CITY OF SCOTTSDALE

Water and Wastewater Study
Combined

3 engineering

planning civil engineering surveying

64th St. & Oak

5713 N. Cattletrack Road

Final Basis Design Report - Sewer

3 engineering Job #: 5153

April 3, 2020 Case #: XX-XXXX-XX

3-GP-2020
4/30/2020

3 engineering
planning civil engineering surveying

64th St & Oak

FINAL BASIS OF DESIGN REPORT - WASTEWATER

Prepared for:

K Hovnanian Great Western Homes, LLC
20830 N. Tatum Blvd., Suite 250
Phoenix, Arizona 85050
Contact: Chuck Chisholm
Phone: (480) 824-4175

Expires 12/31/2021
Matthew J. Mancini, P.E.

April 3, 2020

Submittal to:

City of Scottsdale
7447 E. Indian School Road, Suite 105
Scottsdale, AZ 85251

Prepared by:
3 engineering, L.L.C.
6370 E. Thomas Road, Suite 200
Scottsdale, Arizona 85251
Contact: Matthew J. Mancini, P.E.

Job Number 5153

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1. Introduction

The project site, 64th St & Oak, is located in Section 33, Township 2 North, Range 4 East of the Gila and Salt River Meridian, Maricopa County, Arizona within the City of Scottsdale. The project is located North of Oak Street, and West of 64th Street Road at 6300 E. Oak Street, Scottsdale, Arizona 85257. The site is bounded on the north by an existing commercial polo club, on the west by a residential neighborhood, on the south and east by a commercial property. See Appendix A for a site map.

The site is a proposed 89-lot single-family attached residential subdivision project.

2. Design Documentation

The purpose of this design report is to verify that the existing City of Scottsdale sewer system can accommodate demands generated by the proposed project. Manning's Equation was used to model and analyze the proposed sewer system for compliance with the City of Scottsdale design requirements. Demands were calculated using the City of Scottsdale Design Standards & Policies Manual criteria. It is our opinion that this report is in accordance with the City of Scottsdale Design Standards & Policies Manual.

3. Existing Conditions

The existing land is occupied by an operational medical facility with three (3) buildings, including existing parking & site improvements. See Appendix A for a site map. The topography has an approximate slope of one percent (1.40%) and has an overall general slope from southwest to northeast.

The site is bounded on the north by an existing commercial polo club, on the west by a residential neighborhood, on the south and east by a commercial property. There is an existing 8" sewer line adjacent to the site within Oak street that currently provides service to the existing site. This 8" sewer line will be used to service the proposed project; however, refer to Section 5 for discussion regarding existing capacities. See Exhibit SE1 for sewer line layout.

4. Proposed Conditions

The project consists of an 89-lot single-family attached residential subdivision on approximately 10 acres. The site currently proposes a pool. Refer to Section 5 regarding discussion of the pool and requirements during construction document preparation. 8" sewer lines are proposed within the development to service the lots. Each proposed lot will have a 4" sewer line serving it from the 8" public sewer line. It is proposed that this project will tie into the existing 8" sewer line within Oak Street at the project's entrance. See Exhibit SE1 for the sewer system layout. All sewer lines shall be placed a minimum of six (6) feet horizontally from any structural footing or substantial improvement and shall not be placed within seven (7) feet from the trunk of any tree. The proposed sewer line is to be public onsite and will be owned and maintained by the City of Scottsdale. An easement shall be dedicated over the private street tract to allow for City access and maintenance.

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5. ***Computations***

Based on coordination with the City of Scottsdale, this area of the City has sewer capacity issues and is in a moratorium for new development; however, the proposed development is replacing an existing commercial development that already places sewer demand on the existing system. The following demand criteria was used in determining system demands for the existing site:

1. Existing Building Area = 65,100 SF
2. Average Day Flow Rate = 0.40 gallons per day / SF
3. Design Flow = Peak Flow = Average Day flow x 3.0 = 0.40 x 3.0 = 1.20 gallons per day / SF

TABLE 1: EX. SEWER DEMANDS	
Ex. Building Area	65,100 SF
Avg. daily demand	26,040 gpd
Design Flow Rate	78,120 gpd

Average daily demand: 65,100 SF x 0.40 gpd/SF = 26,040 gpd
= 26,040 gpd/1440 mpd = 18.08 gpm

Peak Factor = 3 (per DS&PM)

Design flow rate = 3.0 x 26,040 gpd = 78,120 gpd
= 78,120 gpd/1440 mpd = 54.25 gpm

The following demand criteria was used in determining system demands for the proposed site.

1. 89 lots
2. Persons per dwelling unit = 2.5 person/du
3. Average Day Flow Rate = 100 gallons per capita per day x 2.5 person/du = 250 gpd
4. Design Flow = Peak Flow = Average Day flow x 4.0 = 250 x 4 = 1,000 gpd

TABLE 2: ON-SITE SEWER DEMANDS	
Number of Lots	89
Avg. daily demand	22,250 gpd
Design Flow Rate	89,000 gpd

Average daily demand: 89 lots x 250 gpd = 22,250 gpd
= 22,250 gpd/1440 mpd = 15.45 gpm

Peak Factor = 4 (per DS&PM based on population)

Design flow rate = 4 x 22,250 gpd = 89,000 gpd
= 89,000 gpd/1440 mpd = 61.81 gpm

Based on this comparison, the proposed development demand is 3,790 gpd (2.63 gpm) less during average day demand conditions, and only 10,880 gpd (7.56 gpm) more during peak demand conditions. This analysis comparison was coordinated with, and accepted by the City on 2/12/20. See email correspondence in Appendix B.

