

WASTEWATER

PRELIMINARY BASIS OF DESIGN REPORT

Headwaters Scottsdale
Scottsdale, Arizona

Prepared for:

Headwater Group
5265 S Rio Grande Ste 201
Littleton, CO 80120

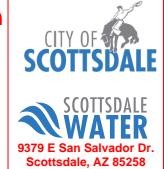
Prepared by:

Kimley»Horn

291753000
November 2022
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PRELIMINARY Basis of Design Report

- ACCEPTED
 ACCEPTED AS NOTED
 REVISE AND RESUBMIT



Disclaimer: If accepted; the preliminary approval is granted under the condition that a final basis of design report will also be submitted for city review and approval (typically during the DR or PP case). The final report shall incorporate further water or sewer design and analysis requirements as defined in the city design standards and policy manual and address those items noted in the preliminary review comments (both separate and included herein). The final report shall be submitted and approved prior to the plan review submission.

For questions or clarifications contact the Water Resources Planning and Engineering Department at 480-312-5685.

BY rsacks

DATE 4/12/2023



Headwaters Scottsdale

WASTEWATER BASIS OF DESIGN REPORT

MARCH 2023

Prepared By:

Kimley»Horn

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1.0 INTRODUCTION

Kimley-Horn and Associates, Inc. has prepared this Wastewater Basis of Design Report for the proposed minimal residential healthcare living development at the southeast corner of 100th Street and Frank Lloyd Wright Boulevard in Scottsdale, Arizona. This report will demonstrate that the proposed project conforms to the City of Scottsdale design requirements.

Headwaters Scottsdale, the “project”, encompasses approximately 6.707 gross acres and contains a 203,929 gross square foot three-story and 5 one-story minimal residential healthcare facility with 217 parking spaces. The total number of units between the three-story and one-story is 172. The complex also includes a swimming pool located in the center of the three-story multifamily complex. The project lies within a portion of the Southwest Quarter of Section 8 and a Portion of the Northeast Quarter of Section 17, Township 3 North, Range 5 East of the Gila and Salt River Base and Meridian in Maricopa County, Arizona. More specifically, the project is bound by East Frank Lloyd Wright Boulevard to the north, Belmont retirement community, 134 units, to the east, single-family to the south, and North 100th Street to the west. See **Appendix A** for the Vicinity Map.

2.0 WASTEWATER ANALYSIS

2.1 INTENT AND SCOPE

The intent of this section is to evaluate the wastewater infrastructure for the proposed development. As a result of this analysis, it will be determined if the wastewater infrastructure can satisfy the projected wastewater demands for the proposed development in accordance with the City of Scottsdale Design Standards & Policies Manual (**Reference 1**).

2.2 GENERAL THEORY

The hydraulic modeling program FlowMaster, a Bentley Systems product developed by Haestad Methods, was used to model the wastewater infrastructure servicing the proposed development. The program uses the Manning equation for flow analysis of non-pressurized closed pipes. This is the typical method used to evaluate wastewater distribution systems.

2.3 WASTEWATER SUPPLY

There is an existing 8-inch VCP sewer main located in 100th Street west of the site. There is an existing public sewer main that runs through the private access road to connect the Belmont Village (134 units) to the sewer located in 100th Street. The existing public sewer main in the private road will be relocated around the proposed building. The water/sewer easement that the sewer is located in will be abandoned.

The existing public sewer main will be cut and tie into a new manholes that will allow the system to be relocated around the proposed development. The proposed 8-inch PVC will extend south, looping around the building and reconnecting to the existing 8-inch sewer main along the private access road near 100th Street entrance. A proposed 20' sewer and sewer/water easement is proposed for the relocation of the public sewer main.

The proposed 8-inch sewer main will have services for the southern buildings and main building. Refer to **Appendix E** for the Preliminary Utility Plan.

The analysis of sewer capacities in this Basis of Design Report will be limited to the 8-inch sewer main extending into the site. This analysis is limited to the use of the proposed development and existing Belmont development.

2.4 WASTEWATER DEMANDS

The following calculations and demands are based on Figure 7-1.2 in the City of Scottsdale's 2018 DS&PM. For clarity of building locations, reference **Appendix B** for the Site Plan. See **Appendix C** for the Scottsdale Quarter Section Map.

Table 1: Proposed Sewer Main Demands

Building	Use	DUs	Demand ¹ per unit (GPD)	Average Daily Flow (GPD)	Peak Flow ² (GPD)	Peak Flow (GPM)
Headwaters Minimal Residential Healthcare Facility	Multifamily	172	140	24,080	108,360	75
Belmont Assisted Living	Multifamily	134	140	18,760	84,420	59
Pool Backwash						100
Total For 8" Diameter Pipe						234

Notes:

1. Demands are based on Figure 7-1.2 in City of Scottsdale's 2018 DS&PM
2. The design peak flow factor for multifamily use is 4.5.
3. The pool backwash rate of 100 gpm is based on correspondence with City of Scottsdale staff.

