CITY OF ALBUQUERQUE

Planning Department
Brennon Williams, Director

Mayor Timothy M. Keller

September 27, 2019

Yolanda Padilla Moyer, PE
Bohannan Huston, Inc.
7500 Jefferson St NE
Albuquerque, NM 87109

RE: **Catalonia Subdivision**
Tr 1 & 2, The Trails Unit 3A
Drainage Report Stamp Date: 9/16/19
Grading Plan Stamp Date: 9/16/19
Hydrology File: C09D013

Dear Ms. Padilla Moyer,

Based on the submittal received on 9/17/19 the above-referenced Drainage Report and Grading Plan cannot be approved until the following are corrected:

Prior to Preliminary Plat and Grading Permit:

1. Offsite Pond 1.
   a. Provide written and signed permission from the owner of *Portion of Tract 5 in the W/2 NE/4 NW/4 SEC 17 T11N R2E* for the grading and swale/pond construction on their property.
   b. Once this is obtained, provide a copy to Hydrology, along with a new DTIS form, requesting grading and preliminary plat approval. There is no resubmittal fee for this action; please include a copy of this letter when resubmitting to obtain the fee waiver.

2. For Information. The following drainage infrastructure needs to be added/amended on the infrastructure list:
   a. *6" diameter orifice plate on Pond B outfall.* This can be its own line item, or be added to the Pond B line item.
   b. *12" diameter orifice plate on Offsite Pond 1 outfall*. This can be its own line item, or be added to the Pond B line item.

3. For Information. Reduced waterblock heights will be allowed at: Matero & Manresa (0.24' min) and Bellaterra & Cambrils (0.15' min).

4. For Information. If the project total area of disturbance (including the staging area and any work within the adjacent Right-of-Way) is 1 acre or more, then an Erosion and Sediment Control (ESC) Plan and Owner's certified Notice of Intent (NOI) is required to be submitted

PO Box 1293

Albuquerque

NM 87103

www.cabq.gov

to the Stormwater Quality Engineer (Curtis Cherne, PE, ccherne@cabq.gov, 924-3420) 14 days prior to any earth disturbance.

Prior to Work Order (For Information):

5. Provide dimensional data on plans (top width, bottom width, depth, etc.) for the spillways and swale.

6. Provide outlet structure detail for Offsite Pond 1 with 12" diameter orifice plate. Provide outlet structure detail for Pond B with 6" dimeter orifice plate.

Prior to Release of Financial Guarantee (For Information):

7. Engineer's Certification, per the DPM Chapter 22.7: *Engineer's Certification Checklist For Subdivision* is required.

If you have any questions, please contact me at 924-3695 or dpeterson@cabq.gov.

PO Box 1293

Albuquerque

NM 87103

www.cabq.gov

Sincerely,

Dana M. Peterson
Senior Engineer, Planning Dept.
Development Review Services

City of Albuquerque

Planning Department

Development & Building Services Division

DRAINAGE AND TRANSPORTATION INFORMATION SHEET (REV 11/2018)

Project Title: Catalonia at the Trails Building Permit #: _____ Hydrology File #: C09D011

DRB#: 2018-001198 EPC#: 2018-2018-001198 Work Order#: _____

Legal Description: Tract 1-2, The Trails Unit 3A

City Address: _____

Applicant: Bohannan Huston Inc. Contact: Yolanda Moyer

Address: 7500 Jefferson St NE CY2 Albuquerque, NM, 87109

Phone#: 505-798-7945 Fax#: _____ E-mail: ypadilla@bhinc.com

Owner: PV Trails Albuquerque LCC Contact: Scott Steffen

Address: 4350 La Jolla Village Dr, Suite 110 San Diego CA 92122

Phone#: 505 243-3949 Fax#: _____ E-mail: ssteffen@priceldg.com

TYPE OF SUBMITTAL: X PLAT (78 # OF LOTS) ____ RESIDENCE ____ DRB SITE ____ ADMIN SITE

IS THIS A RESUBMITTAL?: X Yes _____ No

DEPARTMENT: _____ TRAFFIC/ TRANSPORTATION X HYDROLOGY/ DRAINAGE

Check all that Apply:

TYPE OF SUBMITTAL:

____ ENGINEER/ARCHITECT CERTIFICATION
____ PAD CERTIFICATION
____ CONCEPTUAL G & D PLAN
X GRADING PLAN
____ DRAINAGE MASTER PLAN
x DRAINAGE REPORT
____ FLOODPLAIN DEVELOPMENT PERMIT APPLIC
____ ELEVATION CERTIFICATE
____ CLOMR/LOMR
____ TRAFFIC CIRCULATION LAYOUT (TCL)
____ TRAFFIC IMPACT STUDY (TIS)
____ OTHER (SPECIFY) _____
____ PRE-DESIGN MEETING?

TYPE OF APPROVAL/ACCEPTANCE SOUGHT:

____ BUILDING PERMIT APPROVAL
____ CERTIFICATE OF OCCUPANCY
X PRELIMINARY PLAT APPROVAL
____ SITE PLAN FOR SUB'D APPROVAL
____ SITE PLAN FOR BLDG. PERMIT APPROVAL
x FINAL PLAT APPROVAL
____ SIA/ RELEASE OF FINANCIAL GUARANTEE
____ FOUNDATION PERMIT APPROVAL
X GRADING PERMIT APPROVAL
____ SO-19 APPROVAL
____ PAVING PERMIT APPROVAL
____ GRADING/ PAD CERTIFICATION
X WORK ORDER APPROVAL
____ CLOMR/LOMR
____ FLOODPLAIN DEVELOPMENT PERMIT
____ OTHER (SPECIFY) _____

DATE SUBMITTED: 09/16/2019 By: Yolanda Padilla Moyer, P.E.

COA STAFF: ELECTRONIC SUBMITTAL RECEIVED: _____

FEE PAID: _____

Bohannan Huston

60 est. 1959 years of service

7500 Jefferson Street NE
Albuquerque, NM 87109
www.bhinc.com
p. 505.823.1000

September 16, 2019

Dana M. Peterson
Senior Engineer
City of Albuquerque
Planning Department
Development Review Services
PO Box 1293
Albuquerque, NM 87103

RE: Catalonia Subdivision
Tr 1 & 2, The Trails Unit 3A
Drainage Report Stamp Date: 7/11/19
Grading Plan Stamp Date: 7/11/19
Hydrology File: C09D013

Dear Dan,

Based on the submittal received on 7/12/19 the above-referenced Drainage Report and Grading Plan cannot be approved until the following are corrected:

Prior to Preliminary Plat and Grading Permit:

1. Offsite Pond 1.
   a. Per The Trails DMP (Thompson, 2015) this pond ultimately needs to be 2.44 Ac-Ft. The proposed size (1.54 Ac-Ft) and the ultimate size need to be called-out on the Drainage Report, Grading Plan, and Work Order Plans. In the drainage report, add explaining language that when the development to the north comes in, it'll need to divert its offsite flows south into Offsite Pond 1 and upsize it from 1.54 Ac-Ft (not 1.08 Ac-Ft) to 2.44 Ac-Ft.
   This has been updated
   b. Provide written and signed permission from the owner of *Portion of Tract 5 in the W/2 NE/4 NW/4 SEC 17 T11N R2E* for the grading and swale/pond construction on their property.
   Will provide once we receive written permission.

2. Pond Routing.
   a. Pond B outlet needs to be revised in HMS to show an orifice plate that will restrict discharge to 3.36cfs max. The headwall into 6" culvert under Woodmont won't be acceptable; minimum pipe size is 24" as is correctly shown on the infrastructure list.
   HEC-HMS model has been changed so that the outlet structure is orifice controlled. An orifice plate will be put over the 24" storm drain line to restrict the flow.
   b. Show and label the 100-yr. WSE and SWQV elevation of each pond on the grading plan.
   This has been updated.

3. Storm Water Quality (SWQ). Use of Retention Pond A5 and Pond A for retaining the SWQV acceptable provided that the SWQ volume and SWQ water surface elevations are called out on the plans and in the maintenance covenants. The SWQ retention within these ponds will be permanent.
   This has been updated on the plans and will be provided on the maintenance covenants.

4. Please look at the Cambrils Dr assembly/section in front of lots 1-5. The contours seem to show an inverted crown with an odd transition in front of lot 6.
   This has been updated.

5. The following drainage infrastructure needs to be amended on the infrastructure list provided with the submittal:
   a. Pipe size for the RCP in Girona needs to be called out as 24”-48”, not 18”-42”.
   b. Pipe size for the RCP in Woodmont (Tr 1 to Girona) needs to be called out as 24”, not 18”-30”.
   c. Pipe size for the RCP in Tarragonia needs to be called out as 24”, not 18”-30”.
   This has been updated.

6. For Information. Reduced waterblock heights will be allowed at: Matero & Manresa (0.24’ min) and Bellaterra & Cambrils (0.15’ min).
   Acknowledged.

7. As a reminder, if the project total area of disturbance (including the staging area and any work within the adjacent Right-of-Way) is 1 acre or more, then an Erosion and Sediment Control (ESC) Plan and Owner’s certified Notice of Intent (NOI) is required to be submitted to the Stormwater Quality Engineer (Curtis Cherne, PE, ccherne@cabq.gov, 924-3420) 14 days prior to any earth disturbance.
   This will be provided 14 days prior to any disturbance.

Prior to Work Order (For Information):

8. Provide dimensional data on plans (top width, bottom width, depth, etc.) for the spillways and swale.
   This will be provided prior to Work Order.

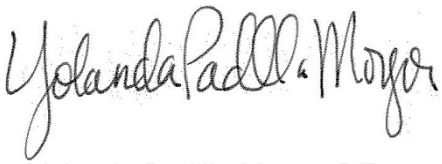
9. Provide outlet structure detail for Offsite Pond 1 with 1’ diameter orifice plate. Provide outlet structure detail for Pond B with orifice plate (diameter to be determined).
   This will be provided prior to Work Order.

Prior to Release of Financial Guarantee (For Information):

10. Engineer’s Certification, per the DPM Chapter 22.7: *Engineer's Certification Checklist for Subdivision* is required.

If you have any questions, please contact me at 823-1000 or ypadilla@bhinc.com.

Sincerely,



Yolanda Padilla Moyer, PE
Senior Project Manager
Community Development & Planning

YPM/
Enclosures

Current DRC
Project No. _____

Date Submitted: _____
Date Site Plan Approved: _____
Date Preliminary Plat Approved: _____
Date Preliminary Plat Expires: _____

DRB Project No. **PR-2018-001158**

Figure 12

INFRASTRUCTURE LIST

EXHIBIT "A"
TO SUBDIVISION IMPROVEMENTS AGREEMENT
DEVELOPMENT REVIEW BOARD (D.R.B.) REQUIRED INFRASTRUCTURE LIST

CATALONIA AT THE TRAILS
REPLAT OF TRACT 1 AND TRACT 2 OF THE TRAILS UNIT 3A

Following is a summary of PUBLIC/PRIVATE Infrastructure required to be constructed or financially guaranteed for the above development. This Listing is not necessarily a complete listing. During the SIA process and/or in the review of the construction drawings, if the DRC Chair determines that appurtenant items and/or unforeseen items have not been included in the infrastructure listing, the DRC Chair may include those items in the listing and related financial guarantee. Likewise, if the DRC Chair determines that appurtenant or non-essential items can be deleted from the listing, those items may be deleted as well as the related portions of the financial guarantees. All such revisions require approval by the DRC Chair, the User Department and agent/owner. If such approvals are obtained, these revisions to the listing will be incorporated administratively. In addition, any unforeseen items which arise during construction which which are necessary to complete the project and which normally are the Subdivider's responsibility will be required as a condition of project acceptance and close out by the City.

PUBLIC WATERLINE IMPROVEMENTS

SIA Sequence #	COA DRC Project #	Size	Type of Improvement	Location	From	To	Private Inspector	City Inspector	City Cnst Engineer
		12" DIA (5W)	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	WOODMONT AVENUE	TRACT 1	STUB IN WOODMONT AVENUE, NORTH OF MANCOS STREET	/	/	/
		8" DIA (5W)	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	GIRONA AVENUE	TRACT 5	WOODMONT AVENUE	/	/	/
		6" DIA (5W)	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	CAMBRILS DRIVE	GIRONA AVENUE	TARRAGONA ROAD	/	/	/
		6" DIA (5W)	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	TARRAGONA ROAD	MANRESA DRIVE	CAMBRILS DRIVE	/	/	/
		6" DIA (5W)	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	MANRESA DRIVE	TARRAGONA ROAD	GIRONA AVENUE	/	/	/
		6" DIA (5W)	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	MATARO ROAD	MANRESA DRIVE	CAMBRILS DRIVE	/	/	/
		6" DIA (5W)	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	MATARO ROAD	MANRESA DRIVE	CAMBRILS DRIVE	/	/	/
		6" DIA (5W)	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	TORTOSA DRIVE	MATARO ROAD	GIRONA AVENUE	/	/	/
		8" DIA (5W)	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	BELLATERRA STREET	CAMBRILS DRIVE	WOODMONT AVENUE	/	/	/
		12" DIA (5W)	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	WOODMONT AVENUE	TRACT 1	PASEO DEL NORTE	/	/	/

PUBLIC SANITARY SEWER IMPROVEMENTS

SIA Sequence #	COA DRC Project #	Size	Type of Improvement	Location	From	To	Private Inspector	City Inspector	City Cnst Engineer
		12" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	WOODMONT AVENUE	PASEO DEL NORTE	STUB IN WOODMONT AVENUE, NORTH OF MANCOS STREET	/	/	/
		8" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	GIRONA AVENUE	TRACT 5	WOODMONT AVENUE	/	/	/
		8" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	CAMBRILS DRIVE	LOT 78	GIRONA AVENUE	/	/	/
		8" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	CAMBRILS DRIVE	LOT 1	SAS ESMT @ LOT 6	/	/	/
		8" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	TARRAGONA ROAD	MANRESA DRIVE	SAS ESMT @ LOT 6	/	/	/
		8" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	MANRESA DRIVE	LOT 32	TARRAGONA ROAD	/	/	/
		8" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	MANRESA DRIVE	LOT 33	GIRONA AVENUE	/	/	/
		8" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	MATARO ROAD	LOT 30	CAMBRILS DRIVE	/	/	/

SIA Sequence #	COA DRC Project #	Size	Type of Improvement	Location	From	To	Private Inspector	City Inspector	City Cnst Engineer
		PUBLIC SANITARY SEWER IMPROVEMENTS CONT…							
		8" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	TORTOSA DRIVE	LOT 50	GIRONA AVENUE	/	/	/
		8" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	SAS EASEMENT	CAMBRILS DRIVE	WOODMONT AVENUE	/	/	/
		12" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	WOODMONT AVE	NORTH BOUNDARY	EXISTING 12" SAS IN WINDOW PEAK DURANGO UNIT 1	/	/	/

SIA Sequence #	COA DRC Project #	Size	Type of Improvement	Location	From	To	Private Inspector	City Inspector	City Cnst Engineer
		PUBLIC STORM DRAIN IMPROVMENTS							
		24-48"* DIA	RCP W/ NEC. MH'S, LATERALS & INLETS	GIRONA AVENUE	OFFSITE POND 1	EAST OF WOODMONT	/	/	/
		24" DIA	RCP W/ NEC. MH'S, LATERALS & INLETS	WOODMONT AVENUE	TRACT 1	GIRONA AVENUE	/	/	/
		24" DIA	RCP W/ NEC. MH'S, LATERALS & INLETS	TARRAGONA ROAD	LOW POINT ADJACENT TO LOT 7	TRACT OS-1	/	/	/
		24" DIA	RCP W/ NEC. MH'S, LATERALS & INLETS	WOODMONT AVENUE	POND B	POND A5	/	/	/
			OFFSITE POND 1 AND SWALE (1.54 Ac-Ft) WITH DRAINAGE CONVENANT	TRACT 5			/	/	/
			WOODMONT POND (0.66 Ac-Ft) w/ Public Drainage Easement	NORTH OF PROPERTY LINE			/	/	/
			POND A (4.37 Ac-Ft) w/ Public Drainage Easement and Covenant	TRACT 4			/	/	/
			POND B (2.13 Ac-Ft) w/ Public Drainage Easement and Covenant	TRACT 0S-1			/	/	/
			POND A5 (4.61 Ac-Ft) w/ Public Drainage Easement and Covenant	TRACT 0S-2			/	/	/
			A GRADING AND DRAINAGE CERTIFICAITON OF THE APPROVED GRADING PLAN IS REQUIRED PRIOR TO THE RELEASE OF FINANCIAL GUARANTY				/	/	/
			ALL SLOPES ON HOA TRACTS TO BE STABILIZED BY NATIVE SEED AND MULCH PER STD SPEC 1012 WITH GRAVEL MULCH OR BETTER						
		*	ACTUAL SIZE TO BE DETERMINED BY HGL AT DRC						

SIA Sequence #	COA DRC Project #	Size	Type of Improvement	Location	From	To	Private Inspector	City Inspector	City Cnst Engineer
		PUBLIC ROADWAY IMPROVEMENTS							
		30' F-EOA	ARTERIAL PAVING W/ PCC CURB & GUTTER & PCC 6' WIDE SIDEWALK ON SOUTH SIDE†*	WOODMONT AVENUE	GIRONA AVENUE	SOUTH BOUNDARY (NORTH BOUNDARY OF OS-1)	/	/	/
		24' F- EOA	RESIDENTIAL PAVING W/ PCC CURB & GUTTER & PCC 4' WIDE SIDEWALK ON SOUTH SIDE	GIRONA AVENUE	WEST BOUNDARY	WOODMONT AVENUE	/	/	/
		28' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER & PCC 4' WIDE SIDEWALK ON BOTH SIDES*	CAMBRILS DRIVE	GIRONA AVENUE	TARRAGONA ROAD	/	/	/
		28' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER & PCC 4' WIDE SIDEWALK ON N SIDE ONLY†*	TARRAGONA ROAD	CAMBRILS DRIVE	MANRESA DRIVE	/	/	/
		28' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER & PCC 4' WIDE SIDEWALK ON BOTH SIDES*	MANRESA DRIVE	TARRAGONA ROAD	GIRONA AVENUE	/	/	/
		28' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER & PCC 4' WIDE SIDEWALK ON BOTH SIDES*	MATARO ROAD	MANRESA DRIVE	CAMBRILS DRIVE	/	/	/

SIA Sequence #	COA DRC Project #	Size	Type of Improvement	Location	From	To	Private Inspector	City Inspector	City Cnst Engineer
			PUBLIC ROADWAY IMPROVEMENTS CONT.…						
		28' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER & PCC 4' WIDE SIDEWALK ON BOTH SIDES*	TORTOSA DRIVE	MATARO ROAD	GIRONA AVENUE	/	/	/
		50' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER & PCC 4' WIDE SIDEWALK†* ON BOTH SIDES	BELLATERRA STREET	CAMBRILS DRIVE	WOODMONT AVENUE	/	/	/
		NOTE:	STREET LIGHTS AS REQUIRED PER THE COA DPM				/	/	/
							/	/	/
							/	/	/

*ALL SIDEWALKS TO BE DEFERRED ALONG FRONTAGE OF LOTS
†SIDEWALK TO BE WAIVED ON: 1) SOUTHSIDE OF TARRAGONA ROAD 2) NORTHSIDE OF GIRONA AVENUE

**PROVIDE / INSTALL THE NECESSARY ROADWAY SIGNAGE ASSOCIATED W/ THE DEVELOPMENT AS APPROVED BY THE CITY DRC

AGENT/OWNER

YOLANDA PADILLA MOYER, P.E..
PREPARED BY: PRINT NAME

BOHANNAN HUSTON INC.
FIRM:

SIGNATURE

MAXIMUM TIME ALLOW TO CONSTRUCT IMPROVEMENTS WITHOUT A DRB EXTENSION

DEVELOPMENT REVIEW BOARD MEMBER APPROVALS

DRB CHAIR	DATE	CODE ENFORCEMENT	DATE
TRANSPORTATION DEVELOPMENT	DATE	AMAFCA	DATE
ABCWUA	DATE	CITY ENGINEER	DATE
	DATE		DATE

DESIGN REVIEW COMMITTEE REVISIONS

REVISION	DATE	DRC CHAIR	USER DEPARTMENT		AGENT/OWNER

DRAINAGE REPORT FOR CATALONIA AT THE TRAILS SUBDIVISION

SEPTEMBER 2019

Prepared for:

PV TRAILS ALBUQUERQUE LCC
4350 LA JOLLA VILLAGE DR. SUITE 110
SAN DIEGO CA, 92122

Prepared by:

Bohannan Huston

Engineering
Spatial Data
Advanced Technologies

DRAINAGE REPORT
FOR
CATALONIA AT THE TRAILS
ALBUQUERQUE, NM

SEPTEMBER 16, 2019

Prepared for:

PV TRAILS ALBUQUERQUE LCC
4350 LA JOLLA VILLAGE DR. SUITE 110
SAN DIEGO, CA 92122

Prepared by:

BOHANNAN HUSTON, INC.
COURTYARD II
7500 JEFFERSON STREET NE
ALBUQUERQUE, NM 87109

PREPARED BY:

Joshua Lutz, E.I. 9-16-19 Date

UNDER THE SUPERVISION OF:

Yolanda Padilla Moyer, PE 9-16-19 Date

YOLANDA PADILLA MOYER NEW MEXICO 16035 LICENSED PROFESSIONAL ENGINEER

Bohannan Huston

TABLE OF CONTENTS

APPENDICES

EXHIBITS

I. INTRODUCTION

This report establishes a drainage management plan for Catalonia at the Trails Unit 3A. The proposed development consists of 78 single family detached residential lots on approximately 20.29 acres. This project is located within the Volcano Trails Sector Plan area, in northwest Albuquerque, west of Rainbow Blvd and south of Woodmont Avenue. Catalonia is in the Trails Units 1-3 Drainage Master Plan (DMP) area and has discharge of developed flows to "Pond B" located to the Southeast of the site, and a temporary Pond located to the east of the site, both of which will be developed with this project. Future Pond A5 is located on the east side of Woodmont Avenue and east of the proposed Catalonia subdivision, both Pond B will be conveyed to this pond through storm drain networks. Future Pond A5 will be fully developed per the Master Drainage Plan with this project, however, the discharge for Future Pond A5 will not be developed. This report is submitted in support of grading approval and preliminary plat approval by the DRB.

II. PURPOSE OF REPORT

The purpose of this report is to provide site-specific drainage analysis for existing and ultimate conditions for the subdivision development referred to as Catalonia at the Trails. This plan is prepared and submitted to support design and grading of the subdivision and internal streets for preliminary and final plat approvals.

III. METHODOLOGY AND REFERENCES

All analysis was completed for the existing and fully developed conditions. The runoff volumes were computed for the 100 yr. – 6 hr. storm in accordance with the City of Albuquerque Development Manual (DPM), Volume II – Design Criteria, Section 22.2, Hydrology, The City of Albuquerque, January 2002. Since the site is less than 40 acres in size, the Rational Method is used in this report for the hydrology analysis. The storm drain network was analyzed assuming laminar flow and applying classical non-compressible fluid mechanics approach.

This report is consistent with previously approved drainage reports for this development. The following City of Albuquerque approved documents will be referenced throughout this report:

Amendment to Drainage Management Plan for the Trails Units 1, 2, and 3 Plate 2, prepared by Thompson Engineering Consultants, Inc., February 2015. This report establishes site specific drainage improvements guidelines for the subdivision Catalonia at the Trails and provides the allowable discharge from the ponds which will be developed with this project.

IV. SITE LOCATION AND CHARACTERISTICS

This project is located within the Volcano Trails Sector Plan area, in northwest Albuquerque, west of Rainbow Blvd and south of Woodmont Avenue. (see 'EXHIBIT E– Subdivision Location Map and Summary Plat').

The site consists primarily of native grasses and bushes, with few trees within the site. Slopes range from 1% to 25%, with the majority of the project sloping at 3% to 15%.

Considering that the site will not be phased, the flow paths for the interim and the ultimate conditions will not differ. Hence, the hydrology and hydraulics analysis will be performed for the existing and ultimate conditions.

V. EXISTING CONDITIONS

The existing basin and drainage patterns are shown graphically on the Existing Drainage Conditions Map in 'EXHIBIT C– Existing Conditions Basin Map'. The site currently has a berm running through the middle it from east to west starting at Woodmont Avenue and ending on the west side of the site. The berm will send the flows to the southeast or northeast depending on which side of the berm the flow is coming from. There are offsite flows draining to the site. For additional information please refer to *Drainage Master Plan for the Trails Units 1, 2, and 3 and* APPENDIX B – Original Developed Conditions Basin Map from DMP'.

The site runoff naturally flows southeast to Future Pond B, or northeast to the temporary pond that will be put in for this site. In addition, a small portion of the site drains

east to Woodmont Avenue which will be collected by existing storm drain inlets. For details refer to APPENDIX B.

The site has been divided into 5 basins: Ex Basin-1 (A = 3.24 acres, $Q_{100} = 4.1$ cfs), Ex Basin-2 (A = 3.17 acres, $Q_{100} = 12.2$ cfs), Ex Basin-3 (A = 3.35 acres, $Q_{100} = 10.9$ cfs), Ex Basin-4 (A = 13.16 acres, $Q_{100} = 42.8$ cfs), and Offsite Basin-1 (A = 30.83 acres, $Q_{100} = 39.1$ cfs).

VI. DEVELOPED CONDITIONS

A. INTERIM CONDITIONS

The development of Catalonia at the Trails Unit 3A must accommodate offsite historic flows. Ex Basin-1 (A = 3.24 acres, $Q_{100} = 4.1$ cfs), Ex Basin-2 (A = 3.17 acres, $Q_{100} = 12.2$ cfs), Ex Basin-3 (A = 3.35 acres, $Q_{100} = 10.9$ cfs), drains Northeast to the Northeastern boundary, Ex Basin-4 (A = 4.20 acres, $Q_{100} = 5.33$ cfs) drains Northwest to Southeast while Ex Basin-5 (A = 13.16 acres, $Q_{100} = 42.8$ cfs) drains to the Southeastern boundary. Per the drainage master plan, Offsite Basin-1 (A = 30.83 acres, $Q_{100} = 39.1$ cfs) is captured on the western boundary by a detention pond formally known as “Future Offsite Pond 1”, from this point on “Future Offsite Pond 1” will be known as “Offsite Pond 1”. Offsite Pond 1 discharges to a 24” storm drain pipe with an allowable discharge of $Q_{100} = 9.25$ cfs for the DMP from Thompson Engineering.

Ex Basin 1, Ex Basin 2, and a portion of Ex Basin 3 are combined to form Basin A (A = 9.20 acres, $Q_{100} = 29.7$ cfs). Within Basin A, $Q_{100} = 0.76$ cfs is conveyed by Mataro Road from lot 30 west to Manresa Drive, $Q_{100} = 14.0$ cfs is conveyed by Manresa Drive from the highpoint located near lot 33 north to the intersection of Manresa Drive and Girona Avenue, $Q_{100} = 7.0$ cfs is conveyed by Tortosa Drive from the highpoint located near lot 50 north to the intersection of Tortosa Drive and Girona Avenue, $Q_{100} = 8.2$ cfs is conveyed by Cambrils Drive from the highpoint located at the intersection of Cambrils Drive and Bellatara Street north to the intersection of Girona Avenue. East of the intersection of Cambrils Drive and Girona Avenue, the flow being conveyed by Girona Avenue is $Q_{100} = 29.7$ cfs, this results in the need for two (2) type A double wing wall inlets, one on each side of Girona Avenue, $Q_{100} = 32.41$ cfs per each inlet. The inlets tie into a 36” storm drain line which discharges to a retention pond, “Pond A” (V = 4.37 Ac-Ft, $Q_{100} = 37.89$ cfs).

A portion of Ex Basin 5 is to form Basin B (A=11.10 acres, $Q_{100} = 35.9$ cfs). Basin B is conveyed by Mataro Road from the highpoint located near lot 28 east to Cambrils Drive with a flowrate of $Q_{100} = 18.4$ cfs. From said intersection, drainage is conveyed by Cambrils Drive south to the low point in Tarragona Road, east of lot 7, at a flowrate of $Q_{100} = 24.8$ cfs. Additionally, $Q_{100} = 11.1$ cfs is conveyed by Tarragona Road from the highpoint located near lot 33 in Manresa Drive east to the low point previously mentioned. At the low point east of Lot 7 will a Type A double wing wall inlet, Inlet 1, to capture the $Q_{100} = 38.47$ cfs that is produced by Basin B. Inlet 1 will be located on the eastern side of the road which will be superelevated to convey the drainage to the inlet. A 12' wide concrete valley gutter will be placed across the road to help convey said drainage. Inlet 1 will discharge to a detention pond, Pond B (V=2.13 Ac-Ft, $Q_{100} = 33.73$ cfs). If the inlet were to clog, the drainage would overtop the curb and spill into Pond B. Pond B has an allowable discharge of $Q_{100} = 3.36$ cfs which will discharge to Pond A5 and is designed to have two feet of freeboard and an emergency spillway as shown on EXHIBIT F.

Basin Offsite 2 is Basin A3 from the master DMP for the Trails Unit 1, 2, and 3 (A = 3.21 acres, $Q_{100} = 11.41$ cfs). A portion of Offsite Basin 2 will be developed with this project as Woodmont Avenue. A pond will be placed just north of the developed Woodmont Avenue, called "Woodmont Pond" (V=1.27 Ac-Ft, $Q_{100} = 28$ cfs). Woodmont Temporary Pond will discharge through a 24" pipe which will ultimately be conveyed to Pond A by a 48" pipe. Woodmont Pond has an allowable discharge of $Q_{100} = 11.41$ cfs per the DMP from Thompson Engineering.

Offsite Basin 3 is a portion of Basin E4 from the master DMP (A=1.43 acres, $Q_{100} = 3.9$ cfs). Offsite Basin 3 will be conveyed down Woodmont Avenue where it will be collected by existing inlets. This basin does not exceed the master DMP flows.

Pond A5, formally known as "Future Pond A5", located east of Woodmont Avenue in Tract OS-2, V=4.61 acres per the master DMP, will be developed as a retention pond in the interim condition. The pond will store drainage from the area to the north of it as well as the discharge from Pond B.

B. ULTIMATE CONDITIONS

The ultimate conditions are the same as the interim conditions except for what is discussed from this point forward. Pond A will be removed and the 48" storm drain pipe that discharges to Pond A will be extended to the Southeast by a 54" storm drain to Pond A5.

Pond A5 will no longer be a retention pond, instead it will be a detention pond as a 24" storm drain pipe will be installed to discharge an allowable flow of $Q_{100} = 15.56$ cfs to "Future Pond A6". As mentioned above, Pond A5 will collect discharge from a 54" from DMP Basin A3, Proposed Basin A and Offsite Pond 1. The Woodmont Pond will also be filled in to allow for Woodmont Avenue to be built. Woodmont Avenue will be designed so that there is a low point located in Basin A3 (Q100 =11.41cfs per the DMP) where inlets can be placed to collect and convey the drainage through the storm drain network which ultimately reaches Pond A5. Offsite Pond 1 will need to be upsized from 1.54 Ac-Ft to 2.44 Ac-Ft to meet the required volume from the master DMP once development to the North is added.

C. FIRST FLUSH REQUIREMENTS

This project is required to meet the first flush requirements of the new City Drainage Ordinance. The first flush requirement will be met via detention volume. Two retentions ponds will be constructed. Pond A ($V_s = 4.37$ Ac-Ft) will convey develop flows from Basin A, and Detention Pond B ($V_s = 2.13$ Ac-Ft) will convey develop flows from Basin B. The required storage is calculated as 0.42 in. times the subdivision acreage times the percent impervious area and is equal to 12628.7 cf (0.29 Ac-Ft). The provided detention volume is $V_{Provided} = 6.50$ Ac-Ft, hence the water quality requirements for this project is fulfilled.

See 'APPENDIX E– First Flush Requirements' for more information.

VII. GRADING PLAN

The grading plan for Catalonia is included in 'EXHIBIT F– Grading Plan' of this report.

VIII. CALCULATIONS

All the calculations to support the narrative are included in the appendices and were computed in accordance to the COA DPM, Chapter 22, Section 2. Microsoft Excel spreadsheets, manning equations and stream were used to analyze the site drainage, storm drain and roadway infrastructure. The design storm used in this analysis is the 100 year – 6hr storm event. The land treatment percentage D was computed using equation from COA DPM table A-5, Chapter 22, Section 2, as a function of the area and number of units. The remaining land treatment percentages was evenly divided between categories B and C. The

runoff coefficient, C, was obtain from COA DPM table A-11, chapter 22, section 2. The average rainfall intensity, i, was taken from COA DPM table A-10, chapter 22, section 2. Once these parameters were known the runoff flows for each sub-basin were computed, as shown in APPENDIX A. Manufactures curvilinear pipe recommendations can be found in APPENDIX I. For HGL analysis Autodesk Civil3D 2020 Analyze Gravity Networks was used which complies with the HEC-22 3rd edition energy grade line calculations. Output files can be found in APPENDIX C.

IX. CONCLUSION

This drainage report is in compliance with the previously approved drainage master plans and drainage reports, and no adverse effects are anticipated to the existing infrastructure. The proposed storm drain infrastructure and drainage management schemes allow for the safe management of storm runoff and preservation of the natural terrain in permanent conditions. The implementation of these concepts would result in the safe passage of the 100-year-6 hr. storm event. With the information presented in this report we are requesting this drainage report to be approved.

APPENDICES

APPENDIX A:
BASIN ANALYSIS AND SUMMARY OF LAND TREATMENTS

Bohannan Huston

EXISTING BASIN SUMMARY

BASIN	AREA	AREA		% LAND TREATMENT				DISCHARGE (CFS)	DISCHARGE (CFS)	VOLUME (AC-FT)	VOLUME (AC-FT)
I.D.	(FT)	(AC)		A	B	C	D	10 yr	100YR	10 yr	100 yr
OFFSITE BASIN 1	1342745	30.83		100.00%	0.00%	0.00%	0.00%	7.7	39.1	0.21	1.13
Ex Basin 1	140918	3.24		100.00%	0.00%	0.00%	0.00%	0.8	4.1	0.02	0.12
Ex Basin 2	138230	3.17		0.00%	0.00%	34.00%	66.00%	7.6	12.2	0.26	0.43
Ex Basin 3	145822	3.35		0.00%	29.00%	29.00%	42.00%	6.2	10.9	0.20	0.37
Ex Basin 4	182996.9	4.20	0	100.00%	0.0%	0.0%	0.0%	1.1	5.33	0.03	0.15
Ex Basin 5	573090	13.16		0.00%	29.00%	29.00%	42.00%	24.5	42.8	0.78	1.43
TOTAL	**2523801.9**	**57.9**						**47.9**	**114.5**	**1.5**	**3.6**

DEVELOPED BASIN SUMMARY

BASIN	AREA	AREA	Lots	% LAND TREATMENT				DISCHARGE (CFS)	DISCHARGE (CFS)	VOLUME (AC-FT)	VOLUME (AC-FT)
I.D.	(ft)	(AC)		A	B	C	D	10 yr	100YR	10 yr	
BASIN A	400914	9.20	39	0.00%	29.6%	29.6%	40.8%	16.9	29.7	0.54	0.99
BASIN B	483543	11.10	39	0.00%	29.6%	29.6%	40.8%	20.4	35.9	0.65	1.20
OFFSITE BASIN 1	1342745	30.83	0	100.00%	0.0%	0.0%	0.0%	7.7	39.1	0.21	1.13
OFFSITE BASIN 2	51247	1.18	0	0.00%	0.0%	10.0%	90.0%	3.2	5.0	0.11	0.18
OFFSITE BASIN 3	62458	1.43	0	0.00%	0.0%	10.0%	90.0%	3.9	6.05	0.14	0.22
OFFSITE BASIN 4	182996.9	4.20	0	100.00%	0.0%	0.0%	0.0%	1.1	5.33	0.03	0.15
TOTAL	**2340907.00**	**53.7**	**78.00**					**52.2**	**115.7**	**1.6**	**3.7**

APPENDIX B:

INLET/STREET HYDRAULICS

Bohannan Huston

ANALYSIS OF AN INLET IN A SUMP CONDITION - **INLET 2 & 3 - Girona Avenue**

INLET TYPE: Single Grate Type "A" with curb opening wings on both sides on inlet.

