CITY OF SCOTTSDALE

Wastewater Study

Wolf Springs Ranch

NWC 94th Street and Cactus Blvd

Scottsdale Arizona 85260

Final Sewer Basis of Design Report

June 7, 2018

SHG Job No.TEG1603-000

Submitted by:

The Empire Group

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Accepted For:
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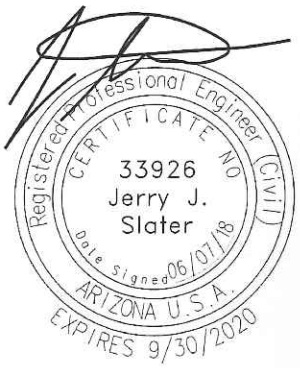
By: R. SACKS
Date: 7/3/18



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14-PP-2017
06/27/18

A. Introduction

The proposed development consists of 40 single-family residential units covering 20 acres located in Scottsdale, Arizona. The project has a gross density of 2.0 du/ac. The site is located on the northwest corner of N. 94th Street and East Cactus Road. The Site is within the southeast quarter of Section 18 in Township 3 North, Range 5 East of the Gila and Salt River Base and Meridian, City of Scottsdale, Maricopa County, Arizona. Refer to the Vicinity Map in Appendix A for the project location.

B. Design Documentation

The infrastructure sewer lines and unit daily flows for this project have been determined using the City of Scottsdale Design Standards & Policies Manual (DS&PM).

C. Existing Conditions

The existing site encompasses approximately 20 acres of developed land on ground that slopes generally to the south and west. The existing zone for the property is R1-18 PRD. The existing Site is used as an equestrian facility and school. The existing low site outfall is located at the southwest corner of the project at the corner of 93rd Street and Cactus. An existing 8" sewer line is located west of the site in 93rd Street and conveys flow south to a 24" sewer main located in Cactus Road that coveys flows west. 144 lots north of this project contribute flow to the 8-inch line in 93rd Street.

D. Sewer flows summary

Per the City of Scottsdale DS&PM residential sewer demand for an 8-inch pipe is 100 gpd per person and a peaking factor of 4. The average day sewer flow for the 40 units (2.5 people per) is 10,000 gpd with a peaking flow of 40,000 gpd. The existing flows from144 lots to the north are 36,000 gpd with a peaking flow of 144,000 gpd. The existing 8-inch line in 93rd Street with a slope of 0.0033 ft/ft flowing at 65% full has a capacity of 343,900 gpd. (See table in Section H).

The existing 8-inch sewer line in 93rd Avenue was analyzed for the peak flow of 184,000 gpd (127.78 gpm). The results are presented in Appendix C and show a d/D ratio of 0.45, less than the allowed 0.65.

E. Wastewater Collection System

The project is located within the City of Scottsdale Wastewater Service Area. Four runs of 8-inch PVC pipes will be installed within the proposed roadways and utility easements throughout the project. The 8-inch sewer lines will convey sewer flows from the 40 units to the existing 8-inch sewer line located in 93rd street west of the project. Existing manholes will be tied into to make the connection to the existing 8-inch sewer line. Individual 4-inch sewer laterals will service each residential unit. Flows from the development ultimately outfall to a 24-inch sewer main located in E. Cactus Road and is conveyed to a City of Scottsdale reclamation facility. See Appendix B – Utility Site Map

F. Design Considerations

All sewer lines will be designed using Manning's equation assuming pipe flowing full using a manning's "n" value of 0.013. Pipe sizes will be designed such that the peak flow will not exceed a depth of flow to pipe diameter ratio of 0.65 (d/D).

G. Minimum Slopes

Per the City of Scottsdale DS&PM a minimum full flow velocity of 2.5 feet per second will used to determine the minimum slope for each pipe segment. The maximum velocity will be limited to 10 fps at estimated peak flow.

