FINAL WATER BASIS OF DESIGN REPORT

94th Street and Bell Road

Northeast Corner of 94th Street and Bell Road
Scottsdale, Arizona

Prepared for:

AG Leaf, LLC
9160 East Verde Grove View
Scottsdale, AZ 85255

Prepared by:

Kimley-Horn and Associates
1001 West Southern Avenue, Suite 131
Mesa, Arizona 85210

291804000
August 23

FINAL
WATER BASIS OF DESIGN REPORT

94TH STREET AND BELL ROAD

NORTHEAST CORNER OF
94TH STREET AND BELL ROAD
SCOTTSDALE, ARIZONA

FINAL Basis of Design Report

- ☐ APPROVED
- ☑ APPROVED AS NOTED
- ☐ REVISE AND RESUBMIT

CITY OF SCOTTSDALE
SCOTTSDALE WATER
9379 E San Salvador Dr.
Scottsdale, AZ 85258

Disclaimer: If approved; the approval is granted under the condition that the final construction documents submitted for city review will match the information herein. Any subsequent changes in the water or sewer design that materially impact design criteria or standards will require re-analysis, re-submittal, and approval of a revised basis of design report prior to the plan review submission.; this approval is not a guarantee of construction document acceptance.
For questions or clarifications contact the Water Resources Planning and Engineering Department at 480-312-5685.

BY apritchard **DATE** 10/17/2023

FIRST PRE-PLAT SUBMITTAL: DECEMBER 2022

SECOND PRE-PLAT SUBMITTAL: MARCH 2023

THIRD PRE-PLAT SUBMITTAL: AUGUST 2023

Prepared By:

Kimley»Horn

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INTRODUCTION

SITE LOCATION

This Final Water Basis of Design Report (Water BOD) has been prepared for the proposed 94th Street and Bell Road development located at the northeast corner of 94th Street and Bell Road in Scottsdale, Arizona (development). The development is bound to the south by Bell Road, to the west by 94th Street, to the north by DC Ranch Parcel 1.11, and to the east by undeveloped land and the Reata Wash. The development is located within Section 31 of Township 4 North, Range 5 East of the Gila and Salt River Base and Meridian, Maricopa County, Arizona. Refer to **Figure 1** for the Vicinity Map.

PROJECT SIZE AND TYPE

The development is a proposed 52-unit single family residential subdivision and a private clubhouse with a pool. The development area is approximately 37.16 acres.

PURPOSE AND OBJECTIVES

This report presents the basis of design criteria that will be used for engineering design of the proposed development. This report establishes a water service plan for the development of the site.

- Demonstrate compliance with the City's 2018 Design Standards & Polices Manual (DSPM).
- Identify a water system layout for the proposed development.
- Determination of the water demand generated by the development.
- Modeling and Analysis of the proposed water system, including Fire service.

