CITY OF SCOTTSDALE

Water and Wastewater Study
Combined

FINAL BASIS OF DESIGN REPORT
for
WATER AND SEWER SERVICE

TSG FOUNDATION

SWC OF STAGECOACH PASS ROAD AND PIMA ROAD

Scottsdale, AZ

Prepared For:

FINAL Basis of Design Report

☐ APPROVED

☑ APPROVED AS NOTED

☐ REVISE AND RESUBMIT

CITY OF SCOTTSDALE

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

Disclaimer: If approved; the approval is granted under the condition that the final construction documents submitted for city review will match the information herein. Any subsequent changes in the water or sewer design that materially impact design criteria or standards will require re-analysis, re-submittal, and approval of a revised basis of design report prior to the plan review submission.; this approval is not a guarantee of construction document acceptance.
For questions or clarifications contact the Water Resources Planning and Engineering Department at 480-312-5685.

BY rrahman **DATE** 3/3/2020

Orcutt Winslow
2929 N Central Ave,
Phoenix, AZ 85012
602.257.1764

Prepared by:

SEG

Registered Professional Engineer (Civil)
CERTIFICATE NO.
45621
ALI SAMIH
FAKIH
Date Signed 02-02-2020
ARIZONA, U.S.A.

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

Project Number: 180333

Date Submitted: 05-09-2019
Revised: 10-25-2019
Revised: 02-02-2020

Pre-Ap No.: 513-PA-2017; 50-DR-2018 **Plan Check No.: TBD**

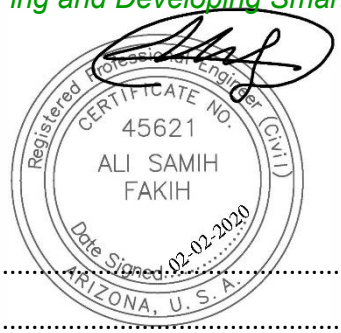


Table of Contents

1. EXECUTIVE SUMMARY

The proposed development consists of 13 acres of residential land located at the Southwest corner of Stagecoach Pass Road and Pima Road. The Site is bounded by:

- Adjoining neighboring property owners at the west and south boundaries
- North Pima Road to the east
- East Stagecoach Pass Road to the north

Refer to **EXHIBIT 1 – Vicinity Map**.

The property is presently zoned R1-35 ESL.

Located within the City of Scottsdale corporate boundary, this site will receive domestic water and fire service from the City of Scottsdale by connecting to a 12" PVC water line in East Stagecoach Pass, west of an existing PRV near the intersection with Pima Road.

Sanitary sewer service will be provided by a connection to the 21" PVC sewer line in Pima Road with a new manhole.

An existing well in the property will be utilized for supplemental irrigation water service. Water quality testing is presently being completed. The irrigation system will utilize purple pipe and will not connect to the public water system at any location.

All water and sewer improvements will be designed and constructed to the most recent City of Scottsdale and MCESD design standards and policies.

2. INTRODUCTION

2.1 PLAN OBJECTIVE:

The purpose of this report is to provide information and calculations defining the water and sewer system design. Preparation of this report has been done in accordance with Chapters 6 and Chapter 7 of the City's Design Standards & Policies Manual.

2.2 SITE LOCATION

The 13.04 acres of the subject property consists of a public R.O.W and thirteen separate but contiguous parcels whose APN's are:

- 216-34-316 (Lot 1)
- 216-34-317 (Lot 2)
- 216-34-318 (Lot 3)
- 216-34-319 (Lot 4)
- 216-34-320 (Lot 5)
- 216-34-326 (Lot 11)
- 216-34-327 (Tract A)
- 216-34-328 (Lot B)
- 216-34-321 (Lot 6)
- 216-34-322 (Lot 7)
- 216-34-323 (Lot 8)
- 216-34-324 (Lot 9)
- 216-34-325 (Lot 10)

There is an existing wash that is relevant to sewer design. DSPM 7-1.408

2.3 PROPOSED DEVELOPMENT

2.3.1 Existing Site Description:

This site is open desert land with one single structure and generally slopes from the northeast (elevation 2,564 +/-) to the southwest (elevation 2,531 +/-) at approximately 3.5% with a change in elevation of 33 feet.

The City of Scottsdale Water & Sewer Quarter Section Map (60-48) shows water mains and Sewer lines in East Stagecoach Pass and North Pima Rd as follows:

- A 12" PVC water main exists in East Stagecoach Pass, 32' South of the road center line.
- An 8" ACP in East Stagecoach Pass 4' north of the road centerline, owned by Carefree Water Company.
- A 10" TYP UNK in East Stagecoach Pass 12' south of the road centerline, owned by Carefree Water Company.
- An 8" TYP UNK RWDS Non-portable water line exists in East Stagecoach Pass, 25' south to the road centerline.
- A 16" TYP UNK potable water main exists to the east in North Pima Road, 20' west of the road centerline.
- A 24" SCP potable water line exists to the east in North Pima Road, 81' east of the road centerline.
- 12" DIP Non-portable water line, 12" TYP UNK Non-portable water line, and 16" TYP UNK Non-portable water line exist to the east in North Pima Road, 50', 32', and 15' east to the road centerline.
- A 21" PVC gravity sewer main exists to the east in North Pima Road, 48' east of the road centerline.

Non-potable

Refer to **EXHIBIT 2** for the COS Water **Quarter Section Map (60-48).**

2.3.2 Proposed Site Development:

The existing site will be re-platted and developed with a new building for office use and a parking lot. An existing structure will be retained as a casita. Refer to **EXHIBIT 3** for the site plan and water/sewer improvement plans. An existing onsite well will remain in service to provide irrigation water for the site. No cross-connections will be made to the potable water system. The irrigation mainlines have been shown on the civil improvement plans (**EXHIBIT 3**). Refer to **EXHIBIT 7** for the proposed irrigation plans.

3. DESIGN CRITERIA

3.1 DEVELOPMENT CRITERIA

Proposed zoning: R1-35 ESL

Acreage: 13.04

Demands, system layout, system pressures, velocities, head losses for fire flow will all be in accordance with the City's DS&PM (References 2 and 3 in Sec. 11).

A 1,500 gpm system fire flow demand will be utilized in hydraulic calculations.

4. DEMANDS

4.1 PROPOSED DEMANDS

Refer to the tables below for the proposed (R1-35 ESL PRD) water and sewer demand calculations in gallons per minute based on design criteria in the City's DS&PM.

Table 1: WATER DEMAND CALCULATIONS

	Area (sf)	Avg. Day Demand (gpm/sf or unit)	Max Day Peaking Factor	Peak Hour Peaking Factor	Avg. Day Demand (gpm)	Max. Day Demand (gpm)	Peak Hour Demand (gpm)
Office	14,588	8.34E-04	2	3.5	12.2	24.3	42.6
Casita	n/a	6.90E-01	2	3.5	0.7	1.4	2.4

Table 2 - SEWER DEMAND CALCULATIONS

	Area (sf)	Avg. Day Demand (gpd/sf or unit)	Avg. Day Demand (gpd)	Peaking Factor	Peak Flow (gpm)
Office	14,588	0.4	5,835	3	12.2
Casita	n/a	250	250	4	0.7

4.2 WATER ZONE

According to the City of Scottsdale DS&PM Sec. 6-1, the site is within Zone 11N.

4.3 PHASING OF PROJECT

The project is anticipated to be constructed in a single phase. This Final Basis of Design Report must be accepted by the Water Resources Department prior to the submittal of improvement plans to the City's 1-Stop Shop.

4.4 SUMMARY NARRATIVE OF DEMANDS

- The max day + fire flow scenario will govern the water system design.
- No offsite sewer flow impacts this site.

5. PROPOSED INFRASTRUCTURE

5.1 WATER DISTRIBUTION SYSTEM

This project proposes to construct approximately 375 LF of 8" DIP connecting to the 12" line in East Stagecoach Pass. Refer to **EXHIBIT 3** for the proposed site and utility plan. A fire hydrant will terminate the extension. Metered service and the main building fire line will be tapped off the new 8" water line. Metered service for the casita will be separately tapped off the 8" water line. All service lines will install a reduced pressure principle backflow preventer and pressure regulator per COS DS+PM Sec. 6-1.417 and 6-1.407.

This is not what is shown on Exhibit 3. Service line is shown to tapped into 4" fire line, not acceptable. Fire line connection shall be per COS Detail 2362-2, See DSPM 6-1.504.

Plans show 4" DIP for Casita. Revise to conform COS Service connection details.

Any manhole over 20' deep requires engineers structural calcs. MAG Detail 420-1 #6 DSPM 7-1.202 F

5.2 SEWER COLLECTION SYSTEM

The 21" PVC sewer pipe in Pima Road is approximately 20' deep per COS as-built #25366. The proposed private 8" DIP Sewer connection to this existing pipe will cross three 16" water lines (one potable and two non-potable). Per as-builts the non-potable lines appear to be approximately 10' deep. The potable line appears to be 6 to 8 feet deep. The proposed 8" DIP Sewer line should have sufficient vertical separation from the existing water lines. A plan's note requires the contractor to verify all utility locations and elevations prior to construction.

The private sanitary sewer service will connect the proposed and existing building to the 21" PVC public sewer main in Pima Road. A new manhole will need to be constructed over the existing sewer. The first reach of pipe will be 8" ductile iron with a cured-in-place PVC liner between the two manholes. 6" service lines serving the casita and main building respectively will be located under or near drives with cleanouts at 100' on-center.

Pipe (CIPP)

Falling topography does not support extension of public sewer along the site's Stagecoach Pass frontage. A public sewer to 8603 E. Stagecoach Pass has been extended to the southwest corner of that parcel which can provide future service.

5.3 MAINTENANCE AND OWNERSHIP

The water line is proposed as public to be owned and maintained by the City and is located within a 20-foot wide water easement.

property

All proposed sanitary sewer lines and related appurtenances will be private, owned and maintained by the owner. The new manhole constructed over the 21" public sewer will be public, owned and maintained by the City.

6. WATER COMPUTATIONS

6.1 DESCRIPTION OF MODEL

The new water system will be designed to meet the criteria of COS Water, the Arizona Department of Environmental Quality ("ADEQ"), and Maricopa County Environmental Services Department ("MCESD").

Bentley WaterCAD® Version 8i was used to model the water extension and demand scenarios. A current fire hydrant flow test is included in **EXHIBIT 4**. The results of water modeling are included in **EXHIBIT 5.**

7. SEWER COMPUTATIONS

DIP per plan

7.1 DESCRIPTION

An 8" PVC sewer service at 1.5% grade will convey the peak 12 gpm flow to Pima Road at 1.6 fps with a normal depth of 0.7". The hydraulic radius is 0.47". At d/D = 0.65 the 8" service pipe has a capacity of 502.4 gpm at 4.7 fps. The full flow capacity is 664 gpm at 4.2 fps.

