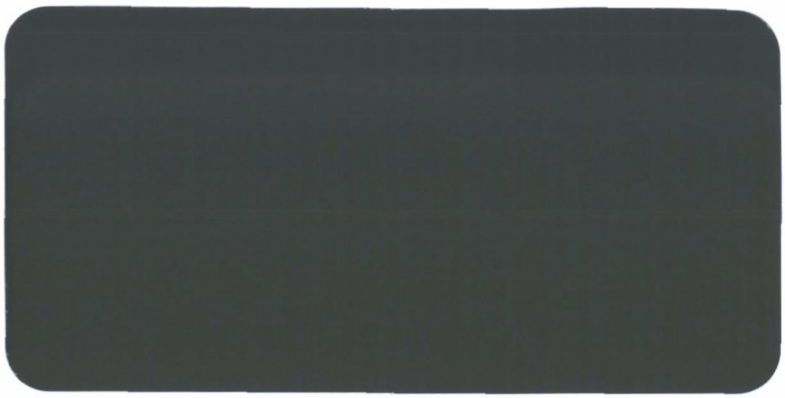
CITY FILE



**Accepted For:**
City of Scottsdale
Water Resources Department
9379 E. San Salvador
Scottsdale, Arizona

By: DOUG MANN
Date: 8.3.16

34-DR-2016
07/27/16

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# PRELIMINARY
# WASTEWATER BASIS OF
# DESIGN REPORT
# FOR
# SKYSONG NORTHWEST QUADRANT

July 14, 2016
WP# 123808

*Prepared For:*

**Plaza Companies, AMO®**
Mr. Jon Stelzer
9401 West Thunderbird Road
Suite 200
Peoria, Arizona 85381
*Phone: (623) 344-4539*

*Submitted To:*

**Mr. Douglas L. Mann, P.E.**
Water Resources Engineer
City of Scottsdale
9388 East San Salvador Drive
Scottsdale, AZ 85258
*Phone: (480) 312-5636*
*Fax: (480) 312-5615*

*Prepared By:*

**Wood, Patel & Associates, Inc.**
2220 South Country Club Drive
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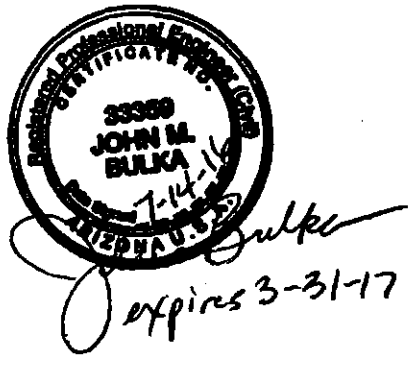


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July 14, 2016

Mr. Douglas L. Mann, P.E.
Water Resources Engineer
City of Scottsdale
9388 East San Salvador Drive
Scottsdale, AZ 85258

*Phone: (480) 312-5636*
*dmann@scottsdaleaz.gov*

Re: **Skysong Northwest Quadrant**
Wastewater Basis of Design
WP# 123808

Dear Mr. Mann:

The proposed Skysong Northwest Quadrant (Site) development is a commercial development with three (3) office buildings, a restaurant building, and a parking structure with associated landscaping and hardscape. The office buildings will have multiple stories (up to 6 stories), and range from 130,000 square feet (sf) to 200,000 sf, and the restaurant will be approximately 12,000 sf, according to information provided by the Architect, Butler Design Group. The proposed development is located east of Scottsdale Road and south of McDowell Road. More specifically, the Site is located in the northwest 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 the project location. The existing Skysong Northwest Quadrant is undeveloped with some desert landscaping.

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*, by Wood, Patel & Associates, Inc. (Wood/Patel), 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 constructed as part of the Skysong ASU Scottsdale Innovation Center infrastructure improvements. These existing sewer lines connect to an existing 18-inch gravity sewer line in Skysong Boulevard (see 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 Wood/Patel's understanding public sewer lines will be located within a dedicated utility corridor.