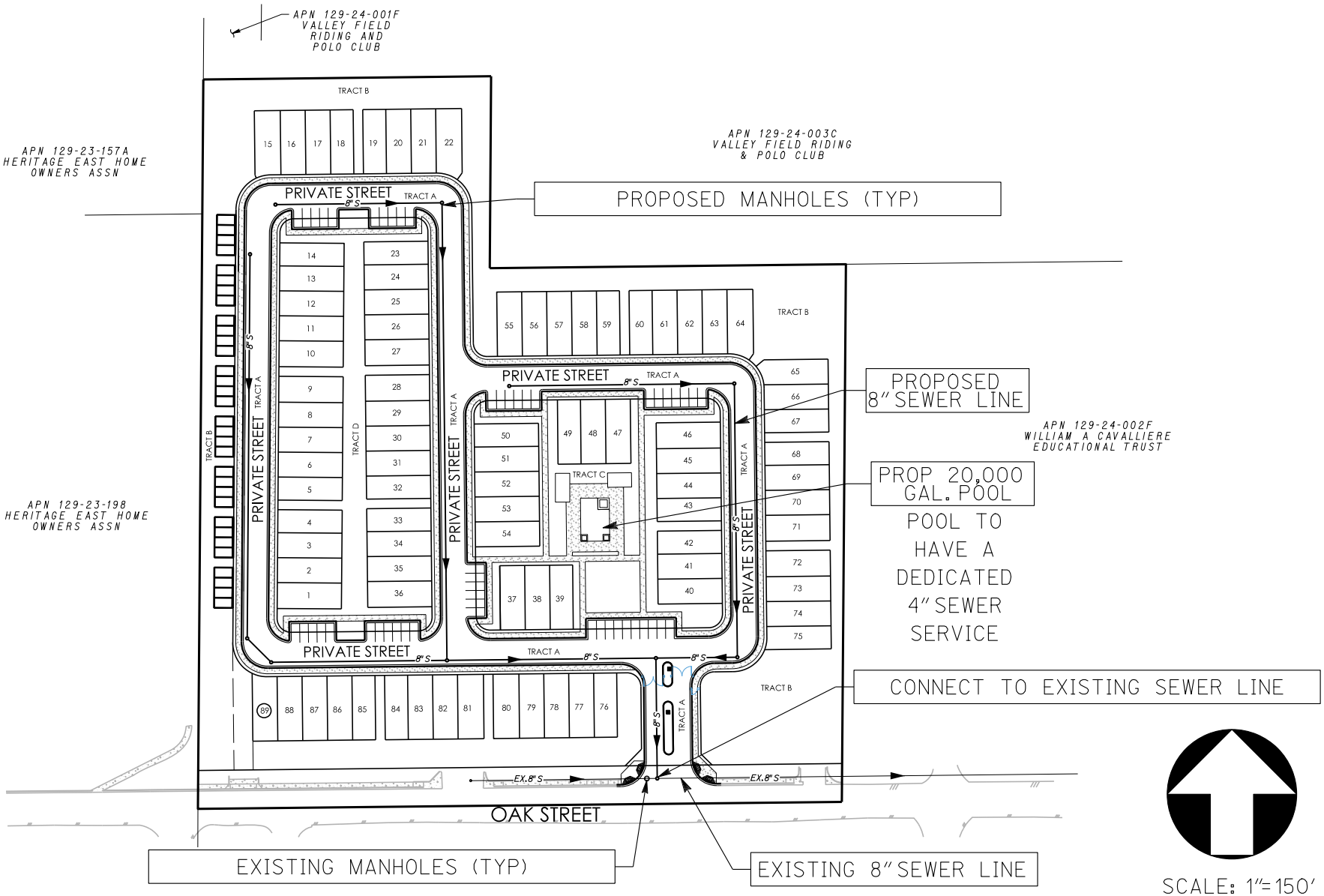
In addition to the proposed lots, the site currently proposes a 20,000 gallon +\- pool. In order to restrict additional demand to the existing City sewer system due to pool backwashing, backwash shall be contained in an 60,000 equalization tank (or as approved by the pool designer), and shall have a restricted and metered pump with a maximum discharge of 10 gpm or 14,400 gpd. The backwashing line shall be connected to a dedicated 4" service to the pool area that then connects to the 8-inch main line within the private streets of the site. The top of the mainline sewer shall be below the discharge invert of the p-trap of the tank line. In addition, no other sewer connections shall be connected to this pool sewer service or the equalization tank. As part of the final design plans for the pool, the following considerations and/or requirements must be made as part of the pool design:

- All relevant details on the pool backwash management system should be submitted including (if applicable) pump design flow and head loss calcs and corresponding pump cut sheet and pump curve showing the operating point (pressure/flow) of the pump at or near the maximum allowable sewer discharge flow rate.
- All relevant design details, criteria and specification for this system shall be shown on the submitted and sealed plans and reviewed and approved by Water Resources.
- Consideration should be given in final pool design to the equalization tank material and (if applicable) backwash waste metering pump with respect to the chlorine levels in the backwash flow and potential for rapid corrosion of concrete and metals. Plastic tanks and pump with plastic impeller and body pumps should be utilized (example Fibroc).
- Pump redundancy is at the discretion of the designer/owner however, controls, interlocks, or valves (e.g. 3-way valve) must prevent both pumps from discharging simultaneously and exceeding the maximum flow.
- Discharging to the sewer must involve:
    - For pumped line: an above the ground gooseneck pipe section with combination air/vacuum release valve at the top (example ARI), this prevents any possible back up or siphoning back to the tank
    - For a pumped or a gravity line: a p-trap below grade and adjacent to the equalization tank to prevent migration of sewage or sewer gases back into the equalization tank. (or if/as plumbing code addresses such a configuration)

For the purpose of design, the 10 gpm (14,400 gpd) of the pool shall be added to the peak demand of 61.81 gpm (89,000 gpd) for a total of 71.81 gpm (103,400 gpd). Manning's Equation was used to model and analyze the proposed sewer system for compliance with the City of Scottsdale design requirements. Manning's equation was based on a minimum sewer slope of 0.43% in order to maintain a velocity of 2.5 fps at d/D of 0.65. Refer to Appendix B for loading of the sewer line and Exhibit SE1 for the Sewer System Layout Exhibit.

6. ***Summary***

The proposed site creates minimal to no impact on the existing sewer City sewer system due to the proposed project replacing an existing commercial development. The Peak Flow for the proposed site is 103,400 gpd. Based on the results from the sewer system analysis the proposed system has a capacity at d/D=0.65 of 268.99 gpm or 387,346 gpd. Therefore, there is adequate capacity to service the site. Any pool design shall comply with the criteria detail in Section 5, and backwashing shall be metered and restricted to 10 gpm (1,440 gpd).



SCALE: 1"=150'

SE1

64TH ST. & OAK
SCOTTSDALE, ARIZONA

SEWER EXHIBIT - SE1

3engineering
planning civil engineering surveying
3 ENGINEERING, LLC
6370 E. THOMAS ROAD, SUITE #200 - SCOTTSDALE, ARIZONA 85251
PHONE: (602) 334-4387 - FAX: (602) 490-323
WWW.3ENGINEERING.COM

DATE:
PROJECT NO.

3-GP-2020
4/30/2020

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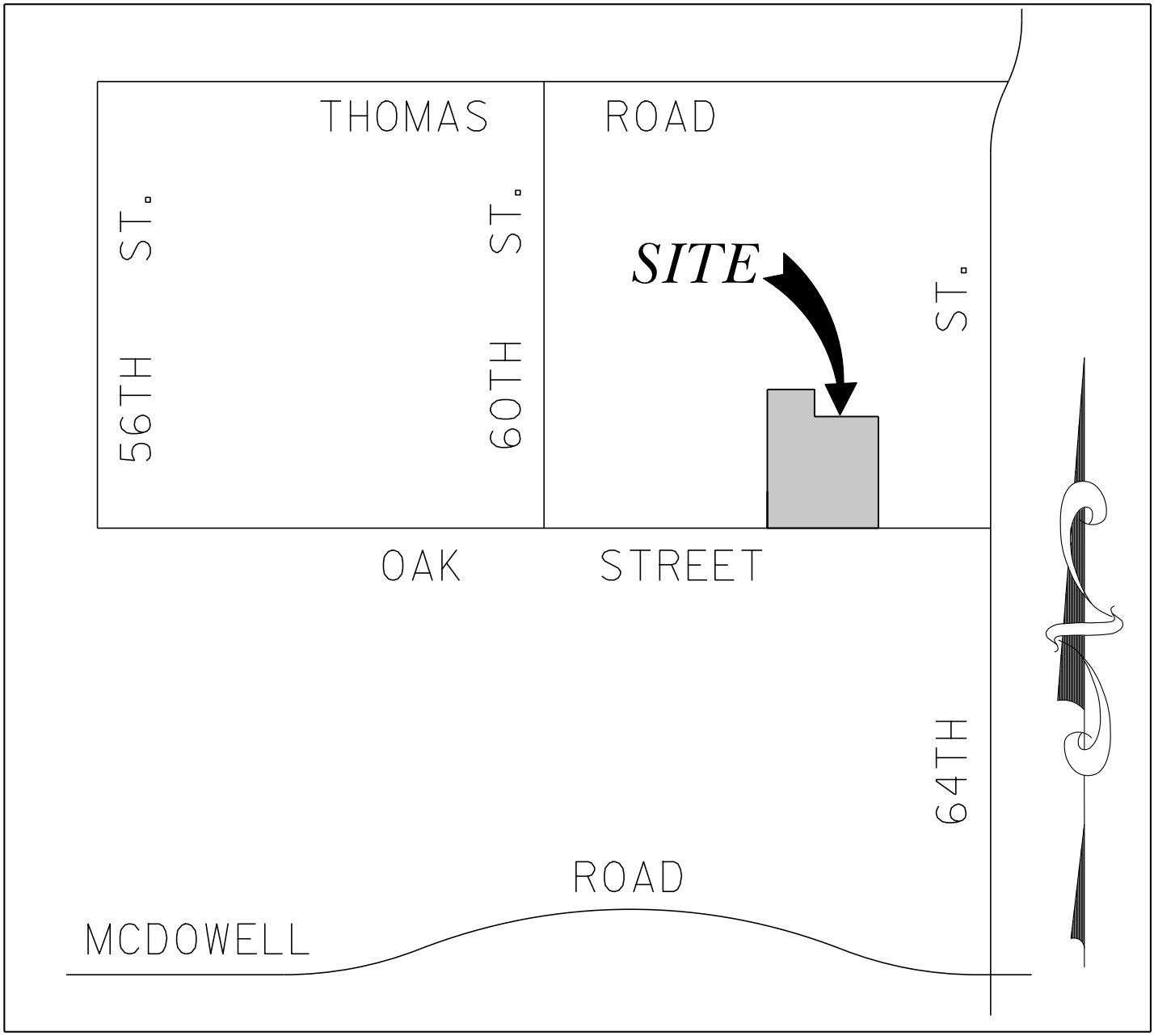
APPENDIX A

