CITY OF ALBUQUERQUE

Planning Department
David Campbell, Director

Mayor Timothy M. Keller

July 24, 2018

David Thompson, P.E.
Thompson Engineering Consultants, Inc.
PO Box 65760
Albuquerque, NM 87193

RE: Signal Village Subdivision
Signal and Ventura NE
Grading Plan Stamp Date: 7/6/18
Drainage Report Stamp Date: 7/6/18
Hydrology File: C20D078

Dear Mr. Thompson:

PO Box 1293

Albuquerque

NM 87103

www.cabq.gov

Based on the submittal received 7/11/18, the above referenced project cannot be approved for Preliminary Plat until the following are corrected:

Prior to Preliminary Plat:

1. Right of Way and Plat boundary lines do not appear to be accurately shown on the grading plan. Label the ROW width and show both sides and centerline. Also dimension the paving, face-to-face of curb, and sidewalks on both sides of the centerline.

2. Provide first flush calculations and additional details for the first flush pond such as dimensions and top and bottom of pond elevations. First flush notes are not legible. Show the water surface elevations for both the first flush volume and the 100-yr volume.

3. Typical sections are required at all retaining walls (not just the scour wall) at the point of maximum retainage showing existing ground, proposed grades, lot lines, and dimensions. Wall footers must not encroach into public right of way or adjacent properties without a written agreement from the adjacent land owner.

4. The typical section provided for the scour wall is illegible and is not supported by the scour calculations. Details such as maximum water surface, scour depths, arroyo thalweg are also missing. Will the scour wall be one uniform depth or variable? Each case must be shown; provide structural design calculations.

5. Provide the scour depth calculations (equations and the excel file). Scour potential should be assessed using equation 3.90 from AMAFCA's erosion and sediment control manual.

6. Provide a profile of the arroyo (not just the HEC-RAS profile) through the future culverts to a point 50’ below this project and show the existing floodwall. The profile and typical sections of the scour wall should show the scour depth measured from the existing arroyo invert elevation and 2' of freeboard above the 100-year base flood elevations. Show the centerline of the HEC-RAS Model with stations on the grading plan.

7. Provide topographic survey data along the west edge of the property and across the property line; include existing elevations on the west side of the existing wall/fence. A new retaining wall will be required and should be shown on the plan view and add a typical section with dimensions.

8. Frontage improvements will be required on Ventura St. and Signal Ave. that must be shown on the G&D plan. Typical sections must be shown on the G&D Plan for all roads both onsite and offsite. The sections and the plans should show both the full planned width and the portion to be constructed with this project, along with any temporary transitions at the ends.

9. The assumptions for the future bridge cannot create a backwater evaluation in excess of the current floodplain. The culverts will likely need to be upsized and/or their inverts lowered. This may impact the depth of the scour protection downstream of the future bridge. Include a plan view of the future culverts and the upstream and downstream wing walls.

10. The Signal Road Levee must continue to meet the freeboard requirements as defined by the National Flood Insurance Program (44CFR, Ch.1, Section 65.10).

11. Supercritical flows are shown at nearly every cross section in the HEC-RAS model. The transition in arroyo geometry must conform to the DPM Ch. 22.3.C.2.f; this generally prevents sustained supercritical flow so the model must be changed to subcritical only for the purpose of modeling the floodplain. Use of the supercritical profile for determining scour depth is acceptable.

12. Recent changes to the floodplain at 9000 Alameda Blvd NE must be surveyed and the new topography shown on the topo work map and the HEC-RAS sections modified.

13. Provide one comparison table in the subcritical flow regime for all three models showing the differences in water surface elevations (net change).

14. The model shows that the proposed fill in the floodplain will cause increased water surface elevations on neighboring properties. This may be allowed if the neighboring properties provide written permission for the specific maximum increase in Base Flood Elevation and Floodplain width associated with this project.

15. Sediment continuity analysis is required in the immediate vicinity of this project to determine vertical stability and insure that the future bridge won’t be clogged by sediment depositions.

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16. Written concurrence with the grading and drainage plan is required from the USACE indicating compliance with section 404 of the clean water act prior to approval of the preliminary plat. The limits of any Waters of the US must be shown on the Grading and Drainage Plan and conditions of any Section 404 permits must be stated on the plan.

17. The LOMR must be listed on an Infrastructure List.

18. An Infrastructure Improvements Agreement, IIA, must be recorded prior to issuance of a Floodplain Development Permit, prior to recording a Plat, prior to issuance of a Building permit, and prior to issuance of a Work Order.

19. The applicant has the option of requesting a Conditional Letter of Map Revision, CLOMR, prior to beginning construction. The applicant may proceed with construction prior to receiving a CLOMR from FEMA, but in so doing assumes the risk that FEMA may require additional or modified storm drainage improvements which must be completed prior to issuing a LOMR. A Floodplain Development Permit is not a guarantee that FEMA will issue a LOMR. The City recommends a CLOMR prior to beginning construction.

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Prior to Grading Permit:

20. An approved ESC Plan is required for this project, and an ESC Permit is required prior to any land disturbance on this site due to the close proximity to the floodplain.

21. A separate floodplain permit must be obtained from Rudy Rael at rrael@cabq.gov prior to any work in the floodplain.

22. A Private Facility Drainage Covenant is required for the stormwater quality pond. The original notarized form, exhibit A (legible on 8.5x11 paper), and recording fee ($25, payable to Bernalillo County) must be turned into DRC (4th, Plaza del Sol) for routing. Please contact Charlotte LaBadie (clabadie@cabq.gov, 924-3996) or Madeline Carruthers (mtafoya@cabq.gov, 924-3997) regarding the routing and recording process for covenants.

Prior to Release of Financial Guarantee (For Information):

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

24. Work Order Closeout Package for the floodplain infrastructure per DPM must be submitted.

25. A Letter of Map Revision (LOMR) must be obtained from FEMA after construction is complete. When a CLOMR has been issued by FEMA, a portion or all of the SIA and financial guarantees for the improvements may be released prior to the LOMR being issued by FEMA, but the financial guarantee for the LOMR will not be released prior to the effective date of the LOMR. Submittal of a copy of the LOMR from FEMA is required for

release of the balance of the financial guarantees and SIA's when issuance is a condition of release.

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

Sincerely,

Dana Peterson, P.E.
Senior Engineer, Planning Dept.
Development Review Services

PO Box 1293

Albuquerque

NM 87103

www.cabq.gov

City of Albuquerque

Planning Department

Development & Building Services Division

DRAINAGE AND TRANSPORTATION INFORMATION SHEET (REV 09/2015)

Project Title: SIGNAL VILLAGE SUBDIVISION Building Permit #: _____ City Drainage #: C20D078

DRB#: _____ EPC#: _____ Work Order#: _____

Legal Description: LOTS 17 & 18, BLOCK 4, TRACT 3, UNIT 3, NORTH ALBUQUERQUE ACRES

City Address: _____

Engineering Firm: Thompson Engineering Consultants, Inc Contact: David Thompson

Address: P.O. Box 65760 Albuquerque, NM 87122

Phone#: 505-271-2199 Fax#: N/A E-mail: tecnm@yahoo.com

Owner: Llave Enterprises, Inc. Contact: Bob Keeran

Address: 8830 Keeran Lane NE Albuquerque, NM 87122

Phone#: 505-249-1502 Fax#: _____ E-mail: _____

Architect: _____ Contact: _____

Address: _____

Phone#: _____ Fax#: _____ E-mail: _____

Other Contact: _____ Contact: _____

Address: _____

Phone#: _____ Fax#: _____ E-mail: _____

Check all that Apply:

DEPARTMENT:

X HYDROLOGY/ DRAINAGE

_____ TRAFFIC/ TRANSPORTATION

_____ MS4/ EROSION & SEDIMENT CONTROL

TYPE OF SUBMITTAL:

_____ ENGINEER/ ARCHITECT CERTIFICATION

_____ CONCEPTUAL G & D PLAN

_____ GRADING PLAN

_____ DRAINAGE MASTER PLAN

X DRAINAGE REPORT

_____ CLOMR/LOMR

_____ TRAFFIC CIRCULATION LAYOUT (TCL)

_____ TRAFFIC IMPACT STUDY (TIS)

_____ EROSION & SEDIMENT CONTROL PLAN (ESC)

_____ OTHER (SPECIFY) _____

CHECK TYPE OF APPROVAL/ACCEPTANCE SOUGHT:

_____ BUILDING PERMIT APPROVAL

_____ CERTIFICATE OF OCCUPANCY

X PRELIMINARY PLAT APPROVAL

_____ SITE PLAN FOR SUB'D APPROVAL

_____ SITE PLAN FOR BLDG. PERMIT APPROVAL

_____ 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

_____ PRE-DESIGN MEETING

_____ OTHER (SPECIFY) _____

IS THIS A RESUBMITTAL?: X Yes _____ No

DATE SUBMITTED: 7/11/18 By: Nirit Finkelshtin - nirit.finkelshtin@respec.com

COA STAFF: ELECTRONIC SUBMITTAL RECEIVED: ___

LA CUEVA FLOODPLAIN ANALYSIS

Prepared for:

Llave Enterprises, Inc

July 2018

Table of Contents

Exhibits

- Exhibit A – La Cueva Arroyo Flood Plain Analysis

Appendices

- Appendix A
    - Annotated Flood Insurance Rate Map 35001C0137H, Zone A Floodplain
- Appendix B
    - Hydrology Background
- Appendix C
    - Hydraulics Analysis
- Appendix D
    - Signal Village Grading and Drainage Plan
- Appendix E
    - Scour Wall Calculations with a Culvert Under Ventura Rd
    - Scour Wall Calculations without a Culvert Under Ventura Rd

Introduction

The purpose of this report is to demonstrate that the proposed arroyo improvements associated with the Signal Village Subdivision are adequate to remove the project area from the FEMA floodplain, protect the project from flooding, and that it is adequately protected from scour. In addition, this report provides a concept plan and analysis for a future sediment basin and box culvert structure at the Alameda crossing of the La Cueva arroyo. This concept plan and analysis demonstrates the viability of a possible land swap between the developer and AMAFCA . The area analyzed is located west of Ventura Road, south of Alameda Boulevard, east of Barstow Street, and north of Signal Avenue. As shown in Appendix A, The La Cueva Arroyo is within a FEMA Floodplain classified as Zone AE. This report uses the hydrologic analysis provided in the North Albuquerque Acres Master Drainage Plan (NAAMDP) by Resource Technology Inc. (RTI) dated October 1998. The NAAMDP should be referenced for general drainage background. The flow rate for the La Cueva Arroyo is 3,048 cfs at Ventura and 3,094 cfs at Barstow according to the NAAMDP, see Appendix B for Hydrology Background..

Existing Conditions

The area within the project limits is mostly undeveloped. There is a small subdivision located north of Signal and west of Ventura and also a single family home located south of Alameda and west of Ventura. There is a concrete channel that begins shortly after the La Cueva Arroyo crosses Alameda and flows northwest. An earthen berm was constructed south of the concrete channel to direct the flows in the arroyo into the channel. The surrounding area generally slopes at 3% from east to west. The arroyo was previously studied by Weston Solutions in 2012, which was used to create the existing floodplain. This analysis uses more current topographic data to model the floodplain.

Methodology

Flood Plain Modeling

The La Cueva arroyo was modeled using HEC-RAS 5.0.1 for both existing and proposed conditions. The manning's coefficient for the natural arroyo was assumed to be 0.025 for the stream bed and 0.035 for the banks. Concrete box culverts for the road crossings at Ventura and Alameda were modeled to have capacity for the100-yr storm. The sedimentation pond includes weir openings, one where the arroyo enters the sediment pond and the second as the arroyo exits the pond and enters the Alameda box culvert.The bottom 5 feet of the pond was assumed to be full with sediment. The portion of the arroyo downstream of the Alameda box culvert crossing was modeled using an average slope of 2.5% and matching the exising elevations before entering the AMAFCA concrete channel. Due to soil type and sediments load this type of the arroyo would typically run supercritial until it reaches a point where velocity is high enough for it to transport enough sediment to cause it to run critical. In this case the bed material is a course material and the arroyo in this area based on anlaysis and observation of flows in the channel would appear able to maintain subcritical flow. Weston's model from 2012 ran the arroyo ran in a mixed flow regime. In our current model the sedimentation pond will force critical and subcritical flow to occur. This model was set to a mixed flow regime. By allowing supercritical flow in the upstream portion of the arroyo, a worst case velocity scenario is created to be able to design the scour wall depth. See model results in appendix C and full run included electronically.

Scour Analysis

The proposed scour wall along the north side of the proposed Signal Village Subdevision was designed per AMAFCA's Sediment and Erosion Design Guide from 1994. Using HECRAS results, the scour analysis was completed to determine the scour wall depth and height for two different scenarios: one assuming a box culvert under Ventura and the second scenario assuming no culvert under Ventura. Both analysis spreadsheets are presented in Appendix E. the scour is deeper for the second scenario and therefore this scour depth will be used in the design on the scour wall.

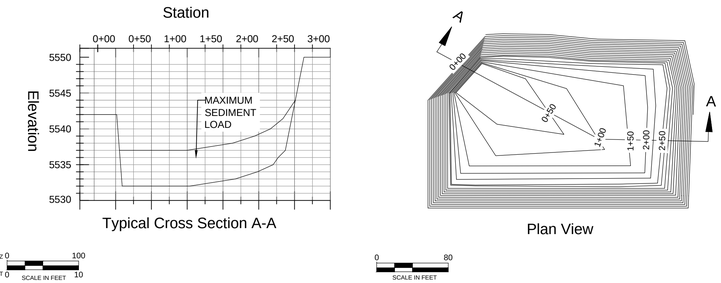
Proposed Design

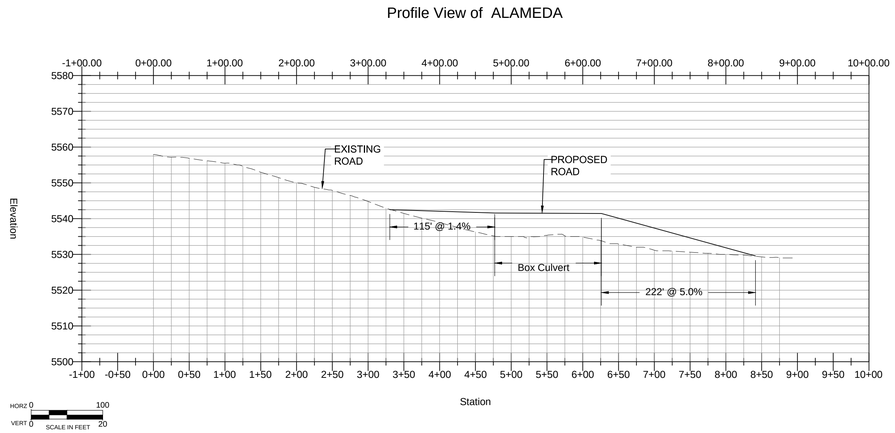
A Scour Wall is proposed beginning at Ventura and will connect to the existing scour wall for the adjacent subdivision to the west. The purpose of the Scour Wall is to contain the incoming arroyo flows from the east, thus removing the floodplain and protecting the future development for this specific location. The proposed length of the scour wall is 420 feet starting near the northwest corner of the Ventura and Signal intersection. From there, it continues north and west following along the left bank of the arroyo until connecting to the existing wall. As shown in the scour analysis included in Appendix B, the total wall height varies from 16.21 to 19.40 ft and the estimated scour varies from 7.69 to 10.41 ft. The model run indicates that the scour wall reduces the floodplain on the property as shown in the attached Exhibit A. The proposed floodplain is mostly within the current floodplain boundary. See grading design in Appendix D.

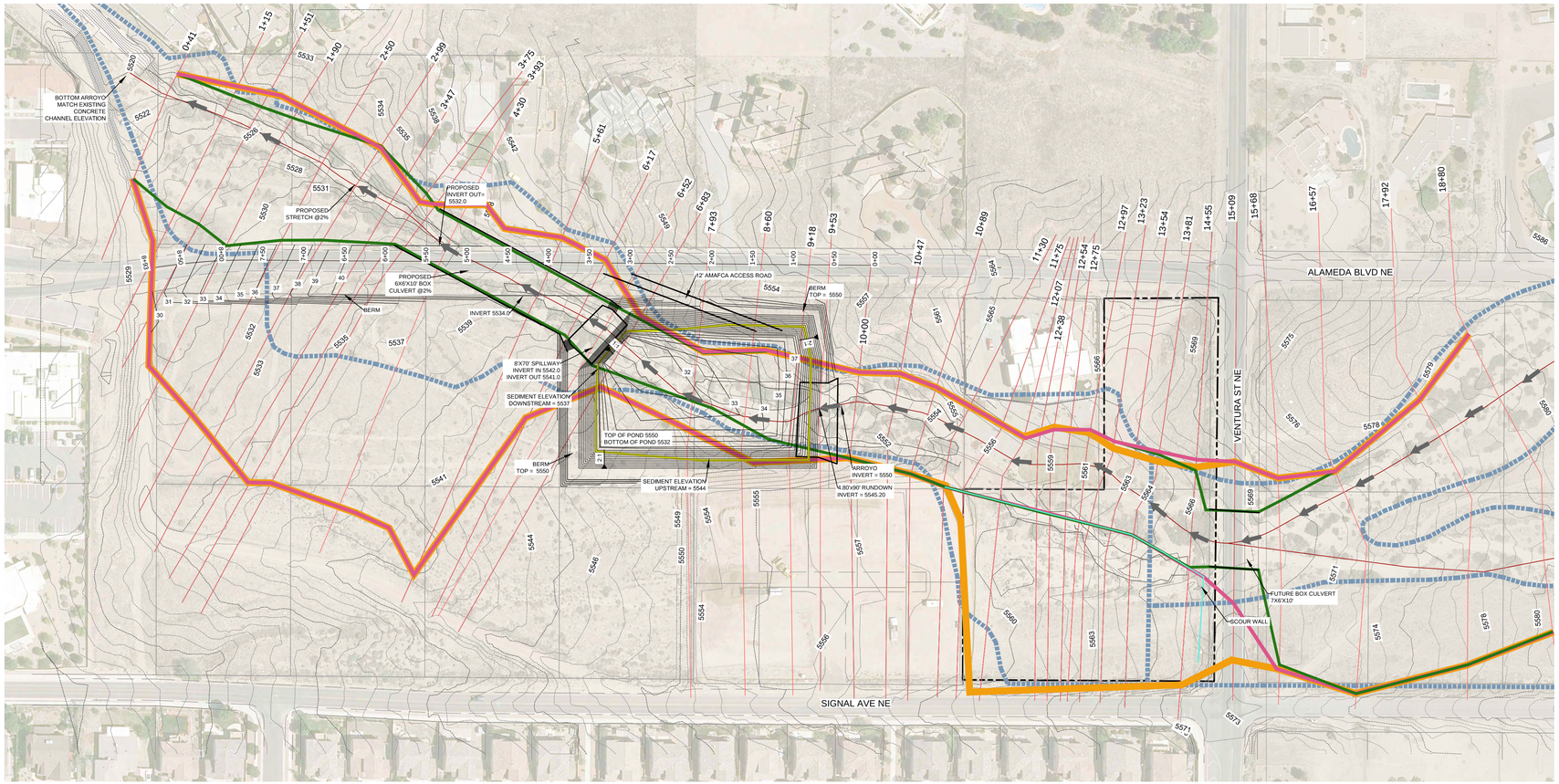
EXHIBIT A

Sediment Pond Volume

Elev.	Area (Sq. Ft.)	Vol (Cu. Ft.)	Cum. (Cu. Ft.)	Cum. (Ac. Ft.)
5532	4,842	-	-	-
5533	10,817	7,830	7,830	0
5534	19,049	14,933	22,763	1
5535	24,681	21,865	44,628	1
5536	28,146	26,414	71,041	2
5537	31,928	30,037	101,078	2
5538	33,902	32,915	133,993	3
5539	35,390	34,646	168,639	4
5540	36,835	36,113	204,752	5
5541	38,432	37,634	242,385	6
5542	39,972	39,202	281,587	6
5543	41,641	40,807	322,394	7
5544	43,217	42,429	364,823	8
5545	44,818	44,018	408,840	9
5546	46,444	45,631	454,471	10
5547	48,093	47,269	501,740	12
5548	49,768	48,931	550,670	13
5549	51,466	50,617	601,287	14
5550	53,189	52,328	653,615	15







LEGEND

- PROPERTY LINE
- ARROYO CENTER LINE
- FEMA FLOODPLAIN ZONE AH/AE
- 1+51 PROPOSED HECRAS CROSS SECTIONS
- EXIST FLOODPLAIN MODEL
- EXIST FLOODPLAIN MODEL WITH PROPOSED WALL
- PROPOSED FLOODPLAIN MODEL
- PROPOSED SCOUR WALL
- USACE CHANNEL
- 32 PROPOSED CONTOURS
- PROPOSED STRUCTURE
- PROPOSED SEDIMENT MAX ELEVATION

Thompson Engineering Consultants, Inc.

STAMP

NEW MEXICO 9677 LICENSED PROFESSIONAL ENGINEER

LA CUEVA ARROYO
FLOODPLAIN ANALYSIS

EXHIBIT A

DATE: 07.5.2018

SHEET NUMBER:
1 OF 1

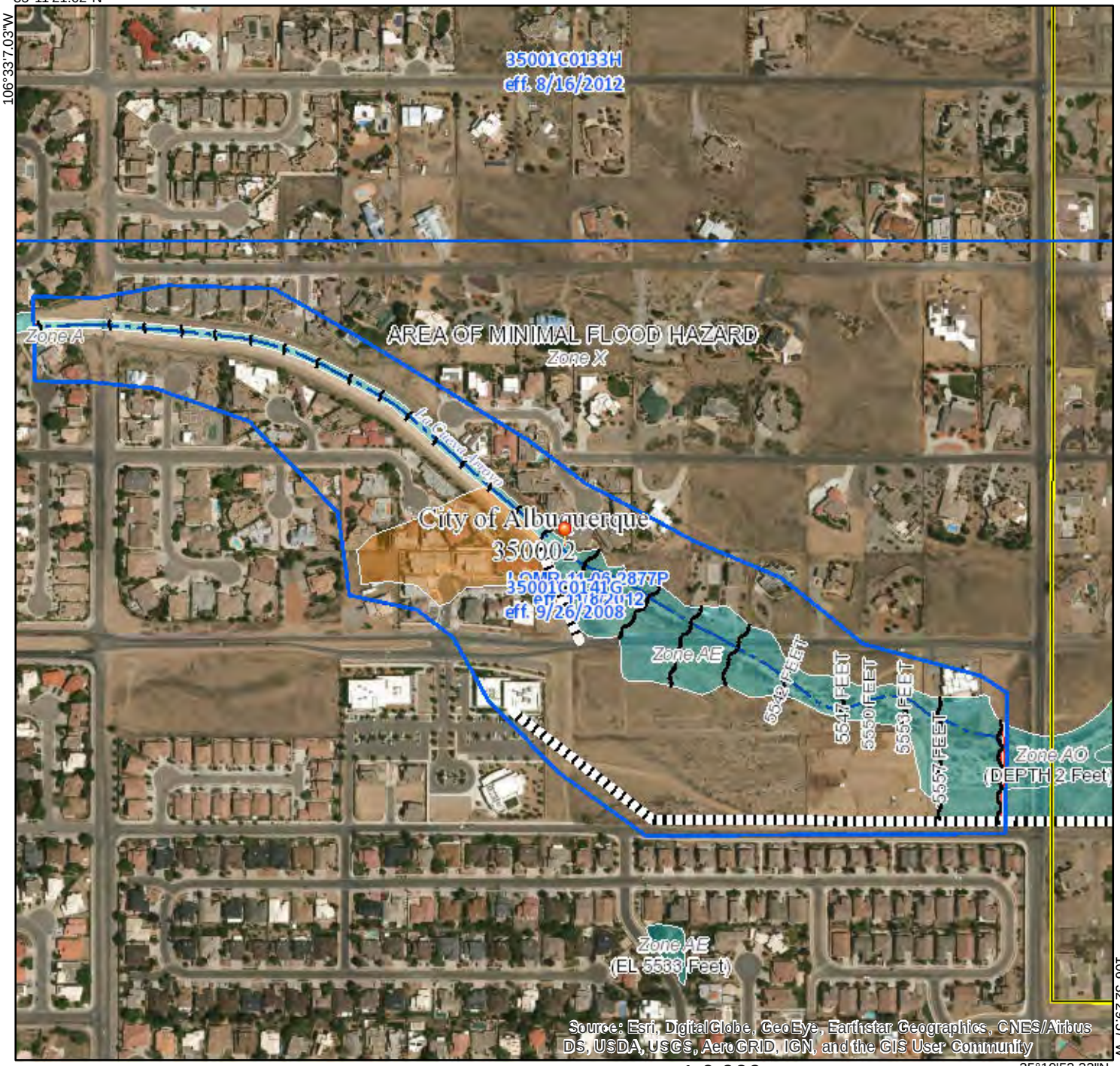
NAME: L:\Active Projects\03384 La Cueva Arroyo\3. DWG\La Cueva - HECRAS Model\MIXED_.dwg PLOT DATE: Jul 10, 2018 9:55am

National Flood Hazard Layer FIRMette

FEMA

35°11'21.62"N

106°33'7.03"W



106°32'29.57"W

35°10'52.22"N

Feet

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

1:6,000

Legend

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

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

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

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

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

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

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

N

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

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 3/30/2018 at 1:12:52 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

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

D. Proposed Condition Hydrology Results

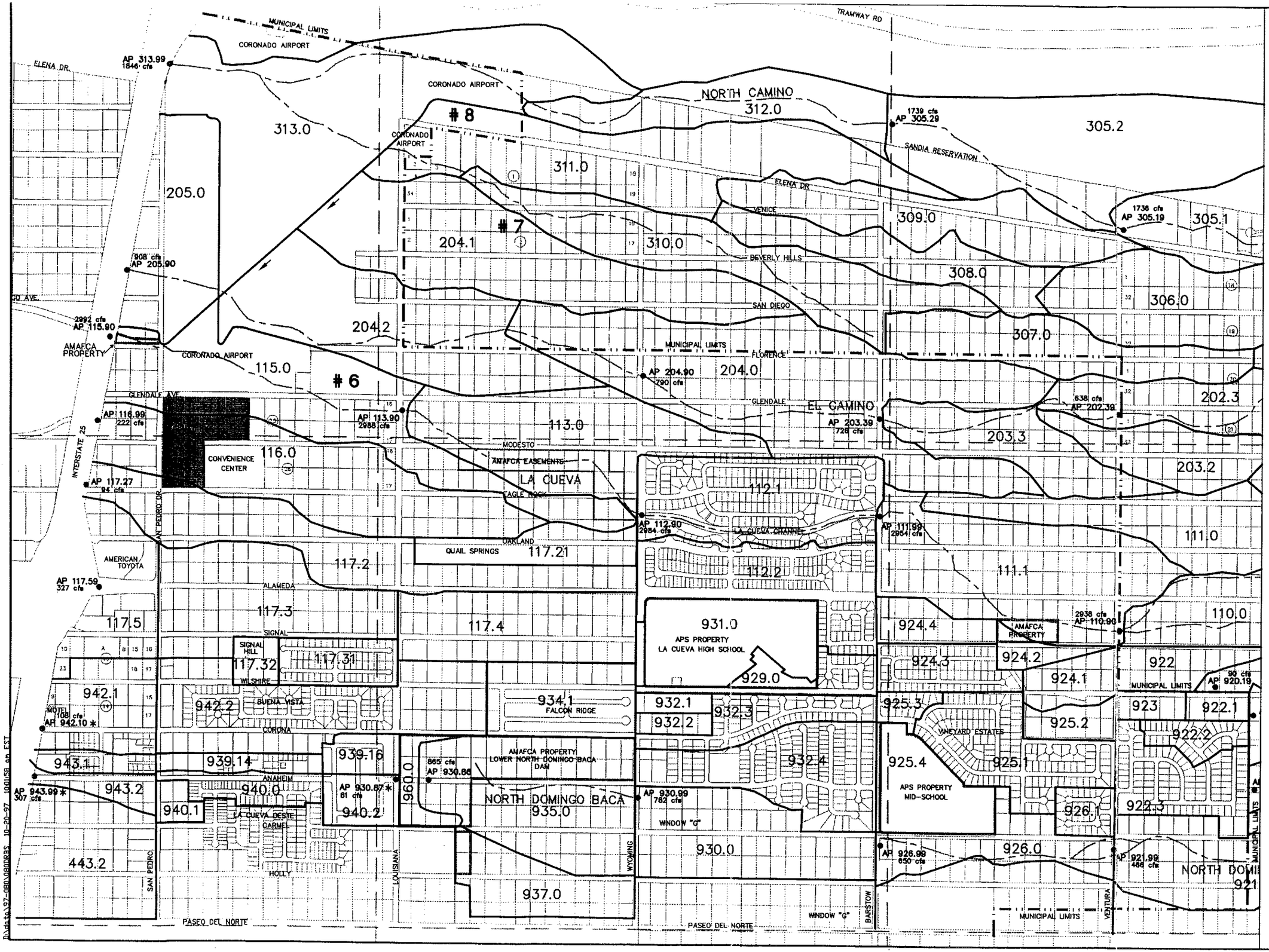
Proposed condition flow rates for future fully developed conditions from the hydrology models incorporating the above facilities are reported in Table 6. All of the interim detention ponds have been eliminated. A comparison with the hydrology results from the **1996 AMAFCA Hydrology Report** for future fully developed conditions without storm drainage or channel improvements for selected points on the main arroyos is made in Tables 7a and 7b. Except where specifically labeled as "worst case" all flow rates reported assume avulsion control.

TABLE 6a

FUTURE CONDITIONS HYDROLOGY SUMMARY (BULKED FLOW RATES)

	AREA (Sq mi)	AP #	VOL-10-YR (ac-ft)	Qp 10-YR (cfs)	VOL-100-YR (ac-ft)	Qp 100-YR (cfs)
NORTH DOMINGO BACA ARROYO						
Holbrook	3.166	919.99	129.0	305	231.1	616
Ventura	3.446	921.99	142.4	609	255.7	1171
Barstow	3.562	926.99	149.2	758	267.5	1813
Wyoming	3.870	930.99	167.4	1096	298.8	1984
Inflow to LNDB Dam	4.259	930.86	189.5	1313	337.0	2442
Out flow from LNDB Dam	4.259	930.87	189.5	170	337.0	200
I-25	4.526	943.99	205.7	400	364.7	731
LA CUEVA ARROYO[1]						
Ventura	3.766	110.90	130.0	1359	265.8	3048
Barstow	4.017	111.99	140.5	1374	284.5	3094
Wyoming	4.189	112.90	150.3	1383	301.0	3128
Louisiana	5.462	113.90	194.5	1632	390.1	3908
I-25	5.582	115.9	202.1	1640	402.6	3923
North Diversion Channel	6.871	128.90	270.8	2901	519.8	5551

[1]La Cueva and El Camino Arroyo Flow Rates reflect diversion of El Camino to the La Cueva west of Wyoming.



LEGEND

- 107.1 SUBBASIN DESIGNATION
- SUBBASIN BOUNDARY
- EXISTING PLATTING
- EXISTING ARROYO FLOW PATH
- AP 107.29 / 2756 cfs — ANALYSIS POINT AND EXISTING CONDITION FLOW RATE
- * — FLOW RATE NOT BULKED FOR SEDIMENT
- # 2 — POTENTIAL AVULSION LOCATION
- MUNICIPAL LIMITS

NORTH ALBUQUERQUE ACRES
MASTER DRAINAGE PLAN

EXISTING CONDITION

FIGURE 3A

CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT

CITY OF Albuquerque

Resource Technology, Inc.
Civil Engineering
Environmental Sciences
Water Resources
Landscape Architecture
Planning
1720 – B Randolph Road SE
Albuquerque, New Mexico 87106
E-mail: rti@rmsa.com
Telephone: (505) 243-7300
Facsimile: (505) 243-7400

LA Cueva 100-YR FUTURE

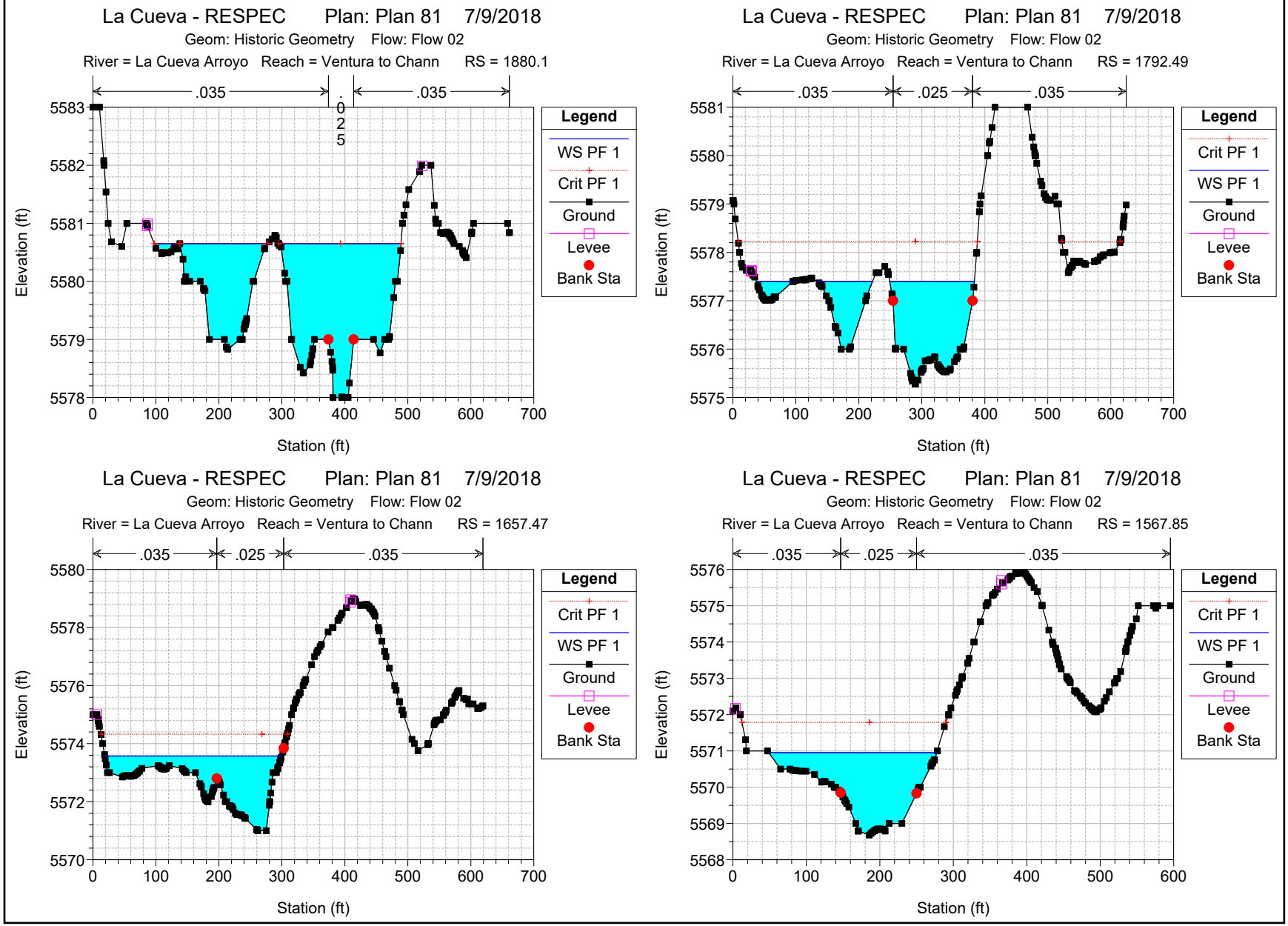
-(s16.67h8.5v0T-&18D
AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/30/1998
INPUT FILE = a:lcwyo100.fut USER NO.= RSTECHNM.STE

