

# PRELIMINARY WATER 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  
March 2023  
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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

PRELIMINARY WATER 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 100<sup>th</sup> 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 6.71 net acres and contains a 203,929 gross square foot three-story and 5 one-story minimal care facility with 217 parking spaces. The three-story building has 162 units, and the 5 one-story buildings have 10 units. The project has a total of 172 units. 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 to the east, single-family to the south, and North 100<sup>th</sup> Street to the west. See **Appendix A** for the Vicinity Map.

## 2.0 DOMESTIC WATER ANALYSIS

### 2.1 INTENT AND SCOPE

The intent of this section is to evaluate the potable water infrastructure for the proposed development. As a result of this analysis, it will be determined if the potable water infrastructure is capable of satisfying the projected water demands for the proposed development in accordance with the City of Scottsdale Design Standards & Policies Manual (**Reference 1**) and the 2018 International Fire Code (**Reference 2**) for fire prevention.

### 2.2 GENERAL THEORY

The water system modeling program Water CAD, developed by Haestad Methods, is used to model the water system servicing the proposed development. The program uses the fluid mechanic head loss theory known as the Hazen-Williams method. This is the typical method used to evaluate water distribution systems.

### 2.3 DOMESTIC WATER SUPPLY

There is an existing 10-inch ACP water main located in North 100<sup>th</sup> Street, west of the site. The existing main is connected by an 8-inch DIP water main on Frank Lloyd Wright and an 8-inch water main connects the two through the site in a private access drive. Portions of the on-site 8-inch main will need to be removed to accommodate the proposed Headwaters development. The existing water/sewer easement will be abandoned.

The existing 8-inch on-site main has a stub that will be used to reroute the on-site main to the connection at the north start and Frank Llyod Wright around the proposed development. New fire hydrants, building fire riser, and domestic service for the Headwaters development will be provided from the rerouted looped on-site water main. The new water main will be located within a 20' wide water/sewer easement. Refer to Appendix B for the Preliminary Utility Plan.

Residual and static pressures were obtained from a flow test performed on two fire hydrants (one flow and one pressure) in the western driveway, by EJ Flow Tests on May 16, 2022. The tested fire hydrants were selected due to the proximity to the proposed building. See **Appendix D** for the Fire Flow Test results.

2.4 INTERNATIONAL FIRE CODE, 2018

According to the City of Scottsdale Fire Department, the 2018 International Fire Code (IFC) with City of Scottsdale Amendments is currently the governing code with respect to fire protection requirements. The IFC evaluates the building construction type, occupancy descriptions, and square footage to set minimum fire flow requirements with regards to a particular development.

The proposed building and casitas are Construction Type V-A. Per Table B105.1(2) of **Reference 2**, the required fire flow is 8,000 gallons per minute. A reduction in fire-flow of 75% percent is allowed when the building is equipped with an approved fire sprinkler system. The apartment building and casitas will be equipped with an approved fire sprinkler system. The minimum fire flow requirements per the IFC 2018 and COS DS&PM 6-1.501 for the proposed building are shown in Table 1. Table 1 also shows the required building fire flow based upon a maximum fire flow reduction of 75% allowed by the IFC 2018. The reduced fire flow shall not be less than 1,500 gpm. See **Appendix C** for IFC 2018 Requirements.

**Table 1 Required Building Fire Flows**

Building	Building Construction Type	Area (sf)	Required Fire Flow per IFC 2018 (gpm)	Reduction	Required Fire Flow per IFC with Reduction (gpm)
Multifamily	V-A	203,929	8,000	75%	2,000
<b>TOTAL</b>	-	203,929	8,000*	75%	2,000

\*Maximum required fire flow prior to automatic sprinkler system reduction per IFC 2018 Table B105.1(2) and B105.2 is 8,000 gpm.

## 2.5 WATER DEMANDS

According to the guidelines provided in Figure 6-1.2 of **Reference 1**, the proposed development will add the following demands to the existing water system for Average Day Demand (ADD), Maximum Day Demand (MDD), and Peak Hour Demand (PHD):

**Table 2: Domestic Water Demands**

Building	Building Area (sf)	# DUs	Total Demand <sup>1</sup> (GPM/DU)	ADD (GPM)	MDD <sup>2</sup> (GPM)	PHD <sup>3</sup> (GPM)
Building	203,929	172	0.27	46.44	92.88	162.54

Notes:

1. For high density multifamily land use, average day demand is 185.3 gpd/du or 0.27 gpm/du.
2. Maximum day demand defined as 2 times the average day demand.
3. Peak hour demand defined as 3.5 times the average day demand.

Three water analyses were performed to evaluate the existing adjacent off-site water infrastructure and the proposed on-site water system:

1. Average Day Demand
2. Peak Hour Demand
3. Maximum Day Demand + Fire Flow

The system was analyzed for the worst-case scenario to ensure that the existing and proposed public water infrastructure can maintain a minimum pressure of 50 psi for the Peak Hour demand, and 30 psi for the Maximum Day plus Fire Flow demand. See **Appendix D** for water model layout to identify nodes and pipes.

See **Appendix D** for the Fire Flow Test and Water CAD Analysis and Layout. A summary of the water analysis results for the project is tabulated below:

**Table 3 Domestic Water Model Result Summary**

Criteria	Peak Hour Demand	Constraint	Peak Hour Pressure at Demand	Node with Minimum Pressure
Minimum Pressure	140 gpm	50 psi	71 psi	J-16 & J-17
Meets Criteria?	Yes	Yes	Yes*	Yes

\*The hydraulic water model was analyzed at the ground floor elevation of the proposed high-rise building. Reference plumbing calculations for any internal booster pump systems to provide adequate water pressures to the higher floors of the building.

**Table 4 Max Day + Fire Flow Water Model Result Summary**

Criteria	Max Day + Fire Flow Demand	Constraint	Max Day + Fire Flow Pressure at Demand	Node with Minimum Pressure
Minimum System Pressure	2,080 gpm	30 psi	39 psi	BLDG FIRE
Meets Criteria?	Yes	Yes	Yes*	J-16

\*The hydraulic water model was analyzed at the ground floor elevation of the proposed high-rise building. Reference plumbing calculations for any internal booster pump systems to provide adequate water pressures to the higher floors of the building.

**Table 5 Fire Hydrant Flow Water Model Result Summary**

Criteria	Fire Flow Demand	Constraint	Fire Flow Pressure at Demand	Meets Criteria?
Hydrant 3	2,000 gpm	20 psi	27 psi	YES
Hydrant 4	2,000 gpm	20 psi	61 psi	YES
Hydrant 5	2,000 gpm	20 psi	26 psi	YES
Hydrant 6	2,000 gpm	20 psi	25 psi	YES
Hydrant 7	2,000 gpm	20 psi	30 psi	YES
Hydrant 8	2,000 gpm	20 psi	30 psi	YES
<b>Residual</b>	2,000 gpm	20 psi	25 psi	YES
<b>Riser</b>	2,000 gpm	20 psi	23 psi	YES



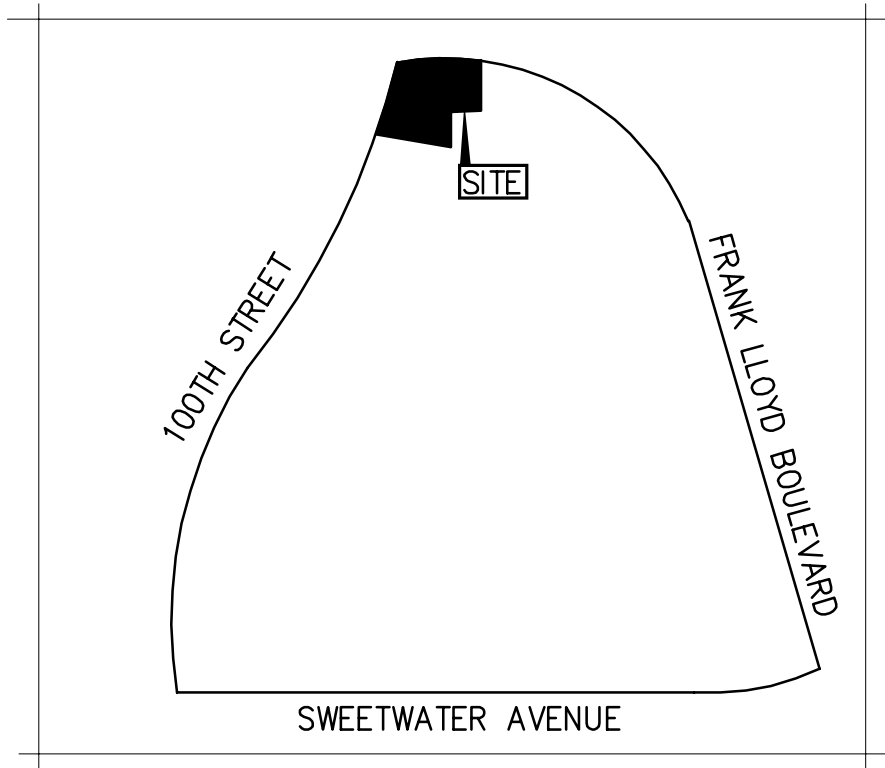
## 4.0 CONCLUSION

The proposed and existing on-site water system as outlined by this analysis appears adequate and sufficient to meet the required fire flow demand to the first floor of the proposed Headwaters Scottsdale development near the southeast corner of 100<sup>th</sup> Street and Frank Lloyd Wright Boulevard in Scottsdale, Arizona. The proposed building may require a domestic booster system to provide adequate water pressures to the top floors of the building based on plumbing calculations.

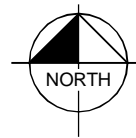
## 5.0 REFERENCES

1. City of Scottsdale, *Design Standards and Policies Manual*. 2018.
2. International Code Council, *2018 International Fire Code*. December 2019.