Figure 1: Vicinity Map

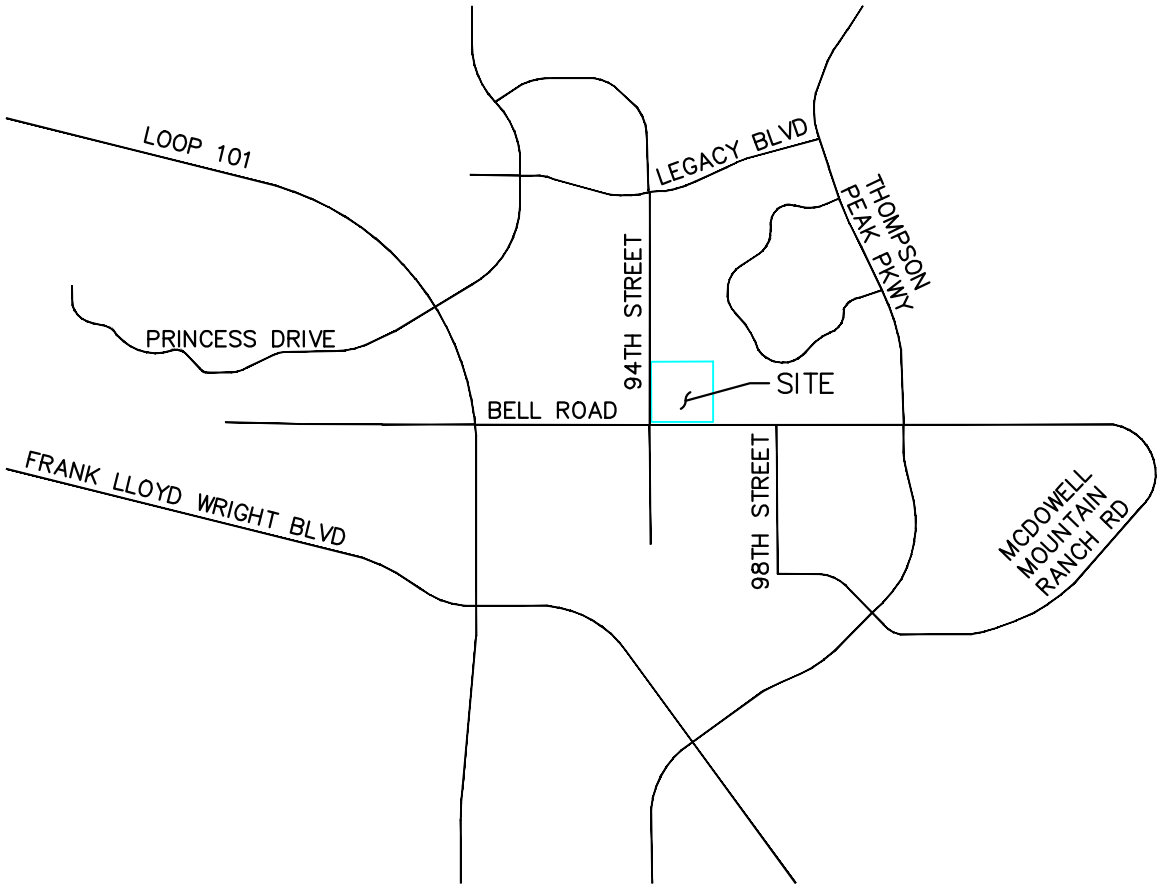


FIGURE 1
VICINITY MAP
94TH STREET AND BELL ROAD

Kimley»Horn

DISTRIBUTION SYSTEM DESCRIPTION

EXISTING DISTRIBUTION SYSTEM

The existing site is undeveloped natural desert. The site slopes in a southerly direction across the development. Existing grade elevations on the site range from approximately 1567' to 1605'. Per the City of Scottsdale Design Standards and Policies Manual (DS&PM), the development falls within pressure zone 4.

Based on a review of the City Quarter Section Maps (QS37-50), there are two water lines that exist in Bell Road and one water line in 94th Street. There is a 24-inch transmission water line that runs east to west on the northern half of Bell Road and a 12-inch distribution water line that runs east to west on the southern half of Bell Road. These two water lines are connected in two areas with 6-inch and 8-inch laterals in Bell Road. In 94th Street, there is one 12-inch distribution water line that is branched off the 24-inch transmission line. The line is located near the center of 94th Street.

PROPOSED DISTRIBUTION SYSTEM

The proposed development consists of 52 single family residential units and private clubhouse with a pool. The onsite distribution system will consist of 8-inch DIP Pressure Class 350 water line. The 12-inch water line in 94th Street will act as the connection points for the development:

94th Street Entry Road Connection – The entry road connection to the development will be off 94th Street approximately 820-feet north from the intersection of Bell Road and 94th Street. A 12-inch by 8-inch tapping sleeve will be constructed. For this 8-inch water line connection, the line will remain in City of Scottsdale right-of-way in 94th Street and will head east to a private street tract designated with a water and sewer facility easement for the City. Refer to **Figure 2** for Water System Layout.

94th Street WSF Easement Connection – To ensure that the development's water system is looped, another connection point to the existing 12-inch water line in 94th Street will be constructed. A 12-inch by 8-inch tapping sleeve will be constructed for the connection. The water line will run east through a 20-foot water-sewer-facility (WSF) easement located in an open space tract until it gets back to the private street tract system within the development. This water line connection in 94th Street is located approximately 290-feet north from the intersection of Bell Road and 94th Street. Refer to **Figure 2** for Water System Layout.

Figure 2: Water System Layout

NOTE:
– ARV WILL BE REQUIRED AT HIGH POINTS IN THE SYSTEM AND VERTICAL REALIGNMENTS FOR CULVERT CROSSINGS. LOCATIONS TO BE PROVIDED AT FINAL DESIGN.
– WASH CROSSINGS SHALL BE PER DSPM 6–1.414

LEGEND

- EX. 8" WATER LINE
- EX. 12" WATER LINE
- EX. 24" WATER LINE
- PROP. 8" WATER LINE
- J–1 WATERCAD JUNCTION AND LABEL
- P–1 WATERCAD PIPE AND LABEL
- PMP–1 WATER MODEL CALIBRATION PUMP (PUMP CURVE PER FIRE FLOW TEST)
- R–1 WATERCAD CALIBRATION RESERVOIR
- PROPOSED FIRE HYDRANT

EX. 12" WATER
PROP. 8" WATER
CONNECT TO EX. 12" WATER
EX. 8" WATER
EX. 24" WATER
94TH STREET
20' WSF ESMT
CLUBHOUSE
BELL ROAD
NORTH
GRAPHIC SCALE IN FEET 0 30 60 120

J–1 J–2 J–3 J–4 J–5 J–6 J–7 J–8 J–9 J–10 J–11 J–12 J–13 J–14 J–15 J–16
P–1 P–2 P–3 P–4 P–5 P–6 P–7 P–8 P–9 P–10 P–11 P–12 P–13 P–14 P–15 P–16 P–17
PMP–1 R–1

NO.	REVISION	BY	DATE	APPR.

