Drainage Reports

Abbreviated Water and Sewer Needs

Water Study

Wastewater Study

Stormwater Waiver Application

WATER & SEWER BASIS OF DESIGN REPORT
FOR
TRAIL WEST PLAZA

FINAL Basis of Design Report

☐ APPROVED

☑ APPROVED AS NOTED

☐ REVISE AND RESUBMIT

CITY OF SCOTTSDALE

SCOTTSDALE WATER

9379 E San Salvador Dr.
Scottsdale, AZ 85258

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 ldillon **DATE** 5/2/2019

Scottsdale, Arizona

14 March 2019

PREPARED FOR
Aline Architecture Concepts
7340 East Main Street, #210
Scottsdale, Arizona 85251

DEVELOPER
Clayton Companies
7340 East Main Street, #200
Scottsdale, Arizona 85251

SITE ADDRESS
3215 North Hayden Road
Scottsdale, Arizona 85251

Address the following on plan submittal:

1) Sewer and water demands are not a concern since the development involves mostly renovation of existing building and large water/sewer infrastructure is available.
2) This BOD did not calculate water or sewer demand per DS&PM..but this requirement is waived/irrelevant given the nature of the redevelopment and water and sewer capacity available.
3) The minimum sewer service line size is 6" for each commercial property.
4) A City side clean-out on each sewer service must be installed per MAG 440-3.
5) The onsite sewer connecting multiple buildings and routing to public main on Hayden must be private sewer and called out as such on plans. If service line are proposed to connect to Hayden Road sewer they must have 5ft diameter manholes installed.
6) Water meter size must be determined per DS&PM method.
7) Any abandoned water service lines and meter must be removed by City forces at a cost to the owner/developer.
8) Any abandoned meters are eligible for development fee meter credit which would be applied to a any new meter(s).

PREPARED BY

CYPRESS CIVIL DEVELOPMENT
strength + sustainability

4450 north 12th street, #228
phoenix, arizona 85014
CYPRESS # 19.023

PROJECT DESCRIPTION AND LOCATION

The Project is known as 'Trail West Plaza' and is located at 3215 North Hayden Road in Scottsdale, Arizona. Refer to Appendix A for location map.

The proposed Project consists of redevelopment of the parcel by replacing the existing car wash building to the south with a new restaurant building and providing a tenant improvement of the existing shopping center building to the north with associated paved access, parking, utility, and drainage improvements.

The utility provider for both water and sewer facilities is the City of Scottsdale.

The Project is located on the east side of North Hayden Road, north of East Earll Drive. Per available utility maps and as-built records, an existing 12" CIP water main is located in Hayden Road to the west of the Project. The existing building to the north is connected to the water main within Hayden Road via a 2" stub with a 1-1/2" meter. Based on observations, this stub supplies the domestic water service for the existing shopping center building to remain. Another 1" meter and stub provide service for the existing car wash building to be replaced by a proposed restaurant. Finally, another stub to the north supplies the fire service to the entire site. As a result, the design team intends to utilize the existing water service and fire service connections. This is anticipated to provide adequate sizing and pressure to supply the intended domestic and fire services to the buildings. Refer to Appendix B for City of Scottsdale Water and Sewer Quarter Section Map for stub locations and sizes.

verify, must be 6" or larger

Per available utility maps and as-built records, an existing 39" VCP sewer main is located in Hayden Road to the west of the Project. Though the City of Scottsdale Water and Sewer Quarter Section maps show the 39" VCP sewer main west of the Project, they do not show a sewer stub to the Project site. However, a recent survey shows the location of an existing 8" VCP lateral service line to the property. Refer to Appendix C for the survey showing the location of the sewer stub. This existing 8" VCP stub is anticipated to supply sewer service to both the interior of the shopping center and the building to the south which will be replaced. Both buildings are anticipated to connect to the 8" VCP lateral service stub via 6" or 4" service laterals. This is anticipated to provide adequate sizing to supply the intended sewer service to the building.

6" required for all commercial

WATER SYSTEM DESIGN

There will be two buildings onsite. One to the north is a single existing shopping center building intended to be redeveloped to contain four businesses and the other will be a new restaurant building replaced the existing car wash to the south. The existing building to remain is approximately 10,165 square feet and the proposed building will be approximately 4,211 square feet. Both buildings are type VB construction. Per the International Fire Code, Table B105.1, the

existing building to remain requires a minimum fire flow of 2,750 GPM for a 2-hour duration and the proposed building requires a minimum fire flow of 1750 GPM for a 2-hour duration. The existing and new buildings will have automatic sprinklers installed resulting in an allowable 50% reduction in fire flow requirements. Required fire flow will be 2,250 GPM for a 2-hour duration. A recent fire flow test was conducted on March 6th, 2019 and the minimum GPM available at 20 PSI is 4,777 GPM, exceeding the minimum fire flow requirements for both the existing and new building sizes and construction types. Refer to Appendix D for Fire Flow Results.

Per the International Fire Code, Table C102.1, the Project requires 2 fire hydrants to meet the minimum spacing requirements and building coverage for the Project. There are two existing offsite hydrants that meet these requirements – one to the northwest and one to the southwest of the property, which are supplied by individual stubs to the existing 12" CIP public water main. The aforementioned fire line stub at the northwest of the property will continue to service the private fire suppression systems for the existing and new building.

WASTEWATER SYSTEM DESIGN

There are 2 individual buildings intended to be constructed or improved onsite. For the existing building to the north, the commercial units are anticipated to share a building sewer connection to the existing 8" VCP sewer stub to the west. The new building to the south is anticipated to have its own existing building sewer connection to the existing 8" VCP stub.

WATER AND SEWER CALCULATIONS

demands should be determined per DS&PM

The table below contains the expected water caculations for the entire site, including the new proposed building and the existing building to be tenant improved:

TYPE	QUANTITY	WFSU/FIXTURE	TOTAL WFSU
WATER CLOSET (PUBLIC TANK)	15	5.0	75.0
URINAL (FV)	6	5.0	30.0
HAND SINK	27	1.5	40.5
CONVEYOR DISHWASHER	2	3.0	6.0
TRIPLE SINK	4	4.0	16.0
GLASS RINSER	3	3.0	9.0
		TOTAL	**176.5**

The Project is designed to have a water supply fixture unit count of 176.5. Per the fire flow test, a pressure range over 60 PSI will be used for calculations. The Project is anticipated to have approximately 90 linear feet of distribution pipe beyond the fire line stub at the northwest of the site to the fire riser room of the existing shopping center to remain. For the most conservative

estimate, the fire line size is assumed to be 6 inches. From the point of connection to the fire distribution line to the existing 2" water connection to the existing building, the distance is less than 50'. Per the International Plumbing Code, Table E201.1, the maximum WFSU based on the above parameters and a 1-1/2 inch meter and a 2 inch distribution line is 275; thus 176.5 WSFU is acceptable.

demands should be determined per DS&PM

The table below contains the expected waste water caculations for the entire site, including the new proposed building and the existing building to be tenant improved:

TYPE	QUANTITY	DFU/FIXTURE	TOTAL DFU
WATER CLOSET (PUBLIC)	15	6	90
URINAL	6	4	24
HAND SINK	27	2	54
CONVEYOR DISHWASHER	2	2	4
TRIPLE SINK	4	2	8
GLASS RINSER	3	2	6
		TOTAL	**186**

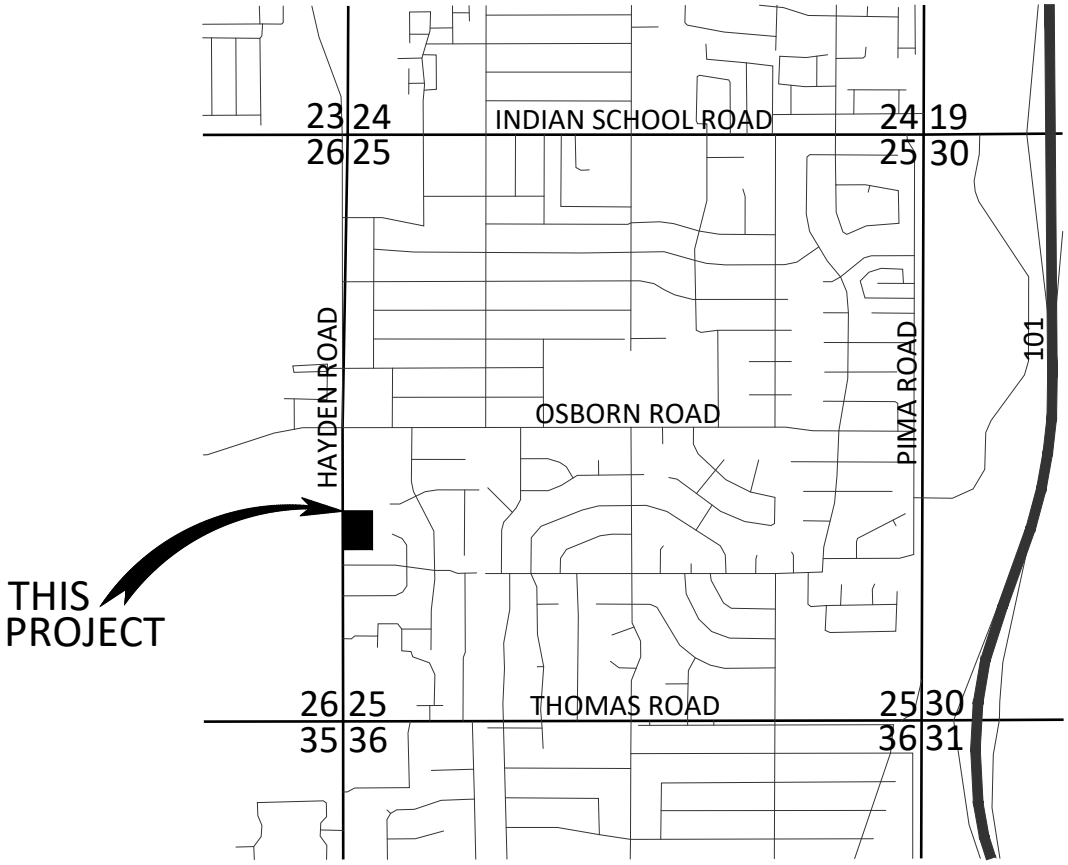
The Project's anticipated drainage fixture unit count is 186 and is designed with an anticipated 6-inch existing sewer laterals with an assumed minimum slope of 2.0%. Per the International Plumbing Code, Table 710.1(1), the maximum DFU based on the above parameters is 840. If it is found to be a 4-inch existing sewer line with an assumed minimum slope of 2.0%, the maximum DFU is 216; thus the expected maximum 186 DFU is acceptable if the sewer laterals are found to be either 4" or 6" diameter.

6" minimum

CONCLUSION

CYPRESS respectfully submits this preliminary report as the Water & Wastewater Design Report for the proposed Trail West Plaza – Scottsdale Development. The proposed water and wastewater systems shall be designed in accordance with ADEQ, International Building Code, and the City of Scottsdale standards.

Appendix A
Location Map



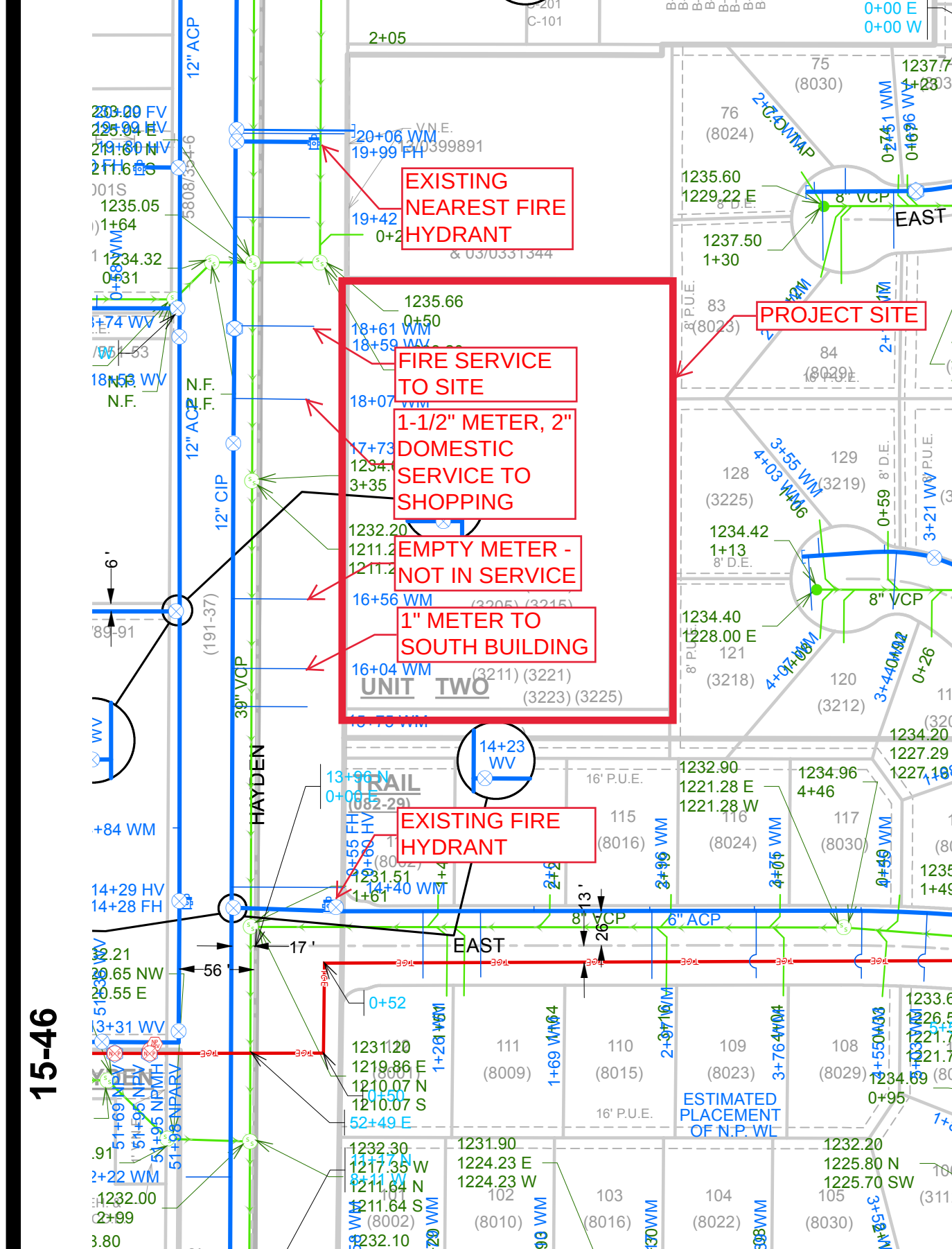
IN THE NW 1/4 OF THE SW 1/4 OF SECTION 25,
T. 2 N., R. 4 E., G.&S.R.M.,
CITY OF SCOTTSDALE, MARICOPA COUNTY, ARIZONA

LOCATION MAP

NORTH

3" = 1 MILE

Appendix B
City of Scottsdale Water and Sewer Quarter Section Map


EXISTING NEAREST FIRE HYDRANT
FIRE SERVICE TO SITE
1-1/2" METER, 2" DOMESTIC SERVICE TO SHOPPING
EMPTY METER - NOT IN SERVICE
1" METER TO SOUTH BUILDING
PROJECT SITE
UNIT TWO
EXISTING FIRE HYDRANT
ESTIMATED PLACEMENT OF N.P. WL
EAST
HAYDEN
TRAIL
12" ACP
12" CIP
39" VCP
8" VCP
6" ACP
16' P.U.E.
8' P.U.E.
8' D.E.
15-46

Appendix C
ALTA/NSPS Land Title Survey (09/06/2017)

17-393

(BASIS OF BEARING)
N0°00'00"W 2634.58'

Southwest Corner
Section 25, T2N, R4E
Found Aluminum Cap Flush

1553.69'

520.75'

560.14'

West Quarter Corner
Section 25, T2N, R4E
Found 3" Brass Cap in Handhole

HAYDEN STREET
130' Width – Public Right of Way – Asphalt Pavement

8" VCP SEWER STUB

N89°51'28"E 65.00'

65.0' R/W

N89°51'27"E 65.00'

30.5'

Set Magnail
W/Tag RLS 42937

Wall 0.5'
W. of PL

Wall 0.5'
W. of PL

N00°00'00"E 520.75'
323.89'

Found Magnail
W/Tag RLS 45763

Found Rebar
W/Cap RLS 17375

15.23'

21.86'

175.00'

9 3.3' Roof Overhang Easement
Docket 7260, Page 52, M.C.R.

N. Face of Building
0.3' S. of PL

Building
Height 11.0'

Building Overhang
0.5' S. of Easement

1-Story
Carwash Building
158 Square Feet

6.2'
25.5'
25.5'
6.3'

31.5'

Water Fountain

Vacuum

Vacuum

Building
Height 13.1'

Curb 0.9'
N. of PL

175.0'
Exception

Closet

1-Story Building
10,062 Square Feet

50.2'
10.2'
9.9'
50.0'
99.9'

60.0'

Sink

47.7'

Water Heater

4.7'
18.0'
18.0'
18.0'
18.0'
18.0'

49.9'
35.6'
62.0'

39.8'

245.52'

N89°51'27"E

245.08'

N89°51'27"E

246.41' (Rec.)
S89°51'28"W 246.41'

246.27' (Rec.)
246.38'

246.22' (Rec.)
246.32'

S89°45'35"W

83.9'

Storage Box

CLEAN MACHINE CAR WASH II LLC
Deed 110301857, M.C.R.
(NOT-A-PART)

TSCHUMY HOLDINGS LLLP
Deed 080173956, M.C.R.
(NOT-A-PART)

Shade Structure

144.8'

N. Face of Wall
0.1' S. of PL

Exception

8 8.0' Pole and Wire Easement
Docket 3852, Page 38, M.C.R.