WEIR: Q=C*L*H^1.5		ORIFICE: Q=C*A*(2*G*H)**0.5	
Wing opening	Grate opeining	Grate opening	Wing opening
C= 3.0	C=3.0	C=0.6	C=0.6
L= 4.0 ft	L(single grate)=[(2.67')+2(1.8')]=6.27	A(single grate)=3.72 sf	A=2.0 sf
Q=3.0(4.0')H**1.5= 12.0H**1.5	Q=3.0(6.27)H^1.5=18.81*H^1.5	Q=2.46*(64.4*H)^0.5	Q=1.2*(64.4*H)^0.5

	WS ELEVATION	HEIGHT ABOVE INLET	Q (CFS) WEIR WING OPENING	Q (CFS) WEIR SINGLE GRATE	Q (CFS) ORIFICE SINGLE GRATE	TOTAL Q (CFS)	**COMMENTS:**
~FL @ INLET	0.00	0.00	0.00	0.00	0.00	0.00	Flow at single "A" inlet w/ two wing openings
	0.10	0.10	0.38	0.59	5.66	1.35	Weir controls on grate analysis
	0.20	0.20	1.07	1.68	8.01	3.83	
	0.30	0.30	1.97	3.09	9.81	7.03	
	0.40	0.40	3.04	4.76	11.33	10.83	
	0.50	0.50	4.24	6.65	12.67	15.14	Q required = 2x100yr = 59.4
	0.60	0.60	5.58	8.74	13.87	19.90	Q provided = 64.82
TOP OF CURB	0.70	0.70	7.03	11.02	14.99	25.07	
	0.80	0.80	8.59	13.46	16.02	30.63	Q(100 yr) = 32.41 cfs is provided at this depth
ROW LIMIT	0.90	0.90	10.25	16.06	16.99	36.55	
	1.00	1.00	12.00	18.81	17.91	41.91	

NOTE: The total runoff intercepted by the inlet at the low point in the road is:

Q(100) = 2*[(runoff of the wing opening) + (the lesser of the weir or orifice amount taken by the double grate)].

THE 100 YR STORM EVENT = 23.79 CFS at the sump condition

Height = Height of water above the center of the opening.

ANALYSIS OF AN INLET IN A SUMP CONDITION - **INLET 1 - Catalonia**

INLET TYPE: Double Grate Type "A" with curb opening wings on both sides on inlet.

WEIR: Q=C*L*H^1.5		ORIFICE: Q=C*A*(2*G*H)**0.5	
Wing opening	Grate opeining	Grate opening	Wing opening
C= 3.0	C=3.0	C=0.6	C=0.6
L= 4.0 ft	L(double grate)=[2(2.67')+2(1.8')]=8.94 ft	A(double grate)=7.14 sf	A=2.0 sf
Q=3.0(4.0')H**1.5= 12.0H**1.5	Q=3.0(8.94)H^1.5=26.82*H^1.5	Q=4.194*(64.4*H)^0.5	Q=1.2*(64.4*H)^0.5

	WS ELEVATION	HEIGHT ABOVE INLET	Q (CFS) WEIR "A" OPENING	Q (CFS) WEIR DOUBLE GRATE	Q (CFS) ORIFICE DOUBLE GRATE	TOTAL Q (CFS)	**COMMENTS:**
~FL @ INLET	0.00	0.00	0.00	0.00	0.00	0.00	Flow at double "A" inlet w/ two wing openings
	0.10	0.10	0.38	0.85	10.87	1.61	Weir controls on grate analysis
	0.20	0.20	1.07	2.40	15.37	4.55	
	0.30	0.30	1.97	4.41	18.83	8.35	
	0.40	0.40	3.04	6.78	21.74	12.86	
	0.50	0.50	4.24	9.48	24.31	17.97	
	0.60	0.60	5.58	12.46	26.63	23.62	
TOP OF CURB	0.70	0.70	7.03	15.71	28.76	29.76	
	0.80	0.80	8.59	19.19	30.75	36.36	Q(100 yr) = 38.47 cfs is provided at this depth
	0.90	0.90	10.25	22.90	32.61	43.39	
ROW LIMIT	1.00	1.00	12.00	26.82	34.38	50.82	

Q required = 100yr = 35.9
Q provided = 38.47

NOTE: The total runoff intercepted by the inlet at the low point in the road is:
Qr(100) = 2*[(runoff of the wing opening) + (the lesser of the weir or orifice amount taken by the double grate)].
Height = Height of water above the center of the opening.

53' ROW - 32' F-F

MANNING'S N = 0.017 SLOPE = 0.020

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.0	0.9	4.0	12.6	0.1	7.0	42.4	0.0
2.0	10.5	0.7	5.0	26.5	0.3	8.0	42.5	0.7
3.0	10.6	0.0	6.0	40.4	0.1	9.0	53.0	0.9

WSEL FT.	DEPTH INC FT.	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID PLUS OBSTRUCTIONS	TOTAL ENERGY (FT)
0.010	0.010	0.002	0.001	0.341	0.349	0.323	0.012
0.020	0.020	0.006	0.004	0.682	0.554	0.646	0.025
0.030	0.030	0.015	0.011	1.023	0.725	0.969	0.038
0.040	0.040	0.026	0.023	1.363	0.879	1.292	0.052
0.050	0.050	0.040	0.041	1.704	1.020	1.615	0.066
0.060	0.060	0.058	0.067	2.045	1.152	1.938	0.081
0.070	0.070	0.079	0.101	2.386	1.276	2.261	0.095
0.080	0.080	0.103	0.144	2.727	1.395	2.584	0.110
0.090	0.090	0.131	0.197	3.068	1.509	2.907	0.125
0.100	0.100	0.162	0.261	3.409	1.619	3.230	0.141
0.110	0.110	0.195	0.337	3.749	1.725	3.553	0.156
0.120	0.120	0.233	0.425	4.090	1.828	3.876	0.172
0.130	0.130	0.274	0.491	4.984	1.789	4.752	0.180
0.140	0.140	0.329	0.561	6.430	1.704	6.181	0.185
0.150	0.150	0.398	0.672	7.876	1.690	7.610	0.194
0.160	0.160	0.481	0.825	9.322	1.714	9.038	0.206
0.170	0.170	0.579	1.019	10.768	1.761	10.467	0.218
0.180	0.180	0.691	1.257	12.214	1.821	11.896	0.232
0.190	0.190	0.817	1.543	13.660	1.890	13.324	0.246
0.200	0.200	0.957	1.880	15.106	1.965	14.753	0.260
0.210	0.210	1.112	2.271	16.552	2.043	16.182	0.275
0.220	0.220	1.281	2.718	17.998	2.123	17.610	0.290
0.230	0.230	1.464	3.227	19.444	2.204	19.039	0.306
0.240	0.240	1.661	3.798	20.890	2.286	20.468	0.321
0.250	0.250	1.873	4.437	22.336	2.369	21.896	0.337
0.260	0.260	2.099	5.145	23.782	2.451	23.325	0.353
0.270	0.270	2.340	5.926	25.228	2.533	24.754	0.370
0.280	0.280	2.594	6.783	26.674	2.615	26.182	0.386
0.290	0.290	2.863	7.719	28.120	2.696	27.611	0.403
0.300	0.300	3.147	8.736	29.566	2.776	29.040	0.420
0.310	0.310	3.444	9.837	31.012	2.856	30.468	0.437
0.320	0.320	3.756	11.026	32.458	2.936	31.897	0.454
0.330	0.330	4.075	12.625	32.478	3.098	31.900	0.479
0.340	0.340	4.394	14.309	32.498	3.257	31.903	0.505
0.350	0.350	4.713	16.076	32.519	3.411	31.906	0.531
0.360	0.360	5.032	17.923	32.539	3.562	31.909	0.557
0.370	0.370	5.351	19.849	32.559	3.709	31.912	0.584
0.380	0.380	5.670	21.851	32.579	3.854	31.915	0.611
0.390	0.390	5.990	23.930	32.599	3.995	31.918	0.638
0.400	0.400	6.309	26.082	32.620	4.134	31.921	0.666

Intersection Girona Ave Manresa Drive (West) - Q=14.0 cfs
E=0.50'<0.87'
D=0.34'

0.410	0.410	6.628	28.307	32.640	4.271	31.924	0.694
0.420	0.420	6.947	30.603	32.660	4.405	31.927	0.722
0.430	0.430	7.267	32.969	32.680	4.537	31.930	0.750
0.440	0.440	7.586	35.404	32.701	4.667	31.933	0.779
0.450	0.450	7.905	37.907	32.721	4.795	31.936	0.808
0.460	0.460	8.225	40.477	32.741	4.922	31.939	0.837
0.470	0.470	8.544	43.113	32.761	5.046	31.942	0.866
0.480	0.480	8.863	45.814	32.781	5.169	31.945	0.896
0.490	0.490	9.183	48.579	32.802	5.290	31.948	0.925

WSEL FT.	DEPTH INC	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID PLUS OBSTRUCTIONS	TOTAL ENERGY (FT)
0.500	0.500	9.502	51.408	32.822	5.410	31.952	0.955
0.510	0.510	9.822	54.299	32.842	5.528	31.955	0.985
0.520	0.520	10.141	57.251	32.862	5.645	31.958	1.016
0.530	0.530	10.461	60.265	32.883	5.761	31.961	1.046
0.540	0.540	10.781	63.339	32.903	5.875	31.964	1.077
0.550	0.550	11.100	66.473	32.923	5.988	31.967	1.108
0.560	0.560	11.420	69.665	32.943	6.100	31.970	1.139
0.570	0.570	11.740	72.916	32.964	6.211	31.973	1.170
0.580	0.580	12.059	76.225	32.984	6.321	31.976	1.201
0.590	0.590	12.379	79.591	33.004	6.429	31.979	1.233
0.600	0.600	12.699	83.013	33.024	6.537	31.982	1.265
0.610	0.610	13.019	86.492	33.044	6.644	31.985	1.297
0.620	0.620	13.339	90.026	33.065	6.749	31.988	1.329
0.630	0.630	13.659	93.615	33.085	6.854	31.991	1.361
0.640	0.640	13.979	97.258	33.105	6.958	31.994	1.393
0.650	0.650	14.299	100.955	33.125	7.061	31.997	1.425
0.660	0.660	14.619	104.706	33.146	7.163	32.000	1.458
0.670	0.670	14.944	106.483	34.146	7.126	33.000	1.460
0.680	0.680	15.279	108.385	35.146	7.094	34.000	1.463
0.690	0.690	15.624	110.410	36.146	7.067	35.000	1.467
0.700	0.700	15.979	112.556	37.146	7.044	36.000	1.472
0.710	0.710	16.344	114.821	38.147	7.026	37.000	1.478
0.720	0.720	16.719	117.206	39.147	7.011	38.000	1.484
0.730	0.730	17.104	119.708	40.147	6.999	39.000	1.492
0.740	0.740	17.499	122.328	41.147	6.991	40.000	1.500
0.750	0.750	17.904	125.065	42.147	6.985	41.000	1.509
0.760	0.760	18.319	127.918	43.148	6.983	42.000	1.518
0.770	0.770	18.744	130.887	44.148	6.983	43.000	1.528
0.780	0.780	19.179	133.973	45.148	6.986	44.000	1.539
0.790	0.790	19.624	137.175	46.148	6.990	45.000	1.550
0.800	0.800	20.079	140.494	47.148	6.997	46.000	1.562
0.810	0.810	20.544	143.931	48.149	7.006	47.000	1.573
0.820	0.820	21.019	147.484	49.149	7.017	48.000	1.586
0.830	0.830	21.504	151.156	50.149	7.029	49.000	1.599
0.840	0.840	21.999	154.946	51.149	7.043	50.000	1.612
0.850	0.850	22.504	158.855	52.149	7.059	51.000	1.625
0.860	0.860	23.019	162.885	53.150	7.076	52.000	1.639

53' ROW 32' F-F

MANNING'S N = 0.017 SLOPE = 0.030

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.0	0.9	4.0	12.6	0.1	7.0	42.4	0.0
2.0	10.5	0.7	5.0	26.5	0.3	8.0	42.5	0.7
3.0	10.6	0.0	6.0	40.4	0.1	9.0	53.0	0.9

WSEL INC FT.	DEPTH AREA SQ.FT.	FLOW RATE (CFS)	FLOW PER (FT)	WETTED VEL (FPS)	FLOW PLUS OBSTRUCTIONS	TOPWID WATER	TOPWID TOTAL (FT)	FROUDE NO. ENERGY
0.010	0.010	0.002	0.001	0.329	0.427	0.311	0.311	0.013	1.063
0.020	0.020	0.006	0.004	0.657	0.677	0.621	0.621	0.027	1.194
0.030	0.030	0.014	0.012	0.986	0.887	0.932	0.932	0.042	1.277
0.040	0.040	0.025	0.027	1.314	1.075	1.243	1.243	0.058	1.340
0.050	0.050	0.039	0.048	1.643	1.247	1.554	1.554	0.074	1.391
0.060	0.060	0.056	0.079	1.971	1.408	1.864	1.864	0.091	1.433
0.070	0.070	0.076	0.119	2.300	1.561	2.175	2.175	0.108	1.471
0.080	0.080	0.099	0.170	2.629	1.706	2.486	2.486	0.125	1.504
0.090	0.090	0.126	0.232	2.957	1.845	2.797	2.797	0.143	1.534
0.100	0.100	0.155	0.308	3.286	1.980	3.107	3.107	0.161	1.561
0.110	0.110	0.188	0.397	3.614	2.110	3.418	3.418	0.179	1.586
0.120	0.120	0.224	0.500	3.943	2.236	3.729	3.729	0.198	1.609
0.130	0.130	0.263	0.619	4.271	2.358	4.039	4.039	0.216	1.631
0.140	0.140	0.310	0.670	5.755	2.161	5.506	5.506	0.213	1.605
0.150	0.150	0.373	0.781	7.238	2.095	6.972	6.972	0.218	1.598
0.160	0.160	0.450	0.943	8.722	2.097	8.438	8.438	0.228	1.602
0.170	0.170	0.541	1.157	10.205	2.138	9.904	9.904	0.241	1.612
0.180	0.180	0.648	1.426	11.689	2.201	11.370	11.370	0.255	1.625
0.190	0.190	0.769	1.751	13.173	2.278	12.837	12.837	0.271	1.641
0.200	0.200	0.905	2.139	14.656	2.364	14.303	14.303	0.287	1.658
0.210	0.210	1.055	2.591	16.140	2.457	15.769	15.769	0.304	1.674
0.220	0.220	1.220	3.114	17.623	2.552	17.235	17.235	0.321	1.691
0.230	0.230	1.400	3.710	19.107	2.651	18.701	18.701	0.339	1.708
0.240	0.240	1.594	4.383	20.590	2.750	20.167	20.167	0.358	1.725
0.250	0.250	1.803	5.139	22.074	2.850	21.634	21.634	0.376	1.741
0.260	0.260	2.027	5.980	23.557	2.950	23.100	23.100	0.395	1.756
0.270	0.270	2.265	6.910	25.041	3.051	24.566	24.566	0.415	1.771
0.280	0.280	2.518	7.933	26.524	3.151	26.032	26.032	0.434	1.786
0.290	0.290	2.786	9.053	28.008	3.250	27.498	27.498	0.454	1.800
0.300	0.300	3.068	10.274	29.491	3.349	28.965	28.965	0.474	1.814
0.310	0.310	3.365	11.599	30.975	3.447	30.431	30.431	0.495	1.827
0.320	0.320	3.677	13.031	32.458	3.544	31.897	31.897	0.515	1.841
0.330	0.330	3.996	14.963	32.479	3.745	31.900	31.900	0.548	1.866
0.340	0.340	4.315	17.000	32.499	3.940	31.903	31.903	0.581	1.889
0.350	0.350	4.634	19.138	32.519	4.130	31.906	31.906	0.615	1.911
0.360	0.360	4.953	21.376	32.539	4.316	31.909	31.909	0.650	1.931
0.370	0.370	5.272	23.710	32.559	4.498	31.912	31.912	0.685	1.951
0.380	0.380	5.591	26.140	32.580	4.675	31.915	31.915	0.720	1.969
0.390	0.390	5.910	28.662	32.600	4.850	31.918	31.918	0.756	1.987

Intersection Girona Ave
Tortorsa St - Q=21.6 cfs
E=0.37'<0.87'
D=0.25'

WSEL	DEPTH INC	FLOW AREA	FLOW RATE	WETTED PER	FLOW VEL	TOPWID PLUS	TOPWID WATER	TOTAL ENERGY	FROUDE NO.
FT.		SQ.FT.	(CFS)	(FT)	(FPS)	OBSTRUCTIONS		(FT)	
0.400	0.400	6.229	31.275	32.620	5.021	31.921	31.921	0.792	2.004
0.410	0.410	6.548	33.978	32.640	5.189	31.924	31.924	0.829	2.020
0.420	0.420	6.868	36.768	32.661	5.354	31.927	31.927	0.866	2.035
0.430	0.430	7.187	39.644	32.681	5.516	31.930	31.930	0.903	2.050
0.440	0.440	7.506	42.606	32.701	5.676	31.933	31.933	0.941	2.064
0.450	0.450	7.826	45.651	32.721	5.833	31.936	31.936	0.979	2.078
0.460	0.460	8.145	48.778	32.742	5.989	31.939	31.939	1.018	2.091
0.470	0.470	8.464	51.986	32.762	6.142	31.942	31.942	1.057	2.103
0.480	0.480	8.784	55.274	32.782	6.293	31.945	31.945	1.096	2.116
0.490	0.490	9.103	58.641	32.802	6.442	31.948	31.948	1.135	2.127
0.500	0.500	9.423	62.085	32.822	6.589	31.952	31.952	1.175	2.139
0.510	0.510	9.742	65.607	32.843	6.734	31.955	31.955	1.215	2.150
0.520	0.520	10.062	69.204	32.863	6.878	31.958	31.958	1.256	2.161
0.530	0.530	10.382	72.876	32.883	7.020	31.961	31.961	1.296	2.171
0.540	0.540	10.701	76.623	32.903	7.160	31.964	31.964	1.337	2.182
0.550	0.550	11.021	80.442	32.924	7.299	31.967	31.967	1.379	2.192
0.560	0.560	11.341	84.334	32.944	7.437	31.970	31.970	1.420	2.201
0.570	0.570	11.660	88.298	32.964	7.573	31.973	31.973	1.462	2.211
0.580	0.580	11.980	92.332	32.984	7.707	31.976	31.976	1.504	2.220
0.590	0.590	12.300	96.437	33.005	7.841	31.979	31.979	1.546	2.229
0.600	0.600	12.620	100.611	33.025	7.973	31.982	31.982	1.589	2.238
0.610	0.610	12.939	104.853	33.045	8.103	31.985	31.985	1.631	2.246
0.620	0.620	13.259	109.164	33.065	8.233	31.988	31.988	1.674	2.254
0.630	0.630	13.579	113.543	33.085	8.362	31.991	31.991	1.717	2.263
0.640	0.640	13.899	117.988	33.106	8.489	31.994	31.994	1.761	2.271
0.650	0.650	14.219	122.500	33.126	8.615	31.997	31.997	1.804	2.278
0.660	0.660	14.539	127.077	33.146	8.740	32.000	32.000	1.848	2.286
0.670	0.670	14.864	129.259	34.146	8.696	33.000	33.000	1.846	2.284
0.680	0.680	15.199	131.593	35.147	8.658	34.000	34.000	1.846	2.283
0.690	0.690	15.544	134.078	36.147	8.626	35.000	35.000	1.847	2.282
0.700	0.700	15.899	136.709	37.147	8.599	36.000	36.000	1.850	2.281
0.710	0.710	16.264	139.487	38.147	8.576	37.000	37.000	1.854	2.281
0.720	0.720	16.639	142.410	39.147	8.559	38.000	38.000	1.859	2.280
0.730	0.730	17.024	145.477	40.148	8.545	39.000	39.000	1.866	2.280
0.740	0.740	17.419	148.687	41.148	8.536	40.000	40.000	1.873	2.280
0.750	0.750	17.824	152.039	42.148	8.530	41.000	41.000	1.882	2.281
0.760	0.760	18.239	155.534	43.148	8.528	42.000	42.000	1.891	2.281
0.770	0.770	18.664	159.170	44.148	8.528	43.000	43.000	1.901	2.282
0.780	0.780	19.099	162.949	45.149	8.532	44.000	44.000	1.912	2.283
0.790	0.790	19.544	166.871	46.149	8.538	45.000	45.000	1.924	2.284
0.800	0.800	19.999	170.935	47.149	8.547	46.000	46.000	1.936	2.285
0.810	0.810	20.464	175.142	48.149	8.559	47.000	47.000	1.949	2.287
0.820	0.820	20.939	179.492	49.149	8.572	48.000	48.000	1.963	2.288
0.830	0.830	21.424	183.987	50.150	8.588	49.000	49.000	1.977	2.290
0.840	0.840	21.919	188.627	51.150	8.606	50.000	50.000	1.992	2.291
0.850	0.850	22.424	193.412	52.150	8.625	51.000	51.000	2.007	2.293
0.860	0.860	22.939	198.344	53.150	8.647	52.000	52.000	2.023	2.295

53' ROW 32' F-F

MANNING'S N = 0.017 SLOPE = 0.030

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.0	0.9	4.0	12.6	0.1	7.0	42.4	0.0
2.0	10.5	0.7	5.0	26.5	0.3	8.0	42.5	0.7
3.0	10.6	0.0	6.0	40.4	0.1	9.0	53.0	0.9

WSEL INC	DEPTH	FLOW AREA	FLOW RATE	WETTED PER	FLOW VEL	TOPWID PLUS	TOPWID WATER	TOTAL ENERGY	FROUDE NO.
FT.		SQ.FT.	(CFS)	(FT)	(FPS)	OBSTRUCTIONS		(FT)	
0.010	0.010	0.002	0.001	0.329	0.427	0.311	0.311	0.013	1.063
0.020	0.020	0.006	0.004	0.657	0.677	0.621	0.621	0.027	1.194
0.030	0.030	0.014	0.012	0.986	0.887	0.932	0.932	0.042	1.277
0.040	0.040	0.025	0.027	1.314	1.075	1.243	1.243	0.058	1.340
0.050	0.050	0.039	0.048	1.643	1.247	1.554	1.554	0.074	1.391
0.060	0.060	0.056	0.079	1.971	1.408	1.864	1.864	0.091	1.433
0.070	0.070	0.076	0.119	2.300	1.561	2.175	2.175	0.108	1.471
0.080	0.080	0.099	0.170	2.629	1.706	2.486	2.486	0.125	1.504
0.090	0.090	0.126	0.232	2.957	1.845	2.797	2.797	0.143	1.534
0.100	0.100	0.155	0.308	3.286	1.980	3.107	3.107	0.161	1.561
0.110	0.110	0.188	0.397	3.614	2.110	3.418	3.418	0.179	1.586
0.120	0.120	0.224	0.500	3.943	2.236	3.729	3.729	0.198	1.609
0.130	0.130	0.263	0.619	4.271	2.358	4.039	4.039	0.216	1.631
0.140	0.140	0.310	0.670	5.755	2.161	5.506	5.506	0.213	1.605
0.150	0.150	0.373	0.781	7.238	2.095	6.972	6.972	0.218	1.598
0.160	0.160	0.450	0.943	8.722	2.097	8.438	8.438	0.228	1.602
0.170	0.170	0.541	1.157	10.205	2.138	9.904	9.904	0.241	1.612
0.180	0.180	0.648	1.426	11.689	2.201	11.370	11.370	0.255	1.625
0.190	0.190	0.769	1.751	13.173	2.278	12.837	12.837	0.271	1.641
0.200	0.200	0.905	2.139	14.656	2.364	14.303	14.303	0.287	1.658
0.210	0.210	1.055	2.591	16.140	2.457	15.769	15.769	0.304	1.674
0.220	0.220	1.220	3.114	17.623	2.552	17.235	17.235	0.321	1.691
0.230	0.230	1.400	3.710	19.107	2.651	18.701	18.701	0.339	1.708
0.240	0.240	1.594	4.383	20.590	2.750	20.167	20.167	0.358	1.725
0.250	0.250	1.803	5.139	22.074	2.850	21.634	21.634	0.376	1.741
0.260	0.260	2.027	5.980	23.557	2.950	23.100	23.100	0.395	1.756
0.270	0.270	2.265	6.910	25.041	3.051	24.566	24.566	0.415	1.771
0.280	0.280	2.518	7.933	26.524	3.151	26.032	26.032	0.434	1.786
0.290	0.290	2.786	9.053	28.008	3.250	27.498	27.498	0.454	1.800
0.300	0.300	3.068	10.274	29.491	3.349	28.965	28.965	0.474	1.814
0.310	0.310	3.365	11.599	30.975	3.447	30.431	30.431	0.495	1.827
0.320	0.320	3.677	13.031	32.458	3.544	31.897	31.897	0.515	1.841
0.330	0.330	3.996	14.963	32.479	3.745	31.900	31.900	0.548	1.866
0.340	0.340	4.315	17.000	32.499	3.940	31.903	31.903	0.581	1.889
0.350	0.350	4.634	19.138	32.519	4.130	31.906	31.906	0.615	1.911
0.360	0.360	4.953	21.376	32.539	4.316	31.909	31.909	0.650	1.931
0.370	0.370	5.272	23.710	32.559	4.498	31.912	31.912	0.685	1.951
0.380	0.380	5.591	26.140	32.580	4.675	31.915	31.915	0.720	1.969
0.390	0.390	5.910	28.662	32.600	4.850	31.918	31.918	0.756	1.987

Intersection Girona Ave Cambrils Drive - Q=29.7 cfs

E=0.48'<0.87'
D=0.31'

WSEL	DEPTH INC	FLOW AREA	FLOW RATE	WETTED PER	FLOW VEL	TOPWID PLUS	TOPWID WATER	TOTAL ENERGY	FROUDE NO.
FT.		SQ.FT.	(CFS)	(FT)	(FPS)	OBSTRUCTIONS		(FT)	
0.400	0.400	6.229	31.275	32.620	5.021	31.921	31.921	0.792	2.004
0.410	0.410	6.548	33.978	32.640	5.189	31.924	31.924	0.829	2.020
0.420	0.420	6.868	36.768	32.661	5.354	31.927	31.927	0.866	2.035
0.430	0.430	7.187	39.644	32.681	5.516	31.930	31.930	0.903	2.050
0.440	0.440	7.506	42.606	32.701	5.676	31.933	31.933	0.941	2.064
0.450	0.450	7.826	45.651	32.721	5.833	31.936	31.936	0.979	2.078
0.460	0.460	8.145	48.778	32.742	5.989	31.939	31.939	1.018	2.091
0.470	0.470	8.464	51.986	32.762	6.142	31.942	31.942	1.057	2.103
0.480	0.480	8.784	55.274	32.782	6.293	31.945	31.945	1.096	2.116
0.490	0.490	9.103	58.641	32.802	6.442	31.948	31.948	1.135	2.127
0.500	0.500	9.423	62.085	32.822	6.589	31.952	31.952	1.175	2.139
0.510	0.510	9.742	65.607	32.843	6.734	31.955	31.955	1.215	2.150
0.520	0.520	10.062	69.204	32.863	6.878	31.958	31.958	1.256	2.161
0.530	0.530	10.382	72.876	32.883	7.020	31.961	31.961	1.296	2.171
0.540	0.540	10.701	76.623	32.903	7.160	31.964	31.964	1.337	2.182
0.550	0.550	11.021	80.442	32.924	7.299	31.967	31.967	1.379	2.192
0.560	0.560	11.341	84.334	32.944	7.437	31.970	31.970	1.420	2.201
0.570	0.570	11.660	88.298	32.964	7.573	31.973	31.973	1.462	2.211
0.580	0.580	11.980	92.332	32.984	7.707	31.976	31.976	1.504	2.220
0.590	0.590	12.300	96.437	33.005	7.841	31.979	31.979	1.546	2.229
0.600	0.600	12.620	100.611	33.025	7.973	31.982	31.982	1.589	2.238
0.610	0.610	12.939	104.853	33.045	8.103	31.985	31.985	1.631	2.246
0.620	0.620	13.259	109.164	33.065	8.233	31.988	31.988	1.674	2.254
0.630	0.630	13.579	113.543	33.085	8.362	31.991	31.991	1.717	2.263
0.640	0.640	13.899	117.988	33.106	8.489	31.994	31.994	1.761	2.271
0.650	0.650	14.219	122.500	33.126	8.615	31.997	31.997	1.804	2.278
0.660	0.660	14.539	127.077	33.146	8.740	32.000	32.000	1.848	2.286
0.670	0.670	14.864	129.259	34.146	8.696	33.000	33.000	1.846	2.284
0.680	0.680	15.199	131.593	35.147	8.658	34.000	34.000	1.846	2.283
0.690	0.690	15.544	134.078	36.147	8.626	35.000	35.000	1.847	2.282
0.700	0.700	15.899	136.709	37.147	8.599	36.000	36.000	1.850	2.281
0.710	0.710	16.264	139.487	38.147	8.576	37.000	37.000	1.854	2.281
0.720	0.720	16.639	142.410	39.147	8.559	38.000	38.000	1.859	2.280
0.730	0.730	17.024	145.477	40.148	8.545	39.000	39.000	1.866	2.280
0.740	0.740	17.419	148.687	41.148	8.536	40.000	40.000	1.873	2.280
0.750	0.750	17.824	152.039	42.148	8.530	41.000	41.000	1.882	2.281
0.760	0.760	18.239	155.534	43.148	8.528	42.000	42.000	1.891	2.281
0.770	0.770	18.664	159.170	44.148	8.528	43.000	43.000	1.901	2.282
0.780	0.780	19.099	162.949	45.149	8.532	44.000	44.000	1.912	2.283
0.790	0.790	19.544	166.871	46.149	8.538	45.000	45.000	1.924	2.284
0.800	0.800	19.999	170.935	47.149	8.547	46.000	46.000	1.936	2.285
0.810	0.810	20.464	175.142	48.149	8.559	47.000	47.000	1.949	2.287
0.820	0.820	20.939	179.492	49.149	8.572	48.000	48.000	1.963	2.288
0.830	0.830	21.424	183.987	50.150	8.588	49.000	49.000	1.977	2.290
0.840	0.840	21.919	188.627	51.150	8.606	50.000	50.000	1.992	2.291
0.850	0.850	22.424	193.412	52.150	8.625	51.000	51.000	2.007	2.293
0.860	0.860	22.939	198.344	53.150	8.647	52.000	52.000	2.023	2.295

47' ROW - 28' F-F

MANNING'S N = 0.017 SLOPE = 0.045

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.0	0.9	4.0	11.6	0.1	7.0	37.5	0.0
2.0	9.5	0.7	5.0	23.5	0.3	8.0	37.6	0.7
3.0	9.6	0.0	6.0	35.5	0.1	9.0	47.0	0.9

WSEL FT.	DEPTH INC FT.	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID PLUS OBSTRUCTIONS	TOTAL ENERGY (FT)
0.010	0.010	0.002	0.001	0.341	0.523	0.323	0.014
0.020	0.020	0.006	0.005	0.682	0.830	0.646	0.031
0.030	0.030	0.015	0.016	1.023	1.088	0.969	0.048
0.040	0.040	0.026	0.034	1.363	1.318	1.292	0.067
0.050	0.050	0.040	0.062	1.704	1.530	1.615	0.086
0.060	0.060	0.058	0.100	2.045	1.727	1.938	0.106
0.070	0.070	0.079	0.152	2.386	1.914	2.261	0.127
0.080	0.080	0.103	0.216	2.727	2.093	2.584	0.148
0.090	0.090	0.131	0.296	3.068	2.263	2.907	0.170
0.100	0.100	0.162	0.392	3.409	2.428	3.230	0.192
0.110	0.110	0.195	0.506	3.749	2.587	3.553	0.214
0.120	0.120	0.233	0.638	4.090	2.742	3.876	0.237
0.130	0.130	0.274	0.731	5.042	2.664	4.810	0.240
0.140	0.140	0.330	0.831	6.604	2.517	6.355	0.239
0.150	0.150	0.402	1.000	8.166	2.489	7.900	0.246
0.160	0.160	0.488	1.232	9.729	2.523	9.445	0.259
0.170	0.170	0.590	1.531	11.291	2.593	10.990	0.275
0.180	0.180	0.708	1.901	12.853	2.685	12.535	0.292
0.190	0.190	0.841	2.347	14.416	2.790	14.080	0.311
0.200	0.200	0.990	2.873	15.978	2.903	15.625	0.331
0.210	0.210	1.154	3.486	17.540	3.021	17.170	0.352
0.220	0.220	1.333	4.190	19.102	3.143	18.715	0.374
0.230	0.230	1.528	4.992	20.665	3.267	20.260	0.396
0.240	0.240	1.738	5.895	22.227	3.391	21.805	0.419
0.250	0.250	1.964	6.906	23.789	3.516	23.350	0.442
0.260	0.260	2.205	8.028	25.352	3.640	24.895	0.466
0.270	0.270	2.462	9.268	26.914	3.765	26.440	0.490
0.280	0.280	2.734	10.630	28.476	3.888	27.985	0.515
0.290	0.290	3.014	12.499	28.496	4.147	27.988	0.558
0.300	0.300	3.294	14.486	28.517	4.398	27.991	0.601
0.310	0.310	3.574	16.588	28.537	4.642	27.994	0.645
0.320	0.320	3.854	18.801	28.557	4.879	27.997	0.690
0.330	0.330	4.134	21.122	28.577	5.110	28.000	0.736
0.340	0.340	4.414	23.549	28.598	5.335	28.003	0.783
0.350	0.350	4.694	26.079	28.618	5.556	28.006	0.830
0.360	0.360	4.974	28.710	28.638	5.772	28.009	0.878
0.370	0.370	5.254	31.441	28.658	5.984	28.012	0.927
0.380	0.380	5.534	34.268	28.678	6.192	28.015	0.976
0.390	0.390	5.814	37.190	28.699	6.396	28.018	1.026
0.400	0.400	6.094	40.206	28.719	6.597	28.021	1.077

IN 1 Upstream (South)
on Tarragona St
Q=11.04 cfs
E=0.26'<0.87'
D=0.16'

Intersection Mataro Rd
Cambrils Drive -
Q=22.08 cfs
E=0.40'<0.87'
D=0.23'

IN 1 Upstream (North)
on Tarragona St
Q=24.86 cfs
E=0.45'<0.87'
D=0.26'

0.410	0.410	6.375	43.314	28.739	6.795	28.024	1.128
0.420	0.420	6.655	46.512	28.759	6.989	28.027	1.180
0.430	0.430	6.935	49.799	28.780	7.181	28.030	1.232
0.440	0.440	7.216	53.174	28.800	7.369	28.033	1.285
0.450	0.450	7.496	56.635	28.820	7.555	28.036	1.338
0.460	0.460	7.776	60.182	28.840	7.739	28.039	1.392
0.470	0.470	8.057	63.812	28.861	7.920	28.042	1.446
0.480	0.480	8.337	67.525	28.881	8.099	28.045	1.500
0.490	0.490	8.618	71.320	28.901	8.276	28.048	1.555

WSEL	DEPTH INC	FLOW AREA	FLOW RATE	WETTED PER	FLOW VEL	TOPWID PLUS	TOTAL ENERGY
FT.		SQ.FT.	(CFS)	(FT)	(FPS)	OBSTRUCTIONS	(FT)
0.500	0.500	8.898	75.196	28.921	8.451	28.052	1.611
0.510	0.510	9.179	79.152	28.941	8.623	28.055	1.667
0.520	0.520	9.459	83.186	28.962	8.794	28.058	1.723
0.530	0.530	9.740	87.299	28.982	8.963	28.061	1.780
0.540	0.540	10.020	91.489	29.002	9.130	28.064	1.837
0.550	0.550	10.301	95.754	29.022	9.296	28.067	1.894
0.560	0.560	10.582	100.096	29.043	9.459	28.070	1.952
0.570	0.570	10.862	104.512	29.063	9.621	28.073	2.010
0.580	0.580	11.143	109.002	29.083	9.782	28.076	2.068
0.590	0.590	11.424	113.565	29.103	9.941	28.079	2.127
0.600	0.600	11.705	118.201	29.124	10.098	28.082	2.186
0.610	0.610	11.986	122.908	29.144	10.255	28.085	2.246
0.620	0.620	12.266	127.687	29.164	10.409	28.088	2.305
0.630	0.630	12.547	132.536	29.184	10.563	28.091	2.365
0.640	0.640	12.828	137.455	29.204	10.715	28.094	2.426
0.650	0.650	13.109	142.443	29.225	10.866	28.097	2.486
0.660	0.660	13.390	147.500	29.245	11.015	28.100	2.547
0.670	0.670	13.676	149.417	30.240	10.925	29.095	2.527
0.680	0.680	13.972	151.538	31.235	10.846	30.089	2.510
0.690	0.690	14.278	153.857	32.230	10.776	31.084	2.496
0.700	0.700	14.594	156.369	33.225	10.715	32.079	2.486
0.710	0.710	14.920	159.070	34.220	10.662	33.074	2.478
0.720	0.720	15.255	161.956	35.215	10.616	34.068	2.473
0.730	0.730	15.601	165.024	36.209	10.578	35.063	2.470
0.740	0.740	15.957	168.272	37.204	10.546	36.058	2.470
0.750	0.750	16.322	171.699	38.199	10.519	37.053	2.471
0.760	0.760	16.698	175.301	39.194	10.499	38.047	2.474
0.770	0.770	17.083	179.080	40.189	10.483	39.042	2.479
0.780	0.780	17.478	183.032	41.184	10.472	40.037	2.486
0.790	0.790	17.884	187.159	42.179	10.465	41.032	2.494
0.800	0.800	18.299	191.460	43.174	10.463	42.026	2.503
0.810	0.810	18.724	195.933	44.169	10.464	43.021	2.513
0.820	0.820	19.160	200.581	45.164	10.469	44.016	2.525
0.830	0.830	19.605	205.402	46.159	10.477	45.011	2.537
0.840	0.840	20.060	210.397	47.154	10.489	46.005	2.551

