CITY OF ALBUQUERQUE
Planning Department
David S. Campbell, Director

Timothy M. Keller, Mayor

March 25, 2019

David Thompson, P.E.
Thompson Engineering Consultants, Inc.
PO Box 65760
Albuquerque, NM 87122

RE: Signal Village Subdivision
Signal and Ventura NE
Grading Plan Stamp Date: 2/20/19
Drainage Report Stamp Date: 2/20/19
Hydrology File: C20D078

Dear Mr. Thompson:

Based upon the information provided in the submittal received on 2/20/2019 the above-referenced project cannot be approved for Preliminary Plat, Work Order, or Grading Permit until the following are addressed.

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Prior to Preliminary Plat:

1. Identify all aspects of the arroyo treatment, and show them clearly on all exhibits.
    a. Excavation is still shown on lot 15 in the HEC-RAS model even though grading is not shown on that lot on the G&D Plan. Will this development be relying on permission from the owner of lot 15 to
        i. Increase BFE
        ii. Grade on lot 15
        iii. Construct grade control structures on lot 15
        iv. Any other impacts or construction on lot 15.
    b. Is the floodwall/ bank protection on lot 16 part of the infrastructure to be built by this project? It is shown in the HEC-RAS model but it is missing from the G&D Plan. Split flows occur upstream of lot 16 at the La Cueva Arroyo crossing of Alameda Blvd where Alameda does not have a water block. While the split flow is not deep enough to be mapped a floodplain, the 100 year flows must still be accounted for in the design of lot 16. Provision must be made for these split flows to reenter the main arroyo in the design of the scour/flood wall on lot 16.
    c. Grade control structures will be required as part of this development. The natural braded arroyo is being replaced with a relatively clean straight channel where the supercritical flow regime is likely and sediment transport rates may significantly exceed the amount of sediment supplied from the natural braded channel upstream.

The sediment transport calculations were missing from this report (include all calculations). Use subcritical results from the HEC-RAS to calculate the bed- load transport rate east of Ventura and compare to normal depth calculations for the typical channel (n=0.02) and equilibrium slope (about 0.2%) next to this development and the existing subdivision to the west. Use a consistent partial size for all calculations. Typical sections used in the calculations must agree with the typical sections shown on the G&D Plan.

d. Correct the HEC-RAS models to agree with 'a' and 'b' above. Also:
    i. In the report explain the source of topography , assumptions for encroachments, Manning's 'n' value, and improvements for each model and use FEMA titles and labels for each model such as
        1. Duplicate effective
        2. Corrected effective - "Existing Conditions"
        3. Proposed Conditions - including only what this project will actually build and include in LOMR
        4. Future Conditions w/ north over bank encroachment (if the bank protection on Lot 16 is to be included with this project then this model may be omitted),
        5. Future Conditions w/ north over bank encroachment and bridge at Ventura.
    ii. Straighten out the channel center line and make the sections perpendicular to the direction of flow adjacent to this development and provide smooth transitions at either end of this development. The channel and bank protection should be parallel.
    iii. The Corrected Effective model is modeling the ineffective flow area at the contraction upstream of the existing subdivision too gradually and the encroachments are being overtopped. The contraction angle should be 45° or more measured from the new centerline above. Elevations should not be specified on the encroachments to avoid overtopping.
    iv. The grades in the Proposed HEC-RAS model at section 1527 are different than what is shown on the grading plan. Both the grading plan and the HEC-RAS section must be fixed to show the grades in accordance with the typical section of Ventura St. Account for C&G and sidewalk whether deferred or not. Provide a profile of Ventura St existing and future road grades and a typical section through the floodwall on lot 6, sidewalk and C&G. If the lot elevations next to Ventura are not elevated above the 100-yr WSEL, plus freeboard, then the east property line must be designated as a levee and all design requirements of FEMA (44CFR, Ch.1, Section 65.10) must be demonstrated in this report.
e. Correct the scale of the Topo Work Map, Exhibit A, and identify the source of topography, surveyor name, registration number, date and datum of survey. Show

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stationing along the HEC-RAS centerline on both the Topo Work Map and on the G&D Plan with bearings, distances, and curve data. If coordinates are used to identify survey baseline control points on the HEC-RAS centerline and on the G&D Plan (Sheets C501 and C105) then a survey control sheet stamped by a registered professional surveyor must be included in the G&D Plan with ties to NM State Plane, ground to grid factor, and basis of coordinates (ground or grid). Alternatively use property corners for control points and property lines for baselines. Also show stationing control points along each cross-section (recommend 1000 at centerline)

f. On the profile of the arroyo show the existing and proposed invert, equilibrium invert, and proposed water surface. Also show the future culverts at Ventura labeling the size, slope, flow rate, velocity, and invert elevations. Label proposed invert elevation, the required scour elevation, the water surface elevation, and the freeboard elevation at each HEC-RAS section. Show the proposed scour wall, and label the station and elevation of each 8" step.

g. Identify horizontal and vertical tie-in points for the SFHA and BFE on the Topo Work Map and on an Annotated FIRM and discuss in the report conclusion. Tie-in should be as close as possible to the development. The transition may be easier to accomplish if you first add 2.7' to the downstream Duplicate Effective BFEs on NGVD '29 to convert to NAVD '88.
    i. Where is the downstream tie-in point?
    ii. What is the downstream limit of the new topo survey and the corrected cross-sections?
    iii. Where does the Corrected Effective HEC-RAS model transition back to the previous Duplicate Effective HEC-RAS sections?
    iv. Show the City Limits on the east side of Ventura St. If revisions to the BFE or SFHA are proposed in Bernalillo County then written approval from the County will be required.

h. Add the duplicate effective water surface elevations to the table on "Exhibit A", the Topo Work Map, and compare to the corrected effective elevations. Add a narrative comparison of duplicate effective to corrected effective and a comparison of corrected effective to proposed elevations in a new "Conclusions" section in the report.

2. Scour Wall design calculations and details are required including scour depth calculations, freeboard calculations, and super-elevation calculations. There is at least one angle point in the Proposed SFHA in the vicinity of Ventura where parallel flow may not be assumed and an angle of about 45° will apply to the first 100' downstream of Ventura on the south side of the arroyo. Use equation 3.90 from the E&S Design Guide for the angle points and equation 3.88 for the wall on the east side of lot 6.
    a. Scour depth calculations were missing (include all calculations).
    b. Freeboard calculations and Super-elevation calculations.
    c. The footing of the scour wall looks too small. The footer has to support the wall after the soil is removed from the low side to the scour depth. Please provide structural calculations including loading assumptions stamped by a registered professional engineer to accompany the wall details shown on the G&D sheets.
    d. Layout the scour/floodwalls, easements, and property lines on the G&D Plan to clearly demonstrate that the footings are contained in the easements and do not encroach into the right of way. Either layout all of the footers or just use the largest footer to dimension between the wall and the easement and property lines.
3. The Grading and Drainage Plan should clearly identify all of the property lines, easements, and improvements that are part of this development. It should include the arroyo profile sheet (see 1.f above), typical sections, and structural details on sheets that are numbered sequentially (for example 1 of 5, 2 of 5, etc) so that it is clear which sheets are included in the plan.
    a. If the scour wall (with drainage easement) on Lot 16 is included with this development then it must be shown on the G&D Plan along with the grading necessary to construct the wall and leave unobstructed passage of the 100 year peak flow that splits off from the main arroyo in Alameda Blvd about 600' upstream of this site. A separate plan should be submitted for the development of lot 16 including all frontage infrastructures that might also include this floodwall if it is not being constructed by the Signal Village Subdivision.
    b. Show the scour wall on the south side of the arroyo and the easement line on the G&D Plan. Either show the footer or a dimension between the wall and the easement that will contain the widest footer.

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c. The easement lines on the G&D Plan and Plat must agree with each other. Please revise both and resubmit to DRB.
    i. The onsite road is offset in the easement but centered on the lot lines.
    ii. An easement for the channel/driveway between the end of the road and the pond, the pond, and the channel between the pond and the arroyo is missing on the plat.
    iii. The easement for the floodwall must leave room for the footer.
d. Show proposed sidewalks and C&G onsite and offsite with solid line type and include in legend whether deferred or not..
e. Add spot elevations in the swales around the pads on lots 2, 3, 4,and 5 showing conformance to the flow arrows shown on those lots and clearly identify any additional retaining walls.
f. Show and label the existing and proposed contours, including all proposed grading both onsite and offsite and label limits of grading. Proposed contours are missing everywhere except in the arroyo.
g. Extend limits of existing topo to include detailed grades and elevations on both sides of the existing wall(s) along the west boundary of this subdivision. Include spot elevations next to the existing adjacent houses and their finished floor elevations. Also provide Elevation Certificates for the existing houses in the Floodplain.
h. Provide additional details for the first flush pond. Show the water surface elevations for both the first flush volume and the 100-yr volume; these are determined by the flow depth in the channel and the weir equation, not the channel invert. Include supporting calculation for the channels both upstream and downstream of the pond.
i. Provide additional details and calculations for the channel/driveway between the end of the onsite road and the pond. A detail is needed showing the transition from the typical crowned roadway section to the channel/driveway section. Typical sections are also required showing the cross-section of the channel/driveway.

4. Typical sections are required at all retaining walls (not just the scour wall) at the point of maximum retainage showing existing ground, proposed grades, the ROW/property line or easement line, and dimensions. Typical sections are needed through north, south, east, west boundaries, and of all roads, onsite and frontage. Show easement and lot lines in legend and on the grading and drainage plan and be sure they match the plat. Floodwall footings must be contained in an easement In accordance with DPM Ch.22, section 5 part B, Show that grading and wall construction near the property line does not endanger adjacent property or constrain its use.
    a. If any such encroachment is made the following must be obtained:
        i. Any private encroachment into the public ROW will require a revocable permit. (east scour wall along Ventura)
        ii. Any private encroachment into a public easement will require an encroachment agreement. (none noted)

iii. Any private encroachment into neighboring private property will require written and signed permission from both property owners. (potentially the west retaining wall, section is missing)

b. The retaining wall details don't contain the information requested in this comment. Separate typical sections are required on the G&D to address this comment.

c. The section of the channel on the west property line is incomplete on sheet C501. It should also show the existing grade on both sides of the existing wall with horizontal and vertical dimensions to the property line and the new retaining wall /channel. The channel, new retaining wall, existing wall, and property line need to be clearly shown on the plan and profile on sheet C105.

d. The street sections on sheet C501 are not consistent with what is shown on the G&D Plan and on the infrastructure list. Signal Ave is to have a 32' FF roadway but it is mislabeled 30' on the G&D Plan and on the section. The onsite road is 24' FF offset to one side to accommodate sidewalk on the north side but the sidewalk is missing on the section and on the G&D Plan. All elements of the roadway, sidewalk and easement must have dimension ties to the property line on both the section and the G&D Plan.

e. The typical section for Ventura St is still missing. The section must be included even if the infrastructure is Deferred Procedure C.

f. Show typical sections of the rear and side yard swales around the pads indicating maximum slopes and retaining walls or garden walls where necessary. Garden walls may be deferred to the builders and should be identified with a different symbol than retaining walls or scour walls.

g. The typical section and profile of the east boundary must accommodate and show the future grade of Ventura and the grade proposed with this project. Provide a road profile showing both the existing and the future road grade after the Ventura box culverts are constructed, and then show both grades in the typical section of the east boundary. The Ventura St Right of way grading must be shown on the G&D Plan per the typical street section even if the infrastructure is deferred. The HEC-RAS model should reflect the grade of the road in the section used to determine the WSEL upstream of lot 6 and the grading of lot 6 adjusted accordingly.

5. AMAFCA approval of the G&D Plan, Drainage Report, and Plat is required.

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Prior to Grading Permit

6. A separate floodplain development permit must be obtained from Rudy Rael at rrael@cabq.gov prior to any work in the floodplain. Draft Elevation Certificates for all of the lots in the floodplain must be submitted for approval prior to approval of the floodplain development permit unless a CLOMR is issued by FEMA first.
7. 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 Grading Permit. The limits of any Waters of the US must be shown on the Grading and Drainage Plan and conditions of the Section 404 Nationwide permits must be stated on the G&D plan.

Prior to Release of Financial Guarantee (For Information):

8. Engineer's Certification, per the DPM Chapter 22.7: *Engineer's Certification Checklist For Subdivision* is required.
9. Work Order Closeout Package for the floodplain infrastructure per DPM must be submitted.
10. 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 IIA's when issuance is a condition of release

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

If you have any questions, please contact me at 924-3986 or e-mail at jhughes@cabq.gov .

Sincerely,

James D. Hughes, P.E.
Principal Engineer, Hydrology
Planning Department

THOMPSON Engineering Consultants, Inc.

February 20, 2019

Mr. Dana Peterson, P.E.
Senior Engineer, Planning Department
Development Review Services
City of Albuquerque
P.O. Box 1293
Albuquerque, NM 87103

Re: Signal Village Subdivision Grading Plan and Drainage Report (C20D078)

Dear Mr. Peterson:

The following is a list of your comments in your letter dated September 28, 2018 for the above referenced grading and drainage plan with our responses.

1. **Comment:** Show all infrastructure improvements on the grading plan, especially curb and gutter and sidewalk on Ventura. The return is not in the correct location at Signal/Ventura intersection. Ventura improvements must include curb and gutter and sidewalk and ½ section collector paving section for the full length of frontage. These improvements provide adequate protection from scour so a scour wall is not required on the east side of the project. Dimension face-to-face of curb, and sidewalks on both sides of the centerline. Show connections and transitions to the existing curb and pavement on Signal.

   Response: All infrastructure improvements have been added to the grading plan including future improvements to Ventura. We believe a scour wall along the east property line is needed. All dimensions have been added to the grading plan.

2. **Comment:** Show and label the existing and proposed contours, including all proposed grading both onsite and offsite and label limits of grading. Extend limits of existing topo to include the ROW on Ventura, south of the Ventura/Signal intersection; include curb returns.

   Response: All existing contours have been shown and labeled throughout the grading area.

3. **Comment:** Provide additional details for the first flush pond; show the water surface elevations for both the first flush volume and the 100-yr volume. Include supporting calculation for the overflow channel as well (both the overflow channel and the pond will need to be dedicated as private drainage easements on the Plat). Correct notes on the grading and drainage plan under Developed Drainage Condition to describe the central first flush pond and its overflow north to the arroyo, not south to Signal.

Response: The first flush pond water surface elevation is the same as the 100-yr water surface elevation since the pond spills into the concrete channel. All notes have been corrected.

4. **Comment:** Typical sections are required as all retaining walls (not just the scour wall) at the point of maximum retainage showing the existing ground, proposed grades, lot lines, and dimensions. Typical sections are needed through north, south, east, west boundaries, and of all roads, onsite and frontage.

   Response: Updated retaining wall sections along the north, east, and west developed areas as well as wall profiles are included in this submittal.

5. **Comment:** Typical sections need to show the ROW/property line or easement line. Show the easement and the lot lines in legend and on the grading and drainage plan and be sure they match the plat. Floodwall footings must be contained in an easement in accordance with DPM Ch. 22, section 5, part B. Show that grading and wall construction near the property line does not endanger adjacent property or constrain its use. If any such encroachment is made revocable permits, encroachment agreements, or written permission from private property owners must be obtained.

   Response: All scour wall footings will be located within the subdivision property lines and therefore there will be no encroachments outside of the property.

6. **Comment:** The HEC-RAS model of future conditions must include either 7 or 8 10'x6' CBCs with the invert as about 5562'. The future culvert must be 60' long and shown on the arroyo profile.

   Response: The HEC-RAS model for future conditions has been modified as requested.

7. **Comment:** The typical section and profile of the east boundary must accommodate and show the future grade of Ventura and grade proposed with this project.

   Response: The developer is planning to defer the Ventura improvements and so proposed grades are not shown on the grading plan.

8. **Comment:** The HEC-RAS model of proposed conditions must include a section at the east boundary of the subdivision showing the area south of the floodwall ineffective and a 45-degree contraction upstream of that section. If the lot elevations next to Ventura are not elevated above the 100-year WSEL, plus freeboard, then the east property line must be designated as a levee and all design requirements of FEMA (44CFR, Ch. 1, Section 65.10) must be demonstrated in this report.

   Response: A section at the east subdivision boundary has been added to the model showing the ineffective area. The lot elevation adjacent to the east boundary has been raised to be above the WSEL.

9. **Comment:** Show typical sections of the channel improvements on the grading plan with proposed contours in plan view and provide written permission and public easements of offsite grading.

   Response: Typical sections of channel improvements and proposed grading in plan view have been included in the submittal. No grading will be performed outside of the subdivision property lines.

10. **Comment:** Use HEC-RAS results to compare bed load sediment transport rates for reaches east of Ventura to arroyo north of the subdivision. Equilibrium slope and grade control structures will probably be required. Discuss and show calculations.

    Response: Bed load transport rates have been calculated using the MPM-Woo and the Zeller and Fullerton Relation for arroyo reaches east and west of Ventura. Both methods result in the reach west of Ventura will aggrade and therefore no grade control structures are required.

11. **Comment:** The scour wall is shown as being constructed from CMU block which is constructed in level runs, but the profile shows the scour wall as sloping along its length. The location of the steps should be called out on the plan for the footer and top of wall.

    Response: The scour wall profile has been revised. All bottom and top of wall elevations are shown on the plan.

12. **Comment:** The footing of the scour wall looks too small. It has to support the wall after the soil is removed from the low side to the scour depth. Provide structural calculations including loading assumptions.

    Response: All retaining walls have been updated and designed by Don MacCornack, PE.

13. **Comment:** Provide the scour depth calculations (equations and the excel file). Be sure to update after correcting the HEC-RAS model for future conditions with the culverts at Ventura.

    Response: The scour depth calculations have been revised and included in the report.

14. **Comment:** On the profile of the arroyo and proposed scour wall, provide proposed grades through the future culverts, provide elevation of the finished grade on both side of the wall, top and bottom of the wall (these should match those shown in the plan view), correct bottom of wall label, confirm that the water surfaces shown are for the critical or subcritical depths (not supercritical). Show as-built elevations of existing downstream floodwall based on new survey, not engineer's certification from Signal Pointe because that datum is inaccurate.

Response: Proposed grades have been provided on the arroyo profile.

15. **Comment:** Pad elevation and label for Lot 5 is missing.

    Response: Lot 5 information has been added.

16. **Comment:** Will there be a retaining wall between Signal Village Lane and Lot 1 due to the 4' grade change?

    Response: The grade change will be accomplished with a 3:1 slope from the street to a swale.

17. **Comment:** In the report under "Methodology" explain that the encroachment on the north over bank is not part of this project but is instead part of a future project being modeled now as a part of this project so we can be sure that this project is designed to accommodate that separate future project on the north bank. The future project is not being designed or reviewed in detail with this plan and will not be constructed with this project nor included in the LOMR for this project. Add a note to this effect on the G&D Plan and show the future contours associated with the encroachment. If this encroachment is to be included with this submittal, then include HEC-RAS models both with the north over bank encroachment wnad without. Explain that there will be the following HEC-RAS models:
    a. Duplicate effective
    b. Corrected effective – "Existing Conditions"
    c. Proposed Conditions – including only what this project will actually build and include in the LOMR
    d. Future Conditions w/north over bank encroachment
    e. Future Conditions w/north over bank encroachment and bridge at Ventura.

    Response: The encroachment on Lot 16 will be constructed with this project and will be included in the LOMR. A parallel scour wall will be constructed along the southern boundary of the developed area of Lot 16. The grading and drainage plan with scour wall analysis has been submitted to the City for review.

18. **Comment:** In the report under "Methodology":
    a. Delete the reference to the bridge under Alameda
    b. Delete the reference to Mixed/supercritical being used in this analysis
    c. The reason for subcritical is irregular channel shape and has little to do with sediment concentrations in the runoff, especially at these low concentrations.

    Response: All items above have been deleted or revised.

19. **Comment:** Manning's "n" value for the channel changed without good justification, change back to match duplicate effective or justify. If grading the channel then existing may be different than proposed.

Response: The Manning's "n" has been changed to be consistant.

20. **Comment:** Compare elevations of duplicate effective to corrected effective. Provide table comparing elevations from all models and include both elevation and the change for each model. Add footnotes explaining what change is relative to. The existing should be relative to the duplicate effective and all others should be relative to the existing.

    Response: Table has been added to Exhibit A.

21. **Comment:** In the report under "existing conditions" explain datum shift from current to effective.

    Response: Completed.

22. **Comment:** In the report under "Introduction" state that the flows match what FEMA used in previous LOMR.

    Response: Completed.

23. **Comment:** Section 12+34 is not perpendicular to flow in left overbank, nor are sections upstream.

    Response: Sections have been revised.

24. **Comment:** Show the stationing base line on the G&D Plan with bearings, distances and curve data. Use the same survey base line for both the HEC-RAS model and the constructed plan profile. The base line should be straighter to represent the center of conveyance rather than trying to follow a particular branch of the thalweg.

    Response: Coordinates for the wall have been included with this submittal.

25. **Comment:** 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.

    Response: The 404 permit is in review by the USACE.

26. **Comment:** Information. 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.

    Response: Agreed.

Comments 27 and 28 will be completed prior to Grading Permit and comments 29, 30, and 31 will be completed prior to release of Financial Guarantee.

If you should have any questions regarding this submittal please do not hesitate to contact me.

Sincerely,

David B. Thompson, P.E.

Cc: Mr. Hugh Floyd, P.E.
Mr. Bob Keeran

Enclosures

LA CUEVA FLOODPLAIN ANALYSIS

Prepared for:

Llave Enterprises, Inc

February 2019

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Exhibits

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Appendices

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  - Annotated Flood Insurance Rate Map 35001C0141G, Zone A Floodplain
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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. 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 historic flow rate chosen for the La Cueva Arroyo is 3,048 cfs at Ventura and 3,094 cfs at Barstow, according to a previous LOMR done by FEMA and 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 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 to 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 HEC-RAS model that was done by Weston was used as a base for this model that includes Manning's coefficient of 0.035 for both the stream bed and the banks this is true for both existing and proposed conditions, since all vegetation will be installed back to the graded channel (19); cross sections were selected approximatley at the same location were drawn more perpendicular to the main channel and at higher frequency where the it requires more study. Concrete box culvert for the road crossings at Ventura was modeled to have capacity for the 100-yr storm Ineffective flow area was added south of the scour wall at a 45-degree contraction Weston's model from 2012 the arroyo ran in a mixed flow regime, but according to the Guidance for Flood Risk Analysis and Mapping by FEMA, the model should run subcritical and mapping critical water surface elevation as a flood plain(18c), thus,this model was set to a subcritical flow regime. See model results in appendix C and full run included electronically.

Sediment Transport Analysis

A sediment transport analysis was completed following the two methods described in the AMAFCA Sediment and Erosion Design Guide. Basins were identified from the North Albuquerque Acres Master Drainage Plan. The project site is included in Basin 111.1. Basins 108, 109, and 110 upstream of the project site were also included in the analysis. The first method followed to calculate the bed load transport is the MPM-Woo method described in the AMAFCA Guide. Basins 108 and 109, which drain to Basin 110, contributes a total of 3.75 acre-feet of sediment to Basin 110. Basin 110, which drains to Basin 111.1 contributes 1.17 acre-feet of sediment to Basin 111.1. And a total of 0.60 acre-feet of sediment is produced in Basin 111.1. Therefore, since there is 1.17 acre-feet of sediment being transported into Basin 111.1 from Basin 110 and only 0.60 acre-feet of sediment being transported out of Basin111.1, so the arroyo reach along the subdivision is aggrading.

