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114th & Shea Retail

Final Water Basis of Design Report

3 engineering Job #: 1831

April 22, 2020

PRELIMINARY Basis of Design Report

- ☐ **ACCEPTED**
- ☑ **ACCEPTED AS NOTED**
- ☐ **REVISE AND RESUBMIT**

CITY OF SCOTTSDALE

SCOTTSDALE WATER

9379 E San Salvador Dr.
Scottsdale, AZ 85258

Disclaimer: If accepted; the preliminary approval is granted under the condition that a final basis of design report will also be submitted for city review and approval (typically during the DR or PP case). The final report shall incorporate further water or sewer design and analysis requirements as defined in the city design standards and policy manual and address those items noted in the preliminary review comments (both separate and included herein). The final report shall be submitted and approved prior to the plan review submission.
For questions or clarifications contact the Water Resources Planning and Engineering Department at 480-312-5685.

BY rsacks **DATE** 6/1/2020

See note on site plan showing width of easement

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114TH & SHEA RETAIL

FINAL WATER BASIS OF DESIGN REPORT

Prepared for:

Hawkins Companies LLC
4700 S. McClintock Drive #160
Scottsdale, Arizona 85257
Contact: Mark Mitchell
Phone: (480) 223-8239

Daniel G. Mann, P.E.

April 22, 2020

Submittal to:

City of Scottsdale
7447 E. Indian School Road, Suite 105
Scottsdale, AZ 85251

Prepared by:

3 engineering, LLC
6370 E. Thomas Road, Suite #200
Scottsdale, Arizona 85251
Contact: Dan G. Mann, P.E.

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1. Introduction

The project site, 114th & Shea Retail, is located in the northwest quarter of Section 27, Township 3 North, Range 5 East of the Gila and Salt River Meridian, Maricopa County, Arizona within the City of Scottsdale. The project is located at the southwest corner of 114th Street and Shea Boulevard, Scottsdale, AZ 85259. The site is bounded on the north by Shea Boulevard, on the east by 114th Street, on the south by Beryl Avenue, and on the west by single family residential homes. See Appendix A for a site map.

The existing zoning is C-O and R1-18. The site is currently undeveloped. The proposed zoning is C1, SR, and R1-18. The City of Scottsdale 2001 General Plan shows the site land use is Office and Rural Neighborhood. Additionally, the site is located within the Shea Corridor. The proposed site consists of two portions that are separated by an existing wash that runs west through the site. The northern portion is a mixed-use office, medical office, and retail center with three pads. Access is provided by 114th Street. The southern portion consists of two residential lots with access provided by Beryl Avenue. The residential lots will be developed at a future date. The proposed mixed-use site will connect to existing City of Scottsdale water facilities within 114th Street.

2. Existing Conditions

The existing zoning is C-O and R1-18. The site is currently undeveloped. See Appendix A for a site map. There is an existing 12" D.I.P. water main in 114th Street, east of the site. There is also an existing 8" D.I.P. water main in Beryl Avenue, south of the site. See Water Plans in Appendix D for existing waterline layout.

The certified flow test can be found in Appendix B. The static pressure of the existing system was 72.0 psi and the residual pressure was 54.0 psi at 1,880 gpm with a 26.0 psi factor of safety. The test was taken at two hydrants in 114th Street, east of the site.

3. Proposed Conditions

The proposed project consists a mixed-use office and retail center and two residential lots. There are three proposed buildings in the mixed-use center. Building A is 3,000 s.f. of retail/office space, building B is 5,100 s.f. of retail/office space, and building C is 7,236 s.f. of medical office space. There are no proposed improvements to the two residential lots at this time and they are not included in the analysis of this report.

The largest proposed building has a fire flow demand of 1,500 gpm based on Table B105.1 of the International Fire Code. This is using the total square footage of the building which is 7,236 s.f. and a construction type of V-B and a 50% reduction for fire sprinklers, not less than 1,500 gpm. The proposed water system is to be public and is to be maintained by the City of Scottsdale. The system will connect to the existing 12" D.I.P. water main in 114th Street with a new 8" D.I.P. water main. The proposed water system includes one (1) new fire hydrant, and a 4" fireline connection to each building. See Water Plans in Appendix D for proposed waterline layout, pipe sizes and material.