# Appendix A – Vicinity Map



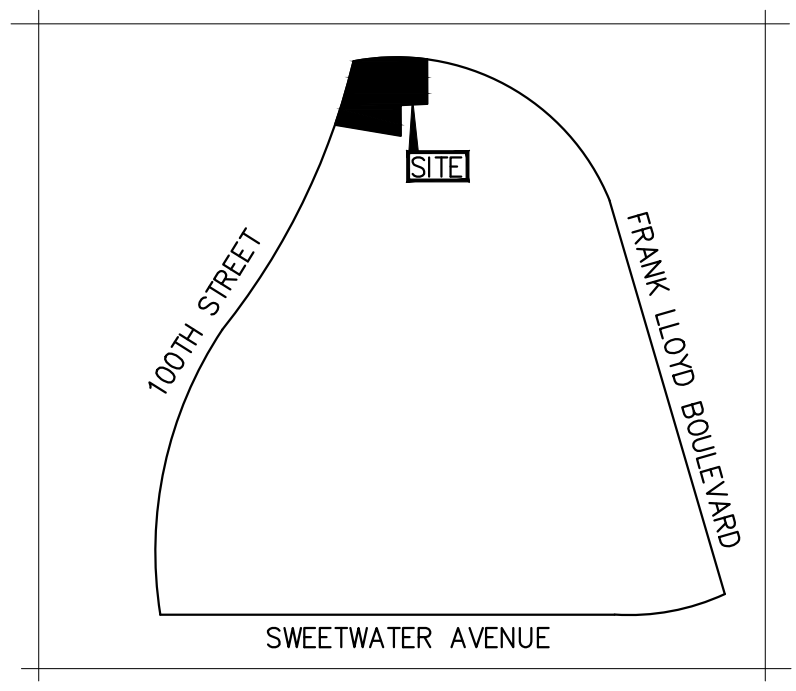
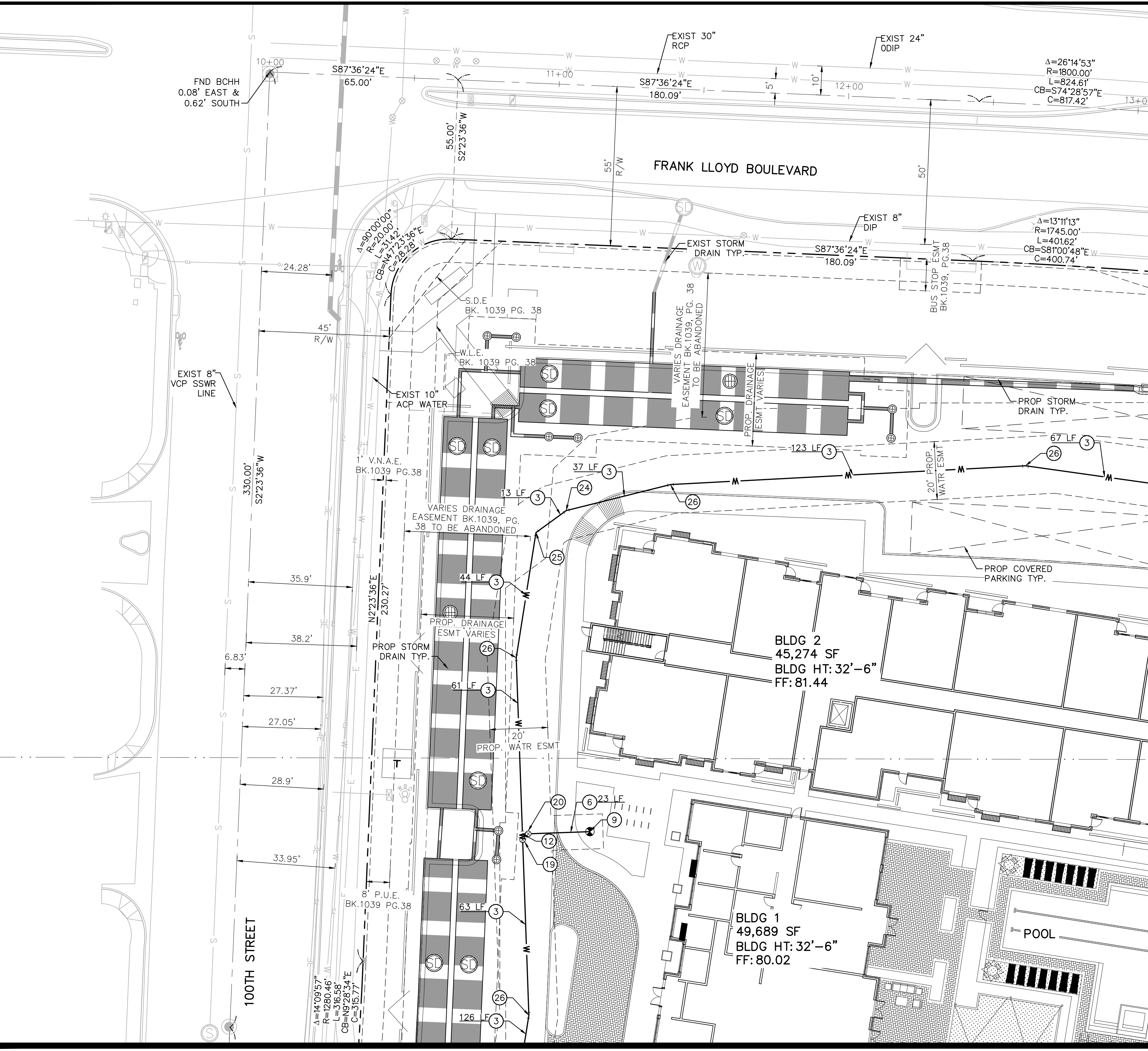
**VICINITY MAP**  
CITY OF SCOTTSDALE  
N.T.S.



# Appendix B –Utility Plan

REV	DESCRIPTION	DATE	BY	APPR

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- . - . - .	STREET CENTERLINE
---	EASEMENT
S	EXISTING SANITARY SEWER MAIN
W	EXISTING PUBLIC WATER MAIN
E	EXISTING ELECTRIC LINE
W	PROPOSED WATER MAIN
S	PROPOSED SEWER MAIN
F	PROPOSED FIRE MAIN
---	PROPOSED STORM DRAIN
⊙	EXISTING SANITARY SEWER MANHOLE
⊙	EXISTING FIRE HYDRANT
⊙	EXISTING CATCH BASIN
⊙	PROPOSED CLEANOUT
⊙	PROPOSED FDC
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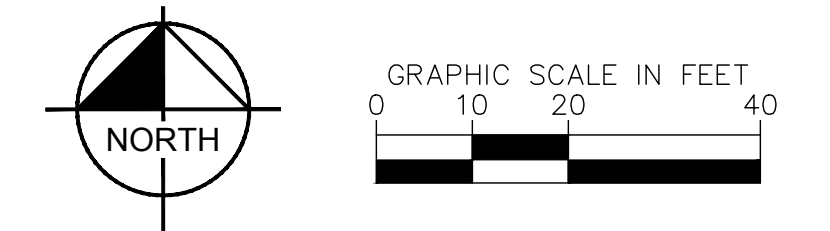
**SEWER CONSTRUCTION NOTES**

**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.
- 19) INSTALL 8" GATE VALVE PER MAG STD DET 391-1 TYPE C AND COS STD DET 2770.
- 20) INSTALL 6" GATE VALVE PER MAG STD DET 391-1 TYPE C AND COS STD DET 2770.
- 24) INSTALL 8" 22' BEND WITH RESTRAINED JOINTS PER COS STD DET 2342-2. AND MAG STD DET 303.
- 25) INSTALL 8" 45' BEND WITH RESTRAINED JOINTS PER COS STD DET 2342-2. AND MAG STD DET 303.
- 26) INSTALL 8" 11' BEND WITH RESTRAINED JOINTS PER COS STD DET 2342-2. AND MAG STD DET 303.

**PRIVATE WATER**

- 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.

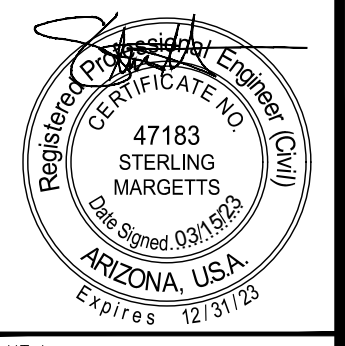


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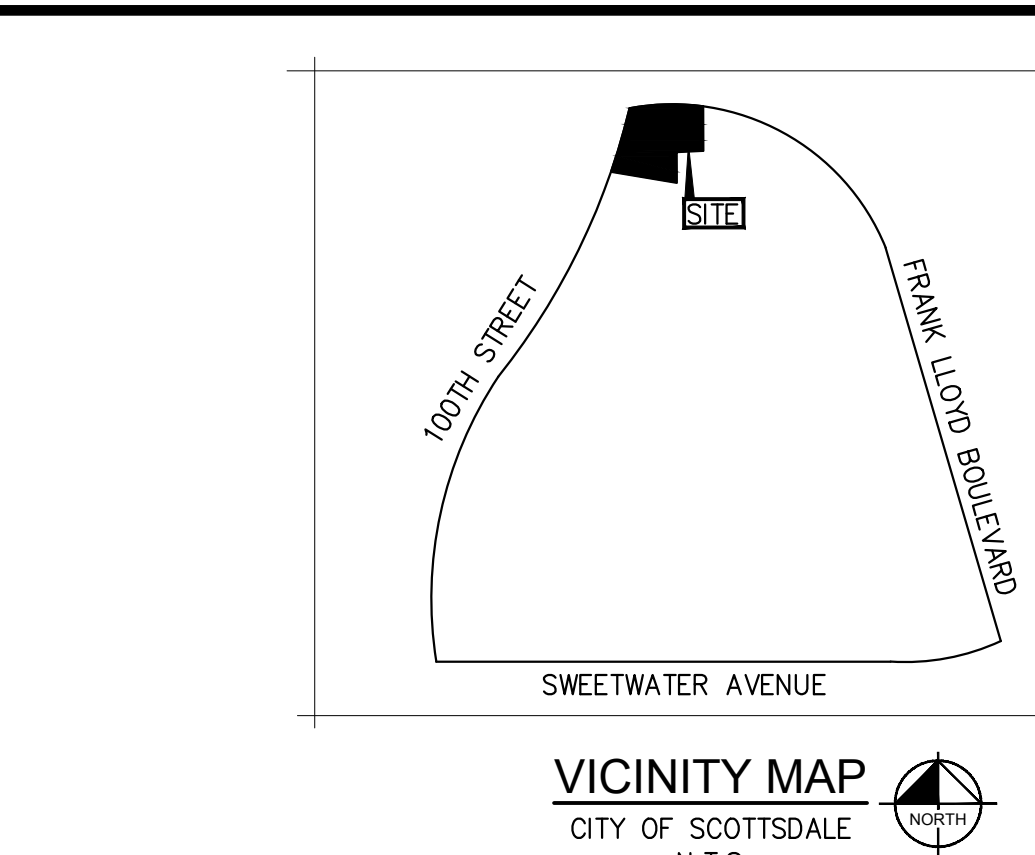
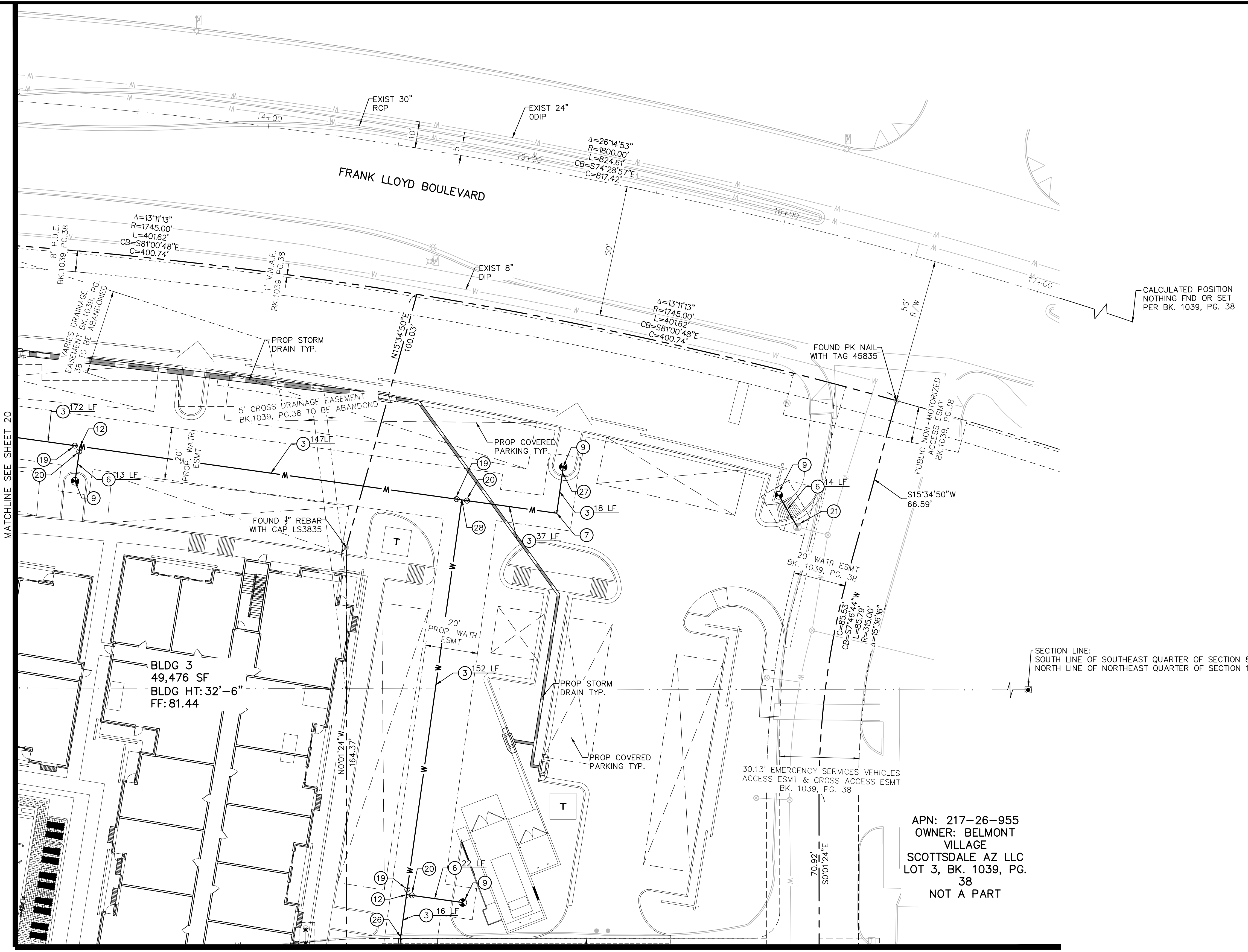
HEADWATERS SCOTTSDALE  
 UTILITY PLAN  
 SCOTTSDALE, ARIZONA

