3 engineering

planning civil engineering surveying

One Scottsdale

Preliminary Drainage Report

3 engineering Job #: 5246

August 19, 2022

COS# 555-PA-2022

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ONE SCOTTSDALE

PRELIMINARY DRAINAGE REPORT

Prepared for:

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Expires 12/31/2024
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August 19, 2022

Submittal to:

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Job Number 5246

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1. Introduction

The purpose of this preliminary drainage report is to present the existing and proposed drainage plan for the project, One Scottsdale (Site). It is our opinion the proposed grading and drainage concept is in accordance with the City of Scottsdale's Design Standards & Policies Manual (Ref. 1).

The Site, is located in Section 26, Township 4 North, Range 4 East of the Gila and Salt River Meridian, Maricopa County, Arizona within the City of Scottsdale, Arizona. The Site is located North of Henkel Way, and East of Scottsdale Road, Scottsdale, Arizona 85255 (Portion of APN 215-05-004A & 215-05-006). The Site is bound on the south by Henkel Way and Henkel Building, on the east by a vacant parcel, on the north by a vacant parcel, and on the west by a vacant parcel. See Appendix A for a Vicinity Map.

The Site is zoned PRC. The Site currently exists as a vacant un-developed parcel. The intent of this project is to construct an approximate 187,000 SF Senior Living Center, including new site utility, drainage, and circulatory infrastructure.

2. Site Description

Existing

The Site currently exists as a vacant un-developed parcel. (See Appendix C for Aerial Photograph of Site) The existing topography slopes from north to south at approximately 3% percent. In addition, adjacent roadways, Henkel Way (south), and Private Drive (east), are, or will be, fully improved with curb, gutter, and sidewalk.

Federal Emergency Management Agency (FEMA) Designation

According to the current FEMA Flood Insurance Rate Map # 04013C1320L, dated October 16, 2013 (Ref. 2), and LOMR Case 20-09-0698P (Ref. 3) the site is located within Zone "X" floodplain designation. Zone "X" is defined as follows:

> "Area of 500-year flood; areas of 100-year flood with an average depth of less than 1-ft or with drainage areas less than 1 square mile; and area protected by levees from 100-year flood.."

Refer to the Current Flood Insurance Rate Map and LOMR in Appendix B.

Proposed

The Site is proposed as an approximate 187,000 SF Senior Living Center, including new site utility, drainage, and circulatory infrastructure.

3. Existing Drainage Conditions – Offsite

The site is not considered to be affected by offsite storm water from offsite areas. Based on Site Topographic Mapping, and the One Scottsdale Infrastructure Roadway Drainage Report (Ref. 4), which also references the One Scottsdale Master Drainage Study (Appendix G), existing grading, and infrastructure that will be in place prior to development of the site mitigates any drainage that would possibly impact the site. Henkel Way has an existing 54" storm drain that conveys storm water to the ADOT outfall. In addition, the private drive to the east that will be constructed prior to the site, contains storm drain systems that tie to the 54" storm drain in Henkel Way. These systems restrict offsite flow from getting to the site. In addition, per Ref. 4, these storm drain systems are designed to handle the storm water generated from the Site. It is only required that first flush storm water be treated prior to entering the offsite storm drain systems.

4. ***Existing Drainage Conditions – Onsite***

Referring to the Aerial Photograph in Appendix C, the Site drains from north to south. The site does not contain any washes. The site does contain a portion of an existing temporary basin. This basin will be removed as part of the site development and the Private Drive to the East's construction. A berm currently exists on the north side of the site which keeps flow from the north to enter the site. Drainage on the west side of the site is maintained in a sheet flow pattern and does not enter the site.

5. ***Proposed Drainage Conditions***

The proposed Site generally drains from north to south, with building roof drains directing storm water to the onsite drives. The Site's paved areas are designed to direct flow to catch basins. Per Ref. 4 it is stated that the storm water placed into the existing storm drain systems east and south of the site require retention or treatment of the first flush storm. It is proposed that FloGuard treatment filters be placed on the storm drain inlets. This will treat the storm water prior to it entering the offsite storm drain systems. Refer to Appendix D for Onsite Drainage Map.

Based on NOAA14 and Ref. 1, the site's 100 yr precipitation value is 2.30 inches. First Flush precipitation rate is 0.5 inches. For required first flush flow rates refer to Appendix E. Note that the site is proposing filters on the onsite inlets, so site retention should not be required,

On-site first flush flows have been calculated using the Rational Method, as established in Ref. 1. The calculations determined the amount of flow generated on-site and directly to the catch basins. Drainage basins were determined based on the preliminary grading plans, and are shown on the Onsite Drainage Map in Appendix D.

For the purposes of this report, a minimum time of concentration of 10 minutes was used. Refer to Appendix D for the onsite rational method calculations.

Weir Calculations were used to determined catch basin sizes. Refer to Appendix D for the Weir calculations. Catch basins shall be designed with a 6" max ponding, with overflows set at the ponding elevation or a max of 3-ft in open space low points.

A underground parking garage is proposed as part of this project. Stormwater that will captured at the inlet of the garage is proposed to be pumped to the drive aisle where it will drain to onsite catch basin that have filtered intels. Exact tank, filtration and pump systems will be determined during final design.

The finished floor for the proposed building onsite is proposed at 1625.00. The ultimate outfall is located at the SEC of the site with an adjacent curb elevation of 1618.10. Therefore, the proposed building is elevated adequately above the outfall.

6. Conclusions

The following is a summary of the One Scottsdale Preliminary Drainage Report.

- The site currently lies within "Zone X" floodplain designation.
- All onsite flow will be directed away from the buildings, will be filtered and discharged to the existing offsite storm drain infrastructure.
- Unit roof tops will drain to the front of the units and into the paved areas.
- The project will treat the first flush storm water.
- Finished Floors are elevated 14-inches above the ultimate site outfall.

7. References

1. City of Scottsdale, *Design Standards and Policies Manual,* 2018.

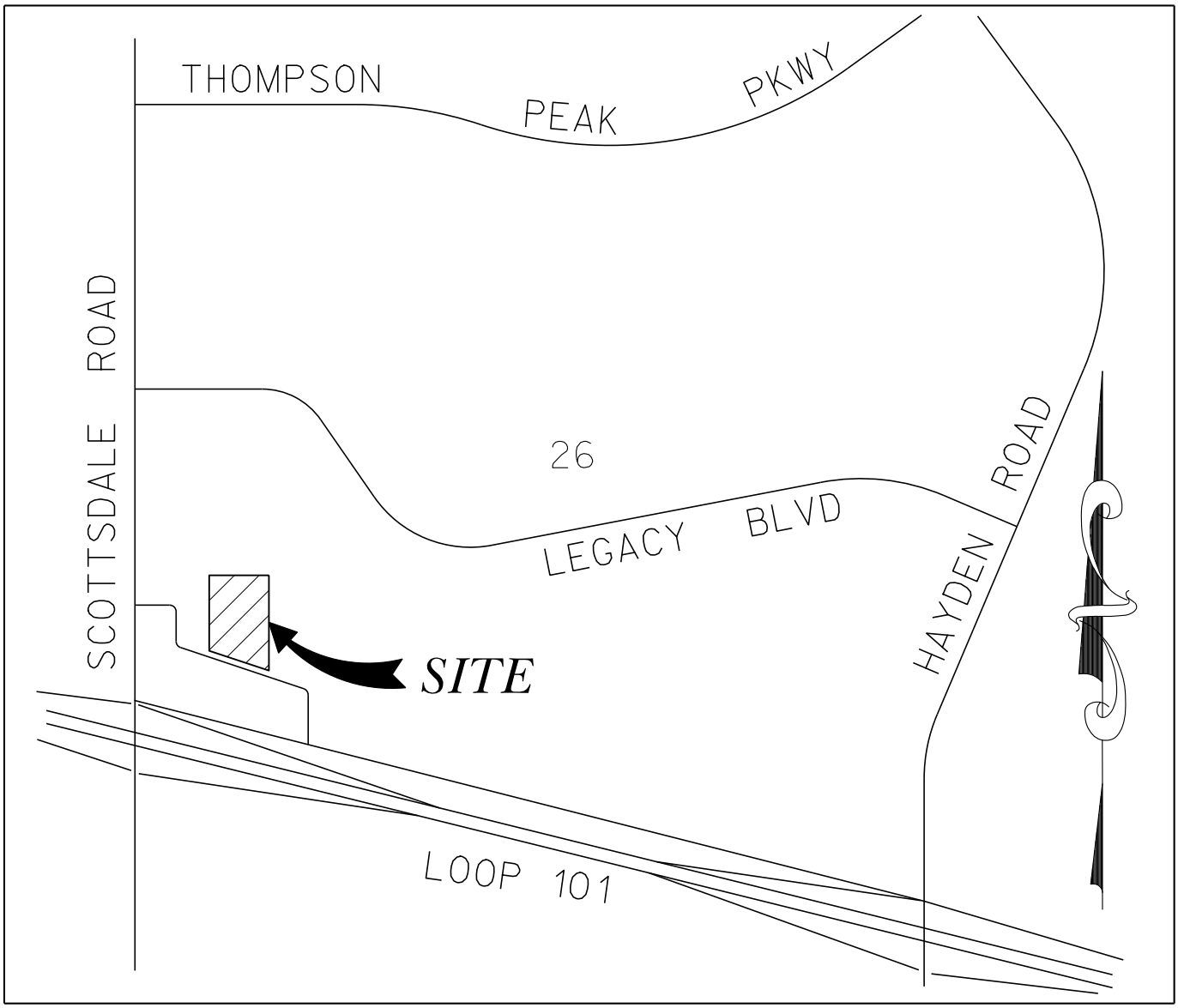
2. Federal Emergency Management Agency, Flood Insurance Rate Maps for Maricopa County Arizona, and Incorporated Area, Map Number 04013C1320L, dated October 16, 2013.

3. Federal Emergency Management Agency, LOMR Case 20-09-0698P, dated January 4, 2021.

4. One Scottsdale Infrastructure Roadway Drainage Report, Wood Patel, April 2022.

APPENDIX A

Vicinity Map



VICINITY MAP

N.T.S.

APPENDIX B

Current FIRM Map & LOMR

NOTES TO USERS

This map is for use in administering the Nation Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Arizona State Plane Central zone (FIPSZONE 0202). The **horizontal datum** was NAD 83 HARN, GRS1980 spheroid. Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988 (NAVD 88). These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. Map users wishing to obtain flood elevations referenced to the National Geodetic Vertical Datum of 1929 (NGVD 29) may use the following Maricopa County website application: http://www.fcd.maricopa.gov/Maps/gismaps/apps/gdacs/application/index.cfm

This web tool allows users to obtain point-specific datum conversion values by zooming in and hovering over a VERTCON checkbox on the layers menu on the left side of the screen. The VERTCON grid referenced in this web application was also used to convert existing flood elevations from NGVD 29 to NAVD 88.

To obtain current elevation, description, and/or location information for National Geodetic Survey bench marks shown on this map, please contact the Information Services Branch of the National Geodetic Survey at (301) 713-3242, or visit its website at http://www.ngs.noaa.gov. To obtain information about Geodetic Densification and Cadastral Survey bench marks produced by the Maricopa County Department of Transportation, please visit the Flood Control District of Maricopa County website at:
http://www.fcd.maricopa.gov/Maps/gismaps/apps/gdacs/application/index.cfm.

Base map information shown on this FIRM was derived from multiple sources. Aerial imagery was provided in digital format by the Maricopa County Department of Public Works, Flood Control District. The imagery is dated October 2009 to November 2009. Additional National Agricultural Imagery Program (NAIP) imagery was provided by the Arizona State Land Department (ALRIS) and is dated 2007. The coordinate system used for the production of the digital FIRM is State Plane Arizona Central NAD83 HARN, International Feet.

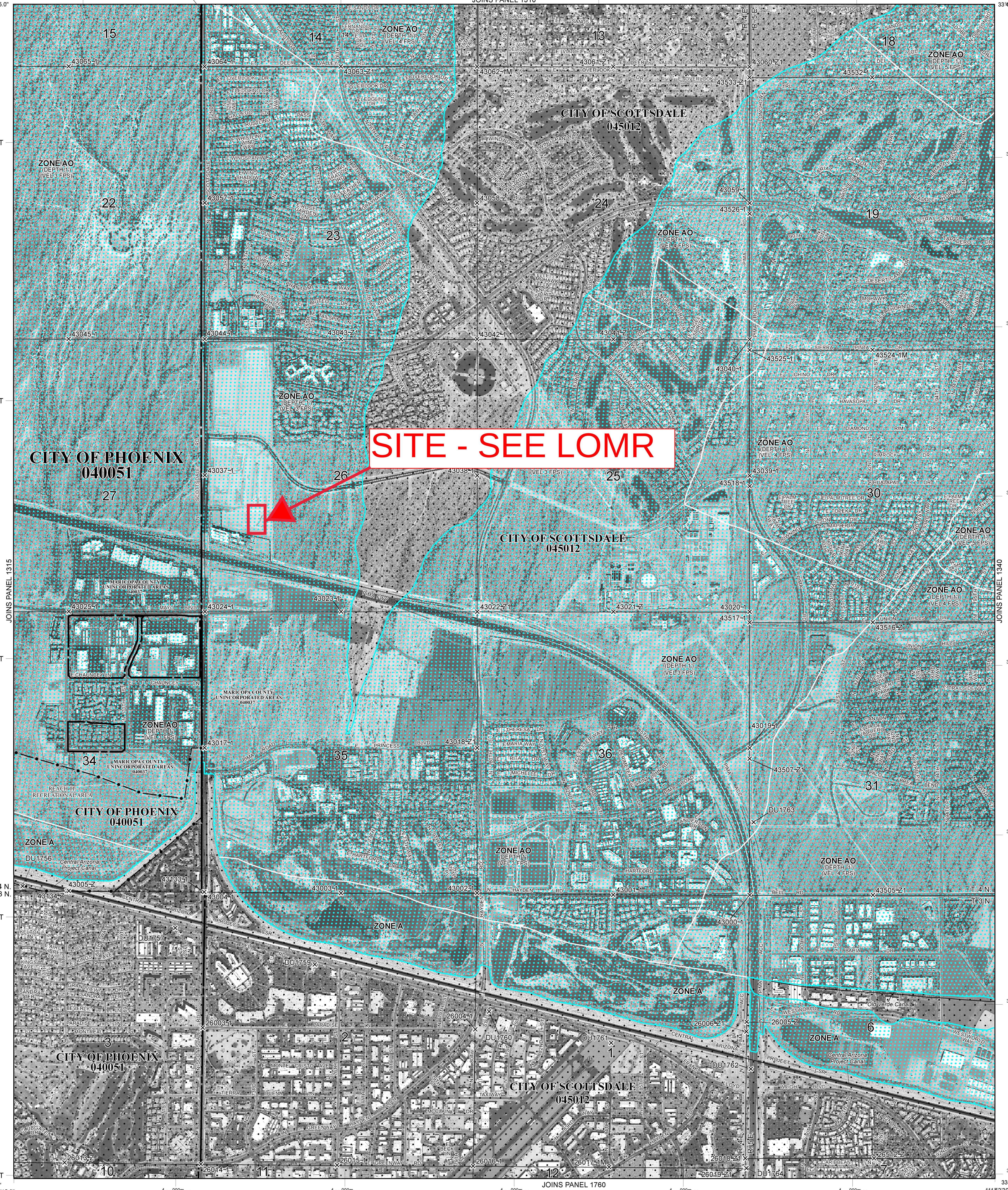
The **profile base line** depicted on this map represents the hydraulic modeling baselines that match flood profiles in the FIS report. As a result of improved topographic data, the profile base line, in some cases, may deviate significantly from the channel centerline or appear outside the SFHA.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community, as well as a listing of the panels on which each community is located.

For Information on available products associated with this FIRM, visit the **FEMA Map Service Center (MSC)** website at http://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, or digital versions of this map. Many of these products can be ordered or obtained directly from the MSC website.

If you have **questions about this map,** how to order products, or the National Flood Insurance Program in general, please call the **FEMA Map Information eXchange (FMIX)** at **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/.



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	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.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

	1% annual chance floodplain boundary
	0.2% annual chance floodplain boundary
	Floodway boundary
	Zone D boundary
	CBRS and OPA boundary
	Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
~~ 513 ~~~~	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

(A)———(A)	Cross section line
(23)- - - - -(23)	Transect line
97°07'30", 32°22'30"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
4275000mN	1000-meter Universal Transverse Mercator grid ticks, zone 12
6000000 M	5000-foot grid ticks: Arizona State Plane coordinate system, central zone (FIPSZONE 0202), Transverse Mercator
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
• M1.5	River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
April 15, 1988
EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
December 3, 1993 September 30, 1995 July 19, 2001 September 30, 2005
October 16, 2013 –to add base flood elevation, to add special flood hazard areas, to incorporate previously issued letters of map revision, to add roads and road names, to update corporate limits, to change floodway, to advance suffix, to change base flood elevations, and to add floodway.

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 1000'
500 0 1000 2000 FEET
300 0 300 600 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 1320L

FIRM
FLOOD INSURANCE RATE MAP
MARICOPA COUNTY, ARIZONA
AND INCORPORATED AREAS

PANEL 1320 OF 4425
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
MARICOPA COUNTY	040037	1320	L
PHOENIX, CITY OF	040051	1320	L
SCOTTSDALE, CITY OF	045012	1320	L

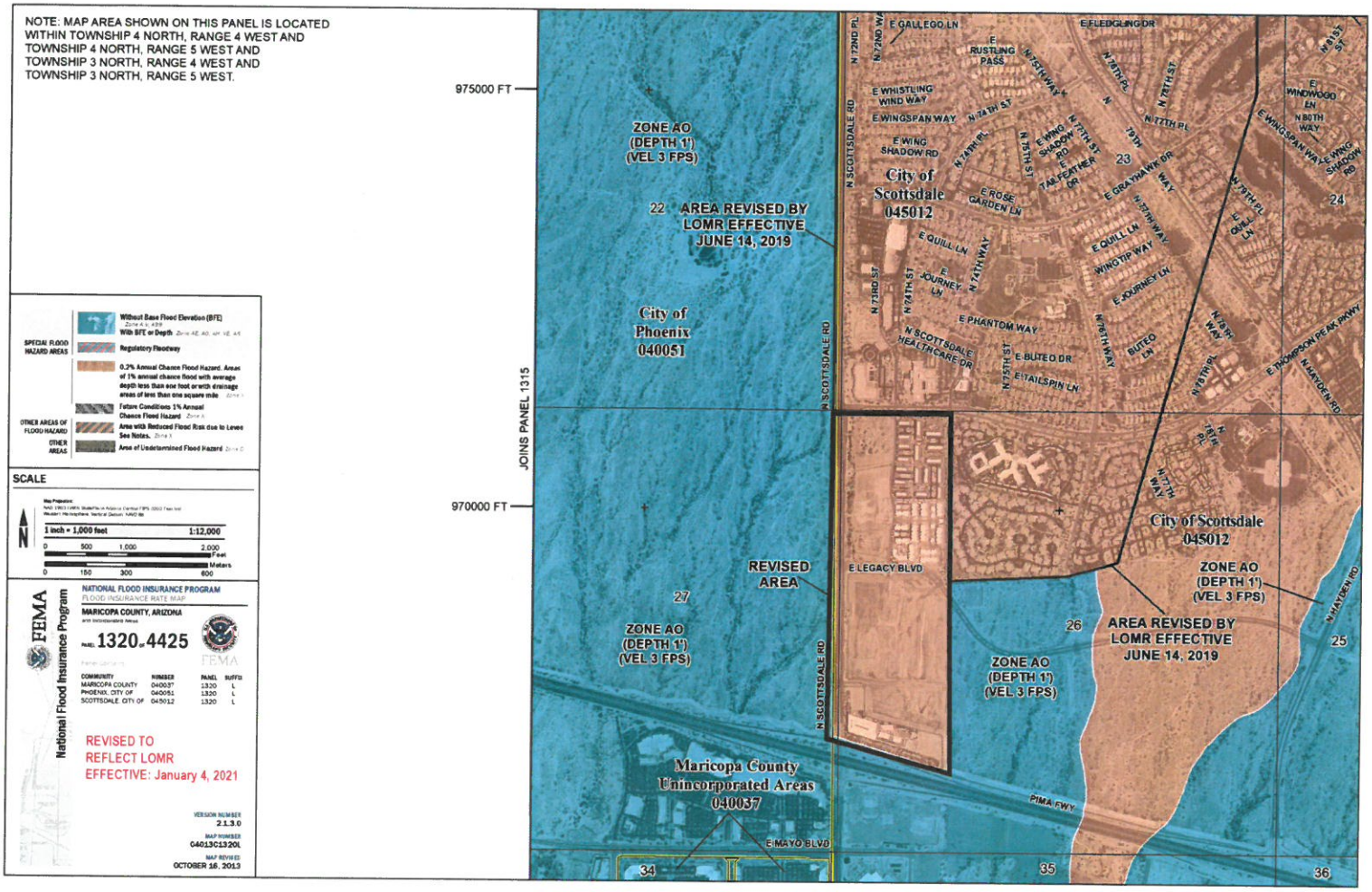
Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
04013C1320L

MAP REVISED
OCTOBER 16, 2013

Federal Emergency Management Agency

NOTE: MAP AREA SHOWN ON THIS PANEL IS LOCATED WITHIN TOWNSHIP 4 NORTH, RANGE 4 WEST AND TOWNSHIP 4 NORTH, RANGE 5 WEST AND TOWNSHIP 3 NORTH, RANGE 4 WEST AND TOWNSHIP 3 NORTH, RANGE 5 WEST.



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
- 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

OTHER AREAS OF FLOOD HAZARD
- Area with Reduced Flood Risk due to Levee See Notes. Zone X

OTHER AREAS
- Area of Undetermined Flood Hazard Zone D

SCALE

1 inch = 1,000 feet 1:12,000

0 500 1,000 2,000 Feet

0 150 300 600 Meters

FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

MARICOPA COUNTY, ARIZONA and Incorporated Areas

PANEL 1320 OF 4425

COMMUNITY	NUMBER	PANEL	SUFFIX
MARICOPA COUNTY	040037	1320	L
PHOENIX, CITY OF	040051	1320	L
SCOTTSDALE, CITY OF	045012	1320	L

REVISED TO REFLECT LOMR EFFECTIVE: January 4, 2021

VERSION NUMBER 2.1.3.0

MAP NUMBER 04013C1320L

MAP REVISED OCTOBER 16, 2013

Federal Emergency Management Agency

Washington, D.C. 20472

LETTER OF MAP REVISION DETERMINATION DOCUMENT

COMMUNITY AND REVISION INFORMATION		PROJECT DESCRIPTION	BASIS OF REQUEST
COMMUNITY	City of Scottsdale Maricopa County Arizona	NO PROJECT	HYDRAULIC ANALYSIS ALLUVIAL FAN ANALYSIS UPDATED TOPOGRAPHIC DATA
	COMMUNITY NO.: 045012		
IDENTIFIER	One Scottsdale	APPROXIMATE LATITUDE & LONGITUDE: 33.667, -111.925 SOURCE: USGS QUANDRANGLE DATUM: NAD 83	

ANNOTATED MAPPING ENCLOSURES	ANNOTATED STUDY ENCLOSURES
TYPE: FIRM* NO.: 04013C1320L DATE: October 16, 2013	NO REVISION TO THE FLOOD INSURANCE STUDY REPORT

Enclosures reflect changes to flooding sources affected by this revision.
* FIRM - Flood Insurance Rate Map

FLOODING SOURCE(S) & REVISED REACH(ES)

Rawhide Wash – Area bounded to the west by North Scottsdale Road, to the north by East Thompson Peak Parkway, to the south by Pima Freeway, and approximately 2,300 feet northeast of the intersection of North Scottsdale Road and Pima Freeway.

SUMMARY OF REVISIONS

Flooding Source	Effective Flooding	Revised Flooding	Increases	Decreases
Rawhide Wash	Zone AO	Zone X (shaded)	NONE	YES
	Depth	No Depth	NONE	YES

DETERMINATION

This document provides the determination from the Department of Homeland Security's Federal Emergency Management Agency (FEMA) regarding a request for a Letter of Map Revision (LOMR) for the area described above. Using the information submitted, we have determined that a revision to the flood hazards depicted in the Flood Insurance Study (FIS) report and/or National Flood Insurance Program (NFIP) map is warranted. This document revises the effective NFIP map, as indicated in the attached documentation. Please use the enclosed annotated map panels revised by this LOMR for floodplain management purposes and for all flood insurance policies and renewals in your community.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Mapping and Insurance eXchange toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 3601 Eisenhower Avenue, Suite 500, Alexandria, VA 22304-6426. Additional Information about the NFIP is available on our website at https://www.fema.gov/flood-insurance.

Patrick "Rick" F. Sacbibit, P.E., Branch Chief
Engineering Services Branch
Federal Insurance and Mitigation Administration

Federal Emergency Management Agency

Washington, D.C. 20472

LETTER OF MAP REVISION
DETERMINATION DOCUMENT (CONTINUED)

OTHER COMMUNITIES AFFECTED BY THIS REVISION

CID Number: 040051 **Name:** City of Phoenix, Arizona

AFFECTED MAP PANELS	AFFECTED PORTIONS OF THE FLOOD INSURANCE STUDY REPORT
TYPE: FIRM* NO.: 04013C1320L DATE: October 16, 2013	NO REVISION TO THE FLOOD INSURANCE STUDY REPORT

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Mapping and Insurance eXchange toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 3601 Eisenhower Avenue, Suite 500, Alexandria, VA 22304-6426. Additional Information about the NFIP is available on our website at https://www.fema.gov/flood-insurance.

Patrick "Rick" F. Sacbibit, P.E., Branch Chief
Engineering Services Branch
Federal Insurance and Mitigation Administration

Federal Emergency Management Agency
Washington, D.C. 20472

LETTER OF MAP REVISION
DETERMINATION DOCUMENT (CONTINUED)

COMMUNITY INFORMATION

APPLICABLE NFIP REGULATIONS/COMMUNITY OBLIGATION

We have made this determination pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (P.L. 93-234) and in accordance with the National Flood Insurance Act of 1968, as amended (Title XIII of the Housing and Urban Development Act of 1968, P.L. 90-448), 42 U.S.C. 4001-4128, and 44 CFR Part 65. Pursuant to Section 1361 of the National Flood Insurance Act of 1968, as amended, communities participating in the NFIP are required to adopt and enforce floodplain management regulations that meet or exceed NFIP criteria. These criteria, including adoption of the FIS report and FIRM, and the modifications made by this LOMR, are the minimum requirements for continued NFIP participation and do not supersede more stringent State/Commonwealth or local requirements to which the regulations apply.

COMMUNITY REMINDERS

We based this determination on the 1-percent-annual-chance flood discharges computed in the FIS for your community without considering subsequent changes in watershed characteristics that could increase flood discharges. Future development of projects upstream could cause increased flood discharges, which could cause increased flood hazards. A comprehensive restudy of your community's flood hazards would consider the cumulative effects of development on flood discharges subsequent to the publication of the FIS report for your community and could, therefore, establish greater flood hazards in this area.

Your community must regulate all proposed floodplain development and ensure that permits required by Federal and/or State/Commonwealth law have been obtained. State/Commonwealth or community officials, based on knowledge of local conditions and in the interest of safety, may set higher standards for construction or may limit development in floodplain areas. If your State/Commonwealth or community has adopted more restrictive or comprehensive floodplain management criteria, those criteria take precedence over the minimum NFIP requirements.

We will not print and distribute this LOMR to primary users, such as local insurance agents or mortgage lenders; instead, the community will serve as a repository for the new data. We encourage you to disseminate the information in this LOMR by preparing a news release for publication in your community's newspaper that describes the revision and explains how your community will provide the data and help interpret the NFIP maps. In that way, interested persons, such as property owners, insurance agents, and mortgage lenders, can benefit from the information.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Mapping and Insurance eXchange toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 3601 Eisenhower Avenue, Suite 500, Alexandria, VA 22304-6426. Additional Information about the NFIP is available on our website at https://www.fema.gov/flood-insurance.

Patrick "Rick" F. Sacbibit, P.E., Branch Chief
Engineering Services Branch
Federal Insurance and Mitigation Administration

Federal Emergency Management Agency

Washington, D.C. 20472

LETTER OF MAP REVISION
DETERMINATION DOCUMENT (CONTINUED)

COMMUNITY INFORMATION (CONTINUED)

We have designated a Consultation Coordination Officer (CCO) to assist your community. The CCO will be the primary liaison between your community and FEMA. For information regarding your CCO, please contact:

Ms. Juliette Hayes
Director, Mitigation Division
Federal Emergency Management Agency, Region IX
1111 Broadway, Suite 1200
Oakland, CA 94607-4052
(510) 627-7211

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Mapping and Insurance eXchange toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 3601 Eisenhower Avenue, Suite 500, Alexandria, VA 22304-6426. Additional Information about the NFIP is available on our website at https://www.fema.gov/flood-insurance.

Patrick "Rick" F. Sacbibit, P.E., Branch Chief
Engineering Services Branch
Federal Insurance and Mitigation Administration

Federal Emergency Management Agency

Washington, D.C. 20472

LETTER OF MAP REVISION
DETERMINATION DOCUMENT (CONTINUED)

PUBLIC NOTIFICATION OF REVISION

A notice of changes will be published in the *Federal Register*. This information also will be published in your local newspaper on or about the dates listed below, and through FEMA's Flood Hazard Mapping website at https://www.floodmaps.fema.gov/fhm/bfe_status/bfe_main.asp

LOCAL NEWSPAPER

Name: *Arizona Business Gazette*
Dates: August 27, 2020 and September 3, 2020

Within 90 days of the second publication in the local newspaper, any interested party may request that we reconsider this determination. Any request for reconsideration must be based on scientific or technical data. Therefore, this letter will be effective only after the 90-day appeal period has elapsed and we have resolved any appeals that we receive during this appeal period. Until this LOMR is effective, the revised flood hazard determination presented in this LOMR may be changed.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Mapping and Insurance eXchange toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 3601 Eisenhower Avenue, Suite 500, Alexandria, VA 22304-6426. Additional Information about the NFIP is available on our website at https://www.fema.gov/flood-insurance.

Patrick "Rick" F. Sacbibit, P.E., Branch Chief
Engineering Services Branch
Federal Insurance and Mitigation Administration

APPENDIX C

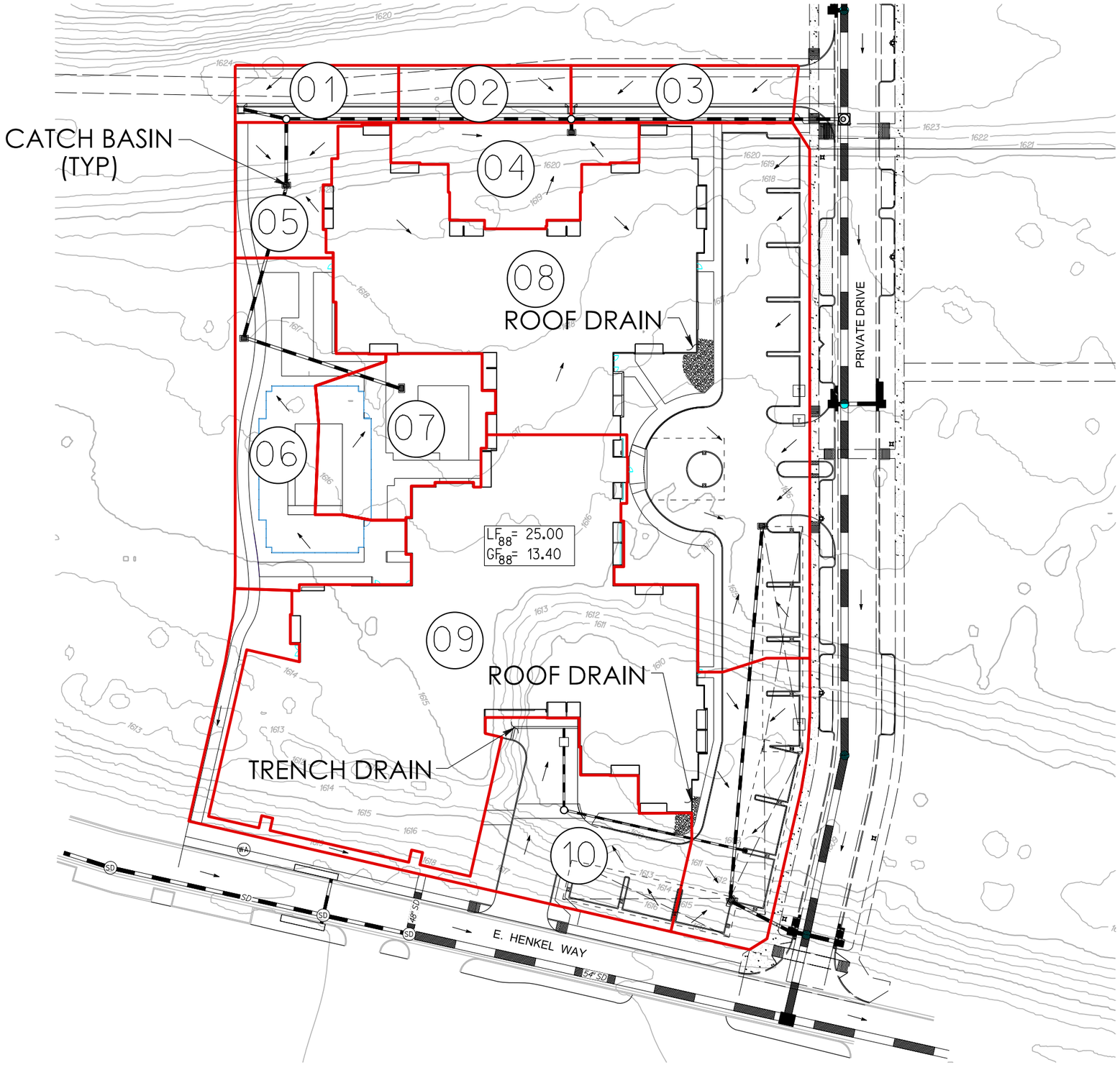
Aerial Photograph of Site

Aerial Image

8/8/2022 1:13:56 PM

APPENDIX D

Onsite Drainage Map



3engineering
planning civil engineering surveying

3 ENGINEERING, LLC
6370 E. THOMAS ROAD, SUITE 200 SCOTTSDALE, ARIZONA 85251
PHONE: (602) 334-4487 FAX: (602) 496-3200
WWW.3ENGINEERING.COM

PROJECT NO. 5246
DATE: 8/19/22

ONE SCOTTSDALE
SCOTTSDALE, ARIZONA

DRAINAGE MAP

1"=60'

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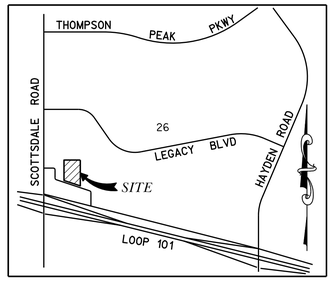
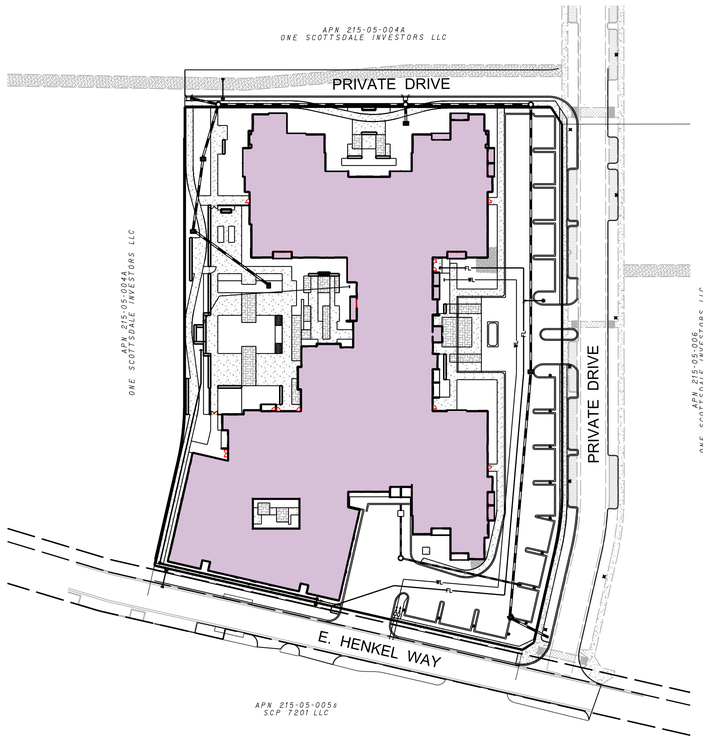
C:\My Securitsync\Projects_5000\5246_One Scottsdale\Reports\Drainage Report\Prelim\5246_DR_Map.dgn

PRELIMINARY IMPROVEMENT PLANS
FOR
"ONE SCOTTSDALE"
SCOTTSDALE, ARIZONA

LOCATED IN A PORTION OF SECTION 11, TOWNSHIP 3 NORTH, RANGE 4 EAST
OF THE GILA AND SALT RIVER MERIDIAN, MARICOPA COUNTY, ARIZONA



VICINITY MAP
N.T.S.



SITE MAP
N.T.S.

SHEET LEGEND:

2 PRELIMINARY GRADING PLAN

3 PRELIMINARY UTILITY PLAN

LEGAL DESCRIPTION:

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

PARCEL ONE:

A PORTION OF PARCEL 2 AND PARCEL 4, ONE SCOTTSDALE, RECORDED IN BOOK 971, PAGE 6, MARICOPA COUNTY RECORDS (MCR), LYING WITHIN SECTION 26, TOWNSHIP 4 NORTH, RANGE 4 EAST, OF THE GILA AND SALT RIVER MERIDIAN, MARICOPA COUNTY, ARIZONA, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE SOUTHEAST CORNER OF LEGACY BOULEVARD, RECORDED IN BOOK 1034, PAGE 5, MCR, FROM WHICH THE SOUTHEAST CORNER OF SAID PARCEL 2, BEARS SOUTH 00°02'11" EAST (BASIS OF BEARING), A DISTANCE OF 1306.46 FEET;

THENCE ALONG THE EAST LINE OF SAID PARCEL 2, SOUTH 00°02'11" EAST, A DISTANCE OF 1028.28 FEET;

THENCE LEAVING SAID EAST LINE, SOUTH 89°57'49" WEST, A DISTANCE OF 415.99 FEET;

THENCE SOUTH 00°02'08" EAST, A DISTANCE OF 310.52 FEET, TO A POINT OF INTERSECTION WITH A NON-TANGENT CURVE;

THENCE SOUTHERLY ALONG SAID NON-TANGENT CURVE TO THE RIGHT, HAVING A RADIUS OF 186.00 FEET, CONCAVE WESTERLY, WHOSE RADIUS BEARS SOUTH 89°57'49" WEST, THROUGH A CENTRAL ANGLE OF 12°56'43", A DISTANCE OF 42.02 FEET, TO THE CURVES END;

THENCE SOUTH 12°54'32" WEST, A DISTANCE OF 84.84 FEET; THENCE SOUTH 57°54'25" WEST, A DISTANCE OF 11.31 FEET; THENCE NORTH 77°05'41" WEST, A DISTANCE OF 316.71 FEET;

THENCE NORTH 12°54'32" EAST, A DISTANCE OF 90.11 FEET, TO A POINT OF INTERSECTION WITH A NON-TANGENT CURVE;

THENCE NORTHERLY ALONG SAID NON-TANGENT CURVE TO THE LEFT, HAVING A RADIUS OF 211.99 FEET, CONCAVE WESTERLY, WHOSE RADIUS BEARS NORTH 77°05'26" WEST, THROUGH A CENTRAL ANGLE OF 12°54'34", A DISTANCE OF 47.76 FEET, TO A POINT OF INTERSECTION WITH A NON-TANGENT LINE;

THENCE NORTH 00°00'03" EAST, A DISTANCE OF 249.56 FEET;

THENCE SOUTH 89°58'33" EAST, A DISTANCE OF 306.87 FEET;

THENCE SOUTH 33°01'29" EAST, A DISTANCE OF 17.24 FEET, TO THE POINT OF BEGINNING.

PARCEL TWO:

A NON-EXCLUSIVE EASEMENT FOR REASONABLE VEHICULAR AND PEDESTRIAN ACCESS, INGRESS AND EGRESS AS MORE PARTICULARLY DESCRIBED IN THAT CERTAIN "RECIPROCAL ACCESS EASEMENT AGREEMENT" RECORDED NOVEMBER 9, 2006 AS 2006-1482868 OF OFFICIAL RECORDS.

APPLICANT:

AUGUSTA DEVELOPEMENT, LLC
34522 N. SCOTTSDALE ROAD #120-638
SCOTTSDALE, AZ 85266

CONTACT: BO NICKOLOFF
PHONE: (651) 324-9492

ENGINEER:

3 ENGINEERING, L.L.C.
6370 E. THOMAS ROAD, SUITE 200
SCOTTSDALE, ARIZONA 85251

CONTACT: MATTHEW J. MANCINI, P.E.
PHONE: (602) 334-4387

PROJECT DESCRIPTION:

120 UNIT SENIOR LIVING CENTER

ZONING (EXISTING/PROPOSED):

PRC

UTILITIES:

TELEPHONE	COX/CENTURYLINK
ELECTRIC	APS
GAS	SOUTHWEST GAS
CABLE TV	COX
SEWER/WATER	CITY OF SCOTTSDALE
POLICE	CITY OF SCOTTSDALE
FIRE	CITY OF SCOTTSDALE
REFUSE	CITY OF SCOTTSDALE
SANITATION	CITY OF SCOTTSDALE

BENCHMARK:

SW COR SEC 26
BRASS CAP IN HANDHOLE GDACS PNT NO. 43024-1
EL.=1588.31 (NAVD '88)

BASIS OF BEARING:

THE WEST LINE OF THE NORTHWEST QUARTER OF SECTION 26, TOWNSHIP 4 NORTH, RANGE 4 EAST USING A BEARING OF NORTH 00 DEGREES 01 MINUTES 45 SECONDS WEST. (PER BK 971, PG 6)

SITE DATA:

SITE AREA:	3.098 AC
BUILDING AREA:	62,840 SF±
ZONING:	PRC
PARCEL NUMBER:	PORTION OF 215-05-004A & 215-05-006

CURRENT FLOOD INSURANCE RATE MAP (FIRM) INFORMATION:

COMMUNITY NUMBER	PANEL NUMBER	PANEL DATE	SUFFIX	FIRM DATE	FIRM ZONE	BASE FLOOD ELEVATION
045012	1320	OCTOBER 16, 2013	L	OCTOBER 16, 2013	X-SHADED	N/A

LOMR 20-09-0698P DATED JANUARY 4, 2021

FLOOD ZONE INFORMATION:

THIS SITE IS LOCATED IN ZONE "X" (SHADED) PER "F.E.M.A." FLOOD MAP NO. 04013C1320L, DATED: OCTOBER 16, 2013. ZONE "X" (SHADED) and LOMR 20-09-0698P, EFFECTIVE DATED: JANUARY 4, 2021: 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.

LEGEND

	INDICATES PROPERTY / BOUNDARY LINE
1560	INDICATES EXISTING CONTOUR ELEVATION
58	INDICATES PROPOSED CONTOUR ELEVATION
TC: 59.13 G: 58.64	INDICATES EXISTING TOP OF CURB ELEVATION INDICATES EXISTING GUTTER ELEVATION
+ 62.52	INDICATES EXISTING GROUND ELEVATION
+ P: 60.11	INDICATES EXISTING PAVEMENT ELEVATION
+ C: 56.69	INDICATES EXISTING CONCRETE ELEVATION
15.9	INDICATES PROPOSED GROUND ELEVATION
1%	INDICATES DIRECTION OF FLOW & SLOPE
GB	INDICATES GRADE BREAK
P=	INDICATES PROPOSED PAVEMENT ELEVATION
C=	INDICATES PROPOSED TOP OF CONC. ELEVATION
G=	INDICATES PROPOSED GUTTER ELEVATION
LF_{88}=	INDICATES LOWEST FINISH FLOOR ELEVATION
W	INDICATES PROPOSED WATERLINE
S	INDICATES PROPOSED SEWERLINE
	INDICATES PROPOSED METER
	INDICATES PROPOSED SEWER CLEANOUT
	INDICATES PROPOSED CATCH BASIN
	INDICATES PROPOSED STORM DRAIN PIPE
	INDICATES PROPOSED STORM DRAIN MANHOLE
	INDICATES PROPOSED FIRE HYDRANT
FH	INDICATES EXISTING FIRE HYDRANT
24" SD	INDICATES EXISTING STORM DRAIN PIPE
8" S	INDICATES EXISTING SEWER LINE & SIZE
12" W (ACP) WV	INDICATES EXISTING WATER LINE,VALVE & SIZE
E	INDICATES EXISTING BURIED ELECTRIC CONDUIT
G	INDICATES EXISTING GAS LINE
OHE	INDICATES EXISTING OVERHEAD ELECTRIC
PP	INDICATES EXISTING POWER POLE
LP	INDICATES EXISTING LIGHT POLE
ET	INDICATES EXISTING ELECTRIC TRANSFORMER
EB	INDICATES EXISTING ELECTRIC BOX
WM	INDICATES EXISTING WATER METER
BWV	INDICATES EXISTING BACKFLOW PREVENTER VALVE

INDEX OF SHEETS

SHEET NO.	DESCRIPTION
CP01	COVER SHEET
CP02	PRELIMINARY GRADING AND DRAINAGE PLAN
CP03	PRELIMINARY UTILITY PLAN

ARIZONA BLUE STAKE
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602-263-1100
1-800-782-5348
(OUTSIDE MARICOPA COUNTY)

ONE SCOTTSDALE
LEGACY BOULEVARD & SCOTTSDALE ROAD
PRELIMINARY IMPROVEMENT PLANS

Registered Professional Engineer
CERTIFICATE NO. 45652
MATTHEW J. MANCINI
9/13/22
Date Signed
ARIZONA, U.S.A.

EXPIRES: 12/31/2024

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surveying
civil engineering
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DATE: 9/13/22

PROJECT NO.
5246

SHEET NO.
CP101
1 of 3

555-PA-2022

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SCALE: 1"= 30'

0' 15' 30' 60'

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(OUTSIDE MARICOPA COUNTY)

SNOB3A38

ONE SCOTTSDALE

LEGACY BOULEVARD & SCOTTSDALE ROAD

PRELIMINARY GRADING PLAN

Registered Professional Engineer (Civil)
CERTIFICATE NO.
45652
MATTHEW J. MANCINI
9/13/22
Date Signed
ARIZONA, U.S.A.

EXPIRES: 12/31/2024

3 engineering
planning surveying civil engineering

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CAD TECH: EL DENTON
DESIGNER: M. MANCINI
ENGINEER: M. MANCINI

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DATE: 9/13/22

PROJECT NO.
5246

SHEET NO.
CP102
2 of 3

555-PA-2022

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APPENDIX E

Onsite Hydrologic & Hydraulic Calculations

NOAA Atlas 14, Volume 1, Version 5
Location name: Scottsdale, Arizona, USA*
Latitude: 33.6599°, Longitude: -111.9221°
Elevation: 1615.29 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	**0.196** (0.163-0.240)	**0.256** (0.215-0.314)	**0.346** (0.286-0.422)	**0.415** (0.342-0.505)	**0.507** (0.412-0.615)	**0.578** (0.463-0.696)	**0.651** (0.513-0.783)	**0.724** (0.561-0.869)	**0.822** (0.620-0.989)	**0.897** (0.664-1.08)
10-min	**0.299** (0.248-0.366)	**0.390** (0.327-0.478)	**0.526** (0.436-0.643)	**0.631** (0.520-0.769)	**0.772** (0.626-0.936)	**0.880** (0.705-1.06)	**0.991** (0.780-1.19)	**1.10** (0.853-1.32)	**1.25** (0.944-1.50)	**1.37** (1.01-1.65)
15-min	**0.370** (0.308-0.453)	**0.483** (0.405-0.592)	**0.652** (0.540-0.797)	**0.782** (0.645-0.952)	**0.957** (0.776-1.16)	**1.09** (0.874-1.31)	**1.23** (0.967-1.48)	**1.37** (1.06-1.64)	**1.55** (1.17-1.87)	**1.69** (1.25-2.04)
30-min	**0.498** (0.414-0.611)	**0.651** (0.545-0.798)	**0.878** (0.727-1.07)	**1.05** (0.868-1.28)	**1.29** (1.05-1.56)	**1.47** (1.18-1.77)	**1.66** (1.30-1.99)	**1.84** (1.43-2.21)	**2.09** (1.58-2.51)	**2.28** (1.69-2.75)
60-min	**0.617** (0.513-0.756)	**0.805** (0.674-0.987)	**1.09** (0.900-1.33)	**1.30** (1.07-1.59)	**1.60** (1.29-1.94)	**1.82** (1.46-2.19)	**2.05** (1.61-2.46)	**2.28** (1.76-2.73)	**2.59** (1.95-3.11)	**2.82** (2.09-3.40)
2-hr	**0.720** (0.606-0.864)	**0.931** (0.786-1.12)	**1.24** (1.04-1.48)	**1.48** (1.23-1.76)	**1.80** (1.48-2.14)	**2.04** (1.66-2.42)	**2.30** (1.83-2.71)	**2.55** (2.00-3.01)	**2.89** (2.21-3.41)	**3.16** (2.36-3.74)
3-hr	**0.794** (0.669-0.972)	**1.02** (0.859-1.25)	**1.33** (1.12-1.62)	**1.58** (1.31-1.91)	**1.92** (1.58-2.32)	**2.20** (1.78-2.64)	**2.48** (1.97-2.98)	**2.78** (2.17-3.33)	**3.19** (2.42-3.82)	**3.52** (2.61-4.22)
6-hr	**0.956** (0.822-1.14)	**1.21** (1.04-1.44)	**1.54** (1.32-1.82)	**1.81** (1.53-2.12)	**2.17** (1.81-2.54)	**2.45** (2.02-2.86)	**2.74** (2.23-3.19)	**3.04** (2.43-3.55)	**3.45** (2.68-4.02)	**3.77** (2.86-4.40)
12-hr	**1.08** (0.932-1.27)	**1.36** (1.17-1.60)	**1.72** (1.47-2.00)	**1.99** (1.70-2.33)	**2.37** (2.00-2.76)	**2.66** (2.22-3.09)	**2.96** (2.43-3.43)	**3.26** (2.65-3.78)	**3.66** (2.90-4.27)	**3.98** (3.09-4.66)
24-hr	**1.26** (1.10-1.46)	**1.60** (1.40-1.86)	**2.07** (1.80-2.40)	**2.44** (2.12-2.82)	**2.96** (2.55-3.42)	**3.37** (2.88-3.88)	**3.80** (3.21-4.39)	**4.25** (3.55-4.91)	**4.88** (4.00-5.64)	**5.37** (4.35-6.25)
2-day	**1.37** (1.19-1.58)	**1.74** (1.51-2.01)	**2.28** (1.97-2.63)	**2.71** (2.34-3.12)	**3.31** (2.83-3.81)	**3.78** (3.21-4.35)	**4.29** (3.60-4.95)	**4.81** (4.01-5.57)	**5.54** (4.54-6.44)	**6.13** (4.94-7.15)
3-day	**1.47** (1.28-1.69)	**1.87** (1.64-2.15)	**2.47** (2.15-2.83)	**2.95** (2.56-3.37)	**3.62** (3.13-4.14)	**4.17** (3.57-4.77)	**4.75** (4.03-5.45)	**5.36** (4.51-6.17)	**6.23** (5.15-7.19)	**6.93** (5.66-8.05)
4-day	**1.57** (1.38-1.79)	**2.00** (1.76-2.29)	**2.66** (2.33-3.03)	**3.18** (2.79-3.62)	**3.94** (3.43-4.48)	**4.55** (3.93-5.19)	**5.21** (4.46-5.95)	**5.92** (5.01-6.78)	**6.92** (5.77-7.95)	**7.74** (6.37-8.94)
7-day	**1.77** (1.55-2.03)	**2.27** (1.98-2.60)	**3.01** (2.63-3.44)	**3.61** (3.14-4.13)	**4.47** (3.87-5.11)	**5.18** (4.44-5.91)	**5.93** (5.04-6.79)	**6.74** (5.67-7.74)	**7.88** (6.54-9.10)	**8.82** (7.22-10.2)
10-day	**1.92** (1.69-2.20)	**2.46** (2.16-2.82)	**3.26** (2.86-3.73)	**3.91** (3.41-4.46)	**4.83** (4.18-5.50)	**5.57** (4.80-6.35)	**6.37** (5.43-7.27)	**7.21** (6.10-8.26)	**8.40** (7.00-9.67)	**9.38** (7.71-10.8)
20-day	**2.38** (2.10-2.72)	**3.07** (2.71-3.50)	**4.06** (3.57-4.62)	**4.82** (4.22-5.47)	**5.85** (5.10-6.64)	**6.65** (5.77-7.56)	**7.48** (6.44-8.52)	**8.32** (7.12-9.51)	**9.47** (8.02-10.9)	**10.4** (8.69-12.0)
30-day	**2.80** (2.46-3.19)	**3.61** (3.17-4.11)	**4.77** (4.18-5.41)	**5.66** (4.95-6.40)	**6.86** (5.97-7.77)	**7.78** (6.74-8.82)	**8.74** (7.53-9.91)	**9.72** (8.32-11.0)	**11.0** (9.36-12.6)	**12.1** (10.1-13.9)
45-day	**3.27** (2.89-3.71)	**4.22** (3.73-4.79)	**5.58** (4.92-6.31)	**6.59** (5.80-7.46)	**7.95** (6.95-8.99)	**8.97** (7.82-10.2)	**10.0** (8.68-11.4)	**11.1** (9.54-12.6)	**12.5** (10.7-14.4)	**13.6** (11.5-15.7)
60-day	**3.63** (3.22-4.11)	**4.70** (4.16-5.31)	**6.19** (5.47-6.98)	**7.29** (6.42-8.22)	**8.73** (7.66-9.85)	**9.81** (8.56-11.1)	**10.9** (9.47-12.3)	**12.0** (10.4-13.6)	**13.4** (11.5-15.3)	**14.5** (12.3-16.7)

[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.

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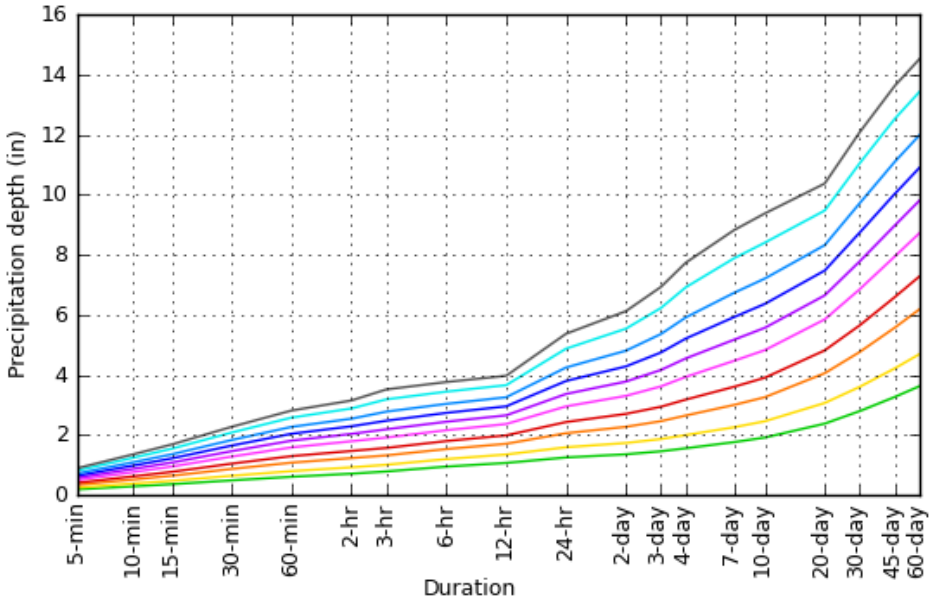
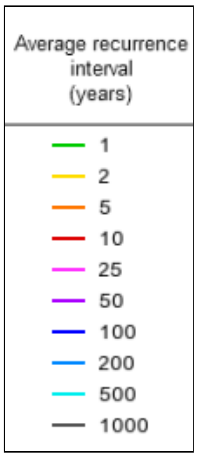
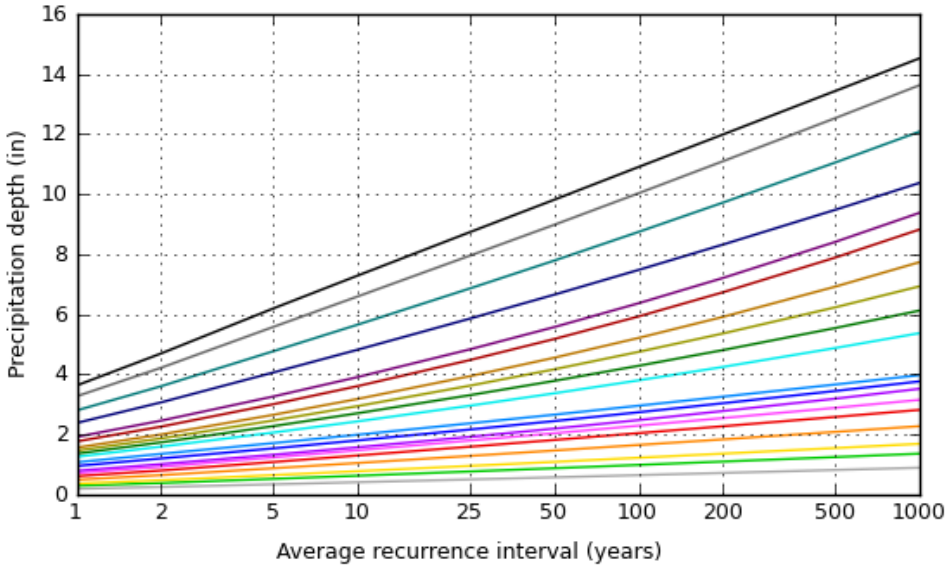
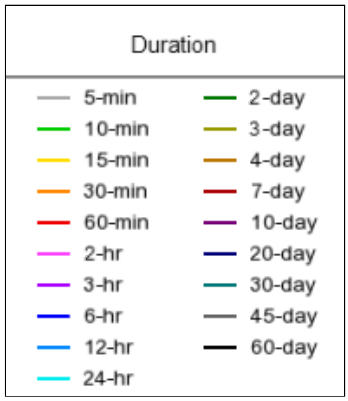
PF graphical

PDS-based depth-duration-frequency (DDF) curves
Latitude: 33.6599°, Longitude: -111.9221°









NOAA Atlas 14, Volume 1, Version 5

Created (GMT): Wed Jul 20 21:08:51 2022

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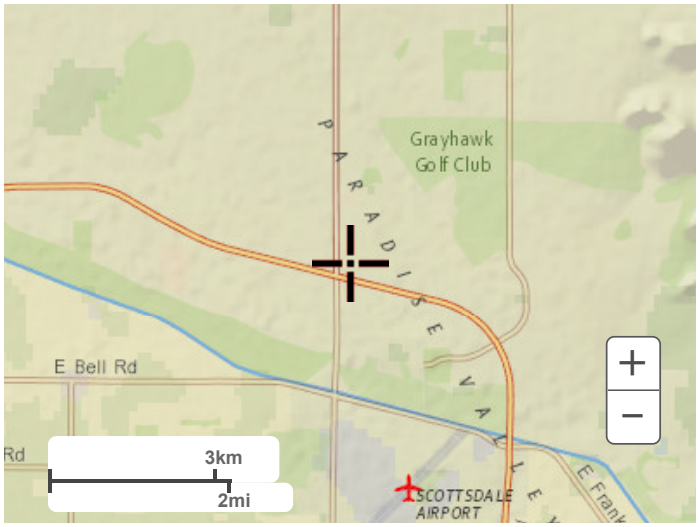
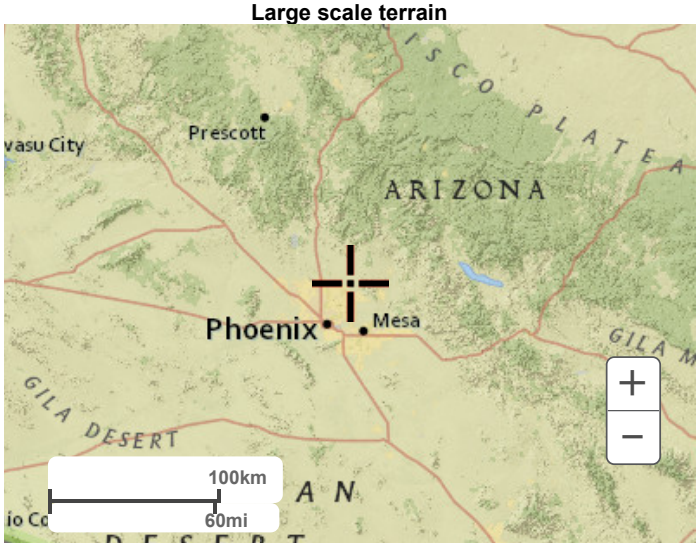
Maps & aerials

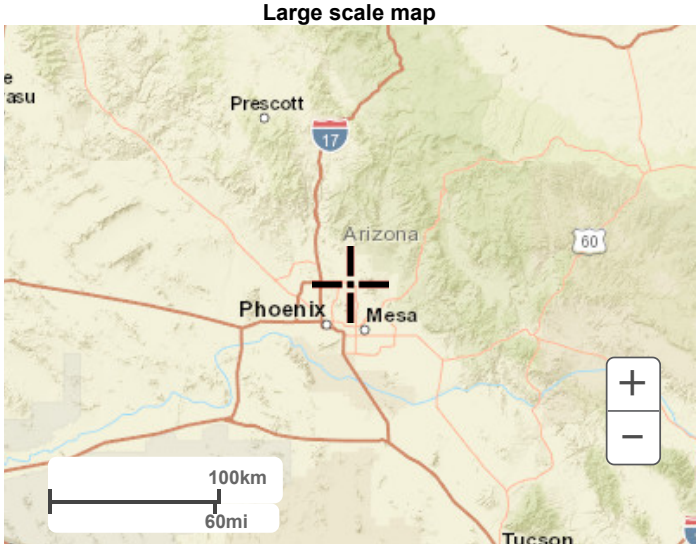
Small scale terrain



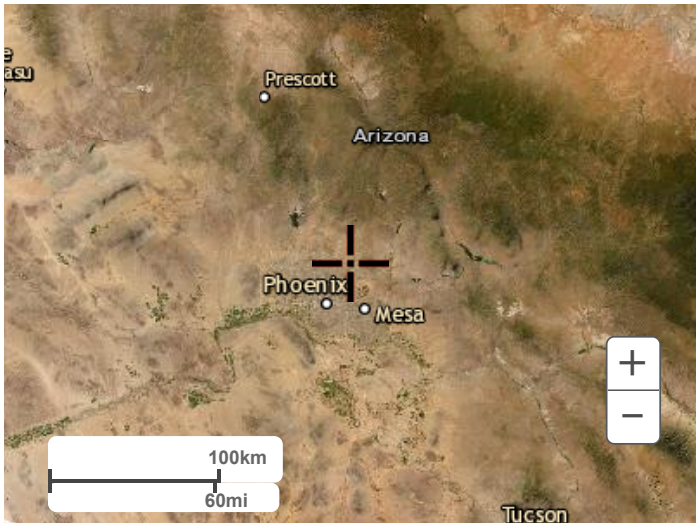
Large scale terrain



Large scale map



Large scale aerial



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National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

NOAA Atlas 14, Volume 1, Version 5
Location name: Scottsdale, Arizona, USA*
Latitude: 33.6599°, Longitude: -111.9221°
Elevation: 1615.29 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	**2.35** (1.96-2.88)	**3.07** (2.58-3.77)	**4.15** (3.43-5.06)	**4.98** (4.10-6.06)	**6.08** (4.94-7.38)	**6.94** (5.56-8.35)	**7.81** (6.16-9.40)	**8.69** (6.73-10.4)	**9.86** (7.44-11.9)	**10.8** (7.97-13.0)
10-min	**1.79** (1.49-2.20)	**2.34** (1.96-2.87)	**3.16** (2.62-3.86)	**3.79** (3.12-4.61)	**4.63** (3.76-5.62)	**5.28** (4.23-6.36)	**5.95** (4.68-7.15)	**6.61** (5.12-7.94)	**7.51** (5.66-9.02)	**8.19** (6.06-9.87)
15-min	**1.48** (1.23-1.81)	**1.93** (1.62-2.37)	**2.61** (2.16-3.19)	**3.13** (2.58-3.81)	**3.83** (3.10-4.64)	**4.36** (3.50-5.25)	**4.92** (3.87-5.91)	**5.46** (4.23-6.56)	**6.20** (4.68-7.46)	**6.77** (5.01-8.16)
30-min	**0.996** (0.828-1.22)	**1.30** (1.09-1.60)	**1.76** (1.45-2.15)	**2.11** (1.74-2.57)	**2.58** (2.09-3.13)	**2.94** (2.35-3.54)	**3.31** (2.60-3.98)	**3.68** (2.85-4.42)	**4.18** (3.15-5.02)	**4.56** (3.37-5.49)
60-min	**0.617** (0.513-0.756)	**0.805** (0.674-0.987)	**1.09** (0.900-1.33)	**1.30** (1.07-1.59)	**1.60** (1.29-1.94)	**1.82** (1.46-2.19)	**2.05** (1.61-2.46)	**2.28** (1.76-2.73)	**2.59** (1.95-3.11)	**2.82** (2.09-3.40)
2-hr	**0.360** (0.303-0.432)	**0.466** (0.393-0.560)	**0.620** (0.520-0.742)	**0.738** (0.612-0.882)	**0.900** (0.738-1.07)	**1.02** (0.828-1.21)	**1.15** (0.914-1.36)	**1.27** (0.998-1.50)	**1.44** (1.11-1.71)	**1.58** (1.18-1.87)
3-hr	**0.264** (0.223-0.324)	**0.339** (0.286-0.416)	**0.443** (0.372-0.541)	**0.525** (0.437-0.637)	**0.640** (0.524-0.772)	**0.732** (0.592-0.878)	**0.827** (0.656-0.992)	**0.927** (0.723-1.11)	**1.06** (0.805-1.27)	**1.17** (0.868-1.41)
6-hr	**0.160** (0.137-0.190)	**0.201** (0.173-0.240)	**0.257** (0.220-0.304)	**0.301** (0.255-0.355)	**0.362** (0.302-0.424)	**0.409** (0.337-0.477)	**0.458** (0.372-0.533)	**0.508** (0.405-0.593)	**0.576** (0.447-0.672)	**0.629** (0.477-0.735)
12-hr	**0.089** (0.077-0.105)	**0.113** (0.097-0.132)	**0.142** (0.122-0.166)	**0.166** (0.141-0.193)	**0.197** (0.166-0.229)	**0.221** (0.184-0.256)	**0.246** (0.202-0.285)	**0.271** (0.220-0.314)	**0.304** (0.241-0.354)	**0.330** (0.256-0.387)
24-hr	**0.053** (0.046-0.061)	**0.067** (0.058-0.077)	**0.086** (0.075-0.100)	**0.102** (0.088-0.118)	**0.123** (0.106-0.142)	**0.140** (0.120-0.162)	**0.158** (0.134-0.183)	**0.177** (0.148-0.204)	**0.203** (0.167-0.235)	**0.224** (0.181-0.260)
2-day	**0.028** (0.025-0.033)	**0.036** (0.031-0.042)	**0.047** (0.041-0.055)	**0.056** (0.049-0.065)	**0.069** (0.059-0.079)	**0.079** (0.067-0.091)	**0.089** (0.075-0.103)	**0.100** (0.083-0.116)	**0.115** (0.095-0.134)	**0.128** (0.103-0.149)
3-day	**0.020** (0.018-0.023)	**0.026** (0.023-0.030)	**0.034** (0.030-0.039)	**0.041** (0.036-0.047)	**0.050** (0.043-0.058)	**0.058** (0.050-0.066)	**0.066** (0.056-0.076)	**0.075** (0.063-0.086)	**0.087** (0.072-0.100)	**0.096** (0.079-0.112)
4-day	**0.016** (0.014-0.019)	**0.021** (0.018-0.024)	**0.028** (0.024-0.032)	**0.033** (0.029-0.038)	**0.041** (0.036-0.047)	**0.047** (0.041-0.054)	**0.054** (0.046-0.062)	**0.062** (0.052-0.071)	**0.072** (0.060-0.083)	**0.081** (0.066-0.093)
7-day	**0.011** (0.009-0.012)	**0.013** (0.012-0.015)	**0.018** (0.016-0.020)	**0.021** (0.019-0.025)	**0.027** (0.023-0.030)	**0.031** (0.026-0.035)	**0.035** (0.030-0.040)	**0.040** (0.034-0.046)	**0.047** (0.039-0.054)	**0.053** (0.043-0.061)
10-day	**0.008** (0.007-0.009)	**0.010** (0.009-0.012)	**0.014** (0.012-0.016)	**0.016** (0.014-0.019)	**0.020** (0.017-0.023)	**0.023** (0.020-0.026)	**0.027** (0.023-0.030)	**0.030** (0.025-0.034)	**0.035** (0.029-0.040)	**0.039** (0.032-0.045)
20-day	**0.005** (0.004-0.006)	**0.006** (0.006-0.007)	**0.008** (0.007-0.010)	**0.010** (0.009-0.011)	**0.012** (0.011-0.014)	**0.014** (0.012-0.016)	**0.016** (0.013-0.018)	**0.017** (0.015-0.020)	**0.020** (0.017-0.023)	**0.022** (0.018-0.025)
30-day	**0.004** (0.003-0.004)	**0.005** (0.004-0.006)	**0.007** (0.006-0.008)	**0.008** (0.007-0.009)	**0.010** (0.008-0.011)	**0.011** (0.009-0.012)	**0.012** (0.010-0.014)	**0.013** (0.012-0.015)	**0.015** (0.013-0.018)	**0.017** (0.014-0.019)
45-day	**0.003** (0.003-0.003)	**0.004** (0.003-0.004)	**0.005** (0.005-0.006)	**0.006** (0.005-0.007)	**0.007** (0.006-0.008)	**0.008** (0.007-0.009)	**0.009** (0.008-0.011)	**0.010** (0.009-0.012)	**0.012** (0.010-0.013)	**0.013** (0.011-0.015)
60-day	**0.003** (0.002-0.003)	**0.003** (0.003-0.004)	**0.004** (0.004-0.005)	**0.005** (0.004-0.006)	**0.006** (0.005-0.007)	**0.007** (0.006-0.008)	**0.008** (0.007-0.009)	**0.008** (0.007-0.009)	**0.009** (0.008-0.011)	**0.010** (0.009-0.012)

[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.

