

NOVEMBER 11, 2024

# FINAL WASTEWATER BOD REPORT MAIN & MARSHALL REMODEL

PROJ NO. 644-PA-2024 KEY CODE 24029

7107 E Main St Scottsdale, Arizona 85251

**FINAL Basis of Design Report**

APPROVED

APPROVED AS NOTED

REVISE AND RESUBMIT



City of Scottsdale  
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 Levi Dillon      DATE 2/24/2025

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XX-DR-2024



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Address any applicable comments below and herein within the submitted improvement plans:

- 1) Refer to DS&PM 7-1.411 on applicability ad criteria for grease interceptor.
- 2) Confirm with applicable City plan review staff the proposed location of the grease interceptor.



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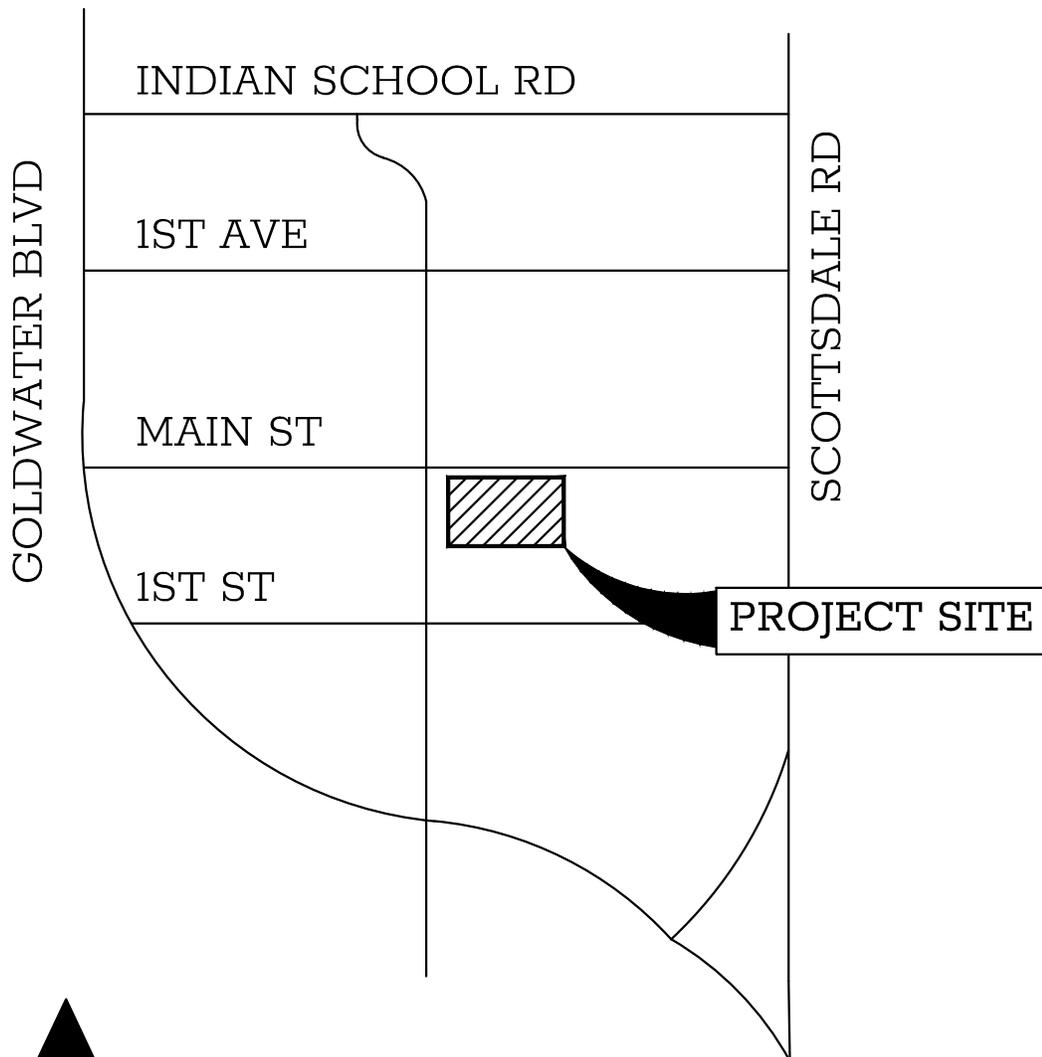
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Appendix A – Sewer Layout Exhibit
Appendix B – Flowmaster Results

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# MAIN & MARSHALL REMODEL

## 7107 E MAIN ST SCOTTSDALE, AZ 85251



***VICINITY MAP***

*NTS*



## Sewer Basis of Design Report

### Main & Marshall Remodel - 7107 E Main St Scottsdale, Arizona 85251

#### 1.0 Introduction

The site is located in a portion of the northeast quarter of Section 27, Township 2 North, Range 4 East of the Gila and Salt River Base and Meridian, Maricopa County, Arizona. See **Figure 1: Vicinity Map** on the previous page for project location.