MANNING'S N = 0.017 SLOPE = 0.015

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.0	0.9	4.0	11.6	0.1	7.0	37.5	0.0
2.0	9.5	0.7	5.0	23.5	0.3	8.0	37.6	0.7
3.0	9.6	0.0	6.0	35.5	0.1	9.0	47.0	0.9

WSEL FT.	DEPTH INC	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID PLUS OBSTRUCTIONS	TOTAL ENERGY (FT)
0.010	0.010	0.002	0.000	0.341	0.302	0.323	0.011
0.020	0.020	0.006	0.003	0.682	0.479	0.646	0.024
0.030	0.030	0.015	0.009	1.023	0.628	0.969	0.036
0.040	0.040	0.026	0.020	1.363	0.761	1.292	0.049
0.050	0.050	0.040	0.036	1.704	0.883	1.615	0.062
0.060	0.060	0.058	0.058	2.045	0.997	1.938	0.075
0.070	0.070	0.079	0.087	2.386	1.105	2.261	0.089
0.080	0.080	0.103	0.125	2.727	1.208	2.584	0.103
0.090	0.090	0.131	0.171	3.068	1.307	2.907	0.117
0.100	0.100	0.162	0.226	3.409	1.402	3.230	0.131
0.110	0.110	0.195	0.292	3.749	1.494	3.553	0.145
0.120	0.120	0.233	0.368	4.090	1.583	3.876	0.159
0.130	0.130	0.274	0.422	5.042	1.538	4.810	0.167
0.140	0.140	0.330	0.480	6.604	1.453	6.355	0.173
0.150	0.150	0.402	0.577	8.166	1.437	7.900	0.182
0.160	0.160	0.488	0.711	9.729	1.457	9.445	0.193
0.170	0.170	0.590	0.884	11.291	1.497	10.990	0.205
0.180	0.180	0.708	1.098	12.853	1.550	12.535	0.217
0.190	0.190	0.841	1.355	14.416	1.611	14.080	0.230
0.200	0.200	0.990	1.659	15.978	1.676	15.625	0.244
0.210	0.210	1.154	2.013	17.540	1.744	17.170	0.257
0.220	0.220	1.333	2.419	19.102	1.815	18.715	0.271
0.230	0.230	1.528	2.882	20.665	1.886	20.260	0.285
0.240	0.240	1.738	3.403	22.227	1.958	21.805	0.300
0.250	0.250	1.964	3.987	23.789	2.030	23.350	0.314
0.260	0.260	2.205	4.635	25.352	2.102	24.895	0.329
0.270	0.270	2.462	5.351	26.914	2.173	26.440	0.343
0.280	0.280	2.734	6.138	28.476	2.245	27.985	0.358
0.290	0.290	3.014	7.216	28.496	2.394	27.988	0.379
0.300	0.300	3.294	8.364	28.517	2.539	27.991	0.400
0.310	0.310	3.574	9.577	28.537	2.680	27.994	0.422
0.320	0.320	3.854	10.855	28.557	2.817	27.997	0.443
0.330	0.330	4.134	12.195	28.577	2.950	28.000	0.465
0.340	0.340	4.414	13.596	28.598	3.080	28.003	0.488
0.350	0.350	4.694	15.057	28.618	3.208	28.006	0.510
0.360	0.360	4.974	16.576	28.638	3.333	28.009	0.533
0.370	0.370	5.254	18.152	28.658	3.455	28.012	0.556
0.380	0.380	5.534	19.785	28.678	3.575	28.015	0.579
0.390	0.390	5.814	21.472	28.699	3.693	28.018	0.602
0.400	0.400	6.094	23.213	28.719	3.809	28.021	0.626

Intersection of Manresa Dr. and Mataro Rd
Q=0.3.1 CFS
D=0.234' which is less than the delta from the HP in Mataro to the flowline in Manresa (0.85')

WSEL	DEPTH	FLOW	FLOW	WETTED	FLOW	TOPWID	TOTAL
	INC	AREA	RATE	PER	VEL	PLUS	ENERGY
FT.		SQ.FT.	(CFS)	(FT)	(FPS)	OBSTRUCTIONS	(FT)
0.410	0.410	6.375	25.007	28.739	3.923	28.024	0.649
0.420	0.420	6.655	26.854	28.759	4.035	28.027	0.673
0.430	0.430	6.935	28.752	28.780	4.146	28.030	0.697
0.440	0.440	7.216	30.700	28.800	4.255	28.033	0.722
0.450	0.450	7.496	32.699	28.820	4.362	28.036	0.746
0.460	0.460	7.776	34.746	28.840	4.468	28.039	0.771
0.470	0.470	8.057	36.842	28.861	4.573	28.042	0.795
0.480	0.480	8.337	38.986	28.881	4.676	28.045	0.820
0.490	0.490	8.618	41.177	28.901	4.778	28.048	0.845
0.500	0.500	8.898	43.415	28.921	4.879	28.052	0.870
0.510	0.510	9.179	45.698	28.941	4.979	28.055	0.896
0.520	0.520	9.459	48.028	28.962	5.077	28.058	0.921
0.530	0.530	9.740	50.402	28.982	5.175	28.061	0.947
0.540	0.540	10.020	52.821	29.002	5.271	28.064	0.972
0.550	0.550	10.301	55.284	29.022	5.367	28.067	0.998
0.560	0.560	10.582	57.790	29.043	5.461	28.070	1.024
0.570	0.570	10.862	60.340	29.063	5.555	28.073	1.050
0.580	0.580	11.143	62.932	29.083	5.648	28.076	1.076
0.590	0.590	11.424	65.567	29.103	5.739	28.079	1.102
0.600	0.600	11.705	68.243	29.124	5.830	28.082	1.129
0.610	0.610	11.986	70.961	29.144	5.921	28.085	1.155
0.620	0.620	12.266	73.720	29.164	6.010	28.088	1.182
0.630	0.630	12.547	76.520	29.184	6.098	28.091	1.208
0.640	0.640	12.828	79.359	29.204	6.186	28.094	1.235
0.650	0.650	13.109	82.239	29.225	6.273	28.097	1.262
0.660	0.660	13.390	85.159	29.245	6.360	28.100	1.289
0.670	0.670	13.676	86.266	30.240	6.308	29.095	1.289
0.680	0.680	13.972	87.491	31.235	6.262	30.089	1.290
0.690	0.690	14.278	88.830	32.230	6.221	31.084	1.292
0.700	0.700	14.594	90.280	33.225	6.186	32.079	1.295
0.710	0.710	14.920	91.839	34.220	6.156	33.074	1.299
0.720	0.720	15.255	93.505	35.215	6.129	34.068	1.304
0.730	0.730	15.601	95.277	36.209	6.107	35.063	1.310
0.740	0.740	15.957	97.152	37.204	6.089	36.058	1.317
0.750	0.750	16.322	99.130	38.199	6.073	37.053	1.324
0.760	0.760	16.698	101.210	39.194	6.061	38.047	1.331
0.770	0.770	17.083	103.392	40.189	6.052	39.042	1.340
0.780	0.780	17.478	105.674	41.184	6.046	40.037	1.349
0.790	0.790	17.884	108.056	42.179	6.042	41.032	1.358
0.800	0.800	18.299	110.539	43.174	6.041	42.026	1.368
0.810	0.810	18.724	113.122	44.169	6.041	43.021	1.378
0.820	0.820	19.160	115.805	45.164	6.044	44.016	1.388
0.830	0.830	19.605	118.589	46.159	6.049	45.011	1.399
0.840	0.840	20.060	121.473	47.154	6.056	46.005	1.410

MANNING'S N = 0.017 SLOPE = 0.030

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.0	0.9	4.0	11.6	0.1	7.0	37.5	0.0
2.0	9.5	0.7	5.0	23.5	0.3	8.0	37.6	0.7
3.0	9.6	0.0	6.0	35.5	0.1	9.0	47.0	0.9

WSEL FT.	DEPTH INC FT.	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID PLUS OBSTRUCTIONS	TOTAL ENERGY (FT)
0.010	0.010	0.002	0.001	0.341	0.427	0.323	0.013
0.020	0.020	0.006	0.004	0.682	0.678	0.646	0.027
0.030	0.030	0.015	0.013	1.023	0.888	0.969	0.042
0.040	0.040	0.026	0.028	1.363	1.076	1.292	0.058
0.050	0.050	0.040	0.050	1.704	1.249	1.615	0.074
0.060	0.060	0.058	0.082	2.045	1.410	1.938	0.091
0.070	0.070	0.079	0.124	2.386	1.563	2.261	0.108
0.080	0.080	0.103	0.177	2.727	1.709	2.584	0.125
0.090	0.090	0.131	0.242	3.068	1.848	2.907	0.143
0.100	0.100	0.162	0.320	3.409	1.983	3.230	0.161
0.110	0.110	0.195	0.413	3.749	2.113	3.553	0.179
0.120	0.120	0.233	0.521	4.090	2.239	3.876	0.198
0.130	0.130	0.274	0.597	5.042	2.175	4.810	0.204
0.140	0.140	0.330	0.679	6.604	2.055	6.355	0.206
0.150	0.150	0.402	0.816	8.166	2.032	7.900	0.214
0.160	0.160	0.488	1.006	9.729	2.060	9.445	0.226
0.170	0.170	0.590	1.250	11.291	2.117	10.990	0.240
0.180	0.180	0.708	1.552	12.853	2.192	12.535	0.255
0.190	0.190	0.841	1.916	14.416	2.278	14.080	0.271
0.200	0.200	0.990	2.346	15.978	2.370	15.625	0.287
0.210	0.210	1.154	2.846	17.540	2.467	17.170	0.305
0.220	0.220	1.333	3.421	19.102	2.566	18.715	0.322
0.230	0.230	1.528	4.076	20.665	2.667	20.260	0.341
0.240	0.240	1.738	4.813	22.227	2.769	21.805	0.359
0.250	0.250	1.964	5.638	23.789	2.871	23.350	0.378
0.260	0.260	2.205	6.555	25.352	2.972	24.895	0.397
0.270	0.270	2.462	7.568	26.914	3.074	26.440	0.417
0.280	0.280	2.734	8.680	28.476	3.175	27.985	0.437
0.290	0.290	3.014	10.206	28.496	3.386	27.988	0.468
0.300	0.300	3.294	11.828	28.517	3.591	27.991	0.501
0.310	0.310	3.574	13.544	28.537	3.790	27.994	0.533
0.320	0.320	3.854	15.351	28.557	3.983	27.997	0.567
0.330	0.330	4.134	17.246	28.577	4.172	28.000	0.601
0.340	0.340	4.414	19.228	28.598	4.356	28.003	0.635
0.350	0.350	4.694	21.294	28.618	4.537	28.006	0.670
0.360	0.360	4.974	23.442	28.638	4.713	28.009	0.705
0.370	0.370	5.254	25.671	28.658	4.886	28.012	0.741
0.380	0.380	5.534	27.980	28.678	5.056	28.015	0.778
0.390	0.390	5.814	30.366	28.699	5.223	28.018	0.814
0.400	0.400	6.094	32.828	28.719	5.387	28.021	0.851

Intersection of Bellaterra St. and Cambrils Drive
Q=0.78 CFS
D=0.147' which is less than the delta from the HP in Bellaterra to the flowline in Cambrils (0.19')

0.410	0.410	6.375	35.366	28.739	5.548	28.024	0.889
0.420	0.420	6.655	37.977	28.759	5.707	28.027	0.927
0.430	0.430	6.935	40.661	28.780	5.863	28.030	0.965
0.440	0.440	7.216	43.417	28.800	6.017	28.033	1.003
0.450	0.450	7.496	46.243	28.820	6.169	28.036	1.042
0.460	0.460	7.776	49.138	28.840	6.319	28.039	1.081
0.470	0.470	8.057	52.102	28.861	6.467	28.042	1.120
0.480	0.480	8.337	55.134	28.881	6.613	28.045	1.160
0.490	0.490	8.618	58.233	28.901	6.757	28.048	1.200

WSEL	DEPTH	FLOW	FLOW	WETTED	FLOW	TOPWID	TOTAL
	INC	AREA	RATE	PER	VEL	PLUS	ENERGY
FT.		SQ.FT.	(CFS)	(FT)	(FPS)	OBSTRUCTIONS	(FT)
0.500	0.500	8.898	61.397	28.921	6.900	28.052	1.241
0.510	0.510	9.179	64.627	28.941	7.041	28.055	1.281
0.520	0.520	9.459	67.921	28.962	7.180	28.058	1.322
0.530	0.530	9.740	71.279	28.982	7.318	28.061	1.363
0.540	0.540	10.020	74.700	29.002	7.455	28.064	1.404
0.550	0.550	10.301	78.183	29.022	7.590	28.067	1.446
0.560	0.560	10.582	81.728	29.043	7.723	28.070	1.488
0.570	0.570	10.862	85.334	29.063	7.856	28.073	1.530
0.580	0.580	11.143	89.000	29.083	7.987	28.076	1.572
0.590	0.590	11.424	92.725	29.103	8.117	28.079	1.615
0.600	0.600	11.705	96.510	29.124	8.245	28.082	1.657
0.610	0.610	11.986	100.354	29.144	8.373	28.085	1.700
0.620	0.620	12.266	104.256	29.164	8.499	28.088	1.744
0.630	0.630	12.547	108.215	29.184	8.625	28.091	1.787
0.640	0.640	12.828	112.231	29.204	8.749	28.094	1.831
0.650	0.650	13.109	116.304	29.225	8.872	28.097	1.874
0.660	0.660	13.390	120.433	29.245	8.994	28.100	1.918
0.670	0.670	13.676	121.999	30.240	8.920	29.095	1.908
0.680	0.680	13.972	123.731	31.235	8.856	30.089	1.900
0.690	0.690	14.278	125.624	32.230	8.798	31.084	1.894
0.700	0.700	14.594	127.675	33.225	8.749	32.079	1.890
0.710	0.710	14.920	129.880	34.220	8.705	33.074	1.889
0.720	0.720	15.255	132.236	35.215	8.668	34.068	1.889
0.730	0.730	15.601	134.742	36.209	8.637	35.063	1.890
0.740	0.740	15.957	137.394	37.204	8.610	36.058	1.893
0.750	0.750	16.322	140.191	38.199	8.589	37.053	1.897
0.760	0.760	16.698	143.133	39.194	8.572	38.047	1.903
0.770	0.770	17.083	146.218	40.189	8.559	39.042	1.909
0.780	0.780	17.478	149.445	41.184	8.550	40.037	1.917
0.790	0.790	17.884	152.815	42.179	8.545	41.032	1.926
0.800	0.800	18.299	156.326	43.174	8.543	42.026	1.935
0.810	0.810	18.724	159.979	44.169	8.544	43.021	1.945
0.820	0.820	19.160	163.774	45.164	8.548	44.016	1.956
0.830	0.830	19.605	167.710	46.159	8.555	45.011	1.968
0.840	0.840	20.060	171.789	47.154	8.564	46.005	1.981

APPENDIX C:

STORM DRAIN PIPE ANALYSIS

Bohannan Huston

GIRONA SD

#Line	Struct. ID	D	Q	L	V	d	dc	v^2/2g	EGLo	HGLo	Sf	Total Pipe	EGLi	HGLi	Ea	EGLa	U/S TOC	Surface El
		(ft)	(cu. ft/sec)	(ft)	(ft/s)	(ft)	(ft)	(ft)	(ft)	(ft)		(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)
1	SDFE12	4	50.35	187.027	13.351	1.361	2.13	2.771	5528.65	5528.4	0.001	0	5530.832	5528.061	4.132	5530.832	5529.8	5534.114
2	SDFE9	3	38.95	131.275	5.51	3	0	0.472	5531.021	5530.549	0.003	0.448	5531.469	5530.997	4.249	5531.705	5529.456	5532.315
3	SDFE8	2	9.25	117.376	2.944	2	0	0.135	5531.759	5531.624	0.002	0.196	5531.956	5531.821	2.779	5531.999	5531.22	5531.401
4	SDFE16	2	9.25	210.682	7.98	0.793	1.087	0.99	5532.053	5531.918	0.002	0	5534.183	5533.193	1.783	5534.183	5534.5	5537.778
5	SDFE17	2	9.25	353.78	8.997	0.725	1.087	1.258	5534.25	5534.082	0	0	5541.984	5540.725	1.984	5541.984	---	5542.375
6	SDFE10	1.5	14.85	23.885	8.403	1.5	0	1.098	5532.145	5531.047	0.02	0.477	5532.622	5531.524	4.841	5532.841	---	5532.045
7	SDFE11	1.5	14.85	8.618	8.403	1.5	0	1.098	5532.145	5531.047	0.02	0.172	5532.317	5531.219	4.476	5532.536	---	5532.059
8	SDFE19	2	11.4	131.583	3.629	2	0	0.205	5530.914	5530.709	0.003	0.334	5531.248	5531.044	3.335	5531.289	---	5530.329

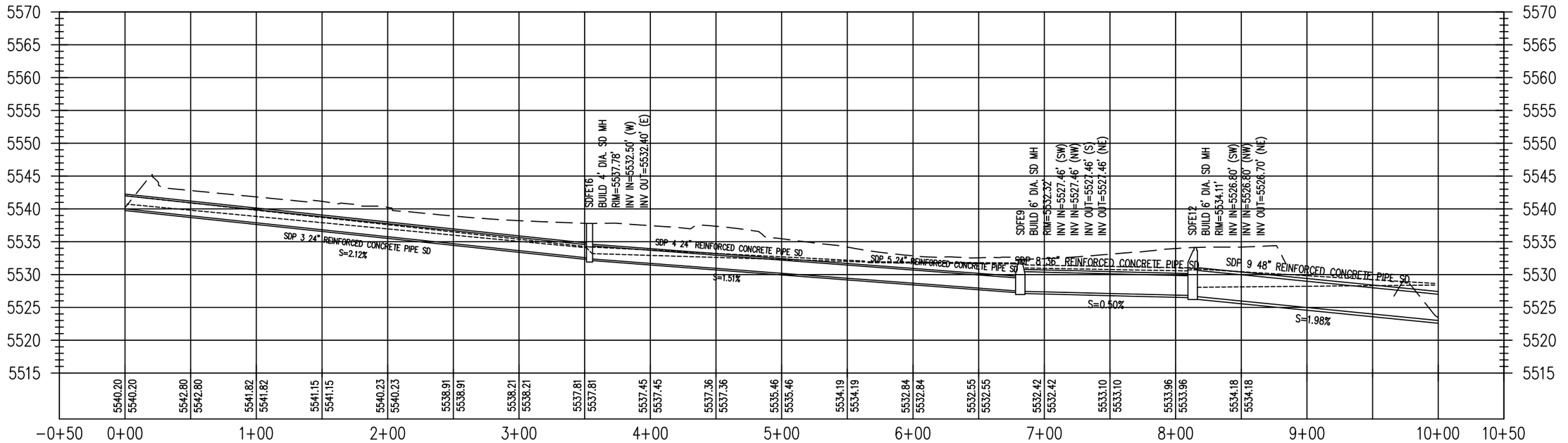
LOWPOINT IN TARRAGONA TO POND B

#Line	Struct. ID	D	Q	L	V	d	dc	v^2/2g	EGLo	HGLo	Sf	Total Pipe	EGLi	HGLi	Ea	EGLa	U/S TOC	Surface El
		(ft)	(cu. ft/sec)	(ft)	(ft/s)	(ft)	(ft)	(ft)	(ft)	(ft)		(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)
1	SDFE2	2	35.9	64.309	11.427	2	0	2.03	5521.492	5519.462	0.02	1.308	5522.8	5520.77	4.437	5523.207	---	5523.267

POND B TO POND A5

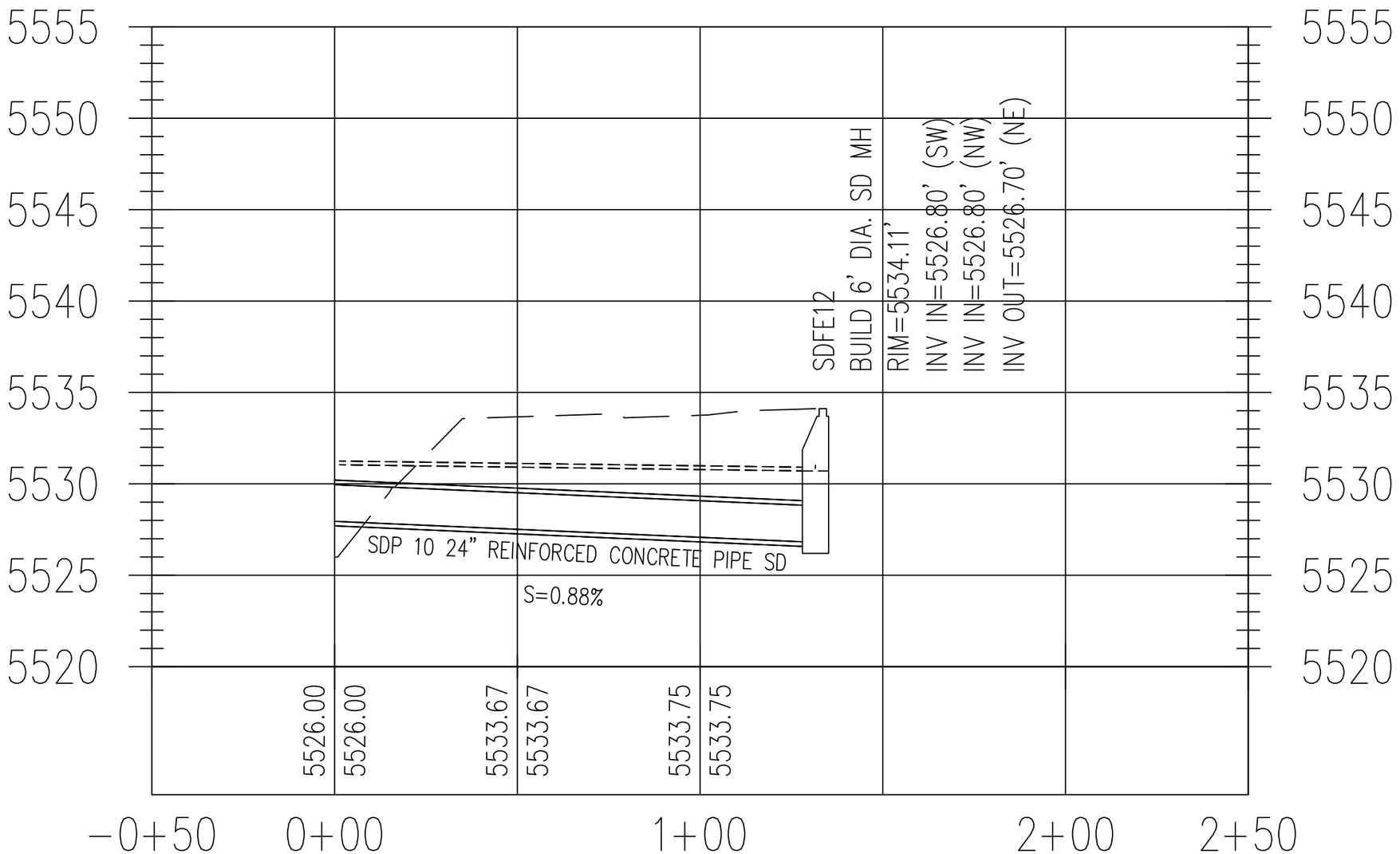
#Line	Struct. ID	D	Q	L	V	d	dc	v^2/2g	EGLo	HGLo	Sf	Total Pipe	EGLi	HGLi	Ea	EGLa	U/S TOC	Surface El
		(ft)	(cu. ft/sec)	(ft)	(ft/s)	(ft)	(ft)	(ft)	(ft)	(ft)		(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)
1	SDFE18	2	3.36	216.583	7.821	0.389	0.641	0.951	5511.771	5511.751	0	0	5517.34	5516.389	1.34	5517.34	---	5518.375

GIRONA
FROM OFFSITE POND 1 TO POND A



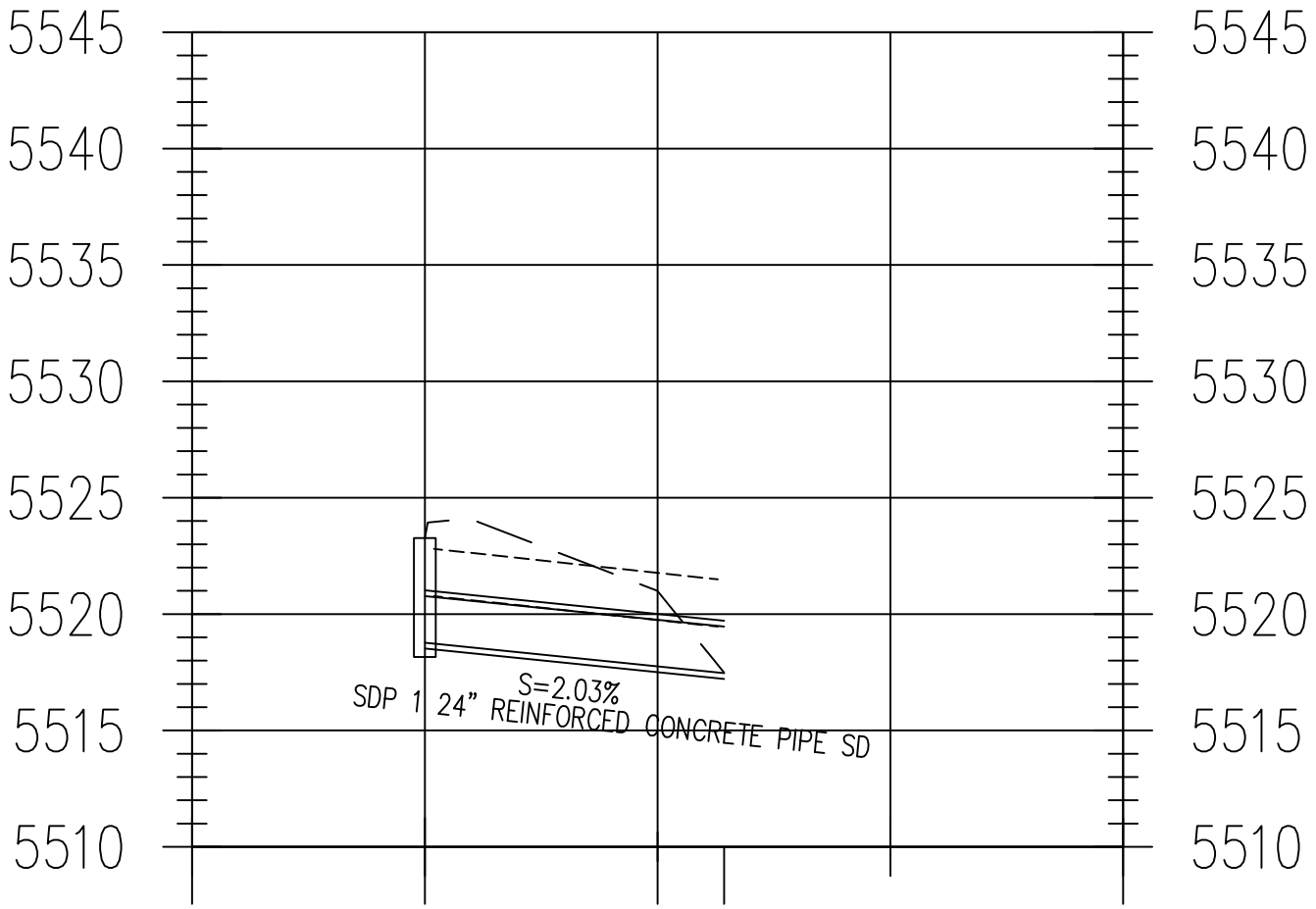
PROFILE VIEW: PV – (2)
ALG: SD Align Girona
HORZ. SCALE: 1"=50'
VERT. EXAG.: 5
VERT. SCALE: 1"=10'

FROM WOODMONT POND
TO GIRONA STORM DRAIN



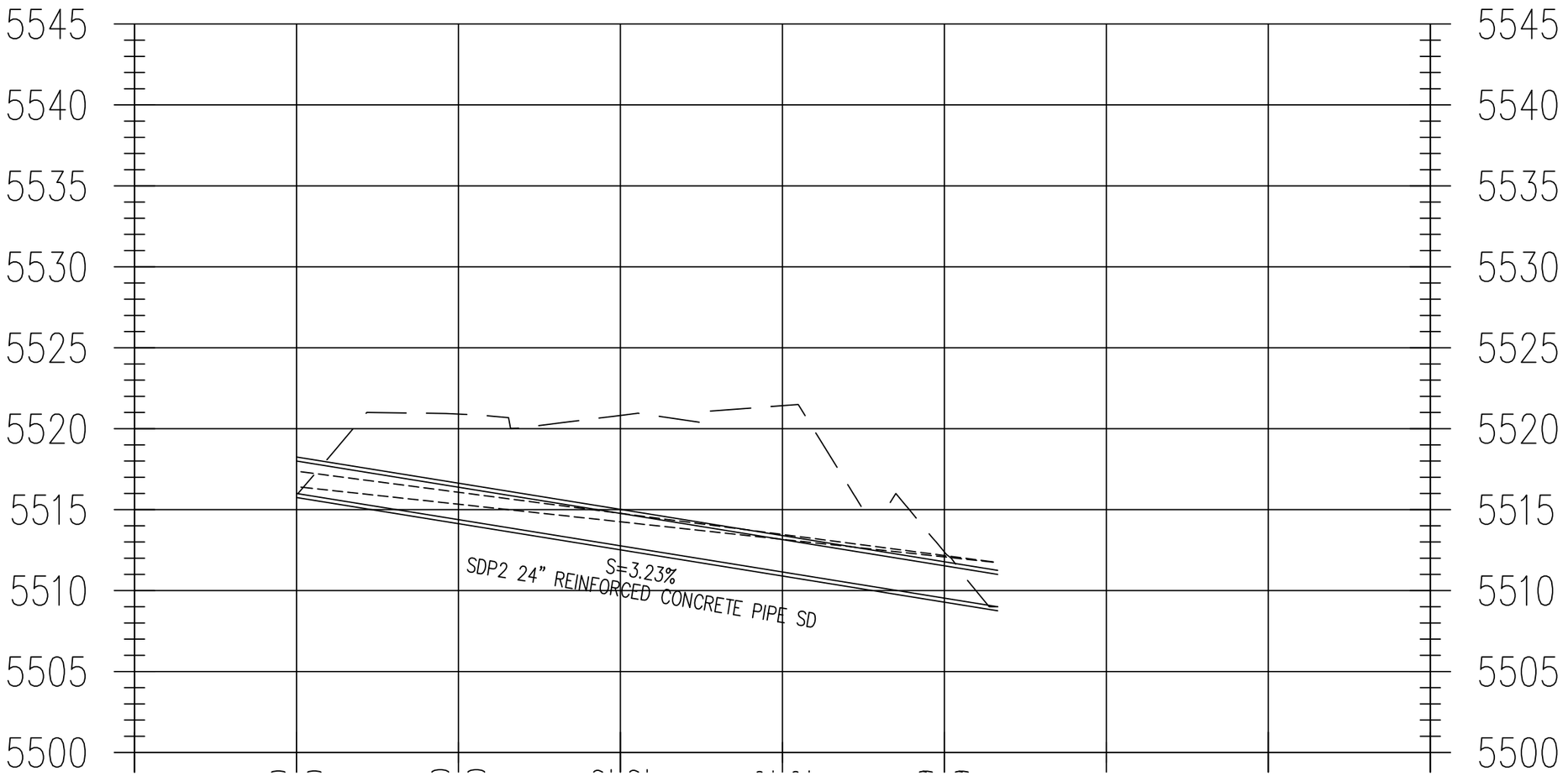
PROFILE VIEW: PV – (9)
ALG: SD Align Woodmont
HORZ. SCALE: 1"=50'
VERT. EXAG.: 5
VERT. SCALE: 1"=10'

LOWPOINT IN TARRAGONA
TO POND B



PROFILE VIEW: PV – (8)
ALG: SD Align Tarragona
HORZ. SCALE: 1"=50'
VERT. EXAG.: 5
VERT. SCALE: 1"=10'

POND B TO POND A5



PROFILE VIEW: PV – (6)
ALG: SD Align Pond B to A5
HORZ. SCALE: 1"=50'
VERT. EXAG.: 5
VERT. SCALE: 1"=10'

APPENDIX D:

DETENTION POND ANALYSIS

Bohannan Huston

Detention Pond Volume Calculations

NOTE: Blue shaded cells require user input, all other cells should not be edited.
ASSUMPTIONS:
1. Area less than 40 acres (simplified hydrograph method).
2. 100-year, 6-hour storm event

Catalonia at the Trails

Offsite Pond 1

Peak Flow per Acre - DPM Section 22.2 Table A-9

Zone	A	B	C	D
1	1.29	2.03	2.87	4.37
2	1.56	2.28	3.14	4.7
3	1.87	2.6	3.45	5.02
4	2.2	2.92	3.73	5.25

Basin Name : Offsite Basin 1
Choose Zone (1 - 4) 1
Basin Area = (acres) 30.83

Exist Conditions				Proposed Conditions			
Treatment	Percentage	Area	Q (cfs)	Treatment	Percentage	Area	Q (cfs)
A	100.0%	30.83	39.77	A	100.0%	30.83	39.77
B	0.0%	0.00	0.00	B	0.0%	0.00	0.00
C	0.0%	0.00	0.00	C	0.0%	0.00	0.00
D	0.0%	0.00	0.00	D	0.0%	0.00	0.00
		Q Peak - exist.=	**39.77**			Peak Q Developed=	**39.8**

Use my calculated exist cond. flow as the peak controlled discharge (1 = yes, or N) ? n
If No, what is the maximum allowable discharge ? 9.25

Excess Precipitation - DPM Section 22.2 Table A-8

Zone	A	B	C	D
1	0.44	0.67	0.99	1.97
2	0.53	0.78	1.13	2.12
3	0.66	0.92	1.29	2.36
4	0.8	1.08	1.46	2.64

Determine Developed E (avg excess precipitation for the developed basin)

%A x E = 0.44
%B x E = 0.00
%C x E = 0.00
%D x E = 0.00
Avg E(in) = 0.44

Determine Tb (hours)

Tb = 0.719

Determine Tc (Note: Tc is assumed to be 0.2 hours, this should be checked using DPM 22.2.B.2)

Tc = 0.2

Determine Tp and Duration of Peak (hours)

Tp = 0.273333
Peak Duration = 0

Compute the required retention volume using the simple hydrograph, Figure A-3 in DPM Section 22.2

Time to Control Q (hrs) = 0.064
Time to end of Control Q (hrs)= 0.61509
Duration of Control Q (hrs)= 0.552

Required Detention Volume (CF) = 30298.82258 0.6955653 AC-ft

Required Volume (10-day)= 30298.82258 0.6955653

Pond A

Peak Flow per Acre - DPM Section 22.2 Table A-9

Zone	A	B	C	D
1	1.29	2.03	2.87	4.37
2	1.56	2.28	3.14	4.7
3	1.87	2.6	3.45	5.02
4	2.2	2.92	3.73	5.25

Basin Name : Pond A
Choose Zone (1 - 4) 1
Basin Area = (acres) 9.2

Exist Conditions				Proposed Conditions Basin A			
Treatment	Percentage	Area	Q (cfs)	Treatment	Percentage	Area	Q (cfs)
A	100.0%	9.20	11.87	A	0.0%	0.00	0.00
B	0.0%	0.00	0.00	B	29.6%	2.72	5.53
C	0.0%	0.00	0.00	C	29.6%	2.72	7.82
D	0.0%	0.00	0.00	D	40.8%	3.75	16.40
		Q Peak - exist.=	**11.87**			Peak Q Developed=	**33.1**