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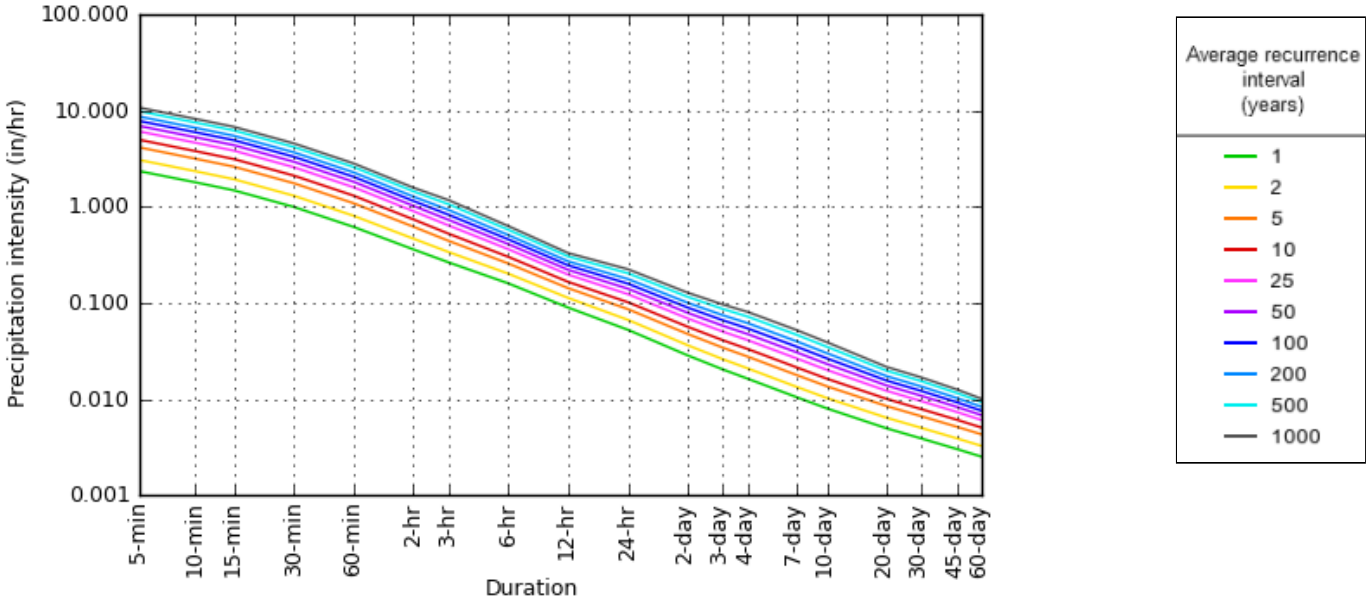
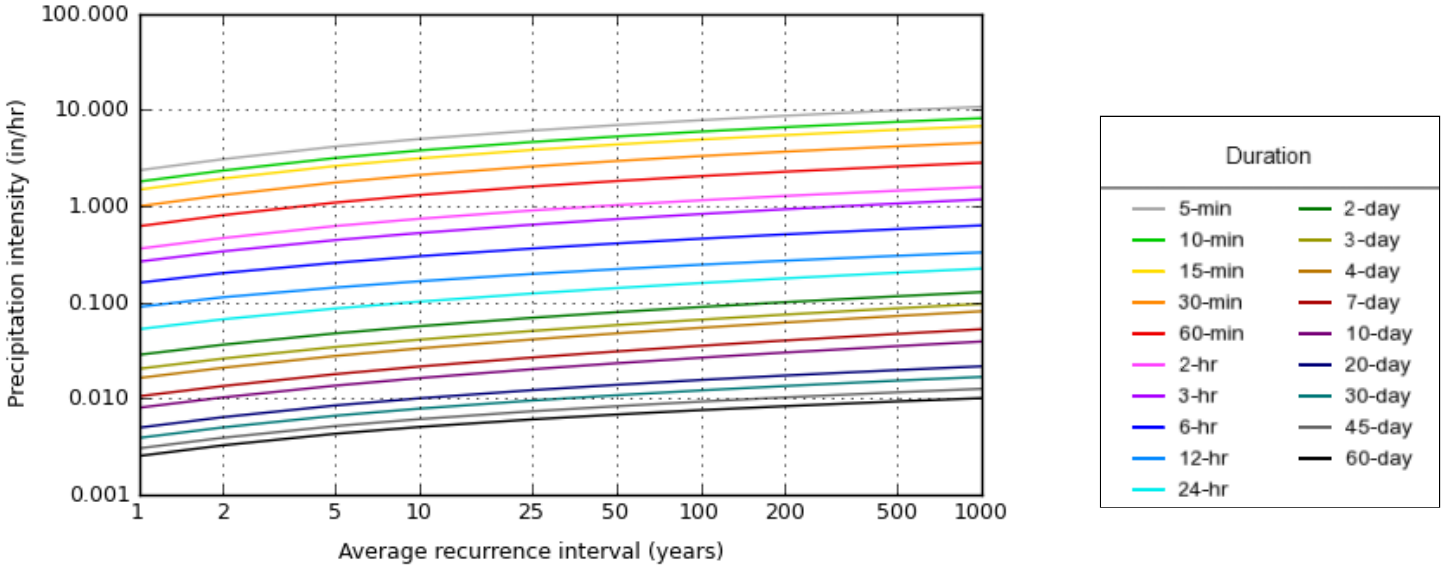
PF graphical

PDS-based intensity-duration-frequency (IDF) curves
Latitude: 33.6599°, Longitude: -111.9221°





NOAA Atlas 14, Volume 1, Version 5

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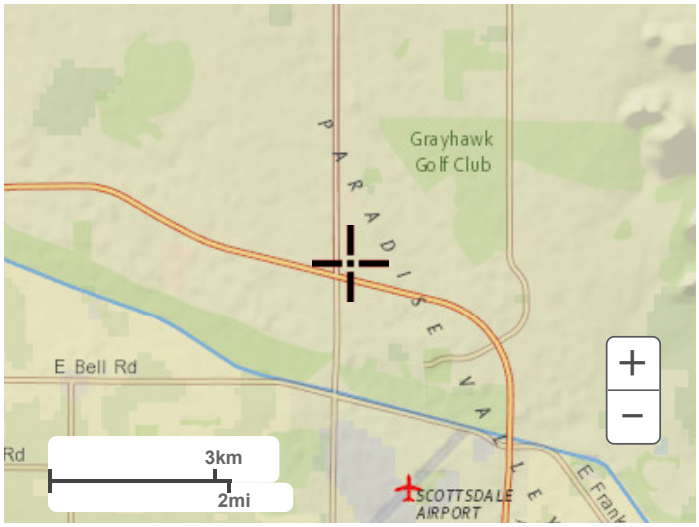
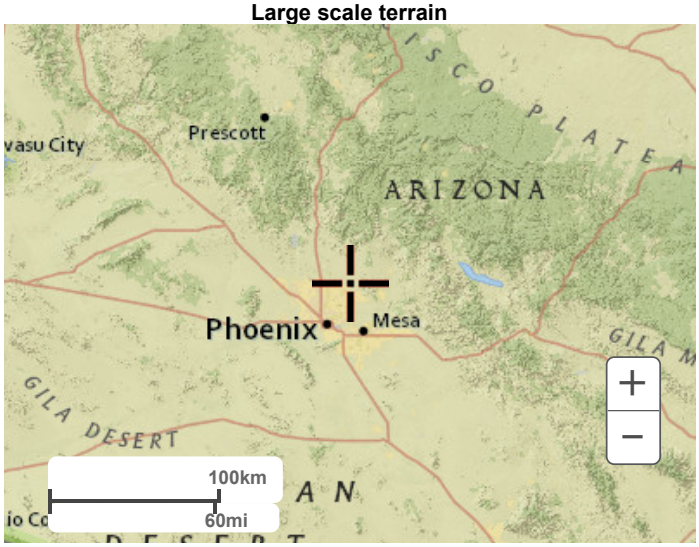
Maps & aerials

Small scale terrain



Large scale terrain



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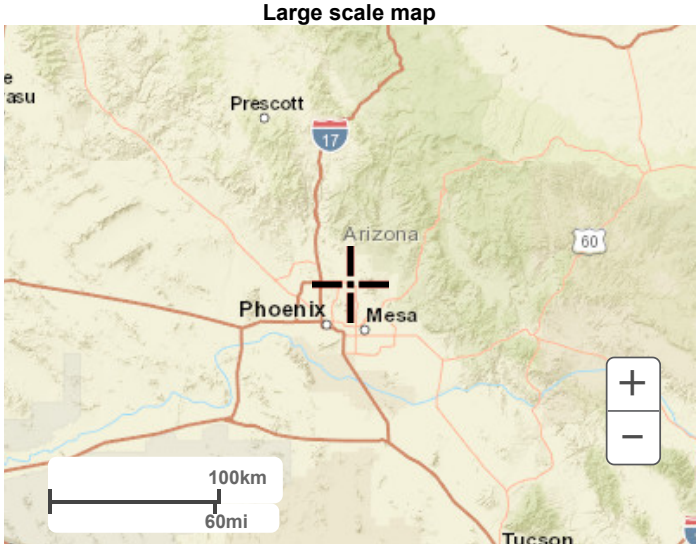
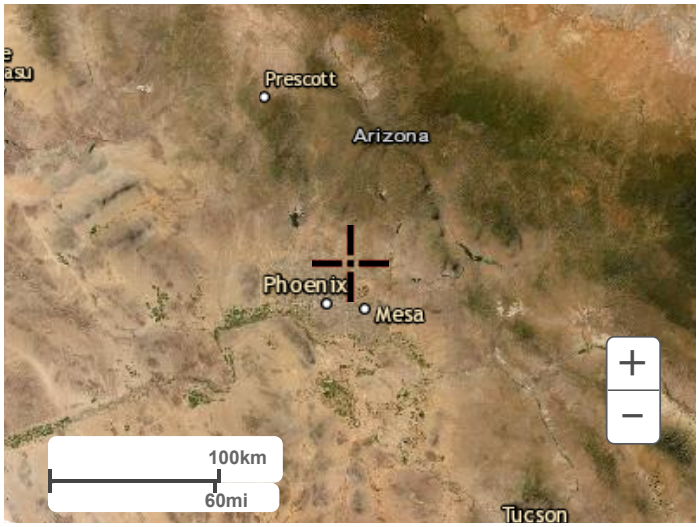


Large scale aerial



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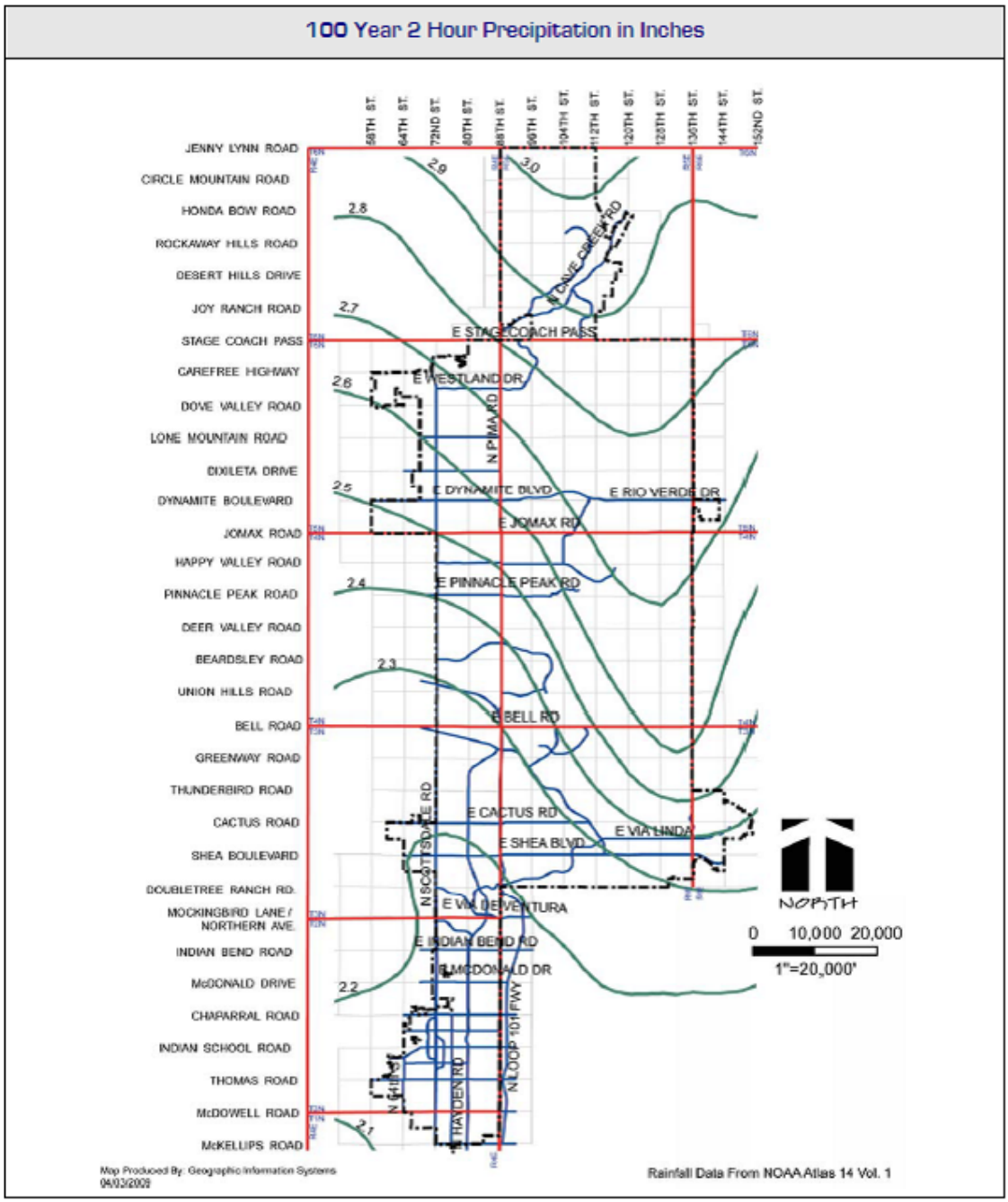


2. A rainfall runoff model using the USACE's HEC 1 Flood Hydrograph Package (generally used for watersheds that are larger than 160 acres, irregular in shape and contour, or if routing of flows is necessary).

B. **Watershed Conditions**

Watersheds are subject to change. Grading and drainage plans shall consider all watershed conditions that would result in the greatest peak discharge rate, to:

1. Size drainage facilities, and
2. Determine lowest floor elevations.

C. **Split-Flow Conditions**

Projects in northern parts of Scottsdale must address split-flow channel conditions where applicable. These splits in the alluvial channels usually include highly erosive soils and are generally unstable and unpredictable. In setting lowest floor elevations relative to upstream splits, assume that 100% of the flow could go either direction in any given flood event. For infrastructure design, the estimate of the actual split, based on a hydraulic analysis of the current channel cross sections, must include a minimum safety factor of 30% of the total flow. If there are extenuating factors affecting the stability of the split, the safety factor should be increased accordingly.

D. **Environmentally Sensitive Lands**

For special considerations regarding Environmentally Sensitive Lands, refer to the City Zoning Ordinance and DSPM Chapter 2 Section 2-2. Modification of natural watercourses with a flow of 50 cfs or greater are addressed in the City Zoning Ordinance.

E. **The Rational Method**

1. Precipitation. Precipitation input is rainfall intensity, "i," and can be obtained directly from NOAA 14.
2. Time of Concentration. Time of concentration "t_c" is the total time of travel from the most hydraulically remote part of the watershed to the concentration point of interest. The calculation of "t_c" must follow FCDMC Hydrology Manual procedures.
3. Runoff Coefficients. Use Fig. 4-1.5, Runoff Coefficients for Use with Rational Method, or equivalent to obtain the runoff coefficients or "C" values. Composite "C" values for the appropriate zoning category or weighted average values calculated for the specific site are both acceptable approaches.

RUNOFF COEFFICIENTS – "C" VALUE

LAND USE	STORM FREQUENCY		
Composite Area-wide Values	2-25 Year	50 Year	100 Year
Commercial & Industrial Areas	0.80	0.83	0.86
Residential Areas – Single Family, slopes 10% or less			
R1-190	0.33	0.50	0.53
R1-130	0.35	0.51	0.59

Post-Development Rational Method Calculations

Sub-Area	Area	C_{10}	C_{100}	Tc	i_{10}	i_{100}	Local Q_{10}	Local Q_{100}
	(acres)	DS&PM	DS&PM	(min)	(in/hr)	(in/hr)	(cfs)	(cfs)
1	0.065	0.80	0.86	10	3.70	5.81	0.19	0.32
2	0.069	0.80	0.86	10	3.70	5.81	0.20	0.34
3	0.090	0.80	0.86	10	3.70	5.81	0.27	0.45
4	0.127	0.80	0.86	10	3.70	5.81	0.38	0.63
5	0.090	0.80	0.86	10	3.70	5.81	0.27	0.45
6	0.252	0.80	0.86	10	3.70	5.81	0.75	1.26
7	0.165	0.80	0.86	10	3.70	5.81	0.49	0.82
8	1.077	0.80	0.86	10	3.70	5.81	3.19	5.38
9	1.103	0.80	0.86	10	3.70	5.81	3.26	5.51
10	0.284	0.80	0.86	10	3.70	5.81	0.84	1.42

Grated Inlet Capacity - Weir Condition

Inlet Type	Inlet Area	Q_{100}	Inlet Capacity w/ 50% clogging	d	Cw	P[(1)]
		(cfs)	(cfs)	(ft)		(ft)
M.A.G. type "F"	4	0.63	6.27	0.50	3	11.83
M.A.G. type "F"	5	0.45	6.27	0.50	3	11.83
M.A.G. type "F"	6	1.26	6.27	0.50	3	11.83
M.A.G. type "F"	7	0.82	6.27	0.50	3	11.83
M.A.G. type "F"	8	5.38	6.27	0.50	3	11.83
M.A.G. type "F"	9	5.51	6.27	0.50	3	11.83
Trench Drain	10	1.42	42.43	0.50	3	80

Q=Cw*P*d^1.5

Cw= 3.0 weir coefficient
Q = discharge capacity
P = inlet perimeter
d = flow depth

[(1)] **Wetted Perimeter**	**ft**
1 Type F Catch Basins	11.83
2 Type F Catch Basins	18.67
3 Type F Catch Basins	25.50

Curb Opening - Sump Condition

Inlet Type - Type M	Inlet Area	Q_{100}	Inlet Capacity W/ 25% Clogging	d	Cw	L
		(cfs)	(cfs)	(ft)		(ft)
CB#1	1	0.32	1.95	0.50	2.3	3
CB#2	2	0.34	1.95	0.50	2.3	3
CB#3	3	0.45	1.95	0.50	2.3	3

Q=Cw*L*d^1.5

L=(Q/(Cw*d^1.5))*1.25

Cw= 2.3 weir coefficient
Q = discharge capacity
L = curb opening length
d = flow depth
CF = clogging factor = 25% (1.25xL)

APPENDIX F

Warning & Disclaimer of Liability

GRADING & DRAINAGE LANGUAGE

WARNING AND DISCLAIMER OF LIABILITY

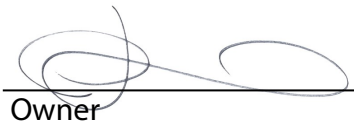
The City's Stormwater and Floodplain Management Ordinance is intended to minimize the occurrence of losses, hazards and conditions adversely affecting the public health, safety and general welfare which might result from flooding.
The Stormwater and Floodplain Management Ordinance identifies floodplains,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

555-PA-2022		8/15/22
Plan Check #	Owner	Date

APPENDIX G

One Scottsdale Infrastructure Roadway Drainage Report

DRAINAGE REPORT
FOR
ONE SCOTTSDALE PRIVATE DRIVE

April 29, 2022
WP# 215234

EXPIRES 6-30-24

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EXHIBITS

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EXHIBIT 2 FEMA FIRM Exhibit
EXHIBIT 3 One Scottsdale – Infrastructure Master Drainage Map
EXHIBIT 4 One Scottsdale – Infrastructure Roadway Drainage Map
EXHIBIT 5 One Scottsdale – StormCAD Map
EXHIBIT 6 One Scottsdale (StreetLights Residential) Final Drainage Report
EXHIBIT 7 One Scottsdale PUII Master Storm Drain Report
EXHIBIT 8 Hydraulic Modeling Assistance Memorandum

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EXPIRES 6-30-24

1.0 INTRODUCTION

This Drainage Report has been prepared to support the One Scottsdale Final Plat and One Scottsdale Private Drive plan submittal, in accordance with Wood, Patel & Associates, Inc.'s (WOODPATEL'S) understanding of the City of Scottsdale technical drainage requirements for stormwater drainage, the previously approved One Scottsdale Master Drainage Plan, revised June 20, 2013, and the previously approved One Scottsdale PUII Master Storm Drain Report, dated July 20, 2007.

One Scottsdale Planning Unit II (Site) is an approximately 59-acre portion of the One Scottsdale parcel located within Section 26, Township 4 North, Range 4 East of the Gila and Salt River Base and Meridian, Maricopa County, Arizona. More specifically, the Site is located at the southeast corner of Scottsdale Road and Legacy Boulevard. Refer to Exhibit 1 – *Vicinity Map* for the project location.

The Site is currently proposed to be divided into 6 lots and 2 tracts to align with future development. Roadway and utility improvements required to provide utility service to the future lots will be constructed within one of the proposed tracts.

This Drainage Report has been prepared to conform with the basis of design for Planning Unit II storm drain in the built-out condition based on the approved One Scottsdale PUII Master Storm Drain Report, July 20, 2007. This Report will analyze the contributing areas adjacent to the Private Drive Improvements, noted as System B and System C on the "Sub-Basin Delineation Map". Systems A-1 and A-2 will be analyzed in future reports as infrastructure is developed within that area.

The hydrologic and hydraulic methods and design criteria utilized within this Report are understood to be in accordance with the *City of Scottsdale Design Standards & Policies Manual, Maricopa County Drainage Design Manual, Volume I – Hydrology, and Maricopa County Drainage Design Manual, Volume II – Hydraulics.*

2.0 EXISTING DRAINAGE CONDITIONS

2.1 Onsite Drainage

The Site is currently undeveloped. The existing topography of the Site generally slopes from north to south with an approximate elevation change of thirty (30) feet.

2.2 Offsite Drainage

Two (2) existing 54-inch RGRCP storm drain pipes and an existing swale that were constructed with the previous TDS improvements run through the Site along the eastern property boundary. This existing stormwater infrastructure is part of the regional stormwater system that was constructed for the One Scottsdale master plan development. The existing storm drain pipes were designed for the 100-year storm event and are currently proposed to accept 76 cfs from PUII. Refer to Exhibit 7 – *One Scottsdale PUII Master Storm Drain Report* for details. The existing storm drain pipes and swale ultimately outfall via a connection to the East Regional Drainage Corridor. See Exhibit 6 – *One Scottsdale (StreetLights Residential) Final Drainage Report.* Per the *One Scottsdale Master Drainage Plan* approximately 225 cfs of stormwater will pass through the Site via the existing 54-inch storm drain pipes in total.

An existing private storm drain system is located within Henkel Way on the south side of the Site. The existing storm drain pipes were designed for the 100-year storm event and are currently proposed to accept 147 cfs from PUII. Refer to Exhibit 7 – *One Scottsdale PUII Master Storm Drain Report* for details. The existing storm drain pipes ultimately outfall to the regional detention basin along the south edge of PUII.

Review of the current ADMS for the project area indicated potential impact from offsite flows from the north across Legacy Boulevard. JE Fuller performed additional analysis to confirm that the project is not subject to offsite flows as shown in the ADMS. See Exhibit 8 - *Hydraulic Modeling Assistance Memorandum.*

2.3 FEMA Floodplain

The Federal Emergency Management Agency (FEMA) has published Flood Insurance Rate Maps for Maricopa County and Incorporated Areas. The Site is located within “Other Areas of Flood Hazard” Zone “X” shaded per Flood Insurance Rate Map (FIRM) Panel 1320 of 4425, Map Number 04013C1320L, dated October 16, 2013. Refer to Exhibit 2 - *FEMA FIRM Exhibit*.

“Other Flood Areas” Zone “X” shaded is defined by FEMA as follows:

> *“Area of 0.2% annual chance flood hazard; areas of 1% annual chance flood with average depths less than 1 foot or with drainage areas of less than 1 square mile”.*

3.0 PROPOSED DRAINAGE PLAN

3.1 Drainage Conditions

Developers for each Lot will be responsible for collecting onsite flows and routing runoff to the Master Storm drain system in accordance with the analysis in this Report, and the *One Scottsdale PUII Master Storm Drain Report*.

3.2 Ongoing Maintenance

Ongoing maintenance of the designed and recommended drainage systems is required to preserve the system's integrity. Failure to provide maintenance can prevent the drainage system from performing its intended design purpose and can result in reduced performance. Maintenance within the public right-of-way is the responsibility of the governing municipality. The property owner shall be solely responsible for the operation and maintenance of facilities on private property and within drainage easements, including private streets.

4.0 ANALYSIS

4.1 Hydrologic Analysis

Peak flow estimates were generated by the Rational Method, as outlined in the *City of Scottsdale Design Standards and Policies Manual* (2018) and the *Drainage Design Manual for Maricopa County, Arizona, Volume 1 – Hydrology* (2013). This method assumes the application of a steady, uniform rainfall intensity that produces a peak flow estimate when all points within the watershed contribute to outflow at the design point.

Rational Method peak flows were computed at concentration points along the Site at key design locations. Runoff coefficients were estimated to reflect anticipated proposed land use conditions for storm drain sizing purposes. 100-year Rational Method runoff coefficients were assumed to be 0.90 for commercial use and 0.95 for paved roadways.

The location of the master drainage sub-basins is illustrated on Exhibit 3 – *One Scottsdale Infrastructure Master Drainage Map*. The roadway infrastructure is further sub-divided in Exhibit 4 – *One Scottsdale Roadway Drainage Map.* Estimates of 100-year peak flows are included in Appendix A – *Hydrology Calculations - Rational Method Analysis*. Peak flow values for Lot 1 are included in Exhibit 6 – *One Scottsdale (StreetLights Residential) Final Drainage Report.*

As noted in Section 1.4, hydrologic analysis has been divided into two (2) sub-basins for capturing stormwater runoff and conveying it into the existing storm drain systems. Sub-basin 1 will include Lots 1 and a portion of 4 along with the adjacent Roadway 1. The flow from Sub-basin 1 will be routed into the existing 54-inch RGRCP storm drain pipes along the eastern property boundary. The total 100-year flow entering the existing system has been calculated to be 72.0 cfs. This is less than the 76.0 cfs allotted in the One Scottsdale PUII Master Storm Drain Report. Sub-basin 2 will include Lots 2,3,5,6,7,8, and the remainder of Lot 4, Roadways 2 and 3, and overflow runoff from the upstream Sub-basin 1. Proposed flows from Sub-basin 2 will be routed into the existing storm drain system within Henkel Way, which ultimately outfalls into the regional retention basin along the south edge of PUII. Sub-basin 2 also includes existing flows from Roadways 4, 5, and 6 and flows from a portion of the existing building south of Henkel Way that are currently captured by the existing storm drain within Henkel Way. The total flow for Sub-basin 2 has been calculated to be 173.8 cfs. This is greater than the 147.0 cfs allotted in the One Scottsdale PUII Master Storm Drain Report. The existing system was modeled to demonstrate sufficient capacity for the increased flows. The location of the master drainage sub-basins is illustrated on Exhibit 3 – *One Scottsdale Infrastructure Master Drainage Map*. The roadway infrastructure is further sub-divided in Exhibit 4 – *One Scottsdale Roadway Drainage Map.*

4.2 Hydraulic Analysis

Stormwater runoff from the private drive will be captured within the roadway via 6-inch curb and directed into a series of catch basins. The private drive is designed such that the 100-year peak flow is contained within the street curbs. The 100-year storm event peak flows will be entirely captured within the proposed catch basins of the private drive. Street capacity and inlet capacity calculations are included in Appendix B – *Hydraulic Calculations*.

The proposed storm drain systems were modeled using Bentley's StormCAD Software. The proposed storm drain systems were designed to convey runoff generated by the 100-year storm event. Design flows from each sub-basin were applied to the associated storm drain system at the upstream inlet. The storm drain systems for Sub-basin 1 was modeled with a free outfall into the existing storm drain system. The storm drain system for Sub-basin 2 included the proposed storm drain in the private drive, and the existing storm drain system within Henkel Way. This system was modeled with a tailwater condition 3-foot above the invert of the outfall to simulate the basin at approximately 60% capacity. Both systems have capacity to covey the 100-year storm event to their respective outfalls. StormCAD analysis for the proposed storm drain system is contained within Appendix B – *Hydraulic Calculations* and Exhibit 5 – *One Scottsdale – StormCAD Map*.

5.0 SPECIAL CONDITIONS

Currently, there are no washes with 100-year flows greater than 50 cfs traversing the Site. Also, there are no designated Section 404 washes within the Site. Therefore, a Section 404 permit is not required for development.

6.0 CONCLUSIONS

Based on our analysis of the Site, the following conclusions can be made:

1. The proposed drainage infrastructure will be designed in accordance with the *City of Scottsdale Design Standards & Policies Manual*, 2018.

2. The proposed Site lies within a FEMA-designated "Other Flood Areas" Zone "X" shaded. Per the FEMA Map (Panel 1320), the FIRM information is as follows: "*0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flow with average depth less than one foot or with drainage areas of less than one square mile"*.

3. Approximately 225 cfs of stormwater runoff from the north will pass through the Site via the existing 54-inch storm drain pipes. The previously approved PUII Master Storm Drain Report assumed these pipes would intercept 76 cfs from Storm System 'C' as shown in the "Sub-Basin Delineation Map".

4. An existing private storm drain system is located within Henkel Way on the south side of the Site. The previously approved PUII Master Storm Drain Report assumed these pipes would intercept 147 cfs from System 'B' as shown in the "Sub-Basin Delineation Map".

5. The Site will be divided into two (2) sub-basins for capturing stormwater runoff and conveying it into the existing storm drain systems. The total 100-year flow entering the existing system from Sub-basin 1 is 72.0 cfs and 173.8 cfs from Sub-basin 2. The existing storm drain systems have capacity for these flows per the One Scottsdale PUII Master Storm Drain Report and the StormCAD modeling results found in this Report.

6. Street, Catch Basin, and Storm Drain has been designed to capture and convey the 100-year storm event per the requirements in the City of Scottsdale Design Standards and Policies Manual, 2018.

7. The property owner shall perform ongoing maintenance of the onsite stormwater system.

7.0 REFERENCES

1. *Drainage Design Manual, Hydrology, Edition 4*, Flood Control District of Maricopa County, December 14, 2018.
2. *Drainage Design Manual, Hydraulic*, *Edition 4*, Flood Control District of Maricopa County, December 14, 2018.
3. *Design Standards and Policies Manual, Chapter 4: Grading and Drainage*, City of Scottsdale, January 2018
4. *One Scottsdale Master Drainage Plan*, Wood, Patel & Associates, Inc., Revised June 20, 2013.
5. *One Scottsdale Planning Unit II Master Storm Drain Plan*, Wood, Patel & Associates, Inc., July 20, 2007.

APPENDIX A – HYDROLOGY CALCULATIONS

WOOD PATEL

SITE I-D-F CURVE

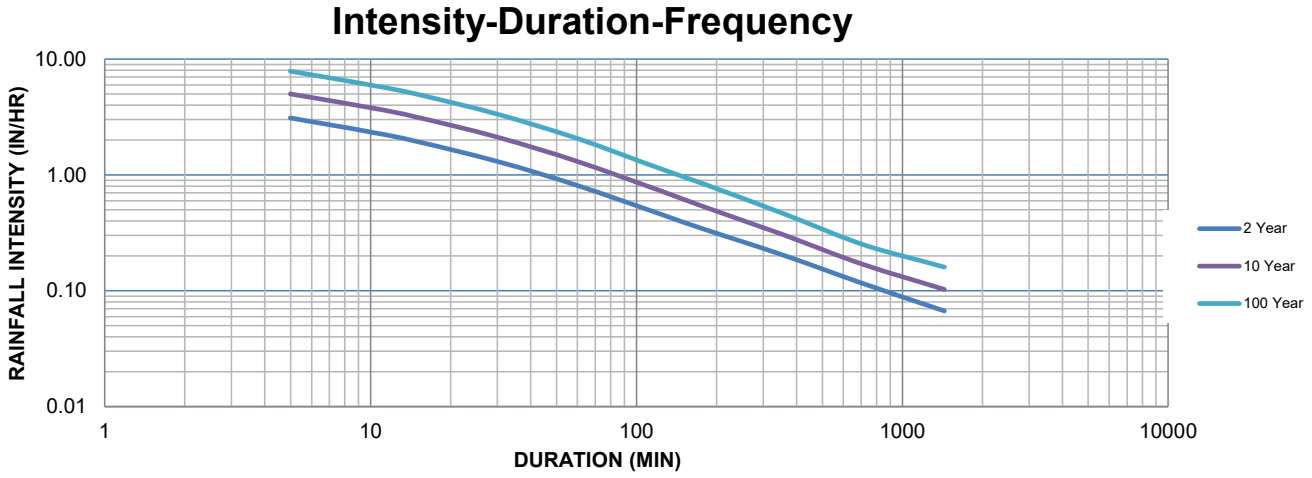
Project	One Scottsdale - Infrastructure
Location	Scottsdale AZ
Project Number	215234
Project Engineer	John G. Ritchie, P.E.

RAINFALL DEPTHS, INCHES

Duration	Average Reccurence Interval (years)					
	2	5	10	25	50	100
5-min	0.258	0.348	0.417	0.511	0.582	0.655
10-min	0.392	0.530	0.635	0.777	0.886	0.997
15-min	0.486	0.657	0.787	0.963	1.100	1.240
30-min	0.655	0.884	1.060	1.300	1.480	1.670
60-min	0.811	1.090	1.310	1.610	1.830	2.060
2-hr	0.938	1.250	1.490	1.810	2.060	2.310
3-hr	1.020	1.340	1.590	1.930	2.210	2.500
6-hr	1.210	1.550	1.810	2.180	2.460	2.760
12-hr	1.370	1.730	2.010	2.390	2.680	2.990
24-hr	1.610	2.090	2.460	2.990	3.410	3.850

RAINFALL INTENSITY, INCHES/HOUR

Duration minutes	Frequency, years					
	2	5	10	25	50	100
5	3.10	4.18	5.00	6.13	6.98	7.86
10	2.35	3.18	3.81	4.66	5.32	5.98
15	1.94	2.63	3.15	3.85	4.40	4.96
30	1.31	1.77	2.12	2.60	2.96	3.34
60	0.81	1.09	1.31	1.61	1.83	2.06
120	0.47	0.63	0.75	0.91	1.03	1.16
180	0.34	0.45	0.53	0.64	0.74	0.83
360	0.20	0.26	0.30	0.36	0.41	0.46
720	0.11	0.14	0.17	0.20	0.22	0.25
1440	0.07	0.09	0.10	0.12	0.14	0.16



WOOD PATEL

MASTER RATIONAL METHOD SUMMARY
100 YEAR, 10 YEAR, 2 YEAR

Project	One Scottsdale - Infrastructure
Location	Scottsdale AZ
Project Number	215234
Project Engineer	John G. Ritchie, P.E.

										100 YEAR				10 YEAR				2 YEAR			
Drainage Subbasin ID	**Longest Watercourse 'L' (ft)**	**Longest Watercourse 'L' (mi)**	**Drainage Area 'A' (sf)**	**Drainage Area 'A' (Acres)**	**'K_b' Type[1]**	**Watershed Resistance Coefficient 'K_b'**	**Top Elevation**	**Bottom Elevation**	**Basin Slope 'S' (ft/mi)**	**Calculated Q100 'Tc' (See Note 2) (min)**	**100 YEAR Intensity 'i' (in/hr)**	**100 YR Runoff Coefficient 'C'**	**Q100 Flow (cfs)**	**Calculated Q10 'Tc' (See Note 2) (min)**	**10 YEAR Intensity 'i' (in/hr)**	**10 YR Runoff Coefficient 'C'**	**Q10 Flow (cfs)**	**Calculated Q2 'Tc' (See Note 2) (min)**	**2 YEAR Intensity 'i' (in/hr)**	**2 YR Runoff Coefficient 'C'**	**Q2 Flow (cfs)**
ROADWAY 3	861	0.163	41,371	0.95	A	0.0401	1637.9	1612.7	154.6	5.0	7.86	0.95	**7.1**	6.0	4.77	0.83	**3.7**	7.4	2.74	0.76	**2.0**
LOT 2	703	0.133	219,350	5.04	A	0.0356	1636.8	1617.3	146.0	5.0	7.86	0.90	**35.6**	5.1	4.98	0.78	**19.6**	6.3	2.90	0.72	**10.5**
LOT 3	557	0.105	139,705	3.21	A	0.0368	1619.8	1612.5	70.0	5.0	7.86	0.90	**22.7**	5.9	4.79	0.78	**12.0**	7.3	2.75	0.72	**6.4**
LOT 4-1	683	0.129	175,719	4.03	A	0.0362	1638.9	1629.5	72.8	5.0	7.86	0.90	**28.5**	6.5	4.67	0.78	**14.7**	8.0	2.66	0.72	**7.7**
LOT 4-2	683	0.129	49,324	1.13	A	0.0397	1638.9	1629.5	72.8	5.0	7.86	0.90	**8.0**	6.8	4.67	0.78	**4.1**	8.4	2.66	0.72	**2.2**
LOT 5	465	0.088	104,072	2.39	A	0.0376	1629.5	1625.9	40.7	5.0	7.86	0.90	**16.9**	6.5	4.65	0.78	**8.7**	8.1	2.63	0.72	**4.5**
LOT 6	481	0.091	114,410	2.63	A	0.0374	1625.9	1624.0	21.4	5.0	7.86	0.90	**18.6**	8.4	4.19	0.78	**8.6**	10.5	2.31	0.72	**4.4**
LOT 7	413	0.078	90,018	2.07	A	0.0380	1624.0	1619.6	56.0	5.0	7.86	0.90	**14.6**	5.5	4.88	0.78	**7.9**	6.7	2.84	0.72	**4.2**
LOT 8	554	0.105	141,479	3.25	A	0.0368	1624.0	1617.8	59.5	5.0	7.86	0.90	**23.0**	6.2	4.72	0.78	**12.0**	7.7	2.69	0.72	**6.3**
ROADWAY 4	209	0.040	10,536	0.24	A	0.0439	1622.9	1621.7	30.7	5.0	7.86	0.95	**1.8**	5.0	5.00	0.83	**1.0**	6.2	2.92	0.76	**0.5**
ROADWAY 5	399	0.076	18,611	0.43	A	0.0423	1621.7	1619.0	35.7	5.0	7.86	0.95	**3.2**	6.7	4.60	0.83	**1.6**	8.3	2.60	0.76	**0.8**
ROADWAY 6	619	0.117	29,665	0.68	A	0.0410	1619.0	1613.8	44.1	5.0	7.86	0.95	**5.1**	7.9	4.31	0.83	**2.4**	9.9	2.37	0.76	**1.2**
EXISTING	921	0.174	60,859	1.40	A	0.0391	1622.0	1617.1	28.2	5.0	7.86	0.90	**9.9**	11.5	3.61	0.78	**3.9**	14.5	1.98	0.72	**2.0**
													195.0				**100.5**				**52.7**

Notes

1. Per Drainage Design Manual for Maricopa County, Vol. I, Hydrology (2018), Table 3.1: Equation for Estimating Kb in the Tc Equation
2. Minimum Tc is 5 minutes.

WOOD PATEL

ROADWAY RATIONAL METHOD SUMMARY

100 YEAR, 10 YEAR, 2 YEAR

Project One Scottsdale - Infrastructure
Location Scottsdale AZ
Project Number 215234
Project Engineer John G. Ritchie, P.E.

ROADWAY 1 WATERSHEDS

										100 YEAR				10 YEAR				2 YEAR			
Drainage Subbasin ID	Longest Watercourse 'L' (ft)	Longest Watercourse 'L' (mi)	Drainage Area 'A' (sf)	Drainage Area 'A' (Acres)	'K_b' Type[1]	Watershed Resistance Coefficient 'K_b'	Top Elevation	Bottom Elevation	Basin Slope 'S' (ft/mi)	Calculated Q100 'Tc' (See Note 2) (min)	100 YEAR Intensity 'i' (in/hr)	100 YR Runoff Coefficient 'C'	Q100 Flow (cfs)	Calculated Q10 'Tc' (See Note 2) (min)	10 YEAR Intensity 'i' (in/hr)	10 YR Runoff Coefficient 'C'	Q10 Flow (cfs)	Calculated Q2 'Tc' (See Note 2) (min)	2 YEAR Intensity 'i' (in/hr)	2 YR Runoff Coefficient 'C'	Q2 Flow (cfs)
1L	273	0.052	8,083	0.19	A	0.0446	1638.4	1632.4	116.1	5.0	7.86	0.95	**1.4**	3.8	5.00	0.83	**0.8**	4.6	3.10	0.76	**0.4**
1R	263	0.050	12,275	0.28	A	0.0434	1638.4	1632.3	122.0	5.0	7.86	0.95	**2.1**	3.7	5.00	0.83	**1.2**	4.4	3.10	0.76	**0.7**
2L	241	0.046	6,265	0.14	A	0.0453	1632.6	1630.9	36.0	5.0	7.86	0.95	**1.1**	5.3	4.93	0.83	**0.6**	6.5	2.87	0.76	**0.3**
2R	300	0.057	11,654	0.27	A	0.0436	1633.0	1630.5	43.4	5.0	7.86	0.95	**2.0**	5.4	4.91	0.83	**1.1**	6.7	2.84	0.76	**0.6**
3R	188	0.036	7,486	0.17	A	0.0448	1631.4	1629.4	54.7	5.0	7.86	0.95	**1.3**	4.0	5.00	0.83	**0.7**	4.8	3.10	0.76	**0.4**
TOTAL													**7.8**				**4.3**				**2.4**

ROADWAY 2 WATERSHEDS

										100 YEAR				10 YEAR				2 YEAR			
Drainage Subbasin ID	Longest Watercourse 'L' (ft)	Longest Watercourse 'L' (mi)	Drainage Area 'A' (sf)	Drainage Area 'A' (Acres)	'K_b' Type[1]	Watershed Resistance Coefficient 'K_b'	Top Elevation	Bottom Elevation	Basin Slope 'S' (ft/mi)	Calculated Q100 'Tc' (See Note 2) (min)	100 YEAR Intensity 'i' (in/hr)	100 YR Runoff Coefficient 'C'	Q100 Flow (cfs)	Calculated Q10 'Tc' (See Note 2) (min)	10 YEAR Intensity 'i' (in/hr)	10 YR Runoff Coefficient 'C'	Q10 Flow (cfs)	Calculated Q2 'Tc' (See Note 2) (min)	2 YEAR Intensity 'i' (in/hr)	2 YR Runoff Coefficient 'C'	Q2 Flow (cfs)
3L	330	0.063	8,777	0.20	A	0.0443	1631.2	1628.5	42.6	5.0	7.86	0.95	**1.5**	5.8	4.81	0.83	**0.8**	7.2	2.77	0.76	**0.4**
4L	118	0.022	3,040	0.07	A	0.0472	1628.8	1626.9	81.3	5.0	7.86	0.95	**0.5**	2.9	5.00	0.83	**0.3**	3.5	3.10	0.76	**0.2**
4R	186	0.035	5,717	0.13	A	0.0455	1632.8	1626.9	166.6	5.0	7.86	0.95	**1.0**	2.9	5.00	0.83	**0.5**	3.4	3.10	0.76	**0.3**
5L	242	0.046	6,468	0.15	A	0.0452	1627.6	1624.4	70.1	5.0	7.86	0.95	**1.1**	4.3	5.00	0.83	**0.6**	5.1	3.08	0.76	**0.3**
5R	187	0.035	4,992	0.11	A	0.0459	1627.8	1625.0	80.2	5.0	7.86	0.95	**0.9**	3.6	5.00	0.83	**0.5**	4.3	3.10	0.76	**0.3**
6L	210	0.040	5,639	0.13	A	0.0455	1625.0	1622.1	74.6	5.0	7.86	0.95	**1.0**	3.9	5.00	0.83	**0.5**	4.7	3.10	0.76	**0.3**
6R	265	0.050	7,114	0.16	A	0.0449	1625.2	1622.1	62.3	5.0	7.86	0.95	**1.2**	4.6	5.00	0.83	**0.7**	5.6	3.01	0.76	**0.4**
7L	294	0.056	7,681	0.18	A	0.0447	1622.7	1618.0	84.5	5.0	7.86	0.95	**1.3**	4.4	5.00	0.83	**0.7**	5.3	3.05	0.76	**0.4**
7R	299	0.057	7,834	0.18	A	0.0447	1622.7	1618.0	82.2	5.0	7.86	0.95	**1.3**	4.5	5.00	0.83	**0.7**	5.4	3.04	0.76	**0.4**
TOTAL													**9.8**				**5.4**				**3.0**

OPEN SPACE AREA

										100 YEAR				10 YEAR				2 YEAR			
Drainage Subbasin ID	Longest Watercourse 'L' (ft)	Longest Watercourse 'L' (mi)	Drainage Area 'A' (sf)	Drainage Area 'A' (Acres)	'K_b' Type[1]	Watershed Resistance Coefficient 'K_b'	Top Elevation	Bottom Elevation	Basin Slope 'S' (ft/mi)	Calculated Q100 'Tc' (See Note 2) (min)	100 YEAR Intensity 'i' (in/hr)	100 YR Runoff Coefficient 'C'	Q100 Flow (cfs)	Calculated Q10 'Tc' (See Note 2) (min)	10 YEAR Intensity 'i' (in/hr)	10 YR Runoff Coefficient 'C'	Q10 Flow (cfs)	Calculated Q2 'Tc' (See Note 2) (min)	2 YEAR Intensity 'i' (in/hr)	2 YR Runoff Coefficient 'C'	Q2 Flow (cfs)
8	91	0.017	3,425	0.08	A	0.0469	1633.0	1629.4	206.3	5.0	7.86	0.72	**0.4**	1.9	5.00	0.63	**0.2**	2.3	3.10	0.58	**0.1**
9	151	0.029	6,260	0.14	A	0.0453	1633.0	1628.0	176.4	5.0	7.86	0.72	**0.8**	2.5	5.00	0.63	**0.4**	3.0	3.10	0.58	**0.3**
TOTAL													**1.3**				**0.7**				**0.4**

Notes

1. Per Drainage Design Manual for Maricopa County, Vol. I, Hydrology (2018), Table 3.1: Equation for Estimating Kb in the Tc Equation

APPENDIX B – HYDRAULIC CALCULATIONS

WOOD PATEL

CATCH BASIN INLET SUMMARY

CATCH BASIN INTERCEPTION CAPACITY AND BY-PASS FLOWS

Project One Scottsdale - Infrastructure
Location Scottsdale AZ
Project Number 215234
Project Engineer John G. Ritchie, P.E.

Catch Basin ID	Catch Basin Type	On-Grade or Sump	Post Q10 Flow (cfs)	Post Q100 Flow (cfs)	Post Q10 Flow + Q10 By-Pass Flow (cfs)	Post Q100 Flow + Q100 By-Pass Flow (cfs)	Intercept Capacity		By-Pass Flow	
							Q10in (cfs)	Q100in (cfs)	Q10by-pass (cfs)	Q100by-pass (cfs)
1L	C.O.P. P1569-2 (9')	On-grade	0.8	1.4	N/A	N/A	0.8	1.3	0.0	0.1
1R	C.O.P. P1569-2 (9')	On-grade	1.2	2.1	N/A	N/A	1.1	1.7	0.0	0.4
2L	C.O.P. P1569-2 (6')	On-grade	0.6	1.1	0.6	1.2	0.6	1.0	0.0	0.2
2R	C.O.P. P1569-2 (6')	On-grade	1.1	2.0	1.1	2.4	1.0	1.6	0.1	0.8
3R	C.O.P. P1569-2 (3')	On-grade	0.7	1.3	0.8	2.1	0.5	0.9	0.3	1.2
3L	C.O.P. P1569-2 (9')	On-grade	0.8	1.5	0.8	1.7	0.8	1.4	0.0	0.3
4L	C.O.P. P1569-2 (6')	On-grade	0.3	0.5	0.3	0.8	0.3	0.7	0.0	0.1
4R	C.O.P. P1569-2 (9')	On-grade	0.5	1.0	0.9	2.2	0.9	1.9	0.0	0.3
5L	C.O.P. P1569-2 (6')	On-grade	0.6	1.1	0.6	1.2	0.6	1.0	0.0	0.3
5R	C.O.P. P1569-2 (3')	On-grade	0.5	0.9	0.5	1.2	0.4	0.6	0.1	0.6
6L	C.O.P. P1569-2 (9')	On-grade	0.5	1.0	0.6	1.2	0.6	1.1	0.0	0.1
6R	C.O.P. P1569-2 (13')	On-grade	0.7	1.2	0.8	1.8	0.8	1.8	0.0	0.1
7L	C.O.P. P1569-2 (9')	On-grade	0.7	1.3	0.7	1.4	0.7	1.4	0.0	0.0
7R	C.O.P. P1569-2 (9')	On-grade	0.7	1.3	0.7	1.4	0.7	1.4	0.0	0.0
8	MAG 535	Sump	0.2	0.4	N/A	N/A	5.0	5.0	0.0	0.0
9	MAG 535	Sump	0.4	0.8	N/A	N/A	5.0	5.0	0.0	0.0

WOOD PATEL

STREET CONVEYANCE CAPACITY CALCULATIONS
6" CURB (POND TO CROWN) - 10 Year

Project One Scottsdale - Infrastructure
Location Scottsdale AZ
Project Number 215234
Project Engineer John G. Ritchie, P.E.

Known Values

Depth of Flow, ft =	0.24	ft
Cross Slope, ft/ft =	0.0200	ft/ft
Full Street Width (f/c to f/c) =	24.0	ft
Right-of-Way Width, ft =	55.0	ft
Manning's "n" Value (street) =	0.015	

Calculated Values

Referenced Equations

$Q = 0.56 * (S_x^{1.67}) * (S^{0.5}) * (T^{2.67}) / n$ for flow below crown (FHWA Procedure)

$Q = 1.486 * A * (R^{0.67}) * (S^{0.5}) / n$ for flow above crown (Manning's equation)

where Q = flow rate, cfs; S_x = cross slope, ft/ft; S = longitudinal slope, ft/ft; T = width of flow, ft; A = conveyance area, sq ft; R = hydraulic radius, ft

Longitudinal Slope (ft/ft)	Conveyance Area (sf)	Velocity (fps)	Full Street Flow Capacity [1] (cfs)	Half Street Flow Without Overtopping [1][2] (cfs)	Half Street Flow With Overtopping [1][3] (cfs)
0.0030	2.88	1.57	4.5	2.3	2.3
0.0035	2.88	1.70	4.9	2.4	2.4
0.0040	2.88	1.82	5.2	2.6	2.6
0.0045	2.88	1.93	5.5	2.8	2.8
0.0050	2.88	2.03	5.8	2.9	2.9
0.0055	2.88	2.13	6.1	3.1	3.1
0.0060	2.88	2.22	6.4	3.2	3.2
0.0065	2.88	2.31	6.7	3.3	3.3
0.0070	2.88	2.40	6.9	3.5	3.5
0.0075	2.88	2.49	7.2	3.6	3.6
0.0080	2.88	2.57	7.4	3.7	3.7
0.0085	2.88	2.65	7.6	3.8	3.8
0.0090	2.88	2.72	7.8	3.9	3.9
0.0095	2.88	2.80	8.1	4.0	4.0
0.0100	2.88	2.87	8.3	4.1	4.1
0.0105	2.88	2.94	8.5	4.2	4.2
0.0110	2.88	3.01	8.7	4.3	4.3
0.0115	2.88	3.08	8.9	4.4	4.4
0.0120	2.88	3.14	9.1	4.5	4.5
0.0125	2.88	3.21	9.2	4.6	4.6
0.0130	2.88	3.27	9.4	4.7	4.7
0.0135	2.88	3.33	9.6	4.8	4.8
0.0140	2.88	3.40	9.8	4.9	4.9
0.0145	2.88	3.46	10.0	5.0	5.0
0.0150	2.88	3.51	10.1	5.1	5.1
0.0155	2.88	3.57	10.3	5.1	5.1
0.0160	2.88	3.63	10.5	5.2	5.2
0.0165	2.88	3.69	10.6	5.3	5.3
0.0170	2.88	3.74	10.8	5.4	5.4
0.0175	2.88	3.80	10.9	5.5	5.5
0.0180	2.88	3.85	11.1	5.5	5.5
0.0185	2.88	3.90	11.2	5.6	5.6
0.0190	2.88	3.96	11.4	5.7	5.7
0.0195	2.88	4.01	11.5	5.8	5.8
0.0200	2.88	4.06	11.7	5.8	5.8
0.0205	2.88	4.11	11.8	5.9	5.9
0.0210	2.88	4.16	12.0	6.0	6.0

Notes
1. Street flow capacity does not include local gutter depression effect.
2. Half-street flow capacity is limited to the lower of the crown elevation or right-of-way elevation.
3. Includes flows up to the specified flow depth elevation.

WOOD PATEL

STREET CONVEYANCE CAPACITY CALCULATIONS
6" CURB (POND TO TOP OF CURB) - 100 Year

Project One Scottsdale - Infrastructure
Location Scottsdale AZ
Project Number 215234
Project Engineer John G. Ritchie, P.E.

Known Values

Depth of Flow, ft =	0.50	ft
Cross Slope, ft/ft =	0.0200	ft/ft
Full Street Width (f/c to f/c) =	24.0	ft
Right-of-Way Width, ft =	55.0	ft
Manning's "n" Value (street) =	0.015	

Calculated Values

Referenced Equations

$Q = 0.56 * (S_x^{1.67}) * (S^{0.5}) * (T^{2.67}) / n$ for flow below crown (FHWA Procedure)

$Q = 1.486 * A * (R^{0.67}) * (S^{0.5}) / n$ for flow above crown (Manning's equation)

where Q = flow rate, cfs; S_x = cross slope, ft/ft; S = longitudinal slope, ft/ft; T = width of flow, ft; A = conveyance area, sq ft; R = hydraulic radius, ft

Longitudinal Slope (ft/ft)	Conveyance Area (sf)	Velocity (fps)	Full Street Flow Capacity [1] (cfs)	Half Street Flow Without Overtopping [1][2] (cfs)	Half Street Flow With Overtopping [1][3] (cfs)
0.0030	9.12	2.76	25.2	2.3	12.6
0.0035	9.12	2.98	27.2	2.4	13.6
0.0040	9.12	3.19	29.1	2.6	14.5
0.0045	9.12	3.38	30.8	2.8	15.4
0.0050	9.12	3.56	32.5	2.9	16.3
0.0055	9.12	3.74	34.1	3.1	17.0
0.0060	9.12	3.90	35.6	3.2	17.8
0.0065	9.12	4.06	37.1	3.3	18.5
0.0070	9.12	4.22	38.5	3.5	19.2
0.0075	9.12	4.36	39.8	3.6	19.9
0.0080	9.12	4.51	41.1	3.7	20.6
0.0085	9.12	4.65	42.4	3.8	21.2
0.0090	9.12	4.78	43.6	3.9	21.8
0.0095	9.12	4.91	44.8	4.0	22.4
0.0100	9.12	5.04	46.0	4.1	23.0
0.0105	9.12	5.16	47.1	4.2	23.6
0.0110	9.12	5.29	48.2	4.3	24.1
0.0115	9.12	5.41	49.3	4.4	24.6
0.0120	9.12	5.52	50.4	4.5	25.2
0.0125	9.12	5.64	51.4	4.6	25.7
0.0130	9.12	5.75	52.4	4.7	26.2
0.0135	9.12	5.86	53.4	4.8	26.7
0.0140	9.12	5.96	54.4	4.9	27.2
0.0145	9.12	6.07	55.4	5.0	27.7
0.0150	9.12	6.17	56.3	5.1	28.1
0.0155	9.12	6.28	57.2	5.1	28.6
0.0160	9.12	6.38	58.1	5.2	29.1
0.0165	9.12	6.47	59.0	5.3	29.5
0.0170	9.12	6.57	59.9	5.4	30.0
0.0175	9.12	6.67	60.8	5.5	30.4
0.0180	9.12	6.76	61.7	5.5	30.8
0.0185	9.12	6.86	62.5	5.6	31.3
0.0190	9.12	6.95	63.4	5.7	31.7
0.0195	9.12	7.04	64.2	5.8	32.1
0.0200	9.12	7.13	65.0	5.8	32.5
0.0205	9.12	7.22	65.8	5.9	32.9
0.0210	9.12	7.30	66.6	6.0	33.3

Notes
1. Street flow capacity does not include local gutter depression effect.
2. Half-street flow capacity is limited to the lower of the crown elevation or top of curb elevation.
3. Includes flows up to the specified flow depth elevation.

WOOD PATEL

STREET RUNOFF CAPACITY SUMMARY

Project One Scottsdale - Infrastructure
Location Scottsdale AZ
Project Number 215234
Project Engineer John G. Ritchie, P.E.

