CITY OF SCOTTSDALE

Water and Wastewater Study
Combined

PRELIMINARY WATER AND SEWER REPORT

9449 N 90th Street

Scottsdale, AZ 85258

COS Case # 471-PA-2019

LDG PROJECT #1908176

PRELIMINARY Basis of Design Report

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

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

Disclaimer: If accepted; the preliminary approval is granted under the condition that a final basis of design report will also be submitted for city review and approval (typically during the DR or PP case). The final report shall incorporate further water or sewer design and analysis requirements as defined in the city design standards and policy manual and address those items noted in the preliminary review comments (both separate and included herein). The final report shall be submitted and approved prior to the plan review submission.
For questions or clarifications contact the Water Resources Planning and Engineering Department at 480-312-5685.

BY rsacks DATE 5/12/2020

See site plan for comment

Prepared for:
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Submitted to:
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Planning & Development Department
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REGISTERED PROFESSIONAL ENGINEER (CIVIL)
CERTIFICATE NO.
41005
NICKOLA
J.
PRODANOV
Date Signed 04/23/20
ARIZONA, U.S.A.

April 23rd, 2020

17-DR-2020
5/7/2020

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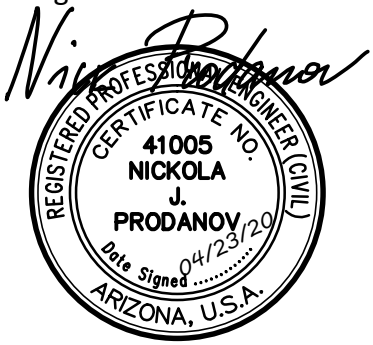


April 23rd, 2020

1. INTRODUCTION

This water report and related water and sewer plan have been developed in accordance with the current Arizona, Maricopa County and City of Scottsdale ordinances, standards and policies for design and operation of domestic and fire water facilities. It provides engineering analysis and assessment of the existing and proposed water systems that currently service and will be installed for the subject development, located at 9449 N 90th Street, Scottsdale, AZ 85258, and also being a portion of the SW ¼ of Section 30, Township 3 North, Range 5 East of the Gila and Salt River Base and Meridian, Maricopa County, Arizona. Refer to Appendix A-1 – Vicinity Map.

The proposed development will consist of 102 minimal health care residential units located in one building. Amenities will include spa and pool, game/social rooms, fitness room and more. additionally, there will be a small restaurant. Vehicular circulation is provided by two driveway entrances on the west (31' wide) and south (24' wide) sides of the site. Surface parking is provided along the drives as well as in the parking garage

This report provides results for the water service demands for Average Day, Maximum Day, Peak Hour and Fire Flow rates for the entire development. No phasing is anticipated for this project. The results provided in this report demonstrate that the proposed water system is capable of providing for the estimated demand and is in compliance with the City standards and performance. No wells or on-site water storage are proposed with this development. The procedures used herein are derived from, and performed with, currently accepted engineering methodologies and practices.

2. EXISTING CONDITIONS

Currently the site is fully developed with asphalt pavement and a two-story commercial building. The entire property will be demolished and cleared with the proposed project. The lot consists primarily of impervious surfaces with small DG landscape area along the frontage of 90th Street & San Victor Drive. The overall existing terrain on site is relatively flat and slopes in southwesterly direction. The land in the vicinity generally slopes in southerly direction. The site has an average elevation of 1354.00 (NAVD88), a peak elevation of 1355.00 and the lowest elevation of 1352.00.

City of Scottsdale is the water provider for this project. Based on the obtained from the City Water and Sewer Maps, 8" ACP public water main runs in both 90th Street and San Victor Drive. It appears that 8" ACP branch provides fire water to the existing commercial building on site and that the domestic water is provided through an existing water meter. Connected to the fire water is an existing water meter and backflow which is to be removed and relocated. The project is located within Pressure Zone with a Ground Elevations Range of 1330 to 1440.

There is an existing public 8" VCP sewer main in in both 90th Street (west) and San Victor Drive (south). Current sewer services to the site appear to be connected to this main. There are existing fire hydrants located on the south and west property lines.

3. DESIGN CRITERIA AND PROJECTED WATER DEMANDS

The following design parameters and requirements were derived from the City of Scottsdale Standards and Policies manual, Figure 6.1-2:
Average day demand per dwelling unit: **185.3 gpd (0.27 gpm per unit)**

Average Day Demand for retail/amenity: 0.8 / s.f. or **9,634** gpd (0.00111 gpm per s.f or **13.37 gpm**)

Maximum daily peaking factor: **2.0**
Peak hour demand factor: **3.5**

City of Scottsdale Fire Department follows 2015 International Fire Code.
Per the Appendix B, Section B105.2 of 2015 IFC, up to a 75% reduction of the fire flow can be granted if an approved automatic sprinkler system is installed. The resulting fire flow shall not be less than the required minimum of 1,500 gpm.

