CITY OF SCOTTSDALE

Water Study

SOUTHBRIDGE EXPANSION
PRELIMINARY
WATER BASIS OF DESIGN REPORT

SCOTTSDALE, ARIZONA

Expiration Date on P.E. seal is missing?

Please see the next page(s) for the Water BOD review comments

By:

Gookin Engineers, Ltd.
4203 N. Brown Avenue
Scottsdale, AZ 85251

September 21, 2018

Revised July 25, 2019

22-ZN-2018

PRELIMINARY Basis of Design Report
- ☐ ACCEPTED
- ☑ ACCEPTED AS NOTED
- ☐ REVISE AND RESUBMIT

Reviewed by carollo
On behalf of the Scottsdale Water Resources Planning and Engineering Department

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 and 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 and clarifications contact the Water Resources Planning and Engineering Department at 480-321-5685

REVIEWER: Brian Bernard
EMAIL: Bbernard@carollo.com
DATE 08/16/19

SOUTHBRIDGE EXPANSION

CASE FILE 22-ZN-2018 - WATER BOD REPORT

CAROLLO ENGINEER'S CASE FILE REVIEW COMMENTS - 08/16/2019

Ordinance Issues:

1. Developers are required to install at their expense, all improvements necessary to provide water service to their development. This includes any water mains, booster pump stations, pressure reducing stations, surge tanks, valves and appurtenances, or other facilities, and the payment of all required fees. Refer to the Scottsdale Revised Code (SRC), Section 49-73.
2. Water line extensions (all property for which water service is desired shall, as a minimum requirement of service, be provided with, as a portion of the City system, a minimum of one-half of an six inch water main for the entire frontage of the parcel, which will require providing lines on both frontages of the property if the property is a corner parcel, or all frontages of the property if multiple frontages occur per SRC Sec. 49-212/219 and DSPM Sec. 6-1.400.) may be required along the property's frontages.

Policy and Design Related Issues:

3. The Infrastructure Phasing Plan description on page 4 of the Water BOD report is not sufficient. Per DSPM Section 6-1.200, a Master Plan (Water) is required for phased developments and was submitted separately. As a minimum, specify how the phased construction will be conducted in more specific detail in both the Proposed Conditions (page 3) and Infrastructure Phasing (page 4) sections and include the project Master Plan in the final BOD through an Appendix.
4. The Water BOD report included water demand and fire flow analysis per DSPM Sections 6-1.201/202 for off-site flows (estimated off-site water uses). Any off-site improvements that may be required shall be the responsibility of the developer. Detailed information of the proposed off-site improvements is to be included in the final wastewater BOD.
5. Each phase of development must provide a looped/second source of water distribution to comply with DSPM Section 6-1.402.
6. Coordinate with Fire Department on the requirement of any on-site fire hydrant per DSPM Section 6-1.502 and/or if any redundant water source is be required for the fire line. Include written correspondence from Fire Department personnel in the final BOD confirming hydrant requirements and source redundancy.
7. Include site information pertaining to the corresponding fire hydrant tests (example Test #4 - performed at FH 100 feet southeast of Rose Garden site) in the final BOD report
8. Per DSPM 6-1.000 a Professional Engineer (civil or sanitary) currently registered in the State of Arizona is required to analyze the fire flow and water demand from a proposed development (analyze all proposed development for the impact on the water distribution system and effects of various flow scenarios on sizing and layout of the proposed water system) and determine its impact on the city's water distribution system. The BOD engineer's seal does not indicate an expiration date.
9. Include written permission from the COS Water Resources staff confirming that permission has been granted to model fire demand as only one of the four fire demands, specifically the fire demand for the Triangle Site as stated on page 11 of the BOD.
10. Report Covers must include the Developer/Owner's name, address, and phone number.

11. Page 3 of the BOD, revise text in the Introduction narrative to accurately reflect that average and peak volumes of water demand per the current design standards can be met within the existing City sewer infrastructure in accordance with the City of Scottsdale Standards and Policies.
12. Page 3 of the BOD - Existing Conditions and Proposed Conditions, state the existing and proposed pipeline sizes, material types, and strength classes per DSPM 6-1.201/202.
13. Page 3 of the BOD - Proposed Conditions, describe in more detail, and also reference the project phasing on page 4 and the Master Plan Appendix.
14. Page 3 of the BOD - Proposed Conditions, state if the proposed fire service lines are going to be looped or redundant.
15. Page 4 of the BOD - Proposed Conditions, include an Exhibit that confirms no new fire hydrants are required, state the hydrant spacing requirements per DSPM, and note the existing fire hydrant locations on all Exhibits.
16. Page 10 of the BOD, consider revising the Hazen-Williams roughness coefficient to 130 for DIP.

Technical Corrections to be Resolved:

17. For all Exhibits, clearly indicate any new or existing utility easements within the limits of the proposed development site
18. Exhibit 2 - give approximate sizes in acres for each designated site and clearly show the location of all existing/proposed fire hydrants
19. Exhibit 3 - 6 the Fire Hydrant Flow Tests are lacking in detail and include graphs that lack relevant data points to determine the Water Curve Data. Revise graphs and callouts to reflect the information collected and determined.
20. Exhibit 7 - denote areas/sub-areas (A1 - A3) to match with Exhibit 2. Include square footage of each principal area of the proposed development. Include Key Notes to respond to callout boxes #1 - #10 or remove them from the Exhibit.
21. Exhibit 8 - explain the importance or purpose of the red dashed line through Site A. If the dashed line is meant to represent a proposed utility (water main) denote pipe sizes, bends, tees, valves, services, and connections. Show the location of existing/proposed fire hydrants.
22. Exhibit 9 - Indicate the proposed utilities (water main) denote pipe sizes, bends, tees, valves, services, and connections. Show the location of existing/proposed fire hydrants.
23. Exhibit 10 - Indicate the proposed utilities (water main) denote pipe sizes, bends, tees, valves, services, and connections. Show the location of existing/proposed fire hydrants.
24. Exhibit 11 - include the new (updated) water demand information from the proposed Craftsman Court development in the new water demand calculations.
25. Exhibit 12 - provide Key Notes to callout proposed facilities, tees, valve vaults, valves, air release and vacuum valves, services, vault rim/invert information, benchmarks, etc.
26. Exhibit 12 - for proposed fire lines, include isolation valves on both sides of the mainline tee.
27. Exhibit 12 - if water meter and BFP have above-ground facilities, coordinate with parking/street areas for the requirement of traffic bollards.
28. Exhibit 12 - for the 3-inch water service to the Office/Retail space, show the location of the tap at least 4-feet away from the water main bend.
29. Exhibit 12 - in the Key Notes, call out the minimum required sewer/water separation both in horizontal and vertical distances.
30. Exhibit 13 - provide Key Notes to callout proposed facilities, tees, valve vaults, valves, air release and vacuum valves, services, vault rim/invert information, benchmarks, etc.
31. Exhibit 13 - for proposed fire lines, include isolation valves on both sides of the mainline tee.
32. Exhibit 13 - if water meter and BFP have above-ground facilities, coordinate with parking/street areas for the requirement of traffic bollards.

33. Exhibit 13 - in the Key Notes, call out the minimum required sewer/water separation both in horizontal and vertical distances.
34. Exhibit 14 - provide Key Notes to callout proposed facilities, tees, valve vaults, valves, air release and vacuum valves, services, vault rim/invert information, benchmarks, etc.
35. Exhibit 14 - for proposed fire lines, include isolation valves on both sides of the mainline tee.
36. Exhibit 14 - if water meter and BFP have above-ground facilities, coordinate with parking/street areas for the requirement of traffic bollards.
37. Exhibit 14 - in the Key Notes, call out the minimum required sewer/water separation both in horizontal and vertical distances.
38. Exhibit 15 - provide Key Notes to callout proposed facilities, tees, valve vaults, valves, air release and vacuum valves, services, vault rim/invert information, benchmarks, etc.
39. Exhibit 15 - for proposed fire lines, include isolation valves on both sides of the mainline tee.
40. Exhibit 15 - if water meter and BFP have above-ground facilities, coordinate with parking/street areas for the requirement of traffic bollards.
41. Exhibit 15 - in the Key Notes, call out the minimum required sewer/water separation both in horizontal and vertical distances.
42. Exhibits 12 - 15 - provide faded back fire hose pull distances in circular arcs denoted the area covered from each hydrant.
43. Exhibits 12 - 15 - provide faded back fire truck turning radii if applicable for the roadway and parking areas.
44. Exhibit 12 - 15 - what DIP pipe material is being proposed for the water main, state pressure or strength class and type of internal lining.

TABLE OF CONTENTS

SOUTHBRIDGE EXPANSION
PRELIMINARY
WATER BASIS OF DESIGN REPORT

INTRODUCTION

The Southbridge Expansion Project is a mixed use development project generally located between Scottsdale Road and just west of Goldwater Boulevard, along the south side of the Arizona Canal and along the north side of 5th Avenue. The total area is approximately 6.5 acres.

This report will provide calculations to determine the average and peak volumes of water demand that can be expected from the project site and if it can be handled by the current infrastructure to a level that is satisfactory to the City of Scottsdale.

water demand can be met with the existing infrastructure in accordance with City of Scottsdale Standards and Policies

EXISTING CONDITIONS

The Triangle, Marketplace and Southbridge West sites are currently occupied by a combination of office, retail, commercial, and restaurant use. The easterly side of the Rose Garden site is a public parking lot. There is a small vacant parcel on the west end. Exhibit 1 is a vicinity map of the site.

Existing water infrastructure includes recent upgrades to the system by the City of Scottsdale to accommodate large anticipated uses in this area. This includes a 20 inch main along 5th Avenue and Stetson Drive between Goldwater Boulevard and Scottsdale Road and a 12 inch main on 5th Avenue west of Goldwater Boulevard. See Exhibit 2 for a quarter section map with improvement areas shown.

State the material type and class for the proposed water main

PROPOSED CONDITIONS

This mixed use development is laid out as 4 separate sites with various uses. These uses are summarized below under the proposed water demand tables. The use categories are taken from the City of Scottsdale DS&PM, Figure 6-1.2.

Add any proposed construction phasing in the background project narrative

Exhibits 7 – 10 show the various buildings overlaid on an aerial photograph. New water appurtenances will be located adjacent to the street. Each site will have one or more separate water meters with backflow prevention and fire service taps. To service the Triangle Site, a private 12" DIP waterline will be tapped off the existing 20 inch line in Stetson and loop into the 8" waterline on 6th Avenue. These utility connections are shown in Exhibits 12-15. Water meter sizing was determined based on the DSPM and proposed water demands. Landscape water will be metered with the remainder of the building.

Are the fire service lines looped or redundant?

Looped waterline cannot be private. Required to be public and requires 20-feet of easement for the waterline.

Coordinatio nt has been initiated and will be ongoing individual building, and infrastructure fire requirements. Fire Department inpu before and during the building design phase of construction. Final fire protecti be provided by the Fire Department c omission of construction

This is 6-inch AC pipe per City GIS map. Per DSPM 6-1.408, fittings installed into AC or PVC pipe within 6-feet of another fitting or joint will require that section of pipe to be removed and replaced with DIP

documents for building permits.

State the hydrant spacing requirements per DS&PM

A minimum of 1 existing hydrant is adjacent to each site. Each hydrant tested is capable of sustaining the required fire flows for the buildings. The sites are fairly small, and within the required hose lay distances. No new fire hydrants are proposed at this time. As the project progresses to DRB fire requirements will be continually evaluated.

INFRASTRUCTURE PHASING

Add the project phasing to the initial background description narrative

Any required water improvements will be constructed during the development of each individual site simultaneously with the demolition of the existing structures. No water improvements are proposed that will impact any other sites. This phasing will limit the disruption to local businesses, causing road restrictions to the least number of businesses.

FIRE HYDRANT FLOW TESTS

On Fire Flow Tests/Exhibits - show which FH relates to which development area

Pressure and available flow information for existing water lines has been obtained by having fire hydrant flow tests performed on the existing system. Metro Fire Equipment, Inc. has conducted tests at four locations to verify if the existing water system is adequate for the entire project limits. The locations are shown on Exhibit 2. The results are shown in Exhibit 3 through Exhibit 6.

REQUIRED FIRE FLOW

According to Section 6-1.501 of the DS&PM, a minimum fire flow of 1500 gpm is required for commercial, industrial, and multi-family residential properties and a minimum of 2500 gpm is required for high rise structures. The IBC defines high rise as buildings taller than 75 feet. This will include the hotel site and the residential site 1.

SITE	REQ, FIRE FLOW (GPM)
Triangle Site	2500
Marketplace Site	1500
Southbridge West Site	2500
Rose Garden Site	1500

PROPOSED WATER DEMAND CALCULATIONS

This mixed use development is laid out as 4 separate sites with various uses. These sites are further broken down based on water connections to determine water meter sizes, and effects on hydraulic calculations. These uses are summarized below under the proposed water demand tables. The use categories are taken from the City of Scottsdale DS&PM, Figure 6-1.2.

1A. Triangle Site (Hotel Tower)				Average Day Water Demands					
				in Gallons Per Day (GPD)			in Gallons Per Minute (GPM)		
Land Use	Values		Peak Factors	Total Use	Total Demand	Peak Use	Total Use	Total Demand	Peak Use
Restaurant	9,700	SF	3.5	1.3	12,610	44,135	1.81e-03	17.56	61.45
Hotel Rooms	200	Units	3.5	446.3	89,260	312,410	0.63	126.00	441.00
TOTAL	**4" meter**				**101,870**	**356,545**		**143.56**	**502.45**

1B. Triangle Site (Residential Tower)				Average Day Water Demands					
				in Gallons Per Day (GPD)			in Gallons Per Minute (GPM)		
Land Use	Values		Peak Factors	Total Use	Total Demand	Peak Use	Total Use	Total Demand	Peak Use
Residential	184	Units	3.5	185.3	34,095	119,333	0.27	49.68	**173.88**
TOTAL	**3" meter**				**34,095**	**119,333**		**49.68**	**173.88**

1C. Triangle Site (Mixed Use Site)				Average Day Water Demands					
				in Gallons Per Day (GPD)			in Gallons Per Minute (GPM)		
Land Use	Values		Peak Factors	Total Use	Total Demand	Peak Use	Total Use	Total Demand	Peak Use
Retail/Commercial	25,820	SF	3.5	0.8	20,656	72,296	1.11e-03	28.66	**100.31**
Office	119,040	SF	3.5	0.6	71,424	249,984	8.34e-04	99.28	**347.48**
TOTAL	**4" meter**				**92,080**	**322,280**		**127.94**	**447.79**

2. Marketplace Site				Average Day Water Demands					
				in Gallons Per Day (GPD)			in Gallons Per Minute (GPM)		
Land Use	Values		Peak Factors	Total Use	Total Demand	Peak Use	Total Use	Total Demand	Peak Use
Retail/Commercial	13,170	SF	3.5	0.8	10,536	38,876	1.11e-03	14.62	**51.17**
Residential	21	Units	3.5	185.3	3,891	13,620	0.27	5.67	**19.85**
TOTAL	**1.5" meter**				**14,427**	**50,496**		**20.29**	**71.01**

3A. Southbridge West Site - East Tower				Average Day Water Demands					
				in Gallons Per Day (GPD)			in Gallons Per Minute (GPM)		
Land Use	Values		Peak Factors	Total Use	Total Demand	Peak Use	Total Use	Total Demand	Peak Use
Retail/Commercial	19,390	SF	3.5	0.8	15,512	54,292	1.11e-03	21.52	**75.33**
Residential	136	Units	3.5	185.3	25,201	88,203	0.27	36.72	**128.52**
TOTAL	**3" meter**				**40,713**	**142,495**		**58.24**	**203.85**

3B. Southbridge West Site - West Tower				Average Day Water Demands					
				in Gallons Per Day (GPD)			in Gallons Per Minute (GPM)		
Land Use	Values		Peak Factors	Total Use	Total Demand	Peak Use	Total Use	Total Demand	Peak Use
Retail/Commercial	8,310	SF	3.5	0.8	6,648	23,268	1.11e-03	9.22	**32.28**
Residential	58	Units	3.5	185.3	10,747	37,616	0.27	15.66	**54.81**
TOTAL	**1.5" meter**				**17,395**	**60,884**		**24.88**	**87.09**

4. Rose Garden Site				Average Day Water Demands					
				in Gallons Per Day (GPD)			in Gallons Per Minute (GPM)		
Land Use	Values		Peak Factors	Total Use	Total Demand	Peak Use	Total Use	Total Demand	Peak Use
Retail/Commercial	10,427	SF	3.5	0.8	8,342	29,196	1.11e-03	11.57	**40.51**
Residential	171	Units	3.5	185.3	31,686	110,902	0.27	46.17	**161.60**
TOTAL	**3" meter**				**40,028**	**140,098**		**57.74**	**202.10**

Outline estimates in more detail and include updated Craftsman Court development flows into model

EXISTING OFFSITE WATER DEMAND CALCULATIONS

To provide hydraulic calculations, Gookin Engineers made an estimate of offsite existing water uses. Existing off-site water uses are laid out as 11 separate sites with various uses. These uses are summarized below under the off-site existing water demand tables. The node listed corresponds to the node in the EPANET model representing where the water use is occurring. Land uses are taken from the Maricopa County Assessor. A map of the existing uses is attached as Exhibit 11. The use categories are taken from the City of Scottsdale DS&PM, Figure 6-1.2.

