PRELIMINARY WASTEWATER REPORT

for

3200 SCOTTSDALE

3202 N. Scottsdale Road,

Scottsdale, Arizona

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 ldillon **DATE** 10/13/2022

Address comments below and herein in a final BOD report submitted under the future DR case. Apply all stipulations noted below to the rezoning case:

1) Stipulation: New proposed pool backwash flows shall be routed to 71st Street sewer. Other new proposed flows to be routed to Scottsdale Road sewer.
2) Stipulation: Two new coated manholes with drop service connections shall be installed on 71st St and Scottsdale Rd respectively.
3) Stipulation: Segments of 6" and 8" ACP water main on 71st St and Scottsdale Road impacted by new sewer service connections or manholes will be realigned and/or replaced with DIP as necessary. DS&PM 6-1.413.
4) Verify existing 8" sewer slopes on 71st St and Scottsdale Road for analysis presented in future DR case submittal. Verify/estimate existing flows in 71St sewer and include in calcs.
5) Slight exceedance of sewer capacity w/ existing pool backwash on Scottsdale Rd is approved as shown in the report. Upstream basin is small, not prone to I&I, and large sewer is located immediately downstream.
6) For DR case utility plan: Cap any unused sewer service line at the property line. Remove any unused water services back to the main. If tee connection on main remove tee and replace with spool piece.DS&PM 6-1.408

Prepared For:

3202 Scottsdale, LLC

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Scottsdale, AZ 85255

Prepared by:

SEG

Sustainability Engineering Group

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Project Number: 210708

Submittal Date: April 6, 2022

1st Revision Date: August 3, 2022

2nd Revision Date: September 14, 2022

3rd Revision Date: October 13, 2022

Case#: 6-ZN-2022 **Plan Check#: TBD**

Contents

1. INTRODUCTION

1.1 SUMMARY OF PROPOSED DEVELOPEMENT

3200 N. Scottsdale Road is a proposed 150-unit high-density multifamily project located between N. 71 Street and N. Scottsdale Road in Scottsdale, Arizona. The project will include a health club/gym on the ground floor. Wastewater service will be provided off the existing 8" sewer system in N. Scottsdale Road. The purpose of this memo is to provide a preliminary wastewater analysis for rezoning.

w/ new proposed pool backwash routed to 71st St

1.2 LEGAL DESCRIPTION

The following parcel of subdivided land is located in the East ½ of the SE ¼ of Section 27, Township 2 North, Range 4 East of the Gila and Salt River Base and Meridian in Scottsdale, Arizona. Refer to **EXHIBIT 1** for a vicinity map.

- APN 130-16-007A, Scottsdale Trailer Corral.

All part of Lot 4, Security Acres Amended, as recorded in Book 8, Page 59 of Maricopa County Records. The total land area is 91,855 sq. ft. (2.11 acres), more or less.

2. DESIGN DOCUMENTATION

2.1 DESIGN COMPLIANCE

The proposed sewer system is designed to meet design criteria of the City of Scottsdale ("the City") Water Resources Department, the Arizona Department of Environmental Quality ("ADEQ"), and Maricopa County Environmental Services Department ("MCESD").

2.2 PROCEDURES, POLICIES AND METHODOLOGIES

ok, then existing must be removed/ capped at property line

This project proposes a new service connection to the existing 8" sewer system in N. Scottsdale Road. A new service connection to the existing 8" sewer in N. 71st Street will be provided for the pool backwash. Hydraulic design of the service pipe to Scottsdale Road will include the peak flow.

2.3 SOFTWARE ACKNOWLEDGEMENT:

Onsite sewer service line will be hydraulically evaluated using Bentley FlowMaster® V8i (SELECTseries 1).

3. EXISTING CONDITIONS

3.1 EXISTING AND PROPOSED ZONING AND LAND USES

The parcel is presently zoned C-3, Highway Commercial. The project is proposing rezoning to D/DMU-2, Downtown Multiple Use, Type 2.

3.2 EXISTING TOPOGRAPHY, VEGETATION AND LANDFORM FEATURES:

The parcel is fully developed as a for rent residential trailer and RV community. The topography slopes from the northwest to the southeast with approximately two feet fall. Refer to **EXHIBIT 2** for an aerial of the overall project existing conditions.

3.3 EXISTING SEWER INFRASTRUCTURE:

See **EXHIBIT 3** - City of Scottsdale (QS 15-44)

- Two 8" sewer lines exist along the site's 71st Street frontage. The western VCP line has been severed, plugged just north of the Earll Drive manhole. Any service connections to this pipe are unknown. The eastern PVC/VCP line provides service to properties along 71st Street including a service connection to the site (that is to be abandoned and plugged per City requirements OK
- An 8" VCP line exists approximately 31' west of the Scottsdale Road centerline and does not presently provide any service connections to this site.
- An existing 21" sanitary sewer trunk line is located near the Earll Drive centerline and flows east to Miller Road.

3.4 FLOWS IN EXISTING 8" SEWER SYSTEM:

To determine existing pools & spas backwash peak flow, volumes were calculated assuming a 5 ft depth for pools and 3 ft depth for spas. Turnover rate of 6 hrs (360 minutes) was used for pools and 20 minutes for spas. Calculations are as follow:

Agave Apartments

Pool

Area = 1,222 ft^2

Volume = 1,222 ft^2 * 5 ft = 6,110 ft^3 = 45,703 gal

Peak flow = 45,703 gal / 360 min = 127 gpm

Spa

Area = 120 ft^2

Volume = 120 ft^2 * 3 ft = 360 ft^3 = 2,693 gal

Peak flow = 2,693 gal / 20 min = 135 gpm

Total Peak Flow = 135 gpm + 127 gpm = 262 gpm

ALTA Osborn Apartments

Pool

Area = 1,974 ft^2

Volume = 1,974 ft^2 * 5 ft = 9,870 ft^3 = 73,828 gal

Peak flow = 73,828 gal / 360 min = 205 gpm

Spa

Area = 144 ft^2

Volume = 144 ft^2 * 3 ft = 432 ft^3 = 3,231 gal

Peak flow = 3,231 gal / 20 min = 162 gpm

Total Peak Flow = 205 gpm + 162 gpm = 367 gpm

As discussed in the Final Sewer Capacity Report for Alta Drinkwater (A.K.A. Osborn), dated July 2017 prepared by SEG (Refer to **APPENDIX III**)**,** and pools and spas calculations above, flow in the existing Scottsdale Road sewer line is as follows:

Table 1: EXISTING FLOW IN SCOTTSDALE ROAD 8" SEWER (Ties in at Earll Drive 21" Sewer)

	Units or s.f. com.	ADF (gpcu) or per s.f.	Avg. Day Flow (GPD)	Avg. Day Flow (GPM)	Peaking Factor	Peak Hour (GPD)	Peak Hour (GPM)
Aqave Apartments	247	140	34,580	24	4	138,320	96
Good Egg restaurant	7,000 s.f.	1.2	8,400	6	6	50,400	35
ALTA Osborn Apartments	134	143	19,162	13	4	76,648	53
Aqave Pool & Spa Backwash	-	-	-	-	-	-	262
ALTA Osborn Pool & Spa Backwash	-	-	-	-	-	-	367
Existing Flow to Thomas 8" sewer and then 21" Earll Drive Sewer			**62,142**	**43**		265,368	813

Note: Combined pool & spa backwash for Agave Apartment and Alta Osborn apartments is 629 gpm and will be analyzed at 50% capacity (315 gpm).

@ 50% backwash total is 500gpm

4. PROPOSED CONDITIONS

4.1 SITE PLAN

EXHIBIT 4 depicts the preliminary site plan. All onsite structures and service line will be removed. The property is being re-developed with a structure containing 150 apartment units. The ground floor will include 4,000 sf of health club/gym use (fitness center/spa/health club).

4.2 PROPOSED SEWER SERVICE CONNECTIONS

Sewer service will consist of a 6'' pipe from the southeast corner of the building connected to a proposed manhole (MH-1) at the existing 8" sewer in N. Scottsdale Road per MAG 426 Type B drop connection. A 6" sewer service for the pool backwash will connect to a proposed manhole (MH-2) at the existing 8" sewer in N. 71st St. per MAG 426 Type A drop connection. The service line's locations will be coordinated to avoid conflict with other existing utilities. The preliminary utility plan is shown in **APPENDIX I**.

4.3 MAINTENANCE RESPONSIBILITIES

The sewer service lines will be owned and maintained by the property owner.

5. SEWER SYSTEM COMPUTATIONS

5.1 PROPOSED NEW SEWER DEMAND

On-site pool backwash peak flow was calculated following the same parameters in Section 3.4 above:

Area = 2,250 ft^2

V= 2,250 ft^2 * 5 ft = 11,250 ft^3 = 84,156 gal

Peak flow = 84,156 gal / 360 min = 234 gpm

Table 2 below presents proposed on-site demands:

Table 2: SEWER DEMAND CALCULATIONS							
	Area (sq.ft.)	Dwelling Units	ADD (gpd/unit)	Peaking Factor	Avg. Day Demand (gpm)	Peak Flow (gpm)	Peak Flow (gpd)
Residential	-	150	140	4.5	14.6	65.6	94,500
Fitness Center/Spa/Health Club	4,000	-	0.8	3.5	2.2	7.8	11,200
Total without Pool backwash					16.8	73.4	105,700
Pool				N/A	-	234.0	336,960
Total with Pool Backwash					16.8	307.4	442,660

5.2 MINIMUM SERVICE REQUIREMENTS

The proposed 6" service line at 2.00% slope (N. Scottsdale Road) is sufficient to convey the peak flow without the pool backwash at a depth of 1.9" and velocity of 3.18 fps. This pipe will connect to the proposed manhole (MH-1) at the existing 8" sewer at N. Scottsdale Road per MAG 426 Type B drop connection.

The existing 8" sewer in N. Scottsdale Road was overburdened when the new pool backwash contribution was considered. Therefore, the proposed 6" service line at 1.00% slope (N. 71st Street) is sufficient to convey the pool backwash peak flow at a depth of 4.6" and velocity of 3.25 fps. This pipe will connect to the proposed manhole (MH-2) at the existing 8" sewer at N. 71st Street per MAG 426 Type A drop connection.

Refer to **APPENDIX II** for the service pipe hydraulic calculations.

5.3 EXISTING SCOTTSDALE ROAD & 71st STREET SEWER CAPACITY

Capacity for the existing 8" sewer lines along N. Scottsdale Road & N. 71st Street were verified to fulfill the d/D requirements per the DSPM. Hydraulics for these lines is shown in **Table 3** and **Table 4.** Expected peak flows for the 3200 N. Scottsdale Road project were added to the existing pipe flows. Refer to **APPENDIX IIA** for the offsite pipe hydraulic calculations. A d/D of ratio of 0.65 is the maximum allowable limit without pool backwash and a d/D ratio of 0.80 is allowed including pool backwash.

N. Scottsdale Road

For the scenario without pool backwash, the maximum calculated flow at the allowable d/D is higher than the proposed peak flow. For the scenario with pool backwash, the maximum calculated flow at allowable d/D is lower than the proposed peak flow. As such, the proposed pool backwash will be directed to the 71st Street sewer.

The existing 8" pipe slope will be surveyed to confirm the inverts shown on the quarter-section map. For preliminary design, the quarter-section data was used indicating a 1% slope on the pipe. Upstream manhole invert = 1232.88, downstream manhole invert = 1228.73, pipe length = 406'.

71st Street

The maximum calculated flow at allowable d/D is higher than the proposed peak flow (pool backwash).

The existing 8" pipe slope will be surveyed to confirm the inverts shown on the quarter-section map. For preliminary design, the quarter-section data was used indicating a 1.17% slope on the pipe. Upstream manhole invert = 1234.65, downstream manhole invert = 1231.93, pipe length = 232'.

ok

Table 3: SCOTTSDALE ROAD SEWER CAPACITY

	Total Peak Flow (gpd)	Total Peak Flow (gpm)	Allowed d/D	Max Flow Capacity at allowed d/D (gpm)	Calculated Velocity (fps)
Existing Flow (Table 1a)	265,368	184			
Proposed Flow (Table 2)	105,700	73			
Total without Pool Backwash	371,068	258	0.65	410	3.8
Pool Backwash Existing* (2 spas & 2 pools)	453,600	315			
Total with Pool Backwash	824,668	573	0.80	530	4.0

* Table assumes two simulatneous pool backwash scenarios at 50% capacity use

slightly over capacity d/D=0.88 but acceptable because upstream area is small, little risk of I&I or other peaking influences and connecting to large 21" sewer very close to connection point.

Table 4: 71st STREET SEWER CAPACITY

	Total Peak Flow (gpd)	Total Peak Flow (gpm)	Allowed d/D	Max Flow Capacity at allowed d/D (gpm)	Calculated Velocity (fps)
Pool Backwash Proposed 1 pool	336,960	234			
Total with Pool Backwash	336,960	234	0.80	573	4.3

Additional analysis of the 71st Street sewer capacity will occur in the final report.

d/D=0.44, ok
establish existing flows in DR report

6. SUMMARY / CONCLUSIONS

6.1 Summary:

The proposed sewer flows, and service connections are designed to meet criteria of the City's Design Standards and Policies Manual, the Arizona Department of Environmental Quality ("ADEQ"), and Maricopa County Environmental Services Department ("MCESD").

The hydraulic output shown in **APPENDIX II** indicates that the 6" sewer connections are sufficient to provide service to this project. The hydraulic output in **APPENDIX IIA** indicates that the existing 8" sewer in Scottsdale Road does not has sufficient capacity to serve this project while considering existing pool backwash from Agave Apartments and ALTA Osborn Apartments. The existing 8" sewer in Scottsdale Road Street will be further evaluated in subsequent submittals to verify enough capacity for the new wastewater flows.

until confirmed zoning stipulation will be that new development pool backwash flows will be routed to 71st St

6.2 PROJECT SCHEDULE:

As a residential apartment development, the infrastructure and buildings are proposed to be constructed in a single phase.

