

**Water Basis of Design Report
For
Hayden and McDowell
Scottsdale, ARIZONA**

**FINAL Basis of Design
Report**

- APPROVED
 APPROVED AS NOTED
 REVISE AND RESUBMIT



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 Idillon DATE 9/7/2021

PREPARED BY:

Larson Engineering, Inc.
6380 E. Thomas Road, Suite 300
Scottsdale, AZ 85251
480.212.4200
www.larsonengr.com

July 30, 2021

Prepared by: MH

Address comments below and throughout in resubmitted report:

- 1) Water meters shall be placed in the easement adjacent to the ROW. Back flow shall be on private property. DS&PM 6-1.416, G.
- 2) Service and fire lines shall be connected perpendicular to the main. DS&PM 6-1.416, J.
- 3) Provide witnessed and certified hydrant flow test and provide results in report. Both flow and pressure hydrant to be on Commerce Court. Compare to fire flow required in report. DS&PM 6-1.405
- 4) Revise water demand and peaking factor values based on two restaurants. Use peak hour factor of 6 for restaurants. DS&PM, 6-1.202, H and 6-1.404, B.
- 5) Clarify backflow location for fire lines and location of FDCs referenced in report. Not clear from utility plan.
- 6) Address comments on utility plan.



Larson

Larson Engineering, Inc.
6380 E. Thomas Road, Suite 300
Scottsdale, AZ 85251
480.212.4200
www.larsonengr.com

© 2018 Larson Engineering, Inc. All rights reserved.

**32-DR-2021
8/12/2021**

Contents

Introduction	3
Design Documentation	3
Existing Conditions.....	4
Proposed Conditions.....	4
Calculations.....	4
Summary	4

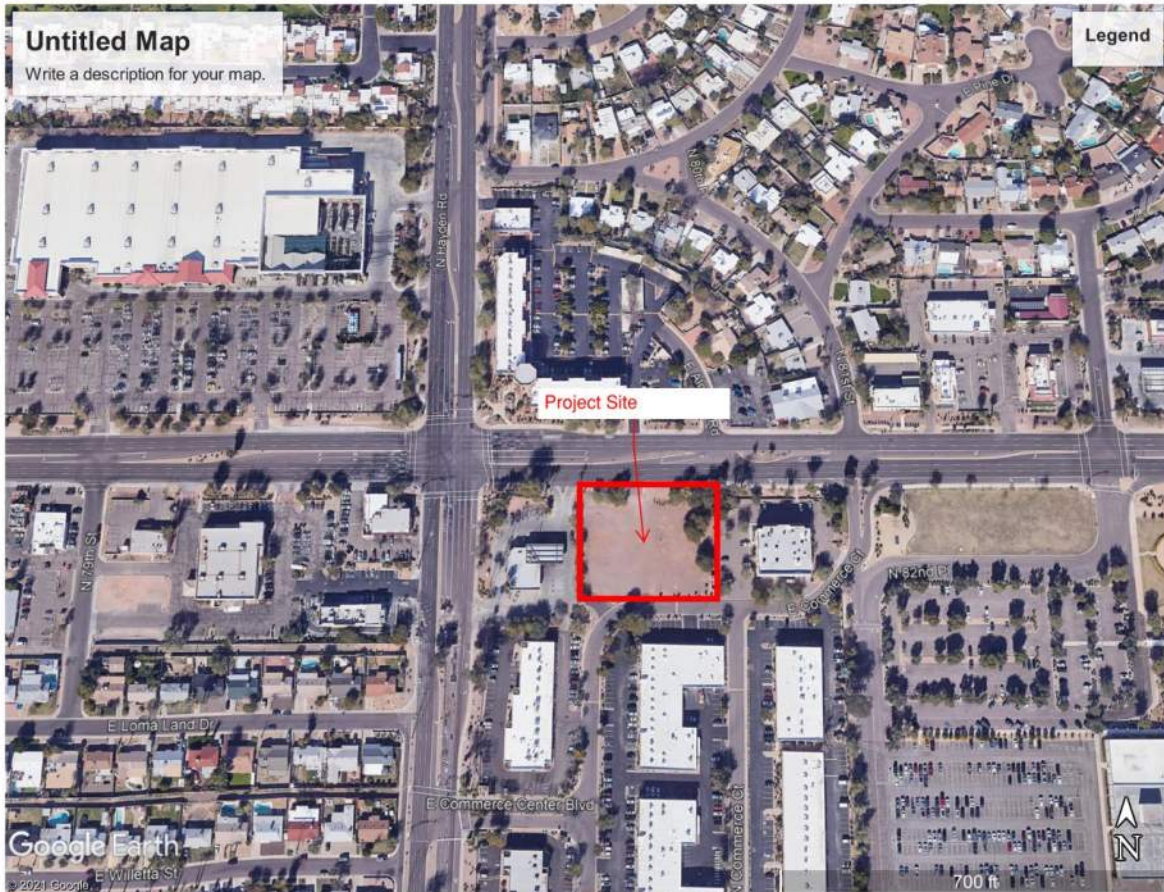
Appendix:

Utility Plan

Calculations

Introduction

The proposed Hayden and McDowell Commercial (The Project) is located at 8101 E McDowell Road in Scottsdale, Arizona. The parcel number for this project is 131-09-002N. The Project consists of adding two new buildings, curbing, refuse container and landscaping. The buildings are 2,400 square feet and 4,000 square feet in size. The Project is located just east of the intersection of Hayden Road at McDowell Road. See Location Map below:



why are you combining square footage of two separate buildings to determine fire flow?

The Project will not alter the existing zoning, which is C-3. The surrounding area at his locations is commercial businesses and consists of commercial services and offices. The new buildings will remain consistent with the City of Scottsdale's general plan.

Design Documentation

Water Design Flows are based on criteria provided in the City of Scottsdale's Design Standards & Policies Manual Chapter 6 dated 2018. Specifically, the criteria used are as follows:

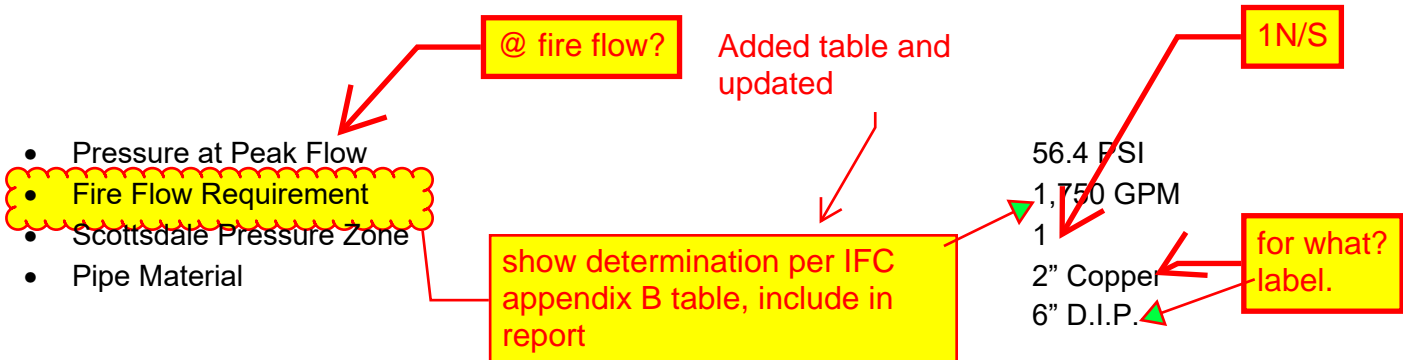
- Building Square Feet (combined)
- Demand Bldg (interior + exterior)

Updated to separate

6,400 SF
6.2 GPM

Larson Engineering, Inc.
6380 E. Thomas Road, Suite 300
Scottsdale, AZ 85251
480.212.4200
www.larsonenr.com

© 2018 Larson Engineering, Inc. All rights reserved.



Water Calculations are attached in the Appendix. Existing service line size, meter and building supply sizes will need to be verified and if needed upgraded and identified prior to final plan approval. The site proposes to install a domestic connection, an FDC and a fire sprinkler line for each building. See the attached Utility Plan in the Appendix for details.

Existing Conditions

The Project will not alter the existing zoning, which is C-3. The existing building was a commercial building and this Project will also be commercial. **proposed as 2 restaurants**

There is an existing 8" water line on the south side of Commerce Court. See attached Water Exhibit for reference. The site will be adding 2 water meters, tap and backflow preventer. Due to the preliminary stage of this project the exact size of utilities and meters will be determined. If the meters and preventers are not adequate size they will be upgraded.