Drainage ID	Post Q10 (cfs)	Post Q100 (cfs)	Minimum Critical Street Slope (%)	Curb Type	Half or Full Street Capacity?	10-Year Street Capacity (cfs)	100-Year Street Capacity (cfs)
1L	0.8	1.4	1.50	6-Inch Vertical	Half	5.1	28.1
1R	1.2	2.1	1.50	6-Inch Vertical	Half	5.1	28.1
2L	0.6	1.1	0.56	6-Inch Vertical	Half	3.1	17.0
2R	1.1	2.0	0.56	6-Inch Vertical	Half	3.1	17.0
3L	0.8	1.5	0.56	6-Inch Vertical	Half	3.1	17.0
3R	0.7	1.3	0.56	6-Inch Vertical	Half	3.1	17.0
4L	0.3	0.5	1.04	6-Inch Vertical	Half	4.2	23.6
4R	0.5	1.0	1.04	6-Inch Vertical	Half	4.2	23.6
5L	0.6	1.1	1.04	6-Inch Vertical	Half	4.2	23.6
5R	0.5	0.9	1.04	6-Inch Vertical	Half	4.2	23.6
6L	0.5	1.0	1.04	6-Inch Vertical	Half	4.2	23.6
6R	0.7	1.2	1.04	6-Inch Vertical	Half	4.2	23.6
7L	0.7	1.3	0.50	6-Inch Vertical	Half	2.9	16.3
7R	0.7	1.3	0.50	6-Inch Vertical	Half	2.9	16.3

WOOD PATEL

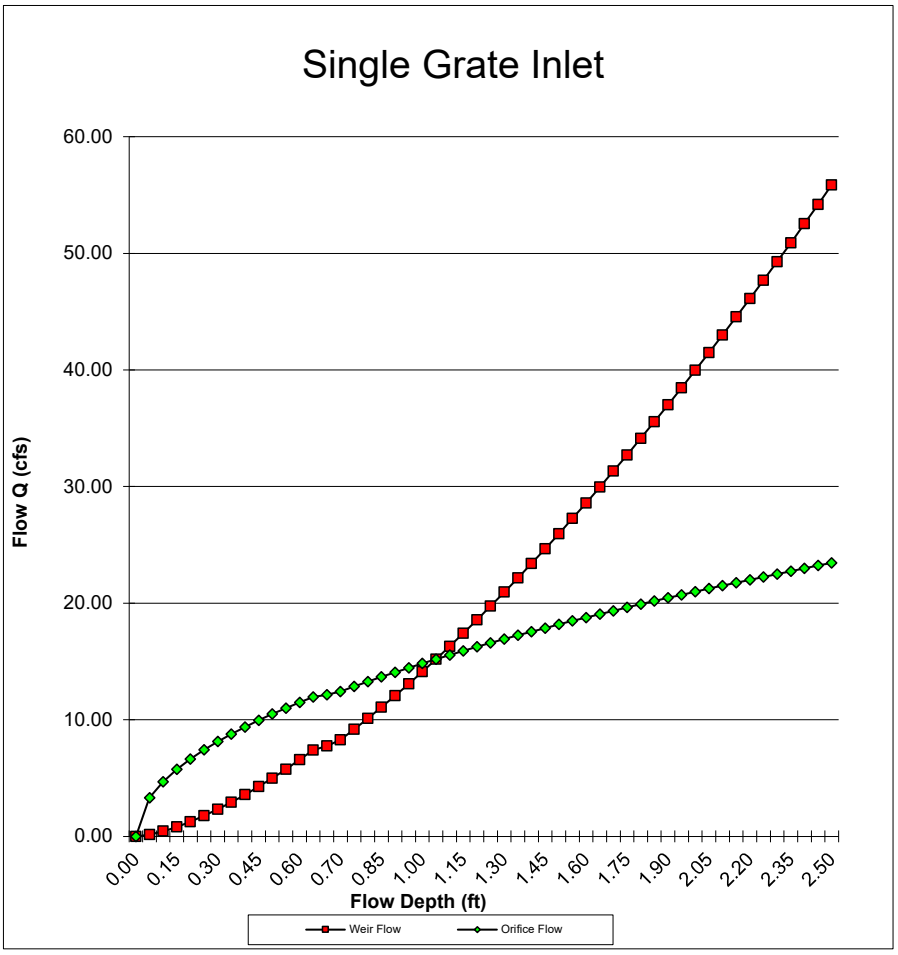
INLET CAPACITY AT SUMP LOCATIONS
MAG 535 TYPE 'F' SINGLE CATCH BASIN

Project	One Scottsdale - Infrastructure
Location	Scottsdale AZ
Project Number	215234
Project Engineer	John G. Ritchie, P.E.

Weir Equation $Q_i = C_w P d^{1.5} (C_f)$
Orifice Equation $Q_i = C_o A (2gd)^{0.5} (C_f)$
Where Cw = 3, Co = 0.67, and Cf = Clogging Factor = 0.5

P =	9.42	**ft**	P = Perimeter of catch basin minus area of longitudinal & lateral bars
A =	5.52	**sf**	A = Total area of grate minus area of longitudinal & lateral bars

Depth (ft)	Weir Qi (cfs)	Orifice Qi (cfs)
0.00	0.00	0.00
0.05	0.16	3.32
0.10	0.45	4.69
0.15	0.82	5.75
0.20	1.26	6.64
0.25	1.77	7.42
0.30	2.32	8.13
0.35	2.93	8.78
0.40	3.57	9.39
0.45	4.27	9.95
0.50	5.00	10.49
0.55	5.76	11.01
0.60	6.57	11.49
0.65	7.40	11.96
0.67	7.75	12.15
0.70	8.28	12.42
0.75	9.18	12.85
0.80	10.11	13.27
0.85	11.07	13.68
0.90	12.06	14.08
0.95	13.08	14.46
1.00	14.13	14.84
1.05	15.20	15.21
1.10	16.30	15.56
1.15	17.43	15.91
1.20	18.57	16.26
1.25	19.75	16.59
1.30	20.94	16.92
1.35	22.16	17.24
1.40	23.41	17.56
1.45	24.67	17.87
1.50	25.96	18.17



Worksheet for 1L (10-YR)

Project Description	
Solve For	Efficiency

Input Data	
Discharge	0.80 cfs
Slope	0.015 ft/ft
Gutter Width	1.50 ft
Gutter Cross Slope	0.020 ft/ft
Road Cross Slope	0.020 ft/ft
Roughness Coefficient	0.015
Curb Opening Length	9.0 ft
Local Depression	2.0 in
Local Depression Width	18.0 in

Results	
Efficiency	100.00 %
Intercepted Flow	0.80 cfs
Bypass Flow	0.00 cfs
Spread	6.0 ft
Depth	1.4 in
Flow Area	0.4 ft²
Gutter Depression	0.0 in
Total Depression	2.0 in
Velocity	2.22 ft/s
Equivalent Cross Slope	0.080 ft/ft
Length Factor	1.023
Total Interception Length	8.8 ft

Worksheet for 1L (100-YR)

Project Description	
Solve For	Efficiency

Input Data	
Discharge	1.40 cfs
Slope	0.015 ft/ft
Gutter Width	1.50 ft
Gutter Cross Slope	0.020 ft/ft
Road Cross Slope	0.020 ft/ft
Roughness Coefficient	0.015
Curb Opening Length	9.0 ft
Local Depression	2.0 in
Local Depression Width	18.0 in

Results	
Efficiency	91.86 %
Intercepted Flow	1.29 cfs
Bypass Flow	0.11 cfs
Spread	7.4 ft
Depth	1.8 in
Flow Area	0.5 ft²
Gutter Depression	0.0 in
Total Depression	2.0 in
Velocity	2.56 ft/s
Equivalent Cross Slope	0.070 ft/ft
Length Factor	0.752
Total Interception Length	12.0 ft

Worksheet for 1R (10-YR)

Project Description	
Solve For	Efficiency

Input Data	
Discharge	1.20 cfs
Slope	0.015 ft/ft
Gutter Width	1.50 ft
Gutter Cross Slope	0.020 ft/ft
Road Cross Slope	0.020 ft/ft
Roughness Coefficient	0.015
Curb Opening Length	9.0 ft
Local Depression	2.0 in
Local Depression Width	18.0 in

Results	
Efficiency	95.36 %
Intercepted Flow	1.14 cfs
Bypass Flow	0.06 cfs
Spread	7.0 ft
Depth	1.7 in
Flow Area	0.5 ft²
Gutter Depression	0.0 in
Total Depression	2.0 in
Velocity	2.46 ft/s
Equivalent Cross Slope	0.073 ft/ft
Length Factor	0.818
Total Interception Length	11.0 ft

Worksheet for 1R (100-YR)

Project Description	
Solve For	Efficiency

Input Data	
Discharge	2.10 cfs
Slope	0.015 ft/ft
Gutter Width	1.50 ft
Gutter Cross Slope	0.020 ft/ft
Road Cross Slope	0.020 ft/ft
Roughness Coefficient	0.015
Curb Opening Length	9.0 ft
Local Depression	2.0 in
Local Depression Width	18.0 in

Results	
Efficiency	80.88 %
Intercepted Flow	1.70 cfs
Bypass Flow	0.40 cfs
Spread	8.6 ft
Depth	2.1 in
Flow Area	0.7 ft²
Gutter Depression	0.0 in
Total Depression	2.0 in
Velocity	2.83 ft/s
Equivalent Cross Slope	0.064 ft/ft
Length Factor	0.601
Total Interception Length	15.0 ft

Worksheet for 2L (10-YR)

Project Description	
Solve For	Efficiency

Input Data	
Discharge	0.60 cfs
Slope	0.006 ft/ft
Gutter Width	1.50 ft
Gutter Cross Slope	0.020 ft/ft
Road Cross Slope	0.020 ft/ft
Roughness Coefficient	0.015
Curb Opening Length	6.0 ft
Local Depression	2.0 in
Local Depression Width	18.0 in

Results	
Efficiency	100.00 %
Intercepted Flow	0.60 cfs
Bypass Flow	0.00 cfs
Spread	6.5 ft
Depth	1.6 in
Flow Area	0.4 ft²
Gutter Depression	0.0 in
Total Depression	2.0 in
Velocity	1.43 ft/s
Equivalent Cross Slope	0.076 ft/ft
Length Factor	1.007
Total Interception Length	6.0 ft

Worksheet for 2L (100-YR)

Project Description	
Solve For	Efficiency

Input Data	
Discharge	1.10 cfs
Slope	0.006 ft/ft
Gutter Width	1.50 ft
Gutter Cross Slope	0.020 ft/ft
Road Cross Slope	0.020 ft/ft
Roughness Coefficient	0.015
Curb Opening Length	6.0 ft
Local Depression	2.0 in
Local Depression Width	18.0 in

Results	
Efficiency	89.95 %
Intercepted Flow	0.99 cfs
Bypass Flow	0.11 cfs
Spread	8.1 ft
Depth	2.0 in
Flow Area	0.7 ft²
Gutter Depression	0.0 in
Total Depression	2.0 in
Velocity	1.66 ft/s
Equivalent Cross Slope	0.067 ft/ft
Length Factor	0.721
Total Interception Length	8.3 ft

Worksheet for 2R (10-YR)

Project Description	
Solve For	Efficiency

Input Data	
Discharge	1.10 cfs
Slope	0.006 ft/ft
Gutter Width	1.50 ft
Gutter Cross Slope	0.020 ft/ft
Road Cross Slope	0.020 ft/ft
Roughness Coefficient	0.015
Curb Opening Length	6.0 ft
Local Depression	2.0 in
Local Depression Width	18.0 in

Results	
Efficiency	89.95 %
Intercepted Flow	0.99 cfs
Bypass Flow	0.11 cfs
Spread	8.1 ft
Depth	2.0 in
Flow Area	0.7 ft²
Gutter Depression	0.0 in
Total Depression	2.0 in
Velocity	1.66 ft/s
Equivalent Cross Slope	0.067 ft/ft
Length Factor	0.721
Total Interception Length	8.3 ft

Worksheet for 2R (100-YR)

Project Description	
Solve For	Efficiency

Input Data	
Discharge	2.40 cfs
Slope	0.006 ft/ft
Gutter Width	1.50 ft
Gutter Cross Slope	0.020 ft/ft
Road Cross Slope	0.020 ft/ft
Roughness Coefficient	0.015
Curb Opening Length	6.0 ft
Local Depression	2.0 in
Local Depression Width	18.0 in

Results	
Efficiency	68.06 %
Intercepted Flow	1.63 cfs
Bypass Flow	0.77 cfs
Spread	10.9 ft
Depth	2.6 in
Flow Area	1.2 ft²
Gutter Depression	0.0 in
Total Depression	2.0 in
Velocity	2.02 ft/s
Equivalent Cross Slope	0.056 ft/ft
Length Factor	0.470
Total Interception Length	12.8 ft

Worksheet for 3L (10-YR)

Project Description	
Solve For	Efficiency

Input Data	
Discharge	0.80 cfs
Slope	0.014 ft/ft
Gutter Width	1.50 ft
Gutter Cross Slope	0.020 ft/ft
Road Cross Slope	0.020 ft/ft
Roughness Coefficient	0.015
Curb Opening Length	9.0 ft
Local Depression	2.0 in
Local Depression Width	18.0 in

Results	
Efficiency	100.00 %
Intercepted Flow	0.80 cfs
Bypass Flow	0.00 cfs
Spread	6.1 ft
Depth	1.5 in
Flow Area	0.4 ft²
Gutter Depression	0.0 in
Total Depression	2.0 in
Velocity	2.14 ft/s
Equivalent Cross Slope	0.079 ft/ft
Length Factor	1.047
Total Interception Length	8.6 ft

Worksheet for 3L (100-YR)

Project Description	
Solve For	Efficiency

Input Data	
Discharge	1.50 cfs
Slope	0.014 ft/ft
Gutter Width	1.50 ft
Gutter Cross Slope	0.020 ft/ft
Road Cross Slope	0.020 ft/ft
Roughness Coefficient	0.015
Curb Opening Length	9.0 ft
Local Depression	2.0 in
Local Depression Width	18.0 in

Results	
Efficiency	91.18 %
Intercepted Flow	1.37 cfs
Bypass Flow	0.13 cfs
Spread	7.7 ft
Depth	1.9 in
Flow Area	0.6 ft²
Gutter Depression	0.0 in
Total Depression	2.0 in
Velocity	2.51 ft/s
Equivalent Cross Slope	0.069 ft/ft
Length Factor	0.740
Total Interception Length	12.2 ft

Worksheet for 3R (10-YR)

Project Description	
Solve For	Efficiency

Input Data	
Discharge	0.80 cfs
Slope	0.006 ft/ft
Gutter Width	1.50 ft
Gutter Cross Slope	0.020 ft/ft
Road Cross Slope	0.020 ft/ft
Roughness Coefficient	0.015
Curb Opening Length	3.0 ft
Local Depression	2.0 in
Local Depression Width	18.0 in

Results	
Efficiency	63.62 %
Intercepted Flow	0.51 cfs
Bypass Flow	0.29 cfs
Spread	7.2 ft
Depth	1.7 in
Flow Area	0.5 ft²
Gutter Depression	0.0 in
Total Depression	2.0 in
Velocity	1.54 ft/s
Equivalent Cross Slope	0.071 ft/ft
Length Factor	0.430
Total Interception Length	7.0 ft

Worksheet for 3R (100-YR)

Project Description	
Solve For	Efficiency

Input Data	
Discharge	2.10 cfs
Slope	0.006 ft/ft
Gutter Width	1.50 ft
Gutter Cross Slope	0.020 ft/ft
Road Cross Slope	0.020 ft/ft
Roughness Coefficient	0.015
Curb Opening Length	3.0 ft
Local Depression	2.0 in
Local Depression Width	18.0 in

Results	
Efficiency	40.79 %
Intercepted Flow	0.86 cfs
Bypass Flow	1.24 cfs
Spread	10.4 ft
Depth	2.5 in
Flow Area	1.1 ft²
Gutter Depression	0.0 in
Total Depression	2.0 in
Velocity	1.96 ft/s
Equivalent Cross Slope	0.058 ft/ft
Length Factor	0.253
Total Interception Length	11.9 ft

Worksheet for 4L (10-YR)

Project Description	
Solve For	Efficiency

Input Data	
Discharge	0.30 cfs
Slope	0.010 ft/ft
Gutter Width	1.50 ft
Gutter Cross Slope	0.020 ft/ft
Road Cross Slope	0.020 ft/ft
Roughness Coefficient	0.015
Curb Opening Length	6.0 ft
Local Depression	2.0 in
Local Depression Width	18.0 in

Results	
Efficiency	100.00 %
Intercepted Flow	0.30 cfs
Bypass Flow	0.00 cfs
Spread	4.4 ft
Depth	1.1 in
Flow Area	0.2 ft²
Gutter Depression	0.0 in
Total Depression	2.0 in
Velocity	1.52 ft/s
Equivalent Cross Slope	0.094 ft/ft
Length Factor	1.271
Total Interception Length	4.7 ft

Worksheet for 4L (100-YR)

Project Description	
Solve For	Efficiency

Input Data	
Discharge	0.80 cfs
Slope	0.010 ft/ft
Gutter Width	1.50 ft
Gutter Cross Slope	0.020 ft/ft
Road Cross Slope	0.020 ft/ft
Roughness Coefficient	0.015
Curb Opening Length	6.0 ft
Local Depression	2.0 in
Local Depression Width	18.0 in

Results	
Efficiency	91.36 %
Intercepted Flow	0.73 cfs
Bypass Flow	0.07 cfs
Spread	6.4 ft
Depth	1.5 in
Flow Area	0.4 ft²
Gutter Depression	0.0 in
Total Depression	2.0 in
Velocity	1.94 ft/s
Equivalent Cross Slope	0.076 ft/ft
Length Factor	0.743
Total Interception Length	8.1 ft

Worksheet for 4R (10-YR)

Project Description	
Solve For	Efficiency

Input Data	
Discharge	0.90 cfs
Slope	0.010 ft/ft
Gutter Width	1.50 ft
Gutter Cross Slope	0.020 ft/ft
Road Cross Slope	0.020 ft/ft
Roughness Coefficient	0.015
Curb Opening Length	9.0 ft
Local Depression	2.0 in
Local Depression Width	18.0 in

Results	
Efficiency	100.00 %
Intercepted Flow	0.90 cfs
Bypass Flow	0.00 cfs
Spread	6.7 ft
Depth	1.6 in
Flow Area	0.5 ft²
Gutter Depression	0.0 in
Total Depression	2.0 in
Velocity	2.00 ft/s
Equivalent Cross Slope	0.074 ft/ft
Length Factor	1.045
Total Interception Length	8.6 ft

Worksheet for 4R (100-YR)

Project Description	
Solve For	Efficiency

Input Data	
Discharge	2.20 cfs
Slope	0.010 ft/ft
Gutter Width	1.50 ft
Gutter Cross Slope	0.020 ft/ft
Road Cross Slope	0.020 ft/ft
Roughness Coefficient	0.015
Curb Opening Length	9.0 ft
Local Depression	2.0 in
Local Depression Width	18.0 in

Results	
Efficiency	83.98 %
Intercepted Flow	1.85 cfs
Bypass Flow	0.35 cfs
Spread	9.4 ft
Depth	2.3 in
Flow Area	0.9 ft²
Gutter Depression	0.0 in
Total Depression	2.0 in
Velocity	2.50 ft/s
Equivalent Cross Slope	0.061 ft/ft
Length Factor	0.639
Total Interception Length	14.1 ft

Worksheet for 5L (10-YR)

Project Description	
Solve For	Efficiency

Input Data	
Discharge	0.60 cfs
Slope	0.010 ft/ft
Gutter Width	1.50 ft
Gutter Cross Slope	0.020 ft/ft
Road Cross Slope	0.020 ft/ft
Roughness Coefficient	0.015
Curb Opening Length	6.0 ft
Local Depression	2.0 in
Local Depression Width	18.0 in

Results	
Efficiency	97.49 %
Intercepted Flow	0.58 cfs
Bypass Flow	0.02 cfs
Spread	5.8 ft
Depth	1.4 in
Flow Area	0.3 ft²
Gutter Depression	0.0 in
Total Depression	2.0 in
Velocity	1.80 ft/s
Equivalent Cross Slope	0.081 ft/ft
Length Factor	0.871
Total Interception Length	6.9 ft

Worksheet for 5L (100-YR)

Project Description	
Solve For	Efficiency

Input Data	
Discharge	1.20 cfs
Slope	0.010 ft/ft
Gutter Width	1.50 ft
Gutter Cross Slope	0.020 ft/ft
Road Cross Slope	0.020 ft/ft
Roughness Coefficient	0.015
Curb Opening Length	6.0 ft
Local Depression	2.0 in
Local Depression Width	18.0 in

Results	
Efficiency	80.30 %
Intercepted Flow	0.96 cfs
Bypass Flow	0.24 cfs
Spread	7.5 ft
Depth	1.8 in
Flow Area	0.6 ft²
Gutter Depression	0.0 in
Total Depression	2.0 in
Velocity	2.15 ft/s
Equivalent Cross Slope	0.070 ft/ft
Length Factor	0.594
Total Interception Length	10.1 ft

Worksheet for 5R (10-YR)

Project Description	
Solve For	Efficiency

Input Data	
Discharge	0.50 cfs
Slope	0.010 ft/ft
Gutter Width	1.50 ft
Gutter Cross Slope	0.020 ft/ft
Road Cross Slope	0.020 ft/ft
Roughness Coefficient	0.015
Curb Opening Length	3.0 ft
Local Depression	2.0 in
Local Depression Width	18.0 in

Results	
Efficiency	69.31 %
Intercepted Flow	0.35 cfs
Bypass Flow	0.15 cfs
Spread	5.4 ft
Depth	1.3 in
Flow Area	0.3 ft²
Gutter Depression	0.0 in
Total Depression	2.0 in
Velocity	1.72 ft/s
Equivalent Cross Slope	0.085 ft/ft
Length Factor	0.481
Total Interception Length	6.2 ft

Worksheet for 5R (100-YR)

Project Description	
Solve For	Efficiency

Input Data	
Discharge	1.20 cfs
Slope	0.010 ft/ft
Gutter Width	1.50 ft
Gutter Cross Slope	0.020 ft/ft
Road Cross Slope	0.020 ft/ft
Roughness Coefficient	0.015
Curb Opening Length	3.0 ft
Local Depression	2.0 in
Local Depression Width	18.0 in

Results	
Efficiency	47.00 %
Intercepted Flow	0.56 cfs
Bypass Flow	0.64 cfs
Spread	7.5 ft
Depth	1.8 in
Flow Area	0.6 ft²
Gutter Depression	0.0 in
Total Depression	2.0 in
Velocity	2.15 ft/s
Equivalent Cross Slope	0.070 ft/ft
Length Factor	0.297
Total Interception Length	10.1 ft

Worksheet for 6L (10-YR)

Project Description	
Solve For	Efficiency

Input Data	
Discharge	0.60 cfs
Slope	0.015 ft/ft
Gutter Width	1.50 ft
Gutter Cross Slope	0.020 ft/ft
Road Cross Slope	0.020 ft/ft
Roughness Coefficient	0.015
Curb Opening Length	9.0 ft
Local Depression	2.0 in
Local Depression Width	18.0 in

Results	
Efficiency	100.00 %
Intercepted Flow	0.60 cfs
Bypass Flow	0.00 cfs
Spread	5.4 ft
Depth	1.3 in
Flow Area	0.3 ft²
Gutter Depression	0.0 in
Total Depression	2.0 in
Velocity	2.08 ft/s
Equivalent Cross Slope	0.085 ft/ft
Length Factor	1.194
Total Interception Length	7.5 ft

Worksheet for 6L (100-YR)

Project Description	
Solve For	Efficiency

Input Data	
Discharge	1.20 cfs
Slope	0.015 ft/ft
Gutter Width	1.50 ft
Gutter Cross Slope	0.020 ft/ft
Road Cross Slope	0.020 ft/ft
Roughness Coefficient	0.015
Curb Opening Length	9.0 ft
Local Depression	2.0 in
Local Depression Width	18.0 in

Results	
Efficiency	95.25 %
Intercepted Flow	1.14 cfs
Bypass Flow	0.06 cfs
Spread	7.0 ft
Depth	1.7 in
Flow Area	0.5 ft²
Gutter Depression	0.0 in
Total Depression	2.0 in
Velocity	2.47 ft/s
Equivalent Cross Slope	0.073 ft/ft
Length Factor	0.816
Total Interception Length	11.0 ft

Worksheet for 6R (10-YR)

Project Description	
Solve For	Efficiency

Input Data	
Discharge	0.80 cfs
Slope	0.015 ft/ft
Gutter Width	1.50 ft
Gutter Cross Slope	0.020 ft/ft
Road Cross Slope	0.020 ft/ft
Roughness Coefficient	0.015
Curb Opening Length	13.0 ft
Local Depression	2.0 in
Local Depression Width	18.0 in

Results	
Efficiency	100.00 %
Intercepted Flow	0.80 cfs
Bypass Flow	0.00 cfs
Spread	6.0 ft
Depth	1.4 in
Flow Area	0.4 ft²
Gutter Depression	0.0 in
Total Depression	2.0 in
Velocity	2.24 ft/s
Equivalent Cross Slope	0.080 ft/ft
Length Factor	1.473
Total Interception Length	8.8 ft

Worksheet for 6R (100-YR)

Project Description	
Solve For	Efficiency

Input Data	
Discharge	1.80 cfs
Slope	0.015 ft/ft
Gutter Width	1.50 ft
Gutter Cross Slope	0.020 ft/ft
Road Cross Slope	0.020 ft/ft
Roughness Coefficient	0.015
Curb Opening Length	13.0 ft
Local Depression	2.0 in
Local Depression Width	18.0 in

Results	
Efficiency	99.41 %
Intercepted Flow	1.79 cfs
Bypass Flow	0.01 cfs
Spread	8.1 ft
Depth	1.9 in
Flow Area	0.7 ft²
Gutter Depression	0.0 in
Total Depression	2.0 in
Velocity	2.74 ft/s
Equivalent Cross Slope	0.067 ft/ft
Length Factor	0.942
Total Interception Length	13.8 ft

Worksheet for 7L (10-YR)

Project Description	
Solve For	Efficiency

Input Data	
Discharge	0.70 cfs
Slope	0.005 ft/ft
Gutter Width	1.50 ft
Gutter Cross Slope	0.020 ft/ft
Road Cross Slope	0.020 ft/ft
Roughness Coefficient	0.015
Curb Opening Length	9.0 ft
Local Depression	2.0 in
Local Depression Width	18.0 in

Results	
Efficiency	100.00 %
Intercepted Flow	0.70 cfs
Bypass Flow	0.00 cfs
Spread	7.0 ft
Depth	1.7 in
Flow Area	0.5 ft²
Gutter Depression	0.0 in
Total Depression	2.0 in
Velocity	1.42 ft/s
Equivalent Cross Slope	0.073 ft/ft
Length Factor	1.425
Total Interception Length	6.3 ft

Worksheet for 7L (100-YR)

Project Description	
Solve For	Efficiency

Input Data	
Discharge	1.40 cfs
Slope	0.005 ft/ft
Gutter Width	1.50 ft
Gutter Cross Slope	0.020 ft/ft
Road Cross Slope	0.020 ft/ft
Roughness Coefficient	0.015
Curb Opening Length	9.0 ft
Local Depression	2.0 in
Local Depression Width	18.0 in

Results	
Efficiency	99.84 %
Intercepted Flow	1.40 cfs
Bypass Flow	0.00 cfs
Spread	9.1 ft
Depth	2.2 in
Flow Area	0.8 ft²
Gutter Depression	0.0 in
Total Depression	2.0 in
Velocity	1.69 ft/s
Equivalent Cross Slope	0.062 ft/ft
Length Factor	0.972
Total Interception Length	9.3 ft

Worksheet for 7R (10-YR)

Project Description	
Solve For	Efficiency

Input Data	
Discharge	0.70 cfs
Slope	0.005 ft/ft
Gutter Width	1.50 ft
Gutter Cross Slope	0.020 ft/ft
Road Cross Slope	0.020 ft/ft
Roughness Coefficient	0.015
Curb Opening Length	9.0 ft
Local Depression	2.0 in
Local Depression Width	18.0 in

Results	
Efficiency	100.00 %
Intercepted Flow	0.70 cfs
Bypass Flow	0.00 cfs
Spread	7.0 ft
Depth	1.7 in
Flow Area	0.5 ft²
Gutter Depression	0.0 in
Total Depression	2.0 in
Velocity	1.42 ft/s
Equivalent Cross Slope	0.073 ft/ft
Length Factor	1.425
Total Interception Length	6.3 ft

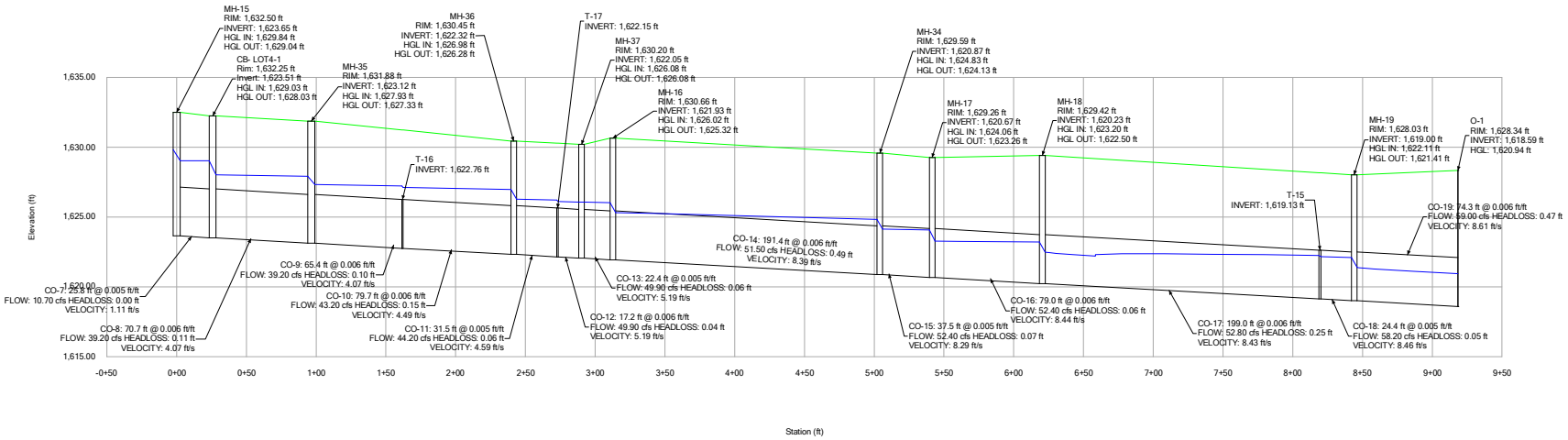
Worksheet for 7R (100-YR)

Project Description	
Solve For	Efficiency

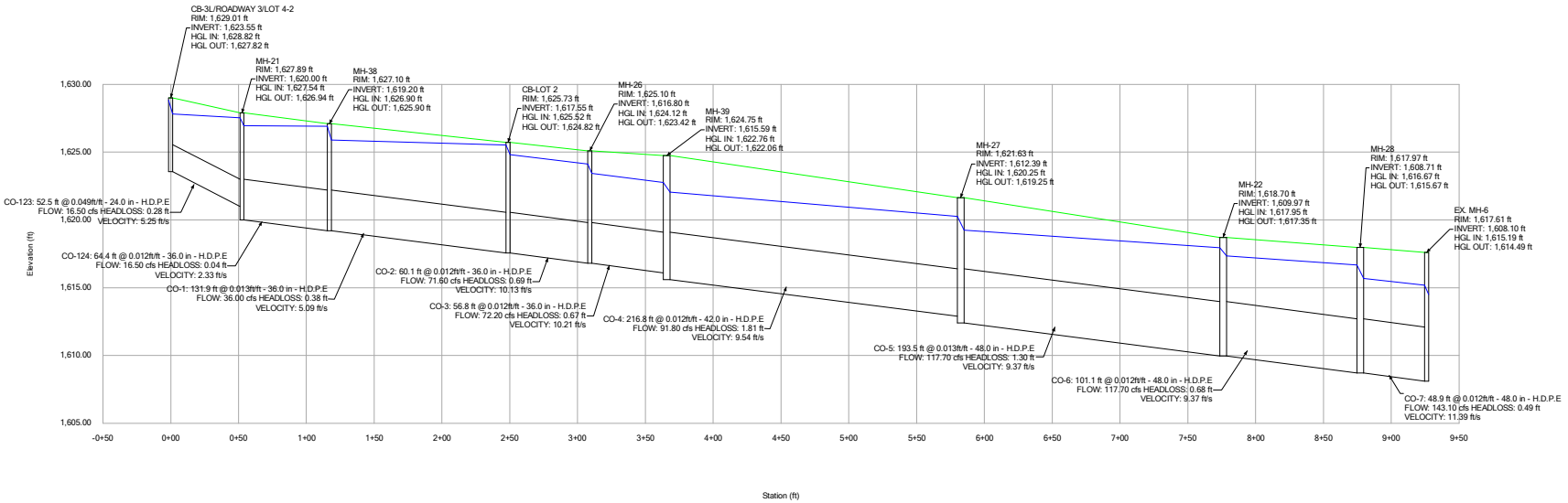
Input Data	
Discharge	1.40 cfs
Slope	0.005 ft/ft
Gutter Width	1.50 ft
Gutter Cross Slope	0.020 ft/ft
Road Cross Slope	0.020 ft/ft
Roughness Coefficient	0.015
Curb Opening Length	9.0 ft
Local Depression	2.0 in
Local Depression Width	18.0 in

Results	
Efficiency	99.84 %
Intercepted Flow	1.40 cfs
Bypass Flow	0.00 cfs
Spread	9.1 ft
Depth	2.2 in
Flow Area	0.8 ft²
Gutter Depression	0.0 in
Total Depression	2.0 in
Velocity	1.69 ft/s
Equivalent Cross Slope	0.062 ft/ft
Length Factor	0.972
Total Interception Length	9.3 ft

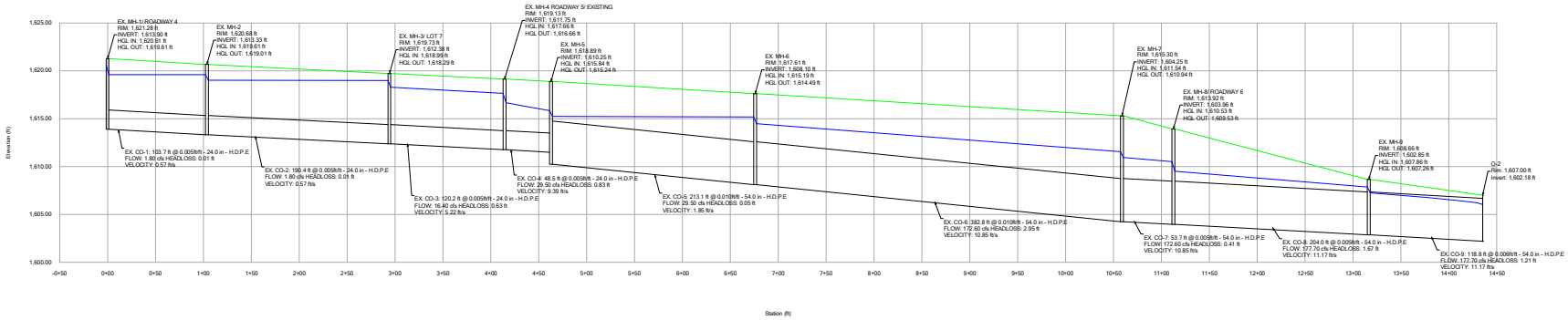
Profile Report
Engineering Profile - MH-15 TO O-1 (5234-StormCad-4-25-22.stsw)
Active Scenario: 100-YR



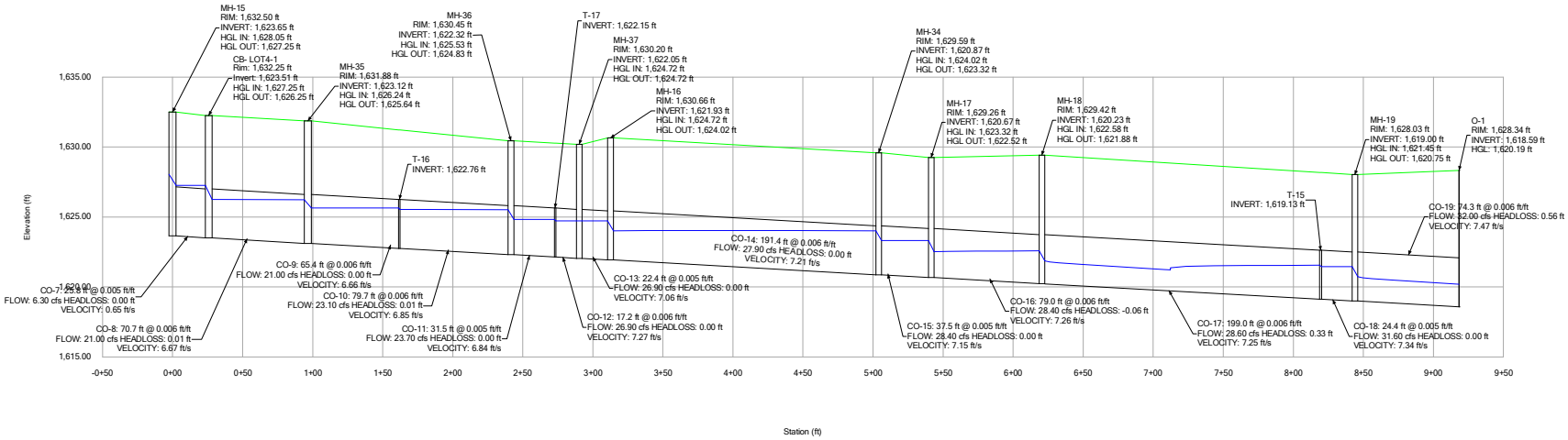
Profile Report
Engineering Profile - CB-3L/ROADWAY 3 TO EXMH-6 (5234-StormCad-4-25-22.stsw)
Active Scenario: 100-YR



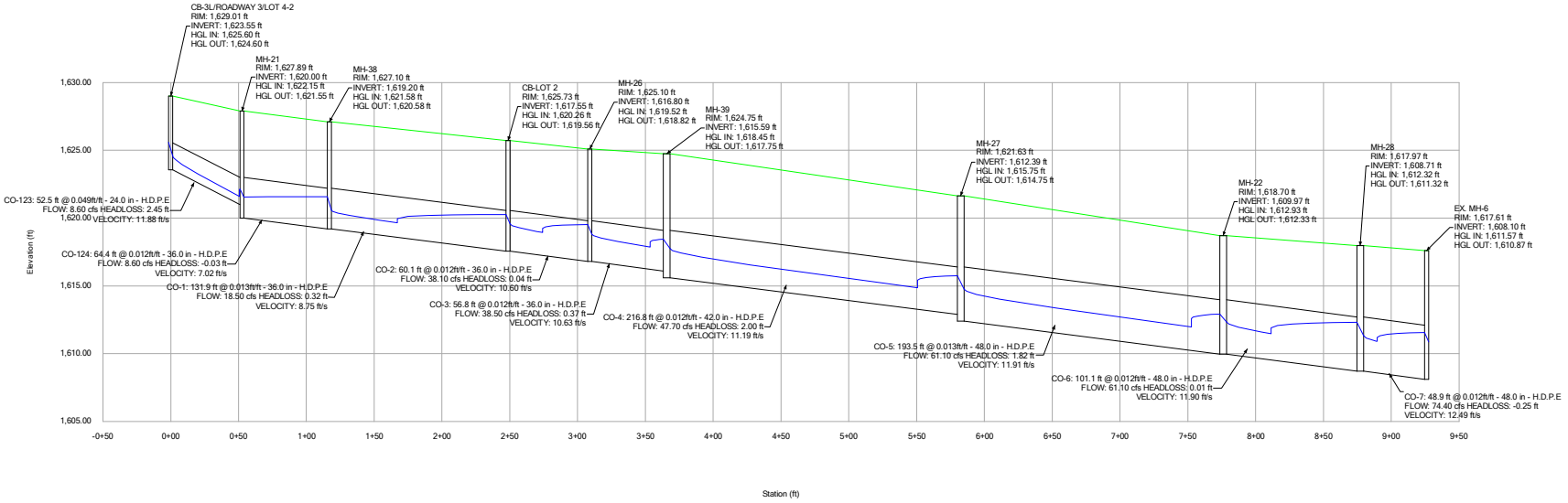
Profile Report
Engineering Profile - EX. MH-1/ ROADWAY 4 TO O-2 (5234-StormCad-4-25-22.stsw)
Active Scenario: 100-YR



Profile Report
Engineering Profile - MH-15 TO O-1 (5234-StormCad-4-25-22.stsw)
Active Scenario: 10-YR



Profile Report
Engineering Profile - CB-3L/ROADWAY 3 TO EXMH-6 (5234-StormCad-4-25-22.stsw)
Active Scenario: 10-YR



Profile Report
Engineering Profile - EX. MH-1/ ROADWAY 4 TO O-2 (5234-StormCad-4-25-22.stsw)
Active Scenario: 10-YR

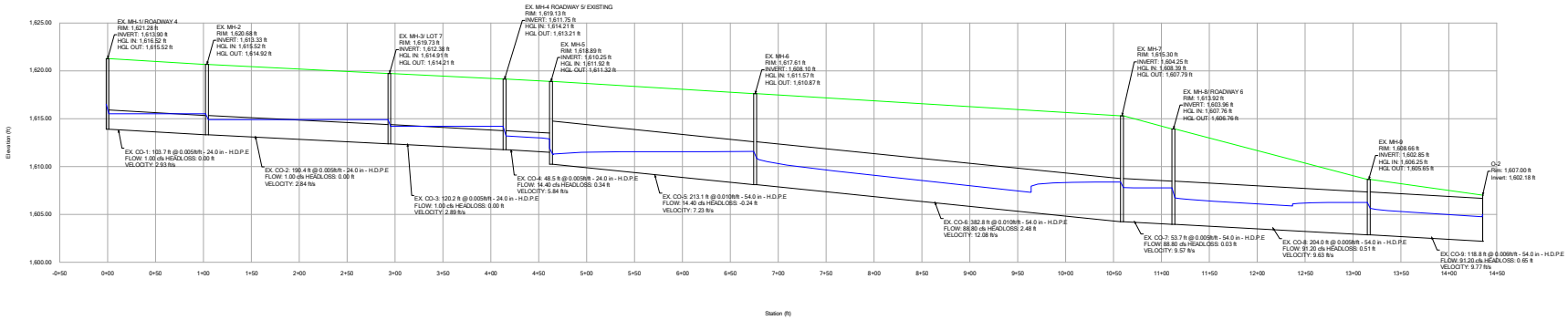
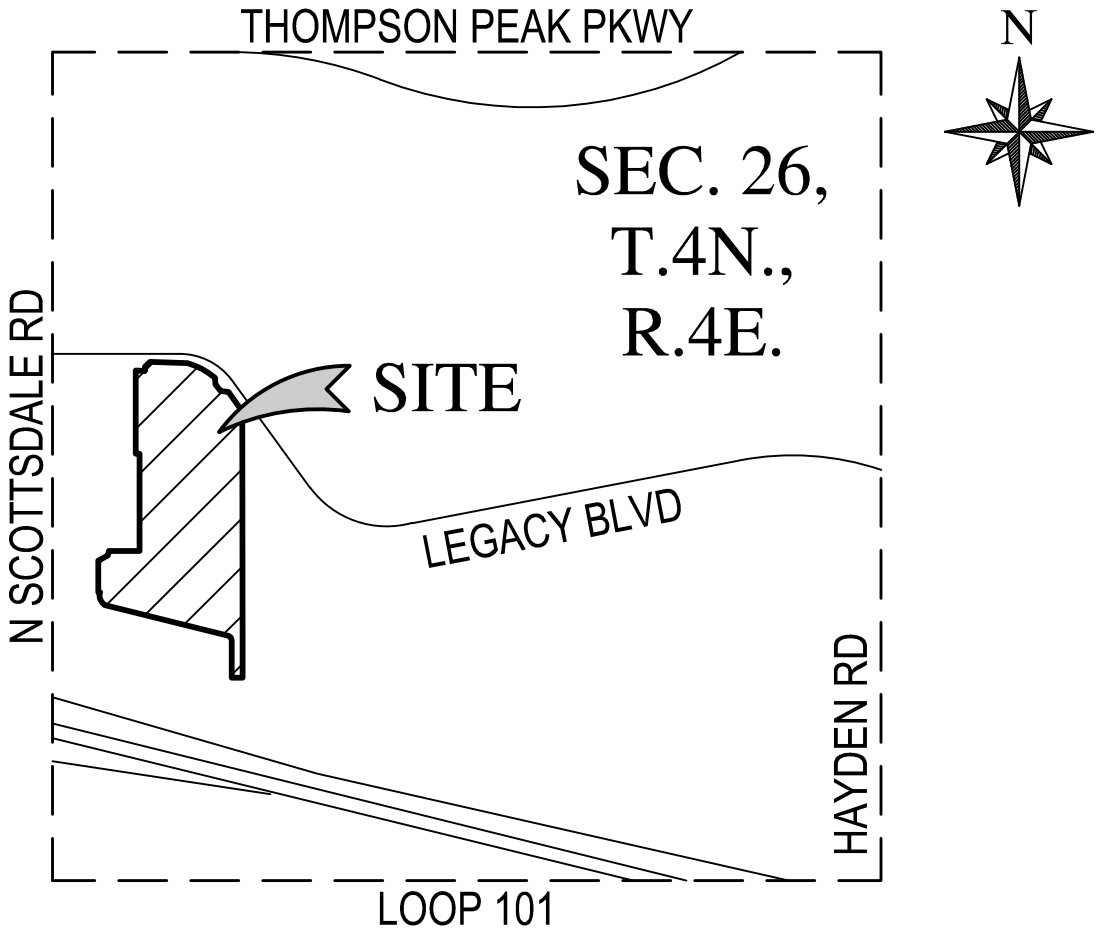


EXHIBIT 1 – VICINITY MAP



VICINITY MAP

N.T.S.

NOT
FOR
CONSTRUCTION
OR RECORDING

WOOD PATEL

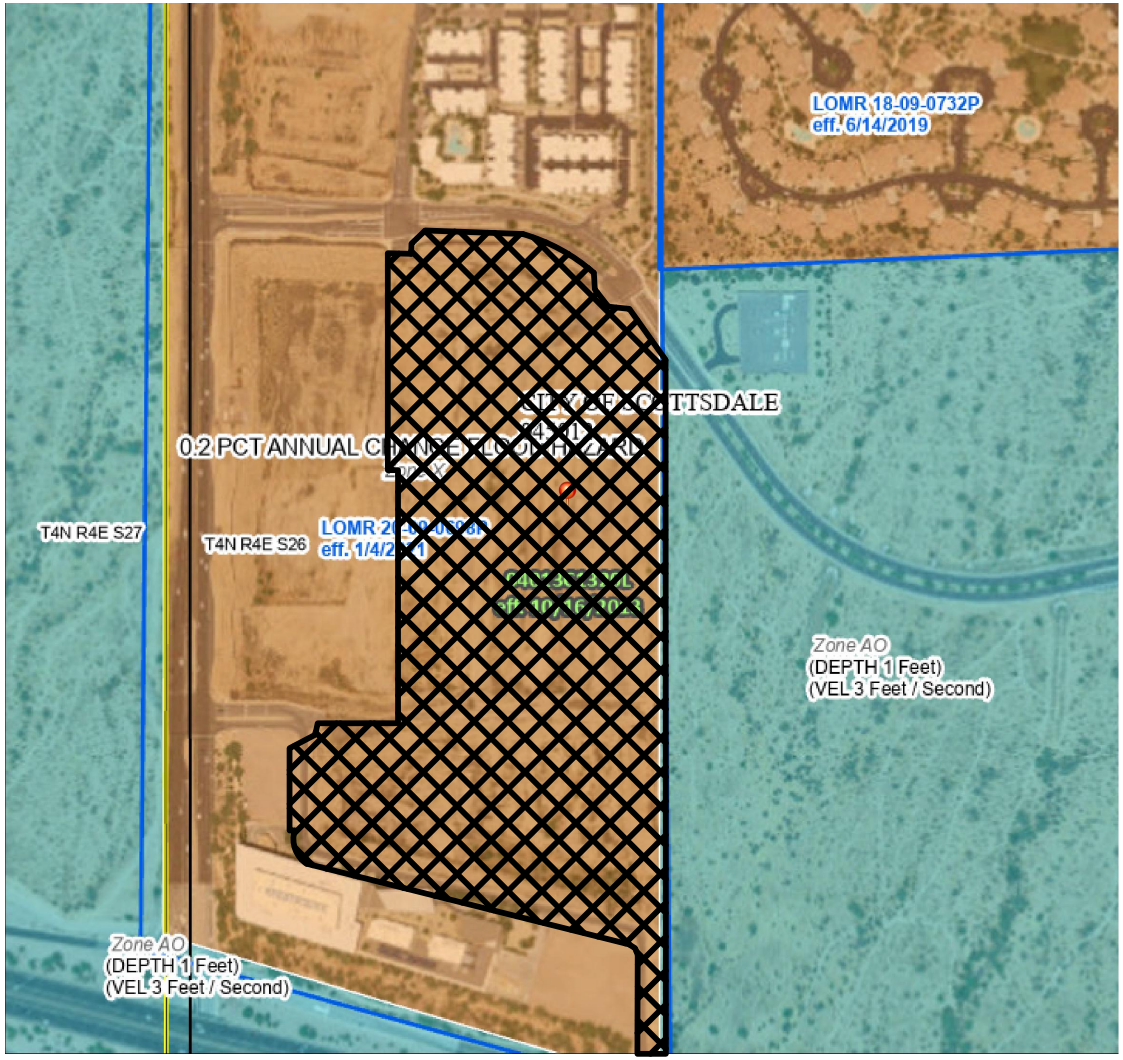
ONE SCOTTSDALE

INFRASTRUCTURE
VICINITY MAP

DATE	02/10/2022	SCALE	N.T.S.	SHEET	1 OF 1
JOB NO.	215234	DESIGN	ZR		
		DRAWN	JRS		

Z:\2021\215234\Project Support\Reports\Drainage\Exhibits\Infrastructure\5234-EXH1 VICINITY MAP.dwg

EXHIBIT 2 – FEMA FIRM EXHIBIT



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
- 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.

PROJECT AREA

NOT FOR CONSTRUCTION OR RECORDING

WOOD PATEL

ONE SCOTTSDALE - INFRASTRUCTURE

EXHIBIT 2
FEMA FIRM

DATE	02/10/2022	SCALE	N/A	SHEET	1 OF 1
JOB NO.	215234	DESIGN	ZNR	DRAWN	ZNR

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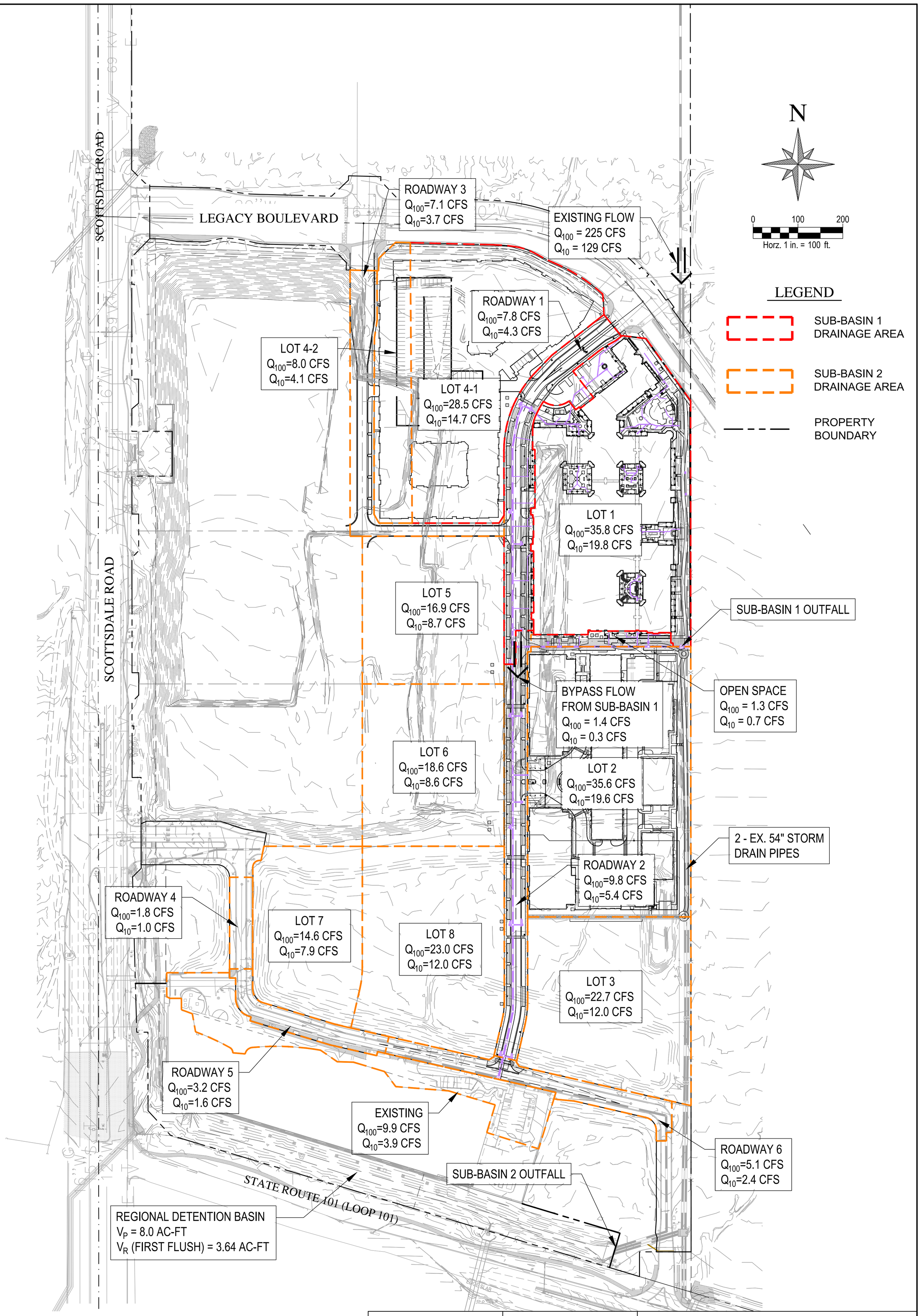
EXHIBIT 3 – ONE SCOTTSDALE – INFRASTRUCTURE MASTER DRAINAGE MAP



NOT FOR CONSTRUCTION OR RECORDING

WOOD PATEL

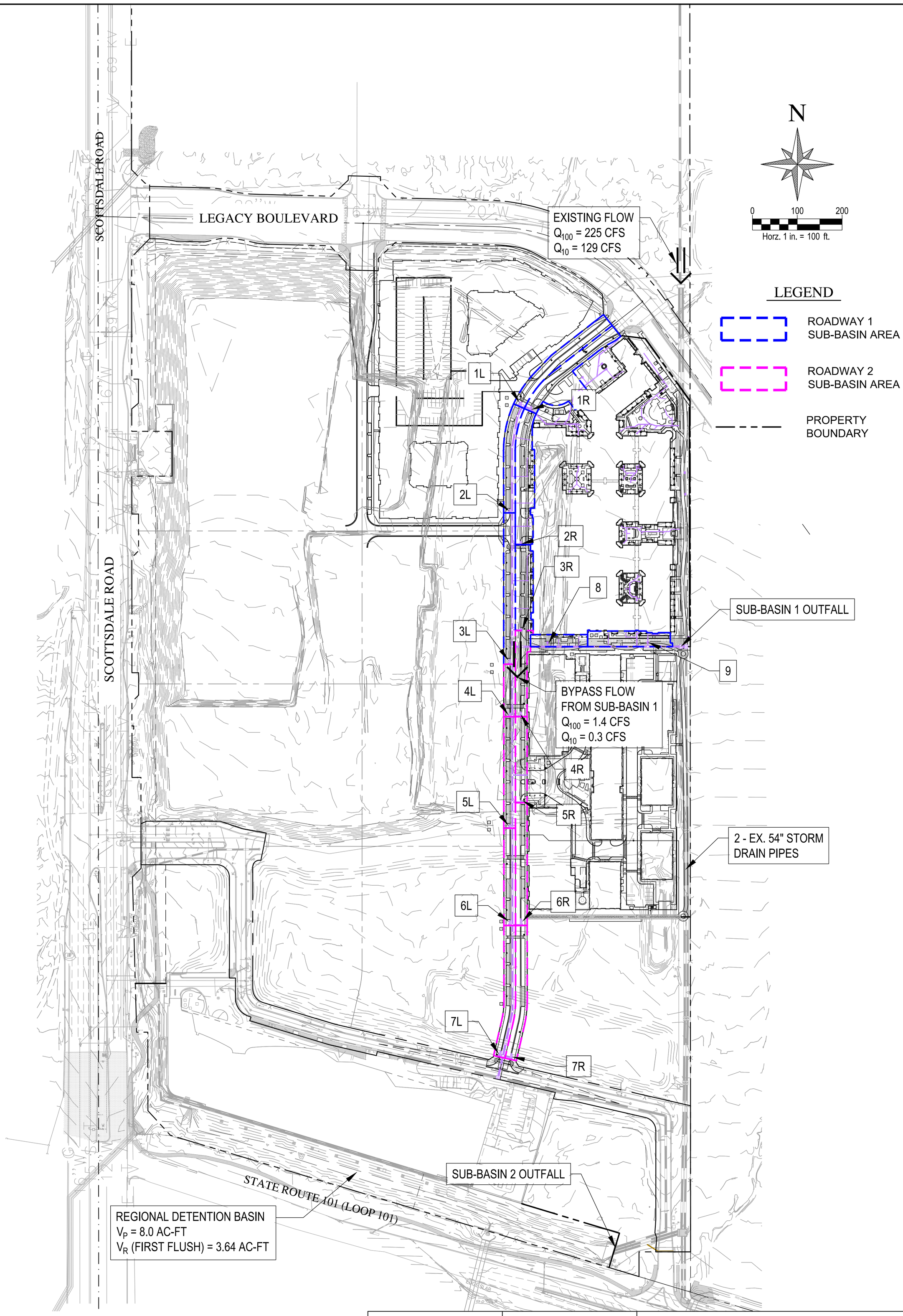
ONE SCOTTSDALE - INFRASTRUCTURE

MASTER DRAINAGE AREA EXHIBIT

DATE	04/25/2022	SCALE	1" = 100'	SHEET	1 OF 1
JOB NO.	215234	DESIGN	CJT	DRAWN	CJT

Z:\2021\215234\Project Support\Reports\Drainage\Exhibits\Infrastructure\5234-EXH3-DRAINAGE MAP.dwg

EXHIBIT 4 – ONE SCOTTSDALE– INFRASTRUCTURE ROADWAY DRAINAGE MAP



NOT FOR CONSTRUCTION OR RECORDING

WOOD PATEL

ONE SCOTTSDALE - INFRASTRUCTURE

ROADWAY DRAINAGE AREA EXHIBIT

DATE	04/25/2022	SCALE	1" = 100'	SHEET	1 OF 1
JOB NO.	215234	DESIGN	CJT	DRAWN	CJT

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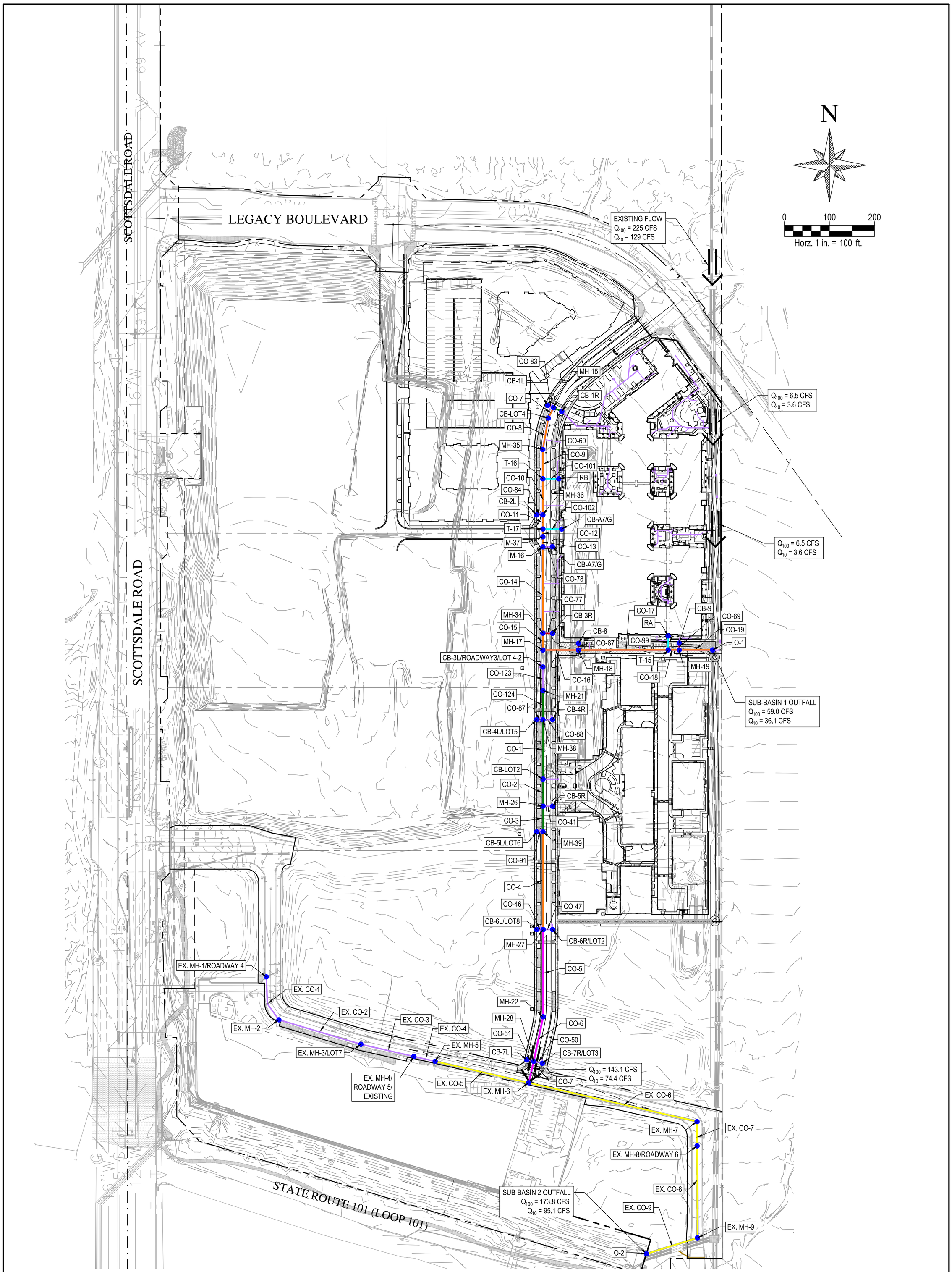
EXHIBIT 5 – ONE SCOTTSDALE – STORMCAD MAP



LEGEND

- PROPOSED 12" STORM DRAIN PIPE
- PROPOSED 18" STORM DRAIN PIPE
- PROPOSED 24" STORM DRAIN PIPE
- PROPOSED 36" STORM DRAIN PIPE
- PROPOSED 42" STORM DRAIN PIPE
- PROPOSED 48" STORM DRAIN PIPE
- PROPOSED 54" STORM DRAIN PIPE
- STORM DRAIN NODE
- CB-10A — CATCH BASIN NODE LABEL
- CO-10 — STORM DRAIN PIPE LABEL
- O-1 — OUTFALL LABEL

NOT FOR CONSTRUCTION OR RECORDING

WOOD PATEL

ONE SCOTTSDALE - INFRASTRUCTURE

STORMCAD MAP

DATE	04/25/2022	SCALE	1" = 100'	SHEET	1 OF 1
JOB NO.	215234	DESIGN	CJT	DRAWN	CJT

Z:\2021\215234\Project Support\Reports\Drainage\Exhibits\Infrastructure\5234-EXH3-DRAINAGE MAP.dwg

EXHIBIT 6 – ONE SCOTTSDALE (STREETLIGHTS RESIDENTIAL) FINAL DRAINAGE REPORT

DOCUMENT FROM SEPARATE DRAINAGE REPORT BEING REVIEWED CONCURRENTLY. FOR REFERENCE ONLY

WOOD PATEL

FINAL DRAINAGE REPORT
FOR
ONE SCOTTSDALE (STREETLIGHTS RESIDENTIAL)

February 22, 2022
WP# 215234

EXPIRES 6-30-24

DOCUMENT FROM SEPARATE DRAINAGE REPORT BEING REVIEWED CONCURRENTLY. FOR REFERENCE ONLY

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2.2 Offsite Drainage 2

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3.3 Retention and Dissipation 3

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5.0 CONCLUSIONS 5

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APPENDICES

APPENDIX A Hydrology Calculations

APPENDIX B Hydraulic Calculations

EXHIBITS

EXHIBIT 1 Vicinity Map

EXHIBIT 2 FEMA FIRM Exhibit

EXHIBIT 3 StreetLights Residential Drainage Exhibit

EXHIBIT 4 StreetLights Residential Storm CAD Exhibit

EXHIBIT 5 One Scottsdale East Regional Drainage Corridor Improvements

EXHIBIT 6 Hydraulic Modeling Assistance for One Scottsdale in Scottsdale, Arizona Report by JE Fuller

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Y:\WP\Reports\Commercial\215234 One Scottsdale (StreetLights Residential) Final Drainage Report.docx

EXPIRES 6-30-24

DOCUMENT FROM SEPARATE DRAINAGE REPORT BEING REVIEWED CONCURRENTLY. FOR REFERENCE ONLY

1.0 INTRODUCTION

The proposed One Scottdale (StreetLights Residential) (Site) consists of proposed multi-family residential building with associated parking, landscape and hardscape open space. The approximate 5.69-acre Site is located within Section 26, Township 4 North, Range 4 East of the Gila and Salt River Base and Meridian, Maricopa County, Arizona. More specifically, the Site is located within Planning Unit II (PU II) of the One Scottsdale master plan development, near the southeast corner of Scottdale Road and Legacy Boulevard in Scottsdale, Arizona. The Site is bound by Legacy Boulevard to the north, undeveloped state land to the east, undeveloped private land to the south, and a proposed private roadway to the west. Refer to Exhibit 1 – *Vicinity Map* for the location.