A 6" PVC sewer service at 2% grade will convey the peak 12 gpm flow to Pima Road at 1.9 fps with a normal depth of 0.8". The hydraulic radius is 0.47". At d/D = 0.65 the 6" service pipe has a capacity of 269 gpm at 4.4 fps. The full flow capacity is 356 gpm at 4.0 fps.

Reference **EXHIBIT 6** .

8. SUMMARY / CONCLUSIONS

- Sufficient city water supply is available to support the project's domestic and fire flow demand.
- Sufficient city sewer capacity is available to support the project.
- An existing onsite well will be utilized for irrigation service.

9. REFERENCES

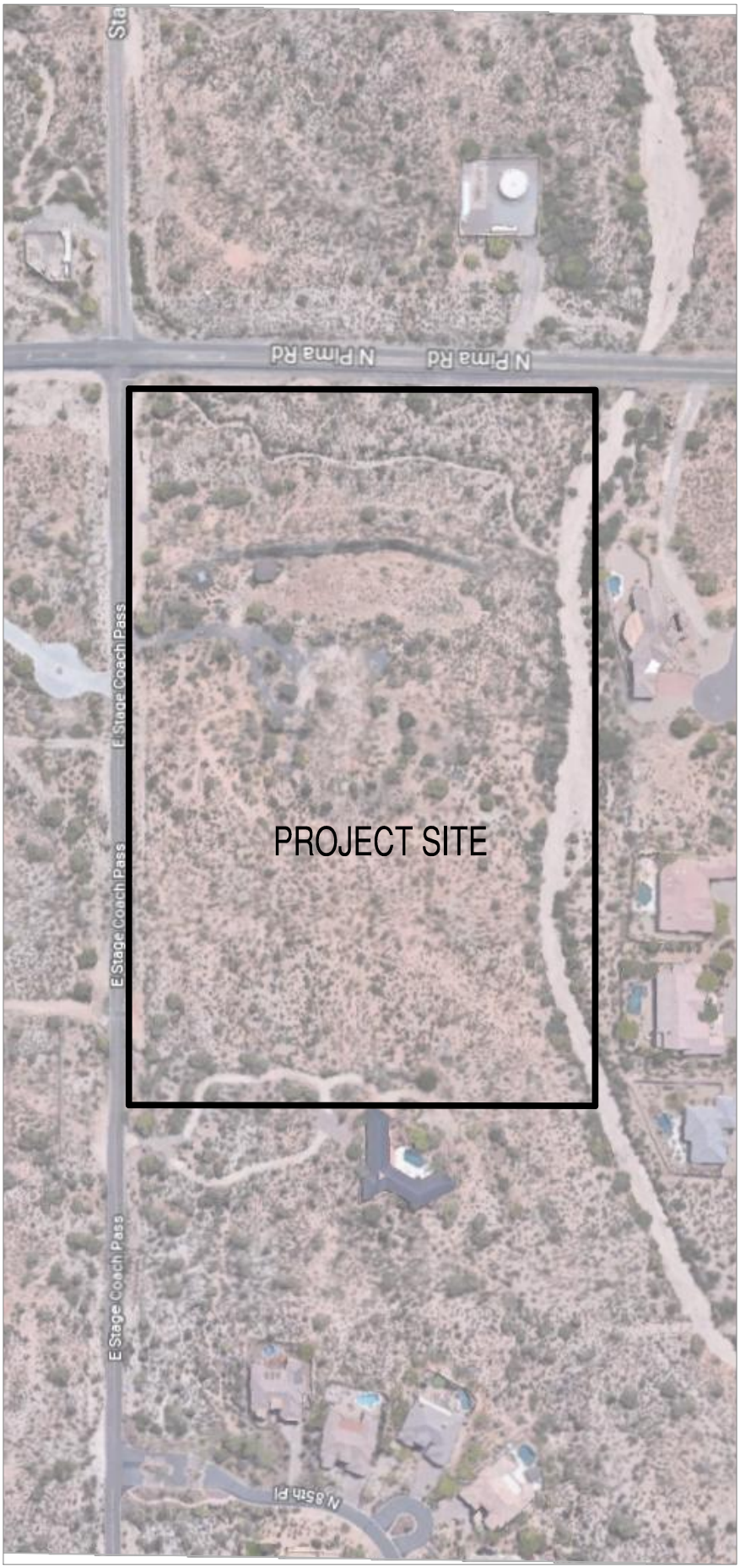
1. COS QS numbers 60-48, 61-49
2. City of Scottsdale Design Standards & Policies Manual, 2018 (Chapter 6 – Water).
3. City of Scottsdale Design Standards & Policies Manual, 2018 (Chapter 7 – Wastewater)

10. EXHIBITS:

EXHIBIT 1 - VICINITY MAP – CONTEXT AERIAL
EXHIBIT 2 - Q-S MAPS 60-48, 61-49
EXHIBIT 3 - Utility Plan/Water Sewer Improvement Plans
EXHIBIT 4 - Fire Hydrant Flow Test
EXHIBIT 5 - Water Modeling
EXHIBIT 6 - Sewer Service Calculation
EXHIBIT 7 - Irrigation Plans

EXHIBIT 1

Vicinity Map



NORTH

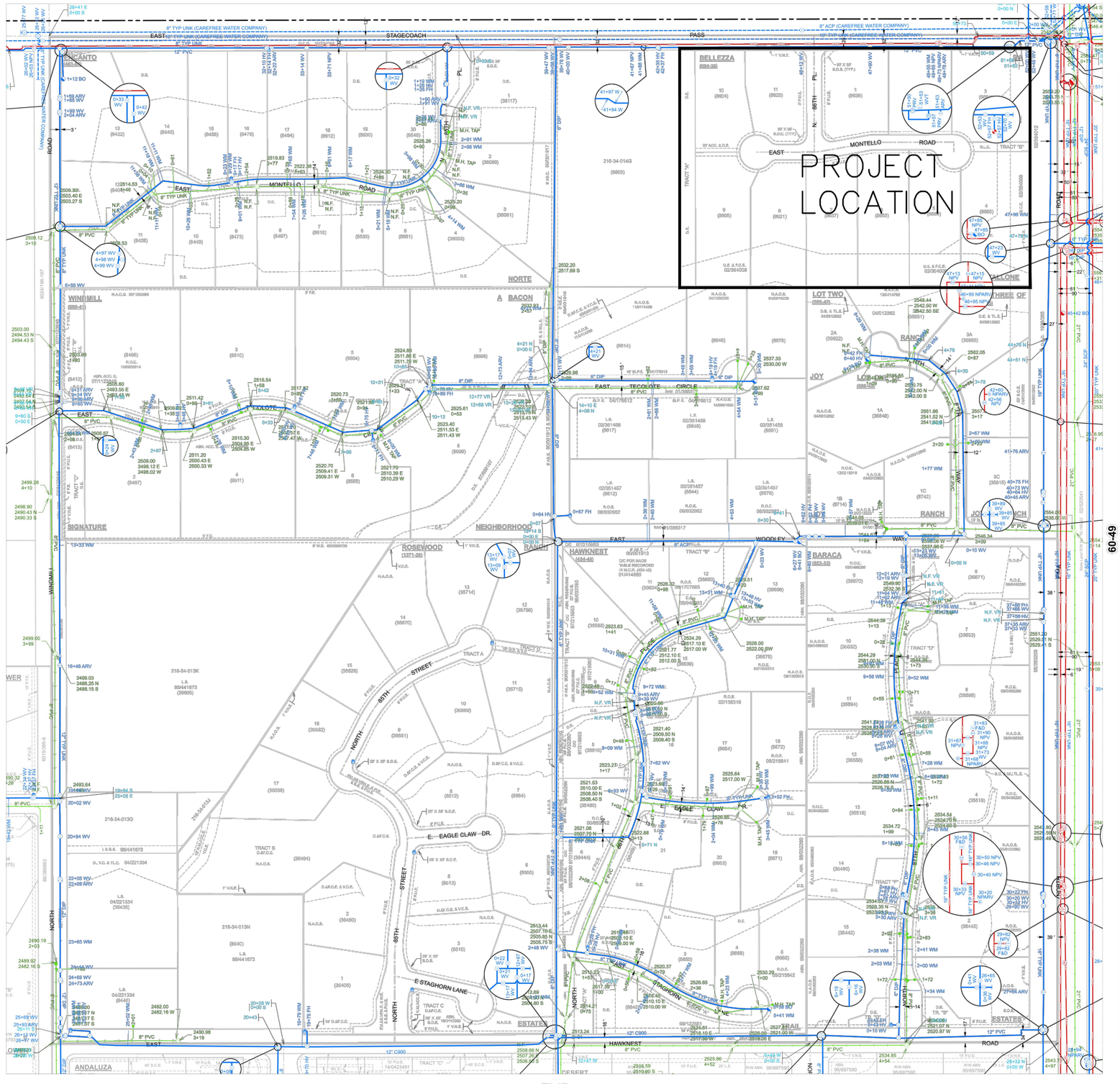
N.T.S

EXHIBIT 1
VICINITY MAP

EXHIBIT 2

Q-S Map

61-48



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

NORTH

SCALE: 1" = 100'

0 50 100 200

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

WATER & SEWER

QUARTER SECTION MAP

60-48

NE 1/4 SEC. 1 T5N R4E

N O T I C E

THIS DOCUMENT IS PROVIDED FOR GENERAL INFORMATION PURPOSES ONLY. THE CITY OF SCOTTSDALE DOES NOT WARRANT THE ACCURACY, COMPLETENESS, OR SUITABILITY FOR ANY PARTICULAR PURPOSE. IT SHOULD NOT BE RELIED UPON WITHOUT FIELD VERIFICATION.

THE CITY OF SCOTTSDALE

CITY OF SCOTTSDALE

SCOTTSDALE GEOGRAPHIC INFORMATION SYSTEMS

3629 North Drinkwater Boulevard
Scottsdale, Arizona 85251

62-49

61-48

61-50

60-49

21-OCT-18

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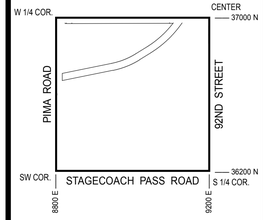
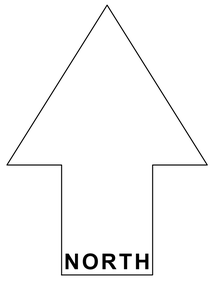
VICINITY MAP





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

61-49

SW 1/4 SEC. 31 T6N R5E

CITY OF SCOTTSDALE

SCOTTSDALE GEOGRAPHIC INFORMATION SYSTEMS

3629 North Drinkwater Boulevard
Scottsdale, Arizona 85251

EXHIBIT 3

Preliminary Utility Plans

6" PVC per Design Drawings

Label this line as Remote F.D.C.