The fire line will utilize a 6-inch Ductile Iron Pipe for the fire sprinkler system.

clarify. using existing or adding new? utility plan shows a 6" fire line for each building. This size seems excessive.

Proposed Conditions

The attached Water Exhibit shows the tie in locations for the domestic water and fire sprinkler system. This Project proposes to connect to the existing line with 2 inch Copper pipe, see the attached Water Exhibit. This Project lies in the City of Scottsdale's Zone 1 Water Pressure Zone Map. The ground elevations associated with this pressure zone are 1180 feet to 1280 feet. All maintenance of the private onsite system is the responsibility of the owner.

Calculations

Based on the attached calculations, the projected pressure and flow will meet the building's needs. The proposed Water distribution system is designed to provide adequate capacity to serve the proposed Project.

Zone	Ground Elevation Range (Ft.)
1	1250-1330

Summary

The Proposed Water Distribution System has been analyzed to ensure all City of Scottsdale Design Standards and Policies Manual Chapter 6 requirements are being met. Figure 6.1-2 of that manual provided the water demand and peaking factors included in the analysis and stated in this report. The Appendix includes calculations of pressure loss, the hydrant flow test and a water exhibit showing proposed water and fire line.

The Project is expected to be completed in 2022.

Enclosed is a set of drawings and spreadsheets which summarize the design and capacity of the system. The spreadsheets show the use, maximum occupancy, average daily flow rate and peak flow rates for the project. This project is proposed to start as soon as approval is obtained and completed within 6 months. Please refer to the attached Water exhibit for layout of the lines and connections.

Thank you for your prompt review of the proposed water collection system.

Sincerely,

Larson Engineering, Inc.

A handwritten signature in black ink, appearing to read "Mike Hreha".

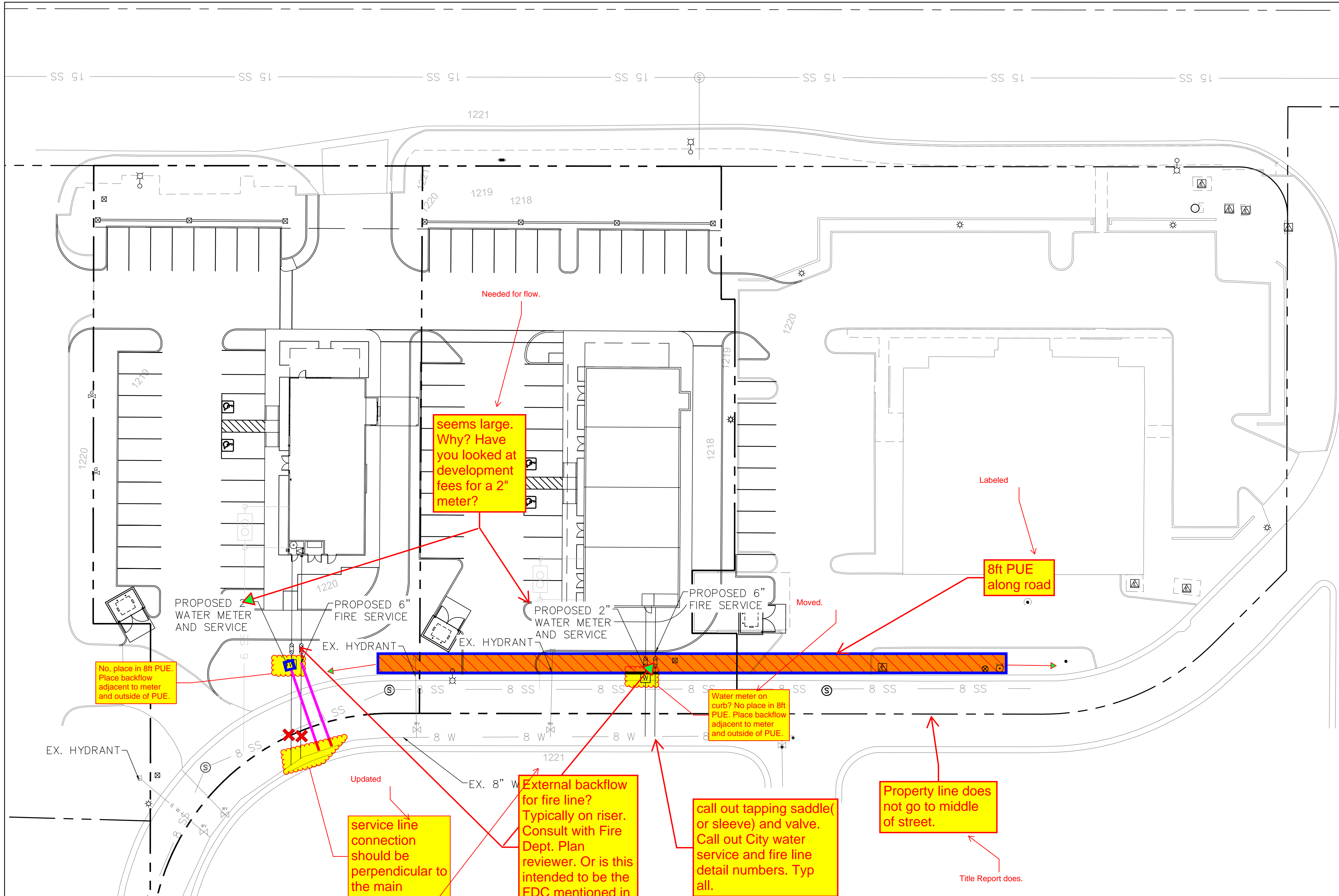
Mike Hreha, P.E.
Land Development Manager

