

## FINAL Basis of Design Report

APPROVED

APPROVED AS NOTED

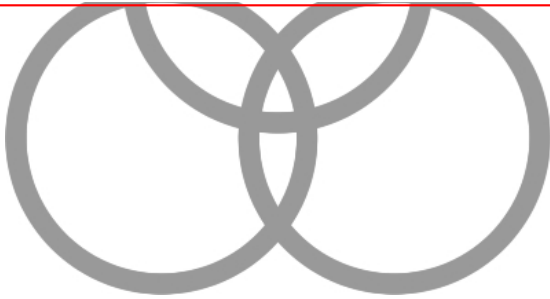
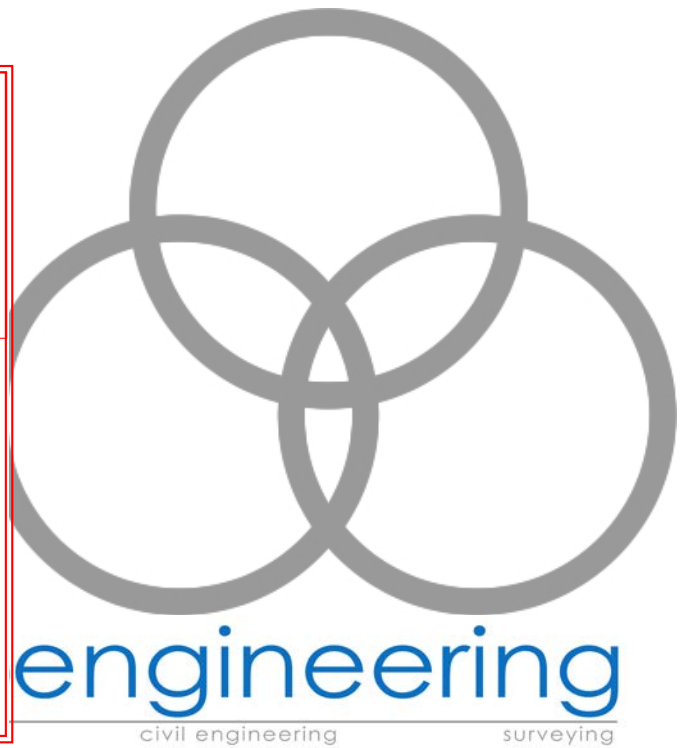
REVISE AND RESUBMIT



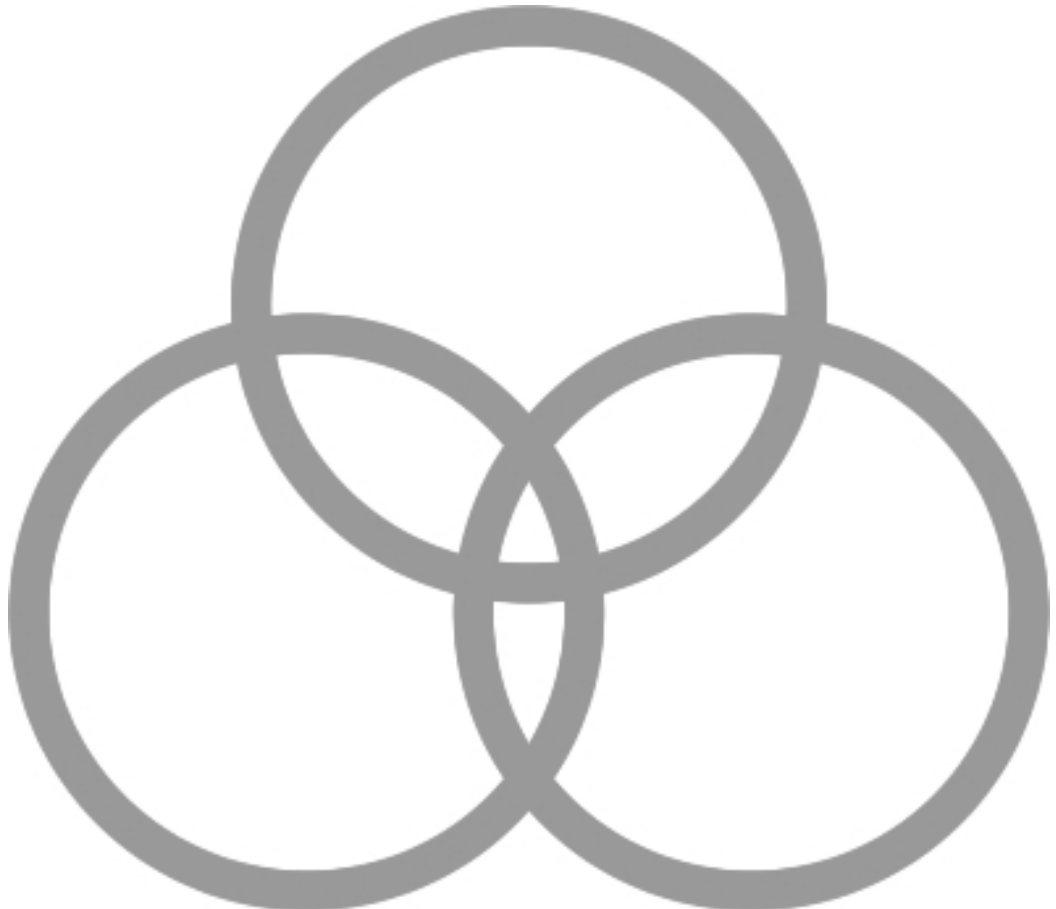
Disclaimer: If approved; the approval is granted under the condition that the final construction documents submitted for city review will match the information herein. Any subsequent changes in the water or sewer design that materially impact design criteria or standards will require re-analysis, re-submittal, 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 RSacks