4. Required Computations & Hydraulic Modeling

The purpose of this basis of design report is to verify that the City of Scottsdale water system is able to accommodate demands generated by the proposed project, 114th & Shea Retail. Demands were calculated using Figure 6.1-2 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.

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

1. Building A – 3,000 s.f. proposed Retail space
2. Building B – 5,100 s.f. proposed Retail space
3. Building C – 7,236 s.f. proposed Office space
4. Residential lots not included in analysis
5. 0.8 gallons per day per square foot (Per DSPM, Commercial/Retail)
6. 0.6 gallons per day per square foot (Per DSPM, Office)
7. Largest Proposed Building = 7,236 s.f., Building type V-B, per Table B105.1 of the 2012 International Fire Code the fire flow = 2,250 gpm. 50% reduction based on fully sprinklered buildings not less than 1,500 gpm (Commercial). Fire Flow = 1,500 gpm.
8. Max day flow = 2.0 x average day demand
9. Peak hour flow = 3.5 x average day demand

TABLE 1: ON-SITE WATER DEMANDS	
Avg. daily demand	7.52 gpm
Max day demand	15.03 gpm
Peak hour flow rate	26.30 gpm
Fire flow	1,500 gpm
Fire flow + Max Day	1,515.03 gpm

Average Daily Demand Retail: 8,100 s.f. x 0.8 gpdpsf = 6,480 gpd
= 6,480 gpd/1440 mpd = 4.5 gpm

Average Daily Demand Office: 7,236 s.f. x 0.6 gpdpsf = 4,341.6 gpd
= 4,341.6 gpd/1440 mpd = 3.02 gpm

Total Average Daily Demand = 10,821.6 gpd
= 10,821.6 gpd/1440 mpd = 7.52 gpm

Max Day Demand = 2.0 x 10,821.6 gpd = 21,643.2 gpd
= 21,643.2 gpd/1440 mpd = 15.03 gpm

Peak Hour Flow rate = 3.5 x 10,821.6 gpd = 37,875.6 gpd
= 37,875.6 gpd/1440 mpd = 26.30 gpm

The WaterCAD system was modeled with connections to the existing water system using a reservoir with the static pressure from the fire flow test results. The Fire Flow + Max Day demand for the site is 1,515.03 gpm. At this flow, the pressure exceeds the City of Scottsdale Requirement of 30 psi minimum under fire flow conditions. The proposed pipes have velocities less than 10 fps. Therefore, the proposed water system is adequate to support the proposed improvements for the site. See WaterCAD Results in Appendix C.

5. ***Summary***

The Peak Hourly Flow for the proposed site is 26.30 gpm.
The fire flow for the Proposed building is 1,500 gpm after a 50% reduction for fully sprinklered buildings.