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	PAGE = 1 NOTATION
START										TIME= .00
RAINFALL TYPE= 2										RAIN24= 4.050
COMPUTE NM HYD	101.00	-	1	.60700	953.84	45.841	1.41600	1.650	2.455	PER IMP= .00
ROUTE MCUNGE	101.80	1	2	.60700	912.90	45.469	1.40451	1.850	2.350	CCODE = .1
RAINFALL TYPE= 2										RAIN24= 4.200
COMPUTE NM HYD	100.00	-	1	1.21400	1201.70	87.881	1.35730	1.850	1.547	PER IMP= .00
ROUTE MCUNGE	100.80	1	3	1.21400	1177.21	87.700	1.35451	2.100	1.515	CCODE = .1
ADD HYD	101.88	3& 2	5	1.82100	1882.13	133.168	1.37117	1.950	1.615	
RAINFALL TYPE= 2										RAIN24= 3.650
COMPUTE NM HYD	102.00	-	1	.87500	1033.60	54.313	1.16386	1.700	1.846	PER IMP= .00
ADD HYD	102.90	1& 5	5	2.69600	2554.30	187.482	1.30389	1.900	1.480	
*S LA CUEVA TRIBUTARY ARROYO @ TRAMWAY BLVD. (102.9)										
ROUTE MCUNGE	102.80	5	2	2.69600	2515.07	187.100	1.30123	2.050	1.458	CCODE = .1
RAINFALL TYPE= 2										RAIN24= 3.370
COMPUTE NM HYD	107.20	-	1	.17200	325.87	13.591	1.48157	1.550	2.960	PER IMP= 17.00
ADD HYD	107.29	1& 2	4	2.86800	2575.01	200.690	1.31205	2.050	1.403	
*S NORTH LA CUEVA AT GLENDALE AND BROWNING (107.29)										
RAINFALL TYPE= 2										RAIN24= 3.500
COMPUTE NM HYD	102.10	-	1	.09300	149.17	4.457	.89867	1.500	2.506	PER IMP= .00
*S LA CUEVA TRIBUTARY @ TRAMWAY BLVD.										
ROUTE MCUNGE	102.18	1	2	.09300	136.20	4.395	.88600	1.700	2.288	CCODE = .1
RAINFALL TYPE= 2										RAIN24= 3.380
COMPUTE NM HYD	107.10	-	1	.18080	399.38	14.303	1.48327	1.500	3.452	PER IMP= 17.00
ADD HYD	107.19	1& 2	5	.27380	399.38	18.697	1.28040	1.500	2.279	
*S NORTH LA CUEVA (TRIB) AT FLORENCE AND BROWNING (107.19)										
ADD HYD	107.90	5& 4	3	3.14180	2666.73	219.388	1.30929	2.000	1.326	
RAINFALL TYPE= 2										RAIN24= 3.400
COMPUTE NM HYD	106.00	-	1	.04360	95.85	3.448	1.48281	1.500	3.435	PER IMP= 17.00
ROUTE MCUNGE	106.80	1	2	.04360	86.06	3.396	1.46043	1.700	3.084	CCODE = .1
RAINFALL TYPE= 2										RAIN24= 3.340
COMPUTE NM HYD	106.10	-	1	.11160	238.47	8.685	1.45925	1.500	3.339	PER IMP= 17.00
ADD HYD	106.19	1& 2	6	.15520	257.25	12.081	1.45958	1.550	2.590	
*S LA CUEVA TRIBUTARY ARROYO @ BROWNING (106.19)										
ADD HYD	107.99	3& 6	5	3.29700	2733.21	231.469	1.31636	2.000	1.295	
ROUTE MCUNGE	107.80	5	2	3.29700	2713.95	231.319	1.31551	2.100	1.286	CCODE = .1
RAINFALL TYPE= 2										RAIN24= 3.230
COMPUTE NM HYD	109.00	-	1	.10060	216.30	7.552	1.40751	1.500	3.359	PER IMP= 17.00
ADD HYD	109.90	1& 2	5	3.39760	2736.13	238.871	1.31823	2.100	1.258	
RAINFALL TYPE= 2										RAIN24= 3.250
COMPUTE NM HYD	108.00	-	7	.20550	404.63	15.573	1.42091	1.550	3.077	PER IMP= 17.00
ADD HYD	109.99	5& 7	5	3.60310	2789.17	254.444	1.32409	2.100	1.210	
*S LA CUEVA ARROYO @ EUBANK (MAIN) (109.99)										
ROUTE MCUNGE	109.88	5	2	3.60310	2763.62	254.113	1.32237	2.200	1.198	CCODE = .1
RAINFALL TYPE= 2										RAIN24= 3.130
COMPUTE NM HYD	110.00	-	1	.16340	275.61	11.738	1.34689	1.550	2.636	PER IMP= 17.00
ADD HYD	110.90	1& 2	5	3.76650	2796.05	265.851	1.32343	2.200	1.160	
*S LA CUEVA ARROYO @ VENTURA (MAIN) (110.90)- FINAL										
*S ROUTE TO BARSTOW										
ROUTE MCUNGE	110.88	5	2	3.76650	2792.08	263.889	1.31366	2.219	1.158	CCODE = .1
RAINFALL TYPE= 2										RAIN24= 3.020
COMPUTE NM HYD	111.00	-	1	.05330	108.83	3.739	1.31526	1.500	3.190	PER IMP= 17.00
COMPUTE NM HYD	111.40	-	4	.01410	28.80	.989	1.31527	1.500	3.192	PER IMP= 17.00
*S COMBINE HYD.'S	111.0	AND	111.4	AS 111.49						
ADD HYD	111.49	1& 4	4	.06740	137.63	4.728	1.31525	1.500	3.191	
*S ROUTE TO LA CUEVA CHANEL @ OAKLAND										
*S PIPE ROUTING										
ROUTE	111.48	4	5	.06740	133.79	4.728	1.31527	1.550	3.102	
RAINFALL TYPE= 2										RAIN24= 3.050
COMPUTE NM HYD	111.10	-	1	.09690	195.97	7.699	1.48968	1.500	3.160	PER IMP= 26.00
RAINFALL TYPE= 2										RAIN24= 3.050
COMPUTE NM HYD	111.30	-	6	.04200	107.90	4.348	1.94094	1.500	4.014	PER IMP= 50.00
ADD HYD	111.39	1& 6	1	.13890	303.87	12.046	1.62612	1.500	3.418	
*S COMBINE HYD.'S	111.48	AND	111.39	AS 111.88						
ADD HYD	111.88	1& 5	1	.20630	436.39	16.774	1.52456	1.500	3.305	
*S LA CUEVA CHANNEL AT BARSTOW (111.89)-NOT FINAL										
ADD HYD	111.89	1& 2	5	3.97280	2827.78	280.143	1.32216	2.194	1.112	
*S DIVERSION FROM NDB ABOVE CARRINGTON										
COMPUTE NM HYD	924.10	-	6	.02500	64.23	2.588	1.94094	1.500	4.015	PER IMP= 50.00
COMPUTE NM HYD	924.20	-	7	.01900	48.82	1.967	1.94094	1.500	4.015	PER IMP= 50.00
*S COMBINE HYD.'S	924.10	AND	924.20	AS 924.22						

Exist Condition

HEC-RAS Plan: Plan 80 River: La Cueva Arroyo Reach: Ventura to Chann Profile: PF 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Ventura to Chann	1880.1	PF 1	3090.00	5578.00	5580.65	5580.65	5581.59	0.010833	11.04	480.38	374.74	1.26
Ventura to Chann	1792.49	PF 1	3090.00	5575.28	5577.40	5578.22	5579.89	0.027793	13.43	279.11	281.13	1.88
Ventura to Chann	1657.47	PF 1	3090.00	5571.00	5573.57	5574.32	5576.17	0.027070	14.10	290.24	280.79	1.89
Ventura to Chann	1567.85	PF 1	3090.00	5568.68	5570.95	5571.79	5573.80	0.024984	14.25	265.97	228.77	1.84
Ventura to Chann	1508.52	PF 1	3090.00	5567.37	5569.49	5570.49	5572.81	0.010961	14.69	213.93	172.96	2.22
Ventura to Chann	1454.61	PF 1	3090.00	5565.36	5567.10	5568.05	5571.49	0.071539	21.09	233.97	270.15	3.01
Ventura to Chann	1381.28	PF 1	3090.00	5563.63	5565.14	5565.77	5567.30	0.041517	14.05	290.45	279.97	2.22
Ventura to Chann	1354.1	PF 1	3090.00	5562.26	5564.21	5564.73	5565.98	0.041580	13.97	308.79	283.15	2.21
Ventura to Chann	1323.43	PF 1	3090.00	5561.43	5563.48	5563.87	5564.87	0.030955	14.44	351.66	297.35	1.97
Ventura to Chann	1297.14	PF 1	3090.00	5561.00	5562.98	5563.35	5564.28	0.024436	13.14	371.72	300.88	1.75
Ventura to Chann	1274.91	PF 1	3090.00	5560.00	5562.58	5562.98	5563.94	0.012442	12.05	420.01	316.48	1.36
Ventura to Chann	1254.2	PF 1	3090.00	5559.00	5562.04	5562.56	5563.68	0.011487	12.74	407.37	321.21	1.33
Ventura to Chann	1238.15	PF 1	3090.00	5558.00	5561.23	5561.99	5563.43	0.012574	13.84	346.60	296.46	1.40
Ventura to Chann	1207.37	PF 1	3090.00	5557.00	5559.84	5560.78	5562.75	0.020547	14.60	272.10	217.37	1.70
Ventura to Chann	1174.73	PF 1	3090.00	5556.00	5558.84	5559.78	5562.10	0.018890	15.11	215.33	133.10	1.67
Ventura to Chann	1130.17	PF 1	3090.00	5555.00	5558.19	5559.13	5561.38	0.016399	14.53	215.96	103.58	1.57
Ventura to Chann	1089.42	PF 1	3090.00	5553.00	5555.76	5557.06	5560.20	0.048750	16.89	183.12	105.64	2.24
Ventura to Chann	1047.06	PF 1	3090.00	5551.93	5554.47	5555.57	5558.19	0.037360	15.49	201.22	117.01	2.03
Ventura to Chann	999.65	PF 1	3090.00	5550.58	5553.02	5554.15	5556.69	0.026257	15.36	201.15	99.73	1.90
Ventura to Chann	873.91	PF 1	3090.00	5546.55	5549.49	5550.69	5553.25	0.028477	15.57	201.81	118.10	1.97
Ventura to Chann	793	PF 1	3090.00	5543.91	5546.86	5548.38	5550.87	0.026441	16.07	192.32	90.34	1.93
Ventura to Chann	683.29	PF 1	3090.00	5541.00	5544.21	5545.10	5548.38	0.021349	16.58	199.07	96.45	1.80
Ventura to Chann	616.82	PF 1	3090.00	5539.00	5542.92	5543.59	5546.93	0.020956	18.25	265.26	216.97	1.82
Ventura to Chann	561.38	PF 1	3090.00	5537.00	5540.32	5541.62	5544.36	0.027313	19.10	260.48	204.57	2.04
Ventura to Chann	490.06	PF 1	3090.00	5535.37	5539.05	5539.95	5542.59	0.015954	15.97	268.49	271.75	1.60
Ventura to Chann	457.16	PF 1	3090.00	5532.90	5537.33	5538.77	5541.69	0.031167	16.76	184.79	95.58	2.04
Ventura to Chann	392.85	PF 1	3090.00	5531.00	5535.81	5536.65	5539.25	0.026274	16.83	305.38	393.91	1.94
Ventura to Chann	374.73	PF 1	3090.00	5530.50	5535.17	5536.04	5538.74	0.024285	16.56	296.91	402.16	1.87
Ventura to Chann	346.75	PF 1	3090.00	5530.00	5534.27	5535.20	5537.92	0.032332	16.57	262.91	317.91	2.08
Ventura to Chann	299.48	PF 1	3090.00	5529.00	5532.80	5533.81	5536.61	0.025059	17.54	283.49	323.41	1.92
Ventura to Chann	249.63	PF 1	3090.00	5528.04	5531.58	5532.49	5535.33	0.024873	17.24	288.32	372.21	1.91
Ventura to Chann	189.79	PF 1	3090.00	5526.53	5529.94	5530.94	5533.81	0.021935	17.35	274.80	279.13	1.83
Ventura to Chann	151.07	PF 1	3090.00	5525.00	5528.89	5530.00	5532.74	0.021470	17.64	252.13	168.17	1.83
Ventura to Chann	115.47	PF 1	3090.00	5525.00	5528.03	5528.99	5531.86	0.024646	17.63	253.79	189.36	1.92
Ventura to Chann	41.45	PF 1	3090.00	5521.88	5525.06	5526.36	5529.69	0.029502	18.91	215.82	139.70	2.10


La Cueva - RESPEC Plan: Plan 81 7/9/2018
Geom: Historic Geometry Flow: Flow 02
River = La Cueva Arroyo Reach = Ventura to Chann RS = 1880.1
.035
.025
.035
Legend
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
La Cueva - RESPEC Plan: Plan 81 7/9/2018
Geom: Historic Geometry Flow: Flow 02
River = La Cueva Arroyo Reach = Ventura to Chann RS = 1792.49
.035
.025
.035
Legend
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
La Cueva - RESPEC Plan: Plan 81 7/9/2018
Geom: Historic Geometry Flow: Flow 02
River = La Cueva Arroyo Reach = Ventura to Chann RS = 1657.47
.035
.025
.035
Legend
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
La Cueva - RESPEC Plan: Plan 81 7/9/2018
Geom: Historic Geometry Flow: Flow 02
River = La Cueva Arroyo Reach = Ventura to Chann RS = 1567.85
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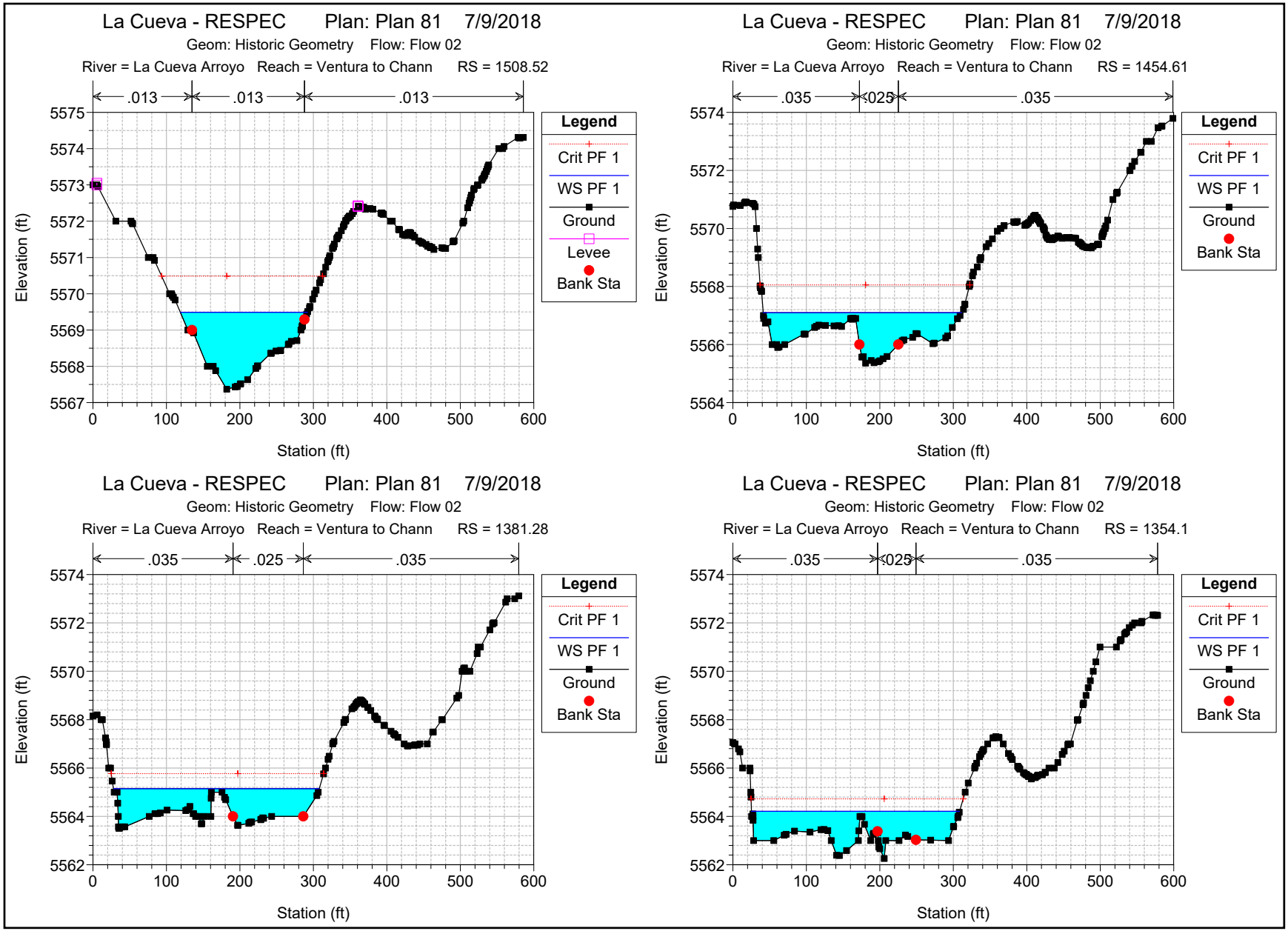
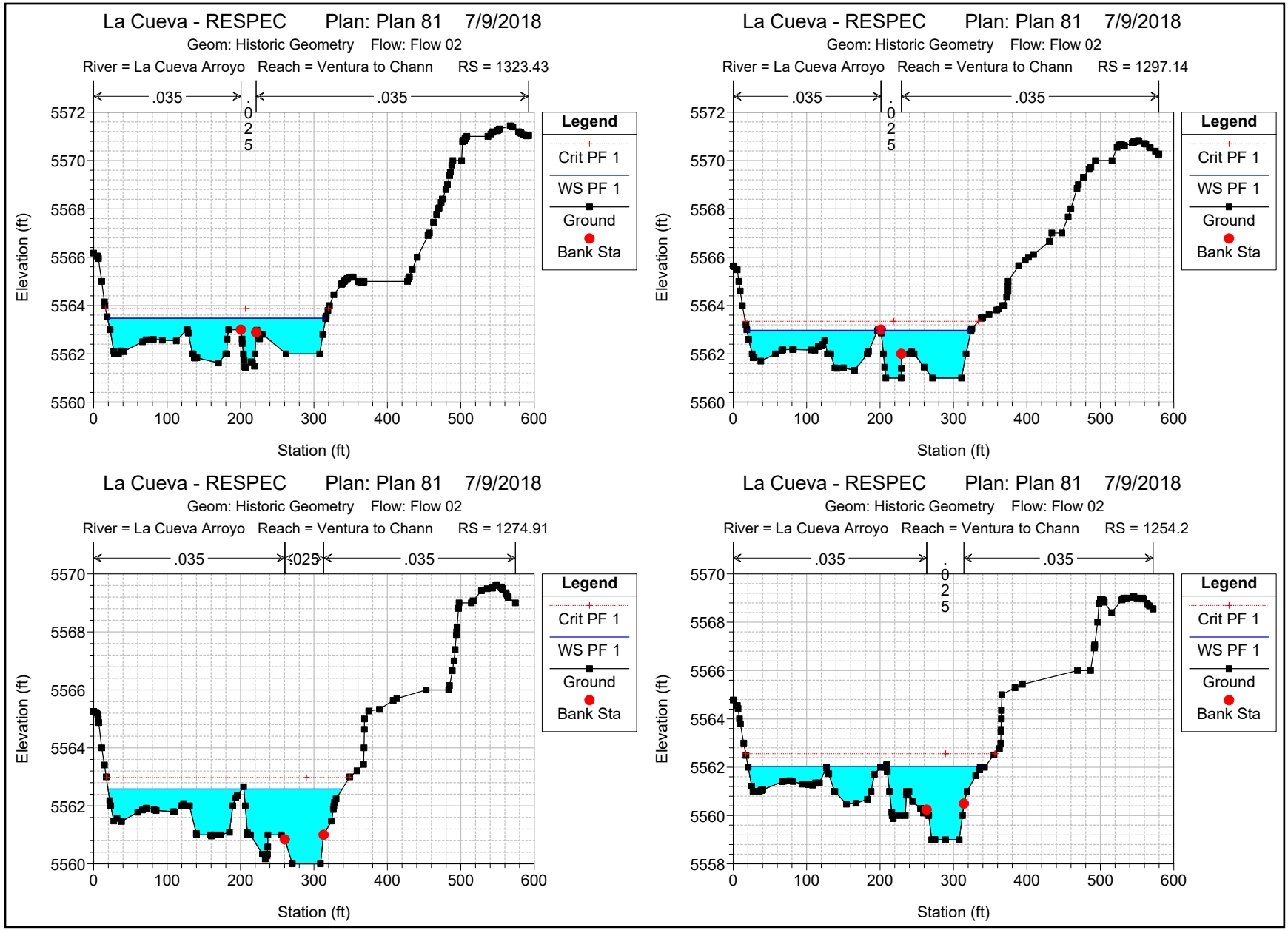
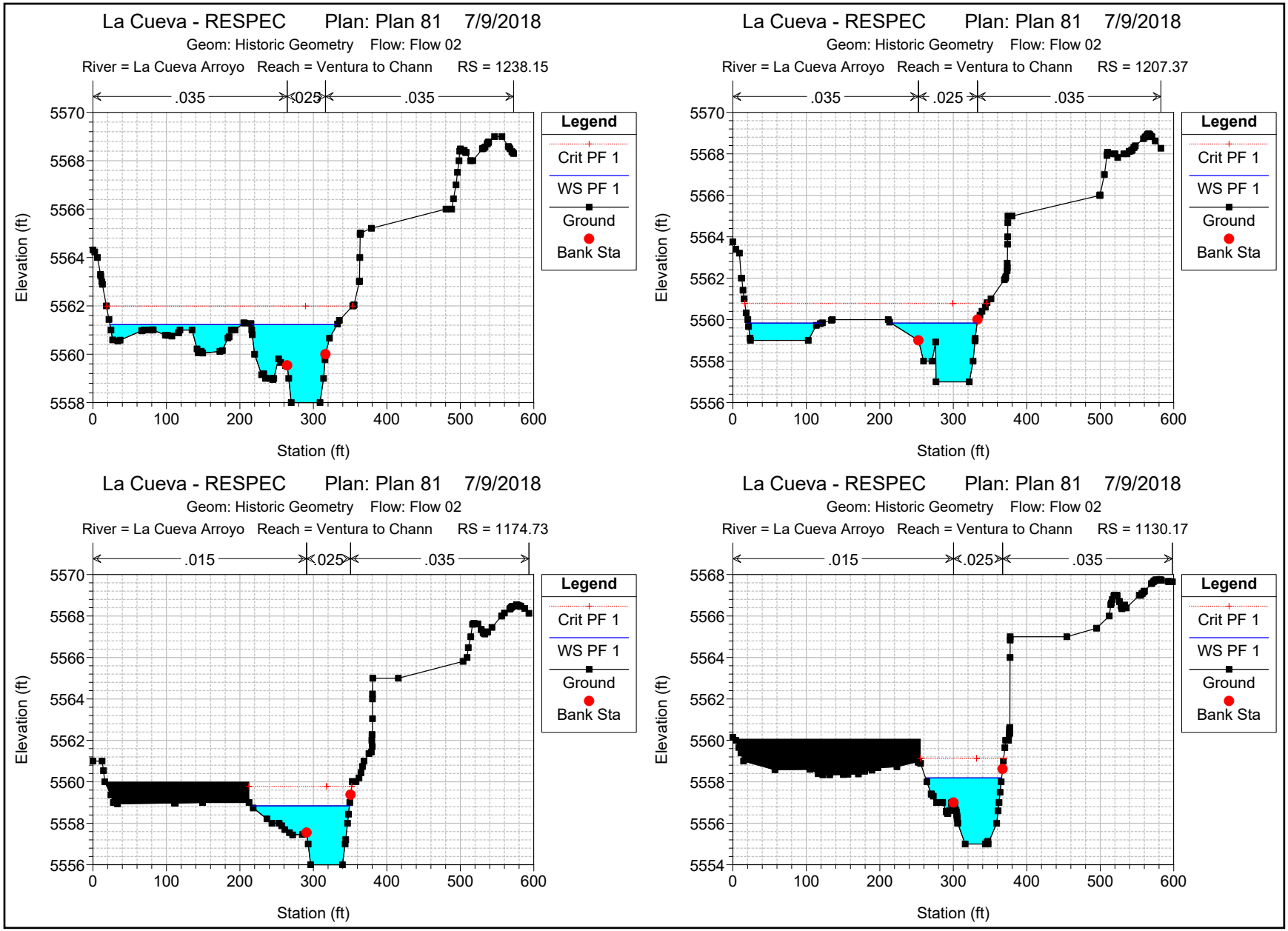
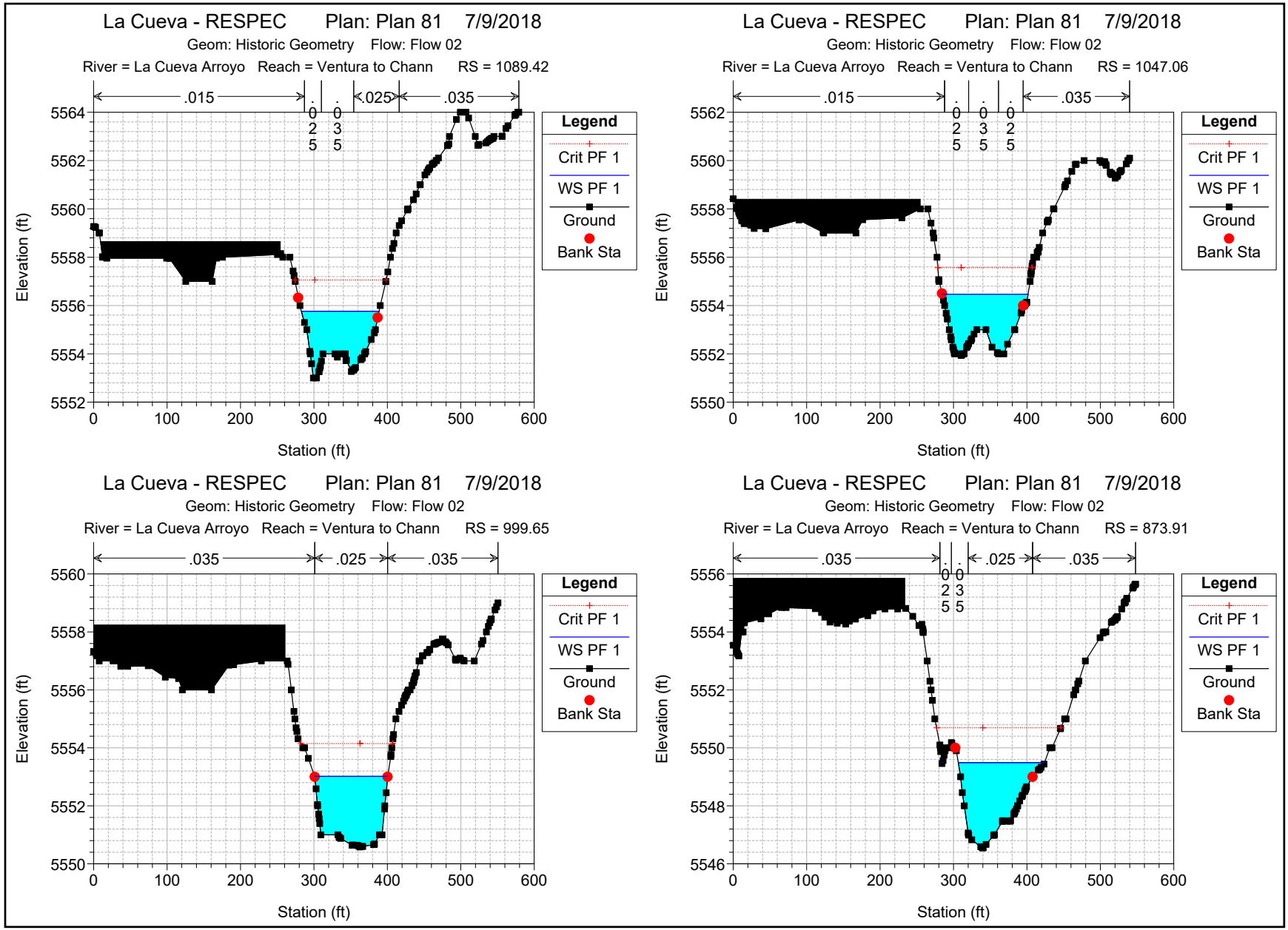
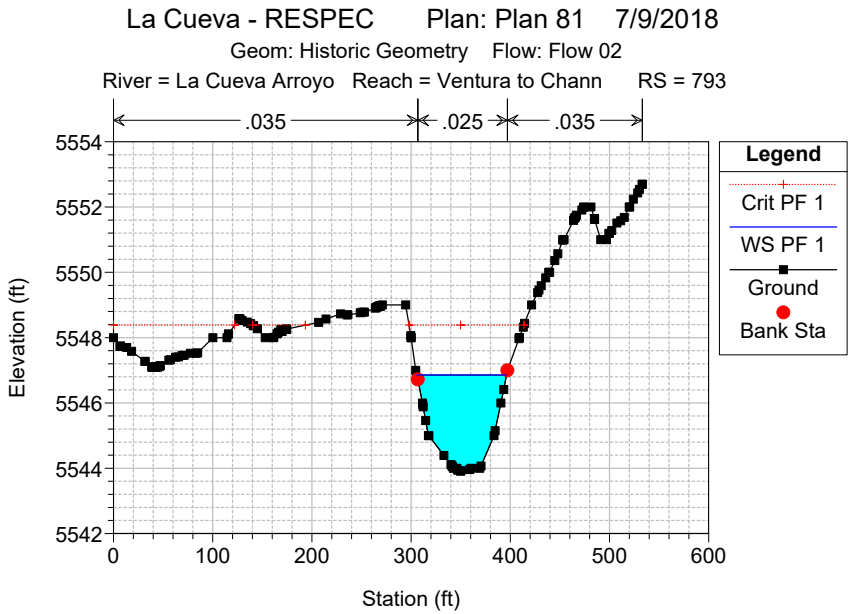
.025
.035
Legend
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

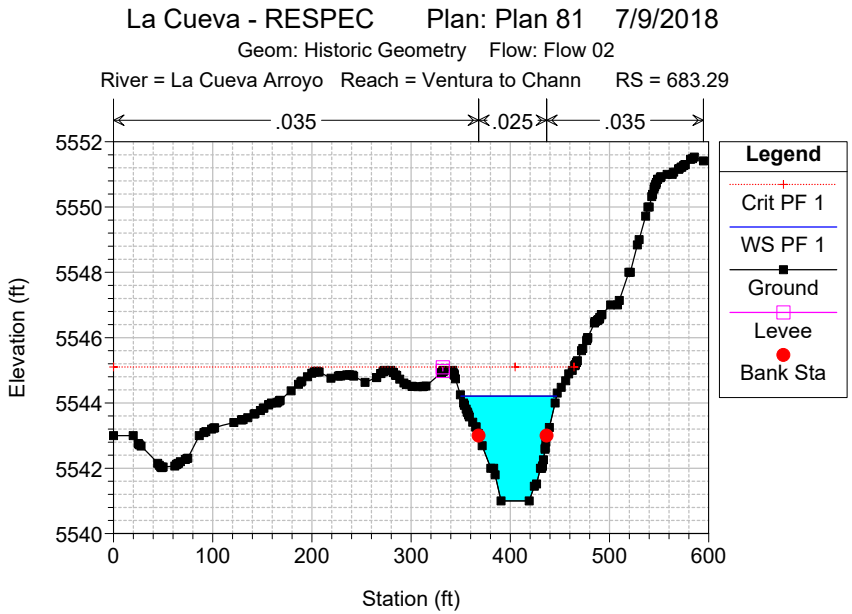

La Cueva - RESPEC Plan: Plan 81 7/9/2018
Geom: Historic Geometry Flow: Flow 02
River = La Cueva Arroyo Reach = Ventura to Chann RS = 1508.52
.013
.013
.013
Legend
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
La Cueva - RESPEC Plan: Plan 81 7/9/2018
Geom: Historic Geometry Flow: Flow 02
River = La Cueva Arroyo Reach = Ventura to Chann RS = 1454.61
.035
.025
.035
Legend
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
La Cueva - RESPEC Plan: Plan 81 7/9/2018
Geom: Historic Geometry Flow: Flow 02
River = La Cueva Arroyo Reach = Ventura to Chann RS = 1381.28
.035
.025
.035
Legend
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
La Cueva - RESPEC Plan: Plan 81 7/9/2018
Geom: Historic Geometry Flow: Flow 02
River = La Cueva Arroyo Reach = Ventura to Chann RS = 1354.1
.035
.025
.035
Legend
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

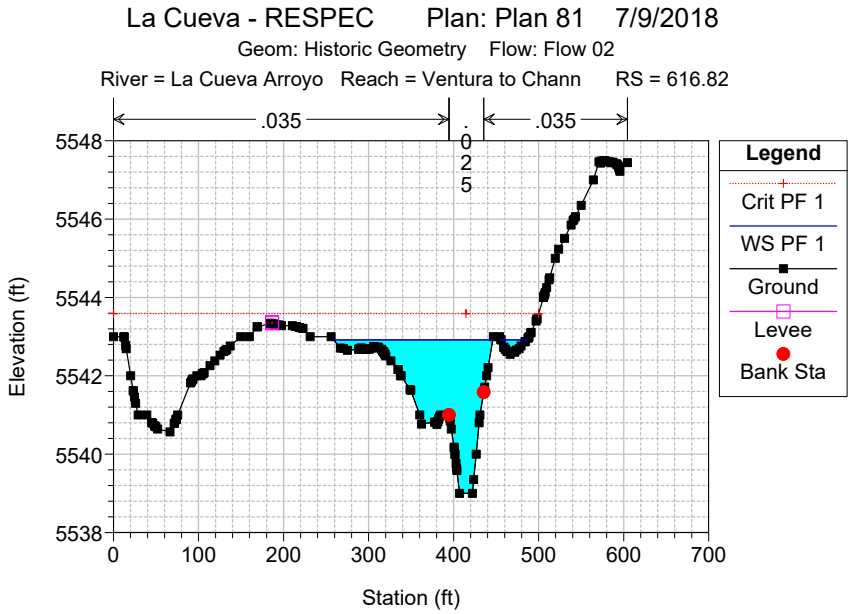

La Cueva - RESPEC Plan: Plan 81 7/9/2018
Geom: Historic Geometry Flow: Flow 02
River = La Cueva Arroyo Reach = Ventura to Chann RS = 1323.43
.035
.025
.035
Legend
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
La Cueva - RESPEC Plan: Plan 81 7/9/2018
Geom: Historic Geometry Flow: Flow 02
River = La Cueva Arroyo Reach = Ventura to Chann RS = 1297.14
.035
.025
.035
Legend
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
La Cueva - RESPEC Plan: Plan 81 7/9/2018
Geom: Historic Geometry Flow: Flow 02
River = La Cueva Arroyo Reach = Ventura to Chann RS = 1274.91
.035
.025
.035
Legend
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
La Cueva - RESPEC Plan: Plan 81 7/9/2018
Geom: Historic Geometry Flow: Flow 02
River = La Cueva Arroyo Reach = Ventura to Chann RS = 1254.2
.035
.025
.035
Legend
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


La Cueva - RESPEC Plan: Plan 81 7/9/2018
Geom: Historic Geometry Flow: Flow 02
River = La Cueva Arroyo Reach = Ventura to Chann RS = 1238.15
.035
.025
.035
Elevation (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
Ground
Bank Sta
La Cueva - RESPEC Plan: Plan 81 7/9/2018
Geom: Historic Geometry Flow: Flow 02
River = La Cueva Arroyo Reach = Ventura to Chann RS = 1207.37
.035
.025
.035
Elevation (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
Ground
Bank Sta
La Cueva - RESPEC Plan: Plan 81 7/9/2018
Geom: Historic Geometry Flow: Flow 02
River = La Cueva Arroyo Reach = Ventura to Chann RS = 1174.73
.015
.025
.035
Elevation (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
Ground
Bank Sta
La Cueva - RESPEC Plan: Plan 81 7/9/2018
Geom: Historic Geometry Flow: Flow 02
River = La Cueva Arroyo Reach = Ventura to Chann RS = 1130.17
.015
.025
.035
Elevation (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
Ground
Bank Sta


La Cueva - RESPEC Plan: Plan 81 7/9/2018
Geom: Historic Geometry Flow: Flow 02
River = La Cueva Arroyo Reach = Ventura to Chann RS = 1089.42
.015
.025
.035
Legend
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
La Cueva - RESPEC Plan: Plan 81 7/9/2018
Geom: Historic Geometry Flow: Flow 02
River = La Cueva Arroyo Reach = Ventura to Chann RS = 1047.06
La Cueva - RESPEC Plan: Plan 81 7/9/2018
Geom: Historic Geometry Flow: Flow 02
River = La Cueva Arroyo Reach = Ventura to Chann RS = 999.65
La Cueva - RESPEC Plan: Plan 81 7/9/2018
Geom: Historic Geometry Flow: Flow 02
River = La Cueva Arroyo Reach = Ventura to Chann RS = 873.91