7. REFERENCES

1. COS Sewer Q-S MAP 15-44
2. City of Scottsdale Design Standards & Policies Manual, 2018 (Chapter 7 – Sewer)

8. EXHIBITS:

EXHIBIT 1 - Vicinity Map- Local Aerial
EXHIBIT 2 - Aerial
EXHIBIT 3 - COS Sewer Q-S Map 15-44
EXHIBIT 4 - Preliminary Site Plan

9. APPENDICIES:

APPENDIX I - Preliminary Utility Plan/Service Layout
APPENDIX II - Preliminary Onsite Sewer Service Line Hydraulic Calculations
APPENDIX IIA- Preliminary Offsite Sewer Hydraulic Calculations
APPENDIX III – Alta Drinkwater Final Sewer Capacity Report Case No. 42-DR-2016

EXHIBITS

1. ***Vicinity Map***
2. ***Aerial***
3. ***Sewer Q-S 15-44***
4. ***Preliminary Site Plan***

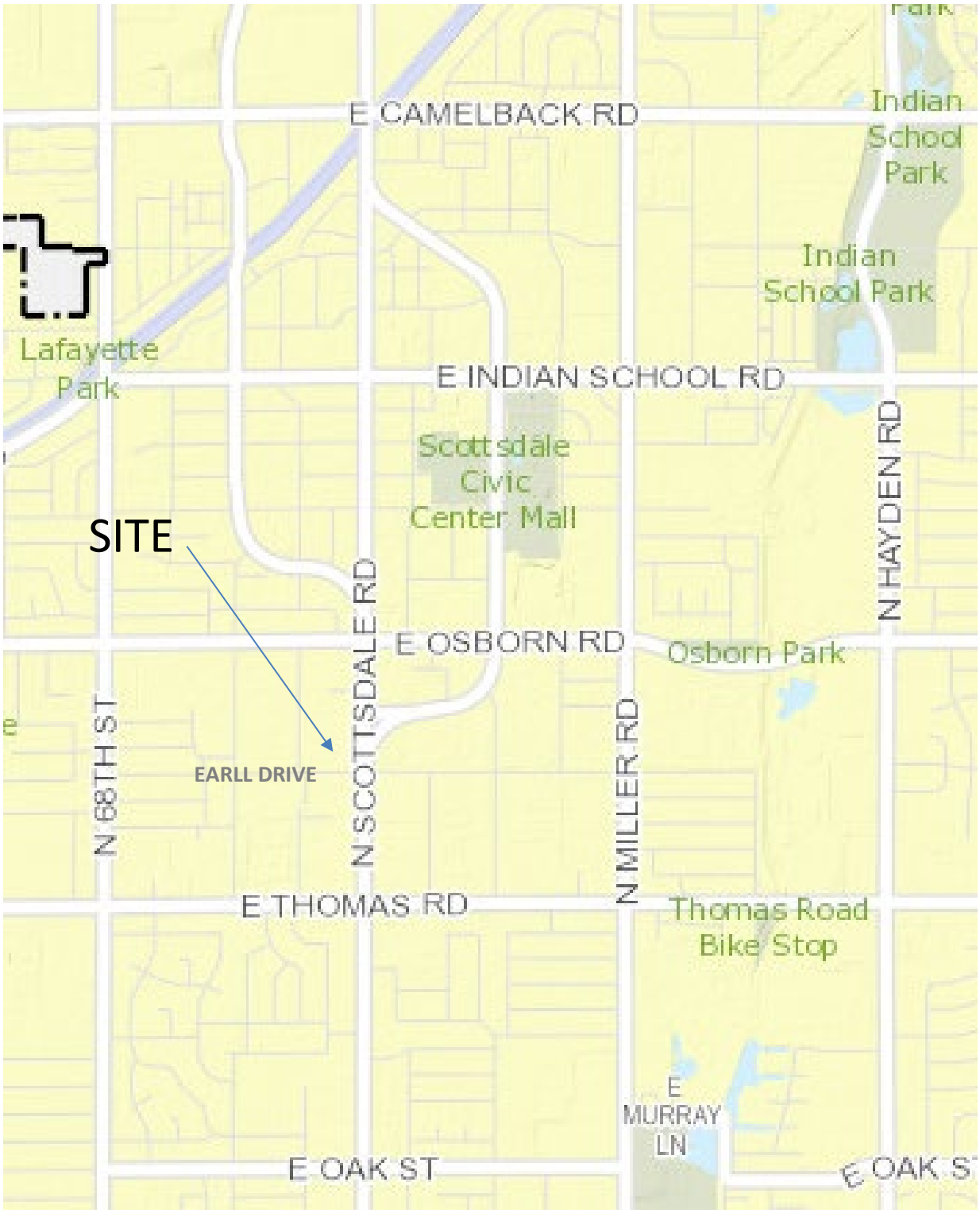


EXHIBIT 1 – Vicinity Map

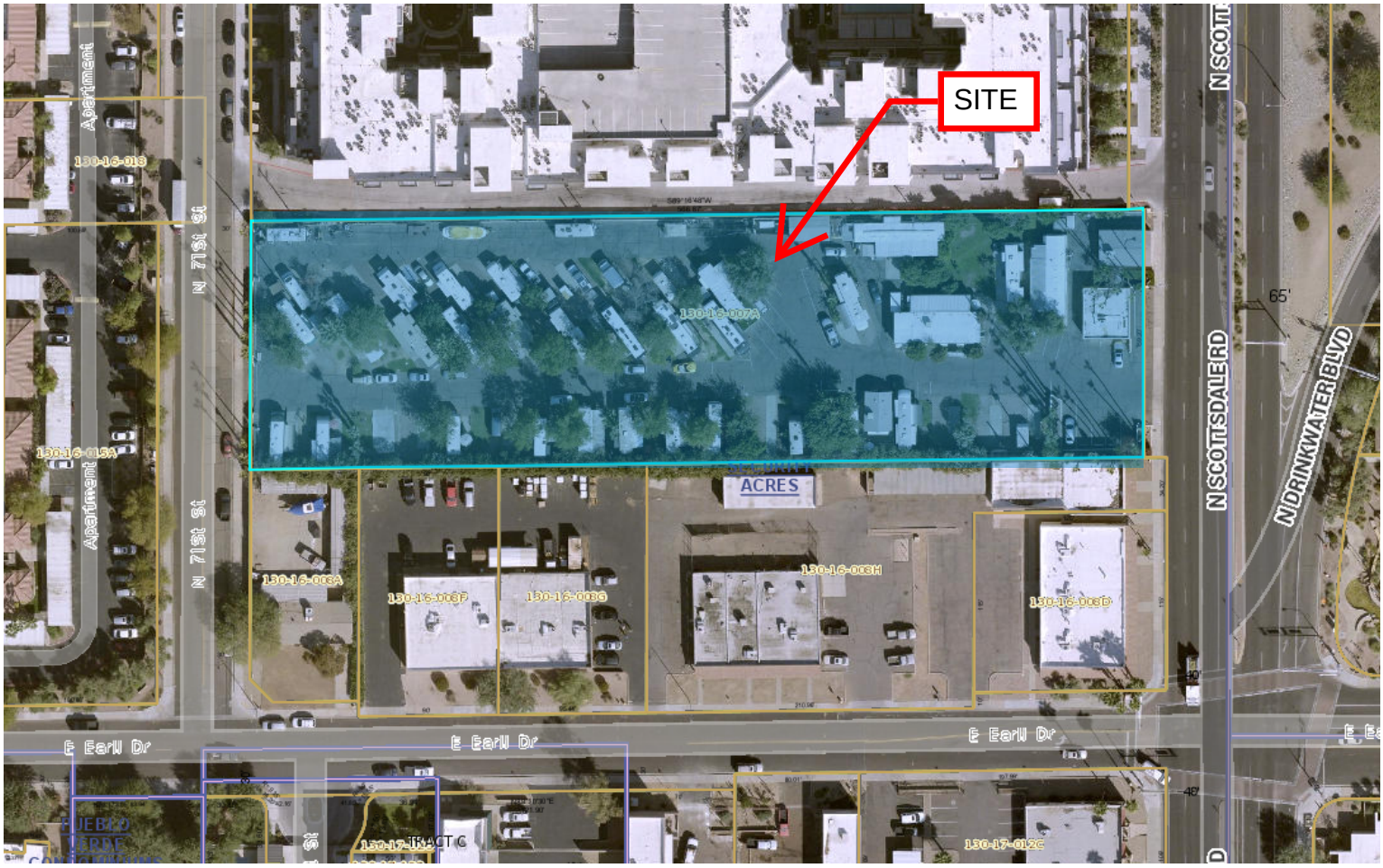


EXHIBIT 2 – Aerial

15-43

15-45

14-44

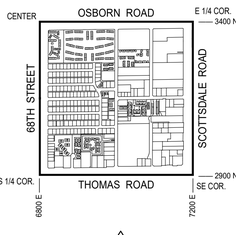
GENERAL NOTES:

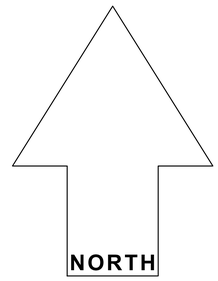
- THIS IS A COMPUTER GENERATED DRAWING. FOR ANY REVISIONS PLEASE CONTACT THE CITY OF SCOTTSDALE GIS DEPARTMENT AT (480) 312-7792.
- THE SECTION LINE BEARING AND DISTANCES ARE BASED ON THE CITY OF SCOTTSDALE GPS SURVEY OF SEPTEMBER, 1991. BEARINGS ARE NAD 83 GRID AND DISTANCES ARE FLATTENED TO GROUND.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

LEGEND:

- Cleanout
- Lift Station (LS)
- Manhole
- Non-GPS Point
- Plug
- Sewer Service Point
- Sewer Tap Point
- Sewer Valve
- Treatment Plant
- Sewer Main - Gravity
- Sewer Main - Force (Force)
- Sewer Main - Private

VICINITY MAP





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

SEWER

QUARTER SECTION MAP

15-44

SE 1/4 SEC. 27 T2N R4E

EXHIBIT 3

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

04-JUL-21

Project Data

Site Area:	2.n aaes net (91,855 sf) 2.42 acres gross (105,370 sf)
Residential Ana:	166,000sf gross (132,600sf lusable)
Total Units:	150 units 142-bedroom
IIInsity:	6198 / acn gross
Flex Office Area:	4,000sf
Parking Reqund:	240 spaces I-br.Up•lriti1361e1.3=f17spacesJ 2-br: \7per\Rtl 14 x \7 : 24 spaces J Guest: 1/6per unit I 150 / 6=25spaces J Flex/Office: 1/300 sf (4000 sf/ 300 sf= 14 spaces I
P.-king Provided:	290 spaces

Site Plan

3202 SCOTTSDALE- Scottsdale, Arizona

10 15tt 167 Ult 1120

[21 "137, 07-22-22

EXHIBIT 4 - Site Plan

APPENDICIES

I. Preliminary Service/ Utility Plan

II. Service Pipe Hydraulics

IIA. Offsite Sewer Pipe Hydraulics

III. Alta Drinkwater Final Sewer Capacity Report Case No. 42-DR-2016

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CHANDLER, ARIZONA 85244
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ATTN: DANIEL ARMIJO
EMAIL: ARMIJODARMIJO@AWLANDSURVEY.COM

OWNER/DEVELOPER:
3202 SCOTTSDALE, LLC.

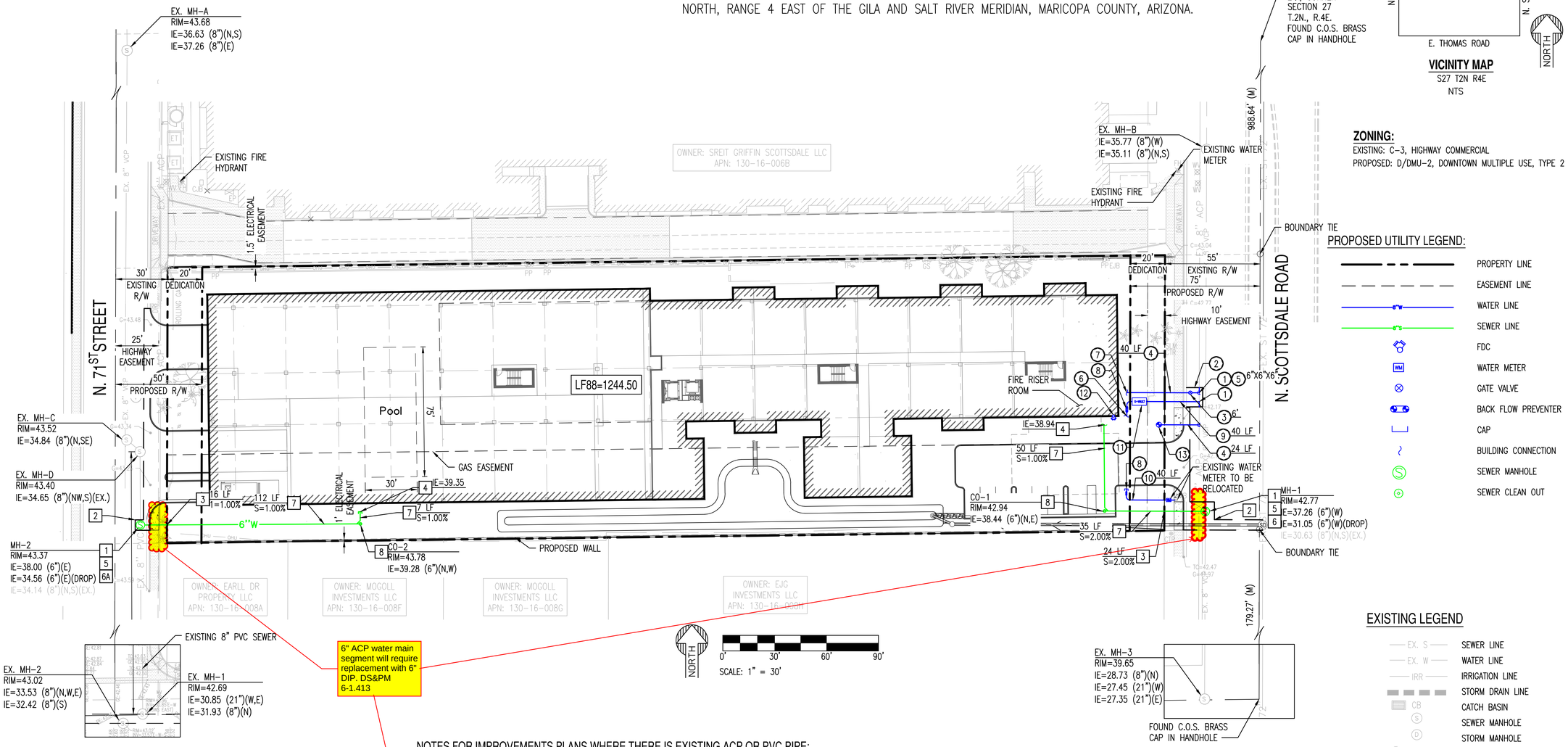
3200 SCOTTSDALE

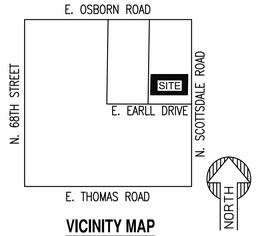
PRELIMINARY UTILITY PLAN

APPENDIX I

3202 N. SCOTTSDALE ROAD. SCOTTSDALE, AZ.

A PORTION OF THE EAST HALF OF THE SOUTHEAST QUARTER OF SECTION 27, TOWNSHIP 2 NORTH, RANGE 4 EAST OF THE GILA AND SALT RIVER MERIDIAN, MARICOPA COUNTY, ARIZONA.