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:

- Peaking Factor, Office: 3.0*
- Peaking Factor, Restaurant: 6.0*

Maximum Peak Flow d/D Ratio (12" dia. or less Sewers): d/D = 0.65

---

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

Preliminary plans for Skysong Building 6 include one (1) sewer building connection. Preliminary plans for Skysong Building 7 include one (1) sewer building connection. Preliminary plans for Skysong Building 8 include two (2) sewer building connections. The Skysong Building 9 Restaurant is currently under construction (by others) and includes one (1) sewer building connection. Each building connection is identified on the attached exhibit, with corresponding wastewater flows assigned to each shown in the attached spreadsheets.

Based on the attached calculations, the Average-Day wastewater preliminary design flow for Skysong Building 6 is approximately 60,000 gallons per day (gpd). The Average-Day wastewater preliminary design flow for Skysong Building 7 is approximately 52,000 gpd. The Average-Day wastewater preliminary design flow for Skysong Building 8 is approximately 80,000 gpd. The Average-Day wastewater preliminary design flow for Skysong Building 9 is approximately 14,400 gpd. The combined peak wet-weather preliminary design flow from Skysong Buildings 6, 7, 8, and 9 within the Skysong project is approximately 662,400 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 the Skysong Northwest Quadrant. Please contact us if you have any questions.

Sincerely,

**Wood, Patel & Associates, Inc.**


John M. Bulka, P.E.
Project Manager

JMB/km

N:\2012\123808\Project Support\Reports\Sewer BOD\Text\123808 Skysong NW Quadrant Preliminary Wastewater BOD Report.docx

# CALCULATIONS

Project: Skysong Northwest Quadrant
Location: Scottdale, AZ
Proj. Number: 123808
Project Manager: John Bulka, P.E.

References: City of Scottsdale Design Standards and Manuals January 2010

| AVERAGE DAY SEWER DEMANDS | | |
|---|---|---|
| **Land Use** | **Demand** | **Peaking Factor** |
| Commercial/Retail | 0.5 per sq. ft. | 3 |
| Office | 0.4 per sq. ft. | 3 |
| Restaurant | 1.2 per sq. ft. | 6 |
| High Density Condominium | 140 per room | 4.5 |
| Resort Hotel (includes site amenities) | 380 per room | 4.5 |
| School: without cafeteria | 30 per student | 6 |
| School: with cafeteria | 50 per student | 6 |
| Cultural | 0.1 per sq. ft. | 3 |

**FIGURE 7.1-2 AVERAGE DAY SEWER DEMAND IN GALLONS**

| Pipe Diameter (inches) | Maximum Manhole Spacing (feet) |
|---|---|
| 8 – 15 | 500 |
| 18 – 30 | 600 |
| 36 – 60 | 800 |
| Over 60 | 1,300 |

| Pipe Size (IN) | Min Slope (FT/FT) |
|---|---|
| 4 | 0.0131 |
| 6 | 0.0076 |
| 8 | 0.0052 |
| 10 | 0.0039 |
| 12 | 0.0030 |
| 15 | 0.0022 |
| 18 | 0.0018 |
| 21 | 0.0014 |
| 24 | 0.0012 |
| 27 | 0.0010 |
| 30 | 0.0009 |
| 36 | 0.0007 |
| 42 | 0.0006 |
| 48 | 0.0005 |

| | |
|---|---|
| **Gravity Sewer Minimum Pipe Velocity** | 2.5 FPS |
| **Gravity Sewer Maximum Pipe Velocity** | 10.0 FPS |

**WOOD/PATEL**

**WASTEWATER MODEL SPREADSHEET**

CIVIL ENGINEERS • HYDROLOGISTS • LAND SURVEYORS • CONSTRUCTION MANAGERS

Project: Skysong Northwest Quadrant
Location: Scottdale, AZ
References: *City of Scottsdale Design Standards and Manuals January 2010*

Proj. Number: 123808
Project Manager: John Bulka, P.E.