Proposed construction type is V-A with the following breakdown of the square footages per building use:

- Circulation/Service: 15,190SF
- Residential: 70,081SF
- Landscape: 29,075 SF
- Garage: 50,352SF

MINIMUM REQUIRED FIREFLOW AND FLOW DURATION FOR BUILDINGS

BLDG DESIGNATION	CONSTRUCTION TYPE	GROSS AREA (s.f.)	FIRE FLOW (gpm)	FLOW DURATION (hrs)
Garage	V-A	50,532	4,000 (2,000)*	4
Residential Building	V-A	93,037	5,500 (2,750)*	4

*Max from 75% Reduction Applied for Fully Sprinklered Building and 2,500 gpm

The static pressure in the distribution system should not exceed 120 pounds per square inch (psi), and the system shall be designed to maintain a minimum residual pressure of 50 psi at the highest, finished, floor level to be served by system pressure under normal daily operating conditions. The system is designed to maintain 30 psi minimum pressure under the design fire flow requirements. The 30 psi minimum pressure requirement provides a 10 psi safety factor to account for aging infrastructure and flexibility in locating pressure zone boundaries.

4. PROPOSED WATER PLAN

The project is to be served by a new domestic water meter. The new water service line will be installed with a new meter and backflow which will serve the landscape needs. The new system will be connected to the existing water service located at San Victor Drive. Sizes of the water meters will be verified by the plumbing engineer during the design process. Per the COS Design Standards & Policies Manual, the recommended max. capacity of 2" water meter is 80 gpm.

The demand used for the required fire flow was 1,572 gpm, which is the maximum of the 1500 gpm required and the 75% reduction of the required 5,500 gpm due to the fact that the buildings will be fully sprinklered as per the 2015 IFC, Appendix B, Section B105.2. Water systems were analyzed for peak hour and maximum day with fire demand.

A fire flow test was conducted for the site on October, 25th by E-J. The flow test resulted in an anticipated 3,968 gpm of available water at 20 psi and a residual pressure of 55 psi at 2,169 gpm.

The overall fire flow is provided by two existing fire hydrants. No new fire hydrants are proposed. The minimum pressure of 30 psi is exceeded while modeling the system with the total required fire flow demand. The velocities in the main waterlines shall be maintained below the maximum of 10 ft/sec for the required fire flow demand.

Refer to Appendix A-5 for fire flow test results and Appendix A-6 for water calculations.

5. SANITARY SEWER SYSTEM

Two new sanitary sewer services are proposed with this project. The first is to be connect to the existing sewer being 8" VCP on 90th Street. Its purpose is to service the new restaurant accompanying the building. Connected to San Victor Drive also being 8" VCP will be the second sewer service which will handle the main building.

The maximum d/D of an 8-inch sewer main at ultimate peak flow per the City of Scottsdale Design Standards and Policies Manual is 0.65. This equates to a maximum allowable discharge of 319 gpm at a velocity of 3 fps at slope of 0.52%. We have calculated that the peak discharge from this development will be 146 gpm. In our opinion the portion of public sewer line that this site discharges to has an adequate capacity.

We have also estimated the sewer discharge from the site using The City of Scottsdale Design Standards & Polices Manual. The average daily flow was estimated at 0.023 cfs. The peak discharge was calculated by increasing the average daily flow by a factor of 4.5, which is a total of 0.10 cfs. Using Manning's Equation, we calculated that the proposed 8-inch sewer line at a minimum of 0.5% have a velocity of 2.45 fps flowing full with a capacity of 0.86 cfs. Pool backwash is not planned for this development as filter cartridge system is designed for the pool. If Pool backwash is desired, it shall be connected to the sanitary sewer system and not discharge to the storm drain system. For the purpose of the design we have assumed a pool backwash flow rate of 100 gpm (0.22 cfs). Actual backwash discharge rate shall not exceed 100 gpm. Backwash pump and pipe sizing will be done by the pool designer under separate permit. Refer to Sanitary Sewer System Design Calculations in Appendix A-7.

6. CONCLUSIONS AND RECOMMENDATIONS

The proposed development and associated new water system comply with the City design standards and policies and the Scottsdale Integrated Water Master Report. It is anticipated that the construction would start in fourth quarter of 2020 and will continue for 24 months.

Specified water line for fire is 6 inch in diameter and shall be ductile iron pipe (DIP) with a minimum pressure class of 350. All ductile iron water lines shall be installed with polyethylene wrapping. Existing tees, tapping sleeves and related appurtenances that are not utilized by the development shall be removed by the contractor. A minimum of 3-foot section of pipe shall be removed and replaced, with no more than 6-feet remaining to the nearest joint.

Fittings cut into the existing 8" ACP main within 6-feet of another fitting or joint will require the short section of pipe to be removed and replaced with DIP. No water line will be deflected either vertically or horizontally, in excess of the recommended (but not exceeding 4 degrees) by the manufacturer of the pipe or coupling, without the appropriate use of bends or offsets. Fittings may be required where more than 2 pipe lengths are deflected.