This project consists of the renovation of three existing, single story, commercial/retail (occupancy type 'M') buildings in Scottsdale, Arizona. Interior walls between the buildings will be removed/remodeled, but the external walls will remain. The proposed use for the renovated/new building is A-2 (Restaurant). A new clerestory roof structure and updates to the exterior façade are also proposed with this project. The proposed building is approximately 7,545 square feet and includes covered and uncovered patio spaces for a total of approximately 9,177 square feet under roof.

The project is an infill project and will connect to existing site parking along Main St (north) and an existing alley (south), with limited disturbance to existing improvements except for within the alley. Five (5) additional stalls are proposed south of the parcel in the existing alley in addition to refuse containment, and architectural/landscape improvements. Existing onsite utilities will be removed and replaced with this project.

#### 2.0 Existing Conditions

This site is an infill project bounded to the north by Main St and existing parking, to the east by Malee's Thai Bistro (zoned C-2 DO), to the west by Marshall Way, and to the south by Canopy by Hilton Hotel separated by an existing alley/access road.

The project consists of Lots 10, 11 and 12 of the *West Scottsdale Subdivision* (platted 1913), located just Southwest of the intersection of Indian School Rd (Paradise Ave) and Scottsdale Rd (2<sup>nd</sup> Ave). The project will require a Lot Combination of existing parcels APN 130-12-112, -113 and -114 for the development. All three parcels are currently zoned D/DC-1 DO. The project will not need to be rezoned.

Existing topography immediately adjacent to the site (within the alley) slopes east to west at approximately 0.35%. The parking area south of the building slopes south toward the alley and away from the building. An 8" public sewer main of unknown material type exists roughly 10 ft south of the southernmost property boundary within the alley. The existing water infrastructure is also located approximately 10 ft south of the southernmost property boundary within the alley. The existing watermain is 6" ACP. The existing gravity distribution main slopes east to west at approximately 0.25% and is approximately 6.5' deep (5.75' cover).

### 3.0 Proposed Conditions

The proposed sanitary sewer system on-site consists of a private 6" PVC gravity sewer service that runs from north to south and ties into the existing 8" main south of the site in the alley. The proposed service will include cleanouts required per IPC section 708.1 and will utilize one of two existing wye connections on the property. The proposed connection will be at the existing service shown on quarter section map 16-44 at station 1+32. Upstream of the tie in at the existing tap, the 6" service will branch into two parallel 6" sewer lines where it connects to the building. The 6" service connection shall be constructed per MAG Detail 440-3. One is specifically for the restaurant and will include an inline grease interceptor, and the other will bypass the grease interceptor to directly discharge effluent from the restrooms. The minimum slopes are set based on International Plumbing Code for minimum pipe slope. For 6" services the minimum slope is 1.25%. A minimum of 4ft of cover shall be maintained over the proposed service lines. See **Appendix A** for the Sewer Layout Exhibit. The existing service to this property sits about 133' east of the existing manhole in Marshall Way. The unused existing service shall be capped and abandoned at the property line per DSPM 7-1.409.

The proposed service and grease interceptor will be privately owned and maintained and shall be accessible per DSPM Section 7-1.411.

### 4.0 Required Design Documentation/Computations/Hydraulic Modeling

All assumptions and methodologies used to develop the on-site design of this project will be in conformance with Section 7-1.3 of the City of Scottsdale 2018 Design Standards and Policies Manual. No variances were required to meet this requirement or unique challenges encountered.

#### 4.1 On-Site Wastewater Demands

Wastewater demands were determined using the City of Scottsdale 2018 DSPM, Section 7-1.403 and Figure 7-1.2 (*Average Day Sewer Demand in Gallons Per Day & Peaking Factors by Land Use*).