109.7'

Wall 1.7'
N. of PL

6 8.0' Public Utility Easement
Docket 3432, Page 55, M.C.R.

Set Rebar
W/Cap RLS 42937

Shed

15.23'

22.28'

323.47'
S00°08'33"E 520.75'

175.00'

Found Rebar
W/Cap RLS 17375

Found Rebar
W/Cap RLS 17375

C.L.F. 1.2'
E. of PL

C.L.F. 0.2'
E. of PL

Wall 1.0'
E. of PL

Wall 1.9'
E. of PL

SILER CHARLES A
Deed 160552327, M.C.R.
(NOT-A-PART)

ARCILLA GEORGE C JR/DANELLE
Deed 970610333, M.C.R.
(NOT-A-PART)

AHUMADA VICTOR E/NYCOLE M
Deed 111037411, M.C.R.
(NOT-A-PART)

LEGEND

- FOUND CAP AS NOTED
- FOUND OR SET SURVEY MONUMENT AS NOTED
- LIGHT POLE
- ELECTRIC PULL BOX
- SEWER MANHOLE
- WATER METER
- FIRE DEPARTMENT CONNECTION
- DOWN GUY
- POWER POLE
- POST/BOLLARD
- AC UNIT
- ELECTRIC METER
- GAS METER
- CATV PEDESTAL
- GATE
- SIGN
- MARKER
- CHAIN LINK FENCE
- OHE — OVERHEAD ELECTRIC LINE
- SS — SEWER LINE
- OHT — OVERHEAD TELEPHONE LINE
- PL — PROPERTY LINE
- R/W — RIGHT OF WAY
- RLS — REGISTERED LAND SURVEYOR
- M.C.R. — MARICOPA COUNTY RECORD
- C.L.F. — CHAIN LINK FENCE

NORTH

20 0 20 40
scale feet

EPS GROUP
2045 S. Vineyard Ave, Suite 101
Mesa, AZ 85210
T: 480.503.2250 | F: 480.503.2258
w w w . e p s g r o u p i n c . c o m

Project:
3215 N. Hayden Road
SCOTTSDALE, ARIZONA
ALTA/NSPS LAND TITLE SURVEY

Revisions:

Call at least two full working days before you begin excavation.
ARIZONA811
Arizona One-Call, Inc.
Dial 8-1-1 or 1-800-STAKE-IT (782-5348)
In Maricopa County: (602)263-1100

Designer: JB
Drawn by: AG

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
42937
JESSE BOYD
Date Signed 09/06/17
ARIZONA, U.S.A.
Expires 06/30/2020

Job No.
17-393

Sheet No.
2
of 2

jboyd Sep 06, 2017 2:18pm S:\Projects\2017\17-393\Legal Survey\Dwgs\17-393_BS01.dwg

Appendix D
Fire Flow Results

Arizona Flow Testing LLC

HYDRANT FLOW TEST REPORT

Project Name:	Trail West Plaza
Project Address:	3213 North Hayden Road, Scottsdale, Arizona, 85251
Client Project No.:	Not Provided
Arizona Flow Testing Project No.:	19083
Flow Test Permit No.:	C57566
Date and time flow test conducted:	March 6, 2019 at 9:00 AM
Data is current and reliable until:	September 6, 2019
Conducted by:	Floyd Vaughan – Arizona Flow Testing, LLC (480-250-8154)
Witnessed by:	Ray Padilla –City of Scottsdale-Inspector (602-541-0586)

Raw Test Data

Static Pressure: **94.0 PSI**
(Measured in pounds per square inch)

Residual Pressure: **88.0 PSI**
(Measured in pounds per square inch)

Pitot Pressure: **12.0 PSI**
(Measured in pounds per square inch)

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

Coefficient of Diffuser: .9

Flowing GPM: **1,489 GPM**
(Measured in gallons per minute)

GPM @ 20 PSI: **5,780 GPM**

Data with 22 PSI Safety Factor

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

Residual Pressure: **66.0 PSI**
(Measured in pounds per square inch)

Scottsdale requires a maximum Static Pressure of 72 PSI for AFES Design.

Distance between hydrants: Approx. 580 Feet

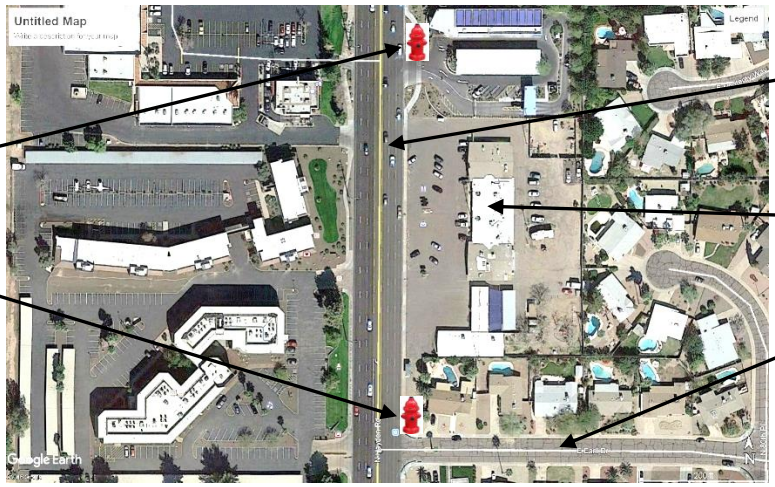
Main size: Not Provided

Flowing GPM: **1,489 GPM**

GPM @ 20 PSI**:** **4,777 GPM**

Flow Test Location

North



Pressure Fire Hydrant

Flow Fire Hydrant

North Hayden Road

Project Site
3213 North Hayden Road

East Earl Street

Plan # _____

Case # 11-DR-2019

Q-S # _____

_X_ Accepted

____ Corrections

A. Menez 08/06/2019

Reviewed By Date

DRAINAGE REPORT FOR TRAIL WEST PLAZA

Scottsdale, Arizona

16 July 2019

This drainage report is approved for the case; however, the final report and plans must address the following:
- Explain how drainage area on west side will be treated for first flush by landscape area.
- Provide proposed grades or contour information on the proposed hydrology map.

PREPARED FOR
Aline Architecture Concepts
7340 Eats Main Street
Scottsdale, Arizona 85251
Attn: Jeff Graham

DEVELOPER
Clayton Companies
7340 East Main Street, #200
Scottsdale, Arizona 85251
Attn: Tom Frenkel

SITE ADDRESS
3215 North Hayden Road
Scottsdale, Arizona 85251

PREPARED BY

CYPRESS CIVIL DEVELOPMENT
strength + sustainability

4450 north 12th street, #228
phoenix, arizona 85014
CYPRESS # 19.023

TABLE OF CONTENTS

I. INTRODUCTION

1. PROJECT NAME AND LOCATION

The Project site is located at 3215 North Hayden Road in Scottsdale, Arizona. The project is located in the southwest ¼ of Section 25, Township 2 North, Range 4 East, G&SRM. The Project site occupies approximately 1.77 acres. The Project is currently developed with two existing buildings. One building is an existing shopping center to the north, which shall be redeveloped. The other building is an existing carwash to the south, which shall be demolished and rebuilt as a new restaurant. The Project has street frontage and access to Hayden Road along its western boundary. To the east are existing single-family homes, to the north is an existing car wash, and to the south is an existing daycare/pre-school facility.

Refer to Appendix A for Location Map and Aerial Photo.

2. PURPOSE

The intent of this Drainage Report is to provide the drainage scheme for the Project in support of the Improvement Plan Submittal.

3. EXISTING STUDIES

No existing regional drainage studies were obtained for the Project.

4. FEMA FLOOD ZONE

According to the Federal Emergency Management Agency Flood Insurance Rate Map, panel number 04013C2235L dated October 16, 2013, the majority of the parcel is located in the shaded Zone X Area, which is an area defined as within the 0.2% annual chance flood. A small portion of the site is located in the unshaded Zone X area, which is an area defined as an area with minimal flood hazard (outside the 0.2% annual chance flood). Portions of the parcel are also located within Zone X (shaded) area, which is defined as 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.

Refer to Appendix B for FEMA FIRM Map.

II. EXISTING DRAINAGE INFRASTRUCTURE

1. OFFSITE

The Project is not impacted by any offsite flows.

2. STREET CAPACITY CALCULATIONS

The half-street capacity within the Hayden Road right-of-way is 8.2 CFS. This shall be more than sufficient to carry the proposed flow from the Project, as it shall be less than the existing flow it carries from the Project site.

Refer to Appendix C for Hayden Road Capacity Calculations.

3. ONSITE

The Project has no existing retention infrastructure. Runoff from the western portion of the site discharges west into Hayden Road and runoff from the eastern portion ponds onsite in the parking and landscape area east of the buildings.

Refer to Appendix D for the Existing and Proposed Conditions Watershed Maps and Calculations.

III. PROPOSED DRAINAGE INFRASTRUCTURE

1. CONVEYANCE OF RUNOFF

Runoff from the western portion of the site, including portions of the northern building and the entire parking area west of the buildings, shall continue to discharge west into Hayden Road as it does in the existing condition. This area was unable to be retained due to the existing building and existing grade constraints. However, the proposed Project shall improve upon the existing condition, as less of the new restaurant building at the south and its surrounding area shall drain to Hayden Road. The entire new restaurant building and more of its surrounding area shall be retained in the proposed condition than was retained in the existing condition. New catch basins shall be installed at low points in the parking area on the east side of the buildings to convey stormwater to the future underground chamber retention system.

Refer to Appendix D for the Existing and Proposed Conditions Watershed Maps and Calculations to verify that the proposed conditions shall decrease the flow discharging into Hayden Road.

2. STORM WATER RETENTION REQUIREMENTS

The Project will meet the 100-yr, 2-hr stormwater runoff volume requirements for the newly-paved eastern portion of the site, retaining more than it did in the existing condition and reducing the discharge into Hayden Road. Retention shall be accomplished via a new underground chamber system and proper discharge of the

chambers will be assured via natural percolation as a part of the engineering drainage system.

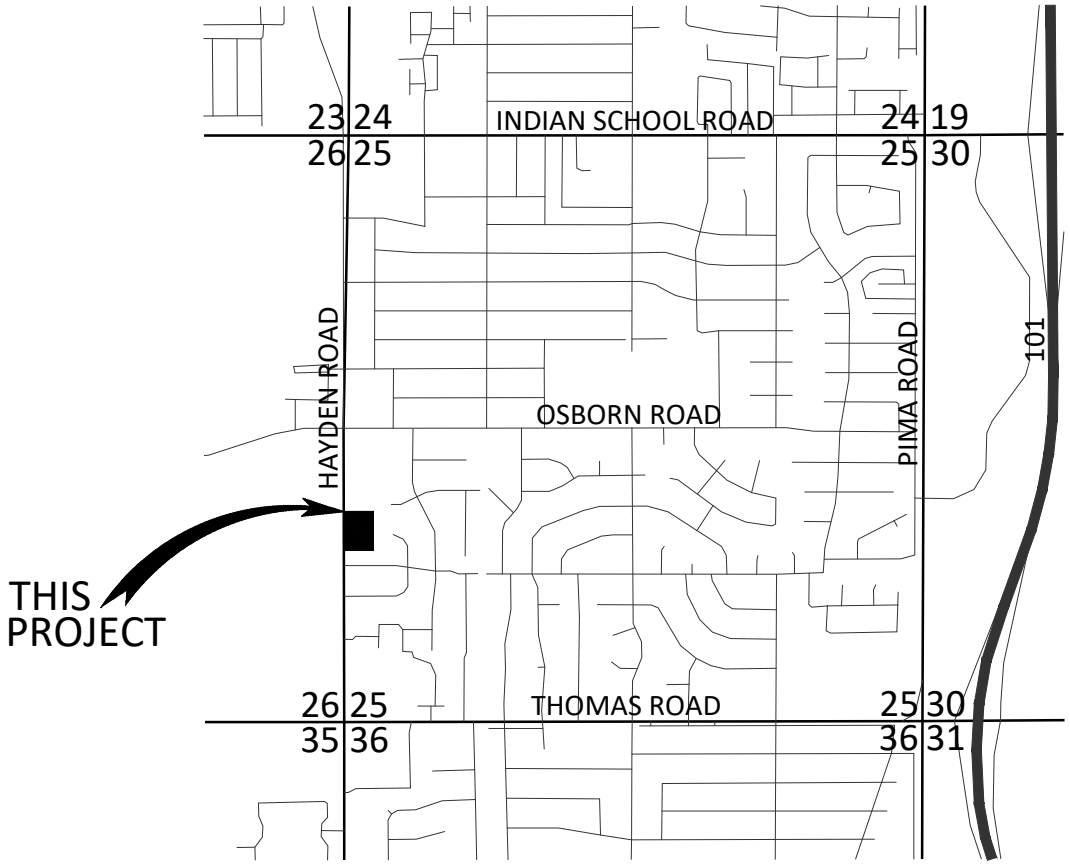
Refer to Appendix D for Retention Calculations.

IV. SUMMARY AND CONCLUSION

This Drainage Report is to accompany the Improvement Plan for the Trail West Plaza development project. This narrative was written utilizing generally accepted engineering practices and all information herein has been researched through archived documents and all calculations were accomplished through applying the City of Scottsdale Engineering Standards.

The analysis presented in this narrative evaluates storm water runoff resulting from a statistical evaluation of storm events of particular duration and frequency up to and including a 100-year frequency event. A storm event exceeding the 100-year frequency may cause or create the risk of greater flood impact than is addressed and presented herein. The scope of this assessment does not include evaluation of storm water runoff resulting from storm events exceeding the 100-year frequency. CYPRESS assumes no responsibility for actual flood damage, increased risks of flood damage, or increased construction or development cost resulting from or related to any such events, nor shall CYPRESS be responsible for any changes in, or additions to, regulatory requirements which may result from, or be related to, any such events or changes in hydrologic or hydraulic conditions within the watershed.

APPENDIX A
(Location Map + Aerial Photo)



IN THE NW 1/4 OF THE SW 1/4 OF SECTION 25,
T. 2 N., R. 4 E., G.&S.R.M.,
CITY OF SCOTTSDALE, MARICOPA COUNTY, ARIZONA

LOCATION MAP

NORTH

3" = 1 MILE

AERIAL PHOTO

APPENDIX B
(FEMA FIRM Map)

National Flood Hazard Layer FIRMette

FEMA

Feet

0 250 500 1,000 1,500 2,000

1:6,000

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 5/8/2019 at 7:59:17 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

APPENDIX C
(Hayden Road Capacity Calculations)

Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Wednesday, Jul 10 2019

Hayden Road Capacity

User-defined

Invert Elev (ft)	= 34.18
Slope (%)	= 0.22
N-Value	= 0.013

Calculations

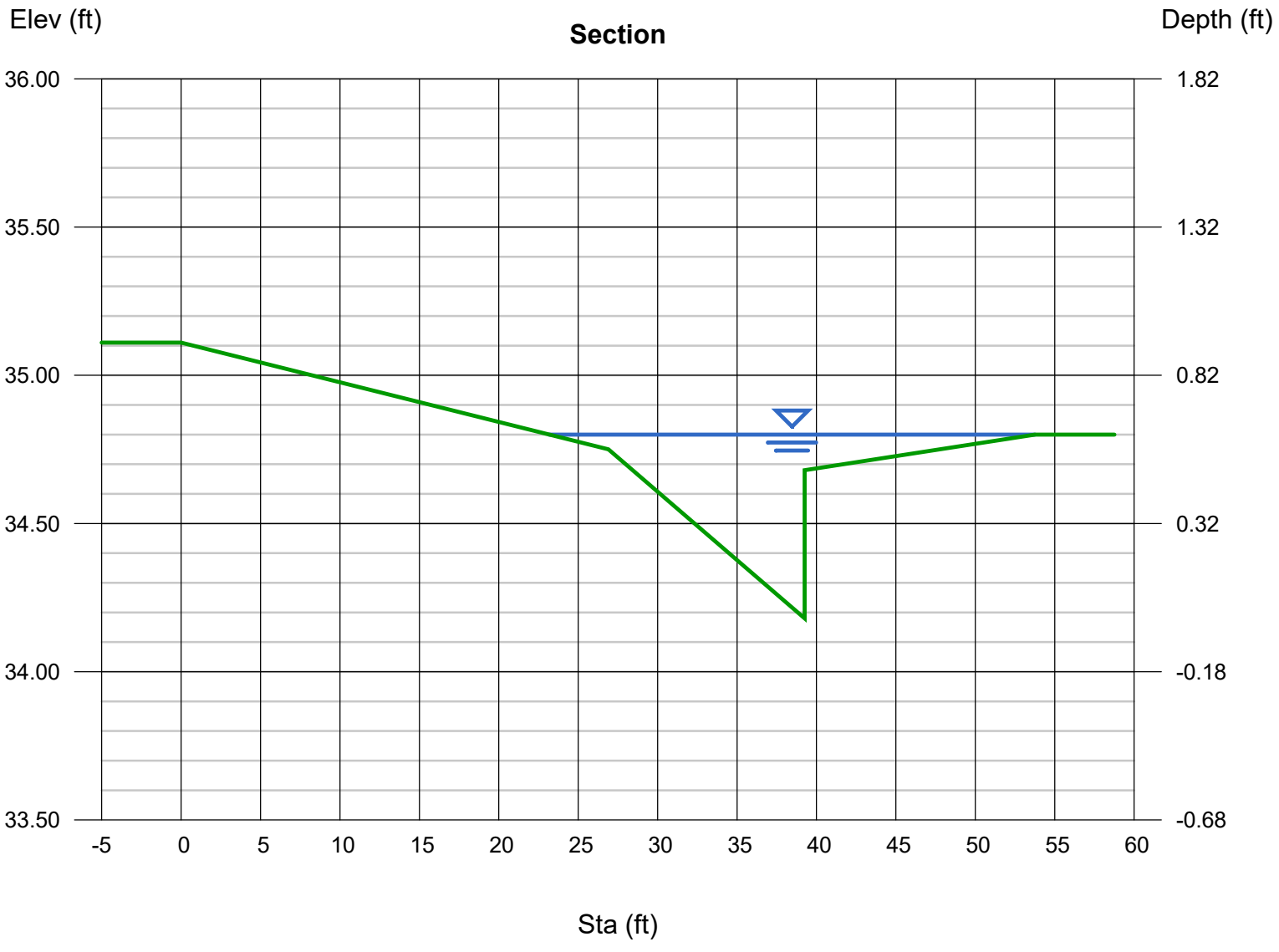
Compute by:	Known Depth
Known Depth (ft)	= 0.62