Vicinity Map



VICINITY MAP

N.T.S.

3-GP-2020
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APPENDIX B

Sewer Capacity Calculations

3-GP-2020
4/30/2020

Manning Formula Uniform Pipe Flow at Given Slope and Depth

64th St & Oak

8-inch Sewer Slope at d/D = 0.65 & V = 2.5 ft/s

Set units: m | mm | ft | in

Pipe diameter, d_0	8 in
Manning roughness, n ?	.013
Pressure slope, S_0	.43 % rise/run
Percent of (or ratio to) full depth (100% or 1 if flowing full)	65 %

Results

Flow, Q	268.9869	gpm
Velocity, v	2.4953	ft/sec
Velocity head, h_v	0.0968	ft
Flow area	34.5868	sq. in.
Wetted perimeter	15.0039	in
Hydraulic radius	2.3052	in
Top width, T	7.6315	in
Froude number, F	0.72	
Shear stress (tractive force), tau	0.0516	psf

3-GP-2020
4/30/2020

Matt Mancini

From: Dillon, Levi <LDillon@Scottsdaleaz.gov>
Sent: Wednesday, February 12, 2020 4:42 PM
To: Matt Mancini
Cc: Chisholm, Chuck; Alex Stedman; Hayes, Eliana; Barnes, Jeff
Subject: RE: 64th St & Oak

Hi Matt,

Yes, based on your demand calcs for proposed and existing developments, if you equalize the pool backwash waste flow and meter this volume into the existing frontage sewer at a max rate that ultimately enters Thomas Road sewer, then the proposed development should be acceptable from a sewer capacity perspective.

Here is some further guidance on the associated submittal and technical requirements: The instantaneous pool backwash flow rate to be assumed shall be 100gpm at a duration to be provided by your pool designer or MEP. The equalization tank should be sized for 3 to 4 consecutive pool backwash volumes (or as recommended by pool designer or MEP) and meter into the onsite or offsite sewer at a maximum allowable discharge rate of 10gpm.

In the basis of design report provide:

1. Full calculations of the pool single backwash volume including size of pool and filter size.
2. Also include determination of equalization tank volume and dimensions and include location on site plan.
3. No piping shall be shown in BOD or on plans that allow direct connection of filter backwash waste to the onsite or offsite sewer system (must be sent to tank).
4. No connection other than the pressurized line from (or to) the pump shall leave the equalization tank in BOD or plans.
    a. Exception: If the equalization tank is completely above ground the flow can be limited/automatically controlled by appropriately sizing the discharge piping. In this case the average flow rate over the total time to drain the full tank must meet the maximum discharge rate. Complete sketch and hydraulic calculations showing this must be provided. In this case a discharge to a box style floor drain should be provided. Downstream connection requirements below still apply.
5. The backwash waste shall be discharged into a dedicated 4 or 6-inch lateral with no other sewer flows that connects to the mainline sewer. The top of the mainline sewer at the connection point shall be below the discharge invert of the p-trap.
6. All relevant details on the pool backwash management system should be submitted including (if applicable) pump design flow and head loss calcs and corresponding pump cut sheet and pump curve showing the operating point (pressure/flow) of the pump at or near the maximum allowable sewer discharge flow rate.

In design and plans:

1. All relevant design details, criteria and specification for this system shall be shown on the submitted and sealed plans and reviewed and approved by Water Resources.

2. Consideration should be given in final design to the equalization tank material and (if applicable) backwash waste metering pump with respect to the chlorine levels in the backwash flow and potential for rapid corrosion of concrete and metals. Plastic tanks and pump with plastic impeller and body pumps should be utilized (example Fibroc).
3. Secure and safe access to the backwash tank for periodic cleaning and/or pump removal/repair (if submersible type pump) should be provided.
4. Pump redundancy is at the discretion of the designer/owner however, controls, interlocks, or valves (e.g. 3-way valve) must prevent both pumps from discharging simultaneously and exceeding the maximum flow.
5. Discharging to the sewer must involve:
    a. For pumped line: an above the ground gooseneck pipe section with combination air/vacuum release valve at the top (example ARI), this prevents any possible back up or siphoning back to the tank
    b. For a pumped or a gravity line: a p-trap below grade and adjacent to the equalization tank to prevent migration of sewage or sewer gases back into the equalization tank. (or if/as plumbing code addresses such a configuration)
6. The backwash waste shall be discharged into a dedicated 4 or 6-inch lateral with no other sewer flows that connects to the mainline sewer. The top of the mainline sewer at the connection point shall be below the discharge invert of the p-trap.

Thanks,

Levi C. Dillon, P.E. | *Sr. Water Resources Engineer*

SCOTTSDALE WATER

"Water Sustainability through Stewardship, Innovation and People"

Contact Info
Direct: (480) 312-5319
Main office: (480) 312-5685
Fax: (480) 312-5615
Mailing/Office Address
Water Resources Administration
9379 E. San Salvador Dr.
Scottsdale, AZ. 85258

Sending me an attachment over 5MB? Please use the link below:
https://securemail.scottsdaleaz.gov/dropbox/ldillon@scottsdaleaz.gov

---

From: Matt Mancini <matt@3engineering.com>
Sent: Wednesday, February 12, 2020 2:50 PM
To: Dillon, Levi <LDillon@Scottsdaleaz.gov>
Cc: Chisholm, Chuck <CChisholm@KHOV.COM>; Alex Stedman <astedman@rviplanning.com>

Subject: 64th St & Oak
Importance: High

⚠ **External Email: Please use caution if opening links or attachments!**

Levi,

Thanks for taking my call today to discuss the 64th Street & Oak project. As discussed I would like to present you with the sewer demand calculation comparison between the existing medical office and the single family attached development KHOV is proposing. Please see the following based on the DS&PM:

Ex. Medial Office:
- Building Area = 65,100 SF
- Unit Demand = 0.4 gpd/SF
- Avg. Demand = 65,100 x 0.4 = 26,040 gpd (18.08 gpm)
- Peak Factor = 3
- Peak Demand = 3 x 26,040 = 78,120 gpd (54.25 gpm)

Prop. Single Family Residential:
- Units = 89
- Person per unit = 2.5 p/u
- Persons = 89 x 2.5 = 223
- Unit Demand = 100 gpppd
- Average Demand 22,300 gpd (15.49 gpm)
- Peak Factor = 4
- Peak Demand = 89,200 gpd (61.94 gpm)

As you can see the Average day demand of the proposed development is less by 3,740 gpd (2.60 gpm), and the Peak is only more by11,080 gpd (7.70 gpm). The proposed development will contain a pool, and based on our conversation you would allow backwashing to be stored in a tank and metered out at a low GPM rate.