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APPENDIX A

Vicinity Map

8-ZN-2020
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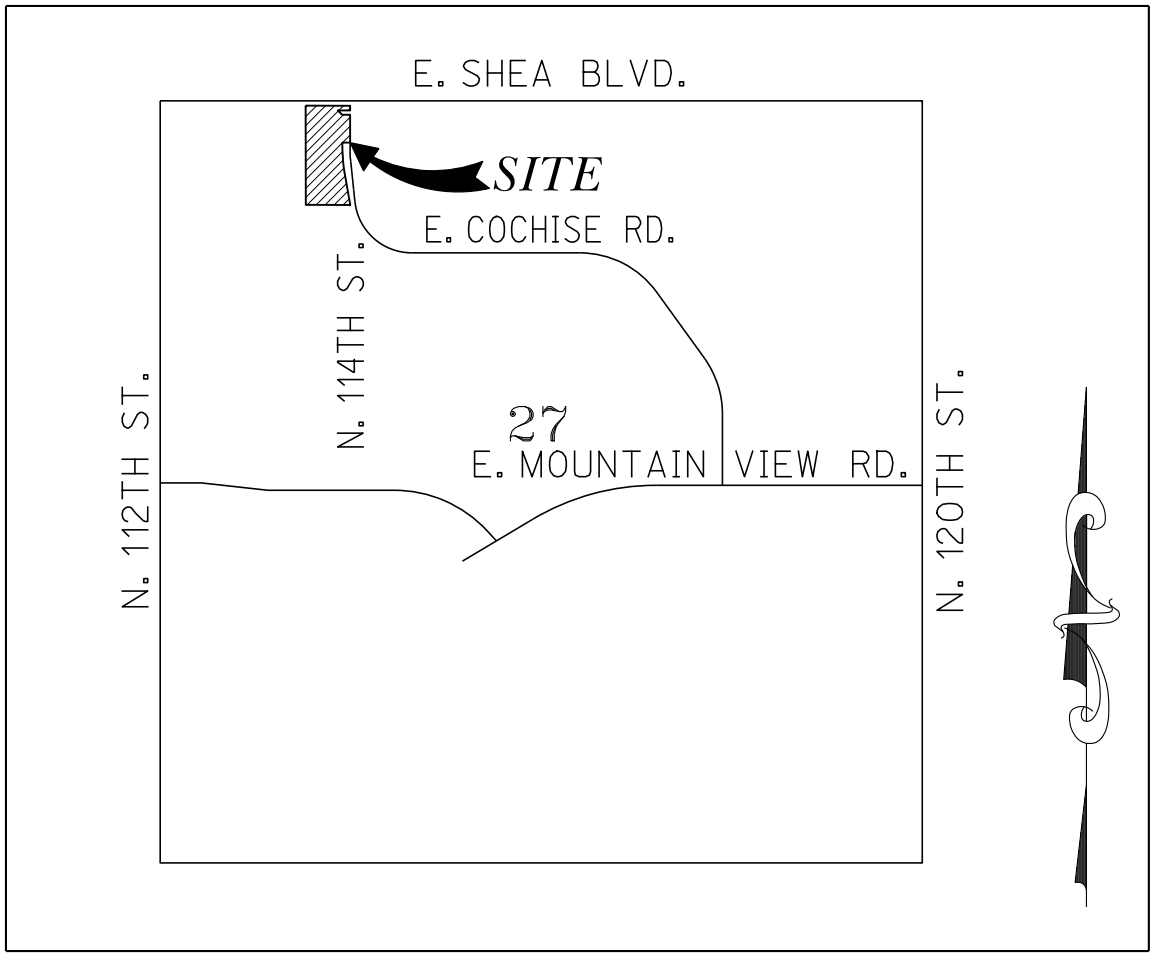

VICINITY MAP

N.T.S.

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APPENDIX B

Fire Flow Test Results

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Arizona Flow Testing LLC

HYDRANT FLOW TEST REPORT

Project Name:	114th Street & Shea SWC
Project Address:	11355 East Shea Blvd., Scottsdale, Arizona, 85259
Client Project No.:	Not Provided
Arizona Flow Testing Project No.:	20132
Flow Test Permit No.:	C61849
Date and time flow test conducted:	April 14, 2020 at 7:00 AM
Data is current and reliable until:	October 14, 2020
Conducted by:	Floyd Vaughan – Arizona Flow Testing, LLC (480-250-8154)
Coordinated by:	Jared Berry – City of Scottsdale-Inspector (602-541-4942)

Raw Test Data

Static Pressure: **98.0 PSI**
(Measured in pounds per square inch)

Residual Pressure: **80.0 PSI**
(Measured in pounds per square inch)

Pitot Pressure: **25.0 PSI**
(Measured in pounds per square inch)

Diffuser Orifice Diameter: One 4-inch Hose Monster
(Measured in inches)

Coefficient of Diffuser: 0.7875

Flowing GPM: **1,880 GPM**
(Measured in gallons per minute)

GPM @ 20 PSI: **4,150 GPM**

Data with 26 PSI Safety Factor

Static Pressure: **72.0 PSI**
(Measured in pounds per square inch)

Residual Pressure: **54.0 PSI**
(Measured in pounds per square inch)

