CITY OF SCOTTSDALE

Drainage Reports

Abbreviated Water and Sewer Needs

Water Study

Wastewater Study

Stormwater Waiver Application

HUNTER
ENGINEERING

CIVIL AND SURVEY

PRELIMINARY DRAINAGE REPORT
For
EVANS CLASSIC AUTO
77TH ST. AND GREENWAY HAYDEN LOOP
SCOTTSDALE, ARIZONA

CASE #249-PA-2019

Prepared by:
Hunter Engineering, P.C.
10450 North 74th Street, #200
Scottsdale, AZ 85258

PRELIMINARY DRAINAGE REPORT
FOR

EVANS CLASSIC AUTO

77TH ST. AND GREENWAY HAYDEN LOOP
SCOTTSDALE, AZ.

PREPARED FOR

LGE DESIGN GROUP
740 NORTH 52ND STREET
PHOENIX, AZ 85008

PREPARED BY

HUNTER ENGINEERING, P.C.
10450 NORTH 74TH STREET, #200
SCOTTSDALE, AZ 85258
(480) 991-3985

MAY, 2019
REVISED SEPTEMBER, 2019

H.E. PROJECT NO. LGEC264

TABLE OF CONTENTS

1.0 INTRODUCTION

This preliminary drainage report has been prepared under a contract from LGE Design Group, developer of the Evans Classic Auto site. The purpose of this report is to provide a preliminary drainage analysis, required by the City of Scottsdale, to support this development. Preparation of this report has been done according to the procedures detailed in Chapter 4 of the City of Scottsdale's Design Standard & Policies Manual dated January 2018.

This development project is located at 77th Street and Greenway Hayden Loop, Scottsdale, Arizona 85251.The site is specifically located in The Southeast Quarter of Section 2. Township 3 North, Range 4 East of The Gila And Salt River Base and Meridian. Maricopa County, Arizona. Figure 1, in Appendix A, illustrates the location of the project site in relation to the City of Scottsdale street system.

The development is for a proposed Evans Classic Auto to be constructed on proposed Lot 1 consisting of approximately 1.046± acres as shown on a preliminary plat entitled, "RE-PLAT OF LOTS 16, 17 & 18 OF 'NORTH SCOTTSDALE AIRPARK UNIT 5'", by Alliance Land Surveying and dated 4/16/19. Improvements to be made on-site include a new 15,699 sf office/warehouse building, parking lot, driveways, underground utilities and the construction of landscaped areas. Exhibit A, attached hereto, illustrates the proposed improvements for the project.

2.0 EXISTING DRAINAGE CONDITIONS

The proposed site is the northern part of the development as shown on a plan entitled, "AIDANT, GRADING AND DRAINAGE PLAN", by Z & H Engineering, Inc., with City of Scottsdale approval date of 07/03/1996 (see Appendix C). The proposed site is currently a parking area for the existing building located on the southern half of the parcel. The existing Grading and Drainage Plan shows that the retention requirement for the entire site is met through the use of six retention basins plus portions of the parking lot. Three catch basins located in parking islands are used to bleed-off the portion of the retention volume contained in the parking lot. An existing 6-inch storm drain pipe conveys the run-off to Basin D located in-between the existing building and 77TH Street.

The current FEMA Flood Insurance Rate Map (FIRM) for this area, map number 04013C1320 L (Revision date October 16, 2013) shows the entire project site is in a flood hazard Zone X. Zone X is defined as, "*Areas determined to be outside the 0.2% annual chance floodplain"*

3.0 PROPOSED DRAINAGE CONCEPT

The proposed drainage concept is presented in three parts: on-site drainage conveyance, off-site drainage conveyance, and storm water retention. These three sections make up sections 3.1, 3.2, and 3.3 respectively. Exhibit A, attached hereto, provides a graphical illustration of the proposed drainage concept.

3.1 On-site Drainage Conveyance

The proposed onsite drainage improvements for the site will direct storm water away from the proposed building via overland flow across the pavement to curb and gutter leading to curb openings and catch basins. This water will ultimately flow into a 3-foot deep basin on the east side of the proposed building and a 5-foot diameter underground retention pipe located in the south driveway. This underground retention pipe will be connected to a drywell to bleed–off the run-off within 36 hrs.

3.2 Off-site Drainage Conveyance

The existing 6-inch bleed-off pipe used to drain the parking lot retention area to the west of the existing building will be relocated to allow this run-off to continue to Basin D.

3.3 Storm Water Retention

The required retention volume for the proposed development will consist of maintaining the existing/historical volume plus the Pre versus Post development runoff for the 100-year, 2-hour storm event. The existing/historical volume, 4,024 cu. ft., is taken from the Aidant Grading Plan shown in Exhibit C.

To calculate Pre versus Post required retention, a weighted C-value was calculated for existing and proposed conditions. A weighted drainage area was determined, and volume required for the 100-year, 2-hour storm was calculated.

Total Site Area= 1.046 acres
C= Runoff Coefficient
C= 0.95 Hardscape area (pavement, building, sidewalk)
C= 0.45 landscape area
C=0.30 existing retention basins
Delta C= increase in weighted runoff
P= 2.2 precipitation depth (inches)
HA= hardscape area (pavement, building, sidewalk)
LA= landscape area
BA=Basin Area
Vr= required retention volume (CF) =Delta C*P/12*A

Pre-development weighted C = 0.81
Post-development weighted C=0.84
Delta C= 0.84 – 0.81=0.03
Pre vs Post Retention Volume = 0.03*2.2/12*45,567 = 251 (cf)

Total Required Volume (V_R) = 4,024+251=4,275 cu. ft.

The volume requirement of 4,275 cu. ft. will be satisfied by the proposed underground retention system and surface retention basins as follows.

V_P = Provided retention volume in cubic-feet

Where:

Underground Retention Tank
$V_P = \pi * D^2 / 4 *$ Tank Length (Diameter = 5', Total tank length = 139 ft)
$= \pi * (5ft)^2 / 4 * 172$ ft
= 2,729 cu. ft.

Surface Retention
V_P=1,547 cu. ft.

Total Volume Provided (V_P) = 2,729 + 1,547 = 4,276 cu. ft.

The surface retention basin will bleed-off through a 12" storm drain pipe into the underground retention pipe. An orifice plate will be attached to the outlet structure and sized to release the surface retention volume in under 36 hours. The underground retention pipe will dewater via a drywell. Using a percolation rate of 0.10 cfs, the basin will dewater in under 36 hours.

See Appendix B for full retention calculations.

The proposed 100-year high water surface elevation for the retention basin is 1489.00, which is 2.10 lower than the proposed building finished floor of 1491.10.

The proposed low outfall for this site is 1489.21 located at the south east corner of the property flowing onto 77th Street. The outfall elevation exceeds the 14" minimum elevation difference between the proposed finished floor of 1491.10 and the low outfall elevation.

4.0 CONCLUSIONS

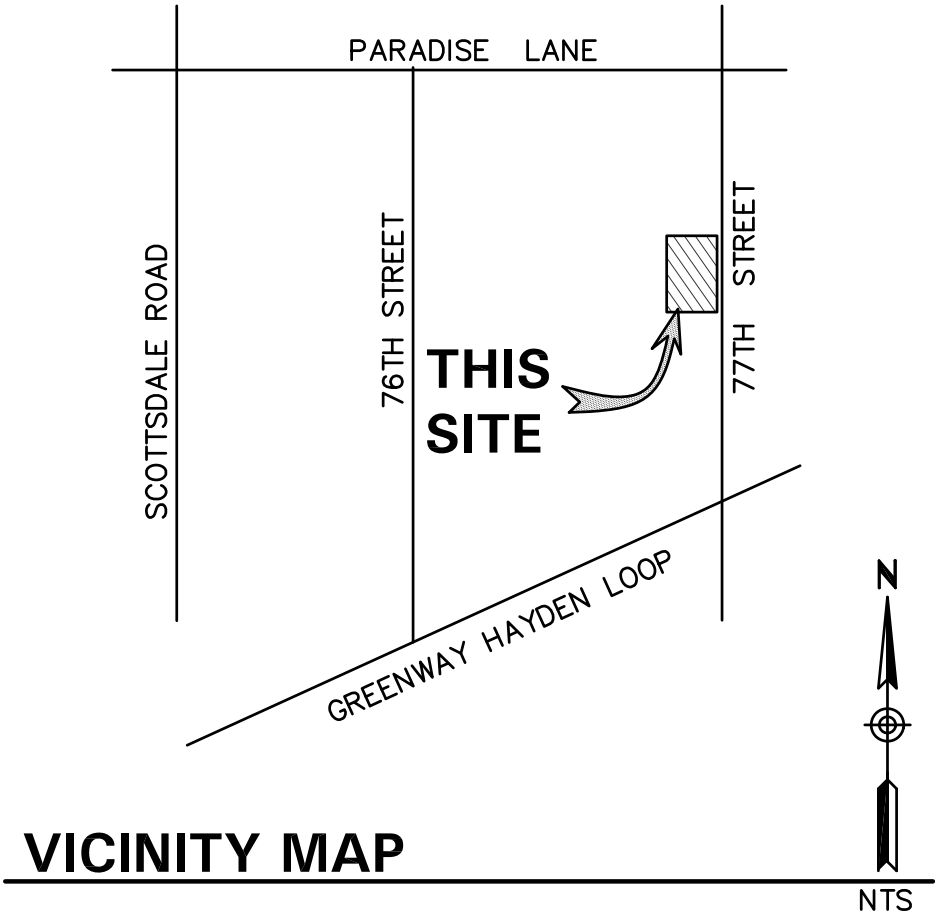
Based on the results of this study, it can be concluded that:

- The site will retain the Pre versus Post run-off for the 100-year, 2-hour storm event.
- The proposed finished floor elevation is a minimum of 14" above the 100-year water surface elevation in the proposed retention basin.

5.0 REFERENCES

1) City of Scottsdale Standards and Policies manual, February 7 ,2010.
2) Drainage Design Manual for Maricopa County, Arizona, Hydrology, February 2011.
3) Drainage Design Manual for Maricopa County, Arizona, Hydraulics, June 2010.

APPENDIX A
FIGURES



VICINITY MAP

VICINITY MAP
FIGURE 1

H:\LGEC264\Drainage\Concept Drainage\FEMA-EXHIBITS LG264.dwg, 9/10/2019 9:23:22 AM, rfitwin

National Flood Hazard Layer FIRMette

FEMA

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 9/10/2019 at 12:38:19 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.

38-DR-2019
09/10/19

APPENDIX B
DRAINAGE CALCULATIONS

Weighted Runoff Coefficient Calculation

Cw=[(C1*A1)+(C2*A2)+(C3*A3)…+(Cn*An)] / Total Area

Project: LGEC264 Calc'd By: CW

Date: 9/10/2019 Chck'd By: LMT

Pre-Development Conditions

C_1=	0.95	Paving	A_1=	0.80	Acres
C_2=	0.45	Existing Landsape	A_2=	0.13	Acres
C_3=	0.30	Existing Retention Basin	A_3=	0.12	
			Total=	**1.05**	Acres

Cw= 0.81

Proposed Conditions

C_1=	0.95	Paving/Roof	A_1=	0.84	Acres
C_2=	0.45	Landsape	A_2=	0.18	Acres
C_3=	0.30	Retention Basin Area	A_3=	0.03	
			Total=	**1.05**	Acres

Cw= 0.84

Retention Basin Calculations

Design Storm: 100-year, 2-hour

Pre Vs. Post Analysis

Required

Pre

Location	Type	Area (ac)	C' Coefficient	Depth	Required (cf)
Pre	Weighted	1.0460	0.8100	2.20	6,766

Post

Location	Type	Area (ac)	C' Coefficient	Depth	Required (cf)
Post	Weighted	1.0460	0.8400	2.20	7,017

Post	7,017	
Pre	6,766	
Required	251	**cf Req**

Existing/Historical Volume =	4,024	cf
Pre vs Post Volume =	251	cf
Total Volume Required =	4,275	cf

Volume Provided

Retention Basin

Elevation	Area (sf)	Avg. Area (sf)	Depth (ft)	Volume (cf)	Σ Volume (cf)
89.0	1,015				
		835	1.00	835	835
88.0	654				
		497	1.00	497	497
87.0	340				
		216	1.00	216	216
86.0	91				

1,547 cf Prov

Underground Retention

Length	Diameter (ft)	Area (sf^2)	Volume (cf)
139	5	19.63	2,729

2,729 cf Prov

Total Provided = 4,276 cf Prov

Total Retention
4,276 cf Prov
4,275 cf Req
1 cf Excess

38-DR-2019
09/10/19

Percolation Calculations

Project: LGEC264 Calc'd By: RSL
Date: 9/10/2019 Chck'd By: LMT

Drywell Percolation Calculations

Design Percolation Rate **0.10** cfs

Basin ID	Number of Drywells	Drywell Perc. Rate (cfs)	Drywell Perc. Rate (cfh)	Basin Volume (cf)	Dry-Up Time (hr)
Underground	1	0.1	360	1,547	**4**

BLEED-OFF CALCULATIONS

Surface Retention Basin

Retained Volume Provided =	1,547	ft^3			
Q for 36hr. Bleed-Off =	0.036	ft^3/sec			
ORIFICE CALCULATION **Q=**	**$CA*(2gh)^{1/2}$**				
A=	**$Q/(C*(2gh)^{1/2)}$**				
Q=	0.036	ft^3/sec			
C=	0.62				
g=	32.20	ft^2/sec			
h=	3.00	ft			
A=	**0.0042**	**ft^2**			
D=	0.07	ft			
$D_{min.}$=	0.87	in			
Orifice Plate used=	2	in dia.	AREA =	0.0218	SF
Q=	0.188	ft^3/sec			
T=	2	hours			

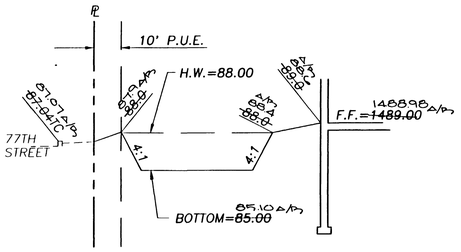
APPENDIX C
AIDANT GRADING & DRAINAGE PLAN

AIDANT

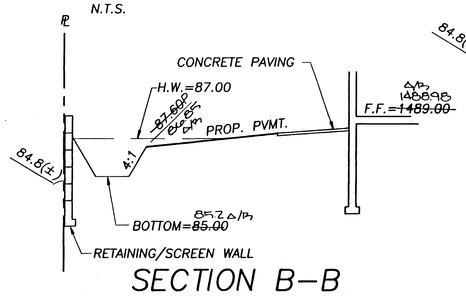
GRADING & DRAINAGE PLAN

41-DR-96

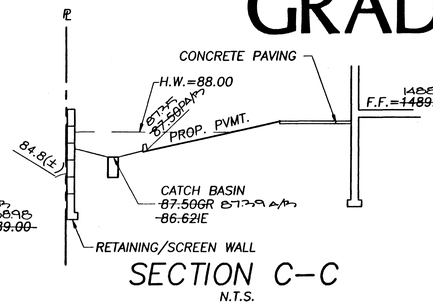
677E96 G,D,P,W,S,LS,



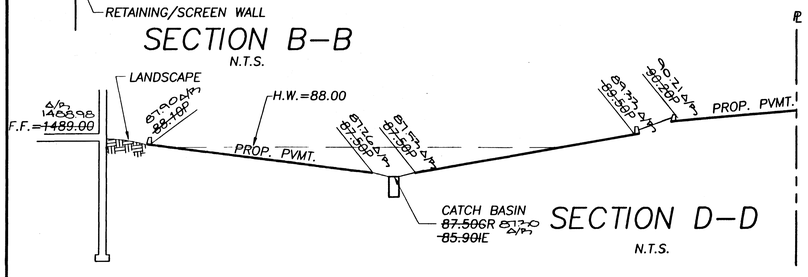
SECTION A–A
N.T.S.