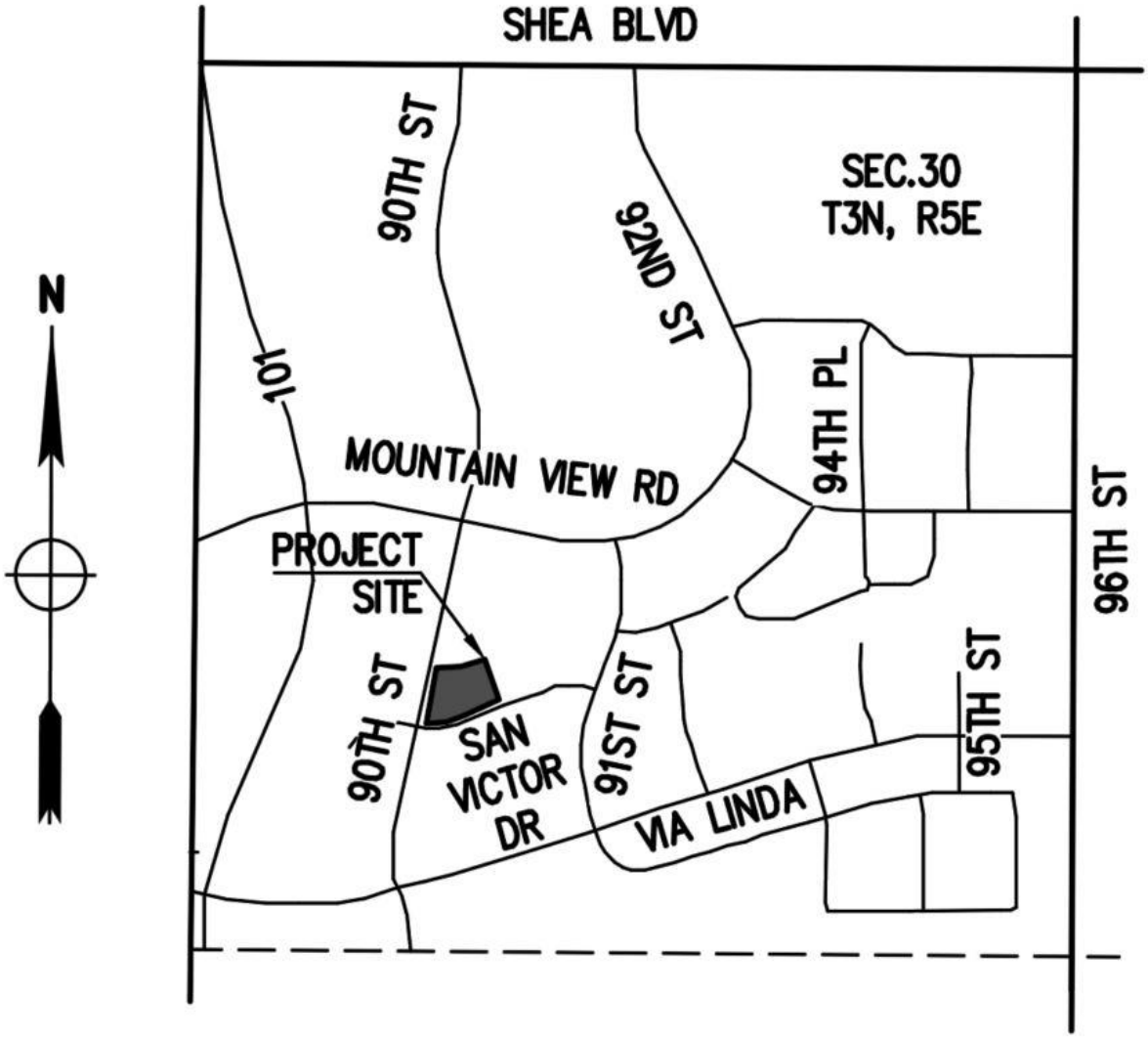
Shutoff valves will be installed on water mains at locations within the distribution system that allow sections of the system to be taken out of service for repairs or maintenance. A sufficient number of valves are provided on the proposed water lines so that inconvenience and sanitary hazards will be minimized during repairs. Maximum spacing of water distribution main isolation valves does not exceed 500 foot.

All water mains shall maintain 3 feet horizontal clearance to dry utilities. Water and sewer mains are placed under the paved section of the driveways. Vertical separation of water and sanitary sewer lines shall be in compliance with the COS Standard Detail No. 2401. For minimum clearance under culverts, storm drains, and other utilities, contractor shall refer to COS Standard Detail No. 2370 and 2372. The vertical realignment of the water mains shall be constructed of ductile iron pipe and shall not be deflected or swept. All metered services will require the installation of an approved backflow prevention device immediately adjacent to the meter on private property unless approved otherwise by the Water Resources Department.