La Cueva - RESPEC Plan: Plan 81 7/9/2018
Geom: Historic Geometry Flow: Flow 02
River = La Cueva Arroyo Reach = Ventura to Chann RS = 793
.035
.025
.035
Elevation (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
Ground
Bank Sta


La Cueva - RESPEC Plan: Plan 81 7/9/2018
Geom: Historic Geometry Flow: Flow 02
River = La Cueva Arroyo Reach = Ventura to Chann RS = 683.29
.035
.025
.035
Elevation (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta


La Cueva - RESPEC Plan: Plan 81 7/9/2018
Geom: Historic Geometry Flow: Flow 02
River = La Cueva Arroyo Reach = Ventura to Chann RS = 616.82
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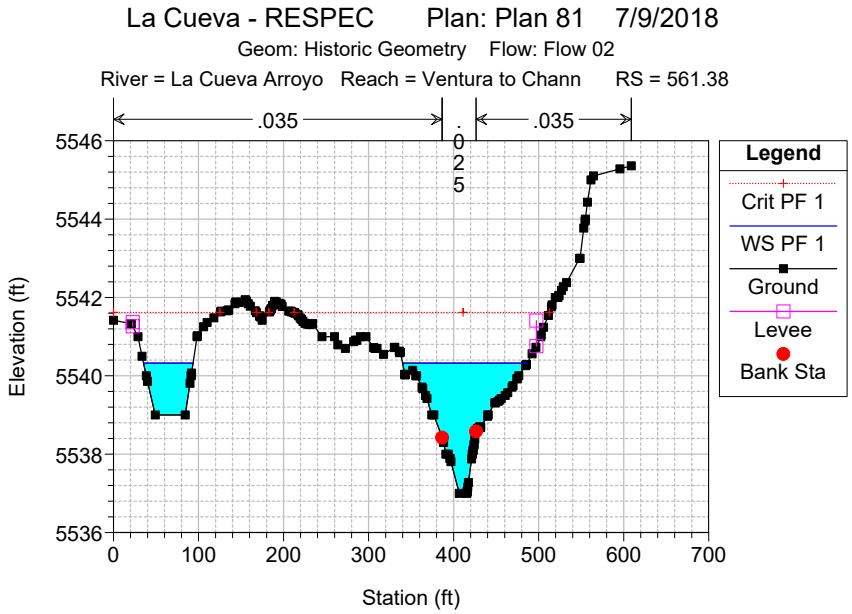
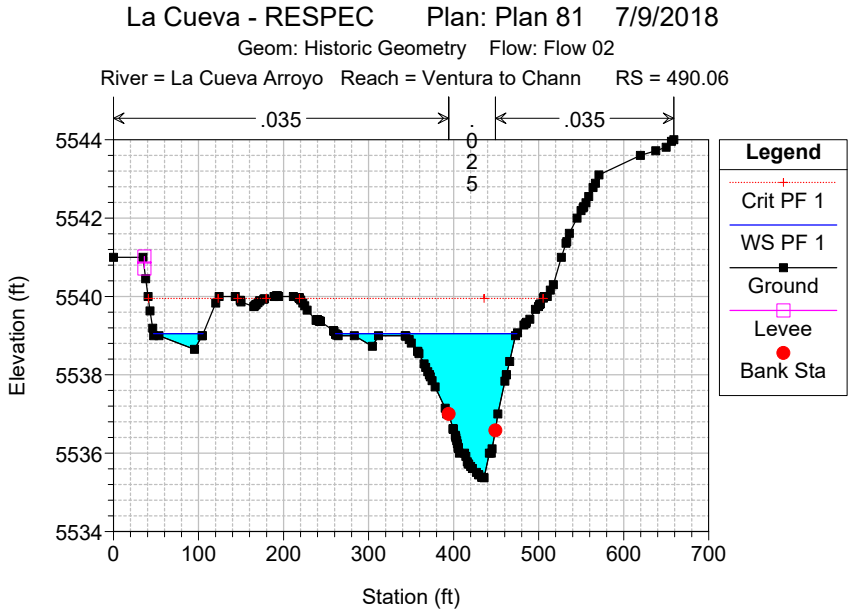
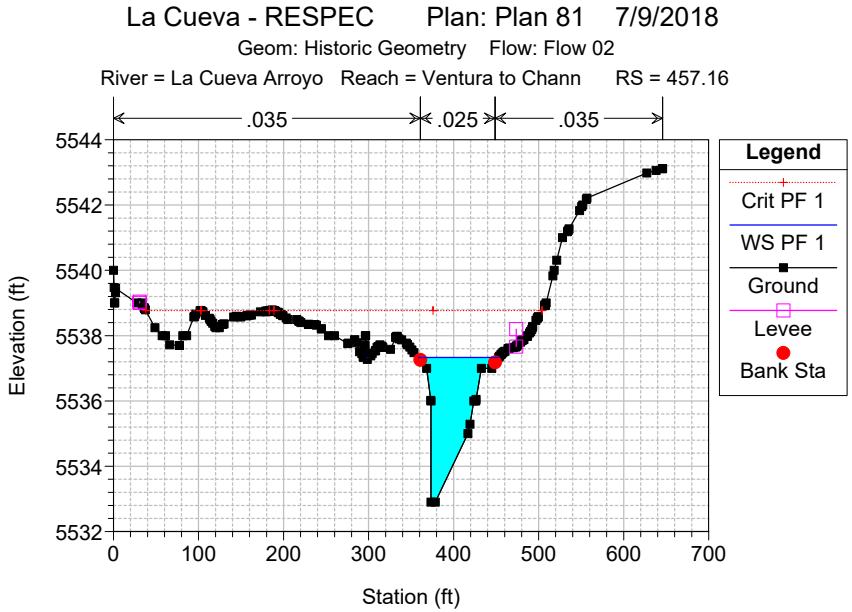
.025
.035
Elevation (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta


La Cueva - RESPEC Plan: Plan 81 7/9/2018
Geom: Historic Geometry Flow: Flow 02
River = La Cueva Arroyo Reach = Ventura to Chann RS = 561.38
.035
.025
.035
Elevation (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta


La Cueva - RESPEC Plan: Plan 81 7/9/2018
Geom: Historic Geometry Flow: Flow 02
River = La Cueva Arroyo Reach = Ventura to Chann RS = 490.06
.035
.025
.035
Legend
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)


La Cueva - RESPEC Plan: Plan 81 7/9/2018
Geom: Historic Geometry Flow: Flow 02
River = La Cueva Arroyo Reach = Ventura to Chann RS = 457.16
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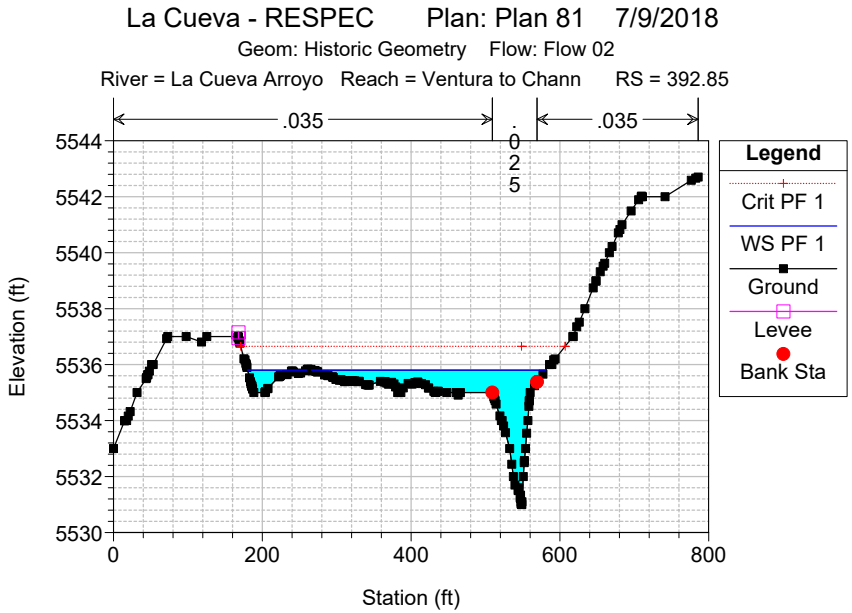
.025
.035
Legend
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)


La Cueva - RESPEC Plan: Plan 81 7/9/2018
Geom: Historic Geometry Flow: Flow 02
River = La Cueva Arroyo Reach = Ventura to Chann RS = 392.85
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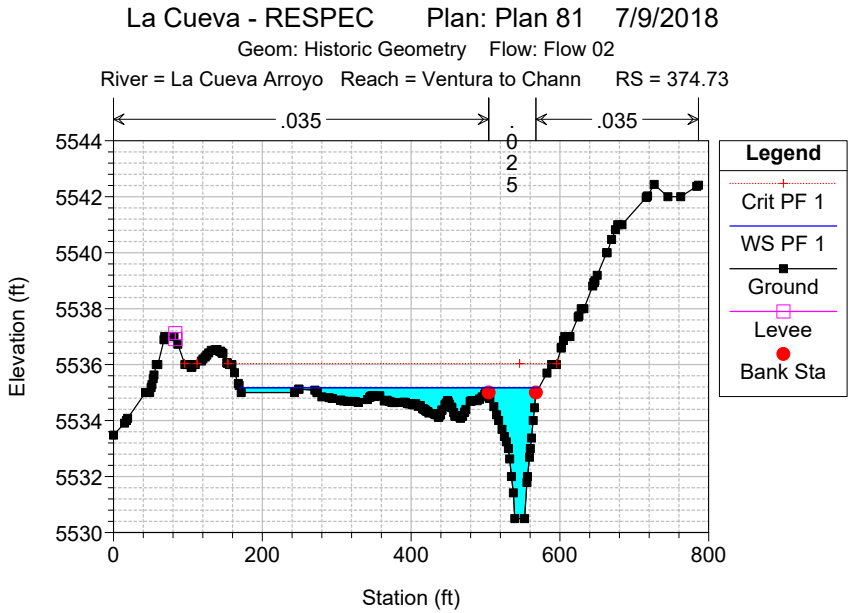
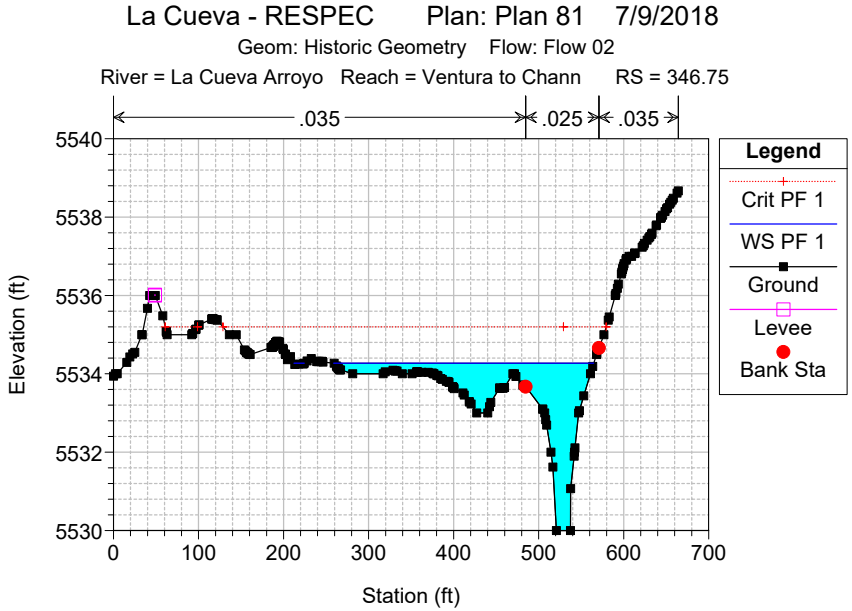
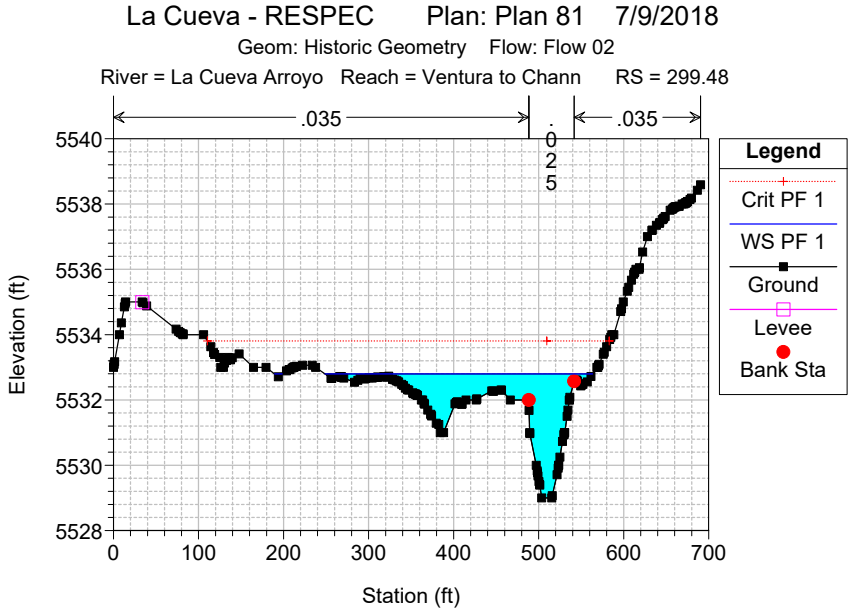
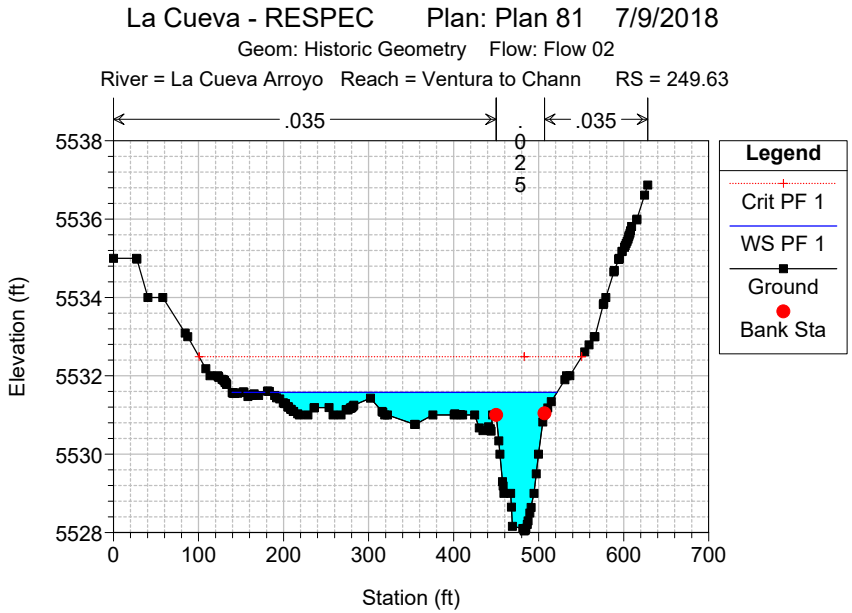
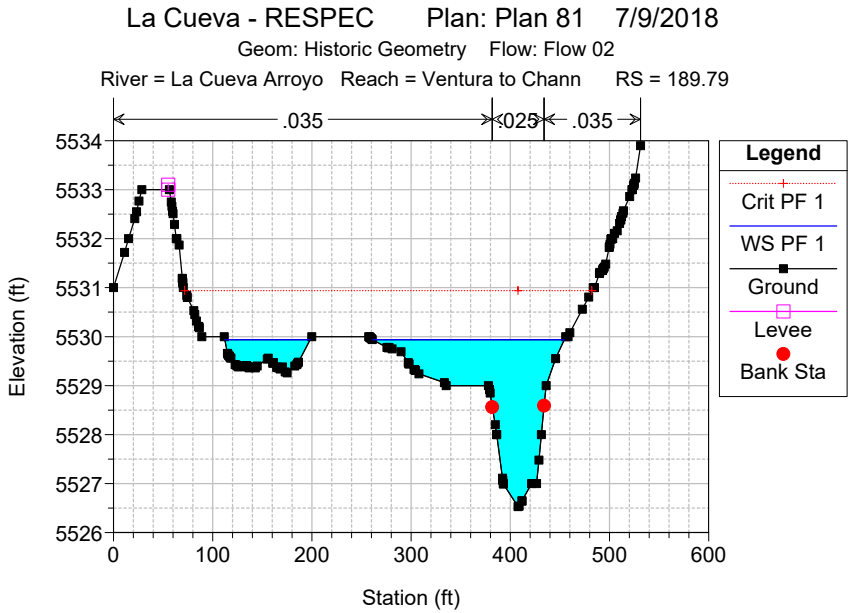
.025
.035
Legend
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

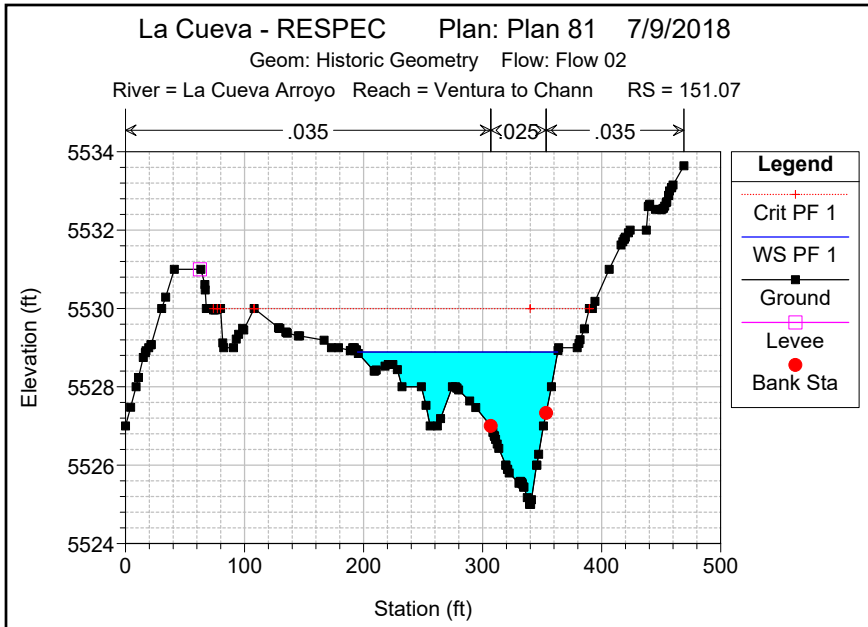

La Cueva - RESPEC Plan: Plan 81 7/9/2018
Geom: Historic Geometry Flow: Flow 02
River = La Cueva Arroyo Reach = Ventura to Chann RS = 374.73
.035
.025
.035
Legend
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

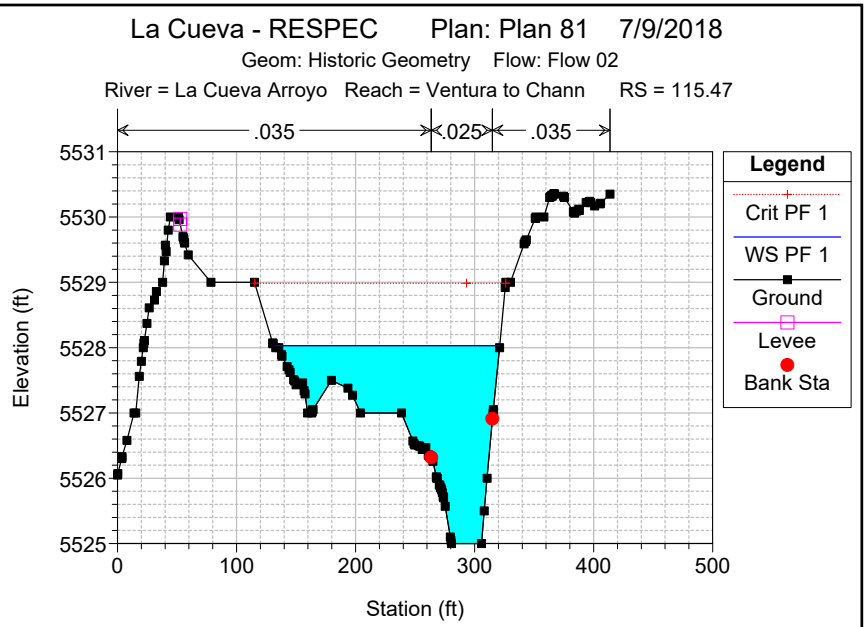

La Cueva - RESPEC Plan: Plan 81 7/9/2018
Geom: Historic Geometry Flow: Flow 02
River = La Cueva Arroyo Reach = Ventura to Chann RS = 346.75
.035
.025
.035
Legend
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

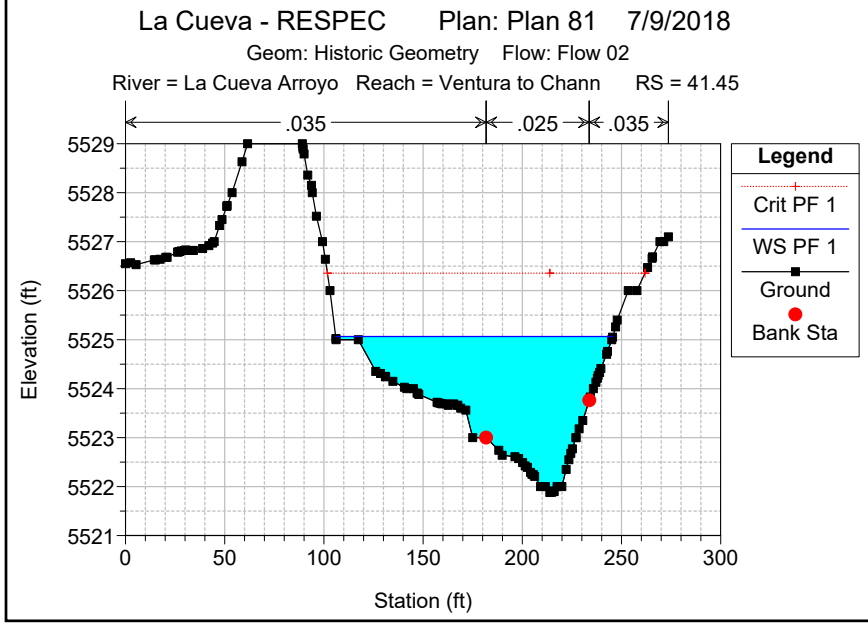

La Cueva - RESPEC Plan: Plan 81 7/9/2018
Geom: Historic Geometry Flow: Flow 02
River = La Cueva Arroyo Reach = Ventura to Chann RS = 299.48
.035
.025
.035
Legend
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

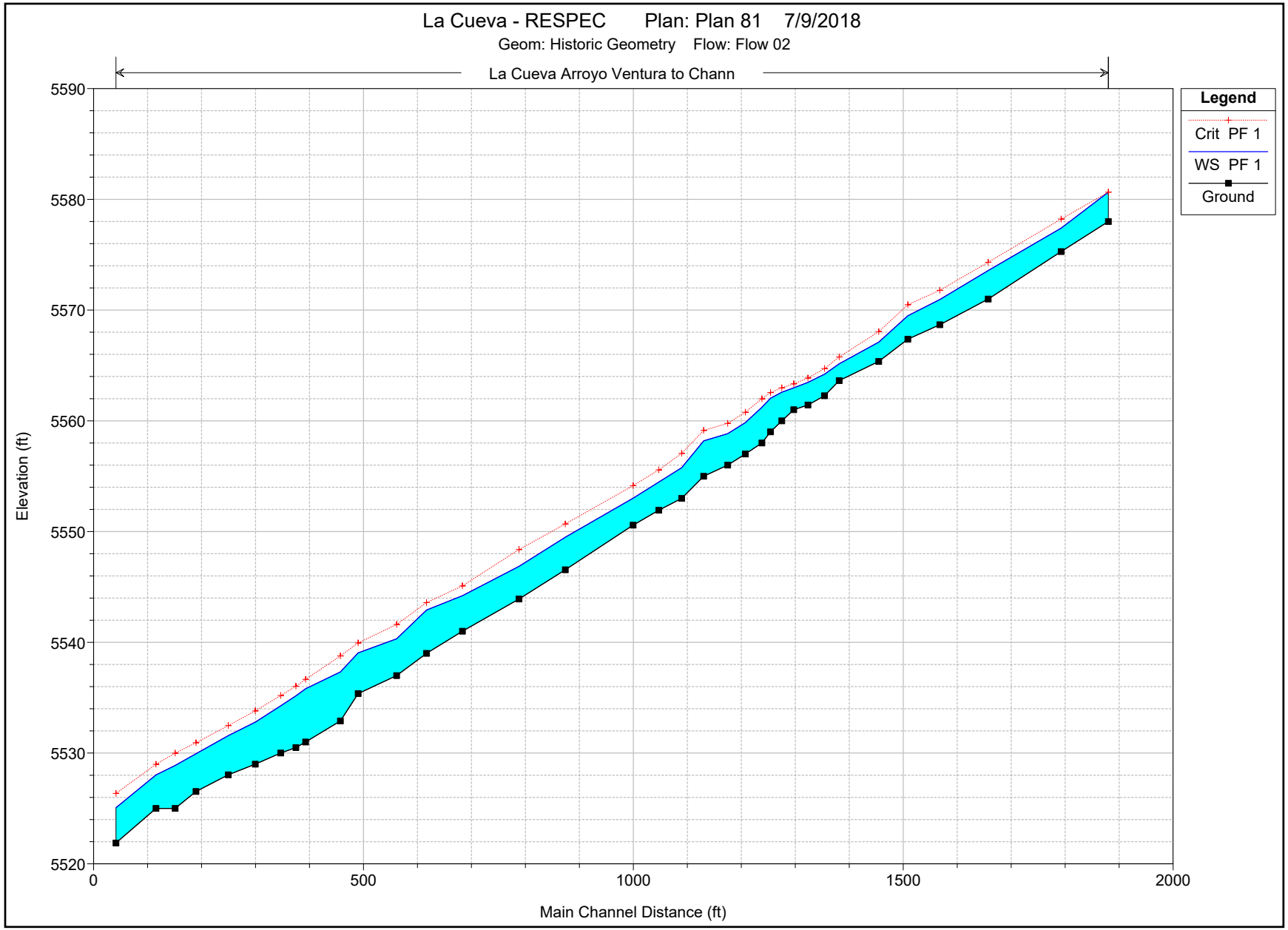

La Cueva - RESPEC Plan: Plan 81 7/9/2018
Geom: Historic Geometry Flow: Flow 02
River = La Cueva Arroyo Reach = Ventura to Chann RS = 249.63
.035
.025
.035
Legend
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


La Cueva - RESPEC Plan: Plan 81 7/9/2018
Geom: Historic Geometry Flow: Flow 02
River = La Cueva Arroyo Reach = Ventura to Chann RS = 189.79
.035
.025
.035
Legend
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)


La Cueva - RESPEC Plan: Plan 81 7/9/2018
Geom: Historic Geometry Flow: Flow 02
River = La Cueva Arroyo Reach = Ventura to Chann RS = 151.07
.035
.025
.035
Elevation (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta


La Cueva - RESPEC Plan: Plan 81 7/9/2018
Geom: Historic Geometry Flow: Flow 02
River = La Cueva Arroyo Reach = Ventura to Chann RS = 115.47
.035
.025
.035
Elevation (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta

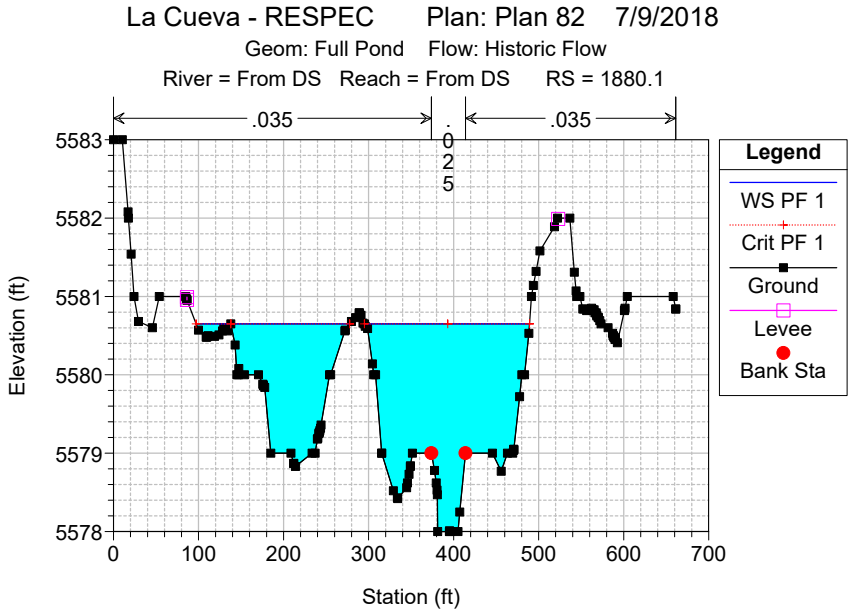

La Cueva - RESPEC Plan: Plan 81 7/9/2018
Geom: Historic Geometry Flow: Flow 02
River = La Cueva Arroyo Reach = Ventura to Chann RS = 41.45
.035
.025
.035
Elevation (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
Ground
Bank Sta

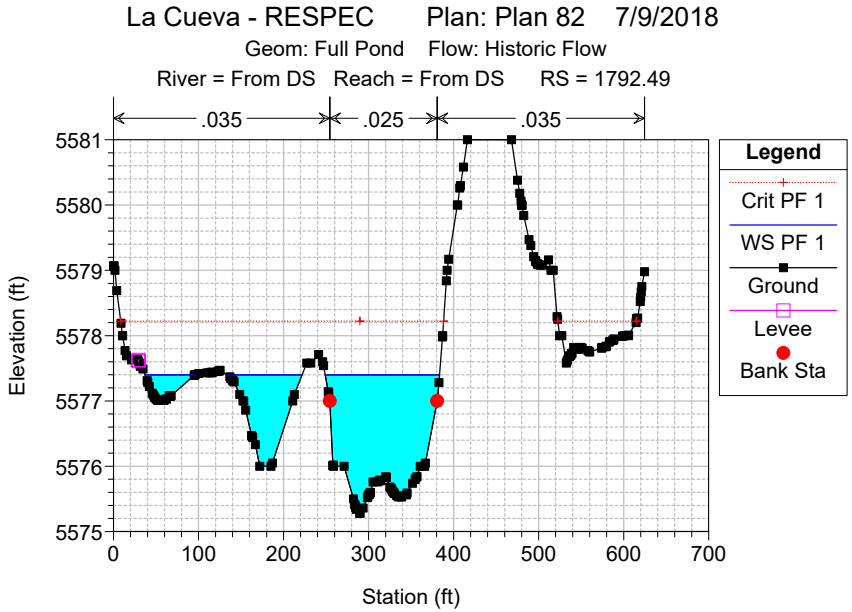

La Cueva - RESPEC Plan: Plan 81 7/9/2018
Geom: Historic Geometry Flow: Flow 02
La Cueva Arroyo Ventura to Chann
Legend
Crit PF 1
WS PF 1
Ground
Elevation (ft)
5590
5580
5570
5560
5550
5540
5530
5520
0
500
1000
1500
2000
Main Channel Distance (ft)

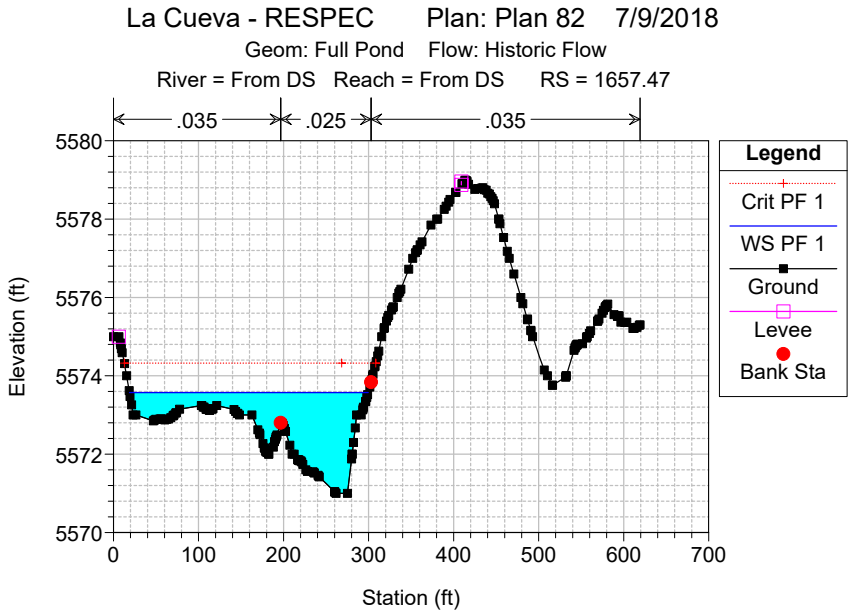
Proposed Condition with Pond and Culverts

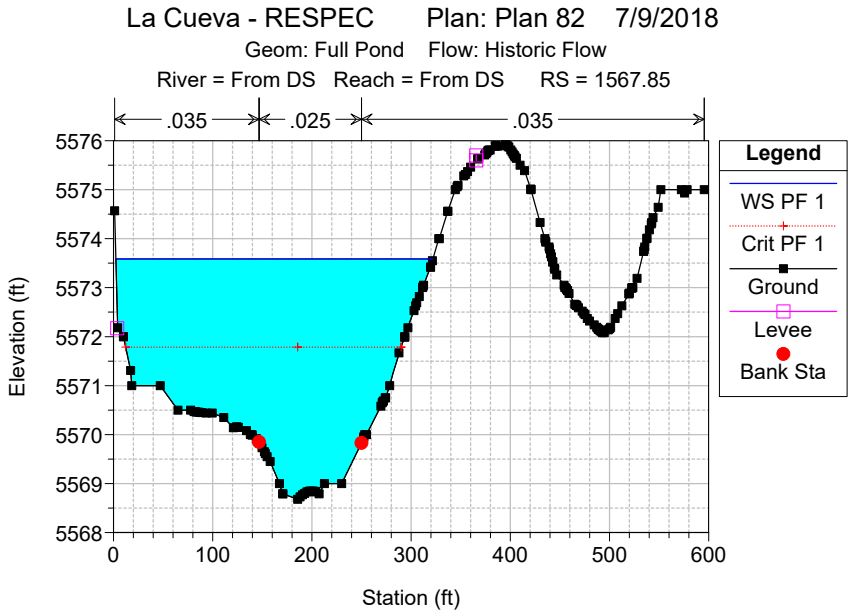
HEC-RAS Plan: Plan 82 River: From DS Reach: From DS Profile: PF 1