SECTION B–B
N.T.S.



SECTION C–C
N.T.S.



SECTION D–D
N.T.S.

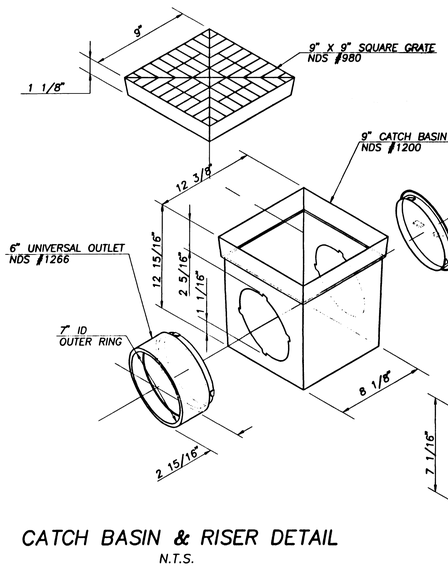
NOTE: ALL DRAINAGE STRUCTURES & FACILITIES TO BE PRIVATE AND MAINTAINED BY OWNERS.

ASBUILT CERTIFICATION:

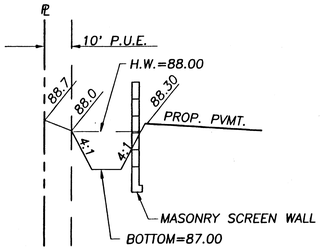
I HEREBY CERTIFY THAT THE AS-BUILT (A/B) MEASUREMENTS SHOWN HEREON ARE TRUE AND CORRECT AND WERE SURVEYED AND DRAWN UNDER MY DIRECTION THE MONTH OF DECEMBER, 1996.

GARY E. MUGGY, R.L.S. # 19357
MUGGY SURVEYING, INC.
1802 EAST THOMAS ROAD, SUITE 8
PHOENIX, ARIZONA 85016
(602) 279-6780

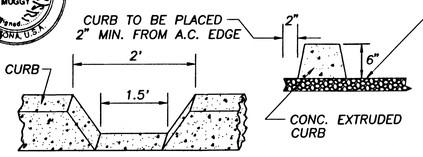
REGISTERED LAND SURVEYOR — CERTIFICATE NO. 19357 — GARY E. MUGGY — ARIZONA, U.S.A.



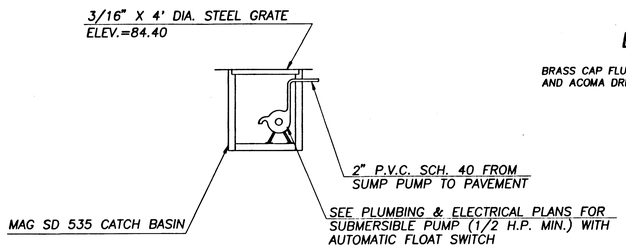
CATCH BASIN & RISER DETAIL
N.T.S.



SECTION E–E
N.T.S.



CURB DETAILS
N.T.S.



SUMP PUMP DETAIL
N.T.S.

32187

OWNER/DEVELOPER
L.G.E. DESIGN BUILD
1555 W. UNIVERSITY STE. #101
TEMPE, AZ
(602) 966-4001

ARCHITECT
CAWLEY ARCHITECTS
5060 N. 40th STREET, SUITE 220
PHOENIX, AZ 85018
(602) 956-5379

Utility Companies

Electrical	Arizona Public Service
Telephone	U. S. West
Gas	Southwest Gas Company
Water & Sewer	City of Scottsdale

ZONING: I-1

LEGAL DESCRIPTION

LOTS 16, 17 & 18 OF NORTH SCOTTSDALE AIRPARK UNIT 5 AS RECORDED IN THE RECORDERS OFFICE OF MARICOPA COUNTY, ARIZONA, IN BOOK 388 OF MAPS, PAGE 25, MARICOPA COUNTY, ARIZONA. SAID LOTS CONTAINING 118,600 S.F. OR 2.7227 ACRES, MORE OR LESS.

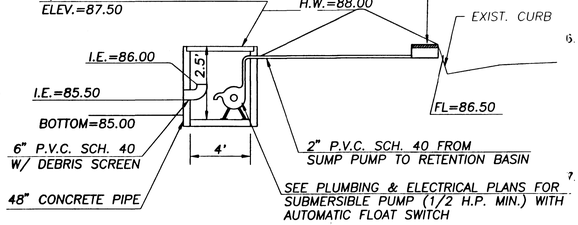
SHEET INDEX

OFF-SITE QUNATITIES

Remove Curb & Gutter	80 L.F.
New 30' Driveway	2 Ea.
Sawcut Remove & Replace Pavement	17 S.Y.
Fire line (in R.O.W.)	53 L.F.
8"X6" T.S.&V.	1 Ea.
Sewer Line	50 L.F.
Water Line	50 L.F.
Monitoring Manhole	1 Ea.

Approximate Earthwork Cut = 960 C.Y. Fill = 1,200 C.Y.

NOTE: Signs require separate approvals and permits.

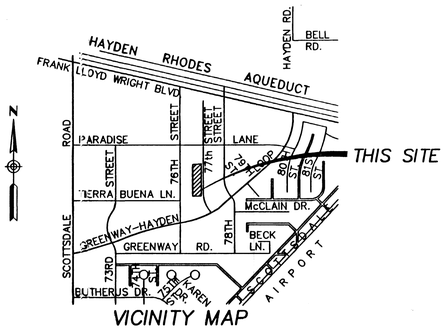


PUMP DETAIL

BENCH MARK

BRASS CAP FLUSH AT INTERSECTION OF 79th STREET AND ACOMA DRIVE – ELEV. = 1452.42 (C.O.S. DATUM)

Two working days before you dig CALL FOR THE BLUE STAKES 263-1100 Blue Stake Center CALL COLLECT



GENERAL NOTES

1. All construction in the public rights-of-way or in easements granted for public use must conform to the latest Maricopa Association of Governments (MAG) Uniform Standard Specifications and Uniform Standard Details for Public Works Construction as amended by the latest version of the City of Scottsdale (COS) Supplemental Standard Specifications and Supplemental Standard Details. If there is a conflict, the latter shall govern.
2. The engineering designs on these plans are only approved by the City in scope and not in detail. If construction quantities are shown on these plans, they are not verified by the City.
3. Approval of plans is valid for six (6) months. If an encroachment permit for the construction has not been issued within six months, the plans shall be resubmitted to the City for re-approval.
4. A Public Works inspector will inspect all works within the City of Scottsdale rights-of-way and in easements. Notify Inspection Services 24 hours prior to starting of construction (telephone 391-5750).
5. Whenever excavation is to be done, call the "Blue Stake Center", 263-1100, two working days before excavation is to begin. The Center will see that the location of the underground utility lines are identified for this project. Call "collect" if necessary.
6. Enchroachment permits are required for all work in public rights-of-way and easements granted for public purposes. An encroachment permit will be issued by the City upon receipt of payment of a base fee plus a fee for inspection services to be provided by the City. Copies of all permits shall be retained on-site and shall be available for inspection at all times. Failure to produce the required permits shall result in immediate work stoppage until proper permit documentation is obtained.
7. All excavation and grading which is not in the public rights-of-way or not in easements granted for public use must conform to Chapter 70, Excavation and Grading, of the latest edition of the Uniform Building Code prepared by the international Conference of Building Officials. A permit for this grading must be secured from the City for a fee established by the Uniform Building Code.

FLOOD INSURANCE RATE MAP (FIRM) INFORMATION

COMMUNITY NUMBER	PANEL NUMBER (PANEL DATE)	SUFFIX	DATE OF FIRM (INDEX DATE)	FIRM ZONE	BASE FLOOD ELEVATION (IN AO ZONE, USE DEPTH)
045012	1245 09-30-95	F	09-30-95	"X"	N/A

Engineer's Certification: The finish floor elevation(s) and/or floodproofing elevation(s) on this plan, are sufficiently high to provide protection from flooding caused by a one-hundred year storm, and are in accordance with City of Scottsdale "Floodways & Floodplain" Ordinance

CITY OF SCOTTSDALE

REVIEW & RECOMMENDED APPROVAL:

FIRE DEPT.	D. Rios 7-1-96	GRADING & DRAINAGE	7/1/96
PLANNING	Carlos Lujan 6-28-96	WATER & SEWER	7/1/96
TRAFFIC	N/A.	PAVING	7/1/96

APPROVED BY:

SENIOR CIVIL ENGINEER — DATE 7-3-96

AIDANT

GRADING & DRAINAGE PLAN

Z & H Engineering, Inc.
717 WEST DUNLAP AVENUE
PHOENIX, ARIZONA 85021
PHONE (602) 997-7536

REGISTERED PROFESSIONAL ENGINEER — CERTIFICATE NO. 10466 — WILLIAM D. ZIDELL — ARIZONA, U.S.A.

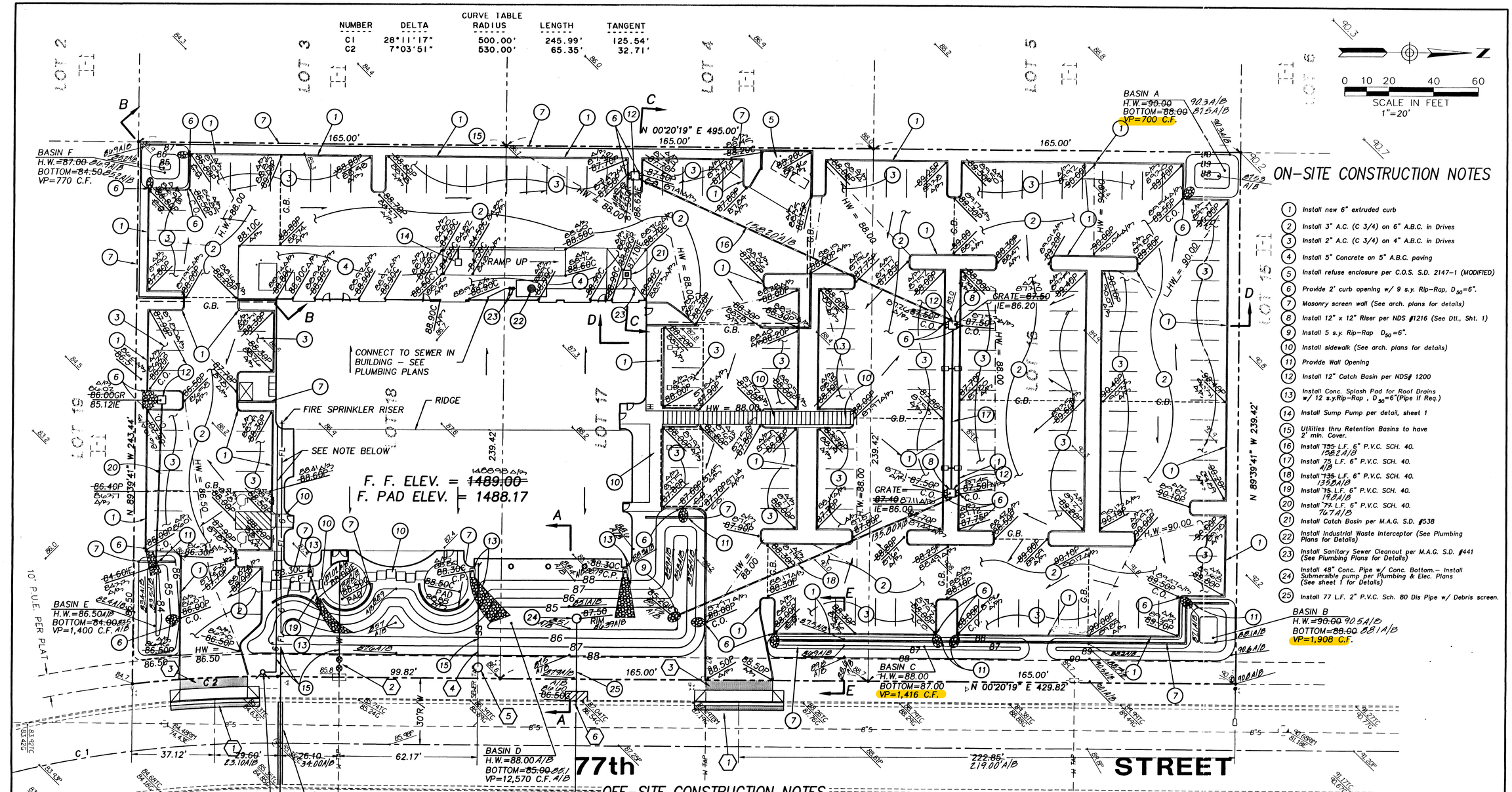
FILE: LGE\96037\6037GCV.DWG	NAME	DATE
DESIGNED BY:	WDZ	04-96
DRAWN BY:	BTH	04-96
CHECKED BY:	WDZ	04-96
PROJECT NO.: 96037	SCALE: AS SHOWN	

C1 OF 3

06-28-96 - BTH

38-DR-2019
09/10/19

CURVE TABLE				
NUMBER	DELTA	RADIUS	LENGTH	TANGENT
C1	28°11'17"	500.00'	245.99'	125.54'
C2	7°03'51"	530.00'	65.35'	32.71'



ON-SITE CONSTRUCTION NOTES

1. Install new 6" extruded curb
2. Install 3" A.C. (C 3/4) on 6" A.B.C. in Drives
3. Install 2" A.C. (C 3/4) on 4" A.B.C. in Drives
4. Install 5" Concrete on 5" A.B.C. paving
5. Install refuse enclosure per C.O.S. S.D. 2147–1 (MODIFIED)
6. Provide 2' curb opening w/ 9 s.y. Rip–Rap, D_{50}=6".
7. Masonry screen wall (See arch. plans for details)
8. Install 12" x 12" Riser per NDS #1216 (See Dtl., Sht. 1)
9. Install 5 s.y. Rip–Rap D_{50}=6".
10. Install sidewalk (See arch. plans for details)
11. Provide Wall Opening
12. Install 12" Catch Basin per NDS# 1200
13. Install Conc. Splash Pad for Roof Drains w/ 12 s.y.Rip–Rap , D_{50}=6"(Pipe if Req.)
14. Install Sump Pump per detail, sheet 1
15. Utilities thru Retention Basins to have 2' min. Cover.
16. Install 135 L.F. 6" P.V.C. SCH. 40. 128.2 A/B
17. Install 75 L.F. 6" P.V.C. SCH. 40. A/B
18. Install 135 L.F. 6" P.V.C. SCH. 40. 135B A/B
19. Install 15 L.F. 6" P.V.C. SCH. 40. 19B A/B
20. Install 74 L.F. 6" P.V.C. SCH. 40. 76.7 A/B
21. Install Catch Basin per M.A.G. S.D. #538
22. Install Industrial Waste Interceptor (See Plumbing Plans for Details)
23. Install Sanitary Sewer Cleanout per M.A.G. S.D. #441 (See Plumbing Plans for Details)
24. Install 48" Conc. Pipe w/ Conc. Bottom.– Install Submersible pump per Plumbing & Elec. Plans (See sheet 1 for Details)
25. Install 77 L.F. 2" P.V.C. Sch. 80 Dis Pipe w/ Debris screen.

