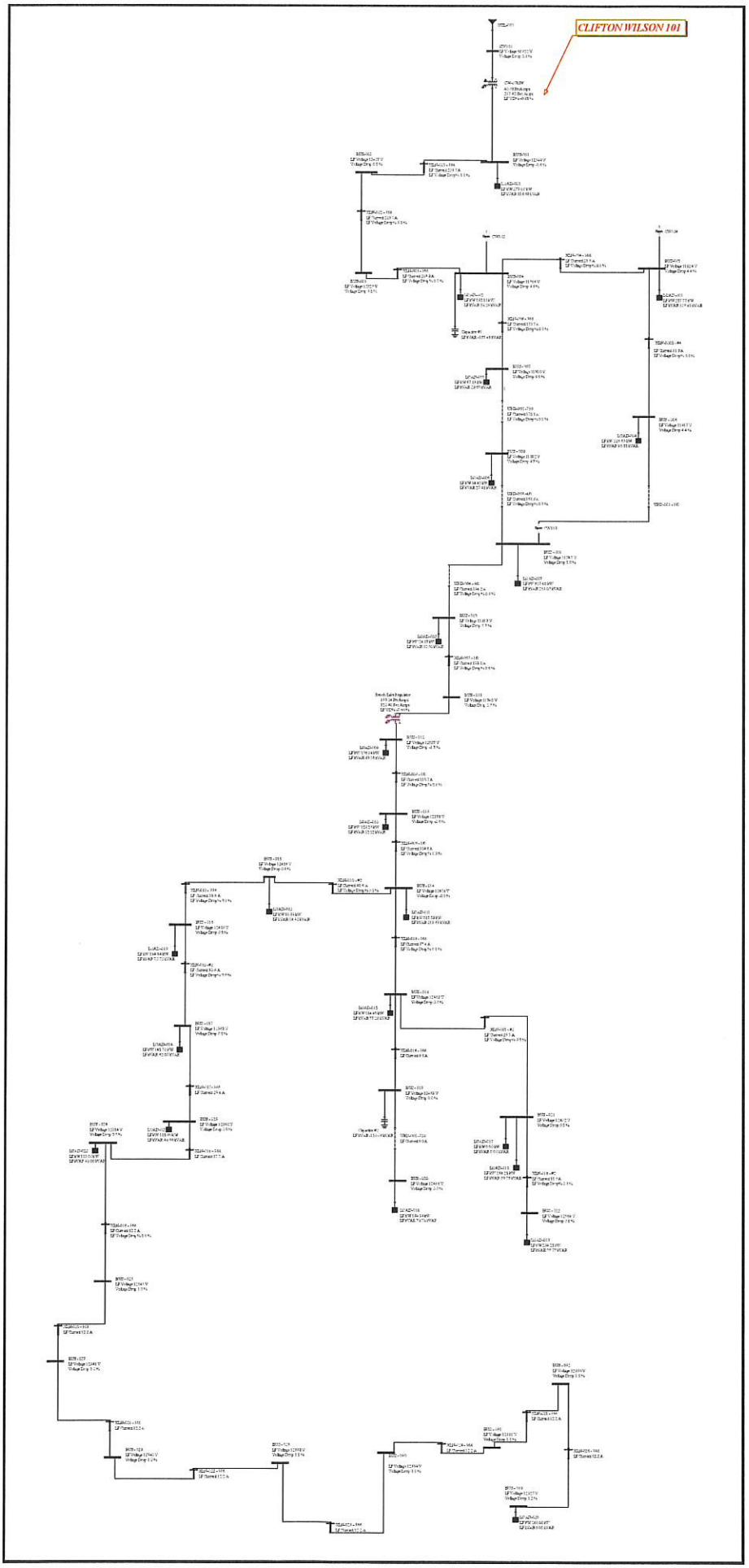
SEL-2431 Date: 09/28/2021 Time: 4:20:37
Bench Lake Voltage Reg B

| # | DATE | TIME | IL | VSSEC | VLSEC | VCMPSEC | TAP_POS | ILFDEM | PFDEM | QFODEM | QFIDEM | SFDEM | ILRDEM | PRDEM | QRODEM | QRIDEM | SRDEM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7699 | 7/9/2021 | 23:45:01 | 55.85 | 122.06 | 122.095 | 122.095 | 4 | 55.748 | 405.242 | 47.46 | 0 | 408.022 | 0 | 0 | 0 | 0 | 0 |
| 7700 | 7/9/2021 | 23:30:01 | 55.05 | 122.02 | 122.05 | 122.05 | 4 | 55.09 | 400.452 | 45.369 | 0 | 403.033 | 0 | 0 | 0 | 0 | 0 |
| 7701 | 7/9/2021 | 23:15:00 | 54.45 | 121.555 | 121.58 | 121.58 | 4 | 55.787 | 405.676 | 46.863 | 0 | 408.391 | 0 | 0 | 0 | 0 | 0 |
| 7702 | 7/9/2021 | 23:00:00 | 53.75 | 122.04 | 122.07 | 122.07 | 5 | 58.65 | 426.388 | 56.833 | 0 | 430.181 | 0 | 0 | 0 | 0 | 0 |
| 7703 | 7/9/2021 | 22:45:01 | 60.35 | 121.81 | 121.84 | 121.84 | 5 | 61.305 | 444.469 | 59.939 | 0 | 448.503 | 0 | 0 | 0 | 0 | 0 |
| 7704 | 7/9/2021 | 22:30:01 | 58.7 | 121.97 | 122 | 122 | 5 | 59.817 | 435.223 | 57.585 | 0 | 439.038 | 0 | 0 | 0 | 0 | 0 |
| 7705 | 7/9/2021 | 22:15:00 | 64.6 | 122.595 | 122.62 | 122.62 | 6 | 62.973 | 458.29 | 63.92 | 0 | 462.734 | 0 | 0 | 0 | 0 | 0 |
| 7706 | 7/9/2021 | 22:00:00 | 66.15 | 121.845 | 121.87 | 121.87 | 6 | 66.15 | 479.921 | 65.002 | 0 | 484.307 | 0 | 0 | 0 | 0 | 0 |
| 7707 | 7/9/2021 | 21:45:00 | 66.7 | 121.945 | 121.97 | 121.97 | 6 | 68.067 | 493.689 | 67.105 | 0 | 498.236 | 0 | 0 | 0 | 0 | 0 |
| 7708 | 7/9/2021 | 21:30:00 | 67 | 122.905 | 122.935 | 122.935 | 7 | 68.736 | 500.724 | 68.741 | 0 | 505.435 | 0 | 0 | 0 | 0 | 0 |
| 7709 | 7/9/2021 | 21:15:00 | 66.55 | 122.79 | 122.82 | 122.82 | 7 | 68.2 | 496.759 | 62.908 | 0 | 500.737 | 0 | 0 | 0 | 0 | 0 |
| 7710 | 7/9/2021 | 21:00:01 | 72.05 | 122.27 | 122.3 | 122.3 | 7 | 68.895 | 502.268 | 63.506 | 0 | 506.288 | 0 | 0 | 0 | 0 | 0 |
| 7711 | 7/9/2021 | 20:45:01 | 75.85 | 121.79 | 121.815 | 121.815 | 7 | 73.808 | 534.374 | 74.552 | 0 | 539.559 | 0 | 0 | 0 | 0 | 0 |
| 7712 | 7/9/2021 | 20:30:00 | 75.8 | 121.735 | 121.76 | 121.76 | 7 | 70.437 | 512.848 | 67.224 | 0 | 517.26 | 0 | 0 | 0 | 0 | 0 |
| 7713 | 7/9/2021 | 20:15:01 | 72.1 | 122.51 | 122.54 | 122.54 | 8 | 74.556 | 543.386 | 68.757 | 0 | 547.727 | 0 | 0 | 0 | 0 | 0 |
| 7714 | 7/9/2021 | 20:00:01 | 72.2 | 122.19 | 122.22 | 122.22 | 8 | 75.726 | 550.278 | 73.792 | 0 | 555.214 | 0 | 0 | 0 | 0 | 0 |
| 7715 | 7/9/2021 | 19:45:00 | 77.2 | 122.76 | 122.785 | 122.785 | 9 | 78.217 | 570.32 | 79.807 | 0 | 575.885 | 0 | 0 | 0 | 0 | 0 |
| 7716 | 7/9/2021 | 19:30:00 | 75.85 | 122.85 | 122.88 | 122.88 | 9 | 80.553 | 585.712 | 84.768 | 0 | 591.823 | 0 | 0 | 0 | 0 | 0 |
| 7717 | 7/9/2021 | 19:15:00 | 83.15 | 122.935 | 122.96 | 122.96 | 9 | 84.293 | 612.744 | 94.711 | 0 | 620.026 | 0 | 0 | 0 | 0 | 0 |
| 7718 | 7/9/2021 | 19:00:01 | 85.9 | 122.895 | 122.92 | 122.92 | 9 | 89.502 | 649.124 | 101.644 | 0 | 657.043 | 0 | 0 | 0 | 0 | 0 |
| 7719 | 7/9/2021 | 18:45:01 | 91.65 | 122.405 | 122.435 | 122.435 | 10 | 94.134 | 680.091 | 108.369 | 0 | 688.688 | 0 | 0 | 0 | 0 | 0 |
| 7720 | 7/9/2021 | 18:30:00 | 85.35 | 122.285 | 122.315 | 122.315 | 9 | 86.858 | 630.072 | 96.388 | 0 | 637.411 | 0 | 0 | 0 | 0 | 0 |
| 7721 | 7/9/2021 | 18:15:01 | 92.55 | 120.695 | 120.72 | 120.72 | 9 | 85.584 | 617.524 | 89.692 | 0 | 624.012 | 0 | 0 | 0 | 0 | 0 |
| 7722 | 7/9/2021 | 18:00:01 | 86.9 | 122.195 | 122.225 | 122.225 | 10 | 87.014 | 631.101 | 93.983 | 0 | 638.078 | 0 | 0 | 0 | 0 | 0 |
| 7723 | 7/9/2021 | 17:45:01 | 84.7 | 122.235 | 122.265 | 122.265 | 11 | 84.585 | 615.379 | 88.698 | 0 | 621.749 | 0 | 0 | 0 | 0 | 0 |
| 7724 | 7/9/2021 | 17:30:01 | 82.95 | 122.295 | 122.325 | 122.325 | 12 | 86.55 | 628.587 | 93.834 | 0 | 635.561 | 0 | 0 | 0 | 0 | 0 |
| 7725 | 7/9/2021 | 17:15:00 | 86.25 | 122.3 | 122.325 | 122.325 | 13 | 87.266 | 633.485 | 95.25 | 0 | 640.617 | 0 | 0 | 0 | 0 | 0 |
| 7726 | 7/9/2021 | 17:00:01 | 90.2 | 121.67 | 121.705 | 121.705 | 13 | 87.976 | 637.173 | 99.303 | 0 | 644.87 | 0 | 0 | 0 | 0 | 0 |
| 7727 | 7/9/2021 | 16:45:00 | 96.35 | 121.755 | 121.785 | 121.785 | 13 | 92.128 | 665.715 | 100.677 | 0 | 673.29 | 0 | 0 | 0 | 0 | 0 |
| 7728 | 7/9/2021 | 16:30:00 | 96.55 | 121.335 | 121.365 | 121.365 | 13 | 92.016 | 665.912 | 101.781 | 0 | 673.65 | 0 | 0 | 0 | 0 | 0 |
| 7729 | 7/9/2021 | 16:15:00 | 89.8 | 122.045 | 122.07 | 122.07 | 13 | 91.565 | 660.947 | 104.05 | 0 | 669.095 | 0 | 0 | 0 | 0 | 0 |
| 7730 | 7/9/2021 | 16:00:01 | 93.1 | 121.02 | 121.05 | 121.05 | 12 | 88.092 | 636.346 | 96.028 | 0 | 643.561 | 0 | 0 | 0 | 0 | 0 |
| 7731 | 7/9/2021 | 15:45:01 | 88.1 | 121.37 | 121.4 | 121.4 | 12 | 86.984 | 628.195 | 94.651 | 0 | 635.299 | 0 | 0 | 0 | 0 | 0 |
| 7732 | 7/9/2021 | 15:30:01 | 81.15 | 121.75 | 121.785 | 121.785 | 12 | 84.519 | 609.647 | 88.868 | 0 | 616.094 | 0 | 0 | 0 | 0 | 0 |
| 7733 | 7/9/2021 | 15:15:01 | 84.7 | 121.36 | 121.385 | 121.385 | 12 | 84.892 | 613.21 | 91.48 | 0 | 620.002 | 0 | 0 | 0 | 0 | 0 |
| 7734 | 7/9/2021 | 15:00:01 | 87.65 | 121.525 | 121.555 | 121.555 | 12 | 82.764 | 600.983 | 87.389 | 0 | 607.309 | 0 | 0 | 0 | 0 | 0 |
| 7735 | 7/9/2021 | 14:45:01 | 82.7 | 121.99 | 122.02 | 122.02 | 12 | 83.784 | 606.074 | 89.031 | 0 | 612.585 | 0 | 0 | 0 | 0 | 0 |
| 7736 | 7/9/2021 | 14:30:01 | 74.35 | 122.915 | 122.945 | 122.945 | 13 | 80.007 | 581.449 | 84.199 | 0 | 587.519 | 0 | 0 | 0 | 0 | 0 |
| 7737 | 7/9/2021 | 14:15:01 | 85.4 | 121.505 | 121.53 | 121.53 | 13 | 82.045 | 590.713 | 84.377 | 0 | 596.714 | 0 | 0 | 0 | 0 | 0 |
| 7738 | 7/9/2021 | 14:00:00 | 78.6 | 121.35 | 121.38 | 121.38 | 12 | 79.199 | 570.858 | 83.531 | 0 | 576.943 | 0 | 0 | 0 | 0 | 0 |
| 7739 | 7/9/2021 | 13:45:00 | 79 | 121.66 | 121.685 | 121.685 | 12 | 77.827 | 561.049 | 84.113 | 0 | 567.332 | 0 | 0 | 0 | 0 | 0 |
| 7740 | 7/9/2021 | 13:30:01 | 78.5 | 122.04 | 122.07 | 122.07 | 11 | 73.194 | 531.438 | 71.473 | 0 | 536.235 | 0 | 0 | 0 | 0 | 0 |
| 7741 | 7/9/2021 | 13:15:00 | 73.25 | 121.68 | 121.71 | 121.71 | 11 | 74.955 | 541.659 | 74.603 | 0 | 546.789 | 0 | 0 | 0 | 0 | 0 |
| 7742 | 7/9/2021 | 13:00:00 | 66.7 | 122.17 | 122.195 | 122.195 | 10 | 70.477 | 513.359 | 68.706 | 0 | 518 | 0 | 0 | 0 | 0 | 0 |
| 7743 | 7/9/2021 | 12:45:00 | 72.05 | 122.64 | 122.67 | 122.67 | 11 | 70.922 | 515.052 | 78.789 | 0 | 521.257 | 0 | 0 | 0 | 0 | 0 |
| 7744 | 7/9/2021 | 12:30:00 | 69.85 | 121.285 | 121.315 | 121.315 | 11 | 73.857 | 527.035 | 111.556 | 0 | 538.717 | 0 | 0 | 0 | 0 | 0 |
| 7745 | 7/9/2021 | 12:15:00 | 76.2 | 121.64 | 121.665 | 121.665 | 11 | 74.738 | 534.383 | 115.089 | 0 | 546.65 | 0 | 0 | 0 | 0 | 0 |
| 7746 | 7/9/2021 | 12:00:00 | 75.3 | 121.68 | 121.71 | 121.71 | 11 | 72.659 | 519.572 | 113.991 | 0 | 531.966 | 0 | 0 | 0 | 0 | 0 |
| 7747 | 7/9/2021 | 11:45:00 | 72.8 | 122.18 | 122.215 | 122.215 | 11 | 74.639 | 533.374 | 119.69 | 0 | 546.664 | 0 | 0 | 0 | 0 | 0 |
| 7748 | 7/9/2021 | 11:30:01 | 72.95 | 121.375 | 121.405 | 121.405 | 10 | 71.507 | 509.55 | 110.513 | 0 | 521.411 | 0 | 0 | 0 | 0 | 0 |
| 7749 | 7/9/2021 | 11:15:00 | 72.85 | 121.175 | 121.2 | 121.2 | 9 | 70.229 | 499.306 | 111.79 | 0 | 511.674 | 0 | 0 | 0 | 0 | 0 |
| 7750 | 7/9/2021 | 11:00:01 | 71.1 | 120.955 | 120.98 | 120.98 | 9 | 67.803 | 483.882 | 107.603 | 0 | 495.713 | 0 | 0 | 0 | 0 | 0 |
| 7751 | 7/9/2021 | 10:45:00 | 66 | 122.82 | 122.85 | 122.85 | 10 | 65.939 | 472.05 | 102.912 | 0 | 483.147 | 0 | 0 | 0 | 0 | 0 |
| 7752 | 7/9/2021 | 10:30:00 | 63.55 | 122.055 | 122.08 | 122.08 | 9 | 64.067 | 457.074 | 98.722 | 0 | 467.622 | 0 | 0 | 0 | 0 | 0 |
| 7753 | 7/9/2021 | 10:15:00 | 64.5 | 121.495 | 121.52 | 121.52 | 9 | 64.073 | 457.374 | 98.911 | 0 | 467.962 | 0 | 0 | 0 | 0 | 0 |
| 7754 | 7/9/2021 | 10:00:00 | 62.7 | 121.79 | 121.82 | 121.82 | 9 | 66.583 | 473.281 | 108.013 | 0 | 485.473 | 0 | 0 | 0 | 0 | 0 |
| 7755 | 7/9/2021 | 9:45:00 | 62.2 | 121.56 | 121.585 | 121.585 | 7 | 59.501 | 426.154 | 89.192 | 0 | 435.4 | 0 | 0 | 0 | 0 | 0 |
| 7756 | 7/9/2021 | 9:30:01 | 64 | 121.575 | 121.6 | 121.6 | 7 | 60.778 | 435.605 | 93.31 | 0 | 445.502 | 0 | 0 | 0 | 0 | 0 |
| 7757 | 7/9/2021 | 9:15:01 | 54.4 | 122.475 | 122.5 | 122.5 | 7 | 53.698 | 387 | 76.402 | 0 | 394.48 | 0 | 0 | 0 | 0 | 0 |
| 7758 | 7/9/2021 | 9:00:01 | 55.7 | 121.485 | 121.515 | 121.515 | 8 | 55.189 | 395.926 | 76.206 | 0 | 403.211 | 0 | 0 | 0 | 0 | 0 |
| 7759 | 7/9/2021 | 8:45:00 | 60.75 | 121.61 | 121.64 | 121.64 | 8 | 56.738 | 406.226 | 82.782 | 0 | 414.585 | 0 | 0 | 0 | 0 | 0 |
| 7760 | 7/9/2021 | 8:30:00 | 52.7 | 121.825 | 121.855 | 121.855 | 8 | 53.606 | 384.545 | 74.776 | 0 | 391.76 | 0 | 0 | 0 | 0 | 0 |
| 7761 | 7/9/2021 | 8:15:00 | 57.15 | 121.535 | 121.565 | 121.565 | 7 | 55.043 | 394.708 | 76.124 | 0 | 402.003 | 0 | 0 | 0 | 0 | 0 |
| 7762 | 7/9/2021 | 8:00:01 | 52.75 | 121.985 | 122.015 | 122.015 | 7 | 51.193 | 366.532 | 71.286 | 0 | 373.413 | 0 | 0 | 0 | 0 | 0 |
| 7763 | 7/9/2021 | 7:45:00 | 50.6 | 121.37 | 121.4 | 121.4 | 6 | 50.855 | 364.755 | 65.357 | 0 | 370.573 | 0 | 0 | 0 | 0 | 0 |
| 7764 | 7/9/2021 | 7:30:00 | 48.3 | 121.45 | 121.48 | 121.48 | 6 | 48.432 | 348.281 | 62.981 | 0 | 353.942 | 0 | 0 | 0 | 0 | 0 |
| 7765 | 7/9/2021 | 7:15:01 | 51.2 | 122.02 | 122.045 | 122.045 | 6 | 50.333 | 361.872 | 70.214 | 0 | 368.631 | 0 | 0 | 0 | 0 | 0 |
| 7766 | 7/9/2021 | 7:00:00 | 52.2 | 121.665 | 121.69 | 121.69 | 6 | 49.209 | 353.398 | 66.207 | 0 | 359.558 | 0 | 0 | 0 | 0 | 0 |
| 7767 | 7/9/2021 | 6:45:01 | 50.1 | 121.09 | 121.115 | 121.115 | 5 | 49.172 | 353.301 | 62.892 | 0 | 358.871 | 0 | 0 | 0 | 0 | 0 |
| 7768 | 7/9/2021 | 6:30:00 | 49.05 | 122.05 | 122.085 | 122.085 | 5 | 48.475 | 347.774 | 63.291 | 0 | 353.497 | 0 | 0 | 0 | 0 | 0 |
| 7769 | 7/9/2021 | 6:15:01 | 46.15 | 121.37 | 121.395 | 121.395 | 4 | 46.193 | 331.132 | 58.679 | 0 | 336.302 | 0 | 0 | 0 | 0 | 0 |
| 7770 | 7/9/2021 | 6:00:01 | 42.25 | 121.425 | 121.45 | 121.45 | 3 | 42.592 | 305.561 | 55.678 | 0 | 310.607 | 0 | 0 | 0 | 0 | 0 |
| 7771 | 7/9/2021 | 5:45:00 | 41 | 121.79 | 121.82 | 121.82 | 3 | 42.16 | 303.066 | 53.808 | 0 | 307.822 | 0 | 0 | 0 | 0 | 0 |
| 7772 | 7/9/2021 | 5:30:00 | 43.65 | 121.665 | 121.685 | 121.685 | 3 | 39.816 | 287.4 | 48.114 | 0 | 291.42 | 0 | 0 | 0 | 0 | 0 |
| 7773 | 7/9/2021 | 5:15:01 | 39.95 | 120.985 | 121.015 | 121.015 | 2 | 38.959 | 280.603 | 43.308 | 0 | 283.96 | 0 | 0 | 0 | 0 | 0 |
| 7774 | 7/9/2021 | 5:00:01 | 39.9 | 121.915 | 121.94 | 121.94 | 2 | 39.943 | 288.601 | 44.602 | 0.004 | 292.252 | 0 | 0 | 0 | 0 | 0 |
| 7775 | 7/9/2021 | 4:45:01 | 43.75 | 121.405 | 121.43 | 121.43 | 2 | 37.884 | 277.225 | 14.002 | 0.043 | 278.11 | 0 | 0 | 0 | 0 | 0 |
| 7776 | 7/9/2021 | 4:30:01 | 39.35 | 121.94 | 121.96 | 121.96 | 2 | 38.555 | 281.944 | 14.01 | 0.009 | 282.343 | 0 | 0 | 0 | 0 | 0 |
| 7777 | 7/9/2021 | 4:15:00 | 39.05 | 121.68 | 121.705 | 121.705 | 2 | 37.914 | 276.996 | 11.498 | 0.089 | 277.296 | 0 | 0 | 0 | 0 | 0 |
| 7778 | 7/9/2021 | 4:00:01 | 33.4 | 121.98 | 122.005 | 122.005 | 2 | 35.692 | 262.278 | 5.307 | 0.83 | 262.399 | 0 | 0 | 0 | 0 | 0 |
| 7779 | 7/9/2021 | 3:45:00 | 38.6 | 122.785 | 122.81 | 122.81 | 3 | 37.727 | 277.346 | 10.498 | 0 | 277.584 | 0 | 0 | 0 | 0 | 0 |
| 7780 | 7/9/2021 | 3:30:01 | 37.65 | 122.27 | 122.295 | 122.295 | 3 | 39.528 | 288.736 | 20.67 | 0 | 289.589 | 0 | 0 | 0 | 0 | 0 |
| 7781 | 7/9/2021 | 3:15:01 | 44.95 | 121.435 | 121.46 | 121.46 | 3 | 43.215 | 314.105 | 31.974 | 0 | 315.745 | 0 | 0 | 0 | 0 | 0 |
| 7782 | 7/9/2021 | 3:00:00 | 42.5 | 122.075 | 122.1 | 122.1 | 3 | 43.658 | 317.46 | 31.099 | 0 | 319.003 | 0 | 0 | 0 | 0 | 0 |
| 7783 | 7/9/2021 | 2:45:01 | 40.55 | 121.53 | 121.56 | 121.56 | 3 | 41.562 | 301.924 | 25.487 | 0 | 303.019 | 0 | 0 | 0 | 0 | 0 |
| 7784 | 7/9/2021 | 2:30:00 | 43.5 | 121.94 | 121.97 | 121.97 | 2 | 43.255 | 315.095 | 25.704 | 0 | 316.157 | 0 | 0 | 0 | 0 | 0 |
| 7785 | 7/9/2021 | 2:15:01 | 45.4 | 121.475 | 121.5 | 121.5 | 2 | 45.045 | 327.316 | 27.509 | 0 | 328.481 | 0 | 0 | 0 | 0 | 0 |
| 7786 | 7/9/2021 | 2:00:00 | 44 | 121.445 | 121.47 | 121.47 | 2 | 42.966 | 312.222 | 27.005 | 0 | 313.397 | 0 | 0 | 0 | 0 | 0 |
| 7787 | 7/9/2021 | 1:45:00 | 42.65 | 121.74 | 121.76 | 121.76 | 2 | 43.408 | 315.521 | 25.885 | 0 | 316.593 | 0 | 0 | 0 | 0 | 0 |
| 7788 | 7/9/2021 | 1:30:00 | 42.45 | 121.655 | 121.675 | 121.675 | 2 | 43.365 | 315.956 | 25.481 | 0 | 316.995 | 0 | 0 | 0 | 0 | 0 |
| 7789 | 7/9/2021 | 1:15:01 | 42.45 | 121.58 | 121.6 | 121.6 | 2 | 43.966 | 319.954 | 25.528 | 0 | 320.978 | 0 | 0 | 0 | 0 | 0 |
| 7790 | 7/9/2021 | 1:00:00 | 46.2 | 121.835 | 121.86 | 121.86 | 2 | 45.205 | 330.213 | 27.144 | 0 | 331.341 | 0 | 0 | 0 | 0 | 0 |
| 7791 | 7/9/2021 | 0:45:00 | 47.2 | 122.415 | 122.45 | 122.45 | 2 | 46.645 | 341.445 | 32.046 | 0 | 342.959 | 0 | 0 | 0 | 0 | 0 |
| 7792 | 7/9/2021 | 0:30:00 | 47.55 | 122.675 | 122.705 | 122.705 | 3 | 48.308 | 353.371 | 34.346 | 0 | 355.047 | 0 | 0 | 0 | 0 | 0 |
| 7793 | 7/9/2021 | 0:15:00 | 45.25 | 122.32 | 122.345 | 122.345 | 3 | 45.901 | 334.968 | 31.662 | 0 | 336.482 | 0 | 0 | 0 | 0 | 0 |
| 7794 | 7/9/2021 | 0:00:00 | 53.15 | 121.935 | 121.965 | 121.965 | 3 | 48.22 | 352.536 | 35.715 | 0 | 354.354 | 0 | 0 | 0 | 0 | 0 |

SEL-2431 Date:09/29/21 Time: 4:24:05
Bench Lake Volta ge Reg C

| # | DATE | TIME | IL | VSSEC | VLSEC | VCMPSEC | TAP_POS | ILFDEM | PFDEM | QFODEM | QFIDEM | SFDEM | ILRDEM | PRDEM | QRODEM | QRIDEM | SRDEM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7699 | 7/9/2021 | 23:45:01 | 46.3 | 121.925 | 121.94 | 121.94 | 1 | 46.966 | 343.645 | 22.703 | 0 | 344.434 | 0 | 0 | 0 | 0 | 0 |
| 7700 | 7/9/2021 | 23:30:01 | 49.65 | 122.14 | 122.155 | 122.155 | 2 | 49.6 | 363.32 | 28.687 | 0 | 364.467 | 0 | 0 | 0 | 0 | 0 |
| 7701 | 7/9/2021 | 23:15:00 | 48.3 | 122.65 | 122.665 | 122.665 | 3 | 50.736 | 372.199 | 29.122 | 0 | 373.357 | 0 | 0 | 0 | 0 | 0 |
| 7702 | 7/9/2021 | 23:00:00 | 52.1 | 121.79 | 121.8 | 121.8 | 3 | 52.2 | 381.13 | 33.174 | 0 | 382.608 | 0 | 0 | 0 | 0 | 0 |
| 7703 | 7/9/2021 | 22:45:00 | 55.05 | 121.54 | 121.555 | 121.555 | 3 | 53.684 | 390.458 | 35.946 | 0 | 392.163 | 0 | 0 | 0 | 0 | 0 |
| 7704 | 7/9/2021 | 22:30:01 | 57 | 122.32 | 122.335 | 122.335 | 3 | 55.312 | 404.269 | 41.787 | 0 | 406.445 | 0 | 0 | 0 | 0 | 0 |
| 7705 | 7/9/2021 | 22:15:00 | 52.7 | 122.455 | 122.47 | 122.47 | 3 | 54.793 | 401.136 | 36.645 | 0 | 402.819 | 0 | 0 | 0 | 0 | 0 |
| 7706 | 7/9/2021 | 22:00:00 | 58.1 | 122.46 | 122.475 | 122.475 | 4 | 58.731 | 427.968 | 40.525 | 0 | 429.898 | 0 | 0 | 0 | 0 | 0 |
| 7707 | 7/9/2021 | 21:45:01 | 57.85 | 121.225 | 121.24 | 121.24 | 3 | 57.867 | 421.261 | 38.885 | 0 | 423.089 | 0 | 0 | 0 | 0 | 0 |
| 7708 | 7/9/2021 | 21:30:01 | 57.15 | 122.74 | 122.755 | 122.755 | 4 | 62.018 | 452.489 | 50.747 | 0 | 455.35 | 0 | 0 | 0 | 0 | 0 |
| 7709 | 7/9/2021 | 21:15:01 | 63.3 | 121.505 | 121.515 | 121.515 | 4 | 63.214 | 458.313 | 47.975 | 0 | 460.827 | 0 | 0 | 0 | 0 | 0 |
| 7710 | 7/9/2021 | 21:00:00 | 64 | 122.635 | 122.65 | 122.65 | 5 | 62.144 | 452.185 | 47.72 | 0 | 454.736 | 0 | 0 | 0 | 0 | 0 |
| 7711 | 7/9/2021 | 20:45:00 | 61.85 | 122.695 | 122.71 | 122.71 | 4 | 65.029 | 475.374 | 51.487 | 0 | 478.221 | 0 | 0 | 0 | 0 | 0 |
| 7712 | 7/9/2021 | 20:30:00 | 66.5 | 122.46 | 122.48 | 122.48 | 5 | 66.95 | 487.984 | 55.798 | 0 | 491.172 | 0 | 0 | 0 | 0 | 0 |
| 7713 | 7/9/2021 | 20:15:00 | 72.05 | 121.415 | 121.425 | 121.425 | 5 | 70.734 | 512.856 | 62.062 | 0 | 516.607 | 0 | 0 | 0 | 0 | 0 |
| 7714 | 7/9/2021 | 20:00:00 | 67.75 | 121.95 | 121.965 | 121.965 | 5 | 70.474 | 510.632 | 59.952 | 0 | 514.161 | 0 | 0 | 0 | 0 | 0 |
| 7715 | 7/9/2021 | 19:45:01 | 74.4 | 121.12 | 121.14 | 121.14 | 5 | 75.821 | 548.217 | 70.238 | 0 | 552.713 | 0 | 0 | 0 | 0 | 0 |
| 7716 | 7/9/2021 | 19:30:00 | 75.35 | 121.78 | 121.795 | 121.795 | 5 | 75.556 | 547.509 | 65.801 | 0 | 551.463 | 0 | 0 | 0 | 0 | 0 |
| 7717 | 7/9/2021 | 19:15:00 | 80.1 | 121.555 | 121.57 | 121.57 | 5 | 78.497 | 567.764 | 74.301 | 0 | 572.636 | 0 | 0 | 0 | 0 | 0 |
| 7718 | 7/9/2021 | 19:00:01 | 76.5 | 121.965 | 121.98 | 121.98 | 5 | 83.019 | 599.817 | 84.329 | 0 | 605.73 | 0 | 0 | 0 | 0 | 0 |
| 7719 | 7/9/2021 | 18:45:01 | 72.5 | 122.76 | 122.78 | 122.78 | 6 | 78.991 | 575.32 | 80.673 | 0 | 580.96 | 0 | 0 | 0 | 0 | 0 |
| 7720 | 7/9/2021 | 18:30:00 | 84.2 | 122.25 | 122.265 | 122.265 | 7 | 81.674 | 594.463 | 84.757 | 0 | 600.48 | 0 | 0 | 0 | 0 | 0 |
| 7721 | 7/9/2021 | 18:15:00 | 85.8 | 122.685 | 122.7 | 122.7 | 8 | 85.363 | 620.785 | 91.636 | 0 | 627.521 | 0 | 0 | 0 | 0 | 0 |
| 7722 | 7/9/2021 | 18:00:01 | 82.35 | 122.59 | 122.605 | 122.605 | 8 | 81.27 | 590.905 | 85.345 | 0 | 597.052 | 0 | 0 | 0 | 0 | 0 |
| 7723 | 7/9/2021 | 17:45:01 | 85.45 | 121.6 | 121.615 | 121.615 | 8 | 80.747 | 584.664 | 81.752 | 0 | 590.362 | 0 | 0 | 0 | 0 | 0 |
| 7724 | 7/9/2021 | 17:30:00 | 78.2 | 121.935 | 121.945 | 121.945 | 8 | 77.025 | 559.908 | 74.335 | 0 | 564.832 | 0 | 0 | 0 | 0 | 0 |
| 7725 | 7/9/2021 | 17:15:01 | 80.75 | 122.01 | 122.025 | 122.025 | 9 | 76.755 | 557.735 | 75.868 | 0 | 562.879 | 0 | 0 | 0 | 0 | 0 |
| 7726 | 7/9/2021 | 17:00:00 | 79.4 | 122.1 | 122.115 | 122.115 | 9 | 81.662 | 590.52 | 81.085 | 0 | 596.083 | 0 | 0 | 0 | 0 | 0 |
| 7727 | 7/9/2021 | 16:45:01 | 75.1 | 123.24 | 123.255 | 123.255 | 9 | 82.451 | 597.924 | 83.084 | 0 | 603.674 | 0 | 0 | 0 | 0 | 0 |
| 7728 | 7/9/2021 | 16:30:01 | 91.8 | 121.465 | 121.48 | 121.48 | 9 | 84.499 | 611.895 | 86.681 | 0 | 618.017 | 0 | 0 | 0 | 0 | 0 |
| 7729 | 7/9/2021 | 16:15:01 | 77.85 | 122.48 | 122.495 | 122.495 | 9 | 81.186 | 589.48 | 89.242 | 0 | 596.209 | 0 | 0 | 0 | 0 | 0 |
| 7730 | 7/9/2021 | 16:00:01 | 80.8 | 122.28 | 122.295 | 122.295 | 9 | 79.397 | 575.17 | 90.218 | 0 | 582.21 | 0 | 0 | 0 | 0 | 0 |
| 7731 | 7/9/2021 | 15:45:01 | 71.35 | 122.44 | 122.45 | 122.45 | 9 | 77.456 | 560.304 | 86.887 | 0 | 567.014 | 0 | 0 | 0 | 0 | 0 |
| 7732 | 7/9/2021 | 15:30:01 | 76.5 | 122.105 | 122.125 | 122.125 | 9 | 76.822 | 555.39 | 84.186 | 0 | 561.747 | 0 | 0 | 0 | 0 | 0 |
| 7733 | 7/9/2021 | 15:15:00 | 82.75 | 121.105 | 121.12 | 121.12 | 9 | 79.193 | 570.805 | 87.547 | 0 | 577.502 | 0 | 0 | 0 | 0 | 0 |
| 7734 | 7/9/2021 | 15:00:01 | 69.4 | 122.75 | 122.76 | 122.76 | 9 | 71.511 | 517.952 | 80.071 | 0 | 524.113 | 0 | 0 | 0 | 0 | 0 |
| 7735 | 7/9/2021 | 14:45:01 | 74.75 | 122.535 | 122.55 | 122.55 | 9 | 70.866 | 515.114 | 78.545 | 0 | 521.083 | 0 | 0 | 0 | 0 | 0 |
| 7736 | 7/9/2021 | 14:30:01 | 75.1 | 121.67 | 121.685 | 121.685 | 10 | 73.267 | 530.386 | 86.608 | 0 | 537.42 | 0 | 0 | 0 | 0 | 0 |
| 7737 | 7/9/2021 | 14:15:01 | 71.85 | 122.225 | 122.235 | 122.235 | 10 | 69.745 | 505.355 | 77.239 | 0 | 511.233 | 0 | 0 | 0 | 0 | 0 |
| 7738 | 7/9/2021 | 14:00:00 | 66.35 | 122.01 | 122.025 | 122.025 | 10 | 69.357 | 499.933 | 77.571 | 0 | 505.925 | 0 | 0 | 0 | 0 | 0 |
| 7739 | 7/9/2021 | 13:45:00 | 68.55 | 121.6 | 121.61 | 121.61 | 9 | 65.988 | 477.117 | 69.963 | 0 | 482.231 | 0 | 0 | 0 | 0 | 0 |
| 7740 | 7/9/2021 | 13:30:00 | 73.05 | 121.875 | 121.885 | 121.885 | 9 | 70.287 | 508.043 | 78.801 | 0 | 514.145 | 0 | 0 | 0 | 0 | 0 |
| 7741 | 7/9/2021 | 13:15:00 | 67 | 121.325 | 121.34 | 121.34 | 9 | 67.112 | 484.398 | 68.539 | 0 | 489.238 | 0 | 0 | 0 | 0 | 0 |
| 7742 | 7/9/2021 | 13:00:00 | 65.1 | 122.075 | 122.09 | 122.09 | 9 | 63.55 | 459.094 | 68.152 | 0 | 464.161 | 0 | 0 | 0 | 0 | 0 |
| 7743 | 7/9/2021 | 12:45:01 | 65.7 | 121.435 | 121.45 | 121.45 | 8 | 65.44 | 470.716 | 78.296 | 0 | 477.351 | 0 | 0 | 0 | 0 | 0 |
| 7744 | 7/9/2021 | 12:30:00 | 68.55 | 121.175 | 121.19 | 121.19 | 8 | 64.125 | 456.932 | 102.735 | 0 | 468.352 | 0 | 0 | 0 | 0 | 0 |
| 7745 | 7/9/2021 | 12:15:00 | 57.6 | 121.815 | 121.83 | 121.83 | 8 | 61.197 | 435.492 | 99.943 | 0 | 446.823 | 0 | 0 | 0 | 0 | 0 |
| 7746 | 7/9/2021 | 12:00:00 | 60.5 | 121.96 | 121.97 | 121.97 | 8 | 64.925 | 461.123 | 108.95 | 0 | 473.848 | 0 | 0 | 0 | 0 | 0 |
| 7747 | 7/9/2021 | 11:45:01 | 67.3 | 121.56 | 121.575 | 121.575 | 8 | 65.316 | 463.38 | 112.15 | 0 | 476.8 | 0 | 0 | 0 | 0 | 0 |
| 7748 | 7/9/2021 | 11:30:00 | 65.3 | 122.105 | 122.12 | 122.12 | 8 | 63.028 | 449.038 | 100.878 | 0 | 460.237 | 0 | 0 | 0 | 0 | 0 |
| 7749 | 7/9/2021 | 11:15:01 | 63.6 | 121.55 | 121.565 | 121.565 | 7 | 65.016 | 462.576 | 106.041 | 0 | 474.582 | 0 | 0 | 0 | 0 | 0 |
| 7750 | 7/9/2021 | 11:00:01 | 56.95 | 121.9 | 121.915 | 121.915 | 7 | 56.645 | 402.267 | 93.804 | 0 | 413.076 | 0 | 0 | 0 | 0 | 0 |
| 7751 | 7/9/2021 | 10:45:01 | 62.75 | 121.375 | 121.39 | 121.39 | 7 | 57.507 | 409.27 | 96.488 | 0 | 420.513 | 0 | 0 | 0 | 0 | 0 |
| 7752 | 7/9/2021 | 10:30:01 | 61.6 | 121.375 | 121.385 | 121.385 | 7 | 58.877 | 418.984 | 99.447 | 0 | 430.639 | 0 | 0 | 0 | 0 | 0 |
| 7753 | 7/9/2021 | 10:15:00 | 55.1 | 122.145 | 122.16 | 122.16 | 7 | 59.176 | 421.035 | 97.508 | 0 | 432.205 | 0 | 0 | 0 | 0 | 0 |
| 7754 | 7/9/2021 | 10:00:01 | 62.25 | 121.215 | 121.23 | 121.23 | 7 | 59.729 | 423.737 | 97.667 | 0 | 434.872 | 0 | 0 | 0 | 0 | 0 |
| 7755 | 7/9/2021 | 9:45:00 | 60.65 | 120.86 | 120.88 | 120.88 | 5 | 55.754 | 397.147 | 91.017 | 0 | 407.459 | 0 | 0 | 0 | 0 | 0 |
| 7756 | 7/9/2021 | 9:30:00 | 53.65 | 122.035 | 122.05 | 122.05 | 5 | 55.914 | 398.456 | 94.752 | 0 | 409.585 | 0 | 0 | 0 | 0 | 0 |
| 7757 | 7/9/2021 | 9:15:01 | 56.2 | 122.545 | 122.56 | 122.56 | 6 | 53.982 | 385.326 | 89.265 | 0 | 395.576 | 0 | 0 | 0 | 0 | 0 |
| 7758 | 7/9/2021 | 9:00:01 | 53.35 | 121.715 | 121.725 | 121.725 | 6 | 52.995 | 378.248 | 79.261 | 0 | 386.475 | 0 | 0 | 0 | 0 | 0 |
| 7759 | 7/9/2021 | 8:45:00 | 52.4 | 121.35 | 121.365 | 121.365 | 5 | 52.628 | 374.35 | 82.847 | 0 | 383.421 | 0 | 0 | 0 | 0 | 0 |
| 7760 | 7/9/2021 | 8:30:00 | 50.45 | 121.78 | 121.795 | 121.795 | 5 | 48.695 | 349.177 | 75.964 | 0 | 357.359 | 0 | 0 | 0 | 0 | 0 |
| 7761 | 7/9/2021 | 8:15:01 | 48.55 | 121.46 | 121.47 | 121.47 | 5 | 48.722 | 348.405 | 73.103 | 0 | 356.014 | 0 | 0 | 0 | 0 | 0 |
| 7762 | 7/9/2021 | 8:00:01 | 49.3 | 121.705 | 121.72 | 121.72 | 5 | 51.259 | 364.989 | 78.517 | 0 | 373.373 | 0 | 0 | 0 | 0 | 0 |
| 7763 | 7/9/2021 | 7:45:00 | 50.1 | 121.495 | 121.51 | 121.51 | 4 | 49.959 | 357.617 | 71.37 | 0 | 364.695 | 0 | 0 | 0 | 0 | 0 |
| 7764 | 7/9/2021 | 7:30:00 | 48.3 | 122.55 | 122.565 | 122.565 | 4 | 48.149 | 347.036 | 68.01 | 0 | 353.665 | 0 | 0 | 0 | 0 | 0 |
| 7765 | 7/9/2021 | 7:15:00 | 47.9 | 121.85 | 121.86 | 121.86 | 4 | 46.833 | 335.084 | 63.935 | 0 | 341.147 | 0 | 0 | 0 | 0 | 0 |
| 7766 | 7/9/2021 | 7:00:00 | 50.45 | 121.425 | 121.435 | 121.435 | 3 | 43.814 | 313.557 | 56.592 | 0 | 318.643 | 0 | 0 | 0 | 0 | 0 |
| 7767 | 7/9/2021 | 6:45:00 | 41.25 | 121.635 | 121.645 | 121.645 | 2 | 41.18 | 296.185 | 53.053 | 0 | 300.92 | 0 | 0 | 0 | 0 | 0 |
| 7768 | 7/9/2021 | 6:30:00 | 38.4 | 122.14 | 122.155 | 122.155 | 2 | 39.962 | 288.506 | 46.65 | 0 | 292.286 | 0 | 0 | 0 | 0 | 0 |
| 7769 | 7/9/2021 | 6:15:01 | 42.1 | 121.1 | 121.115 | 121.115 | 1 | 41.073 | 296.075 | 45.863 | 0 | 299.631 | 0 | 0 | 0 | 0 | 0 |
| 7770 | 7/9/2021 | 6:00:00 | 44.45 | 121.505 | 121.51 | 121.51 | 1 | 39.185 | 281.707 | 46.374 | 0 | 285.528 | 0 | 0 | 0 | 0 | 0 |
| 7771 | 7/9/2021 | 5:45:01 | 39.4 | 121.535 | 121.55 | 121.55 | 0 | 40.017 | 288.565 | 42.423 | 0.001 | 291.692 | 0 | 0 | 0 | 0 | 0 |
| 7772 | 7/9/2021 | 5:30:00 | 39.7 | 121.575 | 121.585 | 121.585 | 0 | 37.963 | 275.024 | 34.636 | 0.006 | 277.217 | 0 | 0 | 0 | 0 | 0 |
| 7773 | 7/9/2021 | 5:15:00 | 38.6 | 121.705 | 121.72 | 121.72 | 0 | 38.465 | 278.851 | 33.4 | 0.061 | 280.88 | 0 | 0 | 0 | 0 | 0 |
| 7774 | 7/9/2021 | 5:00:01 | 39.05 | 121.78 | 121.79 | 121.79 | 0 | 39.395 | 285.93 | 33.027 | 0.606 | 288.015 | 0 | 0 | 0 | 0 | 0 |
| 7775 | 7/9/2021 | 4:45:01 | 38.55 | 121.81 | 121.82 | 121.82 | 0 | 35.779 | 262.292 | 6.797 | 6.073 | 262.903 | 0 | 0 | 0 | 0 | 0 |
| 7776 | 7/9/2021 | 4:30:00 | 39 | 122.34 | 122.355 | 122.355 | 0 | 37.77 | 278.082 | 0.568 | 3.267 | 278.134 | 0 | 0 | 0 | 0 | 0 |
| 7777 | 7/9/2021 | 4:15:01 | 36.05 | 122.865 | 122.875 | 122.875 | 1 | 34.904 | 256.836 | 0.057 | 10.569 | 257.084 | 0 | 0 | 0 | 0 | 0 |
| 7778 | 7/9/2021 | 4:00:01 | 33.4 | 122.395 | 122.41 | 122.41 | 1 | 33.393 | 245.095 | 0.242 | 9.613 | 245.345 | 0 | 0 | 0 | 0 | 0 |
| 7779 | 7/9/2021 | 3:45:01 | 36.5 | 122.24 | 122.25 | 122.25 | 1 | 36.47 | 267.893 | 2.1 | 1.99 | 267.944 | 0 | 0 | 0 | 0 | 0 |
| 7780 | 7/9/2021 | 3:30:01 | 35 | 122.375 | 122.39 | 122.39 | 1 | 35.777 | 262.319 | 5.415 | 1.427 | 262.471 | 0 | 0 | 0 | 0 | 0 |
| 7781 | 7/9/2021 | 3:15:01 | 40.55 | 122.17 | 122.18 | 122.18 | 1 | 41.063 | 300.163 | 17.38 | 0.007 | 300.705 | 0 | 0 | 0 | 0 | 0 |
| 7782 | 7/9/2021 | 3:00:00 | 37.1 | 122.455 | 122.475 | 122.475 | 1 | 37.702 | 276.71 | 8.447 | 0.071 | 276.883 | 0 | 0 | 0 | 0 | 0 |
| 7783 | 7/9/2021 | 2:45:01 | 37.8 | 122.365 | 122.375 | 122.375 | 1 | 38.65 | 283.338 | 4.993 | 0.037 | 283.4 | 0 | 0 | 0 | 0 | 0 |
| 7784 | 7/9/2021 | 2:30:01 | 41.65 | 122.635 | 122.655 | 122.655 | 1 | 40.931 | 300.804 | 7.791 | 0.001 | 300.919 | 0 | 0 | 0 | 0 | 0 |
| 7785 | 7/9/2021 | 2:15:01 | 38.05 | 122.4 | 122.41 | 122.41 | 1 | 39.64 | 291.272 | 4.912 | 0.012 | 291.351 | 0 | 0 | 0 | 0 | 0 |
| 7786 | 7/9/2021 | 2:00:01 | 41.6 | 122.46 | 122.475 | 122.475 | 1 | 42.756 | 313.104 | 16.756 | 0 | 313.59 | 0 | 0 | 0 | 0 | 0 |
| 7787 | 7/9/2021 | 1:45:01 | 45.05 | 121.72 | 121.735 | 121.735 | 1 | 41.579 | 303.548 | 14.44 | 0 | 303.913 | 0 | 0 | 0 | 0 | 0 |
| 7788 | 7/9/2021 | 1:30:01 | 43.15 | 121.35 | 121.36 | 121.36 | 1 | 42.519 | 309.131 | 15.735 | 0 | 309.573 | 0 | 0 | 0 | 0 | 0 |
| 7789 | 7/9/2021 | 1:15:01 | 40.75 | 122.08 | 122.09 | 122.09 | 0 | 40.694 | 297.028 | 9.846 | 0 | 297.225 | 0 | 0 | 0 | 0 | 0 |
| 7790 | 7/9/2021 | 1:00:00 | 42.9 | 121.355 | 121.365 | 121.365 | 0 | 41.009 | 298.579 | 10.294 | 0 | 298.789 | 0 | 0 | 0 | 0 | 0 |
| 7791 | 7/9/2021 | 0:45:00 | 43.75 | 121.21 | 121.225 | 121.225 | 0 | 42.908 | 312.866 | 14.717 | 0 | 313.232 | 0 | 0 | 0 | 0 | 0 |
| 7792 | 7/9/2021 | 0:30:01 | 42.05 | 122.11 | 122.12 | 122.12 | 0 | 43.097 | 314.969 | 16.78 | 0 | 315.437 | 0 | 0 | 0 | 0 | 0 |
| 7793 | 7/9/2021 | 0:15:01 | 41.7 | 121.475 | 121.485 | 121.485 | 0 | 42.48 | 309.936 | 13.89 | 0 | 310.266 | 0 | 0 | 0 | 0 | 0 |
| 7794 | 7/9/2021 | 0:00:00 | 41.75 | 122.72 | 122.73 | 122.73 | 1 | 43.68 | 320.09 | 20.491 | 0 | 320.77 | 0 | 0 | 0 | 0 | 0 |


CLIFTON WILSON 101


CLIFTON WILSON 101

Project: CW101

# Input Report (English)

## Utilities

| Contribution From Name | Bus Name | In/Out Service | Nominal Voltage | | -------- Contribution Data -------- DutyUnits | | X/R | | PU (100 MVA Base) R PU | X PU |
|---|---|---|---|---|---|---|---|---|---|---|
| UTIL-001 | CW101 | In | 69,000 | 3P: | 900 | MVA | 9.86 | Pos: | 0.011 | 0.111 |
| | | | | SLG: | 300 | MVA | 7.00 | Zero: | 0.025 | 0.109 |

## Non-Motor Loads

| Name | Phase | In/Out Service | Bus Name | L-L Volts | Rated size | Units | PF | Type |
|---|---|---|---|---|---|---|---|---|
| LOAD-001 | ABC | In | BUS-001 | 12,470 | 297.71 | kVA | 0.92 | Lag |
| LOAD-006 | ABC | In | BUS - 008 | 12,470 | 70.05 | kVA | 0.92 | Lag |
| LOAD-016 | ABC | In | BUS - 020 | 12,470 | 201.02 | kVA | 0.92 | Lag |
| LOAD-002 | ABC | In | BUS-004 | 12,470 | 143.60 | kVA | 0.92 | Lag |
| LOAD-003 | ABC | In | BUS-005 | 12,470 | 280.19 | kVA | 0.92 | Lag |
| LOAD-004 | ABC | In | BUS - 006 | 12,470 | 246.34 | kVA | 0.92 | Lag |
| LOAD-005 | ABC | In | BUS - 007 | 12,470 | 72.97 | kVA | 0.92 | Lag |
| LOAD-008 | ABC | In | BUS - 010 | 12,470 | 26.27 | kVA | 0.92 | Lag |
| LOAD-010 | ABC | In | BUS - 013 | 12,470 | 134.01 | kVA | 0.92 | Lag |
| LOAD-009 | ABC | In | BUS - 012 | 12,470 | 213.20 | kVA | 0.92 | Lag |
| LOAD-011 | ABC | In | BUS - 014 | 12,470 | 560.41 | kVA | 0.92 | Lag |
| LOAD-012 | ABC | In | BUS - 015 | 12,470 | 36.55 | kVA | 0.92 | Lag |
| LOAD-013 | ABC | In | BUS - 016 | 12,470 | 201.02 | kVA | 0.92 | Lag |
| LOAD-014 | ABC | In | BUS - 017 | 12,470 | 158.38 | kVA | 0.92 | Lag |
| LOAD-015 | ABC | In | BUS - 018 | 12,470 | 146.19 | kVA | 0.92 | Lag |
| LOAD-007 | ABC | In | BUS - 009 | 12,470 | 671.30 | kVA | 0.92 | Lag |
| LOAD-018 | ABC | In | BUS - 021 | 12,470 | 254.62 | kVA | 0.92 | Lag |
| LOAD-019 | ABC | In | BUS - 022 | 12,470 | 254.62 | kVA | 0.92 | Lag |

## 2-Winding Transformers

| Name 1 / 3Phase | In/Out | ----------Primary & Secondary---------- | | | | | Nominal kVA | Percent Z in % | |
|---|---|---|---|---|---|---|---|---|---|
| | | Phases | Bus | Conn. | Volts | FLA | | R | jX |

| Name 1 / 3Phase | In/Out | Phases | Bus | Conn. | Volts | FLA | Nominal kVA | | Percent Z in % R | jX |
|---|---|---|---|---|---|---|---|---|---|---|
| | | ----------Primary & Secondary---------- | | | | | | | | |
| Bench Lake Regulator | In | ABC | BUS - 011 | WG | 12,470 | 162 | 3,500.0 | Pos: | 0.86 | 5.30 |
| 3Phase | | | BUS - 012 | WG | 12,470 | 162 | | Zero: | 0.86 | 5.30 |
| CW-20MW | In | ABC | CW101 | D | 69,000 | 167 | 12,000.0 | Pos: | 0.86 | 5.30 |
| 3Phase | | | BUS-001 | WG | 12,470 | 926 | | Zero: | 0.80 | 5.00 |

