BASIS OF DESIGN REPORT FOR SEWER

Key Essentials Hanger | 16060 N. 82nd Street, Scottsdale, AZ 85260

OWNER/DEVELOPER: DPA Architects, Inc.
3719 N. 75th Street, Suite 105
Scottsdale, AZ 85251
John S. Szafran

CONTACT: JMC Engineering, PLLC
7315 N 16th Street, Suite 101
Phoenix, Arizona 85020
Joseph M. Cirone, P.E.
Phone: (602) 374-4148

PROJECT DESCRIPTION:

The proposed development is located at the southwest corner (SWC) of E. Paradise Lane and N. 82nd Street within the corporate limits of the City of Scottsdale. The development will consist of the construction of a new Hangar Building with concrete parking areas, concrete staging areas, associated landscape areas, and appurtenant facilities. There is currently an 8-inch Vitrified Clay Pipe (VCP) sewer main located within N. 82nd Street, west of the site. The proposed system for the building shall include a 6-inch Polyvinyl Chloride (PVC) pipe with Protecto 401 ceramic epoxy lining gravity sewer service with sewer cleanouts. The proposed sewer service shall connect to a proposed manhole within 82nd street.

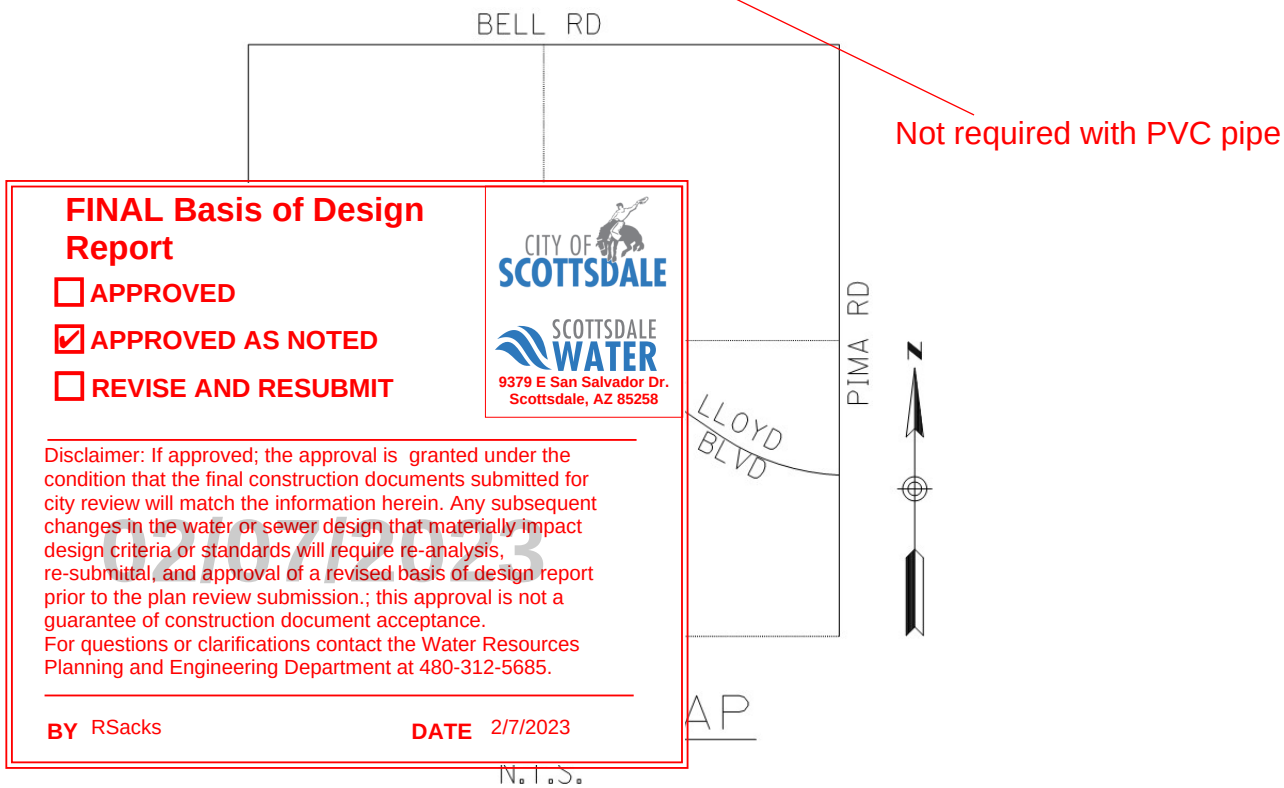


Figure 1. Vicinity Map

SEWER DEMAND AND PRODUCTION CRITERIA

Building Area:	13,944-sf
Property Area:	47,175-sf (1.08-ac)
Land Use:	Commercial[1]
Average Daily Flow (ADF):	0.5-gal/day/sq. ft. (Commercial)[1]
Peaking Factor (PF):	3[1]
Peak Flow:	Peak Flow = PF x (Average Daily Flow)

