CITY OF SCOTTSDALE

Wastewater Study

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 ldillon **DATE** 10/31/2019

Address comments below and throughout in final BODs and apply relevant items to stipulations:

1) Phase 1 sewer pipes to Hayden can remain 8" if max flow is 439gpm in a single 8" pipe at 1% slope shown. d/D=0.68. Perform surveying of inverts to confirm slope for final BOD and provide results in final BOD. If slopes are significantly different upsizing may still be required.
2) Phase 2 will require upsizing of existing 8" pipe in Parkway Ave. to 12" south to Glenrosa and then 15" from Glenrosa to Miller and Indian School intersection.
3.) Inconsistencies throughout report on line sizes existng and proposed. Check.
4) Min pool backwash on any separate public sewer is 100gpm min. Revise analysis in final BOD.
5) Any existing lines will be fully removed to accommodate new larger required lines.

Gentry on the Green
Master Wastewater
Basis of Design Report

Job No. 19001704

Prepared for:
ColRich
444 West Beach Street Ste. 300
San Diego, CA 92101

Prepared by:
Atwell, LLC
4700 E Southern Ave
Mesa, AZ 85206

REGISTERED PROFESSIONAL ENGINEER (CIVIL)
CERTIFICATE NO.
68645
NEIL P.
CRONAN
Date Signed 10/1/2019
ARIZONA U.S.A.

October 2019

GENTRY ON THE GREEN
PRELIMINARY WASTEWATER
TABLE OF CONTENTS

APPENDICES

1.0 INTRODUCTION

The Gentry on the Green development (the "Project"), is a proposed multi-use development that includes residential and commercial uses. The Project's site is currently developed as three apartment complexes. The Project is located in the southeast quarter of Section 23, Township 2 North, Range 4 East of the Gila and Salt River Base and Meridian, Scottsdale, Arizona (See Vicinity Map in Appendix A). The multiple sewer mains surrounding the project site will support the proposed development. See Appendix A Quarter Section map for the existing sewer lines. The Project is approximately 42 acres and is phased into two phases (See Phasing Exhibit in Appendix A). Phase 1 is approximately 27 acres and includes 1,214 dwelling units, 31,000 square feet of commercial/retail development, and 10,000 square feet of restaurant. Phase 2 is approximately 15 acres and includes 270 dwelling units, 250 healthcare beds, and 150 hotel rooms. Phase 2 is based on a conceptual land use scenario for the purpose of determining conceptual infrastructure/traffic generation for Phase 2 and is subject to change. Refer to Appendix B for the proposed and existing wastewater generation calculations.

2.0 EXISTING WASTEWATER COLLECTION SYSTEM

The Project is located within the service area boundary of the City of Scottsdale. Sewer mains in operation exist within the Project boundary. There is an existing 8-inch VCP sewer main and manhole located on the Phase 1A and Phase 1B portion of the site that flows east into an existing 39-inch sewer main along the Hayden Road alignment. There is another 8-inch VCP line on the Phase 1D portion of the site that also flows to the 39-inch sewer main in Hayden Road. This has a slope of 1.03% based on topo information. An 8-inch VCP sewer main exists on Parkway Avenue that serves the existing Phase 2 site and flows south to Indian School Road. This has a slope of 1.92% based on topo information.

A manhole flow test was performed for the manhole at the intersection of Parkway Avenue and Indian School Road, which connects to the 8-inch sewer main on Parkway Avenue. This flow test was performed by Western Environmental Equipment Company from December 8, 2018 to December 19, 2019. The manhole flow test results were used to determine available capacity in the 8-inch sewer main that would primarily serve Phase 2 of this project and found that this line has a d/D ratio of 0.46 and a peak flow rate of 127.45 gpm. The existing Phase 2 units account for 57% of the monitored peak flow. This is based on 354 existing dwelling units in Phase 2 and the 266 dwelling units making up the remainder of dwelling units that contribute to this peak wastewater generation. The 266 units that will remain active on the Parkway Avenue sewer main derive from discussions with the City of Scottsdale staff. The existing 354 units that are being removed by developing Phase 2 account for 73 gpm (57%*127.45 gpm). The remaining 266 units

account for 54 gpm (43%*127.45 gpm). The 54 gpm from the remaining units will be applied to the wastewater model with the proposed demands from the Phase 2 development. The flow test results are available in Appendix D. The existing wastewater generation for the site are calculated in Appendix C.

3.0 PROPOSED WASTEWATER SYSTEM

The design of the proposed wastewater collection system is based on Bulletin 11 (ADEQ) and the City of Scottsdale Design Standards & Policies Manual and sound engineering principles. The proposed wastewater collection system is designed in accordance with the City of Scottsdale's design standards:

- High Density Residential average day generation is 140 gallons per capita per day with a peaking factor of 4.5. Residential density is assumed as 2.2 persons per unit.
- Commercial and Retail average day generation is 0.5 gallons per day per sq. ft. with a peaking factor of 3.
- Office average day generation is 0.4 gallons per day per sq. ft. with a peaking factor of 3.
- Restaurant average day generation is 1.2 gallons per day per sq. ft with a peaking factor of 6.
- Hotel average day generation is 380 gallons per day per room with a peaking factor of 4.5.

4.0 HYDRAULIC MODEL

An Excel spreadsheet was used to analyze the new wastewater collection system for the average day and the peak day wastewater generation for the project site. See Appendix C for results. The City of Scottsdale Design Standards & Policies Manual requires that wastewater pipes less than 15" or less in diameter must have a d/D ratio that does not exceed 0.65. Sewer pipes must also have a minimum velocity of 2.5 ft/s and less than 10 ft/s in the peak flow scenario.

4.1 BOUNDARY CONDITIONS

The wastewater outfall for the Phase 1 project site is an existing 39-inch wastewater main in the Hayden Road alignment. Two existing 8-inch wastewater mains that connect to the 39-inch wastewater main in Hayden Road remain in place and will be utilized to service Phase 1 of the project.

can remain 8" with
max flow of 439gm
@ d/D=0.68

The outfall for a portion of the Phase 2 site is the existing 8-inch sewer main in Parkway Avenue that outfalls to a 15-inch sewer main at the intersection of Indian School Road and Miller Road. This 8-inch sewer main was evaluated using a flow test performed by Western Environmental Equipment Company from December 8, 2018 to December 19, 2019. The highest peak flow is used for analysis when sizing the proposed sewer system. Based on the analysis, the existing 8-inch pipe in Parkway and Indian does not have sufficient capacity for the proposed flows. It is anticipated that the sewer main will need to be upsized to 15-inch to serve phase 2. It is anticipated that these improvements will occur with the Phase 2 development. Assuming worst case scenario for Phase 2 development site plans, a more detailed analysis will need to be performed with the final site plan to determine more accurate future flows and pipe capacity. Refer to Appendix D for the flow test results and Appendix C for the analysis of the pipes.

4.2 PHYSICAL PARAMETERS

Physical parameters used in the hydraulic analysis are summarized in Appendix B. Proposed pipe sizes used in this model are 8-inch for Phase 1 and 15-inch for Phase 2. Nodes defined in the schematic (see Appendix A) are placed at anticipated extents of service line locations. Each proposed building for Phase 1 has been assigned a node (see Appendix B). The wastewater generations for proposed commercial, retail, and restaurant square footage are equally distributed across the proposed buildings. A site plan does not exist for Phase 2. The wastewater generations are projected based on the anticipated density and land use for Phase 2. For the analysis, Phase 1 included two pools and Phase 2 included 1 pool. Refer to Appendix A for the layout of the sewer system for both phases.

4.3 WASTEWATER GENERATION SCENARIOS

The peak day wastewater generation was used to determine the required wastewater main sizes to serve this project.

The existing wastewater generation from the portions of Phase 2 that will be removed when Phase 2 is developed are calculated from a unit fraction and removed from the existing flow test results. 266 units will remain that utilize this Parkway Avenue sewer main. 354 existing units are being removed from the existing Phase 2 site. For the analysis of the proposed main in Parkway Avenue, the proposed supply is combined with the remaining unit flows as measured in the flow test.

The Excel spreadsheet in Appendix C shows the results of the hydraulic analysis for Phase 1 and Phase 2 of the site.

incorrect, 692gpm is proposed plus existing

4.4 ANALYSIS RESULTS

The results of the wastewater analysis show that the Phase 1 portion of the site will discharge into two existing 8-inch sewer mains connected to the 39-inch wastewater main in Hayden Road.

The existing 8" in Phase 2 has a maximum full flow capacity of 306.8 gpm, while the proposed wastewater generation along with the existing peak flow totals to 510.5 gpm. For this reason, Phase 2 will be served by a 15-inch main that will replace an existing 8 inch main in Parkway Avenue extending down to Indian School to Miller Road. This 15" line will run at the same slopes as the existing 8" pipes. Refer to Appendix C for analysis and results.

The analyses show that the d/D ratio remains under the City of Scottsdale recommended 0.65 for all pipes while maintaining a velocity lower than 10 ft/s.