Proposed Conditions Offsite 4			
Treatment	Percentage	Area	Q (cfs)
A	0.0%	0.00	0.00
B	0.0%	0.00	0.00
C	100.0%	1.18	3.39
D	0.0%	0.00	0.00

Use my calculated exist cond. flow as the peak controlled discharge (1 = yes, or N) ? n
If No, what is the maximum allowable discharge ? 0

Excess Precipitation - DPM Section 22.2 Table A-8

Zone	A	B	C	D
1	0.44	0.67	0.99	1.97
2	0.53	0.78	1.13	2.12
3	0.66	0.92	1.29	2.36
4	0.8	1.08	1.46	2.64

Determine Developed E (avg excess precipitation for the developed basin)

%A x E = 0.00
%B x E = 0.20
%C x E = 0.29
%D x E = 0.80
Avg E(in) = 1.30

Determine Tb (hours)

Tb = 0.656

Determine Tc (Note: Tc is assumed to be 0.2 hours, this should be checked using DPM 22.2.B.2)

Tc = 0.2

Determine Tp and Duration of Peak (hours)

Tp = 0.239333
Peak Duration = 0.102

Compute the required retention volume using the simple hydrograph, Figure A-3 in DPM Section 22.2

Time to Control Q (hrs) = 0.000
Time to end of Control Q (hrs)= 0.655696
Duration of Control Q (hrs)= 0.656

Required Detention Volume (CF) = 45189.22343 1.0374018 AC-ft

Required Volume (10-day)= 65218.80839 1.4972178

Pond B

Peak Flow per Acre - DPM Section 22.2 Table A-9

Zone	A	B	C	D
1	1.29	2.03	2.87	4.37
2	1.56	2.28	3.14	4.7
3	1.87	2.6	3.45	5.02
4	2.2	2.92	3.73	5.25

Basin Name : Pond B
Choose Zone (1 - 4) 1
Basin Area = (acres) 11.1

Exist Conditions				Proposed Conditions			
Treatment	Percentage	Area	Q (cfs)	Treatment	Percentage	Area	Q (cfs)
A	100.0%	11.10	14.32	A	0.0%	0.00	0.00
B	0.0%	0.00	0.00	B	29.6%	3.29	6.67
C	0.0%	0.00	0.00	C	29.6%	3.29	9.43
D	0.0%	0.00	0.00	D	40.8%	4.53	19.79
		Q Peak - exist.=	**14.32**			Peak Q Developed=	**35.9**

Use my calculated exist cond. flow as the peak controlled discharge (1 = yes, or N) ? N
If No, what is the maximum allowable discharge ? 3.36

Excess Precipitation - DPM Section 22.2 Table A-8

Zone	A	B	C	D
1	0.44	0.67	0.99	1.97
2	0.53	0.78	1.13	2.12
3	0.66	0.92	1.29	2.36
4	0.8	1.08	1.46	2.64

Determine Developed E (avg excess precipitation for the developed basin)

%A x E = 0.00
%B x E = 0.20
%C x E = 0.29
%D x E = 0.80
Avg E(in) = 1.30

Determine Tb (hours)

Tb = 0.742

Determine Tc (Note: Tc is assumed to be 0.2 hours, this should be checked using DPM 22.2.B.2)

Tc = 0.2

Determine Tp and Duration of Peak (hours)

Tp = 0.239333
Peak Duration = 0.102

Compute the required retention volume using the simple hydrograph, Figure A-3 in DPM Section 22.2

Time to Control Q (hrs) = 0.022
Time to end of Control Q (hrs)= 0.704451
Duration of Control Q (hrs)= 0.682

Required Detention Volume (CF) = 45909.412 1.0539351 AC-ft

Required Volume (10-day)= 70075.54168 1.6087131

Woodmont Pond

Peak Flow per Acre - DPM Section 22.2 Table A-9

Zone	A	B	C	D
1	1.29	2.03	2.87	4.37
2	1.56	2.28	3.14	4.7
3	1.87	2.6	3.45	5.02
4	2.2	2.92	3.73	5.25

Basin Name : Basin A1 from DMP
Choose Zone (1 - 4) 1
Basin Area = (acres) 15.5

Exist Conditions				Proposed Conditions Basin A1			
Treatment	Percentage	Area	Q (cfs)	Treatment	Percentage	Area	Q (cfs)
A	100.0%	15.50	20.00	A	100.0%	15.50	20.00
B	0.0%	0.00	0.00	B	0.0%	0.00	0.00
C	0.0%	0.00	0.00	C	0.0%	0.00	0.00
D	0.0%	0.00	0.00	D	0.0%	0.00	0.00
		Q Peak - exist.=	**20.00**			Peak Q Developed (A1+Offsite 2)=	**25.0**

Proposed Conditions Offsite 2			
Treatment	Percentage	Area	Q (cfs)
A	0.0%	0.00	0.00
B	0.0%	0.00	0.00
C	10.0%	0.12	0.34
D	90.0%	1.07	4.66

Use my calculated exist cond. flow as the peak controlled discharge (1 = yes, or N) ? N
If No, what is the maximum allowable discharge ? 11.41

Excess Precipitation - DPM Section 22.2 Table A-8

Zone	A	B	C	D
1	0.44	0.67	0.99	1.97
2	0.53	0.78	1.13	2.12
3	0.66	0.92	1.29	2.36
4	0.8	1.08	1.46	2.64

Determine Developed E (avg excess precipitation for the developed basin)

%A x E = 0.44
%B x E = 0.00
%C x E = 0.00
%D x E = 0.00
Avg E(in) = 0.44

Determine Tb (hours)

Tb = 0.575

Determine Tc (Note: Tc is assumed to be 0.2 hours, this should be checked using DPM 22.2.B.2)

Tc = 0.2

Determine Tp and Duration of Peak (hours)

Tp = 0.273333
Peak Duration = 0

q

Compute the required retention volume using the simple hydrograph, Figure A-3 in DPM Section 22.2

Time to Control Q (hrs) = 0.125
Time to end of Control Q (hrs)= 0.437273
Duration of Control Q (hrs)= 0.312

103155 2.368113

Required Detention Volume (CF) = 7638.325093 0.1753518 AC-ft

Required Volume (10-day)= 13324.47325 0.3058878

APPENDIX E:
FIRST FLUSH REQUIREMENTS

First Flush Calculations

	Area (Sq Ft)	%D	Required Volume	
Basin A	400914	40.8%	5724.456 CF	0.131 Ac-Ft
Basin B	483543	40.8%	6904.275 CF	0.159 Ac-Ft
		Total	**12628.7**	**0.290 Ac-Ft**

APPENDIX F:

CHANNEL ANALYSIS

Bohannan Huston

Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Thursday, Mar 28 2019

<Name>

Triangular

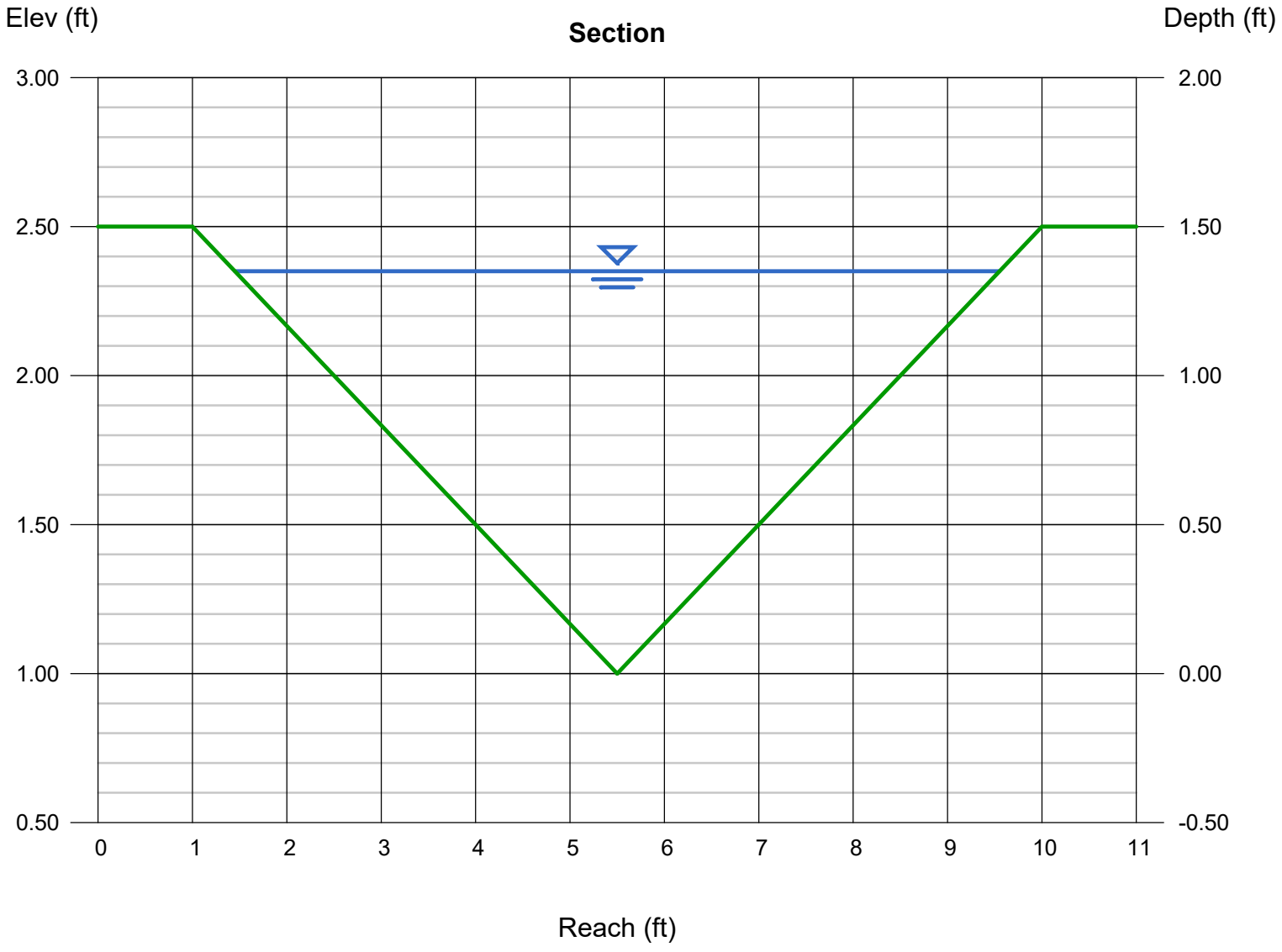
Side Slopes (z:1)	= 3.00, 3.00
Total Depth (ft)	= 1.50
Invert Elev (ft)	= 1.00
Slope (%)	= 1.96
N-Value	= 0.022

Calculations

Compute by:	Q vs Depth
No. Increments	= 10

Highlighted

Depth (ft)	= 1.35
Q (cfs)	= 38.41
Area (sqft)	= 5.47
Velocity (ft/s)	= 7.02
Wetted Perim (ft)	= 8.54
Crit Depth, Yc (ft)	= 1.50
Top Width (ft)	= 8.10
EGL (ft)	= 2.12



APPENDIX G:

EMERGENCY SPILLWAY ANALYSIS

Bohannan Huston

Weir Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Thursday, Mar 28 2019

POND A5 EMERGENCY SPILLWAY

Trapezoidal Weir

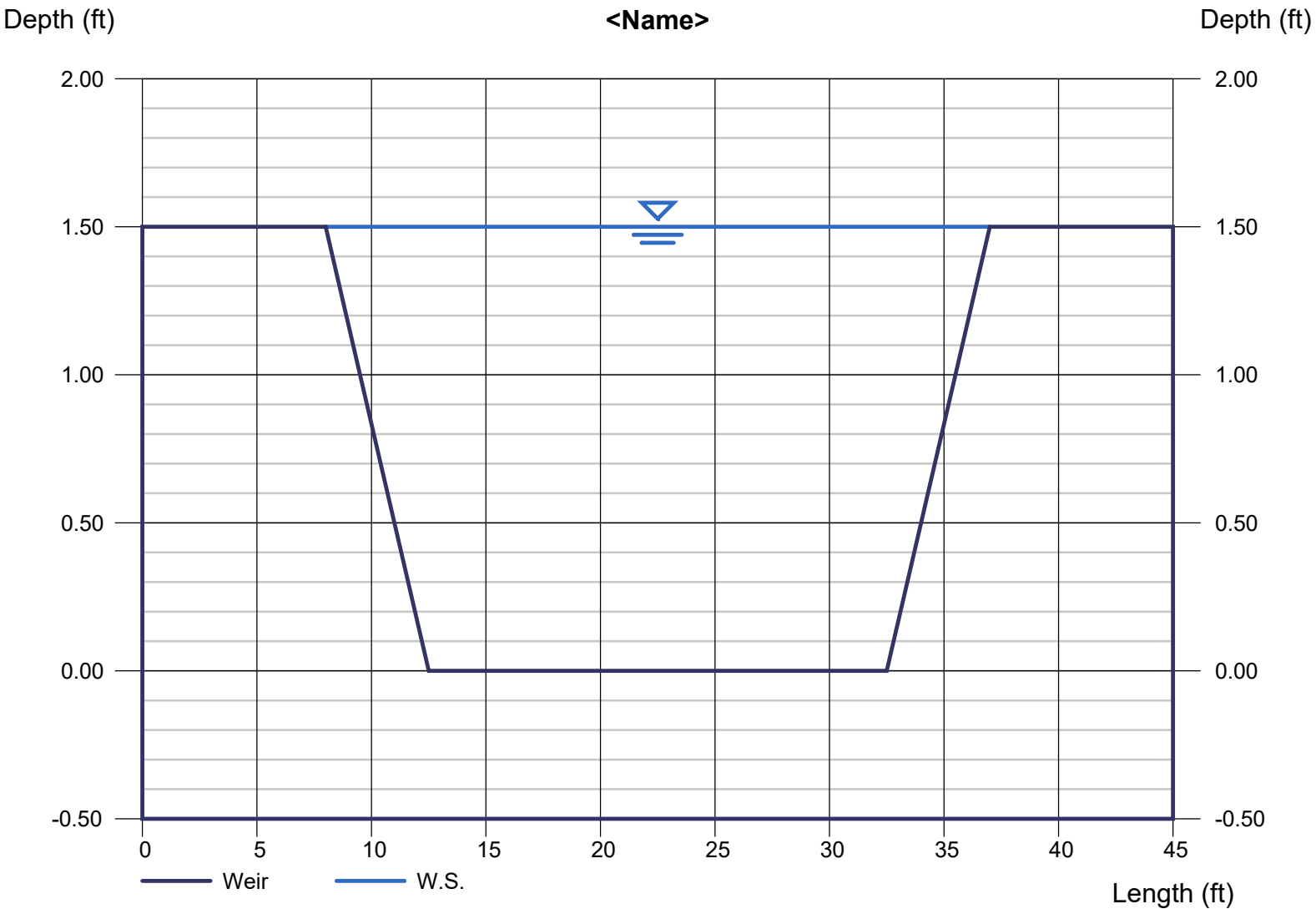
Crest	= Sharp
Bottom Length (ft)	= 20.00
Total Depth (ft)	= 1.50
Side Slope (z:1)	= 3.00

Highlighted

Depth (ft)	= 1.50
Q (cfs)	= 115.33
Area (sqft)	= 36.75
Velocity (ft/s)	= 3.14
Top Width (ft)	= 29.00

Calculations

Weir Coeff. Cw	= 2.66
Compute by:	Q vs Depth
No. Increments	= 10



Weir Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Thursday, Mar 28 2019

OFFSITE POND 1 AND POND B
EMERGENCY SPILLWAY

Trapezoidal Weir

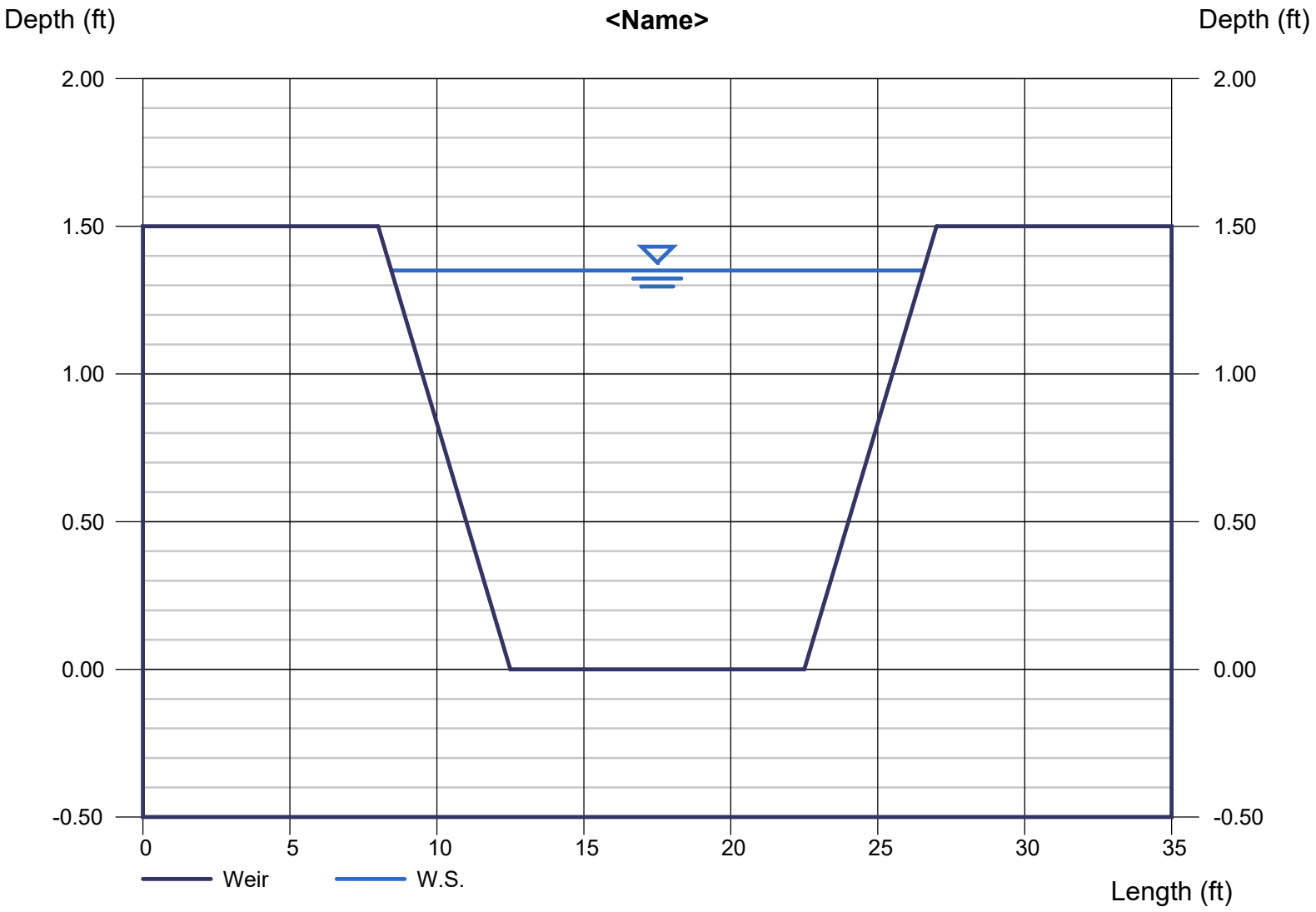
Crest	= Sharp
Bottom Length (ft)	= 10.00
Total Depth (ft)	= 1.50
Side Slope (z:1)	= 3.00

Highlighted

Depth (ft)	= 1.35
Q (cfs)	= 55.24
Area (sqft)	= 18.97
Velocity (ft/s)	= 2.91
Top Width (ft)	= 18.10

Calculations

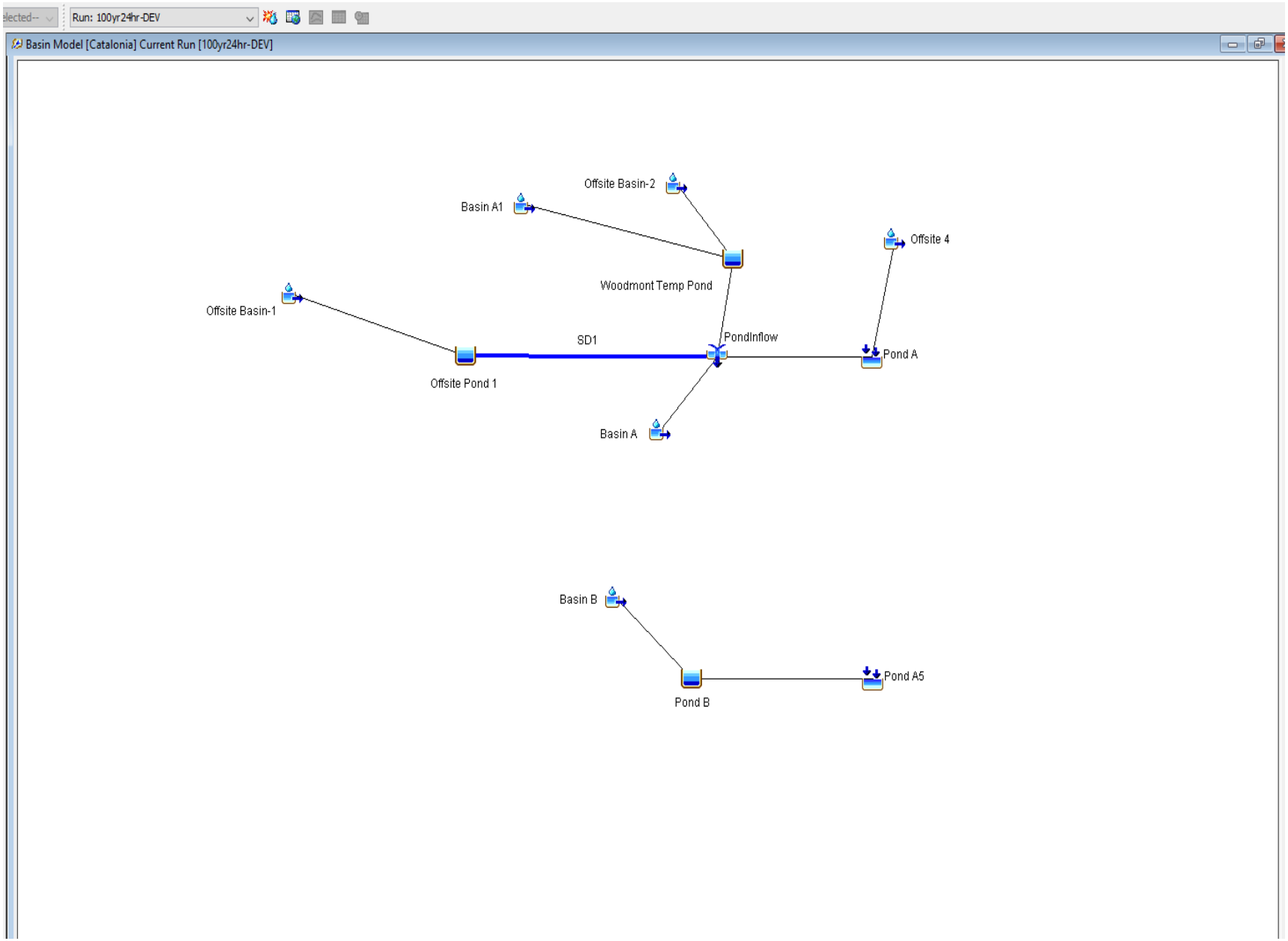
Weir Coeff. Cw	= 2.66
Compute by:	Q vs Depth
No. Increments	= 10



APPENDIX H:

HEC-HMS ANALYSIS

Bohannan Huston


Run: 100yr24hr-DEV
Basin Model [Catalonia] Current Run [100yr24hr-DEV]
Offsite Basin-2
Basin A1
Offsite 4
Woodmont Temp Pond
Offsite Basin-1
SD1
PondInflow
Pond A
Offsite Pond 1
Basin A
Basin B
Pond A5
Pond B

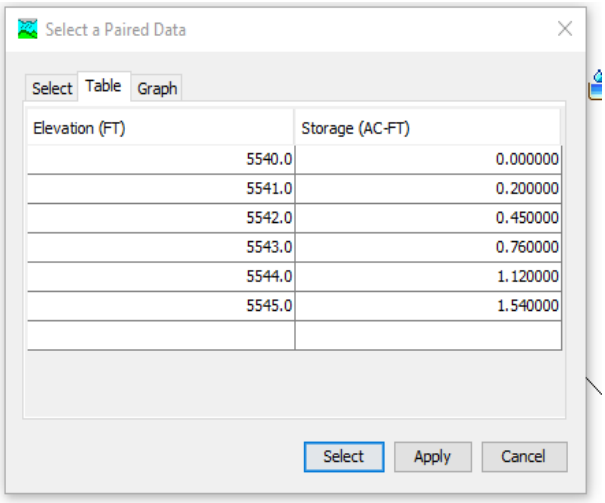
Frequency Storm

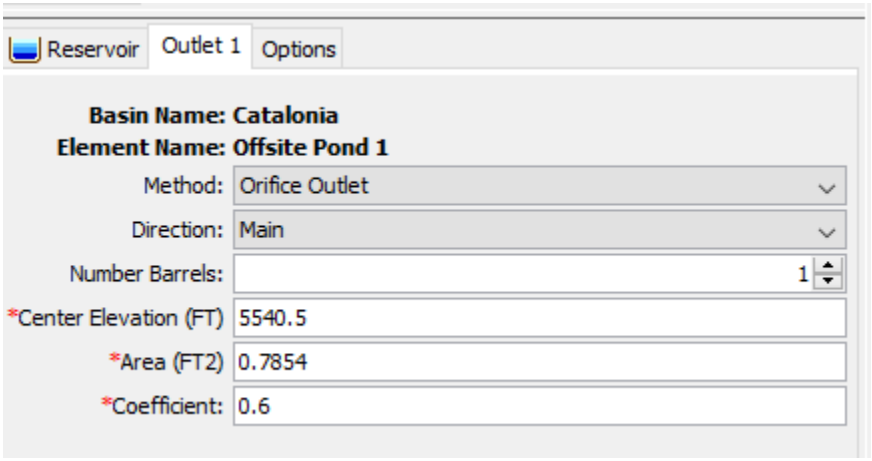
Met Name: 100yr24hr-DPM

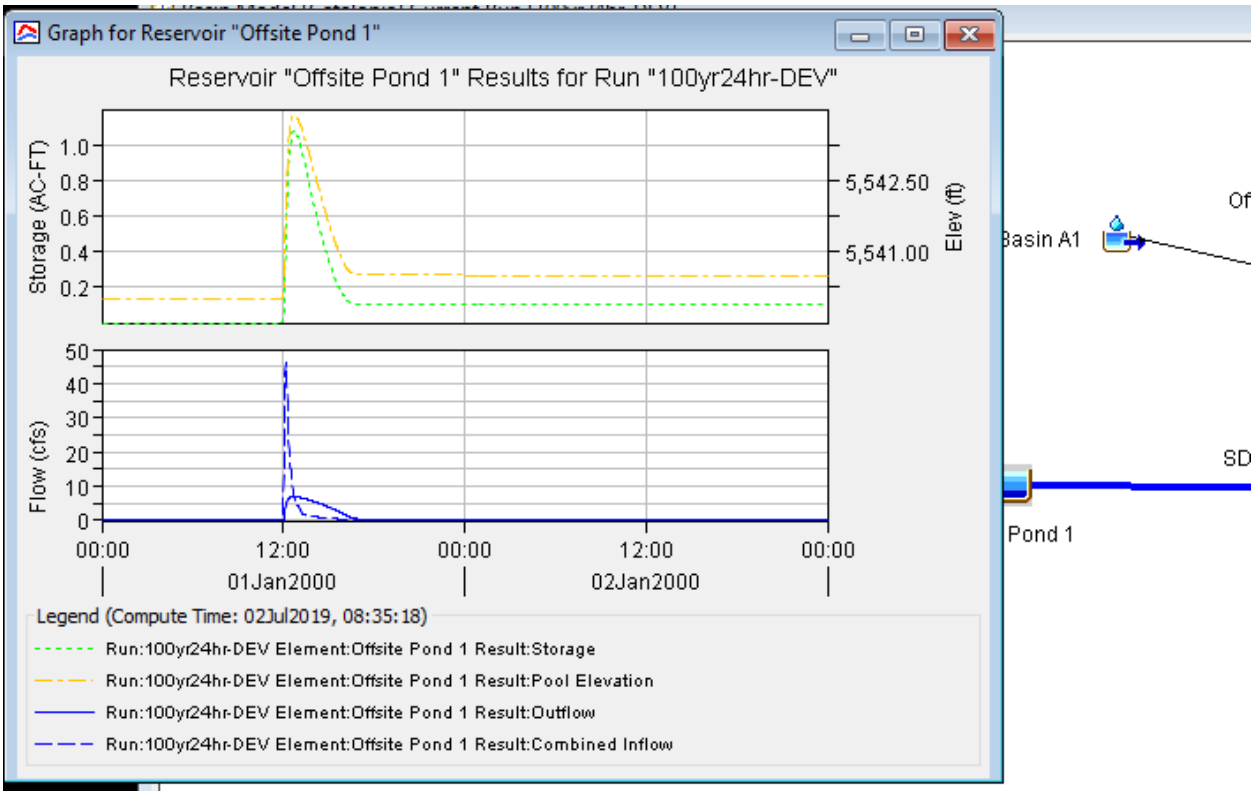
Probability:	Other
Input Type:	Partial Duration
Output Type:	Partial Duration
Intensity Duration:	5 Minutes
Storm Duration:	1 Day
Intensity Position:	50 Percent
Storm Area (MI2)	0
Curve:	Uniform For All Subbasins

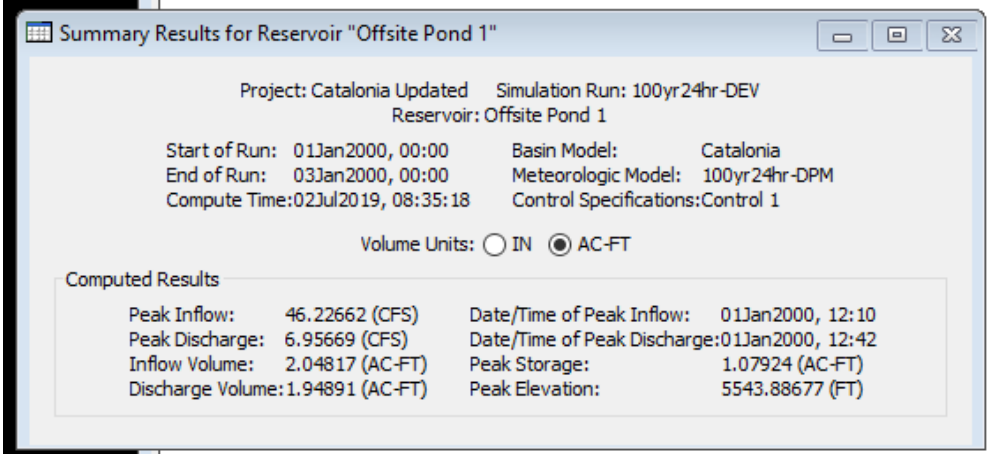
Duration	Partial-Duration Depth (IN)
5 Minutes	0.55100
15 Minutes	1.0400
1 Hour	1.7300
2 Hours	1.9800
3 Hours	2.0700
6 Hours	2.2300
12 Hours	2.3600
1 Day	2.5900
2 Days	

OFFSITE POND 1

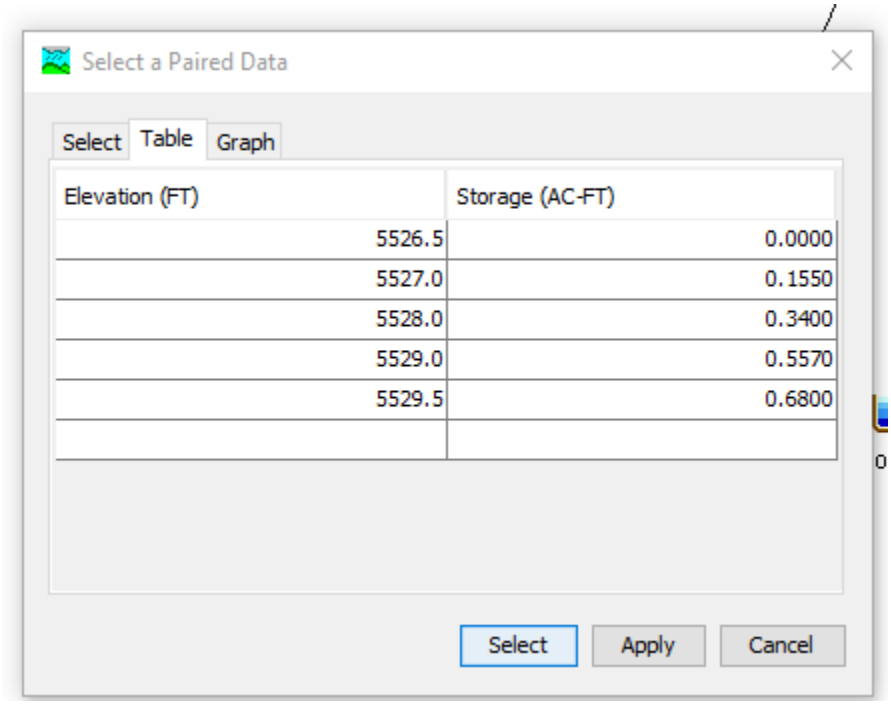





Graph for Reservoir "Offsite Pond 1"
Reservoir "Offsite Pond 1" Results for Run "100yr24hr-DEV"
Storage (AC-FT)
1.0
0.8
0.6
0.4
0.2
5,542.50
5,541.00
Elev (ft)
Flow (cfs)
50
40
30
20
10
0
00:00
12:00
00:00
12:00
00:00
01Jan2000
02Jan2000
Legend (Compute Time: 02Jul2019, 08:35:18)
Run:100yr24hr-DEV Element:Offsite Pond 1 Result:Storage
Run:100yr24hr-DEV Element:Offsite Pond 1 Result:Pool Elevation
Run:100yr24hr-DEV Element:Offsite Pond 1 Result:Outflow
Run:100yr24hr-DEV Element:Offsite Pond 1 Result:Combined Inflow
Basin A1
Pond 1

