

CITY OF ALBUQUERQUE

Planning Department
Alan Varela, Director



Mayor Timothy M. Keller

February 28, 2022

Yolanda Padilla Moyer, P.E.
Bohannon Huston, Inc.
7500 Jefferson St NE
Albuquerque, NM 87109

**RE: La Cuentista Unit 3 Subdivision
Grading Plans & Drainage Report
Engineer's Stamp Date: 12/10/21
Hydrology File: D10D002D**

Dear Ms. Moyer:

Based upon the information provided in your submittal received 12/10/2021, the Grading Plans & Drainage Report are approved for Grading Permit, Work Order and for action by the DRB on Platting.

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 (Dough Hughes, PE, jhughes@cabq.gov, 924-3420) 14 days prior to any earth disturbance.

If you have any questions, please contact me at 924-3995 or rbrissette@cabq.gov.

Sincerely,

Renée C. Brissette

Renée C. Brissette, P.E. CFM
Senior Engineer, Hydrology
Planning Department



City of Albuquerque

Planning Department
Development & Building Services Division

DRAINAGE AND TRANSPORTATION INFORMATION SHEET (REV 6/2018)

Project Title: LA CUMENTISTA SUBDIVISION Building Permit #: _____ Hydrology File #: _____

DRB#: PR-2021-004968 EPC#: _____ Work Order#: _____

Legal Description: TRACT B-1-A & B--A2 LA CUMENTISTA SUBDIVISION

City Address: ROSA PARKS RD NW between UNSER BLVD, NW, and KIMMICK DR. NW

Applicant: BOHANNAN HUSTON, INC Contact: KELLY KLEIN

Address: 7500 JEFFERSON ST. NE

Phone#: (505) 823-1000 Fax#: _____ E-mail: kklein@bhinc.com

Other Contact: PULTE GROUP Contact: KEVIN PATTON

Address: 7601 JEFFERSON ST NE #320

Phone#: (505) 341-8591 Fax#: _____ E-mail: Kevin.Patton@PulteGroup.com

TYPE OF DEVELOPMENT: 248 LOTS PLAT (# of lots) _____ RESIDENCE _____ DRB SITE _____ ADMIN SITE

IS THIS A RESUBMITTAL? _____ Yes _____ X No

DEPARTMENT _____ TRANSPORTATION _____ HYDROLOGY/DRAINAGE

Check all that Apply:

TYPE OF SUBMITTAL:

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

TYPE OF APPROVAL/ACCEPTANCE SOUGHT:

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

DATE SUBMITTED: 12-10-2021 By: KELLY M. KLEIN

COA STAFF:

ELECTRONIC SUBMITTAL RECEIVED: _____

FEE PAID: _____

DRAINAGE REPORT FOR LA CUENTISTA SUBDIVISION UNIT 3

DECEMBER 2021

City of Albuquerque Planning Department Development Review Services HYDROLOGY SECTION	
APPROVED	
DATE:	02/28/22
BY:	<i>Renee C. Briassette</i>
HydroTrans #	D10D002D
THE APPROVAL OF THESE PLANS/REPORT SHALL NOT BE CONSTRUED TO PERMIT VIOLATIONS OF ANY CITY ORDINANCE OR STATE LAW, AND SHALL NOT PREVENT THE CITY OF ALBUQUERQUE FROM REQUIRING CORRECTION, OR ERROR OR DIMENSIONS IN PLANS, SPECIFICATIONS, OR CONSTRUCTIONS. SUCH APPROVED PLANS SHALL NOT BE CHANGED, MODIFIED OR ALTERED WITHOUT AUTHORIZATION.	

Prepared for:

PULTE DEVELOPMENT OF NEW MEXICO, INC

7601 JEFFERSON ST NE, SUITE 320

ALBUQUERQUE, NM 87109

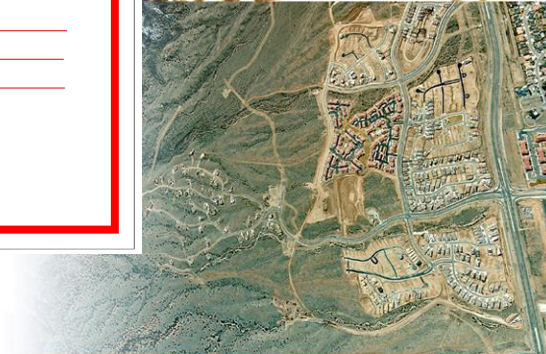
Prepared by:

Bohannon  **Huston**

Engineering

Spatial Data

Advanced Technologies



**DRAINAGE REPORT
FOR
LA CUENTISTA SUBDIVISION
ALBUQUERQUE, NM**

DECEMBER 2021

Prepared for:

**PULTE DEVELOPMENT OF NEW MEXICO, INC
7601 JEFFERSON ST NE, SUITE 320
ALBUQUERQUE, NM 87109**

Prepared by:

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

PREPARED BY:



Kelly M Klein, PE

Date



Alandren Etlantus, PE

Date

TABLE OF CONTENTS

I.	INTRODUCTION	1
II.	PURPOSE OF REPORT	1
III.	METHODOLOGY AND REFERENCES.....	1
IV.	SITE LOCATION AND CHARACTERISTICS	2
V.	EXISTING CONDITIONS	2
VI.	DEVELOPED CONDITIONS.....	4
	A. ALLOWABLE	4
	B. OFFSITE FLOW MANAGEMENT	4
	C. ONSITE.....	4
VII.	DETENTION POND	6
	A. POND ANALYSIS	6
	B. FIRST FLUSH REQUIRMENTS.....	8
VIII.	GRADING PLAN	8
IX.	CONCLUSION.....	8

APPENDICES

APPENDIX A: BASIN ANALYSIS AND
 APPENDIX B: INLET/STREET HYDRAULICS
 APPENDIX C: STORM DRAIN PIPE ANALYSIS
 APPENDIX D: DETENTION POND ANALYSIS DATA
 APPENDIX E: SWALE CALCULATIONS
 APPENDIX F: CURVILINEAR STORM DRAIN
 APPENDIX G: SPILLWAY CALCULATIONS

EXHIBITS

EXHIBIT A: SUBDIVISION LOCATION MAP
 EXHIBIT B: LA CUMENTISTA APPROVED DRAINAGE REPORT EXCERPTS FOR
 ALLOWABLE DISCHARGE
 EXHIBIT C: OFFSITE AND EXISTING CONDITIONS BASIN MAP
 EXHIBIT D: ONSITE PROPOSED BASIN MAP
 EXHIBIT E: STORM DRAIN NETWORK

I. INTRODUCTION

La Cuentista Subdivision Unit III (LCS Unit 3), is a single-family residential development consisting of 248 lots within IDO zoning R-ML. The site is located on Tract B-1-A & B-2-A of the La Cuentista Subdivision and is the third of five bulk land tracts which collectively comprise La Cuentista Subdivision. The site currently drains from northwest to southeast to an existing storm drain system in Rosa Parks Road, ultimately discharging to the Petroglyph National Monument via a series of detention ponds that mitigate developed flows to historic conditions.

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 La Cuentista Subdivision. 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 offsite and fully developed conditions. The runoff flow rates and volumes for the onsite basins were computed for the 100 yr – 6 hr storm in accordance with the City of Albuquerque Development Manual (DPM), Chapter 6, dated June 15, 2020. Since the development has been divided into basins less than 40 acres in size, the Rational Method is used in this report for the hydrology analysis to size storm and inlet capacity. The storm drain network was analyzed assuming laminar flow. The storm drain system hydraulic grade line (HGL) has been computed using the software Stormwater Studio. Street hydraulic capacities were computed in accordance with the COA DPM and assuming 8" standard curb & gutter for the subdivision.

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

Drainage Report for La Cuentista Subdivision, prepared by Wilson & Company, Inc., November 2003. This report establishes existing conditions and site specific drainage improvement guidelines for the La Cuentista subdivision. It provides the allowable discharge

from the future development of La Cuentista Subdivision as part of a series of detention ponds mitigating flow to the Mariposa Channel to existing flows.

Drainage Report for La Cuentista Subdivision, Unit II, prepared by Wilson & Company, Inc., November 2007. This report is a supplement to the Drainage Report for La Cuentista Subdivision dated November 2003. It provides proposed drainage modifications for Basins 201 and 202 which define the project site. This report further quantifies the maximum flow of 15 cfs from the proposed project pond (known as Pond 2). (See Exhibit B – La Cuentista Approved Drainage Report Excerpts for Allowable Discharge).

Volcano Heights Conceptual Drainage Compilation Plans, Exhibit 1 and Plate 1 per CoA Hydrology record C09D000 GD 2010APR22.pdf, prepared by Wilson & Company, Inc., October 2011. This document outlines the Master Plan for drainage in the Volcano Heights area. For the purpose of this report, these exhibits show the master plan for mitigating the offsite flows that enter the proposed subdivision on the northern property line. (See Exhibit C – Offsite and Existing Basin Maps).

IV. SITE LOCATION AND CHARACTERISTICS

The site is approximately 55 ac, located south of Paseo del Norte, north of Rosa Parks Road, east of Unser Blvd, and west of Kimmick Drive (see Exhibit A – Subdivision Location Map and Preliminary Plat).

The site consists primarily of native grasses and bushes, with few trees within the site. The site currently drains from northwest to southeast. Slopes range from 1% to 30% (in northwest corner), with the majority of the project sloping at 2% to 10%.

Subsurface exploration of the site reveals layers of basalt from depths ranging between 2'-10' below existing grades. The grading and drainage plan presented herein is designed to minimize the amount of "cut" into the basalt.

The development will be phased into 4 phases, but the entire site will be mass graded starting with the construction of the first phase.

V. EXISTING CONDITIONS

The existing basin and drainage patterns are shown graphically on the Existing Drainage Conditions Map in 'Exhibit C – Offsite and Existing Conditions Basin Map'.

Offsite flows enter the proposed site from the north. Existing flows from the northeast side of Paseo de Norte are collected into a culvert that runs under Paseo de Norte and ultimately discharges at a point approximately at the midpoint of the northern boundary line of the proposed site. At this same point, additional offsite flows from the southwest side of Paseo del Norte converge with the culvert discharge. Combined discharge at this point is 110 cfs. Currently, these flows flow across the proposed site following natural drainage patterns. Per the Volcano Heights Conceptual Drainage Compilation Plans, Exhibit 1 and Plate 1, these northern offsite flows will ultimately be mitigated by a future detention pond (at the convergence point) and eventual storm drain. The ultimate discharge point for these mitigated flows is east of the proposed site. Until these improvements are made (by future projects), this project will construct temporary drainage infrastructure to divert the flows along the project site's northern boundary to comply with the Volcano Heights Conceptual Drainage Plan.

Using Section 6-1(A)(2) of the City's DPM, a land treatment was assigned to each offsite basin. All offsite basins are undisturbed, natural, desert areas and were determined to be mainly Land Treatment A with less than 10% of Land treatment B based on aerial imagery. Offsite basins are shown in 'Exhibit C – Offsite and Existing Basin Map and summarized in Table 1.

TABLE 1: EXISTING BASIN SUMMARY			
BASIN	AREA	DISCHARGE (CFS)	VOLUME (AC-FT)
	(AC)	100 yr	100 yr
OFFSITE (NORTH)	68.2	110.0	3.3
ONSITE	56.5	89.3	2.6

Existing conditions for the proposed site show existing discharge at 89.3 cfs that currently drains from northwest to southeast to an existing storm drain system in Rosa Parks Road.

The project site is part overall La Cuentista Drainage Plan and located within basins 201 and 202 identified within the above mentioned drainage plans for La Cuentista. (See Exhibit B – La Cuentista Approved Drainage Report Excerpts For Allowable Discharge). Per this report, the project site is to be routed through a new pond, named Pond 2, within the project site directly to Basin 213. Basin 213 then discharges to an existing Pond 4 previously designed and constructed. Ultimately, the developed flows for all La Cuentista

Units are mitigated through a series of detention ponds that discharge to the Petroglyph National Monument at historic flow conditions.

VI. DEVELOPED CONDITIONS

A. ALLOWABLE

The allowable discharge from the developed proposed site was analyzed as part of the Approved Drainage Reports for La Cuentista. Per these reports, discharge from the site is limited to 15 cfs. (see 'Exhibit B - La Cuentista approved Drainage Report Excerpts for Allowable Discharge').

B. OFFSITE FLOW MANAGEMENT

As mentioned in the Existing Conditions, offsite flows ($Q_{100yr} = 110$ cfs) enter the proposed site on its northern boundary. Ultimately, these flows will be mitigated by a future detention pond placed at the point of convergence and an eventual storm drain system within Paseo del Norte right of way. Until these improvements are made by future projects, this project will construct a temporary drainage swale to convey these flows along the property line (and within the ROW of Paseo de Norte) to the east so that they comply with the overall master plan for the area and do not enter the site. See 'Appendix E- Offsite Flow Swale Calculations' and 'Exhibit D- Storm Drain Network' for additional information.

C. ONSITE

La Cuentista is a proposed single-family residential development with 248 single family residential lots on approximately 56 acres. The proposed development will occur in four phases. Considering that the site will be graded with the construction of the first phase, the flow paths for the interim and the ultimate conditions will not differ. Hence, the hydrology and hydraulics analysis will be performed for the ultimate conditions.

Using Section 6-1(A)(2) of the City's DPM, a land treatment was assigned to each onsite basin. Since the number of residential units per acre is less than 6, the percent D land treatment area was determined by "Single Family Residential" equation listed in City's DPM Table 6.2.10. The remaining area was split between land treatments B and C.

Developed flows are calculated for the 100yr-6hr storm event and are shown in 'APPENDIX A-Basin Analysis and Summary of Land Treatments'. The developed flows from the subdivision will be conveyed by the internal street and storm drain networks to the

detention pond, Pond 2. The outlet of the detention pond will connect to the existing storm drain in Rosa Parks via an 18" storm drain and have a controlled discharge of 15 cfs. The Onsite Proposed Basin Map, Exhibit D, illustrates the basin locations and flow directions for the proposed development as well as the proposed street configurations for the subdivision.

"Exhibit E - Inlet and Storm Drain Network Plan", shows the flow, street grade, water depth, flow captured, and type of each inlet and the size, slope, flow and capacity of the storm drain systems. All upstream inlets are on-grade and are placed where the depth of flow in the street starts to exceed the lesser of 1.) the curb height or 2.) the energy grade line at the right of way (ROW) of each street. At the downstream end of each system is an inlet in sump condition that captures all the remaining flows. There are 3 storm drain "systems" for the subdivision.

The first storm drain system, "North System", is in Angelou Lane and captures the runoff from the northern basins B1 through B6. Angelou Lane has a cross slope so all inlets are placed on the southern side of the street. On grade inlets (IN1 and IN2) capture flow so that the bypass flow remains within the ROW of Angelou Lane. The bypass flow eventually drains to inlet 3 (IN3) in sump condition. Since this inlet is placed at the location of an open space swale, any overflow will spill over into the swale. This "North System" discharges a total flow of $Q=38.16$ cfs to the swale behind lots 89-92. This swale is sized to carry the flows to the detention pond, Pond 2. Calculations for the swale capacity are shown in 'APPENDIX E- Swale Calculations'.

The second storm drain system, "Middle System", is in Twain Lane and captures the runoff from Basins B9-B11. The flows from this system are contained within the ROW of the interior streets within these basins and accumulates in a sump condition at IN4 adjacent to the pond. The "Middle" System discharges $Q=22.05$ cfs directly into Pond 2. Since this inlet is adjacent to Pond 2, overflow will spill directly into the detention pond.

The third storm drain system, "Main System", is in Tolkien Lane and captures the runoff from Basins B7, B8, B12 through B22. Due to the cross slope in Chaucer Lane, runoff from Basins B7 will turn into Chaucer Trail and then turn down into Suess Way. Similarly, Basin B8 runoff will turn into Chaucer Trail and then turn and flow down into Salinger Way. The internal road sections within these basins are able to convey the runoff within their internal roadway's ROW before reaching Tolkien Lane. At this point, on grade inlets placed at the intersections of Tolkien Lanes will begin to capture runoff so that the bypass flows can remain within the ROW of Tolkien Lane. Tolkien Lane also has a cross slope so all the inlets are placed on the north side of the street. All bypass flows eventually

drains to the sump condition at Inlets 12 and 13 (IN12 and IN13). The combined bypass runoff reaching these inlets is $Q = 51.24$ cfs. Each inlet is assumed to accept $\frac{1}{2}$ of the flow so that 25.62 cfs enters IN12 and 25.62 cfs enters IN13. This "Main System" discharges $Q = 110.44$ cfs directly into Pond 2. Since these inlets are adjacent to Pond 2, any overflow will spill directly into the detention pond.

Basin B23 ($Q = 2.7$ cfs) contains the swale that captures flows from B24 ($Q = 0.51$ cfs) and the offsite flows ($Q = 110$ cfs). Basin B23 will collect and convey its own flows and the offsite flows to the east boundary of the site in compliance with the Volcano Heights Conceptual Drainage Compilation Plan.

VII. DETENTION POND

The drainage improvements La Cuentista Subdivision Unit III (LCS Unit 3) include a single subdivision detention pond, Pond 2, to provide the required first flush volume and attenuate the flow to the allowable 15 cfs as required by the previous approved drainage reports for La Cuentista.

A. POND ANALYSIS

Following the requirements and procedures in the City of Albuquerque Development Process Manual (COA DPM) Part 6-2(C), HEC-HMS (Version 4.8) was used to model the subdivision runoff and pond routing. The model uses the SCS Curve Number method with a 24-hour rainfall distribution with the peak intensity at 12 hours. Rainfall data for the subdivision was downloaded from NOAA Atlas 14 on May 18, 2021 and is provided in 'APPENDIX D– Detention Pond Rainfall Data'.

The HEC-HMS model includes one basin that is 0.089 square miles in area, representing the entire LCS Unit 3 area. An area-weighted curve number for this basin was calculated using the land treatment types in COA DPM Tables 6.2.9 and 6.2.10. The percent land treatment (A, B, C, or D) was determined based on LCS Unit 3 development to be 46%D with the remaining split between B & C at 27% each. The resulting weighted CN was determined to be 90.

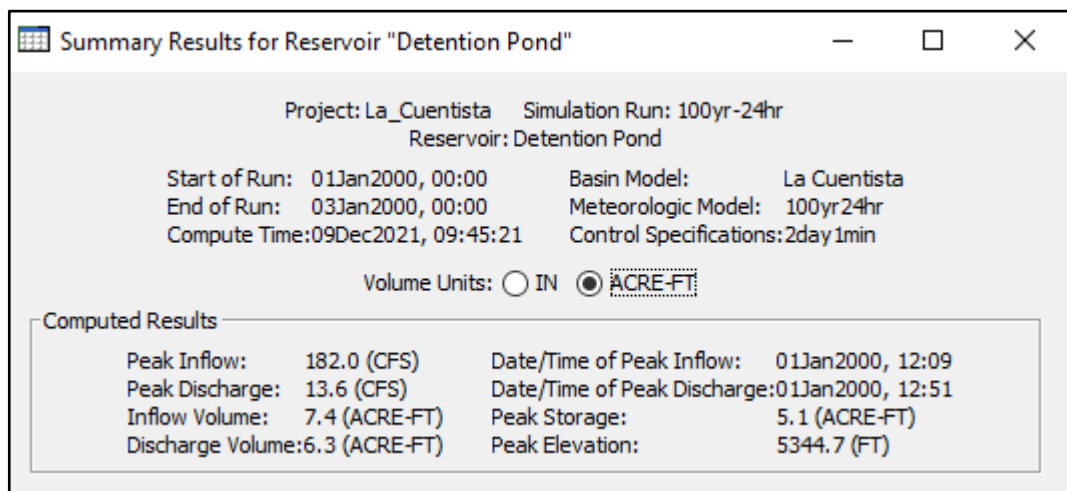
The longest reach length for Unit III is less than 4,000 feet and the flows will be directed into the pond via the subdivision storm drain network described previously. The time of concentration for this basin was calculated using the SCS Upland Method (COA DPM, Part 6-2(B)). The SCS Upland Method produced a time of concentration less than 0.2

hours. The COA DPM specifies that the minimum time of concentration should be 0.2 hours, so a time of 0.2 hours is used in the HEC-HMS model. The resulting inflow to Pond 2 is 182 cfs.

Pond 2 will be in the southeast portion of the subdivision between Twain Way and Bronte Lane. The pond will be in cut and will not include a constructed fill embankment. The pond have 1.5:1 side slopes and be fully lined with shotcrete. The stage storage rating curve used to model the pond is provide in Table 2 below.

TABLE 2: POND 2 STAGE STORAGE	
Elevation (ft)	Storage (ac-ft)
5,339.00	0.00
5,340.00	0.80
5,341.00	1.64
5,342.00	2.52
5,343.00	3.43
5,344.00	4.37
5,345.00	5.36

The primary pond outlet will consist of a single 18" RCP pipe, set at elevation above the bottom of the pond to provide the required first flush retention volume of 0.91 ac-ft (discussed later in this report). The model results show that the pond needs to store 5.1 ac-ft and has an outflow less than the allowable 15 cfs.



A spillway was sized to safely convey the 100-year design flow will be designed and will drain to the southeast along Bronte Lane. A weir calculation was preformed to determine the necessary size of the spillway. Using a weir coefficient of 2.7 (COA DPM, Part 6-16(A)) and one foot of allowable head, the spillway must be at least 70 feet long to convey the 100-year design flow.

B. FIRST FLUSH REQUIRMENTS

This project is required to meet the first flush requirements of the new City Drainage Ordinance. The first flush requirement will be met within the required volume for the detention pond. The required storage is calculated as 0.42" times the subdivision acreage times the percent impervious area (45.59%)*(56.52 acres), and is equal to $V_{Required} = 39,285 \text{ cf} = 0.9 \text{ Ac-Ft}$. The provided detention volume is $V_{Provided} = 0.91 \text{ ac-ft}$, hence the water quality requirements for this project is fulfilled.

VIII. GRADING PLAN

The grading plan for La Cuentista Subdivision is included in 'Exhibit F – Grading Plan' of this report.

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. The implementation of these concepts would result in the safe passage of the 100 year-6hr storm event. Offsite drainage basins will be required to detain developed flows as future development occurs.

APPENDICES

**APPENDIX A: BASIN ANALYSIS AND SUMMARY
OF LAND TREATMENTS**

APPENDIX B: INLET/STREET HYDRAULICS

APPENDIX C: STORM DRAIN PIPE ANALYSIS

APPENDIX D: DETENTION POND ANALYSIS DATA

APPENDIX E: SWALE CALCULATIONS

APPENDIX F: CURVILINEAR STORM DRAIN

**APPENDIX A:
BASIN ANALYSIS AND
SUMMARY OF LAND TREATMENTS**

PROPOSED CONDITIONS

BASIN I.D.	AREA (AC)	UNITS #	% LAND TREATMENT				DISCHARGE (CFS)		VOLUME (AC-FT)	
			A	B	C	D	10 YR	100YR	10 YR	100YR
ONSITE							6 HOUR STORM		6 HOUR STORM	
B1	5.16	26	0.0%	26.7%	26.7%	46.59%	9.27	16.85	0.37	0.64
B2	1.56	8	0.0%	26.7%	26.7%	46.59%	2.80	5.10	0.11	0.19
B3	1.36	6	0.0%	26.7%	26.7%	46.59%	2.44	4.43	0.10	0.17
B4	0.88	4	0.0%	26.7%	26.7%	46.59%	1.59	2.89	0.06	0.11
B5	1.62	8	0.0%	26.7%	26.7%	46.59%	2.91	5.29	0.11	0.20
B6	1.11	5	0.0%	26.7%	26.7%	46.59%	2.00	3.63	0.08	0.14
B7	1.53	6	0.0%	26.7%	26.7%	46.59%	2.74	4.99	0.11	0.19
B8	2.98	14	0.0%	26.7%	26.7%	46.59%	5.35	9.73	0.21	0.37
B9	3.17	15	0.0%	26.7%	26.7%	46.59%	5.70	10.37	0.23	0.39
B10	2.61	14	0.0%	26.7%	26.7%	46.59%	4.69	8.52	0.18	0.32
B11	1.09	5	0.0%	26.7%	26.7%	46.59%	1.97	3.57	0.08	0.14
B12	3.32	17	0.0%	26.7%	26.7%	46.59%	5.97	10.85	0.24	0.41
B13	3.06	16	0.0%	26.7%	26.7%	46.59%	5.49	9.99	0.22	0.38
B14	2.83	14	0.0%	26.7%	26.7%	46.59%	5.08	9.23	0.20	0.35
B15	0.76	1	0.0%	26.7%	26.7%	46.59%	1.37	2.49	0.05	0.09
B16	7.03	39	0.0%	26.7%	26.7%	46.59%	12.62	22.94	0.50	0.87
B17-A	4.59	20	0.0%	26.7%	26.7%	46.59%	8.24	14.98	0.33	0.57
B17-B	2.61	12	0.0%	26.7%	26.7%	46.59%	4.70	8.54	0.19	0.33
B18-A	0.36	2	0.0%	26.7%	26.7%	46.59%	0.65	1.19	0.03	0.05
B18-B	0.80	4	0.0%	26.7%	26.7%	46.59%	1.44	2.62	0.06	0.10
B18-C	0.15	0	0.0%	0.0%	10.0%	90.00%	0.36	0.58	0.02	0.03
B19	0.86	3	0.0%	26.7%	26.7%	46.59%	1.54	2.80	0.06	0.11
B20	0.80	3	0.0%	26.7%	26.7%	46.59%	1.44	2.62	0.06	0.10
B21	2.06	6	0.0%	40.0%	30.0%	30.00%	3.14	6.10	0.11	0.21
B22	0.09	0	0.0%	0.0%	10.0%	90.00%	0.23	0.38	0.01	0.02
POND 2	1.96	0	0.0%	35.8%	35.9%	28.31%	3.01	5.83	0.11	0.20
B23	1.08	0	0.0%	50.0%	50.0%	0.00%	1.22	2.72	0.03	0.08
B24	0.20	0	0.0%	50.0%	50.0%	0.00%	0.23	0.51	0.01	0.01
B25	0.16	0	0.0%	50.0%	50.0%	0.00%	0.19	0.41	0.00	0.01
B26	0.11	0	0.0%	50.0%	50.0%	0.00%	0.12	0.28	0.00	0.01
B27	0.23	0	0.0%	0.0%	15.0%	85.00%	0.54	0.89	0.02	0.04
B28	0.24	0	0.0%	0.0%	15.0%	85.00%	0.58	0.95	0.03	0.04
B29	0.13	0	0.0%	50.0%	50.0%	0.00%	0.15	0.34	0.00	0.01
TOTAL	56.5	248					99.75	182.61	3.90	6.89

NOTES:

Impervious percentages were calculated from the DPM equation D-3, with the remaining percentages distributed to land treatment type B and C, due to the relatively flat terrain

$$N = \text{UNITS/ACRES} = 4.6$$

$$\%D = 7 * \text{SQRT}((N * N) + (5 * N)) = 46.59 \%$$

APPENDIX B: INLET/STREET HYDRAULICS

MANNING'S N = 0.017 SLOPE = 0.038

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.0	1.4	4.0	11.3	0.6	7.0	38.0	0.0
2.0	9.3	1.2	5.0	24.0	0.3	8.0	38.7	0.7
3.0	10.0	0.5	6.0	36.7	0.1	9.0	48.0	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)
0.020	0.020	0.003	0.003	0.349	0.773	0.340	0.029
0.040	0.040	0.014	0.017	0.699	1.228	0.681	0.063
0.060	0.060	0.031	0.049	1.048	1.609	1.021	0.100
0.080	0.080	0.054	0.106	1.398	1.949	1.362	0.139
0.100	0.100	0.090	0.175	2.312	1.946	2.268	0.159
0.120	0.120	0.145	0.306	3.327	2.103	3.274	0.189
0.140	0.140	0.221	0.514	4.341	2.327	4.280	0.224
0.160	0.160	0.317	0.814	5.356	2.572	5.286	0.263
0.180	0.180	0.432	1.219	6.370	2.820	6.292	0.304
0.200	0.200	0.568	1.742	7.385	3.066	7.298	0.346
0.220	0.220	0.724	2.396	8.399	3.308	8.304	0.390
0.240	0.240	0.900	3.192	9.414	3.545	9.310	0.435
0.260	0.260	1.097	4.141	10.428	3.776	10.316	0.482
0.280	0.280	1.313	5.255	11.443	4.003	11.322	0.529
0.300	0.300	1.550	6.545	12.457	4.224	12.328	0.577
0.320	0.320	1.806	8.019	13.472	4.440	13.334	0.627
0.340	0.340	2.083	9.690	14.486	4.652	14.340	0.677
0.360	0.360	2.380	11.554	15.528	4.854	15.374	0.727
0.380	0.380	2.698	13.635	16.570	5.054	16.407	0.777
0.400	0.400	3.036	15.942	17.612	5.250	17.441	0.829
0.420	0.420	3.395	18.485	18.654	5.444	18.474	0.881
0.440	0.440	3.775	21.273	19.696	5.635	19.508	0.934
0.460	0.460	4.176	24.315	20.739	5.823	20.542	0.987
0.480	0.480	4.597	27.621	21.781	6.008	21.575	1.042
0.500	0.500	5.039	31.198	22.823	6.192	22.609	1.096
0.520	0.520	5.503	34.851	24.092	6.333	23.864	1.144
0.540	0.540	5.994	38.710	25.483	6.458	25.238	1.189
0.560	0.560	6.512	42.903	26.875	6.588	26.612	1.235
0.580	0.580	7.058	47.440	28.266	6.721	27.986	1.283
0.600	0.600	7.628	53.094	28.990	6.960	28.693	1.353
0.620	0.620	8.203	59.844	29.047	7.296	28.732	1.448
0.640	0.640	8.778	66.912	29.103	7.623	28.772	1.544
0.660	0.660	9.353	74.291	29.160	7.943	28.812	1.641
0.680	0.680	9.933	81.126	29.693	8.168	29.333	1.718
0.700	0.700	10.529	87.438	30.704	8.304	30.335	1.773
0.720	0.720	11.146	94.086	31.714	8.441	31.337	1.828
0.740	0.740	11.783	101.078	32.725	8.578	32.339	1.885
0.760	0.760	12.440	108.422	33.735	8.716	33.341	1.942
0.780	0.780	13.116	116.123	34.746	8.853	34.343	1.999
0.800	0.800	13.813	124.191	35.756	8.991	35.345	2.057
0.820	0.820	14.530	132.631	36.767	9.128	36.347	2.116
0.840	0.840	15.267	141.451	37.777	9.265	37.349	2.175

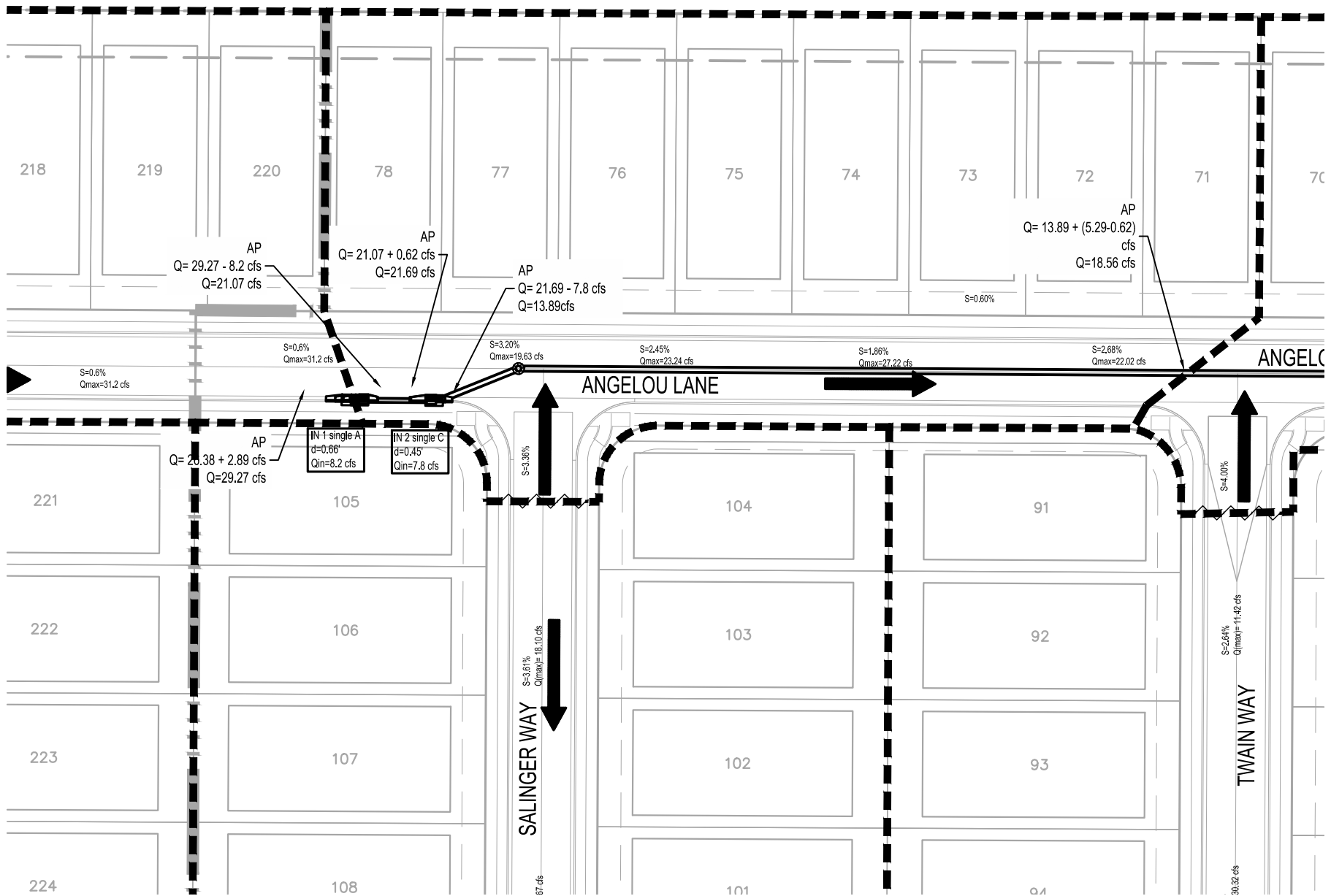
Q(max)= 17.46 cfs
(EGL Controlled)

MANNING'S N = 0.017 SLOPE = 0.019

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.0	1.4	4.0	11.3	0.6	7.0	38.0	0.0
2.0	9.3	1.2	5.0	24.0	0.3	8.0	38.7	0.7
3.0	10.0	0.5	6.0	36.7	0.1	9.0	48.0	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)
0.020	0.020	0.003	0.002	0.349	0.548	0.340	0.025
0.040	0.040	0.014	0.012	0.699	0.870	0.681	0.052
0.060	0.060	0.031	0.035	1.048	1.140	1.021	0.080
0.080	0.080	0.054	0.075	1.398	1.382	1.362	0.110
0.100	0.100	0.090	0.124	2.312	1.379	2.268	0.130
0.120	0.120	0.145	0.217	3.327	1.491	3.274	0.155
0.140	0.140	0.221	0.364	4.341	1.650	4.280	0.182
0.160	0.160	0.317	0.577	5.356	1.823	5.286	0.212
0.180	0.180	0.432	0.864	6.370	1.999	6.292	0.242
0.200	0.200	0.568	1.235	7.385	2.174	7.298	0.274
0.220	0.220	0.724	1.699	8.399	2.346	8.304	0.306
0.240	0.240	0.900	2.263	9.414	2.513	9.310	0.338
0.260	0.260	1.097	2.936	10.428	2.677	10.316	0.371
0.280	0.280	1.313	3.726	11.443	2.838	11.322	0.405
0.300	0.300	1.550	4.640	12.457	2.995	12.328	0.439
0.320	0.320	1.806	5.686	13.472	3.148	13.334	0.474
0.340	0.340	2.083	6.870	14.486	3.298	14.340	0.509
0.360	0.360	2.380	8.191	15.528	3.442	15.374	0.544
0.380	0.380	2.698	9.667	16.570	3.583	16.407	0.580
0.400	0.400	3.036	11.302	17.612	3.722	17.441	0.616
0.420	0.420	3.395	13.105	18.654	3.860	18.474	0.652
0.440	0.440	3.775	15.082	19.696	3.995	19.508	0.688
0.460	0.460	4.176	17.239	20.739	4.128	20.542	0.725
0.480	0.480	4.597	19.583	21.781	4.260	21.575	0.762
0.500	0.500	5.039	22.119	22.823	4.390	22.609	0.800
0.520	0.520	5.503	24.709	24.092	4.490	23.864	0.834
0.540	0.540	5.994	27.445	25.483	4.579	25.238	0.866
0.560	0.560	6.512	30.418	26.875	4.671	26.612	0.899
0.580	0.580	7.058	33.634	28.266	4.765	27.986	0.933
0.600	0.600	7.628	37.643	28.990	4.935	28.693	0.979
0.620	0.620	8.203	42.428	29.047	5.173	28.732	1.036
0.640	0.640	8.778	47.439	29.103	5.405	28.772	1.094
0.660	0.660	9.353	52.671	29.160	5.631	28.812	1.153
0.680	0.680	9.933	57.517	29.693	5.791	29.333	1.202
0.700	0.700	10.529	61.992	30.704	5.888	30.335	1.239
0.720	0.720	11.146	66.706	31.714	5.985	31.337	1.277
0.740	0.740	11.783	71.663	32.725	6.082	32.339	1.315
0.760	0.760	12.440	76.869	33.735	6.179	33.341	1.354
0.780	0.780	13.116	82.330	34.746	6.277	34.343	1.393
0.800	0.800	13.813	88.050	35.756	6.374	35.345	1.432
0.820	0.820	14.530	94.034	36.767	6.472	36.347	1.471
0.840	0.840	15.267	100.287	37.777	6.569	37.349	1.511

Q(max)= 26.9 cfs
(EGL Controlled)



ANGELOU

48ftROW-cross slope-COA 8in curb S=0.6%

NORTH SYSTEM

MANNING'S N = 0.017 SLOPE = 0.006

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.0	1.4	4.0	11.3	0.6	7.0	38.0	0.0
2.0	9.3	1.2	5.0	24.0	0.3	8.0	38.7	0.7
3.0	10.0	0.5	6.0	36.7	0.1	9.0	48.0	0.9

WSEL	DEPTH	FLOW	FLOW	WETTED	FLOW	TOPWID	TOTAL
FT.	INC	AREA	RATE	PER	VEL	PLUS	ENERGY
		SQ.FT.	(CFS)	(FT)	(FPS)	OBSTRUCTIONS	(FT)
0.010	0.010	0.001	0.000	0.175	0.195	0.170	0.011
0.020	0.020	0.003	0.001	0.349	0.309	0.340	0.021
0.030	0.030	0.008	0.003	0.524	0.405	0.511	0.033
0.040	0.040	0.014	0.007	0.699	0.490	0.681	0.044
0.050	0.050	0.021	0.012	0.873	0.569	0.851	0.055
0.060	0.060	0.031	0.020	1.048	0.643	1.021	0.066
0.070	0.070	0.042	0.030	1.223	0.712	1.192	0.078
0.080	0.080	0.054	0.042	1.398	0.778	1.362	0.089
0.090	0.090	0.070	0.054	1.805	0.774	1.765	0.099
0.100	0.100	0.090	0.070	2.312	0.777	2.268	0.109
0.110	0.110	0.115	0.092	2.820	0.803	2.771	0.120
0.120	0.120	0.145	0.122	3.327	0.840	3.274	0.131
0.130	0.130	0.181	0.160	3.834	0.883	3.777	0.142
0.140	0.140	0.221	0.205	4.341	0.930	4.280	0.153
0.150	0.150	0.266	0.260	4.848	0.978	4.783	0.165
0.160	0.160	0.317	0.325	5.356	1.027	5.286	0.176
0.170	0.170	0.372	0.401	5.863	1.077	5.789	0.188
0.180	0.180	0.432	0.487	6.370	1.127	6.292	0.200
0.190	0.190	0.498	0.585	6.877	1.176	6.795	0.212
0.200	0.200	0.568	0.696	7.385	1.225	7.298	0.223
0.210	0.210	0.644	0.820	7.892	1.273	7.801	0.235
0.220	0.220	0.724	0.957	8.399	1.322	8.304	0.247
0.230	0.230	0.810	1.109	8.906	1.369	8.807	0.259
0.240	0.240	0.900	1.275	9.414	1.416	9.310	0.271
0.250	0.250	0.996	1.457	9.921	1.463	9.813	0.283
0.260	0.260	1.097	1.654	10.428	1.509	10.316	0.295
0.270	0.270	1.202	1.868	10.935	1.554	10.819	0.308
0.280	0.280	1.313	2.099	11.443	1.599	11.322	0.320
0.290	0.290	1.429	2.348	11.950	1.643	11.825	0.332
0.300	0.300	1.550	2.614	12.457	1.687	12.328	0.344
0.310	0.310	1.675	2.899	12.964	1.731	12.831	0.357
0.320	0.320	1.806	3.204	13.472	1.774	13.334	0.369
0.330	0.330	1.942	3.527	13.979	1.816	13.837	0.381
0.340	0.340	2.083	3.871	14.486	1.858	14.340	0.394
0.350	0.350	2.229	4.232	15.007	1.899	14.857	0.406
0.360	0.360	2.380	4.615	15.528	1.939	15.374	0.418
0.370	0.370	2.536	5.020	16.049	1.979	15.890	0.431
0.380	0.380	2.698	5.447	16.570	2.019	16.407	0.443
0.390	0.390	2.865	5.896	17.091	2.058	16.924	0.456
0.400	0.400	3.036	6.368	17.612	2.097	17.441	0.468
0.410	0.410	3.213	6.864	18.133	2.136	17.958	0.481
0.420	0.420	3.395	7.384	18.654	2.175	18.474	0.494
0.430	0.430	3.583	7.928	19.175	2.213	18.991	0.506
0.440	0.440	3.775	8.498	19.696	2.251	19.508	0.519
0.450	0.450	3.973	9.093	20.217	2.289	20.025	0.531
0.460	0.460	4.176	9.713	20.739	2.326	20.542	0.544
0.470	0.470	4.384	10.360	21.260	2.363	21.058	0.557
0.480	0.480	4.597	11.034	21.781	2.400	21.575	0.570
0.490	0.490	4.815	11.734	22.302	2.437	22.092	0.582

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NORTH SYSTEM

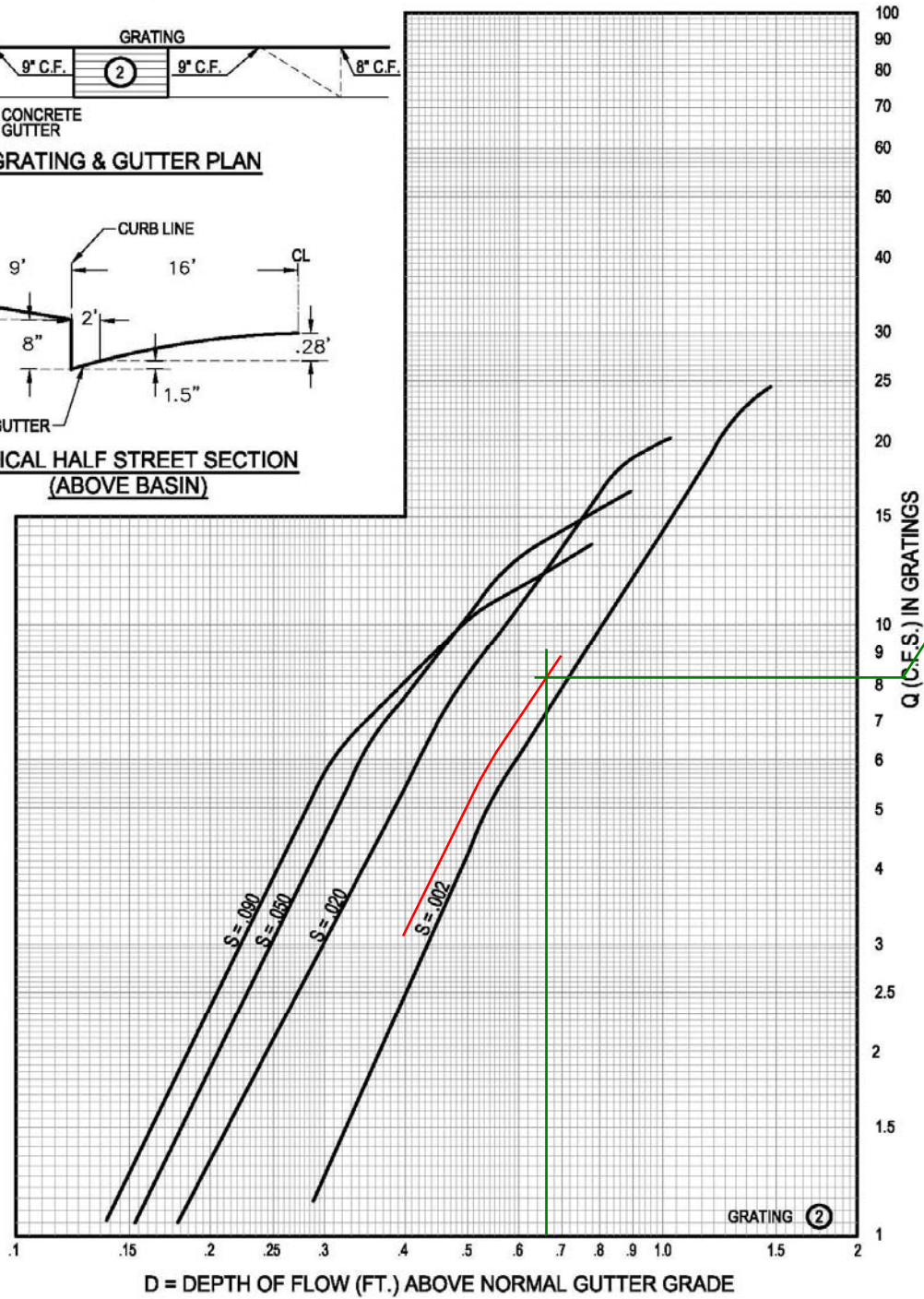
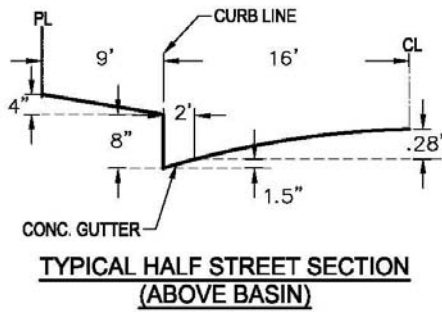
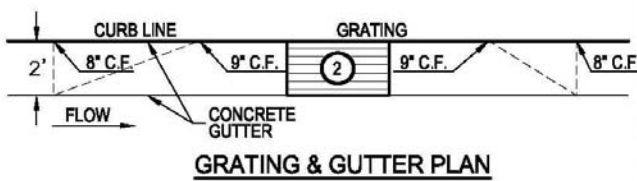
WSEL FT.	DEPTH INC	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID PLUS OBSTRUCTIONS	TOTAL ENERGY (FT)	
0.500	0.500	5.039	12.463	22.823	2.473	22.609	0.595	
0.510	0.510	5.268	13.200	23.396	2.506	23.177	0.608	
0.520	0.520	5.503	13.922	24.092	2.530	23.864	0.620	
0.530	0.530	5.745	14.676	24.788	2.555	24.551	0.632	
0.540	0.540	5.994	15.464	25.483	2.580	25.238	0.644	
0.550	0.550	6.250	16.284	26.179	2.606	25.925	0.656	
0.560	0.560	6.512	17.138	26.875	2.632	26.612	0.668	
0.570	0.570	6.782	18.027	27.570	2.658	27.299	0.680	
0.580	0.580	7.058	18.951	28.266	2.685	27.986	0.692	
0.590	0.590	7.342	19.910	28.962	2.712	28.673	0.704	
0.600	0.600	7.628	21.210	28.990	2.780	28.693	0.720	
0.610	0.610	7.915	22.542	29.018	2.848	28.713	0.736	
0.620	0.620	8.203	23.906	29.047	2.914	28.732	0.752	
0.630	0.630	8.490	25.302	29.075	2.980	28.752	0.768	
0.640	0.640	8.778	26.729	29.103	3.045	28.772	0.784	
0.650	0.650	9.065	28.188	29.131	3.109	28.792	0.800	
0.660	0.660	9.353	29.677	29.160	3.173	28.812	0.817	
0.670	0.670	9.642	31.196	29.188	3.236	28.832	0.833	
0.680	0.680	9.933	32.407	29.693	3.263	29.333	0.846	
0.690	0.690	10.228	33.651	30.198	3.290	29.834	0.858	
0.700	0.700	10.529	34.929	30.704	3.317	30.335	0.871	
0.710	0.710	10.835	36.239	31.209	3.345	30.836	0.884	
0.720	0.720	11.146	37.584	31.714	3.372	31.337	0.897	
0.730	0.730	11.462	38.964	32.219	3.399	31.838	0.910	
0.740	0.740	11.783	40.377	32.725	3.427	32.339	0.923	
0.750	0.750	12.109	41.826	33.230	3.454	32.840	0.936	
0.760	0.760	12.440	43.311	33.735	3.482	33.341	0.949	
0.770	0.770	12.775	44.831	34.240	3.509	33.842	0.962	
0.780	0.780	13.116	46.388	34.746	3.537	34.343	0.975	
0.790	0.790	13.462	47.980	35.251	3.564	34.844	0.988	
0.800	0.800	13.813	49.610	35.756	3.591	35.345	1.001	
0.810	0.810	14.169	51.277	36.261	3.619	35.846	1.014	
0.820	0.820	14.530	52.982	36.767	3.646	36.347	1.027	
0.830	0.830	14.896	54.724	37.272	3.674	36.848	1.040	
0.840	0.840	15.267	56.505	37.777	3.701	37.349	1.053	
0.850	0.850	15.643	58.325	38.283	3.728	37.850	1.066	

