

Abbreviated Water and Sewer Needs



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78TH STREET & PRINCESS BOULEVARD APARTMENTS Final Wastewater Basis of Design Report

3 engineering Job #: 1923 August 13, 2020



9/18/2020



78[™] STREET & PRINCESS BOULEVARD APARTMENTS

FINAL WASTEWATER BASIS OF DESIGN REPORT

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August 13, 2020

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1. Introduction

The project site, 78th Street and Princess Boulevard Apartments, is located in the northeast quarter of Section 35, Township 4 North, Range 4 East of the Gila and Salt River Meridian, Maricopa County, Arizona within the City of Scottsdale. The project is located at the northwest corner of 78th Street and Princess Boulevard, Scottsdale, Arizona 85255. The site is bounded on the north and west by vacant land, on the east by a 78th Street, and on the south by Princess Boulevard. See Appendix A for a site map.

The existing zoning is P-C. The land is undeveloped. The City of Scottsdale 2001 General Plan shows the site as a Freeway Corridor/Regional Care. The proposed zoning is P-C. The site is a proposed 180-unit apartment complex.

2. Existing Conditions

The existing zoning is P-C. The existing site is undeveloped land with adjacent roadway and a drainage channel in an easement. See Appendix A for a site map. The site is surrounded by existing vacant land.

There is an existing 8" DIP sewer main in Princess Boulevard, south of the site. There is also an 8" DIP sewer stub at the southwest corner of the stie that extends under the drainage channel with concrete encasement. See Preliminary Sewer Plans in Appendix C for existing sewer line layout.

site

3. Proposed Conditions

The project consists of a 180-unit apartment complex on 10.70 acres. The proposed site will be serviced by a proposed 8" P.V.C. private sewer line that connects to an existing sewer stub. Each proposed building has a 6" P.V.C. lateral sewer line that connect to the proposed 8" sewer line. See Preliminary Sewer Plans in Appendix C for proposed sewer line layout. The proposed sewer line is to be private and is to be maintained by the owner of the property.

4. Design Documentation/ Computations/ Hydraulic Modeling

The purpose of this basis of design report is to verify that the proposed sewer system is able to accommodate demands generated by the proposed project, 78th Street and Princess Boulevard Apartments. FlowMaster V8i by Bentley Systems was used to model and analyze the proposed sewer system for compliance with the City of Scottsdale design requirements. Demands were calculated using Section 7-1.403A of the City of Scottsdale Design Standards and Policies Manual dated 2018. It is our opinion that this report is in accordance with the 2018 City of Scottsdale Design Standards and Policies Manual.

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

- 1. 180 units (16.8 dwelling units per acre)
- 2.5 persons per dwelling unit (residential less than 22 dwelling units per acre) 2.
- 3. 450 persons
- 100 gpd per capita 4.
- Peaking factor = 4.0 5.



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TABLE 1: ON-SITE SEWER DEMANDS		
Number of people	450	
Avg. daily demand	45,000 gpd	
Design Flow Rate	180,000 gpd	

Average daily demand: 450 persons x 100 gpdpp = 45,000 gpd = 45,000 gpd/1440 mpd = 31.25 gpm

Design flow rate = 4.0 x 45,000 gpd = 180,000 gpd = 180,000 gpd/1440 mpd = 125 gpm

FlowMaster V8i by Bentley Systems was used to model and analyze the proposed sewer system for the site to ensure it has sufficient capacity and is in compliance with the C.O.S. design requirements. The d/D ratio shall not exceed 0.65 for pipes less than 12" in diameter. The 8" sewer line was analyzed at a worst-case scenario with the entire peak flow and a minimum slope of 0.50%. Refer to the FlowMaster data in Appendix B for loading of the sewer line. See Sewer Plans in Appendix C for proposed sewer line layout.

5. Summary

The Peak Flow for the proposed site is 180,000 gpd. Based on the results from the sewer system analysis the proposed 8" sewer line has a capacity of 417,713.49 gpd at a d/D of 0.65 and a d/D of 0.39 at the peak flow rate of 180,000 gpd. The proposed sewer facilities are in accordance with the City of Scottsdale Design.