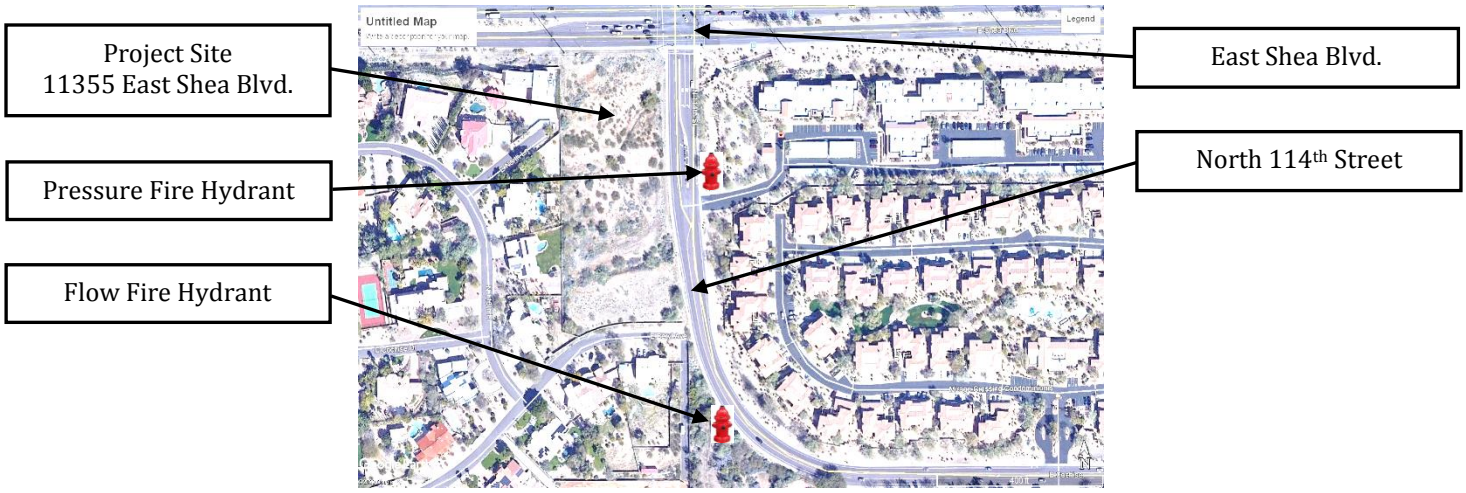
Distance between hydrants: Approx. 620 Feet

Main size: Not Provided

Flowing GPM: **1,880 GPM**

GPM @ 20 PSI**:** **3,334 GPM**

Flow Test Location **North**



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APPENDIX C

WaterCAD Results

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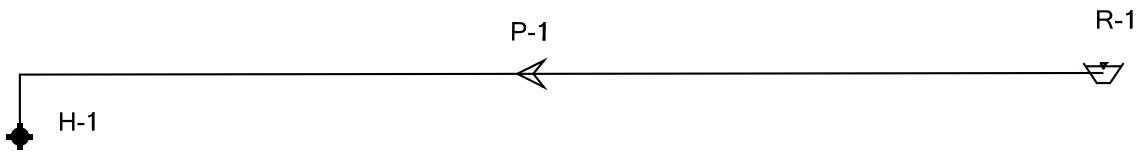
Scenario: Average Day



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FlexTable: Hydrant Table (1831.wtg)

Current Time: 0.000 hours

ID	Label	Hydrant Status	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
29	H-1	Closed	43.38	8	203.92	69.5

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FlexTable: Pipe Table (1831.wtg)

Current Time: 0.000 hours

ID	Label	Length (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
30	P-1	257	R-1	H-1	8.0	Ductile Iron	130.0	8	0.05	0.000

8-ZN-2020
5/22/2020

FlexTable: Reservoir Table (1831.wtg)

Current Time: 0.000 hours

ID	Label	Elevation (ft)	Zone	Flow (Out net) (gpm)	Hydraulic Grade (ft)
28	R-1	203.92	<None>	8	203.92

