Optima McDowell Mountain Village

Scottsdale, Arizona

PRELIMINARY WATER BASIS OF DESIGN REPORT

PRELIMINARY Basis of Design Report

☐ **ACCEPTED**

☑ **ACCEPTED AS NOTED**

☐ **REVISE AND RESUBMIT**

CITY OF SCOTTSDALE

SCOTTSDALE WATER

9379 E San Salvador Dr.
Scottsdale, AZ 85258

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 apritchard **DATE** 9/21/2022

Registered Professional Engineer (Civil)
CERTIFICATE NO.
30886
MICHAEL L.
DELMARTER
Date Signed 09/02/22
ARIZONA, U.S.A.

EXP: 12/31/2023

SEPTEMBER 2022

Prepared By:

Kimley»Horn

CONTENTS

APPENDICES

1.0 INTRODUCTION

Kimley-Horn and Associates, Inc. has prepared this Preliminary Water Basis of Design Report for the proposed Optima McDowell Mountain Village, a multi-family development at the northeast corner of Scottsdale Road and Mayo Boulevard in Scottsdale, Arizona. Refer to **Appendix A** for a Vicinity Map of the project area discussed. This report will demonstrate that the proposed project conforms to the City of Scottsdale design requirements.

Optima McDowell Mountain Village, the "project", encompasses approximately 15.637+/- net acres and 21.88 gross acres of currently undeveloped land with sparce desert vegetation. The proposed development will include (3) 10-story and (3) 9-story standalone mix-use buildings, with 1,390 multi-family units total (1,390DU/15.637 AC = 88.89DU/AC), and 36,000 SF of designated as Commercial Space. In addition to the buildings there will be a two-level underground parking structure below the development. The Commercial space is further broken down as Restaurant = 11,515 SF, Office = 17,935 SF, Loading = 6,550 SF with the loading area located in the garage with no additional water demands. All structures will adhere to fire codes and contain an approved sprinkler system. The Project will be developed in phases that will be determined during plan development.

The project lies within a portion of the Southwest Quarter of Section 26, Township 4 North, Range 4 East of the Gila and Salt River Base and Meridian in Maricopa County, Arizona. More specifically, the parcel is bounded by the Loop 101 Freeway to the north, vacant State Land to the east, a car dealership to the south, and Scottsdale Road to the west. The site generally slopes from the northeast to the southwest at approximately 1.5%. 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 can satisfy the projected water demands for the proposed development in accordance with the City of Scottsdale Design Standards & Policies Manual and the 2018 International Fire Code 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

A 16" ductile iron water main and a 12" ductile iron non-potable water main exists in Mayo Boulevard to the south of the site. The 12" non-potable water main stops near the end of the Mayo Boulevard pavement, and the 16" water main changes material to asbestos cement pipe and continues to the east across the state land. There are existing fire hydrants located along the project side of the street with one on the west and two on the south side of the site. Additionally, a 12" ductile iron water main and a 16" water main exists

in Scottsdale Road which both extend past the length of the project site. The 16" water main services the hydrants located on the project side of the road west of the site.

A certified Fire Hydrant Flow Test was conducted by EJ Flow Tests LLC on June 10, 2022, at the fire hydrant southeast of the site along Mayo Boulevard. Per the Fire Flow Report included in **Appendix B,** the static water pressure is 57.6 psi, the residual pressure is 50.6 psi at 2,110 GPM with a 10% safety factor, with an available flow at 20 psi of 4,666 GPM. The flowing gpm has been reduced per the DSMP Section 6-1.405.B.

The proposed domestic water system layout for this site consists of two 8" domestic connections fed through proposed 6" meters and 8" backflow preventors that tie into proposed 12" feeder mains that connect at two points each to the existing 16" mains in Mayo Boulevard and Scottsdale Road to comply with DSPM 6-1.416.K and 6-1.504.D. See **Appendix F** – Preliminary Utility Plan for the layout of the feeder mains and this site's proposed connections. The commercial portion of the site will also have a 4" water meter that is tapped into the proposed 12" feeder main in Mayo Boulevard. The water system will loop within the site/garage and connect to 3 separate domestic pump rooms which will each feed two buildings and their amenities. Additionally, there will be two 2" irrigation lines connecting to the proposed 12" feeder main in Mayo Boulevard to service the onsite vegetation. All pumps will be designed with Final Improvement Plans and included in Final Basis of Design Report.

The proposed fire system layout consists of two 12" connections through double detector check valves connecting to the same proposed 12" feeder mains in Mayo Boulevard and in Scottsdale Road. The onsite private fire line will be designed as a loop system through the garage. This loop will extend around the perimeter of the site and connect to three private hydrants near the north and eastern property lines and provide a connection to the fire pump room. The fire pump will connect to a fire riser loop which will provide fire flow to all the buildings for a single source. The fire pump design and pump curves will be provided during final design of the site with the Fire Life Safety Plans. Refer to **Appendix F** for the Preliminary Utility Plan layout, additionally **Appendix H** contains an exhibit that shows the separation of private and public utility lines proposed for the site. This report only analyzes the water systems to the connection point of the pump room and the onsite private hydrants.

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. Per the 2018 IFC and the Phoenix Fire department, a maximum 50% reduction of the required fire flow is allowed for the buildings, provided that the building is equipped with an approved interior fire suppression sprinkler system. In addition, remote Fire Department Connections (FDC'S) will be provided in accordance with City of Scottsdale Fire Code. Per the Scottsdale DSPM Section 6-1. 501.E, these buildings are classified as high rise and will therefore be required to have a minimum of 2500 gpm fire flow. See **Table 1** for required building fire flows.

The site has three existing fire hydrants along the southern frontage of the site along Mayo Boulevard, and an additional fire hydrant along the western frontage along Scottsdale Road. Additionally, three private hydrants will be installed along the north and east sides of the project site and an additional public hydrant is proposed along the southern property line at Mayo Boulevard. These hydrants will ensure proper coverage is provided for the site. This layout has been reviewed with the City of Scottsdale Fire Department.

The proposed buildings and structures will be equipped with sprinkler systems approved by the City of Scottsdale Fire Department.

The minimum fire flow requirements per the IFC 2018 for the proposed buildings are shown in Table 1. Table 1 also shows the required building fire flow based upon a maximum fire flow reduction of 50% allowed by the IFC 2018. Per Section B104.3, the building area used for the fire flow calculation is the sum of the three largest successive floors on each building. See **Appendix C** for IFC 2018 fire flow requirements. However, a minimum of 2,500 GPM was utilized in modeling per DSPM 6-1.502 because the buildings proposed have occupied floors over 75 feet classifying them as high-rise buildings.

The IFC evaluates the building construction type, occupancy descriptions, and square footage to set minimum fire flow requirements. The proposed buildings are categorized as Construction Type I-A in the garage through the first floor and Type 1-B through the second floor and above.

Table 1: Required Building Fire Flows

Building	Building Construction Type	Building Area (sf)	Required Fire Flow per IFC 2018 (gpm)	Reduction	Minimum Required Fire Flow with Reduction (gpm)*	Building Heights
Building 1	I-A	114,384	3,750	50%	2,500	133'-0"
Building 2	I-A	107,004	3,500	50%	2,500	133'-0"
Building 3	I-A	110,304	3,500	50%	2,500	123'-0"
Building 4	I-A	108,129	3,500	50%	2,500	123'-0"
Building 5	I-A	99,144	3,500	50%	2,500	123'-0"
Building 6	I-A	100,284	3,500	50%	2,500	133'-0"
Commercial/Retail	I-A	11,515	1,500		1,500	N/A
Office Space	I-A	17,935	1,500		1,500	N/A

2.5 WATER DEMANDS

According to the guidelines provided in Figure 6-1.2 of The City of Scottsdale Design Standards and Policies Manual, the proposed development will add the following demands to the existing water system for, Average Daily Flow (ADF), Maximum Daily Demand (MDD), and Peak Hour Demand (PHD):

Per the City of Scottsdale Design Standard and Policies Manual, the Max Daily Demand is produced by adding a 2.0 peaking factor to the Average Daily Flow. The Peak Hour Demand is produced by adding a 3.5 peaking factor to the Average Daily Flow. A peaking factor of 6 was used for the restaurant demands per DSPM 6-1.404. B.3. See **Table 2** below with the resulting demands for each scenario.

Demands for the vertical planter systems, water features/pools and landscape are also provided in **Table 2** below.

Please note that the proposed building cooling system does not utilize water and therefore does not generate a water demand. Refer to **Appendix D** for the WaterCad Model layout and data analysis reports.

Table 2: Domestic Water Demands

Building	Dwelling Units	ADD (gpm/du)	ADF (gpm)	MDD (gpm)	PHD (gpm)
Building 1	278	0.27	75.06	150.12	262.71
Building 2	238	0.27	64.26	128.52	224.91
Building 3	209	0.27	56.43	112.86	197.51
Building 4	211	0.27	56.97	113.94	199.40
Building 5	209	0.27	56.43	112.86	197.51
Building 6	245	0.27	66.15	132.30	231.53
Restaurant	11,515 SF	0.00181/SF	20.84	41.68	125.04
Office Space	17,935 SF	0.000834/SF	14.96	29.92	52.35
Vertical Planter Boxes*	24,833 LF	150 gal/lf/yr	7.09x4=28.36	28.36	28.36
Roof Top Pools/Water Features**	20,268 SF	1"/day evaporation	1.16	1.16	1.16
Ground Level Landscape***	229,600 SF	2.2 gal/mo./SF	11.53x4=46.12	46.12	46.12
Total			486.74	897.84	1,566.60

Include makeup water due to backwashing pools/spas. DSPM Figure 6-1.2 Note 2.

*Vertical Planter Boxes and Ground Level Landscape water use demand is based on actual meter readings at other Arizona Optima projects. Linear footage and location of the Vertical planter boxes is shown in **Appendix F**. Irrigation will occur over a 6-hour period on a daily basis. The irrigation demand calculation takes into account the peaking factor of four, this is why the value remains constant with the ADF, MDD, and PHF values.

Calculations for the pool/water feature demand has been estimated using the known cumulative water surface area and a 1" daily evaporation rate that will need to be replenished with the domestic line. The demand for this element encompasses the pools, cold plunges, and spas which will only be filled initially and not on a regular basis. A breakdown of the different amenities areas per building is provided in **Appendix G. For the demands, these numbers are split up equally between each of the three domestic pumps as the differences in water feature areas for each group of building is negligible.

***Landscape area excludes building area, hardscape, and artificial turf areas. This is also based on a 6-hour watering schedule similar to the Vertical Planter System. For the demands, these numbers are split up equally between each of the three domestic pumps as the differences in landscape areas for each group of building is negligible.

The domestic demands were split up into three nodes. Each of the nodes represents one of the domestic pumps that is provided for each pair of buildings (Buildings 2 & 3, Buildings 1 & 6, and Buildings 4 & 5). The demand for the pools, spas, cold plunges, vertical landscaping, etc were all broken up into equal thirds. Refer to **Table 3 and 4** for the breakdown in demands for each building group.

Per the Scottdale DSPM 6-1.202, four water scenarios are required for the Final Basis of Design Report which this site was stipulated to per the city comments. However, the fourth scenario (Minimum domestic service pressure at the worst-case demand node under normal daily operating flow conditions) was not performed. Per a discussion with the City of Scottsdale, this scenario will not be completed because this site will be providing domestic pumps to provide the required flows and pressures at the worst-case demand nodes and the pumps will be designed during the final design phase of the project. Therefore, the other three scenarios were completed providing the required flows and pressures to each of the domestic pumps. From that point forward, the pumps and the internal routing of the domestic water systems will take over. The three scenarios that were preformed are listed below.

1. Model Scenario 1 (6-.202. G.6.a): Average Daily Demand – Per the City of Scottsdale Design Standards and Policies Manual. The demand and resulting pressure for each group of buildings, office space, restaurant space, and irrigation is shown in **Table 3**. The demand for each building group includes the Average Daily Flow for both buildings, 1/3 of the total rooftop water feature demand, and 1/3 of the total vertical planter box demand. The demand for the office and restaurant spaces are each split to their own nodes. The demand for the irrigation is split in half between each meter.

2. Model Scenario 2 (6-.202. G.6.b): Peak Hour – Per the City of Scottsdale Design Standards and Policies Manual. The demand and resulting pressure for each group of buildings, office space, restaurant space, and irrigation is shown in **Table 3**. The demand for each building group includes the Peak Hour Flow for both buildings, 1/3 of the total rooftop water feature demand, and 1/3 of the total vertical planter box demand. The demand for the office and restaurant spaces are each split to their own nodes. The demand for the irrigation is split in half between each meter.

3. Model Scenario 3 (6-.202. G.6.c): Max Day + Fire Demand – Per the City of Scottsdale Design Standards and Policies Manual, a minimum pressure of 30 psi must be maintained at the worst-

case hydrant and a minimum of 15 psi must be maintained at the worst-case location in the domestic system during the Max Day Demand with Worst Case Fire Flow. The three domestic pumps, the irrigation connection points, the restaurant connection point, and the office space connection points are all checked as the "worst case location" to ensure pressure within the whole system is maintained. This analysis was performed for each of the three proposed private hydrants and one proposed public hydrant.