## Transmission Lines

| Name LibModel | In/Out Service | From Bus To Bus | Miles Phases | Num Circuits | Per Unit (100 MVA Base) G/2 pu | B/2 pu | | Per Unit (100 MVA Base) R pu | jX pu |
|---|---|---|---|---|---|---|---|---|---|
| URD-001 - 1/0 | In | BUS - 006 | 0.55 | 1 | 0.0000 | 0.0000 | Pos: | 0.001 | 0.001 |
| | | BUS - 009 | ABC | | 0.0000 | 0.0000 | Zero: | 0.0028 | 0.0008 |
| URD-002 -750 | In | BUS - 007 | 0.27 | 1 | 0.0000 | 0.0000 | Pos: | 0.027 | 0.037 |
| | | BUS - 008 | ABC | | 0.0000 | 0.0000 | Zero: | 0.0275 | 0.0371 |
| URD-003 -4/0 | In | BUS - 008 | 0.19 | 1 | 0.0000 | 0.0000 | Pos: | 0.071 | 0.031 |
| | | BUS - 009 | ABC | | 0.0000 | 0.0000 | Zero: | 0.0713 | 0.0306 |
| URD-004 - 4/0 | In | BUS - 009 | 0.24 | 1 | 0.0000 | 0.0000 | Pos: | 0.089 | 0.038 |
| | | BUS - 010 | ABC | | 0.0000 | 0.0000 | Zero: | 0.0887 | 0.0380 |
| URD-005 -750 | In | BUS - 019 | 0.59 | 1 | 0.0000 | 0.0001 | Pos: | 0.060 | 0.081 |
| | | BUS - 020 | ABC | | 0.0000 | 0.0000 | Zero: | 0.0600 | 0.0809 |
| XLN-0005 - #4 | In | BUS-005 | 0.44 | 1 | 0.0000 | 0.0000 | Pos: | 0.136 | 0.189 |
| | | BUS - 006 | ABC | | 0.0000 | 0.0000 | Zero: | 0.1358 | 0.1889 |
| XLN-001 - 336 | In | BUS-001 | 0.74 | 1 | 0.0000 | 0.0000 | Pos: | 0.146 | 0.306 |
| | | BUS-002 | ABC | | 0.0000 | 0.0000 | Zero: | 0.1457 | 0.3061 |
| XLN-002 - 336 | In | BUS-002 | 2.11 | 1 | 0.0000 | 0.0000 | Pos: | 0.416 | 0.853 |
| | | BUS-003 | ABC | | 0.0000 | 0.0000 | Zero: | 0.4162 | 0.8530 |
| XLN-003 - 336 | In | BUS-004 | 0.52 | 1 | 0.0000 | 0.0000 | Pos: | 0.103 | 0.216 |
| | | BUS-003 | ABC | | 0.0000 | 0.0000 | Zero: | 0.1027 | 0.2158 |
| XLN-004 - 366 | In | BUS-005 | 0.53 | 1 | 0.0000 | 0.0000 | Pos: | 0.104 | 0.214 |
| | | BUS-004 | ABC | | 0.0000 | 0.0000 | Zero: | 0.1044 | 0.2140 |
| XLN-006 - 336 | In | BUS-004 | 0.23 | 1 | 0.0000 | 0.0000 | Pos: | 0.046 | 0.095 |
| | | BUS - 007 | ABC | | 0.0000 | 0.0000 | Zero: | 0.0462 | 0.0948 |
| XLN-007 - 1/0 | In | BUS - 010 | 0.27 | 1 | 0.0000 | 0.0000 | Pos: | 0.170 | 0.125 |
| | | BUS - 011 | ABC | | 0.0000 | 0.0000 | Zero: | 0.1703 | 0.1254 |

| Name<br>LibModel | In/Out<br>Service | From Bus<br>To Bus | Miles<br>Phases | Num<br>Circuits | Per Unit (100 MVA Base)<br>G/2 pu | <br>B/2 pu | | Per Unit (100 MVA Base)<br>R pu | <br>jX pu |
|---|---|---|---|---|---|---|---|---|---|
| XLN-008 - 1/0 | In | BUS - 012 | 0.50 | 1 | 0.0000 | 0.0000 | Pos: | 0.311 | 0.229 |
| | | BUS - 013 | ABC | | 0.0000 | 0.0000 | Zero: | 0.3106 | 0.2287 |
| XLN-009 - 1/0 | In | BUS - 013 | 0.50 | 1 | 0.0000 | 0.0000 | Pos: | 0.311 | 0.229 |
| | | BUS - 014 | ABC | | 0.0000 | 0.0000 | Zero: | 0.3106 | 0.2287 |
| XLN-010 - #2 | In | BUS - 015 | 0.47 | 1 | 0.0000 | 0.0000 | Pos: | 0.472 | 0.227 |
| | | BUS - 014 | ABC | | 0.0000 | 0.0000 | Zero: | 0.4721 | 0.2268 |
| XLN-011 - 336 | In | BUS - 015 | 0.49 | 1 | 0.0000 | 0.0000 | Pos: | 0.097 | 0.199 |
| | | BUS - 016 | ABC | | 0.0000 | 0.0000 | Zero: | 0.0970 | 0.1987 |
| XLN-012- #2 | In | BUS - 016 | 0.42 | 1 | 0.0000 | 0.0000 | Pos: | 0.415 | 0.200 |
| | | BUS - 017 | ABC | | 0.0000 | 0.0000 | Zero: | 0.4154 | 0.1996 |
| XLN-013 - 336 | In | BUS - 014 | 0.29 | 1 | 0.0000 | 0.0000 | Pos: | 0.058 | 0.118 |
| | | BUS - 018 | ABC | | 0.0000 | 0.0000 | Zero: | 0.0578 | 0.1184 |
| XLN-014 - 336 | In | BUS - 018 | 0.48 | 1 | 0.0000 | 0.0000 | Pos: | 0.094 | 0.193 |
| | | BUS - 019 | ABC | | 0.0000 | 0.0000 | Zero: | 0.0942 | 0.1931 |
| XLN-015 - #2 | In | BUS - 021 | 0.94 | 1 | 0.0000 | 0.0000 | Pos: | 0.937 | 0.450 |
| | | BUS - 018 | ABC | | 0.0000 | 0.0000 | Zero: | 0.9366 | 0.4499 |
| XLN-016 - #2 | In | BUS - 021 | 0.93 | 1 | 0.0000 | 0.0000 | Pos: | 0.925 | 0.444 |
| | | BUS - 022 | ABC | | 0.0000 | 0.0000 | Zero: | 0.9252 | 0.4444 |

# Clifton Wilson Circuit 101 Impedance

| From | To | LENGTH Feet | Conductor Size | Z(+) Ohms/Mile R | Z(+) Ohms/Mile X | Z(0) Ohms/Mile R | Z(0) Ohms/Mile X | Z(+) pu Full Section R | Z(+) pu Full Section X | Z(0) pu Full Section R | Z(0) pu Full Section X | B mmho/Mil | Bpu Total | 1/2 Bpu Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **12.47 kV Lines** | | | | | | | | | | | | | | |
| XFMR/Bus 001 | Bus 002 | 3,900 | 336 OH Flat | 0.30660 | 0.64420 | 0.64840 | 1.58560 | 0.04854 | 0.10199 | 0.10265 | 0.25102 | 6.58600 | 0.00002 | 0.00001 |
| Bus 002 | Bus 003 | 11,160 | 366 OH | 0.30620 | 0.62760 | 0.64830 | 1.62210 | 0.13872 | 0.28432 | 0.29370 | 0.73485 | 6.67600 | 0.00007 | 0.00003 |
| Bus 003 | Bus 004 | 2,750 | 336 OH Flat | 0.30660 | 0.64420 | 0.64840 | 1.58560 | 0.03423 | 0.07191 | 0.07238 | 0.17700 | 6.58600 | 0.00002 | 0.00001 |
| Bus 004 | Bus 005 | 2,800 | 4/0 OH | 0.48480 | 0.67450 | 0.95070 | 1.76950 | 0.05510 | 0.07667 | 0.10806 | 0.20113 | 6.35600 | 0.00002 | 0.00001 |
| Bus 005 | Bus 006 | 2,300 | #2 OH | 1.55030 | 0.74470 | 2.32340 | 2.35830 | 0.14474 | 0.06953 | 0.21693 | 0.22018 | 5.73400 | 0.00001 | 0.00001 |
| Bus 006 | Bus 009 | 2,900 | 1/0 UG | 1.11400 | 0.27190 | 1.94300 | 0.34320 | 0.13114 | 0.03201 | 0.22873 | 0.04040 | 102.35000 | 0.00026 | 0.00013 |
| Bus 004 | Bus 007 | 1,240 | 336 OH | 0.30620 | 0.62760 | 0.64830 | 1.62210 | 0.01541 | 0.03159 | 0.03263 | 0.08165 | 6.67600 | 0.00001 | 0.00000 |
| Bus 007 | Bus 008 | 1,420 | 750 UG | 0.15890 | 0.21590 | 0.05280 | 0.15310 | 0.00916 | 0.01245 | 0.00304 | 0.00883 | 200.28000 | 0.00025 | 0.00013 |
| Bus 008 | Bus 009 | 1,025 | 4/0 UG | 0.57020 | 0.24440 | 1.70000 | 0.50160 | 0.02373 | 0.01017 | 0.07073 | 0.02087 | 130.41000 | 0.00012 | 0.00006 |
| Bus 009 | Bus 010 | 1,276 | 4/0 UG | 0.57020 | 0.24440 | 1.70000 | 0.50160 | 0.02953 | 0.01266 | 0.08806 | 0.02598 | 130.41000 | 0.00015 | 0.00007 |
| Bus 010 | Bench Lake Reg | 1,435 | 1/0 OH | 0.97450 | 0.71750 | 1.66250 | 2.06750 | 0.05677 | 0.04180 | 0.09684 | 0.12044 | 5.96900 | 0.00001 | 0.00000 |
| Bench Lake Reg | Bus 013 | 2,618 | 1/0 OH | 0.97450 | 0.71750 | 1.66250 | 2.06750 | 0.10356 | 0.07625 | 0.17668 | 0.21972 | 5.96900 | 0.00001 | 0.00001 |
| Bus 013 | Bus 014 | 2,618 | 1/0 OH | 0.97450 | 0.71750 | 1.66250 | 2.06750 | 0.10356 | 0.07625 | 0.17668 | 0.21972 | 5.96900 | 0.00001 | 0.00001 |
| Bus 014 | Bus 015 | 2,500 | 1/0 OH | 0.97450 | 0.71750 | 1.66250 | 2.06750 | 0.09890 | 0.07281 | 0.16872 | 0.20982 | 5.96900 | 0.00001 | 0.00001 |
| Bus 015 | Bus 016 | 2,600 | 336 OH | 0.30620 | 0.62760 | 0.64830 | 1.62210 | 0.03232 | 0.06624 | 0.06842 | 0.17120 | 6.67600 | 0.00002 | 0.00001 |
| Bus 016 | Bus 017 | 2,200 | #2 OH | 1.55030 | 0.74470 | 2.32340 | 2.35830 | 0.13845 | 0.06651 | 0.20749 | 0.21061 | 5.73400 | 0.00001 | 0.00001 |
| Bus 014 | Bus 018 | 1,549 | 336 OH | 0.30620 | 0.62760 | 0.64830 | 1.62210 | 0.01925 | 0.03946 | 0.04076 | 0.10200 | 6.67600 | 0.00001 | 0.00000 |
| Bus 018 | Bus 019 | 2,526 | 336 OH | 0.30620 | 0.62760 | 0.64830 | 1.62210 | 0.03140 | 0.06435 | 0.06648 | 0.16633 | 6.67600 | 0.00001 | 0.00001 |
| Bus 019 | Bus 020 | 3,100 | 750 UG | 0.15890 | 0.21590 | 0.05280 | 0.15310 | 0.02000 | 0.02717 | 0.00664 | 0.01927 | 200.28000 | 0.00055 | 0.00027 |
| Bus 018 | Bus 021 | 4,960 | #2 OH | 1.55030 | 0.74470 | 2.32340 | 2.35830 | 0.31214 | 0.14994 | 0.46780 | 0.47483 | 5.73400 | 0.00003 | 0.00001 |
| Bus 021 | Bus 022 | 4,900 | #2 OH | 1.55030 | 0.74470 | 2.32340 | 2.35830 | 0.30837 | 0.14813 | 0.46215 | 0.46909 | 5.73400 | 0.00002 | 0.00001 |
| New Flat Build | | | | | | | | | | | | | | |
| Bus 017 | Bus 023 | 1,750 | 336 OH Flat | 0.30660 | 0.64420 | 0.64840 | 1.58560 | 0.02178 | 0.04576 | 0.04606 | 0.11264 | 6.58600 | 0.00001 | 0.00001 |
| Bus 023 | Bus 024 | 2,600 | 336 OH Flat | 0.30660 | 0.64420 | 0.64840 | 1.58560 | 0.03236 | 0.06799 | 0.06843 | 0.16735 | 6.58600 | 0.00002 | 0.00001 |
| Bus 024 | Bus 025 | 9,230 | 336 OH Flat | 0.30660 | 0.64420 | 0.64840 | 1.58560 | 0.11488 | 0.24137 | 0.24294 | 0.59409 | 6.58600 | 0.00005 | 0.00003 |
| Bus 025 | Bus 026 | 2,100 | 336 OH Flat | 0.30660 | 0.64420 | 0.64840 | 1.58560 | 0.02614 | 0.05492 | 0.05527 | 0.13517 | 6.58600 | 0.00001 | 0.00001 |
| Bus 026 | Bus 027 | 850 | 336 OH Flat | 0.30660 | 0.64420 | 0.64840 | 1.58560 | 0.01058 | 0.02223 | 0.02237 | 0.05471 | 6.58600 | 0.00000 | 0.00000 |
| Bus 027 | Bus 028 | 1,580 | 336 OH Flat | 0.30660 | 0.64420 | 0.64840 | 1.58560 | 0.01966 | 0.04132 | 0.04159 | 0.10170 | 6.58600 | 0.00001 | 0.00000 |
| Bus 028 | Bus 029 | 3,060 | 336 OH Flat | 0.30660 | 0.64420 | 0.64840 | 1.58560 | 0.03808 | 0.08002 | 0.08054 | 0.19696 | 6.58600 | 0.00002 | 0.00001 |
| Bus 029 | Bus 030 | 2,700 | 336 OH Flat | 0.30660 | 0.64420 | 0.64840 | 1.58560 | 0.03360 | 0.07061 | 0.07107 | 0.17379 | 6.58600 | 0.00002 | 0.00001 |
| Bus 030 | Bus 031 | 750 | 336 OH Flat | 0.30660 | 0.64420 | 0.64840 | 1.58560 | 0.00933 | 0.01961 | 0.01974 | 0.04827 | 6.58600 | 0.00000 | 0.00000 |
| Bus 031 | Bus 030 | 2,580 | 336 OH Flat | 0.30660 | 0.64420 | 0.64840 | 1.58560 | 0.03211 | 0.06747 | 0.06791 | 0.16606 | 6.58600 | 0.00002 | 0.00001 |

| | Hurricane Distribution C101 – 12.47kV Overhead Impedances – FLAT Construction | | | | | | |
|---|---|---|---|---|---|---|---|
| Conductor size | Ampacity (Amps) | Z(+) Ohms/mile | | Z(0) Ohms/mile | | Xc(+) Mohm/mile | $B_{pu}$ mmho/mile |
| | | R | X | R | X | | |
| #2 ACSR | 180 | 1.5510 | 0.7621 | 2.3237 | 2.3221 | 0.1767 | 5.658 |
| 1/0 ACSR | 230 | 0.9752 | 0.7346 | 1.6627 | 2.0312 | 0.1698 | 5.889 |
| 4/0 ACSR | 340 | 0.4863 | 0.6913 | 0.9526 | 1.7335 | 0.1595 | 6.270 |
| 336 ACSR | 530 | 0.3066 | 0.6442 | 0.6484 | 1.5856 | 0.1518 | 6.586 |

| | Hurricane Distribution C101 – 12.47kV Overhead Impedances – Pole Top w/lower Cross Arm Construction | | | | | | |
|---|---|---|---|---|---|---|---|
| Conductor size | Ampacity (Amps) | Z(+) Ohms/**Mile** | | Z(0) Ohms/**Mile** | | Xc (+) Mohm/Mile | $B_{pu}$ mmho/**Mile** |
| | | R | X | R | X | | |
| #2 ACSR | 180 | 1.5503 | 0.7447 | 2.3234 | 2.3583 | 0.1744 | 5.734 |
| 1/0 ACSR | 230 | 0.9745 | 0.7175 | 1.6625 | 2.0675 | 0.1675 | 5.969 |
| 4/0 ACSR | 340 | 0.4848 | 0.6745 | 0.9507 | 1.7695 | 0.1573 | 6.356 |
| 336 ACSR | 530 | 0.3062 | 0.6276 | 0.6483 | 1.6221 | 0.1498 | 6.676 |

| | Hurricane Distribution C101 – 12.47kV Underground Impedances – Three Conductors in One non- metallic Conduit | | | | | | |
|---|---|---|---|---|---|---|---|
| Conductor size | Ampacity (Amps) | Z(+) Ohms/1000' | | Z(0) Ohms/1000' | | Xc (+) Mohm/mile | $B_{pu}$ mmho/Mile' |
| | | R | X | R | X | | |
| 1/0 Al. | 175 | 0.211 | .0515 | 0.3680 | 0.0650 | .009770 | 102.35 |
| 4/0 Al. | 231 | 0.1080 | 0.0463 | 0.322 | 0.095 | .007668 | 130.41 |
| 750 Al. MCM | 457 | 0.03010 | 0.04090 | 0.0100 | 0.029 | .004993 | 200.28 |
| | | | | | | | |

| | Hurricane Distribution C101 – 12.47kV Underground Impedances – Three Conductors in One non- metallic Conduit | | | | | | |
|---|---|---|---|---|---|---|---|
| Conductor size | Ampacity (Amps) | Z(+) Ohms/Mile' | | Z(0) Ohms/Mile' | | Xc (+) Mohm/mile | $B_{pu}$ mmho/Mile' |
| | | R | X | R | X | | |
| 1/0 Al. | 175 | 1.114 | 0.2719 | 1.943 | 0.3432 | .009770 | 102.35 |
| 4/0 Al. | 231 | 0.5702 | 0.2444 | 1.700 | 0.5016 | .007668 | 130.41 |
| 750 Al. MCM | 457 | 0.1589 | 0.2159 | 0.0528 | 0.1531 | .004993 | 200.28 |
| | | | | | | | |

The Okonite Company,
Ramsey NJ, 07446,
1 (201) 825-0300

## Impedance and Technical Data



| Cable Catalog ID | Size | Phase Arrangement | (+/-) Sequence Impedance, Multi-Point Grounding [ohms/kft] | (+/-) Sequence Impedance, 1-Point Grounding [ohms/kft] | Zero Sequence Impedance, Ground and Shield Return [ohms/kft] | Zero Sequence Impedance, Shield Return Only [ohms/kft] | Zero Sequence Impedance, Ground Return Only [ohms/kft] |
|---|---|---|---|---|---|---|---|
| | | Triplexed | 0.114+j0.044 | 0.112+j0.044 | 0.385+j0.145 | 0.449+j0.025 | 0.167+j0.759 |
| | | Cradled | 0.112+j0.041 | 0.110+j0.046 | 0.376+j0.142 | 0.440+j0.024 | 0.164+j0.738 |
| 162-23-3081 | 4/0 AWG Al | 1 OD -Horizontal | 0.113+j0.053 | 0.110+j0.048 | 0.376+j0.143 | 0.440+j0.024 | 0.164+j0.734 |
| | | 7.5 in. -Horizontal | 0.125+j0.091 | 0.110+j0.089 | 0.363+j0.150 | 0.440+j0.024 | 0.164+j0.653 |
| | | Rectangular | 0.112+j0.049 | 0.110+j0.046 | 0.376+j0.142 | 0.440+j0.024 | 0.164+j0.739 |

**Additional Information:** Capacitance = 80.5 [pF/ft] DC Resistance @ 25C = 0.084 [ohms/kft]

**Calculation Parameters:** kV=15.00, Insulation=133%, Conductor Temp.=105C, Concentric Wires 11 x 14 AWG, OD=1.300in

The Okonite Company,
Ramsey NJ, 07446,
1 (201) 825-0300

## Impedance and Technical Data



| Cable Catalog ID | Size | Phase Arrangement | (+/-) Sequence Impedance, Multi-Point Grounding [ohms/kft] | (+/-) Sequence Impedance, 1-Point Grounding [ohms/kft] | Zero Sequence Impedance, Ground and Shield Return [ohms/kft] | Zero Sequence Impedance, Shield Return Only [ohms/kft] | Zero Sequence Impedance, Ground Return Only [ohms/kft] |
|---|---|---|---|---|---|---|---|
| | | Triplexed | 0.036+j0.038 | 0.032+j0.039 | 0.127+j0.032 | 0.130+j0.019 | 0.087+j0.725 |
| | | Cradled | 0.038+j0.035 | 0.032+j0.041 | 0.124+j0.031 | 0.127+j0.018 | 0.085+j0.704 |
| 162-23-3096 | 750 kcmil Al | 1 OD -Horizontal | 0.041+j0.045 | 0.032+j0.043 | 0.124+j0.031 | 0.127+j0.018 | 0.085+j0.700 |
| | | 7.5 in. -Horizontal | 0.059+j0.061 | 0.032+j0.074 | 0.124+j0.032 | 0.127+j0.018 | 0.085+j0.638 |
| | | Rectangular | 0.038+j0.042 | 0.032+j0.041 | 0.124+j0.031 | 0.127+j0.018 | 0.085+j0.705 |

**Additional Information:** Capacitance = 136 [pF/ft] DC Resistance @ 25C = 0.024 [ohms/kft]

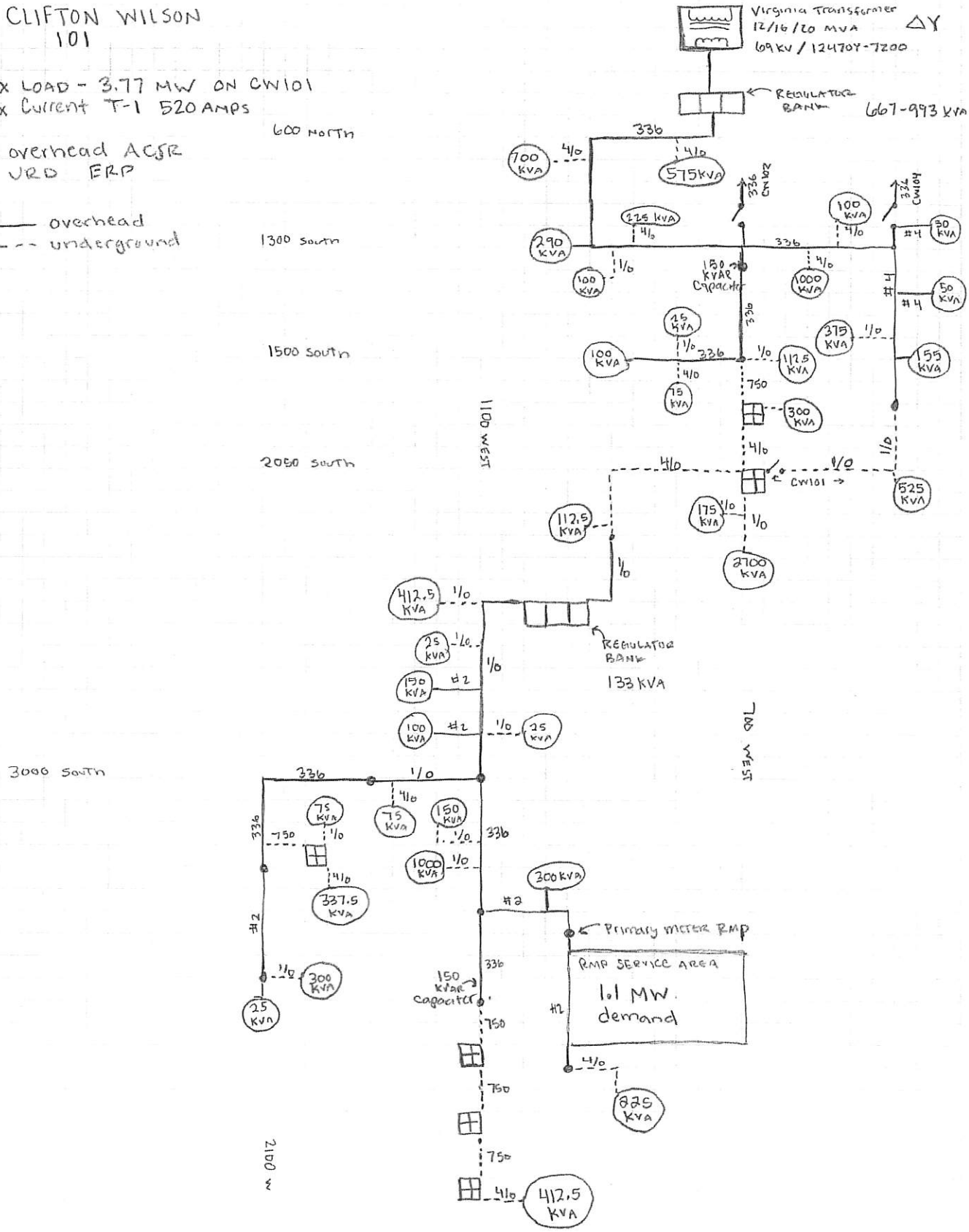
**Calculation Parameters:** kV=15.00, Insulation=133%, Conductor Temp.=105C, Concentric Wires 15 x 10 AWG, OD=1.950in

CLIFTON WILSON
101

MAX LOAD - 3.77 MW ON CW101
MAX Current T-1 520 AMPS

All overhead ACSR
All URD ERP

——— overhead
- - - - - underground



PLANNING & ZONING
HURRICANE CITY
UTAH
147 N 870 W Hurricane UT
PHONE: 435.635.2811 FAX: 435.635.2184

# PRELIMINARY PLAT APPLICATION

*For office use only: $150.00 Fee*
File No. 2022-PP-20
Receipt No. 8-160765

Name: Southern Dunes Townhomes Telephone: _____

Address: 4061 South 2420 East, St. George, UT 84790 Fax No. _____

Email: anthonyboc1@gmail.com Agent Email: bobh@bushandgudgell.com

Agent (If Applicable): Bush & Gudgell, Inc. Telephone: 435-673-2337

Address/Location of Subject Property: SE ¼ Section 29, T42S, R13W

Tax ID of Subject Property: H-3400-O and H-3400-N Zone District: R1-10

Proposed Use: (Describe, use extra sheet if necessary. Include total number of lots) _____

Submittal Requirements: The preliminary plat application shall provide the following:

____ 1. Description: In a title block located in the lower right-hand corner of the sheet the following is required:
- ____ a. The proposed name of the subdivision.
- ____ b. The location of the subdivision, including the address and section, township and range.
- ____ c. The names and addresses of the owner or subdivider, if other than the owner.
- ____ d. Date of preparation, and north point.
- ____ e. Scale shall be of sufficient size to adequately describe in legible form, all required conditions of Chapter 39, City Subdivision regulations.

____ 2. Existing Conditions: The preliminary plat shall show:
- ____ a. The location of the nearest monument.
- ____ b. The boundary of the proposed subdivision and the acreage included.
- ____ c. All property under the control of the subdivider, even though only a portion is being subdivided. (Where the plat submitted covers only a part of the subdivider's tract, a sketch of the prospective street system of the unplatted parts of the subdivider's land shall be submitted, and the street system of the part submitted shall be considered in light of existing Master Street Plan or other Commission studies.)
- ____ d. The location, width, and names/numbers of all existing streets within two hundred (200) feet of the subdivision and of all prior streets or other public ways, utility rights of way, parks and other public open spaces, within and adjacent to the tract.
- ____ e. The location of all wells and springs or seeps, proposed, active and abandoned, and of all reservoirs or ponds within the tract and at a distance of at least one hundred feet (100') beyond the tract boundaries.
- ____ f. Existing sewers, water mains, culverts, or other underground facilities within the tract, indicating the pipe sizes, grades, manholes and the exact locations.
- ____ g. Existing Hurricane Canal Company facilities; other ditches, canals, natural drainage channels and open waterways and any proposed realignments.

PLANNING & ZONING
HURRICANE CITY
UTAH
147 N 870 W Hurricane UT
PHONE: 435.635.2811 FAX: 435.635.2184

# PRELIMINARY SITE PLAN APPLICATION

*For office use only: $200.00 Fee*
File No. 2022-PSP-38
Receipt No. 8-160766

Name: Southern Dunes Townhomes Telephone: _____

Address: 4061 South 2420 East, St. George, UT 84790 Fax No. _____

Email: anthonyboc1@gmail.com Agent Email: bobh@bushandgudgell.com

Agent (If Applicable): _____ Telephone: 435-673-2337

Address/Location of Subject Property: SE ¼ Section 29, T42S, R13W

Tax ID of Subject Property: H-3400-O and H-3400-N Zone District: R1-10

Proposed Use: (Describe, use extra sheet if necessary. Include total number of lots) _____

This application shall be accompanied by the following:

____1. A vicinity map showing the general location of the project.
____2. Three (3) copies of a site plan showing:
- ____ Topography showing 2' contours, identification of 30% or greater slopes:
- ____ The layout of proposed uses.
- ____ Location of open space when applicable.
- ____ Proposed access to the property and traffic circulation patterns.
- ____ Adjoining properties and uses:
- ____ Proposed reservations for parks, playgrounds, school, and any other public facility sites, if any.

____3. Preliminary utility plan, including water, sewer, and storm drainage plans, and including access points to utilities.
____4. Tables showing the number of acres in the proposed development and a land use summary; and
____5. A phased development plan if applicable.
____6. Warranty deed or preliminary title report or other document (see attached Affidavit) showing evidence that the applicant has control of the property
____7. Signed and notarized Acknowledgment Water Supply (see attached)

NOTE: It is important that all applicable information noted above is submitted with the application. An incomplete application will not be scheduled for Planning Commission consideration. Planning Commission meetings are held on the second Thursday and the fourth Wednesday of each month at 6:00 p.m. Contact the Planning Department for the deadline date for submissions. Once your application is deemed complete, it will be put on the agenda for the next Planning Commission meeting. A deadline missed due to an incomplete application could result in a month's delay.

(Office Use Only)

Date Received: _____ Received by: _____

Date application deemed to be complete: _____ Completion determination made by: _____

PLANNING & ZONING
HURRICANE CITY
UTAH

**STAFF COMMENTS**

| | |
|---|---|
| **Agenda Date:** | **1/26//2022** |
| **Application Number:** | 2022-PP-20 2022-PSP-38 |
| **Type of Application:** | Preliminary Plat Application |
| **Action Type:** | Administrative |
| **Applicant:** | Southern Dunes Townhomes |
| **Agent:** | Bush & Gudgell, Inc |
| **Request:** | Approval of a Preliminary Plat and Site Plan |
| **Location:** | 2600 W 4200 S |
| **Zoning:** | Recreation Resort |
| **General Plan Map:** | Planned Community |

**Update 01/26/2023:** The City Council voted on Jan 19, 2023 to allow this application to reapply for preliminary plat approval. This preliminary plat was denied due to insufficient water and power in the area as well as problems with layouts and amenities. The City Council's rationale was that by the time construction drawings were completed then power will be sufficient in the area. Staff and the applicant were able to work out all the concerns with regards to layouts, water, and amenities. Staff recommends that the Planning Commission read the report below and consider the standards of the city ordinances. Staff still has outstanding concerns with utilities, namely power, throughout the region and still recommend denial of this preliminary plat.

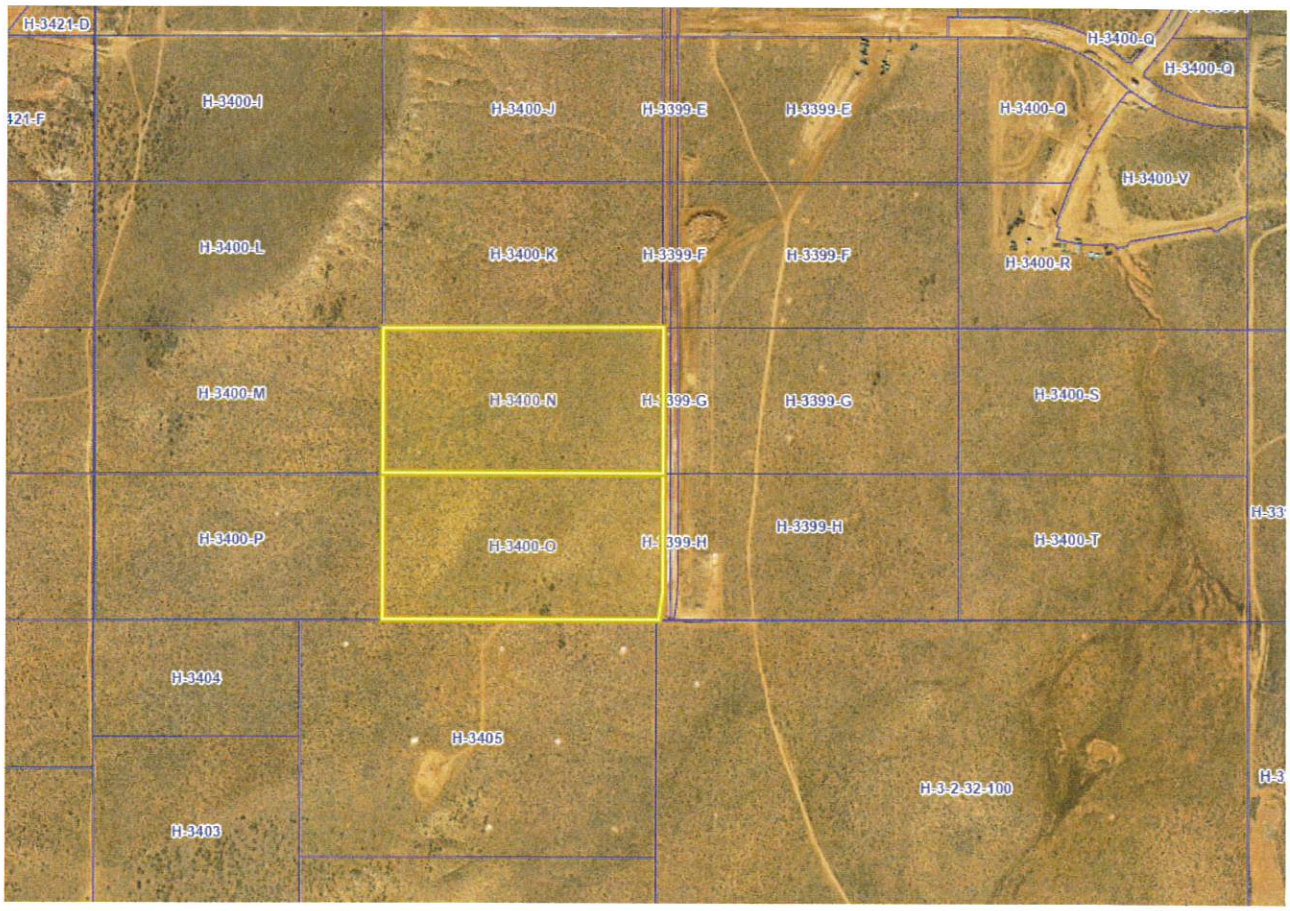
**Previous Planning Commission Recommendation**
The Planning Commission recommended denial of the application based on the limited amenities, block lengths, and limited availability of power and other utilities (see note from Power and Note 10 in the staff report). All voted in favor of the motion.

The Planning Commission's main concern about power was that they believed that there were too many factors to determine if and when power would become available. Though there is a plan the City is

working on increasing power services to the area, there are unknowns about the date of when the service will be available. The applicant has turned in a water model and believes there will be adequate water services.

Several of the Planning Commissioners stated they believed that resorts should be held to the highest standards, and if there is any question about services or compliance, that they should be tabled or denied until all concerns could be resolved.

The applicant stated at the meeting they believed they could address all the comments, with the exception of power, but wished to move forward.




**Discussion:**
The applicant has filed a preliminary plat for Southern Dunes Townhomes within the Cordero development. The applicant is proposing 345 resort townhome units for a density of about 8.63 units per acre. The Cordero development, as approved in 2020 is split into three sections with different zonings: the west side is zoned Recreation Resort (Southern Dunes), the middle section is zoned R1-10 (Southern Shores) and the east side is zoned R1-6 (Cordero). A development agreement governs this development that limits the overall unit count to 700 units across all three sections. This preliminary plat will complete the preliminary plat process for the entire development. Utilities are still scarce throughout the

region so any approval should be contingent on the developer being able to supply adequate services to the property.

**JUC Comments**
The following items will need to be addressed:

1. **Public Works:** Must dedicate and improve 2600 W. Must obtain full ROW for 2600 W and utilities.
2. **Power:** "At this time, the City's power grid is inadequate to support all of the development planned in the area south of 2700 South Street. Although the Power Department has plans to expand and enhance its system to supply adequate power to this area, those plans are subject to funding limitations, the City's acquisition of easements and rights-of-way, the availability of materials, and other limitations. Therefore, the Power Department cannot presently guarantee that it can provide power to all of the development planned in this area, which includes this proposed development."
3. **Sewer:** No comments
4. **Street:** Do these units have garages? Driveways for parking? On street parking?
5. **Water:** Water model needed. Public or private streets? Private streets require ductile iron piping
6. **Engineering:** It appears this development is located in the FH110 subbasin of the Hurricane Storm Drain Master Plan and stormwater from this development will eventually drain to the open channel along 2100 W. The drainage study for this development should elaborate on how. Avoid block lengths greater than 800' stub roadways accordingly. Verify corner lot driveways are out of sight distance triangles. 4300 S is a master-planned 84' ROW with trails on the north and south sides. 2600 W is a master-planned 77' ROW with a trail on the west side that will need to be dedicated at this time. For some reason the current ROW dedication for 2600 W shows a curve in the southeast corner of this development; the road needs to be straight through here.
7. **Fire:** Need second access and buildings to be sprinkled
8. **Cable:** Add Centurylink fiber optic notes for construction drawings
9. **Gas**: No comments.
10. **Water Conservancy:** No comments

**Staff Comments: Preliminary Site Plan and Plat**

1. Zoning is a Recreation Resort and meets the density requirements of that zone.
    a. A "concept plan" that showed this area was submitted as part of the zone change that happened in 2020, before the requirements of the Recreation Resort zone were changed. Due to the fact that this previous plan was both substantially different than what is being proposed here and was not part of an official application this will be reviewed under HCC 10-26 as amended under Ordinance No. 2021-09
2. The development is partly governed by a development agreement which capped the total number of lots at 700 for the whole area. The development agreement required preliminary plats to list the number of lots that have been approved for the full Cordero development. This table is not provided. However, this plat plus the other approved preliminary plats add up to 691 units.
3. Staff would assume that all streets and alleyways not specifically marked "public" are private. This should be made more clear on the plat.

4. **Parking:** Per HCC 10-26-6: *"Within recreational resorts, an application shall provide two parking spaces per unit or one space per bedroom, whichever is higher. Tandem parking spaces are permitted only if approved as part of the preliminary site plan by the Planning Commission."*
    a. It appears from the site plan that the townhome units will have garages and driveways such to meet this code but this should be called out
    b. RV/trailer spaces are also required at a rate of one space per five units. 69 spaces are required and approximately 130 are provided
    c. On-street parking is shown on Road F and Road G. On-street parking is allowed in Recreation Resort zoning, however the code states, "*Parking areas shall be located 50 feet away from any intersection of public roadways.*" These parking spaces do not meet this standard
    d. **Street Parking:** The applicant has proposed a few street parking spaces. These spaces are permitted with the following conditions.
        i. They need to spaced at least 50' from the intersection.
        ii. They are limited to 10 spaces for each section.
        iii. Will need to be signed off by the City Engineer.
5. **Amenities:** Per HCC 10-26-4: two clubhouses with at least 2,000 sq ft of total nonoffice space and four pools of at least 2,000 sq ft are required. The proposed site plan shows two "amenity areas" and one pool. More details are required on the proposed amenities. The Planning Commission may approve consolidated amenities if it leads to a better amenity area. A Pool, club house and on-site management will need to be in place within the first phase of development. The development amenities requirements are listed below.

**10-26-4 Development Standards**

| Number of units | Clubhouses required | Clubhouse size | Pools required | Pool size |
|---|---|---|---|---|
| 300—499 | 2 | At least 2,000 sq ft of total non office space | 4 | At least 2,000 sq ft |

    a. The applicant has requested that the Planning Commission consider approving the pool areas. The applicant is providing a total of 8,810 sq. ft. of pool area of the needed 8,000 sq. ft. They are requesting instead of providing four large pool areas, to provide one large pool area, a large hot tub area, and providing 197 units with individual hottubs instead.

b. The applicant has also included four pickleball courts in addition to the minimum requirements.
c. The applicant has provided two location for two club house locations, each 1,400 sq. ft. This is short of the minimum requirement for two at 2,000 sq. ft. total of non office space.
d. The applicant has requested alternative compliance. The Planning Commission may approve "(a)lternative compliance, such as splash pads, sports courts, and open space amenities may be considered by the Planning Commission to offset other amenities requirements." (10-26-4 Note 4)

6. **Block lengths and connectivity:**
**Update:** The applicant has provided extra connections to the adjacent properties as requested. There are still a couple of roadways internally that do not meet 800' length with full four way intersection. This map has been sent to engineering for their review.

**Previous Notes on Block Lengths:** Per Hurricane City Design Standards: "*When designing local road networks, block lengths without an intervening connector street shall not exceed eight hundred feet (800') in length unless previous approval has been obtained from the City Engineer. Cul-de-sacs are not considered an intervening connecting street.*" Several blocks do not meet this standard on one side or another.

**Update:** The applicant has provided extra connections to the adjacent properties as requested. There are still a couple of roadways internally that do not meet 800' length with full four way intersection.

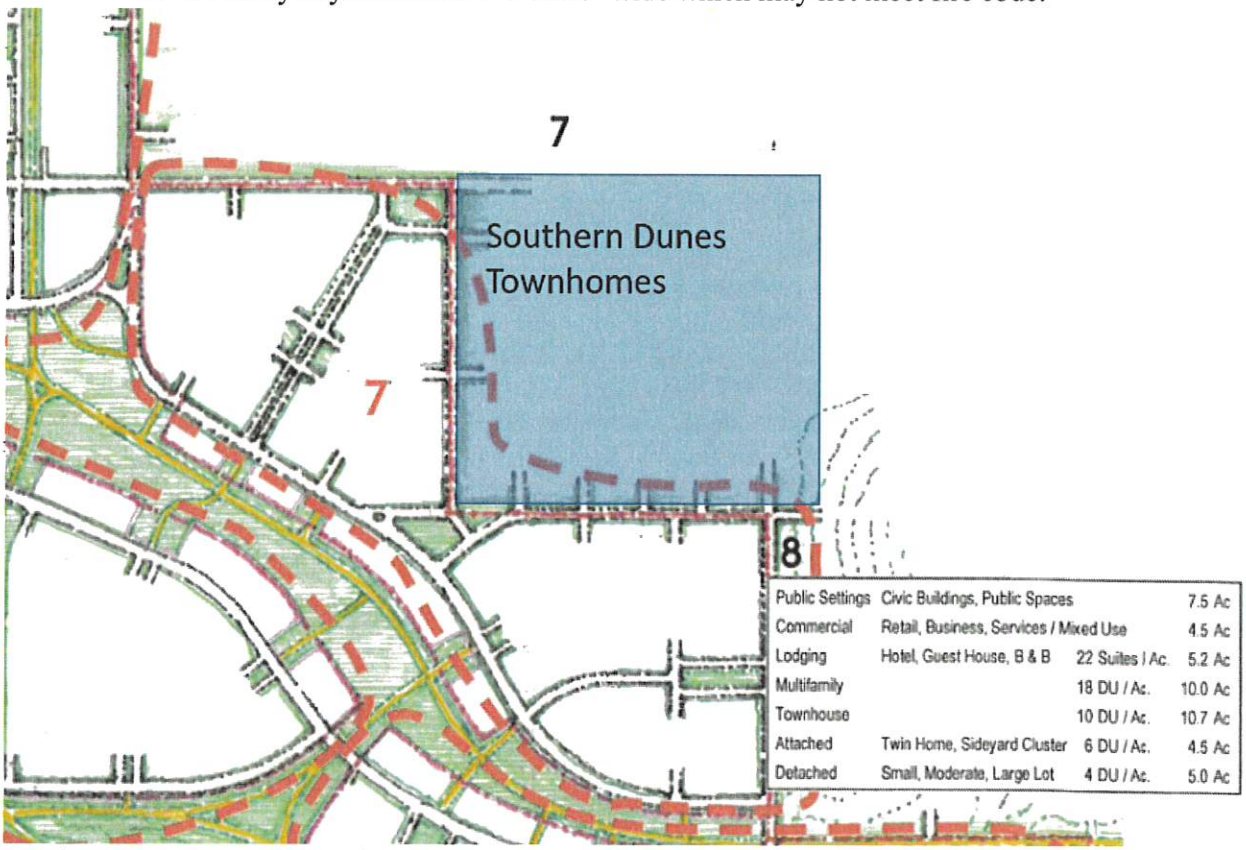
a. This site plan appears to only show alleyway access to the property to the north and limited street access to the property to the west. The Preliminary Site Plan for Sand Hollow Mesa Neighborhoods 7 and 8 shows full street access to this property at approximately the points these alleyways are shown.
b. The applicant should provide better connection to the surrounding property to
   i. Cut down on block lengths
   ii. Provide better transportation and utility connections with adjacent properties.
c. Connecting Streets: Hurricane City Code states the following for connectivity within subdivisions:

*Sec. 10-39-11. - Subdivision streets and fencing.*

*A. Relation to adjoining street systems.*
*1. The arrangements of streets in new subdivisions shall make provision for the continuation of the existing streets to adjoining areas insofar as such may be deemed necessary by the Planning Commission for public requirements. New streets within subdivisions shall not preclude future access to adjoining properties.*
*2. Standard residential streets shall approach the arterial or collector streets at an angle of not less than 80 degrees.*
*3. Except as otherwise provided elsewhere in this Code, all subdivision streets and roadways shall be constructed and installed in accordance with the City roadway construction standards.*

A couple of recommendations would be to have Road B connect all the way through the project. Have Road F make a connection to the North. Have Road D connect to the west.

d. All alleyways are shown to be 20' wide which may not meet fire code.




*Southern Dunes Townhomes location superimposed on the approved Sand Hollow Mesa site plan*

7. All park strips will need to be landscaped and have the proper improvements.
8. A will serve letter from the culinary and sanitary water providers has been provided

9. A note indicating whether or not the property is in a tortoise take area has not been provided

10. Hurricane City Code states: "Land shall be developed only where existing infrastructure is in place or will be timely provided to service proposed development" (Hurricane City Code 10-37-4). The adequacy of public facilities to support the proposed development is in question. The Power Department has stated that the City's power grid is inadequate to support all of the development planned in this area. *See* JUC comments regarding the limited capacity to supply power to this area. Also, developments adjacent to this proposed development have been unable to meet the water pressure requirements of the Fire Code, so the development nearby has been required to put sprinklers in all units to satisfy the Fire Code. Whether this proposed additional development will be able to meet the Fire Code is uncertain at this point. "A proposed development **shall not be approved** if demand for public facility will exceed adopted level of service standards unless public facility improvements, reasonably calculated to raise service levels to adopted level of service standards, will be available to serve the development." HCC 9-6-3(B) (emphasis added). "The City may require an analysis to be completed to determine whether adequate public facilities are available to service a development and whether such development will change existing levels of service or will create a demand which exceeds

acceptable levels of service for roadways, intersections, bridges, storm drainage facilities, water lines, water pressure, sewer lines, fire and emergency response times, and other similar public services." HCC 10-37-4. "The City may disapprove a proposed development if demand for public services exceeds accepted levels of service." HCC 10-37-4. The Planning Commission and City Council should carefully consider whether the infrastructure and public facilities necessary to support this proposed development satisfy the requirements of the Code as explained in this section. If not enough information is available for the Commission or Council to make a finding regarding the adequacy of public facilities, then more information or analysis should be requested from the applicant or City staff, as applicable, before acting on the application.

## LEGAL COMMENTS ON APPLICATION

**Applying the Ordinances**:

The approval or denial of a preliminary plat application is an administrative decision in which the City's ordinances are applied to the application, so the City's ordinances should dictate whether a preliminary plat application is approved or denied. There are two City ordinances that are relevant to this application: Hurricane City Code ("HCC") sections 9-6-3 and 10-37-4.

HCC section 10-37-4 states that: "Land shall be developed only where existing infrastructure is in place or will be timely provided to service proposed development. ... The City may disapprove a proposed development if demand for public services exceeds accepted levels of service. No subsequent approval of such development shall be given until either the developer or the City installs improvements calculated to raise service levels to the standard adopted by the City."

HCC section 9-6-3 states that: "Land shall be developed only where public facilities are in place or will be timely provided to serve proposed development at a level of service which meets the City's adopted level of service standards. ... A proposed development shall not be approved if demand for a public facility will exceed adopted level of service standards unless public facility improvements, reasonably calculated to raise service levels to adopted level of service standards, will be available to serve the development.

When considering an application for development in an area where City staff have found that public facilities are inadequate to serve the development at the established level of service, the question for the Planning Commission and City Council is whether the necessary public facilities "will be timely provided" to serve the development at adopted levels of service. If the City Council cannot find (determine) that the necessary public facilities "will be timely provided" to provide for the new development, then the City's ordinances require that the development be denied.

**Basis and Support for Decision**:

An approval or denial of a preliminary plat application needs to be supported by evidence in the record. City staff's recommendation of denial is based on the following evidence: (1) a report prepared by Intermountain Consumer Professional Engineers, Inc., together with the Power Department's analysis, concluding that "addition of load without improvements is not recommended as voltage will be further reduced and existing customers will experience substandard voltage levels"; (2) a Limited Distribution Capacity analysis for water service levels in the area prepared by Alpha Engineering; and (3) the uncertainty and unknown timeline as to when power and water infrastructure will be installed to raise service levels to acceptable standards. If the Planning Commission or City Council finds (determines) that the necessary public facilities "will be timely provided" to address the inadequate facilities, that finding needs to be supported by evidence in the record.

**Understanding the Process**:

After a preliminary plat is approved by the City Council, the development typically never returns to the Council for further approval. After preliminary plat approval, the next phase is the preparation of detailed construction drawings, which are reviewed and approved by members of the city's Joint Utility Committee. After construction drawings are approved and a final plat application is filed with staff, the developer is permitted to move forward with actual construction of the development. The recording of a final plat is the final step and is approved by the City Engineer, the Mayor, and the City Attorney. If a development that lacks adequate public facilities is approved at the preliminary plat stage, then it leaves members of staff to determine whether construction drawings should be approved to allow the development to begin construction. When reviewing construction drawings, members of staff are also constrained by the requirements of HCC sections 9-6-3 and 10-37-4. Therefore, it would be ideal if the City Council and staff were aligned on when development with inadequate public facilities should be permitted to proceed. If a proposed development cannot be approved pursuant to City ordinances, the City Council would be the preferred body to make that determination—instead of letting it fall to individual utility departments and staff members.

**Policy Behind the Ordinances**:

The adequacy of public facilities is a factor at every phase of development, beginning with zone change applications. A key policy driving this approach is to avoid a situation where a developer believes that a development is entitled to proceed, but the City is unable to provide the necessary services to the development without jeopardizing service to existing residents. Also, developers invest additional funds into a project at each phase of development. Therefore, the further along that the City allows development to occur without adequate public facilities, the larger the potential legal claim against the City if the developer ultimately cannot connect to the City's utility systems for lack of capacity. If the City Council determines that the necessary public facilities are not currently available but "will be timely provided" to serve the development, the City Council should only approve the preliminary plat on the condition that the owner execute a development agreement limiting the developer's rights and outlining the procedure for handling the project, all in a form approved by the City Attorney.

**Recommendation:** Staff recommends the City Council review this application based on standards with Hurricane City Code. Staff would recommend the City Council take into consideration the recommendation by the Planning Commission and items within this report. Though the applicant can likely address most comments within this report, adequate power is outside the control of the applicant. Staff would recommend the City Council discuss if they believe if "existing infrastructure is in place or will be timely provided to service proposed development". In addition, staff would not recommend the Council consider approval until they address the other issues within this report.

**Bush and Gudgell, Inc.**
Engineers • Planners • Surveyors
www.bushandgudgell.com

September 14, 20

**Southern Dunes Townhomes Hurricane, Utah JUC and Staff Comments**

**RE: Hurricane City Staff Comments**

**Discussion:**
The applicant has filed a preliminary plat for Southern Dunes Townhomes within the Cordero development. The applicant is proposing 345 resort townhome units for a density of about 8.63 units per acre. The Cordero development, as approved in 2020 is split into three sections with different zonings: the west side is zoned Recreation Resort (Southern Dunes), the middle section is zoned R1-10 (Southern Shores) and the east side is zoned R1-6 (Cordero). A development agreement governs this development that limits the overall unit count to 700 units across all three sections. This preliminary plat will complete the preliminary plat process for the entire development. Utilities are still scarce throughout the region so any approval should be contingent on the developer being able to supply adequate services to the property.

**JUC Comments**
The following items will need to be addressed:

1. **Public Works:** Must dedicate and improve 2600 W. Must obtain full ROW for 2600 W and utilities.

