CITY OF SCOTTSDALE

Abbreviated Water and Sewer Needs

FINAL Basis of Design Report

☐ APPROVED

☑ APPROVED AS NOTED

☐ REVISE AND RESUBMIT

CITY OF SCOTTSDALE
SCOTTSDALE WATER
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 ldillon **DATE** 1/29/2020

WOOD PATEL

Address following on plans to be submitted:

1) Min slope of sewer shall be 0.52% per DS&PM 7-1.404. DS&PM 0.4% is shown in hydraulic calcs herein.
2) Sewer service lateral shall be 6-inch min and per MAG 440-3.
3) Clearance between proposed sewer, water, and other utilities shall be per City detail 2401. No utilities allowed within 6ft horizontally of sewer main.
4) For any sewer 10ft or more deep from rim to invert provide 5ft diameter manholes. DS&PM 7-1.405
5) Coat any drop manhole used per City standards. DS&PM 7-1.405
6) Sewer main shall be placed in accessible drive aisle with 6ft clear to either side. DS&PM 7-1.402

WASTEWATER COLLECTION SYSTEM
BASIS OF DESIGN REPORT
FOR
SKYSONG 7

December 16, 2019
WP# 195006

58-DR-2019
12/24/2019

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December 16, 2019

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Scottsdale, Arizona 85258

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ldillion@scottsdaleaz.gov

Re: **Skysong 7**
Wastewater Collection System Basis of Design Report
WP# 195006

Mr. Dillion:

This Wastewater Collection System Basis of Design Report is prepared for Butler Design Group and submitted to the City of Scottsdale. The proposed Skysong 7 (Site) is a 5.25-acre site, located at the southeast corner of Scottsdale Road and McDowell Road. More specifically, the Site is located in the southwest quarter of Section 2, Township 1 North, Range 4 East of the Gila and Salt River Meridian. Refer to the *Vicinity Map* at the back of this report for project location. The Skysong 7 building is a proposed 6-story, 281,700 square foot office building and parking garage, with associated paving, utility, hardscape, and landscape improvements.

This basis of design report has been prepared as required by the City of Scottsdale to demonstrate compliance with the *Master Wastewater Collection System Report for Skysong ASU Scottsdale Innovation Center*, prepared by Wood, Patel & Associates, Inc. (WOODPATEL), dated May 11, 2006.

Wastewater from the proposed buildings will be conveyed by a proposed 8-inch gravity line and existing 12-inch public gravity sewer lines that were recently constructed as part of the Skysong ASU Scottsdale Innovation Center infrastructure improvements. These existing sewer lines will connect to an existing 18-inch gravity sewer line in Skysong Boulevard (refer to the attached *Sewer Exhibit*). The existing sewer lines are part of the City of Scottsdale's public wastewater collection system. Since the entire parcel of land is owned by the City of Scottsdale, it is WOODPATEL's understanding there are no sewer easements within the Skysong site.

Projected wastewater flows are based on criteria provided in the City of Scottsdale's *Design Standards & Policy Manual*. Specifically, the design criteria utilized are as follows:

- Average Day Wastewater flows, Office: .4 gpd/sf
- Peaking Factor, Office: 3
- Minimum Mean Full Flow Velocity: 2.50 fps
- Minimum Peak Full Flow Velocity: 10.0 fps
- Minimum Peak Flow d/D Ratio (12-inch diameter or less sewers): d/D = 0.65

Abbreviations: gpd = gallons per day
* When a combination of apartments and commercial impacts a sewer line, 4.0 in model was used.
** Per the *Master Wastewater Collection System Report for Skysong ASU Scottsdale Innovation Center.*

Preliminary plans for Skysong 7 include two (2) sewer building connections; one (1) to the west building wing and one (1) to the east building wing. Both stubs will flow east on an 8-inch line into the existing 12-inch sewer at existing Manhole 1 in Innovation Place (refer to the attached *Wastewater Exhibit*)

The Average-Day wastewater preliminary design flow for Skysong 7 is approximately 112,680 gallons per day (gpd). The Peak wastewater preliminary design flow for Skysong 7 is approximately 338,040 gpd. It is assumed the infiltration and inflow from wet weather has been accounted for in the published design flow rates for the development and the maximum d/D. Therefore, those flows have not been added into the calculations. The proposed sanitary sewer collection system is designed to have adequate capacity to serve the proposed development. The proposed wastewater collection system is in compliance with the *Master Wastewater Collection System Report for Skysong ASU Scottsdale Innovation Center*.

Enclosed are a set of drawings and spreadsheets, which summarize the design and capacity of the system. The spreadsheets show the proposed sewer slopes, projected peak flow rates, and pipe flow capacities. Refer to the attached *Vicinity Map* and *Sewer Exhibit*.

Thank you for your prompt review of the preliminary proposed wastewater collection system provided for Skysong 7. Please contact us if you have any questions.

Sincerely,

Wood, Patel & Associates, Inc.