8-ZN-2020
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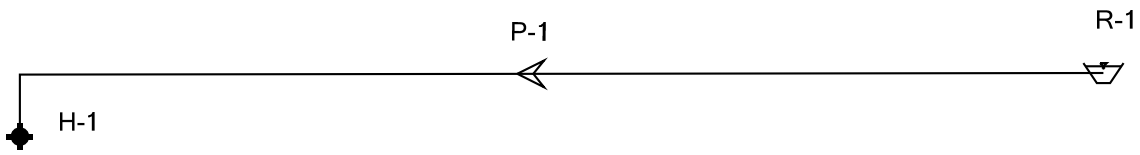
Scenario: Max Day



8-ZN-2020
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FlexTable: Hydrant Table (1831.wtg)

Current Time: 0.000 hours

ID	Label	Hydrant Status	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
29	H-1	Closed	43.38	15	203.92	69.5

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FlexTable: Pipe Table (1831.wtg)

Current Time: 0.000 hours

ID	Label	Length (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
30	P-1	257	R-1	H-1	8.0	Ductile Iron	130.0	15	0.10	0.000

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FlexTable: Reservoir Table (1831.wtg)

Current Time: 0.000 hours

ID	Label	Elevation (ft)	Zone	Flow (Out net) (gpm)	Hydraulic Grade (ft)
28	R-1	203.92	<None>	15	203.92

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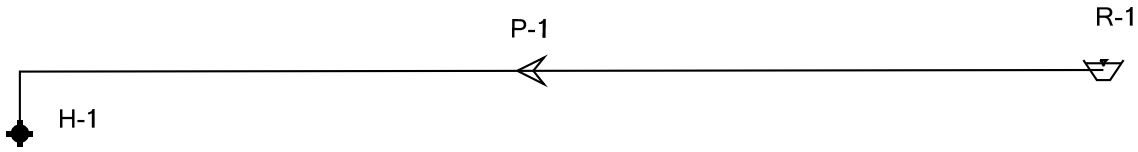
Scenario: Peak Hour



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FlexTable: Hydrant Table (1831.wtg)

Current Time: 0.000 hours

ID	Label	Hydrant Status	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
29	H-1	Closed	43.38	26	203.91	69.5

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FlexTable: Pipe Table (1831.wtg)

Current Time: 0.000 hours

ID	Label	Length (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
30	P-1	257	R-1	H-1	8.0	Ductile Iron	130.0	26	0.17	0.000

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FlexTable: Reservoir Table (1831.wtg)

Current Time: 0.000 hours

ID	Label	Elevation (ft)	Zone	Flow (Out net) (gpm)	Hydraulic Grade (ft)
28	R-1	203.92	<None>	26	203.92

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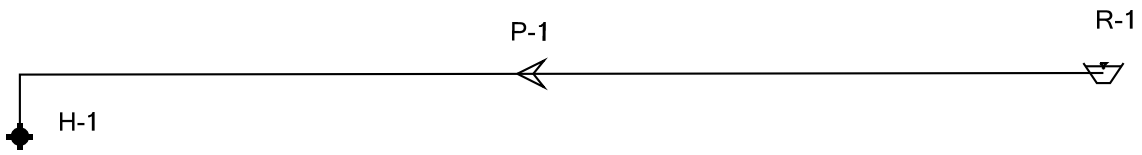
Scenario: Fire Flow + Max Day



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FlexTable: Hydrant Table (1831.wtg)

Current Time: 0.000 hours

ID	Label	Hydrant Status	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
29	H-1	Closed	43.38	1,515	193.78	65.1

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FlexTable: Pipe Table (1831.wtg)

Current Time: 0.000 hours

ID	Label	Length (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
30	P-1	257	R-1	H-1	8.0	Ductile Iron	130.0	1,515	9.67	0.039

Bentley Systems, Inc. Haestad Methods Solution Center
27 Siemon Company Drive Suite 200 W
Watertown, CT 06795 USA +1-203-755-1666

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FlexTable: Reservoir Table (1831.wtg)

