HUNTER
ENGINEERING
CIVIL AND SURVEY

Final Sewer Basis of Design Report
For
Scottsdale and Thunderbird
SEC of Thunderbird Rd and Scottsdale Rd
Scottsdale, Arizona 85260

October 2022

Prepared by:
Hunter Engineering, Inc.
10450 North 74th Street, #200
Scottsdale, AZ 85258

FINAL SEWER BASIS OF DESIGN REPORT
FOR

SCOTTSDALE AND THUNDERBIRD

SEC OF THUNDERBIRD RD AND SCOTTSDALE RD
SCOTTSDALE, ARIZONA 85260

PREPARED FOR

LGE DESIGN BUILD
1200 NORTH 52ND STREET
PHOENIX, AZ 85008

PREPARED BY

LARRY TALBOTT
HUNTER ENGINEERING, INC.
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SCOTTSDALE, AZ 85258
(480) 991-3985

H.E. PROJECT NO. LGEC308

HUNTER
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Table of Contents

1.0 INTRODUCTION

This sewer design report has been prepared under a contract from LGE Design Build, developer of the Scottsdale and Thunderbird project. The purpose of this report is to provide a final sewer analysis, required by the City of Scottsdale, to support this development. Preparation of this report has been done according to the procedures detailed in Chapter 4 of the *City of Scottsdale Design Standards & Policies Manual dated January, 2018 (CSDSPM) (Reference 1) and the City of Phoenix Water Services Department, Design Standards Manual for Water and Wastewater Systems, 2017 (COPWSD) (Reference 2).* The City of Phoenix reference was utilized for the sewer demands where Scottsdale's design standards do not supply demand flows for specific building uses.

This development project is located along the south side of Thunderbird/Redfield Road just east of Scottsdale Road within the City of Scottsdale, Maricopa County, Arizona. The proposed project is located within a developed site with multiple buildings, parking and drive areas and landscaping.

The existing parcel is bound by existing commercial/office developments to the north, North Miller Road to the east, the existing church facility to the south and an existing facility and Thunderbird/Redfield Road to the west. The site is specifically located in section 11, Township 3 North, Range 4 East, of the Gila and Salt River Base and Meridian. Figure 1, in Appendix A, illustrates the location of the project site in relation to the City of Scottsdale street system. Access to the site is provided from Thunderbird/Redfield Road.

The development proposes the construction of a new warehouse building. Site improvements will include construction of driveway entrances, a parking lot, sidewalk/hardscape, landscape areas, and supporting infrastructure including new storm water drainage system, water, sewer and fire line service. The overall project site is approximately 17 acres.

2.0 EXISTING CONDITIONS

There is an existing 12" VCP sewer main in Thunderbird/Redfield Road that turns to the east and runs along the south side of the adjacent property directly to the north of this project site. This existing sewer main is located within a 12' Public Utility Easement. There is an existing 24" VCP sewer main in Scottsdale Road. There is also an existing sewer force main that runs along the south site of Thunderbird near the site entrance that will need to be protected in place during construction.

Per the City of Scottsdale Water and Wastewater Department the existing 12" main in Thunderbird is at or near capacity and a sewer flow test is required to determine the available capacity of the 12" main. The flow test was performed by RDH Environmental Services, LLC between April 14th, 2022 to April 25th, 2022. The highest measured maximum flow during the test period was 100.07 gpm. The main tested is a 12" VCP pipe at 0.25% slope with a capacity of 605 gpm at a d/D of 0.65. Therefore the main appears to only be at 17% capacity.