Highlighted

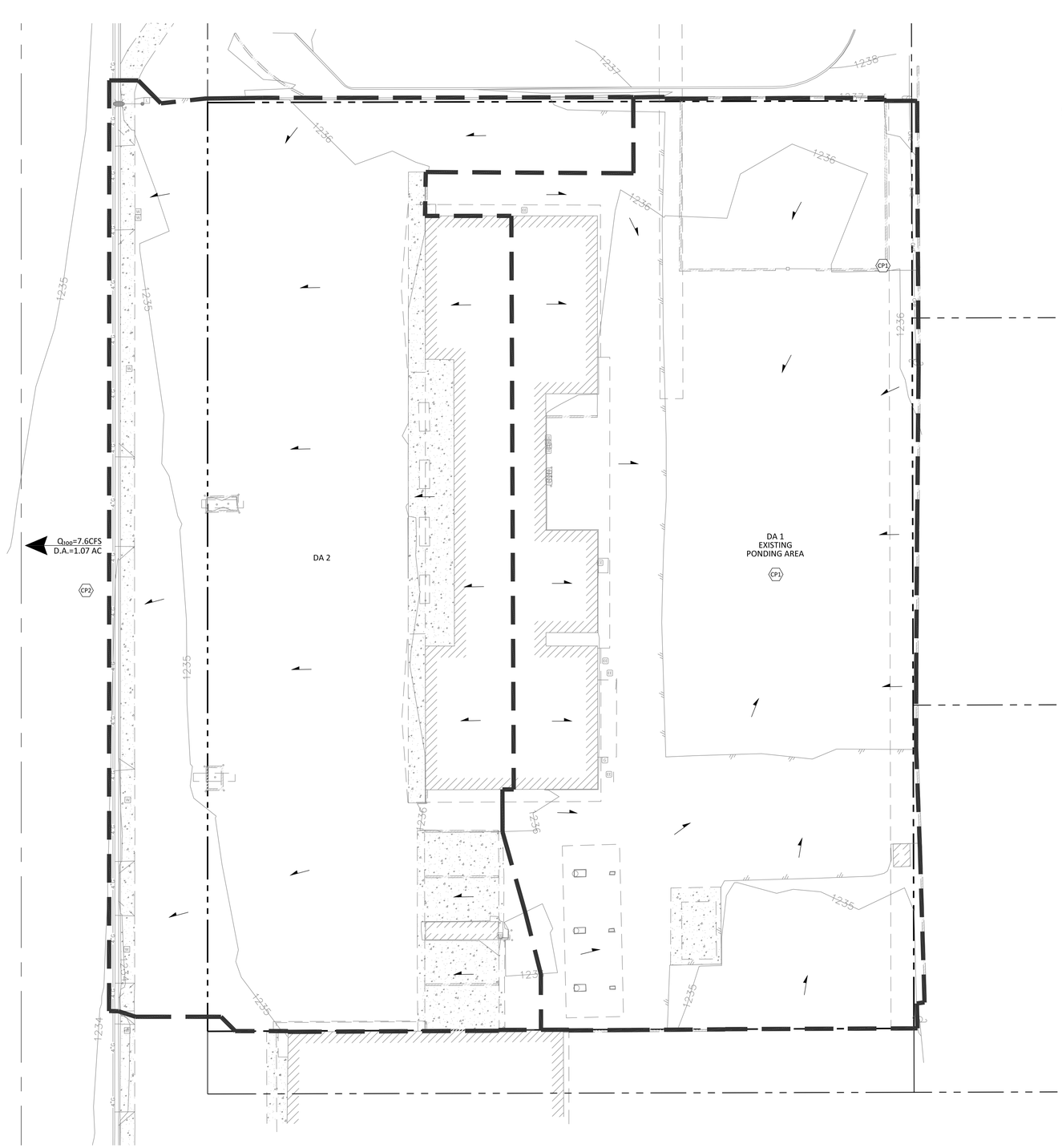
Depth (ft)	= 0.62
Q (cfs)	= 8.214
Area (sqft)	= 5.10
Velocity (ft/s)	= 1.61
Wetted Perim (ft)	= 31.11
Crit Depth, Yc (ft)	= 0.55
Top Width (ft)	= 30.60
EGL (ft)	= 0.66

(Sta, El, n)-(Sta, El, n)...

(0.00, 35.11)-(26.90, 34.75, 0.013)-(39.26, 34.18, 0.013)-(39.26, 34.68, 0.013)-(53.76, 34.80, 0.013)



APPENDIX D
(Existing and Proposed Conditions Watershed Maps + Calculations)

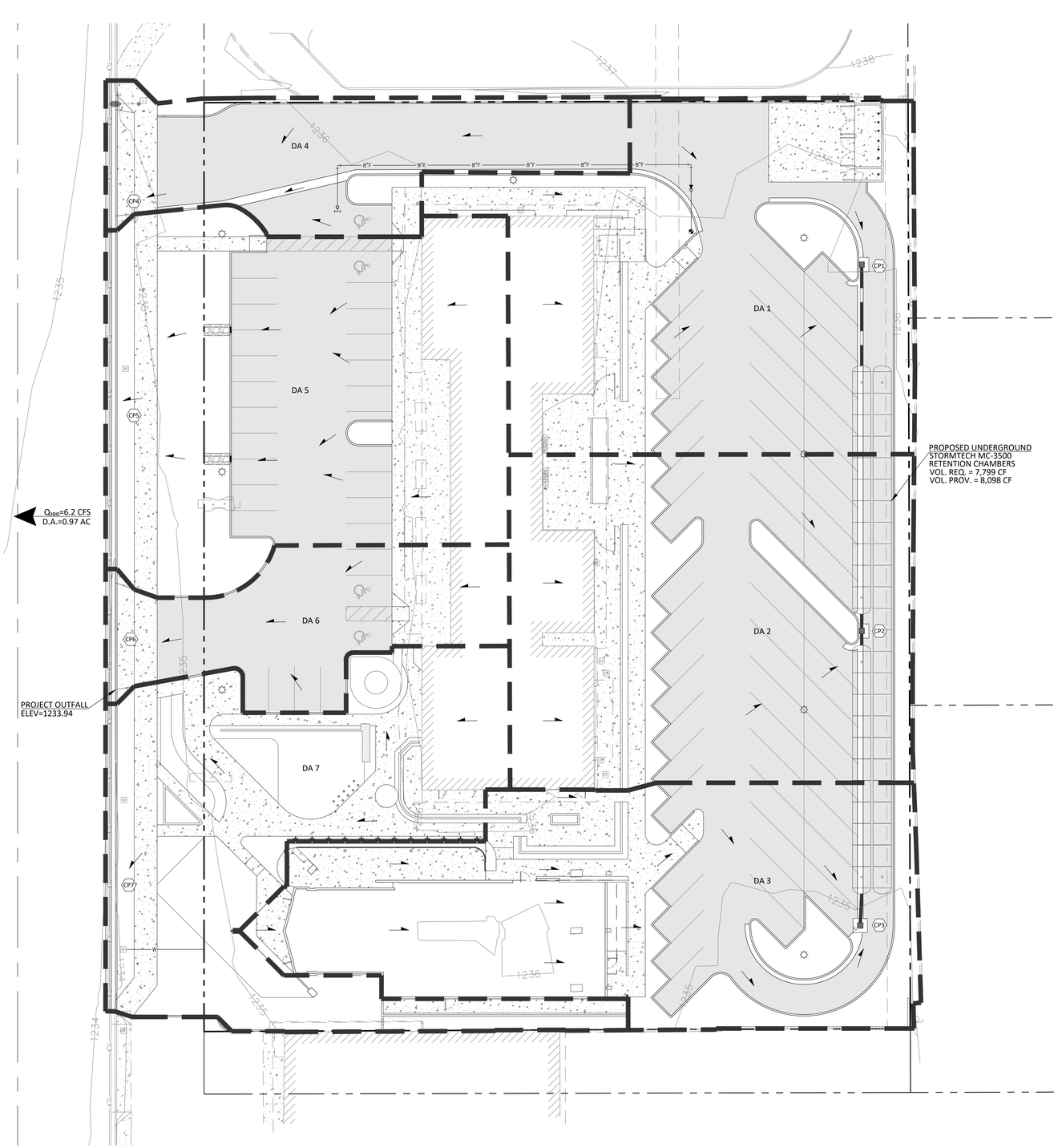


WATERSHED CONCENTATION POINTS		
	AREA	Q 100
CP1	1.03 AC	6.7 CFS
CP2	1.07 AC	7.6 CFS

CYPRESS CIVIL DEVELOPMENT
strength + sustainability
4450 north 12th street, #228
phoenix, arizona 85014
p: 623.282.2498
e: jphunt@cypresscivil.com
CYPRESS PROJECT NO: 19.023

TRAIL WEST PLAZA

existing conditions hydrology map



LEGEND

- RIGHT-OF-WAY
- PROJECT BOUNDARY LINE
- ROADWAY CENTERLINE
- FLOW ARROW
- WATERSHED BOUNDARY
- CONCENTRATION POINT (CP1)

WATERSHED CONCENTATION POINTS

	AREA	Q 100
CP1	0.39 AC	2.6 CFS
CP2	0.37 AC	2.5 CFS
CP3	0.37 AC	2.4 CFS
CP4	0.16AC	1.1 CFS
CP5	0.38 AC	2.4 CFS
CP6	0.13 AC	1.0 CFS
CP7	0.30 AC	1.7 CFS

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4450 north 12th street, #228
phoenix, arizona 85014
p: 623.282.2498
e: jphunt@cypresscivil.com

CYPRESS PROJECT NO: 19.023

TRAIL WEST PLAZA

proposed conditions hydrology map

CYPRESS CIVIL DEVELOPMENT strength + sustainability

EXISTING WATERSHED SUMMARY

PROJECT TRAIL WEST PLAZA

EASTERN PORTION OF THE SITE - PONDS ONSITE

WATERSHED ID	CONCENTRATION POINT	AREA ROOF + PAVEMENT C=0.95 (SF)	AREA GRAVEL PARKING C=0.85 (SF)	AREA DESERT LANDSCAPING C=0.50 (SF)	TOTAL AREA (AC)	WEIGHTED 'C'
DA A1	A1	20,705	20,115	4,165	1.03	0.86
WESTERN PORTION OF THE SITE - DISCHARGES TO HAYDEN ROAD						
DA A2	A2	46,376	0	201	1.07	0.95

CYPRESS CIVIL DEVELOPMENT strength + sustainability

EXISTING FLOWS - RATIONAL METHOD

PROJECT TRAIL WEST PLAZA

$$T_C = 11.4L^{0.5}K_b^{52}S^{-0.31}i^{-0.38} \times 60$$

$$Q = CiA$$

Tc= Time of Concentration (min)
L= Length of longest flow path (miles)
Kb= Watershed resistance coefficient
S= Watercourse slope (ft/mi)
i= rainfall intensity (in/hr)

Q = Peak discharge (cfs)
C = Runoff coefficient
i = Rainfall intensity (inch/hr)
A = Drainage area (Acres)

100-YR, 5-MIN	7.45	in/hr
100-YR, 10-MIN	5.66	in/hr

WATERSHED ID	CONCENTRATION POINT	L	Kb	S		i	Tc	C	i	A	Q
DA-1	1	0.03	0.04	35	0.7%	7.45	3.7	0.86	7.45	1.03	6.7
DA-2	2	0.03	0.04	60	1.1%	7.45	2.7	0.95	7.45	1.07	7.6

CYPRESS CIVIL DEVELOPMENT

strength + sustainability

PROPOSED WATERSHED SUMMARY

PROJECT TRAIL WEST PLAZA

EASTERN PORTION OF THE SITE - SHALL BE RETAINED UNDERGROUND

WATERSHED ID	CONCENTRATION POINT	AREA ROOF + PAVEMENT C=0.95 (SF)	AREA DESERT LANDSCAPING C=0.50 (SF)	TOTAL AREA (AC)	WEIGHTED 'C'
DA 1	A1	14,125	2,812	0.39	0.88
DA 2	A2	14,127	2,101	0.37	0.89
DA 3	A3	13,297	2,773	0.37	0.87
		41,549	**7,686**	**1.13**	**0.88**

WESTERN PORTION OF THE SITE - ULTIMATELY DISCHARGES TO HAYDEN ROAD

DA 4	A4	6,306	534	0.16	0.91
DA 5	A5	12,215	4,434	0.38	0.83
DA 6	A6	5,545	0	0.13	0.95
DA 7	A7	6,974	6,304	0.30	0.74
		31,041	**11,273**	**0.97**	**0.83**

CYPRESS CIVIL DEVELOPMENT strength + sustainability

PROPOSED FLOWS - RATIONAL METHOD

PROJECT TRAIL WEST PLAZA

$$T_C = 11.4L^{0.5}K_b^{52}S^{-0.31}i^{-0.38} \times 60$$

$$Q = CiA$$

Tc= Time of Concentration (min)
L= Length of longest flow path (miles)
Kb= Watershed resistance coefficient
S= Watercourse slope (ft/mi)
i= rainfall intensity (in/hr)

Q = Peak discharge (cfs)
C = Runoff coefficient
i = Rainfall intensity (inch/hr)
A = Drainage area (Acres)

100-YR, 5-MIN	7.45	in/hr
100-YR, 10-MIN	5.66	in/hr

WATERSHED ID	CONCENTRATION POINT	L	Kb	S		i	Tc	C	i	A	Q
DA-1	1	0.04	0.04	30	0.6%	7.45	3.9	0.88	7.45	0.39	2.6
DA-2	2	0.03	0.04	35	0.7%	7.45	3.7	0.89	7.45	0.37	2.5
DA-3	3	0.04	0.04	30	0.6%	7.45	4.4	0.87	7.45	0.37	2.4
DA-4	4	0.03	0.04	30	0.6%	7.45	3.9	0.91	7.45	0.16	1.1
DA-5	5	0.03	0.04	30	0.6%	7.45	3.4	0.83	7.45	0.38	2.4
DA-6	6	0.03	0.04	30	0.6%	7.45	3.4	0.95	7.45	0.13	1.0
DA-7	7	0.03	0.04	30	0.6%	7.45	3.4	0.74	7.45	0.30	1.7