Kimley»Horn
© 2023 KIMLEY–HORN AND ASSOCIATES, INC.
1001 West Southern Avenue, Suite 131
Mesa, Arizona 85210 (480) 207–2666

SCALE (H): 1"=60'
SCALE (V): NONE
DESIGNED BY: CFW
DRAWN BY: CFW
CHECKED BY: JMB
DATE: AUG 2023

94TH STREET AND BELL ROAD
FINAL WATER BOD
FIGURE 2 - WATER SYSTEM LAYOUT
SCOTTSDALE, ARIZONA

Registered Professional Engineer (Civil)
CERTIFICATE NO.
52081
JASON M. BURM
Date Signed 08/28/23
ARIZONA, U.S.A.
Expires 06/30/24

PROJECT NO.
291804000

DRAWING NAME
WATER BOD

01 OF 01

12–PP–2022
308–PA–2022

BASIS OF DESIGN

DESIGN CRITERIA

The design criteria for the development is based on the City of Scottsdale Design Standards and Policies Manual (DS&PM). Average daily demands for the proposed use and peaking factors were used to determine the proposed peak flows generated on site. See **Table 1** below for a summary of the design criteria used.

Table 1. Water Design Criteria

WATER DESIGN CRITERIA		
Water Demands		
Land Use	**Average Daily Flow (gpm)**	
Prop. Development (<2 DU/ac Residential)	0.69	per unit
Water Design Criteria		
Peaking Factors		
Maximum Day	2.0	
Peak Hour	3.5	
Fire Flow (Sprinklered Homes <13,400 SQ. FT.)	1,500*	GPM
Clubhouse Demand	51.9**	GPM
Pressure Requirements		
Residual @ Highest Finished Floor Elevation Under Normal Daily Operations	50-120	PSI
Min. Fire Flow @ Highest Finished Floor Elevation	15	PSI
Fire Flow @ Hydrant Tee or Riser	30	PSI

* Fire Flow and Home Size Note: Per IFC, 1,500 gpm of fire flow correspondences to a maximum of 13,400 SQFT home with an automated sprinkler system. The homes in this community shall be limited to 13,400 SFT per IFC and DSPM Section 6-1.400. Homes larger than 13,400 SFT will be required to conduct additional fire flow analysis on the public utility to ensure if the existing public water main(s) is sufficient to provide required fire flow for the private development. Construction permit of larger homes is contingent upon this fire flow analysis and possible public infrastructure improvements at developer's expense.

**Demand for the private clubhouse is based on bathroom fixtures and additional fixtures located within the clubhouse. Demand is derived from the 2021 International Plumbing Code (IPC). Flow rates provided by the IPC are maximum peaked flow rates and are accounted for under the Peak Hour model simulation. In conformance with the City's DSPM Figure 6-1.4, the water meter size will be 1-1/2 inches.

Check reference. DSPM 6-1.400 is entitled "Transmission & Distribution Systems".

The proposed development generates a peak hour demand of approximately **255,600** gpd or **177.5** gpm. See **Table 2** below for a summary of the existing and proposed flows generated on site.

Table 2. Water Demand Calculations

Water Demand Calculations						
Use	**Units (#)**	**Demand Unit (gpm)**	**Average Daily Demand (gpm)**	**Max Day Demand (gpm)**	**Peak Hour Demand (gpm)**	**Peak Hour Demand (gpd)**
Development	52	0.69	35.9	71.8	125.6	180,864
Clubhouse	-	-	-	-	51.9	74,736
Total	**52**	**-**	**35.9**	**71.8**	**177.5**	**255,600**

WATER SYSTEM ANALYSIS

The WaterCAD v8i water system modeling software distributed by Haestad Methods, Inc. was used to model the proposed water network. A fire hydrant flow test was performed to determine the residual and static pressures of the existing network. The test was performed on Bell Road from the west boundary of the development (94th Street) to the east boundary of the development. Refer to **Appendix A – Fire Hydrant Flow Test** Results.