Utility Plan

Larson Engineering, Inc.
6380 E. Thomas Road, Suite 300
Scottsdale, AZ 85251
480.212.4200
www.larsonengr.com

© 2018 Larson Engineering, Inc. All rights reserved.

32-DR-2021
8/12/2021



No, place in 8ft PUE. Place backflow adjacent to meter and outside of PUE.

seems large. Why? Have you looked at development fees for a 2" meter?

Needed for flow.

8ft PUE along road

Water meter on curb? No place in 8ft PUE. Place backflow adjacent to meter and outside of PUE.

service line connection should be perpendicular to the main

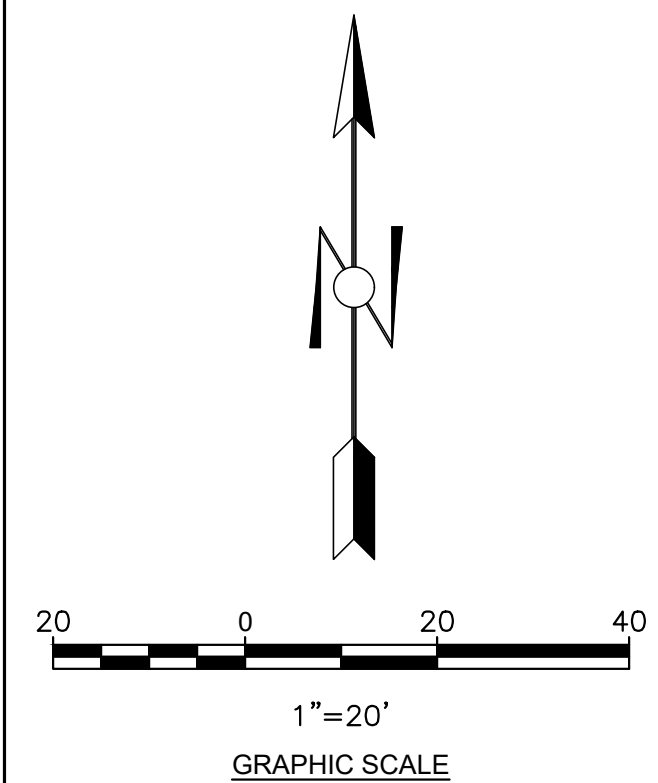
External backflow for fire line? Typically on riser. Consult with Fire Dept. Plan reviewer. Or is this intended to be the FDC mentioned in the report?

call out tapping saddle (or sleeve) and valve. Call out City water service and fire line detail numbers. Typ all.

Property line does not go to middle of street.

Removed. Will be internal.

Note Added.



