Preliminary Basis of Design

Water

FOR

Springhill Suites – 68th and Camelback Rd.

APN# 173-36-008B

6808 E. Camelback Rd.

Scottsdale, AZ 85251

Submittal - *August 12, 2019*

Prepared for:

Kuber Development

1550 S. 52nd Street

Tempe, Arizona 85281

Prepared by:

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IMEG

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August 12, 2019

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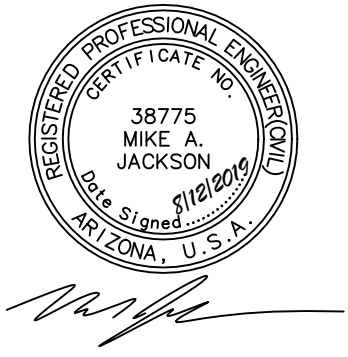


INTRODUCTION

Springhill Suites is planning to develop a new 4 story hotel near the intersection of the NEC of Camelback Rd and 68th Street in the City of Scottsdale. The hotel will have 122 rooms in total. The proposed project is approximately 2.06 acres of undeveloped land. A new 3" domestic water service and 12" fire service are proposed to serve this project. Enclosed in this report are fire flow calculations for the proposed 12" water line at the connection point to the existing 6" CIP/16" DIP waterline in 68th street, and current and future demand calculations.

EXISTING CONDITIONS

There is an existing 6" CIP and 16" DIP water line in 68th street proposed for connection that has an estimated static pressure of 72 psi. The estimated flowing gpm at this location is 2000 gpm at 20psi, per available City of Scottsdale data. This information shall be confirmed via fire hydrant flow testing.

PROPOSED CONDITIONS

122 Guest Rooms
Total Floor Area is approximately 79,902 SF

DESIGN CRITERIA

Average Day Water Demands - 0.56 gpm (inside use), 0.07 gpm (outside use), 0.63 gpm (Total Use), per DS&PM figure 6-1.2
Max Day Peak Factor = 2.0
Peak Hour Factor = 3.5
Building Type VB, includes concession on square footage and reduction of fire flow to 3000 gpm by City of Scottsdale Fire Department. Typical fire flow for this coverage area, would be minimum of 3000 gpm using Type IA and IB construction. See hydraulic analysis for further detail. We anticipate that the city fire department will allow for a reduction in required fire flow to the site.
Minimum Fire Flow = Max Day + 3000 gpm

PROPOSED DESIGN FLOW

Average Day Demand = 0.63 gpm * 122 = 76.86 gpm
Maximum Day Demand = 76.86 x 2 = 153.72 gpm
Peak Hour Demand = 76.86 x 3.5 = 269.01 gpm

DOMESTIC METER SIZING

The proposed service line and meter size for the Springhill Suites is 3". The following design process is used to determine the meter size per Figure 6-1.4 of Scottsdale DS&PM. As required, the Initial Service Line Design Flow is calculated from 2015 IPC Appendix E. The number of fixtures units per room is calculated based on a lavatory, water closet, and shower. The number of water supply fixture units per room is 4.3. Since there are

122 rooms, the total number of fixture units is 524.6. Using table E103.3(3), the total demand is 128 gpm. Based on the criteria in the DS&PM, add 10 gpm and multiply by 1.5 safety factor. The final initial service line design flow is 208 gpm < 350 gpm as required.

HYDRAULIC ANALYSIS

The fire line calculations begin from the point where the static pressure was measured and extend to the entrance of the building, then up to the farthest point of the sprinkler system. The initial energy grade line at the starting point is de-rated to 72 psi (166.32 ft). Friction, velocity, and elevation line losses are generated based on the sum of maximum day plus fire flow demands for the building and height of the facility. Upon entry into the building, a network of sprinklers are carried to the most distant point of the building. Each sprinkler shall provide a minimum coverage of 200 SF. Estimating 15 gpm per head, the total number of sprinklers is 400, with a demand of 6000gpm. To calculate the head loss due to elevation difference, the height of the highest sprinkler shall be 50 feet above finished floor. Refer to calculations in figure 3 for additional calculations. The resultant pressure in the line calculated during operation is 34.77 psi. We anticipate that the fire sprinkler designer will incorporate a fire pump into the design to achieve the required flow rate.