PROJECT No.  
291753000  
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 SCALE (V): NONE  
 DRAWN BY: AMF  
 DESIGN BY: AMF  
 CHECK BY: STM  
 DATE: 03/15/2023



UT1  
 1 OF 4 SHEETS

REV	DESCRIPTION	DATE	BY	APP



**LEGEND**

---	PROPERTY LINE
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---	STREET CENTERLINE
---	EASEMENT
S	EXISTING SANITARY SEWER MAIN
W	EXISTING PUBLIC WATER MAIN
E	EXISTING ELECTRIC LINE
W	PROPOSED WATER MAIN
S	PROPOSED SEWER MAIN
F	PROPOSED FIRE MAIN
---	PROPOSED STORM DRAIN
○	EXISTING SANITARY SEWER MANHOLE
○	EXISTING FIRE HYDRANT
○	EXISTING CATCH BASIN
○	PROPOSED CLEANOUT
○	PROPOSED FDC
***	DEMO UTILITY

- PUBLIC WATER NOTES**
- 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.
  - INSTALL 6" DUCTILE IRON WITH POLYWRAP PRESSURE CLASS 350 WATERLINE WITH BEDDING AND BACKFILL PER MAG SPEC 601. LENGTH PER PLAN.
  - INSTALL 8" DUCTILE IRON 90° BEND WITH RESTRAINED JOINTS PER COS STD DET 2342-2 AND MAG STD DET 303.
  - 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.
  - INSTALL 8"x6" TEE WITH RESTRAINED JOINTS PER COS DET 2342-2 AND MAG STD DET 303.
  - INSTALL 8" GATE VALVE PER MAG STD DET 391-1 TYPE C AND COS STD DET 2770.
  - INSTALL 6" GATE VALVE PER MAG STD DET 391-1 TYPE C AND COS STD DET 2770.
  - REMOVE EXISTING FIRE HYDRANT AND INSTALL 6" DUCTILE IRON WITH PLYWRAP PRESIRE CLASS 150 FIRELINE WITH BEDDING AND BACKFILL PER MAG SPEC 601. LENGTH PER PLAN.
  - INSTALL 8" 11" BEND WITH RESTRAINED JOINTS PER COS STD DET 2342-2. AND MAG STD DET 303.
  - INSTALL 8"x6" REDUCER.
  - INSTALL 8"x8" TEE WITH RESTRAINED JOINTS PER COS STD DET 2342-2 AND MAG STD DET 303.

**NOTES:**

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

**PRIVATE WATER**

**SEWER CONSTRUCTION NOTES**

GRAPHIC SCALE IN FEET  
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SCALE (V): NONE  
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DESIGN BY: AMF  
CHECK BY: STM  
DATE: 03/15/2023

REGISTERED PROFESSIONAL ENGINEER  
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ARIZONA, U.S.A.  
EXPIRES 12/31/23

UT2  
2 OF 4 SHEETS

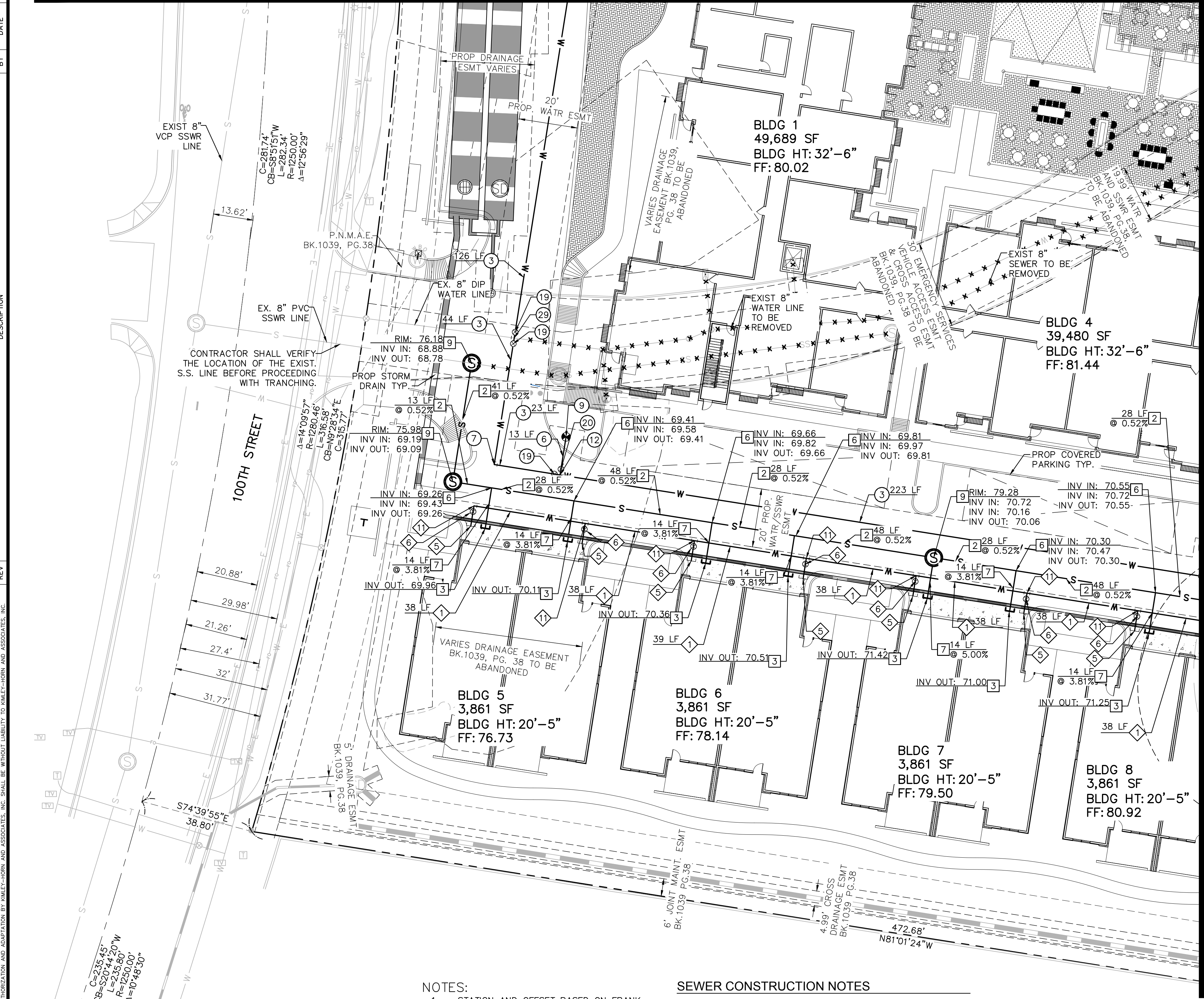
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MATCHLINE SEE SHEET 21



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---	RIGHT OF WAY LINE
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- - - - -	EASEMENT
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W	EXISTING PUBLIC WATER MAIN
E	EXISTING ELECTRIC LINE
W	PROPOSED WATER MAIN
S	PROPOSED SEWER MAIN
F	PROPOSED FIRE MAIN
---	PROPOSED STORM DRAIN
⊙	EXISTING SANITARY SEWER MANHOLE
⊙	EXISTING FIRE HYDRANT
⊙	EXISTING CATCH BASIN
⊙	PROPOSED CLEANOUT
⊙	PROPOSED FDC
⊙	DEMO UTILITY

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.
7. INSTALL 8" DUCTILE IRON 90° BEND WITH RESTRAINED JOINTS PER COS STD DET 2342-2 AND MAG STD DET 303.
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.
19. INSTALL 8" GATE VALVE PER MAG STD DET 391-1 TYPE C AND COS STD DET 2770.
20. INSTALL 6" GATE VALVE PER MAG STD DET 391-1 TYPE C AND COS STD DET 2770.
29. CUT AND INSTALL 8"x8" TEE WITH RESTRAINED JOINTS PER COS STD DET 2342-2 AND MAG STD DET 303.

NOTES:

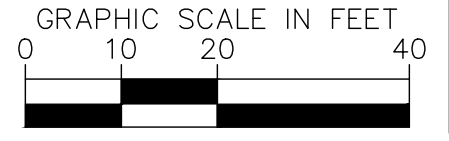
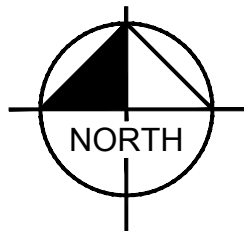
1. STATION AND OFFSET BASED ON FRANK LLOYD WRIGHT BOULEVARD CL.
2. ALL VALVES SHALL BE FLANGED TO TEES, BENDS, AND CROSSES.
3. ADD 1400 TO ALL ELEVATIONS.
4. ALL 8" PIPE SHALL HAVE 3' MINIMUM COVER.