In conjunction with the proposed StreetLights Residential Improvements, offsite roadway, drainage, and utility infrastructure is also anticipated to be constructed. Analysis for this infrastructure will be provided in previously approved Master Reports and information submitted with the Preliminary Plat submittal.

This Final Drainage Report is prepared for Streetlights Creative Studio, LLC and submitted to the City of Scottsdale in support of the project's improvement plan submittal. This Report has been prepared in accordance with Wood, Patel & Associates, Inc.'s (WOODPATEL's) understanding of the City of Scottsdale technical requirements for stormwater drainage and collection systems (Ref. 1, 3).

DOCUMENT FROM SEPARATE DRAINAGE REPORT BEING REVIEWED CONCURRENTLY. FOR REFERENCE ONLY

2.0 EXISTING DRAINAGE CONDITIONS

2.1 Onsite Drainage

The Site is currently an undeveloped portion of the phased, 120-acre One Scottsdale master planned development. The existing topography of the Site generally slopes from north to south with an approximate elevation change of 8 feet. There are existing dirt stockpiles onsite that will be removed as part of the proposed construction. The additional dirt will be utilized for proposed improvements or moved to undeveloped portions of the Site for future use.

2.2 Offsite Drainage

Two (2) existing 54-inch RGRCP storm drain pipes and an existing swale, that were constructed with the previous TDS improvements, go through the Site along the eastern property boundary. This existing stormwater infrastructure is part of the regional stormwater system that was constructed for the One Scottsdale master plan development. The existing storm drain pipes ultimately outfall to Arizona Department of Transportation (ADOT) culvert #6 to the south, with overflow being directed towards the offline regional detention basin. The existing swale outfalls at the southeast corner of PU II and flows beneath the State Route 101 Freeway through ADOT culvert #6. See Exhibit 5 – *One Scottsdale East Regional Drainage Corridor Improvements.*

Per comments from the City of Scottsdale, ADMS maps indicated that offsite flows could potentially impact the Site from Legacy Boulevard via drainage improvements north of Legacy. The ADMS findings underwent further evaluation by JD Fuller and preliminary results indicate that offsite flows from Legacy Boulevard are not anticipated to impact the Site. See Exhibit 6 – *Hydraulic Modeling Assistance for One Scottsdale in Scottsdale, Arizona Report by JE Fuller*, for the full analysis of these offsite flows.

Per the *One Scottsdale Master Drainage Plan* (Ref. 4) approximately 219 cfs of stormwater runoff from a portion of Planning Unit III (PU III) and Legacy Boulevard to the north will pass through the Site via the existing 54-inch storm drain pipes.

Per Exhibit 5 – *One Scottsdale East Reginal Drainage Corridor Improvements*, approximately five (5) cfs of offsite flows form the east are anticipated to enter the Site near the southeastern property corner. These flows are currently captured by the existing swale along the eastern property boundary. Existing contours indicate that offsite flows are not anticipated to impact the Site from the west.

2.3 FEMA Floodplain

The Federal Emergency Management Agency (FEMA) has published Flood Insurance Rate Maps for Maricopa County and Incorporated Areas. The Site is located within “Other Areas of Flood Hazard” Zone “X” shaded per Flood Insurance Rate Map (FIRM) Panel 1320 of 4425, Map Number 04013C1320L, dated October 16, 2013. Refer to Exhibit 2 - *FEMA FIRM Exhibit*.

“Other Flood Areas” Zone “X” shaded is defined by FEMA as follows:

> *“Area of 0.2% annual chance flood hazard; areas of 1% annual chance flood with average depths less than 1 foot or with drainage areas of less than 1 square mile”.*

DOCUMENT FROM SEPARATE DRAINAGE REPORT BEING REVIEWED CONCURRENTLY. FOR REFERENCE ONLY

3.0 PROPOSED DRAINAGE PLAN

3.1 Drainage Conditions

Onsite grades will direct stormwater runoff away from the building, toward the adjacent private drive or concentration points strategically located around the Site. Area drains will be located at the Site's concentration points to capture onsite surface runoff. A proposed private storm drain system was designed to convey the 100-year stormwater event to the existing 54-inch regional storm pipes to the east. Refer to Appendix B – *Hydraulic Analysis*.

The existing offsite flows from the east, as noted in section 2.2, will be captured by a proposed catch basin at the southeast corner of the Site that connects directly to the 54-inch storm drain. This offsite flow will pass though the existing system and outfall into ADOT culvert #6 to match historical conditions.

3.2 Lowest Floor Elevation

The proposed building will have two (2) floor elevations. The northern portion of the building with have a finished floor elevation of 1636, while the remainder of the building will have a finished floor elevation of 1633. The proposed finished floors are designed as an engineer sump and are lower than the adjacent curb elevation of 1638.4. However, stormwater flows will be directed away from the proposed building to prevent inundation. Additionally, the finished floors are at least 3-foot above the Site outfall of 1628.59.

3.3 Retention and Dissipation

Per coordination with the City of Scottsdale, the Site will be required to provide sufficient retention or treatment of the first flush stormwater runoff. Due to ADOT culvert #6, not the offline detention basin, being the ultimate outfall for onsite stormwater; it must be assumed that the first flush storm event is not retained and must therefore be treated. Area drains will be installed with flowguard inserts to provide the necessary treatment for the first flush surface runoff before entering the existing stormwater system.

3.4 Ongoing Maintenance

Ongoing maintenance of the designed and recommended drainage systems is required to preserve system integrity. Failure to provide maintenance can prevent the drainage system from performing its intended design purpose and can result in reduced performance. Maintenance within the public right-of-way is the responsibility of the governing municipality. The property owner shall be solely responsible for the operation and maintenance of facilities on private property and within drainage easements, including private streets.

DOCUMENT FROM SEPARATE DRAINAGE REPORT BEING REVIEWED CONCURRENTLY. FOR REFERENCE ONLY

4.0 SPECIAL CONDITIONS

Currently, there are no washes with 100-year flows greater than 50 cfs traversing the Site. Also, there are no designated Section 404 washes within the Site. Therefore, a Section 404 permit is not required for development.

DOCUMENT FROM SEPARATE DRAINAGE REPORT BEING REVIEWED CONCURRENTLY. FOR REFERENCE ONLY

5.0 CONCLUSIONS

Based on our analysis of the Site, the following conclusions can be made:

1. The proposed drainage infrastructure will be designed in accordance with the *City of Scottsdale Design Standards & Policies Manual*, 2018.

2. The proposed Site lies within a FEMA-designated "Other Flood Areas" Zone "X" shaded. Per the FEMA map (Panel 1320), the FIRM information is as follows: "*0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flow with average depth less than one foot or with drainage areas of less than one square mile*".

3. Preliminary results from JE Fuller indicate that no offsite flows from Legacy Boulevard are anticipated to impact the Site.

4. Approximately 219 cfs of stormwater runoff from the north will pass through the Site via the existing 54-inch storm drain pipes.

5. Approximately 5 cfs of stormwater runoff form the east will enter the Site at the southeast property corner, where it will be captured by a proposed catch basin and conveyed to the it historic outfall via the existing 54-inch storm drain pipes. Offsite flows from the west and south do not appear to impact the Site.

6. The proposed building is in an engineered sump with the finished floors for the building (1636 & 1633) being lower than the adjacent curb elevation of 1638.4. However, stormwater flows are directed away from the building to prevent inundation and the finished floor elevations are a minimum of 3-foot higher than the Site outfall of 1628.59.

7. Per coordination with the City of Scottsdale, the project is required to treat the first flush runoff for the Site. Area drains will be installed with flowguard inserts to provide the necessary treatment for the first flush surface runoff before entering the existing stormwater system.

8. The property owner shall perform ongoing maintenance of the onsite stormwater system.

DOCUMENT FROM SEPARATE DRAINAGE REPORT BEING REVIEWED CONCURRENTLY. FOR REFERENCE ONLY

6.0 REFERENCES

1. *Drainage Design Manual, Hydrology, Edition 4*, Flood Control District of Maricopa County, December 14, 2018.
2. *Drainage Design Manual, Hydraulic*, *Edition 4*, Flood Control District of Maricopa County, December 14, 2018.
3. *Design Standards and Policies Manual, Chapter 4: Grading and Drainage*, City of Scottsdale, January 2018
4. *One Scottsdale Master Drainage Plan*, Wood, Patel & Associates, Inc., Revised June 20, 2013.

DOCUMENT FROM SEPARATE DRAINAGE REPORT BEING REVIEWED CONCURRENTLY. FOR REFERENCE ONLY

APPENDIX A – HYDROLOGY CALCULATIONS

DOCUMENT FROM SEPARATE DRAINAGE REPORT BEING REVIEWED CONCURRENTLY. FOR REFERENCE ONLY

WOOD PATEL

COMPOSITE WEIGHTED "C" FACTOR CALCULATIONS

100 YEAR

Project	One Scottsdale - Streetlights Residential
Location	Scottsdale AZ
Project Number	215234
Project Engineer	John G. Ritchie, P.E.

Drainage Subbasin ID	Area	Paved Streets, Parking Lots, Roofs, Driveways		Lawns, Golf Courses, & Parks (grassed areas)		100 YR Runoff Coefficient
(Description/ID)	(Acres)	%	"C"	%	"C"	"C"
A1	0.13	92.3	0.95	7.7	0.30	**0.90**
A2	0.01	100	0.95	0	0.30	**0.95**
A3	0.27	85	0.95	15	0.30	**0.85**
A4	0.22	90	0.95	10	0.30	**0.89**
A5	0.17	65.2	0.95	34.8	0.30	**0.72**
A6	0.14	75.4	0.95	24.6	0.30	**0.79**
A7	0.09	95	0.95	5	0.30	**0.92**
A8	0.12	78.3	0.95	21.7	0.30	**0.81**
A9	0.24	83	0.95	17	0.30	**0.84**
A10	0.07	60	0.95	40	0.30	**0.72**
RA	0.72	100	0.95	0	0.30	**0.95**
RB	0.51	100	0.95	0	0.30	**0.95**
RC1	0.35	100	0.95	0	0.30	**0.95**
RC2	0.31	100	0.95	0	0.30	**0.95**
RD	0.54	100	0.95	0	0.30	**0.95**
RE	0.37	100	0.95	0	0.30	**0.95**
G	0.69	100	0.95	0	0.30	**0.95**

DOCUMENT FROM SEPARATE DRAINAGE REPORT BEING REVIEWED CONCURRENTLY. FOR REFERENCE ONLY

WOOD PATEL

RATIONAL METHOD SUMMARY

100 YEAR, 10 YEAR, 2 YEAR

Project	One Scottsdale - Streetlights Residential
Location	Scottsdale AZ
Project Number	215234
Project Engineer	John G. Ritchie, P.E.

ON-SITE WATERSHEDS										100 YEAR				10 YEAR				2 YEAR			
Drainage Subbasin ID	Longest Watercourse 'L' (ft)	Longest Watercourse 'L' (mi)	Drainage Area 'A' (sf)	Drainage Area 'A' (Acres)	K_b Type[1]	Watershed Resistance Coefficient 'K_b'	Top Elevation	Bottom Elevation	Basin Slope 'S' (ft/mi)	Calculated Q100 'Tc' (See Note 2) (min)	100 YEAR Intensity 'i' (in/hr)	100 YR Runoff Coefficient 'C'	Q100 Flow (cfs)	Calculated Q10 'Tc' (See Note 2) (min)	10 YEAR Intensity 'i' (in/hr)	10 YR Runoff Coefficient 'C'	Q10 Flow (cfs)	Calculated Q2 'Tc' (See Note 2) (min)	2 YEAR Intensity 'i' (in/hr)	2 YR Runoff Coefficient 'C'	Q2 Flow (cfs)
A1	87	0.016	5,872	0.13	A	0.0454	1636.8	1634.0	166.9	5.0	7.86	0.90	**1.0**	5.0	5.00	0.78	**0.5**	5.0	3.10	0.72	**0.3**
A2	37	0.007	283	0.01	A	0.0537	1638.5	1635.5	431.0	5.0	7.86	0.95	**0.05**	5.0	5.00	0.83	**0.03**	5.0	3.10	0.76	**0.02**
A3	213	0.040	11,795	0.27	A	0.0435	1636.9	1635.4	38.4	5.0	7.86	0.85	**1.8**	5.0	5.00	0.74	**1.0**	5.0	3.10	0.68	**0.6**
A4	117	0.022	9,448	0.22	A	0.0441	1636.0	1632.3	167.4	5.0	7.86	0.89	**1.5**	5.0	5.00	0.77	**0.8**	5.0	3.10	0.71	**0.5**
A5	176	0.033	7,583	0.17	A	0.0447	1636.8	1631.7	152.8	5.0	7.86	0.72	**1.0**	5.0	5.00	0.63	**0.5**	5.0	3.10	0.58	**0.3**
A6	54	0.010	6,286	0.14	A	0.0453	1636.0	1632.3	362.8	5.0	7.86	0.79	**0.9**	5.0	5.00	0.69	**0.5**	5.0	3.10	0.63	**0.3**
A7	14	0.003	3,926	0.09	A	0.0465	1633.0	1632.5	207.9	5.0	7.86	0.92	**0.6**	5.0	5.00	0.80	**0.4**	5.0	3.10	0.73	**0.2**
A8	38	0.007	5,070	0.12	A	0.0458	1633.0	1632.7	45.1	5.0	7.86	0.81	**0.7**	5.0	5.00	0.70	**0.4**	5.0	3.10	0.65	**0.2**
A9	157	0.030	10,668	0.24	A	0.0438	1632.9	1630.8	70.8	5.0	7.86	0.84	**1.6**	5.0	5.00	0.73	**0.9**	5.0	3.10	0.67	**0.5**
A10	75	0.014	3,230	0.07	A	0.0471	1632.5	1631.7	57.7	5.0	7.86	0.72	**0.4**	5.0	5.00	0.63	**0.2**	5.0	3.10	0.58	**0.1**
RA	--	--	31,473	0.72	A	0.0409	--	--	-	5.0	7.86	0.95	**5.4**	5.0	5.00	0.83	**3.0**	5.0	3.10	0.76	**1.7**
RB	--	--	22,280	0.51	A	0.0418	--	--	-	5.0	7.86	0.95	**3.8**	5.0	5.00	0.83	**2.1**	5.0	3.10	0.76	**1.2**
RC1	--	--	15,336	0.35	A	0.0428	--	--	-	5.0	7.86	0.95	**2.6**	5.0	5.00	0.83	**1.5**	5.0	3.10	0.76	**0.8**
RC2	--	--	13,342	0.31	A	0.0432	--	--	-	5.0	7.86	0.95	**2.3**	5.0	5.00	0.83	**1.3**	5.0	3.10	0.76	**0.7**
RD	--	--	23,696	0.54	A	0.0417	--	--	-	5.0	7.86	0.95	**4.1**	5.0	5.00	0.83	**2.2**	5.0	3.10	0.76	**1.3**
RE	--	--	16,114	0.37	A	0.0427	--	--	-	5.0	7.86	0.95	**2.8**	5.0	5.00	0.83	**1.5**	5.0	3.10	0.76	**0.9**
G	--	--	29,980	0.69	A	0.0410	--	--	-	5.0	7.86	0.95	**5.1**	5.0	5.00	0.83	**2.8**	5.0	3.10	0.76	**1.6**

Notes

1. Per Drainage Design Manual for Maricopa County, Vol. I, Hydrology (2018), Table 3.1: Equation for Estimating Kb in the Tc Equation
2. Minimum Tc is 5 minutes.

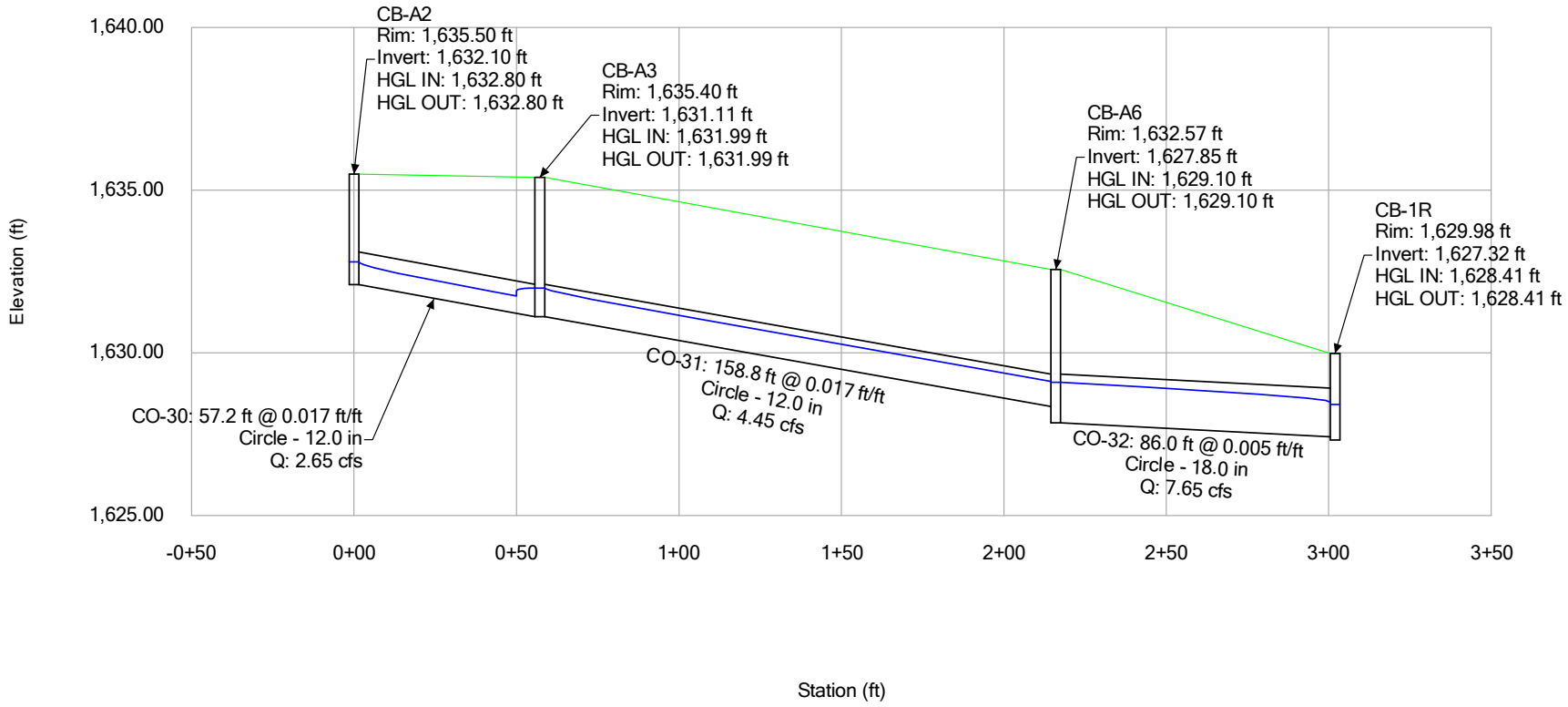
DOCUMENT FROM SEPARATE DRAINAGE REPORT BEING REVIEWED CONCURRENTLY. FOR REFERENCE ONLY

APPENDIX B – HYDRAULIC CALCULATIONS

DOCUMENT FROM SEPARATE DRAINAGE REPORT BEING REVIEWED CONCURRENTLY. FOR REFERENCE ONLY

Profile Report

Engineering Profile - CB-A2 TO CB-1R (5234-StormCad-UPDATE.stsw)



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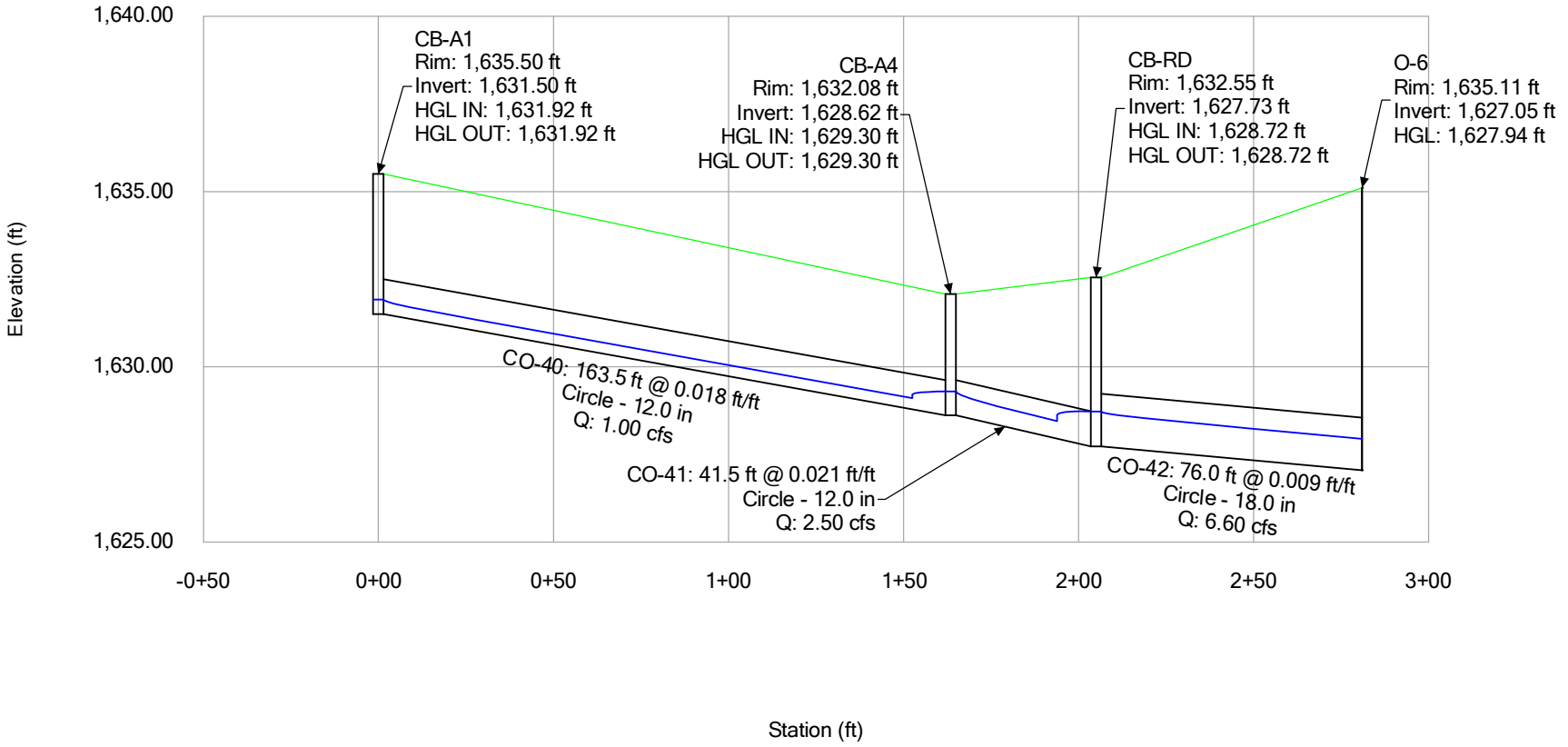
Profile Report

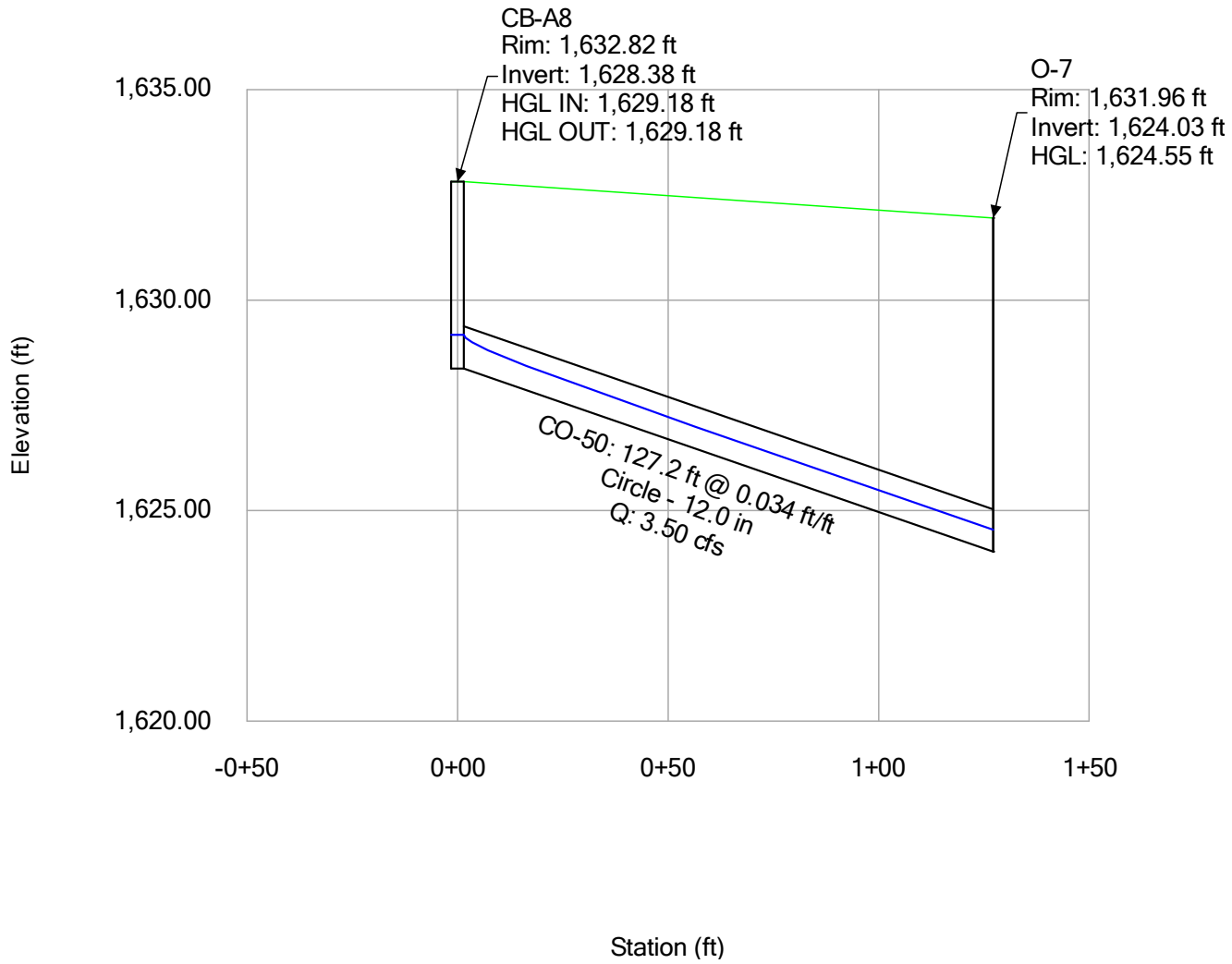
Engineering Profile - CB-A1 TO O-6 (5234-StormCad-UPDATE.stsw)



DOCUMENT FROM SEPARATE DRAINAGE REPORT BEING REVIEWED CONCURRENTLY. FOR REFERENCE ONLY

Profile Report

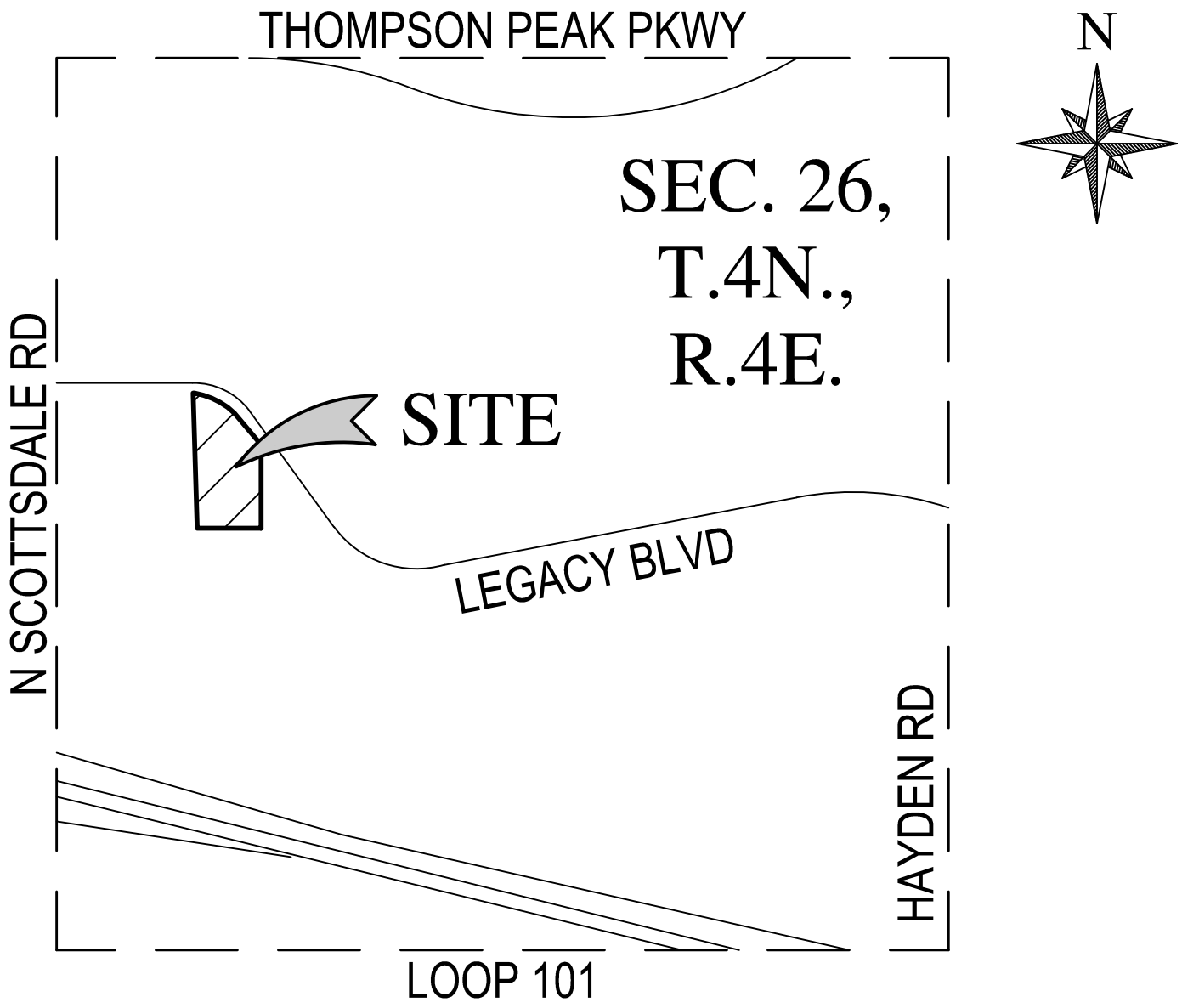
Engineering Profile - CB-A8 TO O-7 (5234-StormCad-UPDATE.stsw)



DOCUMENT FROM SEPARATE DRAINAGE REPORT BEING REVIEWED CONCURRENTLY. FOR REFERENCE ONLY

EXHIBIT 1 – VICINITY MAP

DOCUMENT FROM SEPARATE DRAINAGE REPORT BEING REVIEWED CONCURRENTLY. FOR REFERENCE ONLY



VICINITY MAP

N.T.S.

NOT
FOR CONSTRUCTION OR RECORDING

WOOD PATEL

ONE SCOTTSDALE - STREETLIGHTS RESIDENTIAL

EXHIBIT 1
VICINITY MAP

DATE	06/16/2021	SCALE	N/A	SHEET	1 OF 1
JOB NO.	215234	DESIGN	ZNR	CHECK	JGR
		DRAWN	JRS	RFI #	N/A

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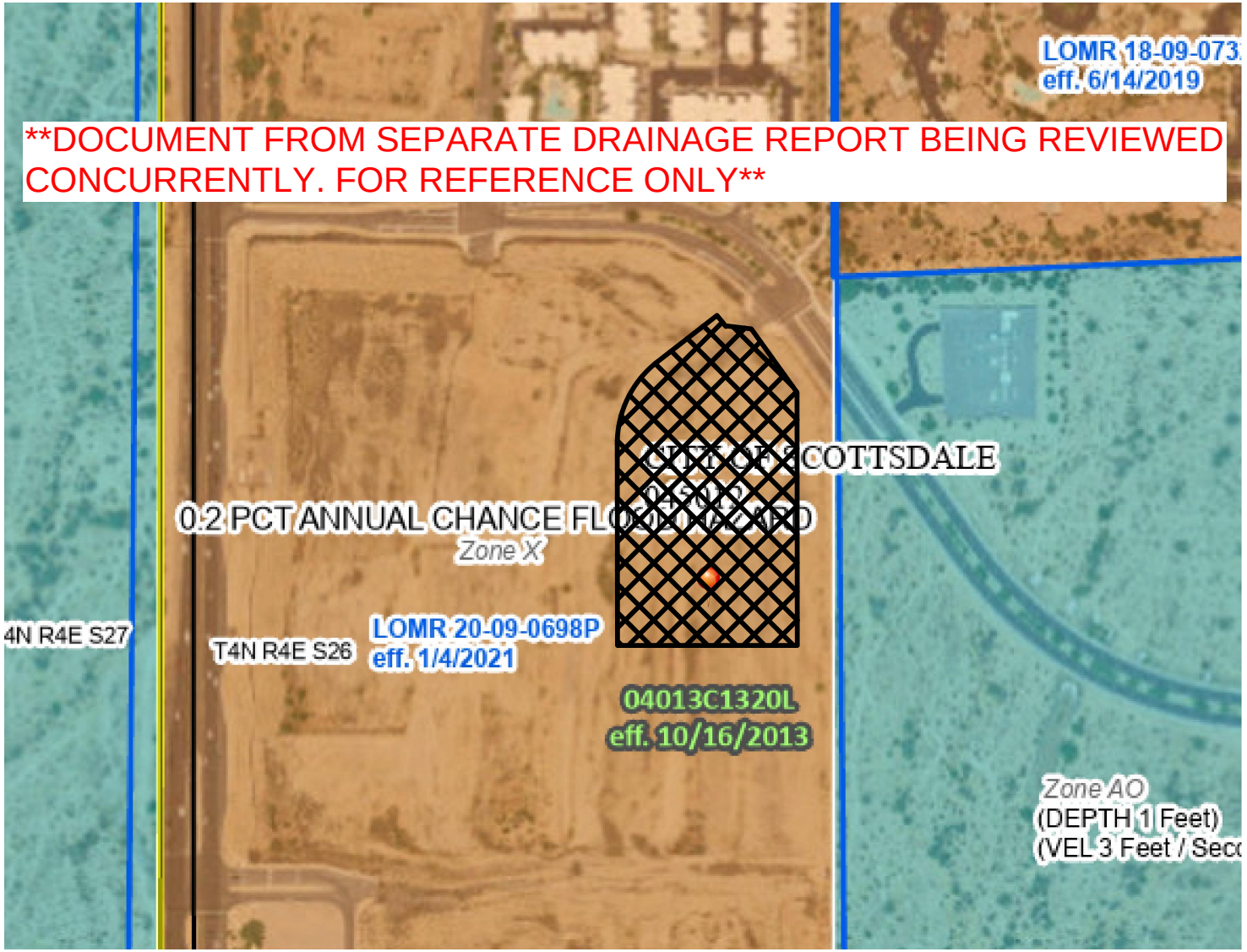
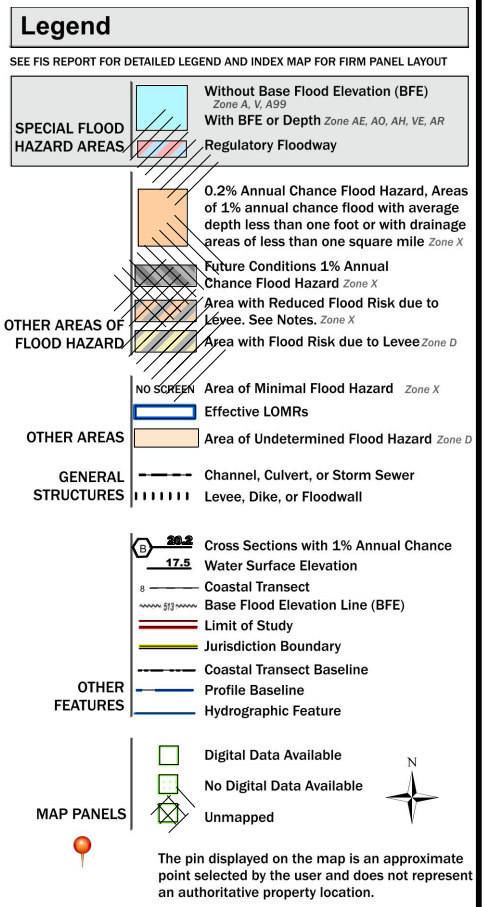
DOCUMENT FROM SEPARATE DRAINAGE REPORT BEING REVIEWED CONCURRENTLY. FOR REFERENCE ONLY

EXHIBIT 2 – FEMA FIRM EXHIBIT





NOT FOR CONSTRUCTION OR RECORDING

WOOD PATEL

ONE SCOTTSDALE - STREETLIGHTS RESIDENTIAL

EXHIBIT 2
FEMA FIRM

DATE	06/16/2021	SCALE	N/A	SHEET	1 OF 1
JOB NO.	215234	DESIGN	ZNR	DRAWN	ZNR

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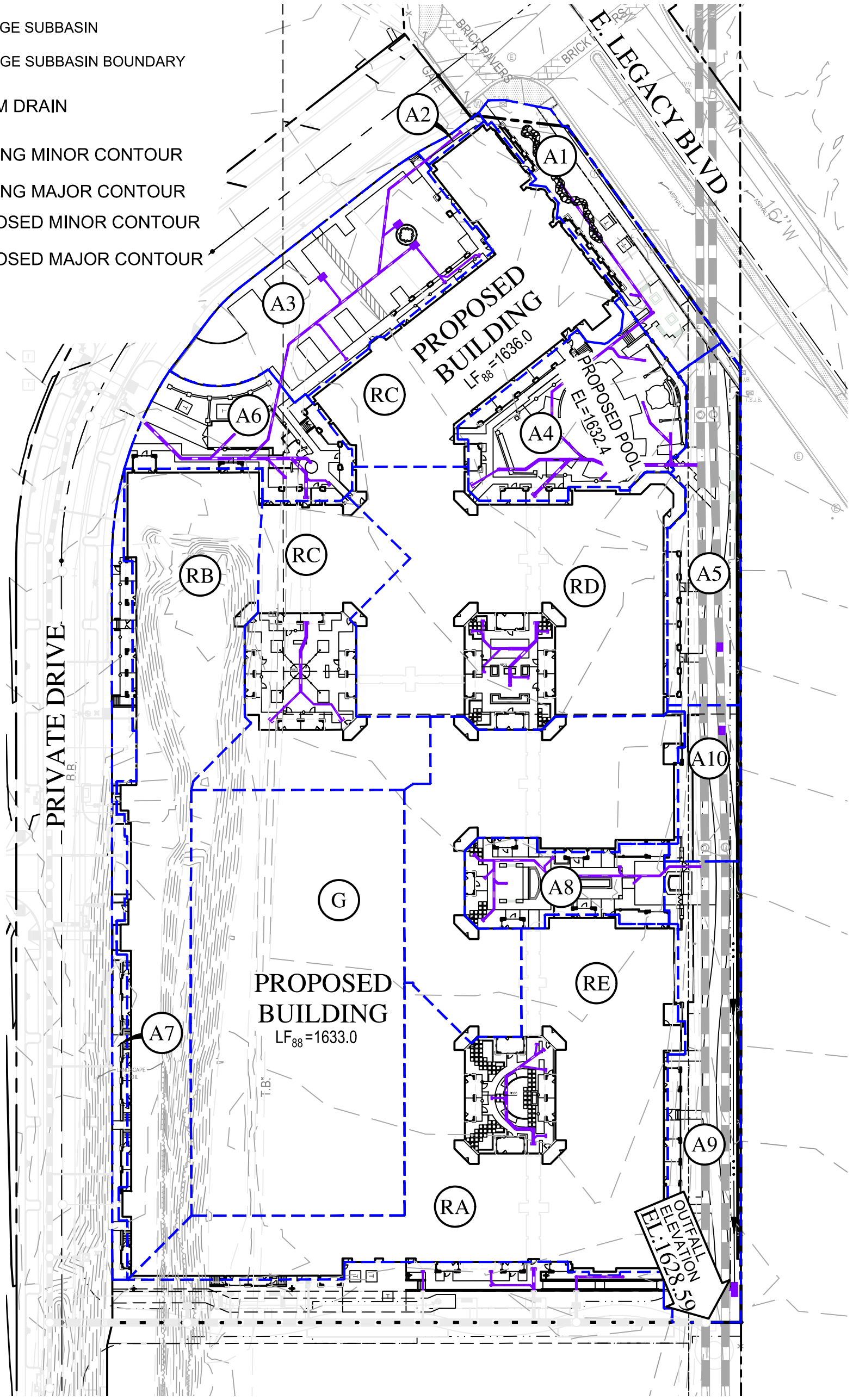
DOCUMENT FROM SEPARATE DRAINAGE REPORT BEING REVIEWED CONCURRENTLY. FOR REFERENCE ONLY

EXHIBIT 3 – STREETLIGHTS RESIDENTIAL DRAINAGE EXHIBIT

DOCUMENT FROM SEPARATE DRAINAGE REPORT BEING REVIEWED CONCURRENTLY. FOR REFERENCE ONLY

LEGEND

- A1 — DRAINAGE SUBBASIN
- DRAINAGE SUBBASIN BOUNDARY
- STORM DRAIN
- EXISTING MINOR CONTOUR
- EXISTING MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- PROPOSED MAJOR CONTOUR



N

0 30 60

Horz. 1 in. = 60 ft.

NOT FOR CONSTRUCTION OR RECORDING

WOOD PATEL

ONE SCOTTSDALE - STEETLIGHTS RESIDENTIAL

STEETLIGHTS RESIDENTIAL DRAINAGE EXHIBIT

DATE	02-21-22	SCALE	1" = 60'	SHEET	1 OF 1
JOB NO.	215234	DESIGN	ZNR	DRAWN	ZNR

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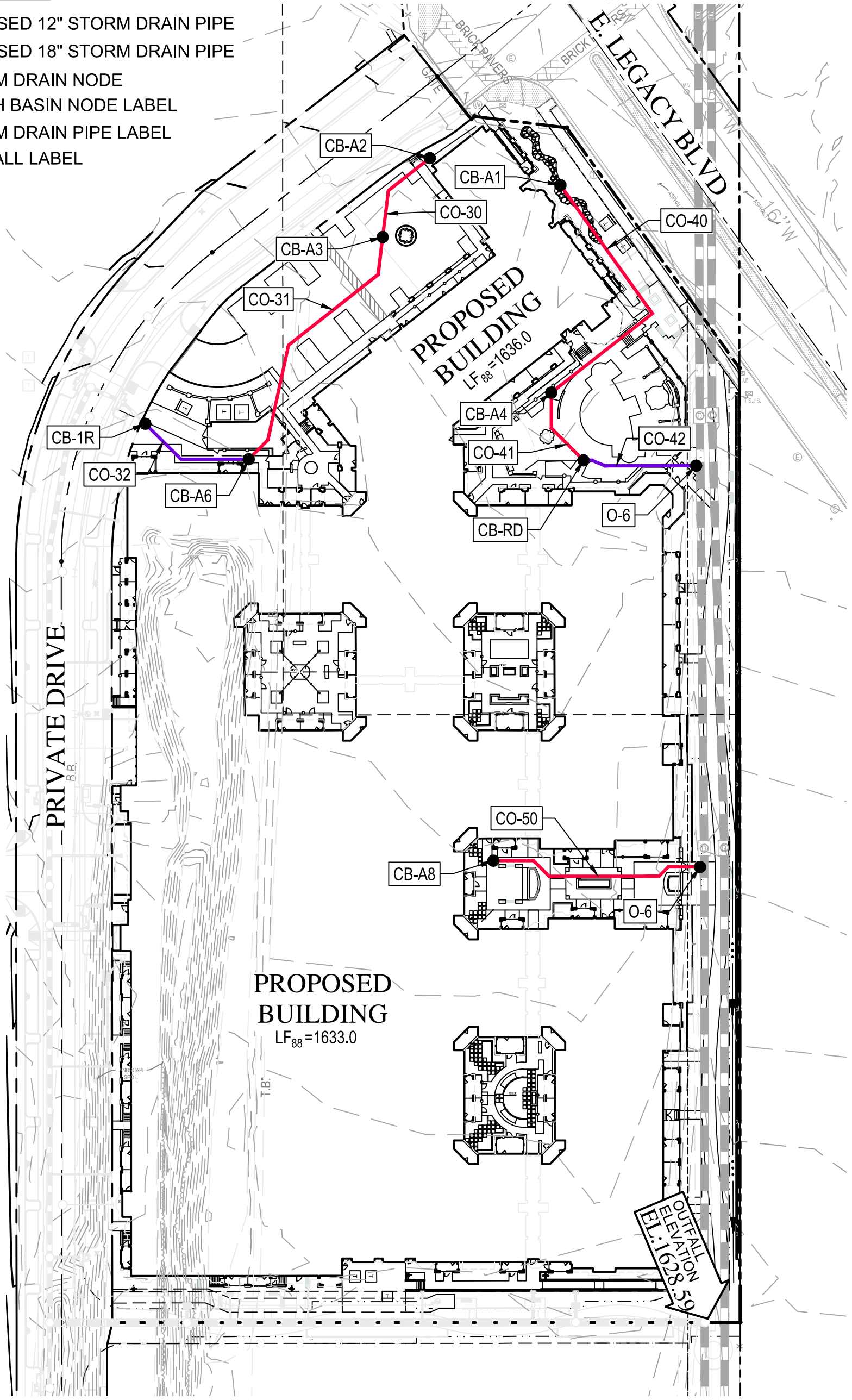
DOCUMENT FROM SEPARATE DRAINAGE REPORT BEING REVIEWED CONCURRENTLY. FOR REFERENCE ONLY

EXHIBIT 4 – STREETLIGHTS RESIDENTIAL STORM CAD EXHIBIT

DOCUMENT FROM SEPARATE DRAINAGE REPORT BEING REVIEWED CONCURRENTLY. FOR REFERENCE ONLY

LEGEND

- PROPOSED 12" STORM DRAIN PIPE
- PROPOSED 18" STORM DRAIN PIPE
- STORM DRAIN NODE
- CB-10A — CATCH BASIN NODE LABEL
- P-10 — STORM DRAIN PIPE LABEL
- O-10 — OUTFALL LABEL



N

0 30 60

Horz. 1 in. = 60 ft.

NOT FOR CONSTRUCTION OR RECORDING

WOOD PATEL

ONE SCOTTSDALE - STEETLIGHTS RESIDENTIAL

STEETLIGHTS RESIDENTIAL STORM CAD EXHIBIT

DATE	02-21-22	SCALE	1" = 60'	SHEET	1 OF 1
JOB NO.	215234	DESIGN	ZNR	DRAWN	ZNR

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DOCUMENT FROM SEPARATE DRAINAGE REPORT BEING REVIEWED CONCURRENTLY. FOR REFERENCE ONLY

EXHIBIT 5 – ONE SCOTTSDALE EAST REGIONAL DRAINAGE CORRIDOR IMPROVEMENTS

DOCUMENT FROM SEPARATE DRAINAGE REPORT BEING REVIEWED CONCURRENTLY. FOR REFERENCE ONLY

ONE SCOTTSDALE EAST REGIONAL DRAINAGE CORRIDOR IMPROVEMENTS SCOTTSDALE, ARIZONA

ENGINEERS NOTES

1. MARICOPA ASSOCIATION OF GOVERNMENTS (M.A.G.) UNIFORM STANDARD SPECIFICATIONS AND DETAILS FOR PUBLIC WORKS CONSTRUCTION (LATEST EDITION INCLUDING LATEST REVISION AND CURRENT SUPPLEMENTALS THEREOF PER THE LOCAL TOWN OR CITY) ARE INCORPORATED INTO THIS PLAN IN THEIR ENTIRETY.
2. ALL WORK REQUIRED TO COMPLETE THE CONSTRUCTION COVERED BY THIS PLAN SHALL BE IN ACCORDANCE WITH THE M.A.G. STANDARD SPECIFICATIONS AND DETAILS AND CURRENT SUPPLEMENTS THEREOF PER THE LOCAL CITY OR TOWN UNLESS SPECIFIED OTHERWISE IN THESE PLANS OR ELSEWHERE IN THE CONTRACT DOCUMENTS. CONTRACTORS SHALL FAMILIARIZE THEMSELVES WITH ALL REQUIRED STANDARD SPECIFICATIONS, DETAILS AND SUPPLEMENTS PRIOR TO BIDDING THE WORK FOR THE CONSTRUCTION COVERED BY THIS PLAN.
3. THE CONTRACTOR IS RESPONSIBLE FOR ALL METHODS, SEQUENCING, AND SAFETY CONCERNS ASSOCIATED WITH THIS PROJECT DURING CONSTRUCTION, UNLESS SPECIFICALLY ADDRESSED OTHERWISE IN THIS PLAN OR ELSEWHERE IN THE CONTRACT.
4. THE CONTRACTOR IS TO COMPLY WITH ALL LOCAL, STATE, AND FEDERAL LAWS AND REGULATIONS APPLICABLE TO THE CONSTRUCTION COVERED BY THIS PLAN.
5. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING AND COMPLYING WITH ALL PERMITS REQUIRED TO COMPLETE ALL WORK COVERED BY THIS PLAN.
6. THE QUANTITIES AND SITE CONDITIONS DEPICTED IN THESE PLANS ARE FOR INFORMATIONAL PURPOSES ONLY AND ARE SUBJECT TO ERROR AND OMISSION. CONTRACTORS SHALL SATISFY THEMSELVES AS TO ACTUAL QUANTITIES AND SITE CONDITIONS PRIOR TO BIDDING THE WORK FOR THE CONSTRUCTION COVERED BY THIS PLAN.
7. A REASONABLE EFFORT HAS BEEN MADE TO SHOW THE LOCATIONS OF EXISTING UNDERGROUND FACILITIES AND UTILITIES IN THE CONSTRUCTION AREA. THE CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE TO UTILITIES AND/OR FACILITIES CAUSED DURING THEIR CONSTRUCTION OPERATIONS. THE CONTRACTOR SHALL CALL 48 HOURS IN ADVANCE FOR BLUE STAKE (1-800-STAKE-IT) PRIOR TO ANY EXCAVATION.
8. THE CONTRACTOR IS RESPONSIBLE FOR ALL COORDINATION OF CONSTRUCTION AFFECTING UTILITIES AND THE COORDINATION OF ANY NECESSARY UTILITY RELOCATION WORK.
9. ALL PAVING, GRADING, EXCAVATION, TRENCHING, PIPE BEDDING, CUT FILL AND BACKFILL SHALL COMPLY WITH THE RECOMMENDATIONS SET FORTH IN THE SOILS (GEOTECHNICAL) REPORT FOR THIS PROJECT IN ADDITION TO THE REFERENCED REQUIRED SPECIFICATIONS AND DETAILS. THE CONTRACTOR SHALL BE AWARE THAT CERTAIN UTILITIES REQUIRE PROPER ATTENTION AND CAREFUL PLANNING DURING SITE CONSTRUCTION. PLEASE NOTE THAT UTILITIES ON THESE PLANS MAY NOT EXHIBIT THE FULL PROTECTIVE COVER REQUIRED DURING THE SUBGRADE PREPARATION PHASE OF THE CONSTRUCTION. IN SUCH INSTANCES, THE CONTRACTOR SHALL PROVIDE ADDITIONAL PROTECTION (SUCH AS RAMPING) OR INCREASED PIPE STRENGTH TO PROVIDE THE NECESSARY PROTECTION REQUIRED TO PREVENT DAMAGE DURING THE CONSTRUCTION OF THIS PROJECT. THE CONTRACTOR SHALL HOLD THE ENGINEER HARMLESS IN ALL CASES FOR DAMAGES TO UTILITIES WHERE INADEQUATE PROTECTIVE MEASURES OCCUR.
10. THE CONTRACTOR IS TO VERIFY THE LOCATION AND THE ELEVATIONS OF ALL EXISTING UTILITIES AT POINTS OF TIE-IN PRIOR TO COMMENCING ANY NEW CONSTRUCTION. SHOULD ANY LOCATION OR ELEVATION DIFFER FROM THAT SHOWN ON THESE PLANS, THE CONTRACTOR SHALL CONTACT THE OWNER'S AGENT.
11. CONTRACTOR TO VERIFY AND COORDINATE ALL DIMENSIONS AND SITE LAYOUT WITH ARCHITECT'S FINAL SITE PLAN AND FINAL BUILDING DIMENSIONS BEFORE STARTING WORK. REPORT DISCREPANCIES TO OWNER'S AGENT.
12. COORDINATION BETWEEN ALL PARTIES IS ESSENTIAL PART OF CONTRACT.
13. CONTRACTOR IS RESPONSIBLE FOR PROJECT AND SITE CONDITIONS, AND TO WORK WITH WEATHER CONDITIONS AS THE PROJECT SITE MAY BE LOCATED IN A FLOOD PRONE AREA AND SUBJECT TO FLOODING AND ITS HAZARDS.
14. THE CONTRACTOR IS TO VERIFY THE LOCATION, ELEVATION, CONDITION, AND PAVEMENT CROSS-SLOPE OF ALL EXISTING SURFACES AT POINTS OF TIE-IN AND MATCHING, PRIOR TO COMMENCEMENT OF GRADING, PAVING, CURB AND GUTTER, OR OTHER SURFACE CONSTRUCTION. SHOULD EXISTING LOCATIONS, ELEVATIONS, CONDITION, OR PAVEMENT CROSS-SLOPE DIFFER FROM THAT SHOWN ON THESE PLANS, RESULTING IN THE DESIGN INTENT REFLECTED ON THESE PLANS NOT ABLE TO BE CONSTRUCTED, THE CONTRACTOR SHALL NOTIFY THE OWNER'S AGENT IMMEDIATELY FOR DIRECTION ON HOW TO PROCEED PRIOR TO COMMENCEMENT OF CONSTRUCTION. THE CONTRACTOR ACCEPTS RESPONSIBILITY FOR ALL COSTS ASSOCIATED WITH CORRECTIVE ACTION IF THESE PROCEDURES ARE NOT FOLLOWED.
15. CONTRACTOR IS RESPONSIBLE TO COORDINATE UTILITY CROSSINGS AT CULVERT CROSSINGS BEFORE STARTING WORK ON CULVERT. COORDINATE WITH OWNER REPRESENTATIVE. VERIFY UTILITY LINES AND/OR CONDUITS ARE IN PLACE BEFORE STARTING CULVERT WORK.
16. CONSTRUCT RETENTION BASIN AS SHOWN. CONTRACTOR TO SCARIFY BOTTOM OF BASIN TWO FEET DEEP AND NOT ALLOW COMPACTION OVER 80%.
17. THIS PROJECT REQUIRES A REGULAR ONGOING MAINTENANCE PROGRAM FOR THE DESIGNED DRAINAGE SYSTEM(S) TO PRESERVE THE DESIGN INTEGRITY AND THE ABILITY TO PERFORM ITS OPERATIONAL INTENT. FAILURE TO PROVIDE MAINTENANCE WILL JEOPARDIZE THE DRAINAGE SYSTEM(S)' PERFORMANCE AND MAY LEAD TO IT'S INABILITY TO PERFORM PROPERLY AND/OR CAUSE DAMAGE ELSEWHERE IN THE PROJECT.
18. SEWER LINES DESIGNED IN PROFILE AND PUBLIC WATER LINES ARE REQUIRED TO BE ASBUILT AND THE INSTALLATION AND TESTING WITNESSED BY A PROFESSIONAL ENGINEER IN ACCORDANCE WITH ARIZONA ADMINISTRATIVE CODES R18-9-E301 "4.01 GENERAL PERMIT: SEWAGE COLLECTIONS SYSTEMS" AND R18-4-507 AND 508 "APPROVAL OF CONSTRUCTION" AND "RECORD DRAWINGS", RESPECTIVELY. IT IS THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY OWNER 72 HOURS IN ADVANCE WHEN THOSE SYSTEMS ARE READY TO BE WITNESSED.
19. THE WORK PRODUCT PRESENTED IS BELIEVED TO BE COMPLIANT WITH THE INTENT OF THE CURRENT AMERICANS DISABILITIES ACT (ADA) REQUIREMENTS AS INTERPRETED BY THE REVIEWING AGENCY(S). IF CONSTRUCTION OF THE PROJECT IS DELAYED, THIS WORK PRODUCT SHOULD BE UPDATED TO ACCOUNT FOR ANY RELEVANT ADA UPDATES BEFORE CONSTRUCTION BEGINS.
20. THIS PLAN SHOULD BE REVIEWED WITH THE MASTER DRAINAGE REPORT DATED 09-26-06 PREPARED BY WOOD, PATEL & ASSOCIATES.

UTILITY NOTES

1. THESE PLANS HAVE BEEN SUBMITTED TO THE FOLLOWING UTILITY COMPANIES AND THE WORK CONTAINED IN THESE PLANS HAS BEEN APPROVED BY THESE COMPANIES WITHIN THEIR AREA OF INTEREST. THE SIZE AND LOCATIONS, AS SHOWN, OF THE GAS, TELEPHONE AND POWER LINES, AND CONNECTIONS AGREE WITH THE INFORMATION CONTAINED IN THE UTILITY COMPANY RECORDS. WHERE THE WORK TO BE DONE CONFLICTS WITH ANY OF THESE UTILITIES, THE CONFLICTS SHALL BE RESOLVED AS SPECIFIED. CONFLICTS ARISING DURING THE COURSE OF CONSTRUCTION FROM UNFORESEEN CIRCUMSTANCES SHALL BE REPORTED TO THE INTERESTED UTILITY COMPANY AND BE RESOLVED BY THEM AND THE DESIGN ENGINEER AND APPROVED BY THE COS.
2. THE CITY WILL NOT PARTICIPATE IN THE COST OF CONSTRUCTION OR UTILITY RELOCATION.
3. IN ACCORDANCE WITH AAC R18-4-119, ALL MATERIALS ADDED AFTER JANUARY 1, 1993 WHICH MAY COME INTO CONTACT WITH DRINKING WATER SHALL CONFORM TO NATIONAL SANITATION FOUNDATION STANDARDS 60 AND 61.

HAUL ROUTE

HAUL ROUTE PERMITS ARE REQUIRED FOR ANY HAUL OPERATION WHICH UTILIZES CITY RIGHT-OF-WAY WITH A VOLUME EXCEEDING 5,000 C.Y.

SHEET INDEX

1	COVER SHEET
2	INDEX/LEGEND/QUANTITIES/ LEGAL DESCRIPTION
3-7	PLAN AND PROFILE
8	SWALE PLAN
9-11	TYPICAL SECTIONS AND DETAILS

GENERAL NOTES

CITY OF SCOTTSDALE GENERAL CONSTRUCTION NOTES FOR PUBLIC WORKS CONSTRUCTION

1. ALL CONSTRUCTION IN THE PUBLIC RIGHT-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 RIGHT-OF-WAY AND IN EASEMENTS. NOTIFY INSPECTION SERVICES 24 HOURS PRIOR TO STARTING OF CONSTRUCTION (TELEPHONE 480-312-5750).
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 I S IDENTIFIED FOR THE PROJECT. CALL "COLLECT" IF NECESSARY.
6. ENCROACHMENT 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 ONSITE AND SHALL BE AVAILABLE FOR INSPECTION AT ALL TIMES. FAILURE TO PRODUCE THE REQUIRED PERMITS WILL RESULT IN IMMEDIATE WORK STOPPAGE UNTIL THE 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.

INDEMNITY

1. CITY OF SCOTTSDALE WILL NOT BE RESPONSIBLE FOR REMOVAL, REPAIR, OR REPLACEMENT OF SIDEWALKS, LANDSCAPING OR ANY OTHER IMPROVEMENTS LOCATED WITHIN CITY EASEMENT(S) AS A RESULT OF ACCESS TO MAINTENANCE OF, OR REPAIRS TO THE WATERLINE SHOWN ON THESE PLANS.
2. CITY OF SCOTTSDALE WILL NOT BE RESPONSIBLE FOR REMOVAL, REPAIR, OR REPLACEMENT OF THE RETAINING WALLS OR OTHER IMPROVEMENTS WITHIN CITY EASEMENT(S) AS A RESULT OF ACCESS TO, MAINTENANCE OF, OR REPAIRS TO THE RETAINING WALLS SURROUNDING THE DETENTION BASINS SHOWN ON THESE PLANS.

"THE ENGINEER OF RECORD ON THESE PLANS HAS RECEIVED A COPY OF THE APPROVED STIPULATIONS FOR THIS PROJECT AND HAS DESIGNED THESE PLANS IN CONFORMANCE WITH THE APPROVED STIPULATIONS."

ENGINEER: LISA L. CRANE, P.E.

NOTE:

STORM DRAIN PIPE MATERIAL NOT YET FINALIZED. H.D.P.E. BEING CONSIDERED.

AS-BUILT CERTIFICATION

I HEREBY CERTIFY THAT THE " AS-BUILT " LOCATIONS SHOWN HEREON WERE PERFORMED UNDER MY SUPERVISION, AND ARE CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

LAND SURVEY DATA

E/W STREET ALIGN	BEARDSLEY ROAD		
N/S STREET	SCOTTSDALE ROAD ALIGN		
DESCRIPTION	MC BC HH, N. BOUND LANE, DOWN 0.6'		
TOWNSHIP	4N	RANGE	4E
SEC	26	DATE UPDATED	NA
COR	NW		
NORTHING (f)	15,283.524	EASTING (f)	27,356.033
NAVD '88 ELEV (f)	1.662.878		

BENCHMARK AND TOPO SOURCE

ALL TOPOGRAPHY WAS OBTAINED FROM AERIAL MAPPING COMPANY. INC., PROJECT NUMBER 04134, FLIGHT DATE JUNE 26, 2004

I HEREBY CERTIFY THAT ALL ELEVATIONS REPRESENTED ON THIS PLAN ARE BASED ON THE ELEVATION DATUM FOR THE CITY OF SCOTTSDALE BENCHMARK PROVIDED ABOVE.