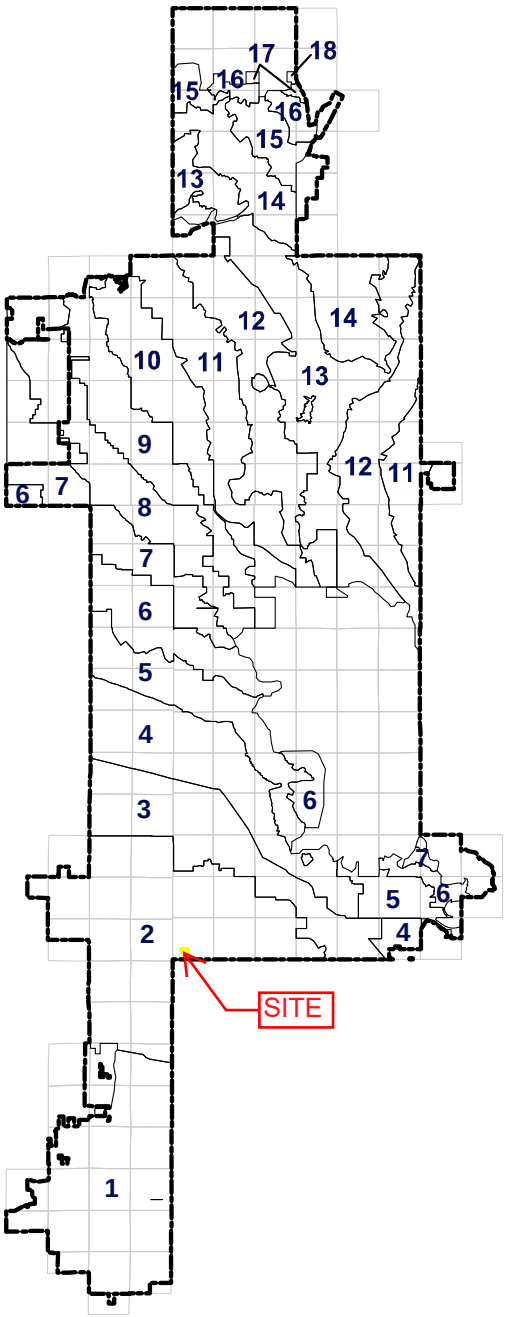
7. REFERENCES

- City of Scottsdale Design Standards & Policies Manual
- City of Scottsdale Pressure Zone Map
- City of Scottsdale Quarter Section Maps
- ADEQ Engineering Bulletin No. 10, “Guidelines for the Construction of Water Systems”

APPENDIX A-1
Vicinity Map



APPENDIX A-2
Pressure Zone Map



Zone	Ground Elevation Range (Ft.)
1	1180-1280
1A	1250-1330
2A	1280-1330
2	1330-1440
3	1440-1550
4	1510-1650
4E	1550-1650
5	1650-1790
5E	1650-1750
6	1790-1920
6E	1750-1934
7	1920-2050
7E	1934-2065
8	2050-2180
8E	2065-2200
9	2180-2310
10	2310-2440
11,11E	2440-2570
12,12E	2570-2700
13	2700-2830
14	2830-2960
15	2960-3090

1356

FIGURE 6.1-3 PRESSURE ZONE MAP

6-1.300 WATER FACILITIES

Water facilities (wells, reservoirs and booster pump stations) are typically designed and constructed by the city through its capital improvement program. Developers needing to construct water facilities should contact the Water Resources Department and request a meeting. The developer should be prepared to address how the proposed system will conform to the Integrated Water Master Plan. The city will address design issues, the review process for facilities and any potential city cost participation.

APPENDIX A-3
Public Water and Sewer Maps

27-48

27-50

26-49

PROJECT SITE

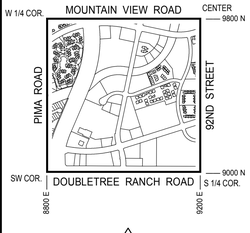
GENERAL NOTES:

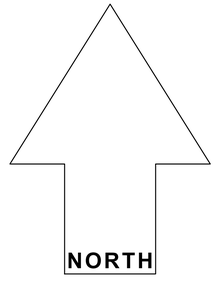
- THIS IS A COMPUTER GENERATED DRAWING. FOR ANY REVISIONS PLEASE CONTACT THE CITY OF SCOTTSDALE GIS DEPARTMENT AT (480) 312-7792.
- THE SECTION LINE BEARING AND DISTANCES ARE BASED ON THE CITY OF SCOTTSDALE GPS SURVEY OF SEPTEMBER, 1991. BEARINGS ARE NAD 83 GRID AND DISTANCES ARE FLATTENED TO GROUND.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

LEGEND:

- Water Valve
- Non-potable Water Valve
- Fire Hydrant
- Water Blowoff
- Water Main Reducer
- Water Sample Station
- Water Air Release Valve
- Non-potable Water Air Release Valve
- Water Pressure Reducing Valve
- Water Vault
- Water Manhole
- Non-Potable Water Manhole
- Water Pump
- Water Main
- Non-Potable Water Main
- Fire Line
- Water Service
- Non-Scottsdale Water Main
- Sewer Manhole
- Sewer Cleanout
- Sewer Lift Station
- Sewer Treatment Plant
- Sewer Main - Gravity
- Sewer Main - Force
- Non-Scottsdale Sewer Main
- Sewer Service