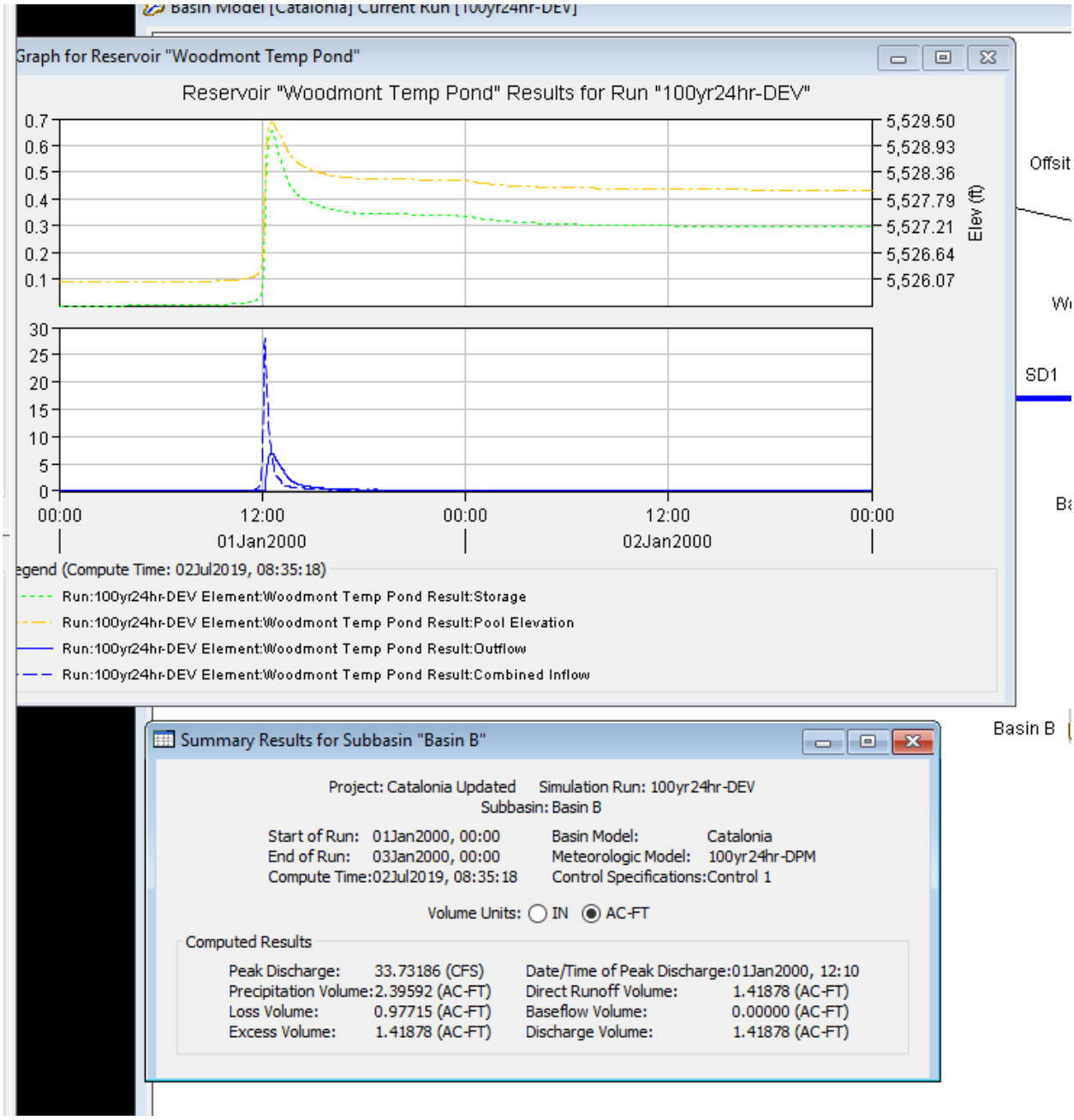

Summary Results for Reservoir "Offsite Pond 1"
Project: Catalonia Updated Simulation Run: 100yr24hr-DEV
Reservoir: Offsite Pond 1
Start of Run: 01Jan2000, 00:00
End of Run: 03Jan2000, 00:00
Compute Time: 02Jul2019, 08:35:18
Basin Model: Catalonia
Meteorologic Model: 100yr24hr-DPM
Control Specifications: Control 1
Volume Units: IN AC-FT
Computed Results
Peak Inflow: 46.22662 (CFS)
Peak Discharge: 6.95669 (CFS)
Inflow Volume: 2.04817 (AC-FT)
Discharge Volume: 1.94891 (AC-FT)
Date/Time of Peak Inflow: 01Jan2000, 12:10
Date/Time of Peak Discharge: 01Jan2000, 12:42
Peak Storage: 1.07924 (AC-FT)
Peak Elevation: 5543.88677 (FT)

WOODMONT TEMPORARY POND

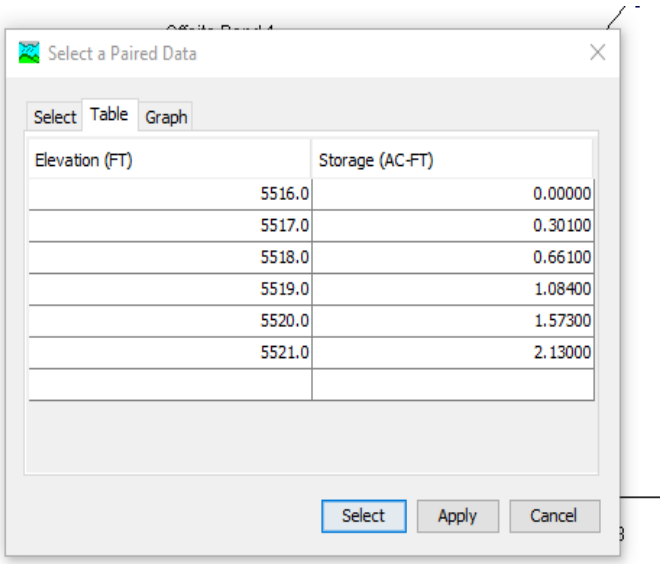


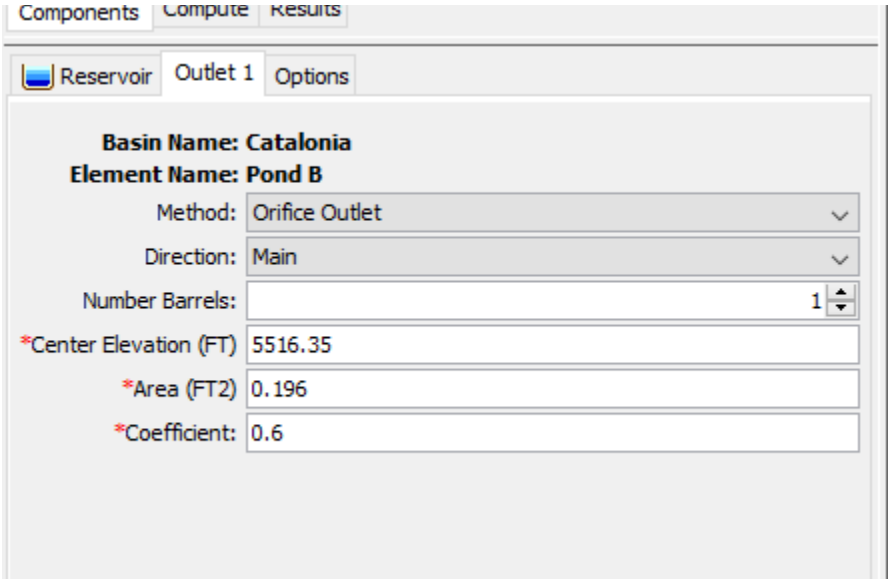
Basin Name: Catalonia
Element Name: Woodmont Temp Pond

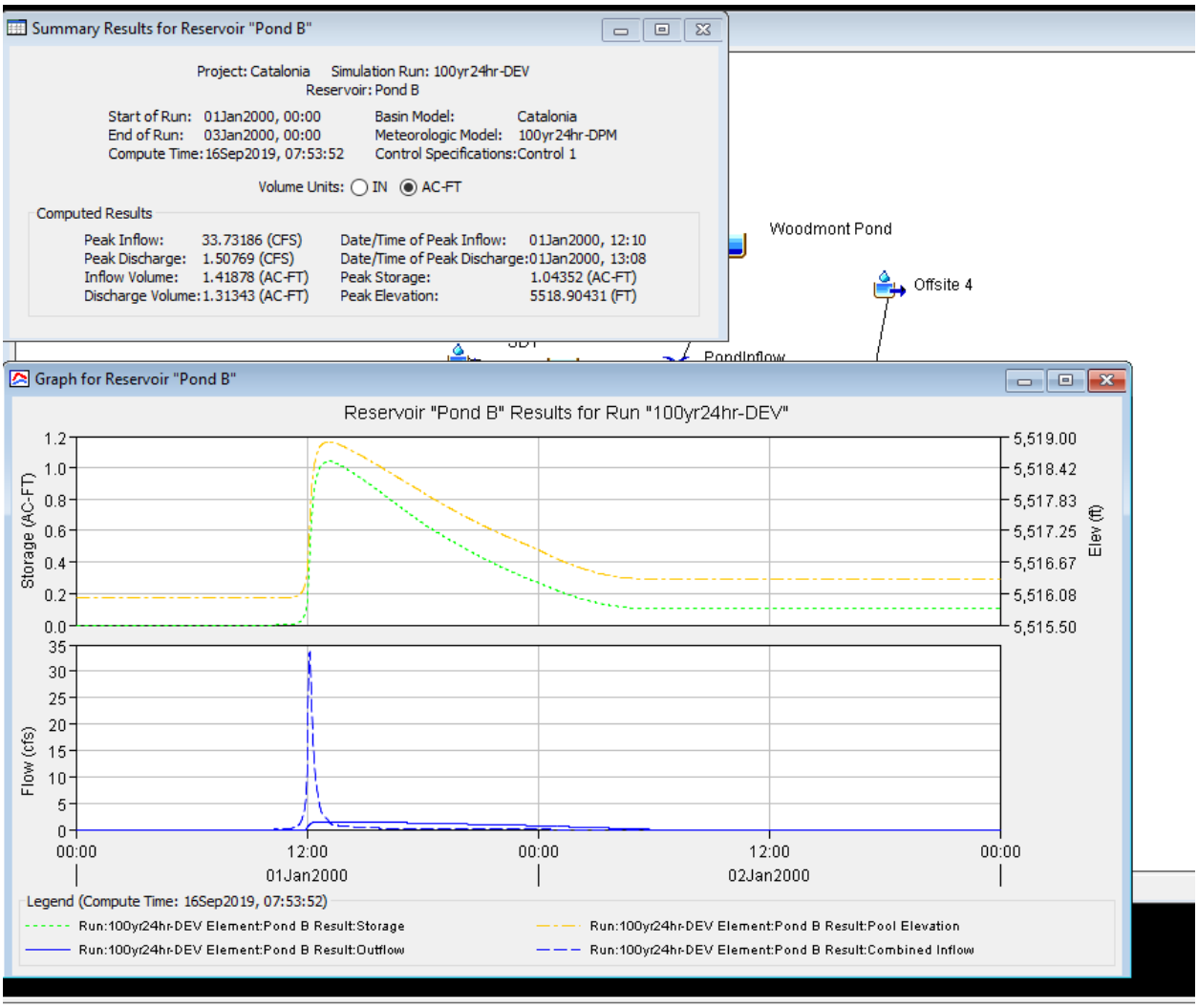
Method:	Culvert Outlet
Direction:	Main
Number Barrels:	1
Solution Method:	Automatic
Shape:	Circular
Chart:	1: Concrete Pipe Culvert
Scale:	1: Square edge entrance with headwall
*Length (FT)	131.58
*Diameter (FT)	2.0
*Inlet Elevation (FT)	5527.95
Entrance Coefficient:	0.5
Outlet Elevation (FT)	5527.29
*Exit Coefficient:	0.5
*Mannings n:	0.013


Basin Model [Catalonia] Current Run [100yr24hr-DEV]
Graph for Reservoir "Woodmont Temp Pond"
Reservoir "Woodmont Temp Pond" Results for Run "100yr24hr-DEV"
0.7
0.6
0.5
0.4
0.3
0.2
0.1
5,529.50
5,528.93
5,528.36
5,527.79
5,527.21
5,526.64
5,526.07
Elev (ft)
30
25
20
15
10
5
0
00:00
12:00
00:00
12:00
00:00
01Jan2000
02Jan2000
egend (Compute Time: 02Jul2019, 08:35:18)
Run:100yr24hr-DEV Element:Woodmont Temp Pond Result:Storage
Run:100yr24hr-DEV Element:Woodmont Temp Pond Result:Pool Elevation
Run:100yr24hr-DEV Element:Woodmont Temp Pond Result:Outflow
Run:100yr24hr-DEV Element:Woodmont Temp Pond Result:Combined Inflow
Offsit
SD1
Basin B
Summary Results for Subbasin "Basin B"
Project: Catalonia Updated Simulation Run: 100yr24hr-DEV
Subbasin: Basin B
Start of Run: 01Jan2000, 00:00
End of Run: 03Jan2000, 00:00
Compute Time: 02Jul2019, 08:35:18
Basin Model: Catalonia
Meteorologic Model: 100yr24hr-DPM
Control Specifications: Control 1
Volume Units: IN AC-FT
Computed Results
Peak Discharge: 33.73186 (CFS)
Precipitation Volume: 2.39592 (AC-FT)
Loss Volume: 0.97715 (AC-FT)
Excess Volume: 1.41878 (AC-FT)
Date/Time of Peak Discharge: 01Jan2000, 12:10
Direct Runoff Volume: 1.41878 (AC-FT)
Baseflow Volume: 0.00000 (AC-FT)
Discharge Volume: 1.41878 (AC-FT)

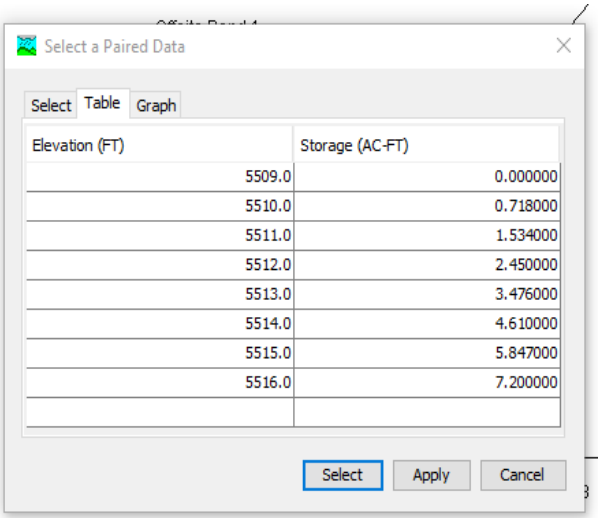
POND B

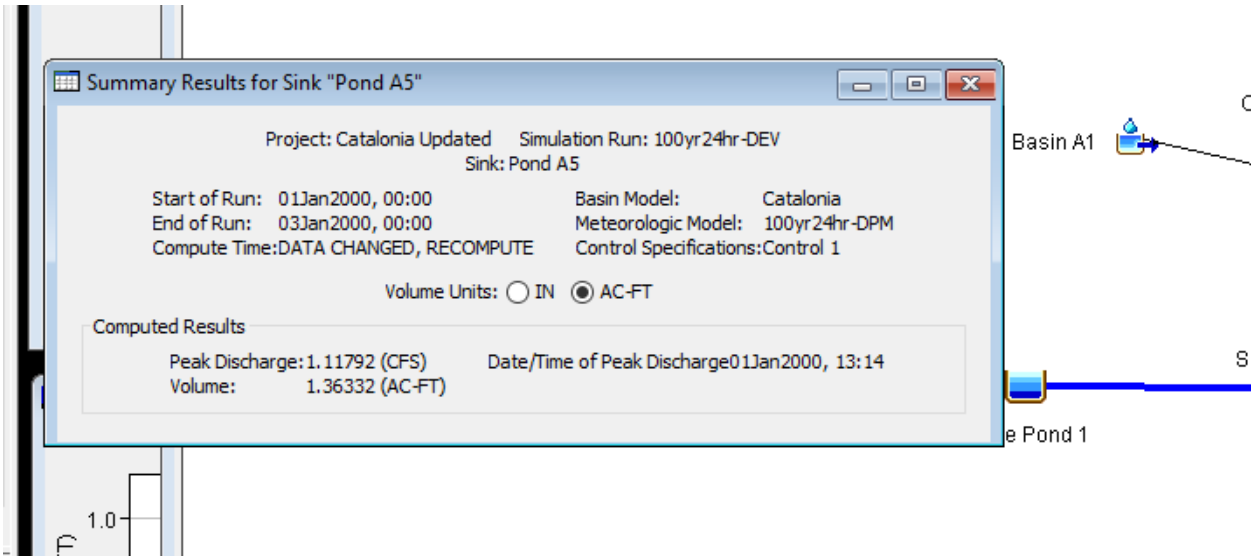

Select a Paired Data
Select
Table
Graph
Elevation (FT)
Storage (AC-FT)
5516.0
0.00000
5517.0
0.30100
5518.0
0.66100
5519.0
1.08400
5520.0
1.57300
5521.0
2.13000
Select
Apply
Cancel


Components
Compute
Results
Reservoir
Outlet 1
Options
Basin Name: Catalonia
Element Name: Pond B
Method:
Orifice Outlet
Direction:
Main
Number Barrels:
1
*Center Elevation (FT)
5516.35
*Area (FT2)
0.196
*Coefficient:
0.6


Summary Results for Reservoir "Pond B"
Project: Catalonia Simulation Run: 100yr24hr-DEV
Reservoir: Pond B
Start of Run: 01Jan2000, 00:00
End of Run: 03Jan2000, 00:00
Compute Time: 16Sep2019, 07:53:52
Basin Model: Catalonia
Meteorologic Model: 100yr24hr-DPM
Control Specifications: Control 1
Volume Units: IN AC-FT
Computed Results
Peak Inflow: 33.73186 (CFS)
Peak Discharge: 1.50769 (CFS)
Inflow Volume: 1.41878 (AC-FT)
Discharge Volume: 1.31343 (AC-FT)
Date/Time of Peak Inflow: 01Jan2000, 12:10
Date/Time of Peak Discharge: 01Jan2000, 13:08
Peak Storage: 1.04352 (AC-FT)
Peak Elevation: 5518.90431 (FT)
Woodmont Pond
Offsite 4
PondInflow
Graph for Reservoir "Pond B"
Reservoir "Pond B" Results for Run "100yr24hr-DEV"
Storage (AC-FT)
Elev (ft)
Flow (cfs)
01Jan2000
02Jan2000
Legend (Compute Time: 16Sep2019, 07:53:52)
Run:100yr24hr-DEV Element:Pond B Result:Storage
Run:100yr24hr-DEV Element:Pond B Result:Outflow
Run:100yr24hr-DEV Element:Pond B Result:Pool Elevation
Run:100yr24hr-DEV Element:Pond B Result:Combined Inflow

POND A5


Select a Paired Data
Select
Table
Graph
Elevation (FT)
Storage (AC-FT)
5509.0 0.000000
5510.0 0.718000
5511.0 1.534000
5512.0 2.450000
5513.0 3.476000
5514.0 4.610000
5515.0 5.847000
5516.0 7.200000
Select
Apply
Cancel


Summary Results for Sink "Pond A5"
Project: Catalonia Updated Simulation Run: 100yr24hr-DEV
Sink: Pond A5
Start of Run: 01Jan2000, 00:00
End of Run: 03Jan2000, 00:00
Compute Time: DATA CHANGED, RECOMPUTE
Basin Model: Catalonia
Meteorologic Model: 100yr24hr-DPM
Control Specifications: Control 1
Volume Units: IN AC-FT
Computed Results
Peak Discharge: 1.11792 (CFS)
Volume: 1.36332 (AC-FT)
Date/Time of Peak Discharge 01Jan2000, 13:14
Basin A1
e Pond 1
1.0

APPENDIX I:

MANUFACTURERS RECOMMENDATION

6560 Langfield Rd. Bldg. 3
Houston, Texas 77092
832-590-5300
832-590-5399 (fax)

September 13, 2018

12" – 108" Gasketed Joint Concrete Pipe (RCP)
Bernalillo Facility
Albuquerque, New Mexico

The 12" – 108" RCP rubber gasket pipe joint that is currently produced at our Bernalillo facility is designed to provide an adequate seal when the joint is not fully 'homed'. The allowable joint gaps that will still maintain an adequate seal for these sizes are listed below.

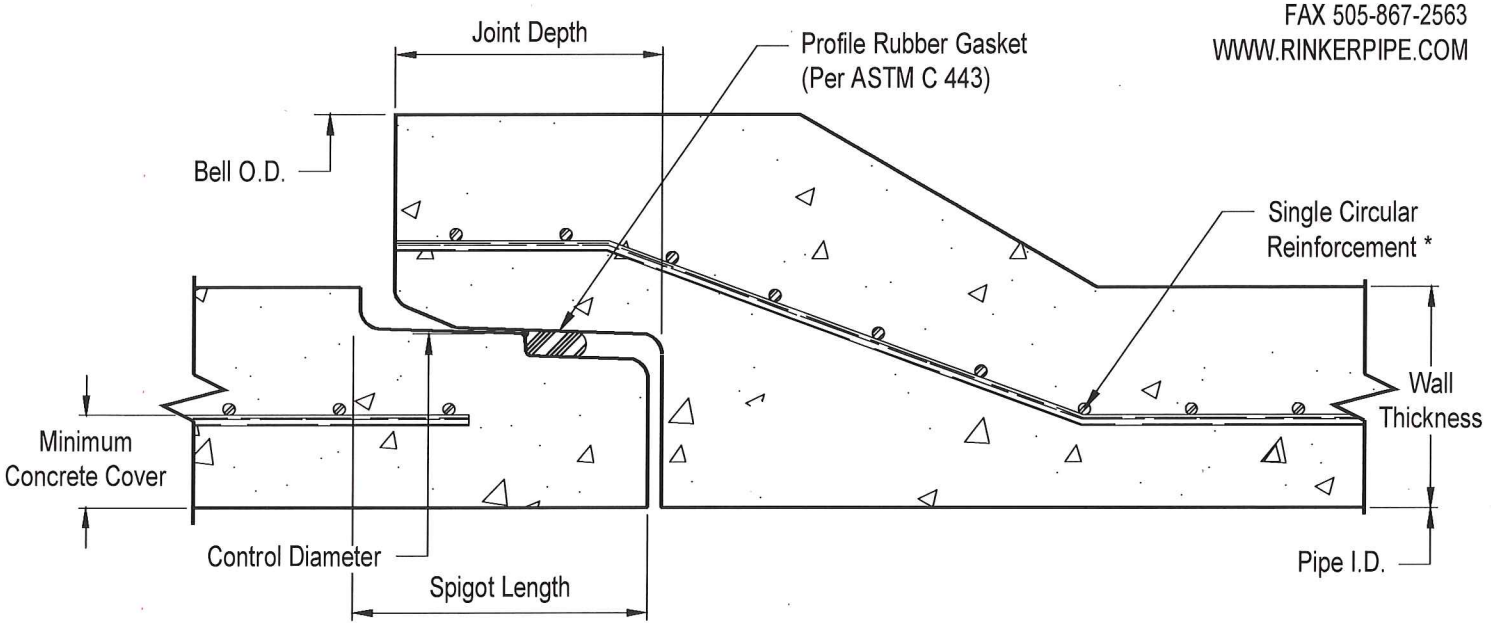
Pipe Diameter	Allowable Joint Gap
12"	0.75"
15"	0.75"
18"	0.75"
24"	0.75"
30"	1.00"
36"	1.00"
48"	1.00"
54"	1.00"
60"	1.00"
66"	1.00"
72"	1.00"
78"	1.00"
84"	1.00"
90"	1.00"
96	1.00"
102"	1.00"
108"	1.00"

Steve Hiner, P.E.
Director – Product Development/Corporate Engineer
Rinker Materials
6560 Langfield Road
Houston, TX 77092
832-590-5351 (work)
281-435-8237 (cell)
www.lovicks.hiner@rinkerpipe.com

Rinker MATERIALS™
A QUIKRETE® COMPANY

Concrete Pipe Division
ALBUQUERQUE, NM PIPE (BERNALILLO)
3700 HIGHWAY 528
BERNALILLO, NM 87004-6600
PHONE 505-867-2394
FAX 505-867-2563
WWW.RINKERPIPE.COM

Reinforced Concrete Pipe (RCP)
Single Offset Joint 12"Ø - 36"Ø Diameter



Section Thru Joint

12"Ø to 36"Ø RCP (Big Bell Single Offset Joint) w/ Single Cage Reinforcement								
Pipe I.D. (Nom.)	Wall Thickness	Joint Depth	Spigot Length	Control Diameter	Gasket Height	Bell O.D.	RCP Length	Weight (Lbs./Foot)
12"Ø	2" (B)	3 5/8"	3 3/4"	15 1/4"Ø	3/4"	20"Ø	8'	95
15"Ø	2 1/4" (B)	3 5/8"	3 3/4"	18 3/4"Ø	3/4"	23 7/8"Ø	8'	130
18"Ø	2 1/2" (B)	3 5/8"	3 3/4"	22 1/8"Ø	3/4"	27 3/4"Ø	8'	175
24"Ø	3" (B)	3 7/8"	4"	29"Ø	3/4"	35 1/2"Ø	8'	275
30"Ø	3 1/2" (B)	4 5/8"	4 3/4"	35 5/8"Ø	13/16"	42 1/4"Ø	8'	395
36"Ø	4" (B)	4 7/8"	5"	42 5/16"Ø	13/16"	50 1/4"Ø	8'	540
"X" RCP (size & class) are included as part of the submittal for the project identified on the cover letter herein.								

NOTES:

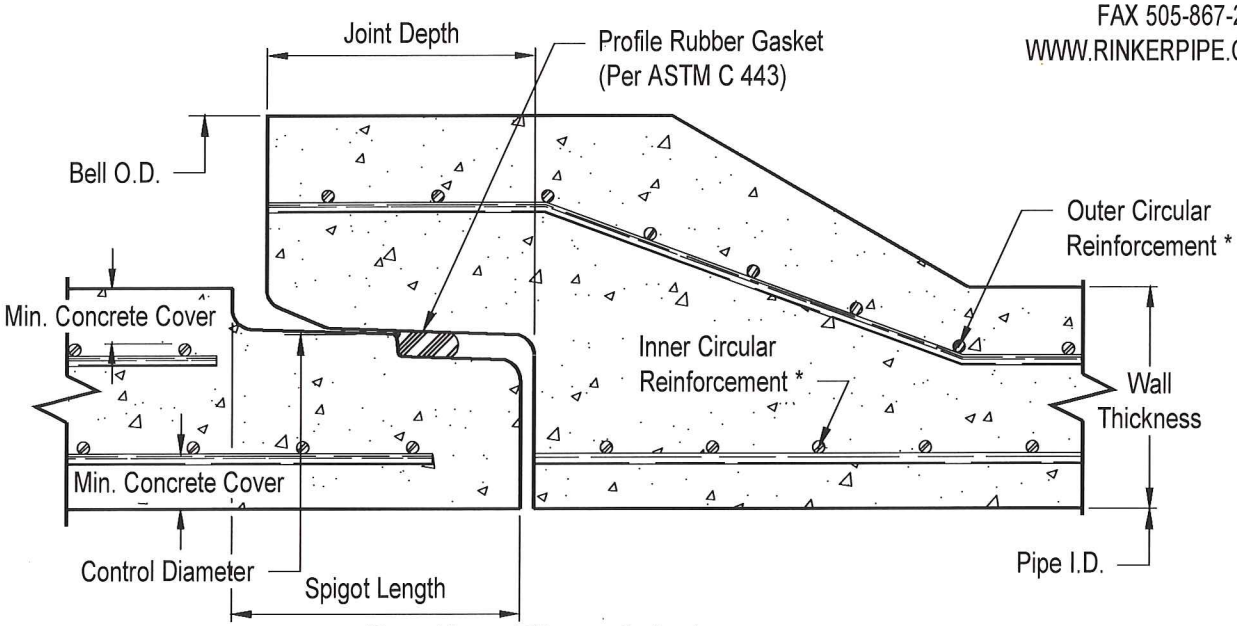
1. Reinforced Concrete Pipe (RCP) manufactured to meet ASTM C76 & AASHTO M170 specifications (latest edition). RCP strength classification requirements as per project requirements and or determined by a qualified engineer.
* 2. Product Data subject to change without notice, reinforcement shown may vary.
3. Profile rubber gaskets are furnished with the pipe and will meet the performance requirements of ASTM C443.
4. Consult a Rinker Materials representative for further details and information not shown.

Rinker MATERIALS™
A QUIKRETE® COMPANY

Concrete Pipe Division

ALBUQUERQUE, NM PIPE (BERNALILLO)
3700 HIGHWAY 528
BERNALILLO, NM 87004-6600
PHONE 505-867-2394
FAX 505-867-2563
WWW.RINKERPIPE.COM

Reinforced Concrete Pipe (RCP)
Single Offset Joint 30"Ø - 72"Ø Diameter



Section Thru Joint

30"Ø to 72"Ø RCP (Big Bell Single Offset Joint) w/ Double Cage Reinforcement

Pipe I.D. (Nom.)	Wall Thickness	Joint Depth	Spigot Length	Control Diameter	Gasket Height	Bell O.D.	RCP Length	Weight (Lbs./Foot)
30"Ø	3 1/2" (B)	4 5/8"	4 3/4"	35 5/8"Ø	13/16"	42 1/4"Ø	8'	395
36"Ø	4" (B)	4 7/8"	5"	42 5/16"Ø	13/16"	50 1/4"Ø	8'	540
42"Ø	4 1/2" (B)	5 1/4"	5 3/8"	49 5/16"Ø	13/16"	58"Ø	8'	705
48"Ø	5" (B)	5 1/2"	5 5/8"	55 5/16"Ø	13/16"	64"Ø	8'	895
54"Ø	6 1/4" (C)	5 1/2"	5 5/8"	61 1/4"Ø	13/16"	70"Ø	8'	1270
60"Ø	6 3/4" (C)	5 1/2"	5 5/8"	67 1/4"Ø	13/16"	76"Ø	8'	1525
66"Ø	7 1/4" (C)	5 1/2"	5 5/8"	73 1/4"Ø	13/16"	82"Ø	8'	1800
72"Ø	7 3/4" (C)	5 1/2"	5 5/8"	79 1/4"Ø	13/16"	88"Ø	8'	2090

"X" RCP (size & class) are included as part of the submittal for the project identified on the cover letter herein.

NOTES:

1. Reinforced Concrete Pipe (RCP) manufactured to meet ASTM C76 & AASHTO M170 specifications (latest edition). RCP strength classification requirements as per project requirements and or determined by a qualified engineer.
* 2. Product Data subject to change without notice, reinforcement shown may vary.
3. Profile rubber gaskets are furnished with the pipe and will meet the performance requirements of ASTM C443.
4. Consult a Rinker Materials representative for further details and information not shown.

Rinker MATERIALS™
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Concrete Pipe Division

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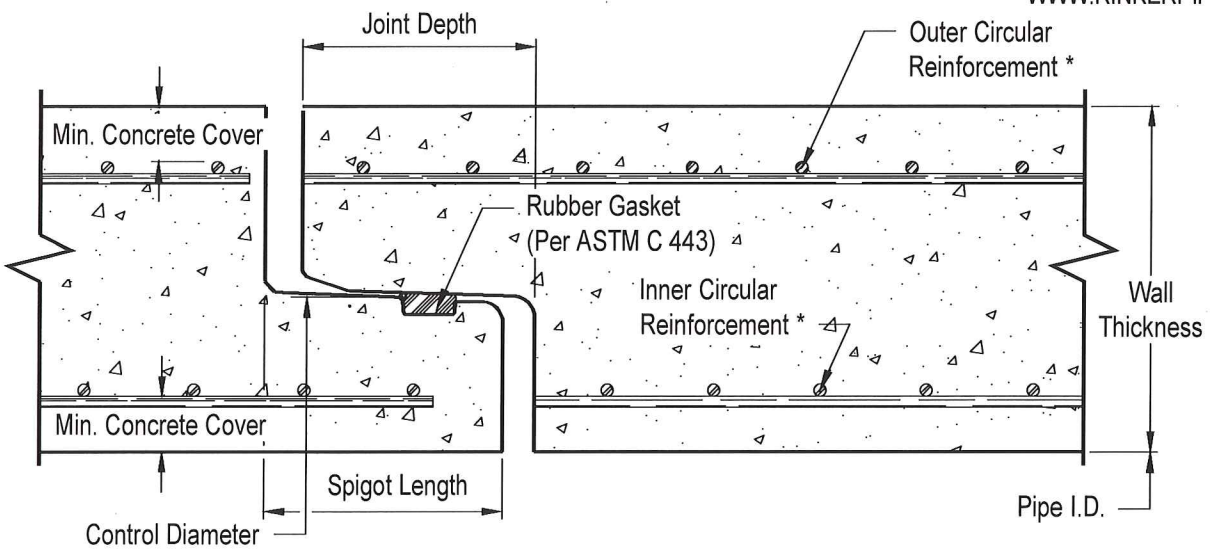
PHONE 505-867-2394
FAX 505-867-2563
WWW.RINKERPIPE.COM

Reinforced Concrete Pipe (RCP)
Rubber Gasket Joint 78"Ø - 96"Ø Diameter



Section Thru Joint

78"Ø to 96"Ø RCP (Flush Bell Rubber Gasket Joint) w/ Double Cage Reinforcement								
Pipe I.D. (Nom.)	Wall Thickness	Joint Depth	Spigot Length	Control Diameter	Gasket Height	Pipe O.D.	RCP Length	Weight (Lbs./Foot)
78"Ø	8 1/4" (C)	5 1/2"	5 5/8"	85 1/4"Ø	13/16"	94 1/2"Ø	8'	2410
84"Ø	8" (B)	5 3/4"	5 7/8"	91"Ø	13/16"	100"Ø	8'	2490
90"Ø	8 1/2" (B)	6 1/8"	6 1/4"	97 1/2"Ø	13/16"	107"Ø	8'	2830
96"Ø	9" (B)	6 5/8"	6 3/4"	104"Ø	13/16"	114"Ø	8'	3195
"X" RCP (size & class) are included as part of the submittal for the project identified on the cover letter herein.								

NOTES:

1. Reinforced Concrete Pipe (RCP) manufactured to meet ASTM C76 & AASHTO M170 specifications (latest edition). RCP strength classification requirements as per project requirements and or determined by a qualified engineer.
* 2. Product Data subject to change without notice, reinforcement shown may vary.
3. Rubber gaskets are furnished with the pipe and will meet the performance requirements of ASTM C443.
4. Consult a Rinker Materials representative for further details and information not shown.

Curved Alignment

Changes in direction of sewer lines are usually accomplished at manhole structures. Grade and alignment changes in concrete pipe sewers, however, can be incorporated into the line through the use of deflected straight pipe, radius pipe or specials.

DEFLECTED STRAIGHT PIPE

With concrete pipe installed in straight alignment and the joints in a home (or normal) position, the joint space, or distance between the ends of adjacent pipe sections, is essentially uniform around the periphery of the pipe. Starting from this home position any joint may be opened up to the maximum permissible on one side while the other side remains in the home position. The difference between the home and opened joint space is generally designated as the pull. The maximum permissible pull must be limited to that opening which will provide satisfactory joint performance. This varies for different joint configurations and is best obtained from the pipe manufacturer.

The radius of curvature which may be obtained by this method is a function of the deflection angle per joint (joint opening), diameter of the pipe and the length of the pipe sections.

The radius of curvature is computed by the equation:

$$R = \frac{L}{2\left(\text{TAN}\,\frac{1}{2}\,\frac{\Delta}{N}\right)} \qquad (1)$$

where:

- R = radius of curvature, feet
- L = length of pipe sections measured along the centerline, feet
- Δ = total deflection angle of curve, degrees
- N = number of pipe with pulled joints
- $\frac{\Delta}{N}$ = total deflection of each pipe, degrees

From Figure 1, the deflection angle $\frac{1}{2}\,\frac{D}{N}$ is further defined as:

$$\frac{1}{2}\,\frac{\Delta}{N} = \text{SIN}^{-1}\,\frac{\text{PULL}}{2(D + 2t)} \text{ or } \text{SIN}^{-1}\,\frac{\text{PULL}}{2B_c} \qquad (2)$$

where:

- PULL = joint opening, inches
- D = inside pipe diameter, inches
- t = wall thickness, inches

Figure 1 Deflected Straight Pipe

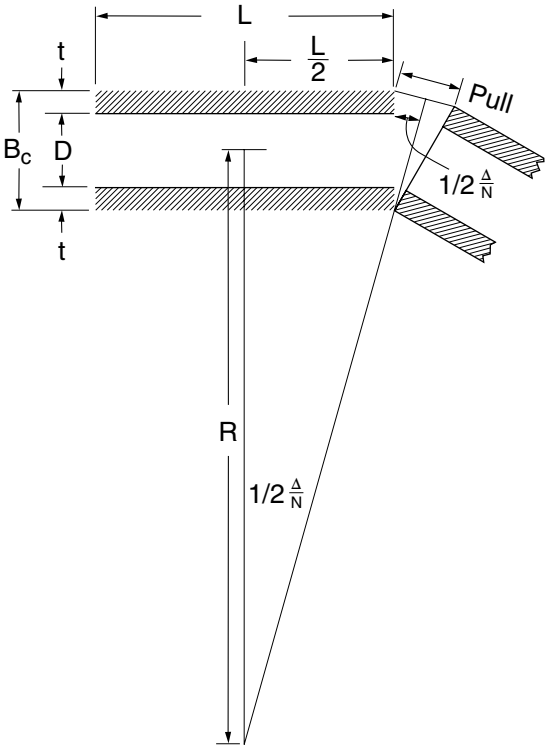
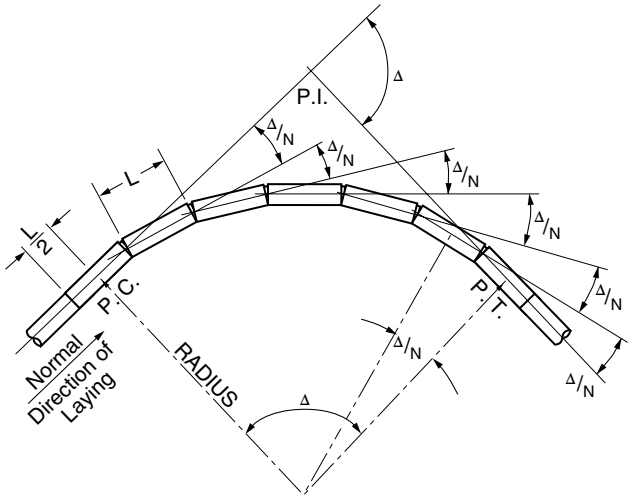


Figure 2 Curved Alignment Using Deflected Straight Pipe



B_c = outside pipe diameter, inches

The joint opening and pipe length required to provide a curved pipeline alignment may be calculated using the unit values found in Table 1 on page 3. The table tabulates the radius of a pipeline constructed of standard eight-foot laying length pipe with a 1-inch joint opening (PULL). Other pipeline radii may be calculated by changing, first, the joint opening, and if necessary, the pipe laying length. An eight-foot laying length is standard for most concrete pipe manufacturers. Other lengths may require special manufacturing procedures. Changes in the design radius are directly proportional to the pipe laying length and inversely proportional to the joint opening. The specific pull per pipe joint is found by the equation:

$$PULL_x = \left(\frac{L_x}{L_8}\right)\left(\frac{R_u}{R_x}\right)\left(PULL_8\right) \quad (3)$$

$$R_x = (L_x/L_8)(PULL_8/PULL_x)\, R_u \quad (4)$$

where:

PULL = the joint opening
Ru = the Unit Radius (Taken from Table 1)
Lx = Length of deflected pipe

Specific radii may be calculated by the following procedure:

- Select the unit radius of curvature for the specified diameter pipe from the chart.
- Increase or decrease the joint opening (PULL) in Equation 1 to obtain the design radius. If the required joint opening exceeds the pipe manufacturers recommendations, select a pipe with a shorter laying length. Four and six foot are common non-standard pipe lengths. Check with the pipe manufacturer for availability of non-standard lengths.
- Recalculate the pull for the shorter pipe.