Wastewater demands were calculated according to building use area and then summed to obtain the total development demand. Commercial Average Day Demand (ADD) was determined for each land use based on square footage of the use area. Peak flow was then calculated as the product of the peaking factor and the average daily flow. **Table 1** shows the wastewater demand and Peaking Factor used to calculate the Peak Hour Flow (PHF) for each use area and for the total development.

**Table 1 – Wastewater Demands by Land Use**

Land Use	Demand Type	Site Quantity	Units	Average Daily Flow/Unit (gpd/unit)	Average Daily Flow (gpd)	ADF(gpm)	Peaking Factor	Peak Hour Flow (gpd)	PHF (gpm)
<sup>1</sup> Floor 1 Shell	Restaurant	5,640	SF	1.2	6,768	4.70	6	40,608	28.20
<sup>1</sup> Floor 1 Patio	Restaurant	1,905	SF	1.2	2,286	1.59	6	13,716	9.53
Total:					9,054	6.29		54,324	37.73

<sup>1</sup> Per City of Scottsdale DSPM Figure 7-1.2 - Average Day Sewer Demand in Gallons Per Day & Peaking Factors by Land Use

The design flow is the Peak Flow calculated for the site which is 54,324 gallons/day.

#### 4.2 Design Methodology

The proposed sanitary system was modeled using the OpenFlows FlowMaster hydraulic calculator program (version 03/20/2020). Manning’s Formula was used to verify the capacity of the **proposed 6" sewer service for the peak flow of 54,324 gallons/day** for each pipe. Sewer lines were designed using a Manning’s roughness value (n value) of 0.013. See **Appendix B** for the FlowMaster Output for each scenario run. **Table 2** shows the summary of the pipe and node data and system results.

**Table 2 – Wastewater System Results**

Pipe Physical Attributes				Node Data			
Pipe ID	Diameter (in)	Pipe Material	Manning’s ‘n’	Lower Node ID	Lower Node Invert	Upper Node ID	Upper Node Invert
P1	6	PVC	0.013	TAP1	1250.74	WYE1	1250.90
P2	6	PVC	0.013	WYE1	1250.90	BLDG1	1251.85
P3	6	PVC	0.013	WYE1	1250.90	GI1	1250.95
P4	6	PVC	0.013	GI2	1250.95	BLDG2	1251.55

Pipe Data				Results					
Pipe ID	Avg Cover (ft)	Pipe Length (ft)	Pipe Slope (ft/ft)	Peak Hour Flow (gpd)	Peak Flow Depth (in)*	d/D Ratio	Peak Flow Velocity (fps)	Full Flow Design Capacity (gpd)	Full Flow Design Velocity (fps)
P1	5.52	13.05	0.0125	54,324	1.5	0.25	2.22	405,436	3.19
P2	4.38	75.98	0.0125	27,162	1.1	0.18	1.82	405,436	3.19
P3	4.83	3.98	0.0125	27,162	1.1	0.18	1.82	405,436	3.19
P4	4.51	47.99	0.0125	27,162	1.1	0.18	1.82	405,436	3.19

\*Assumes 50% of peak flow from BLDG1 connection and 50% of peak flow from BLDG2 connection

Per City of Scottsdale DSPM section 7-1.404 *Hydraulic Design*, the full-flow velocities for all pipes shall be between 2.5 feet per second and 10 feet per second [Scenario 1], and the d/D (depth over diameter) ratio for the system shall remain below 65% at the peak flow condition [Scenario 2].

## 4.3 Results

The proposed sewer line is designed with slopes at 1.25% therefore all pipes maintain a velocity of 3.2 feet per second while flowing full and design Scenario 1 is satisfied.

The proposed sewer line has a flow depth to diameter ratio of 25% for the peak flow of 54,324 gallons/day at the pipe slope of 1.25%. Therefore, the d/D ratio of the proposed 6" sewer service is less than 65%, satisfying design Scenario 2.

The wastewater analysis concludes that the proposed 6" PVC sewer services have sufficient capacity to collect the flows from the entire site and will successfully outlet to the existing 8" sewer main south of the site.

## **5.0 Summary**

The wastewater system will tie into the existing 8" sewer main which runs parallel to the property's southern boundary line in the alley adjacent to the site. The wastewater system will consist of a private 6" service per MAG detail 440-3 on-site and provides sufficient capacity for the project. A grease interceptor will be provided for the restaurant effluent from the site.