SEWER CONSTRUCTION NOTES

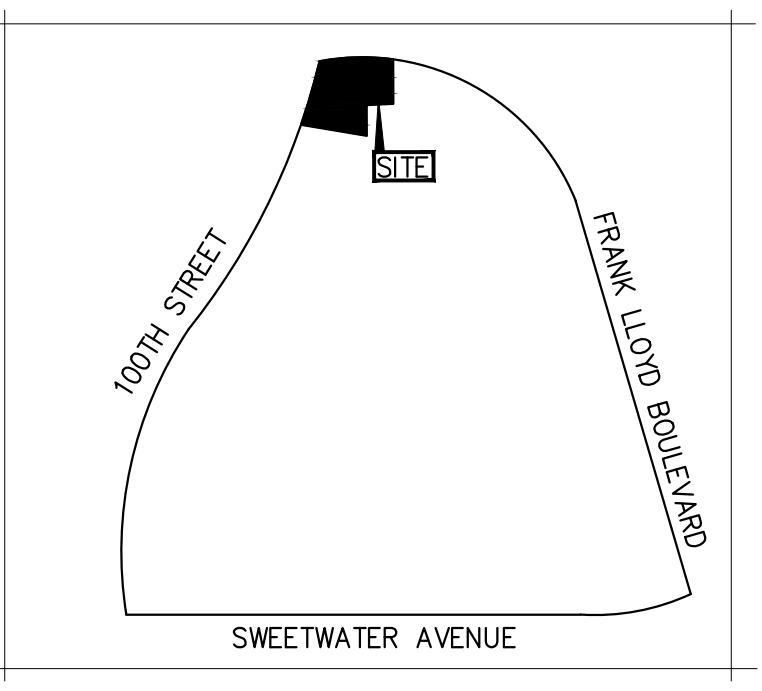
2. INSTALL 8" P.V.C. SDR 35 SANITARY SEWER SERVICE LINE, BEDDING AND BACKFILL PER MAG SPEC 601. LENGTH AND SLOPE PER PLAN.
3. CONNECT TO BUILDING 2-WAY CLEANOUT, INVERT PER PLAN. REF MEP PLANS FOR CONTINUATION.
6. INSTALL INLINE 6"x8" SEWER WYE.
7. INSTALL 6" P.V.C. SDR 35 SANITARY SEWER LATERAL, BEDDING 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.

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.
2. DOMESTIC WATER BUILDING CONNECTION, REF MEP PLANS FOR CONTINUATION.
3. INSTALL 2" GATE VALVE PER COS STD DET 2770 AND PER MAG STD DET 391-1, TYP C
4. INSTALL 2"x2" COPPER TEE.



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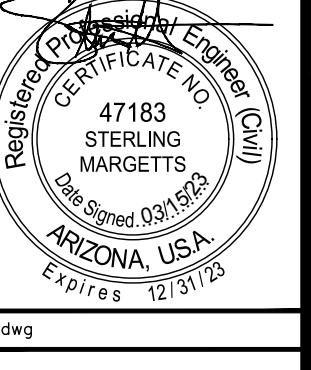


VICINITY MAP  
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SCALE (H): 1"=20'
SCALE (V): NONE
DRAWN BY: AMF
DESIGN BY: AMF
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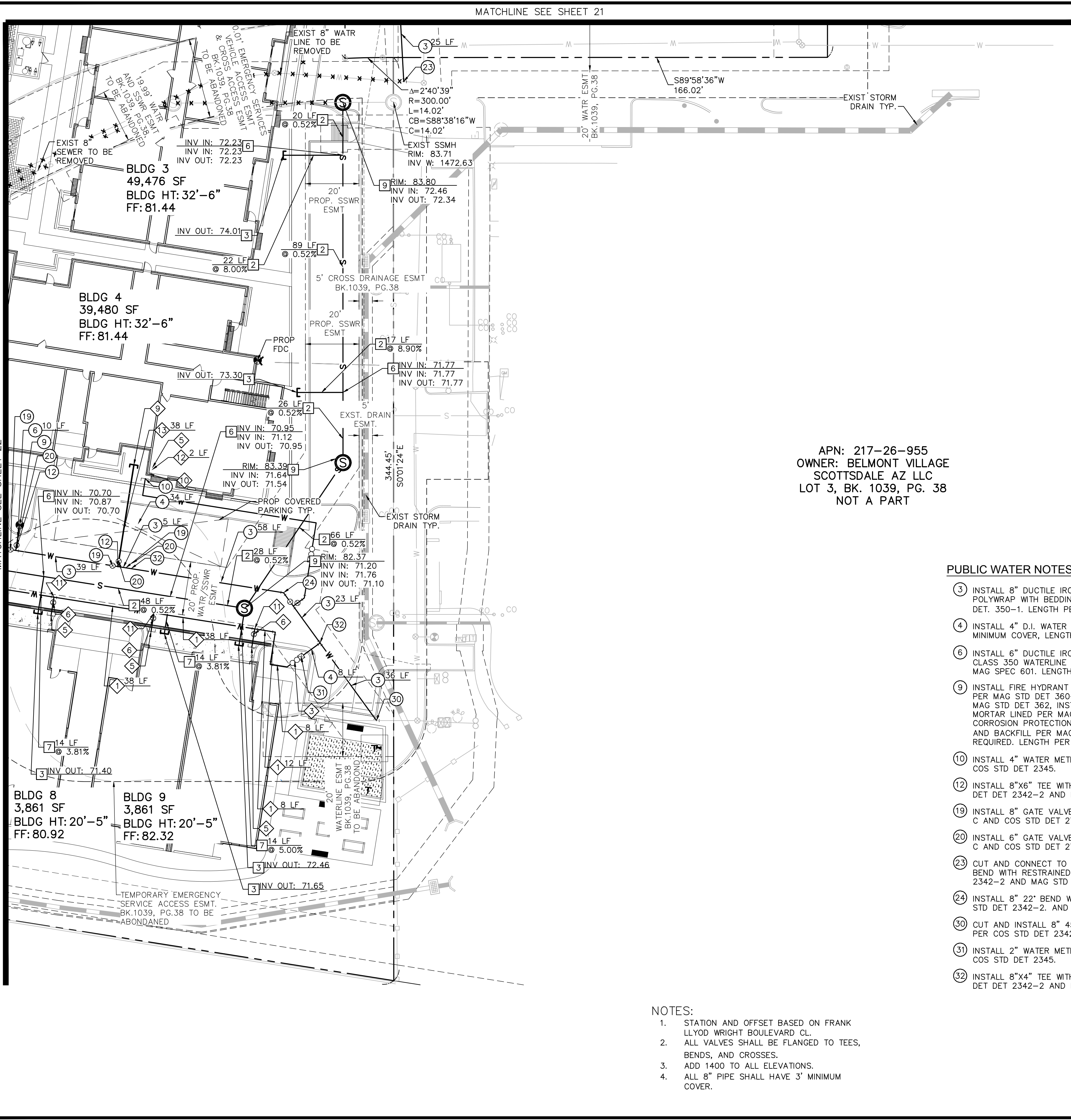
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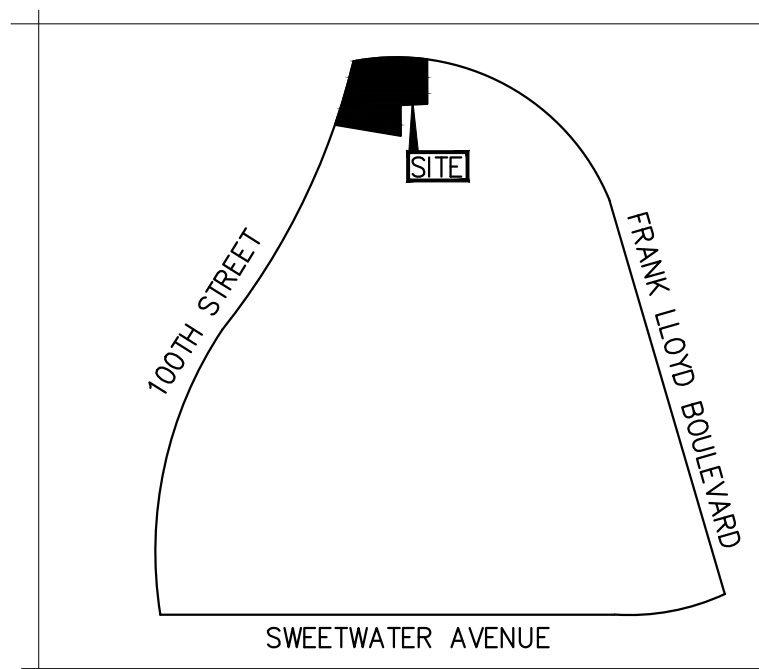


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APN: 217-26-955  
 OWNER: BELMONT VILLAGE  
 SCOTTSDALE AZ LLC  
 LOT 3, BK. 1039, PG. 38  
 NOT A PART



VICINITY MAP  
 CITY OF SCOTTSDALE  
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LEGEND	
[Symbol]	PROPERTY LINE
[Symbol]	RIGHT OF WAY LINE
[Symbol]	STREET CENTERLINE
[Symbol]	EASEMENT
[Symbol]	EXISTING SANITARY SEWER MAIN
[Symbol]	EXISTING PUBLIC WATER MAIN
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[Symbol]	PROPOSED WATER MAIN
[Symbol]	PROPOSED SEWER MAIN
[Symbol]	PROPOSED FIRE MAIN
[Symbol]	PROPOSED STORM DRAIN
[Symbol]	EXISTING SANITARY SEWER MANHOLE
[Symbol]	EXISTING FIRE HYDRANT
[Symbol]	EXISTING CATCH BASIN
[Symbol]	PROPOSED CLEANOUT
[Symbol]	PROPOSED FDC
[Symbol]	DEMO UTILITY

**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.
- 4. INSTALL 4" D.I. WATER SERVICE LINE, MIN. CLASS 350. 3' MINIMUM COVER, LENGTH PER PLAN.
- 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.
- 10. INSTALL 4" WATER METER PER MAG STD DET 345-1 AND COS STD DET 2345.
- 12. INSTALL 8"x6" TEE WITH RESTRAINED JOINTS PER COS DET DET 2342-2 AND MAG STD DET 303.
- 19. INSTALL 8" GATE VALVE PER MAG STD DET 391-1 TYPE C AND COS STD DET 2770.
- 20. INSTALL 6" GATE VALVE PER MAG STD DET 391-1 TYPE C AND COS STD DET 2770.
- 23. CUT AND CONNECT TO EXISTING WATER LINE AT 8" 90° BEND WITH RESTRAINED JOINTS PER COS STD DET 2342-2 AND MAG STD DET 303.
- 24. INSTALL 8" 22' BEND WITH RESTRAINED JOINTS PER COS STD DET 2342-2. AND MAG STD DET 303.
- 30. CUT AND INSTALL 8" 45' BEND WITH RESTRAINED JOINTS PER COS STD DET 2342-2. AND MAG STD DET 303.
- 31. INSTALL 2" WATER METER PER MAG STD DET 345-1 AND COS STD DET 2345.
- 32. INSTALL 8"x4" TEE WITH RESTRAINED JOINTS PER COS DET DET 2342-2 AND MAG STD DET 303.