CITY OF SCOTTSDALE
REVIEW & RECOMMENDED APPROVAL BY:

FIRE DEPT	N/A	GRADING & DRAINAGE	Ajiz E. Helal 10-23-07
PLANNING	10/23/07	WATER & SEWER	N/A
TRAFFIC	N/A	PAVING	N/A
STRUCTURAL	Ajiz E. Helal 10-23-07	RET. WALL	Ajiz E. Helal 10-23-07

APPROVED BY:

ENGINEERING COORDINATOR MANAGER OR DESIGNEE — DATE: 10/23/07

NO CONFLICT SIGNATURE BLOCK

UTILITY	UTILITY COMPANY	NAME OF COMPANY REPRESENTATIVE	TELEPHONE NUMBER	DATE SENT
WATER	CITY OF SCOTTSDALE	CITY OF SCOTTSDALE	N/A	N\A
SANITARY SEWER	CITY OF SCOTTSDALE	CITY OF SCOTTSDALE	N/A	N\A
ELECTRIC	A.P.S.	BARBARA HEIMER	602-371-6688	02-13-07
TELEPHONE	QWEST COMM.	CONFLICT LIAISON DEPT.	602-630-0496	02-13-07
NATURAL GAS	SOUTHWEST GAS CORP.	POM JINTASAWANG	602-749-8550	02-13-07
CABLE TV	COX CABLE	THANH DOAN	623-322-7086	02-13-07
OTHER	-	-	-	-
OTHER	-	-	-	-

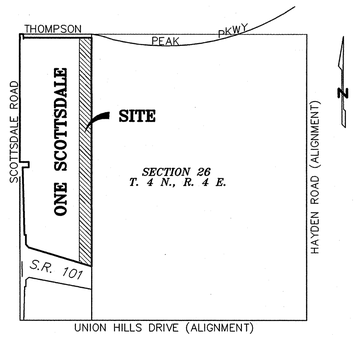
ENGINEER'S CERTIFICATION:

I, LISA L. CRANE, P.E., BEING THE PERSON RESPONSIBLE FOR DESIGNING THE FACILITIES NECESSARY TO SERVE THIS DEVELOPMENT, HEREBY CERTIFY THAT ALL OF THE UTILITY COMPANIES LISTED ABOVE, HAVE REVIEWED THIS PROJECT PROPOSAL AND ALL CONFLICTS HAVE BEEN RESOLVED AT THIS POINT. "NO CONFLICTS" FORMS HAVE BEEN OBTAINED FROM EACH UTILITY COMPANY AND ARE INCLUDED IN THIS SUBMITTAL. I ALSO CERTIFY THAT ALL ONSITE TRANSFORMERS, CABLE BOXES AND ANY OTHER PUBLIC/PRIVATE UTILITY APPURTENANCES ARE PLACED SUCH THAT THEY DO NOT NEGATIVELY IMPACT THE USE OR INTENDED USE OF ANY DEDICATED EASEMENTS OR FACILITIES DEVELOPED WITH THIS PROJECT INCLUDING BUT NOT LIMITED TO STORMWATER STORAGE BASINS, SIGHT DISTANCE EASEMENTS AND NAOS OR OTHER OPEN SPACE EASEMENTS.

SIGNATURE — DATE: 10/23/07

FLOOD INSURANCE RATE MAP (FIRM) INFORMATION

COMMUNITY NUMBER	PANEL NUMBER	SUFFIX	DATE OF FIRM	FIRM ZONE	BASE FLOOD ELEVATION (IN AO ZONE, USE DEPTH)
045012	1245	G	SEPT. 30, 2005	AO	1'



VICINITY MAP

N.T.S.

OWNER / DEVELOPER

ONE SCOTTSDALE HOLDINGS LLC.
7600 E. DOUBLETREE RANCH RD. SUITE 300
SCOTTSDALE, AZ 85258
CONTACT: MR. ART NEHF
TEL.:(480) 367-7000
FAX (480) 367-7558

ENGINEER

WOOD, PATEL & ASSOCIATES INC.
2051 WEST NORTHERN, SUITE 100
PHOENIX, ARIZONA 85021
CONTACT: LISA L. CRANE, P.E.
(602) 335-8500
(FAX) 335-8580

EARTHWORK QUANTITIES

QUANTITIES ARE IN PLACE ESTIMATES. VOLUME OF CUT FOR UNDERGROUND STORAGE IS INCLUDED. NO SHRINK OR SWELL IS ASSUMED.

DESCRIPTION	QUANTITY
CUT	14,305 C.Y.
FILL	187 C.Y.

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(602) 335-8500

ONE SCOTTSDALE
EAST REGIONAL DRAINAGE CORRIDOR IMPROVEMENTS
SCOTTSDALE, ARIZONA

1-DR-2006 ZN# 20-ZN-2002 #2 PLAN CHECK# 6787-06-1 Q.S.# 39-45
D.R.# 1-DR-2006 54-NP-2006 S.A.# 396-SA-2006

Registered Professional Engineer (Civil) CERTIFICATE NO. 44687 LISA L. CRANE Date Signed 10/23/07 ARIZONA, U.S.A.

DRAWN	YLJ
CHECKED	SAA
DATE	09 AUGUST 2007
SCALE	1"=40'
JOB NO.	021584.14
SHEET	1 OF 11

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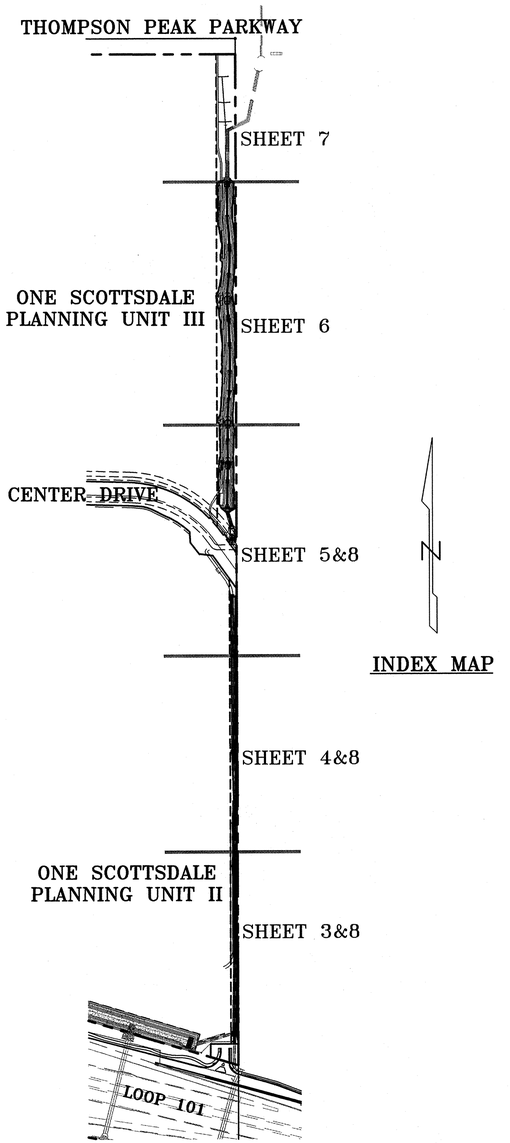
DOCUMENT FROM SEPARATE DRAINAGE REPORT BEING REVIEWED CONCURRENTLY. FOR REFERENCE ONLY



INDEX MAP

LEGEND

1337	PROPOSED CONTOUR
1337	EXISTING CONTOUR
	PROPOSED RIGHT OF WAY
	ROADWAY CENTERLINE
	VERTICAL CURB & GUTTER
	EXISTING CURB AND GUTTER
INV 34.0	PROPOSED INVERT ELEVATION
TC 13.37	TOP OF CURB ELEVATION (FROM TOPO)
GE 13.37	GUTTER ELEVATION (FROM TOPO)
NG 13.37	NATURAL GROUND ELEVATION (FROM TOPO)
CBC	CONCRETE BOX CULVERT
R/W	RIGHT OF WAY
HW	HIGH WATER
BOT	BOTTOM
INV	INVERT
SD	STORM DRAIN
TYP	TYPICAL
EG	EXISTING GROUND
ELEV	ELEVATION
	PROPOSED STAND PIPE
	EXISTING STORM DRAIN
	PROPOSED STORM DRAIN AND MANHOLE
	FIRE HYDRANT
	WATER PIPE AND VALVE
	SANITARY SEWER PIPE AND MANHOLE
	PROPOSED PAVEMENT
	EXISTING PAVEMENT
	FLOWLINE
Q_{100}=5 cfs V_{100}=0.5 ft/s	EXISTING OFFSITE PEAK FLOW & PEAK VELOCITY (100 YEAR)
	MISCELLANEOUS UTILITIES
	EXISTING STREET LIGHT
	EXISITING TRAFFIC SIGNAL
	EXISITNG SIGN

QUANTITY SUMMARY (ESTIMATED)

ITEM #	DESCRIPTION	TOTAL
1	54" RGRCP CLASS III	4042 LF
2	STORM DRAIN MANHOLE MAG 521 & 522	14 EA
3	CATCH BASIN MAG 535 TYPE "F"	2 EA
4	STORM DRAIN PIPE CONNECTION MAG 524	2 EA
5	CONCRETE DROP STRUCTURE	1 EA
6	RIP-RAP TYPE I ANGULAR	1424 CY
7	CHANNEL DROP STRUCTURE	3 EA
8	TRAIL	3829 LF
9	DIVERSION STRUCTURE	1 EA
10	48" RGRCP CLASS III	34 LF

LEGAL DESCRIPTION

THE WEST HALF OF THE WEST HALF OF SECTION 26, TOWNSHIP 4 NORTH, RANGE 4 EAST OF THE GILA AND
SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA;

EXCEPT THE NORTH 100 FEET OF THE WEST 165 FEET OF THAT PART OF THE NORTHWEST QUARTER OF SECTION 26, TOWNSHIP 4 NORTH, RANGE 4 EAST OF THE GILA AND SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA, LYING SOUTH OF AND ADJOINING A STRAIGHT LINE DRAWN AT A RIGHT ANGLE FROM A POINT ON THE WEST LINE OF SAID NORTHWEST QUARTER OF SAID SECTION 26, SAID POINT BEING 2367.00 FEET SOUTH OF THE NORTHWEST CORNER OF SAID SECTION 26; AND ALSO

EXCEPT THAT PORTION OF THE WEST HALF OF THE WEST HALF OF SECTION 26, TOWNSHIP 4 NORTH, RANGE 4 EAST OF THE GILA AND SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA, WHICH LIES WITHIN THE PARCEL OF LAND DESCRIBED AS FOLLOWS:

BEGINNING AT A UNITED STATES GENERAL LAND OFFICE BRASS CAP MARKING THE SOUTHWEST CORNER OF SAID SECTION 26; THENCE ALONG THE WEST LINE OF SAID SECTION 26, NORTH 0 DEGREES 02 MINUTES 06 SECONDS WEST, 2642.06 FEET TO A MARICOPA COUNTY HIGHWAY DEPARTMENT BRASS CAP MARKING THE WEST QUARTER CORNER OF SAID SECTION 26; THENCE CONTINUING ALONG SAID WEST LINE, NORTH 0 DEGREES 02 MINUTES 06 SECONDS WEST 170.94 FEET TO A POINT 2467.00 FEET SOUTH OF THE NORTHWEST CORNER OF SAID SECTION 26; THENCE LEAVING SAID WEST LINE, NORTH 89 DEGREES 57 MINUTES 54 SECONDS EAST 52.30 FEET TO A POINT HEREINAFTER CALLED POINT "A";
THENCE SOUTH 01 DEGREES 32 MINUTES 53 SECONDS EAST, 1238.42 FEET TO A POINT HEREINAFTER CALLED POINT "B";
THENCE NORTH 89 DEGREES 57 MINUTES 54 SECONDS EAST, 25.00 FEET TO A LINE PARALLEL WITH AND
110.00 FEET EAST OF THE WEST LINE OF SAID SECTION 26;
THENCE ALONG SAID PARALLEL LINE, SOUTH 0 DEGREES 02 MINUTES 06 SECONDS EAST, 175.00 FEET;
THENCE SOUTH 42 DEGREES 29 MINUTES 44 SECONDS EAST, 74.07 FEET;
THENCE SOUTH 73 DEGREES 12 MINUTES 54 SECONDS EAST, 1212.44 FEET TO THE EAST LINE OF SAID WEST HALF OF THE WEST HALF;
THENCE ALONG SAID EAST LINE, SOUTH 0 DEGREES 01 MINUTES 50 SECONDS EAST, 421.96 FEET;
THENCE NORTH 79 DEGREES 08 MINUTES 01 SECONDS WEST, 1176.82 FEET;
THENCE SOUTH 50 DEGREES 34 MINUTES 39 SECONDS WEST, 71.10 FEET TO A LINE PARALLEL WITH AND 110.00 FEET EAST OF THE WEST LINE OF SAID SECTION 26;
THENCE ALONG SAID PARALLEL LINE, SOUTH 0 DEGREES 02 MINUTES 06 SECONDS EAST, 125.00 FEET;
THENCE SOUTH 89 DEGREES 57 MINUTES 54 SECONDS WEST, 25.00 FEET TO A POINT HEREINAFTER CALLED POINT "C";
THENCE SOUTH 01 DEGREES 28 MINUTES 41 SECONDS WEST, 625.30 FEET TO THE SOUTH LINE OF SAID SECTION 26 AND TO A POINT HEREINAFTER CALLED POINT "D";
THENCE ALONG SAID SOUTH LINE, NORTH 89 DEGREES 58 MINUTES 35 SECONDS WEST, 68.49 FEET TO THE POINT OF BEGINNING; AND ALSO

EXCEPT THAT PORTION OF THE SOUTHWEST QUARTER OF THE SOUTHWEST QUARTER OF SAID SECTION 26,
DESCRIBED AS FOLLOWS:

COMMENCING AT A UNITED STATES GENERAL LAND OFFICE BRASS CAP MARKING THE SOUTHWEST CORNER
OF SAID SECTION 26, BEING NORTH 89 DEGREES 58 MINUTES 35 SECONDS WEST 2641.00 FEET FROM A 3/4 INCH REBAR MARKING THE SOUTH QUARTER CORNER OF SAID SECTION 26;
THENCE ALONG THE WEST LINE OF SAID SECTION 26, NORTH 0 DEGREES 02 MINUTES 26 SECONDS WEST 625.01 FEET TO A POINT BEING SOUTH 0 DEGREES 02 MINUTES 26 SECONDS EAST 2015.76 FEET FROM THE MARICOPA COUNTY HIGHWAY BRASS CAP MARKING THE WEST QUARTER CORNER OF SAID SECTION 26;
THENCE NORTH 89 DEGREES 57 MINUTES 34 SECONDS EAST 110.00 FEET TO THE POINT OF BEGINNING ON THE SOUTHERLY RIGHT OF WAY LINE OF STATE ROUTE 101L (PIMA FREEWAY);
THENCE ALONG SAID SOUTHERLY RIGHT OF WAY LINE, SOUTH 89 DEGREES 57 MINUTES 54 SECONDS WEST
25.00 FEET;
THENCE CONTINUING ALONG SAID SOUTHERLY RIGHT OF WAY LINE, SOUTH 01 DEGREES 28 MINUTES 41 SECONDS WEST 50.00 FEET;
THENCE NORTH 27 DEGREES 44 MINUTES 09 SECONDS EAST 56.49 FEET TO THE POINT OF BEGINNING; AND ALSO

EXCEPT A PARCEL OF LAND LYING WITHIN SAID SECTION 26, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE SOUTHWEST CORNER OF SAID SECTION 26;
THENCE ALONG THE SOUTH LINE OF SAID SECTION, SOUTH 89 DEGREES 58 MINUTES 26 SECONDS EAST, A DISTANCE OF 68.49 FEET TO THE EASTERLY LINE OF PARCEL NO. 7-5398, TRACT NO. 1, AS RECORDED
IN INSTRUMENT NO. 2002-0294002, AND THE POINT OF BEGINNING;
THENCE LEAVING SAID SOUTH LINE ALONG SAID EASTERLY LINE, NORTH 01 DEGREES 28 MINUTES 38 SECONDS EAST, A DISTANCE OF 625.29 FEET;
THENCE NORTH 89 DEGREES 57 MINUTES 52 SECONDS EAST, A DISTANCE OF 25.00 FEET;
THENCE NORTH 00 DEGREES 02 MINUTES 08 SECONDS WEST, A DISTANCE OF 124.88 FEET;
THENCE NORTH 50 DEGREES 34 MINUTES 37 SECONDS EAST, A DISTANCE OF 71.10 FEET;
THENCE SOUTH 79 DEGREES 08 MINUTES 03 SECONDS EAST, A DISTANCE OF 1176.65 FEET TO THE EAST
LINE OF THE WEST HALF OF THE WEST HALF OF SAID SECTION 26;
THENCE LEAVING SAID EASTERLY LINE ALONG SAID EAST LINE, SOUTH 00 DEGREES 02 MINUTES 11 SECONDS EAST, A DISTANCE OF 573.88 FEET TO THE SOUTH LINE OF SAID SECTION;
THENCE LEAVING SAID EAST LINE ALONG SAID SOUTH LINE, NORTH 89 DEGREES 58 MINUTES 26 SECONDS
WEST, A DISTANCE OF 1251.89 FEET TO THE POINT OF BEGINNING.

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ONE SCOTTSDALE

EAST REGIONAL DRAINAGE CORRIDOR IMPROVEMENTS

SCOTTSDALE, ARIZONA

S.A.# 396-SA-2006 S.A.# 280-SA-2006 54-N.P.-2006 D.R.# 1-DR-2006 ZN# 20-ZN-2002 #2 PLAN CHECK# 6787-06-1 Q.S.# 39-45

Registered Professional Engineer (Civil) CERTIFICATE NO. 44687 USA L. CRANE Date Signed 8/6/07 ARIZONA, U.S.A.

DRAWN	YLJ
CHECKED	SAA
DATE	09 AUGUST 2007
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JOB NO.	021584.14
SHEET	2 OF 11

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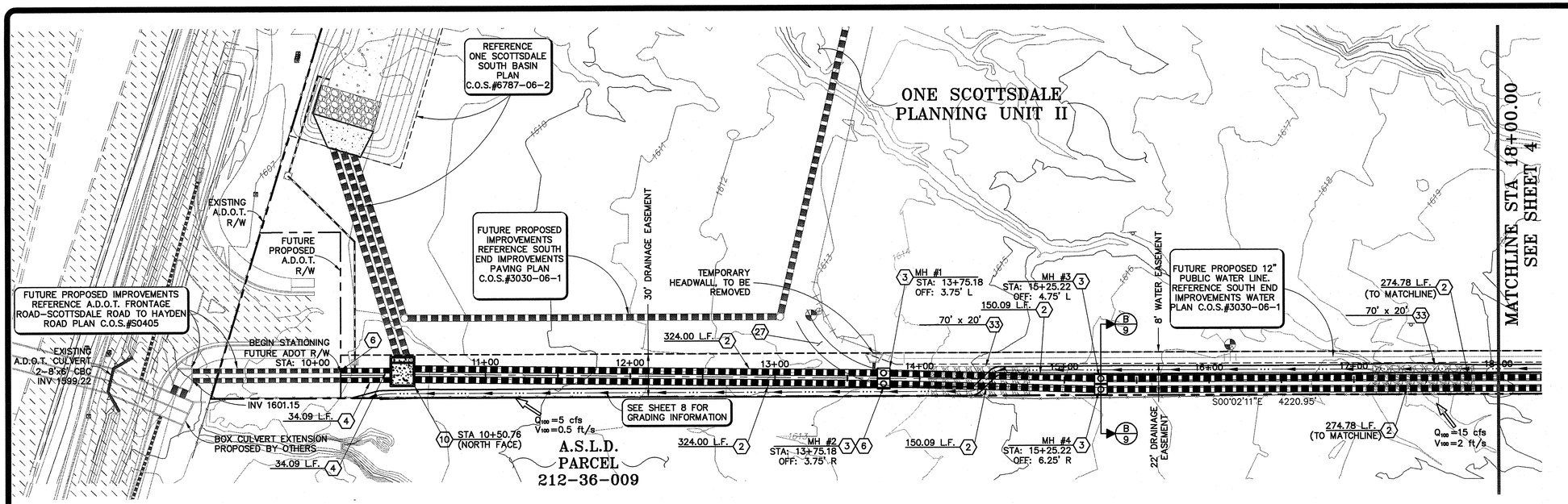

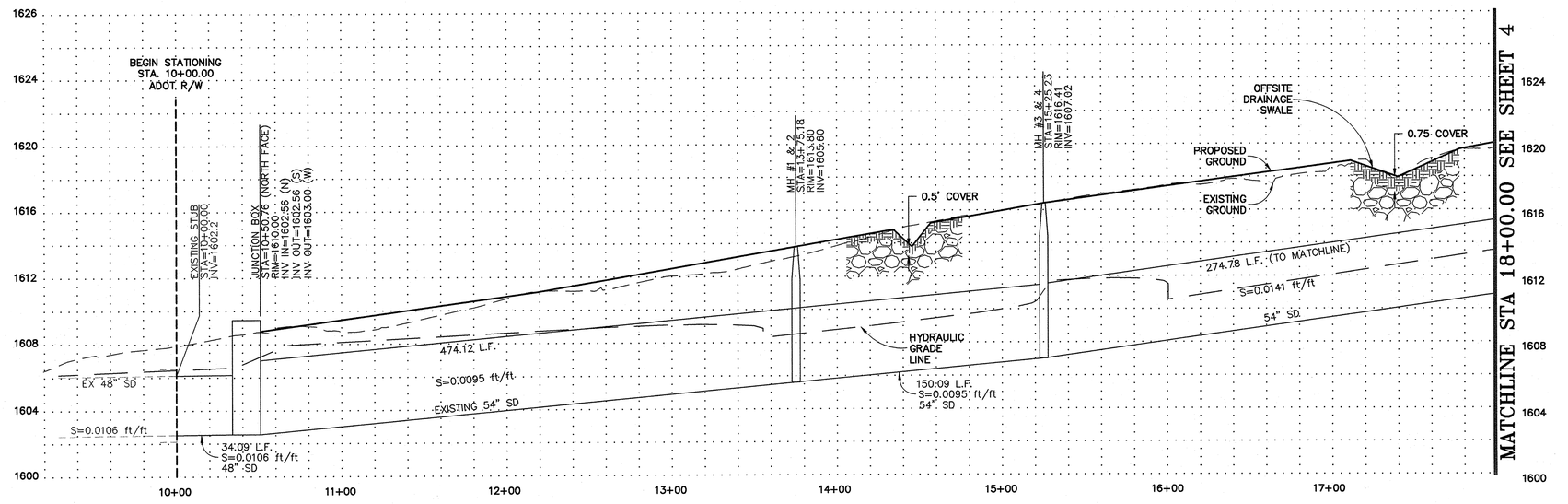

CONSTRUCTION NOTES

(2) INSTALL 54" RGRCP CLASS III. TRENCH BEDDING AND BACKFILL PER C.O.S. STD. DET. 2201.

(3) CONSTRUCT STORM DRAIN MANHOLE WITH WATER TIGHT LID PER MAG STD. DTL. 521 & 522. ADJUST MANHOLE RIM TO FINAL GRADE PER C.O.S. STD. DET. 2270. FILL 0.58' VOID BETWEEN MANHOLES WITH 1/2 SACK ABC SLURRY BACKFILL OR APPROVED EQUIVALENT. SEE LANDSCAPE PLAN FOR STORM DRAIN MANHOLE RIM FINISH.

(4) INSTALL 48" RGRCP CLASS III. TRENCH BEDDING AND BACKFILL PER S.O.S. STD. DET. 2201.

(6) REMOVE PLUG AND CONNECT TO EXISTING 48" R.G.R.C.P. FOR CONTINUATION SEE THE ADOT FRONTAGE ROAD PLAN C.O.S.#S0405. CONTRACTOR TO VERIFY HORIZONTAL AND VERTICAL LOCATION PRIOR TO START OF CONSTRUCTION & REPORT ANY DISCREPANCIES TO OWNER.

(10) CONSTRUCT CONCRETE DIVERSION STRUCTURE PER DETAILS, SHEET 11. COLOR TO BE SAN DIEGO BUFF.

(27) MEANDERING TRAIL SHOWN FOR GENERAL INFORMATION (POTENTIAL FUTURE LOCATION) SEE LANDSCAPE PLAN FOR LOCATION AND DESIGN.

(33) INSTALL TYPE I INDIGENOUS/NATIVE STONE BURIED RIP-RAP (D_{50}=8", 2' THICK, AREA PER PLAN). REFERENCE TABLE ON SHEET 10. SEE BURIED RIP-RAP DETAIL, SHEET 9.

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ONE SCOTTSDALE

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SCOTTSDALE, ARIZONA

S.A.# 396-SA-2006 S.A.# 280-SA-2006 54-N.P.-2006 D.R.# 1-DR-2006 ZN# 20-ZN-2002 #2 PLAN CHECK# 6787-06-1 Q.S.# 39-45

Registered Professional Engineer (Civil) CERTIFICATE NO. 44687 LISA L. CRANE Date Signed 11/8/07 ARIZONA, U.S.A.

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SHEET	3 OF 11

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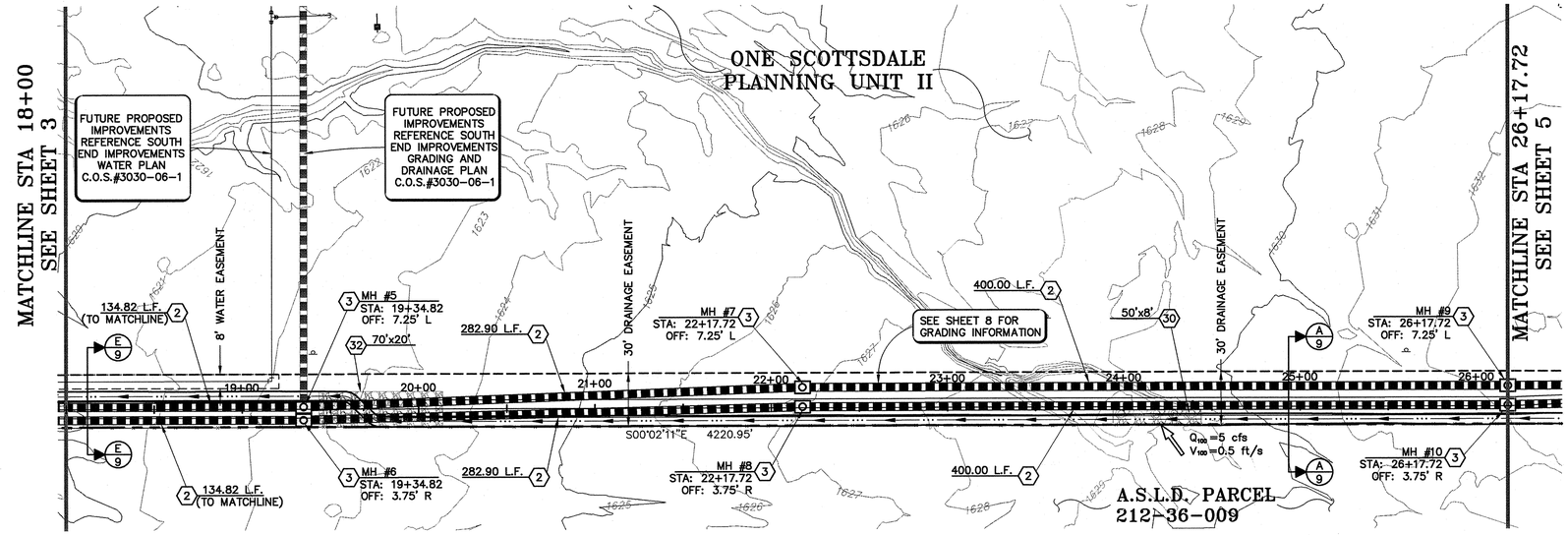

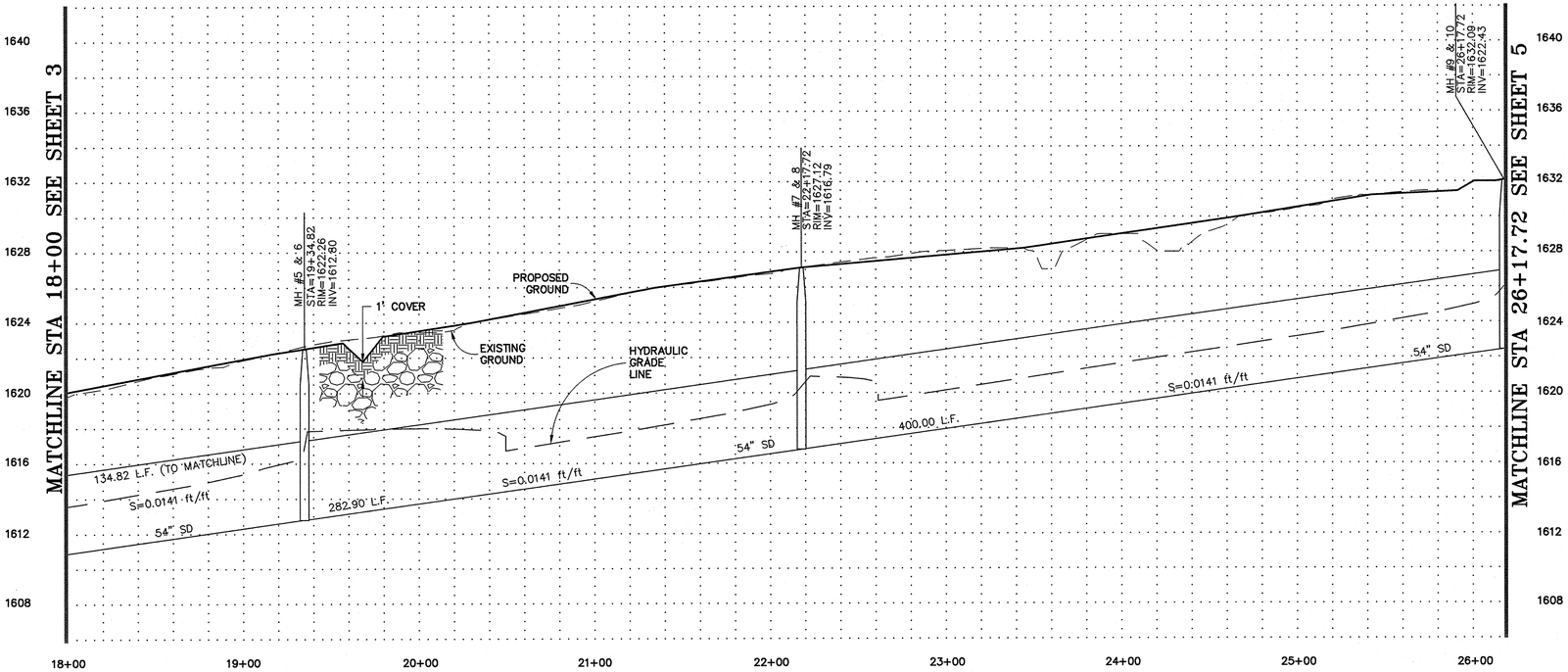

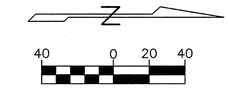

CONSTRUCTION NOTES

(2) INSTALL 54" RGRCP CLASS III. TRENCH BEDDING AND BACKFILL PER C.O.S. STD. DET. 2201.

(3) CONSTRUCT STORM DRAIN MANHOLE WITH WATER TIGHT LID PER MAG STD. DTL. 521 & 522. ADJUST MANHOLE RIM TO FINAL GRADE PER C.O.S. STD. DET. 2270. FILL 0.58' VOID BETWEEN MANHOLES WITH 1/2 SACK ABC SLURRY BACKFILL OR APPROVED EQUIVALENT. SEE LANDSCAPE PLAN FOR STORM DRAIN MANHOLE RIM FINISH.

(30) INSTALL TYPE I INDIGENOUS/NATIVE STONE BURIED RIP-RAP (D_{50}=8", 3' THICK, AREA PER PLAN). REFERENCE TABLE ON SHEET 10. SEE BURIED RIP-RAP DETAIL, SHEET 9.

(32) INSTALL TYPE I INDIGENOUS/NATIVE STONE BURIED RIP-RAP (D_{50}=8", 2.5' THICK, AREA PER PLAN). REFERENCE TABLE ON SHEET 10. SEE BURIED RIP-RAP DETAIL, SHEET 9.

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SCOTTSDALE, ARIZONA

S.A.# 396-SA-2006 S.A.# 280-SA-2006 54-N.P.-2006 D.R.# 1-DR-2006 ZN# 20-ZN-2002 #2 PLAN CHECK# 6787-06-1 Q.S.# 39-45

Registered Professional Engineer (Civil) CERTIFICATE NO. 44687 LISA L. CRANE Date Signed 8/10/07 ARIZONA, U.S.A.

DRAWN	YLJ
CHECKED	SAA
DATE	09 AUGUST 2007
SCALE	1"=40'
JOB NO.	021584.14
SHEET	4 OF 11

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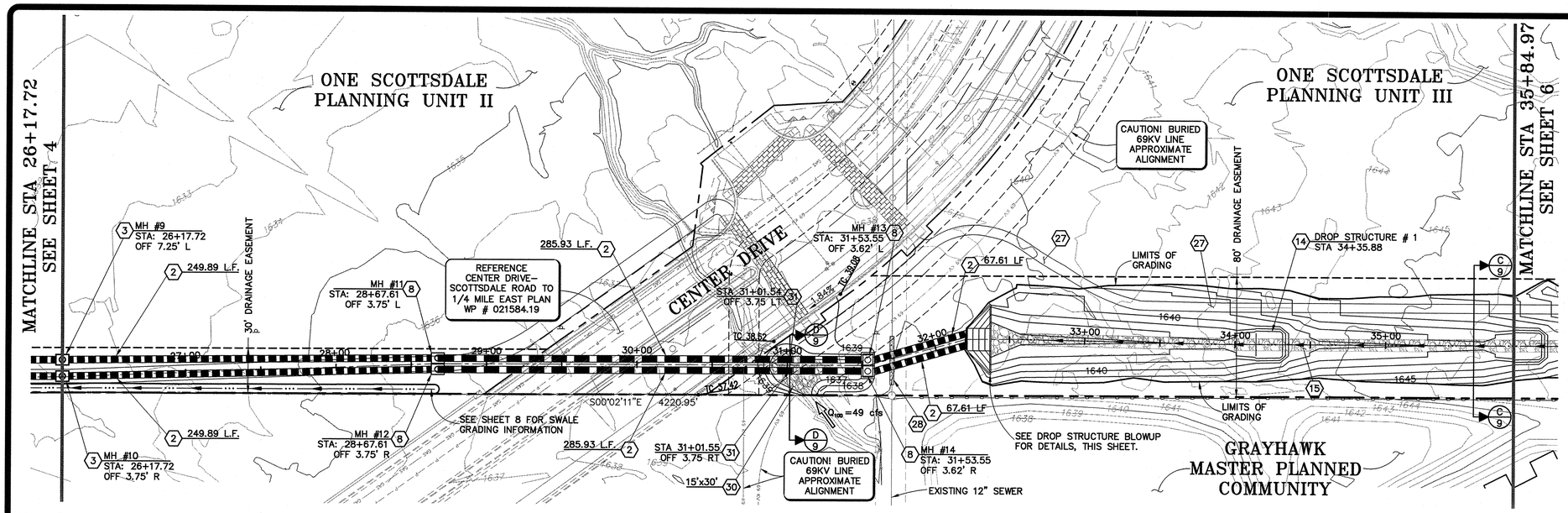

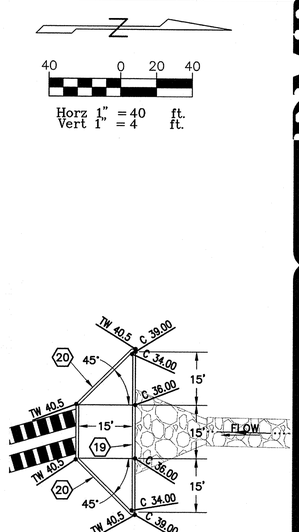

CONSTRUCTION NOTES

(2) INSTALL 54" RGRCP CLASS III. TRENCH BEDDING AND BACKFILL PER C.O.S. STD. DET. 2201.

(3) CONSTRUCT STORM DRAIN MANHOLE WITH WATER TIGHT LID PER MAG STD. DTL. 521 & 522. ADJUST MANHOLE RIM TO FINAL GRADE PER C.O.S. STD. DET. 2270. FILL 0.58' VOID BETWEEN MANHOLES WITH 1/2 SACK ABC SLURRY BACKFILL OR APPROVED EQUIVALENT. SEE LANDSCAPE PLAN FOR STORM DRAIN MANHOLE RIM FINISH.

(8) REMOVE EXISTING 18" LEACH LINE & ROCK PIT. CONSTRUCT STORM DRAIN MANHOLE WITH WATER TIGHT LID ON EXISTING 54" PIPES PER MAG. STD. DET. 521 AND 522. FOR CONTINUATION SEE CENTER DRIVE – SCOTTSDALE ROAD TO 1/4 MILE EAST PLAN. CONTRACTOR TO VERIFY HORIZONTAL AND VERTICAL LOCATION PRIOR TO START OF CONSTRUCTION & REPORT ANY DISCREPANCIES TO OWNER.

(14) CONSTRUCT CHANNEL DROP STRUCTURE SEE DETAIL ON SHEET 10. COLOR TO BE SAN DIEGO BUFF.

(15) CONSTRUCT EARTHEN CHANNEL PER SECTION C–C, SEE SHEET 9. RIP–RAP TO BE TYPE I INDIGENOUS/NATIVE STONE (D_{50}=8",3' THICK), SEE TABLE ON SHEET 10.

(19) CONSTRUCT CANTILEVER RETAINING WALL (H=4') PER A.D.O.T. STD. DET. B–18.10 AND B–18.20. PROVIDE 1" DIA. WEEP HOLES, 18" O.C. AT ELEV. 1634.5 INSTALL FILTER FABRIC MIRAF1–140, OR APPROVED EQUAL. INSTALL TRASH RACK PER M.A.G. STD. DET. 502–1. COLOR TO BE SAN DIEGO BUFF.

(20) CONSTRUCT MULTIPLE PIPE INLET HEADWALL PER A.D.O.T. STD. DET. B–11.14, SKEW ANGLE 45° (DIMS PER PLAN). INSTALL HANDRAIL PER C.O.S. STD. DET. 2508. COLOR TO BE SAN DIEGO BUFF.

(27) MEANDERING TRAIL SHOWN FOR GENERAL INFORMATION (POTENTIAL FUTURE LOCATION) SEE LANDSCAPE PLAN FOR LOCATION AND DESIGN.

(28) CONCRETE ENCASE EXISTING 12" SEWER PER M.A.G. STD. DET. 404–2.

(30) INSTALL TYPE I INDIGENOUS/NATIVE STONE BURIED RIP–RAP (D_{50}=8", 3' THICK, AREA PER PLAN). REFERENCE TABLE ON SHEET 10. SEE BURIED RIP–RAP DETAIL, SHEET 9.

(31) INSTALL CATCH BASIN (V=2') PER M.A.G. STD. DET. 535 TYPE "F", MODIFIED. SEE SHEET 10 FOR MODIFICATIONS. CONNECT CATCH BASIN TO STORM DRAIN VIA 18" CMP PER M.A.G. STD. DET. 524.

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SCOTTSDALE, ARIZONA

Registered Professional Engineer (Civil) CERTIFICATE NO. 44687 LISA L. CRANE State Signed 9/6/07 ARIZONA, U.S.A.

DRAWN	YLJ
CHECKED	SAA
DATE	09 AUGUST 2007
SCALE	1"=40'
JOB NO.	021584.14
SHEET	5 OF 11

S.A.# 396-SA-2006 S.A.# 280-SA-2006 54-N.P.-2006 D.R.# 1-DR-2006 ZN# 20-ZN-2002 #2 PLAN CHECK# 6787-06-1 Q.S.# 39-45

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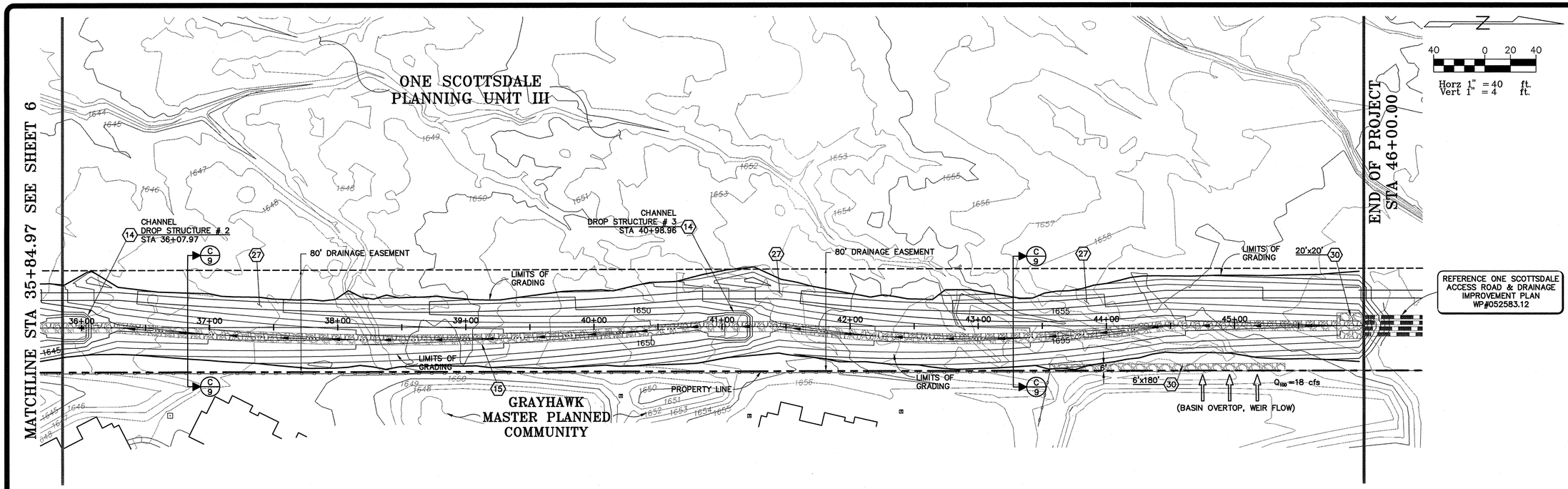

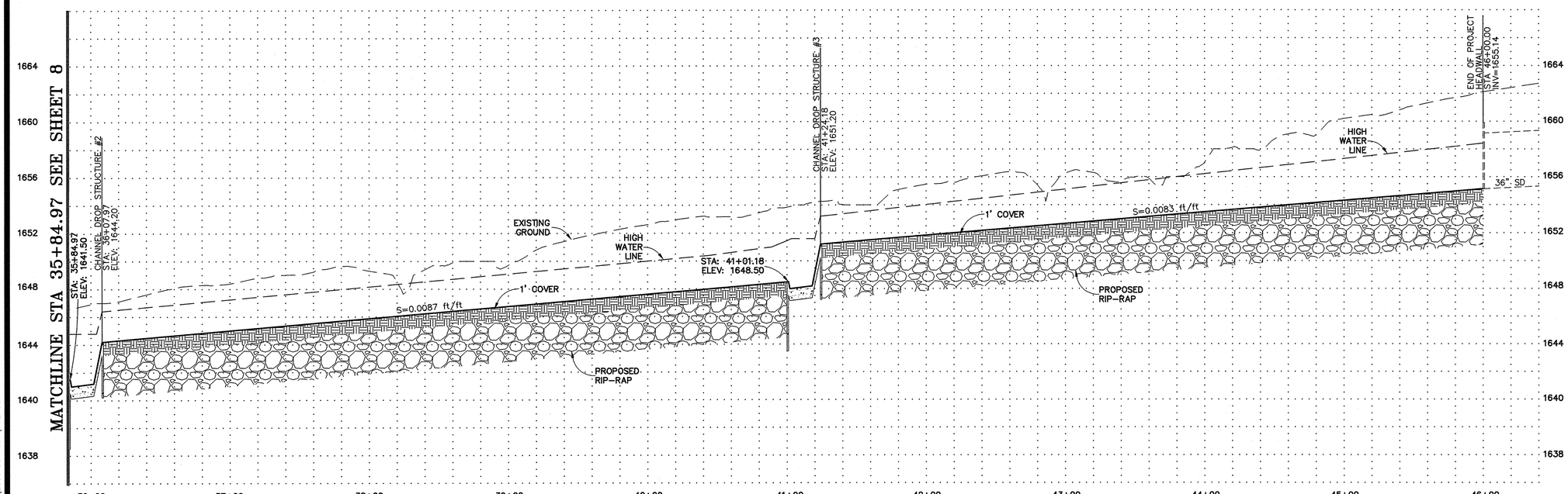

CONSTRUCTION NOTES

(14) CONSTRUCT CHANNEL DROP STRUCTURE SEE DETAIL ON SHEET 10. COLOR TO BE SAN DIEGO BUFF.

(15) CONSTRUCT EARTHEN CHANNEL PER SECTION C–C, SEE SHEET 9. RIP–RAP TO BE TYPE I INDIGENOUS/NATIVE STONE (D_{50}=8",3' THICK), SEE TABLE ON SHEET 10.

(27) MEANDERING TRAIL SHOWN FOR GENERAL INFORMATION (POTENTIAL FUTURE LOCATION) SEE LANDSCAPE PLAN FOR LOCATION AND DESIGN.

(30) INSTALL TYPE I INDIGENOUS/NATIVE STONE BURIED RIP–RAP (D_{50}=8", 3' THICK, AREA PER PLAN). REFERENCE TABLE ON SHEET 10. SEE BURIED RIP–RAP DETAIL, SHEET 9.

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CRANE
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DATE	09 AUGUST 2007
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SHEET	6 OF 11

S.A.# 396-SA-2006 S.A.# 280-SA-2006 54-N.P.-2006 D.R.# 1-DR-2006 ZN# 20-ZN-2002 #2 PLAN CHECK# 6787-06-1 Q.S.# 39-45

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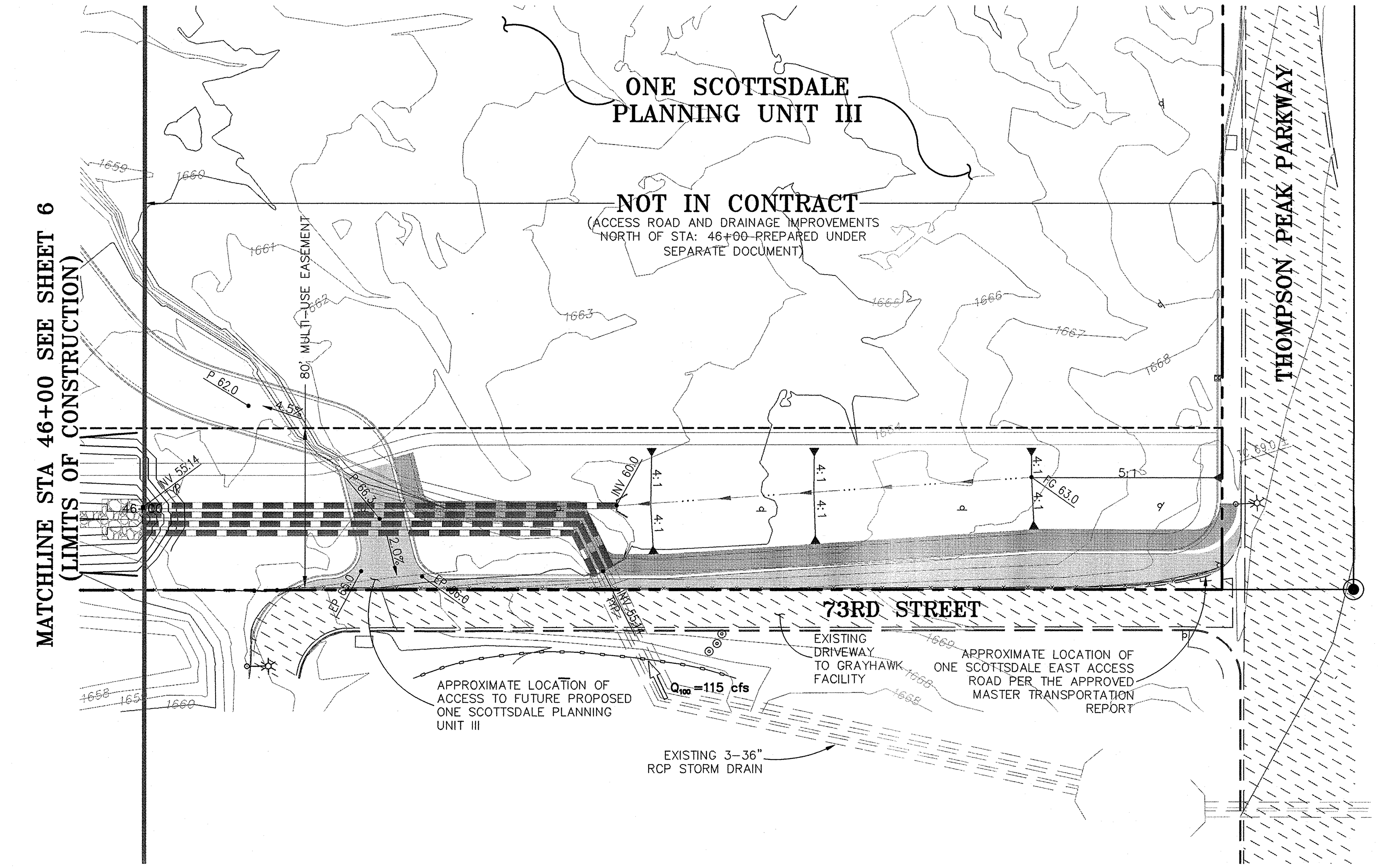

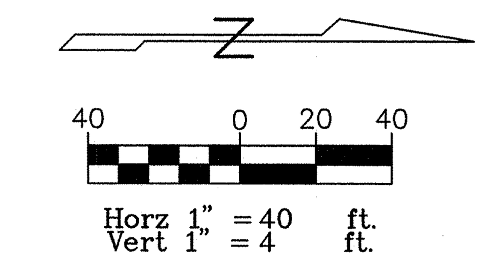

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DATE	09 AUGUST 2007
SCALE	1"=40'
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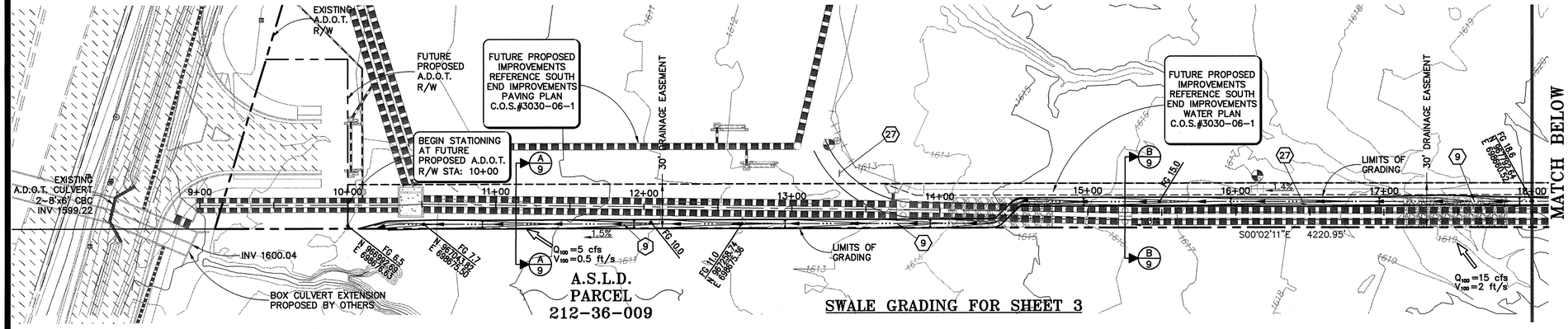
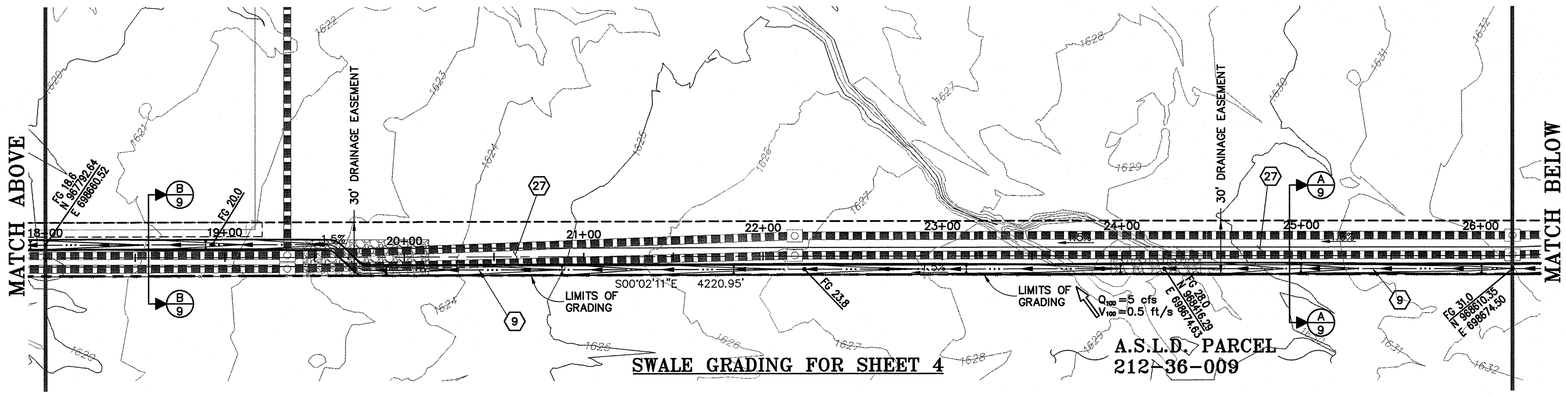
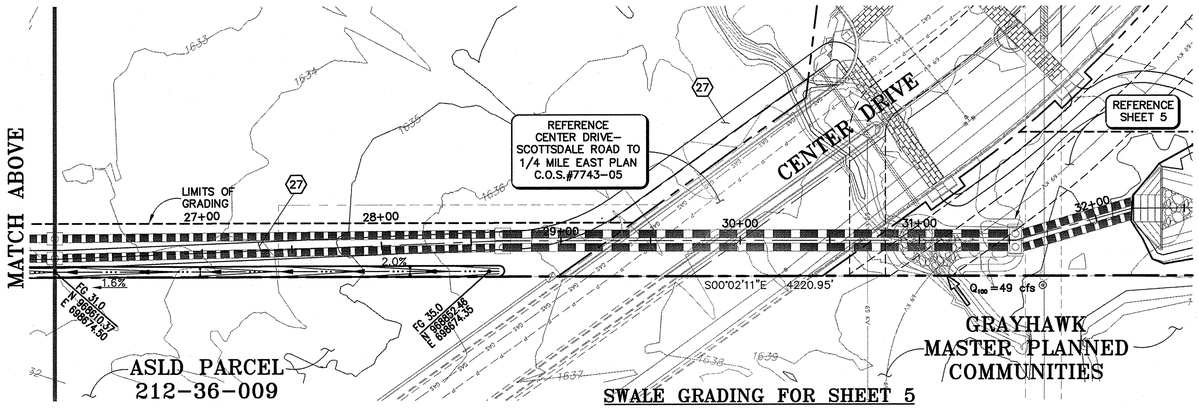
DRAINAGE SWALE PLAN



SWALE GRADING FOR SHEET 3



SWALE GRADING FOR SHEET 4



SWALE GRADING FOR SHEET 5

CONSTRUCTION NOTES

(9) CONSTRUCT SWALE PER TYPICAL SECTION A-A OR B-B AS SHOWN.

(27) MEANDERING TRAIL SHOWN FOR GENERAL INFORMATION (POTENTIAL FUTURE LOCATION) SEE LANDSCAPE PLAN FOR LOCATION AND DESIGN.

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DRAWN	YLJ
CHECKED	SAA
DATE	09 AUGUST 2007
SCALE	1"=40'
JOB NO.	021584.14
SHEET	8 OF 11

S.A.# 396-SA-2006 S.A.# 280-SA-2006 54-N.P.-2006 D.R.# 1-DR-2006 ZN# 20-ZN-2002 #2 PLAN CHECK# 6787-06-1 Q.S.# 39-45

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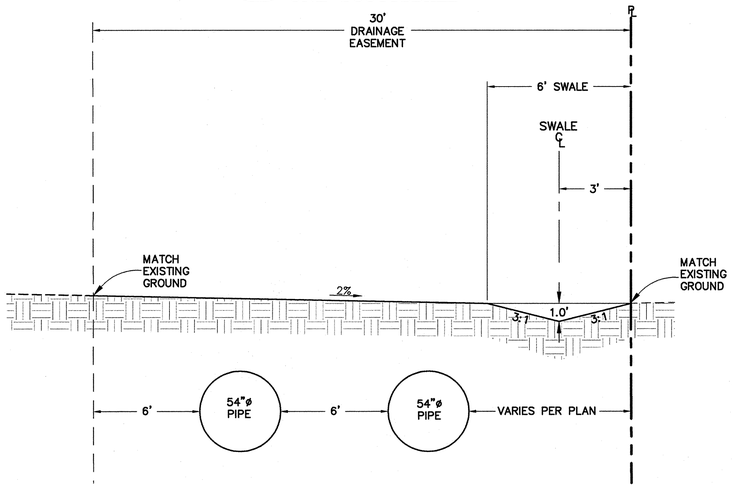
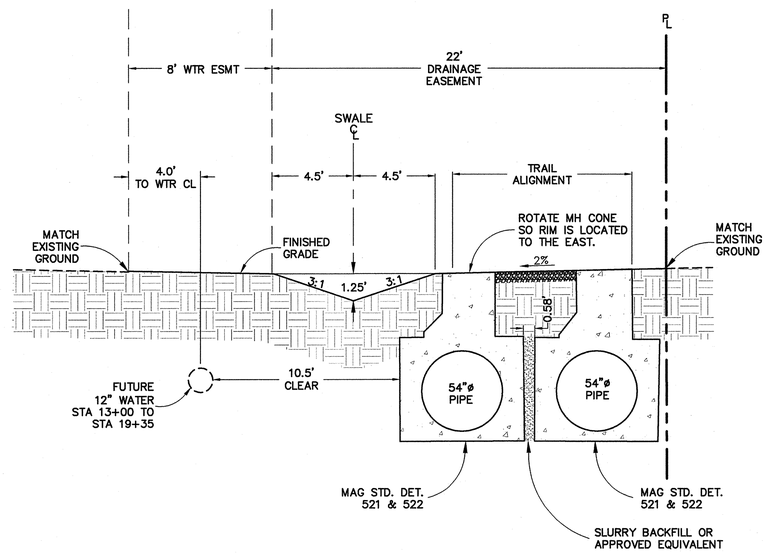
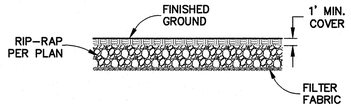


SECTION A–A
SCALE: 1"=4'
STA 10+00 TO 13+00

ONE SCOTTSDALE

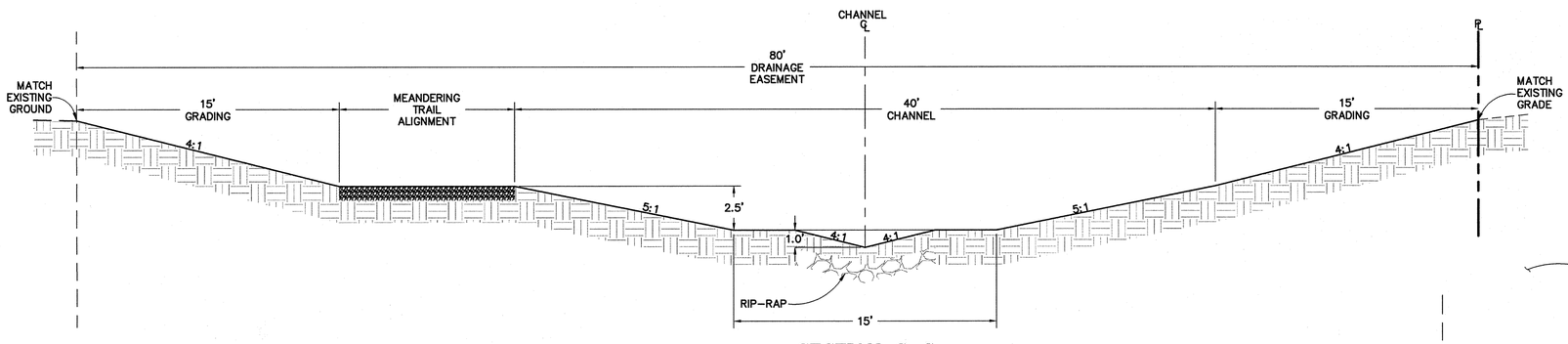


SECTION B–B
SCALE: 1"=4'
STA 13+00 TO 28+60



BURIED RIP–RAP
DETAIL

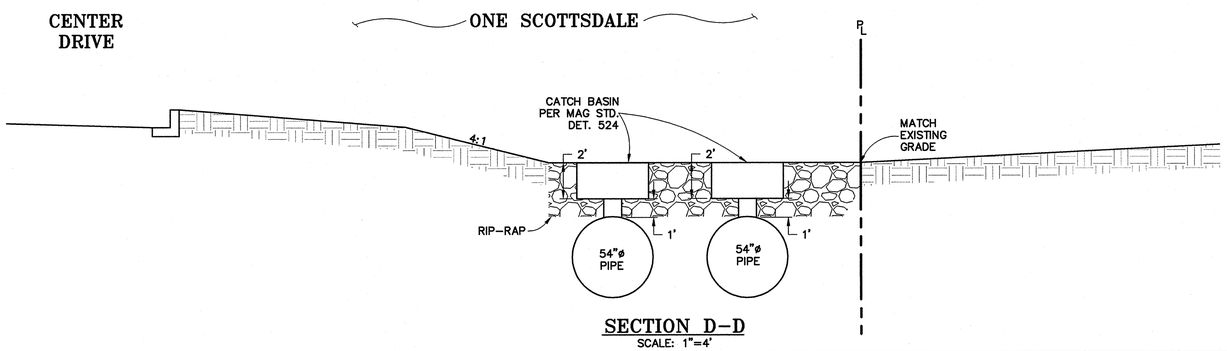
ONE SCOTTSDALE



SECTION C–C
SCALE: 1"=4'
STA 32+12 TO 46+00

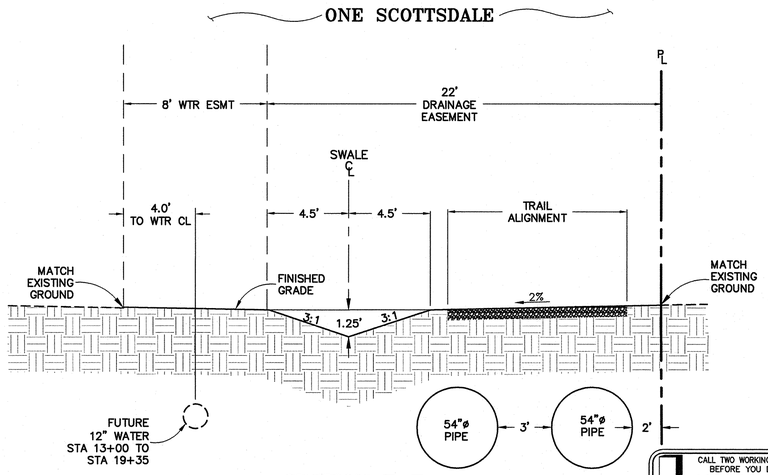
CENTER
DRIVE

ONE SCOTTSDALE



SECTION D–D
SCALE: 1"=4'

ONE SCOTTSDALE



SECTION E–E
SCALE: 1"=4'

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S.A.# 396-SA-2006 S.A.# 280-SA-2006 54-N.P.-2006 D.R.# 1-DR-2006 ZN# 20-ZN-2002 #2 PLAN CHECK# 6787-06-1 Q.S.# 39-45

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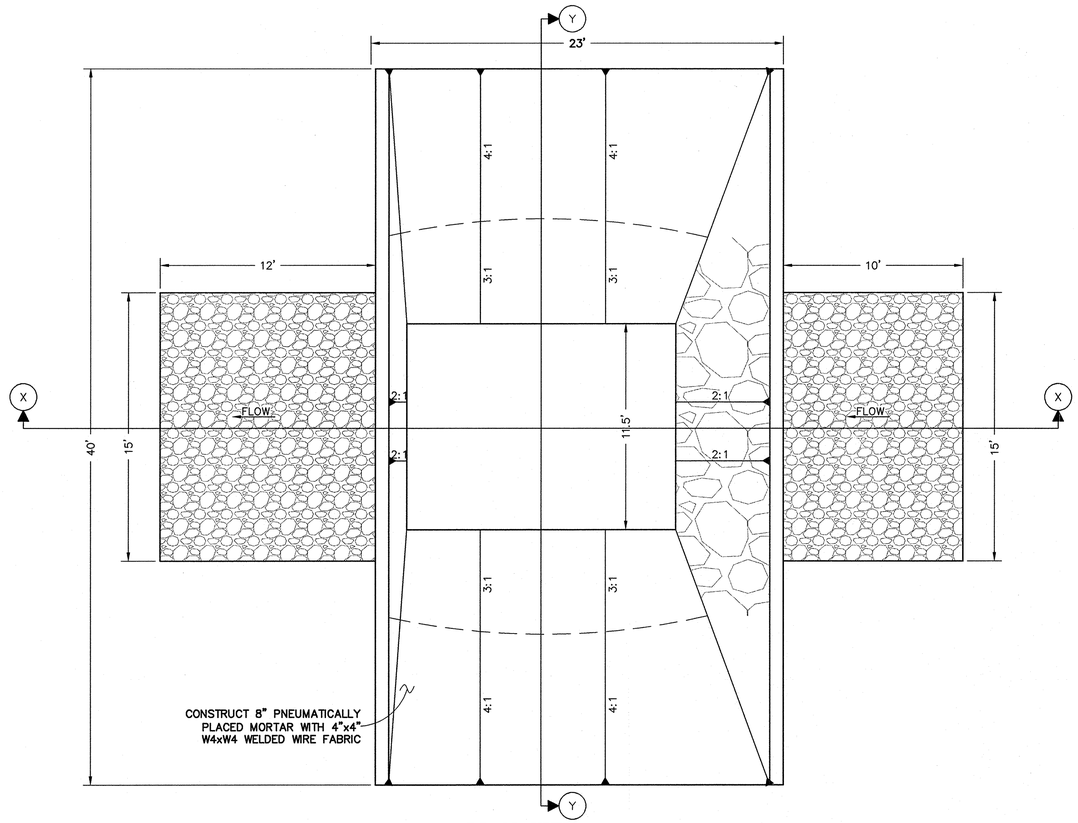
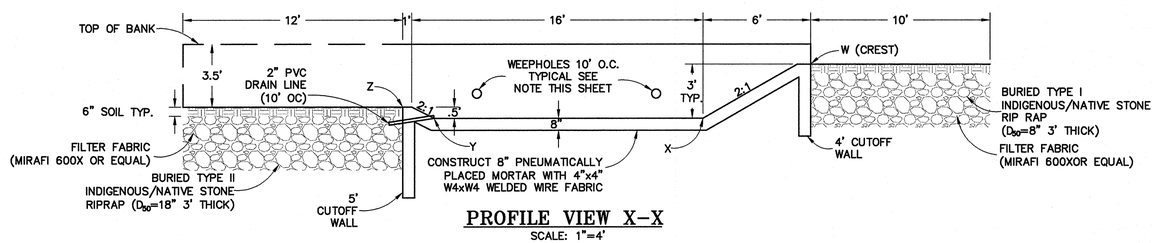
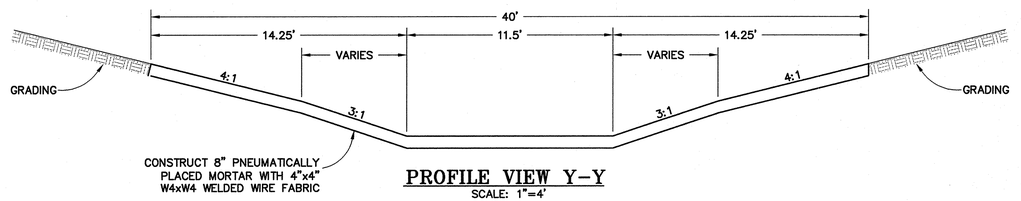


PLAN VIEW
SCALE: 1"=4'



PROFILE VIEW X–X
SCALE: 1"=4'



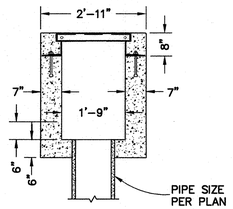
PROFILE VIEW Y–Y
SCALE: 1"=4'

INDIGENOUS/NATIVE STONE RIPRAP GRADATION TABLE		
PERCENT FINER BY WEIGHT	SIEVE SIZE	
	TYPE I	TYPE II
15	8"	12"
50	12"	18"
85	18"	27"
100	24"	36"
INSTALL LOOSE RIPRAP PER M.A.G. SPEC. 200.		