   **Response:** 70' ROW improvements along 2600 West matching Transportation Master Plan are part of this plan set.

2. **Power:** "At this time, the City's power grid is inadequate to support all of the development planned in the area south of 2700 South Street. Although the Power Department has plans to expand and enhance its system to supply adequate power to this area, those plans are subject to funding limitations, the City's acquisition of easements and rights-of-way, the availability of materials, and other limitations. Therefore, the Power Department cannot presently guarantee that it can provide power to all of the development planned in this area, which includes this proposed development."

   **Response:** We understand and acknowledge that power will be provided on a first come first serve basis. We also understand that a new substation is in the plans to provide power to the entire area.

3. **Sewer:** No comments

   **Response:** N/A

4. **Street:** Do these units have garages? Driveways for parking? On street parking?

205 East Tabernacle #4
St. George, UT 84770
435-673-2337

**Response:** All units have a 2 car garage with some end units having a 3 car garage. Driveways are 25' and can be used for parking. Some street parking will be available within the 52' ROW but the street parking on the 45' ROW will not be permitted.

5. **Water:** Water model needed. Public or private streets? Private streets require ductile iron piping

   **Response:** Water model is provided; all streets are Public.

6. **Engineering:** It appears this development is located in the FH110 subbasin of the Hurricane Storm Drain Master Plan and stormwater from this development will eventually drain to the open channel along 2100 W. The drainage study for this development should elaborate on how. Avoid block lengths greater than 800' stub roadways accordingly. Verify corner lot driveways are out of sight distance triangles. 4300 S is a master-planned 84' ROW with trails on the north and south sides. 2600 W is a master-planned 77' ROW with a trail on the west side that will need to be dedicated at this time. For some reason the current ROW dedication for 2600 W shows a curve in the southeast corner of this development; the road needs to be straight through here.

   **Response:** When Drainage study is finished it will demonstrate how drainage will work. Block lengths are less then 800'. Corner lots meet set back requirements. Will need to address the difference from the Transportation Master Plan that shows 70' ROW in the area.

7. **Fire:** Need second access and buildings to be sprinkled

   **Response:** A second access will be provided and all buildings will be fire sprinkled

8. **Cable:** Add Centurylink fiber optic notes for construction drawings

   **Response:** Notes will be added to CD's

9. **Gas**: No comments.

   **Response:** N/A

10. **Water Conservancy:** No comments

**Response:** N/A

**Staff Comments: Preliminary Site Plan and Plat**

1. Zoning is a Recreation Resort and meets the density requirements of that zone.
    a. A "concept plan" that showed this area was submitted as part of the zone change that happened in 2020, before the requirements of the Recreation Resort zone were changed. Due to the fact that this previous plan was both substantially different than what is being proposed here and was not part of an official application this will be reviewed under HCC 10-26 as amended under Ordinance No. 2021-09
2. The development is partly governed by a development agreement which capped the total number of lots at 700 for the whole area. The development agreement required preliminary plats to list the number of lots that have been approved for the full Cordero development. This table is not provided. However, this plat plus the other approved preliminary plats add up to 691 units.
3. Staff would assume that all streets and alleyways not specifically marked "public" are private. This should be made more clear on the plat.

    **Response:** All streets will be clearly labeled, there are no alley ways or private streets in this project.

4. **Parking:** Per HCC 10-26-6: *"Within recreational resorts, an application shall provide two parking spaces per unit or one space per bedroom, whichever is higher. Tandem parking spaces are permitted only if approved as part of the preliminary site plan by the Planning Commission."*
    a. It appears from the site plan that the townhome units will have garages and driveways such to meet this code but this should be called out
    b. RV/trailer spaces are also required at a rate of one space per five units. 69 spaces are required and approximately 130 are provided
    c. On-street parking is shown on Road F and Road G. On-street parking is allowed in Recreation Resort zoning, however the code states, "*Parking areas shall be located 50 feet away from any intersection of public roadways.*" These parking spaces do not meet this standard

    **Response:** On-street parking has been moved away from intersections.

5. **Amenities:** Per HCC 10-26-4: two clubhouses with at least 2,000 sq ft of total nonoffice space and four pools of at least 2,000 sq ft are required. The proposed site plan shows two "amenity areas" and one pool. More details are required on the proposed amenities. The Planning Commission may approve consolidated amenities if it leads to a better amenity area. A Pool, club house and on-site management will need to be inplace within the first phase a development.

**Response:** Amenities will be labeled and tallied.

6. **Block lengths and connectivity:** Per Hurricane City Design Standards: "*When designing local road networks, block lengths without an intervening connector street shall not exceed eight hundred feet (800') in length unless previous approval has been obtained from the City Engineer. Cul-de-sacs are not considered an intervening connecting street.*" Several blocks do not meet this standard on one side or another.
   a. This site plan appears to only show alleyway access to the property to the north and limited street access to the property to the west. The Preliminary Site Plan for Sand Hollow Mesa Neighborhoods 7 and 8 shows full street access to this property at approximately the points these alleyways are shown.

   **Response:** Will compare designs and make changes as needed.

   b. The applicant should provide better connection to the surrounding property to
      i. Cut down on block lengths
      ii. Provide better transportation and utility connections with adjacent properties.

      **Response:** Added street connections to north and west properties

   c. Connecting Streets: Hurricane City Code states the following for connectivity within subdivisions:

      *Sec. 10-39-11. - Subdivision streets and fencing.*

*A. Relation to adjoining street systems.*
*1. The arrangements of streets in new subdivisions shall make provision for the continuation of the existing streets to adjoining areas insofar as such may be deemed necessary by the Planning Commission for public requirements. New streets within subdivisions shall not preclude future access to adjoining properties.*
*2. Standard residential streets shall approach the arterial or collector streets at an angle of not less than 80 degrees.*
*3. Except as otherwise provided elsewhere in this Code, all subdivision streets and roadways shall be constructed and installed in accordance with the City roadway construction standards.*

An couple of recommendation would be to have Road B connect all the way through the project. Have Road F make a conection to the North. Have Road D connect to the west.

**Response:** Road F & D stubs have been added to plans with utilities extended.

All alleyways are shown to be 20' wide which may not meet fire code.

**Response:** No alley ways are proposed on this plat, 20' is the building separation.

7. All park strips will need to be landscaped and have the proper improvements.

   **Response:** Landscaping will be provided

8. A will serve letter from the culinary and sanitary water providers has been provided

   **Response:** Will serve letters have been provided

9. A note indicating whether or not the property is in a tortoise take area has not been provided

   **Response:** Property is not in tortoise take area

**Recommendation:** Staff recommends the Planning Commission review this application based on standards with Hurricane City Code. Staff would recommend continuing this application so the applicant can address staff concerns about layout and amenities.

AGEC
Applied GeoTech

July 29, 2022

RANlife Homes
9272 South 700 East
Sandy, Utah 84070

Attention: Anthony Bochino
Email: anthonyboc1@gmail.com

Subject: Geotechnical Consultation
Codero Subdivision
Hurricane, Utah
AGEC Project No. 2220977

Applied Geotechnical Engineering Consultants, Inc., (AGEC) was requested to conduct a geotechnical investigation for the proposed Codero Subdivision located in Hurricane, Utah. The study is currently in progress. We have scheduled to excavate 8 exploratory test pits across the 40-acre development. A final report will be provided upon completion of the study. The report summarizes the work to date and the conditions of the site along with conclusions to the suitability of the property for the proposed development.

**Site Conditions**

The property is located west of the Southern Shores Ski Lake Community project in south Hurricane. The property consists of undeveloped property. There is vacant property to the west, north and south.

The property slopes down to the north with approximately 30 feet of elevation change. . The property is moderately covered with small brush and grasses infilled with wind blown sand and silt.

**Geology**

AGEC has reviewed the available literature for the property including the following:

*Literature Document No. 1:* Geologic Map of the Hurricane 7.5' Quadrangle, Washington County, Utah, Map M-187, 2003, Robert F. Biek.

*Literature Document No. 2:* Geologic Hazards and adverse Construction Conditions, St. George-hurricane Metropolitan Area, Washington County, Utah, SS-127, 2008, Lund etal.

Based on the literature review the following conclusions are made:

1. There is minor amounts of wind blown or aeolian type deposits overlying the basalt with greater amounts along the south end of the site.
2. There are not faults on or near the property. The nearest fault, the Hurricane Fault is on the order of 1.9 miles to the east.
3. There is also shallow hard rock anticipated below the surface sands.

**Anticipated Subsurface Conditions**

AGEC is in the process of completing 8 test pits (explorations) as shown below. AGEC has also reviewed previous geotechnical studies in the area including:

1. Romney Study – Larger parcel that included this parcel.
2. 100 Acre Study to the south

Based on our experience and review of the property, the subsurface conditions are anticipated to consist of silty sand (wind blown) overlying caliche and/or sandstone bedrock.

Groundwater was not encountered during previous investigations, nor anticipated throughout the property.

**Proposed Construction**

The property consists of approximately 40 acres and is to be developed with single family residences. There will be public improvements throughout the property.

**Conclusions**

Based on the review of the various items noted above, the following conclusions are noted:

1. The site is suitable for the proposed development. No geologic hazards other than hard rock for excavation purposes are noted on the property.

2. The site will require cuts and fills. The on-soils and bedrock may be used as fill materials.

**Limitations**

AGEC will be providing a final report upon completion of the field exploration and the necessary laboratory testing. The information within this report may be used for review and preliminary design details.

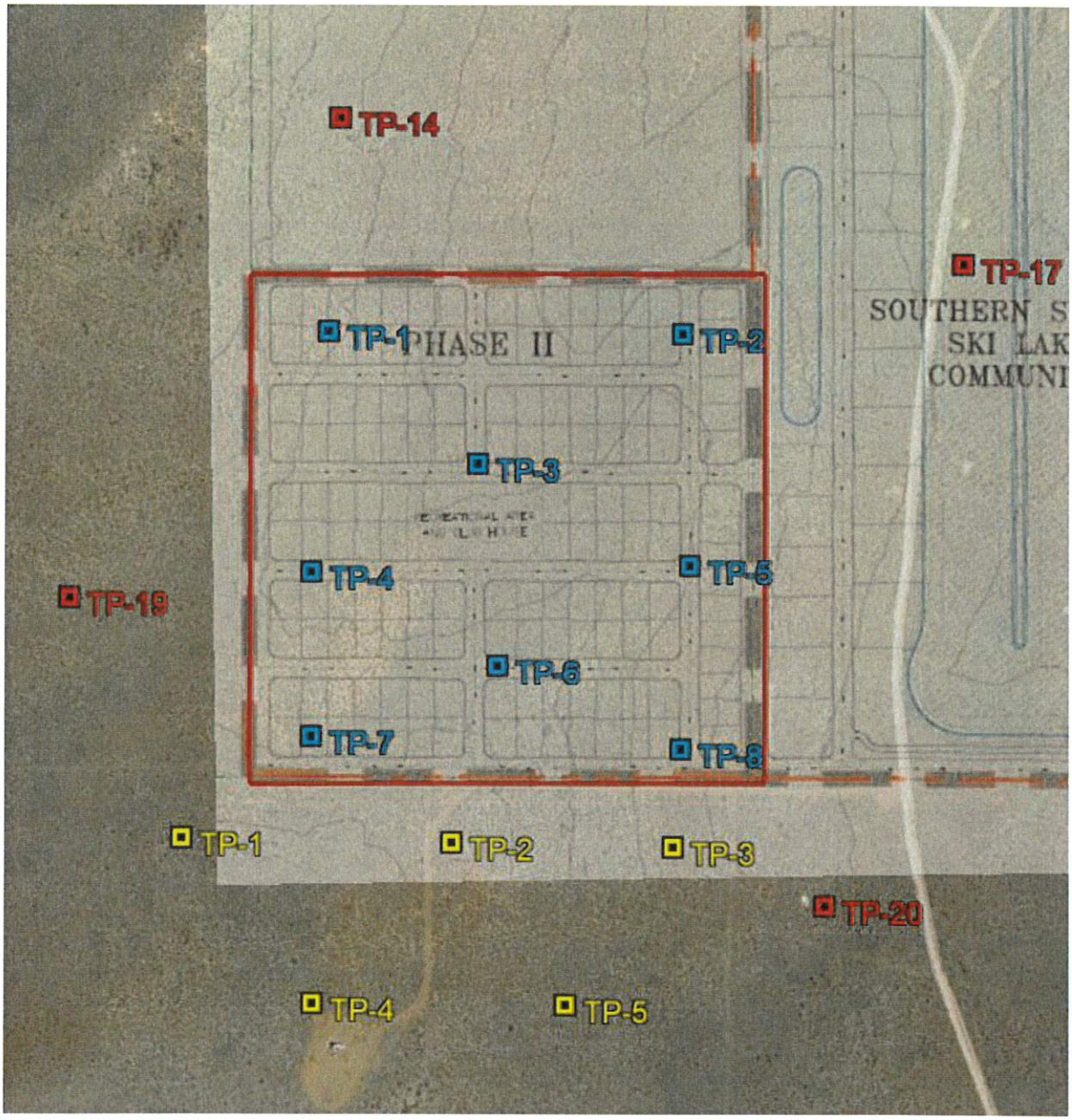
Sincerely,

APPLIED GEOTECHNICAL ENGINEERING CONSULTANTS, INC.

G. Wayne Rogers, P.E.

LICENSED PROFESSIONAL ENGINEER
7-29-22
No. 177876
G. WAYNE
ROGERS
STATE OF UTAH

P:\2022 PROJECT FILES\2220900\2220977 - GT CORDERO SUBDIVISION (40 ACRES)\GEOTECHNICAL CONSULTATION LETTER.DOCX




Yellow TP- indicates test pits from 100 Acre Study
Red TP- indicates test pits from Romney Study
Blue = test pits this study

October 7, 2021

**Addendum to Hurricane Circuit CW101 Analysis Report**

In the "Hurricane Circuit CW101 Analysis Report" it was stated:

***Load Flow Analysis***

*Circuit CW-101 was studied using real time regulator load data and through computer modeling using SKM software. Study shows that the existing circuit does not have overloading conditions but is voltage limited. It was determined that:*

1. *Areas of the existing circuit does experience voltage drop below Level of Service criteria under peak loading.*
2. *Addition of load without improvements is not recommended as voltage will be further reduced and existing customers will experience substandard voltage levels.*

*Potential short term solutions for some load addition would be:*

1. *Optimize voltage regulator bank position.*
2. *Add another in line regulator bank.*
3. *Add capacitor banks to maintain a high power factor during peak loading.*
4. *If possible, move existing load to another circuit to allow new load.*

*Additional work is needed to determine potential loading with equipment addition and or load transfer; noting the limitations of the existing Bench Lake regulators (1.9 MVA margin) and line conductors.*

Subsequent to report issuance, ICPE was requested to study potential short term solutions to maximize load addition to the southern end of the circuit. This addendum provides finding of the additional study.

As a part of the study ICPE was directed to study transferring approximately 1.5 MW from circuit CW101 to other circuits. Transferred load include loads along 600N, loads east of 700 West, and some loads off 2500 South and 700 west.

Studies included:

1. Determining possible load addition at the southern end of the circuit with only the 1.5 MW load transfers.
2. Determining possible load addition with load transfer and relocation of the Bench Lake regulators in the Northward direction.
3. Determine possible load addition with a new regulator bank and with the Bench Lake regulators.
4. Study optimizing regulator bank(s) locations.
5. Studying the effect of capacitor banks added for power factor correction.

For the studies voltage was allowed to drop to 0.97 pu at circuit end points. Studies indicate that maximum power transfer is possible with:

1. The addition of a regulator bank in the vicinity of 1300 South and 950 West (with no load between the substation and regulator bank).
2. Add a second regulator bank southward (approx. ½ mile) of the existing Bench Lake regulator bank. (The existing Bench Lake regulators would need to be removed and with a larger bank installed in the southward location)
3. Install capacitor banks as needed and in optimal locations to main a high power factor on the circuit.
4. Maintain a balanced circuit.

With improvements as indicated loading on circuit CW101 can go to approximately 4.8 MW with approximately 4.2 MW's flowing southward of 2050 south. The 4.2 MW flow represents 2.3 MW over existing loads south of the Bench Lake regulators. Under indicated loading voltage at the unregulated (source side) bus of the 1300 South regulator bank falls to 0.95 pu.

Some incremental load addition (600 kW) may be obtained by reconductoring the 1/0 circuit section between approximately 2100 South and 3000 south and with the regulator bank bench lake regulator bank upsized and located southward 1mile, verses 0.5 mile, from the existing site.

Removal of the existing Bench Lake regulator bank with a new down line replacement bank should be delayed until needed allowing to monitor load growth patterns.

It is noted that actual allowable load addition will be influenced by actual grow patterns.

For review select load flow studies and results are tabulated and results for various configurations.

*Culinary Water Distribution System Sizing & Modeling Report*

# *The Cordero Subdivision*

April 15, 2022

Prepared by: Jake Black, EIT
Reviewed by: Brant Tuttle, PE
Northern Engineering, Inc.
1040 East 800 North
Orem, Utah 84097
(801) 802-8992

# ***The Cordero Subdivision***

## 1.0 INTRODUCTION & PURPOSE:

The original Cordero Subdivision is a 200-acre residential development located at Copper Rock Parkway and 2100 West. An 80-acre parcel has been sold for the Southern Shores Ski Lake Community, which has been designed, approved, and is under construction with 56 lots. The remaining 120-acres has been divided into the east 80-acres (299 units) consisting of single-family lots zoned R1-6, and west 40-acres (345 units) which is zoned Recreational Resort and planned for vacation rentals. The total combined unit count for the 200-acres is 700 units. The purpose of this report is to demonstrate that the proposed water distribution system can meet the anticipated peak water demands that it may come subject to. The State of Utah stipulates that public water systems be sized adequately to deliver the high flows associated with the periods of peak use and for fire flow emergencies. (See applicable Utah codes R309-105, R309-510, and R309-511 along with the International Fire Code). Typically, these peak usage events occur during the hottest period of the summer, when outdoor watering is at its highest.

- The Peak Day Demand (PDD) for a system is defined as the maximum volume of water used on any given day during the year, including water used for irrigation.
- Peak Instantaneous Demand (PID) is defined as the maximum amount of water used in a single hour, in any given day, including water used for irrigation.
- The Fire Flow Demand (FFD) is the flow rate expected at any given fire hydrant within the system and is determined by the Fire Marshall in accordance with building codes.

Delivery of these peak flows are to be provided while simultaneously keeping residual pressures within the system above certain levels. Flow tests performed on the new fire hydrant located at the 2100 W and Copper Rock Parkway intersection (also known as Ex.FH3 in the water model labeling system) by City Staff, provided information on what types of pressures the model needed to meet. The fire hydrant elevation is 3338 feet. The static pressure of the hydrant was 95 psi. According to State Code, Public Water Systems are to ensure that distribution systems maintain a ***minimum*** residual system pressure of:

(a) <u>at least 40 psi</u> during a *peak day demand* condition;
(b) <u>at least 30 psi</u> during a *peak instantaneous demand* condition; and
(c) <u>at least 20 psi</u> during *fire flow conditions* **and** that this fire demand be experienced concurrently with a *peak day demand* condition.

## 1.1 WATER SYSTEM DESIGN CRITERIA:

<u>State of Utah Admin Code Section R309R-510</u> was used to calculate the Peak Day Demand for each residential lot. Both indoor use and irrigation use together was analyzed to calculate the PDD. For indoor use, Table 510-1 of State code lists a PDD of 800 gallons per day per residence. This equates to 0.556 gallons per minute. Table 510-3 lists a PDD of 4.90 gallons per minute per irrigated acre within Map Zone 6, which this project falls within. We determined this project will have an average

of 3,000 square feet of irrigation per lot which equates to 0.0689 acres. Multiplying 4.90 gallons per minute per acre by 0.0689 acres equates to 0.337 gallons per minute. Adding this to the indoor use, the total PDD equals 0.893 gallons per minute. This demand was applied to all 700 lots of the project for analysis of PDD and PDD+FFD.

For the Peak Instantaneous Demand, the Peak Day Demand is multiplied by a factor of 2. This equals 1.786 gallons per minute. This demand was applied to all 700 lots of the project for the analysis of PID.

State of Utah Admin Code Section R309R-510 was used to calculate the total storage requirement for the project. Both indoor use and irrigation use together was analyzed to calculate the total storage. For indoor use, Table 510-4 of State code lists a storage of 400 gallons per residence. Table 510-5 lists a storage of 4,964 gallons per irrigated acre within Map Zone 6, which this project falls within. We determined this project will have an average of 3,000 square feet of irrigation per lot which equates to 0.0689 acres. Multiplying 4,964 gallons per acre by 0.0689 acres equates to 342 gallons. Adding this to the indoor use storage, the total storage equals 742 gallons per residence. This storage applied to all 700 lots of the project equates to a total storage requirement of 519,400 gallons.

According to the International Code, Fire Flow demand is dependent on dwelling size. For dwellings less than 3,600 sq. ft. the Fire Flow Demand is 1,500 gpm. For dwellings less than 4,800 sq. ft. but greater than 3600 sq. ft. the Fire Flow Requirement is 1,750 gpm. For dwellings less than 6,200 sq. ft. but greater than 4,800 sq. ft. the Fire Flow Requirement is 2,000 gpm.

$$FFD = \begin{cases} 1500\ gpm, & dwelling < 3600\ ft^2 \\ 1750\ gpm, & 3600\ ft^2 < dwelling < 4800\ ft^2 \\ 2000\ gpm, & 4800\ ft^2 < dwelling < 6200\ ft^2 \end{cases}$$

It was determined that the average dwelling size for this project will be less than 3600 sq. ft. For the PDD+FFD analysis, the PDD was applied to all lots and a 1500 gallons per minute fire flow was applied to the most critical fire hydrant for the project. This fire hydrant is node labeled "FH-SW" in the model as shown in the Appendix and sits higher in elevation than all other hydrants. Applying the fire flow to this hydrant resulted in the lowest pressures as compared to applying the fire flow to all other hydrants.

- ➔ Peak Day Demand (PDD) **0.893 GPM**
- ➔ Peak Instantaneous Demand (PID) **1.786 GPM**
- ➔ Peak Day w/ Fire Flow Flows (PDD+FFD) **0.893 GPM + 1500 GPM**

## 1.2 HYDRAULIC ANALYSIS AND COMPUTER MODELING:

Hydraulic modeling software programs have been developed to aid in the analysis and design of water distribution systems and, when properly prepared, have been found to accurately simulate available flows and system pressures with a system. These analyses allow the designer to size, compare, and confirm the performance of existing or proposed infrastructure.

"EPANET 2.2", a hydraulic modeling software developed by the United States Department of Environmental Protection, was utilized for the water distribution system analysis herein described. EPANET 2.2 was developed for conducting steady-state analysis of pressure pipe networks and allows the evaluation of a variety of water demands and operating conditions within a water system. The software allows the designer to link a graphical representation of the water distribution system to a database that describes the physical characteristics of each hydraulic feature (i.e. length, diameter, and roughness coefficient for a pipeline) and the physical attributes and demand conditions at junction nodes (i.e. ground elevation, demand, etc.). In a water model, junction nodes are established at all intersections between pipes as well as other water demand locations in the system. Altogether, these water models can accurately simulate the different components of the distribution system, including the piping, points of connection, system elevations, system demands, and available pressures.

### 1.3 DISTRIBUTION SYSTEM:

The distribution system within the model was laid within the proposed public streets. All 700 lots were divided up and their water demands applied to the nearest node. Nodes representing fire hydrants were also placed throughout the system according to fire code and Hurricane City Standards.

As per Hurricane City Standards, pipes 12-inches and larger are to be constructed as ductile iron. All smaller pipes are to be constructed as PVC. The model was created to reflect this standard. A roughness coefficient of 150 was applied to all PVC pipes and 130 to all ductile iron pipes. See Appendix A for an exhibit of the subdivision showing the proposed waterline sizes and location, as well as fire hydrant locations. See Appendix A for a map of the 200 acres.

The model was calibrated to reflect the existing condition of the new fire hydrant at 2100 W and Copper Rock Parkway intersection that was tested at a static 95 psi. In order for the model to reflect the measured static pressures in hydrants, a coefficient of 134 was applied to the existing 8-inch water line in 3000 South. A static test was conducted in the model with no demands applied to the lots or hydrants to verify matching static pressures at existing hydrant.

### 1.4 SYSTEM ANALYSIS:

The goal of the model is to determine if upsizing the 8" water main in 3000 South to a 12" water main will provide sufficient flows to meet state code. The system was modeled using the following:

- Upsizing the existing 8" main in 3000 South to a 12" main from 1100 W to 2100 W.
- The new 12" main that runs down 2100 West from 3000 South to Copper Rock Parkway remains.
- The new 8" main running from 1500 West to 2100 West in approximately 2800 South remains. (across the Zarbock and Beard Property).
- The new 12" main connected to the new 8" main mentioned previous, running from 2100 West to 2600 West at approximately 2800 South and then down to 3000 South remains.

- The new 18” main in 2600 West running from 3000 South to Copper Rock Parkway remains.
- The new 12” main in Copper Rock Parkway running from 2600 West to 2100 West remains.

All new mains listed above have been approved and are under construction. The only new proposed change would be the upsizing of the existing 3000 S main from 1100 W to 2100 W. See Table 1 for model results. See Figure 1 for a map exhibit of main lines.

Table 1 – Minimum Connection Pressure Values:

| MODEL | LOWEST RESULTING PRESSURE PSI | | | MODEL RESULTS: PASS/FAIL |
|---|---|---|---|---|
| | PDD (P>40psi) | PID (P>30psi) | PDD+FFD (P>20psi) | |
| SCENARIO 1 | **56.93** | **49.12** | **29.59** | **PASS** |

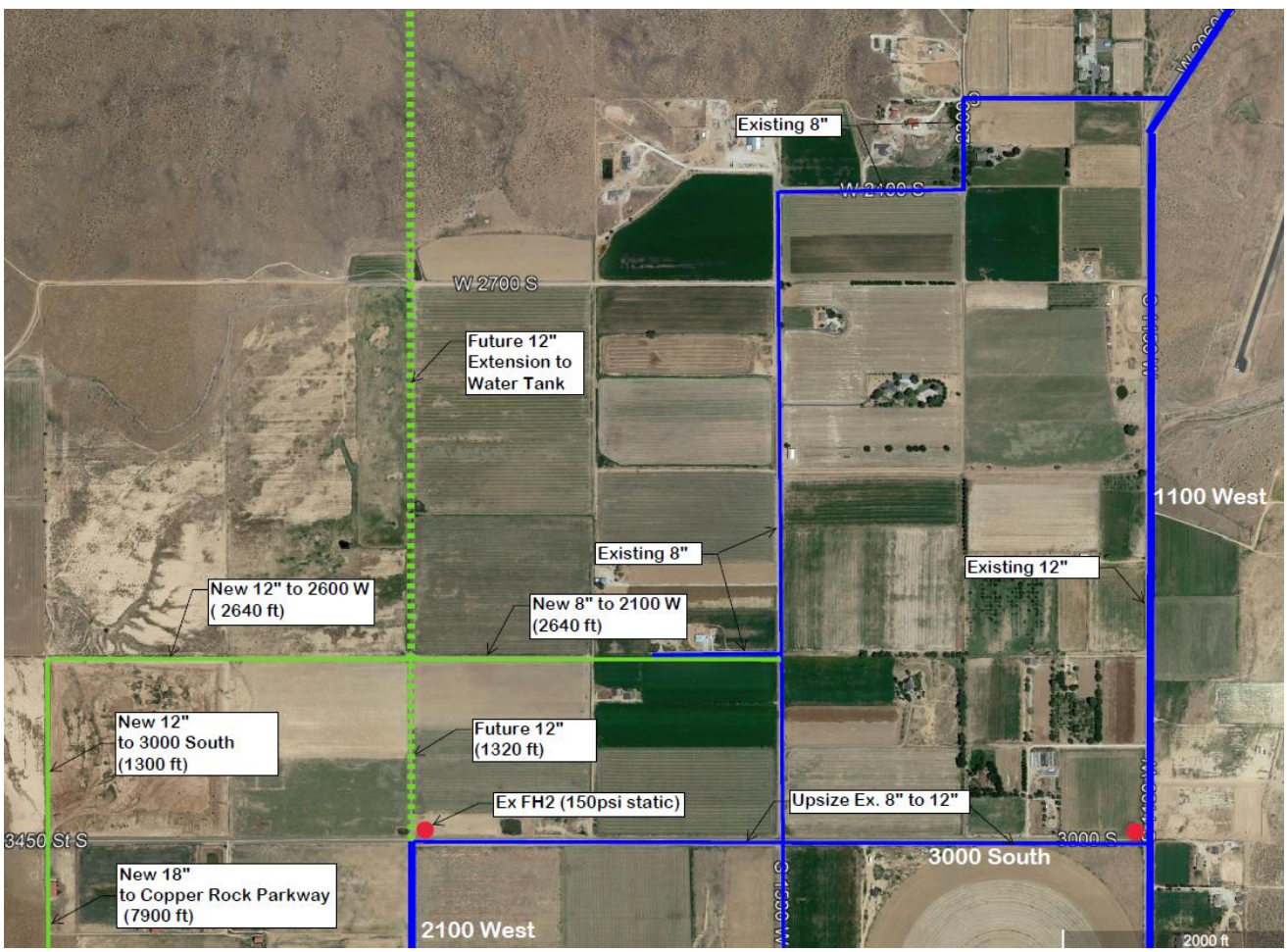


Figure 1: Map Exhibit of Main Water Lines

## 1.5 RESULTS:

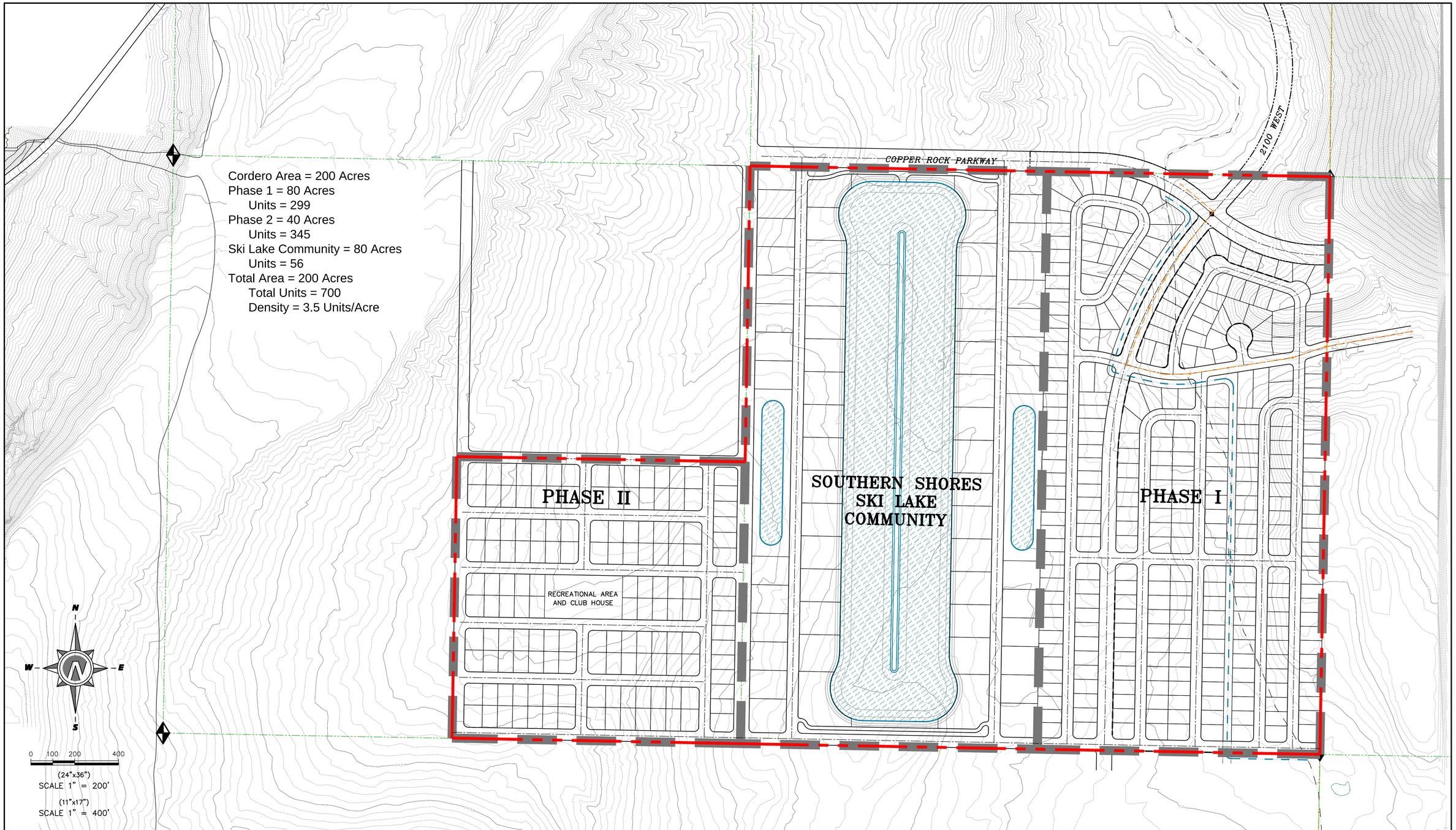
The modeled system was able to supply sufficient pressure during PDD, PID, and Fire Flow + PDD and is acceptable per state code. See Appendix for all figures and data of the model.

## 1.6 CONCLUSION:

The new, under construction water system is able to supply the pressures and meet the design criteria minimums of Utah State Code.

## 1.7 APPENDIX:

Appendix A – Project Map
Appendix B – Node & Pipe Locations
Appendix C – Scenario 1 Model Tests




THESE DRAWINGS, OR ANY PORTION THEREOF, SHALL NOT BE USED ON ANY PROJECT OR EXTENSIONS OF THIS PROJECT EXCEPT BY AGREEMENT IN WRITING WITH NORTHERN ENGINEERING, INC.

| NO. | REVISIONS | BY | DATE |
|---|---|---|---|
| 5 | | | |
| 4 | | | |
| 3 | | | |
| 2 | | | |
| 1 | | | |

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|---|---|
| DESIGNED BY: | DATE: |
| DRAWN BY: | DATE: |
| CHECKED BY: | DATE: |
| APPROVED: | DATE: |
| COGO FILE: | DATE: |
| REV. COGO FILE: | DATE: |

K:\3-16-052-00 SPILSBURY-COPPER ROCK\CAD\2020 DESIGN\2020 BASE 09-02-20 c.dwg 9/9/2020 5:11 PM

**Northern**
*ENGINEERING INC*
ENGINEERING-LAND PLANNING
CONSTRUCTION MANAGEMENT

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OREM, UTAH 84097
(801) 802-8992

*CORDERO*

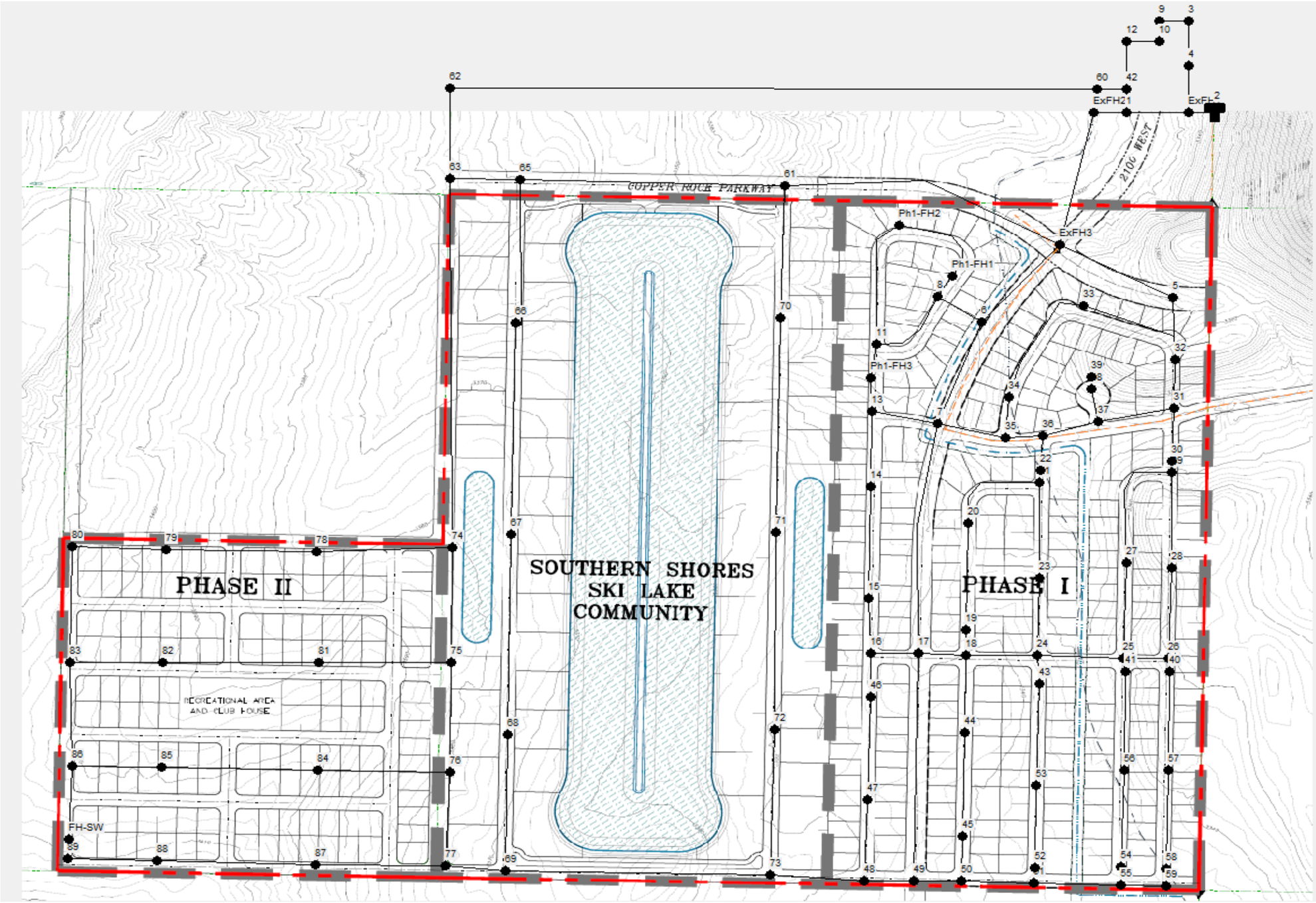
CONCEPT PLAN

HURRICANE, UTAH

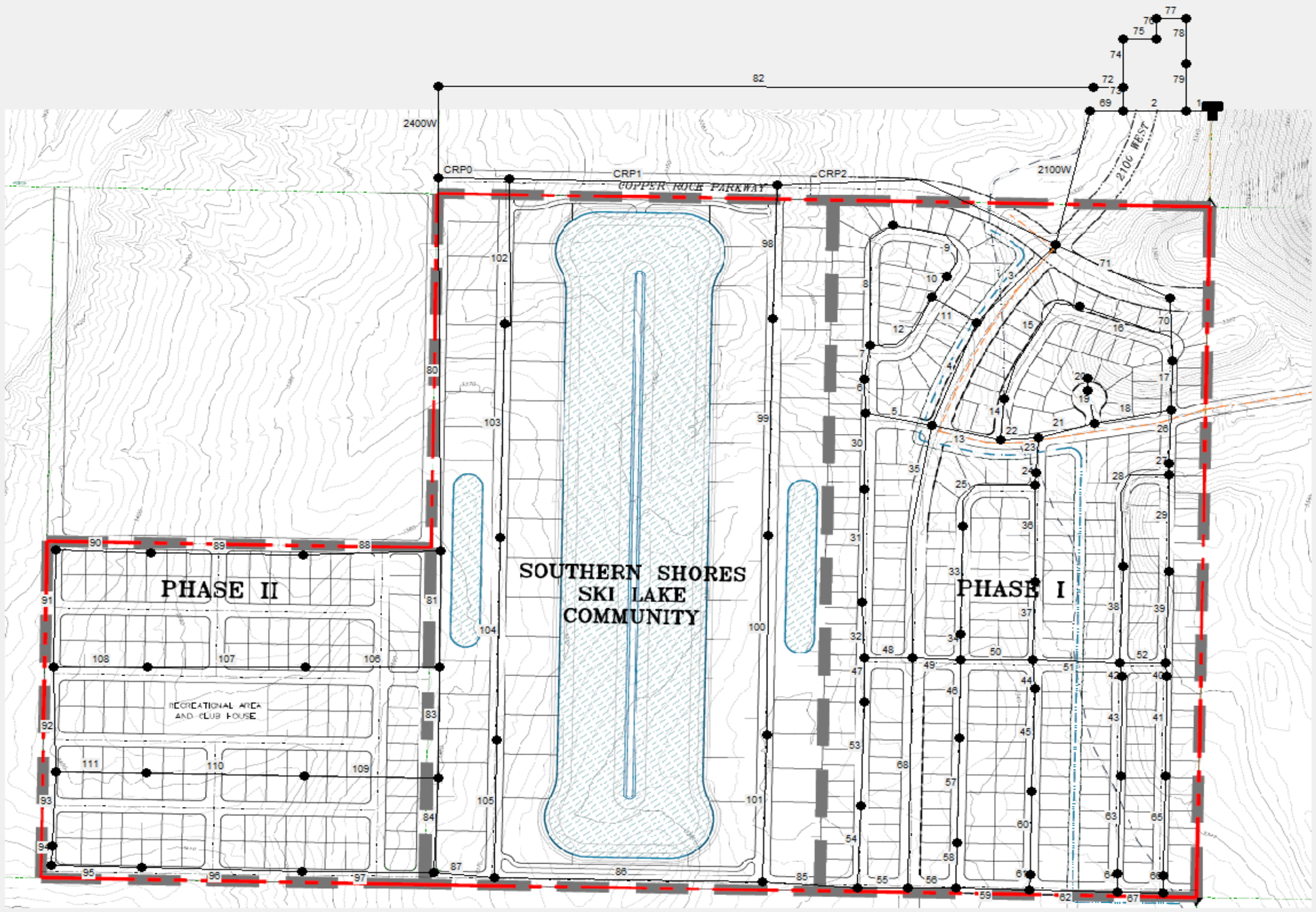
JOB NO.
3-16-052

SHEET NO.
1

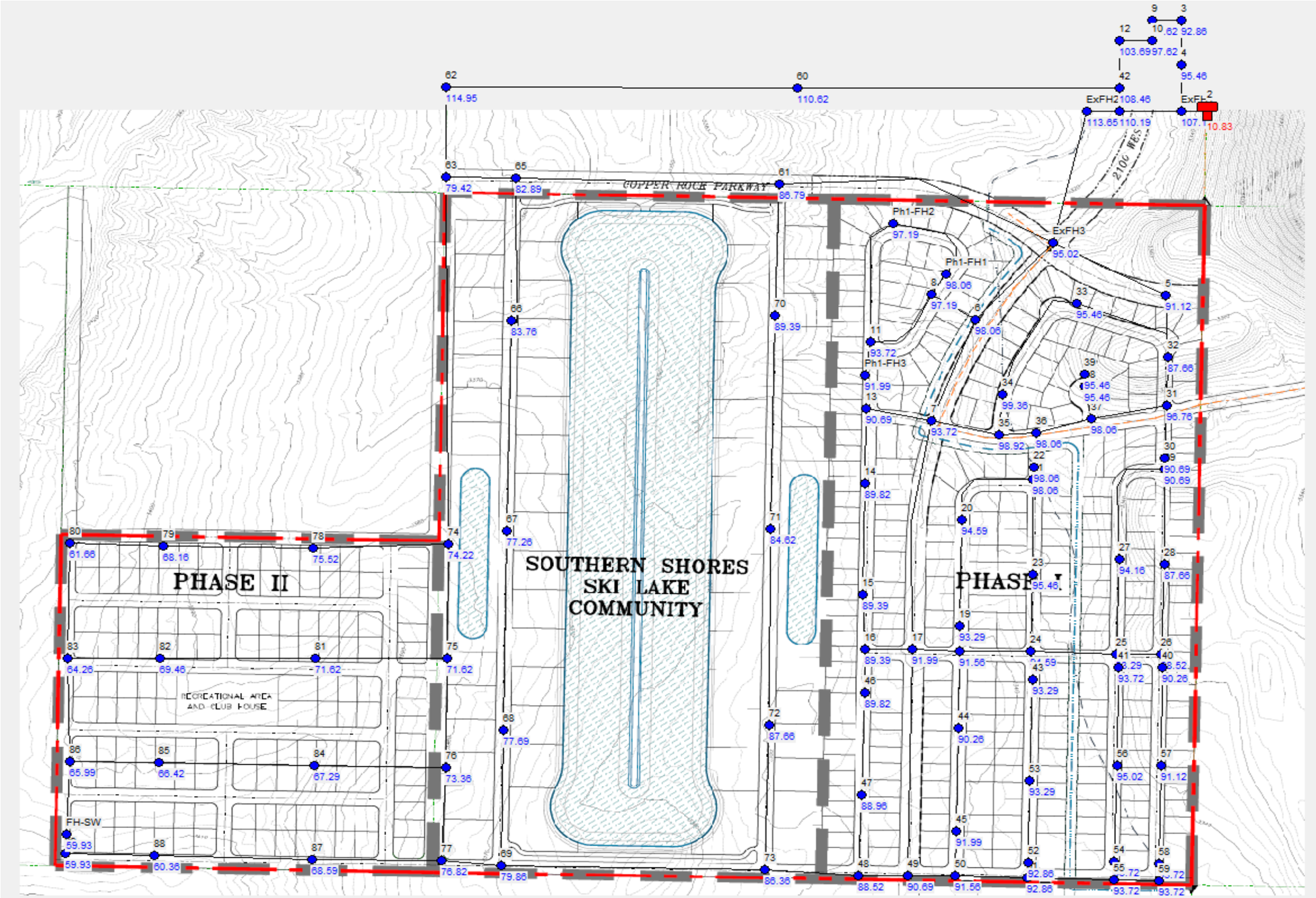
## Node IDs and Locations



## Link IDs and Locations



## Static - No Demands



# Static - No Demands - Nodes

| Node ID | Elevation ft | Demand GPM | Head ft | Pressure psi |
|---|---|---|---|---|
| Junc 89 | 3414 | 0 | 3552.3 | 59.93 |
| Junc FH-SW | 3414 | 0 | 3552.3 | 59.93 |
| Junc 88 | 3413 | 0 | 3552.3 | 60.36 |
| Junc 80 | 3410 | 0 | 3552.3 | 61.66 |
| Junc 83 | 3404 | 0 | 3552.3 | 64.26 |
| Junc 86 | 3400 | 0 | 3552.3 | 65.99 |
| Junc 85 | 3399 | 0 | 3552.3 | 66.42 |
| Junc 84 | 3397 | 0 | 3552.3 | 67.29 |
| Junc 79 | 3395 | 0 | 3552.3 | 68.16 |
| Junc 87 | 3394 | 0 | 3552.3 | 68.59 |
| Junc 82 | 3392 | 0 | 3552.3 | 69.46 |
| Junc 81 | 3387 | 0 | 3552.3 | 71.62 |
| Junc 75 | 3387 | 0 | 3552.3 | 71.62 |
| Junc 76 | 3383 | 0 | 3552.3 | 73.36 |
| Junc 74 | 3381 | 0 | 3552.3 | 74.22 |
| Junc 78 | 3378 | 0 | 3552.3 | 75.52 |
| Junc 77 | 3375 | 0 | 3552.3 | 76.82 |
| Junc 67 | 3374 | 0 | 3552.3 | 77.26 |
| Junc 68 | 3373 | 0 | 3552.3 | 77.69 |
| Junc 63 | 3369 | 0 | 3552.3 | 79.42 |
| Junc 69 | 3368 | 0 | 3552.3 | 79.86 |
| Junc 65 | 3361 | 0 | 3552.3 | 82.89 |
| Junc 66 | 3359 | 0 | 3552.3 | 83.76 |
| Junc 71 | 3357 | 0 | 3552.3 | 84.62 |
| Junc 73 | 3353 | 0 | 3552.3 | 86.36 |
| Junc 61 | 3352 | 0 | 3552.3 | 86.79 |
| Junc 72 | 3350 | 0 | 3552.3 | 87.66 |
| Junc 32 | 3350 | 0 | 3552.3 | 87.66 |
| Junc 28 | 3350 | 0 | 3552.3 | 87.66 |
| Junc 26 | 3348 | 0 | 3552.3 | 88.52 |
| Junc 48 | 3348 | 0 | 3552.3 | 88.52 |
| Junc 47 | 3347 | 0 | 3552.3 | 88.96 |

| Node ID | Elevation ft | Demand GPM | Head ft | Pressure psi |
|---|---|---|---|---|
| Junc 15 | 3346 | 0 | 3552.3 | 89.39 |
| Junc 16 | 3346 | 0 | 3552.3 | 89.39 |
| Junc 70 | 3346 | 0 | 3552.3 | 89.39 |
| Junc 46 | 3345 | 0 | 3552.3 | 89.82 |
| Junc 14 | 3345 | 0 | 3552.3 | 89.82 |
| Junc 40 | 3344 | 0 | 3552.3 | 90.26 |
| Junc 44 | 3344 | 0 | 3552.3 | 90.26 |
| Junc 49 | 3343 | 0 | 3552.3 | 90.69 |
| Junc 13 | 3343 | 0 | 3552.3 | 90.69 |
| Junc 29 | 3343 | 0 | 3552.3 | 90.69 |
| Junc 30 | 3343 | 0 | 3552.3 | 90.69 |
| Junc 5 | 3342 | 0 | 3552.3 | 91.12 |
| Junc 57 | 3342 | 0 | 3552.3 | 91.12 |
| Junc 18 | 3341 | 0 | 3552.3 | 91.56 |
| Junc 50 | 3341 | 0 | 3552.3 | 91.56 |
| Junc Ph1-FH3 | 3340 | 0 | 3552.3 | 91.99 |
| Junc 17 | 3340 | 0 | 3552.3 | 91.99 |
| Junc 45 | 3340 | 0 | 3552.3 | 91.99 |
| Junc 3 | 3338 | 0 | 3552.3 | 92.86 |
| Junc 51 | 3338 | 0 | 3552.3 | 92.86 |
| Junc 52 | 3338 | 0 | 3552.3 | 92.86 |
| Junc 19 | 3337 | 0 | 3552.3 | 93.29 |
| Junc 43 | 3337 | 0 | 3552.3 | 93.29 |
| Junc 53 | 3337 | 0 | 3552.3 | 93.29 |
| Junc 25 | 3337 | 0 | 3552.3 | 93.29 |
| Junc 41 | 3336 | 0 | 3552.3 | 93.72 |
| Junc 54 | 3336 | 0 | 3552.3 | 93.72 |
| Junc 59 | 3336 | 0 | 3552.3 | 93.72 |
| Junc 58 | 3336 | 0 | 3552.3 | 93.72 |
| Junc 11 | 3336 | 0 | 3552.3 | 93.72 |
| Junc 55 | 3336 | 0 | 3552.3 | 93.72 |
| Junc 7 | 3336 | 0 | 3552.3 | 93.72 |

| Node ID | Elevation ft | Demand GPM | Head ft | Pressure psi |
|---|---|---|---|---|
| Junc 27 | 3335 | 0 | 3552.3 | 94.16 |
| Junc 20 | 3334 | 0 | 3552.3 | 94.59 |
| Junc 24 | 3334 | 0 | 3552.3 | 94.59 |
| Junc 56 | 3333 | 0 | 3552.3 | 95.02 |
| Junc ExFH3 | 3333 | 0 | 3552.3 | 95.02 |
| Junc 4 | 3332 | 0 | 3552.3 | 95.46 |
| Junc 38 | 3332 | 0 | 3552.3 | 95.46 |
| Junc 23 | 3332 | 0 | 3552.3 | 95.46 |
| Junc 33 | 3332 | 0 | 3552.3 | 95.46 |
| Junc 39 | 3332 | 0 | 3552.3 | 95.46 |
| Junc 31 | 3329 | 0 | 3552.3 | 96.76 |
| Junc 8 | 3328 | 0 | 3552.3 | 97.19 |
| Junc Ph1-FH2 | 3328 | 0 | 3552.3 | 97.19 |
| Junc 10 | 3327 | 0 | 3552.3 | 97.62 |
| Junc 9 | 3327 | 0 | 3552.3 | 97.62 |
| Junc Ph1-FH1 | 3326 | 0 | 3552.3 | 98.06 |
| Junc 6 | 3326 | 0 | 3552.3 | 98.06 |
| Junc 21 | 3326 | 0 | 3552.3 | 98.06 |
| Junc 22 | 3326 | 0 | 3552.3 | 98.06 |
| Junc 37 | 3326 | 0 | 3552.3 | 98.06 |
| Junc 36 | 3326 | 0 | 3552.3 | 98.06 |
| Junc 35 | 3324 | 0 | 3552.3 | 98.92 |
| Junc 34 | 3323 | 0 | 3552.3 | 99.36 |
| Junc 12 | 3313 | 0 | 3552.3 | 103.69 |
| Junc ExFH1 | 3305 | 0 | 3552.3 | 107.16 |
| Junc 42 | 3302 | 0 | 3552.3 | 108.46 |
| Junc 1 | 3298 | 0 | 3552.3 | 110.19 |
| Junc 60 | 3297 | 0 | 3552.3 | 110.62 |
| Junc ExFH2 | 3290 | 0 | 3552.3 | 113.65 |
| Junc 62 | 3287 | 0 | 3552.3 | 114.95 |