Upsize to 12" south to Monterosa then 15" south to Miller

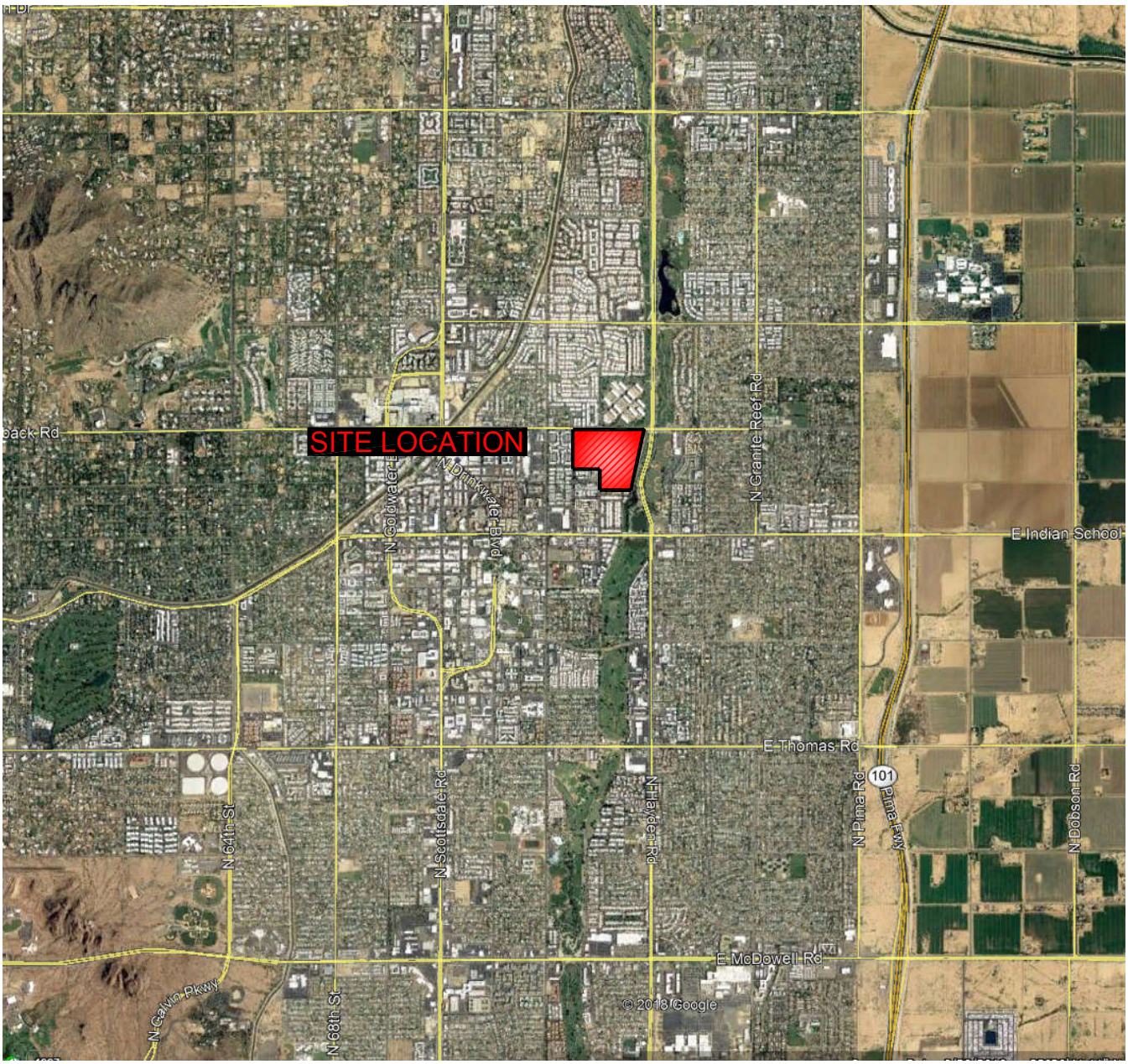
5.0 CONCLUSION

The Phase 1 portion of the site will utilize the two existing 8-inch sewer connections that cross Indian Bend Wash low flow channel and enter a 39-inch sewer main in Hayden Road.

Phase 2 will require upsizing an existing 8-inch sewer main to a 15-inch main in Parkway Avenue to the Indian School Road and Miller Road intersection. This will need to be verified with more testing during the development of Phase 2 that could be in 10 years or longer. The Phase 2 proposed generation is based on the highest generation scenario for the land use matrix currently available and will be updated at Final BOD.

APPENDIX A

EXHIBITS



LEGEND

GENTRY ON THE GREEN

N

N.T.S.

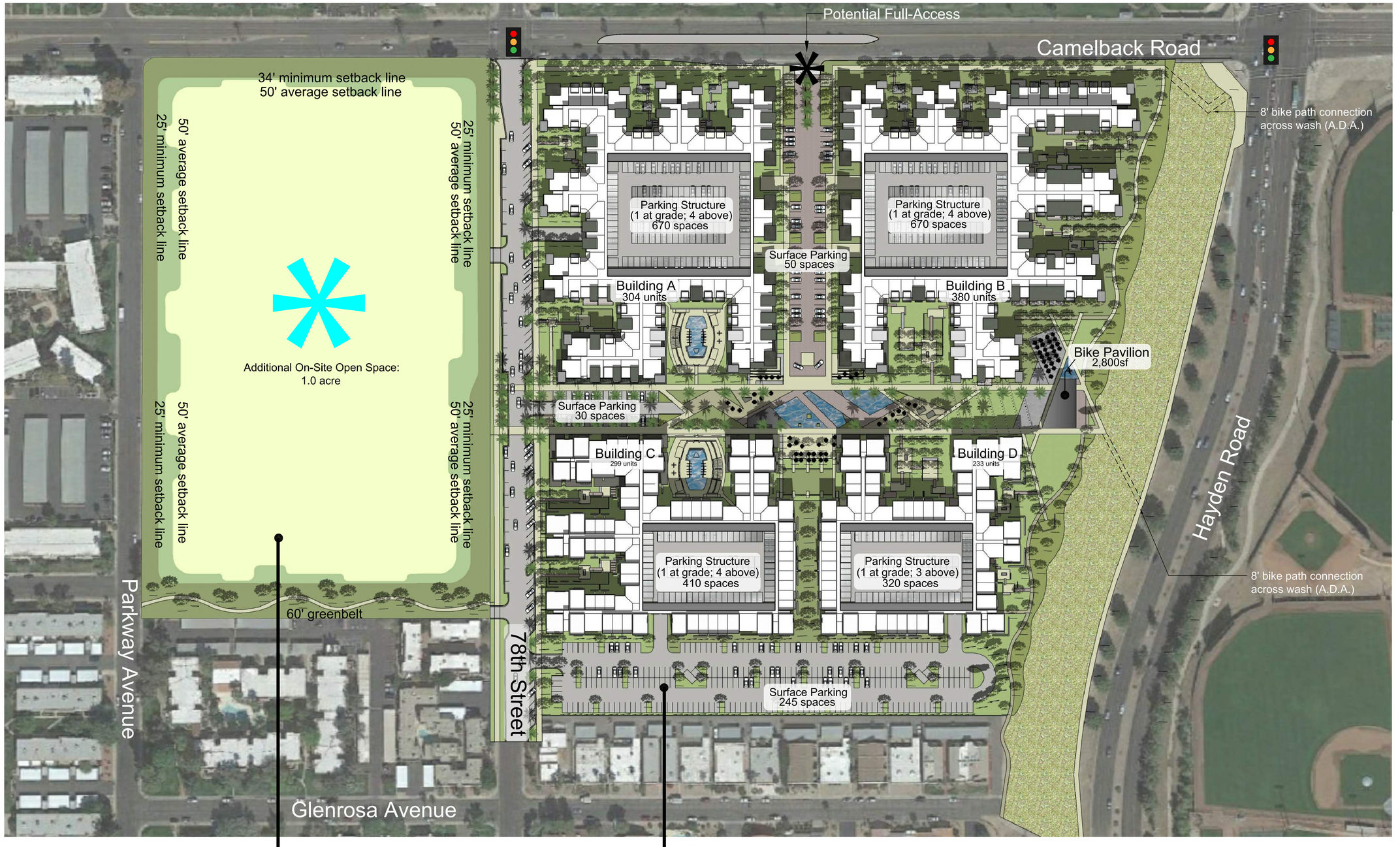
ATWELL
866.850.4200 www.atwell-group.com
4700 E. SOUTHERN AVENUE
MESA, AZ 85206
480.218.8851

EXHIBIT 1 - VICINITY MAP

GENTRY ON THE GREEN

SCOTTSDALE, AZ

11-ZN-2019



Phase Two

Site Area: 14.97 gross acres

Phase One

Site Area:	26.53 gross acres
Residential Unit Total:	1,214 units
Total Non-Residential Area:	21,000sf
Total Retail Area:	20,000sf
Total Retail Patio Area:	2,800sf
Total Non-Residential / Retail Area:	43,800sf
Total Parking Required:	1,950 spaces [per zoning ordinance]
Total Parking Provided:	2,471 spaces [includes 78th street parking]

Site Plan

0' 80' 160' 240' 320' NORTH

18160- 8/9/19

DAVIS

GENTRY ON THE GREEN- Scottsdale, Arizona

Phase 1A
Phase 1B
Phase 1C
Phase 1D
Phase 1E
The Paseo

Phasing Exhibit

0' 80' 160' 240' 320' NORTH

18160- 8/9/19

DAVIS

GENTRY ON THE GREEN- Scottsdale, Arizona

09-SEP-18

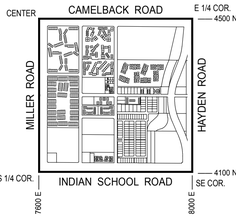
GENERAL NOTES:

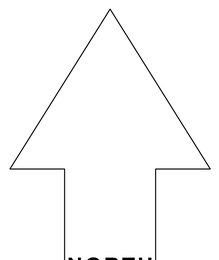
- THIS IS A COMPUTER GENERATED DRAWING. FOR ANY REVISIONS PLEASE CONTACT THE CITY OF SCOTTSDALE GIS DEPARTMENT AT (480) 312-7792.
- THE SECTION LINE BEARING AND DISTANCES ARE BASED ON THE CITY OF SCOTTSDALE GPS SURVEY OF SEPTEMBER, 1991. BEARINGS ARE NAD 83 GRID AND DISTANCES ARE FLATTENED TO GROUND. 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