NOAA Atlas 14, Volume 1, Version 5
Location name: Scottsdale, Arizona, USA*
Latitude: 33.4851°, Longitude: -111.9083°
Elevation: 1230.76 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches/hour)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**2.20** (1.85-2.68)	**2.88** (2.42-3.50)	**3.91** (3.26-4.74)	**4.70** (3.90-5.68)	**5.77** (4.72-6.94)	**6.60** (5.33-7.90)	**7.45** (5.89-8.88)	**8.32** (6.48-9.90)	**9.47** (7.18-11.3)	**10.4** (7.70-12.4)
10-min	**1.67** (1.40-2.03)	**2.18** (1.84-2.66)	**2.97** (2.48-3.61)	**3.58** (2.97-4.32)	**4.39** (3.59-5.27)	**5.02** (4.06-6.01)	**5.66** (4.49-6.76)	**6.33** (4.93-7.54)	**7.21** (5.47-8.60)	**7.88** (5.86-9.41)
15-min	**1.38** (1.16-1.68)	**1.81** (1.52-2.20)	**2.46** (2.06-2.98)	**2.96** (2.46-3.57)	**3.63** (2.97-4.36)	**4.15** (3.35-4.97)	**4.68** (3.71-5.58)	**5.23** (4.07-6.23)	**5.96** (4.52-7.10)	**6.51** (4.84-7.78)
30-min	**0.930** (0.780-1.13)	**1.22** (1.02-1.48)	**1.65** (1.38-2.01)	**1.99** (1.65-2.40)	**2.44** (2.00-2.94)	**2.80** (2.26-3.34)	**3.15** (2.50-3.76)	**3.52** (2.74-4.19)	**4.01** (3.04-4.78)	**4.39** (3.26-5.24)
60-min	**0.576** (0.483-0.701)	**0.753** (0.634-0.917)	**1.02** (0.856-1.24)	**1.23** (1.02-1.49)	**1.51** (1.24-1.82)	**1.73** (1.40-2.07)	**1.95** (1.55-2.33)	**2.18** (1.70-2.60)	**2.48** (1.88-2.96)	**2.71** (2.02-3.24)
2-hr	**0.334** (0.284-0.398)	**0.432** (0.368-0.516)	**0.578** (0.490-0.688)	**0.690** (0.579-0.819)	**0.842** (0.699-0.994)	**0.960** (0.786-1.13)	**1.08** (0.871-1.27)	**1.20** (0.952-1.41)	**1.37** (1.06-1.61)	**1.50** (1.13-1.77)
3-hr	**0.242** (0.205-0.291)	**0.310** (0.264-0.375)	**0.408** (0.345-0.490)	**0.485** (0.407-0.580)	**0.593** (0.491-0.705)	**0.679** (0.554-0.805)	**0.770** (0.616-0.911)	**0.863** (0.680-1.02)	**0.993** (0.758-1.18)	**1.10** (0.818-1.30)
6-hr	**0.146** (0.126-0.172)	**0.185** (0.161-0.217)	**0.237** (0.205-0.278)	**0.279** (0.239-0.325)	**0.335** (0.284-0.389)	**0.380** (0.316-0.439)	**0.426** (0.350-0.493)	**0.474** (0.381-0.549)	**0.539** (0.422-0.625)	**0.590** (0.452-0.687)
12-hr	**0.081** (0.071-0.094)	**0.102** (0.089-0.119)	**0.130** (0.113-0.150)	**0.151** (0.131-0.174)	**0.180** (0.154-0.207)	**0.202** (0.171-0.232)	**0.225** (0.188-0.258)	**0.248** (0.204-0.285)	**0.279** (0.224-0.323)	**0.304** (0.239-0.353)
24-hr	**0.048** (0.043-0.054)	**0.061** (0.055-0.069)	**0.079** (0.071-0.089)	**0.094** (0.084-0.105)	**0.114** (0.101-0.127)	**0.129** (0.114-0.144)	**0.146** (0.127-0.162)	**0.163** (0.141-0.181)	**0.186** (0.159-0.208)	**0.204** (0.174-0.229)
2-day	**0.026** (0.023-0.029)	**0.033** (0.030-0.037)	**0.044** (0.039-0.049)	**0.052** (0.046-0.058)	**0.064** (0.056-0.071)	**0.073** (0.064-0.082)	**0.083** (0.072-0.093)	**0.093** (0.081-0.104)	**0.107** (0.092-0.120)	**0.118** (0.101-0.133)
3-day	**0.018** (0.016-0.021)	**0.024** (0.021-0.026)	**0.031** (0.028-0.035)	**0.037** (0.033-0.041)	**0.045** (0.040-0.051)	**0.052** (0.046-0.058)	**0.059** (0.052-0.066)	**0.067** (0.058-0.075)	**0.077** (0.066-0.087)	**0.086** (0.073-0.096)
4-day	**0.015** (0.013-0.016)	**0.019** (0.017-0.021)	**0.025** (0.022-0.027)	**0.029** (0.026-0.033)	**0.036** (0.032-0.040)	**0.042** (0.037-0.046)	**0.047** (0.041-0.053)	**0.054** (0.046-0.060)	**0.062** (0.053-0.070)	**0.069** (0.059-0.078)
7-day	**0.009** (0.008-0.010)	**0.012** (0.011-0.013)	**0.016** (0.014-0.017)	**0.019** (0.016-0.021)	**0.023** (0.020-0.026)	**0.026** (0.023-0.029)	**0.030** (0.026-0.034)	**0.034** (0.029-0.038)	**0.039** (0.034-0.044)	**0.044** (0.037-0.049)
10-day	**0.007** (0.006-0.008)	**0.009** (0.008-0.010)	**0.012** (0.011-0.013)	**0.014** (0.013-0.016)	**0.017** (0.015-0.019)	**0.020** (0.018-0.022)	**0.023** (0.020-0.025)	**0.026** (0.022-0.028)	**0.030** (0.025-0.033)	**0.033** (0.028-0.037)
20-day	**0.004** (0.004-0.005)	**0.006** (0.005-0.006)	**0.007** (0.007-0.008)	**0.009** (0.008-0.010)	**0.010** (0.009-0.012)	**0.012** (0.010-0.013)	**0.013** (0.012-0.015)	**0.015** (0.013-0.016)	**0.017** (0.014-0.019)	**0.018** (0.016-0.020)
30-day	**0.003** (0.003-0.004)	**0.004** (0.004-0.005)	**0.006** (0.005-0.006)	**0.007** (0.006-0.007)	**0.008** (0.007-0.009)	**0.009** (0.008-0.010)	**0.010** (0.009-0.011)	**0.011** (0.010-0.013)	**0.013** (0.011-0.014)	**0.014** (0.012-0.016)
45-day	**0.003** (0.002-0.003)	**0.003** (0.003-0.004)	**0.004** (0.004-0.005)	**0.005** (0.005-0.006)	**0.006** (0.006-0.007)	**0.007** (0.006-0.008)	**0.008** (0.007-0.009)	**0.009** (0.008-0.009)	**0.010** (0.008-0.011)	**0.010** (0.009-0.012)
60-day	**0.002** (0.002-0.002)	**0.003** (0.002-0.003)	**0.004** (0.003-0.004)	**0.004** (0.004-0.005)	**0.005** (0.005-0.006)	**0.006** (0.005-0.006)	**0.006** (0.006-0.007)	**0.007** (0.006-0.008)	**0.008** (0.007-0.009)	**0.008** (0.007-0.009)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

Back to Top

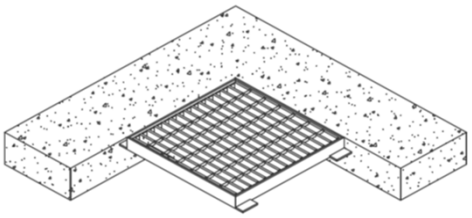
PF graphical

CYPRESS CIVIL DEVELOPMENT

strength + sustainabilty

INLET CALCULATION

PROJECT TRAIL WEST PLAZA
LOCATION CP1



INLET TYPE	MAG - 2'x2'	
LENGTH	2	FT
WIDTH	2	FT
OPEN AREA	3.02	SF
Cw	3.00	
Co	0.67	
CLOGGING FACTOR	50%	

DEPTH (FT)	WEIR (CFS)	ORIFICE (CFS)	CONTROLLING (CFS)
0.00	0.0	0.0	0.0
0.05	0.1	1.8	0.1
0.10	0.4	2.6	0.4
0.15	0.7	3.1	0.7
0.20	1.1	3.6	1.1
0.25	1.5	4.1	1.5
0.30	2.0	4.4	2.0
0.35	2.5	4.8	2.5
0.40	3.0	5.1	3.0
0.45	3.6	5.4	3.6
0.50	4.2	5.7	4.2
0.55	4.9	6.0	4.9
0.60	5.6	6.3	5.6
0.65	6.3	6.5	6.3
0.70	7.0	6.8	6.8
0.75	7.8	7.0	7.0
0.80	8.6	7.3	7.3
0.85	9.4	7.5	7.5

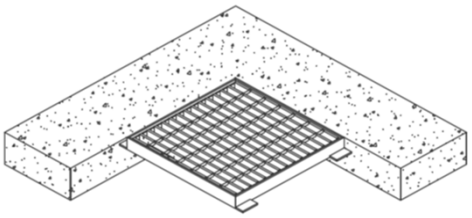
100-YR FLOW	2.6	CFS
CALCULATED DEPTH	0.40	FT

CYPRESS CIVIL DEVELOPMENT

strength + sustainabilty

INLET CALCULATION

PROJECT TRAIL WEST PLAZA
LOCATION CP2



INLET TYPE	MAG - 2'x2'	
LENGTH	2	FT
WIDTH	2	FT
OPEN AREA	3.02	SF
Cw	3.00	
Co	0.67	
CLOGGING FACTOR	50%	

DEPTH (FT)	WEIR (CFS)	ORIFICE (CFS)	CONTROLLING (CFS)
0.00	0.0	0.0	0.0
0.05	0.1	1.8	0.1
0.10	0.4	2.6	0.4
0.15	0.7	3.1	0.7
0.20	1.1	3.6	1.1
0.25	1.5	4.1	1.5
0.30	2.0	4.4	2.0
0.35	2.5	4.8	2.5
0.40	3.0	5.1	3.0
0.45	3.6	5.4	3.6
0.50	4.2	5.7	4.2
0.55	4.9	6.0	4.9
0.60	5.6	6.3	5.6
0.65	6.3	6.5	6.3
0.70	7.0	6.8	6.8
0.75	7.8	7.0	7.0
0.80	8.6	7.3	7.3
0.85	9.4	7.5	7.5

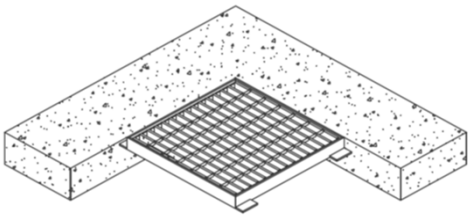
100-YR FLOW	2.5	CFS
CALCULATED DEPTH	0.40	FT

CYPRESS CIVIL DEVELOPMENT

strength + sustainabilty

INLET CALCULATION

PROJECT TRAIL WEST PLAZA
LOCATION CP3



INLET TYPE	MAG - 2'x3'	
LENGTH	2	FT
WIDTH	3	FT
OPEN AREA	4.53	SF
Cw	3.00	
Co	0.67	
CLOGGING FACTOR	50%	

DEPTH (FT)	WEIR (CFS)	ORIFICE (CFS)	CONTROLLING (CFS)
0.00	0.0	0.0	0.0
0.05	0.2	2.7	0.2
0.10	0.5	3.8	0.5
0.15	0.9	4.7	0.9
0.20	1.3	5.4	1.3
0.25	1.9	6.1	1.9
0.30	2.5	6.7	2.5
0.35	3.1	7.2	3.1
0.40	3.8	7.7	3.8
0.45	4.5	8.2	4.5
0.50	5.3	8.6	5.3
0.55	6.1	9.0	6.1
0.60	7.0	9.4	7.0
0.65	7.9	9.8	7.9
0.70	8.8	10.2	8.8
0.75	9.7	10.5	9.7
0.80	10.7	10.9	10.7
0.85	11.8	11.2	11.2

100-YR FLOW	2.4	CFS
CALCULATED DEPTH	0.30	FT

APPENDIX E
(Retention Calculations)

EQUATION SHEET

PROJECT RETENTION REQUIREMENTS

FOR TRAIL WEST PLAZA

REQUIRED ONSITE RETENTION (FOR EASTERN AREA ABLE TO BE RETAINED):

$$V = D \times C \times A$$

V = VOLUME (CUBIC FEET)

D = DEPTH OF 100-YR, 2-HR RAINFALL (FEET) = 2.16 IN

A = WATERSHED AREA (SQUARE FEET)= 49,235 SF

C = WEIGHTED SITE RUNOFF COEFFICIENT= 0.88*

*Refer to contributing watershed summary sheet

$$V = 0.88 \times (\frac{2.16}{12}) \times 49{,}235$$

$$V = 7{,}799\ CF$$

The provided underground retention tank provides 8,098 CF via 46 StormTech MC-3500 underground retention chambers.

User Inputs

Chamber Model:	MC-3500
Outlet Control Structure:	Yes
Project Name:	
Engineer:	Brianna Tallas
Project Location:	
Measurement Type:	Imperial
Required Storage Volume:	500 cubic ft.
Stone Porosity:	30%
Stone Foundation Depth:	9 in.
Stone Above Chambers:	12 in.
Average Cover Over Chambers:	18 in.
Design Constraint Dimensions:	(20 ft. x 20 ft.)

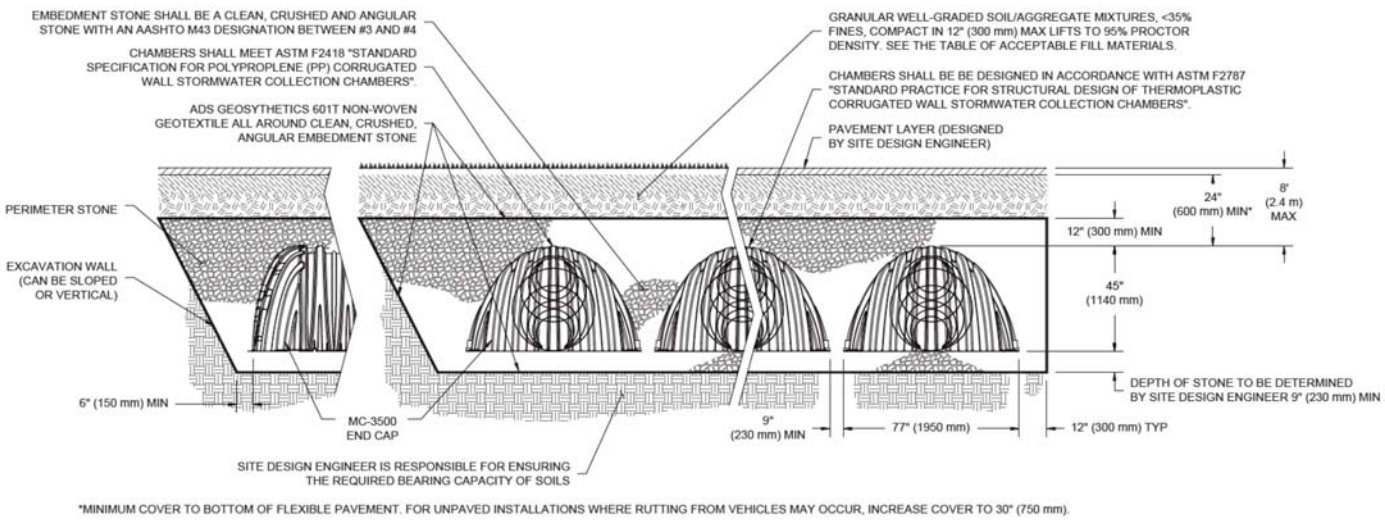
Results

System Volume and Bed Size

Installed Storage Volume:	8098.44 cubic ft.
Storage Volume Per Chamber:	109.90 cubic ft.
Number Of Chambers Required:	46
Number Of End Caps Required:	6
Chamber Rows:	2
Maximum Length:	177.75 ft.
Maximum Width:	15.33 ft.
Approx. Bed Size Required:	2725.50 square ft.

System Components

Amount Of Stone Required:	364.65 cubic yards
Volume Of Excavation (Not Including Fill):	555.19 cubic yards



EQUATION SHEET

RETENTION CHAMBERS DRAIN TIME

FOR TRAIL WEST PLAZA

ANTICIPATED NATURAL PERCOLATION RATE FOR CHAMBER SYSTEM = 0.1 CFS

$$t = \frac{V}{r}$$

V = VOLUME (CUBIC FEET) = 7,799 CU. FT.

r = PERCOLATION RATE = 0.1 CFS

t = TIME TO DRAIN BASIN

SURFACE RETENTION BASIN

TOTAL RETAIN VOLUME (100-YR, 2-HR) = 7,799 CUBIC FEET

$$t = \frac{7{,}799}{0.1}$$

t = 77,990 SECONDS

t = 21.7 HOURS

NOAA Atlas 14, Volume 1, Version 5
Location name: Scottsdale, Arizona, USA*
Latitude: 33.4851°, Longitude: -111.9083°
Elevation: 1230.76 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.183** (0.154-0.223)	**0.240** (0.202-0.292)	**0.326** (0.272-0.395)	**0.392** (0.325-0.473)	**0.481** (0.393-0.578)	**0.550** (0.444-0.658)	**0.621** (0.491-0.740)	**0.693** (0.540-0.825)	**0.789** (0.598-0.941)	**0.863** (0.642-1.03)
10-min	**0.279** (0.234-0.339)	**0.364** (0.307-0.444)	**0.495** (0.414-0.601)	**0.596** (0.495-0.720)	**0.732** (0.599-0.879)	**0.837** (0.676-1.00)	**0.944** (0.748-1.13)	**1.06** (0.821-1.26)	**1.20** (0.911-1.43)	**1.31** (0.976-1.57)
15-min	**0.345** (0.290-0.421)	**0.452** (0.381-0.550)	**0.614** (0.514-0.745)	**0.739** (0.614-0.892)	**0.907** (0.742-1.09)	**1.04** (0.838-1.24)	**1.17** (0.927-1.40)	**1.31** (1.02-1.56)	**1.49** (1.13-1.78)	**1.63** (1.21-1.95)
30-min	**0.465** (0.390-0.567)	**0.608** (0.512-0.741)	**0.827** (0.692-1.00)	**0.994** (0.827-1.20)	**1.22** (0.999-1.47)	**1.40** (1.13-1.67)	**1.58** (1.25-1.88)	**1.76** (1.37-2.10)	**2.01** (1.52-2.39)	**2.19** (1.63-2.62)
60-min	**0.576** (0.483-0.701)	**0.753** (0.634-0.917)	**1.02** (0.856-1.24)	**1.23** (1.02-1.49)	**1.51** (1.24-1.82)	**1.73** (1.40-2.07)	**1.95** (1.55-2.33)	**2.18** (1.70-2.60)	**2.48** (1.88-2.96)	**2.71** (2.02-3.24)
2-hr	**0.668** (0.568-0.795)	**0.864** (0.736-1.03)	**1.16** (0.981-1.38)	**1.38** (1.16-1.64)	**1.69** (1.40-1.99)	**1.92** (1.57-2.26)	**2.16** (1.74-2.54)	**2.41** (1.91-2.83)	**2.74** (2.11-3.22)	**2.99** (2.26-3.54)
3-hr	**0.726** (0.616-0.873)	**0.931** (0.793-1.13)	**1.22** (1.04-1.47)	**1.46** (1.22-1.74)	**1.78** (1.47-2.12)	**2.04** (1.66-2.42)	**2.31** (1.85-2.74)	**2.59** (2.04-3.07)	**2.98** (2.28-3.53)	**3.30** (2.46-3.92)
6-hr	**0.873** (0.756-1.03)	**1.11** (0.962-1.30)	**1.42** (1.23-1.66)	**1.67** (1.43-1.95)	**2.01** (1.70-2.33)	**2.28** (1.90-2.63)	**2.55** (2.09-2.95)	**2.84** (2.28-3.29)	**3.23** (2.53-3.74)	**3.53** (2.70-4.11)
12-hr	**0.975** (0.853-1.13)	**1.23** (1.08-1.43)	**1.56** (1.36-1.81)	**1.82** (1.58-2.10)	**2.17** (1.86-2.49)	**2.44** (2.06-2.80)	**2.71** (2.26-3.11)	**2.99** (2.46-3.44)	**3.37** (2.70-3.89)	**3.66** (2.89-4.26)
24-hr	**1.16** (1.04-1.30)	**1.47** (1.32-1.65)	**1.90** (1.71-2.14)	**2.25** (2.01-2.52)	**2.73** (2.41-3.05)	**3.10** (2.73-3.46)	**3.49** (3.06-3.90)	**3.90** (3.39-4.35)	**4.46** (3.83-4.98)	**4.91** (4.17-5.49)
2-day	**1.25** (1.12-1.41)	**1.60** (1.44-1.80)	**2.10** (1.88-2.36)	**2.50** (2.23-2.80)	**3.06** (2.71-3.42)	**3.50** (3.08-3.92)	**3.97** (3.47-4.45)	**4.46** (3.87-5.00)	**5.14** (4.41-5.77)	**5.69** (4.83-6.41)
3-day	**1.32** (1.19-1.49)	**1.69** (1.52-1.90)	**2.23** (1.99-2.49)	**2.66** (2.37-2.97)	**3.26** (2.89-3.64)	**3.74** (3.29-4.18)	**4.26** (3.72-4.76)	**4.80** (4.16-5.37)	**5.56** (4.76-6.23)	**6.18** (5.23-6.94)
4-day	**1.39** (1.25-1.57)	**1.78** (1.60-2.00)	**2.35** (2.10-2.63)	**2.81** (2.50-3.14)	**3.46** (3.06-3.87)	**3.99** (3.51-4.45)	**4.55** (3.97-5.08)	**5.14** (4.45-5.75)	**5.98** (5.11-6.69)	**6.67** (5.63-7.47)
7-day	**1.55** (1.38-1.74)	**1.97** (1.77-2.22)	**2.61** (2.33-2.92)	**3.11** (2.77-3.49)	**3.84** (3.40-4.29)	**4.42** (3.89-4.94)	**5.04** (4.40-5.63)	**5.69** (4.93-6.37)	**6.61** (5.65-7.41)	**7.36** (6.22-8.27)
10-day	**1.68** (1.51-1.88)	**2.15** (1.93-2.41)	**2.84** (2.53-3.17)	**3.39** (3.02-3.78)	**4.16** (3.68-4.64)	**4.78** (4.21-5.32)	**5.44** (4.75-6.05)	**6.13** (5.32-6.83)	**7.09** (6.08-7.92)	**7.87** (6.68-8.80)
20-day	**2.07** (1.85-2.30)	**2.66** (2.38-2.96)	**3.50** (3.14-3.90)	**4.15** (3.70-4.61)	**5.01** (4.46-5.57)	**5.67** (5.03-6.31)	**6.35** (5.60-7.07)	**7.03** (6.17-7.84)	**7.96** (6.92-8.89)	**8.67** (7.48-9.70)
30-day	**2.41** (2.16-2.69)	**3.10** (2.78-3.46)	**4.09** (3.66-4.54)	**4.83** (4.32-5.36)	**5.83** (5.19-6.48)	**6.61** (5.85-7.32)	**7.40** (6.52-8.20)	**8.20** (7.19-9.09)	**9.27** (8.07-10.3)	**10.1** (8.72-11.2)
45-day	**2.79** (2.51-3.11)	**3.60** (3.24-4.01)	**4.74** (4.26-5.27)	**5.59** (5.00-6.21)	**6.70** (5.98-7.44)	**7.53** (6.71-8.37)	**8.38** (7.42-9.31)	**9.22** (8.13-10.3)	**10.3** (9.04-11.5)	**11.2** (9.71-12.5)
60-day	**3.10** (2.79-3.43)	**3.99** (3.60-4.43)	**5.25** (4.73-5.82)	**6.16** (5.53-6.83)	**7.35** (6.59-8.14)	**8.23** (7.35-9.12)	**9.11** (8.10-10.1)	**9.97** (8.83-11.1)	**11.1** (9.77-12.3)	**11.9** (10.4-13.3)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