VICINITY MAP





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 & SEWER

QUARTER SECTION MAP

27-49

SW 1/4 SEC. 30 T3N R5E

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

11-AUG-19

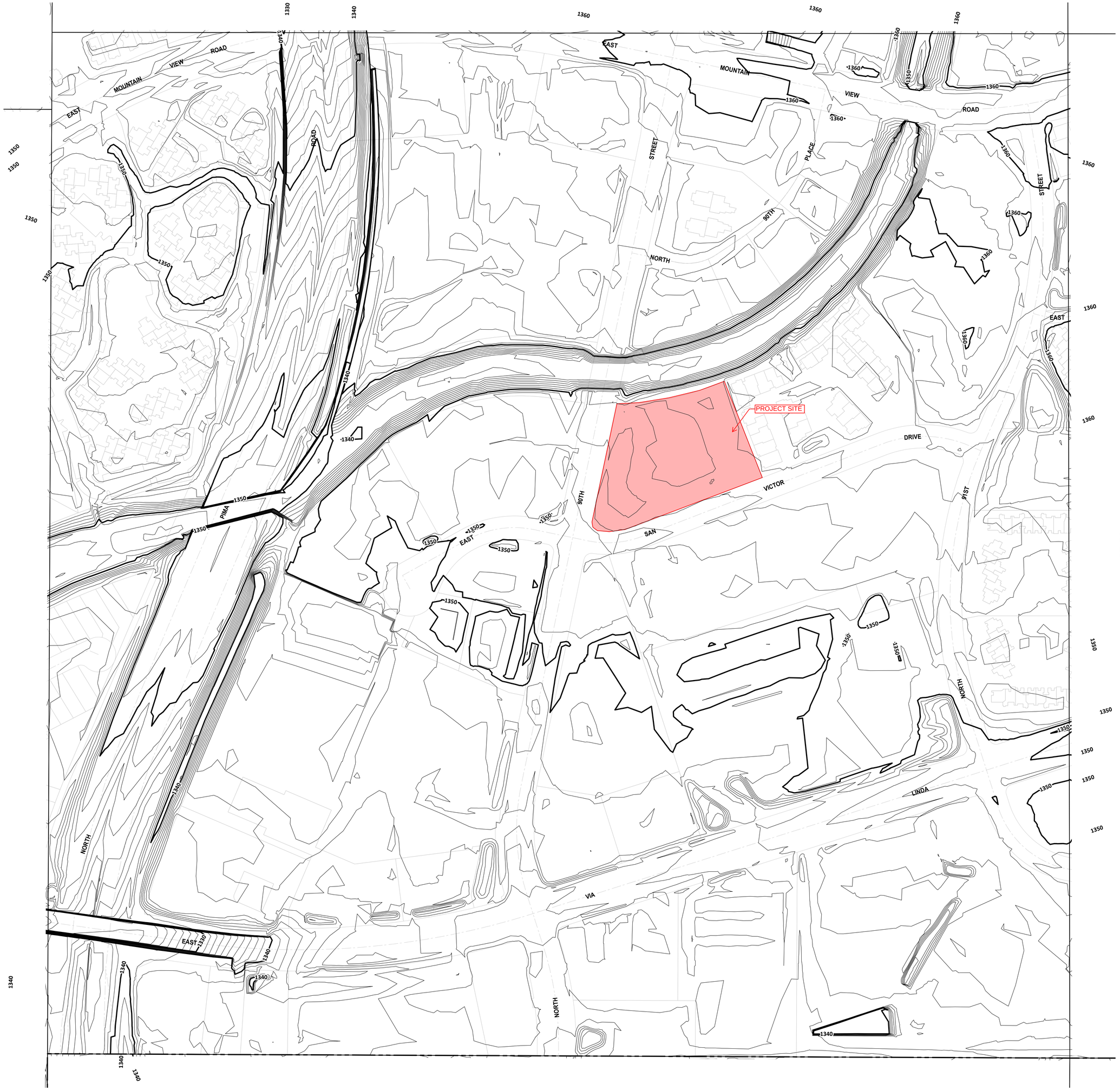
17-DR-2020
5/7/2020

28-49

27-48

27-50

26-49



GENERAL NOTES:

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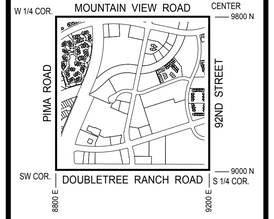
- THE SECTION LINE BEARING AND DISTANCES ARE BASED ON THE CITY OF SCOTTSDALE GPS SURVEY OF SEPTEMBER, 1991. BEARINGS ARE NAD 83 GRID AND DISTANCES ARE FLATTENED TO GROUND. WHERE NO CORNER WAS FOUND THE DIMENSIONS ARE GIVEN TO CALCULATED SECTION CORNERS AND ARE NOTED AS 'CALCULATED' ON THE MAP.

LEGEND:

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"