As discussed, having City buy-in at this stage in the development process is integral for the KHOV's feasibility of the project; So, please let us know your initial thoughts on this comparison, as based on the above it is our opinion the development would not adversely affect the existing system. Thank you in advance for your time, as we look forward to hearing back from you.

Sincerely,

Matthew J. Mancini, P.E. | *Vice President*
3engineering
6370 E. Thomas Rd., Suite # 200 | Scottsdale, AZ 85251
O: (602) 334-4387 x-103 | D: (602) 730-6847 | C: (602) 309-2257 | F: (602) 490-3230
matt@3engineering.com | www.3engineering.com

3 engineering

planning civil engineering surveying

64th St. & Oak

Final Basis Design Report - Water

3 engineering Job #: 5153

April 3, 2020 Case #: XX-XXXX-XX

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4/30/2020

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64th St & Oak

FINAL BASIS OF DESIGN REPORT - WATER

Prepared for:

K Hovnanian Great Western Homes, LLC
20830 N. Tatum Blvd., Suite 250
Phoenix, Arizona 85050
Contact: Chuck Chisholm
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The site is a proposed 89-lot single-family attached residential subdivision project.

2. Design Documentation

The purpose of this design report is to verify that the existing City of Scottsdale water system can accommodate demands generated by the proposed project.. Demands were calculated using the City of Scottsdale Design Standards & Policies Manual. It is our opinion that this report is in accordance with the City of Scottsdale Standards.

3. Existing Conditions

The existing land is occupied by an operational medical facility with three (3) buildings, including existing parking & site improvements. See Appendix A for a site map. The topography has an approximate slope of one percent (1.40%) and has an overall general slope from southwest to northeast.

The site is bounded on the north by an existing commercial polo club, on the west by a residential neighborhood, on the south and east by a commercial property. There is an existing 8" water line adjacent to the site within Oak street that currently provides service to the existing site. This 8" water line will be used to service the proposed project. See Exhibit WE1 for the water line layout.

4. Proposed Conditions

The project consists of an 89-lot single-family attached residential subdivision on approximately 10 acres. There is a proposed public 8" water line through the development to service the lots. See WE1 for the proposed water system layout. All water lines shall be placed a minimum of six (6) feet horizontally from any structural footing or substantial improvement, and shall not be placed within seven (7) feet from the trunk of any tree. The fire flow demand for the site is 1,500 gpm based on Chapter 6 of the City of Scottsdale's Design Standards & Policies Manual. The proposed water line is to be public within the site and is to be owned and maintained by the City.

5. Computations

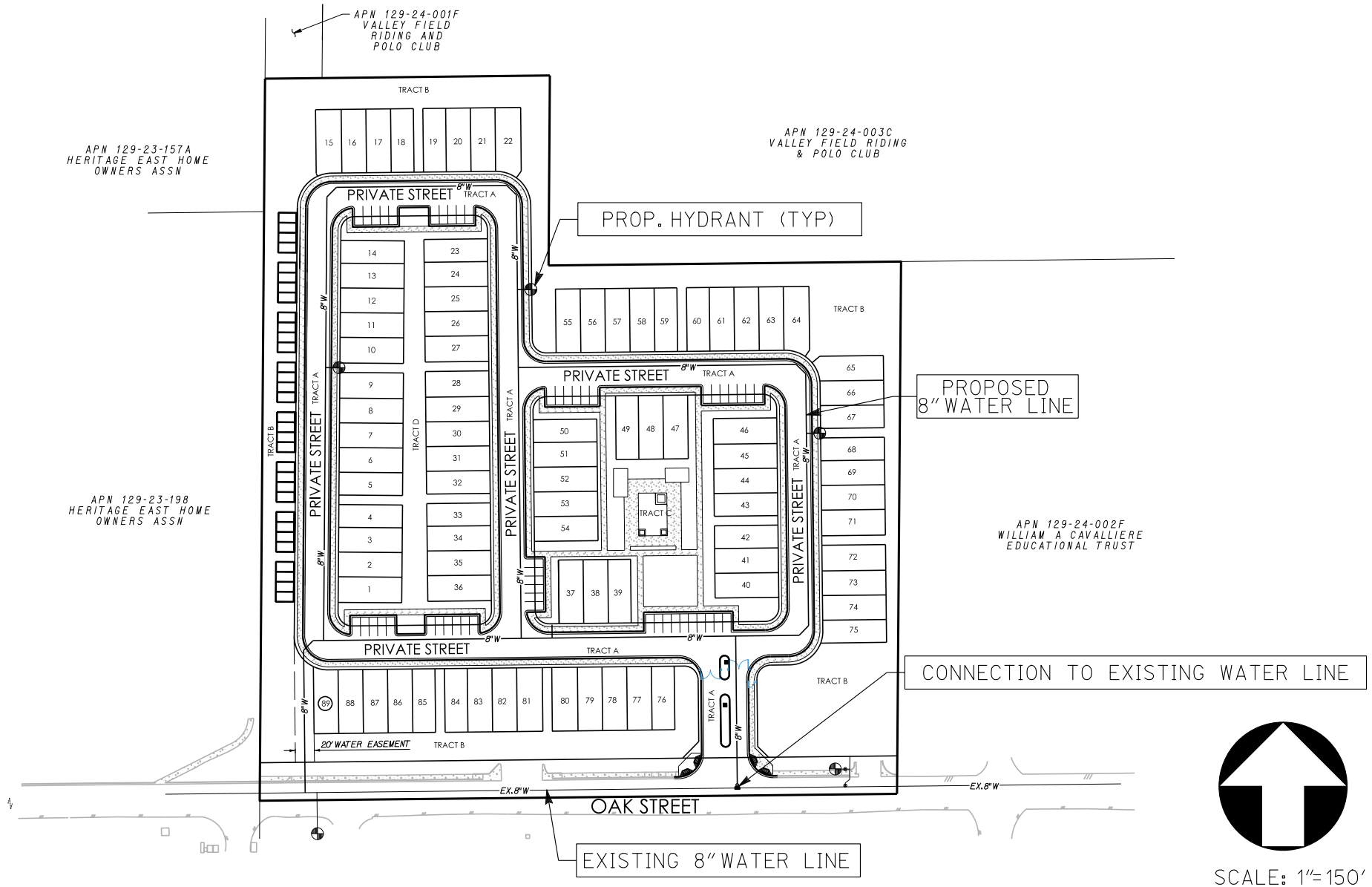
The following demand criteria were used in determining the system demands for the proposed site.

1. Average Day Demand = 227.6 gallons per lot/day = 227.6 x 89 = 20,256 gpd or 14.07 gpm
2. Max Day Demand = 2.0 x Avg. Day = 2.0 x 20,256 gpd = 40,512 gpd or 28.14 gpm
3. Peak Hour Demand = 3.5 x Avg. Day = 3.5 x 20,256 gpd = 70,896 gpd or 49.23 gpm

TABLE 1: ON-SITE WATER DEMANDS	
Lots	89
Fire flow	1,500 gpm
Max Day Demand Flow	28.14 gpm
Fire flow + Peak Flow	1,528.14 gpm

6. ***Summary***

The Max Day Plus Fire Flow for the proposed site is 1,528.14 gpm. Per the fire flow test (Appendix B) the existing system has 3,556 gpm available at 20 psi. Based on the WaterCAD analysis in Appendix C, the existing water infrastructure provides adequate demand capacity and pressure for the proposed site during Average Day, Max Day, Peak Hour, and Max Day Plus Fire Flow Conditions.