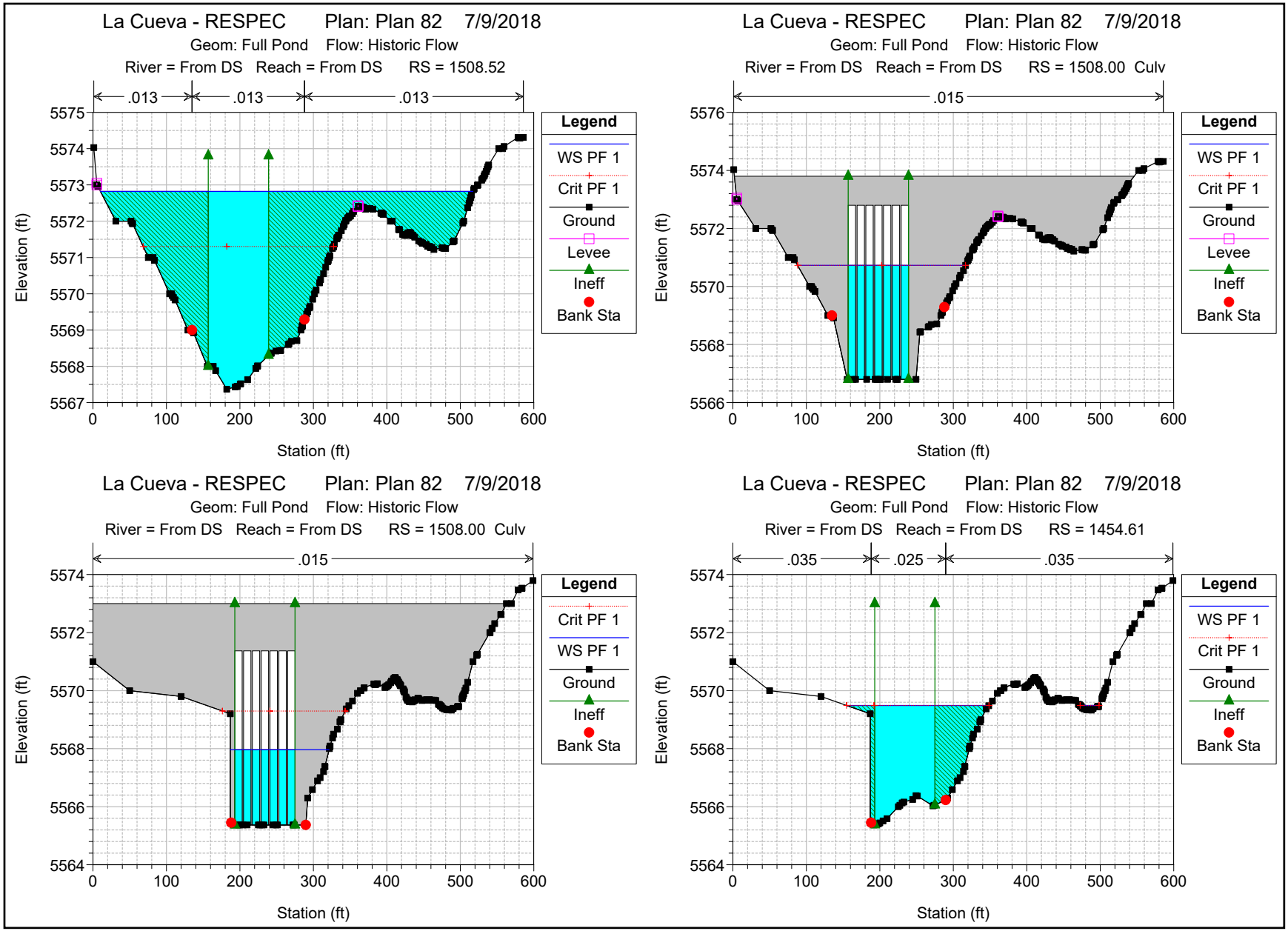
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
From DS	1880.1	PF 1	3090.00	5578.00	5580.65	5580.65	5581.59	0.010833	11.04	480.38	374.74	1.26
From DS	1792.49	PF 1	3090.00	5575.28	5577.40	5578.22	5579.89	0.027793	13.43	279.11	281.13	1.88
From DS	1657.47	PF 1	3090.00	5571.00	5573.57	5574.32	5576.17	0.027070	14.10	290.24	280.79	1.89
From DS	1567.85	PF 1	3090.00	5568.68	5573.59	5571.79	5573.78	0.000647	4.12	1030.75	319.65	0.34
From DS	1508.52	PF 1	3090.00	5567.37	5572.82	5571.30	5573.68	0.000483	7.42	416.31	506.92	0.58
From DS	1508.00		Culvert									
From DS	1454.61	PF 1	3090.00	5565.37	5569.49	5569.49	5571.27	0.006064	10.71	288.58	219.67	1.01
From DS	1381.28	PF 1	3090.00	5563.71	5566.08	5567.33	5569.83	0.030496	15.54	198.90	106.17	2.00
From DS	1354.1	PF 1	3090.00	5563.00	5565.19	5566.44	5568.98	0.031639	16.04	200.82	105.16	2.07
From DS	1323.43	PF 1	3090.00	5562.00	5564.39	5565.64	5568.04	0.027567	15.55	205.28	105.75	1.95
From DS	1297.14	PF 1	3090.00	5561.00	5563.44	5564.55	5567.24	0.033305	16.12	203.68	116.40	2.11
From DS	1274.91	PF 1	3090.00	5560.00	5562.36	5563.59	5566.47	0.038248	16.68	192.78	109.38	2.24
From DS	1254.2	PF 1	3090.00	5559.00	5561.87	5563.05	5565.69	0.030473	15.69	197.06	105.74	2.02
From DS	1238.15	PF 1	3090.00	5558.00	5560.95	5562.18	5565.18	0.028405	17.55	200.18	95.35	2.02
From DS	1207.37	PF 1	3090.00	5557.00	5559.81	5561.22	5564.21	0.027938	16.89	186.70	87.41	1.97
From DS	1174.73	PF 1	3090.00	5556.00	5558.82	5559.83	5563.30	0.027292	18.10	213.25	132.71	2.01
From DS	1130.17	PF 1	3090.00	5555.00	5558.13	5559.37	5562.13	0.022063	16.63	209.66	102.81	1.81
From DS	1089.42	PF 1	3090.00	5553.00	5555.65	5557.04	5560.71	0.052414	18.03	171.41	103.88	2.46
From DS	1047.06	PF 1	3090.00	5551.93	5554.39	5555.59	5558.47	0.040678	16.21	192.00	116.01	2.17
From DS	999.65	PF 1	3090.00	5550.58	5552.98	5554.19	5556.80	0.028002	15.67	197.17	99.18	1.96
From DS	953.12	PF 1	3090.00	5545.20	5546.99	5548.45	5552.22	0.045918	18.33	168.54	94.00	2.41
From DS	918.65	PF 1	3090.00	5544.00	5546.18	5546.53	5547.81	0.011793	10.26	301.18	149.85	1.28
From DS	860	PF 1	3090.00	5539.00	5544.36	5542.06	5544.71	0.000890	4.75	650.06	146.68	0.40
From DS	793	PF 1	3090.00	5537.00	5544.26	5540.84	5544.48	0.000444	3.77	819.02	155.31	0.29
From DS	683.29	PF 1	3090.00	5537.00	5543.76	5541.24	5544.23	0.000997	5.49	562.43	110.55	0.43
From DS	651		Inl Struct									
From DS	561.38	PF 1	3090.00	5535.63	5541.07	5539.03	5541.47	0.000931	5.11	605.21	153.27	0.45
From DS	495		Culvert									
From DS	430	PF 1	3090.00	5530.85	5539.35	5534.62	5539.63	0.000378	4.25	727.64	90.08	0.26
From DS	392.85	PF 1	3090.00	5530.22	5537.75	5537.75	5539.24	0.004717	10.25	358.47	129.90	0.89
From DS	374.73	PF 1	3090.00	5529.80	5535.85	5536.83	5538.93	0.011956	14.23	231.87	94.17	1.37
From DS	346.75	PF 1	3090.00	5529.24	5534.61	5535.77	5538.29	0.022622	15.44	202.20	88.85	1.78
From DS	299.48	PF 1	3090.00	5528.29	5533.03	5534.39	5537.26	0.019183	17.17	216.69	127.13	1.72
From DS	249.63	PF 1	3090.00	5527.21	5531.61	5532.96	5536.16	0.024038	17.86	213.60	147.89	1.89
From DS	189.79	PF 1	3090.00	5526.10	5529.86	5531.17	5534.61	0.025064	18.57	225.23	184.84	1.96
From DS	151.07	PF 1	3090.00	5525.32	5528.78	5530.00	5533.32	0.027034	19.03	231.45	164.66	2.03
From DS	115.47	PF 1	3090.00	5524.60	5527.86	5528.98	5532.29	0.026208	18.42	234.99	181.72	1.98
From DS	41.45	PF 1	3090.00	5521.88	5524.97	5526.36	5529.96	0.033327	19.60	203.07	127.02	2.21

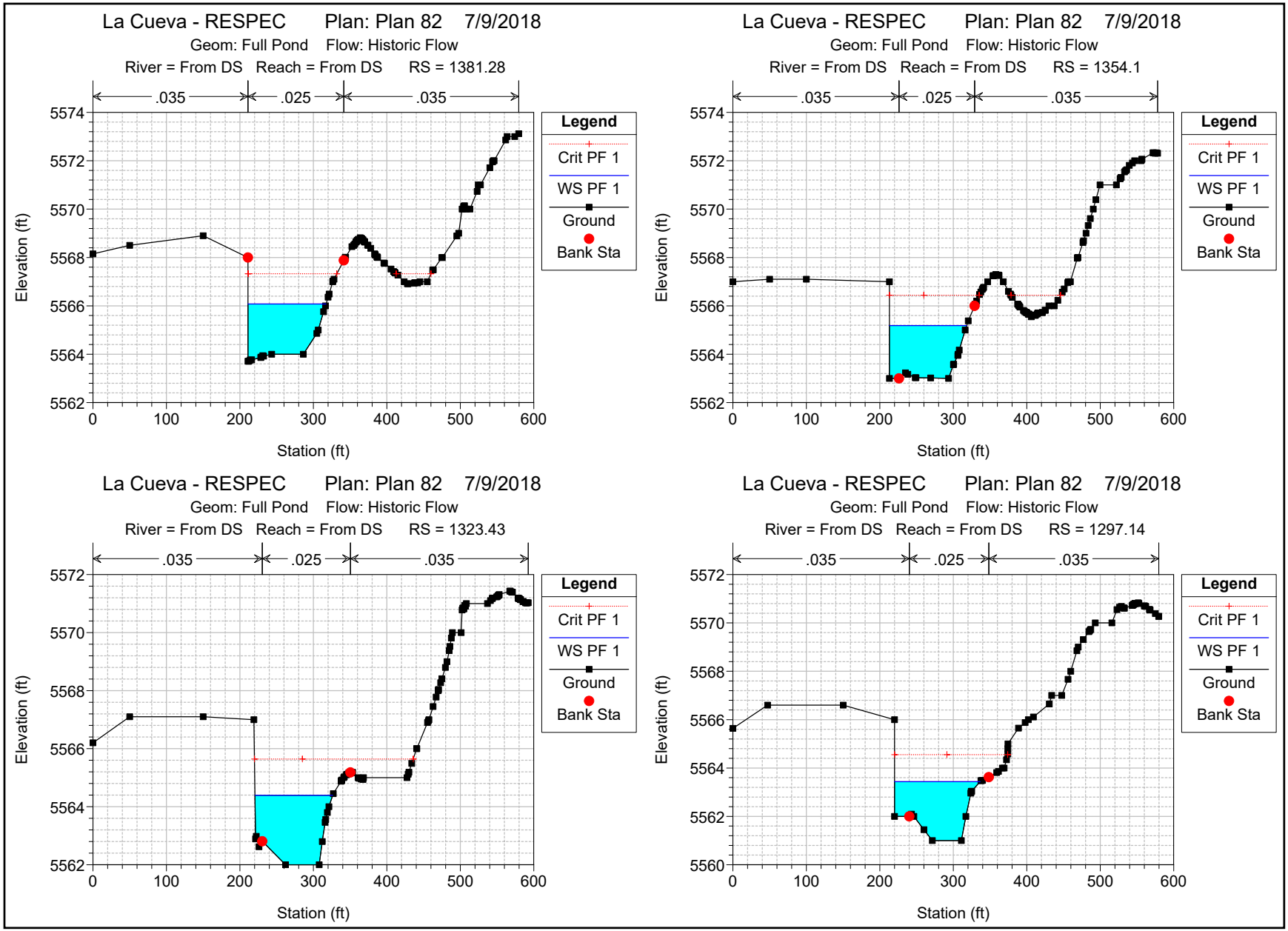

La Cueva - RESPEC Plan: Plan 82 7/9/2018
Geom: Full Pond Flow: Historic Flow
River = From DS Reach = From DS RS = 1880.1
.035
.025
.035
Legend
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

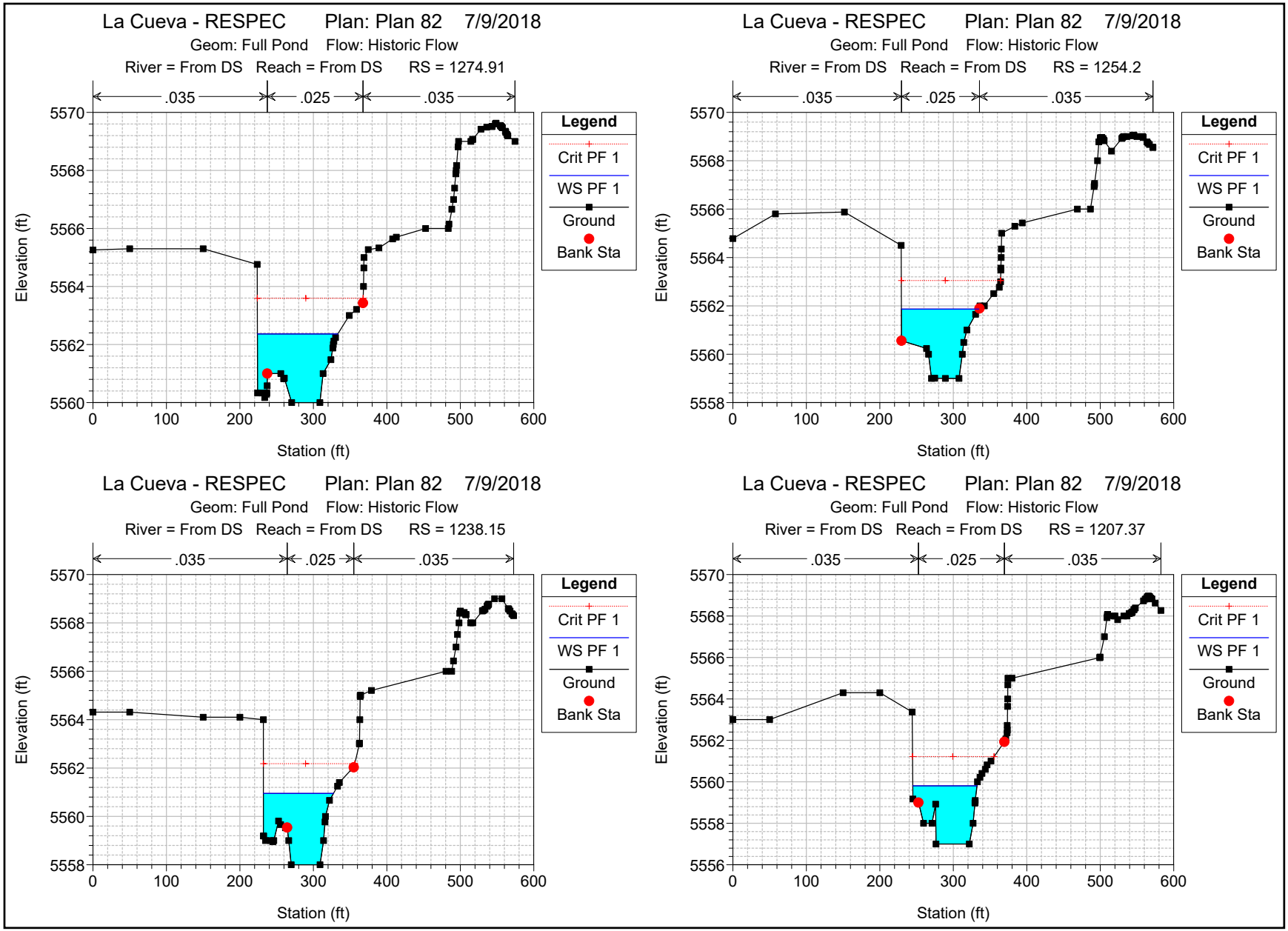

La Cueva - RESPEC Plan: Plan 82 7/9/2018
Geom: Full Pond Flow: Historic Flow
River = From DS Reach = From DS RS = 1792.49
.035
.025
.035
Legend
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

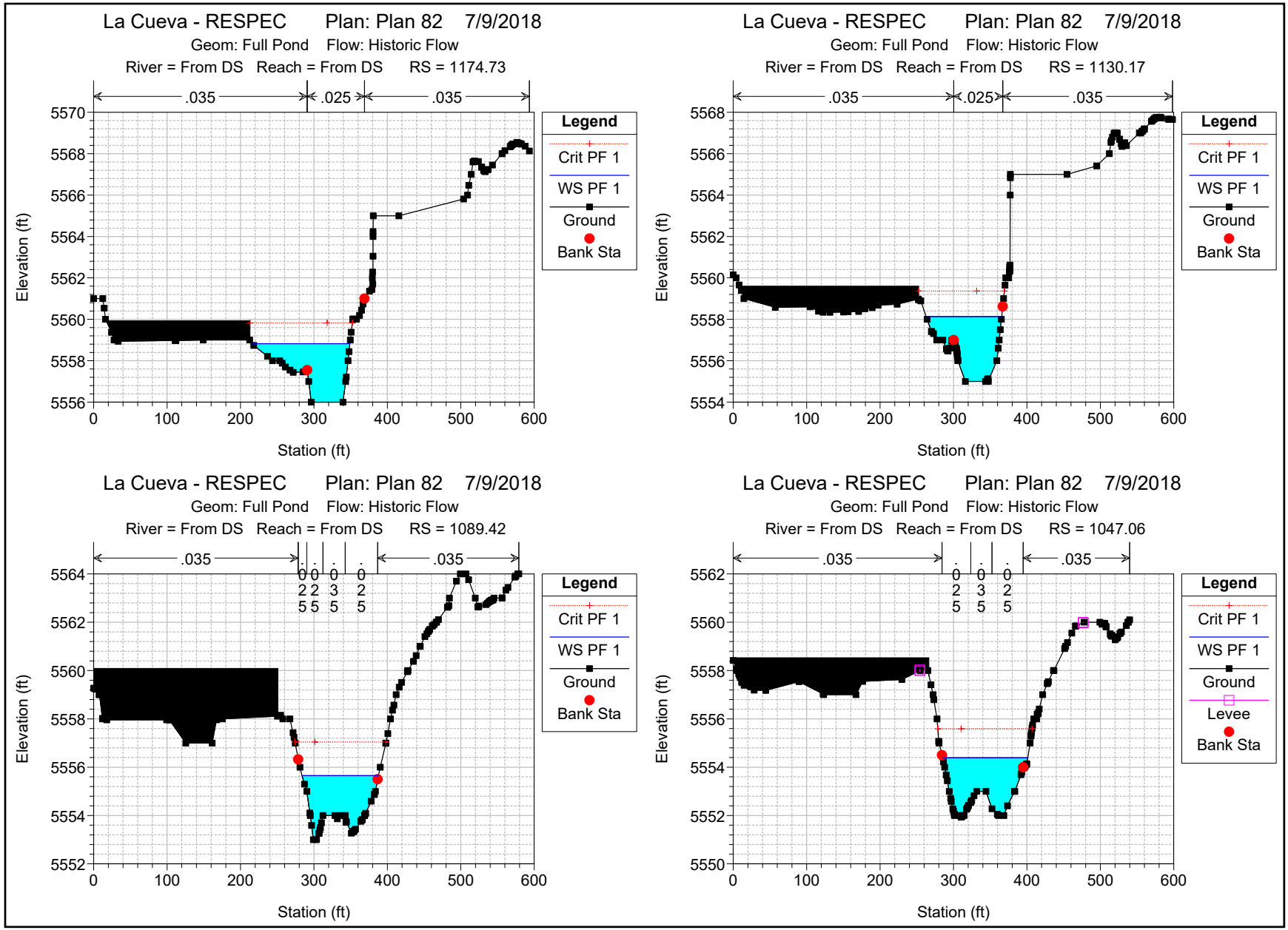

La Cueva - RESPEC Plan: Plan 82 7/9/2018
Geom: Full Pond Flow: Historic Flow
River = From DS Reach = From DS RS = 1657.47
.035
.025
.035
Legend
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

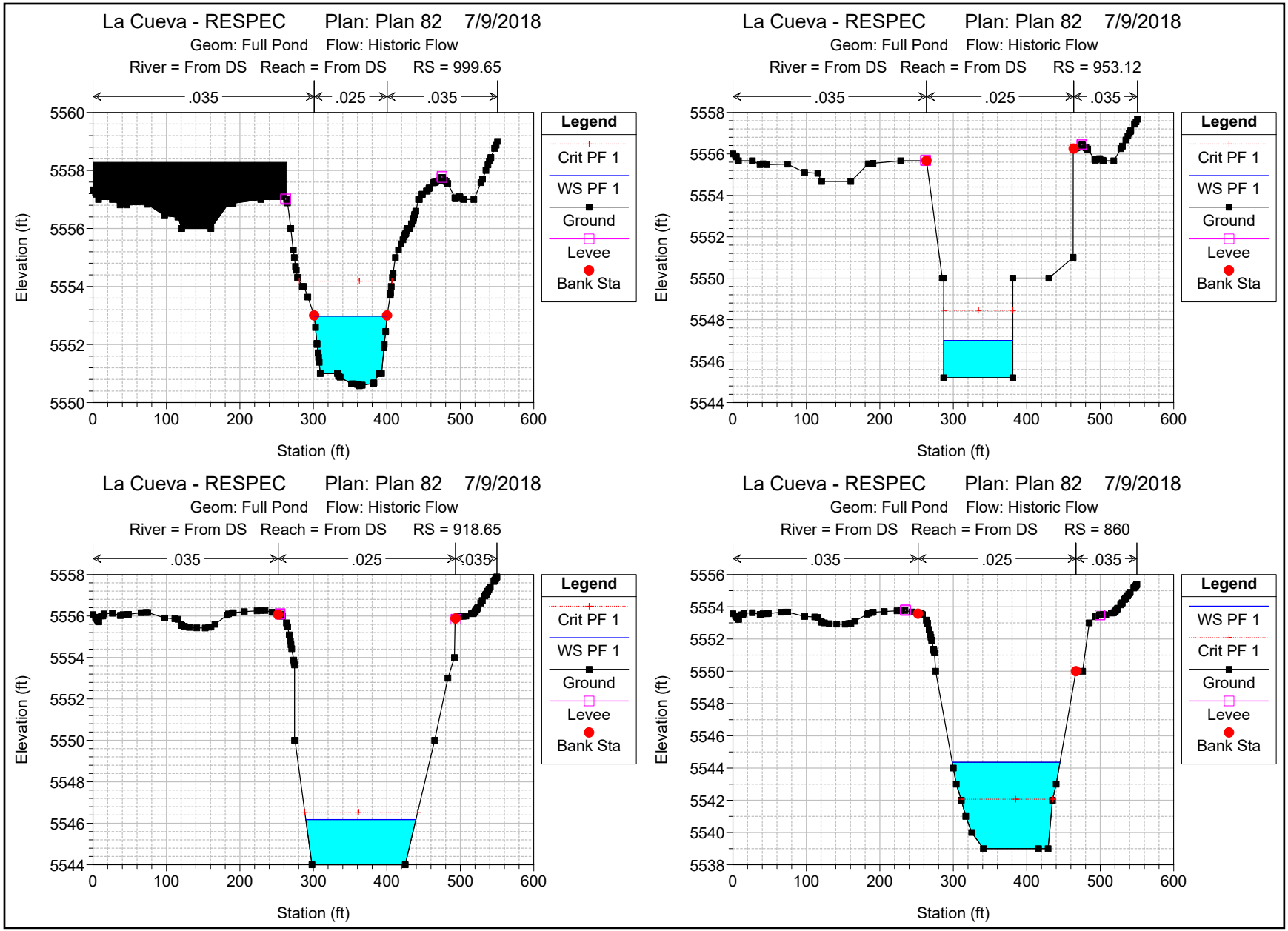

La Cueva - RESPEC Plan: Plan 82 7/9/2018
Geom: Full Pond Flow: Historic Flow
River = From DS Reach = From DS RS = 1567.85
.035
.025
.035
Legend
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

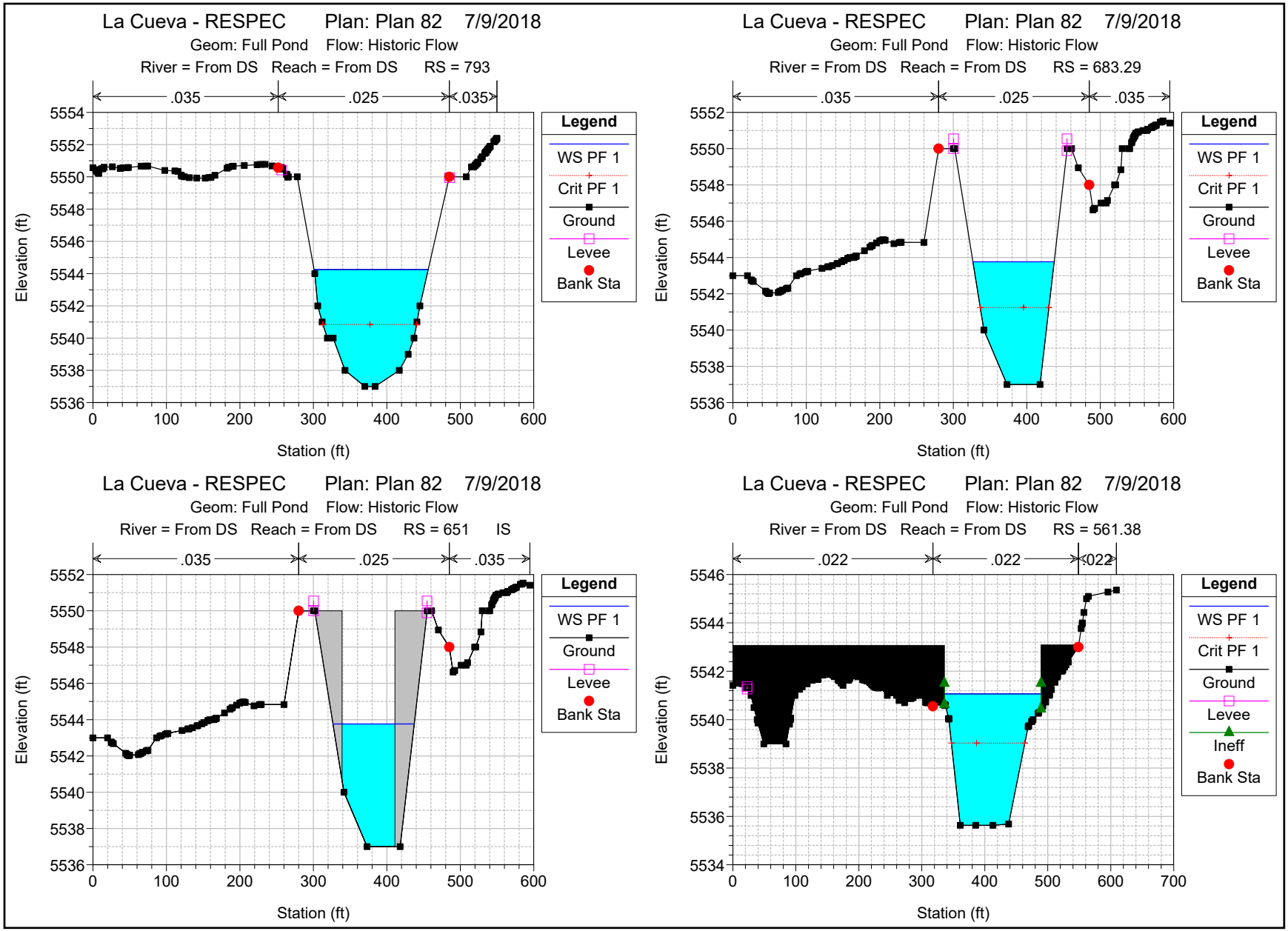

La Cueva - RESPEC Plan: Plan 82 7/9/2018
Geom: Full Pond Flow: Historic Flow
River = From DS Reach = From DS RS = 1508.52
.013
.013
.013
Elevation (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
Ground
Levee
Ineff
Bank Sta
La Cueva - RESPEC Plan: Plan 82 7/9/2018
Geom: Full Pond Flow: Historic Flow
River = From DS Reach = From DS RS = 1508.00 Culv
.015
Elevation (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
Ground
Levee
Ineff
Bank Sta
La Cueva - RESPEC Plan: Plan 82 7/9/2018
Geom: Full Pond Flow: Historic Flow
River = From DS Reach = From DS RS = 1508.00 Culv
.015
Elevation (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
Ground
Ineff
Bank Sta
La Cueva - RESPEC Plan: Plan 82 7/9/2018
Geom: Full Pond Flow: Historic Flow
River = From DS Reach = From DS RS = 1454.61
.035
.025
.035
Elevation (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta

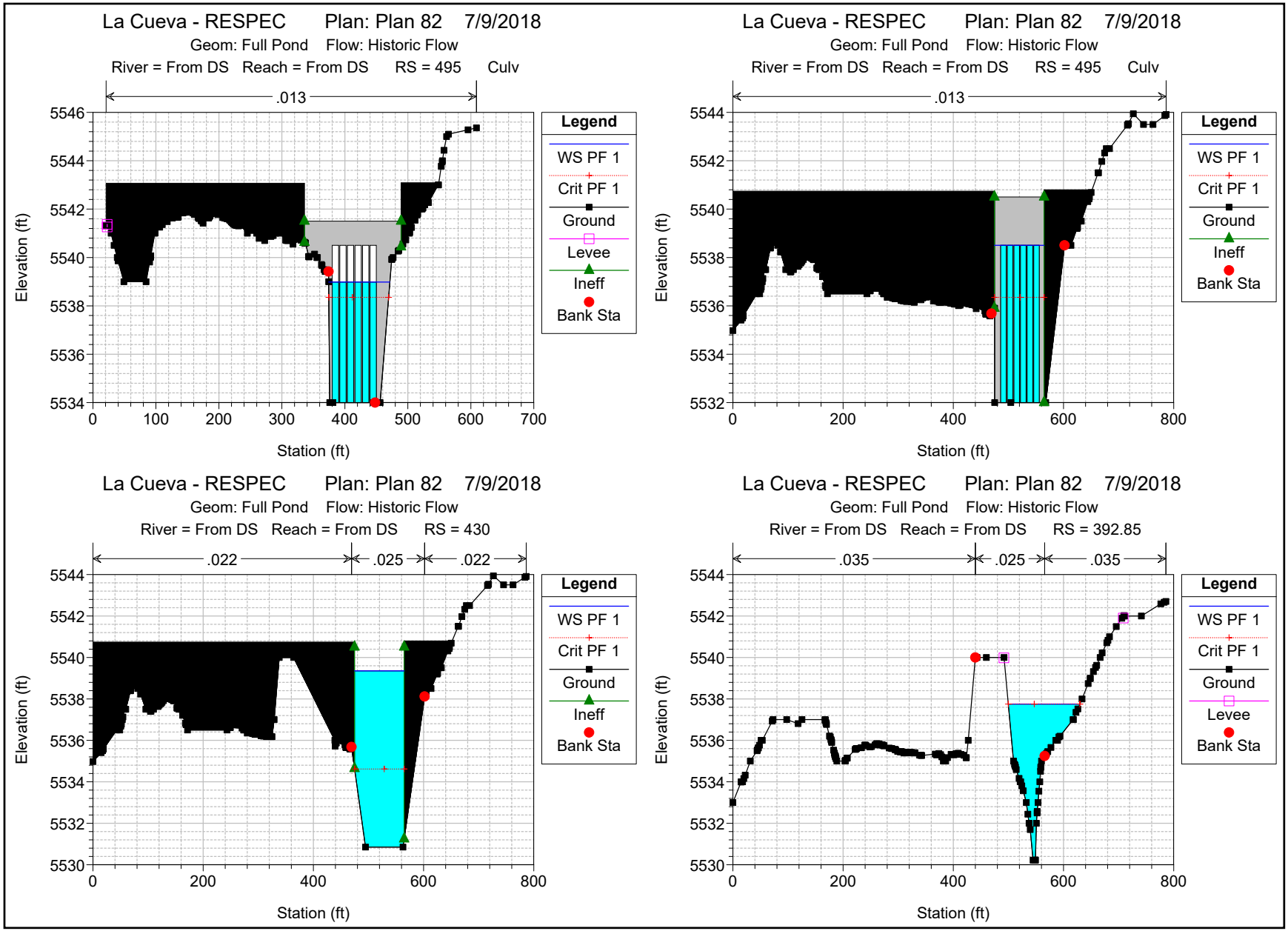

La Cueva - RESPEC Plan: Plan 82 7/9/2018
Geom: Full Pond Flow: Historic Flow
River = From DS Reach = From DS RS = 1381.28
.035
.025
.035
Legend
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
La Cueva - RESPEC Plan: Plan 82 7/9/2018
Geom: Full Pond Flow: Historic Flow
River = From DS Reach = From DS RS = 1354.1
La Cueva - RESPEC Plan: Plan 82 7/9/2018
Geom: Full Pond Flow: Historic Flow
River = From DS Reach = From DS RS = 1323.43
La Cueva - RESPEC Plan: Plan 82 7/9/2018
Geom: Full Pond Flow: Historic Flow
River = From DS Reach = From DS RS = 1297.14

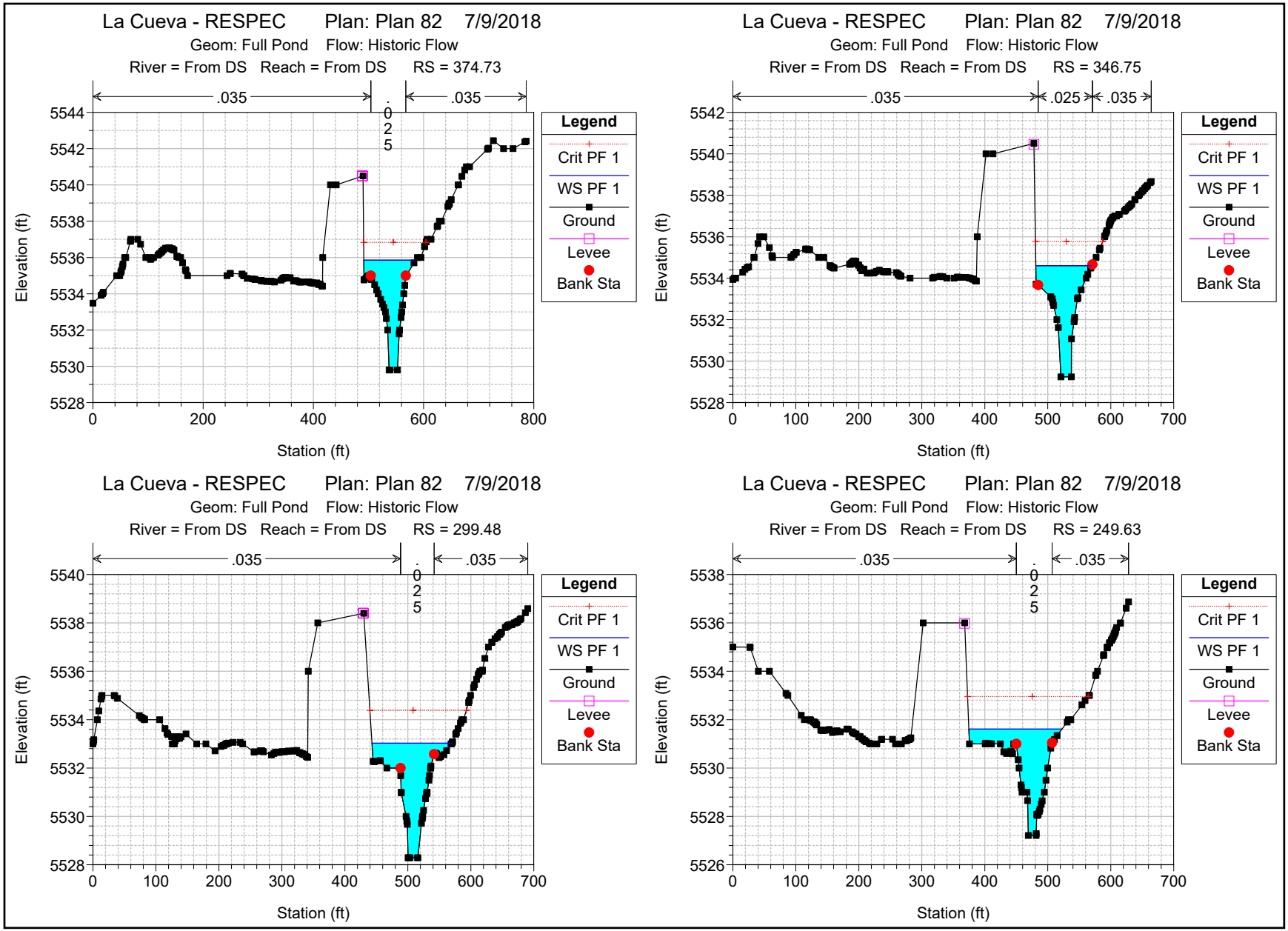

La Cueva - RESPEC Plan: Plan 82 7/9/2018
Geom: Full Pond Flow: Historic Flow
River = From DS Reach = From DS RS = 1274.91
.035
.025
.035
Elevation (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
Ground
Bank Sta
La Cueva - RESPEC Plan: Plan 82 7/9/2018
Geom: Full Pond Flow: Historic Flow
River = From DS Reach = From DS RS = 1254.2
La Cueva - RESPEC Plan: Plan 82 7/9/2018
Geom: Full Pond Flow: Historic Flow
River = From DS Reach = From DS RS = 1238.15
La Cueva - RESPEC Plan: Plan 82 7/9/2018
Geom: Full Pond Flow: Historic Flow
River = From DS Reach = From DS RS = 1207.37