CONTOUR

QUARTER SECTION MAP

27-49

SW 1/4 SEC. 30 T3N R5E

CITY OF SCOTTSDALE

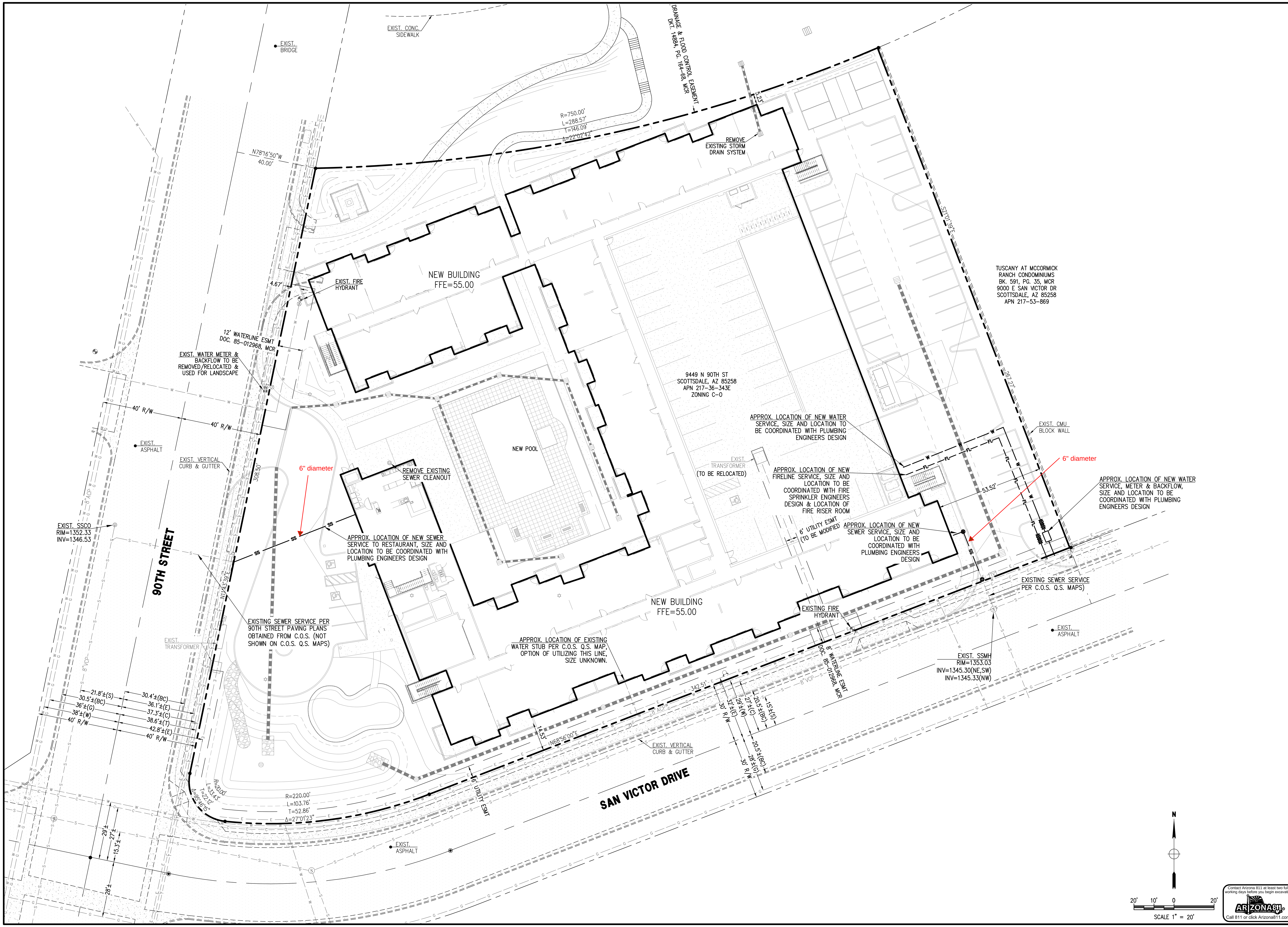
SCOTTSDALE GEOGRAPHIC INFORMATION SYSTEMS

3629 North Drinkwater Boulevard
Scottsdale, Arizona 85251

28-APR-14

17-DR-2020
5/7/2020

APPENDIX A-4
Preliminary Water and Sewer Plan



EXIST. CONC. SIDEWALK
EXIST. BRIDGE
DRAINAGE & FLOOD CONTROL EASEMENT DKT. 14884, PG. 164-68, MCR
R=750.00'
L=288.57'
T=146.09'
Δ=22°02'42"
N78°16'50"W
40.00'
REMOVE EXISTING STORM DRAIN SYSTEM
S21°01'19"E
TUSCANY AT MCCORMICK RANCH CONDOMINIUMS
BK. 591, PG. 35, MCR
9000 E SAN VICTOR DR
SCOTTSDALE, AZ 85258
APN 217-53-869
NEW BUILDING
FFE=55.00
EXIST. FIRE HYDRANT
4.67'
12' WATERLINE ESMT DOC. 85-012968, MCR
EXIST. WATER METER & BACKFLOW TO BE REMOVED/RELOCATED & USED FOR LANDSCAPE
9449 N 90TH ST
SCOTTSDALE, AZ 85258
APN 217-36-343E
ZONING C-O
APPROX. LOCATION OF NEW WATER SERVICE, SIZE AND LOCATION TO BE COORDINATED WITH PLUMBING ENGINEERS DESIGN
EXIST. CMU BLOCK WALL
40' R/W
EXIST. ASPHALT
EXIST. VERTICAL CURB & GUTTER
308.50'
NEW POOL
6" diameter
REMOVE EXISTING SEWER CLEANOUT
EXIST. TRANSFORMER
(TO BE RELOCATED)
APPROX. LOCATION OF NEW FIRELINE SERVICE, SIZE AND LOCATION TO BE COORDINATED WITH FIRE SPRINKLER ENGINEERS DESIGN & LOCATION OF FIRE RISER ROOM
53.52'
APPROX. LOCATION OF NEW WATER SERVICE, METER & BACKFLOW, SIZE AND LOCATION TO BE COORDINATED WITH PLUMBING ENGINEERS DESIGN
EXIST. SSCO
RIM=1352.33
INV=1346.53
90TH STREET
APPROX. LOCATION OF NEW SEWER SERVICE TO RESTAURANT, SIZE AND LOCATION TO BE COORDINATED WITH PLUMBING ENGINEERS DESIGN
6' UTILITY ESMT (TO BE MODIFIED)
APPROX. LOCATION OF NEW SEWER SERVICE, SIZE AND LOCATION TO BE COORDINATED WITH PLUMBING ENGINEERS DESIGN
N11°43'39"E
EXISTING SEWER SERVICE PER C.O.S. Q.S. MAPS)
NEW BUILDING
FFE=55.00
EXISTING FIRE HYDRANT
EXIST. ASPHALT
EXISTING SEWER SERVICE PER 90TH STREET PAVING PLANS OBTAINED FROM C.O.S. (NOT SHOWN ON C.O.S. Q.S. MAPS)
EXIST. TRANSFORMER
APPROX. LOCATION OF EXISTING WATER STUB PER C.O.S. Q.S. MAP, OPTION OF UTILIZING THIS LINE, SIZE UNKNOWN.
8" WATERLINE ESMT DOC. 85-012968, MCR
EXIST. SSMH
RIM=1353.03
INV=1345.30(NE,SW)
INV=1345.33(NW)
21.8'±(S)
30.5'±(BC)
36'±(G)
38'±(W)
40' R/W
30.4'±(BC)
36.1'±(E)
37.3'±(C)
38.6'±(T)
42.8'±(E)
40' R/W
342.51'
15'±(S)
20.5'±(BC)
27'±(W)
29'±(W)
32'±(E)
30' R/W
14.53'
N68°56'00"E
EXIST. VERTICAL CURB & GUTTER
20.5'±(BC)
28'±(G)
30' R/W
6' UTILITY ESMT
SAN VICTOR DRIVE
R=220.00'
L=103.76'
T=52.86'
Δ=27°01'23"
EXIST. ASPHALT
29'±
27'±
15.3'±
28'±
N
20' 10' 0 20'
SCALE 1" = 20'