See **Appendix B** for the Fire Flow Test Results used to model the WaterCAD system and **Appendix D** for the WaterCAD System Layout Exhibit and the detailed reports of the full results of each of the scenarios described above. A summary of the results of the three water scenarios are shown below:

Table 3 below shows the resulting pressures that are at each domestic building pump, irrigation connection point, office connection point, and restaurant connection point for both the Average Daily Demand and Peak Hour Demand (Scenarios 1 and 2 described above). These pressures are compared to the required pressures in the City of Scottsdale Design Standard and Policies Manual.

The breakdown of the demand summations can be found in **Appendix E**. This appendix can be used to help further break down the calculation of the combined demands in Tables 3 and 4 if the explanation in the scenario description above is not clear enough.

Table 3: Resulting Pressure for Combined Building Demand Nodes

Scenarios	Scenario 1 – ADF (gpm)		Scenario 2 – PHD (gpm)	
Demand	Demand	Resulting Pressure	Demand	Resulting Pressure
Building 1&6	151.05	64	504.08	45
Building 2&3	130.53	56	432.26	47
Building 4&5	123.24	61	406.75	45
Irrigation 1	23.06	55	23.06	50
Irrigation 2	23.06	54	23.06	50
Commercial (Office)	14.96	60	52.35	37
Commercial (Restaurant)	20.84	60	125.04	27

Table 4 below shows the resulting pressures for each domestic building pump, irrigation connection point, office connection point, and restaurant connection point for the Maximum Daily Demand and Fire Flow for each of the four proposed hydrants (Scenario 3 described above). These pressures are compared to the required pressures in the City of Scottsdale Design Standard and Policies Manual.

Update tables to include water demand from backwashing pools. DSPM Figure 6-1.2 Note 2.

The breakdown of the demand summations can be found in **Appendix E**. This appendix can be used to help further break down the calculation of the combined demands in **Tables 3 and 4** if the explanation in the Scenario description above is not clear enough.

Table 4: Scenario 3 - Max Day Demand with Worst Case Fire Flow

	Buildings 1 & 6			Building 2 & 3		
Scenario	Max Day Demand	Required Pressure	Provided Pressure	Max Day Demand	Required Pressure	Provided Pressure
Fire Flow at H-7	292.26	15	31	251.22	15	32
Fire Flow at H-8	292.26	15	31	251.22	15	32
Fire Flow at H-9	292.26	15	31	251.22	15	32
Fire Flow at H-10	292.26	15	33	251.22	15	32

	Buildings 4 & 5			Fire Flow to Hydrant		
Scenario	Max Day Demand	Required Pressure	Provided Pressure	Fire Flow Demand	Required Pressure	Provided Pressure
Fire Flow at H-7	236.64	15	31	2500	30	31
Fire Flow at H-8	236.64	15	31	2500	30	30
Fire Flow at H-9	236.64	15	31	2500	30	33
Fire Flow at H-10	236.64	15	33	2500	30	37

	Irrigation 1			Irrigation 2		
Scenario	Max Day Demand	Required Pressure	Provided Pressure	Max Day Demand	Required Pressure	Provided Pressure
Fire Flow at H-7	23.06	15	33	23.06	15	33
Fire Flow at H-8	23.06	15	33	23.06	15	33
Fire Flow at H-9	23.06	15	33	23.06	15	33
Fire Flow at H-10	23.06	15	33	23.06	15	33

Update tables to include water demand from backwashing pools. DSPM Figure 6-1.2 Note 2.

	Commercial (Office)			Commercial (Restaurant)		
Scenario	Max Day Demand	Required Pressure	Provided Pressure	Max Day Demand	Required Pressure	Provided Pressure
Fire Flow at H-7	29.92	15	33	41.68	15	31
Fire Flow at H-8	29.92	15	33	41.68	15	31
Fire Flow at H-9	29.92	15	32	41.68	15	31
Fire Flow at H-10	29.92	15	35	41.68	15	34

3.0 CONCLUSION

The proposed and existing on-site water system as outlined by this analysis appears adequate to meet the required fire flow demand and peak domestic water demand for the proposed Optima McDowell Mountain Village development per the requirements of the Scottsdale Design Standards and Policies Manual. All Fire and domestic pump design will be provided with final engineering/building plans. Refer to **Appendix D** for the results of the water system analysis.

4.0 REFERENCES

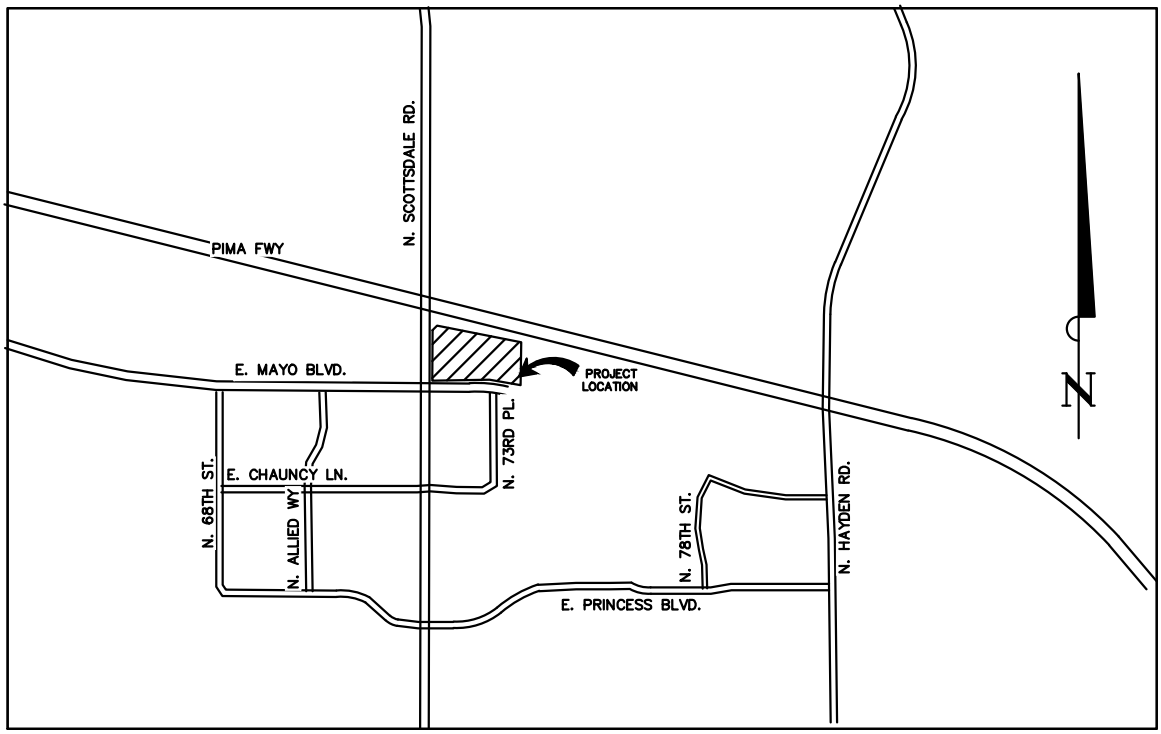
1. City of Scottsdale, *Design Standards and Policies Manual.* 2018.

2. International Code Council, *2018 International Fire* Code. May 2018

Update table to include water demand from backwashing pools. DSPM Figure 6-1.2 Note 2.

Appendices

Appendix A: Vicinity Map



VICINITY MAP

N.T.S

Appendix B: Flow Test

Flow Test Summary

Project Name:	EJFT 22276 - 101 Scottsdale
Project Address:	N Scottsdale Rd & E Mayo Blvd, Scottsdale, AZ 85255
Date of Flow Test:	2022-06-10
Time of Flow Test:	6:35 AM
Data Reliable Until:	2022-12-10
Conducted By:	Eder Cueva & Caleb Crabbs (EJ Flow Tests) 602.999.7637
Witnessed By:	Sonny Schreiner (City of Scottsdale) 602.819.7718
City Forces Contacted:	City of Scottsdale (602.819.7718)
Permit Number:	C69081

Note Static pressure on the flow hydrant was 64 PSI.

Raw Flow Test Data

Static Pressure:	64.0 PSI
Residual Pressure:	57.0 PSI
Flowing GPM:	2,110
GPM @ 20 PSI:	5,694

Hydrant F_1

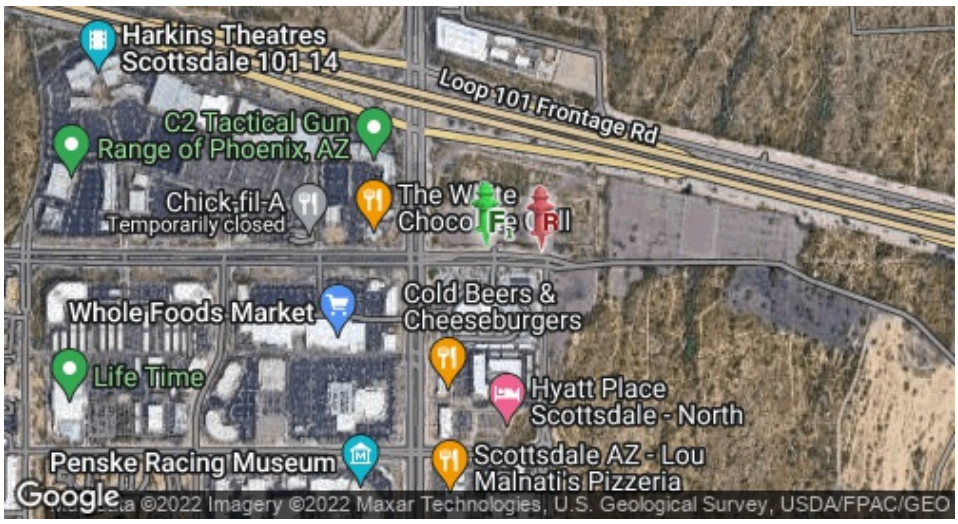
Pitot Pressure (1):	35	PSI
Coefficient of Discharge (1):	0.9	
Hydrant Orifice Diameter (1):	4	inches

Additional Coefficient 0.83 on orifice #1

Data with a 10 % Safety Factor

Static Pressure:	57.6 PSI	
Residual Pressure:	~~50.6~~ PSI	57*0.9=51.3
Flowing GPM:	2,110	1899
GPM @ 20 PSI:	5,230	4666

Values reduced per DSPM Section 6-1.405.B



Static-Residual Hydrant

Flow Hydrant

Distance Between F_1 and R
369 ft (measured linearly)

Static-Residual Elevation
1592 ft (above sea level)

Flow Hydrant (F_1) Elevation
1590 ft (above sea level)

Elevation & distance values are approximate

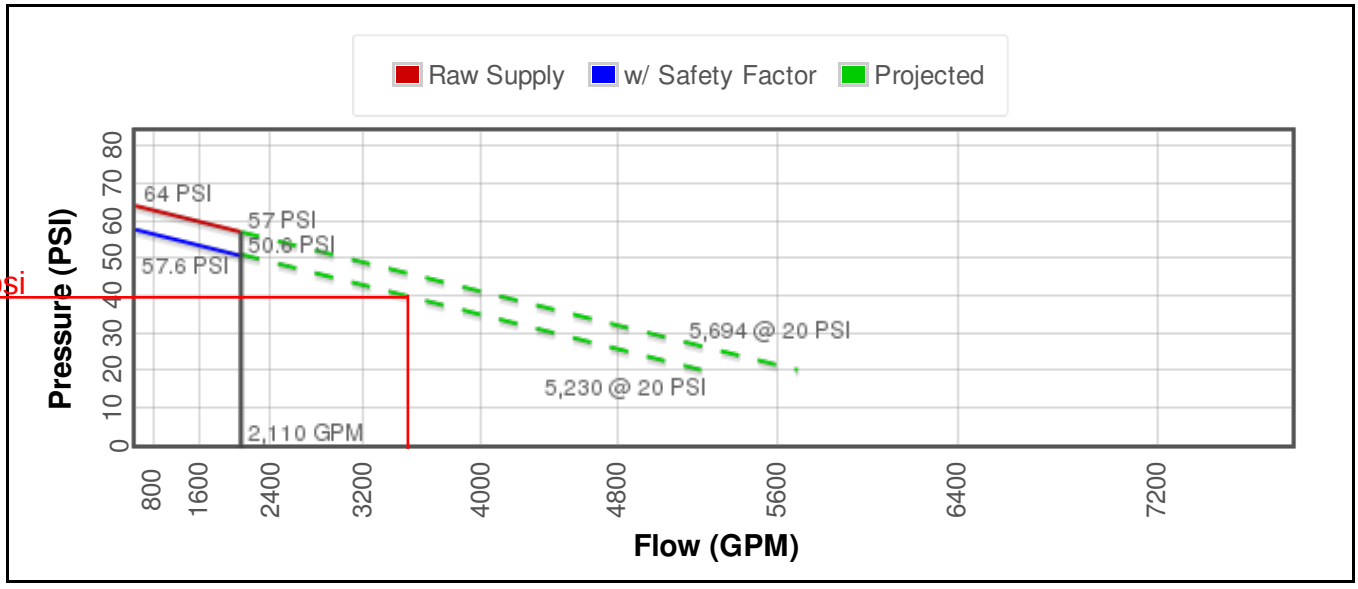
Flow Test Summary

Static-Residual Hydrant

Flow Hydrant (only hydrant F1 shown for clarity)

Approximate Project Site

Water Supply Curve $N^{1.85}$ Graph



2500+897.84=3398GPM

Appendix C: IFC Fire Flow Requirements

APPENDIX B

FIRE-FLOW REQUIREMENTS FOR BUILDINGS

User note:

About this appendix: *Appendix B provides a tool for the use of jurisdictions in establishing a policy for determining fire-flow requirements in accordance with Section 507.3. The determination of required fire flow is not an exact science, but having some level of information provides a consistent way of choosing the appropriate fire flow for buildings throughout a jurisdiction. The primary tool used in this appendix is a table that presents fire flow based on construction type and building area based on the correlation of the Insurance Services Office (ISO) method and the construction types used in the* International Building Code

SECTION B101
GENERAL

B101.1 Scope. The procedure for determining fire-flow requirements for buildings or portions of buildings hereafter constructed shall be in accordance with this appendix. This appendix does not apply to structures other than buildings.