2.5 WASTEWATER ANALYSIS

Sanitary sewer lines will be designed to maintain a maximum depth to diameter ratio (d/D) of 0.65, a minimum full flow velocity of 2.5 ft/sec and a maximum full flow velocity of 10.0 ft/sec in the ultimate peak flow condition. To verify the proposed main has adequate capacity to serve the project, design flows were analyzed with Flow Master using pipe design slopes. Pool backwash shall be connected to the sanitary sewer system through the building service and not discharge to the storm drain system. Backwash pump and pipe sizing will be done by the pool designer under separate permit. Refer to **Table 2** below and **Appendix D** for the Sewer Capacity Calculations.

Table 2: Proposed Sewer Main Capacity

	Peak Flow (GPM)	Manning Roughness (n)	Slope (ft/ft)	d/D	Velocity (ft/s)
8" Diameter Pipe	234	0.010	0.0052	0.475	3.18

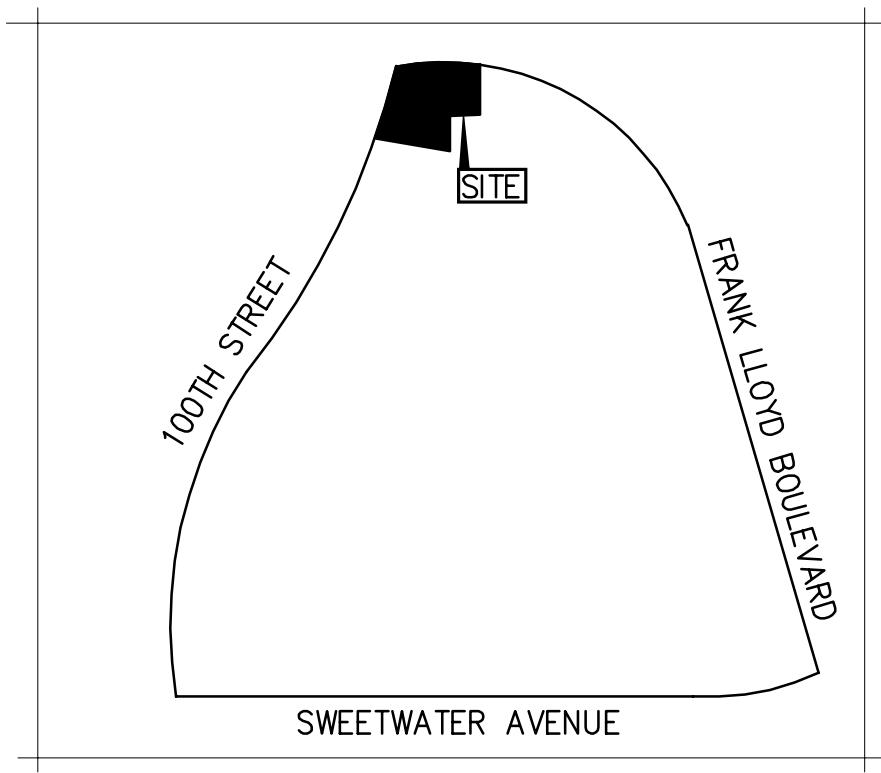
4.0 CONCLUSION

The development proposes to connect one new 8-inch sewer service to the existing 8-inch sewer main in the private access drive via manhole. The proposed sewer main will loop on the south side of the proposed building and reconnect to the existing sewer main near the 100th Street entrance. The proposed and existing sewer infrastructure as outlined by this analysis has adequate capacity for the flows generated by the proposed building located at the southeast corner of 100th Street and Frank Lloyd Wright Boulevard.

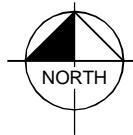
5.0 REFERENCES

1. City of Scottsdale, *Design Standards and Policies Manual*. 2018.
2. Sustainability Engineering Group, *Preliminary Basis of Design for Wastewater*, September 2018.