GOLDWATER OFFSITE NODE GWs1				Average Day Water Demands					
				in Gallons Per Day (GPD)			in Gallons Per Minute (GPM)		
Land Use	Values		Peak Factors	Total Use	Total Demand	Peak Use	Total Use	Total Demand	Peak Use
Restaurant	4,224	SF	3.5	1.3	5,491	19,219	1.81e-03	7.65	26.76
Retail/Commercial	9,455	SF	3.5	0.8	7,564	26,474	1.11e-03	10.50	36.73
Office	4,610	SF	3.5	0.6	2,766	9,681	8.34e-04	3.84	13.46
TOTAL					**15,821**	**55,374**		**21.99**	**76.95**

ROSE GARDEN OFFSITE NODE RG1				Average Day Water Demands					
				in Gallons Per Day (GPD)			in Gallons Per Minute (GPM)		
Land Use	Values		Peak Factors	Total Use	Total Demand	Peak Use	Total Use	Total Demand	Peak Use
Restaurant	2,333	SF	3.5	1.3	3,033	10,615	1.81e-03	4.22	**14.78**
Retail/Commercial	35,088	SF	3.5	0.8	28,070	98,246	1.11e-03	38.95	**136.32**
Office	11,499	SF	3.5	0.6	6,899	24,148	8.34e-04	9.59	**33.57**
Hotel Rooms	60	Units	3.5	446.3	26,778	93,723	0.63	37.8	**132.30**
TOTAL					**64,781**	**226,732**		**90.56**	**316.96**

5TH AVENUE OFFSITE NODE 5A OFFSITE				Average Day Water Demands					
				in Gallons Per Day (GPD)			in Gallons Per Minute (GPM)		
Land Use	Values		Peak Factors	Total Use	Total Demand	Peak Use	Total Use	Total Demand	Peak Use
Retail/Commercial	7,920	SF	3.5	0.8	6,336	22,176	1.11e-03	8.79	**30.77**
Office	2,152	SF	3.5	0.6	1,291	4,519	8.34e-04	1.79	**6.28**
TOTAL					**7,627**	**26,695**		**10.59**	**37.05**

MARSHALL WAY OFFSITE NODE MW1				Average Day Water Demands					
				in Gallons Per Day (GPD)			in Gallons Per Minute (GPM)		
Land Use	Values		Peak Factors	Total Use	Total Demand	Peak Use	Total Use	Total Demand	Peak Use
Retail/Commercial	57,235	SF	3.5	0.8	45,788	160,258	1.11e-03	65.53	**222.36**
TOTAL					**45,788**	**160,258**		**65.53**	**222.36**

CRAFTSMAN COURT SOUTH OFFSITE NODE CC2				Average Day Water Demands					
				in Gallons Per Day (GPD)			in Gallons Per Minute (GPM)		
Land Use	Values		Peak Factors	Total Use	Total Demand	Peak Use	Total Use	Total Demand	Peak Use
Restaurant	28,353	SF	3.5	1.3	36,859	129,006	1.81e-03	51.32	**179.62**
Retail/Commercial	66,885	SF	3.5	0.8	53,508	187,278	1.11e-03	74.24	**259.85**
Office	3,443	SF	3.5	0.6	2,066	7,230	8.34e-04	2.87	**10.05**
TOTAL					**92,433**	**323,514**		**128.43**	**449.51**

SCOTTSDALE SOUTH OFFSITE NODE SCOTTSDALE 1				Average Day Water Demands					
				in Gallons Per Day (GPD)			in Gallons Per Minute (GPM)		
Land Use	Values		Peak Factors	Total Use	Total Demand	Peak Use	Total Use	Total Demand	Peak Use
Restaurant	12,086	SF	3.5	1.3	15,712	54,991	1.81e-03	21.88	**76.56**
Retail/Commercial	11,065	SF	3.5	0.8	8,852	30,982	1.11e-03	12.28	**42.99**
Office	2,740	SF	3.5	0.6	1,644	5,754	8.34e-04	2.29	**8.00**
TOTAL					**26,208**	**91,727**		**36.44**	**127.55**

MARKETPLACE WEST OFFSITE NODE S4				Average Day Water Demands					
				in Gallons Per Day (GPD)			in Gallons Per Minute (GPM)		
Land Use	Values		Peak Factors	Total Use	Total Demand	Peak Use	Total Use	Total Demand	Peak Use
Restaurant	5,484	SF	3.5	1.3	7,129	24,952	1.81e-03	9.93	**34.74**
Retail/Commercial	4,418	SF	3.5	0.8	3,534	12,370	1.11e-03	4.90	**17.16**
TOTAL					**10,644**	**37,323**		**14.83**	**51.91**

SCOTTSDALE MID OFFSITE NODE SCOTTSDALE 3				Average Day Water Demands					
				in Gallons Per Day (GPD)			in Gallons Per Minute (GPM)		
Land Use	Values		Peak Factors	Total Use	Total Demand	Peak Use	Total Use	Total Demand	Peak Use
Restaurant	8,593	SF	3.5	1.3	11,171	39,098	1.81e-03	15.55	**54.44**
Retail/Commercial	9,410	SF	3.5	0.8	7,528	26,348	1.11e-03	10.45	**36.56**
Office	11,160	SF	3.5	0.6	6,696	23,436	8.34e-04	9.31	**32.58**
TOTAL					**25,395**	**88,882**		**35.31**	**123.57**

SCOTTSDALE NORTH OFFSITE NODE SCOTTSDALE 6				Average Day Water Demands					
				in Gallons Per Day (GPD)			in Gallons Per Minute (GPM)		
Land Use	Values		Peak Factors	Total Use	Total Demand	Peak Use	Total Use	Total Demand	Peak Use
Office	16,376	SF	3.5	0.6	9,826	34,390	8.34e-04	13.66	**47.80**
TOTAL					**9,826**	**34,390**		**13.66**	**47.80**

STETSON OFFSITE NODE Ss1				Average Day Water Demands					
				in Gallons Per Day (GPD)			in Gallons Per Minute (GPM)		
Land Use	Values		Peak Factors	Total Use	Total Demand	Peak Use	Total Use	Total Demand	Peak Use
Restaurant	13,112	SF	3.5	1.3	17,046	59,660	1.81e-03	23.73	**83.06**
Office	53,437	SF	3.5	0.6	32,062	112,218	8.34e-04	44.57	**155.98**
TOTAL					**49,108**	**171,877**		**68.30**	**239.05**

CRAFTSMAN COURT NORTH OFFSITE NODE 5As5				Average Day Water Demands					
				in Gallons Per Day (GPD)			in Gallons Per Minute (GPM)		
Land Use	Values		Peak Factors	Total Use	Total Demand	Peak Use	Total Use	Total Demand	Peak Use
Retail/Commercial	8,067	SF	3.5	0.8	6,454	22,588	1.11e-03	8.95	**31.34**
TOTAL					**6,454**	**22,588**		**8.95**	**31.34**

HYDRAULIC ANALYSIS

A hydraulic analysis of the water system was performed using EPANET to determine flows throughout the system. The pipes were a mixture of ACP and DIP pipes, ranging from 6" diameter to 20" diameter. The flow network was graphically simplified in order to reduce total pipes to be analyzed. Each pipe has notes in the attached sheets that describe which minor losses were attributed to that pipe.

Existing/Proposed

The vast majority of the network is existing. The only proposed sections for the Marketplace Site, Southbridge West Site and Rose Garden Site are the individual taps. There is a proposed 12" line leading into the Triangle Site, narrowing to an 8 inch line after the first 2 service and fire taps, before looping into the 8" line in 6th Avenue.

6-inch AC line per City GIS map

Description of Nodes

The nodes in the project represent either intersections of pipes or locations where water can be removed or added to the system. Individual bends and fittings were included in the minor losses for each pipe. Naming of nodes was based o le, a use (such as FH for fire hydrant), and a first node on Goldwater Avenue. 5As2 is t

No labeling on the Network Diagram for nodes or pumps/reservoirs per DSPM Section 6-1.202. Include labeled Network Diagram in the final BOD

The proposed nodes use the same format, but use the location and use. For example, HotelFire1 is the first fire tap for the proposed hotel site. PH1 is the first node on the proposed hotel water extension.

Description of Pipes

Consider H-W Coeff of 130 for DIP

Pipes in this area are either Ductile Iron (DIP) or Asbestos Cement (ACP). Both pipes have similar Hazen-Williams roughness coefficients. All pipes were set with a Hazen Williams roughness coefficient of 140.

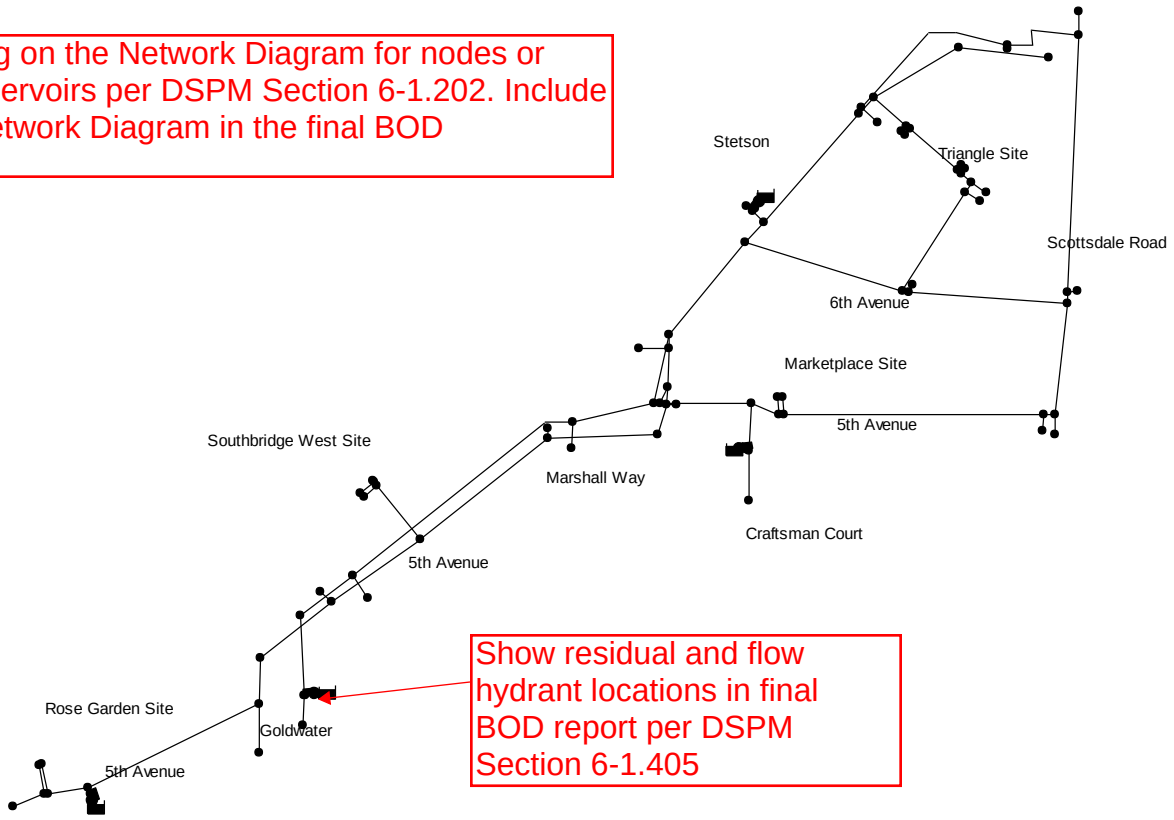
Minor Losses can occur in a number of fittings throughout the area. Number and type of fittings were estimated based on the quarter section maps. The following is a list of the fittings and their associated minor losses.

Gate Valve	0.2
Tee Inline (Equal Size)	0.35
Tee Branch (Any Size)	1
Tee Inline (smaller branch)	0.25
Tap Inline	0.15
90 degree elbow	0.5
45 degree elbow	0.2
22.5 degree elbow	0.1
11.25 degree elbow	0.05

Pipes are named in a similar convention to the nodes. It uses street first, size of water line, use of waterline and an identifying number. For example 5A20Main1 is the 1st pipe of the 20" main in 5th Avenue. These descriptions are included, along with the minor losses associated with each pipe, as Appendix 4.

EPANET Model Map

No labeling on the Network Diagram for nodes or pumps/reservoirs per DSPM Section 6-1.202. Include labeled Network Diagram in the final BOD



Show residual and flow hydrant locations in final BOD report per DSPM Section 6-1.405

Description of Water Source

Water servicing this project was modeled as a reservoir at each of the 4 fire hydrant test locations. The pressure in the hydrant was represented by a pump curve and a pump object corresponding to the fire hydrant test.

Conditions Modeled

Based on discussions with City Staff, 3 conditions were modeled, corresponding to Conditions 1, 2 and 3 in the DS&PM, 6-1.200. Condition 1 is all sites using average daily demand at all demand nodes. Condition 2 is all sites using peak daily demand at all demand nodes. Condition 3 is all sites using peak daily demand including fire flow demand.

Existing and proposed demands are shown in the above tables. Based on discussions with City Staff, Gookin Engineers modeled fire demand as only 1 of the 4 fire demands, specifically the fire demand for the Triangle Site. To simulate worst case pressure drops, Gookin Engineers chose the fire hydrant

Submit written confirmation that this was acceptable to WR

on 6th Avenue to apply a 2500 GPM demand in Condition 3. This fire hydrant is located on the smallest waterline, and will lead to the largest pressure drops at any point in the system.

Model Results

Condition 1

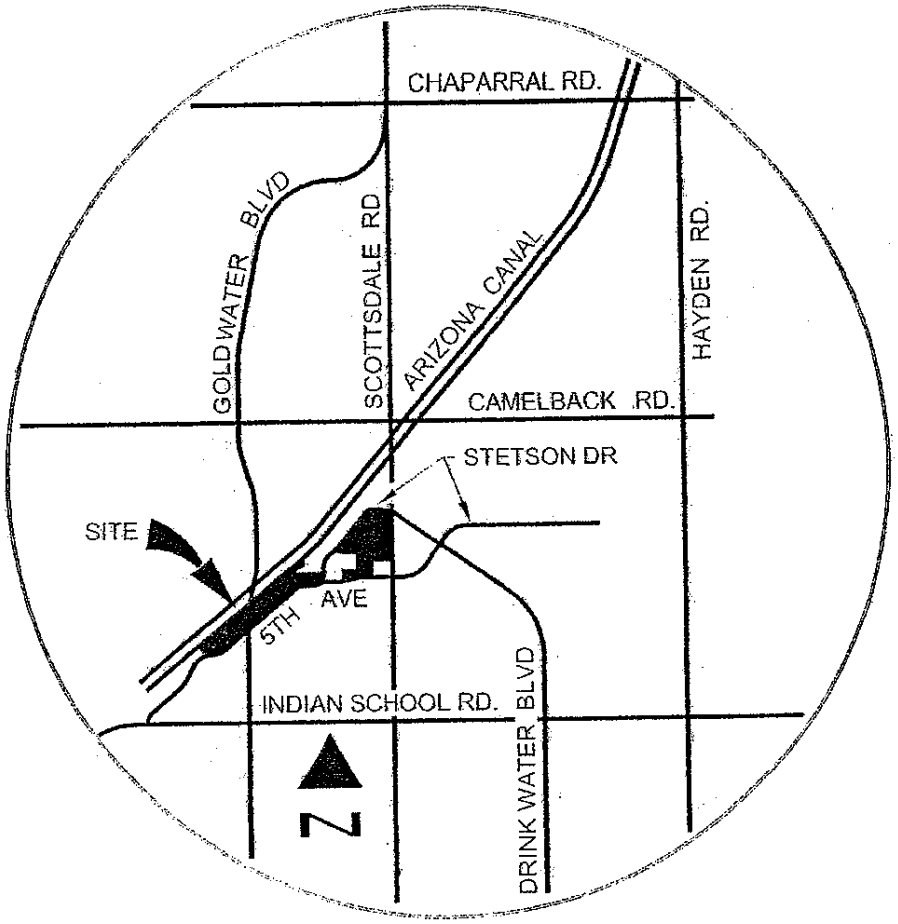
This model resulted in sufficient pressure throughout the system. Attached Appendix 1 is the Full Output Report for EPANET condition 1. To summarize, pressures throughout the system vary from a high of 101.72 psi to a low of 100.49 psi.

Condition 2

This model resulted in sufficient pressure throughout the system. Attached Appendix 2 is the Full Output Report for EPANET condition 2. To summarize, pressures throughout the system vary from a high of 99.37 psi to a low of 88.15 psi.

Condition 3

This model resulted in sufficient pressure throughout the system. Attached Appendix 3 is the Full Output Report for EPANET condition 3. To summarize, pressures throughout the system vary from a high of 95.47 psi to a low of 76.64 psi.



VICINITY MAP

SW 1/4 SEC 22 T2N R4E
NOT TO SCALE

SOUTHBRIDGE EXPANSION

EXHIBIT 1 LOCATION OF THE PROJECT

VICINITY MAP
EXHIBIT 1

18-44

17-43

17-44

TRIANGLE SITE

HYDRANT TEST 2

HYDRANT TEST 3

HYDRANT TEST 1

HYDRANT TEST 4

SOUTHBRIDGE WEST SITE

ROSE GARDEN SITE

MARKETPLACE SITE

Detail A

Detail B

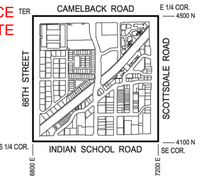
GENERAL NOTES:

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

LEGEND:

- Air Release Valve (ARV)
- Non-potable Air Release Valve (NPARV)
- Blowoff
- Cap
- Cathodic Protection (CP)
- Fill Drain (FAD)
- Fire Hydrant
- Non-GPS Point
- Pressure Reducing Valve (PRV)
- Pump (MP)
- Reducer
- Sample Station (SS)
- Water Manhole (WMH)
- Non-Potable Manhole (NPMH)
- Well (WELL)
- Valve
- Non-potable Valve (NPV)
- Vault (WVT)
- Water Main
- Non-Potable Main (NP)
- Fire / Private Main
- Non-Scottsdale Main

VICINITY MAP



NORTH

SCALE: 1" = 100'

0 50 100 200

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

WATER

QUARTER SECTION MAP

17-44

SE 1/4 SEC. 22 T2N R4E

EXHIBIT 2

07-JUL-19

CITY OF SCOTTSDALE

SCOTTSDALE GEOGRAPHIC INFORMATION SYSTEMS

3629 North Drinkwater Boulevard
Scottsdale, Arizona 85251

Show residual and flow hydrant locations in final BOD report per DSPM Section 6-1.405 (Typ).

METRO FIRE EQUIPMENT, INC.