CONCLUSIONS

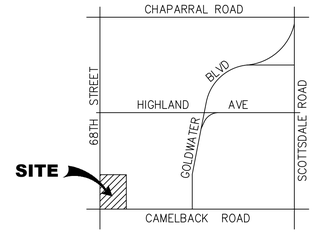
The proposed project will provide for a new 3" water meter for domestic service and a separate fire line which will tie into the existing 6"/16" water line in 68th Street. We anticipate that the new fire line will be an 8" once reduced fire flow requirements are confirmed with the fire department. The water lines in the Springhill Suites project will conform to the City of Scottsdale DS&PM and 2015 IPC. Proposed water construction, materials, and appurtenances shall be per DSPM, Chapters 6 & 7 and the City of Scottsdale Standard Detail Series 2300 and 2400.

Figure 1: Utility Plan

68TH ST & CAMELBACK ROAD

A PORTION OF THE SOUTHWEST QUARTER OF THE NORTHEAST QUARTER OF SECTION 22,
TOWNSHIP 2 NORTH, RANGE 4 EAST OF THE GILA AND SALT RIVER BASE AND MERIDIAN,
MARICOPA COUNTY, ARIZONA

PRELIMINARY GRADING AND DRAINAGE PLAN



VICINITY MAP
NTS

LEGAL DESCRIPTION

PARCEL NO. 1:

LOT 7, ARCADIA VISTA UNIT 4, ACCORDING TO THE PLAT OF RECORD IN THE OFFICE OF THE COUNTY RECORDER OF MARICOPA COUNTY, ARIZONA, IN BOOK 21 OF MAPS, PAGE 38;
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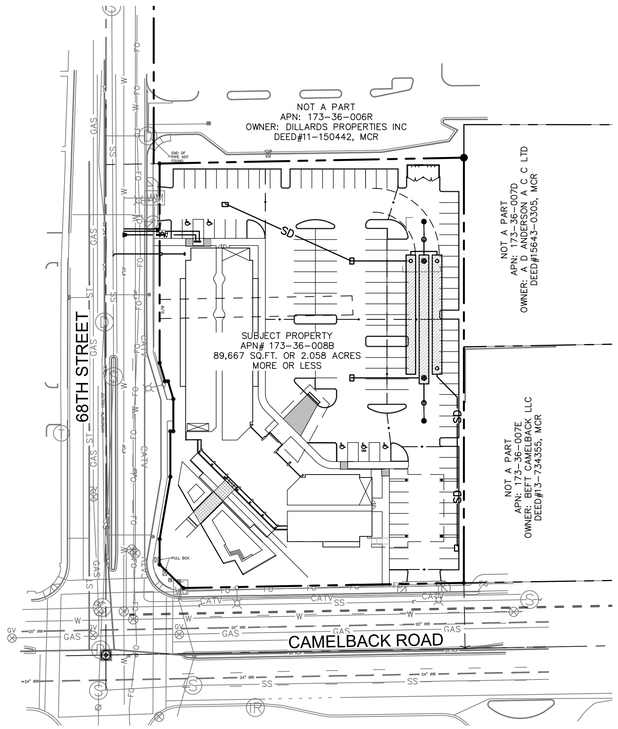

INDEX MAP
NTS

LEGEND

——— – – ———	PROPERTY BOUNDARY	S	SLOPE
– – – – – – – – – –	SAWCUT LINE/LIMITS OF GRADING	FT	FOOT
——— – ———	CENTER LINE	TC	TOP OF CURB ELEVATION
1581 ———	EXISTING MINOR CONTOUR	GB	GRADE BREAK
1580 ———	EXISTING MAJOR CONTOUR	SW	SIDEWALK
		P	PAVEMENT
1581 ———	PROPOSED MINOR CONTOUR	C	CONCRETE
1580 ———	PROPOSED MAJOR CONTOUR	– ◆ –	GRADE BREAK
W ———	PROPOSED WATER LINE SERVICE	1.0%	FLOW ARROW
———	CONCEPTUAL GAS LINE	P=1425.00	PROPOSED SPOT ELEVATION
6"S ———	PROPOSED SANITARY SEWER LINE	(P=1424.25)	EXISTING SPOT ELEVATION