LEGEND

- CENTER/MONUMENT LINE
- PROPERTY/R.O.W. LINE
- EXISTING SINGLE CURB
- EXISTING WATER LINE (6"W)
- EXISTING SEWER LINE (6"S)
- EXISTING WATER METER
- EXISTING SEWER MANHOLE
- EXISTING LIGHT POLE
- EXISTING POWER POLE
- EXISTING FIRE HYDRANT
- EXISTING WATER VALVE
- EXISTING SPOT ELEVATION

ON–SITE

INSTALL (2–1/2" X 2–1/2" X 4" F.D.C., N.S.T.) W/ PAVEMENT MARKERS PER C.O.S. 2363, AT 6' BACK OF CURB BEGINING ON SPRINKLER ABOVE SYSTEMS SHUT–OFF VALVE. INSTALL ABOVE GROUND CHECK VALVE. INSTALL 6" P.V.C. C–900 CLASS 150 FIRELINE. (228 L.F. TOTAL P.V.C, ON–SITE)

OFF–SITE

SAWCUT, REMOVE & REPLACE 8 S.Y. EXIST. PER C.O.S. S.D. 2200 & 2201. INSTALL 8" X 6" T.S. & V., PER M.A.G. S.D. 340, R391–1–C. INSTALL 53 L.F. 6" CLASS 50 D.I.P. TO PROPERTY LINE.

OFF–SITE CONSTRUCTION NOTES

1. SAWCUT, REMOVE & REPLACE 2' MIN. EXIST. PAVEMENT AND 40 L.F. EXIST. CURB & GUTTER, PER C.O.S. S.D. #2200 & 2201. INSTALL NEW 30" DRIVEWAY(TYPE "CL–1') W/ 5' WINGS PER C.O.S. S.D. # 2256.
2. CONNECT TO EXIST. WATER SERVICE (SIZE INDICATED ON ARCH PLANS) – TYPE "K" COPPER PIPE TO BUILDING PER C.O.S. S.D. 2330 & M.A.G. S.D. 320. INSTALL 1" REDUCED PRESSURE BACKFLOW PREVENTOR PER C.O.S. S.D. # 2354. (SEE PLUMBING PLAN)
3. INSTALL 3" A.C. ON 6" A.B.C. IN R.O.W.
4. LOCATE EXIST. SEWER TAP, CONNECT 6" SEWER PIPE TO WITHIN 5' OF BUILDING AND INSTALL SEWER CLEANOUT PER M.A.G. S.D. 441 (SEE PLUMBLING PLANS FOR DETAILS). PROVIDE 2' MIN. COVER IN RETENTION BASINS.
5. INSTALL MONITORING MANHOLE PER M.A.G. S.D. 420 (IE. IN = 77.70, I.E. OUT = 77.60)
6. INSTALL CONCRETE SIDEWALK SCUPPER PER M.A.G. S.D. 203 – ANGLE = 90°

06–28–96 – BTH

C2

AIDANT

GRADING & DRAINAGE PLAN

Z & H Engineering, Inc.
717 WEST DUNLAP AVENUE
PHOENIX, ARIZONA 85021
PHONE (602) 997–7536

FILE: LGE\96037\6037-GD.DWG	NAME	DATE
DESIGNED BY:	WDZ	02–96
DRAWN BY:	BTH	02–96
CHECKED BY:	WDZ	02–96
PROJECT NO.: 96037	SCALE: 1"= 20'	

CERTIFICATE NO. 10466 WILLIAM D. ZEISLER 10-31-97 REGISTERED PROFESSIONAL ENGINEER ARIZONA, U.S.A.

32188

2 OF 3

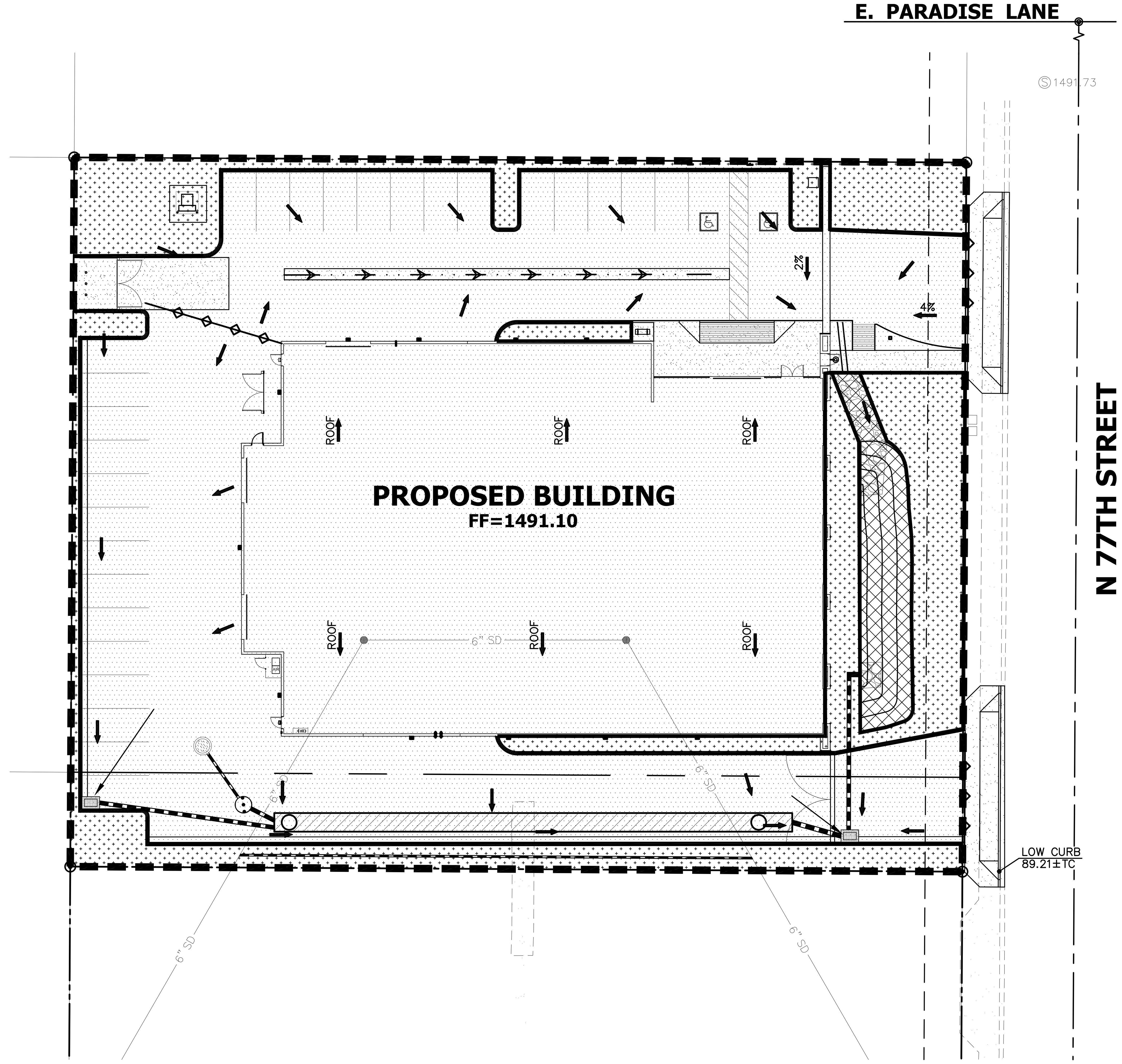
DRAINAGE EXHIBIT 'A'
PROPOSED DRAINAGE CONDITIONS

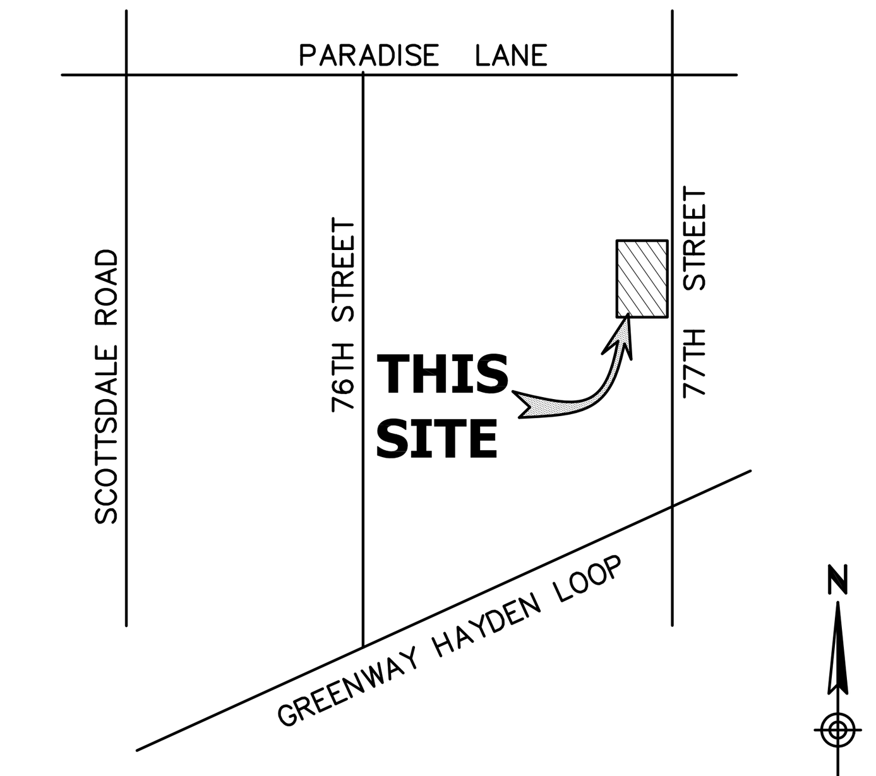
FOR

EVANS CLASSIC AUTO

77TH STREET AND GREENWAY HAYDEN LOOP
SCOTTSDALE, ARIZONA

SCALE 1"=20'





VICINITY MAP

CIVIL ENGINEER
HUNTER ENGINEERING, INC.
10450 N. 74TH STREET, SUITE #200
SCOTTSDALE, ARIZONA 85258
PHONE: JEFF NORMAN P.E.
EMAIL: JNORMAN@HUNTERENGINEERINGPC.COM

DEVELOPER
LGE CORPORATION
740 N. 52ND STREET
PHOENIX, ARIZONA 85008
PHONE:(480) 966-4001
CONTACT: BEN MCBRAE
EMAIL: BENM@LGEDESIGNBUILD.COM

ARCHITECT
LGE CORPORATION
740 N. 52ND STREET
PHOENIX, ARIZONA 85008
PHONE:(480) 966-4001
CONTACT: BEN MCBRAE
EMAIL: BENM@LGEDESIGNBUILD.COM

LEGEND

43	PROPOSED CONTOUR
	PROPOSED STORM LINE
	PROPOSED CATCH BASIN
	PROPOSED GRADE BREAK
	PROPOSED FLOW ARROW
	DRAINAGE AREA BOUNDARY
	RETENTION BASIN AREA = 1,176 SF OR 0.03 AC. (C=0.30)
	LANDSCAPE AREA = 7,656 SF OR 0.13 AC. (C=0.45)
	PAVING/ROOF AREA = 36,735 SF OR 0.84 AC. (C=0.95)

NO.	DATE	REVISION	BY

PURPOSE: 2ND CONCEPTUAL SUBMITTAL

DESIGN BY: JJN
DRAWN BY: LEW
CHECKED BY: JJN

HUNTER ENGINEERING CIVIL AND SURVEY
10450 NORTH 74TH STREET, SUITE 200
SCOTTSDALE, AZ 85258
T 480 991 3985
F 480 991 3986

Registered Professional Engineer
CERTIFICATE NO. 20938
JEFFREY J. NORMAN
Date Signed 09/10/19
ARIZONA U.S.A. (CIVIL)

DRAIANGE EXHIBIT 'A'
FOR
EVANS CLASSIC AUTO
15882 N. 77TH STREET
SCOTTSDALE, ARIZONA

CONTACT ARIZONA 811 AT LEAST 2 FULL WORKING DAYS BEFORE YOU BEGIN EXCAVATION
ARIZONA811
CALL 811 OR CLICK ARIZONA811.COM

THESE PLANS ARE NOT APPROVED FOR CONSTRUCTION WITHOUT AN APPROVED SIGNATURE FROM THE GOVERNING MUNICIPALITY.