The second method used to analyze the sediment transport is the Zeller and Fullerton Relation, which includes the gradation of the arroyo bed in each reach as well as the hydraulic properties of the arroyo in each reach. We took soil samples of the arroyo bed upstream and downstream of Ventura to determine the soil gradations for each location. Using the Zeller and Fullerton Relation the volume of sediment entering the downstream reach from upstream is 34,176 cubic feet and the sediment leaving the downstream reach is 26,296 cubic feet. Therefore, as with the MPM-Woo method the downstream reach adjacent to the subdivision will aggrade and average of 0.29 feet. Please refer to the Basin Map and Sediment Analysis spreadsheet in Appendix D.

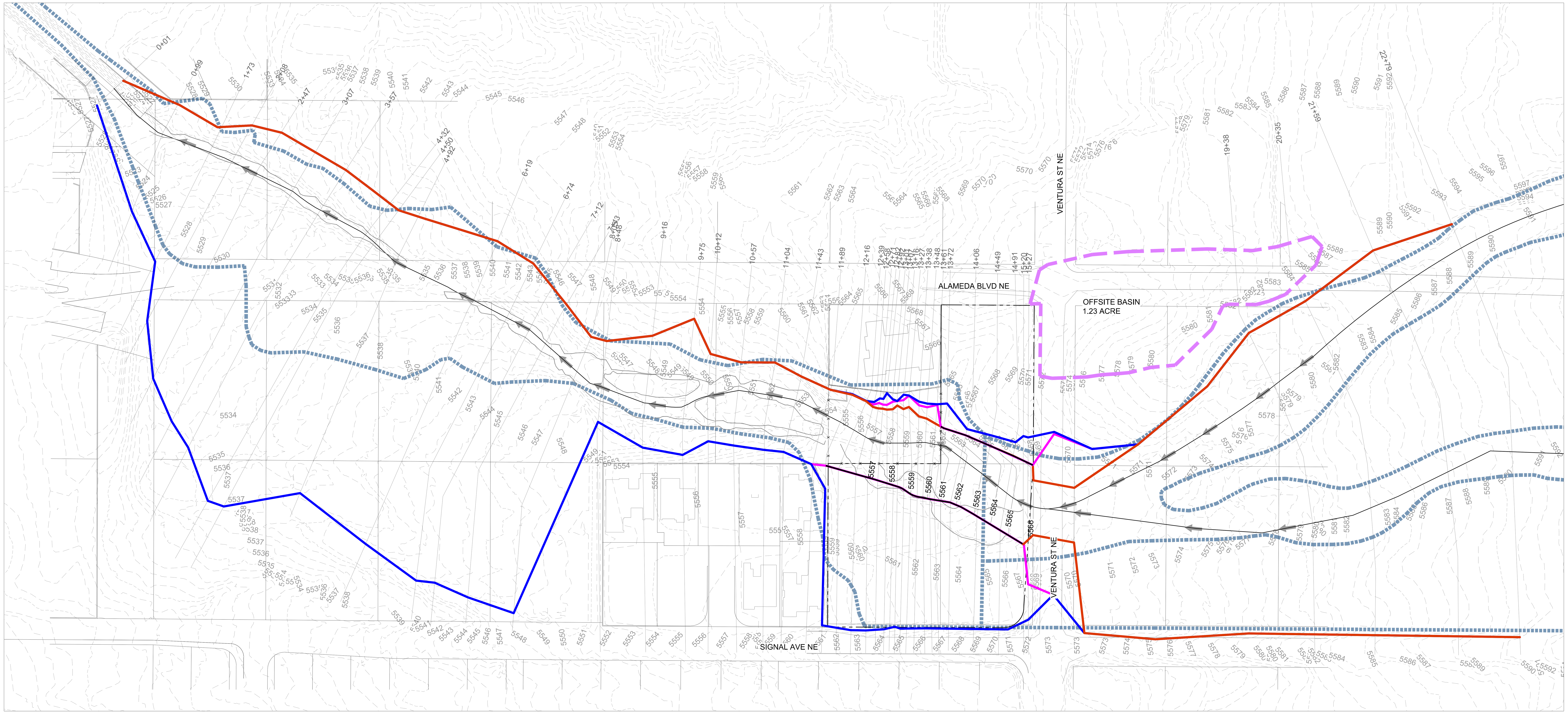
Scour Analysis

The proposed scour wall along the north side of the subdivision was analyzed following the methods described in Sections 3.4 and 3.5 in the AMAFCA Sediment and Erosion Design Guide from 1994. Using the HEC-RAS results, the scour analysis was completed to determine the scour wall depth and height for the worst case between assuming a box culvert under Ventura and Ventura in its existing condition. The proposed parallel scour wall along Lot 15 and Lot 16 to the north of the Signal Village Subdivision is located a distance of 104 feet to 163 feet. Since there are parallel scour walls along the arroyo the maximum lateral erosion distance is reduced per figure 3.24. Therefore, the total scour depth along the Signal Village scour wall is due to the parallel scour along the wall as there is no impingement scour acting on the wall. See Appendix F for the scour wall calculations.

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 F, the total wall height varies from 11.80 to 14.00 feet and the

estimated scour varies from 2.53 to 4.41 feet. 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 the subdivision grading design in Appendix E.



		WSE (ft)			Difference in WSE from Existing Conditions (ft)	
	Cross Section	Existing	Proposed Conditions	W/culvert Conditions	Proposed	W/culvert
	1715	5574.24	5574.24	5574.23	0	0
	1625	5571.64	5571.64	5568.78	0	-2.86
	1565	5570.58	5570.57	Culvert	0	0
Lot 16	1527	5568.6	5569.01	5566.56	0.41	-2.04
	1520	5568.31	5568.03	5566.7	-0.28	-1.61
	1491	5567.15	5567.51	5565.6	0.36	-1.55
	1449	5566.04	5566.26	5564.76	0.22	-1.28
	1406	5564.77	5565.06	5564.04	0.29	-0.73
	1372	5564.05	5563.84	5563.28	-0.21	-0.77
Lot 15	1361	5563.72	5563.68	5562.64	-0.04	-1.08
	1348	5563.36	5563.27	5562.95	-0.09	-0.41
	1338	5563.05	5562.91	5562.01	-0.14	-1.04
	1327	5562.77	5562.38	5562.38	-0.39	-0.39
	1316	5562.61	5562.26	5561.67	-0.35	-0.94
	1307	5561.96	5561.93	5561.15	-0.03	-0.81
	1301	5561.89	5561.68	5561.18	-0.21	-0.71
	1292	5562.21	5561.29	5560.94	-0.92	-1.27
	1282	5561.61	5560.91	5560.81	-0.7	-0.8
	1271	5561.54	5561.2	5560.51	-0.34	-1.03
	1258	5561.1	5560.68	5560.13	-0.42	-0.97
	1239	5560.51	5560.44	5560.33	-0.07	-0.18
	1216	5560.03	5559.9	5560.52	-0.13	0.49
	1189	5559.45	5559.45	5559.45	0	0

LEGEND

- PROPERTY LINE
- ARROYO CENTER LINE
- FEMA CURRENT FLOODPLAIN ZONE AH/AE
- 13+48 PROPOSED HECRAS CROSS SECTIONS
- WATER SURFACE ELEVATION - EXISTING CONDITIONS
- WATER SURFACE ELEVATION - PROPOSED CONDITIONS WITH WALLS NO CULVERT UNDER
- WATER SURFACE ELEVATION - PROPOSED CONDITIONS WITH WALLS AND CULVERT UNDER VENTURA
- OFFSITE BASIN
- PROPOSED SCOUR WALL
- USACE OHWM

Thompson Engineering Consultants, Inc.
P.O. BOX 65760
ALBUQUERQUE, NM 87193
tecnm@yahoo.com
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:

DAVID THOMPSON 9677 PROFESSIONAL ENGINEER
2-20-19

LA CUEVA ARROYO

WATER SURFACE ELEVATION MAP

CITY/COUNTY REVIEW

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

FOR CITY/COUNTY USE ONLY

SHEET No.

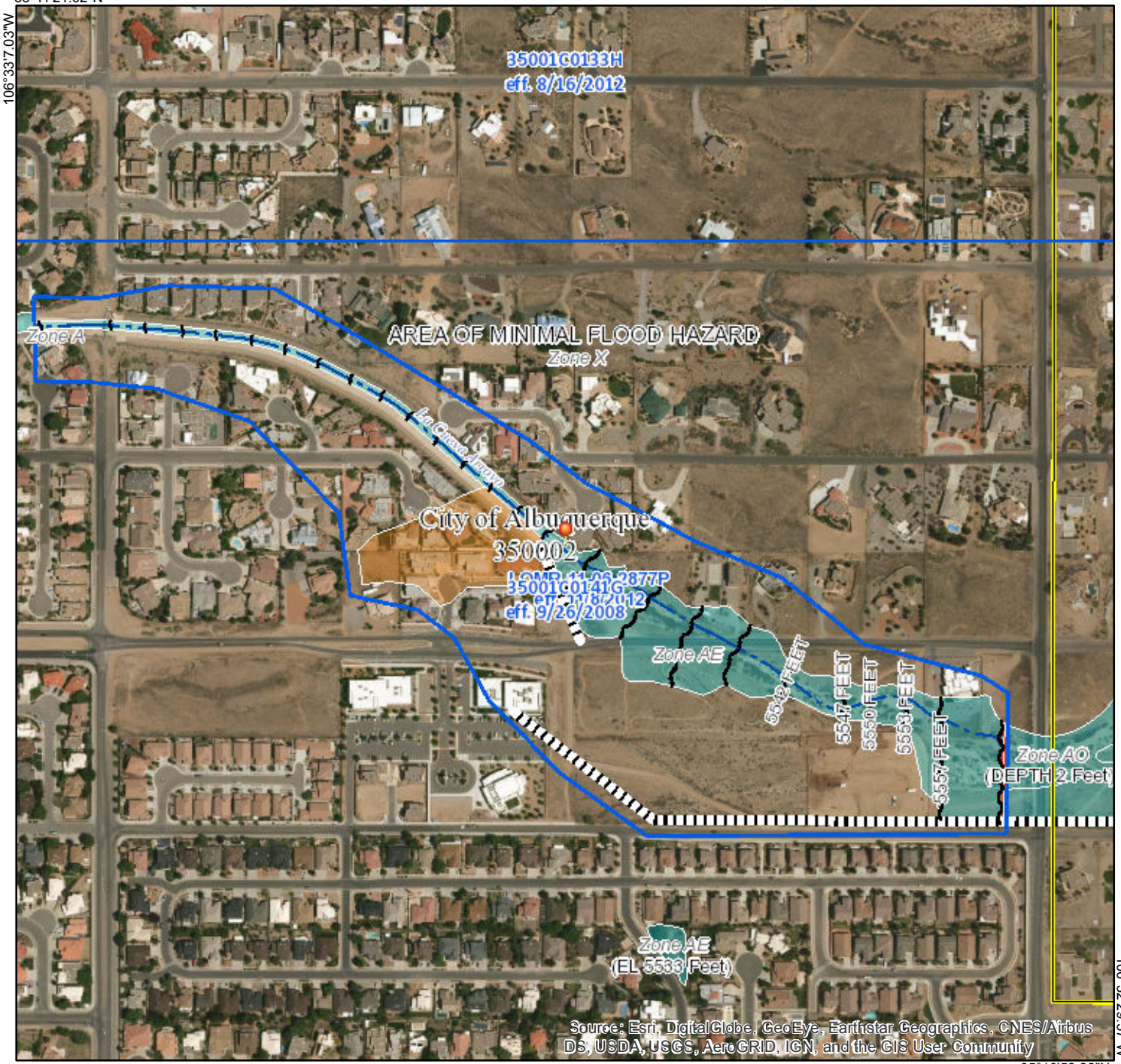
EXHIBIT A

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

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

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
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

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

N

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

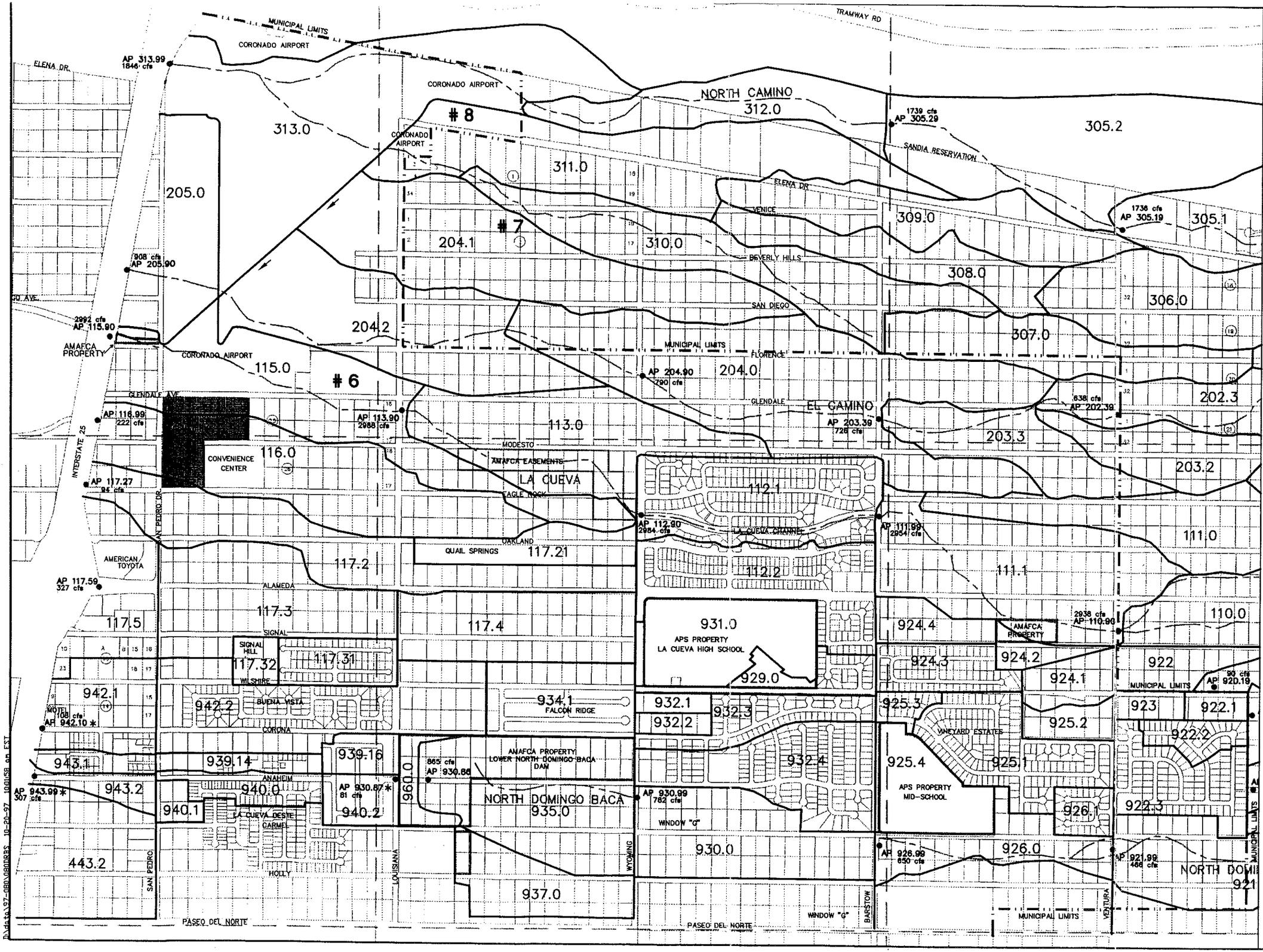
Proposed condition flow rates for future fully developed conditions from the hydrology models incorporating the above facilities are reported in Table 6. All of the interim detention ponds have been eliminated. A comparison with the hydrology results from the **1996 AMAFCA Hydrology Report** for future 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@rmia.com
Telephone: (505) 243-7300
Facsimile: (505) 243-7400

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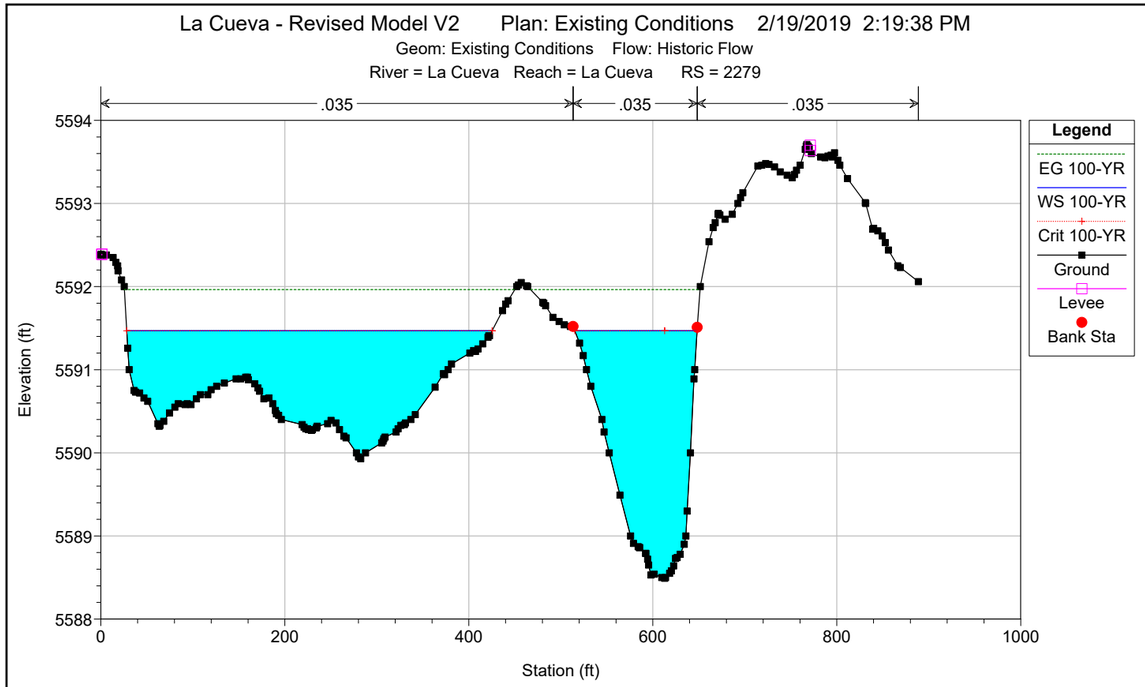
LA Cueva 100-YR FUTURE