SECTION B102
DEFINITIONS

B102.1 Definitions. For the purpose of this appendix, certain terms are defined as follows:

FIRE-FLOW. The flow rate of a water supply, measured at 20 pounds per square inch (psi) (138 kPa) residual pressure, that is available for firefighting.

FIRE-FLOW CALCULATION AREA. The floor area, in square feet (m^2), used to determine the required fire flow.

SECTION B103
MODIFICATIONS

B103.1 Decreases. The *fire code official* is authorized to reduce the fire-flow requirements for isolated buildings or a group of buildings in rural areas or small communities where the development of full fire-flow requirements is impractical.

B103.2 Increases. The *fire code official* is authorized to increase the fire-flow requirements where conditions indicate an unusual susceptibility to group fires or conflagrations. An increase shall be not more than twice that required for the building under consideration.

B103.3 Areas without water supply systems. For information regarding water supplies for fire-fighting purposes in rural and suburban areas in which adequate and reliable water supply systems do not exist, the *fire code official* is authorized to utilize NFPA 1142 or the *International Wildland-Urban Interface Code.*

B103.4 Outside storage use. The fire code is authorized to require a fire-flow of no less than 2,000 gpm (7571 L/min) where combustible materials, *hazardous materials* and other items are stored or used outside.

SECTION B104
FIRE-FLOW CALCULATION AREA

B104.1 General. The fire-flow calculation area shall be the total floor area of all floor levels within the *exterior walls*, and under the horizontal projections of the roof of a building,

B104.2 Area separation. Portions of buildings that are separated by *fire walls* without openings, constructed in accordance with the *International Building Code*, are allowed to be considered as separate fire-flow calculation areas.

B104.3 Type IA and Type IB construction. The fire-flow calculation area of buildings constructed of Type IA and Type IB construction shall be the area of the three largest successive floors.

Exception: Fire-flow calculation area for open parking garages shall be determined by the area of the largest floor.

SECTION B105
FIRE-FLOW REQUIREMENTS FOR BUILDINGS

B105.1 One- and two-family dwellings, Group R-3 and R-4 buildings and townhouses. The minimum *fire-flow* and flow duration requirements for one- and two-family *dwellings*, Group R-3 and R-4 buildings and *townhouses* shall be as specified in Tables B105.1(1) and B105.1(2).

B105.2 Buildings other than one- and two-family dwellings, Group R-3 and R-4 buildings and townhouses. The minimum *fire-flow* and flow duration for buildings other than one- and two-family *dwellings*, Group R-3 and R-4 buildings and *townhouses* shall be as specified in Tables B105.2 and B105.1(2).

Exception: A reduction in required fire-flow of up to 50 percent, as *approved*, is allowed when the building is provided with an *approved* NFPA 13 *automatic sprinkler system* installed in accordance with Section 903.3.1.1. The resulting fire-flow shall not be less than 1,500 gallons per minute (5678 L/min) for the prescribed duration as specified in Table B105.1. No reductions are allowed for NFPA 13D or 13R systems other than Group R-3 single-family homes.

B105.3 Water supply for buildings equipped with an automatic sprinkler system. For buildings equipped with an *approved automatic sprinkler system*, the water supply shall be capable of providing the greater of:

1. The *automatic sprinkler system* demand, including hose stream allowance.
2. The required *fire flow*.

TABLE B105.1(1)
REQUIRED FIRE FLOW FOR ONE- AND TWO-FAMILY DWELLINGS, GROUP R-3 AND R-4 BUILDINGS AND TOWNHOUSES

FIRE-FLOW CALCULATION AREA	AUTOMATIC SPRINKLER SYSTEM (Design Standard)	MINIMUM FIRE FLOW (gallons per minute)	FLOW DURATION (hours)
0–3,600	No automatic sprinkler system	1,000	1
3,601 and greater	No automatic sprinkler system	Value in Table B105.1(2)	Duration in Table B105.1(2) at the required fire-flow rate
0 - 3,600	Section 903.3.1.3 of the *International Fire Code* or Section P2904 of the *International Residential Code*	500	B105.1(2)
3,601 and greater	Section 903.3.1.3 of the *International Fire Code* or Section P2904 of the *International Residential Code*	½ value in Table B105.1(2)	Duration in Table B105.1(2)

TABLE B105.1(2)
MINIMUM REQUIRED FIRE-FLOW AND FLOW DURATION FOR BUILDINGS

FIRE-FLOW CALCULATION AREA (square feet)					FIRE-FLOW (gallons per minute)[b]	FLOW DURATION (hours)
Type IA and IB[a]	Type IIA and IIIA[a]	Type IV and V-A[a]	Type IIB and IIIB[a]	Type V-B[a]		
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^2, 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*.

b. Measured at 20 psi residual pressure.

TABLE B105.2
REQUIRED FIRE FLOW FOR BUILDINGS OTHER THAN ONE- AND TWO-FAMILY DWELLINGS, GROUP R-3 AND R-4 BUILDINGS AND TOWNHOUSES

AUTOMATIC SPRINKLER SYSTEM (Design Standard)	MINIMUM FIRE FLOW (gallons per minute)	FLOW DURATION (hours)
No automatic sprinkler system	Value in Table B105.1(2)	Duration in Table B105.1(2)
Section 903.3.1.1 of the *International Fire Code*	25% of the value in Table B105.1(2)[a]	Duration in Table B105.1(2) at the reduced flow rate
Section 903.3.1.2 of the *International Fire Code*	25% of the value in Table B105.1(2)[b]	Duration in Table B105.1(2) at the reduced flow rate

For SI: 1 gallon per minute = 3.785 L/m.
a. The reduced fire flow shall be not less than 1,000 gallons per minute.
b. The reduced fire flow shall be not less than 1,500 gallons per minute.

SECTION B106
REFERENCED STANDARDS

ICC	IBC—18	International Building Code	B104.2
ICC	IWUIC—18	International Wildland-Urban Interface Code	B103.3
ICC	IRC—18	International Residential Code	Table 105.1(1)
NFPA	1142—17	Standard on Water Supplies for Suburban and Rural Fire Fighting	

B106.1 Additional requirements. See Chapter 5 of this code for additional requirements.

Appendix D: Layout Exhibit and WaterCAD Model Reports

Per DSPM 6-1.405, service line velocities more than 7.5 ft/s are not allowed.

PROPOSED BUILDING 1 FF = 1,596 FT

PROPOSED BUILDING 2 FF = 1,596 FT

PROPOSED BUILDING 3 FF = 1,596 FT

PROPOSED BUILDING 4 FF = 1,596 FT

PROPOSED BUILDING 5 FF = 1,596 FT

PROPOSED BUILDING 6 FF = 1,596 FT

LABELS BELOW NODE J-8 LINE ARE ONLY SHOWN FOR MODELING PURPOSES

Kimley»Horn

Optima McDowell Mountain Village

WaterCAD Exhibit

September 2, 2022

0 50 100 200

NORTH

FlexTable: Pipe Table

Active Scenario: Aveage Daily Demand

Label	Length (Scaled) (ft)	Diameter (in)	Flow (gpm)	Velocity (ft/s)	Headloss (ft)
P-6	42	6.0	0	0.00	0.00
P-7	38	6.0	0	0.00	0.00
P-8	328	16.0	-487	0.78	0.05
P-9	39	6.0	0	0.00	0.00
P-10	164	16.0	0	0.00	0.00
P-11	34	6.0	0	0.00	0.00
P-12	48	16.0	0	0.00	0.00
P-13	39	6.0	0	0.00	0.00
P-16	78	16.0	-5,350	8.54	1.48
P-22	24	6.0	0	0.00	0.00
P-23	50	12.0	4,831	13.71	5.49
P-25	121	12.0	517	1.47	1.28
P-26	813	12.0	288	0.82	1.28
P-28	24	5,000.0	-487	0.00	0.00
P-29	33	5,000.0	-487	0.00	0.00
P-33	20	6.0	151	1.71	0.04
P-34	14	6.0	123	1.40	0.02
P-35	27	6.0	131	1.48	0.05
P-36	319	8.0	78	0.50	3.33
P-37	1,115	8.0	209	1.33	11.53
P-39	871	8.0	332	2.12	8.40
P-40	3	12.0	2,357	6.69	0.06
P-42	3	12.0	537	1.52	0.10
P-43	3	12.0	-4,295	12.18	0.06
P-45	100	8.0	483	3.08	0.79
P-47	99	12.0	4,831	13.71	10.90
P-48	12	12.0	4,831	13.71	1.36
P-49	100	4.0	36	0.91	0.11
P-50	75	2.0	-21	2.13	0.90
P-51	18	2.0	15	1.53	0.12
P-52	48	2.0	23	2.36	0.70
P-53	8	8.0	78	0.50	0.08
P-54	48	8.0	-78	0.50	0.51
P-58	7	2.0	23	2.35	0.10
P-59	596	12.0	517	1.47	6.30
P-60	651	8.0	483	3.08	5.17
P-62	151	16.0	0	0.00	0.00
P-63	162	16.0	-5,350	8.54	3.10
P-64	12	12.0	-1,020	2.89	0.23
P-65	246	16.0	-5,350	8.54	4.70
P-66	118	16.0	-5,350	8.54	2.24
P-67	19	12.0	-2,311	6.56	0.39
P-68	19	12.0	2,553	7.24	0.52
P-69	15	16.0	3,039	4.85	0.08
P-70	12	16.0	-4,330	6.91	0.05
P-71	89	6.0	0	0.00	0.00
P-72	12	12.0	4,330	12.28	0.21

Per DSPM 6-1.405, service line velocities more than 7.5 ft/s are not allowed.

FlexTable: Pipe Table

Active Scenario: Aveage Daily Demand

Label	Length (Scaled) (ft)	Diameter (in)	Flow (gpm)	Velocity (ft/s)	Headloss (ft)
P-73	12	4.0	36	0.91	0.01
P-75	3	12.0	2,279	6.46	0.10
P-76	155	16.0	-487	0.78	0.03
P-77	3	12.0	-2,334	6.62	0.06
P-78	48	2.0	23	2.36	0.70
P-79	7	2.0	23	2.35	0.10
P-80	172	4.0	36	0.91	0.19
P-81	487	12.0	-229	0.65	2.24
P-81	11	6.0	483	5.48	0.37
P-82	311	12.0	-4,314	12.24	17.44
P-83	7	12.0	-4,831	13.71	0.76
P-84	48	12.0	-4,831	13.71	5.30
P-85	457	12.0	517	1.47	4.83
P-86	614	12.0	288	0.82	0.96
P-87	264	12.0	517	1.47	2.79
P-88	17	12.0	4,831	13.71	1.91

FlexTable: Junction Table

Active Scenario: Aveage Daily Demand

Label	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)	Elevation (ft)
J-2	0	54	1,718.72	1,593.00
J-3	0	67	1,748.94	1,593.00
J-5	0	58	1,727.74	1,593.00
J-6	0	58	1,727.74	1,593.00
J-7	0	58	1,727.74	1,593.00
J-8	0	58	1,727.79	1,593.00
J-9	0	58	1,727.79	1,593.00
J-10	0	58	1,727.79	1,593.00
J-13	0	63	1,739.37	1,593.00
J-15	0	61	1,734.62	1,593.00
J-16	0	61	1,733.14	1,593.00
J-20	0	57	1,724.10	1,593.00
J-25	0	67	1,747.15	1,593.00
J-26	0	56	1,722.05	1,593.00
J-27	131	56	1,722.01	1,593.00
J-28	0	61	1,733.59	1,593.00
J-29	123	61	1,733.56	1,593.00
J-30	0	64	1,741.98	1,593.00
J-31	151	64	1,741.94	1,593.00
J-35	0	63	1,739.59	1,593.00
J-36	0	63	1,739.64	1,593.00
J-37	0	63	1,739.54	1,593.00
J-38	0	58	1,727.35	1,593.00
J-39	0	58	1,727.29	1,593.00
J-40	0	58	1,727.19	1,593.00
J-41	0	60	1,731.89	1,593.00
J-42	15	60	1,731.77	1,593.00
J-43	21	60	1,730.98	1,593.00
J-44	23	54	1,718.93	1,593.00
J-50	0	63	1,739.37	1,593.00
J-51	0	63	1,739.37	1,593.00
J-52	0	63	1,739.32	1,593.00
J-53	0	58	1,727.80	1,593.00
J-54	0	58	1,727.71	1,593.00
J-55	0	58	1,727.41	1,593.00
J-56	23	55	1,718.99	1,593.00
J-57	0	67	1,747.03	1,593.00
J-59	0	59	1,729.59	1,593.00
J-60	0	60	1,732.08	1,593.00
J-61	0	64	1,742.00	1,593.00
J-62	0	65	1,744.24	1,593.00