The proposed water distribution system models are designed under four design scenarios in two different models. Average Day, Max Day, Peak Hour, Max Day plus Fire Flow and Model Scenario 4 per DSPM 6-1.202.G6. In modeling Scenario 4, we added the Initial Service Line Design Flow to a node (J-9) at the highest finished floor elevation (Lot 29) to ensure that minimum pressure criteria is met under normal daily operating flow conditions. Based on the criteria established in Table E103.3(2) and Table E103.3(3) of the 2015 International Plumbing Code, the Initial Service Line Design Flow was calculated to be 40.8 gpm. The model utilized raw fire flow test data. The model was created to demonstrate that the system would meet local requirements. Domestic demands based on the calculated demands from **Table 2** were placed on the corresponding WaterCAD design Nodes. See **Table 3** below for WaterCAD Junction Demands.

Table 3. WaterCAD Node Summary

WaterCAD Node	Proposed Ground Elevation	Average Day Demand (gpm)	Max Day Demand (gpm)	Peak Hour Demand (gpm)	Fire Flow Demand (gpm)
J-2	1570.00	0.0	0.0	0.0	1,500
J-3	1572.90	0.0	0.0	0.0	1,500
J-4	1581.40	0.0	0.0	0.0	1,500
J-5	1573.40	2.1	4.1	7.2	1,500
Clubhouse*	1573.40	-	-	51.9	1,500
J-6	1570.50	6.2	12.4	22.0	1,500
J-7	1581.40	2.8	5.5	10.0	1,500
J-8	1582.80	4.8	9.7	17.0	1,500
J-9	1591.40	4.8	9.7	17.0	1,500
J-10	1586.40	4.1	8.3	14.0	1,500
J-11	1587.30	3.5	6.9	12.0	1,500
J-12	1583.00	0.0	0.0	0.0	1,500
J-13	1580.50	2.1	4.1	7.0	1,500
J-14	1573.40	1.4	2.8	5.0	1,500
J-15	1578.50	4.1	8.3	14.0	1,500
TOTAL		**35.9**	**71.8**	**177.5**	-
J-16 (Scenario 4)	1592.30	40.8	-	-	1,500

*Clubhouse demand is included on J-5 node. Refer to **Table 1** for demand criteria.

Demands are placed at the highest finished floor of the proposed building. For the Average Day, Max Day and Peak hour, the minimum residual pressure in the system is greater than 55 PSI for the project which accounts for an approximate 5 PSI loss through the service, meter and PRV per DSPM 6-1.202.G6.d.iv. The pressures are to be maintained between above 50 PSI at the highest finished floor and below 120 PSI in the system. For the Fire Flow scenario, the required fire flow is applied to all nodes independently. In the Fire Flow scenario, the minimum residual pressure in the network should be maintained above 30 PSI at the hydrant tee or building riser elevation and above 15 PSI at all demand nodes.

ANALYSIS RESULTS

Results from the water model indicated the proposed system is able to provide the required domestic and fire flow demands at or above the minimum required pressures when utilizing the raw fire flow test data. The available Fire Flow in the Max Day is above 1,500 gpm at a residual pressure of 30 psi at the hydrant tee and 15 psi at the highest finished floor.

See Appendix B – WaterCAD Output for complete analysis results.

Appendix A – Fire Hydrant Flow Test Results

Flow Test Summary

Project Name:	EJFT 23059 - 94th Street & Bell Road
Project Address:	East Bell Road & North 94th Street, Scottsdale, AZ 85260
Date of Flow Test:	2023-02-15
Time of Flow Test:	7:20 AM
Data Reliable Until:	2023-08-15
Conducted By:	Steven Saethre & Simon Rohklin (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:	C71424

Raw Flow Test Data

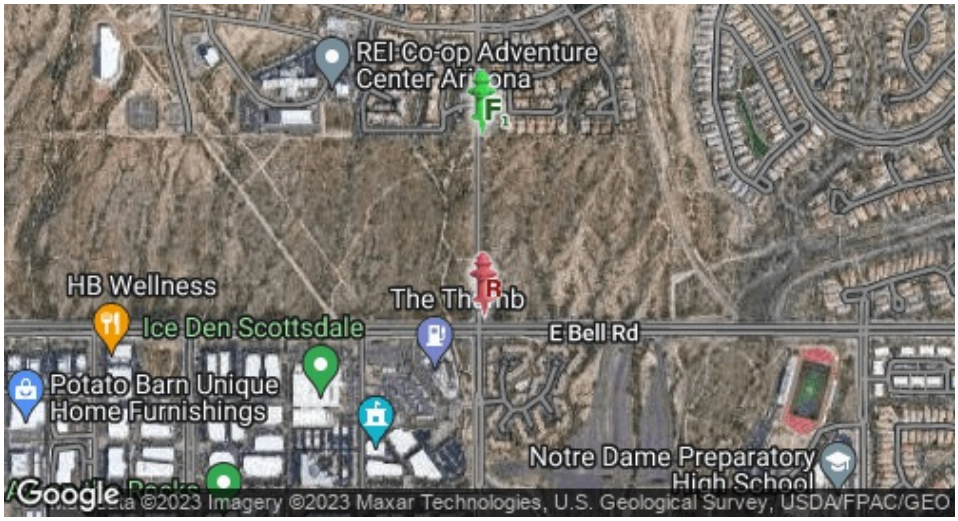
Static Pressure:	80.0 PSI
Residual Pressure:	74.0 PSI
Flowing GPM:	1,943
GPM @ 20 PSI:	6,735