BASIN A
HWE=51.97
BOT=51.00
Vr=9,075 CF
Vp=9,261 CF

50' SCENIC COORIDOR EASEMENT
PER DOC. NO. 02-0354009

1' VNAE

50' SCENIC CORRIDOR EASEMENT

60' SETBACK

40' DRAINAGE AND NAOS EASEMENT

35' DRAINAGE AND NAOS EASEMENT

75' ROW

DRAINAGE EASEMENT PER DOC. NO. 02-0354008

WIRE FENCE

WIRE FENCE POSSIBLE ENCROACHMENT

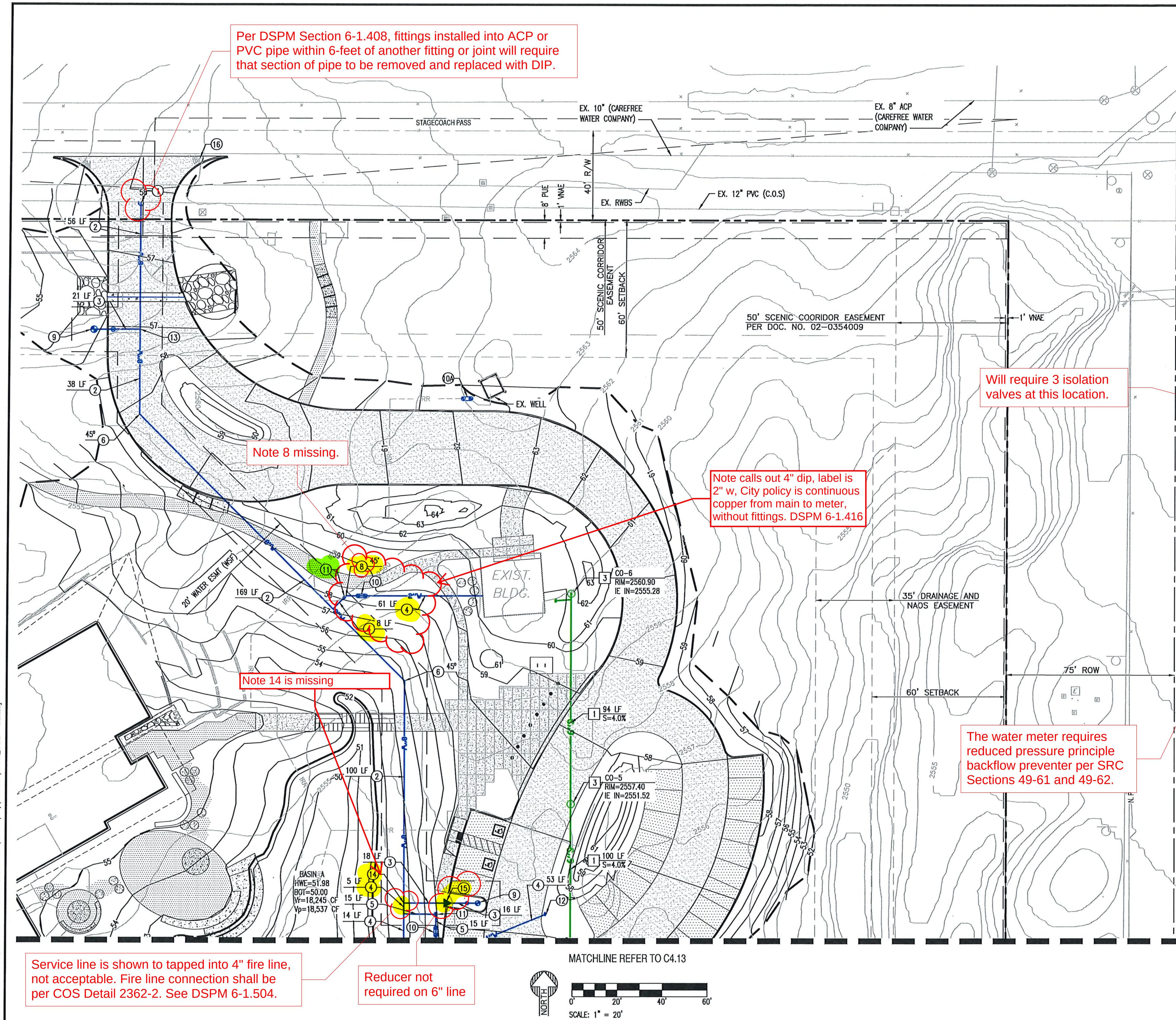
HEADWALL

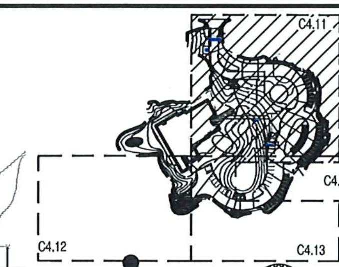
EXIST. SHADE

EXIST. BLDG.

UTILITY VAULT

SAGUARO SHAPED UTILITY POWER





VICINITY MAP (NTS)

LEGEND:

- 8"W — WATER LINE
- 6"S — SEWER LINE
- IRR — IRRIGATION LINE
- 2250 — EXISTING 5' CONTOUR
- 50 — PROPOSED 5' CONTOUR
- PROPERTY LINE
- WATER EASEMENT
- FIRE HYDRANT
- WATER VALVE
- WATER METER
- REDUCER
- BACKFLOW PREVENTER

WATER LINE CONSTRUCTION NOTES:

(1) FURNISH AND INSTALL 12"X8" TAPPING SLEEVE, VALVE BOX & COVER PER M.A.G. STD. DTL. 340 AND 391-1 TYPE "A".

(2) FURNISH AND INSTALL 8" DUCTILE IRON PIPE, CLASS 350, WITH MEGA-LUG MECHANICAL JOINT RESTRAINT PER M.A.G. STD. DTL. 303-1 AND 303-2, WITH POLYETHYLENE WRAPPING. LENGTH PER PLAN. PROVIDE BLUE POLYETHYLENE LOCATING TAPE ABOVE ALL PUBLIC WATER LINES. MAINTAIN 3' MINIMUM COVER. LENGTH PER PLAN.

(3) FURNISH AND INSTALL 6" DUCTILE IRON PIPE, CLASS 350, WITH POLYETHYLENE WRAPPING. LENGTH PER PLAN.

(4) FURNISH AND INSTALL 4" DUCTILE IRON PIPE, CLASS 350, WITH POLYETHYLENE WRAPPING. LENGTH PER PLAN.

(5) FURNISH AND INSTALL 2" TYPE "K" COPPER PIPE. LENGTH PER PLAN.

(6) FURNISH AND INSTALL 8" BEND, ANGLE PER PLAN. PROVIDE ELECTRONIC MARKER PER C.O.S. STD. DTL. 2397.

(9) FURNISH AND INSTALL FIRE HYDRANT (COMPLETE WITH GATE VALVE, BOX & COVER) PER M.A.G. STD. DET. 360. PROVIDE PAVEMENT MARKER (PM) PER C.O.S. STD. DTL. 2363.

(10) FURNISH AND INSTALL 2" BACKFLOW PREVENTION DEVICE PER C.O.S. STD. DTL. 2352.

(10A) FURNISH AND INSTALL 1.5" BACKFLOW PREVENTION DEVICE. REFER TO LANDSCAPE PLANS FOR DETAILS.

(11) FURNISH AND INSTALL 2" SERVICE CONNECTION AND WATER METER BOX PER C.O.S. STD. DTL. 2330.

(12) INSTALL REMOTE FIRE DEPARTMENT CONNECTION PER C.O.S. STD. DTL. 2367.

(13) FURNISH AND INSTALL 8"x6"x8" TEE.

(15) FURNISH AND INSTALL 8"x6" REDUCER.

(16) ADJUST VALVE BOX RIM ELEVATION PRIOR TO PLACEMENT OF FINAL PAVEMENT SURFACE PER M.A.G. STD. DTL. 391-1 & 391-2.

SEWER CONSTRUCTION NOTES

[3] FURNISH AND INSTALL CLEAN-OUT PER C.O.S. STD. DTL. 2403.

[9] FURNISH AND INSTALL 4" PVC-SDR 35 SEWER LINE. S=2% MINIMUM.

Call at least two full working days before you begin excavation. ARIZONA 811

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phoenix arizona 85012
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602.257.9029 f
www.owp.com

Registered Professional Engineer (Civil) Certificate No. 45621 ALI SAMIH FAKIH Arizona, U.S.A.

BID SET
NOT FOR CONSTRUCTION

TSG FOUNDATION
Center for Spiritual Development
PIMA RD & STAGECOACH DR, SCOTTSDALE, AZ #Site
Postcode

CLIENT CONTACT
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Cave Creek, AZ 85327
480.502.1909 t
gita@tsgfoundation.org

PROJECT NO.	DATE OF ISSUE
18_077-01	01/14/2020
REVISION NO.	DATE
PROJECT TEAM	DRAWN BY
SEG	DB

PROJECT PHASE
BID SET

SHEET CONTENTS
UTILITY PLAN 1

SHEET NO.
C4.11

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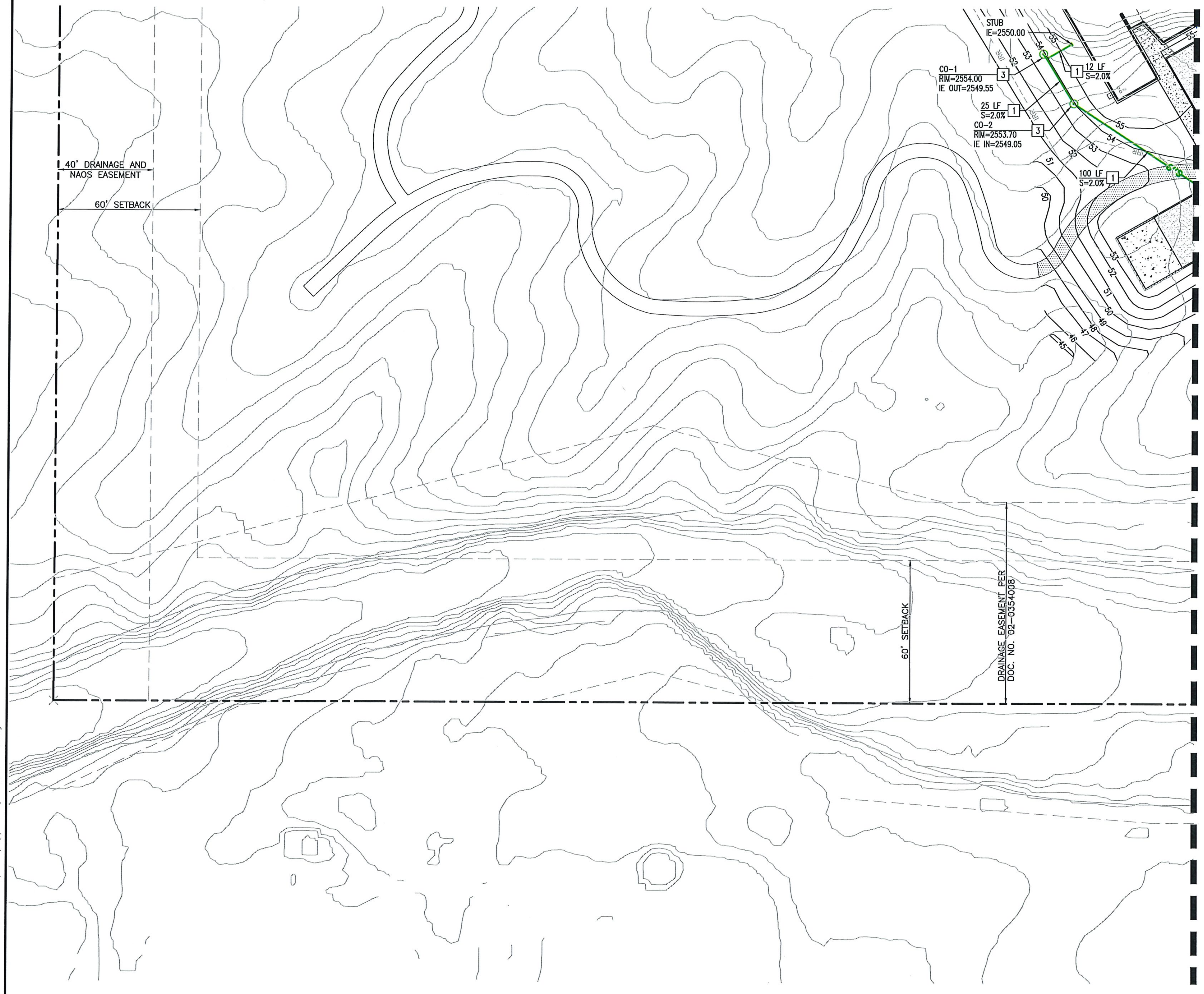