Appendix A – Vicinity Map



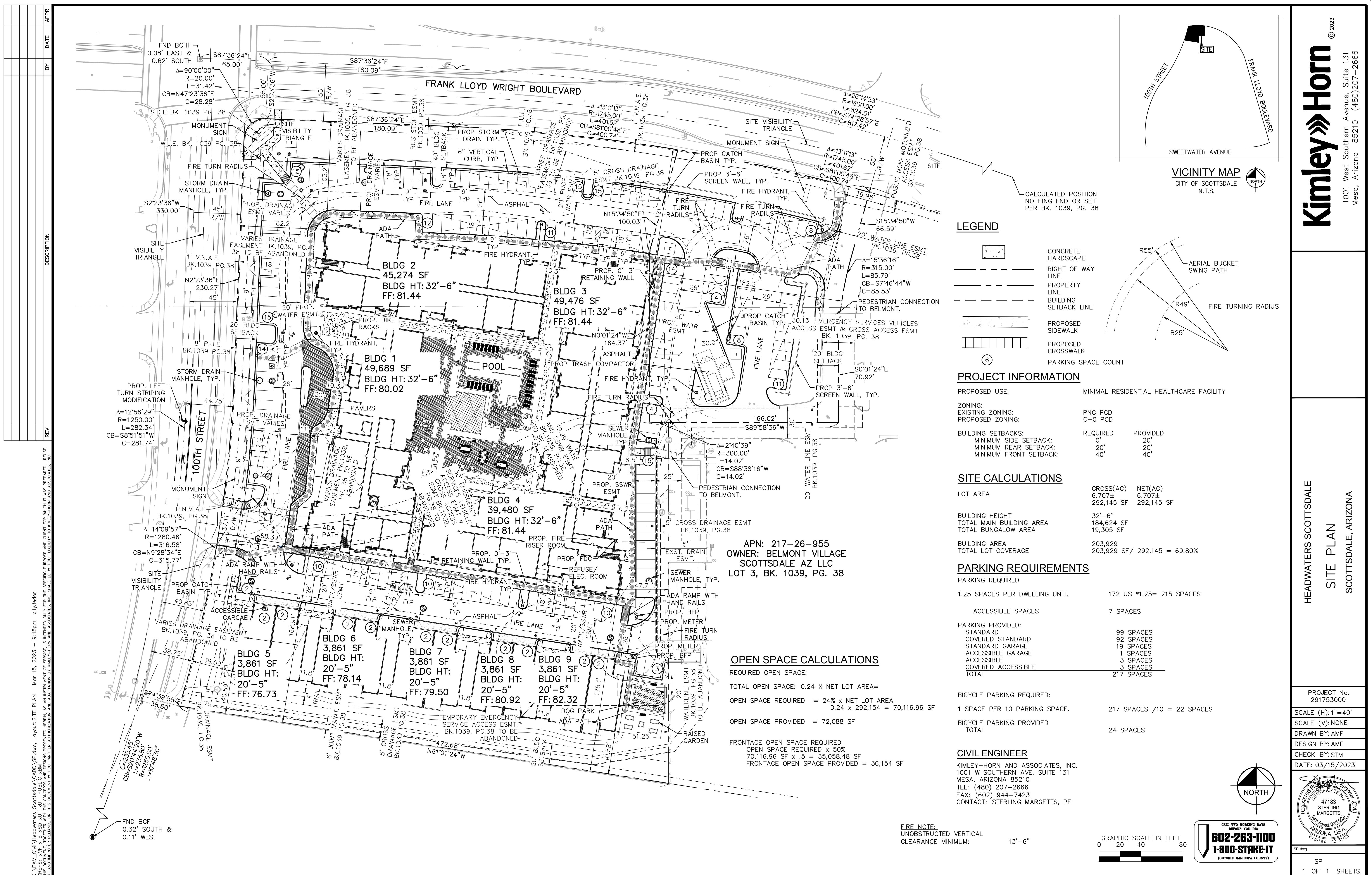
VICINITY MAP
CITY OF SCOTTSDALE
N.T.S.