VICINITY MAP
S27 T2N R4E
NTS

ZONING:
EXISTING: C-3, HIGHWAY COMMERCIAL
PROPOSED: D/DMU-2, DOWNTOWN MULTIPLE USE, TYPE 2

PROPOSED UTILITY LEGEND:

- PROPERTY LINE
- EASEMENT LINE
- WATER LINE
- SEWER LINE
- FDC
- WATER METER
- GATE VALVE
- BACK FLOW PREVENTER
- CAP
- BUILDING CONNECTION
- SEWER MANHOLE
- SEWER CLEAN OUT

EXISTING LEGEND

- EX. S — SEWER LINE
- EX. W — WATER LINE
- IRR — IRRIGATION LINE
- STORM DRAIN LINE
- CB — CATCH BASIN
- SEWER MANHOLE
- STORM MANHOLE
- WV — WATER VALVE
- WMB — WATER METER BOX
- FIRE HYDRANT
- ECB — ELECTRIC CABINET

C.O.S. GENERAL NOTES FOR PUBLIC WORKS CONSTRUCTION

1. ALL CONSTRUCTION IN THE PUBLIC RIGHTS-OF-WAY OR IN EASEMENTS GRANTED FOR PUBLIC USE MUST CONFORM TO THE LATEST MAG UNIFORM STANDARD SPECIFICATIONS AND UNIFORM STANDARD DETAILS FOR PUBLIC WORKS CONSTRUCTION AS AMENDED BY THE LATEST VERSION OF THE CITY OF SCOTTSDALE SUPPLEMENTAL STANDARD SPECIFICATIONS AND SUPPLEMENTAL STANDARD DETAILS. IF THERE IS A CONFLICT, THE CITY'S SUPPLEMENTAL STANDARD DETAILS WILL GOVERN.
2. THE CITY ONLY APPROVES THE SCOPE, NOT THE DETAIL, OF ENGINEERING DESIGNS; THEREFORE, IF CONSTRUCTION QUANTITIES ARE SHOWN ON THESE PLANS, THEY ARE NOT VERIFIED BY THE CITY.
3. THE APPROVAL OF PLANS IS VALID FOR SIX (6) MONTHS. IF A RIGHT-OF-WAY PERMIT FOR THE CONSTRUCTION HAS NOT BEEN ISSUED WITHIN SIX MONTHS, THE PLANS MUST BE RESUBMITTED TO THE CITY FOR REAPPROVAL.
4. A PUBLIC WORKS INSPECTOR WILL INSPECT ALL WORKS WITHIN THE CITY RIGHTS-OF-WAY AND IN EASEMENTS. NOTIFY INSPECTION SERVICES 24 HOURS PRIOR TO BEGINNING CONSTRUCTION BY CALLING 480-312-5750.
5. WHENEVER EXCAVATION IS NECESSARY, CALL THE BLUE STAKE CENTER, 811, TWO WORKING DAYS BEFORE EXCAVATION BEGINS. THE CENTER WILL SEE THAT THE LOCATION OF THE UNDERGROUND UTILITY LINES IS IDENTIFIED FOR THE PROJECT.
6. RIGHT-OF-WAY PERMITS ARE REQUIRED FOR ALL WORK IN PUBLIC RIGHTS-OF-WAY AND EASEMENTS GRANTED FOR PUBLIC PURPOSES. A RIGHT-OF-WAY PERMIT WILL BE ISSUED BY THE CITY ONLY AFTER THE REGISTRANT HAS PAID A BASE FEE PLUS A FEE FOR INSPECTION SERVICES. COPIES OF ALL PERMITS MUST BE RETAINED ON-SITE AND BE AVAILABLE FOR INSPECTION AT ALL TIMES. FAILURE TO PRODUCE THE REQUIRED PERMITS WILL RESULT IN IMMEDIATE SUSPENSION OF ALL WORK UNTIL THE PROPER PERMIT DOCUMENTATION IS OBTAINED.
7. ALL EXCAVATION AND GRADING THAT IS NOT IN THE PUBLIC RIGHTS-OF-WAY OR NOT IN EASEMENTS GRANTED FOR PUBLIC USE MUST CONFORM TO APPENDIX J, GRADING, OF THE LATEST EDITION OF THE INTERNATIONAL BUILDING CODE. A PERMIT FOR THIS GRADING MUST BE SECURED FROM THE CITY FOR A FEE ESTABLISHED BY THE CITY.

NOTES FOR IMPROVEMENTS PLANS WHERE THERE IS EXISTING ACP OR PVC PIPE:

ANY WATER LINE PROJECT THAT INVOLVES CONNECTING TO AN EXISTING ACP OR PVC PIPE REQUIRES SPECIAL ATTENTION. PER DSPM SECTION 6-1.408:

FITTINGS INSTALLED INTO ASBESTOS CEMENT PIPE (ACP) OR PVC PIPE WITHIN 6-FEET OF ANOTHER
FITTING OR JOINT WILL REQUIRE THAT SECTION OF PIPE TO BE REMOVED AND REPLACED WITH DUCTILE IRON PIPE (DIP).
EXISTING TEES, TAPPING SLEEVES AND RELATED APPURTENANCES THAT ARE NOT UTILIZED BY A DEVELOPMENT SHALL BE REMOVED BY THE CONTRACTOR. A MINIMUM 3-FOOT SECTION OF PIPE SHALL BE REMOVED, WITH NO LESS THAN 6 FEET REMAINING TO THE NEAREST JOINT. THE REMOVED
PIPE SHALL BE REPLACED WITH DIP.
WHEN MORE THAN 3-FEET OF EXISTING ACP OR PVC WATER LINES ARE EXPOSED DURING CONSTRUCTION AND THE BEDDING IS DISTURBED, THE WATER LINE MUST BE REPLACED WITH DIP (MINIMUM CLASS 350) WITH MECHANICAL JOINTS OR FLANGED JOINTS TO 3-FEET PAST THE SIDES OF THE EXPOSED CROSSING TRENCH. REFER TO MAG STANDARD DETAIL NO. 403-3.
NO TAPPING SLEEVE AND VALVE SHALL BE USED ON ACP PIPE. VALVES WILL NEED TO BE CUT INTO ACP PIPE.
DISPOSAL OF MATERIALS CONTAINING ASBESTOS AND/OR LEAD SHALL BE IN CONFORMANCE WITH ALL REGULATIONS, LAWS AND ORDINANCES.

NOTE:

1. EXISTING MANHOLES RIMS AND INVERTS HAVE BEEN SET BASED ON QUARTER SECTION MAP QS# 15-44. DATED 07/04/2021. ELEVATIONS TO BE VERIFIED IN FIELD.
2. EXISTING MANHOLES RIMS AND INVERTS HAVE BEEN SET BASED ON ALTA DRINKWATER UTILITY PLAN SHEET C4.00 AND C4.10. DATED 08/03/2018. ELEVATIONS TO BE VERIFIED IN FIELD.

PRELIMINARY WATER KEY NOTES

1. CONNECTION TO EXISTING WATER LINE. REPLACE AT LEAST 3' OF ACP PIPE PER C.O.S. REQUIREMENTS.
2. SAWCUT, REMOVE AND REPLACE EXISTING PAVEMENT.
3. GATE VALVE WITH VALVE BOX AND COVER, SIZE PER PLAN.
4. 6" DUCTILE IRON PIPE. LENGTH PER PLAN.
5. INSTALL CUT-IN TEE, SIZE PER PLAN.
6. DOMESTIC CONNECTION TO BUILDING.
7. FIRE CONNECTION TO BUILDING.
8. BACKFLOW PREVENTION, SIZE TO MATCH WATER METER SIZE.
9. INSTALL 3" TYPE "K" COPPER DOMESTIC SERVICE CONNECTION. LENGTH PER PLAN.
10. CONNECT TO EXISTING WATER METER AND INSTALL 1-1/2" TYPE "K" COPPER IRRIGATION SERVICE LINE. LENGTH PER PLAN.
11. INSTALL 3" DOMESTIC SERVICE VAULT.
12. INSTALL FIRE DEPARTMENT CONNECTION.
13. FIRE HYDRANT.

PRELIMINARY SEWER KEY NOTES

1. VERIFY EXISTING SEWER LOCATION PRIOR TO CONSTRUCTION.
2. SAWCUT, REMOVE AND REPLACE EXISTING PAVEMENT, SIDEWALK AND CURB AND GUTTER.
3. 6" PVC SEWER SERVICE CONNECTION PER MAG STD. DET. 440-3. LENGTH AND SLOPE PER PLAN.
4. SEWER CONNECTION TO BUILDING.
5. PROPOSED 5' SEWER MANHOLE WITH COATING PER DS&PM SEC. 7-1.405.D
6. DROP SEWER CONNECTION PER MAG STD. DET. 426. TYPE "B".
6A. DROP SEWER CONNECTION PER MAG STD. DET. 426 TYPE "A"
7. 6" PVC SDR-35 SEWER LINE. SIZE, LENGTH AND SLOPE PER PLAN.
8. SEWER CLEAN-OUT PER MAG STD. DET. 441.

SDR35

CO per this detail, other aspects per drop detail

PRELIMINARY
NOT FOR
CONSTRUCTION

SUSTAINABILITY ENGINEERING GROUP
SEG
8280 E. GELDING DRIVE SUITE 101, SCOTTSDALE, ARIZONA 85260
WWW.AZSEG.COM TEL. 480.588.7226 FAX. 480.259.3534

LAND DEVELOPMENT SERVICES

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

PROJECT: 3200 SCOTTSDALE
LOCATION: 3202 N. SCOTTSDALE ROAD. SCOTTSDALE, AZ.

DRAWN	JC	10/13/2022
DESIGNED	JC	10/13/2022
QC	SC	08/01/2022
FINAL QC		
PROJ. MGR.	AF	10/13/2022

DATE: 10/13/2022
ISSUED FOR: REZONING

REVISION NO.:	DATE:
1	
2	
3	
4	

JOB NO.: 210708

SHEET TITLE: **PRELIMINARY UTILITY PLAN**

PAGE NO.: 2 OF 2
SHEET NO.: **C4.10**

PRE-APP #: 488-PA-2021

Scottsdale Road 6" Sewer Service@ 2.00%

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.020 ft/ft
Diameter	6.0 in
Discharge	73.40 gpm

Results	
Normal Depth	1.9 in
Flow Area	0.1 ft²
Wetted Perimeter	0.6 ft
Hydraulic Radius	1.0 in
Top Width	0.46 ft
Critical Depth	2.4 in
Percent Full	30.8 %
Critical Slope	0.007 ft/ft
Velocity	3.18 ft/s
Velocity Head	0.16 ft
Specific Energy	0.31 ft
Froude Number	1.678
Maximum Discharge	383.10 gpm
Discharge Full	356.14 gpm
Slope Full	0.001 ft/ft
Flow Type	Supercritical

APPENDIX II – Pipe Hydraulics

71st Street 6" Sewer @ 1.00% Pool Backwash

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.010	ft/ft
Diameter	6.0	in
Discharge	234.00	gpm

Results		
Normal Depth	4.6	in
Flow Area	0.2	ft²
Wetted Perimeter	1.1	ft
Hydraulic Radius	1.8	in
Top Width	0.43	ft
Critical Depth	4.4	in
Percent Full	76.2	%
Critical Slope	0.011	ft/ft
Velocity	3.25	ft/s
Velocity Head	0.16	ft
Specific Energy	0.54	ft
Froude Number	0.932	
Maximum Discharge	270.89	gpm
Discharge Full	251.83	gpm
Slope Full	0.009	ft/ft
Flow Type	Subcritical	

APPENDIX II – Pipe Hydraulics

Scottsdale Road 8" Sewer @ 1%, d/D= 0.65

Project Description	
Friction Method	Manning Formula
Solve For	Discharge

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.010 ft/ft
Normal Depth	5.2 in
Diameter	8.0 in

Results	
Discharge	410.23 gpm
Flow Area	0.2 ft²
Wetted Perimeter	1.3 ft
Hydraulic Radius	2.3 in
Top Width	0.64 ft
Critical Depth	5.4 in
Percent Full	65.0 %
Critical Slope	0.009 ft/ft
Velocity	3.81 ft/s
Velocity Head	0.23 ft
Specific Energy	0.66 ft
Froude Number	1.092
Maximum Discharge	583.40 gpm
Discharge Full	542.34 gpm
Slope Full	0.006 ft/ft
Flow Type	Supercritical

APPENDIX IIA – Pipe Hydraulics

Scottsdale Road 8" Sewer @ 1% d/D= 0.8

Project Description	
Friction Method	Manning Formula
Solve For	Discharge

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.010 ft/ft
Normal Depth	6.4 in
Diameter	8.0 in

Results	
Discharge	530.12 gpm
Flow Area	0.3 ft²
Wetted Perimeter	1.5 ft
Hydraulic Radius	2.4 in
Top Width	0.53 ft
Critical Depth	6.2 in
Percent Full	80.0 %
Critical Slope	0.011 ft/ft
Velocity	3.95 ft/s
Velocity Head	0.24 ft
Specific Energy	0.78 ft
Froude Number	0.928
Maximum Discharge	583.40 gpm
Discharge Full	542.34 gpm
Slope Full	0.010 ft/ft
Flow Type	Subcritical

APPENDIX IIA – Pipe Hydraulics

71st Street 8" Sewer @ 1% d/D=0.8

Project Description	
Friction Method	Manning Formula
Solve For	Discharge

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.012 ft/ft
Normal Depth	6.4 in
Diameter	8.0 in

Results	
Discharge	573.42 gpm
Flow Area	0.3 ft²
Wetted Perimeter	1.5 ft
Hydraulic Radius	2.4 in
Top Width	0.53 ft
Critical Depth	6.4 in
Percent Full	80.0 %
Critical Slope	0.012 ft/ft
Velocity	4.27 ft/s
Velocity Head	0.28 ft
Specific Energy	0.82 ft
Froude Number	1.004
Maximum Discharge	631.05 gpm
Discharge Full	586.63 gpm
Slope Full	0.011 ft/ft
Flow Type	Supercritical

APPENDIX IIA – Pipe Hydraulics

FINAL SEWER CAPACITY REPORT

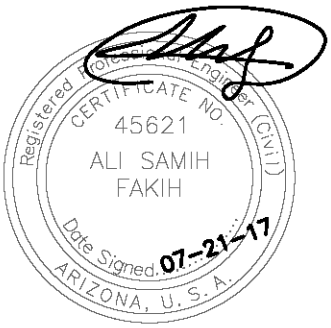
ALTA DRINKWATER

3220 N. Scottsdale Road
Scottsdale, AZ

Prepared For:

WOOD PARTNERS

8777 E. Via De Ventura
Scottsdale, AZ 85258
Phone: 480.607.0622



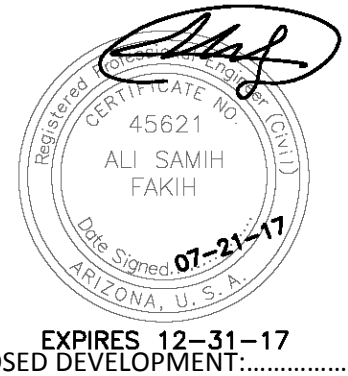
EXPIRES 12–31–17

Prepared by:

Sustainability Engineering Group
8280 E. Gelding Drive, Suite 101
Scottsdale, AZ 85260
480.588.7226 www.azSEG.com

Project Number: 160410
Submittal Date: July 21, 2017

Case No.: 42-DR-2016 **Plan Check No.: 2157-17**



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1. INTRODUCTION

1.1 SUMMARY OF PROPOSED DEVELOPMENT:

Proposed development consists of a maximum of 277 apartment units in a four (4) story building complex that includes a clubhouse and parking garage. The purpose of this report is to provide an analysis of the impact that this development will have on the city's wastewater system.

1.2 LEGAL DESCRIPTION:

The project property consists of a parcel of land located on the west side of Scottsdale Road, across from the Drinkwater Boulevard intersection. It is further bound by 71st Street to the west, developed commercial property to the north, and a mobile home park to the south. It is located in a portion of Section 27, Township 2 North, Range 4 East of the Gila and Salt River Base and Meridian, Maricopa County,

- Arizona Parcel ID numbers APN: 130-16-006A
- Street address is 3220 N. Scottsdale Road
- The legal description is:

Lot three (3), Block twenty-nine (29), Security Acres Amended, according to the plat of record in the office of the County Recorder of Maricopa County, Arizona in Book 8 of Maps, page 59.

Except the east 22 feet thereof, and

Except the east 5 feet of the west 30 feet conveyed to the City of Scottsdale in instrument recorded June 7, 1983, document no. 83-217883.

Refer to **FIGURE 1** - **Vicinity Map** for the project's location with respect to major cross streets.

1.3 EXISTING AND PROPOSED SITE ZONING AND LAND USES:

The overall project parcel is zoned C-3 (Highway Commercial). Rezoning to D/DMU- 2 PBD DO is proposed. Auto collision/repair facilities and a vacant car dealership currently exist on the property. The site will be totally demolished for the redevelopment into an apartment complex.

1.4 REFERENCES:

The project falls within Mixed-Use Neighborhoods conceptual land use district of the City's General Plan and appears to be located in the Downtown Plan character area.

2. DESIGN DOCUMENTATION

2.1 DESIGN COMPLIANCE:

The analysis of the proposed and existing sewer system is done in compliance with Chapter 7 – Wastewater of the City of Scottsdale 2010 update of the Design Standards & Policies Manual (DS&PM). Design flow calculations for the on-site system will be based on the recommendations in Section 7-1.403 of the DS&PM.