DATE 5/20/2021



The Toy Barn Scottsdale  
Sewer Design Report  
3 engineering Job #: 5201  
March 5, 2021  
COS# 22-PA-2021



# TOY BARN SCOTTSDALE

## SEWER DESIGN REPORT

**Prepared for:**

Wesley Development  
PO Box 26768  
Scottsdale, Arizona 85255  
Contact: Jason Phillips  
Phone: (602) 920-3998



Expires 12/31/2021

Matthew J. Mancini, P.E.

March 5, 2021

**Submittal to:**

City of Scottsdale  
7447 E. Indian School Road, Suite 105  
Scottsdale, Arizona 85251

**Prepared by:**

3 engineering, L.L.C.  
6370 E. Thomas Road, Suite 200  
Scottsdale, AZ 85251  
Contact: Matthew J. Mancini, P.E.

**Job Number 5201**

**Table of Contents**

		<i>Page</i>
1.	<i>Introduction.....</i>	1
2.	<i>Design Documentation.....</i>	1
3.	<i>Existing Conditions.....</i>	1
4.	<i>Proposed Conditions.....</i>	1
5.	<i>Computations.....</i>	1
6.	<i>Summary.....</i>	2

**Tables**

TABLE 1: On-Site Sewer Demands .....	2
--------------------------------------	---

**Appendices**

Vicinity Map.....	A
Mannings Calculations.....	B

**Exhibits**

Sewer Design Exhibit .....	SE1
----------------------------	-----

## 1. Introduction

The purpose of this sewer report is to present the existing and proposed sewer plan for the project, Toy Barn Scottsdale (Site). It is our opinion the proposed sewer concept is in accordance with the City of Scottsdale's Design Standards & Policies Manual (Ref. 1).

The Site, is located in Section 11, Township 3 North, Range 4 East of the Gila and Salt River Meridian, Maricopa County, Arizona within the City of Scottsdale, Arizona. The Site is located South of Helm Drive, and East of 73<sup>rd</sup> Street, Scottsdale, Arizona 85254 (APNs 215-56-029 & 215-56-027C). The Site is bound on the south by existing commercial development, the east by a vacant parcel, on the north by Helm Drive Road, and on the west by 73<sup>rd</sup> Street. See Appendix A for a Vicinity Map.

The Site is zoned I-1. The Site currently exists as a vacant un-developed parcel. The intent of this project is to construct 52 Garage Storage Condominiums and a Clubhouse, including new site utility, drainage, and circulatory infrastructure.