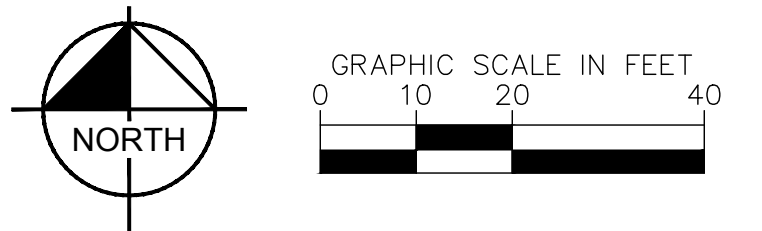
**PRIVATE WATER**

- 1. INSTALL 2" COPPER TYPE 'K' DOMESTIC WATER SERVICE WITH BEDDING AND BACKFILL PER MAG SPEC 601. LENGTH PER PLAN. 3' MIN COVER.
- 3. INSTALL 2" BACKFLOW PREVENTOR PER COS STD DET 2353.
- 5. DOMESTIC WATER BUILDING CONNECTION, REF MEP PLANS FOR CONTINUATION.
- 6. INSTALL 2" GATE VALVE PER COS STD DET 2770 AND PER MAG STD DET 391-1, TYP C
- 9. FIRE LINE BUILDING CONNECTION TO WITHIN 5' OF BUILDING. REF MEP PLANS FOR CONTINUATION.
- 10. INSTALL 4" BACKFLOW PREVENTOR PER COS STD DET 2353.
- 11. INSTALL 2"x2" COPPER TEE.
- 12. INSTALL 4" D.I. WATER SERVICE LINE, MIN. CLASS 350. 3' MINIMUM COVER, LENGTH PER PLAN.
- 13. INSTALL 8" DUCTILE IRON WITH POLYWRAP PRESSURE CLASS 150 FIRELINE WITH BEDDING AND BACKFILL PER MAG SPEC 601. LENGTH PER PLAN

**SEWER CONSTRUCTION NOTES**

- 2. INSTALL 8" P.V.C. SDR 35 SANITARY SEWER SERVICE LINE, BEDDING AND BACKFILL PER MAG SPEC 601. LENGTH AND SLOPE PER PLAN.
- 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.

- 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.



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HEADWATERS SCOTTSDALE  
 UTILITY PLAN  
 SCOTTSDALE, ARIZONA

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

UT1  
 4 OF 4 SHEETS

# Appendix C – Fire Flow Requirements from 2018 IFC

**TABLE B105.1(2)**  
**REFERENCE TABLE FOR TABLES B105.1(1) AND B105.2**

FIRE-FLOW CALCULATION AREA (square feet)					FIRE-FLOW (gallons per minute) <sup>b</sup>	FLOW DURATION (hours)
Type IA and IB <sup>a</sup>	Type IIA and IIIA <sup>a</sup>	Type IV and V-A <sup>a</sup>	Type IIB and IIIB <sup>a</sup>	Type V-B <sup>a</sup>		
0-22,700	0-12,700	0-8,200	0-5,900	0-3,600	1,500	2
22,701-30,200	12,701-17,000	8,201-10,900	5,901-7,900	3,601-4,800	1,750	
30,201-38,700	17,001-21,800	10,901-12,900	7,901-9,800	4,801-6,200	2,000	
38,701-48,300	21,801-24,200	12,901-17,400	9,801-12,600	6,201-7,700	2,250	
48,301-59,000	24,201-33,200	17,401-21,300	12,601-15,400	7,701-9,400	2,500	
59,001-70,900	33,201-39,700	21,301-25,500	15,401-18,400	9,401-11,300	2,750	
70,901-83,700	39,701-47,100	25,501-30,100	18,401-21,800	11,301-13,400	3,000	3
83,701-97,700	47,101-54,900	30,101-35,200	21,801-25,900	13,401-15,600	3,250	
97,701-112,700	54,901-63,400	35,201-40,600	25,901-29,300	15,601-18,000	3,500	
112,701-128,700	63,401-72,400	40,601-46,400	29,301-33,500	18,001-20,600	3,750	
128,701-145,900	72,401-82,100	46,401-52,500	33,501-37,900	20,601-23,300	4,000	4
145,901-164,200	82,101-92,400	52,501-59,100	37,901-42,700	23,301-26,300	4,250	
164,201-183,400	92,401-103,100	59,101-66,000	42,701-47,700	26,301-29,300	4,500	
183,401-203,700	103,101-114,600	66,001-73,300	47,701-53,000	29,301-32,600	4,750	
203,701-225,200	114,601-126,700	73,301-81,100	53,001-58,600	32,601-36,000	5,000	
225,201-247,700	126,701-139,400	81,101-89,200	58,601-65,400	36,001-39,600	5,250	
247,701-271,200	139,401-152,600	89,201-97,700	65,401-70,600	39,601-43,400	5,500	
271,201-295,900	152,601-166,500	97,701-106,500	70,601-77,000	43,401-47,400	5,750	
295,901-Greater	166,501-Greater	106,501-115,800	77,001-83,700	47,401-51,500	6,000	
—	—	115,801-125,500	83,701-90,600	51,501-55,700	6,250	
—	—	125,501-135,500	90,601-97,900	55,701-60,200	6,500	
—	—	135,501-145,800	97,901-106,800	60,201-64,800	6,750	
—	—	145,801-156,700	106,801-113,200	64,801-69,600	7,000	
—	—	156,701-167,900	113,201-121,300	69,601-74,600	7,250	
—	—	167,901-179,400	121,301-129,600	74,601-79,800	7,500	
—	—	179,401-191,400	129,601-138,300	79,801-85,100	7,750	
—	—	191,401-Greater	138,301-Greater	85,101-Greater	8,000	

For SI: 1 square foot = 0.0929 m<sup>2</sup>, 1 gallon per minute = 3.785 L/m, 1 pound per square inch = 6.895 kPa.

a. Types of construction are based on the *International Building Code*.

# Appendix D – Fire Flow Test and Water CAD Results and Layout



# Flow Test Summary

Project Name: EJFT 22242  
 Project Address: 13880 N Frank Lloyd Wright Blvd, Scottsdale, AZ 85260  
 Date of Flow Test: 2022-05-16  
 Time of Flow Test: 7:30 AM  
 Data Reliable Until: 2022-11-16  
 Conducted By: Caleb Crabbs & Steven Saethre (EJ Flow Tests) 602.999.7637  
 Witnessed By: Vince Cusumano (City of Scottsdale) 480.312.5761  
 City Forces Contacted: City of Scottsdale (480.312.5761)  
 Permit Number: C68759

### Raw Flow Test Data

Static Pressure: 80.0 PSI  
 Residual Pressure: 54.0 PSI  
 Flowing GPM: 2,110  
 GPM @ 20 PSI: 3,314



### Data with a 10 % Safety Factor

Static Pressure: 72.0 PSI  
 Residual Pressure: 46.0 PSI  
 Flowing GPM: 2,110  
 GPM @ 20 PSI: 3,068

### Hydrant F<sub>1</sub>

Pitot Pressure (1): 35 PSI  
 Coefficient of Discharge (1): 0.9  
 Hydrant Orifice Diameter (1): 4 inches  
 Additional Coefficient 0.83 on orifice #1



 Static-Residual Hydrant  
 Flow Hydrant  
 Distance Between F<sub>1</sub> and R  
 604 ft (measured linearly)  
 Static-Residual Elevation  
 1489 ft (above sea level)  
 Flow Hydrant (F<sub>1</sub>) Elevation  
 1477 ft (above sea level)  
 Elevation & distance values are approximate

### Static-Residual Hydrant



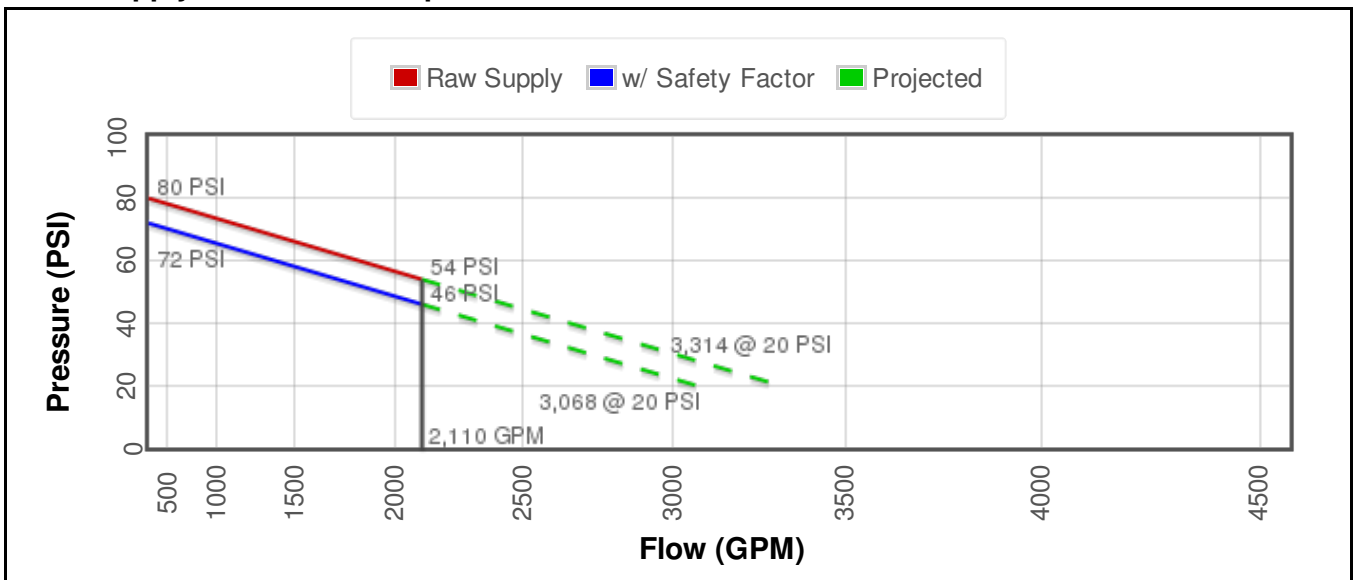
### Flow Hydrant (only hydrant F1 shown for clarity)