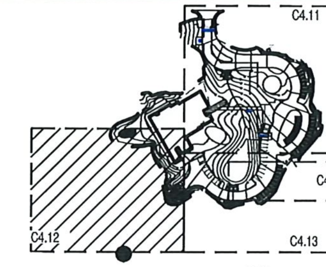

VICINITY MAP
(NTS)

LEGEND:

Symbol	Description
	PROPERTY LINE
8"W	WATER LINE
6"S	SEWER LINE
IRR	IRRIGATION LINE
-2250-	EXISTING 5' CONTOUR
50	PROPOSED 5' CONTOUR
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	FIRE HYDRANT
	WATER VALVE
	WATER METER
	REDUCER
	BACKFLOW PREVENTER

SEWER CONSTRUCTION NOTES

1. FURNISH AND INSTALL 6" PVC-SDR 35 SEWER LINE CONNECTION PER M.A.G. STD. DET. 440-3. S=2% MINIMUM.
3. FURNISH AND INSTALL CLEAN-OUT PER C.O.S. STD. DTL 2403.

NORTH

0' 20' 40' 60'
SCALE: 1" = 20'

orcutt winslow
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eleventh floor
phoenix arizona 85012
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www.owp.com

Registered Professional Engineer (Civil) CERTIFICATE NO. 45621 ALI SAMIH FAKIH Date Signed 01-14-2020 ARIZONA, U.S.A.

BID SET
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CONSTRUCTION

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PROJECT TEAM	DRAWN BY
SEG	DB

PROJECT PHASE
BID SET

SHEET CONTENTS
UTILITY PLAN 2

SHEET NO.
C4.12

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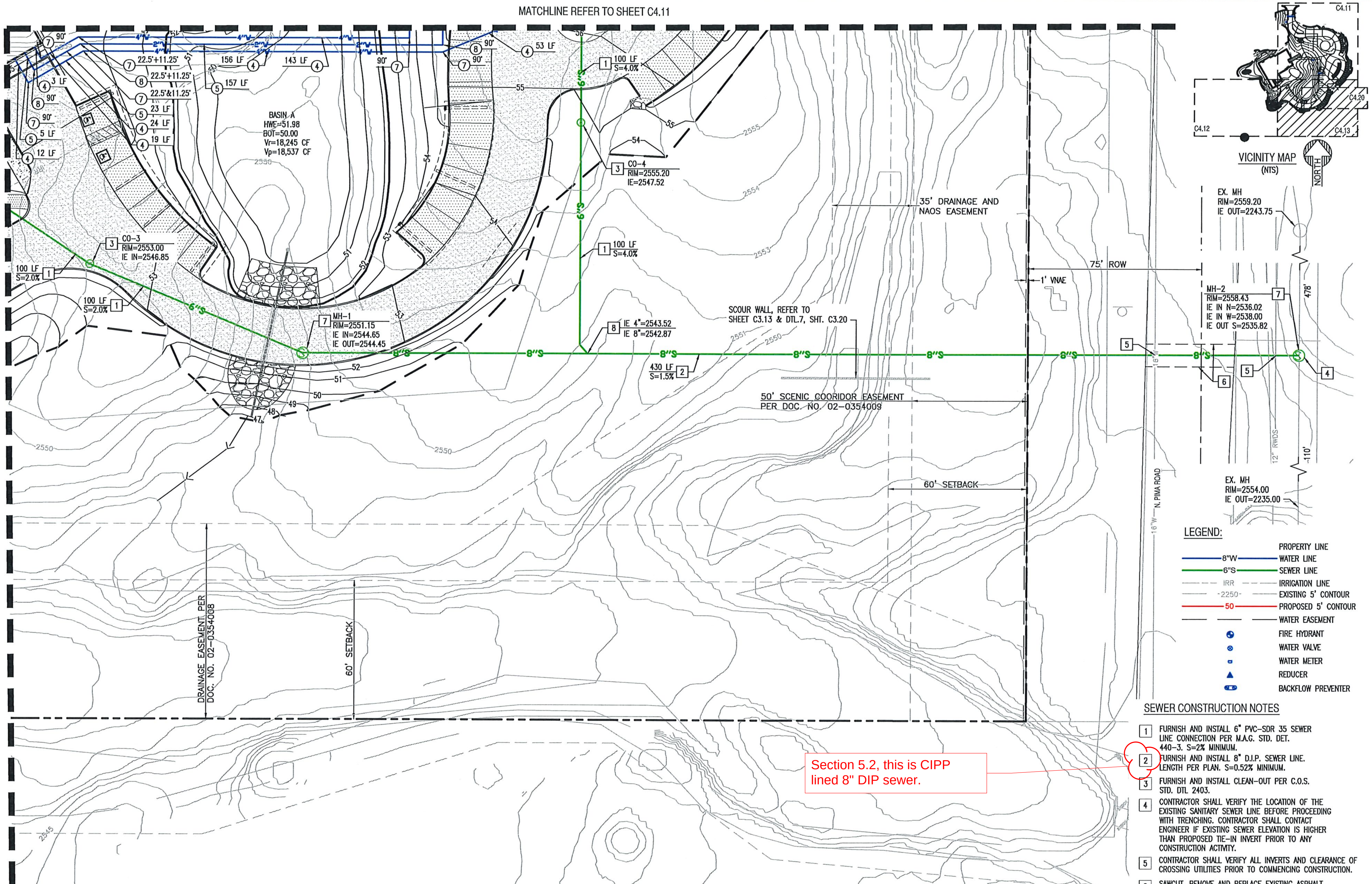
MATCHLINE REFER TO SHEET C4.11



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	WATER METER
	REDUCER
	BACKFLOW PREVENTER

SEWER CONSTRUCTION NOTES

1. FURNISH AND INSTALL 6" PVC-SDR 35 SEWER LINE CONNECTION PER M.A.G. STD. DET. 440-3. S=2% MINIMUM.
2. FURNISH AND INSTALL 8" D.I.P. SEWER LINE. LENGTH PER PLAN. S=0.52% MINIMUM.
3. FURNISH AND INSTALL CLEAN-OUT PER C.O.S. STD. DTL 2403.
4. CONTRACTOR SHALL VERIFY THE LOCATION OF THE EXISTING SANITARY SEWER LINE BEFORE PROCEEDING WITH TRENCHING. CONTRACTOR SHALL CONTACT ENGINEER IF EXISTING SEWER ELEVATION IS HIGHER THAN PROPOSED TIE-IN INVERT PRIOR TO ANY CONSTRUCTION ACTIVITY.
5. CONTRACTOR SHALL VERIFY ALL INVERTS AND CLEARANCE OF CROSSING UTILITIES PRIOR TO COMMENCING CONSTRUCTION.
6. SAWCUT, REMOVE AND REPLACE EXISTING ASPHALT FOR TRENCHING PER C.O.S. STD. DET. 2200 & 2201 (T-TOP).
7. FURNISH AND INSTALL 5' DIAMETER PRECAST CONCRETE SEWER MANHOLE PER M.A.G. STD. DET. 420-1 (NO STEPS) WITH 12 CONCRETE COLLAR PER C.O.S. STD. DET. 2270. 30" WATERTIGHT COVER PER M.A.G. STD. DET. 424-2 AND C.O.S. STD. DET. 2421. CAST-IN-PLACE BASE.
8. FURNISH AND INSTALL SEWER CONNECTION PER M.A.G. STD. DTL. 440-1.

NOTE:

IRRIGATION LINE TO BE CONNECTED TO AN EXISTING WELL AND WILL BE INDEPENDENT OF CITY WATER CONNECTION. REFER TO LANDSCAPE PLANS FOR DETAILS.

NORTH
0' 20' 40' 60'
SCALE: 1" = 20'

WATER LINE CONSTRUCTION NOTES:

4. FURNISH AND INSTALL 4" DUCTILE IRON PIPE, CLASS 350, WITH POLYETHYLENE WRAPPING. LENGTH PER PLAN.
5. FURNISH AND INSTALL 2" TYPE "K" COPPER PIPE. LENGTH PER PLAN.
7. FURNISH AND INSTALL 4" BEND, ANGLE PER PLAN. PROVIDE ELECTRONIC MARKER PER C.O.S. STD. DTL. 2397.
8. FURNISH AND INSTALL 2" BEND, ANGLE PER PLAN. PROVIDE ELECTRONIC MARKER PER C.O.S. STD. DTL. 2397.

Call at least two full working days before you begin excavation.
ARIZONA 811

orcutt winslow
2929 n central ave
eleventh floor
phoenix arizona 85012
602.257.1764 t
602.257.9029 f
www.owp.com

CERTIFICATE NO. 45621
ALI SAMIH FAKIH
Date Signed 01-14-2020
ARIZONA, U.S.A.