## 2. Design Documentation

Manning's Equation was used to model and analyze the proposed sewer system for compliance with the City of Scottsdale design requirements. Demands were calculated using the City of Scottsdale Design Standards Manual for Water and Wastewater Systems. It is our opinion that this report is in accordance with the City of Scottsdale's Design Standards & Policies Manual.

## 3. Existing Conditions

The Site currently exists as a vacant un-developed parcel. See Appendix A for a vicinity map. The existing topography slopes from north to south at approximately 1.3% percent.

The Site is bound on the south by existing commercial development, the east by a vacant parcel, on the north by Helm Drive Road, and on the west by 73<sup>rd</sup> Street. There is an existing 8" PVC sewer line in both Helm and 73<sup>rd</sup> Street. The Sewer Line in 73<sup>rd</sup> Street will service the project. See Exhibit SE1 Sewer Plans for sewer line layouts.

## 4. Proposed Conditions

The project consists of an 52 Unit Garage Storage and Clubhouse project on 3.9 acres. The on-site sewer system will be private. The on-site sewer system will tie into the public system with a 6-inch service tap into a new manhole connection at the site entrance. Onsite sewer consists 6" private sewer lines that are designed at 1.0% slopes. See Exhibit SE1 for the proposed sewer design.

## 5. Computations

The following demand criteria were used in determining the system demands for the proposed site.

1. 52 Storage Units w/ clubhouse = approximately 81,270 sf
2. 0.5 gal/day per sf (using commercial use)
3. Design Flow = Peak Flow = Q Peak = Q avg x 3.0

TABLE 1: ON-SITE SEWER DEMANDS	
Number of Units 52 w/ clubhouse (total square footage of all three buildings)	81,270 sf
Avg. daily demand	40,635 gpd
Design Flow Rate (peaking factor – use 3.0 for industrial)	121,905 gpd

Average daily demand:  $81,270 \text{ sf} \times .5 \text{ gpd/sf} = 40,635 \text{ gpd}$   
 $= 40,635 \text{ gpd} / 1440 \text{ mpd} = 28.2 \text{ gpm}$

Peak Factor = 3.0

Design flow rate =  $3.0 \times 40,635 \text{ gpd} = 121,905 \text{ gpd}$   
 $= 121,905 \text{ gpd} / 1440 \text{ mpd} = 84.6 \text{ gpm}$

Manning’s Equation was used to model and analyze the proposed 6” sewer system for compliance with the City of Scottsdale design requirements. Refer to Appendix B for loading of the sewer line and Exhibit SE1 for the sewer design.