3. EXISTING CONDITIONS

3.1 EXISTING ZONING & LAND USE:

Land ownership, as defined by ALTA/ACSM Land Title Survey by AW Land Surveying, LLC dated 04/13/16 includes 183,705.9 square feet or 4.217+/- acres of commercially developed land. City of Scottsdale zoning map designates this parcel as C-3.

3.2 EXISTING TOPOGRAPHY, VEGETATION AND LANDFORM FEATURES:

This site is fully developed as a car dealership. The topography generally slopes from the west-northwest to the southeast corner at approximately one-half percent with a change in elevation of approximately three and one-half (3.5) feet. Typical desert landscaping exists at the perimeter of the site. Refer to **FIGURE 2** for an aerial of the overall project existing conditions.

FIRM Map Number 04013C2235L dated October 16, 2013 indicates this site is designated as Zone "X". As such, it is defined as areas outside of the 0.2% annual chance of flooding. Refer to **FIGURE 3** for the FIRM.

3.3 EXISTING UTILITIES:

Sanitary Sewer: QS 15-44 City of Scottsdale

- An 8" VCP sanitary sewer is available approximately six (6) feet east of the 71st Street centerline. A manhole is located off both the NW corner and SE corner of the subject site. Depth to invert is approximately 8'. Per the QS map, a service lead to this system exists approximately in the middle of the property.
- An 8" VCP sanitary sewer is also available in Scottsdale Road approximately in the centerline of the road. Depth to invert is approximately 8.5'

Refer to **FIGURE 4** for the City quarter section map **(QS 15-44)**

4. PROPOSED CONDITIONS

4.1 SITE PLAN:

The property is proposed to be re-developed with new lot configurations into 277 apartment homes. Development will include a 24' wide paved access road along the southerly property line from Scottsdale Road to 71st Street. A 24' wide fire lane is also proposed along the northerly property line. This is conceptualized to be GrassPave type of reinforcement. An open courtyard is proposed in the westerly third of the units, with a parking structure near the center of the site, and an amenities / pool area and clubhouse in the easterly portion.

4.2 PROPOSED SEWER SYSTEM:

Sewer service will consist of stubs from the east and west ends of the building to existing 8" sewers in 71st Street and Scottsdale Road respectively.

Refer to **APPENDIX III** for the Utility Plan.

4.3 MAINTENANCE RESPONSIBILITIES:

The on-site sewer line for the proposed development will be private and maintained by the property owner. The off-site sewer is a public system maintained by the City of Scottsdale.

5. SANITARY SYSTEM COMPUTATIONS

5.1. SEWER FLOW DEMANDS:

DS&PM, Chapter 7 – Wastewater specifies that for residential uses, sanitary sewer lines 8 to 12 inches in diameter will be designed using 100 gallons per capita per day (gpdpc) and a peaking factor of 4.

Per the developer, the average person per unit for this product has been trending at approximately 1.1 capita per dwelling unit (c/du). For the purposes of this report, an assumption of one (1) person per bedroom will be used.

Therefore the average proposed design flow is:

- One Bedroom: 172 units x 1 = 172
- Two Bedroom: 92 units x 2 = 184
- Three Bedroom: 13 units x 3 = 39

TOTAL = 395 persons / 277 units or 1.43 c/du
= 143 gpdpc

277 units x 1.43 persons/du x 100 gpdpc = **39,611 gpd (Average)**
Peak Flow: 39,611 gpd x 4 = **158,444 gpd (Peak)**

The existing commercial buildings total approximately 32,681 s.f. in area. Per the referenced manual, sewer demands are 0.5 per sq.ft. with a peaking factor of 3 for commercial use.

Therefore the average original design flow was:
32,6810 s.f. x 0.5 = 16,341 gpd (Average)
Peak Flow: 16,340 gpd x 3 = 49,023 gpd (Peak)

This represents an increase of 23,270 gpd (average daily flow) or 109,421 gpd (peak) over the existing development contributions.

5.2. VARIANCE FROM STATED DESIGN FLOWS:

Stated design flows for the on-site system will be used as recommended.

5.3. SEWER SYSTEM ANALYSIS (Off-Site):

- No off-site contributions will be carried through the proposed on-site system.
- On-site system will consist of a sewer service stub from the east and west end of the building directly to the existing sewers in 71st Street and Scottsdale Road as noted below.

- The proposed Agave Old Town Apartments to the north include 365 units. These are split 143 units toward 71st street and 247 units toward Scottsdale Road. Note that a portion of the existing sanitary sewer in Angus Drive is be removed as a result of the Agave development. The sewer in 71st Street is being extended south to connect to the existing sewer adjacent to the subject parcel.

Refer to APPENDIX IV for excerpts from the Agave Old Town Apartments basis of design report.

At the request of the City of Scottsdale staff, the existing sanitary sewer systems in 71st Street(8"), Earll Drive(21"), and Scottsdale Road (8") have been analyzed. The flow parameters of these three sewers are shown in Appendix 2. The present flow rate of 0.729mgd in the 21" sewer at 71st Street and Earll Drive was provided from the City wastewater model by City staff. The pipe capacity at d/D of 0.7 was calculated to be 4.7mgd, shown in Appendix 2. Including both the Agave and Alta project's flows increased the flow rate in Earll Drive to 0.87 mgd. At this capacity, the d/D is calculated at 0.26, shown in Appendix 2. Additional wastewater contributions to the existing public sewers, based on the contribution boundary presented as FIGURE 4A, are summarized in Table 1 below as follows:

Table 1: Sewer Demand Calculations (gpd)

	Units or s.f. com.	ADF (gpcu) or per s.f.	Avg. Day Flow (GPD)	Peaking Factor	Peak Hour (GPD)
71st Street (DP-1 to DP-2)	Point of tie in to 71st Street				
Baptist Church	24,500 s.f.	0.1	2,450	3	7,350
Aqave Apartments	118	140.0	16,520	4	66,080
ALTA Osborn Apartments*	143	143.0	20,449	4	81,796
Security Acres	92	250.0	23,000	4	92,000
Mobile Home Park (Assumed full)	40	250.0	10,000	4	40,000
MHP commercial	2,000 s.f.	0.5	1,000	3	3,000
Duplex	2	250.0	500	4	2,000
	SUBTOTAL (DP-1 to DP-2)		**73,919**		292,226
Earll Drive 8" (DP-2 to DP-3)	For information only				
Pueblo Condo's area (west)	36	250.0	9,000	4	36,000
Commercial	41,000 s.f.	0.5	20,500	3	61,500
	SUBTOTAL (DP-2 to DP-3)		**103,419**		97,500
Scottsdale Road (DP-4 TO DP-3)	Ties in at Earll Drive				
Aqave Apartments	247	140	34,580	4	138,320
Good Egg restaurant	7,000 s.f.	1.2	8,400	6	50,400
ALTA Osborn Apartments	134	143	19,162	4	76,648
	SUBTOTAL (DP-4 to DP-3)		**62,142**		265,368

5.4. DEMAND FACTORS:

DS&PM requires a peak factor of 4 for the residential units. Refer to Section 5.1 above for calculations. Additionally, the following peak factors are used for off-site contributions to the existing systems:

- Commercial: PF=3
- Restaurants: PF=6

5.5. SEWER CAPACITY CALCULATIONS

Flowmaster calculations of the existing sewer capacities can be found in Appendix II. Based on the Peak Hour calculations shown above in Section 5.3, the following Table 2 is provided as a summary of the capacity of the existing sewers in 71st Street, Earll Drive, and Scottsdale Road.

Table 2: Pipe Capacity of Existing Sewers

Location	Diameter (inch)	Proposed Peak Flow (gpd)	Full Flow Capacity (gpd)	Peak Flow to Full Flow Capicity Ratio
71st Street (DP-1 to DP-2)	8	292,226	454,642	0.64
Scottsdale Road (DP-4 to DP-3)	8	265,368	576,171	0.46
Earll Drive (21")	Re: Section 5.3			

6. SUMMARY

6.1 SUMMARY OF PROPOSED IMPROVEMENTS:

- The proposed wastewater improvement was designed based on the current City of Scottsdale's design standards and policies.
- The average day and peak sewer flows discharging to 71st Street from ALTA Osborn apartments are estimated to be 20,449 gpd and 81,796 gpd respectively.
- The average day and peak sewer flows discharging to Scottsdale Road from ALTA Osborn apartments are estimated to be 19,162 gpd and 76,648 gpd respectively.
- The existing 8" sewer in 71st Street has a full flow capacity of 454,642 gpd and is adequately sized to accommodate the anticipated flows from the contributing developments (existing and proposed)
- The existing 21" sewer in Earll has a capacity of 4.7mgd and is adequately sized to accommodate the anticipated flows from the contributing developments (existing and proposed)
- The existing 8" sewer in Scottsdale Road has a full flow capacity of 576,171 gpd and is adequately sized to accommodate the anticipated flows from the contributing developments (existing and proposed)

6.2 PROJECT SCHEDULE:

As a residential apartment development the infrastructure and buildings are proposed to be constructed in a single phase.

7 SUPPORTING MAPS

7.1 UTILITY PLAN

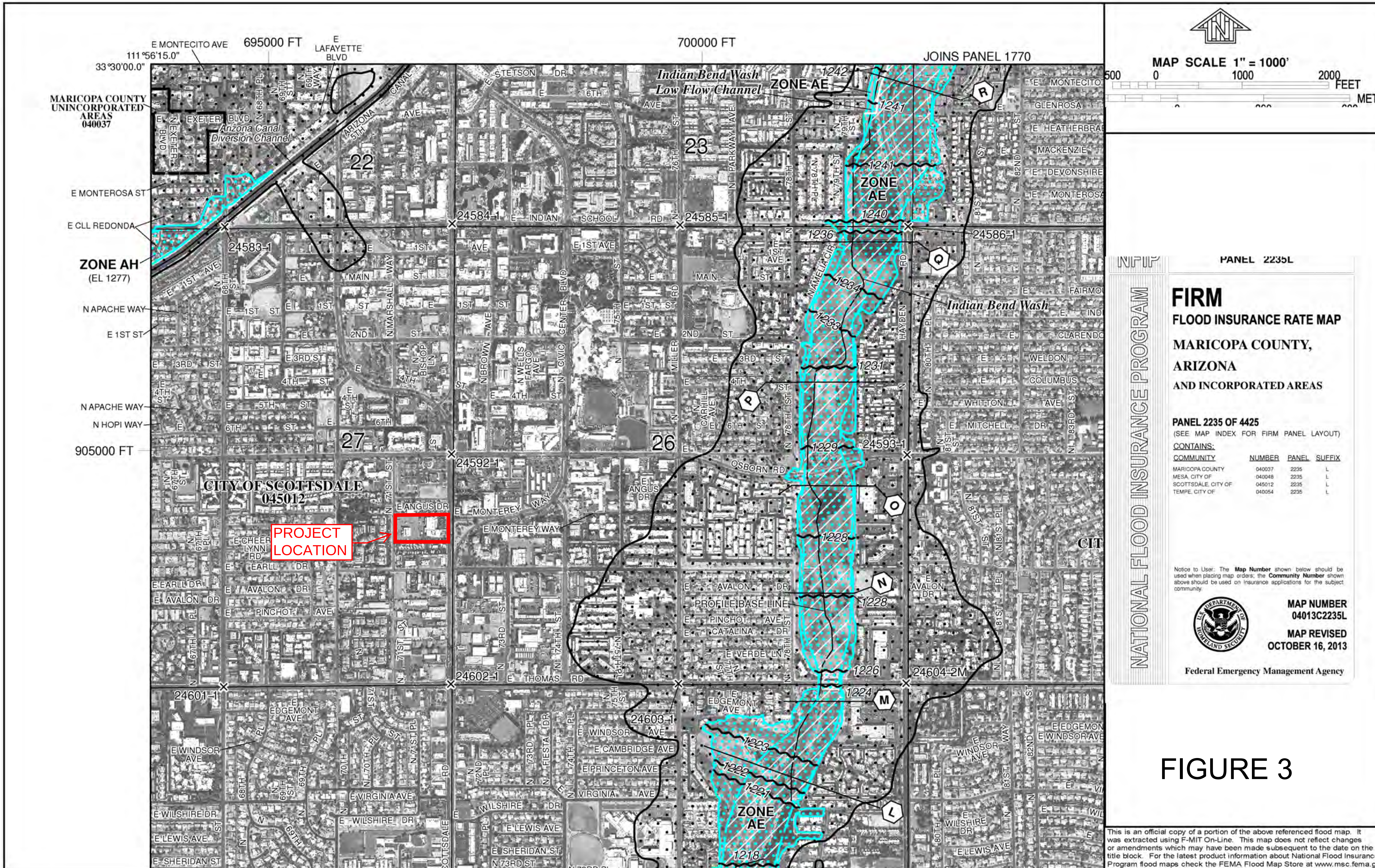
Refer to **APPENDIX III** for a Preliminary Utility Plan

8 REFERENCES

1. *COS QS Sewer Plan number 15-44*
2. *City of Scottsdale Design Standards & Policies Manual, 2010 (Chapter 7 – Wastewater)*
3. *Wastewater Basis of Design Report for Agave Old Town Apartments prepared by Hilgart Wilson dated December 10, 2015.*

FIGURE 1
VICINITY MAP

FIGURE 2
AERIAL



NFIP

PANEL 2235L

FIRM
FLOOD INSURANCE RATE MAP
MARICOPA COUNTY, ARIZONA
AND INCORPORATED AREAS

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 2235 OF 4425

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
MARICOPA COUNTY	040037	2235	L
MESA, CITY OF	040048	2235	L
SCOTTSDALE, CITY OF	045012	2235	L
TEMPE, CITY OF	040054	2235	L

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
04013C2235L

MAP REVISED
OCTOBER 16, 2013

Federal Emergency Management Agency

FIGURE 3

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

16-44

15-43

15-45

14-44

03-APR-16

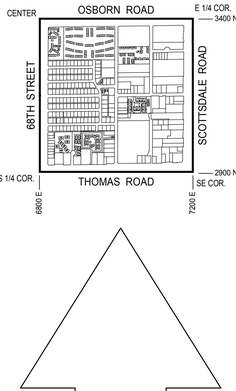
GENERAL NOTES:

- 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:

- Cleanout
- Lift Station (LS)
- Manhole
- Non-GPS Point
- Plug
- Sewer Service Point
- Sewer Tap Point
- Sewer Valve
- Treatment Plant
- Sewer Main - Gravity
- Sewer Main - Force (Force)
- Sewer Main - Private