FlexTable: Hydrant Table

Active Scenario: Aveage Daily Demand

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
H-1	1,592.00	0	1,739.37	64
H-2	1,590.00	0	1,727.74	60
H-3	1,592.00	0	1,727.79	59
H-4	1,593.00	0	1,727.79	58
H-7	1,596.00	0	1,740.72	63
H-8	1,596.00	0	1,742.96	64
H-9	1,592.36	0	1,734.42	61
H-10	1,593.70	0	1,730.04	59

FlexTable: Pump Table

Active Scenario: Aveage Daily Demand

Label	Elevation (ft)	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpm)	Pump Head (ft)
PMP-3	1,596.00	1,596.00	1,727.79	487	131.79

FlexTable: GPV Table

Active Scenario: Aveage Daily Demand

Label	Elevation (ft)	Diameter (Valve) (in)	General Purpose Valve Headloss Curve	Flow (gpm)	Headloss (ft)
GPV-3	1,594.00	8.0	8" FEBCO	-78	9.15
GPV-7	1,591.51	12.0	12" 2000 SS Watts	4,831	27.81
GPV-9	1,594.00	2.0	2" FEBCO	23	7.62
GPV-11	1,591.50	2.0	2" FEBCO	36	7.38
GPV-12	1,594.00	2.0	2" FEBCO	-23	7.62
GPV-6	1,594.00	12.0	12" 2000 SS Watts	-4,831	27.81
GPV-8	0.00	8.0	8" FEBCO	483	8.77

FlexTable: Pipe Table

Active Scenario: Peak Hour Demand

Label	Length (Scaled) (ft)	Diameter (in)	Flow (gpm)	Velocity (ft/s)	Headloss (ft)
P-6	42	6.0	0	0.00	0.00
P-7	38	6.0	0	0.00	0.00
P-8	328	16.0	-1,567	2.50	0.47
P-9	39	6.0	0	0.00	0.00
P-10	164	16.0	0	0.00	0.00
P-11	34	6.0	0	0.00	0.00
P-12	48	16.0	0	0.00	0.00
P-13	39	6.0	0	0.00	0.00
P-16	78	16.0	-17,407	27.78	1.01
P-22	24	6.0	0	0.00	0.00
P-23	50	12.0	16,794	47.64	0.96
P-25	121	12.0	1,764	5.00	0.79
P-26	813	12.0	623	1.77	0.79
P-28	24	5,000.0	-1,567	0.00	0.00
P-29	33	5,000.0	-1,567	0.00	0.00
P-33	20	6.0	504	5.72	0.42
P-34	14	6.0	407	4.62	0.20
P-35	27	6.0	432	4.90	0.42
P-36	319	8.0	-908	5.79	4.70
P-37	1,115	8.0	-476	3.04	4.47
P-39	871	8.0	-69	0.44	0.60
P-40	3	12.0	11,028	31.28	0.06
P-42	3	12.0	13,106	37.18	0.14
P-43	3	12.0	-3,689	10.46	0.03
P-45	100	8.0	435	2.78	0.34
P-47	99	12.0	16,794	47.64	1.91
P-48	12	12.0	16,794	47.64	0.24
P-49	100	4.0	177	4.53	2.16
P-50	75	2.0	-125	12.77	24.92
P-51	18	2.0	52	5.35	1.18
P-52	48	2.0	23	2.36	0.70
P-53	8	8.0	-908	5.79	0.11
P-54	48	8.0	908	5.79	0.71
P-58	7	2.0	23	2.35	0.10
P-59	596	12.0	1,764	5.00	3.87
P-60	651	8.0	435	2.78	2.18
P-62	151	16.0	0	0.00	0.00
P-63	162	16.0	-17,407	27.78	2.12
P-64	12	12.0	-13,541	38.41	0.06
P-65	246	16.0	-17,407	27.78	3.21
P-66	118	16.0	-17,407	27.78	1.53
P-67	19	12.0	-10,981	31.15	0.33
P-68	19	12.0	4,859	13.78	0.57
P-69	15	16.0	6,425	10.25	0.04
P-70	12	16.0	-3,866	6.17	0.03
P-71	89	6.0	0	0.00	0.00
P-72	12	12.0	3,866	10.97	0.14

It is difficult to read the network diagram for the pipes on this table. However, pipe velocities in this table are extremely high. Based on values in this BOD, the PHD is 1566 gpm. Update table.

FlexTable: Pipe Table

Active Scenario: Peak Hour Demand

Label	Length (Scaled) (ft)	Diameter (in)	Flow (gpm)	Velocity (ft/s)	Headloss (ft)
P-73	12	4.0	177	4.53	0.26
P-75	3	12.0	11,935	33.86	0.17
P-76	155	16.0	-1,567	2.50	0.22
P-77	3	12.0	-11,005	31.22	0.05
P-78	48	2.0	23	2.36	0.70
P-79	7	2.0	23	2.35	0.10
P-80	172	4.0	177	4.53	3.74
P-81	487	12.0	-1,141	3.24	1.39
P-81	11	6.0	435	4.94	0.16
P-82	311	12.0	-15,030	42.64	10.72
P-83	7	12.0	-16,794	47.64	0.13
P-84	48	12.0	-16,794	47.64	0.93
P-85	457	12.0	1,764	5.00	2.96
P-86	614	12.0	623	1.77	0.60
P-87	264	12.0	1,764	5.00	1.71
P-88	17	12.0	16,794	47.64	0.33

FlexTable: Junction Table

Active Scenario: Peak Hour Demand

Label	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)	Elevation (ft)
J-2	0	49	1,706.56	1,593.00
J-3	0	49	1,706.76	1,593.00
J-5	0	54	1,717.31	1,593.00
J-6	0	54	1,717.31	1,593.00
J-7	0	54	1,717.31	1,593.00
J-8	0	54	1,717.78	1,593.00
J-9	0	54	1,717.78	1,593.00
J-10	0	54	1,717.78	1,593.00
J-13	0	50	1,709.13	1,593.00
J-15	0	52	1,712.38	1,593.00
J-16	0	52	1,713.39	1,593.00
J-20	0	54	1,718.78	1,593.00
J-25	0	46	1,698.97	1,593.00
J-26	0	47	1,701.86	1,593.00
J-27	432	47	1,701.44	1,593.00
J-28	0	45	1,697.39	1,593.00
J-29	407	45	1,697.20	1,593.00
J-30	0	45	1,696.79	1,593.00
J-31	504	45	1,696.37	1,593.00
J-35	0	50	1,709.00	1,593.00
J-36	0	50	1,708.97	1,593.00
J-37	0	50	1,709.11	1,593.00
J-38	0	54	1,717.43	1,593.00
J-39	0	54	1,717.49	1,593.00
J-40	0	54	1,717.65	1,593.00
J-41	0	38	1,680.84	1,593.00
J-42	52	37	1,679.66	1,593.00
J-43	125	27	1,655.92	1,593.00
J-44	23	50	1,709.01	1,593.00
J-50	0	50	1,709.13	1,593.00
J-51	0	50	1,709.13	1,593.00
J-52	0	50	1,709.17	1,593.00
J-53	0	54	1,717.04	1,593.00
J-54	0	54	1,717.08	1,593.00
J-55	0	54	1,717.37	1,593.00
J-56	23	50	1,708.96	1,593.00
J-57	0	49	1,707.09	1,593.00
J-59	0	54	1,717.82	1,593.00
J-60	0	40	1,684.58	1,593.00
J-61	0	51	1,710.20	1,593.00
J-62	0	50	1,708.81	1,593.00

FlexTable: Hydrant Table

Active Scenario: Peak Hour Demand

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
H-1	1,592.00	0	1,709.13	51
H-2	1,590.00	0	1,717.31	55
H-3	1,592.00	0	1,717.78	54
H-4	1,593.00	0	1,717.78	54
H-7	1,596.00	0	1,710.98	50
H-8	1,596.00	0	1,709.60	49
H-9	1,592.36	0	1,714.85	53
H-10	1,593.70	0	1,715.51	53

FlexTable: Pump Table

Active Scenario: Peak Hour Demand

Label	Elevation (ft)	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpm)	Pump Head (ft)
PMP-3	1,596.00	1,596.00	1,717.78	1,567	121.78

FlexTable: GPV Table

Active Scenario: Peak Hour Demand

Label	Elevation (ft)	Diameter (Valve) (in)	General Purpose Valve Headloss Curve	Flow (gpm)	Headloss (ft)
GPV-3	1,594.00	8.0	8" FEBCO	908	10.10
GPV-7	1,591.51	12.0	12" 2000 SS Watts	16,794	11.95
GPV-9	1,594.00	2.0	2" FEBCO	23	7.62
GPV-11	1,591.50	2.0	2" FEBCO	177	22.00
GPV-12	1,594.00	2.0	2" FEBCO	-23	7.62
GPV-6	1,594.00	12.0	12" 2000 SS Watts	-16,794	11.95
GPV-8	0.00	8.0	8" FEBCO	435	9.65

FlexTable: Pipe Table

Active Scenario: Maximum Daily Demand + Fire FH7

Label	Length (Scaled) (ft)	Diameter (in)	Flow (gpm)	Velocity (ft/s)	Headloss (ft)
P-6	42	6.0	0	0.00	0.00
P-7	38	6.0	0	0.00	0.00
P-8	328	16.0	-3,398	5.42	1.97
P-9	39	6.0	0	0.00	0.00
P-10	164	16.0	0	0.00	0.00
P-11	34	6.0	0	0.00	0.00
P-12	48	16.0	0	0.00	0.00
P-13	39	6.0	0	0.00	0.00
P-16	78	16.0	-1,512	2.41	0.10
P-22	24	6.0	0	0.00	0.00
P-23	50	12.0	1,110	3.15	0.15
P-25	121	12.0	-1,438	4.08	0.60
P-26	813	12.0	-516	1.46	0.61
P-28	24	5,000.0	-3,398	0.00	0.00
P-29	33	5,000.0	-3,398	0.00	0.00
P-33	20	6.0	292	3.32	0.15
P-34	14	6.0	237	2.69	0.07
P-35	27	6.0	251	2.85	0.16
P-36	319	8.0	-450	2.88	1.33
P-37	1,115	8.0	-199	1.27	1.03
P-39	871	8.0	37	0.24	0.04
P-40	3	12.0	-615	1.74	0.00
P-42	3	12.0	482	1.37	0.00
P-43	3	12.0	-628	1.78	0.00
P-45	100	8.0	330	2.10	0.23
P-47	99	12.0	1,110	3.15	0.31
P-48	12	12.0	1,110	3.15	0.04
P-49	100	4.0	72	1.83	0.40
P-50	75	2.0	-42	4.26	3.26
P-51	18	2.0	30	3.06	0.42
P-52	48	2.0	23	2.36	0.70
P-53	8	8.0	-450	2.88	0.03
P-54	48	8.0	450	2.88	0.20
P-58	7	2.0	23	2.35	0.10
P-59	596	12.0	1,062	3.01	1.69
P-60	651	8.0	330	2.10	1.52
P-62	151	16.0	0	0.00	0.00
P-63	162	16.0	-1,512	2.41	0.22
P-64	12	12.0	-812	2.30	0.02
P-65	246	16.0	-1,512	2.41	0.33
P-66	118	16.0	-1,512	2.41	0.16
P-67	19	12.0	661	1.87	0.02
P-68	19	12.0	-1,226	3.48	0.07
P-69	15	16.0	2,172	3.47	0.04
P-70	12	16.0	-700	1.12	0.00
P-71	89	6.0	0	0.00	0.00
P-72	12	12.0	700	1.99	0.02

FlexTable: Pipe Table

Active Scenario: Maximum Daily Demand + Fire FH7

Label	Length (Scaled) (ft)	Diameter (in)	Flow (gpm)	Velocity (ft/s)	Headloss (ft)
P-73	12	4.0	72	1.83	0.05
P-75	3	12.0	-164	0.47	0.00
P-76	155	16.0	-3,398	5.42	0.93
P-77	3	12.0	638	1.81	0.00
P-78	48	2.0	23	2.36	0.70
P-79	7	2.0	23	2.35	0.10
P-80	172	4.0	72	1.83	0.70
P-81	487	12.0	922	2.62	1.06
P-81	11	6.0	330	3.74	0.11
P-82	311	12.0	-49	0.14	0.00
P-83	7	12.0	1,390	3.94	0.03
P-84	48	12.0	1,390	3.94	0.22
P-85	457	12.0	1,062	3.01	1.29
P-86	614	12.0	-516	1.46	0.46
P-87	264	12.0	-1,438	4.08	1.31
P-88	17	12.0	-1,390	3.94	0.08