PROJECT NAME:
EVANS CLASSIC AUTO

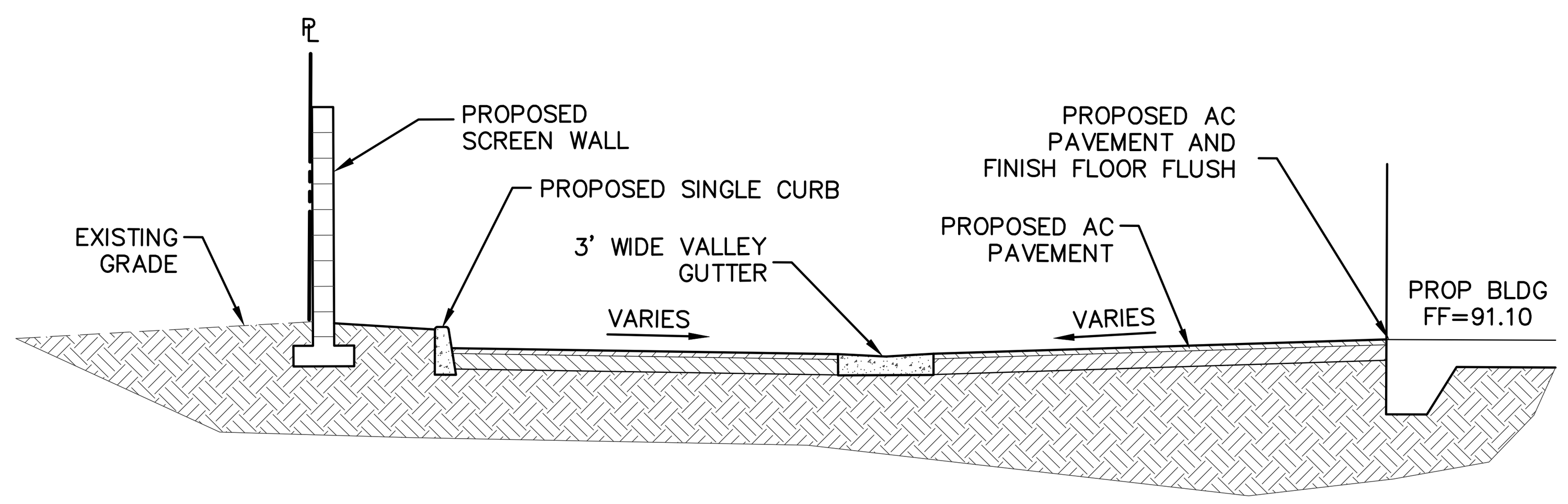
HE NO.: LGEC264
SCALE: 1"=20'

SHEET:
1

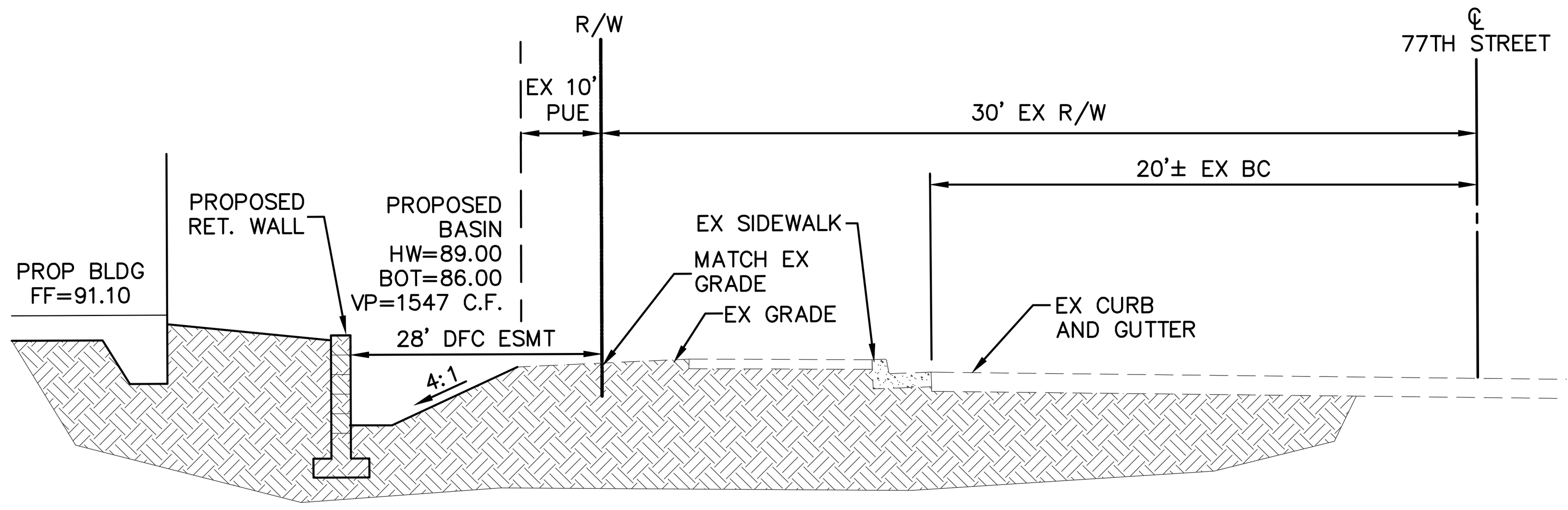
38-DR-2019
09/10/19

CONCEPTUAL GRADING & DRAINAGE PLAN
FOR
EVANS CLASSIC AUTO
15882 N. 77TH STREET
SCOTTSDALE, ARIZONA 85260

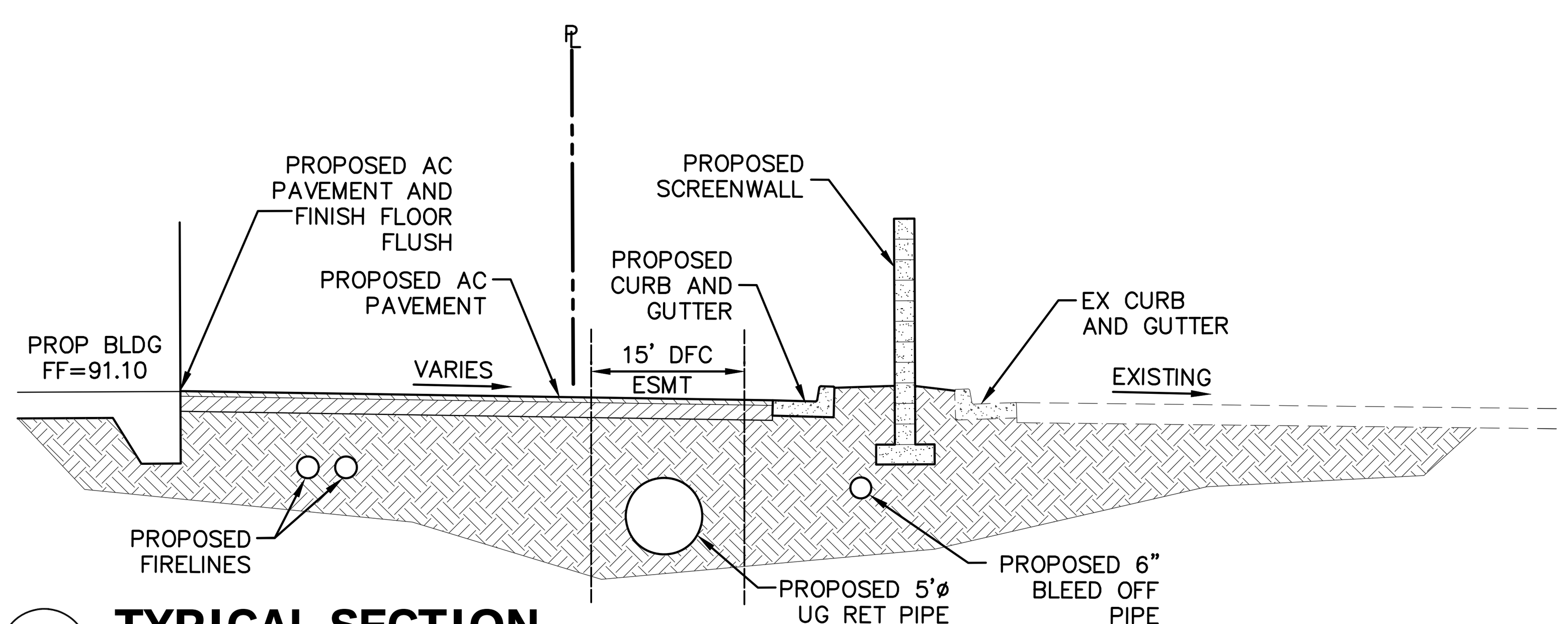
SCALE 1"=20'