-(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	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							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Geom: Existing Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 2279
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.035
Legend
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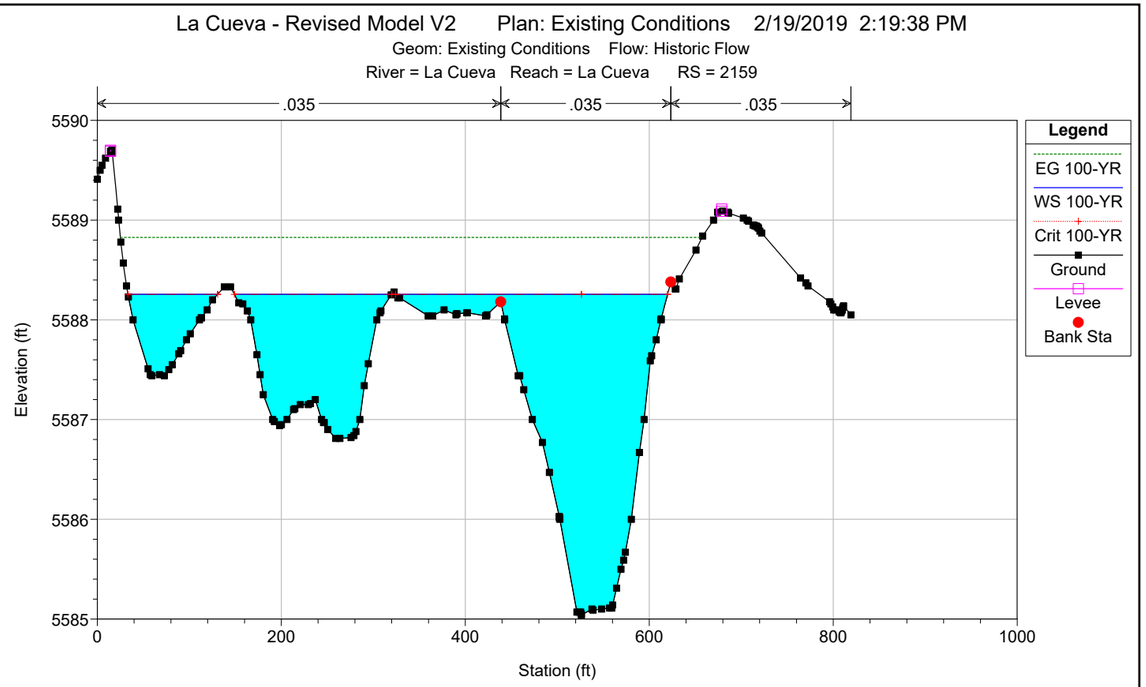
WS 100-YR
Crit 100-YR
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)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Crit 100-YR
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Bank Sta
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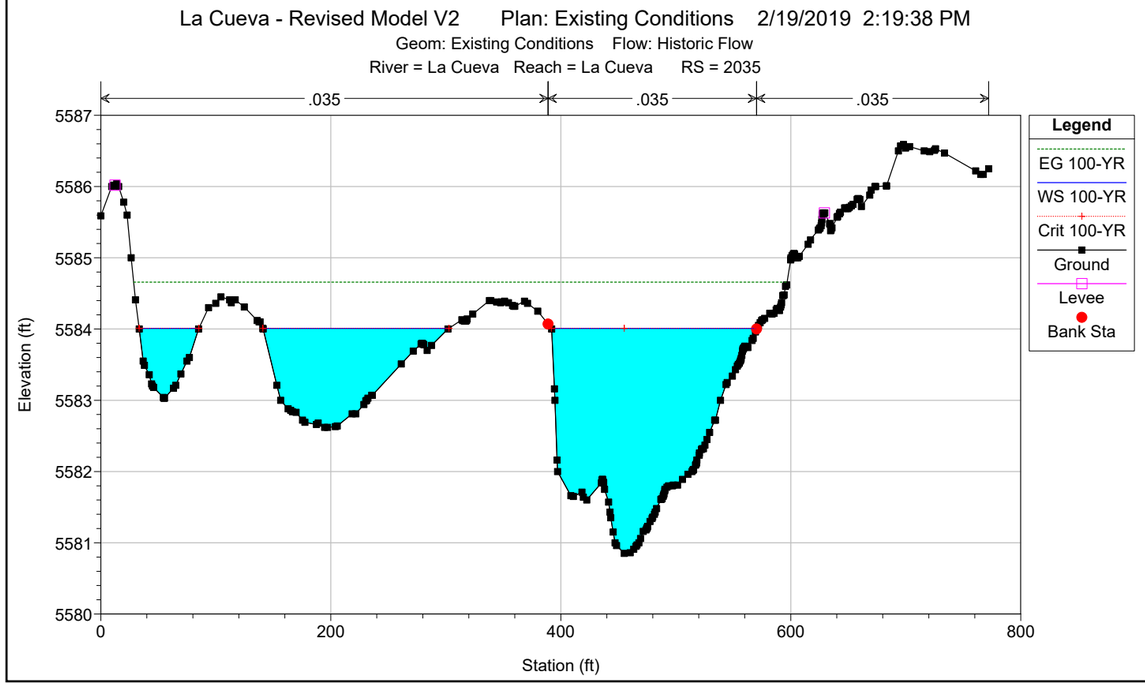
Station (ft)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Levee
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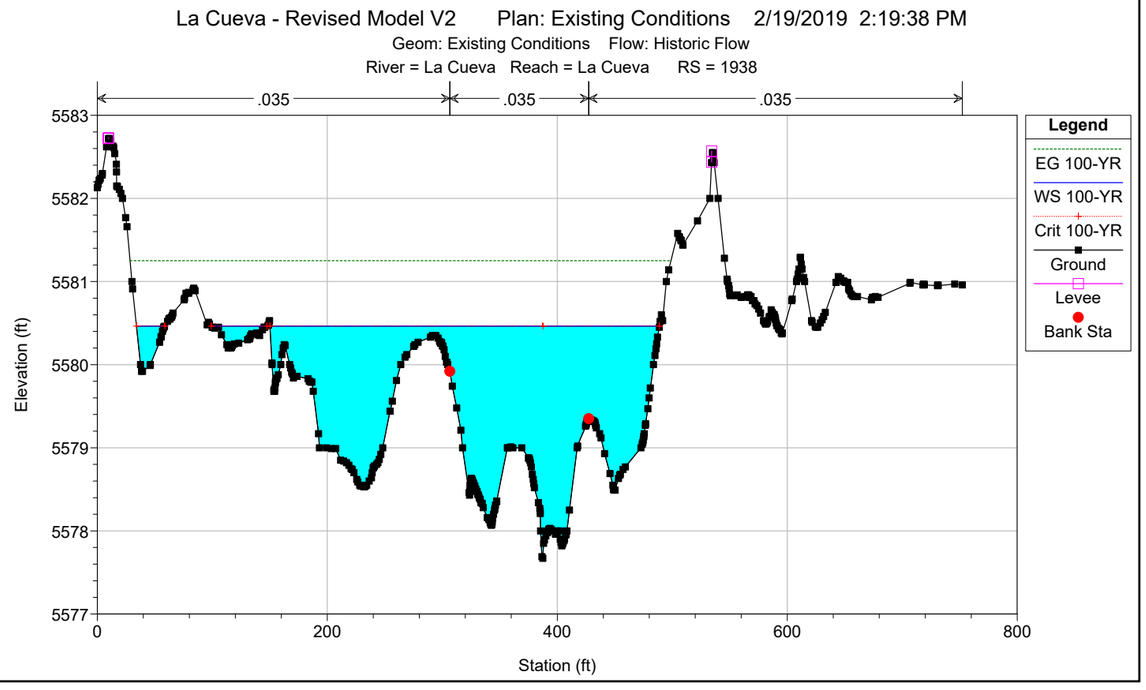
Station (ft)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Legend
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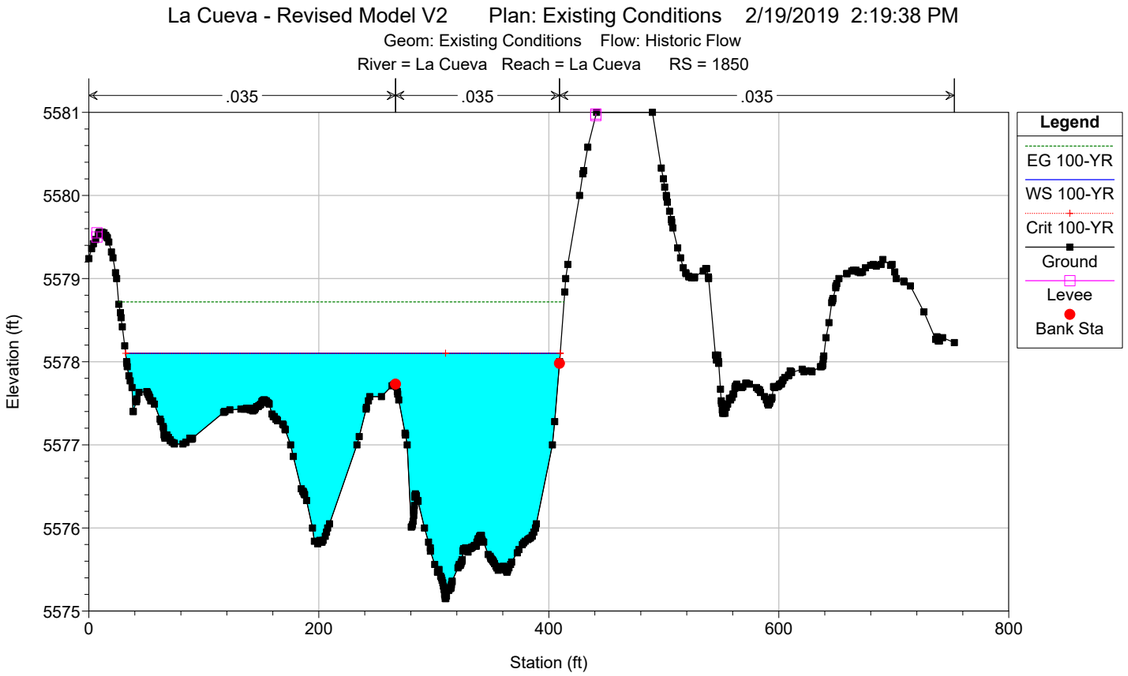
Levee
Bank Sta
Elevation (ft)
Station (ft)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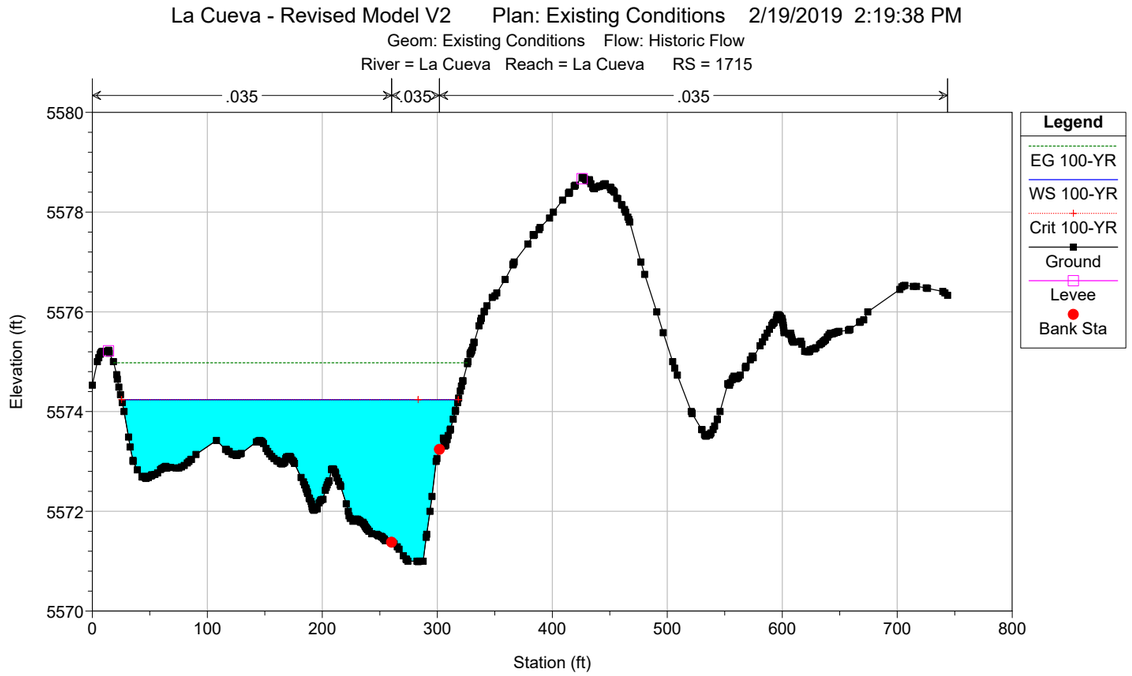
WS 100-YR
Crit 100-YR
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)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Legend
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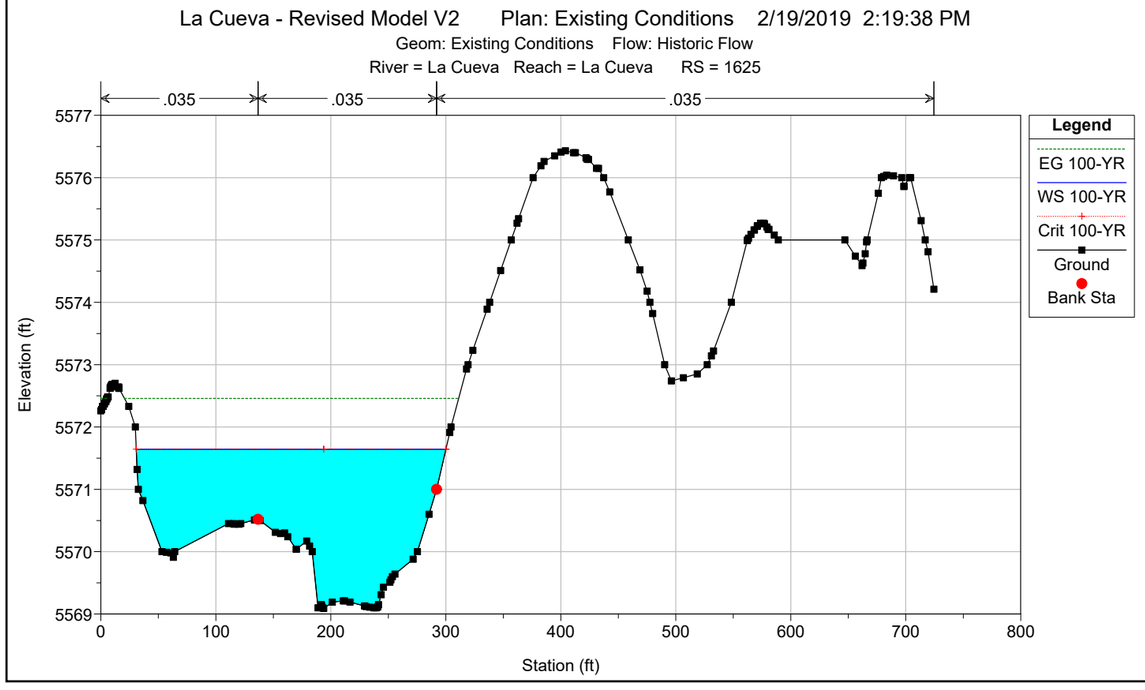
Crit 100-YR
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)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Legend
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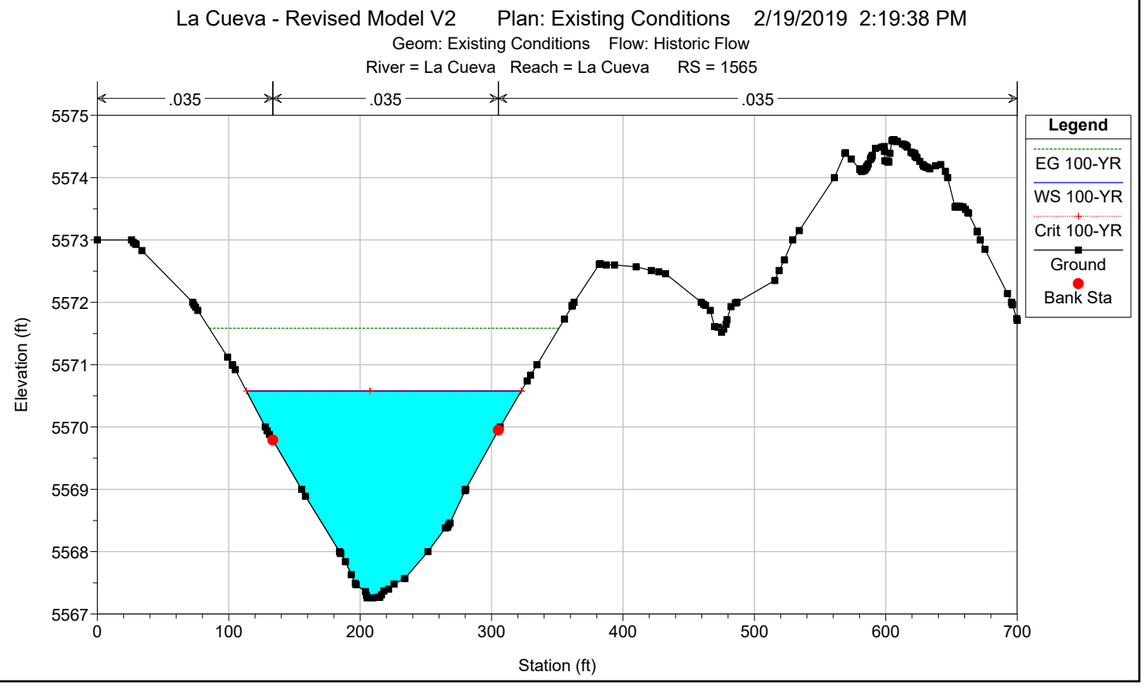
WS 100-YR
Crit 100-YR
Ground
Bank Sta
Elevation (ft)
Station (ft)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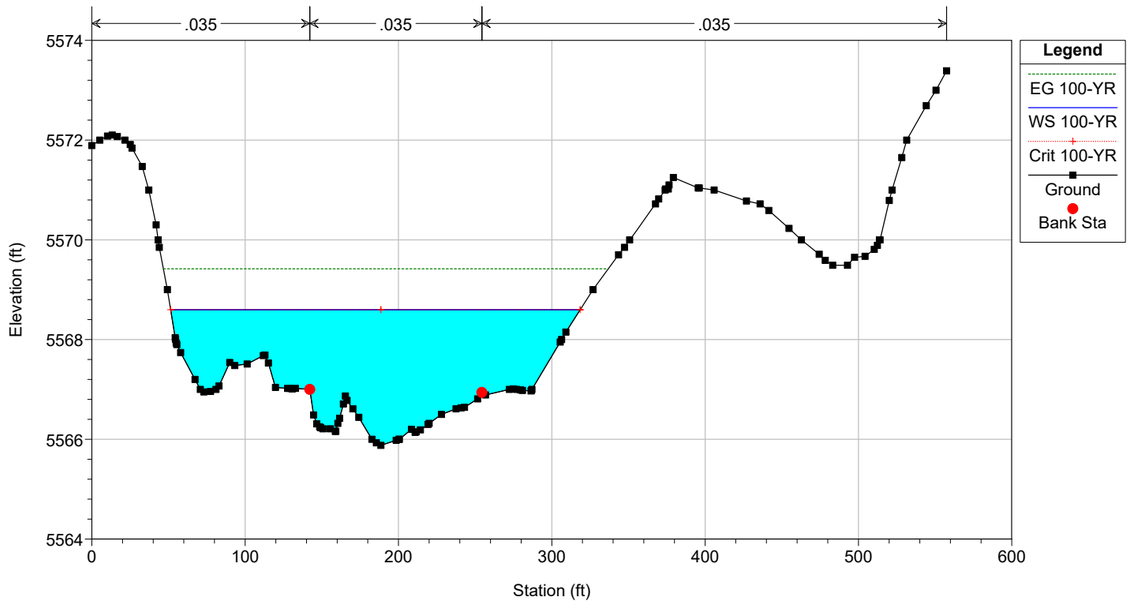
.035
.035
Legend
EG 100-YR
WS 100-YR
Crit 100-YR
Ground
Bank Sta
Elevation (ft)
Station (ft)

La Cueva - Revised Model V2 Plan: Existing Conditions 2/19/2019 2:19:38 PM

Geom: Existing Conditions Flow: Historic Flow

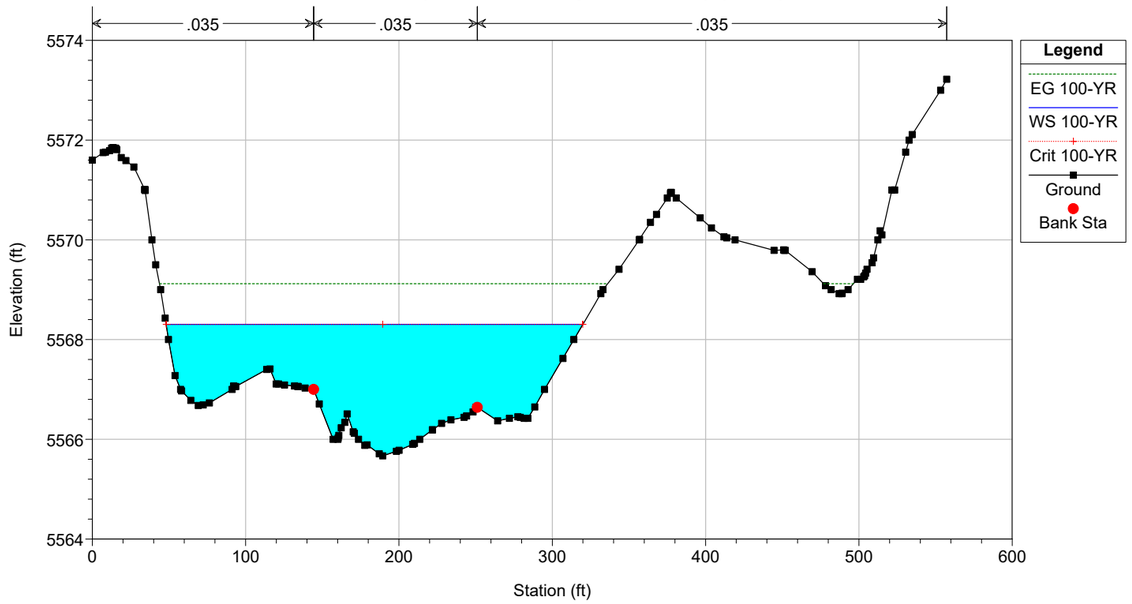
River = La Cueva Reach = La Cueva RS = 1527 Lot 16



La Cueva - Revised Model V2 Plan: Existing Conditions 2/19/2019 2:19:38 PM

Geom: Existing Conditions Flow: Historic Flow

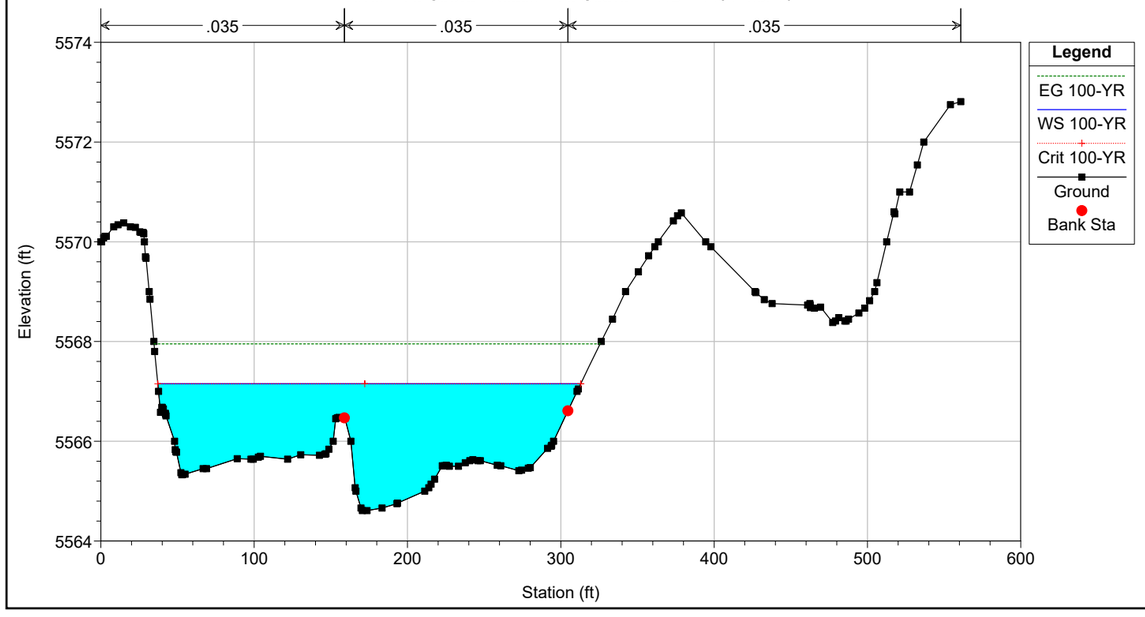
River = La Cueva Reach = La Cueva RS = 1520 Lot 16



La Cueva - Revised Model V2 Plan: Existing Conditions 2/19/2019 2:19:38 PM

Geom: Existing Conditions Flow: Historic Flow

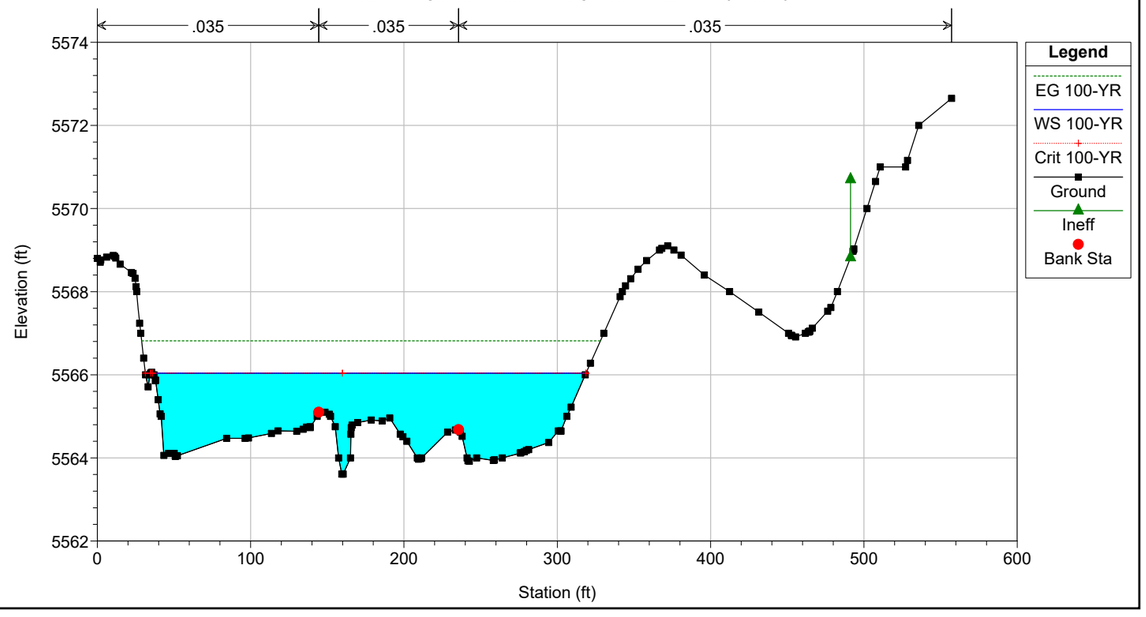
River = La Cueva Reach = La Cueva RS = 1491 Lot 16