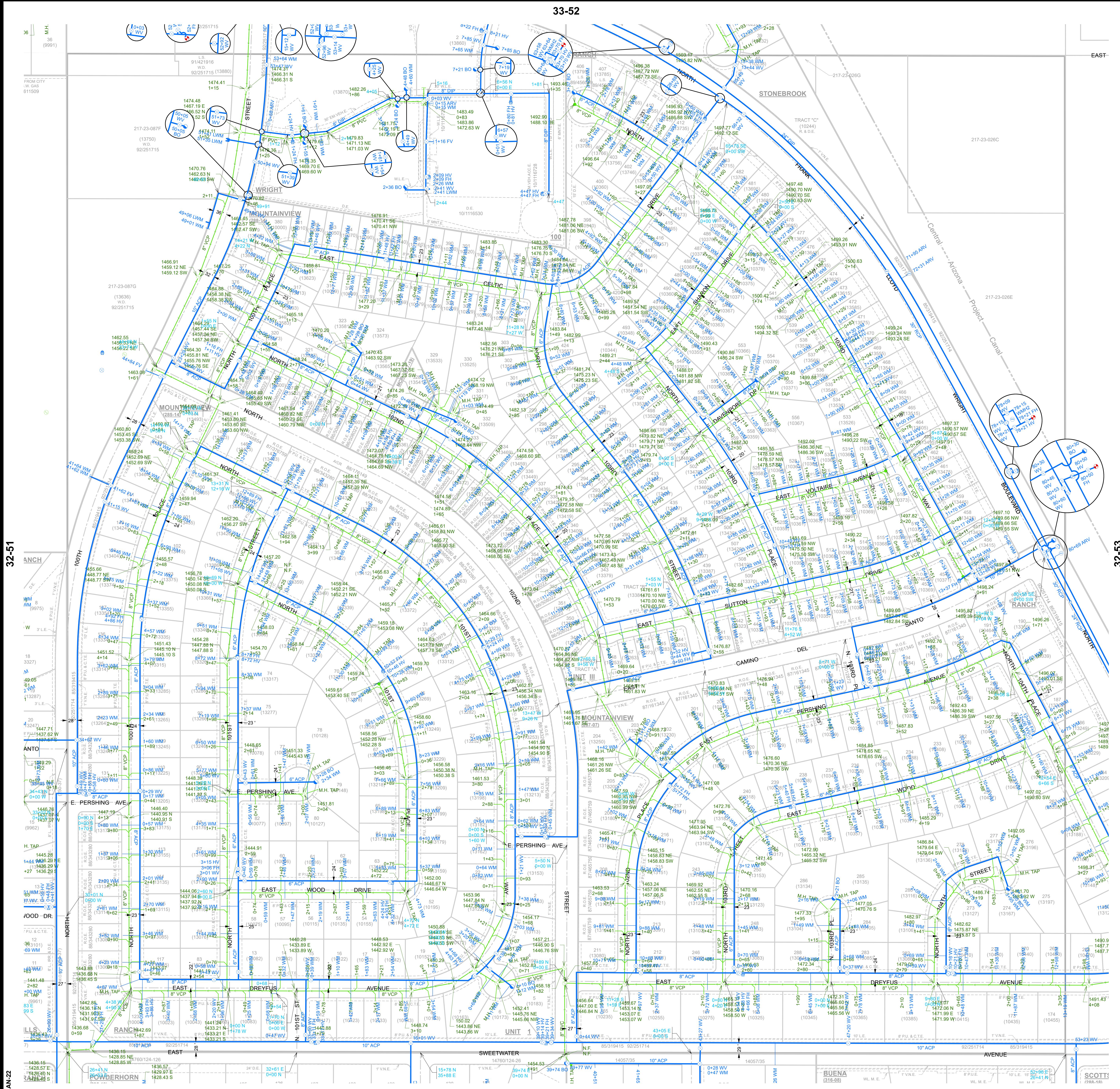
Appendix B – Site Plan

Kimley-Horn

HEADWATERS SCOTTSDALE
SCOTTSDALE, ARIZONA



Appendix C – Scottsdale Quarter Section Map

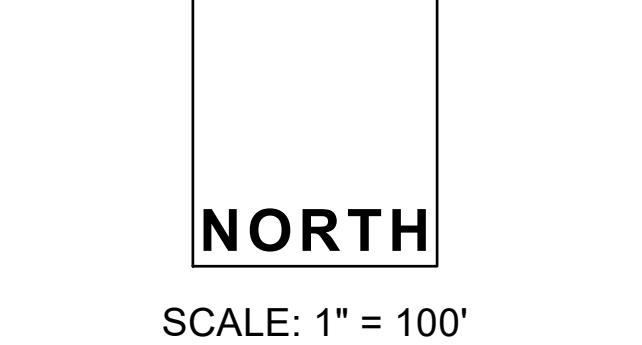
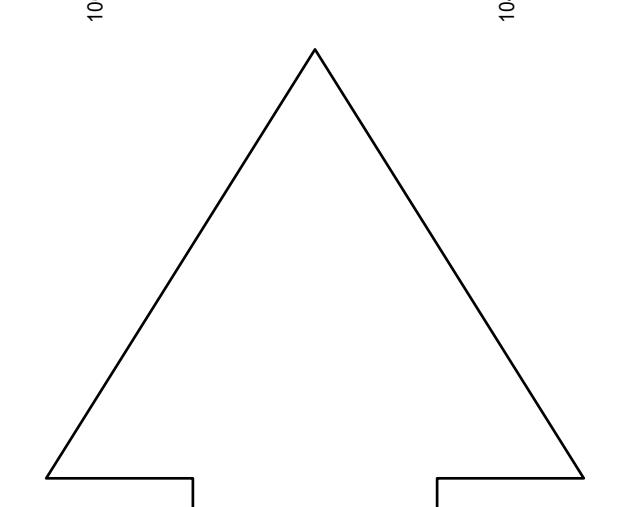
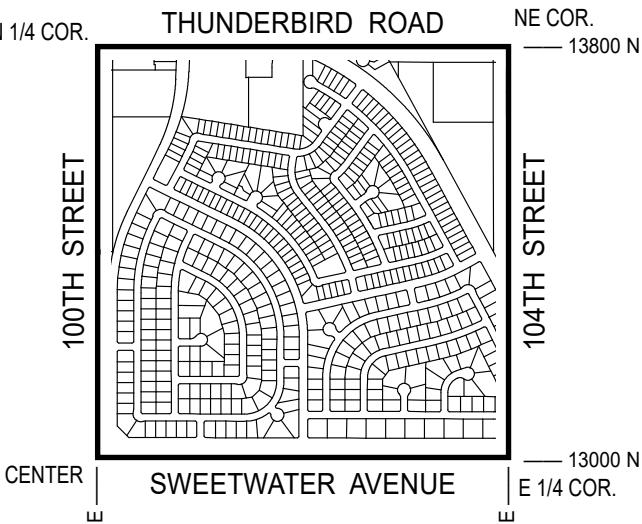


GENERAL NOTES:
• THIS IS A COMPUTER GENERATED DRAWING. FOR ANY REVISIONS PLEASE CONTACT THE CITY OF SCOTTSDALE GIS DEPARTMENT AT (480) 312-7792.
• THE SECTION LINE BEARING AND DISTANCES ARE BASED ON THE CITY OF SCOTTSDALE GPS SURVEY OF SEPTEMBER, 1991. BEARINGS ARE NAD 83 GRID AND DISTANCES ARE FLATTENED TO GROUND, WHERE NO CORNER WAS FOUND. THE DIMENSIONS ARE GIVEN TO CALCULATED SECTION CORNERS AND ARE NOTED AS CALCULATED ON THE MAP.