As illustrated in Figure 2, when concrete pipe is installed on curved alignment using deflected straight pipe, the point of curve (P.C.) is at the midpoint of the last undeflected pipe section and the point of tangent (P.T.) is at the midpoint of the last pulled pipe.

RADIUS PIPE

Radius pipe, also referred to as bevelled or mitered pipe, incorporates the deflection angle into the pipe joint. The pipe is manufactured by shortening one side of the pipe. The amount of shortening or drop for any given pipe is dependent on manufacturing feasibility. Because of the possibility of greater deflection angles per joint, sharper curvature with correspondingly shorter radii can be obtained with radius pipe than with deflected straight pipe. As in the case of deflected straight pipe, the radius of curvature which may be obtained by radius pipe is a function of the deflection angle per joint, diameter of the pipe, length of pipe sections and wall thickness.

The radius of curvature is computed by the equation:

$$R = \frac{L}{\text{TAN}\ \frac{\Delta}{N}} - \left(\frac{D}{2} + t\right) \quad (5)$$

where:

Δ = total deflection angle of curve, degrees
N = number of radius pipe
L = standard pipe length being used, feet
$\frac{\Delta}{N}$ = total deflection angle of each pipe

From Figure 3, the radius of curvature can be expressed in terms of the drop and is given by the equation:

$$R = \frac{L(D + 2t)}{DROP} - \left(\frac{D}{2} + t\right) \quad (6)$$

$$R = B_c\left(\frac{L}{DROP} - \frac{1}{2}\right) \quad (7)$$

$$DROP = \frac{LB_c}{R + B_{c/2}} \quad (8)$$

where:

B_c = outside diameter of the pipe, feet

Figure 5 presents R/Bc ratios for drops from one inch through 15 inches and commonly manufactured pipe lengths. **Since the maximum permissible drop for any given pipe is dependent on manufacturing feasibility, it is essential to coordinate the design of radius pipe with the pipe manufacturer. Many manufacturers have standardized joint configurations and deflections for specific radii and economics may be realized by utilizing standard radius pipe.**

As illustrated in Figure 4, when concrete pipe is installed on curved alignment using radius pipe, the pipe sections are oriented such that the plane of the dropped joint is tangent to the theoretical circular curve. Projection of the joints do not converge at a common point, but are tangents to a common circle of diameter equal to the length of pipe sections. The point of curve (P.C.) is at the midpoint of the last straight pipe and the point of tangent (P.T.) is one half of the standard pipe length back from the straight end of the last radius pipe. The required number of pieces of radius pipe is equal to the length of the circular curve in feet divided by the centerline length of the radius pipe (L-1/2 DROP). Where possible, minor modifications in the radius are normally made so this quotient will be a whole number.

Minimum radius of curvature obtained from equations (1) and (5) are approximate, but are within a range of accuracy that will enable the pipe to be readily installed to fit the required alignment. A reasonable amount of field adjustment is possible for radius pipe by pulling the joints in the same manner as with deflected straight pipe.

BENDS AND SPECIAL SECTIONS

Special precast sections can be used for extremely

short radius curves which cannot be negotiated with either deflected straight pipe or with conventional radius pipe. Sharper curves can be handled by using special short lengths of radius pipe rather than standard lengths. These may be computed in accordance with the methods discussed for radius pipe. Certain types of manufacturing processes permit the use of a dropped joint on both ends of the pipe, which effectively doubles the deflection. Special bends, or elbows can be manufactured to meet any required deflection angle and some manufacturers produce standard bends which provide given angular deflection per section.

One or more of these methods may be employed to meet the most severe alignment requirements. **Since manufacturing processes and local standards vary, local concrete pipe manufacturers should be consulted to determine the availability and geometric configuration of special sections.**

The following example illustrates proper use of the Tables and Figures.

Given: A 42-inch diameter concrete pipe storm sewer is to be installed on curved alignment corresponding to the roadway curvature. The pipe will be manufactured in 7-1/2 foot lengths with a 4-1/2-inch wall thickness. The curve data for the roadway curb is:

point of intersection station	P.I.	= 50+00
point of curve station	P.C.	= 49+29.6
point of tangent station	P.T.	= 50+63.1
total deflection angle	Δ	= 45°
radius of curvature	R	= 170 feet

Find: The required pull per joint for deflected straight pipe or the required drop for radius pipe.

Solution: From Table 1, for a 42-inch diameter pipe, the radius of curvature for a 1-inch pull is 408 feet. The required pull for 170 feet is:

$$PULL_X = \left(\frac{7.5}{8}\right)\left(\frac{408}{170}\right)(1) = 1.125"$$

To evaluate the required drop for radius pipe to negotiate the roadway curvature, it is first necessary to calculate the R/Bc ratio:

$$\frac{R}{B_c} = \frac{170}{4.25} = 40$$

Enter Figure 5 on the vertical scale at R/Bc 40. Proceed horizontally until the line representing L = 7.5 feet is intersected. At this point the horizontal scale shows the required drop to be 2.2 inches. Or

$$\text{Drop} = \frac{(7.5)\ (4.25)}{170 + 4.25/2} = 0.185 \text{ ft.} = 2.2 \text{ in.}$$

Answer: Radius pipe with a 2-1/4-inch drop would be required. **It is important to consult local concrete pipe manufacturers to determine the feasibility of manufacturing a 42-inch diameter pipe with the required drop.**

Figure 3 Radius Pipe

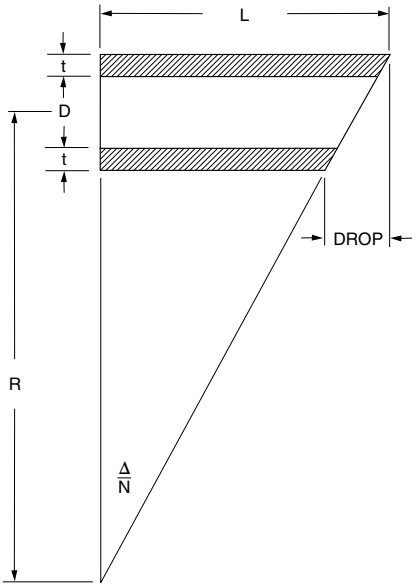


Figure 4 Curved Alignment Using Radius Pipe

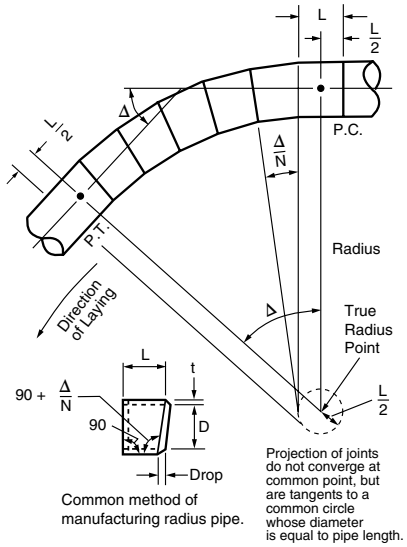
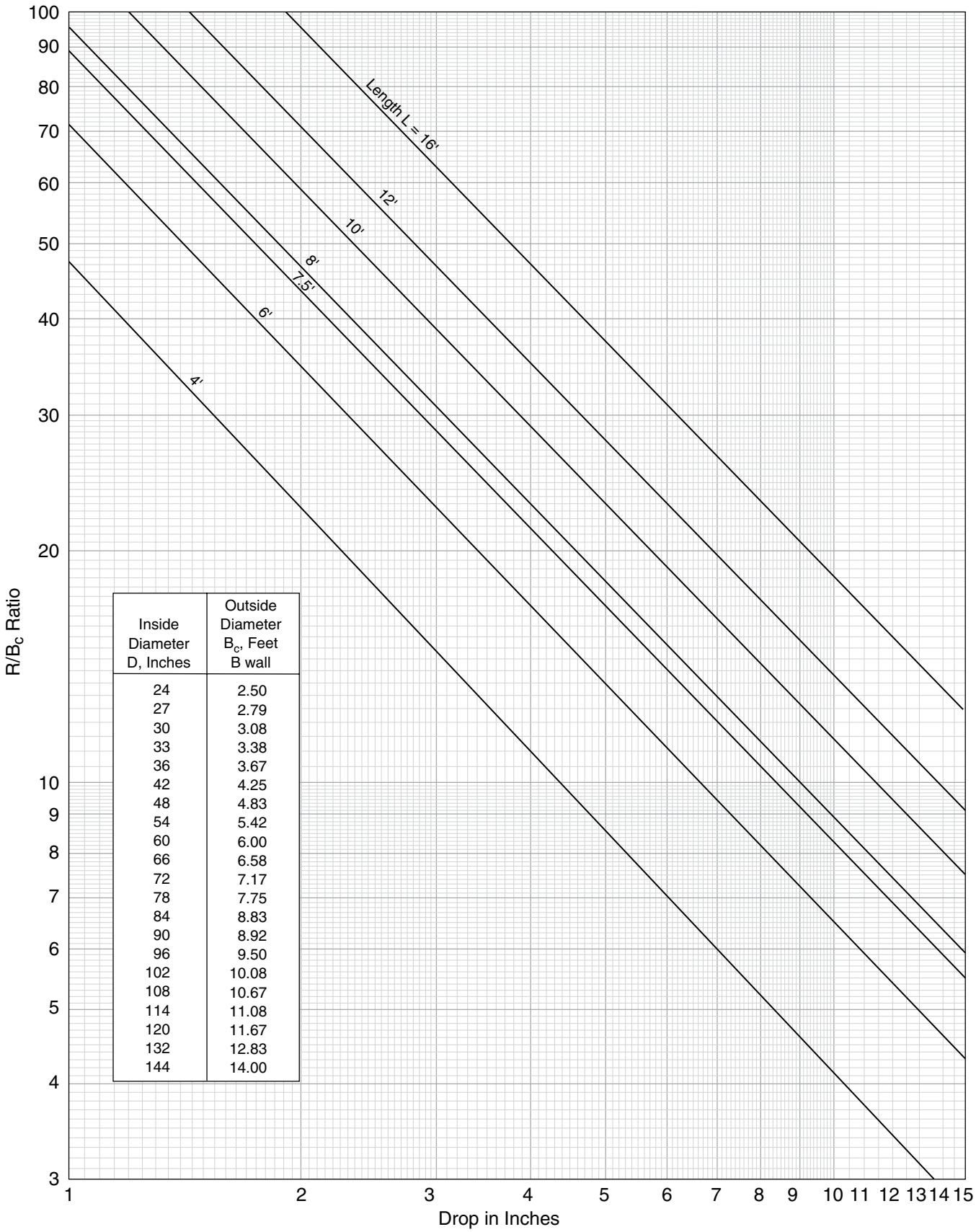


Table 1 Unit Radius of Curature For 8-Foot Straight Deflected Pipe With 1" Pull

Size	12	15	18	20	24	27	30	33	36	42	48	54	60	66	72	78	84	90	96
Radius	128	156	184	212	240	268	286	364	352	408	464	520	576	632	688	744	780	856	912

Figure 5 Radius of Curature For Radius Pipe



Inside Diameter D, Inches	Outside Diameter B_c, Feet B wall
24	2.50
27	2.79
30	3.08
33	3.38
36	3.67
42	4.25
48	4.83
54	5.42
60	6.00
66	6.58
72	7.17
78	7.75
84	8.83
90	8.92
96	9.50
102	10.08
108	10.67
114	11.08
120	11.67
132	12.83
144	14.00

SD SIZE	PULL* (in)	D (inside dia)	t (wall thickness)	Bc	1/2 *theta/N	R (ft)
	(max joint gap)[1]	(in)	(in)	Outer dia (in)		
18"	0.7500	18	2 1/2	23	0.9342	245
24"	0.7500	24	3	30	0.7162	320
30"	1.0000	30	3 1/2	37	0.7743	296
36"	1.0000	36	4	44	0.6511	352
42"	1.0000	42	4 1/2	51	0.5617	408

[1] Allowable joint gap provided by Rinker 09-13-18

* max joint gap suggested by manufacturer
is 1/2 Dimension "A" + 3/8"

$$\text{min Radius}^{**} = \frac{L}{2(\tan 1/2^{*}\ \text{theta}/N)}$$

** see formula on enclosed data sheet for american concrete pipe association

$$1/2\ ^{*}\text{theta}/N = \sin^{-1}{}^{*}\ \text{sin-1}\ ^{*}\ \frac{(\text{PULL})}{2\text{Bc}}$$

D= inside pipe diameter
t=wall thickness

EXHIBITS

EXHIBIT A: PRELIMINARY PLAT

EXHIBIT B: ORIGINAL DEVELOPED CONDITIONS BASIN MAP FROM DMP

EXHIBIT C: EXISTING BASIN MAP

EXHIBIT D: PROPOSED BASIN MAP

EXHIBIT E: STORM DRAIN NETWORK

EXHIBIT F: GRADING PLAN

EXHIBIT A:

PRELIMINARY PLAT

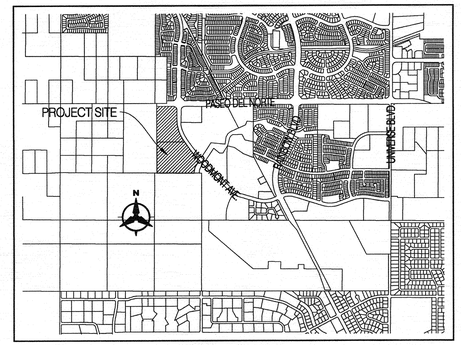
Bohannan Huston

PRELIMINARY PLAT
CATALONIA

REPLAT OF TRACT 1 AND TRACT 2 THE TRAILS UNIT 3A

ALBUQUERQUE, NEW MEXICO

MARCH, 2019



LOCATION MAP
SCALE: 1"=2000'

Zone Atlas Index Number: C-08

PASEO DEL NORTE

(TIE) S72°20'38"E 2625.42'

ACS MONUMENT "UNION"
GEOGRAPHIC POSITION (NAD 1983)
NM STATE PLANE COORDINATES (CENTRAL ZONE)
N=1,523,503.475 U.S. SURVEY FEET
E=1,493,655.03 U.S. SURVEY FEET
GROUND TO GRID FACTOR = 0.99966436
DELTA ALPHA = -00°16'58.96"
ELEVATION = 5524.95 U.S. SURVEY FEET

TRACT 3
THE TRAILS UNIT 3A
FILED: DEC. 21, 2007
(2007C-0352)

TRACT 5
BLACK RANCH
UNPLATTED

TRACT 1
THE TRAILS UNIT 3A
FILED: DEC. 21, 2007
(2007C-0352)

SHEET 3
SHEET 2

SHEET 3
SHEET 2

TRACT 4
THE TRAILS UNIT 3A
FILED: DEC. 21, 2007
(2007C-0352)

WOODMONT AVE.

TRACT OS-2
THE TRAILS UNIT 3A
FILED: DEC. 21, 2007
(2007C-0352)

TRACT 2
THE TRAILS UNIT 3A
FILED: DEC. 21, 2007
(2007C-0352)

TRACT 5
BLACK RANCH
UNPLATTED

(TIE) N01°19'17"E 698.73'

TRACT 6
THE TRAILS UNIT 3A
FILED: DEC. 21, 2007
(2007C-0352)

R-1-B ZONING
R-1-D ZONING

TRACT OS-1
THE TRAILS UNIT 3A
FILED: DEC. 21, 2007
(2007C-0352)

ACS MONUMENT "UNION"
GEOGRAPHIC POSITION (NAD 1983)
NM STATE PLANE COORDINATES (CENTRAL ZONE)
N=1,523,503.475 U.S. SURVEY FEET
E=1,493,655.03 U.S. SURVEY FEET
GROUND TO GRID FACTOR = 0.99966436
DELTA ALPHA = -00°16'58.96"
ELEVATION = 5524.95 U.S. SURVEY FEET

TRACT 5
BLACK RANCH
UNPLATTED

TRACT 7A
THE TRAILS UNIT 3A
FILED: DEC. 21, 2007
(2007C-0352)

PLAT IS LOCATED WITHIN TOWN OF ALAMEDA GRANT, PROJECTED SECTIONS 16 & 17, TOWNSHIP 11 NORTH, RANGE 2 EAST, NEW MEXICO PRINCIPAL MERIDIAN, CITY OF ALBUQUERQUE, BERNALILLO COUNTY, NEW MEXICO.

LEGEND

- BOUNDARY LINE
- TRACT LINE
- ADJOINING PROPERTY LINE
- EXISTING EASEMENT
- PROJECT SITE

N

100 50 0 100

SCALE: 1"=100'

SURVEY NOTES:

1. UNLESS OTHERWISE NOTED, ALL BOUNDARY CORNERS SHOWN THUS (●) SHALL BE MARKED BY A #5 REBAR STAMPED "HUGG, PS 9750".
2. ALL STREET CENTERLINE MONUMENTATION SHALL BE INSTALLED AT ALL CENTERLINE PC'S, PT'S, ANGLE POINTS AND STREET INTERSECTIONS AND SHOWN THUS (▲) WILL BE MARKED BY A FOUR (4") ALUMINUM CAP STAMPED "CITY OF ALBUQUERQUE CENTERLINE MONUMENTATION MARKED. DO NOT DISTURB, P.L.S. 9750".
3. THE SUBDIVISION BOUNDARY WILL BE TIED TO THE NEW MEXICO STATE PLANE COORDINATE SYSTEM AS SHOWN.
4. BASIS OF BEARINGS WILL BE NEW MEXICO STATE PLANE GRID BEARINGS.
5. DISTANCES SHALL BE GROUND DISTANCES.
6. MANHOLES WILL BE OFFSET AT ALL POINTS OF CURVATURE POINTS OF TANGENCY, STREET INTERSECTIONS AND ALL OTHER ANGLE POINTS TO ALLOW THE USE OF CENTERLINE MONUMENTATION.

APPROVED FOR MONUMENTATION AND STREET NAMES

Steven M. Rienbrock P.S. 3/28/19
CITY SURVEYOR DATE

3/28/19
DATE

PV TRAILS ALBUQUERQUE, LLC
ITS MANAGER
PV GENERAL PARTNER, LLC
ANDREW M. KAPLAN, MANAGER

SHEET 1 of 3

Bohannan Huston
www.bhinc.com 800.877.5332

Wed, 27-Mar-2019 - 8:18:am, Plotted by: AROMERO
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PRELIMINARY PLAT
CATALONIA

REPLAT OF TRACT 1 AND TRACT 2 THE TRAILS UNIT 3A

ALBUQUERQUE, NEW MEXICO

MARCH, 2019

BOUNDARY CURVE TABLE						
ID	ARC	RADIUS	DELTA	TANGENT	CHORD LENGTH	CHORD DIRECTION
C1	157.10'	100.00'	90°00'43.31"	100.02'	141.436	S44° 48' 26.34"E
C2	649.92'	1049.00'	35°29'52.79"	335.77'	639.570	S17° 33' 01.08"E
C3	317.65'	2049.00'	8°52'57.01"	159.15'	317.336	S39° 44' 25.98"E

LEGAL DESCRIPTION:
A REPLAT OF :
TRACT '1' AND TRACT '2'
THE TRAILS UNIT 3A
FILED: DEC 21, 2007 (2007C-0352)

1. EXISTING ZONING: R-1B AND R-1D (LOT 7-16, 31 & 32)
   PROPOSED ZONING: NO CHANGE
   PROPOSED RESIDENTIAL DEVELOPMENT:
   SINGLE FAMILY DETACHED RESIDENTIAL

2. TOTAL ACREAGE:
   EXISTING TRACT '1' = 13.9033 ACRES
   EXISTING TRACT '2' = 20.2878 ACRES

   ACREAGE:
   TRACT '1' = 0.7055 Acres
   TRACT '2' = 0.0997 Acres
   TRACT '3' = 0.0500 Acres
   TRACT '4' = 0.2307 Acres
   TRACT '5' = 0.0220 Acres
   TRACT '6' = 0.0196 Acres
   TRACT '7' = 0.0740 Acres
   TRACT '8' = 0.1456 Acres
   TRACT '9' = 0.0130 Acres
   TRACT '10' = 13.7197 Acres

   NUMBER OF LOTS: CATALONIA = 78
   SUBDIVISION ACREAGE: CATALONIA = 20.4376
   PROPOSED DENSITY: 3.82 D.U./ACRE

3. MINIMUM LOT DIMENSIONS R-1A R-1D
   55' x 120' 75' x 133.333'
   MINIMUM LOT AREA 6600 S.F. 10,000 S.F.

4. SEWER AND WATER ARE PUBLIC TO BE OWNED AND MAINTAINED BY THE ALBUQUERQUE BERNALILLO COUNTY WATER UTILITY AUTHORITY. STREET AND STORM DRAIN IMPROVEMENTS ARE PUBLIC TO BE OWNED AND MAINTAINED BY THE CITY OF ALBUQUERQUE

5. LOT SETBACKS SHALL CONFORM TO R-1B AND R-1D (LOT 7-16, 31 & 32) ZONE REGULATIONS.

6. TRACTS 1-9 WILL BE OWNED AND MAINTAINED BY TRAILS COMMUNITY ASSOCIATION INC.

7. NO LOTS ARE ALLOWED DIRECT ACCESS TO WOODMONT AVE.

MATCH LINE SEE SHEET 3

MATCH LINE SEE SHEET 3

EXISTING 50' PUBLIC ROADWAY AND DRAINAGE EASEMENT GRANTED TO THE CITY OF ALBUQUERQUE AND EXISTING 50' PUBLIC WATER AND SANITARY SEWER EASEMENT GRANTED TO NMUI BY PLAT FILED MARCH 16, 2006 IN BOOK 2006C, PAGE 85 TO BE VACATED WITH THE FINAL PLAT (HATCHED AREA)

EXISTING 98' PUBLIC R/W DEDICATED TO THE CITY OF ALBUQUERQUE BY PLAT FILED MARCH 16, 2006 IN PLAT BOOK 2006C, PAGE 85

TRACT 4 THE TRAILS UNIT 3A FILED: DEC. 21, 2007 (2007C-0352)

TRACT OS-2 THE TRAILS UNIT 3A FILED: DEC. 21, 2007 (2007C-0352)

TRACT OS-1 THE TRAILS UNIT 3A FILED: DEC. 21, 2007 (2007C-0352)

TRACT 5 BLACK RANCH UNPLATTED

TRACT 5 BLACK RANCH UNPLATTED

TRACT 'A' THE TRAILS UNIT 3A FILED: DEC. 21, 2007 (2007C-0352)

25' SANITARY SEWER EASEMENT GRANTED TO THE CITY OF ALBUQUERQUE WITH THE FINAL PLAT

R-1-B ZONING
R-1-D ZONING

GRONA AVENUE
MATARO ROAD
TARRAGONA ROAD
MANRESA DRIVE
TORTOSA DRIVE
CAMBRES DRIVE
WOODMONT AVE.
BELLATERRA ST.

TRACT 10
TRACT 9
TRACT 8
TRACT 7
TRACT 6
TRACT 5
TRACT 4
TRACT 3
TRACT 2
TRACT 1

N0° 02' 45"W 1865.82'
S89° 48' 48"E 778.81'
R=399.50'
R=1193.5'
R=200'
R=2193.5'
R=75'
R=150'
S35° 20' 35"W 306.54'
S10° 36' 24"W 174.46'
N89° 41' 41"W 1033.20'

LEGEND	
	BOUNDARY LINE
	TRACT LINE
	ADJOINING PROPERTY LINE
	EXISTING EASEMENT
	PROPOSED EASEMENT

N

60 30 0 60
SCALE: 1"=60'

Thu, 28-Mar-2019 - 8:22:pm, Plotted by: AROMERO
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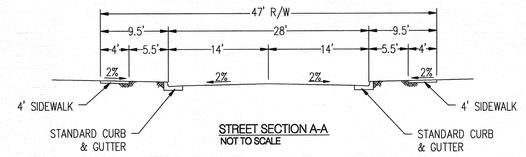
Bohannan Huston
www.bhinc.com 800.877.5332

PRELIMINARY PLAT
CATALONIA

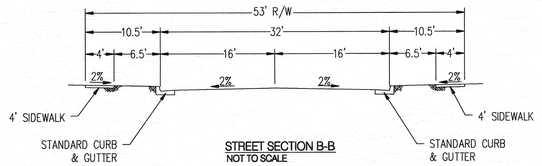
REPLAT OF TRACT 1 AND TRACT 2
THE TRAILS UNIT 3A

ALBUQUERQUE, NEW MEXICO

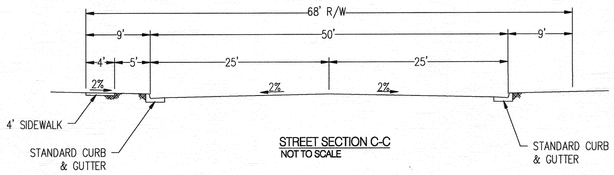
MARCH, 2019



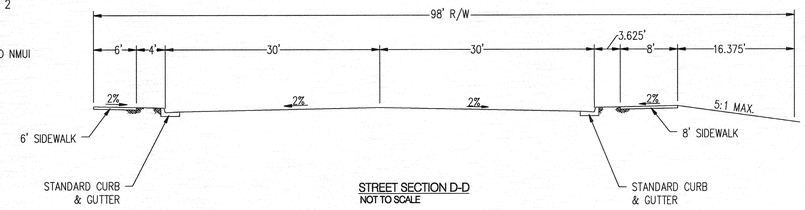
STREET SECTION A-A
NOT TO SCALE



STREET SECTION B-B
NOT TO SCALE



STREET SECTION C-C
NOT TO SCALE



STREET SECTION D-D
NOT TO SCALE

LEGEND

- BOUNDARY LINE
- TRACT LINE
- ADJOINING PROPERTY LINE
- EXISTING EASEMENT
- PROPOSED EASEMENT

SHEET 3 of 3

Bohannan Huston
www.bhinc.com 800.877.5332

Thu, 28-Mar-2019 - 8:22:pm, Plotted by: AROMERO
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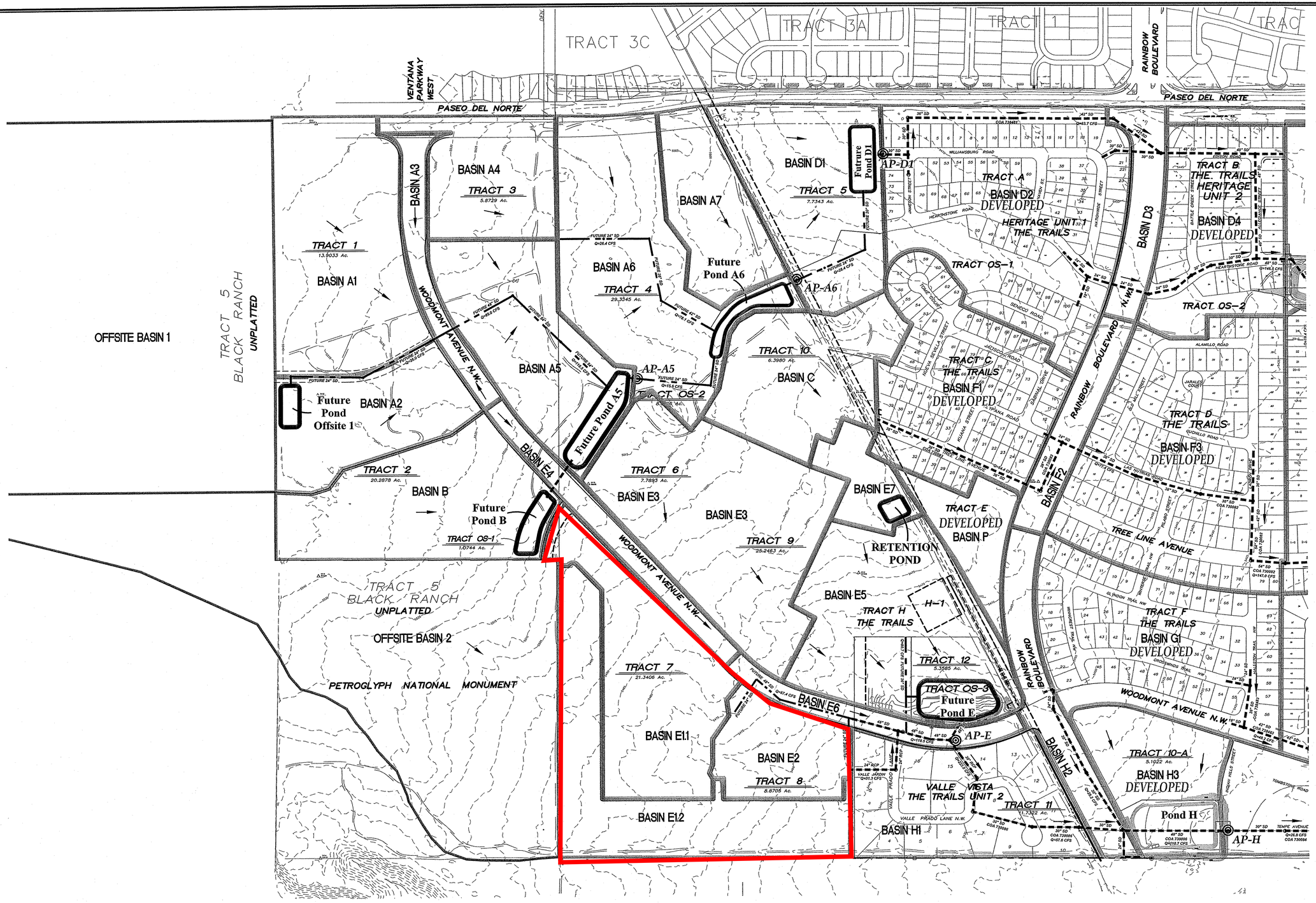
EXHIBIT B:

ORIGINAL DEVELOPED CONDITIONS BASIN MAP

FROM DMP

Bohannan Huston



NOTES:

1. STORM DRAIN SIZES BASED ON 100-YR, 24-HR STORM FLOWS. FUTURE PROJECTS MAY BE REQUIRED TO INCREASE STORM DRAIN SIZE BASED ON 100-YR, 6-HR STORM FLOWS.
2. THE INTENDED FUTURE CONTRIBUTION FROM THE TRAILS UNIT 4 IS 20 CFS TO THE MAXIMUM DOWNSTREAM DISCHARGE OF 62 CFS IN UNIVERSE BLVD.