SHEET INDEX	
SHEET NO.	SHEET TITLE
C1	PRELIMINARY G&D COVER SHEET
C2	PRELIMINARY GRADING & DRAINAGE PLAN

ARCHITECT

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CONTACT: MIKE JACKSON

SITE DATA

A.P.N: 173-36-008B
AREA : 86,664 S.F. OR 2.06 AC.
ADDRESS: NE CORNER 68TH ST. & CAMELBACK ROAD
SCOTTSDALE, ARIZONA 85251

BASIS OF BEARING

THE BASIS OF BEARING USED FOR THIS SURVEY IS THE SOUTH LINE OF THE NORTHEAST QUARTER OF SECTION 22, TOWNSHIP 2 NORTH, RANGE 4 EAST, AS SHOWN ON THE SUBDIVISION PLAT OF "ARCADIA VISTA UNIT 4" FILED IN BOOK 21, PAGE 48, MARICOPA COUNTY RECORDS.

SAID BEARING = SOUTH 88° 57' 00" WEST

PROJECT BENCHMARK

THE BENCHMARK USED FOR THIS SURVEY IS THE EAST 1/4 CORNER OF SECTION 21, UNIQUE POINT ID 3158, BEING MARKED BY A 3" AZ HIGHWAY DPT BRASS CAP IN HANDHOLE, 0.75' DOWN, HAVING AN ELEVATION OF 1,305.137 FEET, MARICOPA COUNTY DEPARTMENT OF TRANSPORTATION (NAVD88).

SITE BENCHMARK

THE BRASS CAP IN HANDHOLE BEING THE CENTER OF SECTION 22, TOWNSHIP 2 NORTH, RANGE 4 EAST, LOCATED IN THE CENTERLINE INTERSECTION OF 68TH STREET & CAMELBACK ROAD.
SAID ELEVATION = 1288.75 (N.A.V.D.88)

FLOOD PLAIN CERTIFICATION

THIS IS TO CERTIFY THAT THE ABOVE SUBJECT PROPERTY LIES WITHIN SHADED ZONE 'X' AS DESIGNATED ON THE FIRM FLOOD INSURANCE RATE MAP, MAP NUMBER 04013C1770L, DATED OCTOBER 16, 2013. SHADED ZONE 'X' IS DESIGNATED AS BEING AREAS OF 0.2% ANNUAL CHANCE FLOOD; AREAS OF 1% ANNUAL CHANCE FLOOD WITH AVERAGE DEPTHS OF LESS THAN 1 FOOT OR WITH DRAINAGE AREAS LESS THAN 1 SQUARE MILE; AND AREAS PROTECTED BY LEVEES FROM 1% ANNUAL CHANCE FLOOD AS DETERMINED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY UNDER THAT CIRCUMSTANCE.

30 15 0 30 60
SCALE: 1" = 30'

Call at least two full working days before you begin excavation.
ARIZONA 811 Arizona Blue Stake, Inc.
Dial 8-1-1 or 1-800-STAKE-IT (782-5348)
In Maricopa County: (602) 263-1100

REVISIONS		
No.	DESCRIPTION	DATE

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REGISTERED PROFESSIONAL ENGINEER
CERTIFICATE NO.
38775
MIKE A. JACKSON
Date Signed 4/26/2019
ARIZONA, U.S.A.