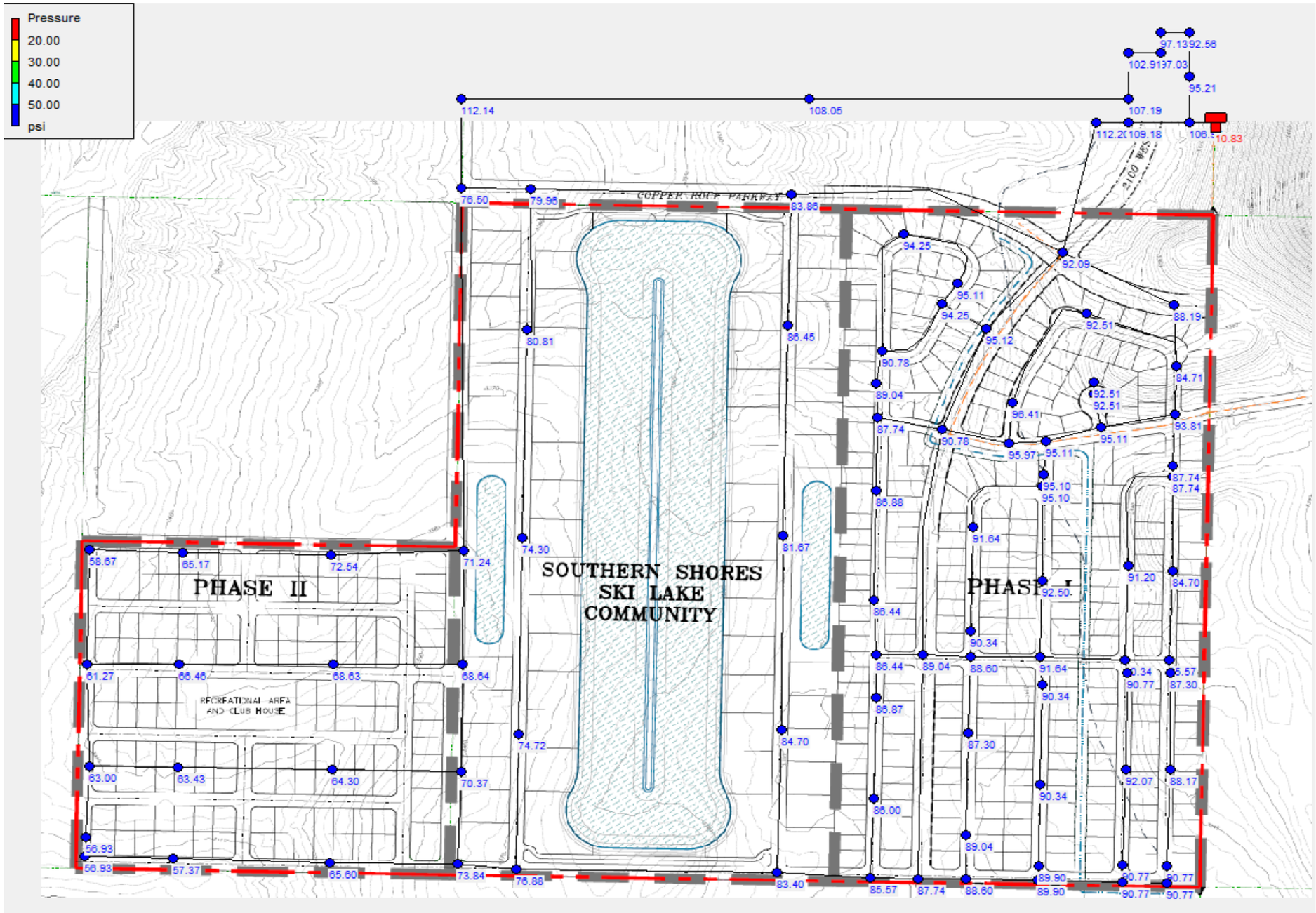
## Static - No Demands - Links

| Link ID | Length ft | Diameter in | Roughness | Flow GPM | Velocity fps |
|---|---|---|---|---|---|
| Pipe 38 | 362.01 | 8 | 150 | 0 | 0 |
| Pipe 35 | 874.02 | 18 | 130 | 0 | 0 |
| Pipe 86 | 920 | 12 | 130 | 0 | 0 |
| Pipe 87 | 240 | 12 | 130 | 0 | 0 |
| Pipe 103 | 880 | 8 | 150 | 0 | 0 |
| Pipe 102 | 440 | 8 | 150 | 0 | 0 |
| Pipe 104 | 880 | 8 | 150 | 0 | 0 |
| Pipe 36 | 361.83 | 8 | 150 | 0 | 0 |
| Pipe 105 | 440 | 8 | 150 | 0 | 0 |
| Pipe 80 | 1400 | 12 | 130 | 0 | 0 |
| Pipe 28 | 478.35 | 8 | 150 | 0 | 0 |
| Pipe 42 | 49.2 | 8 | 150 | 0 | 0 |
| Pipe 22 | 125.92 | 8 | 150 | 0 | 0 |
| Pipe 85 | 340 | 12 | 130 | 0 | 0 |
| Pipe 61 | 55.41 | 12 | 100 | 0 | 0 |
| Pipe 56 | 162.17 | 12 | 130 | 0 | 0 |
| Pipe 63 | 366.83 | 8 | 150 | 0 | 0 |
| Pipe 43 | 372.26 | 8 | 150 | 0 | 0 |
| Pipe 37 | 293.37 | 8 | 150 | 0 | 0 |
| Pipe 2400W | 9200 | 18 | 130 | 0 | 0 |
| Pipe 64 | 66.37 | 8 | 150 | 0 | 0 |
| Pipe 45 | 385.3 | 8 | 150 | 0 | 0 |
| Pipe 60 | 311.45 | 8 | 150 | 0 | 0 |
| Pipe 44 | 106.8 | 8 | 150 | 0 | 0 |
| Pipe 59 | 248.84 | 8 | 150 | 0 | 0 |
| Pipe 68 | 860.44 | 18 | 130 | 0 | 0 |
| Pipe 48 | 159.97 | 8 | 150 | 0 | 0 |
| Pipe 67 | 154.89 | 8 | 150 | 0 | 0 |
| Pipe 24 | 45.86 | 8 | 150 | 0 | 0 |
| Pipe 98 | 440 | 8 | 150 | 0 | 0 |
| Pipe 101 | 440 | 8 | 150 | 0 | 0 |
| Pipe 23 | 129.72 | 8 | 150 | 0 | 0 |
| Pipe 100 | 880 | 8 | 150 | 0 | 0 |
| Pipe 40 | 49.07 | 8 | 150 | 0 | 0 |
| Pipe 99 | 880 | 8 | 150 | 0 | 0 |
| Pipe 81 | 430 | 12 | 130 | 0 | 0 |
| Pipe 82 | 2640 | 12 | 130 | 0 | 0 |
| Pipe 55 | 167.7 | 12 | 130 | 0 | 0 |
| Pipe 89 | 430 | 12 | 130 | 0 | 0 |

| Link ID | Length ft | Diameter in | Roughness | Flow GPM | Velocity fps |
|---|---|---|---|---|---|
| Pipe 91 | 430 | 12 | 130 | 0 | 0 |
| Pipe 88 | 430 | 12 | 130 | 0 | 0 |
| Pipe 90 | 430 | 12 | 130 | 0 | 0 |
| Pipe CRP1 | 950 | 12 | 130 | 0 | 0 |
| Pipe 21 | 197.76 | 8 | 150 | 0 | 0 |
| Pipe CRP0 | 250 | 12 | 130 | 0 | 0 |
| Pipe 33 | 399.99 | 8 | 150 | 0 | 0 |
| Pipe 34 | 99.03 | 8 | 150 | 0 | 0 |
| Pipe 25 | 368.41 | 8 | 150 | 0 | 0 |
| Pipe 46 | 292.53 | 8 | 150 | 0 | 0 |
| Pipe 57 | 390.74 | 8 | 150 | 0 | 0 |
| Pipe 58 | 169.58 | 8 | 150 | 0 | 0 |
| Pipe 62 | 293.1 | 8 | 150 | 0 | 0 |
| Pipe 39 | 342.98 | 8 | 150 | 0 | 0 |
| Pipe 29 | 361.83 | 8 | 150 | 0 | 0 |
| Pipe CRP2 | 1000 | 12 | 130 | 0 | 0 |
| Pipe 27 | 41.9 | 8 | 150 | 0 | 0 |
| Pipe 26 | 198.2 | 8 | 150 | 0 | 0 |
| Pipe 3 | 384.76 | 18 | 130 | 0.01 | 0 |
| Pipe CRP3 | 420 | 12 | 130 | 0 | 0 |
| Pipe 47 | 165.56 | 8 | 150 | 0 | 0 |
| Pipe 54 | 308.02 | 8 | 150 | 0 | 0 |
| Pipe 53 | 385.25 | 8 | 150 | 0 | 0 |
| Pipe 66 | 66.34 | 8 | 150 | 0 | 0 |
| Pipe 41 | 372.25 | 8 | 150 | 0 | 0 |
| Pipe 83 | 430 | 12 | 130 | 0 | 0 |
| Pipe 65 | 372.36 | 8 | 150 | 0 | 0 |
| Pipe 12 | 304.26 | 8 | 150 | 0 | 0 |
| Pipe 52 | 152.35 | 8 | 150 | 0 | 0 |
| Pipe 92 | 430 | 12 | 130 | 0 | 0 |
| Pipe 78 | 2643 | 12 | 130 | 0 | 0 |
| Pipe 79 | 2674 | 12 | 130 | 0 | 0 |
| Pipe 106 | 430 | 8 | 150 | 0 | 0 |
| Pipe 108 | 430 | 8 | 150 | 0 | 0 |
| Pipe 107 | 430 | 8 | 150 | 0 | 0 |
| Pipe 4 | 413.75 | 18 | 130 | 0.01 | 0 |
| Pipe 17 | 186.67 | 8 | 150 | 0 | 0 |
| Pipe 1 | 400 | 12 | 130 | 0 | 0 |
| Pipe 72 | 2640 | 8 | 150 | 0 | 0 |

| Link ID | Length ft | Diameter in | Roughness | Flow GPM | Velocity fps |
|---|---|---|---|---|---|
| Pipe 73 | 1330 | 8 | 134 | 0 | 0 |
| Pipe 30 | 281.87 | 8 | 150 | 0 | 0 |
| Pipe 31 | 422.84 | 8 | 150 | 0 | 0 |
| Pipe 32 | 209.62 | 8 | 150 | 0 | 0 |
| Pipe 51 | 293.49 | 8 | 150 | 0 | 0 |
| Pipe 19 | 127.75 | 8 | 150 | 0 | 0 |
| Pipe 20 | 45.7 | 8 | 150 | 0 | 0 |
| Pipe 11 | 179.66 | 8 | 150 | 0 | 0 |
| Pipe 7 | 127.12 | 8 | 150 | 0 | 0 |
| Pipe 6 | 129.55 | 8 | 150 | 0 | 0 |
| Pipe 110 | 430 | 8 | 150 | 0 | 0 |
| Pipe 109 | 430 | 8 | 150 | 0 | 0 |
| Pipe 111 | 430 | 8 | 150 | 0 | 0 |
| Pipe 2100W | 8620 | 12 | 130 | 0.01 | 0 |
| Pipe 69 | 2650 | 12 | 130 | 0.01 | 0 |
| Pipe 50 | 239.95 | 8 | 150 | 0 | 0 |
| Pipe 49 | 163.95 | 8 | 150 | 0 | 0 |
| Pipe 84 | 430 | 12 | 130 | -0.01 | 0 |
| Pipe 94 | 30 | 12 | 130 | 0.01 | 0 |
| Pipe 97 | 430 | 12 | 130 | 0.01 | 0 |
| Pipe 96 | 430 | 12 | 130 | 0.01 | 0 |
| Pipe 95 | 430 | 12 | 130 | 0.01 | 0 |
| Pipe 93 | 400 | 12 | 130 | 0.01 | 0 |
| Pipe 70 | 200 | 8 | 150 | 0 | 0 |
| Pipe 18 | 259.94 | 8 | 150 | 0 | 0 |
| Pipe 2 | 2650 | 12 | 130 | 0.01 | 0 |
| Pipe 74 | 3268 | 8 | 134 | 0 | 0 |
| Pipe 76 | 628 | 8 | 134 | 0 | 0 |
| Pipe 75 | 1320 | 8 | 134 | 0 | 0 |
| Pipe 77 | 1340 | 8 | 134 | 0 | 0 |
| Pipe 8 | 487.49 | 8 | 150 | 0 | 0 |
| Pipe 10 | 96.13 | 8 | 150 | 0 | 0 |
| Pipe 9 | 355.92 | 8 | 150 | 0 | 0 |
| Pipe 5 | 225.58 | 8 | 150 | 0 | 0 |
| Pipe 13 | 238.37 | 8 | 150 | 0 | 0 |
| Pipe 14 | 156.58 | 8 | 150 | 0 | 0 |
| Pipe 15 | 480.87 | 8 | 150 | 0 | 0 |
| Pipe 16 | 415.24 | 8 | 150 | 0 | 0 |

## Peak Daily Demand (PDD)



# Peak Daily Demand (PDD) Nodes

| Node ID | Elevation ft | Demand GPM | Head ft | Pressure psi | |
|---|---|---|---|---|---|
| Junc FH-SW | 3414 | 0 | 3545.39 | **56.93** | **40 req.** |
| Junc 89 | 3414 | 8.93 | 3545.39 | 56.93 | |
| Junc 88 | 3413 | 16.97 | 3545.4 | 57.37 | |
| Junc 80 | 3410 | 8.93 | 3545.39 | 58.67 | |
| Junc 83 | 3404 | 16.97 | 3545.39 | 61.27 | |
| Junc 86 | 3400 | 16.97 | 3545.39 | 63 | |
| Junc 85 | 3399 | 33.93 | 3545.39 | 63.43 | |
| Junc 84 | 3397 | 34.83 | 3545.39 | 64.3 | |
| Junc 79 | 3395 | 16.97 | 3545.4 | 65.17 | |
| Junc 87 | 3394 | 16.97 | 3545.4 | 65.6 | |
| Junc 82 | 3392 | 33.93 | 3545.39 | 66.46 | |
| Junc 81 | 3387 | 33.93 | 3545.39 | 68.63 | |
| Junc 75 | 3387 | 16.97 | 3545.41 | 68.64 | |
| Junc 76 | 3383 | 16.97 | 3545.41 | 70.37 | |
| Junc 74 | 3381 | 8.93 | 3545.42 | 71.24 | |
| Junc 78 | 3378 | 16.97 | 3545.41 | 72.54 | |
| Junc 77 | 3375 | 8.93 | 3545.41 | 73.84 | |
| Junc 67 | 3374 | 8.04 | 3545.47 | 74.3 | |
| Junc 68 | 3373 | 8.04 | 3545.44 | 74.72 | |
| Junc 63 | 3369 | 0 | 3545.54 | 76.5 | |
| Junc 69 | 3368 | 0 | 3545.43 | 76.88 | |
| Junc 65 | 3361 | 0 | 3545.54 | 79.96 | |
| Junc 66 | 3359 | 8.93 | 3545.51 | 80.81 | |
| Junc 71 | 3357 | 8.04 | 3545.49 | 81.67 | |
| Junc 73 | 3353 | 0 | 3545.47 | 83.4 | |
| Junc 61 | 3352 | 0 | 3545.53 | 83.86 | |
| Junc 72 | 3350 | 8.04 | 3545.48 | 84.7 | |
| Junc 28 | 3350 | 0 | 3545.48 | 84.7 | |
| Junc 32 | 3350 | 0 | 3545.5 | 84.71 | |
| Junc 26 | 3348 | 16.07 | 3545.48 | 85.57 | |
| Junc 48 | 3348 | 11.61 | 3545.48 | 85.57 | |
| Junc 47 | 3347 | 0 | 3545.49 | 86 | |

| Node ID | Elevation ft | Demand GPM | Head ft | Pressure psi |
|---|---|---|---|---|
| Junc 16 | 3346 | 24.11 | 3545.49 | 86.44 |
| Junc 15 | 3346 | 0 | 3545.49 | 86.44 |
| Junc 70 | 3346 | 8.93 | 3545.51 | 86.45 |
| Junc 46 | 3345 | 0 | 3545.49 | 86.87 |
| Junc 14 | 3345 | 0 | 3545.5 | 86.88 |
| Junc 40 | 3344 | 0 | 3545.48 | 87.3 |
| Junc 44 | 3344 | 0 | 3545.49 | 87.3 |
| Junc 29 | 3343 | 18.75 | 3545.48 | 87.74 |
| Junc 30 | 3343 | 0 | 3545.49 | 87.74 |
| Junc 49 | 3343 | 0 | 3545.49 | 87.74 |
| Junc 13 | 3343 | 16.97 | 3545.5 | 87.74 |
| Junc 57 | 3342 | 0 | 3545.48 | 88.17 |
| Junc 5 | 3342 | 0 | 3545.52 | 88.19 |
| Junc 18 | 3341 | 19.65 | 3545.49 | 88.6 |
| Junc 50 | 3341 | 10.72 | 3545.49 | 88.6 |
| Junc 45 | 3340 | 0 | 3545.49 | 89.04 |
| Junc 17 | 3340 | 0 | 3545.49 | 89.04 |
| Junc Ph1-FH3 | 3340 | 0 | 3545.5 | 89.04 |
| Junc 51 | 3338 | 10.72 | 3545.48 | 89.9 |
| Junc 52 | 3338 | 0 | 3545.48 | 89.9 |
| Junc 25 | 3337 | 14.29 | 3545.48 | 90.34 |
| Junc 43 | 3337 | 0 | 3545.48 | 90.34 |
| Junc 53 | 3337 | 0 | 3545.48 | 90.34 |
| Junc 19 | 3337 | 0 | 3545.49 | 90.34 |
| Junc 59 | 3336 | 8.04 | 3545.48 | 90.77 |
| Junc 58 | 3336 | 0 | 3545.48 | 90.77 |
| Junc 55 | 3336 | 8.04 | 3545.48 | 90.77 |
| Junc 54 | 3336 | 0 | 3545.48 | 90.77 |
| Junc 41 | 3336 | 0 | 3545.48 | 90.77 |
| Junc 11 | 3336 | 18.75 | 3545.5 | 90.78 |
| Junc 7 | 3336 | 0 | 3545.51 | 90.78 |
| Junc 27 | 3335 | 0 | 3545.48 | 91.2 |

| Node ID | Elevation ft | Demand GPM | Head ft | Pressure psi |
|---|---|---|---|---|
| Junc 24 | 3334 | 19.65 | 3545.48 | 91.64 |
| Junc 20 | 3334 | 0 | 3545.49 | 91.64 |
| Junc 56 | 3333 | 0 | 3545.48 | 92.07 |
| Junc ExFH3 | 3333 | 0 | 3545.53 | 92.09 |
| Junc 23 | 3332 | 0 | 3545.49 | 92.5 |
| Junc 38 | 3332 | 6.25 | 3545.49 | 92.51 |
| Junc 39 | 3332 | 0 | 3545.49 | 92.51 |
| Junc 33 | 3332 | 0 | 3545.5 | 92.51 |
| Junc 3 | 3338 | 0 | 3551.61 | 92.56 |
| Junc 31 | 3329 | 12.5 | 3545.49 | 93.81 |
| Junc Ph1-FH2 | 3328 | 0 | 3545.51 | 94.25 |
| Junc 8 | 3328 | 11.61 | 3545.51 | 94.25 |
| Junc 21 | 3326 | 19.65 | 3545.49 | 95.1 |
| Junc 22 | 3326 | 0 | 3545.49 | 95.1 |
| Junc 36 | 3326 | 0.89 | 3545.49 | 95.11 |
| Junc 37 | 3326 | 1.79 | 3545.49 | 95.11 |
| Junc Ph1-FH1 | 3326 | 0 | 3545.51 | 95.11 |
| Junc 6 | 3326 | 0 | 3545.52 | 95.12 |
| Junc 4 | 3332 | 0 | 3551.74 | 95.21 |
| Junc 35 | 3324 | 16.97 | 3545.5 | 95.97 |
| Junc 34 | 3323 | 0 | 3545.5 | 96.41 |
| Junc 10 | 3327 | 0 | 3550.94 | 97.03 |
| Junc 9 | 3327 | 0 | 3551.16 | 97.13 |
| Junc 12 | 3313 | 0 | 3550.49 | 102.91 |
| Junc ExFH1 | 3305 | 0 | 3551.88 | 106.97 |
| Junc 42 | 3302 | 0 | 3549.38 | 107.19 |
| Junc 60 | 3297 | 0 | 3546.36 | 108.05 |
| Junc 1 | 3298 | 0 | 3549.98 | 109.18 |
| Junc 62 | 3287 | 0 | 3545.81 | 112.14 |
| Junc ExFH2 | 3290 | 0 | 3548.93 | 112.2 |

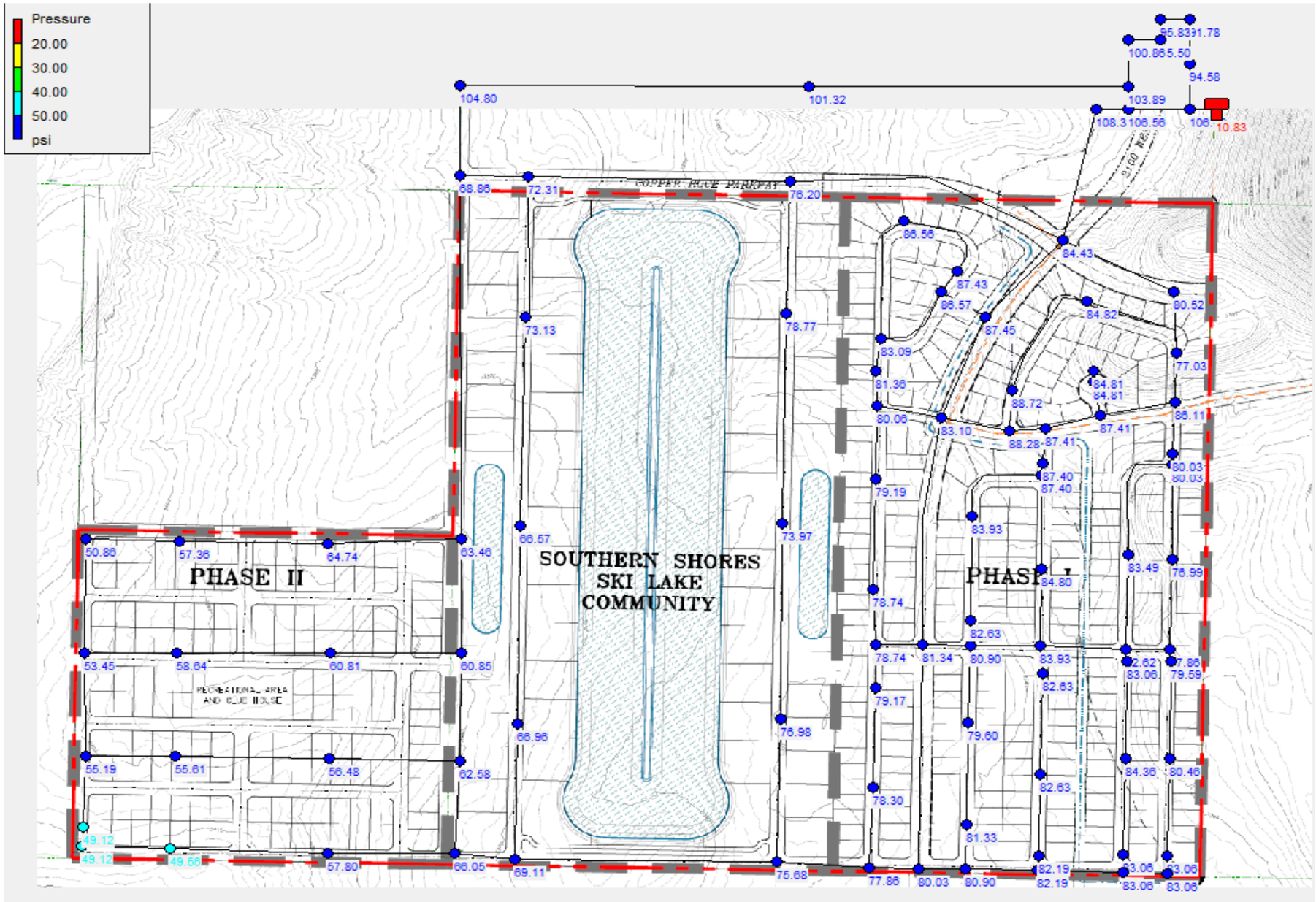
## Peak Daily Demand (PDD) Links

| Link ID | Length ft | Diameter in | Roughness | Flow GPM | Velocity fps |
|---|---|---|---|---|---|
| Pipe 20 | 45.7 | 8 | 150 | 0 | 0 |
| Pipe 61 | 55.41 | 12 | 100 | 2.16 | 0.01 |
| Pipe 40 | 49.07 | 8 | 150 | 1.19 | 0.01 |
| Pipe 66 | 66.34 | 8 | 150 | 1.19 | 0.01 |
| Pipe 41 | 372.25 | 8 | 150 | 1.19 | 0.01 |
| Pipe 65 | 372.36 | 8 | 150 | 1.19 | 0.01 |
| Pipe 92 | 430 | 12 | 130 | 2.83 | 0.01 |
| Pipe 64 | 66.37 | 8 | 150 | 1.32 | 0.01 |
| Pipe 42 | 49.2 | 8 | 150 | 1.32 | 0.01 |
| Pipe 63 | 366.83 | 8 | 150 | 1.32 | 0.01 |
| Pipe 43 | 372.26 | 8 | 150 | 1.32 | 0.01 |
| Pipe 58 | 169.58 | 8 | 150 | 1.71 | 0.01 |
| Pipe 57 | 390.74 | 8 | 150 | 1.71 | 0.01 |
| Pipe 46 | 292.53 | 8 | 150 | 1.71 | 0.01 |
| Pipe CRP2 | 1000 | 12 | 130 | -4.06 | 0.01 |
| Pipe 44 | 106.8 | 8 | 150 | 2.16 | 0.01 |
| Pipe 45 | 385.3 | 8 | 150 | 2.16 | 0.01 |
| Pipe 60 | 311.45 | 8 | 150 | 2.16 | 0.01 |
| Pipe 34 | 99.03 | 8 | 150 | 2.18 | 0.01 |
| Pipe 33 | 399.99 | 8 | 150 | 2.18 | 0.01 |
| Pipe 25 | 368.41 | 8 | 150 | 2.18 | 0.01 |
| Pipe 18 | 259.94 | 8 | 150 | 3.29 | 0.02 |
| Pipe 83 | 430 | 12 | 130 | 9.08 | 0.03 |
| Pipe 21 | 197.76 | 8 | 150 | -4.75 | 0.03 |
| Pipe 19 | 127.75 | 8 | 150 | 6.25 | 0.04 |
| Pipe 67 | 154.89 | 8 | 150 | 6.85 | 0.04 |
| Pipe 52 | 152.35 | 8 | 150 | 7.06 | 0.05 |
| Pipe 38 | 362.01 | 8 | 150 | 8.72 | 0.06 |
| Pipe 28 | 478.35 | 8 | 150 | 8.72 | 0.06 |
| Pipe 39 | 342.98 | 8 | 150 | 10.2 | 0.07 |
| Pipe 29 | 361.83 | 8 | 150 | 10.2 | 0.07 |
| Pipe 110 | 430 | 8 | 150 | 11.85 | 0.08 |
| Pipe 10 | 96.13 | 8 | 150 | -12.25 | 0.08 |
| Pipe 9 | 355.92 | 8 | 150 | -12.25 | 0.08 |
| Pipe 8 | 487.49 | 8 | 150 | -12.25 | 0.08 |
| Pipe 107 | 430 | 8 | 150 | 12.44 | 0.08 |
| Pipe 36 | 361.83 | 8 | 150 | 13.36 | 0.09 |
| Pipe 37 | 293.37 | 8 | 150 | 13.36 | 0.09 |
| Pipe 62 | 293.1 | 8 | 150 | 13.57 | 0.09 |

| Link ID | Length ft | Diameter in | Roughness | Flow GPM | Velocity fps |
|---|---|---|---|---|---|
| Pipe 56 | 162.17 | 12 | 130 | 31.15 | 0.09 |
| Pipe 51 | 293.49 | 8 | 150 | 13.95 | 0.09 |
| Pipe 14 | 156.58 | 8 | 150 | -15.75 | 0.1 |
| Pipe 16 | 415.24 | 8 | 150 | -15.75 | 0.1 |
| Pipe 15 | 480.87 | 8 | 150 | -15.75 | 0.1 |
| Pipe 6 | 129.55 | 8 | 150 | -15.99 | 0.1 |
| Pipe 7 | 127.12 | 8 | 150 | -15.99 | 0.1 |
| Pipe 93 | 400 | 12 | 130 | -36.22 | 0.1 |
| Pipe 94 | 30 | 12 | 130 | -36.22 | 0.1 |
| Pipe CRP1 | 950 | 12 | 130 | -38.77 | 0.11 |
| Pipe 101 | 440 | 8 | 150 | 17.82 | 0.11 |
| Pipe 91 | 430 | 12 | 130 | 41.28 | 0.12 |
| Pipe 47 | 165.56 | 8 | 150 | 19.99 | 0.13 |
| Pipe 54 | 308.02 | 8 | 150 | 19.99 | 0.13 |
| Pipe 53 | 385.25 | 8 | 150 | 19.99 | 0.13 |
| Pipe 95 | 430 | 12 | 130 | -45.15 | 0.13 |
| Pipe 48 | 159.97 | 8 | 150 | -21.31 | 0.14 |
| Pipe 108 | 430 | 8 | 150 | -21.49 | 0.14 |
| Pipe 111 | 430 | 8 | 150 | -22.08 | 0.14 |
| Pipe 59 | 248.84 | 8 | 150 | 22.13 | 0.14 |
| Pipe 90 | 430 | 12 | 130 | 50.21 | 0.14 |
| Pipe 50 | 239.95 | 8 | 150 | 22.4 | 0.14 |
| Pipe 12 | 304.26 | 8 | 150 | 22.49 | 0.14 |
| Pipe 31 | 422.84 | 8 | 150 | 22.79 | 0.15 |
| Pipe 30 | 281.87 | 8 | 150 | 22.79 | 0.15 |
| Pipe 32 | 209.62 | 8 | 150 | 22.79 | 0.15 |
| Pipe 68 | 860.44 | 18 | 130 | 117.99 | 0.15 |
| Pipe 5 | 225.58 | 8 | 150 | 23.77 | 0.15 |
| Pipe 84 | 430 | 12 | 130 | -54.57 | 0.15 |
| Pipe 100 | 880 | 8 | 150 | 25.86 | 0.17 |
| Pipe 96 | 430 | 12 | 130 | -62.12 | 0.18 |
| Pipe 105 | 440 | 8 | 150 | 29.54 | 0.19 |
| Pipe 89 | 430 | 12 | 130 | 67.18 | 0.19 |
| Pipe CRP3 | 420 | 12 | 130 | -69.21 | 0.2 |
| Pipe 81 | 430 | 12 | 130 | 72.43 | 0.21 |
| Pipe 99 | 880 | 8 | 150 | 33.9 | 0.22 |
| Pipe 97 | 430 | 12 | 130 | -79.09 | 0.22 |
| Pipe 24 | 45.86 | 8 | 150 | 35.19 | 0.22 |
| Pipe 23 | 129.72 | 8 | 150 | 35.19 | 0.22 |

| Link ID | Length ft | Diameter in | Roughness | Flow GPM | Velocity fps |
|---|---|---|---|---|---|
| Pipe 35 | 874.02 | 18 | 130 | 180.87 | 0.23 |
| Pipe 88 | 430 | 12 | 130 | 84.15 | 0.24 |
| Pipe 104 | 880 | 8 | 150 | 37.58 | 0.24 |
| Pipe 26 | 198.2 | 8 | 150 | 37.67 | 0.24 |
| Pipe 27 | 41.9 | 8 | 150 | 37.67 | 0.24 |
| Pipe 55 | 167.7 | 12 | 130 | -86.84 | 0.25 |
| Pipe 22 | 125.92 | 8 | 150 | -40.83 | 0.26 |
| Pipe CRP0 | 250 | 12 | 130 | -93.32 | 0.26 |
| Pipe 49 | 163.95 | 8 | 150 | 41.57 | 0.27 |
| Pipe 13 | 238.37 | 8 | 150 | 42.05 | 0.27 |
| Pipe 85 | 340 | 12 | 130 | 95.23 | 0.27 |
| Pipe 98 | 440 | 8 | 150 | 42.83 | 0.27 |
| Pipe 103 | 880 | 8 | 150 | 45.62 | 0.29 |
| Pipe 11 | 179.66 | 8 | 150 | -46.35 | 0.3 |
| Pipe 106 | 430 | 8 | 150 | 46.37 | 0.3 |
| Pipe 109 | 430 | 8 | 150 | 46.68 | 0.3 |
| Pipe 4 | 413.75 | 18 | 130 | 246.69 | 0.31 |
| Pipe 86 | 920 | 12 | 130 | 113.05 | 0.32 |
| Pipe 2400W | 9200 | 18 | 130 | 258.83 | 0.33 |
| Pipe 78 | 2643 | 12 | 130 | -119.86 | 0.34 |
| Pipe 79 | 2674 | 12 | 130 | -119.86 | 0.34 |
| Pipe 17 | 186.67 | 8 | 150 | 53.46 | 0.34 |
| Pipe 102 | 440 | 8 | 150 | 54.55 | 0.35 |
| Pipe 3 | 384.76 | 18 | 130 | 293.04 | 0.37 |
| Pipe 87 | 240 | 12 | 130 | 142.59 | 0.4 |
| Pipe 70 | 200 | 8 | 150 | -69.21 | 0.44 |
| Pipe 80 | 1400 | 12 | 130 | 165.51 | 0.47 |
| Pipe 82 | 2640 | 12 | 130 | 258.83 | 0.73 |
| Pipe 75 | 1320 | 8 | 134 | -119.86 | 0.77 |
| Pipe 74 | 3268 | 8 | 134 | -119.86 | 0.77 |
| Pipe 77 | 1340 | 8 | 134 | -119.86 | 0.77 |
| Pipe 76 | 628 | 8 | 134 | -119.86 | 0.77 |
| Pipe 73 | 1330 | 8 | 134 | -138.98 | 0.89 |
| Pipe 2100W | 8620 | 12 | 130 | 366.32 | 1.04 |
| Pipe 69 | 2650 | 12 | 130 | 366.32 | 1.04 |
| Pipe 2 | 2650 | 12 | 130 | 505.29 | 1.43 |
| Pipe 72 | 2640 | 8 | 150 | -258.83 | 1.65 |
| Pipe 1 | 400 | 12 | 130 | 625.15 | 1.77 |

## Peak Instantaneous Demand (PID)



# Peak Instantaneous Demand (PID) Nodes

| Node ID | Elevation ft | Demand GPM | Head ft | Pressure psi | |
|---|---|---|---|---|---|
| Junc FH-SW | 3414 | 0 | 3527.37 | **49.12** | **30 req.** |
| Junc 89 | 3414 | 17.86 | 3527.37 | 49.12 | |
| Junc 88 | 3413 | 33.94 | 3527.38 | 49.56 | |
| Junc 80 | 3410 | 17.86 | 3527.37 | 50.86 | |
| Junc 83 | 3404 | 33.94 | 3527.36 | 53.45 | |
| Junc 86 | 3400 | 33.94 | 3527.36 | 55.19 | |
| Junc 85 | 3399 | 67.86 | 3527.34 | 55.61 | |
| Junc 84 | 3397 | 69.66 | 3527.35 | 56.48 | |
| Junc 79 | 3395 | 33.94 | 3527.39 | 57.36 | |
| Junc 87 | 3394 | 33.94 | 3527.41 | 57.8 | |
| Junc 82 | 3392 | 67.86 | 3527.34 | 58.64 | |
| Junc 81 | 3387 | 67.86 | 3527.35 | 60.81 | |
| Junc 75 | 3387 | 33.94 | 3527.42 | 60.85 | |
| Junc 76 | 3383 | 33.94 | 3527.42 | 62.58 | |
| Junc 74 | 3381 | 17.86 | 3527.45 | 63.46 | |
| Junc 78 | 3378 | 33.94 | 3527.41 | 64.74 | |
| Junc 77 | 3375 | 17.86 | 3527.44 | 66.05 | |
| Junc 67 | 3374 | 16.08 | 3527.64 | 66.57 | |
| Junc 68 | 3373 | 16.08 | 3527.53 | 66.96 | |
| Junc 63 | 3369 | 0 | 3527.91 | 68.86 | |
| Junc 69 | 3368 | 0 | 3527.5 | 69.11 | |
| Junc 65 | 3361 | 0 | 3527.88 | 72.31 | |
| Junc 66 | 3359 | 17.86 | 3527.78 | 73.13 | |
| Junc 71 | 3357 | 16.08 | 3527.71 | 73.97 | |
| Junc 73 | 3353 | 0 | 3527.65 | 75.68 | |
| Junc 61 | 3352 | 0 | 3527.86 | 76.2 | |
| Junc 72 | 3350 | 16.08 | 3527.66 | 76.98 | |
| Junc 28 | 3350 | 0 | 3527.69 | 76.99 | |
| Junc 32 | 3350 | 0 | 3527.76 | 77.03 | |
| Junc 26 | 3348 | 32.14 | 3527.69 | 77.86 | |
| Junc 48 | 3348 | 23.22 | 3527.69 | 77.86 | |
| Junc 47 | 3347 | 0 | 3527.7 | 78.3 | |

| Node ID | Elevation ft | Demand GPM | Head ft | Pressure psi |
|---|---|---|---|---|
| Junc 16 | 3346 | 48.22 | 3527.72 | 78.74 |
| Junc 15 | 3346 | 0 | 3527.73 | 78.74 |
| Junc 70 | 3346 | 17.86 | 3527.8 | 78.77 |
| Junc 46 | 3345 | 0 | 3527.71 | 79.17 |
| Junc 14 | 3345 | 0 | 3527.75 | 79.19 |
| Junc 40 | 3344 | 0 | 3527.69 | 79.59 |
| Junc 44 | 3344 | 0 | 3527.7 | 79.6 |
| Junc 29 | 3343 | 37.5 | 3527.69 | 80.03 |
| Junc 30 | 3343 | 0 | 3527.7 | 80.03 |
| Junc 49 | 3343 | 0 | 3527.71 | 80.03 |
| Junc 13 | 3343 | 33.94 | 3527.76 | 80.06 |
| Junc 57 | 3342 | 0 | 3527.69 | 80.46 |
| Junc 5 | 3342 | 0 | 3527.84 | 80.52 |
| Junc 50 | 3341 | 21.44 | 3527.7 | 80.9 |
| Junc 18 | 3341 | 39.3 | 3527.7 | 80.9 |
| Junc 45 | 3340 | 0 | 3527.7 | 81.33 |
| Junc 17 | 3340 | 0 | 3527.73 | 81.34 |
| Junc Ph1-FH3 | 3340 | 0 | 3527.77 | 81.36 |
| Junc 51 | 3338 | 21.44 | 3527.69 | 82.19 |
| Junc 52 | 3338 | 0 | 3527.69 | 82.19 |
| Junc 25 | 3337 | 28.58 | 3527.69 | 82.62 |
| Junc 53 | 3337 | 0 | 3527.69 | 82.63 |
| Junc 43 | 3337 | 0 | 3527.69 | 82.63 |
| Junc 19 | 3337 | 0 | 3527.7 | 82.63 |
| Junc 59 | 3336 | 16.08 | 3527.69 | 83.06 |
| Junc 58 | 3336 | 0 | 3527.69 | 83.06 |
| Junc 55 | 3336 | 16.08 | 3527.69 | 83.06 |
| Junc 54 | 3336 | 0 | 3527.69 | 83.06 |
| Junc 41 | 3336 | 0 | 3527.69 | 83.06 |
| Junc 11 | 3336 | 37.5 | 3527.77 | 83.09 |
| Junc 7 | 3336 | 0 | 3527.77 | 83.1 |
| Junc 27 | 3335 | 0 | 3527.69 | 83.49 |

| Node ID | Elevation ft | Demand GPM | Head ft | Pressure psi |
|---|---|---|---|---|
| Junc 24 | 3334 | 39.3 | 3527.69 | 83.93 |
| Junc 20 | 3334 | 0 | 3527.7 | 83.93 |
| Junc 56 | 3333 | 0 | 3527.69 | 84.36 |
| Junc ExFH3 | 3333 | 0 | 3527.86 | 84.43 |
| Junc 23 | 3332 | 0 | 3527.7 | 84.8 |
| Junc 38 | 3332 | 12.5 | 3527.72 | 84.81 |
| Junc 39 | 3332 | 0 | 3527.72 | 84.81 |
| Junc 33 | 3332 | 0 | 3527.75 | 84.82 |
| Junc 31 | 3329 | 25 | 3527.72 | 86.11 |
| Junc Ph1-FH2 | 3328 | 0 | 3527.78 | 86.56 |
| Junc 8 | 3328 | 23.22 | 3527.78 | 86.57 |
| Junc 21 | 3326 | 39.3 | 3527.7 | 87.4 |
| Junc 22 | 3326 | 0 | 3527.71 | 87.4 |
| Junc 37 | 3326 | 3.58 | 3527.72 | 87.41 |
| Junc 36 | 3326 | 1.78 | 3527.72 | 87.41 |
| Junc Ph1-FH1 | 3326 | 0 | 3527.78 | 87.43 |
| Junc 6 | 3326 | 0 | 3527.81 | 87.45 |
| Junc 35 | 3324 | 33.94 | 3527.74 | 88.28 |
| Junc 34 | 3323 | 0 | 3527.74 | 88.72 |
| Junc 3 | 3338 | 0 | 3549.81 | 91.78 |
| Junc 4 | 3332 | 0 | 3550.29 | 94.58 |
| Junc 10 | 3327 | 0 | 3547.4 | 95.5 |
| Junc 9 | 3327 | 0 | 3548.17 | 95.83 |
| Junc 12 | 3313 | 0 | 3545.78 | 100.86 |
| Junc 60 | 3297 | 0 | 3530.84 | 101.32 |
| Junc 42 | 3302 | 0 | 3541.77 | 103.89 |
| Junc 62 | 3287 | 0 | 3528.87 | 104.8 |
| Junc ExFH1 | 3305 | 0 | 3550.77 | 106.49 |
| Junc 1 | 3298 | 0 | 3543.92 | 106.56 |
| Junc ExFH2 | 3290 | 0 | 3540.14 | 108.39 |

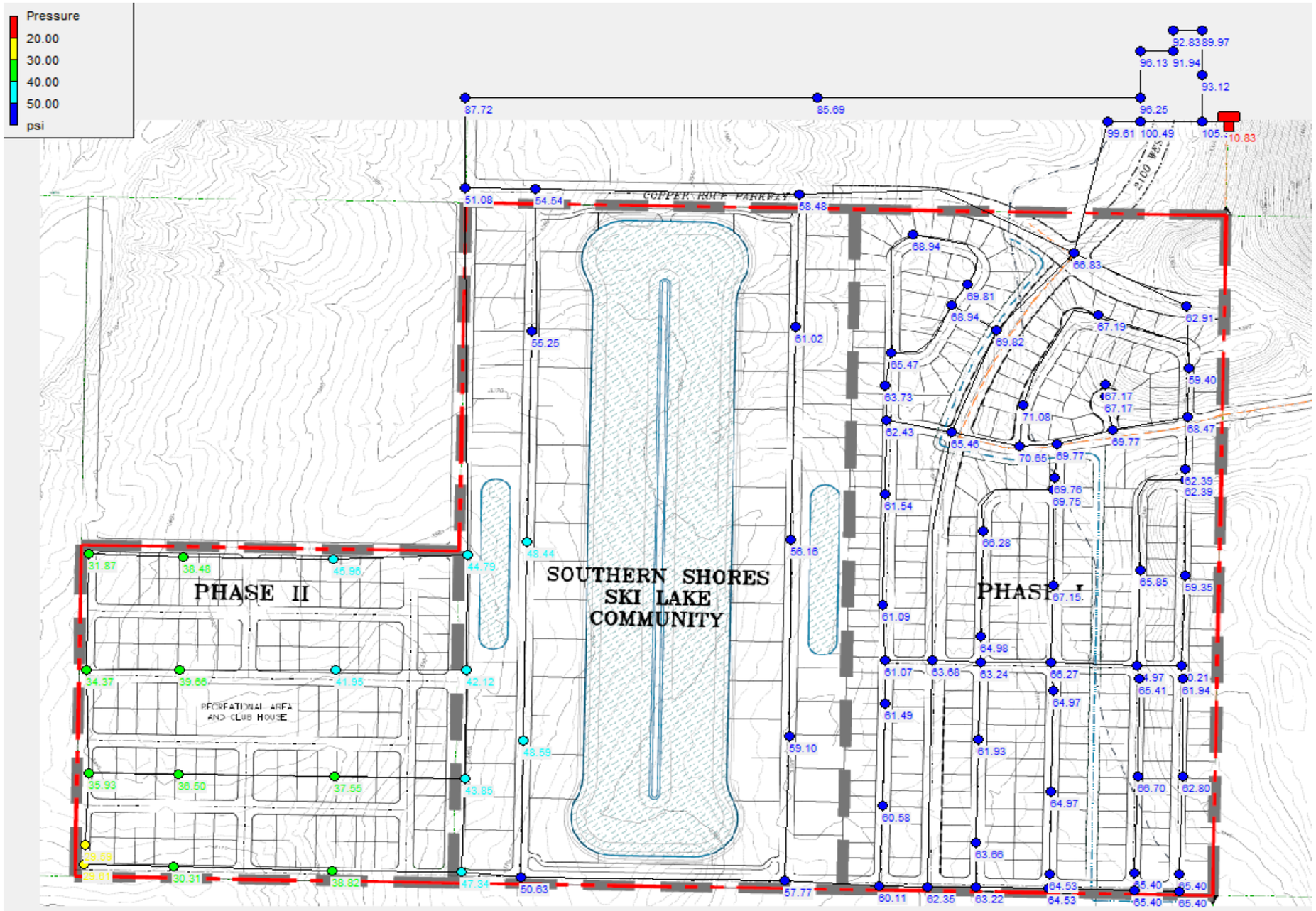
## Peak Instantaneous Demand (PID) Links

| Link ID | Length ft | Diameter in | Roughness | Flow GPM | Velocity fps |
|---|---|---|---|---|---|
| Pipe 20 | 45.7 | 8 | 150 | 0 | 0 |
| Pipe 61 | 55.41 | 12 | 100 | 4.31 | 0.01 |
| Pipe 66 | 66.34 | 8 | 150 | 2.39 | 0.02 |
| Pipe 41 | 372.25 | 8 | 150 | 2.39 | 0.02 |
| Pipe 40 | 49.07 | 8 | 150 | 2.39 | 0.02 |
| Pipe 65 | 372.36 | 8 | 150 | 2.39 | 0.02 |
| Pipe 92 | 430 | 12 | 130 | 5.65 | 0.02 |
| Pipe 64 | 66.37 | 8 | 150 | 2.63 | 0.02 |
| Pipe 42 | 49.2 | 8 | 150 | 2.63 | 0.02 |
| Pipe 43 | 372.26 | 8 | 150 | 2.63 | 0.02 |
| Pipe 63 | 366.83 | 8 | 150 | 2.63 | 0.02 |
| Pipe 58 | 169.58 | 8 | 150 | 3.41 | 0.02 |
| Pipe 57 | 390.74 | 8 | 150 | 3.41 | 0.02 |
| Pipe 46 | 292.53 | 8 | 150 | 3.41 | 0.02 |
| Pipe CRP2 | 1000 | 12 | 130 | -8.13 | 0.02 |
| Pipe 44 | 106.8 | 8 | 150 | 4.31 | 0.03 |
| Pipe 45 | 385.3 | 8 | 150 | 4.31 | 0.03 |
| Pipe 60 | 311.45 | 8 | 150 | 4.31 | 0.03 |
| Pipe 34 | 99.03 | 8 | 150 | 4.37 | 0.03 |
| Pipe 33 | 399.99 | 8 | 150 | 4.37 | 0.03 |
| Pipe 25 | 368.41 | 8 | 150 | 4.37 | 0.03 |
| Pipe 18 | 259.94 | 8 | 150 | 6.58 | 0.04 |
| Pipe 83 | 430 | 12 | 130 | 18.17 | 0.05 |
| Pipe 21 | 197.76 | 8 | 150 | -9.5 | 0.06 |
| Pipe 19 | 127.75 | 8 | 150 | 12.5 | 0.08 |
| Pipe 67 | 154.89 | 8 | 150 | 13.69 | 0.09 |
| Pipe 52 | 152.35 | 8 | 150 | 14.12 | 0.09 |
| Pipe 38 | 362.01 | 8 | 150 | 17.44 | 0.11 |
| Pipe 28 | 478.35 | 8 | 150 | 17.44 | 0.11 |
| Pipe 39 | 342.98 | 8 | 150 | 20.41 | 0.13 |
| Pipe 29 | 361.83 | 8 | 150 | 20.41 | 0.13 |
| Pipe 110 | 430 | 8 | 150 | 23.7 | 0.15 |
| Pipe 10 | 96.13 | 8 | 150 | -24.48 | 0.16 |
| Pipe 9 | 355.92 | 8 | 150 | -24.48 | 0.16 |
| Pipe 8 | 487.49 | 8 | 150 | -24.48 | 0.16 |
| Pipe 107 | 430 | 8 | 150 | 24.89 | 0.16 |
| Pipe 36 | 361.83 | 8 | 150 | 26.72 | 0.17 |
| Pipe 37 | 293.37 | 8 | 150 | 26.72 | 0.17 |
| Pipe 62 | 293.1 | 8 | 150 | 27.14 | 0.17 |

| Link ID | Length ft | Diameter in | Roughness | Flow GPM | Velocity fps |
|---|---|---|---|---|---|
| Pipe 56 | 162.17 | 12 | 130 | 62.29 | 0.18 |
| Pipe 51 | 293.49 | 8 | 150 | 27.9 | 0.18 |
| Pipe 14 | 156.58 | 8 | 150 | -31.5 | 0.2 |
| Pipe 16 | 415.24 | 8 | 150 | -31.5 | 0.2 |
| Pipe 15 | 480.87 | 8 | 150 | -31.5 | 0.2 |
| Pipe 6 | 129.55 | 8 | 150 | -31.97 | 0.2 |
| Pipe 7 | 127.12 | 8 | 150 | -31.97 | 0.2 |
| Pipe 93 | 400 | 12 | 130 | -72.45 | 0.21 |
| Pipe 94 | 30 | 12 | 130 | -72.45 | 0.21 |
| Pipe CRP1 | 950 | 12 | 130 | -77.53 | 0.22 |
| Pipe 101 | 440 | 8 | 150 | 35.64 | 0.23 |
| Pipe 91 | 430 | 12 | 130 | 82.56 | 0.23 |
| Pipe 47 | 165.56 | 8 | 150 | 39.98 | 0.26 |
| Pipe 54 | 308.02 | 8 | 150 | 39.98 | 0.26 |
| Pipe 53 | 385.25 | 8 | 150 | 39.98 | 0.26 |
| Pipe 95 | 430 | 12 | 130 | -90.31 | 0.26 |
| Pipe 48 | 159.97 | 8 | 150 | -42.63 | 0.27 |
| Pipe 108 | 430 | 8 | 150 | -42.97 | 0.27 |
| Pipe 111 | 430 | 8 | 150 | -44.16 | 0.28 |
| Pipe 59 | 248.84 | 8 | 150 | 44.27 | 0.28 |
| Pipe 90 | 430 | 12 | 130 | 100.42 | 0.28 |
| Pipe 50 | 239.95 | 8 | 150 | 44.79 | 0.29 |
| Pipe 12 | 304.26 | 8 | 150 | 45 | 0.29 |
| Pipe 31 | 422.84 | 8 | 150 | 45.58 | 0.29 |
| Pipe 30 | 281.87 | 8 | 150 | 45.58 | 0.29 |
| Pipe 32 | 209.62 | 8 | 150 | 45.58 | 0.29 |
| Pipe 68 | 860.44 | 18 | 130 | 235.98 | 0.3 |
| Pipe 5 | 225.58 | 8 | 150 | 47.54 | 0.3 |
| Pipe 84 | 430 | 12 | 130 | -109.13 | 0.31 |
| Pipe 100 | 880 | 8 | 150 | 51.72 | 0.33 |
| Pipe 96 | 430 | 12 | 130 | -124.25 | 0.35 |
| Pipe 105 | 440 | 8 | 150 | 59.09 | 0.38 |
| Pipe 89 | 430 | 12 | 130 | 134.36 | 0.38 |
| Pipe CRP3 | 420 | 12 | 130 | -138.43 | 0.39 |
| Pipe 81 | 430 | 12 | 130 | 144.86 | 0.41 |
| Pipe 99 | 880 | 8 | 150 | 67.8 | 0.43 |
| Pipe 97 | 430 | 12 | 130 | -158.19 | 0.45 |
| Pipe 24 | 45.86 | 8 | 150 | 70.38 | 0.45 |
| Pipe 23 | 129.72 | 8 | 150 | 70.38 | 0.45 |

| Link ID | Length ft | Diameter in | Roughness | Flow GPM | Velocity fps |
|---|---|---|---|---|---|
| Pipe 35 | 874.02 | 18 | 130 | 361.74 | 0.46 |
| Pipe 88 | 430 | 12 | 130 | 168.3 | 0.48 |
| Pipe 104 | 880 | 8 | 150 | 75.17 | 0.48 |
| Pipe 26 | 198.2 | 8 | 150 | 75.35 | 0.48 |
| Pipe 27 | 41.9 | 8 | 150 | 75.35 | 0.48 |
| Pipe 55 | 167.7 | 12 | 130 | -173.69 | 0.49 |
| Pipe 22 | 125.92 | 8 | 150 | -81.66 | 0.52 |
| Pipe CRP0 | 250 | 12 | 130 | -186.64 | 0.53 |
| Pipe 49 | 163.95 | 8 | 150 | 83.14 | 0.53 |
| Pipe 13 | 238.37 | 8 | 150 | 84.1 | 0.54 |
| Pipe 85 | 340 | 12 | 130 | 190.45 | 0.54 |
| Pipe 98 | 440 | 8 | 150 | 85.66 | 0.55 |
| Pipe 103 | 880 | 8 | 150 | 91.25 | 0.58 |
| Pipe 11 | 179.66 | 8 | 150 | -92.69 | 0.59 |
| Pipe 106 | 430 | 8 | 150 | 92.75 | 0.59 |
| Pipe 109 | 430 | 8 | 150 | 93.36 | 0.6 |
| Pipe 4 | 413.75 | 18 | 130 | 493.39 | 0.62 |
| Pipe 86 | 920 | 12 | 130 | 226.09 | 0.64 |
| Pipe 2400W | 9200 | 18 | 130 | 517.66 | 0.65 |
| Pipe 78 | 2643 | 12 | 130 | -239.71 | 0.68 |
| Pipe 79 | 2674 | 12 | 130 | -239.71 | 0.68 |
| Pipe 17 | 186.67 | 8 | 150 | 106.92 | 0.68 |
| Pipe 102 | 440 | 8 | 150 | 109.11 | 0.7 |
| Pipe 3 | 384.76 | 18 | 130 | 586.08 | 0.74 |
| Pipe 87 | 240 | 12 | 130 | 285.18 | 0.81 |
| Pipe 70 | 200 | 8 | 150 | -138.43 | 0.88 |
| Pipe 80 | 1400 | 12 | 130 | 331.02 | 0.94 |
| Pipe 82 | 2640 | 12 | 130 | 517.66 | 1.47 |
| Pipe 75 | 1320 | 8 | 134 | -239.71 | 1.53 |
| Pipe 74 | 3268 | 8 | 134 | -239.71 | 1.53 |
| Pipe 77 | 1340 | 8 | 134 | -239.71 | 1.53 |
| Pipe 76 | 628 | 8 | 134 | -239.71 | 1.53 |
| Pipe 73 | 1330 | 8 | 134 | -277.95 | 1.77 |
| Pipe 2100W | 8620 | 12 | 130 | 732.64 | 2.08 |
| Pipe 69 | 2650 | 12 | 130 | 732.64 | 2.08 |
| Pipe 2 | 2650 | 12 | 130 | 1010.59 | 2.87 |
| Pipe 72 | 2640 | 8 | 150 | -517.66 | 3.3 |
| Pipe 1 | 400 | 12 | 130 | 1250.3 | 3.55 |