H. Peaking Factor

The City of Scottsdale requires a sewer line to be designed to account for a peak flow scenario. A peaking factor is applied to the average day flows. A peaking factor of 4 was used for this parcel per the Engineer Design Standards and Policy Manual. Please see the table below for sewer flow calculations.

Development	2.5 persons per DU (P)	*Average Day (100gpcpd x P)	Peaking Factors (Average Day x 4)
Project	100	10,000	40,000

** 100 gallons per person and a peaking factor of 4. 100*(100) = 10,000gpd x 4 = 40,000gpd*

I. Conclusion

The project sewer design described within this Sewer Basis of Design Report was designed to collect and covey the wastewater flow under peak flow conditions. The 8-inch line in 93rd street has enough capacity to covey this project. The wastewater will ultimately be conveyed and treated at a City of Scottsdale Reclamation Facility.

- Approx. 1,300 LF of 8-inch PVC sewer line,
- Manhole Tap connections to the existing 8-inch sewer main.
- Individual 4" Sewer laterals (40)

J. References

- City of Scottsdale Design Standards & Policies Manual (DS&PM).
- City of Scottsdale Geographic Information Systems Quarter Section Maps 31-50 and 30-50

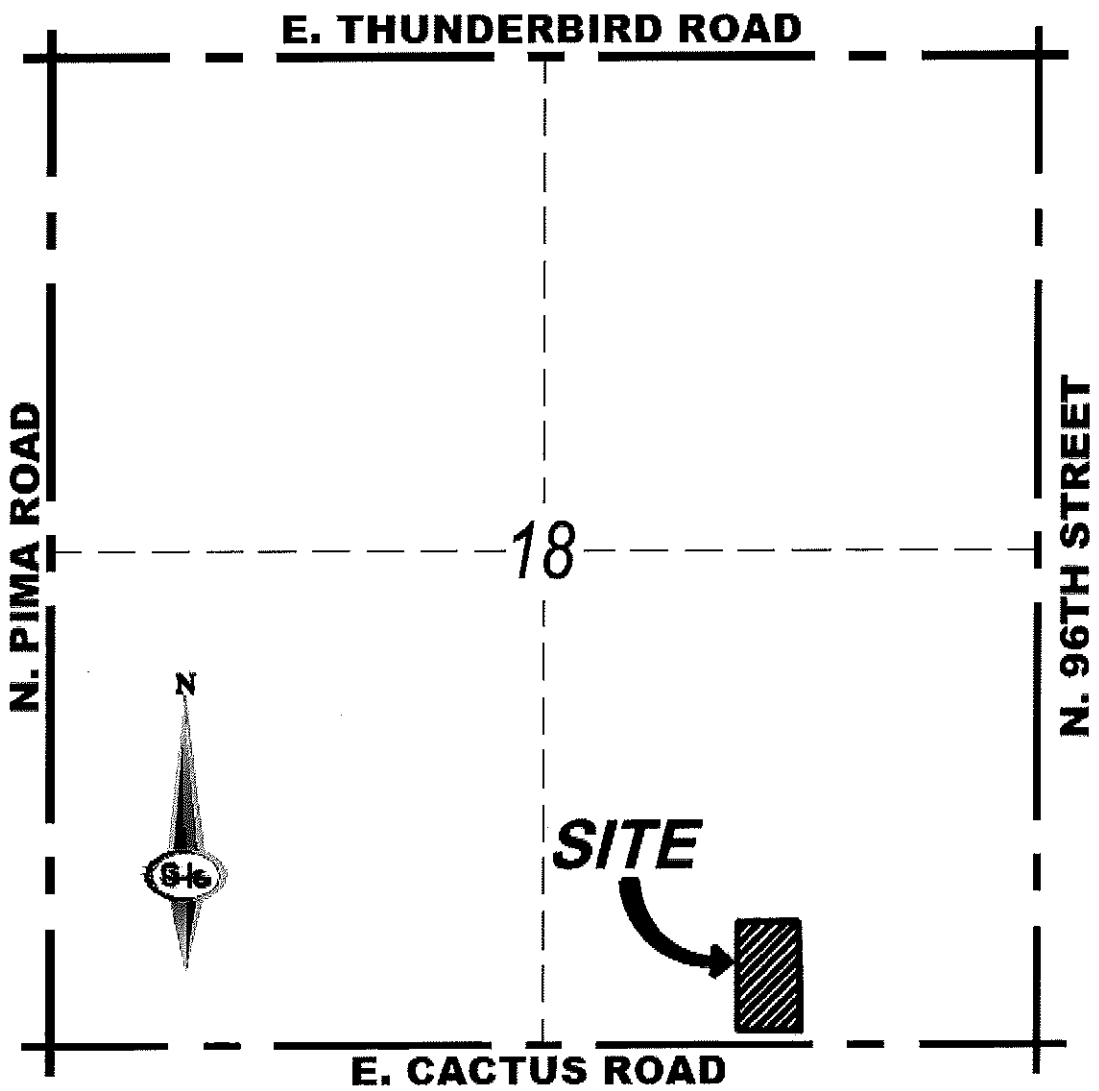
K. Appendices

Appendix A – Vicinity Map

Appendix B –Utility Site Map

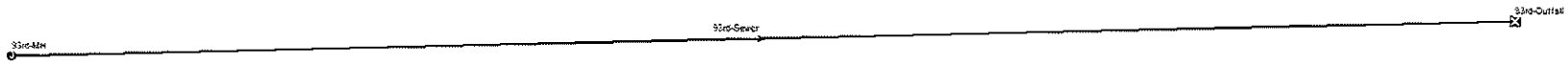
Appendix C – 93rd Avenue Pipe Capacity Check

Appendix A – Vicinity Map



VICINITY MAP

SEC. 18, T3N, R5E.


33rd-Sewer
33rd-Outfall

Project Description

File Name ..... 93rd Ave Pipe Check.SPF