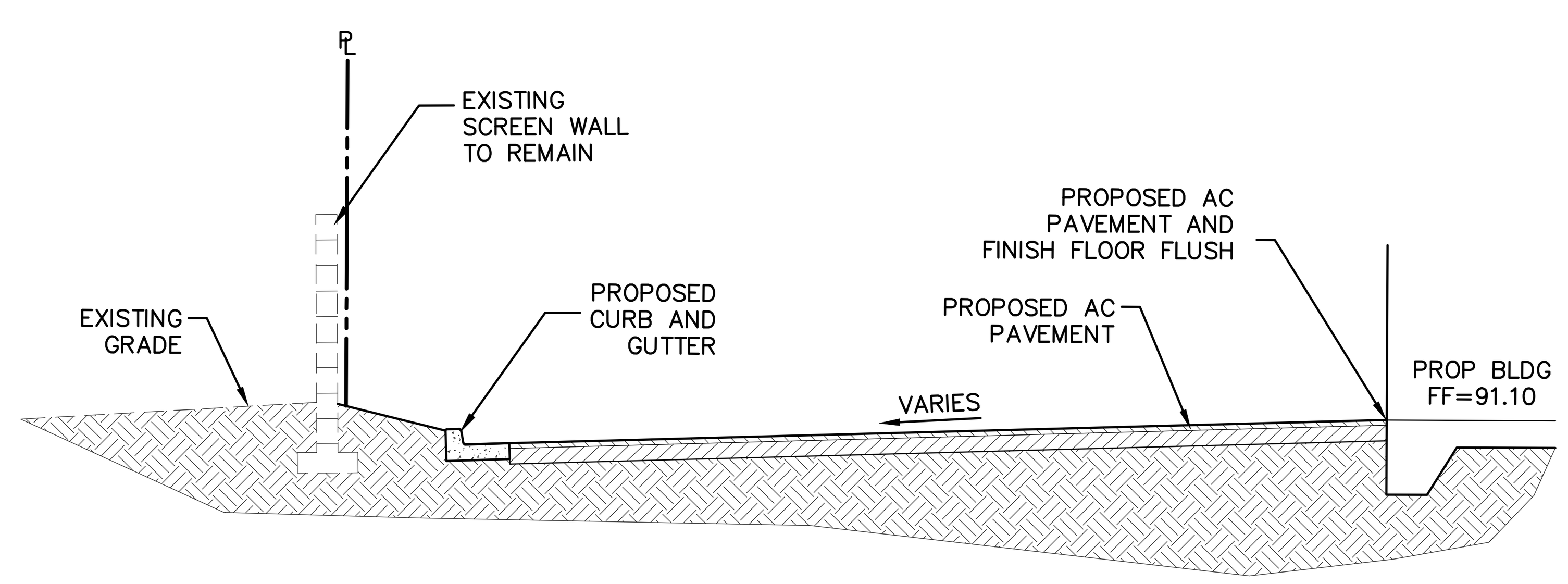
A **TYPICAL SECTION** N.T.S



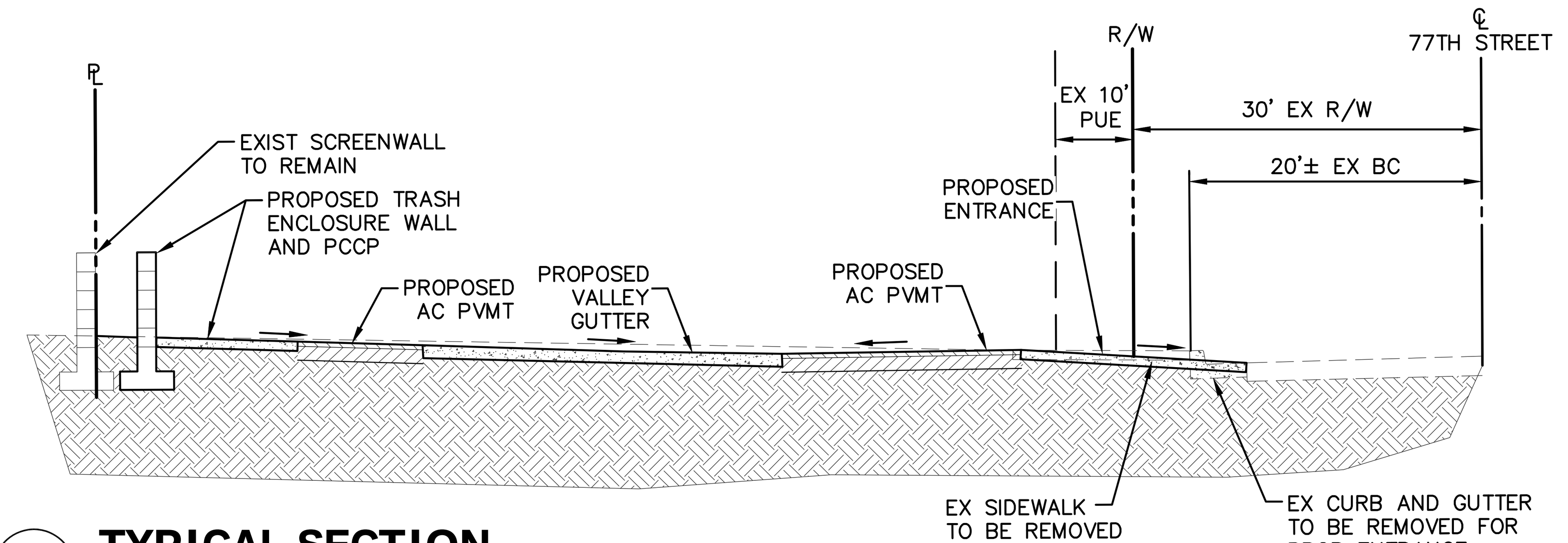
B **TYPICAL SECTION** N.T.S



C **TYPICAL SECTION** N.T.S

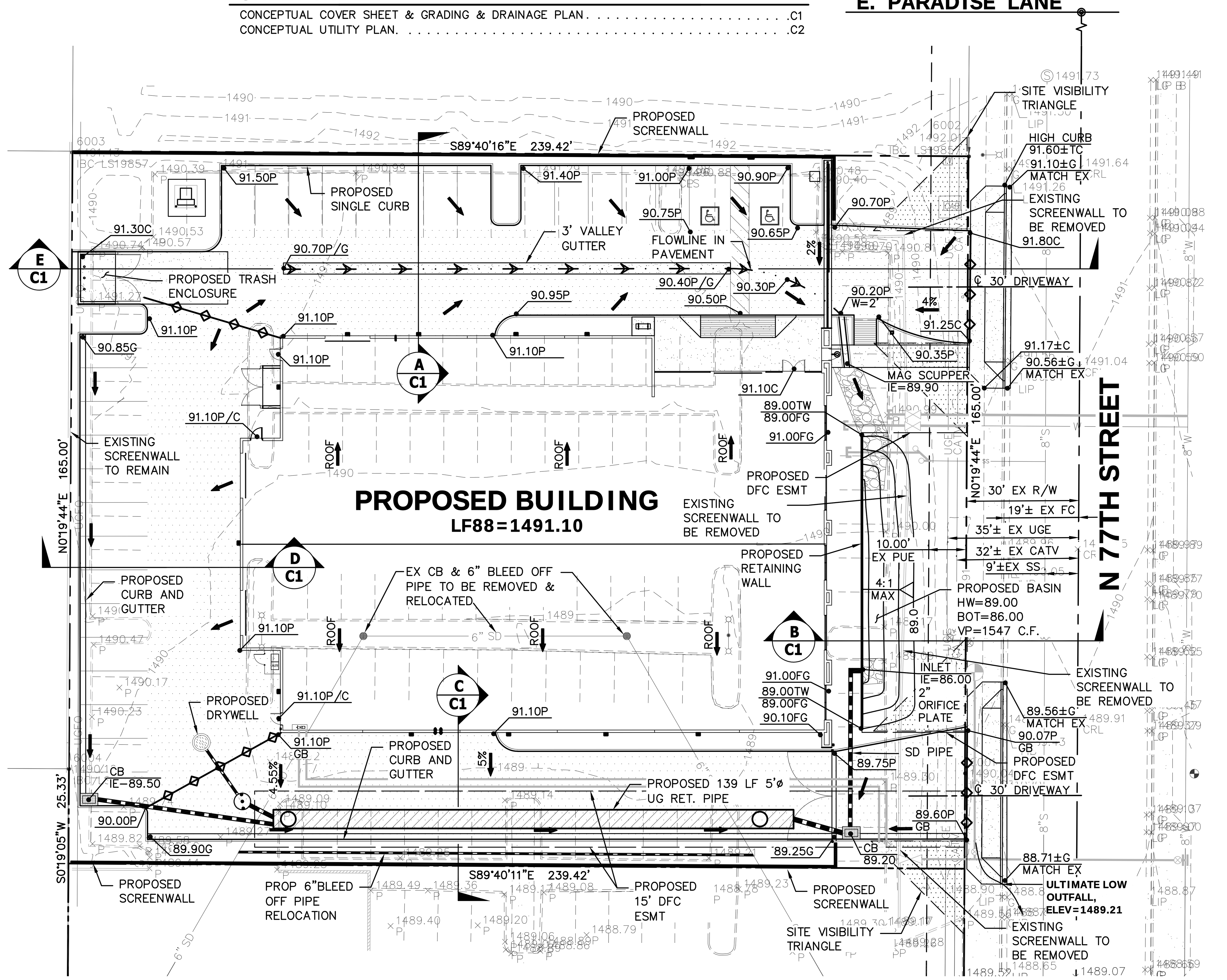


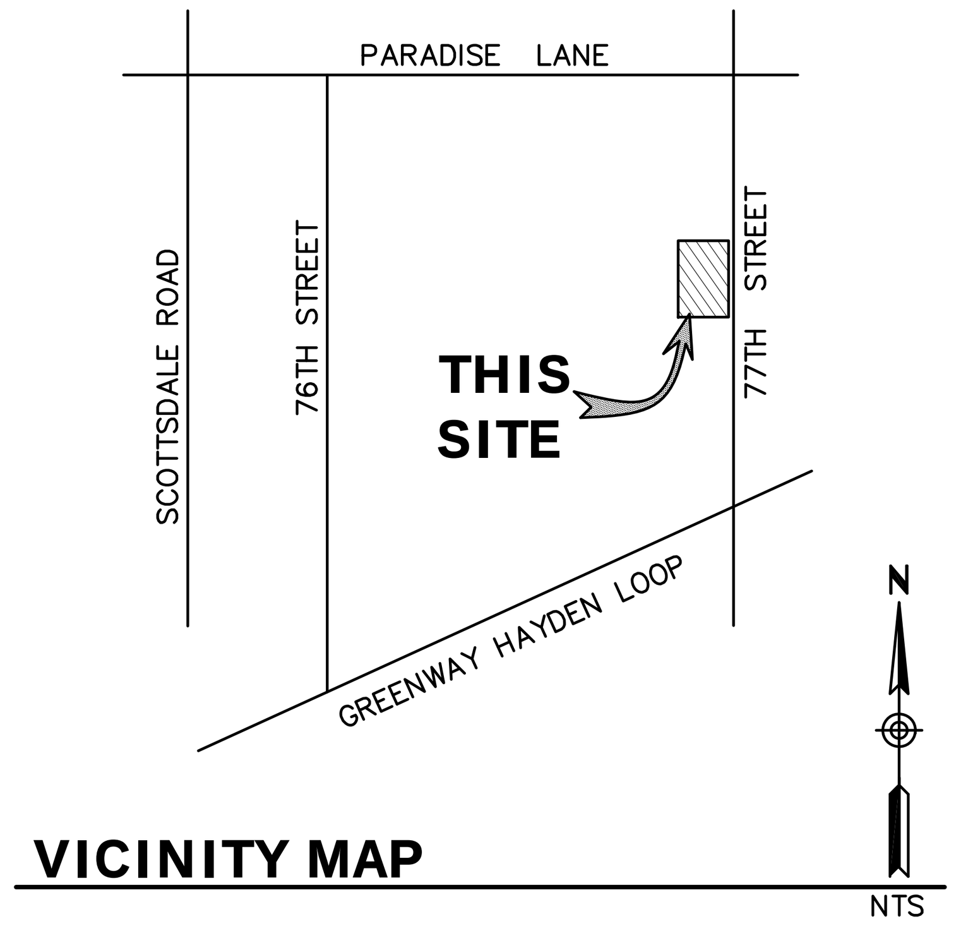
D **TYPICAL SECTION** N.T.S



E **TYPICAL SECTION** N.T.S

SHEET INDEX





VICINITY MAP

OWNER
EVANS FAMILY REAL ESTATE HOLDINGS, LLC
6011 EAST THUNDERBIRD ROAD
SCOTTSDALE, ARIZONA 85254
PHONE: (480) 966-4001
CONTACT: BEN MCBRAE
EMAIL: BENM@LGEDESIGNBUILD.COM

DEVELOPER
LGE CORPORATION
740 N. 52ND STREET
PHOENIX, ARIZONA 85008
PHONE: (480) 966-4001
CONTACT: BEN MCBRAE
EMAIL: BENM@LGEDESIGNBUILD.COM

ARCHITECT
LGE CORPORATION
740 N. 52ND STREET
PHOENIX, ARIZONA 85008
PHONE: (480) 966-4001
CONTACT: BEN MCBRAE
EMAIL: BENM@LGEDESIGNBUILD.COM

CIVIL ENGINEER
HUNTER ENGINEERING, INC.
10450 N. 74TH STREET, SUITE #200
SCOTTSDALE, ARIZONA 85258
PHONE: (480) 991-3985
CONTACT: JEFF NORMAN, P.E.
EMAIL: JNORMAN@HUNTERENGINEERINGPC.COM

BENCHMARK
WEST ¼ CORNER SECTION 2, T.3N., R.4E. FND BRASS CAP IN HANDHOLE STAMPED "CITY OF SCOTTSDALE" 0.3 DOWN, ELEVATION=1497.399. (CITY OF SCOTTSDALE NAD88 DATUM)

NO.	DATE	REVISION	BY

PURPOSE: 2ND CONCEPTUAL SUBMITTAL

DESIGN BY: JJN
DRAWN BY: LEW
CHECKED BY: JJN

HUNTER ENGINEERING CIVIL AND SURVEY
10450 NORTH 74TH STREET, SUITE 200
SCOTTSDALE, AZ 85258
T 480 991 3985
F 480 991 3986

Registered Professional Engineer, Certificate 20938, JEFFREY J. NORMAN, ARIZONA U.S.A., Date Signed 09/10/19

CONCEPT GRADING & DRAINAGE PLAN FOR EVANS CLASSIC AUTO 15882 N. 77TH STREET SCOTTSDALE, ARIZONA

CONTACT ARIZONA 811 AT LEAST 2 FULL WORKING DAYS BEFORE YOU BEGIN EXCAVATION
ARIZONA811
CALL 811 OR CLICK ARIZONA811.COM

THESE PLANS ARE NOT APPROVED FOR CONSTRUCTION WITHOUT AN APPROVED SIGNATURE FROM THE GOVERNING MUNICIPALITY.

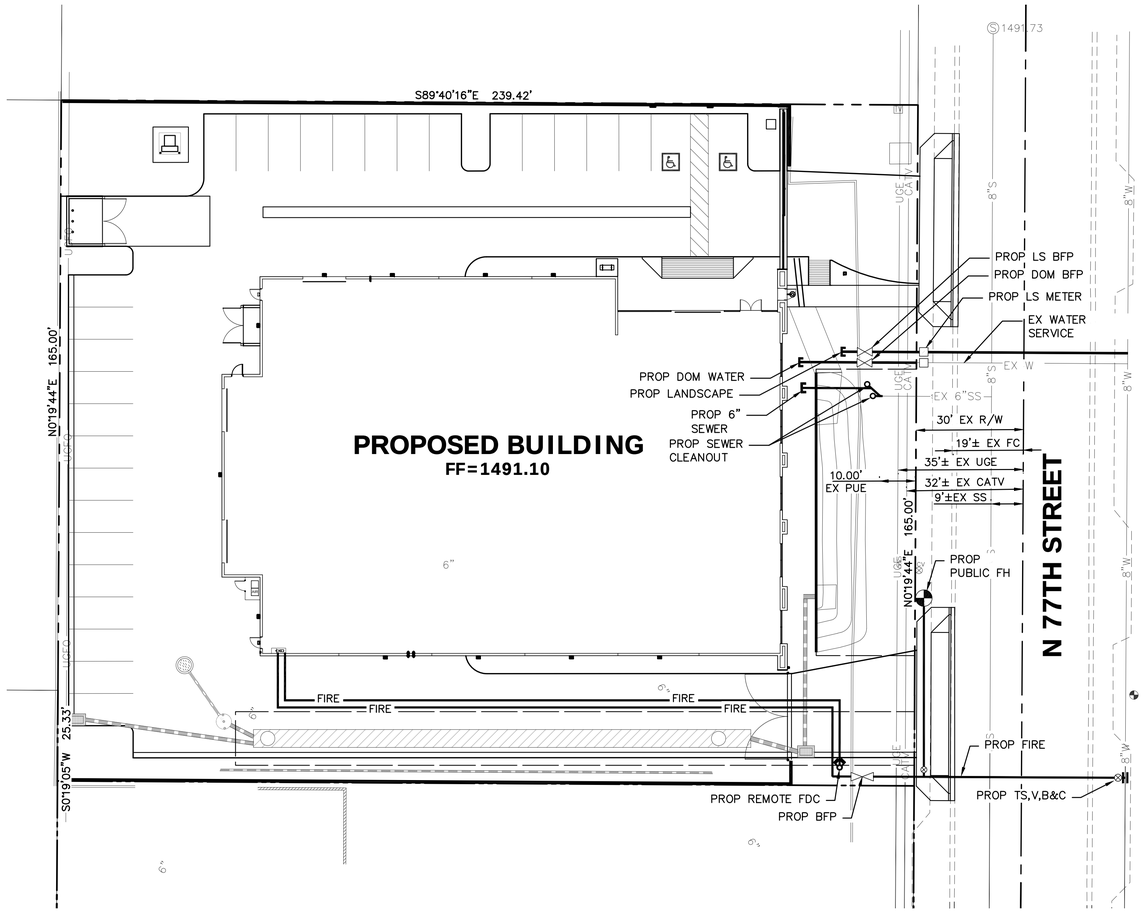
PROJECT NAME: EVANS CLASSIC AUTO

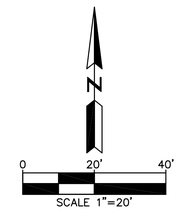
HE NO.: LGEC264
SCALE: 1"=20'

SHEET: C1

38-DR-2019
09/10/19

CONCEPTUAL UTILITY PLAN
FOR
EVANS CLASSIC AUTO
15882 N. 77TH STREET
SCOTTSDALE, ARIZONA 85260





NO.	DATE	REVISION	BY

PURPOSE: **2ND CONCEPTUAL SUBMITTAL**

DESIGN BY: JJN
DRAWN BY: LEW
CHECKED BY: JJN

HUNTER ENGINEERING
CIVIL AND SURVEY
10450 NORTH 74TH STREET, SUITE 200
SCOTTSDALE, AZ 85258
T 480 991 3985
F 480 991 3986

Registered Professional Engineer
CERTIFICATE NO.
20938
JEFFREY J. NORMAN
Date Signed 09/10/19
ARIZONA U.S.A.

CONCEPT UTILITY PLAN FOR EVANS CLASSIC AUTO 15882 N. 77TH STREET SCOTTSDALE, ARIZONA

CONTACT ARIZONA 811 AT LEAST 2 FULL WORKING DAYS BEFORE YOU BEGIN EXCAVATION
AR ZONA811
CALL 811 OR CLICK ARIZONA811.COM

THESE PLANS ARE NOT APPROVED FOR CONSTRUCTION WITHOUT AN APPROVED SIGNATURE FROM THE GOVERNING MUNICIPALITY.

PROJECT NAME: EVANS CLASSIC AUTO

HE NO.: LGEC264
SCALE: 1"=20'

SHEET:
C2

38-DR-2019
09/10/19

G:\LGEC264\Concept\LGEC264CONCEPT1.dwg, 9/10/2019 8:39:20 AM, lawnick

HUNTER
ENGINEERING

CIVIL AND SURVEY

ABBREVIATED SEWER REPORT
For
EVAN'S CLASSIC AUTO
77TH ST. AND GREENWAY HAYDEN LOOP
SCOTTSDALE, ARIZONA

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 rsacks **DATE** 9/18/2019

CASE # 249-PA-2019

Registered Professional Engineer (Civil)
CERTIFICATE NO.
20938
JEFFREY J.
NORMAN
Date Signed 9.9.19
ARIZONA, U.S.A.

Prepared by:
Hunter Engineering, P.C.
10450 North 74th Street, #200
Scottsdale, AZ 85258

ABBREVIATED SEWER REPORT
FOR

EVAN'S CLASSIC AUTO

77TH ST. AND GREENWAY HAYDEN LOOP
SCOTTSDALE, AZ.