## Peak Daily Demand + Fire Flow Demand (PDD+FFD)



# Peak Daily Demand + Fire Flow Demand (PDD+FFD) Nodes

| Node ID | Elevation ft | Demand GPM | Head ft | Pressure psi | |
|---|---|---|---|---|---|
| Junc FH-SW | 3414 | 1500 | 3482.29 | **29.59** | **20 req.** |
| Junc 89 | 3414 | 8.93 | 3482.33 | 29.61 | |
| Junc 88 | 3413 | 16.97 | 3482.94 | 30.31 | |
| Junc 80 | 3410 | 8.93 | 3483.56 | 31.87 | |
| Junc 83 | 3404 | 16.97 | 3483.32 | 34.37 | |
| Junc 86 | 3400 | 16.97 | 3482.92 | 35.93 | |
| Junc 85 | 3399 | 33.93 | 3483.24 | 36.5 | |
| Junc 84 | 3397 | 34.83 | 3483.66 | 37.55 | |
| Junc 79 | 3395 | 16.97 | 3483.81 | 38.48 | |
| Junc 87 | 3394 | 16.97 | 3483.59 | 38.82 | |
| Junc 82 | 3392 | 33.93 | 3483.53 | 39.66 | |
| Junc 81 | 3387 | 33.93 | 3483.82 | 41.95 | |
| Junc 75 | 3387 | 16.97 | 3484.22 | 42.12 | |
| Junc 76 | 3383 | 16.97 | 3484.2 | 43.85 | |
| Junc 74 | 3381 | 8.93 | 3484.36 | 44.79 | |
| Junc 78 | 3378 | 16.97 | 3484.08 | 45.96 | |
| Junc 77 | 3375 | 8.93 | 3484.26 | 47.34 | |
| Junc 67 | 3374 | 8.04 | 3485.8 | 48.44 | |
| Junc 68 | 3373 | 8.04 | 3485.14 | 48.59 | |
| Junc 69 | 3368 | 0 | 3484.84 | 50.63 | |
| Junc 63 | 3369 | 0 | 3486.88 | 51.08 | |
| Junc 65 | 3361 | 0 | 3486.88 | 54.54 | |
| Junc 66 | 3359 | 8.93 | 3486.5 | 55.25 | |
| Junc 71 | 3357 | 8.04 | 3486.6 | 56.16 | |
| Junc 73 | 3353 | 0 | 3486.32 | 57.77 | |
| Junc 61 | 3352 | 0 | 3486.97 | 58.48 | |
| Junc 72 | 3350 | 8.04 | 3486.4 | 59.1 | |
| Junc 28 | 3350 | 0 | 3486.97 | 59.35 | |
| Junc 32 | 3350 | 0 | 3487.09 | 59.4 | |
| Junc 48 | 3348 | 11.61 | 3486.74 | 60.11 | |
| Junc 26 | 3348 | 16.07 | 3486.95 | 60.21 | |
| Junc 47 | 3347 | 0 | 3486.81 | 60.58 | |

| Node ID | Elevation ft | Demand GPM | Head ft | Pressure psi |
|---|---|---|---|---|
| Junc 70 | 3346 | 8.93 | 3486.83 | 61.02 |
| Junc 16 | 3346 | 24.11 | 3486.95 | 61.07 |
| Junc 15 | 3346 | 0 | 3486.98 | 61.09 |
| Junc 46 | 3345 | 0 | 3486.91 | 61.49 |
| Junc 14 | 3345 | 0 | 3487.03 | 61.54 |
| Junc 44 | 3344 | 0 | 3486.94 | 61.93 |
| Junc 40 | 3344 | 0 | 3486.95 | 61.94 |
| Junc 49 | 3343 | 0 | 3486.89 | 62.35 |
| Junc 29 | 3343 | 18.75 | 3486.98 | 62.39 |
| Junc 30 | 3343 | 0 | 3486.99 | 62.39 |
| Junc 13 | 3343 | 16.97 | 3487.07 | 62.43 |
| Junc 57 | 3342 | 0 | 3486.94 | 62.8 |
| Junc 5 | 3342 | 0 | 3487.19 | 62.91 |
| Junc 50 | 3341 | 10.72 | 3486.9 | 63.22 |
| Junc 18 | 3341 | 19.65 | 3486.95 | 63.24 |
| Junc 45 | 3340 | 0 | 3486.91 | 63.66 |
| Junc 17 | 3340 | 0 | 3486.96 | 63.68 |
| Junc Ph1-FH3 | 3340 | 0 | 3487.08 | 63.73 |
| Junc 51 | 3338 | 10.72 | 3486.92 | 64.53 |
| Junc 52 | 3338 | 0 | 3486.92 | 64.53 |
| Junc 53 | 3337 | 0 | 3486.94 | 64.97 |
| Junc 43 | 3337 | 0 | 3486.95 | 64.97 |
| Junc 25 | 3337 | 14.29 | 3486.95 | 64.97 |
| Junc 19 | 3337 | 0 | 3486.96 | 64.98 |
| Junc 55 | 3336 | 8.04 | 3486.93 | 65.4 |
| Junc 54 | 3336 | 0 | 3486.94 | 65.4 |
| Junc 59 | 3336 | 8.04 | 3486.94 | 65.4 |
| Junc 58 | 3336 | 0 | 3486.94 | 65.4 |
| Junc 41 | 3336 | 0 | 3486.95 | 65.41 |
| Junc 7 | 3336 | 0 | 3487.08 | 65.46 |
| Junc 11 | 3336 | 18.75 | 3487.09 | 65.47 |
| Junc 27 | 3335 | 0 | 3486.96 | 65.85 |

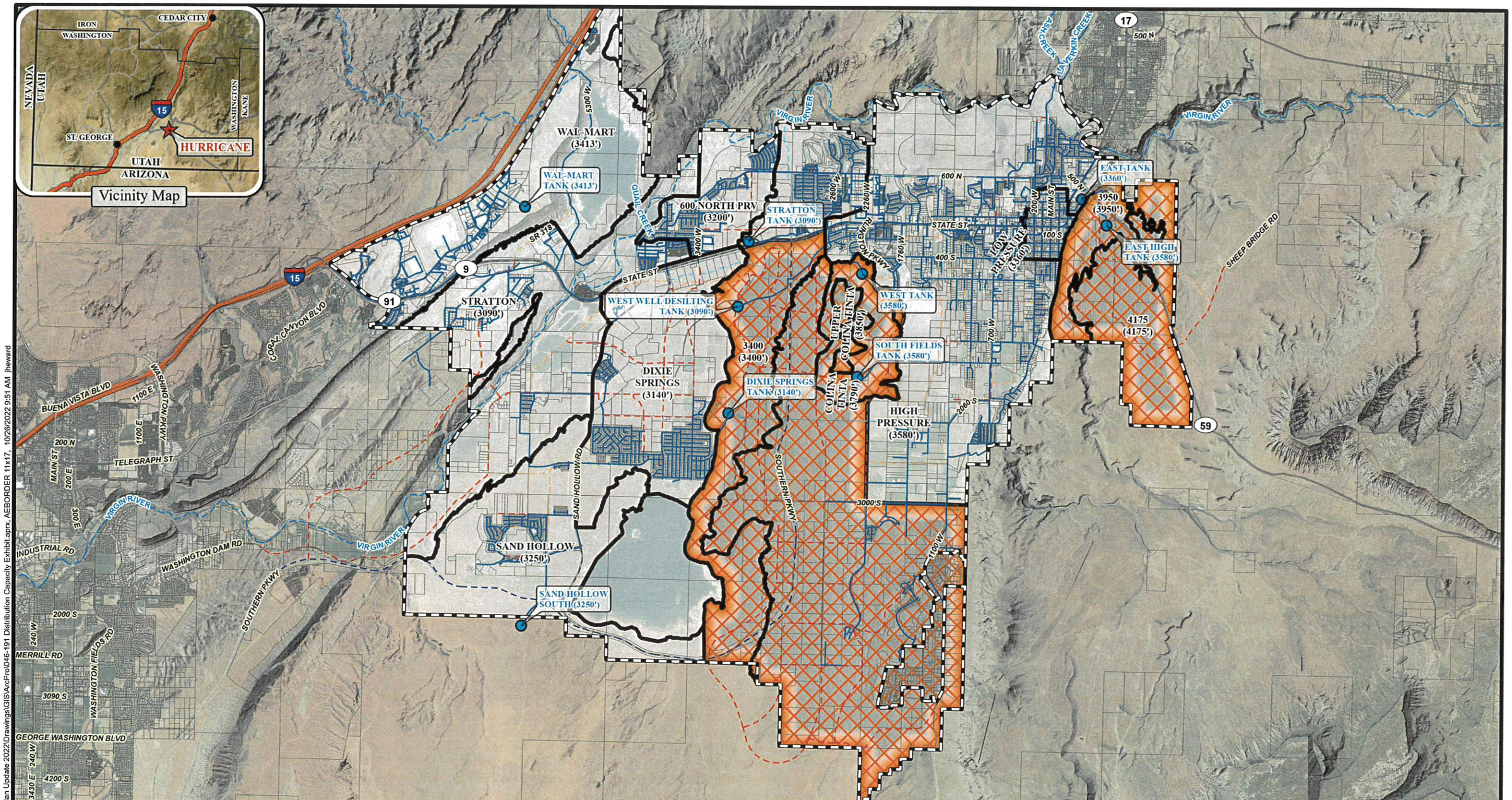
| Node ID | Elevation ft | Demand GPM | Head ft | Pressure psi |
|---|---|---|---|---|
| Junc 24 | 3334 | 19.65 | 3486.95 | 66.27 |
| Junc 20 | 3334 | 0 | 3486.97 | 66.28 |
| Junc 56 | 3333 | 0 | 3486.94 | 66.7 |
| Junc ExFH3 | 3333 | 0 | 3487.23 | 66.83 |
| Junc 23 | 3332 | 0 | 3486.97 | 67.15 |
| Junc 38 | 3332 | 6.25 | 3487.02 | 67.17 |
| Junc 39 | 3332 | 0 | 3487.02 | 67.17 |
| Junc 33 | 3332 | 0 | 3487.07 | 67.19 |
| Junc 31 | 3329 | 12.5 | 3487.03 | 68.47 |
| Junc Ph1-FH2 | 3328 | 0 | 3487.1 | 68.94 |
| Junc 8 | 3328 | 11.61 | 3487.11 | 68.94 |
| Junc 21 | 3326 | 19.65 | 3486.99 | 69.75 |
| Junc 22 | 3326 | 0 | 3487 | 69.76 |
| Junc 36 | 3326 | 0.89 | 3487.02 | 69.77 |
| Junc 37 | 3326 | 1.79 | 3487.02 | 69.77 |
| Junc Ph1-FH1 | 3326 | 0 | 3487.11 | 69.81 |
| Junc 6 | 3326 | 0 | 3487.15 | 69.82 |
| Junc 35 | 3324 | 16.97 | 3487.05 | 70.65 |
| Junc 34 | 3323 | 0 | 3487.05 | 71.08 |
| Junc 60 | 3297 | 0 | 3494.76 | 85.69 |
| Junc 62 | 3287 | 0 | 3489.45 | 87.72 |
| Junc 3 | 3338 | 0 | 3545.64 | 89.97 |
| Junc 10 | 3327 | 0 | 3539.19 | 91.94 |
| Junc 9 | 3327 | 0 | 3541.25 | 92.83 |
| Junc 4 | 3332 | 0 | 3546.92 | 93.12 |
| Junc 12 | 3313 | 0 | 3534.86 | 96.13 |
| Junc 42 | 3302 | 0 | 3524.14 | 96.25 |
| Junc ExFH2 | 3290 | 0 | 3519.88 | 99.61 |
| Junc 1 | 3298 | 0 | 3529.92 | 100.49 |
| Junc ExFH1 | 3305 | 0 | 3548.2 | 105.38 |

## Peak Daily Demand + Fire Flow Demand (PDD+FFD) Links

| Link ID | Length ft | Diameter in | Roughness | Flow GPM | Velocity fps |
|---|---|---|---|---|---|
| Pipe 20 | 45.7 | 8 | 150 | 0 | 0 |
| Pipe 52 | 152.35 | 8 | 150 | 1.6 | 0.01 |
| Pipe 19 | 127.75 | 8 | 150 | 6.25 | 0.04 |
| Pipe 51 | 293.49 | 8 | 150 | 6.77 | 0.04 |
| Pipe 21 | 197.76 | 8 | 150 | 9.87 | 0.06 |
| Pipe 61 | 55.41 | 12 | 100 | 39.31 | 0.11 |
| Pipe 18 | 259.94 | 8 | 150 | 17.91 | 0.11 |
| Pipe 50 | 239.95 | 8 | 150 | 18.14 | 0.12 |
| Pipe 67 | 154.89 | 8 | 150 | -19.67 | 0.13 |
| Pipe CRP0 | 250 | 12 | 130 | -52.03 | 0.15 |
| Pipe 65 | 372.36 | 8 | 150 | 27.71 | 0.18 |
| Pipe 40 | 49.07 | 8 | 150 | 27.71 | 0.18 |
| Pipe 41 | 372.25 | 8 | 150 | 27.71 | 0.18 |
| Pipe 66 | 66.34 | 8 | 150 | 27.71 | 0.18 |
| Pipe 63 | 366.83 | 8 | 150 | 29.23 | 0.19 |
| Pipe 64 | 66.37 | 8 | 150 | 29.23 | 0.19 |
| Pipe 43 | 372.26 | 8 | 150 | 29.23 | 0.19 |
| Pipe 42 | 49.2 | 8 | 150 | 29.23 | 0.19 |
| Pipe 9 | 355.92 | 8 | 150 | -29.88 | 0.19 |
| Pipe 8 | 487.49 | 8 | 150 | -29.88 | 0.19 |
| Pipe 10 | 96.13 | 8 | 150 | -29.88 | 0.19 |
| Pipe 5 | 225.58 | 8 | 150 | 30.32 | 0.19 |
| Pipe 38 | 362.01 | 8 | 150 | 38.35 | 0.24 |
| Pipe 28 | 478.35 | 8 | 150 | 38.35 | 0.24 |
| Pipe 45 | 385.3 | 8 | 150 | 39.31 | 0.25 |
| Pipe 44 | 106.8 | 8 | 150 | 39.31 | 0.25 |
| Pipe 60 | 311.45 | 8 | 150 | 39.31 | 0.25 |
| Pipe 25 | 368.41 | 8 | 150 | 39.53 | 0.25 |
| Pipe 33 | 399.99 | 8 | 150 | 39.53 | 0.25 |
| Pipe 34 | 99.03 | 8 | 150 | 39.53 | 0.25 |
| Pipe 14 | 156.58 | 8 | 150 | -40.22 | 0.26 |
| Pipe 15 | 480.87 | 8 | 150 | -40.22 | 0.26 |
| Pipe 16 | 415.24 | 8 | 150 | -40.22 | 0.26 |
| Pipe 83 | 430 | 12 | 130 | 91 | 0.26 |
| Pipe 62 | 293.1 | 8 | 150 | -40.86 | 0.26 |
| Pipe 39 | 342.98 | 8 | 150 | 42.18 | 0.27 |
| Pipe 29 | 361.83 | 8 | 150 | 42.18 | 0.27 |
| Pipe 36 | 361.83 | 8 | 150 | 47.59 | 0.3 |
| Pipe 37 | 293.37 | 8 | 150 | 47.59 | 0.3 |

| Link ID | Length ft | Diameter in | Roughness | Flow GPM | Velocity fps |
|---|---|---|---|---|---|
| Pipe 56 | 162.17 | 12 | 130 | -113.77 | 0.32 |
| Pipe 49 | 163.95 | 8 | 150 | 53.3 | 0.34 |
| Pipe 12 | 304.26 | 8 | 150 | 54.92 | 0.35 |
| Pipe 46 | 292.53 | 8 | 150 | 55.04 | 0.35 |
| Pipe 57 | 390.74 | 8 | 150 | 55.04 | 0.35 |
| Pipe 58 | 169.58 | 8 | 150 | 55.04 | 0.35 |
| Pipe 48 | 159.97 | 8 | 150 | -58.6 | 0.37 |
| Pipe 7 | 127.12 | 8 | 150 | -66.04 | 0.42 |
| Pipe 6 | 129.55 | 8 | 150 | -66.04 | 0.42 |
| Pipe 59 | 248.84 | 8 | 150 | -69.45 | 0.44 |
| Pipe 13 | 238.37 | 8 | 150 | 74.53 | 0.48 |
| Pipe CRP1 | 950 | 12 | 130 | 169.56 | 0.48 |
| Pipe CRP3 | 420 | 12 | 130 | -169.92 | 0.48 |
| Pipe 30 | 281.87 | 8 | 150 | 79.39 | 0.51 |
| Pipe 31 | 422.84 | 8 | 150 | 79.39 | 0.51 |
| Pipe 32 | 209.62 | 8 | 150 | 79.39 | 0.51 |
| Pipe 84 | 430 | 12 | 130 | -199.16 | 0.56 |
| Pipe 68 | 860.44 | 18 | 130 | 464.14 | 0.59 |
| Pipe 11 | 179.66 | 8 | 150 | -96.4 | 0.62 |
| Pipe 22 | 125.92 | 8 | 150 | -97.79 | 0.62 |
| Pipe 27 | 41.9 | 8 | 150 | 99.28 | 0.63 |
| Pipe 26 | 198.2 | 8 | 150 | 99.28 | 0.63 |
| Pipe 101 | 440 | 8 | 150 | 100.49 | 0.64 |
| Pipe 24 | 45.86 | 8 | 150 | 106.77 | 0.68 |
| Pipe 23 | 129.72 | 8 | 150 | 106.77 | 0.68 |
| Pipe 100 | 880 | 8 | 150 | 108.53 | 0.69 |
| Pipe 35 | 874.02 | 18 | 130 | 576.03 | 0.73 |
| Pipe 47 | 165.56 | 8 | 150 | 113.88 | 0.73 |
| Pipe 53 | 385.25 | 8 | 150 | 113.88 | 0.73 |
| Pipe 54 | 308.02 | 8 | 150 | 113.88 | 0.73 |
| Pipe 99 | 880 | 8 | 150 | 116.57 | 0.74 |
| Pipe 98 | 440 | 8 | 150 | 125.5 | 0.8 |
| Pipe 17 | 186.67 | 8 | 150 | 129.69 | 0.83 |
| Pipe CRP2 | 1000 | 12 | 130 | -295.07 | 0.84 |
| Pipe 4 | 413.75 | 18 | 130 | 680.89 | 0.86 |
| Pipe 81 | 430 | 12 | 130 | 337.47 | 0.96 |
| Pipe 3 | 384.76 | 18 | 130 | 777.29 | 0.98 |
| Pipe 108 | 430 | 8 | 150 | 161.64 | 1.03 |
| Pipe 70 | 200 | 8 | 150 | -169.92 | 1.08 |

| Link ID | Length ft | Diameter in | Roughness | Flow GPM | Velocity fps |
|---|---|---|---|---|---|
| Pipe 2400W | 9200 | 18 | 130 | 882.88 | 1.11 |
| Pipe 78 | 2643 | 12 | 130 | -407.88 | 1.16 |
| Pipe 79 | 2674 | 12 | 130 | -407.88 | 1.16 |
| Pipe 107 | 430 | 8 | 150 | 195.57 | 1.25 |
| Pipe 91 | 430 | 12 | 130 | 441.58 | 1.25 |
| Pipe 105 | 440 | 8 | 150 | 196.58 | 1.25 |
| Pipe 90 | 430 | 12 | 130 | 450.51 | 1.28 |
| Pipe 111 | 430 | 8 | 150 | 204.43 | 1.3 |
| Pipe 104 | 880 | 8 | 150 | 204.62 | 1.31 |
| Pipe 89 | 430 | 12 | 130 | 467.48 | 1.33 |
| Pipe 103 | 880 | 8 | 150 | 212.66 | 1.36 |
| Pipe 88 | 430 | 12 | 130 | 484.45 | 1.37 |
| Pipe 102 | 440 | 8 | 150 | 221.59 | 1.41 |
| Pipe 106 | 430 | 8 | 150 | 229.5 | 1.46 |
| Pipe 110 | 430 | 8 | 150 | 238.36 | 1.52 |
| Pipe 55 | 167.7 | 12 | 130 | -577.91 | 1.64 |
| Pipe 92 | 430 | 12 | 130 | 586.25 | 1.66 |
| Pipe 109 | 430 | 8 | 150 | 273.19 | 1.74 |
| Pipe 85 | 340 | 12 | 130 | 680.18 | 1.93 |
| Pipe 94 | 30 | 12 | 130 | -726.28 | 2.06 |
| Pipe 95 | 430 | 12 | 130 | -735.21 | 2.09 |
| Pipe 96 | 430 | 12 | 130 | -752.18 | 2.13 |
| Pipe 97 | 430 | 12 | 130 | -769.15 | 2.18 |
| Pipe 93 | 400 | 12 | 130 | 773.72 | 2.19 |
| Pipe 86 | 920 | 12 | 130 | 780.67 | 2.21 |
| Pipe 80 | 1400 | 12 | 130 | 830.85 | 2.36 |
| Pipe 82 | 2640 | 12 | 130 | 882.88 | 2.5 |
| Pipe 74 | 3268 | 8 | 134 | -407.88 | 2.6 |
| Pipe 77 | 1340 | 8 | 134 | -407.88 | 2.6 |
| Pipe 76 | 628 | 8 | 134 | -407.88 | 2.6 |
| Pipe 75 | 1320 | 8 | 134 | -407.88 | 2.6 |
| Pipe 87 | 240 | 12 | 130 | 977.25 | 2.77 |
| Pipe 73 | 1330 | 8 | 134 | -474.99 | 3.03 |
| Pipe 2100W | 8620 | 12 | 130 | 1242.27 | 3.52 |
| Pipe 69 | 2650 | 12 | 130 | 1242.27 | 3.52 |
| Pipe 2 | 2650 | 12 | 130 | 1717.27 | 4.87 |
| Pipe 72 | 2640 | 8 | 150 | -882.88 | 5.64 |
| Pipe 1 | 400 | 12 | 130 | 2125.15 | 6.03 |




0 2,500 5,000 10,000
Feet

ALPHA ENGINEERING
43 South 100 East, Suite 100 • St George, Utah 84770
T: 435.628.6500 • F: 435.628.6553 • alphaengineering.com

Legend
- Hurricane Municipal Boundary
- Washington County Parcels
- Pressure Zone Boundaries
- Approximate Extent of Limit Culinary Distribution
- Existing Culinary Water
- Existing Tank

Master Planned Roads
- Major Arterial (106' ROW)
- Minor Arterial (90' ROW)
- Major Collector (70' ROW)
- Minor Collector (60' ROW)

N
W E
S

1 of 1

# Approximate Areas of Limited Distribution Capacity

## Hurricane, Utah

| | |
|---|---|
| **Spatial Reference:** | Utah State Plane NAD 83, feet |
| **Drawn By:** | JRH |
| **Scale:** | 1" = 6,000 feet |
| **Date:** | October 2022 |

P:\046-191 Hurricane Water Model & 6-Yr Plan Update 2022\Drawings\GIS\ArcPro\046-191 Distribution Capacity Exhibit.aprx, AEBORDER 11x17, 10/26/2022 9:51 AM jheward

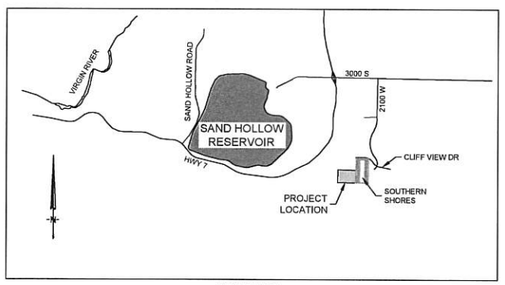
B&G PROJECT NUMBER 221077

# SOUTHERN DUNES TOWNHOMES

# PRELIMINARY PLAT

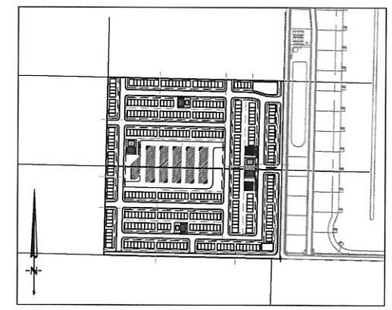
## LOCATED IN HURRICANE, UTAH

SOUTHEAST 1/4 OF SOUTHWEST 1/4 OF SECTION 29 ,
TOWNSHIP 42 SOUTH, RANGE 13 WEST, SALT LAKE BASE AND MERIDIAN
PARCELS H-3400-N & H-3400-O




VICINITY MAP
NTS

| SHEET NO. | DESCRIPTION |
|---|---|
| 1 | COVER SHEET |
| 2 | SITE AND UTILITY PLAN |
| 3 | OFFSITE UTILITY PLAN |
| 4 | GRADING PLAN |
| 5 | PHASING EXHIBIT |



KEY MAP
NTS

### GENERAL NOTES

1. ALL CONSTRUCTION SHALL CONFORM WITH THE CURRENT EDITION OF HURRICANE CITY STANDARDS FOR DESIGN AND CONSTRUCTION, TOGETHER WITH HURRICANE CITY STANDARD DRAWINGS. ANY CONFLICT BETWEEN THESE PLANS AND HURRICANE CITY STANDARDS SHALL BE RESOLVED IN FAVOR OF HURRICANE CITY STANDARDS.
2. ALL WORK SHALL BE SUPERVISED BY A PROPERLY LICENSED AND QUALIFIED GENERAL CONTRACTOR.
3. CONSTRUCTION ACTIVITIES THAT DISTURB ONE OR MORE ACRES OF LAND MUST BE AUTHORIZED UNDER THE UTAH POLLUTANT DISCHARGE ELIMINATION SYSTEM (UPDES). OWNERS AND GENERAL CONTRACTORS ARE REQUIRED TO OBTAIN A STORM WATER PERMIT FROM THE STATE OF UTAH.
4. THE CONTRACTOR/OWNER SHALL PROVIDE ADEQUATE RESOURCES TO CONTROL DUST ON THE SITE AND TRACKING OF MUD FROM THE SITE. DUST COMPLAINTS WILL RESULT IN SUSPENSION OF WORK UNTIL THE PROBLEM IS CORRECTED. TRACKING OF MUD ONTO ADJACENT STREETS SHALL BE MINIMIZED AND CLEANED UP DAILY.
5. IT IS THE CONTRACTOR'S RESPONSIBILITY TO BE FAMILIAR WITH THE MUST-CALL MANDATORY INSPECTION LIST PROVIDED BY THE PUBLIC WORKS DEPARTMENT AND TO ARRANGE FOR MATERIAL TESTING AT THE STANDARD INTERVALS AND QUANTITIES REQUIRED AND PROVIDE DOCUMENTATION OF TEST RESULTS.
6. PROOFS FOR STREET SIGNS SHALL BE SUBMITTED TO THE GIS COORDINATOR PRIOR TO ORDERING OF SIGNS.
7. WORK IN THE PUBLIC WAY REQUIRES AN ENCROACHMENT PERMIT ISSUED BY HURRICANE CITY PUBLIC WORKS.
8. A CITY-APPROVED TRAFFIC CONTROL PLAN MUST BE IN PLACE PRIOR TO COMMENCING ANY WORK THAT AFFECTS THE TRAVELLING PUBLIC.
9. NO WORK SHALL COMMENCE UNTIL A NOTICE-TO-PROCEED HAS BEEN ISSUED BY HURRICANE CITY PUBLIC WORKS.

**DEVELOPER INFORMATION**
RANLIFE HOMES CORDERO LLC
ANTHONY BOCCHINNO
(801) 918-1779
9272 S. 700 E
SANDY, UT 84070

**ENGINEER INFORMATION**
BUSH AND GUDGELL, INC.
PROJECT MANAGER: RICK MEYER
(435) 673-2337
205 EAST TABERNACLE #4
ST. GEORGE, UT 84770

| PROJECT INFORMATION | |
|---|---|
| ZONING | RR |
| LAND USE | PLANNED COMMUNITY |
| | |
| TOTAL AREA | 39.97 ACRES |
| TOTAL UNITS | 344 |
| DENSITY | 8.61 D.U./ ACRE |

OCTOBER 2022


BUSH & GUDGELL, INC.
Engineers - Planners - Surveyors
205 East Tabernacle #4
St. George, Utah 84770
Phone (435) 673-2337


AVOID CUTTING UNDERGROUND UTILITY LINES, IT'S COSTLY
Call before you Dig
1-800-662-4111

| No | Date | By | Revision |
|---|---|---|---|


BUSH & GUDGELL, INC.
Engineers - Planners - Surveyors
205 East Tabernacle Suite #4
St. George, Utah 84770
Phone (435) 673-2337 / Fax (435) 673-3161
www.bushandgudgell.com

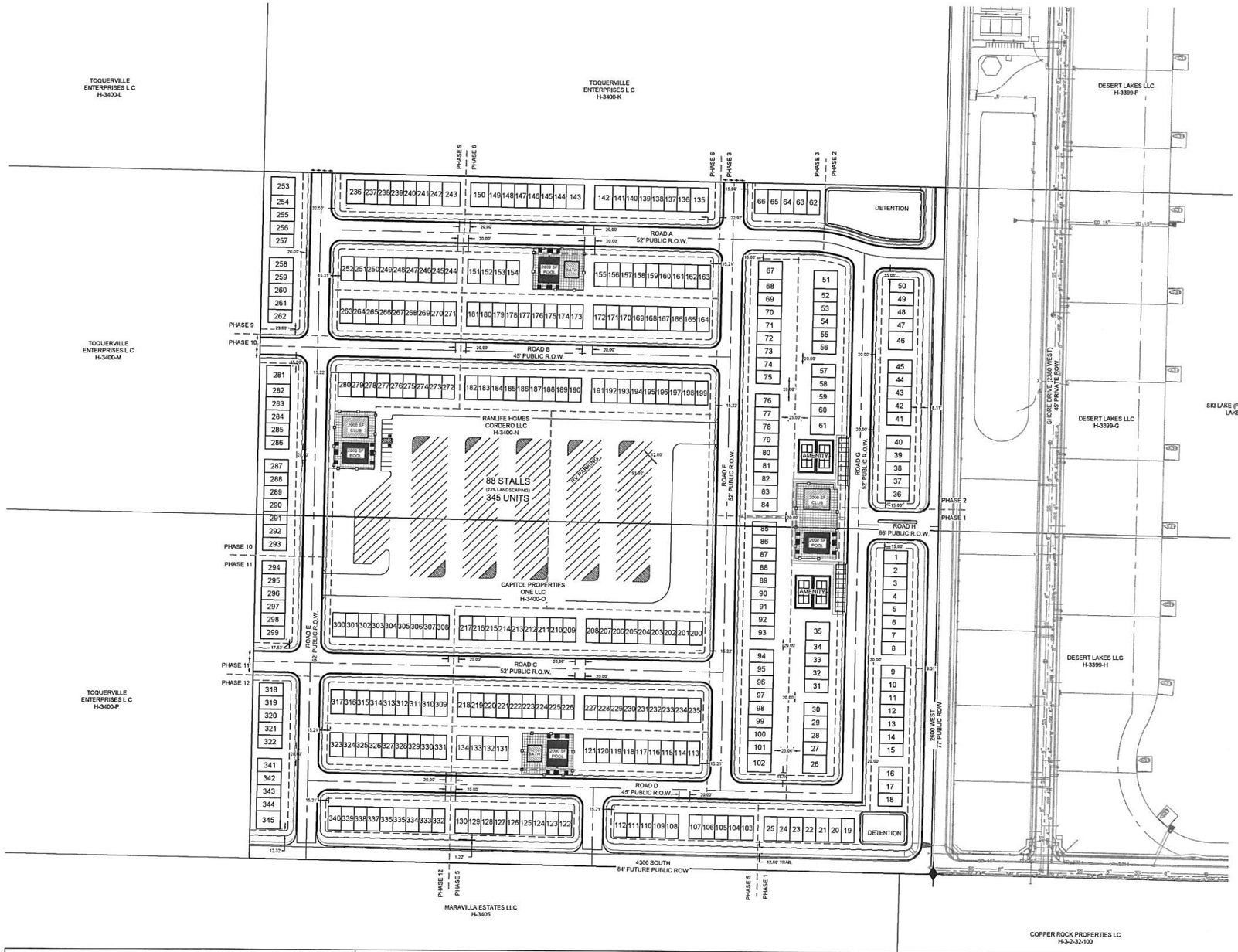

DATE: OCT 2022
DRAWN: CBM/CS
APPROVED: WEM
SCALE: NTS
JOB NO.: 221077

COVER SHEET
SOUTHERN DUNES TOWNHOMES
LOCATED IN HURRICANE, UTAH

SHEET 1 OF 5 SHEETS

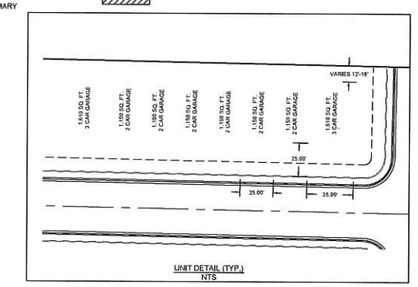
FILE: 2007-PRELIMINARY PLAT

X:\221000-221999\221077 - Southern Shores Ski Lake\Drawings\Preliminary Plat\221077 - Preliminary Plat.dwg




## LEGEND

- EXISTING RIGHT OF WAY LINE
- PROPOSED CURB & GUTTER
- DRAINAGE CHANNEL FLOW LINE
- EXISTING CURB & GUTTER
- EXISTING FENCING
- EXISTING SEWER
- EXISTING WATER
- EXISTING IRRIGATION
- EXISTING GAS
- EXISTING POWER / JUC TRENCH
- PROPOSED SEWER
- PROPOSED WATER
- PROPOSED IRRIGATION
- PROPOSED GAS
- PROPOSED JUC TRENCH
- PHASE LINE
- PUBLIC UTILITY EASEMENT
- STOP / STREET SIGN
- END OF ROAD MARKERS
- SECTIONAL MONUMENT (TYPE, LOCATION, ETC AS NOTED IN PLAT)
- LIMITED COMMON SPACE
- BUILDING PARCEL




UNIT DETAIL (TYP.)
NTS

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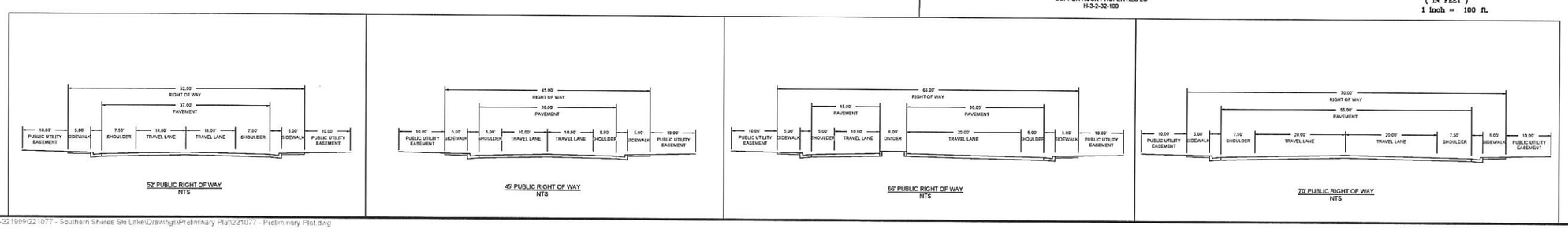
**DEVELOPER INFORMATION**
RANLIFE HOMES CORDERO LLC
ANTHONY BOCCHINNO
(801) 918-1779
9272 S. 700 E
SANDY, UT 84070

**ENGINEER INFORMATION**
BUSH AND GUDGELL, INC.
PROJECT MANAGER: RICK MEYER
(435) 673-2337
205 EAST TABERNACLE #4
ST. GEORGE, UT 84770

GRAPHIC SCALE
100 0 50 100 200
( IN FEET )
1 inch = 100 ft.




| No | Date | By | Revision |
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**BUSH & GUDGELL, INC.**
Engineers - Planners - Surveyors
205 East Tabernacle Suite #4
St. George, Utah 84770
Phone (435) 673-2337 / Fax (435) 673-3161
www.bushandgudgell.com

DATE: OCT 2022
DRAWN: CBW/CL
APPROVED: MEM
SCALE: 1"=100'
JOB NO.: 221077

# SITE & UTILITY PLAN
## SOUTHERN DUNES TOWNHOMES
## LOCATED IN HURRICANE, UTAH

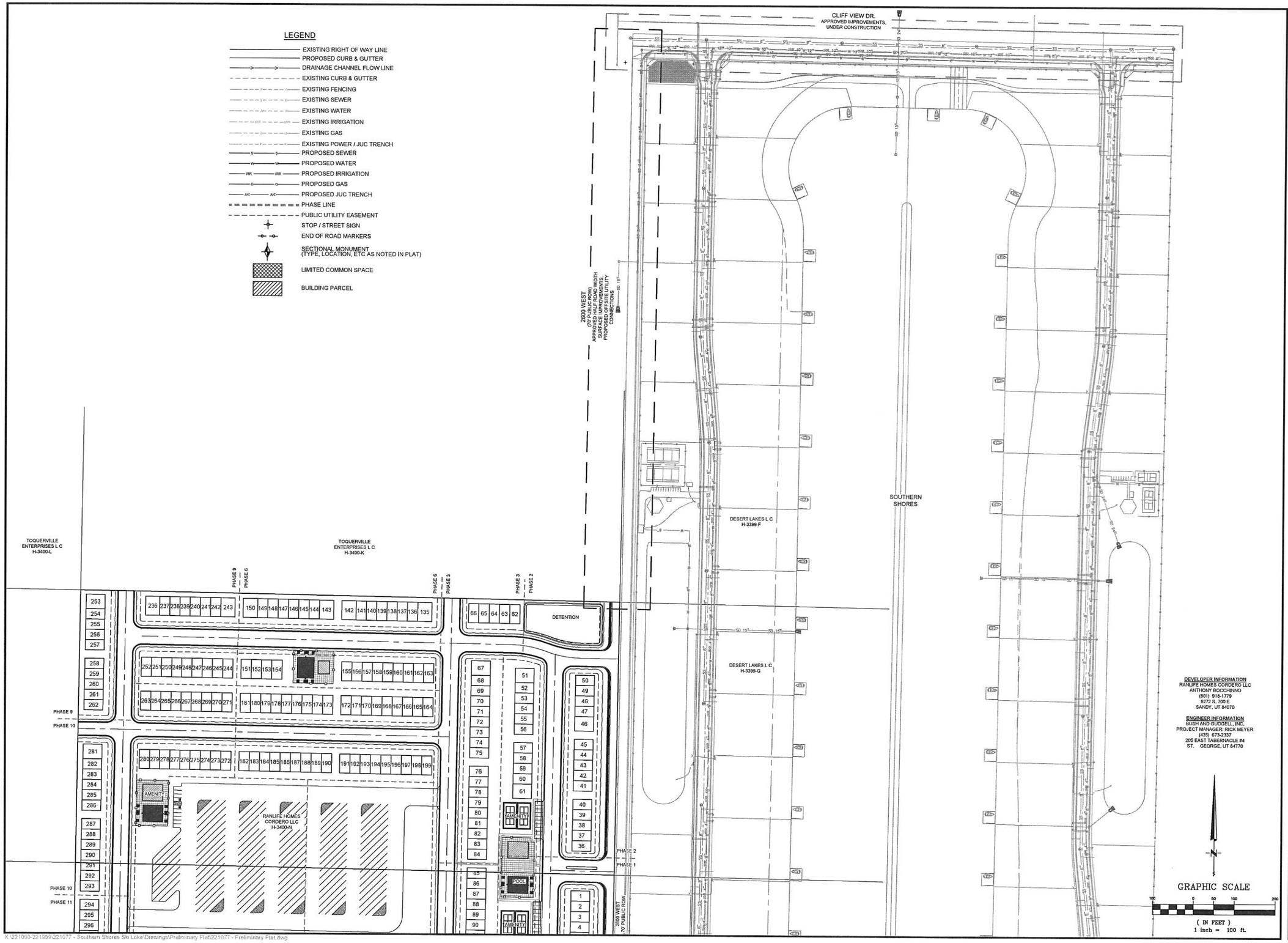
SHEET 2 OF 5 SHEETS

FILE: 221077-PRELIMINARY PLAT

X:\221000-221999\221077 - Southern Shores Ski Lake\Drawings\Preliminary Plat\221077 - Preliminary Plat.dwg

## LEGEND

- EXISTING RIGHT OF WAY LINE
- PROPOSED CURB & GUTTER
- DRAINAGE CHANNEL FLOW LINE
- EXISTING CURB & GUTTER
- EXISTING FENCING
- EXISTING SEWER
- EXISTING WATER
- EXISTING IRRIGATION
- EXISTING GAS
- EXISTING POWER / JUC TRENCH
- PROPOSED SEWER
- PROPOSED WATER
- PROPOSED IRRIGATION
- PROPOSED GAS
- PROPOSED JUC TRENCH
- PHASE LINE
- PUBLIC UTILITY EASEMENT
- STOP / STREET SIGN
- END OF ROAD MARKERS
- SECTIONAL MONUMENT (TYPE, LOCATION, ETC AS NOTED IN PLAT)
- LIMITED COMMON SPACE
- BUILDING PARCEL




| No. | Date | By | Revision |
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**BUSH & GUDGELL, INC.**
Engineers - Planners - Surveyors
205 East Tabernacle Suite #4
St. George, Utah 84770
Phone (435) 673-2337 / Fax (435) 673-3161
www.bushandgudgell.com

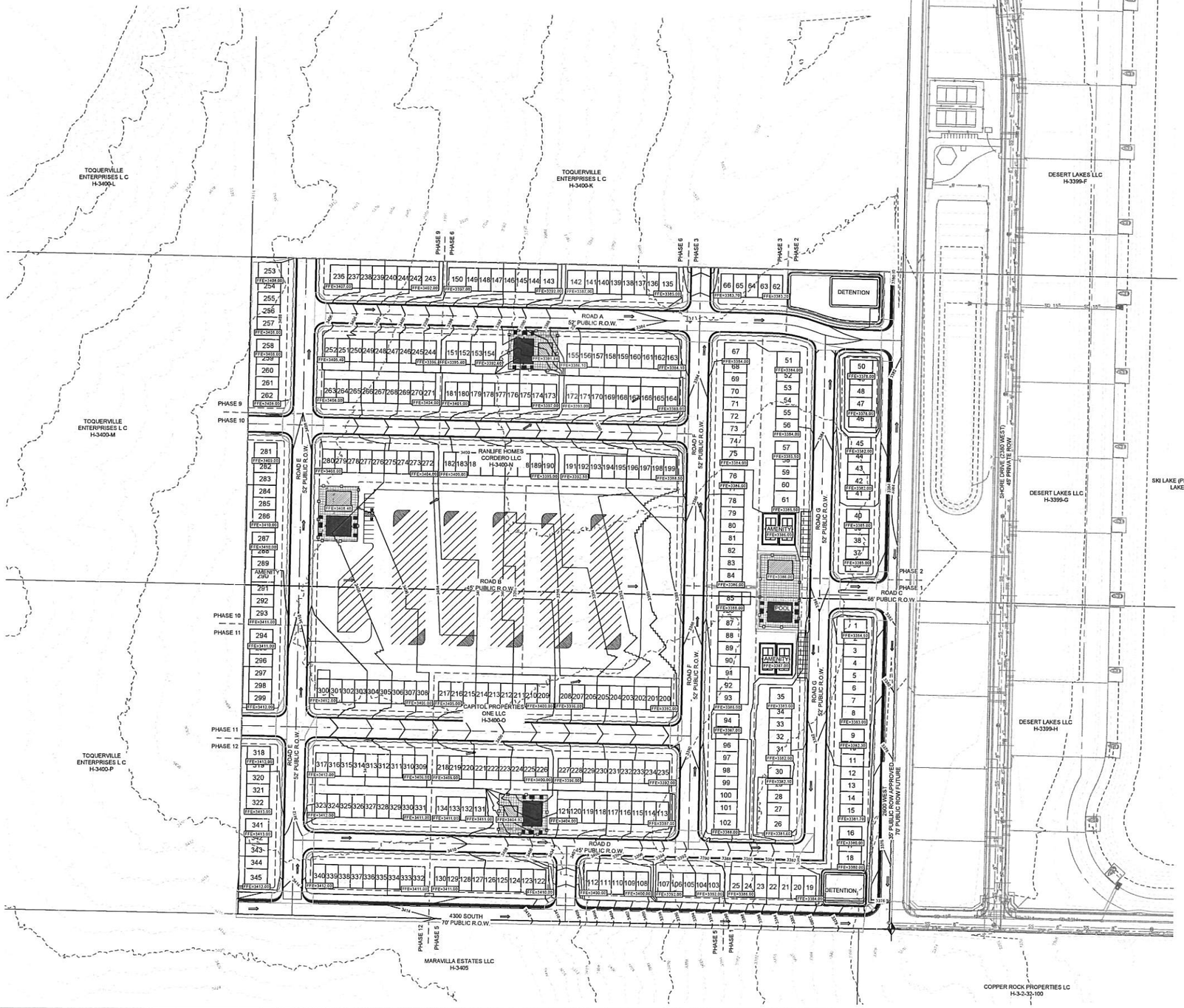
DATE: OCT 2022
DRAWN: CRW/CL
APPROVED: MPM
SCALE: 1"=100'
JOB NO.: 221077

# OFFSITE UTILITY PLAN
## SOUTHERN DUNES TOWNHOMES
## LOCATED IN HURRICANE, UTAH

SHEET 3 OF 5 SHEETS

FILE: 2007-PRELIMINARY PLAT

X:\221000-221999\221077 - Southern Shores Ski Lake\Drawings\Preliminary Plat\221077 - Preliminary Plat.dwg




## LEGEND

- EXISTING RIGHT OF WAY LINE
- PROPOSED CURB & GUTTER
- EXISTING CURB & GUTTER
- EXISTING FENCE
- DRAINAGE CHANNEL FLOW LINE
- EXISTING GRADE CONTOUR
- PROPOSED GRADE CONTOUR
- PROPOSED RETAINING WALL
- 2789 PROPOSED ELEVATION
- EXISTING ELEVATION
- DRAINAGE FLOW DIRECTION

APPROXIMATELY **215,449** CU.YD. OF CUT **130,572** CU.YD. OF FILL AND **84,877** CU.YD. OF EXPORT MATERIAL IS REQUIRED (FOR GRADING PERMIT ONLY) THE CONTRACTOR SHOULD VERIFY THE QUANTITIES FOR COMPLETION OF WORK. QUANTITIES ARE BASED ON FINISH GRADE OF ROADS & PADS.

ALL IMPORTED STRUCTURAL FILL SHALL BE APPROVED BY THE GEOTECHNICAL ENGINEER PRIOR TO DELIVERY TO THE SITE. ALL IMPORTED STRUCTURAL FILL SHALL BE PLACED IN 8-INCH LOOSE HORIZONTAL LIFTS AND COMPACTED TO A MINIMUM OF 95 PERCENT OF MAXIMUM DRY DENSITY (ASTM D-1557).

ALL EXCAVATION, GRADING AND FILL OPERATIONS WITHIN THE BUILDING AREA SHOULD BE OBSERVED BY THE GEOTECHNICAL ENGINEER TO VERIFY SUB-SOIL CONDITIONS AND DETERMINE ADEQUACY OF SITE PREPARATION, SUITABILITY OF FILL MATERIALS AND COMPLIANCE WITH COMPACTION REQUIREMENTS.

THE CONTRACTOR SHALL PROVIDE SUITABLE EQUIPMENT TO CONTROL DUST AND AIR POLLUTION CAUSED BY CONSTRUCTION OPERATIONS. THE CONTRACTOR SHALL ALSO PROVIDE SUITABLE MUD AND DIRT CONTAINMENT TO MAINTAIN THE WORK SITE, ACCESS ROADWAYS AND ADJACENT PROPERTIES IN A CLEAN CONDITION.

ALL EXCAVATION AND GRADING SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF WASHINGTON CITY AND APPENDIX K OF THE UNIFORM BUILDING CODE, 1994 EDITION, AND THE SPECIFICATIONS AND REQUIREMENTS INCLUDED IN THE GEOTECHNICAL STUDY.

GEOTECHNICAL ENGINEER TO PROVIDE GRADING COMPLETION REPORT TO CONFIRM WORK HAS BEEN PERFORMED IN CONFORMANCE WITH THEIR RECOMMENDATIONS.

OWNER IS RESPONSIBLE FOR ALL ON-SITE DRAINAGE AND DETENTION.

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**DEVELOPER INFORMATION**
RANLIFE HOMES CORDERO LLC
ANTHONY BOCCHINNO
(801) 918-1779
9272 S. 700 E
SANDY, UT 84070

**ENGINEER INFORMATION**
BUSH AND GUDGELL, INC.
PROJECT MANAGER: RICK MEYER
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205 EAST TABERNACLE #4
ST. GEORGE, UT 84770

GRAPHIC SCALE
100 0 50 100 200
( IN FEET )
1 inch = 100 ft.

| No | Date | By | Revision |
|---|---|---|---|


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205 East Tabernacle Suite #4
St. George, Utah 84770
Phone (435) 673-2337 / Fax (435) 673-3161
www.bushandgudgell.com

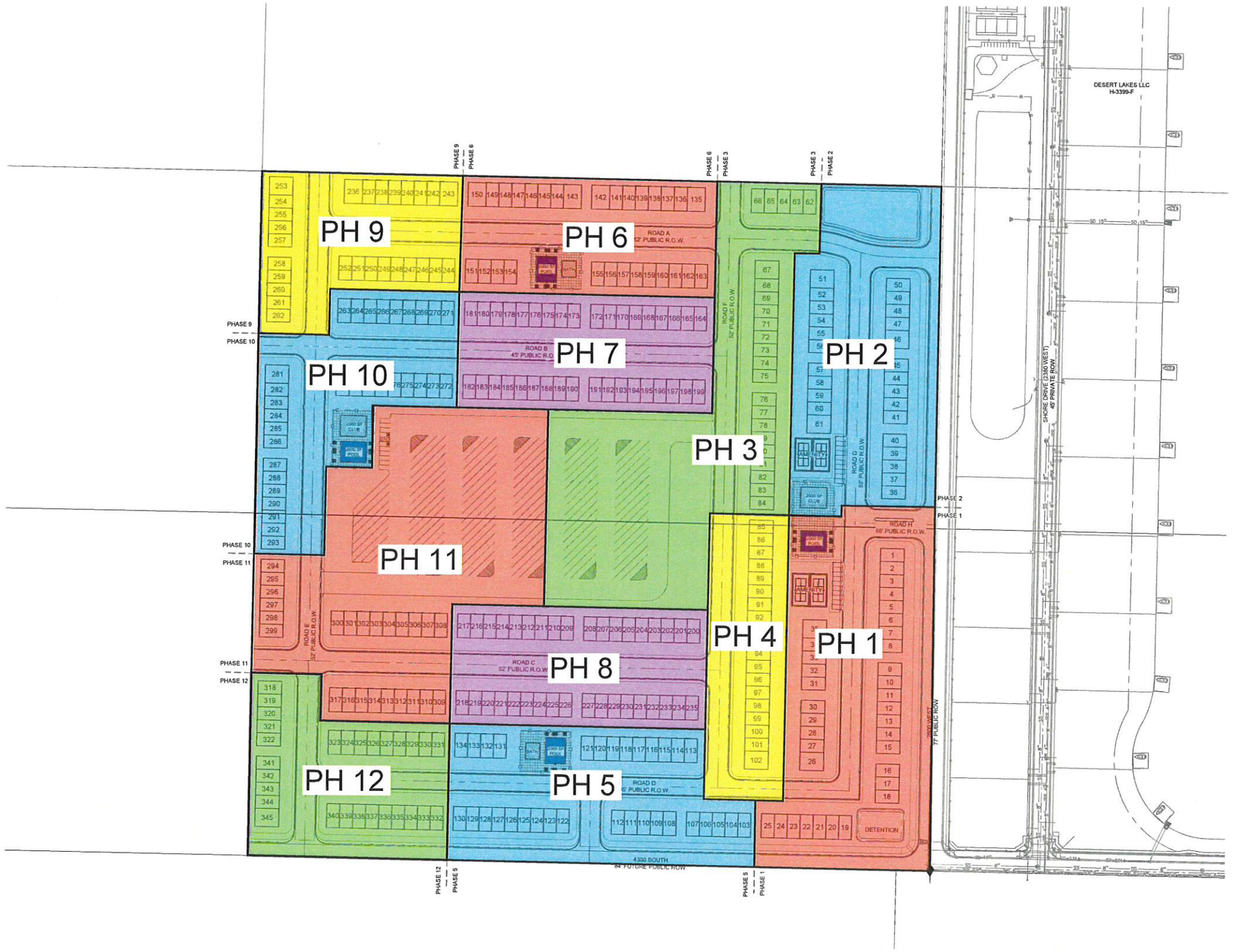

DATE: OCT 2022
DRAWN: CRWCL
APPROVED: WFM
SCALE: 1"=100'
JOB NO.: 221077

# GRADING PLAN
## SOUTHERN DUNES TOWNHOMES
## LOCATED IN HURRICANE, UTAH

SHEET 4 OF 5 SHEETS

FILE: 221077-PRELIMINARY PLAT

X:\221000-221999\221077 - Southern Shores Ski Lake\Drawings\Preliminary Plat\221077 - Preliminary Plat.dwg




AVOID PLACING UNDERGROUND UTILITY LINES IN THE PUBLIC

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BLUE STAKES UTAH CONTACTING

**DEVELOPER INFORMATION**
RANLIFE HOMES CORDERO LLC
ANTHONY BOCCHINNO
(801) 916-1779
9272 S. 700 E
SANDY, UT 84070

**ENGINEER INFORMATION**
BUSH AND GUDGELL, INC.
PROJECT MANAGER: RICK MEYER
(435) 673-2337
205 EAST TABERNACLE #4
ST. GEORGE, UT 84770

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GRAPHIC SCALE

100 0 50 100 200

( IN FEET )
1 inch = 100 ft.

| No | Date | By | Revision |
|---|---|---|---|

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DATE: OCT 2022
DRAWN: CBW/CL
APPROVED: WFM
SCALE: 1"=100'
JOB NO.: 221077

# PHASING EXHIBIT
## SOUTHERN DUNES TOWNHOMES
## LOCATED IN HURRICANE, UTAH

SHEET 5 OF 5 SHEETS

FILE: 221077-PRELIMINARY PLAT

X:\221000-221999\221077 - Southern Shores Ski Lake\Drawings\Preliminary Plat\221077 - Preliminary Plat.dwg

PLANNING & ZONING
HURRICANE CITY
UTAH
147 N 870 W Hurricane UT
PHONE: 435.635.2811 FAX: 435.635.2184

# PRELIMINARY PLAT APPLICATION

*For office use only: $150.00 Fee*
File No. 2023-PP-01
Receipt No. 8-164647

Name: Western MTG & Realty Co Contact: Brent Moser Telephone: 801-793-0346

Address: 950 E Foster Wells Rd, Pasco, WA 99301 Fax No.