VICINITY MAP



SEWER

QUARTER SECTION MAP

15-44

SE 1/4 SEC. 27 T2N R4E

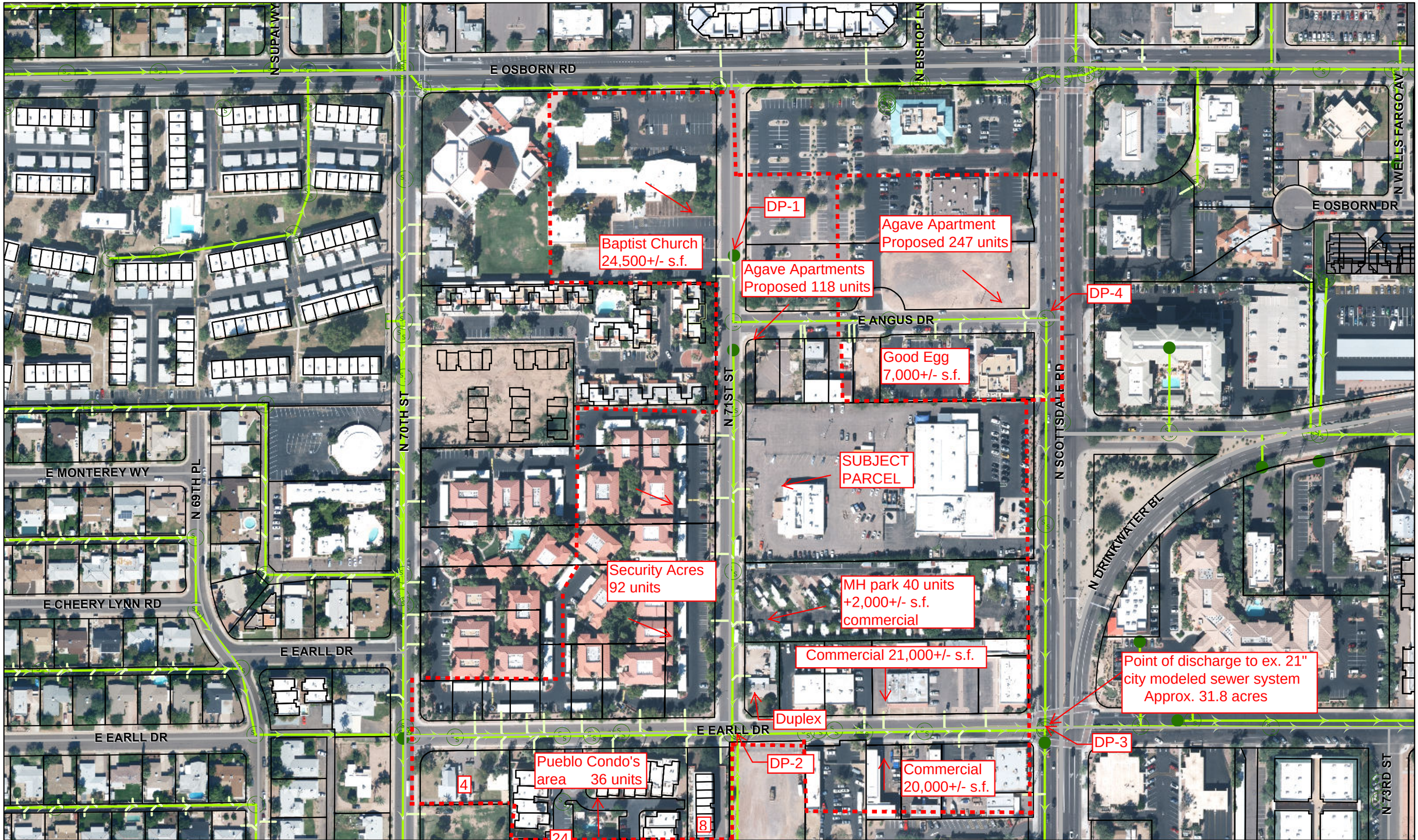
FIGURE 4

CITY OF SCOTTSDALE

SCOTTSDALE GEOGRAPHIC INFORMATION SYSTEMS

3629 North Drinkwater Boulevard
Scottsdale, Arizona 85251

281-PA-2016 Sewer Basin



dman
4/15/2016 7:00:05 AM

Notice: This document is provided for general information purposes only. The City of Scottsdale does not warrant its accuracy, completeness, or suitability for any particular purpose. It should not be relied upon without field verification.

FIGURE 4A
Contribution Boundary

CITY OF SCOTTSDALE
City of Scottsdale GIS

APPENDIX I

Design Requirements

4. The water line and sanitary sewer line will run parallel to each other, with 9 feet of separation to the pipes' centerline in order to maintain 6 feet of clearance at manholes.
5. Deflections in the sanitary sewer line shall be designed to nominal fitting angles within standard tolerances and will occur at the same locations where the water line is deflected.

See Section 6-1.302 for related water system criteria.

DESIGN FLOWS 7-1.403

A. Residential

Sanitary sewer lines 8 to 12 inches in diameter will be designed using 100 gallons per capita per day (gpcpd) and a peaking factor of 4.

Sanitary sewer lines larger than 12 inches in diameter will be designed using 105 gpcpd and a peaking factor developed from "Harmon's Formula":

$$Q_{max} = Q_{avg} [1+14 / (4+P1/2)]$$

$$P = Population / 1{,}000$$

Residential densities are to assume 2.5 persons per dwelling unit, apartment or town home.

B. Commercial and Industrial

Wastewater flows for uses other than those listed below shall be based upon known regional or accepted engineering reference sources approved by the Water Resources Department.

AVERAGE DAY SEWER DEMANDS

Land Use	Demand	Peaking Factor
Commercial/Retail	0.5 per sq. ft.	3
Office	0.4 per sq. ft.	3
Restaurant	1.2 per sq. ft.	6
High Density Condominium	140 per room	4.5
Resort Hotel (includes site amenities)	380 per room	4.5
School: without cafeteria	30 per student	6
School: with cafeteria	50 per student	6
Cultural	0.1 per sq. ft.	3

FIGURE 7.1-2 AVERAGE DAY SEWER DEMAND IN GALLONS

HYDRAULIC DESIGN 7-1.404

No public sanitary sewer lines will be less than 8 inches in diameter unless permission is received in writing from the Water Resources Department.

Sanitary sewer lines should be designed and constructed to give mean full flow velocities of not less than 2.5 fps, based upon Manning's Formula, using an "*n*" value of 0.013.

Conversely, to prevent abrasion and erosion of the pipe material, the maximum velocity will be limited to 10 fps at estimated peak flow. Where velocities exceed this maximum figure, the engineer will be required to submit a hydraulic analysis along with construction recommendations to the Water Resources Department for consideration. In no case will velocities greater than 15 fps be allowed.

Actual velocities will be analyzed under peak flow conditions for each reach of pipe.

APPENDIX II

Calculations

SEWER DESIGN CALCULATIONS:

Table 1: Sewer Demand Calculations (gpd)					
	Units or s.f. com.	ADF (gpcu) or per s.f.	Avg. Day Flow (GPD)	Peaking Factor	Peak Hour (GPD)
71st Street (DP-1 to DP-2)	Point of tie in to 71st Street				
Baptist Church	24,500 s.f.	0.1	2,450	3	7,350
Aqave Apartments	118	140.0	16,520	4	66,080
ALTA Osborn Apartments*	143	143.0	20,449	4	81,796
Security Acres	92	250.0	23,000	4	92,000
Mobile Home Park (Assumed full)	40	250.0	10,000	4	40,000
MHP commercial	2,000 s.f.	0.5	1,000	3	3,000
Duplex	2	250.0	500	4	2,000
	SUBTOTAL (DP-1 to DP-2)		**73,919**		292,226
Earll Drive 8" (DP-2 to DP-3)	For information only				
Pueblo Condo's area (west)	36	250.0	9,000	4	36,000
Commercial	41,000 s.f.	0.5	20,500	3	61,500
	SUBTOTAL (DP-2 to DP-3)		**103,419**		97,500
Scottsdale Road (DP-4 TO DP-3)	Ties in at Earll Drive				
Aqave Apartments	247	140	34,580	4	138,320
Good Egg restaurant	7,000 s.f.	1.2	8,400	6	50,400
ALTA Osborn Apartments	134	143	19,162	4	76,648
	SUBTOTAL (DP-4 to DP-3)		**62,142**		265,368

Table 2: Pipe Capacity of Existing Sewers				
Location	**Diameter (inch)**	**Proposed Peak Flow (gpd)**	**Full Flow Capacity (gpd)**	**Peak Flow to Full Flow Capicity Ratio**
71st Street (DP-1 to DP-2)	8	292,226	454,642	0.64
Scottsdale Road (DP-4 to DP-3)	8	265,368	576,171	0.46
Earll Drive (21")	Re: Section 5.3			

Worksheet for 8" Sewer in 71st Street @ 0.33%

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00330	ft/ft
Normal Depth	0.67	ft
Diameter	0.67	ft

Results

Discharge	454642.75	gal/day
Flow Area	0.35	ft^2
Wetted Perimeter	2.10	ft
Hydraulic Radius	0.17	ft
Top Width	0.00	ft
Critical Depth	0.40	ft
Percent Full	100.0	%
Critical Slope	0.00770	ft/ft
Velocity	2.00	ft/s
Velocity Head	0.06	ft
Specific Energy	0.73	ft
Froude Number	0.00	
Maximum Discharge	0.76	ft^3/s
Discharge Full	0.70	ft^3/s
Slope Full	0.00330	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	100.00	%
Downstream Velocity	Infinity	ft/s

Worksheet for 8" Sewer in 71st Street @ 0.33%

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.67	ft
Critical Depth	0.40	ft
Channel Slope	0.00330	ft/ft
Critical Slope	0.00770	ft/ft

Worksheet for 8" sewer in Earll Drive @0.33%

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00330	ft/ft
Normal Depth	0.67	ft
Diameter	0.67	ft

Results

Discharge	0.70	ft^3/s
Flow Area	0.35	ft^2
Wetted Perimeter	2.10	ft
Hydraulic Radius	0.17	ft
Top Width	0.00	ft
Critical Depth	0.40	ft
Percent Full	100.0	%
Critical Slope	0.00770	ft/ft
Velocity	2.00	ft/s
Velocity Head	0.06	ft
Specific Energy	0.73	ft
Froude Number	0.00	
Maximum Discharge	0.76	ft^3/s
Discharge Full	0.70	ft^3/s
Slope Full	0.00330	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	100.00	%
Downstream Velocity	Infinity	ft/s

Worksheet for 8" sewer in Earll Drive @0.33%

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.67	ft
Critical Depth	0.40	ft
Channel Slope	0.00330	ft/ft
Critical Slope	0.00770	ft/ft

Worksheet existing 8" sewer in Scottsdale Road

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00530	ft/ft
Normal Depth	0.67	ft
Diameter	0.67	ft

Results

Discharge	576170.79	gal/day
Flow Area	0.35	ft^2
Wetted Perimeter	2.10	ft
Hydraulic Radius	0.17	ft
Top Width	0.00	ft
Critical Depth	0.45	ft
Percent Full	100.0	%
Critical Slope	0.00861	ft/ft
Velocity	2.53	ft/s
Velocity Head	0.10	ft
Specific Energy	0.77	ft
Froude Number	0.00	
Maximum Discharge	0.96	ft^3/s
Discharge Full	0.89	ft^3/s
Slope Full	0.00530	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	100.00	%
Downstream Velocity	Infinity	ft/s

Worksheet existing 8" sewer in Scottsdale Road

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.67	ft
Critical Depth	0.45	ft
Channel Slope	0.00530	ft/ft
Critical Slope	0.00861	ft/ft

Worksheet for 21" Sewer in Earll Drive @ dD = 0.70

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00300	ft/ft
Normal Depth	1.23	ft
Diameter	1.75	ft

Results

Discharge	4695963.10	gal/day
Flow Area	1.80	ft^2
Wetted Perimeter	3.47	ft
Hydraulic Radius	0.52	ft
Top Width	1.60	ft
Critical Depth	1.00	ft
Percent Full	70.0	%
Critical Slope	0.00547	ft/ft
Velocity	4.04	ft/s
Velocity Head	0.25	ft
Specific Energy	1.48	ft
Froude Number	0.67	
Maximum Discharge	9.34	ft^3/s
Discharge Full	8.68	ft^3/s
Slope Full	0.00210	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	70.00	%
Downstream Velocity	Infinity	ft/s

Worksheet for 21" Sewer in Earll Drive @ dD = 0.70

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	1.23	ft
Critical Depth	1.00	ft
Channel Slope	0.00300	ft/ft
Critical Slope	0.00547	ft/ft

Worksheet for Proposed Flow in 8" Sewer in 71st Street

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00330	ft/ft
Diameter	0.67	ft
Discharge	292226.00	gal/day

Results

Normal Depth	0.39	ft
Flow Area	0.21	ft^2
Wetted Perimeter	1.16	ft
Hydraulic Radius	0.18	ft
Top Width	0.66	ft
Critical Depth	0.31	ft
Percent Full	58.3	%
Critical Slope	0.00683	ft/ft
Velocity	2.12	ft/s
Velocity Head	0.07	ft
Specific Energy	0.46	ft
Froude Number	0.66	
Maximum Discharge	0.76	ft^3/s
Discharge Full	0.70	ft^3/s
Slope Full	0.00136	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	58.31	%
Downstream Velocity	Infinity	ft/s

Worksheet for Proposed Flow in 8" Sewer in 71st Street

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.39	ft
Critical Depth	0.31	ft
Channel Slope	0.00330	ft/ft
Critical Slope	0.00683	ft/ft

Worksheet for Proposed Flow in 21" Sewer in Earll Road

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00300	ft/ft
Diameter	1.75	ft
Discharge	876876.00	gal/day

Results

Normal Depth	0.47	ft
Flow Area	0.52	ft^2
Wetted Perimeter	1.90	ft
Hydraulic Radius	0.27	ft
Top Width	1.55	ft
Critical Depth	0.42	ft
Percent Full	26.7	%
Critical Slope	0.00470	ft/ft
Velocity	2.63	ft/s
Velocity Head	0.11	ft
Specific Energy	0.57	ft
Froude Number	0.80	
Maximum Discharge	9.34	ft^3/s
Discharge Full	8.68	ft^3/s
Slope Full	0.00007	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	26.73	%
Downstream Velocity	Infinity	ft/s

Worksheet for Proposed Flow in 21" Sewer in Earll Road

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.47	ft
Critical Depth	0.42	ft
Channel Slope	0.00300	ft/ft
Critical Slope	0.00470	ft/ft

Worksheet for Proposed Flow in 8" Sewer in Scottsdale Road

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00530	ft/ft
Diameter	0.67	ft
Discharge	265368.00	gal/day

Results

Normal Depth	0.32	ft
Flow Area	0.17	ft^2
Wetted Perimeter	1.02	ft
Hydraulic Radius	0.16	ft
Top Width	0.67	ft
Critical Depth	0.30	ft
Percent Full	47.7	%
Critical Slope	0.00674	ft/ft
Velocity	2.48	ft/s
Velocity Head	0.10	ft
Specific Energy	0.41	ft
Froude Number	0.88	
Maximum Discharge	0.96	ft^3/s
Discharge Full	0.89	ft^3/s
Slope Full	0.00112	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	47.65	%
Downstream Velocity	Infinity	ft/s

Worksheet for Proposed Flow in 8" Sewer in Scottsdale Road

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.32	ft
Critical Depth	0.30	ft
Channel Slope	0.00530	ft/ft
Critical Slope	0.00674	ft/ft