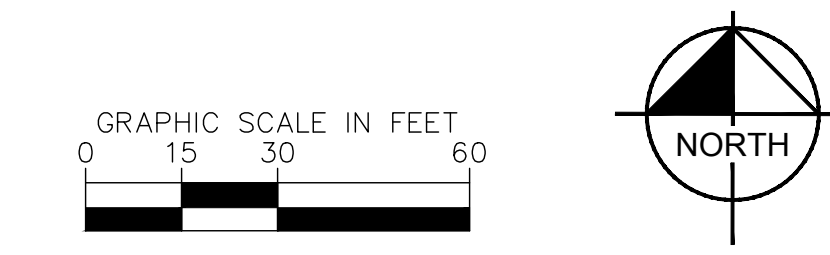
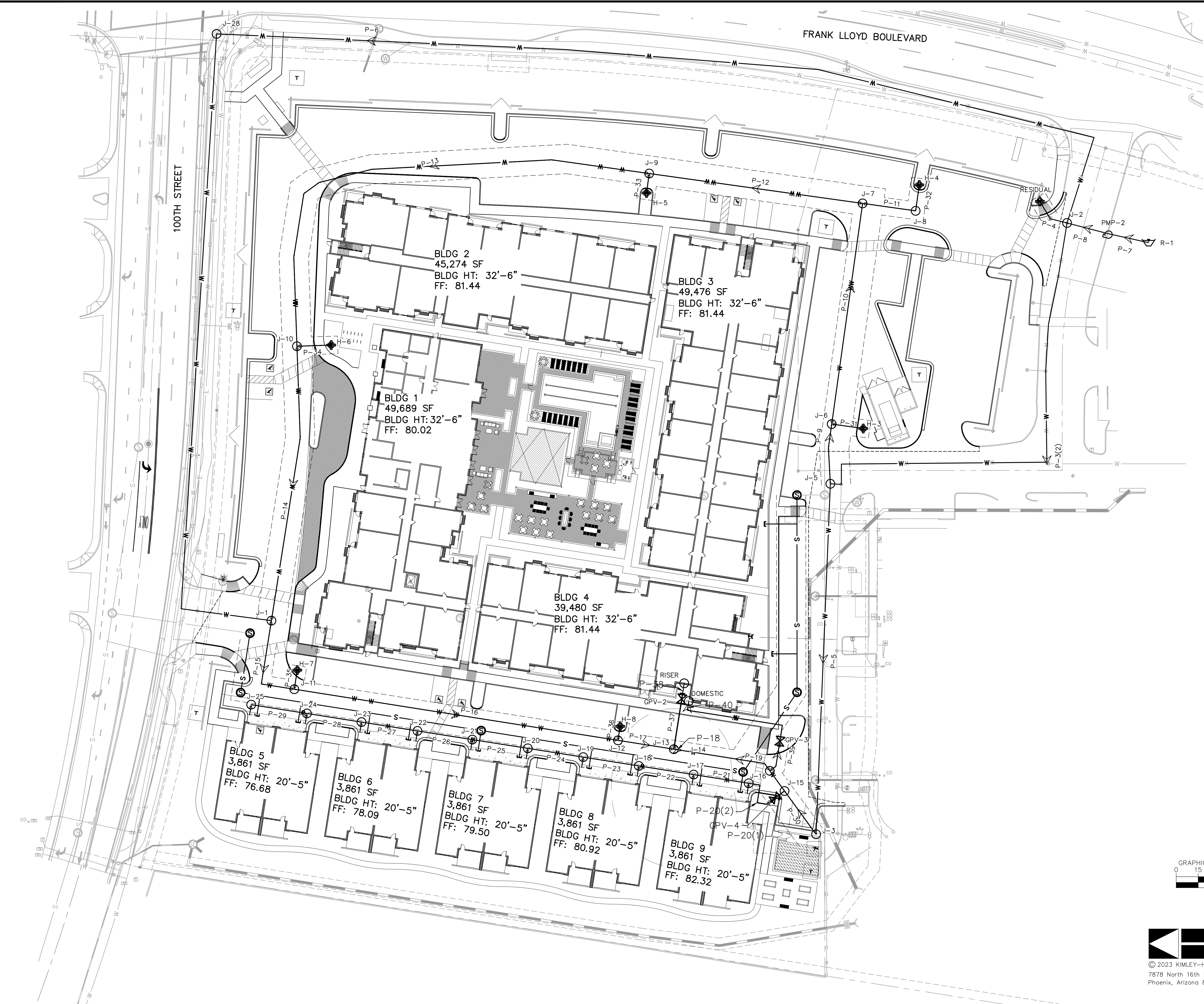
### Approximate Project Site



### Water Supply Curve N<sup>1.85</sup> Graph



K:\EAV\_Civil\Headwaters\Scottsdale\Reports\Appendix\WaterCAD Layout.dwg Mar 15, 2023 dly/fed  
XREFS: XDT\_XREF\_AEM\_XDT\_PUBLIC  
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Phoenix, Arizona 85020 (602) 944-5500

# Calibration.wtg

## Active Scenario: Calibration

### Junction Table - Time: 0.00 hours

ID	Label	Elevation (ft)	Zone	Demand Collection	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
32	J-1	74.86	<None>	<Collection: 0 items>	0	180.16	46
33	J-2	83.76	<None>	<Collection: 0 items>	0	195.26	48
34	J-3	79.60	<None>	<Collection: 0 items>	0	187.71	47
40	J-5	79.51	<None>	<Collection: 0 items>	0	187.71	47
51	J-6	78.60	<None>	<Collection: 0 items>	0	182.82	45



**Calibration.wtg**  
**Active Scenario: Calibration**  
**Pipe Table - Time: 0.00 hours**

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Has Check Valve?	Minor Loss Coefficient (Local)	Flow (gpm)
35	P-1	17	FLOW HYDRANT	J-1	6.0	Ductile Iron	130.0	False	0.000	-2,110
39	P-4	12	J-2	RESIDUAL	6.0	Ductile Iron	130.0	False	0.000	0
41	P-3(1)	371	J-1	J-5	8.0	Ductile Iron	130.0	False	0.000	-1,096
42	P-3(2)	327	J-5	J-2	8.0	Ductile Iron	130.0	False	0.000	-1,096
43	P-5	239	J-3	J-5	8.0	Ductile Iron	130.0	False	0.000	0
48	P-7	28	R-1	PMP-2	100.0	Ductile Iron	180.0	False	0.000	2,110
49	P-8	29	PMP-2	J-2	100.0	Ductile Iron	180.0	False	0.000	2,110
52	P-6(1)	667	J-2	J-6	8.0	Ductile Iron	130.0	False	0.000	1,014
53	P-6(2)	484	J-6	J-1	10.0	Asbestos Cement	140.0	False	0.000	1,014

Velocity (ft/s)	Headloss Gradient (ft/ft)	Has User Defined Length?	Length (User Defined) (ft)
23.94	0.296	False	0
0.00	0.000	False	0
7.00	0.022	True	349
7.00	0.022	True	349
0.00	0.000	True	238
0.09	0.000	True	1
0.09	0.000	True	1
6.47	0.019	True	664
4.14	0.006	True	482

# Calibration.wtg

## Active Scenario: Calibration

Hydrant Table - Time: 0.00 hours

ID	Label	Hydrant Status	Include Hydrant Lateral Loss?	Emitter Coefficient (gpm/psi^n)	Length (Hydrant Lateral) (ft)	Elevation (ft)	Zone	Demand Collection	Demand (gpm)	Hydraulic Grade (ft)
30	FLOW HYDRANT	Closed	False	0.000	20	77.00	<None>	<Collection: 1 item>	2,110	175.20
31	RESIDUAL	Closed	False	0.000	20	89.00	<None>	<Collection: 0 items>	0	195.26

Pressure (psi)
42
46

# Calibration.wtg

## Active Scenario: Calibration

### Pump Table - Time: 0.00 hours

ID	Label	Elevation (ft)	Pump Definition	Status (Initial)	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpm)	Pump Head (ft)
47	PMP-2	89.00	Fire Flow	On	89.00	195.26	2,110	106.26

# Calibration.wtg

## Active Scenario: Calibration

### Reservoir Table - Time: 0.00 hours

ID	Label	Elevation (ft)	Zone	Flow (Out net) (gpm)	Hydraulic Grade (ft)
45	R-1	89.00	<None>	2,110	89.00

# Water Model 2022-11-09 DOMESTIC.wtg

Active Scenario: ADD

Headwaters Scottsdale

Junction Table - Time: 0.00 hours

ID	Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
32	J-1	74.55	0	255.26	78
33	J-2	83.76	0	255.27	74
34	J-3	78.83	0	255.26	76
40	J-5	79.59	0	255.26	76
55	J-6	78.26	0	255.26	77
57	J-7	76.86	0	255.26	77
59	J-8	78.21	0	255.26	77
61	J-9	76.40	0	255.26	77
63	J-10	75.87	0	255.26	78
66	J-11	73.06	0	255.26	79
68	J-12	77.12	0	255.25	77
70	J-13	77.81	0	255.25	77
72	J-14	77.94	0	255.25	77
74	J-15	78.81	0	255.25	76
76	J-16	78.21	0	220.60	62
78	J-17	77.94	0	220.60	62
80	J-18	76.83	0	220.60	62
82	J-19	76.57	0	220.60	62
84	J-20	75.41	0	220.60	63
86	J-21	75.14	0	220.60	63
88	J-22	74.05	0	220.60	63
90	J-23	73.73	0	220.60	64
92	J-24	72.65	0	220.60	64
94	J-25	72.27	0	220.60	64
124	RISER	78.94	0	238.85	69
126	DOMESTIC	78.94	46	221.61	62
153	J-28	78.28	0	255.26	77

# Water Model 2022-11-09 DOMESTIC.wtg

**Active Scenario: ADD**

**Headwaters Scottsdale**

**Pipe Table - Time: 0.00 hours**

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)	Minor Loss Coefficient (Local)	Length (User Defined) (ft)
39	P-4	26	J-2	RESIDUAL	6.0	Ductile Iron	130.0	0	0.00	0.000	0.000	0
42	P-3(2)	326	J-5	J-2	8.0	Ductile Iron	130.0	-28	0.18	0.000	0.000	349
43	P-5	239	J-3	J-5	8.0	Ductile Iron	130.0	-22	0.14	0.000	0.000	238
48	P-7	28	R-1	PMP-2	100.0	Ductile Iron	180.0	46	0.00	0.000	0.000	1
49	P-8	29	PMP-2	J-2	100.0	Ductile Iron	180.0	46	0.00	0.000	0.000	1
56	P-9	77	J-5	J-6	8.0	Ductile Iron	130.0	6	0.04	0.000	0.000	0
58	P-10	116	J-6	J-7	8.0	Ductile Iron	130.0	6	0.04	0.000	0.000	0
60	P-11	37	J-7	J-8	8.0	Ductile Iron	130.0	0	0.00	0.000	0.000	0
62	P-12	147	J-7	J-9	8.0	Ductile Iron	130.0	6	0.04	0.000	0.000	0
64	P-13	348	J-9	J-10	8.0	Ductile Iron	130.0	6	0.04	0.000	0.000	0
65	P-14	189	J-10	J-1	8.0	Ductile Iron	130.0	6	0.04	0.000	0.000	0
67	P-15	66	J-1	J-11	8.0	Ductile Iron	130.0	24	0.15	0.000	0.000	0
69	P-16	223	J-11	J-12	8.0	Ductile Iron	130.0	24	0.15	0.000	0.000	0
71	P-17	39	J-12	J-13	8.0	Ductile Iron	130.0	24	0.15	0.000	0.000	0
73	P-18	5	J-13	J-14	8.0	Ductile Iron	130.0	24	0.15	0.000	0.000	0
75	P-19	81	J-14	J-15	8.0	Ductile Iron	130.0	-22	0.14	0.000	0.000	0
79	P-21	38	J-16	J-17	2.0	Copper	135.0	0	0.00	0.000	0.000	0
81	P-22	38	J-17	J-18	2.0	Copper	135.0	0	0.00	0.000	0.000	0
83	P-23	38	J-18	J-19	2.0	Copper	135.0	0	0.00	0.000	0.000	0
85	P-24	38	J-19	J-20	2.0	Copper	135.0	0	0.00	0.000	0.000	0
87	P-25	38	J-20	J-21	2.0	Copper	135.0	0	0.00	0.000	0.000	0
89	P-26	38	J-21	J-22	2.0	Copper	135.0	0	0.00	0.000	0.000	0
91	P-27	39	J-22	J-23	2.0	Copper	135.0	0	0.00	0.000	0.000	0
93	P-28	38	J-23	J-24	2.0	Copper	135.0	0	0.00	0.000	0.000	0
95	P-29	38	J-24	J-25	2.0	Copper	135.0	0	0.00	0.000	0.000	0
96	P-30	36	J-15	J-3	6.0	Ductile Iron	130.0	-22	0.25	0.000	0.000	0
110	P-31	22	J-6	H-3	6.0	Ductile Iron	130.0	0	0.00	0.000	0.000	0
112	P-32	18	J-8	H-4	6.0	Ductile Iron	130.0	0	0.00	0.000	0.000	0
114	P-33	13	J-9	H-5	6.0	Ductile Iron	130.0	0	0.00	0.000	0.000	0
116	P-34	23	J-10	H-6	6.0	Ductile Iron	130.0	0	0.00	0.000	0.000	0
118	P-35	13	J-11	H-7	6.0	Ductile Iron	130.0	0	0.00	0.000	0.000	0
120	P-36	10	J-12	H-8	6.0	Ductile Iron	130.0	0	0.00	0.000	0.000	0
129	P-37	35	J-13	GPV-2	8.0	Ductile Iron	130.0	0	0.00	0.000	0.000	0
130	P-38	11	GPV-2	RISER	8.0	Ductile Iron	130.0	0	0.00	0.000	0.000	0
132	P-39	35	J-14	GPV-3	8.0	Ductile Iron	130.0	46	0.30	0.000	0.000	0
133	P-40	11	GPV-3	DOMESTIC	4.0	Copper	135.0	46	1.19	0.002	0.000	0
135	P-20(1)	8	J-15	GPV-4	2.0	Copper	135.0	0	0.00	0.000	0.000	0