DROP STRUCTURE	CREST STATION	ELEVATIONS			
		W	X	Y	Z
#1	34+10.66	40.2	37.2	37.0	37.5
#2	35+82.75	44.2	41.2	41.0	41.5
#3	40+98.96	51.2	48.2	48.0	48.5

CHANNEL DROP STRUCTURE DETAIL

NOTE:
WEEPHOLES SHALL INCLUDE 3" DRAIN PIPES 10' O.C. WITH A SLOPE OF $\frac{1}{4}$" PER FOOT, INSTALLED ONE FOOT ABOVE THE BASIN BOTTOM. USE 1 CU. FT. OF COARSE AGGREGATE (AASHTO M43 SIZE NO.7) SECURELY TIED IN BURLAP SACK AT EACH DRAIN LOCATION.



M.A.G. 535 CATCH BASIN TYPE 'F' BOX MODIFICATION
MODIFICATIONS TO M.A.G. STD. DET. 534–1, SECTION B–B

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SHEET	10 OF 11

S.A.# 396-SA-2006 S.A.# 280-SA-2006 54-N.P.-2006 D.R.# 1-DR-2006 ZN# 20-ZN-2002 #2 PLAN CHECK# 6787-06-1 Q.S.# 39-45

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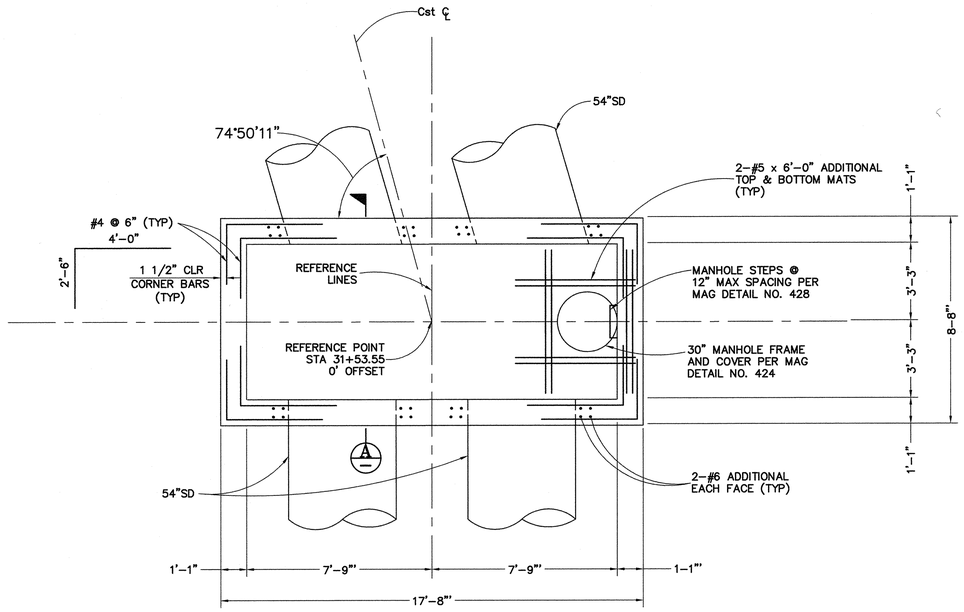
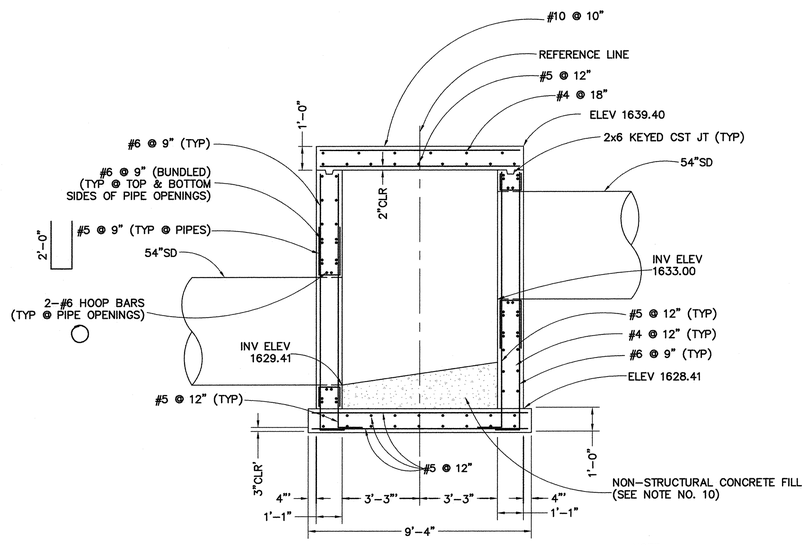


PLAN VIEW



SECTION A

NOTE:

CONRNER BARS (#4 @ 6") NOT SHOWN FOR CLARITY.

GENERAL NOTES

1. CONSTRUCTION SPECIFICATIONS – M.A.G. UNIFORM STANDARD SPECIFICATIONS AND DETAILS FOR PUBLIC WORKS.
2. ALL CONCRETE SHALL BE MAG CLASS AA UNLESS OTHERWISE NOTED.
3. REINFORCING STEEL SHALL CONFORM TO ASTM SPECIFICATION A615. ALL REINFORCING SHALL BE FURNISHED AS GRADE 60.
4. ALL BENDS AND HOOKS SHALL MEET THE REQUIREMENTS OF AASHTO ARTICLE 8.23. ALL BEND DIMENSIONS FOR REINFORCING STEEL SHALL BE OUT-TO-OUT OF BARS. ALL PLACEMENT DIMENSIONS FOR REINFORCING STEEL SHALL BE TO CENTER OF BARS UNLESS NOTED OTHERWISE.
5. ALL REINFORCING STEEL SHALL HAVE 2 INCH CLEAR COVER UNLESS NOTED OTHERWISE.
6. STRESSES:
   MAG AA CONCRETE.....f'c = 4000 PSI.
   GRADE 60 REINFORCEMENT.....Fy = 60,000 PSI.
7. CHAMFER ALL EXPOSED CORNERS 3/4" UNLESS NOTED OTHERWISE.
8. DIMENSIONS SHALL NOT BE SCALED FROM DRAWINGS.
9. PIPES SHALL BE TRIMMED TO FINAL SHAPE AND LENGTH BEFORE CONCRETE IS PLACED.
10. SUMP FLOOR SHALL HAVE A WOOD TROWEL FINISH AND A MINIMUM SLOPE OF 4:1 IN ALL DIRECTIONS TOWARD OUTLET PIPE.
11. CONSTRUCTION JOINTS SHALL BE PLACED TO MEET FIELD CONDITIONS.
12. TRIM REINFORCING STEEL AROUND PIPES TO PROVIDE A 2" CLEAR.

DMB

ONE SCOTTSDALE

EAST REGIONAL DRAINAGE CORRIDOR IMPROVEMENTS

SCOTTSDALE, ARIZONA

Registered Professional Engineer
39510
DIEGO ERNESTO OLIDEN
Date Signed 08/15/07
ARIZONA, U.S.A.

DRAWN	DBB
CHECKED	SEO
DATE	14 AUGUST 2007
SCALE	N/A
JOB NO.	021584.14
SHEET	11 OF 11

CALL TWO WORKING DAYS BEFORE YOU DIG
263-1100
1-800-STAKE-IT
(OUTSIDE MARICOPA COUNTY)

S.A.# 396-SA-2006 S.A.# 280-SA-2006 54-N.P.-2006 D.R.# 1-DR-2006 ZN# 20-ZN-2002 #2 PLAN CHECK# 6787-06-1 Q.S.# 39-45

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EXHIBIT 6 – HYDRAULIC MODELING ASSISTANCE FOR ONE SCOTTSDALE IN SCOTTSDALE, ARIZONA REPORT BY JE FULLER

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JE FULLER
hydrology • geomorphology

DRAFT
Memorandum

DATE: December 17, 2021

TO: Michael F. Burke
One Scottsdale Core LLC

FROM: Richard Waskowsky, PE
JE Fuller Hydrology & Geomorphology, Inc.

RE: Hydraulic Modeling Assistance for One Scottsdale in Scottsdale, Arizona

1. Introduction

The One Scottsdale project is in Scottsdale, Arizona on the northeast corner of Scottsdale Road and the Loop 101. Refer to project parcels in Figure 1. During the City of Scottsdale's (COS) drainage review of the project, the COS made a comment about how the project is handing off-site flow from the Pinnacle Peak West Area Drainage Master Study (PPW ADMS) (JEF, 2014). Note the PPW discharge results in **Figure 1**. The purpose of this memorandum is to document the hydraulic analyses used to resolve the City's comment.

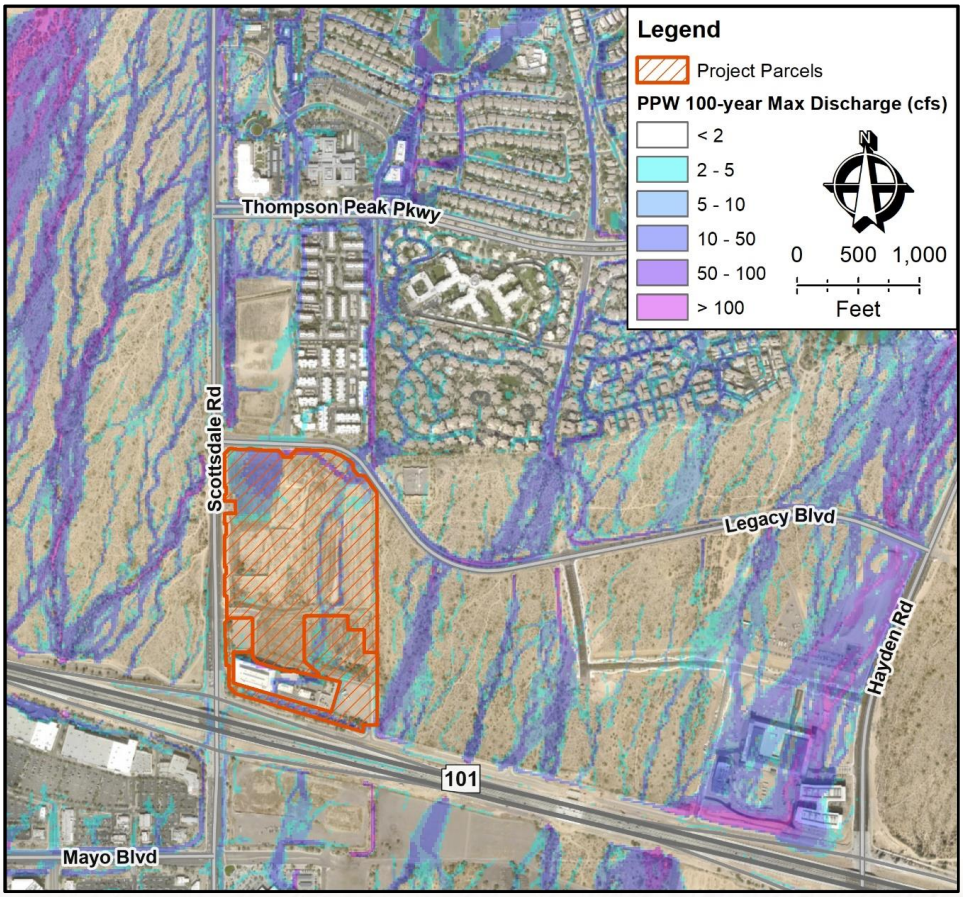

Figure 1. Location of One Scottsdale Project

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2. Review of Existing Modeling Studies in the Area

This area of Scottsdale has been extensively studied with two-dimensional modeling since late 2010. The studies in the area are tabulated in the list below along with a brief description, starting with the first study:

- Pinnacle Peak South (PPS) ADMS (TY Lin, 2013) – This analysis had a study area of approximately 40 square miles and used both HEC-1 and FLO-2D to complete the hydrology for the entire area. The FLO-2D software used was version 2009.06 with a Build Number of 09-11.07.06, and the modeling area used a 30-ft grid. This study was prepared for the COS in partnership with the Flood Control District of Maricopa County (FCDMC).
- Pinnacle Peak West ADMS (JEF, 2014) – This study had a total area of approximately 97 square miles, and FLO-2D was used for the entire study except some inflows were from the adjacent PPS FLO-2D modeling and HEC-1 modeling for in the Carefree area. The FLO-2D software used was version PRO with a Build Number of 13.07.05, and the modeling used a 20-ft grid. This study was prepared for the FCDMC in partnership with the COS, the City of Phoenix (COP), and the Arizona State Land Department (ASLD).
- Rawhide Wash Hydrology Conditional Letter of Map Revision (CLOMR) (JEF, 2018) – This study was approximately 14 square miles and was used to redefine the 100-year discharge for Rawhide Wash at the alluvial fan apex. The entire area was modeled with FLO-2D. The FLO-2D software used was version PRO with a Build Number of 16.06.16, and the modeling used a 20-ft grid. The 100-year discharge for the Rawhide Wash apex was approved by FEMA in January 2019. This study was performed for the FCDMC with the COS as a project partner.
- Rawhide Wash Flood Hazard Mitigation (FHM) CLOMR (JEF, 2020) – This CLOMR is part of the ongoing Rawhide Wash FHM Final Design project. The design project's primary goal is to mitigate the flood hazard from Rawhide Wash by designing levees to contain the flow on the reach of Rawhide Wash from its alluvial fan apex to Pinnacle Peak Road. The existing and proposed conditions hydrology for the design was developed with FLO-2D modeling. These hydrology models used a 20-ft grid, and the FLO-2D software used was version PRO with a Build Number of 16.06.16. These models used the same methodologies and procedures from the Rawhide Wash Hydrology CLOMR since this modeling was accepted by FEMA. The design project is being performed for the FCDMC with the COS and the COP as project partners.

The FLO-2D modeling domains in relation to the project site are shown in **Figure 2**.

All the above studies used FLO-2D as a part of the overall analysis. However, different versions were used as the modeling becomes newer. In general, the newer releases of the FLO-2D model are improvements over past versions through performance enhancements or software corrections. Additionally, the FCDMC developed and formalized a review process for new FLO-2D build versions that is documented in the FLO-2D Verification Report (FCDMC, 2016). The version of the FLO-2D software used in the Rawhide studies was tested and approved through the FCDMC approval process. Therefore, since the Rawhide Wash FHM CLOMR existing conditions modeling is the latest modeling that covers the watershed that drains to One Scottsdale, the results from this model will be used to assess the off-site flows affecting One Scottsdale.

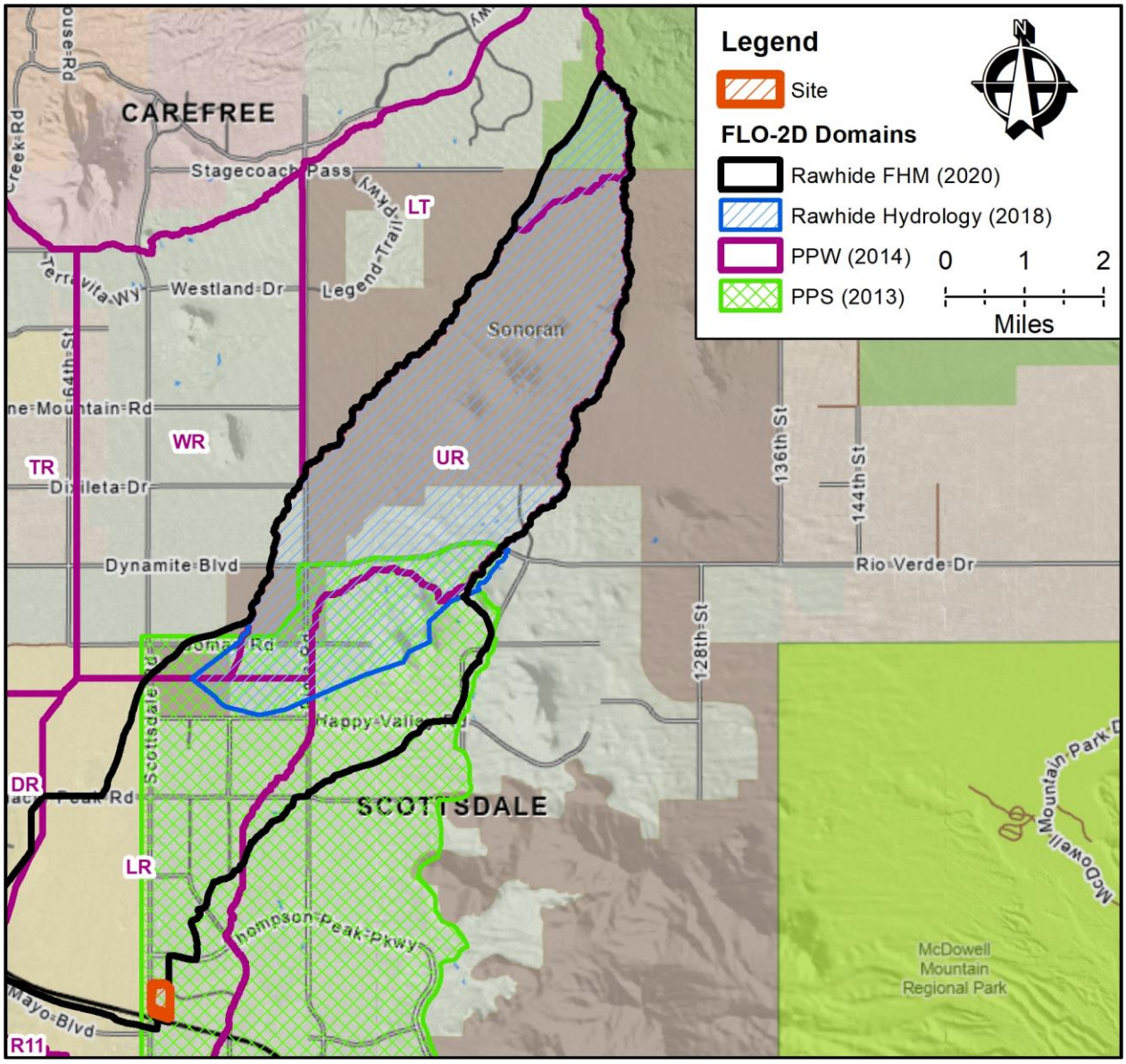

Figure 2. FLO-2D Modeling Domains in Relation to the One Scottsdale Project Site

3. Rawhide Wash FHM CLOMR FLO-2D Model Existing Condition Results

The existing conditions modeling from the Rawhide FHM project was used to analyze off-site flows for the project site for the following reasons:

1. The Rawhide Wash FHM CLOMR modeling is the most current modeling for the area,
2. The City of Scottsdale is a project partner on Rawhide Wash FHM study,
3. This modeling uses the latest procedures outlined in the Drainage Design Manual (DDM) for Maricopa County, Arizona – Hydrology (2018)
4. The entire off-site watershed is contained in one model without relying on inflows from other studies.

While the FHM CLOMR modeling represents the best modeling in the area, there are a few items to note that include:

1) There are significant storm drain improvements on the east side of the One Scottsdale project north of Legacy Boulevard that changed the inflow condition to the two 54-in diameter storm drain pipes along the east side of One Scottsdale south of Legacy Boulevard. Basically, a 60-in diameter storm drain was added from approximately 250-ft south of Thompson Peak Parkway to Legacy Boulevard that took inflows from three 36-in culverts just south of Thompson Peak Parkway and connected to the two 54-in storm drains in a junction structure. The additional 60-in storm drain has multiple grate inlets along its length to capture off-site inflows (see **Figure 3**). This 60-in storm drain improvement has not been modeled in the Rawhide Wash FHM CLOMR modeling.

Figure 3. Typical Grate Inlet along 60-in Storm Drain

2) As shown in **Figure 2**, the modeling domain for the Rawhide Wash FHM CLOMR does not cover the entire upstream watershed that drains to One Scottsdale. This is because the FLO-2D domain was truncated to focus on areas affected by Rawhide Wash for the submittal to FEMA. For the current study, an earlier version of the modeling that covered the entire upstream watershed is used. However, the expanded modeling used the same parameters and procedures as the truncated model. The relationship between the two domains is shown in **Figure 4**.

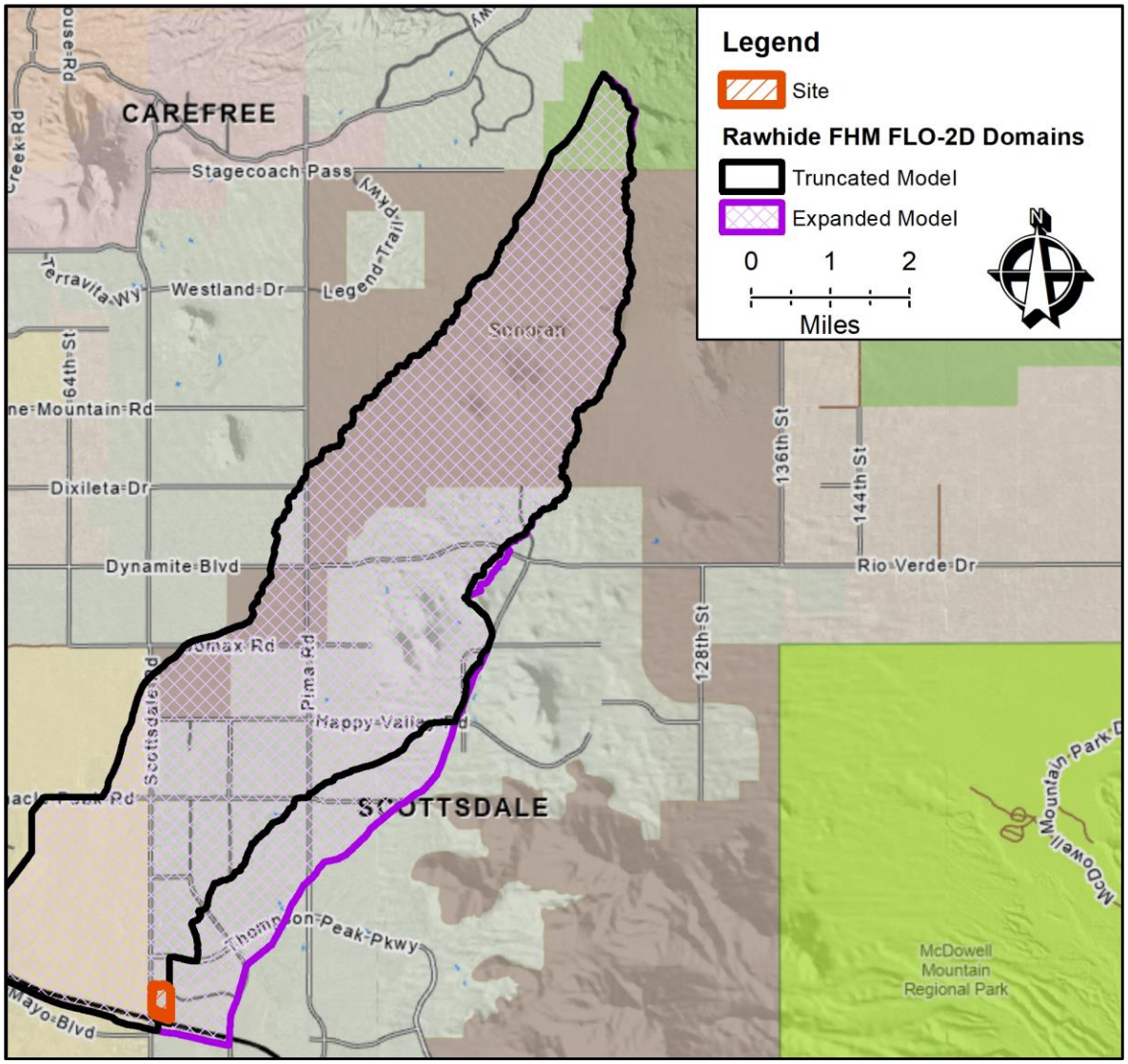

Figure 4. Rawhide FHM FLO-2D Domains shown with One Scottsdale Site

With these two items in mind, the results from the Rawhide FHM CLOMR modeling can be compared with the results from the PPW ADMS. A comparison of the maximum depth results between the two models is shown in **Figure 5**, while a comparison of the maximum discharges is shown in **Figure 6**. It can be seen from both figures that the off-site flows impacting the One Scottsdale site have been greatly reduced with the new modeling. This reduction is driven primarily by the updated infiltration parameters that have been included in the newer modeling based on the procedures formalized in the FCDMC manuals (2016, 2018).

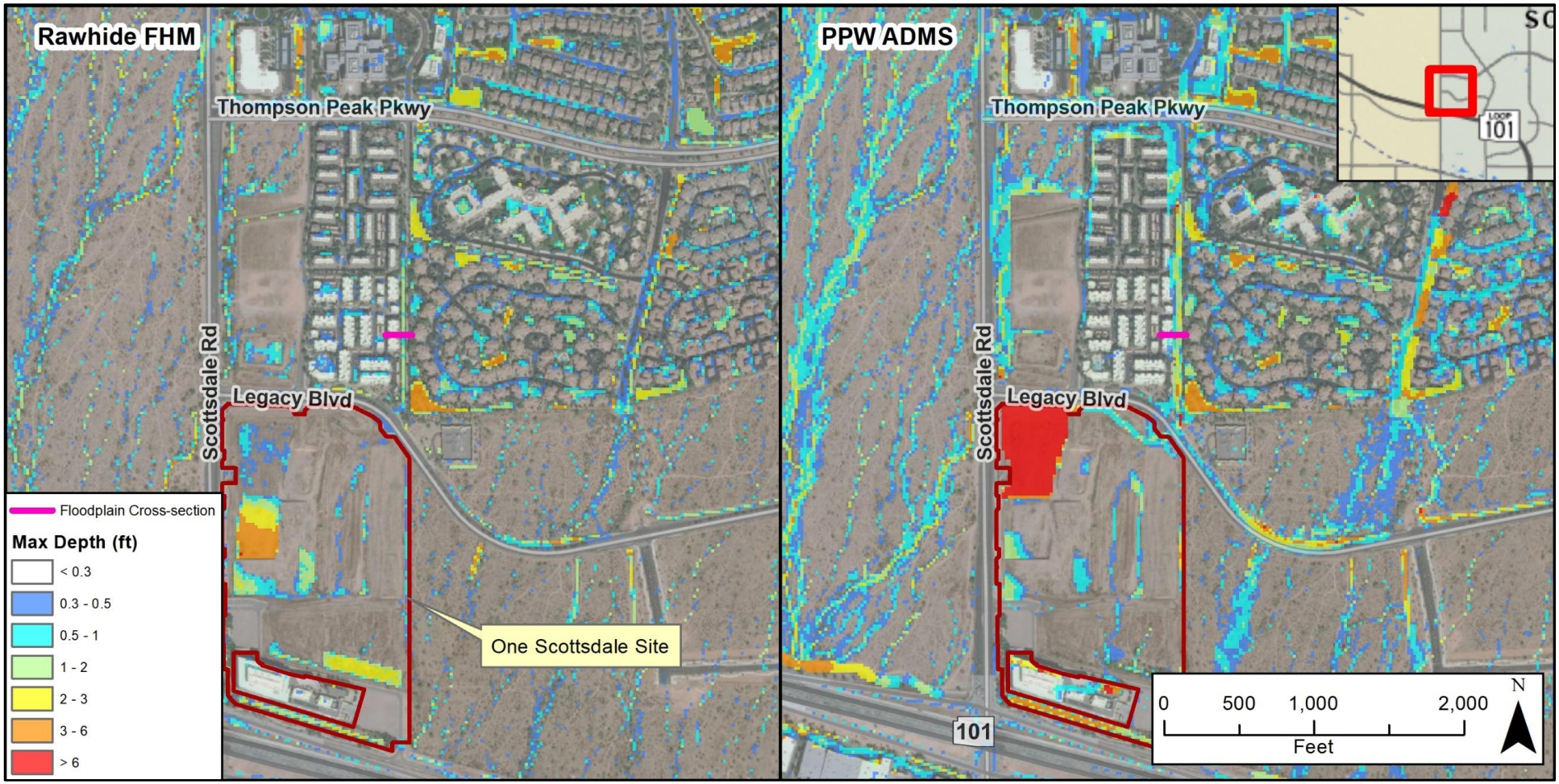

Figure 5. Comparison of Maximum Depth Results near the One Scottsdale Site shown with Location of Relevant FLO-2D Cross-section

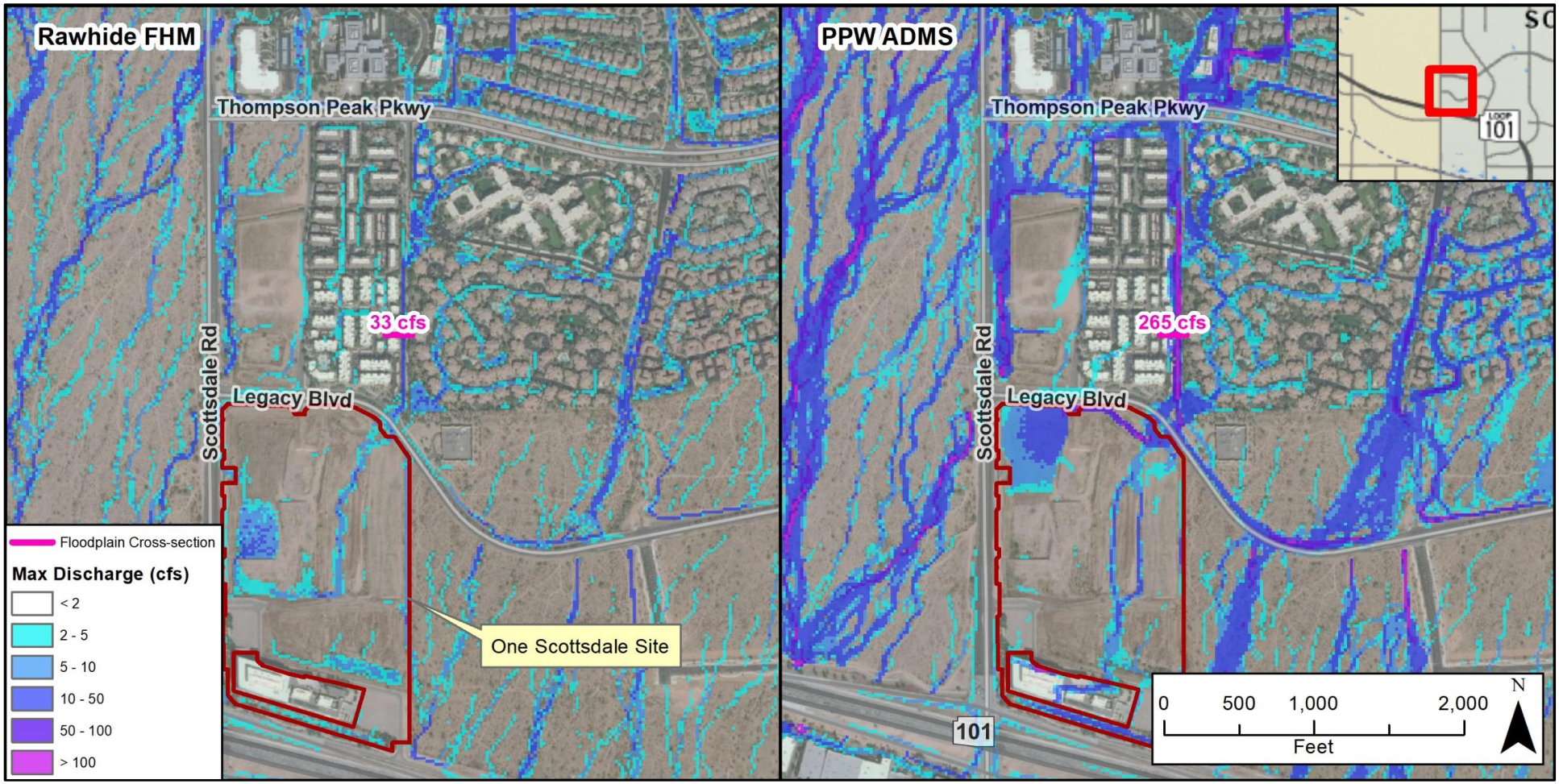

Figure 6. Comparison of Maximum Discharge Results near the One Scottsdale Site shown with Location of Relevant FLO-2D Cross-section

Figure 6 also shows the peak flows at the most relevant FLO-2D floodplain cross-section along the eastern edge of the site. The original PPW ADMS shows a flow 265 cfs, while the Rawhide FHM modeling shows a peak flow of 33 cfs. With the updated infiltration parameters, the existing upstream drainage infrastructure is more efficient. Most of the flow is captured in the Deer Valley Road Channel or the drainage infrastructure (channels and basins) with the existing powerline corridor (see **Figure 7**). Most of the upstream watershed is cutoff by this existing infrastructure thereby reducing the flows that affect the site. **Figure 8** is a detailed view of the maximum discharges downstream of this infrastructure that also shows the location of the additional 60-in diameter pipe.

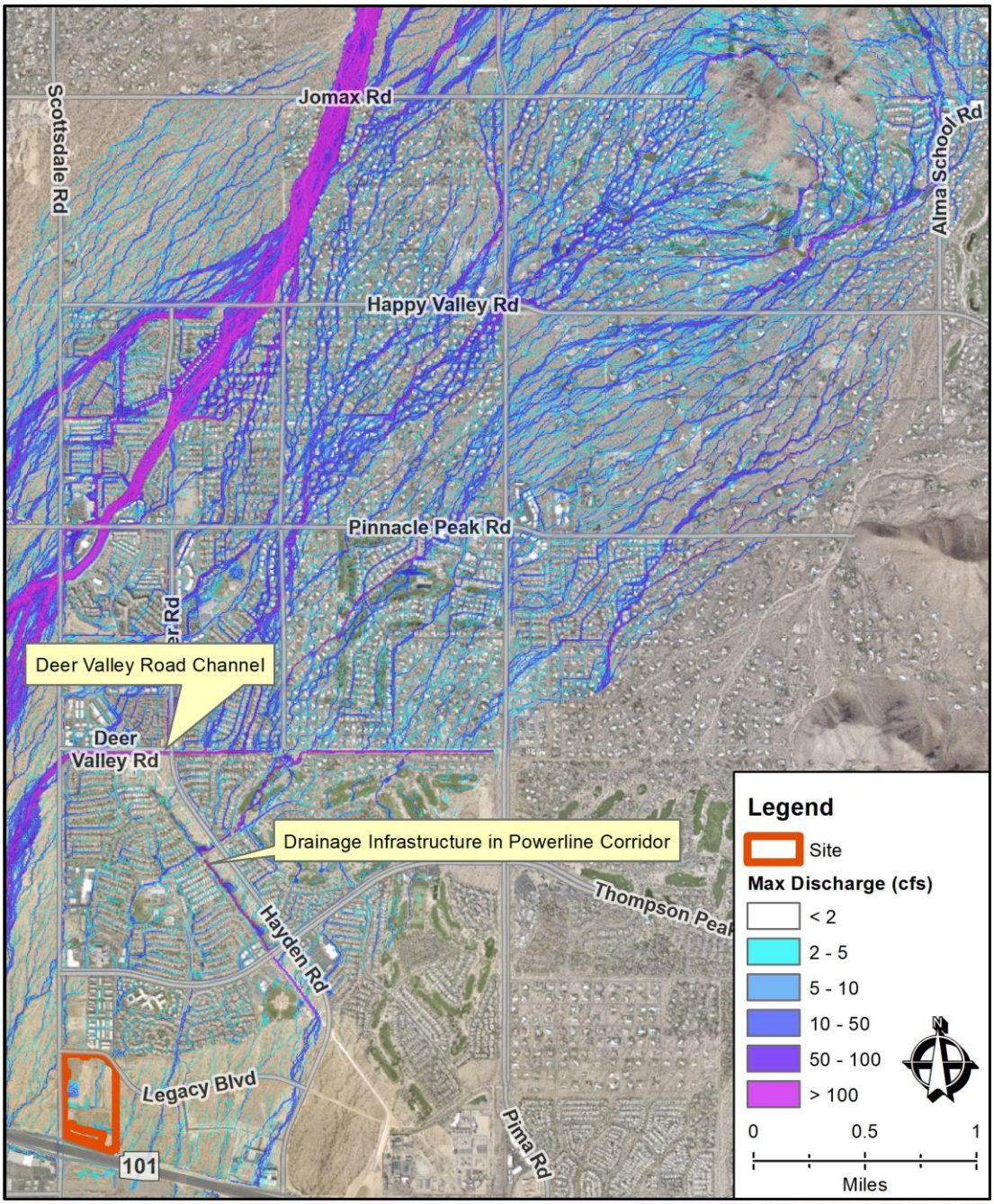

Figure 7. Rawhide FHM Maximum Discharge Results in the Upstream Watershed

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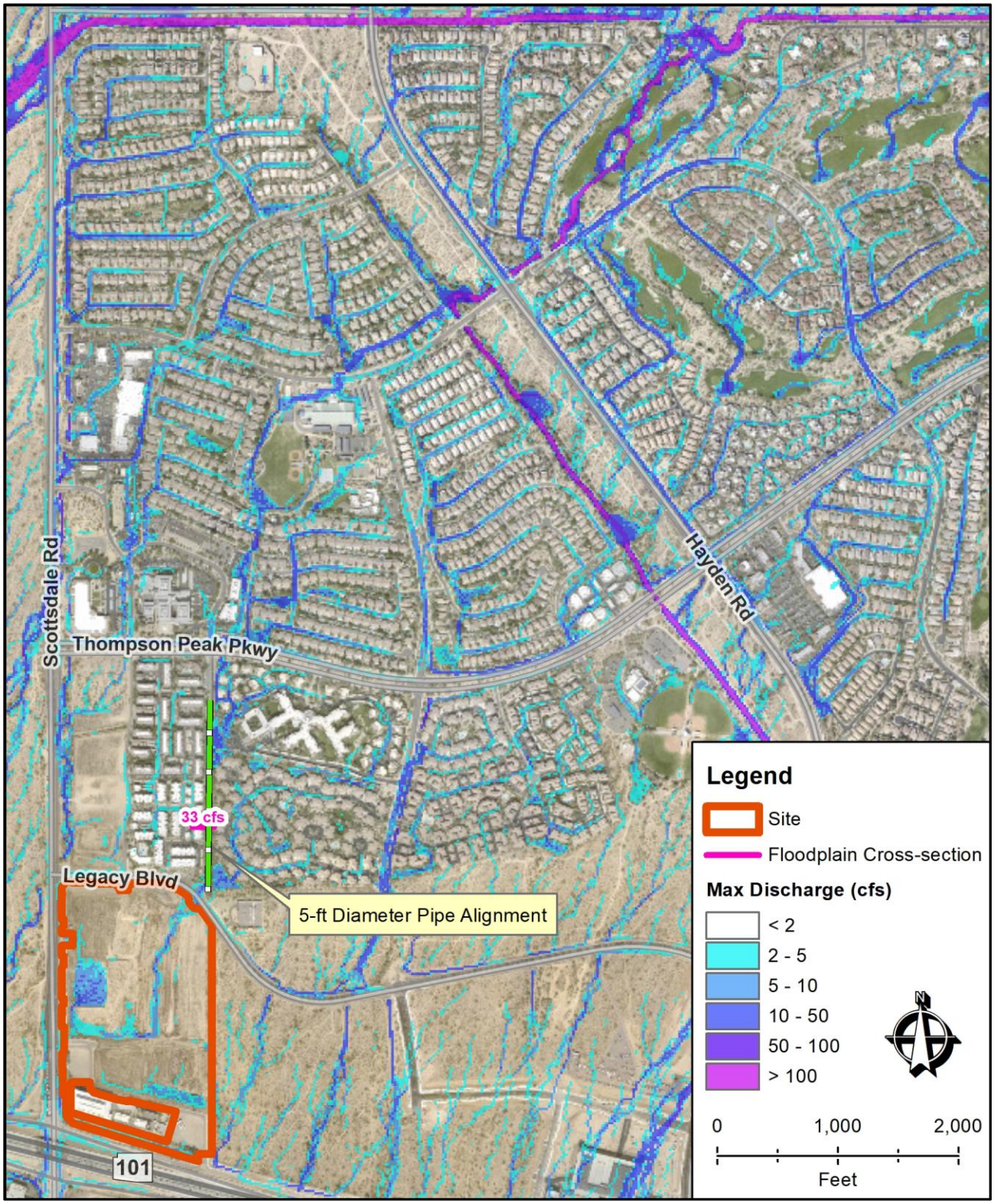

Figure 8. Detailed View of Rawhide FHM Maximum Discharge Results near One Scottsdale Site

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Since the more refined modeling indicates that the off-site flows have been reduced to 33 cfs, a normal depth analysis of the 60-in diameter pipe was performed. The results indicate that this magnitude would fill the pipe to approximately 1.84 feet (or 22 inches) of depth. Therefore, since there are many inlets along the length of the pipe and the normal depth analysis indicates that the trunkline has excess capacity, the existing infrastructure appears adequate for the more refined off-site flows.

4. Summary and Conclusion

In summary, this memorandum discussed the following items:

- An overview of the past and current FLO-2D modeling and studies near the One Scottsdale site were reviewed.
- Reasons documenting why the Rawhide Wash FHM CLOMR FLO-2D hydrology modeling represents the latest and best modeling for the area were given.
- The results from the Rawhide Wash FHM CLOMR existing conditions FLO-2D model were presented and compared with the PPW ADMS results near the One Scottsdale site.
- Based on the refined Rawhide Wash FHM modeling, the off-site flow is approximately 33 cfs.
- A normal depth analysis was performed for the 60-in storm drain that indicated there is excess capacity in the pipe.

Based on the latest and most current FLO-2D modeling results, the off-site flow affecting the One Scottsdale project site are approximately 33 cfs, and most of the upstream watershed is cut off by the Deer Valley Road Channel and the drainage infrastructure along the powerline corridor. Since there are many inlets along the length of the pipe and the normal depth analysis indicates that the trunkline has excess capacity, the existing infrastructure appears adequate for the more refined off-site flows. Therefore, although all the inlets and full storm drain system were not explicitly modeled in FLO-2D, the results indicate the no off-site flow would affect the One Scottsdale site.

5. References

Flood Control District of Maricopa County (FCDMC), 2016, Drainage Policies and Standards for Maricopa County, Supplemental Technical Document, FLO-2D Verification Report, May 2016.

____, 2018, Drainage Design Manual for Maricopa County, Arizona - Hydrology, December 2018.

JE Fuller Hydrology & Geomorphology, Inc. (JEF), 2014, Pinnacle Peak West Area Drainage Master Study Hydrology and Hydraulics Technical Support Data Notebook, prepared for the Flood Control District of Maricopa County.

____, 2018, Rawhide Wash Conditional Letter of Map Revision, Hydrology, Final, prepared for the Flood Control District of Maricopa County.

____, 2020, Rawhide Wash Flood Hazard Mitigation Conditional Letter of Map Revision, prepared for the Flood Control District of Maricopa County. *Currently under review by FEMA*

TY Lin International (TY Lin), 2013, Pinnacle Peak South Area Drainage Master Study, Draft Hydrology and Hydraulics Report Volume 1, prepared for the City of Scottsdale.

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6. Digital Attachments

- Rawhide FHM Existing Conditions FLO-2D Model
- Design plans of drainage infrastructure on east side of One Scottsdale
- Site Visit Photos
- 5-ft Diameter Normal Depth Model (FHWA Hydraulic Toolbox)

EXHIBIT 7 – ONE SCOTTSDALE PUII MASTER STORM DRAIN REPORT

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ONE SCOTTSDALE

PLANNING UNIT II

MASTER STORM DRAIN PLAN

July 20, 2007

WP # 052583.14

Submitted to:

City of Scottsdale
7447 East Indian School Road
Suite 205
Scottsdale, AZ 85251

Prepared for:

One Scottsdale Holdings LLC
c/o DMB Associates, Inc.
7600 East Doubletree Ranch Road
Suite 300
Scottsdale, AZ 85258
Phone: (480) 367-7000
Fax: (480) 367-7558

Prepared by:

Wood, Patel & Associates, Inc.
2051 West Northern Avenue
Suite 100
Phoenix, AZ 85021
Phone: (602) 335-8500
Fax: (602) 335-8580
Contact: Ms. Lisa L. Crane, P.E.

Peer Reviewer

Engineer

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ONE SCOTTSDALE

PLANNING UNIT II

MASTER STORM DRAIN PLAN

Plan # 4375-07
Case # ~~[illegible]~~
Q-S #

☑ Accepted
☐ Correction

Reviewed By

8/21/07
Date

WOOD/PATEL

4375-07 Case Drainage 1st 8-2-07

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1.1 Project Background 1
1.2 Purpose of Master Storm Drain Plan 1
2.0 DRAINAGE ANALYSIS 3
2.1 Drainage Background 3
2.2 Drainage Concept 3
3.0 DATA ANALYSIS 4
3.1 Hydrology 4
3.2 Hydraulics 4
4.0 SUMMARY 6
5.0 REFERENCES 7

PLATES

Plate 1 Vicinity Map

EXHIBITS

Exhibit 1 Planning Unit II - Master Storm Drain Plan
Exhibit 2 Planning Unit II – Sub-basin Delineation Map
Exhibit 3 Proposed Drainage Facilities (Exhibit 1d) - Stacked 40s Master Drainage Plan

APPENDICES

Appendix A Hydrology – Rational Method Analysis
Appendix B Hydraulics – StormCAD Analysis and Culvert Master Analysis

kjg
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1.0 INTRODUCTION

1.1 Project Background

This plan has been prepared in accordance with Wood, Patel & Associates, Inc.'s (Wood/Patel) understanding of City of Scottsdale technical requirements for drainage and using the City of Scottsdale approved One Scottsdale Master Drainage Plan as a guide. The parcel of land to be developed is known as One Scottsdale Planning Unit II and will hereafter be referred to as the Site.

The Site is located at the northeast corner of Scottsdale Road and the Arizona Department of Transportation (ADOT) State Route 101 Freeway. The Site is bound on the north by proposed Center Drive and on the east by Arizona State Trust Land. Specifically, the Site is located in the west half of Section 26, Township 4 North, Range 4 East of the Gila and Salt River Meridian. Plate 1 – *Vicinity Map* displays the location.

The Site is anticipated to be a phased mixed-use development that may include single-family residential, multi-family residential, hotel, mixed-use office, retail, and commercial uses as applicable per the Development Agreement. According to the Development Agreement, the approved Development Plan for the Project is on file with the Planning and Development Services Department at the City of Scottsdale. The two proposed Planning Unit locations are as follows: Planning Unit II will extend north from the State Route 101 Freeway to the proposed Center Drive; and Planning Unit III will extend north from Center Drive to Thompson Peak Parkway. The scope of this Master Storm Drain Plan includes Planning Unit II as shown in Plate 1 – *Vicinity Map*.

1.2 Purpose of Master Storm Drain Plan

This master storm drain plan will define the storm drain requirements and provide a basis of design for Planning Unit II storm drain in the built out condition. As Site specific development proceeds, each plan will demonstrate conformity with this master storm drain plan and describe how the storm drain system is to operate until Planning Unit II has reached the built out condition.

The locations of the expected storm drain system within Planning Unit II are presented on Exhibit A – *Master Storm Drain Plan – Planning Unit II.*

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It is understood that any improvement plans submitted for Site development will require an easement over the drainage system that allows the City, after appropriate notification to the owner, the right to repair, or cause repairs to be made for damaged or non-functioning portions or all of the system as required and the City will receive compensation from the owner for such work. Language for City intervention to repair or maintain must be reviewed and approved by attorneys representing the City and the development's owner.

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2.0 DRAINAGE ANALYSIS

2.1 Drainage Background

Planning Unit II is bordered by roadways and drainage systems which will serve as a buffer to offsite flows. Proposed Center Drive is the north boundary of this planning unit and will ultimately convey the 100-year storm to storm drain systems to the west and east of the Site. The west boundary drainage corridor is located within the City of Scottsdale scenic corridor, along the east side of Scottsdale Road. This corridor is to consist of an open channel flow system blended with the requirements of scenic corridors per the City of Scottsdale's *Scenic Corridor Design Guidelines* (Ref. 7). The corridor currently receives drainage flows from Grayhawk to the north. However, this corridor may also propose to have an additional capacity for potential offsite flow from Scottsdale Road, which may overtop the street and drain to the scenic corridor. This additional capacity may be revised subject to finalization of the scenic corridor cross-section by the City of Scottsdale. The east boundary of Planning Unit II contains a drainage corridor that is planned to convey offsite flows along the perimeter of the Site to existing points of discharge. Stormwater storage is planned for the south area of Site as described in the One Scottsdale Master Drainage Plan.

It is noted that there are no Section 404 "Waters of the U.S." watercourses on the Site per the U.S. Army Corps of Engineers' letter, dated February 5, 2002 (see Appendix A).

2.2 Drainage Concept

The Planning Unit II storm drain system has been designed consistent with the One Scottsdale project grading and drainage goals. A summary of these goals as they relate to the storm drain system are included here for reference.

- Remove street runoff as quickly as is reasonably possible.
- Use curb inlets in lieu of grated catch basins to provide a more pedestrian friendly environment.
- Size the storm drain system for the 100-year event in order to limit street runoff.
- Design roof drains to connect directly to storm drain system.

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3.0 DATA ANALYSIS

3.1 Hydrology

Peak flow estimates were generated by the Rational Method, as outlined in the City of Scottsdale Design Standards and Policies Manual, revised September 2006 and the *Drainage Design Manual for Maricopa County, Arizona, Volume 1 – Hydrology*, revised January 1995. This method assumes the application of a steady, uniform rainfall intensity that produces a peak flow estimate when all points within the watershed contribute to outflow at the design point.

Rational Method peak flows were computed at concentration points along the Site at key design locations. Runoff coefficients were estimated to reflect anticipated proposed land use conditions for storm drain sizing purposes. Estimated 100-year Rational Method runoff coefficients used are given as follows:

Component	Estimated Runoff Coefficient
Commercial	0.90
Scenic Corridor/Mixed desert landscaping	0.79

The location of the drainage sub-basins are illustrated on *Exhibit 2 – Planning Unit II - Sub-basin Delineation Map*. Estimates of 100-year peak flows are included in Appendix A – *Hydrology - Rational Method Analysis*.

3.2 Hydraulics

The proposed storm drain systems were modeled using Bentley's StormCAD: Storm Sewer Design & Analysis Software (Ref. 4) using the methodologies specified in HEC-22 (Ref. 5). The proposed storm drain systems were designed to convey runoff generated by the 100-year storm event. Design flows from each sub-basin were applied to the associated storm drain system at the upstream inlet. This conservative method was used

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because roof drain connection points have not yet been established. Storm drain systems A1, A2 and B were modeled with a tailwater condition that represents the south detention basin at full capacity (5-feet of head). Storm drain system C was modeled with a tailwater condition that represents a free outfall (0-feet of head) at the proposed connection point to the East Regional Drainage Corridor storm drain system. This assumption was made based on the proposed connection configuration represented on the One Scottsdale East Regional Drainage Corridor Improvement Plan (C.O.S. #6187-06-1). StormCAD analysis for the proposed storm drain system is contained within Appendix B – *Hydraulics – StormCAD Analysis and Culvert Master Analysis*.

The proposed culverts were modeled using Culvert Master by Haested Methods. The culvert systems were designed to convey runoff generated by the 100-year storm event. Culvert Master results for the proposed culverts are contained within Appendix B – *Hydraulics – StormCAD Analysis and Culvert Master Analysis*.

Note that a supplemental final open channel hydraulic analysis will be required as a part of any improvement plan development for the Project Area.

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4.0 SUMMARY

The One Scottsdale Planning Unit II Master Storm Drain Plan as presented herewith is believed to meet City of Scottsdale standards and requirements, and serves as a guide for construction documents associated with the proposed drainage components. No critical issues were identified that would prevent the anticipated drainage outcome as presented in this Plan. The following summarizes critical conclusions.

1. As documented by this Plan, the Project is capable of being designed in accordance with the City of Scottsdale's current drainage criteria.

2. This Master Storm Drain plan will define the storm drain requirements and provide a basis of design for Planning Unit II storm drain in the built out condition.

3. As Site specific development proceeds, each plan will demonstrate conformity with this master storm drain plan and describe how the storm drain system operates until Planning Unit II has reached the built out condition.

4. Ongoing maintenance is required for all drainage systems in order to assure design performance. Project maintenance is the responsibility of either the property owners association or ADOT depending on the location of the drainage improvements.

5. As noted within this Drainage Plan, the Project Area is not subject to the jurisdiction of the U.S. Army Corps of Engineers for Section 404, "Waters of the U.S." issues.

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5.0 REFERENCES

1. The City of Scottsdale, *Design Standards and Policies Manual*, December 1999.

2. The City of Scottsdale, *Scenic Corridor Design Guidelines*, February 20, 2003.

3. Wood/Patel & Associates, *One Scottsdale Master Drainage Plan*, September 26, 2006.

4. *Bentley StormCAD: Storm Sewer Design & Analysis Software,* copyright 1995-2005.

5. *Hydraulic Engineering Circular No. 22, Second Edition: Urban Drainage Design Manual,* U.S. Department of Transportation: Federal Highway Administration, dated August 2001.

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PLATE 1

Vicinity Map

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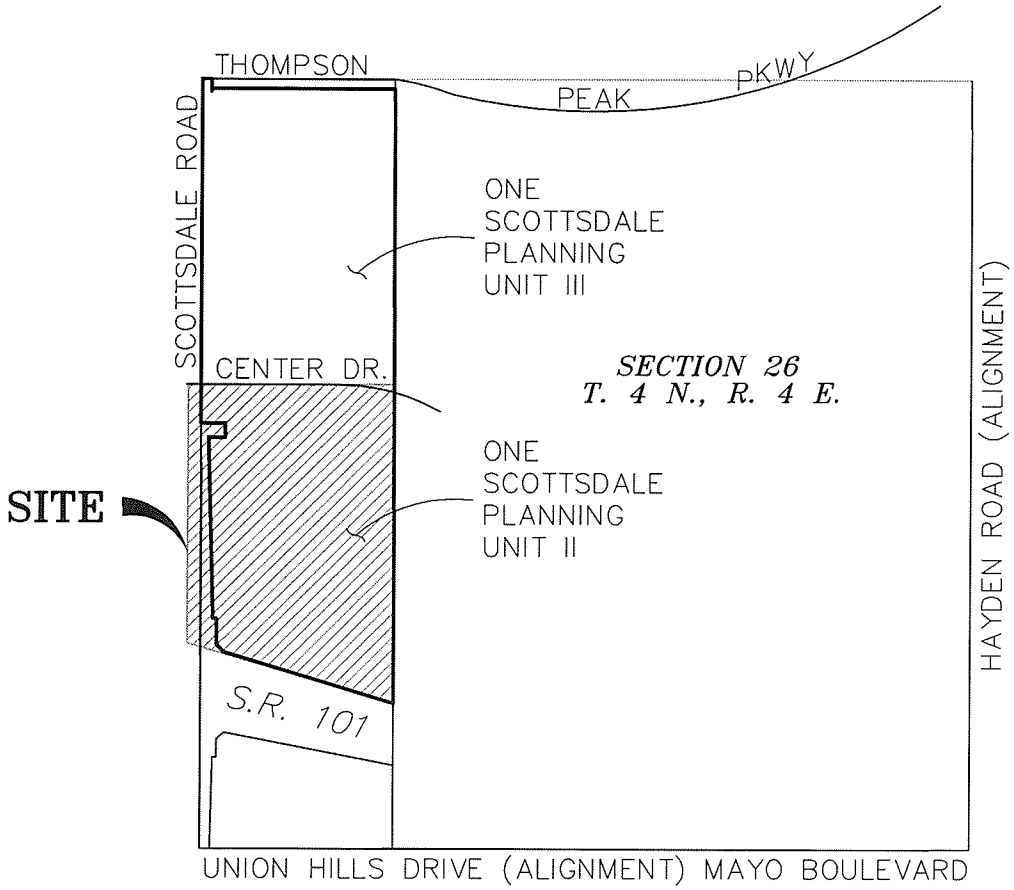

VICINITY MAP

N.T.S.

NOT
FOR CONSTRUCTION
OR RECORDING

ONE SCOTTSDALE

VICINITY
MAP

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EXHIBIT 1

Planning Unit II – Master Storm Drain Plan

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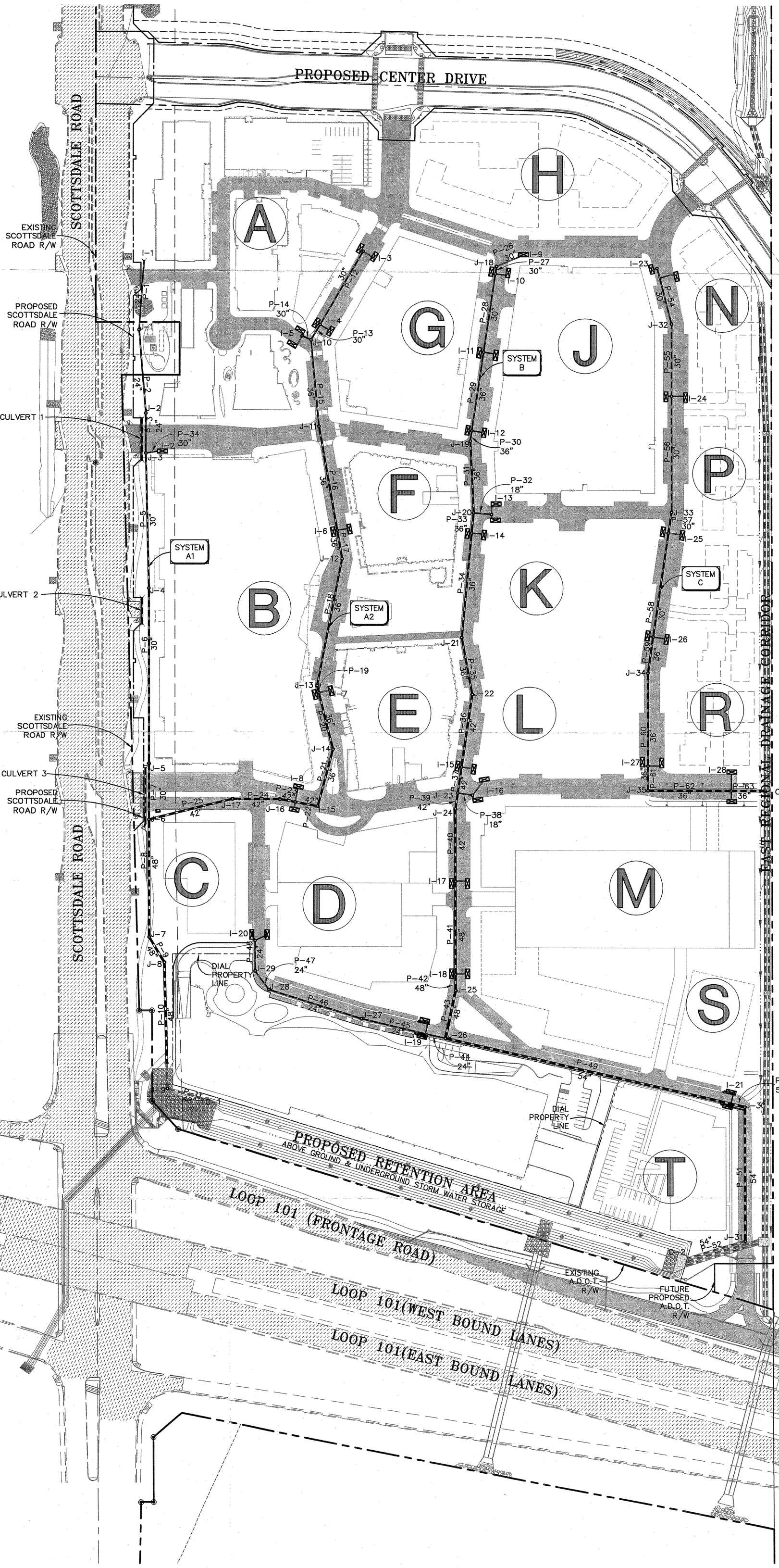

N

100 0 50 100

1 inch = 100 ft.