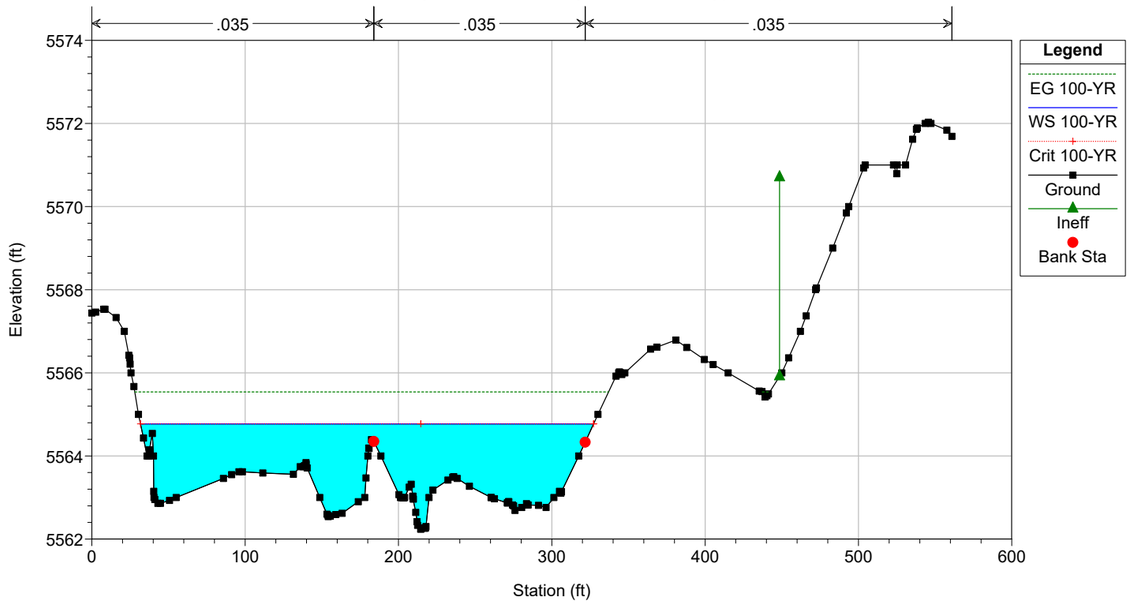
La Cueva - Revised Model V2 Plan: Existing Conditions 2/19/2019 2:19:38 PM

Geom: Existing Conditions Flow: Historic Flow

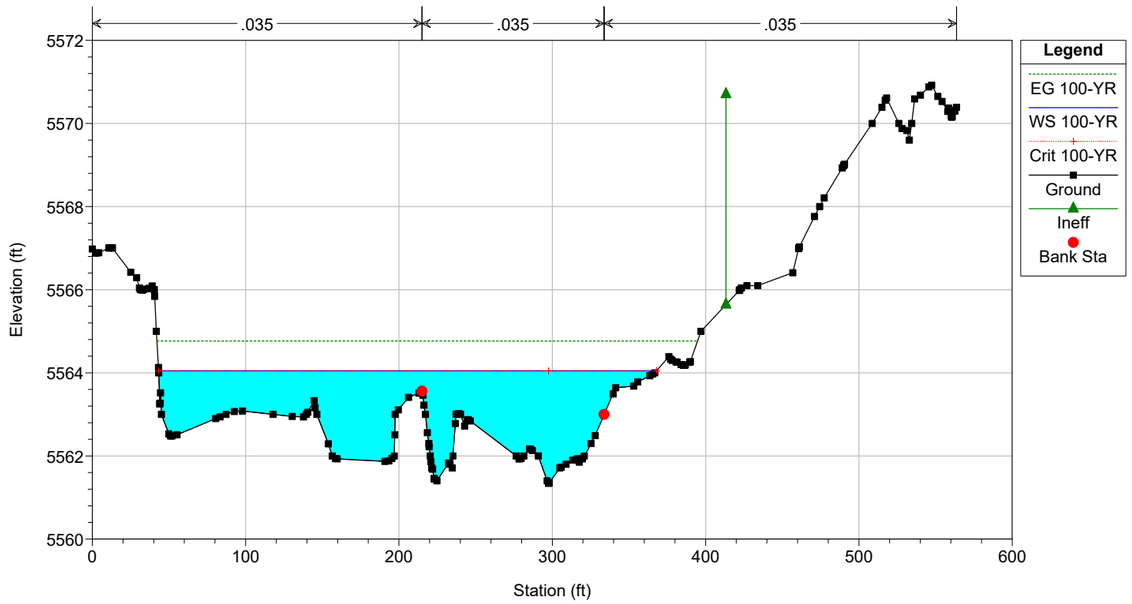
River = La Cueva Reach = La Cueva RS = 1449 Lot 16



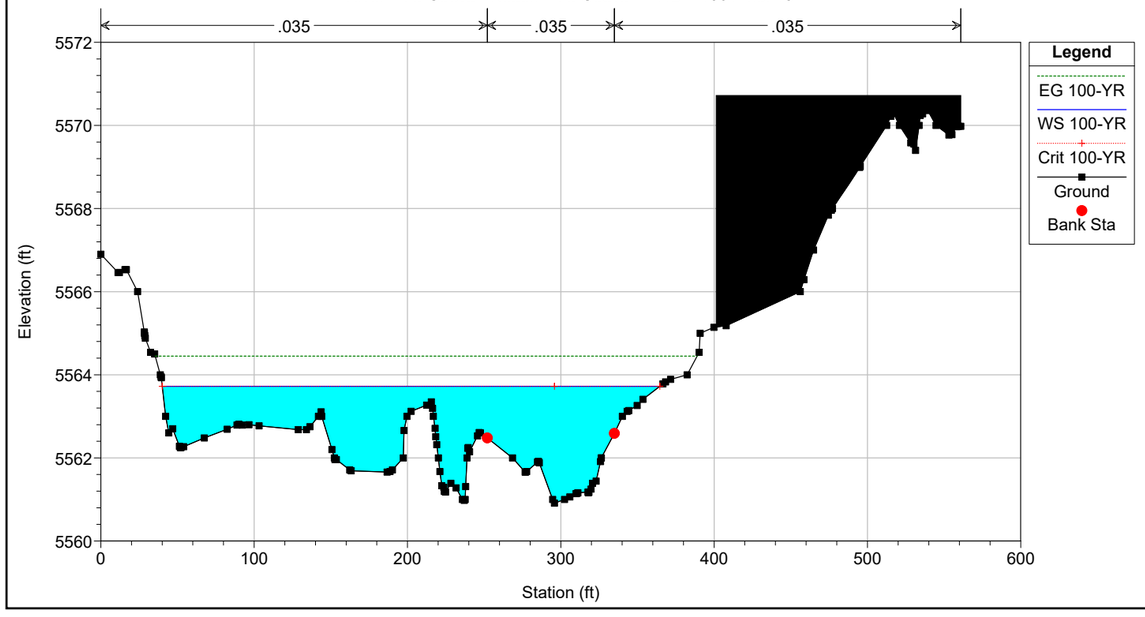
La Cueva - Revised Model V2 Plan: Existing Conditions 2/19/2019 2:19:38 PM
Geom: Existing Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 1406 Lot 16



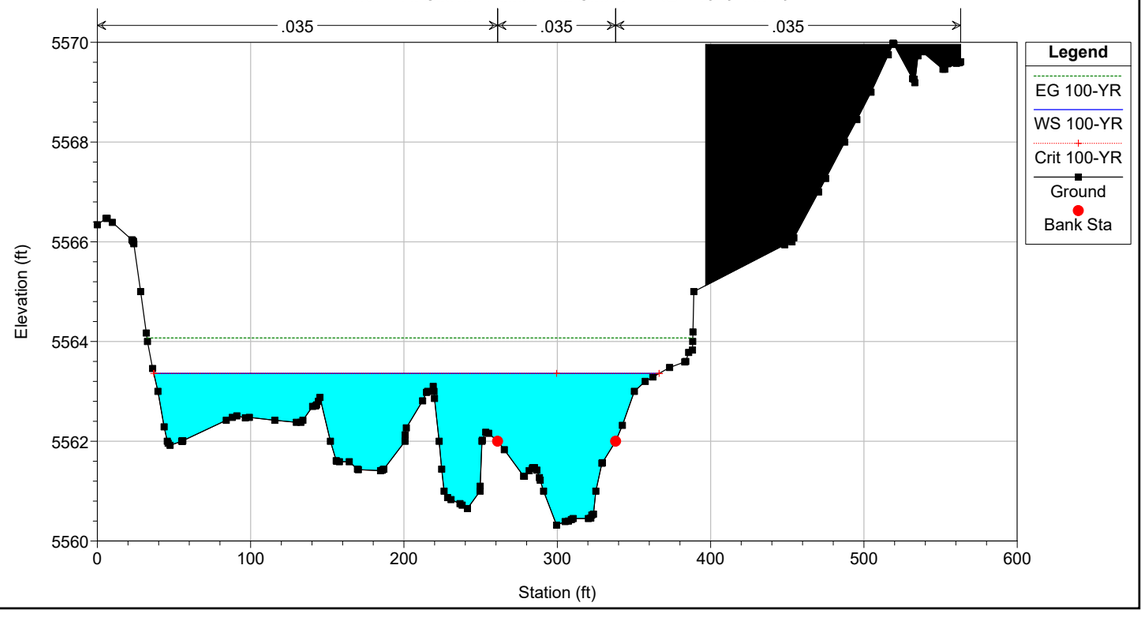
La Cueva - Revised Model V2 Plan: Existing Conditions 2/19/2019 2:19:38 PM
Geom: Existing Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 1372 Lot 16



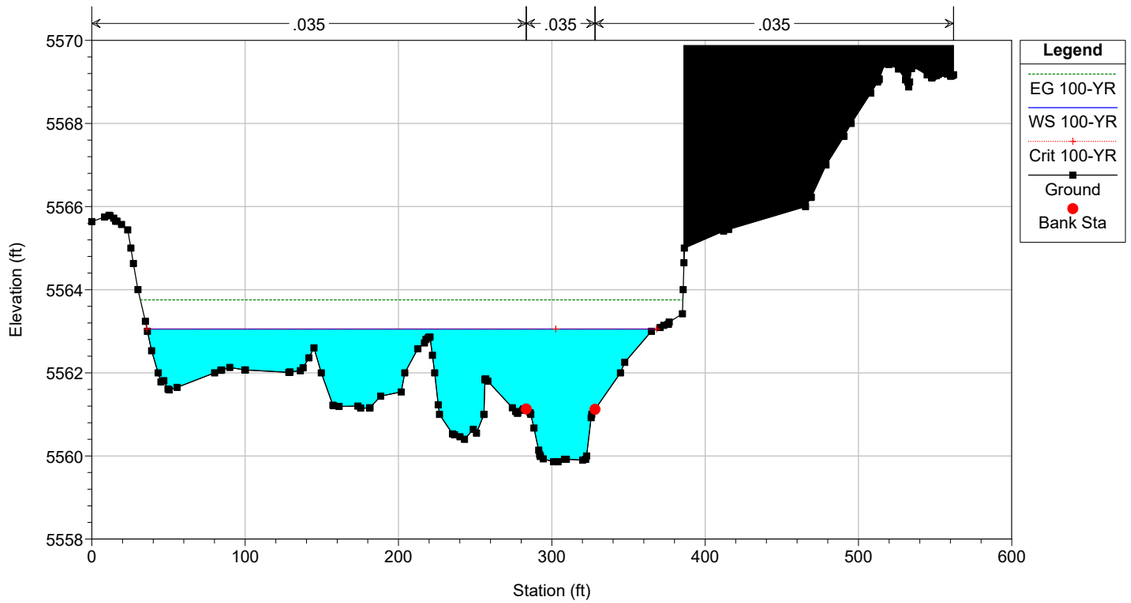
La Cueva - Revised Model V2 Plan: Existing Conditions 2/19/2019 2:19:38 PM
Geom: Existing Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 1361 Lot 15



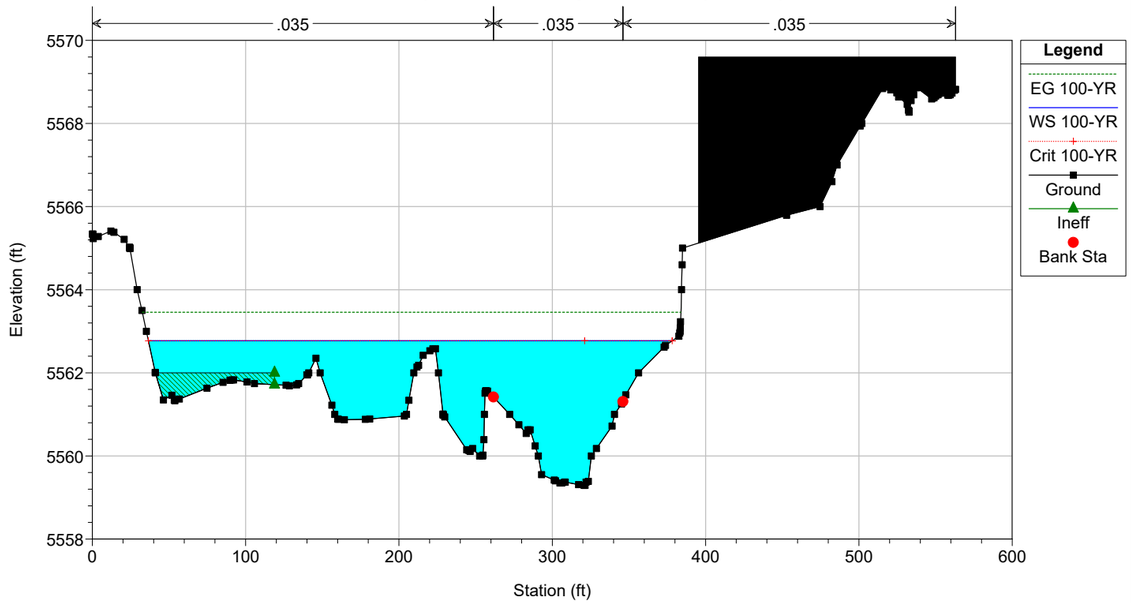
La Cueva - Revised Model V2 Plan: Existing Conditions 2/19/2019 2:19:38 PM
Geom: Existing Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 1348 Lot 15



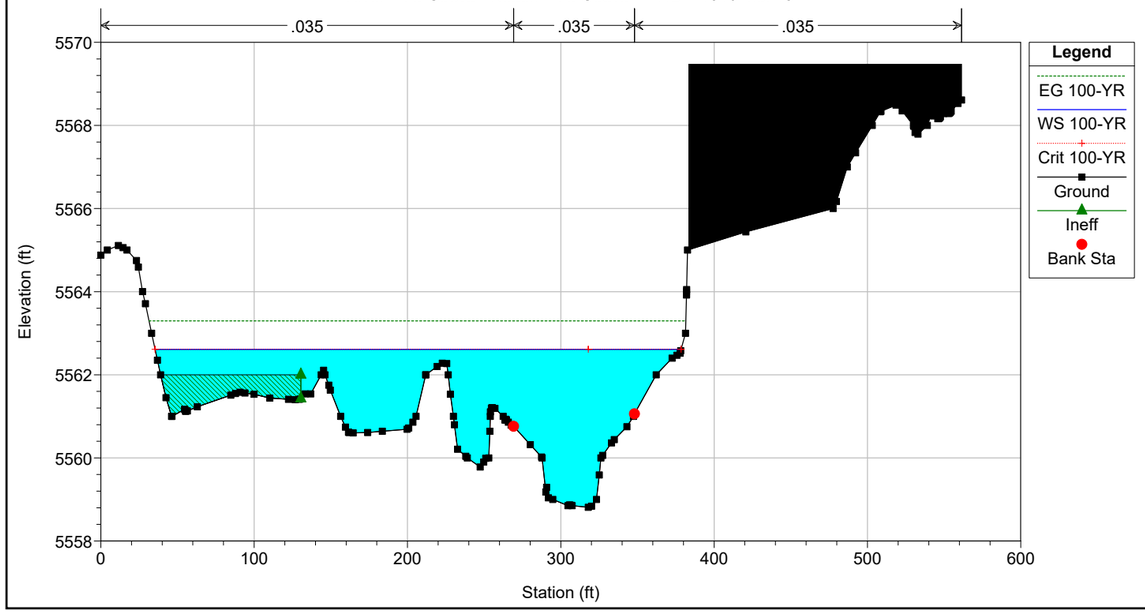
La Cueva - Revised Model V2 Plan: Existing Conditions 2/19/2019 2:19:38 PM
Geom: Existing Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 1338 Lot 15



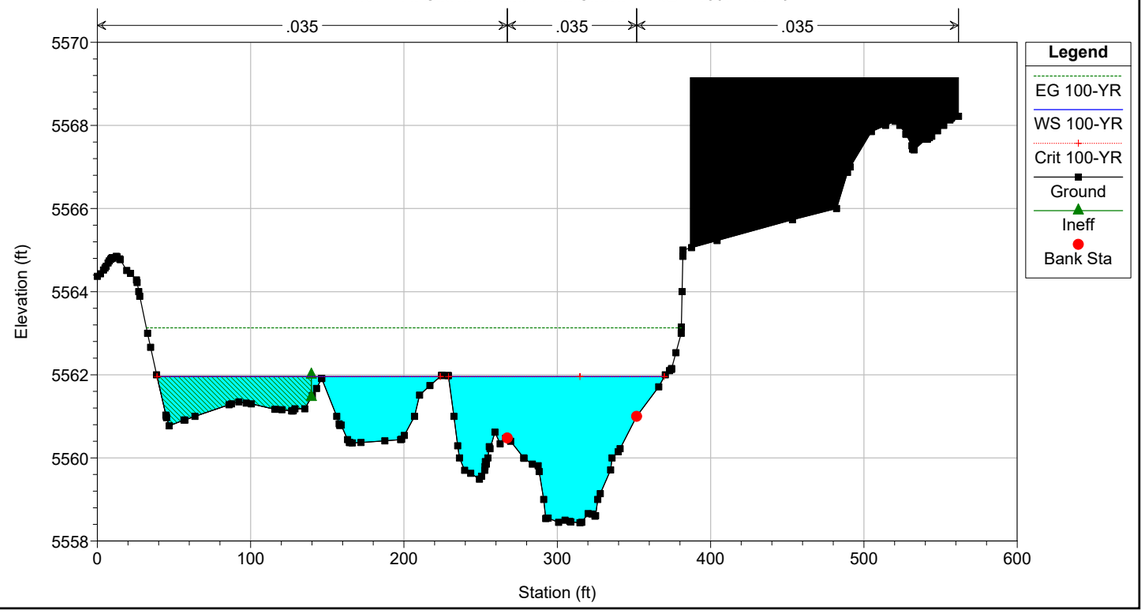
La Cueva - Revised Model V2 Plan: Existing Conditions 2/19/2019 2:19:38 PM
Geom: Existing Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 1327 Lot 15



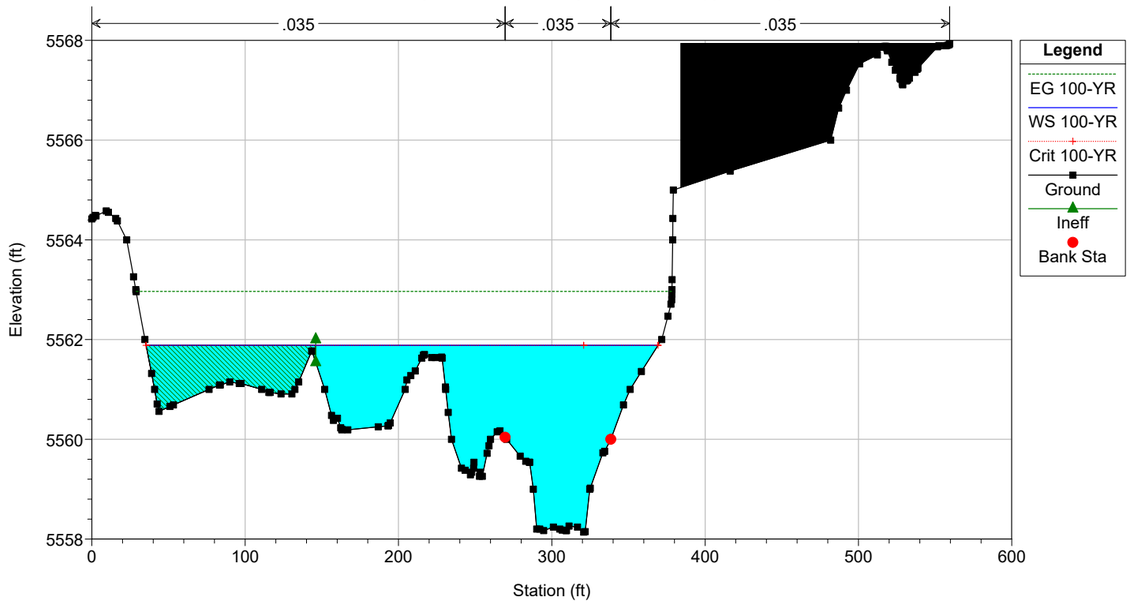
La Cueva - Revised Model V2 Plan: Existing Conditions 2/19/2019 2:19:38 PM
Geom: Existing Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 1316 Lot 15



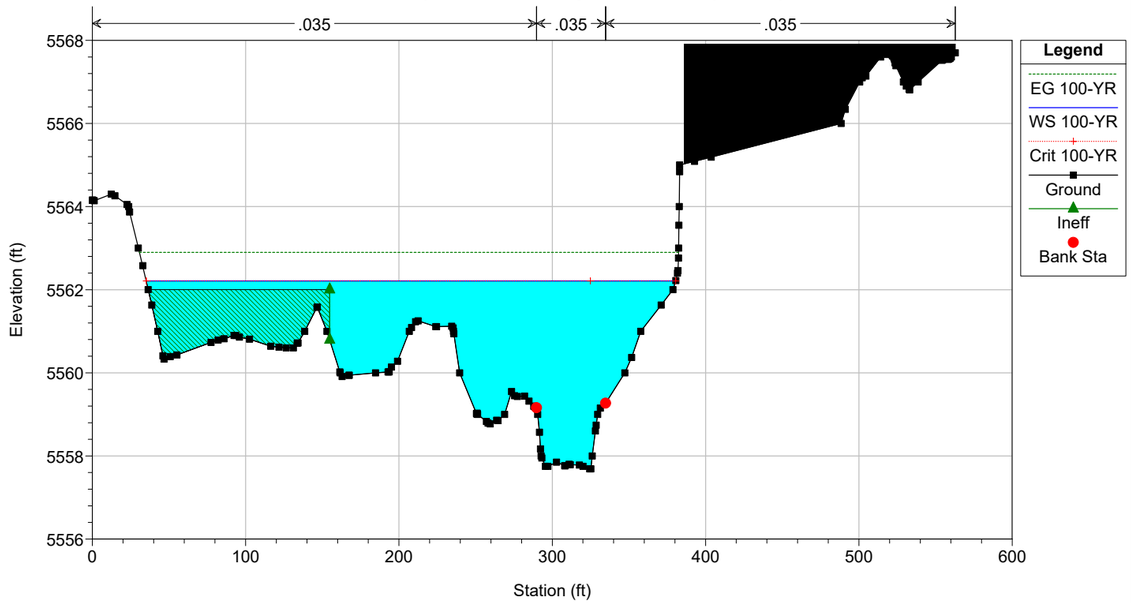
La Cueva - Revised Model V2 Plan: Existing Conditions 2/19/2019 2:19:38 PM
Geom: Existing Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 1307 Lot 15