LEGEND:

- Water Valve
- Non-potable Water Valve
- Fire Hydrant
- Water Blowoff
- Water Main Reducer
- Water Sample Station
- Water Air Release Valve
- Non-potable Water Air Release Valve
- Water Pressure Reducing Valve
- Water Vault
- Water Manhole
- Non-Potable Water Manhole
- Water Pump
- Water Main
- Non-Potable Water Main
- Fire Line
- Water Service
- Non-Scottsdale Water Main
- Sewer Manhole
- Sewer Cleanout
- Sewer Lift Station
- Sewer Treatment Plant
- Sewer Main - Gravity
- Sewer Main - Force
- Force
- Non-Scottsdale Sewer Main
- Sewer Service

VICINITY MAP



NORTH

SCALE: 1" = 100'

The map scale of 1" = 100' is based on a full size print of 30" x 36"

WATER & SEWER QUARTER SECTION MAP
32-52
NE 1/4 SEC. 17 T3N R5E

Appendix D – Sewer Calculations

Sewer Capacity

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.010
Channel Slope	0.520 %
Diameter	8.0 in
Discharge	234.00 gpm

Results

Normal Depth	3.8 in
Flow Area	0.2 ft ²
Wetted Perimeter	1.0 ft
Hydraulic Radius	1.9 in
Top Width	0.67 ft
Critical Depth	4.1 in
Percent Full	47.6 %
Critical Slope	0.418 %
Velocity	3.18 ft/s
Velocity Head	0.16 ft
Specific Energy	0.47 ft
Froude Number	1.129
Maximum Discharge	546.91 gpm
Discharge Full	508.42 gpm
Slope Full	0.110 %
Flow Type	Supercritical

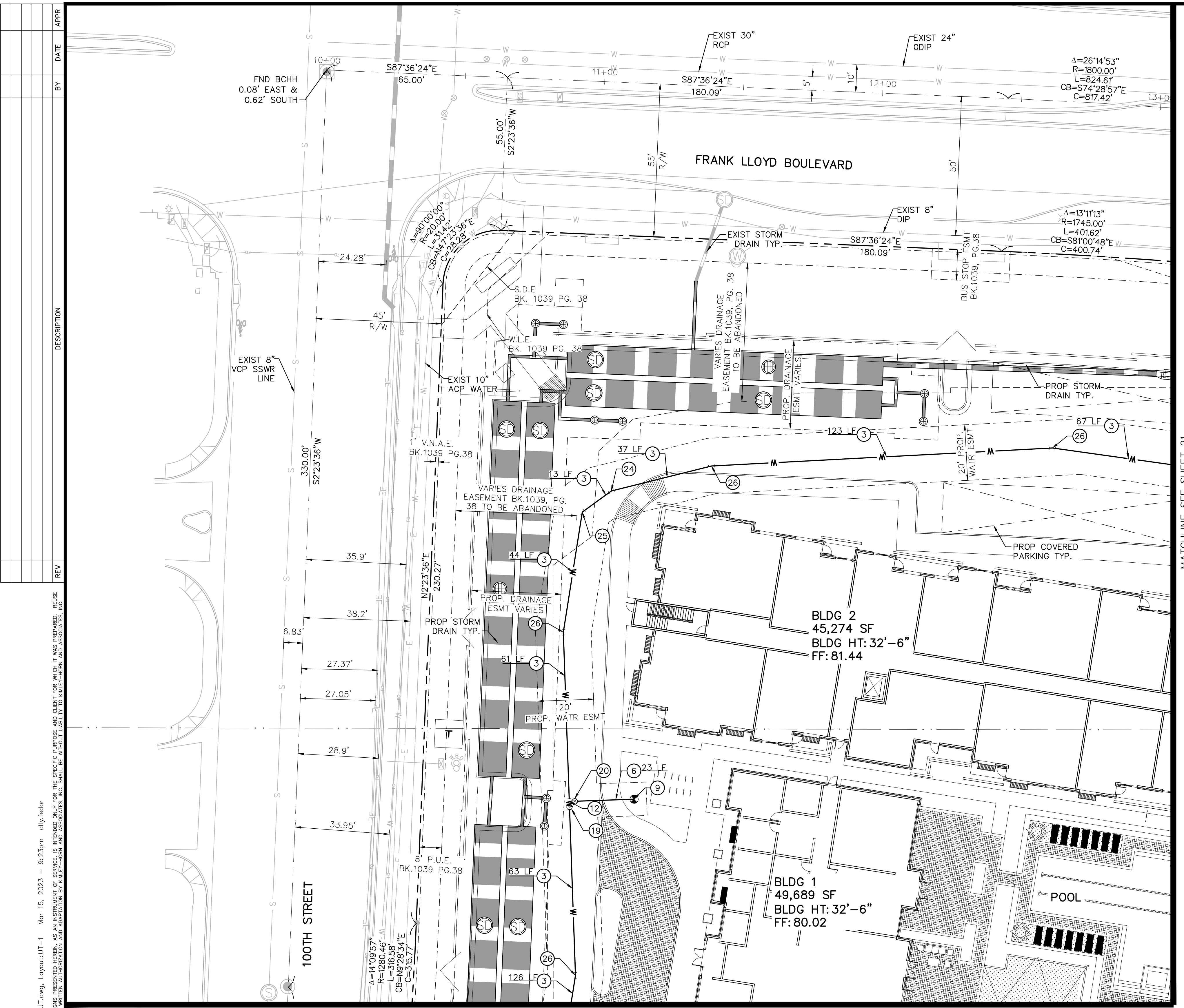
GVF Input Data

Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

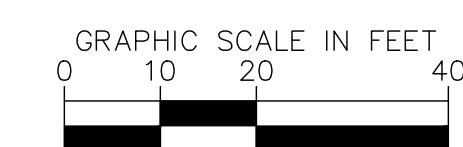
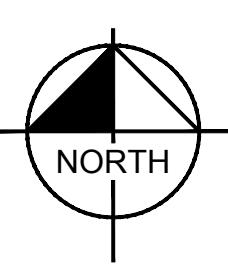
GVF Output Data

Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	47.6 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	3.8 in
Critical Depth	4.1 in
Channel Slope	0.520 %
Critical Slope	0.418 %

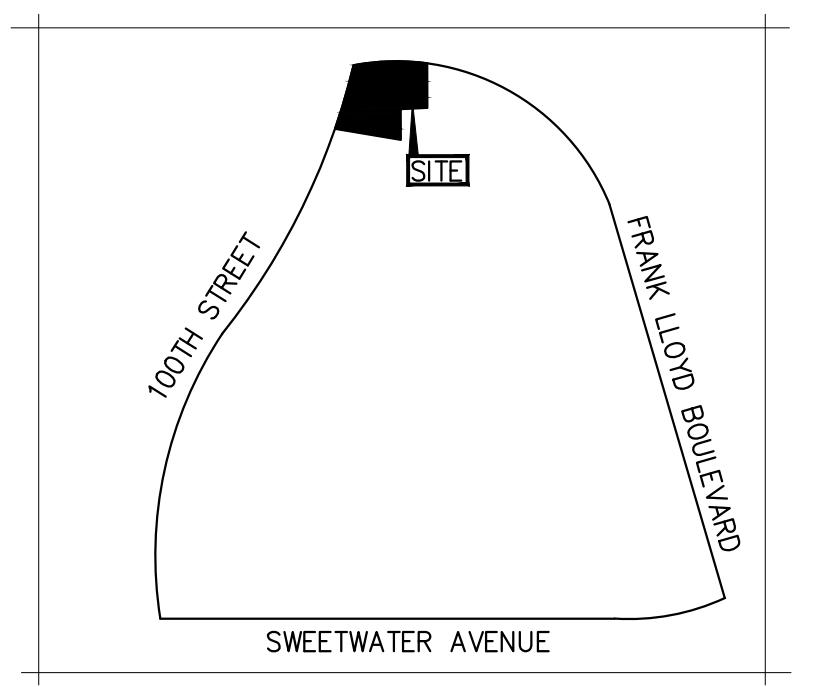
Appendix E – Utility Plan



- NOTES:
1. STATION AND OFFSET BASED ON FRANK LLOYD WRIGHT BOULEVARD CL.
 2. ALL VALVES SHALL BE FLANGED TO TEES, BENDS, AND CROSSES.
 3. ADD 1400 TO ALL ELEVATIONS.
 4. ALL 8" PIPE SHALL HAVE 3' MINIMUM COVER.



1 OF 4 SHEETS



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Mesa, Arizona 85210 (480) 207-2866

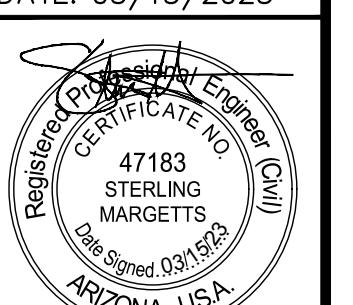
HEADWATERS SCOTTSDALE
UTILITY PLAN
SCOTTSDALE, ARIZONA

PUBLIC WATER NOTES

- ③ INSTALL 8" DUCTILE IRON CLASS 350 WATERLINE WITH POLYWRAP WITH BEDDING AND BACKFILL PER EPCOR STD DET. 350-1. LENGTH PER PLAN. 3' MIN COVER.
- ⑥ INSTALL 6" DUCTILE IRON WITH POLYWRAP PRESSURE CLASS 350 WATERLINE WITH BEDDING AND BACKFILL PER MAG SPEC 601. LENGTH PER PLAN.
- ⑨ INSTALL FIRE HYDRANT ASSEMBLY AND VALVE COMPLETE PER MAG STD DET 360-1. PROVIDE MIN. CLEARANCE PER MAG STD DET 362, INSTALL 6-INCH D.I. FIRE LINE, MORTAR LINED PER MAG SPEC 750 WITH POLYWRAP CORROSION PROTECTION PER MAG SPEC 610.5, BEDDING AND BACKFILL PER MAG Specs. 4' MINIMUM COVER REQUIRED. LENGTH PER PLAN.
- ⑫ INSTALL 8"X6" TEE WITH RESTRAINED JOINTS PER COS DET DET 2342-2 AND MAG STD DET 303.
- ⑯ INSTALL 8" GATE VALVE PER MAG STD DET 391-1 TYPE C AND COS STD DET 2770.
- ⑰ INSTALL 6" GATE VALVE PER MAG STD DET 391-1 TYPE C AND COS STD DET 2770.
- ㉑ INSTALL 8" 22° BEND WITH RESTRAINED JOINTS PER COS STD DET 2342-2. AND MAG STD DET 303.
- ㉒ INSTALL 8" 45° BEND WITH RESTRAINED JOINTS PER COS STD DET 2342-2. AND MAG STD DET 303.
- ㉓ INSTALL 8" 11" BEND WITH RESTRAINED JOINTS PER COS STD DET 2342-2. AND MAG STD DET 303.