Contact Arizona 811 at least two full working days before you begin excavation

ARIZONA811

Call 811 or click Arizona811.com

REVISIONS:	DATE:
SCALE: 1"=20'	DATE: 04/22/20
DESIGNED BY: NP	JOB: 1908176
DRAWN BY: DW	VERSION: 1.1
CHECKED BY: NP	PLOT DATE: 04/22/20

WATER, SEWER & FIRELINE PLAN

PARCEL NO. 217-36-343E 9449 N 90TH ST., SCOTTSDALE, AZ 85258

Land DEVELOPMENT GROUP
P 602 889 1984 | F 602 445 9482
8808 N CENTRAL AVE., SUITE 288
PHOENIX, AZ 85020
PHOENIX@LDGENG.COM

PRELIMINARY NOT FOR CONSTRUCTION

C-3

17-DR-2020
5/7/2020

APPENDIX A-5
Fire Flow Test Results

Flow Test Summary

Project Name:	EJFT 19249
Project Address:	9449 N 90th St, Scottsdale, AZ 85258
Date of Flow Test:	2019-10-25
Time of Flow Test:	7:40 AM
Data Reliable Until:	2020-04-25
Conducted By:	Eder Cueva & Tayler Lynch (EJ Flow Tests) 602.999.7637
Witnessed By:	Jared Berry (City of Scottsdale) 602.541.4942
City Forces Contacted:	City of Scottsdale (602.541.4942)
Permit Number:	C60138

Note Scottsdale requires a max static pressure of 72 psi for safety factor.

Raw Flow Test Data

Static Pressure:	85.0 PSI
Residual Pressure:	68.0 PSI
Flowing GPM:	2,169
GPM @ 20 PSI:	4,476

Data with a 13 PSI Safety Factor

Static Pressure:	72.0 PSI
Residual Pressure:	55.0 PSI
Flowing GPM:	2,169
GPM @ 20 PSI:	3,968

Hydrant F_1

Pitot Pressure (1):	37	PSI
Coefficient of Discharge (1):	0.9	
Hydrant Orifice Diameter (1):	4	inches

Additional Coefficient 0.83 on orifice #1

Project Site

Static-Residual Hydrant

Flow Hydrant

Distance Between F_1 and R
600 ft (measured linearly)

Static-Residual Elevation
1356 ft (above sea level)

Flow Hydrant (F_1) Elevation
1355 ft (above sea level)