68TH ST & CAMELBACK ROAD
68TH ST & CAMELBACK ROAD, SCOTTSDALE, AZ

PRELIMINARY G&D COVER SHEET

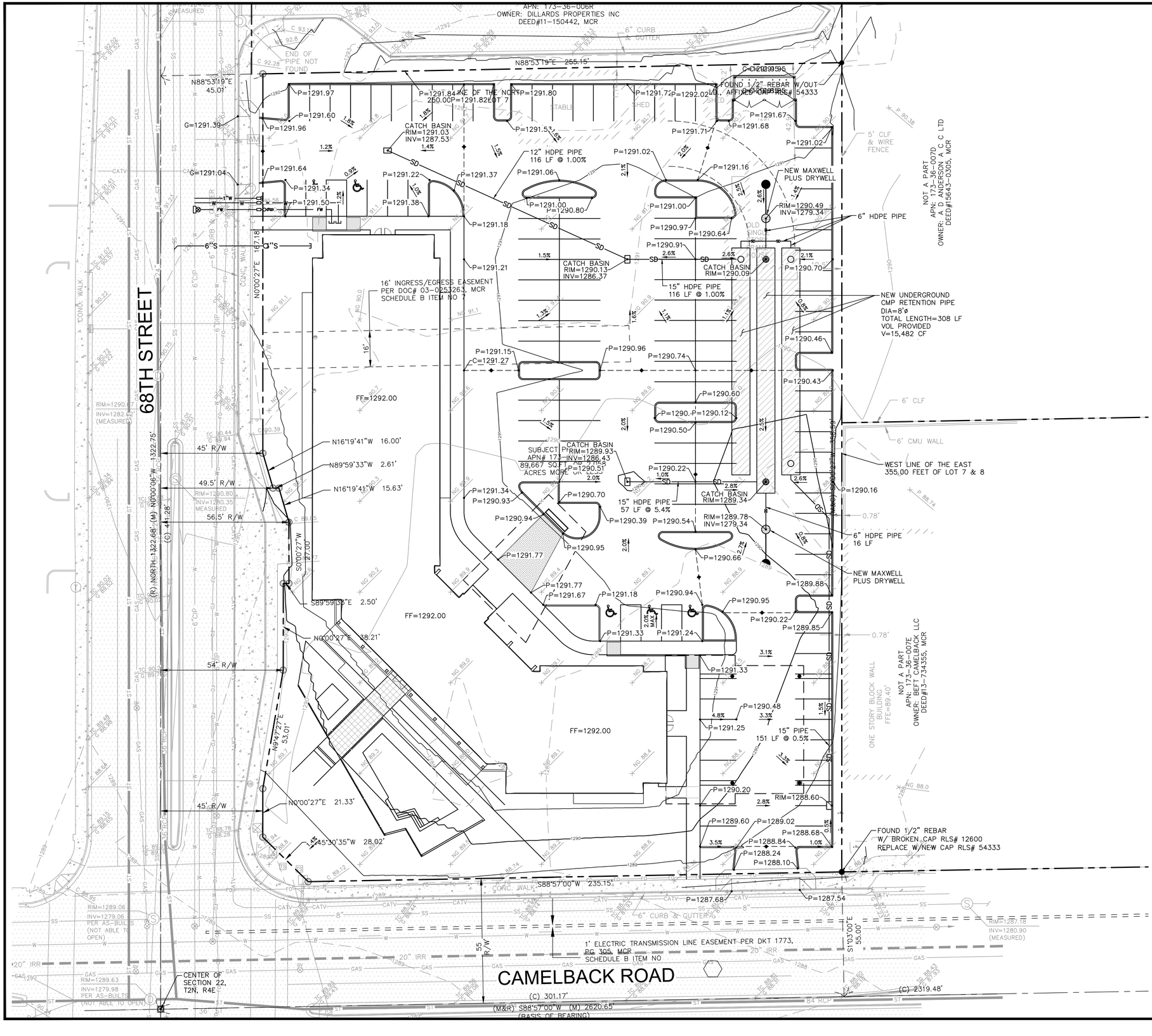
IMEG Project No: 19001014.00
File Name: 19001014-C1-Prelim Cover.dwg

Field Book No:
Drawn By: RMR
Checked By: MAJ
Date: 05/16/2019

C1

Sheet 1 of 2

10-ZN-2005#2
09/09/2019



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68TH ST & CAMELBACK ROAD

68TH ST & CAMELBACK ROAD, SCOTTSDALE, AZ

PRELIMINARY GRADING & DRAINAGE PLAN

IMEG Project No: 19001014.00

File Name: 19001014-C2-Prelim G&D.dwg

Field Book No:

Drawn By: RMR

Checked By: MAJ

Date: 05/16/2019

C2

Sheet 1 of 2

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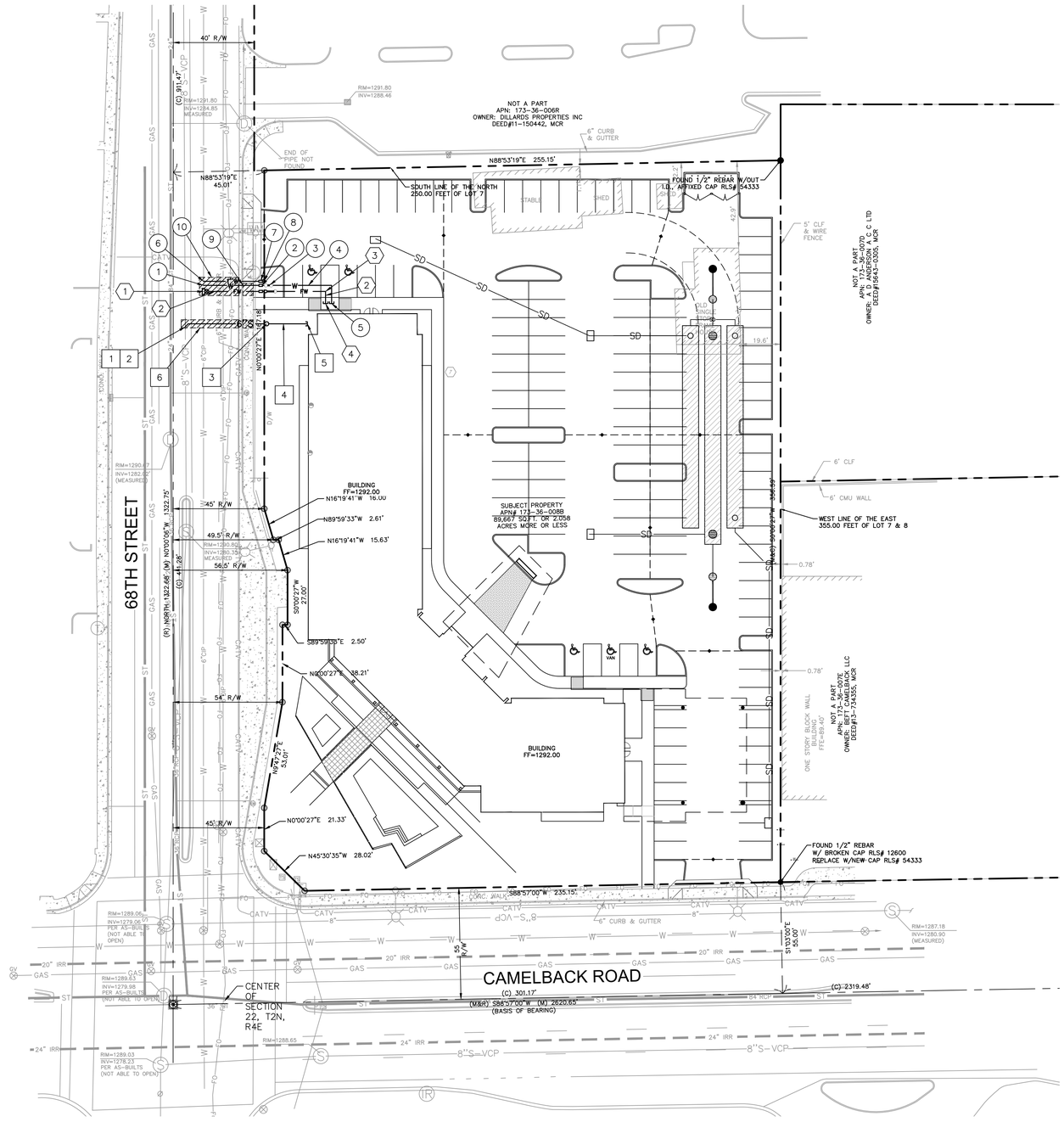
PRELIMINARY UTILITY PLAN