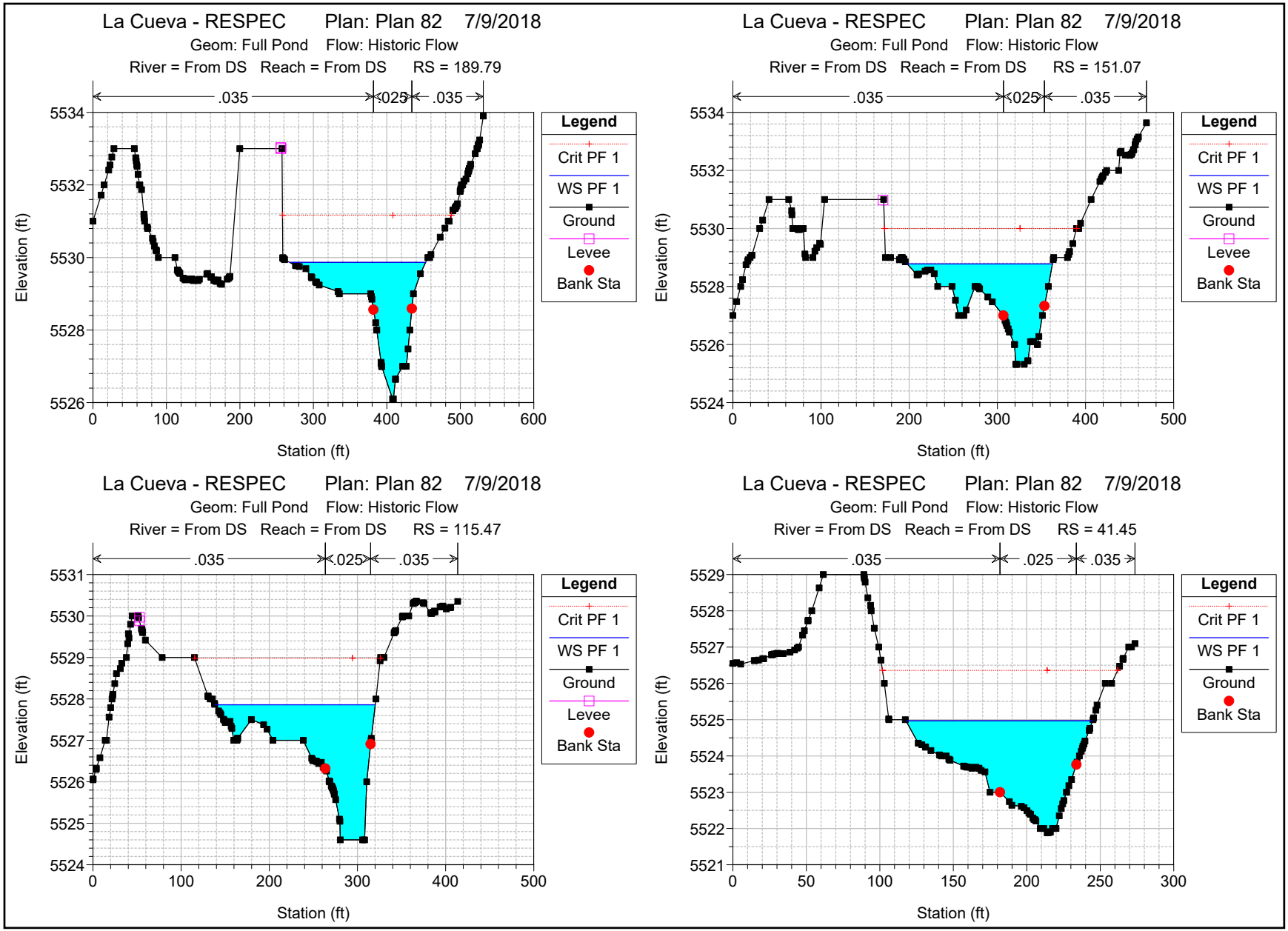

La Cueva - RESPEC Plan: Plan 82 7/9/2018
Geom: Full Pond Flow: Historic Flow
River = From DS Reach = From DS RS = 1174.73
.035
.025
.035
Elevation (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
Ground
Bank Sta
La Cueva - RESPEC Plan: Plan 82 7/9/2018
Geom: Full Pond Flow: Historic Flow
River = From DS Reach = From DS RS = 1130.17
.035
.025
.035
Elevation (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
Ground
Bank Sta
La Cueva - RESPEC Plan: Plan 82 7/9/2018
Geom: Full Pond Flow: Historic Flow
River = From DS Reach = From DS RS = 1089.42
.035
.035
Elevation (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
Ground
Bank Sta
La Cueva - RESPEC Plan: Plan 82 7/9/2018
Geom: Full Pond Flow: Historic Flow
River = From DS Reach = From DS RS = 1047.06
.035
.035
Elevation (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta

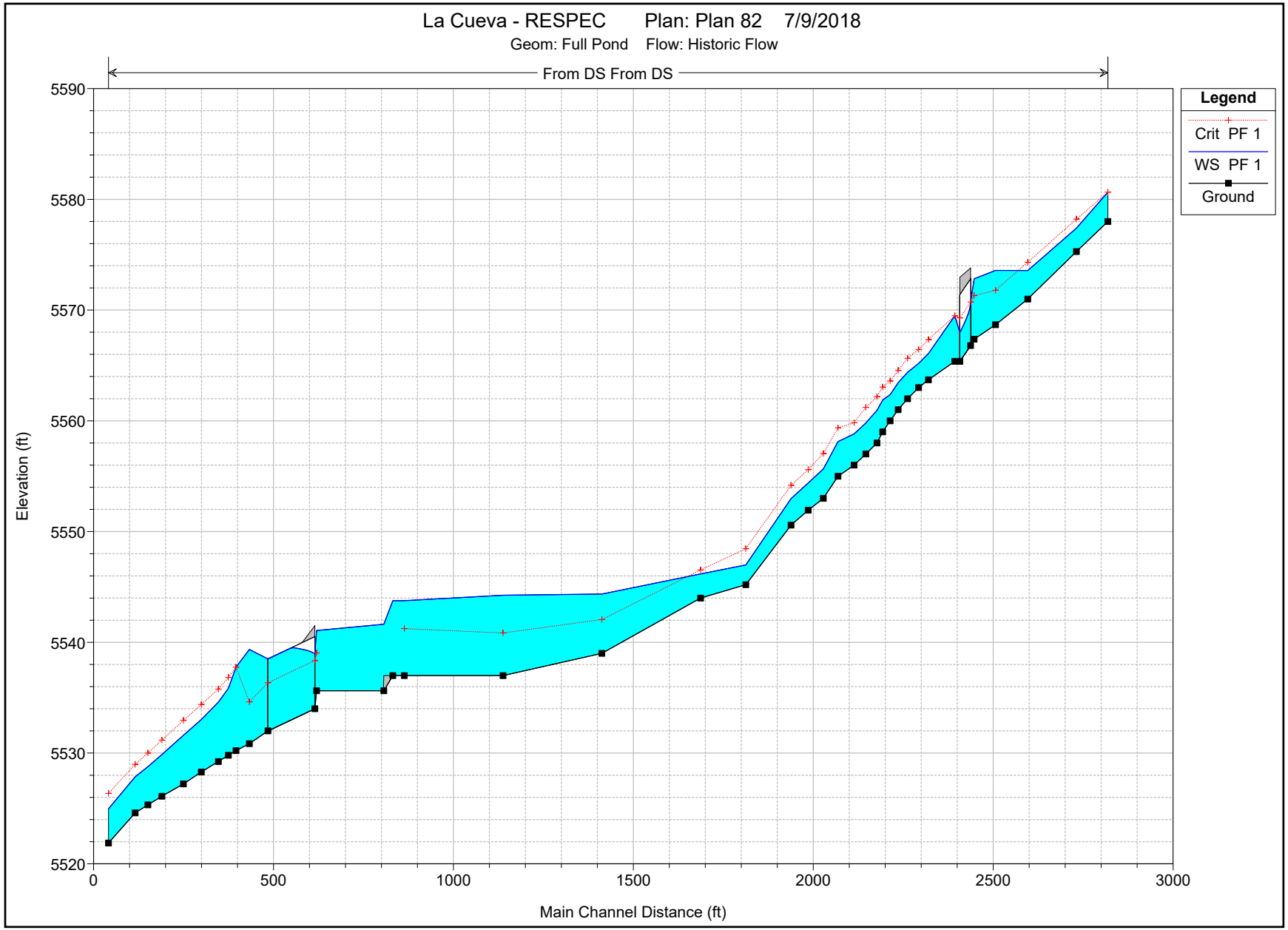

La Cueva - RESPEC Plan: Plan 82 7/9/2018
Geom: Full Pond Flow: Historic Flow
River = From DS Reach = From DS RS = 999.65
.035
.025
.035
Elevation (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta
La Cueva - RESPEC Plan: Plan 82 7/9/2018
Geom: Full Pond Flow: Historic Flow
River = From DS Reach = From DS RS = 953.12
.035
.025
.035
Elevation (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta
La Cueva - RESPEC Plan: Plan 82 7/9/2018
Geom: Full Pond Flow: Historic Flow
River = From DS Reach = From DS RS = 918.65
.035
.025
.035
Elevation (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta
La Cueva - RESPEC Plan: Plan 82 7/9/2018
Geom: Full Pond Flow: Historic Flow
River = From DS Reach = From DS RS = 860
.035
.025
.035
Elevation (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta


La Cueva - RESPEC Plan: Plan 82 7/9/2018
Geom: Full Pond Flow: Historic Flow
River = From DS Reach = From DS RS = 793
.035
.025
.035
Elevation (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
La Cueva - RESPEC Plan: Plan 82 7/9/2018
Geom: Full Pond Flow: Historic Flow
River = From DS Reach = From DS RS = 683.29
.035
.025
.035
Elevation (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
La Cueva - RESPEC Plan: Plan 82 7/9/2018
Geom: Full Pond Flow: Historic Flow
River = From DS Reach = From DS RS = 651 IS
.035
.025
.035
Elevation (ft)
Station (ft)
Legend
WS PF 1
Ground
Levee
Bank Sta
La Cueva - RESPEC Plan: Plan 82 7/9/2018
Geom: Full Pond Flow: Historic Flow
River = From DS Reach = From DS RS = 561.38
.022
.022
.022
Elevation (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
Ground
Levee
Ineff
Bank Sta


La Cueva - RESPEC Plan: Plan 82 7/9/2018
Geom: Full Pond Flow: Historic Flow
River = From DS Reach = From DS RS = 495 Culv
.013
Elevation (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
Ground
Levee
Ineff
Bank Sta
La Cueva - RESPEC Plan: Plan 82 7/9/2018
Geom: Full Pond Flow: Historic Flow
River = From DS Reach = From DS RS = 495 Culv
.013
Elevation (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
La Cueva - RESPEC Plan: Plan 82 7/9/2018
Geom: Full Pond Flow: Historic Flow
River = From DS Reach = From DS RS = 430
.022
.025
.022
Elevation (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
La Cueva - RESPEC Plan: Plan 82 7/9/2018
Geom: Full Pond Flow: Historic Flow
River = From DS Reach = From DS RS = 392.85
.035
.025
.035
Elevation (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta


La Cueva - RESPEC Plan: Plan 82 7/9/2018
Geom: Full Pond Flow: Historic Flow
River = From DS Reach = From DS RS = 374.73
.035
.025
.035
Legend
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
La Cueva - RESPEC Plan: Plan 82 7/9/2018
Geom: Full Pond Flow: Historic Flow
River = From DS Reach = From DS RS = 346.75
.035
.025
.035
Legend
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
La Cueva - RESPEC Plan: Plan 82 7/9/2018
Geom: Full Pond Flow: Historic Flow
River = From DS Reach = From DS RS = 299.48
.035
.025
.035
Legend
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
La Cueva - RESPEC Plan: Plan 82 7/9/2018
Geom: Full Pond Flow: Historic Flow
River = From DS Reach = From DS RS = 249.63
.035
.025
.035
Legend
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

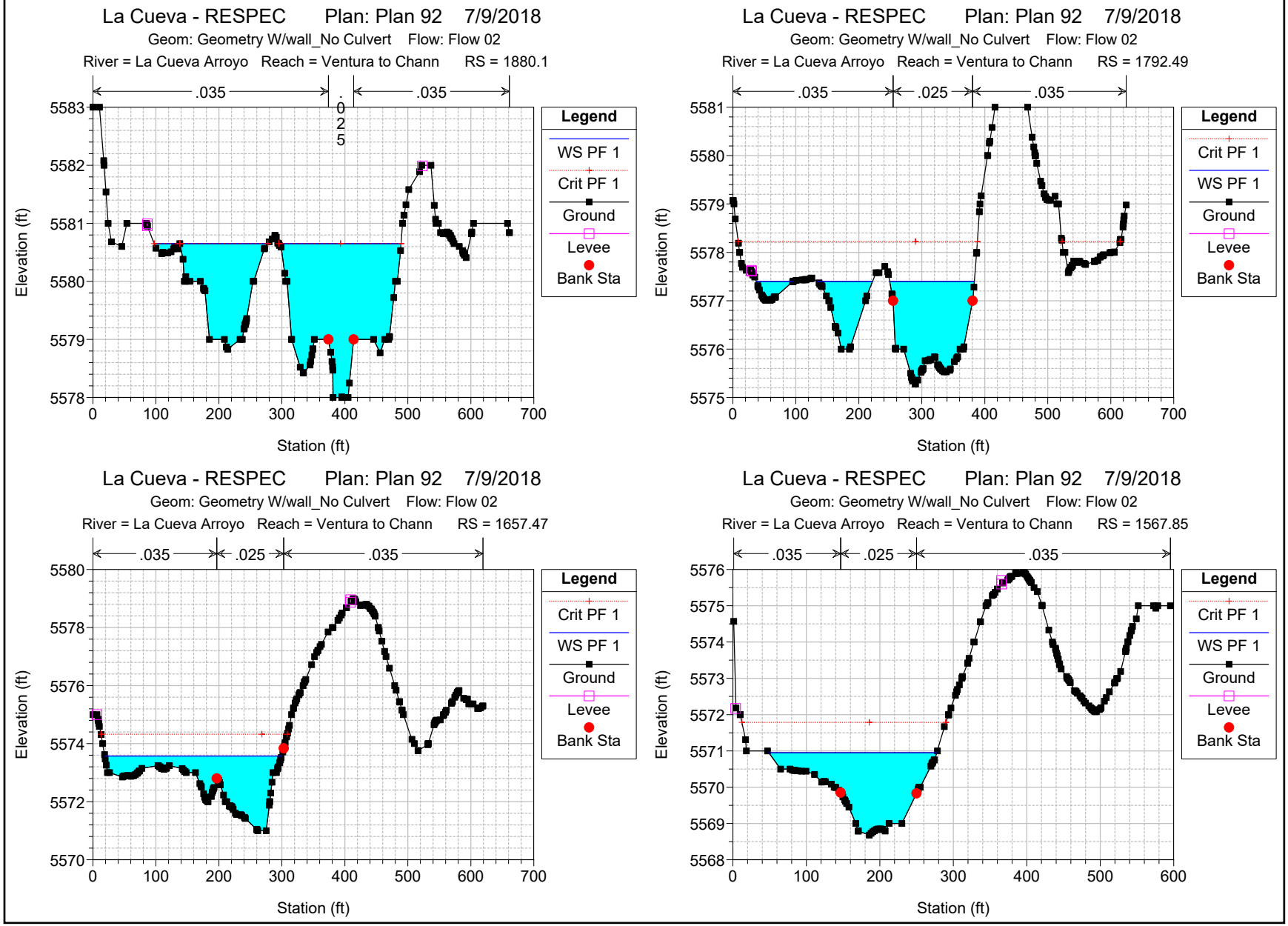

La Cueva - RESPEC Plan: Plan 82 7/9/2018
Geom: Full Pond Flow: Historic Flow
River = From DS Reach = From DS RS = 189.79
.035
.025
.035
Elevation (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta
La Cueva - RESPEC Plan: Plan 82 7/9/2018
Geom: Full Pond Flow: Historic Flow
River = From DS Reach = From DS RS = 151.07
.035
.025
.035
Elevation (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta
La Cueva - RESPEC Plan: Plan 82 7/9/2018
Geom: Full Pond Flow: Historic Flow
River = From DS Reach = From DS RS = 115.47
.035
.025
.035
Elevation (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta
La Cueva - RESPEC Plan: Plan 82 7/9/2018
Geom: Full Pond Flow: Historic Flow
River = From DS Reach = From DS RS = 41.45
.035
.025
.035
Elevation (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
Ground
Bank Sta

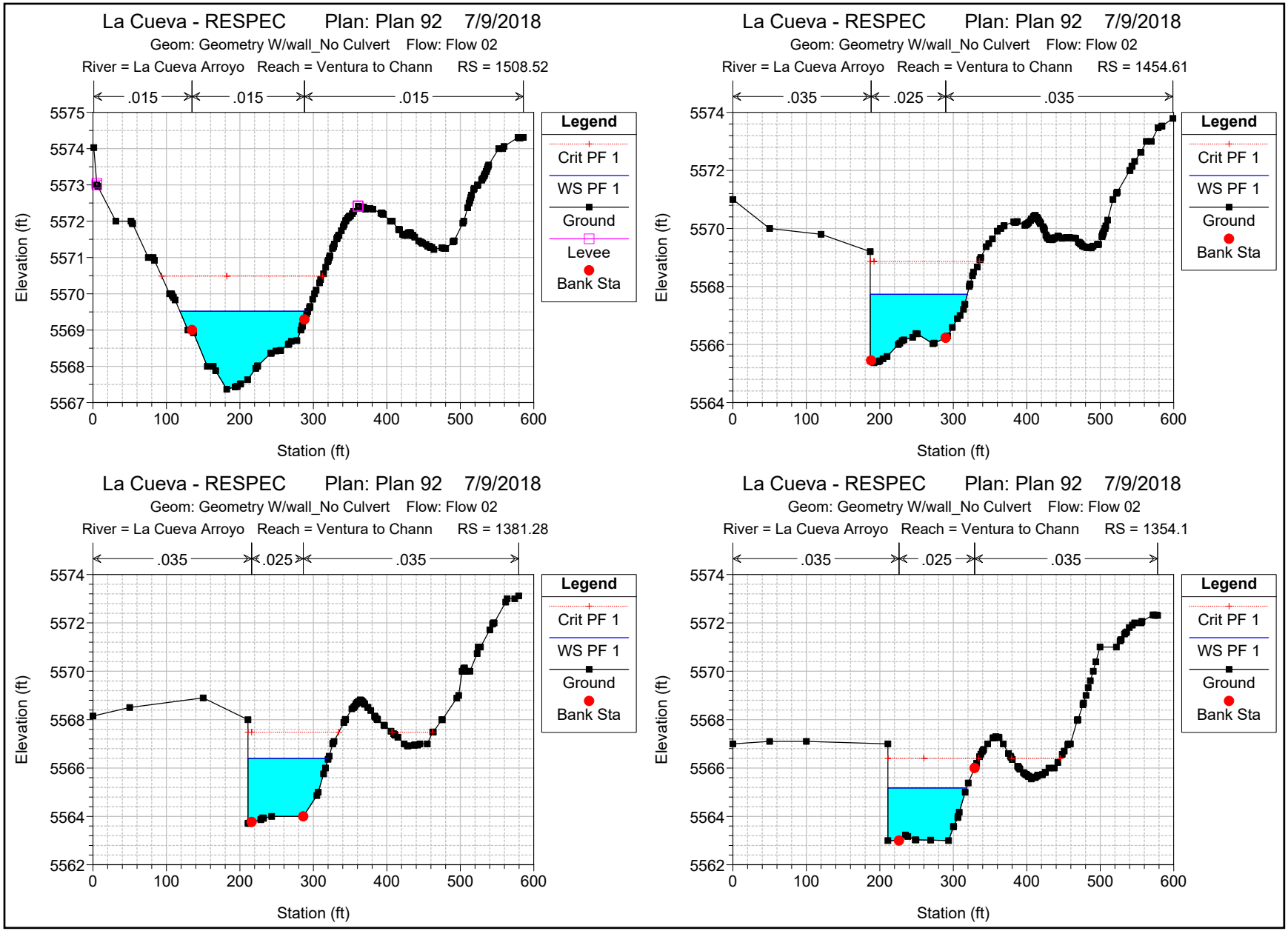

La Cueva - RESPEC Plan: Plan 82 7/9/2018
Geom: Full Pond Flow: Historic Flow
From DS From DS
Legend
Crit PF 1
WS PF 1
Ground
Elevation (ft)
5590
5580
5570
5560
5550
5540
5530
5520
0
500
1000
1500
2000
2500
3000
Main Channel Distance (ft)

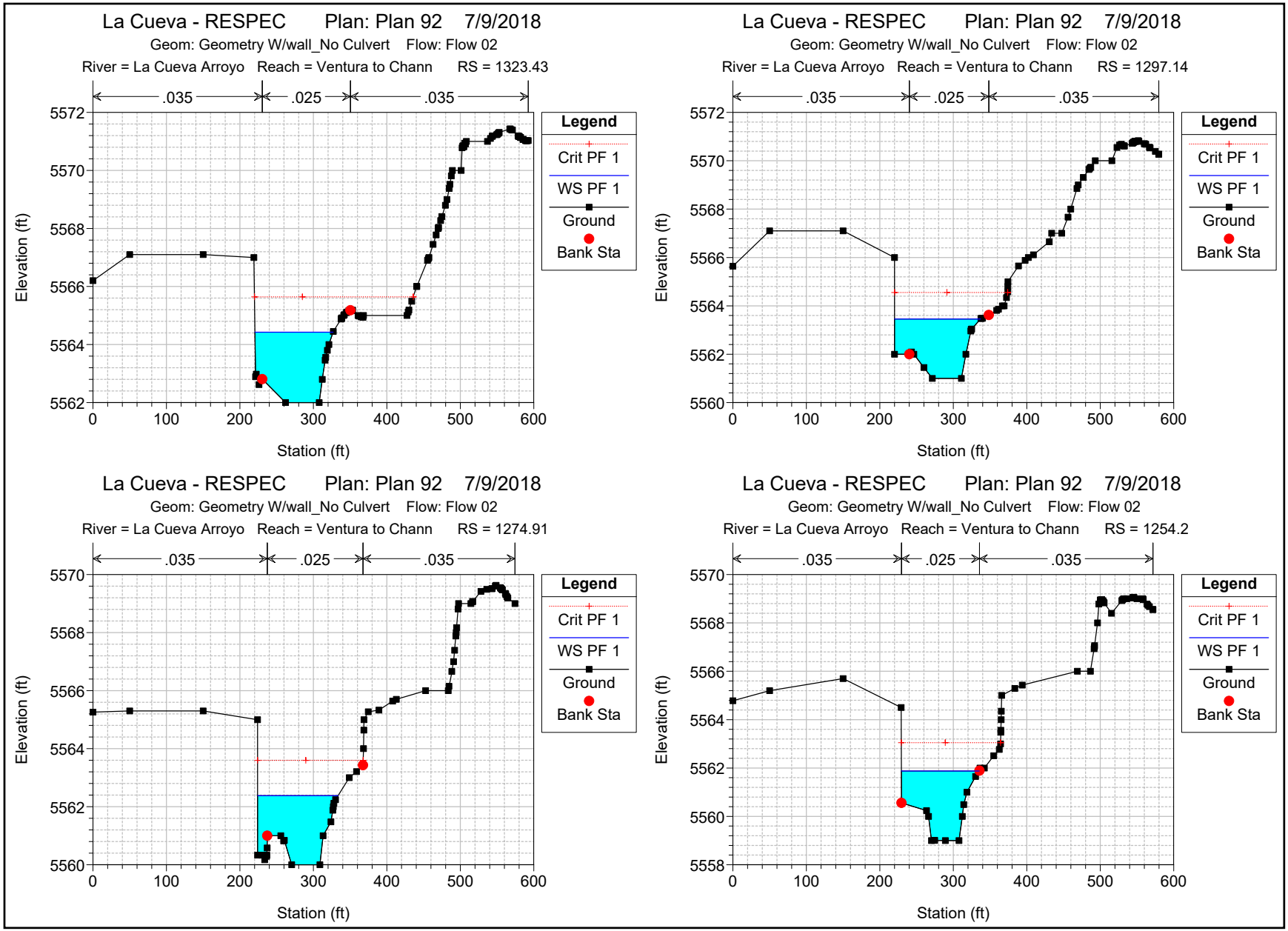
Proposed Scour Wall without a Culvert

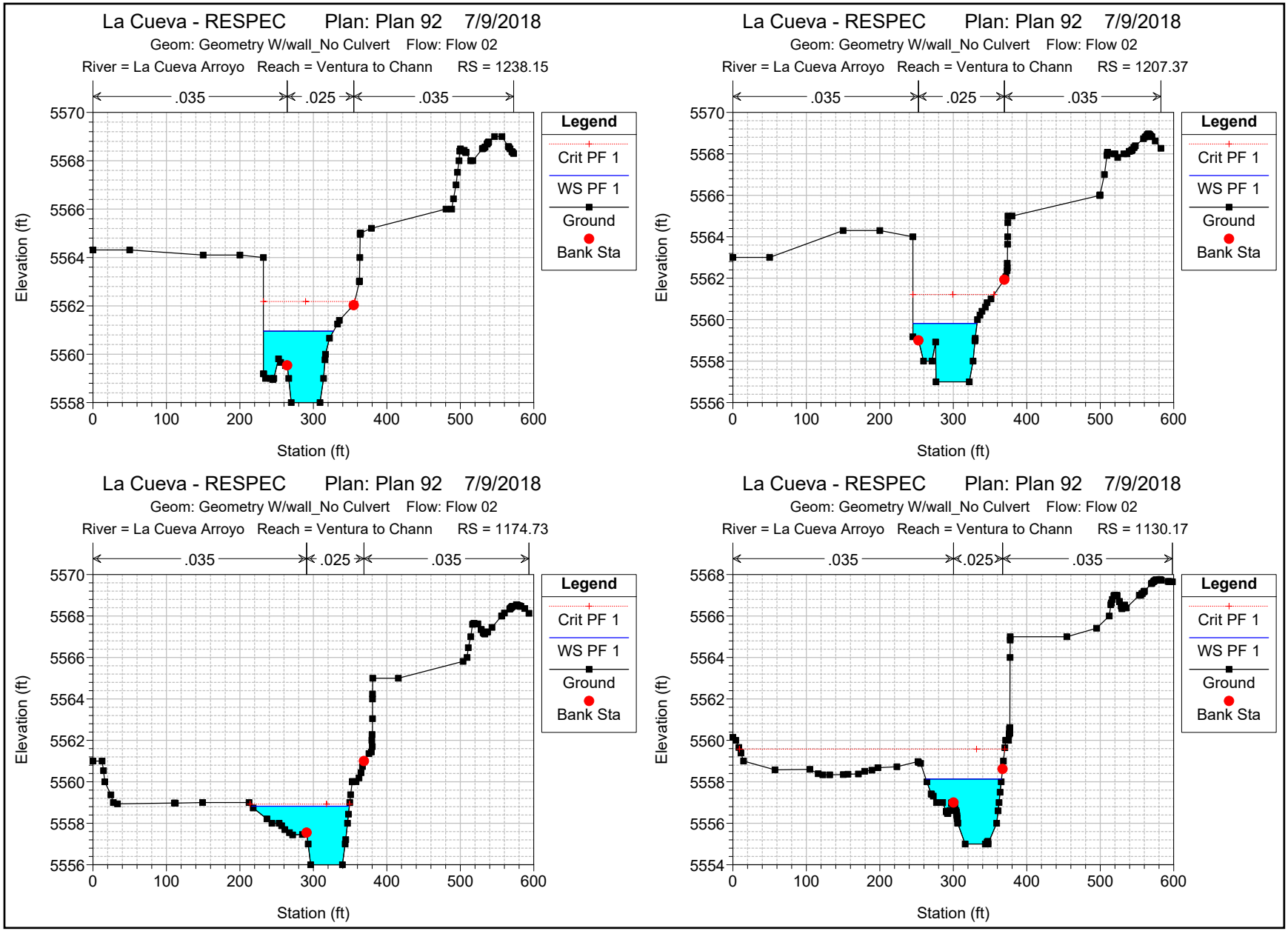
HEC-RAS Plan: Plan 03 River: La Cueva Arroyo Reach: Ventura to Chann Profile: PF 1

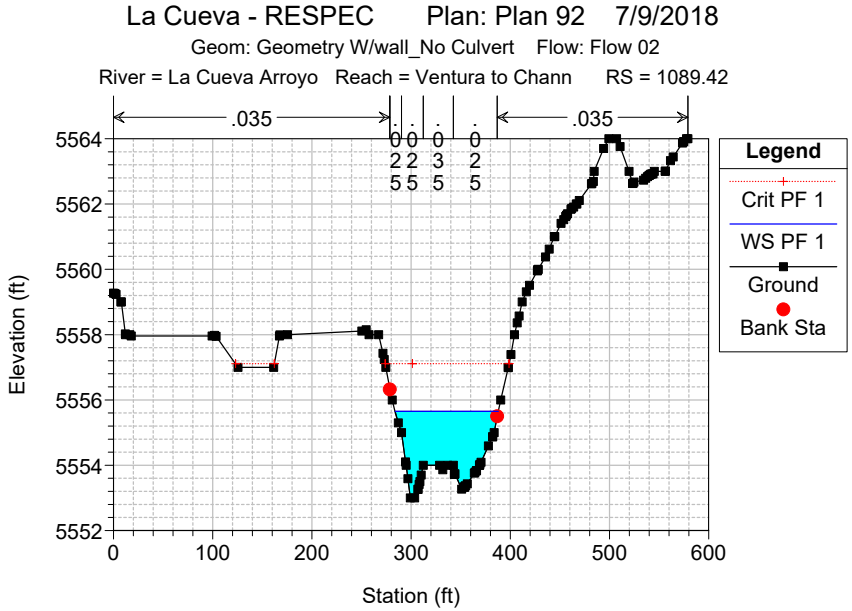
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Ventura to Chann	1880.1	PF 1	3090.00	5578.00	5580.65	5580.65	5581.59	0.010833	11.04	480.38	374.74	1.26
Ventura to Chann	1792.49	PF 1	3090.00	5575.28	5577.40	5578.22	5579.89	0.027793	13.43	279.11	281.13	1.88
Ventura to Chann	1657.47	PF 1	3090.00	5571.00	5573.57	5574.32	5576.17	0.027070	14.10	290.24	280.79	1.89
Ventura to Chann	1567.85	PF 1	3090.00	5568.68	5570.95	5571.79	5573.80	0.024984	14.25	265.97	228.77	1.84
Ventura to Chann	1508.52	PF 1	3090.00	5567.37	5569.52	5570.49	5572.70	0.013616	14.38	218.76	174.16	2.15
Ventura to Chann	1454.61	PF 1	3090.00	5565.37	5567.73	5568.86	5571.55	0.034489	16.11	207.73	132.14	2.14
Ventura to Chann	1381.28	PF 1	3090.00	5563.77	5566.40	5567.48	5569.58	0.019853	15.19	233.47	109.37	1.71
Ventura to Chann	1354.1	PF 1	3090.00	5563.00	5565.17	5566.40	5568.85	0.031073	15.85	204.04	107.04	2.05
Ventura to Chann	1323.43	PF 1	3090.00	5562.00	5564.43	5565.64	5567.94	0.026121	15.27	209.06	106.24	1.90
Ventura to Chann	1297.14	PF 1	3090.00	5561.00	5563.46	5564.55	5567.18	0.032410	15.95	205.79	116.91	2.08
Ventura to Chann	1274.91	PF 1	3090.00	5560.00	5562.38	5563.60	5566.42	0.037405	16.55	194.30	109.58	2.22
Ventura to Chann	1254.2	PF 1	3090.00	5559.00	5561.88	5563.05	5565.66	0.030050	15.61	198.05	105.95	2.01
Ventura to Chann	1238.15	PF 1	3090.00	5558.00	5560.96	5562.18	5565.16	0.028159	17.48	200.88	95.48	2.01
Ventura to Chann	1207.37	PF 1	3090.00	5557.00	5559.82	5561.22	5564.19	0.027692	16.85	187.21	87.28	1.97
Ventura to Chann	1174.73	PF 1	3090.00	5556.00	5558.83	5558.93	5563.29	0.027231	18.08	213.45	132.75	2.00
Ventura to Chann	1130.17	PF 1	3090.00	5555.00	5558.13	5559.58	5562.13	0.022005	16.61	209.86	102.84	1.81
Ventura to Chann	1089.42	PF 1	3090.00	5553.00	5555.65	5557.11	5560.71	0.052414	18.03	171.41	103.88	2.46
Ventura to Chann	1047.06	PF 1	3090.00	5551.93	5554.39	5555.59	5558.47	0.040678	16.21	192.00	116.01	2.17
Ventura to Chann	999.65	PF 1	3090.00	5550.58	5552.98	5554.19	5556.80	0.028002	15.67	197.17	99.18	1.96
Ventura to Chann	873	PF 1	3090.00	5546.55	5549.48	5550.67	5553.17	0.029043	15.42	200.43	117.64	2.08
Ventura to Chann	793	PF 1	3090.00	5543.91	5546.82	5548.15	5550.98	0.021883	16.36	188.89	89.82	1.99
Ventura to Chann	683.29	PF 1	3090.00	5541.00	5544.04	5545.23	5548.47	0.025527	16.89	182.97	93.09	2.12
Ventura to Chann	616.82	PF 1	3090.00	5539.00	5542.23	5543.65	5546.69	0.027800	20.39	254.69	202.85	2.29
Ventura to Chann	561.38	PF 1	3090.00	5537.00	5540.89	5541.99	5544.06	0.016067	16.61	296.68	220.86	1.61
Ventura to Chann	430	PF 1	3090.00	5532.00	5536.48	5537.49	5541.62	0.036401	19.24	225.83	288.58	2.26
Ventura to Chann	374.73	PF 1	3090.00	5531.00	5535.06	5536.02	5539.75	0.035440	18.76	245.52	373.59	2.23
Ventura to Chann	346.75	PF 1	3090.00	5530.00	5534.20	5535.20	5538.49	0.038208	17.73	240.86	301.69	2.26
Ventura to Chann	299.48	PF 1	3090.00	5529.00	5532.69	5533.81	5536.96	0.029328	18.45	250.21	281.62	2.07
Ventura to Chann	249.63	PF 1	3090.00	5528.04	5531.56	5532.49	5535.46	0.025903	17.51	281.86	362.77	1.95
Ventura to Chann	189.79	PF 1	3090.00	5526.53	5529.92	5530.94	5533.89	0.022543	17.53	270.72	276.92	1.86
Ventura to Chann	151.07	PF 1	3090.00	5525.00	5528.87	5530.00	5532.80	0.021970	17.79	249.75	167.83	1.85
Ventura to Chann	115.47	PF 1	3090.00	5525.00	5528.02	5528.99	5531.90	0.025037	17.73	252.13	189.00	1.94
Ventura to Chann	41.45	PF 1	3090.00	5521.88	5525.06	5526.36	5529.71	0.029651	18.94	215.41	139.67	2.10

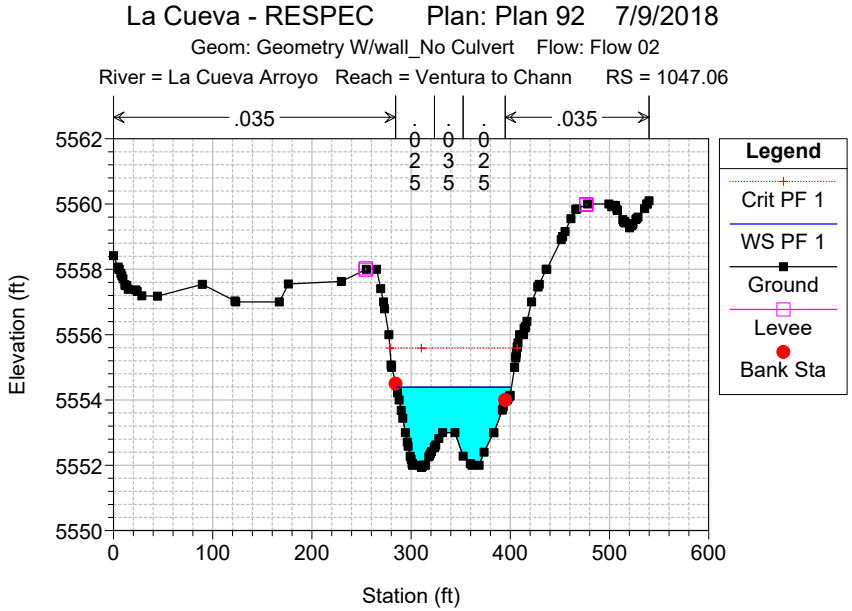

La Cueva - RESPEC Plan: Plan 92 7/9/2018
Geom: Geometry W/wall_No Culvert Flow: Flow 02
River = La Cueva Arroyo Reach = Ventura to Chann RS = 1880.1
.035
.025
.035
Legend
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
La Cueva - RESPEC Plan: Plan 92 7/9/2018
Geom: Geometry W/wall_No Culvert Flow: Flow 02
River = La Cueva Arroyo Reach = Ventura to Chann RS = 1792.49
.035
.025
.035
Legend
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
La Cueva - RESPEC Plan: Plan 92 7/9/2018
Geom: Geometry W/wall_No Culvert Flow: Flow 02
River = La Cueva Arroyo Reach = Ventura to Chann RS = 1657.47
.035
.025
.035
Legend
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
La Cueva - RESPEC Plan: Plan 92 7/9/2018
Geom: Geometry W/wall_No Culvert Flow: Flow 02
River = La Cueva Arroyo Reach = Ventura to Chann RS = 1567.85
.035
.025
.035
Legend
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