Data with a 10 % Safety Factor

Static Pressure:	72.0 PSI
Residual Pressure:	66.0 PSI
Flowing GPM:	1,943
GPM @ 20 PSI:	6,235

Hydrant F_1

Pitot Pressure (1):	35	PSI
Coefficient of Discharge (1):	0.9	
Hydrant Orifice Diameter (1):	2.5	inches
Pitot Pressure (2):	32	PSI
Coefficient of Discharge (2):	0.9	
Hydrant Orifice Diameter (2):	2.5	inches



Static-Residual Hydrant

Flow Hydrant

Distance Between F_1 and R
1248 ft (measured linearly)

Static-Residual Elevation
1572 ft (above sea level)

Flow Hydrant (F_1) Elevation
1593 ft (above sea level)

Elevation & distance values are approximate

EJ Flow Tests, LLC
21505 North 78th Ave. | Suite 130 | Peoria, Arizona 85382 | (602) 999-7637 |
John L. Echeverri | NICET Level IV 78493 SME | C-16 FP Contractor ROC 271705 AZ | NFPA CFPS 1915
www.flowtestsummary.com

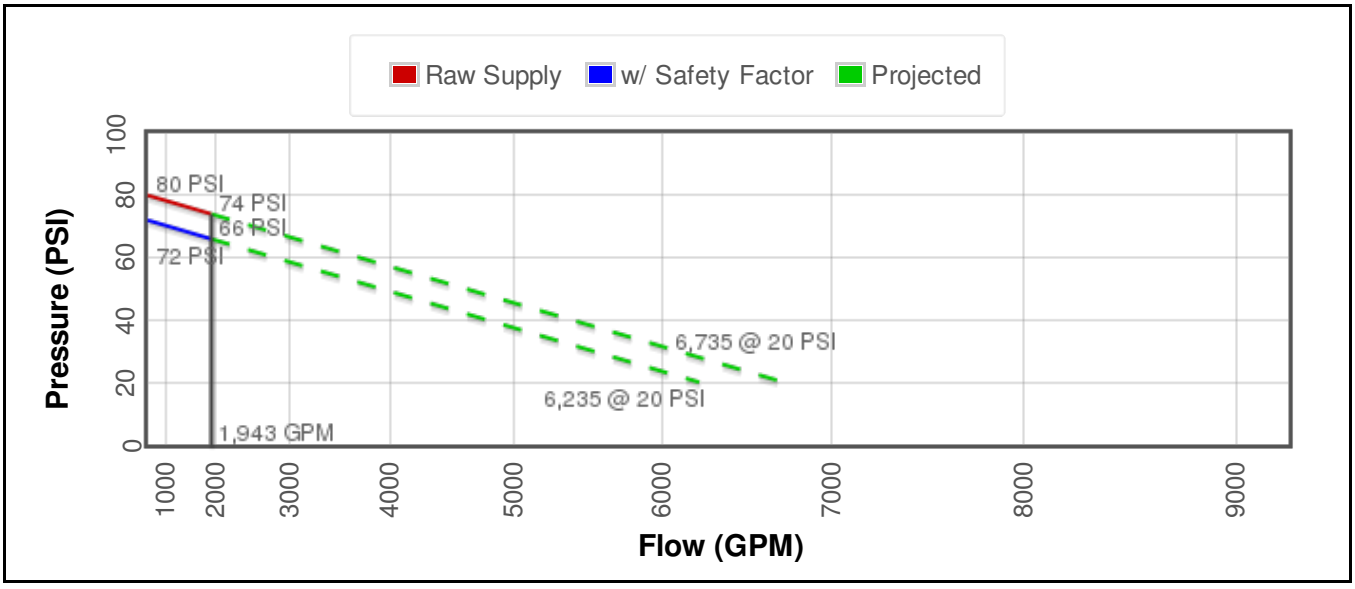
Flow Test Summary

Static-Residual Hydrant

Flow Hydrant (only hydrant F1 shown for clarity)

Approximate Project Site

Water Supply Curve $N^{1.85}$ Graph



Appendix B – WaterCAD Output

- *Average Day*
- *Average Day – Scenario 4 per DSPM 6-1.202.G6*
- *Max Day*
- *Peak Hour*
- *Max Day + Fire Flow*