Current Time: 0.000 hours

ID	Label	Elevation (ft)	Zone	Flow (Out net) (gpm)	Hydraulic Grade (ft)
28	R-1	203.92	<None>	1,515	203.92

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APPENDIX D

Preliminary Water Plans

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MEASURED LINE TABLE

LINE	BEARING	DISTANCE
L1	N89°52'10"W	8.12'

RECORD LINE TABLE

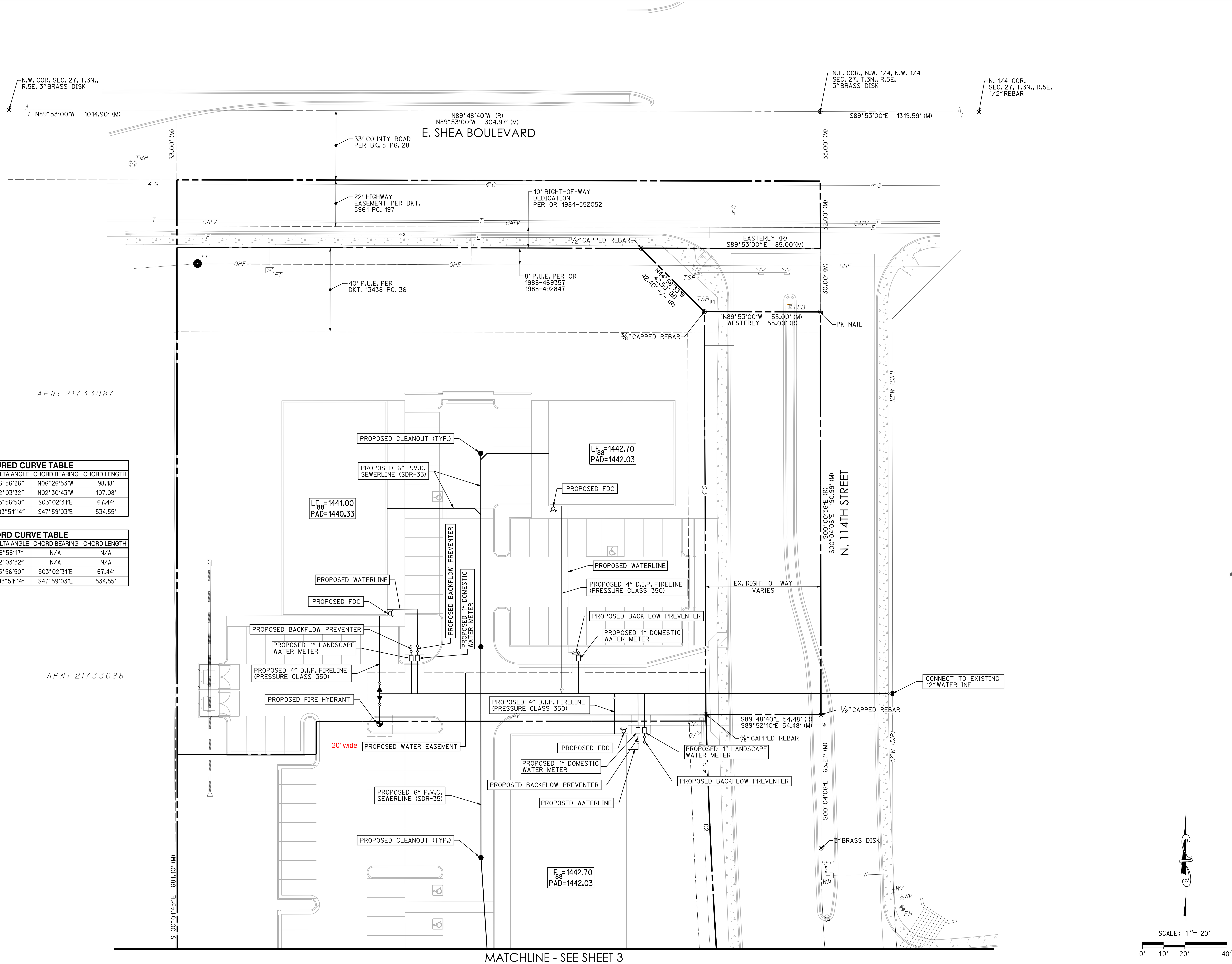
LINE	BEARING	DISTANCE
L1	N89°48'40"W	8.12'