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

WATER & SEWER

QUARTER SECTION MAP

17-46

SE 1/4 SEC. 23 T2N R4E

11-ZN-2019

CITY OF SCOTTSDALE

SCOTTSDALE GEOGRAPHIC INFORMATION SYSTEMS

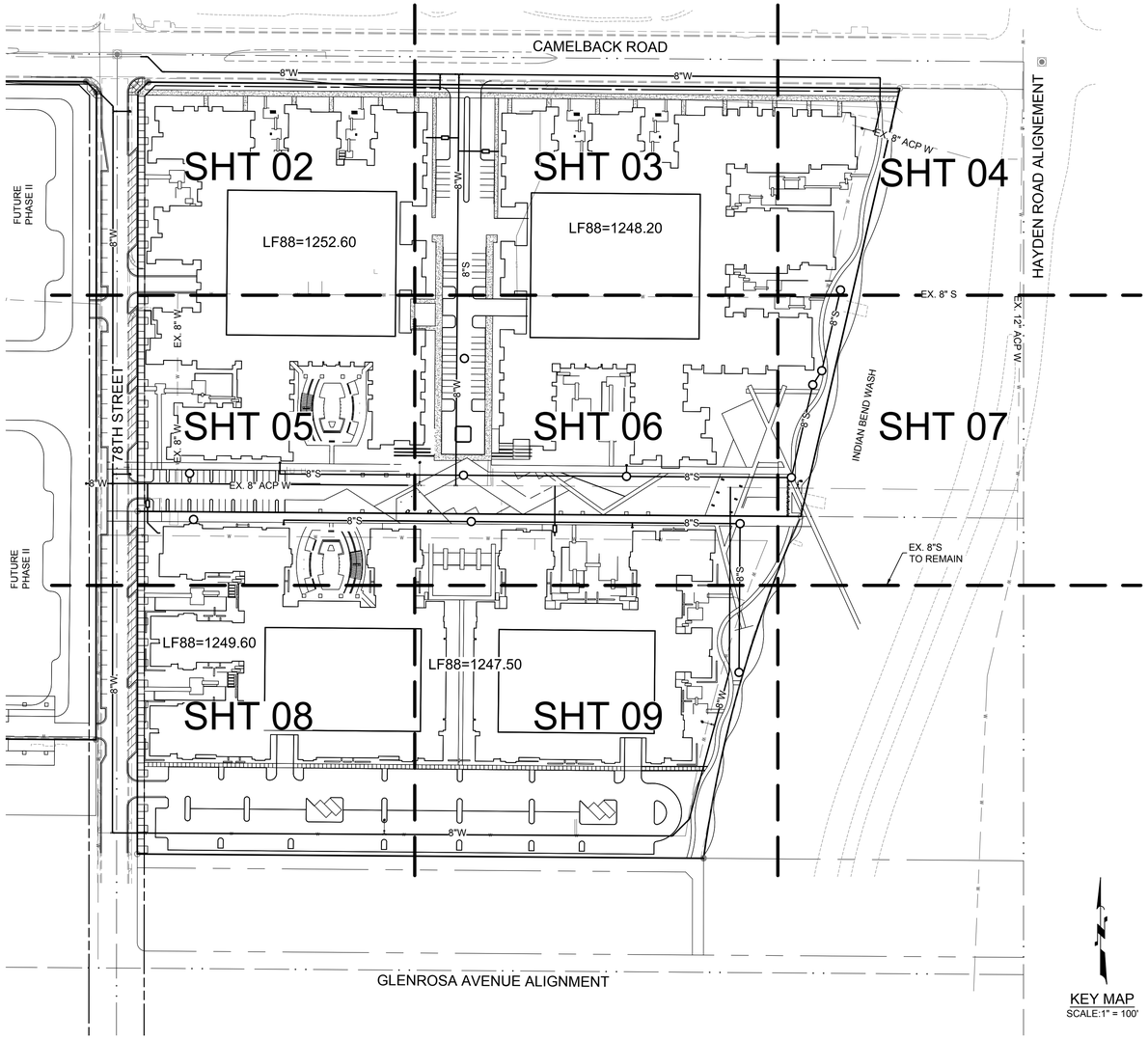
3629 North Drinkwater Boulevard
Scottsdale, Arizona 85251

CONCEPTUAL WATER & SEWER PLAN
FOR
PHASE I OF GENTRY ON THE GREEN
SCOTTSDALE, ARIZONA

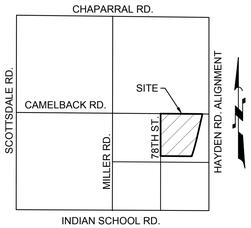
LEGEND

	MATCHLINE
	BOUNDARY LINE
	LOT LINE
	CAP SURVEY MARKER
	CENTER LINE
	EASEMENT
	RIGHT-OF-WAY
	EXISTING CONTOUR
1350	PROPOSED CONTOUR
	RETAINING WALL
W	WATER LINE
	FIRE HYDRANT
	WATER VALVE
	AIR RELEASE VALVE
	WATER METER BOX
	REDUCER
S	SEWER LINE
	SEWER MANHOLE
	FLOW DIRECTION
	GRADE BREAK
	STREET SIGN POST
	STREET LIGHTS
	DRYWELL
	STORM DRAIN
	EXISTING GAS MANHOLE
	EXISTING SANITARY SEWER MANHOLE
	EXISTING ELECTRICAL PULL BOX
	EXISTING TELEPHONE PEDISTAL
	EXISTING GUY WIRE
	EXISTING POWER POLE
EX.W	EXISTING WATER
EX.S	EXISTING SEWER
EX G	EXISTING GAS
OHE	EXISTING OVERHEAD ELECTRIC

EX.	EXISTING
ELEC	ELECTRIC
BFP	BACKFLOW PREVENTION
G	GAS
WTR	WATER
SWR	SEWER
P	PAVEMENT
R/W	RIGHT-OF-WAY
CL	CENTER LINE
B/C	BACK OF CURB
S/W	SIDEWALK
C&G	CURB & GUTTER
E/P	EDGE OF PAVEMENT
PUE	PUBLIC UTILITY EASEMENT
CB	CATCH BASIN
MH	SEWER MANHOLE
SD	STORM DRAIN
SD MH	STORM DRAIN MANHOLE



KEY MAP
SCALE:1" = 100'



VICINITY MAP
N.T.S.

THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTATIVE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.

NOTICE:
CONSTRUCTION SITE SAFETY IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR; NEITHER THE OWNER NOR THE ENGINEER SHALL BE EXPECTED TO ASSUME ANY RESPONSIBILITY FOR SAFETY OF THE WORK, OF PERSONS ENGAGED IN THE WORK, OF ANY NEARBY STRUCTURES, OR OF ANY OTHER PERSONS.

OWNER/DEVELOPER
COLRICH
444 WEST BEACH STREET, STE. 300
SAN DIEGO, CA 92101
PHONE: 858.490.2300
CONTACT: MATTHEW BATEMAN
EMAIL:

ENGINEER
ATWELL
4700 E. SOUTHERN AVENUE
MESA, AZ 85206
PHONE: 602.690.7527
CONTACT: RAMZI GEORGES
EMAIL: rgeorges@atwell-group.com

SHEET INDEX

ATWELL
866.850.4200 www.atwell-group.com
4700 E. SOUTHERN AVENUE
MESA, AZ 85206
480.218.8831

COVER SHEET

CONCEPTUAL WATER & SEWER PLAN
PHASE I OF GENTRY ON THE GREEN
SCOTTSDALE, ARIZONA

811 Know what's below. Call before you dig.

REVISIONS:

REGISTERED PROFESSIONAL ENGINEER
CERTIFICATE NO.
37287
RAMZI
GEORGES
DATE SIGNED ON 10/10/2019
ARIZONA U.S.A.

PM. R. GEORGES
DR. A. CABALLERO
JOB NO.
19001704
FILE NO.
19001704-01-CS01
01
SHEET NO.
01 OF 09

PROJECT NUMBER

NOTE:
ONSITE UTILITIES TO BE REMOVED BEFORE CONSTRUCTION. UNLESS OTHERWISE NOTED.

STA=23+12.93 (CAMELBACK ROAD)
STA=36+47.69 (78TH STREET)

CONNECT TO EX. 8" ACP WATER

CAMELBACK ROAD

8" DIP W

OHE TO BE UNDERGROUNDED

6" DIP W

PROP. 14.00' WATER ESMT

N89°31'33"W 1088.80'

PROPOSED 8" DIP W

SITE DIST. DOC2017-958172

40' EX. R/W

22' EX. DRN ESMT. DKT.13087, PG. 646, M.C.R.

FND. 1/2" NO ID. ACCEPTED & TAGGED RLS#52139

S45°15'31"W 21.13'

CAP FOR FUTURE USE

PROP. FIRE HYDRANT

S00°02'35"W 1103.37'

78TH STREET

PROPOSED PHASE 2

PROP. 40' R/W TO BE DEDICATED WITH PHASE 2

PROP. 40' R/W

10' SW

23.50' B/C

BUILDING
LF88=1252.60

EX. ELEC. TRANSFORMER TO BE RELOCATED

EX. METER BOX TO BE RELOCATED

EX. VALVE TO BE RELOCATED TYP.

EX. LIGHT TO BE REMOVED TYP.

EX. ELEC TRANSFORMER TO BE RELOCATED TYP.

PARKING STRUCTURE
LF88=1252.60

EX. GAS METER TO BE RELOCATED TYP.

EX. BFP TO BE RELOCATED TYP.

EX. ELEC. CABINET TO BE RELOCATED TYP.

EX. FH TO BE RELOCATED TYP.

12' EX. UTILITY ESMT. DKT. 13198, PG. 1316, M.C.R. TO BE ABANDONED

12' EX. UTILITY ESMT. DKT. 13198, PG. 1313, M.C.R.

18' EX. ESMT DKT13198,PG1316

EX. 8" ACP W

MATCHLINE SEE SHT 03

MATCHLINE SEE SHT 05

GRAPHIC SCALE 1" = 20'

ATWELL
866.850.4200 www.atwell-group.com
4700 E. SOUTHERN AVENUE
MESA, AZ 85206
480.218.8831

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WATER & SEWER PLAN

CONCEPTUAL WATER & SEWER PLAN

PHASE I OF GENTRY ON THE GREEN

SCOTTSDALE, ARIZONA

Know what's below. Call before you dig.

REVISIONS:

REGISTERED PROFESSIONAL ENGINEER (CERTIFICATE NO.)
37287
RAMZI GEORGES
DATE 5/30/19
ARIZONA U.S.A.