IN 2
Q=21.05
d=0.60'

IN 1
Q=29.25
d=0.66'

Q(max)= 31.2 cfs
(d Controlled)

GRATING CAPACITIES FOR TYPE "A", "C" AND "D"



Q = 8.2 cfs
IN1

d = 0.66'
IN1

PLATE 22.3 D-5

ANGELOU

48ftROW_Cross slope_ S=3.20%

NORTH SYSTEM

MANNING'S N = 0.017 SLOPE = 0.032

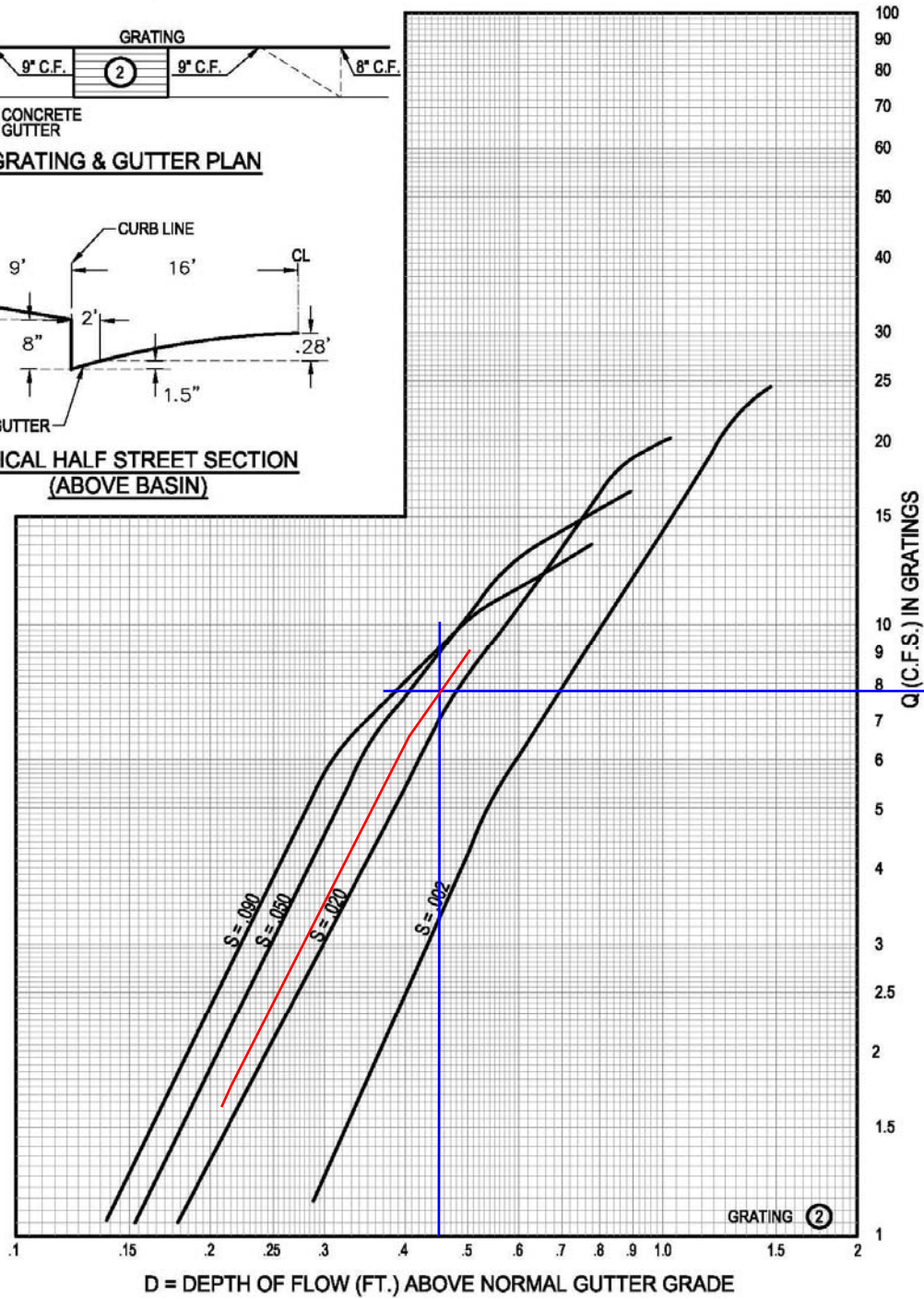
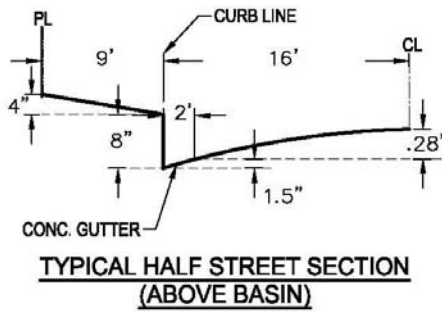
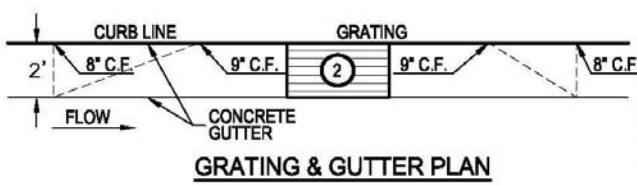
POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.0	1.4	4.0	11.3	0.6	7.0	38.0	0.0
2.0	9.3	1.2	5.0	24.0	0.3	8.0	38.7	0.7
3.0	10.0	0.5	6.0	36.7	0.1	9.0	48.0	0.9

WSEL FT.	DEPTH INC	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID PLUS OBSTRUCTIONS	TOTAL ENERGY (FT)
0.020	0.020	0.003	0.002	0.349	0.713	0.340	0.028
0.040	0.040	0.014	0.015	0.699	1.132	0.681	0.060
0.060	0.060	0.031	0.045	1.048	1.484	1.021	0.094
0.080	0.080	0.054	0.098	1.398	1.798	1.362	0.130
0.100	0.100	0.090	0.161	2.312	1.795	2.268	0.150
0.120	0.120	0.145	0.282	3.327	1.940	3.274	0.179
0.140	0.140	0.221	0.474	4.341	2.147	4.280	0.212
0.160	0.160	0.317	0.751	5.356	2.373	5.286	0.248
0.180	0.180	0.432	1.125	6.370	2.602	6.292	0.285
0.200	0.200	0.568	1.607	7.385	2.829	7.298	0.324
0.220	0.220	0.724	2.210	8.399	3.052	8.304	0.365
0.240	0.240	0.900	2.945	9.414	3.270	9.310	0.406
0.260	0.260	1.097	3.821	10.428	3.484	10.316	0.449
0.280	0.280	1.313	4.848	11.443	3.692	11.322	0.492
0.300	0.300	1.550	6.038	12.457	3.896	12.328	0.536
0.320	0.320	1.806	7.398	13.472	4.096	13.334	0.581
0.340	0.340	2.083	8.939	14.486	4.292	14.340	0.626
0.360	0.360	2.380	10.659	15.528	4.478	15.374	0.672
0.380	0.380	2.698	12.578	16.570	4.662	16.407	0.718
0.400	0.400	3.036	14.707	17.612	4.844	17.441	0.765
0.420	0.420	3.395	17.053	18.654	5.022	18.474	0.812
0.440	0.440	3.775	19.625	19.696	5.198	19.508	0.860
0.460	0.460	4.176	22.432	20.739	5.372	20.542	0.909
0.480	0.480	4.597	25.481	21.781	5.543	21.575	0.958
0.500	0.500	5.039	28.781	22.823	5.712	22.609	1.007
0.520	0.520	5.503	32.151	24.092	5.843	23.864	1.051
0.540	0.540	5.994	35.712	25.483	5.958	25.238	1.092
0.560	0.560	6.512	39.579	26.875	6.078	26.612	1.135
0.580	0.580	7.058	43.765	28.266	6.201	27.986	1.178
0.600	0.600	7.628	48.981	28.990	6.421	28.693	1.241
0.620	0.620	8.203	55.208	29.047	6.731	28.732	1.325
0.640	0.640	8.778	61.728	29.103	7.032	28.772	1.409
0.660	0.660	9.353	68.535	29.160	7.327	28.812	1.495
0.680	0.680	9.933	74.842	29.693	7.535	29.333	1.563
0.700	0.700	10.529	80.664	30.704	7.661	30.335	1.613
0.720	0.720	11.146	86.797	31.714	7.787	31.337	1.663
0.740	0.740	11.783	93.248	32.725	7.914	32.339	1.714
0.760	0.760	12.440	100.022	33.735	8.041	33.341	1.766
0.780	0.780	13.116	107.127	34.746	8.167	34.343	1.818
0.800	0.800	13.813	114.570	35.756	8.294	35.345	1.870
0.820	0.820	14.530	122.357	36.767	8.421	36.347	1.923
0.840	0.840	15.267	130.493	37.777	8.547	37.349	1.976

Q(max)= 19.63 cfs
(EGL Controlled)

IN2
Q= 21.69 cfs
d=0.45'

GRATING CAPACITIES FOR TYPE "A", "C" AND "D"



SLOPE = 3.20%

Q = 7.8 cfs
IN2

d = 0.45"
IN2

PLATE 22.3 D-5

ANGELOU

48ftROW_Cross slope_ S=2.45%

NORTH SYSTEM

MANNING'S N = 0.017 SLOPE = 0.025

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.0	1.4	4.0	11.3	0.6	7.0	38.0	0.0
2.0	9.3	1.2	5.0	24.0	0.3	8.0	38.7	0.7
3.0	10.0	0.5	6.0	36.7	0.1	9.0	48.0	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)
0.020	0.020	0.003	0.002	0.349	0.624	0.340	0.026
0.040	0.040	0.014	0.013	0.699	0.991	0.681	0.055
0.060	0.060	0.031	0.040	1.048	1.298	1.021	0.086
0.080	0.080	0.054	0.086	1.398	1.573	1.362	0.118
0.100	0.100	0.090	0.141	2.312	1.571	2.268	0.138
0.120	0.120	0.145	0.247	3.327	1.697	3.274	0.165
0.140	0.140	0.221	0.415	4.341	1.879	4.280	0.195
0.160	0.160	0.317	0.657	5.356	2.076	5.286	0.227
0.180	0.180	0.432	0.984	6.370	2.276	6.292	0.261
0.200	0.200	0.568	1.407	7.385	2.475	7.298	0.295
0.220	0.220	0.724	1.934	8.399	2.670	8.304	0.331
0.240	0.240	0.900	2.577	9.414	2.862	9.310	0.367
0.260	0.260	1.097	3.343	10.428	3.048	10.316	0.405
0.280	0.280	1.313	4.242	11.443	3.231	11.322	0.442
0.300	0.300	1.550	5.283	12.457	3.409	12.328	0.481
0.320	0.320	1.806	6.473	13.472	3.584	13.334	0.520
0.340	0.340	2.083	7.822	14.486	3.755	14.340	0.559
0.360	0.360	2.380	9.326	15.528	3.919	15.374	0.599
0.380	0.380	2.698	11.006	16.570	4.080	16.407	0.639
0.400	0.400	3.036	12.868	17.612	4.238	17.441	0.679
0.420	0.420	3.395	14.921	18.654	4.394	18.474	0.720
0.440	0.440	3.775	17.172	19.696	4.548	19.508	0.762
0.460	0.460	4.176	19.628	20.739	4.700	20.542	0.804
0.480	0.480	4.597	22.296	21.781	4.850	21.575	0.846
0.500	0.500	5.039	25.184	22.823	4.998	22.609	0.889
0.520	0.520	5.503	28.132	24.092	5.112	23.864	0.927
0.540	0.540	5.994	31.248	25.483	5.213	25.238	0.963
0.560	0.560	6.512	34.632	26.875	5.318	26.612	1.000
0.580	0.580	7.058	38.294	28.266	5.426	27.986	1.038
0.600	0.600	7.628	42.859	28.990	5.618	28.693	1.091
0.620	0.620	8.203	48.307	29.047	5.889	28.732	1.159
0.640	0.640	8.778	54.012	29.103	6.153	28.772	1.229
0.660	0.660	9.353	59.968	29.160	6.411	28.812	1.299
0.680	0.680	9.933	65.486	29.693	6.593	29.333	1.356
0.700	0.700	10.529	70.581	30.704	6.703	30.335	1.399
0.720	0.720	11.146	75.948	31.714	6.814	31.337	1.442
0.740	0.740	11.783	81.592	32.725	6.925	32.339	1.486
0.760	0.760	12.440	87.519	33.735	7.036	33.341	1.530
0.780	0.780	13.116	93.737	34.746	7.147	34.343	1.574
0.800	0.800	13.813	100.249	35.756	7.257	35.345	1.619
0.820	0.820	14.530	107.062	36.767	7.368	36.347	1.664
0.840	0.840	15.267	114.182	37.777	7.479	37.349	1.710

Q(max)= 23.24 cfs
(EGL Controlled)

MANNING'S N = 0.017 SLOPE = 0.019

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.0	1.4	4.0	11.3	0.6	7.0	38.0	0.0
2.0	9.3	1.2	5.0	24.0	0.3	8.0	38.7	0.7
3.0	10.0	0.5	6.0	36.7	0.1	9.0	48.0	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)
0.020	0.020	0.003	0.002	0.349	0.544	0.340	0.025
0.040	0.040	0.014	0.012	0.699	0.863	0.681	0.052
0.060	0.060	0.031	0.035	1.048	1.131	1.021	0.080
0.080	0.080	0.054	0.075	1.398	1.371	1.362	0.109
0.100	0.100	0.090	0.123	2.312	1.368	2.268	0.129
0.120	0.120	0.145	0.215	3.327	1.479	3.274	0.154
0.140	0.140	0.221	0.362	4.341	1.637	4.280	0.182
0.160	0.160	0.317	0.573	5.356	1.809	5.286	0.211
0.180	0.180	0.432	0.858	6.370	1.984	6.292	0.241
0.200	0.200	0.568	1.226	7.385	2.157	7.298	0.272
0.220	0.220	0.724	1.685	8.399	2.327	8.304	0.304
0.240	0.240	0.900	2.245	9.414	2.493	9.310	0.337
0.260	0.260	1.097	2.913	10.428	2.656	10.316	0.370
0.280	0.280	1.313	3.696	11.443	2.815	11.322	0.403
0.300	0.300	1.550	4.603	12.457	2.971	12.328	0.437
0.320	0.320	1.806	5.640	13.472	3.123	13.334	0.472
0.340	0.340	2.083	6.815	14.486	3.272	14.340	0.507
0.360	0.360	2.380	8.126	15.528	3.414	15.374	0.541
0.380	0.380	2.698	9.590	16.570	3.555	16.407	0.577
0.400	0.400	3.036	11.212	17.612	3.693	17.441	0.612
0.420	0.420	3.395	13.001	18.654	3.829	18.474	0.648
0.440	0.440	3.775	14.962	19.696	3.963	19.508	0.684
0.460	0.460	4.176	17.102	20.739	4.095	20.542	0.721
0.480	0.480	4.597	19.427	21.781	4.226	21.575	0.758
0.500	0.500	5.039	21.943	22.823	4.355	22.609	0.795
0.520	0.520	5.503	24.512	24.092	4.455	23.864	0.829
0.540	0.540	5.994	27.226	25.483	4.542	25.238	0.861
0.560	0.560	6.512	30.175	26.875	4.634	26.612	0.894
0.580	0.580	7.058	33.366	28.266	4.727	27.986	0.928
0.600	0.600	7.628	37.343	28.990	4.895	28.693	0.973
0.620	0.620	8.203	42.090	29.047	5.131	28.732	1.030
0.640	0.640	8.778	47.061	29.103	5.362	28.772	1.087
0.660	0.660	9.353	52.251	29.160	5.586	28.812	1.145
0.680	0.680	9.933	57.059	29.693	5.745	29.333	1.193
0.700	0.700	10.529	61.498	30.704	5.841	30.335	1.231
0.720	0.720	11.146	66.174	31.714	5.937	31.337	1.268
0.740	0.740	11.783	71.092	32.725	6.034	32.339	1.306
0.760	0.760	12.440	76.257	33.735	6.130	33.341	1.345
0.780	0.780	13.116	81.674	34.746	6.227	34.343	1.383
0.800	0.800	13.813	87.348	35.756	6.323	35.345	1.422
0.820	0.820	14.530	93.284	36.767	6.420	36.347	1.461
0.840	0.840	15.267	99.488	37.777	6.516	37.349	1.500

Q(max)= 27.22 cfs
(EGL Controlled)

ANGELOU

48ftROW-cross slope-COA 8in curb S=2.68%

NORTH SYSTEM

MANNING'S N = 0.017 SLOPE = 0.027

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.0	1.4	4.0	11.3	0.6	7.0	38.0	0.0
2.0	9.3	1.2	5.0	24.0	0.3	8.0	38.7	0.7
3.0	10.0	0.5	6.0	36.7	0.1	9.0	48.0	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	0.001	0.000	0.175	0.411	0.170	0.013
0.020	0.020	0.003	0.002	0.349	0.653	0.340	0.027
0.030	0.030	0.008	0.007	0.524	0.856	0.511	0.041
0.040	0.040	0.014	0.014	0.699	1.036	0.681	0.057
0.050	0.050	0.021	0.026	0.873	1.203	0.851	0.072
0.060	0.060	0.031	0.042	1.048	1.358	1.021	0.089
0.070	0.070	0.042	0.063	1.223	1.505	1.192	0.105
0.080	0.080	0.054	0.090	1.398	1.645	1.362	0.122
0.090	0.090	0.070	0.114	1.805	1.636	1.765	0.132
0.100	0.100	0.090	0.148	2.312	1.643	2.268	0.142
0.110	0.110	0.115	0.195	2.820	1.697	2.771	0.155
0.120	0.120	0.145	0.258	3.327	1.775	3.274	0.169
0.130	0.130	0.181	0.337	3.834	1.866	3.777	0.184
0.140	0.140	0.221	0.434	4.341	1.965	4.280	0.200
0.150	0.150	0.266	0.550	4.848	2.067	4.783	0.216
0.160	0.160	0.317	0.687	5.356	2.171	5.286	0.233
0.170	0.170	0.372	0.847	5.863	2.276	5.789	0.251
0.180	0.180	0.432	1.029	6.370	2.381	6.292	0.268
0.190	0.190	0.498	1.237	6.877	2.485	6.795	0.286
0.200	0.200	0.568	1.471	7.385	2.589	7.298	0.304
0.210	0.210	0.644	1.733	7.892	2.691	7.801	0.323
0.220	0.220	0.724	2.023	8.399	2.793	8.304	0.341
0.230	0.230	0.810	2.343	8.906	2.894	8.807	0.360
0.240	0.240	0.900	2.695	9.414	2.993	9.310	0.379
0.250	0.250	0.996	3.079	9.921	3.091	9.813	0.399
0.260	0.260	1.097	3.496	10.428	3.188	10.316	0.418
0.270	0.270	1.202	3.949	10.935	3.284	10.819	0.438
0.280	0.280	1.313	4.437	11.443	3.379	11.322	0.458
0.290	0.290	1.429	4.962	11.950	3.473	11.825	0.478
0.300	0.300	1.550	5.525	12.457	3.566	12.328	0.498
0.310	0.310	1.675	6.128	12.964	3.658	12.831	0.518
0.320	0.320	1.806	6.770	13.472	3.749	13.334	0.539
0.330	0.330	1.942	7.454	13.979	3.838	13.837	0.559
0.340	0.340	2.083	8.181	14.486	3.928	14.340	0.580
0.350	0.350	2.229	8.945	15.007	4.013	14.857	0.601
0.360	0.360	2.380	9.754	15.528	4.098	15.374	0.621
0.370	0.370	2.536	10.609	16.049	4.183	15.890	0.642
0.380	0.380	2.698	11.511	16.570	4.267	16.407	0.663
0.390	0.390	2.865	12.461	17.091	4.350	16.924	0.684
0.400	0.400	3.036	13.459	17.612	4.433	17.441	0.706
0.410	0.410	3.213	14.507	18.133	4.515	17.958	0.727
0.420	0.420	3.395	15.606	18.654	4.596	18.474	0.749
0.430	0.430	3.583	16.756	19.175	4.677	18.991	0.770
0.440	0.440	3.775	17.960	19.696	4.757	19.508	0.792
0.450	0.450	3.973	19.217	20.217	4.837	20.025	0.814
0.460	0.460	4.176	20.528	20.739	4.916	20.542	0.836
0.470	0.470	4.384	21.895	21.260	4.995	21.058	0.858
0.480	0.480	4.597	23.319	21.781	5.073	21.575	0.880
0.490	0.490	4.815	24.800	22.302	5.150	22.092	0.903

Q(max)= 22.02 cfs
(EGL Controlled)

ANGELOU

48' ROW_Cross Slope_s-1.44

NORTH SYSTEM

MANNING'S N = 0.017 SLOPE = 0.014

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.0	1.4	4.0	11.3	0.6	7.0	38.0	0.0
2.0	9.3	1.2	5.0	24.0	0.3	8.0	38.7	0.7
3.0	10.0	0.5	6.0	36.7	0.1	9.0	48.0	0.9

WSEL	DEPTH	FLOW	FLOW	WETTED	FLOW	TOPWID	TOTAL
FT.	INC	AREA	RATE	PER	VEL	PLUS	ENERGY
		SQ.FT.	(CFS)	(FT)	(FPS)	OBSTRUCTIONS	(FT)
0.020	0.020	0.003	0.002	0.349	0.479	0.340	0.024
0.040	0.040	0.014	0.010	0.699	0.760	0.681	0.049
0.060	0.060	0.031	0.031	1.048	0.995	1.021	0.075
0.080	0.080	0.054	0.066	1.398	1.206	1.362	0.103
0.100	0.100	0.090	0.108	2.312	1.204	2.268	0.123
0.120	0.120	0.145	0.189	3.327	1.301	3.274	0.146
0.140	0.140	0.221	0.318	4.341	1.440	4.280	0.172
0.160	0.160	0.317	0.504	5.356	1.592	5.286	0.199
0.180	0.180	0.432	0.755	6.370	1.745	6.292	0.227
0.200	0.200	0.568	1.078	7.385	1.898	7.298	0.256
0.220	0.220	0.724	1.483	8.399	2.047	8.304	0.285
0.240	0.240	0.900	1.975	9.414	2.194	9.310	0.315
0.260	0.260	1.097	2.563	10.428	2.337	10.316	0.345
0.280	0.280	1.313	3.252	11.443	2.477	11.322	0.375
0.300	0.300	1.550	4.050	12.457	2.614	12.328	0.406
0.320	0.320	1.806	4.963	13.472	2.748	13.334	0.437
0.340	0.340	2.083	5.997	14.486	2.879	14.340	0.469
0.360	0.360	2.380	7.150	15.528	3.004	15.374	0.500
0.380	0.380	2.698	8.438	16.570	3.128	16.407	0.532
0.400	0.400	3.036	9.866	17.612	3.249	17.441	0.564
0.420	0.420	3.395	11.439	18.654	3.369	18.474	0.597
0.440	0.440	3.775	13.165	19.696	3.487	19.508	0.629
0.460	0.460	4.176	15.048	20.739	3.604	20.542	0.662
0.480	0.480	4.597	17.093	21.781	3.718	21.575	0.695
0.500	0.500	5.039	19.307	22.823	3.832	22.609	0.728
0.520	0.520	5.503	21.568	24.092	3.919	23.864	0.759
0.540	0.540	5.994	23.956	25.483	3.997	25.238	0.788
0.560	0.560	6.512	26.551	26.875	4.077	26.612	0.819
0.580	0.580	7.058	29.359	28.266	4.159	27.986	0.849
0.600	0.600	7.628	32.858	28.990	4.307	28.693	0.889
0.620	0.620	8.203	37.035	29.047	4.515	28.732	0.937
0.640	0.640	8.778	41.409	29.103	4.717	28.772	0.986
0.660	0.660	9.353	45.975	29.160	4.915	28.812	1.036
0.680	0.680	9.933	50.205	29.693	5.055	29.333	1.077
0.700	0.700	10.529	54.111	30.704	5.139	30.335	1.111
0.720	0.720	11.146	58.225	31.714	5.224	31.337	1.144
0.740	0.740	11.783	62.552	32.725	5.309	32.339	1.178
0.760	0.760	12.440	67.097	33.735	5.394	33.341	1.213
0.780	0.780	13.116	71.863	34.746	5.479	34.343	1.247
0.800	0.800	13.813	76.856	35.756	5.564	35.345	1.282
0.820	0.820	14.530	82.079	36.767	5.649	36.347	1.316
0.840	0.840	15.267	87.538	37.777	5.734	37.349	1.351

Q(max)= 30.32 cfs
(EGL Controlled)

ANALYSIS OF AN INLET IN A SUMP CONDITION

IN 3 Angelou Lane

INLET TYPE: **Single Grate Type "A"** with curb opening wings on both sides on inlet.WEIR: $Q=C*L*H^{1.5}$ Wing opening

C= 3.0

L= **4.0** ft $Q=3.0(4.0)H^{1.5}= 12.0H^{1.5}$ Grate opening

C=3.0

L(single grate)=[(2.67')+2(1.8')]=**6.27** ft $Q=3.0(6.27)H^{1.5}=18.81*H^{1.5}$ ORIFICE: $Q=C*A*(2*G*H)^{0.5}$ Grate opening

C=0.6

A(single grate)=**3.72** sf $Q=0.6*3.72*(64.4*H)^{0.5}$ Wing opening*

C=0.6

A=2.0 sf

 $Q=1.2*(64.4*H)^{0.5}$

*not included in the orifice calcs

	WS ELEVATION	HEIGHT ABOVE INLET	Q (CFS) WEIR	Q (CFS) WEIR	Q (CFS) ORIFICE	TOTAL Q (CFS)	COMMENTS:
			WING OPENING	SINGLE GRATE	SINGLE GRATE		
~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	
	0.60	0.60	5.58	8.74	13.87	19.90	
TOP OF CURB	0.70	0.70	7.03	11.02	14.99	25.07	@ Q(100 yr) = 22.19 cfs<<Flow is under TC Elevation (d=0.64')
	0.80	0.80	8.59	13.46	16.02	30.63	
ROW LIMIT	0.86	0.86	9.52	14.92	16.58	33.96	
	0.90	0.90	10.25	16.06	16.99	36.55	
	1.00	1.00	12.00	18.81	17.91	41.91	@ Q(2 x 100 yr) = 45.38cfs<<Flow OVERFLOWS ROW Elevation**

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

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

**** This inlet has an emergency overflow into POND**

MANNING'S N = 0.017 SLOPE = 0.036

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.0	1.4	4.0	11.3	0.6	7.0	38.0	0.0
2.0	9.3	1.2	5.0	24.0	0.3	8.0	38.7	0.7
3.0	10.0	0.5	6.0	36.7	0.1	9.0	48.0	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)
0.020	0.020	0.003	0.003	0.349	0.758	0.340	0.029
0.040	0.040	0.014	0.016	0.699	1.203	0.681	0.063
0.060	0.060	0.031	0.048	1.048	1.576	1.021	0.099
0.080	0.080	0.054	0.104	1.398	1.909	1.362	0.137
0.100	0.100	0.090	0.171	2.312	1.906	2.268	0.157
0.120	0.120	0.145	0.299	3.327	2.060	3.274	0.186
0.140	0.140	0.221	0.504	4.341	2.281	4.280	0.221
0.160	0.160	0.317	0.798	5.356	2.520	5.286	0.259
0.180	0.180	0.432	1.195	6.370	2.763	6.292	0.299
0.200	0.200	0.568	1.707	7.385	3.005	7.298	0.340
0.220	0.220	0.724	2.348	8.399	3.242	8.304	0.383
0.240	0.240	0.900	3.128	9.414	3.474	9.310	0.428
0.260	0.260	1.097	4.058	10.428	3.700	10.316	0.473
0.280	0.280	1.313	5.150	11.443	3.922	11.322	0.519
0.300	0.300	1.550	6.413	12.457	4.139	12.328	0.566
0.320	0.320	1.806	7.858	13.472	4.351	13.334	0.614
0.340	0.340	2.083	9.494	14.486	4.558	14.340	0.663
0.360	0.360	2.380	11.321	15.528	4.757	15.374	0.712
0.380	0.380	2.698	13.360	16.570	4.952	16.407	0.761
0.400	0.400	3.036	15.620	17.612	5.145	17.441	0.812
0.420	0.420	3.395	18.112	18.654	5.334	18.474	0.863
0.440	0.440	3.775	20.844	19.696	5.521	19.508	0.914
0.460	0.460	4.176	23.825	20.739	5.706	20.542	0.966
0.480	0.480	4.597	27.064	21.781	5.887	21.575	1.019
0.500	0.500	5.039	30.570	22.823	6.067	22.609	1.072
0.520	0.520	5.503	34.149	24.092	6.206	23.864	1.119
0.540	0.540	5.994	37.930	25.483	6.328	25.238	1.163
0.560	0.560	6.512	42.039	26.875	6.455	26.612	1.208
0.580	0.580	7.058	46.484	28.266	6.586	27.986	1.255
0.600	0.600	7.628	52.025	28.990	6.820	28.693	1.323
0.620	0.620	8.203	58.638	29.047	7.149	28.732	1.415
0.640	0.640	8.778	65.563	29.103	7.469	28.772	1.508
0.660	0.660	9.353	72.794	29.160	7.783	28.812	1.602
0.680	0.680	9.933	79.492	29.693	8.003	29.333	1.676
0.700	0.700	10.529	85.676	30.704	8.137	30.335	1.730
0.720	0.720	11.146	92.190	31.714	8.271	31.337	1.784
0.740	0.740	11.783	99.041	32.725	8.406	32.339	1.839
0.760	0.760	12.440	106.237	33.735	8.540	33.341	1.894
0.780	0.780	13.116	113.784	34.746	8.675	34.343	1.951
0.800	0.800	13.813	121.689	35.756	8.810	35.345	2.007
0.820	0.820	14.530	129.959	36.767	8.944	36.347	2.064
0.840	0.840	15.267	138.601	37.777	9.078	37.349	2.122

Q(max)= 18.10 cfs
(EGL Controlled)

SALINGER

48' ROW_Cross Slope_s-0.72%

MIDDLE SYSTEM

MANNING'S N = 0.017 SLOPE = 0.007

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.0	1.4	4.0	11.3	0.6	7.0	38.0	0.0
2.0	9.3	1.2	5.0	24.0	0.3	8.0	38.7	0.7
3.0	10.0	0.5	6.0	36.7	0.1	9.0	48.0	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)
0.020	0.020	0.003	0.001	0.349	0.338	0.340	0.022
0.040	0.040	0.014	0.007	0.699	0.537	0.681	0.044
0.060	0.060	0.031	0.022	1.048	0.704	1.021	0.068
0.080	0.080	0.054	0.046	1.398	0.853	1.362	0.091
0.100	0.100	0.090	0.077	2.312	0.851	2.268	0.111
0.120	0.120	0.145	0.134	3.327	0.920	3.274	0.133
0.140	0.140	0.221	0.225	4.341	1.018	4.280	0.156
0.160	0.160	0.317	0.356	5.356	1.125	5.286	0.180
0.180	0.180	0.432	0.534	6.370	1.234	6.292	0.204
0.200	0.200	0.568	0.762	7.385	1.342	7.298	0.228
0.220	0.220	0.724	1.048	8.399	1.448	8.304	0.253
0.240	0.240	0.900	1.397	9.414	1.551	9.310	0.277
0.260	0.260	1.097	1.812	10.428	1.653	10.316	0.302
0.280	0.280	1.313	2.300	11.443	1.751	11.322	0.328
0.300	0.300	1.550	2.864	12.457	1.848	12.328	0.353
0.320	0.320	1.806	3.509	13.472	1.943	13.334	0.379
0.340	0.340	2.083	4.240	14.486	2.036	14.340	0.404
0.360	0.360	2.380	5.056	15.528	2.124	15.374	0.430
0.380	0.380	2.698	5.966	16.570	2.212	16.407	0.456
0.400	0.400	3.036	6.976	17.612	2.298	17.441	0.482
0.420	0.420	3.395	8.089	18.654	2.382	18.474	0.508
0.440	0.440	3.775	9.309	19.696	2.466	19.508	0.535
0.460	0.460	4.176	10.640	20.739	2.548	20.542	0.561
0.480	0.480	4.597	12.087	21.781	2.629	21.575	0.588
0.500	0.500	5.039	13.652	22.823	2.709	22.609	0.614
0.520	0.520	5.503	15.251	24.092	2.771	23.864	0.639
0.540	0.540	5.994	16.939	25.483	2.826	25.238	0.664
0.560	0.560	6.512	18.774	26.875	2.883	26.612	0.689
0.580	0.580	7.058	20.760	28.266	2.941	27.986	0.715
0.600	0.600	7.628	23.234	28.990	3.046	28.693	0.744
0.620	0.620	8.203	26.187	29.047	3.193	28.732	0.779
0.640	0.640	8.778	29.280	29.103	3.336	28.772	0.813
0.660	0.660	9.353	32.509	29.160	3.476	28.812	0.848
0.680	0.680	9.933	35.500	29.693	3.574	29.333	0.879
0.700	0.700	10.529	38.262	30.704	3.634	30.335	0.905
0.720	0.720	11.146	41.172	31.714	3.694	31.337	0.932
0.740	0.740	11.783	44.231	32.725	3.754	32.339	0.959
0.760	0.760	12.440	47.445	33.735	3.814	33.341	0.986
0.780	0.780	13.116	50.815	34.746	3.874	34.343	1.013
0.800	0.800	13.813	54.345	35.756	3.934	35.345	1.041
0.820	0.820	14.530	58.039	36.767	3.994	36.347	1.068
0.840	0.840	15.267	61.898	37.777	4.054	37.349	1.096

Q(max)= 33.67 cfs
(EGL Controlled)

SALINGER

48ftROW_Cross slope_ S=2.11%

MIDDLE SYSTEM

MANNING'S N = 0.017 SLOPE = 0.021

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.0	1.4	4.0	11.3	0.6	7.0	38.0	0.0
2.0	9.3	1.2	5.0	24.0	0.3	8.0	38.7	0.7
3.0	10.0	0.5	6.0	36.7	0.1	9.0	48.0	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)
0.020	0.020	0.003	0.002	0.349	0.579	0.340	0.025
0.040	0.040	0.014	0.013	0.699	0.920	0.681	0.053
0.060	0.060	0.031	0.037	1.048	1.205	1.021	0.083
0.080	0.080	0.054	0.080	1.398	1.460	1.362	0.113
0.100	0.100	0.090	0.131	2.312	1.458	2.268	0.133
0.120	0.120	0.145	0.229	3.327	1.575	3.274	0.159
0.140	0.140	0.221	0.385	4.341	1.744	4.280	0.187
0.160	0.160	0.317	0.610	5.356	1.927	5.286	0.218
0.180	0.180	0.432	0.913	6.370	2.113	6.292	0.249
0.200	0.200	0.568	1.305	7.385	2.297	7.298	0.282
0.220	0.220	0.724	1.795	8.399	2.478	8.304	0.316
0.240	0.240	0.900	2.391	9.414	2.656	9.310	0.350
0.260	0.260	1.097	3.102	10.428	2.829	10.316	0.384
0.280	0.280	1.313	3.937	11.443	2.998	11.322	0.420
0.300	0.300	1.550	4.903	12.457	3.164	12.328	0.456
0.320	0.320	1.806	6.007	13.472	3.326	13.334	0.492
0.340	0.340	2.083	7.259	14.486	3.485	14.340	0.529
0.360	0.360	2.380	8.655	15.528	3.637	15.374	0.566
0.380	0.380	2.698	10.214	16.570	3.786	16.407	0.603
0.400	0.400	3.036	11.942	17.612	3.933	17.441	0.641
0.420	0.420	3.395	13.847	18.654	4.078	18.474	0.679
0.440	0.440	3.775	15.936	19.696	4.221	19.508	0.717
0.460	0.460	4.176	18.215	20.739	4.362	20.542	0.756
0.480	0.480	4.597	20.691	21.781	4.501	21.575	0.795
0.500	0.500	5.039	23.371	22.823	4.638	22.609	0.835
0.520	0.520	5.503	26.107	24.092	4.744	23.864	0.870
0.540	0.540	5.994	28.998	25.483	4.838	25.238	0.904
0.560	0.560	6.512	32.139	26.875	4.935	26.612	0.939
0.580	0.580	7.058	35.538	28.266	5.035	27.986	0.974
0.600	0.600	7.628	39.774	28.990	5.214	28.693	1.023
0.620	0.620	8.203	44.830	29.047	5.465	28.732	1.085
0.640	0.640	8.778	50.124	29.103	5.710	28.772	1.147
0.660	0.660	9.353	55.652	29.160	5.950	28.812	1.211
0.680	0.680	9.933	60.773	29.693	6.119	29.333	1.262
0.700	0.700	10.529	65.501	30.704	6.221	30.335	1.302
0.720	0.720	11.146	70.481	31.714	6.323	31.337	1.342
0.740	0.740	11.783	75.719	32.725	6.426	32.339	1.382
0.760	0.760	12.440	81.220	33.735	6.529	33.341	1.423
0.780	0.780	13.116	86.990	34.746	6.632	34.343	1.464
0.800	0.800	13.813	93.033	35.756	6.735	35.345	1.506
0.820	0.820	14.530	99.356	36.767	6.838	36.347	1.547
0.840	0.840	15.267	105.963	37.777	6.941	37.349	1.589

Q(max)= 25.32 cfs
(EGL Controlled)

CHAUCER

48' ROW_Cross Slope_s=2.10%

MIDDLE SYSTEM

MANNING'S N = 0.017 SLOPE = 0.021

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.0	1.4	4.0	11.3	0.6	7.0	38.0	0.0
2.0	9.3	1.2	5.0	24.0	0.3	8.0	38.7	0.7
3.0	10.0	0.5	6.0	36.7	0.1	9.0	48.0	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)
0.020	0.020	0.003	0.002	0.349	0.578	0.340	0.025
0.040	0.040	0.014	0.012	0.699	0.917	0.681	0.053
0.060	0.060	0.031	0.037	1.048	1.202	1.021	0.082
0.080	0.080	0.054	0.079	1.398	1.456	1.362	0.113
0.100	0.100	0.090	0.131	2.312	1.454	2.268	0.133
0.120	0.120	0.145	0.228	3.327	1.571	3.274	0.158
0.140	0.140	0.221	0.384	4.341	1.739	4.280	0.187
0.160	0.160	0.317	0.608	5.356	1.922	5.286	0.217
0.180	0.180	0.432	0.911	6.370	2.108	6.292	0.249
0.200	0.200	0.568	1.302	7.385	2.292	7.298	0.282
0.220	0.220	0.724	1.791	8.399	2.472	8.304	0.315
0.240	0.240	0.900	2.385	9.414	2.649	9.310	0.349
0.260	0.260	1.097	3.095	10.428	2.822	10.316	0.384
0.280	0.280	1.313	3.928	11.443	2.991	11.322	0.419
0.300	0.300	1.550	4.891	12.457	3.156	12.328	0.455
0.320	0.320	1.806	5.993	13.472	3.318	13.334	0.491
0.340	0.340	2.083	7.241	14.486	3.477	14.340	0.528
0.360	0.360	2.380	8.635	15.528	3.628	15.374	0.565
0.380	0.380	2.698	10.190	16.570	3.777	16.407	0.602
0.400	0.400	3.036	11.914	17.612	3.924	17.441	0.639
0.420	0.420	3.395	13.814	18.654	4.068	18.474	0.677
0.440	0.440	3.775	15.898	19.696	4.211	19.508	0.716
0.460	0.460	4.176	18.172	20.739	4.352	20.542	0.755
0.480	0.480	4.597	20.642	21.781	4.490	21.575	0.794
0.500	0.500	5.039	23.316	22.823	4.627	22.609	0.833
0.520	0.520	5.503	26.046	24.092	4.733	23.864	0.868
0.540	0.540	5.994	28.930	25.483	4.827	25.238	0.902
0.560	0.560	6.512	32.063	26.875	4.923	26.612	0.937
0.580	0.580	7.058	35.454	28.266	5.023	27.986	0.972
0.600	0.600	7.628	39.679	28.990	5.202	28.693	1.021
0.620	0.620	8.203	44.724	29.047	5.452	28.732	1.082
0.640	0.640	8.778	50.006	29.103	5.697	28.772	1.145
0.660	0.660	9.353	55.520	29.160	5.936	28.812	1.208
0.680	0.680	9.933	60.629	29.693	6.104	29.333	1.260
0.700	0.700	10.529	65.345	30.704	6.206	30.335	1.299
0.720	0.720	11.146	70.314	31.714	6.308	31.337	1.339
0.740	0.740	11.783	75.539	32.725	6.411	32.339	1.379
0.760	0.760	12.440	81.027	33.735	6.514	33.341	1.420
0.780	0.780	13.116	86.783	34.746	6.616	34.343	1.461
0.800	0.800	13.813	92.812	35.756	6.719	35.345	1.502
0.820	0.820	14.530	99.120	36.767	6.822	36.347	1.544
0.840	0.840	15.267	105.712	37.777	6.924	37.349	1.586

Q(max)= 25.42 cfs
(EGL Controlled)

TWAIN WAY

48' ROW_Cross Slope_s=2.64%

MIDDLE SYSTEM

MANNING'S N = 0.017 SLOPE = 0.026

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.0	1.4	4.0	11.3	0.6	7.0	38.0	0.0
2.0	9.3	1.2	5.0	24.0	0.3	8.0	38.7	0.7
3.0	10.0	0.5	6.0	36.7	0.1	9.0	48.0	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)
0.020	0.020	0.003	0.002	0.349	0.648	0.340	0.027
0.040	0.040	0.014	0.014	0.699	1.029	0.681	0.056
0.060	0.060	0.031	0.041	1.048	1.348	1.021	0.088
0.080	0.080	0.054	0.089	1.398	1.633	1.362	0.121
0.100	0.100	0.090	0.147	2.312	1.630	2.268	0.141
0.120	0.120	0.145	0.256	3.327	1.762	3.274	0.168
0.140	0.140	0.221	0.431	4.341	1.950	4.280	0.199
0.160	0.160	0.317	0.682	5.356	2.155	5.286	0.232
0.180	0.180	0.432	1.022	6.370	2.363	6.292	0.267
0.200	0.200	0.568	1.460	7.385	2.569	7.298	0.303
0.220	0.220	0.724	2.008	8.399	2.772	8.304	0.340
0.240	0.240	0.900	2.675	9.414	2.970	9.310	0.377
0.260	0.260	1.097	3.470	10.428	3.164	10.316	0.416
0.280	0.280	1.313	4.404	11.443	3.354	11.322	0.455
0.300	0.300	1.550	5.484	12.457	3.539	12.328	0.495
0.320	0.320	1.806	6.720	13.472	3.720	13.334	0.535
0.340	0.340	2.083	8.119	14.486	3.898	14.340	0.576
0.360	0.360	2.380	9.681	15.528	4.068	15.374	0.617
0.380	0.380	2.698	11.425	16.570	4.235	16.407	0.659
0.400	0.400	3.036	13.358	17.612	4.399	17.441	0.701
0.420	0.420	3.395	15.489	18.654	4.562	18.474	0.744
0.440	0.440	3.775	17.825	19.696	4.722	19.508	0.787
0.460	0.460	4.176	20.374	20.739	4.879	20.542	0.830
0.480	0.480	4.597	23.144	21.781	5.035	21.575	0.874
0.500	0.500	5.039	26.142	22.823	5.188	22.609	0.919
0.520	0.520	5.503	29.203	24.092	5.307	23.864	0.958
0.540	0.540	5.994	32.437	25.483	5.412	25.238	0.996
0.560	0.560	6.512	35.950	26.875	5.520	26.612	1.034
0.580	0.580	7.058	39.752	28.266	5.632	27.986	1.073
0.600	0.600	7.628	44.489	28.990	5.832	28.693	1.129
0.620	0.620	8.203	50.145	29.047	6.113	28.732	1.201
0.640	0.640	8.778	56.067	29.103	6.388	28.772	1.275
0.660	0.660	9.353	62.250	29.160	6.655	28.812	1.349
0.680	0.680	9.933	67.978	29.693	6.844	29.333	1.409
0.700	0.700	10.529	73.267	30.704	6.958	30.335	1.453
0.720	0.720	11.146	78.837	31.714	7.073	31.337	1.498
0.740	0.740	11.783	84.696	32.725	7.188	32.339	1.544
0.760	0.760	12.440	90.850	33.735	7.303	33.341	1.590
0.780	0.780	13.116	97.303	34.746	7.418	34.343	1.636
0.800	0.800	13.813	104.063	35.756	7.534	35.345	1.683
0.820	0.820	14.530	111.136	36.767	7.649	36.347	1.730
0.840	0.840	15.267	118.526	37.777	7.763	37.349	1.777

Q(max)= 11.42 cfs
(EGL Controlled)