| | | COMMERCIAL | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| UPSTREAM NODE | DOWNSTREAM NODE | Office (S.F.) | Restaurant (S.F.) | ADF/ UNIT (GPD)[2] | SEWER NODE ADF (GPD) | TOTAL ADF (GDP) | PEAKING FACTOR[1] | SEWER NODE PEAK FLOW (GPD) | PEAK FLOW (GPD) |
| **Proposed Sewer Service** | | | | | | | | | |
| Proposed Building 7 | MH 1 | 130,000 | -- | 0.4 | 52,000 | 52,000 | 3.00 | 156,000 | 156,000 |
| MH 1 | B8 Connect 1 | -- | -- | -- | -- | 52,000 | -- | -- | 156,000 |
| (1/2) Proposed Building 8 | B8 Connect 1 | 100,000 | -- | 0.4 | 40,000 | 40,000 | 3.00 | 120,000 | 120,000 |
| B8 Connect 1 | B8 Connect 2 | -- | -- | -- | -- | 92,000 | 3.00 | -- | 276,000 |
| (1/2) Proposed Building 8 | B8 Connect 2 | 100,000 | -- | 0.4 | 40,000 | 40,000 | 3.00 | 120,000 | 120,000 |
| B8 Connect 2 | EX MH 1 | -- | -- | -- | -- | 132,000 | -- | -- | 396,000 |
| EX MH 1 | EX MH 2 | -- | -- | -- | -- | 132,000 | -- | -- | 396,000 |
| EX MH 2 | EX MH 3 | -- | -- | -- | -- | 132,000 | -- | -- | 396,000 |
| Proposed Building 9 | EX MH 5 | -- | 12,000 | 1.2 | 14,400 | 14,400 | 6.00 | 86,400 | 86,400 |
| EX MH 5 | EX MH 4 | -- | -- | -- | -- | 146,400 | -- | -- | 86,400 |
| Proposed Building 6 | EX MH 4 | 150,000 | -- | 0.4 | 60,000 | 60,000 | 3.00 | 180,000 | 180,000 |
| EX MH 4 | EX MH 3 | -- | -- | -- | -- | 206,400 | -- | -- | 266,400 |
| EX MH 3 | Ex 18" Gravity Sewer | -- | -- | -- | -- | 338,400 | -- | -- | 662,400 |
| | | | | | | 338,400 | | | 662,400 |

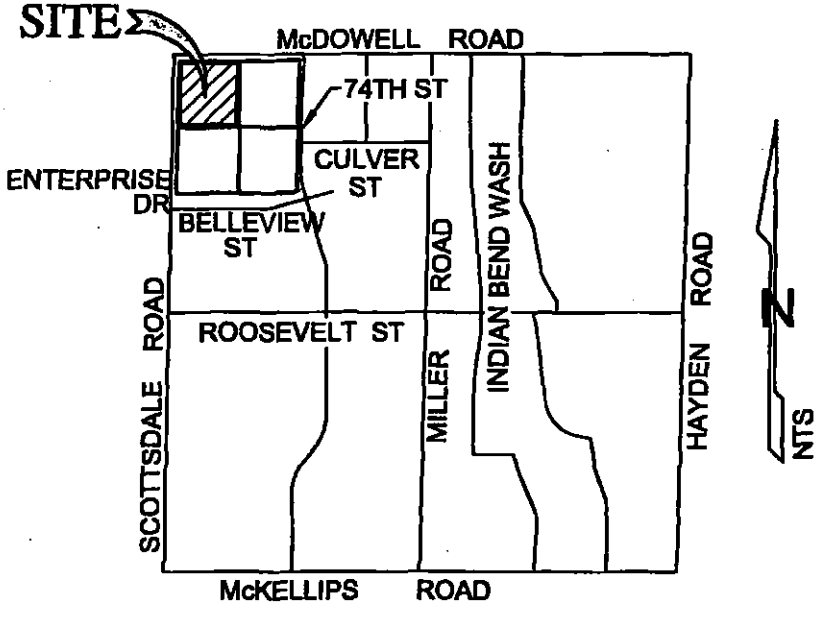
1) Peaking factor taken from the City of Scottsdale Design Standards and Manuals January 2010 section 7-1.403

Project: Skysong Northwest Quadrant
Location: Scottdale, AZ
References: *City of Scottsdale Design Standards and Manuals January 2010*

Proj. Number: 123808
Project Manager: John Bulka, P.E.