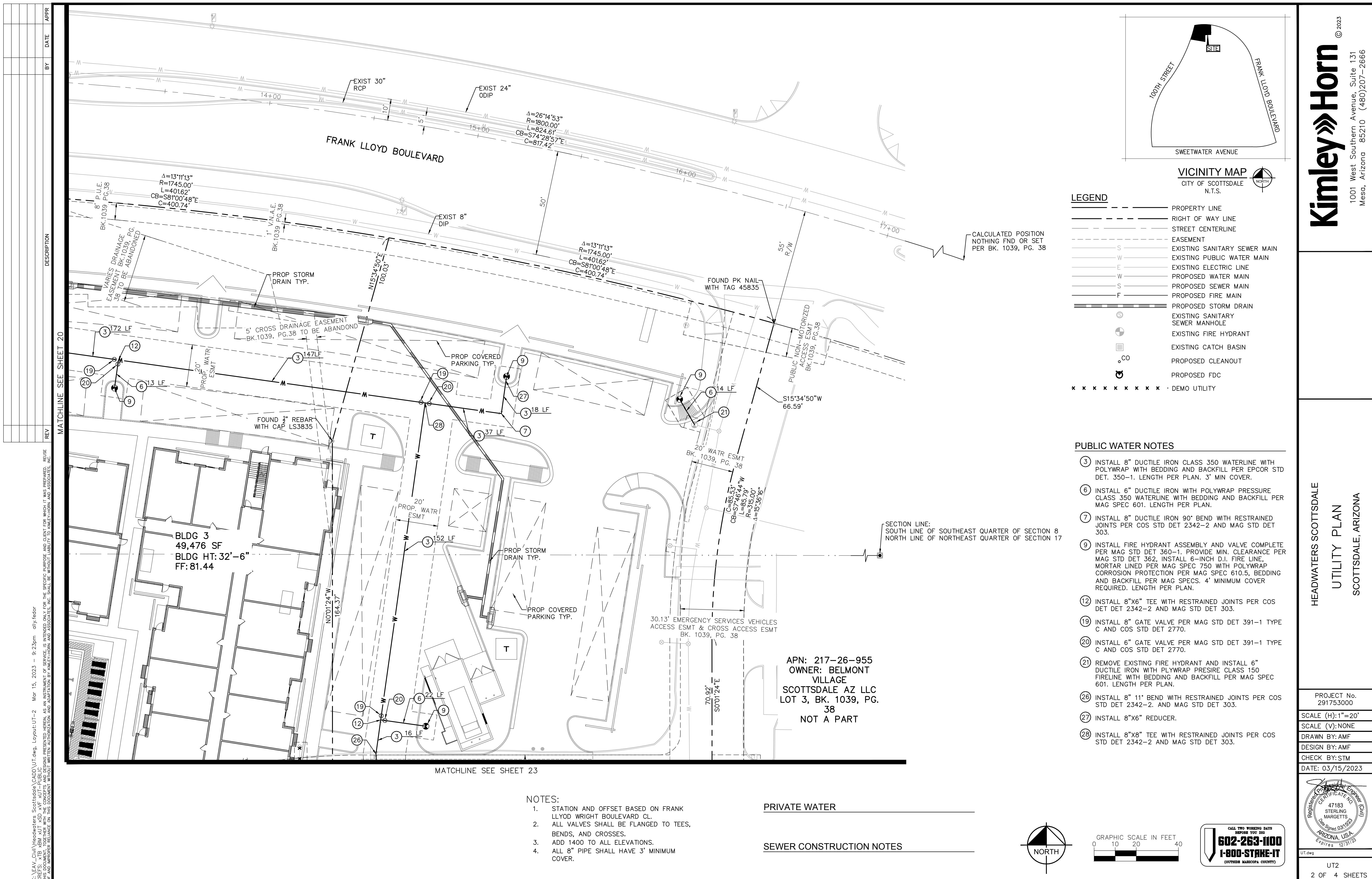
PRIVATE WATER

PROJECT No.	291753000
SCALE (H):	1"=20'
SCALE (V):	NONE
DRAWN BY:	AMF
DESIGN BY:	AMF
CHECK BY:	STM
DATE:	03/15/2023

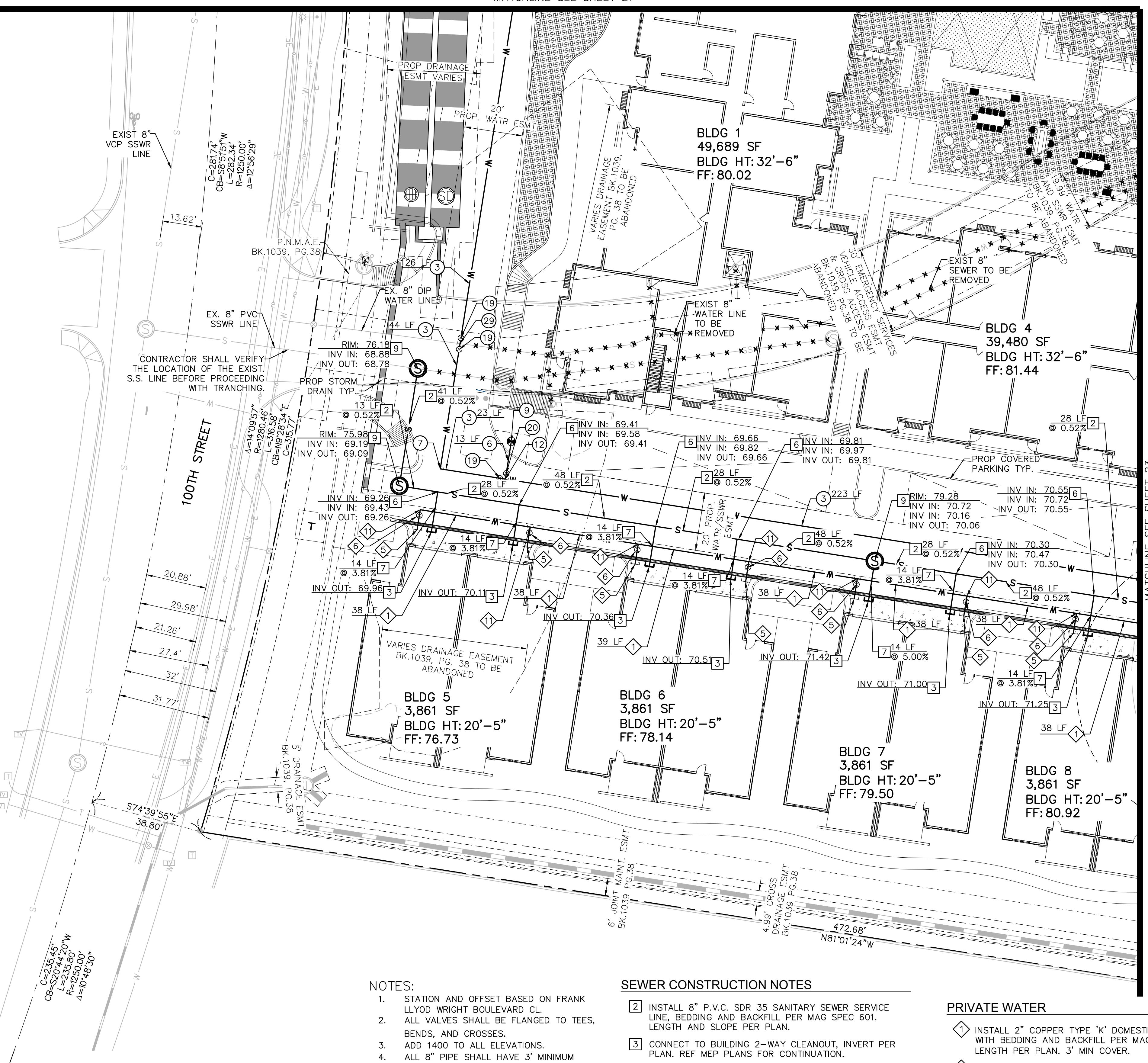


UT.dwg

UT1



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XREFS: XTB xBM xUT xSD xVF xUT-PUBLIC
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SEWER CONSTRUCTION NOTES

- NOTES:

 1. STATION AND OFFSET BASED ON FRANK LLYOD WRIGHT BOULEVARD CL.
 2. ALL VALVES SHALL BE FLANGED TO TEES, BENDS, AND CROSSES.
 3. ADD 1400 TO ALL ELEVATIONS.
 4. ALL 8" PIPE SHALL HAVE 3' MINIMUM COVER.

PRIVATE WATER

- PRIVATE WATER**

 - 1 INSTALL 2" COPPER TYPE 'K' DOMESTIC WATER SERVICE WITH BEDDING AND BACKFILL PER MAG SPEC 601. LENGTH PER PLAN. 3' MIN COVER.
 - 3 CONNECT TO BUILDING 2-WAY CLEANOUT, INVERT PER PLAN. REF MEP PLANS FOR CONTINUATION.
 - 6 INSTALL INLINE 6"X8" SEWER WYE.
 - 7 INSTALL 6" P.V.C SDR 35 SANITARY SEWER LATERAL, BEDDING AND BACKFILL PER MAG SPEC 601, LENGTH AND SLOPE PER PLAN.
 - 9 INSTALL 60" SANITARY SEWER MANHOLE PER MAG STD DET 420-1. MANHOLE SHALL HAVE 30" FRAME AND COVER PER COS STD DET 2421. RIM AND INVERT PER PLAN.

FND BCF
0.32' SOUTH & 0.11' WEST

A compass rose icon with the word "NORTH" written in capital letters at the bottom left.



**CALL TWO WORKING DAYS
BEFORE YOU DIG**

602-263-1100

1-800-STAKE-IT

(OUTSIDE MARICOPA COUNTY)

PROJECT No.	291753000
SCALE (H):	1"=20'
SCALE (V):	NONE
DRAWN BY:	AMF
DESIGN BY:	AMF
CHECK BY:	STM
DATE: 03/15/2023	
UT.dwg	
UT3	
3 OF 4 SHEETS	

EDWAIERS SCOTTSDALE UTILITY PLAN SCOTTSDALE, ARIZONA

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