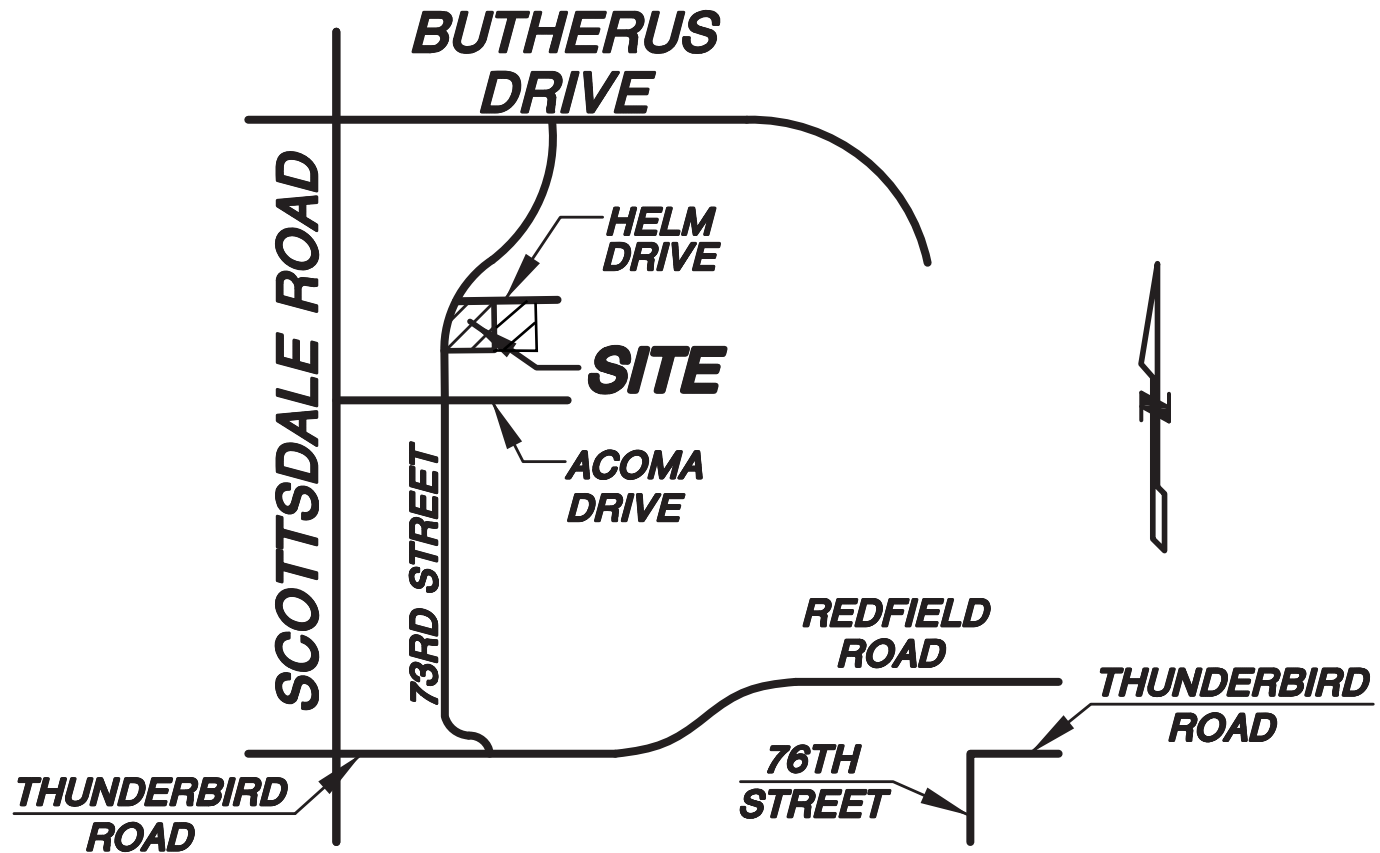
## 6. Summary

The Peak Flow for the proposed site is 121,905 gpd or 84.6 gpm. Based on the results from the sewer system analysis the onsite 6” system provides adequate capacity at 251.8 gpm, or 362,592 gpd.