63 S. Hamilton Place, Gilbert, AZ 85233 • 3851 N. Oracle Road, Tucson, AZ 85705
Main (480) 464-0509 • Fax (480) 962-5372 • Tucson (520) 888-0694 • www.metrofireaz.com
AZ ROC# C-16:111021 • CR-67:103313 • CR-5: 213027 • CR-80:295875 • R-16:166777

Hydrant Flow Test Report

LOCATION	7007 E. 5th Ave.				DATE:	8/24/2018
TEST BY:	Metro Fire Equipment		TIME:	7:20 AM		
WATER SUPPLIED BY:	City of Scottsdale					
PURPOSE OF TEST:	Water Curve Data					

DATA

FLOW HYDRANT(S)	A1	A2		
SIZE OPENING:	2.5	2.5		
COEFFICIENT:	0.9			
PITOT READING:	55	0		
GPM:	**1244**	0		

TOTAL FLOW DURING TEST: **1244** GPM

STATIC READING:	102	PSI	RESIDUAL:	79	PSI

ADJ. STATIC:	**102**	**PSI**	**RESIDUAL:**	**79**	**PSI**		
ADJ. FLOW:	**AT 20 PSI RESIDUAL**	**2472**	**GPM**	**AT 0 PSI**	**2781**	**GPM**	

Results of this flow test identify water system characteristics for the date, time, and locations of this test only. Pressure and flows within the water system vary of time, it is expected and should be considered when preparing designs based upon fire flow test data. Numerous factors affect the water system, such as water level fluctuations in reservoirs, operating pressure ranges at booster pump stations, elevations at point of use, daily demand fluctuations, seasonal demands, emergency demands, water treatment plant availability, increased demands due to growth, operation/maintenance schedules, etc.

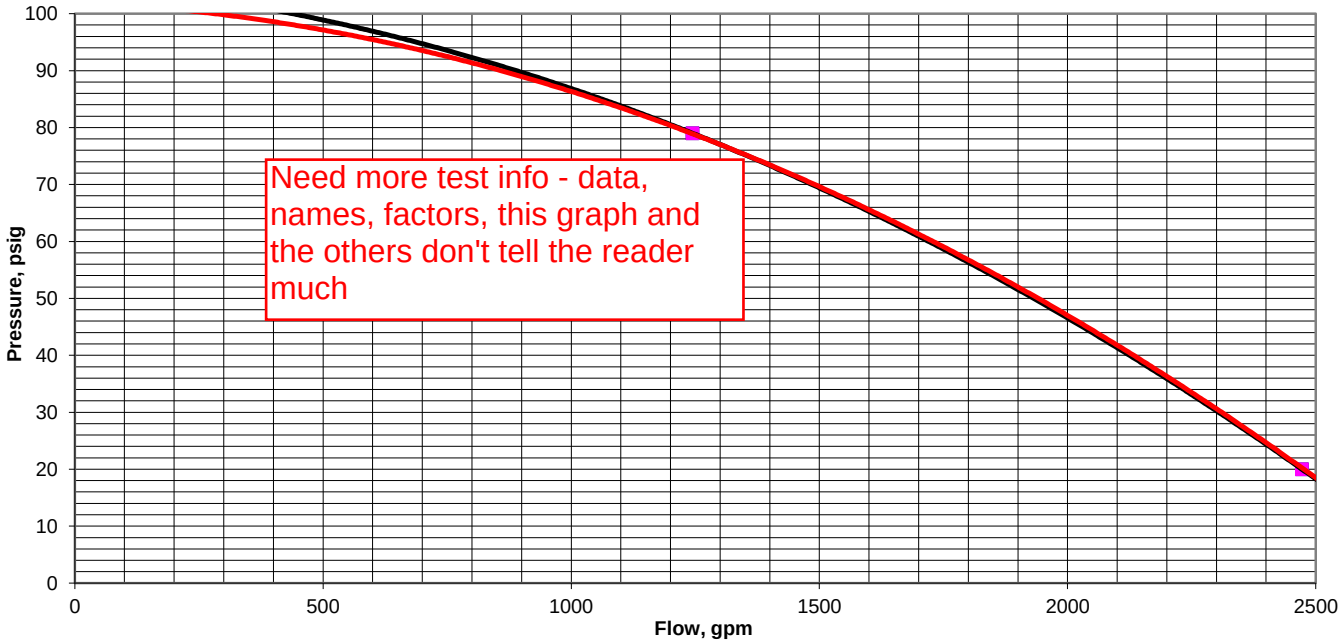


EXHIBIT 3
HYDRANT TEST 1
C.O.S. WITNESS: BRIAN DICK
INSPECTION SERVICES
602-228-2187

METRO FIRE EQUIPMENT, INC.

63 S. Hamilton Place, Gilbert, AZ 85233 • 3851 N. Oracle Road, Tucson, AZ 85705
Main (480) 464-0509 • Fax (480) 962-5372 • Tucson (520) 888-0694 • www.metrofireaz.com
AZ ROC# C-16:111021 • CR-67:103313 • CR-5: 213027 • CR-80:295875 • R-16:166777

Hydrant Flow Test Report

LOCATION	7133 E Stetson Dr.			DATE:	8/24/2018
TEST BY:	Metro Fire Equipment		TIME:	7:50 AM	
WATER SUPPLIED BY:	City of Scottsdale				
PURPOSE OF TEST:	Water Curve Data				

DATA

FLOW HYDRANT(S)	A1	A2		
SIZE OPENING:	2.5	2.5		
COEFFICIENT:	0.9			
PITOT READING:	67	0		
GPM:	**1373**	0		
TOTAL FLOW DURING TEST:	**1373**	GPM		

STATIC READING:	102	PSI	RESIDUAL:	96	PSI

ADJ. STATIC:	**102**	**PSI**	**RESIDUAL:**	**96**	**PSI**		
ADJ. FLOW:	**AT 20 PSI RESIDUAL**	**5637**	**GPM**	**AT 0 PSI**	**6342**	**GPM**	

Results of this flow test identify water system characteristics for the date, time, and locations of this test only. Pressure and flows within the water system vary of time, it is expected and should be considered when preparing designs based upon fire flow test data. Numerous factors affect the water system, such as water level fluctuations in reservoirs, operating pressure ranges at booster pump stations, elevations at point of use, daily demand fluctuations, seasonal demands, emergency demands, water treatment plant availability, increased demands due to growth, operation/maintenance schedules, etc.

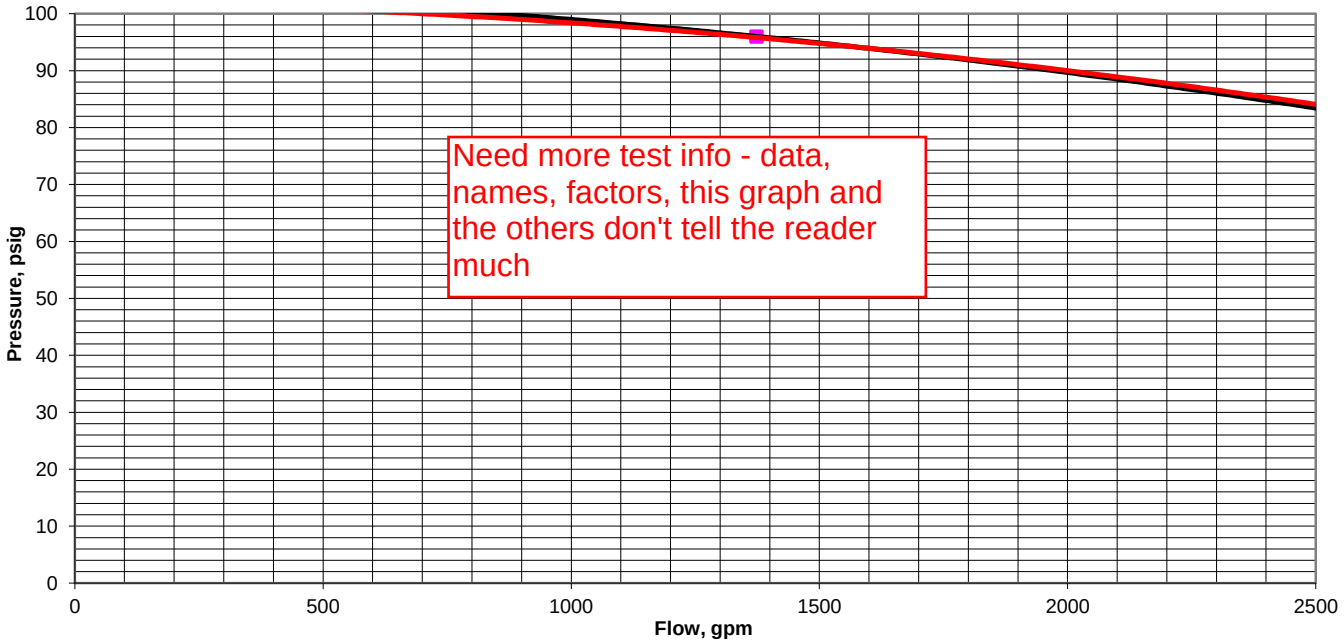


EXHIBIT 4
HYDRANT TEST 2
C.O.S. WITNESS: BRIAN DICK
INSPECTION SERVICES
602-228-2187

METRO FIRE EQUIPMENT, INC.

63 S. Hamilton Place, Gilbert, AZ 85233 • 3851 N. Oracle Road, Tucson, AZ 85705
Main (480) 464-0509 • Fax (480) 962-5372 • Tucson (520) 888-0694 • www.metrofireaz.com
AZ ROC# C-16:111021 • CR-67:103313 • CR-5: 213027 • CR-80:295875 • R-16:166777

Hydrant Flow Test Report

LOCATION	7124 E. 5th Ave.			DATE:	8/24/2018
TEST BY:	Metro Fire Equipment		TIME:	7:35 AM	
WATER SUPPLIED BY:	City of Scottsdale				
PURPOSE OF TEST:	Water Curve Data				

DATA

FLOW HYDRANT(S)	A1	A2		
SIZE OPENING:	2.5	2.5		
COEFFICIENT:	0.9			
PITOT READING:	56	0		
GPM:	**1256**	0		
TOTAL FLOW DURING TEST:	**1256** GPM			

STATIC READING:	101	PSI	RESIDUAL:	78	PSI

ADJ. STATIC:	**101**	**PSI**	**RESIDUAL:**	**78**	**PSI**		
ADJ. FLOW:	**AT 20 PSI RESIDUAL**	**2478**	**GPM**	**AT 0 PSI**	**2792**	**GPM**	

Results of this flow test identify water system characteristics for the date, time, and locations of this test only. Pressure and flows within the water system vary of time, it is expected and should be considered when preparing designs based upon fire flow test data. Numerous factors affect the water system, such as water level fluctuations in reservoirs, operating pressure ranges at booster pump stations, elevations at point of use, daily demand fluctuations, seasonal demands, emergency demands, water treatment plant availability, increased demands due to growth, operation/maintenance schedules, etc.

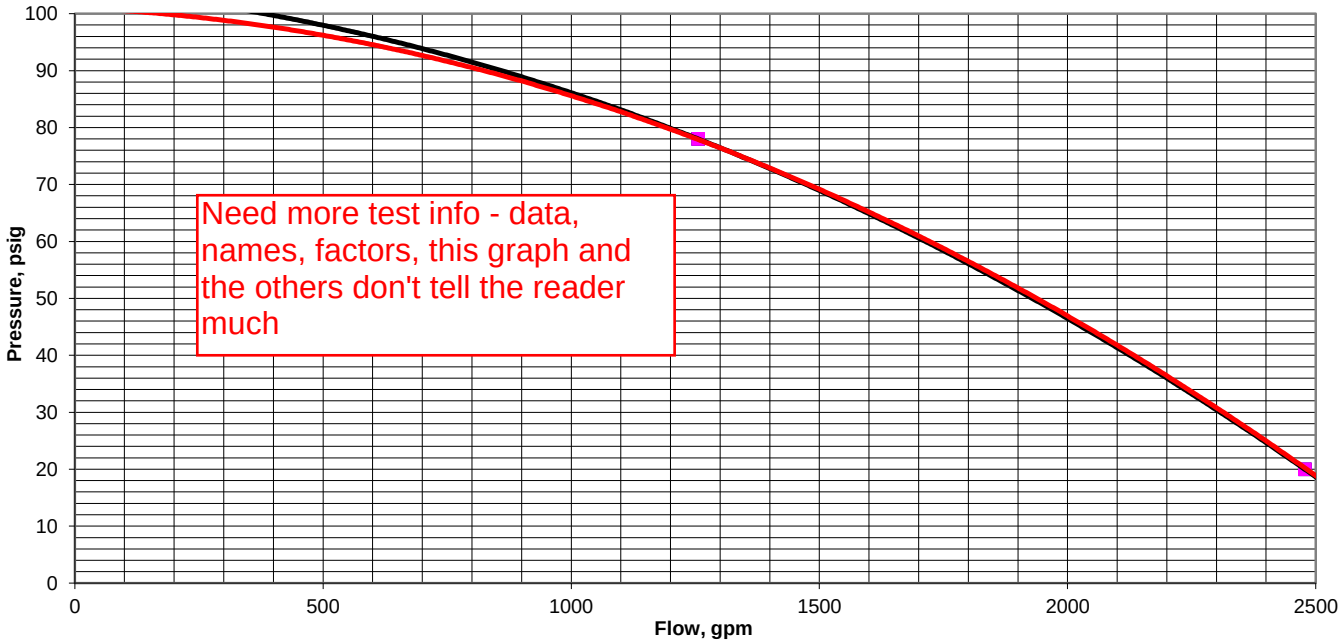


EXHIBIT 5
HYDRANT TEST 3
C.O.S. WITNESS: BRIAN DICK
INSPECTION SERVICES
602-228-2187

METRO FIRE EQUIPMENT, INC.

63 S. Hamilton Place, Gilbert, AZ 85233 • 3851 N. Oracle Road, Tucson, AZ 85705
Main (480) 464-0509 • Fax (480) 962-5372 • Tucson (520) 888-0694 • www.metrofireaz.com
AZ ROC# C-16:111021 • CR-67:103313 • CR-5: 213027 • CR-80:295875 • R-16:166777

Hydrant Flow Test Report

LOCATION	6941 E. 5th Ave.				DATE:	3/21/2019
TEST BY:	Metro Fire Equipment		TIME:	7:00 AM		
WATER SUPPLIED BY:	City of Scottsdale					
PURPOSE OF TEST:	Water Curve Data					

DATA

FLOW HYDRANT(S)	A1	A2		
SIZE OPENING:	2.5	2.5		
COEFFICIENT:	0.9			
PITOT READING:	80	0		
GPM:	**1501**	0		
TOTAL FLOW DURING TEST:	**1501** GPM			

STATIC READING:	102	PSI	RESIDUAL:	98	PSI

ADJ. STATIC:	**102**	**PSI**	**RESIDUAL:**	**98**	**PSI**		
ADJ. FLOW:	**AT 20 PSI RESIDUAL**	**7668**	**GPM**	**AT 0 PSI**	**8627**	**GPM**	

Results of this flow test identify water system characteristics for the date, time, and locations of this test only. Pressure and flows within the water system vary of time, it is expected and should be considered when preparing designs based upon fire flow test data. Numerous factors affect the water system, such as water level fluctuations in reservoirs, operating pressure ranges at booster pump stations, elevations at point of use, daily demand fluctuations, seasonal demands, emergency demands, water treatment plant availability, increased demands due to growth, operation/maintenance schedules, etc.