3.0 PROPOSED SEWER COLLECTION SYSTEM

This project proposes to connect to the existing public 12" gravity sewer line in Thunderbird. See the Concept Utility Plans in Appendix A for proposed service stub location and size. Wastewater flows for the proposed site were calculated in accordance with the CSDSPM (Reference 1) and City of Phoenix Water Services Department, Design Standards Manual for Water and Wastewater Systems, 2021. Wastewater flows of 50gpd per every 1,000 sf of building were calculated in accordance with the City of Phoenix design standards as Scottsdale does not have a demand flow for Industrial. The peaking was calculated as 4.23 using Harmon's Formula per the City of Phoenix design standards and an assumed population of one person per 2,100 sf of building as Scottsdale does not have peaking factors for Industrial.

According to the calculations provided in Appendix B the proposed building will have an estimated Average Daily Flow of 8.5 gpm and a Peak Hour Flow of 35.9 gpm. This is well below the just over 500-gpm available in the 12" downstream sewer main from the recent flow test. Refer to Appendix B for the sewer demand and pipe capacity calculations and Appendix C for the flow test results.

The final plumbing design for the buildings is not complete at this time. Therefore, the proposed sewer service is calculated based on the minimum 0.5%. The capacity of the proposed 6-in sewer service line at the minimum slope is 135 gpm based on a max d/D ratio of 0.65. Which is far greater than the Peak Hour Flow of 35.9 gpm.

The sanitary sewer pipe and fitting material for this project has been designated as PVC SDR-35. Trenching and bedding details for this project are to be per MAG Standard Specifications Section 601. Trench width above the installed pipe may be as wide as necessary to properly brace/install the work. Bedding backfill and compaction shall be installed per MAG Standard Specification 601.4. Service lines should connect to sewer according to MAG Standard Detail No. 440-3.

4.0 CONCLUSIONS

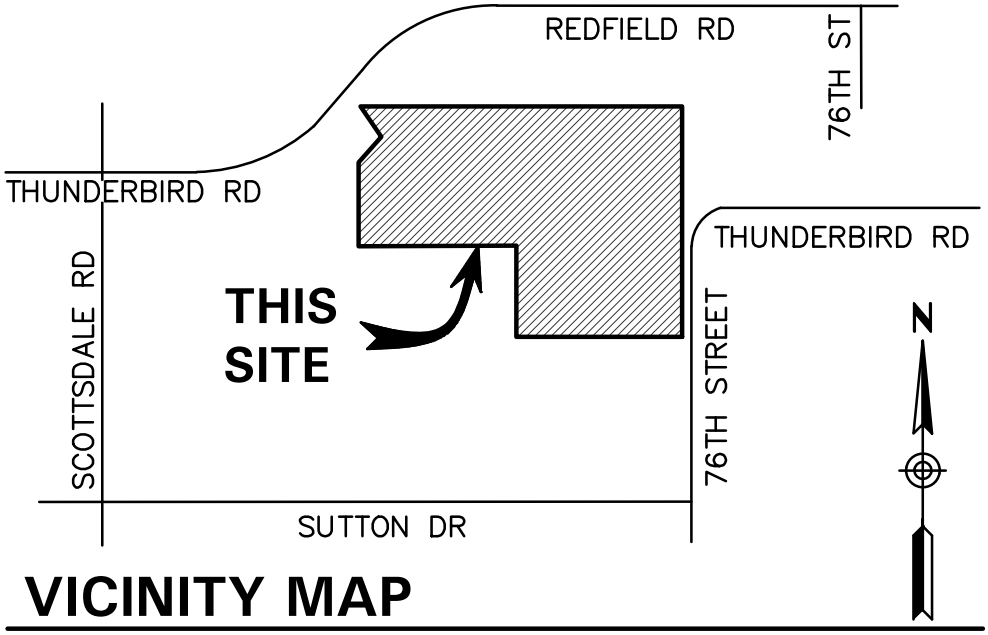
Based on the results of this study, it can be concluded that:

- The existing public sewer system and proposed sewer service is adequate to support this development.