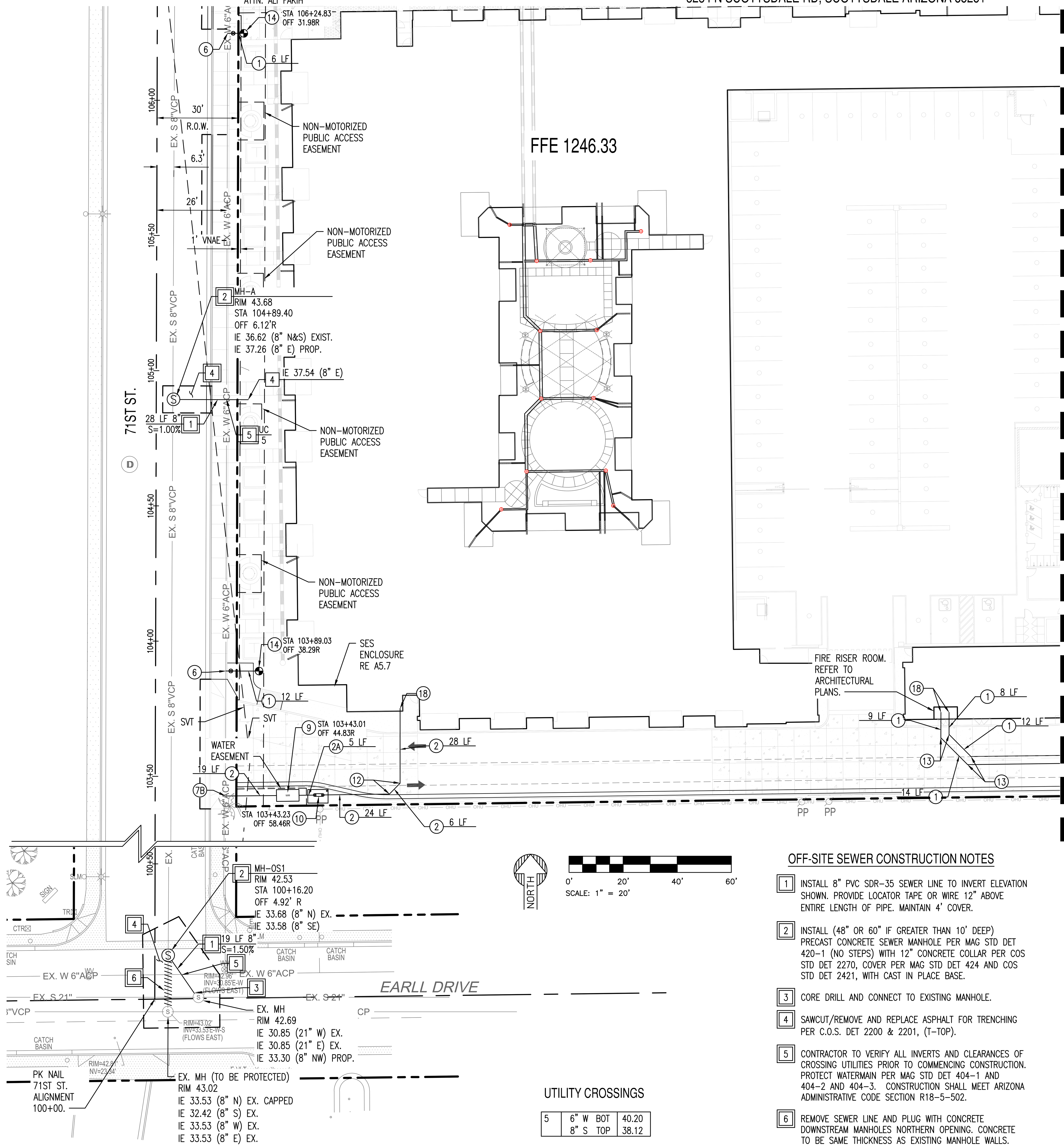
APPENDIX III

Utility Plan

PROPERTY OWNER
DAVID L CHAPMAN TRUST
6601 E MCDOWELL RD
SCOTTSDALE, ARIZONA 85257

CIVIL ENGINEER
SUSTAINABILITY ENGINEERING GROUP
8280 E. GELDING DR, SUITE 101
SCOTTSDALE, ARIZONA 85260
PHONE 480-588-7226
ATTN. ALI FAKIH

ALTA DRINKWATER
UTILITY PLAN
3234 N SCOTTSDALE RD, SCOTTSDALE ARIZONA 85251



UTILITY CROSSINGS

5	6" W 8" S	BOT TOP	40.20 38.12

OFF-SITE SEWER CONSTRUCTION NOTES

1. INSTALL 8" PVC SDR-35 SEWER LINE TO INVERT ELEVATION SHOWN. PROVIDE LOCATOR TAPE OR WIRE 12" ABOVE ENTIRE LENGTH OF PIPE. MAINTAIN 4' COVER.
2. INSTALL (48" OR 60" IF GREATER THAN 10' DEEP) PRECAST CONCRETE SEWER MANHOLE PER MAG STD DET 420-1 (NO STEPS) WITH 12" CONCRETE COLLAR PER COS STD DET 2270, COVER PER MAG STD DET 424 AND COS STD DET 2421, WITH CAST IN PLACE BASE.
3. CORE DRILL AND CONNECT TO EXISTING MANHOLE.
4. SAWCUT/REMOVE AND REPLACE ASPHALT FOR TRENCHING PER C.O.S. DET 2200 & 2201, (T-TOP).
5. CONTRACTOR TO VERIFY ALL INVERTS AND CLEARANCES OF CROSSING UTILITIES PRIOR TO COMMENCING CONSTRUCTION. PROTECT WATERMAIN PER MAG STD DET 404-1 AND 404-2 AND 404-3. CONSTRUCTION SHALL MEET ARIZONA ADMINISTRATIVE CODE SECTION R18-5-502.
6. REMOVE SEWER LINE AND PLUG WITH CONCRETE DOWNSTREAM MANHOLES NORTHERN OPENING. CONCRETE TO BE SAME THICKNESS AS EXISTING MANHOLE WALLS.

UTILITY NOTES

1. REFER TO SHEET C0.10 FOR ADDITIONAL GENERAL NOTES.
2. PROTECT AND MAINTAIN CROSSINGS OF OTHER UTILITY LINES.
3. PROPER COORDINATION WITH THE RESPECTIVE UTILITY COMPANIES SHALL BE PERFORMED BY THE CONTRACTOR TO INSURE THAT ALL UTILITY COMPANY, LOCAL MUNICIPALITY, AND LOCAL COUNTY STANDARDS FOR MATERIALS AND CONSTRUCTION METHODS ARE MET.
4. ALL WATER MAINS, WATER SERVICES, AND SANITARY SEWER LATERALS SHALL CONFORM TO THE DEPARTMENT OF ENVIRONMENTAL PROTECTION, APPLICABLE COUNTY AND LOCAL DEPARTMENTS, AND APPROPRIATE UTILITY COMPANY SPECIFICATIONS.
5. CONTRACTOR TO PROVIDE SLEEVES UNDER FOOTINGS OR THROUGH FOUNDATIONS FOR UTILITY CONNECTIONS.
6. CONTRACTOR SHALL PROVIDE ALL BENDS, FITTINGS, ADAPTERS, ETC. AS REQUIRED FOR PIPE CONNECTIONS TO BUILDING STUB-OUTS, INCLUDING ROOF/FOOTING DRAIN CONNECTIONS TO ROOF LEADERS AND TO STORM DRAINAGE SYSTEM.
7. ALL UTILITY CONSTRUCTION IS SUBJECT TO INSPECTION PRIOR TO APPROVAL FOR BACKFILL, IN ACCORDANCE WITH THE APPROPRIATE UTILITY COMPANY, LOCAL MUNICIPALITY, AND/OR LOCAL COUNTY REQUIREMENTS.
8. UTILITY CONNECTION DESIGN AS REFLECTED ON THE PLAN MAY CHANGE SUBJECT TO UTILITY COMPANY AND LOCAL AGENCY REVIEW.
9. CAP STUBS AND PROVIDE FIELD MARKERS.
10. FOR PIPE INSTALLATION, PROVIDE TRENCH EXCAVATION, BEDDING AND BACKFILLING, AND COMPACTION PER MAG SPECIFICATION SECTION 601. REFER TO CITY OF SCOTTSDALE STANDARD DETAIL 2201 & 2202 FOR DETAIL.
11. BEDDING MATERIAL TO BE IN ACCORDANCE WITH MAG SECTION 702.2 AND TABLE 702-1.
12. FOR HDPE PIPE INSTALLATION, PROVIDE TRENCH EXCAVATION, BEDDING AND BACKFILLING, AND COMPACTION PER MAG SPECIFICATION SECTION 603.
13. PROTECT CROSSING OF OTHER UTILITIES. MAINTAIN MINIMUM SEPARATION BETWEEN UTILITIES PER CITY OF SCOTTSDALE STANDARD DETAIL 2372.
14. ALL JOINTS FOR D.I.P. WATER MAINS AND SEWER MAINS TO BE RESTRAINED WITH MEGA LUG JOINTS PER MAG STANDARD DETAIL 303-1 AND 303-2 UNLESS OTHERWISE NOTED.
15. ALL PRODUCTS USED ON THIS SITE SHALL CONFORM TO ANSI/NSF STANDARDS 60 AND 61 IN ACCORDANCE WITH REGULATORY CITATION R18-4-213.
16. PROVIDE ANCHOR BLOCKS FOR VERTICAL BENDS PER MAG STANDARD DETAIL 381.
17. PROVIDE WARNING TAPE ABOVE UTILITIES PER CITY OF SCOTTSDALE REQUIREMENTS.
18. PROVIDE 5' MINIMUM COVER FOR SANITARY LEADS AT LOT LINES.
19. PROVIDE 3' MINIMUM COVER FOR WATER SERVICE LEADS AT LOT LINES.
20. MAINTAIN SANITARY SEWER SEPARATION/PROTECTION FROM WATER AND UTILITIES PER CITY OF SCOTTSDALE STANDARD DETAIL 2401.

PROPOSED LEGEND

- PROPERTY LINE
- SAWCUT LINE
- 6"W — WATER LINE
- 6"S — SEWER LINE
- WATER METER VAULT
- WATER METER BOX
- WATER BACKFLOW PREVENTER
- WATER VALVE
- FIRE HYDRANT
- FIRE DEPARTMENT CONNECTION
- Ⓢ SEWER MANHOLE

SEWER CONSTRUCTION NOTES

1. INSTALL 8" PVC SDR-35 SEWER LINE TO INVERT ELEVATION SHOWN. PROVIDE LOCATOR TAPE OR WIRE 12" ABOVE ENTIRE LENGTH OF PIPE. MAINTAIN 4' COVER.
2. INSTALL (48" OR 60" IF GREATER THAN 10' DEEP) PRECAST CONCRETE SEWER MANHOLE PER MAG STD DET 420-1 (NO STEPS) WITH 12" CONCRETE COLLAR PER COS STD DET 2270, COVER PER MAG STD DET 424 AND COS STD DET 2421, WITH CAST IN PLACE BASE.
3. CONTRACTOR TO VERIFY ALL INVERTS AND CLEARANCES OF CROSSING UTILITIES PRIOR TO COMMENCING CONSTRUCTION. PROTECT WATERMAIN PER MAG STD DET 404-1 AND 404-2 AND 404-3. CONSTRUCTION SHALL MEET ARIZONA ADMINISTRATIVE CODE SECTION R18-5-502.
4. CONNECTION TO BUILDING. REFER TO PLUMBING PLANS FOR CONTINUATION.
5. SAWCUT/REMOVE AND REPLACE ASPHALT FOR TRENCHING PER C.O.S. DET 2200 & 2201, (T-TOP).
6. CONCRETE ENCASE EXISTING SEWER LINE TO PROTECT PER MAG STD DET 404-3.

WATER LINE CONSTRUCTION NOTES:

(1) FURNISH & INSTALL 6" DUCTILE IRON PIPE CLASS 350 WITH POLYETHYLENE WRAPPING. LENGTH PER PLAN. MEGA LUG RESTRAINED JOINT PER MAG STD DET 303-1 & 303-2.

(2) FURNISH & INSTALL 4" DUCTILE IRON PIPE CLASS 350 WITH POLYETHYLENE WRAPPING. LENGTH PER PLAN. MEGA LUG RESTRAINED JOINT PER MAG STD DET 303-1 & 303-2.

(2A) FURNISH & INSTALL 3" DUCTILE IRON PIPE CLASS 350 WITH POLYETHYLENE WRAPPING. LENGTH PER PLAN. MEGA LUG RESTRAINED JOINT PER MAG STD DET 303-1 & 303-2.

(3) FURNISH & INSTALL 1" COPPER TYPE "K" WATER SERVICE LINE CONNECTION PER COS STD DET 2330.

(4) FURNISH & INSTALL 8"X6" TEE. MEGA LUG RESTRAINED JOINT PER M.A.G. STD DET 303-1 & 303-2.

(5) FURNISH & INSTALL 8"X6" TAPPING SLEEVE, VALVE, BOX, & COVER PER M.A.G. STD DET 340 AND 391-1 TYPE 'C' WITH LOCKING LID. MEGA LUG RESTRAINED JOINT PER M.A.G. STD DET 303-1 & 303-2.

(6) FURNISH & INSTALL 6"X6" CUT-IN TEE. MEGA LUG RESTRAINED JOINT PER M.A.G. STD DET 303-1 & 303-2.

(7A) FURNISH & INSTALL 8"X4" TAPPING SLEEVE, VALVE, BOX, & COVER PER M.A.G. STD DET 340 AND 391-1 TYPE 'C' WITH LOCKING LID. MEGA LUG RESTRAINED JOINT PER M.A.G. STD DET 303-1 & 303-2.

(7B) FURNISH & INSTALL 6"X4" TAPPING SLEEVE, VALVE, BOX, & COVER PER M.A.G. STD DET 340 AND 391-1 TYPE 'C' WITH LOCKING LID. MEGA LUG RESTRAINED JOINT PER M.A.G. STD DET 303-1 & 303-2.

(8) FURNISH & INSTALL CONCRETE WATER METER BOX #1 PER M.A.G. STD DET 320 WITH LID PER M.A.G. STD DET 310 WITHIN 3' OF PROPERTY LINE. 1" WATER METER TO BE INSTALLED BY CITY FORCES.

(9) FURNISH & INSTALL 3" VAULT AND COMPOUND METER PER C.O.S. DET 2345-2. MEGA LUG RESTRAINED JOINT PER M.A.G. STD DET 303-1 & 303-2.

(10) FURNISH & INSTALL 3" DOUBLE CHECK VALVE BACKFLOW PREVENTION ASSEMBLY PER C.O.S. DET 2351. MEGA LUG RESTRAINED JOINT PER M.A.G. STD DET 303-1 & 303-2. GUARD POSTS PER C.O.S. DET 2356. 4"X3" REDUCER ON DOWNSTREAM SIDE. PROVIDE SCREENED ENCLOSURE WITH 24" CLEAR AROUND THE ASSEMBLY.

(11) FURNISH & INSTALL 1" DOUBLE CHECK VALVE BACKFLOW PREVENTION ASSEMBLY PER C.O.S. DET 2352. MEGA LUG RESTRAINED JOINT PER M.A.G. STD DET 303-1 & 303-2.

(12) FURNISH & INSTALL 4" 45° BEND. PROVIDE ELECTRONIC MARKER PER C.O.S. STD DET 2397. MEGA LUG RESTRAINED JOINTS PER M.A.G. STD DET 303-1 & 303-2.

(13) FURNISH & INSTALL 6" 45° BEND. PROVIDE ELECTRONIC MARKER PER C.O.S. STD DET 2397. MEGA LUG RESTRAINED JOINTS PER M.A.G. STD DET 303-1 & 303-2.

(14) FURNISH & INSTALL FIRE HYDRANT (INCLUDING 6" GATE VALVE, BOX, & COVER) PER M.A.G. STD DET 360-1. PROVIDE PAVEMENT (PM) MARKER PER C.O.S. DET 2363. NOZZLE TO BE 1' FROM SIDEWALK. MEGA LUG RESTRAINED JOINT PER M.A.G.STD DET 303-1 & 303-2.

(15) FURNISH & INSTALL 6" GATE VALVE, BOX, & COVER PER M.A.G. STD DET 340 & 391-1 WITH 40" DIA. CONCRETE COLLAR. MEGA LUG RESTRAINED JOINTS PER M.A.G. STD DET 303-1 & 33-2.

(16) SAWCUT/REMOVE AND REPLACE ASPHALT FOR TRENCHING PER C.O.S. DET 2200 & 2201, (T-TOP).

(17) FURNISH & INSTALL REMOTE F.D.C. PER C.O.S. STD DET 2367.

(18) REFER TO ARCHITECTURAL PLANS FOR PLUMBING CONTINUATION.