94th St & Bell Road
Average Day Demand

Reservoir Table - Time: 0.00 hours

ID	Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
92	R-1	1,574.80	35.9	1,574.80

94th St & Bell Road
Average Day Demand

Junction Table - Time: 0.00 hours

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-2	1,570.00	0.0	1,759.59	82
J-3	1,572.90	0.0	1,759.59	81
J-4	1,581.40	0.0	1,759.59	77
J-5	1,573.40	2.1	1,759.59	81
J-6	1,570.50	6.2	1,759.58	82
J-7	1,581.40	2.8	1,759.58	77
J-8	1,582.80	4.8	1,759.58	76
J-9	1,591.40	4.8	1,759.58	73
J-10	1,586.40	4.1	1,759.58	75
J-11	1,587.30	3.5	1,759.58	75
J-12	1,583.00	0.0	1,759.59	76
J-13	1,580.50	2.1	1,759.59	77
J-14	1,573.40	1.4	1,759.59	81
J-15	1,578.50	4.1	1,759.58	78
J-16	1,592.30	(N/A)	(N/A)	(N/A)

94th St & Bell Road

Average Day Demand

Pipe Table - Time: 0.00 hours

Label	Length (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
P-1	1	R-1	PMP-1	48.0	Ductile Iron	140.0	35.9	0.01	0.000
P-4	264	J-2	J-3	12.0	Ductile Iron	130.0	35.9	0.10	0.000
P-5	522	J-3	J-4	12.0	Ductile Iron	130.0	17.9	0.05	0.000
P-6	179	J-3	J-5	8.0	Ductile Iron	130.0	18.0	0.12	0.000
P-8	416	J-6	J-7	8.0	Ductile Iron	130.0	7.6	0.05	0.000
P-9	225	J-7	J-8	8.0	Ductile Iron	130.0	4.8	0.03	0.000
P-10	385	J-8	J-9	8.0	Ductile Iron	130.0	-4.1	0.03	0.000
P-11	605	J-9	J-10	8.0	Ductile Iron	130.0	-8.9	0.06	0.000
P-12	273	J-10	J-11	8.0	Ductile Iron	130.0	3.5	0.02	0.000
P-13	238	J-10	J-12	8.0	Ductile Iron	130.0	-16.5	0.11	0.000
P-14	314	J-12	J-4	8.0	Ductile Iron	130.0	-17.9	0.11	0.000
P-15	223	J-12	J-13	8.0	Ductile Iron	130.0	1.4	0.01	0.000
P-17	255	J-5	J-14	8.0	Ductile Iron	130.0	15.9	0.10	0.000
P-7	462	J-14	J-6	8.0	Ductile Iron	130.0	13.8	0.09	0.000
P-16	302	J-13	J-14	8.0	Ductile Iron	130.0	-0.7	0.00	0.000
P-17	585	J-8	J-15	8.0	Ductile Iron	130.0	4.1	0.03	0.000
P-18	41	J-9	J-16	1.0	Copper	135.0	(N/A)	(N/A)	(N/A)

Single family homes over 12,000 sf in area within exterior enclosing walls including all floors shall have minimum 1 ½-inch domestic meter and minimum 2-inch domestic line. See Chapter 8.1.5 of the City of Scottsdale Fire Department Interpretations and Applications of NFPA 13 D (2022 Edition) Effective January 1, 2023

94th St & Bell Road

Scenario 4 per DSPM 6-1.202.G6

Reservoir Table - Time: 0.00 hours

ID	Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
92	R-1	1,574.80	76.7	1,574.80

94th St & Bell Road

Scenario 4 per DSPM 6-1.202.G6

Junction Table - Time: 0.00 hours

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-2	1,570.00	0.0	1,759.57	82
J-3	1,572.90	0.0	1,759.56	81
J-4	1,581.40	0.0	1,759.56	77
J-5	1,573.40	2.1	1,759.55	81
J-6	1,570.50	6.2	1,759.53	82
J-7	1,581.40	2.8	1,759.52	77
J-8	1,582.80	4.8	1,759.52	76
J-9	1,591.40	4.8	1,759.51	73
J-10	1,586.40	4.1	1,759.53	75
J-11	1,587.30	3.5	1,759.53	75
J-12	1,583.00	0.0	1,759.54	76
J-13	1,580.50	2.1	1,759.54	77
J-14	1,573.40	1.4	1,759.54	81
J-15	1,578.50	4.1	1,759.52	78
J-16	1,592.30	40.8	1,713.07	52