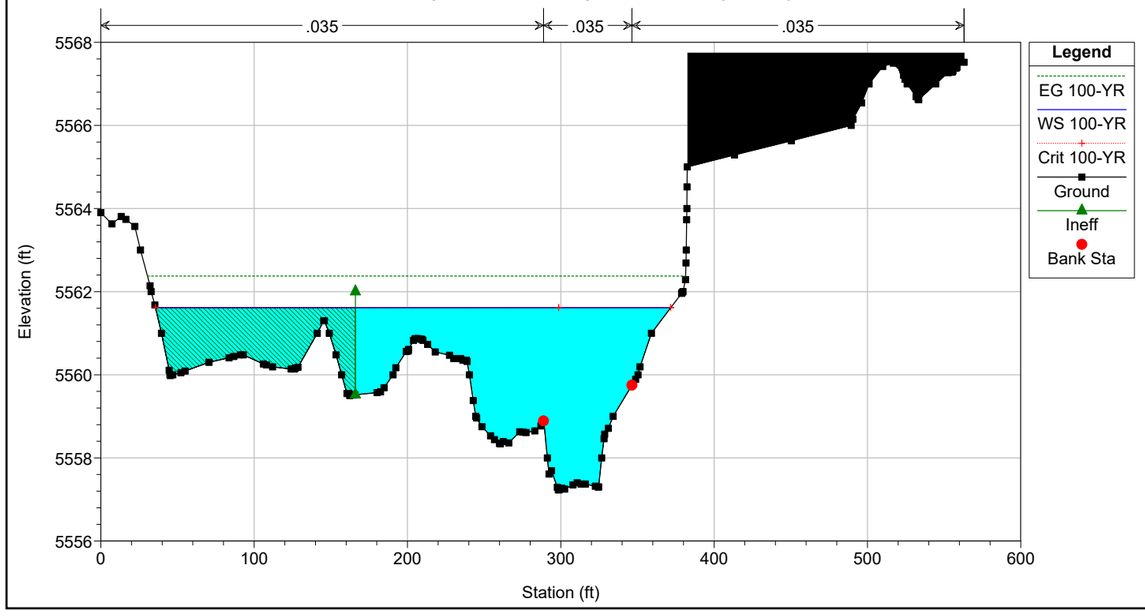
La Cueva - Revised Model V2 Plan: Existing Conditions 2/19/2019 2:19:38 PM
Geom: Existing Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 1301 Lot 15



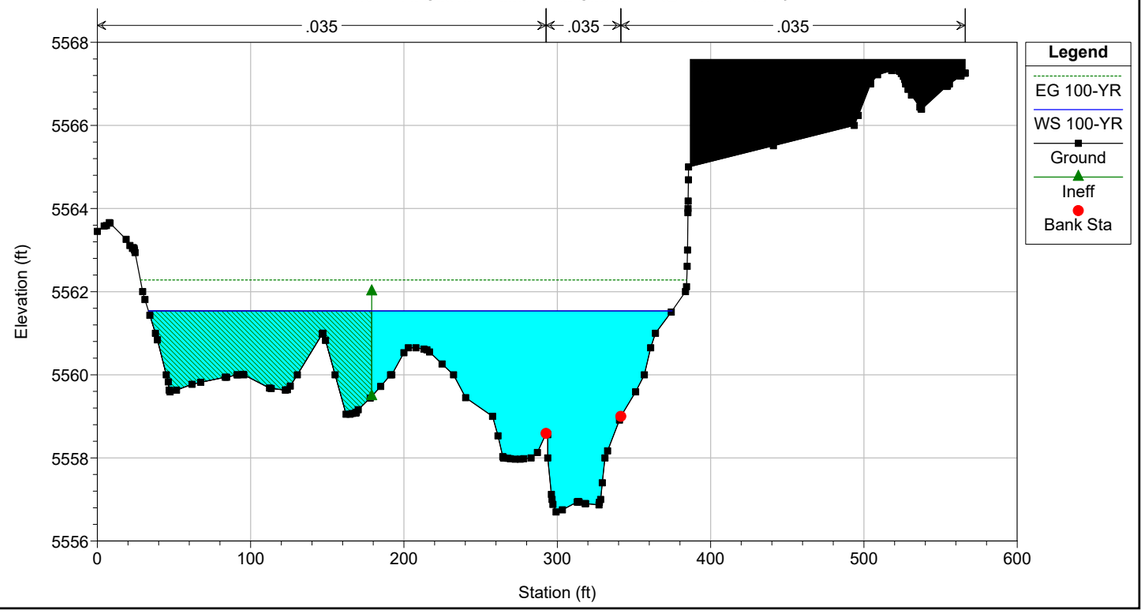
La Cueva - Revised Model V2 Plan: Existing Conditions 2/19/2019 2:19:38 PM
Geom: Existing Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 1292 Lot 15



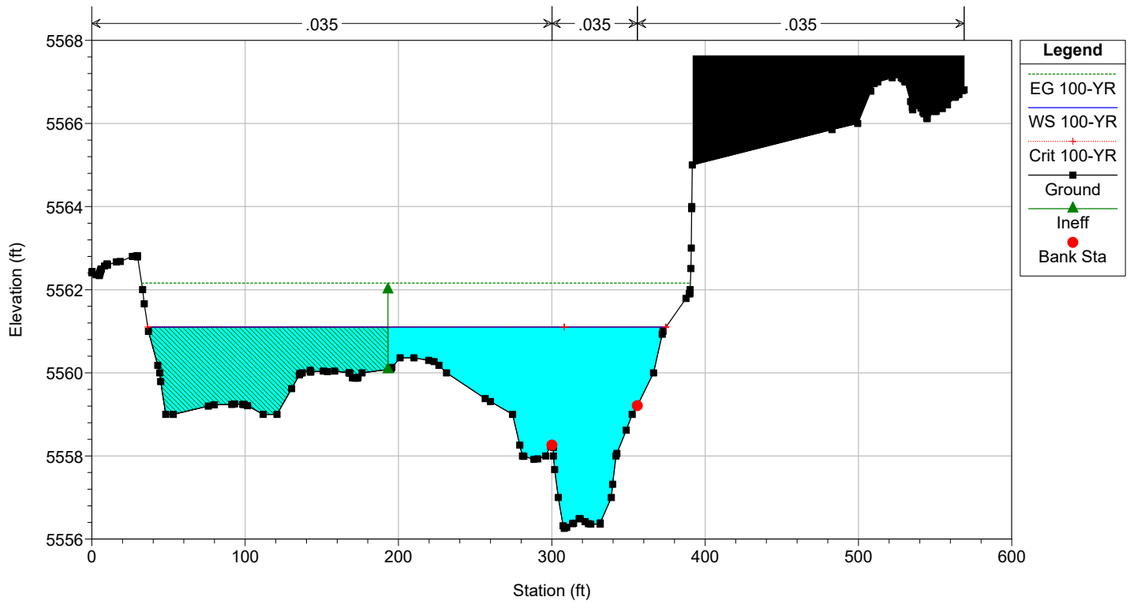
La Cueva - Revised Model V2 Plan: Existing Conditions 2/19/2019 2:19:38 PM
Geom: Existing Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 1282 Lot 15



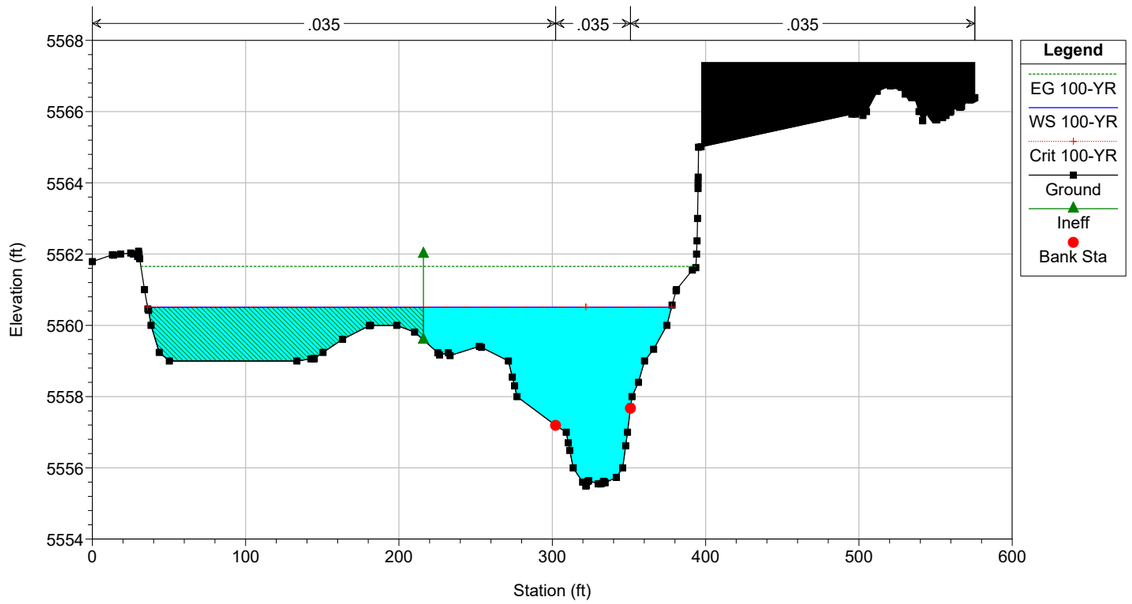
La Cueva - Revised Model V2 Plan: Existing Conditions 2/19/2019 2:19:38 PM
Geom: Existing Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 1271 Lot 15



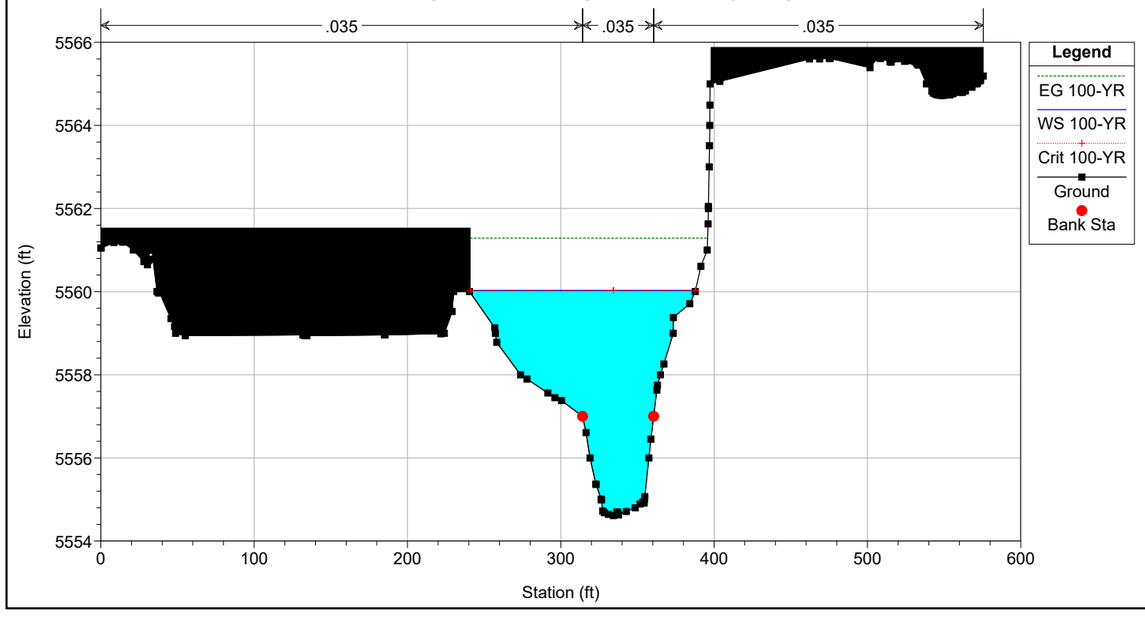
La Cueva - Revised Model V2 Plan: Existing Conditions 2/19/2019 2:19:38 PM
Geom: Existing Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 1258 Lot 15



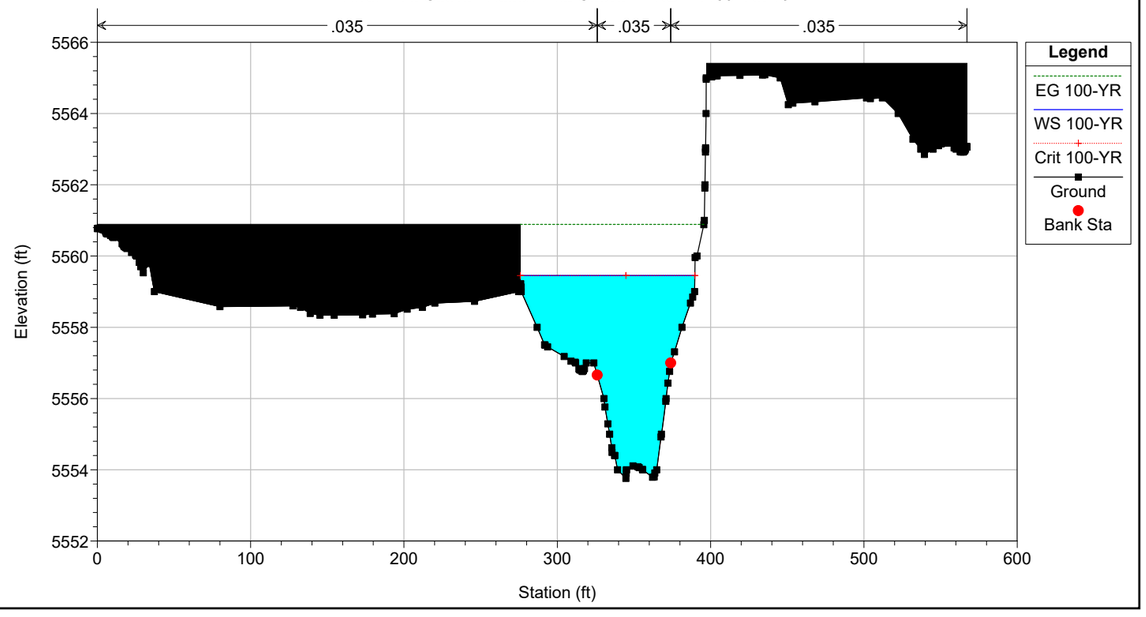
La Cueva - Revised Model V2 Plan: Existing Conditions 2/19/2019 2:19:38 PM
Geom: Existing Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 1239 Lot 15



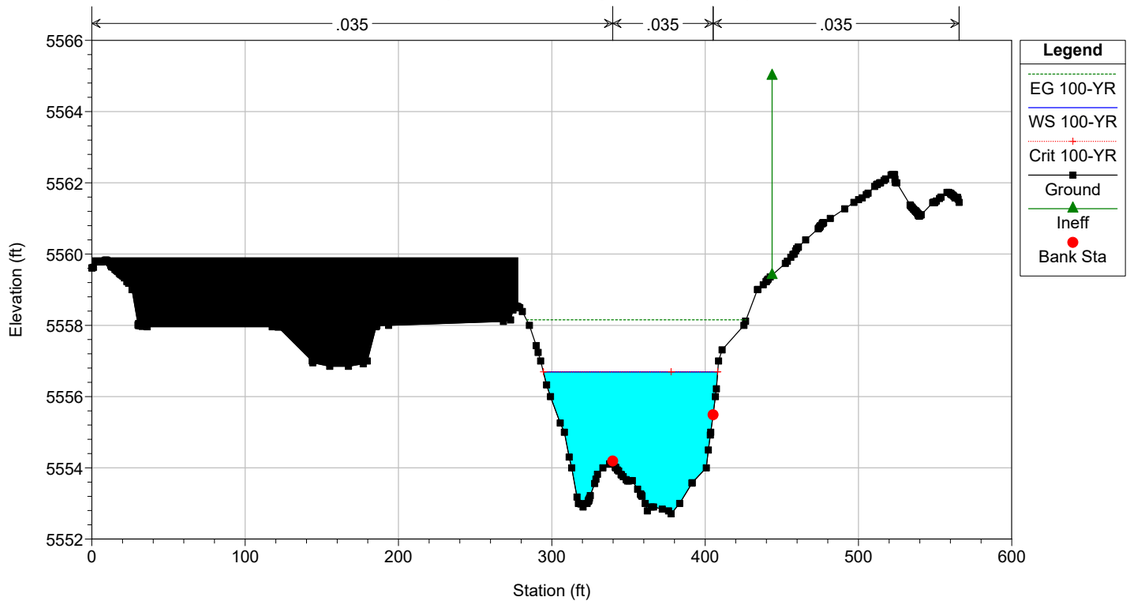
La Cueva - Revised Model V2 Plan: Existing Conditions 2/19/2019 2:19:38 PM
Geom: Existing Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 1216 Lot 15



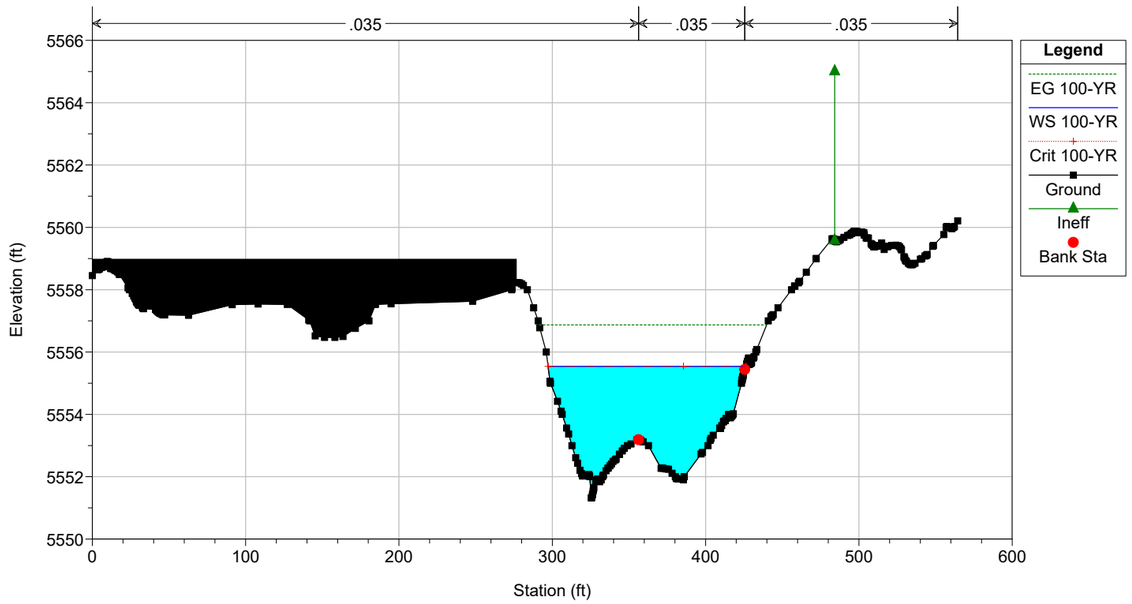
La Cueva - Revised Model V2 Plan: Existing Conditions 2/19/2019 2:19:38 PM
Geom: Existing Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 1189 Lot 15



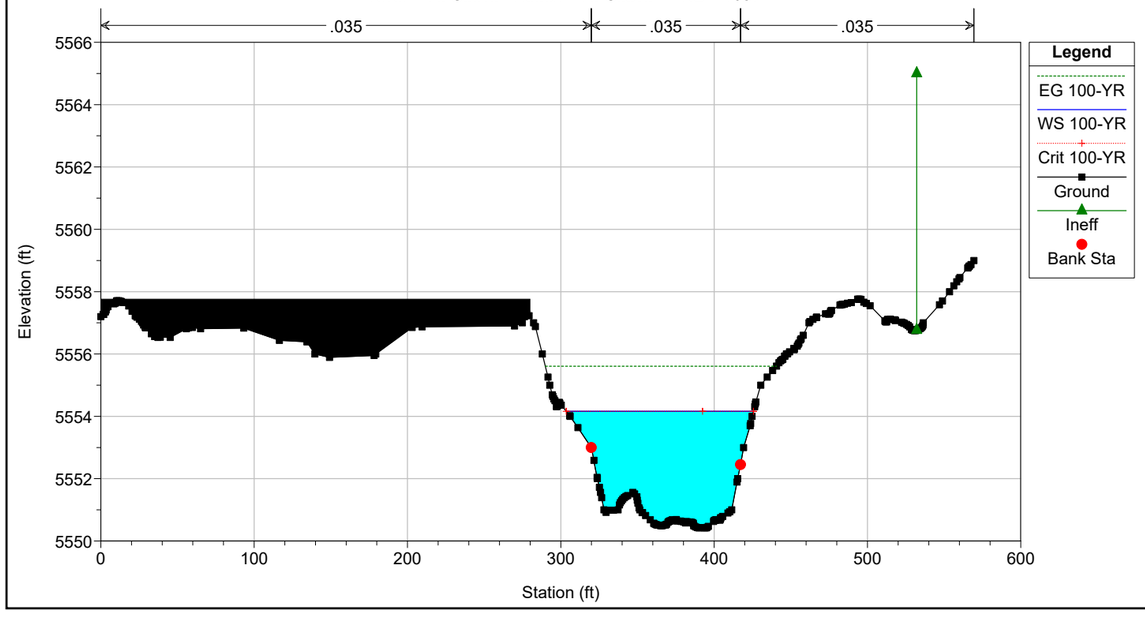
La Cueva - Revised Model V2 Plan: Existing Conditions 2/19/2019 2:19:38 PM
Geom: Existing Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 1143



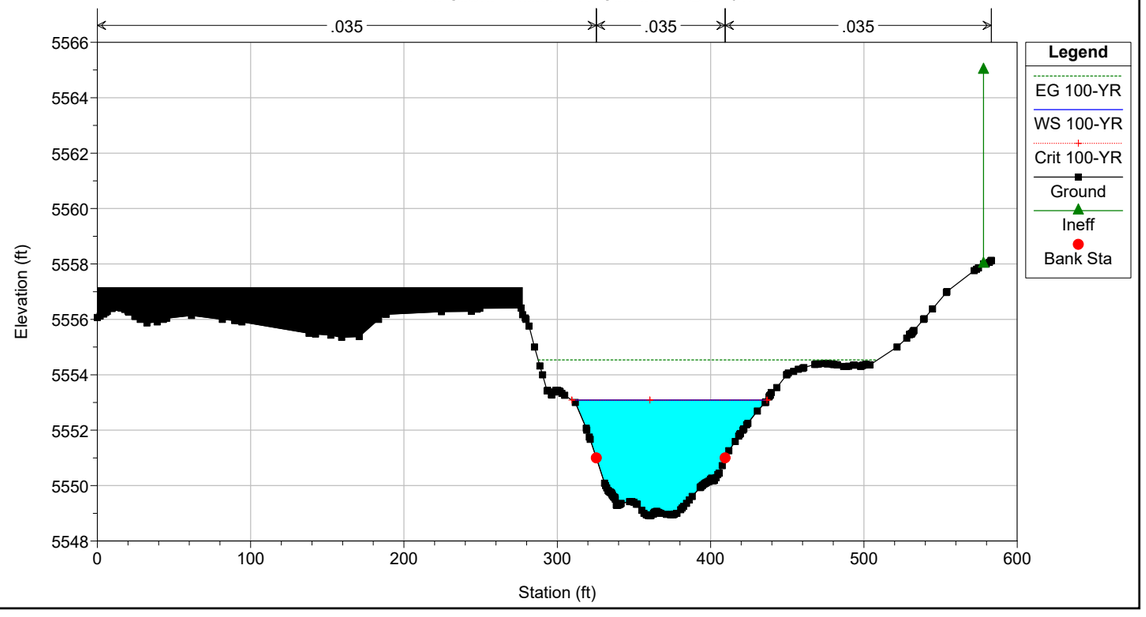
La Cueva - Revised Model V2 Plan: Existing Conditions 2/19/2019 2:19:38 PM
Geom: Existing Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 1104



La Cueva - Revised Model V2 Plan: Existing Conditions 2/19/2019 2:19:38 PM
Geom: Existing Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 1057