FlexTable: Junction Table

Active Scenario: Maximum Daily Demand + Fire FH7

Label	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)	Elevation (ft)
J-2	0	33	1,668.19	1,593.00
J-3	0	34	1,670.70	1,593.00
J-5	0	37	1,679.09	1,593.00
J-6	0	37	1,679.09	1,593.00
J-7	0	37	1,679.09	1,593.00
J-8	0	38	1,681.06	1,593.00
J-9	0	38	1,681.06	1,593.00
J-10	0	38	1,681.06	1,593.00
J-13	0	36	1,677.30	1,593.00
J-15	0	37	1,677.64	1,593.00
J-16	0	37	1,677.74	1,593.00
J-20	0	34	1,670.78	1,593.00
J-25	0	32	1,667.40	1,593.00
J-26	0	32	1,666.86	1,593.00
J-27	251	32	1,666.71	1,593.00
J-28	0	32	1,665.84	1,593.00
J-29	237	31	1,665.76	1,593.00
J-30	0	32	1,665.87	1,593.00
J-31	292	31	1,665.72	1,593.00
J-35	0	36	1,677.29	1,593.00
J-36	0	36	1,677.28	1,593.00
J-37	0	36	1,677.28	1,593.00
J-38	0	37	1,678.09	1,593.00
J-39	0	37	1,678.09	1,593.00
J-40	0	37	1,678.09	1,593.00
J-41	0	33	1,668.54	1,593.00
J-42	30	33	1,668.12	1,593.00
J-43	42	31	1,665.28	1,593.00
J-44	23	33	1,669.67	1,593.00
J-50	0	36	1,677.30	1,593.00
J-51	0	36	1,677.30	1,593.00
J-52	0	36	1,677.30	1,593.00
J-53	0	37	1,678.11	1,593.00
J-54	0	37	1,678.16	1,593.00
J-55	0	37	1,678.09	1,593.00
J-56	23	33	1,669.68	1,593.00
J-57	0	34	1,670.62	1,593.00
J-59	0	34	1,670.62	1,593.00
J-60	0	33	1,669.24	1,593.00
J-61	0	33	1,668.24	1,593.00
J-62	0	33	1,669.31	1,593.00

FlexTable: Hydrant Table

Active Scenario: Maximum Daily Demand + Fire FH7

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
H-1	1,592.00	0	1,677.30	37
H-2	1,590.00	0	1,679.09	39
H-3	1,592.00	0	1,681.06	39
H-4	1,593.00	0	1,681.06	38
H-7	1,596.00	2,500	1,667.64	31
H-8	1,596.00	0	1,668.70	31
H-9	1,592.36	0	1,669.33	33
H-10	1,593.70	0	1,677.96	36

FlexTable: Pump Table

Active Scenario: Maximum Daily Demand + Fire FH7

Label	Elevation (ft)	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpm)	Pump Head (ft)
PMP-3	1,596.00	1,596.00	1,681.06	3,398	85.06

FlexTable: GPV Table

Active Scenario: Maximum Daily Demand + Fire FH7

Label	Elevation (ft)	Diameter (Valve) (in)	General Purpose Valve Headloss Curve	Flow (gpm)	Headloss (ft)
GPV-3	1,594.00	8.0	8" FEBCO	450	9.66
GPV-7	1,591.51	12.0	12" 2000 SS Watts	1,110	6.16
GPV-9	1,594.00	2.0	2" FEBCO	23	7.62
GPV-11	1,591.50	2.0	2" FEBCO	72	7.60
GPV-12	1,594.00	2.0	2" FEBCO	-23	7.62
GPV-6	1,594.00	12.0	12" 2000 SS Watts	1,390	7.13
GPV-8	0.00	8.0	8" FEBCO	330	9.55

FlexTable: Pipe Table

Active Scenario: Maximum Daily Demand + Fire FH8

Label	Length (Scaled) (ft)	Diameter (in)	Flow (gpm)	Velocity (ft/s)	Headloss (ft)
P-6	42	6.0	0	0.00	0.00
P-7	38	6.0	0	0.00	0.00
P-8	328	16.0	-3,398	5.42	1.97
P-9	39	6.0	0	0.00	0.00
P-10	164	16.0	0	0.00	0.00
P-11	34	6.0	0	0.00	0.00
P-12	48	16.0	0	0.00	0.00
P-13	39	6.0	0	0.00	0.00
P-16	78	16.0	-1,505	2.40	0.10
P-22	24	6.0	0	0.00	0.00
P-23	50	12.0	1,103	3.13	0.15
P-25	121	12.0	831	2.36	0.22
P-26	813	12.0	-1,194	3.39	2.86
P-28	24	5,000.0	-3,398	0.00	0.00
P-29	33	5,000.0	-3,398	0.00	0.00
P-33	20	6.0	292	3.32	0.15
P-34	14	6.0	237	2.69	0.07
P-35	27	6.0	251	2.85	0.16
P-36	319	8.0	-450	2.87	1.33
P-37	1,115	8.0	-199	1.27	1.02
P-39	871	8.0	38	0.24	0.04
P-40	3	12.0	-619	1.76	0.00
P-42	3	12.0	478	1.36	0.00
P-43	3	12.0	-625	1.77	0.00
P-45	100	8.0	330	2.11	0.23
P-47	99	12.0	1,103	3.13	0.30
P-48	12	12.0	1,103	3.13	0.04
P-49	100	4.0	72	1.83	0.40
P-50	75	2.0	-42	4.26	3.26
P-51	18	2.0	30	3.06	0.42
P-52	48	2.0	23	2.36	0.70
P-53	8	8.0	-450	2.87	0.03
P-54	48	8.0	450	2.87	0.20
P-58	7	2.0	23	2.35	0.10
P-59	596	12.0	831	2.36	1.07
P-60	651	8.0	330	2.11	1.53
P-62	151	16.0	0	0.00	0.00
P-63	162	16.0	-1,505	2.40	0.22
P-64	12	12.0	-808	2.29	0.02
P-65	246	16.0	-1,505	2.40	0.33
P-66	118	16.0	-1,505	2.40	0.16
P-67	19	12.0	665	1.89	0.02
P-68	19	12.0	-1,228	3.48	0.07
P-69	15	16.0	2,170	3.46	0.04
P-70	12	16.0	-697	1.11	0.00
P-71	89	6.0	0	0.00	0.00
P-72	12	12.0	697	1.98	0.02

FlexTable: Pipe Table

Active Scenario: Maximum Daily Demand + Fire FH8

Label	Length (Scaled) (ft)	Diameter (in)	Flow (gpm)	Velocity (ft/s)	Headloss (ft)
P-73	12	4.0	72	1.83	0.05
P-75	3	12.0	-169	0.48	0.00
P-76	155	16.0	-3,398	5.42	0.93
P-77	3	12.0	642	1.82	0.00
P-78	48	2.0	23	2.36	0.70
P-79	7	2.0	23	2.35	0.10
P-80	172	4.0	72	1.83	0.70
P-81	487	12.0	475	1.35	0.31
P-81	11	6.0	330	3.74	0.11
P-82	311	12.0	-272	0.77	0.07
P-83	7	12.0	1,397	3.96	0.03
P-84	48	12.0	1,397	3.96	0.23
P-85	457	12.0	831	2.36	0.82
P-86	614	12.0	1,306	3.70	2.55
P-87	264	12.0	-1,669	4.74	1.73
P-88	17	12.0	-1,397	3.96	0.08

FlexTable: Junction Table

Active Scenario: Maximum Daily Demand + Fire FH8

Label	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)	Elevation (ft)
J-2	0	33	1,668.19	1,593.00
J-3	0	34	1,670.67	1,593.00
J-5	0	37	1,679.09	1,593.00
J-6	0	37	1,679.09	1,593.00
J-7	0	37	1,679.09	1,593.00
J-8	0	38	1,681.06	1,593.00
J-9	0	38	1,681.06	1,593.00
J-10	0	38	1,681.06	1,593.00
J-13	0	36	1,677.31	1,593.00
J-15	0	37	1,677.64	1,593.00
J-16	0	37	1,677.74	1,593.00
J-20	0	34	1,670.81	1,593.00
J-25	0	32	1,667.40	1,593.00
J-26	0	32	1,666.86	1,593.00
J-27	251	32	1,666.71	1,593.00
J-28	0	32	1,665.84	1,593.00
J-29	237	31	1,665.77	1,593.00
J-30	0	32	1,665.88	1,593.00
J-31	292	31	1,665.72	1,593.00
J-35	0	36	1,677.29	1,593.00
J-36	0	36	1,677.29	1,593.00
J-37	0	36	1,677.29	1,593.00
J-38	0	37	1,678.09	1,593.00
J-39	0	37	1,678.09	1,593.00
J-40	0	37	1,678.09	1,593.00
J-41	0	33	1,668.55	1,593.00
J-42	30	33	1,668.13	1,593.00
J-43	42	31	1,665.29	1,593.00
J-44	23	33	1,669.67	1,593.00
J-50	0	36	1,677.31	1,593.00
J-51	0	36	1,677.31	1,593.00
J-52	0	36	1,677.31	1,593.00
J-53	0	37	1,678.12	1,593.00
J-54	0	37	1,678.16	1,593.00
J-55	0	37	1,678.09	1,593.00
J-56	23	33	1,669.68	1,593.00
J-57	0	34	1,670.59	1,593.00
J-59	0	34	1,670.66	1,593.00
J-60	0	33	1,669.24	1,593.00
J-61	0	33	1,668.55	1,593.00
J-62	0	33	1,668.86	1,593.00

FlexTable: Hydrant Table

Active Scenario: Maximum Daily Demand + Fire FH8

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
H-1	1,592.00	0	1,677.31	37
H-2	1,590.00	0	1,679.09	39
H-3	1,592.00	0	1,681.06	39
H-4	1,593.00	0	1,681.06	38
H-7	1,596.00	0	1,668.77	31
H-8	1,596.00	2,500	1,666.00	30
H-9	1,592.36	0	1,669.84	34
H-10	1,593.70	0	1,677.96	36

FlexTable: Pump Table

Active Scenario: Maximum Daily Demand + Fire FH8

Label	Elevation (ft)	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpm)	Pump Head (ft)
PMP-3	1,596.00	1,596.00	1,681.06	3,398	85.06

FlexTable: GPV Table

Active Scenario: Maximum Daily Demand + Fire FH8

Label	Elevation (ft)	Diameter (Valve) (in)	General Purpose Valve Headloss Curve	Flow (gpm)	Headloss (ft)
GPV-3	1,594.00	8.0	8" FEBCO	450	9.66
GPV-7	1,591.51	12.0	12" 2000 SS Watts	1,103	6.14
GPV-9	1,594.00	2.0	2" FEBCO	23	7.62
GPV-11	1,591.50	2.0	2" FEBCO	72	7.60
GPV-12	1,594.00	2.0	2" FEBCO	-23	7.62
GPV-6	1,594.00	12.0	12" 2000 SS Watts	1,397	7.15
GPV-8	0.00	8.0	8" FEBCO	330	9.55

FlexTable: Pipe Table

Active Scenario: Maximum Daily Demand + Fire FH9

Label	Length (Scaled) (ft)	Diameter (in)	Flow (gpm)	Velocity (ft/s)	Headloss (ft)
P-6	42	6.0	0	0.00	0.00
P-7	38	6.0	0	0.00	0.00
P-8	328	16.0	-3,398	5.42	1.97
P-9	39	6.0	0	0.00	0.00
P-10	164	16.0	0	0.00	0.00
P-11	34	6.0	0	0.00	0.00
P-12	48	16.0	0	0.00	0.00
P-13	39	6.0	0	0.00	0.00
P-16	78	16.0	-1,529	2.44	0.11
P-22	24	6.0	0	0.00	0.00
P-23	50	12.0	1,128	3.20	0.16
P-25	121	12.0	-951	2.70	0.28
P-26	813	12.0	-341	0.97	0.28
P-28	24	5,000.0	-3,398	0.00	0.00
P-29	33	5,000.0	-3,398	0.00	0.00
P-33	20	6.0	292	3.32	0.15
P-34	14	6.0	237	2.69	0.07
P-35	27	6.0	251	2.85	0.16
P-36	319	8.0	-451	2.88	1.33
P-37	1,115	8.0	-200	1.28	1.03
P-39	871	8.0	37	0.24	0.04
P-40	3	12.0	-604	1.71	0.00
P-42	3	12.0	491	1.39	0.00
P-43	3	12.0	-636	1.81	0.00
P-45	100	8.0	329	2.10	0.23
P-47	99	12.0	1,128	3.20	0.31
P-48	12	12.0	1,128	3.20	0.04
P-49	100	4.0	72	1.83	0.40
P-50	75	2.0	-42	4.26	3.26
P-51	18	2.0	30	3.06	0.42
P-52	48	2.0	23	2.36	0.70
P-53	8	8.0	-451	2.88	0.03
P-54	48	8.0	451	2.88	0.20
P-58	7	2.0	23	2.35	0.10
P-59	596	12.0	-951	2.70	1.38
P-60	651	8.0	329	2.10	1.52
P-62	151	16.0	0	0.00	0.00
P-63	162	16.0	-1,529	2.44	0.22
P-64	12	12.0	-820	2.33	0.02
P-65	246	16.0	-1,529	2.44	0.34
P-66	118	16.0	-1,529	2.44	0.16
P-67	19	12.0	650	1.84	0.02
P-68	19	12.0	-1,219	3.46	0.07
P-69	15	16.0	2,179	3.48	0.04
P-70	12	16.0	-708	1.13	0.00
P-71	89	6.0	0	0.00	0.00
P-72	12	12.0	708	2.01	0.02

FlexTable: Pipe Table

Active Scenario: Maximum Daily Demand + Fire FH9

Label	Length (Scaled) (ft)	Diameter (in)	Flow (gpm)	Velocity (ft/s)	Headloss (ft)
P-73	12	4.0	72	1.83	0.05
P-75	3	12.0	-153	0.43	0.00
P-76	155	16.0	-3,398	5.42	0.93
P-77	3	12.0	627	1.78	0.00
P-78	48	2.0	23	2.36	0.70
P-79	7	2.0	23	2.35	0.10
P-80	172	4.0	72	1.83	0.70
P-81	487	12.0	610	1.73	0.49
P-81	11	6.0	329	3.73	0.11
P-82	311	12.0	421	1.19	0.16
P-83	7	12.0	1,372	3.89	0.03
P-84	48	12.0	1,372	3.89	0.22
P-85	457	12.0	1,549	4.39	2.60
P-86	614	12.0	-341	0.97	0.21
P-87	264	12.0	-951	2.70	0.61
P-88	17	12.0	-1,372	3.89	0.08