[1] Source: City of Scottsdale Design Standards and Policies Manual. Chapter 7-Wastewater; Section 7-1, Figure 7.1-2
[2] Source: City of Scottsdale Design Standards and Policies Manual. Chapter 7-Wastewater; Section 7-1.409

SEWER DESIGN FLOWS

$$ADF = 0.5\frac{gpd}{sf}(13{,}944\ sf) = 6{,}972\ gpd = 4.84\ gpm$$

$$Peak\ Flow = 3(6{,}972\ gpd) = 20{,}916\ gpd = 14.53\ gpm = 0.039\ cfs$$

CAPACITY OF NEW 6" SERVICE PIPE (@S=1.00%)

$$Manning's\ Equation = v = \frac{1.49}{n}R^{2/3}s^{1/2}$$

v = average velocity of flow, fps
n = roughness coefficient
R = hydraulic radius, ft
s = hydraulic gradient, ft/ft

Manning's Coefficient	Hydraulic Radius	Hydraulic Gradient	Calculated Velocity	Minimum Velocity[3]
n	R	s	v_c	v_{min}
	(ft)	(ft/ft)	(fps)	(fps)
0.013	0.125	0.0100	2.8	2.50

$$Continuity\ Equation = Q = va$$

v = average velocity of flow, fps
a = flow area, sq. ft

Average Velocity	Pipe Diameter	Flow Area	Flow Capacity	Project Peak Flow	Normal Depth	d/D Maximum	Project d/D
v_c	D	a	Q_{cap}	Q_{peak}	d	d/D_{Max}	d/D
(fps)	(ft)	(sf)	(cfs)	(cfs)	(ft)		
2.87	0.50	0.196	0.563	0.039	0.65	0.65	0.20

[3] Source: City of Scottsdale Design Standards and Policies Manual. Chapter 7-Wastewater; Section 7-1.404

RESULT SUMMARY:

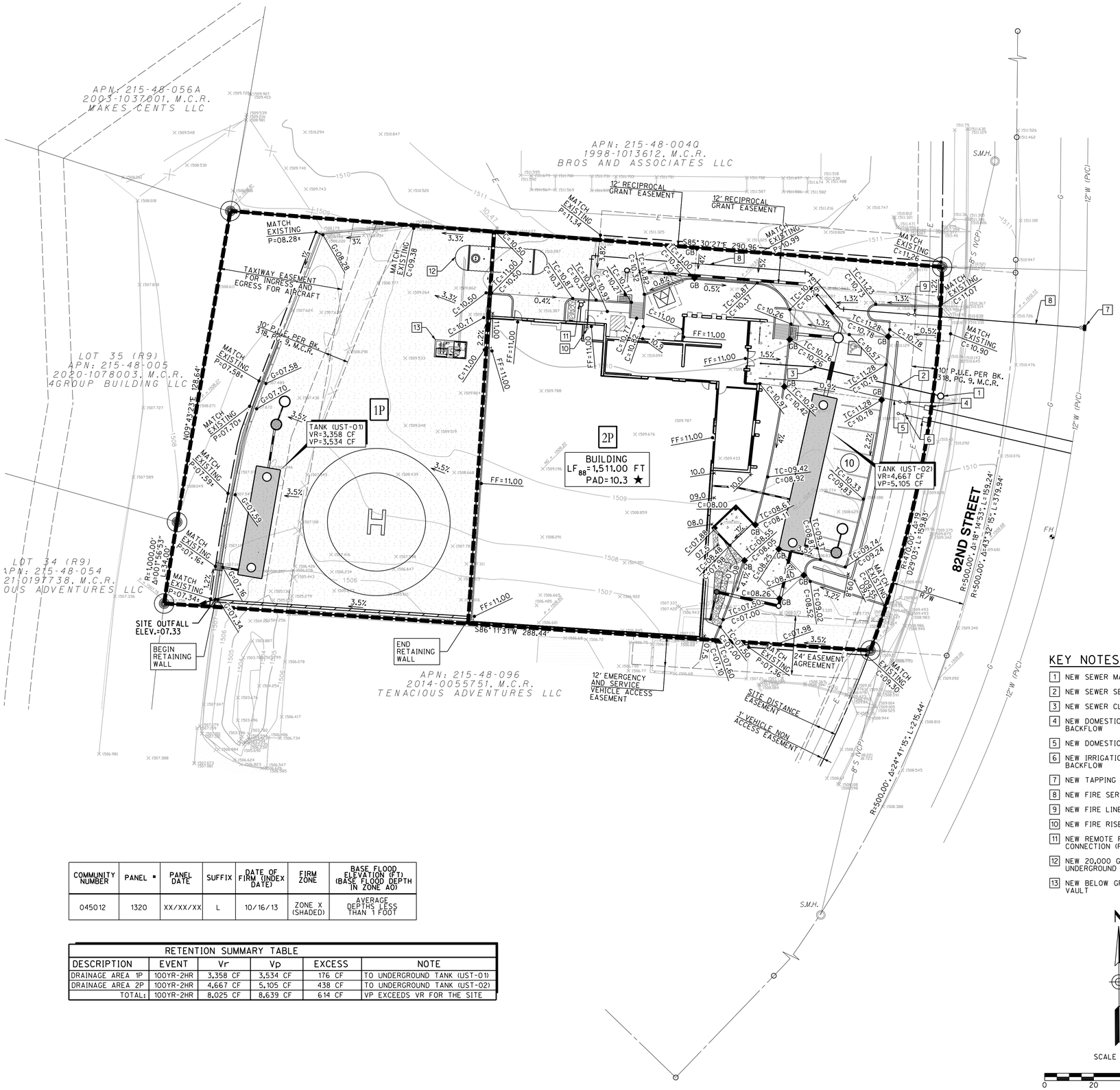
The proposed 6-inch sewer service has sufficient capacity to accommodate the project's calculated peak flow demand of 14.53-gpm (0.039-cfs). The resulting pipe velocity of 2.80-fps exceeds the minimum required cleaning velocity of 2.50-fps for 6-inch diameter pipe, per City of Scottsdale design guidelines and the American Society of Civil Engineers Manual of Practice No. 69 (MOP 69).

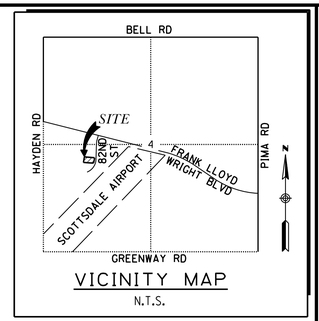
ATTACHMENTS:

Attachment 1 – Preliminary Grading & Utility Plan

ATTACHMENT 1

Sewer Plan





VICINITY MAP

N.T.S.

ENGINEER:

JMC ENGINEERING, PLLC
7315 N 16TH STREET, SUITE 101
PHOENIX, AZ 85020

CONTACT: JOSEPH M. CIRONE, P.E.
PHONE: (602) 374-4148
EMAIL: JCIRONE@JMC-ENG.COM

ARCHITECT:

DPA ARCHITECTS, INC
3719 N 75TH STREET, SUITE 105
SCOTTSDALE, AZ 85251

CONTACT: JOHN S. SZAFRAN
EMAIL: JSSZAFRAN@DPAARCHITECTS.COM

ADDRESS:

16060 N 82ND ST
SCOTTSDALE, AZ 85260

APN NUMBERS:

215-48-005R

LEGAL DESCRIPTION:

A PORTION OF THE SOUTHWEST QUARTER OF SECTION 1, TOWNSHIP 3 NORTH, RANGE 4 EAST OF THE GILA AND SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA

BENCHMARK:

EAST WUARTER CORNER OF SECTION 1, BEING GDACS POINT NUMBER 26006-Z1 HAVING AN ELECATION OF 1523.687, NAVD88 DATUM PER THE MCDOT SURVERY DATA SHEET AVAILBALE ONLINE. THE BENCHMARK MONUMENT IS DESCRIBED AS A SET 5/8"RB W/ 2"MARICOPA COUNTY AL CAP FL STAMPED "T3N R4E R5E 1/4 21 2005 RLS 21782".

BASIS OF BEARING:

THE MONUMENT LINE OF 83RD STREET, USING A BEARING OF S00°29'12"W, PER THE MAP OF DEDICATION, RECORDED IN BOOK 299, PAGE 20, M.C.R.