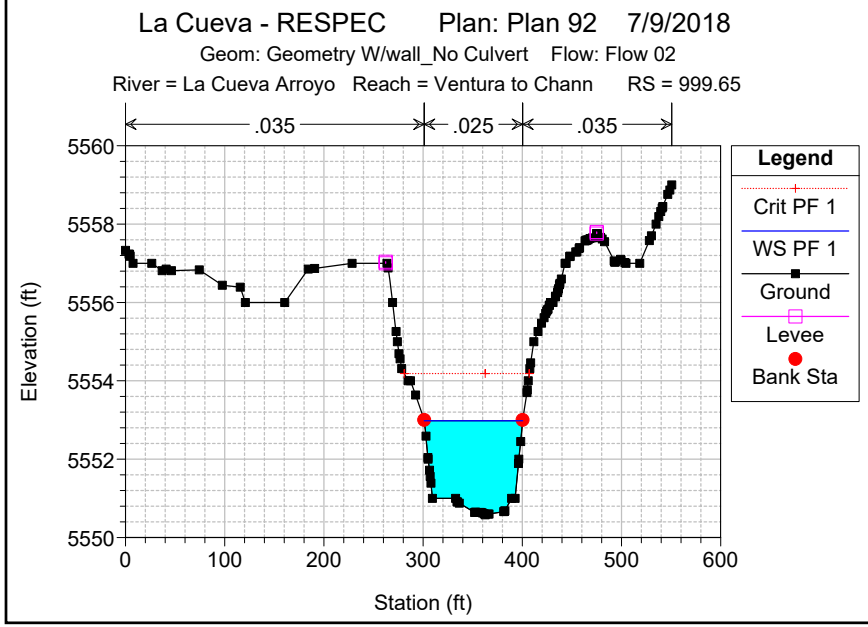

La Cueva - RESPEC Plan: Plan 92 7/9/2018
Geom: Geometry W/wall_No Culvert Flow: Flow 02
River = La Cueva Arroyo Reach = Ventura to Chann RS = 1508.52
.015
.015
.015
Elevation (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta
La Cueva - RESPEC Plan: Plan 92 7/9/2018
Geom: Geometry W/wall_No Culvert Flow: Flow 02
River = La Cueva Arroyo Reach = Ventura to Chann RS = 1454.61
.035
.025
.035
Elevation (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
Ground
Bank Sta
La Cueva - RESPEC Plan: Plan 92 7/9/2018
Geom: Geometry W/wall_No Culvert Flow: Flow 02
River = La Cueva Arroyo Reach = Ventura to Chann RS = 1381.28
.035
.025
.035
Elevation (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
Ground
Bank Sta
La Cueva - RESPEC Plan: Plan 92 7/9/2018
Geom: Geometry W/wall_No Culvert Flow: Flow 02
River = La Cueva Arroyo Reach = Ventura to Chann RS = 1354.1
.035
.025
.035
Elevation (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
Ground
Bank Sta

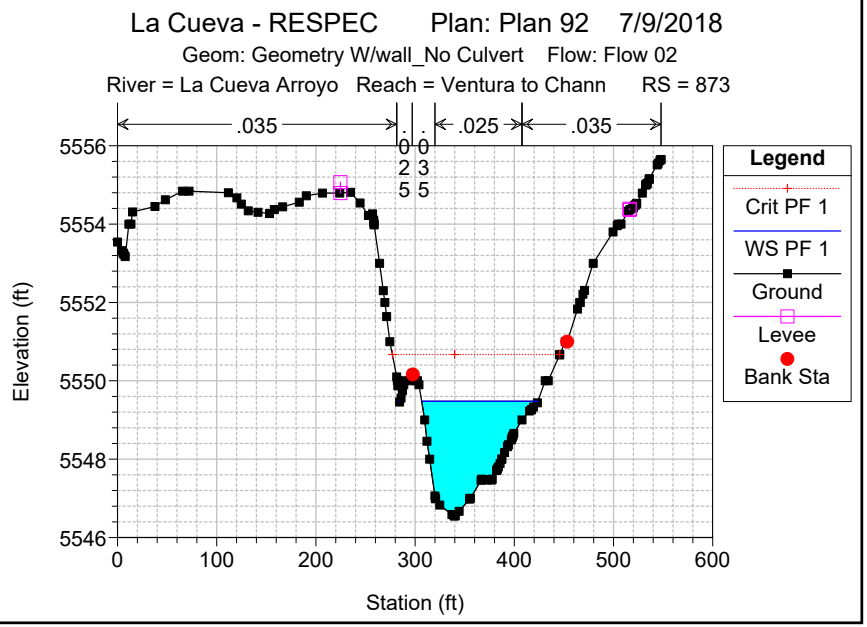

La Cueva - RESPEC Plan: Plan 92 7/9/2018
Geom: Geometry W/wall_No Culvert Flow: Flow 02
River = La Cueva Arroyo Reach = Ventura to Chann RS = 1323.43
.035
.025
.035
Elevation (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
Ground
Bank Sta
La Cueva - RESPEC Plan: Plan 92 7/9/2018
Geom: Geometry W/wall_No Culvert Flow: Flow 02
River = La Cueva Arroyo Reach = Ventura to Chann RS = 1297.14
.035
.025
.035
Elevation (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
Ground
Bank Sta
La Cueva - RESPEC Plan: Plan 92 7/9/2018
Geom: Geometry W/wall_No Culvert Flow: Flow 02
River = La Cueva Arroyo Reach = Ventura to Chann RS = 1274.91
.035
.025
.035
Elevation (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
Ground
Bank Sta
La Cueva - RESPEC Plan: Plan 92 7/9/2018
Geom: Geometry W/wall_No Culvert Flow: Flow 02
River = La Cueva Arroyo Reach = Ventura to Chann RS = 1254.2
.035
.025
.035
Elevation (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
Ground
Bank Sta

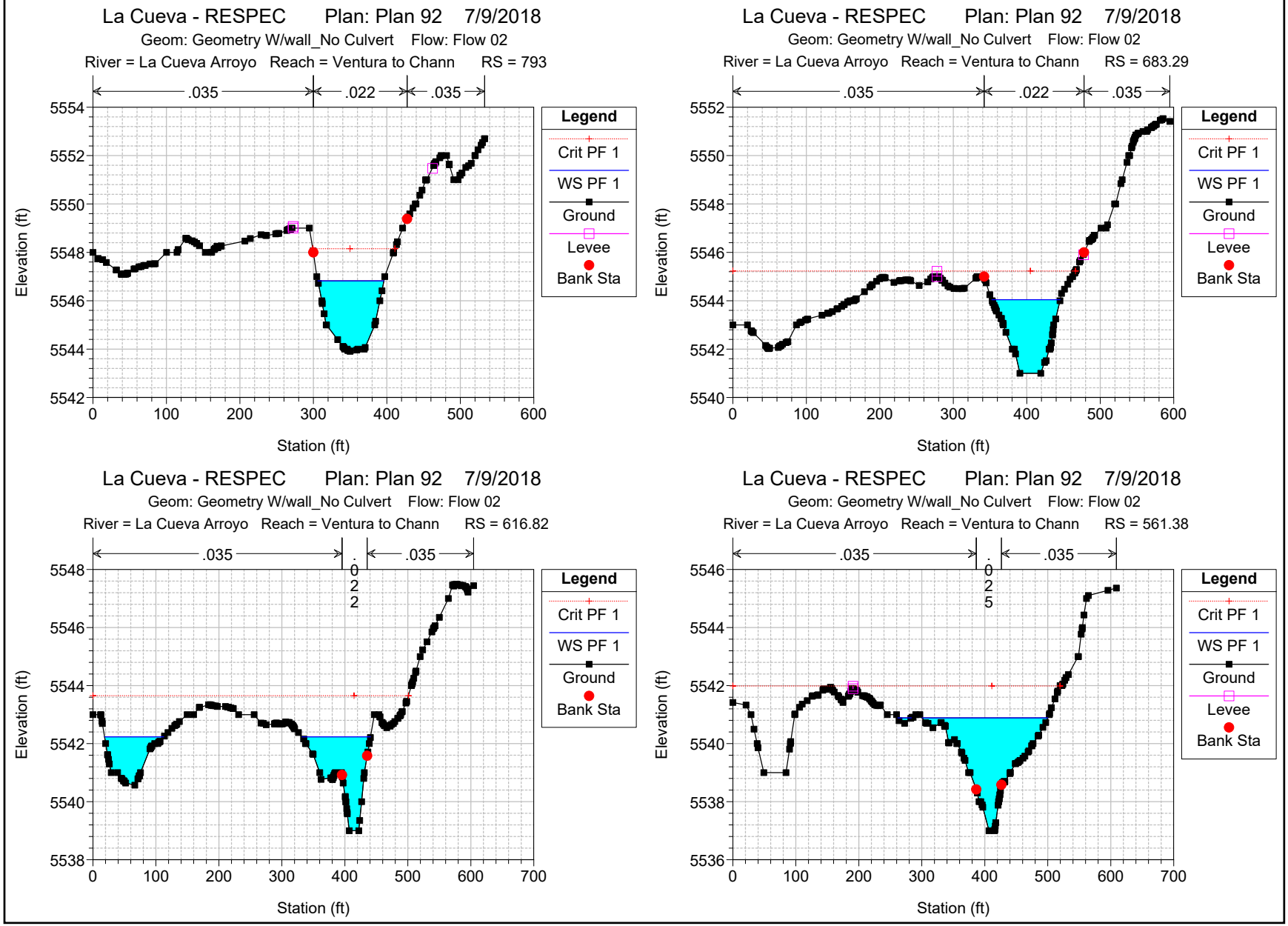

La Cueva - RESPEC Plan: Plan 92 7/9/2018
Geom: Geometry W/wall_No Culvert Flow: Flow 02
River = La Cueva Arroyo Reach = Ventura to Chann RS = 1238.15
.035
.025
.035
Elevation (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
Ground
Bank Sta
La Cueva - RESPEC Plan: Plan 92 7/9/2018
Geom: Geometry W/wall_No Culvert Flow: Flow 02
River = La Cueva Arroyo Reach = Ventura to Chann RS = 1207.37
.035
.025
.035
Elevation (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
Ground
Bank Sta
La Cueva - RESPEC Plan: Plan 92 7/9/2018
Geom: Geometry W/wall_No Culvert Flow: Flow 02
River = La Cueva Arroyo Reach = Ventura to Chann RS = 1174.73
.035
.025
.035
Elevation (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
Ground
Bank Sta
La Cueva - RESPEC Plan: Plan 92 7/9/2018
Geom: Geometry W/wall_No Culvert Flow: Flow 02
River = La Cueva Arroyo Reach = Ventura to Chann RS = 1130.17
.035
.025
.035
Elevation (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
Ground
Bank Sta

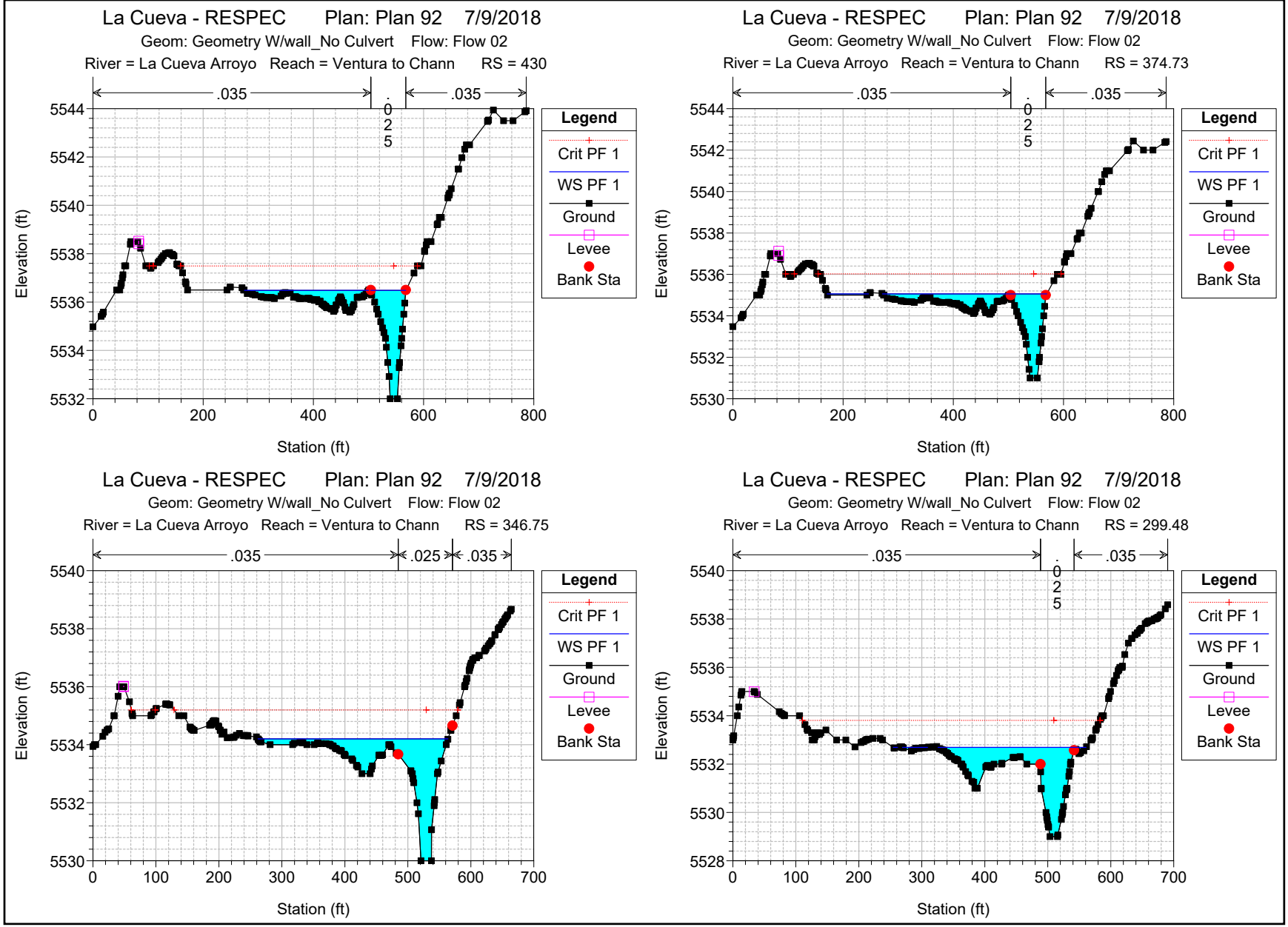

La Cueva - RESPEC Plan: Plan 92 7/9/2018
Geom: Geometry W/wall_No Culvert Flow: Flow 02
River = La Cueva Arroyo Reach = Ventura to Chann RS = 1089.42
.035
.035
Legend
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

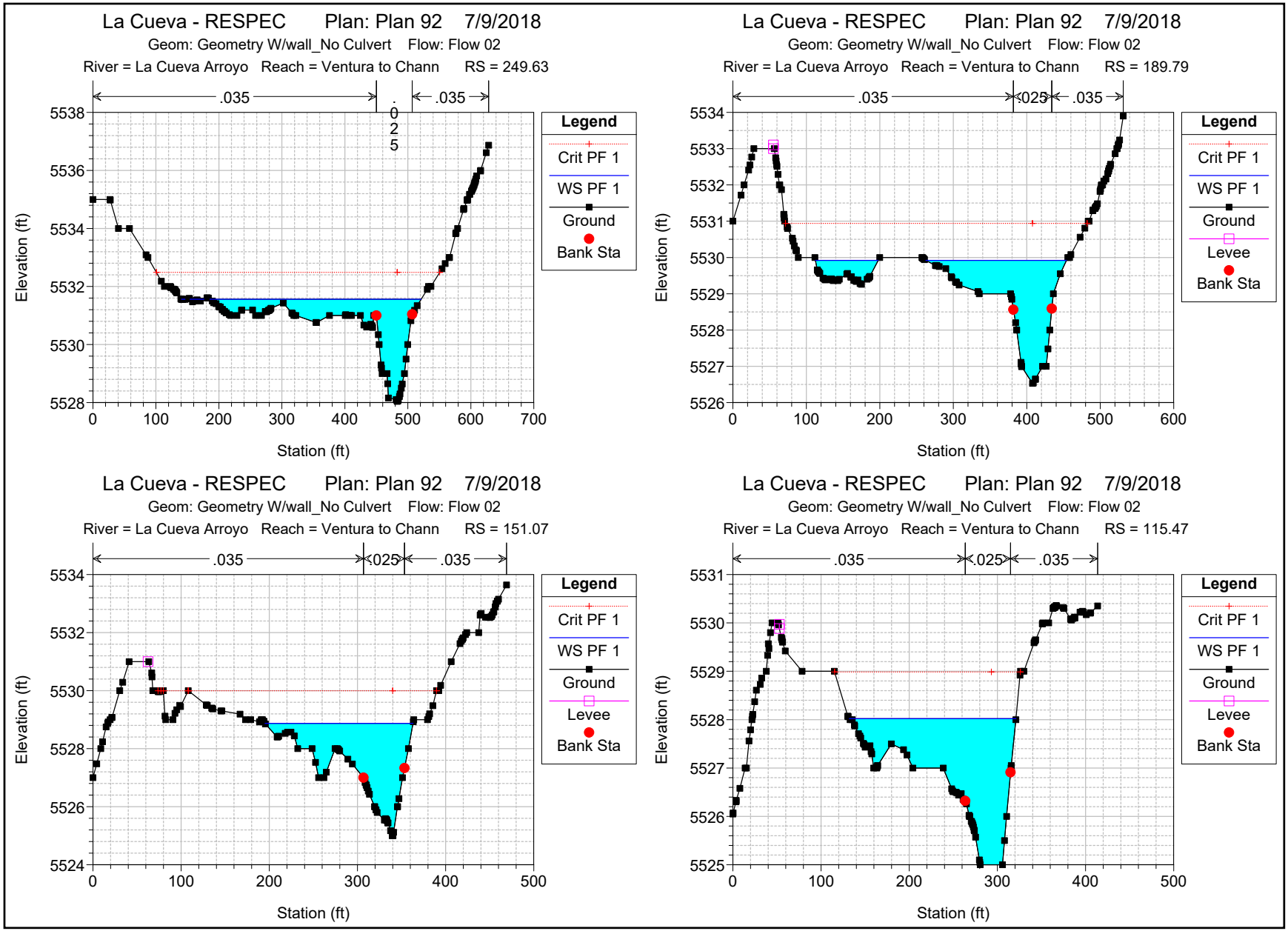

La Cueva - RESPEC Plan: Plan 92 7/9/2018
Geom: Geometry W/wall_No Culvert Flow: Flow 02
River = La Cueva Arroyo Reach = Ventura to Chann RS = 1047.06
.035
.035
Legend
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

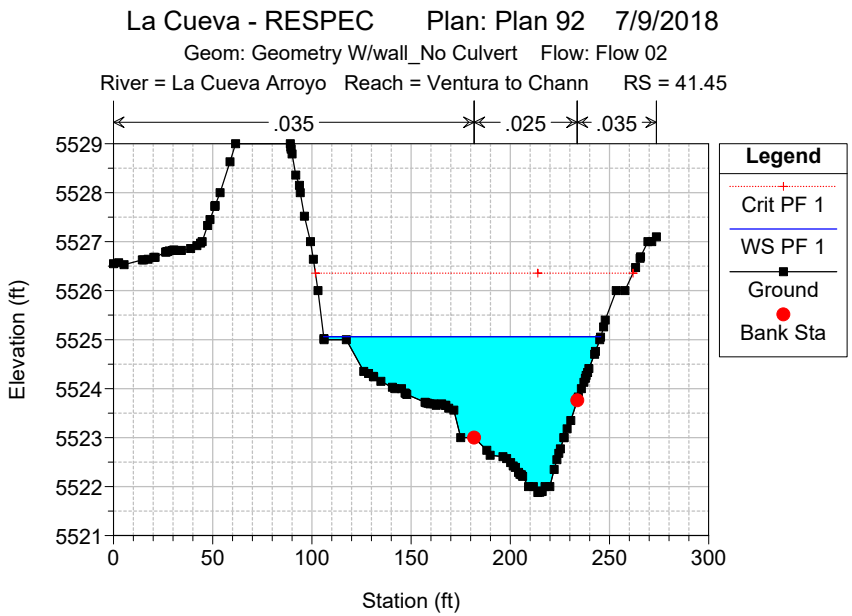

La Cueva - RESPEC Plan: Plan 92 7/9/2018
Geom: Geometry W/wall_No Culvert Flow: Flow 02
River = La Cueva Arroyo Reach = Ventura to Chann RS = 999.65
.035
.025
.035
Legend
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

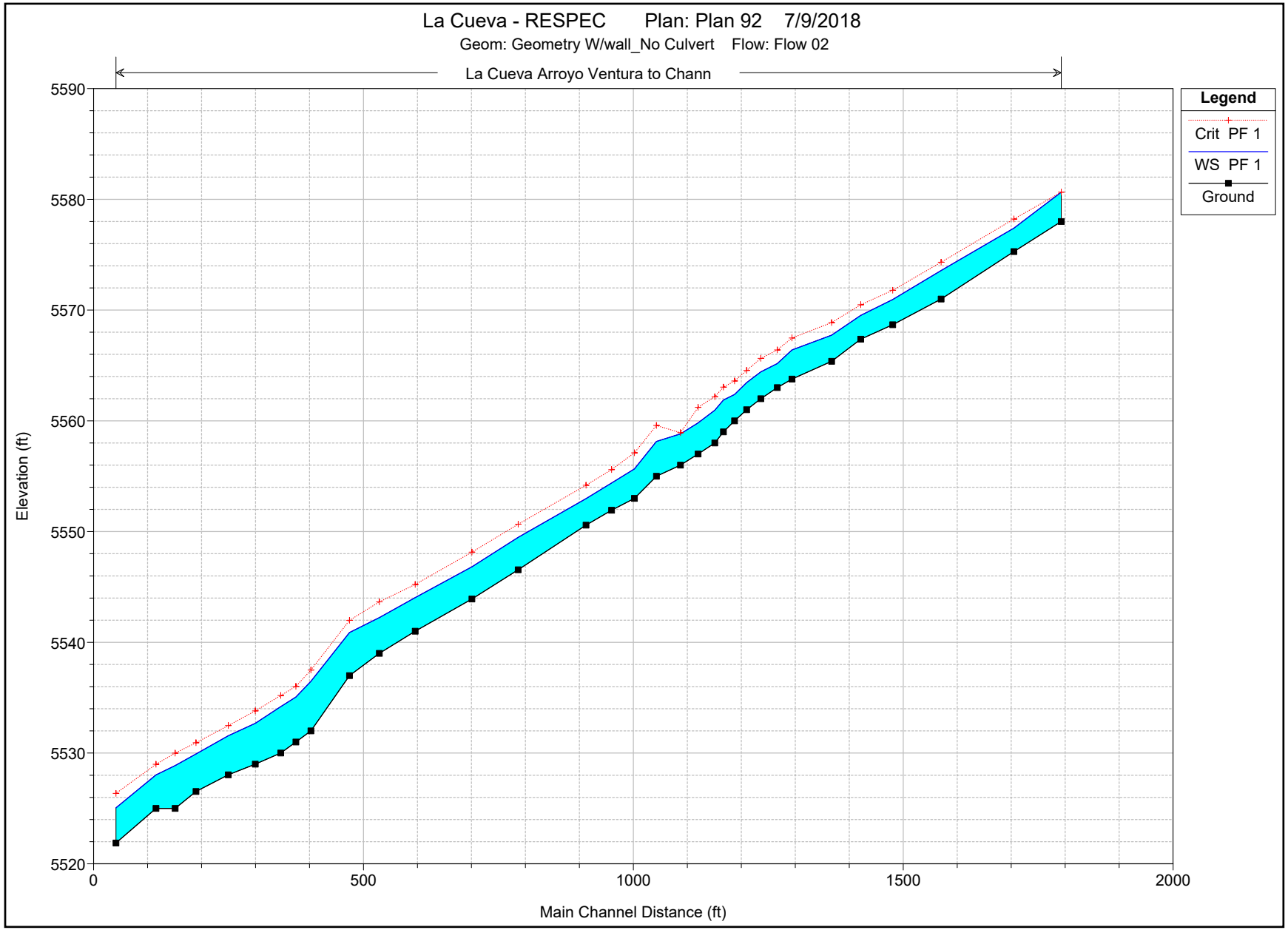

La Cueva - RESPEC Plan: Plan 92 7/9/2018
Geom: Geometry W/wall_No Culvert Flow: Flow 02
River = La Cueva Arroyo Reach = Ventura to Chann RS = 873
.035
.025
.035
Legend
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)


La Cueva - RESPEC Plan: Plan 92 7/9/2018
Geom: Geometry W/wall_No Culvert Flow: Flow 02
River = La Cueva Arroyo Reach = Ventura to Chann RS = 793
.035
.022
.035
Elevation (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta
La Cueva - RESPEC Plan: Plan 92 7/9/2018
Geom: Geometry W/wall_No Culvert Flow: Flow 02
River = La Cueva Arroyo Reach = Ventura to Chann RS = 683.29
.035
.022
.035
Elevation (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta
La Cueva - RESPEC Plan: Plan 92 7/9/2018
Geom: Geometry W/wall_No Culvert Flow: Flow 02
River = La Cueva Arroyo Reach = Ventura to Chann RS = 616.82
.035
.022
.035
Elevation (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
Ground
Bank Sta
La Cueva - RESPEC Plan: Plan 92 7/9/2018
Geom: Geometry W/wall_No Culvert Flow: Flow 02
River = La Cueva Arroyo Reach = Ventura to Chann RS = 561.38
.035
.025
.035
Elevation (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta


La Cueva - RESPEC Plan: Plan 92 7/9/2018
Geom: Geometry W/wall_No Culvert Flow: Flow 02
River = La Cueva Arroyo Reach = Ventura to Chann RS = 430
.035
.025
.035
Legend
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
La Cueva - RESPEC Plan: Plan 92 7/9/2018
Geom: Geometry W/wall_No Culvert Flow: Flow 02
River = La Cueva Arroyo Reach = Ventura to Chann RS = 374.73
.035
.025
.035
Legend
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
La Cueva - RESPEC Plan: Plan 92 7/9/2018
Geom: Geometry W/wall_No Culvert Flow: Flow 02
River = La Cueva Arroyo Reach = Ventura to Chann RS = 346.75
.035
.025
.035
Legend
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
La Cueva - RESPEC Plan: Plan 92 7/9/2018
Geom: Geometry W/wall_No Culvert Flow: Flow 02
River = La Cueva Arroyo Reach = Ventura to Chann RS = 299.48
.035
.025
.035
Legend
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)


La Cueva - RESPEC Plan: Plan 92 7/9/2018
Geom: Geometry W/wall_No Culvert Flow: Flow 02
River = La Cueva Arroyo Reach = Ventura to Chann RS = 249.63
.035
.025
.035
Legend
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
La Cueva - RESPEC Plan: Plan 92 7/9/2018
Geom: Geometry W/wall_No Culvert Flow: Flow 02
River = La Cueva Arroyo Reach = Ventura to Chann RS = 189.79
.035
.025
.035
Legend
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
La Cueva - RESPEC Plan: Plan 92 7/9/2018
Geom: Geometry W/wall_No Culvert Flow: Flow 02
River = La Cueva Arroyo Reach = Ventura to Chann RS = 151.07
.035
.025
.035
Legend
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
La Cueva - RESPEC Plan: Plan 92 7/9/2018
Geom: Geometry W/wall_No Culvert Flow: Flow 02
River = La Cueva Arroyo Reach = Ventura to Chann RS = 115.47
.035
.025
.035
Legend
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

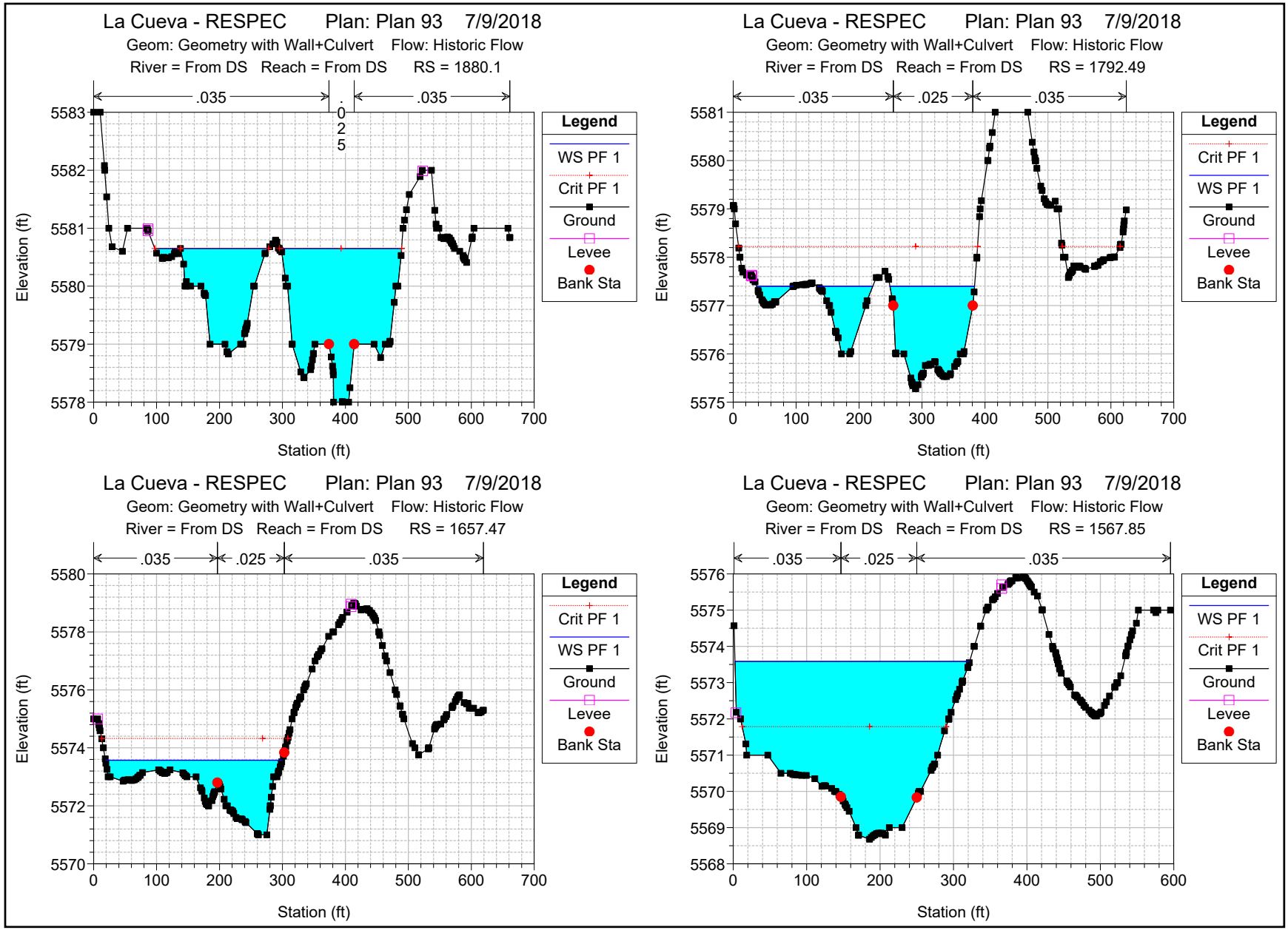

La Cueva - RESPEC Plan: Plan 92 7/9/2018
Geom: Geometry W/wall_No Culvert Flow: Flow 02
River = La Cueva Arroyo Reach = Ventura to Chann RS = 41.45
.035
.025
.035
Legend
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
5529
5528
5527
5526
5525
5524
5523
5522
5521
0
50
100
150
200
250
300

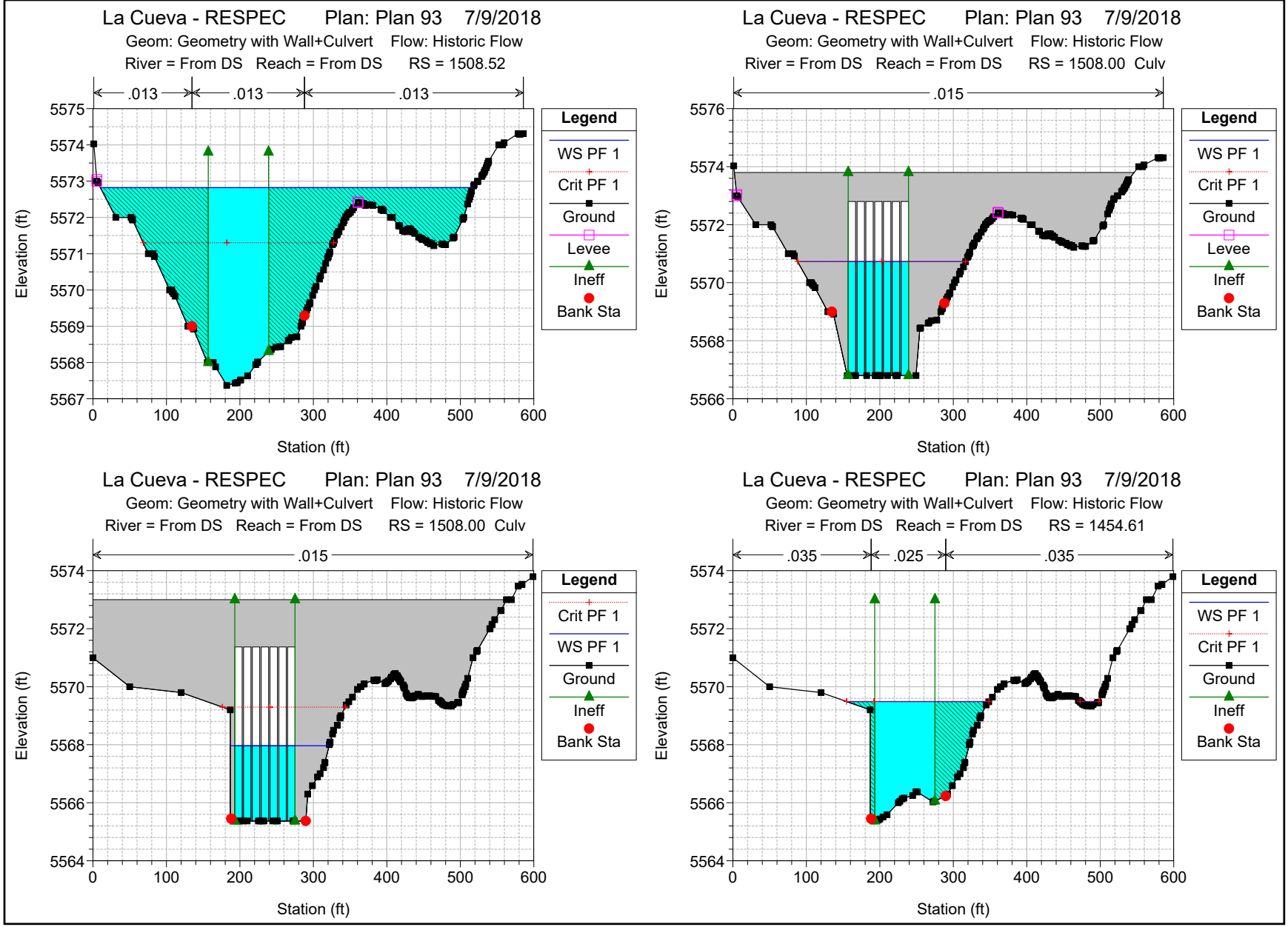

La Cueva - RESPEC Plan: Plan 92 7/9/2018
Geom: Geometry W/wall_No Culvert Flow: Flow 02
La Cueva Arroyo Ventura to Chann
Legend
Crit PF 1
WS PF 1
Ground
Elevation (ft)
5590
5580
5570
5560
5550
5540
5530
5520
0
500
1000
1500
2000
Main Channel Distance (ft)