PREPARED FOR

LGE DESIGN GROUP
740 NORTH 52ND STREET
PHOENIX, AZ 85008

PREPARED BY

LARRY TALBOTT, PE
HUNTER ENGINEERING, P.C.
10450 NORTH 74TH STREET, #200
SCOTTSDALE, AZ 85258
(480) 991-3985

MAY 2019
REVISED SEPTEMBER 2019

H.E. PROJECT NO. LGEC264

HUNTER
ENGINEERING

TABLE OF CONTENTS

1.0 INTRODUCTION

This sewer report has been prepared under a contract from LGE Design Build the developer for the Evan's Classic Auto project. The purpose of this report is to provide a sewer analysis, as required by the City of Scottsdale, to support this development. This report has been prepared according to the procedures detailed in Chapter 7 of the City of Scottsdale's Design Standards & Policies Manual dated January 2018.

This development project is located at 77th Street and Greenway Hayden Loop, Scottsdale, Arizona. The site is specifically located in The Southeast Quarter of Section 2, Township 3 North, Range 4 East of The Gila And Salt River Base and Meridian. Maricopa County, Arizona. Figure 1, in Appendix A, illustrates the location of the project site in relation to the City of Scottsdale street system.

The development is for a proposed Evan's Classic Auto consisting of approximately 1.05± acres. Improvements to be made on-site include a new 15,699 sf office/warehouse building, parking, and the construction of landscaped areas. Exhibit A, located attached hereto, illustrates the proposed improvements for the project.

2.0 EXISTING SITE CONDITIONS

The site is currently developed as an existing parking lot for the adjacent office building. The site is bordered by existing developments to the north, west and south and 77th Street to the east. There is an existing 8" ACP line in 77th Street, and an existing 6" sewer service stub tees off of the 8" line and is capped on site.

3.0 PROPOSED SANITARY SEWER SYSTEM

This development proposes to extend the existing 6" sewer service to the proposed building. The estimated Average Daily Flow of 6,280 GPD and a Peak Hour Flow of 13.2 GPM. Wastewater flows were calculated in accordance with the City of Scottsdale Design Standards and Policy Manual (Reference 1). A demand of 0.4 gpd per square feet was used for the building with a peaking factor of 3.0. See the demand calculations in Appendix B.

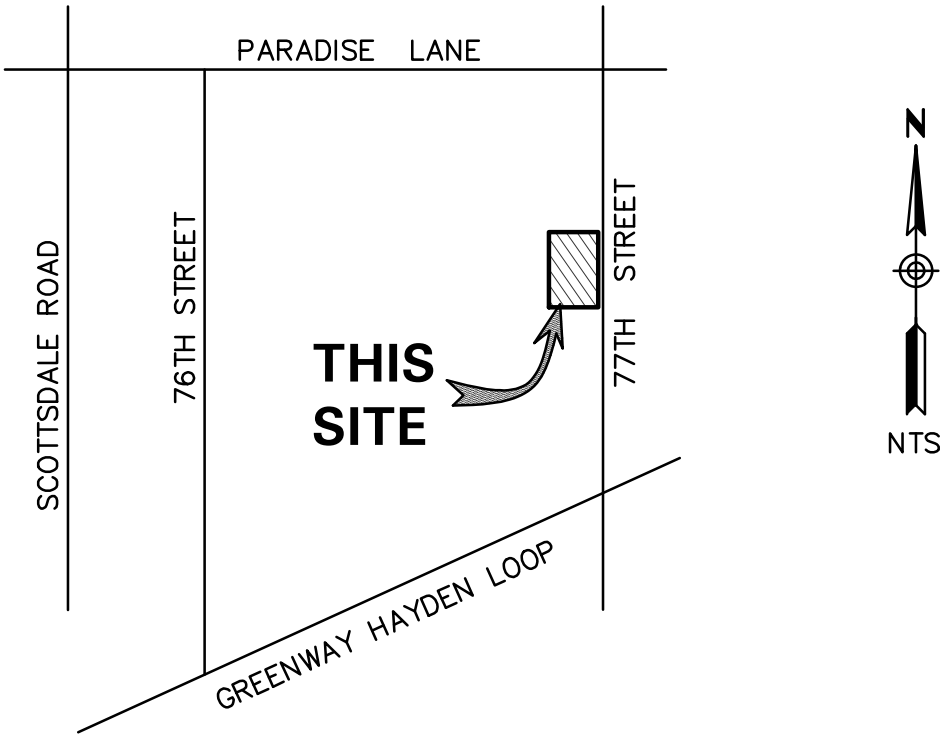
The calculated proposed flow of 13.2 gpm is well below the available flow of 195 gpm for a 6" service at the minimum slope of 1% and a 0.65 d/D ratio.

4.0 CONCLUSIONS

Based on the results of this study, it can be concluded that:

- The proposed sewer system is adequate to service the development.

APPENDIX A
FIGURES



VICINITY MAP
FIGURE 1

APPENDIX B
CALCULATIONS AND
REFERENCE INFORMATION

Project: Evans Classic Auto
Project No.: LGEC264
City: SCOTTSDALE, AZ
Date: 9/9/2019

PROJECTED MAXIMUM SANITARY SEWER LOADS

I.D.	Land Use	Building Area or Units sq.ft. / Units	Average Day Sewer Demands in Gallons Figure 7.1-2		Peaking Factor Figure 7.1-2	Average Daily Flow gpd	Average Daily Flow gpm	Peak Flow gpm
Building Area A	**Office/Warehouse**	15,699	0.40	gpd/sq.ft.	3	6,280	4.4	13.2
	Sub-Total					**6,280**	**4**	**13**

HUNTER ENGINEERING

Worksheet
Worksheet for Circular Channel

Project Description	
Worksheet	6" Service
Flow Element	Circular Chann
Method	Manning's For
Solve For	Discharge

Input Data			
Mannings Coeffic	0.013		
Channel Slope	010000	ft/ft	
Depth	0.33	ft	d/D = 0.65
Diameter	6.0	in	

Results			
Discharge	195	gpm	>13.2gpm OK
Flow Area	0.1	ft²	
Wetted Perime	0.95	ft	
Top Width	0.00	ft	
Critical Depth	0.34	ft	
Percent Full	66.0	%	
Critical Slope	0.009559	ft/ft	
Velocity	3.15	ft/s	
Velocity Head	0.15	ft	
Specific Energ	0.48	ft	
Froude Numbe	1.03		
Maximum Disc	271	gpm	
Discharge Full	252	gpm	
Slope Full	0.005974	ft/ft	
Flow Type	Supercritical		

Hunter
37 Brookside Road Waterbury, CT 06708 USA +1-203-755-1666

38-DR-2019
09/10/19

CITY OF SCOTTSDALE

DESIGN STANDARDS & POLICIES MANUAL

38-DR-2019
09/10/19

calculations to the Water Resources Department for permission to use extra-strength pipe, special bedding specifications, or alternative construction methods. The Water Resources Department must accept the request in writing prior to Plan Review's approval of the final plans.
Ensure that all types of pipe material used in design have established ASTM, ANSI, AWWA or NSF standards of manufacture or seals of approval and are designated for use with wastewater.

SYSTEM LAYOUT 7-1.402

Generally, SS lines constructed along a street grid should be aligned parallel to, and south or west of the street centerline. Lines should not cross the street centerline except in cases where curvilinear roadway alignments are encountered.
Public SS lines within commercial, industrial or multi-family developments must be located within drive aisles a minimum of 6 feet from any structure. Public SS lines will be located within tracts and/or sewer line easements. No private utilities are allowed longitudinally within a sewer line easement.
Curvilinear SS lines are not allowed. Developments with numerous curved streets should be discussed with the Water Resources Department to decide whether the city will consider a design report with water and sewer layouts in accordance with the following criteria:

A. Water and SS lines will be placed under the paved section of the roadway within the area, from back-of-curb to back-of-curb.
B. SS lines must maintain a minimum of 6-feet horizontal clearance to dry utilities per COS Standard Detail No. 2401.
C. SS manholes are to be located at the approximate center of the drive lane.
D. The water line and SS line shall run parallel to each other with 6 feet of separation between the pipe walls. Lines may cross the street centerline.
E. Deflections in the SS line through manholes shall be designed to nominal fitting angles within standard tolerances and will occur at the same locations where the water line is deflected. Refer to Section 6-1.402 for related water system criteria.

DESIGN FLOWS 7-1.403

A. **Residential**
SS lines 8 to 12 inches in diameter will be designed using 100 gallons per capita per day (gpcpd) and a peaking factor of 4.
SS lines larger than 12 inches in diameter will be designed using 105 gpcpd and a peaking factor developed from "Harmon's Formula":
Qmax = Qavg x [1+ (14 / (4+P1/2))]
P = Population / 1,000
Residential densities are to assume 2.5 persons per dwelling unit. Multifamily densities exceeding 22 dwelling units per acre can assume 1.7 to 2.2 persons per unit.

B. **Commercial and Industrial**
Wastewater flows for uses other than those listed below shall be based upon known regional or accepted engineering reference sources approved by the Water Resources Department.

LAND USE	DEMAND (gpd)	DESIGN PEAKING FACTOR
Commercial/Retail	0.5 per sq. ft.	3
Office	0.4 per sq. ft.	3
Restaurant	1.2 per sq. ft.	6
High Density Condominium (Condo)	140 per unit	4.5
Resort Hotel (includes site amenities)	380 per room.	4.5
School: without cafeteria	30 per student	6
School: with cafeteria	50 per student	6
Cultural	0.1 per sq. ft.	3
Clubhouse for Subdivision Golf Course	100 per patron x 2 patrons per du per day	4.5
Fitness Center/ Spa/ Health club	0.8 per sq. ft.	3.5

FIGURE 7-1.2 AVERAGE DAY SEWER DEMAND IN GALLONS PER DAY & PEAKING FACTORS BY LAND USE

HYDRAULIC DESIGN 7-1.404

No public SS lines will be less than 8 inches in diameter unless permission is received in writing from the Water Resources Department.

SS lines shall be designed and constructed to give mean full flow velocities equal to or greater than 2.5 fps, based upon Manning's Formula, using an "n" value of 0.013.

To prevent abrasion and erosion of the pipe material, the maximum velocity will be limited to 10 fps at estimated peak flow. Where velocities exceed this maximum figure, submit a hydraulic analysis along with construction recommendations to the Water Resources Department for consideration. In no case will velocities greater than 15 fps be allowed.

Actual velocities shall be analyzed for minimum, average day and peak day design flow conditions for each reach of pipe.

The SS system shall be designed to achieve uniform flow velocities through consistent slopes. Abrupt changes in slope shall be evaluated for hydraulic jump.

The depth to diameter ratio (d/D) for gravity SS pipes 12 inches in diameter and less shall not exceed 0.65 in the ultimate peak flow condition. This d/D ratio includes an allowance for system infiltration and inflow.

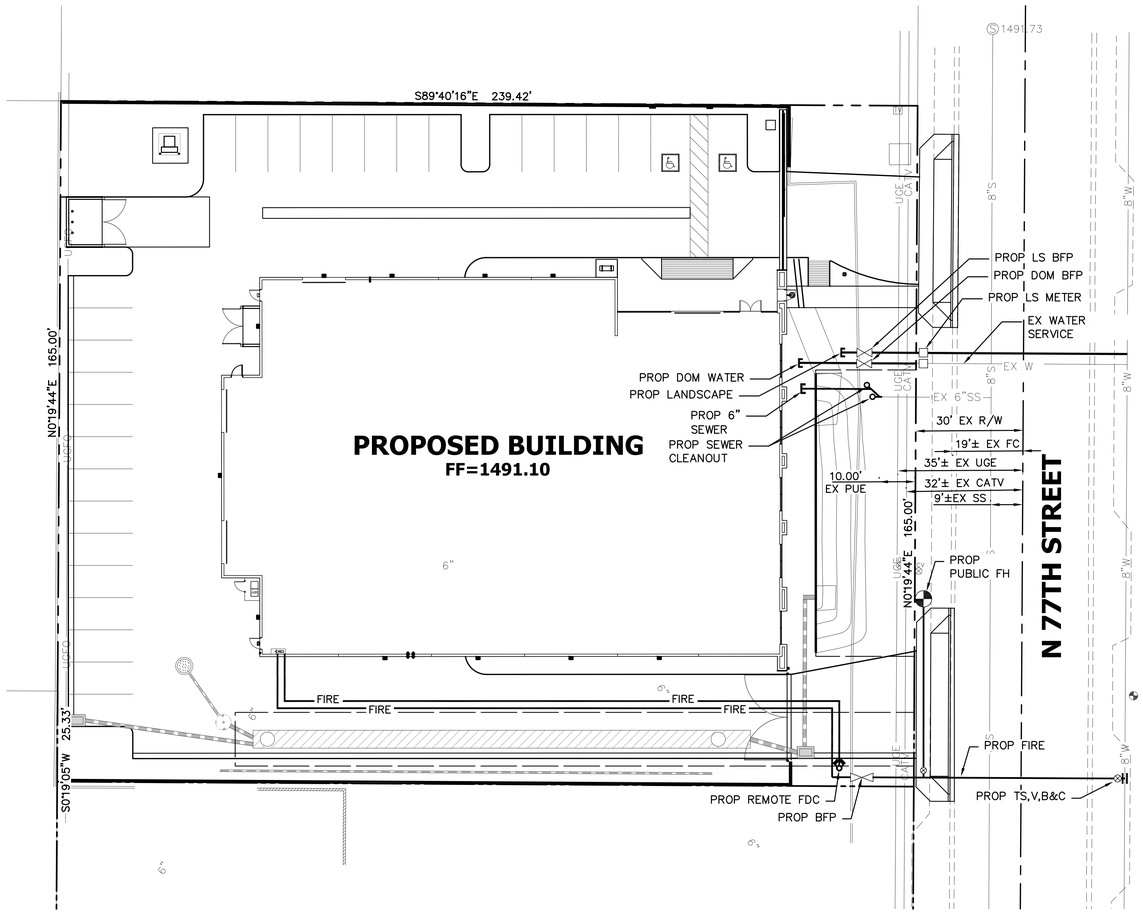
The d/D for gravity drains greater than 12 inches diameter shall not exceed 0.70 for the ultimate peak flow condition. This d/D includes an allowance for system infiltration and inflow.

Measures to mitigate hydrogen sulfide shall be analyzed at manhole drops, abrupt changes in pipe slope or direction and at changes in pipe diameter.

MANHOLES AND CLEAN OUTS 7-1.405

Manholes in city streets shall be located near the center of the inside traffic lane, rather than on or near the line separating traffic lanes. Manholes shall not be in bike trails, equestrian trails, sidewalks, crosswalks or wash crossings. Manholes are required at all

CONCEPTUAL UTILITY PLAN
FOR
EVANS CLASSIC AUTO
15882 N. 77TH STREET
SCOTTSDALE, ARIZONA 85260



0 20' 40'
SCALE 1"=20'

NO.	DATE	REVISION	BY

PURPOSE: 2ND CONCEPTUAL SUBMITTAL

DESIGN BY: JJN
DRAWN BY: LEW
CHECKED BY: JJN

HUNTER ENGINEERING
CIVIL AND SURVEY
10450 NORTH 74TH STREET, SUITE 200
SCOTTSDALE, AZ 85258
T 480 991 3985
F 480 991 3986

Registered Professional Engineer
CERTIFICATE NO.
20938
JEFFREY J. NORMAN
Date Signed 09/10/19
ARIZONA U.S.A.