LEGEND

———	PROPERTY BOUNDARY	□	NEW WATER METER
- - - - - -	EASEMENT LINE	○—○	NEW BACKFLOW PREVENTOR
———	CENTER LINE		NEW FIRE HYDRANT
——6"F——	PROPOSED FIRE LINE		NEW FIRE DEPARTMENT CONNECTION
——6"S——	PROPOSED SEWER LINE	○	NEW CLEANOUT
——2"W——	PROPOSED DOMESTIC WATER LINE	ESMT	NEW EASEMENT
——G——G——	CONCEPTUAL GAS LINE		
——E——E——	CONCEPTUAL GAS LINE		



WATER KEYNOTES

1. CONTRACTOR TO POTHOLE AND VERIFY VERTICAL AND HORIZONTAL LOCATION OF EXISTING 6" CIP WATER LINE PRIOR TO CONSTRUCTION. NOTIFY ENGINEER OF ANY DISCREPANCIES. INSTALL 2" DOMESTIC SERVICE (TYPE K COPPPER) PER COS STD DTL 2330.
2. INSTALL 2" METER PER COS STD DTL 2345, 2345–1 AND 2345–2 TO BE INSTALLED BY CITY OF SCOTTSDALE CREWS AND AFTER APPROPRIATE FEES HAVE BEEN PAID.
3. INSTALL 3" REDUCED PRESSURE BACK FLOW PREVENTOR PER COS STD DTL 2352.
4. INSTALL 3" PVC WATERLINE, SCHEDULE 80 OR BETTER. LENGTH PER PLAN.
5. REFER TO PLUMBING PLANS FOR CONTINUATION.
6. CONTRACTOR TO POTHOLE AND VERIFY VERTICAL AND HORIZONTAL LOCATION OF EXISTING 12" WATER LINE PRIOR TO CONSTRUCTION. NOTIFY ENGINEER OF ANY DISCREPANCIES. INSTALL 1" PVC LANDSCAPE WATERLINE.
7. CONSTRUCT 1" LANDSCAPE METER.
8. REFER TO LANDSCAPE PLANS FOR CONTINUATION.
9. PROVIDE 12" CLEAR VERTICAL SEPARATION FROM UNDERGROUND ELECTRICAL UTILITY PER APS ELECTRICAL SERVICE REQUIREMENTS.
10. SAWCUT EXISTING AC PAVEMENT, REMOVED AND REPLACE TO MATCH EXISTING.

SEWER KEYNOTES

1. CONTRACTOR TO FIELD VERIFY VERTICAL AND HORIZONTAL LOCATION OF THE EXISTING SEWER STUB PRIOR TO TRENCHING AND CONTACT ENGINEER WITH ANY DISCREPANCIES ARE FOUND.
2. CONSTRUCT SEWER 6" SEWER BUILDING CONNECTION PER MAG STD DTL 440–1, TYPE "A".
3. INSTALL CLEANOUT PER MAG STD DTL 441.
4. INSTALL 6" PVC (SDR–35) SANITARY SEWER LINE. LENGTH & SLOPE PER PLAN.
5. REFER TO PLUMBING PLANS FOR CONTINUATION. CAP LINE.
6. SAWCUT EXISTING AC PAVEMENT, REMOVED AND REPLACE TO MATCH EXISTING.

FIRE KEYNOTES

1. INSTALL FIRELINE CONNECTION PER COS STD DTL 2362–2 AND MAG STD DTL 340. CONTRACTOR TO FIELD VERIFY VERTICAL AND HORIZONTAL LOCATION OF EXISTING WATERLINE PRIOR TO TRENCHING CONTRACTOR SHALL ADJUST PROPOSED VERTICAL AND HORIZONTAL WATERLINE ALIGNMENT AS REQUIRED TO TIE INTO EXISTING WATERLINE.
2. INSTALL 6" DUCTILE IRON PIPE (DIP) CLASS 350 WATERLINE, JOINT RESTRAINT PER MAG STD DTL 303–1 & 303–2 WITH POLY WRAP. LENGTH PER PLAN.
3. INSTALL 6" DUCTILE IRON PIPE (DIP) FITTING. TYPE PER PLAN.
4. INSTALL CAP. SEE PLUMBING PLAN FOR CONTINUATION.