Project Options

Flow Units	GPM
Elevation Type	Elevation
Hydrology Method	EPA SWMM
EPA SWMM Infiltration Method	SCS Curve Number
Link Routing Method	Steady Flow
Enable Overflow Ponding at Nodes	YES
Skip Steady State Analysis Time Periods	NO

Analysis Options

Start Analysis On	Dec 21, 2016	00:00:00
End Analysis On	Dec 22, 2016	00:00:00
Start Reporting On	Dec 21, 2016	00:00:00
Antecedent Dry Days	0	days
Runoff (Dry Weather) Time Step	0 01:00:00	days hh:mm:ss
Runoff (Wet Weather) Time Step	0 00:05:00	days hh:mm:ss
Reporting Time Step	0 00:05:00	days hh:mm:ss
Routing Time Step	30	seconds

Number of Elements

	Qty
Rain Gages	0
Subbasins	0
Nodes	2
Junctions	1
Outfalls	1
Flow Diversions	0
Inlets	0
Storage Nodes	0
Links	1
Channels	0
Pipes	1
Pumps	0
Orifices	0
Weirs	0
Outlets	0
Pollutants	0
Land Uses	0

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft^2)	Peak Inflow (gpm)	Max HGL Elevation Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	93rd-MH	Junction	100.33	110.00	100.33	110.00	0.00	127.78	100.63	0.00	9.37	0 00:00	0.00	0.00
2	93rd-Outfall	Outfall	100.00					127.78	100.30					

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length	Inlet Invert Elevation	Outlet Invert Elevation	Average Slope	Diameter or Height	Manning's Roughness	Peak Flow	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Reported Condition
					(ft)	(ft)	(ft)	(%)	(in)		(gpm)	(gpm)		(ft/sec)	(ft)		(min)	
1	93rd-Sewer	Pipe	93rd-MH	93rd-Outfall	100.00	100.33	100.00	0.3300	8.000	0.0130	127.78	311.57	0.41	1.89	0.30	0.45	0.00	Calculated