94th St & Bell Road

Scenario 4 per DSPM 6-1.202.G6

Pipe Table - Time: 0.00 hours

Label	Length (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
P-1	1	R-1	PMP-1	48.0	Ductile Iron	140.0	76.7	0.01	0.000
P-4	264	J-2	J-3	12.0	Ductile Iron	130.0	76.7	0.22	0.000
P-5	522	J-3	J-4	12.0	Ductile Iron	130.0	39.0	0.11	0.000
P-6	179	J-3	J-5	8.0	Ductile Iron	130.0	37.7	0.24	0.000
P-8	416	J-6	J-7	8.0	Ductile Iron	130.0	25.7	0.16	0.000
P-9	225	J-7	J-8	8.0	Ductile Iron	130.0	22.9	0.15	0.000
P-10	385	J-8	J-9	8.0	Ductile Iron	130.0	14.0	0.09	0.000
P-11	605	J-9	J-10	8.0	Ductile Iron	130.0	-31.6	0.20	0.000
P-12	273	J-10	J-11	8.0	Ductile Iron	130.0	3.5	0.02	0.000
P-13	238	J-10	J-12	8.0	Ductile Iron	130.0	-39.2	0.25	0.000
P-14	314	J-12	J-4	8.0	Ductile Iron	130.0	-39.0	0.25	0.000
P-15	223	J-12	J-13	8.0	Ductile Iron	130.0	-0.2	0.00	0.000
P-17	255	J-5	J-14	8.0	Ductile Iron	130.0	35.6	0.23	0.000
P-7	462	J-14	J-6	8.0	Ductile Iron	130.0	31.9	0.20	0.000
P-16	302	J-13	J-14	8.0	Ductile Iron	130.0	-2.3	0.01	0.000
P-17	585	J-8	J-15	8.0	Ductile Iron	130.0	4.1	0.03	0.000
P-18	41	J-9	J-16	1.0	Copper	135.0	40.8	16.67	1.141

94th St & Bell Road
Max Day Demand

Reservoir Table - Time: 0.00 hours

ID	Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
92	R-1	1,574.80	71.8	1,574.80

94th St & Bell Road
Max Day Demand

Junction Table - Time: 0.00 hours

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-2	1,570.00	0.0	1,759.57	82
J-3	1,572.90	0.0	1,759.56	81
J-4	1,581.40	0.0	1,759.56	77
J-5	1,573.40	4.2	1,759.56	81
J-6	1,570.50	12.4	1,759.54	82
J-7	1,581.40	5.6	1,759.54	77
J-8	1,582.80	9.6	1,759.53	76
J-9	1,591.40	9.6	1,759.54	73
J-10	1,586.40	8.2	1,759.54	75
J-11	1,587.30	7.0	1,759.54	75
J-12	1,583.00	0.0	1,759.55	76
J-13	1,580.50	4.2	1,759.55	77
J-14	1,573.40	2.8	1,759.55	81
J-15	1,578.50	8.2	1,759.53	78
J-16	1,592.30	(N/A)	(N/A)	(N/A)

94th St & Bell Road

Max Day Demand

Pipe Table - Time: 0.00 hours

Label	Length (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
P-1	1	R-1	PMP-1	48.0	Ductile Iron	140.0	71.8	0.01	0.000
P-4	264	J-2	J-3	12.0	Ductile Iron	130.0	71.8	0.20	0.000
P-5	522	J-3	J-4	12.0	Ductile Iron	130.0	35.8	0.10	0.000
P-6	179	J-3	J-5	8.0	Ductile Iron	130.0	36.0	0.23	0.000
P-8	416	J-6	J-7	8.0	Ductile Iron	130.0	15.3	0.10	0.000
P-9	225	J-7	J-8	8.0	Ductile Iron	130.0	9.7	0.06	0.000
P-10	385	J-8	J-9	8.0	Ductile Iron	130.0	-8.1	0.05	0.000
P-11	605	J-9	J-10	8.0	Ductile Iron	130.0	-17.7	0.11	0.000
P-12	273	J-10	J-11	8.0	Ductile Iron	130.0	7.0	0.04	0.000
P-13	238	J-10	J-12	8.0	Ductile Iron	130.0	-32.9	0.21	0.000
P-14	314	J-12	J-4	8.0	Ductile Iron	130.0	-35.8	0.23	0.000
P-15	223	J-12	J-13	8.0	Ductile Iron	130.0	2.8	0.02	0.000
P-17	255	J-5	J-14	8.0	Ductile Iron	130.0	31.8	0.20	0.000
P-7	462	J-14	J-6	8.0	Ductile Iron	130.0	27.7	0.18	0.000
P-16	302	J-13	J-14	8.0	Ductile Iron	130.0	-1.4	0.01	0.000
P-17	585	J-8	J-15	8.0	Ductile Iron	130.0	8.2	0.05	0.000
P-18	41	J-9	J-16	1.0	Copper	135.0	(N/A)	(N/A)	(N/A)