LEGEND

- PROJECT BOUNDARY
- ASPHALT PAVEMENT
- X — BLOCK ID
- PROPOSED STORM DRAIN PIPE
- PROPOSED CURB INLET
- PROPOSED MANHOLE/ JUNCTION
- I–1 — INLET I.D.
- J–1 — JUNCTION I.D.
- O–1 — OUTLET I.D.

ONE SCOTTSDALE
PLANNING UNIT II

MASTER
STORM DRAIN
PLAN

04–10–2007 (IN PROGRESS) WP#052583

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EXHIBIT 2

Planning Unit II – Sub-basin Delineation Map

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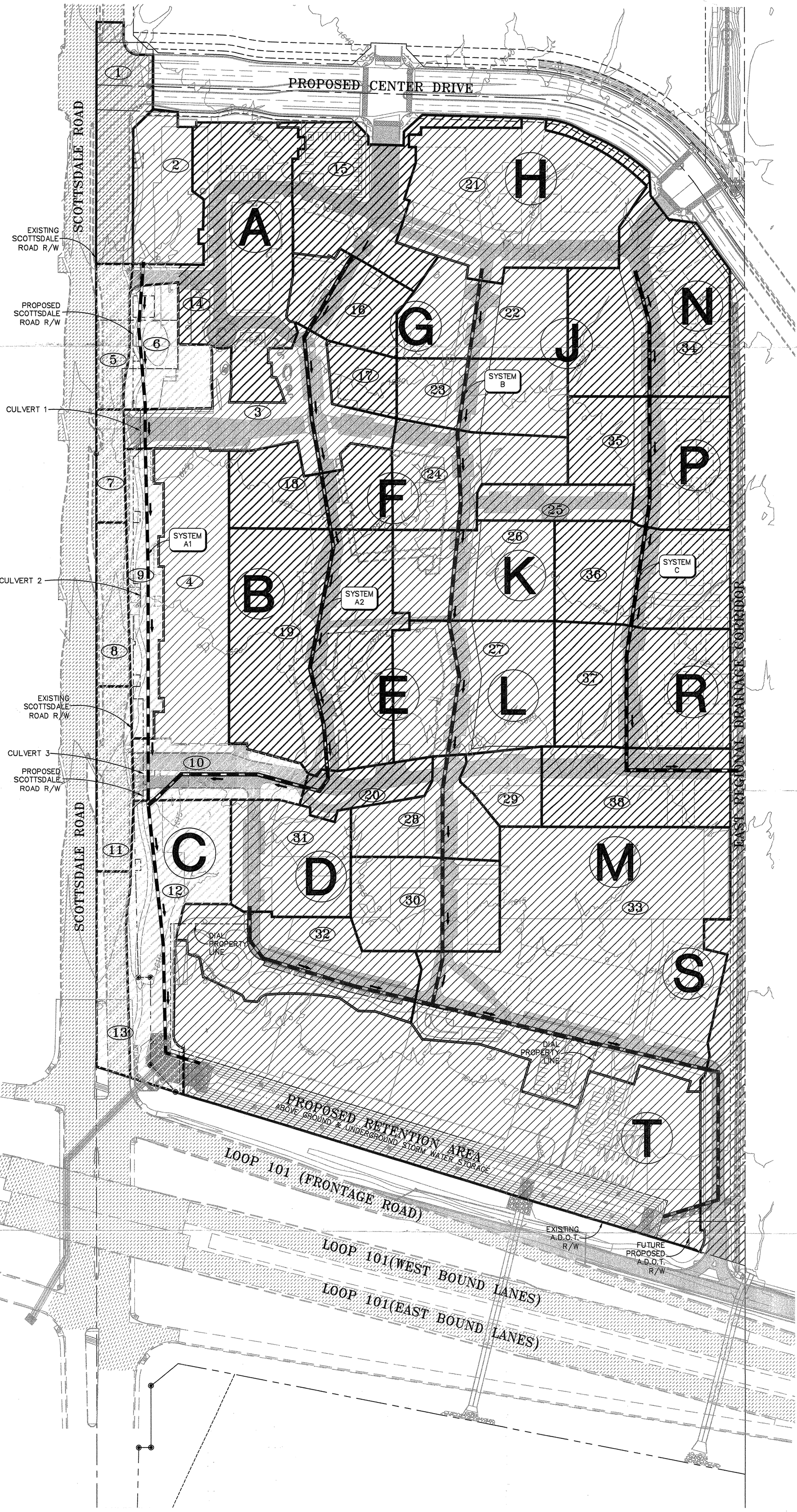

100 0 50 100

1 inch = 100 ft.

LEGEND

- PROJECT BOUNDARY
- ASPHALT PAVEMENT
- FLOW DIRECTION
- FLOW LINE
- X — BLOCK ID
- (1) — SUB BASIN I.D.
- SUB BASIN BOUNDARY
- PROPOSED STORM DRAIN PIPE
- 1337 — EXISTING CONTOUR
- AREA DRAINS TO S.D. SYSTEM A1
- AREA DRAINS TO SCENIC CORRIDOR SWALE
- AREA DRAINS TO S.D. SYSTEM A2
- AREA DRAINS TO S.D. SYSTEM B
- AREA DRAINS DIRECTLY TO DETENTION BASIN
- AREA DRAINS TO S.D. SYSTEM C
- AREA DRAINS TO EAST REGIONAL DRAINAGE CORRIDOR SWALE

ONE SCOTTSDALE
PLANNING UNIT II

SUB-BASIN DELINEATION MAP

04-09-2007 (IN PROGRESS) WP#052583

NOT FOR CONSTRUCTION OR RECORDING

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Phoenix, AZ 85021
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S:\2005\052583\Project Support\Hydro\Exhibits\2583-Drainage Map.dwg

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EXHIBIT 3

Proposed Drainage Facilities (Exhibit 1d) – Stacked 40s Master Drainage Plan

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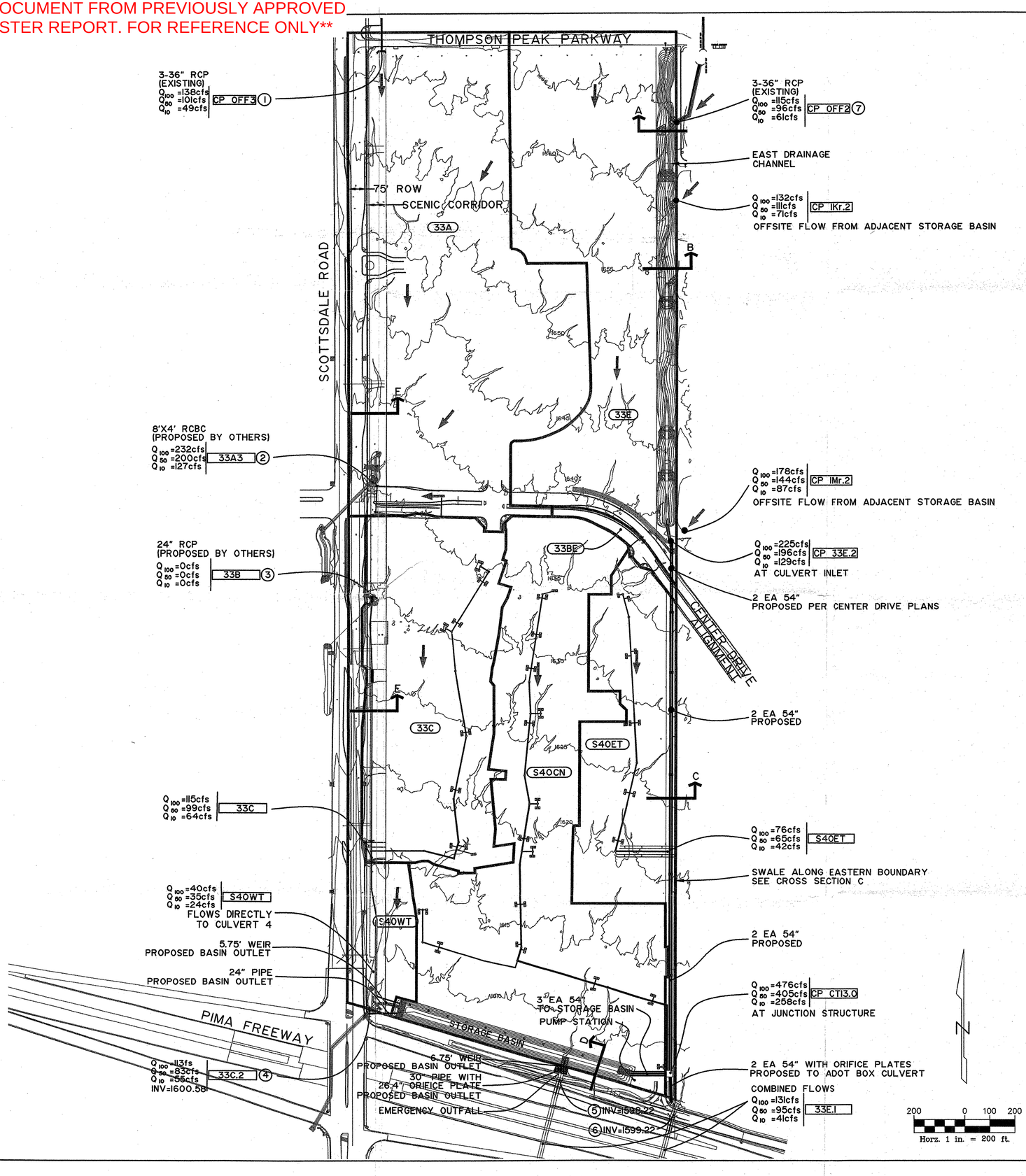
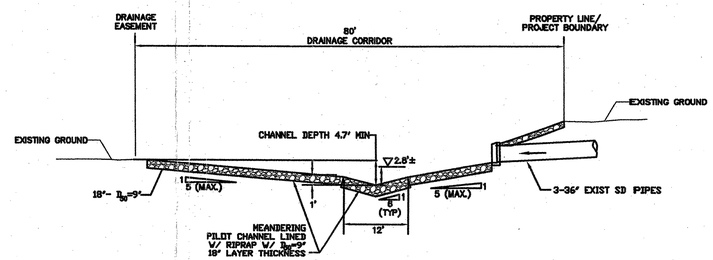
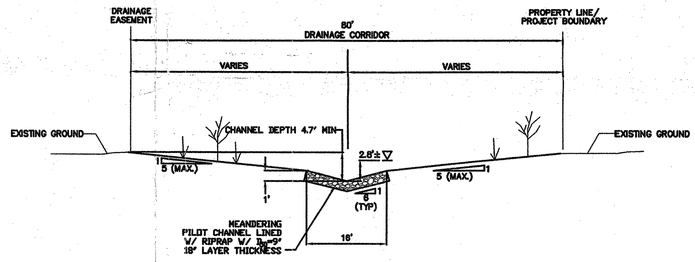




SECTION A-A
NTS



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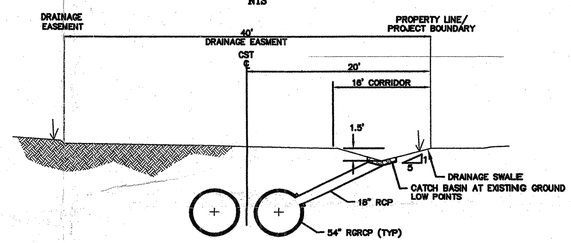
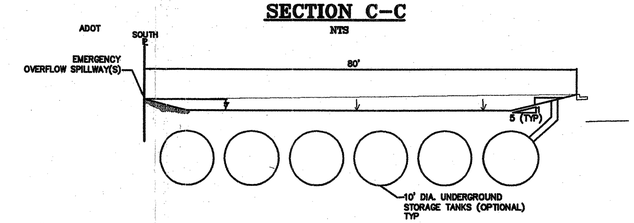
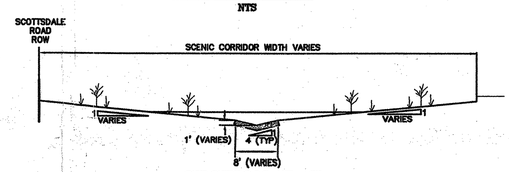
NTS



SECTION C-C
NTS



SECTION D-D
NTS



SECTION E-E
NTS

OFFSITE CULVERT SUMMARY		
CULVERT ID	CULVERT SIZE AND TYPE	NOTES
1	3-36" RCP	EXISTING CULVERTS
2	1-8'X4' RCBC	PROPOSED PER COS
3	1-24" RCP	PROPOSED PER COS
4	3-36"ø RCP	EXISTING ADOT CULVERT
5	2-8'X6' CBC	EXISTING ADOT CULVERT
6	2-8'X6' CBC	EXISTING ADOT CULVERT
7	3-36"ø RCP	EXISTING CULVERTS

LEGEND

- SUBBASIN BOUNDARY
- (33A) SUBBASIN
- [S40ET] POST-DEVELOPMENT CONDITION HEC-1 CONCENTRATION POINT
- B — TYPICAL CROSS-SECTION. SEE EXHIBIT I.e FOR CROSS-SECTION DETAILS.
- POST-DEVELOPMENT CONDITION FLOW ARROW

NOTES:
1. ALL STORM DRAINS SHOWN ARE CONCEPTUAL AND ARE SUBJECT TO CHANGE.
2. CHANNEL LAYOUT IS CONCEPTUAL AND IS SUBJECT TO CHANGE.

ONE SCOTTSDALE
PROPOSED DRAINAGE FACILITIES AND CROSS-SECTIONS

Wood, Patel & Associates, Inc.
2051 West Northern, Suite 100
Phoenix, Arizona 85021
(602) 335-8500

DRAWN BY: CVD | DATE: 09-12-06
JOB NO: 021584.04

Exhibit I.d

N:\2002\021584-04\Project Support\Drainage MP\Exhibits\ EXHIBIT - ID - 2006-09-21.dwg

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APPENDIX A

Hydrology – Rational Method Analysis

ONE SCOTTSDALE
PLANNING UNIT II
MASTER STORM DRAIN
HYDROLOGY SUMMARY SHEET

SYSTEM A1			
Q_{100} Design Application	Sub Basin ID	Description	Q_{100} (cfs)
IA1-1	1 and 2	14	14
IA1-2	1 through 4	43-14= 29	29

SYSTEM A2			
Q_{100} Design Application	Sub Basin ID	Description	Q_{100} (cfs)
IA2-1	15	13	13
IA2-2	15 and 16	21-13= 8	8
IA2-3	15 through 17	24-21= 3	3
IA2-4	14	19	19
IA2-5	15 through 18	30-24= 6	6
IA2-6	15 through 19	53-30= 23	23
IA2-7	15 through 20	56-53= 3	3

SYSTEM B			
Q_{100} Design Application	Sub Basin ID	Description	Q_{100} (cfs)
IB-1	21 and 22	34	34
IB-2	21 through 23	42-34= 8	8
IB-3	21 through 24	50-42= 8	8
IB-4	21 through 25	54-50= 4	4
IB-5	21 through 26	63-54= 9	9
IB-6	21 through 27	73-63= 10	10
IB-7	21 through 28	78-73= 5	5
IB-8	21 through 29	82-78= 4	4
IB-9	21 through 30	88-78= 10	10
IB-10	21 through 30 and 33	121-88= 33	33
IB-11	31 and 32	22	22

SYSTEM C			
Q_{100} Design Application	Sub Basin ID	Description	Q_{100} (cfs)
IC-1	34	22	22
IC-2	34 and 35	36-22= 14	14
IC-3	34 through 36	47-36= 11	11
IC-4	34 through 37	61-47= 14	14
IC-5	34 through 38	69-61= 8	8

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RATIONAL FOR WINDOWS

Flood Control District of Maricopa County Rational Method

Project Information

Project Name:

Project Description:

Drainage Point: IA1-1

Location: One Scottsdale-System A1

Drainage Basin Data

Water Course Length: 500.00 ft

Basin Area: 1.760 acres

High Elevation: 1637.00 ft

Low Elevation: 1630.00 ft

Average Slope: 0.0140 ft/ft

Roughness, Kb: 0.0385 (A)

10-Year Runoff Coefficient: 0.720

10-Year 6 Hour Rainfall Depth: 2.10 inches

Hydrological Summary Table

Parameter	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q (cfs)	5	6	7	10	12	14
C	0.720	0.720	0.720	0.792	0.864	0.900
Tc (min)	6.3	5.6	5.2	5.0	5.0	5.0
i (in/hr)	3.6	4.9	5.9	7.1	8.1	9.1

Computed by ,
Friday, April 06, 2007 5:31:28 p

Author Frank M. Koo, P.E.
Email: gufrank@engsoftwarecenter.com
URL: http://www.engsoftwarecenter.com/rational.html

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RATIONAL FOR WINDOWS

Flood Control District of Maricopa County Rational Method

Project Information

Project Name:

Project Description:

Drainage Point: IA1-2

Location: One Scottsdale-System A1

Drainage Basin Data

Water Course Length: 562.00 ft

Basin Area: 3.370 acres

High Elevation: 1637.00 ft

Low Elevation: 1625.00 ft

Average Slope: 0.0214 ft/ft

Roughness, Kb: 0.0367 (A)

10-Year Runoff Coefficient: 0.720

10-Year 6 Hour Rainfall Depth: 2.10 inches

Hydrological Summary Table

Parameter	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q (cfs)	9	12	15	19	24	28
C	0.720	0.720	0.720	0.792	0.864	0.900
Tc (min)	5.6	5.0	5.0	5.0	5.0	5.0
i (in/hr)	3.7	5.1	6.0	7.1	8.1	9.1

Computed by
Friday, April 06, 2007, 5:31:28 p

Author: Frank M. Koo, P.E.
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RATIONAL FOR WINDOWS

Flood Control District of Maricopa County Rational Method

Project Information

Project Name:

Project Description:

Drainage Point: IA1-3

Location: One Scottsdale-System A1

Drainage Basin Data

Water Course Length: 645.00 ft

Basin Area: 5.270 acres

High Elevation: 1637.00 ft

Low Elevation: 1621.00 ft

Average Slope: 0.0248 ft/ft

Roughness, Kb: 0.0355 (A)

10-Year Runoff Coefficient: 0.720

10-Year 6 Hour Rainfall Depth: 2.10 inches

Hydrological Summary Table

Parameter	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q (cfs)	14	19	23	30	37	43
C	0.720	0.720	0.720	0.792	0.864	0.900
Tc (min)	5.6	5.0	5.0	5.0	5.0	5.0
i (in/hr)	3.7	5.1	6.0	7.1	8.1	9.1

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Author: Frank M. Koo, P.E.
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RATIONAL FOR WINDOWS

Flood Control District of Maricopa County Rational Method

Project Information

Project Name:

Project Description:

Drainage Point: IA2-1

Location: One Scottsdale- Syatem A2

Drainage Basin Data

Water Course Length: 382.00 ft

Basin Area: 1.630 acres

High Elevation: 1638.00 ft

Low Elevation: 1633.00 ft

Average Slope: 0.0131 ft/ft

Roughness, Kb: 0.0387 (A)

10-Year Runoff Coefficient: 0.720

10-Year 6 Hour Rainfall Depth: 2.10 inches

Hydrological Summary Table

Parameter	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q (cfs)	4	6	7	9	11	13
C	0.720	0.720	0.720	0.792	0.864	0.900
Tc (min)	5.5	5.0	5.0	5.0	5.0	5.0
i (in/hr)	3.8	5.1	6.0	7.1	8.1	9.1

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RATIONAL FOR WINDOWS

Flood Control District of Maricopa County Rational Method

Project Information

Project Name:

Project Description:

Drainage Point: IA2-2

Location: One Scottsdale- Syatem A2

Drainage Basin Data

Water Course Length: 560.00 ft

Basin Area: 2.510 acres

High Elevation: 1638.00 ft

Low Elevation: 1631.00 ft

Average Slope: 0.0125 ft/ft

Roughness, Kb: 0.0375 (A)

10-Year Runoff Coefficient: 0.720

10-Year 6 Hour Rainfall Depth: 2.10 inches

Hydrological Summary Table

Parameter	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q (cfs)	6	9	10	14	18	21
C	0.720	0.720	0.720	0.792	0.864	0.900
Tc (min)	6.9	6.1	5.7	5.3	5.0	5.0
i (in/hr)	3.5	4.8	5.7	7.0	8.1	9.1

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RATIONAL FOR WINDOWS

Flood Control District of Maricopa County Rational Method

Project Information

Project Name:

Project Description:

Drainage Point: IA2-3

Location: One Scottsdale- Syatem A2

Drainage Basin Data

Water Course Length: 360.00 ft

Basin Area: 2.910 acres

High Elevation: 1638.00 ft

Low Elevation: 1631.00 ft

Average Slope: 0.0194 ft/ft

Roughness, Kb: 0.0371 (A)

10-Year Runoff Coefficient: 0.720

10-Year 6 Hour Rainfall Depth: 2.10 inches

Hydrological Summary Table

Parameter	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q (cfs)	8	11	13	16	20	24
C	0.720	0.720	0.720	0.792	0.864	0.900
Tc (min)	5.0	5.0	5.0	5.0	5.0	5.0
i (in/hr)	3.9	5.1	6.0	7.1	8.1	9.1

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RATIONAL FOR WINDOWS

Flood Control District of Maricopa County Rational Method

Project Information

Project Name:

Project Description:

Drainage Point: IA2-4

Location: One Scottsdale- Syatem A2

Drainage Basin Data

Water Course Length: 685.00 ft

Basin Area: 2.510 acres

High Elevation: 1638.00 ft

Low Elevation: 1632.00 ft

Average Slope: 0.0088 ft/ft

Roughness, Kb: 0.0375 (A)

10-Year Runoff Coefficient: 0.720

10-Year 6 Hour Rainfall Depth: 2.10 inches

Hydrological Summary Table

Parameter	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q (cfs)	6	8	9	13	16	19
C	0.720	0.720	0.720	0.792	0.864	0.900
Tc (min)	8.8	7.8	7.3	6.7	6.3	6.0
i (in/hr)	3.1	4.3	5.2	6.5	7.5	8.6

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RATIONAL FOR WINDOWS

Flood Control District of Maricopa County Rational Method

Project Information

Project Name:

Project Description:

Drainage Point: IA2-5

Location: One Scottsdale- Syatem A2

Drainage Basin Data

Water Course Length: 970.00 ft

Basin Area: 4.090 acres

High Elevation: 1638.00 ft

Low Elevation: 1629.00 ft

Average Slope: 0.0093 ft/ft

Roughness, Kb: 0.0362 (A)

10-Year Runoff Coefficient: 0.720

10-Year 6 Hour Rainfall Depth: 2.10 inches

Hydrological Summary Table

Parameter	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q (cfs)	9	12	14	20	25	30
C	0.720	0.720	0.720	0.792	0.864	0.900
Tc (min)	10.4	9.2	8.6	7.8	7.4	7.0
i (in/hr)	2.9	4.1	4.9	6.1	7.1	8.1

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RATIONAL FOR WINDOWS

Flood Control District of Maricopa County Rational Method

Project Information

Project Name:

Project Description:

Drainage Point: IA2-6

Location: One Scottsdale- Syatem A2

Drainage Basin Data

Water Course Length: 1470.00 ft

Basin Area: 7.760 acres

High Elevation: 1638.00 ft

Low Elevation: 1624.00 ft

Average Slope: 0.0095 ft/ft

Roughness, Kb: 0.0344 (A)

10-Year Runoff Coefficient: 0.720

10-Year 6 Hour Rainfall Depth: 2.10 inches

Hydrological Summary Table

Parameter	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q (cfs)	15	21	25	35	44	53
C	0.720	0.720	0.720	0.792	0.864	0.900
Tc (min)	12.8	11.3	10.5	9.6	9.1	8.6
i (in/hr)	2.6	3.7	4.4	5.7	6.5	7.5

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Friday, April 06, 2007 5:00:27 p

File: S:\2005\052583\Project Support\Hydro\Rational\PL_Hwest-GLOBAL-04-06-07.rat

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RATIONAL FOR WINDOWS

Flood Control District of Maricopa County Rational Method

Project Information

Project Name:

Project Description:

Drainage Point: IA2-7

Location: One Scottsdale- Syatem A2

Drainage Basin Data

Water Course Length: 1550.00 ft

Basin Area: 8.250 acres

High Elevation: 1638.00 ft

Low Elevation: 1623.00 ft

Average Slope: 0.0097 ft/ft

Roughness, Kb: 0.0343 (A)

10-Year Runoff Coefficient: 0.720

10-Year 6 Hour Rainfall Depth: 2.10 inches

Hydrological Summary Table

Parameter	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q (cfs)	16	22	26	37	46	56
C	0.720	0.720	0.720	0.792	0.864	0.900
Tc (min)	13.1	11.6	10.8	9.8	9.3	8.8
i (in/hr)	2.6	3.7	4.4	5.6	6.5	7.5

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RATIONAL FOR WINDOWS

Flood Control District of Maricopa County Rational Method

Project Information

Project Name:

Project Description:

Drainage Point: IA2-8

Location: One Scottsdale- Syatem A2

Drainage Basin Data

Water Course Length: 1900.00 ft

Basin Area: 9.120 acres

High Elevation: 1638.00 ft

Low Elevation: 1616.00 ft

Average Slope: 0.0116 ft/ft

Roughness, Kb: 0.0340 (A)

10-Year Runoff Coefficient: 0.720

10-Year 6 Hour Rainfall Depth: 2.10 inches

Hydrological Summary Table

Parameter	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q (cfs)	17	23	28	40	50	60
C	0.720	0.720	0.720	0.792	0.864	0.900
Tc (min)	13.8	12.2	11.3	10.3	9.8	9.3
i (in/hr)	2.6	3.6	4.3	5.5	6.3	7.3

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RATIONAL FOR WINDOWS

Flood Control District of Maricopa County Rational Method

Project Information

Project Name:

Project Description:

Drainage Point: IB-1

Location: One Scottsdale-System B

Drainage Basin Data

Water Course Length: 700.00 ft

Basin Area: 4.160 acres

High Elevation: 1641.00 ft

Low Elevation: 1631.00 ft

Average Slope: 0.0143 ft/ft

Roughness, Kb: 0.0361 (A)

10-Year Runoff Coefficient: 0.720

10-Year 6 Hour Rainfall Depth: 2.10 inches

Hydrological Summary Table

Parameter	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q (cfs)	10	14	17	23	29	34
C	0.720	0.720	0.720	0.792	0.864	0.900
Tc (min)	7.3	6.5	6.0	5.6	5.3	5.0
i (in/hr)	3.4	4.7	5.6	6.9	7.9	9.1

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RATIONAL FOR WINDOWS

Flood Control District of Maricopa County Rational Method

Project Information

Project Name:

Project Description:

Drainage Point: IB-2

Location: One Scottsdale-System B

Drainage Basin Data

Water Course Length: 840.00 ft

Basin Area: 5.330 acres

High Elevation: 1641.00 ft

Low Elevation: 1630.00 ft

Average Slope: 0.0131 ft/ft

Roughness, Kb: 0.0355 (A)

10-Year Runoff Coefficient: 0.720

10-Year 6 Hour Rainfall Depth: 2.10 inches

Hydrological Summary Table

Parameter	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q (cfs)	12	17	20	28	35	42
C	0.720	0.720	0.720	0.792	0.864	0.900
Tc (min)	8.3	7.3	6.8	6.3	6.0	5.7
i (in/hr)	3.2	4.4	5.3	6.6	7.6	8.8

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RATIONAL FOR WINDOWS

Flood Control District of Maricopa County Rational Method

Project Information

Project Name:

Project Description:

Drainage Point: IB-3

Location: One Scottsdale-System B

Drainage Basin Data

Water Course Length: 1040.00 ft

Basin Area: 6.590 acres

High Elevation: 1641.00 ft

Low Elevation: 1628.00 ft

Average Slope: 0.0125 ft/ft

Roughness, Kb: 0.0349 (A)

10-Year Runoff Coefficient: 0.720

10-Year 6 Hour Rainfall Depth: 2.10 inches

Hydrological Summary Table

Parameter	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q (cfs)	14	20	24	33	41	50
C	0.720	0.720	0.720	0.792	0.864	0.900
Tc (min)	9.5	8.4	7.8	7.2	6.8	6.4
i (in/hr)	3.0	4.2	5.0	6.3	7.3	8.4

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RATIONAL FOR WINDOWS

Flood Control District of Maricopa County Rational Method

Project Information

Project Name:

Project Description:

Drainage Point: IB-4

Location: One Scottsdale-System B

Drainage Basin Data

Water Course Length: 1040.00 ft

Basin Area: 7.130 acres

High Elevation: 1641.00 ft

Low Elevation: 1628.00 ft

Average Slope: 0.0125 ft/ft

Roughness, Kb: 0.0347 (A)

10-Year Runoff Coefficient: 0.720

10-Year 6 Hour Rainfall Depth: 2.10 inches

Hydrological Summary Table

Parameter	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q (cfs)	16	22	26	36	45	54
C	0.720	0.720	0.720	0.792	0.864	0.900
Tc (min)	9.4	8.3	7.8	7.1	6.8	6.4
i (in/hr)	3.0	4.2	5.1	6.3	7.3	8.4

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RATIONAL FOR WINDOWS

Flood Control District of Maricopa County Rational Method

Project Information

Project Name:

Project Description:

Drainage Point: IB-5

Location: One Scottsdale-System B

Drainage Basin Data

Water Course Length: 1230.00 ft

Basin Area: 8.600 acres

High Elevation: 1641.00 ft

Low Elevation: 1626.00 ft

Average Slope: 0.0122 ft/ft

Roughness, Kb: 0.0342 (A)

10-Year Runoff Coefficient: 0.720

10-Year 6 Hour Rainfall Depth: 2.10 inches

Hydrological Summary Table

Parameter	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q (cfs)	18	25	30	42	52	63
C	0.720	0.720	0.720	0.792	0.864	0.900
Tc (min)	10.4	9.2	8.6	7.9	7.5	7.1
i (in/hr)	2.9	4.0	4.8	6.1	7.0	8.1

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RATIONAL FOR WINDOWS

Flood Control District of Maricopa County Rational Method

Project Information

Project Name:

Project Description:

Drainage Point: IB-6

Location: One Scottsdale-System B

Drainage Basin Data

Water Course Length: 1500.00 ft

Basin Area: 10.600 acres

High Elevation: 1641.00 ft

Low Elevation: 1625.00 ft

Average Slope: 0.0107 ft/ft

Roughness, Kb: 0.0336 (A)

10-Year Runoff Coefficient: 0.720

10-Year 6 Hour Rainfall Depth: 2.10 inches

Hydrological Summary Table

Parameter	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q (cfs)	21	29	35	49	61	73
C	0.720	0.720	0.720	0.792	0.864	0.900
Tc (min)	12.3	10.8	10.1	9.2	8.7	8.3
i (in/hr)	2.7	3.8	4.5	5.8	6.6	7.7

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RATIONAL FOR WINDOWS

Flood Control District of Maricopa County Rational Method

Project Information

Project Name:

Project Description:

Drainage Point: IB-7

Location: One Scottsdale-System B

Drainage Basin Data

Water Course Length: 1700.00 ft

Basin Area: 11.540 acres

High Elevation: 1641.00 ft

Low Elevation: 1622.00 ft

Average Slope: 0.0112 ft/ft

Roughness, Kb: 0.0334 (A)

10-Year Runoff Coefficient: 0.720

10-Year 6 Hour Rainfall Depth: 2.10 inches

Hydrological Summary Table

Parameter	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q (cfs)	22	31	37	52	65	78
C	0.720	0.720	0.720	0.792	0.864	0.900
Tc (min)	12.9	11.4	10.6	9.7	9.2	8.7
i (in/hr)	2.6	3.7	4.4	5.7	6.5	7.5

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RATIONAL FOR WINDOWS

Flood Control District of Maricopa County Rational Method

Project Information

Project Name:

Project Description:

Drainage Point: IB-8

Location: One Scottsdale-System B

Drainage Basin Data

Water Course Length: 1700.00 ft

Basin Area: 12.040 acres

High Elevation: 1641.00 ft

Low Elevation: 1622.00 ft

Average Slope: 0.0112 ft/ft

Roughness, Kb: 0.0332 (A)

10-Year Runoff Coefficient: 0.720

10-Year 6 Hour Rainfall Depth: 2.10 inches

Hydrological Summary Table

Parameter	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q (cfs)	23	32	38	54	68	82
C	0.720	0.720	0.720	0.792	0.864	0.900
Tc (min)	12.9	11.4	10.6	9.7	9.2	8.7
i (in/hr)	2.6	3.7	4.4	5.7	6.5	7.5

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RATIONAL FOR WINDOWS

Flood Control District of Maricopa County Rational Method

Project Information

Project Name:

Project Description:

Drainage Point: IB-9

Location: One Scottsdale-System B

Drainage Basin Data

Water Course Length: 1900.00 ft

Basin Area: 13.340 acres

High Elevation: 1641.00 ft

Low Elevation: 1620.00 ft

Average Slope: 0.0111 ft/ft

Roughness, Kb: 0.0330 (A)

10-Year Runoff Coefficient: 0.720

10-Year 6 Hour Rainfall Depth: 2.10 inches

Hydrological Summary Table

Parameter	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q (cfs)	25	34	41	58	73	88
C	0.720	0.720	0.720	0.792	0.864	0.900
Tc (min)	13.8	12.1	11.3	10.3	9.8	9.2
i (in/hr)	2.6	3.6	4.3	5.5	6.3	7.3

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RATIONAL FOR WINDOWS

Flood Control District of Maricopa County Rational Method

Project Information

Project Name:

Project Description:

Drainage Point: IB-10

Location: One Scottsdale-System B

Drainage Basin Data

Water Course Length: 2330.00 ft

Basin Area: 19.330 acres

High Elevation: 1641.00 ft

Low Elevation: 1617.00 ft

Average Slope: 0.0103 ft/ft

Roughness, Kb: 0.0320 (A)

10-Year Runoff Coefficient: 0.720

10-Year 6 Hour Rainfall Depth: 2.10 inches

Hydrological Summary Table

Parameter	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q (cfs)	33	47	56	80	100	121
C	0.720	0.720	0.720	0.792	0.864	0.900
Tc (min)	15.8	13.9	12.9	11.7	11.1	10.5
i (in/hr)	2.4	3.4	4.1	5.2	6.0	7.0

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RATIONAL FOR WINDOWS

Flood Control District of Maricopa County Rational Method

Project Information

Project Name:

Project Description:

Drainage Point: IB-11

Location: One Scottsdale-System B

Drainage Basin Data

Water Course Length: 780.00 ft

Basin Area: 2.920 acres

High Elevation: 1626.00 ft

Low Elevation: 1619.00 ft

Average Slope: 0.0090 ft/ft

Roughness, Kb: 0.0371 (A)

10-Year Runoff Coefficient: 0.720

10-Year 6 Hour Rainfall Depth: 2.10 inches

Hydrological Summary Table

Parameter	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q (cfs)	6	9	11	15	18	22
C	0.720	0.720	0.720	0.792	0.864	0.900
Tc (min)	9.4	8.3	7.7	7.1	6.7	6.4
i (in/hr)	3.1	4.2	5.1	6.4	7.3	8.4

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RATIONAL FOR WINDOWS

Flood Control District of Maricopa County Rational Method

Project Information

Project Name:

Project Description:

Drainage Point: IB-11

Location: One Scottsdale-System B

Drainage Basin Data

Water Course Length: 2600.00 ft

Basin Area: 22.250 acres

High Elevation: 1641.00 ft

Low Elevation: 1616.00 ft

Average Slope: 0.0096 ft/ft

Roughness, Kb: 0.0316 (A)

10-Year Runoff Coefficient: 0.720

10-Year 6 Hour Rainfall Depth: 2.10 inches

Hydrological Summary Table

Parameter	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q (cfs)	37	52	62	88	112	135
C	0.720	0.720	0.720	0.792	0.864	0.900
Tc (min)	17.2	15.1	14.1	12.8	12.1	11.4
i (in/hr)	2.3	3.2	3.9	5.0	5.8	6.7

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RATIONAL FOR WINDOWS

Flood Control District of Maricopa County Rational Method

Project Information

Project Name:

Project Description:

Drainage Point: IC-1

Location: One Scottsdale-System C

Drainage Basin Data

Water Course Length: 420.00 ft

Basin Area: 2.640 acres

High Elevation: 1639.00 ft

Low Elevation: 1633.00 ft

Average Slope: 0.0143 ft/ft

Roughness, Kb: 0.0374 (A)

10-Year Runoff Coefficient: 0.720

10-Year 6 Hour Rainfall Depth: 2.10 inches

Hydrological Summary Table

Parameter	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q (cfs)	7	10	11	15	18	22
C	0.720	0.720	0.720	0.792	0.864	0.900
Tc (min)	5.5	5.0	5.0	5.0	5.0	5.0
i (in/hr)	3.7	5.1	6.0	7.1	8.1	9.1

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RATIONAL FOR WINDOWS

Flood Control District of Maricopa County Rational Method

Project Information

Project Name:

Project Description:

Drainage Point: IC-2

Location: One Scottsdale-System C

Drainage Basin Data

Water Course Length: 688.00 ft

Basin Area: 4.420 acres

High Elevation: 1639.00 ft

Low Elevation: 1631.00 ft

Average Slope: 0.0116 ft/ft

Roughness, Kb: 0.0360 (A)

10-Year Runoff Coefficient: 0.720

10-Year 6 Hour Rainfall Depth: 2.10 inches

Hydrological Summary Table

Parameter	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q (cfs)	10	15	17	24	30	36
C	0.720	0.720	0.720	0.792	0.864	0.900
Tc (min)	7.8	6.9	6.4	5.9	5.6	5.3
i (in/hr)	3.3	4.6	5.5	6.7	7.8	9.0

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RATIONAL FOR WINDOWS

Flood Control District of Maricopa County Rational Method

Project Information

Project Name:

Project Description:

Drainage Point: IC-3

Location: One Scottsdale-System C

Drainage Basin Data

Water Course Length: 900.00 ft

Basin Area: 6.130 acres

High Elevation: 1639.00 ft

Low Elevation: 1628.00 ft

Average Slope: 0.0122 ft/ft

Roughness, Kb: 0.0351 (A)

10-Year Runoff Coefficient: 0.720

10-Year 6 Hour Rainfall Depth: 2.10 inches

Hydrological Summary Table

Parameter	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q (cfs)	14	19	23	32	40	47
C	0.720	0.720	0.720	0.792	0.864	0.900
Tc (min)	8.8	7.8	7.3	6.7	6.3	6.0
i (in/hr)	3.1	4.3	5.2	6.5	7.5	8.6

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Flood Control District of Maricopa County Rational Method

Project Information

Project Name:

Project Description:

Drainage Point: IC-4

Location: One Scottsdale-System C

Drainage Basin Data

Water Course Length: 1140.00 ft

Basin Area: 8.150 acres

High Elevation: 1639.00 ft

Low Elevation: 1625.00 ft

Average Slope: 0.0123 ft/ft

Roughness, Kb: 0.0343 (A)

10-Year Runoff Coefficient: 0.720

10-Year 6 Hour Rainfall Depth: 2.10 inches

Hydrological Summary Table

Parameter	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q (cfs)	17	24	29	40	50	61
C	0.720	0.720	0.720	0.792	0.864	0.900
Tc (min)	10.0	8.8	8.2	7.5	7.1	6.8
i (in/hr)	3.0	4.1	4.9	6.2	7.2	8.3

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RATIONAL FOR WINDOWS

Flood Control District of Maricopa County Rational Method

Project Information

Project Name:

Project Description:

Drainage Point: IC-5

Location: One Scottsdale-System C

Drainage Basin Data

Water Course Length: 1350.00 ft

Basin Area: 9.590 acres

High Elevation: 1639.00 ft

Low Elevation: 1622.00 ft

Average Slope: 0.0126 ft/ft

Roughness, Kb: 0.0339 (A)

10-Year Runoff Coefficient: 0.720

10-Year 6 Hour Rainfall Depth: 2.10 inches

Hydrological Summary Table

Parameter	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q (cfs)	20	28	33	46	58	69
C	0.720	0.720	0.720	0.792	0.864	0.900
Tc (min)	10.9	9.6	8.9	8.2	7.8	7.3
i (in/hr)	2.9	4.0	4.8	6.1	6.9	8.0

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RATIONAL FOR WINDOWS

Flood Control District of Maricopa County Rational Method

Project Information

Project Name: One Scottsdale - Planning Unit

Project Description:

Drainage Point: 1st crossing

Location: One Scottsdale-scenic swale

Drainage Basin Data

Water Course Length: 321.00 ft

Basin Area: 1.250 acres

High Elevation: 1631.00 ft

Low Elevation: 1625.00 ft

Average Slope: 0.0187 ft/ft

Roughness, Kb: 0.0394 (A)

10-Year Runoff Coefficient: 0.660

10-Year 6 Hour Rainfall Depth: 2.10 inches

Hydrological Summary Table

Parameter	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q (cfs)	3	4	5	6	8	9
C	0.660	0.660	0.660	0.726	0.792	0.825
Tc (min)	5.0	5.0	5.0	5.0	5.0	5.0
i (in/hr)	3.9	5.1	6.0	7.1	8.1	9.1

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RATIONAL FOR WINDOWS

Flood Control District of Maricopa County Rational Method

Project Information

Project Name: One Scottsdale - Planning Unit

Project Description:

Drainage Point: 2nd crossing

Location: One Scottsdale- scenic swale

Drainage Basin Data

Water Course Length: 675.00 ft

Basin Area: 1.980 acres

High Elevation: 1631.00 ft

Low Elevation: 1616.00 ft

Average Slope: 0.0222 ft/ft

Roughness, Kb: 0.0381 (A)

10-Year Runoff Coefficient: 0.660

10-Year 6 Hour Rainfall Depth: 2.10 inches

Hydrological Summary Table

Parameter	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q (cfs)	5	6	8	10	13	15
C	0.660	0.660	0.660	0.726	0.792	0.825
Tc (min)	6.3	5.6	5.2	5.0	5.0	5.0
i (in/hr)	3.6	4.9	5.9	7.1	8.1	9.1

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RATIONAL FOR WINDOWS

Flood Control District of Maricopa County Rational Method

Project Information

Project Name: One Scottsdale - Planning Unit

Project Description:

Drainage Point: 3rd crossing

Location: One Scottsdale-scenic swale

Drainage Basin Data

Water Course Length: 1050.00 ft

Basin Area: 2.920 acres

High Elevation: 1631.00 ft

Low Elevation: 1616.00 ft

Average Slope: 0.0143 ft/ft

Roughness, Kb: 0.0371 (A)

10-Year Runoff Coefficient: 0.670

10-Year 6 Hour Rainfall Depth: 2.10 inches

Hydrological Summary Table

Parameter	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Q (cfs)	6	8	10	14	17	21
C	0.670	0.670	0.670	0.737	0.804	0.838
Tc (min)	9.4	8.3	7.8	7.1	6.8	6.4
i (in/hr)	3.0	4.2	5.1	6.4	7.3	8.4

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APPENDIX B

Hydraulics– StormCAD Analysis and Culvert Master Analysis

SYSTEM A1 & A2

Scenario: 100-YR

Combined Pipe\Node Report

Label	Upstream Node	Downstream Node	Length (ft)	Section Size	Mannings n	Full Capacity (cfs)	Average Velocity (ft/s)	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Constructed Slope (ft/ft)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)	Total System Flow (cfs)
P-1	I-1	J-1	122.00	24 inch	0.013	23.80	7.88	26.40	25.05	0.011066	27.75	26.52	14.00
P-2	J-1	J-2	160.00	24 inch	0.013	28.56	9.05	25.05	22.50	0.015938	26.40	25.30	14.00
P-3	J-2	J-3	79.00	24 inch	0.013	22.04	4.46	22.50	21.75	0.009494	25.21	24.91	14.00
P-4	I-2	J-3	33.00	30 inch	0.013	48.42	5.91	22.21	21.75	0.013939	25.07	24.91	29.00
P-5	J-3	J-4	266.00	30 inch	0.013	64.46	14.06	21.75	15.18	0.024699	23.94	18.74	43.00
P-6	J-4	J-5	358.00	30 inch	0.013	41.01	8.76	15.18	11.60	0.010000	18.68	14.75	43.00
P-7	J-5	J-6	94.00	30 inch	0.013	41.01	8.76	11.60	10.66	0.010000	14.69	13.65	43.00
P-8	J-6	J-7	226.00	48 inch	0.013	131.00	9.39	8.33	6.45	0.008319	12.56	11.03	118.00
P-9	J-7	J-8	58.00	48 inch	0.013	142.39	9.39	6.45	5.88	0.009828	11.03	10.64	118.00
P-10	J-8	J-9	243.00	48 inch	0.013	156.37	9.39	5.88	3.00	0.011852	10.23	8.59	118.00
P-11	J-9	O-1	73.00	48 inch	0.013	168.11	9.39	3.00	2.00	0.013699	7.49	7.00	118.00
P-12	I-3	I-4	167.00	30 inch	0.013	30.28	4.28	19.37	18.46	0.005449	31.64	31.20	21.00
P-13	I-4	J-10	35.00	30 inch	0.013	31.00	4.89	18.46	18.26	0.005714	30.91	30.79	24.00
P-14	I-5	J-10	20.00	30 inch	0.013	41.01	3.87	20.46	20.26	0.010000	30.83	30.79	19.00
P-15	J-10	J-11	166.00	36 inch	0.013	49.38	6.08	18.26	17.35	0.005482	30.38	29.69	43.00
P-16	J-11	I-6	208.00	36 inch	0.013	47.16	6.08	17.35	16.31	0.005000	29.52	28.66	43.00
P-17	I-6	J-12	57.00	36 inch	0.013	47.57	10.19	16.31	16.02	0.005088	27.37	26.70	72.00
P-18	J-12	J-13	252.00	36 inch	0.013	50.07	10.19	16.02	14.60	0.005635	26.22	23.28	72.00
P-19	J-13	I-7	14.00	36 inch	0.013	53.47	10.19	14.60	14.51	0.006429	22.80	22.63	72.00
P-20	I-7	J-14	104.00	36 inch	0.013	50.23	10.19	14.51	13.92	0.005673	21.34	20.13	72.00
P-21	J-14	J-15	134.00	36 inch	0.013	51.53	10.19	13.92	13.12	0.005970	19.65	18.09	72.00
P-22	J-15	I-8	22.00	42 inch	0.013	83.07	7.48	13.12	12.97	0.006818	17.30	17.19	72.00
P-23	I-8	J-16	79.00	42 inch	0.013	98.68	11.29	12.97	12.21	0.009620	16.43	16.00	75.00
P-24	J-16	J-17	87.00	42 inch	0.013	112.09	7.80	12.21	11.13	0.012414	15.72	15.23	75.00
P-25	J-17	J-6	166.00	42 inch	0.013	130.66	14.05	11.13	8.33	0.016867	14.57	13.65	75.00

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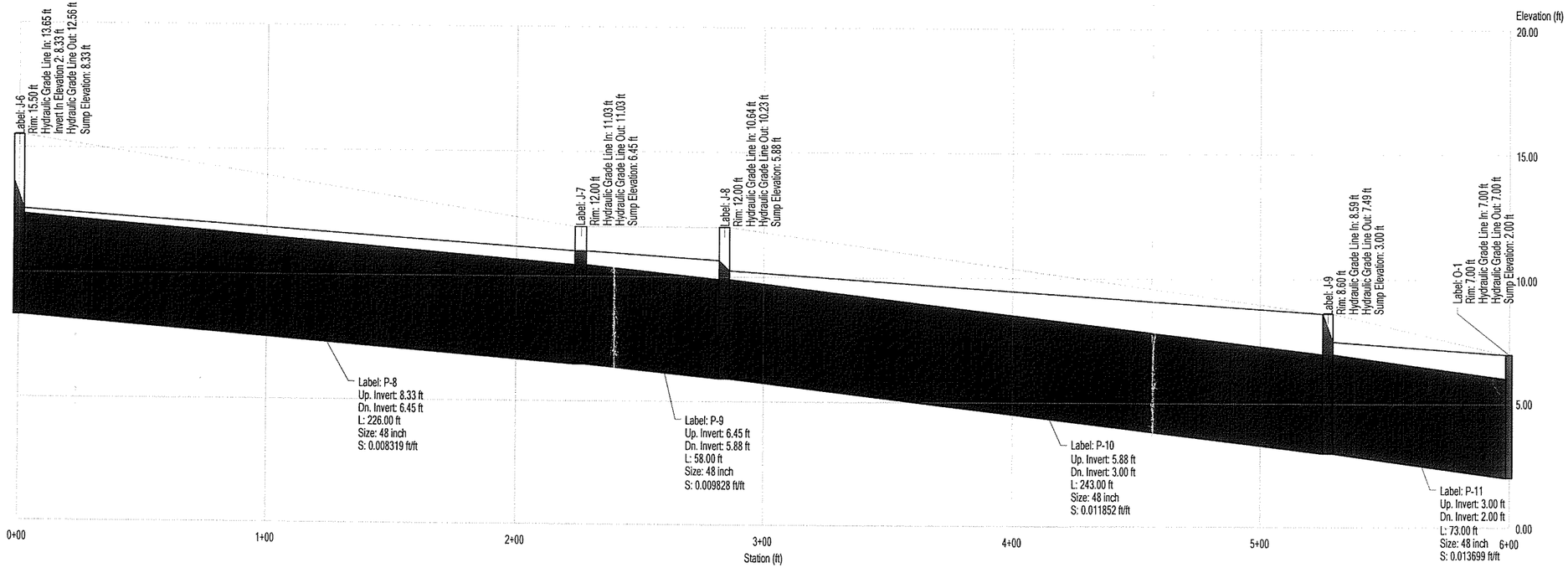
Profile: J6 - O1 (system-IA1)

Scenario: 100-YR



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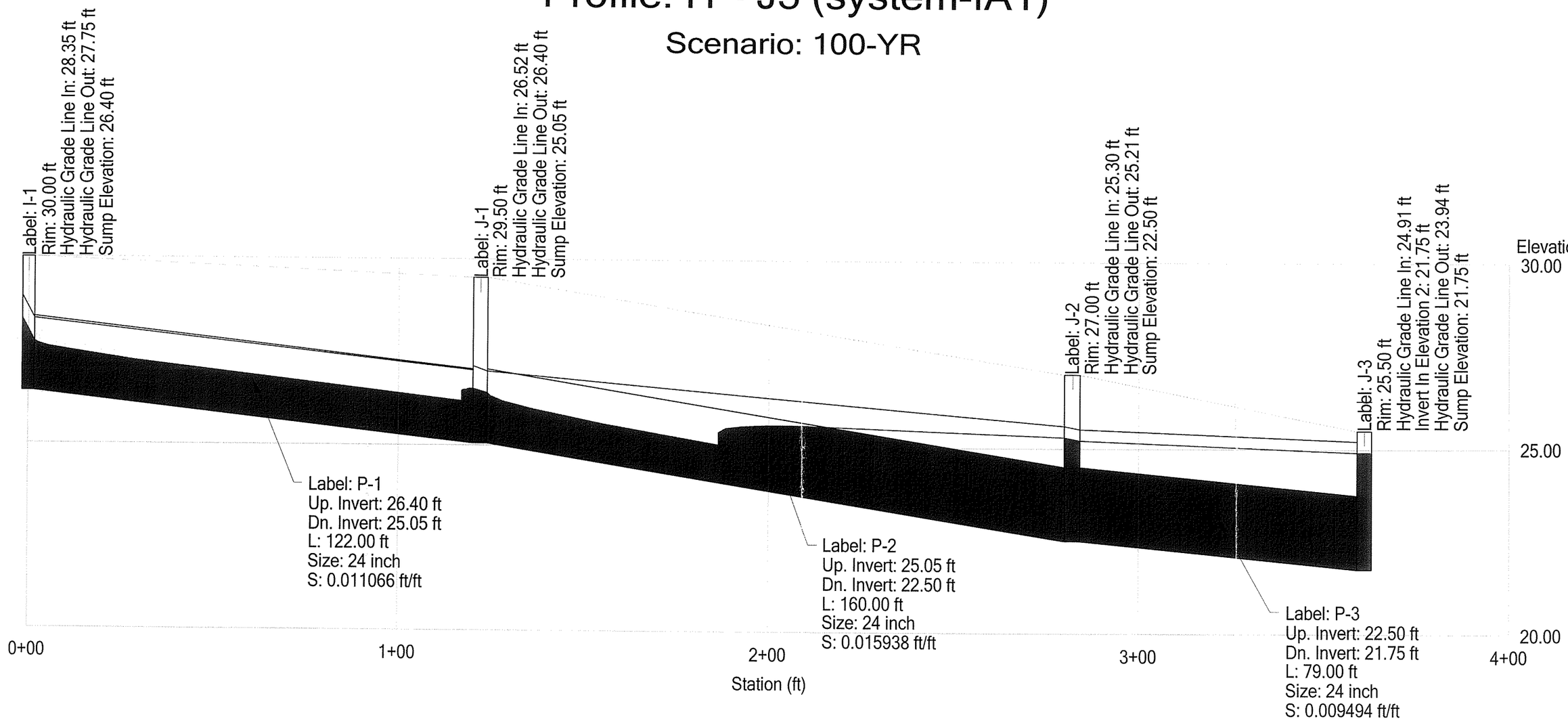
Scenario: 100-YR



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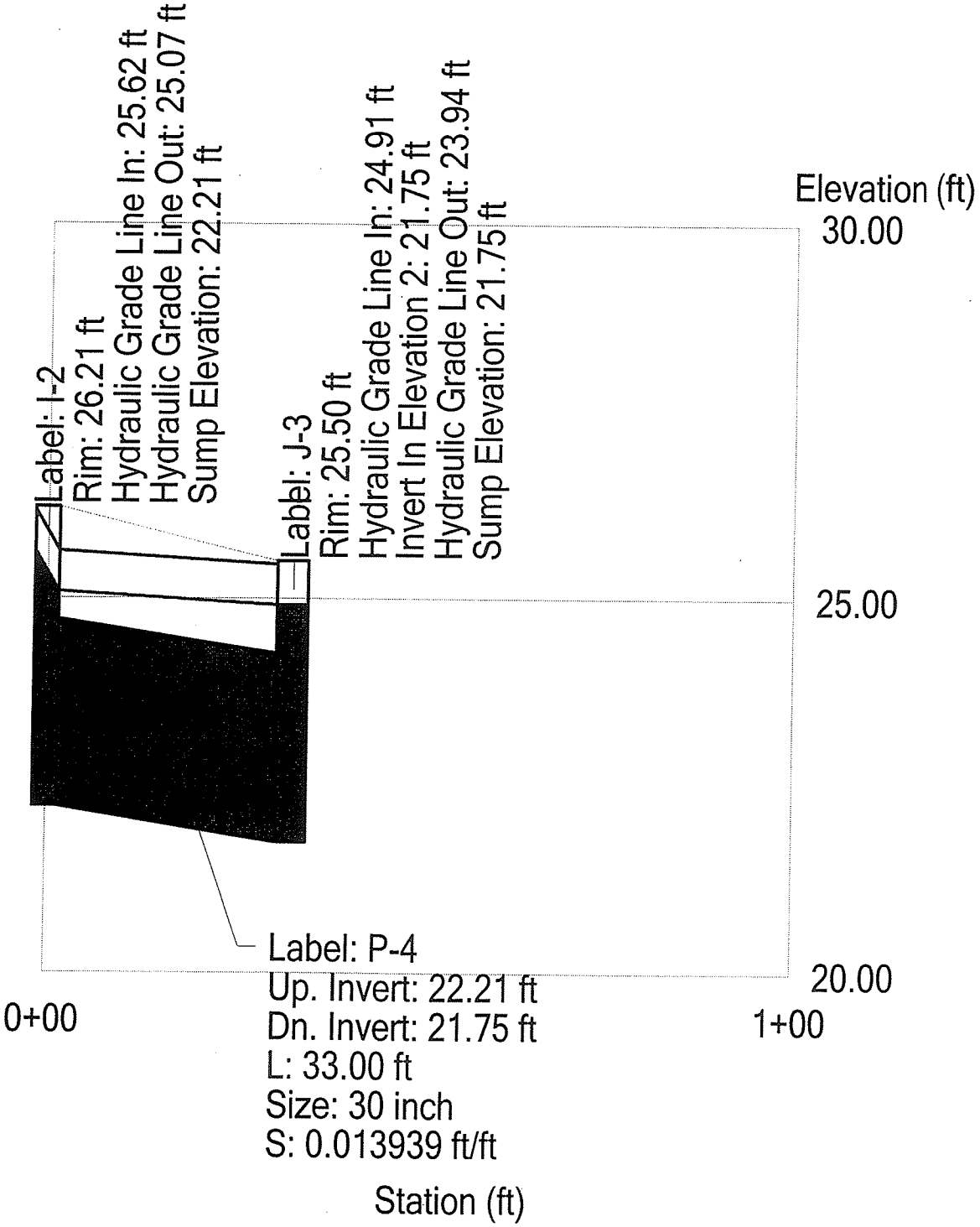
Profile: I12 - J3 (system-IA1)

Scenario: 100-YR



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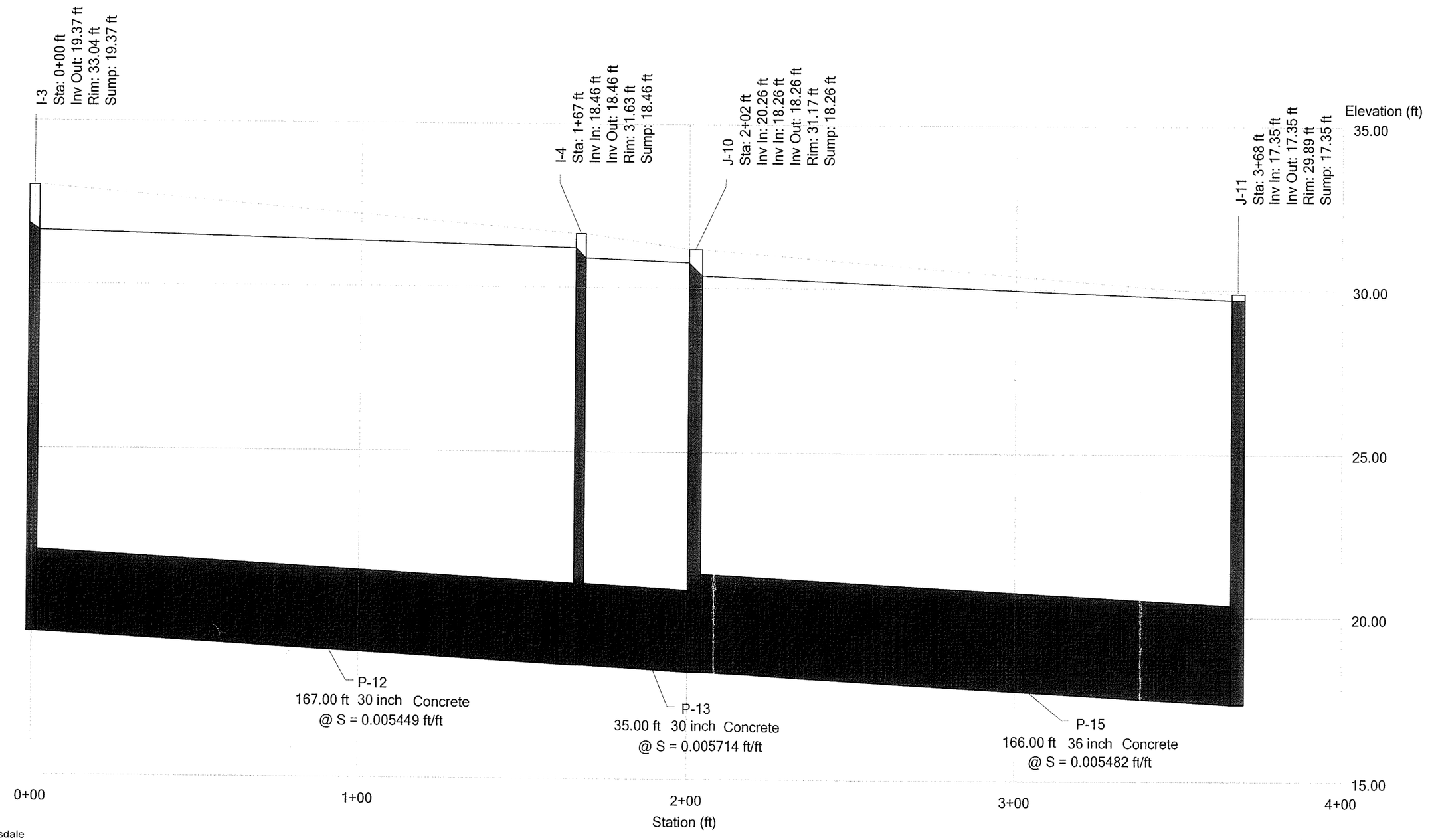
Profile: I3 - J11 (system-IA2)

Scenario: 100-YR



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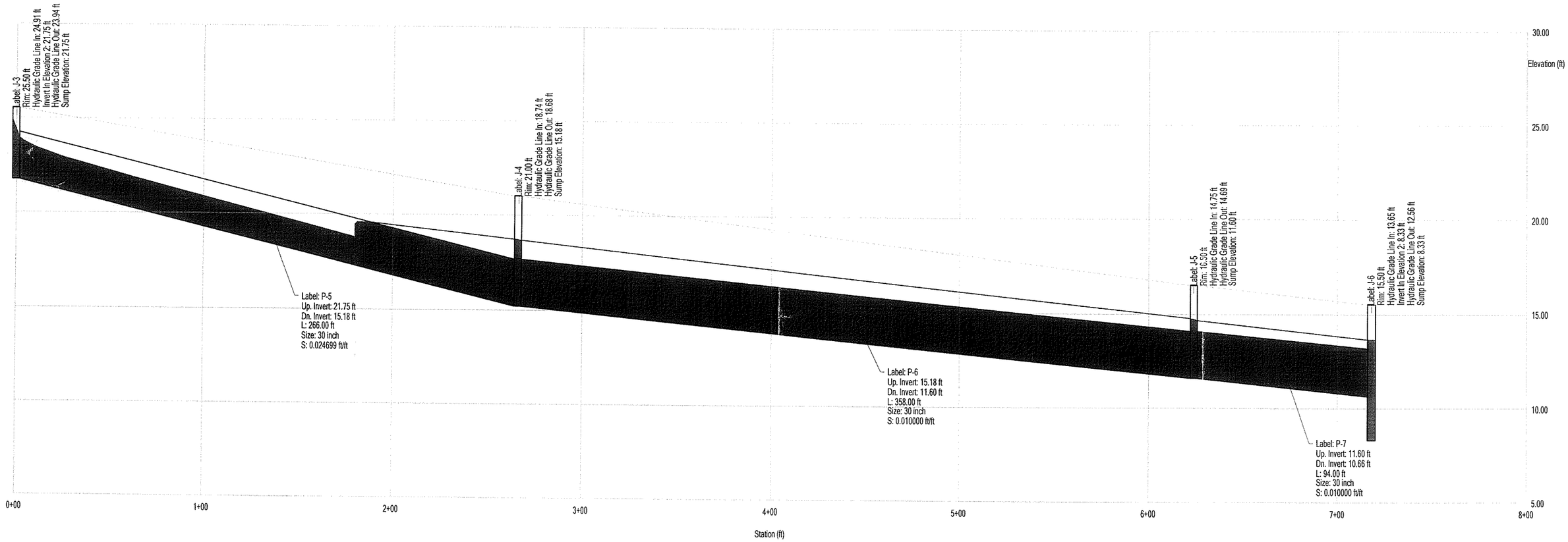
Profile
Scenario: 100-YR

Profile: J3- J6 (system-IA1)