FlexTable: Junction Table

Active Scenario: Maximum Daily Demand + Fire FH9

Label	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)	Elevation (ft)
J-2	0	33	1,668.19	1,593.00
J-3	0	34	1,670.77	1,593.00
J-5	0	37	1,679.09	1,593.00
J-6	0	37	1,679.09	1,593.00
J-7	0	37	1,679.09	1,593.00
J-8	0	38	1,681.06	1,593.00
J-9	0	38	1,681.06	1,593.00
J-10	0	38	1,681.06	1,593.00
J-13	0	36	1,677.28	1,593.00
J-15	0	37	1,677.62	1,593.00
J-16	0	37	1,677.73	1,593.00
J-20	0	34	1,670.69	1,593.00
J-25	0	32	1,667.38	1,593.00
J-26	0	32	1,666.86	1,593.00
J-27	251	32	1,666.70	1,593.00
J-28	0	32	1,665.83	1,593.00
J-29	237	31	1,665.75	1,593.00
J-30	0	32	1,665.86	1,593.00
J-31	292	31	1,665.71	1,593.00
J-35	0	36	1,677.27	1,593.00
J-36	0	36	1,677.26	1,593.00
J-37	0	36	1,677.27	1,593.00
J-38	0	37	1,678.09	1,593.00
J-39	0	37	1,678.09	1,593.00
J-40	0	37	1,678.09	1,593.00
J-41	0	33	1,668.52	1,593.00
J-42	30	32	1,668.10	1,593.00
J-43	42	31	1,665.26	1,593.00
J-44	23	33	1,669.67	1,593.00
J-50	0	36	1,677.28	1,593.00
J-51	0	36	1,677.28	1,593.00
J-52	0	36	1,677.29	1,593.00
J-53	0	37	1,678.11	1,593.00
J-54	0	37	1,678.15	1,593.00
J-55	0	37	1,678.09	1,593.00
J-56	23	33	1,669.68	1,593.00
J-57	0	34	1,670.69	1,593.00
J-59	0	34	1,670.53	1,593.00
J-60	0	33	1,669.22	1,593.00
J-61	0	33	1,669.58	1,593.00
J-62	0	33	1,670.08	1,593.00

FlexTable: Hydrant Table

Active Scenario: Maximum Daily Demand + Fire FH9

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
H-1	1,592.00	0	1,677.28	37
H-2	1,590.00	0	1,679.09	39
H-3	1,592.00	0	1,681.06	39
H-4	1,593.00	0	1,681.06	38
H-7	1,596.00	0	1,669.30	32
H-8	1,596.00	0	1,669.80	32
H-9	1,592.36	2,500	1,667.93	33
H-10	1,593.70	0	1,677.95	36

FlexTable: Pump Table

Active Scenario: Maximum Daily Demand + Fire FH9

Label	Elevation (ft)	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpm)	Pump Head (ft)
PMP-3	1,596.00	1,596.00	1,681.06	3,398	85.06

FlexTable: GPV Table

Active Scenario: Maximum Daily Demand + Fire FH9

Label	Elevation (ft)	Diameter (Valve) (in)	General Purpose Valve Headloss Curve	Flow (gpm)	Headloss (ft)
GPV-3	1,594.00	8.0	8" FEBCO	451	9.66
GPV-7	1,591.51	12.0	12" 2000 SS Watts	1,128	6.22
GPV-9	1,594.00	2.0	2" FEBCO	23	7.62
GPV-11	1,591.50	2.0	2" FEBCO	72	7.60
GPV-12	1,594.00	2.0	2" FEBCO	-23	7.62
GPV-6	1,594.00	12.0	12" 2000 SS Watts	1,372	7.07
GPV-8	0.00	8.0	8" FEBCO	329	9.55

FlexTable: Pipe Table

Active Scenario: Maximum Daily Demand + Fire FH10

Label	Length (Scaled) (ft)	Diameter (in)	Flow (gpm)	Velocity (ft/s)	Headloss (ft)
P-6	42	6.0	0	0.00	0.00
P-7	38	6.0	0	0.00	0.00
P-8	328	16.0	-3,398	5.42	1.97
P-9	39	6.0	0	0.00	0.00
P-10	164	16.0	0	0.00	0.00
P-11	34	6.0	0	0.00	0.00
P-12	48	16.0	0	0.00	0.00
P-13	39	6.0	0	0.00	0.00
P-16	78	16.0	4,024	6.42	0.53
P-22	24	6.0	0	0.00	0.00
P-23	50	12.0	-4,619	13.10	1.08
P-25	121	12.0	-2,793	7.92	0.08
P-26	813	12.0	-506	1.43	1.13
P-28	24	5,000.0	-3,398	0.00	0.00
P-29	33	5,000.0	-3,398	0.00	0.00
P-33	20	6.0	292	3.32	0.15
P-34	14	6.0	237	2.69	0.07
P-35	27	6.0	251	2.85	0.16
P-36	319	8.0	-256	1.64	0.34
P-37	1,115	8.0	-5	0.03	0.55
P-39	871	8.0	231	1.48	0.64
P-40	3	12.0	-1,179	3.35	0.03
P-42	3	12.0	-2,307	6.55	0.02
P-43	3	12.0	2,312	6.56	0.02
P-45	100	8.0	524	3.34	0.51
P-47	99	12.0	-4,619	13.10	2.14
P-48	12	12.0	-4,619	13.10	0.27
P-49	100	4.0	72	1.83	0.40
P-50	75	2.0	-42	4.26	3.26
P-51	18	2.0	30	3.06	0.42
P-52	48	2.0	23	2.36	0.70
P-53	8	8.0	-256	1.64	0.01
P-54	48	8.0	256	1.64	0.05
P-58	7	2.0	23	2.35	0.10
P-59	596	12.0	-2,793	7.92	0.38
P-60	651	8.0	524	3.34	3.33
P-62	151	16.0	0	0.00	0.00
P-63	162	16.0	4,024	6.42	1.12
P-64	12	12.0	1,784	5.06	0.10
P-65	246	16.0	4,024	6.42	1.69
P-66	118	16.0	1,524	2.43	1.41
P-67	19	12.0	1,225	3.48	0.21
P-68	19	12.0	-3,697	10.49	0.27
P-69	15	16.0	-299	0.48	0.06
P-70	12	16.0	2,241	3.58	0.02
P-71	89	6.0	0	0.00	0.00
P-72	12	12.0	-2,241	6.36	0.08

FlexTable: Pipe Table

Active Scenario: Maximum Daily Demand + Fire FH10

Label	Length (Scaled) (ft)	Diameter (in)	Flow (gpm)	Velocity (ft/s)	Headloss (ft)
P-73	12	4.0	72	1.83	0.05
P-75	3	12.0	-923	2.62	0.04
P-76	155	16.0	-3,398	5.42	0.93
P-77	3	12.0	1,202	3.41	0.03
P-78	48	2.0	23	2.36	0.70
P-79	7	2.0	23	2.35	0.10
P-80	172	4.0	72	1.83	0.70
P-81	487	12.0	2,287	6.49	1.98
P-81	11	6.0	524	5.94	0.24
P-82	311	12.0	1,827	5.18	2.88
P-83	7	12.0	4,619	13.10	0.15
P-84	48	12.0	4,619	13.10	1.04
P-85	457	12.0	-2,793	7.92	0.29
P-86	614	12.0	-506	1.43	0.85
P-87	264	12.0	-2,793	7.92	0.17
P-88	17	12.0	-4,619	13.10	0.38

FlexTable: Junction Table

Active Scenario: Maximum Daily Demand + Fire FH10

Label	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)	Elevation (ft)
J-2	0	33	1,668.40	1,593.00
J-3	0	39	1,683.26	1,593.00
J-5	0	37	1,679.09	1,593.00
J-6	0	37	1,679.09	1,593.00
J-7	0	37	1,679.09	1,593.00
J-8	0	38	1,681.06	1,593.00
J-9	0	38	1,681.06	1,593.00
J-10	0	38	1,681.06	1,593.00
J-13	0	39	1,682.98	1,593.00
J-15	0	38	1,681.27	1,593.00
J-16	0	38	1,680.73	1,593.00
J-20	0	37	1,678.92	1,593.00
J-25	0	34	1,672.58	1,593.00
J-26	0	32	1,668.06	1,593.00
J-27	251	32	1,667.90	1,593.00
J-28	0	33	1,668.61	1,593.00
J-29	237	33	1,668.53	1,593.00
J-30	0	33	1,669.25	1,593.00
J-31	292	33	1,669.10	1,593.00
J-35	0	39	1,683.06	1,593.00
J-36	0	39	1,683.08	1,593.00
J-37	0	39	1,683.06	1,593.00
J-38	0	37	1,677.96	1,593.00
J-39	0	37	1,677.93	1,593.00
J-40	0	37	1,677.89	1,593.00
J-41	0	35	1,674.31	1,593.00
J-42	30	35	1,673.89	1,593.00
J-43	42	34	1,671.05	1,593.00
J-44	23	33	1,669.55	1,593.00
J-50	0	39	1,682.98	1,593.00
J-51	0	39	1,682.98	1,593.00
J-52	0	39	1,682.96	1,593.00
J-53	0	37	1,678.21	1,593.00
J-54	0	37	1,678.16	1,593.00
J-55	0	37	1,678.00	1,593.00
J-56	23	33	1,669.58	1,593.00
J-57	0	39	1,682.89	1,593.00
J-59	0	38	1,680.00	1,593.00
J-60	0	35	1,675.01	1,593.00
J-61	0	38	1,680.74	1,593.00
J-62	0	39	1,682.72	1,593.00

FlexTable: Hydrant Table

Active Scenario: Maximum Daily Demand + Fire FH10

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
H-1	1,592.00	0	1,682.98	39
H-2	1,590.00	0	1,679.09	39
H-3	1,592.00	0	1,681.06	39
H-4	1,593.00	0	1,681.06	38
H-7	1,596.00	0	1,680.66	37
H-8	1,596.00	0	1,681.59	37
H-9	1,592.36	0	1,680.29	38
H-10	1,593.70	2,500	1,679.62	37

FlexTable: Pump Table

Active Scenario: Maximum Daily Demand + Fire FH10

Label	Elevation (ft)	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpm)	Pump Head (ft)
PMP-3	1,596.00	1,596.00	1,681.06	3,398	85.06

FlexTable: GPV Table

Active Scenario: Maximum Daily Demand + Fire FH10

Label	Elevation (ft)	Diameter (Valve) (in)	General Purpose Valve Headloss Curve	Flow (gpm)	Headloss (ft)
GPV-3	1,594.00	8.0	8" FEBCO	256	9.48
GPV-7	1,591.51	12.0	12" 2000 SS Watts	-4,619	6.56
GPV-9	1,594.00	2.0	2" FEBCO	23	7.62
GPV-11	1,591.50	2.0	2" FEBCO	72	7.60
GPV-12	1,594.00	2.0	2" FEBCO	-23	7.62
GPV-6	1,594.00	12.0	12" 2000 SS Watts	4,619	6.56
GPV-8	0.00	8.0	8" FEBCO	524	9.73

Appendix E: Demand Summation Tables

Building 1 & 6				
Demands	ADF	MDD	PHD	Node
Building 1	75.06	150.12	262.71	J-31
Building 6	66.15	132.3	231.53	J-31
Vertical Planter Boxes*	9.45	9.45	9.45	J-31
Roof Top Pools/Water Features**	0.39	0.39	0.39	J-31
Total Demands	151.05	292.26	504.08	J-31

Building 2 & 3				
Demands	ADF	MDD	PHD	Node
Building 2	64.26	128.52	224.91	J-27
Building 3	56.43	112.86	197.51	J-27
Vertical Planter Boxes*	9.45	9.45	9.45	J-27
Roof Top Pools/Water Features**	0.39	0.39	0.39	J-27
Total Demands	130.53	251.22	432.26	J-27