Back to Top

PF graphical

APPENDIX F
(Warning and Disclaimer of Liability Form)

GRADING & DRAINAGE LANGUAGE

WARNING AND DISCLAIMER OF LIABILITY

The City's Stormwater and Floodplain Management Ordinance is intended to minimize the occurrence of losses, hazards and conditions adversely affecting the public health, safety and general welfare which might result from flooding.

The Stormwater and Floodplain Management Ordinance identifies floodplains, floodways, flood fringes and special flood hazard areas. However, a property outside these areas could be inundated by floods. Also, much of the city is a dynamic flood area; floodways, floodplains, flood fringes and special flood hazard areas may shift from one location to another, over time, due to natural processes.

WARNING AND DISCLAIMER OF LIABILITY

The flood protection provided by the Stormwater and Floodplain Management Ordinance is considered reasonable for regulatory purposes and is based on scientific and engineering considerations. Floods larger than the base flood can and will occur on rare occasions. Floodwater heights may be increased by constructed or natural causes. The Stormwater and Floodplain Management Ordinance does not create liability on the part of the city, any officer or employee thereof, or the federal, state or county government for any flood damages that result from reliance on the Ordinance or any administrative decision lawfully made thereunder.

Compliance with the Stormwater and Floodplain Management Ordinance does not ensure complete protection from flooding. Flood-related problems such as natural erosion, streambed meander, or constructed obstructions and diversions may occur and have an adverse effect in the event of a flood. You are advised to consult your own engineer or other expert regarding these considerations.

I have read and understand the above.

11-DR-2019		7-16-2019
Plan Check #	Owner	Date

FINAL WATER
BASIS OF DESIGN REPORT
FOR
TRAIL WEST PLAZA - SCOTTSDALE

Scottsdale, Arizona

14 June 2019

PREPARED FOR
Aline Architecture Concepts
7340 East Main Street, #210
Scottsdale, Arizona 85251

DEVELOPER
Clayton Companies
7340 East Main Street, #200
Scottsdale, Arizona 85251

SITE ADDRESS
3215 North Hayden Road
Scottsdale, Arizona 85251

PREPARED BY
CYPRESS CIVIL DEVELOPMENT
strength + sustainability
4450 north 12th street, #228
phoenix, arizona 85014
CYPRESS # 19.023

11-DR-2019
6/19/2019

TABLE OF CONTENTS

INTRODUCTION: PROJECT DESCRIPTION AND LOCATION

The Project is known as 'Trail West Plaza' and is located at 3215 North Hayden Road in Scottsdale, Arizona. The Project is located on the east side of North Hayden Road, north of East Earll Drive.

The proposed Project consists of redevelopment of the parcel by replacing the existing car wash building to the south with a new restaurant building and providing a tenant improvement of the existing shopping center building to the north with associated paved access, parking, utility, and drainage improvements.

The utility provider for water facilities is the City of Scottsdale.

EXISTING CONDITIONS

Per available utility maps and as-built records, an existing 12" CIP water main is located in Hayden Road to the west of the Project. The existing building to the north is connected to the water main within Hayden Road via a 2" stub with a 1-1/2" meter. Based on observations, this stub supplies the domestic water service for the existing shopping center building to remain. Another 1" meter and stub provide service for the existing car wash building to be replaced by a proposed restaurant. Finally, another stub to the north supplies the fire service to the entire site.

There are two existing offsite hydrants that meet these requirements – one to the northwest and one to the southwest of the property, which are supplied by individual stubs to the existing 12" CIP public water main.

Refer to Appendix A for City of Scottsdale Water and Sewer Quarter Section Map for stub locations and sizes.

A recent fire flow test was conducted on March 6th, 2019 and the minimum GPM available at 20 PSI is 4,777 GPM, exceeding the minimum fire flow requirements for both the existing and new building sizes and construction types. Refer to Appendix B for Fire Flow Test Results.

A new private fire hydrant is proposed at the northeast corner of the existing building to provide ample fire coverage. The new hydrant will tie onto the existing 8" fire service line currently supplying fire flow to the existing building. Refer to Appendix B for Fire Hydrant Pressure Calculation.

11-DR-2019
6/19/2019

PROPOSED CONDITIONS

There will be two buildings onsite. The existing shopping center building to the north is intended to be redeveloped to contain four businesses and a new restaurant building will replace the existing car wash to the south. The design team intends to utilize the existing water service and fire service connections. The Project is anticipated to have approximately 90 linear feet of distribution pipe beyond the fire line stub at the northwest of the site to the fire riser room of the existing shopping center to remain. For the most conservative estimate, the fire line size is assumed to be 6 inches. From the point of connection to the fire distribution line to the existing 2" water connection to the existing building, the distance is less than 50'. This is anticipated to provide adequate sizing and pressure to supply the intended domestic and fire services to the building.

Per the International Fire Code, Table C102.1, the Project requires 2 fire hydrants to meet the minimum spacing requirements and building coverage. The two existing offsite hydrants meet these requirements. The aforementioned fire line stub at the northwest of the property will continue to service the private fire suppression systems for the existing and new building.

Refer to Appendix C for Preliminary Floor Plan and Appendix D for Preliminary Improvement Plans.

REQUIRED COMPUTATIONS

EXISTING WATER DEMAND

The existing building to remain is approximately 10,165 square feet and is type V-B construction. The existing car wash to be demolished is approximately 5,740 square feet of usable interior/exterior car wash space. The largest building is the existing building to remain. Per the International Fire Code, Table B105.1, it requires a minimum fire flow of 2,750 GPM for a 2-hour duration. The existing building has automatic sprinklers installed resulting in an allowable 50% reduction in fire flow requirements, but cannot be less than 1,500 GPM. Therefore, required fire flow will be 1,500 GPM for a 2-hour duration.

NORTH BUILDING:

Average Day Demand (Commercial/Retail): 0.00111/SF x 10,165 SF = 11.28 GPM

Peak Hour Demand: 3.5 x 11.28 = 39.48 GPM

Maximum Day Demand + Fire Flow Demand: 2x(11.28 GPM) + 1,500 GPM=1,522.56 GPM

SOUTH CAR WASH BUILDING:

Average Day Demand (Car Wash – assumed 3x retail use): 0.00333 x 5,740 SF = 19.11 GPM

Peak Hour Demand: 3.5 x 19.11 = 66.89 GPM

Maximum Day Demand + Fire Flow Demand: 2 x (19.11) + 1,500 GPM = 1,538.22 GPM

PROPOSED WATER DEMAND

The proposed building will be approximately 4,211 square feet and is construction type V-B. The largest building will still be the existing building to remain that has 10,165 square feet. Per the International Fire Code, Table B105.1, it requires a minimum fire flow of 2,750 GPM for a 2-hour duration. The existing building has automatic sprinklers installed resulting in an allowable 50% reduction in fire flow requirements, but cannot be less than 1,500 GPM. Therefore, required fire flow will be 1,500 GPM for a 2-hour duration.

NORTH BUILDING:

Average Day Demand (Commercial/Retail): 0.00111/SF x 10,165 SF = 11.28 GPM

Peak Hour Demand: 3.5 x 11.28 = 39.48 GPM

Maximum Day Demand + Fire Flow Demand: 2x(11.28 GPM) + 1,500 GPM=1,522.56 GPM

SOUTH CAR WASH BUILDING:

Average Day Demand (Restaurant): 0.00181/SF x 4,211 SF = 7.62 GPM

Peak Hour Demand: 3.5 x 7.62 = 26.67 GPM

Maximum Day Demand + Fire Flow Demand: 2x(7.62 GPM) + 1,500 GPM=1,515.24 GPM

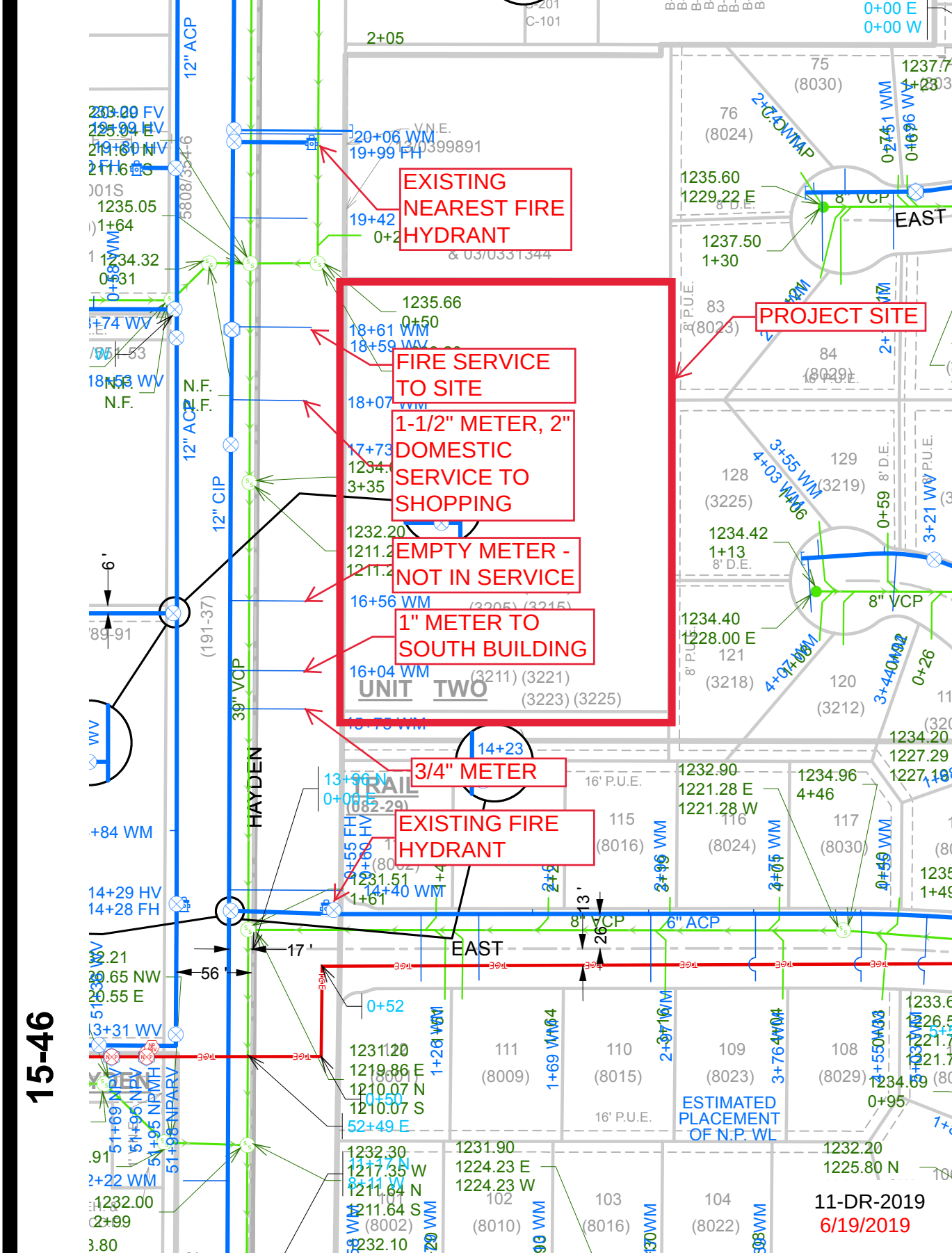
The proposed condition is anticipated to have the same demand as the existing condition for the north building and a lower demand than the existing condition for the south building. Therefore, it is expected that the existing water infrastructure will be sufficient to serve the redeveloped building.

CONCLUSION

CYPRESS respectfully submits this preliminary report as the Water Design Report for the proposed Trail West Plaza– Scottsdale Development. The proposed water system shall be designed in accordance with ADEQ, International Building Code, and the City of Scottsdale standards.

11-DR-2019
6/19/2019

Appendix A
City of Scottsdale Water + Sewer Quarter Section Map


EXISTING NEAREST FIRE HYDRANT
PROJECT SITE
FIRE SERVICE TO SITE
1-1/2" METER, 2" DOMESTIC SERVICE TO SHOPPING
EMPTY METER - NOT IN SERVICE
1" METER TO SOUTH BUILDING
UNIT TWO
3/4" METER
EXISTING FIRE HYDRANT
HAYDEN
EAST
ESTIMATED PLACEMENT OF N.P. WL
8" VCP
6" ACP
12" ACP
12" CIP
36" VCP
16' P.U.E.
8' D.E.
N.F.
15-46
11-DR-2019
6/19/2019

Appendix B
Fire Flow Test Results + Fire Hydrant Calculation

Arizona Flow Testing LLC

HYDRANT FLOW TEST REPORT

Project Name:	Trail West Plaza
Project Address:	3213 North Hayden Road, Scottsdale, Arizona, 85251
Client Project No.:	Not Provided
Arizona Flow Testing Project No.:	19083
Flow Test Permit No.:	C57566
Date and time flow test conducted:	March 6, 2019 at 9:00 AM
Data is current and reliable until:	September 6, 2019
Conducted by:	Floyd Vaughan – Arizona Flow Testing, LLC (480-250-8154)
Witnessed by:	Ray Padilla –City of Scottsdale-Inspector (602-541-0586)

Raw Test Data

Static Pressure: **94.0 PSI**
(Measured in pounds per square inch)

Residual Pressure: **88.0 PSI**
(Measured in pounds per square inch)

Pitot Pressure: **12.0 PSI**
(Measured in pounds per square inch)

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

Coefficient of Diffuser: .9

Flowing GPM: **1,489 GPM**
(Measured in gallons per minute)

GPM @ 20 PSI: **5,780 GPM**

Data with 22 PSI Safety Factor

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

Residual Pressure: **66.0 PSI**
(Measured in pounds per square inch)

Scottsdale requires a maximum Static Pressure of 72 PSI for AFES Design.