BID SET
NOT FOR
CONSTRUCTION

TSG FOUNDATION
Center for Spiritual Development
PIMA RD & STAGECOACH DR, SCOTTSDALE, AZ #Site
Postcode

CLIENT CONTACT
Gita Saraydarian
PO Box 7068
Cave Creek, AZ 85327
480.502.1909 t
gita@tsgfoundation.org

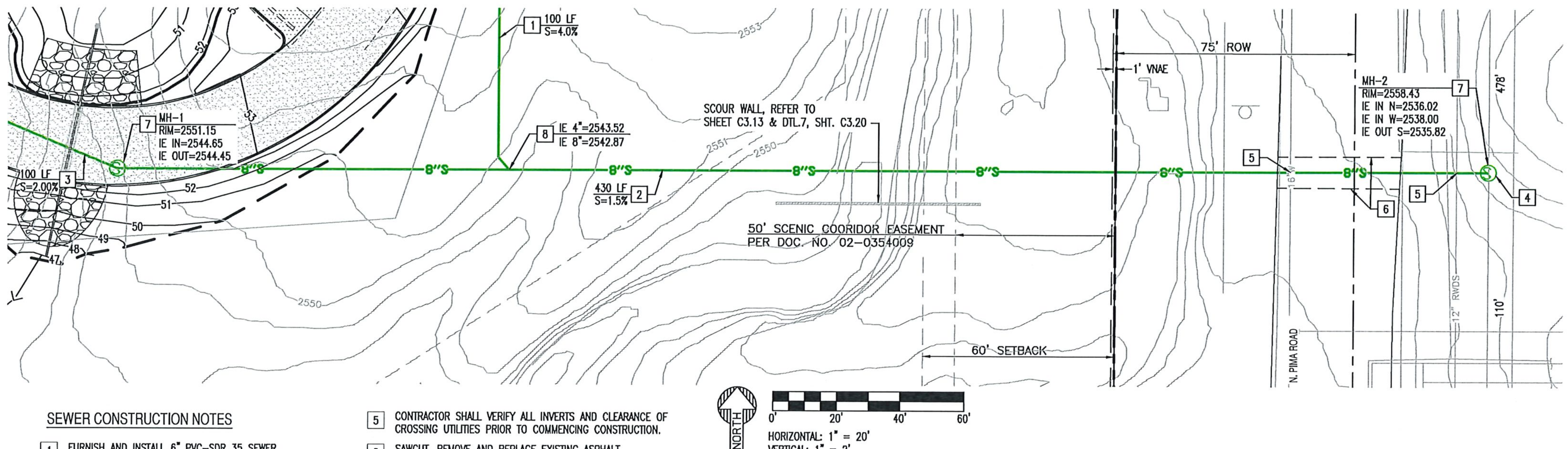
PROJECT NO.	DATE OF ISSUE
18_077-01	01/14/2020
REVISION NO.	DATE
PROJECT TEAM	DRAWN BY
SEG	DB

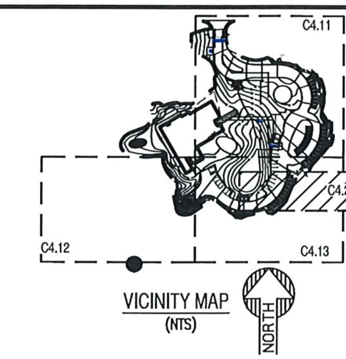
PROJECT PHASE
BID SET

SHEET CONTENTS
UTILITY PLAN 3

SHEET NO.
C4.13

X:\PROJECTS\Orcutt Winslow\TSG Foundation Pima Scottsdale 180333\11 CAD (SEG)\11.3 CD's\180333_C4.10 - C4.4.dwg

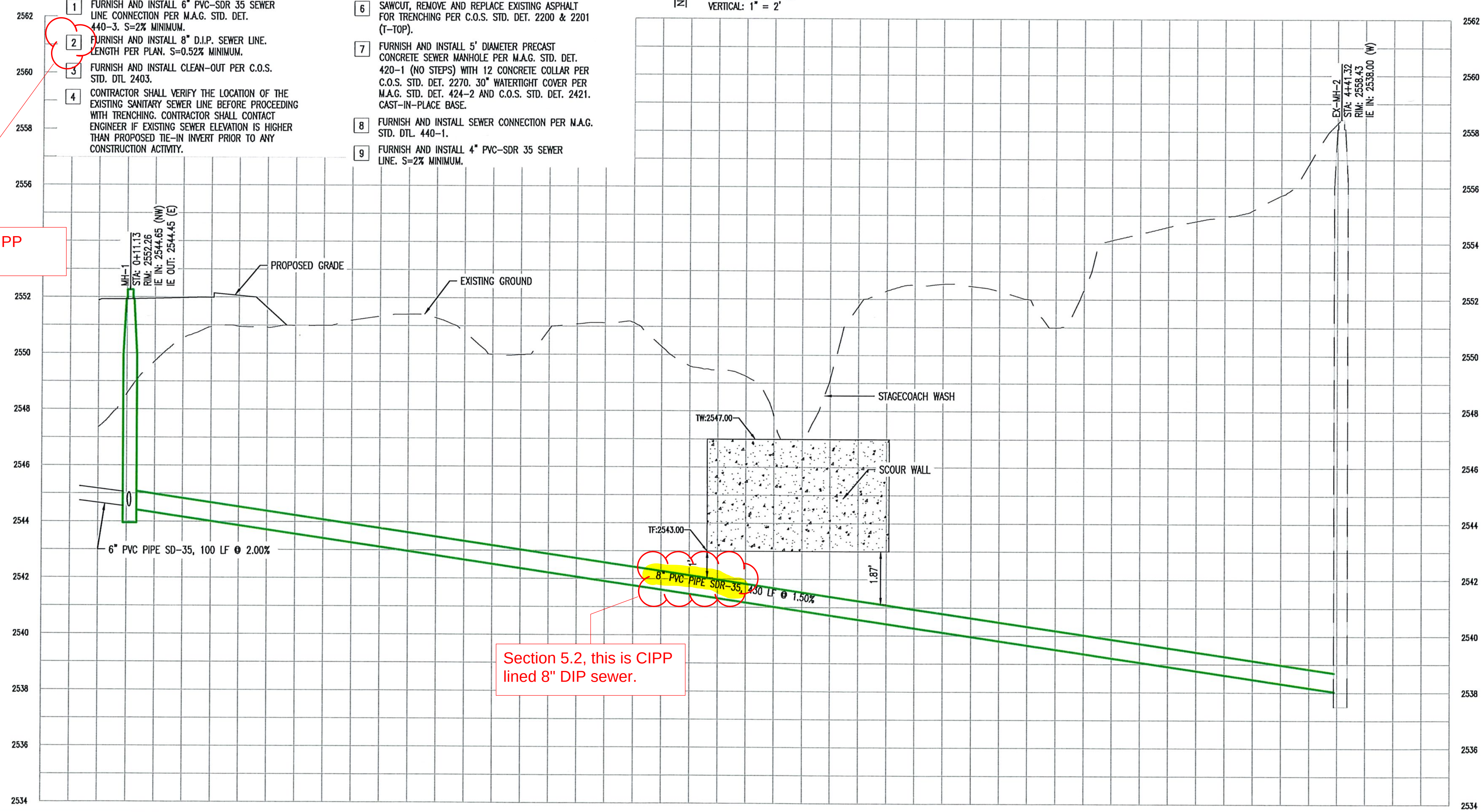




SEWER CONSTRUCTION NOTES

1. FURNISH AND INSTALL 6" PVC-SDR 35 SEWER LINE CONNECTION PER M.A.G. STD. DET. 440-3. S=2% MINIMUM.
2. FURNISH AND INSTALL 8" D.I.P. SEWER LINE. LENGTH PER PLAN. S=0.52% MINIMUM.
3. FURNISH AND INSTALL CLEAN-OUT PER C.O.S. STD. DTL 2403.
4. CONTRACTOR SHALL VERIFY THE LOCATION OF THE EXISTING SANITARY SEWER LINE BEFORE PROCEEDING WITH TRENCHING. CONTRACTOR SHALL CONTACT ENGINEER IF EXISTING SEWER ELEVATION IS HIGHER THAN PROPOSED TIE-IN INVERT PRIOR TO ANY CONSTRUCTION ACTIVITY.
5. CONTRACTOR SHALL VERIFY ALL INVERTS AND CLEARANCE OF CROSSING UTILITIES PRIOR TO COMMENCING CONSTRUCTION.
6. SAWCUT, REMOVE AND REPLACE EXISTING ASPHALT FOR TRENCHING PER C.O.S. STD. DET. 2200 & 2201 (T-TOP).
7. FURNISH AND INSTALL 5' DIAMETER PRECAST CONCRETE SEWER MANHOLE PER M.A.G. STD. DET. 420-1 (NO STEPS) WITH 12 CONCRETE COLLAR PER C.O.S. STD. DET. 2270. 30" WATERTIGHT COVER PER M.A.G. STD. DET. 424-2 AND C.O.S. STD. DET. 2421. CAST-IN-PLACE BASE.
8. FURNISH AND INSTALL SEWER CONNECTION PER M.A.G. STD. DTL. 440-1.
9. FURNISH AND INSTALL 4" PVC-SDR 35 SEWER LINE. S=2% MINIMUM.

Section 5.2, this is CIPP lined 8" DIP sewer.



Section 5.2, this is CIPP lined 8" DIP sewer.

X:\PROJECTS\Orcutt Winslow\TSG Foundation Pima Scottsdale 180333\11 CAD (SEG)\1.3 CD's\180333_C4.10 - C4.4.dwg

Call at least two full working days before you begin excavation. ARIZONA 811

orcutt winslow
2929 n central ave
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phoenix arizona 85012
602.257.1764 t
602.257.9029 f
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ALI SAMIH FAKIH 45621

BID SET
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CONSTRUCTION

TSG FOUNDATION
Center for Spiritual Development
PIMA RD & STAGECOACH DR, SCOTTSDALE, AZ #Site
Postcode

CLIENT CONTACT
Gita Saraydarian
PO Box 7068
Cave Creek, AZ 85327
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PROJECT NO.	DATE OF ISSUE
18_077-01	01/14/2020
REVISION NO.	DATE

PROJECT TEAM	DRAWN BY
SEG	DB

PROJECT PHASE
BID SET

SHEET CONTENTS
SANITARY PROFILE

SHEET NO.
C4.20

EXHIBIT 4

Fire Hydrant Flow Test

Arizona Flow Testing LLC

HYDRANT FLOW TEST REPORT

Project Name:	TSG
Project Address:	Pima & Stagecoach Pass (SWC), Scottsdale, Arizona 85262
Arizona Flow Testing Project No.:	19051
Client Project No.:	Not Provided
Flow Test Permit No.:	C57398
Date and time flow test conducted:	February 21, 2019 at 8:30 AM
Data is current and reliable until:	August 21, 2019
Conducted by:	Floyd Vaughan – Arizona Flow Testing, LLC (480-250-8154)
Witnessed by:	Phil Cipolla – City of Scottsdale-Inspector (602-828-0847)

Raw Test Data

Static Pressure: **80.0 PSI**
(Measured in pounds per square inch)

Residual Pressure: **72.0 PSI**
(Measured in pounds per square inch)

Pitot Pressure: **23.0 PSI**
(Measured in pounds per square inch)

Diffuser Orifice Diameter: 4 Inch Hose Monster
(Measured in inches)