PM. R. GEORGES
DR. A. CABALLERO
JOB NO. 19001704
FILE NO. 19001704-02-UT01
02

SHEET NO.
02 OF 09

PROJECT NUMBER

NOTE:
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CAMELBACK ROAD

N89°31'33"W 1088.80'

MATCHLINE SEE SHT 02

MATCHLINE SEE SHT 04

MATCHLINE SEE SHT 06

BUILDING
LF88=1248.20

PARKING STRUCTURE
LF88=1248.20

5' EX. S/W
34.45± EX. B/C
34.58± EX. B/C
24.84' PROP. WATER
26.46± EX. B/C
16.32± EX. B/C
26.26± EX. B/C
43.34± EX. SD
35.62± EX. OHE
30.68± EX. G
40' EX. R/W
45' PROP. R/W
24.84' PROP. WATER
28+00
29+00
30+00
31+00
32+00
8"x8" TEE
8" DIP W
PROP 8" DIP WATER
OHE TO BE UNDERGROUNDED
EX. SD
EX. SD MH
PROP. FIRE HYDRANT
EX. BFP TO BE RELOCATED TYP.
WATER SERVICE AND VAULT
14' PROP. WA ESMT
14.90± BLDG
22'
EX. DRN ESMT. DKT. 5087, PG. 946, M.C.R.
EX. BFP TO BE RELOCATED TYP.
13.05± BLDG
8.06'± BLDG
32'
EX. DRN ESMT. DKT. 12981, PG. 348, M.C.R.
EX. ELEC TRANSFORMER TO BE RELOCATED TYP.
EX. METER TO BE RELOCATED TYP.
EX. 6"W
EX. MH TO BE REMOVED
PROP. SD
EX. LIGHT TO BE REMOVED TYP.
EX. UTILITY BOX TO BE RELOCATED
EX. ELEC TRANSFORMER TO BE RELOCATED TYP.
EX. VALVE TO BE RELOCATED TYP.
14' PROP. WA ESMT
12' EX. UTILITY ESMT. DKT.13198, PG. 1316, M.C.R.
8" VCP S
21.5'
8'
10'
23.5'
12' EX. UTILITY ESMT. DKT. 13198, PG. 1316, M.C.R.
12' EX. UTILITY ESMT. DKT. 13198, PG. 1313, M.C.R.
EX. GAS METER TO BE RELOCATED TYP.
EX. WTR METER TO BE RELOCATED TYP.
EX. BFP TO BE RELOCATED TYP.
EX.FO
EX.G
EX.8"S
REMOVE EXISTING 8" VCP SEWER
EX. CO
EX. 8" S TO BE REMOVED
PROP. SD
EX. 8" SEWER TO REMAIN FOR PHASE IA
6"S
EX. MH TO REMAIN

20 10 0 20 40
GRAPHIC SCALE
1" = 20'

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WATER & SEWER PLAN

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PM. R. GEORGES
DR. A. CABALLERO
JOB NO. 19001704
FILE NO. 19001704-03-UT02
03

SHEET NO.
03 OF 09

PROJECT NUMBER

s:\19001704 - visconte,glen cortesian\dwg\plan set\conceptwater & sewer\19001704-03-ut02.dwg Plotdate: 10/1/2019

NOTE:
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CAMELBACK ROAD

STA=36+26.02 (CAMELBACK ROAD)
STA=23+22.57 (HAYDEN ROAD)

33+00 34+00 35+00 36+00

5' EX. S/W
34.45'± EX. B/C
34.58'± EX. B/C
39.93'± EX. SD
29.30'± EX. G
45' PROP. R/W

PROP. 8" DIP WATER
8" DIP W
EX. G
N89°31'33"W 1088.80'
EX. SD
8" DIP W
PROP. 8" DIP WATER
35.00' EX. DRN ESMT. DKT. 12981, PG. 348, M.C.R.
14.00' PROP WA ESMT
EX. G

EX. METER TO BE RELOCATED TYP.
EX. UTILITY BOX TO BE RELOCATED TYP.
EX. FH TO BE RELOCATED TYP.
EX. VALVE TO BE RELOCATED TYP.
CONNECT TO EX. 8" ACP WATER
PROP. FIRE HYDRANT
24.00' PROP ESVAE
EX. 8" ACP W
EX. 8" W TO REMAIN
EX. STREET LIGHT

BUILDING
LF88=1248.20

MATCHLINE SEE SHT 03

PROP. SD
12' EX. UTILITY ESMT. DKT. 13198, PG. 1316, M.C.R. TO BE ABANDONED
N13°01'58"E 638.67'
EX. ACP W TO BE REMOVED
14'
7"
24.00' PROP ESVAE

BUILDING
LF88=1248.20

EX. WTR METER TO BE RELOCATED TYP.
EX. BFP TO BE RELOCATED TYP.
12' EX. UTILITY ESMT. DKT. 13198, PG. 1316, M.C.R.
12' EX. UTILITY ESMT. DKT. 13198, PG. 1313, M.C.R.
EX. 8" S TO BE ABANDONED
PROP. SD
PROP. SD
EX. 8" S TO REMAIN
EX. 8" S
EX. MH
PROP. SEWER MH
MATCHLINE SEE SHT 07

INDIAN BEND WASH

HAYDEN ROAD

EX. 12" ASPH

24+00 23+00 22+00 21+00 20+00

EX. MH

GRAPHIC SCALE
20 10 0 20 40
1" = 20'

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PHASE I OF GENTRY ON THE GREEN

SCOTTSDALE, ARIZONA

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CERTIFICATE NO.
37287
RAMZI GEORGES
Date Signed 09/13/2019
ARIZONA U.S.A.

PM. R. GEORGES
DR. A. CABALLERO
JOB NO. 19001704
FILE NO. 19001704-04-UT03
04

SHEET NO.
04 OF 09

PROJECT NUMBER

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MATCHLINE SEE SHT 02

FUTURE PHASE 2

EX.FO

EX. 8" W

EX.G

8" DIP W

PROP. 8" DIP WA

78TH STREET

32+00

31+00

30+00

29+00

PROP. 40' R/W TO BE DEDICATED WITH PHASE 2

PROP. 40' R/W

23.50' B/C

4' EX. S/W

23.55'± EX. B/C

17.48'± EX. B/C

4' EX. S/W

10' SW

26.45'± EX. WTR

27.59'± EX. OHE

9'± EX. G

20.40'± EX. FO

18.31'± EX. FO

EX. FH

EX.WTR

PROP. FIRE HYDRANT

PROP. 8" DIP W

CAP FOR FUTURE EXTENTION

EX.CATV

PROP. SD

50.86'

6" DIP W

EX. 6" ACP W

EX.6" ACP W TO BE ABANDONED AND REMOVED

PROP. 8" DIP W

BUILDING LF88=1249.60

PARKING STRUCTURE LF88=1252.60

EX. BFP TO BE RELOCATED TYP.

EX. METER TO BE RELOCATED TYP.

BUILDING LF88=1252.60

12' EX. UTILITY ESMT. DKT. 13198, PG. 1316, M.C.R. TO BE ABANDONED

ABANDON AND REMOVE EX. 8" ACP W

EX. ELEC TO BE RELOCATED TYP.

EX. LIGHT TO BE REMOVED TYP.

EX. VALVE TO BE RELOCATED TYP.

EX. FH TO BE RELOCATED TYP.

EX. BFP & METER TO BE RELOCATED TYP.

6" MIN SEWER SERVICE

EX. GAS METER TO BE RELOCATED TYP.

PROP. SD

PROP. 8" VCP S

PROP. MH

8" VCP S

EX.FO

EX. 8" ACP W

CONNECT TO EX. 8" ACP. W

20.41'

16.96'

14' PROP. WA ESMT

16' EX. PUE TO BE ABANDONED APPROX. LOCATION COS QS MAP

MATCHLINE SEE SHT 06

MATCHLINE SEE SHT 08

20 10 0 20 40

GRAPHIC SCALE 1" = 20'

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37287
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Date Signed 09/19/19
ARIZONA U.S.A.

PM. R. GEORGES
DR. A. CABALLERO
JOB NO. 19001704
FILE NO. 19001704-05-UT04
05

PROJECT NUMBER

SHEET NO.
05 OF 09

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MATCHLINE SEE SHT 03

EX.G
EX.CATV
EX. FH TO BE RELOCATED TYP.
PARKING STRUCTURE LF88=1248.20
21.5' B/C
8'
10'
23.50' B/C
8" DIP W
8" VCP S
PROP. SD
EX. BFP TO BE RELOCATED TYP.
EX. ELEC TO BE RELOCATED TYP.
BUILDING LF88=1248.20
EX.ELEC
11' PROP. PUE
PROP. 8" DIP W
EX. LIGHT TO BE REMOVED TYP.
EX. VALVE TO BE RELOCATED TYP.
EX.ELEC
EX. ELEC TO BE RELOCATED TYP.
PROP. SD
EX. BFP TO BE RELOCATED TYP.
12' EX. UTILITY ESMT. DKT. 13198, PG. 1316, M.C.R.
6" MIN SEWER SERVICE
PROP. FIRE HYDRANT
14' PROP. WA ESMT
PROP. SEWER MH
PROP. SD
EX. FH TO BE RELOCATED TYP.
PROP. MH
PROPOSED 8" VCP S
EX. 8" W TO REMAIN (PROTECT IN PLACE)
EX. FH TO BE RELOCATED TYP.
CONNECT TO EX. 8" W
EX.FO
EX. VALVE
EX. 8" ACP W
EX.G
PROP. SD
EX.CATV
23.98'
3.02'
PROP. SEWER MH
8" VCP S
6" MIN SEWER SERVICE
EX. 6" ACP W
EX. 6 ACP W TO BE REMOVED
EX. FH TO BE RELOCATED TYP.
16' EX. PUE
APPROX. LOCATION COS QS MAP
EX. TEL
BUILDING LF88=1247.50
EX. BFP TO BE RELOCATED TYP.
BUILDING LF88=1247.50
PROP SEWER MH
PROPOSED 8" VCP S
8" DIP W

MATCHLINE SEE SHT 05

MATCHLINE SEE SHT 07

MATCHLINE SEE SHT 09

20 10 0 20 40
GRAPHIC SCALE
1" = 20'

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FILE NO. 19001704-06-UT05
06

SHEET NO.
06 OF 09

PROJECT NUMBER

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MATCHLINE SEE SHT 04

EX. FH

BUILDING
LF88=1248.20

PROP. 8" VCP S

8" VCP S

PROP. MH

PROP. MH

PROP. SD

N13°01'58"E 636.67'

PROP. SD

PROP. 8" VCP S

MATCHLINE SEE SHT 06

8" VCP S

12' EX. UTILITY ESMT. DK. 13198, PG. 1316, M.C.R.