Distance between hydrants: Approx. 580 Feet

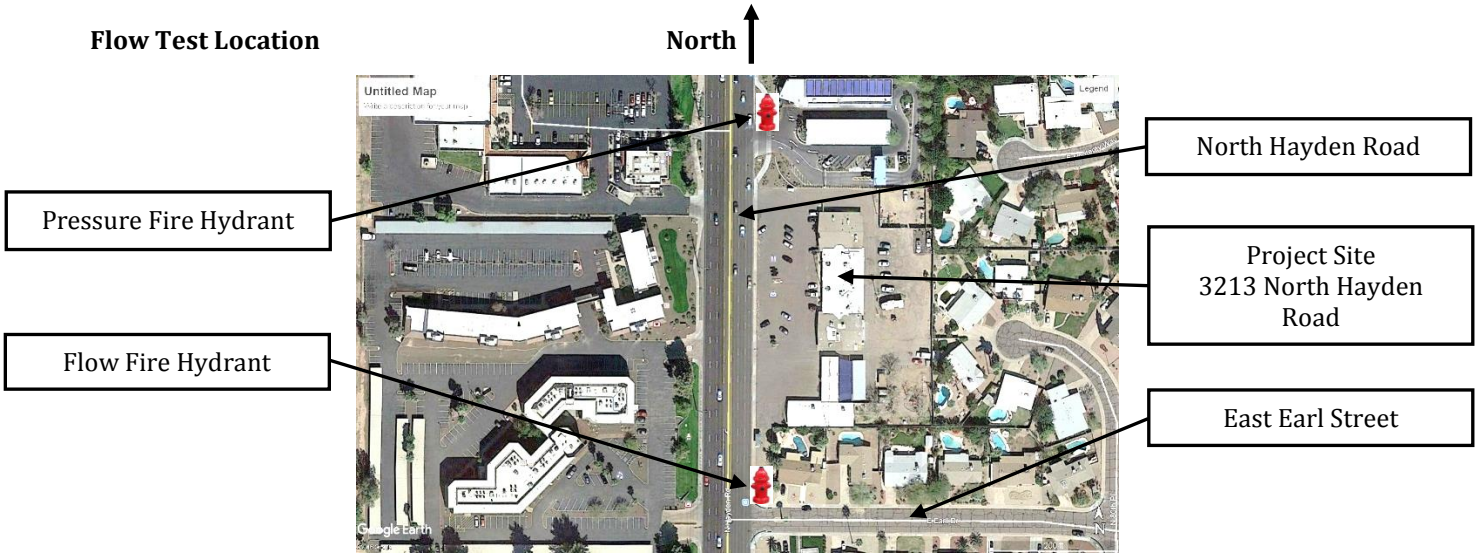
Main size: Not Provided

Flowing GPM: **1,489 GPM**

GPM @ 20 PSI**:** **4,777 GPM**

Flow Test Location

North



CYPRESS CIVIL DEVELOPMENT

strength + sustainabilty

Pipe Headloss Calculator

PROJECT Trail West Plaza
PIPE SEGMENT Fire Line to new private fire hydrant

Headloss in Pipe

$$P_d = \frac{4.52 \times q^{1.85}}{C^{1.85} \times d^{4.8655}}$$

P_d = Pressure Drop (psi/LF)
C = Pipe Roughness Coefficient
q = Pipe Flow (gpm)
d = Inside pipe diameter (inches)

Headloss in Fittings

$$h_m = k \frac{V^2}{2 \times g} \times 0.43$$

h_m= Minor headloss (psi)
k = Minor Headloss Coefficient
V = Velocity (fps)
g = Gravity (32.2 ft/sec^2)

Required Domestic Flow	1500	gpm						
Pipe Roughness Coefficient	130							
				90° Bend k=0.3	45° Bend k=0.2	Tee k=1.0	Valve k=0.15	Headloss (psi)
4-inch Pipe:	Length	0	ft					0.0
6-inch Pipe:	Length	15	ft				2	1.6
8-inch Pipe:	Length	273	ft	2		1	1	5.7

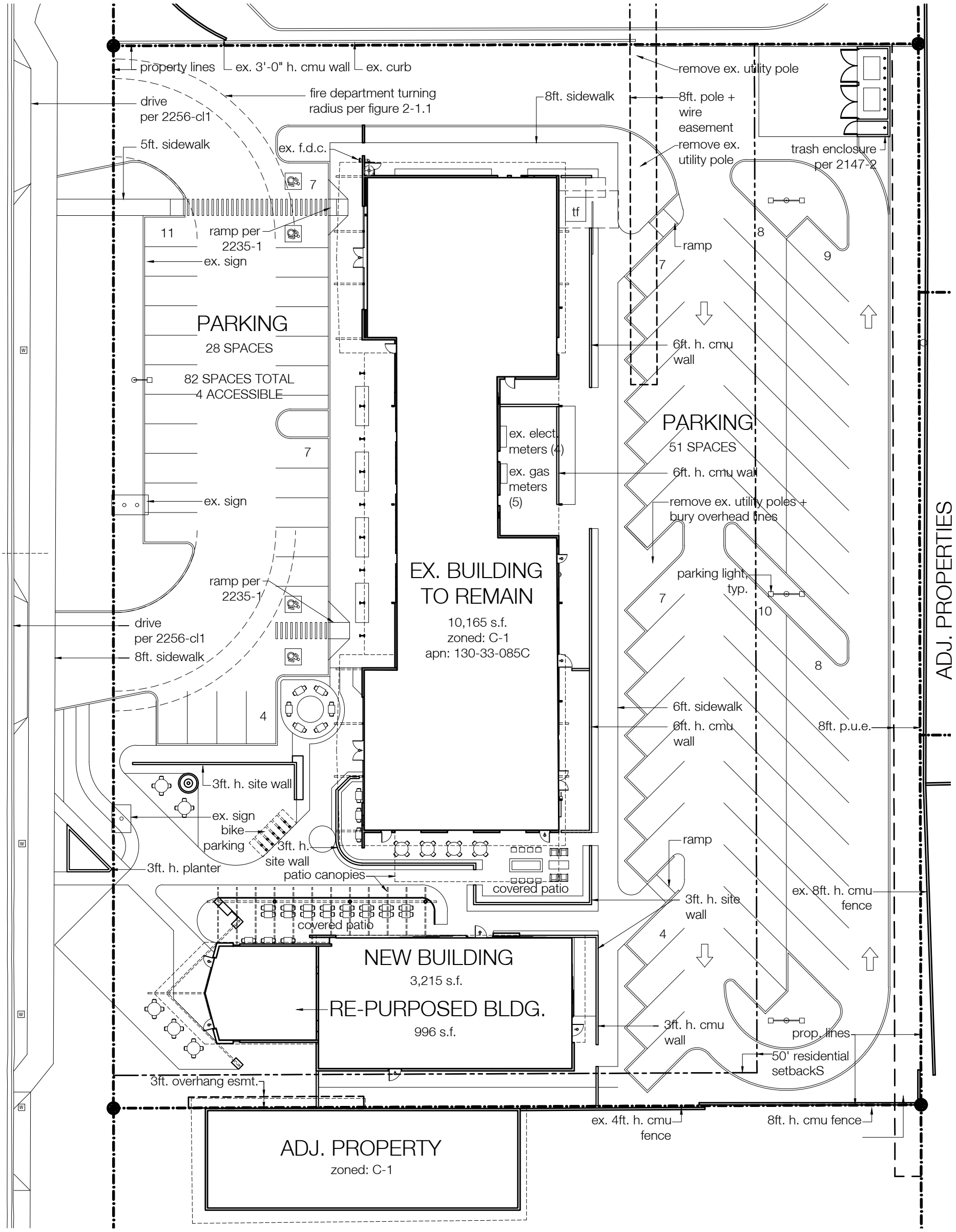
Headloss (backflow)	3.5	psi	(per manufacturer chart)
Headloss (meter)	0.0	psi	(per manufacturer chart)
Total Headloss	10.8	psi	

Static Pressure at Main	72	psi			
- Total Headloss	10.8	psi			
Minimum Pressure at Hydrant	61.2	psi	at	1500	gpm

Appendix C
Preliminary Floor Plan

PROPOSED SITE PLAN

PR-01



3215 N. HAYDEN RD.
SCOTTSDALE, AZ 85251
FEBRUARY 27, 2019
SCALE: 1" = 30'

TRAIL WEST

7340 EAST MAIN STREET #210
SCOTTSDALE, ARIZONA 85251
MADEWITHALINE.COM

ALINE
ARCHITECTUR

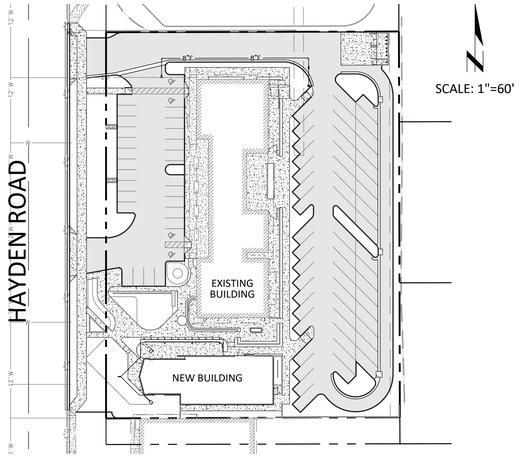
11-DR-2019
6/19/2019

Appendix D
Preliminary Improvement Plan

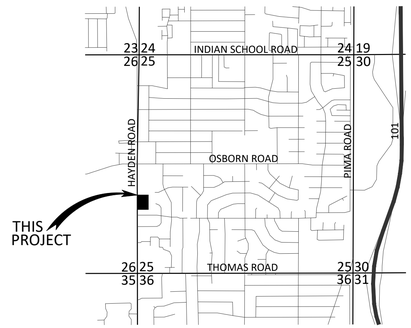
PRELIMINARY GRADING & DRAINAGE PLAN for TRAIL WEST PLAZA

3215 NORTH HAYDEN ROAD SCOTTSDALE, ARIZONA

A PORTION SOUTHWEST QUARTER OF SECTION 25, TOWNSHIP 2 NORTH, RANGE 4 EAST OF THE GILA AND SALT RIVER MERIDIAN MARICOPA COUNTY, ARIZONA



PROJECT OVERVIEW



IN THE NW 1/4 OF THE SW 1/4 OF SECTION 25,
T. 2 N., R. 4 E., G.&S.R.M.,
CITY OF SCOTTSDALE, MARICOPA COUNTY, ARIZONA

LOCATION MAP

NORTH

3" = 1 MILE

LEGEND

PROJECT RIGHT-OF-WAY	NEW SITE LIGHT
EXISTING RIGHT-OF-WAY	SURVEY MONUMENT AS NOTED
PROJECT/NEW PROPERTY LINE	99.99F SPOT ELEV. (EXIST. GRADE)
EXISTING PROPERTY LINE	99.99P SPOT ELEV. (NEW GRADE)
ROADWAY CENTERLINE	R.O.W. RIGHT-OF-WAY
FLOW-LINE	R RADIUS
EXISTING EASEMENT	P PAVEMENT (ASPHALT)
NEW EASEMENT	C CONCRETE
2321 EXISTING CONTOUR	G GUTTER
2580 NEW CONTOUR	TC TOP OF CURB
EXISTING CONCRETE	FG FINISHED GRADE
EXISTING WALL	LP LOW POINT
NEW ASPHALT	HP HIGH POINT
NEW CONCRETE	GB GRADE BREAK
NEW WALL	FFE FINISHED FLOOR ELEVATION
EXISTING CURB	FGH FINISH GRADE HIGH
NEW CURB	FGL FINISH GRADE LOW
NEW PAINT STRIPE	PUE PUBLIC UTILITY EASEMENT
NEW FENCE	R: RIM
OHE EXISTING OVERHEAD ELECTRIC	I: INVERT
S EXISTING SEWER LINE	L: LENGTH
NEW STORM DRAIN PIPE	S: SLOPE
EXISTING SEWER MANHOLE	
W EXISTING WATER METER	
EXISTING FIRE CONNECTION	
G EXISTING GAS METER	
EXISTING SIGN	
EXISTING STREET LIGHT	
EE EXISTING ELECTRICAL EQUIPMENT	
L EXISTING LIGHT PULL BOX	
EXISTING UTILITY POLE	

PROJECT INFORMATION

1. PROJECT DESCRIPTION:
   THE SCOPE OF THIS PROJECT CONSISTS OF THE DEMOLITION OF THE EXISTING CARWASH TO THE SOUTH AND THE CONSTRUCTION OF A NEW SINGLE STORY RESTAURANT WITH ALL REQUIRED GRADING & DRAINAGE, UTILITY AND PAVING IMPROVEMENTS. ADDITIONAL IMPROVEMENTS INCLUDE A NEW PARKING LOT AND TRASH ENCLOSURE IN THE REAR OF THE PLAZA AS WELL AS HARDSCAPE IMPROVEMENTS AND TWO NEW DRIVEWAYS ONTO HAYDEN ROAD.

2. ADDRESS:
   3215 NORTH HAYDEN ROAD
   SCOTTSDALE, ARIZONA 85251

   APN: 130-33-085C

3. ZONING: C-1

4. SITE AREA: 77,101 SF (1.77 AC)

SURVEY NOTES

1. THE SURVEY FOR THIS PROJECT WAS PERFORMED BY:
   EPS GROUP
   2045 SOUTH VINEYARD AVE, SUITE 101
   MESA, ARIZONA 85210
   PH: 480-503-2250
   CONTACT: JESSE BOYD, R.L.S.

2. THE BASIS OF BEARINGS FOR THIS PROJECT IS THE WEST LINE OF THE SOUTHWEST QUARTER OF SECTION 25, TOWNSHIP 2 NORTH, RANGE 4 EAST OF THE GILA AND SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA, WITH A BEARING OF N 00°00'00" E, AS SHOWN ON AMENDED PLAT OF TRAIL WEST UNIT TWO, BOOK 92, PAGE 37, M.C.R.

3. THE BASIS OF ELEVATION FOR THIS PROJECT IS THE FOUND BRASS CAP IN HANDHOLE AT OSBORN & HAYDEN (DOWN 0.30') WITH AN ELEVATION OF 1235.10', CITY OF SCOTTSDALE DATUM (NAVD 88).

BENCHMARK

THE BENCHMARK USED FOR THIS PLAN IS THE FOUND BRASS CAP IN HANDHOLE AT OSBORN & HAYDEN (DOWN 0.30') WITH AN ELEVATION OF 1235.10', CITY OF SCOTTSDALE DATUM (NAVD 88).

LEGAL DESCRIPTION

THE LAND REFERRED TO HEREIN BELOW IS SITUATED IN THE MARICOPA, STATE OF ARIZONA, AND IS DESCRIBED AS FOLLOWS:

TRACT "A", TRAIL WEST UNIT TWO AMENDED, ACCORDING TO BOOK 92 OF MAPS, PAGE 37, RECORDS OF MARICOPA COUNTY, ARIZONA;
EXCEPT THE NORTH 175 FEET; AND
EXCEPT THE FOLLOWING DESCRIBED PROPERTY:
BEGINNING AT THE SOUTHWEST CORNER OF TRACT "A" OF TRAIL WEST UNIT TWO AMENDED, ACCORDING TO BOOK 92 OF MAPS, PAGE 37, RECORDS OF MARICOPA COUNTY, ARIZONA;
THENCE NORTH (AMENDED BEARING), ALONG THE WEST LINE OF SAID TRACT "A", A DISTANCE OF 21.86 FEET;
THENCE N 89°45'35" E, A DISTANCE OF 246.22 FEET TO THE EAST LINE OF SAID TRACT "A";
THENCE S 00°08'33" E, ALONG THE EAST LINE OF SAID TRACT "A" AND SOUTHERLY PROLONGATION THEREOF, A DISTANCE OF 37.51 FEET TO THE NORTH LINE OF LOT 115, OF TRAIL WEST UNIT ONE, ACCORDING TO BOOK 82 OF MAPS, PAGE 29, RECORDS OF MARICOPA COUNTY, ARIZONA;
THENCE S 89°51'27" W, ALONG THE NORTH LINE OF LOTS 113, 114 AND 115 OF SAID TRAIL WEST UNIT ONE, A DISTANCE OF 246.27 FEET TO THE NORTHWEST CORNER OF SAID LOT 113;
THENCE NORTH, 15.23 FEET TO THE POINT OF BEGINNING.

PROJECT RETENTION

THE REQUIRED RETENTION VOLUME IS 100-YR, 2-HR FOR THE NEW RESTAURANT BUILDING TO THE SOUTH AND THE NEW PARKING AREA TO THE EAST OF THE EXISTING BUILDING.

100-YR, 2-HR RETENTION VOLUME:
VOLUME [AC-FT] = C x (P [IN] / 12) x AREA [AC]
V = 0.88 x (2.16/12) x 50,006 = 7,921 CU.FT.

PROVIDED:
TOTAL PROVIDED VOLUME = 8,236 CU.FT. VIA 48 STORMTECH MC-3500 STORM WATER CHAMBERS.

DRYWELL CALCULATIONS

TOTAL VOLUME = 7,921CF

DRYWELL DISSIPATION RATE = 0.1CFS

TIME [SEC] = VOLUME [CF] / RATE [CFS]

t = 7,921/ 0.1 = 79,210 SEC = 22.0 HOURS

DRAINAGE STATEMENT

-SITE IS IN A SPECIAL FLOOD HAZARD AREA - NO
-OFFSITE FLOWS AFFECT THIS SITE - NO
-RETENTION PROVIDED IS 100-YR, 2-HR FOR THE NEW RESTAURANT TO THE SOUTH AND THE NEW PARKING AREA TO THE EAST OF THE EXISTING BUILDING
-EXTREME STORM OUTFALLS THE SITE AT THE SOUTHWEST CORNER AT THE ELEVATION OF 1133.94

FLOODPLAIN INFORMATION

ACCORDING TO THE FEDERAL EMERGENCY MANAGEMENT AGENCY FLOOD INSURANCE RATE MAP PANEL NUMBER 04013C2235L, DATED OCTOBER 16, 2013 THE PARCEL IS LOCATED IN THE ZONE X (SHADED) AREA, WHICH IS DEFINED AS 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.