5.0 REFERENCES

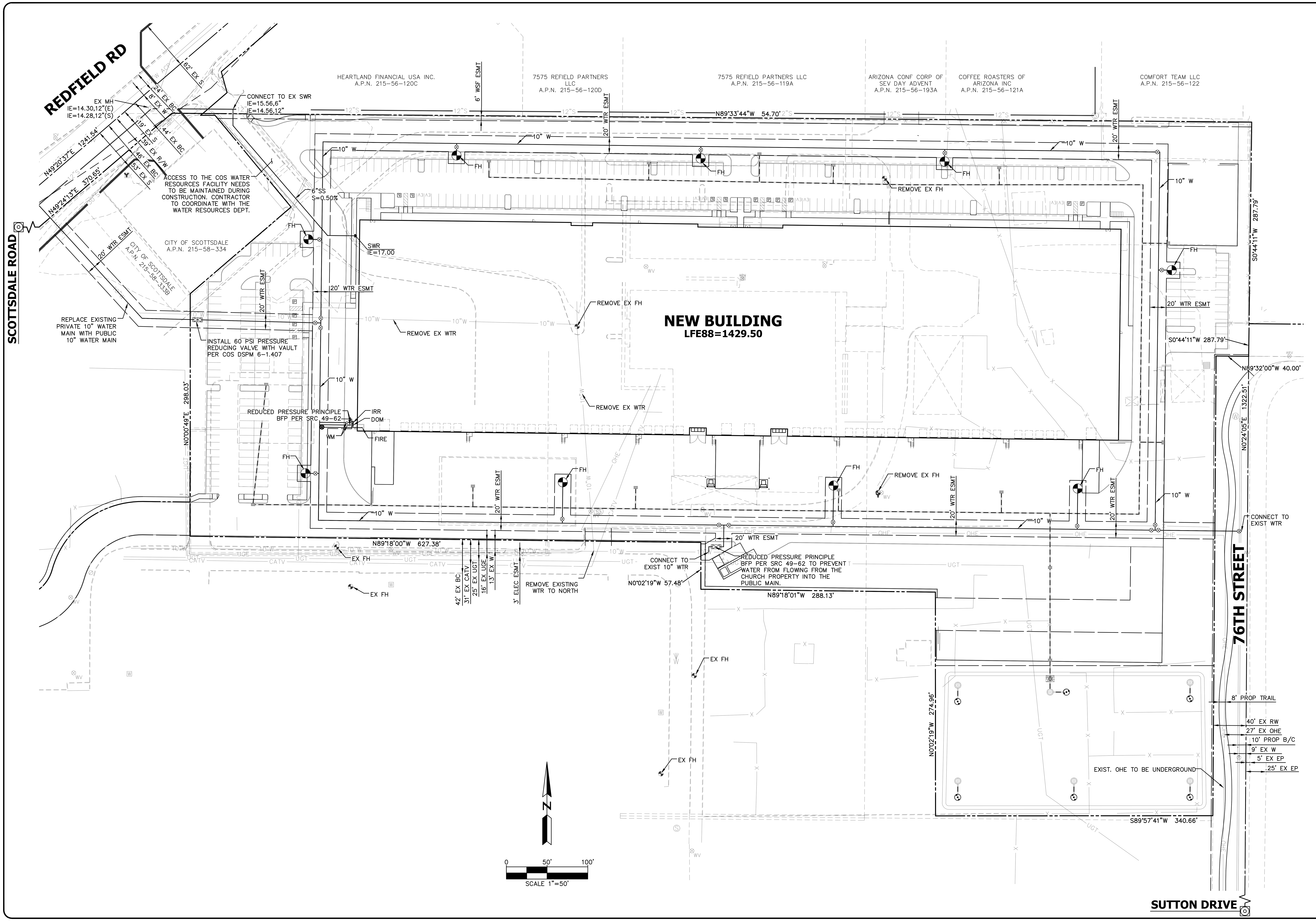
1) City of Scottsdale Design Standard & Policies Manual, January 2018 (Ref 1).
2) City of Phoenix Water Services Department, Design Standards Manual for Water and Wastewater Systems, 2017 (Ref 2).
3) Final Master Design Report - Sanitary Sewer for Corporate Center at DC Ranch, dated April 2006 and prepared by Hunter Engineering (Ref 3).