LEGEND

- ANALYSIS POINT
- EXISTING STORM DRAIN
- FLOW DIRECTION
- FUTURE DEVELOPED STORM DRAIN

N

200' 100' 0 200' 400'

SCALE: 200'

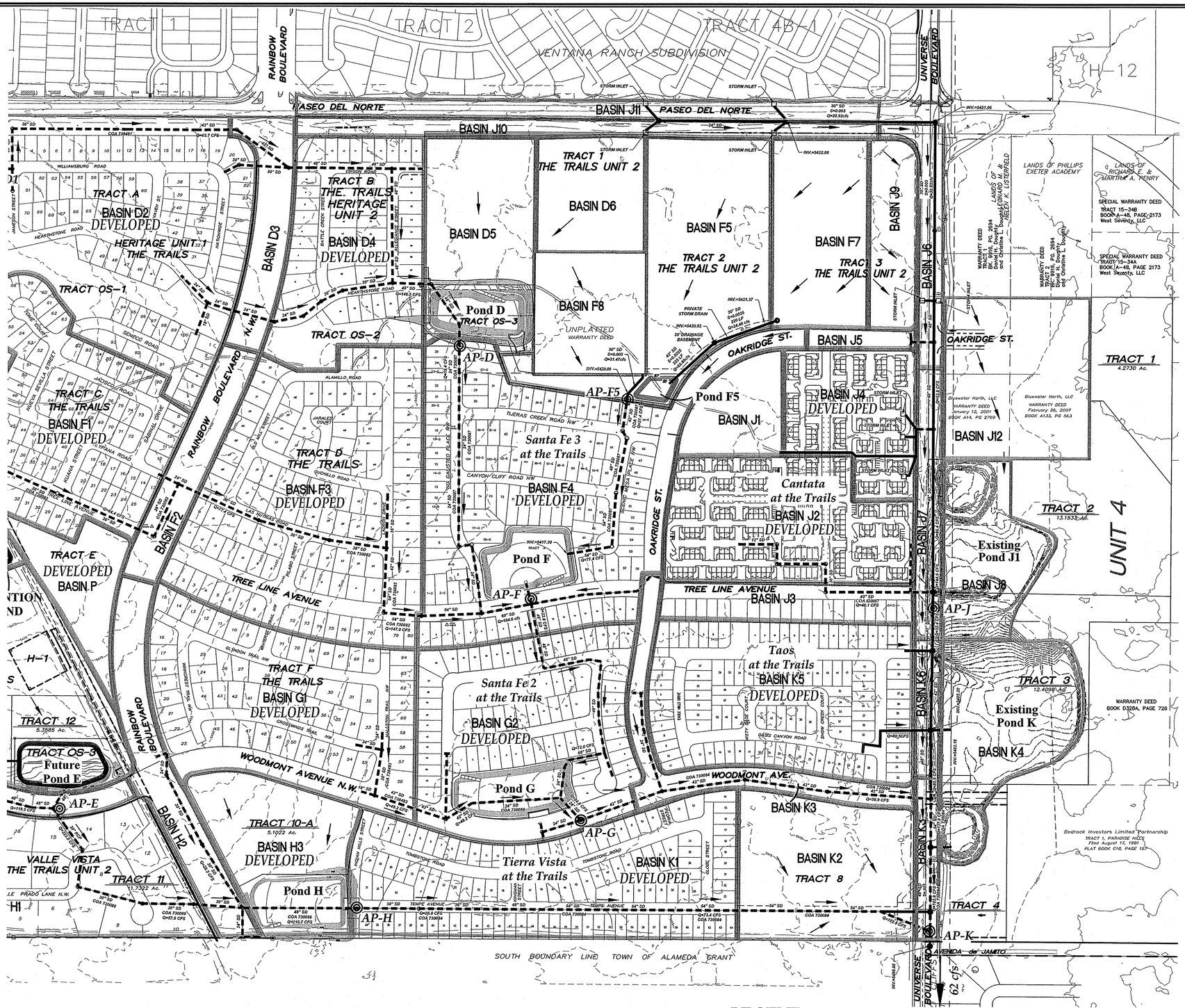
DATUM NAVD 1929

Thompson Engineering Consultants, Inc.
tecnm@yahoo.com
P.O. BOX 65760 ALBUQUERQUE, NM 87193
PHONE: (505) 271-2199 FAX: (505) 830-9248

UPDATE TO THE AMENDMENT TO DMP FOR THE TRAILS UNITS, 1, 2 AND 3

PLATE 1

NEW MEXICO 9677 REGISTERED PROFESSIONAL ENGINEER



DETENTION POND CHARACTERISTICS

POND	DRAIN AREA (AC)	Q100 IN (CFS)	Q100 OUT (CFS)	BYPASS Q (CFS)	MAX VOL (ac-ft)	V100 (ac-ft)	TOP ELEV	BOTTOM ELEV	WSEL
OFF 1	127.9	37.00	9.25		2.44	2.302	6	0	5.80
A5	179.6	121.19	16.29		4.61	4.256	5516	5511	5515.76
A6	204.2	84.21	16.19		4.72	3.241	5506	5500	5504.73
B	12.8	34.80	3.36		0.99	0.930	5519	5515	5518.86
D1	222.5	65.02	14.46		6.06	5.360	5475	5471	5474.48
D	274.7	146.48	5.93	13.77	6.24	4.035	5436.9	5429.5	5435.03
E	118.2	194.46	20.22		7.17	6.412	5452	5440	5451.44
F5	18.9	62.89	19.84		1.40	1.386	5426	5421	5425.97
F	373.1	259.49	17.58	6.20	11.76	10.293	5424.3	5415.08	5423.51
G	405.5	111.28	7.00	17.61	7.21	2.948	5422.5	5415.67	5419.83
H	149.8	97.80	4.50	21.60	3.02	2.205	5422	5418.65	5421.42
J	57.9	141.18	6.05	26.34	7.94	3.771	5417	5414	5415.66
K	670.8	239.15	15.75	44.91	14.84	8.346	5409	5404.85	5407.77

ANALYSIS POINT PEAK FLOWS

ANALYSIS POINT	PEAK FLOW
AP-A5	16.29 CFS
AP-A6	16.19 CFS
AP-D1	14.46 CFS
AP-D	19.42 CFS
AP-E	20.22 CFS
AP-F5	27.40 CFS
AP-F	23.78 CFS
AP-G	24.61 CFS
AP-H	26.10 CFS
AP-J	32.39 CFS
AP-K	60.66 CFS

DEVELOPED DRAINAGE BASIN CHARACTERISTICS

BASIN	AREA	LAND TREATMENT				Q	VOL
	ACRES	A	B	C	D	CFS	AC-FT
OFFSITE 1	127.87	100	0	0	0	37.00	4.426
A1	13.50	0	12.5	12.5	75	51.68	2.610
A2	8.52	0	33	33	34	23.43	0.960
A3	3.21	0	5	5	90	11.41	0.606
A4	7.59	0	7.5	7.5	85	26.39	1.381
A5	11.71	0	17	17	66	37.55	1.829
A6	16.97	0	19	19	62	53.44	2.558
A7	6.75	0	12.5	12.5	75	22.52	1.137
C	9.08	12.8	28.4	28.4	30.4	23.20	0.935
D1	11.62	0	19	19	62	36.60	1.752
D2	22.12	0	28.5	28.5	43	63.65	2.763
D3	3.71	0	5	5	90	13.18	0.701
D4	12.55	0	28.5	28.5	43	36.13	1.568
D5	8.75	0	23	23	54	26.55	1.224
D6	5.00	0	18	18	64	15.89	0.764
F1	14.13	0	21.7	21.8	56.5	43.39	2.025
F2	3.67	0	5	5	90	13.02	0.692
F3	22.80	0	21.7	21.8	56.5	70.02	3.267
F4	24.91	0	25	25	50	74.16	3.349
F5	11.85	0	12.5	12.5	75	39.52	1.996
F7	7.02	0	7.5	7.5	85	24.42	1.278
F8	5.00	0	18	18	64	15.89	0.764
G1	16.20	0	25	25	50	48.23	2.178
G2	16.19	0	25	25	50	48.22	2.177
OFFSITE 2	51.52	100	0	0	0	13.87	1.783
B	12.79	0	34	34	32	34.80	1.407
E1.1	11.91	0	28.1	28.1	43.8	34.41	1.501
E1.2	12.76	0	28.1	28.1	43.8	36.78	1.608
E2	5.55	0	30.7	30.7	38.6	15.63	0.660
E3	15.50	0	22	22	56	47.48	2.210
E4	3.69	0	5	5	90	13.11	0.697
E5	17.28	18.8	23.8	26.4	31	43.19	1.762
E6	3.12	0	5	5	90	11.09	0.590
E7	2.90	16.5	24.8	20.6	38.1	7.55	0.324
P	4.51	43	25	25	7	8.41	0.273
H1	11.00	0	26.6	26.6	46.8	32.26	1.431
H2	5.35	0	5	5	90	19.16	1.018
H3	7.62	0	20	20	60	23.79	1.128
J1	3.31	0	12.5	12.5	75	11.04	0.557
J2	10.92	0	12.5	12.5	75	36.40	1.839
J3	3.71	0	19	19	62	11.70	0.560
J4	6.44	0	12.5	12.5	75	21.47	1.084
J5	0.86	0	5	5	90	3.05	0.162
J6	2.70	0	5	5	90	9.59	0.510
J7	2.84	0	5	5	90	10.09	0.536
J8	5.78	0	70	30	0	12.31	0.355
J9	3.51	0	7.5	7.5	85	12.20	0.638
J10	4.02	0	5	5	90	14.27	0.759
J11	4.79	0	5	5	90	16.65	0.886
J12	9.08	100	0	0	0	10.65	0.314
K1	17.11	0	19	19	62	50.54	2.579
K2	9.51	0	15	15	70	29.39	1.537
K3	5.85	0	5	5	90	20.76	1.104
K4	8.58	0	70	30	0	18.28	0.527
K5	15.13	0	19	19	62	47.63	2.281
K6	1.41	0	5	5	90	5.01	0.266

LEGEND

- ANALYSIS POINT
- EXISTING STORM DRAIN
- FLOW DIRECTION
- FUTURE DEVELOPED STORM DRAIN

NOTES:

1. STORM DRAIN SIZES BASED ON 100-YR, 24-HR STORM FLOWS. FUTURE PROJECTS MAY BE REQUIRED TO INCREASE STORM DRAIN SIZE BASED ON 100-YR, 6-HR STORM FLOWS.
2. THE INTENDED FUTURE CONTRIBUTION FROM THE TRAILS UNIT 4 IS 20 CFS TO THE MAXIMUM DOWNSTREAM DISCHARGE OF 62 CFS IN UNIVERSE BLVD.

N

200' 100' 0 200' 400'

SCALE: 200'

DATUM NAVD 1929

Thompson Engineering Consultants, Inc.
leonn@yahoo.com
P.O. BOX 65760 ALBUQUERQUE, NM 87193
PHONE: (505) 271-2199 FAX: (505) 830-9248

NEW MEXICO 9677 LICENSED PROFESSIONAL ENGINEER 2-26-15

UPDATE TO THE AMENDMENT TO DMP FOR THE TRAILS UNITS, 1, 2 AND 3

PLATE 2

EXHIBIT C:

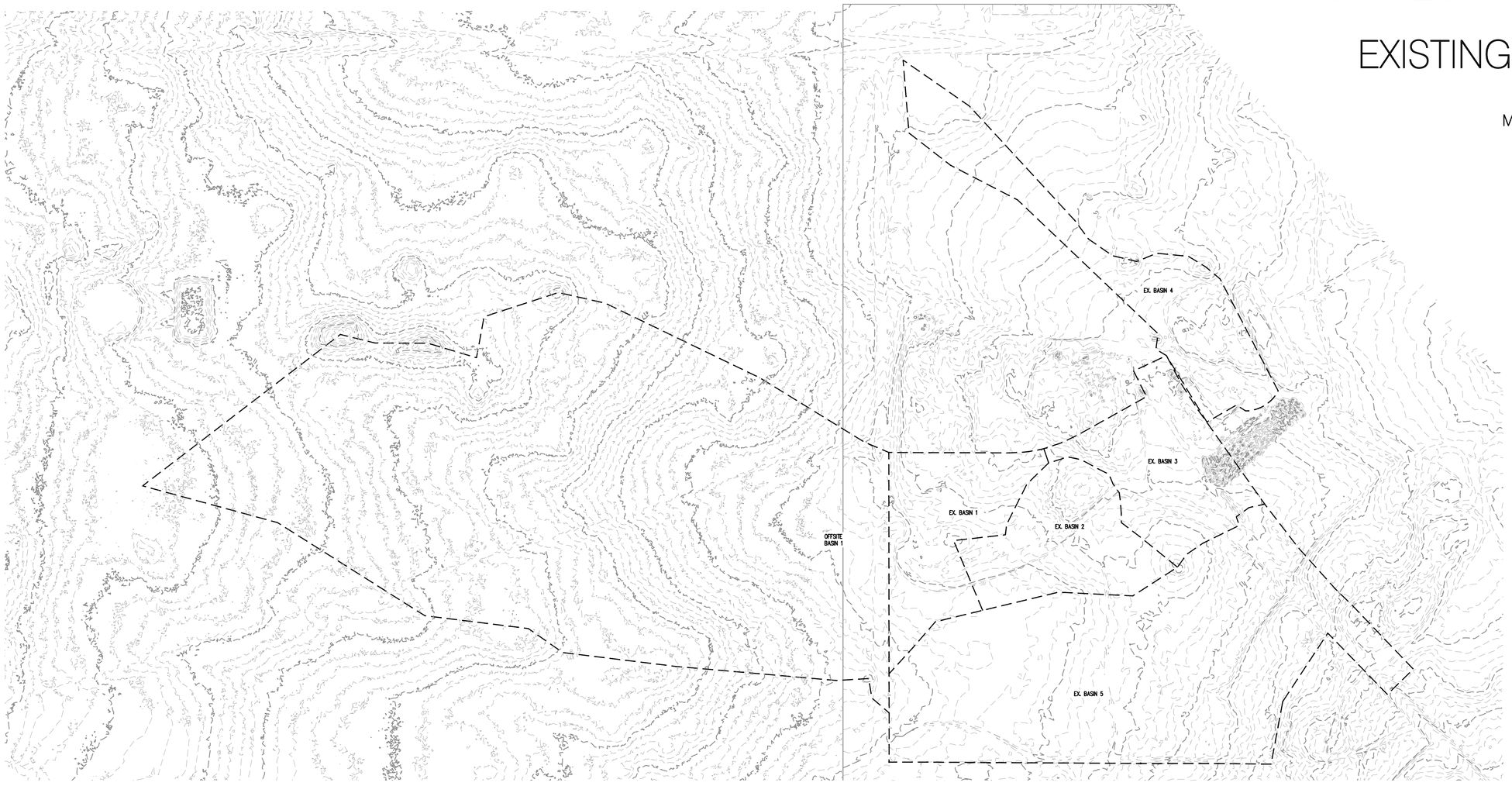
EXISTING BASIN MAP

Bohannan Huston

CATALONIA SUBDIVISION

EXISTING BASINS MAP

MARCH 2019



EXISTING BASIN SUMMARY

BASIN	AREA	AREA		% LAND TREATMENT				DISCHARGE (CFS)	DISCHARGE (CFS)	VOLUME (AC-FT)	VOLUME (AC-FT)
I.D.	(FT)	(AC)		A	B	C	D	10 yr	100YR	10 yr	100 yr
OFFSITE BASIN 1	1342745	30.83		100.00%	0.00%	0.00%	0.00%	7.7	39.1	0.21	1.13
Ex Basin 1	140918	3.24		100.00%	0.00%	0.00%	0.00%	0.8	4.1	0.02	0.12
Ex Basin 2	138230	3.17		0.00%	0.00%	34.00%	66.00%	7.6	12.2	0.26	0.43
Ex Basin 3	145822	3.35		0.00%	29.00%	29.00%	42.00%	6.2	10.9	0.20	0.37
Ex Basin 4	182996.9	4.20	0	100.00%	0.0%	0.0%	0.0%	1.1	5.33	0.03	0.15
Ex Basin 5	573090	13.16		0.00%	29.00%	29.00%	42.00%	24.5	42.8	0.78	1.43
TOTAL	**2523801.9**	**57.9**						**47.9**	**114.5**	**1.5**	**3.6**

LEGEND

- BASIN BOUNDARY
- FLOW ARROW
- PROPOSED STORM DRAIN
- EXISTING STORM DRAIN
- PROPOSED STREET SLOPE OR FLOW PATH — 2.19%
- PROPOSED STORM DRAIN MANHOLE
- PROPOSED STORM DRAIN INLET

N

150 75 0 150

SCALE: 1"=150'

Mon, 8-Jul-2019 - 4:17:pm, Plotted by: JLUTZ
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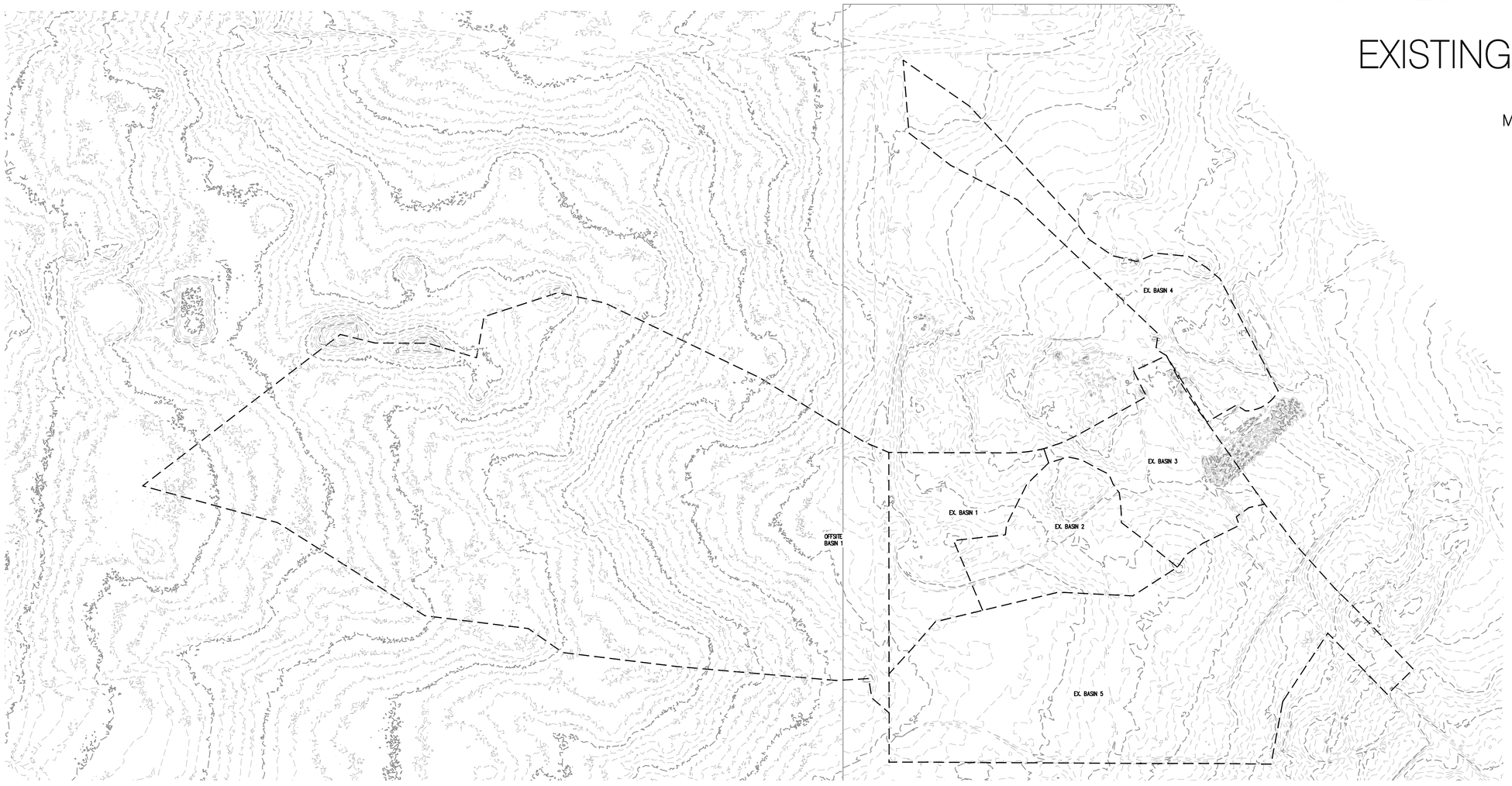
CATALONIA SUBDIVISION

EXISTING BASINS MAP

MARCH 2019



EXISTING BASIN SUMMARY

BASIN	AREA	AREA		% LAND TREATMENT				DISCHARGE (CFS)	DISCHARGE (CFS)	VOLUME (AC-FT)	VOLUME (AC-FT)
I.D.	(FT)	(AC)		A	B	C	D	10 yr	100YR	10 yr	100 yr
OFFSITE BASIN 1	1342745	30.83		100.00%	0.00%	0.00%	0.00%	7.7	39.1	0.21	1.13
Ex Basin 1	140918	3.24		100.00%	0.00%	0.00%	0.00%	0.8	4.1	0.02	0.12
Ex Basin 2	138230	3.17		0.00%	0.00%	34.00%	66.00%	7.6	12.2	0.26	0.43
Ex Basin 3	145822	3.35		0.00%	29.00%	29.00%	42.00%	6.2	10.9	0.20	0.37
Ex Basin 4	182996.9	4.20	0	100.00%	0.0%	0.0%	0.0%	1.1	5.33	0.03	0.15
Ex Basin 5	573090	13.16		0.00%	29.00%	29.00%	42.00%	24.5	42.8	0.78	1.43
TOTAL	**2523801.9**	**57.9**						**47.9**	**114.5**	**1.5**	**3.6**

LEGEND

- BASIN BOUNDARY
- FLOW ARROW
- PROPOSED STORM DRAIN
- EXISTING STORM DRAIN
- PROPOSED STREET SLOPE OR FLOW PATH — 2.19%
- PROPOSED STORM DRAIN MANHOLE
- PROPOSED STORM DRAIN INLET

N

150 75 0 150

SCALE: 1"=150'

Mon, 8-Jul-2019 - 4:17:pm, Plotted by: JLUTZ
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EXHIBIT D:

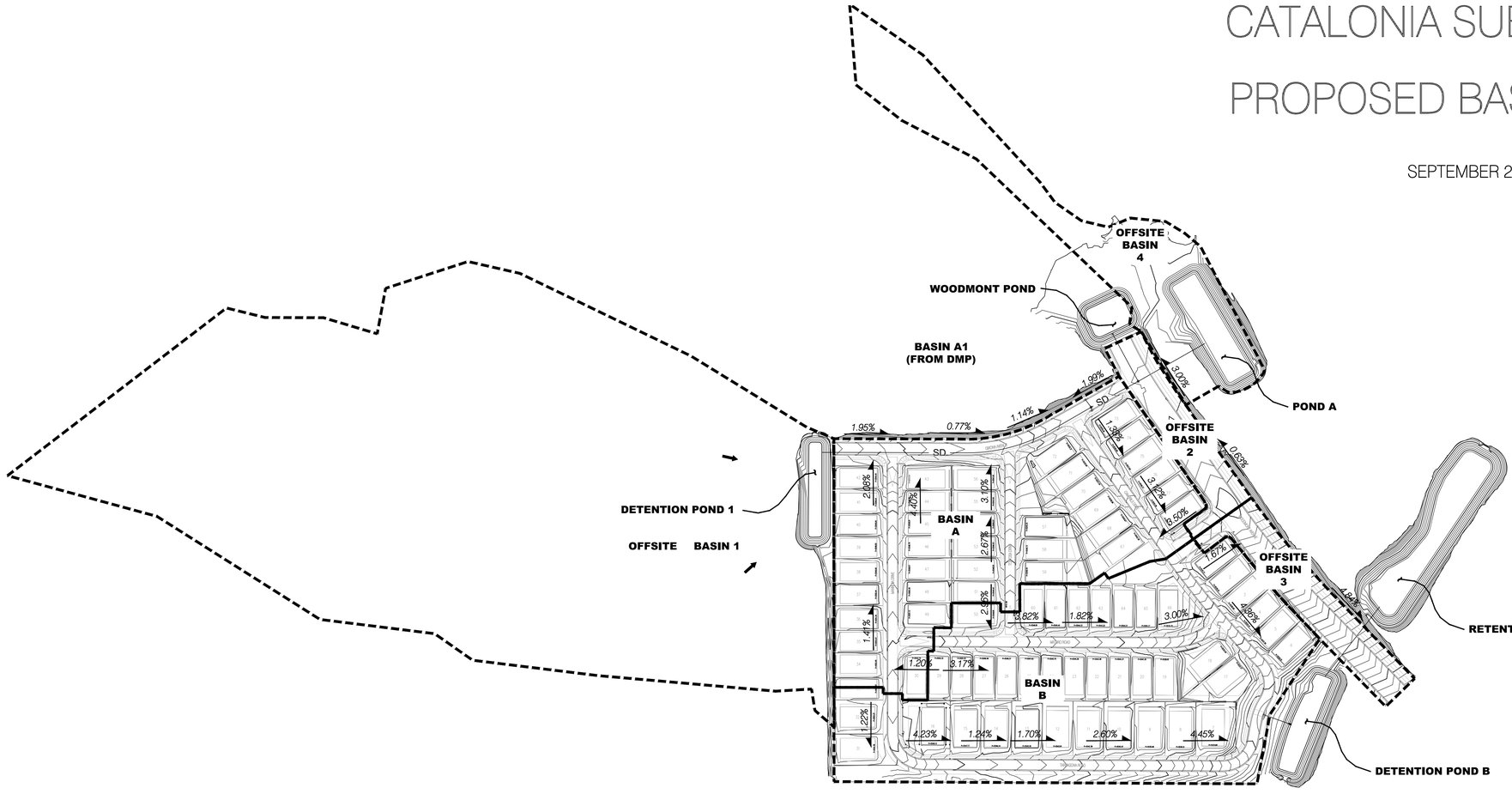
PROPOSED BASIN MAP

Bohannan Huston

CATALONIA SUBDIVISION

PROPOSED BASINS MAP

SEPTEMBER 2019



DEVELOPED BASIN SUMMARY											
BASIN	AREA	AREA	Lots	% LAND TREATMENT				DISCHARGE (CFS)	DISCHARGE (CFS)	VOLUME (AC-FT)	VOLUME (AC-FT)
I.D.	(ft)	(AC)		A	B	C	D	10 yr	100YR	10 yr	
BASIN A	400914	9.20	39	0.00%	29.6%	29.6%	40.8%	16.9	29.7	0.54	0.99
BASIN B	483543	11.10	39	0.00%	29.6%	29.6%	40.8%	20.4	35.9	0.65	1.20
OFFSITE BASIN 1	1342745	30.83	0	100.00%	0.0%	0.0%	0.0%	7.7	39.1	0.21	1.13
OFFSITE BASIN 2	51247	1.18	0	0.00%	0.0%	10.0%	90.0%	3.2	5.0	0.11	0.18
OFFSITE BASIN 3	62458	1.43	0	0.00%	0.0%	10.0%	90.0%	3.9	6.05	0.14	0.22
OFFSITE BASIN 4	182996.9	4.20	0	100.00%	0.0%	0.0%	0.0%	1.1	5.33	0.03	0.15
TOTAL	**2340907.00**	**53.7**	**78.00**					**52.2**	**115.7**	**1.6**	**3.7**

LEGEND

- BASIN BOUNDARY
- FLOW ARROW
- PROPOSED STORM DRAIN
- EXISTING STORM DRAIN
- PROPOSED STREET SLOPE OR FLOW PATH 2.19%
- PROPOSED STORM DRAIN MANHOLE
- PROPOSED STORM DRAIN INLET

N

150 75 0 150

SCALE: 1"=150'

Mon, 16-Sep-2019 - 8:00:am, Plotted by: JLUTZ
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EXHIBIT E:

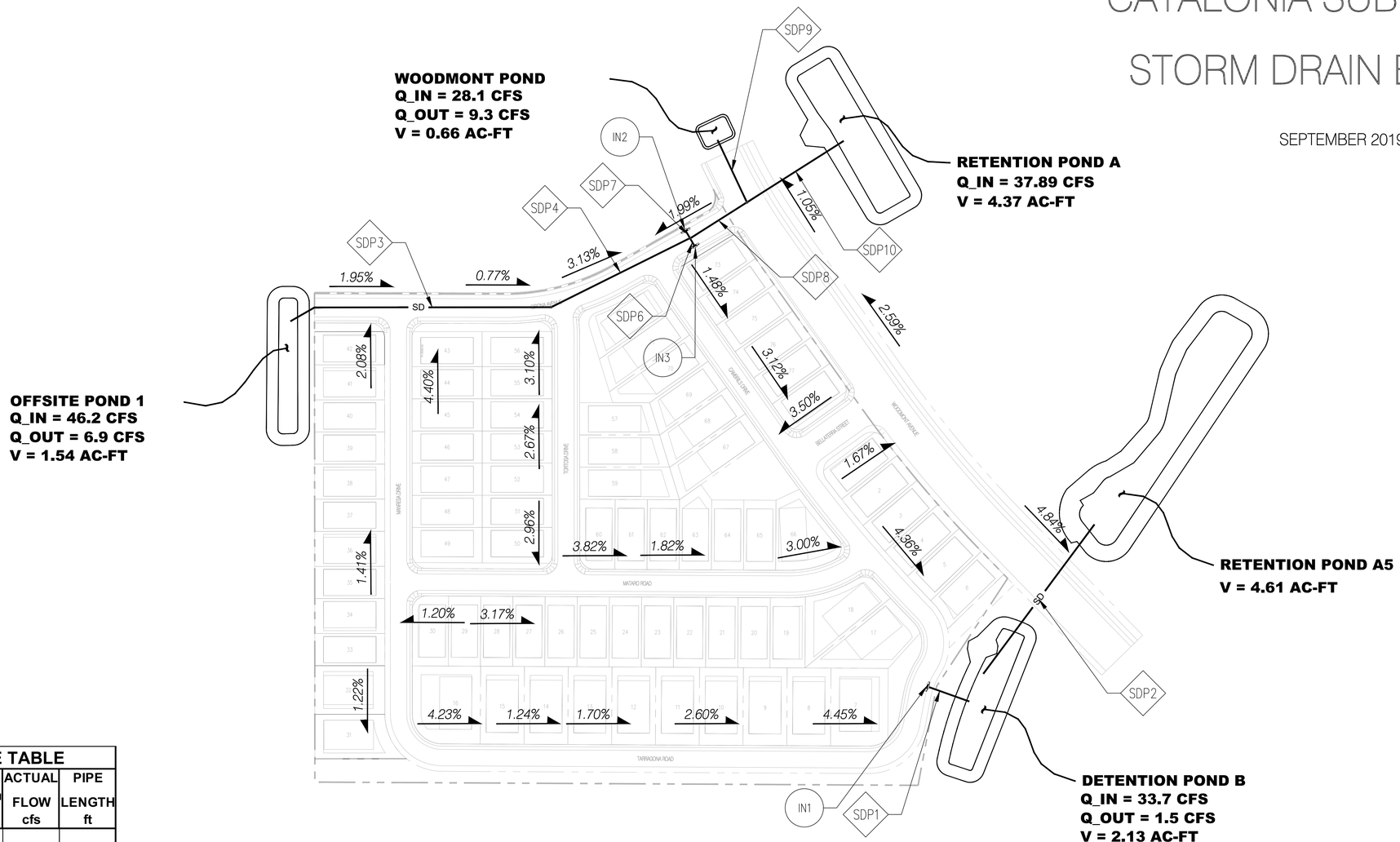
STORM DRAIN NETWORK

Bohannan Huston

CATALONIA SUBDIVISION

STORM DRAIN EXHIBIT

SEPTEMBER 2019



STORM DRAIN PIPE TABLE					
PIPE #	Size in.	Slope	Capacity[1] cfs	ACTUAL FLOW cfs	PIPE LENGTH ft
ONSITE					
SDP1	24	3.00%	39.18	35.90	
SDP2	24	1.00%	22.62	3.36	
SDP3	24	0.70%	18.93	9.25	
SDP4	24	3.00%	39.18	9.25	
SDP6	18	2.00%	14.86	14.85	
SDP7	18	2.00%	14.86	14.85	
SDP8	36	2.00%	94.33	34.68	
SDP9	24	1.00%	22.62	11.40	
SDP10	48	1.00%	143.64	46.09	

1- Capacity Based on Manning's Eq w/ N= 0.013

INLET TABLE			
Inlet #	Inlet Type	Actual Flow	Avail Head ft
IN1	1-DBL COA TYPE A	35.90	0.83
IN2	1-SGL COA TYPE C	14.85	0.83
IN3	1-SGL COA TYPE C	14.85	0.83

LEGEND

- BASIN BOUNDARY
- FLOW ARROW
- PROPOSED STORM DRAIN
- EXISTING STORM DRAIN
- PROPOSED STREET SLOPE OR FLOW PATH 2.19%
- PROPOSED STORM DRAIN MANHOLE
- PROPOSED STORM DRAIN INLET

N

100 50 0 100

SCALE: 1"=100'

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Mon, 16-Sep-2019 - 8:06:am, Plotted by: JLUTZ
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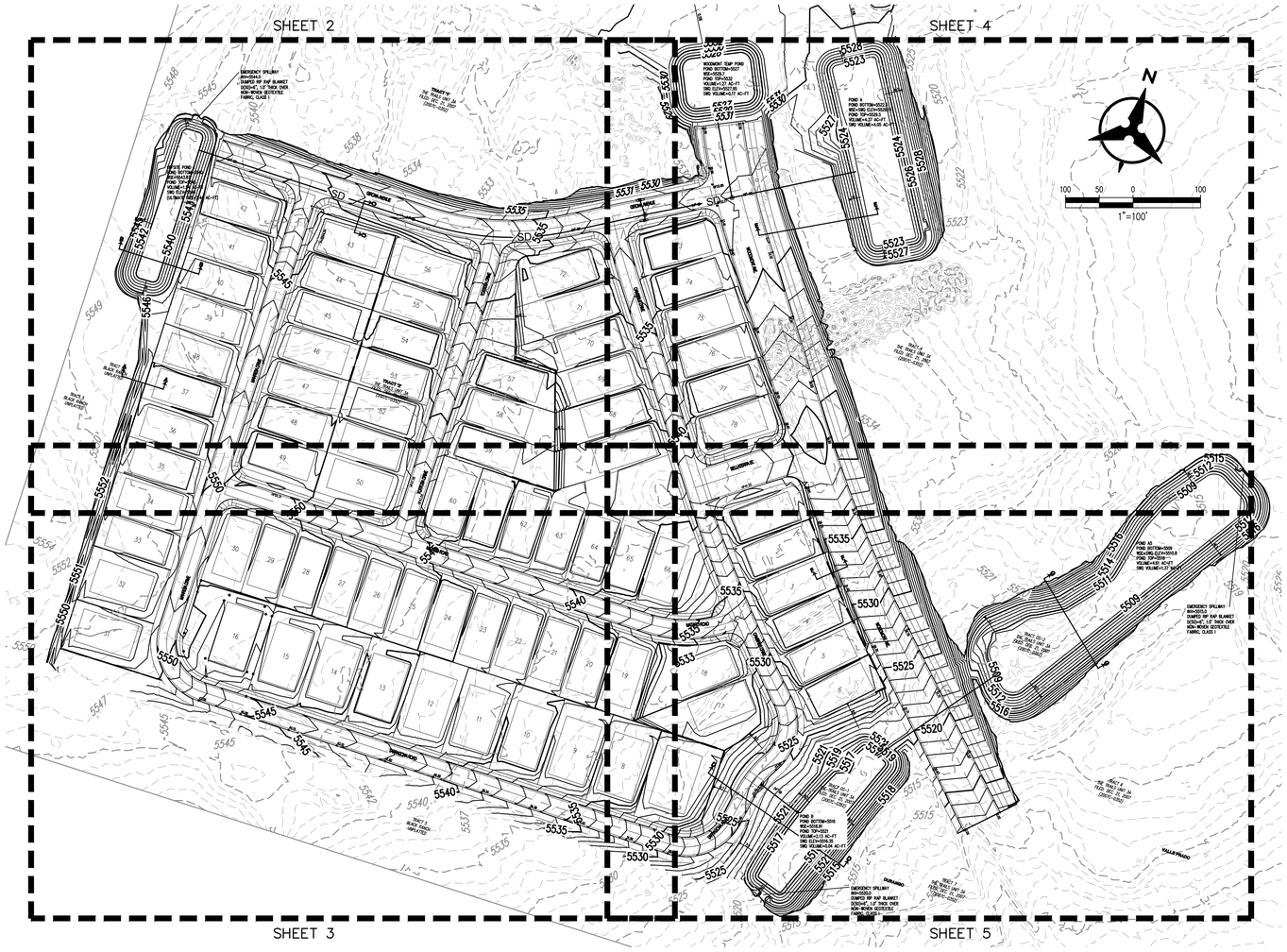
EXHIBIT F:

GRADING PLAN

Bohannan Huston



GENERAL NOTES

1. ALL WORK DETAILED ON THESE PLANS AND PERFORMED UNDER THIS CONTRACT SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS AND THE PROJECT GEOTECHNICAL REPORT. WHERE APPLICABLE, CITY OF ALBUQUERQUE PUBLIC WORKS STANDARDS SHALL APPLY.

2. THE CONTRACTOR SHALL ABIDE BY ALL LOCAL, STATE, AND FEDERAL LAWS, RULES AND REGULATIONS WHICH APPLY TO THE CONSTRUCTION OF THESE IMPROVEMENTS, INCLUDING EPA REQUIREMENTS WITH RESPECT TO STORM WATER DISCHARGE.

3. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL FIELD VERIFY THE HORIZONTAL AND VERTICAL LOCATIONS OF ALL POTENTIAL OBSTRUCTIONS INCLUDING ALL UNDERGROUND UTILITIES. SHOULD A CONFLICT EXIST, THE CONTRACTOR SHALL NOTIFY THE CONSTRUCTION OBSERVER OR ENGINEER SO THAT THE CONFLICT CAN BE RESOLVED WITH A MINIMUM AMOUNT OF DELAY.

4. TWO (2) WORKING DAYS PRIOR TO ANY EXCAVATION, THE CONTRACTOR SHALL CONTACT LINE LOCATING SERVICE FOR LOCATION OF EXISTING UTILITIES.

5. ALL ELECTRICAL, TELEPHONE, CABLE TV, GAS AND OTHER UTILITY LINES, CABLES, AND APPURTENANCES ENCOUNTERED DURING CONSTRUCTION THAT REQUIRE RELOCATION, SHALL BE COORDINATED WITH THAT UTILITY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION OF ALL NECESSARY UTILITY ADJUSTMENTS. NO ADDITIONAL COMPENSATION WILL BE ALLOWED FOR DELAYS OR INCONVENIENCES CAUSED BY UTILITY COMPANY WORK CREWS. THE CONTRACTOR MAY BE REQUIRED TO RESCHEDULE HIS ACTIVITIES TO ALLOW UTILITY CREWS TO PERFORM THEIR REQUIRED WORK.

6. THE CONTRACTOR IS RESPONSIBLE FOR PROTECTING ALL EXISTING UTILITY LINES WITHIN THE CONSTRUCTION AREA. ANY DAMAGE TO EXISTING FACILITIES CAUSED BY CONSTRUCTION ACTIVITY SHALL BE REPAIRED OR REPLACED AT THE CONTRACTOR'S EXPENSE AND APPROVED BY THE CONSTRUCTION OBSERVER.

7. CONSTRUCTION ACTIVITY SHALL BE LIMITED TO THE PROPERTY AND/OR PROJECT LIMITS. ANY DAMAGE TO ADJACENT PROPERTIES RESULTING FROM THE CONSTRUCTION PROCESS SHALL BE REPAIRED OR REPLACED AT THE CONTRACTOR'S EXPENSE.

8. OVERNIGHT PARKING OF CONSTRUCTION EQUIPMENT SHALL NOT OBSTRUCT DRIVEWAYS OR DESIGNATED TRAFFIC LANES. THE CONTRACTOR SHALL NOT STORE ANY EQUIPMENT OR MATERIAL WITHIN THE PUBLIC RIGHT-OF-WAY.

9. THE CONTRACTOR SHALL OBTAIN ALL THE NECESSARY PERMITS FOR THE PROJECT PRIOR TO COMMENCING CONSTRUCTION (I.E., BARRICADING, TOPSOIL DISTURBANCE, EXCAVATION PERMITS, EPA STORM WATER PERMITS, ETC.).

10. ALL PROPERTY CORNERS DESTROYED DURING CONSTRUCTION SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE. ALL PROPERTY CORNERS MUST BE RESET BY A REGISTERED LAND SURVEYOR.

11. THE CONTRACTOR SHALL PREPARE A CONSTRUCTION TRAFFIC CONTROL AND SIGNING PLAN AND OBTAIN APPROVAL OF SUCH PLAN FROM THE CITY OF ALBUQUERQUE, TRAFFIC ENGINEERING DEPARTMENT, PRIOR TO BEGINNING ANY CONSTRUCTION WORK ON OR ADJACENT TO EXISTING STREETS.

12. ALL BARRICADES AND CONSTRUCTION SIGNING SHALL CONFORM TO APPLICABLE SECTIONS OF THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (MUTCD), US DEPARTMENT OF TRANSPORTATION, LATEST EDITION.

13. THE CONTRACTOR SHALL MAINTAIN ALL CONSTRUCTION BARRICADES AND SIGNING AT ALL TIMES. THE CONTRACTOR SHALL VERIFY THE PROPER LOCATION OF ALL BARRICADING AT THE END AND BEGINNING OF EACH DAY.