*APPENDIX A*

*Vicinity Map*



# **VICINITY MAP**

**NOT TO SCALE**

*APPENDIX B*

*Manning's Calculations*

# Manning Pipe Flow Calculator

## Manning Formula Uniform Pipe Flow at Given Slope and Depth

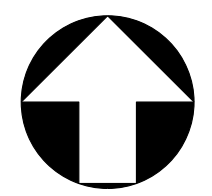
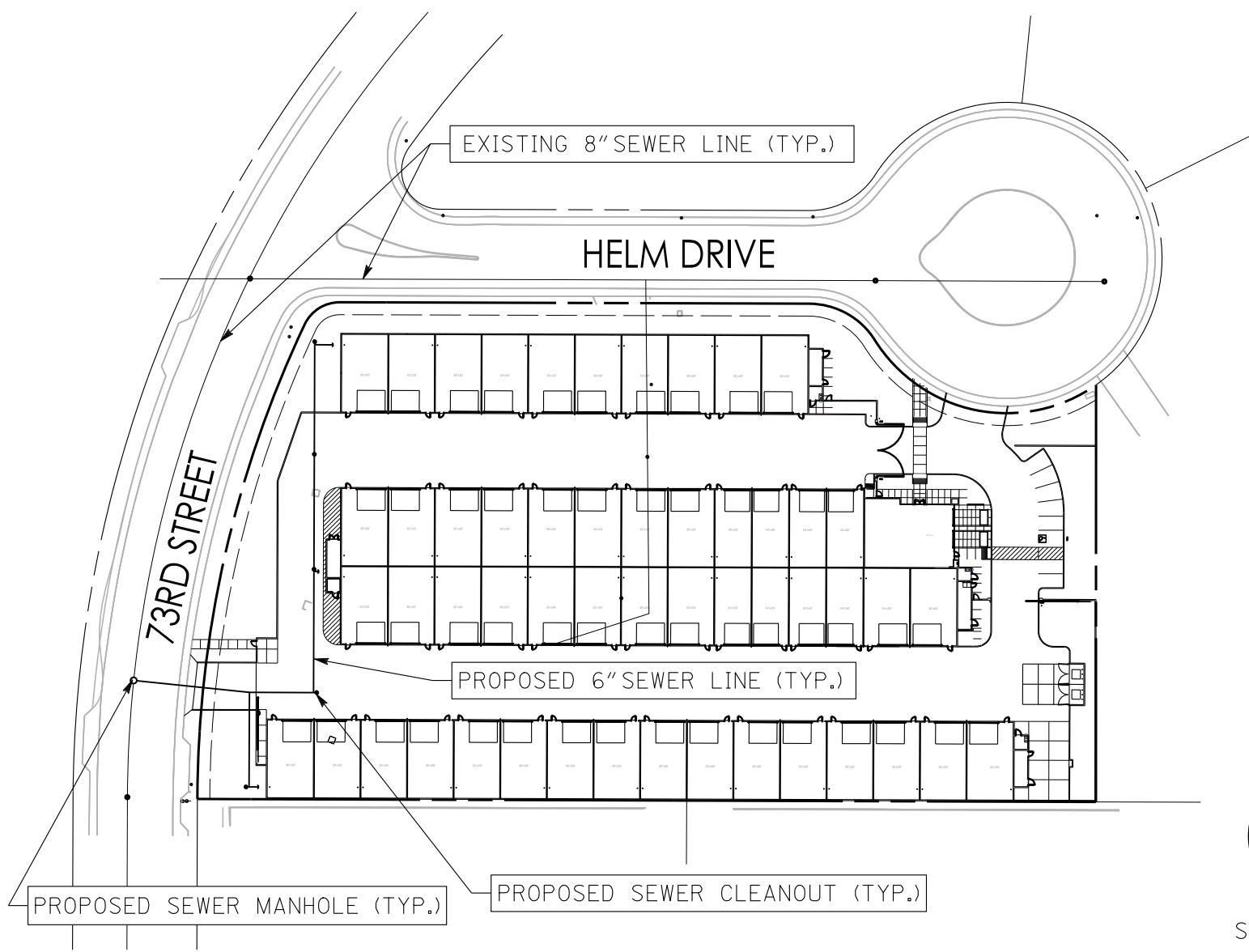
Toy Barn Scottsdale		Results	
Sewer Capacity - 6"		Flow, Q	251.8086 gpm
Set units: <input type="checkbox"/> m <input type="checkbox"/> mm <input type="checkbox"/> ft <input type="checkbox"/> in	Pipe diameter, $d_0$	Velocity, $v$	2.8575 ft/sec
	6 in	Velocity head, $h_v$	0.1269 ft
	Manning roughness, $n$ ?	Flow area	0.1964 ft <sup>2</sup>
	0.013	Wetted perimeter	18.8496 in
	Pressure slope $S_0$	Hydraulic radius	0.1250 ft
	.01 rise/run	Top width, T	0.0000 in
	Percent of (or ratio to) full depth (100% or 1 if flowing full)	Froude number, F	0.00
	100 %	Shear stress (tractive force), $\tau$	0.3122 psf



*EXHIBIT 1*

*Sewer Design Exhibit*

C:\My\_SecuriSync\Projects\_5000\5201\_Toy Barn Scottsdale\Reports\Sewer Report\5201exb\_SE01.dgn



SCALE: 1"=100'

# SE1

**TOY BARN SCOTTSDALE**  
73RD STREET & HELM DRIVE

**SEWER EXHIBIT - SE1**

**3e engineering**  
planning      civil engineering      surveying

3 ENGINEERING, LLC  
6370 E. THOMAS ROAD SUITE 200 SCOTTSDALE, ARIZONA 85251  
PHONE: (602) 334-4387 - FAX: (602) 490-3230  
WWW.3ENGINEERING.COM

DATE:	PROJECT NO.
02/04/21	5201