APPENDIX A
FIGURES



VICINITY MAP

VICINITY MAP
FIGURE 1


REDFIELD RD
SCOTTSDALE ROAD
76TH STREET
SUTTON DRIVE
NEW BUILDING
LFE88=1429.50
HEARTLAND FINANCIAL USA INC.
A.P.N. 215-56-120C
7575 REFIELD PARTNERS LLC
A.P.N. 215-56-120D
7575 REFIELD PARTNERS LLC
A.P.N. 215-56-119A
ARIZONA CONF CORP OF SEV DAY ADVENT
A.P.N. 215-56-193A
COFFEE ROASTERS OF ARIZONA INC
A.P.N. 215-56-121A
COMFORT TEAM LLC
A.P.N. 215-56-122
CITY OF SCOTTSDALE
A.P.N. 215-58-334
CITY OF SCOTTSDALE
A.P.N. 215-58-333B
EX MH
IE=14.30,12"(E)
IE=14.28,12"(S)
CONNECT TO EX SWR
IE=15.56,6"
IE=14.56,12"
ACCESS TO THE COS WATER RESOURCES FACILITY NEEDS TO BE MAINTAINED DURING CONSTRUCTION. CONTRACTOR TO COORDINATE WITH THE WATER RESOURCES DEPT.
6"SS
S=0.50%
SWR
IE=17.00
REPLACE EXISTING PRIVATE 10" WATER MAIN WITH PUBLIC 10" WATER MAIN
INSTALL 60 PSI PRESSURE REDUCING VALVE WITH VAULT PER COS DSPM 6-1.407
REDUCED PRESSURE PRINCIPLE BFP PER SRC 49-62
IRR
DOM
WM
FIRE
REMOVE EX FH
REMOVE EX WTR
N89°33'44"W 54.70'
S0°44'11"W 287.79'
N89°32'00"W 40.00'
N0°24'05"E 1322.51'
N0°00'49"E 298.03'
N89°18'00"W 627.38'
N0°02'19"W 57.48'
N89°18'01"W 288.13'
N0°02'19"W 274.96'
S89°57'41"W 340.66'
N49°20'37"E 1241.54'
N49°24'13"E 370.65'
20' WTR ESMT
6' WSF ESMT
3' ELEC ESMT
42' EX BC
31' EX CATV
25' EX UGT
16' EX UGE
13' EX W
REMOVE EXISTING WTR TO NORTH
CONNECT TO EXIST 10" WTR
REDUCED PRESSURE PRINCIPLE BFP PER SRC 49-62 TO PREVENT WATER FROM FLOWING FROM THE CHURCH PROPERTY INTO THE PUBLIC MAIN.
CONNECT TO EXIST WTR
8' PROP TRAIL
40' EX RW
27' EX OHE
10' PROP B/C
9' EX W
5' EX EP
.25' EX EP
EXIST. OHE TO BE UNDERGROUND
EX FH
FH
10" W
SCALE 1"=50'

NO. | DATE | REVISION | BY

PURPOSE:
3RD CONCEPTUAL SUBMITTAL

DESIGN BY: WG
DRAWN BY: DC
CHECKED BY: LT

HUNTER
ENGINEERING
CIVIL AND SURVEY
10450 NORTH 74TH STREET, SUITE 200
SCOTTSDALE, AZ 85258
T 480 991 3985
F 480 991 3986

Registered Professional Engineer
CERTIFICATE NO. 42104
LARRY M. TALBOTT
ARIZONA U.S.A.