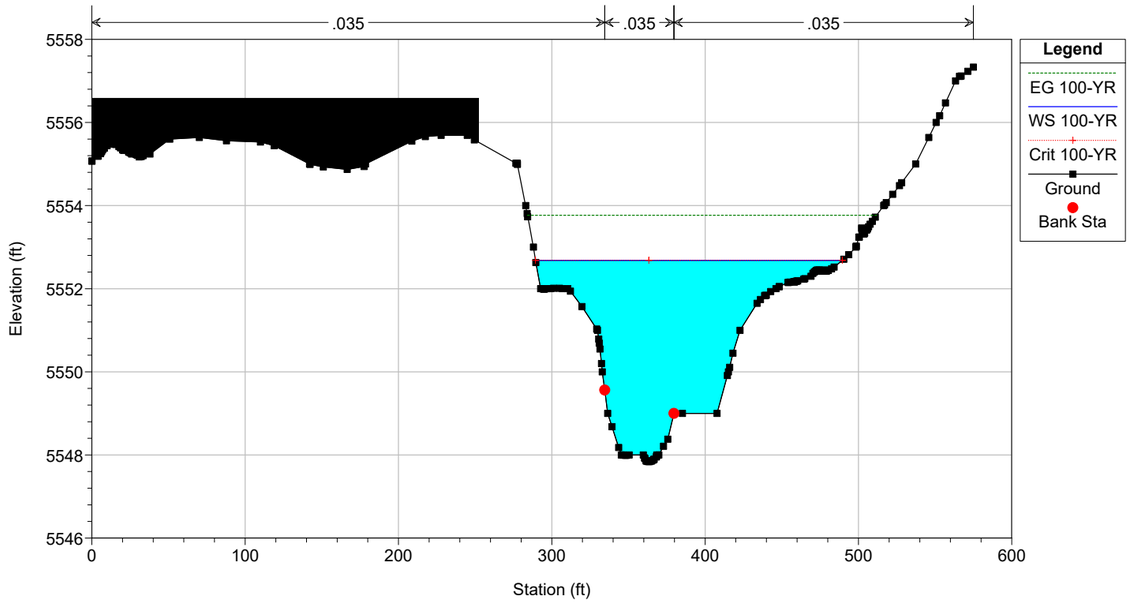
La Cueva - Revised Model V2 Plan: Existing Conditions 2/19/2019 2:19:38 PM
Geom: Existing Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 1012



La Cueva - Revised Model V2 Plan: Existing Conditions 2/19/2019 2:19:38 PM

Geom: Existing Conditions Flow: Historic Flow

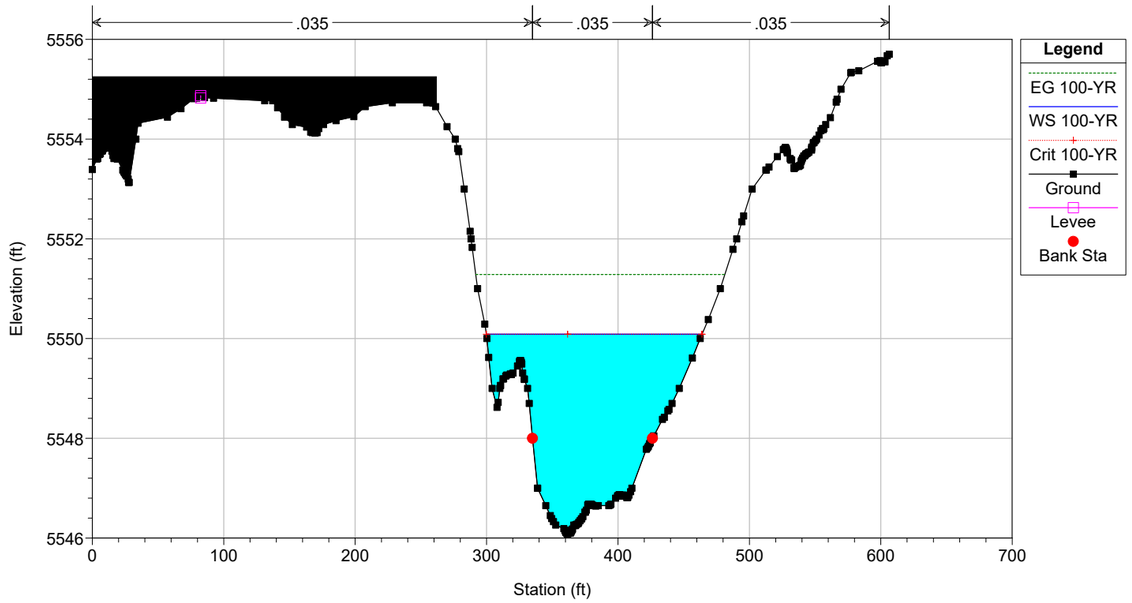
River = La Cueva Reach = La Cueva RS = 975



La Cueva - Revised Model V2 Plan: Existing Conditions 2/19/2019 2:19:38 PM

Geom: Existing Conditions Flow: Historic Flow

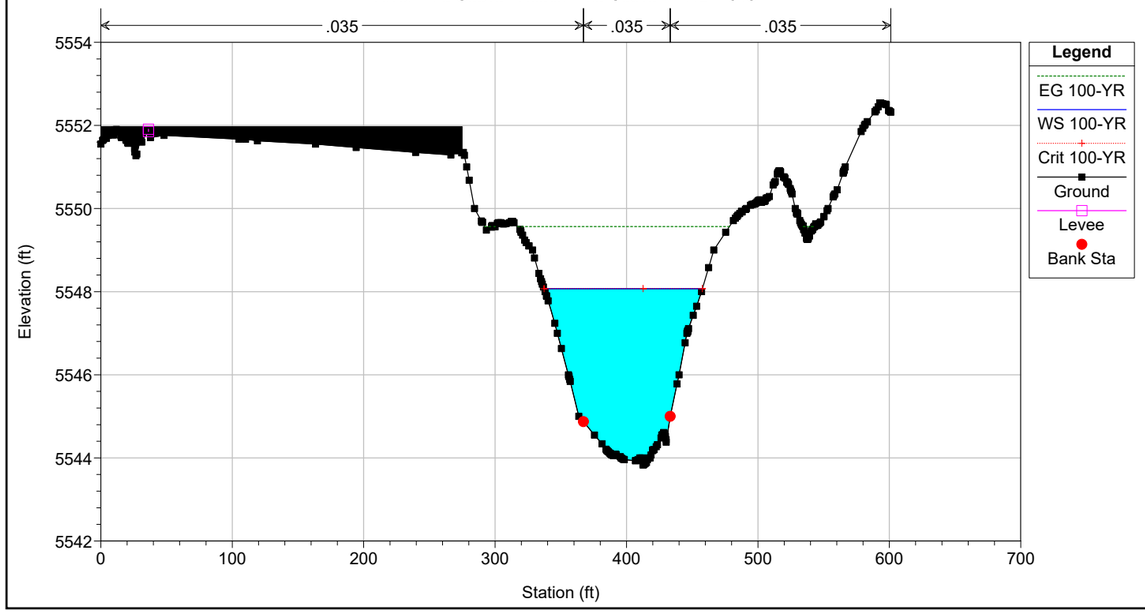
River = La Cueva Reach = La Cueva RS = 916



La Cueva - Revised Model V2 Plan: Existing Conditions 2/19/2019 2:19:38 PM

Geom: Existing Conditions Flow: Historic Flow

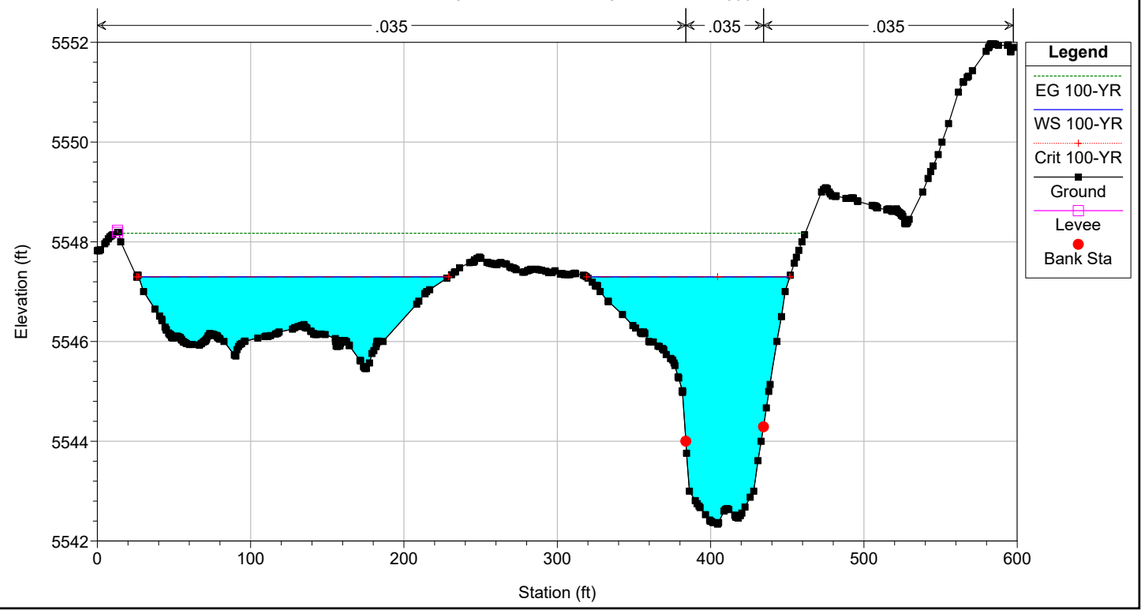
River = La Cueva Reach = La Cueva RS = 848



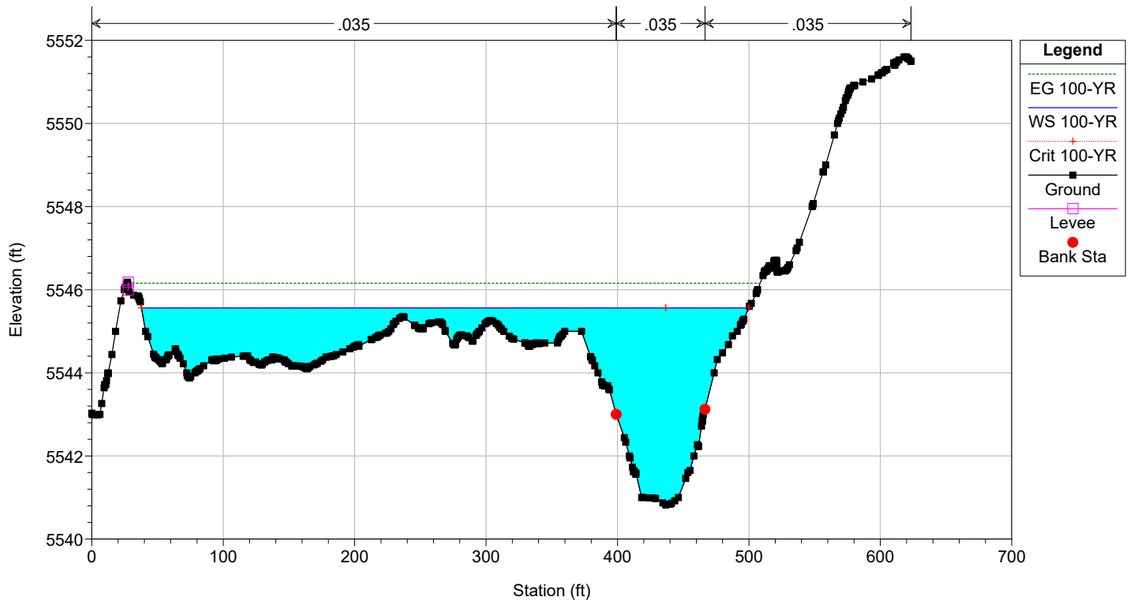
La Cueva - Revised Model V2 Plan: Existing Conditions 2/19/2019 2:19:38 PM

Geom: Existing Conditions Flow: Historic Flow

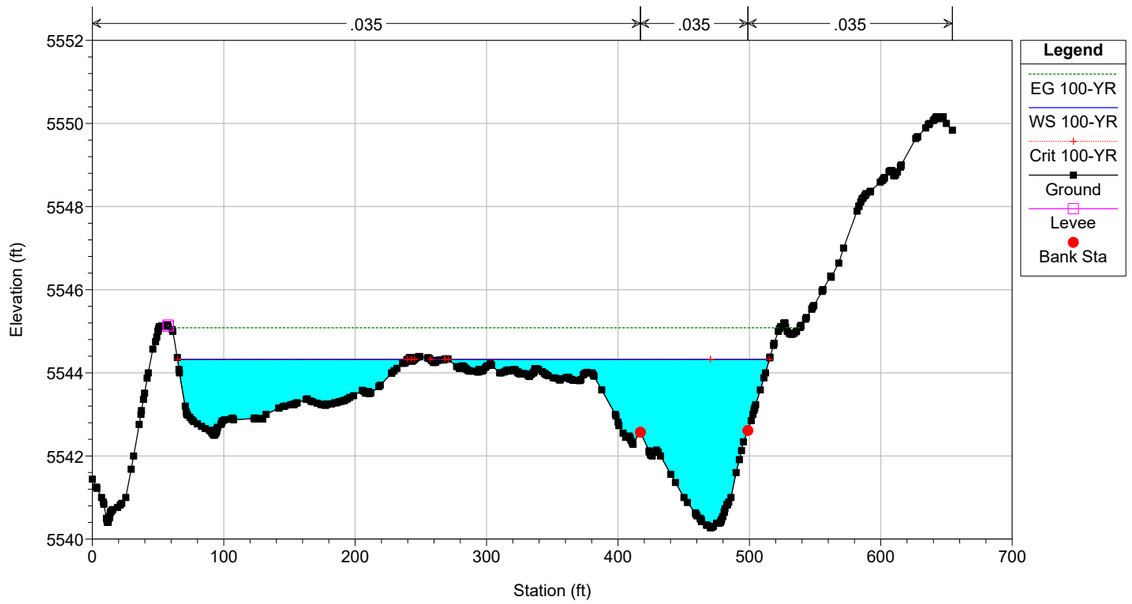
River = La Cueva Reach = La Cueva RS = 805



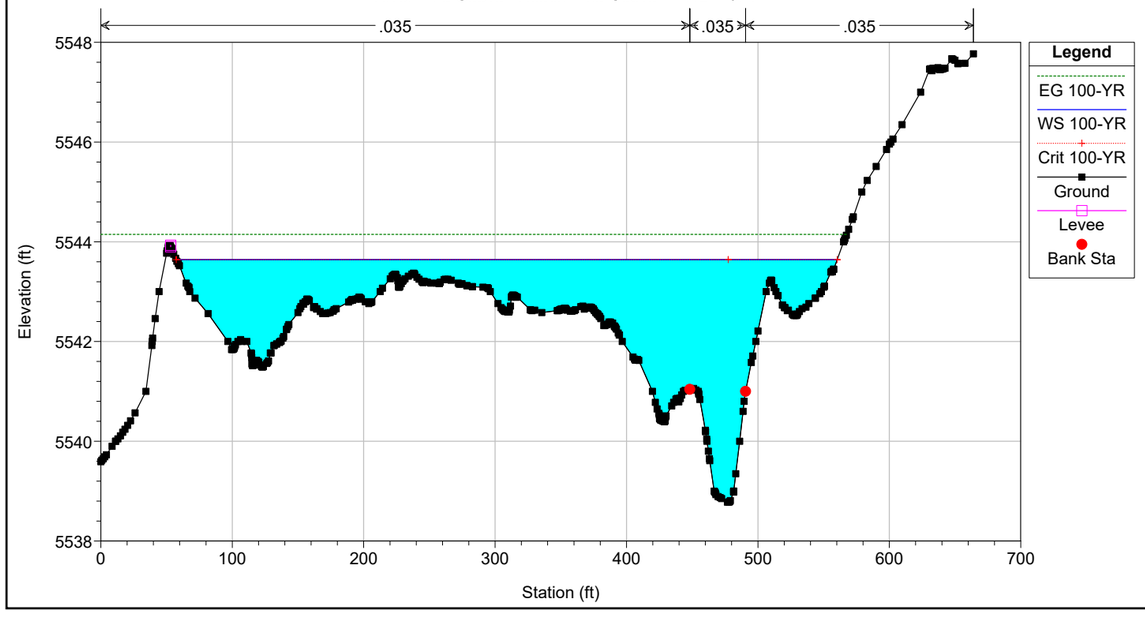
La Cueva - Revised Model V2 Plan: Existing Conditions 2/19/2019 2:19:38 PM
Geom: Existing Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 743



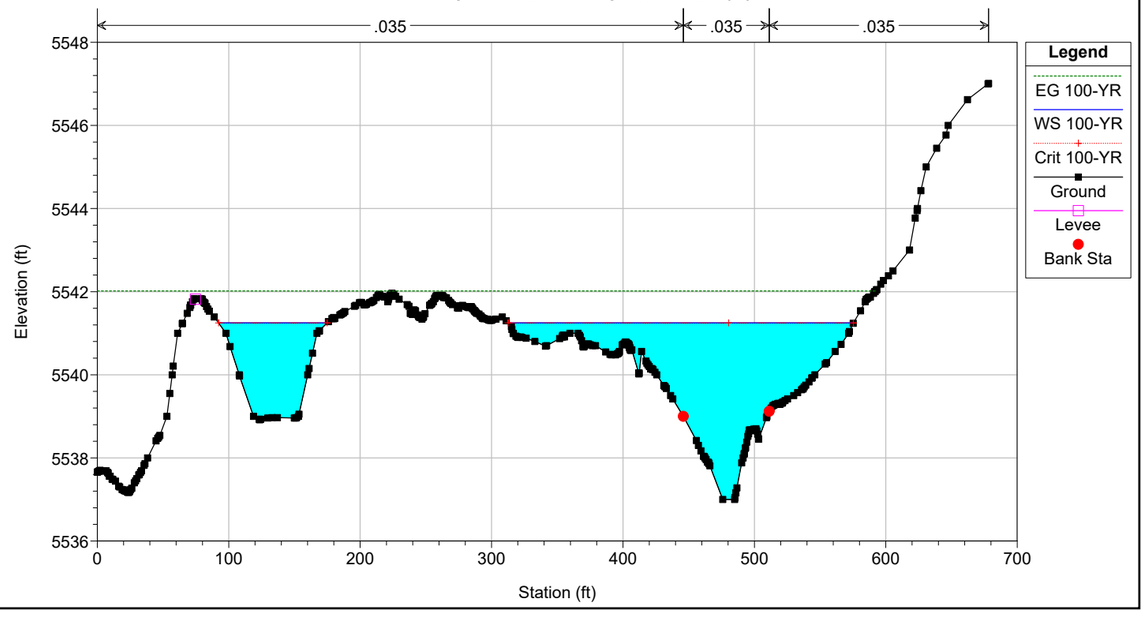
La Cueva - Revised Model V2 Plan: Existing Conditions 2/19/2019 2:19:38 PM
Geom: Existing Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 712

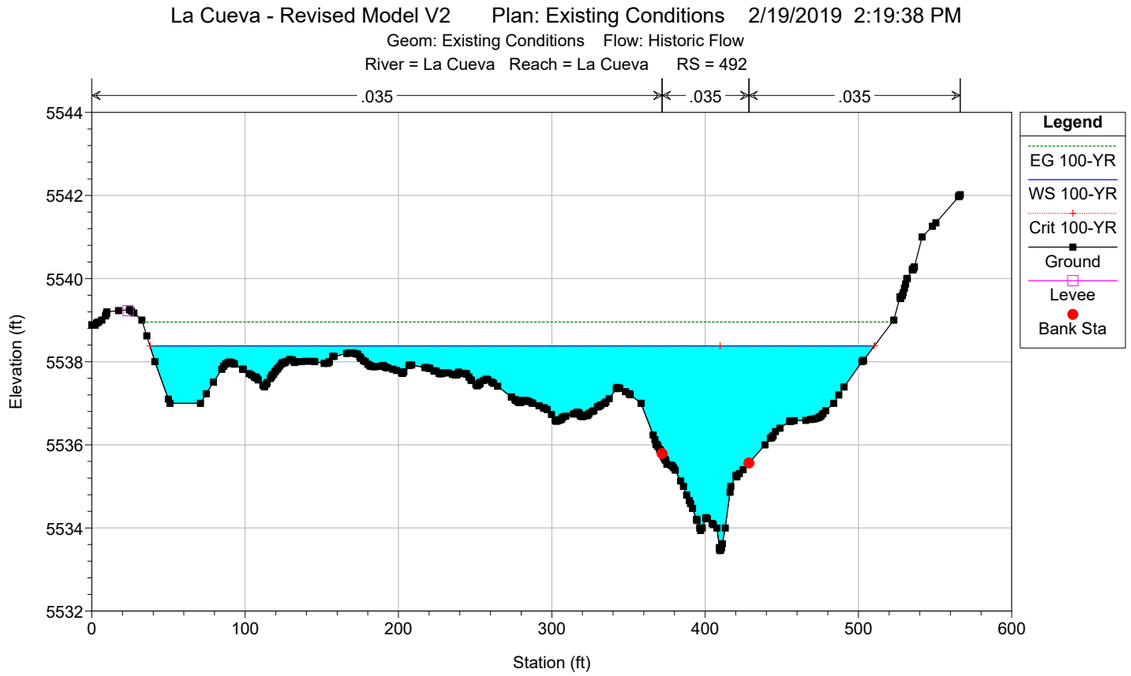


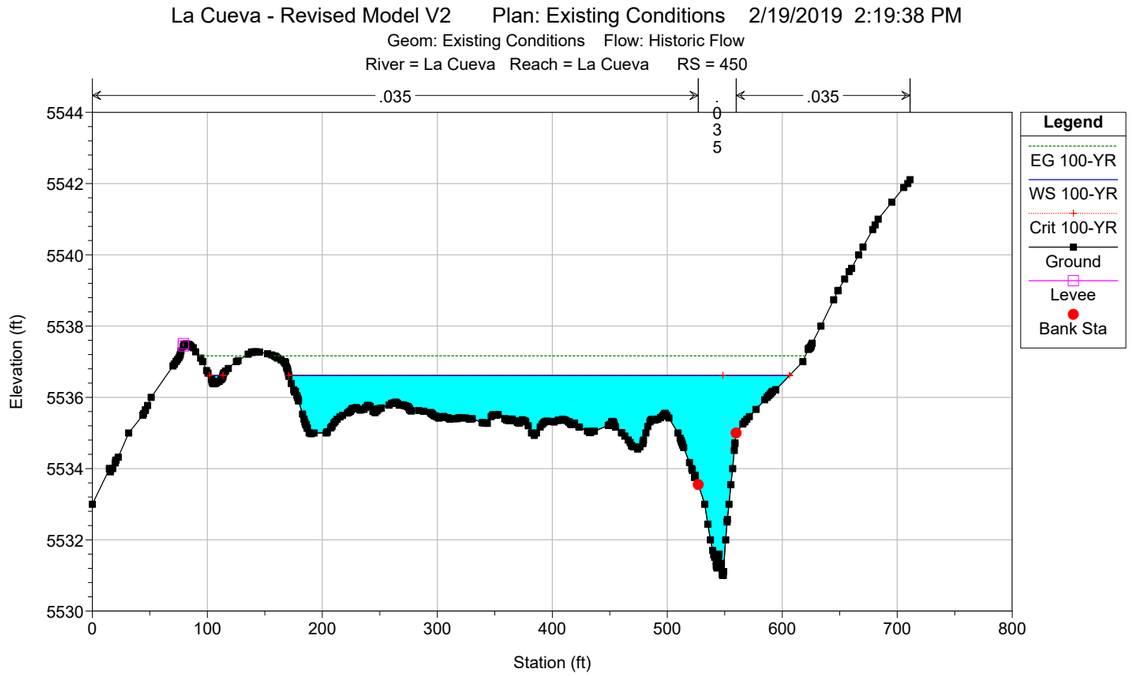
La Cueva - Revised Model V2 Plan: Existing Conditions 2/19/2019 2:19:38 PM
Geom: Existing Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 674