TWAIN WAY

48' ROW_Cross Slope_s-1.44

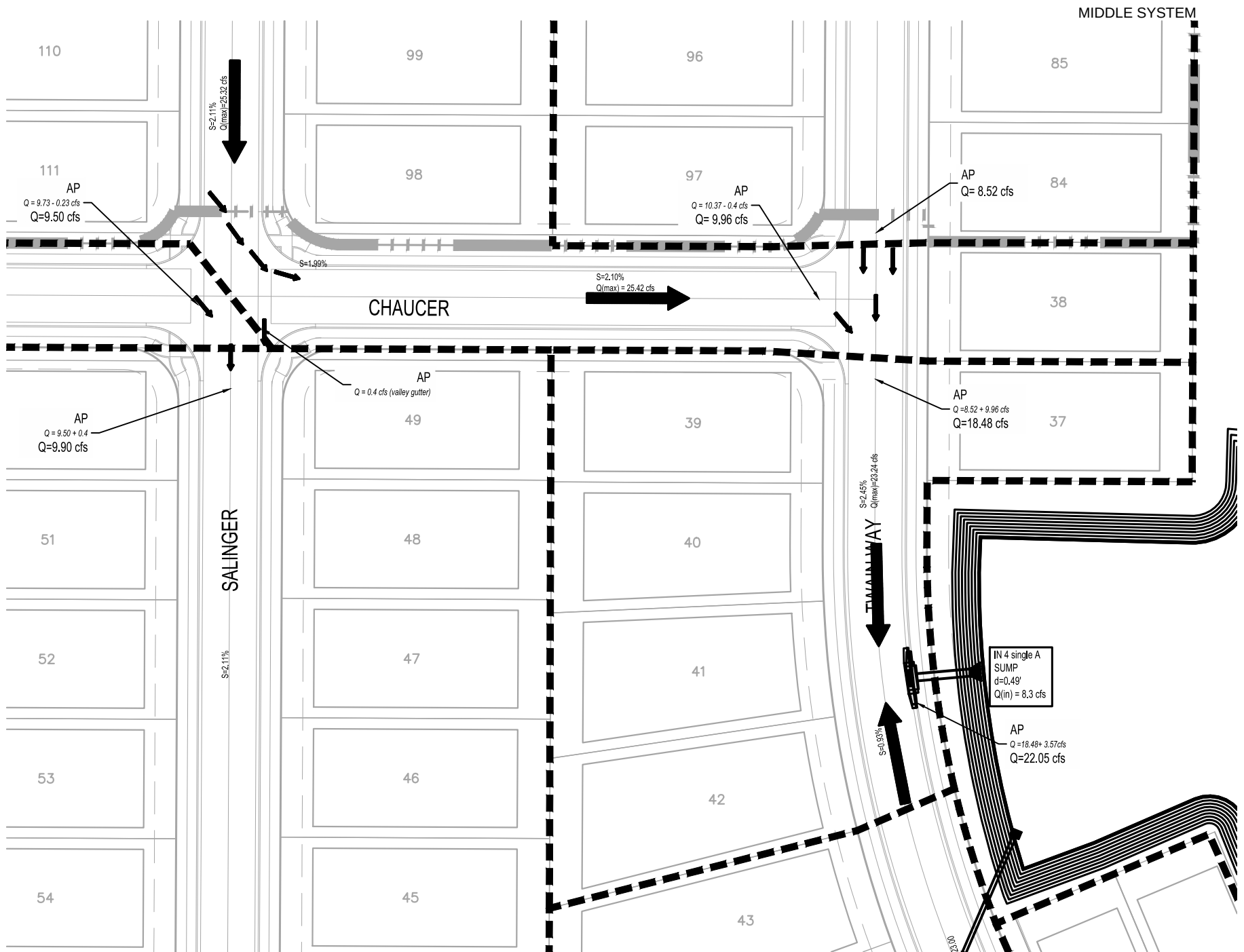
MIDDLE SYSTEM

MANNING'S N = 0.017 SLOPE = 0.014

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.0	1.4	4.0	11.3	0.6	7.0	38.0	0.0
2.0	9.3	1.2	5.0	24.0	0.3	8.0	38.7	0.7
3.0	10.0	0.5	6.0	36.7	0.1	9.0	48.0	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)
0.020	0.020	0.003	0.002	0.349	0.479	0.340	0.024
0.040	0.040	0.014	0.010	0.699	0.760	0.681	0.049
0.060	0.060	0.031	0.031	1.048	0.995	1.021	0.075
0.080	0.080	0.054	0.066	1.398	1.206	1.362	0.103
0.100	0.100	0.090	0.108	2.312	1.204	2.268	0.123
0.120	0.120	0.145	0.189	3.327	1.301	3.274	0.146
0.140	0.140	0.221	0.318	4.341	1.440	4.280	0.172
0.160	0.160	0.317	0.504	5.356	1.592	5.286	0.199
0.180	0.180	0.432	0.755	6.370	1.745	6.292	0.227
0.200	0.200	0.568	1.078	7.385	1.898	7.298	0.256
0.220	0.220	0.724	1.483	8.399	2.047	8.304	0.285
0.240	0.240	0.900	1.975	9.414	2.194	9.310	0.315
0.260	0.260	1.097	2.563	10.428	2.337	10.316	0.345
0.280	0.280	1.313	3.252	11.443	2.477	11.322	0.375
0.300	0.300	1.550	4.050	12.457	2.614	12.328	0.406
0.320	0.320	1.806	4.963	13.472	2.748	13.334	0.437
0.340	0.340	2.083	5.997	14.486	2.879	14.340	0.469
0.360	0.360	2.380	7.150	15.528	3.004	15.374	0.500
0.380	0.380	2.698	8.438	16.570	3.128	16.407	0.532
0.400	0.400	3.036	9.866	17.612	3.249	17.441	0.564
0.420	0.420	3.395	11.439	18.654	3.369	18.474	0.597
0.440	0.440	3.775	13.165	19.696	3.487	19.508	0.629
0.460	0.460	4.176	15.048	20.739	3.604	20.542	0.662
0.480	0.480	4.597	17.093	21.781	3.718	21.575	0.695
0.500	0.500	5.039	19.307	22.823	3.832	22.609	0.728
0.520	0.520	5.503	21.568	24.092	3.919	23.864	0.759
0.540	0.540	5.994	23.956	25.483	3.997	25.238	0.788
0.560	0.560	6.512	26.551	26.875	4.077	26.612	0.819
0.580	0.580	7.058	29.359	28.266	4.159	27.986	0.849
0.600	0.600	7.628	32.858	28.990	4.307	28.693	0.889
0.620	0.620	8.203	37.035	29.047	4.515	28.732	0.937
0.640	0.640	8.778	41.409	29.103	4.717	28.772	0.986
0.660	0.660	9.353	45.975	29.160	4.915	28.812	1.036
0.680	0.680	9.933	50.205	29.693	5.055	29.333	1.077
0.700	0.700	10.529	54.111	30.704	5.139	30.335	1.111
0.720	0.720	11.146	58.225	31.714	5.224	31.337	1.144
0.740	0.740	11.783	62.552	32.725	5.309	32.339	1.178
0.760	0.760	12.440	67.097	33.735	5.394	33.341	1.213
0.780	0.780	13.116	71.863	34.746	5.479	34.343	1.247
0.800	0.800	13.813	76.856	35.756	5.564	35.345	1.282
0.820	0.820	14.530	82.079	36.767	5.649	36.347	1.316
0.840	0.840	15.267	87.538	37.777	5.734	37.349	1.351

Q(max)= 30.32 cfs
(EGL Controlled)



TWAIN WAY

48ftROW_Cross slope_ S=2.45%

MIDDLE SYSTEM

MANNING'S N = 0.017 SLOPE = 0.025

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.0	1.4	4.0	11.3	0.6	7.0	38.0	0.0
2.0	9.3	1.2	5.0	24.0	0.3	8.0	38.7	0.7
3.0	10.0	0.5	6.0	36.7	0.1	9.0	48.0	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)
0.020	0.020	0.003	0.002	0.349	0.624	0.340	0.026
0.040	0.040	0.014	0.013	0.699	0.991	0.681	0.055
0.060	0.060	0.031	0.040	1.048	1.298	1.021	0.086
0.080	0.080	0.054	0.086	1.398	1.573	1.362	0.118
0.100	0.100	0.090	0.141	2.312	1.571	2.268	0.138
0.120	0.120	0.145	0.247	3.327	1.697	3.274	0.165
0.140	0.140	0.221	0.415	4.341	1.879	4.280	0.195
0.160	0.160	0.317	0.657	5.356	2.076	5.286	0.227
0.180	0.180	0.432	0.984	6.370	2.276	6.292	0.261
0.200	0.200	0.568	1.407	7.385	2.475	7.298	0.295
0.220	0.220	0.724	1.934	8.399	2.670	8.304	0.331
0.240	0.240	0.900	2.577	9.414	2.862	9.310	0.367
0.260	0.260	1.097	3.343	10.428	3.048	10.316	0.405
0.280	0.280	1.313	4.242	11.443	3.231	11.322	0.442
0.300	0.300	1.550	5.283	12.457	3.409	12.328	0.481
0.320	0.320	1.806	6.473	13.472	3.584	13.334	0.520
0.340	0.340	2.083	7.822	14.486	3.755	14.340	0.559
0.360	0.360	2.380	9.326	15.528	3.919	15.374	0.599
0.380	0.380	2.698	11.006	16.570	4.080	16.407	0.639
0.400	0.400	3.036	12.868	17.612	4.238	17.441	0.679
0.420	0.420	3.395	14.921	18.654	4.394	18.474	0.720
0.440	0.440	3.775	17.172	19.696	4.548	19.508	0.762
0.460	0.460	4.176	19.628	20.739	4.700	20.542	0.804
0.480	0.480	4.597	22.296	21.781	4.850	21.575	0.846
0.500	0.500	5.039	25.184	22.823	4.998	22.609	0.889
0.520	0.520	5.503	28.132	24.092	5.112	23.864	0.927
0.540	0.540	5.994	31.248	25.483	5.213	25.238	0.963
0.560	0.560	6.512	34.632	26.875	5.318	26.612	1.000
0.580	0.580	7.058	38.294	28.266	5.426	27.986	1.038
0.600	0.600	7.628	42.859	28.990	5.618	28.693	1.091
0.620	0.620	8.203	48.307	29.047	5.889	28.732	1.159
0.640	0.640	8.778	54.012	29.103	6.153	28.772	1.229
0.660	0.660	9.353	59.968	29.160	6.411	28.812	1.299
0.680	0.680	9.933	65.486	29.693	6.593	29.333	1.356
0.700	0.700	10.529	70.581	30.704	6.703	30.335	1.399
0.720	0.720	11.146	75.948	31.714	6.814	31.337	1.442
0.740	0.740	11.783	81.592	32.725	6.925	32.339	1.486
0.760	0.760	12.440	87.519	33.735	7.036	33.341	1.530
0.780	0.780	13.116	93.737	34.746	7.147	34.343	1.574
0.800	0.800	13.813	100.249	35.756	7.257	35.345	1.619
0.820	0.820	14.530	107.062	36.767	7.368	36.347	1.664
0.840	0.840	15.267	114.182	37.777	7.479	37.349	1.710

Q(max)= 23.24 cfs
(EGL Controlled)

ANALYSIS OF AN INLET IN A SUMP CONDITION

IN 4 Twain Way

INLET TYPE: **Single Grate Type "A"** with curb opening wings on both sides on inlet.WEIR: $Q=C*L*H^{1.5}$ Wing opening

C= 3.0

L= **4.0** ft $Q=3.0(4.0')H^{1.5}= 12.0H^{**1.5}$ Grate opening

C=3.0

L(single grate)=[(2.67')+2(1.8')]=**6.27** ft $Q=3.0(6.27)H^{1.5}=18.81*H^{1.5}$ ORIFICE: $Q=C*A*(2*G*H)^{0.5}$ Grate opening

C=0.6

A(single grate)=**3.72** sf $Q=0.6*3.72*(64.4*H)^{0.5}$ Wing opening*

C=0.6

A=2.0 sf

 $Q=1.2*(64.4*H)^{0.5}$

*not included in the orifice calcs

	WS ELEVATION	HEIGHT ABOVE INLET	Q (CFS) WEIR	Q (CFS) WEIR	Q (CFS) ORIFICE	TOTAL Q (CFS)	COMMENTS:
			WING OPENING	SINGLE GRATE	SINGLE GRATE		
~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	
	0.60	0.60	5.58	8.74	13.87	19.90	
TOP OF CURB	0.70	0.70	7.03	11.02	14.99	25.07	@ Q(100 yr) = 22.05 cfs<<Flow is under TC Elevation (d=0.64')
	0.80	0.80	8.59	13.46	16.02	30.63	
ROW LIMIT	0.86	0.86	9.52	14.92	16.58	33.96	
	0.90	0.90	10.25	16.06	16.99	36.55	
	1.00	1.00	12.00	18.81	17.91	41.91	@ Q(2 x 100 yr) = 44.10cfs<<Flow OVERFLOWS ROW Elevation**

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

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

**** This inlet has an emergency overflow into POND**

VONNEGUT

48' ROW_Cross Slope_s=1.68%

MAIN SYSTEM

MANNING'S N = 0.017 SLOPE = 0.017

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.0	1.4	4.0	11.3	0.6	7.0	38.0	0.0
2.0	9.3	1.2	5.0	24.0	0.3	8.0	38.7	0.7
3.0	10.0	0.5	6.0	36.7	0.1	9.0	48.0	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)
0.020	0.020	0.003	0.002	0.349	0.517	0.340	0.024
0.040	0.040	0.014	0.011	0.699	0.821	0.681	0.050
0.060	0.060	0.031	0.033	1.048	1.075	1.021	0.078
0.080	0.080	0.054	0.071	1.398	1.303	1.362	0.106
0.100	0.100	0.090	0.117	2.312	1.301	2.268	0.126
0.120	0.120	0.145	0.204	3.327	1.405	3.274	0.151
0.140	0.140	0.221	0.344	4.341	1.556	4.280	0.178
0.160	0.160	0.317	0.544	5.356	1.719	5.286	0.206
0.180	0.180	0.432	0.815	6.370	1.885	6.292	0.235
0.200	0.200	0.568	1.165	7.385	2.050	7.298	0.265
0.220	0.220	0.724	1.602	8.399	2.211	8.304	0.296
0.240	0.240	0.900	2.134	9.414	2.370	9.310	0.327
0.260	0.260	1.097	2.768	10.428	2.524	10.316	0.359
0.280	0.280	1.313	3.513	11.443	2.675	11.322	0.391
0.300	0.300	1.550	4.375	12.457	2.823	12.328	0.424
0.320	0.320	1.806	5.361	13.472	2.968	13.334	0.457
0.340	0.340	2.083	6.477	14.486	3.110	14.340	0.490
0.360	0.360	2.380	7.723	15.528	3.245	15.374	0.524
0.380	0.380	2.698	9.114	16.570	3.378	16.407	0.558
0.400	0.400	3.036	10.656	17.612	3.510	17.441	0.592
0.420	0.420	3.395	12.356	18.654	3.639	18.474	0.626
0.440	0.440	3.775	14.220	19.696	3.766	19.508	0.661
0.460	0.460	4.176	16.253	20.739	3.892	20.542	0.696
0.480	0.480	4.597	18.463	21.781	4.016	21.575	0.731
0.500	0.500	5.039	20.854	22.823	4.139	22.609	0.766
0.520	0.520	5.503	23.296	24.092	4.233	23.864	0.799
0.540	0.540	5.994	25.875	25.483	4.317	25.238	0.830
0.560	0.560	6.512	28.678	26.875	4.404	26.612	0.862
0.580	0.580	7.058	31.711	28.266	4.493	27.986	0.894
0.600	0.600	7.628	35.490	28.990	4.652	28.693	0.937
0.620	0.620	8.203	40.002	29.047	4.877	28.732	0.990
0.640	0.640	8.778	44.726	29.103	5.095	28.772	1.044
0.660	0.660	9.353	49.659	29.160	5.309	28.812	1.098
0.680	0.680	9.933	54.228	29.693	5.460	29.333	1.144
0.700	0.700	10.529	58.447	30.704	5.551	30.335	1.179
0.720	0.720	11.146	62.891	31.714	5.642	31.337	1.215
0.740	0.740	11.783	67.564	32.725	5.734	32.339	1.251
0.760	0.760	12.440	72.473	33.735	5.826	33.341	1.288
0.780	0.780	13.116	77.621	34.746	5.918	34.343	1.325
0.800	0.800	13.813	83.014	35.756	6.010	35.345	1.362
0.820	0.820	14.530	88.656	36.767	6.101	36.347	1.399
0.840	0.840	15.267	94.551	37.777	6.193	37.349	1.437

Q(max)= 28.50 cfs
(EGL Controlled)

VONNEGUT

48' ROW_Cross Slope_s=2.69%

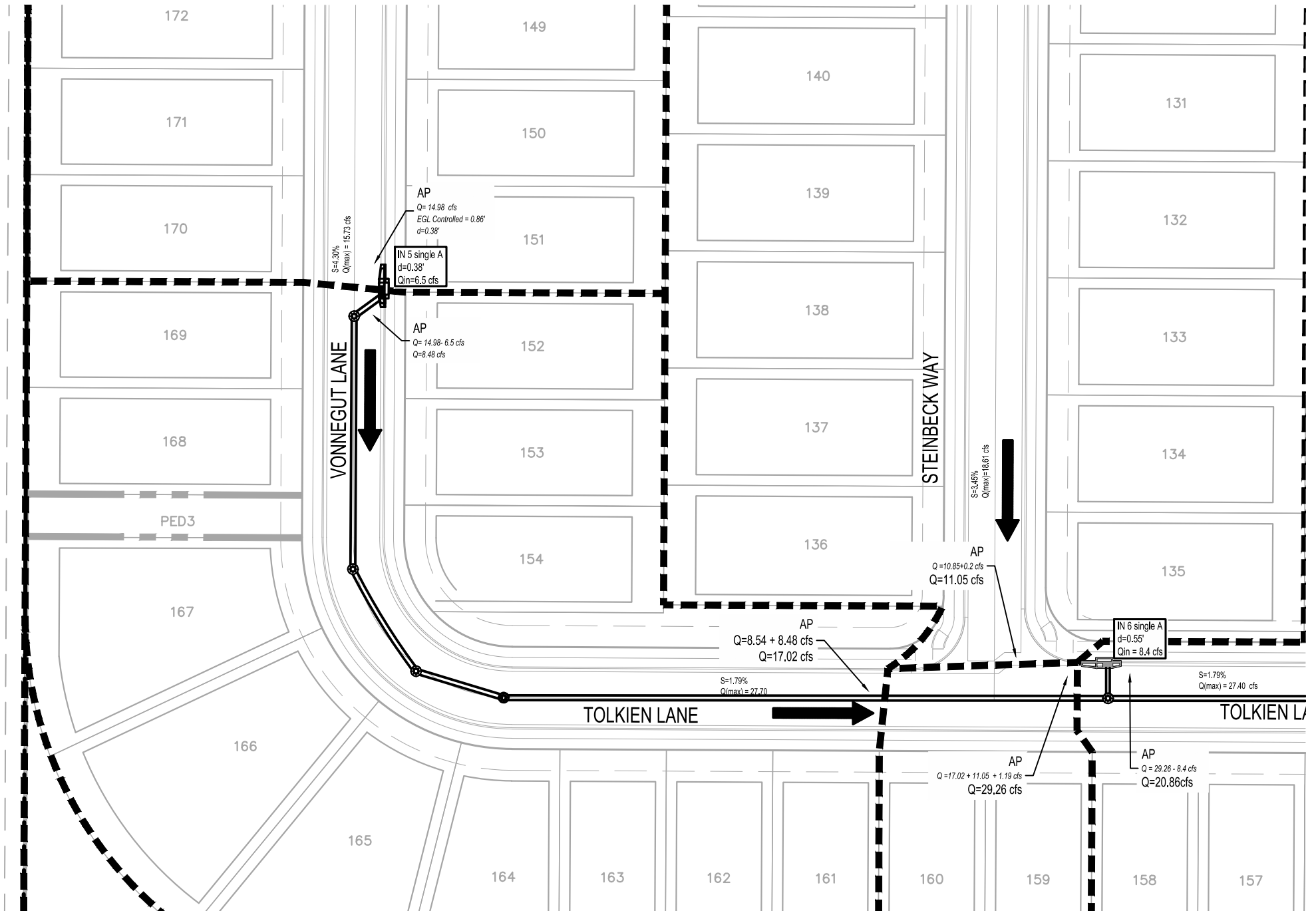
MAIN SYSTEM

MANNING'S N = 0.017 SLOPE = 0.027

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.0	1.4	4.0	11.3	0.6	7.0	38.0	0.0
2.0	9.3	1.2	5.0	24.0	0.3	8.0	38.7	0.7
3.0	10.0	0.5	6.0	36.7	0.1	9.0	48.0	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)
0.020	0.020	0.003	0.002	0.349	0.654	0.340	0.027
0.040	0.040	0.014	0.014	0.699	1.038	0.681	0.057
0.060	0.060	0.031	0.042	1.048	1.361	1.021	0.089
0.080	0.080	0.054	0.090	1.398	1.648	1.362	0.122
0.100	0.100	0.090	0.148	2.312	1.646	2.268	0.142
0.120	0.120	0.145	0.258	3.327	1.778	3.274	0.169
0.140	0.140	0.221	0.435	4.341	1.969	4.280	0.200
0.160	0.160	0.317	0.689	5.356	2.175	5.286	0.234
0.180	0.180	0.432	1.031	6.370	2.385	6.292	0.269
0.200	0.200	0.568	1.474	7.385	2.594	7.298	0.305
0.220	0.220	0.724	2.027	8.399	2.798	8.304	0.342
0.240	0.240	0.900	2.700	9.414	2.998	9.310	0.380
0.260	0.260	1.097	3.503	10.428	3.194	10.316	0.419
0.280	0.280	1.313	4.445	11.443	3.385	11.322	0.458
0.300	0.300	1.550	5.536	12.457	3.572	12.328	0.499
0.320	0.320	1.806	6.783	13.472	3.756	13.334	0.539
0.340	0.340	2.083	8.196	14.486	3.935	14.340	0.581
0.360	0.360	2.380	9.773	15.528	4.106	15.374	0.622
0.380	0.380	2.698	11.532	16.570	4.275	16.407	0.664
0.400	0.400	3.036	13.484	17.612	4.441	17.441	0.707
0.420	0.420	3.395	15.635	18.654	4.605	18.474	0.750
0.440	0.440	3.775	17.993	19.696	4.766	19.508	0.793
0.460	0.460	4.176	20.566	20.739	4.925	20.542	0.837
0.480	0.480	4.597	23.362	21.781	5.082	21.575	0.882
0.500	0.500	5.039	26.388	22.823	5.237	22.609	0.927
0.520	0.520	5.503	29.478	24.092	5.357	23.864	0.966
0.540	0.540	5.994	32.742	25.483	5.463	25.238	1.004
0.560	0.560	6.512	36.289	26.875	5.572	26.612	1.043
0.580	0.580	7.058	40.126	28.266	5.685	27.986	1.083
0.600	0.600	7.628	44.909	28.990	5.887	28.693	1.139
0.620	0.620	8.203	50.618	29.047	6.171	28.732	1.212
0.640	0.640	8.778	56.596	29.103	6.448	28.772	1.287
0.660	0.660	9.353	62.837	29.160	6.718	28.812	1.362
0.680	0.680	9.933	68.619	29.693	6.908	29.333	1.422
0.700	0.700	10.529	73.957	30.704	7.024	30.335	1.467
0.720	0.720	11.146	79.581	31.714	7.140	31.337	1.513
0.740	0.740	11.783	85.495	32.725	7.256	32.339	1.559
0.760	0.760	12.440	91.706	33.735	7.372	33.341	1.605
0.780	0.780	13.116	98.220	34.746	7.488	34.343	1.652
0.800	0.800	13.813	105.044	35.756	7.605	35.345	1.699
0.820	0.820	14.530	112.183	36.767	7.721	36.347	1.747
0.840	0.840	15.267	119.644	37.777	7.837	37.349	1.795

Q(max)= 22.02 cfs
(EGL Controlled)



VONNEGUT

48ft ROW_Cross slope_ s=4.3%

MAIN SYSTEM

MANNING'S N = 0.017 SLOPE = 0.043

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.0	1.4	4.0	11.3	0.6	7.0	38.0	0.0
2.0	9.3	1.2	5.0	24.0	0.3	8.0	38.7	0.7
3.0	10.0	0.5	6.0	36.7	0.1	9.0	48.0	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)
0.020	0.020	0.003	0.003	0.349	0.827	0.340	0.031
0.040	0.040	0.014	0.018	0.699	1.313	0.681	0.067
0.060	0.060	0.031	0.053	1.048	1.720	1.021	0.106
0.080	0.080	0.054	0.114	1.398	2.084	1.362	0.148
0.100	0.100	0.090	0.187	2.312	2.081	2.268	0.167
0.120	0.120	0.145	0.327	3.327	2.249	3.274	0.199
0.140	0.140	0.221	0.550	4.341	2.489	4.280	0.236
0.160	0.160	0.317	0.871	5.356	2.750	5.286	0.278
0.180	0.180	0.432	1.304	6.370	3.016	6.292	0.321
0.200	0.200	0.568	1.863	7.385	3.279	7.298	0.367
0.220	0.220	0.724	2.562	8.399	3.538	8.304	0.415
0.240	0.240	0.900	3.413	9.414	3.791	9.310	0.464
0.260	0.260	1.097	4.429	10.428	4.038	10.316	0.514
0.280	0.280	1.313	5.620	11.443	4.280	11.322	0.565
0.300	0.300	1.550	6.999	12.457	4.517	12.328	0.617
0.320	0.320	1.806	8.576	13.472	4.748	13.334	0.671
0.340	0.340	2.083	10.362	14.486	4.975	14.340	0.725
0.360	0.360	2.380	12.356	15.528	5.191	15.374	0.779
0.380	0.380	2.698	14.581	16.570	5.405	16.407	0.834
0.400	0.400	3.036	17.048	17.612	5.615	17.441	0.890
0.420	0.420	3.395	19.768	18.654	5.822	18.474	0.947
0.440	0.440	3.775	22.749	19.696	6.026	19.508	1.005
0.460	0.460	4.176	26.003	20.739	6.227	20.542	1.063
0.480	0.480	4.597	29.538	21.781	6.425	21.575	1.122
0.500	0.500	5.039	33.364	22.823	6.621	22.609	1.182
0.520	0.520	5.503	37.270	24.092	6.773	23.864	1.234
0.540	0.540	5.994	41.397	25.483	6.907	25.238	1.282
0.560	0.560	6.512	45.881	26.875	7.045	26.612	1.332
0.580	0.580	7.058	50.733	28.266	7.188	27.986	1.384
0.600	0.600	7.628	56.779	28.990	7.443	28.693	1.462
0.620	0.620	8.203	63.997	29.047	7.802	28.732	1.567
0.640	0.640	8.778	71.555	29.103	8.152	28.772	1.674
0.660	0.660	9.353	79.446	29.160	8.494	28.812	1.782
0.680	0.680	9.933	86.757	29.693	8.735	29.333	1.867
0.700	0.700	10.529	93.506	30.704	8.881	30.335	1.927
0.720	0.720	11.146	100.616	31.714	9.027	31.337	1.987
0.740	0.740	11.783	108.093	32.725	9.174	32.339	2.049
0.760	0.760	12.440	115.946	33.735	9.321	33.341	2.111
0.780	0.780	13.116	124.182	34.746	9.468	34.343	2.174
0.800	0.800	13.813	132.810	35.756	9.615	35.345	2.238
0.820	0.820	14.530	141.836	36.767	9.761	36.347	2.302
0.840	0.840	15.267	151.268	37.777	9.908	37.349	2.367

IN 5
Q(in)=14.98 cfs
d=0.38'

Q(max)= 15.73 cfs
(EGL Controlled)

GRATING CAPACITIES FOR TYPE "A", "C" AND "D"

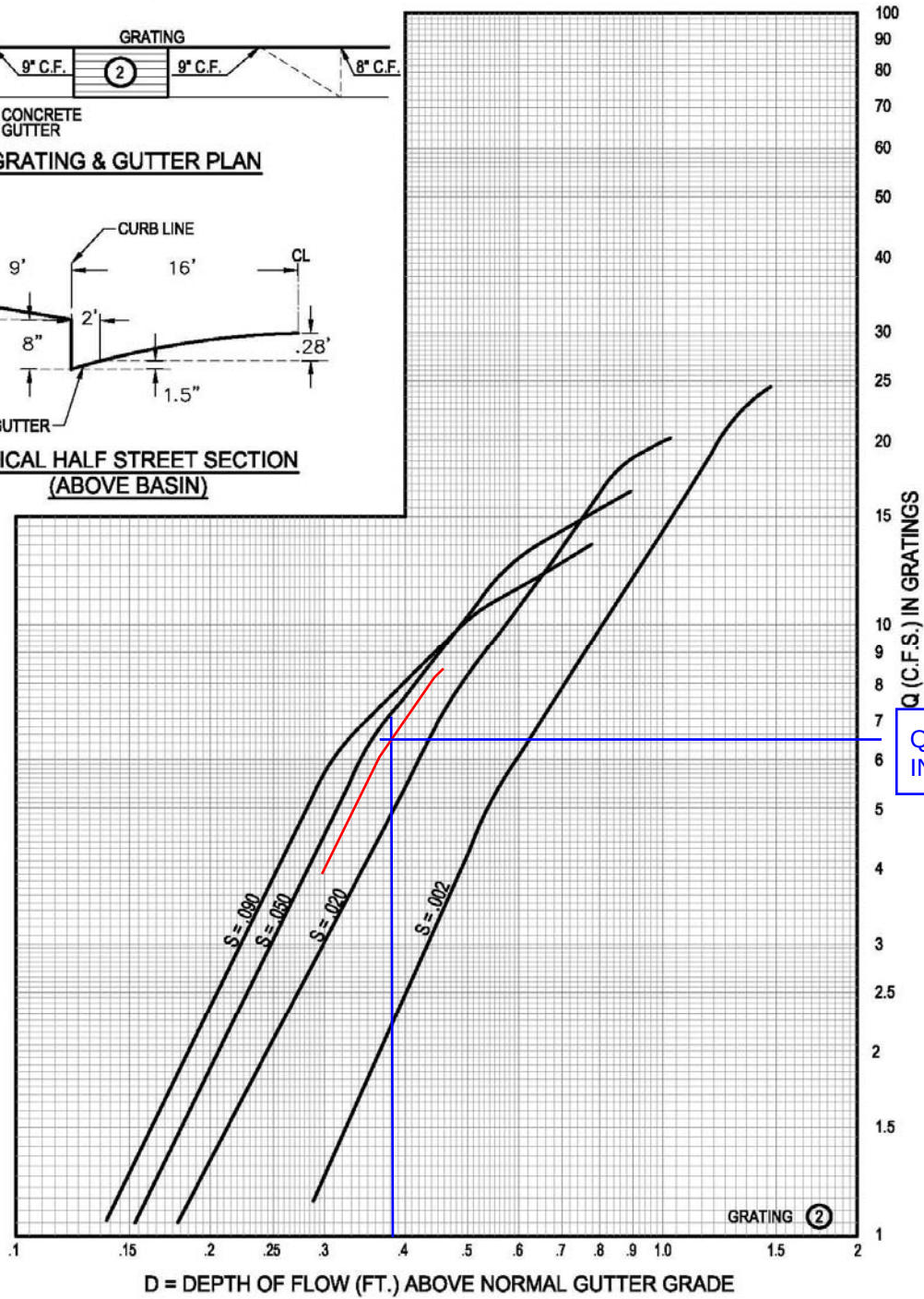
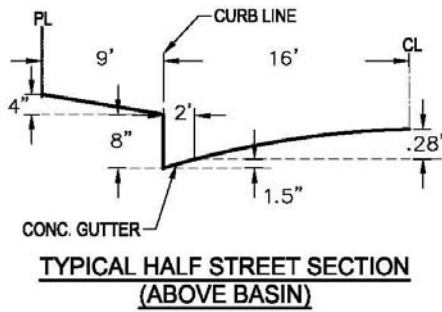
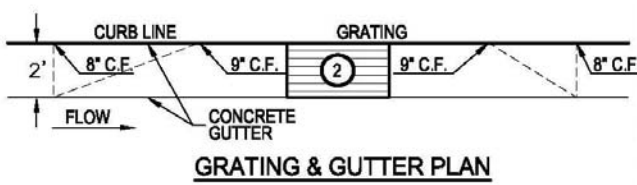


PLATE 22.3 D-5

TOLKEIN LANE

48ft ROW_Cross slope_ s=1.79%

MAIN SYSTEM

MANNING'S N = 0.017 SLOPE = 0.018

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.0	1.4	4.0	11.3	0.6	7.0	38.0	0.0
2.0	9.3	1.2	5.0	24.0	0.3	8.0	38.7	0.7
3.0	10.0	0.5	6.0	36.7	0.1	9.0	48.0	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)
0.020	0.020	0.003	0.002	0.349	0.534	0.340	0.024
0.040	0.040	0.014	0.012	0.699	0.847	0.681	0.051
0.060	0.060	0.031	0.034	1.048	1.110	1.021	0.079
0.080	0.080	0.054	0.073	1.398	1.344	1.362	0.108
0.100	0.100	0.090	0.121	2.312	1.342	2.268	0.128
0.120	0.120	0.145	0.211	3.327	1.451	3.274	0.153
0.140	0.140	0.221	0.355	4.341	1.606	4.280	0.180
0.160	0.160	0.317	0.562	5.356	1.775	5.286	0.209
0.180	0.180	0.432	0.841	6.370	1.946	6.292	0.239
0.200	0.200	0.568	1.202	7.385	2.116	7.298	0.270
0.220	0.220	0.724	1.653	8.399	2.283	8.304	0.301
0.240	0.240	0.900	2.202	9.414	2.446	9.310	0.333
0.260	0.260	1.097	2.857	10.428	2.606	10.316	0.366
0.280	0.280	1.313	3.626	11.443	2.762	11.322	0.399
0.300	0.300	1.550	4.516	12.457	2.914	12.328	0.432
0.320	0.320	1.806	5.533	13.472	3.064	13.334	0.466
0.340	0.340	2.083	6.686	14.486	3.210	14.340	0.500
0.360	0.360	2.380	7.972	15.528	3.349	15.374	0.534
0.380	0.380	2.698	9.407	16.570	3.487	16.407	0.569
0.400	0.400	3.036	10.999	17.612	3.623	17.441	0.604
0.420	0.420	3.395	12.754	18.654	3.756	18.474	0.639
0.440	0.440	3.775	14.678	19.696	3.888	19.508	0.675
0.460	0.460	4.176	16.777	20.739	4.018	20.542	0.711
0.480	0.480	4.597	19.058	21.781	4.146	21.575	0.747
0.500	0.500	5.039	21.526	22.823	4.272	22.609	0.784
0.520	0.520	5.503	24.046	24.092	4.370	23.864	0.817
0.540	0.540	5.994	26.709	25.483	4.456	25.238	0.849
0.560	0.560	6.512	29.602	26.875	4.546	26.612	0.881
0.580	0.580	7.058	32.733	28.266	4.637	27.986	0.915
0.600	0.600	7.628	36.634	28.990	4.802	28.693	0.959
0.620	0.620	8.203	41.291	29.047	5.034	28.732	1.014
0.640	0.640	8.778	46.167	29.103	5.260	28.772	1.070
0.660	0.660	9.353	51.259	29.160	5.480	28.812	1.127
0.680	0.680	9.933	55.975	29.693	5.636	29.333	1.174
0.700	0.700	10.529	60.330	30.704	5.730	30.335	1.211
0.720	0.720	11.146	64.917	31.714	5.824	31.337	1.248
0.740	0.740	11.783	69.741	32.725	5.919	32.339	1.285
0.760	0.760	12.440	74.808	33.735	6.014	33.341	1.323
0.780	0.780	13.116	80.122	34.746	6.109	34.343	1.360
0.800	0.800	13.813	85.689	35.756	6.203	35.345	1.399
0.820	0.820	14.530	91.512	36.767	6.298	36.347	1.437
0.840	0.840	15.267	97.598	37.777	6.393	37.349	1.476

Q(max)= 27.70 cfs
(EGL Controlled)

STEINBECK

48ft ROW_Cross slope_ s=3.45%

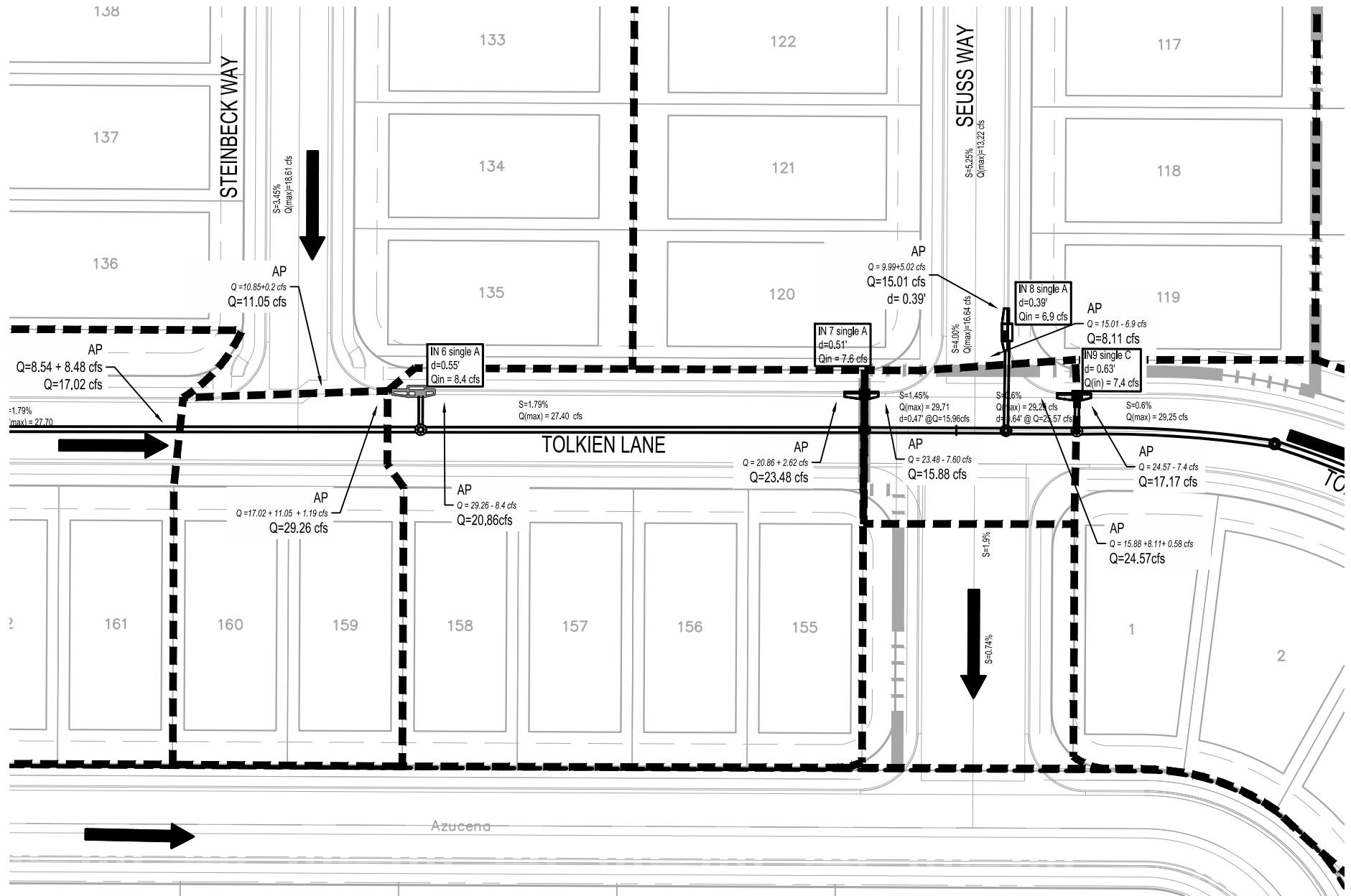
MAIN SYSTEM

MANNING'S N = 0.017 SLOPE = 0.035

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.0	1.4	4.0	11.3	0.6	7.0	38.0	0.0
2.0	9.3	1.2	5.0	24.0	0.3	8.0	38.7	0.7
3.0	10.0	0.5	6.0	36.7	0.1	9.0	48.0	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)
0.020	0.020	0.003	0.003	0.349	0.741	0.340	0.029
0.040	0.040	0.014	0.016	0.699	1.176	0.681	0.062
0.060	0.060	0.031	0.047	1.048	1.541	1.021	0.097
0.080	0.080	0.054	0.102	1.398	1.867	1.362	0.134
0.100	0.100	0.090	0.168	2.312	1.864	2.268	0.154
0.120	0.120	0.145	0.293	3.327	2.014	3.274	0.183
0.140	0.140	0.221	0.492	4.341	2.229	4.280	0.217
0.160	0.160	0.317	0.780	5.356	2.464	5.286	0.254
0.180	0.180	0.432	1.168	6.370	2.701	6.292	0.294
0.200	0.200	0.568	1.669	7.385	2.937	7.298	0.334
0.220	0.220	0.724	2.295	8.399	3.169	8.304	0.376
0.240	0.240	0.900	3.057	9.414	3.396	9.310	0.419
0.260	0.260	1.097	3.967	10.428	3.617	10.316	0.464
0.280	0.280	1.313	5.034	11.443	3.834	11.322	0.509
0.300	0.300	1.550	6.269	12.457	4.046	12.328	0.555
0.320	0.320	1.806	7.682	13.472	4.253	13.334	0.601
0.340	0.340	2.083	9.282	14.486	4.456	14.340	0.649
0.360	0.360	2.380	11.067	15.528	4.650	15.374	0.696
0.380	0.380	2.698	13.060	16.570	4.841	16.407	0.745
0.400	0.400	3.036	15.270	17.612	5.029	17.441	0.793
0.420	0.420	3.395	17.706	18.654	5.215	18.474	0.843
0.440	0.440	3.775	20.377	19.696	5.397	19.508	0.893
0.460	0.460	4.176	23.291	20.739	5.578	20.542	0.944
0.480	0.480	4.597	26.458	21.781	5.755	21.575	0.995
0.500	0.500	5.039	29.885	22.823	5.931	22.609	1.047
0.520	0.520	5.503	33.384	24.092	6.067	23.864	1.092
0.540	0.540	5.994	37.080	25.483	6.186	25.238	1.135
0.560	0.560	6.512	41.096	26.875	6.311	26.612	1.179
0.580	0.580	7.058	45.443	28.266	6.438	27.986	1.225
0.600	0.600	7.628	50.859	28.990	6.667	28.693	1.291
0.620	0.620	8.203	57.324	29.047	6.989	28.732	1.380
0.640	0.640	8.778	64.094	29.103	7.302	28.772	1.469
0.660	0.660	9.353	71.162	29.160	7.608	28.812	1.560
0.680	0.680	9.933	77.710	29.693	7.824	29.333	1.632
0.700	0.700	10.529	83.756	30.704	7.955	30.335	1.684
0.720	0.720	11.146	90.124	31.714	8.086	31.337	1.737
0.740	0.740	11.783	96.822	32.725	8.217	32.339	1.790
0.760	0.760	12.440	103.856	33.735	8.349	33.341	1.844
0.780	0.780	13.116	111.233	34.746	8.481	34.343	1.899
0.800	0.800	13.813	118.961	35.756	8.612	35.345	1.954
0.820	0.820	14.530	127.046	36.767	8.744	36.347	2.009
0.840	0.840	15.267	135.495	37.777	8.875	37.349	2.065

Q(max)= 18.61 cfs
(EGL Controlled)



TOLKEIN LANE

48ft ROW_Cross slope_ s=1.79%

MAIN SYSTEM

MANNING'S N = 0.017 SLOPE = 0.018

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.0	1.4	4.0	11.3	0.6	7.0	38.0	0.0
2.0	9.3	1.2	5.0	24.0	0.3	8.0	38.7	0.7
3.0	10.0	0.5	6.0	36.7	0.1	9.0	48.0	0.9

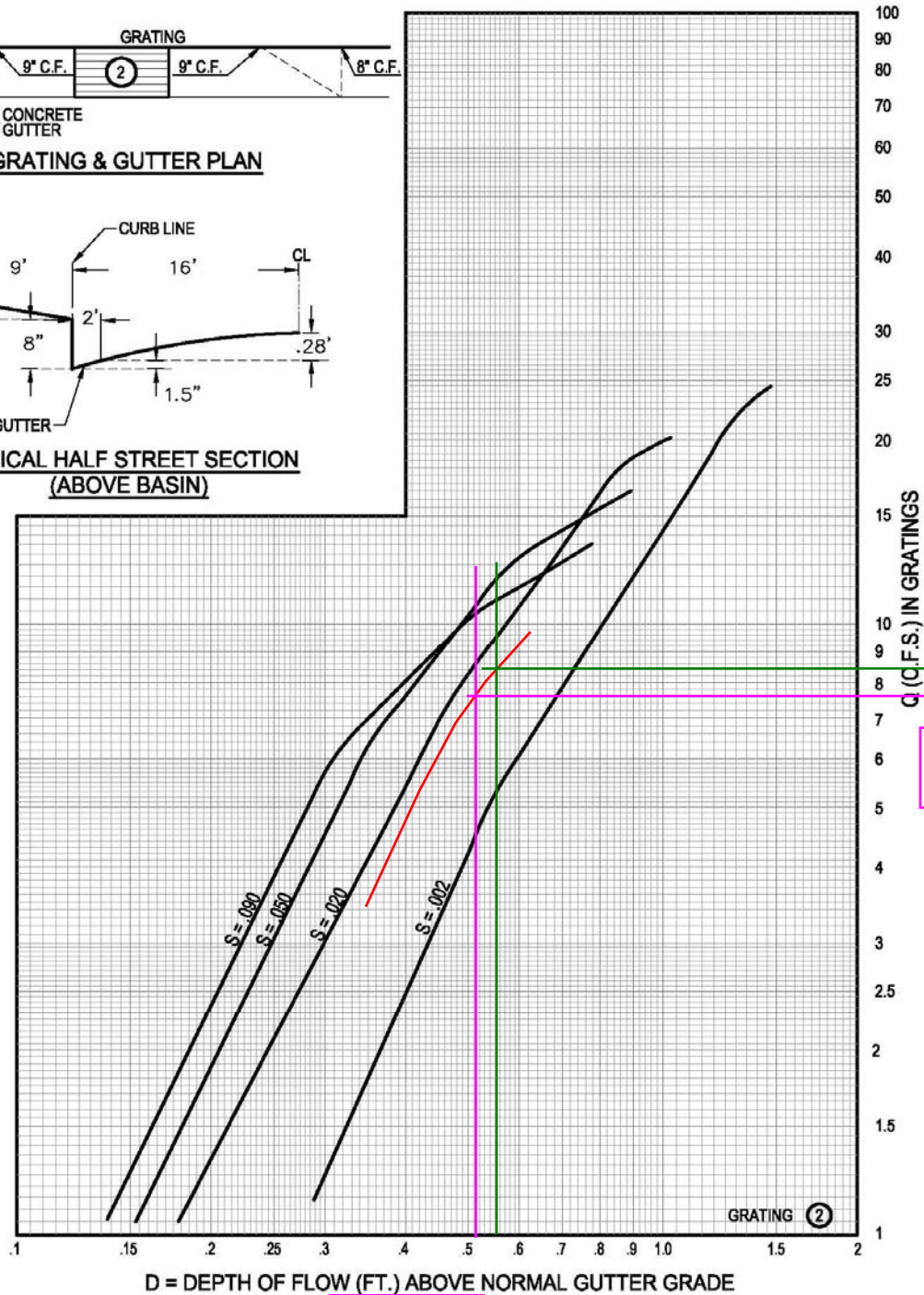
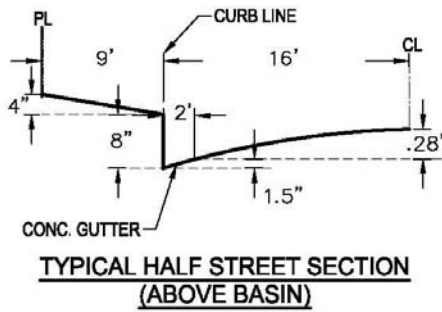
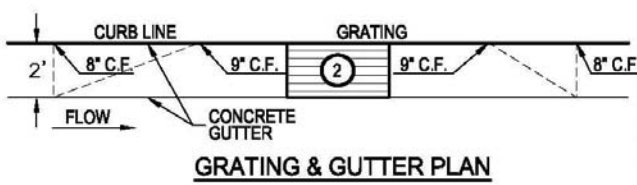
WSEL FT.	DEPTH INC	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID PLUS OBSTRUCTIONS	TOTAL ENERGY (FT)
0.020	0.020	0.003	0.002	0.349	0.534	0.340	0.024
0.040	0.040	0.014	0.012	0.699	0.847	0.681	0.051
0.060	0.060	0.031	0.034	1.048	1.110	1.021	0.079
0.080	0.080	0.054	0.073	1.398	1.344	1.362	0.108
0.100	0.100	0.090	0.121	2.312	1.342	2.268	0.128
0.120	0.120	0.145	0.211	3.327	1.451	3.274	0.153
0.140	0.140	0.221	0.355	4.341	1.606	4.280	0.180
0.160	0.160	0.317	0.562	5.356	1.775	5.286	0.209
0.180	0.180	0.432	0.841	6.370	1.946	6.292	0.239
0.200	0.200	0.568	1.202	7.385	2.116	7.298	0.270
0.220	0.220	0.724	1.653	8.399	2.283	8.304	0.301
0.240	0.240	0.900	2.202	9.414	2.446	9.310	0.333
0.260	0.260	1.097	2.857	10.428	2.606	10.316	0.366
0.280	0.280	1.313	3.626	11.443	2.762	11.322	0.399
0.300	0.300	1.550	4.516	12.457	2.914	12.328	0.432
0.320	0.320	1.806	5.533	13.472	3.064	13.334	0.466
0.340	0.340	2.083	6.686	14.486	3.210	14.340	0.500
0.360	0.360	2.380	7.972	15.528	3.349	15.374	0.534
0.380	0.380	2.698	9.407	16.570	3.487	16.407	0.569
0.400	0.400	3.036	10.999	17.612	3.623	17.441	0.604
0.420	0.420	3.395	12.754	18.654	3.756	18.474	0.639
0.440	0.440	3.775	14.678	19.696	3.888	19.508	0.675
0.460	0.460	4.176	16.777	20.739	4.018	20.542	0.711
0.480	0.480	4.597	19.058	21.781	4.146	21.575	0.747
0.500	0.500	5.039	21.526	22.823	4.272	22.609	0.784
0.520	0.520	5.503	24.046	24.092	4.370	23.864	0.817
0.540	0.540	5.994	26.709	25.483	4.456	25.238	0.849
0.560	0.560	6.512	29.602	26.875	4.546	26.612	0.881
0.580	0.580	7.058	32.733	28.266	4.637	27.986	0.915
0.600	0.600	7.628	36.634	28.990	4.802	28.693	0.959
0.620	0.620	8.203	41.291	29.047	5.034	28.732	1.014
0.640	0.640	8.778	46.167	29.103	5.260	28.772	1.070
0.660	0.660	9.353	51.259	29.160	5.480	28.812	1.127
0.680	0.680	9.933	55.975	29.693	5.636	29.333	1.174
0.700	0.700	10.529	60.330	30.704	5.730	30.335	1.211
0.720	0.720	11.146	64.917	31.714	5.824	31.337	1.248
0.740	0.740	11.783	69.741	32.725	5.919	32.339	1.285
0.760	0.760	12.440	74.808	33.735	6.014	33.341	1.323
0.780	0.780	13.116	80.122	34.746	6.109	34.343	1.360
0.800	0.800	13.813	85.689	35.756	6.203	35.345	1.399
0.820	0.820	14.530	91.512	36.767	6.298	36.347	1.437
0.840	0.840	15.267	97.598	37.777	6.393	37.349	1.476