CONCEPTUAL UTILITY PLAN FOR SCOTTSDALE AND THUNDERBIRD
SEC OF SCOTTSDALE AND THUNDERBIRD SCOTTSDALE, ARIZONA

CONTACT ARIZONA 811 AT LEAST 2 FULL WORKING DAYS BEFORE YOU BEGIN EXCAVATION
ARIZONA811
CALL 811 OR CLICK ARIZONA811.COM

THESE PLANS ARE NOT APPROVED FOR CONSTRUCTION WITHOUT AN APPROVED SIGNATURE FROM THE GOVERNING MUNICIPALITY.

PROJECT NAME: SCOTTSDALE AND THUNDERBIRD

HE NO.: LGEC308
SCALE: 1"=50'

SHEET: C3

14-DR-2022
11/4/22

APPENDIX B
SEWER CAPACITY WORK SHEET

Project: Scottsdale and Thunderbird
Project No.: LGEC308
City: SCOTTSDALE, AZ
Date: 7/29/2022

PROJECTED SANITARY SEWER LOADS

Land Use	Building Area (sf)	Average Day Sewer Demand (gpd) City of Phoenix Water Services Dept. Deisgn Standards Manual Table 8. Water and Wastewater Design Flows		Peaking Factor	Average Daily Flow (gpd)	Average Daily Flow (gpm)	Peak Flow (gpm)
Industrial	243,360	50.0	gpd/1000sf	4.23	12,168	8.5	35.9
Total Buiding					**12,168**	**8.5**	**35.9**

Worksheet
Worksheet for Circular Channel

Project Description	
Worksheet	6" Service
Flow Element	Circular Chann
Method	Manning's For
Solve For	Discharge

Input Data			
Mannings Coeffic	0.013		
Channel Slope	005000	ft/ft	
Depth	0.33	ft	d/D=0.65 Flow Depth
Diameter	6.0	in	

Results			
Discharge	135	gpm	>35.9 gpm OK
Flow Area	0.1	ft²	
Wetted Perime	0.94	ft	
Top Width	0.00	ft	
Critical Depth	0.28	ft	
Percent Full	65.0	%	
Critical Slope	0.008150	ft/ft	
Velocity	2.22	ft/s	
Velocity Head	0.08	ft	
Specific Energ	0.40	ft	
Froude Numbe	0.74		
Maximum Disc	192	gpm	
Discharge Full	178	gpm	
Slope Full	0.002861	ft/ft	
Flow Type	Subcritical		

14-DR-2022
11/4/22

APPENDIX C
SEWER MAIN FLOW TEST

28-DR-2021

14-DR-2022
11/4/22

SL1327 RDH Flow Study Thunderbird and Scottsdale

Blake Wells, Vice President of Preconstruction
LGE Design Build
1200 N. 52nd St., Phoenix AZ 85008

SL1327 RDH Flow Study, 1 site in Scottsdale, AZ Thursday, 04-14-22 to Monday 04-25-22

Equipment for Site: Hach 901 Logger with Flo-Dar Sensor (Area Velocity).
The equipment was installed on Thursday, 04/14/22 with confined space entry, pipe size confirmed, sensor calibrated, and level depth confirmed to the flow level.

Duration of monitoring requested: 9-days including 2 weekends
Monitor: Flow (gpm), Level (in), and Velocity (fps)
Data logging: 5 minutes intervals (No averaged intervals)

Calibration Performed: Calibration method using yardstick

Yardstick Measure: 2.5 inches	Meter Read:	2.48 inches	4/14/2022 09:25

Calibration Performed: Calibration method using set target

Target Measure: 4.5 inches	Meter Read:	4.50 inches	4/14/2022 09:23

Meter Validation: PASSED

Monitoring Location: Manhole located on E. Thunderbird Rd between Scottsdale Rd and N 73rd St
72” Diameter, Rim to Invert: 195.00 inches
12” VCP pipe, flowing west
No Lateral(s)
The pipe condition was intact and reasonably clean
Scum line of between 3.5 and 4.0 inches
Flo-Dar installed pointing upstream in the 12” pipe channel

Flow data is valid having no missing, erroneous, or anomalies with data. This monitoring site required traffic control. All traffic requirements and permits were executed by RDH and documentation available upon request.