LEGEND:

- PROPERTY LINE
- ROADWAY CENTERLINE
- SAWCUT LINE
- SETBACK LINE
- EASEMENT
- (X) NO. PARKING SPACES
- HANDICAP PARKING
- CONCRETE
- FH EXISTING FIRE HYDRANT
- S.M.H. EXISTING SEWER MANHOLE
- 8"W (PVC) EXISTING WATER LINE
- 8"S (VCP) EXISTING SEWER LINE
- E EXISTING ELECTRIC LINE
- G EXISTING GAS LINE
- 1% DIRECTION OF FLOW & SLOPE
- P=XX.XX PROPOSED PAVEMENT ELEVATION
- TC=XX.XX PROPOSED TOP OF CURB ELEVATION
- G=XX.XX PROPOSED GUTTER ELEVATION
- C=XX.XX PROPOSED CONCRETE ELEVATION
- FL=XX.XX PROPOSED FLOWLINE ELEVATION
- FF=XX.XX FINISH FLOOR ELEVATION
- GB GRADE BREAK
- PROPOSED UNDERGROUND RETENTION STORAGE TANK
- PROPOSED STORM DRAIN
- PROPOSED STORM DRAIN MANHOLE
- PROPOSED GRATED AREA DRAIN
- PROPOSED ADS NYLOPLAST INLINE DRAIN WITH SOLID COVER
- PROPOSED ROOF DRAIN CLEANOUT
- PROPOSED DRYWELL
- PROPOSED CATCH BASIN
- PROPOSED TRENCH DRAIN
- DRAINAGE AREA DELINEATION
- 1P DRAINAGE AREA ID

KEY NOTES:

1. NEW SEWER MANHOLE
2. NEW SEWER SERVICE
3. NEW SEWER CLEANOUT
4. NEW DOMESTIC WATER METER & BACKFLOW
5. NEW DOMESTIC WATER SERVICE
6. NEW IRRIGATION METER, SERVICE & BACKFLOW
7. NEW TAPPING SLEEVE
8. NEW FIRE SERVICE
9. NEW FIRE LINE BACKFLOW
10. NEW FIRE RISER
11. NEW REMOTE FIRE DEPARTMENT CONNECTION (FDC)
12. NEW 20,000 GALLON JET-A UNDERGROUND FUEL TANK
13. NEW BELOW GROUND EQUIPMENT VAULT

N

SCALE 1"=20'

0 20 40 60

COMMUNITY NUMBER	PANEL #	PANEL DATE	SUFFIX	DATE OF FIRM INDEX DATE)	FIRM ZONE	BASE FLOOD ELEVATION (FT) (BASE FLOOD DEPTH IN ZONE AO)
045012	1320	XX/XX/XX	L	10/16/13	ZONE X (SHADED)	AVERAGE DEPTHS LESS THAN 1 FOOT

RETENTION SUMMARY TABLE

DESCRIPTION	EVENT	Vr	Vp	EXCESS	NOTE
DRAINAGE AREA 1P	100YR-2HR	3,358 CF	3,534 CF	176 CF	TO UNDERGROUND TANK (UST-01)
DRAINAGE AREA 2P	100YR-2HR	4,667 CF	5,105 CF	438 CF	TO UNDERGROUND TANK (UST-02)
TOTAL:	100YR-2HR	8,025 CF	8,639 CF	614 CF	VP EXCEEDS VR FOR THE SITE

★NOTE:
VERIFY PAD GRADE WITH FINAL BUILDING PLANS

Contact Arizona 811 at least two full working days before you begin excavation
Arizona811.com
Call 811 or click Arizona811.com

REVISIONS		
NO.	DESCRIPTION	DATE

KEY ESSENTIALS HANGAR
16060 N. 82ND ST, SCOTTSDALE, AZ 85260
PRELIMINARY GRADING & DRAINAGE PLAN

Professional Engineer
JOSEPH M. CIRONE
40968
01-26-23
Signed
ARIZONA, U.S.A.
Expires: 6-30-2025

7315 N 16TH STREET
SUITE 101
PHOENIX, AZ 85020
JCIRONE@JMC-ENG.COM

JMC ENGINEERING

DESIGNED: JMC/HTF
DRAWN: MJR

PROJECT NO: 0140
DATE: 26-JAN-2023

SHEET 1 OF 1

41-DR-2022