PROP. SEWER MH

PROP. FIRE HYDRANT

EX.8" ACP W TO REMAIN PROTECT IN PLACE

EX.8" ACP W

CONNECT TO EXIST. WATER

12' PROP. PUBLIC UTILITY & WA ESMT.

PROP. SD

S89°33'12"E 960.69'

Δ=16°17'47"
L=516.59'
R=1816.26'

INDIAN BEND WASH

EXISTING STREET LIGHT

EX 12" ACP W

19+00

18+00

17+00

16+00

HAYDEN ROAD

EXISTING STREET LIGHT

MATCHLINE SEE SHT ##

20 10 0 20 40
GRAPHIC SCALE
1" = 20'

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GEORGES
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DR. A. CABALLERO
JOB NO. 19001704
FILE NO. 19001704-07-UT06
07

SHEET NO.
07 OF 09

PROJECT NUMBER

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MATCHLINE SEE SHT 05

THE PASEO

78TH STREET

8" DIP W

PROP. 40' R/W TO BE DEDICATED WITH PHASE 2

PROP. 40' R/W

51.40'

10' SW

30' R/W

30' R/W B/C

23.50' B/C

4' EX. S/W

23.59'± EX. B/C

26.52'± EX. WTR

27.82'± EX. OHE

17.54'± EX. B/C

4' EX. S/W

9'± EX. G

28+00

27+00

26+00

25+00

S00°02'35"W 1103.37'

EX. VALVE TO BE RELOCATED TYP.

PROP. 8" DIP W

PROP. SD

BUILDING
LF88=1249.60

PARKING STRUCTURE
LF88=1249.60

EX. ELEC TO BE RELOCATED TYP.

EX. LIGHT TO BE REMOVED TYP.

EX. GAS METER TO BE RELOCATED TYP.

GM

EX. METER TO BE RELOCATED TYP.

EX. ELEC TO BE RELOCATED TYP.

MATCHLINE SEE SHT 09

46.70'

EX. SS MH

EX. 8" VCP S

EX. 8" VCP S

35.15'

16' EX. PUE TO BE ABANDONED APPROX. LOCATION COS QS MAP

14' PROP. WA ESMT

14' PROP. WA ESMT

EX. VALVE TO BE RELOCATED TYP.

EX. BFP TO BE RELOCATED TYP.

EX. G

EX. G

PROP. FIRE HYDRANT

EX. FH TO BE RELOCATED TYP.

EX.CATV

EX. 6" ACP W

8" DIP W

6" DIP W

EX.6" ACP W

EX.6" ACP W TO BE REMOVED

REPLACE EXISTING 6" ACP W WITH 8" DIP W

PROP. SD

S89°33'44"E 820.29'

20 10 0 20 40
GRAPHIC SCALE
1" = 20'

NOTE:
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PHASE I OF GENTRY ON THE GREEN

SCOTTSDALE, ARIZONA

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DR. A. CABALLERO
JOB NO. 19001704
FILE NO. 19001704-08-UT07
08

SHEET NO.
08 OF 09

PROJECT NUMBER

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MATCHLINE SEE SHT 06

BUILDING
LF88=1247.50

EX. VALVE TO BE RELOCATED TYP.

EX. TEL TO BE RELOCATED TYP.

EX. UTILITY BOX TO BE RELOCATED TYP.

EX. LIGHT TO BE REMOVED TYP.

EX. CATV TO BE RELOCATED TYP.

PARKING STRUCTURE
LF88=1247.50

MATCHLINE SEE SHT 08

BUILDING
LF88=1247.50

EX. GAS METER TO BE RELOCATED TYP.

EX. VALVE TO BE RELOCATED TYP.

16' EX. PUE TO BE ABANDONED APPROX. LOCATION COS QS MAP

EX. BFP TO BE RELOCATED TYP.

EX. FH TO BE RELOCATED TYP.

14' PROP. WA ESMT

EX. G

EX.CATV

EX.6" ACP W

8" DIP W

REPLACE EXISTING 6" ACP W WITH 8" DIP W

2.19'

PROP. SD

S89°33'44"E 820.29'

10' EX. UTILITY ESMT DKT. 91110, PG. 600, M.C.R.

EX. MH TO BE REMOVED

EX. 8" VCP TO BE REMOVED

EX. 8" VCP S

EX. 6" VCP S

EX. 8"S TO REMAIN

PROP.SEWER MH

EX. FH TO BE RELOCATED TYP.

PROP. SD

14' PROP. WA ESMT

PROP 8" VCP S

PROP 8" DIP W

8" DIP W

6" VCP S

15+00

14+00

EX. 8"S

HAYDEN ROAD ALIGNEMENT

PROP. MH

PROP. SD

6.45' PROP. SD

16' EX. PUE TO BE ABANDONED APPROX. LOCATION COS QS MAP

8" DIP W

Δ=16°17'47"
L=516.59'
R=1816.26'

INDIAN BEND WASH

EX. 6" ACP W TO BE REMOVED

PROP 8" DIP W

PROP. SD

6" DIP W

PROP 8" DIP W

EX.6"ACP W

8" DIP W

PROP. SD

20 10 0 20 40
GRAPHIC SCALE
1" = 20'

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PHASE I OF GENTRY ON THE GREEN

CONCEPTUAL WATER & SEWER PLAN

SCOTTSDALE, ARIZONA

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GEORGES
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DR. A. CABALLERO
JOB NO. 19001704
FILE NO. 19001704-09-UT08
09

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09 OF 09

PROJECT NUMBER

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APPENDIX B
WASTEWATER DEMAND CALCULATIONS

Gentry on the Green
Wastewater Demand Estimates
ATWELL

Prepared by: N. Cronan
10/1/2019

100gpm minimum of each separate sewer system with a pool must be applied.

should be 100gpm

TABLE 1

Proposed Wastewater Generation Table - Phase 1

NODE #	Land Use	Unit (Area or Dwelling Units)	Demand (gpd per unit)	Demand (gpm)	Peak Flow (gpm)	Peak Flow (MGD)
1	HDR (BLDG A)	302 DUs	140.0	29.4	132.1	0.19026
	Restaurant (BLDG A)	5,000 sq. ft.	1.2	4.2	25.0	0.036
	Pool (BLDG A)	1 ea (50%)	50 (gpm)	50.0	50.0	0.072
	Retail (BLDG A)	5,000 sq. ft.	0.5	1.7	5.2	0.0075
2	HDR (BLDG B)	380 DUs	140.0	36.9	166.3	0.2394
	Club Room / Gym (BLDG B)	10,500 sq. ft.	0.5	3.6	10.9	0.01575
6	HDR (BLDG C)	299 DUs	140.0	29.1	130.8	0.18837
	Restaurant BLDG C)	5,000 sq. ft.	1.2	4.2	25.0	0.036
	Pool (BLDG C)	1 ea (50%)	50 (gpm)	50.0	50.0	0.072
	Retail (BLDG C)	5,000 sq. ft.	0.5	1.7	5.2	0.0075
7	HDR (BLDG D)	233 DUs	140.0	22.7	101.9	0.14679
	Club Room / Gym (BLDG D)	10,500 sq. ft.	0.8	5.8	17.5	0.0252
Phase 1 Wastewater Generation				***239.3***	***720.0***	**1.03677**

TABLE NOTE: the two pools flow into the same Hayden sewer system. They combine for a total 100 gpm into the Hayden sewer system, as required.

Proposed Wastewater Generation Table - Phase 2

Land Use		Unit (Area or Dwelling Units)	Demand (gpd per unit)	Demand (gpm)	Peak Flow (gpm)	Peak Flow (MGD)
HDR	9	270 DUs	140.0	26.3	118.1	0.1701
Healthcare [4]	9	250 beds	250.0	43.4	195.3	0.28125
Hotel	9	150 rooms	380.0	39.6	225.0	0.324
Pool	9	1 ea	100 (gpm)	100.0	100.0	0.144
Phase 2 Wastewater Generation				***209.2***	***638.4***	0.91935
Phase 1 & 2 Total Wastewater Generation				***448.5***	***1,358.4***	**1.95612**

Flow Test at Indian School Road and Parkway Avenue

Monitored Peak Flow Rate (gpm)	*Flow Removed for Phase 2 Development (gpm)*	*Remaining Flow After Ex. Phase 2 Unit Removal (gpm)*	*Proposed Peak Flow in Indian School Road and Parkway Avenue (gpm)*	*Proposed Peak Flow in Indian School Road and Parkway Avenue (gpm)*
127.45	***72.4992***	***54.9508***	***693.4***	***1.0***

TABLE NOTE: Phase 2 wastewater generation based on flow monitoring of 12" main in Parkway Avenue. 266 DU remain after the removal of existing 354 DU from Phase 2.
127 gpm / (266+354) DU = 0.2048 gpm/DU

existing 8" main

Notes:

1) Average Day Demand (ADD) based on City of Scottsdale Design Standards & Policies Manual.

2) Peaking Factors:

Land Use		Peaking Factor
HDR/ Healthcare		4.5
Commercial/ Retail/ Office		3.0
Restaurant		6.0
Hotel		4.5

3) Demand based on Arizona Administrative Code Title 18 Chapter 9 Unit Design Flows for wastewater.