Larson Engineering, Inc.
 6380 E. Thomas Road, Suite 300
 Scottsdale, AZ 85251
 480.212.4200 (M-F 8:00-5:00)
 www.larsonengr.com

Arizona Professional Engineer
 Call 811 or call at Arizona811.com

IRKAA
 ARCHITECTS
 2333 EAST THOMAS ROAD, PHOENIX, ARIZONA 85016
 602-955-3900

Professional Engineer
 LICENSE NO. 279
 MICHAEL HREHA
 ARIZONA U.S.A.
 EXPIRES 06/30/2022

NOTICE OF ALTERNATE BILLING OR PAYMENT CYCLE: THIS CONTRACT MAY ALLOW THE OWNER TO REQUIRE THE SUBMISSION OF BILLING OR ESTIMATES IN BILLING CYCLES OTHER THAN THIRTY DAYS. THIS CONTRACT MAY REQUIRE OWNER TO MAKE PAYMENT CERTIFICATION AND APPROVAL OF BILLING AND ESTIMATES. A WRITTEN DESCRIPTION OF SUCH OTHER BILLING CYCLE APPLICABLE TO THE PROJECT IS AVAILABLE FROM OWNER OR DESIGNATED AGENT.

MCDOWELL - HAYDEN RETAIL
 8101 E MCDOWELL ROAD, SCOTTSDALE AZ 85257
 E OF SEC OF MCDOWELL RD AND HAYDEN RD
 DATE: 07-15-2021 (PRELIMINARY)

PRELIMINARY WATER PLAN

DESIGNED AND PREPARED BY: IRKAA ARCHITECTS, INC. AND MAY NOT BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, WITHOUT WRITTEN PERMISSION OF THE CORPORATION.

design by: -
 drawn by: -
 checked by: -

C3
 project: 18107.00

v1, site plan added from CDS case folder for reference by LDillon 9/7/21

PROJECT DIRECTORY

ARCHITECT:
 RKA ARCHITECTS, INC.
 2233 EAST THOMAS ROAD
 PHOENIX, ARIZONA 85016
 CONTACT: NEIL FEASER
 PHONE: (602) 955-3900
 FAX: (602) 955-0496
 E-MAIL: nfeaser@rkaa.com

SITE DATA

PARCEL NUMBER: 131-09-002N
 EXISTING ZONING: C-3
 SITE AREA: 1.397 ACRES (60,885 S.F.)

PROPOSED USE: RETAIL / RESTAURANTS
 CONSTRUCTION TYPE: V-B

BUILDING AREA:
 PAD A: RESTAURANT WITH DRIVE THRU 2,400 S.F.
 PAD A: PATIO SEATING 350 S.F.
 PAD B: RETAIL-RESTAURANT WITH DRIVE THRU 4,000 S.F.

TOTAL BUILDING AREA: 6,750 S.F.
 MAX. ALLOWABLE F.A.R. 0.80
 F.A.R. PROVIDED: 0.11
 MAX. BUILDING HEIGHT: 36'-0"
 BUILDING HEIGHT PROVIDED: 30'-0"