Elevation & distance values are approximate

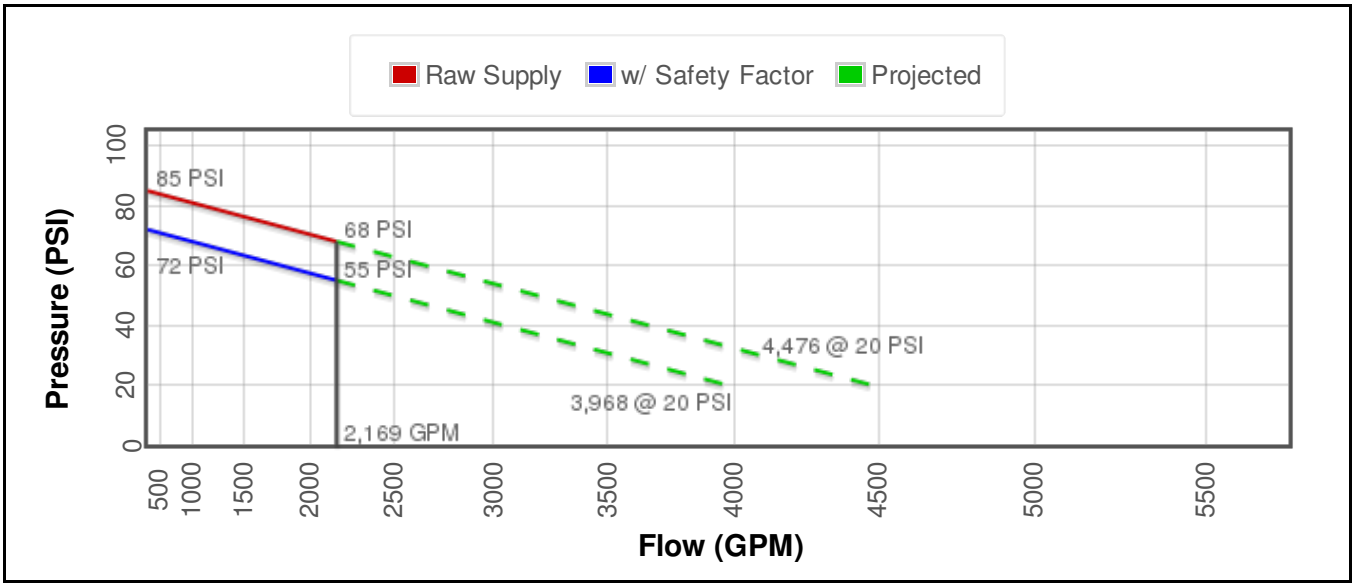
Flow Test Summary

Static-Residual Hydrant

Flow Hydrant (only hydrant F1 shown for clarity)

Approximate Project Site

Water Supply Curve $N^{1.85}$ Graph



APPENDIX A-6
Water Calculations

Number of units:	102
Average day demand per dwelling unit:	0.27 gpm (388.8 gpd)
Commercial:	0.00111 x 7,767 = 8.62 gpm (12,414.2 gpd)
Average day demand:	**102 x 0.27+8.62 = 36.16 gpm (52,070 gpd)**

Maximum daily peaking factor:	2.0*ADD
Maximum daily demand per dwelling unit:	0.54 gpm (777.6 gpd)
Maximum daily demand - retail:	17.24 gpm (24,825.6 gpd)
Maximum day demand	**102 x 0.54+17.24 = 72.32 gpm (104,140.8 gpd)**

Peak hour demand factor:	3.5*ADD
Peak hour demand per dwelling unit:	0.945 gpm (1,360.8 gpd)
Peak hour demand - retail:	30.17 gpm (43,444.8 gpd)
Peak hour demand	**102 x 0.945 + 30.17 = 126.56 gpm (182,246.4 gpd)**

Residential fire flow demand*:

*IFC 2015, Table B105.1

- Max. Building Area: **93,037 s.f.**
- For Construction **Type V-A**, min. required fire-flow is **5,500 gpm x 0.25** = 1,375 gpm or 1,500 gpm**

**Per Exception under IFC 2015, Sec. B105.2

TOTAL SITE DEMAND

Maximum day demand + Fire flow demand	**72.3 + 1,500 = 1,572 gpm**

APPENDIX A-7
Sanitary Sewer System Design Calculations

Manning's Formula

8" Pipe Flowing Full

Capacity

$$Q = \frac{1.49}{n} * R^{2/3} * S^{1/2} * A$$

n = 0.013
R = 0.16667
A = 0.3490
S = 0.0050 ft/ft

Q = 0.86 cfs

Velocity

$$Q = \frac{1.49}{n} * R^{2/3} * S^{1/2}$$

n = 0.013
R = 0.16667
S = 0.0050 ft/ft

V = 2.45 fps

Manning's Formula

6" Pipe Flowing Full

Capacity

$$Q = \frac{1.49}{n} * R^{2/3} * S^{1/2} * A$$

n = 0.013
R = 0.125
A = 0.1963
S = 0.010 ft/ft

Q = 0.56 cfs

Velocity

$$Q = \frac{1.49}{n} * R^{2/3} * S^{1/2}$$

n = 0.013
R = 0.125
S = 0.010 ft/ft

V = 2.86 fps

Sewer Demand Calculations

Average daily flow

Number of Units:	102
Average day demand per dwelling unit:	200
Average day demand:	**102 x 200 = 11,000 gpd**
Area of Commercial:	**7,767**
Average day demand per s.f.:	**0.5**
Average day demand:	**3,884 gpd**
Total average daily flow:	**11,000 + 3,884 = 14,884 gpd = 0.0230 cfs**

Peak daily flow

0.0230 cfs x 4.5 = 0.1035 cfs or 46.45 gpm

6" service lines are connected to an existing 6" sewer line that is tapped to the existing 8" public sewer main. Building sewer service lines to be sized by the plumbing engineer at the time of the final design.

Capacity of 6" sewer line is **0.56** cfs > Peak Demand of **0.10 cfs**

Pool Backwash Flow Rate

100 gpm (0.22 cfs) assumed for preliminary purposes. Actual discharge and pipe sizing will be calculated at the time of final design. Current design plans for filter cartridge system that does not require pool backwash pipe installation.

Sewer Peak Daily Flow

46.45 gpm + 100 gpm (pool)	**146.45 gpm or 0.326 cfs**

Capacity of Proposed and Existing 6" Sewer = **0.56** cfs > Peak Demand of **0.33 cfs**