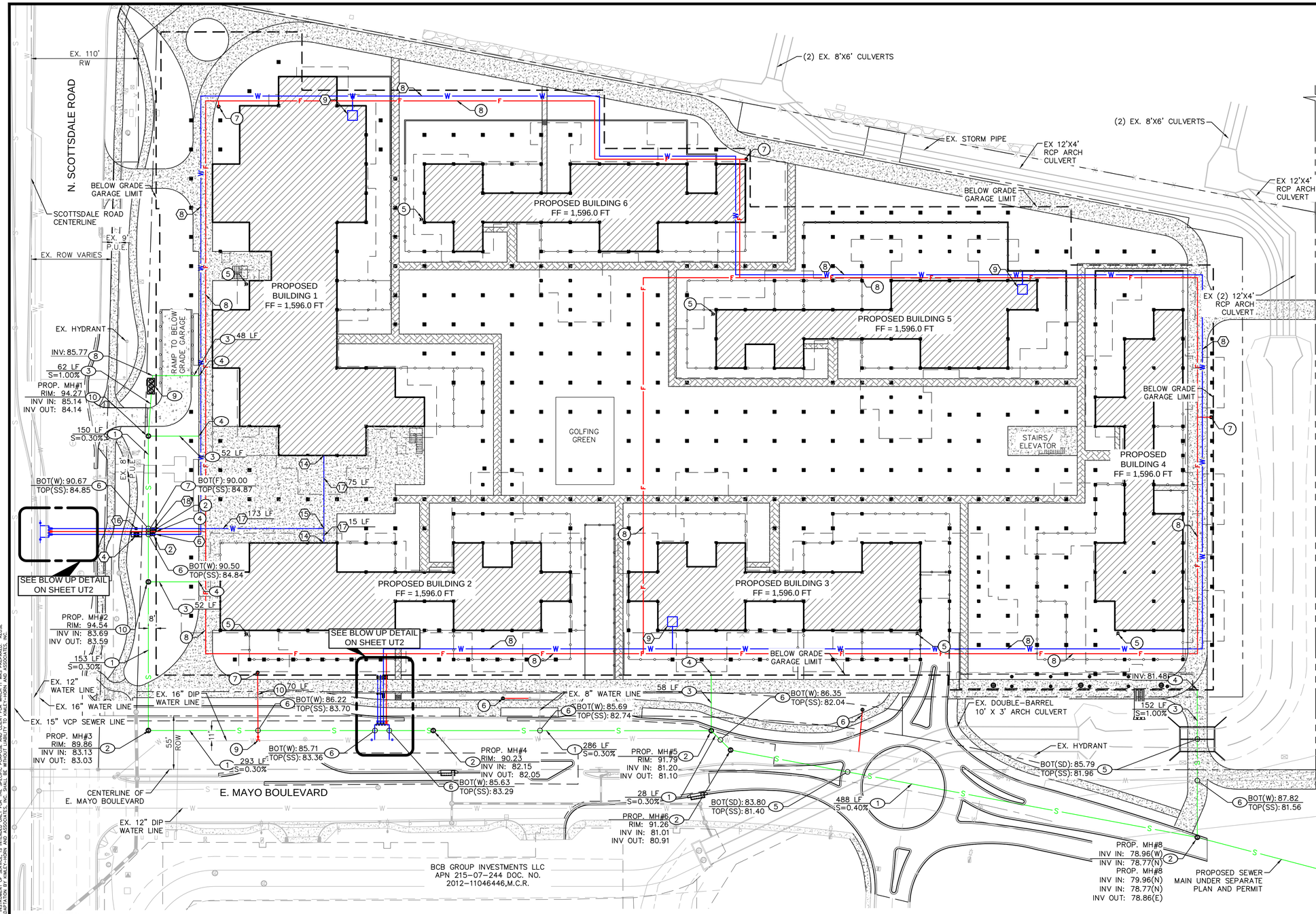
Building 4 & 5				
Demands	ADF	MDD	PHD	Node
Building 4	56.97	113.94	199.4	J-29
Building 5	56.43	112.86	197.51	J-29
Vertical Planter Boxes*	9.45	9.45	9.45	J-29
Roof Top Pools/Water Features**	0.39	0.39	0.39	J-29
Total Demands	123.24	236.64	406.75	J-29

Additonal Demands				
Demands	ADF	MDD	PHD	Node
Irrigation 1	23.06	23.06	23.06	J-56
Irrigation 2	23.06	23.06	23.06	J-44
Commercial (Office)	14.96	29.92	52.35	J-42
Commercial (Restaurant)	20.84	41.68	125.04	J-43

*Note: All Vertical Planter Box demands divided by three and split up accress each of the three groups of buildings.

**Note: All Roof Top Pool/Water Features demands are producted by dividing the total Roof Top Pool/Water Features demand by 3 to equally split it amongst the three building groups. The differences in surface area for the water is negligible.

Appendix F: Preliminary Utility Plan



VICINITY MAP
N.T.S.

PRELIMINARY DOMESTIC WATER NOTES

1. PROPOSED 8"X12" TEE AND VALVE.
2. PROPOSED 8" BACKFLOW PREVENTER.
3. PROPOSED 8" POLYWRAPPED CLASS 350 DIP WATERLINE.
4. PROPOSED 6" DOMESTIC WATER METER WITH 8"X6" REDUCERS MINIMUM 3' TO EITHER SIDE OF METER.
6. PROPOSED CONNECTION TO GARAGE.
7. PROPOSED 8" POLYWRAPPED CLASS 350 DIP WATERLINE.
8. PROPOSED 8" WATER LOOP.
9. PROPOSED DOMESTIC PUMP.
10. PROPOSED 2"X12" TEE AND VALVE.
11. PROPOSED 2" WATER METER.
12. PROPOSED 2" SCH 40 PVC WATER LINE.
13. PROPOSED 2" BACKFLOW PREVENTER
14. PROPOSED COMMERCIAL BUILDING CONNECTION.
15. PROPOSED 4"X4" TEE CONNECTION.
16. PROPOSED 4" WATER METER.
17. PROPOSED 4" SCH 40 PVC WATER LINE..
18. PROPOSED 4" BACKFLOW PREVENTER

COMMERCIAL

commercial line?

PRELIMINARY FIRELINE NOTES

1. PROPOSED 12"X12" TEE AND VALVE PER COS STD DET 2362-2.
2. PROPOSED 12" BACKFLOW PREVENTOR.
3. PROPOSED 12" POLYWRAPPED CLASS 350 DIP FIRE LINE.
4. PROPOSED GARAGE CONNECTION.
5. PROPOSED BUILDING MOUNTED FDC.
6. PROPOSED FIRE HYDRANT RELOCATION.
7. PROPOSED FIRE HYDRANT.
8. PROPOSED 12" POLYWRAPPED CLASS 350 FIRE LOOP, REF FIRE LIFE SAFTEY PLANS FOR DETAILS.
9. PROPOSED 16"X6" TAPPING SLEEVE AND VALVE PER COS STD. DET. 2362-2.
10. PROPOSED 6" POLYWRAPPED CLASS 350 DIP FIRE LINE.

UTILITY NOTES

1. REFER TO CITY STANDARD AND DETAILS FOR TRENCHING, BEDDING, AND BACKFILL, AND TRENCH COMPACTION REQUIREMENTS.
2. ALL FILL MATERIAL IS TO BE IN PLACE, AND COMPACTED BEFORE INSTALLATION OF PROPOSED UTILITIES.
3. CONTRACTOR SHALL NOTIFY THE UTILITY AUTHORITIES INSPECTORS 72 HOURS BEFORE CONNECTING TO ANY EXISTING LINE.
4. SANITARY SEWER PIPE SHALL BE AS FOLLOWS:
   PRIVATE: PVC SDR 35 PER ASTM D 3034
5. CONTRACTOR IS RESPONSIBLE FOR COMPLYING TO THE SPECIFICATIONS OF THE CITY OF SCOTTSDALE WITH REGARDS TO MATERIALS AND INSTALLATION OF THE WATER LINE AND WITH COS AND MAG REQUIREMENTS FOR UTILITY CROSSINGS.
6. IT IS THE CONTRACTOR'S RESPONSIBILITY TO DEFLECT ELECTRIC, GAS CABLE, AND TELEPHONE CONDUIT AND PIPING AS REQUIRED TO AVOID UTILITY CONFLICTS.
7. THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT THE LOCATION AND/OR ELEVATION OF EXISTING UTILITIES AS SHOWN ON THESE PLANS IS BASED ON RECORDS OF THE VARIOUS UTILITY COMPANIES, AND WHERE POSSIBLE, MEASUREMENTS TAKEN IN THE FIELD. THE INFORMATION IS NOT TO BE RELIED ON AS BEING EXACT OR COMPLETE. THE CONTRACTOR MUST CALL THE APPROPRIATE UTILITY COMPANIES AT LEAST 72 HOURS BEFORE ANY EXCAVATION TO REQUEST EXACT FIELD LOCATION OF UTILITIES. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO RELOCATE ALL EXISTING UTILITIES WHICH CONFLICT WITH THE PROPOSED IMPROVEMENTS SHOWN ON THE PLANS.
8. CONTRACTOR IS RESPONSIBLE FOR ALL NECESSARY PERMITS, INSPECTIONS AND/OR CERTIFICATIONS REQUIRED BY CITY CODES AND/OR UTILITY SERVICE COMPANIES.
9. CONTRACTOR SHALL COORDINATE WITH ALL UTILITY COMPANIES FOR INSTALLATION REQUIREMENTS AND SPECIFICATIONS IN REGARDS TO TAPS, HYDRANTS, VALVES, ETC.
10. CONTRACTOR IS RESPONSIBLE FOR PAVEMENT REPLACEMENT REQUIRED FOR ALL UTILITY INSTALLATIONS PER CITY OF SCOTTSDALE STANDARDS.
11. WATER TIGHT CONNECTION SHALL BE MADE USING A RESILIENT CONNECTOR "SEAL BOOT" PER ASTM C-923.
12. CONTRACTOR SHALL MAINTAIN A MINIMUM OF 4 FEET COVER ON ALL WATER LINES.
13. ALL SANITARY SEWER AND WATER WORK DESIGNATED AS "PRIVATE" IN THIS SET OF PLANS SHALL BE INSTALLED BY A LICENSED PLUMBER.
14. BACKFLOW PREVENTER AND VAULT FOR THE IRRIGATION TO BE PROVIDED BY THE GC.
15. INSPECTION OF THE WATER PIPING CONNECTING THE METER TO THE BACKFLOW PREVENTER SHALL BE CONDUCTED BY A CITY BACKFLOW PREVENTION SPECIALIST PRIOR TO CLSM AND BACKFILL. DSPM 6-1.417.

LEGEND

- PROPERTY LINE
- RIGHT OF WAY LINE
- STREET CENTERLINE
- EASEMENT LINE
- S — EXISTING SANITARY SEWER MAIN
- W — EXISTING PUBLIC WATER MAIN
- EXISTING STORM DRAIN
- W — PROPOSED WATER MAIN
- F — PROPOSED FIRELINE
- S — PROPOSED SEWER MAIN
- EXISTING SANITARY SEWER MANHOLE
- EXISTING FIRE HYDRANT

PRELIMINARY SEWER NOTES

1. PROPOSED 12" PVC SEWER MAIN, LENGTH PER PLAN.
2. PROPOSED PUBLIC MANHOLE, INVERT PER PLAN.
3. PROPOSED 8" PVC SEWER SERVICE, LENGTH PER PLAN.
4. PROPOSED BUILDING CONNECTION.
5. SEWER/STORM DRAIN CROSSING.
6. SEWER/WATER MAIN CROSSING PER COS STD DET 2401.
7. SEWER/FIRE MAIN CROSSING PER COS STD DET 2401.
8. PROPOSED 8" SEWER WYE AND CLEANOUT, INVERT PER PLAN
9. PROPOSED GREASE INTERCEPTOR.
10. PROPOSED PRIVATE MANHOLE, INVERT PER PLAN.

NORTH

GRAPHIC SCALE IN FEET
0 25 50 100

Q.S.#: 39-45

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811 Call 811 or click Arizona811.com

NO.	REVISION	BY	DATE	APPR

Kimley»Horn

7740 North 16th Street, Suite 300
Phoenix, Arizona 85020 (602) 944-5500

SCALE (H): 1" = 50'
SCALE (V): NONE
DESIGNED BY: DJH
DRAWN BY: DJH
CHECKED BY: MLD
DATE: SEP 2022

OPTIMA MCDOWELL MOUNTAIN VILLAGE
PRELIMINARY UTILITY PLAN
18777 N SCOTTSDALE RD.
SCOTTSDALE, ARIZONA 85255

PRELIMINARY
FOR REVIEW ONLY
NOT FOR CONSTRUCTION PURPOSES
Kimley»Horn
ENGINEER MIKE DELMASTRO
PE NO. 30886 DATE 09/20/22

PROJECT NO.
191007711

DRAWING NAME
UT1

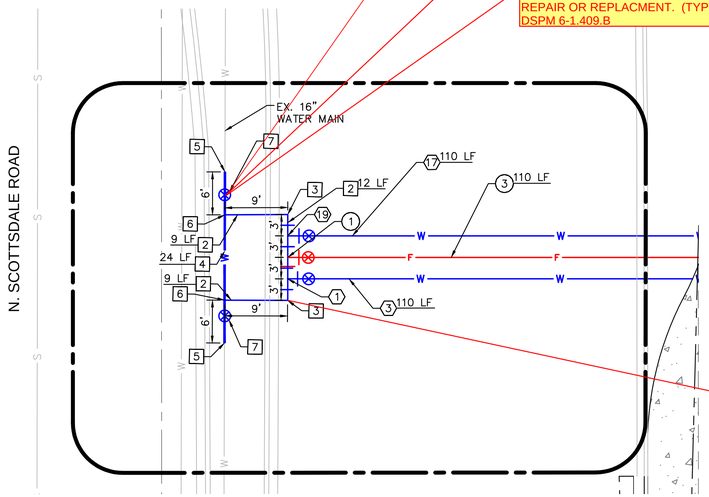
1 OF 2

C:\Users\TOBIN.KOPP\appdata\local\temp\AcPublish_20308\Prelim UT.dwg Sep 02, 2022 Tobin.Kopp
XREFS: ..\XR ..\XF ..\DM

GV ≥16", TO BE LOW TORQUE RESILIENT WEDGE.
DSPM 6-1.409.B (TYP)