IN 6
Q=29.26 cfs
d=0.55'

IN 7
Q=23.48 cfs
d=0.51'

Q(max)= 27.70 cfs
(EGL Controlled)

GRATING CAPACITIES FOR TYPE "A", "C" AND "D"



SLOPE = 1.79%

Q = 8.4 cfs
IN 6

Q = 7.6 cfs
IN 7

d = 0.51"
IN 7

d = 0.55'
IN 6

PLATE 22.3 D-5

TOLKEIN LANE

48ftROW-Cross slope_ S=1.45%

MAIN SYSTEM

MANNING'S N = 0.017 SLOPE = 0.015

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.0	1.4	4.0	11.3	0.7	7.0	42.0	0.0
2.0	9.3	1.3	5.0	26.0	0.4	8.0	42.7	0.7
3.0	10.0	0.6	6.0	40.7	0.1	9.0	52.0	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)
0.020	0.020	0.003	0.002	0.349	0.480	0.340	0.024
0.040	0.040	0.014	0.010	0.699	0.762	0.681	0.049
0.060	0.060	0.031	0.031	1.048	0.999	1.021	0.076
0.080	0.080	0.054	0.066	1.398	1.210	1.362	0.103
0.100	0.100	0.090	0.108	2.325	1.205	2.281	0.123
0.120	0.120	0.146	0.190	3.355	1.301	3.303	0.146
0.140	0.140	0.222	0.320	4.385	1.441	4.324	0.172
0.160	0.160	0.319	0.508	5.415	1.593	5.345	0.199
0.180	0.180	0.436	0.762	6.445	1.747	6.367	0.227
0.200	0.200	0.573	1.090	7.475	1.901	7.388	0.256
0.220	0.220	0.731	1.500	8.504	2.051	8.409	0.285
0.240	0.240	0.910	2.000	9.534	2.198	9.431	0.315
0.260	0.260	1.109	2.596	10.564	2.342	10.452	0.345
0.280	0.280	1.328	3.297	11.594	2.482	11.473	0.376
0.300	0.300	1.568	4.107	12.624	2.620	12.495	0.407
0.320	0.320	1.828	5.034	13.654	2.754	13.516	0.438
0.340	0.340	2.108	6.085	14.684	2.886	14.538	0.470
0.360	0.360	2.409	7.265	15.713	3.015	15.559	0.501
0.380	0.380	2.731	8.580	16.743	3.142	16.580	0.534
0.400	0.400	3.072	10.037	17.769	3.267	17.598	0.566
0.420	0.420	3.435	11.641	18.795	3.389	18.616	0.599
0.440	0.440	3.817	13.398	19.822	3.510	19.633	0.632
0.460	0.460	4.220	15.312	20.848	3.629	20.651	0.665
0.480	0.480	4.643	17.390	21.875	3.745	21.669	0.698
0.500	0.500	5.087	19.637	22.901	3.860	22.687	0.732
0.520	0.520	5.551	22.057	23.928	3.974	23.705	0.766
0.540	0.540	6.035	24.657	24.954	4.086	24.723	0.800
0.560	0.560	6.540	27.441	25.981	4.196	25.741	0.834
0.580	0.580	7.065	30.414	27.007	4.305	26.759	0.868
0.600	0.600	7.611	33.412	28.261	4.390	27.998	0.900
0.620	0.620	8.185	36.536	29.636	4.464	29.357	0.930
0.640	0.640	8.786	39.889	31.012	4.540	30.715	0.961
0.660	0.660	9.413	43.476	32.388	4.618	32.074	0.992
0.680	0.680	10.068	47.468	33.581	4.715	33.254	1.026
0.700	0.700	10.743	51.856	34.592	4.827	34.256	1.062
0.720	0.720	11.438	56.473	35.602	4.937	35.258	1.099
0.740	0.740	12.153	61.326	36.613	5.046	36.260	1.136
0.760	0.760	12.888	66.416	37.624	5.153	37.262	1.173
0.780	0.780	13.644	71.750	38.634	5.259	38.265	1.210
0.800	0.800	14.419	77.330	39.645	5.363	39.267	1.247
0.820	0.820	15.214	83.162	40.655	5.466	40.269	1.285
0.840	0.840	16.030	89.250	41.666	5.568	41.271	1.322

INTERSECTION
of Tolkein and Sues
Q=15.9 CFS
d(min) =0.47'

Q(max)= 29.71 cfs
(d Controlled)

CHAUCER

48' ROW_Cross Slope_s=2.50%

MAIN SYSTEM

MANNING'S N = 0.017 SLOPE = 0.025

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.0	1.4	4.0	11.3	0.6	7.0	38.0	0.0
2.0	9.3	1.2	5.0	24.0	0.3	8.0	38.7	0.7
3.0	10.0	0.5	6.0	36.7	0.1	9.0	48.0	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)
0.020	0.020	0.003	0.002	0.349	0.631	0.340	0.026
0.040	0.040	0.014	0.014	0.699	1.001	0.681	0.056
0.060	0.060	0.031	0.040	1.048	1.312	1.021	0.087
0.080	0.080	0.054	0.087	1.398	1.589	1.362	0.119
0.100	0.100	0.090	0.143	2.312	1.587	2.268	0.139
0.120	0.120	0.145	0.249	3.327	1.714	3.274	0.166
0.140	0.140	0.221	0.419	4.341	1.898	4.280	0.196
0.160	0.160	0.317	0.664	5.356	2.097	5.286	0.228
0.180	0.180	0.432	0.994	6.370	2.300	6.292	0.262
0.200	0.200	0.568	1.421	7.385	2.500	7.298	0.297
0.220	0.220	0.724	1.954	8.399	2.698	8.304	0.333
0.240	0.240	0.900	2.603	9.414	2.891	9.310	0.370
0.260	0.260	1.097	3.377	10.428	3.079	10.316	0.407
0.280	0.280	1.313	4.285	11.443	3.264	11.322	0.446
0.300	0.300	1.550	5.337	12.457	3.444	12.328	0.484
0.320	0.320	1.806	6.539	13.472	3.620	13.334	0.524
0.340	0.340	2.083	7.901	14.486	3.793	14.340	0.564
0.360	0.360	2.380	9.421	15.528	3.958	15.374	0.604
0.380	0.380	2.698	11.118	16.570	4.121	16.407	0.644
0.400	0.400	3.036	12.999	17.612	4.281	17.441	0.685
0.420	0.420	3.395	15.073	18.654	4.439	18.474	0.726
0.440	0.440	3.775	17.346	19.696	4.595	19.508	0.768
0.460	0.460	4.176	19.827	20.739	4.748	20.542	0.811
0.480	0.480	4.597	22.522	21.781	4.899	21.575	0.853
0.500	0.500	5.039	25.439	22.823	5.049	22.609	0.896
0.520	0.520	5.503	28.418	24.092	5.164	23.864	0.935
0.540	0.540	5.994	31.565	25.483	5.266	25.238	0.971
0.560	0.560	6.512	34.984	26.875	5.372	26.612	1.009
0.580	0.580	7.058	38.683	28.266	5.481	27.986	1.047
0.600	0.600	7.628	43.294	28.990	5.675	28.693	1.101
0.620	0.620	8.203	48.797	29.047	5.949	28.732	1.170
0.640	0.640	8.778	54.560	29.103	6.216	28.772	1.241
0.660	0.660	9.353	60.577	29.160	6.476	28.812	1.312
0.680	0.680	9.933	66.151	29.693	6.660	29.333	1.370
0.700	0.700	10.529	71.298	30.704	6.771	30.335	1.413
0.720	0.720	11.146	76.719	31.714	6.883	31.337	1.457
0.740	0.740	11.783	82.420	32.725	6.995	32.339	1.501
0.760	0.760	12.440	88.408	33.735	7.107	33.341	1.546
0.780	0.780	13.116	94.688	34.746	7.219	34.343	1.591
0.800	0.800	13.813	101.267	35.756	7.331	35.345	1.636
0.820	0.820	14.530	108.149	36.767	7.443	36.347	1.682
0.840	0.840	15.267	115.341	37.777	7.555	37.349	1.728

Q(max)= 23.00 cfs
(EGL Controlled)

SUESS

48ft ROW_Cross slope_ s=0.69%

MAIN SYSTEM

MANNING'S N = 0.017 SLOPE = 0.007

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.0	1.4	4.0	11.3	0.6	7.0	38.0	0.0
2.0	9.3	1.2	5.0	24.0	0.3	8.0	38.7	0.7
3.0	10.0	0.5	6.0	36.7	0.1	9.0	48.0	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)
0.020	0.020	0.003	0.001	0.349	0.331	0.340	0.022
0.040	0.040	0.014	0.007	0.699	0.526	0.681	0.044
0.060	0.060	0.031	0.021	1.048	0.689	1.021	0.067
0.080	0.080	0.054	0.045	1.398	0.835	1.362	0.091
0.100	0.100	0.090	0.075	2.312	0.833	2.268	0.111
0.120	0.120	0.145	0.131	3.327	0.901	3.274	0.133
0.140	0.140	0.221	0.220	4.341	0.997	4.280	0.155
0.160	0.160	0.317	0.349	5.356	1.102	5.286	0.179
0.180	0.180	0.432	0.522	6.370	1.208	6.292	0.203
0.200	0.200	0.568	0.746	7.385	1.314	7.298	0.227
0.220	0.220	0.724	1.026	8.399	1.417	8.304	0.251
0.240	0.240	0.900	1.367	9.414	1.519	9.310	0.276
0.260	0.260	1.097	1.774	10.428	1.618	10.316	0.301
0.280	0.280	1.313	2.251	11.443	1.715	11.322	0.326
0.300	0.300	1.550	2.804	12.457	1.809	12.328	0.351
0.320	0.320	1.806	3.435	13.472	1.902	13.334	0.376
0.340	0.340	2.083	4.151	14.486	1.993	14.340	0.402
0.360	0.360	2.380	4.949	15.528	2.080	15.374	0.427
0.380	0.380	2.698	5.841	16.570	2.165	16.407	0.453
0.400	0.400	3.036	6.829	17.612	2.249	17.441	0.479
0.420	0.420	3.395	7.918	18.654	2.332	18.474	0.505
0.440	0.440	3.775	9.113	19.696	2.414	19.508	0.531
0.460	0.460	4.176	10.416	20.739	2.494	20.542	0.557
0.480	0.480	4.597	11.832	21.781	2.574	21.575	0.583
0.500	0.500	5.039	13.365	22.823	2.652	22.609	0.609
0.520	0.520	5.503	14.930	24.092	2.713	23.864	0.634
0.540	0.540	5.994	16.583	25.483	2.767	25.238	0.659
0.560	0.560	6.512	18.379	26.875	2.822	26.612	0.684
0.580	0.580	7.058	20.323	28.266	2.879	27.986	0.709
0.600	0.600	7.628	22.745	28.990	2.982	28.693	0.738
0.620	0.620	8.203	25.636	29.047	3.125	28.732	0.772
0.640	0.640	8.778	28.664	29.103	3.266	28.772	0.806
0.660	0.660	9.353	31.825	29.160	3.402	28.812	0.840
0.680	0.680	9.933	34.753	29.693	3.499	29.333	0.870
0.700	0.700	10.529	37.457	30.704	3.557	30.335	0.897
0.720	0.720	11.146	40.305	31.714	3.616	31.337	0.923
0.740	0.740	11.783	43.300	32.725	3.675	32.339	0.950
0.760	0.760	12.440	46.446	33.735	3.734	33.341	0.977
0.780	0.780	13.116	49.745	34.746	3.793	34.343	1.004
0.800	0.800	13.813	53.201	35.756	3.851	35.345	1.031
0.820	0.820	14.530	56.817	36.767	3.910	36.347	1.058
0.840	0.840	15.267	60.595	37.777	3.969	37.349	1.085

Q(max)= 33.3 cfs
(d Controlled)

SUESS

48' ROW_Cross slope_ S=5.25%

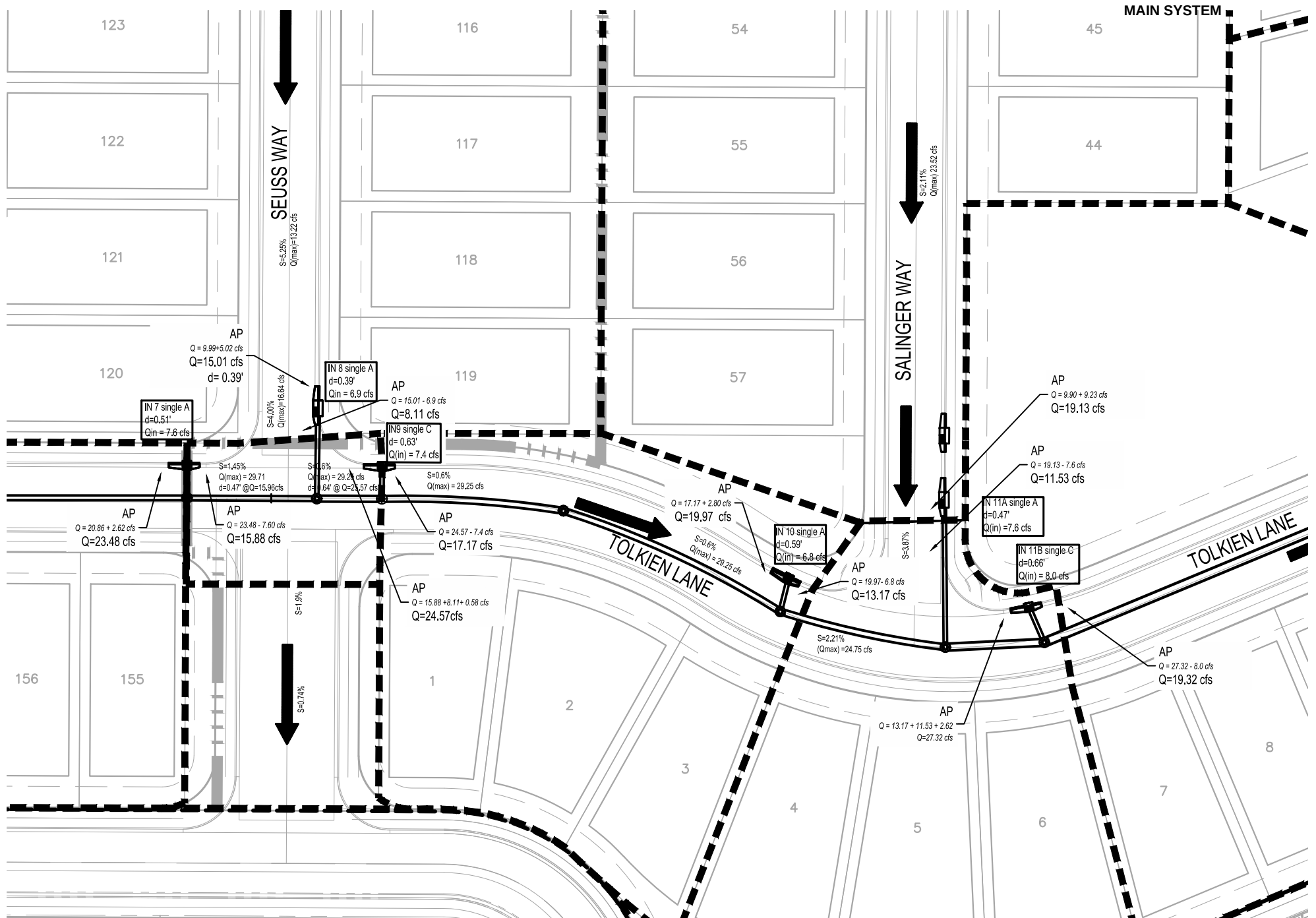
MAIN SYSTEM

MANNING'S N = 0.017 SLOPE = 0.053

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.0	1.4	4.0	11.3	0.6	7.0	38.0	0.0
2.0	9.3	1.2	5.0	24.0	0.3	8.0	38.7	0.7
3.0	10.0	0.5	6.0	36.7	0.1	9.0	48.0	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)
0.020	0.020	0.003	0.003	0.349	0.914	0.340	0.033
0.040	0.040	0.014	0.020	0.699	1.451	0.681	0.073
0.060	0.060	0.031	0.058	1.048	1.901	1.021	0.116
0.080	0.080	0.054	0.125	1.398	2.303	1.362	0.162
0.100	0.100	0.090	0.207	2.312	2.299	2.268	0.182
0.120	0.120	0.145	0.361	3.327	2.485	3.274	0.216
0.140	0.140	0.221	0.607	4.341	2.750	4.280	0.258
0.160	0.160	0.317	0.962	5.356	3.039	5.286	0.304
0.180	0.180	0.432	1.441	6.370	3.332	6.292	0.353
0.200	0.200	0.568	2.059	7.385	3.623	7.298	0.404
0.220	0.220	0.724	2.831	8.399	3.909	8.304	0.458
0.240	0.240	0.900	3.772	9.414	4.189	9.310	0.513
0.260	0.260	1.097	4.894	10.428	4.462	10.316	0.570
0.280	0.280	1.313	6.210	11.443	4.730	11.322	0.628
0.300	0.300	1.550	7.734	12.457	4.991	12.328	0.687
0.320	0.320	1.806	9.476	13.472	5.247	13.334	0.748
0.340	0.340	2.083	11.450	14.486	5.497	14.340	0.810
0.360	0.360	2.380	13.652	15.528	5.736	15.374	0.872
0.380	0.380	2.698	16.111	16.570	5.972	16.407	0.935
0.400	0.400	3.036	18.837	17.612	6.204	17.441	0.999
0.420	0.420	3.395	21.842	18.654	6.433	18.474	1.064
0.440	0.440	3.775	25.137	19.696	6.658	19.508	1.130
0.460	0.460	4.176	28.732	20.739	6.881	20.542	1.196
0.480	0.480	4.597	32.638	21.781	7.100	21.575	1.264
0.500	0.500	5.039	36.865	22.823	7.316	22.609	1.333
0.520	0.520	5.503	41.182	24.092	7.484	23.864	1.391
0.540	0.540	5.994	45.742	25.483	7.632	25.238	1.446
0.560	0.560	6.512	50.696	26.875	7.785	26.612	1.503
0.580	0.580	7.058	56.057	28.266	7.942	27.986	1.561
0.600	0.600	7.628	62.739	28.990	8.224	28.693	1.652
0.620	0.620	8.203	70.714	29.047	8.621	28.732	1.776
0.640	0.640	8.778	79.066	29.103	9.008	28.772	1.902
0.660	0.660	9.353	87.785	29.160	9.385	28.812	2.030
0.680	0.680	9.933	95.862	29.693	9.651	29.333	2.129
0.700	0.700	10.529	103.320	30.704	9.813	30.335	2.198
0.720	0.720	11.146	111.176	31.714	9.975	31.337	2.267
0.740	0.740	11.783	119.438	32.725	10.137	32.339	2.338
0.760	0.760	12.440	128.115	33.735	10.299	33.341	2.410
0.780	0.780	13.116	137.216	34.746	10.461	34.343	2.482
0.800	0.800	13.813	146.749	35.756	10.624	35.345	2.556
0.820	0.820	14.530	156.723	36.767	10.786	36.347	2.630
0.840	0.840	15.267	167.145	37.777	10.948	37.349	2.704

Q(max)= 13.22 cfs
(EGL Controlled)



SUESS

52ftROW-Cross slope_ S=4.0%

MAIN SYSTEM

MANNING'S N = 0.017 SLOPE = 0.040

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.0	1.4	4.0	11.3	0.6	7.0	38.0	0.0
2.0	9.3	1.2	5.0	24.0	0.3	8.0	38.7	0.7
3.0	10.0	0.5	6.0	36.7	0.1	9.0	48.0	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)
0.020	0.020	0.003	0.003	0.349	0.798	0.340	0.030
0.040	0.040	0.014	0.017	0.699	1.266	0.681	0.065
0.060	0.060	0.031	0.051	1.048	1.659	1.021	0.103
0.080	0.080	0.054	0.109	1.398	2.010	1.362	0.143
0.100	0.100	0.090	0.180	2.312	2.007	2.268	0.163
0.120	0.120	0.145	0.315	3.327	2.169	3.274	0.193
0.140	0.140	0.221	0.530	4.341	2.401	4.280	0.230
0.160	0.160	0.317	0.840	5.356	2.653	5.286	0.269
0.180	0.180	0.432	1.258	6.370	2.909	6.292	0.312
0.200	0.200	0.568	1.797	7.385	3.163	7.298	0.356
0.220	0.220	0.724	2.471	8.399	3.412	8.304	0.401
0.240	0.240	0.900	3.292	9.414	3.656	9.310	0.448
0.260	0.260	1.097	4.272	10.428	3.895	10.316	0.496
0.280	0.280	1.313	5.421	11.443	4.128	11.322	0.545
0.300	0.300	1.550	6.750	12.457	4.356	12.328	0.595
0.320	0.320	1.806	8.271	13.472	4.580	13.334	0.646
0.340	0.340	2.083	9.994	14.486	4.798	14.340	0.698
0.360	0.360	2.380	11.917	15.528	5.007	15.374	0.750
0.380	0.380	2.698	14.063	16.570	5.213	16.407	0.803
0.400	0.400	3.036	16.443	17.612	5.415	17.441	0.856
0.420	0.420	3.395	19.065	18.654	5.615	18.474	0.910
0.440	0.440	3.775	21.941	19.696	5.812	19.508	0.965
0.460	0.460	4.176	25.079	20.739	6.006	20.542	1.021
0.480	0.480	4.597	28.489	21.781	6.197	21.575	1.077
0.500	0.500	5.039	32.179	22.823	6.386	22.609	1.134
0.520	0.520	5.503	35.946	24.092	6.532	23.864	1.184
0.540	0.540	5.994	39.927	25.483	6.661	25.238	1.230
0.560	0.560	6.512	44.251	26.875	6.795	26.612	1.278
0.580	0.580	7.058	48.931	28.266	6.932	27.986	1.328
0.600	0.600	7.628	54.763	28.990	7.179	28.693	1.402
0.620	0.620	8.203	61.724	29.047	7.525	28.732	1.501
0.640	0.640	8.778	69.014	29.103	7.862	28.772	1.602
0.660	0.660	9.353	76.625	29.160	8.192	28.812	1.704
0.680	0.680	9.933	83.675	29.693	8.424	29.333	1.784
0.700	0.700	10.529	90.185	30.704	8.565	30.335	1.841
0.720	0.720	11.146	97.042	31.714	8.706	31.337	1.899
0.740	0.740	11.783	104.254	32.725	8.848	32.339	1.958
0.760	0.760	12.440	111.828	33.735	8.990	33.341	2.017
0.780	0.780	13.116	119.772	34.746	9.131	34.343	2.077
0.800	0.800	13.813	128.093	35.756	9.273	35.345	2.138
0.820	0.820	14.530	136.799	36.767	9.415	36.347	2.199
0.840	0.840	15.267	145.896	37.777	9.556	37.349	2.260

IN 8
Q=15.01 cfs
d=0.39'

Q(max)=16.64 cfs
(EGL Controlled)

GRATING CAPACITIES FOR TYPE "A", "C" AND "D"

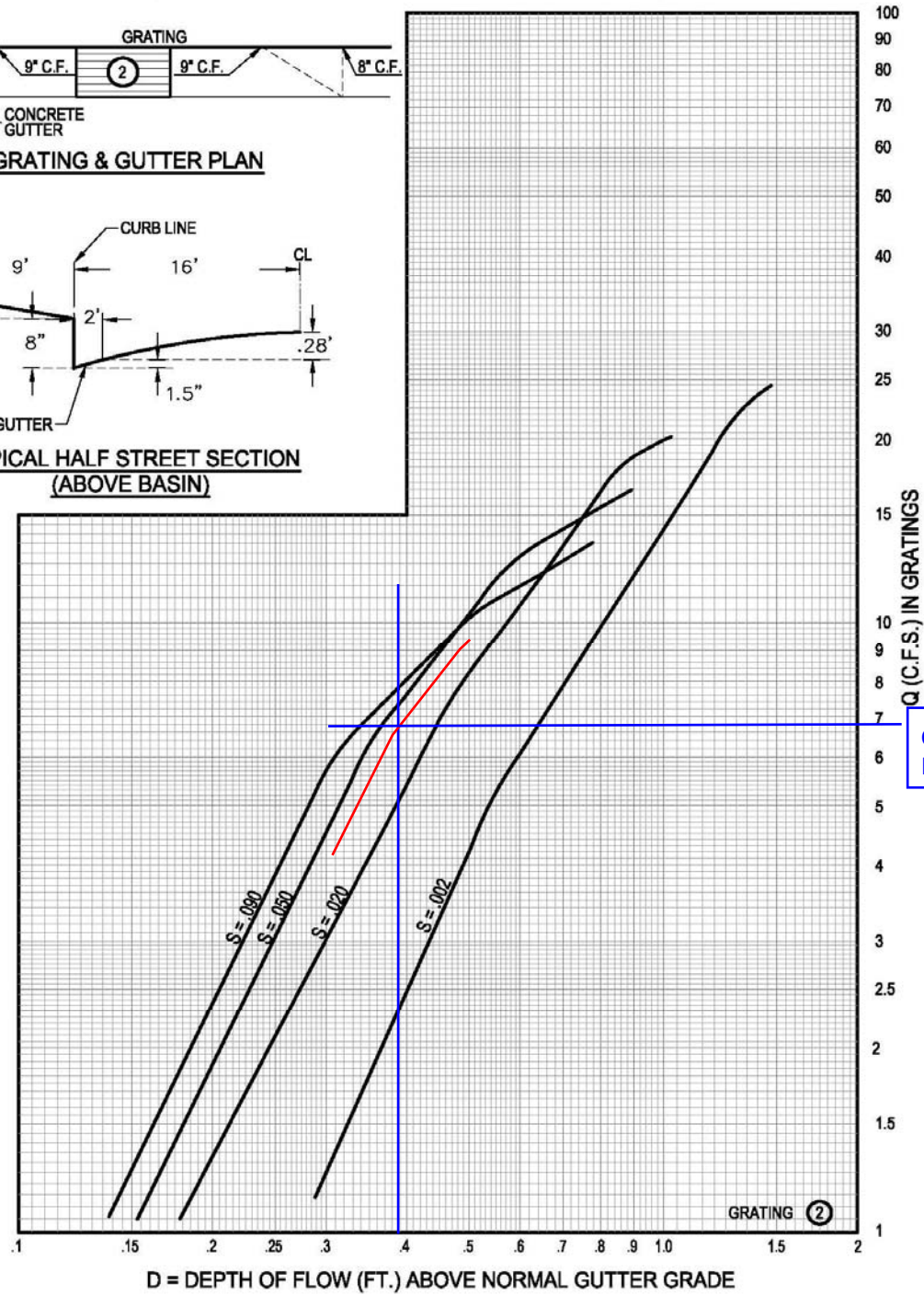
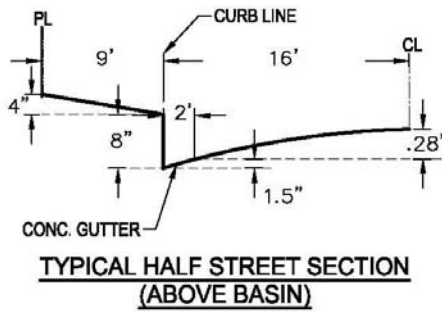
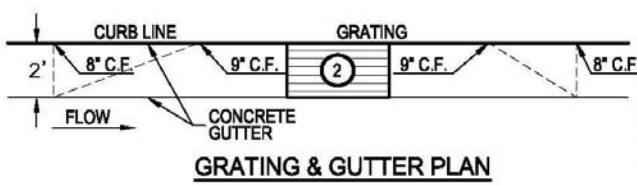


PLATE 22.3 D-5

TOLKEIN LANE

52ftROW-Cross slope_ S=0.6%

MAIN SYSTEM

MANNING'S N = 0.017 SLOPE = 0.006

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.0	1.4	4.0	11.3	0.7	7.0	42.0	0.0
2.0	9.3	1.3	5.0	26.0	0.4	8.0	42.7	0.7
3.0	10.0	0.6	6.0	40.7	0.1	9.0	52.0	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)
0.020	0.020	0.003	0.001	0.349	0.309	0.340	0.021
0.040	0.040	0.014	0.007	0.699	0.490	0.681	0.044
0.060	0.060	0.031	0.020	1.048	0.643	1.021	0.066
0.080	0.080	0.054	0.042	1.398	0.778	1.362	0.089
0.100	0.100	0.090	0.070	2.325	0.775	2.281	0.109
0.120	0.120	0.146	0.122	3.355	0.837	3.303	0.131
0.140	0.140	0.222	0.206	4.385	0.927	4.324	0.153
0.160	0.160	0.319	0.327	5.415	1.025	5.345	0.176
0.180	0.180	0.436	0.490	6.445	1.124	6.367	0.200
0.200	0.200	0.573	0.701	7.475	1.223	7.388	0.223
0.220	0.220	0.731	0.965	8.504	1.319	8.409	0.247
0.240	0.240	0.910	1.287	9.534	1.414	9.431	0.271
0.260	0.260	1.109	1.670	10.564	1.506	10.452	0.295
0.280	0.280	1.328	2.121	11.594	1.597	11.473	0.320
0.300	0.300	1.568	2.642	12.624	1.685	12.495	0.344
0.320	0.320	1.828	3.238	13.654	1.772	13.516	0.369
0.340	0.340	2.108	3.914	14.684	1.857	14.538	0.394
0.360	0.360	2.409	4.673	15.713	1.940	15.559	0.419
0.380	0.380	2.731	5.519	16.743	2.021	16.580	0.444
0.400	0.400	3.072	6.457	17.769	2.101	17.598	0.469
0.420	0.420	3.435	7.488	18.795	2.180	18.616	0.494
0.440	0.440	3.817	8.618	19.822	2.258	19.633	0.519
0.460	0.460	4.220	9.850	20.848	2.334	20.651	0.545
0.480	0.480	4.643	11.187	21.875	2.409	21.669	0.570
0.500	0.500	5.087	12.632	22.901	2.483	22.687	0.596
0.520	0.520	5.551	14.189	23.928	2.556	23.705	0.622
0.540	0.540	6.035	15.861	24.954	2.628	24.723	0.647
0.560	0.560	6.540	17.652	25.981	2.699	25.741	0.673
0.580	0.580	7.065	19.564	27.007	2.769	26.759	0.699
0.600	0.600	7.611	21.493	28.261	2.824	27.998	0.724
0.620	0.620	8.185	23.503	29.636	2.871	29.357	0.748
0.640	0.640	8.786	25.659	31.012	2.921	30.715	0.773
0.660	0.660	9.413	27.967	32.388	2.971	32.074	0.797
0.680	0.680	10.068	30.535	33.581	3.033	33.254	0.823
0.700	0.700	10.743	33.357	34.592	3.105	34.256	0.850
0.720	0.720	11.438	36.328	35.602	3.176	35.258	0.877
0.740	0.740	12.153	39.449	36.613	3.246	36.260	0.904
0.760	0.760	12.888	42.723	37.624	3.315	37.262	0.931
0.780	0.780	13.644	46.154	38.634	3.383	38.265	0.958
0.800	0.800	14.419	49.744	39.645	3.450	39.267	0.985
0.820	0.820	15.214	53.496	40.655	3.516	40.269	1.012
0.840	0.840	16.030	57.411	41.666	3.582	41.271	1.040

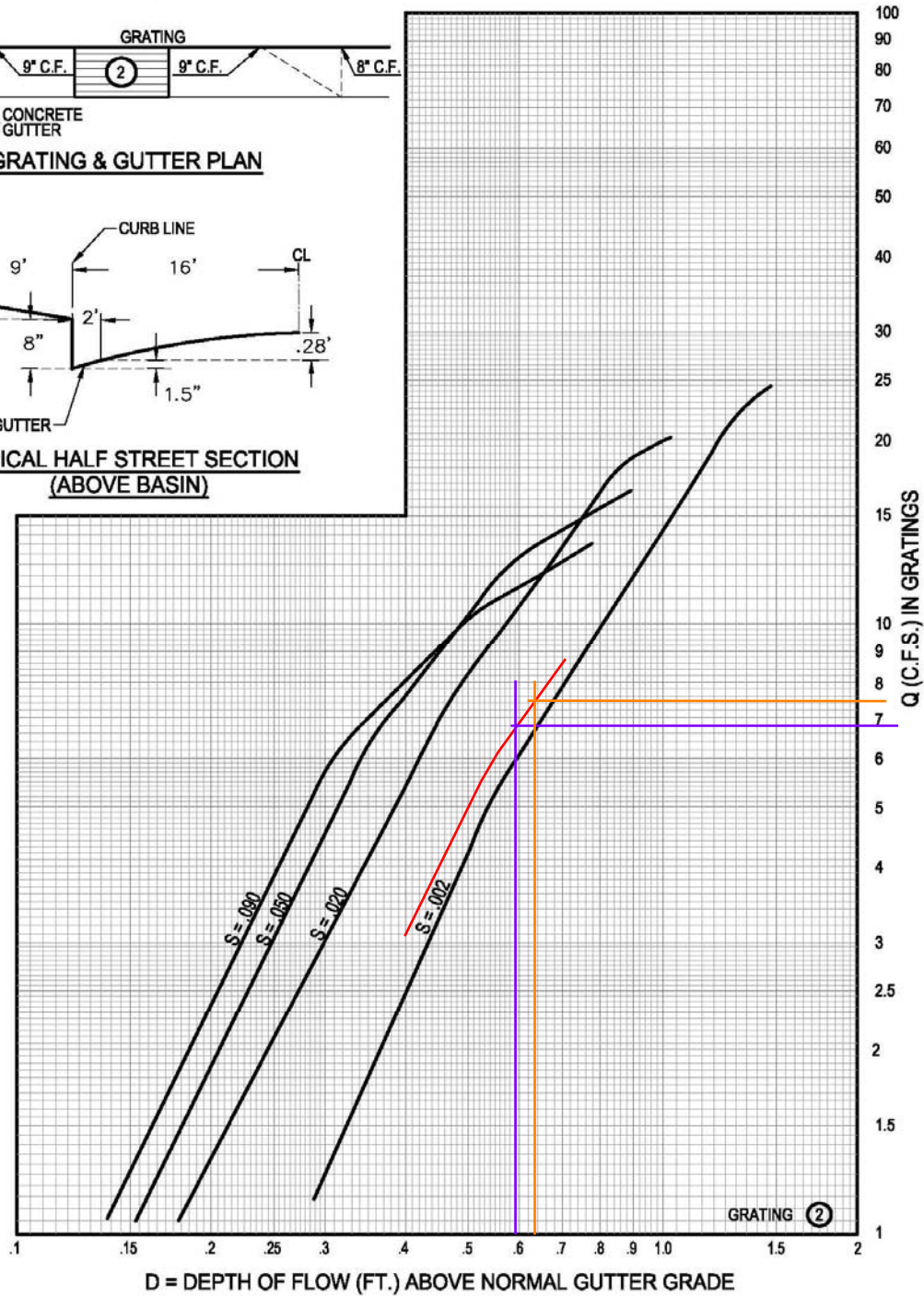
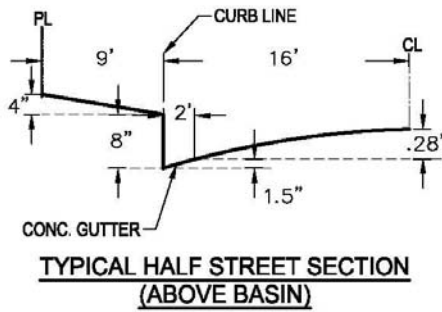
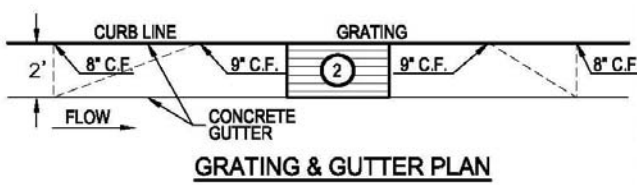
IN 10
Q=19.97 cfs
d=0.59'

IN 9
Q=24.57 cfs
d=0.63'

Q(max)= 29.25 cfs
(d Controlled)

INTERSECTION
of Tolkein and Sues
@ Q=25.57 d=0.64'

GRATING CAPACITIES FOR TYPE "A", "C" AND "D"



Q = 7.4 cfs
IN 9

Q = 6.8 cfs
IN 10

d = 0.59'
IN 10

d = 0.63'
IN 9

TOLKEIN LANE

48' ROW_Cross slope_ S=2.21%

MAIN SYSTEM

MANNING'S N = 0.017 SLOPE = 0.022

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.0	1.4	4.0	11.3	0.7	7.0	42.0	0.0
2.0	9.3	1.3	5.0	26.0	0.4	8.0	42.7	0.7
3.0	10.0	0.6	6.0	40.7	0.1	9.0	52.0	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)	
0.020	0.020	0.003	0.002	0.349	0.593	0.340	0.025	
0.040	0.040	0.014	0.013	0.699	0.941	0.681	0.054	
0.060	0.060	0.031	0.038	1.048	1.233	1.021	0.084	
0.080	0.080	0.054	0.081	1.398	1.494	1.362	0.115	
0.100	0.100	0.090	0.134	2.325	1.487	2.281	0.134	
0.120	0.120	0.146	0.234	3.355	1.607	3.303	0.160	
0.140	0.140	0.222	0.395	4.385	1.779	4.324	0.189	
0.160	0.160	0.319	0.627	5.415	1.967	5.345	0.220	
0.180	0.180	0.436	0.941	6.445	2.157	6.367	0.252	
0.200	0.200	0.573	1.346	7.475	2.346	7.388	0.286	
0.220	0.220	0.731	1.852	8.504	2.532	8.409	0.320	
0.240	0.240	0.910	2.469	9.534	2.714	9.431	0.355	
0.260	0.260	1.109	3.206	10.564	2.891	10.452	0.390	
0.280	0.280	1.328	4.070	11.594	3.065	11.473	0.426	
0.300	0.300	1.568	5.070	12.624	3.234	12.495	0.463	
0.320	0.320	1.828	6.215	13.654	3.401	13.516	0.500	
0.340	0.340	2.108	7.512	14.684	3.563	14.538	0.537	
0.360	0.360	2.409	8.969	15.713	3.723	15.559	0.576	
0.380	0.380	2.731	10.592	16.743	3.879	16.580	0.614	
0.400	0.400	3.072	12.391	17.769	4.033	17.598	0.653	
0.420	0.420	3.435	14.372	18.795	4.185	18.616	0.692	
0.440	0.440	3.817	16.540	19.822	4.333	19.633	0.732	
0.460	0.460	4.220	18.904	20.848	4.480	20.651	0.772	
0.480	0.480	4.643	21.469	21.875	4.624	21.669	0.813	
0.500	0.500	5.087	24.243	22.901	4.766	22.687	0.853	Q(max)= 24.75 cfs (EGL Controlled)
0.520	0.520	5.551	27.231	23.928	4.906	23.705	0.894	
0.540	0.540	6.035	30.440	24.954	5.044	24.723	0.936	
0.560	0.560	6.540	33.877	25.981	5.180	25.741	0.977	
0.580	0.580	7.065	37.548	27.007	5.315	26.759	1.019	
0.600	0.600	7.611	41.249	28.261	5.419	27.998	1.057	
0.620	0.620	8.185	45.106	29.636	5.511	29.357	1.092	
0.640	0.640	8.786	49.245	31.012	5.605	30.715	1.129	
0.660	0.660	9.413	53.674	32.388	5.702	32.074	1.166	
0.680	0.680	10.068	58.602	33.581	5.821	33.254	1.207	
0.700	0.700	10.743	64.019	34.592	5.959	34.256	1.252	
0.720	0.720	11.438	69.720	35.602	6.096	35.258	1.298	
0.740	0.740	12.153	75.710	36.613	6.230	36.260	1.344	
0.760	0.760	12.888	81.995	37.624	6.362	37.262	1.390	
0.780	0.780	13.644	88.579	38.634	6.492	38.265	1.436	
0.800	0.800	14.419	95.469	39.645	6.621	39.267	1.482	
0.820	0.820	15.214	102.669	40.655	6.748	40.269	1.528	
0.840	0.840	16.030	110.184	41.666	6.874	41.271	1.575	

MANNING'S N = 0.017 SLOPE = 0.025

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.0	1.4	4.0	11.3	0.6	7.0	38.0	0.0
2.0	9.3	1.2	5.0	24.0	0.3	8.0	38.7	0.7
3.0	10.0	0.5	6.0	36.7	0.1	9.0	48.0	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)
0.020	0.020	0.003	0.002	0.349	0.624	0.340	0.026
0.040	0.040	0.014	0.013	0.699	0.991	0.681	0.055
0.060	0.060	0.031	0.040	1.048	1.298	1.021	0.086
0.080	0.080	0.054	0.086	1.398	1.573	1.362	0.118
0.100	0.100	0.090	0.141	2.312	1.571	2.268	0.138
0.120	0.120	0.145	0.247	3.327	1.697	3.274	0.165
0.140	0.140	0.221	0.415	4.341	1.879	4.280	0.195
0.160	0.160	0.317	0.657	5.356	2.076	5.286	0.227
0.180	0.180	0.432	0.984	6.370	2.276	6.292	0.261
0.200	0.200	0.568	1.407	7.385	2.475	7.298	0.295
0.220	0.220	0.724	1.934	8.399	2.670	8.304	0.331
0.240	0.240	0.900	2.577	9.414	2.862	9.310	0.367
0.260	0.260	1.097	3.343	10.428	3.048	10.316	0.405
0.280	0.280	1.313	4.242	11.443	3.231	11.322	0.442
0.300	0.300	1.550	5.283	12.457	3.409	12.328	0.481
0.320	0.320	1.806	6.473	13.472	3.584	13.334	0.520
0.340	0.340	2.083	7.822	14.486	3.755	14.340	0.559
0.360	0.360	2.380	9.326	15.528	3.919	15.374	0.599
0.380	0.380	2.698	11.006	16.570	4.080	16.407	0.639
0.400	0.400	3.036	12.868	17.612	4.238	17.441	0.679
0.420	0.420	3.395	14.921	18.654	4.394	18.474	0.720
0.440	0.440	3.775	17.172	19.696	4.548	19.508	0.762
0.460	0.460	4.176	19.628	20.739	4.700	20.542	0.804
0.480	0.480	4.597	22.296	21.781	4.850	21.575	0.846
0.500	0.500	5.039	25.184	22.823	4.998	22.609	0.889
0.520	0.520	5.503	28.132	24.092	5.112	23.864	0.927
0.540	0.540	5.994	31.248	25.483	5.213	25.238	0.963
0.560	0.560	6.512	34.632	26.875	5.318	26.612	1.000
0.580	0.580	7.058	38.294	28.266	5.426	27.986	1.038
0.600	0.600	7.628	42.859	28.990	5.618	28.693	1.091
0.620	0.620	8.203	48.307	29.047	5.889	28.732	1.159
0.640	0.640	8.778	54.012	29.103	6.153	28.772	1.229
0.660	0.660	9.353	59.968	29.160	6.411	28.812	1.299
0.680	0.680	9.933	65.486	29.693	6.593	29.333	1.356
0.700	0.700	10.529	70.581	30.704	6.703	30.335	1.399
0.720	0.720	11.146	75.948	31.714	6.814	31.337	1.442
0.740	0.740	11.783	81.592	32.725	6.925	32.339	1.486
0.760	0.760	12.440	87.519	33.735	7.036	33.341	1.530
0.780	0.780	13.116	93.737	34.746	7.147	34.343	1.574
0.800	0.800	13.813	100.249	35.756	7.257	35.345	1.619
0.820	0.820	14.530	107.062	36.767	7.368	36.347	1.664
0.840	0.840	15.267	114.182	37.777	7.479	37.349	1.710

Q(max)= 23.24 cfs
(EGL Controlled)