The proposed wastewater system design meets the criteria set forth by Section 7-1.3 of the City of Scottsdale 2018 Design Standards and Policies Manual. Therefore, it can be determined that the wastewater infrastructure proposed herein is sufficient to support the multi-use development proposed with this project.

## **References**

City of Scottsdale Architectural & Engineering Design Guidelines- 2018 Design Standards and Policies Manual.

January 30, 2004. Section R18-5-501 through R18-5-509 of the Arizona Administrative Code (A.A.C)

July 1978, ADEQ Engineering Bulletin No 11 – Minimum Requirements for Design, Submission of Plans and Specifications of Sewage Works

International Plumbing Code, 2018

## Appendix A- Sewer Layout Exhibit



## Appendix B- FlowMaster Output

## Worksheet for 6" Pipe-1.25% Slope\_Peak Hour System

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.013
Channel Slope	1.250 %
Diameter	6.0 in
Discharge	54,324.00 gpd
Results	
Normal Depth	1.5 in
Flow Area	0.0 ft <sup>2</sup>
Wetted Perimeter	0.5 ft
Hydraulic Radius	0.9 in
Top Width	0.43 ft
Critical Depth	1.7 in
Percent Full	24.8 %
Critical Slope	0.708 %
Velocity	2.22 ft/s
Velocity Head	0.08 ft
Specific Energy	0.20 ft
Froude Number	1.322
Maximum Discharge	436,129.76 gpd
Discharge Full	405,435.88 gpd
Slope Full	0.022 %
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	24.8 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	1.5 in
Critical Depth	1.7 in
Channel Slope	1.250 %
Critical Slope	0.708 %

## Worksheet for 6" Pipe-1.25% Slope\_Peak Hour BLDG1 Connection

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.013
Channel Slope	1.250 %
Diameter	6.0 in
Discharge	27,162.00 gpd
Results	
Normal Depth	1.1 in
Flow Area	0.0 ft <sup>2</sup>
Wetted Perimeter	0.4 ft
Hydraulic Radius	0.6 in
Top Width	0.38 ft
Critical Depth	1.2 in
Percent Full	17.5 %
Critical Slope	0.719 %
Velocity	1.82 ft/s
Velocity Head	0.05 ft
Specific Energy	0.14 ft
Froude Number	1.298
Maximum Discharge	436,129.76 gpd
Discharge Full	405,435.88 gpd
Slope Full	0.006 %
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	17.5 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	1.1 in
Critical Depth	1.2 in
Channel Slope	1.250 %
Critical Slope	0.719 %

## Worksheet for 6" Pipe-1.25% Slope\_Peak Hour BLDG2 Connection

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.013
Channel Slope	1.250 %
Diameter	6.0 in
Discharge	27,162.00 gpd
Results	
Normal Depth	1.1 in
Flow Area	0.0 ft <sup>2</sup>
Wetted Perimeter	0.4 ft
Hydraulic Radius	0.6 in
Top Width	0.38 ft
Critical Depth	1.2 in
Percent Full	17.5 %
Critical Slope	0.719 %
Velocity	1.82 ft/s
Velocity Head	0.05 ft
Specific Energy	0.14 ft
Froude Number	1.298
Maximum Discharge	436,129.76 gpd
Discharge Full	405,435.88 gpd
Slope Full	0.006 %
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	17.5 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	1.1 in
Critical Depth	1.2 in
Channel Slope	1.250 %
Critical Slope	0.719 %

## Worksheet for 6" Pipe-1.25% Slope\_Full Flow

Project Description	
Friction Method	Manning Formula
Solve For	Full Flow Capacity
Input Data	
Roughness Coefficient	0.013
Channel Slope	1.250 %
Normal Depth	6.0 in
Diameter	6.0 in
Discharge	405,435.88 gpd
Results	
Discharge	405,435.88 gpd
Normal Depth	6.0 in
Flow Area	0.2 ft <sup>2</sup>
Wetted Perimeter	1.6 ft
Hydraulic Radius	1.5 in
Top Width	0.00 ft
Critical Depth	4.8 in
Percent Full	100.0 %
Critical Slope	1.293 %
Velocity	3.19 ft/s
Velocity Head	0.16 ft
Specific Energy	0.66 ft
Froude Number	(N/A)
Maximum Discharge	436,129.76 gpd
Discharge Full	405,435.88 gpd
Slope Full	1.250 %
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	18.1 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	6.0 in
Critical Depth	4.8 in
Channel Slope	1.250 %
Critical Slope	1.293 %