Coefficient of Diffuser: 0.7875

Flowing GPM**:** **1,803 GPM**
(Measured in gallons per minute)

GPM @ 20 PSI: **5,353 GPM**

Data with 10% Safety Factor

Static Pressure: **72.0 PSI**
(Measured in pounds per square inch)

Residual Pressure: **64.0PSI**
(Measured in pounds per square inch)

Distance between hydrants: Approx. 1,060 feet

Main size: Not Provided

Flowing GPM: **1,803 GPM**

GPM @ 20 PSI**:** **4,955 GPM**

Flow Test Location **North**

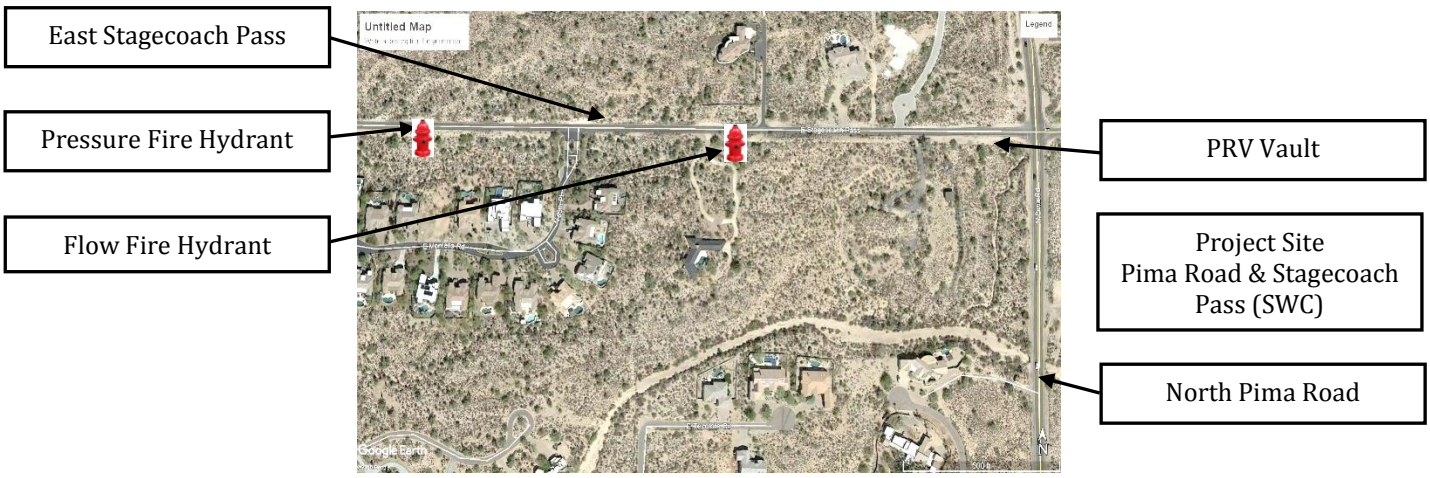


EXHIBIT 5

Model Output

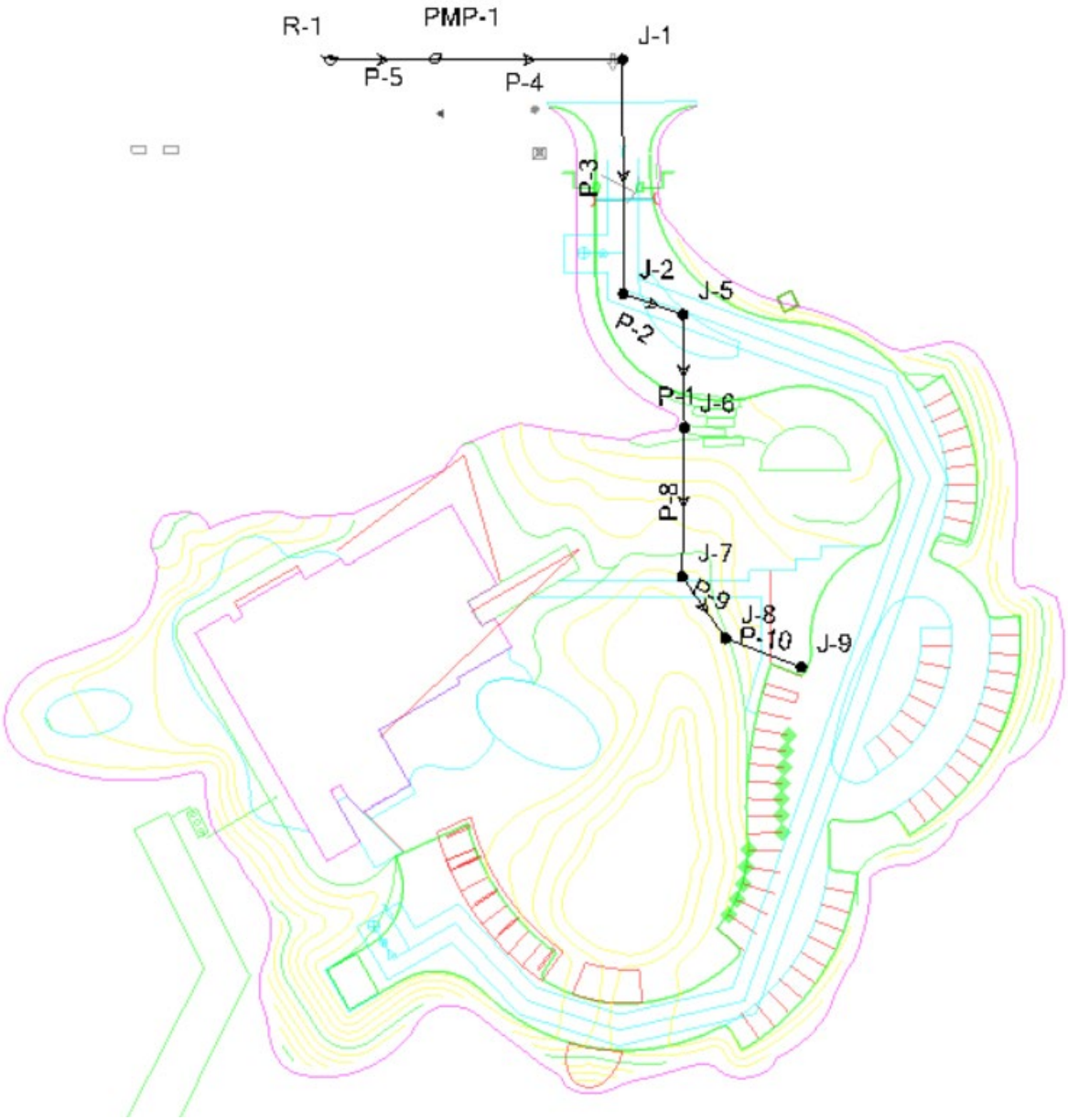


EXHIBIT 5 – MODEL MAP

2019-03-15 - TSG 1500 gpm FF with 8-in pipes.wtg

Active Scenario: ADD

FlexTable: Junction Table

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-1	2,560.28	0	2,698.00	60
J-2	2,553.00	0	2,698.00	63
J-5	2,552.00	0	2,698.00	63
J-6	2,556.55	1	2,698.00	61
J-7	2,554.00	0	2,698.00	62
J-8	2,555.00	12	2,698.00	62
J-9	2,555.00	0	2,698.00	62

2019-03-15 - TSG 1500 gpm FF with 8-in pipes.wtg

Active Scenario: ADD

FlexTable: Pipe Table

Label	Diameter (in)	Length (ft)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
P-1	8.0	59	Ductile Iron	130.0	13	0.08
P-2	8.0	33	Ductile Iron	130.0	13	0.08
P-3	8.0	123	Ductile Iron	130.0	13	0.08
P-4	12.0	1,120	PVC	150.0	13	0.04
P-5	16.0	25	Ductile Iron	130.0	13	0.02
P-8	8.0	78	Ductile Iron	130.0	12	0.08
P-9	8.0	39	Ductile Iron	130.0	12	0.08
P-10	8.0	42	Ductile Iron	130.0	0	0.00

2019-03-15 - TSG 1500 gpm FF with 8-in pipes.wtg

Active Scenario: ADD

FlexTable: Pump Table

Label	Elevation (ft)	Pump Status	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpm)	Pump Head (ft)
PMP-1	2,530.00	On	2,532.00	2,698.00	13	166.00

2019-03-15 - TSG 1500 gpm FF with 8-in pipes.wtg

Active Scenario: ADD

FlexTable: Reservoir Table

Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
R-1	2,532.00	13	2,532.00

2019-03-15 - TSG 1500 gpm FF with 8-in pipes.wtg

Active Scenario: MDD

FlexTable: Junction Table

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-1	2,560.28	0	2,697.99	60
J-2	2,553.00	0	2,697.99	63
J-5	2,552.00	0	2,697.99	63
J-6	2,556.55	1	2,697.98	61
J-7	2,554.00	0	2,697.98	62
J-8	2,555.00	24	2,697.98	62
J-9	2,555.00	0	2,697.98	62

2019-03-15 - TSG 1500 gpm FF with 8-in pipes.wtg

Active Scenario: MDD

FlexTable: Pipe Table

Label	Diameter (in)	Length (ft)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
P-1	8.0	59	Ductile Iron	130.0	26	0.16
P-2	8.0	33	Ductile Iron	130.0	26	0.16
P-3	8.0	123	Ductile Iron	130.0	26	0.16
P-4	12.0	1,120	PVC	150.0	26	0.07
P-5	16.0	25	Ductile Iron	130.0	26	0.04
P-8	8.0	78	Ductile Iron	130.0	24	0.16
P-9	8.0	39	Ductile Iron	130.0	24	0.16
P-10	8.0	42	Ductile Iron	130.0	0	0.00

2019-03-15 - TSG 1500 gpm FF with 8-in pipes.wtg

Active Scenario: MDD

FlexTable: Pump Table

Label	Elevation (ft)	Pump Status	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpm)	Pump Head (ft)
PMP-1	2,530.00	On	2,532.00	2,697.99	26	165.99

2019-03-15 - TSG 1500 gpm FF with 8-in pipes.wtg

Active Scenario: MDD

FlexTable: Reservoir Table

Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
R-1	2,532.00	26	2,532.00

2019-03-15 - TSG 1500 gpm FF with 8-in pipes.wtg

Active Scenario: PHD

FlexTable: Junction Table

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-1	2,560.28	0	2,697.97	60
J-2	2,553.00	0	2,697.96	63
J-5	2,552.00	0	2,697.96	63
J-6	2,556.55	2	2,697.96	61
J-7	2,554.00	0	2,697.95	62
J-8	2,555.00	43	2,697.95	62
J-9	2,555.00	0	2,697.95	62