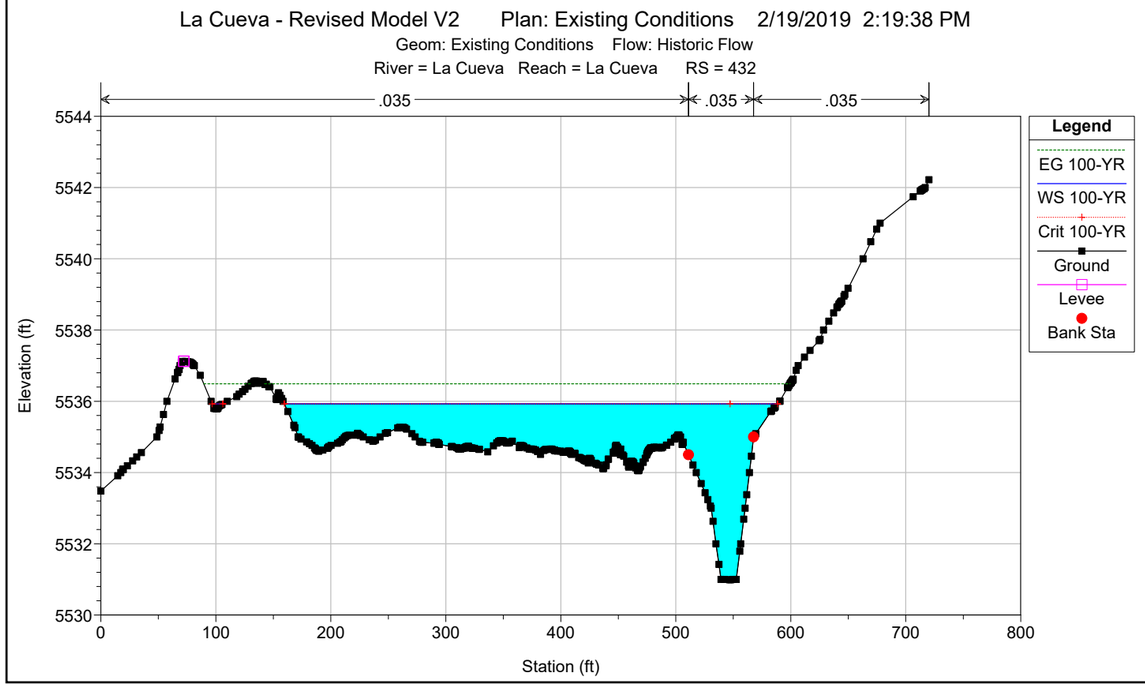


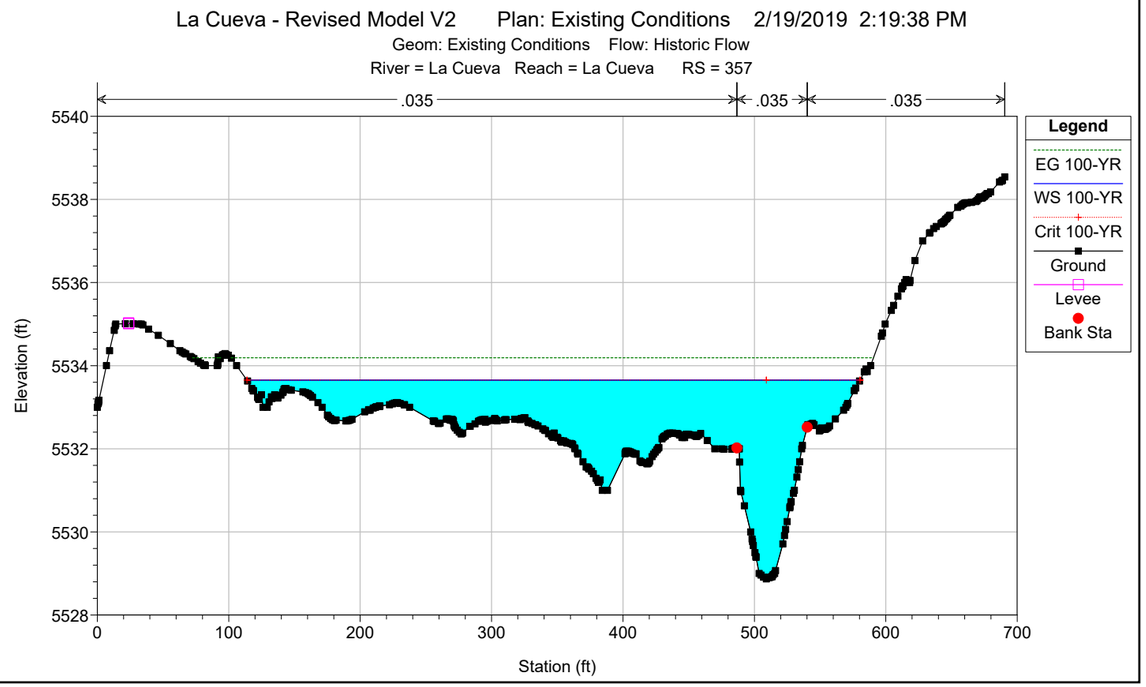
La Cueva - Revised Model V2 Plan: Existing Conditions 2/19/2019 2:19:38 PM
Geom: Existing Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 619

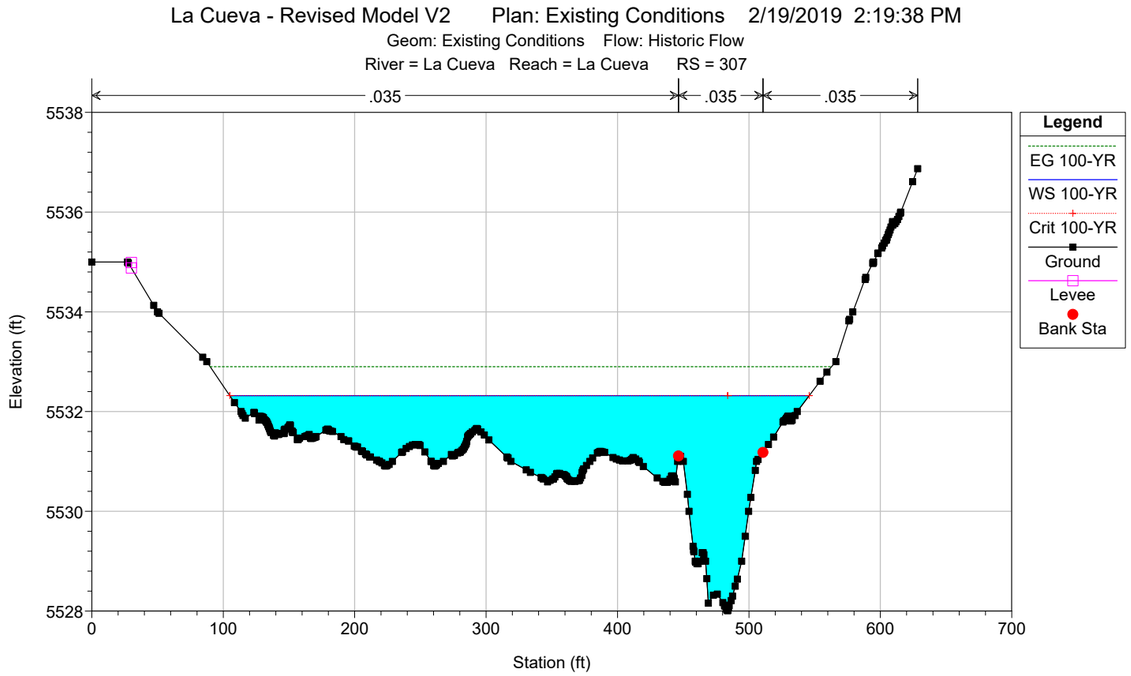


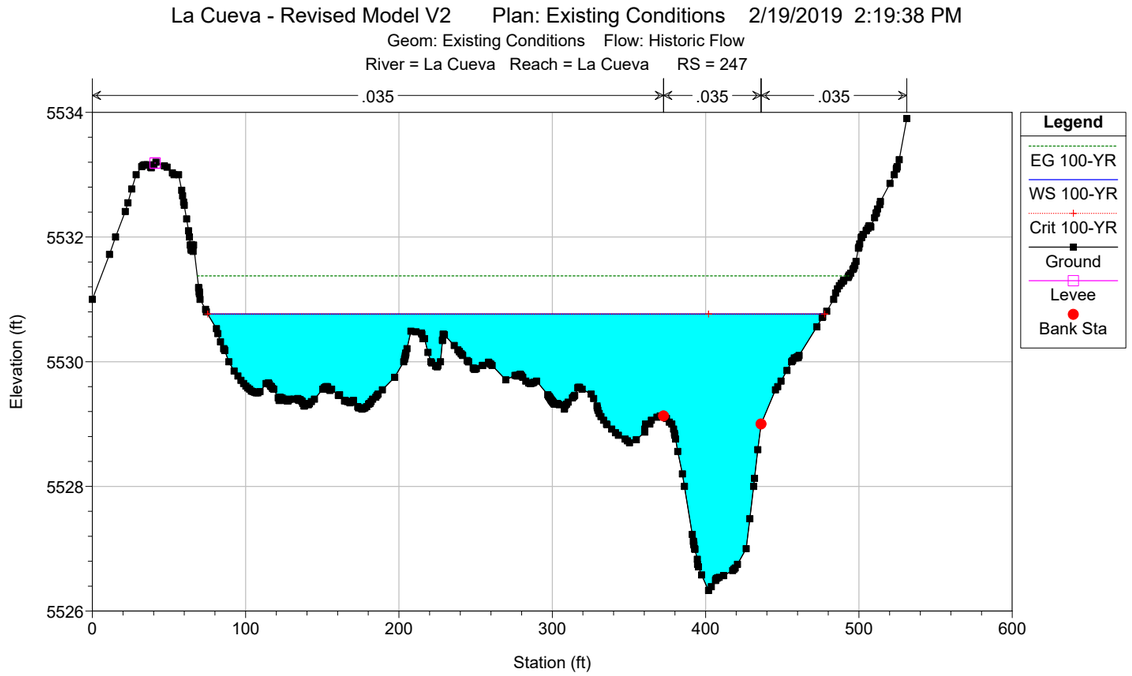

La Cueva - Revised Model V2 Plan: Existing Conditions 2/19/2019 2:19:38 PM
Geom: Existing Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 492
.035
.035
.035
Legend
EG 100-YR
WS 100-YR
Crit 100-YR
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

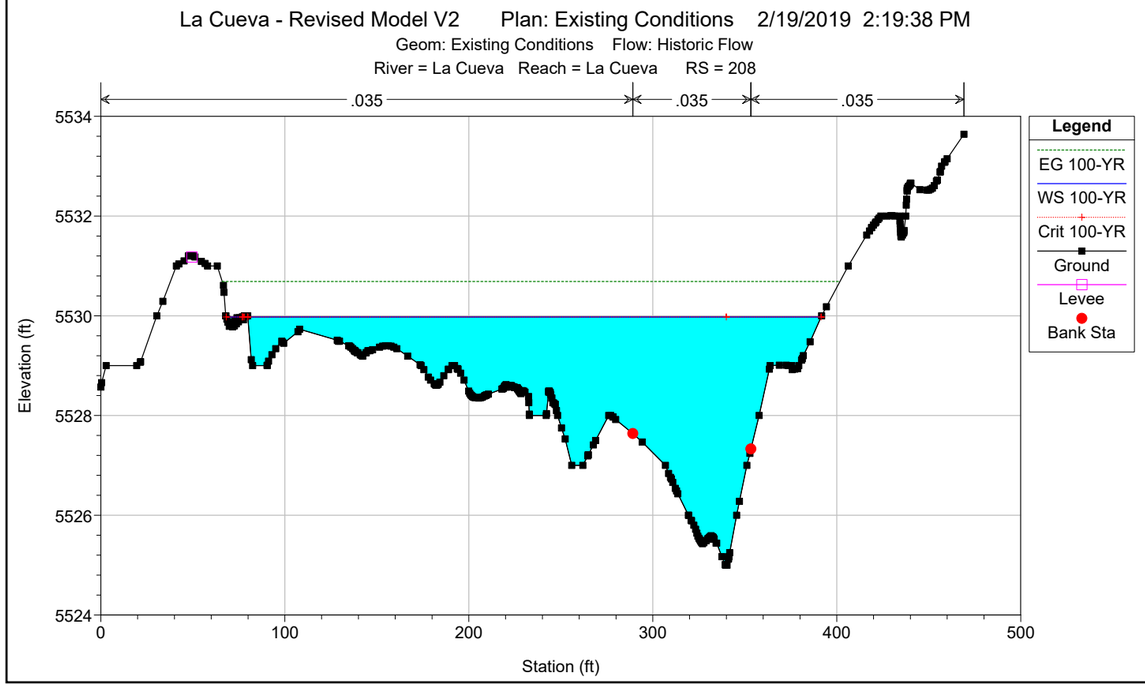

La Cueva - Revised Model V2 Plan: Existing Conditions 2/19/2019 2:19:38 PM
Geom: Existing Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 450
.035
.035
Legend
EG 100-YR
WS 100-YR
Crit 100-YR
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

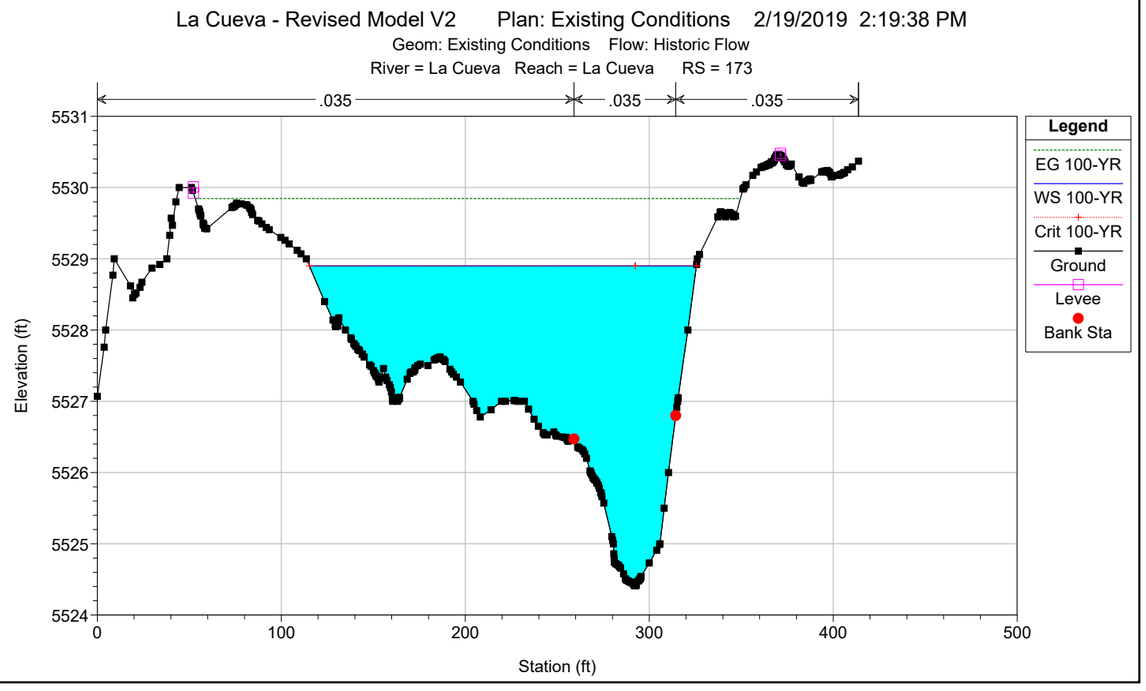

La Cueva - Revised Model V2 Plan: Existing Conditions 2/19/2019 2:19:38 PM
Geom: Existing Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 432
.035
.035
.035
Legend
EG 100-YR
WS 100-YR
Crit 100-YR
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

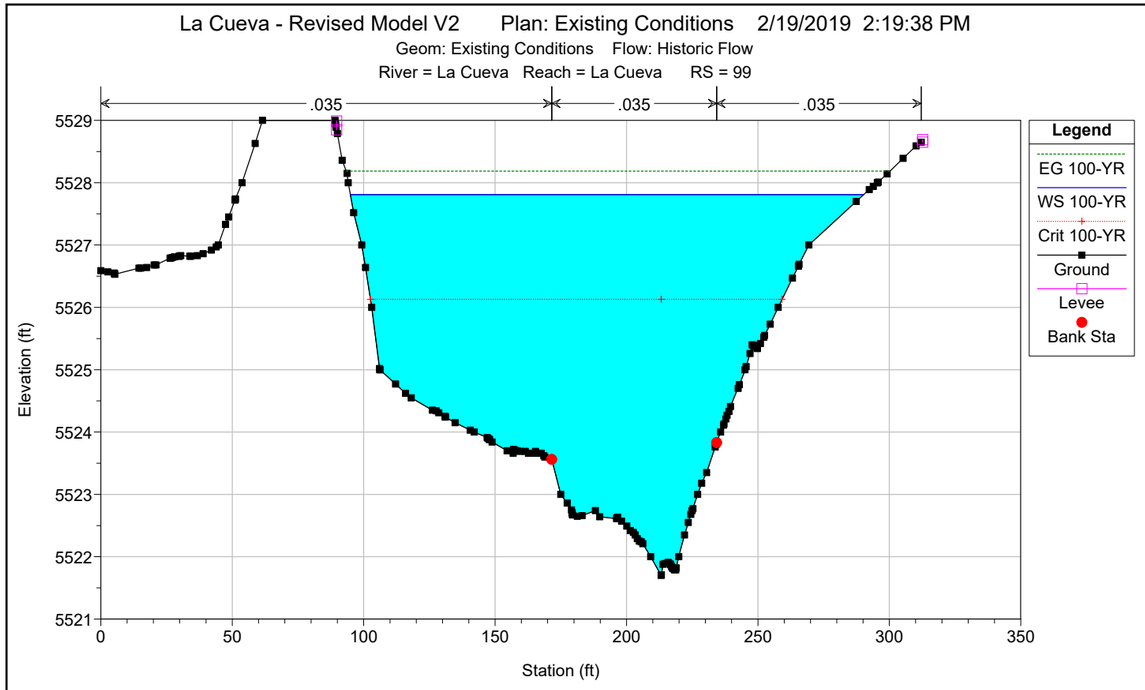

La Cueva - Revised Model V2 Plan: Existing Conditions 2/19/2019 2:19:38 PM
Geom: Existing Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 357
.035
.035
.035
Legend
EG 100-YR
WS 100-YR
Crit 100-YR
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

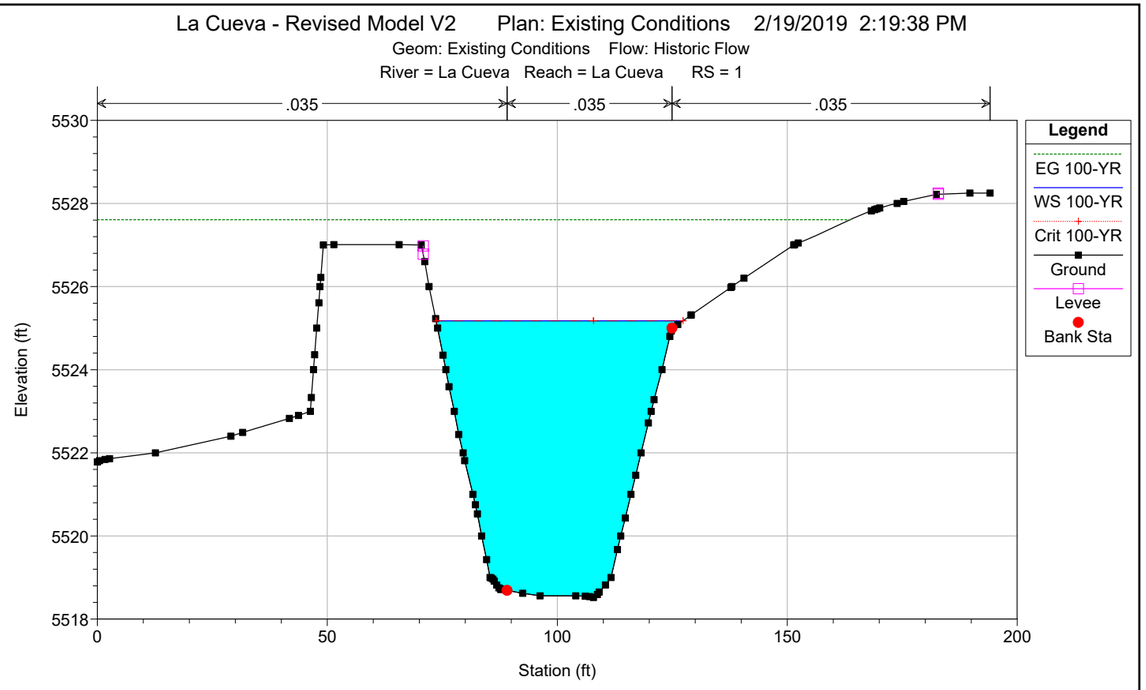

La Cueva - Revised Model V2 Plan: Existing Conditions 2/19/2019 2:19:38 PM
Geom: Existing Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 307
.035
.035
.035
Legend
EG 100-YR
WS 100-YR
Crit 100-YR
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)


La Cueva - Revised Model V2 Plan: Existing Conditions 2/19/2019 2:19:38 PM
Geom: Existing Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 247
.035
.035
.035
Legend
EG 100-YR
WS 100-YR
Crit 100-YR
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)


La Cueva - Revised Model V2 Plan: Existing Conditions 2/19/2019 2:19:38 PM
Geom: Existing Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 208
.035
.035
.035
Legend
EG 100-YR
WS 100-YR
Crit 100-YR
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