OWNER

CLAYTON COMPANIES
7340 EAST MAIN STREET, #200
SCOTTSDALE, ARIZONA 85251
PH: 480-941-2260
ATTN: TOM FRENKEL

CIVIL ENGINEER

CYPRESS CIVIL DEVELOPMENT
4450 NORTH 12TH STREET, #228
PHOENIX, ARIZONA 85014
PH: 623-282-2498
ATTN: JEFF HUNT

ARCHITECT

ALINE ARCHITECTURE CONCEPTS
7340 EAST MAIN STREET
SCOTTSDALE, ARIZONA 85251
PH: 480-225-7359
ATTN: JEFF GRAHAM

UTILITIES

WATER:	CITY OF SCOTTSDALE
SEWER:	CITY OF SCOTTSDALE
ELECTRIC:	SALT RIVER PROJECT
GAS:	SOUTHWEST GAS
TELEPHONE:	CENTURYLINK
CABLE:	COX COMMUNICATIONS

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

THESE PLANS ARE PRELIMINARY AND ARE NOT FOR CONSTRUCTION OR RECORDING.

CYPRESS CIVIL DEVELOPMENT
strength + sustainability
4450 north 12th street, #228
phoenix, arizona 85014
p: 623.282.2498
e: jphunt@cypresscivil.com

CYPRESS PROJECT NO: 19.023

Registered Professional Engineer (Civil) CERTIFICATE NO. 53640 JEFFREY P. HUNT 06-14-2019 ARIZONA, U.S.A.

NO.	DATE	REVISION

PRELIMINARY GRADING & DRAINAGE PLAN for TRAIL WEST PLAZA
3215 NORTH HAYDEN ROAD SCOTTSDALE, ARIZONA
cover

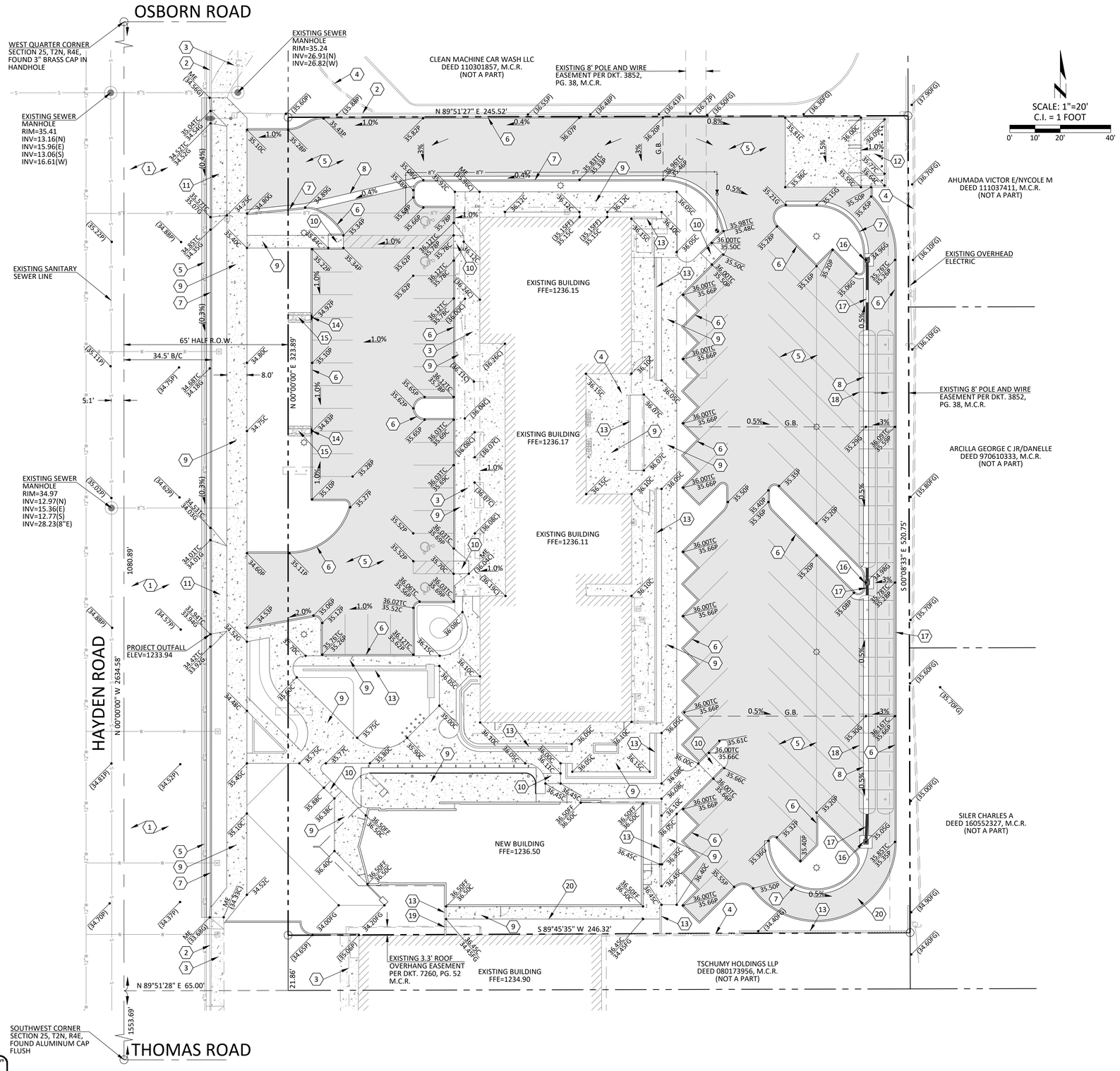
OWNER
CLAYTON COMPANIES
7340 EAST MAIN STREET, #200
SCOTTSDALE, ARIZONA 85251
PH: 480-941-2260
ATTN: TOM FRENKEL

SITE ADDRESS
3215 NORTH HAYDEN ROAD
SCOTTSDALE, ARIZONA 85251

APN: 130-33-085C

SHEET NUMBER

11-DR-2019
6/19/2019



KEYNOTES

1. EXISTING ASPHALT TO REMAIN.
2. EXISTING CURB TO REMAIN.
3. EXISTING CONCRETE SIDEWALK TO REMAIN.
4. EXISTING MASONRY SCREEN WALL TO REMAIN.
5. NEW ASPHALT PAVEMENT.
6. NEW CONCRETE VERTICAL CURB.
7. NEW CONCRETE VERTICAL CURB AND GUTTER.
8. NEW CONCRETE VALLEY GUTTER.
9. NEW CONCRETE SIDEWALK.
10. NEW ACCESSIBLE ACCESS RAMP.
11. NEW CONCRETE DRIVEWAY.
12. NEW TRASH ENCLOSURE.
13. NEW MASONRY SCREEN WALL.
14. NEW CURB OPENING.
15. NEW RIP RAP SPILLWAY.
16. NEW STORM DRAIN INLET.
17. NEW STORM DRAIN PIPE.
18. NEW STORMTECH MC-3500 STORM WATER CHAMBERS. TOTAL INSTALLED VOLUME = 8,236 CU.FT. THE SYSTEM SHALL DRAIN VIA NATURAL PERCOLATION AS A PART OF THE ENGINEERED DRAINAGE SYSTEM.
19. NEW WALL OPENING.
20. NEW RETAINING WALL AT FACE OF SIDEWALK. OPTIONAL RAILING AND/OR FALL PROTECTION.

CYPRESS CIVIL DEVELOPMENT
strength + sustainability
4450 north 12th street, #228
phoenix, arizona 85014
p: 623.282.2498
e: jphunt@cypresscivil.com

CYPRESS PROJECT NO: 19.023

Registered Professional Engineer (Civil) CERTIFICATE NO. 53640 JEFFREY P. HUNT 06.14.2019 ARIZONA U.S.A.

NO.	DATE	REVISION

PRELIMINARY GRADING & DRAINAGE PLAN for TRAIL WEST PLAZA

3215 NORTH HAYDEN ROAD SCOTTSDALE, ARIZONA

grading and drainage plan

OWNER
CLAYTON COMPANIES
7340 EAST MAIN STREET, #200
SCOTTSDALE, ARIZONA 85251
PH: 480-941-2260
ATTN: TOM FRENKEL

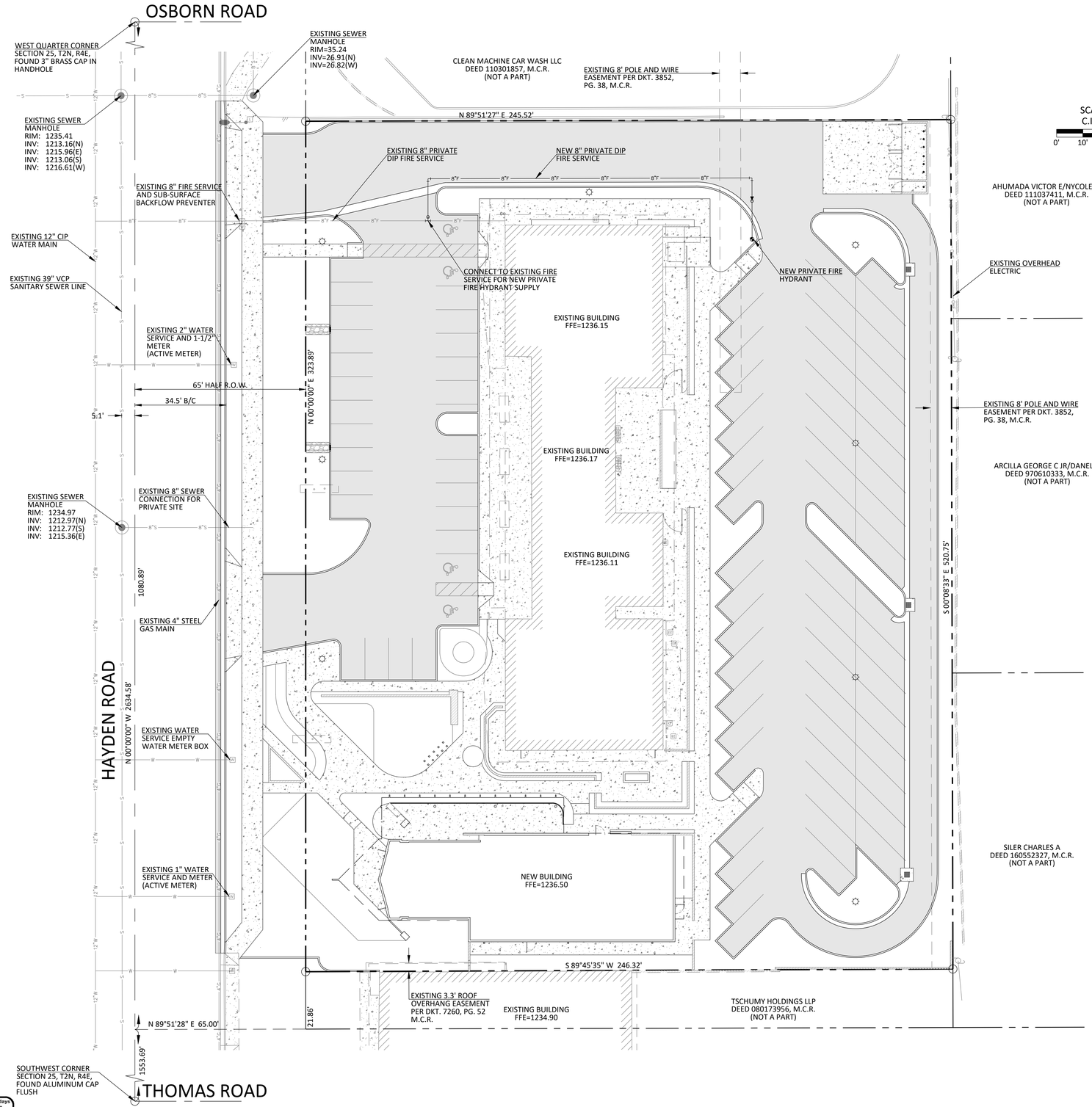
SITE ADDRESS
3215 NORTH HAYDEN ROAD
SCOTTSDALE, ARIZONA 85251
APN: 130-33-085C

SHEET NUMBER
2 OF 3

Call at least two full working days before you begin excavation. ARIZONA811 Arizona Blue Stake, Inc. Dial 8-1-1 or 1-800-STAKE-IT (782-5348) In Maricopa County: (602) 263-1100

THESE PLANS ARE PRELIMINARY AND ARE NOT FOR CONSTRUCTION OR RECORDING.

11-DR-2019
6/19/2019



KEYNOTES

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2. EXISTING CURB TO REMAIN.
3. EXISTING CONCRETE SIDEWALK TO REMAIN.
4. EXISTING MASONRY SCREEN WALL TO REMAIN.
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7. NEW CONCRETE VERTICAL CURB AND GUTTER.
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19. NEW WALL OPENING.
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CYPRESS PROJECT NO: 19.023

Registered Professional Engineer (Civil) CERTIFICATE NO. 53640 JEFFREY P. HUNT 06-14-2019 ARIZONA, U.S.A.

NO.	DATE	REVISION

PRELIMINARY GRADING & DRAINAGE PLAN for TRAIL WEST PLAZA

3215 NORTH HAYDEN ROAD SCOTTSDALE, ARIZONA

onsite utility plan

OWNER
CLAYTON COMPANIES
7340 EAST MAIN STREET, #200
SCOTTSDALE, ARIZONA 85251
PH: 480-941-2260
ATTN: TOM FRENKEL

SITE ADDRESS
3215 NORTH HAYDEN ROAD
SCOTTSDALE, ARIZONA 85251

APN: 130-33-085C

SHEET NUMBER

3 OF 3

Call at least two full working days before you begin excavation. ARIZONA811 Arizona Blue Stake, Inc. Dial 8-1-1 or 1-800-STAKE-IT (782-5348) In Maricopa County: (602) 263-1100

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11-DR-2019
6/19/2019

WATER & SEWER BASIS OF DESIGN REPORT
FOR
TRAIL WEST PLAZA

Scottsdale, Arizona

14 March 2019

PREPARED FOR
Aline Architecture Concepts
7340 East Main Street, #210
Scottsdale, Arizona 85251

DEVELOPER
Clayton Companies
7340 East Main Street, #200
Scottsdale, Arizona 85251

SITE ADDRESS
3215 North Hayden Road
Scottsdale, Arizona 85251

PREPARED BY

CYPRESS
CIVIL DEVELOPMENT
strength + sustainability

4450 north 12th street, #228
phoenix, arizona 85014
CYPRESS # 19.023

PROJECT DESCRIPTION AND LOCATION

The Project is known as 'Trail West Plaza' and is located at 3215 North Hayden Road in Scottsdale, Arizona. Refer to Appendix A for location map.

The proposed Project consists of redevelopment of the parcel by replacing the existing car wash building to the south with a new restaurant building and providing a tenant improvement of the existing shopping center building to the north with associated paved access, parking, utility, and drainage improvements.

The utility provider for both water and sewer facilities is the City of Scottsdale.

The Project is located on the east side of North Hayden Road, north of East Earll Drive. Per available utility maps and as-built records, an existing 12" CIP water main is located in Hayden Road to the west of the Project. The existing building to the north is connected to the water main within Hayden Road via a 2" stub with a 1-1/2" meter. Based on observations, this stub supplies the domestic water service for the existing shopping center building to remain. Another 1" meter and stub provide service for the existing car wash building to be replaced by a proposed restaurant. Finally, another stub to the north supplies the fire service to the entire site. As a result, the design team intends to utilize the existing water service and fire service connections. This is anticipated to provide adequate sizing and pressure to supply the intended domestic and fire services to the buildings. Refer to Appendix B for City of Scottsdale Water and Sewer Quarter Section Map for stub locations and sizes.

Per available utility maps and as-built records, an existing 39" VCP sewer main is located in Hayden Road to the west of the Project. Though the City of Scottsdale Water and Sewer Quarter Section maps show the 39" VCP sewer main west of the Project, they do not show a sewer stub to the Project site. However, a recent survey shows the location of an existing 8" VCP lateral service line to the property. Refer to Appendix C for the survey showing the location of the sewer stub. This existing 8" VCP stub is anticipated to supply sewer service to both the interior of the shopping center and the building to the south which will be replaced. Both buildings are anticipated to connect to the 8" VCP lateral service stub via 6" or 4" service laterals. This is anticipated to provide adequate sizing to supply the intended sewer service to the building.

WATER SYSTEM DESIGN

There will be two buildings onsite. One to the north is a single existing shopping center building intended to be redeveloped to contain four businesses and the other will be a new restaurant building replaced the existing car wash to the south. The existing building to remain is approximately 10,165 square feet and the proposed building will be approximately 4,211 square feet. Both buildings are type VB construction. Per the International Fire Code, Table B105.1, the

existing building to remain requires a minimum fire flow of 2,750 GPM for a 2-hour duration and the proposed building requires a minimum fire flow of 1750 GPM for a 2-hour duration. The existing and new buildings will have automatic sprinklers installed resulting in an allowable 50% reduction in fire flow requirements. Required fire flow will be 2,250 GPM for a 2-hour duration. A recent fire flow test was conducted on March 6th, 2019 and the minimum GPM available at 20 PSI is 4,777 GPM, exceeding the minimum fire flow requirements for both the existing and new building sizes and construction types. Refer to Appendix D for Fire Flow Results.

Per the International Fire Code, Table C102.1, the Project requires 2 fire hydrants to meet the minimum spacing requirements and building coverage for the Project. There are two existing offsite hydrants that meet these requirements – one to the northwest and one to the southwest of the property, which are supplied by individual stubs to the existing 12" CIP public water main. The aforementioned fire line stub at the northwest of the property will continue to service the private fire suppression systems for the existing and new building.

WASTEWATER SYSTEM DESIGN

There are 2 individual buildings intended to be constructed or improved onsite. For the existing building to the north, the commercial units are anticipated to share a building sewer connection to the existing 8" VCP sewer stub to the west. The new building to the south is anticipated to have its own existing building sewer connection to the existing 8" VCP stub.