Email: enhancedhomesofutah@gmail.com Agent Email: karl@pv-eng.com; treasa@pv-eng.com

Agent (If Applicable): ProValue Engineering- Karl Rasmussen Telephone: 435-668-8307

Address/Location of Subject Property: approx. 4392 W 2400 S

Tax ID of Subject Property: H-4-2-11-31031-GS3, H-4-2-11-2103-GS3, H-4-2-14-1101-GS3, H-4-2-13-2114-GS3, H-4-2-12-2113-GS3, H-4-2-12-1102-GS3 Zone District: R1-6 & R1-10

Proposed Use: (Describe, use extra sheet if necessary. Include total number of lots) Subdivision with 238 lots

Submittal Requirements: The preliminary plat application shall provide the following:

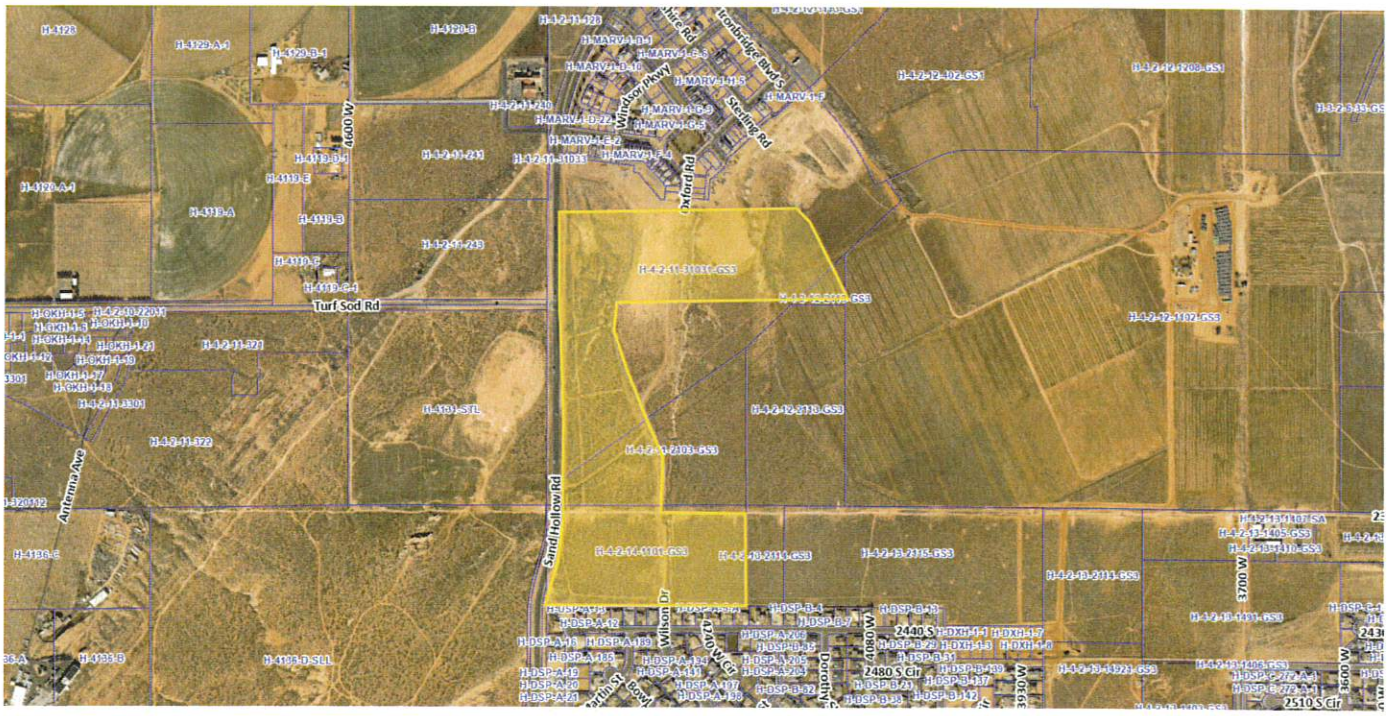
✓ 1. Description: In a title block located in the lower right-hand corner of the sheet the following is required:
- ✓ a. The proposed name of the subdivision.
- ✓ b. The location of the subdivision, including the address and section, township and range.
- ✓ c. The names and addresses of the owner or subdivider, if other than the owner.
- ✓ d. Date of preparation, and north point.
- ✓ e. Scale shall be of sufficient size to adequately describe in legible form, all required conditions of Chapter 39, City Subdivision regulations.

✓ 2. Existing Conditions: The preliminary plat shall show:
- ✓ a. The location of the nearest monument.
- ✓ b. The boundary of the proposed subdivision and the acreage included.
- ✓ c. All property under the control of the subdivider, even though only a portion is being subdivided. (Where the plat submitted covers only a part of the subdivider's tract, a sketch of the prospective street system of the unplatted parts of the subdivider's land shall be submitted, and the street system of the part submitted shall be considered in light of existing Master Street Plan or other Commission studies.)
- ✓ d. The location, width, and names/numbers of all existing streets within two hundred (200) feet of the subdivision and of all prior streets or other public ways, utility rights of way, parks and other public open spaces, within and adjacent to the tract.
- ✓ e. The location of all wells and springs or seeps, proposed, active and abandoned, and of all reservoirs or ponds within the tract and at a distance of at least one hundred feet (100') beyond the tract boundaries.
- ✓ f. Existing sewers, water mains, culverts, or other underground facilities within the tract, indicating the pipe sizes, grades, manholes and the exact locations.
- ✓ g. Existing Hurricane Canal Company facilities; other ditches, canals, natural drainage channels and open waterways and any proposed realignments.

PLANNING & ZONING
# HURRICANE CITY
UTAH — **STAFF COMMENTS**

| | |
|---|---|
| **Agenda Date:** | **01/26/2023** |
| **Application Number:** | 2023-PP-01 |
| **Type of Application:** | Preliminary Plat Application |
| **Action Type:** | Administrative |
| **Applicant:** | Western MTG & Realty Co Brent Moser |
| **Agent:** | ProValue Engineering-Karl Rasmussen |
| **Request:** | Approval of a Preliminary Plat |
| **Location:** | Approximately 4392 W 2400 S |
| **Zoning:** | R1-6 and R1-10 |
| **General Plan Map:** | Planned Community |

**Discussion:** The applicant is proposing a 238 lot single family subdivision located between the existing Marla at Elim Valley development and Dixie Springs. This is part of Phase 3 of the Sand Hollow Gateway Public Infrastructure District, phase 1 of which is currently under development. No off-site improvement plans for phase 3 (or Phase 2) have been submitted at this time.



*Map is approximate*

**JUC Comments**

**Public Works:** What work is the PID doing? Need to see improvement drawings from the PID.
**Water:** Has a water model been submitted? Need details on water flow, looping, pressure zones, and mainline connections and connections to adjacent properties. The HDPE water line that goes through the property should be replaced and the water line will need to be in designated right of ways
**Cable:** No comments.
**Phone:** No facilities in subdivision. Fiber on the west side of Sand Hollow Road. When will Sand Hollow Road be redesigned?
**Power:** Dixie Power area. No power out there. Need major improvements. Will need to review it with the applicant. Wilson Drive and 2300 S will need to be improved to get power to the area. Almost nothing out there currently.
**Sewer:** 15" sewer main runs through several lots. Adjust roadways or relocate sewer.
**Engineering:** Legal description incorrect. Much of Sand Hollow Road is not dedicated through here. Stormwater note is inconsistent with both the proposed plans and the PID plans. Construction plans for Marla at Elim Valley Phase 2 have not been approved yet. Construction plans connecting the proposed subdivision to the existing end of Iron Bridge Blvd haven't been approved, depicted plans are about 700' from existing improvements. Master planned storm drain seems to follow Iron Bridge. Existing storm drain isn't shown. Where does the water from the ditch go? GIS data is insufficient. Partial street construction must be completed with or prior to phase 3 and 4 on Wilson Drive. Trail along 2300 S should continue to Sand Hollow Road. Section corner must be preserved on 2300 S. Sand Hollow Road is planned as a 112' wide roadway.Unless a separate roadway dedication plat is planned the subdivision boundary should follow the existing west parcel boundary. It appears the proposed subdivision includes an area owned by the WCWCD. Existing storm drain isn't shown on Wilson Dr, stormwater discharged from a pipe near there. Traffic model required, current model only for phase 1 of the PID.
**Streets:** Need stormwater plan from Wilson Dr. Will stormwater connect with Marla detention? Current detention system at Marla may need to be addressed.
**Fire:** Access okay.

**Staff Comments: Preliminary Plat**

1. **Density:** Within this subdivision, property north of Turf Sod Road is R1-6 and south of Turf Sod Road is R1-10. All lots north of Turf Sod Road meet R1-6 development standards and all lots south of Turf Sod Road meet R1-10 development standards.
2. Wilson Drive and 2300 S are depicted as outside the phasing lines. These roads will need to be constructed, either by the PID or the developer, as part of this subdivision
3. Due to the elevation differences 2300 S will not connect to Sand Hollow Road, as anticipated by the Transportation Master Plan, however the Active Transportation Master plan does show the master planned trail connecting 2300 S to the trail on Sand Hollow Road. This will need to be shown on the plans. Staff recomends that the trail follows the power easement on the property.
4. In the southwest corner of the property, the plans show Lot 182 extending all the way from the parcel boundary to Sand Hollow Road, however as shown below there is a strip of property owned by the Washington County Water Conservancy District. This needs to be resolved:

5. Will serve letters have been provided from the culinary and sanitary water providers
6. A note has been added to the plat indicating whether the property is in a tortoise take area
7. A water acknowledgement form has not been provided
8. **Utilities:** JUC has raised some concerns about utility availability for this project.
   **a.** Hurricane City Code 10-37-4 states:
      i. *Land shall be developed only where existing infrastructure is in place or will be timely provided to service proposed development. The City may require an analysis to be completed to determine whether adequate public facilities are available to service a development and whether such development will change existing levels of service or will create a demand which exceeds acceptable levels of service for roadways, intersections, bridges, storm drainage facilities, water lines, water pressure, sewer lines, fire and emergency response times, and other similar public services. The City may disapprove a proposed development if demand for public services exceeds accepted levels of service. No subsequent approval of such development shall be given until either the developer or the City installs improvements calculated to raise service levels to the standard adopted by the City.*
   b. Hurricane City Code 9-6-3 states:
      i. *A. Land shall be developed only where public facilities are in place or will be timely provided to serve proposed development at a level of service which meets the City's adopted level of service standards. For each proposed development the City may require an analysis to be completed to determine whether adequate public facilities are available to service the development and whether the development will change existing levels of service or will create a demand which exceeds acceptable levels of service for any public facility, including roadways, intersections, bridges, storm drainage facilities, water storage, water lines, water pressure, sewer lines, fire and emergency response times, and other similar public services.*

ii. *B. A proposed development shall not be approved if demand for a public facility will exceed adopted level of service standards unless public facility improvements, reasonably calculated to raise service levels to adopted level of service standards, will be available to serve the development.*

c. The following is what is required to show for a preliminary plat from 10-39-7:
   i. *A tentative plan or method by which the subdivider proposes to handle the stormwater drainage for the subdivision.*
   ii. *The location, width and names/numbers of all existing streets within 200 feet of the subdivision and of all prior streets or other public ways, easements, utility rights-of-way, parks and other public open spaces, within and adjacent to the tract.*
   iii. *A tentative plan or method for providing nondiscriminatory access to the subdivision for purposes of placement of communications infrastructure, and for purposes of placement of utility infrastructure.*
d. The City has normally required a tentative plan or method for how an applicant would provide utility services within a preliminary plat. The code requires that during the construction drawings, that the applicant provide a full plan on how to provide utility services to a site, and then bond for those improvements prior to recording a plat.
e. This site is within the Sand Hollow Gateway Public Infrastructure District Phase 3. The City has not received or reviewed any plans or drawing of future infrastructure other than overall concept plans on how services will tie between each of the phases. If the PID is not funded and submits plans, the developer would be responsible for improvements to all master plan roadway and associated utilities.
f. As noted by the JUC comments, there are some utilities that are available at the site, but there were significant concerns raised by Public Works and Power.

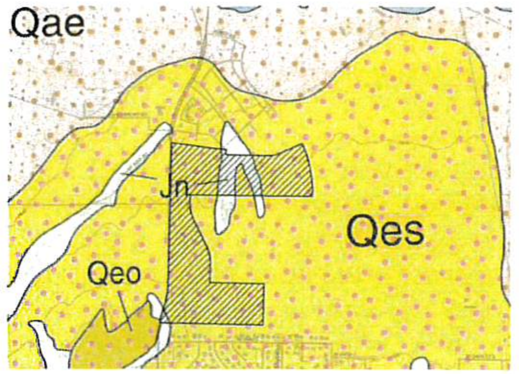
**Recommendation:** The Planning Commission should review this application based on standards within the Hurricane City Code. Because of the concerns raised by the different utilities and planning staff, staff would recommend continuing the item to allow the applicant time to respond to the following concerns:

1. Utilities. The applicant should submit a preliminary plan on how utilities shall be addressed. The applicant and the City should discuss the concerns raised by power. Planning staff's main concern is about adequate services and to what extent it would take for the applicant to address those items.
2. Address the property ownership concerns raised in this report. The proposed plat includes property not owned by the applicant.
3. Address active transportation concerns raised in this report.
4. A water acknowledgment form has not been provided as required by City Code.

# PRELIMINARY PLAT FOR:
# DIXIE MEADOWS SUBDIVISION

**LOCATED IN SECTIONS 11-14, T42S, R14W, S.L.B.&M.**
**SAND HOLLOW RD, HURRICANE, WASHINGTON COUNTY, UTAH**

## GEOLOGICAL MAP




## GEOLOGICAL NARRATIVE

QEO/QES: EOLIAN SAND DEPOSITS (HOLOCENE TO UPPER PLEISTOCENE):–

WELL SORTED, FINE– TO MEDIUM–GRAINED, WELL–ROUNDED, FROSTED QUARTZ SAND; SAND IS RECYCLED PRINCIPALLY FROM THE NAVAJO SANDSTONE AND KAYENTA FORMATION; LOCALLY FORMS SMALL DUNES PARTLY STABILIZED BY VEGETATION; LOCALLY INCLUDES THICK CALCIC SOILS (HARDPAN OR CALICHE); TYPICALLY LESS THAN 20 FEET (6 M) THICK.

JN: NAVAJO SANDSTONE (LOWER JURASSIC)

PALE–REDDISH–ORANGE, REDDISH–BROWN, OR WHITE, CLIFF–FORMING, CROSS–BEDDED, QUARTZ SANDSTONE; FORMS SPECTACULAR SHEER CLIFFS, DEEP CANYONS, AND IMPRESSIVE SPIRES, PROMONTORIES, AND MONOLITHS; CONSISTS OF WELL SORTED, WELL–ROUNDED, FINE TO MEDIUM–GRAINED, FROSTED QUARTZ SAND; BEDDING CONSISTS OF HIGH–ANGLE, LARGE–SCALE CROSS–BEDDING IN TABULAR–PLANAR, WEDGE–PLANAR, AND TROUGH–SHAPED SETS 10 TO 45 FEET OR MORE (3–14+ M) THICK; CONTAINS SPARSE PLANAR INTERDUNE DEPOSITS AND LOCALLY COMMON IRONSTONE BANDS AND CONCRETIONS; LOCALLY PROMINENTLY JOINTED (SEE, FOR EXAMPLE, ROGERS AND ENGELDER, 2004; ROGERS AND OTHERS, 2004); LOWER PART FORMS TRANSITION ZONE CHARACTERIZED BY PLANAR–BEDDED, FINE–GRAINED SANDSTONE AND SILTY SANDSTONE WITH THIN SILTSTONE INTERBEDS WITH WAVY BEDDING, FLASER–LIKE LAMINAE, AND SOFT–SEDIMENT DEFORMATION AND BIOTURBATION FEATURES, AND LESS COMMON BUT RESISTANT CROSS–STRATIFIED SANDSTONE; DIVIDED INTO THREE INFORMAL NON–STRATIGRAPHIC UNITS OF VARIABLE BUT ROUGHLY EQUAL THICKNESS BASED ON COLOR AND WEATHERING HABIT IN THE SOUTH PART OF ZION NATIONAL PARK (DOELLING AND OTHERS, 2002): (1) "WHITE NAVAJO," WHICH FORMS THE UPPER PART OF THE NAVAJO SANDSTONE AND IS PALE–GRAY, YELLOWISH–GRAY, ORANGISH–GRAY, AND WHITE BECAUSE OF ALTERATION, REMOBILIZATION, AND BLEACHING OF LIMONITIC AND HEMATITIC (IRON–BEARING) CEMENT, PROBABLY DUE TO HYDROCARBON MIGRATION (SEE, FOR EXAMPLE, BEITLER AND OTHERS, 2003); (2) "PINK NAVAJO," WHICH FORMS THE MIDDLE PART OF THE NAVAJO SANDSTONE, IS GENERALLY LESS RESISTANT THAN THE "WHITE NAVAJO" ABOVE AND "BROWN NAVAJO" BELOW, AND IS PALE REDDISH ORANGE DUE TO MORE UNIFORMLY DISPERSED HEMATITIC CEMENT; AND (3) "BROWN NAVAJO," WHICH IS STREAKED MEDIUM TO DARK REDDISH BROWN DUE TO IRON OXIDE REMOBILIZATION CAUSED BY GROUND–WATER OR HYDROCARBON MIGRATION, AND WHICH FORMS THE LOWER MASSIVE CLIFF OF THE NAVAJO SANDSTONE AND IS CORRELATIVE IN PART WITH THE LOWER TRANSITIONAL BEDS OF THE NAVAJO; NIELSEN AND CHAN (IN PREPARATION) DESCRIBED DIAGENETIC FACIES AND FLUID–RELATED ALTERATION OF THE NAVAJO SANDSTONE IN SOUTHWEST UTAH; THE UPPER, UNCONFORMABLE CONTACT OF THE NAVAJO IS SHARP AND PLANAR AND CORRESPONDS TO A PROMINENT BREAK IN SLOPE, WITH CLIFF–FORMING, CROSS–BEDDED SANDSTONE BELOW AND REDDISH–BROWN MUDSTONE OF THE SINAWAVA MEMBER OF THE TEMPLE CAP FORMATION ABOVE; DEPOSITED IN A VAST COASTAL AND INLAND DUNE FIELD WITH PREVAILING WINDS PRINCIPALLY FROM THE NORTH (BLAKEY, 1994, PETERSON, 1994); CORRELATIVE WITH THE NUGGET SANDSTONE OF NORTHERN UTAH AND WYOMING AND THE AZTEC SANDSTONE OF SOUTHERN NEVADA AND ADJACENT AREAS (SEE, FOR EXAMPLE, KOCUREK AND DOTT, 1983; RIGGS AND OTHERS, 1993); THE LOWER TRANSITION INTERVAL, WHICH REACHES ITS MAXIMUM THICKNESS OF ABOUT 300 FEET (100 M) IN THE RED CLIFFS AREA NORTHEAST OF ST. GEORGE, REPRESENTS DEPOSITION IN A SAND–DOMINATED SABKHA ENVIRONMENT (TUESINK, 1989; SANSOM, 1992); MUCH OF THE SAND MAY ORIGINALLY HAVE BEEN TRANSPORTED TO AREAS NORTH AND NORTHWEST OF UTAH VIA A TRANSCONTINENTAL RIVER SYSTEM THAT TAPPED GRENVILLIAN–AGE (ABOUT 1.0 TO 1.3 BILLION–YEAR–OLD) CRUST INVOLVED IN APPALACHIAN OROGENESIS OF EASTERN NORTH AMERICA (DICKINSON AND GEHRELS, 2003; RAHL AND OTHERS, 2003; REINERS AND OTHERS, 2005); FORMS THE PRINCIPAL AQUIFER THROUGHOUT MUCH OF THE QUADRANGLE (CLYDE, 1987; HURLOW, 1998; HEILWEIL AND OTHERS, 2000; HEILWEIL AND OTHERS, 2002; ROWLEY AND DIXON, 2004; ROWLEY AND OTHERS, 2004); ABOUT 1800 TO 2300 FEET (550–700 M) THICK.

## SUBDIVISION BOUNDARY LEGAL DESCRIPTION

COMMENCING AT THE NORTHEAST CORNER OF SECTION 14, TOWNSHIP 42 SOUTH, RANGE 13 WEST, OF THE SALT LAKE BASE AND MERIDIAN; THENCE S01°07'04"W ALONG THE EAST SECTION LINE, 34.00 FEET TO THE POINT OF BEGINNING. THENCE S88°31'01"E 256.01 FEET; THENCE S01°29'01"W 282.00 FEET; THENCE S01°20'05"W 345.19 FEET; THENCE N88°52'30"W 760.79 FEET; THENCE N88°57'52"W 77.00 FEET; THENCE N89°02'45"W 753.41 FEET; THENCE NORTHERLY ALONG THE ARC OF A NON–TANGENT CURVE TO THE RIGHT, HAVING A RADIUS OF 744.00 FEET AND A RADIAL BEARING OF S83°49'47"E, A DISTANCE OF 144.89 FEET, THROUGH A CENTRAL ANGLE OF 11°09'28" (LONG CHORD BEARS: N11°44'57"E 144.66 FEET); THENCE N17°19'41"E 192.45 FEET; THENCE NORTHERLY ALONG THE ARC OF A 856.00 FOOT RADIUS CURVE TO THE LEFT A DISTANCE OF 243.09 FEET, THROUGH A CENTRAL ANGLE OF 16°16'16", (LONG CHORD BEARS: N09°11'33"E 242.27 FEET); THENCE N01°03'25"E 1380.75 FEET; THENCE N01°03'25"E 92.03 FEET; THENCE N01°03'25"E 696.13 FEET; THENCE S82°24'51"E 630.52 FEET; THENCE S84°38'00"E 160.08 FEET; THENCE S84°38'53"E 52.00 FEET; THENCE S04°50'09"W 60.20 FEET; THENCE SOUTHEASTERLY ALONG THE ARC OF A 20.00 FOOT RADIUS CURVE TO THE LEFT A DISTANCE OF 31.23 FEET, THROUGH A CENTRAL ANGLE OF 89°28'09", (LONG CHORD BEARS: S39°53'55"E 28.15 FEET); THENCE S84°38'00"E 8.58 FEET; THENCE EASTERLY ALONG THE ARC OF A 374.00 FOOT RADIUS CURVE TO THE LEFT A DISTANCE OF 28.96 FEET, THROUGH A CENTRAL ANGLE OF 04°26'10", (LONG CHORD BEARS: S86°51'05"E 28.95 FEET); THENCE S89°04'10"E 611.08 FEET; THENCE EASTERLY ALONG THE ARC OF A 374.00 FOOT RADIUS CURVE TO THE LEFT A DISTANCE OF 159.37 FEET, THROUGH A CENTRAL ANGLE OF 24°24'56", (LONG CHORD BEARS: N78°43'22"E 158.17 FEET); THENCE N66°30'54"E 388.79 FEET; THENCE S23°09'17"E 74.55 FEET; THENCE SOUTHERLY ALONG THE ARC OF A NON–TANGENT CURVE TO THE RIGHT, HAVING A RADIUS OF 1922.99 FEET AND A RADIAL BEARING OF S67°57'21"W, A DISTANCE OF 653.23 FEET, THROUGH A CENTRAL ANGLE OF 19°27'47" (LONG CHORD BEARS: S12°18'45"E 650.09 FEET); THENCE S00°00'35"W 108.85 FEET; THENCE N89°04'10"W 1881.94 FEET; THENCE S00°15'33"W 109.62 FEET; THENCE SOUTHERLY ALONG THE ARC OF A NON–TANGENT CURVE TO THE LEFT, HAVING A RADIUS OF 566.56 FEET AND A RADIAL BEARING OF S88°51'39"E, A DISTANCE OF 89.27 FEET, THROUGH A CENTRAL ANGLE OF 09°01'40" (LONG CHORD BEARS: S03°22'29"E 89.18 FEET); THENCE SOUTHERLY ALONG THE ARC OF A NON–TANGENT CURVE TO THE LEFT, HAVING A RADIUS OF 545.00 FEET AND A RADIAL BEARING OF N82°01'19"E, A DISTANCE OF 165.58 FEET, THROUGH A CENTRAL ANGLE OF 17°24'27" (LONG CHORD BEARS: S16°40'55"E 164.95 FEET); THENCE S25°23'08"E 495.31 FEET; THENCE SOUTHERLY ALONG THE ARC OF A 474.94 FOOT RADIUS CURVE TO THE RIGHT A DISTANCE OF 219.14 FEET, THROUGH A CENTRAL ANGLE OF 26°26'14", (LONG CHORD BEARS: S12°10'07"E 217.21 FEET); THENCE S01°05'54"W 309.11 FEET; THENCE S89°02'49"E 585.03 FEET; THENCE S88°31'01"E 0.08 FEET TO THE POINT OF BEGINNING.

AREA CONTAINS 3,096,400 SQUARE FEET OR 71.084 ACRES.

## DESERT TORTOISE TAKE AREA

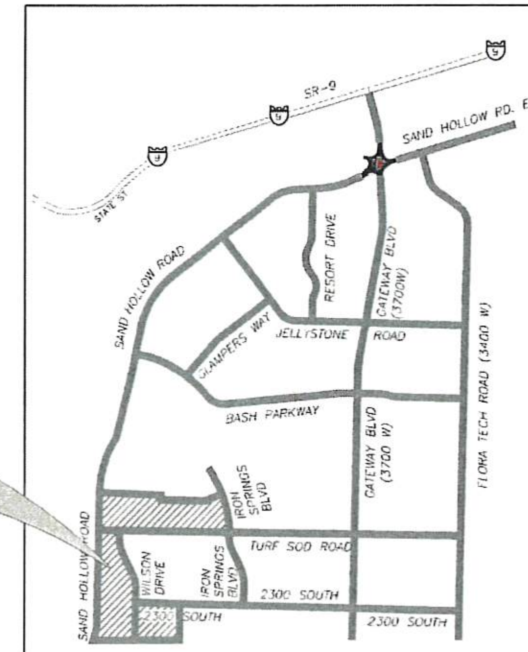
THE PROJECT IS NOT LOCATED IN A DESERT TORTOISE TAKE AREA. (PER RED CLIFFS DESERT RESERVE TAKE AREA 7 MAP)

## GEOLOGICAL HAZARDS

| | |
|---|---|
| FAULTS & SURFACE FAULTING | NONE |
| LIQUEFACTION | H2 – HIGH2–SIMILAR IN TEXTURE TO HIGH CATEGORY, NO GROUND–WATER INFORMATION |
| FLOODING | NONE |
| LANDSLIDE HAZARD | NONE |
| ROCKFALL HAZARD | NONE |
| BRECCIA PIPES AND PALEOKARST | NONE |
| CALICHE | CA – CALICHE |
| COLLAPSIBLE SOIL | CSA–STREAM/TERRACE ALLUVIUM >=3% |
| EXPANSIVE SOIL | ESL–SOILS WITH LOW SUSCEPTIBILITY FOR EXPANSION |
| GYPSIFEROUS SOIL & ROCK | NONE |
| PIPING & EROSION | P&ES–SOILS SUSCEPTIBLE TO PIPING AND EROSION |
| SHALLOW BEDROCK | BRB–BURIED: AREAS WHERE DEPTH TO BEDROCK IS GENERALLY ≤10 FEET BENEATH SOIL COVER AND BRB–HARD: AREAS WHERE GENERALLY HARD AND RESISTANT BEDROCK VISIBLE AT GROUND SURFACE |
| WIND BLOWN SAND | WBSH–HIGH: MODERN SAND–DUNE OR SHEET–SAND DEPOSITS |
| SHALLOW GROUND WATER | NONE |

THE MITIGATION OF POTENTIAL HAZARDS WILL BE RECOMMENDED IN THE FUTURE GEOTECHNICAL REPORT.

**PROJECT LOCATION**




## VICINITY MAP

N.T.S.

## ADDITIONAL NOTES

STORM WATER CAN BE LOCALLY RETAINED AND CONTROLLED USING RETENTION BASINS. THIS IS THE METHOD TO HANDLE STORM WATER.

THERE ARE NO HURRICANE CANAL FACILITIES IN THE SUBJECT AREA.

PROPERTY CAN BE SERVED BY HURRICANE CITY WATER, AND ASH CREEK SPECIAL SERVICE DISTRICT.

THERE ARE NO WELLS, SPRINGS OR SEEPS ON THIS PROPERTY.

OWNER PLANS TO ALLOW PLACEMENT OF COMMUNICATIONS INFRASTRUCTURE AND PLACEMENT OF UTILITY INFRASTRUCTURE ON AND ALONG ALL RIGHTS–OF–WAY AND EASEMENTS.

## LAND USE SUMMARY

TOTAL LOTS: 238

TOTAL LOTS PER PHASE

PHASE 1: 74
PHASE 2: 58
PHASE 3: 38
PHASE 4: 36
PHASE 5: 32

ZONING PER PHASE

PHASE 1–2: R1–6
PHASE 3–5: R1–10

AVERAGE LOT SIZES PER PHASE

PHASE 1: 6,685 SQ. FT. OR 0.153 ACRES
PHASE 2: 6,969 SQ. FT. OR 0.160 ACRES
PHASE 3: 11,704 SQ. FT. OR 0.269 ACRES
PHASE 4: 11,522 SQ. FT. OR 0.265 ACRES
PHASE 5: 12,171 SQ. FT. OR 0.279 ACRES

## OWNERS:

WESTERN MORTGAGE & REALTY COMPANY

## CONTACT REPRESENTATIVE:

BRENT MOSER
(801)–793–0346
THEBEACHATSANDHOLLOW@GMAIL.COM

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REVISIONS

| NO | DESCRIPTION | DATE | BY |
|---|---|---|---|
| | | | |

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Phone: (435) 590-3127 Chad Hill

PRELIMINARY PLAT FOR:
DIXIE MEADOWS SUBDIVISION
LOCATED IN SECTIONS 11-14, T42S, R14W, S.L.B.&M.
SAND HOLLOW RD, HURRICANE, WASHINGTON COUNTY, UTAH

DATE: 12/19/2022
SCALE: N.T.S.
JOB NO. 336-012
SHEET NO: 1 OF 8

PRELIMINARY PLAT

# FULL SITE PRELIMINARY PLAT FOR:
# DIXIE MEADOWS SUBDIVISION

LOCATED IN SECTIONS 11-14, T42S, R14W, S.L.B.&M.
SAND HOLLOW RD, HURRICANE, WASHINGTON COUNTY, UTAH

**PROPOSED 52.00' ROW**
N.T.S.




**PROPOSED 77.00' ROW**
N.T.S.

SCALE IN FEET
100 0 100

## LEGEND

- PROPERTY LINE
- ADJACENT PROPERTY LINE
- EXISTING SEWER LINE
- EXISTING WATER LINE
- CENTER LINE
- 10' PUBLIC UTILITY EASEMENT (PUE)
- SECTION LINE
- PHASE LINE
- MAJOR CONTOUR
- MINOR CONTOUR
- SECTION CORNER AS DESCRIBED
- SET PROVALUE ENGINEERING REBAR & CAP P.L.S. #7837685
- SET P.K. NAIL IN TBC ON PROPERTY LINE PROJECTION

## NOTES

FOR LOTS SIZE AND AREA SEE FURTHER SHEETS.

SUBDIVISION IS LOCATED IN THE FOLLOWING PARCELS:
H-4-2-11-31031
H-4-2-11-2103
H-4-2-14-1101
H-4-2-13-2114

| NO | DESCRIPTION | DATE | BY |
|---|---|---|---|
| | | | |

REVISIONS


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FULL SITE PRELIMINARY PLAT FOR
DIXIE MEADOWS SUBDIVISION
LOCATED IN SECTIONS 11-14, T42S, R14W, S.L.B.&M.
SAND HOLLOW RD, HURRICANE, WASHINGTON COUNTY, UTAH

DATE: 10-18-2022
SCALE: 1"=100'

JOB NO. 336-010

SHEET NO.
**2 OF 8**

FULL SITE PRELIMINARY PLAT

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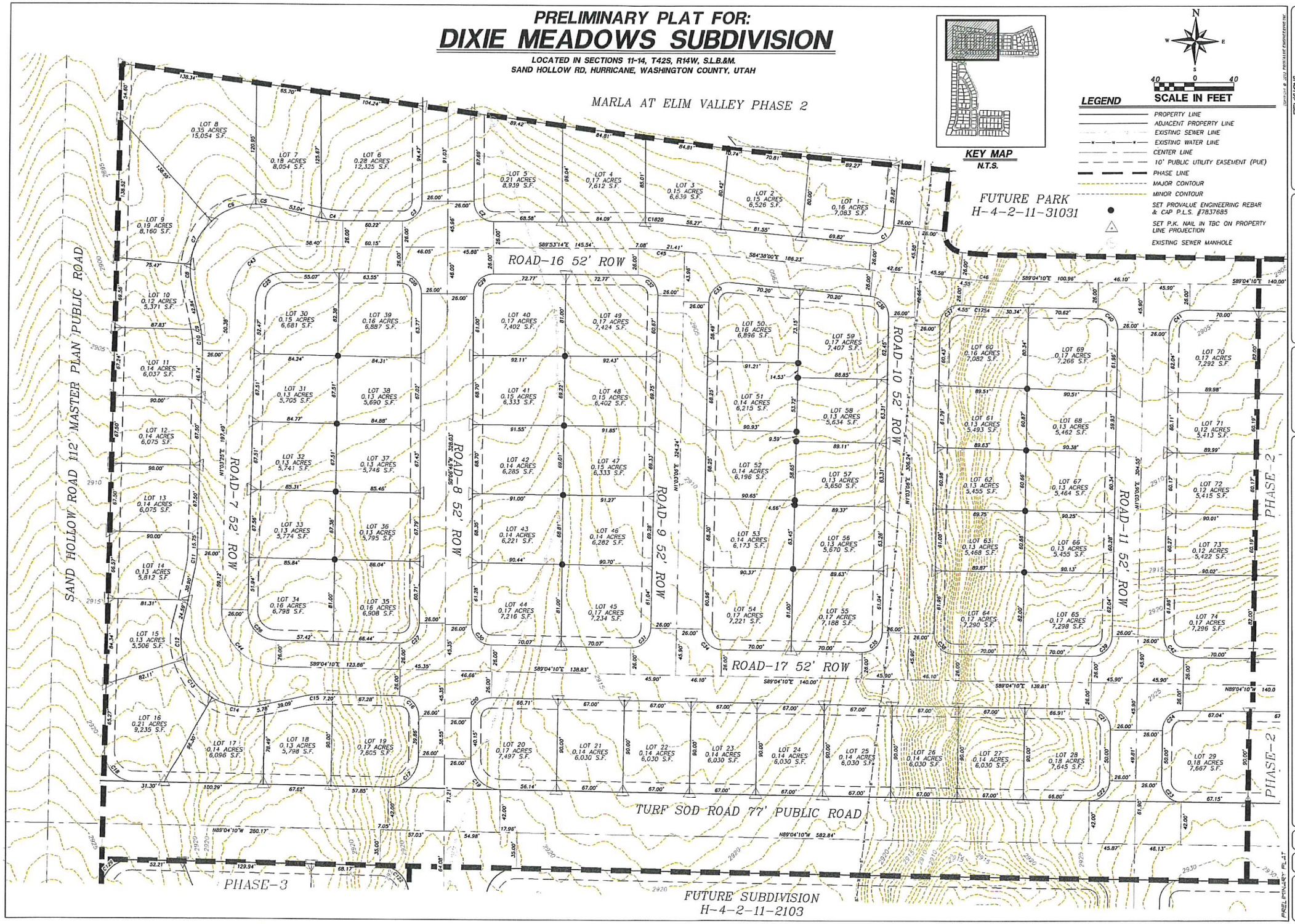
# PRELIMINARY PLAT FOR:
# DIXIE MEADOWS SUBDIVISION

LOCATED IN SECTIONS 11-14, T42S, R14W, S.L.B.&M.
SAND HOLLOW RD, HURRICANE, WASHINGTON COUNTY, UTAH

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PRELIMINARY PLAT FOR
DIXIE MEADOWS SUBDIVISION
LOCATED IN SECTIONS 11-14, T42S, R14W, S.L.B.&M.
SAND HOLLOW RD, HURRICANE, WASHINGTON COUNTY, UTAH

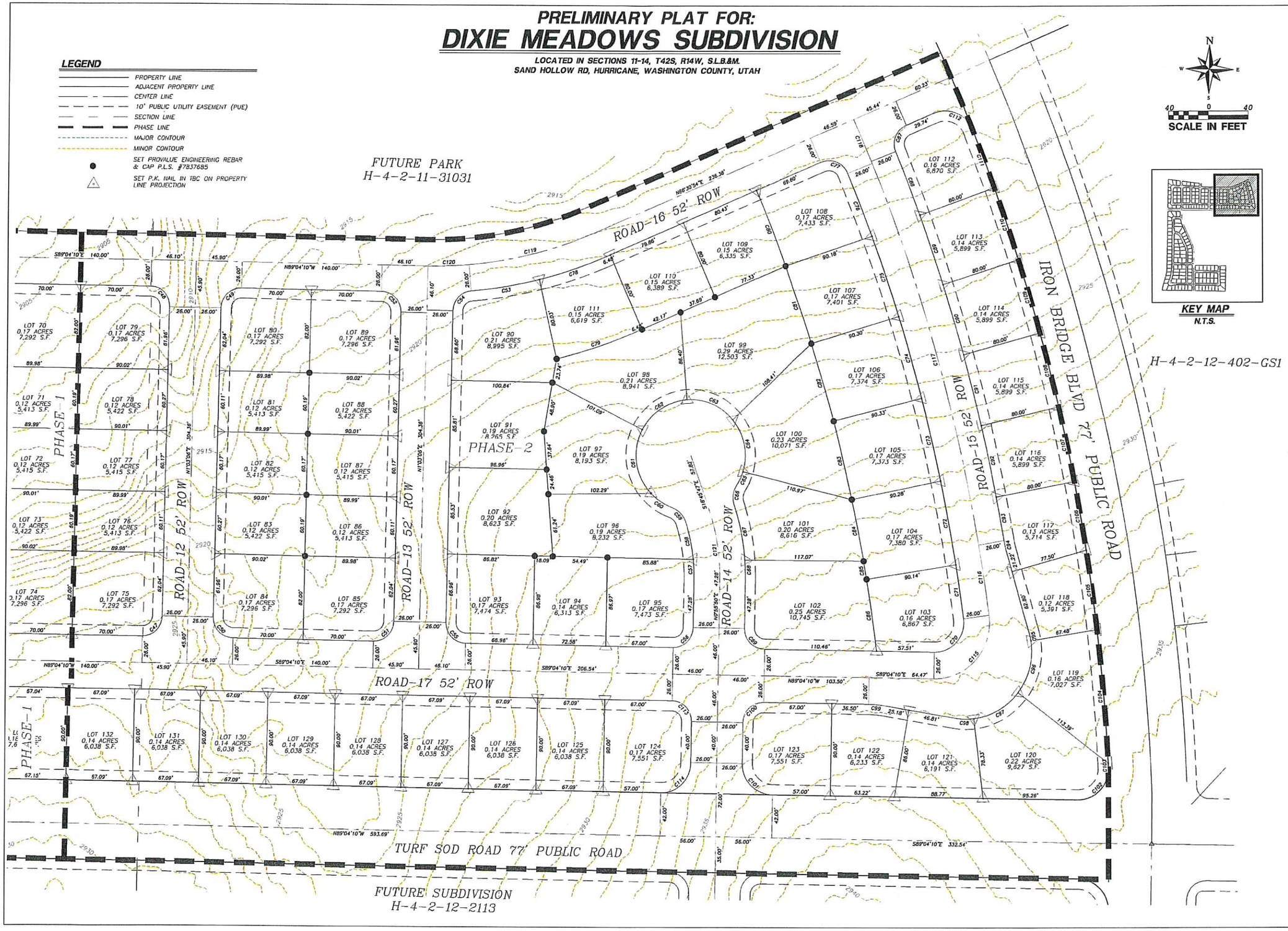
DATE: 12/19/2022
SCALE: 1"=40'
JOB NO. 356-010
SHEET NO. 3 OF 8

# PRELIMINARY PLAT FOR:
# DIXIE MEADOWS SUBDIVISION

LOCATED IN SECTIONS 11-14, T42S, R14W, S.L.B.&M.
SAND HOLLOW RD, HURRICANE, WASHINGTON COUNTY, UTAH

**LEGEND**

- PROPERTY LINE
- ADJACENT PROPERTY LINE
- CENTER LINE
- 10' PUBLIC UTILITY EASEMENT (PUE)
- SECTION LINE
- PHASE LINE
- MAJOR CONTOUR
- MINOR CONTOUR
- SET PROVALUE ENGINEERING REBAR & CAP P.L.S. #7837695
- SET P.K. NAIL IN TBC ON PROPERTY LINE PROJECTION




KEY MAP
N.T.S.

| NO | DESCRIPTION | DATE | BY |
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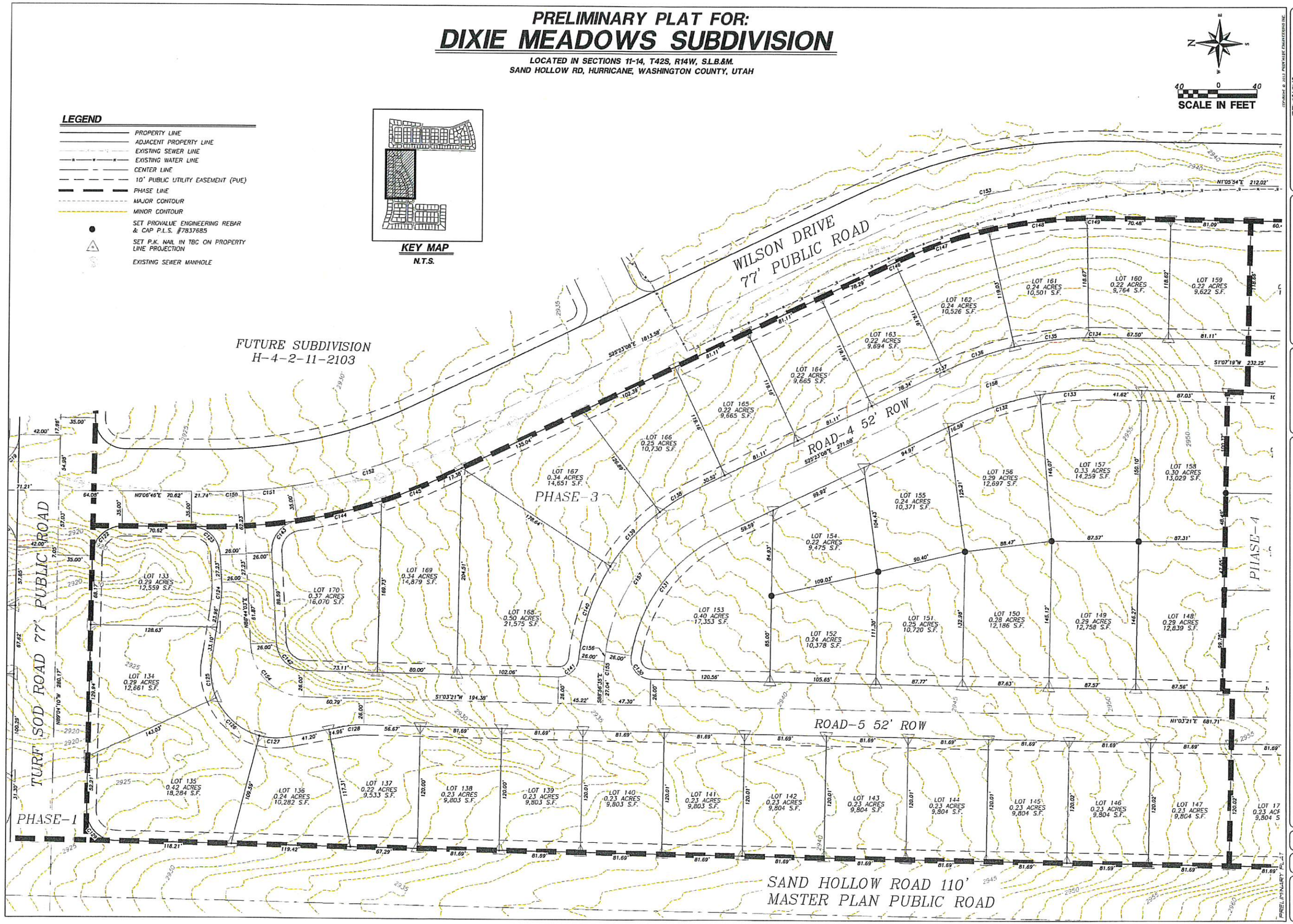
PRELIMINARY PLAT FOR
DIXIE MEADOWS SUBDIVISION
LOCATED IN SECTIONS 11-14, T42S, R14W, S.L.B.&M.
SAND HOLLOW RD, HURRICANE, WASHINGTON COUNTY, UTAH

DATE: 12/18/2022
SCALE: 1"=40'
JOB NO. 336-002
SHEET NO. 4 OF 8

PRELIMINARY PLAT

# PRELIMINARY PLAT FOR:
# DIXIE MEADOWS SUBDIVISION

LOCATED IN SECTIONS 11-14, T42S, R14W, S.L.B.&M.
SAND HOLLOW RD, HURRICANE, WASHINGTON COUNTY, UTAH




| NO | DESCRIPTION | DATE | BY |
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REVISIONS


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PRELIMINARY PLAT FOR
DIXIE MEADOWS SUBDIVISION
LOCATED IN SECTIONS 11-14, T42S, R14W, S.L.B.&M.
SAND HOLLOW RD, HURRICANE, WASHINGTON COUNTY, UTAH

DATE: 12/19/2022
SCALE: 1"=40'
JOB NO. 336-00
SHEET NO. 5 OF 8

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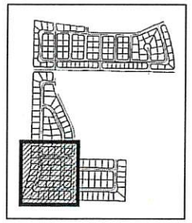
# PRELIMINARY PLAT FOR:
# DIXIE MEADOWS SUBDIVISION

LOCATED IN SECTIONS 11-14, T42S, R14W, S.L.B.&M.
SAND HOLLOW RD, HURRICANE, WASHINGTON COUNTY, UTAH



**KEY MAP**
N.T.S.

## LEGEND

- PROPERTY LINE
- ADJACENT PROPERTY LINE
- EXISTING SEWER LINE
- EXISTING WATER LINE
- EXISTING OVERHEAD POWER
- CENTER LINE
- 10' PUBLIC UTILITY EASEMENT (PUE)
- SECTION LINE
- PHASE LINE
- MAJOR CONTOUR
- MINOR CONTOUR
- SET PROVALUE ENGINEERING REBAR & CAP P.L.S. #7837685
- SET P.K. NAIL IN TBC ON PROPERTY LINE PROJECTION

| NO | DESCRIPTION | DATE | BY |
|---|---|---|---|
| | | | |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PRELIMINARY PLAT FOR
DIXIE MEADOWS SUBDIVISION
LOCATED IN SECTIONS 11-14, T42S, R14W, S.L.B.&M.
SAND HOLLOW RD, HURRICANE, WASHINGTON COUNTY, UTAH

DATE: 12/18/2022
SCALE: 1"=40'
JOB NO. 336-012
SHEET NO. 6 OF 8

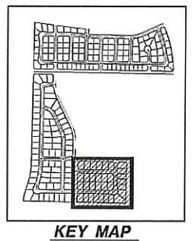
PRELIMINARY PLAT

# PRELIMINARY PLAT FOR:
# DIXIE MEADOWS SUBDIVISION

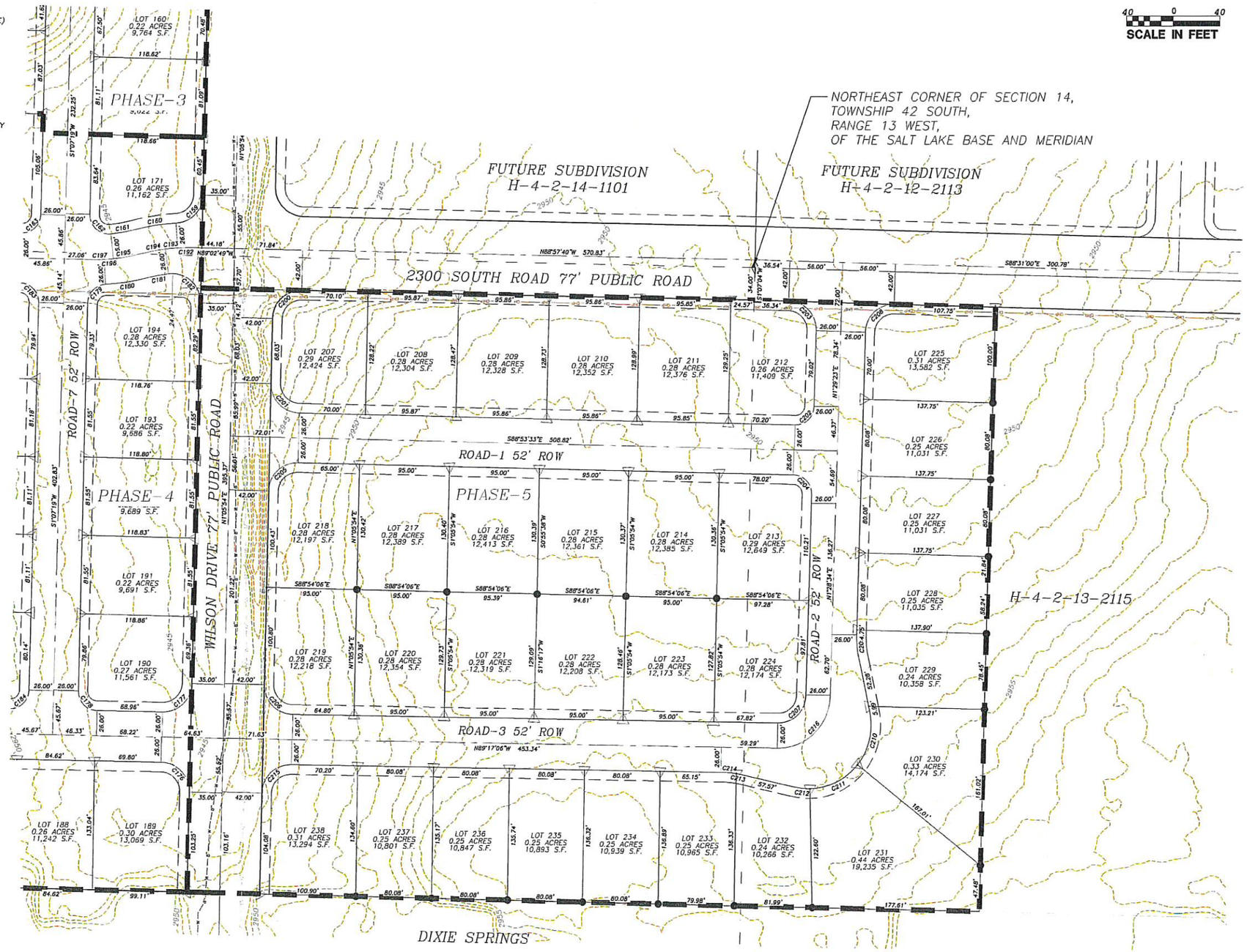
**LOCATED IN SECTIONS 11-14, T42S, R14W, S.L.B.&M.**
**SAND HOLLOW RD, HURRICANE, WASHINGTON COUNTY, UTAH**