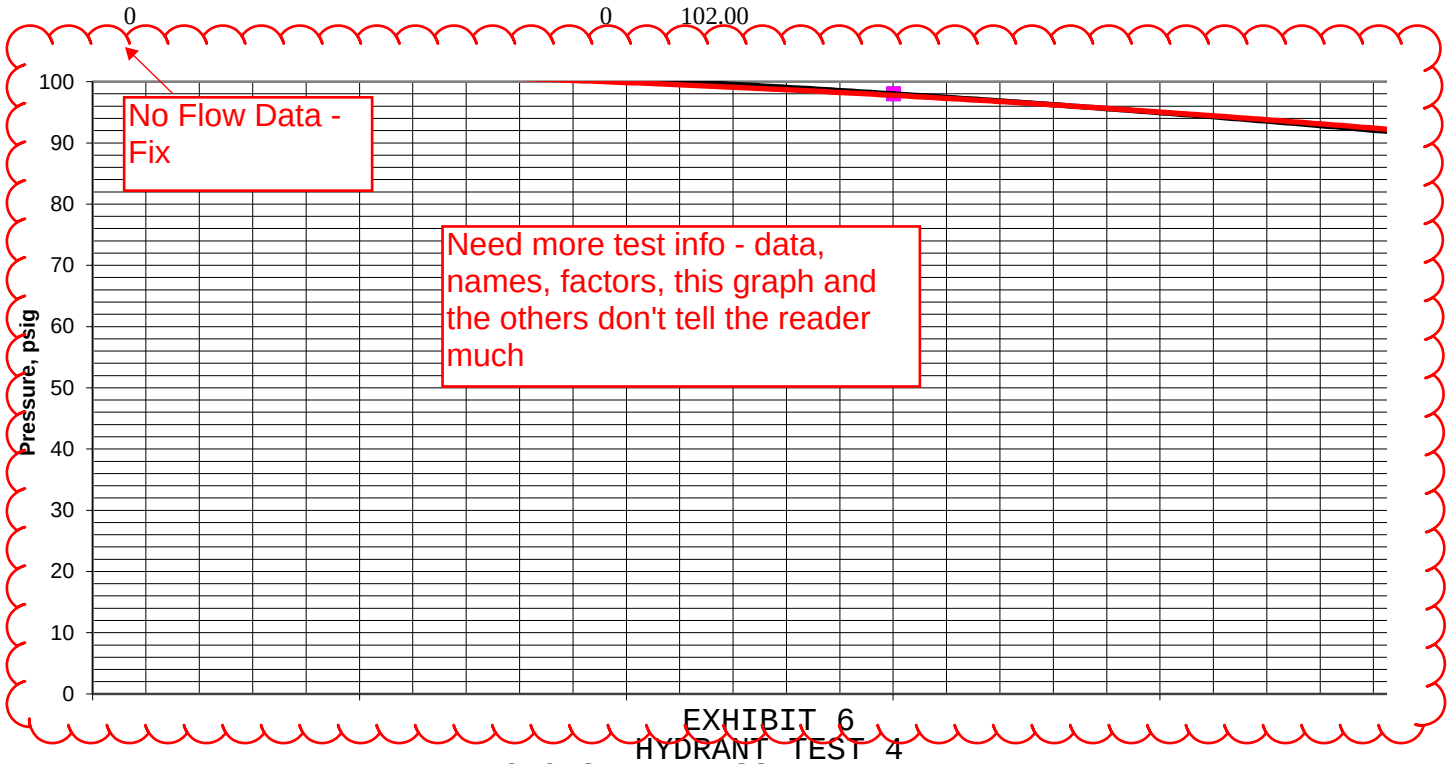
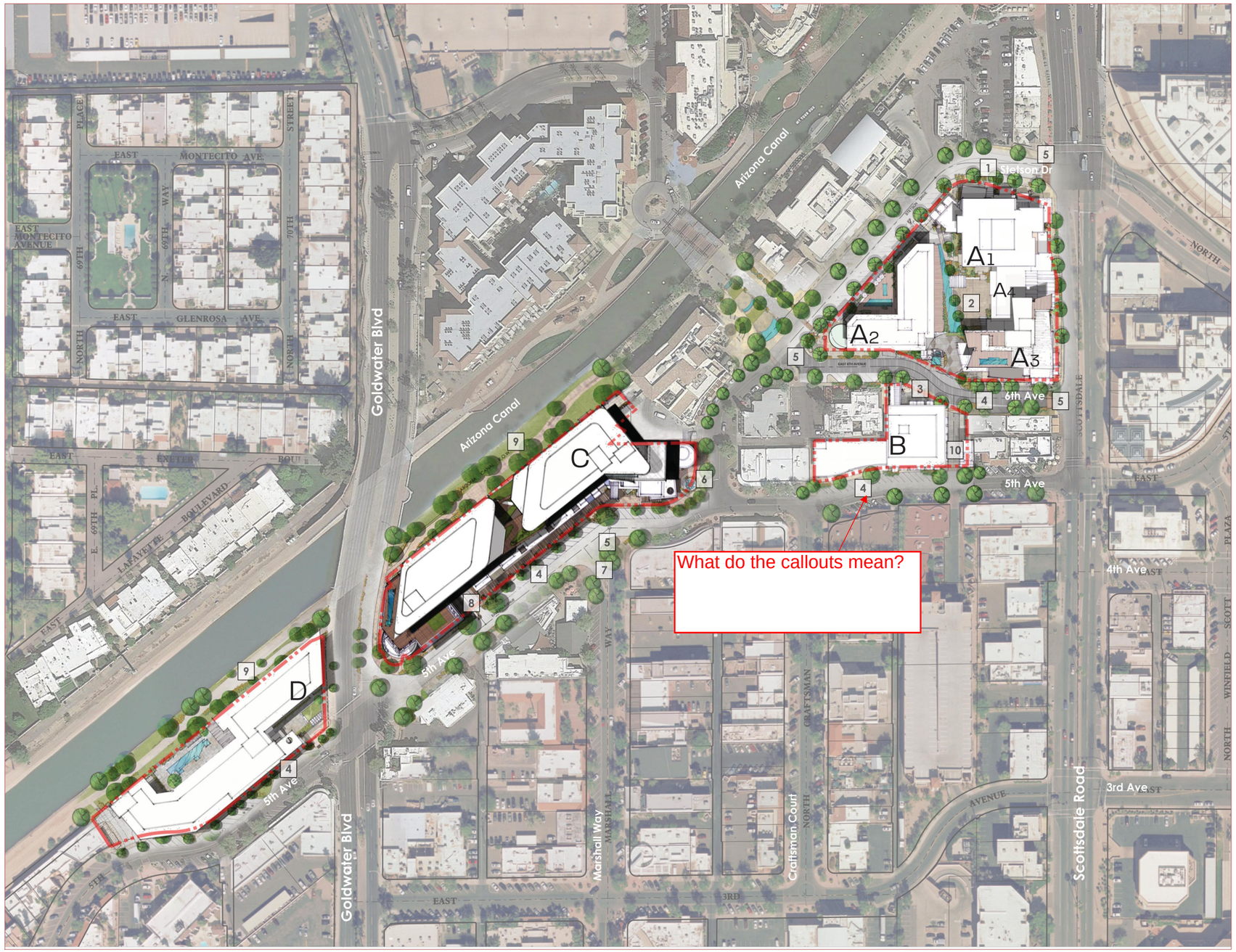
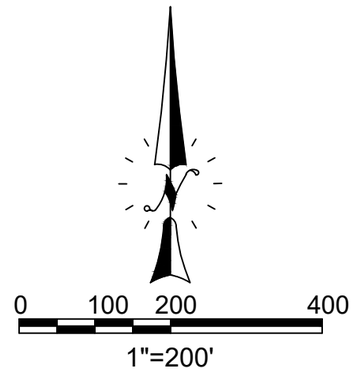
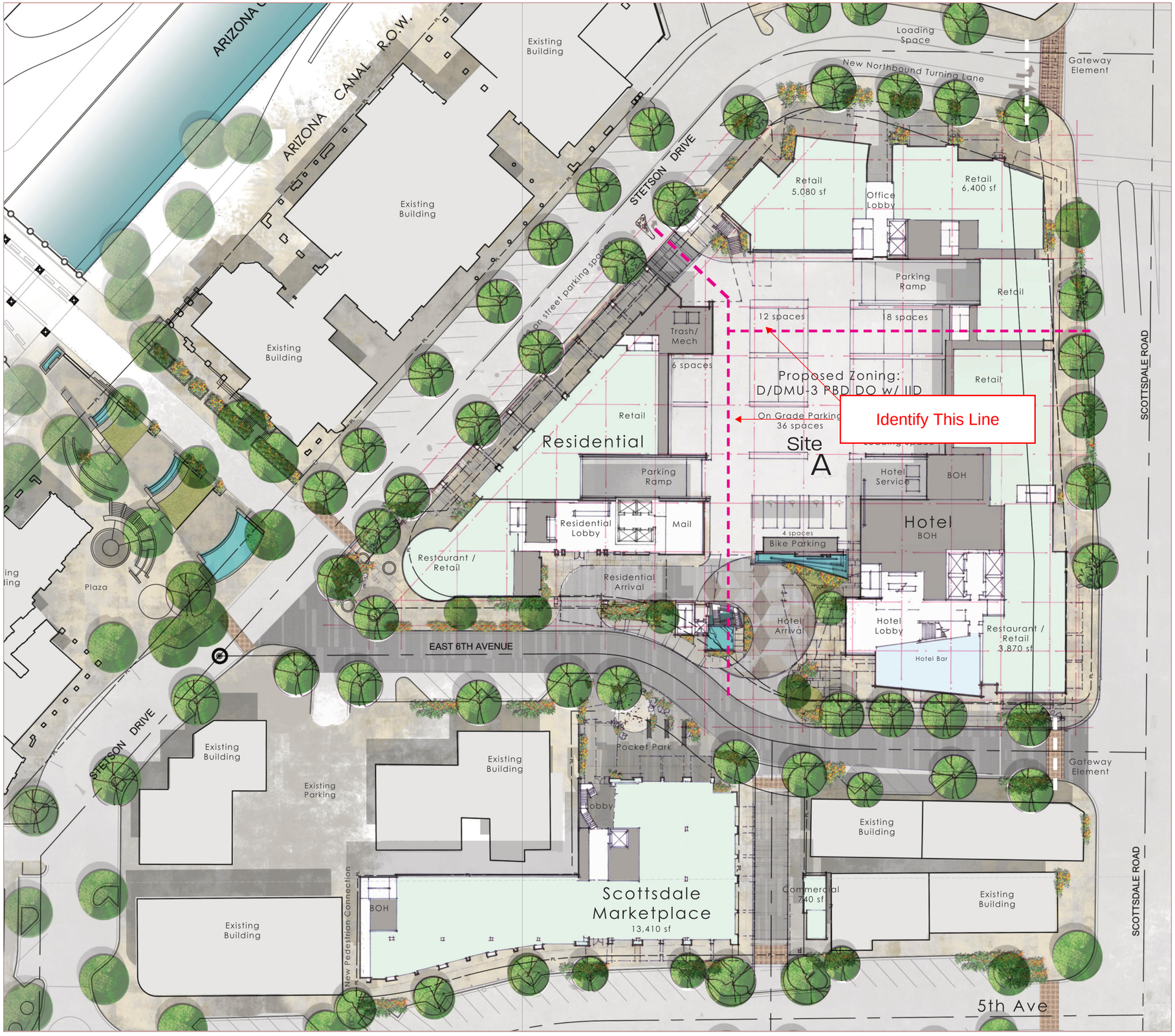


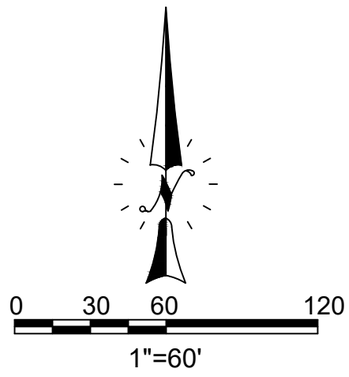
EXHIBIT 6
HYDRANT TEST 4
C.O.S. WITNESS: RAY PADILLA
INSPECTION SERVICES
602-228-2187



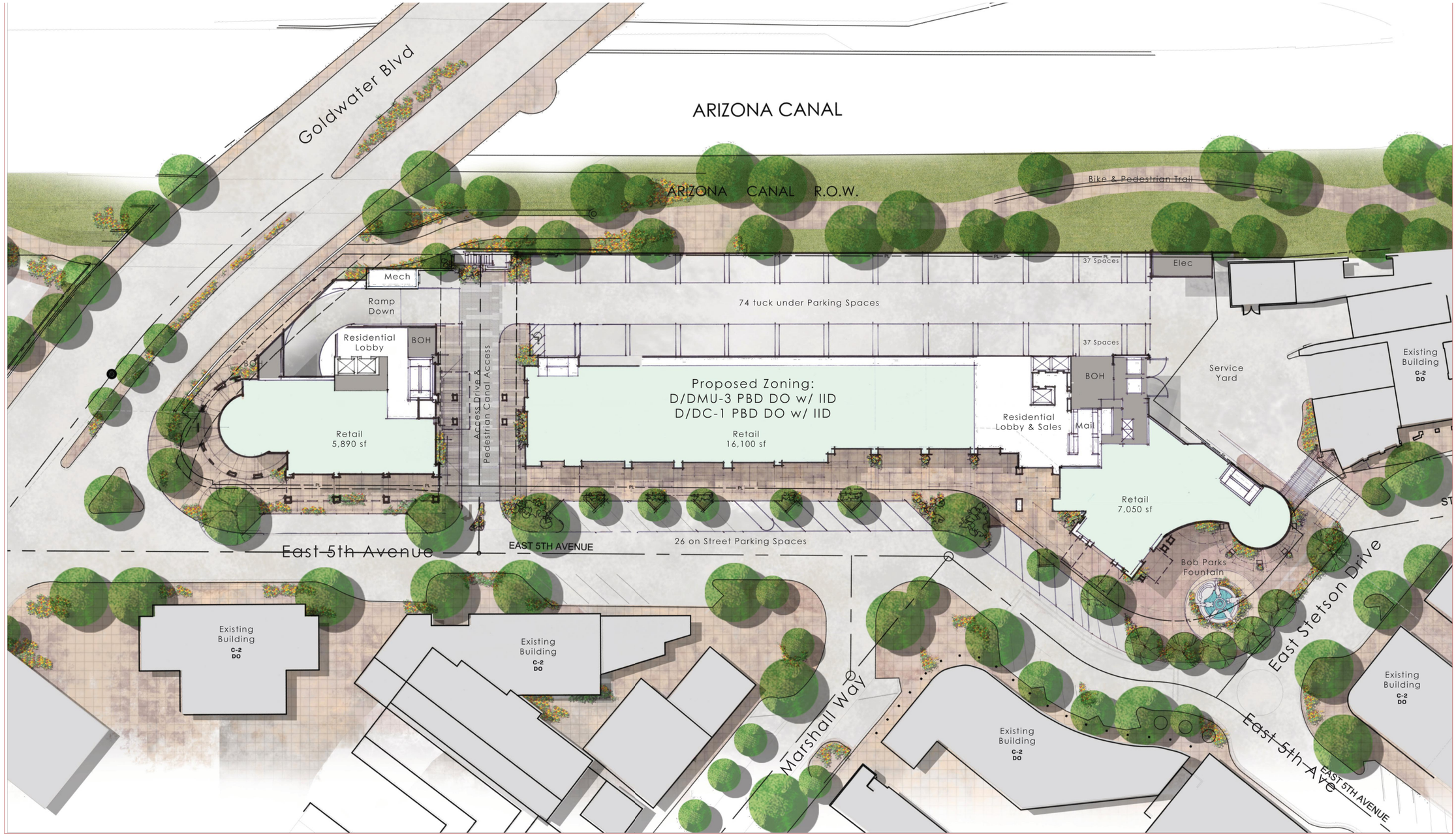


OVERALL SITE PLAN
AERIAL PHOTOGRAPH
PROPOSED CONDITION
EXHIBIT 7





TRIANGLE AND MARKETPLACE SITES AERIAL PHOTOGRAPH PROPOSED CONDITION EXHIBIT 8

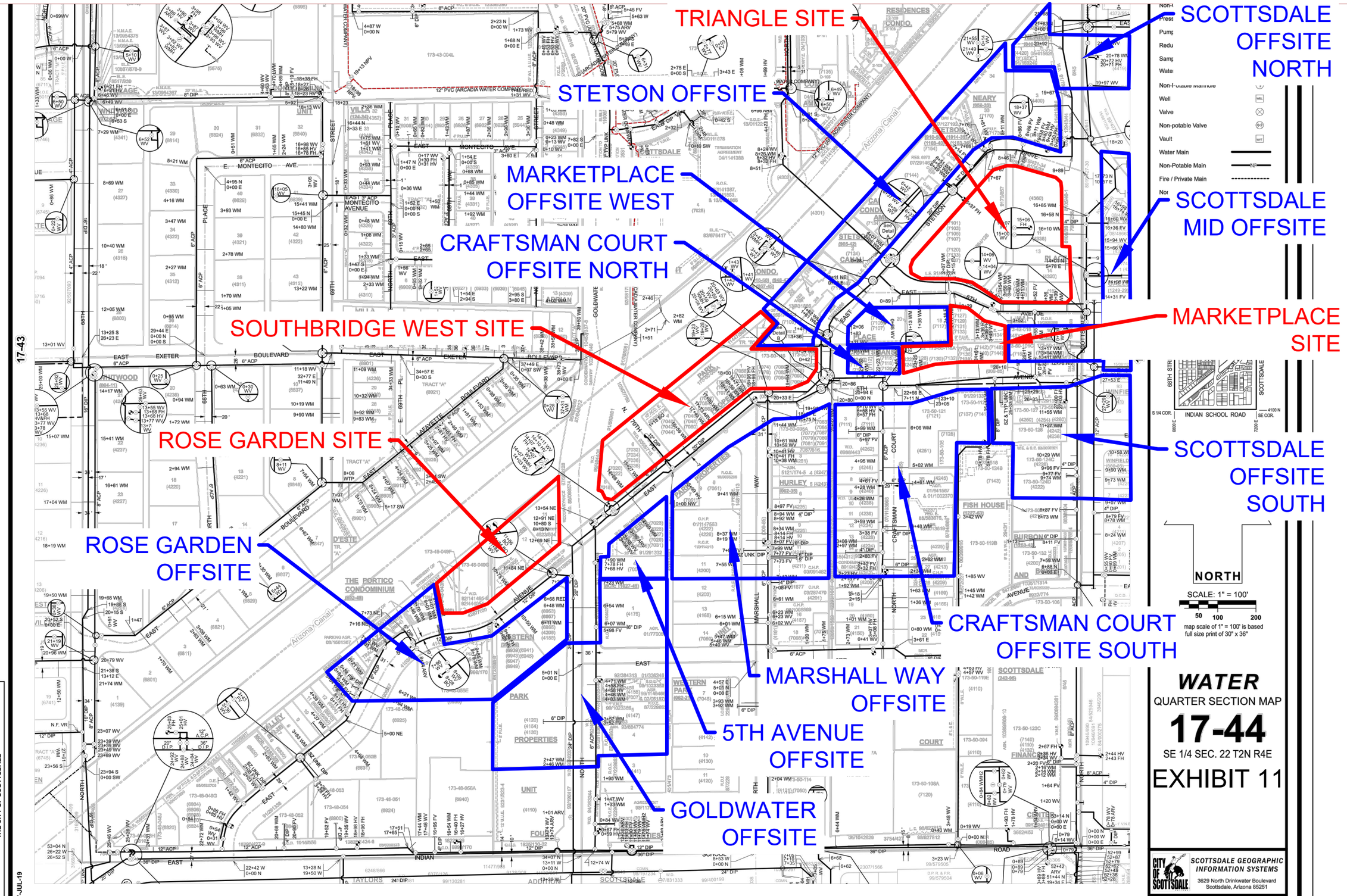


0 30 60 120

1"=60'

SOUTHBRIDGE WEST
AERIAL PHOTOGRAPH
PROPOSED CONDITION
EXHIBIT 9

ROSE GARDEN
AERIAL PHOTOGRAPH
PROPOSED CONDITION
EXHIBIT 10



N O T I C E

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THE CITY OF SCOTTSDALE

07-JUL-19

Non-Potable Manhole
Well
Valve
Non-potable Valve
Vault
Water Main
Non-Potable Main
Fire / Private Main

WATER

QUARTER SECTION MAP

17-44

SE 1/4 SEC. 22 T2N R4E

EXHIBIT 11

SCOTTSDALE GEOGRAPHIC INFORMATION SYSTEMS
3629 North Drinkwater Boulevard
Scottsdale, Arizona 85251

Requires a valve on the existing 20-inch waterline along with the tapping sleeve per DSPM Section 6-1.409

NEW 20"X12" T.S. & VB&C

EX. FH.

EAST STETSON DRIVE

NEW 3" DIA WATER METER WITH BFP'S

NEW 12" DIA DIP WATERLINE

RESIDENTIAL TOWER HFF=1392.5 +/- (GROUND +121') 184 UNITS

NEW 8" DIA DIP WATER LINE

OFFICE/RETAIL HFF= 1394 +/- (GROUND +122')

NEW 8" DIA FIRELINE

NEW 8" DIA FIRELINE

NEW 3" DIA WATER METER

For the fire lines add isolation valves on the mainline water main, are the lines planned to be looped or redundant?