Attached is a MS Excel summary showing level, velocity, and flow logged at 5-minute intervals during the monitoring period.

RDH Environmental Services
Jeff Schulte
Service Manager
servicemanager@rdh-env.com

SL1327 RDH Flow Study Thunderbird and Scottsdale

Period Summaries:

LGE Thunderbird & Scottsdale Flow				
Date	Maximum (gpm)	Minimum (gpm)	Average (gpm)	Total (gal)
Thursday, April 14, 2022	93.25	12.73	50.28	43,489.70
Friday, April 15, 2022	74.18	11.34	29.31	42,206.30
Saturday, April 16, 2022	38.08	11.74	20.22	29,121.30
Sunday, April 17, 2022	22.24	5.74	11.92	17,168.70
Monday, April 18, 2022	94.42	5.20	31.82	45,815.50
Tuesday, April 19, 2022	85.00	8.95	37.16	53,507.50
Wednesday, April 20, 2022	100.07	14.37	43.41	62,504.80
Thursday, April 21, 2022	79.43	11.67	38.96	56,105.40
Friday, April 22, 2022	78.16	6.34	31.64	45,567.70
Saturday, April 23, 2022	49.07	9.14	25.75	37,075.60
Sunday, April 24, 2022	55.87	9.04	28.23	40,657.10
Monday, April 25, 2022	28.56	11.15	15.10	8,078.80

LGE Thunderbird & Scottsdale Level (in.)			
Date	Maximum	Minimum	Average
Thursday, April 14, 2022	3.06	1.28	2.28
Friday, April 15, 2022	2.77	1.21	1.80
Saturday, April 16, 2022	2.16	1.33	1.62
Sunday, April 17, 2022	1.77	0.98	1.34
Monday, April 18, 2022	3.04	0.94	1.78
Tuesday, April 19, 2022	2.91	1.08	1.93
Wednesday, April 20, 2022	3.14	1.34	2.09
Thursday, April 21, 2022	2.85	1.25	2.02
Friday, April 22, 2022	2.84	0.99	1.81
Saturday, April 23, 2022	2.28	1.10	1.69
Sunday, April 24, 2022	2.41	1.19	1.79
Monday, April 25, 2022	1.89	1.23	1.43

SL1327 RDH Flow Study Thunderbird and Scottsdale

Period Summaries:

LGE Thunderbird & Scottsdale Velocity (fps)			
Date	**Maximum**	**Minimum**	**Average**
Thursday, April 14, 2022	1.32	0.63	1.02
Friday, April 15, 2022	1.20	0.57	0.81
Saturday, April 16, 2022	0.89	0.51	0.69
Sunday, April 17, 2022	0.69	0.41	0.54
Monday, April 18, 2022	1.35	0.40	0.80
Tuesday, April 19, 2022	1.28	0.52	0.90
Wednesday, April 20, 2022	1.36	0.66	0.98
Thursday, April 21, 2022	1.24	0.60	0.93
Friday, April 22, 2022	1.22	0.46	0.83
Saturday, April 23, 2022	1.07	0.48	0.79
Sunday, April 24, 2022	1.11	0.47	0.80
Monday, April 25, 2022	0.84	0.55	0.63

*Data begins at 9:35 am on April 14th and ends at 08:55 am on April 25th.