**LEGEND**

- PROPERTY LINE
- ADJACENT PROPERTY LINE
- EXISTING SEWER LINE
- EXISTING WATER LINE
- EXISTING OVERHEAD POWER
- CENTER LINE
- 10' PUBLIC UTILITY EASEMENT (PUE)
- SECTION LINE
- PHASE LINE
- MAJOR CONTOUR
- MINOR CONTOUR
- SECTION CORNER AS DESCRIBED
- SET PROVALUE ENGINEERING REBAR & CAP P.L.S. #7837685
- SET P.K. NAIL IN TBC ON PROPERTY LINE PROJECTION
- EXISTING SEWER MANHOLE



**KEY MAP**
N.T.S.

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PRELIMINARY PLAT FOR
DIXIE MEADOWS SUBDIVISION
LOCATED IN SECTIONS 11-14, T42S, R14W, S.L.B.&M.
SAND HOLLOW RD, HURRICANE, WASHINGTON COUNTY, UTAH

DATE: 12/19/2012
SCALE: 1"=40'
JOB NO: 336-012
SHEET NO: **7 OF 8**

PRELIMINARY PLAT

## CURVE TABLE FOR:
# DIXIE MEADOWS SUBDIVISION

**LOCATED IN SECTIONS 11-14, T42S, R14W, S.L.B.&M.**
**SAND HOLLOW RD, HURRICANE, WASHINGTON COUNTY, UTAH**

### CURVE TABLE

| CURVE | LENGTH | RADIUS | CHORD DIST. | CHORD BRG. | DELTA |
|---|---|---|---|---|---|
| C1 | 31.60' | 20.00' | 28.41' | S50°06'05"W | 90°31'51" |
| C2 | 31.40' | 20.00' | 28.27' | N44°54'55"W | 89°56'39" |
| C3 | 31.44' | 20.00' | 28.30' | S45°05'05"W | 90°03'21" |
| C4 | 21.69' | 98.00' | 21.65' | N83°32'47"W | 12°40'54" |
| C5 | 14.83' | 66.00' | 14.80' | N83°38'32"W | 12°52'24" |
| C6 | 48.95' | 66.00' | 47.84' | S68°40'19"W | 42°29'55" |
| C7 | 48.96' | 66.00' | 47.85' | S26°10'13"W | 42°30'18" |
| C8 | 20.26' | 66.00' | 20.18' | S3°52'35"E | 17°35'17" |
| C9 | 2.83' | 98.00' | 2.83' | S11°50'37"E | 1°39'12" |
| C10 | 20.65' | 98.00' | 20.61' | S4°58'47"E | 12°04'26" |
| C11 | 20.78' | 98.00' | 20.74' | S7°07'49"W | 12°08'47" |
| C12 | 35.03' | 66.00' | 34.62' | S1°59'59"E | 30°24'23" |
| C13 | 48.95' | 66.00' | 47.84' | S38°27'00"E | 42°29'39" |
| C14 | 49.03' | 66.00' | 47.91' | S80°58'45"E | 42°33'51" |
| C15 | 22.56' | 98.00' | 22.51' | N84°20'05"E | 13°11'30" |
| C16 | 31.13' | 20.00' | 28.08' | S44°28'42"E | 89°10'56" |
| C17 | 47.55' | 30.00' | 42.73' | S45°31'18"W | 90°49'04" |
| C18 | 47.19' | 30.00' | 42.47' | N44°00'22"W | 90°07'36" |
| C19 | 46.70' | 30.00' | 42.12' | S44°28'42"E | 89°10'56" |
| C20 | 31.70' | 20.00' | 28.49' | S45°31'18"W | 90°49'04" |
| C21 | 31.46' | 20.00' | 28.31' | N44°00'32"W | 90°07'16" |
| C22 | 31.37' | 20.00' | 28.25' | N45°59'28"E | 89°52'44" |
| C23 | 31.46' | 20.00' | 28.31' | S44°00'32"E | 90°07'16" |
| C24 | 31.37' | 20.00' | 28.25' | S45°59'28"W | 89°52'44" |
| C25 | 45.08' | 29.00' | 40.67' | N45°35'06"E | 89°03'20" |
| C26 | 45.62' | 29.00' | 41.06' | N44°00'22"W | 90°07'36" |
| C27 | 31.70' | 20.00' | 28.49' | S45°31'18"W | 90°49'04" |
| C28 | 31.43' | 20.08' | 28.31' | S44°57'22"E | 89°40'41" |
| C29 | 31.42' | 20.00' | 28.28' | S45°06'46"W | 90°00'00" |
| C30 | 31.13' | 20.00' | 28.08' | S44°28'42"E | 89°10'56" |
| C31 | 31.37' | 20.00' | 28.25' | N45°59'28"E | 89°52'44" |
| C32 | 31.74' | 20.00' | 28.52' | N44°25'04"W | 90°56'20" |
| C33 | 32.92' | 20.00' | 29.33' | N48°12'33"E | 94°18'54" |
| C34 | 31.46' | 20.00' | 28.31' | N44°00'32"W | 90°07'16" |
| C35 | 31.37' | 20.00' | 28.25' | S45°59'28"W | 89°52'44" |
| C36 | 29.91' | 20.00' | 27.20' | S41°47'27"E | 85°41'06" |
| C37 | 32.92' | 20.00' | 29.33' | N48°12'33"E | 94°18'54" |
| C38 | 31.46' | 20.00' | 28.31' | N44°00'32"W | 90°07'16" |
| C39 | 31.37' | 20.00' | 28.25' | S45°59'28"W | 89°52'44" |
| C40 | 31.46' | 20.00' | 28.31' | S44°00'32"E | 90°07'16" |
| C41 | 31.37' | 20.00' | 28.25' | N45°59'28"E | 89°52'44" |
| C42 | 31.46' | 20.00' | 28.31' | N44°00'32"W | 90°07'16" |
| C43 | 85.49' | 55.00' | 77.14' | S45°35'06"W | 89°03'20" |
| C44 | 86.52' | 55.00' | 77.87' | S44°00'22"E | 90°07'36" |
| C45 | 18.34' | 200.00' | 18.33' | N87°15'37"W | 5°15'14" |
| C46 | 30.97' | 400.00' | 30.96' | S86°51'05"E | 4°26'10" |
| C47 | 31.37' | 20.00' | 28.25' | S45°59'28"W | 89°52'44" |
| C48 | 31.46' | 20.00' | 28.31' | S44°00'32"E | 90°07'16" |
| C49 | 31.37' | 20.00' | 28.25' | N45°59'28"E | 89°52'44" |
| C50 | 31.46' | 20.00' | 28.31' | N44°00'32"W | 90°07'16" |
| C51 | 31.37' | 20.00' | 28.25' | S45°59'28"W | 89°52'44" |
| C52 | 31.46' | 20.00' | 28.31' | S44°00'32"E | 90°07'16" |
| C53 | 69.03' | 426.00' | 68.96' | N80°22'57"E | 9°17'06" |
| C54 | 29.33' | 20.00' | 26.77' | N43°00'57"E | 84°01'07" |
| C55 | 31.46' | 20.00' | 28.31' | N44°00'32"W | 90°07'16" |
| C56 | 31.42' | 20.00' | 28.28' | S45°55'50"W | 90°00'00" |
| C57 | 19.72' | 174.00' | 19.71' | S2°18'57"E | 6°29'33" |

### CURVE TABLE

| CURVE | LENGTH | RADIUS | CHORD DIST. | CHORD BRG. | DELTA |
|---|---|---|---|---|---|
| C58 | 36.81' | 174.00' | 36.75' | S11°37'23"E | 12°07'21" |
| C59 | 20.93' | 23.00' | 20.21' | S43°45'08"E | 52°08'08" |
| C60 | 25.74' | 55.00' | 25.50' | S56°24'51"E | 26°48'42" |
| C61 | 67.58' | 55.00' | 63.41' | S7°48'29"E | 70°24'02" |
| C62 | 55.88' | 55.00' | 53.50' | S56°29'47"W | 58°12'30" |
| C63 | 52.54' | 55.00' | 50.57' | N67°01'51"W | 54°44'13" |
| C64 | 54.34' | 55.00' | 52.15' | N11°21'33"W | 56°36'22" |
| C65 | 14.77' | 55.00' | 14.73' | N24°38'22"E | 15°23'27" |
| C66 | 20.25' | 23.00' | 19.60' | N7°07'01"E | 50°26'08" |
| C67 | 55.35' | 226.00' | 55.21' | N11°05'04"W | 14°01'58" |
| C68 | 19.72' | 226.00' | 19.71' | N1°34'08"W | 4°59'55" |
| C69 | 31.42' | 20.00' | 28.28' | N44°04'10"W | 90°00'00" |
| C70 | 49.80' | 29.00' | 43.90' | S41°44'16"W | 98°23'07" |
| C71 | 53.44' | 1750.66' | 53.44' | S8°09'38"E | 1°44'56" |
| C72 | 83.86' | 1750.66' | 83.85' | S10°24'27"E | 2°44'40" |
| C73 | 83.80' | 1750.66' | 83.79' | S13°09'03"E | 2°44'34" |
| C74 | 83.80' | 1750.66' | 83.79' | S15°53'37"E | 2°44'34" |
| C75 | 83.44' | 1750.66' | 83.43' | S18°37'49"E | 2°43'51" |
| C76 | 66.48' | 1750.66' | 66.48' | S21°05'01"E | 2°10'33" |
| C77 | 31.93' | 20.00' | 28.65' | S67°44'38"E | 91°28'55" |
| C78 | 68.59' | 426.00' | 68.52' | N71°07'39"E | 9°13'30" |
| C79 | 83.93' | 506.00' | 83.83' | N71°16'00"E | 9°30'12" |
| C80 | 80.07' | 1701.00' | 80.06' | N21°16'02"W | 2°41'49" |
| C81 | 80.59' | 1701.00' | 80.58' | N18°33'42"W | 2°42'53" |
| C82 | 79.48' | 1701.00' | 79.47' | N15°51'57"W | 2°40'38" |
| C83 | 79.48' | 1701.00' | 79.47' | N13°11'19"W | 2°40'38" |
| C84 | 61.69' | 1701.00' | 61.69' | N10°48'40"W | 2°04'41" |
| C85 | 18.04' | 1701.00' | 18.04' | N9°28'05"W | 0°36'28" |
| C86 | 71.06' | 1701.00' | 71.05' | N7°58'03"W | 2°23'36" |
| C87 | 30.92' | 20.00' | 27.93' | S22°13'10"W | 88°35'28" |
| C88 | 67.49' | 1843.00' | 67.48' | S21°01'38"E | 2°05'53" |
| C89 | 72.17' | 1843.00' | 72.16' | S18°51'23"E | 2°14'37" |
| C90 | 72.17' | 1843.00' | 72.16' | S16°36'46"E | 2°14'37" |
| C91 | 72.17' | 1843.00' | 72.16' | S14°22'09"E | 2°14'37" |
| C92 | 72.17' | 1843.00' | 72.16' | S12°07'32"E | 2°14'37" |
| C93 | 43.45' | 1843.00' | 43.45' | S10°19'42"E | 1°21'03" |
| C94 | 10.39' | 98.00' | 10.38' | S12°41'24"E | 6°04'27" |
| C95 | 7.56' | 66.00' | 7.56' | S12°26'46"E | 6°33'44" |
| C96 | 53.70' | 66.00' | 52.23' | S14°08'38"W | 46°37'03" |
| C97 | 52.78' | 66.00' | 51.38' | S60°21'41"W | 45°49'04" |
| C98 | 18.97' | 66.00' | 18.90' | N88°29'46"W | 16°28'02" |
| C99 | 15.06' | 98.00' | 15.05' | N84°39'58"W | 8°48'25" |
| C100 | 31.42' | 20.00' | 28.28' | S45°55'50"W | 90°00'00" |
| C101 | 47.12' | 30.00' | 42.43' | S44°04'10"E | 90°00'00" |
| C102 | 48.96' | 30.00' | 43.71' | N44°10'29"E | 93°30'42" |
| C103 | 4.45' | 1923.00' | 4.45' | N2°38'51"W | 0°07'58" |
| C104 | 130.81' | 1923.00' | 130.78' | N4°39'45"W | 3°53'51" |
| C105 | 78.81' | 1923.00' | 78.81' | N7°47'08"W | 2°20'54" |
| C106 | 68.61' | 1923.00' | 68.60' | N9°58'54"W | 2°02'39" |
| C107 | 75.30' | 1923.00' | 75.30' | N12°07'32"W | 2°14'37" |
| C108 | 75.30' | 1923.00' | 75.30' | N14°22'09"W | 2°14'37" |
| C109 | 75.30' | 1923.00' | 75.30' | N16°36'46"W | 2°14'37" |
| C110 | 75.30' | 1923.00' | 75.30' | N18°51'23"W | 2°14'37" |
| C111 | 61.00' | 1923.00' | 61.00' | N20°53'13"W | 1°49'03" |
| C112 | 48.01' | 30.00' | 43.05' | N67°38'25"W | 91°41'21" |
| C113 | 31.42' | 20.00' | 28.28' | N44°04'10"W | 90°00'00" |
| C114 | 47.12' | 30.00' | 42.43' | N45°55'50"E | 90°00'00" |

### CURVE TABLE

| CURVE | LENGTH | RADIUS | CHORD DIST. | CHORD BRG. | DELTA |
|---|---|---|---|---|---|
| C115 | 94.44' | 55.00' | 83.26' | N41°44'16"E | 98°23'07" |
| C116 | 69.71' | 1817.00' | 69.71' | N8°33'14"W | 2°11'54" |
| C117 | 391.65' | 1817.00' | 390.89' | N15°49'41"W | 12°21'00" |
| C118 | 44.87' | 1817.00' | 44.87' | N22°47'01"W | 1°24'54" |
| C119 | 129.22' | 400.00' | 128.66' | N75°46'12"E | 18°30'36" |
| C120 | 41.23' | 400.00' | 41.21' | N87°58'40"E | 5°54'20" |
| C121 | 68.74' | 200.00' | 68.41' | S8°54'59"E | 19°41'37" |
| C122 | 46.70' | 30.00' | 42.12' | S44°28'43"E | 89°10'55" |
| C123 | 45.35' | 30.00' | 41.16' | S43°25'24"W | 86°37'18" |
| C124 | 20.53' | 98.00' | 20.49' | N87°15'57"W | 12°00'00" |
| C125 | 37.73' | 66.00' | 37.22' | S82°21'24"W | 32°45'19" |
| C126 | 59.23' | 66.00' | 57.26' | S40°16'09"W | 51°25'09" |
| C127 | 29.38' | 66.00' | 29.14' | S1°48'28"W | 25°30'13" |
| C128 | 20.53' | 98.00' | 20.49' | S4°56'39"E | 12°00'00" |
| C129 | 47.06' | 30.00' | 42.38' | N45°59'38"E | 89°52'24" |
| C130 | 34.15' | 20.00' | 30.15' | S49°58'44"W | 97°50'45" |
| C131 | 154.61' | 159.00' | 148.59' | N53°14'31"W | 55°42'46" |
| C132 | 81.56' | 309.00' | 81.34' | N17°49'21"W | 15°07'35" |
| C133 | 61.38' | 309.00' | 61.28' | N4°34'07"W | 11°22'53" |
| C134 | 12.72' | 361.00' | 12.72' | S0°06'44"W | 2°01'10" |
| C135 | 75.85' | 361.00' | 75.71' | S6°55'01"E | 12°02'21" |
| C136 | 75.85' | 361.00' | 75.71' | S18°57'22"E | 12°02'21" |
| C137 | 2.58' | 361.00' | 2.58' | S25°10'50"E | 0°24'36" |
| C138 | 45.23' | 211.00' | 45.14' | S31°31'35"E | 12°16'54" |
| C139 | 73.45' | 211.00' | 73.08' | S47°38'23"E | 19°56'42" |
| C140 | 98.03' | 211.00' | 97.15' | S70°55'21"E | 26°37'12" |
| C141 | 29.77' | 20.00' | 27.10' | S41°35'18"E | 85°17'18" |
| C142 | 43.37' | 29.00' | 39.44' | S43°53'42"W | 85°40'41" |
| C143 | 44.18' | 30.00' | 40.29' | N51°04'52"W | 84°22'10" |
| C144 | 86.91' | 545.00' | 86.82' | N13°27'54"W | 9°08'14" |
| C145 | 69.93' | 545.00' | 69.88' | N21°42'35"W | 7°21'07" |
| C146 | 3.49' | 474.94' | 3.49' | N25°10'37"W | 0°25'15" |
| C147 | 100.88' | 474.94' | 100.69' | N18°52'53"W | 12°10'13" |
| C148 | 100.83' | 474.94' | 100.64' | N6°42'51"W | 12°09'51" |
| C149 | 13.94' | 474.94' | 13.94' | N0°12'32"E | 1°40'56" |
| C150 | 30.49' | 510.00' | 30.48' | S1°36'00"E | 3°25'31" |
| C151 | 49.70' | 510.00' | 49.68' | S6°06'16"E | 5°35'02" |
| C152 | 146.77' | 510.00' | 146.27' | S17°08'28"E | 16°29'21" |
| C153 | 235.32' | 510.00' | 233.24' | S12°10'01"E | 26°26'14" |
| C154 | 82.25' | 55.00' | 74.79' | S43°53'42"W | 85°40'41" |
| C155 | 15.21' | 185.00' | 15.21' | N86°35'16"W | 4°42'38" |
| C156 | 10.12' | 185.00' | 10.12' | N82°39'55"W | 3°08'03" |
| C157 | 178.89' | 185.00' | 172.88' | N53°14'31"W | 55°42'46" |
| C158 | 154.99' | 335.00' | 153.61' | N12°07'54"W | 26°30'28" |
| C159 | 44.62' | 30.00' | 40.62' | N43°42'31"E | 85°13'13" |
| C160 | 43.81' | 226.00' | 43.74' | N80°45'56"E | 11°06'22" |
| C161 | 26.19' | 174.00' | 26.17' | N79°31'29"E | 8°37'27" |
| C162 | 33.96' | 20.00' | 30.02' | S47°31'14"E | 97°17'07" |
| C163 | 31.36' | 20.00' | 28.24' | N46°02'15"E | 89°49'52" |
| C164 | 31.45' | 20.00' | 28.31' | S43°59'44"E | 90°06'10" |
| C165 | 44.00' | 974.00' | 44.00' | S2°21'00"W | 2°35'18" |
| C166 | 89.17' | 974.00' | 89.13' | S6°16'01"W | 5°14'43" |
| C167 | 89.17' | 974.00' | 89.14' | S11°30'44"W | 5°14'43" |
| C177 | 46.92' | 30.00' | 42.28' | N45°54'24"E | 89°37'00" |
| C178 | 31.56' | 20.00' | 28.38' | S44°04'53"E | 90°24'25" |
| C179 | 29.83' | 20.00' | 27.14' | S43°59'44"W | 85°26'48" |
| C180 | 44.79' | 226.00' | 44.72' | S80°53'27"W | 11°21'22" |

### CURVE TABLE

| CURVE | LENGTH | RADIUS | CHORD DIST. | CHORD BRG. | DELTA |
|---|---|---|---|---|---|
| C181 | 22.37' | 174.00' | 22.36' | S78°53'46"W | 7°22'01" |
| C182 | 51.58' | 30.00' | 45.46' | N48°09'40"W | 98°31'08" |
| C183 | 31.47' | 20.00' | 28.33' | S43°57'45"E | 90°10'08" |
| C184 | 31.27' | 20.00' | 28.18' | S45°55'07"W | 89°35'35" |
| C185 | 53.86' | 29.00' | 46.45' | N36°04'39"W | 106°24'53" |
| C186 | 0.80' | 1026.00' | 0.80' | N17°06'27"E | 0°02'42" |
| C187 | 87.05' | 1026.00' | 87.03' | N14°39'16"E | 4°51'41" |
| C188 | 80.08' | 1026.00' | 80.06' | N9°59'16"E | 4°28'20" |
| C189 | 79.07' | 1026.00' | 79.05' | N5°32'38"E | 4°24'56" |
| C190 | 40.83' | 1026.00' | 40.83' | N2°11'46"E | 2°16'48" |
| C191 | 31.38' | 20.00' | 28.26' | N46°00'16"E | 89°53'50" |
| C192 | 16.18' | 200.00' | 16.17' | N88°38'09"E | 4°38'03" |
| C193 | 13.05' | 200.00' | 13.05' | N84°26'57"E | 3°44'21" |
| C194 | 25.72' | 200.00' | 25.70' | N78°53'46"E | 7°22'01" |
| C195 | 30.10' | 200.00' | 30.08' | N79°31'29"E | 8°37'27" |
| C196 | 9.54' | 200.00' | 9.54' | N85°12'10"E | 2°43'55" |
| C197 | 15.30' | 200.00' | 15.30' | N88°45'39"E | 4°23'03" |
| C198 | 280.54' | 1000.00' | 279.62' | S9°05'35"W | 16°04'26" |
| C199 | 102.15' | 55.00' | 88.09' | S36°04'39"E | 106°24'53" |
| C200 | 47.05' | 30.00' | 42.37' | N46°01'32"E | 89°51'16" |
| C201 | 47.12' | 30.00' | 42.42' | N43°53'50"W | 89°59'27" |
| C202 | 31.28' | 20.00' | 28.19' | S46°17'44"W | 89°37'26" |
| C203 | 47.12' | 30.00' | 42.43' | S43°31'00"E | 90°00'00" |
| C204 | 31.55' | 20.00' | 28.38' | N43°42'21"W | 90°22'25" |
| C205 | 47.13' | 30.00' | 42.43' | S46°06'10"W | 90°00'33" |
| C206 | 47.32' | 30.00' | 42.57' | S44°05'36"E | 90°23'00" |
| C207 | 45.92' | 29.00' | 41.27' | N45°21'27"E | 90°42'54" |
| C208 | 47.12' | 30.00' | 42.43' | N46°29'00"E | 90°00'00" |
| C209 | 23.06' | 98.00' | 23.01' | N5°15'30"W | 13°29'00" |
| C210 | 58.00' | 66.00' | 56.15' | N13°10'32"E | 50°21'05" |
| C211 | 58.08' | 66.00' | 56.22' | N63°33'38"E | 50°25'07" |
| C212 | 16.06' | 66.00' | 16.02' | S84°15'27"E | 13°56'43" |
| C213 | 5.64' | 98.00' | 5.64' | S78°56'06"E | 3°18'00" |
| C214 | 14.88' | 98.00' | 14.87' | S84°56'06"E | 8°42'00" |
| C215 | 46.92' | 30.00' | 42.28' | N45°54'24"E | 89°37'00" |
| C216 | 85.66' | 55.00' | 77.28' | N46°05'57"E | 89°13'54" |

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| REVISIONS | | | |
|---|---|---|---|
| NO | DESCRIPTION | DATE | BY |

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CURVE TABLE SHEET FOR:
DIXIE MEADOWS SUBDIVISION
LOCATED IN SECTIONS 11-14, T42S, R14W, S.L.B.&M.
SAND HOLLOW RD, HURRICANE, WASHINGTON COUNTY, UTAH

PRELIMINARY PLAT

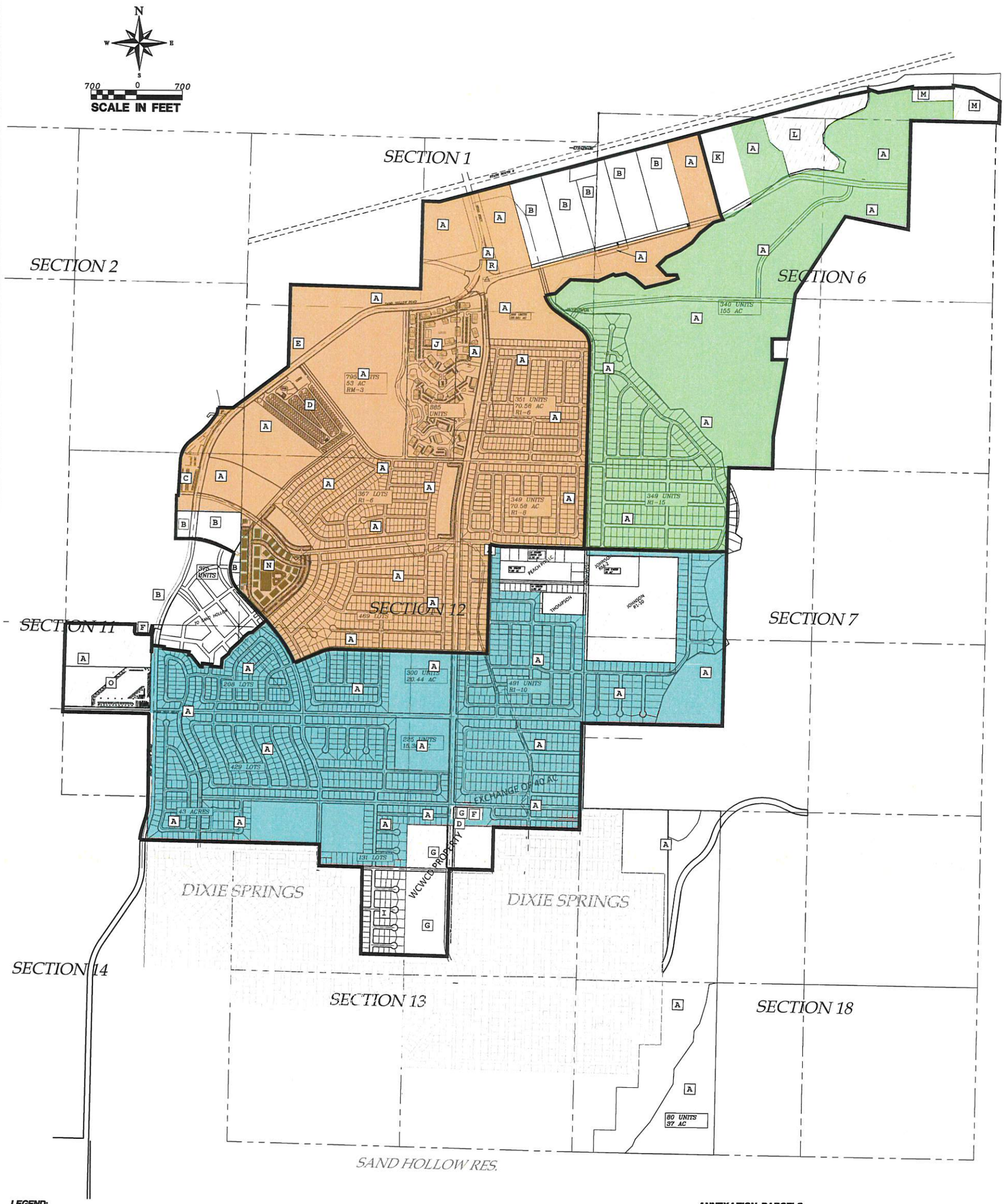
DATE: 12/19/2022
SCALE: N.T.S.

JOB NO.
336-012

SHEET NO:
8 OF 8

# EXHIBIT A:
# GATEWAY AT SAND HOLLOW DISTRICT BOUNDARY MAP

**LOCATED ON SAND HOLLOW RD, HURRICANE**
**WASHINGTON COUNTY, UTAH**




**LEGEND:**

- PROPOSED PETITION AREA DISTRICT 1
- POSSIBLE ANNEXATION AREAS DISTRICTS 1, 2 AND 3
- PROPOSED PETITION AREA DISTRICT 2
- PROPOSED PETITION AREA DISTRICT 3
- PROPOSED PETITION AREA BOUNDARY LINE

A– WESTERN MORT. & REALTY CO PARCELS:
H–3–2–6–431
H–3–2–6–1402
H–3–2–6–1406
H–3–2–6–1408
H–3–2–6–33
H–3–2–7–4402
H–4–2–1–1103
H–4–2–1–1104
H–4–2–1–1107
H–4–2–1–1108
H–4–2–1–1109
H–4–2–1–1113
H–4–2–1–1123
H–4–2–11–125
H–4–2–11–127
H–4–2–13–1410
H–4–2–11–2103
H–4–2–11–2112
H–4–2–1–131
H–4–211–31031
H–4–2–12–1102
H–4–2–12–130
H–4–2–12–131
H–4–2–12–2113
H–4–2–13–1409
H–4–2–13–2114
H–4–2–14–1101
H–4–2–1–4203

C– SH HOLDINGS LLC PARCELS:
H–4–2–11–21121

D– GLAMPERS INN LLC PARCELS:
H–3–2–6–330

E– JASON AND HOLLY CURTIS PARCEL:
H–4–2–1–340

J– SECURE PRIVATE FUND LLC – PARCEL
H–4–2–1–234.

N– BASH RESORTS LLC:
H–4–2–12–2113

O– CROWTHER ELIM LLC:
H–4–2–11–243

**ANNEXATION PARCELS**

B CYPRESS CAPITAL XI LLC, ET AL – PARCELS H–4–2–1–1105&1106, H–3–2–6–1403,1404,&1405 & H–4–2–11–126,127&128.
F DIXIE ESCALANTE RURAL ELECTRIC – PARCELS H–4–2–13–1407–SA & H–4–2–11–240.
G WASHINGTON CO. WATER CONSERVANCY DISTRICT – PARCELS H–4–2–13–1405 & H–4–2–13–1491.
I WASHINGTON CO. BOARD OF EDUCATION – PARCEL H–4–2–13–1492.
K REV INVEST 1 LP, PERRY J FALK, ET AL – PARCEL H–3–2–6–1407.
L DOS RIOS LC – PARCEL H–3–2–6–1409.
M VIRTUS INVESTMENTS 1 – PARCELS H–3–1–31–220 & H–3–1–31–221.
R QUESTAR GAS – PARCEL H–4–2–1–131

EXHIBIT A:

COPYRIGHT © 2013 provalue engineering inc.

SHEET NO. 1 OF 1

JOB NO. 339-602

DATE: 3/7/2021
SCALE: 1"=1200'

EXHIBIT A::
GATEWAY AT S.H. DISTRICT BOUNDARY MAP
SAND HOLLOW RD
HURRICANE, WASHINGTON COUNTY, UTAH

PROVALUE ENGINEERING, INC.
Engineers- Land Surveyors - Land Planners
38 South 850 West, Suite 1
Hurricane City, Utah 84737
Phone: (435) 668-8367

REVISIONS

| NO | DESCRIPTION | DATE | BY |
|---|---|---|---|
| | | | |

PLANNING & ZONING
HURRICANE CITY
UTAH
147 N 870 W Hurricane UT
PHONE: 435.635.2811 FAX: 435.635.2184

# FINAL SITE PLAN APPLICATION

*For office use only: $250.00 Fee*
File No. 2023-FSP-01
Receipt No. _____

Name: JOHNATHAN WEST Telephone: 435-680-3892

Address: 1550 W STATE STR Fax No. 435-216-3313

Agent (If Applicable): _____ Telephone: 435-215-7362

Email: westjohnathan@yahoo.com Agent Email: ~~john~~

Address/Location of Subject Property: 1550 W STATE STR

Tax ID of Subject Property: _____ Zone District: _____

Proposed Use: (Describe, use extra sheet if necessary) Current commercial use for car + shed sales, 4 airbnb listings.

Submittal Requirements: This application must be accompanied by a set of development plans which meet the following standards:

- Plans shall be drawn at a scale of no smaller than 1" =100'
- Submit one (1) set of plans on 11 x 17-inch paper. Also submit one (1) copy of all plans on larger sheets whenever a reduction is required.
- Except for the landscaping plan, the other plans shall be prepared, stamped, and signed by a professional engineer licensed by the State of Utah.
- Warranty deed or preliminary title report or other document (see attached Affidavit) showing evidence that the applicant has control of the property
- Signed and notarized Acknowledgement of Water Supply (see attached)

The following shall be shown on separate sheets:

1) Site plan including:

_____a) All facilities related to the project located within two hundred and fifty (250) feet of the site boundary.

_____b) Layout, dimensions, and names of existing and future road rights-of-way.

_____c) Project name, North arrow, and tie to a section monument.

_____d) The boundary lines of the project site with bearings and distances.

_____e) Layout and dimensions of proposed streets, buildings, parking areas, and landscape areas.

PLANNING & ZONING
HURRICANE CITY
UTAH

**STAFF COMMENTS**

| | |
|---|---|
| **Agenda Date:** | **01/26/2023** |
| **Application Number:** | 2023-FSP-02 |
| **Type of Application:** | Final Site Plan Application |
| **Action Type:** | Administrative |
| **Applicant:** | Jonathan West |
| **Agent:** | |
| **Request:** | Approval of a Final Site Plan |
| **Location:** | 1550 W State St |
| **Zoning:** | HC |
| **General Plan Map:** | Commercial |

**Discussion:**
The applicant has filed an amended final site plan for the Car Barn. For the past several years the applicants have run four unlicensed short-term rentals out of shed-like buildings in the rear of their property. They never updated their business license and the buildings were erected and tied into utility lines without filing building permits or paying impact fees. In February 2021 a letter was sent from the City to the owners informing them that this was not a permitted use of their property and to cease immediately and come into compliance with city ordinances. The City has no record of any response to this letter. In December 2022, with our new short-term rental enforcement system up and running, the City sent them another letter informing them that this is not a permitted use and in violation of several city ordinances and that a $750 a day fine will be levied for each illegal short-term rental if they do not come into compliance (both letters are attached to this report). This final site plan is the first step for them, once this is approved, with any conditions attached, then they will need to turn in building plans to the Building Department and pay all applicable connection and impact fees as well as be subject to any inspections the Building Official deems necessary. Once that is done they will need a new business license for the short term rentals, pay those fees, and be inspected by the Fire District.

**Staff Comments: Final Site Plan**

1. Car dealerships and short-term rentals (substantially similar to a motel/hotel use) are permitted in the Highway Commercial zone.
2. **Setbacks:** The rear setback in a commercial zone is, "*New building on a lot abutting an existing agricultural or residential use: 10 feet. Otherwise: no requirement." (HCC 10-15-4)* the buildings are about 40 feet from the property line
3. **Management:** This ordinance is still being debated by the City Council however the current language, which will most likely be approved, states that, "*Each Bed and Breakfast Inn, Boarding House, Hostel, Hotel, or Motel must maintain an office on the premises in charge and under the immediate supervision of a manager or attendant at all times. Such office shall remain continuously open and staffed whenever guests are registered or present and when the facility is open to receive guests." (HCC 3-10-2)* There is a management office within the Car Barn but it is currently unknown if the management is or will be present whenever guests are present.
4. **Parking:** HCC 10-34 has the following standards for the proposed uses:

| | | |
|---|---|---|
| Motel | 2 spaces, plus 1 space per living or sleeping unit | |

| | | |
|---|---|---|
| Vehicle and equipment rental or sale | 1 space per 250 square feet of gross floor area, plus<br>1 space for every 10 vehicles displayed | 4 spaces minimum |

Per this code the site would require 6 spaces for the short-term rentals and approximately 22 (4000 sq ft building, about 50 cars on display per satellite view) for a total of 28 spaces. Staff believes that the parking that exists on site is probably sufficient for the two different uses on the property. Staff will require a parking plan showing this.

5. **Landscaping:** This site was originally approved and designed with no landscaping. Staff does not find that the change to the site justifies requiring the site be brought up to current codes
6. **Outdoor Lighting:** Any changes to their current outdoor lighting fixtures will be required to be brought up to current city standards.

**Recommendation:** Staff recommends the Planning Commission review this application based on standards with Hurricane City Code. Staff would recommend approving this item subject to

1. Including requiring onsite management for the units.
2. Paying all unpaid impact, connection, and permit fees
3. Having the buildings inspected by the Building Official and then bringing the buildings up to compliance with his findings
4. Updated parking plan.
5. Apply for and be issued a new business license for the short-term rentals

Hurricane City,

Dear planning and zoning. We, John and Tadi West, own The Car Barn located at 1550 W State Str. It is a very challenging business to run and generates a lot of tax revenue for the city and county. Approximately $250,000 a year in sales tax. $6,500 in property tax. After 10 years in business, we are getting close to becoming a profitable business. Now hopefully we can pay down the tremendous debt load that it has taken us to build this business. Many businesses have come and gone at this location and unfortunately have not been able to stay in business. I take great pride in the fact that I have been able to stay in business for 10 years by subsidizing it through my successful insurance business located in Hurricane at the Grand Circle Plaza. I now have 11 employees who benefit from The Car Barn. To my knowledge, in the past the location has been a gas station, restaurant, ATV sales and repairs, car lot and SWIG. I know from time to time it has been vacant for long periods of time as well.

1550 W State Street was sold to me in 2016 and over the last 6 years I have worked hard at repairing and maintaining the property to keep the location attractive and usable. I have painted the building, resurfaced the asphalt, built an attractive block wall, reconnected the grease trap that had been inappropriately bypassed by a previous tenant/owner and much more. A few weeks and several calls to the plumber later after purchasing the building I discovered that all the underground plumbing was corroded as it was originally galvanized pipe. I paid a contractor to repair all the galvanized plumbing and replace it with up-to-date pipe and pex. We did not run any new water or sewer lines to new locations. We only replaced what was already on the property that was damaged or could be potentially problematic.

We began selling Cumberland buildings and sheds at our location in 2018. I decided to have one outbuild to show people what they look like finished. I posted it on Airbnb one night and due to the high demand, we have been booked solid for three years. I repeated that with three more and do not plan on adding any others. The structures are not permanent as they are on skids and can be easily moved. I connected them to my existing power and sewer as when this location was a gas station it had several RV cleanouts / stations that connected to the existing sewer. The units are built to code and have appropriate fire extinguishers and fire alarms. There are no gas utilities.

I originally applied for and paid for an Airbnb application which wasn't accepted. I e-mailed a city employee asking what to do and didn't receive a response. I would be happy to work with the city and make sure everything is safe and compliant. I haven't had any complaints and it is a quite business that helps provide employment for my employees, helps pay the Mortgage and brings in tourists dollars to other businesses in the area.

I'd like to request that my application and fees are accepted. We are zoned commercial and feel like we are an asset to the community. Our reviews are so high that we maintain a super host status with Airbnb. We appreciate your time in this matter.

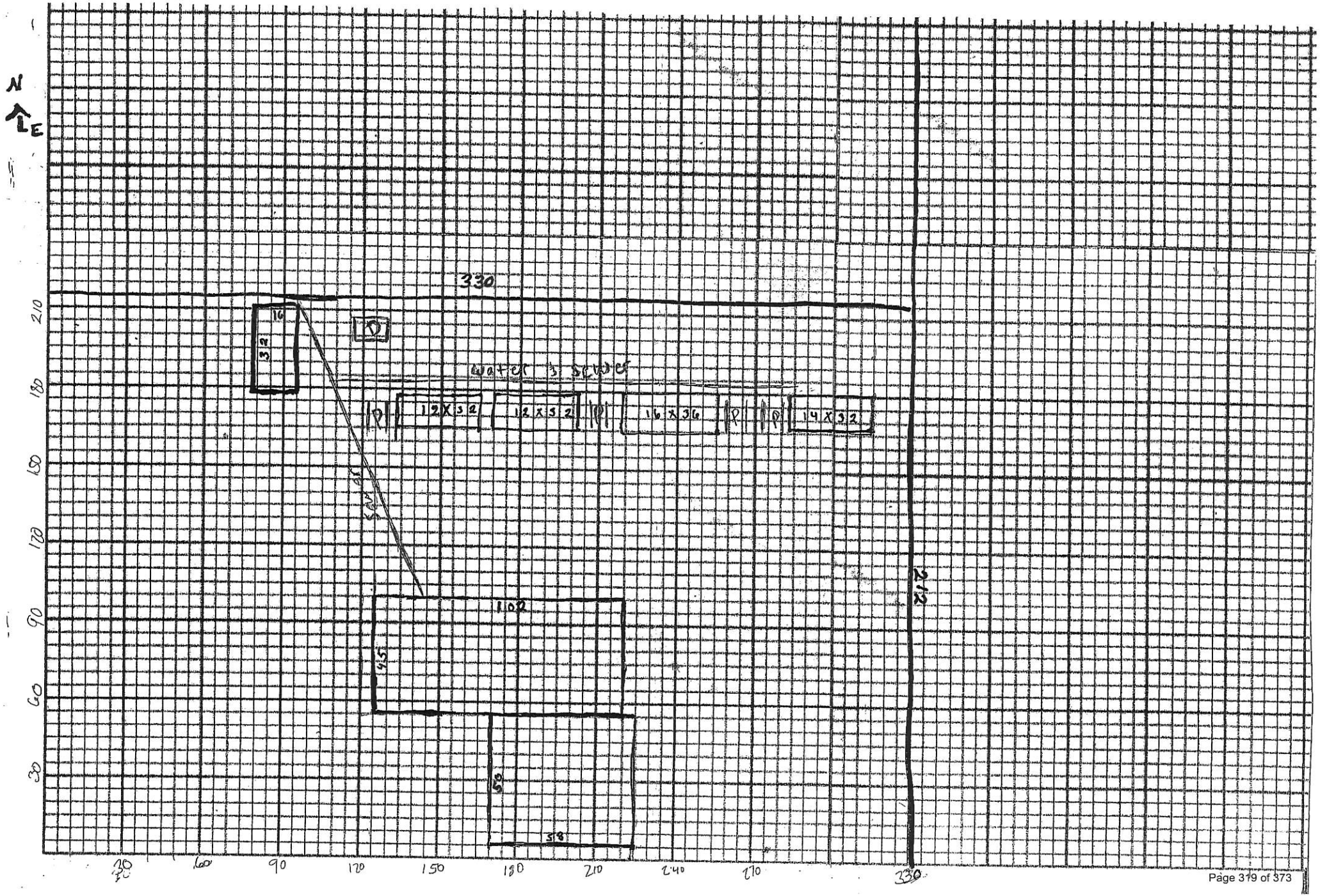
Tadi West

1/11/23

John and Tadi West

Google Maps The Car Barn

Imagery ©2023 State of Utah, Map data ©2023 20 ft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Mayor

John W Bramall

City Manager

Kaden DeMille

# City of Hurricane

*Planning Department*
*Stephen Nelson, Planning Director*
*Brienna Spencer, Planning Assistant*

February 22, 2020

CAR BARN LLC
1550 W STATE ST
HURRICANE UT 84737

To Property Owner

Hurricane City has become aware that you have been allowing the use of short-term rentals/transient rentals on your property without obtaining a proper business license, site plan approval, or building permit for these units. This is a violation of Hurricane City code.

**Parcel IDs:** H-3-1-33-24401
**Address:** 1550 W STATE ST

**Hurricane City Code Violation:**

***10-7-10 Site Plan Review:***

*H. Amendments: Except as may be provided for elsewhere in this title, no element of an approved site plan shall be changed or modified without first obtaining approval of an amended site plan as follows:*

*1. Alteration or expansion of an approved site plan may be permitted by the Zoning Administrator upon making the following findings:*

*a. Any proposed use is consistent with uses permitted on the site;*

*b. Existing uses were permitted when the site plan was approved, or have received a conditional use permit;*

*c. The proposed use and site will conform to applicable requirements of this Code;*

*d. The proposed alteration or expansion meets the approval standards of subsection E of this section;*

*e. The architecture of the proposed alteration or expansion, and landscaping, site design and parking layout are compatible with facilities existing on the site; and*

*f. The site can accommodate any change in the number of employees on the site or any change in impact on surrounding infrastructure.*

***3-1-4 License Required:***

*A. It shall be unlawful for any person or entity, either directly or indirectly, to engage in business within the corporate limits of the city without having first obtained an annual business license, whether such license shall be a new license or renewal license, and without having first paid the applicable license fee in accordance with all provisions of this chapter. (1998 Code § 9-210; amd. Ord. 2013-12, 11-7-2013)*

***3-1-8: RULES, REGULATIONS AND REQUIREMENTS:***

*A. Nature And Location Of Business: Each license issued by the City Recorder-Clerk shall authorize the licensee to carry on, pursue or conduct only that type of general business specified in such license and only at the location specified therein. A different type of general business activity than that specified in said license shall require issuance of a separate license and a business at a location different from that indicated on the license shall be considered a branch establishment and shall require a separate license. (1998 Code § 9-301)*

**Title 9 Building Regulation:** See full title for building permit, fees, and Impact Fee Requirements.

Violation may be subject to fines, citations, and revocation of the current business license according to Utah and Hurricane City law. This letter is an official notice of the offenses listed above, and the property will be reinspected in 20 days to ensure compliance. If you have any questions, please contact me at (435) 635-2811 ext. 118.

Stephen Nelson
Planning Director

Mayor
*Nanette Billings*

City Manager
*Kaden C. DeMille*

# HURRICANE CITY
UTAH

City Council
*Joseph Prete*
*David Sanders*
*David Hirschi*
*Kevin Thomas*
*Doug Heideman*

December 12, 2022

The Car Barn
1550 W State Street
Hurricane, UT 84737

Ms. West,

Hurricane City received your business license renewal for The Car Ban LLC on December 2, 2022; however, there was a notice of violations letter sent in February of 2021 that has not been addressed. The following will need to be taken care of before your business license renewal can be approved: 1. An approved amended site plan that addresses the additional use of ~~short term~~short-term rentals on the property; 2. As built plans being approved; 3. The Hurricane City Building Official providing a Certificate of Occupancy for the unpermitted units; ~~3~~4. Impact fees paid for the additional services; ~~4~~5. A separate business license for the short-term rentals; ~~5~~6. The occupied RV trailer removed from the property.

**Hurricane City Codes Applicable to the Car Barn's Violations Are Below:**

**10-7-10 Site Plan Review:**

H. *Amendments.* Except as may be provided for elsewhere in this title, no element of an approved site plan shall be changed or modified without first obtaining approval of an amended site plan as follows:

1. Alteration or expansion of an approved site plan may be permitted by the Zoning Administrator upon making the following findings:
    a. Any proposed use is consistent with uses permitted on the site;
    b. Existing uses were permitted when the site plan was approved, or have received a conditional use permit;
    c. The proposed use and site will conform to applicable requirements of this Code;
    d. The proposed alteration or expansion meets the approval standards of subsection E of this section;
    e. The architecture of the proposed alteration or expansion, and landscaping, site design and parking layout are compatible with facilities existing on the site; and
    f. The site can accommodate any change in the number of employees on the site or any change in impact on surrounding infrastructure.

**3-1-4-License Required:**

A. It shall be unlawful for any person or entity, either directly or indirectly, to engage in business within the corporate limits of the city without having first obtained an annual business license,

Whether such license shall be a new license or renewal license, and without having first paid the applicable license fee in accordance with all provisions of this chapter. (1998 Code 9-210; amd. Ord. 2013-12, 11-7-2013)

**3-1-8: Rules, regulations and requirements**

A. *Nature and location of business.* Each license issued by the City Recorder-Clerk shall authorize the licensee to carry on, pursue or conduct only that type of general business specified in such license and only at the location specified therein. A different type of general business activity than that specified in said license shall require issuance of a separate license and a business at a location different from that indicated on the license shall be considered a branch establishment and shall require a separate license. (1998 Code 9-301)

**Title 9 Building Regulation**: See full title for building permit, fees, and Impact Fee Requirements.

**10-43-3: Uses allowed.**

C *Location of an occupied recreational vehicle.* No occupied recreational vehicle shall be located anywhere within the City except as follows:

1. Within a:
    a. Recreational vehicle park;
    b. Manufactured/mobile home park, subject to the requirements of subsection 10-43-6A2b of this chapter; or
    c. Designated camping area; and

A business license renewal that has not had all required items submitted and approved and the license issued within forty-five (45) days of the expiration date shall be considered void and a new application and fee will be required. In the event that you do not have an amended site plan application and business license application within~~g~~ 30 days of the date of this letter, the City will levy an administrative fine of $750 per day per unit for each day the violation continues.

If you have questions, please contact me at 435-635-2811 x 106 or Planning Director, Stephen Nelson at 435-635-2811 x 118.

Thank you,

Cindy Beteag
City Recorder

Cc: Planning Director Stephen Nelson
City Attorney Dayton Hall

Dashboard

Rental Unit Record

# 1550 W State St, Hurricane, UT 84737, USA

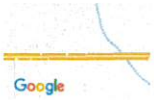
Active ●
Identified ✓
Compliant X

PRINT
SEND A LETTER

## Listing(s) Information

Airbnb - 577433044060380722 Airbnb - 43821346 Airbnb - 48991891

## Rental Unit Information




**Identified Address**

1550 W State St, Hurricane, UT 84737, USA

**Identified Unit Number**

None

**Identified Latitude, Longitude**

37.176775, -113.317370

**Parcel Number**

295942

**Owner Name**

CAR BARN LLC

**Owner Address**

1550 STATE STREET
HURRICANE, UT 84737, US

## Matched Details

**Analyst** 9TIP

**Explanation**

I recognized the cabin in the picture the surroundings. Drive past it every day. CB

## Listing Details

| | |
|---|---|
| **Listing URL** | – https://www.airbnb.com/rooms/577433044060380722 |
| **Listing Status** | ● Active |
| **Host Compliance Listing ID** | – air577433044060380722 |
| **Listing Title** | – The Big Tiny White House |
| **Property type** | – Tiny house |
| **Room type** | – Entire home/apt |
| **Listing Info Last Captured** | – Jan 14, 2023 |
| **Screenshot Last Captured** | |

### Timeline of Activity

View the series of events and documentation pertaining to this property

**7 Documented Stays**
**January, 2023**

**19 Documented Stays**
**December, 2022**

| | |
|---|---|
| | – Jan 05, 2023 |
| Price | – $46/night |
| Cleaning Fee | – $ |

## Information Provided on Listing

| | |
|---|---|
| Contact Name | – John |
| Minimum Stay (# of Nights) | – 1 |
| Max Sleeping Capacity (# of People) | – 3 |
| Max Number of People per Bedroom | – 3.0 |
| Number of Reviews | – 76 |
| Last Documented Stay | – 01/2023 |

## Listing Screenshot History

View Latest Listing Screenshot

November (6) December (5) January (1)

- 29 Documented Stays
  November, 2022
- 34 Documented Stays
  October, 2022
- 33 Documented Stays
  September, 2022
- Listing air43821346 Reposted
  September 29th, 2022
- Listing air43821346 Removed
  September 24th, 2022
- 31 Documented Stays
  August, 2022
- 40 Documented Stays
  July, 2022
- Listing air48991891 Reposted
  July 3rd, 2022
- 39 Documented Stays
  June, 2022
- Listing air48991891 Removed
  June 26th, 2022
- Listing air48991891 Reposted
  June 20th, 2022
- Listing air48991891 Removed
  June 17th, 2022
- 44 Documented Stays
  May, 2022
- 40 Documented Stays
  April, 2022
- 47 Documented Stays
  March, 2022
- Listing air577433044060380722 First Activity
  March 13th, 2022
- Listing air577433044060380722 First Crawled
  March 13th, 2022
- 26 Documented Stays
  February, 2022
- Listing air48991891 Reposted
  February 9th, 2022
- Listing air48991891 Removed
  February 7th, 2022
- 17 Documented Stays
  January, 2022
- 20 Documented Stays
  December, 2021
- 34 Documented Stays
  November, 2021
- 31 Documented Stays
  October, 2021
- 29 Documented Stays
  September, 2021
- Listing air43819665 Reposted

September 5th, 2021

- Listing air43821346 Reposted
  September 5th, 2021
- Listing air48991891 Reposted
  September 5th, 2021
- Listing air43819665 Removed
  September 1st, 2021
- Listing air43821346 Removed
  September 1st, 2021
- Listing air48991891 Removed
  September 1st, 2021
- 37 Documented Stays
  August, 2021
- Listing air43821346 Identified
  August 22nd, 2021
- Listing air48991891 Identified
  August 22nd, 2021
- 31 Documented Stays
  July, 2021
- 29 Documented Stays
  June, 2021
- Listing air43819665 Reposted
  June 12th, 2021
- Listing air43821346 Reposted
  June 12th, 2021
- Listing air48991891 Reposted
  June 12th, 2021
- Listing air43819665 Removed
  June 6th, 2021
- Listing air43821346 Removed
  June 6th, 2021
- Listing air48991891 Removed
  June 6th, 2021
- 36 Documented Stays
  May, 2021
- Listing air43819665 Identified
  May 14th, 2021
- 31 Documented Stays
  April, 2021
- Listing air48991891 First Activity
  April 2nd, 2021
- Listing air48991891 First Crawled
  April 2nd, 2021
- 23 Documented Stays
  March, 2021
- 15 Documented Stays
  February, 2021
- 21 Documented Stays
  January, 2021
- 27 Documented Stays
  December, 2020
- 21 Documented Stays
  November, 2020

- 25 Documented Stays
  October, 2020
- 30 Documented Stays
  September, 2020
- 23 Documented Stays
  August, 2020
- 21 Documented Stays
  July, 2020
- Listing air43821346 First Crawled
  July 30th, 2020
- Listing air43819665 First Crawled
  July 30th, 2020
- 10 Documented Stays
  June, 2020
- Listing air43821346 First Activity
  June 18th, 2020
- Listing air43819665 First Activity
  June 18th, 2020

PLANNING & ZONING
HURRICANE CITY
UTAH
147 N 870 W Hurricane UT
PHONE: 435.635.2811 FAX: 435.635.2184

# HIGHER WALL CONDITIONAL USE PERMIT

*For office use only: $250.00 Fee*
File No. 2023-CUP-03
Receipt No. 8-165284

## APPLICATION & SUBMITTAL CHECKLIST

Name: Dixie Power (Russ Condie) Telephone: 435-673-3297

Address: 145 Brigham Rd. St. George, UT 84790 Fax No. _____

Email: russc@dixiepower.com Agent's Email: ccoats@allianceconsulting.us

Agent (If applicable): Alliance Consulting LLC Agent's Phone: 435-673-8060

Address of Subject Property: 4898 W 3150 S, Hurricane, UT 84737

Parcel # of Subject Property: H-4-2-23-442 Zone District: PF

Proposed Conditional Use: (Describe, use extra sheet if necessary) 8' wall for Dixie Power Substation

This application shall be accompanied by the following:

____ 1. A plot plan showing the following:
- ____ Property boundaries, dimensions, and existing streets.
- ____ Location of existing and proposed wall
- ____ Adjoining property lines and uses within one hundred (100) feet of subject property.

____2) A reduced copy of all plans (8 ½ x 11 if readable, or 11 x 17) if original plans are larger.

____3) Photos of location where higher wall is proposed

____4) Approximate heights of adjoining structures

____5) Signed and notarized Affidavit of Property owner showing evidence that the applicant has control of the property or copy of warranty deed

NOTE: It is important that all applicable information noted above is submitted with the application. An incomplete application cannot be reviewed until it is complete. Fee is part of the application.