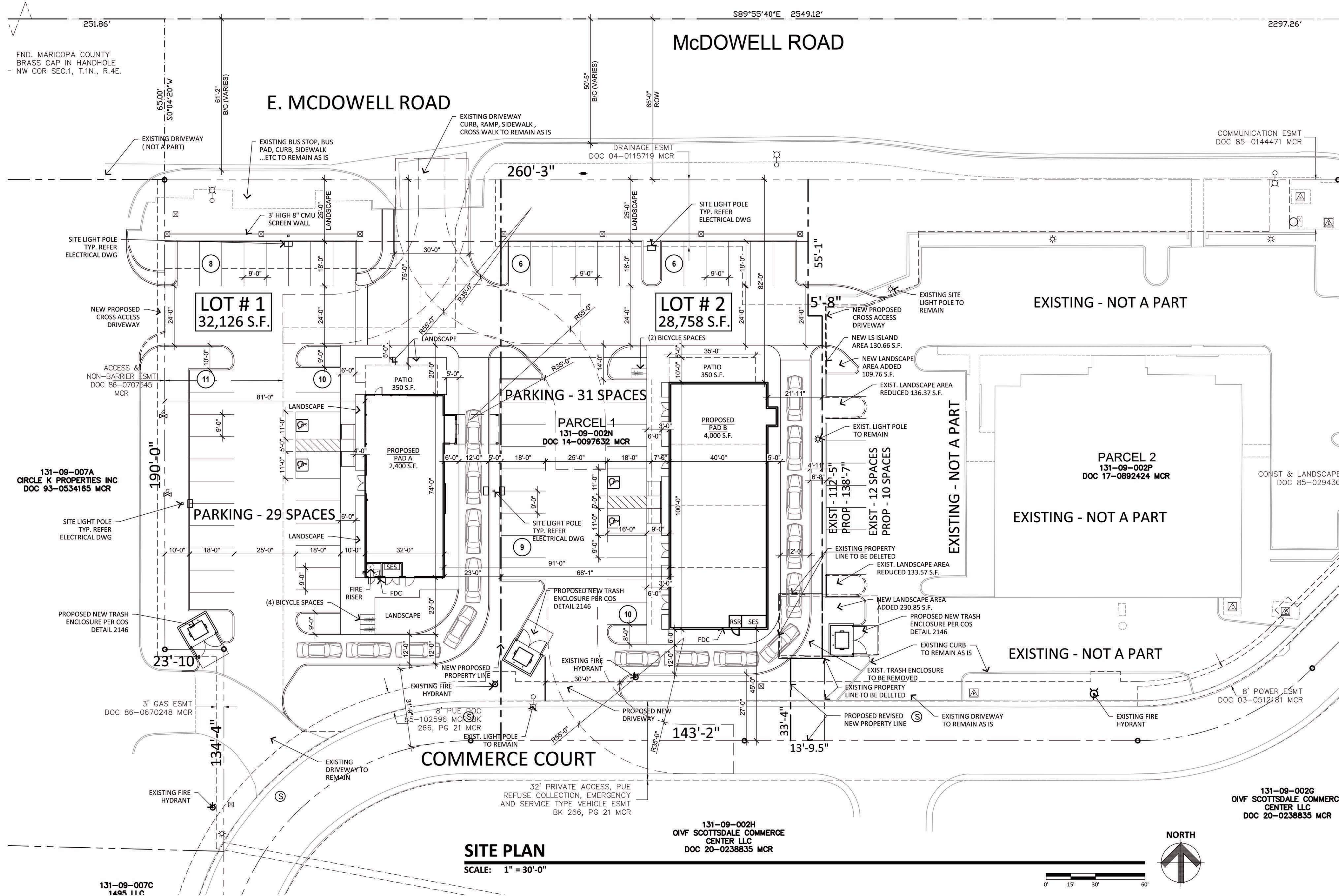
OPEN SPACE REQUIRED:
 UP TO 12' HEIGHT - 60,885 X 0.10 6,088.5 S.F.
 ABOVE 12' - 60,885X0.004X(30-12) 4,383.7 S.F.
 TOTAL OPEN SPACES REQUIRE: 10,472.2 S.F.
 TOTAL FRONT OPEN SPACES REQUIRE: 50% 5,236.1 S.F.

PARKING REQUIRED:
 PAD-A: RESTAURANT: 1 PER 120 S.F. - 2400/120 20 SPACES
 PAD-A: OUTDOOR PATIO - (350 S.F.-350 / 350) 00 SPACES
 PAD-B: RESTAURANT: 1 PER 120 S.F. - 2400 / 120 20 SPACES
 PAD-A: OUTDOOR PATIO - (350 S.F.-350 / 350) 00 SPACES
 PAD-B: RETAIL: 1 PER 250 S.F. - 1600 / 250 07 SPACES
 TOTAL PARKING REQUIRED: 47 SPACES