DRY UTILITY KEYNOTES

1. APPROXIMATE LOCATION OF ELECTRICAL TRANSFORMER. CONTRACTOR TO COORDINATE WITH ELECTRICAL PLANS FOR INSTALLATION AND EXACT LOCATION.
2. CONCEPTUAL ROUTING FOR ELECTRICAL CONDUIT. CONTRACTOR TO COORDINATE WITH ELECTRICAL PLANS FOR INSTALLATION AND EXACT ROUTING.
3. SEE ELECTRICAL PLAN FOR CONNECTION TO PROVIDER.

ARCHITECT

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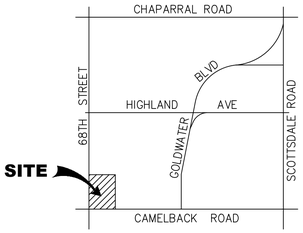

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68TH ST & CAMELBACK ROAD
68TH ST & CAMELBACK ROAD, SCOTTSDALE, AZ

PRELIMINARY UTILITY PLAN

IMEG Project No: 19001014.00
File Name: 19001014-C3-Utility.dwg

Field Book No:
Drawn By: RMR
Checked By: MAJ
Date: 05/16/2019

UT-1

Sheet 1 of 1

10-ZN-2005#2
09/09/2019

Figure 2: Fire Flow Calculations

PIPING HYDRAULIC ANALYSIS & HYDRAULIC PROFILE (Smooth Pipe Only)

Project Name: Springhill Suites
Project No: 19001014.00

Date of this Run: 15-Jul-19
Time: 03:14 PM

Darcy Weisbach Friction factor: (see note below)

$f=10^{x}$, Where $x = [-1.4655-0.2775*\log_{10}VD$
$+0.0340*(\log_{10}VD)^2-0.0029*(\log_{10}VD)^3]$
Where V=velocity in ft/sec &
D=Pipe dia in inches

Starting EGL = 166.32

Ending EGL = _____

PIPING	I.D. No.	
Straight pipe	0	
FITTINGS		**K***
Entrance	1	0.5
Exit	2	1
90 deg. bend	3	0.3
45 deg. bend	4	0.2
Tee - thru run	5	0.3
Tee - thru branch	6	0.9
Valve	7	0.27
Check valve	8	1.5
Reducer	20	$1-sd^2/ld^2)$
Enlargement	30	$(1-sd^2/ld^2)^2$

sd = small dia.;
ld = large dia.

Approx loss of 10psi in double check not modeled

* from "Cameron", 16th Edition

Loc.	Piping I.D. No.	Size in.	Length ft.	Elev. ft.	Q gpm	V fps	f (D-W)	Hv ft.	Hf ft.	HGL	EGL	Pressure Head feet	Pressure Head psi
L1	1	12		1.00	6154	17.46	0.0109	4.732	2.366	159.22	163.95	158.22	68.55
L2	0	12	100	1.00	6154	17.46	0.0109	4.732	5.156	154.07	158.80	153.07	66.32
L3	3	12		1.00	6154	17.46	0.0109	4.732	1.420	152.65	157.38	151.65	65.70
L4	0	12	10	1.00	6154	17.46	0.0109	4.732	0.516	152.13	156.86	151.13	65.48
L5	3	12		1.00	6154	17.46	0.0109	4.732	1.420	150.71	155.44	149.71	64.87
L6	0	12	50	51.00	6154	17.46	0.0109	4.732	2.578	148.13	152.86	97.13	42.09
L7	3	12		51.00	6154	17.46	0.0109	4.732	1.420	146.71	151.44	95.71	41.47
L8	0	12	300	51.00	6154	17.46	0.0109	4.732	15.469	131.24	135.98	80.24	34.77
L9													
L10													
L11													
L12													
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L27													

Note: the friction factor formula was derived using Excel's curve fitting capabilities based upon a table derived from the Moody Diagram (log-log) for smooth pipes.

10-ZN-2005#2
09/09/2019