2019-03-15 - TSG 1500 gpm FF with 8-in pipes.wtg

Active Scenario: PHD

FlexTable: Pipe Table

Label	Diameter (in)	Length (ft)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
P-1	8.0	59	Ductile Iron	130.0	45	0.29
P-2	8.0	33	Ductile Iron	130.0	45	0.29
P-3	8.0	123	Ductile Iron	130.0	45	0.29
P-4	12.0	1,120	PVC	150.0	45	0.13
P-5	16.0	25	Ductile Iron	130.0	45	0.07
P-8	8.0	78	Ductile Iron	130.0	43	0.27
P-9	8.0	39	Ductile Iron	130.0	43	0.27
P-10	8.0	42	Ductile Iron	130.0	0	0.00

2019-03-15 - TSG 1500 gpm FF with 8-in pipes.wtg

Active Scenario: PHD

FlexTable: Pump Table

Label	Elevation (ft)	Pump Status	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpm)	Pump Head (ft)
PMP-1	2,530.00	On	2,532.00	2,697.98	45	165.98

2019-03-15 - TSG 1500 gpm FF with 8-in pipes.wtg

Active Scenario: PHD

FlexTable: Reservoir Table

Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
R-1	2,532.00	45	2,532.00

2019-03-15 - TSG 1500 gpm FF with 8-in pipes.wtg

Active Scenario: MDD+Fire

Fire Flow Node FlexTable: Fire Flow Report

Label	Needed Fire Flow (gpm)	MD + Needed Flow (gpm)	Calculated Pressure at Junction (psi)	Total Available Flow at 20 psi (gpm)	Junction w/ Minimum Pressure	Junction Pressure) (psi)	Pipe w/ Maximum Velocity	Pipe Velocity (ft/s)
J-1	1,500	1,500	51	1,501	J-6	53	P-4	4.33
J-2	1,500	1,500	52	1,501	J-6	51	P-3	9.74
J-5	1,500	1,500	52	1,501	J-6	50	P-3	9.74
J-6	1,500	1,501	49	1,502	J-9	50	P-3	9.74
J-7	1,500	1,500	49	1,501	J-9	49	P-3	9.74
J-8	1,500	1,524	48	1,525	J-9	48	P-3	9.74
J-9	1,500	1,500	47	1,501	J-8	48	P-3	9.74

EXHIBIT 6

Sewer Service Calculation

8280 E. Gelding Dr., Suite 101
Scottsdale, AZ 85260
Sustainability Engineering Group *info@azSEG.com* *480.588.7226* *www.azSEG.com*

8" Pipe - Peak Flow

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01500	ft/ft
Diameter	8	in
Discharge	12.0	gal/min

Results

Normal Depth	0.74	in
Flow Area	0.02	ft²
Wetted Perimeter	0.41	ft
Hydraulic Radius	0.47	in
Top Width	0.39	ft
Critical Depth	0.07	ft
Percent Full	9.3	%
Critical Slope	0.00743	ft/ft
Velocity	1.64	ft/s
Velocity Head	0.04	ft
Specific Energy	0.10	ft
Froude Number	1.40	
Maximum Discharge	714.52	gal/min
Discharge Full	664.2	gal/min
Slope Full	0.00000	ft/ft
Flow Type	SuperCritical	

8" Pipe - d/D = 0.65

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01500	ft/ft
Normal Depth	5.20	in
Diameter	8	in

Results

Discharge	502.4	gal/min
Flow Area	0.24	ft²
Wetted Perimeter	1.25	ft
Hydraulic Radius	2.31	in
Top Width	0.64	ft
Critical Depth	0.50	ft
Percent Full	65.0	%
Critical Slope	0.01023	ft/ft
Velocity	4.66	ft/s
Velocity Head	0.34	ft
Specific Energy	0.77	ft
Froude Number	1.34	
Maximum Discharge	714.52	gal/min
Discharge Full	664.2	gal/min
Slope Full	0.00858	ft/ft
Flow Type	SuperCritical	

8" Pipe - Full Flow Capacity

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01500	ft/ft
Normal Depth	8.00	in
Diameter	8	in
Discharge	664.2	gal/min

Results

Discharge	664.2	gal/min
Normal Depth	8.00	in
Flow Area	0.35	ft²
Wetted Perimeter	2.09	ft
Hydraulic Radius	2.00	in
Top Width	0.00	ft
Critical Depth	0.57	ft
Percent Full	100.0	%
Critical Slope	0.01402	ft/ft
Velocity	4.24	ft/s
Velocity Head	0.28	ft
Specific Energy	0.95	ft
Froude Number	0.00	
Maximum Discharge	714.52	gal/min
Discharge Full	664.2	gal/min
Slope Full	0.01500	ft/ft
Flow Type	SubCritical	

6" Pipe - Peak Flow

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.02000	ft/ft
Diameter	6	in
Discharge	12.0	gal/min

Results

Normal Depth	0.75	in
Flow Area	0.01	ft²
Wetted Perimeter	0.36	ft
Hydraulic Radius	0.47	in
Top Width	0.33	ft
Critical Depth	0.08	ft
Percent Full	12.6	%
Critical Slope	0.00760	ft/ft
Velocity	1.87	ft/s
Velocity Head	0.05	ft
Specific Energy	0.12	ft
Froude Number	1.59	
Maximum Discharge	383.10	gal/min
Discharge Full	356.1	gal/min
Slope Full	0.00002	ft/ft
Flow Type	SuperCritical	

6" Pipe - d/D = 0.65

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.02000	ft/ft
Normal Depth	3.90	in
Diameter	6	in

Results

Discharge	269.4	gal/min
Flow Area	0.14	ft²
Wetted Perimeter	0.94	ft
Hydraulic Radius	1.73	in
Top Width	0.48	ft
Critical Depth	0.39	ft
Percent Full	65.0	%
Critical Slope	0.01234	ft/ft
Velocity	4.44	ft/s
Velocity Head	0.31	ft
Specific Energy	0.63	ft
Froude Number	1.47	
Maximum Discharge	383.10	gal/min
Discharge Full	356.1	gal/min
Slope Full	0.01144	ft/ft
Flow Type	SuperCritical	

6" Pipe - Full Flow Capacity

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

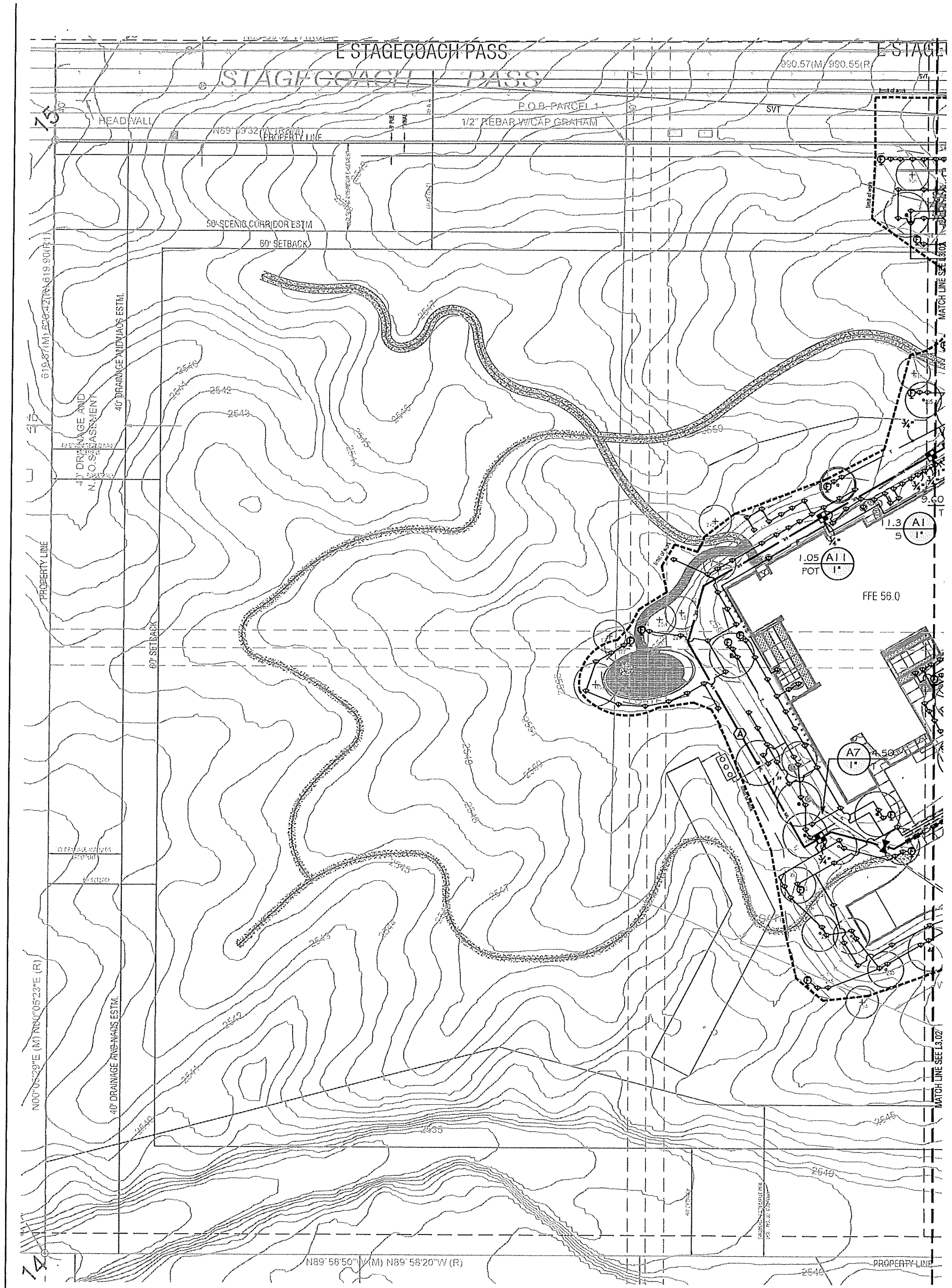
Roughness Coefficient	0.013	
Channel Slope	0.02000	ft/ft
Normal Depth	6.00	in
Diameter	6	in
Discharge	356.1	gal/min

Results

Discharge	356.1	gal/min
Normal Depth	6.00	in
Flow Area	0.20	ft²
Wetted Perimeter	1.57	ft
Hydraulic Radius	1.50	in
Top Width	0.00	ft
Critical Depth	0.44	ft
Percent Full	100.0	%
Critical Slope	0.01788	ft/ft
Velocity	4.04	ft/s
Velocity Head	0.25	ft
Specific Energy	0.75	ft
Froude Number	0.00	
Maximum Discharge	383.10	gal/min
Discharge Full	356.1	gal/min
Slope Full	0.02000	ft/ft
Flow Type	SubCritical	

EXHIBIT 7

Irrigation Plans



IRRIGATION SCHEDULE

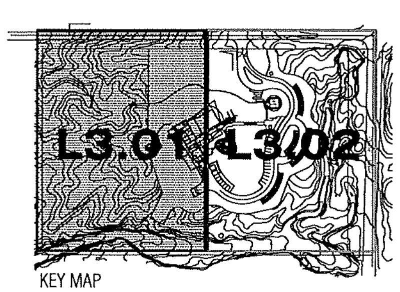
SYMBOL	MANUFACTURER/MODEL/DESCRIPTION
▣	Rain Bird XCZ-100-PRB-COM Wide Flow Drip Control Kit for Commercial Applications. 1" Ball Valve with 1" PESB Valve and 1" Pressure Regulating 40psi Quick-Check Basket Filter. 0.3gpm to 20gpm.
Φ	Drip Flush Valve AG Products. 3/4"-B
0.6 1.0 2.0	Bowsmith ML200 Series Multi-Outlet Emitter Multi Outlet Emitter, six open outlets, 1/2" FPT inlet, 0.6-2.0 gph flows, Green=0.6gph, Blue=1.0gph, Red=2.0gph.