# Water Model 2022-11-09 DOMESTIC.wtg

Active Scenario: ADD

Headwaters Scottsdale

Pipe Table - Time: 0.00 hours

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)	Minor Loss Coefficient (Local)	Length (User Defined) (ft)
136	P-20(2)	34	GPV-4	J-16	2.0	Copper	135.0	0	0.00	0.000	0.000	0
154	P-6(1)	666	J-2	J-28	8.0	Ductile Iron	130.0	18	0.12	0.000	0.000	682
155	P-6(2)	454	J-28	J-1	10.0	Asbestos Cement	140.0	18	0.08	0.000	0.000	465

# Water Model 2022-11-09 DOMESTIC.wtg

Active Scenario: ADD

## Headwaters Scottsdale

Hydrant Table - Time: 0.00 hours

ID	Label	Length (Hydrant Lateral) (ft)	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
31	RESIDUAL	20	89.00	0	255.27	72
109	H-3	20	84.77	0	255.26	74
111	H-4	20	0.00	0	255.26	110
113	H-5	20	83.56	0	255.26	74
115	H-6	20	83.05	0	255.26	75
117	H-7	20	80.35	0	255.26	76
119	H-8	20	84.35	0	255.25	74



# Water Model 2022-11-09 DOMESTIC.wtg

Active Scenario: ADD

## Headwaters Scottsdale

Pump Table - Time: 0.00 hours

ID	Label	Elevation (ft)	Pump Definition	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpm)	Pump Head (ft)
47	PMP-2	89.00	Fire Flow	89.00	255.27	46	166.27

# Water Model 2022-11-09 DOMESTIC.wtg

Active Scenario: ADD

Headwaters Scottsdale

Reservoir Table - Time: 0.00 hours

ID	Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
45	R-1	89.00	46	89.00

# Water Model 2022-11-09 DOMESTIC.wtg

Active Scenario: ADD

Headwaters Scottsdale

GPV Table - Time: 0.00 hours

ID	Label	Elevation (ft)	Diameter (Valve) (in)	Minor Loss Coefficient (Local)	General Purpose Valve Headloss Curve	Flow (gpm)	Hydraulic Grade (From) (ft)	Hydraulic Grade (To) (ft)	Headloss (ft)
128	GPV-2	17.74	8.0	0.000	8"	0	255.25	238.85	16.40
131	GPV-3	19.48	8.0	0.000	4"	46	255.25	221.63	33.62
134	GPV-4	78.70	2.0	0.000	2"	0	255.25	220.60	34.65

# Water Model 2022-11-09 DOMESTIC.wtg

Active Scenario: MDD

Headwaters Scottsdale

Junction Table - Time: 0.00 hours

ID	Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
32	J-1	74.55	0	255.10	78
33	J-2	83.76	0	255.14	74
34	J-3	78.83	0	255.09	76
40	J-5	79.59	0	255.11	76
55	J-6	78.26	0	255.11	77
57	J-7	76.86	0	255.11	77
59	J-8	78.21	0	255.11	77
61	J-9	76.40	0	255.10	77
63	J-10	75.87	0	255.10	78
66	J-11	73.06	0	255.10	79
68	J-12	77.12	0	255.08	77
70	J-13	77.81	0	255.08	77
72	J-14	77.94	0	255.08	77
74	J-15	78.81	0	255.08	76
76	J-16	78.21	0	289.73	92
78	J-17	77.94	0	289.73	92
80	J-18	76.83	0	289.73	92
82	J-19	76.57	0	289.73	92
84	J-20	75.41	0	289.73	93
86	J-21	75.14	0	289.73	93
88	J-22	74.05	0	289.73	93
90	J-23	73.73	0	289.73	93
92	J-24	72.65	0	289.73	94
94	J-25	72.27	0	289.73	94
124	RISER	78.94	0	238.68	69
126	DOMESTIC	78.94	93	225.27	63
153	J-28	78.28	0	255.11	77

# Water Model 2022-11-09 DOMESTIC.wtg

**Active Scenario: MDD**

**Headwaters Scottsdale**

**Pipe Table - Time: 0.00 hours**

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)	Minor Loss Coefficient (Local)	Length (User Defined) (ft)
39	P-4	26	J-2	RESIDUAL	6.0	Ductile Iron	130.0	0	0.00	0.000	0.000	0
42	P-3(2)	326	J-5	J-2	8.0	Ductile Iron	130.0	-56	0.36	0.000	0.000	349
43	P-5	239	J-3	J-5	8.0	Ductile Iron	130.0	-44	0.28	0.000	0.000	238
48	P-7	28	R-1	PMP-2	100.0	Ductile Iron	180.0	93	0.00	0.000	0.000	1
49	P-8	29	PMP-2	J-2	100.0	Ductile Iron	180.0	93	0.00	0.000	0.000	1
56	P-9	77	J-5	J-6	8.0	Ductile Iron	130.0	12	0.07	0.000	0.000	0
58	P-10	116	J-6	J-7	8.0	Ductile Iron	130.0	12	0.07	0.000	0.000	0
60	P-11	37	J-7	J-8	8.0	Ductile Iron	130.0	0	0.00	0.000	0.000	0
62	P-12	147	J-7	J-9	8.0	Ductile Iron	130.0	12	0.07	0.000	0.000	0
64	P-13	348	J-9	J-10	8.0	Ductile Iron	130.0	12	0.07	0.000	0.000	0
65	P-14	189	J-10	J-1	8.0	Ductile Iron	130.0	12	0.07	0.000	0.000	0
67	P-15	66	J-1	J-11	8.0	Ductile Iron	130.0	48	0.31	0.000	0.000	0
69	P-16	223	J-11	J-12	8.0	Ductile Iron	130.0	48	0.31	0.000	0.000	0
71	P-17	39	J-12	J-13	8.0	Ductile Iron	130.0	48	0.31	0.000	0.000	0
73	P-18	5	J-13	J-14	8.0	Ductile Iron	130.0	48	0.31	0.000	0.000	0
75	P-19	81	J-14	J-15	8.0	Ductile Iron	130.0	-44	0.28	0.000	0.000	0
79	P-21	38	J-16	J-17	2.0	Copper	135.0	0	0.00	0.000	0.000	0
81	P-22	38	J-17	J-18	2.0	Copper	135.0	0	0.00	0.000	0.000	0
83	P-23	38	J-18	J-19	2.0	Copper	135.0	0	0.00	0.000	0.000	0
85	P-24	38	J-19	J-20	2.0	Copper	135.0	0	0.00	0.000	0.000	0
87	P-25	38	J-20	J-21	2.0	Copper	135.0	0	0.00	0.000	0.000	0
89	P-26	38	J-21	J-22	2.0	Copper	135.0	0	0.00	0.000	0.000	0
91	P-27	39	J-22	J-23	2.0	Copper	135.0	0	0.00	0.000	0.000	0
93	P-28	38	J-23	J-24	2.0	Copper	135.0	0	0.00	0.000	0.000	0
95	P-29	38	J-24	J-25	2.0	Copper	135.0	0	0.00	0.000	0.000	0
96	P-30	36	J-15	J-3	6.0	Ductile Iron	130.0	-44	0.50	0.000	0.000	0
110	P-31	22	J-6	H-3	6.0	Ductile Iron	130.0	0	0.00	0.000	0.000	0
112	P-32	18	J-8	H-4	6.0	Ductile Iron	130.0	0	0.00	0.000	0.000	0
114	P-33	13	J-9	H-5	6.0	Ductile Iron	130.0	0	0.00	0.000	0.000	0
116	P-34	23	J-10	H-6	6.0	Ductile Iron	130.0	0	0.00	0.000	0.000	0
118	P-35	13	J-11	H-7	6.0	Ductile Iron	130.0	0	0.00	0.000	0.000	0
120	P-36	10	J-12	H-8	6.0	Ductile Iron	130.0	0	0.00	0.000	0.000	0
129	P-37	35	J-13	GPV-2	8.0	Ductile Iron	130.0	0	0.00	0.000	0.000	0
130	P-38	11	GPV-2	RISER	8.0	Ductile Iron	130.0	0	0.00	0.000	0.000	0
132	P-39	35	J-14	GPV-3	8.0	Ductile Iron	130.0	93	0.59	0.000	0.000	0
133	P-40	11	GPV-3	DOMESTIC	4.0	Copper	135.0	93	2.37	0.006	0.000	0
135	P-20(1)	8	J-15	GPV-4	2.0	Copper	135.0	0	0.00	0.000	0.000	0

# Water Model 2022-11-09 DOMESTIC.wtg

Active Scenario: MDD

Headwaters Scottsdale

Pipe Table - Time: 0.00 hours

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)	Minor Loss Coefficient (Local)	Length (User Defined) (ft)
136	P-20(2)	34	GPV-4	J-16	2.0	Copper	135.0	0	0.00	0.000	0.000	0
154	P-6(1)	666	J-2	J-28	8.0	Ductile Iron	130.0	37	0.23	0.000	0.000	682
155	P-6(2)	454	J-28	J-1	10.0	Asbestos Cement	140.0	37	0.15	0.000	0.000	465

# Water Model 2022-11-09 DOMESTIC.wtg

Active Scenario: MDD

Headwaters Scottsdale

Hydrant Table - Time: 0.00 hours

ID	Label	Length (Hydrant Lateral) (ft)	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
31	RESIDUAL	20	89.00	0	255.14	72
109	H-3	20	84.77	0	255.11	74
111	H-4	20	0.00	0	255.11	110
113	H-5	20	83.56	0	255.10	74
115	H-6	20	83.05	0	255.10	74
117	H-7	20	80.35	0	255.10	76
119	H-8	20	84.35	0	255.08	74