SALINGER

48ftROW_Cross slope_ S=2.11%

MAIN SYSTEM

MANNING'S N = 0.017 SLOPE = 0.021

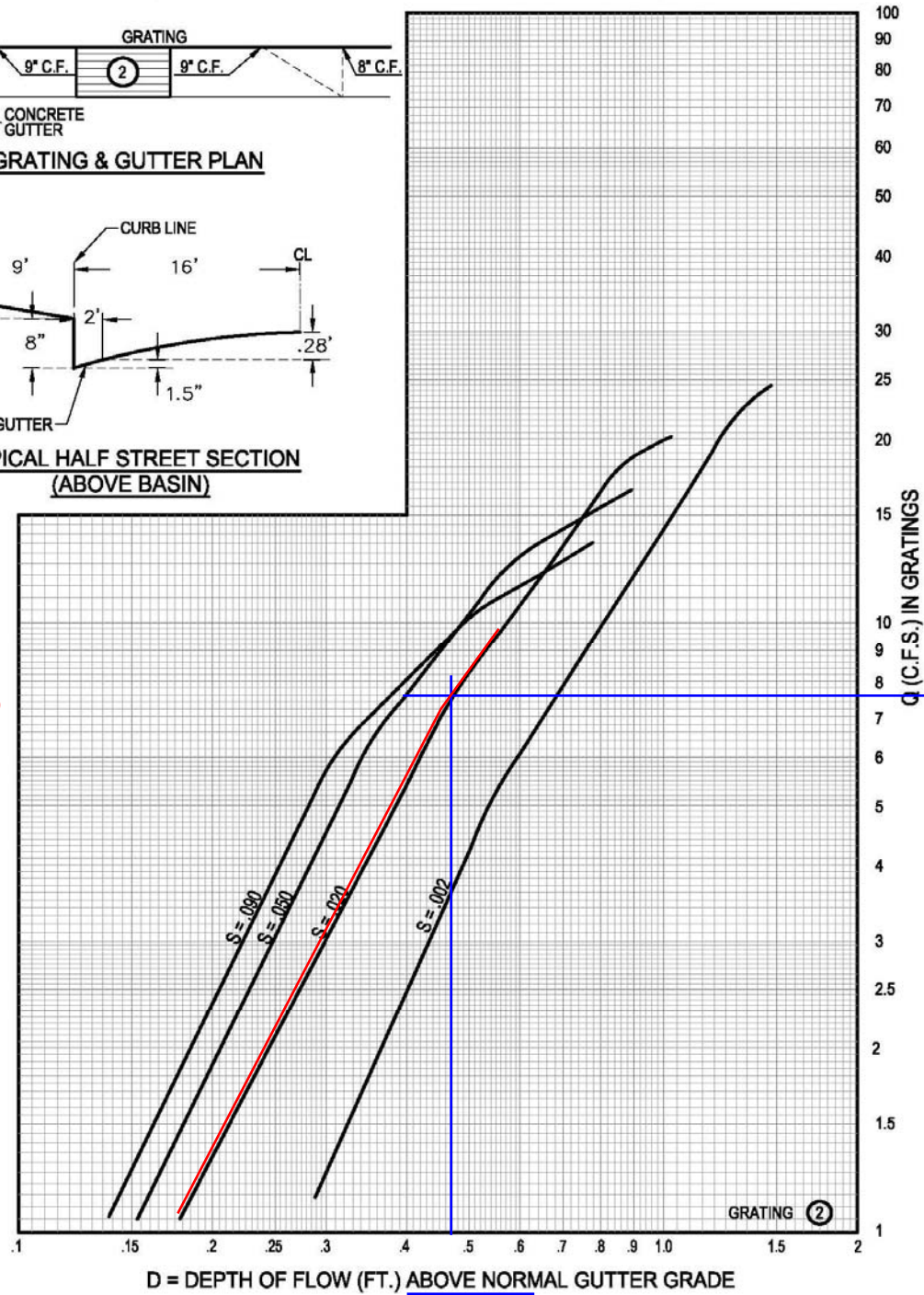
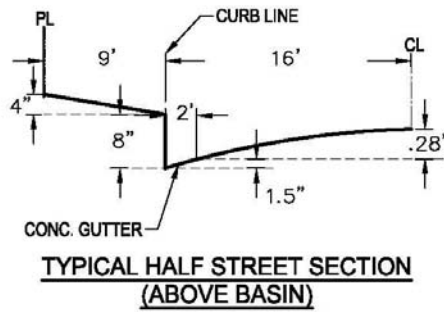
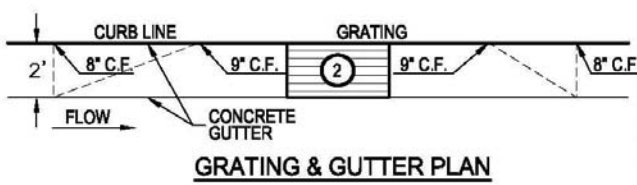
POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.0	1.4	4.0	11.3	0.6	7.0	38.0	0.0
2.0	9.3	1.2	5.0	24.0	0.3	8.0	38.7	0.7
3.0	10.0	0.5	6.0	36.7	0.1	9.0	48.0	0.9

WSEL FT.	DEPTH INC	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID PLUS OBSTRUCTIONS	TOTAL ENERGY (FT)
0.020	0.020	0.003	0.002	0.349	0.579	0.340	0.025
0.040	0.040	0.014	0.013	0.699	0.920	0.681	0.053
0.060	0.060	0.031	0.037	1.048	1.205	1.021	0.083
0.080	0.080	0.054	0.080	1.398	1.460	1.362	0.113
0.100	0.100	0.090	0.131	2.312	1.458	2.268	0.133
0.120	0.120	0.145	0.229	3.327	1.575	3.274	0.159
0.140	0.140	0.221	0.385	4.341	1.744	4.280	0.187
0.160	0.160	0.317	0.610	5.356	1.927	5.286	0.218
0.180	0.180	0.432	0.913	6.370	2.113	6.292	0.249
0.200	0.200	0.568	1.305	7.385	2.297	7.298	0.282
0.220	0.220	0.724	1.795	8.399	2.478	8.304	0.316
0.240	0.240	0.900	2.391	9.414	2.656	9.310	0.350
0.260	0.260	1.097	3.102	10.428	2.829	10.316	0.384
0.280	0.280	1.313	3.937	11.443	2.998	11.322	0.420
0.300	0.300	1.550	4.903	12.457	3.164	12.328	0.456
0.320	0.320	1.806	6.007	13.472	3.326	13.334	0.492
0.340	0.340	2.083	7.259	14.486	3.485	14.340	0.529
0.360	0.360	2.380	8.655	15.528	3.637	15.374	0.566
0.380	0.380	2.698	10.214	16.570	3.786	16.407	0.603
0.400	0.400	3.036	11.942	17.612	3.933	17.441	0.641
0.420	0.420	3.395	13.847	18.654	4.078	18.474	0.679
0.440	0.440	3.775	15.936	19.696	4.221	19.508	0.717
0.460	0.460	4.176	18.215	20.739	4.362	20.542	0.756
0.480	0.480	4.597	20.691	21.781	4.501	21.575	0.795
0.500	0.500	5.039	23.371	22.823	4.638	22.609	0.835
0.520	0.520	5.503	26.107	24.092	4.744	23.864	0.870
0.540	0.540	5.994	28.998	25.483	4.838	25.238	0.904
0.560	0.560	6.512	32.139	26.875	4.935	26.612	0.939
0.580	0.580	7.058	35.538	28.266	5.035	27.986	0.974
0.600	0.600	7.628	39.774	28.990	5.214	28.693	1.023
0.620	0.620	8.203	44.830	29.047	5.465	28.732	1.085
0.640	0.640	8.778	50.124	29.103	5.710	28.772	1.147
0.660	0.660	9.353	55.652	29.160	5.950	28.812	1.211
0.680	0.680	9.933	60.773	29.693	6.119	29.333	1.262
0.700	0.700	10.529	65.501	30.704	6.221	30.335	1.302
0.720	0.720	11.146	70.481	31.714	6.323	31.337	1.342
0.740	0.740	11.783	75.719	32.725	6.426	32.339	1.382
0.760	0.760	12.440	81.220	33.735	6.529	33.341	1.423
0.780	0.780	13.116	86.990	34.746	6.632	34.343	1.464
0.800	0.800	13.813	93.033	35.756	6.735	35.345	1.506
0.820	0.820	14.530	99.356	36.767	6.838	36.347	1.547
0.840	0.840	15.267	105.963	37.777	6.941	37.349	1.589

IN11A
Q= 19.13 cfs
d=0.47'

Q(max)= 25.32 cfs
(EGL Controlled)

GRATING CAPACITIES FOR TYPE "A", "C" AND "D"



SLOPE = 2.11%

Q = 7.6 cfs
IN11A

d = 0.47'
IN11A

PLATE 22.3 D-5

TOLKEIN LANE

52' ROW_Cross slope_ S=0.58%

MAIN SYSTEM

MANNING'S N = 0.017 SLOPE = 0.006

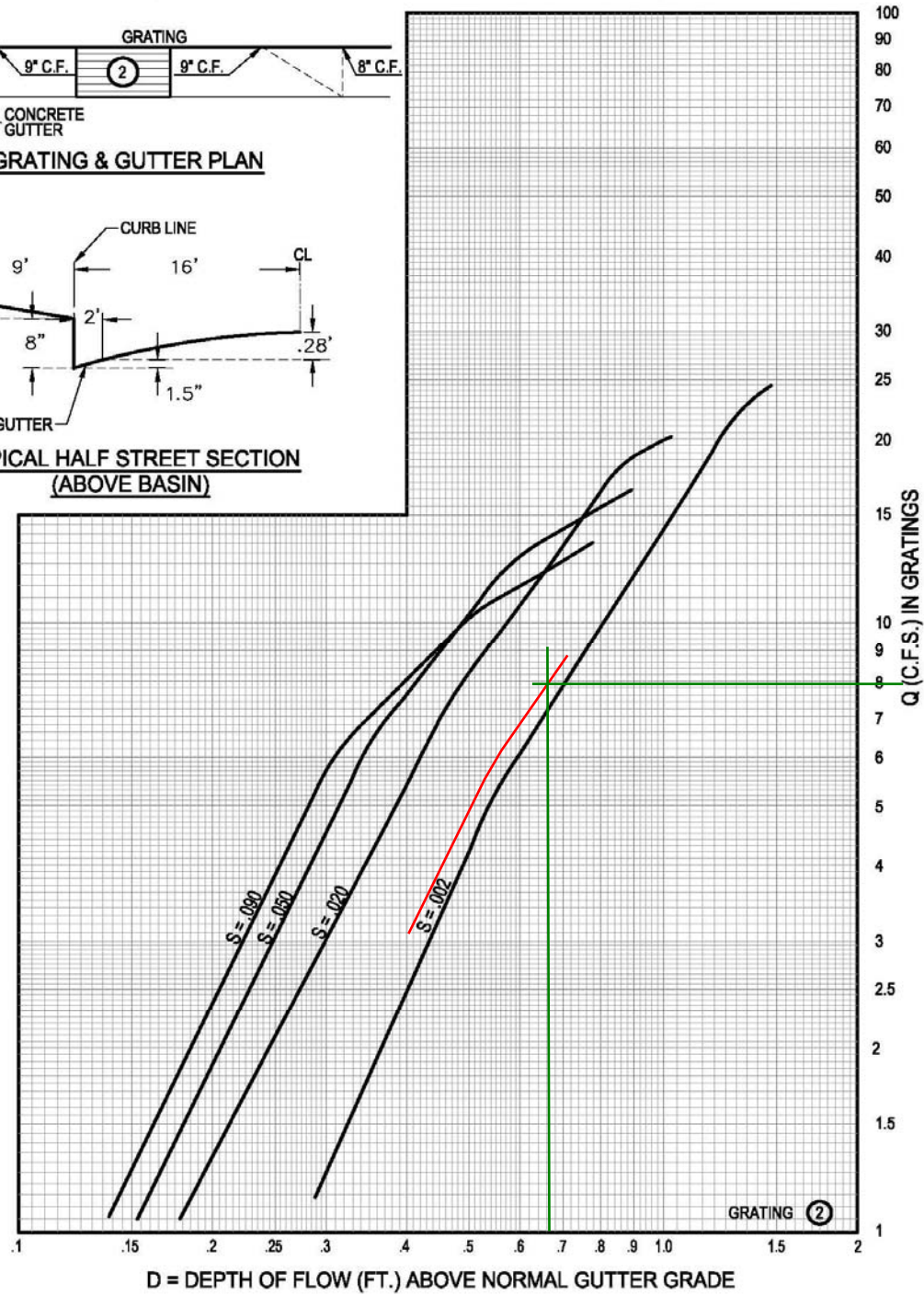
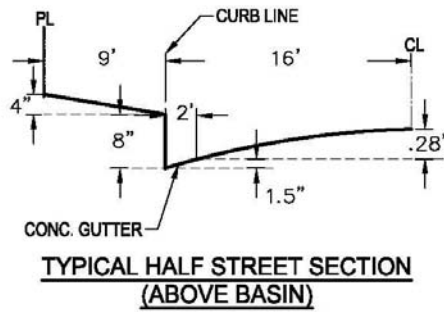
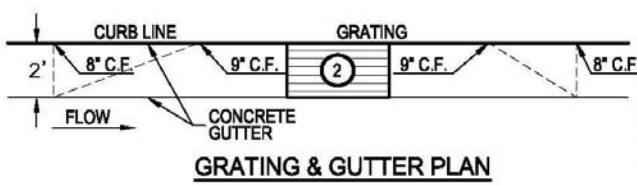
POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.0	1.4	4.0	11.3	0.7	7.0	42.0	0.0
2.0	9.3	1.3	5.0	26.0	0.4	8.0	42.7	0.7
3.0	10.0	0.6	6.0	40.7	0.1	9.0	52.0	0.9

WSEL FT.	DEPTH INC	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID PLUS OBSTRUCTIONS	TOTAL ENERGY (FT)
0.020	0.020	0.003	0.001	0.349	0.304	0.340	0.021
0.040	0.040	0.014	0.007	0.699	0.482	0.681	0.044
0.060	0.060	0.031	0.019	1.048	0.632	1.021	0.066
0.080	0.080	0.054	0.042	1.398	0.765	1.362	0.089
0.100	0.100	0.090	0.069	2.325	0.762	2.281	0.109
0.120	0.120	0.146	0.120	3.355	0.823	3.303	0.131
0.140	0.140	0.222	0.202	4.385	0.911	4.324	0.153
0.160	0.160	0.319	0.321	5.415	1.008	5.345	0.176
0.180	0.180	0.436	0.482	6.445	1.105	6.367	0.199
0.200	0.200	0.573	0.689	7.475	1.202	7.388	0.222
0.220	0.220	0.731	0.949	8.504	1.297	8.409	0.246
0.240	0.240	0.910	1.265	9.534	1.390	9.431	0.270
0.260	0.260	1.109	1.642	10.564	1.481	10.452	0.294
0.280	0.280	1.328	2.085	11.594	1.570	11.473	0.318
0.300	0.300	1.568	2.598	12.624	1.657	12.495	0.343
0.320	0.320	1.828	3.184	13.654	1.742	13.516	0.367
0.340	0.340	2.108	3.848	14.684	1.825	14.538	0.392
0.360	0.360	2.409	4.595	15.713	1.907	15.559	0.417
0.380	0.380	2.731	5.426	16.743	1.987	16.580	0.441
0.400	0.400	3.072	6.348	17.769	2.066	17.598	0.466
0.420	0.420	3.435	7.363	18.795	2.144	18.616	0.491
0.440	0.440	3.817	8.474	19.822	2.220	19.633	0.517
0.460	0.460	4.220	9.684	20.848	2.295	20.651	0.542
0.480	0.480	4.643	10.998	21.875	2.369	21.669	0.567
0.500	0.500	5.087	12.419	22.901	2.442	22.687	0.593
0.520	0.520	5.551	13.950	23.928	2.513	23.705	0.618
0.540	0.540	6.035	15.594	24.954	2.584	24.723	0.644
0.560	0.560	6.540	17.355	25.981	2.654	25.741	0.670
0.580	0.580	7.065	19.236	27.007	2.723	26.759	0.695
0.600	0.600	7.611	21.131	28.261	2.776	27.998	0.720
0.620	0.620	8.185	23.108	29.636	2.823	29.357	0.744
0.640	0.640	8.786	25.228	31.012	2.872	30.715	0.768
0.660	0.660	9.413	27.497	32.388	2.921	32.074	0.793
0.680	0.680	10.068	30.022	33.581	2.982	33.254	0.818
0.700	0.700	10.743	32.797	34.592	3.053	34.256	0.845
0.720	0.720	11.438	35.717	35.602	3.123	35.258	0.872
0.740	0.740	12.153	38.786	36.613	3.191	36.260	0.898
0.760	0.760	12.888	42.005	37.624	3.259	37.262	0.925
0.780	0.780	13.644	45.378	38.634	3.326	38.265	0.952
0.800	0.800	14.419	48.908	39.645	3.392	39.267	0.979
0.820	0.820	15.214	52.596	40.655	3.457	40.269	1.006
0.840	0.840	16.030	56.446	41.666	3.521	41.271	1.033

IN11B
Q= 27.32 cfs
d=0.66'

Q(max)= 28.76 cfs
(d Controlled)

GRATING CAPACITIES FOR TYPE "A", "C" AND "D"



Q = 8.0 cfs
IN11B

d = 0.66'
IN11B

PLATE 22.3 D-5

TWAIN WAY

48' ROW_Cross Slope_s=2.50%

MAIN SYSTEM

MANNING'S N = 0.017 SLOPE = 0.025

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.0	1.4	4.0	11.3	0.6	7.0	38.0	0.0
2.0	9.3	1.2	5.0	24.0	0.3	8.0	38.7	0.7
3.0	10.0	0.5	6.0	36.7	0.1	9.0	48.0	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)
0.020	0.020	0.003	0.002	0.349	0.631	0.340	0.026
0.040	0.040	0.014	0.014	0.699	1.001	0.681	0.056
0.060	0.060	0.031	0.040	1.048	1.312	1.021	0.087
0.080	0.080	0.054	0.087	1.398	1.589	1.362	0.119
0.100	0.100	0.090	0.143	2.312	1.587	2.268	0.139
0.120	0.120	0.145	0.249	3.327	1.714	3.274	0.166
0.140	0.140	0.221	0.419	4.341	1.898	4.280	0.196
0.160	0.160	0.317	0.664	5.356	2.097	5.286	0.228
0.180	0.180	0.432	0.994	6.370	2.300	6.292	0.262
0.200	0.200	0.568	1.421	7.385	2.500	7.298	0.297
0.220	0.220	0.724	1.954	8.399	2.698	8.304	0.333
0.240	0.240	0.900	2.603	9.414	2.891	9.310	0.370
0.260	0.260	1.097	3.377	10.428	3.079	10.316	0.407
0.280	0.280	1.313	4.285	11.443	3.264	11.322	0.446
0.300	0.300	1.550	5.337	12.457	3.444	12.328	0.484
0.320	0.320	1.806	6.539	13.472	3.620	13.334	0.524
0.340	0.340	2.083	7.901	14.486	3.793	14.340	0.564
0.360	0.360	2.380	9.421	15.528	3.958	15.374	0.604
0.380	0.380	2.698	11.118	16.570	4.121	16.407	0.644
0.400	0.400	3.036	12.999	17.612	4.281	17.441	0.685
0.420	0.420	3.395	15.073	18.654	4.439	18.474	0.726
0.440	0.440	3.775	17.346	19.696	4.595	19.508	0.768
0.460	0.460	4.176	19.827	20.739	4.748	20.542	0.811
0.480	0.480	4.597	22.522	21.781	4.899	21.575	0.853
0.500	0.500	5.039	25.439	22.823	5.049	22.609	0.896
0.520	0.520	5.503	28.418	24.092	5.164	23.864	0.935
0.540	0.540	5.994	31.565	25.483	5.266	25.238	0.971
0.560	0.560	6.512	34.984	26.875	5.372	26.612	1.009
0.580	0.580	7.058	38.683	28.266	5.481	27.986	1.047
0.600	0.600	7.628	43.294	28.990	5.675	28.693	1.101
0.620	0.620	8.203	48.797	29.047	5.949	28.732	1.170
0.640	0.640	8.778	54.560	29.103	6.216	28.772	1.241
0.660	0.660	9.353	60.577	29.160	6.476	28.812	1.312
0.680	0.680	9.933	66.151	29.693	6.660	29.333	1.370
0.700	0.700	10.529	71.298	30.704	6.771	30.335	1.413
0.720	0.720	11.146	76.719	31.714	6.883	31.337	1.457
0.740	0.740	11.783	82.420	32.725	6.995	32.339	1.501
0.760	0.760	12.440	88.408	33.735	7.107	33.341	1.546
0.780	0.780	13.116	94.688	34.746	7.219	34.343	1.591
0.800	0.800	13.813	101.267	35.756	7.331	35.345	1.636
0.820	0.820	14.530	108.149	36.767	7.443	36.347	1.682
0.840	0.840	15.267	115.341	37.777	7.555	37.349	1.728

Q(max)= 23.00 cfs
(EGL Controlled)

MANNING'S N = 0.017 SLOPE = 0.006

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.0	1.4	4.0	11.3	0.7	7.0	42.0	0.0
2.0	9.3	1.3	5.0	26.0	0.4	8.0	42.7	0.7
3.0	10.0	0.6	6.0	40.7	0.1	9.0	52.0	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)
0.020	0.020	0.003	0.001	0.349	0.296	0.340	0.021
0.040	0.040	0.014	0.006	0.699	0.469	0.681	0.043
0.060	0.060	0.031	0.019	1.048	0.615	1.021	0.066
0.080	0.080	0.054	0.041	1.398	0.745	1.362	0.089
0.100	0.100	0.090	0.067	2.325	0.742	2.281	0.109
0.120	0.120	0.146	0.117	3.355	0.802	3.303	0.130
0.140	0.140	0.222	0.197	4.385	0.888	4.324	0.152
0.160	0.160	0.319	0.313	5.415	0.981	5.345	0.175
0.180	0.180	0.436	0.469	6.445	1.076	6.367	0.198
0.200	0.200	0.573	0.671	7.475	1.171	7.388	0.221
0.220	0.220	0.731	0.924	8.504	1.263	8.409	0.245
0.240	0.240	0.910	1.232	9.534	1.354	9.431	0.269
0.260	0.260	1.109	1.599	10.564	1.442	10.452	0.292
0.280	0.280	1.328	2.030	11.594	1.529	11.473	0.316
0.300	0.300	1.568	2.529	12.624	1.614	12.495	0.340
0.320	0.320	1.828	3.101	13.654	1.696	13.516	0.365
0.340	0.340	2.108	3.748	14.684	1.778	14.538	0.389
0.360	0.360	2.409	4.474	15.713	1.857	15.559	0.414
0.380	0.380	2.731	5.284	16.743	1.935	16.580	0.438
0.400	0.400	3.072	6.182	17.769	2.012	17.598	0.463
0.420	0.420	3.435	7.170	18.795	2.088	18.616	0.488
0.440	0.440	3.817	8.251	19.822	2.162	19.633	0.513
0.460	0.460	4.220	9.431	20.848	2.235	20.651	0.538
0.480	0.480	4.643	10.710	21.875	2.307	21.669	0.563
0.500	0.500	5.087	12.094	22.901	2.378	22.687	0.588
0.520	0.520	5.551	13.585	23.928	2.447	23.705	0.613
0.540	0.540	6.035	15.186	24.954	2.516	24.723	0.638
0.560	0.560	6.540	16.900	25.981	2.584	25.741	0.664
0.580	0.580	7.065	18.731	27.007	2.651	26.759	0.689
0.600	0.600	7.611	20.578	28.261	2.704	27.998	0.714
0.620	0.620	8.185	22.502	29.636	2.749	29.357	0.738
0.640	0.640	8.786	24.567	31.012	2.796	30.715	0.762
0.660	0.660	9.413	26.776	32.388	2.844	32.074	0.786
0.680	0.680	10.068	29.235	33.581	2.904	33.254	0.811
0.700	0.700	10.743	31.937	34.592	2.973	34.256	0.837
0.720	0.720	11.438	34.781	35.602	3.041	35.258	0.864
0.740	0.740	12.153	37.769	36.613	3.108	36.260	0.890
0.760	0.760	12.888	40.905	37.624	3.174	37.262	0.917
0.780	0.780	13.644	44.189	38.634	3.239	38.265	0.943
0.800	0.800	14.419	47.626	39.645	3.303	39.267	0.970
0.820	0.820	15.214	51.218	40.655	3.366	40.269	0.996
0.840	0.840	16.030	54.967	41.666	3.429	41.271	1.023

Intersection Twain and Tolkein
at Q=28.29 cfs
d=0.67'

Q(max)= 28.29 cfs
(d Controlled)

BRONTE

48' ROW_Cross Slope_s=4.77%

MAIN SYSTEM

MANNING'S N = 0.017 SLOPE = 0.048

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.0	1.4	4.0	11.3	0.6	7.0	38.0	0.0
2.0	9.3	1.2	5.0	24.0	0.3	8.0	38.7	0.7
3.0	10.0	0.5	6.0	36.7	0.1	9.0	48.0	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)
0.020	0.020	0.003	0.003	0.349	0.871	0.340	0.032
0.040	0.040	0.014	0.019	0.699	1.383	0.681	0.070
0.060	0.060	0.031	0.056	1.048	1.812	1.021	0.111
0.080	0.080	0.054	0.120	1.398	2.195	1.362	0.155
0.100	0.100	0.090	0.197	2.312	2.191	2.268	0.175
0.120	0.120	0.145	0.344	3.327	2.368	3.274	0.207
0.140	0.140	0.221	0.579	4.341	2.621	4.280	0.247
0.160	0.160	0.317	0.917	5.356	2.897	5.286	0.291
0.180	0.180	0.432	1.373	6.370	3.176	6.292	0.337
0.200	0.200	0.568	1.963	7.385	3.454	7.298	0.386
0.220	0.220	0.724	2.699	8.399	3.726	8.304	0.436
0.240	0.240	0.900	3.595	9.414	3.993	9.310	0.488
0.260	0.260	1.097	4.665	10.428	4.253	10.316	0.541
0.280	0.280	1.313	5.919	11.443	4.508	11.322	0.596
0.300	0.300	1.550	7.372	12.457	4.757	12.328	0.652
0.320	0.320	1.806	9.033	13.472	5.001	13.334	0.709
0.340	0.340	2.083	10.914	14.486	5.240	14.340	0.767
0.360	0.360	2.380	13.013	15.528	5.468	15.374	0.825
0.380	0.380	2.698	15.357	16.570	5.692	16.407	0.884
0.400	0.400	3.036	17.956	17.612	5.914	17.441	0.944
0.420	0.420	3.395	20.820	18.654	6.132	18.474	1.005
0.440	0.440	3.775	23.960	19.696	6.347	19.508	1.066
0.460	0.460	4.176	27.387	20.739	6.558	20.542	1.129
0.480	0.480	4.597	31.110	21.781	6.768	21.575	1.192
0.500	0.500	5.039	35.140	22.823	6.974	22.609	1.256
0.520	0.520	5.503	39.254	24.092	7.134	23.864	1.311
0.540	0.540	5.994	43.601	25.483	7.274	25.238	1.363
0.560	0.560	6.512	48.323	26.875	7.420	26.612	1.416
0.580	0.580	7.058	53.433	28.266	7.570	27.986	1.471
0.600	0.600	7.628	59.802	28.990	7.839	28.693	1.556
0.620	0.620	8.203	67.404	29.047	8.217	28.732	1.670
0.640	0.640	8.778	75.365	29.103	8.586	28.772	1.787
0.660	0.660	9.353	83.676	29.160	8.946	28.812	1.905
0.680	0.680	9.933	91.375	29.693	9.200	29.333	1.996
0.700	0.700	10.529	98.484	30.704	9.353	30.335	2.061
0.720	0.720	11.146	105.972	31.714	9.508	31.337	2.126
0.740	0.740	11.783	113.847	32.725	9.662	32.339	2.192
0.760	0.760	12.440	122.118	33.735	9.817	33.341	2.259
0.780	0.780	13.116	130.793	34.746	9.972	34.343	2.327
0.800	0.800	13.813	139.880	35.756	10.126	35.345	2.395
0.820	0.820	14.530	149.386	36.767	10.281	36.347	2.464
0.840	0.840	15.267	159.321	37.777	10.436	37.349	2.534

Q(max)= 14.40 cfs
(EGL Controlled)

BRONTE

48' ROW-Cross Slope_s=0.55%

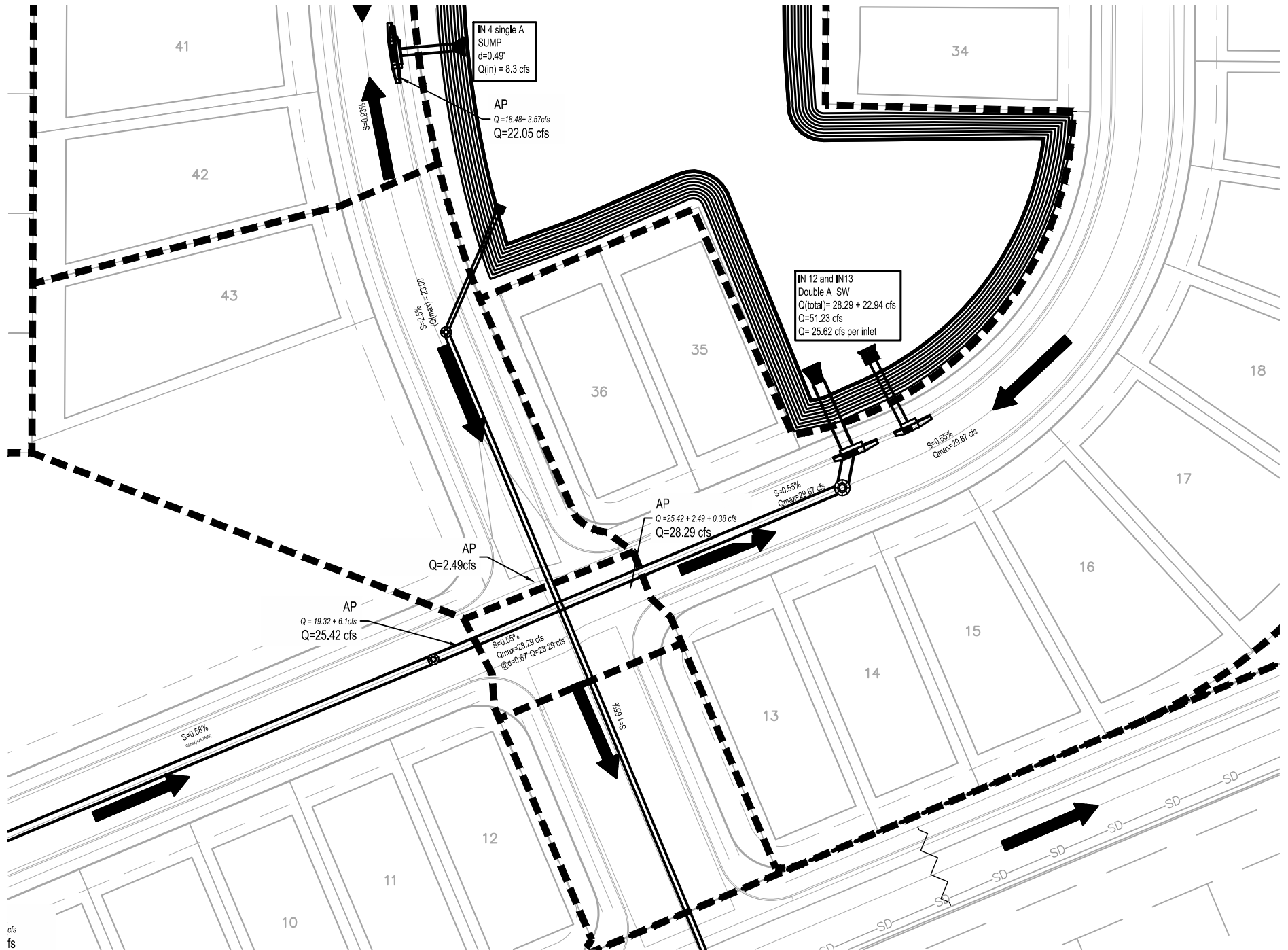
MAIN SYSTEM

MANNING'S N = 0.017 SLOPE = 0.006

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.0	1.4	4.0	11.3	0.6	7.0	38.0	0.0
2.0	9.3	1.2	5.0	24.0	0.3	8.0	38.7	0.7
3.0	10.0	0.5	6.0	36.7	0.1	9.0	48.0	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)
0.020	0.020	0.003	0.001	0.349	0.296	0.340	0.021
0.040	0.040	0.014	0.006	0.699	0.469	0.681	0.043
0.060	0.060	0.031	0.019	1.048	0.615	1.021	0.066
0.080	0.080	0.054	0.041	1.398	0.745	1.362	0.089
0.100	0.100	0.090	0.067	2.312	0.744	2.268	0.109
0.120	0.120	0.145	0.117	3.327	0.804	3.274	0.130
0.140	0.140	0.221	0.197	4.341	0.890	4.280	0.152
0.160	0.160	0.317	0.311	5.356	0.984	5.286	0.175
0.180	0.180	0.432	0.466	6.370	1.079	6.292	0.198
0.200	0.200	0.568	0.666	7.385	1.173	7.298	0.221
0.220	0.220	0.724	0.916	8.399	1.265	8.304	0.245
0.240	0.240	0.900	1.221	9.414	1.356	9.310	0.269
0.260	0.260	1.097	1.584	10.428	1.444	10.316	0.292
0.280	0.280	1.313	2.010	11.443	1.531	11.322	0.316
0.300	0.300	1.550	2.503	12.457	1.615	12.328	0.341
0.320	0.320	1.806	3.067	13.472	1.698	13.334	0.365
0.340	0.340	2.083	3.706	14.486	1.779	14.340	0.389
0.360	0.360	2.380	4.419	15.528	1.857	15.374	0.414
0.380	0.380	2.698	5.215	16.570	1.933	16.407	0.438
0.400	0.400	3.036	6.097	17.612	2.008	17.441	0.463
0.420	0.420	3.395	7.070	18.654	2.082	18.474	0.487
0.440	0.440	3.775	8.136	19.696	2.155	19.508	0.512
0.460	0.460	4.176	9.300	20.739	2.227	20.542	0.537
0.480	0.480	4.597	10.564	21.781	2.298	21.575	0.562
0.500	0.500	5.039	11.932	22.823	2.368	22.609	0.587
0.520	0.520	5.503	13.329	24.092	2.422	23.864	0.611
0.540	0.540	5.994	14.805	25.483	2.470	25.238	0.635
0.560	0.560	6.512	16.409	26.875	2.520	26.612	0.659
0.580	0.580	7.058	18.144	28.266	2.571	27.986	0.683
0.600	0.600	7.628	20.307	28.990	2.662	28.693	0.710
0.620	0.620	8.203	22.888	29.047	2.790	28.732	0.741
0.640	0.640	8.778	25.591	29.103	2.915	28.772	0.772
0.660	0.660	9.353	28.413	29.160	3.038	28.812	0.804
0.680	0.680	9.933	31.028	29.693	3.124	29.333	0.832
0.700	0.700	10.529	33.442	30.704	3.176	30.335	0.857
0.720	0.720	11.146	35.984	31.714	3.228	31.337	0.882
0.740	0.740	11.783	38.658	32.725	3.281	32.339	0.907
0.760	0.760	12.440	41.467	33.735	3.333	33.341	0.933
0.780	0.780	13.116	44.413	34.746	3.386	34.343	0.958
0.800	0.800	13.813	47.498	35.756	3.439	35.345	0.984
0.820	0.820	14.530	50.726	36.767	3.491	36.347	1.010
0.840	0.840	15.267	54.100	37.777	3.544	37.349	1.035

Q(max)= 29.87 cfs
(d Controlled)



cfs
fs

ANALYSIS OF AN INLET IN A SUMP CONDITION -

IN 12 and IN 13 Bronte Rd

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

WEIR: $Q = C * L * H^{1.5}$ Wing opening

C= 3.0

L= 4.0 ft

 $Q = 3.0(4.0')H^{1.5} = 12.0H^{1.5}$ Grate opening

C=3.0

L(double grate)=[2(2.67')+2(1.8')]=8.94 ft

 $Q = 3.0(8.94)H^{1.5} = 26.82 * H^{1.5}$ ORIFICE: $Q = C * A * (2 * G * H)^{0.5}$ Grate opening

C=0.6

A(double grate)=8.19 sf

 $Q = 0.6(7.14)((64.4 * H)^{0.5})$ Wing opening*

C=0.6

A=2.0 sf

 $Q = 1.2 * (64.4 * H)^{0.5}$

*not included in the orifice calcs

	WS ELEVATION	HEIGHT ABOVE INLET	Q (CFS) WEIR "A" OPENING	Q (CFS) WEIR DOUBLE GRATE	Q (CFS) ORIFICE DOUBLE GRATE	TOTAL Q (CFS)	COMMENTS:
							$Q = 51.23 \text{ cfs} / 2 = 25.62 \text{ cfs per inlet}$
~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	12.47	1.61	Weir controls on grate analysis
	0.20	0.20	1.07	2.40	17.64	4.55	
	0.30	0.30	1.97	4.41	21.60	8.35	
	0.40	0.40	3.04	6.78	24.94	12.86	
	0.50	0.50	4.24	9.48	27.88	17.97	
	0.60	0.60	5.58	12.46	30.55	23.62	
TOP OF CURB	0.70	0.70	7.03	15.71	32.99	29.76	@ Q(100 yr) = 25.62cfs << Flow is BELOW TC Elevation (d=0.63')
	0.80	0.80	8.59	19.19	35.27	36.36	
ROW LIMIT	0.86	0.86	9.52	21.28	36.51	40.32	
	0.90	0.90	10.25	22.90	37.41	43.39	@ Q(2 x100 yr) = 51.23 cfs >> Flow Exceeds ROW Elevation***
	1.00	1.00	12.00	26.82	39.43	50.82	

NOTE:

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

 $Q_r(100) = 2 * [(\text{runoff of the wing opening}) + (\text{the lesser of the weir or orifice amount taken by the double grate})]$ **Total Q = 51.23 cfs/2 = 25.62 cfs per inlet****** This inlet has an emergency overflow into POND**

APPENDIX C: STORM DRAIN PIPE ANALYSIS

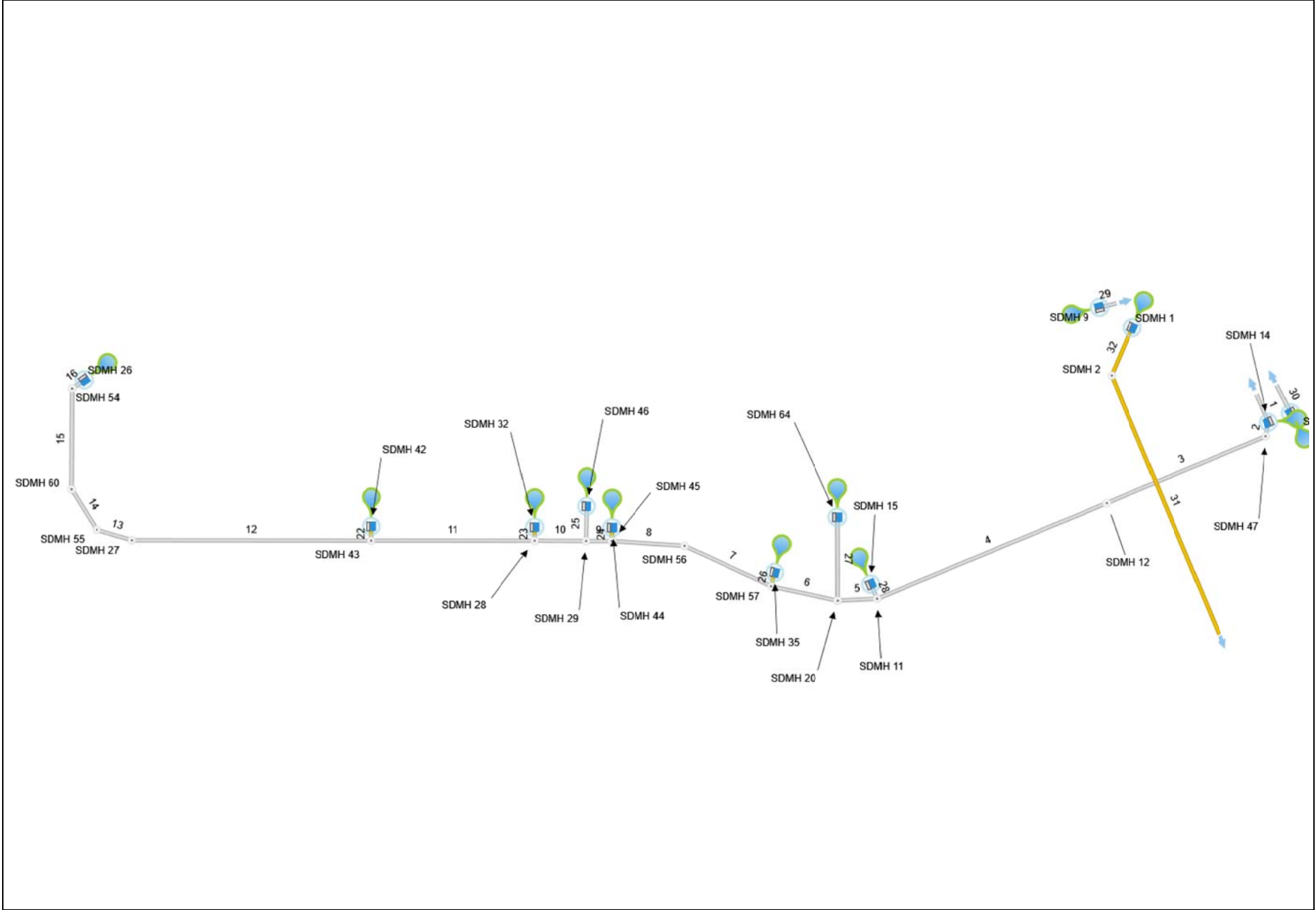
LineNo.	Line Size	Flow Rate	Vel Ave	Grnd/Rim Elev Dn	HGL Dn	Grnd/Rim Elev Up	HGL Up	EGL Dn	EGL Up	Vel Ave	Vel Dn	Vel Up	Line Slope
	(in)	(cfs)	(ft/s)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft/s)	(ft/s)	(ft/s)	(ft/ft)
1	54	84.85	5.34	5341.46	5344	5345.18	5344.07	5344.44	5344.51	5.34	5.34	5.34	0.005
2	42	59.2	6.15	5345.18	5344.16	5345.25	5344.22	5344.75	5344.81	6.15	6.15	6.15	0.005
3	42	59.2	6.15	5345.25	5344.72	5346.6	5345.42	5345.31	5346.01	6.15	6.15	6.15	0.005
4	42	59.2	6.15	5346.6	5345.67	5348.29	5346.69	5346.26	5347.28	6.15	6.15	6.15	0.005
5	36	51.2	7.24	5348.29	5346.93	5348.83	5347.21	5347.74	5348.02	7.24	7.24	7.24	0.0135
6	36	43.6	6.17	5348.83	5347.85	5349.76	5348.19	5348.44	5348.78	6.17	6.17	6.17	0.0143
7	36	36.8	5.21	5349.76	5348.65	5350.87	5349	5349.07	5349.42	5.21	5.21	5.21	0.009
8	30	36.8	7.5	5350.87	5348.97	5351.39	5349.66	5349.84	5350.54	7.5	7.5	7.5	0.0109
9	30	29.4	5.99	5351.39	5350.35	5351.71	5350.51	5350.91	5351.07	5.99	5.99	5.99	0.007
10	30	22.5	4.58	5351.71	5350.98	5352.28	5351.16	5351.3	5351.49	4.58	4.58	4.58	0.01
11	24	14.9	4.74	5352.28	5351.36	5355.69	5352.2	5351.71	5352.55	4.74	4.74	4.74	0.0161
12	24	6.5	3.39	5355.69	5352.65	5361.76	5354.94	5352.71	5355.29	3.39	2.07	4.72	0.0211
13	24	6.5	6.41	5361.76	5354.74	5363.67	5356.79	5355.42	5357.14	6.41	8.1	4.72	0.0407
14	24	6.5	6.78	5363.67	5356.56	5366.08	5359.4	5357.27	5359.75	6.78	8.83	4.72	0.0446
15	24	6.5	6.98	5366.08	5359.15	5371.17	5364.32	5359.88	5364.67	6.98	9.24	4.72	0.0406
16	24	6.5	8.17	5371.17	5363.99	5371.3	5367.7	5364.8	5368.05	8.17	11.62	4.72	0.1888
17	36	38.84	5.76	5351.87	5351.54	5355.71	5351.51	5352.01	5352.07	5.76	5.5	6.02	0.02
18	24	16	5.54	5355.71	5351.9	5356.22	5351.93	5352.32	5352.47	5.54	5.2	5.89	0.01
19	24	16	8.7	5356.22	5351.38	5367.44	5362.87	5352.86	5363.57	8.7	10.67	6.72	0.0245
20	24	16	8.81	5367.44	5362.5	5368.09	5364.81	5363.72	5365.52	8.81	10.89	6.72	0.05
21	18	8.2	4.64	5368.09	5365.32	5368.84	5365.51	5365.65	5365.85	4.64	4.64	4.64	0.0126
22	18	8.4	4.75	5355.69	5352.48	5355.38	5352.58	5352.83	5352.94	4.75	4.75	4.75	0.002
23	18	7.6	4.3	5352.28	5351.4	5351.93	5351.48	5351.68	5351.77	4.3	4.3	4.3	0.0021
24	18	7.4	4.19	5351.39	5350.52	5351.04	5350.6	5350.8	5350.88	4.19	4.19	4.19	0.0021
25	18	6.9	3.9	5351.71	5351.03	5352.13	5351.21	5351.27	5351.44	3.9	3.91	3.9	0.04
26	18	6.8	3.85	5349.76	5348.77	5349.46	5348.84	5349	5349.07	3.85	3.85	3.85	0.0019
27	18	7.6	4.3	5348.83	5348.03	5350.01	5348.55	5348.32	5348.83	4.3	4.3	4.3	0.0167
28	18	8	4.53	5348.29	5347.23	5347.92	5347.34	5347.55	5347.65	4.53	4.53	4.53	0.1224
29	36	22.05	3.12	5340.83	5344	5351.25	5344.02	5344.15	5344.17	3.12	3.12	3.12	0.0052
30	36	25.65	5.12	5341.82	5339.86	5345.25	5339.98	5340.07	5340.66	5.12	3.63	6.62	0.0421
31	24	25.62	8.16	5343.38	5334.1	5350.82	5338.34	5335.13	5339.37	8.16	8.16	8.16	0.0103
32	18	25.62	14.5	5350.82	5337.79	5350.47	5341.47	5341.06	5344.73	14.5	14.5	14.5	0.0324