(19) 45" CONC PIPE IN SCOTTSDALE ROAD IS ABANDONED. REMOVE SECTION OF PIPE FOR CROSSING AND PLUG ENDS WITH BRICK AND MORTAR PER MAG STD DET 427 FOR DRAIN LINE PLUGS.

(20) CONSTRUCT VERTICAL REALIGNMENT OF WATERMAIN C.O.S. STD DET 2370. PROTECT WATERMAIN PER MAG STD DET 404-1 AND 404-2 AND 404-3. CONSTRUCTION SHALL MEET ARIZONA ADMINISTRATIVE CODE SECTION R18-5-502.

NOTE TO CONTRACTOR:
THIS SET OF DRAWINGS AND DOCUMENTS IS INTENDED AS A SET OF GUIDELINES FOR THE PROJECT AND ARE INTENDED TO BE USED IN CONJUNCTION WITH A SET OF CONSTRUCTION SPECIFICATIONS TO BE SUPPLIED BY OWNER. THEY MUST BE READ TO INCORPORATE ALL APPLICABLE FEDERAL, STATE, AND LOCAL CODES INCLUDING FEDERAL A.D.A. REQUIREMENTS. THIS SET ASSUMES THAT THERE ARE NO UNUSUAL SOIL CONDITIONS OR WIND LOADS. THE FAILURE OF THIS CONDITION MAY REQUIRE SIGNIFICANT CHANGES TO THESE DOCUMENTS. IT IS THE RESPONSIBILITY OF THE GENERAL CONTRACTOR TO CONFORM TO ALL APPLICABLE CODES AND TO INFORM THE OWNERS/ARCHITECTS OF ANY QUESTIONS OR CLARIFICATIONS WHICH ARE DESIRED. CONTRACTORS SHALL ALSO VISIT THE SITE BEFORE BIDDING. CONTRACTORS ARE REQUIRED TO KNOW ALL OBSERVABLE CONDITIONS AND APPLICABLE CODES.

SUSTAINABILITY ENGINEERING GROUP
SEG
8280 E GELDING DR #101, SCOTTSDALE, ARIZONA 85260
WWW. AZSEG.COM TEL. 480.588.7226

Registered Professional Engineer (Civil)
CERTIFICATE NO. 45621
ALI SAMIH FAKIH
Date Signed 07-14-17
ARIZONA, U.S.A.
EXPIRES 12-31-17
PREPARED UNDER THE DIRECT SUPERVISION OF ALI FAKIH, P.E. ARIZONA REGISTRATION NO. 45621 FOR AND ON BEHALF OF SUSTAINABILITY ENGINEERING GROUP, LLC.

ALTA DRINKWATER
Apartment Homes
3234 NORTH SCOTTSDALE ROAD SCOTTSDALE, ARIZONA 85251

WOOD PARTNERS
8777 E. Via De Ventura, Suite 201, Scottsdale, AZ. 85258
PHONE: 480-607-0622

THIRD CITY SUBMITTAL
07 / 14 / 2017

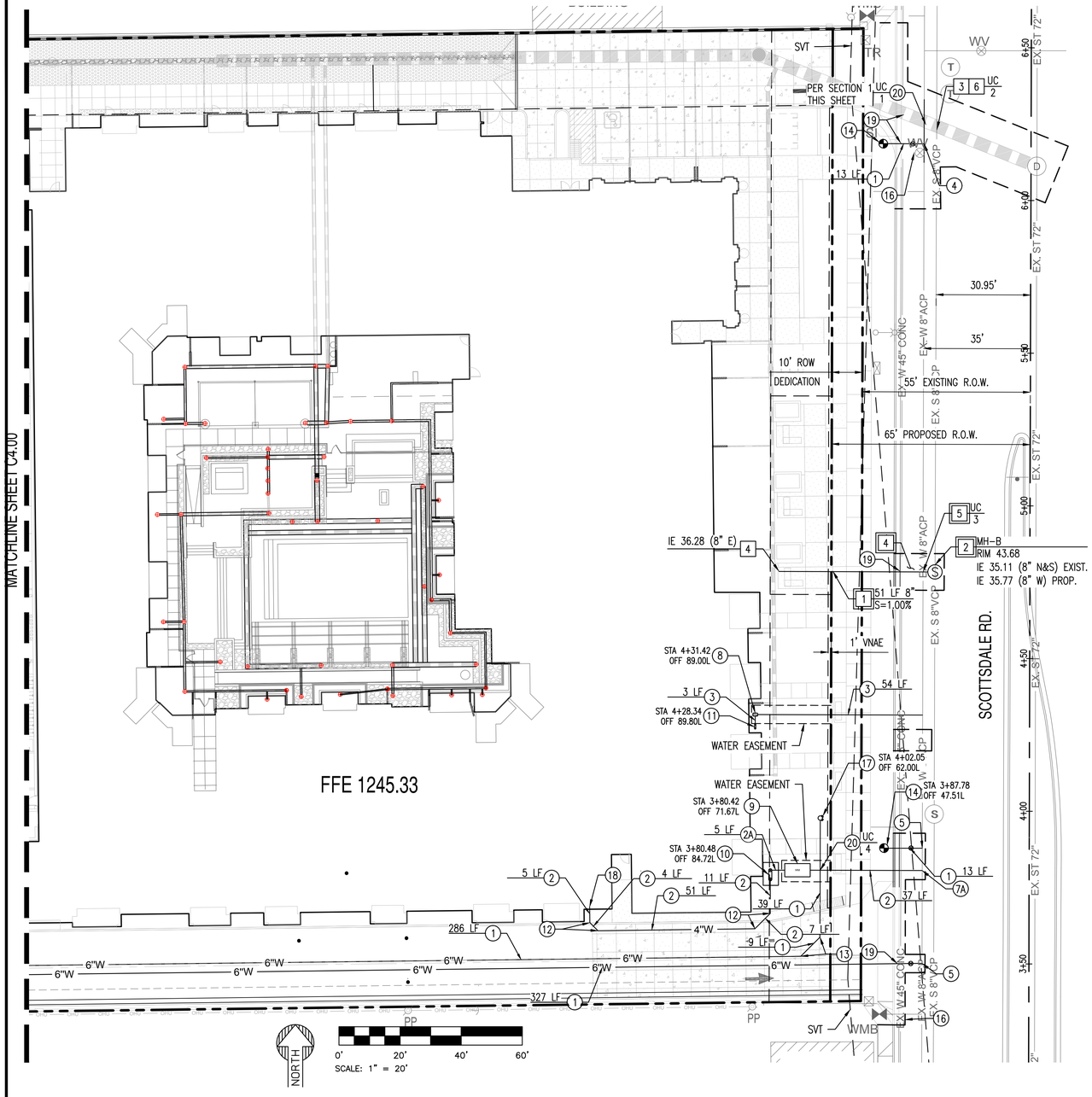
PC#2157-17-1

REVISIONS:
1 -
2 -
3 -
4 -
5

JOB NO: 15-054
SCALE:
SHEET NO:

UTILITY PLAN

C4.00



SEWER CONSTRUCTION NOTES

1. INSTALL 8" PVC SDR-35 SEWER LINE TO INVERT ELEVATION SHOWN. PROVIDE LOCATOR TAPE OR WIRE 12" ABOVE ENTIRE LENGTH OF PIPE. MAINTAIN 4' COVER.
2. INSTALL (48" OR 60" IF GREATER THAN 10' DEEP) PRECAST CONCRETE SEWER MANHOLE PER MAG STD DET 420-1 (NO STEPS) WITH 12" CONCRETE COLLAR PER COS STD DET 2270, COVER PER MAG STD DET 424 AND COS STD DET 2421, WITH CAST IN PLACE BASE.
3. CONTRACTOR TO VERIFY ALL INVERTS AND CLEARANCES OF CROSSING UTILITIES PRIOR TO COMMENCING CONSTRUCTION. PROTECT WATERMAIN PER MAG STD DET 404-1 AND 404-2 AND 404-3. CONSTRUCTION SHALL MEET ARIZONA ADMINISTRATIVE CODE SECTION R18-5-502.
4. CONNECTION TO BUILDING. REFER TO PLUMBING PLANS FOR CONTINUATION.
5. SAWCUT/REMOVE AND REPLACE ASPHALT FOR TRENCHING PER C.O.S. DET 2200 & 2201, (T-TOP).
6. CONCRETE ENCASE EXISTING SEWER LINE TO PROTECT PER MAG STD DET 404-3.

OFF-SITE SEWER CONSTRUCTION NOTES

1. INSTALL 8" PVC SDR-35 SEWER LINE TO INVERT ELEVATION SHOWN. PROVIDE LOCATOR TAPE OR WIRE 12" ABOVE ENTIRE LENGTH OF PIPE. MAINTAIN 4' COVER.
2. INSTALL (48" OR 60" IF GREATER THAN 10' DEEP) PRECAST CONCRETE SEWER MANHOLE PER MAG STD DET 420-1 (NO STEPS) WITH 12" CONCRETE COLLAR PER COS STD DET 2270, COVER PER MAG STD DET 424 AND COS STD DET 2421, WITH CAST IN PLACE BASE.
3. CORE DRILL AND CONNECT TO EXISTING MANHOLE.
4. SAWCUT/REMOVE AND REPLACE ASPHALT FOR TRENCHING PER C.O.S. DET 2200 & 2201, (T-TOP).
5. CONTRACTOR TO VERIFY ALL INVERTS AND CLEARANCES OF CROSSING UTILITIES PRIOR TO COMMENCING CONSTRUCTION. PROTECT WATERMAIN PER MAG STD DET 404-1 AND 404-2 AND 404-3. CONSTRUCTION SHALL MEET ARIZONA ADMINISTRATIVE CODE SECTION R18-5-502.
6. REMOVE SEWER LINE AND PLUG WITH CONCRETE DOWNSTREAM MANHOLES NORTHERN OPENING. CONCRETE TO BE SAME THICKNESS AS EXISTING MANHOLE WALLS.

WATER LINE CONSTRUCTION NOTES:

1. FURNISH & INSTALL 6" DUCTILE IRON PIPE CLASS 350 WITH POLYETHYLENE WRAPPING. LENGTH PER PLAN. MEGA LUG RESTRAINED JOINT PER MAG STD DET 303-1 & 303-2.
2. FURNISH & INSTALL 4" DUCTILE IRON PIPE CLASS 350 WITH POLYETHYLENE WRAPPING. LENGTH PER PLAN. MEGA LUG RESTRAINED JOINT PER MAG STD DET 303-1 & 303-2.

2A. FURNISH & INSTALL 3" DUCTILE IRON PIPE CLASS 350 WITH POLYETHYLENE WRAPPING. LENGTH PER PLAN. MEGA LUG RESTRAINED JOINT PER MAG STD DET 303-1 & 303-2.

3. FURNISH & INSTALL 1" COPPER TYPE "K" WATER SERVICE LINE CONNECTION PER COS STD DET 2330.
4. FURNISH & INSTALL 8"X6" TEE. MEGA LUG RESTRAINED JOINT PER M.A.G. STD DET 303-1 & 303-2.
5. FURNISH & INSTALL 8"X6" TAPPING SLEEVE, VALVE, BOX, & COVER PER M.A.G. STD DET 340 AND 391-1 TYPE 'C' WITH LOCKING LID. MEGA LUG RESTRAINED JOINT PER M.A.G. STD DET 303-1 & 303-2.
6. FURNISH & INSTALL 6"X6" CUT-IN TEE. MEGA LUG RESTRAINED JOINT PER M.A.G. STD DET 303-1 & 303-2.

7A. FURNISH & INSTALL 8"X4" TAPPING SLEEVE, VALVE, BOX, & COVER PER M.A.G. STD DET 340 AND 391-1 TYPE 'C' WITH LOCKING LID. MEGA LUG RESTRAINED JOINT PER M.A.G. STD DET 303-1 & 303-2.

7B. FURNISH & INSTALL 6"X4" TAPPING SLEEVE, VALVE, BOX, & COVER PER M.A.G. STD DET 340 AND 391-1 TYPE 'C' WITH LOCKING LID. MEGA LUG RESTRAINED JOINT PER M.A.G. STD DET 303-1 & 303-2.

8. FURNISH & INSTALL CONCRETE WATER METER BOX #1 PER M.A.G. STD DET 320 WITH LID PER M.A.G. STD DET 310 WITHIN 3' OF PROPERTY LINE. 1" WATER METER TO BE INSTALLED BY CITY FORCES.
9. FURNISH & INSTALL 3" VAULT AND COMPOUND METER PER C.O.S. DET 2345-2. MEGA LUG RESTRAINED JOINT PER M.A.G. STD DET 303-1 & 303-2.
10. FURNISH & INSTALL 3" DOUBLE CHECK VALVE BACKFLOW PREVENTION ASSEMBLY PER C.O.S. DET 2351. MEGA LUG RESTRAINED JOINT PER M.A.G. STD DET 303-1 & 303-2. GUARD POSTS PER C.O.S. DET 2356. 4"X3" REDUCER ON DOWNSTREAM SIDE. PROVIDE SCREENED ENCLOSURE WITH 24" CLEAR AROUND THE ASSEMBLY.
11. FURNISH & INSTALL 1" DOUBLE CHECK VALVE BACKFLOW PREVENTION ASSEMBLY PER C.O.S. DET 2352. MEGA LUG RESTRAINED JOINT PER M.A.G. STD DET 303-1 & 303-2.
12. FURNISH & INSTALL 4" 45° BEND. PROVIDE ELECTRONIC MARKER PER C.O.S. STD DET 2397. MEGA LUG RESTRAINED JOINTS PER M.A.G. STD DET 303-1 & 303-2.
13. FURNISH & INSTALL 6" 45° BEND. PROVIDE ELECTRONIC MARKER PER C.O.S. STD DET 2397. MEGA LUG RESTRAINED JOINTS PER M.A.G. STD DET 303-1 & 303-2.
14. FURNISH & INSTALL FIRE HYDRANT (INCLUDING 6" GATE VALVE, BOX, & COVER) PER M.A.G. STD DET 360-1. PROVIDE PAVEMENT (PM) MARKER PER C.O.S. DET 2363. NOZZLE TO BE 1' FROM SIDEWALK. MEGA LUG RESTRAINED JOINT PER M.A.G.STD DET 303-1 & 303-2.
15. FURNISH & INSTALL 6" GATE VALVE, BOX, & COVER PER M.A.G. STD DET 340 & 391-1 WITH 40" DIA. CONCRETE COLLAR. MEGA LUG RESTRAINED JOINTS PER M.A.G. STD DET 303-1 & 33-2.
16. SAWCUT/REMOVE AND REPLACE ASPHALT FOR TRENCHING PER C.O.S. DET 2200 & 2201, (T-TOP).
17. FURNISH & INSTALL REMOTE F.D.C. PER C.O.S. STD DET 2367.
18. REFER TO ARCHITECTURAL PLANS FOR PLUMBING CONTINUATION.
19. 45" CONC PIPE IN SCOTTSDALE ROAD IS ABANDONED. REMOVE SECTION OF PIPE FOR CROSSING AND PLUG ENDS WITH BRICK AND MORTAR PER MAG STD DET 427 FOR DRAIN LINE PLUGS.
20. CONSTRUCT VERTICAL REALIGNMENT OF WATERMAIN C.O.S. STD DET 2370. PROTECT WATERMAIN PER MAG STD DET 404-1 AND 404-2 AND 404-3. CONSTRUCTION SHALL MEET ARIZONA ADMINISTRATIVE CODE SECTION R18-5-502.