Reservoir Table - Time: 0.00 hours

ID	Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
92	R-1	1,574.80	177.6	1,574.80

94th St & Bell Road
Peak Hour Demand

Junction Table - Time: 0.00 hours

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-2	1,570.00	0.0	1,759.44	82
J-3	1,572.90	0.0	1,759.41	81
J-4	1,581.40	0.0	1,759.40	77
J-5	1,573.40	59.2	1,759.36	80
J-6	1,570.50	21.7	1,759.32	82
J-7	1,581.40	9.8	1,759.31	77
J-8	1,582.80	16.8	1,759.31	76
J-9	1,591.40	16.8	1,759.31	73
J-10	1,586.40	14.4	1,759.33	75
J-11	1,587.30	12.3	1,759.33	74
J-12	1,583.00	0.0	1,759.35	76
J-13	1,580.50	7.3	1,759.35	77
J-14	1,573.40	4.9	1,759.35	80
J-15	1,578.50	14.4	1,759.30	78
J-16	1,592.30	(N/A)	(N/A)	(N/A)

94th St & Bell Road

Peak Hour Demand

Pipe Table - Time: 0.00 hours

Label	Length (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
P-1	1	R-1	PMP-1	48.0	Ductile Iron	140.0	177.6	0.03	0.000
P-4	264	J-2	J-3	12.0	Ductile Iron	130.0	177.5	0.50	0.000
P-5	522	J-3	J-4	12.0	Ductile Iron	130.0	75.3	0.21	0.000
P-6	179	J-3	J-5	8.0	Ductile Iron	130.0	102.3	0.65	0.000
P-8	416	J-6	J-7	8.0	Ductile Iron	130.0	26.0	0.17	0.000
P-9	225	J-7	J-8	8.0	Ductile Iron	130.0	16.2	0.10	0.000
P-10	385	J-8	J-9	8.0	Ductile Iron	130.0	-15.0	0.10	0.000
P-11	605	J-9	J-10	8.0	Ductile Iron	130.0	-31.8	0.20	0.000
P-12	273	J-10	J-11	8.0	Ductile Iron	130.0	12.3	0.08	0.000
P-13	238	J-10	J-12	8.0	Ductile Iron	130.0	-58.4	0.37	0.000
P-14	314	J-12	J-4	8.0	Ductile Iron	130.0	-75.3	0.48	0.000
P-15	223	J-12	J-13	8.0	Ductile Iron	130.0	16.9	0.11	0.000
P-17	255	J-5	J-14	8.0	Ductile Iron	130.0	43.0	0.27	0.000
P-7	462	J-14	J-6	8.0	Ductile Iron	130.0	47.7	0.30	0.000
P-16	302	J-13	J-14	8.0	Ductile Iron	130.0	9.5	0.06	0.000
P-17	585	J-8	J-15	8.0	Ductile Iron	130.0	14.4	0.09	0.000
P-18	41	J-9	J-16	1.0	Copper	135.0	(N/A)	(N/A)	(N/A)

Fire Flow Node FlexTable: Fire Flow Results Table

Label	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)	Junction w/ Minimum Pressure (Zone)	Junction w/ Minimum Pressure (System)
J-2	Passed	1,500.0	3,000.0	1,500.0	3,000.0	30	68	J-9	J-9
J-3	Passed	1,500.0	3,000.0	1,500.0	3,000.0	30	64	J-9	J-9
J-4	Passed	1,500.0	3,000.0	1,500.0	3,000.0	30	58	J-9	J-9
J-5	Passed	1,500.0	2,176.3	1,504.2	2,180.5	30	68	J-9	J-9
J-6	Passed	1,500.0	2,300.5	1,512.4	2,312.9	30	59	J-9	J-9
J-7	Passed	1,500.0	2,724.1	1,505.6	2,729.7	30	41	J-8	J-8
J-8	Passed	1,500.0	2,972.9	1,509.6	2,982.5	30	34	J-15	J-15
J-9	Passed	1,500.0	2,671.1	1,509.6	2,680.7	30	39	J-8	J-8
J-10	Passed	1,500.0	2,060.2	1,508.2	2,068.4	30	58	J-9	J-9
J-11	Passed	1,500.0	1,559.7	1,507.0	1,566.7	30	59	J-9	J-9
J-12	Passed	1,500.0	2,647.4	1,500.0	2,647.4	30	56	J-9	J-9
J-13	Passed	1,500.0	2,911.1	1,504.2	2,915.3	30	51	J-9	J-9
J-14	Passed	1,500.0	2,766.5	1,502.8	2,769.3	30	59	J-9	J-9
J-15	Passed	1,500.0	1,558.5	1,508.2	1,566.7	30	54	J-9	J-9