CONCEPT UTILITY PLAN
FOR
EVANS CLASSIC AUTO
15882 N. 77TH STREET
SCOTTSDALE, ARIZONA

CONTACT ARIZONA 811 AT LEAST 2 FULL WORKING DAYS BEFORE YOU BEGIN EXCAVATION
AR ZONA811
BLUE STAKE, INC.
CALL 811 OR CLICK ARIZONA811.COM

THESE PLANS ARE NOT APPROVED FOR CONSTRUCTION WITHOUT AN APPROVED SIGNATURE FROM THE GOVERNING MUNICIPALITY.

PROJECT NAME:
EVANS CLASSIC AUTO

HE NO.: LGEC264
SCALE: 1"=20'

SHEET:
C2

38-DR-2019
09/10/19

HUNTER
ENGINEERING

CIVIL AND SURVEY

ABBREVIATED WATER REPORT
For
EVAN'S CLASSIC AUTO
77TH ST. AND GREENWAY HAYDEN LOOP
SCOTTSDALE, ARIZONA

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 rsacks DATE 9/18/2019

CASE # 249-PA-2019

Registered Professional Engineer (Civil)
CERTIFICATE NO.
20938
JEFFREY J.
NORMAN
Date Signed 9.9.19
ARIZONA, U.S.A.

Prepared by:
Hunter Engineering, P.C.
10450 North 74th Street, #200
Scottsdale, AZ 85258

ABBREVIATED WATER REPORT
FOR

EVAN'S CLASSIC AUTO

77TH ST. AND GREENWAY HAYDEN LOOP
SCOTTSDALE, AZ.

PREPARED FOR

LGE DESIGN GROUP
740 NORTH 52ND STREET
PHOENIX, AZ 85008

PREPARED BY

LARRY TALBOTT, PE
HUNTER ENGINEERING, P.C.
10450 NORTH 74TH STREET, #200
SCOTTSDALE, AZ 85258
(480) 991-3985

MAY 2019
REVISED: SEPTEMBER 2019

H.E. PROJECT NO. LGEC264

HUNTER
ENGINEERING

TABLE OF CONTENTS

1.0 INTRODUCTION

This water report has been prepared under a contract from LGE Design Build the developer for the Evan's Classic Auto project. The purpose of this report is to provide a water analysis, as required by the City of Scottsdale, to support this development. This report has been prepared according to the procedures detailed in Chapter 6 of the City of Scottsdale's Design Standards & Policies Manual dated January 2018.

This development project is located at 77th Street and Greenway Hayden Loop, Scottsdale, Arizona. The site is specifically located in The Southeast Quarter of Section 2, Township 3 North, Range 4 East of The Gila And Salt River Base and Meridian. Maricopa County, Arizona. Figure 1, in Appendix A, illustrates the location of the project site in relation to the City of Scottsdale street system.

The development is for a proposed Evan's Classic Auto consisting of approximately 1.05± acres. Improvements to be made on-site include a new 15,699 s.f. office/warehouse building, parking, and the construction of landscaped areas. Exhibit A, located attached hereto, illustrates the proposed improvements for the project.

2.0 EXISTING SITE CONDITIONS

The site is currently developed as an existing parking lot for the adjacent office building. The site is bordered by existing developments to the north, west and south and 77th Street to the east.

3.0 EXISTING WATER DISTRIBUTION SYSTEM

There is an existing 8" ACP line in 77th Street that will be used for service. There is also an existing water service to the site.

4.0 PROPOSED DOMESTIC WATER DEMAND

The average day, maximum day and peak hour demands for this development were derived using unit flow requirements out of the City of Scottsdale Design Standards & Policies Manual for Water, Figure 6.1-2. Refer to Appendix D in this report. Average Day Demand (ADD), Maximum Day Demand (MDD) and Peak Hour Demand (PHD) for domestic water usage for each building are located in Appendix B. Maximum Day Demand is 2 times the ADD and Peak Hour Demand is 3.5 times the ADD.

5.0 PROPOSED FIRE FLOW DEMAND

Per the International Fire Code (IFC), the maximum fire flow is based on the construction type of the building and its square footage. The total building area is 15,699 sf. The building construction type is V-B. This requires a fire flow of 3,500 GPM be achieved at a minimum pressure of 20 PSI. The proposed building will be sprinklered. Therefore, a 50% reduction in the fire flow requirement may be applied. This reduces the required fire flow to 1,750 GPM.

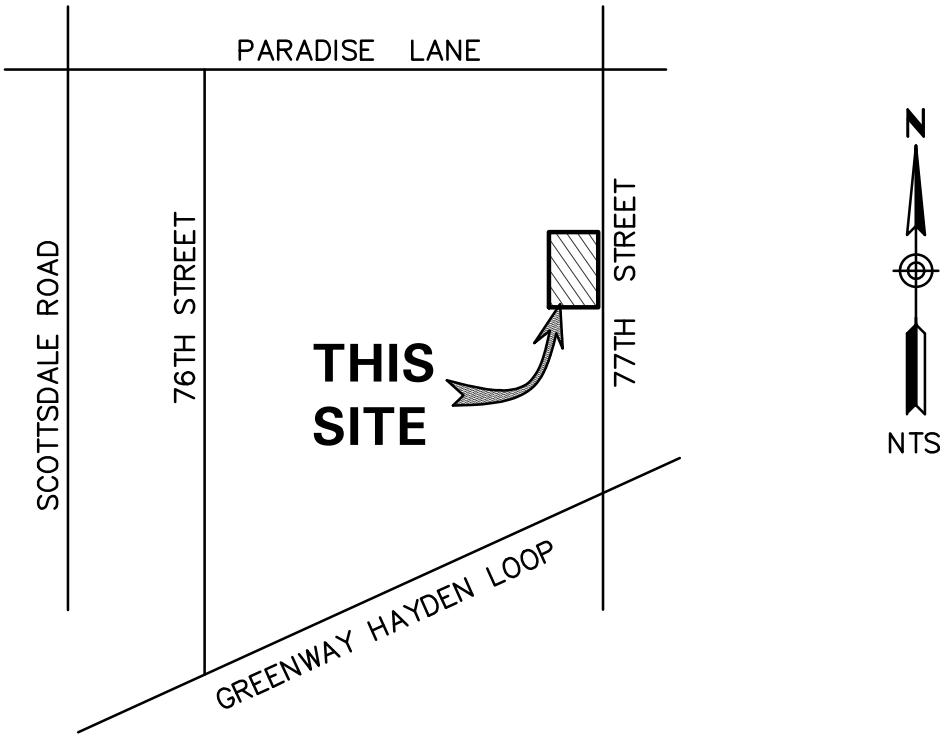
A fire hydrant flow test was performed adjacent to the site. The resultant flow at 20 psi on that test was 5,845 gpm. This is well above the required 1,750 gpm and therefore the existing water system has adequate flows and pressure to support this development.

6.0 CONCLUSIONS

Based on the results of this study, it can be concluded that:

- The existing water network meets the requirements to support this development.
- All domestic water lines and fire lines shall be privately owned and maintained.

APPENDIX A
FIGURES



VICINITY MAP
FIGURE 1

APPENDIX B
CALCULATIONS AND DATA SHEET

SUMMIT FIRE PROTECTION CO.

Phone: (480) 966-9178 Fax: (480) 967-9191 AZ Lic. C-16 275324
2114 East Cedar Street • Tempe, Arizona 85281
E-mail Address: EBeckman@SummitCoUS.com

FIRE HYDRANT FLOW TEST

Name: Evans Classic Auto
N. 77th St & Greenway Hayden Loop
Scottsdale, AZ

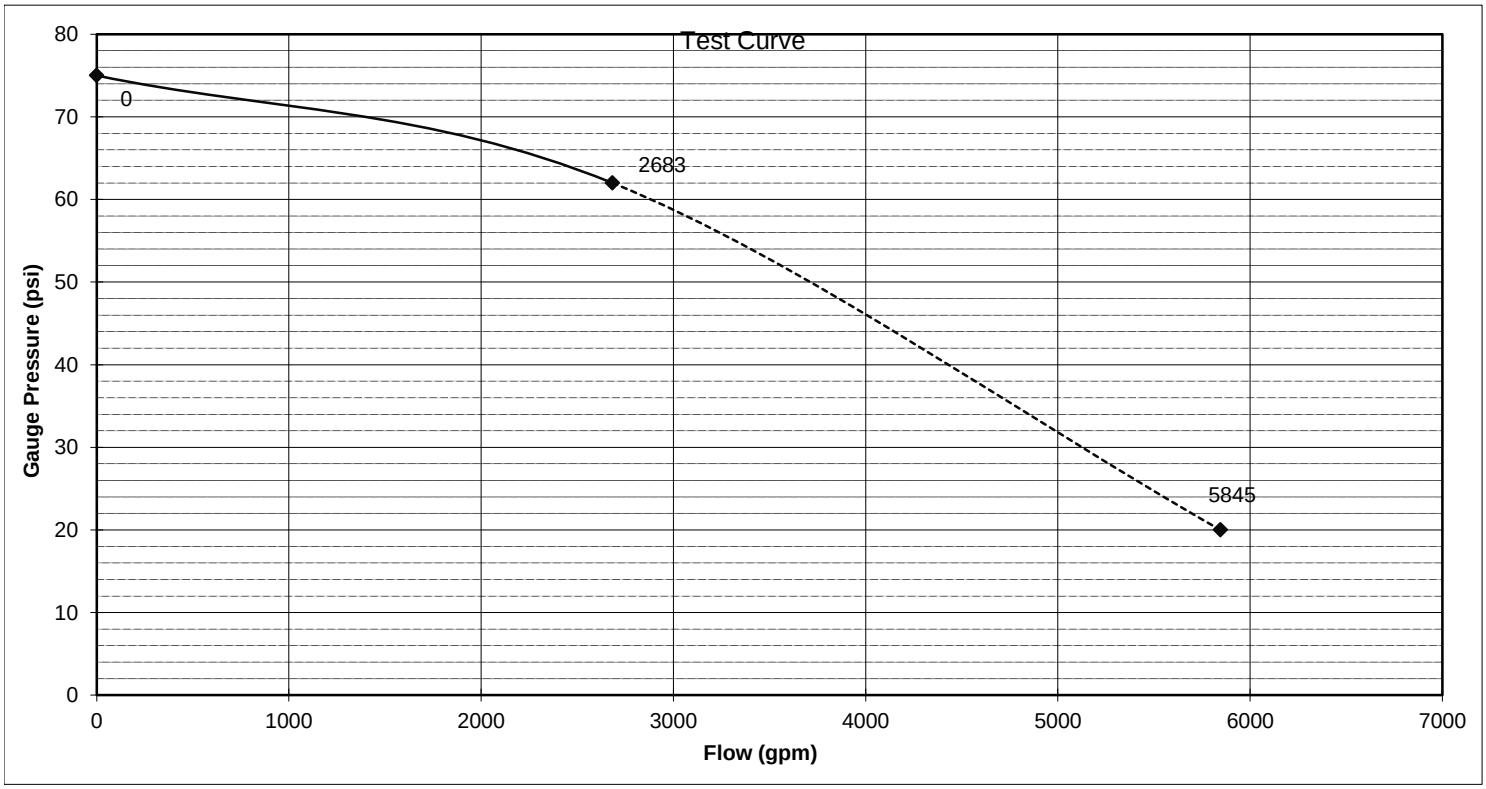
Date: 05/01/19
Time: 8:00 AM
Report #
Tech: Tim Harrison

Static Hydrant: N of Greenway Hayden Loop
W. side of 77th St.
Elevation:
Dist. Between Hydrants: 150'-0"
Diameter of Main:
Static Pressure: 75.0
Residual Pressure: 62.0
Pump Present:
Tank Present:
Req. GPM: Req. PSI:

Flowing Hydrant: N of static hydrant along E. side of 77th St.
Elevation: 0
Type of Supply: City Main

Hydrant:	1	2	3	4
Outlet Diameter:	4.0			
Pitot Reading:	39.0			
Coeff:	0.900			
Discharge GPM:	2683	0	0	0

Static pressure of	75	psi	@	0	gpm
Residual pressure of	62	psi	@	2683	gpm
Available flow @	20	psi	@	5845	gpm



Comments:

NOTES:

1. Flowing hydrant is assumed to be on a circulating main or downstream of the pressure test hydrant on a dead-end system.
2. Flow analysis assumes a gravity flow system with no distribution pumps and having no demand, other than the test
3. The distance between hydrants, elevations & main diameters are for information only.

38-DR-2019
09/10/19

38-DR-2019
09/10/19

FLOW

Google Maps

Imagery ©2019 Google, Map data ©2019 Google 50 ft

STATIC

APPENDIX C
REFERENCE INFORMATION

Project: Evan's Classic Auto
Project Number: LGEC264
City: Scottsdale
Date: 9/9/2019

PROJECTED MAXIMUM DOMESTIC WATER DEMANDS

I.D.	Land Use	Building Area or Units sf Unit	Average Daily Flows by Land Use Table 6-1.2 Avg Day Water Dem Design Standards Manual For Water and Wastewater Systems		Average Daily Flow (ADF) gpd	Average Daily Flow (ADF) gpm	Maximum Daily Flow (ADF * 2) gpm	Peak Flow (ADF * 3.5) gpm
Building	**Office/Warehouse**	15,699	0.00083	gpm per s.f.	18,854	13.1	26.2	45.8
	TOTAL:				**18,854**	**13.1**	**26.2**	**45.8**

FIRE FLOW SUMMARY

I.D.	Proposed Building Type	Building Area squate feet	Estimated Construction Type	Minimum Required Fire Flow, Table B105.1 2009 Internation Fire Code	50% Sprinklered Fire Flow	Building Sprinklered
				(gpm)	**(gpm)**	
Building	Office Warehouse	15,699	V-B	3,500	1,750	YES

38-DR-2019
09/10/19

APPENDIX C
REFERENCE INFORMATION

FIRE-FLOW CALCULATION AREA. The floor area, in square feet (m^2), used to determine the required fire flow.

SECTION B103
MODIFICATIONS

B103.1 Decreases.

The *fire code official* is authorized to reduce the *fire-flow* requirements for isolated buildings or a group of buildings in rural areas or small communities where the development of full *fire-flow* requirements is impractical.

B103.2 Increases.