SCALE: 1"=150'

WE1

64TH ST. & OAK
SCOTTSDALE, ARIZONA

WATER EXHIBIT - WE1

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planning civil engineering surveying

3 ENGINEERING, LLC
6370 E. THOMAS ROAD, SUITE #200 - SCOTTSDALE, ARIZONA 85251
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WWW.3ENGINEERING.COM

DATE:

PROJECT NO.

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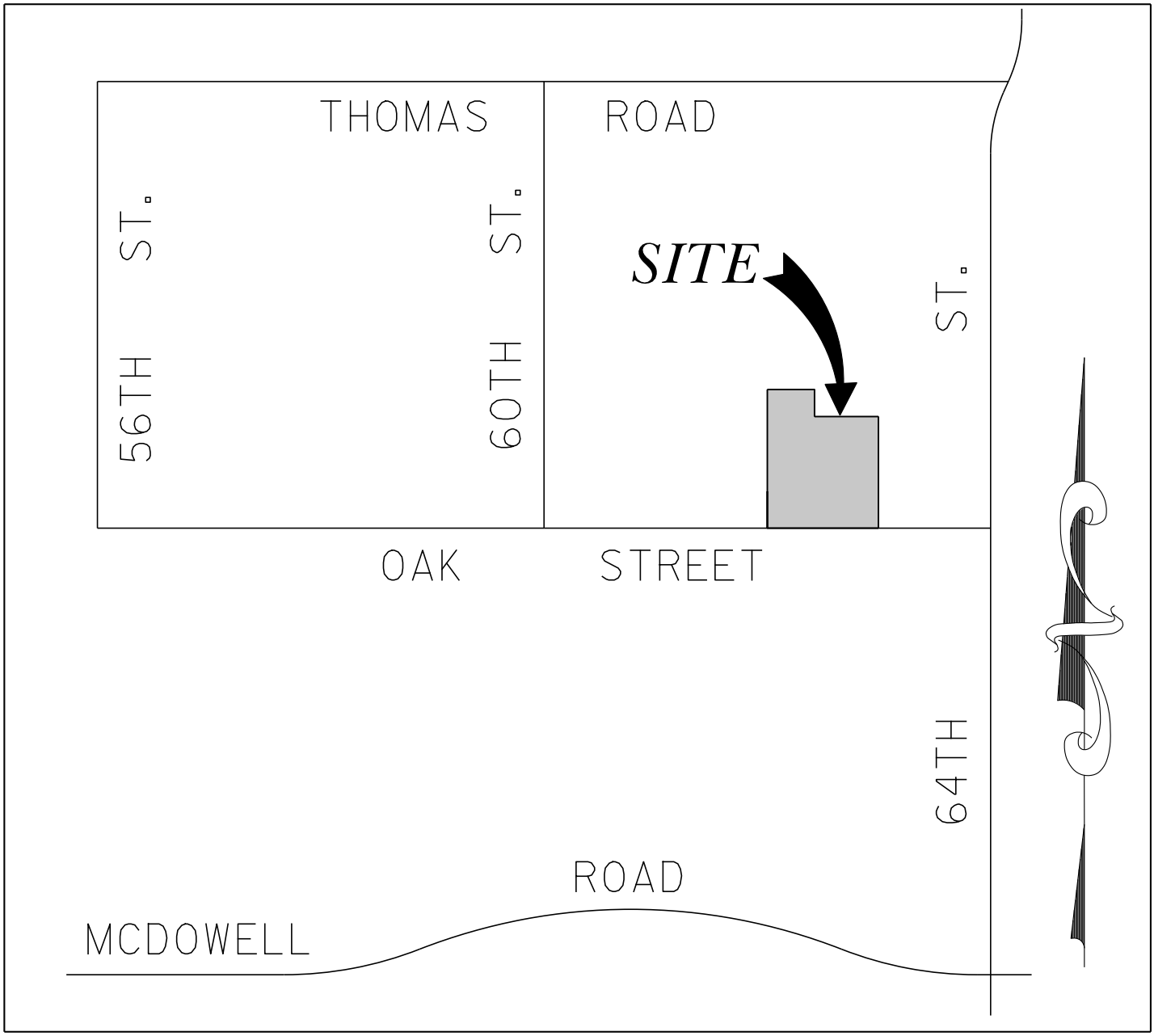
3-GP-2020
4/30/2020

APPENDIX A

Vicinity Map



VICINITY MAP

N.T.S.

3-GP-2020
4/30/2020

APPENDIX B

Fire Flow Test

Arizona Flow Testing LLC

HYDRANT FLOW TEST REPORT

Project Name:	64th & Oak
Project Address:	6210 East Oak Street, Scottsdale, Arizona, 85257
Client Project No.:	5153
Arizona Flow Testing Project No.:	20113
Flow Test Permit No.:	C61665
Date and time flow test conducted:	March 20, 2020 at 7:35 AM
Data is current and reliable until:	September 20, 2020
Conducted by:	Floyd Vaughan – Arizona Flow Testing, LLC (480-250-8154)
Coordinated by:	Ray Padilla –City of Scottsdale-Inspector (602-541-0586)

Raw Test Data

Static Pressure: **68.0 PSI**
(Measured in pounds per square inch)

Residual Pressure: **50.0 PSI**
(Measured in pounds per square inch)

Pitot Pressure: **28.0 PSI**

(Measured in pounds per square inch)

Diffuser Orifice Diameter: One 4-inch Pollard Diffuser
(Measured in inches)

Coefficient of Diffuser: 0.9

Flowing GPM: **2,274 GPM**
(Measured in gallons per minute)

GPM @ 20 PSI: **3,892 GPM**

Data with 10% Safety Factor

Static Pressure: **61.2 PSI**
(Measured in pounds per square inch)

Residual Pressure: **43.2 PSI**
(Measured in pounds per square inch)