MEASURED CURVE TABLE

CURVE	ARC LENGTH	RADIUS	DELTA ANGLE	CHORD BEARING	CHORD LENGTH
C1	98.24'	811.00'	6°56'26"	N06°26'53"W	98.18'
C2	107.09'	2979.97'	2°03'32"	N02°30'43"W	107.08'
C3	67.47'	650.00'	5°56'50"	S03°02'31"E	67.44'
C4	585.41'	400.00'	83°51'14"	S47°59'03"E	534.55'

RECORD CURVE TABLE

CURVE	ARC LENGTH	RADIUS	DELTA ANGLE	CHORD BEARING	CHORD LENGTH
C1	98.21'	811.00'	6°56'17"	N/A	N/A
C2	107.13'	2981.15'	2°03'32"	N/A	N/A
C3	67.47'	650.00'	5°56'50"	S03°02'31"E	67.44'
C4	585.41'	400.00'	83°51'14"	S47°59'03"E	534.55'



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

REVISIONS

114TH & SHEA RETAIL

SWC 114TH ST. & SHEA BLVD., SCOTTSDALE, AZ 85259

PRELIMINARY UTILITY PLAN

Registered Professional Engineer (Civil) — Certificate No. 46857 — DANIEL G. MANN — Date Signed 4/27/20 — ARIZONA, U.S.A.

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ENGINEER: D. MANN | DESIGNER: D. MANN | CAD TECH: PHILLIE V.

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3 ENGINEERING, LLC
6370 E. THOMAS ROAD SUITE # 200
SCOTTSDALE, ARIZONA 85251
PHONE: (602) 334-4387
FAX: (602) 490-3230
WWW.3ENGINEERING.COM