Plan View

Stormwater Studio 2021 v 3.0.0.25

Project Name: SD

12-10-2021

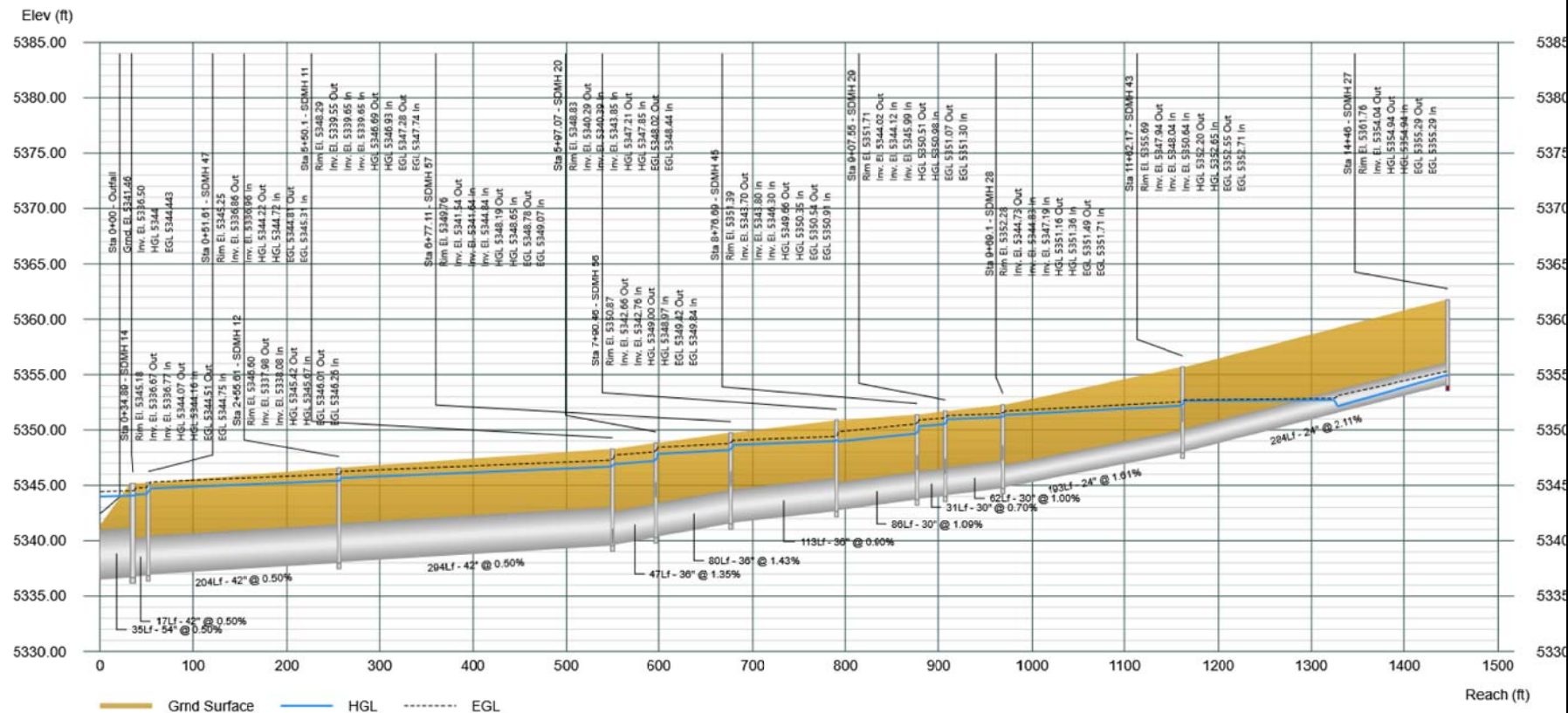


Profile View

Stormwater Studio 2021 v 3.0.0.25

Project Name: SD

12-10-2021



Plan View

Stormwater Studio 2021 v 3.0.0.25

Project Name: SD

12-07-2021

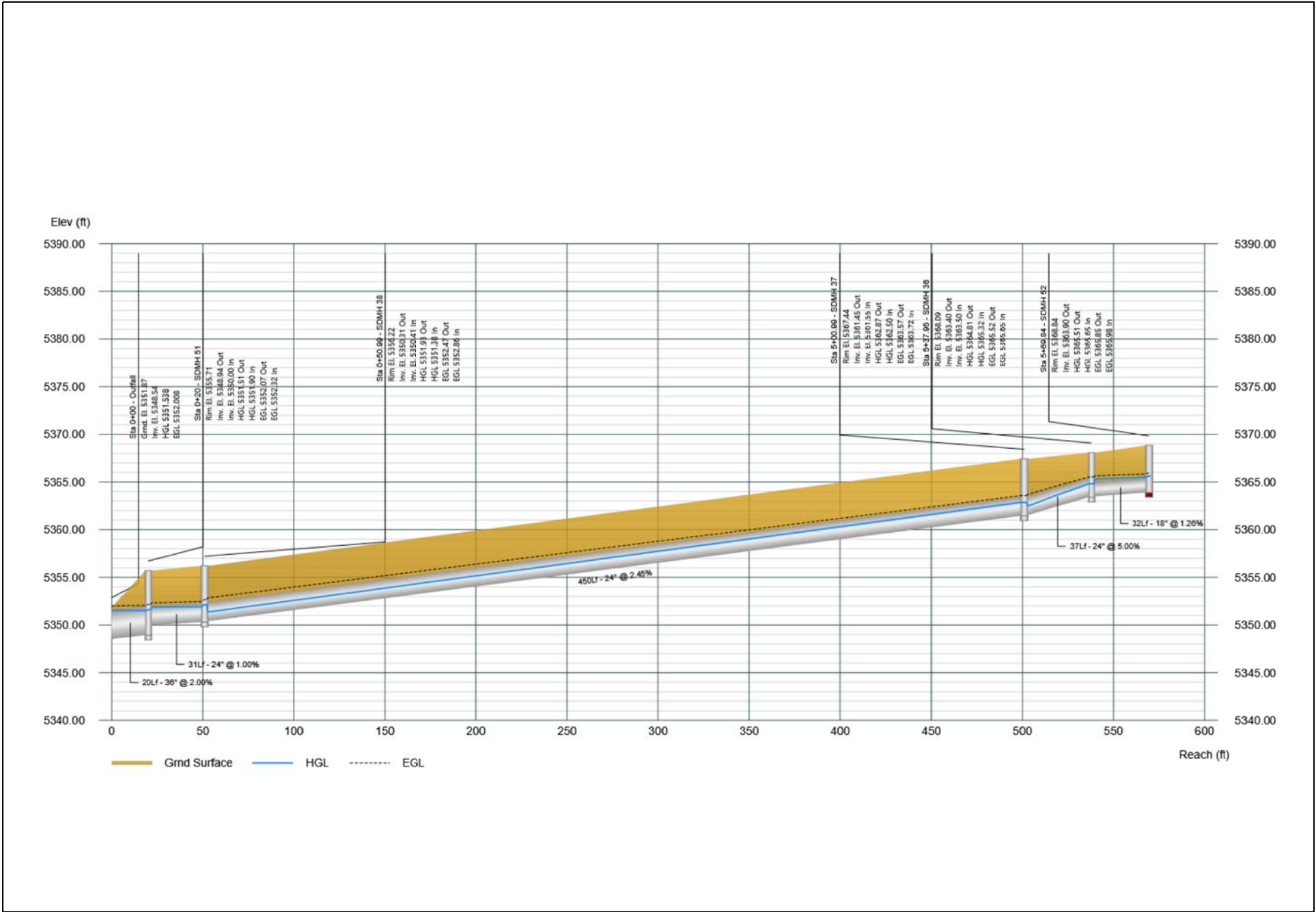


Profile View

Stormwater Studio 2021 v 3.0.0.25

Project Name: SD

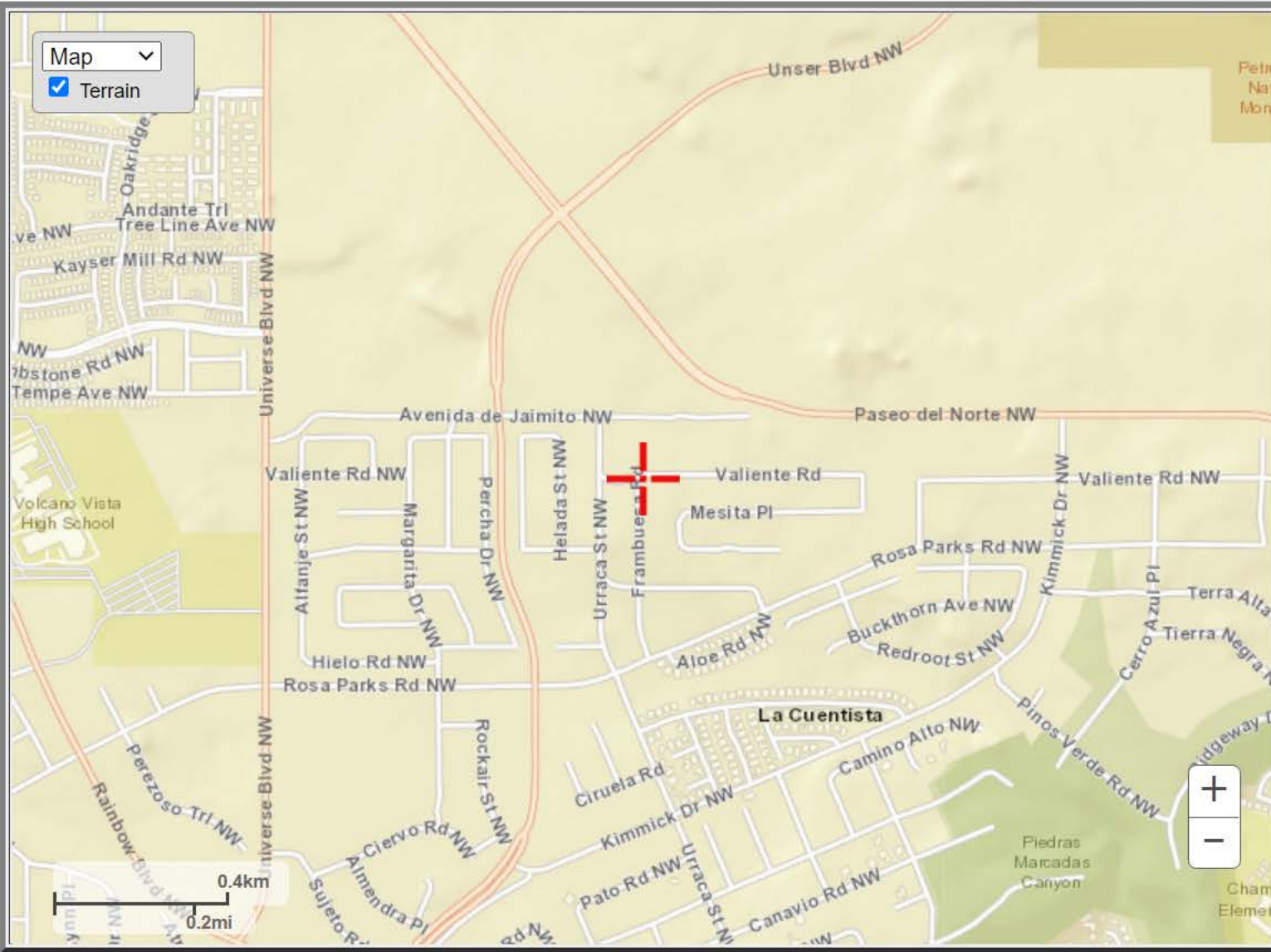
12-07-2021



APPENDIX D:
DETENTION POND ANALYSIS DATA

Map ▾

☒ Terrain



a) Select location

Move crosshair or double click

b) Click on station icon

☐ Show stations on map

Location information:

Name: Albuquerque, New Mexico, USA*

Latitude: 35.1784°

Longitude: -106.7180°

Elevation: 5384.92 ft **



* Source: ESRI Maps

** Source: USGS



NOAA Atlas 14, Volume 1, Version 5
Location name: Albuquerque, New Mexico, USA*
Latitude: 35.1784°, Longitude: -106.718°
Elevation: 5384.92 ft**
* source: ESRI Maps
** source: USGS



POINT PRECIPITATION FREQUENCY ESTIMATES

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

NOAA, National Weather Service, Silver Spring, Maryland

[PF_tabular](#) | [PF_graphical](#) | [Maps_&_aerials](#)

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches) ¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.159 (0.136-0.186)	0.206 (0.176-0.242)	0.278 (0.236-0.326)	0.335 (0.285-0.391)	0.412 (0.348-0.481)	0.473 (0.398-0.550)	0.537 (0.449-0.624)	0.606 (0.502-0.704)	0.699 (0.574-0.814)	0.774 (0.630-0.900)
10-min	0.242 (0.208-0.284)	0.314 (0.268-0.367)	0.423 (0.359-0.496)	0.510 (0.433-0.595)	0.627 (0.529-0.732)	0.719 (0.605-0.837)	0.818 (0.683-0.950)	0.922 (0.764-1.07)	1.06 (0.873-1.24)	1.18 (0.958-1.37)
15-min	0.300 (0.257-0.351)	0.389 (0.332-0.455)	0.524 (0.445-0.615)	0.632 (0.537-0.738)	0.778 (0.656-0.907)	0.892 (0.751-1.04)	1.01 (0.847-1.18)	1.14 (0.948-1.33)	1.32 (1.08-1.54)	1.46 (1.19-1.70)
30-min	0.404 (0.347-0.473)	0.524 (0.447-0.613)	0.706 (0.599-0.828)	0.852 (0.724-0.993)	1.05 (0.884-1.22)	1.20 (1.01-1.40)	1.37 (1.14-1.59)	1.54 (1.28-1.79)	1.78 (1.46-2.07)	1.97 (1.60-2.29)
60-min	0.500 (0.429-0.585)	0.648 (0.553-0.759)	0.874 (0.741-1.02)	1.05 (0.895-1.23)	1.30 (1.09-1.51)	1.49 (1.25-1.73)	1.69 (1.41-1.96)	1.91 (1.58-2.21)	2.20 (1.81-2.56)	2.43 (1.98-2.83)
2-hr	0.588 (0.506-0.685)	0.752 (0.645-0.877)	0.998 (0.853-1.16)	1.20 (1.02-1.38)	1.47 (1.25-1.70)	1.70 (1.43-1.95)	1.94 (1.62-2.22)	2.19 (1.81-2.51)	2.54 (2.09-2.91)	2.83 (2.30-3.25)
3-hr	0.629 (0.551-0.732)	0.801 (0.699-0.932)	1.05 (0.920-1.22)	1.26 (1.09-1.45)	1.54 (1.32-1.77)	1.76 (1.51-2.03)	2.00 (1.71-2.30)	2.26 (1.91-2.60)	2.62 (2.19-3.01)	2.92 (2.40-3.36)
6-hr	0.727 (0.638-0.834)	0.920 (0.812-1.06)	1.19 (1.05-1.37)	1.41 (1.23-1.61)	1.70 (1.48-1.94)	1.93 (1.68-2.19)	2.17 (1.87-2.47)	2.42 (2.08-2.75)	2.78 (2.35-3.16)	3.07 (2.58-3.50)
12-hr	0.812 (0.718-0.919)	1.03 (0.907-1.16)	1.31 (1.15-1.48)	1.53 (1.35-1.73)	1.82 (1.60-2.05)	2.06 (1.79-2.31)	2.30 (1.99-2.58)	2.55 (2.19-2.86)	2.88 (2.46-3.25)	3.16 (2.67-3.57)
24-hr	0.927 (0.818-1.06)	1.17 (1.03-1.32)	1.46 (1.29-1.66)	1.70 (1.50-1.92)	2.02 (1.77-2.28)	2.26 (1.98-2.56)	2.52 (2.20-2.85)	2.78 (2.42-3.13)	3.14 (2.70-3.53)	3.41 (2.92-3.84)
2-day	0.974 (0.868-1.09)	1.22 (1.09-1.37)	1.53 (1.37-1.72)	1.78 (1.58-1.99)	2.11 (1.87-2.35)	2.36 (2.09-2.64)	2.62 (2.31-2.93)	2.89 (2.53-3.23)	3.25 (2.83-3.64)	3.53 (3.06-3.96)
3-day	1.13 (1.02-1.25)	1.41 (1.28-1.56)	1.75 (1.58-1.93)	2.01 (1.82-2.22)	2.37 (2.13-2.61)	2.64 (2.37-2.92)	2.92 (2.61-3.22)	3.20 (2.85-3.53)	3.57 (3.17-3.95)	3.86 (3.41-4.27)
4-day	1.29 (1.18-1.41)	1.60 (1.46-1.75)	1.96 (1.79-2.15)	2.25 (2.05-2.45)	2.63 (2.40-2.87)	2.93 (2.66-3.19)	3.22 (2.92-3.51)	3.51 (3.17-3.83)	3.90 (3.51-4.26)	4.19 (3.76-4.59)
7-day	1.47 (1.35-1.61)	1.83 (1.68-1.99)	2.23 (2.04-2.42)	2.54 (2.33-2.76)	2.94 (2.69-3.19)	3.25 (2.97-3.52)	3.55 (3.24-3.85)	3.84 (3.50-4.17)	4.21 (3.83-4.58)	4.49 (4.07-4.89)
10-day	1.63 (1.50-1.78)	2.03 (1.86-2.20)	2.48 (2.28-2.69)	2.84 (2.61-3.07)	3.31 (3.03-3.58)	3.66 (3.35-3.96)	4.01 (3.66-4.34)	4.36 (3.97-4.72)	4.81 (4.36-5.21)	5.15 (4.65-5.58)
20-day	2.05 (1.88-2.23)	2.54 (2.33-2.77)	3.09 (2.84-3.36)	3.50 (3.21-3.80)	4.02 (3.68-4.36)	4.39 (4.02-4.77)	4.76 (4.35-5.16)	5.10 (4.66-5.53)	5.53 (5.04-6.00)	5.84 (5.31-6.34)
30-day	2.45 (2.25-2.65)	3.03 (2.79-3.28)	3.65 (3.36-3.95)	4.11 (3.77-4.43)	4.67 (4.29-5.04)	5.08 (4.65-5.47)	5.46 (5.00-5.88)	5.82 (5.32-6.27)	6.25 (5.70-6.73)	6.55 (5.97-7.05)
45-day	2.99 (2.76-3.24)	3.70 (3.42-4.00)	4.41 (4.07-4.76)	4.92 (4.53-5.30)	5.53 (5.10-5.95)	5.94 (5.48-6.40)	6.32 (5.83-6.80)	6.65 (6.13-7.15)	7.02 (6.48-7.55)	7.25 (6.70-7.79)
60-day	3.44 (3.17-3.72)	4.25 (3.92-4.60)	5.06 (4.68-5.47)	5.64 (5.22-6.09)	6.34 (5.86-6.84)	6.82 (6.30-7.35)	7.25 (6.71-7.82)	7.64 (7.06-8.24)	8.07 (7.47-8.71)	8.34 (7.73-9.00)

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

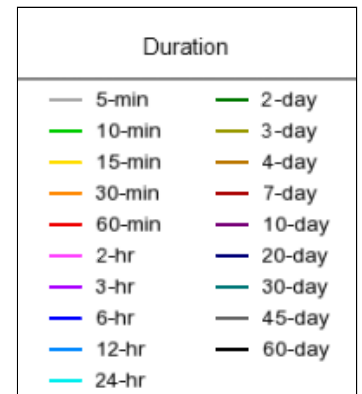
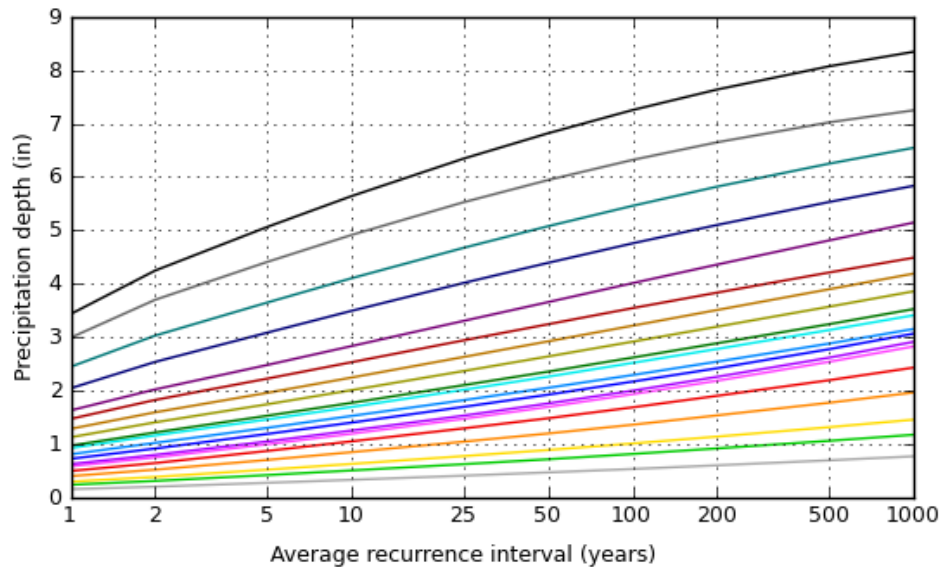
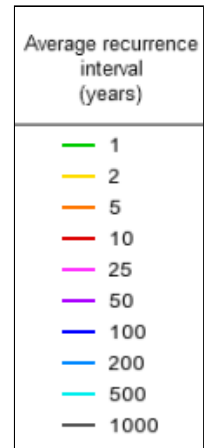
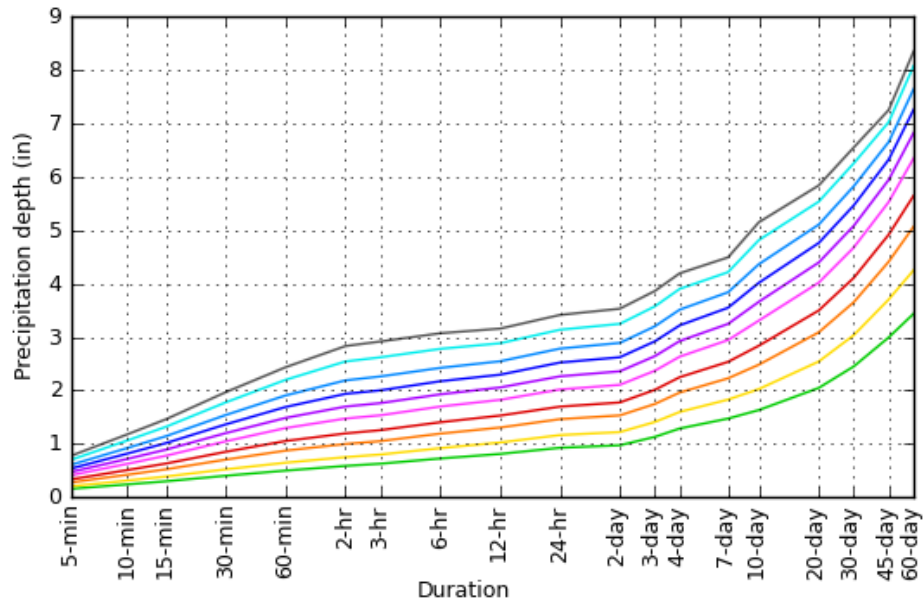
Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper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

Please refer to NOAA Atlas 14 document for more information.

[Back to Top](#)

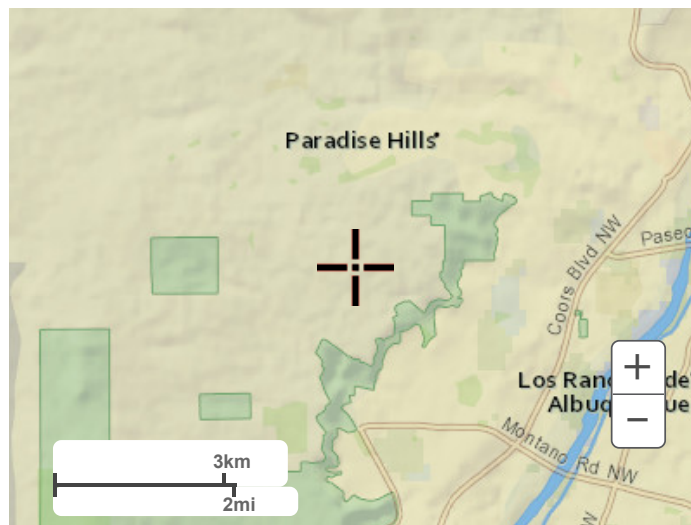
PF graphical

PDS-based depth-duration-frequency (DDF) curves
Latitude: 35.1784°, Longitude: -106.7180°



Maps & aerials

Small scale terrain



Large scale terrain



Large scale map



Large scale aerial



[Back to Top](#)

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[National Weather Service](#)
[National Water Center](#)
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

[Disclaimer](#)

APPENDIX E: SWALE CALCULATIONS

Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc.

Tuesday, Dec 7 2021

La Cuentista North Swale for Offsite Flows (temporary asphalt)

Triangular

Side Slopes (z:1) = 3.00, 3.00
Total Depth (ft) = 2.50

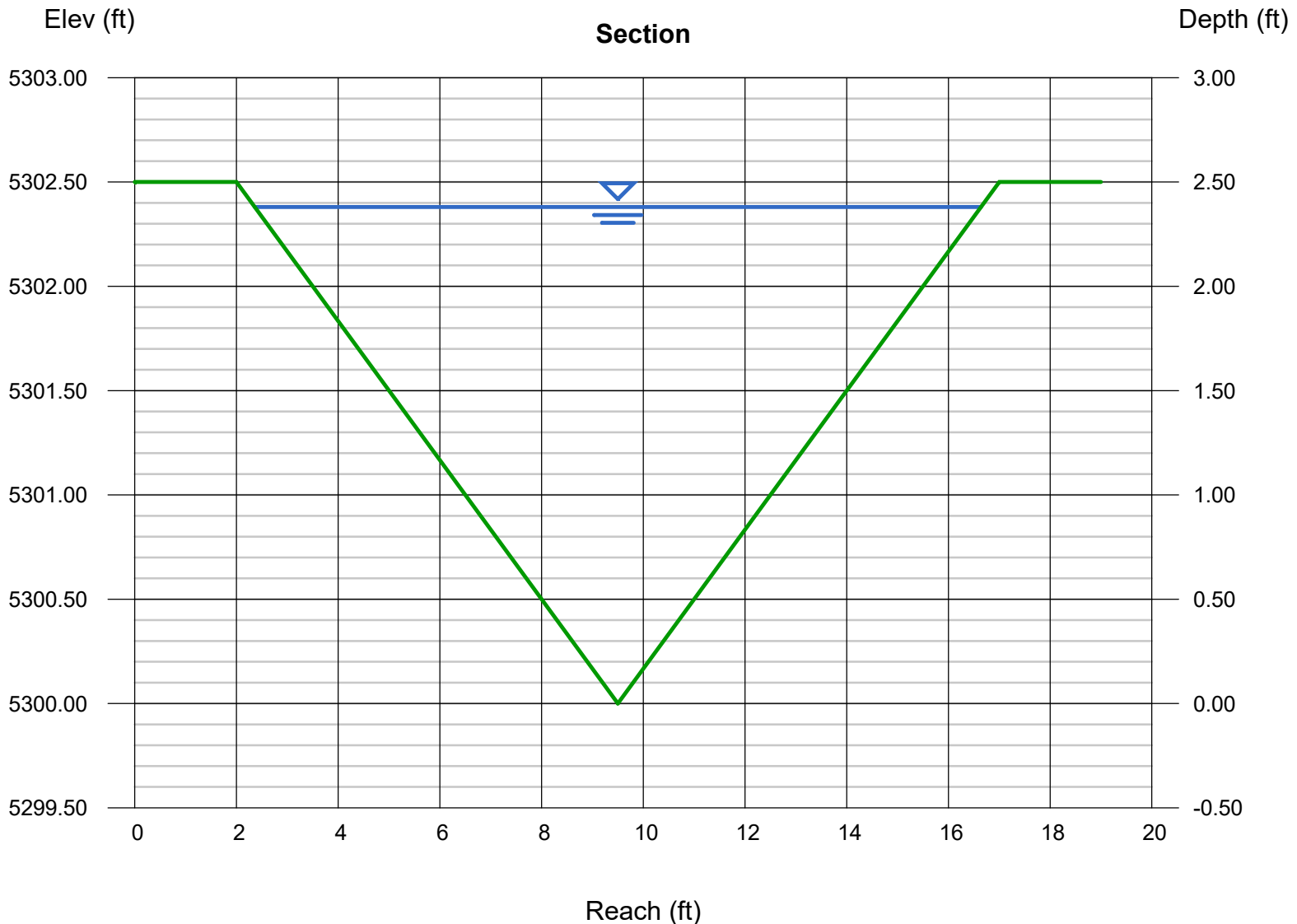
Invert Elev (ft) = 5300.00
Slope (%) = 0.50
N-Value = 0.017

Calculations

Compute by: Known Q
Known Q (cfs) = 113.20

Highlighted

Depth (ft) = 2.38
Q (cfs) = 113.20
Area (sqft) = 16.99
Velocity (ft/s) = 6.66
Wetted Perim (ft) = 15.05
Crit Depth, Yc (ft) = 2.46
Top Width (ft) = 14.28
EGL (ft) = 3.07



Channel Report

Pond Swale

Triangular

Side Slopes (z:1) = 3.00, 3.00
Total Depth (ft) = 1.50

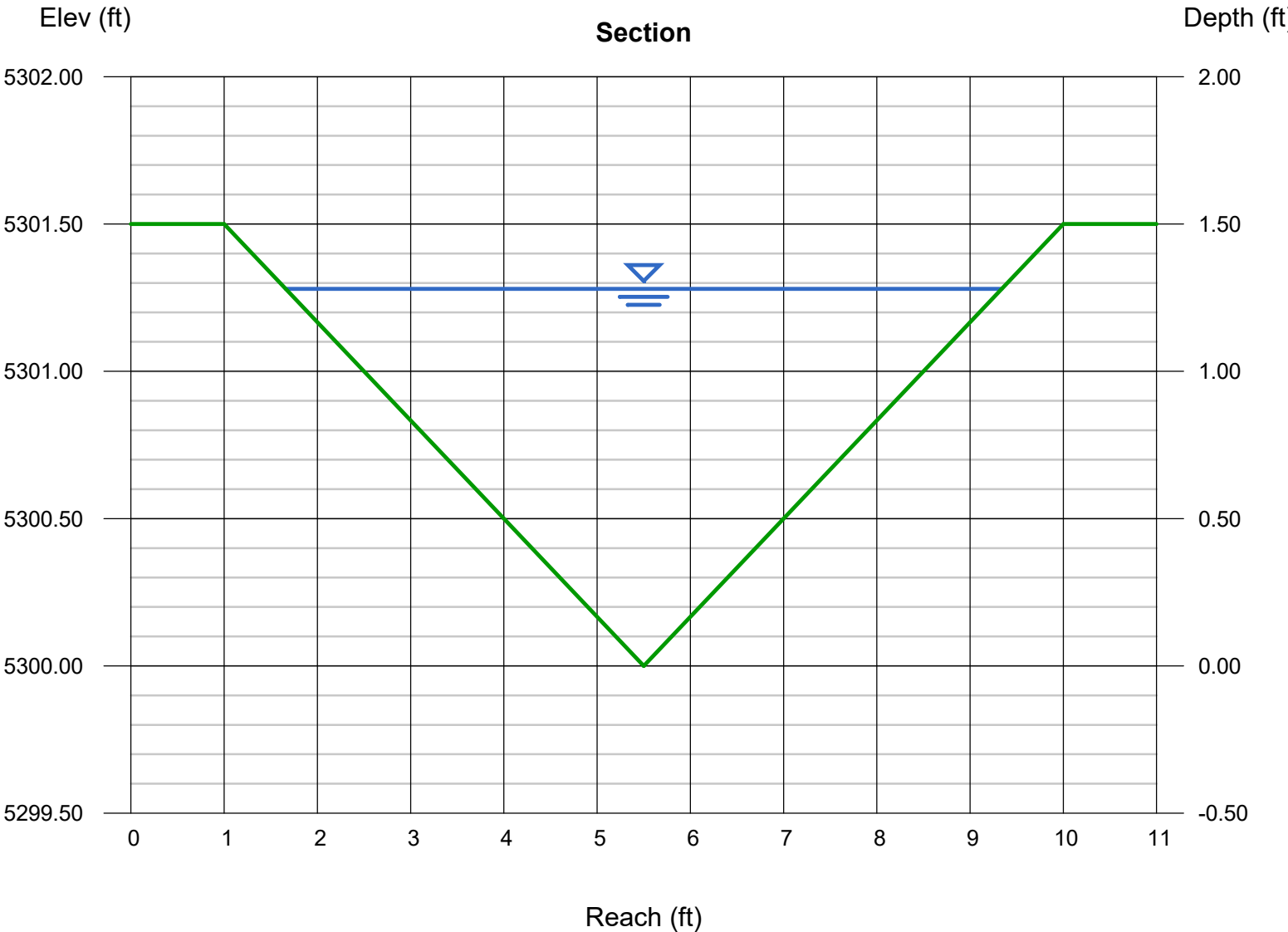
Invert Elev (ft) = 5300.00
Slope (%) = 1.75
N-Value = 0.018

Calculations

Compute by: Known Q
Known Q (cfs) = 38.20

Highlighted

Depth (ft) = 1.28
Q (cfs) = 38.20
Area (sqft) = 4.92
Velocity (ft/s) = 7.77
Wetted Perim (ft) = 8.10
Crit Depth, Yc (ft) = 1.50
Top Width (ft) = 7.68
EGL (ft) = 2.22



APPENDIX F:
CURVILINEAR STORM DRAIN



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

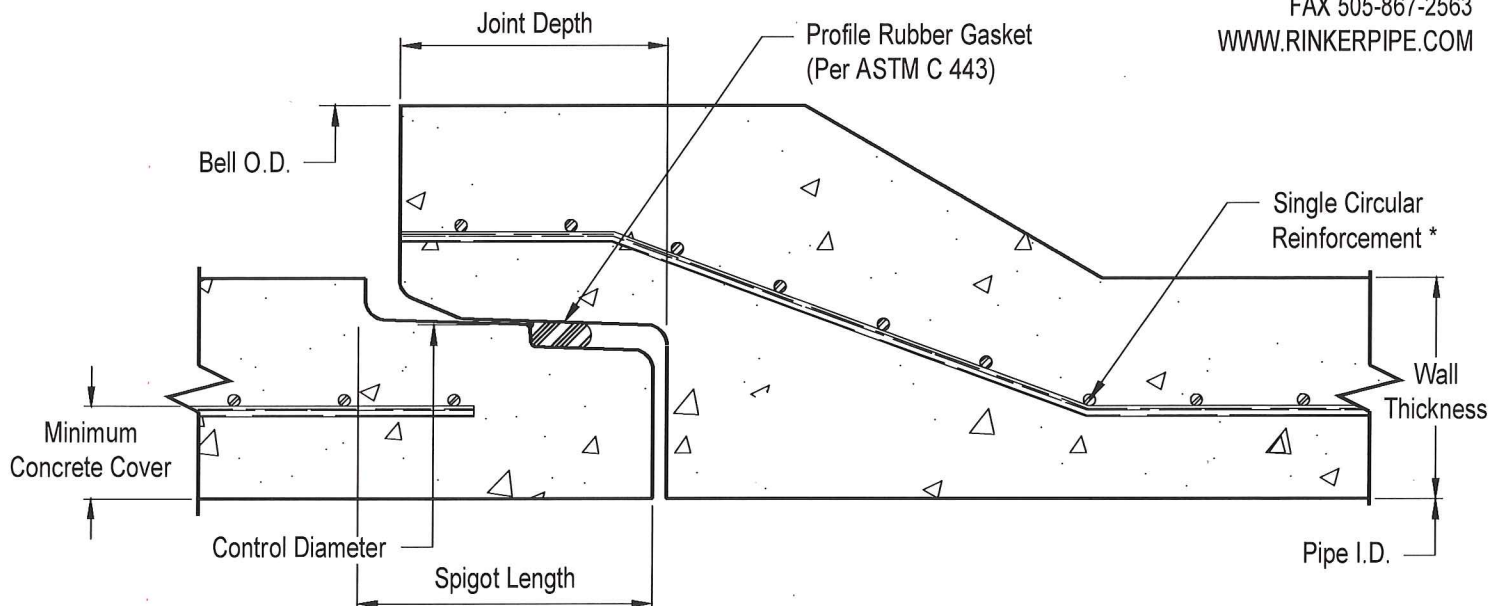
The 12" – 108" RCP rubber gasket pipe joint that is currently produced at our Bernalillo facility is designed to provide an adequate seal when the joint is not fully 'homed'. The allowable joint gaps that will still maintain an adequate seal for these sizes are listed below.

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"

A handwritten signature in black ink, appearing to read "Steve Hiner".

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

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



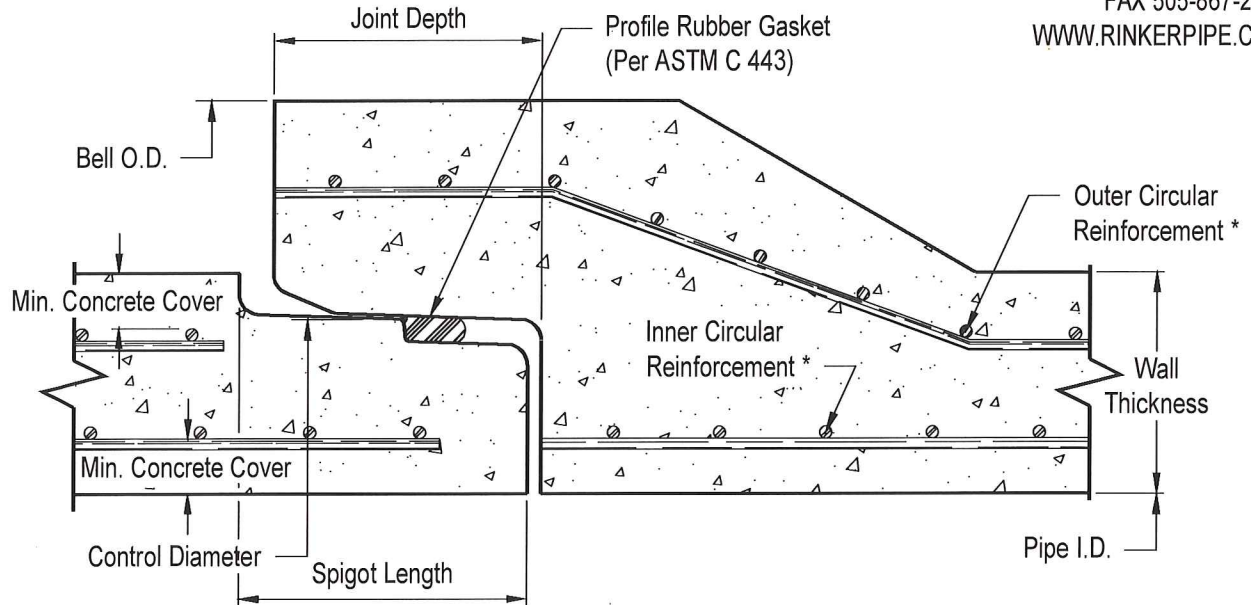
Section Thru Joint

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.

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



Section Thru Joint

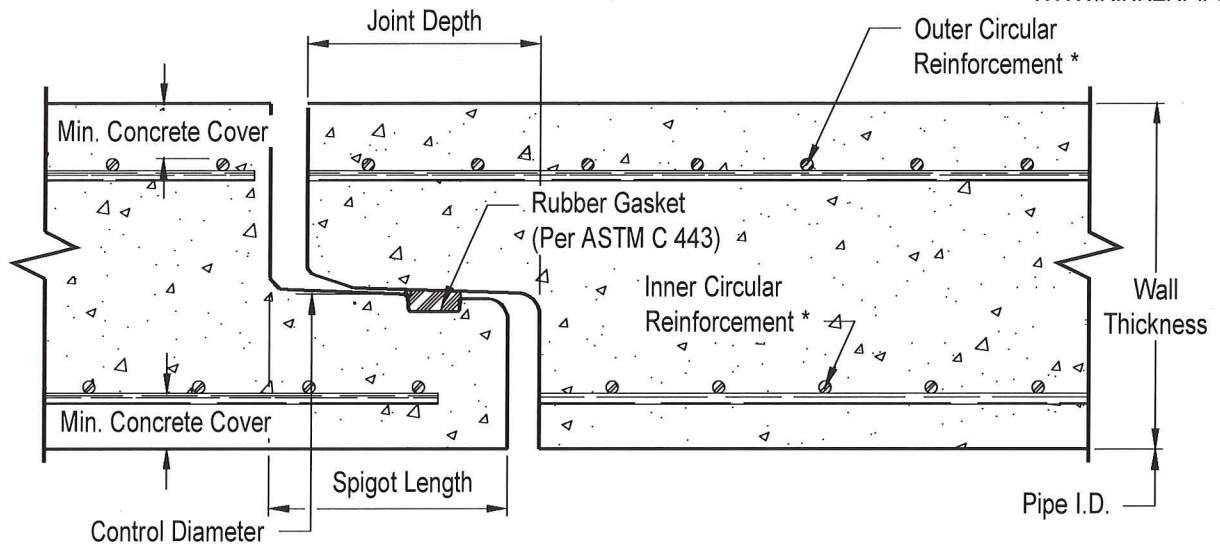
30"Ø to 72"Ø RCP (Big Bell Single Offset Joint) w/ Double Cage Reinforcement								
Pipe I.D. (Nom.)	Wall Thickness	Joint Depth	Spigot Length	Control Diameter	Gasket Height	Bell O.D.	RCP Length	Weight (Lbs./Foot)
30"Ø	3 1/2" (B)	4 5/8"	4 3/4"	35 5/8"Ø	13/16"	42 1/4"Ø	8'	395
36"Ø	4" (B)	4 7/8"	5"	42 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.

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

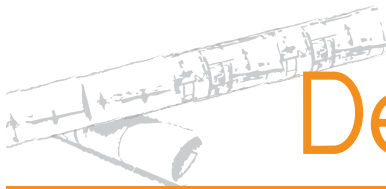


Section Thru Joint

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:

$$R = \frac{L}{2 \left(\tan \frac{1}{2} \frac{\Delta}{N} \right)} \quad (1)$$

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 $\frac{1}{2} \frac{\Delta}{N}$ is further defined as:

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

where:

PULL = joint opening, inches

D = inside pipe diameter, inches

t = wall thickness, inches

Figure 1 Deflected Straight Pipe

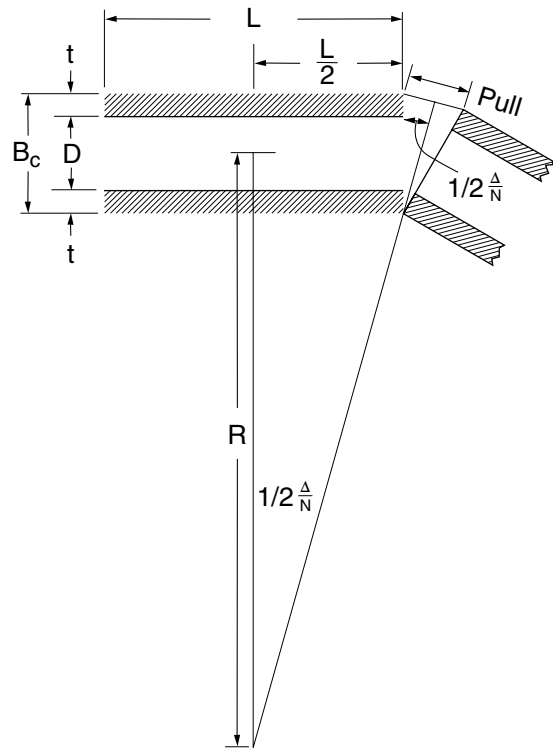
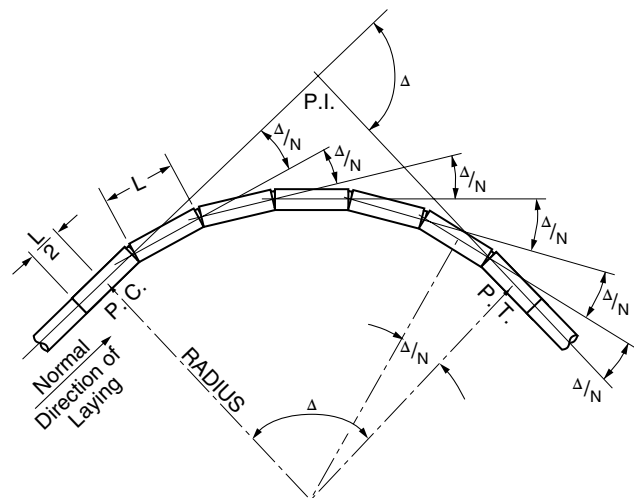


Figure 2 Curved Alignment Using Deflected Straight Pipe



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:

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

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

where:

PULL = the joint opening

R_u = the Unit Radius (Taken from Table 1)

L_x = 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:

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

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/B_c 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	$\Delta = 45^\circ$
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

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

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

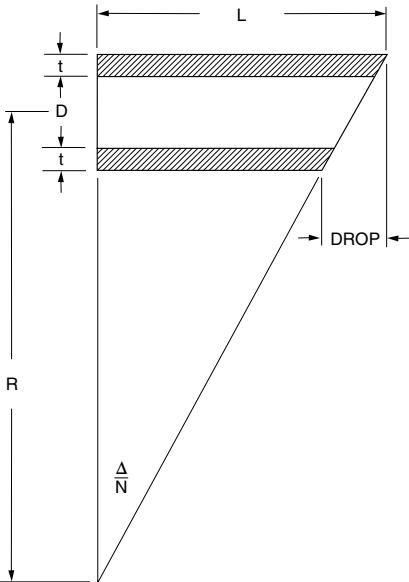


Figure 4 Curved Alignment Using Radius Pipe

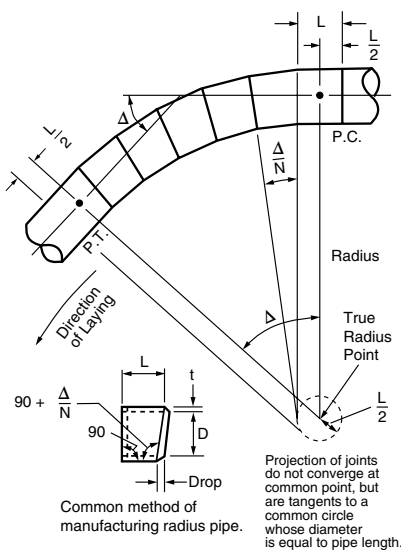
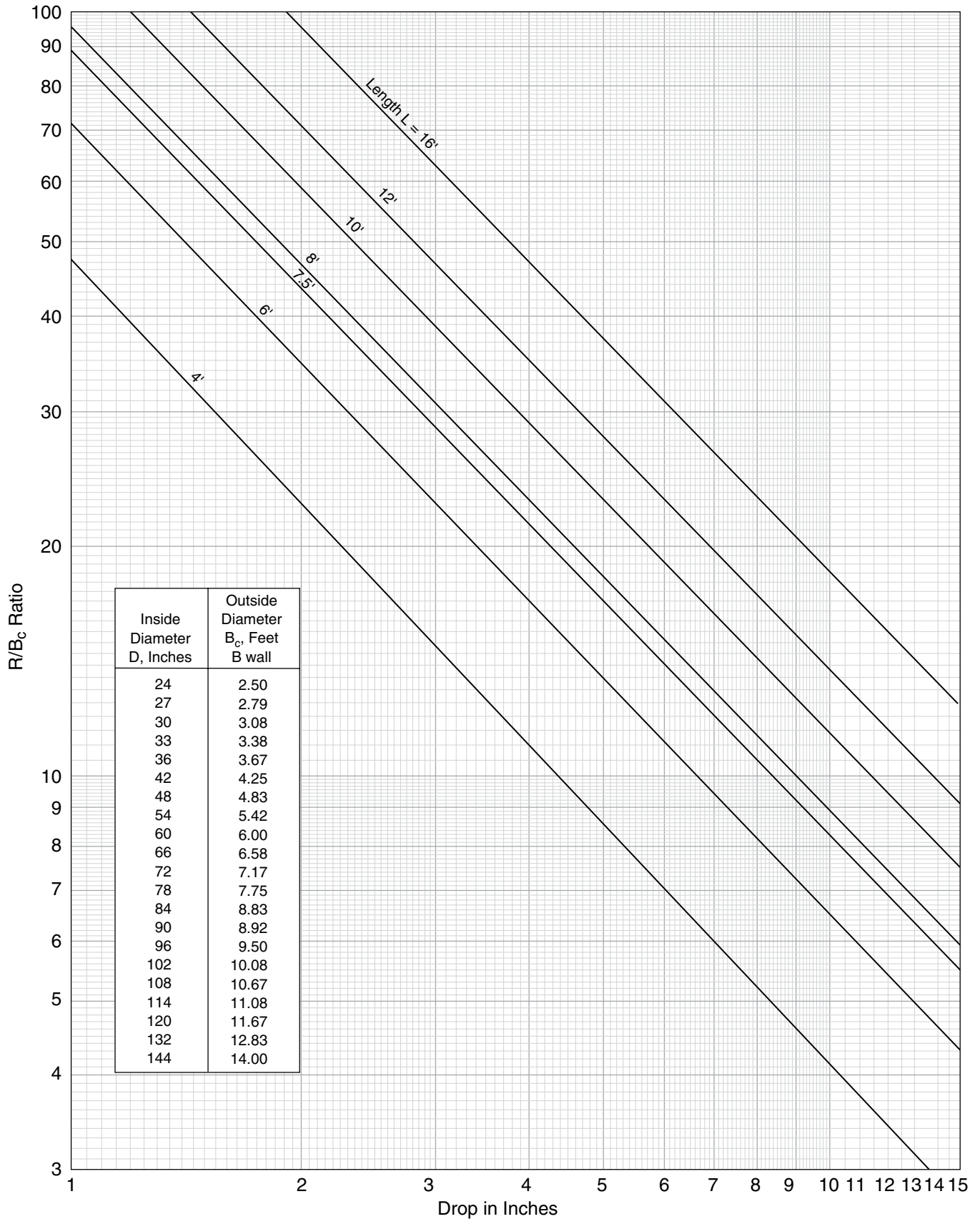


Table 1 Unit Radius of Curvature For 8-Foot Straight Deflected Pipe With 1" Pull

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 Curvature For Radius Pipe



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"

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

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

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

D= inside pipe diameter
t=wall thickness

APPENDIX G: SPILLWAY CALCULATIONS

70' Spillway

WEIR COEFFICIENT = 2.700 X-SECTION DISTANCE = 0.100

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.0	1.0	3.0	73.0	0.0			
2.0	3.0	0.0	4.0	76.0	1.0			