| FROM NODE | TO NODE | PIPE DIA. (INCHES) | PEAK FLOW (GPD) | PIPE SLOPE (FT / FT) | FULL FLOW VELOCITY (FPS) | d/D RATIO | PIPE CAPACITY (GPD) | SURPLUS CAPACITY (GPD) | PERCENT OF CAPACITY |
|---|---|---|---|---|---|---|---|---|---|
| **Proposed Sewer Service** | | | | | | | | | |
| Proposed Building 7 | MH 1 | 6 | 156,000 | 0.005 | 2.0 | 0.56 | 256,928 | 100,928 | 61% |
| MH 1 | B8 Connect 1 | 8 | 156,000 | 0.005 | 2.5 | 0.36 | 553,380 | 397,380 | 28% |
| (1/2) Proposed Building 8 | B8 Connect 1 | 6 | 120,000 | 0.02 | 4.0 | 0.33 | 513,857 | 393,857 | 23% |
| B8 Connect 1 | B8 Connect 2 | 8 | 276,000 | 0.005 | 2.5 | 0.50 | 553,380 | 277,380 | 50% |
| (1/2) Proposed Building 8 | B8 Connect 2 | 6 | 120,000 | 0.02 | 4.0 | 0.33 | 513,857 | 393,857 | 23% |
| B8 Connect 2 | EX MH 1 | 8 | 396,000 | 0.005 | 2.5 | 0.63 | 553,380 | 157,380 | 72% |
| EX MH 1 | EX MH 2 | 12 | 396,000 | 0.005 | 3.2 | 0.34 | 1,631,771 | 1,235,771 | 24% |
| EX MH 2 | EX MH 3 | 12 | 396,000 | 0.005 | 3.2 | 0.34 | 1,631,771 | 1,235,771 | 24% |
| Proposed Building 9 | EX MH 5 | 12 | 86,400 | 0.005 | 3.2 | 0.16 | 1,631,771 | 1,545,371 | 5% |
| EX MH 5 | EX MH 4 | 12 | 86,400 | 0.083 | 13.1 | 0.08 | 6,648,339 | 6,561,939 | 1% |
| Proposed Building 6 | EX MH 4 | 6 | 180,000 | 0.02 | 4.0 | 0.41 | 513,857 | 333,857 | 35% |
| EX MH 4 | EX MH 3 | 12 | 266,400 | 0.0035 | 2.7 | 0.30 | 1,365,237 | 1,098,837 | 20% |
| EX MH 3 | Ex 18" Gravity Sewer | 18 | 662,400 | 0.005 | 4.2 | 0.25 | 4,811,655 | 4,149,255 | 14% |

# VICINITY MAP




N:\2012\123808\Project Support\Reports\Water BOD\Skysong O+M\Exhibits\3808_50 Exhibit 1 - Vicinity Map.dwg

# VICINITY MAP

## SKYSONG NW QUADRANT


WOOD/PATEL
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(602) 335-8500
WWW.WOODPATEL.COM


| DATE | SCALE | SHEET |
|---|---|---|
| 01-18-2016 | N.T.S. | 1 OF 1 |
| JOB NO. | DESIGN JB | CHECK RS |
| 123808.50 | DRAWN JS | |

**SEWER EXHIBIT**

E. McDOWELL ROAD

N. SCOTTSDALE ROAD

INNOVATION PLACE

PROPOSED BUILDING 8

PROPOSED BUILDING 7

PROPOSED BUILDING 9 RESTAURANT (UNDER CONSTRUCTION)

PROPOSED BUILDING 6

PROPOSED PARKING GARAGE

PROPOSED 8" SEWER

MH 1

B8 CONNECT 1

B8 CONNECT 2

EX MH 1

EX MH 2

EX MH 3

EX MH 4

EX MH 5

EX. 12"-S

EX. 18"-S

SKYSONG BOULEVARD

N

0 40 80

Horz. 1 In. = 40 ft.

LEGEND

PROPOSED SEWER W/ MANHOLE (SIZE AS INDICATED)

PROPOSED SEWER W/ CLEANOUT (SIZE AS INDICATED)

EXISTING SEWER

WOOD/PATEL

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ARIZONA811

SKYSONG

NW QUADRANT

SCOTTSDALE, ARIZONA

WASTEWATER EXHIBIT

| REV | DESCRIPTION | DATE |
|---|---|---|
| | | |

SCALE (HORIZONTAL) 1" = 40'

SCALE (VERTICAL) N/A

DATE 07/14/2019

JOB NUMBER 123808

SHEET 1 OF 1