WATER AND SEWER CALCULATIONS

The table below contains the expected water caculations for the entire site, including the new proposed building and the existing building to be tenant improved:

TYPE	QUANTITY	WFSU/FIXTURE	TOTAL WFSU
WATER CLOSET (PUBLIC TANK)	15	5.0	75.0
URINAL (FV)	6	5.0	30.0
HAND SINK	27	1.5	40.5
CONVEYOR DISHWASHER	2	3.0	6.0
TRIPLE SINK	4	4.0	16.0
GLASS RINSER	3	3.0	9.0
		TOTAL	**176.5**

The Project is designed to have a water supply fixture unit count of 176.5. Per the fire flow test, a pressure range over 60 PSI will be used for calculations. The Project is anticipated to have approximately 90 linear feet of distribution pipe beyond the fire line stub at the northwest of the site to the fire riser room of the existing shopping center to remain. For the most conservative

estimate, the fire line size is assumed to be 6 inches. From the point of connection to the fire distribution line to the existing 2" water connection to the existing building, the distance is less than 50'. Per the International Plumbing Code, Table E201.1, the maximum WFSU based on the above parameters and a 1-1/2 inch meter and a 2 inch distribution line is 275; thus 176.5 WSFU is acceptable.

The table below contains the expected waste water caculations for the entire site, including the new proposed building and the existing building to be tenant improved:

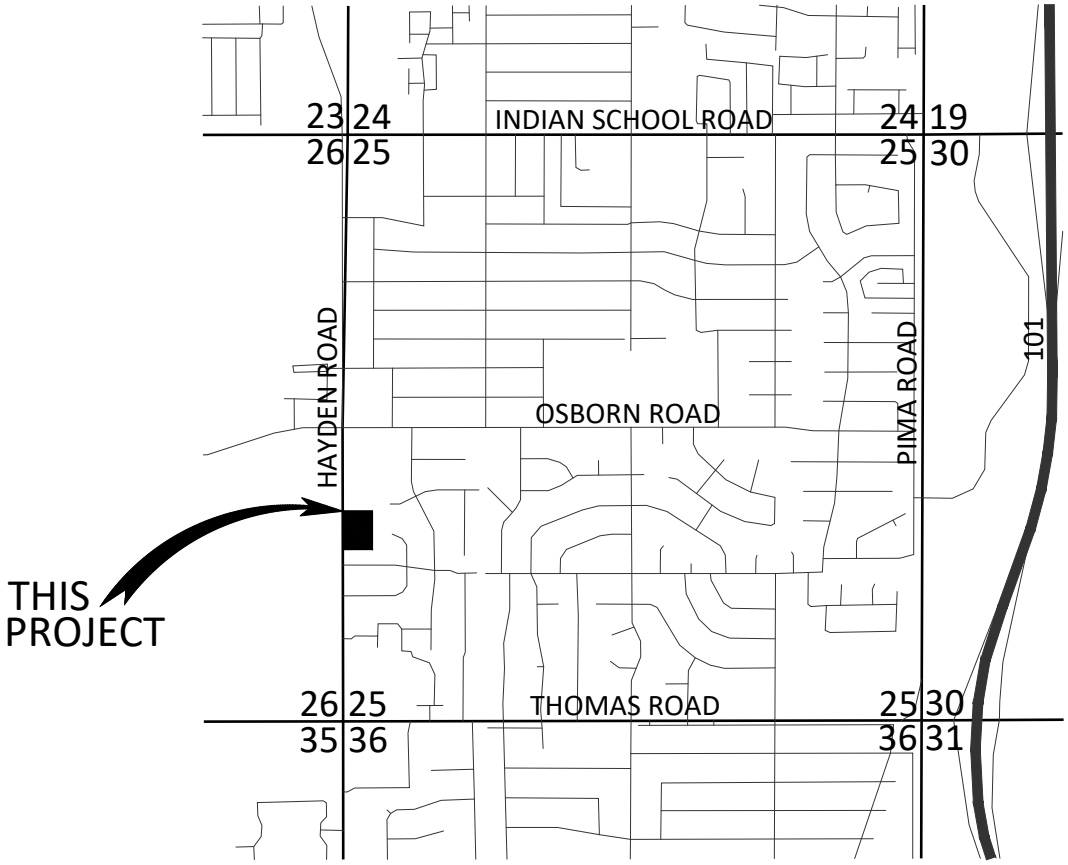
TYPE	QUANTITY	DFU/FIXTURE	TOTAL DFU
WATER CLOSET (PUBLIC)	15	6	90
URINAL	6	4	24
HAND SINK	27	2	54
CONVEYOR DISHWASHER	2	2	4
TRIPLE SINK	4	2	8
GLASS RINSER	3	2	6
		TOTAL	**186**

The Project's anticipated drainage fixture unit count is 186 and is designed with an anticipated 6-inch existing sewer laterals with an assumed minimum slope of 2.0%. Per the International Plumbing Code, Table 710.1(1), the maximum DFU based on the above parameters is 840. If it is found to be a 4-inch existing sewer line with an assumed minimum slope of 2.0%, the maximum DFU is 216; thus the expected maximum 186 DFU is acceptable if the sewer laterals are found to be either 4" or 6" diameter.

CONCLUSION

CYPRESS respectfully submits this preliminary report as the Water & Wastewater Design Report for the proposed Trail West Plaza – Scottsdale Development. The proposed water and wastewater systems shall be designed in accordance with ADEQ, International Building Code, and the City of Scottsdale standards.

Appendix A
Location Map



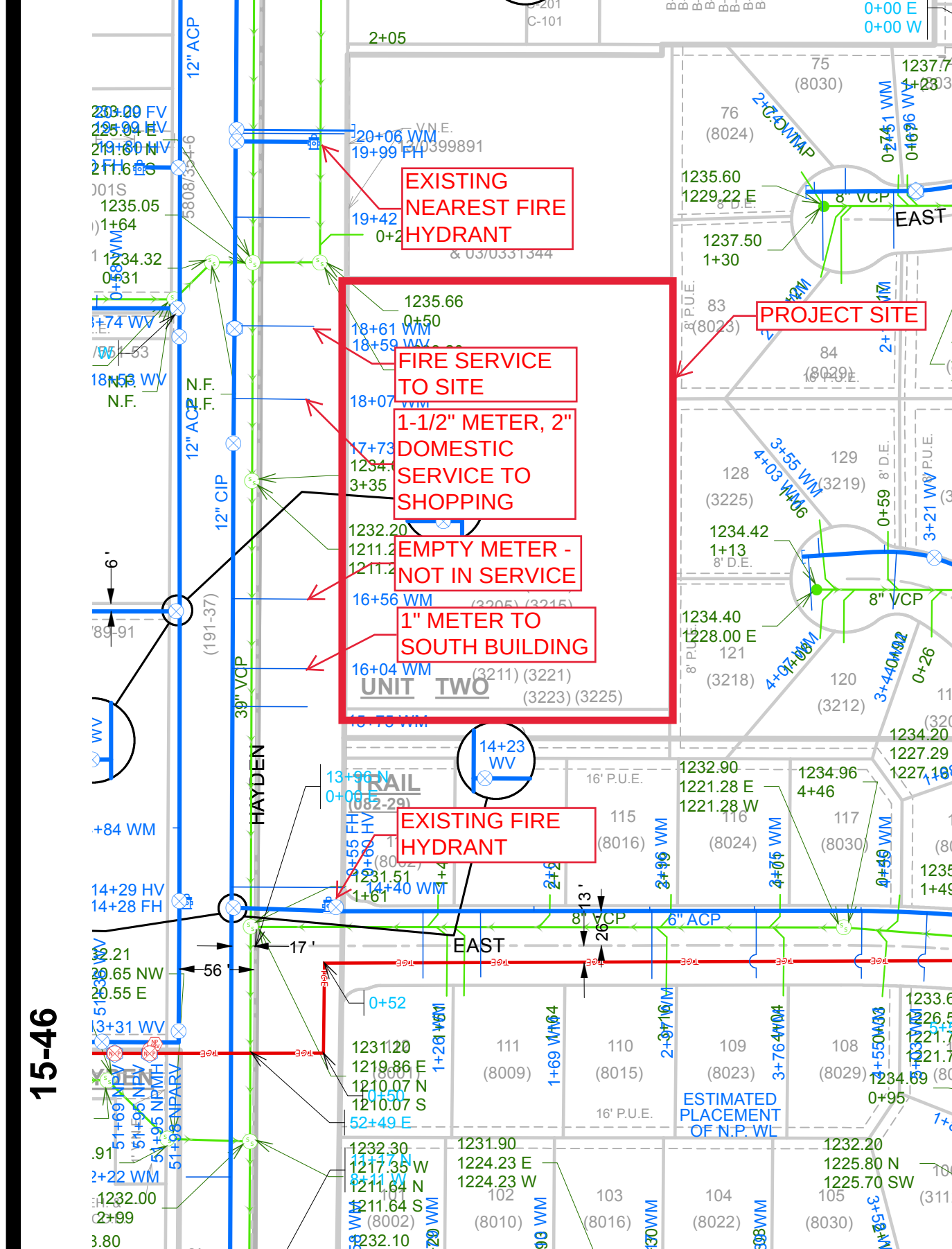
IN THE NW 1/4 OF THE SW 1/4 OF SECTION 25,
T. 2 N., R. 4 E., G.&S.R.M.,
CITY OF SCOTTSDALE, MARICOPA COUNTY, ARIZONA

LOCATION MAP

NORTH

3" = 1 MILE

Appendix B
City of Scottsdale Water and Sewer Quarter Section Map


EXISTING NEAREST FIRE HYDRANT
FIRE SERVICE TO SITE
1-1/2" METER, 2" DOMESTIC SERVICE TO SHOPPING
EMPTY METER - NOT IN SERVICE
1" METER TO SOUTH BUILDING
PROJECT SITE
UNIT TWO
EXISTING FIRE HYDRANT
ESTIMATED PLACEMENT OF N.P. WL
EAST
HAYDEN
TRAIL
12" ACP
12" CIP
39" VCP
8" VCP
6" ACP
16' P.U.E.
8' P.U.E.
8' D.E.
15-46

Appendix C
ALTA/NSPS Land Title Survey (09/06/2017)

17-393

(BASIS OF BEARING)
N0°00'00"W 2634.58'

Southwest Corner
Section 25, T2N, R4E
Found Aluminum Cap Flush

1553.69'

520.75'

560.14'

West Quarter Corner
Section 25, T2N, R4E
Found 3" Brass Cap in Handhole

HAYDEN STREET
130' Width – Public Right of Way – Asphalt Pavement

8" VCP SEWER STUB

N89°51'28"E 65.00'

65.0' R/W

N89°51'27"E 65.00'

30.5'

Set Magnail
W/Tag RLS 42937

Wall 0.5'
W. of PL

Wall 0.5'
W. of PL

N00°00'00"E 520.75'
323.89'

Found Magnail
W/Tag RLS 45763

Found Rebar
W/Cap RLS 17375

15.23'

21.86'

175.00'

9 3.3' Roof Overhang Easement
Docket 7260, Page 52, M.C.R.

N. Face of Building
0.3' S. of PL

Building
Height 11.0'

Building Overhang
0.5' S. of Easement

1-Story
Carwash Building
158 Square Feet

6.2'
25.5'
25.5'
6.3'

31.5'

Water Fountain

Vacuum

Vacuum

Building
Height 13.1'

Curb 0.9'
N. of PL

175.0'
Exception

Closet

1-Story Building
10,062 Square Feet

50.2'
10.2'
9.9'
50.0'
99.9'

60.0'

Sink

47.7'

Water Heater

4.7'
18.0'
18.0'
18.0'
18.0'
18.0'

49.9'
35.6'
62.0'

39.8'

245.52'

N89°51'27"E

245.08'

N89°51'27"E

246.41' (Rec.)
S89°51'28"W 246.41'

246.27' (Rec.)
246.38'

246.22' (Rec.)
246.32'

S89°45'35"W

83.9'

Storage Box

CLEAN MACHINE CAR WASH II LLC
Deed 110301857, M.C.R.
(NOT-A-PART)

TSCHUMY HOLDINGS LLLP
Deed 080173956, M.C.R.
(NOT-A-PART)

Shade Structure

144.8'

N. Face of Wall
0.1' S. of PL

Exception

8 8.0' Pole and Wire Easement
Docket 3852, Page 38, M.C.R.

109.7'

Wall 1.7'
N. of PL

6 8.0' Public Utility Easement
Docket 3432, Page 55, M.C.R.

Set Rebar
W/Cap RLS 42937

Shed

15.23'

22.28'

323.47'
S00°08'33"E 520.75'

175.00'

Found Rebar
W/Cap RLS 17375

Found Rebar
W/Cap RLS 17375

C.L.F. 1.2'
E. of PL

C.L.F. 0.2'
E. of PL

Wall 1.0'
E. of PL

Wall 1.9'
E. of PL

SILER CHARLES A
Deed 160552327, M.C.R.
(NOT-A-PART)

ARCILLA GEORGE C JR/DANELLE
Deed 970610333, M.C.R.
(NOT-A-PART)

AHUMADA VICTOR E/NYCOLE M
Deed 111037411, M.C.R.
(NOT-A-PART)

LEGEND

- FOUND CAP AS NOTED
- FOUND OR SET SURVEY MONUMENT AS NOTED
- LIGHT POLE
- ELECTRIC PULL BOX
- SEWER MANHOLE
- WATER METER
- FIRE DEPARTMENT CONNECTION
- DOWN GUY
- POWER POLE
- POST/BOLLARD
- AC UNIT
- ELECTRIC METER
- GAS METER
- CATV PEDESTAL
- GATE
- SIGN
- MARKER
- CHAIN LINK FENCE
- OHE — OVERHEAD ELECTRIC LINE
- SS — SEWER LINE
- OHT — OVERHEAD TELEPHONE LINE
- PL — PROPERTY LINE
- R/W — RIGHT OF WAY
- RLS — REGISTERED LAND SURVEYOR
- M.C.R. — MARICOPA COUNTY RECORD
- C.L.F. — CHAIN LINK FENCE

NORTH

20 0 20 40
scale feet

EPS GROUP
2045 S. Vineyard Ave, Suite 101
Mesa, AZ 85210
T: 480.503.2250 | F: 480.503.2258
w w w . e p s g r o u p i n c . c o m

Project:
3215 N. Hayden Road
SCOTTSDALE, ARIZONA
ALTA/NSPS LAND TITLE SURVEY

Revisions:

Call at least two full working days before you begin excavation.
ARIZONA811
Arizona One-Call, Inc.
Dial 8-1-1 or 1-800-STAKE-IT (782-5348)
In Maricopa County: (602)263-1100

Designer: JB
Drawn by: AG

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
42937
JESSE BOYD
Date Signed 09/06/17
ARIZONA, U.S.A.
Expires 06/30/2020

Job No.
17-393

Sheet No.
2
of 2

jboyd Sep 06, 2017 2:18pm S:\Projects\2017\17-393\Legal Survey\Dwgs\17-393_BS01.dwg

Appendix D
Fire Flow Results

Arizona Flow Testing LLC

HYDRANT FLOW TEST REPORT

Project Name:	Trail West Plaza
Project Address:	3213 North Hayden Road, Scottsdale, Arizona, 85251
Client Project No.:	Not Provided
Arizona Flow Testing Project No.:	19083
Flow Test Permit No.:	C57566
Date and time flow test conducted:	March 6, 2019 at 9:00 AM
Data is current and reliable until:	September 6, 2019
Conducted by:	Floyd Vaughan – Arizona Flow Testing, LLC (480-250-8154)
Witnessed by:	Ray Padilla –City of Scottsdale-Inspector (602-541-0586)

Raw Test Data

Static Pressure: **94.0 PSI**
(Measured in pounds per square inch)

Residual Pressure: **88.0 PSI**
(Measured in pounds per square inch)

Pitot Pressure: **12.0 PSI**
(Measured in pounds per square inch)

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

Coefficient of Diffuser: .9

Flowing GPM: **1,489 GPM**
(Measured in gallons per minute)

GPM @ 20 PSI: **5,780 GPM**

Data with 22 PSI Safety Factor

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

Residual Pressure: **66.0 PSI**
(Measured in pounds per square inch)

Scottsdale requires a maximum Static Pressure of 72 PSI for AFES Design.

Distance between hydrants: Approx. 580 Feet

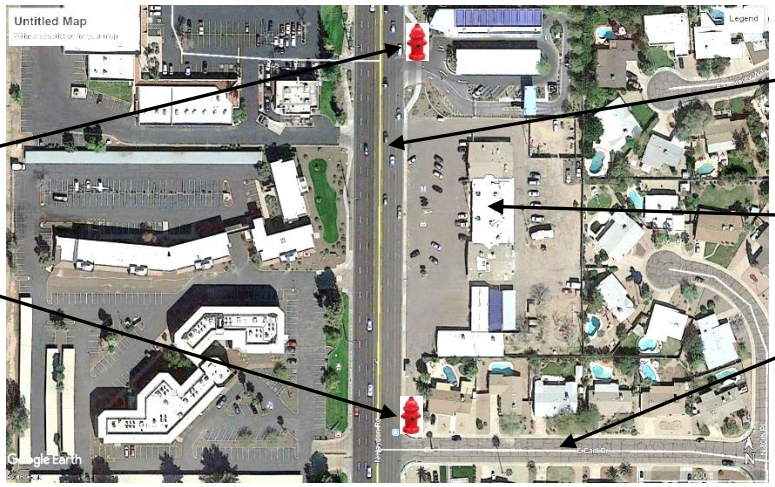
Main size: Not Provided

Flowing GPM: **1,489 GPM**

GPM @ 20 PSI**:** **4,777 GPM**

Flow Test Location

North



Pressure Fire Hydrant

Flow Fire Hydrant

North Hayden Road

Project Site
3213 North Hayden Road

East Earl Street