# Water Model 2022-11-09 DOMESTIC.wtg

Active Scenario: MDD

Headwaters Scottsdale

Pump Table - Time: 0.00 hours

ID	Label	Elevation (ft)	Pump Definition	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpm)	Pump Head (ft)
47	PMP-2	89.00	Fire Flow	89.00	255.14	93	166.14



# Water Model 2022-11-09 DOMESTIC.wtg

Active Scenario: MDD

Headwaters Scottsdale

Reservoir Table - Time: 0.00 hours

ID	Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
45	R-1	89.00	93	89.00

# Water Model 2022-11-09 DOMESTIC.wtg

Active Scenario: MDD

Headwaters Scottsdale

GPV Table - Time: 0.00 hours

ID	Label	Elevation (ft)	Diameter (Valve) (in)	Minor Loss Coefficient (Local)	General Purpose Valve Headloss Curve	Flow (gpm)	Hydraulic Grade (From) (ft)	Hydraulic Grade (To) (ft)	Headloss (ft)
128	GPV-2	17.74	8.0	0.000	8"	0	255.08	238.68	16.40
131	GPV-3	19.48	8.0	0.000	4"	93	255.07	225.34	29.73
134	GPV-4	78.70	2.0	0.000	2"	0	255.08	289.73	34.65

# Water Model 2022-11-09 DOMESTIC.wtg

## Active Scenario: MDD+FF

### Fire Flow Node FlexTable: Fire Flow Results Table

Label	Satisfies Fire Flow Constraints?	Fire Flow Status	Fire Flow (Needed) (gpm)	Fire Flow (Available) (gpm)	Flow (Total Needed) (gpm)	Flow (Total Available) (gpm)	Pressure (Residual Lower Limit) (psi)	Pressure (Calculated Residual) (psi)
RESIDUAL	True	Passed	2,000	2,628	2,000	2,628	20	25
H-3	True	Passed	2,000	2,414	2,000	2,414	20	27
H-4	True	Passed	2,000	2,414	2,000	2,414	20	61
H-5	True	Passed	2,000	2,413	2,000	2,413	20	26
H-6	True	Passed	2,000	2,404	2,000	2,404	20	25
H-7	True	Passed	2,000	2,373	2,000	2,373	20	30
H-8	True	Passed	2,000	2,307	2,000	2,307	20	30
RISER	True	Passed	2,000	2,296	2,000	2,296	20	23

Pressure (Zone Lower Limit) (psi)	Pressure (Calculated Zone Lower Limit) (psi)	Junction w/ Minimum Pressure (Zone)	Pressure (Calculated System Lower Limit) (psi)	Junction w/ Minimum Pressure (System)	Is Fire Flow Run Balanced?
20	20	J-16	20	J-16	True
20	20	J-16	20	J-16	True
20	20	J-16	20	J-16	True
20	20	J-16	20	J-16	True
20	20	J-16	20	J-16	True
20	20	J-16	20	J-16	True
20	20	J-16	20	J-16	True
20	20	J-16	20	J-16	True

# Water Model 2022-11-09 DOMESTIC.wtg

Active Scenario: PHD

Headwaters Scottsdale

Junction Table - Time: 0.00 hours

ID	Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
32	J-1	74.55	0	254.71	78
33	J-2	83.76	0	254.80	74
34	J-3	78.83	0	254.68	76
40	J-5	79.59	0	254.72	76
55	J-6	78.26	0	254.72	76
57	J-7	76.86	0	254.72	77
59	J-8	78.21	0	254.72	76
61	J-9	76.40	0	254.71	77
63	J-10	75.87	0	254.71	77
66	J-11	73.06	0	254.69	79
68	J-12	77.12	0	254.65	77
70	J-13	77.81	0	254.64	77
72	J-14	77.94	0	254.64	76
74	J-15	78.81	0	254.66	76
76	J-16	78.21	0	220.01	61
78	J-17	77.94	0	220.01	61
80	J-18	76.83	0	220.01	62
82	J-19	76.57	0	220.01	62
84	J-20	75.41	0	220.01	63
86	J-21	75.14	0	220.01	63
88	J-22	74.05	0	220.01	63
90	J-23	73.73	0	220.01	63
92	J-24	72.65	0	220.01	64
94	J-25	72.27	0	220.01	64
124	RISER	78.94	0	238.24	69
126	DOMESTIC	78.94	163	225.30	63
153	J-28	78.28	0	254.72	76

# Water Model 2022-11-09 DOMESTIC.wtg

**Active Scenario: PHD**

**Headwaters Scottsdale**

**Pipe Table - Time: 0.00 hours**

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)	Minor Loss Coefficient (Local)	Length (User Defined) (ft)
39	P-4	26	J-2	RESIDUAL	6.0	Ductile Iron	130.0	0	0.00	0.000	0.000	0
42	P-3(2)	326	J-5	J-2	8.0	Ductile Iron	130.0	-98	0.63	0.000	0.000	349
43	P-5	239	J-3	J-5	8.0	Ductile Iron	130.0	-78	0.50	0.000	0.000	238
48	P-7	28	R-1	PMP-2	100.0	Ductile Iron	180.0	163	0.01	0.000	0.000	1
49	P-8	29	PMP-2	J-2	100.0	Ductile Iron	180.0	163	0.01	0.000	0.000	1
56	P-9	77	J-5	J-6	8.0	Ductile Iron	130.0	21	0.13	0.000	0.000	0
58	P-10	116	J-6	J-7	8.0	Ductile Iron	130.0	21	0.13	0.000	0.000	0
60	P-11	37	J-7	J-8	8.0	Ductile Iron	130.0	0	0.00	0.000	0.000	0
62	P-12	147	J-7	J-9	8.0	Ductile Iron	130.0	21	0.13	0.000	0.000	0
64	P-13	348	J-9	J-10	8.0	Ductile Iron	130.0	21	0.13	0.000	0.000	0
65	P-14	189	J-10	J-1	8.0	Ductile Iron	130.0	21	0.13	0.000	0.000	0
67	P-15	66	J-1	J-11	8.0	Ductile Iron	130.0	85	0.54	0.000	0.000	0
69	P-16	223	J-11	J-12	8.0	Ductile Iron	130.0	85	0.54	0.000	0.000	0
71	P-17	39	J-12	J-13	8.0	Ductile Iron	130.0	85	0.54	0.000	0.000	0
73	P-18	5	J-13	J-14	8.0	Ductile Iron	130.0	85	0.54	0.000	0.000	0
75	P-19	81	J-14	J-15	8.0	Ductile Iron	130.0	-78	0.50	0.000	0.000	0
79	P-21	38	J-16	J-17	2.0	Copper	135.0	0	0.00	0.000	0.000	0
81	P-22	38	J-17	J-18	2.0	Copper	135.0	0	0.00	0.000	0.000	0
83	P-23	38	J-18	J-19	2.0	Copper	135.0	0	0.00	0.000	0.000	0
85	P-24	38	J-19	J-20	2.0	Copper	135.0	0	0.00	0.000	0.000	0
87	P-25	38	J-20	J-21	2.0	Copper	135.0	0	0.00	0.000	0.000	0
89	P-26	38	J-21	J-22	2.0	Copper	135.0	0	0.00	0.000	0.000	0
91	P-27	39	J-22	J-23	2.0	Copper	135.0	0	0.00	0.000	0.000	0
93	P-28	38	J-23	J-24	2.0	Copper	135.0	0	0.00	0.000	0.000	0
95	P-29	38	J-24	J-25	2.0	Copper	135.0	0	0.00	0.000	0.000	0
96	P-30	36	J-15	J-3	6.0	Ductile Iron	130.0	-78	0.88	0.001	0.000	0
110	P-31	22	J-6	H-3	6.0	Ductile Iron	130.0	0	0.00	0.000	0.000	0
112	P-32	18	J-8	H-4	6.0	Ductile Iron	130.0	0	0.00	0.000	0.000	0
114	P-33	13	J-9	H-5	6.0	Ductile Iron	130.0	0	0.00	0.000	0.000	0
116	P-34	23	J-10	H-6	6.0	Ductile Iron	130.0	0	0.00	0.000	0.000	0
118	P-35	13	J-11	H-7	6.0	Ductile Iron	130.0	0	0.00	0.000	0.000	0
120	P-36	10	J-12	H-8	6.0	Ductile Iron	130.0	0	0.00	0.000	0.000	0
129	P-37	35	J-13	GPV-2	8.0	Ductile Iron	130.0	0	0.00	0.000	0.000	0
130	P-38	11	GPV-2	RISER	8.0	Ductile Iron	130.0	0	0.00	0.000	0.000	0
132	P-39	35	J-14	GPV-3	8.0	Ductile Iron	130.0	163	1.04	0.001	0.000	0
133	P-40	11	GPV-3	DOMESTIC	4.0	Copper	135.0	163	4.15	0.017	0.000	0
135	P-20(1)	8	J-15	GPV-4	2.0	Copper	135.0	0	0.00	0.000	0.000	0

# Water Model 2022-11-09 DOMESTIC.wtg

Active Scenario: PHD

Headwaters Scottsdale

Pipe Table - Time: 0.00 hours

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)	Minor Loss Coefficient (Local)	Length (User Defined) (ft)
136	P-20(2)	34	GPV-4	J-16	2.0	Copper	135.0	0	0.00	0.000	0.000	0
154	P-6(1)	666	J-2	J-28	8.0	Ductile Iron	130.0	64	0.41	0.000	0.000	682
155	P-6(2)	454	J-28	J-1	10.0	Asbestos Cement	140.0	64	0.26	0.000	0.000	465

# Water Model 2022-11-09 DOMESTIC.wtg

Active Scenario: PHD

Headwaters Scottsdale

Hydrant Table - Time: 0.00 hours

ID	Label	Length (Hydrant Lateral) (ft)	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
31	RESIDUAL	20	89.00	0	254.80	72
109	H-3	20	84.77	0	254.72	74
111	H-4	20	0.00	0	254.72	110
113	H-5	20	83.56	0	254.71	74
115	H-6	20	83.05	0	254.71	74
117	H-7	20	80.35	0	254.69	75
119	H-8	20	84.35	0	254.65	74

# Water Model 2022-11-09 DOMESTIC.wtg

Active Scenario: PHD

Headwaters Scottsdale

Pump Table - Time: 0.00 hours

ID	Label	Elevation (ft)	Pump Definition	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpm)	Pump Head (ft)
47	PMP-2	89.00	Fire Flow	89.00	254.80	163	165.80



# Water Model 2022-11-09 DOMESTIC.wtg

Active Scenario: PHD

Headwaters Scottsdale

Reservoir Table - Time: 0.00 hours

ID	Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
45	R-1	89.00	163	89.00

# Water Model 2022-11-09 DOMESTIC.wtg

Active Scenario: PHD

Headwaters Scottsdale

GPV Table - Time: 0.00 hours

ID	Label	Elevation (ft)	Diameter (Valve) (in)	Minor Loss Coefficient (Local)	General Purpose Valve Headloss Curve	Flow (gpm)	Hydraulic Grade (From) (ft)	Hydraulic Grade (To) (ft)	Headloss (ft)
128	GPV-2	17.74	8.0	0.000	8"	0	254.64	238.24	16.40
131	GPV-3	19.48	8.0	0.000	4"	163	254.62	225.48	29.14
134	GPV-4	78.70	2.0	0.000	2"	0	254.66	220.01	34.65