(GROUND +15)

NEW 8" DIA FIRELINE

NEW 4" DIA WATER METER WITH BFP'S

Requires a valve in the branch along with the tapping sleeve per DSPM Section 6-1.409

HOTEL 1 HFF=1348.0 +/- (GROUND +76') 200 KEYS

Per COS GIS data this is 6-inch ACP

Per DSPM 6-1.408, fittings installed into AC or PVC pipe within 6-feet of another fitting or joint will require that section of pipe to be removed and replaced with DIP. Requires a valve on the existing 6-inch waterline along with tapping sleeve per DSPM 6-1.409.

EAST 6TH AVENUE

SCOTTSDALE ROAD

12W 20-W-DIP 8S 8-W 6W-ABN V-DIP *SD W

25 50 =50'

EXPIRES 12-31-21

EXHIBIT 12 CASE NO: 22-ZN-2018

SOUTHBRIDGE EXPANSION
TRIANGLE SITE
PRELIMINARY WATER PLAN
SCOTTSDALE, ARIZONA

e	1"=50'
Date	1-18-19
Rev	1-31-19
Designed	WSG
Drawn	MJF

GOOKIN ENGINEERS
ENGINEERS • HYDROLOGISTS • PLANNERS • SURVEYORS
4203 N0RTH BROWN AVENUE
SCOTTSDALE, ARIZONA 85251
480-947-3741

1

JOB NO. 2591B

File: STETSON EXHIBITS 7-17-19.dwg

RESIDENTIAL
TOWER
HFF=1392.5 +/-
(GROUND +121')
184 UNITS

HYDRANT
TEST 2

EX. FH.

Per COS GIS data
this is 6-inch ACP

XXX-Feet

Shade in fire hose length figures
to show coverage - this is just an
example

NEW 8" DIA
FIRELINE

NEW 4" DIA
WATER METER
WITH BFP'S

NEW 8" DIA
DIP WATER LINE

HOTEL 1
HFF=1348.0 +/-
(GROUND +76')
200 KEYS

EAST 6TH AVENUE

MARKETPLACE
HFF= 1305.0 +/- (GROUND +36')
56,862 S.F.

NEW 6" DIA.
D.I.P. FIRELINE

NEW 1.5" DIA
WATER METER
WITH BFP'S

E. 5TH AVENUE

NEW 6" DIA.
T.S. & V.

HYDRANT
TEST 3

EX. FH.

E. STETSON DR

SCOTTSDALE ROAD

8VCP
8-W
20-W-DIP
6W-ABN
8S
6-W

Per DSPM 6-1.408, fittings installed into AC or PVC pipe within 6-feet of another fitting or joint will require that section of pipe to be removed and replaced with DIP. Requires a valve on the existing 6-inch waterline along with tapping sleeve per DSPM 6-1.409.

0 25 50
1"=50'

EXPIRES 12-31-21

EXHIBIT 13

CASE NO: 22-ZN-2018

SOUTHBRIDGE EXPANSION
MARKETPLACE SITE
PRELIMINARY WATER PLAN
SCOTTSDALE, ARIZONA

Scale	1"=50'
Date	1-18-19
Rev	1-31-19
Designed	WSG
Drawn	MJF

GOOKIN ENGINEERS
ENGINEERS • HYDROLOGISTS • PLANNERS • SURVEYORS
4203 NORTH BROWN AVENUE
SCOTTSDALE, ARIZONA 85251
480-947-3741

2

JOB NO. 2591B

File: STETSON EXHIBITS 7-17-19.dwg

ARIZONA CANAL

OLDWATER BLVD

70TH PL.

NEW 4" DIA.
D.I.P. FIRELINE

NEW 1.5" DIA
WATER METER
WITH BFP'S

RESIDENTIAL/RETAIL
HFF=1339.5 +/- (GROUND +68')

NEW 8" DIA.
D.I.P. FIRELINE

NEW 3" DIA
WATER METER
WITH BFP'S

RESIDENTIAL/RETAIL
HFF=1406.5 +/- (GROUND +135')
75,605 S.F. + 177 UNITS

EX. FH.

12W

S8

6-W

20-W-DIP

12PVC

E. 5TH AVENUE

MARSHALL WAY

8"V/CP

E. STETSON DR

N.
WA
With

0 25 50
1"=50'

EXHIBIT 14

CASE NO: 22-ZN-2018

EXPIRES 12-31-21

SOUTHBRIDGE EXPANSION
SOUTHBRIDGE WEST SITE
PRELIMINARY WATER PLAN
SCOTTSDALE, ARIZONA

Scale	1"=50'
Date	1-18-19
Rev	1-31-19
Designed	WSG
Drawn	MJF
File:	STETSON EXHIBITS 7-17-19.dwg

GOOKIN ENGINEERS
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4203 N0RTH BROWN AVENUE
SCOTTSDALE, ARIZONA 85251
480-947-3741

3

JOB NO.
2591B

ARIZONA CANAL

GOLDWATER BLVD

NEW 3" DIA. WATER
METER WITH BFP

RESIDENTIAL
HFF=1334. +/- (GROUND +61')
118 UNITS

NEW 8" DIA.
D.I.P. FIRELINE

16DIP

W

12DIP

NEW 12"X8"
T.S. & V

Requires a valve on the existing 12-inch waterline along with the tapping sleeve per DSPM 6-1.409

E. 5TH AVENUE

W 12DIP W 12DIP

20W 16DIP 6-W

0 25 50
1"=50'

EXHIBIT 15

CASE NO: 22-ZN-2018

EXPIRES 12-31-21

SOUTHBRIDGE EXPANSION
ROSE GARDEN SITE
PRELIMINARY WATER PLAN
SCOTTSDALE, ARIZONA

Scale	1"=50'
Date	1-18-19
Rev	1-31-19
Designed	WSG
Drawn	MJF
File:	STETSON EXHIBITS 7-17-19.dwg

GOOKIN ENGINEERS
ENGINEERS • HYDROLOGISTS • PLANNERS • SURVEYORS
4203 N0RTH BROWN AVENUE
SCOTTSDALE, ARIZONA 85251
480-947-3741

4

JOB NO.
2591B

APPENDIX 1

```
******************************************************************
*                          E P A N E T                           *
*                   Hydraulic and Water Quality                  *
*                   Analysis for Pipe Networks                   *
*                         Version 2.0                            *
******************************************************************

Input File: SouthBridge_Condition 1.net

Southbridge Expansion

Link - Node Table:
------------------------------------------------------------------
Link           Start          End                Length  Diameter
ID             Node           Node                  ft        in
------------------------------------------------------------------
Scottsdale8Main1Scottsdale1    Scottsdale2         33.32         8
Scottsdale8Main5Scottsdale5    Scottsdale6         39.34         8
5A6Main1       GWs3           5As1                 120         6
RGMain2        RG2            RG3                 5.28        12
5A6Main5       5As4           5As5               169.99         6
5A20Main3      5A3            5A2                 273.5        20
S20MAIN5       S4             S5                  46.89        20
GW6Main1       GWs2           GWs1                50.71         6
GWMain2        GW3            GW2                 78.21        20
GWMain1        GW1            GW2                    50        20
5A6Main7       5As6           5As7                8.792         6
PROPOSED12HOTEL4PH4            PH3                 8.288        12
PROPOSED12HOTEL3PH3            PH2                 106.3        12
PROPOSED12HOTEL2PH2            PH1                 7.324        12
PROPOSED8HOTEL2PH5             PH6                 8.792         8
PROPOSEDHOTELFIRE3PH6             HOTELFIRE3             15         8
PROPOSEDHOTELFIRE1PH2             HOTELFIRE1             15         8
PROPOSEDHOTELSERVICE1HOTELSERVICE1  PH1                    15         3
PROPOSEDHOTELFIRE2PH3             HOTELFIRE2             45         8
PROPOSEDHOTELSERVICEHOTELSERVICE2  PH4                    45         3
CC6Main2       CC1            CC2                    20         6
MarketplaceFireTap5As7            MarketplaceFireTap     30.29         6
MarketplaceServiceTap5As6            MarketplaceServiceTap     29.91
1.5
ResidenBuildingFireTap170th2          ResidentialFireTap1     3.264
4
ResidentialServiceTap170th1          ResidentialServiceTap1     28.68
3
RGFIRETAP      RG3            RGFire              50.31         8
RGServiceTap   RG2            RGService           50.88         3
5A20MAIN6      5A5            5A6                 16.68        20
GWFireHydrant  GWs2           GWFH2                3.64         6
CCHydrant      CC1            CCFH                 4.16         6
70th12Main3    70th3          70th2               3.233        12
70th12Main2    70th1          70th2               8.793        12
70th12Main1    5A2            70th1              114.43        12
Scottsdale8Main3Scottsdale3    Scottsdale4         20.20         8
```

Canal20Main2	Canal1	Canal2	12	20
S20Main2	S1	S2	66.65	20
S20MAIN3	S3	S2	24	20

Link - Node Table: (continued)

Link ID	Start Node	End Node	Length ft	Diameter in
RGFireHydrantLine	RG4	RGFH	10.04	6
RGMain1	RG1	RG2	58.062	12
RGMain3	RG3	RG4	69.24	12
RGMain4	RG4	GW2	332.54	12
5A20Main1	GW3	5A1	151.16	20
GWFireHydrant1	5A1	GWFH1	26.01	6
GW6Main2	GWs3	GWs2	133.56	6
5A20Main2	5A1	5A2	188.5	20
5A20MAIN4	5A3	5A4	202.302	20
5A20MAIN5	5A4	5A5	15.55	20
5A6Main4	5As4	5aS3	11.58	6
S20main1	S1	5A5	28.67	20
BYPASS1	S1	5As4	37.85	6
5AStub	S2	5AStub1	60	8
S6Main1	S3	5aS3	118.31	6
S20MAIN4	S3	S4	215.68	20
S20MAIN6	S5	S6	251.96	20
StetsonHydrant1	Ss1	StetsonFH1	37.17	6
S20MAIN7	S6	S7	37.16	20
PROPOSEDHOTELSERVICE3	HOTELSERVICE3	PH5	15	4
PROPOSED12HOTEL1	PH1	S7	1000	12
S20MAIN8	S7	S8	177.31	20
S20MAIN9	S8	S9	151.44	20
MWFIREHYDRANTLINE	5A3	MWFH	15	6
CanalFireHydrant	Canal1	CanalFH	7.95	6
Canal20Main1	Canal1	S5	51.89	20
MW6Main1	5As2	MW1	45.19	6
5A6Main3	5As2	5aS3	139.60	6
CC6Main1	5As5	CC1	78.06	6
5A6Main6	5As5	5As6	49.44	6
5A6Main8	5As7	5As8	558.78	6
5A6Main9	5As8	Scottsdale2	19.32	6
ScottsdaleFireHydrant1	5As8	ScottsdaleRoadFH1	27.63	6
6A8Main3	Scottsdale3	6A1	267.21	8
6AFireHydrant	6A1	6AFH	10	12
Scottsdale8Main2	Scottsdale3	Scottsdale2	195.8	8
Scottsdale8Main4	Scottsdale5	Scottsdale4	489.94	8
ScottsdaleFireHydrant2	Scottsdale4	ScottsdaleRoadFH2	17.42	6
S12Main2	Ss1	Ss2	373.82	12
S12Main3	Ss2	Scottsdale5	142.75	12
S12Main1	S6	Ss1	12.8	12
StetsonHydrant2	Ss2	StetsonFH2	5.48	6
5A6Main2	5As1	5As2	450	6
5AOffsite	5As1	5AOffsiteUse	1000	4
6A8MAIN1	S4	6A2	267	8
6A8MAIN2	6A2	6A1	10	8

PROPOSED8HOTEL1PH4	PH6	10	8

Link - Node Table: (continued)

Link ID	Start Node	End Node	Length ft	Diameter in	
PROPOSED8HOTEL3PH5		6A2	150	8	
HYDRANT1	RES1	GWFH2	#N/A	#N/A	Pump
Hydrant2	RES2	CanalFH	#N/A	#N/A	Pump
Hydrant3	RES3	CCFH	#N/A	#N/A	Pump
hydrant4	res4	RGFH	#N/A	#N/A	Pump

Energy Usage:

Pump	Usage Factor	Avg. Effic.	Kw-hr /Mgal	Avg. Kw	Peak Kw	Cost /day
HYDRANT1	100.00	75.00	983.36	7.93	7.93	0.00
Hydrant2	100.00	75.00	981.14	23.39	23.39	0.00
Hydrant3	0.00	0.00	0.00	0.00	0.00	0.00
hydrant4	100.00	75.00	981.47	26.65	26.65	0.00
				Demand Charge:		0.00
				Total Cost:		0.00

Node Results:

Node ID	Demand GPM	Head ft	Pressure psi	Quality
Ss1	68.30	233.94	101.37	0.00
StetsonFH1	0.00	233.94	101.37	0.00
5As5	8.95	233.68	101.26	0.00
Scottsdale1	36.44	233.80	101.30	0.00
Scottsdale2	0.00	233.80	101.30	0.00
Scottsdale4	0.00	233.84	101.32	0.00
Scottsdale5	0.00	233.92	101.36	0.00
Scottsdale6	13.66	233.92	101.36	0.00
5As1	0.00	234.40	101.57	0.00
5As2	0.00	233.97	101.38	0.00
RG1	90.56	234.06	101.42	0.00
RG2	0.00	234.07	101.42	0.00
RG3	0.00	234.07	101.42	0.00
5As4	0.00	233.94	101.37	0.00
GW3	0.00	233.97	101.38	0.00
5A1	0.00	233.97	101.38	0.00
5A2	0.00	233.96	101.38	0.00
5A3	0.00	233.96	101.38	0.00
5A4	0.00	233.96	101.37	0.00
5A5	0.00	233.96	101.37	0.00
S3	0.00	233.96	101.37	0.00
S4	14.83	233.95	101.37	0.00
S6	0.00	233.94	101.37	0.00

Node Results: (continued)

Node ID	Demand GPM	Head ft	Pressure psi	Quality
S7	0.00	233.94	101.37	0.00
S8	0.00	233.94	101.37	0.00
S9	0.00	233.94	101.37	0.00
GWs1	21.99	234.74	101.71	0.00
GWs2	0.00	234.74	101.71	0.00
GWs3	0.00	234.57	101.64	0.00
GW2	0.00	233.98	101.38	0.00
GW1	0.00	233.98	101.38	0.00
5As6	0.00	233.69	101.26	0.00
5As7	0.00	233.69	101.26	0.00
6A1	0.00	233.84	101.32	0.00
Scottsdale3	35.31	233.83	101.32	0.00
Ss2	0.00	233.92	101.36	0.00
5aS3	0.00	233.95	101.37	0.00
MW1	65.53	233.95	101.37	0.00
PH4	0.00	233.80	101.31	0.00
PH3	0.00	233.81	101.31	0.00
PH2	0.00	233.82	101.31	0.00
PH1	0.00	233.82	101.31	0.00
PH5	0.00	233.80	101.31	0.00
PH6	0.00	233.80	101.31	0.00
HOTELFIRE3	0.00	233.80	101.31	0.00
HOTELSERVICE2	127.94	231.91	100.49	0.00
HOTELFIRE1	0.00	233.82	101.31	0.00
HOTELSERVICE1	49.68	233.71	101.27	0.00
HOTELFIRE2	0.00	233.81	101.31	0.00
CC1	0.00	233.55	101.20	0.00
CC2	128.43	233.52	101.19	0.00
MarketplaceFireTap	0.00	233.69	101.26	0.00
MarketplaceServiceTap	20.29	232.47	100.73	0.00
S2	0.00	233.96	101.37	0.00
ResidentialFireTap1	0.00	233.96	101.38	0.00
70th1	0.00	233.96	101.38	0.00
ResidentialServiceTap1	83.12	233.42	101.14	0.00
RGFire	0.00	234.07	101.42	0.00
RGService	65.04	233.46	101.16	0.00
Canal2	0.00	233.96	101.37	0.00
S5	0.00	233.95	101.37	0.00
CanalFH	0.00	234.22	101.49	0.00
Canal1	0.00	233.96	101.37	0.00
5A6	0.00	233.96	101.37	0.00
S1	0.00	233.96	101.37	0.00
GWFH2	0.00	234.76	101.72	0.00
CCFH	0.00	233.55	101.20	0.00
70th3	0.00	233.96	101.38	0.00
70th2	0.00	233.96	101.38	0.00
RG4	0.00	234.07	101.42	0.00

Node Results: (continued)

Node ID	Demand GPM	Head ft	Pressure psi	Quality	
RGFH	0.00	234.30	101.52	0.00	
GWFH1	0.00	233.97	101.38	0.00	
5AStub1	0.00	233.96	101.37	0.00	
HOTELSERVICE3	143.56	233.61	101.22	0.00	
MWFH	0.00	233.96	101.38	0.00	
5As8	0.00	233.79	101.30	0.00	
ScottsdaleRoadFH1	0.00	233.79	101.30	0.00	
6AFH	0.00	233.84	101.32	0.00	
ScottsdaleRoadFH2	0.00	233.84	101.32	0.00	
StetsonFH2	0.00	233.92	101.36	0.00	
5AOffsiteUse	10.59	234.21	101.48	0.00	
6A2	0.00	233.84	101.32	0.00	
RES1	-134.46	0.00	0.00	0.00	Reservoir
RES2	-397.29	0.00	0.00	0.00	Reservoir
RES3	0.00	0.00	0.00	0.00	Reservoir
res4	-452.48	0.00	0.00	0.00	Reservoir

Link Results:

Link ID	Flow GPM	Velocity fps	Unit Headloss ft/Kft	Status
Scottsdale8Main1	-36.44	0.23	0.04	Open
Scottsdale8Main5	13.66	0.09	0.01	Open
5A6Main1	112.47	1.28	1.46	Open
RGMain2	-155.60	0.44	0.16	Open
5A6Main5	117.78	1.34	1.50	Open
5A20Main3	-213.76	0.22	0.01	Open
S20MAIN5	-23.36	0.02	0.00	Open
GW6Main1	21.99	0.25	0.07	Open
GWMain2	-296.88	0.30	0.03	Open
GWMain1	0.00	0.00	0.00	Open
5A6Main7	-39.90	0.45	0.29	Open
PROPOSED12HOTEL4	-163.46	0.46	0.18	Open
PROPOSED12HOTEL3	-163.46	0.46	0.09	Open
PROPOSED12HOTEL2	-163.46	0.46	0.19	Open
PROPOSED8HOTEL2	-35.52	0.23	0.06	Open
PROPOSEDHOTELFIRE3	0.00	0.00	0.00	Open
PROPOSEDHOTELFIRE1	0.00	0.00	0.00	Open
PROPOSEDHOTELSERVICE1	-49.68	2.25	7.28	Open
PROPOSEDHOTELFIRE2	0.00	0.00	0.00	Open
PROPOSEDHOTELSERVICE	-127.94	5.81	41.99	Open
CC6Main2	128.43	1.46	1.45	Open
MarketplaceFireTap	0.00	0.00	0.00	Open
MarketplaceServiceTap	20.29	3.68	40.58	Open
ResidenBuildingFireTap1	0.00	0.00	0.00	Open
ResidentialServiceTap1	83.12	3.77	18.89	Open

Link Results: (continued)

Link ID	Flow GPM	Velocity fps	Unit Headloss ft/Kft	Status
RGFIRETAP	0.00	0.00	0.00	Open
RGServiceTap	65.04	2.95	11.99	Open
5A20MAIN6	0.00	0.00	0.00	Open
GWFireHydrant	-134.46	1.53	3.56	Open
CCHydrant	0.00	0.00	0.00	Open
70th12Main3	0.00	0.00	0.00	Open
70th12Main2	0.00	0.00	0.00	Open
70th12Main1	83.12	0.24	0.02	Open
Scottsdale8Main3	-78.82	0.50	0.21	Open
Canal20Main2	0.00	0.00	0.00	Open
S20Main2	156.28	0.16	0.01	Open
S20MAIN3	-156.28	0.16	0.01	Open
RGFireHydrantLine	-452.48	5.13	23.04	Open
RGMain1	-90.56	0.26	0.04	Open
RGMain3	-155.60	0.44	0.09	Open
RGMain4	296.88	0.84	0.29	Open
5A20Main1	296.88	0.30	0.03	Open
GWFireHydrant1	0.00	0.00	0.00	Open
GW6Main2	-112.47	1.28	1.26	Open
5A20Main2	296.88	0.30	0.02	Open
5A20MAIN4	213.76	0.22	0.01	Open
5A20MAIN5	213.76	0.22	0.03	Open
5A6Main4	-60.29	0.68	0.70	Open
S20main1	-213.76	0.22	0.04	Open
BYPASS1	57.48	0.65	0.48	Open
5AStub	0.00	0.00	0.00	Open
S6Main1	23.95	0.27	0.08	Open
S20MAIN4	132.33	0.14	0.01	Open
S20MAIN6	373.93	0.38	0.04	Open
StetsonHydrant1	0.00	0.00	0.00	Open
S20MAIN7	213.14	0.22	0.02	Open
PROPOSEDHOTELSERVICE3	-143.56	3.67	12.80	Open
PROPOSED12HOTEL1	-213.14	0.60	0.13	Open
S20MAIN8	0.00	0.00	0.00	Open
S20MAIN9	0.00	0.00	0.00	Open
MWFIREHYDRANTLINE	0.00	0.00	0.00	Open
CanalFireHydrant	-397.29	4.51	33.53	Open
Canal20Main1	397.29	0.41	0.07	Open
MW6Main1	65.53	0.74	0.45	Open
5A6Main3	36.35	0.41	0.16	Open
CC6Main1	128.43	1.46	1.68	Open
5A6Main6	-19.61	0.22	0.05	Open
5A6Main8	-39.90	0.45	0.18	Open
5A6Main9	-39.90	0.45	0.33	Open
ScottsdaleFireHydrant1	0.00	0.00	0.00	Open
6A8Main3	-32.82	0.21	0.04	Open
6AFireHydrant	0.00	0.00	0.00	Open

Link Results: (continued)

Link ID	Flow GPM	Velocity fps	Unit Headloss ft/Kft	Status	
Scottsdale8Main2	76.34	0.49	0.18	Open	
Scottsdale8Main4	78.82	0.50	0.17	Open	
ScottsdaleFireHydrant2	0.00	0.00	0.00	Open	
S12Main2	92.48	0.26	0.03	Open	
S12Main3	92.48	0.26	0.04	Open	
S12Main1	160.78	0.46	0.54	Open	
StetsonHydrant2	0.00	0.00	0.00	Open	
5A6Main2	101.88	1.16	0.96	Open	
5AOffsite	10.59	0.27	0.19	Open	
6A8MAIN1	140.86	0.90	0.42	Open	
6A8MAIN2	32.82	0.21	0.03	Open	
PROPOSED8HOTEL1	35.52	0.23	0.03	Open	
PROPOSED8HOTEL3	-108.04	0.69	0.26	Open	
HYDRANT1	134.46	0.00	-234.76	Open	Pump
Hydrant2	397.29	0.00	-234.22	Open	Pump
Hydrant3	0.00	0.00	0.00	Closed	Pump
hydrant4	452.48	0.00	-234.30	Open	Pump

APPENDIX 2

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******************************************************************
*                          E P A N E T                           *
*                   Hydraulic and Water Quality                  *
*                   Analysis for Pipe Networks                   *
*                         Version 2.0                            *
******************************************************************

Input File: SouthBridge_Condition 2.net

Southbridge Expansion

Link - Node Table:
------------------------------------------------------------------
Link           Start          End                Length  Diameter
ID             Node           Node                  ft        in
------------------------------------------------------------------
Scottsdale8Main1Scottsdale1    Scottsdale2         33.32         8
Scottsdale8Main5Scottsdale5    Scottsdale6         39.34         8
5A6Main1       GWs3           5As1                 120         6
RGMain2        RG2            RG3                 5.28        12
5A6Main5       5As4           5As5               169.99         6
5A20Main3      5A3            5A2                 273.5        20
S20MAIN5       S4             S5                  46.89        20
GW6Main1       GWs2           GWs1                50.71         6
GWMain2        GW3            GW2                 78.21        20
GWMain1        GW1            GW2                    50        20
5A6Main7       5As6           5As7                8.792         6
PROPOSED12HOTEL4PH4            PH3                 8.288        12
PROPOSED12HOTEL3PH3            PH2                 106.3        12
PROPOSED12HOTEL2PH2            PH1                 7.324        12
PROPOSED8HOTEL2PH5             PH6                 8.792         8
PROPOSEDHOTELFIRE3PH6             HOTELFIRE3             15         8
PROPOSEDHOTELFIRE1PH2             HOTELFIRE1             15         8
PROPOSEDHOTELSERVICE1HOTELSERVICE1  PH1                    15         3
PROPOSEDHOTELFIRE2PH3             HOTELFIRE2             45         8
PROPOSEDHOTELSERVICEHOTELSERVICE2  PH4                    45         3
CC6Main2       CC1            CC2                    20         6
MarketplaceFireTap5As7           MarketplaceFireTap     30.29         6
MarketplaceServiceTap5As6           MarketplaceServiceTap     29.91
1.5
ResidenBuildingFireTap70th2          ResidentialFireTap     3.264
4
ResidentialServiceTap70th1          ResidentialServiceTap     28.68
3
RGFIRETAP      RG3            RGFire              50.31         8
RGServiceTap   RG2            RGService           50.88         3
5A20MAIN6      5A5            5A6                 16.68        20
GWFireHydrant  GWs2           GWFH2                3.64         6
CCHydrant      CC1            CCFH                 4.16         6
70th12Main3    70th3          70th2               3.233        12
70th12Main2    70th1          70th2               8.793        12
70th12Main1    5A2            70th1              114.43        12
Scottsdale8Main3Scottsdale3    Scottsdale4         20.20         8
```

Canal20Main2	Canal1	Canal2	12	20
S20Main2	S1	S2	66.65	20
S20MAIN3	S3	S2	24	20

Link - Node Table: (continued)

Link ID	Start Node	End Node	Length ft	Diameter in
RGFireHydrantLine	RG4	RGFH	10.04	6
RGMain1	RG1	RG2	58.062	12
RGMain3	RG3	RG4	69.24	12
RGMain4	RG4	GW2	332.54	12
5A20Main1	GW3	5A1	151.16	20
GWFireHydrant1	5A1	GWFH1	26.01	6
GW6Main2	GWs3	GWs2	133.56	6
5A20Main2	5A1	5A2	188.5	20
5A20MAIN4	5A3	5A4	202.302	20
5A20MAIN5	5A4	5A5	15.55	20
5A6Main4	5As4	5aS3	11.58	6
S20main1	S1	5A5	28.67	20
BYPASS1	S1	5As4	37.85	6
5AStub	S2	5AStub1	60	8
S6Main1	S3	5aS3	118.31	6
S20MAIN4	S3	S4	215.68	20
S20MAIN6	S5	S6	251.96	20
StetsonHydrant1	Ss1	StetsonFH1	37.17	6
S20MAIN7	S6	S7	37.16	20
PROPOSEDHOTELSERVICE3	HOTELSERVICE3	PH5	15	4
PROPOSED12HOTEL1	PH1	S7	1000	12
S20MAIN8	S7	S8	177.31	20
S20MAIN9	S8	S9	151.44	20
MWFIREHYDRANTLINE	5A3	MWFH	15	6
CanalFireHydrant	Canal1	CanalFH	7.95	6
Canal20Main1	Canal1	S5	51.89	20
MW6Main1	5As2	MW1	45.19	6
5A6Main3	5As2	5aS3	139.60	6
CC6Main1	5As5	CC1	78.06	6
5A6Main6	5As5	5As6	49.44	6
5A6Main8	5As7	5As8	558.78	6
5A6Main9	5As8	Scottsdale2	19.32	6
ScottsdaleFireHydrant1	5As8	ScottsdaleRoadFH1	27.63	6
6A8Main3	Scottsdale3	6A1	267.21	8
6AFireHydrant	6A1	6AFH	10	12
Scottsdale8Main2	Scottsdale3	Scottsdale2	195.8	8
Scottsdale8Main4	Scottsdale5	Scottsdale4	489.94	8
ScottsdaleFireHydrant2	Scottsdale4	ScottsdaleRoadFH2	17.42	6
S12Main2	Ss1	Ss2	373.82	12
S12Main3	Ss2	Scottsdale5	142.75	12
S12Main1	S6	Ss1	12.8	12
StetsonHydrant2	Ss2	StetsonFH2	5.48	6
5A6Main2	5As1	5As2	450	6
5AOffsite	5As1	5AOffsiteUse	1000	4
6A8MAIN1	S4	6A2	267	8
6A8MAIN2	6A2	6A1	10	8

PROPOSED8HOTEL1PH4	PH6	10	8

Link - Node Table: (continued)

Link ID	Start Node	End Node	Length ft	Diameter in	
PROPOSED8HOTEL3PH5		6A2	150	8	
HYDRANT1	RES1	GWFH2	#N/A	#N/A	Pump
Hydrant2	RES2	CanalFH	#N/A	#N/A	Pump
Hydrant3	RES3	CCFH	#N/A	#N/A	Pump
hydrant4	res4	RGFH	#N/A	#N/A	Pump

Energy Usage:

Pump	Usage Factor	Avg. Effic.	Kw-hr /Mgal	Avg. Kw	Peak Kw	Cost /day
HYDRANT1	100.00	75.00	960.61	22.65	22.65	0.00
Hydrant2	100.00	75.00	946.81	63.92	63.92	0.00
Hydrant3	100.00	75.00	937.65	27.85	27.85	0.00
hydrant4	100.00	75.00	950.66	81.26	81.26	0.00
				Demand Charge:		0.00
				Total Cost:		0.00

Node Results:

Node ID	Demand GPM	Head ft	Pressure psi	Quality
Ss1	239.05	223.82	96.98	0.00
StetsonFH1	0.00	223.82	96.98	0.00
5As5	31.34	223.65	96.91	0.00
Scottsdale1	127.55	223.15	96.69	0.00
Scottsdale2	0.00	223.16	96.70	0.00
Scottsdale4	0.00	223.20	96.71	0.00
Scottsdale5	0.00	223.70	96.93	0.00
Scottsdale6	47.80	223.69	96.93	0.00
5As1	0.00	226.83	98.29	0.00
5As2	0.00	224.04	97.08	0.00
RG1	316.96	224.78	97.40	0.00
RG2	0.00	224.81	97.41	0.00
RG3	0.00	224.82	97.41	0.00
5As4	0.00	223.98	97.05	0.00
GW3	0.00	224.12	97.11	0.00
5A1	0.00	224.09	97.10	0.00
5A2	0.00	224.05	97.08	0.00
5A3	0.00	224.03	97.07	0.00
5A4	0.00	224.01	97.06	0.00
5A5	0.00	224.01	97.06	0.00
S3	0.00	223.99	97.06	0.00
S4	51.91	223.97	97.05	0.00
S6	0.00	223.88	97.01	0.00

Node Results: (continued)

Node ID	Demand GPM	Head ft	Pressure psi	Quality
S7	0.00	223.88	97.01	0.00
S8	0.00	223.88	97.01	0.00
S9	0.00	223.88	97.01	0.00
GWs1	76.95	229.18	99.31	0.00
GWs2	0.00	229.22	99.32	0.00
GWs3	0.00	228.06	98.82	0.00
GW2	0.00	224.14	97.12	0.00
GW1	0.00	224.14	97.12	0.00
5As6	0.00	223.54	96.86	0.00
5As7	0.00	223.54	96.86	0.00
6A1	0.00	223.17	96.70	0.00
Scottsdale3	123.71	223.18	96.70	0.00
Ss2	0.00	223.73	96.94	0.00
5aS3	0.00	223.99	97.05	0.00
MW1	222.36	223.84	96.99	0.00
PH4	0.00	222.66	96.48	0.00
PH3	0.00	222.67	96.48	0.00
PH2	0.00	222.75	96.52	0.00
PH1	0.00	222.76	96.52	0.00
PH5	0.00	222.65	96.48	0.00
PH6	0.00	222.65	96.48	0.00
HOTELFIRE3	0.00	222.65	96.48	0.00
HOTELSERVICE2	447.79	203.43	88.15	0.00
HOTELFIRE1	0.00	222.75	96.52	0.00
HOTELSERVICE1	173.88	221.65	96.04	0.00
HOTELFIRE2	0.00	222.67	96.48	0.00
CC1	0.00	223.67	96.92	0.00
CC2	449.51	223.38	96.79	0.00
MarketplaceFireTap	0.00	223.54	96.86	0.00
MarketplaceServiceTap	71.01	211.19	91.51	0.00
S2	0.00	223.99	97.06	0.00
ResidentialFireTap	0.00	224.02	97.07	0.00
70th1	0.00	224.02	97.07	0.00
ResidentialServiceTap	290.94	218.51	94.68	0.00
RGFire	0.00	224.82	97.41	0.00
RGService	227.65	218.60	94.72	0.00
Canal2	0.00	224.00	97.06	0.00
S5	0.00	223.97	97.05	0.00
CanalFH	0.00	226.03	97.94	0.00
Canal1	0.00	224.00	97.06	0.00
5A6	0.00	224.01	97.06	0.00
S1	0.00	224.00	97.06	0.00
GWFH2	0.00	229.32	99.37	0.00
CCFH	0.00	223.84	96.99	0.00
70th3	0.00	224.02	97.07	0.00
70th2	0.00	224.02	97.07	0.00
RG4	0.00	224.89	97.44	0.00

Node Results: (continued)

Node ID	Demand GPM	Head ft	Pressure psi	Quality	
RGFH	0.00	226.95	98.34	0.00	
GWFH1	0.00	224.09	97.10	0.00	
5AStub1	0.00	223.99	97.06	0.00	
HOTELSERVICE3	502.45	220.70	95.63	0.00	
MWFH	0.00	224.03	97.07	0.00	
5As8	0.00	223.18	96.71	0.00	
ScottsdaleRoadFH1	0.00	223.18	96.71	0.00	
6AFH	0.00	223.17	96.70	0.00	
ScottsdaleRoadFH2	0.00	223.20	96.71	0.00	
StetsonFH2	0.00	223.73	96.94	0.00	
5AOffsiteUse	37.05	224.89	97.44	0.00	
6A2	0.00	223.17	96.70	0.00	
RES1	-393.05	0.00	0.00	0.00	Reservoir
RES2	-1125.26	0.00	0.00	0.00	Reservoir
RES3	-495.06	0.00	0.00	0.00	Reservoir
res4	-1424.55	0.00	0.00	0.00	Reservoir

Link Results:

Link ID	Flow GPM	Velocity fps	Unit Headloss ft/Kft	Status
Scottsdale8Main1	-127.55	0.81	0.46	Open
Scottsdale8Main5	47.80	0.31	0.06	Open
5A6Main1	316.10	3.59	10.24	Open
RGMain2	-544.61	1.54	1.77	Open
5A6Main5	133.87	1.52	1.91	Open
5A20Main3	-589.00	0.60	0.08	Open
S20MAIN5	52.93	0.05	0.00	Open
GW6Main1	76.95	0.87	0.72	Open
GWMain2	-879.94	0.90	0.23	Open
GWMain1	0.00	0.00	0.00	Open
5A6Main7	77.07	0.87	1.03	Open
PROPOSED12HOTEL4	-512.94	1.46	1.63	Open
PROPOSED12HOTEL3	-512.95	1.46	0.75	Open
PROPOSED12HOTEL2	-512.95	1.46	1.76	Open
PROPOSED8HOTEL2	-65.15	0.42	0.21	Open
PROPOSEDHOTELFIRE3	0.00	0.00	0.00	Open
PROPOSEDHOTELFIRE1	0.00	0.00	0.00	Open
PROPOSEDHOTELSERVICE1	-173.88	7.89	74.11	Open
PROPOSEDHOTELFIRE2	0.00	0.00	0.00	Open
PROPOSEDHOTELSERVICE	-447.79	20.32	427.29	Open
CC6Main2	449.51	5.10	14.71	Open
MarketplaceFireTap	0.00	0.00	0.00	Open
MarketplaceServiceTap	71.01	12.89	412.95	Open
ResidenBuildingFireTap	0.00	0.00	0.00	Open
ResidentialServiceTap	290.94	13.21	192.26	Open

Link Results: (continued)

Link ID	Flow GPM	Velocity fps	Unit Headloss ft/Kft	Status
RGFIRETAP	0.00	0.00	0.00	Open
RGServiceTap	227.65	10.33	122.07	Open
5A20MAIN6	0.00	0.00	0.00	Open
GWFireHydrant	-393.05	4.46	28.44	Open
CCHydrant	-495.06	5.62	41.14	Open
70th12Main3	0.00	0.00	0.00	Open
70th12Main2	0.00	0.00	0.00	Open
70th12Main1	290.94	0.83	0.24	Open
Scottsdale8Main3	-204.51	1.31	1.30	Open
Canal20Main2	0.00	0.00	0.00	Open
S20Main2	524.73	0.54	0.10	Open
S20MAIN3	-524.73	0.54	0.10	Open
RGFireHydrantLine	-1424.55	16.16	205.33	Open
RGMain1	-316.96	0.90	0.49	Open
RGMain3	-544.61	1.54	0.98	Open
RGMain4	879.94	2.50	2.25	Open
5A20Main1	879.94	0.90	0.22	Open
GWFireHydrant1	0.00	0.00	0.00	Open
GW6Main2	-316.10	3.59	8.71	Open
5A20Main2	879.94	0.90	0.19	Open
5A20MAIN4	589.00	0.60	0.09	Open
5A20MAIN5	589.00	0.60	0.20	Open
5A6Main4	-69.60	0.79	0.92	Open
S20main1	-589.00	0.60	0.25	Open
BYPASS1	64.27	0.73	0.60	Open
5AStub	0.00	0.00	0.00	Open
S6Main1	12.91	0.15	0.02	Open
S20MAIN4	511.82	0.52	0.08	Open
S20MAIN6	1178.19	1.20	0.36	Open
StetsonHydrant1	0.00	0.00	0.00	Open
S20MAIN7	686.83	0.70	0.14	Open
PROPOSEDHOTELSERVICE3	-502.45	12.83	130.25	Open
PROPOSED12HOTEL1	-686.83	1.95	1.12	Open
S20MAIN8	0.00	0.00	0.00	Open
S20MAIN9	0.00	0.00	0.00	Open
MWFIREHYDRANTLINE	0.00	0.00	0.00	Open
CanalFireHydrant	-1125.26	12.77	255.57	Open
Canal20Main1	1125.26	1.15	0.50	Open
MW6Main1	222.36	2.52	4.43	Open
5A6Main3	56.69	0.64	0.36	Open
CC6Main1	-45.55	0.52	0.24	Open
5A6Main6	148.08	1.68	2.19	Open
5A6Main8	77.07	0.87	0.63	Open
5A6Main9	77.07	0.87	1.18	Open
ScottsdaleFireHydrant1	0.00	0.00	0.00	Open
6A8Main3	30.32	0.19	0.03	Open
6AFireHydrant	0.00	0.00	0.00	Open

Link Results: (continued)

Link ID	Flow GPM	Velocity fps	Unit Headloss ft/Kft	Status	
Scottsdale8Main2	50.48	0.32	0.08	Open	
Scottsdale8Main4	204.51	1.31	1.01	Open	
ScottsdaleFireHydrant2	0.00	0.00	0.00	Open	
S12Main2	252.31	0.72	0.23	Open	
S12Main3	252.31	0.72	0.26	Open	
S12Main1	491.36	1.39	4.95	Open	
StetsonHydrant2	0.00	0.00	0.00	Open	
5A6Main2	279.05	3.17	6.20	Open	
5AOffsite	37.05	0.95	1.94	Open	
6A8MAIN1	406.97	2.60	3.01	Open	
6A8MAIN2	-30.32	0.19	0.02	Open	
PROPOSED8HOTEL1	65.15	0.42	0.10	Open	
PROPOSED8HOTEL3	-437.30	2.79	3.44	Open	
HYDRANT1	393.05	0.00	-229.32	Open	Pump
Hydrant2	1125.26	0.00	-226.03	Open	Pump
Hydrant3	495.06	0.00	-223.84	Open	Pump
hydrant4	1424.55	0.00	-226.95	Open	Pump

APPENDIX 3

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******************************************************************
*                          E P A N E T                           *
*                   Hydraulic and Water Quality                  *
*                   Analysis for Pipe Networks                   *
*                         Version 2.0                            *
******************************************************************

Input File: SouthBridge_Condition 3.net

Southbridge Expansion

Link - Node Table:
------------------------------------------------------------------
Link           Start          End                Length  Diameter
ID             Node           Node                  ft        in
------------------------------------------------------------------
Scottsdale8Main1Scottsdale1    Scottsdale2         33.32         8
Scottsdale8Main5Scottsdale5    Scottsdale6         39.34         8
5A6Main1       GWs3           5As1                 120         6
RGMain2        RG2            RG3                 5.28        12
5A6Main5       5As4           5As5               169.99         6
5A20Main3      5A3            5A2                 273.5        20
S20MAIN5       S4             S5                  46.89        20
GW6Main1       GWs2           GWs1                50.71         6
GWMain2        GW3            GW2                 78.21        20
GWMain1        GW1            GW2                    50        20
5A6Main7       5As6           5As7                8.792         6
PROPOSED12HOTEL4PH4            PH3                 8.288        12
PROPOSED12HOTEL3PH3            PH2                 106.3        12
PROPOSED12HOTEL2PH2            PH1                 7.324        12
PROPOSED8HOTEL2PH5             PH6                 8.792         8
PROPOSEDHOTELFIRE3PH6             HOTELFIRE3             15         8
PROPOSEDHOTELFIRE1PH2             HOTELFIRE1             15         8
PROPOSEDHOTELSERVICE1HOTELSERVICE1  PH1                    15         3
PROPOSEDHOTELFIRE2PH3             HOTELFIRE2             45         8
PROPOSEDHOTELSERVICEHOTELSERVICE2  PH4                    45         3
CC6Main2       CC1            CC2                    20         6
MarketplaceFireTap5As7            MarketplaceFireTap     30.29         6
MarketplaceServiceTap5As6            MarketplaceServiceTap     29.91
1.5
ResidenBuildingFireTap70th2           ResidentialFireTap     3.264
4
ResidentialServiceTap70th1           ResidentialServiceTap     28.68
3
RGFIRETAP      RG3            RGFire              50.31         8
RGServiceTap   RG2            RGService           50.88         3
5A20MAIN6      5A5            5A6                 16.68        20
GWFireHydrant  GWs2           GWFH2                3.64         6
CCHydrant      CC1            CCFH                 4.16         6
70th12Main3    70th3          70th2               3.233        12
70th12Main2    70th1          70th2               8.793        12
70th12Main1    5A2            70th1              114.43        12
Scottsdale8Main3Scottsdale3    Scottsdale4         20.20         8
```