SL1327 RDH Flow Study Thunderbird and Scottsdale

Pictures:

RDH ENVIRONMENTAL SERVICES, L.L.C.
6007 S. 40th Street, Suite # 3 ● Phoenix, AZ 85042 ● (602) 381-1960
Licenses: 122278 A

SL1327 RDH Flow Study Thunderbird and Scottsdale

Site Map:

RDH ENVIRONMENTAL SERVICES, L.L.C.
6007 S. 40th Street, Suite # 3 ● Phoenix, AZ 85042 ● (602) 381-1960
Licenses: 122278 A

APPENDIX D
REFERENCES

CITY OF SCOTTSDALE

DESIGN STANDARDS & POLICIES MANUAL

14-DR-2022
11/4/22

LAND USE	DEMAND (gpd)	DESIGN 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 (Condo)	140 per unit	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
Clubhouse for Subdivision Golf Course	100 per patron x 2 patrons per du per day	4.5
Fitness Center/ Spa/ Health club	0.8 per sq. ft.	3.5

FIGURE 7-1.2 AVERAGE DAY SEWER DEMAND IN GALLONS PER DAY & PEAKING FACTORS BY LAND USE

HYDRAULIC DESIGN 7-1.404

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

SS lines shall be designed and constructed to give mean full flow velocities equal to or greater than 2.5 fps, based upon Manning's Formula, using an "n" value of 0.013.

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, 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 shall be analyzed for minimum, average day and peak day design flow conditions for each reach of pipe.

The SS system shall be designed to achieve uniform flow velocities through consistent slopes. Abrupt changes in slope shall be evaluated for hydraulic jump.

The depth to diameter ratio (d/D) for gravity SS pipes 12 inches in diameter and less shall not exceed 0.65 in the ultimate peak flow condition. This d/D ratio includes an allowance for system infiltration and inflow.

The d/D for gravity drains greater than 12 inches diameter shall not exceed 0.70 for the ultimate peak flow condition. This d/D includes an allowance for system infiltration and inflow.

Measures to mitigate hydrogen sulfide shall be analyzed at manhole drops, abrupt changes in pipe slope or direction and at changes in pipe diameter.

MANHOLES AND CLEAN OUTS 7-1.405

Manholes in city streets shall be located near the center of the inside traffic lane, rather than on or near the line separating traffic lanes. Manholes shall not be in bike trails, equestrian trails, sidewalks, crosswalks or wash crossings. Manholes are required at all

City of Phoenix
Water Services Department

DESIGN STANDARDS MANUAL FOR WATER AND WASTEWATER SYSTEMS

2021

Water Services Department
200 West Washington Street
Phoenix, Arizona 85003-1697
Phone: (602) 495-5601
Fax: (602) 495-5461

14-DR-2022
11/4/22

in Chapter IV, Section C), are not always adequate to meet water demands. For some projects, a detailed analysis of domestic and fire flow demands may be required to properly define requirements for system design.

1. Water and Sewer Design Flows

The following **Table 8**, *Water and Wastewater Design Flows* shall be used to calculate both water and sewer design flows utilized in the preparation of engineering design reports, plans, and specifications.

Table 8. Water and Wastewater Design Flows.

Land Use	Unit	Water Average Daily Flow/Unit (gal)	Wastewater Average Daily flow/Unit (gal)
Single Family Residential	Dwelling	360	240
Multi-family	Dwelling	240	180
Commercial (retail/mall)	1000 ft^2	125	75
Commercial (office)	1000 ft^2	115	90
Warehousing/Big Box Retail	1000 ft^2	30	25
Industrial	1000 ft^2	65	50
Schools	Student	25	20
Hotel (no restaurant)	Room	140	100
Hotel (with restaurant)	Room	200	150
Resort	Room	300	210
Hospital (all flows)	Bed	500	300
Landscape Water Requirements			
General Landscaping	Acre	4,374	N/A
Public Right of Way or Streetscape	Acre	1,339	N/A
Surface Water	Acre	5,335	N/A

NOTES: The following Italicized notes are for Table 8, Water and Wastewater Design Flows