John M. Bulka, PE
Project Manager

JMB/km

Attachments: Calculations and Hydraulic Modeling Results
Vicinity Map
Water System Exhibit

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CALCULATIONS AND HYDRAULIC MODELING RESULTS

WOOD PATEL

TABLE 1
WASTEWATER MODEL, FULL BUILD-OUT CONDITION

Project	Skysong 7
Location	Scottsdale, Arizona
Project Number	195006
Project Engineer	John Bulka
References	City of Scottsdale Design Policies and Design Manual (2018)
	Arizona Administrative Code, Title 18, Chapter 9

		LAND USE									
FROM NODE	**TO NODE**	**Single Family Residential (DU)**	**Multi-Family Residential (DU)**	**Commercial (Retail/Mall)**	**Commercial (Office)**	**SEWER NODE ADD (gpd)**	**TOTAL ADD (gpd)**	**POPULATION**	**PEAKING FACTOR**	**PEAK FLOW (gpd)**	**PEAK FLOW (gpm)**
Outfall 1											
Stub 1	MH 1				41,500	16,600	16,600	166.0	3.0	49,800	35
Stub 2	Ex. MH 1				240,200	96,080	112,680	960.8	3.0	288,240	200
Total Proposed Flow		**0**	**0**	**0**	**281,700**	**112,680**	**129,280**	**1,127**	**3.0**	**338,040**	**235**

8-Inch Flowing at Peak Flow

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00400	ft/ft
Diameter	8.00	in
Discharge	338040.00	gal/day

Results

Normal Depth	4.86	in
Flow Area	0.22	ft²
Wetted Perimeter	1.19	ft
Hydraulic Radius	2.23	in
Top Width	0.65	ft
Critical Depth	0.34	ft
Percent Full	60.7	%
Critical Slope	0.00708	ft/ft
Velocity	2.36	ft/s
Velocity Head	0.09	ft
Specific Energy	0.49	ft
Froude Number	0.71	
Maximum Discharge	0.82	ft³/s
Discharge Full	0.76	ft³/s
Slope Full	0.00187	ft/ft
Flow Type	SubCritical	

Min slope per City standards in 0.52%. Revised calc below

INPUT		
	Slope, S	0.0052
	Manning's roughness, n_{full}	0.013
	Manning's roughness is	Constant
	Diameter, D	8 in
	Relative depth, d/D	0.560

Flowrate =	236 gpm
Velocity =	2.62 ft/s

GVF Input Data

Downstream Depth	0.00	in
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	in
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	60.73	%
Downstream Velocity	Infinity	ft/s

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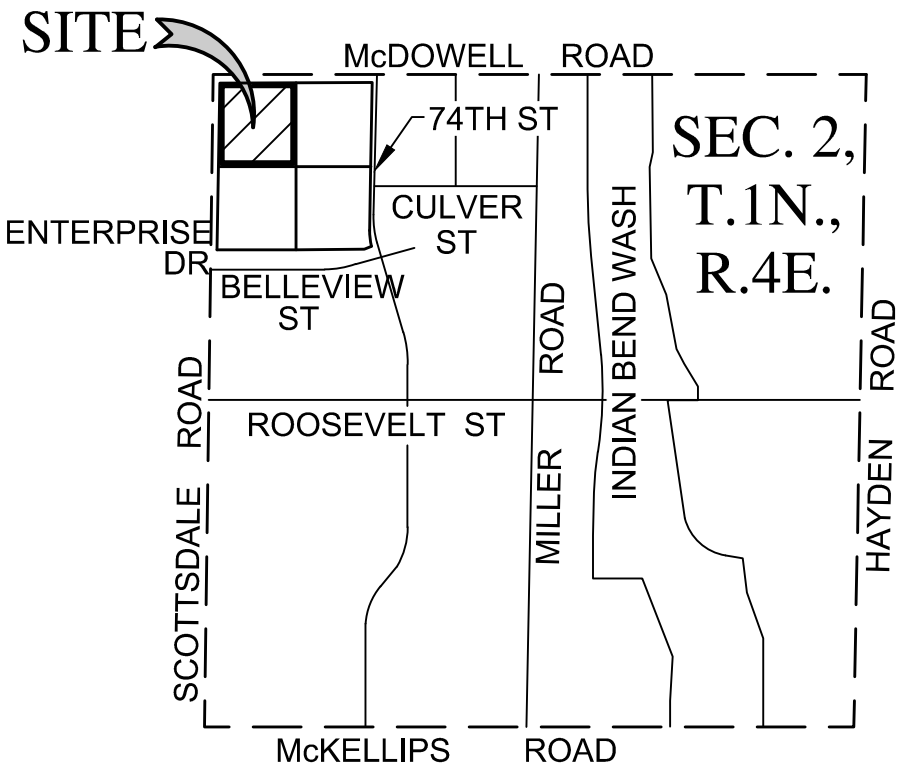
8-Inch Flowing at Peak Flow

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	4.86	in
Critical Depth	0.34	ft
Channel Slope	0.00400	ft/ft
Critical Slope	0.00708	ft/ft

VICINITY MAP

N



VICINITY MAP

N.T.S.