WSEL	DEPTH	FLOW	FLOW	FLOW	TOPWID
FT.	INC	AREA	RATE	VEL	PLUS
	FT.	SQ.FT.	(CFS)	(FPS)	OBSTRUCTIONS
0.100	0.100	7.030	5.997	0.853	70.600
0.200	0.200	14.120	17.020	1.205	71.200
0.300	0.300	21.270	31.375	1.475	71.800
0.400	0.400	28.480	48.469	1.702	72.400
0.500	0.500	35.750	67.966	1.901	73.000
0.600	0.600	43.080	89.645	2.081	73.600
0.700	0.700	50.470	113.346	2.246	74.200
0.800	0.800	57.920	138.946	2.399	74.800
0.900	0.900	65.430	166.349	2.542	75.400
1.000	1.000	73.000	195.479	2.678	76.000

EXHIBITS

**EXHIBIT A: SUBDIVISION LOCATION MAP AND
PRELIMINARY PLAT**

**EXHIBIT B: DEVELOPED CONDITIONS BASIN
MAP FROM DMP**

EXHIBIT C: EXISTING CONDITIONS BASIN MAP

EXHIBIT D: ULTIMATE CONDITIONS BASIN MAP

EXHIBIT E: STORM DRAIN NETWORK

EXHIBIT F: GRADING PLAN

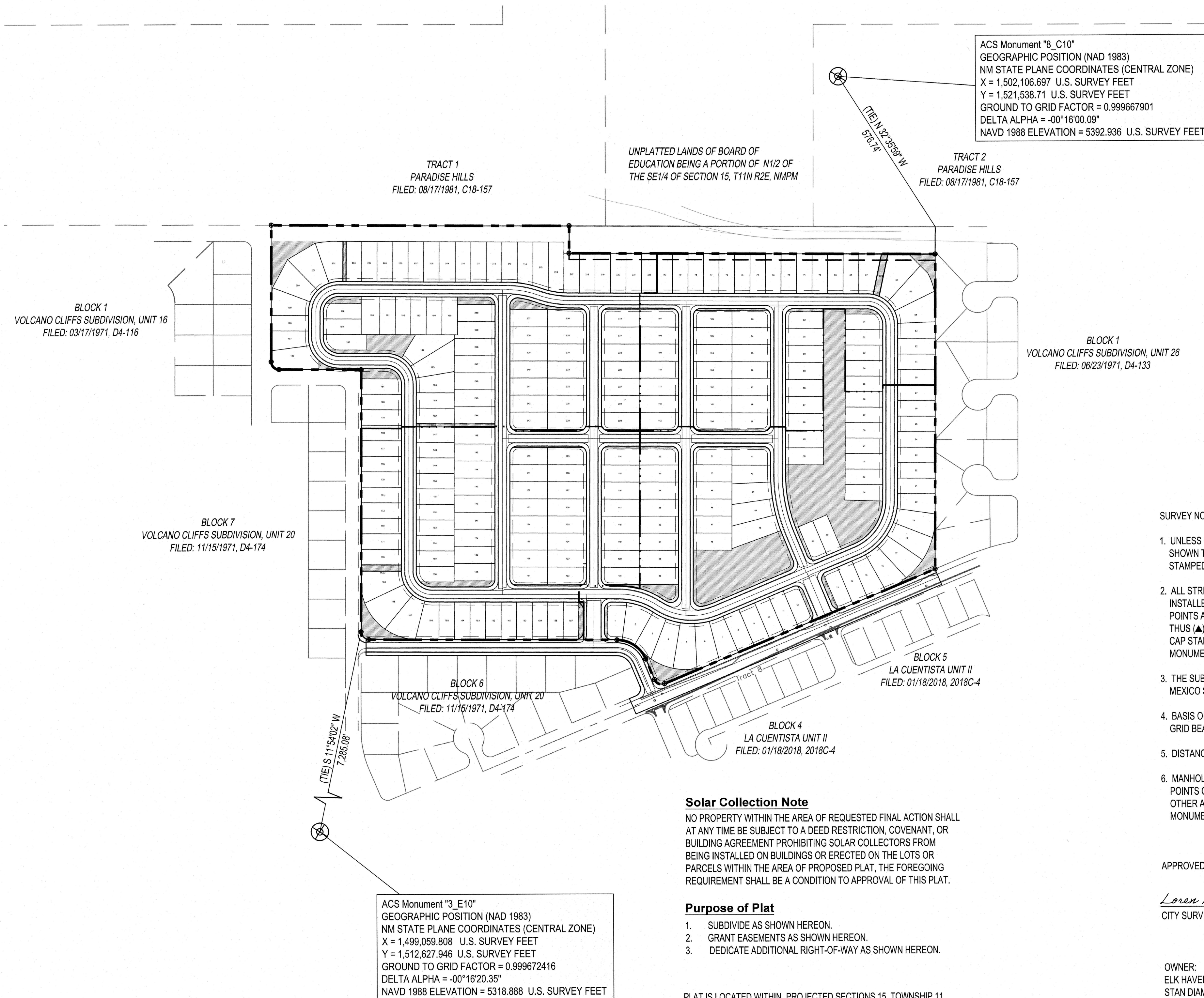
EXHIBIT A:
SUBDIVISION LOCATION MAP
AND PRELIMINARY PLAT

PRELIMINARY PLAT LA CUENTISTA SUBDIVISION

(REPLAT OF TRACT B-1-A AND TRACT B-2-A)

CITY OF ALBUQUERQUE
BERNALILLO COUNTY, NEW MEXICO

DECEMBER, 2021



SURVEY NOTES:

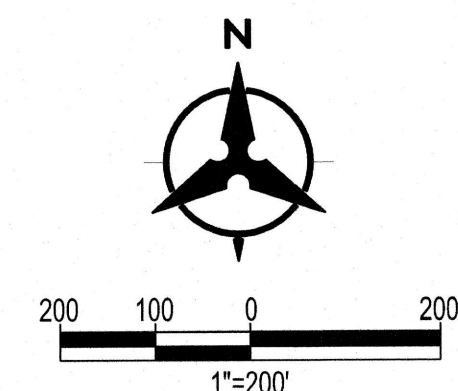
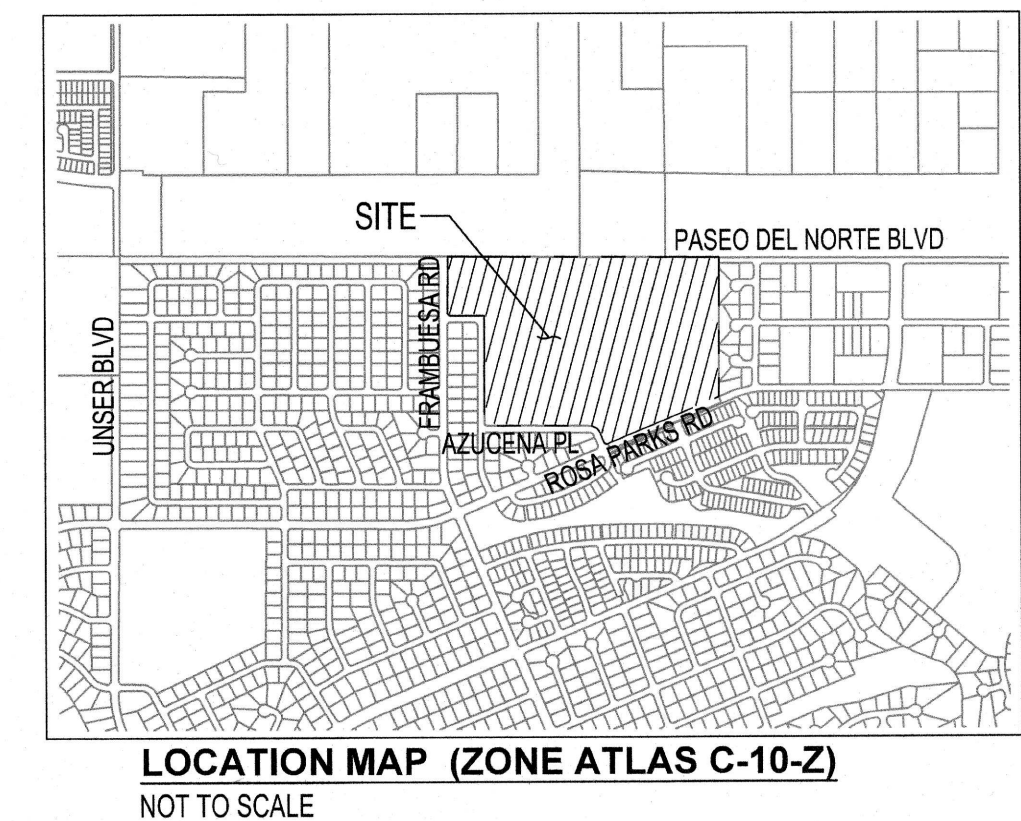
1. UNLESS OTHERWISE NOTED, ALL BOUNDARY CORNERS SHOWN THUS (●) SHALL BE MARKED BY A #5 REBAR STAMPED "PLOTNER, PS 14271".
2. ALL STREET CENTERLINE MONUMENTATION SHALL BE INSTALLED AT ALL CENTERLINE PCS, PT'S, ANGLE POINTS AND STREET INTERSECTIONS AND SHOWN THUS (▲) WILL BE MARKED BY A FOUR (4") ALUMINUM CAP STAMPED "CITY OF ALBUQUERQUE CENTERLINE MONUMENTATION MARKED. DO NOT DISTURB, P.L.S. 14271".
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

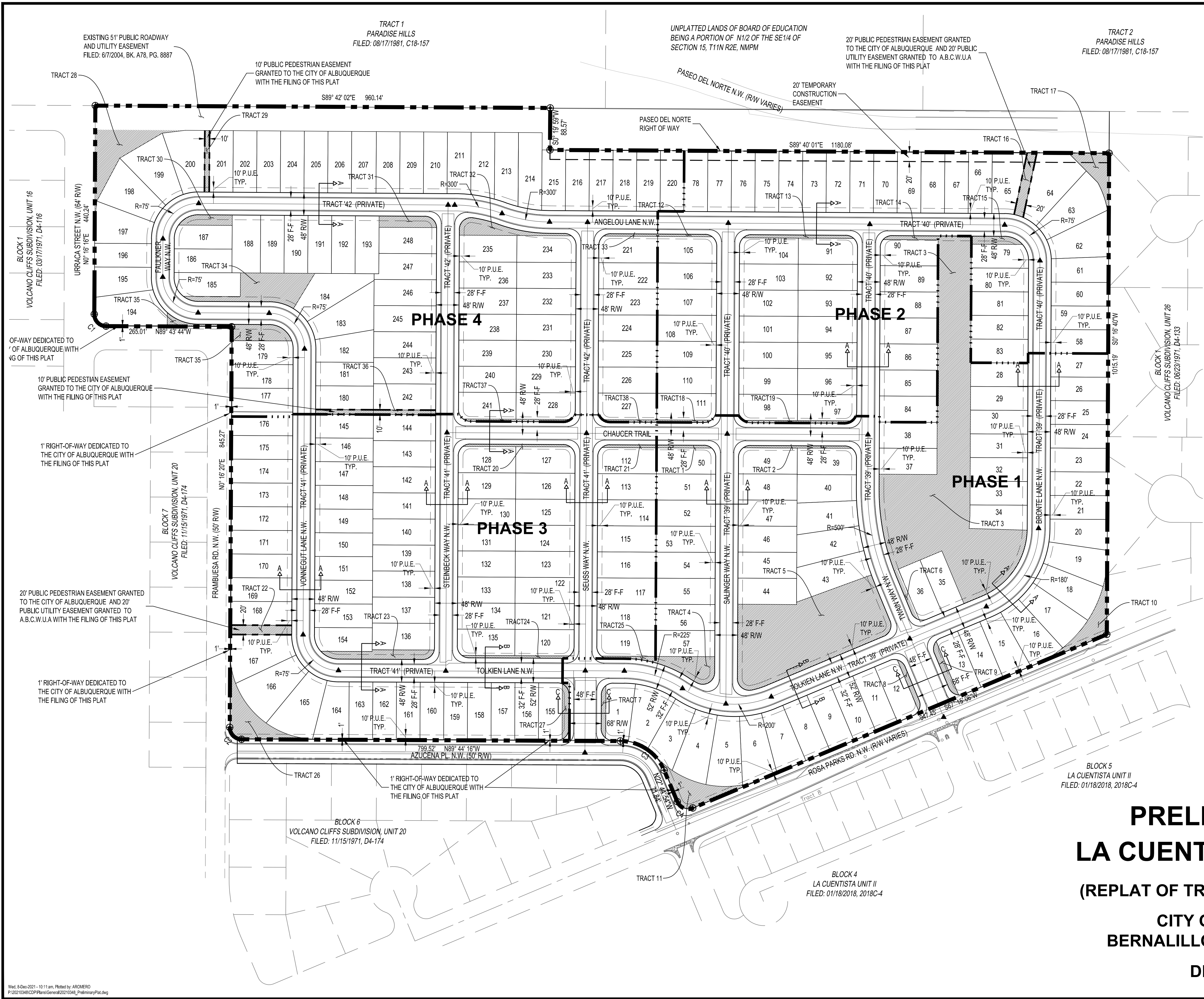
Loren N. Risenhoover P.S. 12/6/2021
CITY SURVEYOR DATE

OWNER:
ELK HAVEN, LLC
STAN DIAMOND, MANAGING MEMBER

BY: Stan Diamond
NAME: Stan Diamond
TITLE: _____
DATE: _____

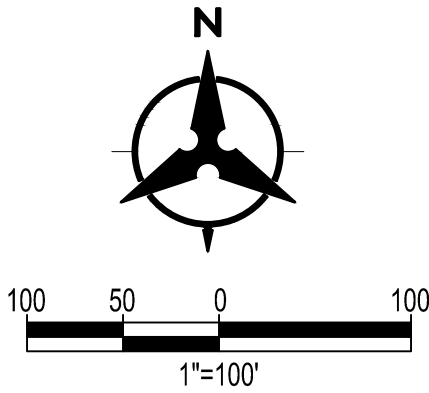


LEGEND			
	SUBDIVISION BOUNDARY LINE		PROPOSED EASEMENT
	TRACT LINE		PERIMETER FENCE
	ADJOINING PROPERTY LINE		PROPOSED HOA TRACT
	EXISTING EASEMENT		



CURVE TABLE				
ID	RADIUS	ARC	DELTA	TANGENT
C1	25.00'	39.27'	90° 00' 00"	25.00'
C2	25.00'	39.27'	90° 00' 37"	25.00'
C3	100.60'	117.62'	66° 59' 22"	66.57'
C4	25.00'	39.27'	90° 00' 00"	25.00'

LEGEND	
	SUBDIVISION BOUNDARY LINE
	TRACT LINE
	ADJOINING PROPERTY LINE
	EXISTING EASEMENT
	PROPOSED EASEMENT
	PERIMETER FENCE
	PROPOSED HOA TRACT



PRELIMINARY PLAT
LA CUENTISTA SUBDIVISION
(REPLAT OF TRACT B-1-A AND TRACT B-2-A)

CITY OF ALBUQUERQUE
BERNALILLO COUNTY, NEW MEXICO

DECEMBER, 2021

LEGAL DESCRIPTION:

TRACT 'B-1-A' AND TRACT 'B-2-A', OF THE BULK LAND PLAT FOR TRACT B-1-A and TRACT B-2-B LA CUENTISTA SUBDIVISION WITHIN SECTION 15, TOWNSHIP 11 NORTH, RANGE 2 EAST, OF THE NEW MEXICO PRINCIPAL MERIDIAN, CITY OF ALBUQUERQUE, NEW MEXICO AS THE SAME IS SHOWN AND DESIGNATED ON SAID PLAT FILED FOR RECORD IN THE OFFICE OF THE COUNTY CLERK OF BERNALILLO COUNTY, NEW MEXICO

1. EXISTING ZONING: R-ML

PROPOSED ZONING: R-ML

PROPOSED RESIDENTIAL DEVELOPMENT:
SINGLE FAMILY DETACHED RESIDENTIAL

2. TOTAL ACREAGE:
EXISTING TRACT 'B-1-A' = 29.5744 ACRES
EXISTING TRACT 'B-2-A' = 27.1077 ACRES

ACREAGE:

	ENCUMBERED BY EASEMENT
PHASE 1	
TRACT '1' = 0.0152 Acres	B
TRACT '2' = 0.0252 Acres	B
TRACT '3' = 1.9571 Acres	B
TRACT '4' = 0.1105 Acres	B
TRACT '5' = 1.0781 Acres	B
TRACT '6' = 0.0169 Acres	B
TRACT '7' = 0.0218 Acres	B
TRACT '8' = 0.0228 Acres	B
TRACT '9' = 0.0334 Acres	B
TRACT '10' = 0.1106 Acres	B
TRACT '11' = 0.1344 Acres	B
TRACT '39' = 3.7594 Acres	A, C, D
PHASE 2	
TRACT '12' = 0.0127 Acres	B
TRACT '13' = 0.0337 Acres	B
TRACT '14' = 0.0215 Acres	B
TRACT '15' = 0.0378 Acres	B
TRACT '16' = 0.0626 Acres	B
TRACT '17' = 0.0942 Acres	B
TRACT '18' = 0.0127 Acres	B
TRACT '19' = 0.0252 Acres	B
TRACT '40' = 2.0054 Acres	A, C, D
PHASE 3	
TRACT '20' = 0.0249 Acres	B
TRACT '21' = 0.0150 Acres	B
TRACT '22' = 0.0590 Acres	B
TRACT '23' = 0.0937 Acres	B
TRACT '24' = 0.0249 Acres	B
TRACT '25' = 0.0169 Acres	B
TRACT '26' = 0.1563 Acres	B
TRACT '27' = 0.0370 Acres	B
TRACT '41' = 2.7568 Acres	A, C, D
PHASE 4	
TRACT '28' = 0.2032 Acres	B
TRACT '29' = 0.0298 Acres	B
TRACT '30' = 0.0509 Acres	B
TRACT '31' = 0.0636 Acres	B
TRACT '32' = 0.0916 Acres	B
TRACT '33' = 0.0125 Acres	B
TRACT '34' = 0.2274 Acres	B
TRACT '35' = 0.1134 Acres	B
TRACT '36' = 0.0582 Acres	B
TRACT '37' = 0.0249 Acres	B
TRACT '38' = 0.0125 Acres	B
TRACT '42' = 2.7624 Acres	A, C, D

EASEMENT LEGEND

- A PRIVATE DRAINAGE EASEMENT SEE NOTE 4
- B PRIVATE DRAINAGE EASEMENT SEE NOTE 10
- C PUBLIC SUBSURFACE SANITARY AND WATERLINE EASEMENT
SEE NOTE 4
- D PRIVATE PEDESTRIAN AND VEHICULAR ACCESS EASEMENT
SEE NOTE 4

NUMBER OF LOTS:
LA CUENTISTA PHASE 1 = 57
LA CUENTISTA PHASE 2 = 54
LA CUENTISTA PHASE 3 = 65
LA CUENTISTA PHASE 4 = 72
TOTAL 248

PROPOSED DENSITY: 4.41 D.U./ACRE

3. MINIMUM LOT DIMENSIONS: 50'x122'
MINIMUM LOT AREA: 6,100 SF

4. TRACTS 39 THROUGH 42 TO BE OWNED BY THE H.O.A. AND CONTAINS THE FOLLOWING BLANKET EASEMENTS:

- PUBLIC SUBSURFACE SANITARY SEWER, PUBLIC SUBSURFACE WATERLINE EASEMENT TO BE GRANTED TO ABCWUA FOR OWNERSHIP, OPERATIONS AND MAINTENANCE OF THE PUBLIC WATER AND SANITARY SEWER INFRASTRUCTURE.
- A PRIVATE SURFACE AND SUBSURFACE DRAINAGE EASEMENT TO BE GRANTED TO THE CITY OF ALBUQUERQUE. SEE SHEET 3 OF 3 FOR 'DRAINAGE FACILITIES MAINTENANCE NOTE' FOR OWNERSHIP AND MAINTENANCE RESPONSIBILITY.
- A PRIVATE PEDESTRIAN AND VEHICULAR ACCESS EASEMENT TO BE GRANTED TO THE H.O.A. FOR THE OWNERSHIP, OPERATIONS AND MAINTENANCE OF THE SIDEWALK AND ROADWAY INFRASTRUCTURE TO SERVE THE RESIDENCE IN 'LA CUENTISTA SUBDIVISION'.

5. LOT SETBACKS:

FRONT: 15'
SIDE : 5'
REAR: 15'

6. PROPOSED SOLAR ACCESS PROVISIONS,
SHALL BE IN ACCORDANCE WITH INTEGRATED DEVELOPMENT ORDINANCE 14-16-S-10.

7. THE H.O.A. SHALL MAINTAIN ALL TRAILS LOCATED WITHIN H.O.A. TRACTS AND ITS CONNECTIONS TO ANY PUBLIC OWNED AND MAINTAINED SIDEWALK / TRAIL.

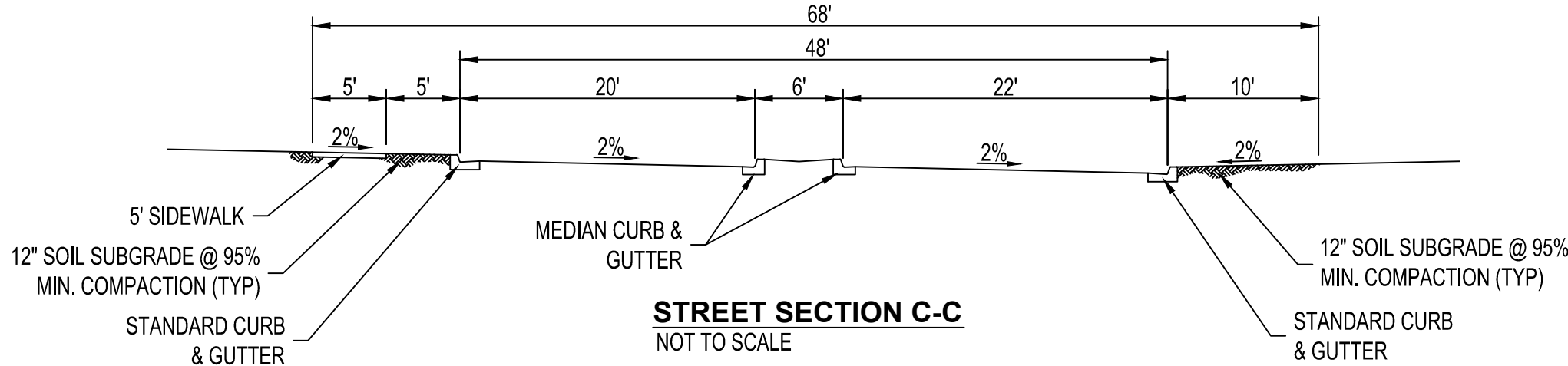
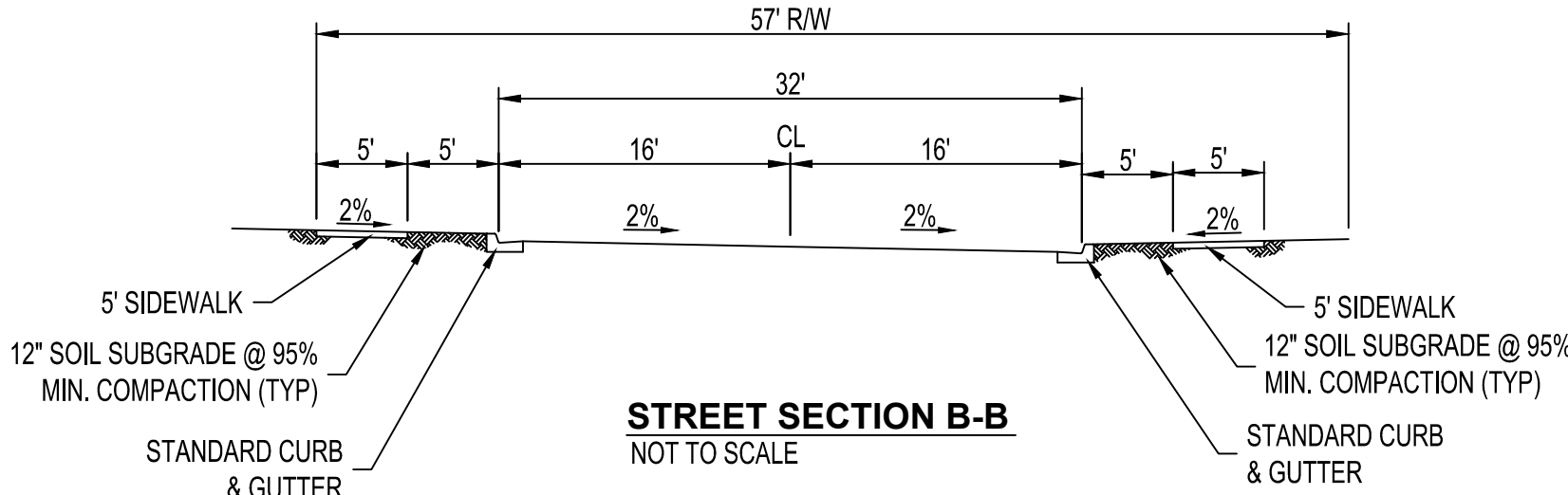
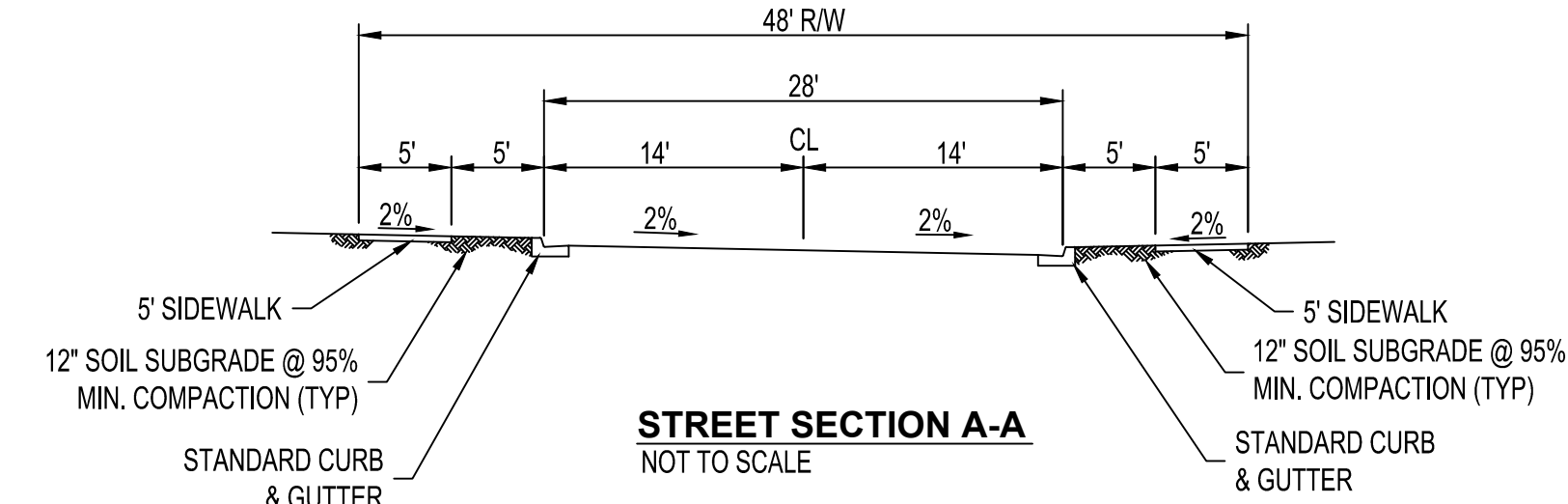
8. TRACT '1' THROUGH TRACT '41' TO BE OWNED AND MAINTAINED BY THE HOME OWNERS ASSOCIATION.

10. TRACTS '1' - '38' CONTAIN A PRIVATE DRAINAGE EASEMENT GRANTED TO THE H.O.A. SEE THIS SHEET FOR 'DRAINAGE FACILITIES MAINTENANCE NOTE' FOR OWNERSHIP AND MAINTENANCE RESPONSIBILITY

DRAINAGE FACILITIES MAINTENANCE NOTES:

AREAS DESIGNATED ON THE ACCOMPANYING PLAT AS "DRAINAGE EASEMENTS" ["DETENTION AREAS"] ARE HEREBY DEDICATED BY THE OWNER AS A PERPETUAL EASEMENT FOR THE COMMON USE AND BENEFIT OF THE VARIOUS LOTS WITHIN THE SUBDIVISIONS FOR THE PURPOSE OF PERMITTING THE CONVEYANCE OF STORM WATER RUNOFF AND THE CONSTRUCTING AND MAINTAINING OF DRAINAGE FACILITIES [STORM WATER DETENTION FACILITIES] IN ACCORDANCE WITH STANDARDS PRESCRIBED BY THE CITY OF ALBUQUERQUE. NO FENCE, WALL, BUILDING OR OTHER OBSTRUCTION (UNLESS SHOWN ON THE APPROVED GRADING PLAN) MAY BE PLACED OR MAINTAINED IN THE EASEMENT AREA WITHOUT APPROVAL OF THE CITY ENGINEER OF THE CITY OF ALBUQUERQUE. THERE ALSO SHALL BE NO ALTERATION OF THE GRADES OR CONTOURS IN SAID EASEMENT AREA WITHOUT THE APPROVAL OF THE CITY ENGINEER. IT SHALL BE THE DUTY OF THE LOT OWNERS OF THIS SUBDIVISION TO MAINTAIN SAID DRAINAGE EASEMENT [DETENTION AREA] AND FACILITIES AT THEIR COST IN ACCORDANCE WITH STANDARDS PRESCRIBED BY THE CITY OF ALBUQUERQUE. THE CITY SHALL HAVE THE RIGHT TO ENTER PERIODICALLY TO INSPECT THE FACILITIES. IN THE EVENT SAID LOT OWNERS FAIL TO ADEQUATELY AND PROPERLY MAINTAIN DRAINAGE EASEMENT [DETENTION AREA] AND FACILITIES, AT ANY TIME FOLLOWING FIFTEEN (15) DAYS WRITTEN NOTICE TO SAID LOT OWNERS, THE CITY MAY ENTER UPON SAID AREA, PERFORM SAID MAINTENANCE, AND THE COST OF PERFORMING SAID MAINTENANCE SHALL BE PAID BY APPLICABLE LOT OWNERS PROPORTIONATELY ON THE BASIS OF LOT OWNERSHIP. IN THE EVENT LOT OWNERS FAIL TO PAY THE COST OF MAINTENANCE WITHIN THIRTY (30) DAYS AFTER DEMAND FOR PAYMENT MADE BY THE CITY, THE CITY MAY FILE A LIEN AGAINST ALL LOTS IN THE SUBDIVISION FOR WHICH PROPORTIONATE PAYMENT HAS NOT BEEN MADE. THE OBLIGATIONS IMPOSED HEREIN SHALL BE BINDING UPON THE OWNER, HIS HEIRS, AND ASSIGNS AND SHALL RUN WITH ALL LOTS WITHIN THIS SUBDIVISION.

THE GRANTOR AGREES TO DEFEND, INDEMNIFY, AND HOLD HARMLESS, THE CITY, ITS OFFICIALS, AGENTS AND EMPLOYEES FROM AND AGAINST ANY AND ALL CLAIMS, ACTIONS, SUITS, OR PROCEEDINGS OF ANY KIND BROUGHT AGAINST SAID PARTIES FOR OR ON ACCOUNT OF ANY MATTER ARISING FROM THE DRAINAGE FACILITY PROVIDED FOR HEREIN OR THE GRANTOR'S FAILURE TO CONSTRUCT, MAINTAIN, OR MODIFY SAID DRAINAGE FACILITY.



Free Consent & Dedication

THE SUBDIVISION SHOWN AND DESCRIBED HEREON IS WITH THE FREE CONSENT AND IN ACCORDANCE WITH THE DESIRES OF THE UNDERSIGNED OWNER(S) THEREOF AND GRANT ALL EASEMENTS AS SHOWN HEREON. EXISTING AND/OR GRANTED PUBLIC UTILITY EASEMENTS (P.U.E.) AS SHOWN HEREON, UNLESS NOTED OTHERWISE, ARE FOR THE COMMON AND JOINT USE OF GAS, ELECTRICAL POWER AND COMMUNICATION SERVICES FOR BURIED AND/OR OVERHEAD DISTRIBUTION LINES, CONDUIT AND PIPES FOR UNDERGROUND UTILITIES. SAID UTILITY COMPANIES HAVE THE RIGHT OF INGRESS/EGRESS FOR CONSTRUCTION OF, MAINTENANCE OF AND REPLACEMENT OF SAID UTILITIES INCLUDING THE RIGHT TO TRIM INTERFERING TREES AND SHRUBS WITHIN SAID P.U.E. SAID OWNERS CERTIFY THAT THIS SUBDIVISION IS THEIR FREE ACT AND DEED.

STAN DIAMOND, MANAGING MEMBER
ELK HAVEN, LLC

STATE OF NEW MEXICO }
COUNTY OF BERNALILLO } SS

THIS INSTRUMENT WAS ACKNOWLEDGED BEFORE ME ON _____, 20____
BY: STAN DIAMOND, MANAGING MEMBER, ELK HAVEN, LLC

By: _____
NOTARY PUBLIC

MY COMMISSION EXPIRES _____

PRELIMINARY PLAT LA CUENTISTA SUBDIVISION (REPLAT OF TRACT B-1-A AND TRACT B-2-A)

CITY OF ALBUQUERQUE
BERNALILLO COUNTY, NEW MEXICO

DECEMBER, 2021

EXHIBIT B:
LA CUENTISTA APPROVED DRAINAGE REPORT
EXCERPTS FOR ALLOWABLE DISCHARGE

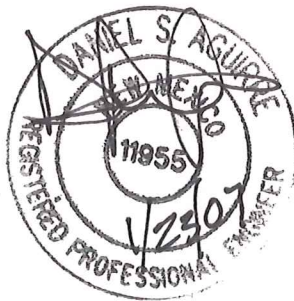
Drainage Report

for

LA CUENTISTA SUBDIVISION – Unit II

**A Supplement to the
Drainage Report for La Cuentista Subdivision
Dated November 2003**

Prepared by:



**Daniel S. Aguirre, PE
NM #11955**

**Wilson & Company, Inc.
4900 Lang Ave NE
Albuquerque, New Mexico 87109
(505) 348-4191**

**January 2007
WCI File No: 0660004701**

Summary

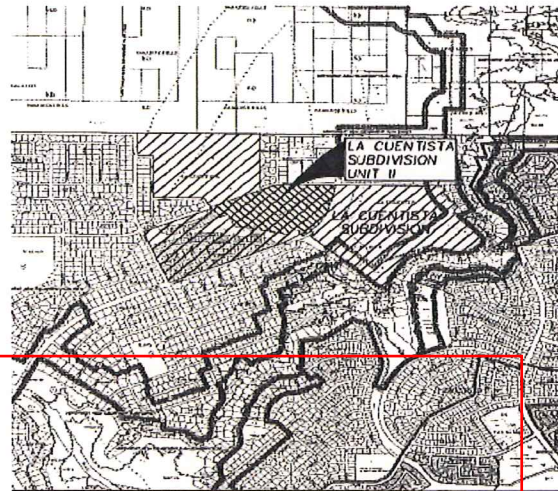
La Cuentista Subdivision - Unit II, a residential development, is Tract C and the second of five bulk land tracts which collectively comprise La Cuentista Subdivision. The 35.47 acres of Unit II (Tract C) is approximately 15% of the total La Cuentista Subdivision. The approved "Drainage Report for La Cuentista Subdivision" dated November 2003 by Wilson & Company, Inc., provides site and existing conditions information.

Drainage

Proposed Conditions/Modification:

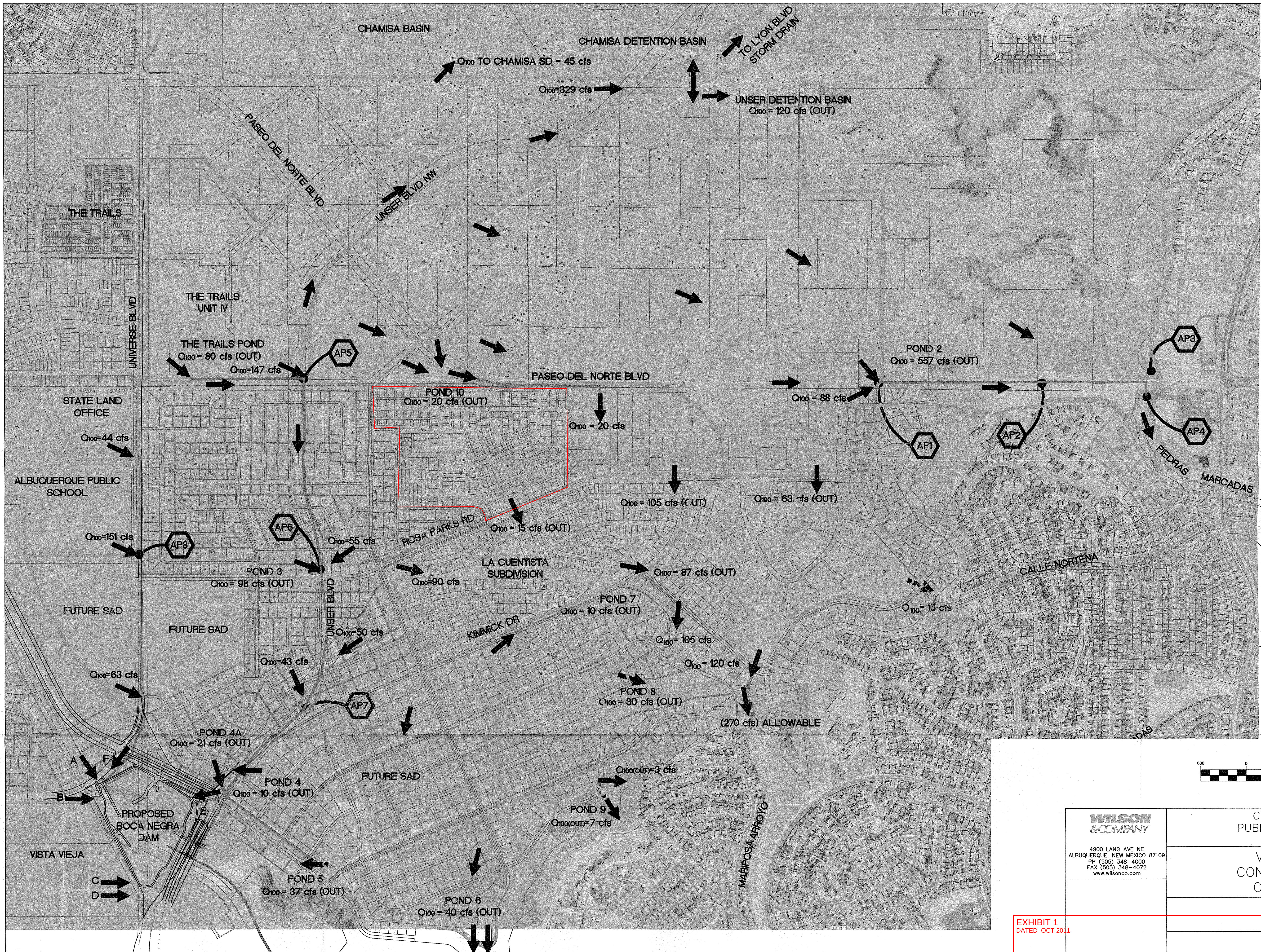
Unit II (Tract C) approximately replicates Basin 213 from the approved Drainage Report. This basin is designated to discharge into Pond 4 along with Unit I (Tract A) discharge. Pond 4, located north of Kimmick Dr., along with the outfall structure to the Petroglyph National Monument allowed per agreement with COA Open Space Division, are currently under construction.

Site design of Unit I (Tract A), Unit II (Tract C) and plans for Tract B require modifications to the approved Drainage Report. Basins 201 and 202 make up Tract B, an as yet undesignated unit of La Cuentista. The approved Drainage Report routed Basin 201 flows through Pond 1 and then through Unit I (Tract A) basins into Pond 4. Basin 202 was routed through Basin 213 to Pond 4. Flows from Basin 201 are herein proposed to route through Basin 202 and a newly designated Pond 2. A maximum flow of 15 cfs from Pond 2 will then be directed into Basin 213 via appropriately sized storm drain pipe, with Basin 213 discharging to Pond 4, as previously designed.



Flows from Basin 301 and 302, previously designed to route through storm drain in Kimmick Drive and into Pond 8 will be routed through Basin 214 to Pond 8.

A review and the updating of hydraulic data led to changes to Tables 3 & 4 from the approved Drainage Report. These are presented below. Additionally, a revised **Proposed Conditions: Drainage Basin Map** (Plate 2) is provided herein.