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APPENDIX A

Vicinity Map

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VICINITY MAP

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APPENDIX B

FlowMaster Data

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Cross Section for 8" Sewer 0.65 d/D

Project Description		
Friction Method	Manning Formula	
Solve For	Discharge	
Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.50000	%
Normal Depth	5.20	in
Diameter	8.00	in
Discharge	417713.49	gal/day
Cross Section Image		



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V	Vorksheet for 8" Sew	er 0.65 d/D
Project Description		
Friction Method	Manning Formula	
Solve For	Discharge	
Input Data		
Roughness Coefficient	0.01	3
Channel Slope	0.5000	0 %
Normal Depth	5.2	0 in
Diameter	8.0	0 in
Results		
Discharge	417713.4	9 gal/day
Flow Area	0.2	4 ft ²
Wetted Perimeter	1.2	5 ft
Hydraulic Radius	2.3	1 in
Top Width	0.6	4 ft
Critical Depth	0.3	8 ft
Percent Full	65.	0 %
Critical Slope	0.0075	1 ft/ft
Velocity	2.6	9 ft/s
Velocity Head	0.1	1 ft
Specific Energy	0.5	5 ft
Froude Number	0.7	7
Maximum Discharge	0.9	2 ft³/s
Discharge Full	0.8	5 ft³/s
Slope Full	0.0028	6 ft/ft
Flow Type	SubCritical	
GVF Input Data		
Downstream Depth	0.0	0 in
Length	0.0	0 ft
Number Of Steps		0
GVF Output Data		
Upstream Depth	0.0	0 in
Profile Description		
Profile Headloss	0.0	0 ft
Average End Depth Over Rise	0.0	0 %
Normal Depth Over Rise	65.0	0 %
Downstream Velocity	Infinit	ty ft/s
,		-

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Worksheet for 8" Sewer 0.65 d/D

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	5.20	in
Critical Depth	0.38	ft
Channel Slope	0.50000	%
Critical Slope	0.00751	ft/ft

Cross Section for 8" Sewer Peak Flow

Project Description		
Friction Method Solve For	Manning Formula Normal Depth	
Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.50000	%
Normal Depth	3.15	in
Diameter	8.00	in
Discharge	180000.00	gal/day
Cross Section Image		



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	worksheet for o	Jewei	reak flow
Project Description			
Friction Method	Manning Formula		
Solve For	Normal Depth		
Input Data			
Roughness Coefficient		0.013	
Channel Slope		0.50000	%
Diameter		8.00	in
Discharge		180000.00	gal/day
Results			
Normal Depth		3.15	in
Flow Area		0.13	ft²
Wetted Perimeter		0.90	ft
Hydraulic Radius		1.69	in
Top Width		0.65	ft
Critical Depth		0.24	ft
Percent Full		39.3	%
Critical Slope		0.00652	ft/ft
Velocity		2.19	ft/s
Velocity Head		0.07	ft
Specific Energy		0.34	ft
Froude Number		0.87	
Maximum Discharge		0.92	ft³/s
Discharge Full		0.85	ft³/s
Slope Full		0.00053	ft/ft
Flow Type	SubCritical		
GVF Input Data			
Downstream Depth		0.00	in
Length		0.00	ft
Number Of Steps		0	
GVF Output Data			
LInstream Denth		0.00	in
Profile Description		0.00	
Profile Headloss		0 00	ft
Average End Depth Over Rise		0.00	%
Normal Depth Over Rise		39.32	%
Downstream Velocity		Infinity	ft/s

Worksheet for 8" Sewer Peak Flow

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Worksheet for 8" Sewer Peak Flow

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	3.15	in
Critical Depth	0.24	ft
Channel Slope	0.50000	%
Critical Slope	0.00652	ft/ft

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APPENDIX C

Preliminary Sewer Plans



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