NOT FOR CONSTRUCTION OR RECORDING

WOOD PATEL

SKYSONG 7

VICINITY MAP

DATE	12/16/2019	SCALE	N/A	SHEET	01 OF 01
JOB NO.	195006	DESIGN	JB	CHECK	JB
		DRAWN	AF	RFI #	N/A

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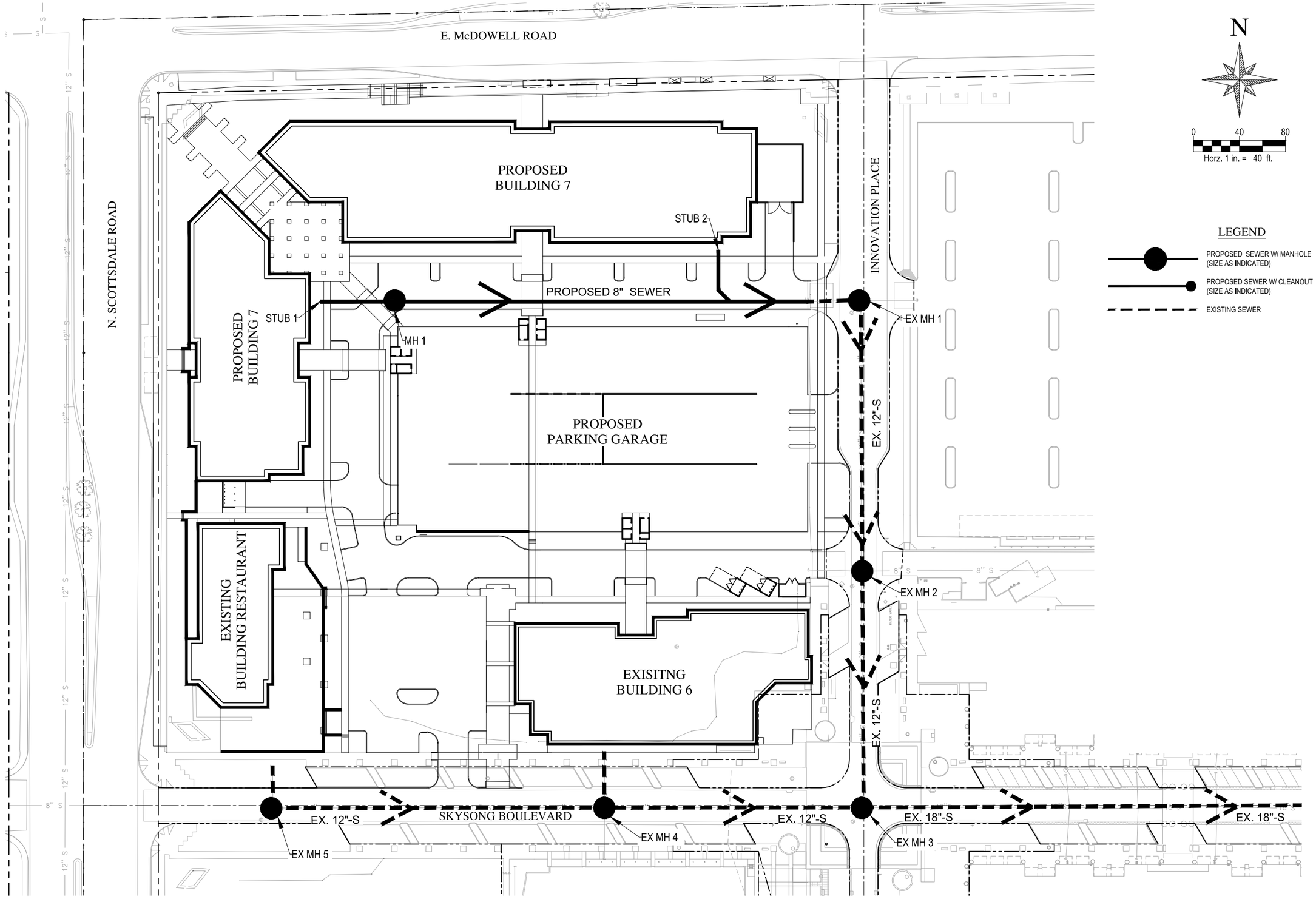
WASTEWATER SYSTEM EXHIBIT



WOOD/PATEL
MISSION: CLIENT SERVICE ®
(602) 335-8500
WWW.WOODPATEL.COM

Call at least two full working days before you begin excavation.
ARIZONA811
Arizona Blue Stake, Inc.
Dial 8-1-1 or 1-800-STAKE-IT (782-5348)
In Maricopa County: (602) 263-1100

SKYSONG
NW QUADRANT
SCOTTSDALE, ARIZONA
WASTEWATER EXHIBIT

REV	DESCRIPTION	DATE

SCALE (HORIZONTAL) 1" = 40'
SCALE (VERTICAL) N/A
DATE 12/16/2019
JOB NUMBER

58-DR-2019
12/24/2019

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