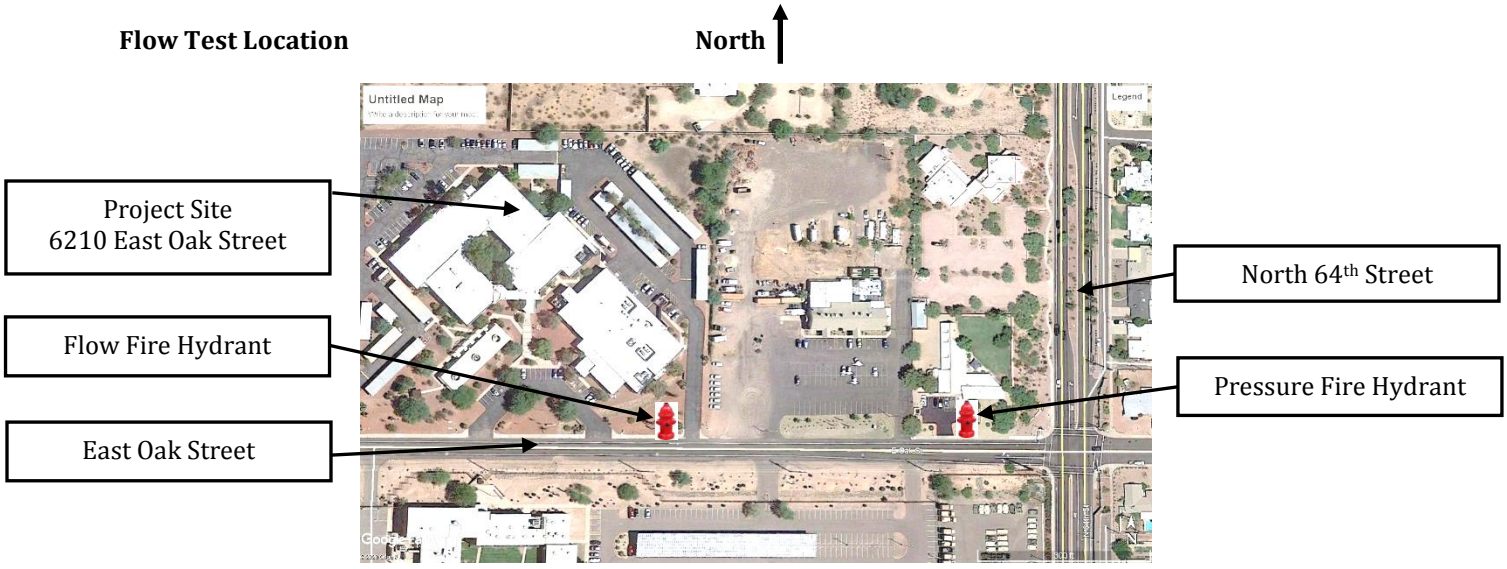
Distance between hydrants: Approx.: 490 feet

Main size: Not Provided

Flowing GPM: **2,274 GPM**

GPM @ 20 PSI**:** **3,556 GPM**

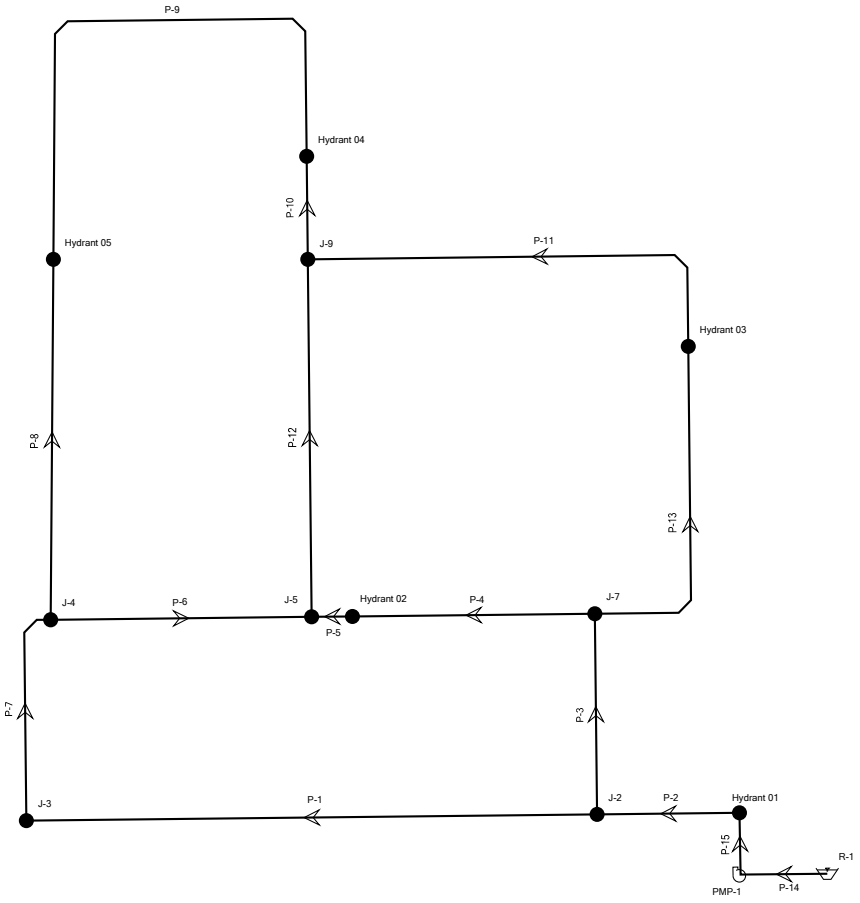
Flow Test Location **North**



APPENDIX C

WaterCAD Model

Scenario: Average Day



FlexTable: Junction Table (5153.wtg)

Current Time: 0.000 hours

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
30	J-3	100.00	<None>	0	235.87	58.8
38	Hydrant 05	95.00	<None>	4	235.87	60.9
29	J-2	95.00	<None>	0	235.87	60.9
31	J-4	94.90	<None>	0	235.87	61.0
37	Hydrant 04	94.85	<None>	4	235.87	61.0
36	J-9	94.60	<None>	0	235.87	61.1
32	J-5	94.50	<None>	0	235.87	61.2
33	Hydrant 02	94.50	<None>	4	235.87	61.2
28	Hydrant 01	94.50	<None>	0	235.87	61.2
35	Hydrant 03	94.00	<None>	4	235.87	61.4
34	J-7	93.80	<None>	0	235.87	61.5

FlexTable: Pipe Table (5153.wtg)

Current Time: 0.000 hours

ID	Label	Length (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
47	P-9	487	Hydrant 05	Hydrant 04	8.0	Ductile Iron	130.0	0	0.00	0.000
64	P-15	1	PMP-1	Hydrant 01	48.0	Ductile Iron	130.0	14	0.00	0.000
63	P-14	1	R-1	PMP-1	48.0	Ductile Iron	130.0	14	0.00	0.000
49	P-11	370	J-9	Hydrant 03	8.0	Ductile Iron	130.0	-1	0.01	0.000
43	P-5	33	Hydrant 02	J-5	8.0	Ductile Iron	130.0	1	0.01	0.000
44	P-6	208	J-5	J-4	8.0	Ductile Iron	130.0	-2	0.01	0.000
50	P-12	285	J-5	J-9	8.0	Ductile Iron	130.0	3	0.02	0.000
48	P-10	82	Hydrant 04	J-9	8.0	Ductile Iron	130.0	-4	0.02	0.000
46	P-8	287	J-4	Hydrant 05	8.0	Ductile Iron	130.0	4	0.02	0.000
51	P-13	283	J-7	Hydrant 03	8.0	Ductile Iron	130.0	4	0.03	0.000
42	P-4	193	J-7	Hydrant 02	8.0	Ductile Iron	130.0	4	0.03	0.000
39	P-1	455	J-3	J-2	8.0	Asbestos Cement	140.0	-5	0.03	0.000
45	P-7	175	J-3	J-4	8.0	Ductile Iron	130.0	5	0.03	0.000
41	P-3	160	J-2	J-7	8.0	Ductile Iron	130.0	9	0.06	0.000
40	P-2	114	J-2	Hydrant 01	8.0	Asbestos Cement	140.0	-14	0.09	0.000

3-GP-2020
4/30/2020

FlexTable: Pump Table (5153.wtg)

Current Time: 0.000 hours

ID	Label	Elevation (ft)	Pump Definition	Status (Initial)	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpm)	Pump Head (ft)
61	PMP-1	94.50	Fire Flow 032020	On	94.50	235.87	14	141.37

FlexTable: Reservoir Table (5153.wtg)

Current Time: 0.000 hours

ID	Label	Elevation (ft)	Zone	Flow (Out net) (gpm)	Hydraulic Grade (ft)
60	R-1	94.50	<None>	14	94.50