The *fire code official* is authorized to increase the *fire-flow* requirements where conditions indicate an unusual susceptibility to group fires or conflagrations. An increase shall be not more than twice that required for the building under consideration.

B103.3 Areas without water supply systems.

For information regarding water supplies for fire-fighting purposes in rural and suburban areas in which adequate and reliable water supply systems do not exist, the *fire code official* is authorized to utilize NFPA 1142 or the *International Wildland-Urban Interface Code*.

SECTION B104
FIRE-FLOW CALCULATION AREA

B104.1 General.

The *fire-flow calculation area* shall be the total floor area of all floor levels within the *exterior walls*, and under the horizontal projections of the roof of a building, except as modified in Section B104.3.

B104.2 Area separation.

Portions of buildings that are separated by *fire walls* without openings, constructed in accordance with the *International Building Code*, are allowed to be considered as separate *fire-flow calculation areas*.

B104.3 Type IA and Type IB construction.

The *fire-flow calculation area* of buildings constructed of Type IA and Type IB construction shall be the area of the three largest successive floors.

Exception: *Fire-flow calculation area* for open parking garages shall be determined by the area of the largest floor.

SECTION B105
FIRE-FLOW REQUIREMENTS FOR BUILDINGS

B105.1 One- and two-family dwellings, Group R-3 and R-4 buildings and townhouses.

The minimum *fire-flow* and flow duration requirements for one- and two-family *dwellings*, Group R-3 and R-4 buildings and *townhouses* shall be as specified in Tables B105.1(1) and B105.1(2).

TABLE B105.1(1)
REQUIRED FIRE FLOW FOR ONE- AND TWO-FAMILY DWELLINGS, GROUP R-3 AND R-4 BUILDINGS AND TOWNHOUSES

38-DR-2019
09/10/19

FIRE-FLOW CALCULATION AREA (square feet)	AUTOMATIC SPRINKLER SYSTEM (Design Standard)	MINIMUM FIRE FLOW (gallons per minute)	FLOW DURAT (hours)
0–3,600	No automatic sprinkler system	1,000	1
3,601 and greater	No automatic sprinkler system	Value in Table B105.1(2)	Duration in Table B at the required fire-
0–3,600	Section 903.3.1.3 of the *International Fire Code* or Section P2904 of the *International Residential Code*	500	1/2
3,601 and greater	Section 903.3.1.3 of the *International Fire Code* or Section P2904 of the *International Residential Code*	1/2 value in Table B105.1(2)	1

For SI: 1 square foot = 0.0929 m^2, 1 gallon per minute = 3.785 L/m.

TABLE B105.1(2)
REFERENCE TABLE FOR TABLES B105.1(1) AND B105.2

FIRE-FLOW CALCULATION AREA (square feet)					FIRE-FLOW (gallons per minute)[b]	FLOW DURATION (hours)
Type IA and IB[a]	Type IIA and IIIA[a]	Type IV and V-A[a]	Type IIB and IIIB[a]	Type V-B[a]		
0-22,700	0-12,700	0-8,200	0-5,900	0-3,600	1,500	2
22,701-30,200	12,701-17,000	8,201-10,900	5,901-7,900	3,601-4,800	1,750	
30,201-38,700	17,001-21,800	10,901-12,900	7,901-9,800	4,801-6,200	2,000	
38,701-48,300	21,801-24,200	12,901-17,400	9,801-12,600	6,201-7,700	2,250	
48,301-59,000	24,201-33,200	17,401-21,300	12,601-15,400	7,701-9,400	2,500	
59,001-70,900	33,201-39,700	21,301-25,500	15,401-18,400	9,401-11,300	2,750	
70,901-83,700	39,701-47,100	25,501-30,100	18,401-21,800	11,301-13,400	3,000	3
83,701-97,700	47,101-54,900	30,101-35,200	21,801-25,900	13,401-15,600	3,250	
97,701-112,700	54,901-63,400	35,201-40,600	25,901-29,300	15,601-18,000	3,500	
112,701-128,700	63,401-72,400	40,601-46,400	29,301-33,500	18,001-20,600	3,750	
128,701-145,900	72,401-82,100	46,401-52,500	33,501-37,900	20,601-23,300	4,000	
145,901-	82,101-92,400	52,501-59,100	37,901-42,700	23,301-	4,250	

164,200				26,300		
164,201-183,400	92,401-103,100	59,101-66,000	42,701-47,700	26,301-29,300	4,500	
183,401-203,700	103,101-114,600	66,001-73,300	47,701-53,000	29,301-32,600	4,750	
203,701-225,200	114,601-126,700	73,301-81,100	53,001-58,600	32,601-36,000	5,000	
225,201-247,700	126,701-139,400	81,101-89,200	58,601-65,400	36,001-39,600	5,250	
247,701-271,200	139,401-152,600	89,201-97,700	65,401-70,600	39,601-43,400	5,500	
271,201-295,900	152,601-166,500	97,701-106,500	70,601-77,000	43,401-47,400	5,750	
295,901-Greater	166,501-Greater	106,501-115,800	77,001-83,700	47,401-51,500	6,000	4
—	—	115,801-125,500	83,701-90,600	51,501-55,700	6,250	
—	—	125,501-135,500	90,601-97,900	55,701-60,200	6,500	
—	—	135,501-145,800	97,901-106,800	60,201-64,800	6,750	
—	—	145,801-156,700	106,801-113,200	64,801-69,600	7,000	
—	—	156,701-167,900	113,201-121,300	69,601-74,600	7,250	
—	—	167,901-179,400	121,301-129,600	74,601-79,800	7,500	
—	—	179,401-191,400	129,601-138,300	79,801-85,100	7,750	
—	—	191,401-Greater	138,301-Greater	85,101-Greater	8,000	

For SI: 1 square foot = 0.0929 m^2, 1 gallon per minute = 3.785 L/m, 1 pound per square inch = 6.895 kPa.

a. Types of construction are based on the *International Building Code*.

b. Measured at 20 psi residual pressure.

B105.2 Buildings other than one- and two-family dwellings, Group R-3 and R-4 buildings and townhouses.

The minimum *fire-flow* and flow duration for buildings other than one- and two-family *dwellings*, Group R-3 and R-4 buildings and *townhouses* shall be as specified in Tables B105.2 and B105.1(2).

TABLE B105.2
REQUIRED FIRE FLOW FOR BUILDINGS OTHER THAN ONE- AND TWO-FAMILY DWELLINGS, GROUP R-3 AND R-4 BUILDINGS AND TOWNHOUSES

38-DR-2019
09/10/19

CITY OF SCOTTSDALE

DESIGN STANDARDS & POLICIES MANUAL

38-DR-2019
09/10/19

d. Pipe flow velocity in feet per second (fps)
e. Each pipe segment's head loss rate (ft. /1,000ft or psi/ft.)
f. PRVs: Upstream and downstream pressures (psi or HGL elevation)
g. Tanks: Inflow and outflow (gpm)
h. Shows all units for the values presented or provide a legend on the diagram page that indicates the units used

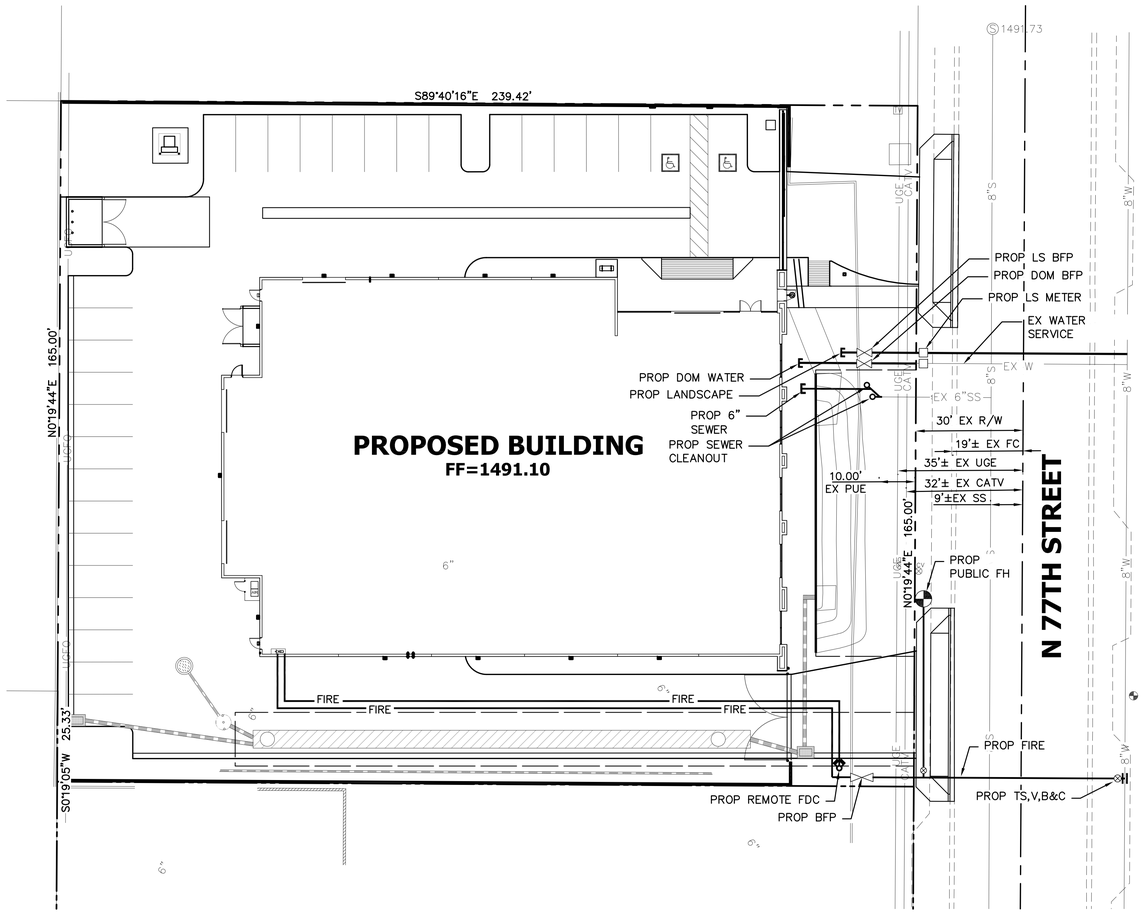
AVERAGE DAY WATER DEMANDS [1]							
IN GALLONS PER DAY (GPD) [2]				IN GALLONS PER MINUTE (GPM) [2][3]			
Land Use	Inside Use	Outside Use	Total Use	Inside Use	Outside Use	Total Use	Units
Residential Demand per Dwelling Unit							
< 2 dwelling unit per acre (DU/ac)	208.9	276.7	485.6	0.30	0.39	0.69	per unit
2 – 2.9 DU/ac	193.7	276.7	470.4	0.27	0.39	0.66	per unit
3 – 7.9 DU/ac	175.9	72.3	248.2	0.25	0.11	0.36	per unit
8 – 11.9 DU/ac	155.3	72.3	227.6	0.22	0.11	0.33	per unit
12 – 22 DU/ac	155.3	72.3	227.6	0.22	0.11	0.33	per unit
High Density Condominium (condo)	155.3	30	185.3	0.22	0.05	0.27	per unit
Resort Hotel (includes site amenities)	401.7	44.6	446.3	0.56	0.07	0.63	per room
Service and Employment							
Restaurant	1.2	0.1	1.3	1.67E-03	1.39E-04	1.81E-03	per square foot (sq.ft.)
Commercial/ Retail	0.7	0.1	0.8	9.73E-04	1.39E-04	1.11E-03	per sq.ft.
Commercial High Rise	0.5	0.1	0.6	6.95E-04	1.39E-04	8.34E-04	per sq.ft.

AVERAGE DAY WATER DEMANDS [1]							
IN GALLONS PER DAY (GPD) [2]				IN GALLONS PER MINUTE (GPM) [2][3]			
Office	0.5	0.1	0.6	6.95E-04	1.39E-04	8.34E-04	per sq.ft.
Institutional	670	670	1340	0.94	0.94	1.88	per acre
Industrial	873	154	1027	1.22	0.22	1.44	per acre
Research and Development	1092	192	1284	1.52	0.27	1.79	per acre
Special Use Areas							
Natural Area Open Space	0	0	0	0.0	0.0	0.0	per acre
Developed Open Space – Parks	0	1786	1786	0.0	2.49	2.49	per acre
Developed Open Space – Golf Course	0	4285	4285	0.0	5.96	5.96	per acre

Notes:
(1) These values shall not be used directly for service line or water meter sizing.
(2) Gallon per day values are provided for reference only. The instantaneous gallon per minute flow rates presented are intended for use in the required hydraulic modeling scenarios. The gpm values assume a 12-hour active water use period per 24-hour day. In large or specialty developments or master plans the hydraulic analysis criteria and parameters should be discussed with the Water Resources Department. Seasonal peaking should also be considered. Upon review, the Water Resources Department reserves the right to designate flows to be used in hydraulic modeling scenarios that may be different from those presented here.
(3) The hydraulic modeling peaking factors used in select modeling scenarios are to be applied to the gpm values shown here. Max day and peak hour peaking factors can be found in Section 6-1.404.

FIGURE 6-1.2 AVERAGE DAY WATER DEMANDS

CONCEPTUAL UTILITY PLAN
FOR
EVANS CLASSIC AUTO
15882 N. 77TH STREET
SCOTTSDALE, ARIZONA 85260



0 20' 40'
SCALE 1"=20'

NO.	DATE	REVISION	BY

PURPOSE: 2ND CONCEPTUAL SUBMITTAL

DESIGN BY: JJN
DRAWN BY: LEW
CHECKED BY: JJN

HUNTER ENGINEERING
CIVIL AND SURVEY
10450 NORTH 74TH STREET, SUITE 200
SCOTTSDALE, AZ 85258
T 480 991 3985
F 480 991 3986

Registered Professional Engineer
CERTIFICATE NO.
20938
JEFFREY J. NORMAN
Date Signed 09/10/19
ARIZONA U.S.A.

CONCEPT UTILITY PLAN
FOR
EVANS CLASSIC AUTO
15882 N. 77TH STREET
SCOTTSDALE, ARIZONA

CONTACT ARIZONA 811 AT LEAST 2 FULL WORKING DAYS BEFORE YOU BEGIN EXCAVATION
AR ZONA811
BLUE STAKE, INC.
CALL 811 OR CLICK ARIZONA811.COM

THESE PLANS ARE NOT APPROVED FOR CONSTRUCTION WITHOUT AN APPROVED SIGNATURE FROM THE GOVERNING MUNICIPALITY.

PROJECT NAME:
EVANS CLASSIC AUTO

HE NO.: LGEC264
SCALE: 1"=20'

SHEET:
C2

38-DR-2019
09/10/19