Canal20Main2	Canal1	Canal2	12	20
S20Main2	S1	S2	66.65	20
S20MAIN3	S3	S2	24	20

Link - Node Table: (continued)

Link ID	Start Node	End Node	Length ft	Diameter in
RGFireHydrantLine	RG4	RGFH	10.04	6
RGMain1	RG1	RG2	58.062	12
RGMain3	RG3	RG4	69.24	12
RGMain4	RG4	GW2	332.54	12
5A20Main1	GW3	5A1	151.16	20
GWFireHydrant1	5A1	GWFH1	26.01	6
GW6Main2	GWs3	GWs2	133.56	6
5A20Main2	5A1	5A2	188.5	20
5A20MAIN4	5A3	5A4	202.302	20
5A20MAIN5	5A4	5A5	15.55	20
5A6Main4	5As4	5aS3	11.58	6
S20main1	S1	5A5	28.67	20
BYPASS1	S1	5As4	37.85	6
5AStub	S2	5AStub1	60	8
S6Main1	S3	5aS3	118.31	6
S20MAIN4	S3	S4	215.68	20
S20MAIN6	S5	S6	251.96	20
StetsonHydrant1	Ss1	StetsonFH1	37.17	6
S20MAIN7	S6	S7	37.16	20
PROPOSEDHOTELSERVICE3	HOTELSERVICE3	PH5	15	4
PROPOSED12HOTEL1	PH1	S7	1000	12
S20MAIN8	S7	S8	177.31	20
S20MAIN9	S8	S9	151.44	20
MWFIREHYDRANTLINE	5A3	MWFH	15	6
CanalFireHydrant	Canal1	CanalFH	7.95	6
Canal20Main1	Canal1	S5	51.89	20
MW6Main1	5As2	MW1	45.19	6
5A6Main3	5As2	5aS3	139.60	6
CC6Main1	5As5	CC1	78.06	6
5A6Main6	5As5	5As6	49.44	6
5A6Main8	5As7	5As8	558.78	6
5A6Main9	5As8	Scottsdale2	19.32	6
ScottsdaleFireHydrant1	5As8	ScottsdaleRoadFH1	27.63	6
6A8Main3	Scottsdale3	6A1	267.21	8
6AFireHydrant	6A1	6AFH	10	12
Scottsdale8Main2	Scottsdale3	Scottsdale2	195.8	8
Scottsdale8Main4	Scottsdale5	Scottsdale4	489.94	8
ScottsdaleFireHydrant2	Scottsdale4	ScottsdaleRoadFH2	17.42	6
S12Main2	Ss1	Ss2	373.82	12
S12Main3	Ss2	Scottsdale5	142.75	12
S12Main1	S6	Ss1	12.8	12
StetsonHydrant2	Ss2	StetsonFH2	5.48	6
5A6Main2	5As1	5As2	450	6
5AOffsite	5As1	5AOffsiteUse	1000	4
6A8MAIN1	S4	6A2	267	8
6A8MAIN2	6A2	6A1	10	8

PROPOSED8HOTEL1PH4	PH6	10	8

Link - Node Table: (continued)

Link ID	Start Node	End Node	Length ft	Diameter in	
PROPOSED8HOTEL3PH5		6A2	150	8	
HYDRANT1	RES1	GWFH2	#N/A	#N/A	Pump
Hydrant2	RES2	CanalFH	#N/A	#N/A	Pump
Hydrant3	RES3	CCFH	#N/A	#N/A	Pump
hydrant4	res4	RGFH	#N/A	#N/A	Pump

Energy Usage:

Pump	Usage Factor	Avg. Effic.	Kw-hr /Mgal	Avg. Kw	Peak Kw	Cost /day
HYDRANT1	100.00	75.00	922.93	35.15	35.15	0.00
Hydrant2	100.00	75.00	874.20	103.08	103.08	0.00
Hydrant3	100.00	75.00	858.60	46.09	46.09	0.00
hydrant4	100.00	75.00	890.55	130.55	130.55	0.00
				Demand Charge:		0.00
				Total Cost:		0.00

Node Results:

Node ID	Demand GPM	Head ft	Pressure psi	Quality
Ss1	239.05	202.00	87.53	0.00
StetsonFH1	0.00	202.00	87.53	0.00
5As5	31.34	203.09	88.00	0.00
Scottsdale1	127.55	197.39	85.53	0.00
Scottsdale2	0.00	197.41	85.54	0.00
Scottsdale4	0.00	197.44	85.55	0.00
Scottsdale5	0.00	201.25	87.20	0.00
Scottsdale6	47.80	201.24	87.20	0.00
5As1	0.00	213.11	92.34	0.00
5As2	0.00	204.22	88.49	0.00
RG1	316.96	206.71	89.57	0.00
RG2	0.00	206.74	89.58	0.00
RG3	0.00	206.75	89.58	0.00
5As4	0.00	203.06	87.99	0.00
GW3	0.00	203.54	88.19	0.00
5A1	0.00	203.40	88.13	0.00
5A2	0.00	203.24	88.07	0.00
5A3	0.00	203.09	88.00	0.00
5A4	0.00	202.97	87.95	0.00
5A5	0.00	202.95	87.94	0.00
S3	0.00	202.80	87.87	0.00
S4	51.91	202.58	87.78	0.00
S6	0.00	202.20	87.62	0.00

Node Results: (continued)

Node ID	Demand GPM	Head ft	Pressure psi	Quality
S7	0.00	202.18	87.60	0.00
S8	0.00	202.18	87.60	0.00
S9	0.00	202.18	87.60	0.00
GWs1	76.95	220.03	95.34	0.00
GWs2	0.00	220.07	95.35	0.00
GWs3	0.00	216.70	93.90	0.00
GW2	0.00	203.62	88.23	0.00
GW1	0.00	203.62	88.23	0.00
5As6	0.00	202.47	87.73	0.00
5As7	0.00	202.34	87.67	0.00
6A1	0.00	194.52	84.28	0.00
Scottsdale3	123.71	197.24	85.46	0.00
Ss2	0.00	201.48	87.30	0.00
5aS3	0.00	203.10	88.00	0.00
MW1	222.36	204.02	88.40	0.00
PH4	0.00	196.10	84.97	0.00
PH3	0.00	196.20	85.01	0.00
PH2	0.00	196.74	85.25	0.00
PH1	0.00	196.84	85.29	0.00
PH5	0.00	195.61	84.76	0.00
PH6	0.00	195.95	84.91	0.00
HOTELFIRE3	0.00	195.95	84.91	0.00
HOTELSERVICE2	447.79	176.87	76.64	0.00
HOTELFIRE1	0.00	196.74	85.25	0.00
HOTELSERVICE1	173.88	195.72	84.81	0.00
HOTELFIRE2	0.00	196.20	85.01	0.00
CC1	0.00	204.43	88.58	0.00
CC2	449.51	204.14	88.45	0.00
MarketplaceFireTap	0.00	202.34	87.67	0.00
MarketplaceServiceTap	71.01	190.11	82.38	0.00
S2	0.00	202.82	87.88	0.00
ResidentialFireTap	0.00	203.22	88.05	0.00
70th1	0.00	203.22	88.05	0.00
ResidentialServiceTap	290.94	197.70	85.66	0.00
RGFire	0.00	206.75	89.58	0.00
RGService	227.65	200.53	86.89	0.00
Canal2	0.00	202.65	87.81	0.00
S5	0.00	202.58	87.78	0.00
CanalFH	0.00	208.70	90.43	0.00
Canal1	0.00	202.65	87.81	0.00
5A6	0.00	202.95	87.94	0.00
S1	0.00	202.89	87.91	0.00
GWFH2	0.00	220.33	95.47	0.00
CCFH	0.00	204.97	88.81	0.00
70th3	0.00	203.22	88.05	0.00
70th2	0.00	203.22	88.05	0.00
RG4	0.00	206.82	89.61	0.00

Node Results: (continued)

Node ID	Demand GPM	Head ft	Pressure psi	Quality	
RGFH	0.00	212.60	92.12	0.00	
GWFH1	0.00	203.40	88.13	0.00	
5AStub1	0.00	202.82	87.88	0.00	
HOTELSERVICE3	502.45	193.65	83.91	0.00	
MWFH	0.00	203.09	88.00	0.00	
5As8	0.00	197.73	85.68	0.00	
ScottsdaleRoadFH1	0.00	197.73	85.68	0.00	
6AFH	2500.00	194.24	84.16	0.00	
ScottsdaleRoadFH2	0.00	197.44	85.55	0.00	
StetsonFH2	0.00	201.48	87.30	0.00	
5AOffsiteUse	37.05	211.16	91.50	0.00	
6A2	0.00	195.01	84.50	0.00	
RES1	-634.79	0.00	0.00	0.00	Reservoir
RES2	-1965.30	0.00	0.00	0.00	Reservoir
RES3	-894.65	0.00	0.00	0.00	Reservoir
res4	-2443.18	0.00	0.00	0.00	Reservoir

Link Results:

Link ID	Flow GPM	Velocity fps	Unit Headloss ft/Kft	Status
Scottsdale8Main1	-127.55	0.81	0.46	Open
Scottsdale8Main5	47.80	0.31	0.06	Open
5A6Main1	557.84	6.33	29.97	Open
RGMain2	-544.61	1.54	1.77	Open
5A6Main5	-37.36	0.42	0.17	Open
5A20Main3	-1607.63	1.64	0.55	Open
S20MAIN5	525.80	0.54	0.09	Open
GW6Main1	76.95	0.87	0.72	Open
GWMain2	-1898.57	1.94	1.01	Open
GWMain1	0.00	0.00	0.00	Open
5A6Main7	305.44	3.47	14.61	Open
PROPOSED12HOTEL4	-1423.76	4.04	11.89	Open
PROPOSED12HOTEL3	-1423.76	4.04	5.08	Open
PROPOSED12HOTEL2	-1423.76	4.04	12.90	Open
PROPOSED8HOTEL2	-975.97	6.23	39.21	Open
PROPOSEDHOTELFIRE3	0.00	0.00	0.00	Open
PROPOSEDHOTELFIRE1	0.00	0.00	0.00	Open
PROPOSEDHOTELSERVICE1	-173.88	7.89	74.11	Open
PROPOSEDHOTELFIRE2	0.00	0.00	0.00	Open
PROPOSEDHOTELSERVICE	-447.79	20.32	427.29	Open
CC6Main2	449.51	5.10	14.71	Open
MarketplaceFireTap	0.00	0.00	0.00	Open
MarketplaceServiceTap	71.01	12.89	412.95	Open
ResidenBuildingFireTap	0.00	0.00	0.00	Open
ResidentialServiceTap	290.94	13.21	192.26	Open

Link Results: (continued)