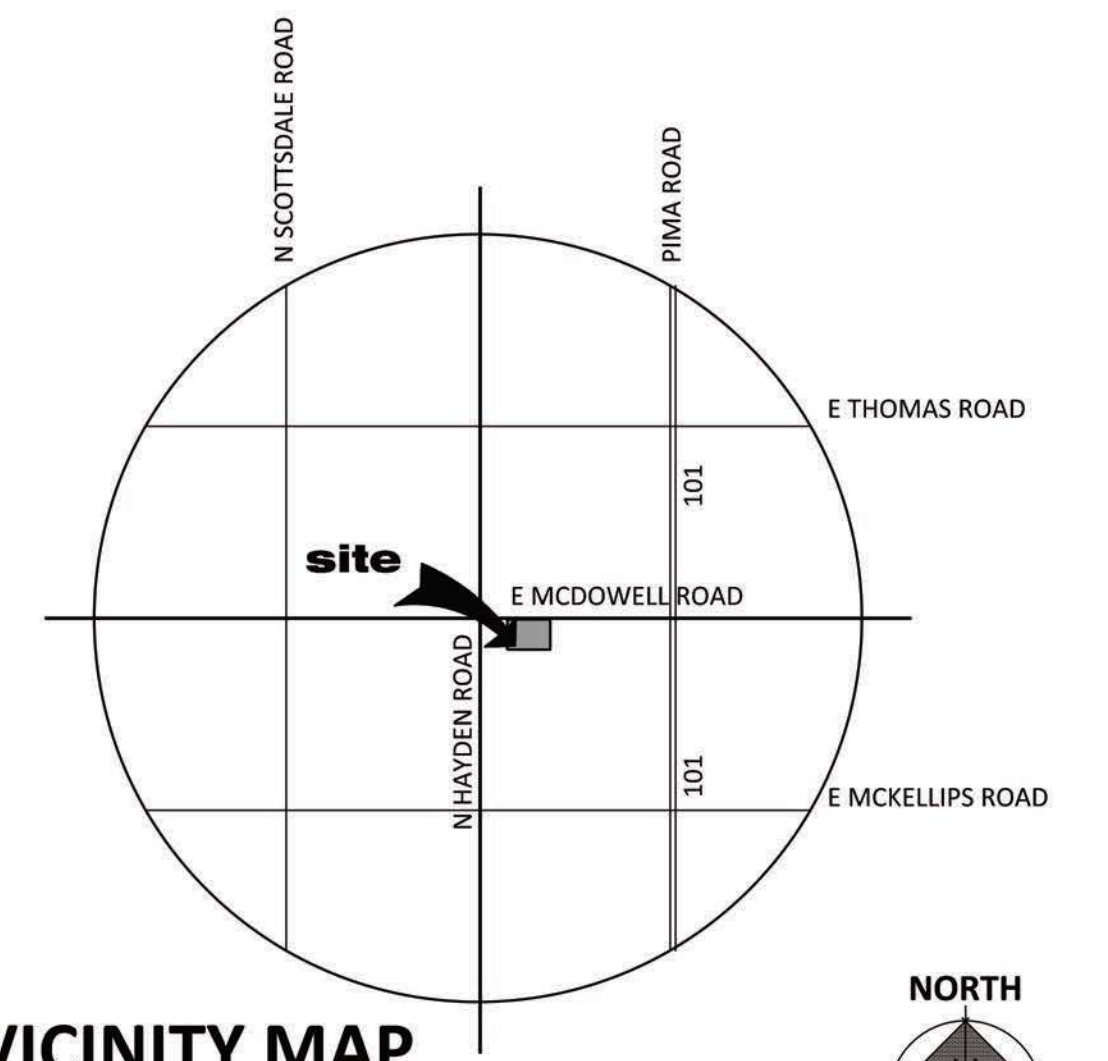
PARKING PROVIDED:
 PAD-A 29 SPACES
 PAD-B 31 SPACES
 TOTAL PARKING PROVIDED: 60 SPACES

ACCESSIBLE SPACES REQUIRED: 03 SPACES
 ACCESSIBLE SPACES PROVIDED: 04 SPACES

BICYCLE SPACES REQUIRED: 10% - MIN. 2 06 SPACES
 BICYCLE SPACES PROVIDED: 06 SPACES



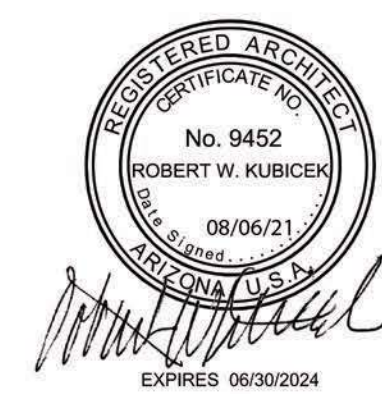
SITE PLAN
 SCALE: 1" = 30'-0"



VICINITY MAP
 SCALE: N.T.S.

THIS SITE PLAN HAS BEEN PREPARED WITHOUT THE AID OF A SURVEY. ALL PROPERTY BOUNDARIES ARE ROUGH APPROXIMATIONS. THIS DRAWING IS TO BE USED FOR CONCEPTUAL PURPOSES ONLY AND IT IS NOT TO BE THE BASIS FOR ANY LEGALLY BINDING DOCUMENTATION.