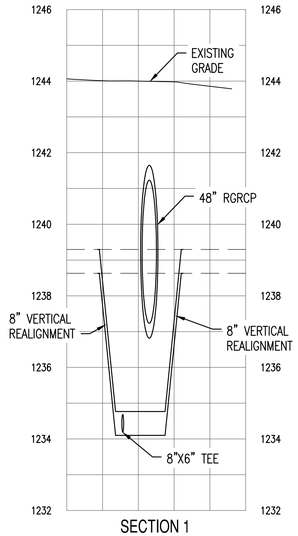
PROPOSED LEGEND

- PROPERTY LINE
- SAWCUT LINE
- 6"W — WATER LINE
- 6"S — SEWER LINE
- WATER METER VAULT
- WATER METER BOX
- WATER BACKFLOW PREVENTER
- WATER VALVE
- FIRE HYDRANT
- FIRE DEPARTMENT CONNECTION
- (S) SEWER MANHOLE

UTILITY CROSSINGS

1	48"ST	BOT	37.23	
	8" W	TOP	34.77	
2	48"ST	BOT	37.21	CONCRETE ENCASE SEWER LINE
	8" S	TOP	36.34	
3	8" W	BOT	38.75*	
	8" S	TOP	36.48*	
4	4" W	BOT	40.50	
	6" W	TOP	40.00	

* PIPE LOCATIONS ARE BASED ON POT-HOLE EXPLORATION PREFOMED ON 2/13/2017 BY SAFE SITE UTILITY SERVICES, LLC.



SECTION 1
SCALE: HORZ 1"=20'
VERT 1"=2'

Call at least two full working days before you begin excavation. ARIZONA 811 Arizona Blue Stake, Inc. Dial 8-1-1 or 1-800-STAKE-IT (782-5348) In Maricopa County: (602) 263-1100

NOTE TO CONTRACTOR:
THIS SET OF DRAWINGS AND DOCUMENTS IS INTENDED AS A SET OF GUIDELINES FOR THE PROJECT AND ARE INTENDED TO BE USED IN CONJUNCTION WITH A SET OF CONSTRUCTION SPECIFICATIONS TO BE SUPPLIED BY OWNER. THEY MUST BE READ TO INCORPORATE ALL APPLICABLE FEDERAL, STATE, AND LOCAL CODES AND REGULATIONS. THE CONTRACTOR SHALL NOTIFY THE ENGINEER IF THERE ARE NO UNUSUAL SOIL CONDITIONS OR WIND LOADS. THE FAILURE OF THIS CONDITION MAY REQUIRE SIGNIFICANT CHANGES TO THESE DOCUMENTS.
IT IS THE RESPONSIBILITY OF THE GENERAL CONTRACTOR TO CONFORM TO ALL APPLICABLE CODES AND TO INFORM THE OWNER/ARCHITECTS OF ANY QUESTIONS OR DISCREPANCIES. THE CONTRACTOR SHALL VISIT THE JOB SITE AND FAMILIARIZE HIMSELF WITH ALL SITE BEFORE BIDDING. CONTRACTORS ARE REQUIRED TO KNOW ALL OBSERVABLE CONDITIONS AND APPLICABLE CODES.

SUSTAINABILITY ENGINEERING GROUP
SEG
8280 E GELDING DR #101, SCOTTSDALE, ARIZONA 85260
WWW.AZSEG.COM TEL. 480.588.7226

EXPIRES 03-31-17
PREPARED UNDER THE DIRECT SUPERVISION OF ALI FAKIH, P.E. ARIZONA REGISTRATION NO. 45621 FOR AND ON BEHALF OF SUSTAINABILITY ENGINEERING GROUP, LLC

ALTA DRINKWATER
Apartment Homes
3234 NORTH SCOTTSDALE ROAD SCOTTSDALE, ARIZONA 85251

WOOD PARTNERS
8777 E. Via De Ventura, Suite 201, Scottsdale, AZ. 85258
PHONE: 480-607-0622

THIRD CITY SUBMITTAL
07 / 14 / 2017

PC#2157-17-1

REVISIONS:
1 -
2 -
3 -
4 -
5

JOB NO: 15-054
SCALE:
SHEET NO:

UTILITY PLAN

C4.10

APPENDIX IV

Agave Old Town Apartments Sewer Report (excerpts)

HILGARTWILSON
ENGINEER | PLAN | SURVEY | MANAGE

WASTEWATER BASIS OF DESIGN REPORT FOR

AGAVE OLD TOWN APARTMENTS

SWC OF OSBORN ROAD AND SCOTTSDALE ROAD SCOTTSDALE, ARIZONA

Accepted for

City of Scottsdale
Water Resources Administration
9379 E. San Salvador
Scottsdale, AZ 85258

Doug Mann
12.22.2015

Prepared For:
JLB PARTNERS
9237 E. Via De Ventura, Suite 215
Scottsdale, AZ 85258
Phone: (480) 800-3072
Contact: Ryan Kleinau

Prepared By:
HILGARTWILSON
2141 E. Highland Ave., Suite 250
Phoenix, AZ 85016
Phone: (602) 490-0535
Fax: (602) 325-0161

REVISIONS:
Initial Issue – September 25, 2015
Revised Per City of Scottsdale Comments – December 10, 2015

HILGARTWILSON Project No. 1388.0201

12/11/15
Sewer
6.29.15-1

WASTEWATER BASIS OF DESIGN REPORT
FOR
AGAVE OLD TOWN APARTMENTS

TABLE OF CONTENTS

APPENDICES

FIGURES

TABLES

1.0 INTRODUCTION

1.1 GENERAL DESCRIPTION

Agave Old Town Apartments (Project) is a proposed multi-family development in the southeast quarter of Section 27 in Township 2 North, Range 4 East of the Gila and Salt River Base Line and Meridian in Scottsdale, Arizona in Maricopa County. Figure 1 in **Appendix A** provides a Vicinity Map for the Project.

Encompassing approximately 8.85 gross acres (7.10 net), the Project includes four multiple-story multi-family residences with a total of 365 units, a fitness/clubroom area, parking structure, sidewalks, driveways and landscaped areas. The total building area of the Project is anticipated to be greater than 449,107 square feet, excluding the parking garages. A breakdown of the proposed building is presented in Table 1. See **Appendix A** for the Architectural Site Plan A1.1 for the Agave Residences Layout.

Table 1. Building Breakdown

Building	Building Area (ft^2)	Dwelling Units
Building Area 1	135,107	112
Building Area 2	87,781	72
Building Area 3	114,154	92
Building Area 4	112,065	89
Building Area 5 Parking Garage	205,093	0
Total		**365**

Notes:
1. Rounding may affect total values.

The Project is located on the southwest corner of Osborn Road and Scottsdale Road. The site is generally bound by an existing commercial development to the north, Scottsdale Road to the east, Angus Drive and commercial developments to the south and 71st Street to the west.

The site is currently occupied by a portion of Angus Drive, a vacant lot and two commercial developments with surface parking areas. These buildings and their respective sewer taps are intended to be removed as part of this project.

1.2 PURPOSE

The purpose of this wastewater basis of design report is to evaluate the existing and proposed wastewater system infrastructure for the Project and confirm design flows under average day and peak flow conditions.

2.0 DESIGN CRITERIA

The design criteria used in this Study for determining flow are based on the 2010 City of Scottsdale *Design Standards & Policies Manual*. A summary of the design criteria is shown in **Table 2** below.

Table 2. Design Criteria

Design Criteria	Criteria Units
Average Day Unit Wastewater Flow	
Multi-Family Residential	140 gpd/unit
Peaking Factors	
Multi-Family Residential	4.0 times average day
Roughness Coefficient	
Manning's n	0.013

3.0 PROJECTED WASTEWATER FLOWS

The projected wastewater flows for the Project are based on the dwelling units described in **Table 2** and the design criteria detailed in **Section 2.0**. The collective average day and peak flows for the Project are anticipated to be 51,100 gallons per day (gpd) and 229,950 gpd, respectively. A summary of the projected wastewater flows is provided in **Table 3**.

Table 3. Wastewater Flow Summary

Discharge Location	Average Day Flow (gpd)	Peaking Factor	Peak Flow (gpd)
To 71st Street	16,520	4.0	66,080
To Angus Drive / Scottsdale Road	34,580	4.0	138,320
Totals	51,100		204,400

4.0 WASTEWATER SYSTEM

4.1 EXISTING WASTEWATER SYSTEM INFRASTRUCTURE

The wastewater distribution system in the vicinity of the Project is very well established. A 12-inch sewer line exists along Osborn Road north of the Project that flows east to Scottsdale Road. Two 8-inch lines exist along 71st Street, both with a southerly direction flow. About 133 feet of 8-inch sewer line, along 71st Street, bends to the east on Angus Drive and connects to a sewer manhole located at the intersection of Scottsdale Road and Angus Drive. From this manhole the existing 8-inch sewer line continues along Scottsdale Road to the south. The second sewer line is located to the south of the intersection between 71st Street and Angus Drive. This sewer line continues to the south and connects to an existing 8-inch sewer line along Earll Drive. The existing 8-inch sewer main terminates east of 70th street so the tributary area is relatively and further analysis is not warranted.

4.2 PROPOSED WASTEWATER SYSTEM INFRASTRUCTURE

Since a portion of the existing 8-inch sewer main along Angus Road will be removed, a connection between the two 8-inch sewer mains along 71st Street will be made to reroute wastewater that currently flows to the east along Angus Road, to the south along 71st Street.

Two 8-inch services are proposed to connect to the sewer main along 71st Street and three 8-inch sewer services are proposed to connect to the sewer main along Angus Road, as shown in Figures 2 and 4, **Appendix A.**

5.0 PIPE CAPACITY ANALYSIS

The evaluations of the sewer lines in Angus Road and 71st street are provided in this report to confirm that there is available capacity for the Project estimated demands. A summary of the pipe capacity calculations is presented in **Table 4.** Related calculations are found in **Appendix B.**

Table 4. Pipe Capacity of Existing Sewers

Location	Diameter (inch)	Proposed Peak Flow (gpd)	Full Flow Capacity (gpd)	Peak Flow to Full Flow Capacity Ratio
71st Street	8	66,080	449,897	0.15
Angus Drive	8	138,320	456,663	0.30
Scottsdale Road	8	138,320	570,157	0.24

6.0 CONCLUSIONS

This report analyzes the performance of the wastewater system. The system, as designed, meets the design parameters outlined within this report. The specific conclusions from this report are:

- The average day and peak sewer flows discharging to 71st Street are estimated to be 16,520 gpd, and 66,080 gpd, respectively.
- The existing sewer line in 71st Street has a capacity of 449,897 gpd and is adequately sized to accommodate the anticipated flows from Agave Old Town Apartments.
- The average day and peak sewer flows discharging to Angus Drive / Scottsdale Rd. are estimated to be 34,580 gpd, and 138,320 gpd, respectively.
- The existing sewer line in Angus Drive has a capacity of 445,663 gpd and is adequately sized to accommodate the anticipated flows from Agave Old Town Apartments.
- The existing sewer in Scottsdale Rd. has a capacity of 570,157 gpd and is adequately sized to accommodate the anticipated flows from Agave Old Town Apartments.

AT Scottsdale + Earll All goes into the 24"

7.0 REFERENCES

City of Scottsdale. (2010). *Design Standards & Policies Manual.*

APPENDIX B

SEWER CAPACITY CALCULATIONS

Sewer Capacity Calculation

Project: Agave Old Town Apartments
Prepared By: JLB
September 2015

HILGART WILSON
ENGINEER | PLAN | SURVEY | MANAGE

Design Wastewater Flows

Combined Sewer Flows to 71st Street

Number of Units:	118	Multi-Family
Average Daily Flow in Gallons per Dwelling Unit:	140	per Table 7.1-2 of City of Scottsdale Design Standards & Policies, Section 7. January 2010.
Average Daily Flow:	16,520	gpd

Combined Sewer Flows to Scottsdale Road

Number of Units:	247	Multi-Family
Average Daily Flow in Gallons per Dwelling Unit:	140	per Table 7.1-2 of City of Scottsdale Design Standards & Policies, Section 7. January 2010.
Average Daily Flow:	34,580	gpd

Average Daily Flow Summary

Flow to 71st Street	16,520	gpd
Flows to Angus Dr. / Scottsdale Road	34,580	gpd
Total Average Daily Flow	51,100	gpd
Peaking Factor:	4.00	per Table 7.1-2 of City of Scottsdale Design Standards & Policies, Section 7. January 2010.

Peak Daily Flow Calculations

Flow to 71st Street	66,080	gpd
Flows to Angus Dr. / Scottsdale Road	138,320	gpd
Total Peak Daily Flow	204,400	gpd

Capacity of Existing and Proposed Sewer Alingnments

8" Sewer Main flowing South Along 71st Street

Sewer Segments: 8" @ 0.48% — Existing North Segment
8" @ 1.94% — Proposed Connector Segment
Limiting Sewer Segment 8" @ 0.33% — Existing South Segment

Sewer Size (D):	8	in.	
Manning's n-value (n):	0.013		
Minimum Required Slope of Sewer based on 2.0 ft/sec Velocity	0.0033		
Slope of Existing Sewer (S):	0.0033	ft/ft	
Hydraulic Radius (R):	0.167	ft	R=D/4 (full pipe)
Manning's Equation:	V = (1.486/n) * R^(2/3) * S^(1/2)		
Velocity In Proposed Sewer Pipe (V, full pipe):	2.0	ft/s minimum	
Mannings Equation solved for Capacity (Q)	Q = (1.49/n) * A * R^(2/3) * S^(1/2)		
Proposed Sewer Pipe Capacity:	0.696	cfs	
	449,897	gpd*	
Proposed Peak Sewer Flows to 71st Street:	0.102	cfs	
	66,080	gpd*	

*The pipe capacity is greater than the total peak daily flow, therefore adequate capacity is available.

Remaining 8" East Segment (West Piece Demo'd) Flowing East Along Angus Dr to Scottsdale Rd

Sewer Segments: 8" @ 0.34% — Remaining East Segment

Sewer Size (D):	8	in.	
Manning's n-value (n):	0.013		
Minimum Required Slope of Sewer based on 2.0 ft/sec Velocity	0.0033		
Slope of Existing Sewer (S):	0.0034	ft/ft	
Hydraulic Radius (R):	0.167	ft	R=D/4 (full pipe)
Manning's Equation:	V = (1.486/n) * R^(2/3) * S^(1/2)		
Velocity In Proposed Sewer Pipe (V, full pipe):	2.0	ft/s minimum	
Mannings Equation solved for Capacity (Q)	Q = (1.49/n) * A * R^(2/3) * S^(1/2)		
Proposed Sewer Pipe Capacity:	0.707	cfs	
	456,663	gpd*	
Proposed Peak Sewer Flows To Angus Dr:	0.214	cfs	
	138,320	gpd*	

*The pipe capacity is greater than the total peak daily flow, therefore adequate capacity is available.

Existing 8" VCP Flowing South Along Scottsdale Road from Angus Drive

Sewer Segments: 8" @ 0.53%

Sewer Size (D):	8	in.	
Manning's n-value (n):	0.013		
Minimum Required Slope of Sewer based on 2.0 ft/sec Velocity	0.0033		
Slope of Existing Sewer (S):	0.0053	ft/ft	
Hydraulic Radius (R):	0.167	ft	R=D/4 (full pipe)
Manning's Equation:	V = (1.486/n) * R^(2/3) * S^(1/2)		
Velocity In Proposed Sewer Pipe (V, full pipe):	2.5	ft/s minimum	
Mannings Equation solved for Capacity (Q)	Q = (1.49/n) * A * R^(2/3) * S^(1/2)		
Existing Sewer Pipe Capacity:	0.882	cfs	
	570,157	gpd*	
Proposed Peak Sewer Flows To Scottsdale Rd:	0.214	cfs	
	138,320	gpd*	

*The pipe capacity is greater than the total peak daily flow, therefore adequate capacity is available.