Link ID	Flow GPM	Velocity fps	Unit Headloss ft/Kft	Status
RGFIRETAP	0.00	0.00	0.00	Open
RGServiceTap	227.65	10.33	122.07	Open
5A20MAIN6	0.00	0.00	0.00	Open
GWFireHydrant	-634.79	7.20	72.13	Open
CCHydrant	-894.65	10.15	129.54	Open
70th12Main3	0.00	0.00	0.00	Open
70th12Main2	0.00	0.00	0.00	Open
70th12Main1	290.94	0.83	0.24	Open
Scottsdale8Main3	-606.61	3.87	10.34	Open
Canal20Main2	0.00	0.00	0.00	Open
S20Main2	1790.26	1.83	1.05	Open
S20MAIN3	-1790.26	1.83	1.08	Open
RGFireHydrantLine	-2443.18	27.72	575.86	Open
RGMain1	-316.96	0.90	0.49	Open
RGMain3	-544.61	1.54	0.98	Open
RGMain4	1898.57	5.39	9.61	Open
5A20Main1	1898.57	1.94	0.97	Open
GWFireHydrant1	0.00	0.00	0.00	Open
GW6Main2	-557.84	6.33	25.20	Open
5A20Main2	1898.57	1.94	0.80	Open
5A20MAIN4	1607.63	1.64	0.63	Open
5A20MAIN5	1607.63	1.64	1.38	Open
5A6Main4	-145.27	1.65	3.82	Open
S20main1	-1607.63	1.64	1.83	Open
BYPASS1	-182.63	2.07	4.36	Open
5AStub	0.00	0.00	0.00	Open
S6Main1	-153.15	1.74	2.58	Open
S20MAIN4	1943.41	1.98	1.01	Open
S20MAIN6	2491.10	2.54	1.47	Open
StetsonHydrant1	0.00	0.00	0.00	Open
S20MAIN7	1597.64	1.63	0.71	Open
PROPOSEDHOTELSERVICE3	-502.45	12.83	130.25	Open
PROPOSED12HOTEL1	-1597.64	4.53	5.34	Open
S20MAIN8	0.00	0.00	0.00	Open
S20MAIN9	0.00	0.00	0.00	Open
MWFIREHYDRANTLINE	0.00	0.00	0.00	Open
CanalFireHydrant	-1965.30	22.30	760.15	Open
Canal20Main1	1965.30	2.01	1.49	Open
MW6Main1	222.36	2.52	4.43	Open
5A6Main3	298.43	3.39	8.03	Open
CC6Main1	-445.14	5.05	17.23	Open
5A6Main6	376.45	4.27	12.59	Open
5A6Main8	305.44	3.47	8.24	Open
5A6Main9	305.44	3.47	16.84	Open
ScottsdaleFireHydrant1	0.00	0.00	0.00	Open
6A8Main3	660.78	4.22	10.18	Open
6AFireHydrant	2500.00	7.09	27.68	Open

Link Results: (continued)

Link ID	Flow GPM	Velocity fps	Unit Headloss ft/Kft	Status	
Scottsdale8Main2	-177.89	1.14	0.87	Open	
Scottsdale8Main4	606.61	3.87	7.76	Open	
ScottsdaleFireHydrant2	0.00	0.00	0.00	Open	
S12Main2	654.41	1.86	1.39	Open	
S12Main3	654.41	1.86	1.61	Open	
S12Main1	893.46	2.53	16.21	Open	
StetsonHydrant2	0.00	0.00	0.00	Open	
5A6Main2	520.79	5.91	19.74	Open	
5AOffsite	37.05	0.95	1.94	Open	
6A8MAIN1	1365.70	8.72	28.36	Open	
6A8MAIN2	1839.22	11.74	49.22	Open	
PROPOSED8HOTEL1	975.97	6.23	15.22	Open	
PROPOSED8HOTEL3	473.52	3.02	3.99	Open	
HYDRANT1	634.79	0.00	-220.33	Open	Pump
Hydrant2	1965.30	0.00	-208.70	Open	Pump
Hydrant3	894.65	0.00	-204.97	Open	Pump
hydrant4	2443.18	0.00	-212.60	Open	Pump

APPENDIX 4

Show nodal Network Diagram with all node, pumps/reservoirs labels and elevations per DSPM Section 6-1.202 in the final BOD

[PIPES]								
ID	Node1	Node2	Length	Diameter	Roughness	MinorLoss	Status	
5A20Main1	GW3	5A1	151.16	20	140	0.95	Open	20" DIP Water Main from elbow to Fire Hydrant tap. Includes losses for ARV tap, Bypass Tee, Gate Valve and Fire Hydrant Tee
5A20Main2	5A1	5A2				0.65	Open	20" DIP Water Main from Fire Hydrant tap to 70th place tee. Includes losses for 70th street Tee and 2 x 45 degree elbows.
5A20Main3	5A3	5A2	273.5	20	140	0.7	Open	20" DIP Water Main from 70th place tee to intersection of Marshall Way and 5th Avenue. Includes losses for ARV Tee, 45 degree elbow and tee for fire hydrant .
5A20MAIN4	5A3	5A4	202.302	20	140	0.9	Open	20" DIP Water Main from intersection of Marshall Way and 5th Avenue TO INERSECTION OF 5TH AVE AND STETSON . Includes losses for 2 x 22.5 degree elbow and 2 tee for water manhole, and gate valve .
5A20MAIN5	5A4	5A5	15.55	20	140	0.35	Open	20" DIP Water Main from INERSECTION OF 5TH AVE AND STETSON to 20 inch tee. Includes losses for tee.
5A20MAIN6	5A5	5A6	16.68	20	140	0	Open	20" DIP stub out
5A6Main1	GWs3	5As1	523.31	6	140	1.55	Open	6" ACP Main in 5th Avenue from Goldwater to Marshall Way. Includes losses for 9 taps and a 45 degree elbow
5A6Main2	5As1	5As2	48.54	6	140	0.35	Open	6" ACP main from Marshall Way to Marshall Way Tee. Includes losses for Marshall Way Tee.
5A6Main3	5As2	5aS3	139.6	6	140	0.9	Open	6" ACP main from Marshall Way Tee to Stetson Tee. Includes losses for 2 x 45 degree elbows, 1 Tee and 1 tap.
5A6Main4	5As4	5aS3	11.58	6	140	0.55	Open	6" ACP Main from Stetson Tee to Stetson Bypass Tee. Includes losses for gate valve and Bypass Tee.
5A6Main5	5As4	5As5	169.99	6	140	1.65	Open	6" ACP Main from Bypass tee to Craftsman Court Tee. Includes losses for 2 taps and 2 tees.
5A6Main6	5As5	5As6	49.44	6	140	0.35	Open	6" ACP Main from Craftsman Court Tee to proposed Marketplace Service Tap. Includes gate valve and tap losses.
5A6Main7	5As6	5As7	8.792	6	140	0.35	Open	6" ACP Main from Proposed Marketplace Service tap to Proposed Marketplace Fire Tap. Includes 6" tee losses.
5A6Main8	5As7	5As8	558.78	6	140	3.15	Open	6" ACP Main from Proposed Fire Tap to Fire Hydrant Tee. Includes losses for 4 taps, 1 valve, and 3 6 inch tees. 2 x 45, 2 x 11.25.
5A6Main9	5As8	Scottsdale2	19.32	6	140	1	Open	6" ACP main from Fire Hydrant Tee to Scottsdale Road Tee. Includes losses for 6" tee in Scottsdale Road.
5AStub	S2	5AStub1	60	8	140	0.2	Open	This is an 8" stubbed water line. Includes Gate valve losses.
6A8Main1	S4	6A1	287.77	8	140	1.95	Open	8" Main from Stetson to 6th Avenue Fire Hydrant Tee. Includes losses for 1 gate vale, 3" Tee, 5 taps, 6" Fire Hydrant Tee, 2x45 degree elbow.
6A8Main2	Scottsdale3	6A1	267.21	8	140	2.7	Open	8" Main from 6th Avenue Fire Hydrant Tee to Scottsdale Road Tee. Includes losses for 2 gate valves, 7 taps, 4" tee, and 8" Scottsdale Road Tee.
6AFireHydrant	6A1	6AFH	10	12	140	0.2	Open	Service line for 6th Avenue Fire Hydrant. Includes losses for gate valve.
70th12Main1	5A2	70th1	114.43	12	140	0.15	Open	70th Street main from Tee to proposed service tap. Includes losses for service tap.
70th12Main2	70th1	70th2	8.793	12	140	0.35	Open	70th street main from service tap to fire tap. Includes losses for fire tap.
70th12Main3	70th3	70th2	3.233	12	140	0	Open	70th street main from fire tap to blowoff - end of line.
BYPASS1	S1	5As4	37.85	6	140	0.9	Open	6" Bypass. Includes losses for 2 gate valves and 90 degree elbow.
Canal20Main1	Canal1	S5	51.89	20	140	0.7	Open	20" Main crossing canal from 5th avenue 20" tee to fire hydrant tee. Includes losses for 2 x 6" tee and gate valve.
Canal20Main2	Canal1	Canal2	12	20	140	0	Open	20" Main crossing canal from fire hydrant tee starting across canal TO END OF MODEL.

CanalFireHydrant	Canal1	CanalFH	7.95	6	140	0.55	Open	Service Line for Canal Crossing Fire Hydrant. Includes losses for gate valve and tee.
CC6Main1	5As5	CC1	78.06	6	140	0.55	Open	6" Main from Craftsman Court to Fire Hydrant Tee. Includes gate valve and Tee losses.
CC6Main2	CC1	CC2	20	6	140	0	Open	6" Main in Craftsman Court from Fire Hydrant Tee to edge of model. No Minor losses.
CCHydrant	CC1	CCFH	4.16	6	140	0.2	Open	Includes losses for gate valve.
GW6Main1	GWs2	GWs1	50.71	6	140	0.35	Open	6" main in Goldwater to Fire Hydrant. Includes losses for fire hydrant tee.
GW6Main2	GWs3	GWs2	133.56	6	140	0.7	Open	6" main in Goldwater from Fire Hydrant Tee to 5th Avenue Tee. Includes losses for 5th avenue tee, gate valve and tap.
GWFireHydrant	GWs2	GWFH2	3.64	6	140	0.2	Open	Service line for Goldwater fire hydrant. Includes Gate Valve
GWFireHydrant1	5A1	GWFH1	26.01	6	140	0.75	Open	Fire Hydrant service line. Includes losses for 2 gate valves and Bypass Tee
GWMain1	GW1	GW2	50	20	140	0	Open	Water Main from Tee to Expander in Goldwater. Expander is beyond limits of model.
GWMain2	GW3	GW2	78.21	20	140	0.55	Open	Pipe includes losses from 45 degree elbow and Tee
MarketplaceFireTap	5As7	MarketplaceFireTap	30.29	6	140	0.2	Open	Marketplace fire tap. Includes gate valve losses.
MarketplaceServiceTap	5As6	MarketplaceServiceTap	29.91	2	140	0	Open	Marketplace Service Tap
MW6Main1	5As2	MW1	45.19	6	140	0.2	Open	6" Main from 5th Avenue along Marshall Way. Includes losses for water Valve
MWFIREHYDRANTLINE	5A3	MWFH	15	6	140	0.2	Open	FIRE HYDRANT SERVICE TAP. INCLUDES LOSSES FOR GATE VALVE.
PROPOSED12HOTEL1	PH1	S7	1000	12	140	0.25	Open	12" PROPOSED HOTEL WATER MAIN FROM 20" TEE TO 6" TEE. INCLUDES 6" TEE LOSSES.
PROPOSED12HOTEL2	PH2	PH1	7.324	12	140	0.25	Open	12" PROPOSED HOTEL WATER MAIN FROM 6" TEE TO 8" TEE. INCLUDES 8" TEE LOSSES.
PROPOSED12HOTEL3	PH3	PH2	106.3	12	140	0.35	Open	12" PROPOSED HOTEL WATER MAIN FROM 8" TEE TO 8" TEE. INCLUDES 8" TEE LOSSES.
PROPOSED12HOTEL4	PH4	PH3	8.288	12	140	0.25	Open	12" PROPOSED HOTEL WATER MAIN FROM 8" TEE TO 4" TEE. INCLUDES 4" TEE LOSSES.
PROPOSED8HOTEL1	PH4	PH5	1000	8	140	0.35	Open	8" PROPOSED HOTEL WATER MAIN FROM 4" TEE TO 4" TEE. INCLUDES 4" TEE LOSSES.
PROPOSED8HOTEL2	PH5	PH6	8.792	8	140	0.35	Open	8" PROPOSED HOTEL WATER MAIN FROM 4" TEE TO 8" TEE. INCLUDES 8" TEE LOSSES.
PROPOSEDHOTELFIRE1	PH2	HOTELFIRE1	15	8	140	0.2	Open	8" PROPOSED FIRE TAP. Includes 8" Gate Valve.
PROPOSEDHOTELFIRE2	PH3	HOTELFIRE2	45	8	140	0.2	Open	8" PROPOSED FIRE TAP. Includes 8" Gate Valve.
PROPOSEDHOTELFIRE3	PH6	HOTELFIRE3	15	8	140	0.2	Open	8" PROPOSED FIRE TAP. Includes 8" Gate Valve.
PROPOSEDHOTELSERVICE	HOTELSERVICE2	PH4	45	4	140	0	Open	4" PROPOSE SERVICE TAP
PROPOSEDHOTELSERVICE1	HOTELSERVICE1	PH1	15	6	140	0	Open	6" PROPOSED SERVICE
PROPOSEDHOTELSERVICE3	HOTELSERVICE3	PH5	15	4	140	0	Open	4" PROPOSED SERVICE TAP
ResidentialBuildingFireTap	70th2	ResidentialFireTap	3.264	4	140	0.2	Open	4" Fire Tap for Residential Building. Includes Gate Valve.
ResidentialServiceTap	70th1	ResidentialServiceTap	28.68	3	140	0	Open	3" tap for Residential Building
RGFireHydrantLine	RG4	RGFH	10.04	6	140	0.2	Open	Fire Hydran Service Line. Includes loss for gate valve.
RGFIRETAP	RG3	RGFire	50.31	8	140	0.2	Open	Proposed Rose Garden Fire Tap. Includes loss for gate valve.
RGMain1	RG1	RG2	58.062	12	140	1.05	Open	This pipe was simplified to eliminate curvature. Total length as shown, plus minor losses from 5 water taps and a tee for an air relief valve. Model stops at transition from 12" to 6" pipe on west end. Stops at Rose Garden Water tap on East End.
RGMain2	RG2	RG3	5.28	12	140	0.15	Open	Water main between Rose Garden water tap and Rose Garden Fire Tap
RGMain3	RG3	RG4	69.24	12	140	0.5	Open	Water main between Rose Garden Fire Tap and Fire Hydrant Tee. Includes losses for 2 water taps and curvature.

RGMain4	RG4	GW2	332.54	12	140	1.75	Open	5th Avenue Water Main connecting Fire Hydrant to Goldwater Main. Length adjusted to account for Fire Hydrant Tee, 2 water taps 2 Blow Off taps, a 45 degree bend, and a gate valve
RGServiceTap	RG2	RGService	50.88	2	140	0	Open	Proposed Rose Garden Service Tap
S12Main1	S6	Ss1	12.8	12	140	1.85	Open	12" Main from 20" tee to fire hydrant cosss. Includes gate valve, 90 degree elbow and cross.
S12Main2	Ss1	Ss2	373.82	12	140	2.7	Open	12 inch main from fire hydrant cross to fire hydrant tee. includes 3 taps, 2x 4" tee, 2x6" tee, 90 degree elbow, 2x 45 degree elbow, 2 x 22.5 degree elbow
S12Main3	Ss2	Scottsdale5	142.75	12	140	1.6	Open	12" main from fire hydrant tee to Scottsdale Road main. Includes losses for gate valve, tee, 2 x 45 degee elbow
S20main1	S1	5A5	28.67	20	140	0.95	Open	Stetson 20" main to 6" cross connect. Include gate valve and 3 tees for losses
S20Main2	S1	S2	66.65	20	140	0.65	Open	Stetson 20" main from 6" cross connect to 8" tee. Include losses for tee and 2 taps.
S20MAIN3	S3	S2	24	20	140	0.25	Open	Stetson 20" main from 8" tee to 6" cross connect. Include losses for cross connect tee.
S20MAIN4	S3	S4	215.68	20	140	1.35	Open	Stetson 20" main from 6" cross connect to 8" tee. Include losses for 3 x 22.5 degree elbows, 2 tees, 1 gate valve, 1 tap and 8" tee.
S20MAIN5	S4	S5	46.89	20	140	0.35	Open	Stetson 20" main from 8" tee to 20" tee. Include losses for 20" tee.
S20MAIN6	S5	S6	251.96	20	140	1.2	Open	Stetson 20" main from 20" tee to 12" tee. Include losses for gate valve, 3 x 8" tees, 2 x 12.5 elbows, and 12" tee.
S20MAIN7	S6	S7	37.16	20	140	0.25	Open	Stetson 20" main from 12" tee to proposed 12" tee. Include losses for 12" tee.
S20MAIN8	S7	S8	177.31	20	140	0.3	Open	Stetson 20" main from proposed 12" tee to alley. Include losses for 3 x 22.5 degree elbow.
S20MAIN9	S8	S9	151.44	20	140	0.1	Open	Stetson 20" main from Alley to Scottsdale Road. Include losses for 22.5 degree elbow.
S6Main1	S3	5aS3	118.31	6	140	1.45	Open	6" Main from Tee in 5th Avenue to Tee in Stetson. Includes 3 Tee, 1 tap, 1 gate valve.
Scottsdale8Main1	Scottsdale1	Scottsdale2	33.32	8	140	0.35	Open	8" Main in Scottsdale Road to 6" tee at 5th avenue. Includes losses for tee.
Scottsdale8Main2	Scottsdale3	Scottsdale2	195.8	8	140	2.15	Open	8" Main in Scottsdale Road from 6" tee at 5th avenue to 8" tee at 6th Avenue. Includes losses for tee, 3 taps, 3 gate valves, 2 x 45 degree bends.
Scottsdale8Main3	Scottsdale3	Scottsdale4	20.2	8	140	0.35	Open	8" Main in Scottsdale Road from 8" tee at 5th avenue to fire hydrant tee. Includes losses for tee.
Scottsdale8Main4	Scottsdale5	Scottsdale4	489.94	8	140	3.05	Open	8" Main from fire hydran tee to Stetson 8" tee. Includes losses for 2 gate valve, 4 x 45 degree elbow, 5 taps, 2 x 4" tees, 1x8" tee.
Scottsdale8Main5	Scottsdale5	Scottsdale6	39.34	8	140	0	Open	8" main from Stetson tee to end of model
ScottsdaleRoadFireHydrant1	5As8	ScottsdaleRoadFH1	27.63	6	140	0.2	Open	Service Line for Hydrant on Scottsdale Road. Includes Gate Valve.
ScottsdaleRoadFireHydrant2	Scottsdale4	ScottsdaleRoadFH2	17.42	6	140	0.2	Open	Service Line for Scottsdale Road Fire Hydrant. Includes Gate Valve.
StetsonHydrant1	Ss1	StetsonFH1	37.17	6	140	0.2	Open	Service Line for Stetson Fire Hydrant. Includes Gate Valve.
StetsonHydrant2	Ss2	StetsonFH2	5.48	6	140	0.2	Open	Service line for Stetson Fire Hydrant. Includes gate valve.