Gentry on the Green Prepared by: N. Cronan

Wastewater Demand Estimates 9/27/2019

ATWELL

TABLE 2

Existing Wastewater Generation - Phase 1

Land Use	Unit (Area or Dwelling Units)	Wastewater Generation (gpd per unit)	Average Day Demand (gpm)	Peak Flow (gpm)	Peak Flow (MGD)
HDR (PHASE 1A+1B)	303 DUs	140.0000	29.5	132.6	0.19089
HDR (PHASE 1D)	172 DUs	140.0000	16.7	75.3	0.10836
Commercial	17,100 sq. ft.	0.0003	5.9	17.8	0.02565
Total Phase I Wastewater Generation			***52.1***	***225.6***	**0.3249**

Existing Wastewater Generation - Phase 2

Land Use	Unit (Area or Dwelling Units)	Wastewater* Generation (gpm per unit)	Peak Flow (gpm)	Peak Flow (MGD)
HDR	354 DUs	0.2048	72.5	0.104398848
Total Phase II Wastewater Generation			***72.5***	**0.104398848**

**Phase 2 wastewater generation based on flow monitoring of 12" main in Parkway Avenue. 266 DU remain after the removal of existing 354 DU from Phase 2.*
127 gpm / (266+354) DU = 0.2048 gpm/DU

Notes:

1) Average Day Demand (ADD) based on City of Scottsdale Design Standards & Policies Manual.

2) Peaking Factors:

Land Use	Peaking Factor
HDR/ Healthcare	4.5
Commercial/ Retail/ Office	3.0
Restaurant	6.0
Hotel	4.5

3) Demand based on Arizona Administrative Code Title 18 Chapter 9 Unit Design Flows for wastewater.

GENTRY ON THE GREEN

Wastewater System Hydraulic Analysis

with 100gpm min from pool max d/D=0.68, this would still be acceptable over a short reach and small basin such as this.

Prepared by: Atwell

Date: 10/1/2019

Phase I Peak Flow Wastewater System Hydraulic Analysis

Pipes			Estimated Flow		Pipe Sizing									Performance		
Pipe Segment	Upstream Node	Downstream Node	Peak Flow (mgd)	Flow (cfs)	Pipe Dia. (in.)	Mannings "n"	Design Slope (ft/ft)	K	Central Angle θ (degrees)	Depth to Diameter h/D	Flow Area (ft^2)	Flow Velocity (ft/s)	Pipe Capacity (mgd)	Depth to Dia. [2] Check	Max Velocity [1] Check	Capacity Check
1	1	2	0.306	0.47	8	0.013	0.01040	0.120	2.8972	0.439	0.148	3.21	0.778	OK	OK	OK
2	2	3	0.561	0.87	8	0.013	0.01040	0.219	3.6140	0.617	0.226	3.84	0.778	OK	OK	OK
3	3	4	0.561	0.87	8	0.013	0.01040	0.219	3.6140	0.617	0.226	3.84	0.778	OK	OK	OK
4	4	5	0.561	0.87	8	0.013	0.01030	0.221	3.6215	0.619	0.227	3.83	0.775	OK	OK	OK
5	6	7	0.304	0.47	8	0.013	0.01920	0.088	2.6251	0.372	0.118	3.97	1.050	OK	OK	OK
6	7	8	0.476	0.74	8	0.013	0.01040	0.186	3.3820	0.560	0.201	3.66	0.778	OK	OK	OK
7	8	9	0.476	0.74	8	0.013	0.01040	0.186	3.3820	0.560	0.201	3.66	0.778	OK	OK	OK
8	9	10	0.476	0.74	8	0.013	0.01040	0.186	3.3820	0.560	0.201	3.66	0.778	OK	OK	OK

1. Maximum velocity allowed = 10 ft/s
2. Maximum depth over diameter ratio = "OK" if ratio less than 0.65.

w/ 100gpm max d/D would be higher but still acceptable

Minimum Slopes		
Pipe Size (in)	Slope (ft/ft)	Full flow Velocity ft/s
8	0.0052	2.5
12	0.0030	2.5

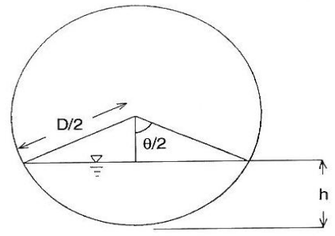
$$Q = \frac{1.486 \cdot A \cdot R^{\frac{2}{3}} \cdot S^{\frac{1}{2}}}{n}$$

Pipe flow parameters were estimated by Saatçi equations for partially filled circular pipes (Debo and Reese, 1995):

$$K = 0.673Q \cdot n \cdot D^{-\frac{8}{3}} \cdot S^{-\frac{1}{2}}$$

$$\theta = \frac{3\pi}{2}\left[1 - \left[1 - [\pi K]^{\frac{1}{2}}\right]^{\frac{1}{2}}\right]^{\frac{1}{2}}$$

$$\frac{h}{D} = \frac{1}{2}\left[1 - \cos\left(\frac{\theta}{2}\right)\right]$$



Debo, Thomas N and Reese, Andrew J (1995). *Municipal Stormwater Management - 2nd edition* . Lewis Publishers - CRC Press LLC. Boca Raton, Florida

Notes:

1) BLDG 1 and BLDG 3 each account for the demands for a pool. The third pool is to be part of Phase 2.
2) Demands from the proposed restaurant, commercial, and retail are evenly distributed across the four building nodes.
3) Slopes for pipe segments 1 and 5 are determined from obtained survey data. All other pipe slopes are running at 1/8" per foot.

GENTRY ON THE GREEN

Wastewater System Hydraulic Analysis

Prepared by: Atwell

Date: 9/30/2019

Phase 2 Peak Flow Wastewater System Hydraulic Analysis

Pipes			Estimated Flow		Pipe Sizing									Performance		
Pipe Segment	Upstream Node	Downstream Node	Peak Flow (mgd)	Flow (cfs)	Pipe Dia. (in.)	Mannings "n"	Design Slope (ft/ft)	K	Central Angle θ (degrees)	Depth to Diameter h/D	Flow Area (ft^2)	Flow Velocity (ft/s)	Pipe Capacity (mgd)	Depth to Dia. (2) Check	Max Velocity (1) Check	Capacity Check
9	11	12	0.998	1.54	15	0.013	0.00320	0.132	2.9909	0.462	0.555	2.78	2.159	OK	OK	OK
10	12	13	0.998	1.54	15	0.013	0.00280	0.141	3.0591	0.479	0.581	2.66	2.308	OK	OK	OK

1. Maximum velocity allowed = 10 ft/s
2. Maximum depth over diameter ratio = "OK" if ratio less than 0.65.

Minimum Slopes		
Pipe Size (in)	Slope (ft/ft)	Full flow Velocity ft/s
8	0.0052	2.5
12	0.0030	2.5

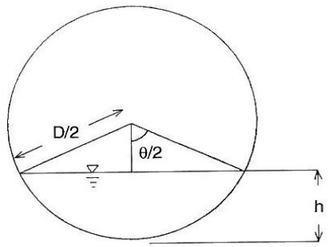
$$Q = \frac{1.486 \cdot A \cdot R^{\frac{2}{3}} \cdot S^{\frac{1}{2}}}{n}$$

Pipe flow parameters were estimated by Saatçi equations for partially filled circular pipes (Debo and Reese, 1995):

$$K = 0.673Q \cdot n \cdot D^{-\frac{8}{3}} \cdot S^{-\frac{1}{2}}$$

$$\theta = \frac{3\pi}{2}\left[1 - \left[1 - [\pi K]^{\frac{1}{2}}\right]^{\frac{1}{2}}\right]^{\frac{1}{2}}$$

$$\frac{h}{D} = \frac{1}{2}\left[1 - \cos\left(\frac{\theta}{2}\right)\right]$$



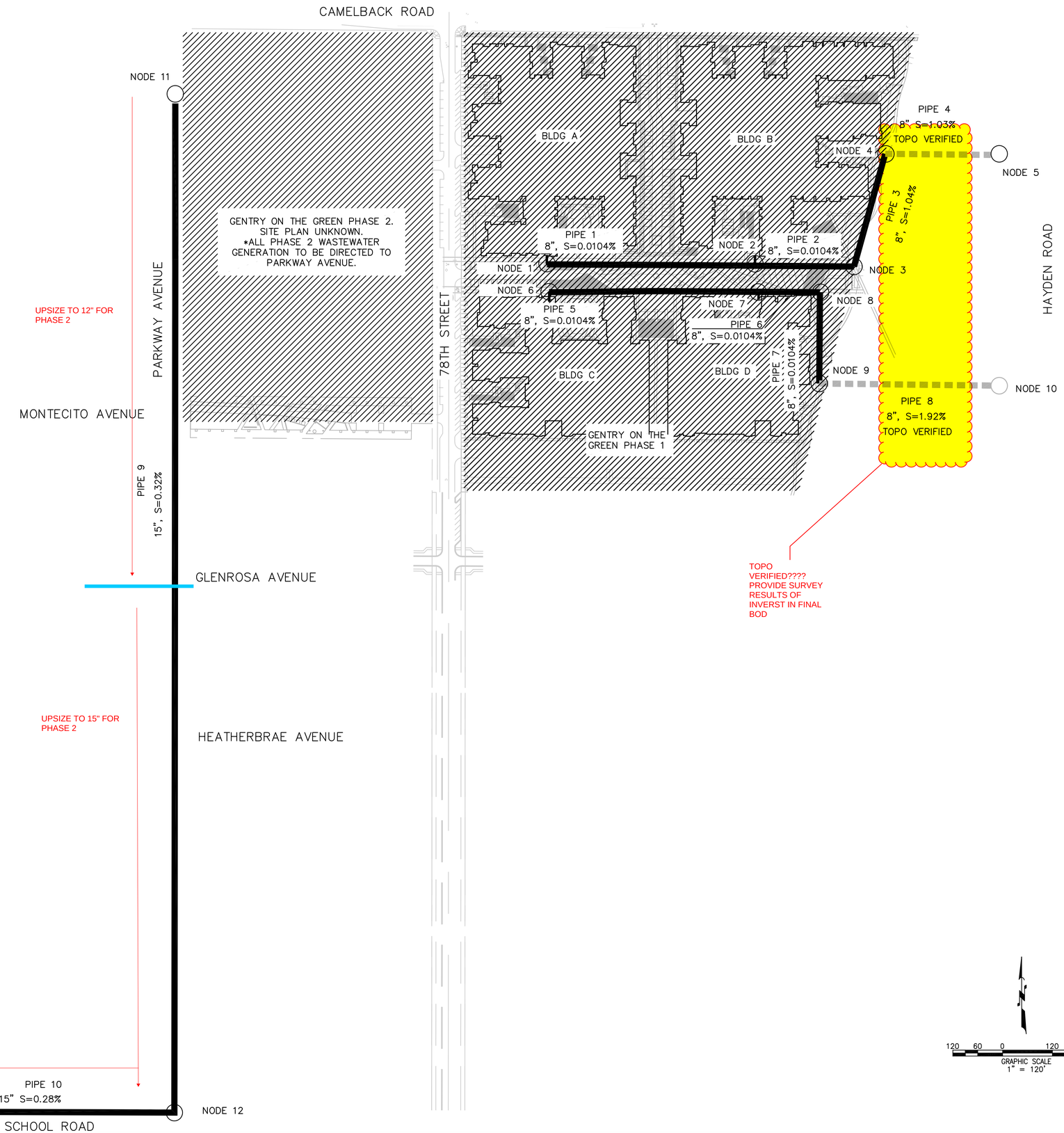
Debo, Thomas N and Reese, Andrew J (1995). *Municipal Stormwater Management - 2nd edition* . Lewis Publishers - CRC Press LLC. Boca Raton, Florida