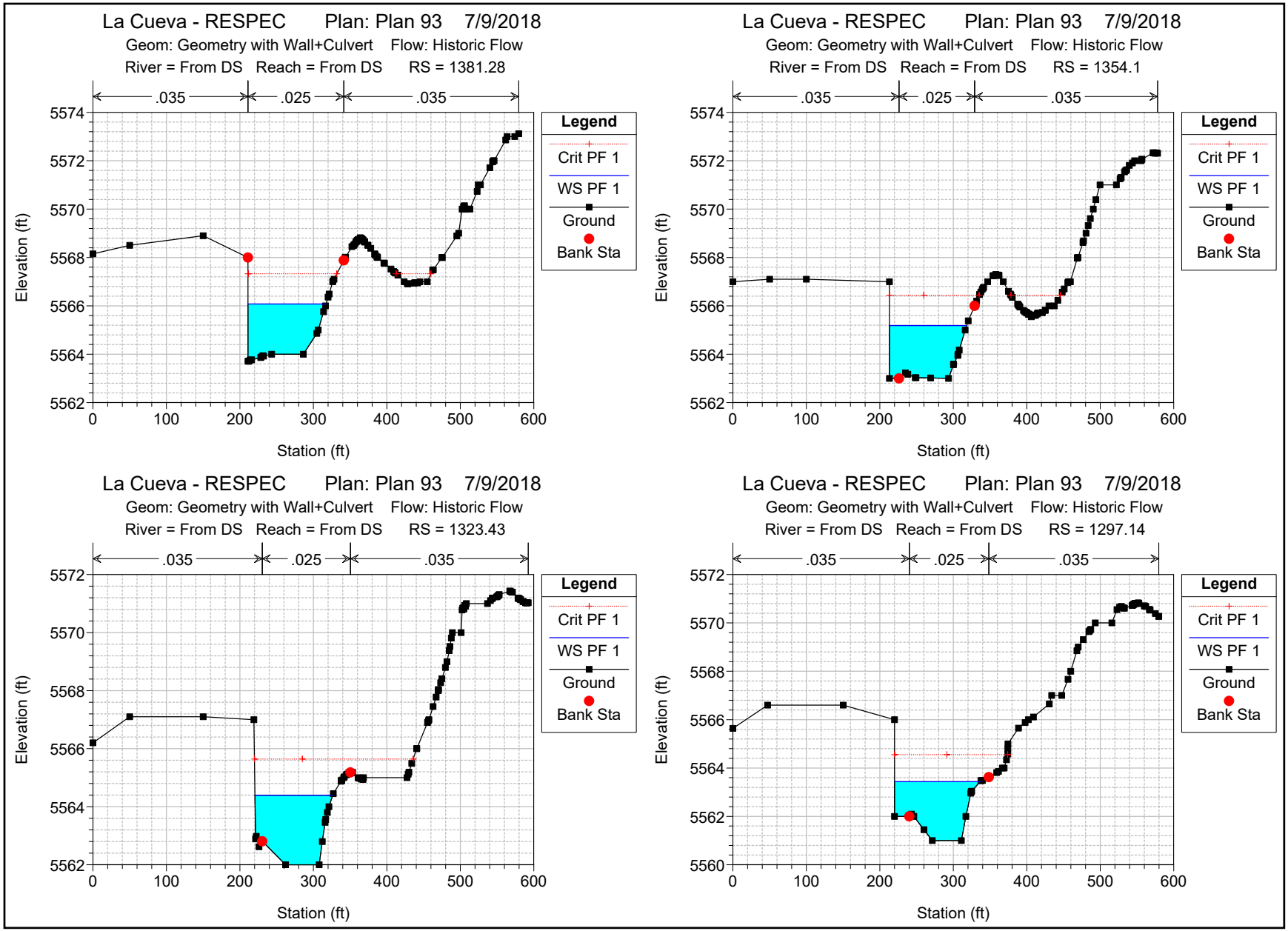
Proposed Scour Wall with Culvert under Ventura Rd

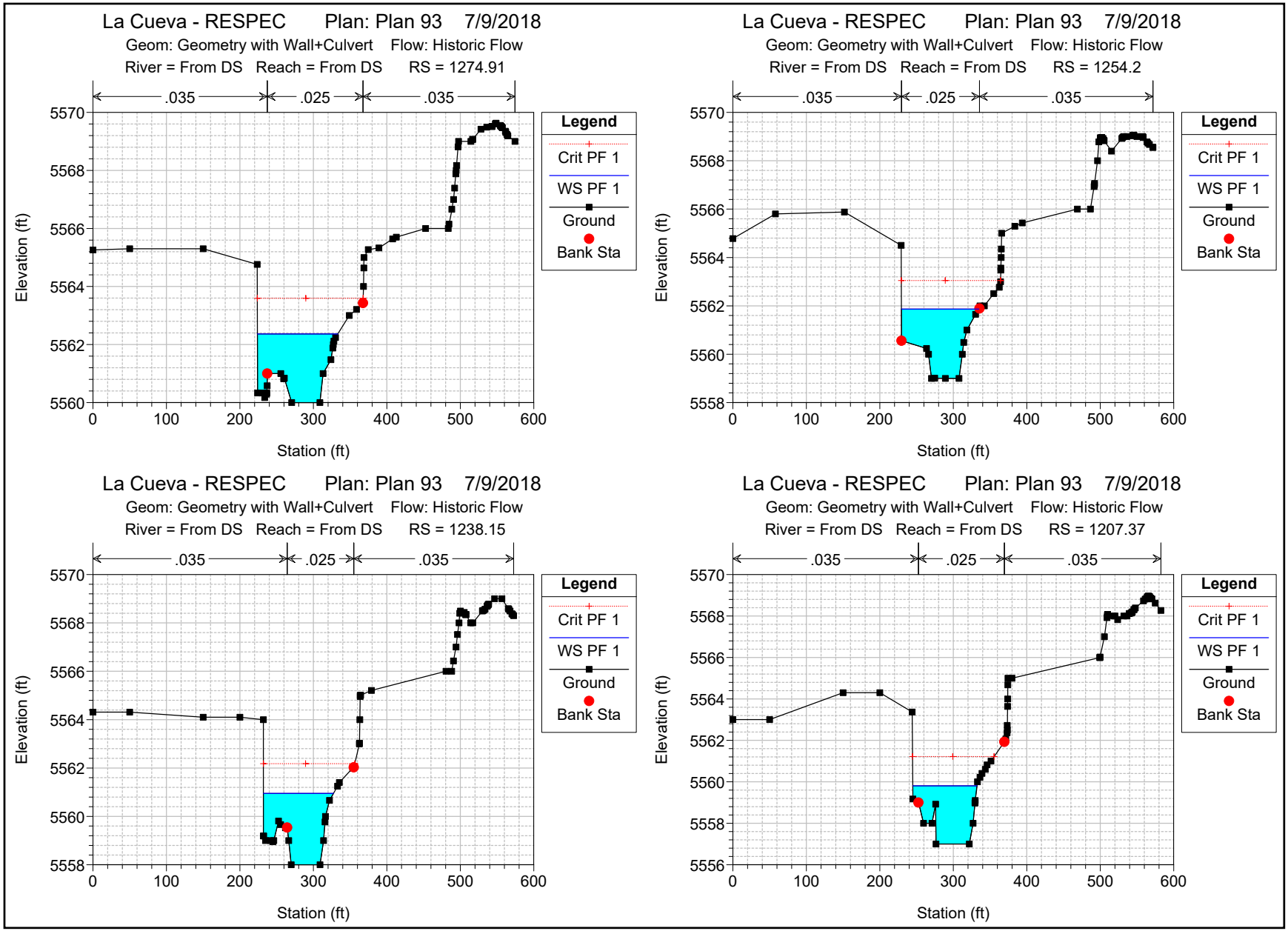
HEC-RAS Plan: Plan 93 River: From DS Reach: From DS Profile: PF 1

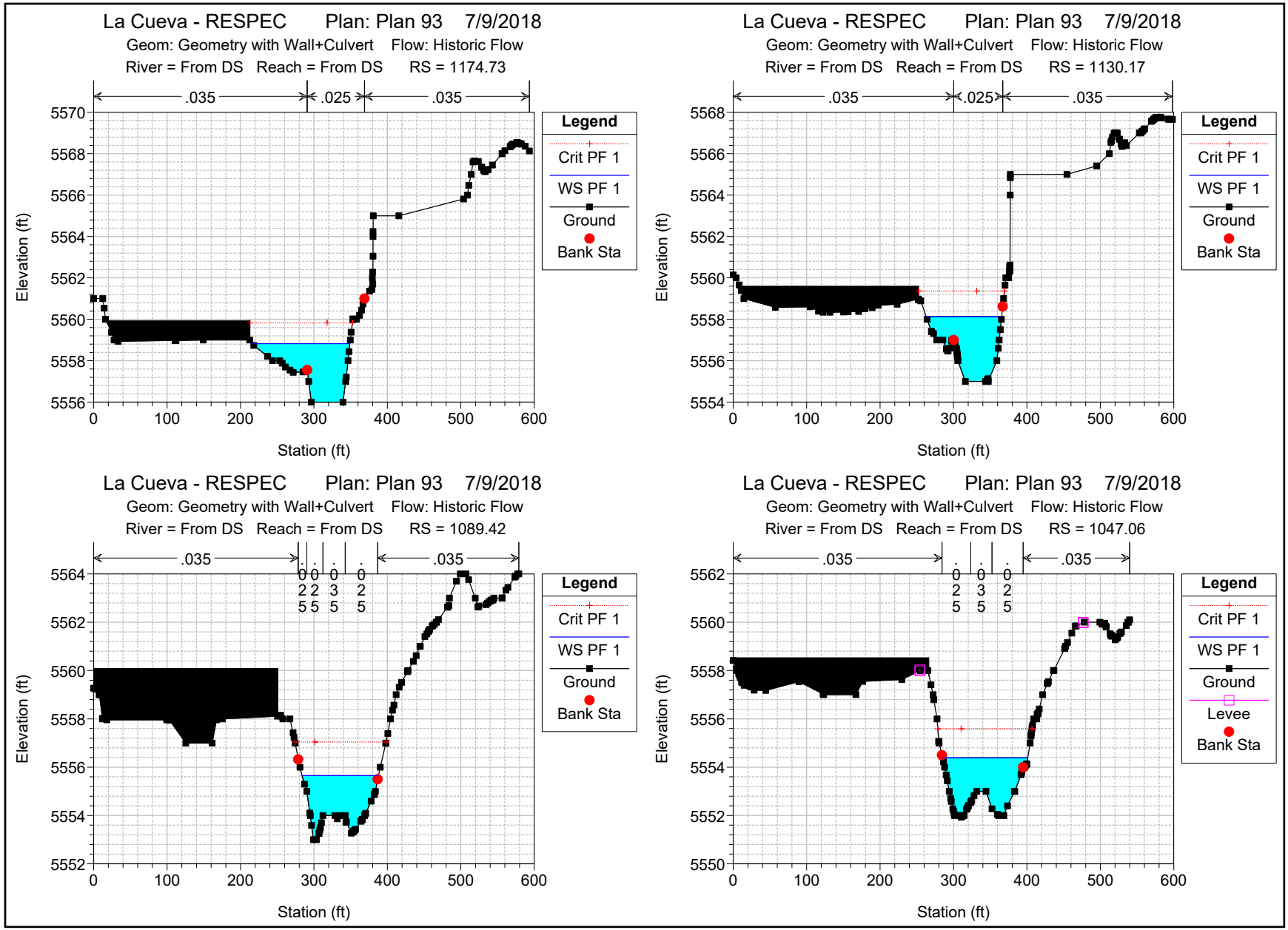
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
From DS	1880.1	PF 1	3090.00	5578.00	5580.65	5580.65	5581.59	0.010833	11.04	480.38	374.74	1.26
From DS	1792.49	PF 1	3090.00	5575.28	5577.40	5578.22	5579.89	0.027793	13.43	279.11	281.13	1.88
From DS	1657.47	PF 1	3090.00	5571.00	5573.57	5574.32	5576.17	0.027070	14.10	290.24	280.79	1.89
From DS	1567.85	PF 1	3090.00	5568.68	5573.59	5571.79	5573.78	0.000647	4.12	1030.75	319.65	0.34
From DS	1508.52	PF 1	3090.00	5567.37	5572.82	5571.30	5573.68	0.000483	7.42	416.31	506.92	0.58
From DS	1508.00		Culvert									
From DS	1454.61	PF 1	3090.00	5565.37	5569.49	5569.49	5571.27	0.006064	10.71	288.58	219.67	1.01
From DS	1381.28	PF 1	3090.00	5563.71	5566.08	5567.33	5569.83	0.030496	15.54	198.90	106.17	2.00
From DS	1354.1	PF 1	3090.00	5563.00	5565.19	5566.44	5568.98	0.031639	16.04	200.82	105.16	2.07
From DS	1323.43	PF 1	3090.00	5562.00	5564.39	5565.64	5568.04	0.027567	15.55	205.28	105.75	1.95
From DS	1297.14	PF 1	3090.00	5561.00	5563.44	5564.55	5567.24	0.033305	16.12	203.68	116.40	2.11
From DS	1274.91	PF 1	3090.00	5560.00	5562.36	5563.59	5566.47	0.038248	16.68	192.78	109.38	2.24
From DS	1254.2	PF 1	3090.00	5559.00	5561.87	5563.05	5565.69	0.030473	15.69	197.06	105.74	2.02
From DS	1238.15	PF 1	3090.00	5558.00	5560.95	5562.18	5565.18	0.028405	17.55	200.18	95.35	2.02
From DS	1207.37	PF 1	3090.00	5557.00	5559.81	5561.22	5564.21	0.027938	16.89	186.70	87.41	1.97
From DS	1174.73	PF 1	3090.00	5556.00	5558.82	5559.83	5563.30	0.027292	18.10	213.25	132.71	2.01
From DS	1130.17	PF 1	3090.00	5555.00	5558.13	5559.37	5562.13	0.022063	16.63	209.66	102.81	1.81
From DS	1089.42	PF 1	3090.00	5553.00	5555.65	5557.04	5560.71	0.052414	18.03	171.41	103.88	2.46
From DS	1047.06	PF 1	3090.00	5551.93	5554.39	5555.59	5558.47	0.040678	16.21	192.00	116.01	2.17
From DS	999.65	PF 1	3090.00	5550.58	5552.98	5554.19	5556.80	0.028002	15.67	197.17	99.18	1.96
From DS	873	PF 1	3090.00	5546.55	5549.48	5550.64	5553.17	0.029043	15.42	200.43	117.64	2.08
From DS	793	PF 1	3090.00	5543.91	5548.15	5548.15	5549.58	0.006387	9.59	322.14	111.72	1.00
From DS	683.29	PF 1	3090.00	5541.00	5544.78	5545.00	5547.00	0.011890	11.99	266.59	151.16	1.33
From DS	561.38	PF 1	3090.00	5537.00	5540.21	5541.07	5542.88	0.028742	13.52	237.67	198.17	2.10
From DS	430	PF 1	3090.00	5530.85	5537.08	5534.49	5537.37	0.000697	4.51	825.89	431.92	0.36
From DS	392.85	PF 1	3090.00	5530.22	5536.52	5536.52	5537.16	0.006523	7.47	571.68	431.02	0.94
From DS	374.73	PF 1	3090.00	5529.80	5535.87	5536.25	5536.98	0.005812	9.97	527.84	417.87	0.96
From DS	346.75	PF 1	3090.00	5530.00	5534.58	5535.20	5536.48	0.016420	12.57	373.86	386.45	1.51
From DS	299.48	PF 1	3090.00	5529.00	5532.97	5533.80	5535.64	0.017200	15.18	342.56	356.95	1.61
From DS	249.63	PF 1	3090.00	5528.04	5531.70	5532.50	5534.67	0.019403	15.70	333.76	389.32	1.70
From DS	189.79	PF 1	3090.00	5526.53	5530.07	5530.95	5533.41	0.018161	16.28	317.81	371.69	1.68
From DS	151.07	PF 1	3090.00	5525.00	5528.96	5529.98	5532.46	0.019141	16.93	264.43	175.23	1.73
From DS	115.47	PF 1	3090.00	5525.00	5528.07	5528.99	5531.67	0.022816	17.15	262.06	191.09	1.86
From DS	41.45	PF 1	3090.00	5521.88	5525.08	5526.36	5529.60	0.028561	18.70	218.49	139.89	2.07

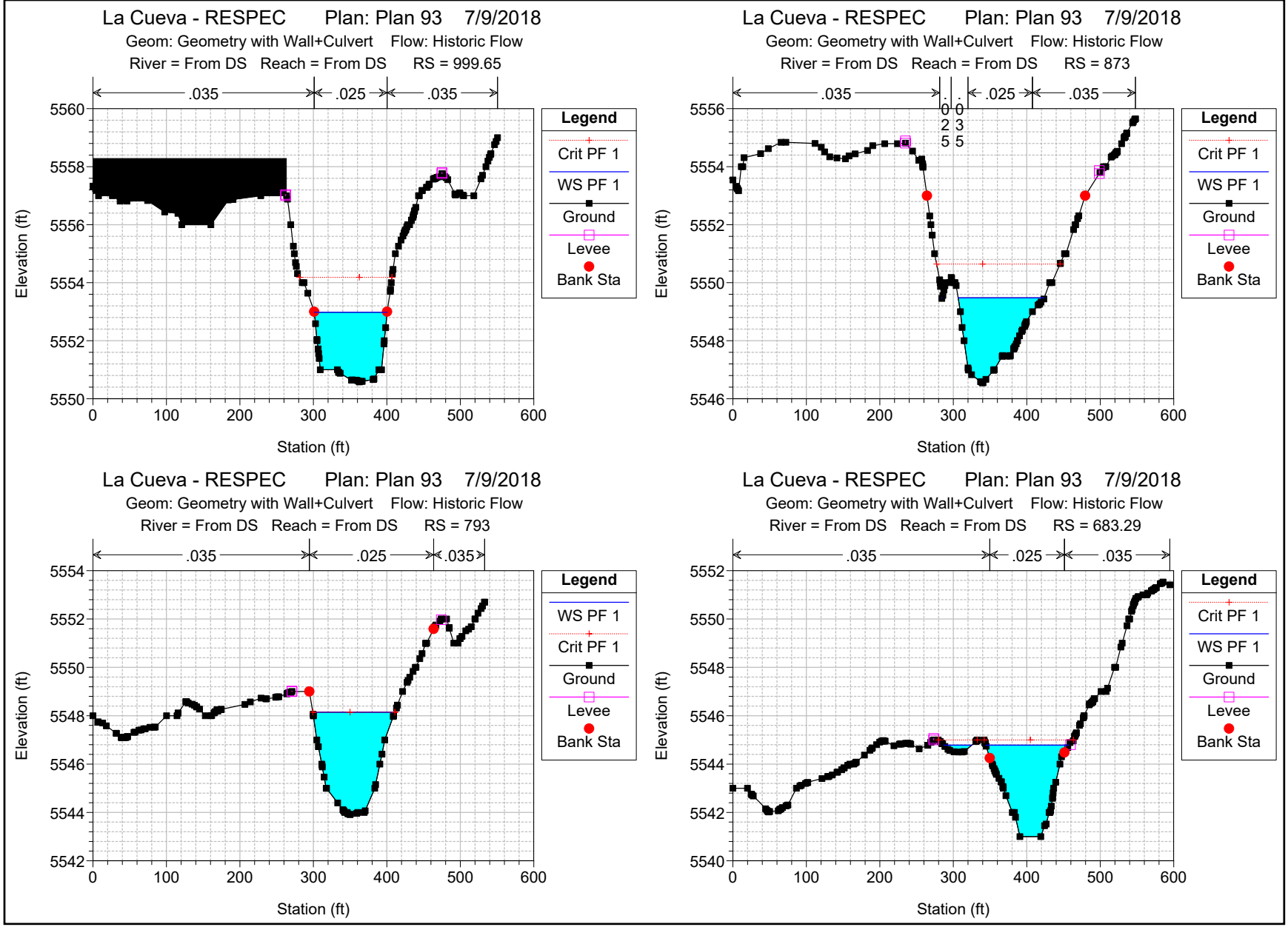

La Cueva - RESPEC Plan: Plan 93 7/9/2018
Geom: Geometry with Wall+Culvert Flow: Historic Flow
River = From DS Reach = From DS RS = 1880.1
.035
.025
.035
Legend
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
La Cueva - RESPEC Plan: Plan 93 7/9/2018
Geom: Geometry with Wall+Culvert Flow: Historic Flow
River = From DS Reach = From DS RS = 1792.49
.035
.025
.035
Legend
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
La Cueva - RESPEC Plan: Plan 93 7/9/2018
Geom: Geometry with Wall+Culvert Flow: Historic Flow
River = From DS Reach = From DS RS = 1657.47
.035
.025
.035
Legend
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
La Cueva - RESPEC Plan: Plan 93 7/9/2018
Geom: Geometry with Wall+Culvert Flow: Historic Flow
River = From DS Reach = From DS RS = 1567.85
.035
.025
.035
Legend
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

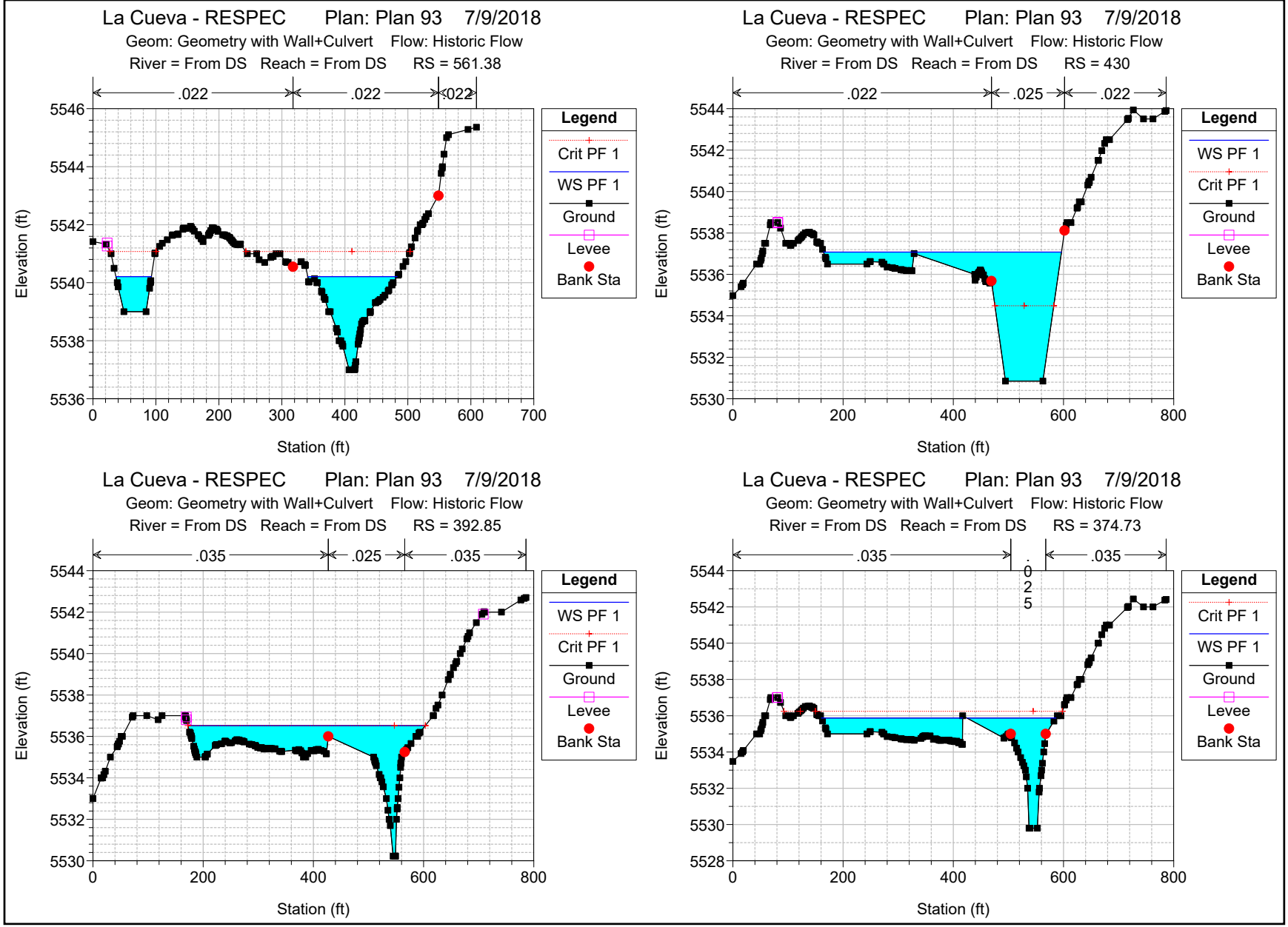

La Cueva - RESPEC Plan: Plan 93 7/9/2018
Geom: Geometry with Wall+Culvert Flow: Historic Flow
River = From DS Reach = From DS RS = 1508.52
.013
.013
.013
Elevation (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
Ground
Levee
Ineff
Bank Sta
La Cueva - RESPEC Plan: Plan 93 7/9/2018
Geom: Geometry with Wall+Culvert Flow: Historic Flow
River = From DS Reach = From DS RS = 1508.00 Culv
.015
Elevation (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
Ground
Levee
Ineff
Bank Sta
La Cueva - RESPEC Plan: Plan 93 7/9/2018
Geom: Geometry with Wall+Culvert Flow: Historic Flow
River = From DS Reach = From DS RS = 1508.00 Culv
.015
Elevation (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
Ground
Ineff
Bank Sta
La Cueva - RESPEC Plan: Plan 93 7/9/2018
Geom: Geometry with Wall+Culvert Flow: Historic Flow
River = From DS Reach = From DS RS = 1454.61
.035
.025
.035
Elevation (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta

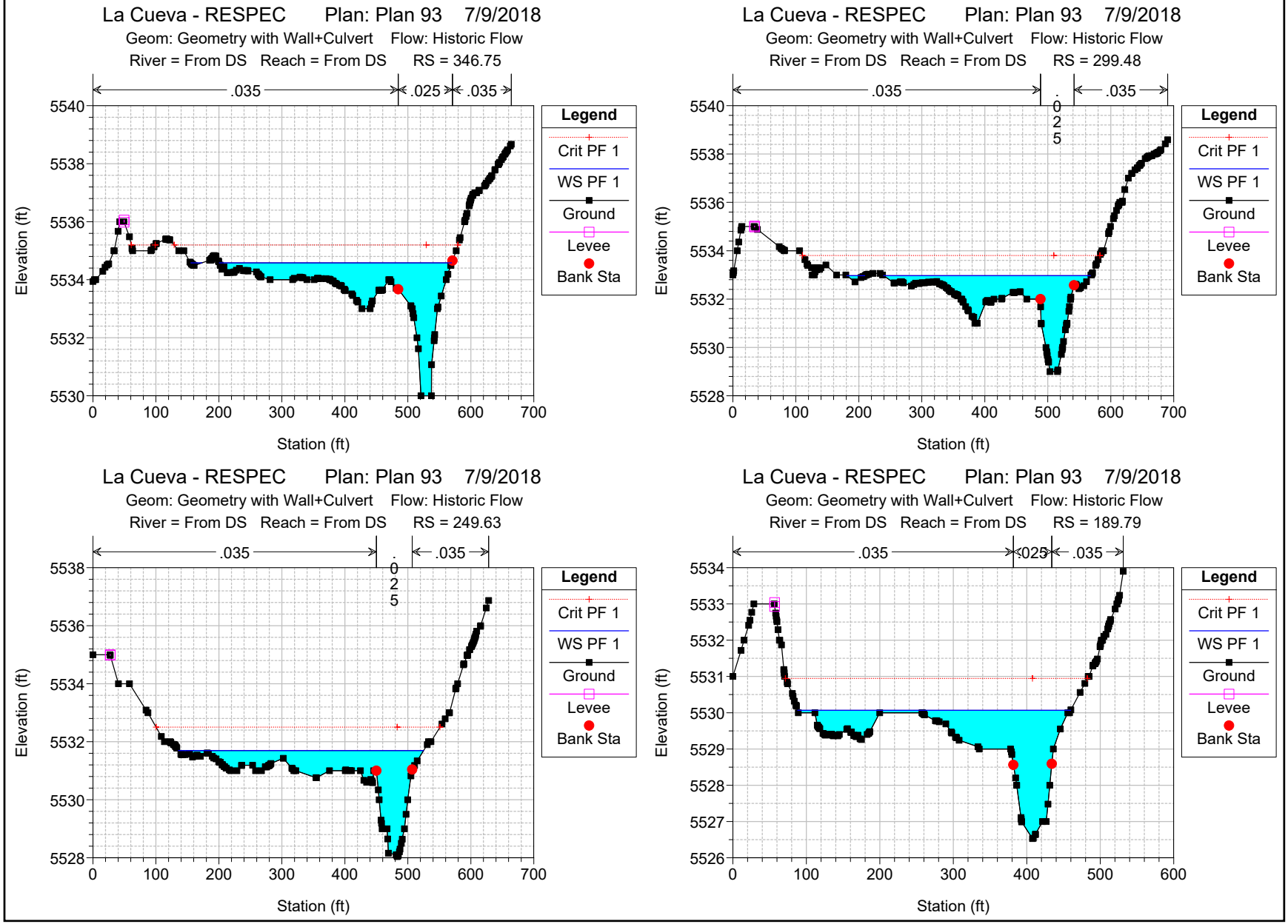

La Cueva - RESPEC Plan: Plan 93 7/9/2018
Geom: Geometry with Wall+Culvert Flow: Historic Flow
River = From DS Reach = From DS RS = 1381.28
.035
.025
.035
Legend
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
La Cueva - RESPEC Plan: Plan 93 7/9/2018
Geom: Geometry with Wall+Culvert Flow: Historic Flow
River = From DS Reach = From DS RS = 1354.1
La Cueva - RESPEC Plan: Plan 93 7/9/2018
Geom: Geometry with Wall+Culvert Flow: Historic Flow
River = From DS Reach = From DS RS = 1323.43
La Cueva - RESPEC Plan: Plan 93 7/9/2018
Geom: Geometry with Wall+Culvert Flow: Historic Flow
River = From DS Reach = From DS RS = 1297.14

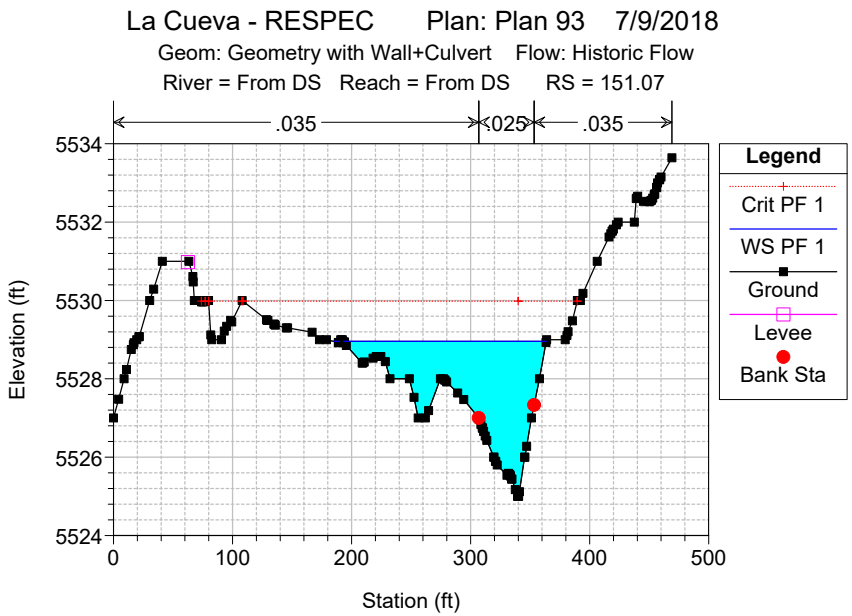

La Cueva - RESPEC Plan: Plan 93 7/9/2018
Geom: Geometry with Wall+Culvert Flow: Historic Flow
River = From DS Reach = From DS RS = 1274.91
.035
.025
.035
Elevation (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
Ground
Bank Sta
La Cueva - RESPEC Plan: Plan 93 7/9/2018
Geom: Geometry with Wall+Culvert Flow: Historic Flow
River = From DS Reach = From DS RS = 1254.2
.035
.025
.035
Elevation (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
Ground
Bank Sta
La Cueva - RESPEC Plan: Plan 93 7/9/2018
Geom: Geometry with Wall+Culvert Flow: Historic Flow
River = From DS Reach = From DS RS = 1238.15
.035
.025
.035
Elevation (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
Ground
Bank Sta
La Cueva - RESPEC Plan: Plan 93 7/9/2018
Geom: Geometry with Wall+Culvert Flow: Historic Flow
River = From DS Reach = From DS RS = 1207.37
.035
.025
.035
Elevation (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
Ground
Bank Sta

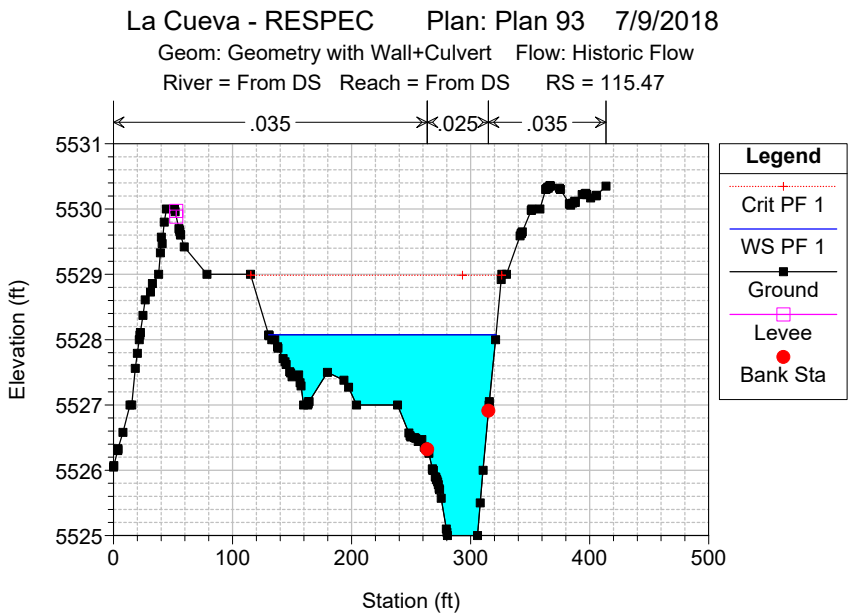

La Cueva - RESPEC Plan: Plan 93 7/9/2018
Geom: Geometry with Wall+Culvert Flow: Historic Flow
River = From DS Reach = From DS RS = 1174.73
.035
.025
.035
Elevation (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
Ground
Bank Sta
La Cueva - RESPEC Plan: Plan 93 7/9/2018
Geom: Geometry with Wall+Culvert Flow: Historic Flow
River = From DS Reach = From DS RS = 1130.17
.035
.025
.035
Elevation (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
Ground
Bank Sta
La Cueva - RESPEC Plan: Plan 93 7/9/2018
Geom: Geometry with Wall+Culvert Flow: Historic Flow
River = From DS Reach = From DS RS = 1089.42
.035
.035
Elevation (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
Ground
Bank Sta
La Cueva - RESPEC Plan: Plan 93 7/9/2018
Geom: Geometry with Wall+Culvert Flow: Historic Flow
River = From DS Reach = From DS RS = 1047.06
.035
.035
Elevation (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta

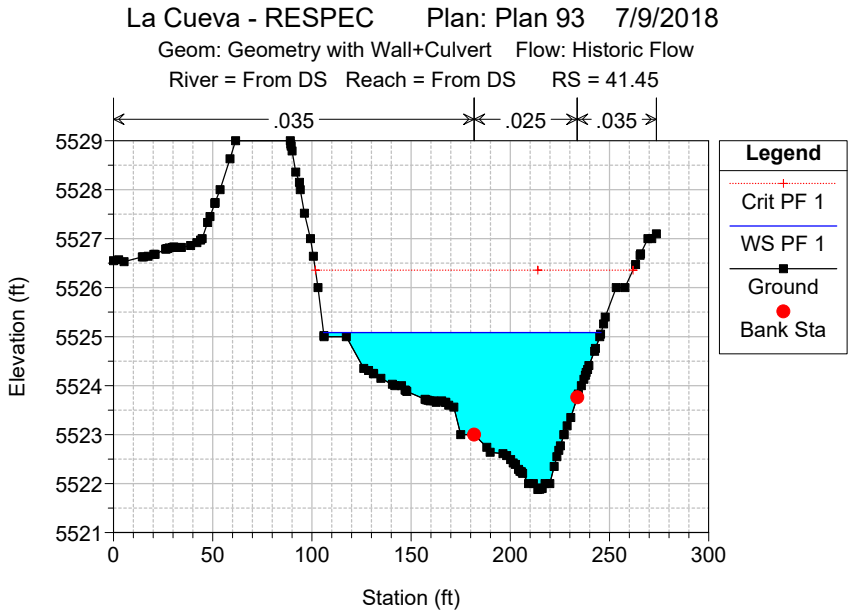

La Cueva - RESPEC Plan: Plan 93 7/9/2018
Geom: Geometry with Wall+Culvert Flow: Historic Flow
River = From DS Reach = From DS RS = 999.65
.035
.025
.035
Elevation (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta
La Cueva - RESPEC Plan: Plan 93 7/9/2018
Geom: Geometry with Wall+Culvert Flow: Historic Flow
River = From DS Reach = From DS RS = 873
.035
.025
.035
Elevation (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta
La Cueva - RESPEC Plan: Plan 93 7/9/2018
Geom: Geometry with Wall+Culvert Flow: Historic Flow
River = From DS Reach = From DS RS = 793
.035
.025
.035
Elevation (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
La Cueva - RESPEC Plan: Plan 93 7/9/2018
Geom: Geometry with Wall+Culvert Flow: Historic Flow
River = From DS Reach = From DS RS = 683.29
.035
.025
.035
Elevation (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta

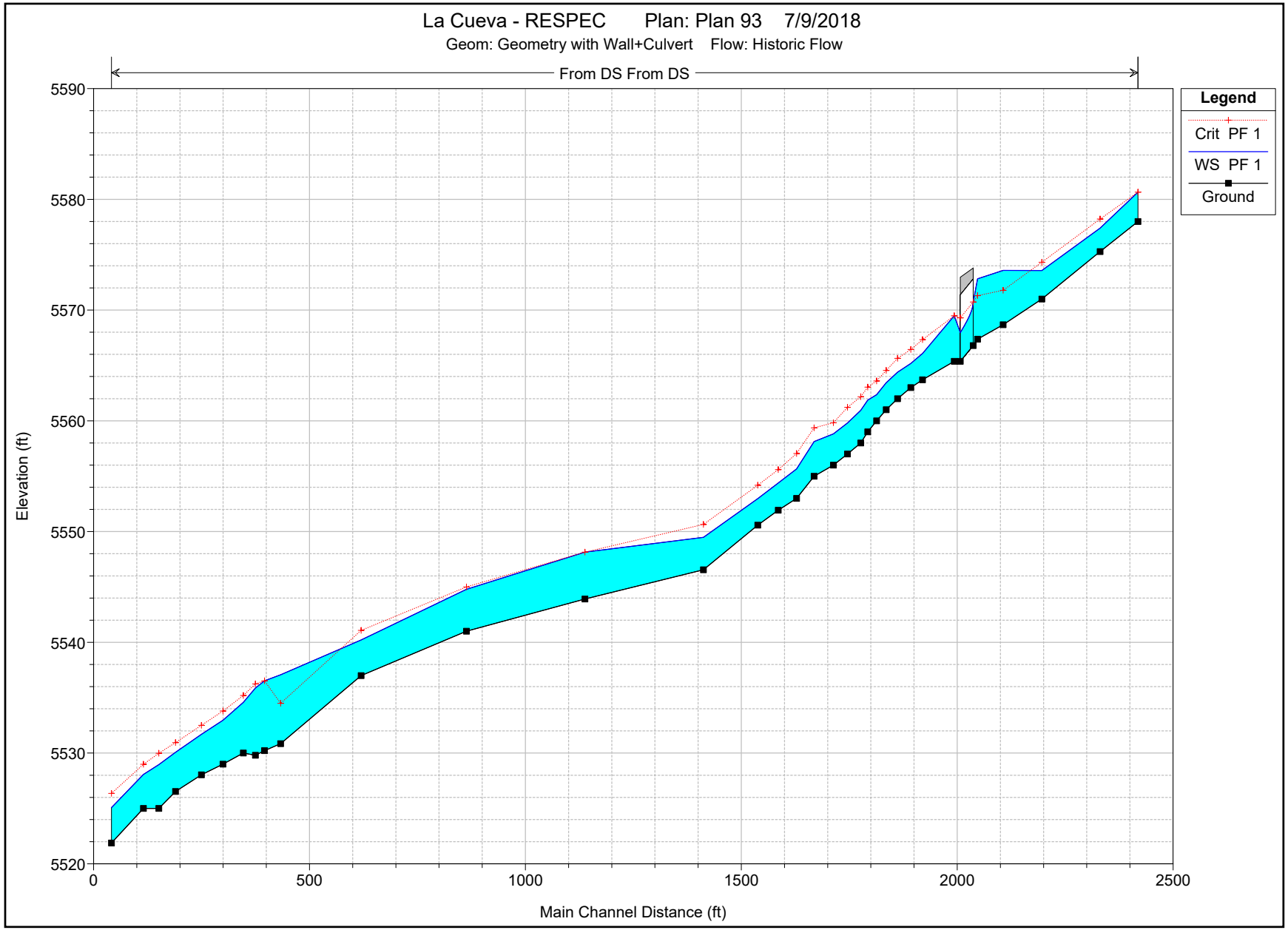

La Cueva - RESPEC Plan: Plan 93 7/9/2018
Geom: Geometry with Wall+Culvert Flow: Historic Flow
River = From DS Reach = From DS RS = 561.38
.022
.022
.022
Elevation (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta
La Cueva - RESPEC Plan: Plan 93 7/9/2018
Geom: Geometry with Wall+Culvert Flow: Historic Flow
River = From DS Reach = From DS RS = 430
.022
.025
.022
Elevation (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
La Cueva - RESPEC Plan: Plan 93 7/9/2018
Geom: Geometry with Wall+Culvert Flow: Historic Flow
River = From DS Reach = From DS RS = 392.85
.035
.025
.035
Elevation (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
La Cueva - RESPEC Plan: Plan 93 7/9/2018
Geom: Geometry with Wall+Culvert Flow: Historic Flow
River = From DS Reach = From DS RS = 374.73
.035
.025
.035
Elevation (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta

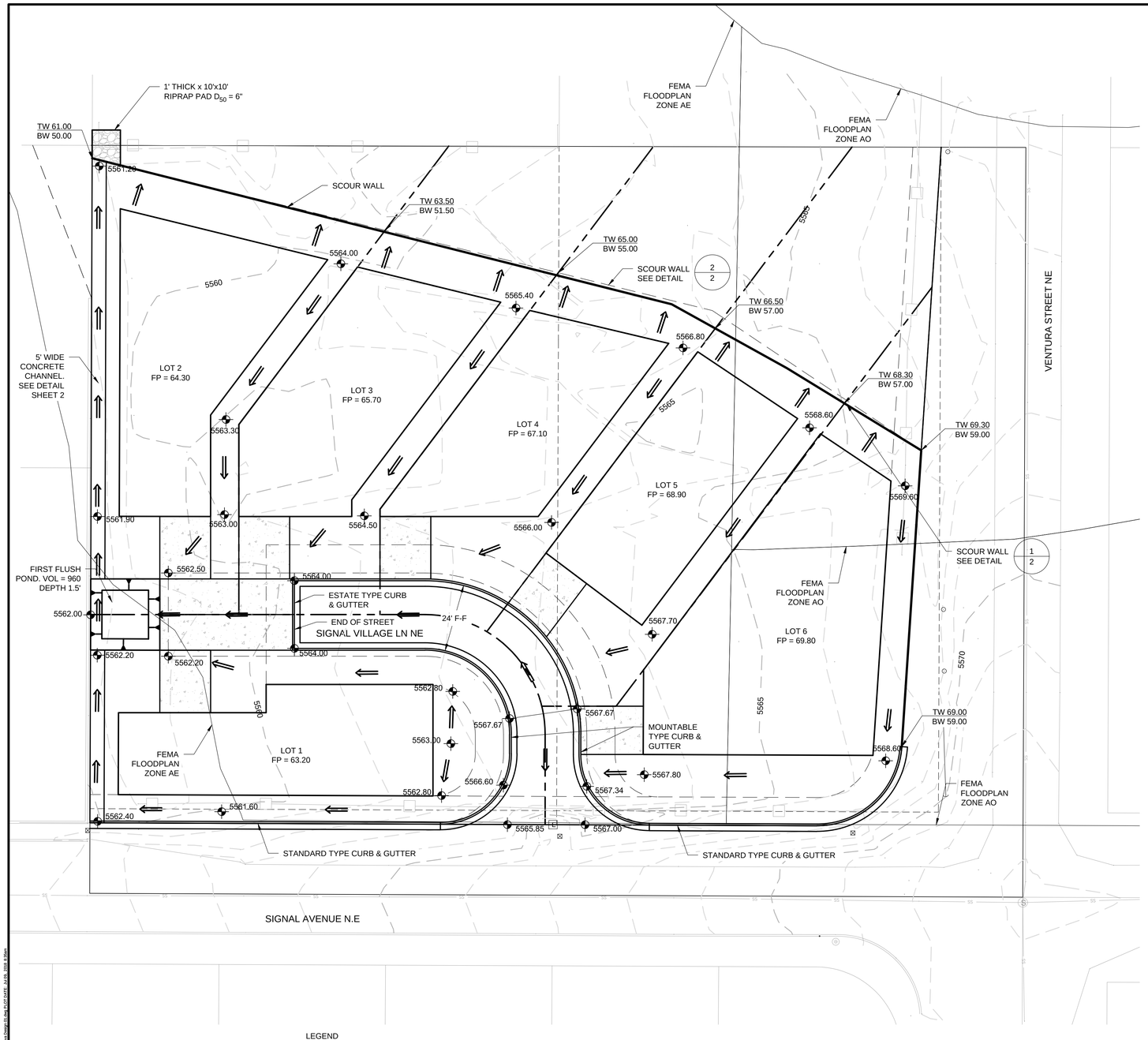

La Cueva - RESPEC Plan: Plan 93 7/9/2018
Geom: Geometry with Wall+Culvert Flow: Historic Flow
River = From DS Reach = From DS RS = 346.75
.035
.025
.035
Legend
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
La Cueva - RESPEC Plan: Plan 93 7/9/2018
Geom: Geometry with Wall+Culvert Flow: Historic Flow
River = From DS Reach = From DS RS = 299.48
.035
.025
.035
Legend
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
La Cueva - RESPEC Plan: Plan 93 7/9/2018
Geom: Geometry with Wall+Culvert Flow: Historic Flow
River = From DS Reach = From DS RS = 249.63
.035
.025
.035
Legend
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
La Cueva - RESPEC Plan: Plan 93 7/9/2018
Geom: Geometry with Wall+Culvert Flow: Historic Flow
River = From DS Reach = From DS RS = 189.79
.035
.025
.035
Legend
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

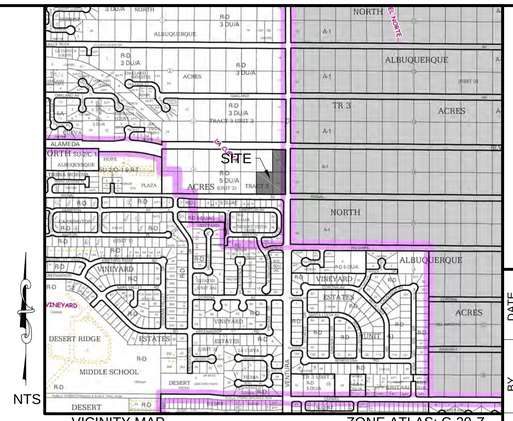

La Cueva - RESPEC Plan: Plan 93 7/9/2018
Geom: Geometry with Wall+Culvert Flow: Historic Flow
River = From DS Reach = From DS RS = 151.07
.035
.025
.035
Elevation (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta


La Cueva - RESPEC Plan: Plan 93 7/9/2018
Geom: Geometry with Wall+Culvert Flow: Historic Flow
River = From DS Reach = From DS RS = 115.47
.035
.025
.035
Elevation (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta


La Cueva - RESPEC Plan: Plan 93 7/9/2018
Geom: Geometry with Wall+Culvert Flow: Historic Flow
River = From DS Reach = From DS RS = 41.45
.035
.025
.035
Elevation (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
Ground
Bank Sta


La Cueva - RESPEC Plan: Plan 93 7/9/2018
Geom: Geometry with Wall+Culvert Flow: Historic Flow
From DS From DS
Legend
Crit PF 1
WS PF 1
Ground
Elevation (ft)
5590
5580
5570
5560
5550
5540
5530
5520
0
500
1000
1500
2000
2500
Main Channel Distance (ft)





VICINITY MAP ZONE ATLAS: C-20-Z

LEGEND

- CONCRETE DRIVEWAY
- FLOW ARROW
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- CURB & GUTTER
- FEMA FLOODPLAIN BOUNDARY

DRAINAGE PLAN:

LEGAL DESCRIPTION: LOTS 17 & 18, BLOCK 4, TRACT 3, UNIT 3, NAA

SITE AREA: 1.6135 ACRES (TOTAL SITE), 1.2020 ACRES (DEVELOPED AREA)

FLOOD HAZARD STATEMENT: F.E.M.A. FLOODWAY BOUNDARY AND FLOODWAY MAP DATED AUGUST 16, 2012 (PANEL NO. 35001C0141H) INDICATES A FLOOD HAZARD ZONE AE WHICH IS AN AREA DETERMINED TO BE INSIDE THE 100-YEAR FLOODPLAIN WITH BASE FLOOD ELEVATIONS.

EXISTING DRAINAGE CONDITIONS:

THE DRAINAGE ANALYSIS FOR THIS SUBDIVISION IS IN ACCORDANCE WITH SETION 22 OF THE CITY OF ALBUQUERQUE DEVELOPMENT PROCESS MANUAL (DPM), ENTITLED "DRAINAGE, FLOOD CONTROL, AND EROSION CONTROL." THE DESIGN STORM USED FOR BOTH UNDEVELOPED AND DEVELOPED CONDITIONS IS THE 100-YEAR, 6-HOUR STORM EVENT FOR RUNOFF. THE SITE IS LOCATED IN ZONE 3 SO THE 100-YEAR, 6-HOUR STORM EVENT IS 2.60 INCHES.

LOTS 17 & 18 ARE LOCATED IN NORTH ALBUQUERQUE ACRES, AT THE NORTHWEST CORNER OF THE VENTURA STREET/SIGNAL AVENUE INTERSECTION. THE LOTS DRAIN FROM SOUTHEAST TO NORTHWEST TO THE LA CUEVA ARROYO. THE PEAK RUNOFF FROM THE LOTS UNDER EXISTING CONDITIONS IS 2.25 CFS DURING A 100-YEAR, 6-HOUR STORM. THE MAJORITY IS CURRENTLY ENCUMBERED BY A FLOOD HAZARD ZONE AE.

DEVELOPED DRAINAGE CONDITIONS:

THIS PROJECT INVOLVES THE CONSTRUCTION OF A RESIDENTIAL SUBDIVISION WITH 6 LOTS. THE SUBDIVISION WILL DRAIN FROM EAST TO WEST IN THE PRIVATE STREET TO A 5-FOOT WIDE CONCRETE CHANNEL ALONG THE WEST PROPERTY BOUNDARY. THIS CONCRETE CHANNEL WILL DRAIN SOUTH TO A 24-INCH WIDE SIDEWALK CULVERT TO SIGNAL AVENUE. THE TOTAL DISCHARGE FROM THE SUBDIVISION DURING A 100-YEAR, 6-HOUR STORM IS 5.19 CFS. THE FIRST FLUSH VOLUME FROM THE SUBDIVISION FOR A 0.44-INCH RAIN IS 960 CUBIC-FEET. ON EACH LOT THE AREA BEHIND THE BASK OF THE CURB WILL BE DEPRESSED TO ALLOW FOR THE RETENTION OF THE FIRST FLUSH VOLUME.

ALONG THE EASTERN AND NORTHERN BOUNDARY OF THE DEVELOPED AREA WILL BE A SCOUR WALL TO PROTECT THE SUBDIVISION FROM UPSTREAM FLOWS IN THE LA CUEVA ARROYO. THE SCOUR WALL WILL BE AS DEEP AS 8 FEET BELOW THE ARROYO BOTTOM TO PROTECT THE SUBDIVISION AGAINST SCOUR DURING STORM EVENTS. A HEC-RAS ANALYSIS IS CURRENTLY BEING PERFORMED TO DETERMINE THE IMPROVEMENTS WITHIN THE LA CUEVA ARROYO TO BE CONSTRUCTED TO BOTH PROTECT THE SUBDIVISION AND TO REMOVE THE FLOOD HAZARD ZONE THROGH A LOMR TO FEMA. THIS ANALYSIS WILL BE SUBMITTED AS A SUPPLEMENT TO THIS GRADING AND DRAINAGE PLAN.

100-YEAR HYDROLOGIC CALCULATIONS

BASIN #	AREA (acre)	LAND TREATMENT A (%)	B (%)	C (%)	D (%)	WEIGHTED E (in)	100-YEAR PRECIPITATION V (6-hr) (acre-ft)	V (6-hr) (cu-ft)	V(24-hr) (acre-ft)	V(24-hr) (cu-ft)	Q (cfs)
EXISTING CONDITIONS											
SITE	1.2020	100.00	0.00	0.00	0.00	0.66	0.07	2,880	0.07	2,880	2.25
TOTAL RUNOFF	1.20						0.07	2,880	0.07	2,880	2.25
PROPOSED CONDITIONS											
SITE	1.2020	0.00	17.60	17.70	64.70	1.92	0.19	8,365	0.22	9,777	5.19
TOTAL RUNOFF	1.20						0.19	8,365	0.22	9,777	5.19
EXCESS PRECIP.		0.66	0.92	1.29	2.36	E_c (in)					
PEAK DISCHARGE		1.87	2.6	3.45	5.02	Q_{PC} (cfs)					

WEIGHTED E (in) = $(E_A)(\%A) + (E_B)(\%B) + (E_C)(\%C) + (E_D)(\%D)$
$V_{6\text{-HR}}$ (acre-ft) = (WEIGHTED E)(AREA)/12
V_{10DAY} (acre-ft) = $V_{6\text{-HR}} + (A_D)(P_{10DAY} - P_{6\text{-HR}})/12$
Q (cfs) = $(Q_{PA})(A_A) + (Q_{PB})(A_B) + (Q_{PC})(A_C) + (Q_{PD})(A_D)$

ZONE = 3
$P_{6\text{-HR}}$ (in.) = 2.60
$P_{24\text{-HR}}$ (in.) = 3.10
P_{10DAY} (in.) = 4.90

FIRST FLUSH CALCULATIONS:
(0.34in ÷ 12 in/ft) x (1.2ac x 43,560 sf/ac x 0.647) = 958 CF

BENCHMARKS
AGRS Aluminum Cap stamped "7-C19 1995"
From the intersection of I-25 and Paseo Del Norte NE travel east on
Paseo Del Norte 1.87 miles to Barstow Street NE. Turn left and travel
north on Barstow Street 0.65 miles to Signal Avenue NE. The station is
located on the NNW curb return.
Geographic Position, in feet (NAD83)
N.M. State Plane Coordinates (Central Zone)
N=1522068.520, E=1550417.138, G-G=0.999650745, DA=-00°10'24.78"
Elevation, in feet (NAVD88) = 5485.723

0 20 40
SCALE IN FEET
CONTOUR INTERVAL = 1 FOOT

Thompson Engineering Consultants, Inc.
tecnm@yahoo.com
P.O. BOX 65760
ALBUQUERQUE, NM 87193
PHONE: (505) 271-2198
FAX: (505) 880-9245

NO. | REVISION | BY | DATE

PROJECT:
DATE:
HORIZ. SCALE:
VERT. SCALE:

DRAWN BY: DEM
CHECKED BY:
APPROVED BY:
FILE:

NEW MEXICO 9677 REGISTERED PROFESSIONAL ENGINEER 7-6-18

CITY/COUNTY REVIEW

DEPARTMENT	SIGN-OFF	DATE
WASTEWATER MGMT. DIV.		
WATER SERVICES		
SUBDIVISION ENG.		
STREETS		
TRAFFIC		

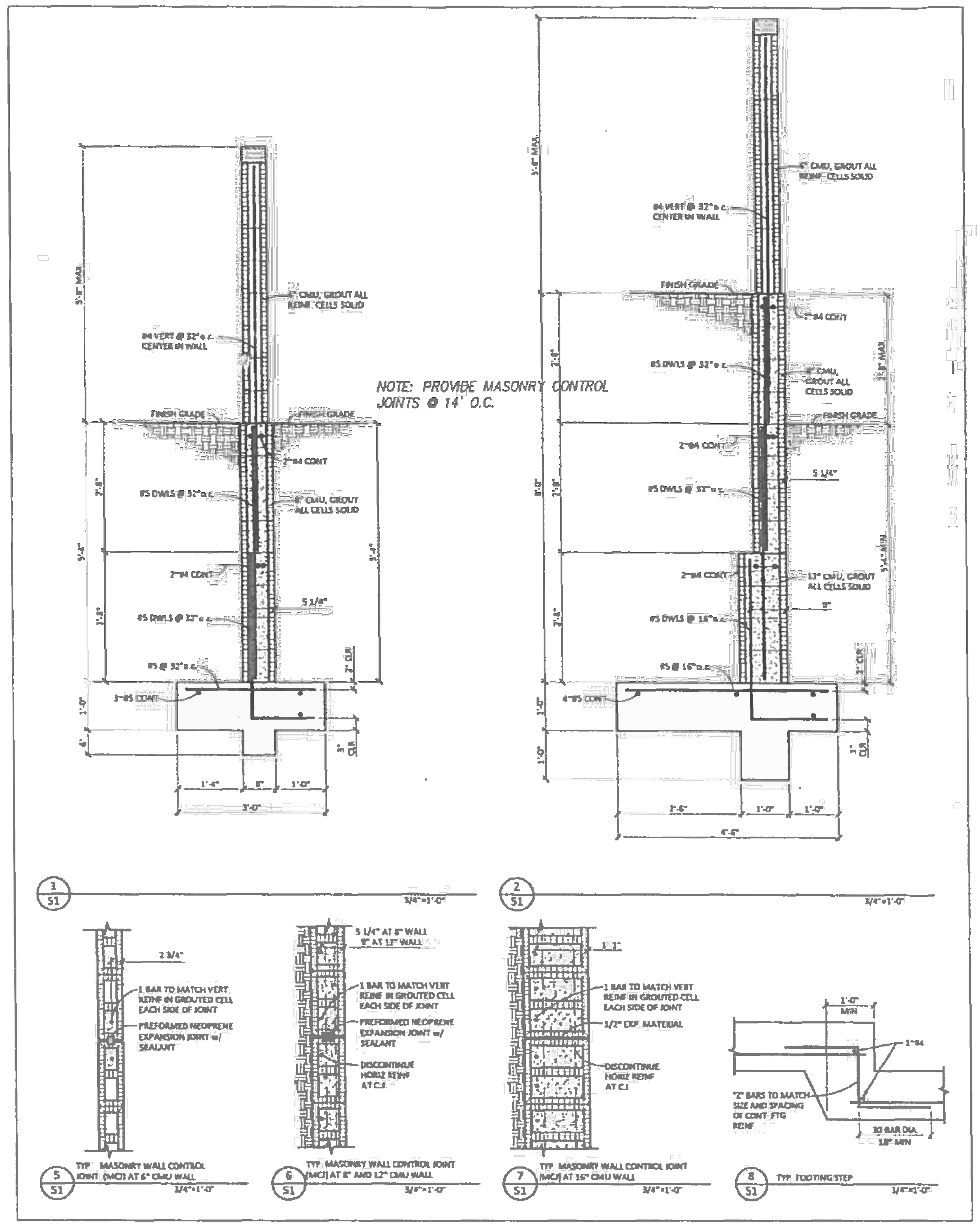
FOR CITY/COUNTY USE ONLY

SIGNAL VILLAGE

GRADING AND DRAINAGE PLAN

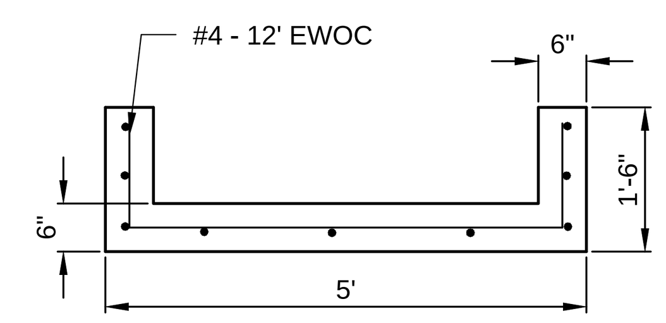
SHEET No.

1 OF 2



REINFORCED CONCRETE MASONRY / SCOUR WALL

NO SCALE



5' WIDE CONCRETE CHANNEL DETAIL

NTS

Thompson Engineering Consultants, Inc.
tecnm@yahoo.com
P.O. BOX 65760
ALBUQUERQUE, NM 87193
PHONE: (505) 271-2199
FAX: (505) 830-9246

NO.	REVISION	BY	DATE

PROJECT:
DATE:
HORIZ. SCALE:
VERT. SCALE:

DRAWN BY: DEM
CHECKED BY:
APPROVED BY:
FILE:

SIGNAL VILLAGE

MISCELLANEOUS DETAILS

CITY/COUNTY REVIEW

DEPARTMENT	SIGN-OFF	DATE
WASTEWATER MGMT. DIV.		
WATER SERVICES		
SUBDIVISION ENG.		
STREETS		
TRAFFIC		

FOR CITY/COUNTY USE ONLY

SHEET No.

2 OF 2

LA CUEVA ARROYO SCOUR ANALYSIS INCLUDING CHANNEL EXCAVATION WITH VERTICAL CONCRETE SCOUR WALL WITHOUT VENTURA CULVERT

COL 1	COL 2	COL 3	COL 4	COL 5	COL 6	COL 7	COL 8	COL 9	COL 10	COL 11	COL 12	COL 13	COL 14	COL 15	COL 16	COL 17	COL 18	COL 19	COL 20	COL 21	COL 22	COL 23	COL 24	COL 25	COL 26
SEC. NO.	HEC-RAS STA.		Q100 (CFS)	QD (CFS)	SC (FT/FT)	SAVG (FT/FT)	WD (FT)	LAMDA	LV (FT)	DELTA MAX (FT)	EROS. SET. (FT)	VEL (FPS)	FROUDE	AREA (SF)	TOP WID (FT)	HYD DEP (FT)	UVW (FT)	UVW/WD	YS/Y	YS (FT)	HECRAS DEPTH (FT)	HECRAS FROUDE	SEQ DEP (FT)	FRBRD (FT)	WALL HT (FT)
1	1454.61		3090	618.0	0.0157	0.0332	60.1	841.9	421.0	210.5	240.6	15.84	2.22	209.73	132.29	1.59	481.1	8.00	4.85	7.69	2.38	2.09	4.75	1.77	16.21
2	1381.28		3090	618.0	0.0157	0.0332	60.1	841.9	421.0	210.5	240.6	14.40	1.73	235.07	109.53	2.15	481.1	8.00	4.85	10.41	2.64	1.62	4.45	1.75	18.61
3	1354.10		3090	618.0	0.0157	0.0332	60.1	841.9	421.0	210.5	240.6	13.07	1.62	216.14	106.78	2.02	481.1	8.00	4.85	9.82	2.33	1.64	4.10	1.70	17.62
4	1323.43		3090	618.0	0.0157	0.0332	60.1	841.9	421.0	210.5	240.6	15.32	2.05	193.97	112.24	1.73	481.1	8.00	4.85	8.38	2.16	2.01	4.56	1.75	16.68
5	1297.14		3090	618.0	0.0157	0.0332	60.1	841.9	421.0	210.5	240.6	15.18	2.05	194.45	114.11	1.70	481.1	8.00	4.85	8.26	2.36	2.01	4.72	1.75	16.74
6	1274.91		3090	618.0	0.0157	0.0332	60.1	841.9	421.0	210.5	240.6	14.11	1.85	199.52	110.75	1.80	481.1	8.00	4.85	8.74	2.43	1.88	4.60	1.73	17.07
7	1254.20		3090	618.0	0.0157	0.0332	60.1	841.9	421.0	210.5	240.6	16.79	2.21	184.07	102.96	1.79	481.1	8.00	4.85	8.67	2.74	2.21	5.72	1.81	18.20
8	1238.15		3090	618.0	0.0157	0.0332	60.1	841.9	421.0	210.5	240.6	16.90	2.14	175.60	90.42	1.94	481.1	8.00	4.85	9.42	2.68	1.98	5.29	1.81	18.52
9	1207.37		3090	618.0	0.0157	0.0332	60.1	841.9	421.0	210.5	240.6	17.94	2.23	173.65	86.75	2.00	481.1	8.00	4.85	9.71	2.66	2.16	5.85	1.83	19.40
10	1174.73		3090	618.0	0.0157	0.0332	60.1	841.9	421.0	210.5	240.6	18.05	2.36	172.85	95.24	1.81	481.1	8.00	4.85	8.80	2.60	2.08	5.29	1.83	17.93

COL 1	CHANNEL CROSS-SECTION NUMBER
COL 2	HEC-RAS CHANNEL STATION
COL 3	NOT USED
COL 4	100-YEAR PEAK DISCHARGE, Q (CFS)
COL 5	DOMINANT DISCHARGE, QD = 0.2 Q100 (CFS)
COL 6	CRITICAL SLOPE, SC = 0.037 QD (^-0.133) (FT/FT)
COL 7	AVERAGE SLOPE OF THE CHANNEL (FT/FT)
COL 8	DOMINANT CHANNEL WIDTH, WD = 4.6QD(^0.4) (FT)
COL 9	MEANDER WAVELENGTH, LAMDA = (014)WD (FT) FOR QD > 2000 CFS
COL 10	DOWN-VALLEY LENGTH, LV = LAMDA/2 (FT)
COL 11	MAXIMUM LATERAL EROSION, DELTA MAX = (16.1)QD(^0.4) (FT) FOR QD > 2000 CFS
COL 12	EROSION SETBACK = WD/2 + DELTA MAX (FT)
COL 13	CHANNEL VELOCITY FROM HECRAS (FT/SEC)
COL 14	FROUDE NUMBER CALCULATED USING HYDRAULIC DEPTH
COL 15	CROSS-SECTIONAL AREA FROM HECRAS (SQ. FT)
COL 16	TOP WIDTH FROM HECRAS (FT)
COL 17	HYDRAULIC DEPTH, HD = A/TW (FT)
COL 18	UNCONSTRAINED VALLEY WIDTH, UVW = 2 X EROSION SETBACK (FT)
COL 19	RATIO OF UNCONSTRAINED VALLEY WIDTH TO DOMINANT CHANNEL WIDTH, UVW/WD
COL 20	RATIO OF SCOUR DEPTH TO FLOW DEPTH, YS/Y (FIGURE 3.31 AMAFCA SEDIMENT AND EROSION DESIGN GUIDE)
COL 21	ESTIMATED SCOUR (FT)
COL 22	DEPTH OF FLOW FROM HECRAS (FT)
COL 23	FROUDE NUMBER FROM HECRAS
COL 24	SEQUENT DEPTH (FT)
COL 25	FREEBOARD (FT)
COL 26	SCOUR WALL HEIGHT = SCOUR DEPTH + SEQUENT DEPTH +FREEBOARD+ TWO FOOT FACTOR OF SAFTEY (FT)

LA CUEVA ARROYO SCOUR ANALYSIS INCLUDING CHANNEL EXCAVATION WITH VERTICAL CONCRETE SCOUR WALL WITH VENTURA CULVERT

COL 1	COL 2	COL 3	COL 4	COL 5	COL 6	COL 7	COL 8	COL 9	COL 10	COL 11	COL 12	COL 13	COL 14	COL 15	COL 16	COL 17	COL 18	COL 19	COL 20	COL 21	COL 22	COL 23	COL 24	COL 25	COL 26
SEC. NO.	HEC-RAS STA.		Q100 (CFS)	QD (CFS)	SC (FT/FT)	SAVG (FT/FT)	WD (FT)	LAMDA	LV (FT)	DELTA MAX (FT)	EROS. SET. (FT)	VEL (FPS)	FROUDE	AREA (SF)	TOP WID (FT)	HYD DEP (FT)	UVW (FT)	UVW/WD	YS/Y	YS (FT)	HECRAS DEPTH (FT)	HECRAS FROUDE	SEQ DEP (FT)	FRBRD (FT)	WALL HT (FT)
1	1454.61		3090	618.0	0.0157	0.0332	60.1	841.9	421.0	210.5	240.6	21.87	3.76	141.28	134.15	1.05	481.1	8.00	4.85	5.11	2.56	2.71	5.05	1.92	14.08
2	1381.28		3090	618.0	0.0157	0.0332	60.1	841.9	421.0	210.5	240.6	17.23	2.32	179.32	104.29	1.72	481.1	8.00	4.85	8.34	2.18	2.32	5.31	1.79	17.44
3	1354.10		3090	618.0	0.0157	0.0332	60.1	841.9	421.0	210.5	240.6	14.30	1.84	197.18	104.77	1.88	481.1	8.00	4.85	9.13	2.15	1.86	4.37	1.72	17.22
4	1323.43		3090	618.0	0.0157	0.0332	60.1	841.9	421.0	210.5	240.6	16.44	2.17	183.88	102.95	1.79	481.1	8.00	4.85	8.66	2.19	2.14	4.99	1.77	17.43
5	1297.14		3090	618.0	0.0157	0.0332	60.1	841.9	421.0	210.5	240.6	16.03	2.19	185.08	111.73	1.66	481.1	8.00	4.85	8.03	2.27	2.14	4.87	1.77	16.67
6	1274.91		3090	618.0	0.0157	0.0332	60.1	841.9	421.0	210.5	240.6	14.62	1.94	192.70	109.21	1.76	481.1	8.00	4.85	8.56	2.37	1.96	4.69	1.74	16.99
7	1254.20		3090	618.0	0.0157	0.0332	60.1	841.9	421.0	210.5	240.6	17.20	2.28	179.67	102.00	1.76	481.1	8.00	4.85	8.54	2.70	2.28	5.81	1.82	18.17
8	1238.15		3090	618.0	0.0157	0.0332	60.1	841.9	421.0	210.5	240.6	17.30	2.20	172.17	89.86	1.92	481.1	8.00	4.85	9.29	2.65	2.04	5.39	1.82	18.50
9	1207.37		3090	618.0	0.0157	0.0332	60.1	841.9	421.0	210.5	240.6	18.16	2.27	171.58	86.67	1.98	481.1	8.00	4.85	9.60	2.64	2.20	5.91	1.84	19.35
10	1174.73		3090	618.0	0.0157	0.0332	60.1	841.9	421.0	210.5	240.6	18.16	2.38	171.97	95.22	1.81	481.1	8.00	4.85	8.76	2.59	2.10	5.32	1.84	17.92

COL 1	CHANNEL CROSS-SECTION NUMBER
COL 2	HEC-RAS CHANNEL STATION
COL 3	NOT USED
COL 4	100-YEAR PEAK DISCHARGE, Q (CFS)
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COL 7	AVERAGE SLOPE OF THE CHANNEL (FT/FT)
COL 8	DOMINANT CHANNEL WIDTH, WD = 4.6QD(^0.4) (FT)
COL 9	MEANDER WAVELENGTH, LAMDA = (014)WD (FT) FOR QD > 2000 CFS
COL 10	DOWN-VALLEY LENGTH, LV = LAMDA/2 (FT)
COL 11	MAXIMUM LATERAL EROSION, DELTA MAX = (16.1)QD(^0.4) (FT) FOR QD > 2000 CFS
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COL 16	TOP WIDTH FROM HECRAS (FT)
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COL 21	ESTIMATED SCOUR (FT)
COL 22	DEPTH OF FLOW FROM HECRAS (FT)
COL 23	FROUDE NUMBER FROM HECRAS
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COL 25	FREEBOARD (FT)
COL 26	SCOUR WALL HEIGHT = SCOUR DEPTH + SEQUENT DEPTH +FREEBOARD+ TWO FOOT FACTOR OF SAFTEY (FT)