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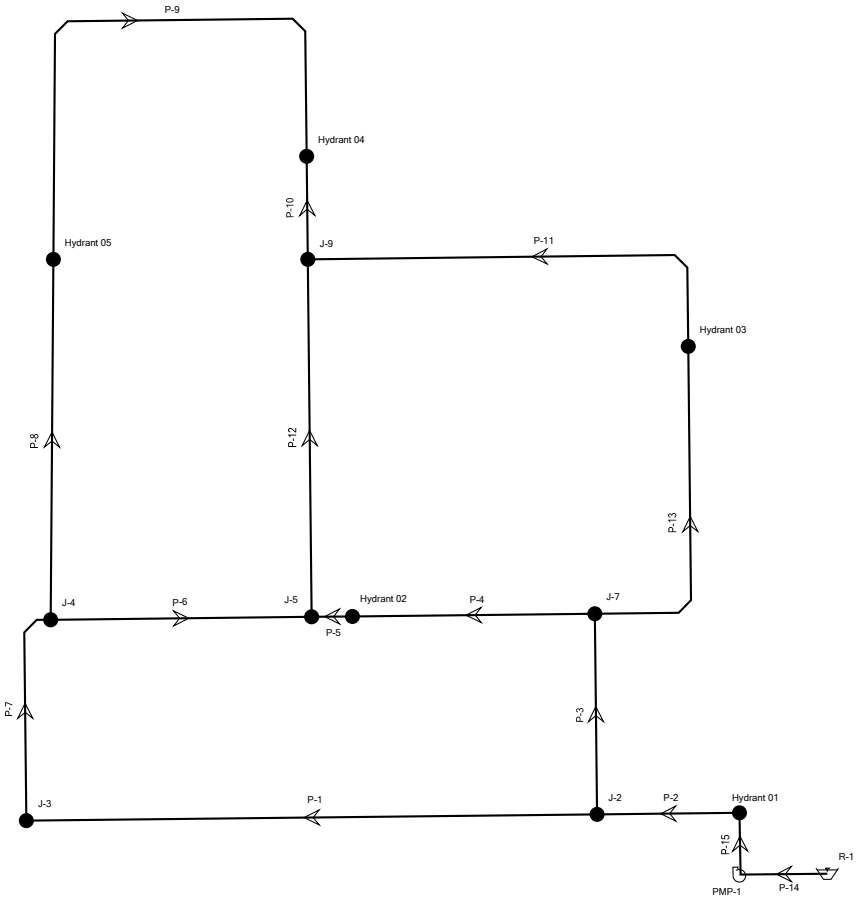
Scenario: Max Day



FlexTable: Junction Table (5153.wtg)

Current Time: 0.000 hours

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
30	J-3	100.00	<None>	0	235.85	58.8
38	Hydrant 05	95.00	<None>	7	235.85	60.9
29	J-2	95.00	<None>	0	235.86	60.9
31	J-4	94.90	<None>	0	235.85	61.0
37	Hydrant 04	94.85	<None>	7	235.85	61.0
36	J-9	94.60	<None>	0	235.85	61.1
32	J-5	94.50	<None>	0	235.85	61.2
33	Hydrant 02	94.50	<None>	7	235.85	61.2
28	Hydrant 01	94.50	<None>	0	235.86	61.2
35	Hydrant 03	94.00	<None>	7	235.85	61.4
34	J-7	93.80	<None>	0	235.85	61.5

FlexTable: Pipe Table (5153.wtg)

Current Time: 0.000 hours

ID	Label	Length (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
47	P-9	487	Hydrant 05	Hydrant 04	8.0	Ductile Iron	130.0	0	0.00	0.000
64	P-15	1	PMP-1	Hydrant 01	48.0	Ductile Iron	130.0	28	0.00	0.000
63	P-14	1	R-1	PMP-1	48.0	Ductile Iron	130.0	28	0.00	0.000
49	P-11	370	J-9	Hydrant 03	8.0	Ductile Iron	130.0	-2	0.01	0.000
43	P-5	33	Hydrant 02	J-5	8.0	Ductile Iron	130.0	2	0.01	0.000
44	P-6	208	J-5	J-4	8.0	Ductile Iron	130.0	-3	0.02	0.000
50	P-12	285	J-5	J-9	8.0	Ductile Iron	130.0	5	0.03	0.000
48	P-10	82	Hydrant 04	J-9	8.0	Ductile Iron	130.0	-7	0.04	0.000
46	P-8	287	J-4	Hydrant 05	8.0	Ductile Iron	130.0	7	0.05	0.000
51	P-13	283	J-7	Hydrant 03	8.0	Ductile Iron	130.0	9	0.06	0.000
42	P-4	193	J-7	Hydrant 02	8.0	Ductile Iron	130.0	9	0.06	0.000
39	P-1	455	J-3	J-2	8.0	Asbestos Cement	140.0	-10	0.07	0.000
45	P-7	175	J-3	J-4	8.0	Ductile Iron	130.0	10	0.07	0.000
41	P-3	160	J-2	J-7	8.0	Ductile Iron	130.0	18	0.11	0.000
40	P-2	114	J-2	Hydrant 01	8.0	Asbestos Cement	140.0	-28	0.18	0.000

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FlexTable: Pump Table (5153.wtg)

Current Time: 0.000 hours

ID	Label	Elevation (ft)	Pump Definition	Status (Initial)	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpm)	Pump Head (ft)
61	PMP-1	94.50	Fire Flow 032020	On	94.50	235.86	28	141.36

FlexTable: Reservoir Table (5153.wtg)

Current Time: 0.000 hours

ID	Label	Elevation (ft)	Zone	Flow (Out net) (gpm)	Hydraulic Grade (ft)
60	R-1	94.50	<None>	28	94.50

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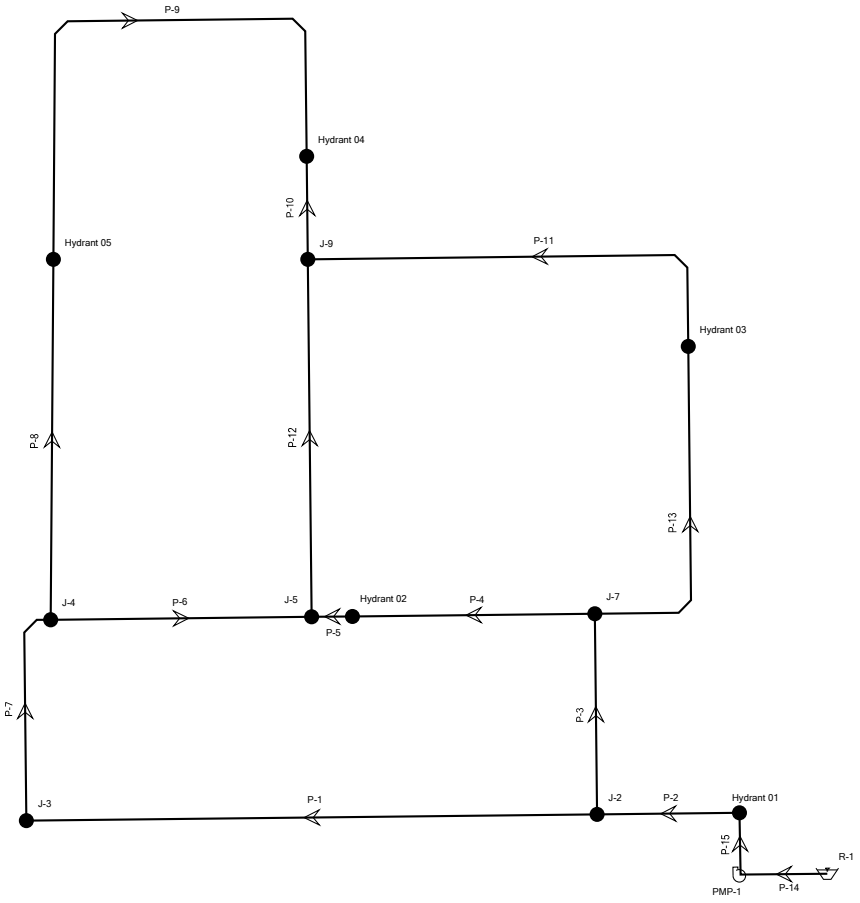
Scenario: Peak Hour