14. THE CONTRACTOR SHALL TAKE ALL STEPS NECESSARY TO CONFORM WITH EPA REQUIREMENTS, INCLUDING COMPLIANCE WITH NPDES PHASE 2 REQUIREMENTS.

GRADING NOTES

1. EXCEPT AS PROVIDED HERIN, GRADING SHALL BE PERFORMED AT THE ELEVATIONS AND IN ACCORDANCE WITH THE DETAILS SHOWN ON THIS PLAN.

2. CONTRACTOR SHALL OBTAIN AND ABIDE BY A TOPSOIL DISTURBANCE PERMIT FROM THE CITY OF ALBUQUERQUE ENVIRONMENTAL HEALTH DIVISION, PRIOR TO CONSTRUCTION. THE COST FOR REQUIRED CONSTRUCTION DUST AND EROSION CONTROL MEASURES SHALL BE INCIDENTAL TO THE PROJECT COST. THE CONTRACTOR SHALL CONFORM TO ALL CITY, COUNTY, STATE, AND FEDERAL DUST CONTROL MEASURES AND REQUIREMENTS AND WILL BE RESPONSIBLE FOR PREPARING AND OBTAINING ALL NECESSARY APPLICATIONS AND APPROVALS.

3. ALL WORK RELATIVE TO FOUNDATION CONSTRUCTION, SITE PREPARATION, AND PAVEMENT INSTALLATION, AS SHOWN ON THIS PLAN, SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE SOILS REPORT PREPARED BY XBEVINYARD DATED JULY 22, 2013. ALL OTHER WORK, UNLESS OTHERWISE STATED OR PROVIDED FOR HEREON, SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS (FIRST PRIORITY), AND/OR THE CITY OF ALBUQUERQUE (COA) STANDARD SPECIFICATIONS FOR PUBLIC WORKS (SECOND PRIORITY).

4. TWO WORKING DAYS PRIOR TO EXCAVATION, CONTRACTOR MUST CONTACT LINE LOCATING SERVICE (765-1264) FOR LOCATION OF EXISTING UTILITIES.

5. PRIOR TO GRADING, ALL VEGETATION DEBRIS, AND NEAR SURFACE ORGANICALLY CONTAMINATED SOIL SHALL BE STRIPPED FROM ALL AREAS TO BE GRADED. VEGETATION AND DEBRIS SHALL BE DISPOSED OF OFF-SITE OR STOCK-PILED FOR USE IN PLANTERS AND NON-STRUCTURAL FILLS.

6. EARTH SLOPES SHALL NOT EXCEED 4 HORIZONTAL TO 1 VERTICAL UNLESS SHOWN OTHERWISE.

7. IT IS THE INTENT OF THESE PLANS THAT THIS CONTRACTOR SHALL NOT PERFORM ANY WORK OUTSIDE OF THE PROPERTY BOUNDARIES EXCEPT AS REQUIRED BY THIS PLAN.

8. THE CONTRACTOR IS TO ENSURE THAT NO SOIL ERODES FROM THE SITE ONTO ADJACENT PROPERTY OR PUBLIC RIGHT-OF-WAY. THIS SHOULD BE ACHIEVED BY CONSTRUCTING TEMPORARY BERMS AT THE PROPERTY LINES WETTING THE SOIL TO PROTECT IT FROM WIND EROSION.

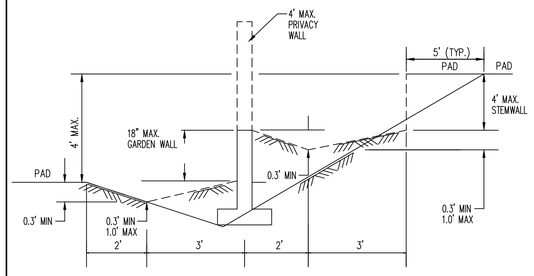
9. A DISPOSAL SITE FOR ALL EXCESS EXCAVATION AND UNSUITABLE MATERIAL SHALL BE OBTAINED BY THE CONTRACTOR IN COMPLIANCE WITH APPLICABLE ENVIRONMENTAL REGULATIONS AND APPROVED BY THE OBSERVER. ALL COSTS INCURRED IN OBTAINING A DISPOSAL SITE AND HAUL THERETO SHALL BE CONSIDERED INCIDENTAL TO THE PROJECT, AND NO SEPARATE MEASUREMENT OR PAYMENT SHALL BE MADE.

10. PAVING AND ROADWAY GRADES SHALL BE +/- 0.1' FROM PLAN ELEVATIONS. PAD ELEVATION SHALL BE +/- 0.05' FROM BUILDING PLAN ELEVATIONS.

11. ALL SPOT ELEVATIONS ARE TO FLOWLINE UNLESS OTHERWISE NOTED. VALLEY GUTTER ELEVATIONS ARE SHOWN AT FLOWLINE ELEVATION.

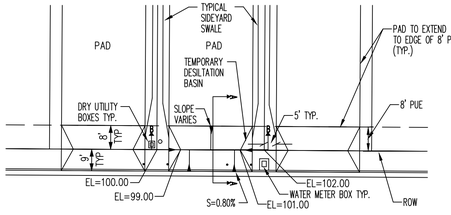
NOTE

ALL SLOPES ON HOA TRACTS TO BE STABILIZED BY NATIVE SEED AND MULCH PER STD SPEC 1012 WITH GRAVEL MULCH OR BETTER.



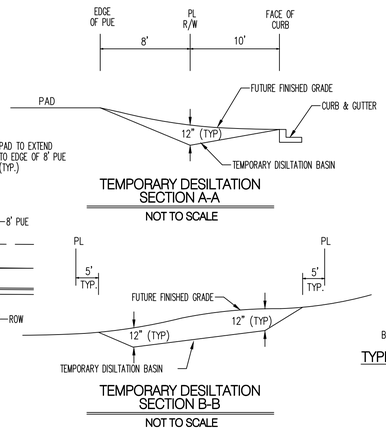
TYPICAL SIDE LOT LINE SECTION
NOT TO SCALE

NOTE: DASHED LINES IN TYP. SIDE LOT LINE SECTIONS REPRESENT THE FINAL CONDITION AFTER THE GARDEN, STEM, AND PRIVACY WALLS HAVE BEEN CONSTRUCTED. THE INTERIM CONDITION, WHICH IS TO BE CONSTRUCTED BY THE GRADING CONTRACTOR AND CERTIFIED BY THE ENGINEER, IS REPRESENTED BY THE SOLID LINES. RETAINING WALLS WILL BE CONSTRUCTED PRIOR TO GRADING CERTIFICATION.



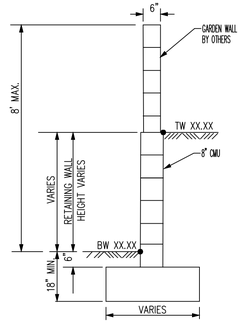
TEMPORARY DESILTATION BASIN
NOT TO SCALE

** BOTTOM OF BASIN IS 1' BELOW PROPERTY LINE ELEVATION SEE GRADING PLANS FOR EXACT ELEVATIONS



TEMPORARY DESILTATION SECTION A-A
NOT TO SCALE

TEMPORARY DESILTATION SECTION B-B
NOT TO SCALE



TW=FINISHED GRADE ELEVATION AT TOP OF RETAINING WALL
BW=FINISHED GRADE ELEVATION AT BOTTOM OF RETAINING WALL

TYPICAL RETAINING WALL NOMENCLATURE
NOT TO SCALE

(RETAINING HEIGHT IS TAKEN TO BE DIFFERENCE IN FINISHED GRADES ON LEFT AND RIGHT SIDE OF WALL.)

HEIGHT IS IN ACCORDANCE WITH CITY COMPREHENSIVE ZONING CODE, SECTION 14-16-3-19, GENERAL HEIGHT AND DESIGN REGULATIONS FOR WALLS, FENCES, AND RETAINING WALLS.

LEGEND

PROPOSED SPOT ELEVATION	● 5235.25
EXISTING SPOT ELEVATION	● EX 5235.25
PROPOSED CONTOUR	5025
EXISTING STORM DRAIN LINE	
PROPOSED STORM DRAIN INLET	
PROPOSED STORM DRAIN LINE	
PROPOSED STORM DRAIN MANHOLE	
PROPOSED WATER BLOCK	
RETAINING WALL, CONSTRUCTED PRIOR TO GRADING/PAD CERTIFICATION	
PAD	10 P=5300.00
TURNED BLOCK	TB
STREET SLOPE	XX

BHI JOB NO. 20190248

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Mon, 16-Sep-2019 - 10:55:am, Plotted by: JLUTZ

AS-BUILT INFORMATION

CONTRACTOR	DATE
WORK STAKED BY	DATE
FINAL INSPECTION/ ACCEPTANCE BY	DATE
FIELD VERIFICATION BY	DATE
DRAWINGS CORRECTED BY	DATE

BENCH MARKS

ACS MONUMENT STAMPED "UNION"
GEOGRAPHIC POSITION (NAD 83)
N.M. STATE PLANE COORDINATES (CENTRAL ZONE)
N = 1,523,503.475 E = 1,493,655.030
GROUND-TO-GRID FACTOR = 0.999664360
$\Delta\alpha$ = -00°16'58.96"
NAVD 1988 ELEVATION = 5524.950

MICRO-FILM INFORMATION

RECORDED BY DATE
NO.

SURVEY INFORMATION

FIELD NOTES

NO.	BY	DATE

ENGINEER'S SEAL

YOLANDA PADILLA RAMOS
16035
REGISTERED PROFESSIONAL ENGINEER
9-16-19

NO.	DATE	REMARKS	BY
		REVISIONS	
		DESIGN	DATE04/19 YPM
			DATE04/19 AR
			DATE04/19 YPM

DESIGNED BY YPM
DRAWN BY AR
CHECKED BY YPM

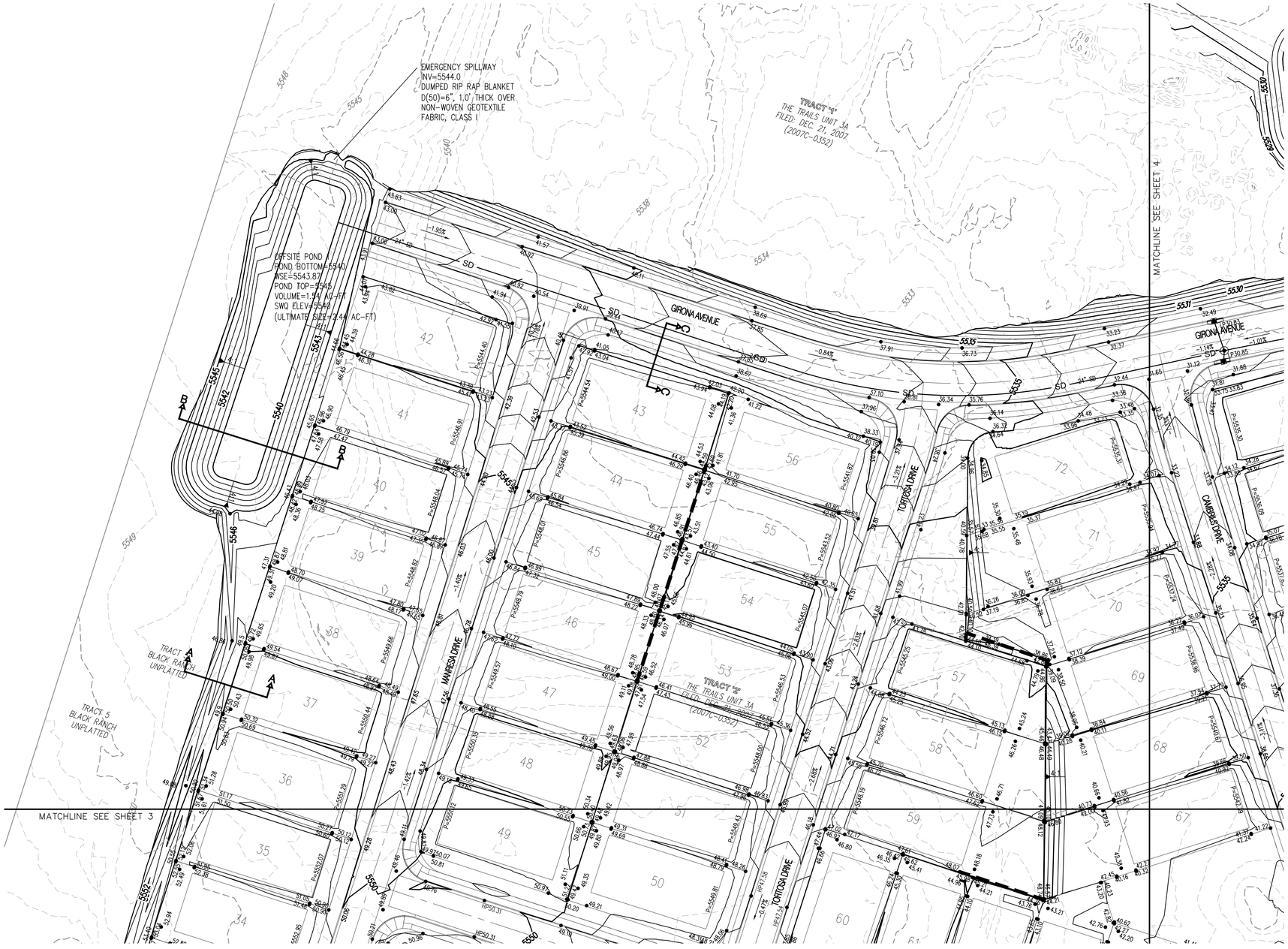
Bohannan Huston
www.bhinc.com 800.877.5332

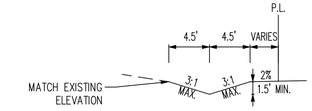
CITY OF ALBUQUERQUE
DEPARTMENT OF MUNICIPAL DEVELOPMENT

CATALONIA
OVERALL GRADING PLAN

DESIGN REVIEW COMMITTEE	CITY ENGINEER APPROVAL	LAST DESIGN UPDATE	MO./DAY/YR.	MO./DAY/YR.

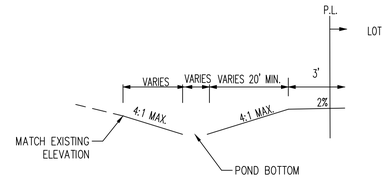
CITY PROJECT NO. | ZONE MAP NO. C-08 | SHEET 1 OF





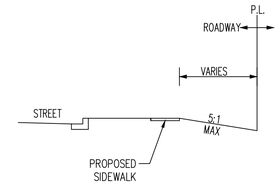
TYPICAL CROSS SETION A-A

NOT TO SCALE



TYPICAL CROSS SETION B-B

NOT TO SCALE

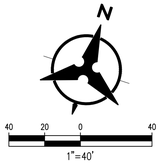


TYPICAL CROSS SETION C-C

NOT TO SCALE

LEGEND

PROPOSED SPOT ELEVATION	● 5235.25
EXISTING SPOT ELEVATION	● EX 5235.25
PROPOSED CONTOUR	5025
EXISTING STORM DRAIN LINE	
PROPOSED STORM DRAIN INLET	
PROPOSED STORM DRAIN LINE	
PROPOSED STORM DRAIN MANHOLE	
PROPOSED WATER BLOCK	
RETAINING WALL, CONSTRUCTED PRIOR TO GRADING/PAD CERTIFICATION	
PAD	10 P=5300.00
TURNED BLOCK	TB
STREET SLOPE	XX



BHI JOB NO. 20190248

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Mon, 16-Sep-2019 - 10:55:am, Plotted by: JLUTZ

SURVEY INFORMATION
FIELD NOTES

NO.	BY	DATE

BENCH MARKS

ACS MONUMENT STAMPED "UNION"
GEOGRAPHIC POSITION (NAD 83)
N.M. STATE PLANE COORDINATES (CENTRAL ZONE)
N = 1,523,503.475 E = 1,493,655.030
GROUND-TO-GRID FACTOR = 0.999664360
$\Delta\alpha$ = -00°16'58.96"
NAVD 1988 ELEVATION = 5524.950

AS-BUILT INFORMATION

CONTRACTOR DATE
WORK STAKED BY DATE
ACCEPTANCE BY DATE
FIELD VERIFICATION BY DATE
DRAWINGS CORRECTED BY DATE

MICRO-FILM INFORMATION

RECORDED BY DATE
NO.

ENGINEER'S SEAL

YOLANDA PADILLA RAE
16039
REGISTERED PROFESSIONAL ENGINEER
9-16-19

NO.	DATE	REVISIONS / REMARKS	BY
		DESIGN	DESIGNED BY YPM
			DRAWN BY AR
			CHECKED BY YPM

DATE 04/19
DATE 04/19
DATE 04/19

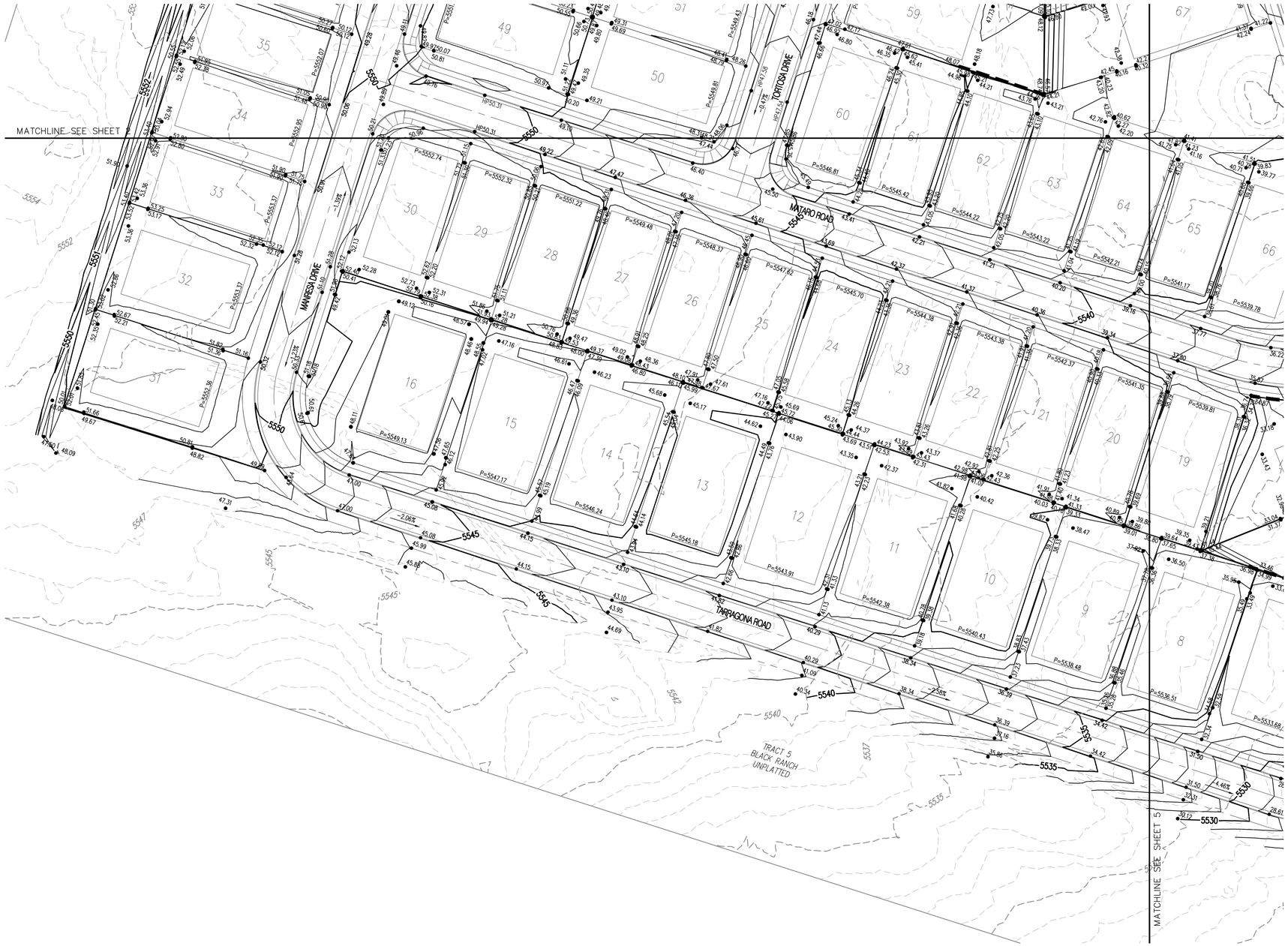
Bohannan Huston
www.bhinc.com 800.877.5332

CITY OF ALBUQUERQUE
DEPARTMENT OF MUNICIPAL DEVELOPMENT

CATALONIA
GRADING PLAN

DESIGN REVIEW COMMITTEE	CITY ENGINEER APPROVAL	LAST DESIGN UPDATE	MO./DAY/YR.	MO./DAY/YR.

CITY PROJECT NO.	ZONE MAP NO.	SHEET	OF
	C-08	2	



LEGEND

PROPOSED SPOT ELEVATION	● 5235.25
EXISTING SPOT ELEVATION	● EX 5235.25
PROPOSED CONTOUR	5025
EXISTING STORM DRAIN LINE	
PROPOSED STORM DRAIN INLET	
PROPOSED STORM DRAIN LINE	
PROPOSED STORM DRAIN MANHOLE	
PROPOSED WATER BLOCK	
RETAINING WALL, CONSTRUCTED PRIOR TO GRADING/PAD CERTIFICATION	
PAD	1 0 P=5300.00
TURNED BLOCK	TB
STREET SLOPE	XX

N

40 20 0 40

1"=40'

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www.bhinc.com 800.877.5332

SURVEY INFORMATION
FIELD NOTES

NO.	BY	DATE

BENCH MARKS
ACS MONUMENT STAMPED "UNION"
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$\Delta\alpha$ = -00°16'58.96"
NAVD 1988 ELEVATION = 5524.950

AS-BUILT INFORMATION

	DATE
CONTRACTOR	
WORK STAKED BY	
ACCEPTANCE BY	
FIELD VERIFICATION BY	
DRAWINGS CORRECTED BY	

MICRO-FILM INFORMATION

RECORDED BY	DATE
NO.	DATE

ENGINEER'S SEAL

YOLANDA PADILLA
16039
REGISTERED PROFESSIONAL ENGINEER
9-16-19

NO.	DATE	REMARKS	BY
		REVISIONS	
		DESIGN	
		DESIGNED BY YPM	DATE04/19
		DRAWN BY AR	DATE04/19
		CHECKED BY YPM	DATE04/19

CITY OF ALBUQUERQUE
DEPARTMENT OF MUNICIPAL DEVELOPMENT

CATALONIA
GRADING PLAN

DESIGN REVIEW COMMITTEE	CITY ENGINEER APPROVAL	LAST DESIGN UPDATE	MO./DAY/YR.	MO./DAY/YR.

CITY PROJECT NO.	ZONE MAP NO.	SHEET	OF
	C-08	3	

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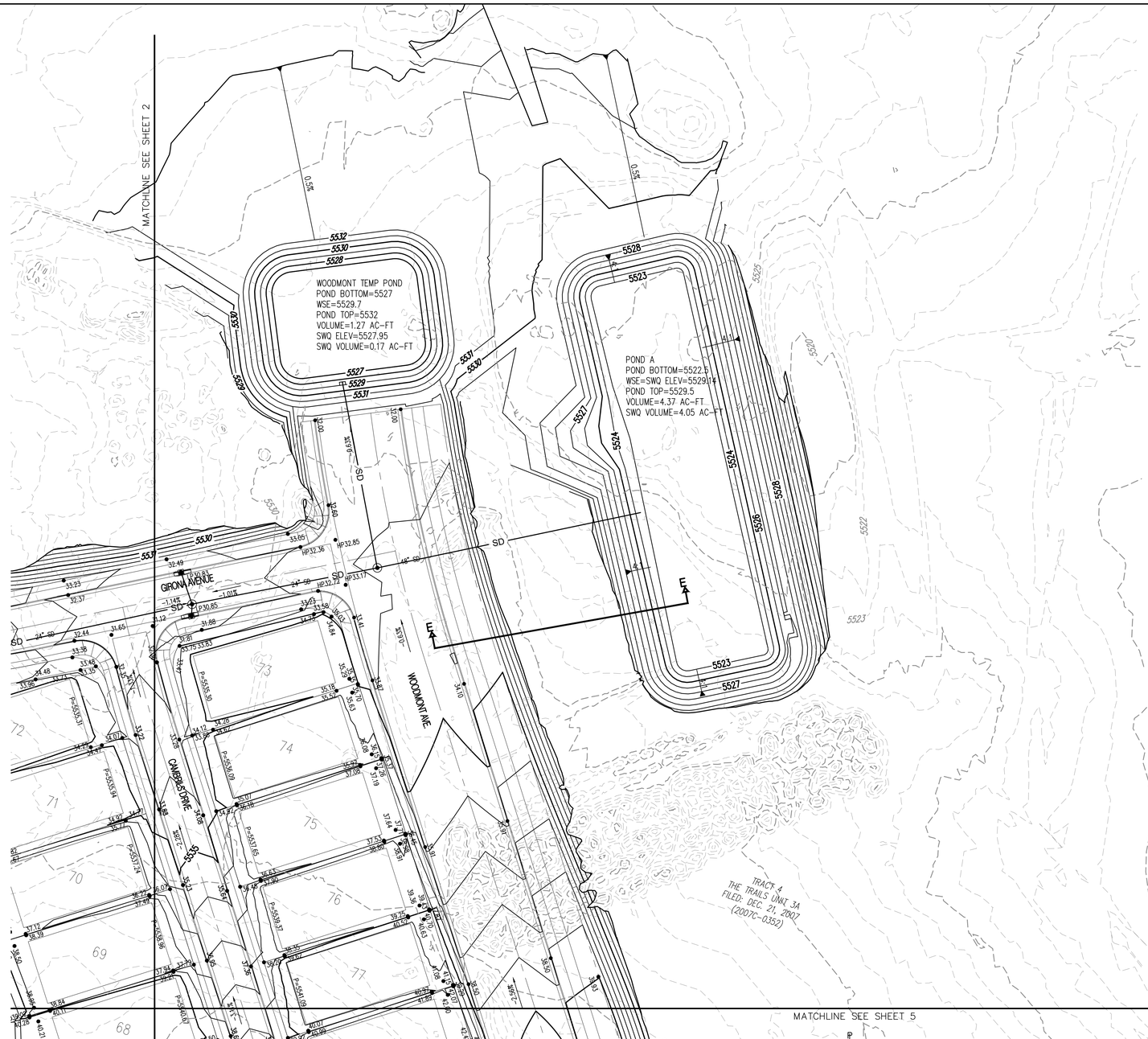
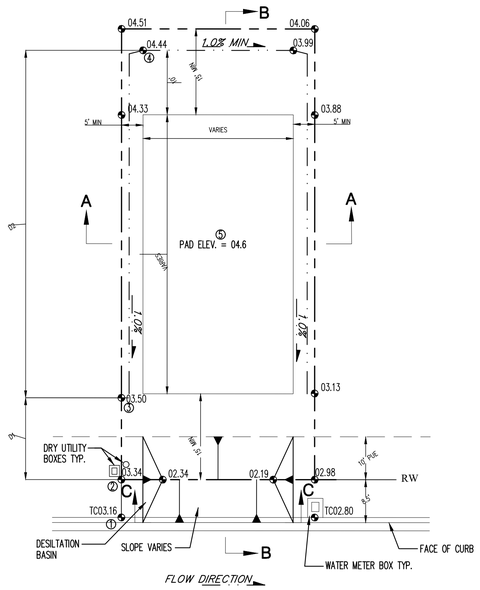
BHI JOB NO. 20190248





TYPICAL LOT GRADE DETAIL
WITH DESILTATION BASIN FOR SEDIMENTATION CONTROL

NOT TO SCALE

TO SET SPOT② - ADD 0.17' TO SPOT①
TO SET SPOT③ - MULTIPLY D1 BY 1.0% AND ADD TO SPOT②
TO SET SPOT④ - MULTIPLY D2 BY 1.0% AND ADD TO SPOT③
TO SET SPOT⑤ - ADD 0.2 TO SPOT④

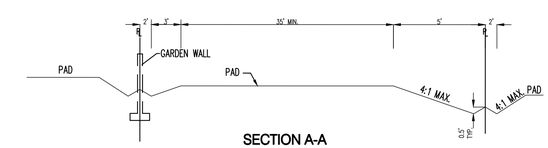
BOTTOM OF BASIN IS 1' BELOW PROPERTY LINE ELEVATION.
SEE GRADING PLANS FOR EXACT ELEVATIONS.
CONTRACTOR SHALL CONSTRUCT TEMPORARY DESILTATION BASIN AT EACH LOT.

LEGEND

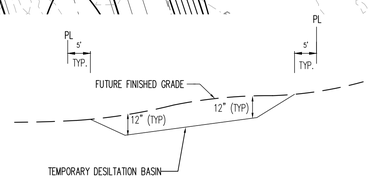
PROPOSED SPOT ELEVATION	● 5235.25
EXISTING SPOT ELEVATION	● EX 5235.25
PROPOSED CONTOUR	5025
EXISTING STORM DRAIN LINE	
PROPOSED STORM DRAIN INLET	
PROPOSED STORM DRAIN LINE	
PROPOSED STORM DRAIN MANHOLE	
PROPOSED WATER BLOCK	
RETAINING WALL, CONSTRUCTED PRIOR TO GRADING/PAD CERTIFICATION	
PAD	1 O P=5300.00
TURNED BLOCK	TB
STREET SLOPE	XX

N

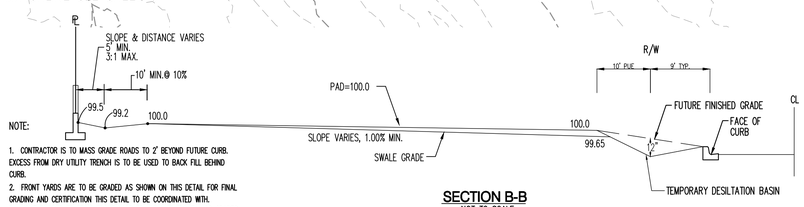
40 20 0 40
1"=40'



SECTION A-A
TYPICAL SIDE YARD SWALE
NOT TO SCALE



SECTION C-C
NOT TO SCALE



NOTE:
1. CONTRACTOR IS TO MASS GRADE ROADS TO 2' BEYOND FUTURE CURB. EXCESS FROM DRY UTILITY TRENCH IS TO BE USED TO BACK FILL BEHIND CURB.
2. FRONT YARDS ARE TO BE GRADED AS SHOWN ON THIS DETAIL FOR FINAL GRADING AND CERTIFICATION THIS DETAIL TO BE COORDINATED WITH.
3. HOME BUILDER TO BRING FRONT YARD TO ULTIMATE FRONT YARD GRADES AFTER HOME CONSTRUCTION IS COMPLETED. SEE ULTIMATE FRONT YARD GRADING DETAIL ON THIS SHEET.

SECTION B-B
NOT TO SCALE

BHI JOB NO. 20190248

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AS-BUILT INFORMATION

CONTRACTOR	DATE
WORK STAKED BY	DATE
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$\Delta\alpha$ = -00°16'58.96"
NAVD 1988 ELEVATION = 5524.950

MICRO-FILM INFORMATION

RECORDED BY DATE
NO.

SURVEY INFORMATION
FIELD NOTES

NO.	BY	DATE

ENGINEER'S SEAL

YOLANDA PADILLA RIOS
NEW MEXICO
16039
PROFESSIONAL ENGINEER
9-16-19

NO.	DATE	REMARKS	BY
		DESIGN	DESIGNED BY YPM DATE04/19
		REVISIONS	DRAWN BY AR DATE04/19
			CHECKED BY YPM DATE04/19

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CITY OF ALBUQUERQUE
DEPARTMENT OF MUNICIPAL DEVELOPMENT

CATALONIA
GRADING PLAN

DESIGN REVIEW COMMITTEE	CITY ENGINEER APPROVAL	LAST DESIGN UPDATE	MO./DAY/YR.	MO./DAY/YR.

CITY PROJECT NO.	ZONE MAP NO.	SHEET	OF
	C-08	4	

MATCHLINE SEE SHEET 4

MATCHLINE SEE SHEET 3

BELLATERRA ST.

MATADO ROAD

CAMBRAS DRIVE

WOODMONT AVE.

CHUINE SEE SHEET 3

TARAGONA ROAD

DURANGO

VALLE PRADO

POND A5
POND BOTTOM=5509
WSE=SWQ ELEV=5510.8
POND TOP=5516
VOLUME=4.61 AC-FT
SWQ VOLUME=1.37 AC-FT

EMERGENCY SPILLWAY
INV=5515.0
DUMPED RIP RAP BLANKET
D(50)=6", 1.0' THICK OVER
NON-WOVEN GEOTEXTILE
FABRIC, CLASS I

POND B
POND BOTTOM=5516
WSE=5518.91
POND TOP=5521
VOLUME=2.13 AC-FT
SWQ ELEV=5516.35
SWQ VOLUME=0.04 AC-FT

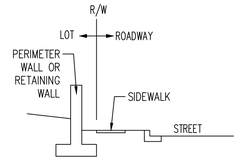
EMERGENCY SPILLWAY
INV=5520.0
DUMPED RIP RAP BLANKET
D(50)=6", 1.0' THICK OVER
NON-WOVEN GEOTEXTILE
FABRIC, CLASS I

TRACT OS-2
THE TRAILS UNIT 3A
FILED: DEC. 21, 2007
(2007C-0352)

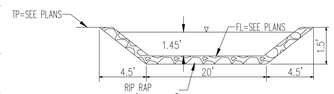
TRACT OS-1
THE TRAILS UNIT 3A
FILED: DEC. 21, 2007
(2007C-0352)

TRACT 6
THE TRAILS UNIT 3A
FILED: DEC. 21, 2007
(2007C-0352)

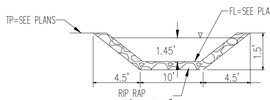
TRACT 7
THE TRAILS UNIT 3A
FILED: DEC. 21, 2007
(2007C-0352)



TYPICAL CROSS SETION F-F
NOT TO SCALE



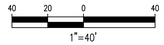
EMERGENCY SPILLWAY
POND A5
NOT TO SCALE

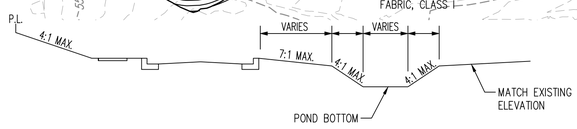


EMERGENCY SPILLWAY
NOT TO SCALE

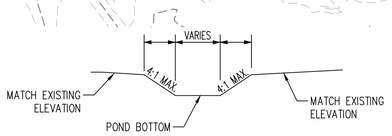
LEGEND

PROPOSED SPOT ELEVATION	● 5235.25
EXISTING SPOT ELEVATION	● EX 5235.25
PROPOSED CONTOUR	5225
EXISTING STORM DRAIN LINE	
PROPOSED STORM DRAIN INLET	
PROPOSED STORM DRAIN LINE	
PROPOSED STORM DRAIN MANHOLE	
PROPOSED WATER BLOCK	
RETAINING WALL, CONSTRUCTED PRIOR TO GRADING/PAD CERTIFICATION	
PAD	10 P=5300.00
TURNED BLOCK	TB
STREET SLOPE	XX





TYPICAL CROSS SETION D-D
NOT TO SCALE



TYPICAL CROSS SETION G-G
NOT TO SCALE

BHI JOB NO. 20190248

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CITY OF ALBUQUERQUE
DEPARTMENT OF MUNICIPAL DEVELOPMENT

CATALONIA
GRADING PLAN

DESIGN REVIEW COMMITTEE	CITY ENGINEER APPROVAL	LAST DESIGN UPDATE	MO./DAY/YR.	MO./DAY/YR.

CITY PROJECT NO.	ZONE MAP NO.	SHEET	OF
	C-08	5	

AS-BUILT INFORMATION

CONTRACTOR	DATE
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DRAWINGS CORRECTED BY	DATE

BENCH MARKS

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$\Delta\alpha$ = -00°16'58.96"	
NAVD 1988 ELEVATION = 5524.950	

SURVEY INFORMATION
FIELD NOTES

NO.	BY	DATE

ENGINEER'S SEAL

YOLANDA PADILLA RAE
NEW MEXICO
16035
REGISTERED PROFESSIONAL ENGINEER
9-16-19

NO.	DATE	REMARKS	BY
		REVISIONS	
		DESIGN	
		DESIGNED BY YPM	DATE04/19
		DRAWN BY AR	DATE04/19
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