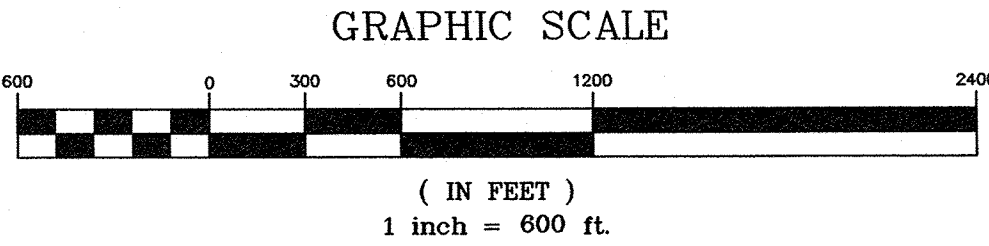


ANALYSIS POINT	FLOW (CFS)
AP1	620
AP2	643
AP3	288
AP4	824
AP5	227
AP6	330
AP7	439
AP8	176

DISCHARGE POINT	FLOW (CFS)	STRUCTURE
A	1,060	—
B	138	48" RCP
C	200	48" RCP
D	341	60" RCP
E	454	96" RCP
F	286	66" RCP

RECEIVED
OCT 25 2011
HYDROLOGY SECTION

- LEGEND
- WATERSHED BOUNDARY
 - FLOW DIRECTION
 - ANALYSIS POINT DESIGNATION
 - REGIONAL STORM DRAIN SYSTEM



WILSON & COMPANY
4900 LANG AVE NE
ALBUQUERQUE, NEW MEXICO 87109
PH (505) 348-4000
FAX (505) 348-4072
www.wilsonco.com

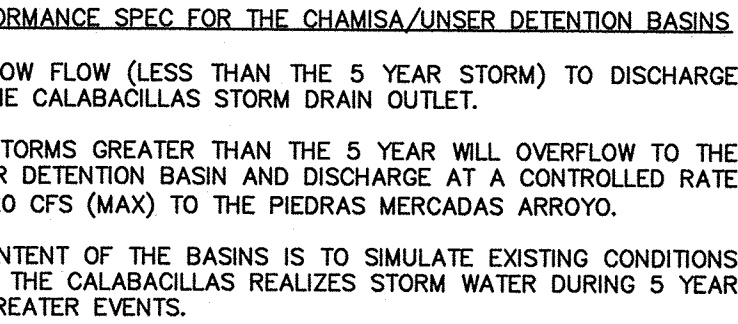
CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT
ENGINEERING GROUP

VOLCANO HEIGHTS
CONCEPTUAL DRAINAGE
COMPILATION PLAN

EXHIBIT 1
DATED OCT 2011

WCI #X3210022
OCTOBER 2011

EXHIBIT 1



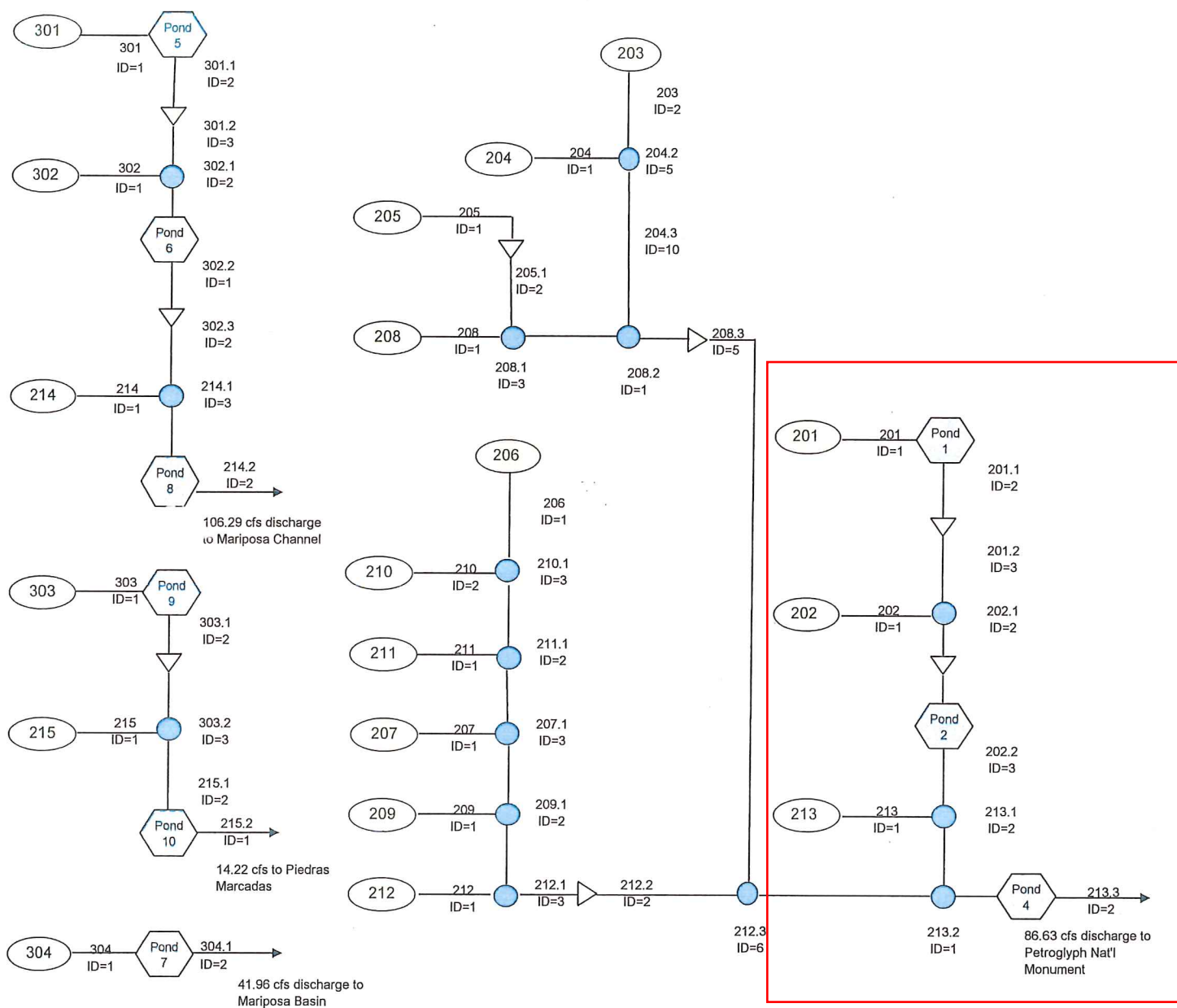
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HYDROLOGY
SECTION

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WCI #X3210022
OCTOBER 2011

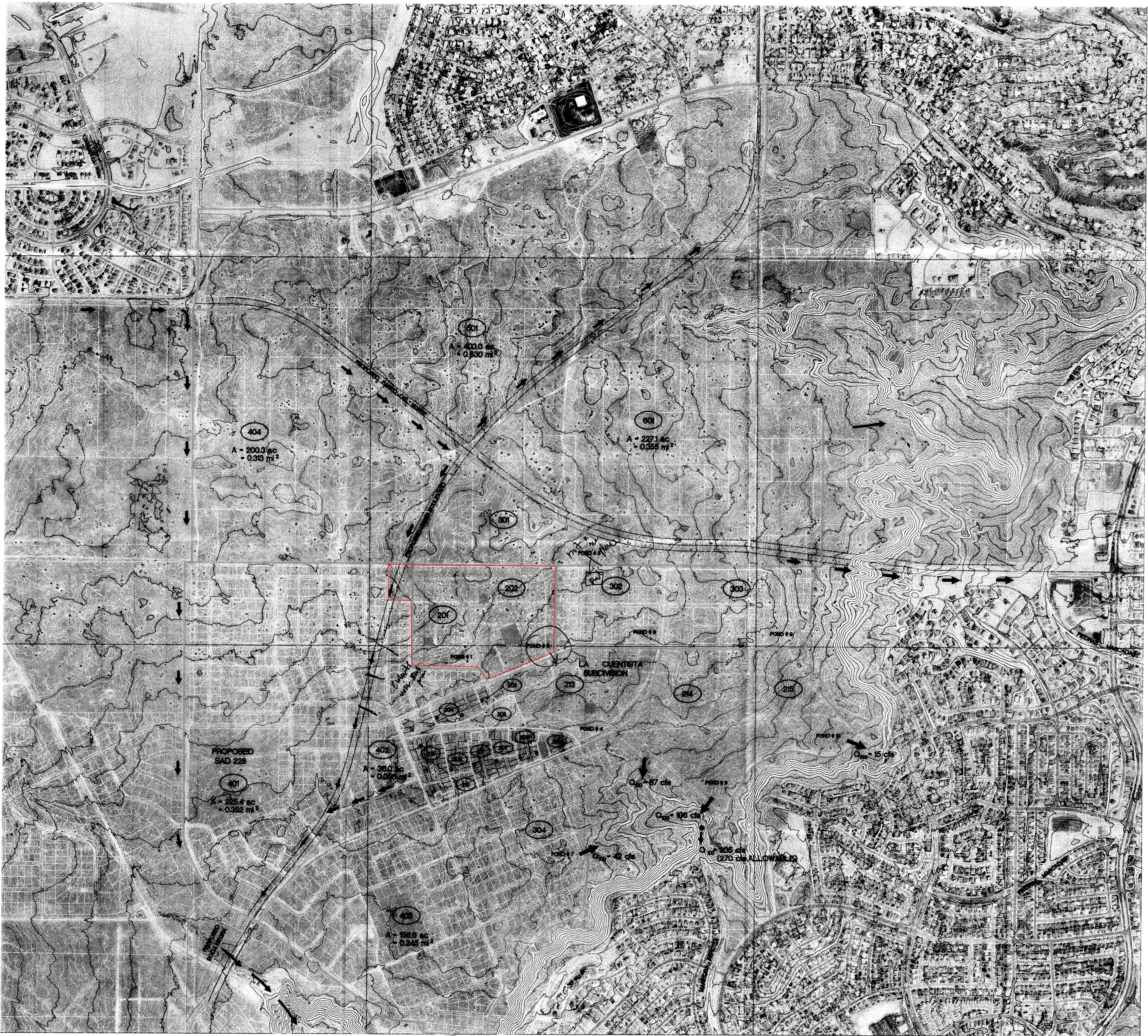
PLATE 1

La Cuentista; Hydrologic Model Diagram: Fully Developed Conditions - Revised January 2007



KEY

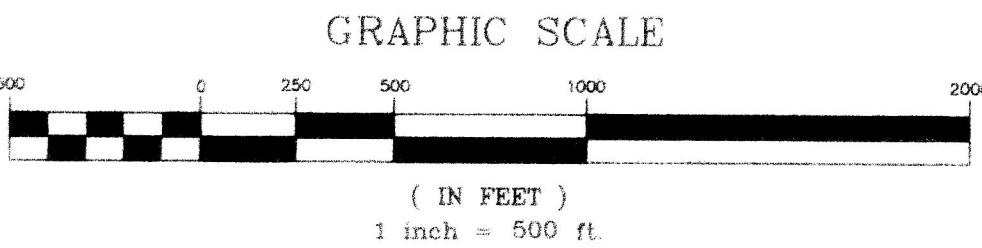




LEGEND

- EXISTING INTERMEDIATE CONTOUR
- EXISTING INDEX CONTOUR
- EXISTING SPOT ELEVATION
- PROPOSED SPOT ELEVATION
- BASIN DESIGNATION
- PROPOSED BASIN BOUNDARY
- PROPOSED SUB BASIN BOUNDARY
- PROPOSED FLOWLINE

TABLE A										
SUB BASIN SUMMARY										
BASIN	AREA (sq. mi.)	AREA (ac)	%A	%B	%C	%D	Q100 (cfs)	VOL100 (ac-ft)		
201	0.035	22.1	10	15	30	45	71.82	3.236		
202	0.055	35.0	10	15	30	45	112.86	5.664		
203	0.002	1.2	10	15	30	45	4.12	0.162		
204	0.008	5.0	10	15	30	45	16.43	0.647		
205	0.014	8.8	10	15	30	45	28.74	1.133		
206	0.007	4.6	10	15	30	45	14.36	0.566		
207	0.004	2.4	10	15	30	45	8.22	0.324		
208	0.013	8.5	10	50	20	20	21.22	0.781		
209	0.006	3.6	10	15	30	45	12.33	0.485		
210	0.004	2.6	10	15	35	40	8.04	0.308		
211	0.010	6.2	10	15	30	45	20.53	0.809		
212	0.005	3.3	10	15	40	35	9.81	0.366		
213	0.063	40.2	10	15	30	45	129.28	5.097		
214	0.086	55.1	10	15	30	45	176.58	6.958		
215	0.054	34.5	10	15	30	45	110.81	4.369		
TOTAL	0.364	233.1								
301	0.068	43.7	10	15	25	50	142.60	7.547		
302	0.058	37.3	10	15	30	45	119.01	5.664		
303	0.067	43.0	10	15	30	45	137.50	7.282		
304	0.108	69.0	10	15	35	40	217.09	3.852		
TOTAL	0.302	193.0								



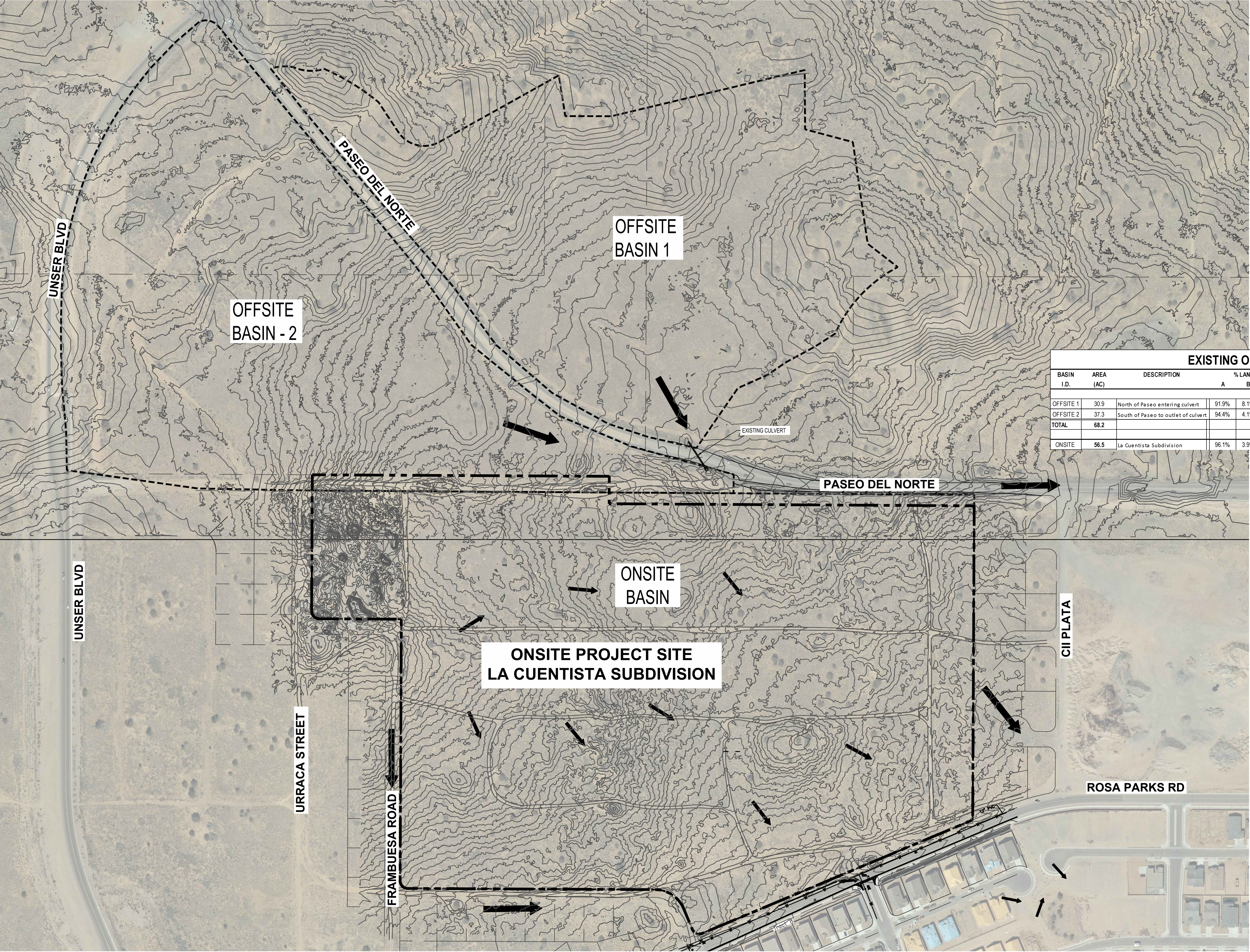
WILSON & COMPANY
2600 THE AMERICAN ROAD S.E.
SUITE 100
RIO RANCHO, NEW MEXICO
87124
(505) 898-8021

CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT
ENGINEERING GROUP
**LA CUENTISTA SUBDIVISION
PROPOSED CONDITIONS
DRAINAGE BASIN MAP**

EXHIBIT C:
OFFSITE AND EXISTING CONDITIONS BASIN MAP

LA CUENTISTA OFFSITE AND EXISTING CONDITION BASIN MAP

DECEMBER 2021



EXISTING OFFSITE CONDITIONS												
BASIN I.D.	AREA (AC)	DESCRIPTION	% LAND TREATMENT				DISCHARGE (CFS)		VOLUME (AC-FT)		VOLUME (AC-FT)	
			A	B	C	D	10 YR	100YR	10 YR	100YR	10 YR	100YR
OFFSITE 1	30.9	North of Paseo entering culvert	91.9%	8.1%	0.0%	0.0%	10.9	49.6	0.3	1.5	0.3	1.5
OFFSITE 2	37.3	South of Paseo to outlet of culvert	94.4%	4.1%	0.0%	1.5%	13.7	60.4	0.4	1.8	0.5	1.9
TOTAL	68.2						24.6	110.0	0.7	3.3	0.8	3.3
ONSITE	56.5	La Cuentista Subdivision	96.1%	3.9%	0.0%	0.0%	18.8	89.3	0.5	2.6	0.5	2.6

LEGEND	
---	PROPERTY LINE
- - - -	PROPOSED BASIN BOUNDARY
→	FLOW ARROW

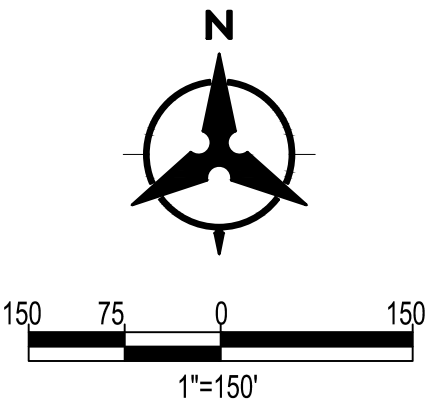
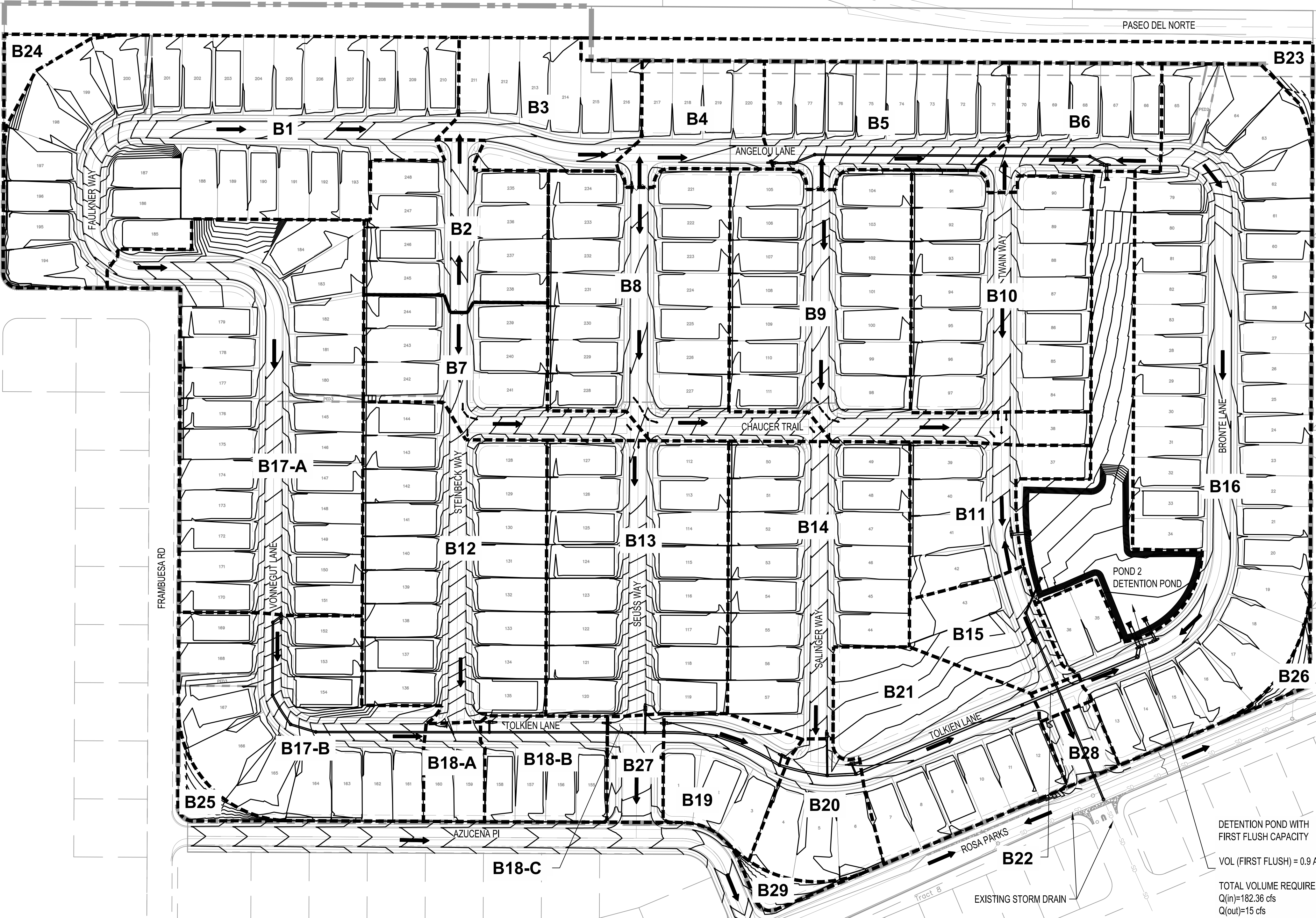


EXHIBIT D:
ONSITE PROPOSED BASIN MAP

PROPOSED CONDITION
BASIN MAP

DECEMBER 2021



PROPOSED CONDITIONS										
BASIN I.D.	AREA (AC)	UNITS #	% LAND TREATMENT				DISCHARGE (CFS)		VOLUME (AC-FT)	
			A	B	C	D	10 YR	100YR	10 YR	100YR
ONSITE							6 HOUR STORM		6 HOUR STORM	
B1	5.16	26	0.0%	26.7%	26.7%	46.59%	9.27	16.85	0.37	0.64
B2	1.56	8	0.0%	26.7%	26.7%	46.59%	2.80	5.10	0.11	0.19
B3	1.36	6	0.0%	26.7%	26.7%	46.59%	2.44	4.43	0.10	0.17
B4	0.88	4	0.0%	26.7%	26.7%	46.59%	1.59	2.89	0.06	0.11
B5	1.62	8	0.0%	26.7%	26.7%	46.59%	2.91	5.29	0.11	0.20
B6	1.11	5	0.0%	26.7%	26.7%	46.59%	2.00	3.63	0.08	0.14
B7	1.53	6	0.0%	26.7%	26.7%	46.59%	2.74	4.99	0.11	0.19
B8	2.98	14	0.0%	26.7%	26.7%	46.59%	5.35	9.73	0.21	0.37
B9	3.17	15	0.0%	26.7%	26.7%	46.59%	5.70	10.37	0.23	0.39
B10	2.61	14	0.0%	26.7%	26.7%	46.59%	4.69	8.52	0.18	0.32
B11	1.09	5	0.0%	26.7%	26.7%	46.59%	1.97	3.57	0.08	0.14
B12	3.32	17	0.0%	26.7%	26.7%	46.59%	5.97	10.85	0.24	0.41
B13	3.06	16	0.0%	26.7%	26.7%	46.59%	5.49	9.99	0.22	0.38
B14	2.83	14	0.0%	26.7%	26.7%	46.59%	5.08	9.23	0.20	0.35
B15	0.76	1	0.0%	26.7%	26.7%	46.59%	1.37	2.49	0.05	0.09
B16	7.03	39	0.0%	26.7%	26.7%	46.59%	12.62	22.94	0.50	0.87
B17-A	4.59	20	0.0%	26.7%	26.7%	46.59%	8.24	14.98	0.33	0.57
B17-B	2.61	12	0.0%	26.7%	26.7%	46.59%	4.70	8.54	0.19	0.33
B18-A	0.36	2	0.0%	26.7%	26.7%	46.59%	0.65	1.19	0.03	0.05
B18-B	0.80	4	0.0%	26.7%	26.7%	46.59%	1.44	2.62	0.06	0.10
B18-C	0.15	0	0.0%	0.0%	10.0%	90.00%	0.36	0.58	0.02	0.03
B19	0.86	3	0.0%	26.7%	26.7%	46.59%	1.54	2.80	0.06	0.11
B20	0.80	3	0.0%	26.7%	26.7%	46.59%	1.44	2.62	0.06	0.10
B21	2.06	6	0.0%	40.0%	30.0%	30.00%	3.14	6.10	0.11	0.21
B22	0.09	0	0.0%	0.0%	10.0%	90.00%	0.23	0.38	0.01	0.02
POND 2	1.96	0	0.0%	35.8%	35.9%	28.31%	3.01	5.83	0.11	0.20
B23	1.08	0	0.0%	50.0%	50.0%	0.00%	1.22	2.72	0.03	0.08
B24	0.20	0	0.0%	50.0%	50.0%	0.00%	0.23	0.51	0.01	0.01
B25	0.16	0	0.0%	50.0%	50.0%	0.00%	0.19	0.41	0.00	0.01
B26	0.11	0	0.0%	50.0%	50.0%	0.00%	0.12	0.28	0.00	0.01
B27	0.23	0	0.0%	0.0%	15.0%	85.00%	0.54	0.89	0.02	0.04
B28	0.24	0	0.0%	0.0%	15.0%	85.00%	0.58	0.95	0.03	0.04
B29	0.13	0	0.0%	50.0%	50.0%	0.00%	0.15	0.34	0.00	0.01
TOTAL	56.5	248					99.75	182.61	3.90	6.89

DETENTION POND WITH
FIRST FLUSH CAPACITY
VOL (FIRST FLUSH) = 0.9 AC-FT
TOTAL VOLUME REQUIRED = 5.3 AC-FT
Q(in)=182.36 cfs
Q(out)=15 cfs

LEGEND	
	PROPERTY LINE
	PROPOSED BASIN BOUNDARY
	FLOW ARROW
	PROPOSED STORM DRAIN
	PROPOSED STORM DRAIN MANHOLE
	PROPOSED STORM DRAIN INLET

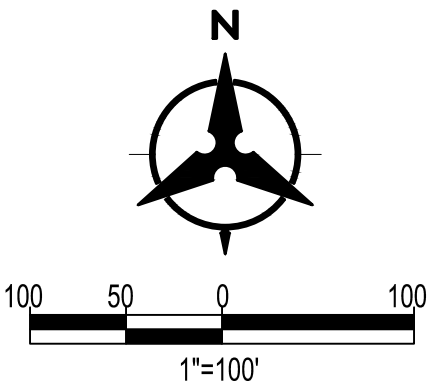
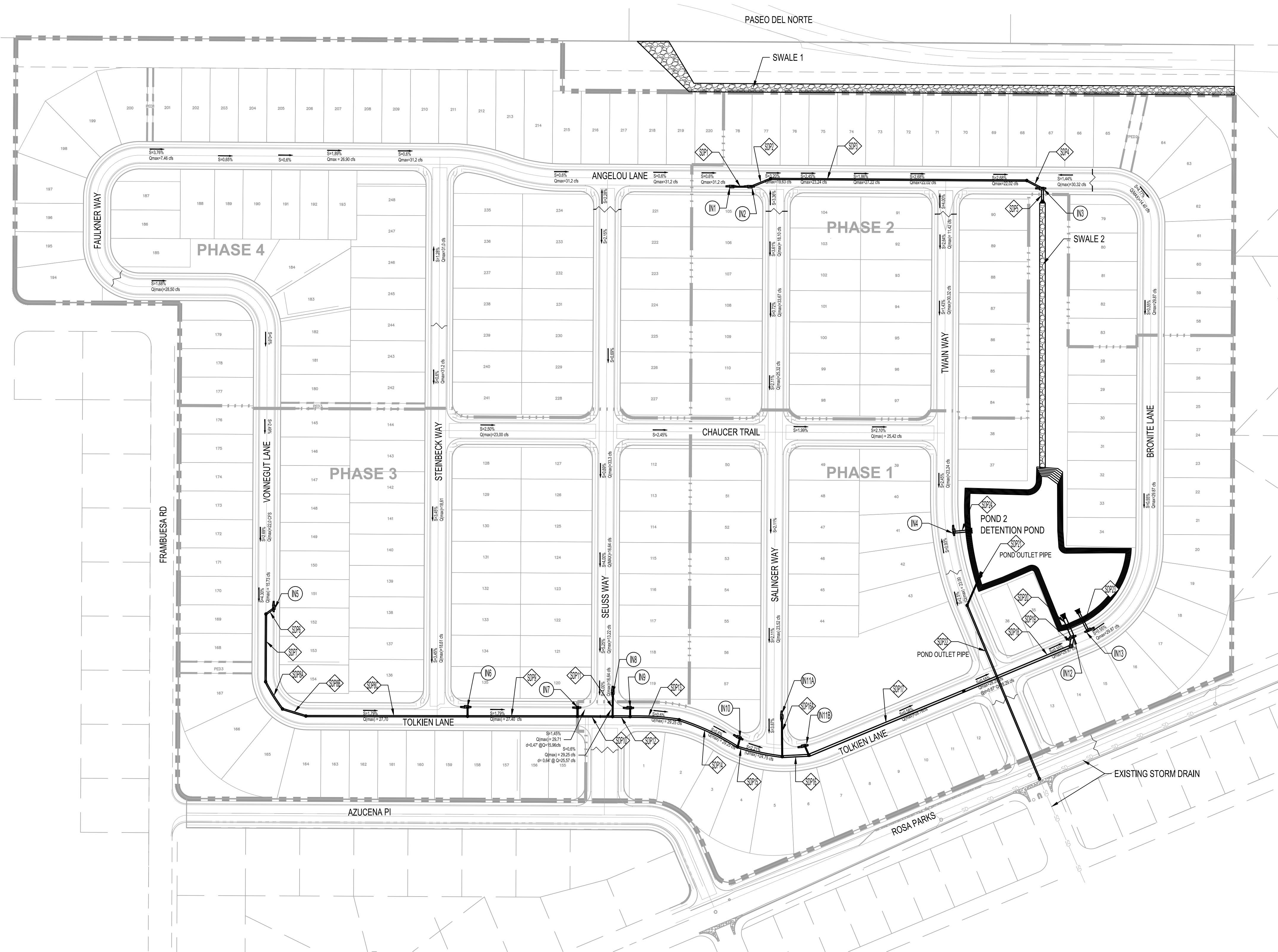


EXHIBIT E:
STORM DRAIN NETWORK

LA CUENTISTA
STORM DRAIN EXHIBIT

DECEMBER 2021



STORM DRAIN PIPE TABLE				
PIPE #	Size in.	Slope	Capacity1 cfs	ACTUAL FLOW cfs
ONSITE				
SDP1	18	1.26%	11.79	8.20
SDP2	24	5.00%	50.59	16.00
SDP3	24	2.45%	35.41	16.00
SDP4	24	1.00%	22.62	16.00
SDP5	36	0.50%	47.16	38.19
SDP6	18	18.88%	45.64	6.50
SDP7	24	4.06%	45.58	6.50
SDP8A	24	4.45%	47.72	6.50
SDP8B	24	4.07%	45.64	6.50
SDP8C	24	2.11%	32.86	6.50
SDP9	24	1.61%	28.70	14.90
SDP10	30	1.00%	41.02	22.50
SDP11	18	4.00%	21.01	6.90
SDP12	30	0.70%	34.32	29.40
SDP13	30	1.09%	42.82	36.80
SDP14	36	0.90%	63.28	36.80
SDP15	36	1.44%	80.04	43.60
SDP16A	18	1.44%	12.61	7.60
SDP16	36	1.35%	77.50	51.20
SDP17	42	0.50%	71.14	59.20
SDP18	42	0.50%	71.14	59.20
SDP19	42	0.50%	71.14	59.20
SDP20	54	0.50%	139.05	84.82
SDP21	18	0.50%	7.43	15.00
SDP22	18	4.00%	21.01	15.00
SDP23	36	3.24%	120.06	25.62
SDP24	36	1.03%	67.69	22.05

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

INLET TABLE					
Inlet #	UPSTREAM FLOW (cfs)	Inlet Type	FLOW CAPTURED (cfs)	Avail Head ft	BYPASS FLOW (cfs)
IN1	29.27	1-SGL TYPE A	8.20	0.66	21.07
IN2	21.69	1-SGL TYPE C	7.80	7.80	13.89
IN3	22.19	1SGL TYPE A SUMP	22.19	0.66	0.00
IN4	22.05	1SGL TYPE A SUMP	22.05	0.64	0.00
IN5	14.98	1-SGL TYPE A	6.50	0.38	8.48
IN6	29.26	1-SGL TYPE A	8.40	0.55	20.86
IN7	23.48	1-SGL TYPE A	7.60	0.51	15.88
IN8	15.01	1-SGL TYPE A	6.90	0.39	8.11
IN9	24.57	1-SGL TYPE C	7.40	0.63	17.17
IN10	19.97	1-SGL TYPE A	6.80	0.59	13.17
IN11-A	19.13	1-SGL TYPE A	7.60	0.47	11.53
IN11-B	27.32	1-SGL TYPE C	8.00	0.66	19.32
IN12	25.62	1DBL TYPE A SUMP	25.62	0.63	0.00
IN13	25.62	1DBL TYPE A SUMP	25.62	0.63	0.00

SWALE TABLE						
SWALE #	DESCRIPTION	Swale Type	SWALE CAPACITY (CFS)	ACTUAL FLOW (cfs)	DEPTH OF FLOW (ft)	VELOCITY (ft/sec)
SWALE 1	Northern swale Capturing Offsite Flows	V SWALE 3:1 side slopes d=2.5' n=0.017 S=0.5%	129.8	113.2	2.4	6.7
SWALE 2	Pond Swale	V SWALE 3:1 side slopes d=1.5' n=0.017 S=1.75%	58.8	38.2	1.3	7.8

LEGEND

PROPERTY LINE

PHASE BOUNDARY

FLOW ARROW

PROPOSED STORM DRAIN

PROPOSED STORM DRAIN MANHOLE

PROPOSED STORM DRAIN INLET

WATER BLOCK / HIGH POINT

STREET SLOPE Q(MAX)=MAX FLOW CARRIED BY STREET SECTION WITH THAT SLOPE

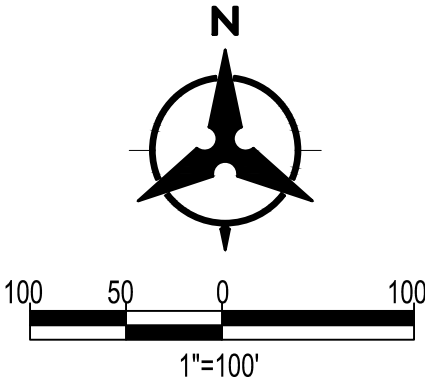
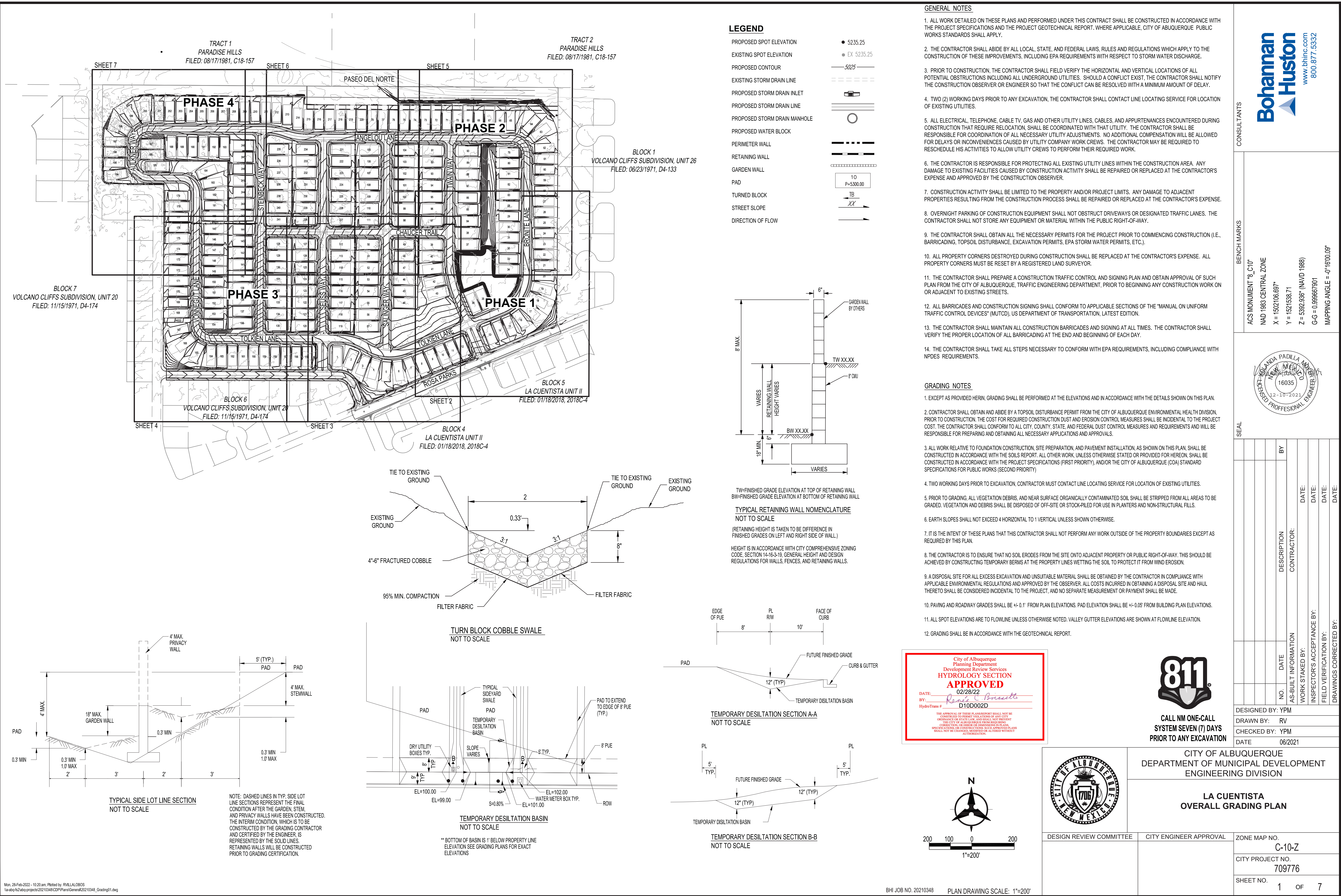


EXHIBIT F:
GRADING PLAN



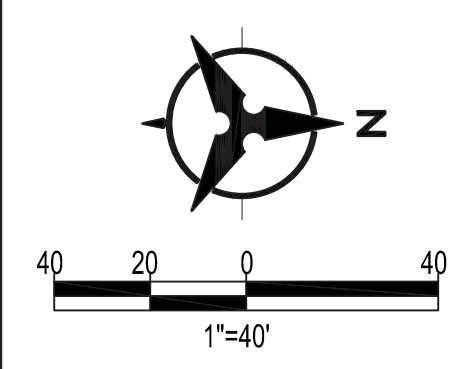


PHASE 1

OCK 4
TISTA UNIT II
2/2018, 2018C-4

Mon, 28-Feb-2022 - 10:21am. Plotted by: RV/LAL/BOB
\\city-02\city-proj\20210348\CDP\Plan\General\20210348_Grading\22.dwg

- LEGEND**
- PROPOSED SPOT ELEVATION
 - EXISTING SPOT ELEVATION
 - PROPOSED CONTOUR
 - EXISTING STORM DRAIN LINE
 - PROPOSED STORM DRAIN INLET
 - PROPOSED STORM DRAIN LINE
 - PROPOSED STORM DRAIN MANHOLE
 - PROPOSED WATER BLOCK
 - PERIMETER WALL
 - RETAINING WALL
 - GARDEN WALL
 - PAD
 - TURNED BLOCK WITH SWALE
SEE SWALE DETAIL SHEET 1
 - STREET SLOPE
 - DIRECTION OF FLOW



CITY OF ALBUQUERQUE
DEPARTMENT OF MUNICIPAL DEVELOPMENT
ENGINEERING DIVISION

LA CUMENTISTA
GRADING PLAN

DESIGN REVIEW COMMITTEE	CITY ENGINEER APPROVAL	ZONE MAP NO.
		C-10-Z
		CITY PROJECT NO.
		709776
		SHEET NO.
		3 OF 7

CONSULTANTS

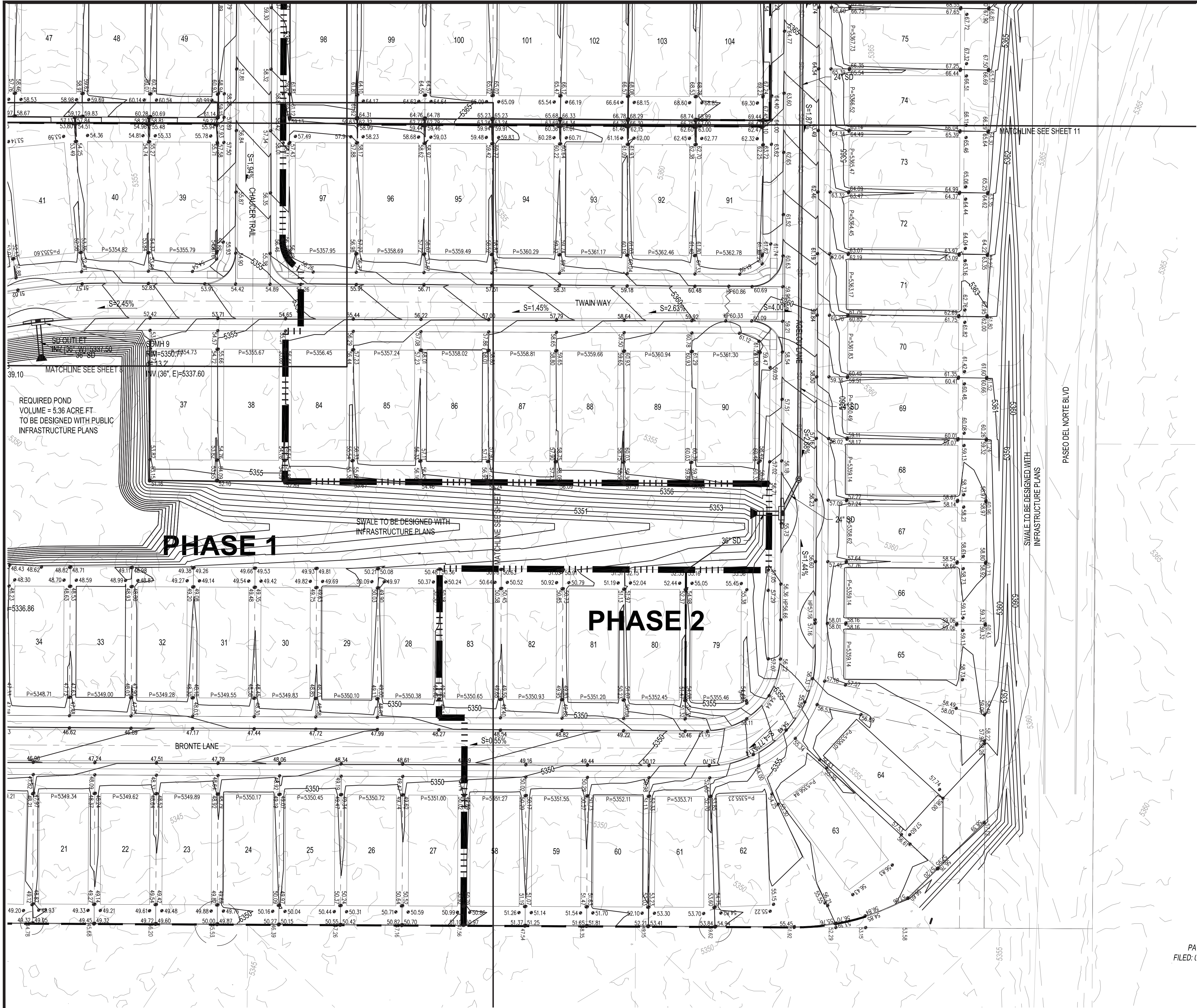
BENCH MARKS

ACS MONUMENT "C" 107
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Y = 1521538.71
Z = 6382.386' (NAVD 1988)
G-G = 0.999657901
MAPPING ANGLE = -0°16'00.09"

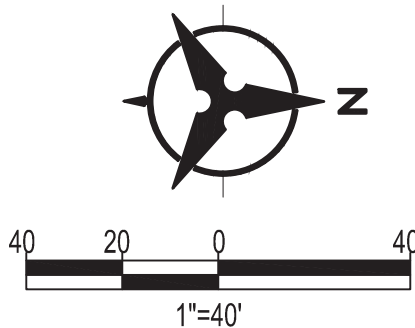


SEAL	NO.	DATE	DESCRIPTION	BY
			CONTRACTOR:	
			AS-BUILT INFORMATION	
			WORK STAKED BY:	
			INSPECTOR'S ACCEPTANCE BY:	
			FIELD VERIFICATION BY:	
			DRAWINGS CORRECTED BY:	
			DATE:	DATE:
			DATE:	DATE:
			DATE:	DATE:

DESIGNED BY: YPM
DRAWN BY: RV
CHECKED BY: YPM
DATE: 02/2022



- LEGEND**
- PROPOSED SPOT ELEVATION
 - EXISTING SPOT ELEVATION
 - PROPOSED CONTOUR
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CITY OF ALBUQUERQUE
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DESIGN REVIEW COMMITTEE

CITY ENGINEER APPROVAL

ZONE MAP NO.

C-10-Z

CITY PROJECT NO.

709776

SHEET NO.

5 OF 7

CONSULTANTS

**Bohannon
Huston**
www.bhinc.com
800.877.5332

BENCH MARKS

ACS MONUMENT "C" 10'
NAD 1983 CENTRAL ZONE
X = 1502106.697
Y = 1521538.71
Z = 6302.336' (NAVD 1988)
G-G = 0.999657901
MAPPING ANGLE = -0°16'00.09"



SEAL

NO.	DATE	DESCRIPTION	BY
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		AS-BUILT INFORMATION	
		WORK STAKED BY:	
		INSPECTOR'S ACCEPTANCE BY:	
		DATE:	
		DATE:	
		DATE:	
		DATE:	
		DATE:	
		DATE:	

DESIGNED BY: YPM

DRAWN BY: RV

CHECKED BY: YPM

DATE 02/20/22



City of Albuquerque
Planning Department
Development Review Services

HYDROLOGY SECTION

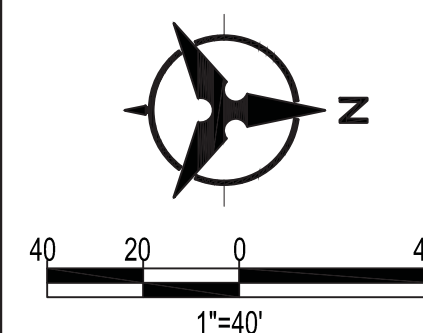
APPROVED

DATE: 02/28/22

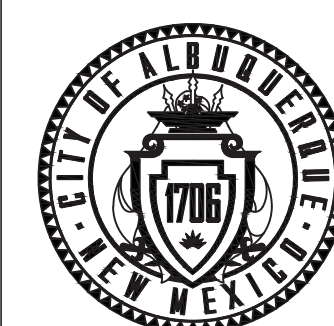
BY: *Renee C. Brissetto*

HydroTrans ID: D10D002D

THE APPROVAL OF THIS PLAN OR PLANSET SHALL NOT BE
CONSIDERED TO PREVENT VIOLATIONS OF ANY CITY
ORDINANCE OR STATE LAW, AND NOT TO REPRESENT
THE CITY OF ALBUQUERQUE OR ANY OTHER
CORPORATION, OR ENDORSE OR GUARANTEE THE
DESIGN, CONSTRUCTION, OR MAINTENANCE OF THE
SPECIFICATIONS, OR CONSTRUCTIONS. SUEL APPROVED PLANS
SHALL NOT BE CHANGED, MODIFIED, OR ALTERED WITHOUT
AUTHORIZATION.



**CALL NM ONE-CALL
SYSTEM SEVEN (7) DAYS
PRIOR TO ANY EXCAVATION**



CITY OF ALBUQUERQUE
DEPARTMENT OF MUNICIPAL DEVELOPMENT
ENGINEERING DIVISION

LA CUENTISTA
GRADING PLAN

CONSULTANTS

S

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Huston**

www.bhinc.com
800.877.5332

ACS MONUMENT "8_C10"
 NAD 1983 CENTRAL ZONE
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 Y = 1521538.71
 Z = 5392.936* (NAVD 1988)
 G-G = 0.999667901
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SEAL

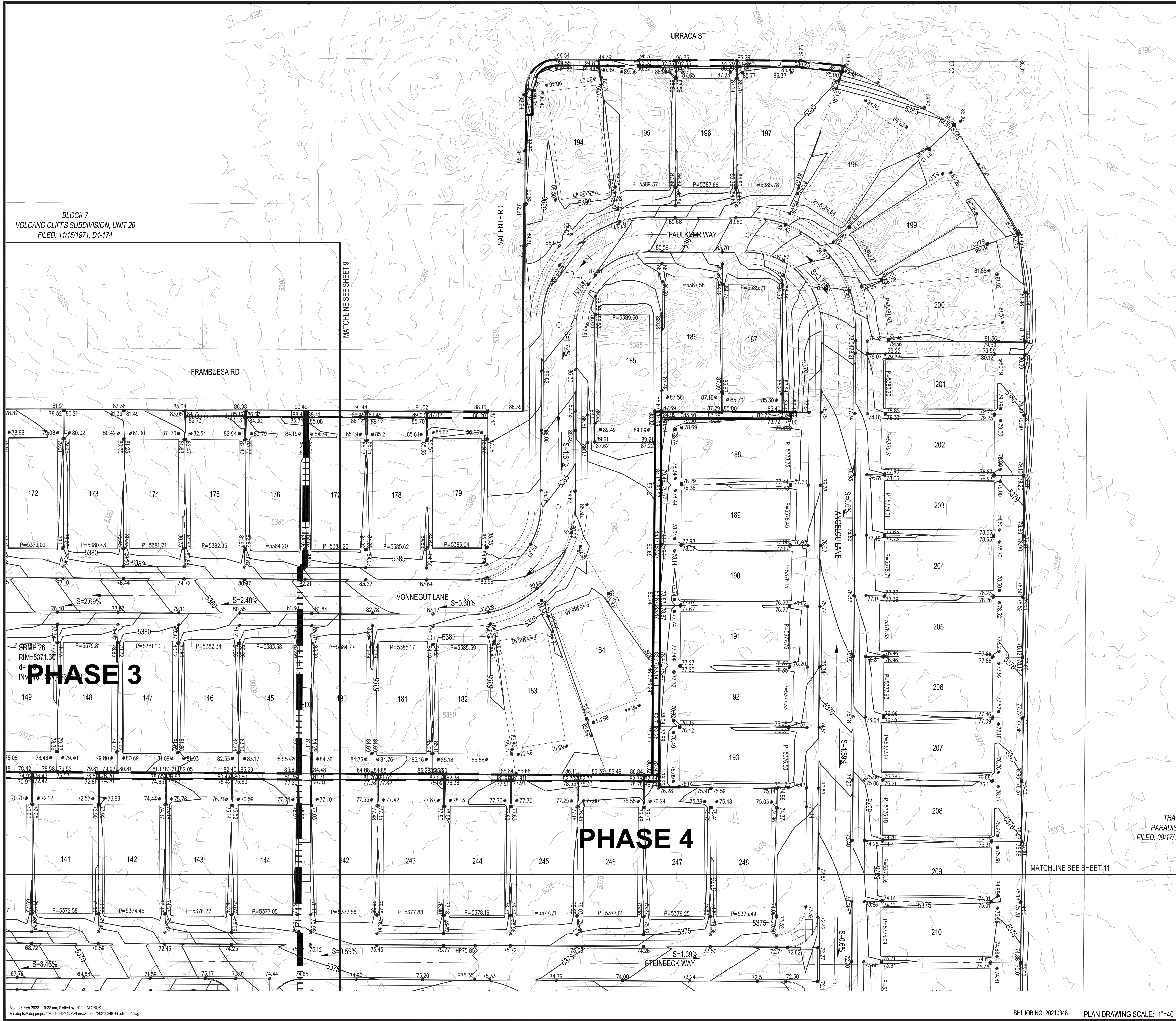
BY			NO.	DATE	DESCRIPTION
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			FIELD VERIFICATION BY:		
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			DRAWINGS CORRECTED BY:		
			DATE:		

DESIGNED BY: YPM
DRAWN BY: RV
CHECKED BY: YPM
DATE 02/20

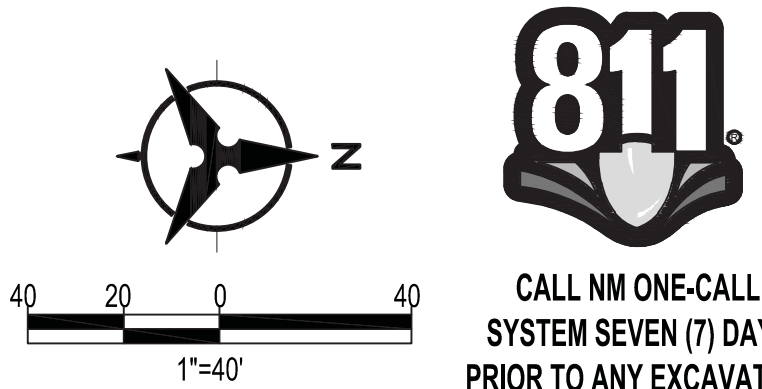
ZONE MAP NO.

C-10-Z
CITY PROJECT NO. 709776

SHEET NO. 6 OF 7



- LEGEND**
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DESIGN REVIEW COMMITTEE

CITY ENGINEER APPROVAL

ZONE MAP NO.

C-10-Z

CITY PROJECT NO.

709776

SHEET NO.

7 OF 7

CONSULTANTS

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DESIGNED BY: YPM

DRAWN BY: RV

CHECKED BY: YPM

DATE: 02/20/22