(Office Use Only)

Date Received: _____ Received by: _____

Date application deemed to be complete: _____ Completion determination made by: _____

PLANNING & ZONING
HURRICANE CITY
UTAH

STAFF COMMENTS

| | |
|---|---|
| **Agenda Date:** | **01/26/2023** |
| **Application Number:** | 2023-CUP-03 |
| **Type of Application:** | Conditional Use Permit |
| **Action Type:** | Administrative |
| **Applicant:** | Dixie Power (Russ Condie) |
| **Agent:** | Alliance Consulting LLC |
| **Request:** | A conditional use permit for a wall of greater height |
| **Location:** | 4898 W 3150 S |
| **Zoning:** | Public Facility |
| **General Plan Map:** | Planned Community |

**Discussion:** The applicant proposes constructing an 8' wall around the new substation located along 3150 S across from the Sand Hollow Resort development. Hurricane City Code (HCC) 10-37-9 states that:

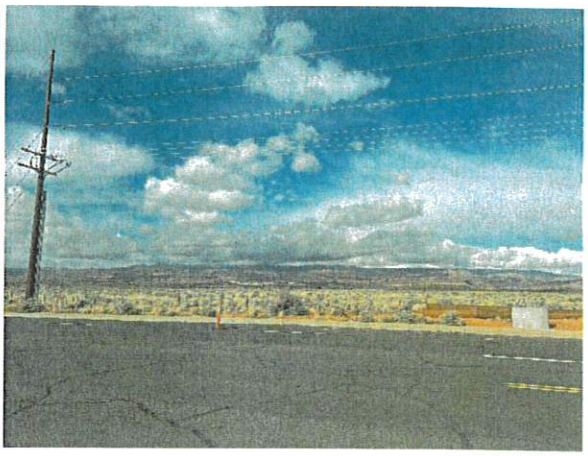
> *Height of fences and walls. No fence, wall, or similar structure exceeding six feet in height shall be erected in any rear or side yard except for accessory buildings and structures permitted by this chapter unless by conditional use permit.*

However, Title 10 Chapter 7 of the Hurricane City Code has no standards by which to approve walls and fences of a greater height than six feet. In this case, staff would recommend approval of any request that could be seen as reasonable. It is a national standard to have higher walls around power substations to protect the public and the equipment. Staff does not have any concerns about the request for the higher wall around the substation as requested. The City has recently approved similar applications from Hurricane Power. The wall will be setback at least 10 feet from any future roadway.

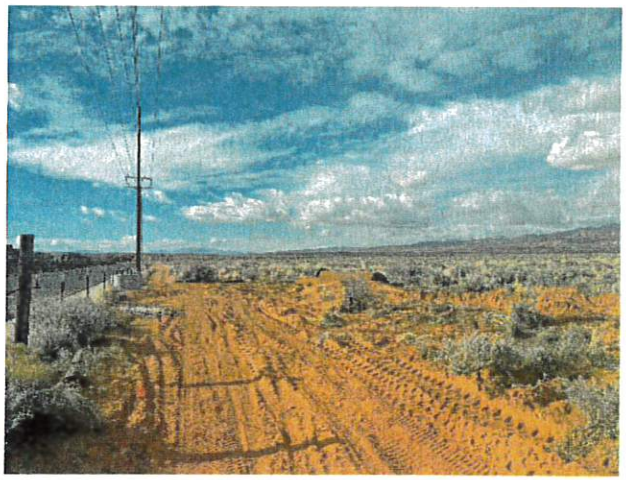
The applicant will need to submit a final site plan application for the entire site. The JUC should be signing the construction plans within the next couple weeks.

**Recommendation:** Staff recommends approval of the conditional use permit subject to staff comments.

W Hwy
3100 S
3110 S
W 2800
3150 S
3175 S
W 2600



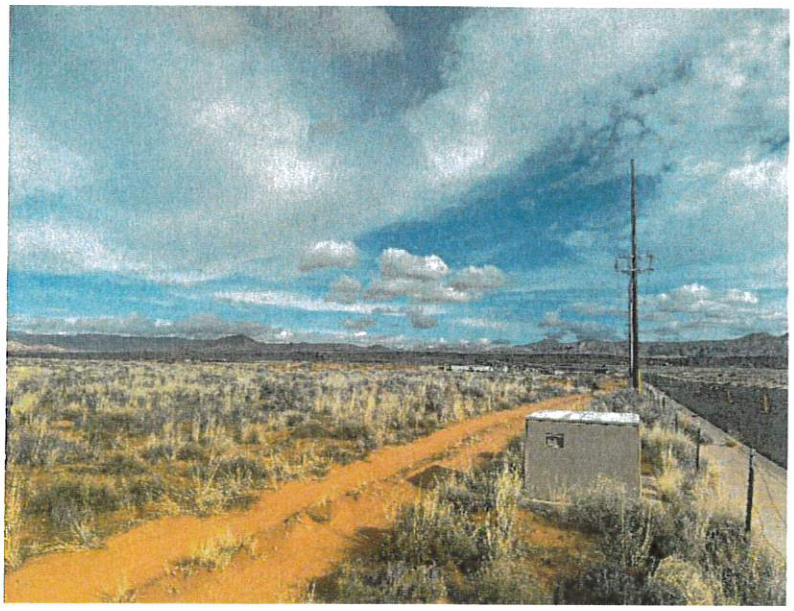
^Intersection of 3150 South & 4900 W facing North towards the substation site.



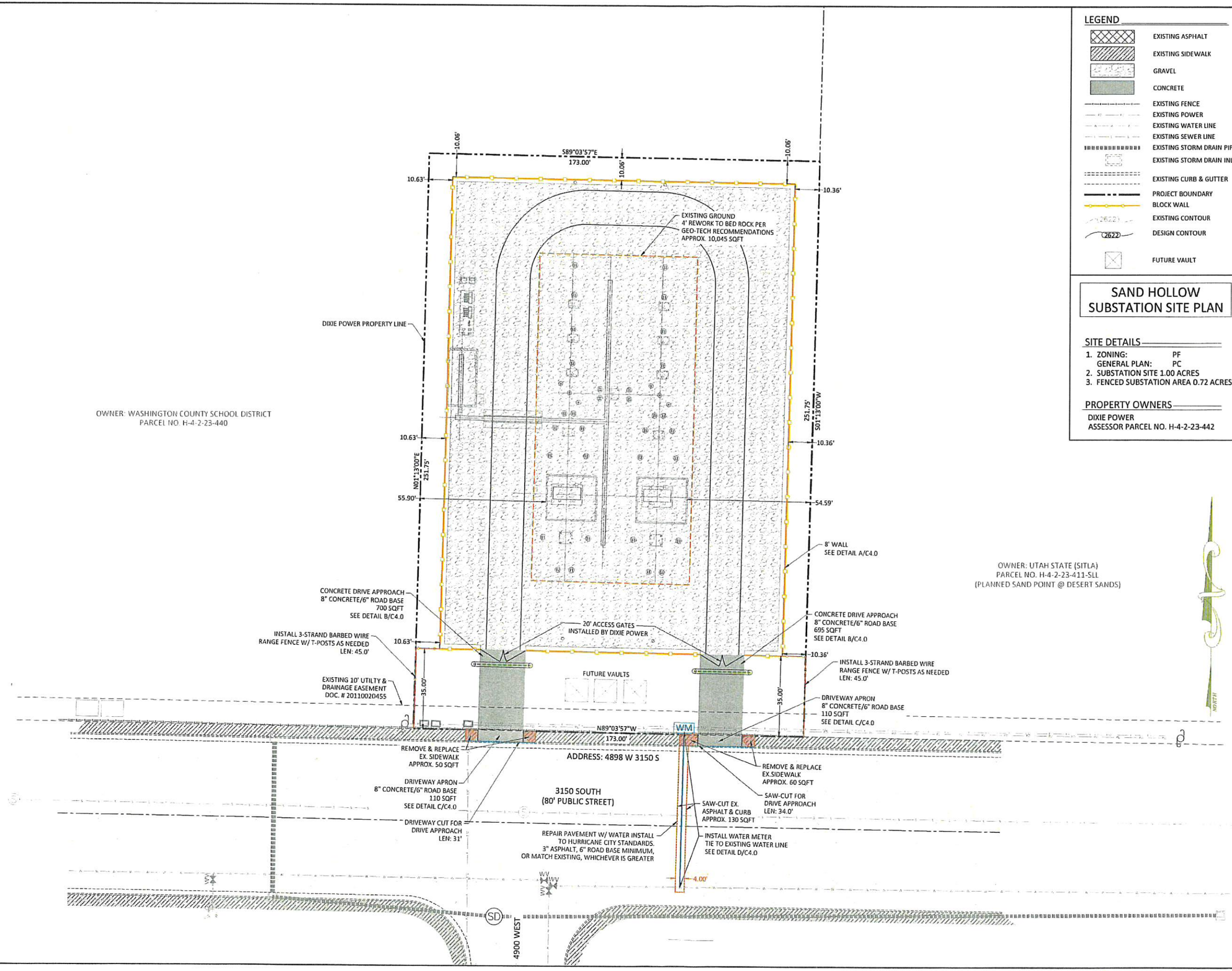
^Picture taken from the East side of the substation site, facing West.

^Picture taken from the North side of the substation site, facing South.

^Picture taken from the Northwest corner of the substation site, facing South-East



^Picture taken from the Southwest corner of the substation site, facing East.




## LEGEND

- EXISTING ASPHALT
- EXISTING SIDEWALK
- GRAVEL
- CONCRETE
- EXISTING FENCE
- EXISTING POWER
- EXISTING WATER LINE
- EXISTING SEWER LINE
- EXISTING STORM DRAIN PIPE
- EXISTING STORM DRAIN INLET
- EXISTING CURB & GUTTER
- PROJECT BOUNDARY
- BLOCK WALL
- EXISTING CONTOUR
- DESIGN CONTOUR
- FUTURE VAULT

# SAND HOLLOW SUBSTATION SITE PLAN

## SITE DETAILS

1. ZONING: PF
   GENERAL PLAN: PC
2. SUBSTATION SITE 1.00 ACRES
3. FENCED SUBSTATION AREA 0.72 ACRES

## PROPERTY OWNERS

DIXIE POWER
ASSESSOR PARCEL NO. H-4-2-23-442

Date: 1-9-23

REVISIONS

| No. | Date | by | Description |
|---|---|---|---|
| 1 | 1-6-23 | NTP | CITY COMMENTS |

File Name: SHS-Base.dwg

GRAPHIC SCALE

( IN FEET )
1 inch = 20 ft.
If Printed 11x17 use Half Scale


ALLIANCE CONSULTING
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SUITE 201,
WASHINGTON, UT 84780
435-673-8060

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


SAND HOLLOW
SUBSTATION SITE
SITE PLAN
FOR
DIXIE POWER
LOCATED IN SEC 23
TOWNSHIP 42 SOUTH, R 14 WEST SLB&M
CITY OF HURRICANE, WASHINGTON COUNTY, UTAH

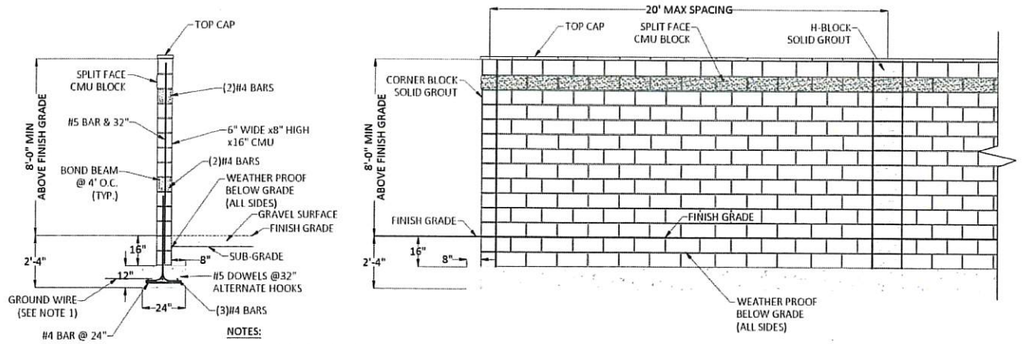
NOT FOR
CONSTRUCTION
REVIEW ONLY

| | |
|---|---|
| Drawn By: NTP | Scale: 1"=20' |
| Client No. 4612-22 | Project No. 4612-22 |

Drawing Sheet
C1.1

Sheet 1 of 1 Sheets

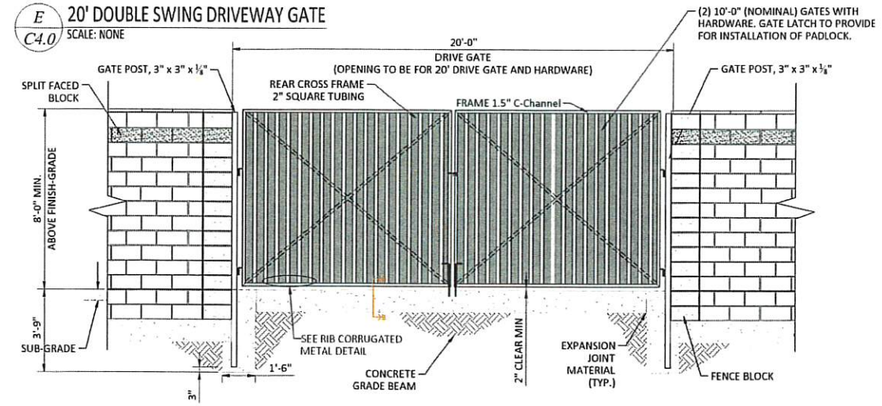
## A / C4.0 BLOCK WALL DETAIL
SCALE: NONE




NOTES:

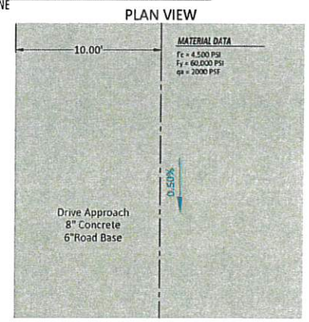
1. WALL CONTRACTOR TO COORDINATE WITH DIXIE POWER FOR REBAR TO GROUND GRID BONDING CONNECTIONS.
2. ALL HORIZONTAL REBAR IN THE FOOTING IS TO OVER LAP AND BE SECURELY TIED TO FORM A CONTINUOUS GROUNDING CONNECTION.
3. ALL VERTICAL REBAR TO BE SECURELY TIED TO ALL HORIZONTAL BARS IN THE FOOTING.
4. CMU BLOCK IS A COLORED BLOCK (OWNER APPROVED COLOR)
5. SOLID GROUT CELLS EVERY 32"
6. SPLIT FACE BLOCK 2nd TO TOP ROW
7. f'c: 3,000 psi CONCRETE
8. f'm: 1,500 psi MASONRY
9. 3" MIN CLEARANCE FOR ALL REBAR

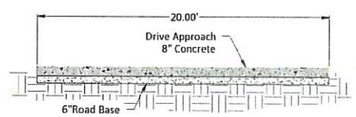
## E / C4.0 20' DOUBLE SWING DRIVEWAY GATE
SCALE: NONE



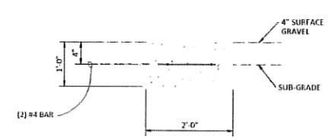

## B / C4.0 CONCRETE DRIVE APPROACH DETAIL
SCALE: NONE

PLAN VIEW

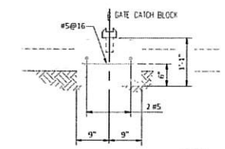



SECTION VIEW

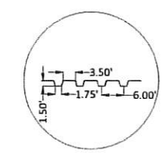



SECTION B

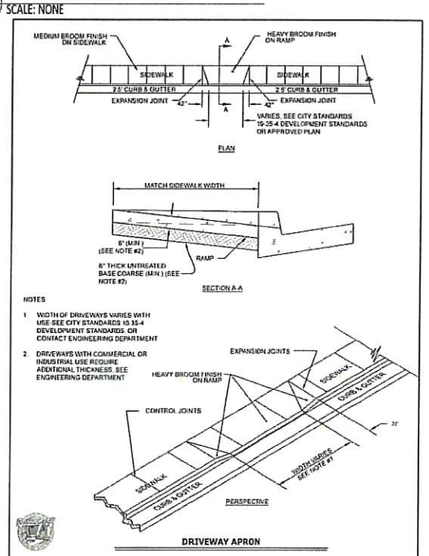



TYPICAL GATE CATCH BLOCK DETAIL 2

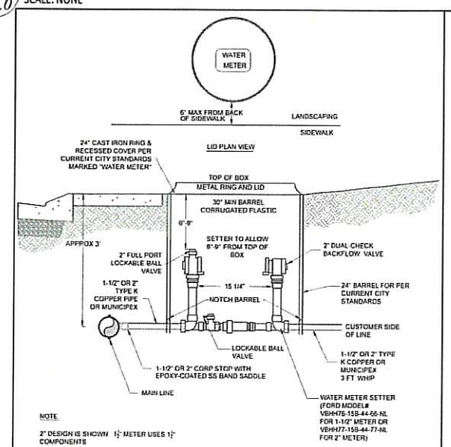
6" RIB CORRUGATED METAL



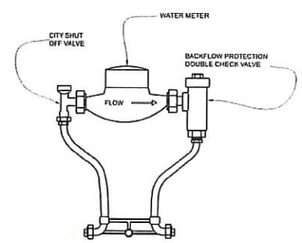

## C / C4.0 DRIVEWAY APRON DETAIL
SCALE: NONE




## D / C4.0 WATER METER DETAIL
SCALE: NONE




1½" OR 2" WATER SERVICE & METER
N.T.S



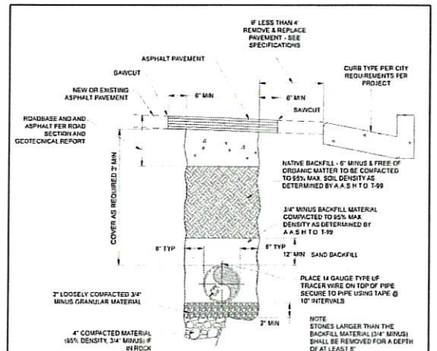

| APPROVED METER SETTERS | |
|---|---|
| SIZE | FORD MODEL NUMBER |
| ¾" | VBHC72-15W-11-33-NL |
| 1" | VBHC72-15W-11-44-NL |
| 1½" | VBHH76-15B-44-66-NL |
| 2" | VBHH77-15B-44-77-NL |

WATER METER SETTER
N.T.S

CITY OF HURRICANE
1½" OR 2" WATER SERVICE & METER
STANDARD DWG. NO. WD 303-4 4 OF 4

CITY OF HURRICANE
WATER METER SETTER DETAILS
STANDARD DWG. NO. WD 303-1 1 OF 1

## F / C4.0 WATER TRENCH DETAIL
SCALE: NONE




CULINARY WATER TRENCH
N.T.S

CITY OF HURRICANE
CULINARY WATER TRENCH DETAIL
STANDARD DWG. NO. WD 200 1 OF 1

| Date: | |
|---|---|
| | 1-9-23 |

REVISIONS

| No. | Date | by | Description |
|---|---|---|---|
| 1 | 1-6-23 | NTP | CITY COMMENTS |

File Name
SHS-Base.dwg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435-673-8060

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


SAND HOLLOW SUBSTATION SITE DETAILS
FOR
DIXIE POWER
LOCATED IN SEC 23
TOWNSHIP 42 SOUTH, R 14 WEST SLB&M
CITY OF HURRICANE, WASHINGTON COUNTY, UTAH

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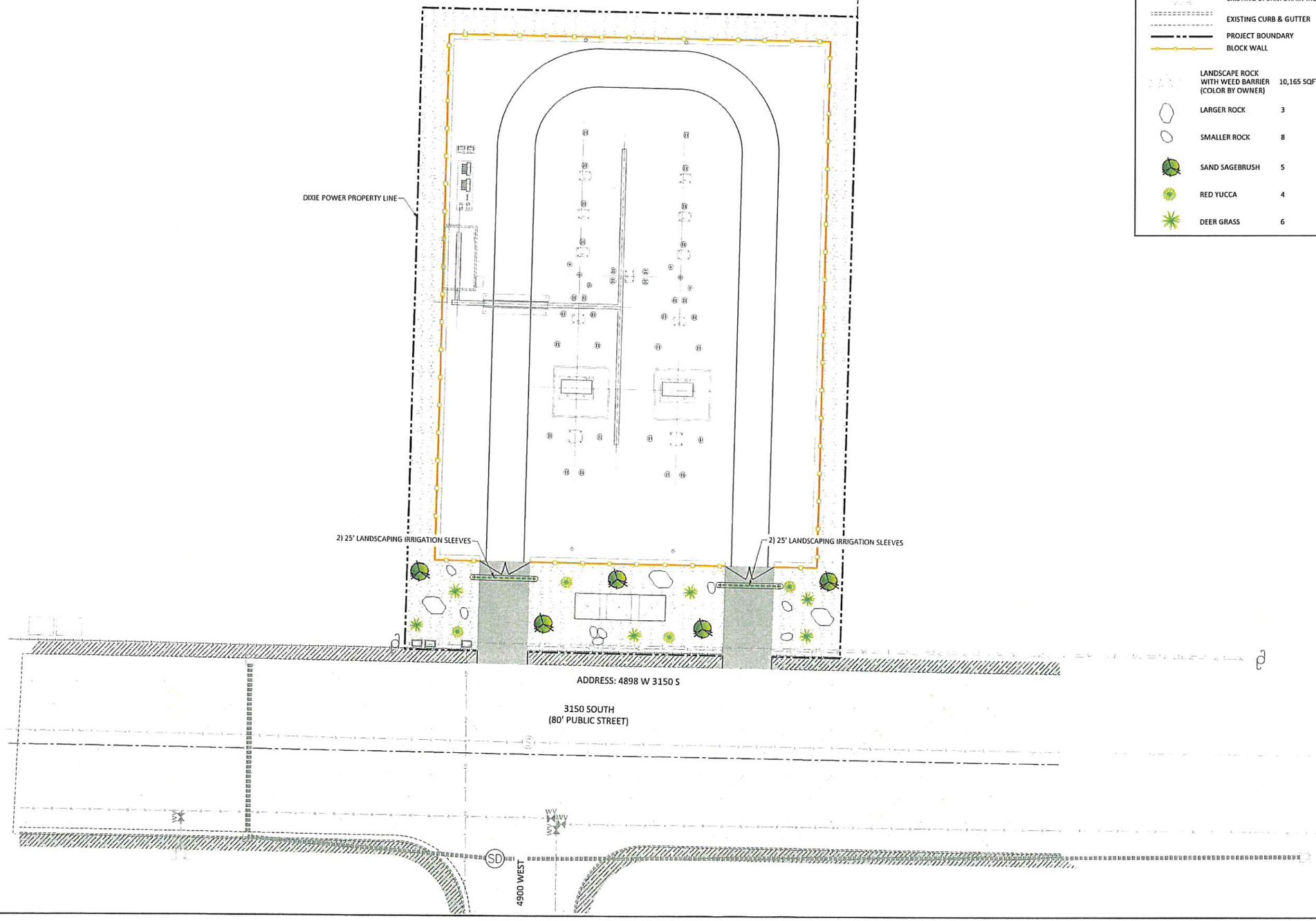
| Drawn By: NTP | Scale: VARIES |
|---|---|
| Client No. 4612-22 | Project No. 4612-22 |

Drawing Sheet
C4.0

Sheet 1 of 1 Sheets




## LEGEND

- EXISTING ASPHALT
- EXISTING SIDEWALK
- CONCRETE
- EXISTING FENCE
- EXISTING POWER
- EXISTING WATER LINE
- EXISTING SEWER LINE
- EXISTING STORM DRAIN PIPE
- EXISTING STORM DRAIN INLET
- EXISTING CURB & GUTTER
- PROJECT BOUNDARY
- BLOCK WALL

| | |
|---|---|
| LANDSCAPE ROCK WITH WEED BARRIER (COLOR BY OWNER) | 10,165 SQFT |
| LARGER ROCK | 3 |
| SMALLER ROCK | 8 |
| SAND SAGEBRUSH | 5 |
| RED YUCCA | 4 |
| DEER GRASS | 6 |

Date: 1-9-23

REVISIONS

| No. | Date | by | Description |
|---|---|---|---|
| 1 | 1-6-23 | NTP | CITY COMMENTS |

File Name: SHS-Landscape.dwg

NORTH

GRAPHIC SCALE

( IN FEET )
1 inch = 20 ft.
If Printed 11x17 use Half Scale

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435-673-8060

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

# SAND HOLLOW SUBSTATION SITE LANDSCAPING PLAN

FOR

DIXIE POWER

LOCATED IN SEC 23
TOWNSHIP 42 SOUTH, R 14 WEST SLB&M
CITY OF HURRICANE, WASHINGTON COUNTY, UTAH

NOT FOR CONSTRUCTION REVIEW ONLY

| | |
|---|---|
| Drawn By: NTP | Scale: 1"=20' |
| Client No. 4612-22 | Project No. 4612-22 |

Drawing Sheet: L1.0

Sheet 1 of 1 Sheets

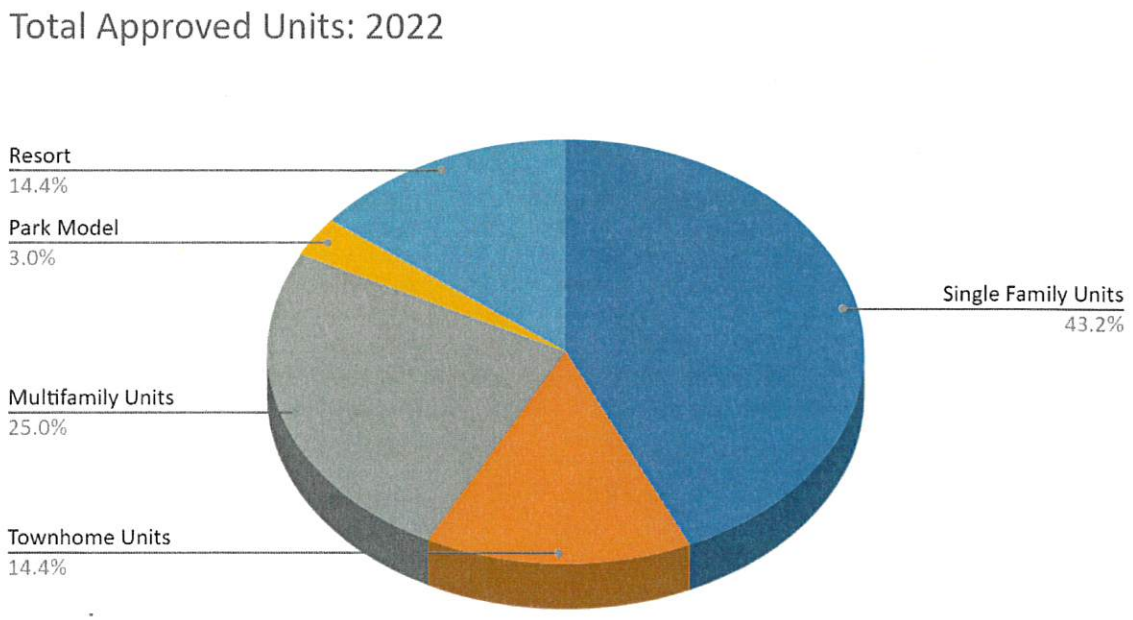
# Development Report 2022

## Introduction:

As has been predicted and seen throughout the recent months there has been a marked slowdown in growth in 2022. This was perhaps inevitable as the overheated post pandemic economy was bound to come back to earth eventually. While there has been a significant decrease in the numbers of planning approvals and building permits there has still been significant growth, in some cases still above pre-2020 numbers. While the overall rate of growth has decreased, the potential for growth is still quite large and the challenges that come from growth have persisted.

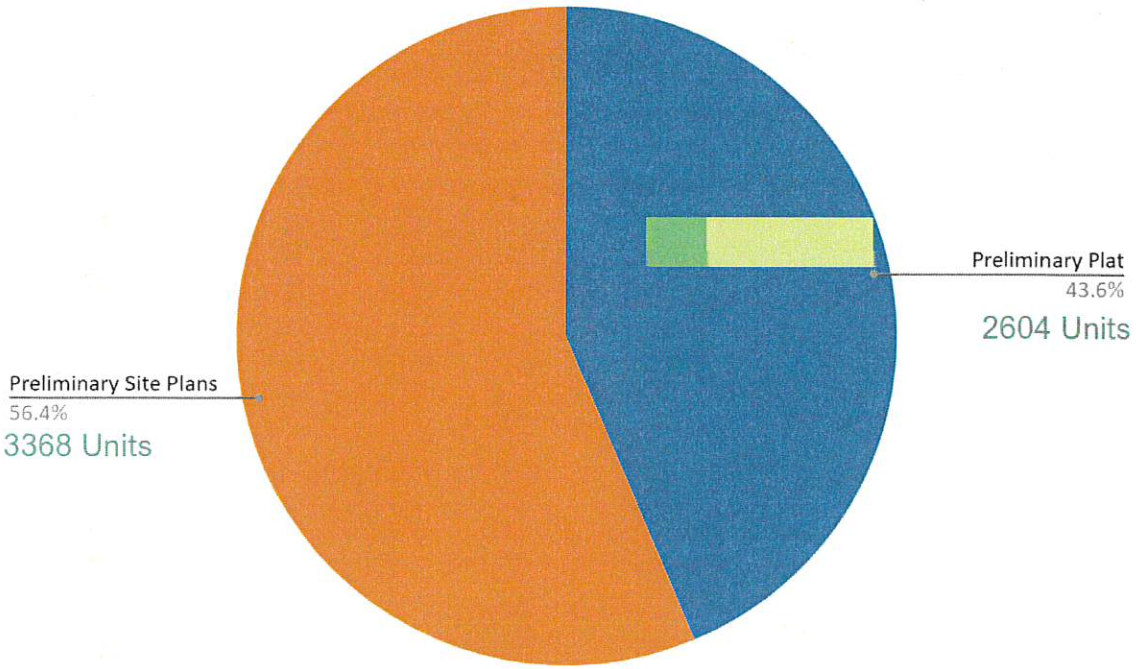
## Planning:

At the preliminary site plan and preliminary plat level, the Planning Commission approved 5,972 new units. 2,557 single family homes, 862 townhome units, 1,492 multifamily units (this number is made up of duplexes, condos, and apartments approved as part of site plans), 180 park model units and 861 resort units.




This is a major decrease from last year's totals of 13,555 units. It would be incorrect to say that the City has approved 19,527 (13555+5972) units over the past two years as many developments got preliminary site plan approval in 2021 and preliminary plat approval in 2022. This year did not have the same type of large scale developments that we saw in 2021. For example, the average planning approval (preliminary site plan and preliminary plat) in 2021 was 294 units

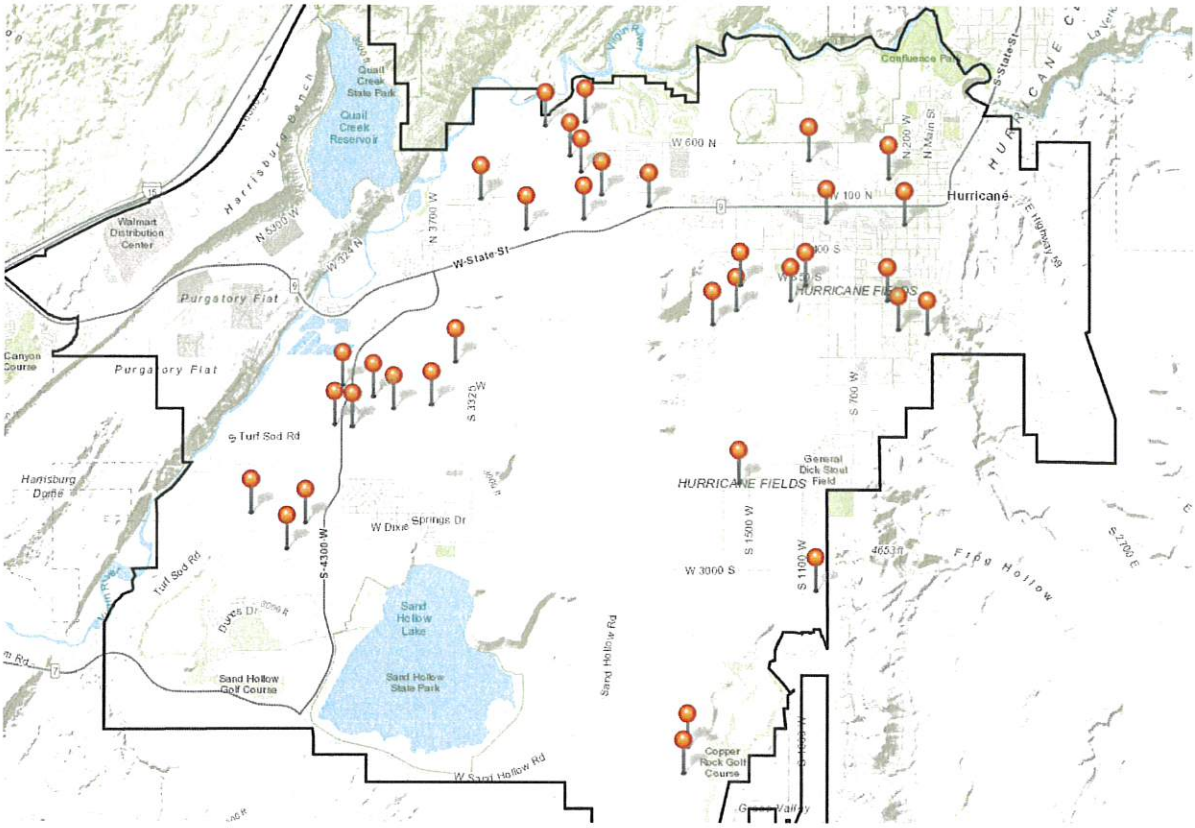
while it was 173 units in 2022. This year saw 2,604 units approved at the preliminary plat level and 3,368 units approved at the preliminary site plan level. This is a much more even split from last year, showing how development is continuing to progress.




**Location of Development**

The map below shows every approved development in the city in the past year. We are seeing patterns of development start to form around the Gateway to Sand Hollow/Elim Valley area, along SR-9, and south of 3000 S. We believe these areas will continue to be our growth areas moving forward. Despite this staff believes that the effects, both good and bad, will continue to be felt throughout the City.

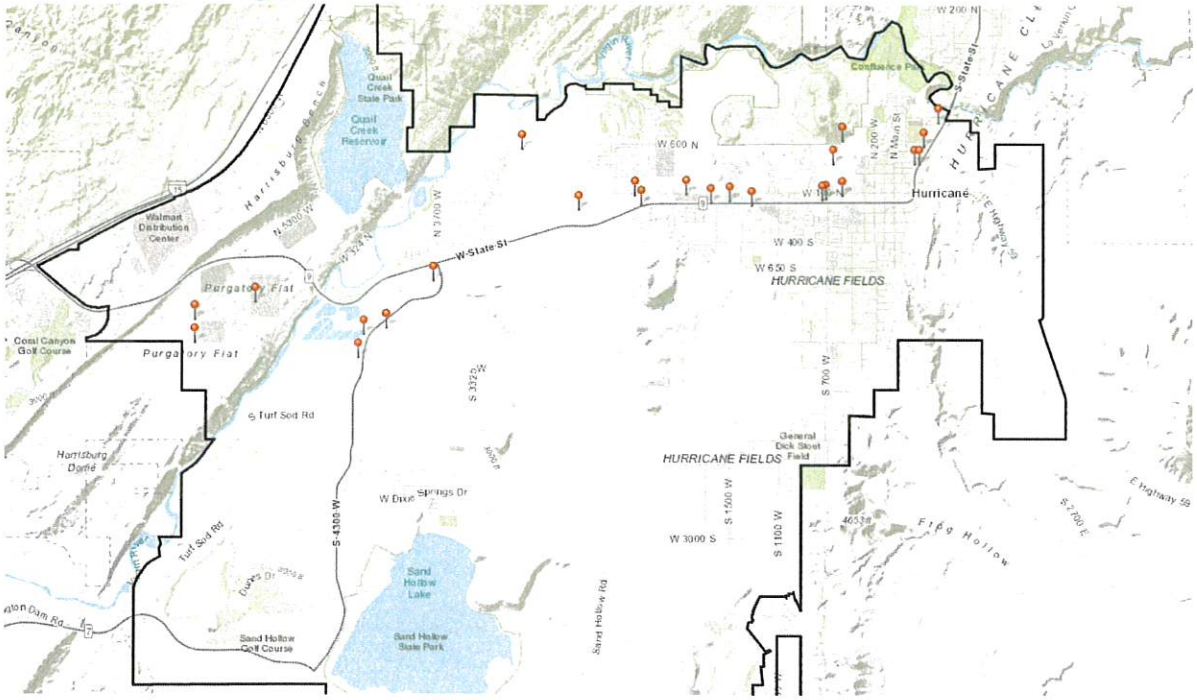
HURRICANE CITY
UTAH



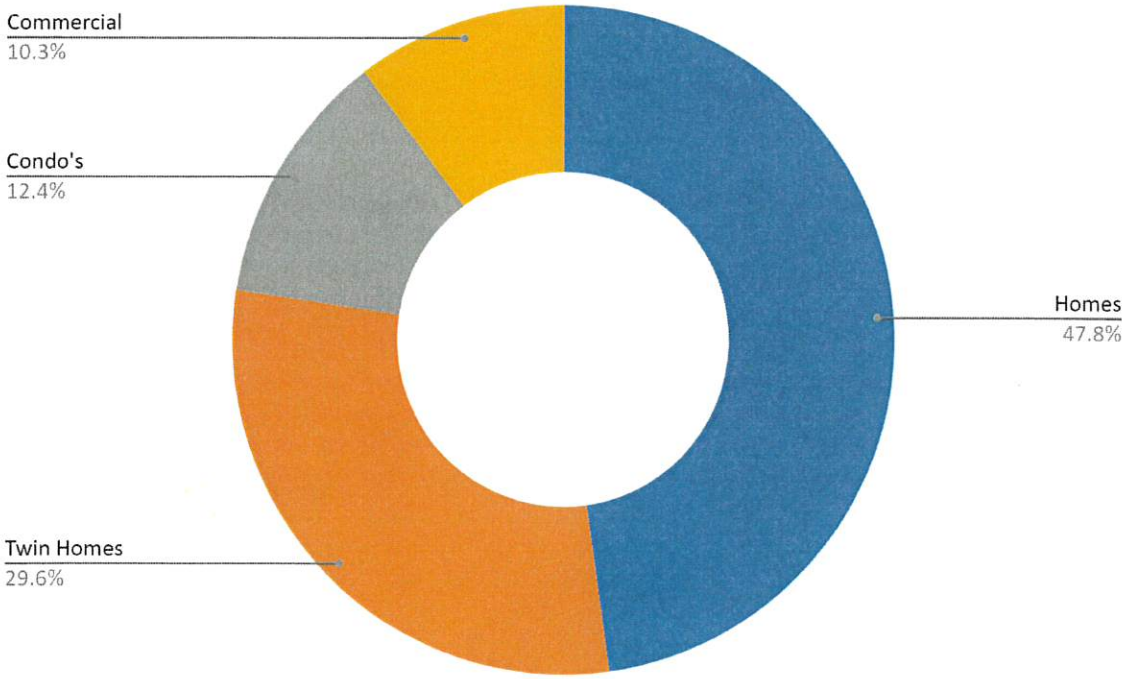

**Commercial:**

As residential growth has continued we have started to see an increase in commercial development as well. This year the Planning Commission approved 13 new restaurant pads, 14 new retail pads, 82 new industrial lots, 252 new hotel rooms (over two hotels), 333 new RV pads (across two RV parks), and 212 new storage units (across three complexes). These developments have been clustered around SR-9 and Sand Hollow Road with new development in our industrial parks.

HURRICANE CITY
UTAH

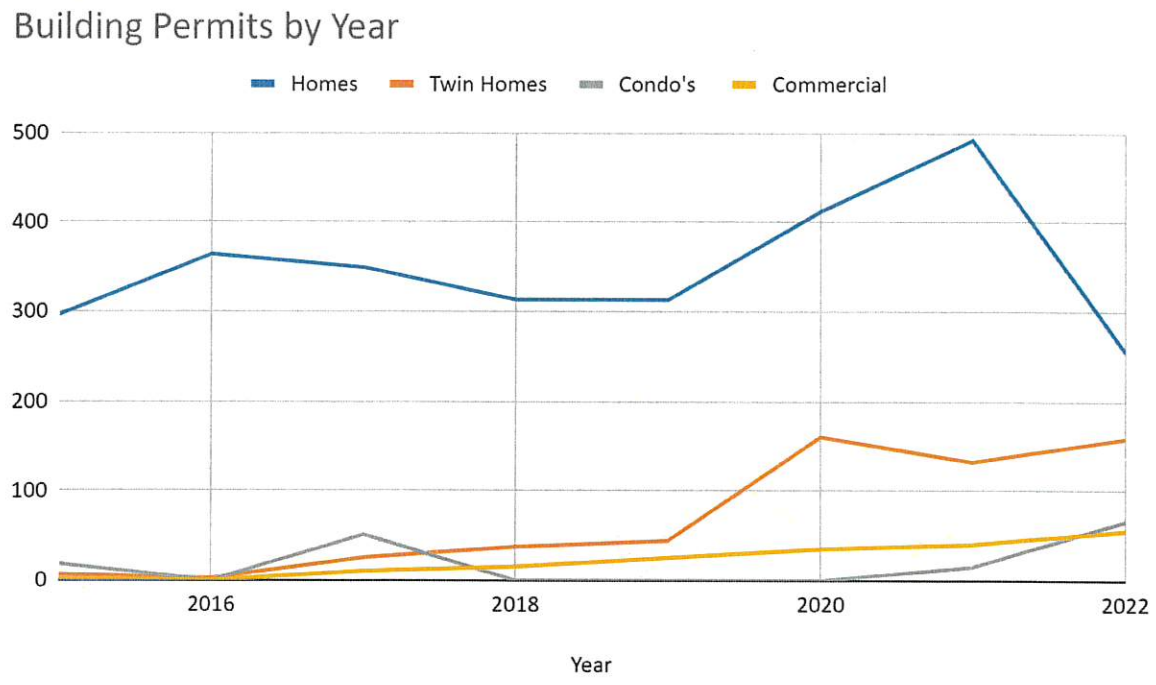



## Building Permits:

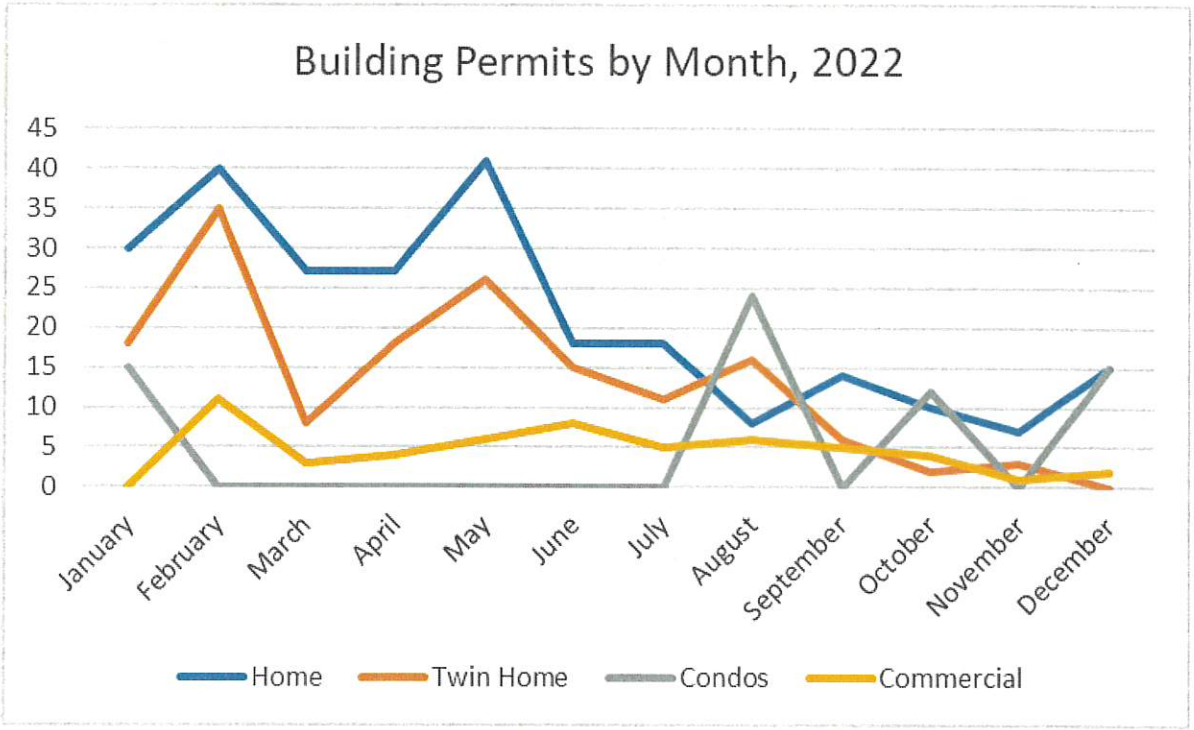


The total number of building permits issued for new buildings this year was 534 permits. This is a significant decrease from last year's totals of 679 permits but still well above pre-pandemic levels (see below) This breaks down to 255 single family homes, 158 twin homes, 66 condos, and 55 commercial as illustrated above.

As can be seen below, the majority of the decrease in building permits this year has been seen in single family home permits. Single family homes are expensive to build and have seen some of the highest inflation rates within the housing market. How this shakes out in the coming years is still unknown.

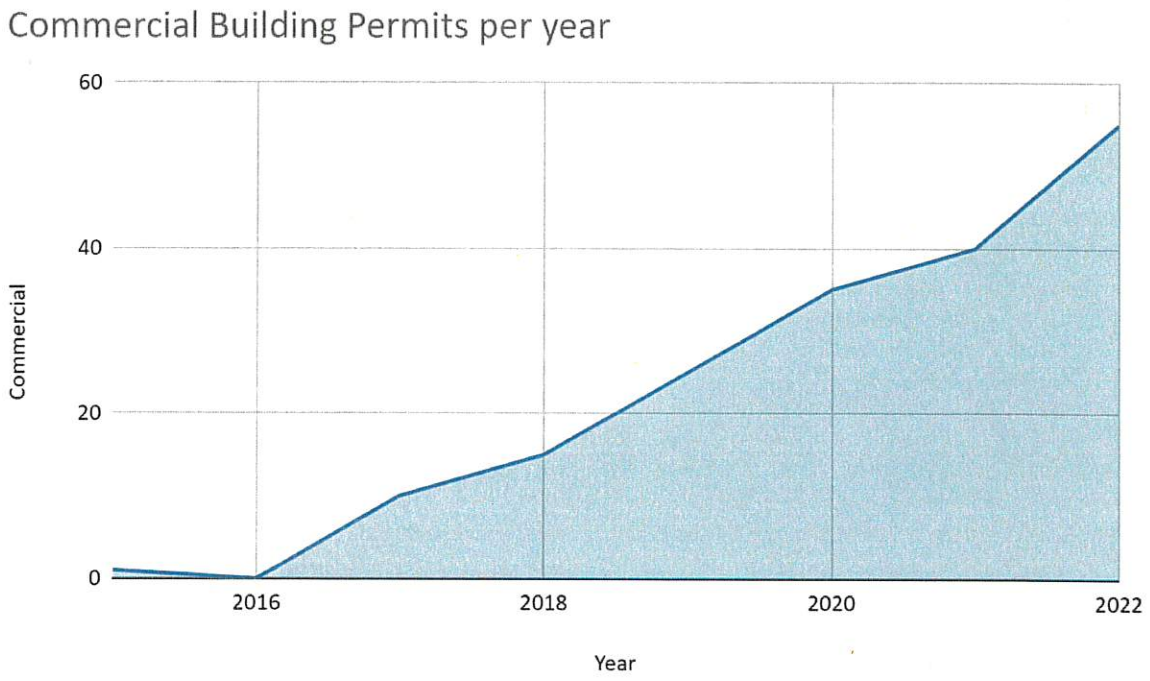


HURRICANE CITY
UTAH




## Commercial/Industrial Growth

Residential growth is not the only kind of growth we have seen this year. The Building Department issued 55 commercial building permits this year, a 37.5% increase over last year. Of these commercial permits, 42 of them were industrial lots. Some other highlights include: the IHC expansion, Scooter's Coffee, Del Taco , and Jimmy Johns.



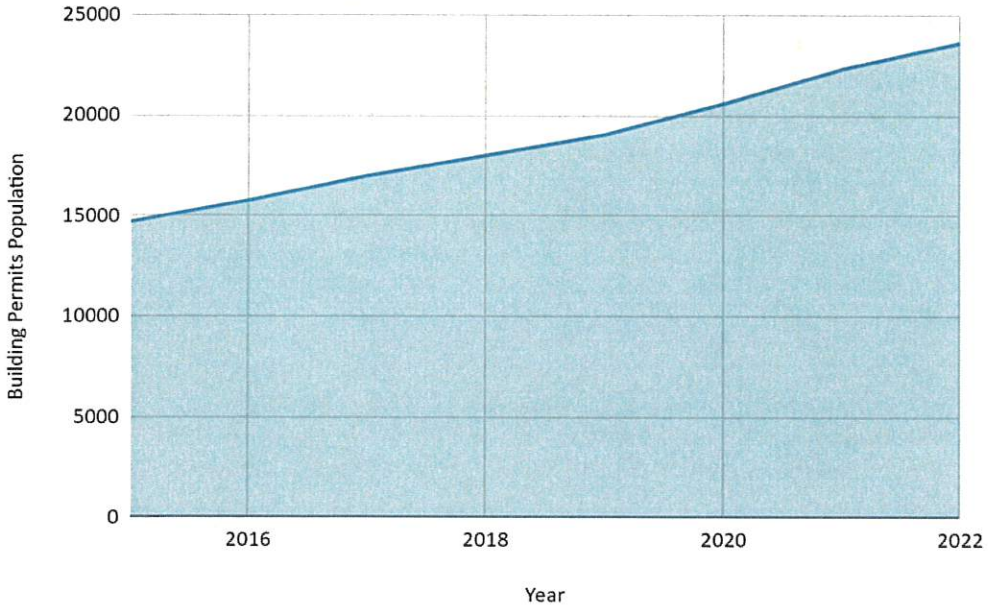

## Population Growth

There are generally two ways that staff have used to estimate the population and population growth in Hurricane. The first is Census data, which in non-Census years is estimated through surveys and other data. Another way staff has estimated the population growth is through building permits. The Census Bureau says Hurricane averages 2.7 residents per dwelling unit, so we take the number of residential building permits issued, multiply that by 2.7, and add that number onto our population.

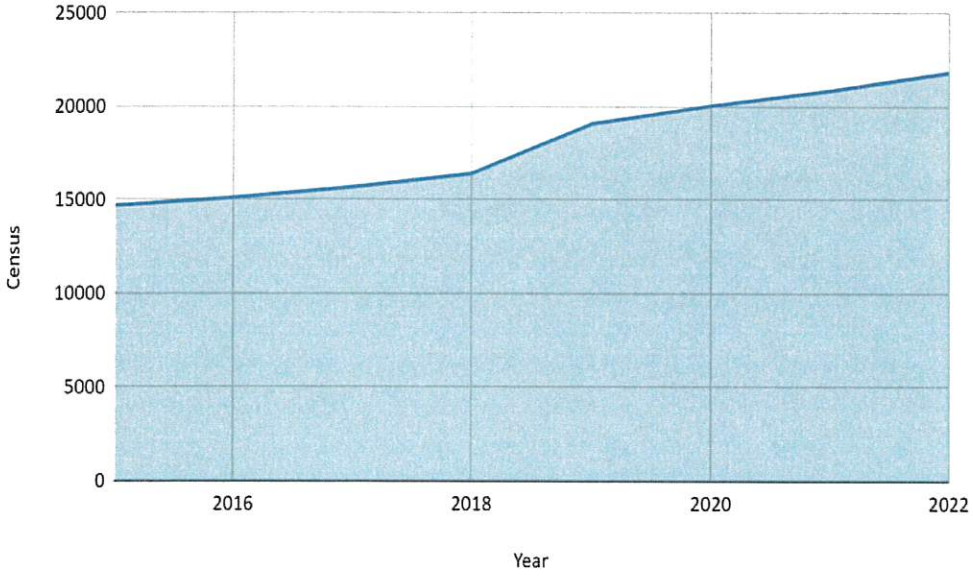
The Census estimates that our population is 21,808, a 5% increase from last year. Building permits allow us to estimate a population of 23,601, a 6% increase from last year. The gap between these numbers can be explained by a number of things: statistical errors on the Census Bureau's part, the large number of secondary/vacation homes in our market etc. Staff finds the near identical growth rate from the two numbers to be a sign that the real number is somewhere in there.

HURRICANE CITY
UTAH

Building Permits Population vs. Year




Census vs. Year



We project that growth will be fairly steady in the foreseeable future. There will be some years that may see an increase and other years with a decrease. Growth will continue to depend on several factors, including the local and national housing market, interest rates, zoning, and if key developments begin construction.

**Summary**

Broader market factors and economic conditions will always be a factor when it comes to growth in Hurricane. This year has seen a broad slowdown in the economy and that has been reflected in both building permits and planning applications. Staff believes there is still a broad economic demand for growth in this area and that the slowdown we are seeing will only be temporary.

Even with this slowdown the problems related to growth continue to affect the City. Utility concerns continue to be an issue as the City attempts to ensure that new infrastructure is installed correctly and the City does not overextend themselves. City departments continue to find themselves overextended and in need of further help.

As well some of the positive effects of new growth are starting to manifest themselves. Housing prices are starting to see a slight decline for the first time since before the pandemic. New retail and dining establishments are slowly starting to come online which increase tax revenue and quality of life for Hurricane residents.

Overall staff remains cautiously optimistic about their ability to handle upcoming growth and development. Staff believes that the path that the City is on right now is broadly sustainable, especially if this slowdown continues, and that they can implement policies in the meantime to manage growth better if and when the market picks back up.