Notes:

1) Phase 2 accounts for the demands of a pool.
2) Existing demands are subtracted from the proposed demands because the existing structures are being replaced.
3) The existing peak flow rate from the flow test at Indian School Road and Parkway Avenue is added to the proposed demands for phase 2.
3) Slopes for pipe segments 6 and 7 are determined from obtained survey data and quartersection invert data. Only Node 9 has an invert that is verified by survey data.
4) The existing 8" line in Parkway Ave and Indian School Road is analyzed as being upsized to a 12" pipe.

12" and 15" pipe, Exhibit 5 shows all 15"

APPENDIX C
WASTEWATER SYSTEM HYDRAULIC ANALYSIS



THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTATIVE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.

NOTICE:
CONSTRUCTION SITE SAFETY IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR; NEITHER THE OWNER NOR THE ENGINEER SHALL BE EXPECTED TO ASSUME ANY RESPONSIBILITY FOR SAFETY OF THE WORK, OF PERSONS ENGAGED IN THE WORK, OF ANY NEARBY STRUCTURES, OR OF ANY OTHER PERSONS.

ATWELL
866.850.4200 www.atwell-group.com
4700 E. SOUTHERN AVENUE
MESA, AZ 85206
480.218.8831

EXHIBIT 5: FULL BUILD OUT SEWER

PROJECT:
GENTRY ON THE GREEN
CITY OF SCOTTSDALE, ARIZONA

Know what's **below.** **Call** before you dig.

REVISIONS:

PM. R. GEORGES
DR. M. MENDEZ
JOB NO. 19001704
FILE NO.

Worksheet for INDIAN SCHOOL ROAD - PROP. 15" DEPTH

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.0028
Diameter	15.0
Discharge	693.39

Results	
Normal Depth	7.1
Flow Area	0.6
Wetted Perimeter	1.9
Hydraulic Radius	3.6
Top Width	1.25
Critical Depth	5.9
Percent Full	47.1
Critical Slope	0.0053
Velocity	2.72
Velocity Head	0.11
Specific Energy	0.70
Froude Number	0.709
Maximum Discharge	1,650.25
Discharge Full	1,534.11
Slope Full	0.0006
Flow Type	Subcritical

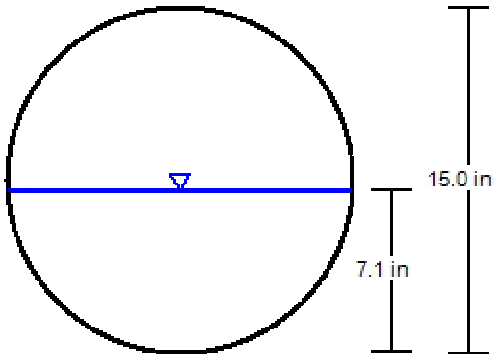
GVF Input Data	
Downstream Depth	0.0
Length	0.0
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0
Profile Description	
Profile Headloss	0.00
Average End Depth Over Rise	0.0
Normal Depth Over Rise	75.0
Downstream Velocity	Infinity
Upstream Velocity	Infinity
Normal Depth	7.1
Critical Depth	5.9
Channel Slope	0.0028
Critical Slope	0.0053

Cross Section for INDIAN SCHOOL ROAD - PROP. 15" DEPTH

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.0028
Normal Depth	7.1
Diameter	15.0
Discharge	693.39



V: 1
H: 1

Worksheet for EX SS INDIAN SCHOOL RD MAX CAPACITY

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.0028
Diameter	8.0
Discharge	217.00

Results	
Normal Depth	5.2
Flow Area	0.2
Wetted Perimeter	1.3
Hydraulic Radius	2.3
Top Width	0.64
Critical Depth	3.9
Percent Full	65.0
Critical Slope	0.0070
Velocity	2.01
Velocity Head	0.06
Specific Energy	0.50
Froude Number	0.578
Maximum Discharge	308.71
Discharge Full	286.98
Slope Full	0.0016
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0
Length	0.0
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0
Profile Description	
Profile Headloss	0.00
Average End Depth Over Rise	0.0
Normal Depth Over Rise	75.0
Downstream Velocity	Infinity
Upstream Velocity	Infinity
Normal Depth	5.2
Critical Depth	3.9
Channel Slope	0.0028
Critical Slope	0.0070

Worksheet for PARKWAY AVENUE - PROP. 15" DEPTH

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.0032
Diameter	15.0
Discharge	693.39

Results	
Normal Depth	6.8
Flow Area	0.5
Wetted Perimeter	1.8
Hydraulic Radius	3.5
Top Width	1.24
Critical Depth	5.9
Percent Full	45.4
Critical Slope	0.0053
Velocity	2.85
Velocity Head	0.13
Specific Energy	0.69
Froude Number	0.762
Maximum Discharge	1,764.19
Discharge Full	1,640.03
Slope Full	0.0006
Flow Type	Subcritical

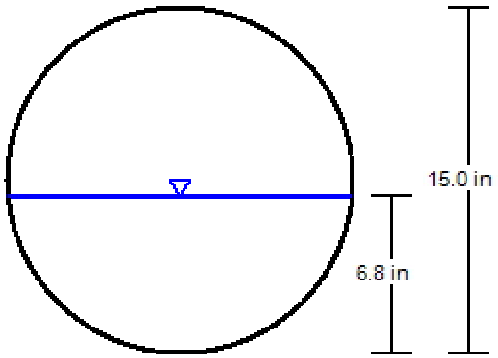
GVF Input Data	
Downstream Depth	0.0
Length	0.0
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0
Profile Description	
Profile Headloss	0.00
Average End Depth Over Rise	0.0
Normal Depth Over Rise	75.0
Downstream Velocity	Infinity
Upstream Velocity	Infinity
Normal Depth	6.8
Critical Depth	5.9
Channel Slope	0.0032
Critical Slope	0.0053

Cross Section for PARKWAY AVENUE - PROP. 15" DEPTH

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.0032
Normal Depth	6.8
Diameter	15.0
Discharge	693.39



V: 1
H: 1

Worksheet for Ex SS PARKWAY AVE MAX CAPACITY

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

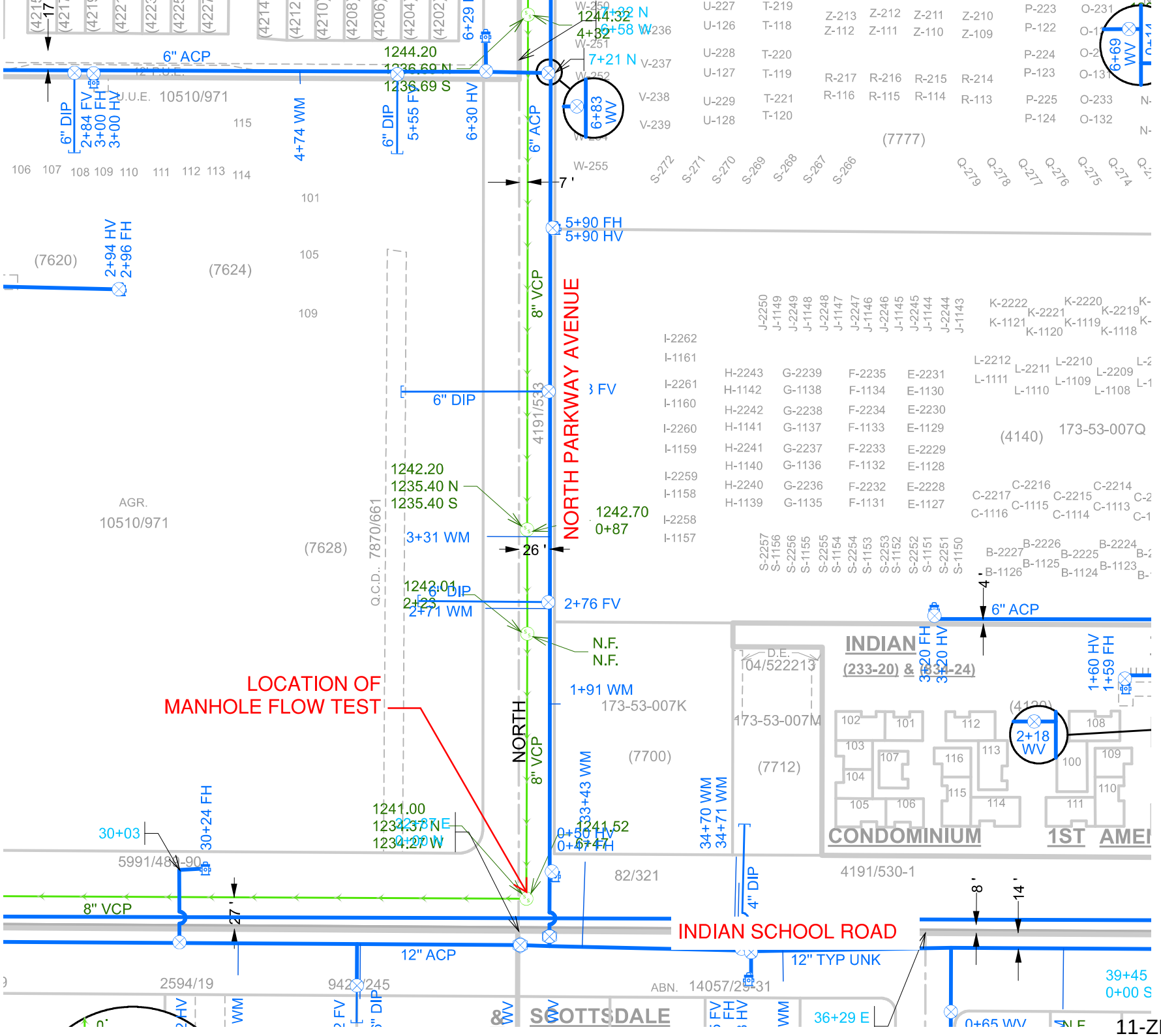
Input Data	
Roughness Coefficient	0.013
Channel Slope	0.0032
Diameter	8.0
Discharge	232.00