DATE: 04/27/20

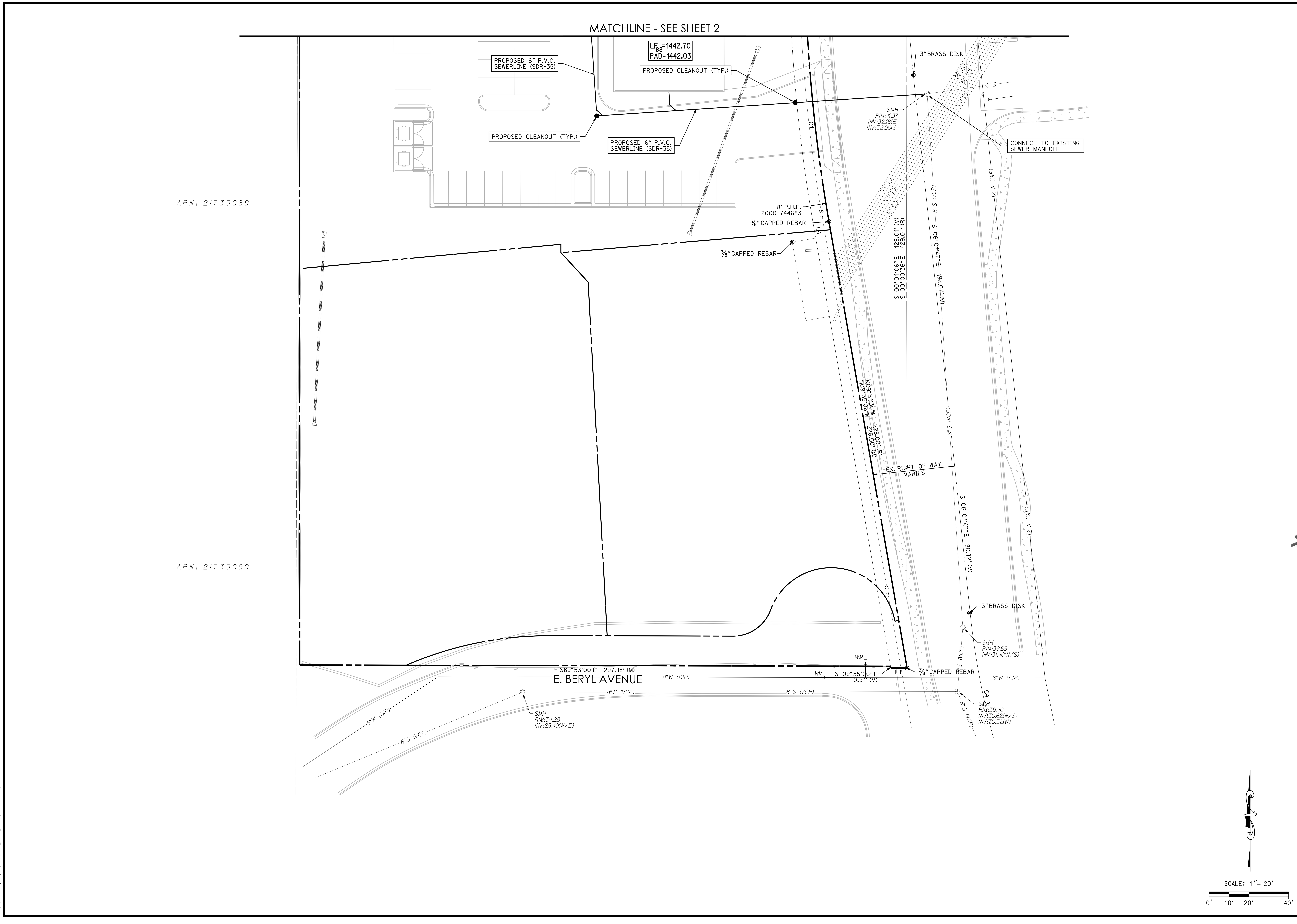
PROJECT NO. 1831

SHEET NO. PUTL02

Q.S. #28-55

8-ZN-2020
5/22/2020

C:\My SecurSync\Projects\1831_114th_Shea\1831putl02.dgn


MATCHLINE - SEE SHEET 2
LF88=1442.70
PAD=1442.03
PROPOSED 6" P.V.C. SEWERLINE (SDR-35)
PROPOSED CLEANOUT (TYP.)
PROPOSED CLEANOUT (TYP.)
PROPOSED 6" P.V.C. SEWERLINE (SDR-35)
3" BRASS DISK
SMH RIM:41.37 INV:32.18(E) INV:32.00(S)
CONNECT TO EXISTING SEWER MANHOLE
APN: 21733089
8' P.U.E. 2000-744683
3/8" CAPPED REBAR
3/8" CAPPED REBAR
S 00°04'06"E 429.01' (M)
S 00°00'36"E 429.01' (R)
S 06°01'47"E 192.07' (M)
N09°51'36"W 228.00' (R)
N09°55'06"W 228.00' (M)
EX. RIGHT OF WAY VARIES
S 06°01'47"E 80.72' (M)
APN: 21733090
3" BRASS DISK
SMH RIM:39.68 INV:31.40(N/S)
S89°53'00"E 297.18' (M)
E. BERYL AVENUE
S 09°55'06"E 0.91' (M)
L1
3/8" CAPPED REBAR
8"W (DIP)
8"S (VCP)
SMH RIM:34.28 INV:28.40(W/E)
SMH RIM:39.40 INV:30.62(N/S) INV:30.52(W)
C4
SCALE: 1"= 20'
0' 10' 20' 40'

114TH & SHEA RETAIL

SWC 114TH ST. & SHEA BLVD., SCOTTSDALE, AZ 85259

PRELIMINARY UTILITY PLAN

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6370 E. THOMAS ROAD SUITE # 200
SCOTTSDALE, ARIZONA 85251
PHONE: (602) 334-4387
FAX: (602) 490-3230
WWW.3ENGINEERING.COM

DATE: 04/27/20

PROJECT NO. 1831

SHEET NO. PUTL03
3 of 3

Q.S. #28-55

8-ZN-2020
5/22/2020