SYMBOL	MANUFACTURER/MODEL/DESCRIPTION
⧗	Nibco T-113-K Class 125 bronze gate shut off valve with cross handle, same size as mainline pipe diameter at valve location. Size Range - 1/4" - 3"
(A)	Air Release Valve 2" Crispin Combination Air and Vacuum Release Valve
(BF)	Febco 825Y 1-1/2" Reduced Pressure Backflow Preventer
[A]	Rain Bird ESP12LXMEF-LXMMSS 12 Station Commercial Controller. Stainless Steel Metal Cabinet. Flow Sensing. Mount inside pump station cabinet or on wall of well house.
POC	Existing Well
———	Irrigation Lateral Line: PVC Schedule 40 See Pipe Sizing Detail for Size.
———	Irrigation Lateral Line: PVC Schedule 40 See Pipe Sizing Detail for Size.
—— ML ——	Irrigation Mainline: PVC Schedule 40 1" - 3" Diameter
========	Pipe Sleeve: PVC Schedule 40 Twice the nominal diameter of the pipe being sleeved.

Valve Callout: Valve Number, Valve Flow, Valve Type, Valve Size

VALVE TYPE:
T=TREE, S=SHRUB,
SP=SPRINKLER,
TT=TREES IN TURF,
P=PALM, A=ANNUALS,
ABD=ABANDON

NOTE:
1. Irrigation layout is diagrammatic only. Install all irrigation components in landscape areas. Irrigation is not to be installed in R.O.W.s, P.U.E.s, roadways, hardscape, or home site lots. Adjust irrigation lines to avoid any and all utilities.
2. Contractor to mount controller on interior wall of pump station cabinet or pump building and provide power per manufacturer's specifications.
3. Contractor to verify existing pump and storage equipment is functional prior to irrigation installation.



KEY MAP
nts

NORTH
0 15 30 60
SCALE: 1" = 30'-0"

ARIZONA BLUE STAKE
CALL TWO WORKING DAYS BEFORE YOU DIG
Dial 811 or 602-263-1100
1-800-STAKE-IT
(OUTSIDE MARICOPA COUNTY)

COLEMAN DESIGN GROUP
landscape architecture
Irrigation Consulting and Design
111 E. DUNLAP AVENUE, SUITE 1-107
PHOENIX, AZ 85020
602-432-5507
www.colemandesigngroup.net

orcutt winslow
2929 n central ave
eleventh floor
phoenix arizona 85012
602.257.1764 t
602.257.9029 f
www.owp.com

REGISTERED LANDSCAPE ARCHITECT
CERTIFICATE NO. 48442
JOHN B. COLEMAN
Date Signed 11/7/19
ARIZONA U.S.A.
Expires 09/30/2020

TRUEFORM
landscape architecture studio
2009 north 7th street
phoenix, az 85006
480.382.4244
www.trueformlas.com

TSG FOUNDATION
Center for Spiritual Development
PIMA RD & STAGECOACH DR, SCOTTSDALE, AZ #Site
Postcode

CLIENT CONTACT

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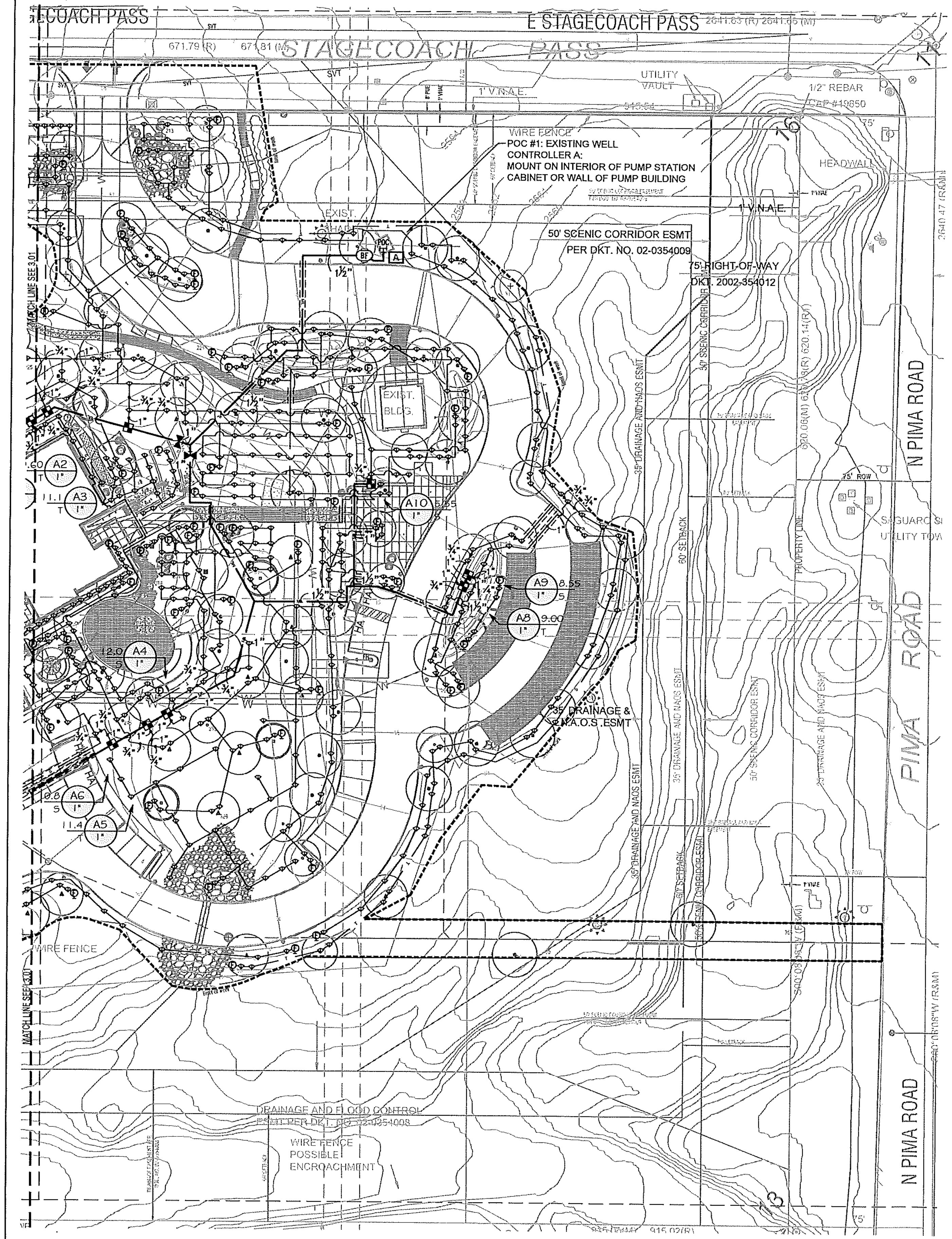
PROJECT NO.	DATE OF ISSUE
18_077-01	11.08.2019
REVISION NO.	DATE

PROJECT TEAM	DRAWN BY
Trueform	Team

PROJECT PHASE
cd progress

SHEET CONTENTS
irrigation plan

SHEET NO.
L3.01



IRRIGATION SCHEDULE

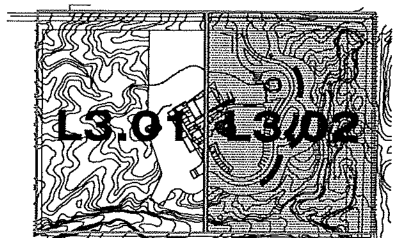
SYMBOL	MANUFACTURER/MODEL/DESCRIPTION
(drip control kit)	Rain Bird XCZ-100-PRB-COM Wide Flow Drip Control Kit for Commercial Applications. 1" Ball Valve with 1" PESB Valve and 1" Pressure Regulating 40psi Quick-Check Basket Filter. 0.3gpm to 20gpm.
F	Drip Flush Valve AG Products, 3/4"-B
0.6 1.0 2.0	Bowsmith ML200 Series Multi-Outlet Emitter Multi Oultet Emitter, six open outlets, 1/2" FPT inlet, 0.6-2.0 gph flows, Green=0.6gph, Blue=1.0gph, Red=2.0gph.

SYMBOL	MANUFACTURER/MODEL/DESCRIPTION
(gate valve)	Nibco T-113-K Class 125 bronze gate shut off valve with cross handle, same size as mainline pipe diameter at valve location. Size Range - 1/4" - 3"
A	Air Release Valve 2" Crispin Combination Air and Vacuum Release Valve
BF	Febco 825Y 1-1/2" Reduced Pressure Backflow Preventer
A	Rain Bird ESP12LXMEF-LXMMSS 12 Station Commercial Controller. Stainless Steel Metal Cabinet. Flow Sensing. Mount inside pump station cabinet or on wall of well house.
POC	Existing Well
—— L ——	Irrigation Lateral Line: PVC Schedule 40 See Pipe Sizing Detail for Size.
—— S ——	Irrigation Lateral Line: PVC Schedule 40 See Pipe Sizing Detail for Size.
—— ML ——	Irrigation Mainline: PVC Schedule 40 1" - 3" Diameter
= = = = = = = =	Pipe Sleeve: PVC Schedule 40 Twice the nominal diameter of the pipe being sleeved.

Valve Callout
- Valve Number
- Valve Flow
- Valve Type
- Valve Size

VALVE TYPE:
T=TREE, S=SHRUB,
SP=SPRINKLER,
TT=TREES IN TURF,
P=PALM, A=ANNUALS,
ABD=ABANDON

NOTE:
1. Irrigation layout is diagrammatic only. Install all irrigation components in landscape areas. Irrigation is not to be installed in R.O.W.s, P.U.E.s, roadways, hardscape, or home site lots. Adjust irrigation lines to avoid any and all utilities.
2. Contractor to mount controller on interior wall of pump station cabinet or pump building and provide power per manufacturer's specifications.
3. Contractor to verify existing pump and storage equipment is functional prior to irrigation installation.



KEY MAP
nts

NORTH
0 15 30 60
SCALE: 1" = 30'-0"

General Note:

ARIZONA BLUE STAKE
Dial 811 or
602-263-1100
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TSG FOUNDATION
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PIMA RD & STAGECOACH DR, SCOTTSDALE, AZ #Site
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