Results	
Normal Depth	5.2
Flow Area	0.2
Wetted Perimeter	1.3
Hydraulic Radius	2.3
Top Width	0.64
Critical Depth	4.0
Percent Full	65.0
Critical Slope	0.0071
Velocity	2.15
Velocity Head	0.07
Specific Energy	0.51
Froude Number	0.617
Maximum Discharge	330.02
Discharge Full	306.80
Slope Full	0.0018
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0
Length	0.0
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0
Profile Description	
Profile Headloss	0.00
Average End Depth Over Rise	0.0
Normal Depth Over Rise	75.0
Downstream Velocity	Infinity
Upstream Velocity	Infinity
Normal Depth	5.2
Critical Depth	4.0
Channel Slope	0.0032
Critical Slope	0.0071

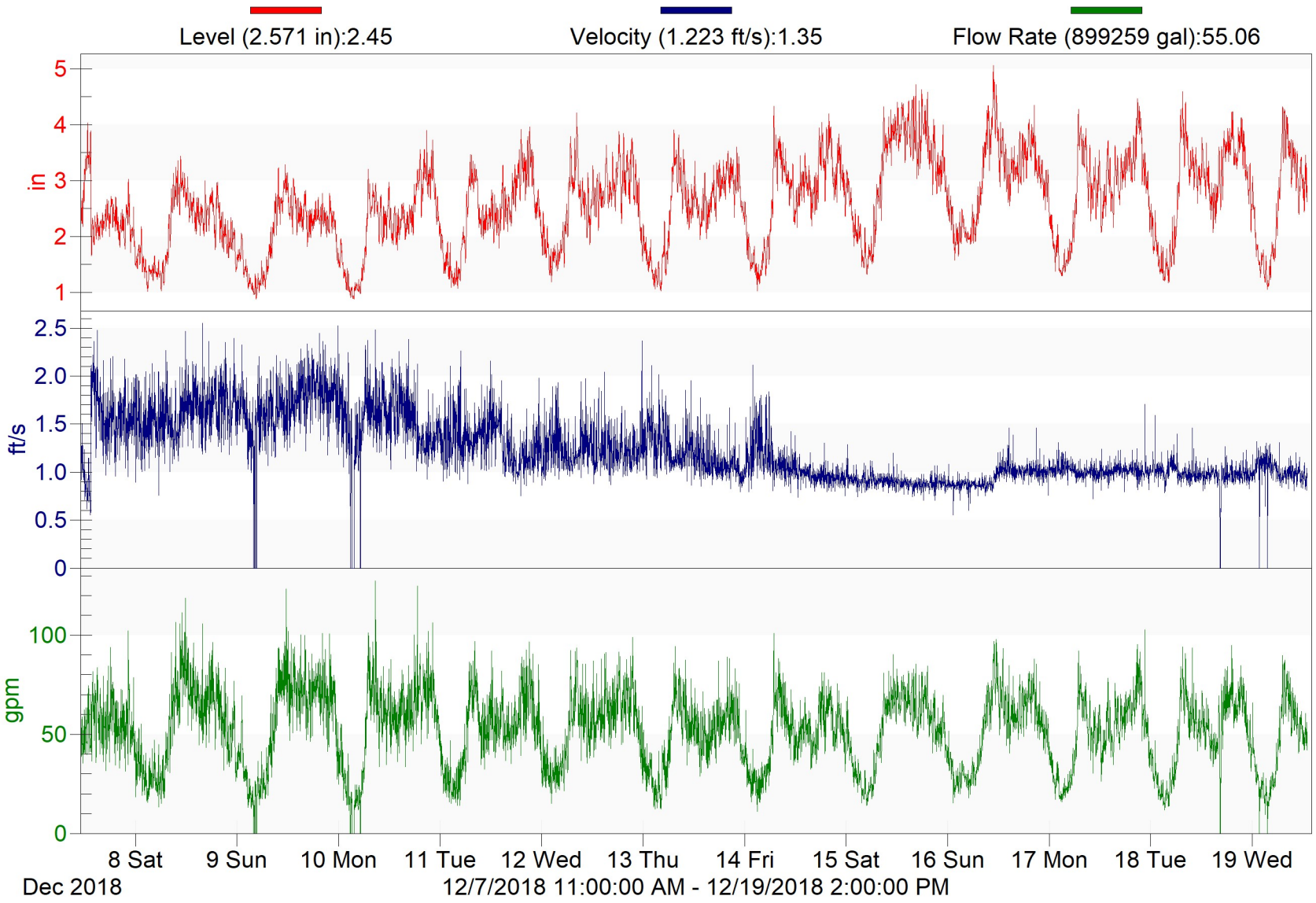
APPENDIX D
FLOW TEST RESULTS


LOCATION OF
MANHOLE FLOW TEST
NORTH PARKWAY AVENUE
NORTH
INDIAN SCHOOL ROAD
6" ACP
6" DIP
8" VCP
12" ACP
12" TYP UNK
4" DIP
1244.20
1236.69 N
1236.69 S
1242.20
1235.40 N
1235.40 S
1242.70
0+87
1242.01
2+23
2+71 WM
1241.00
1234.37 N
1234.27 W
1241.52
0+67 FH
1244.32
1236.58 W
7+21 N
6+83 WV
6+69 WV
6+30 HV
6+29 FV
5+90 FH
5+90 HV
5+55 FV
4+74 WM
4+32
2+84 FV
3+00 FH
3+00 HV
2+94 HV
2+96 FH
3+31 WM
2+76 FV
1+91 WM
3+43 WM
34+70 WM
34+71 WM
30+03
30+24 FH
0+50 HV
2+18 WV
1+60 HV
1+59 FH
39+45
0+00 S
36+29 E
0+65 WV
7 '
26 '
27 '
8 '
14 '
4 '
17
INDIAN
(233-20) & (233-24)
CONDOMINIUM
1ST AMEN
SCOTTSDALE
(7620)
(7624)
(7628)
(7700)
(7712)
(7777)
(4140)
AGR.
10510/971
U.U.E. 10510/971
7870/661
4191/533
5991/480-90
82/321
4191/530-1
2594/19
ABN. 14057/29-31
173-53-007K
173-53-007M
173-53-007Q
04/522213
D.E.
N.F.
N.F.
Q.C.D.

11-ZN-2019

Indian School and Parkway

Flowlink 5



11-ZN-2019

WATEWATER FLOW TEST RESULTS - PEAK FLOW

Site Name	Indian School and Parkway								
Label	Min Velocity	Time	Max Velocity	Time	Min Flow Rate	Time	Peak Flow Rate	Time	Total Flow
Units	ft/s	Date/Time	ft/s	Date/Time	gpm	Date/Time	gpm	Date/Time	gal
Resolution	0.1	N/A	0.1	N/A	0.1	N/A	0.1	N/A	0.1
Significant Digits	0	N/A	0	N/A	0	N/A	0	N/A	0
12/8/2018 0:00	0.759	5:34:00 AM	2.552	3:50:00 PM	13.229	5:34:00 AM	118.726	11:46:00 AM	77719
12/9/2018 0:00	0.996	3:22:00 AM	2.524	11:50:00 PM	0	4:40:00 AM	123.401	11:40:00 AM	80251.2
12/10/2018 0:00	0.925	9:00:00 PM	2.482	8:44:00 AM	0	5:12:00 AM	127.45	8:44:00 AM	77839.6
12/11/2018 0:00	0.75	7:04:00 PM	2.26	4:52:00 AM	14.011	4:08:00 AM	96.859	8:14:00 AM	74313
12/12/2018 0:00	0.86	12:02:00 AM	2.367	11:44:00 PM	15.171	2:20:00 AM	98.889	9:32:00 PM	77594.4
12/13/2018 0:00	0.794	11:00:00 PM	2.111	2:02:00 AM	12.32	4:18:00 AM	94.213	7:38:00 AM	70086.7
12/14/2018 0:00	0.737	12:40:00 PM	2.115	2:00:00 AM	10.978	3:02:00 AM	100.848	6:54:00 AM	70285.1
12/15/2018 0:00	0.703	9:04:00 PM	1.285	12:18:00 AM	14.031	4:50:00 AM	90.339	11:12:00 AM	74713.5
12/16/2018 0:00	0.553	1:22:00 AM	1.461	2:30:00 PM	15.467	1:22:00 AM	97.769	11:28:00 AM	75418.6
12/17/2018 0:00	0.722	10:24:00 AM	1.707	10:40:00 PM	15.907	3:04:00 AM	102.804	10:40:00 PM	71911.2
12/18/2018 0:00	0.528	4:22:00 PM	1.592	1:02:00 AM	0	4:32:00 PM	94.766	7:10:00 PM	71707.7

PEAK FLOW