Scenario: 100-YR



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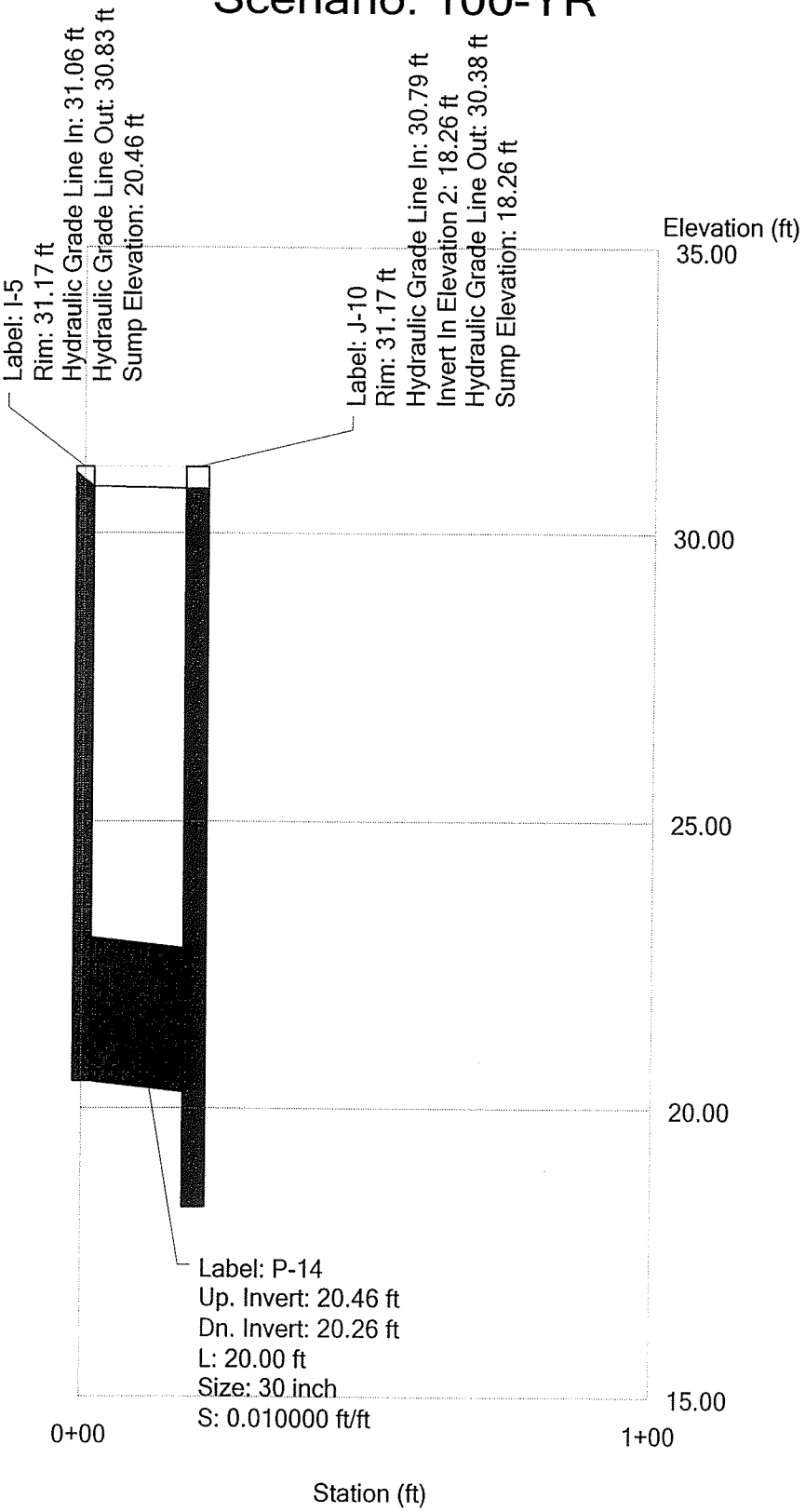
Profile: I5 - J10 (system-IA2)

Scenario: 100-YR



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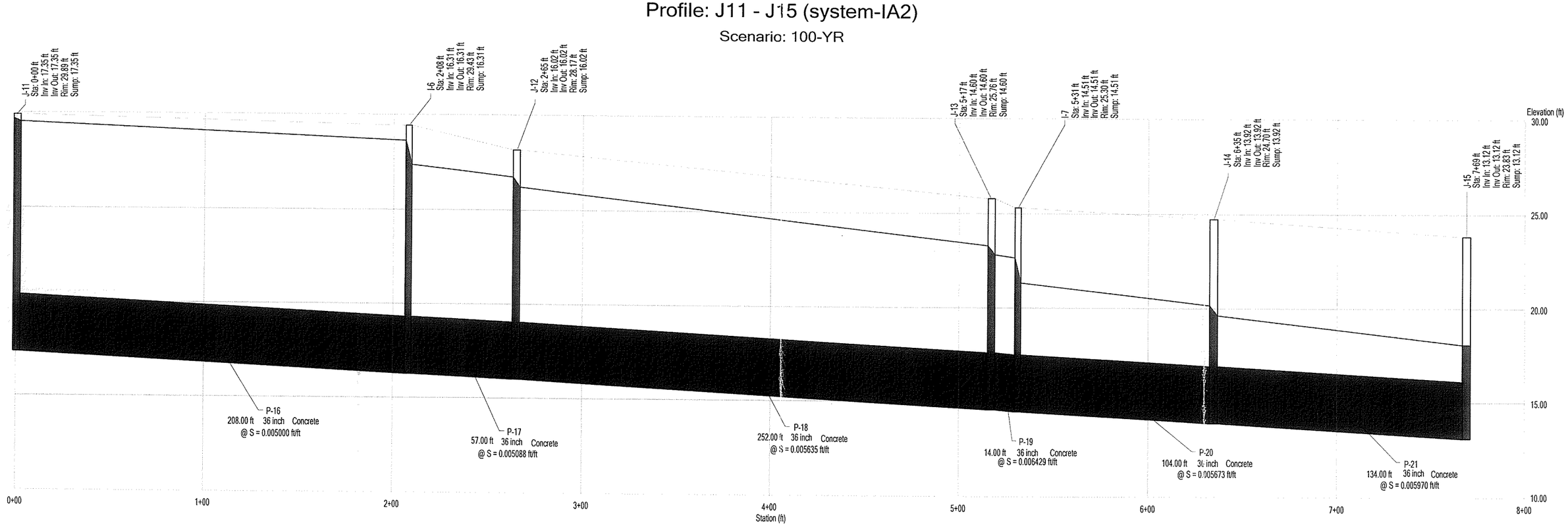
Profile
Scenario: 100-YR

Profile: J11 - J15 (system-IA2)

Scenario: 100-YR



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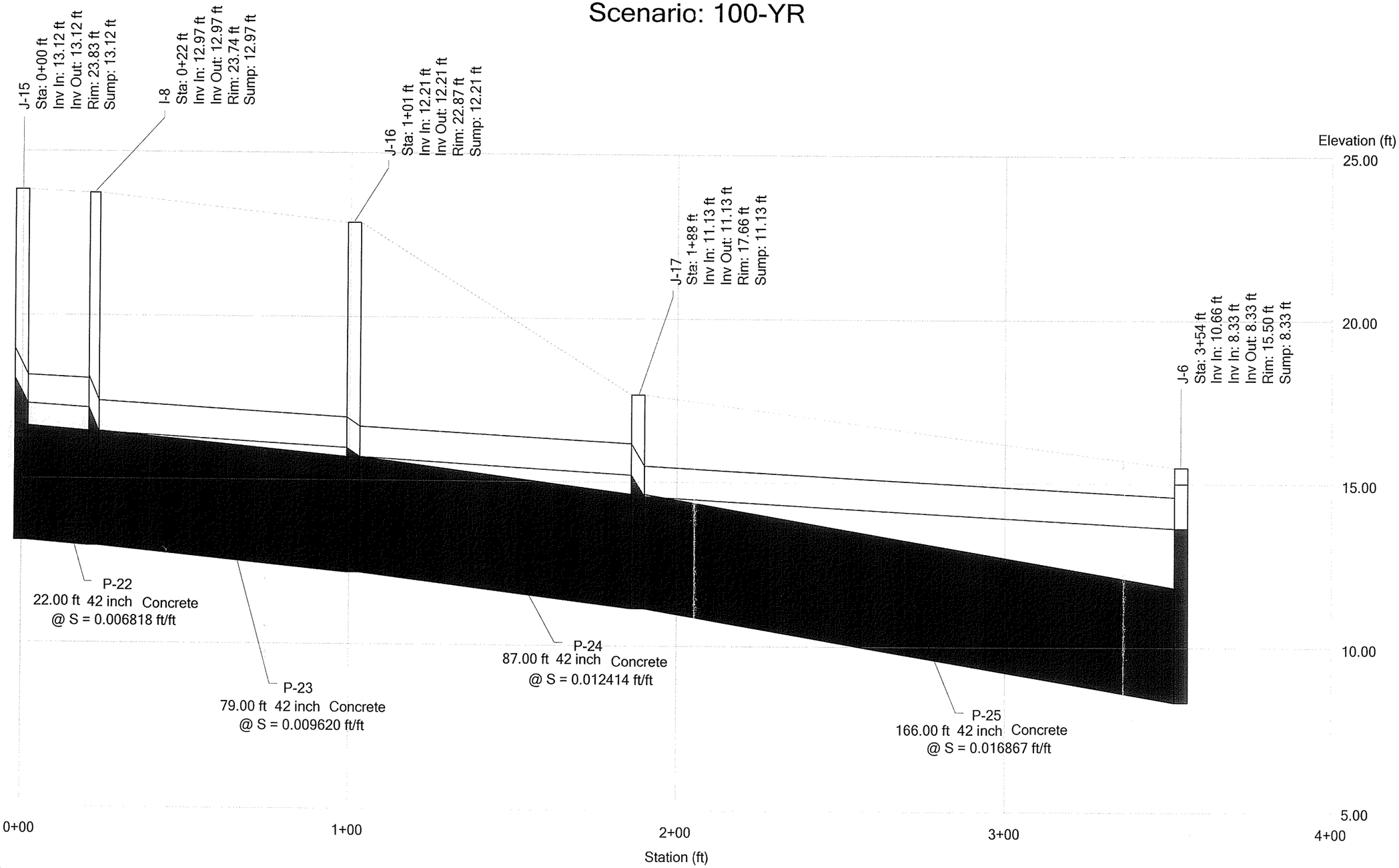
Profile: J15 - J6 (system-IA2)

Scenario: 100-YR



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SYSTEM B

Scenario: 100-YR

Combined Pipe\Node Report

Label	Upstream Node	Downstream Node	Length (ft)	Section Size	Mannings n	Full Capacity (cfs)	Average Velocity (ft/s)	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Constructed Slope (ft/ft)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)	Total System Flow (cfs)
P-26	I-9	J-18	57.00	30 inch	0.013	30.25	6.93	20.93	20.62	0.005439	33.02	32.63	34.00
P-27	J-18	I-10	15.00	30 inch	0.013	31.77	6.93	20.62	20.53	0.006000	32.09	31.99	34.00
P-28	I-10	I-11	153.00	30 inch	0.013	30.39	6.93	20.53	19.69	0.005490	31.39	30.34	34.00
P-29	I-11	I-12	153.00	36 inch	0.013	49.42	5.94	19.69	18.85	0.005490	29.90	29.29	42.00
P-30	I-12	J-19	21.00	36 inch	0.013	50.42	7.07	18.85	18.73	0.005714	28.67	28.55	50.00
P-31	J-19	J-20	141.00	36 inch	0.013	61.01	7.07	18.73	17.55	0.008369	28.32	27.53	50.00
P-32	I-13	J-20	35.00	18 inch	0.013	14.85	2.26	18.25	17.55	0.020000	27.58	27.53	4.00
P-33	J-20	I-14	40.00	36 inch	0.013	50.57	7.64	17.55	17.32	0.005750	26.89	26.63	54.00
P-34	I-14	J-21	205.00	36 inch	0.013	50.17	10.33	17.32	16.16	0.005659	25.30	22.85	73.00
P-35	J-21	J-22	112.00	36 inch	0.013	50.42	10.33	16.16	15.52	0.005714	22.85	21.51	73.00
P-36	J-22	I-15	144.00	42 inch	0.013	75.92	7.59	15.52	14.70	0.005694	21.24	20.48	73.00
P-37	I-15	J-23	51.00	42 inch	0.013	75.86	8.11	14.70	14.41	0.005686	19.66	19.36	78.00
P-38	I-16	J-23	29.00	18 inch	0.013	7.80	2.26	14.57	14.41	0.005517	19.40	19.36	4.00
P-39	J-23	J-24	32.00	42 inch	0.013	94.11	8.52	14.41	14.13	0.008750	18.56	18.35	82.00
P-40	J-24	I-17	140.00	42 inch	0.013	95.06	8.52	14.13	12.88	0.008929	18.01	17.08	82.00
P-41	I-17	I-18	179.00	48 inch	0.013	135.80	11.61	12.88	11.28	0.008939	16.27	15.75	92.00
P-42	I-18	J-25	32.00	48 inch	0.013	134.36	11.51	11.28	11.00	0.008750	15.05	14.97	92.00
P-43	J-25	J-26	94.00	48 inch	0.013	128.30	11.10	11.00	10.25	0.007979	14.71	14.40	92.00
P-44	I-19	J-26	52.00	24 inch	0.013	16.30	7.00	11.77	11.50	0.005192	14.89	14.40	22.00
P-45	J-27	I-19	117.00	24 inch	0.013	16.33	7.00	12.38	11.77	0.005214	16.61	15.50	22.00
P-46	J-28	J-27	189.00	24 inch	0.013	16.04	7.00	13.33	12.38	0.005026	18.43	16.64	22.00
P-47	J-29	J-28	45.00	24 inch	0.013	15.82	7.00	13.55	13.33	0.004889	19.09	18.66	22.00
P-48	I-20	J-29	69.00	24 inch	0.013	16.11	7.00	13.90	13.55	0.005072	19.97	19.31	22.00
P-49	J-26	I-21	568.00	54 inch	0.013	197.16	12.84	10.25	4.54	0.010053	13.39	11.87	114.00
P-50	I-21	J-30	29.00	54 inch	0.013	196.64	9.24	4.54	4.25	0.010000	10.81	10.65	147.00
P-51	J-30	J-31	260.00	54 inch	0.013	144.29	9.24	4.25	2.85	0.005385	9.45	8.00	147.00
P-52	J-31	O-2	118.00	54 inch	0.013	148.17	9.24	2.85	2.18	0.005678	7.66	7.00	147.00

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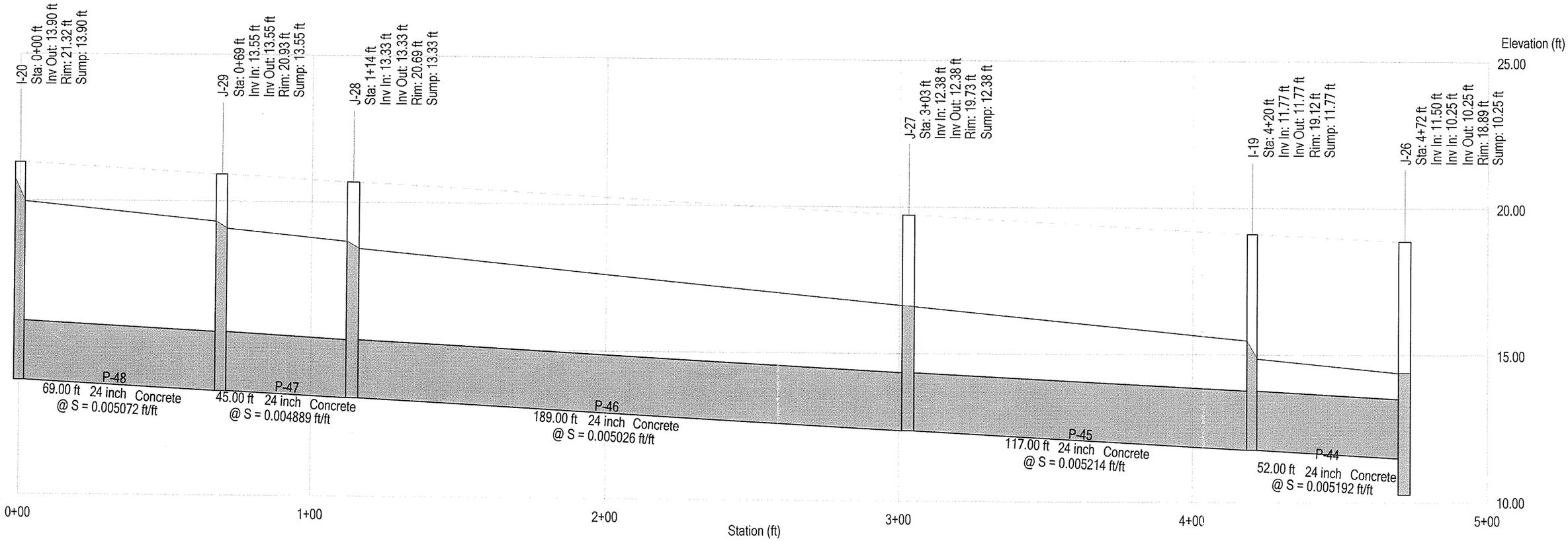
Profile: I20 - J26 (system-IB)

Scenario: 100-YR



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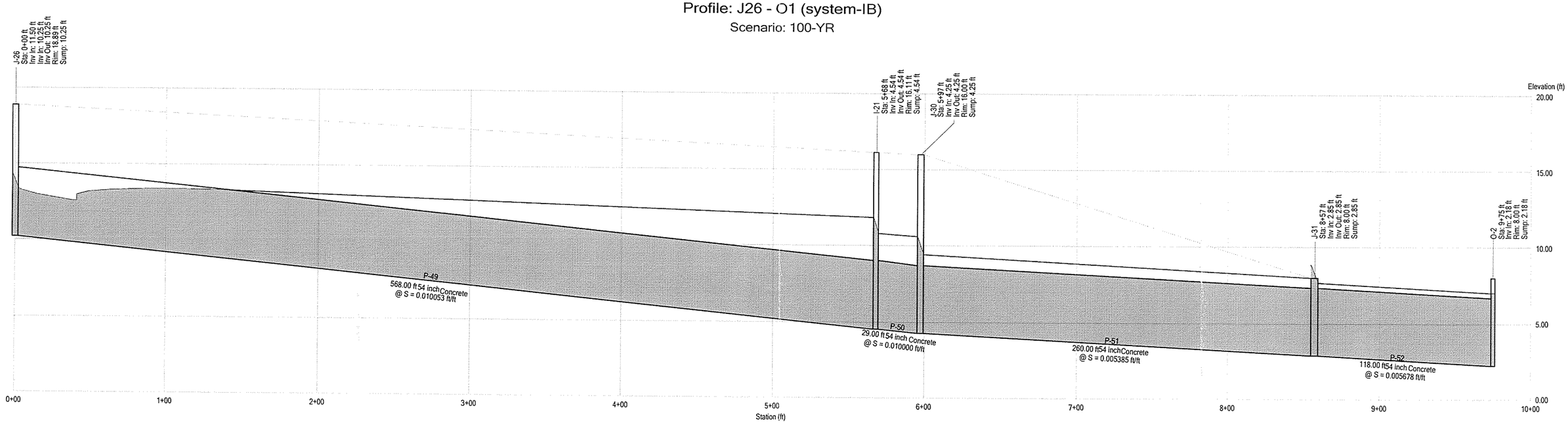
Profile
Scenario: 100-YR

Profile: J26 - O1 (system-IB)
Scenario: 100-YR



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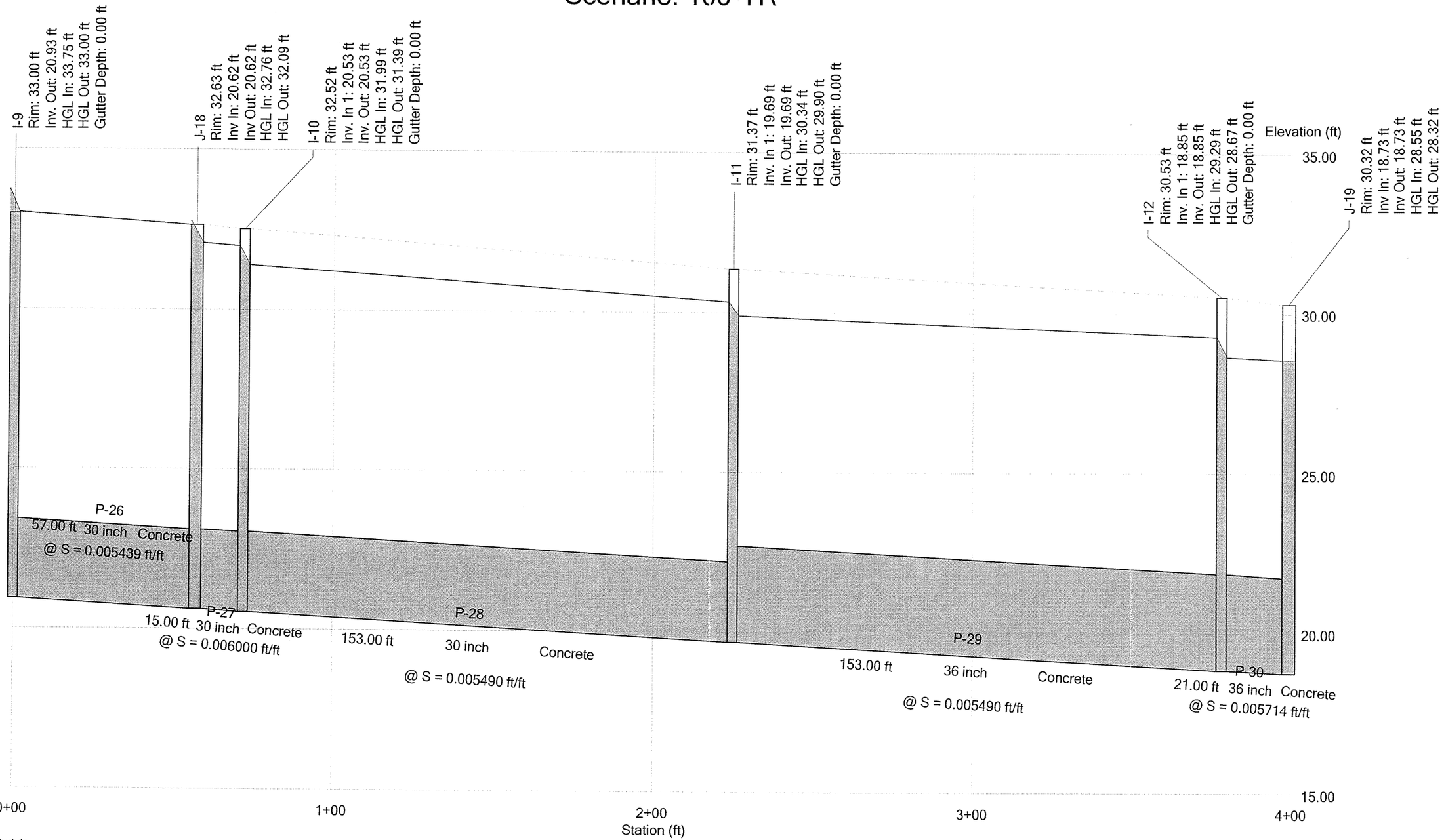
Profile: I9 - J19 (system-IB)

Scenario: 100-YR



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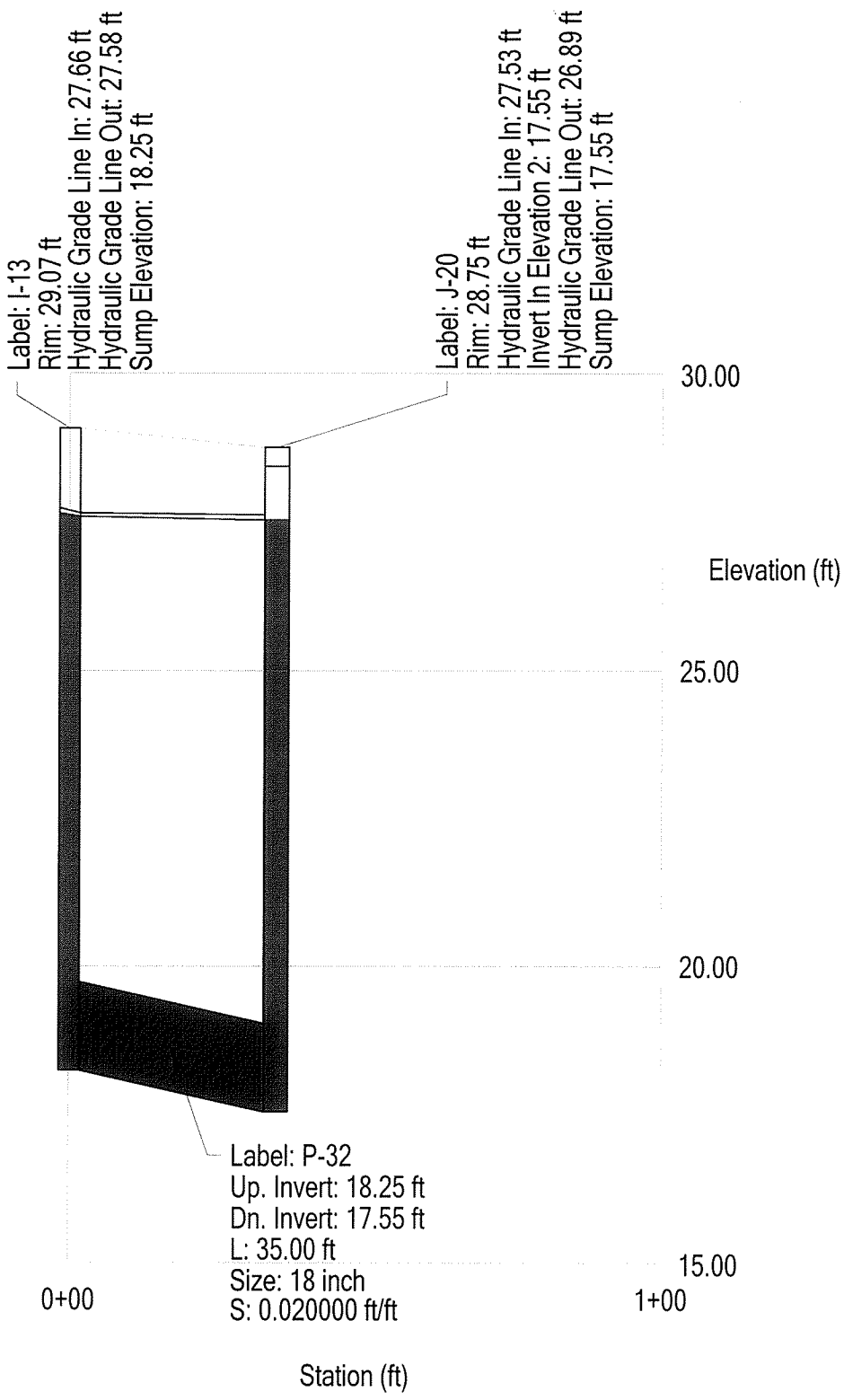
Profile: I13 - J20 (system-IB)

Scenario: 100-YR



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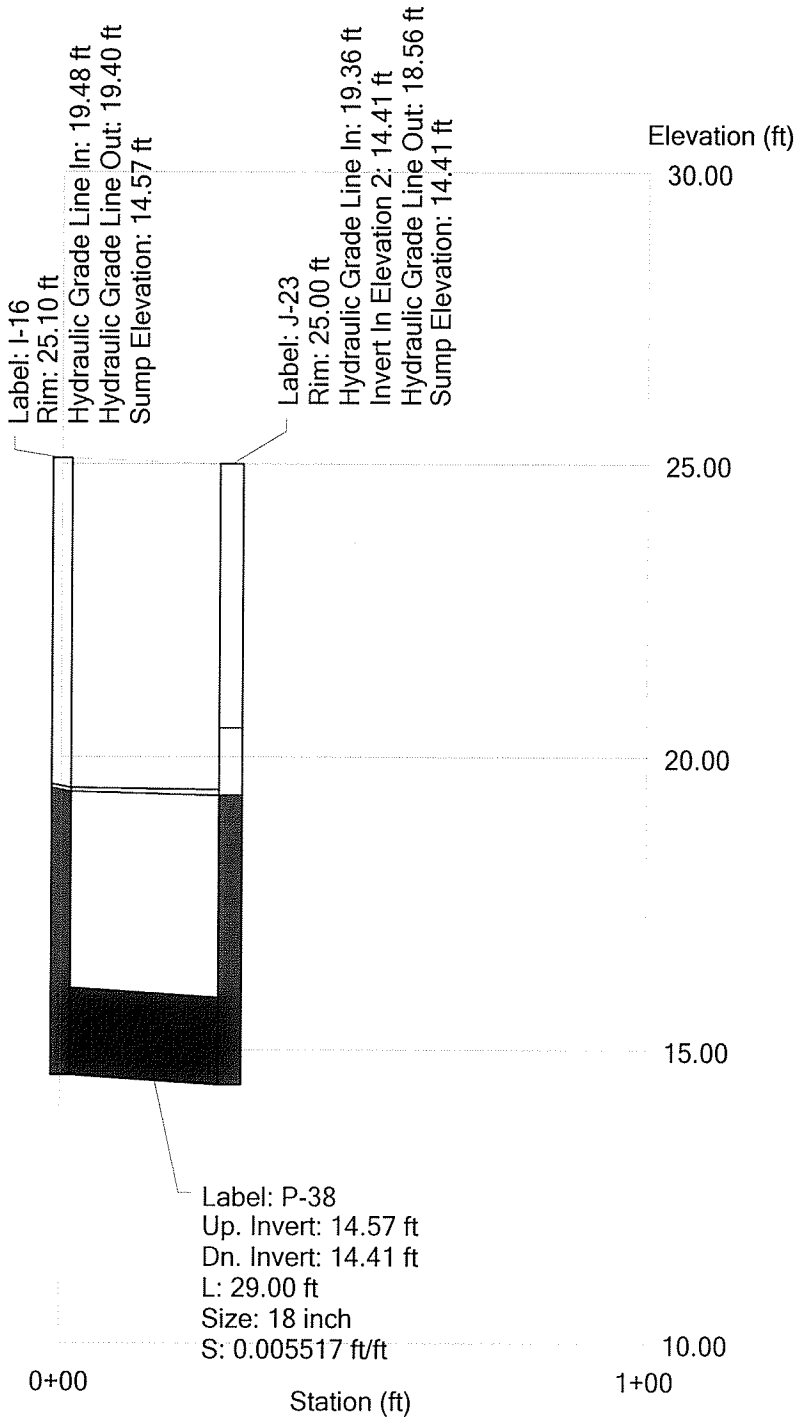
Profile: I16 - J23 (system-IB)

Scenario: 100-YR



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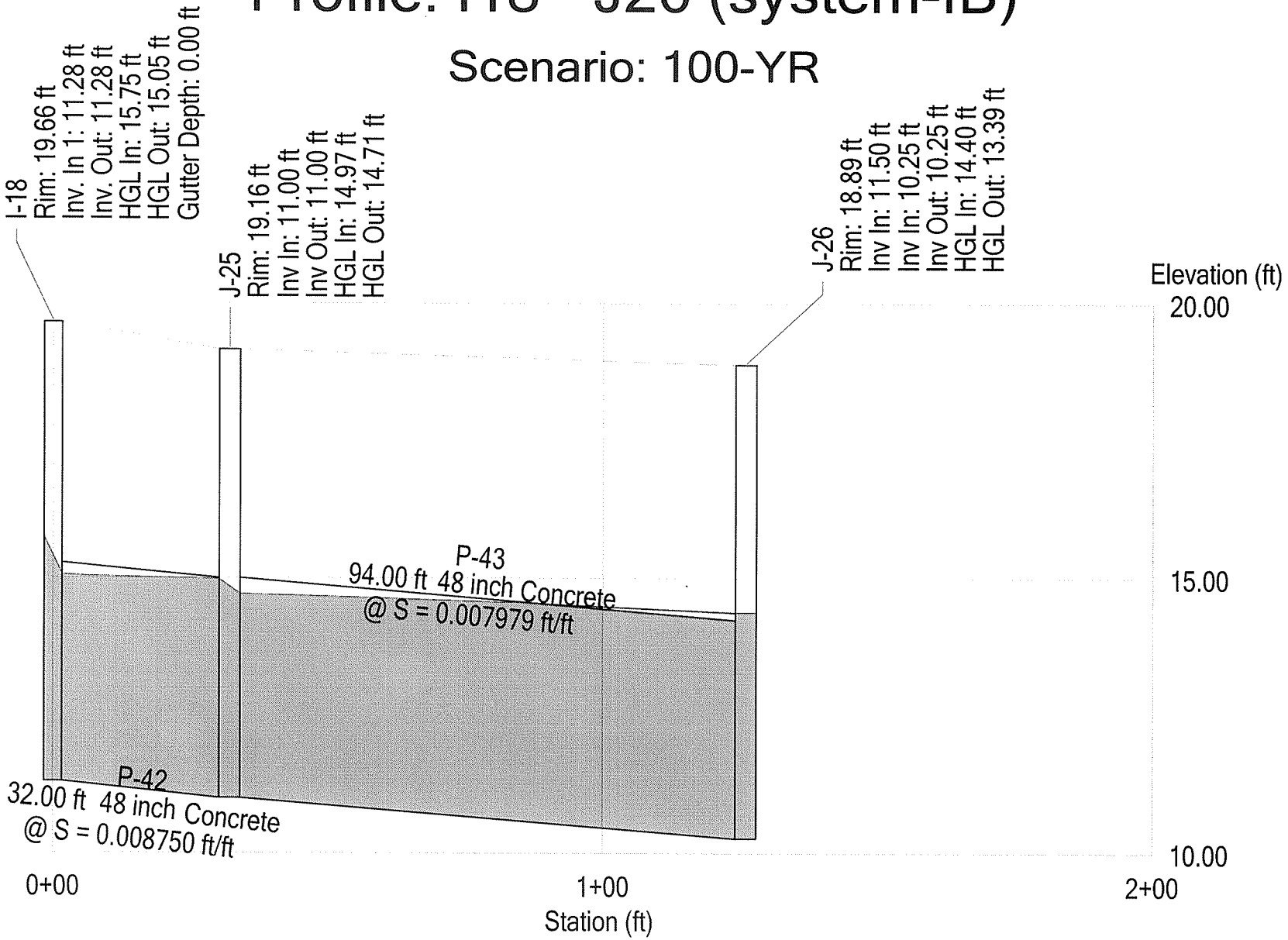
Profile: I18 - J26 (system-IB)

Scenario: 100-YR



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04/11/07 04:03:24 PM

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Project Engineer: Darrel E. Wood P.E. R.L.S.
StormCAD v5.6 [05.06.012.00]

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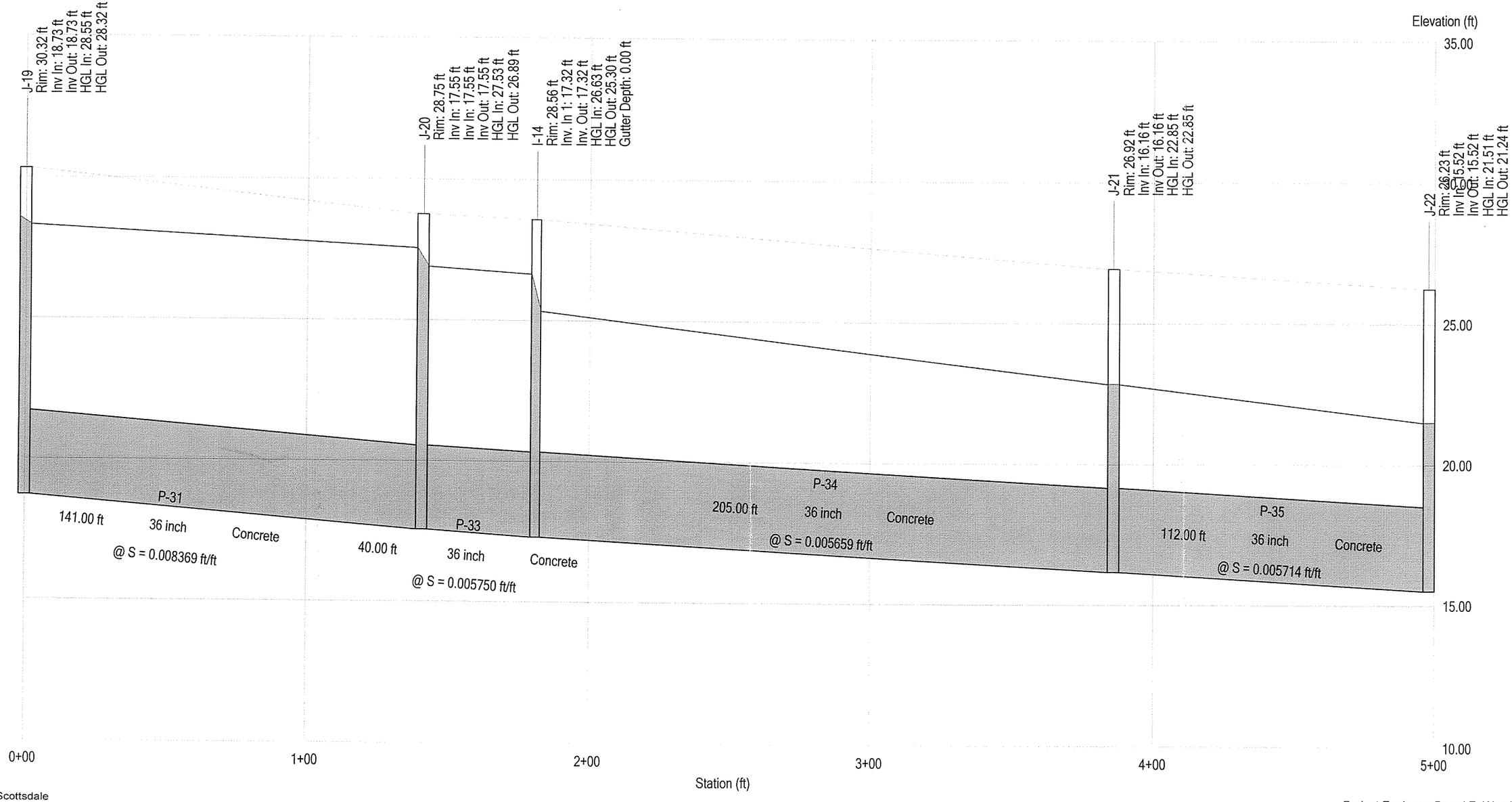
Profile: J19 - J22 (system-IB)

Scenario: 100-YR



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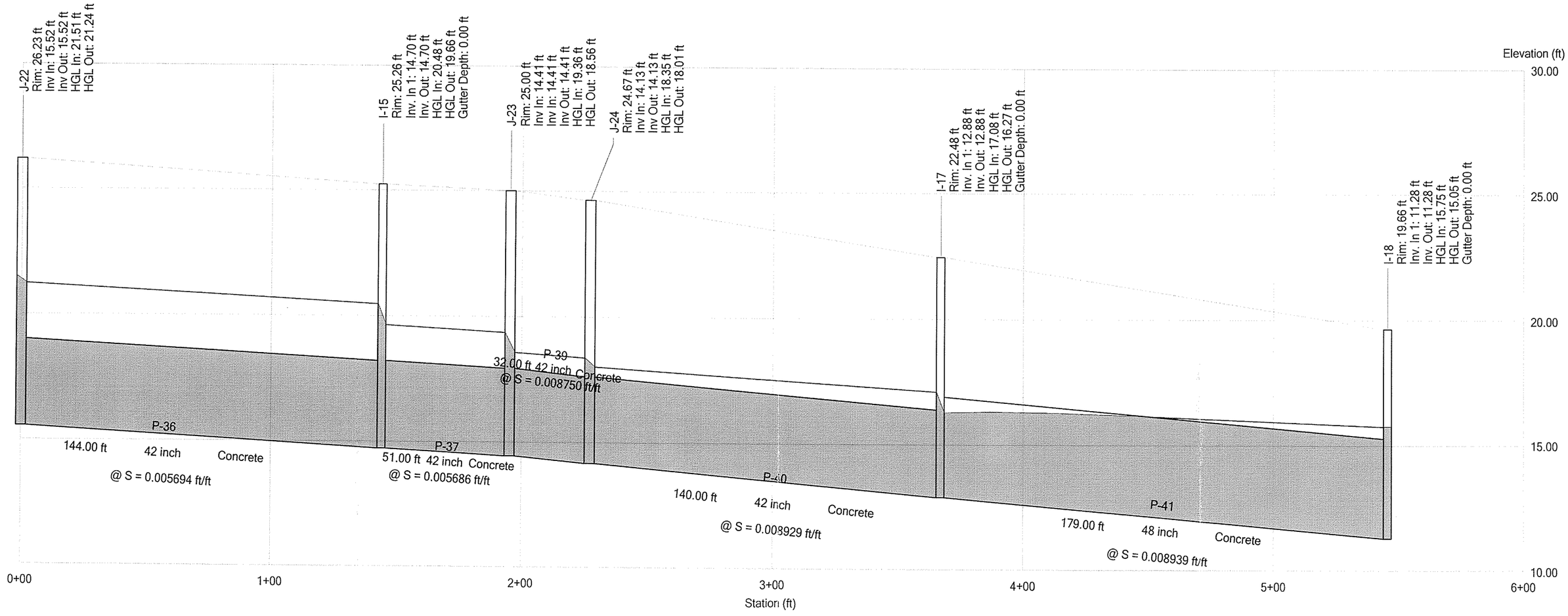
Profile: J22 - I18 (system-IB)

Scenario: 100-YR



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SYSTEM C

Scenario: 100-YR

Combined Pipe\Node Report

Label	Upstream Node	Downstream Node	Length (ft)	Section Size	Mannings n	Full Capacity (cfs)	Average Velocity (ft/s)	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Constructed Slope (ft/ft)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)	Total System Flow (cfs)
P-54	I-23	J-32	112.00	30 inch	0.013	39.71	4.48	27.00	25.95	0.009375	33.52	33.20	22.00
P-55	J-32	I-24	138.00	30 inch	0.013	39.81	4.48	25.95	24.65	0.009420	33.11	32.71	22.00
P-56	I-24	J-33	229.00	30 inch	0.013	39.74	7.33	24.65	22.50	0.009389	32.04	30.28	36.00
P-57	J-33	I-25	41.00	30 inch	0.013	52.43	7.33	22.50	21.83	0.016341	30.02	29.71	36.00
P-58	I-25	I-26	206.00	30 inch	0.013	52.54	9.57	21.83	18.45	0.016408	28.57	25.86	47.00
P-59	I-26	J-34	71.00	36 inch	0.013	84.88	8.63	18.45	17.30	0.016197	24.94	24.34	61.00
P-60	J-34	I-27	183.00	36 inch	0.013	65.96	8.63	17.30	15.51	0.009781	24.00	22.47	61.00
P-61	I-27	J-35	48.00	36 inch	0.013	65.29	9.76	15.51	15.05	0.009583	21.28	20.77	69.00
P-62	J-35	I-28	162.00	36 inch	0.013	62.66	9.76	15.05	13.62	0.008827	19.43	17.70	69.00
P-63	I-28	O-4	67.00	36 inch	0.013	62.05	9.76	13.62	13.04	0.008657	16.47	15.68	69.00

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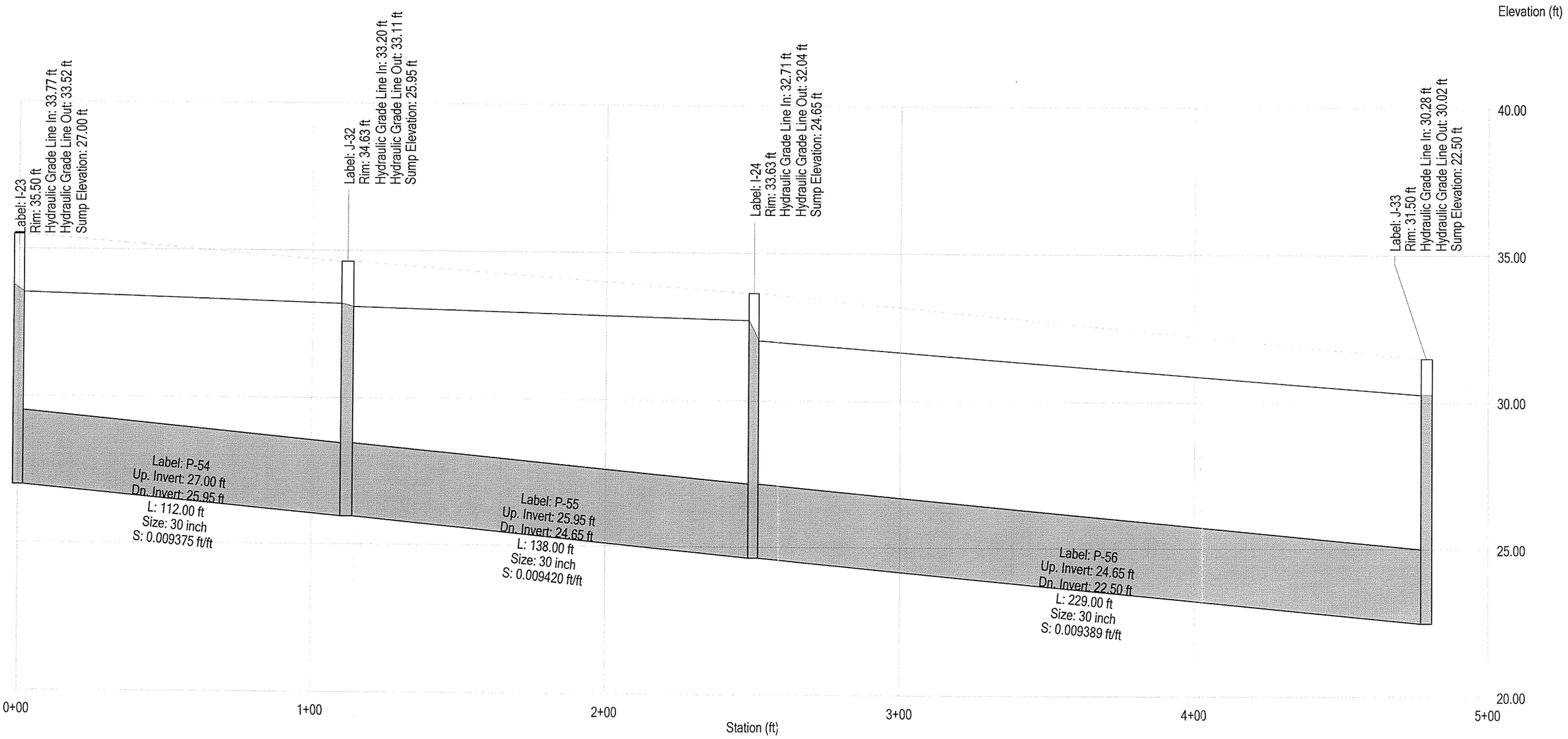
Profile: I23 - J33 (system-IC)

Scenario: 100-YR



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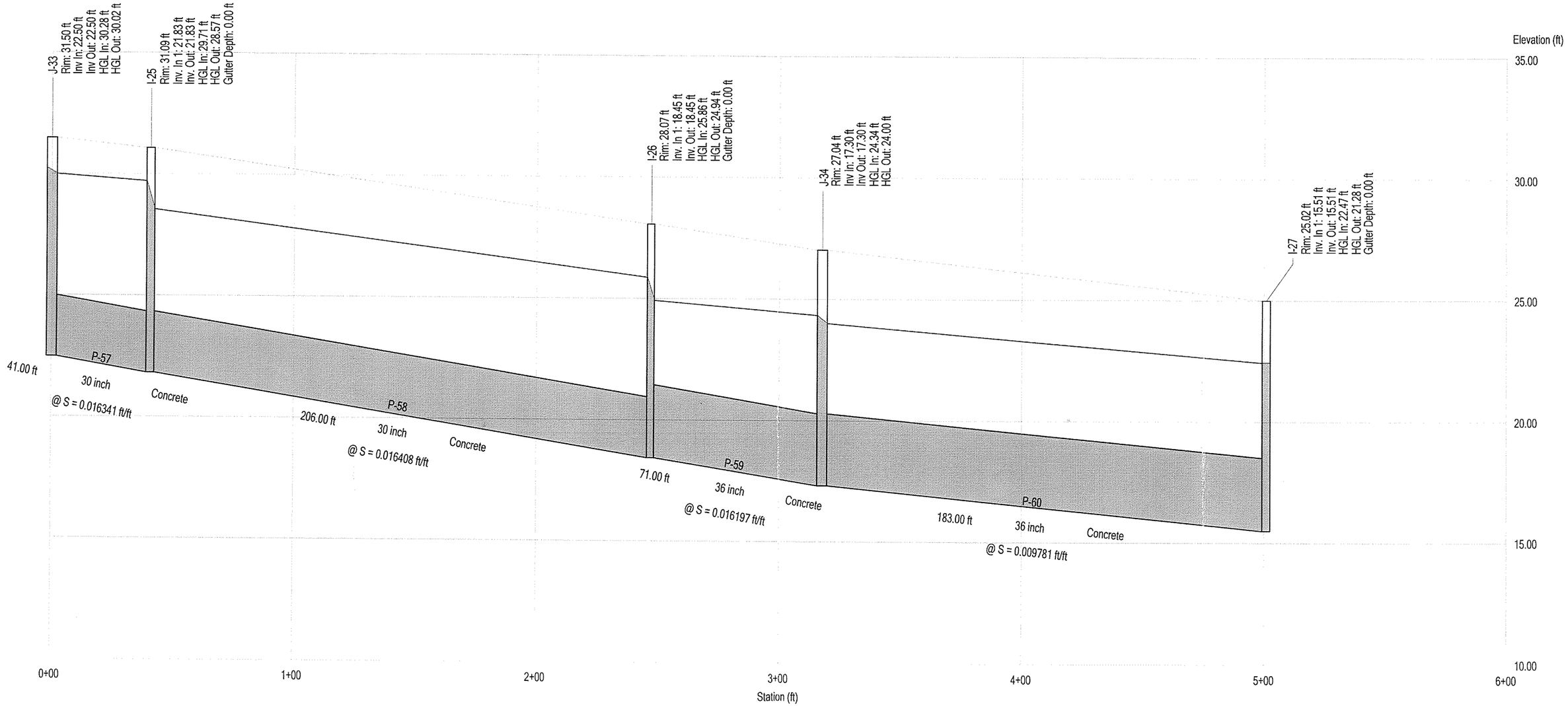
Profile: J33 - I27 (system-IC)

Scenario: 100-YR



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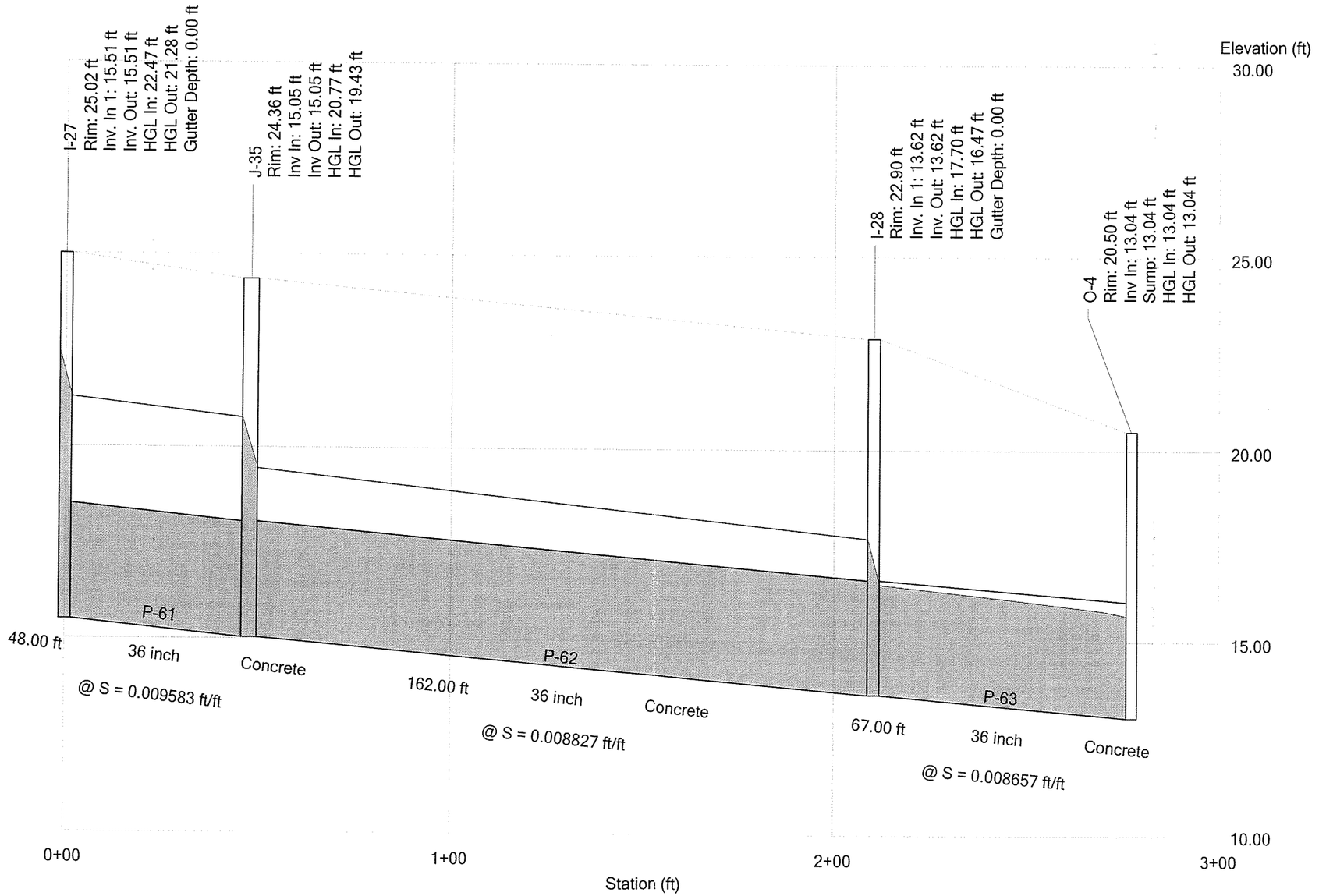
DOCUMENT FROM PREVIOUSLY APPROVED MASTER REPORT. FOR REFERENCE ONLY

Profile: I27 - O4 (system-IC)

Scenario: 100-YR



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Culvert Designer/Analyzer Report
1st Crossing-100yr

Analysis Component			
Storm Event	Design	Discharge	9.00 cfs

Peak Discharge Method: User-Specified			
Design Discharge	9.00 cfs	Check Discharge	9.00 cfs

Tailwater properties: Trapezoidal Channel

Tailwater conditions for Design Storm.			
Discharge	9.00 cfs	Bottom Elevation	21.60 ft
Depth	0.38 ft	Velocity	2.05 ft/s

Name	Description	Discharge	HW Elev.	Velocity
Culvert-1	1-24 inch Circular	9.00 cfs	24.00 ft	6.67 ft/s
Weir	Not Considered	N/A	N/A	N/A

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Culvert Designer/Analyzer Report
1st Crossing-100yr

Component:Culvert-1

Culvert Summary					
Computed Headwater Elev	24.00	ft	Discharge	9.00	cfs
Inlet Control HW Elev.	23.92	ft	Tailwater Elevation	21.98	ft
Outlet Control HW Elev.	24.00	ft	Control Type	Entrance Control	
Headwater Depth/Height	0.79				

Grades					
Upstream Invert	22.41	ft	Downstream Invert	21.60	ft
Length	85.00	ft	Constructed Slope	0.009529	ft/ft

Hydraulic Profile					
Profile	S2		Depth, Downstream	0.89	ft
Slope Type	Steep		Normal Depth	0.89	ft
Flow Regime	Supercritical		Critical Depth	1.07	ft
Velocity Downstream	6.67	ft/s	Critical Slope	0.005036	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.013	
Section Material	Concrete		Span	2.00	ft
Section Size	24 inch		Rise	2.00	ft
Number Sections	1				

Outlet Control Properties					
Outlet Control HW Elev.	24.00	ft	Upstream Velocity Head	0.43	ft
Ke	0.20		Entrance Loss	0.09	ft

Inlet Control Properties					
Inlet Control HW Elev.	23.92	ft	Flow Control	Unsubmerged	
Inlet Type	Beveled ring, 33.7° bevels		Area Full	3.1	ft²
K	0.00180		HDS 5 Chart	3	
M	2.50000		HDS 5 Scale	B	
C	0.02430		Equation Form	1	
Y	0.83000				

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Culvert Designer/Analyzer Report
2nd Crossing-100yr

Analysis Component			
Storm Event	Design	Discharge	15.00 cfs

Peak Discharge Method: User-Specified			
Design Discharge	15.00 cfs	Check Discharge	15.00 cfs

Tailwater properties: Trapezoidal Channel

Tailwater conditions for Design Storm.			
Discharge	15.00 cfs	Bottom Elevation	15.47 ft
Depth	0.51 ft	Velocity	2.43 ft/s

Name	Description	Discharge	HW Elev.	Velocity
Culvert-1	1-30 inch Circular	15.00 cfs	17.93 ft	7.47 ft/s
Weir	Not Considered	N/A	N/A	N/A

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Culvert Designer/Analyzer Report
2nd Crossing-100yr

Component:Culvert-1

Culvert Summary					
Computed Headwater Elev	17.93	ft	Discharge	15.00	cfs
Inlet Control HW Elev.	17.84	ft	Tailwater Elevation	15.98	ft
Outlet Control HW Elev.	17.93	ft	Control Type	Entrance Control	
Headwater Depth/Height	0.77				

Grades					
Upstream Invert	16.00	ft	Downstream Invert	15.47	ft
Length	53.00	ft	Constructed Slope	0.010000	ft/ft

Hydraulic Profile					
Profile	S2		Depth, Downstream	1.07	ft
Slope Type	Steep		Normal Depth	1.05	ft
Flow Regime	Supercritical		Critical Depth	1.31	ft
Velocity Downstream	7.47	ft/s	Critical Slope	0.004617	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.013	
Section Material	Concrete		Span	2.50	ft
Section Size	30 inch		Rise	2.50	ft
Number Sections	1				

Outlet Control Properties					
Outlet Control HW Elev.	17.93	ft	Upstream Velocity Head	0.52	ft
Ke	0.20		Entrance Loss	0.10	ft

Inlet Control Properties					
Inlet Control HW Elev.	17.84	ft	Flow Control	Unsubmerged	
Inlet Type	Beveled ring, 45° bevels		Area Full	4.9	ft²
K	0.00180		HDS 5 Chart	3	
M	2.50000		HDS 5 Scale	A	
C	0.03000		Equation Form	1	
Y	0.74000				

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Culvert Designer/Analyzer Report
3rd Crossing-100yr

Analysis Component			
Storm Event	Design	Discharge	21.00 cfs

Peak Discharge Method: User-Specified			
Design Discharge	21.00 cfs	Check Discharge	21.00 cfs

Tailwater properties: Trapezoidal Channel

Tailwater conditions for Design Storm.

Discharge	21.00 cfs	Bottom Elevation	10.51 ft
Depth	0.62 ft	Velocity	2.72 ft/s

Name	Description	Discharge	HW Elev.	Velocity
Culvert-1	1-30 inch Circular	21.00 cfs	13.96 ft	8.38 ft/s
Weir	Not Considered	N/A	N/A	N/A

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Culvert Designer/Analyzer Report
3rd Crossing-100yr

Component:Culvert-1

Culvert Summary					
Computed Headwater Elev	13.96	ft	Discharge	21.00	cfs
Inlet Control HW Elev.	13.87	ft	Tailwater Elevation	11.13	ft
Outlet Control HW Elev.	13.96	ft	Control Type	Entrance Control	
Headwater Depth/Height	0.94				

Grades					
Upstream Invert	11.61	ft	Downstream Invert	10.51	ft
Length	110.00	ft	Constructed Slope	0.010000	ft/ft

Hydraulic Profile					
Profile	S2		Depth, Downstream	1.27	ft
Slope Type	Steep		Normal Depth	1.27	ft
Flow Regime	Supercritical		Critical Depth	1.56	ft
Velocity Downstream	8.38	ft/s	Critical Slope	0.005186	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.013	
Section Material	Concrete		Span	2.50	ft
Section Size	30 inch		Rise	2.50	ft
Number Sections	1				

Outlet Control Properties					
Outlet Control HW Elev.	13.96	ft	Upstream Velocity Head	0.66	ft
Ke	0.20		Entrance Loss	0.13	ft

Inlet Control Properties					
Inlet Control HW Elev.	13.87	ft	Flow Control	Unsubmerged	
Inlet Type	Beveled ring, 33.7° bevels		Area Full	4.9	ft²
K	0.00180		HDS 5 Chart	3	
M	2.50000		HDS 5 Scale	B	
C	0.02430		Equation Form	1	
Y	0.83000				

DOCUMENT FROM PREVIOUSLY APPROVED MASTER REPORT. FOR REFERENCE ONLY

EXHIBIT 8 – HYDRAULIC MODELING ASSISTANCE MEMORANDUM

DOCUMENT FROM PREVIOUSLY APPROVED MASTER REPORT. FOR REFERENCE ONLY

JE FULLER
hydrology • geomorphology

Q-S # _____

X Accepted

____ Corrections

Memorandum

DATE: January 20, 2022

TO: Michael F. Burke
One Scottsdale Core LLC

Richard M. Anderson — Reviewed By
02/18/2022 — Date

FROM: Richard Waskowsky, PE
JE Fuller Hydrology & Geomorphology, Inc.

RE: Hydraulic Modeling Assistance for One Scottsdale in Scottsdale, Arizona

Registered Professional Engineer (Civil)
CERTIFICATE NO.
52467
RICHARD M.
WASKOWSKY
Date Signed 1/20/2022
ARIZONA, U. S. A.

1. Introduction

The One Scottsdale project is in Scottsdale, Arizona on the northeast corner of Scottsdale Road and the Loop 101. Refer to project parcels in Figure 1. During the City of Scottsdale's (COS) drainage review of the project, the COS made a comment about how the project is handling off-site flow from the Pinnacle Peak West Area Drainage Master Study (PPW ADMS) (JEF, 2014). Note the PPW discharge results in **Figure 1**. The purpose of this memorandum is to document the hydraulic analyses used to resolve the City's comment.

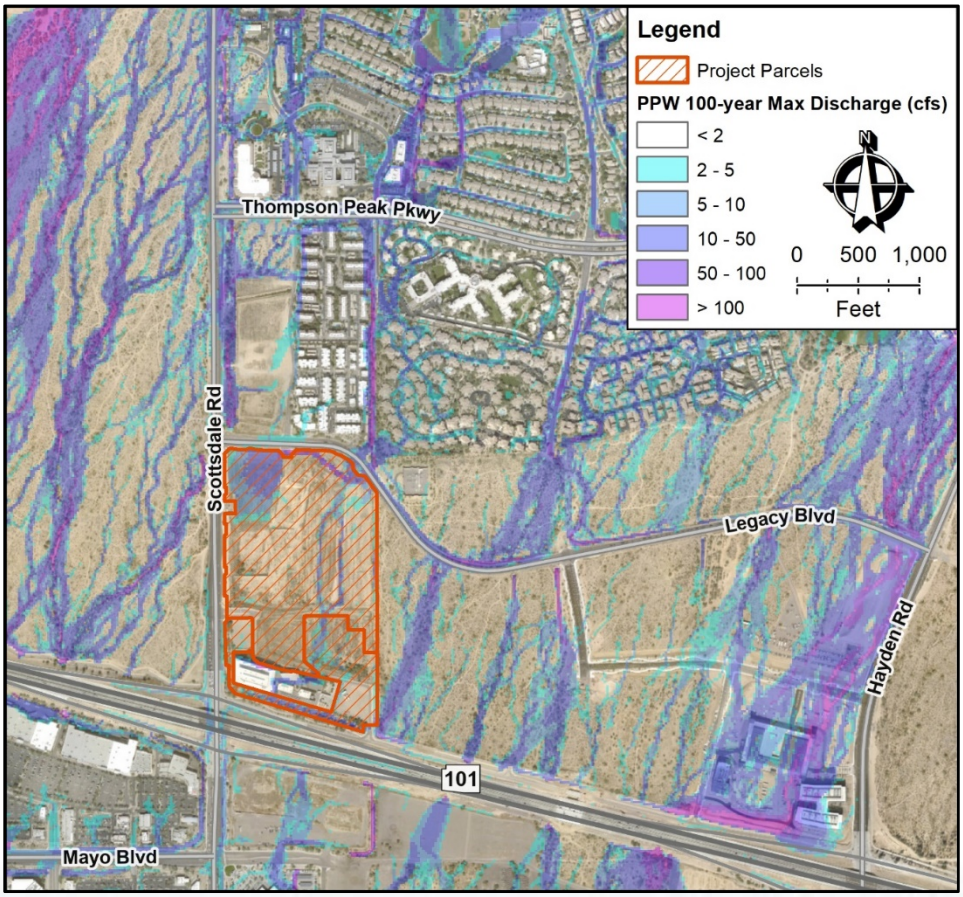

Figure 1. Location of One Scottsdale Project