FlexTable: Junction Table (5153.wtg)

Current Time: 0.000 hours

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
30	J-3	100.00	<None>	0	235.82	58.8
38	Hydrant 05	95.00	<None>	12	235.82	60.9
29	J-2	95.00	<None>	0	235.83	60.9
31	J-4	94.90	<None>	0	235.82	61.0
37	Hydrant 04	94.85	<None>	12	235.82	61.0
36	J-9	94.60	<None>	0	235.82	61.1
32	J-5	94.50	<None>	0	235.82	61.1
33	Hydrant 02	94.50	<None>	12	235.82	61.1
28	Hydrant 01	94.50	<None>	0	235.84	61.1
35	Hydrant 03	94.00	<None>	12	235.82	61.4
34	J-7	93.80	<None>	0	235.82	61.4

FlexTable: Pipe Table (5153.wtg)

Current Time: 0.000 hours

ID	Label	Length (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
47	P-9	487	Hydrant 05	Hydrant 04	8.0	Ductile Iron	130.0	0	0.00	0.000
64	P-15	1	PMP-1	Hydrant 01	48.0	Ductile Iron	130.0	49	0.01	0.000
63	P-14	1	R-1	PMP-1	48.0	Ductile Iron	130.0	49	0.01	0.000
49	P-11	370	J-9	Hydrant 03	8.0	Ductile Iron	130.0	-3	0.02	0.000
43	P-5	33	Hydrant 02	J-5	8.0	Ductile Iron	130.0	3	0.02	0.000
44	P-6	208	J-5	J-4	8.0	Ductile Iron	130.0	-6	0.04	0.000
50	P-12	285	J-5	J-9	8.0	Ductile Iron	130.0	9	0.06	0.000
48	P-10	82	Hydrant 04	J-9	8.0	Ductile Iron	130.0	-12	0.08	0.000
46	P-8	287	J-4	Hydrant 05	8.0	Ductile Iron	130.0	12	0.08	0.000
51	P-13	283	J-7	Hydrant 03	8.0	Ductile Iron	130.0	16	0.10	0.000
42	P-4	193	J-7	Hydrant 02	8.0	Ductile Iron	130.0	16	0.10	0.000
39	P-1	455	J-3	J-2	8.0	Asbestos Cement	140.0	-18	0.11	0.000
45	P-7	175	J-3	J-4	8.0	Ductile Iron	130.0	18	0.11	0.000
41	P-3	160	J-2	J-7	8.0	Ductile Iron	130.0	31	0.20	0.000
40	P-2	114	J-2	Hydrant 01	8.0	Asbestos Cement	140.0	-49	0.31	0.000

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FlexTable: Pump Table (5153.wtg)

Current Time: 0.000 hours

ID	Label	Elevation (ft)	Pump Definition	Status (Initial)	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpm)	Pump Head (ft)
61	PMP-1	94.50	Fire Flow 032020	On	94.50	235.84	49	141.34

FlexTable: Reservoir Table (5153.wtg)

Current Time: 0.000 hours

ID	Label	Elevation (ft)	Zone	Flow (Out net) (gpm)	Hydraulic Grade (ft)
60	R-1	94.50	<None>	49	94.50

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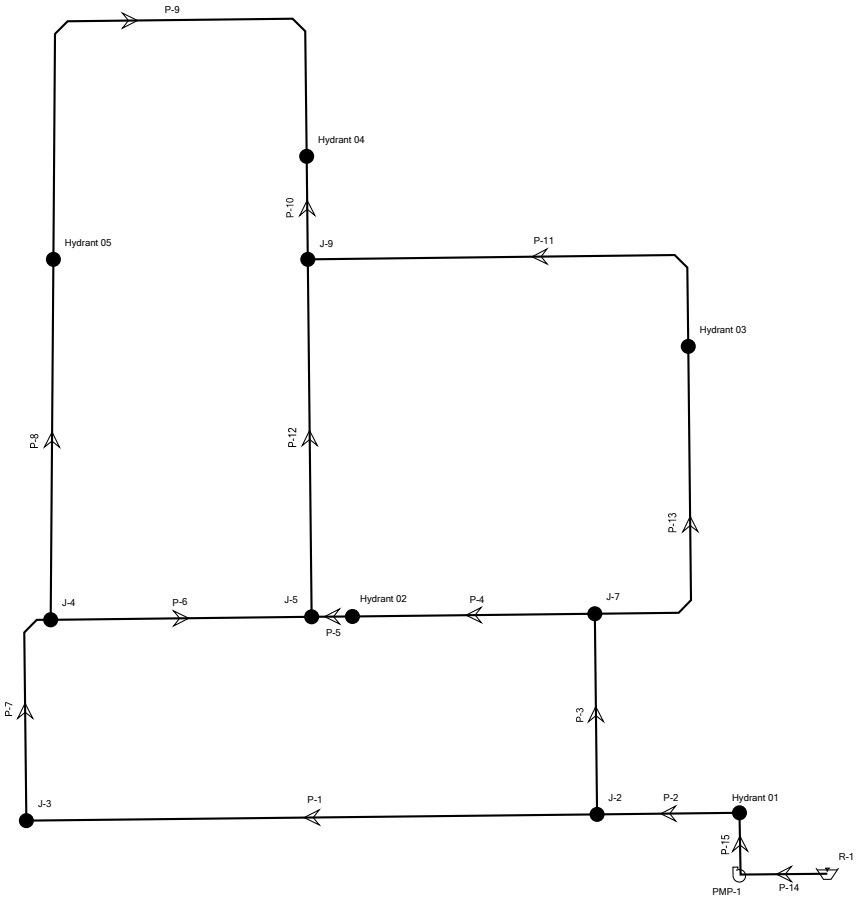
Scenario: Max Day + Fire Flow



Fire Flow Node FlexTable: Fire Flow Report (5153.wtg)

Current Time: 0.000 hours

Label	Satisfies Fire Flow Constraints?	Fire Flow (Available) (gpm)	Flow (Total Needed) (gpm)	Pressure (Residual Lower Limit) (psi)	Pressure (Calculated Residual) (psi)	Junction w/ Minimum Pressure (Zone)	Junction w/ Minimum Pressure (System)
Hydrant 05	True	2,697	1,507	20.0	20.0	Hydrant 04	Hydrant 04
Hydrant 04	True	2,759	1,507	20.0	20.0	J-9	J-9
Hydrant 03	True	2,780	1,507	20.0	20.0	J-9	J-9
J-3	True	2,786	1,500	20.0	20.0	J-4	J-4
J-9	True	2,822	1,500	20.0	20.0	Hydrant 04	Hydrant 04
J-4	True	2,874	1,500	20.0	20.1	J-3	J-3
Hydrant 02	True	2,894	1,507	20.0	20.0	J-5	J-5
J-5	True	2,899	1,500	20.0	20.0	Hydrant 02	Hydrant 02
J-7	True	2,978	1,500	20.0	20.3	J-3	J-3
J-2	True	3,093	1,500	20.0	22.2	J-3	J-3
Hydrant 01	True	3,415	1,500	20.0	22.4	J-3	J-3