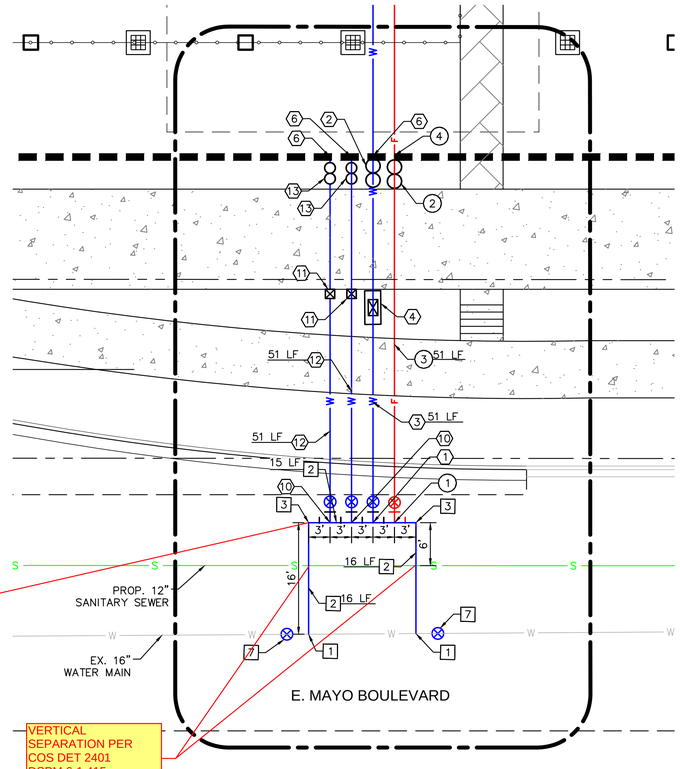
GV ≥16", TO HAVE BYPASS PER COS DET. 2361*(UNLESS OTHERWISE APPROVED BY WRD)
DSPM 6-1.409.B. (TYP)

VALVE OPERATORS ON GV ≥16", TO BE INSTALLED ENTIRELY IN MH FOR REPAIR OR REPLACMENT. (TYP)
DSPM 6-1.409.B



WEST UTILITY BLOW UP DETAIL

MECHANICAL JOINT
DSPM 6-1.411.B
(TYP)



VERTICAL SEPARATION PER COS DET 2401
DSPM 6-1.415

SOUTH UTILITY BLOW UP DETAIL

LEGEND

- PROPERTY LINE
- RIGHT OF WAY LINE
- STREET CENTERLINE
- EASEMENT LINE
- S — EXISTING SANITARY SEWER MAIN
- W — EXISTING PUBLIC WATER MAIN
- PROPOSED STORM DRAIN
- W — PROPOSED WATER MAIN
- F — PROPOSED FIRELINE
- S — PROPOSED SEWER MAIN
- EXISTING SANITARY SEWER MANHOLE
- EXISTING FIRE HYDRANT
- PROPOSED SANITARY SEWER MANHOLE
- PROPOSED FIRE HYDRANT

PRELIMINARY DOMESTIC WATER NOTES

1. PROPOSED 8"X12" TEE AND VALVE.
2. PROPOSED 8" BACKFLOW PREVENTER.
3. PROPOSED 8" POLYWRAPPED CLASS 350 DIP WATERLINE.
4. PROPOSED 6" DOMESTIC WATER METER WITH 8"X6" REDUCERS MINIMUM 3' TO EITHER SIDE OF METER.
6. PROPOSED CONNECTION TO GARAGE.
7. PROPOSED 8" POLYWRAPPED CLASS 350 DIP WATERLINE.
8. PROPOSED 8" WATER LOOP.
9. PROPOSED DOMESTIC PUMP.
10. PROPOSED 2"X12" TEE AND VALVE.
11. PROPOSED 2" WATER METER.
12. PROPOSED 2" SCH 40 PVC WATER LINE.
13. PROPOSED 2" BACKFLOW PREVENTER
14. PROPOSED COMMERCIAL BUILDING CONNECTION.
15. PROPOSED 4"X4" TEE CONNECTION
16. PROPOSED 4" WATER METER.
17. PROPOSED 4" SCH 40 PVC WATER
18. PROPOSED 4" BACKFLOW PREVENTER
19. PROPOSED 4"X12" TEE AND VALVE.

PVC is prohibited in the COS water distribution system. DSPM 6-1.402

PRELIMINARY FIRELINE NOTES

1. PROPOSED 12"X12" TEE AND VALVE PER COS STD DET 2362-2.
2. PROPOSED 12" BACKFLOW PREVENTOR.
3. PROPOSED 12" POLYWRAPPED CLASS 350 DIP FIRE LINE.
4. PROPOSED GARAGE CONNECTION.

PRELIMINARY WATER MAIN

1. PROPOSED 16"X12" TAPPING SLEEVE AND VALVE PER COS 2362-2*.
2. PROPOSED 12" POLYWRAPPED DIP WATER MAIN.
3. PROPOSED 12" DIP 90° BEND.
4. PROPOSED 16" POLYWRAPPED DIP WATER MAIN.
5. PROPOSED CONNECTION TO EXISTING 16" MAIN.
6. PROPOSED 16"X12" TEE AND VALVE PER COS 2362-2.
7. PROPOSED 16" VALVE.

NOTE:
EXISTING 16" WATER MAIN IS ACP, REPLACE MINIMUM 3' SECTION OF PIPE WITH NO LESS THAN 6' REMAINING TO NEAREST JOINT. THE REMOVED PIPE SHALL BE REPLACED WITH DIP. RECOMMENDED TO REPLACE ENTIRE SEGMENT BETWEEN LINES WITH DIP AND FITTING UP TO 6' PAST THE NEAREST JOINT ON EACH SIDE.

NORTH

GRAPHIC SCALE IN FEET
0 5 10 20

Q.S.#: 39-45

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

NO.	REVISION	BY	DATE	APPR.

Kimley»Horn

7740 North 16th Street, Suite 300
Phoenix, Arizona 85020 (602) 944-5500

SCALE (H): 1"=10'
SCALE (V): NONE
DESIGNED BY: DJH
DRAWN BY: DJH
CHECKED BY: MLD
DATE: SEP 2022

OPTIMA MCDOWELL MOUNTAIN VILLAGE
PRELIMINARY UTILITY PLAN
SCOTTSDALE, ARIZONA 85255

PRELIMINARY
FOR REVIEW ONLY
NOT FOR CONSTRUCTION PURPOSES
Kimley»Horn
ENGINEER MIKE DELMARTER
PE NO. 30886 DATE 09/02/22

PROJECT NO.
191007011

DRAWING NAME
UT2

2 OF 2

Appendix G: Water Feature Areas

POOL SPA AND COLD PLUNGE AREAS

Building 1

Grade Level	Spa	92	sf
Grade Level	Cold Plunge	48	sf
Roof Level	Spa	151	sf
Roof Level	Cold Plunge	74	sf
Roof Level	Pool	2,999	sf
Total Area		3,364	sf

Building 2

Grade Level	Spa	92	sf
Grade Level	Cold Plunge	48	sf
Roof Level	Spa	179	sf
Roof Level	Cold Plunge	88	sf
Roof Level	Pool	2,999	sf
Total Area		3,406	sf

Building 3

Grade Level	Spa	92	sf
Grade Level	Cold Plunge	48	sf
Roof Level	Spa	179	sf
Roof Level	Cold Plunge	88	sf
Roof Level	Pool	2,999	sf
Total Area		3,406	sf

Building 4

Grade Level	Spa	92	sf
Grade Level	Cold Plunge	48	sf
Roof Level	Spa	151	sf
Roof Level	Cold Plunge	74	sf
Roof Level	Pool	2,999	sf
Total Area		3,364	sf

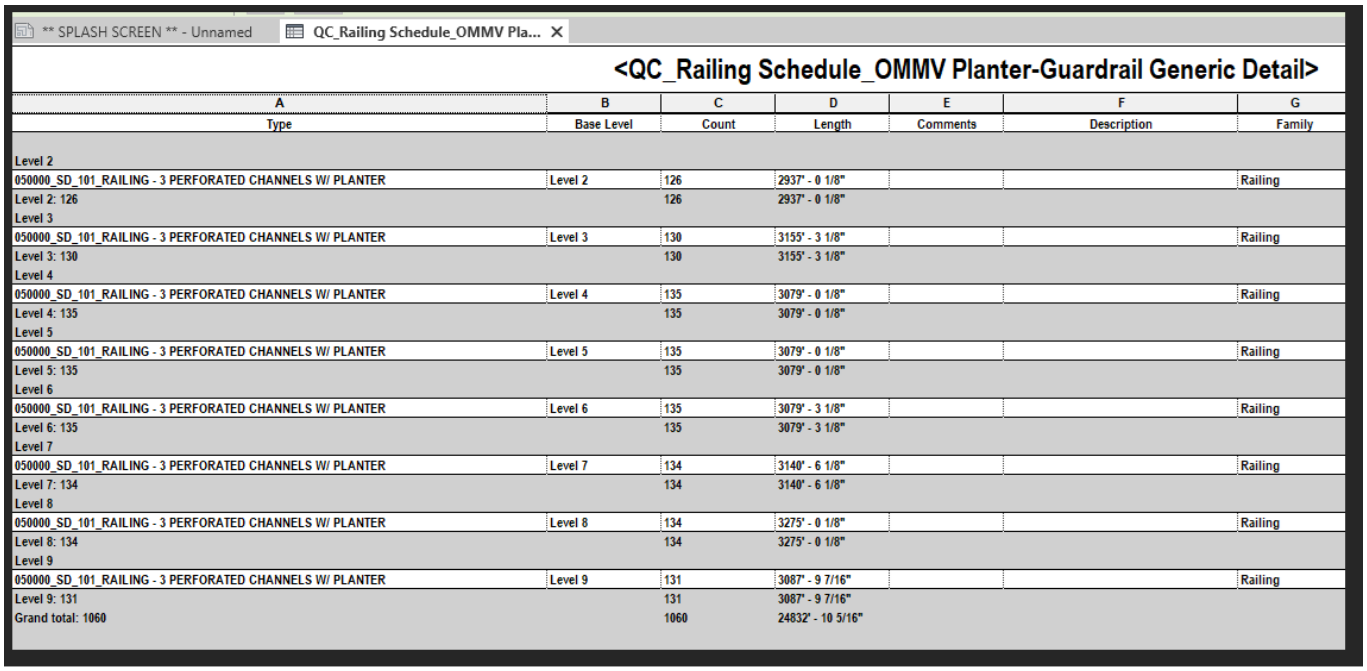
Building 5

Grade Level	Spa	92	sf
Grade Level	Cold Plunge	48	sf
Roof Level	Spa	151	sf
Roof Level	Cold Plunge	74	sf
Roof Level	Pool	2,999	sf
Total Area		3,364	sf

Building 6

Grade Level	Spa	92	sf
Grade Level	Cold Plunge	48	sf
Roof Level	Spa	151	sf
Roof Level	Cold Plunge	74	sf
Roof Level	Pool	2,999	sf
Total Area		3,364	sf

Total Water Surface Area	20,268	sf



** SPLASH SCREEN ** - Unnamed | QC_Railing Schedule_OMMV Pla...

<QC_Railing Schedule_OMMV Planter-Guardrail Generic Detail>

A	B	C	D	E	F	G
Type	Base Level	Count	Length	Comments	Description	Family
Level 2						
050000_SD_101_RAILING - 3 PERFORATED CHANNELS W/ PLANTER	Level 2	126	2937' - 0 1/8"			Railing
Level 2: 126		126	2937' - 0 1/8"			
Level 3						
050000_SD_101_RAILING - 3 PERFORATED CHANNELS W/ PLANTER	Level 3	130	3155' - 3 1/8"			Railing
Level 3: 130		130	3155' - 3 1/8"			
Level 4						
050000_SD_101_RAILING - 3 PERFORATED CHANNELS W/ PLANTER	Level 4	135	3079' - 0 1/8"			Railing
Level 4: 135		135	3079' - 0 1/8"			
Level 5						
050000_SD_101_RAILING - 3 PERFORATED CHANNELS W/ PLANTER	Level 5	135	3079' - 0 1/8"			Railing
Level 5: 135		135	3079' - 0 1/8"			
Level 6						
050000_SD_101_RAILING - 3 PERFORATED CHANNELS W/ PLANTER	Level 6	135	3079' - 3 1/8"			Railing
Level 6: 135		135	3079' - 3 1/8"			
Level 7						
050000_SD_101_RAILING - 3 PERFORATED CHANNELS W/ PLANTER	Level 7	134	3140' - 6 1/8"			Railing
Level 7: 134		134	3140' - 6 1/8"			
Level 8						
050000_SD_101_RAILING - 3 PERFORATED CHANNELS W/ PLANTER	Level 8	134	3275' - 0 1/8"			Railing
Level 8: 134		134	3275' - 0 1/8"			
Level 9						
050000_SD_101_RAILING - 3 PERFORATED CHANNELS W/ PLANTER	Level 9	131	3087' - 9 7/16"			Railing
Level 9: 131		131	3087' - 9 7/16"			
Grand total: 1060		1060	24832' - 10 5/16"			

Appendix H: Private Vs Public Utility Exhibit

LEGEND

PUBLIC SEWER — S

PRIVATE SEWER — S

PUBLIC WATER — W

PRIVATE WATER — W

PROPOSED BUILDING 6
FF = 1,596 FT

PROPOSED BUILDING 1
FF = 1,596 FT

PROPOSED BUILDING 5
FF = 1,596 FT

PROPOSED BUILDING 4
FF = 1,596 FT

PROPOSED BUILDING 2
FF = 1,596 FT

PROPOSED BUILDING 3
FF = 1,596 FT

Kimley»Horn

Optima McDowell Mountain Village

Public v Private Utility Exhibit

September 2, 2022

0 50 100 200

NORTH