*Complete design flows are not provided for **industrial and hospital facilities** because case-by-case evaluation is necessary due to varying water demands observed for these use types. Some industrial uses such as data warehouses, food processing, bottling plants, and semi-conductor manufacturing can use more than ten times as much water as compared to warehousing or dry assembly manufacturing with no cooling tower use. Water use in hospitals varies greatly depending upon cooling tower and boiler use, the extent to which the hospital is used as a research and teaching facility, the amount of out-patient versus in-patient services provided, and the types of equipment used. Estimates of anticipated water use and wastewater generation must be produced for each new development or major expansion using projections of demands taking into account the following types of categories:*

- ***Water for cooling towers**: Cooling towers use can make up more than fifty percent of water demand at industrial facilities having large refrigeration units or cooling of servers. In most cases, cooling towers use twenty to forty percent of the water requirements for industrial operations and hospitals.*
- ***Water used as an input for production**: In some manufacturing operations, water is used as an input in the manufacturing process and must be included in demand projections because of the large volumes used. Examples include ice-making, soft-drink or water bottling operations, and food manufacturing such as industrial bakeries.*
- ***Water used in production/activities**: In many manufacturing operations water is used for cooling, cleaning, or other operational activities and must be included in demand projections. Examples include metal forming and finishing, semi-conductor wafer production, and aerospace parts manufacturing. Processes employing newer technologies tend to use less water than older technologies, but estimates must be made on a location and process-specific basis. Some medical facilities are now using the newer medical imaging techniques and sterilization processes that use little or no water, while some medical equipment still requires significant amounts of water.*
- ***Bed to space ratios and mix of services**: Bed to space ratios and services provided in hospitals can vary greatly. These variations depend upon the proportion of space necessary to provide 24/7 nursing care, full linen service, and full food service*

to patients staying overnight. Furthermore, some hospitals are highly specialized and focus on particular types of treatment and/or research while others provide general and emergency services only. Water use on a per-square-foot or per-bed-basis can even vary significantly between different parts of hospitals, so large expansions will require an individual analysis.

2. Water Peak Flow

Peak Flow shall be calculated as 1.7 times the average daily flow.

NOTE: *For clarification, the following example characterizes the calculations performed to determine the design flows and quantities involved in a hypothetical facility.*

EXAMPLE: Hypothetical water demand/flow evaluation (not including fire flows).

ASSUME: A 1000 dwelling unit multi-family development.

CRITERIA: From **Table 8**, *Water and Wastewater Design Flows*.
Average daily flow = 240 gallons per unit per day (gpupd)
Average total daily flow = 1,000 x 240 = 240,000 gallons per day (GPD)
Peak daily flow = 240,000 GPD x 1.7 (peaking factor)
Peak daily flow = 408,000 GPD

3. Sewer Peak Flow

All gravity sewer mains shall be designed for peak flow conditions. Peak flow is calculated as the product of the peaking factor and the average daily flow. The peaking factor should be calculated from Harmon's formula.

Design Flow = Peak Flow = Q Peak = Q avg [1+14/ (4+ $P^{1/2}$)], Where P = Population/1,000

F. WATER AND SEWER MAIN ABANDONMENT METHODS

There are three approved methods of abandoning water and sewer mains in public ROW and easements:

a. Total removal of pipe.

b. Crush pipe in place by mechanical means. This cannot be applied to asbestos cement pipe.

c. Leave pipe in place and fill with low strength grout.

No other methods are acceptable.

G. WATER AND SEWER STUBS OR TAPS AHEAD OF PAVING

City of Phoenix does not allow new stubs or taps ahead of paving unless the property owner can provide a conceptual design report and a site plan demonstrating the appropriate sizing and location of the mains or stubs. This applies to connections such as water/sewer stubs, water/sewer mains and service taps for fire lines and/or domestic use. The request for taps ahead of paving shall be submitted by the developer through a Water and Sewer Technical Appeal.

If the City approves the request for taps ahead of paving, and the size or location changes after the installation due to design changes, or for any other reason, it shall be the property owner's responsibility to abandon any unused infrastructure at the property owner's expense.

H. CROSS CONNECTIONS AND BACKFLOW PREVENTION

1. Cross Connection