MCDOWELL - HAYDEN RETAIL
 8101 E MCDOWELL ROAD SCOTTSDALE AZ 85257
 E OF SEC OF MCDOWELL RD AND HAYDEN RD
 DATE: 07-15-2021 (PRELIMINARY)



© 2017 RKA ARCHITECTS, INC. ALL RIGHTS RESERVED. THIS DRAWING IS AN INSTRUMENT OF SERVICE. IT IS THE PROPERTY OF RKA ARCHITECTS, INC. AND MAY NOT BE DUPLICATED, USED OR DISCLOSED WITHOUT WRITTEN PERMISSION OF THE ARCHITECT.

SP-1 A
 RKA# 18107.00



CALCULATIONS

Larson Engineering, Inc.
6380 E. Thomas Road, Suite 300
Scottsdale, AZ 85251
480.212.4200
www.larsonengr.com

© 2018 Larson Engineering, Inc. All rights reserved.

32-DR-2021
8/12/2021

no use restaurant values

should be peak hour and use peaking factor of 6 for restaurant

Hayden and McDowell											
Water Calculations											
Description	Bldg Sqft	*Demand (GPM/SF)	Demand Bldg + Exterior (GPM)	Max Day Demand (GPM)	Peak Day Demand (GPM)	Residual Pressure (P.S.I.)	**2" Meter Loss	**Backflow Pressure Loss	Friction Loss (P.S.I.)	Total Pressure Loss (P.S.I.)	Peak Hour (P.S.I.)
Commercial Building	4,000	0.000973	3.9	7.8	11.7	62	0.1000	3	1.5	5.6	56.4

*Based on City of Scottsdale Design and Engineering Manual Chapter 6

Hayden and McDowell							
Water + Fire Flow							
Description	Bldg Sqft	Max Day Demand (GPM)	*Fire Flow Requirement (GPM)	Max Day Demand + Fire Flow Requirement (GPM)	Peak Day Demand (GPM)	Peak Day + Fire Flow Demand (GPM)	Hydrant Flow Test Results (GPM)
Commercial Building	4,000	7.8	1,750	1,757.8	11.7	1,761.7	2,000

*Per IFC 2015 Table B105.1 (2)

provide corresponding fire flow test providing this is achievable DS&PM 6-1.201 A, 2. and 6-1.405/1.501 Both flow and test hydrants need to be on Commerce Court.

provide IFC table, show derivation

$$f = 0.2083 (100 / c)^{1.852} q^{1.852} / d_h^{4.8655}$$

where
f = friction head loss in feet of water per 100 feet of pipe (ft_{h20}/100 ft pipe)
c = Hazen-Williams roughness constant
q = volume flow (gal/min)
d_h = inside hydraulic diameter (inches)

140 Copper
 2*radius 1.5

Updated to 6

Updated to Rest values.

no use restaurant values

update per previous table comments

Hayden and McDowell											
Water Calculations											
Description	Bldg Sqft	*Demand (GPM/SF)	Demand Bldg + Exterior (GPM)	Max Day Demand (GPM)	Peak Day Demand (GPM)	Residual Pressure (P.S.I.)	**2" Meter Loss	**Backflow Pressure Loss	Friction Loss (P.S.I.)	Total Pressure Loss (P.S.I.)	Peak Hour (P.S.I.)
Commercial Building	2,400	0.000973	2.3	4.7	7.0	62	0.1000	4	0.6	4.7	57.3

*Based on City of Scottsdale Design and Engineering Manual Chapter 6

Hayden and McDowell							
Water + Fire Flow							
Description	Bldg Sqft	Max Day Demand (GPM)	*Fire Flow Requirement (GPM)	Max Day Demand + Fire Flow Requirement (GPM)	Peak Day Demand (GPM)	Peak Day + Fire Flow Demand (GPM)	Hydrant Flow Test Results (GPM)
Commercial Building	2,400	4.7	1,750	1,754.7	7.0	1,757.0	2,000

*Per IFC 2015 Table B105.1 (2)

$$f = 0.2083 (100 / c)^{1.852} q^{1.852} / d_h^{4.8655}$$

where

f = friction head loss in feet of water per 100 feet of pipe (ft_{h20}/100 ft pipe)

c = Hazen-Williams roughness constant

140 Copper

q = volume flow (gal/min)

dh = inside hydraulic diameter (inches)

2*radius

1.5