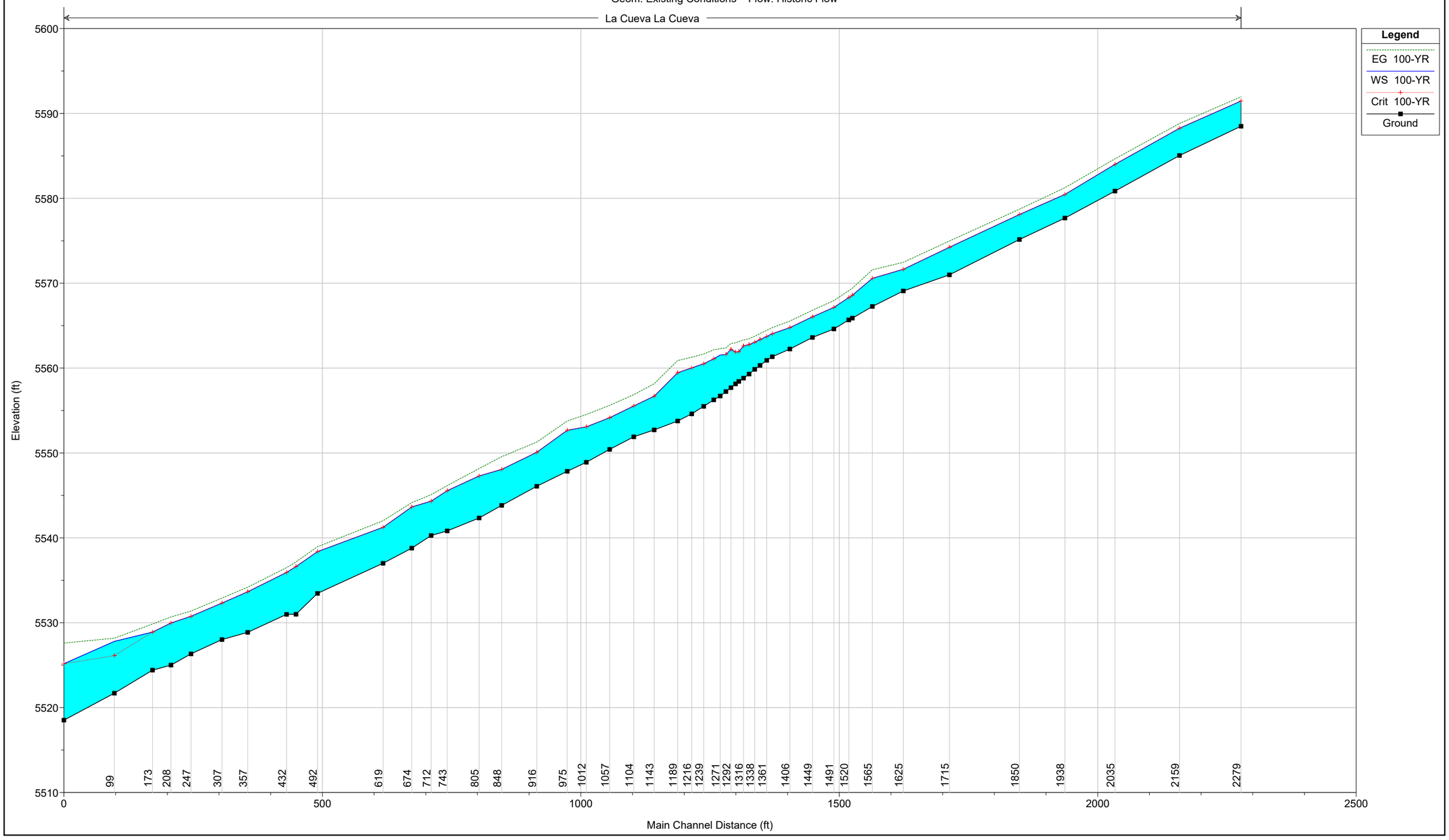

La Cueva - Revised Model V2 Plan: Existing Conditions 2/19/2019 2:19:38 PM
Geom: Existing Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 173
.035
.035
.035
Legend
EG 100-YR
WS 100-YR
Crit 100-YR
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)


La Cueva - Revised Model V2 Plan: Existing Conditions 2/19/2019 2:19:38 PM
Geom: Existing Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 99
.035
.035
.035
Elevation (ft)
Station (ft)
Legend
EG 100-YR
WS 100-YR
Crit 100-YR
Ground
Levee
Bank Sta


La Cueva - Revised Model V2 Plan: Existing Conditions 2/19/2019 2:19:38 PM
Geom: Existing Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 1
.035
.035
.035
Elevation (ft)
Station (ft)
Legend
EG 100-YR
WS 100-YR
Crit 100-YR
Ground
Levee
Bank Sta

La Cueva - Revised Model V2 Plan: Existing Conditions 2/19/2019 2:19:23 PM

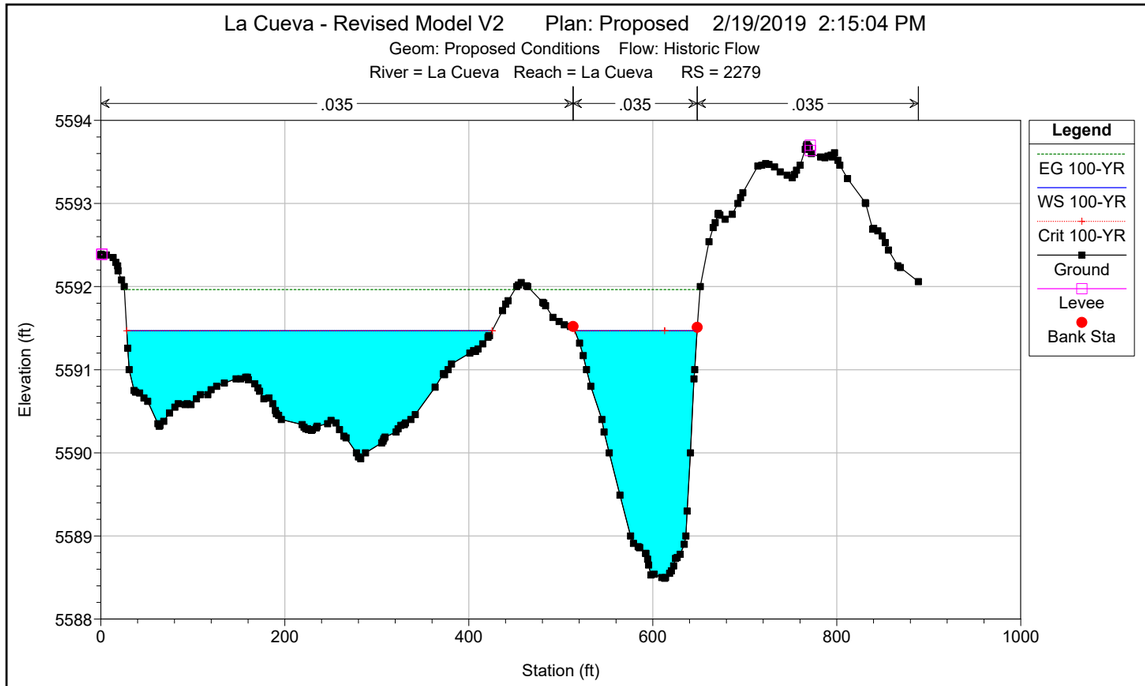
Geom: Existing Conditions Flow: Historic Flow

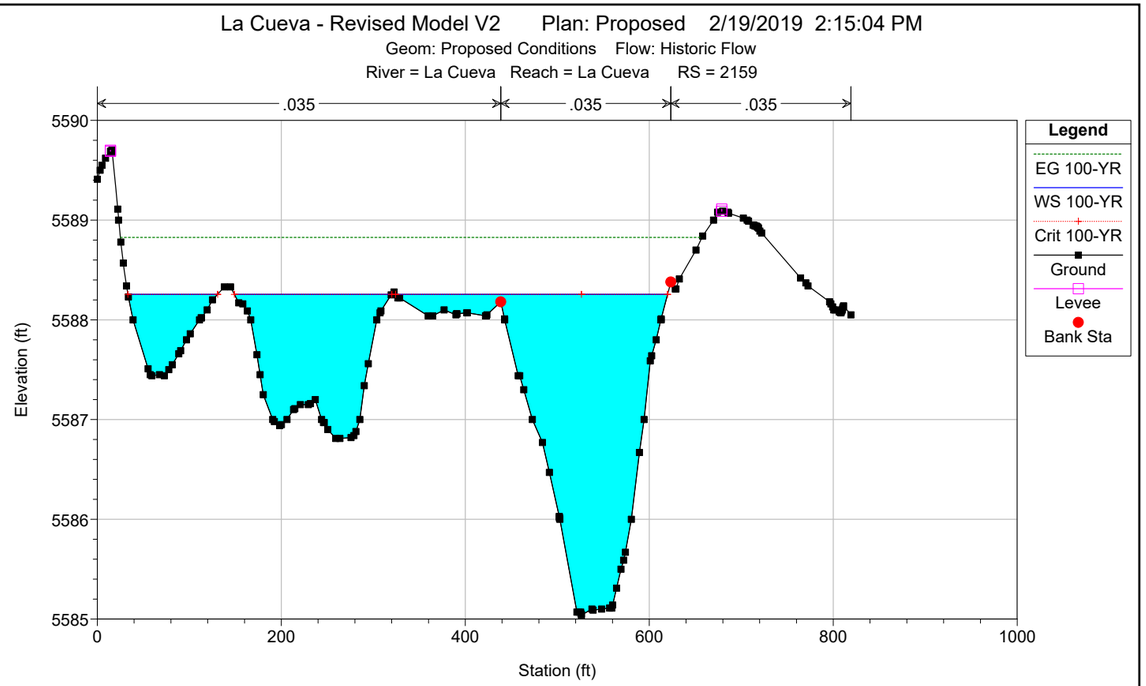


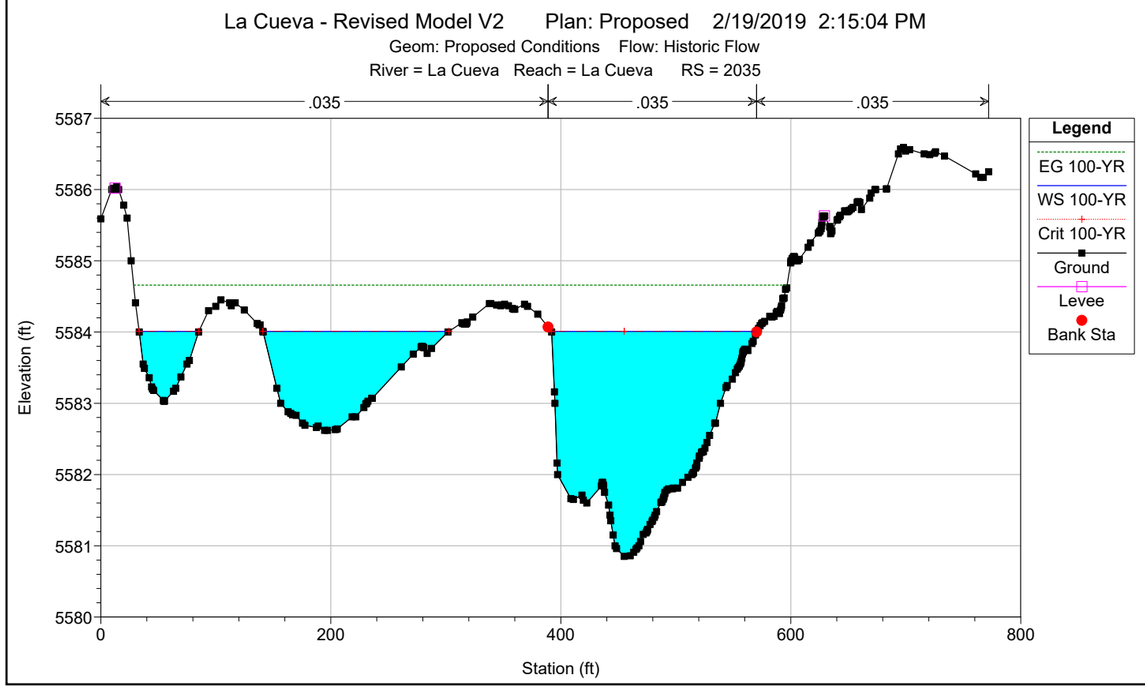
HEC-RAS Plan: Existing River: La Cueva Reach: La Cueva Profile: 100-YR

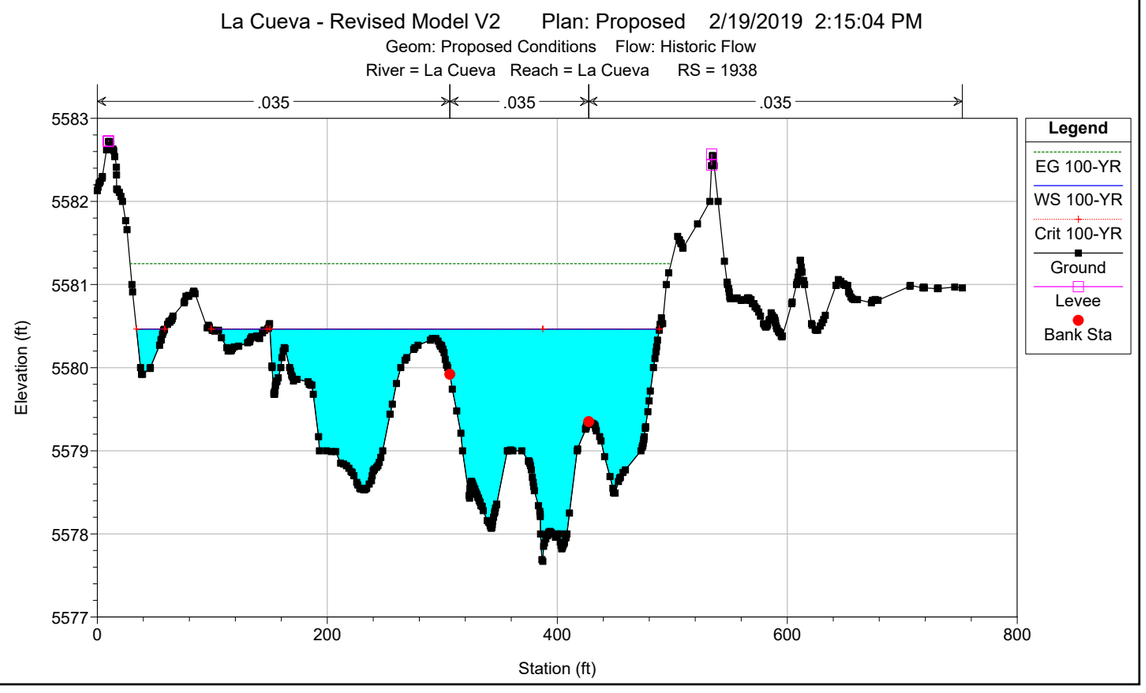
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
La Cueva	2279	100-YR	3090.00	5588.49	5591.47	5591.47	5591.96	0.010567	6.69	601.96	530.19	0.86
La Cueva	2159	100-YR	3090.00	5585.04	5588.26	5588.26	5588.83	0.010815	6.71	562.55	564.37	0.86
La Cueva	2035	100-YR	3090.00	5580.85	5584.01	5584.01	5584.66	0.011100	7.00	517.57	392.77	0.88
La Cueva	1938	100-YR	3090.00	5577.67	5580.46	5580.46	5581.25	0.015831	8.04	464.35	411.80	1.04
La Cueva	1850	100-YR	3090.00	5575.15	5578.10	5578.10	5578.72	0.010308	7.06	529.34	377.97	0.86
La Cueva	1715	100-YR	3090.00	5570.99	5574.24	5574.24	5574.98	0.011016	8.74	476.99	292.83	0.93
La Cueva	1625	100-YR	3090.00	5569.09	5571.64	5571.64	5572.46	0.013924	7.66	435.41	269.35	0.98
La Cueva	1565	100-YR	3090.00	5567.26	5570.58	5570.58	5571.59	0.012690	8.09	391.38	209.16	0.96
La Cueva	1527 Lot 16	100-YR	3090.00	5565.88	5568.60	5568.60	5569.42	0.012179	8.05	446.83	267.11	0.95
La Cueva	1520 Lot 16	100-YR	3090.00	5565.67	5568.31	5568.31	5569.12	0.012879	8.06	445.02	271.76	0.97
La Cueva	1491 Lot 16	100-YR	3090.00	5564.61	5567.15	5567.15	5567.95	0.014566	7.57	435.77	275.90	0.99
La Cueva	1449 Lot 16	100-YR	3090.00	5563.61	5566.04	5566.04	5566.82	0.015578	6.85	437.44	286.17	0.99
La Cueva	1406 Lot 16	100-YR	3090.00	5562.24	5564.77	5564.77	5565.54	0.015805	7.30	440.71	295.50	1.02
La Cueva	1372 Lot 16	100-YR	3090.00	5561.34	5564.05	5564.05	5564.77	0.013369	7.46	469.03	324.72	0.96
La Cueva	1361 Lot 15	100-YR	3090.00	5560.91	5563.72	5563.72	5564.45	0.013240	7.90	470.69	324.52	0.97
La Cueva	1348 Lot 15	100-YR	3090.00	5560.32	5563.36	5563.36	5564.07	0.011905	8.00	485.18	329.63	0.94
La Cueva	1338 Lot 15	100-YR	3090.00	5559.86	5563.05	5563.05	5563.76	0.010309	8.71	506.42	332.35	0.90
La Cueva	1327 Lot 15	100-YR	3090.00	5559.29	5562.77	5562.77	5563.46	0.009793	7.86	512.57	341.63	0.87
La Cueva	1316 Lot 15	100-YR	3090.00	5558.81	5562.61	5562.61	5563.30	0.008497	7.88	528.66	343.06	0.82
La Cueva	1307 Lot 15	100-YR	3090.00	5558.44	5561.96	5561.96	5563.13	0.014920	9.67	379.64	325.55	1.07
La Cueva	1301 Lot 15	100-YR	3090.00	5558.14	5561.89	5561.89	5562.97	0.011777	9.53	407.41	334.00	0.97
La Cueva	1292 Lot 15	100-YR	3090.00	5557.69	5562.21	5562.21	5562.90	0.006068	8.48	572.23	345.38	0.73
La Cueva	1282 Lot 15	100-YR	3090.00	5557.23	5561.61	5561.61	5562.38	0.006672	8.09	473.39	336.00	0.75
La Cueva	1271 Lot 15	100-YR	3090.00	5556.70	5561.54		5562.28	0.005554	8.15	488.82	341.51	0.70
La Cueva	1258 Lot 15	100-YR	3090.00	5556.26	5561.10	5561.10	5562.16	0.007993	9.40	417.33	337.99	0.83
La Cueva	1239 Lot 15	100-YR	3090.00	5555.49	5560.51	5560.51	5561.66	0.007304	9.75	406.40	341.73	0.82
La Cueva	1216 Lot 15	100-YR	3090.00	5554.61	5560.03	5560.03	5561.29	0.007004	10.06	389.28	146.91	0.81
La Cueva	1189 Lot 15	100-YR	3090.00	5553.76	5559.45	5559.45	5560.89	0.007668	10.46	351.92	113.83	0.84
La Cueva	1143	100-YR	3090.00	5552.71	5556.69	5556.69	5558.16	0.012055	10.24	323.89	113.69	1.00
La Cueva	1104	100-YR	3090.00	5551.90	5555.54	5555.54	5556.87	0.013344	9.15	334.39	129.07	1.01
La Cueva	1057	100-YR	3090.00	5550.42	5554.16	5554.16	5555.61	0.011186	9.72	328.16	122.11	0.96
La Cueva	1012	100-YR	3090.00	5548.91	5553.09	5553.09	5554.54	0.010165	9.89	336.27	127.27	0.93
La Cueva	975	100-YR	3090.00	5547.84	5552.68	5552.68	5553.77	0.007265	9.78	433.21	200.15	0.82
La Cueva	916	100-YR	3090.00	5546.08	5550.09	5550.09	5551.28	0.009383	9.15	378.45	164.18	0.88
La Cueva	848	100-YR	3090.00	5543.83	5548.07	5548.07	5549.57	0.009984	10.37	335.88	120.44	0.93
La Cueva	805	100-YR	3090.00	5542.34	5547.30	5547.30	5548.17	0.005949	8.90	535.04	334.90	0.74
La Cueva	743	100-YR	3090.00	5540.82	5545.57	5545.57	5546.16	0.004729	7.37	653.17	462.18	0.65
La Cueva	712	100-YR	3090.00	5540.27	5544.33	5544.33	5545.09	0.008485	8.20	535.24	432.29	0.83
La Cueva	674	100-YR	3090.00	5538.78	5543.64	5543.64	5544.15	0.005678	7.83	683.63	502.95	0.70
La Cueva	619	100-YR	3090.00	5537.00	5541.25	5541.25	5542.02	0.008483	8.48	511.81	345.29	0.84
La Cueva	492	100-YR	3090.00	5533.46	5538.38	5538.38	5538.96	0.005945	7.71	639.07	472.56	0.71
La Cueva	450	100-YR	3090.00	5531.00	5536.61	5536.61	5537.17	0.006206	8.38	637.38	447.46	0.73
La Cueva	432	100-YR	3090.00	5530.99	5535.93	5535.93	5536.49	0.006967	7.76	608.66	438.34	0.75
La Cueva	357	100-YR	3090.00	5528.87	5533.65	5533.65	5534.19	0.006423	7.70	641.33	466.51	0.73
La Cueva	307	100-YR	3090.00	5528.01	5532.32	5532.32	5532.90	0.007796	7.74	595.10	440.97	0.79
La Cueva	247	100-YR	3090.00	5526.33	5530.77	5530.77	5531.38	0.006672	7.79	592.68	402.44	0.75
La Cueva	208	100-YR	3090.00	5525.00	5529.98	5529.98	5530.69	0.006513	8.08	539.71	321.11	0.75
La Cueva	173	100-YR	3090.00	5524.41	5528.90	5528.90	5529.85	0.008580	9.16	438.88	210.34	0.85
La Cueva	99	100-YR	3090.00	5521.70	5527.81	5526.13	5528.19	0.001891	5.55	672.35	195.27	0.43
La Cueva	1	100-YR	3090.00	5518.52	5525.18	5525.18	5527.61	0.010654	13.01	250.75	53.71	1.00

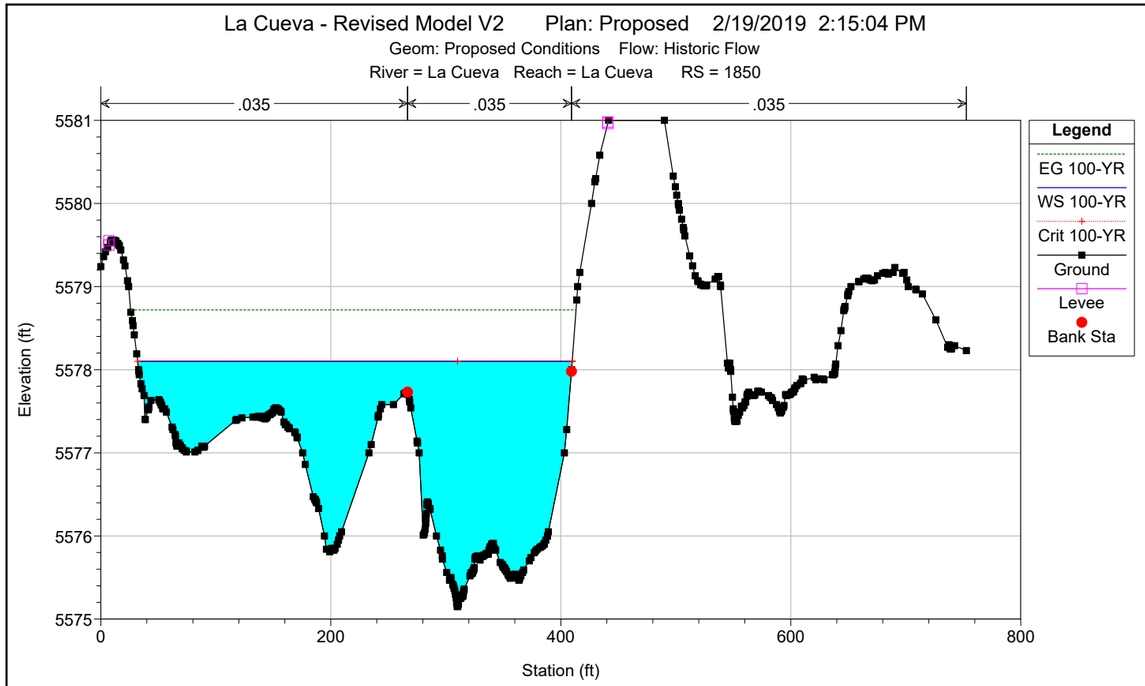
PROPOSED CONDITIONS WITHOUT A CULVERT UNDER VENTURA STREET

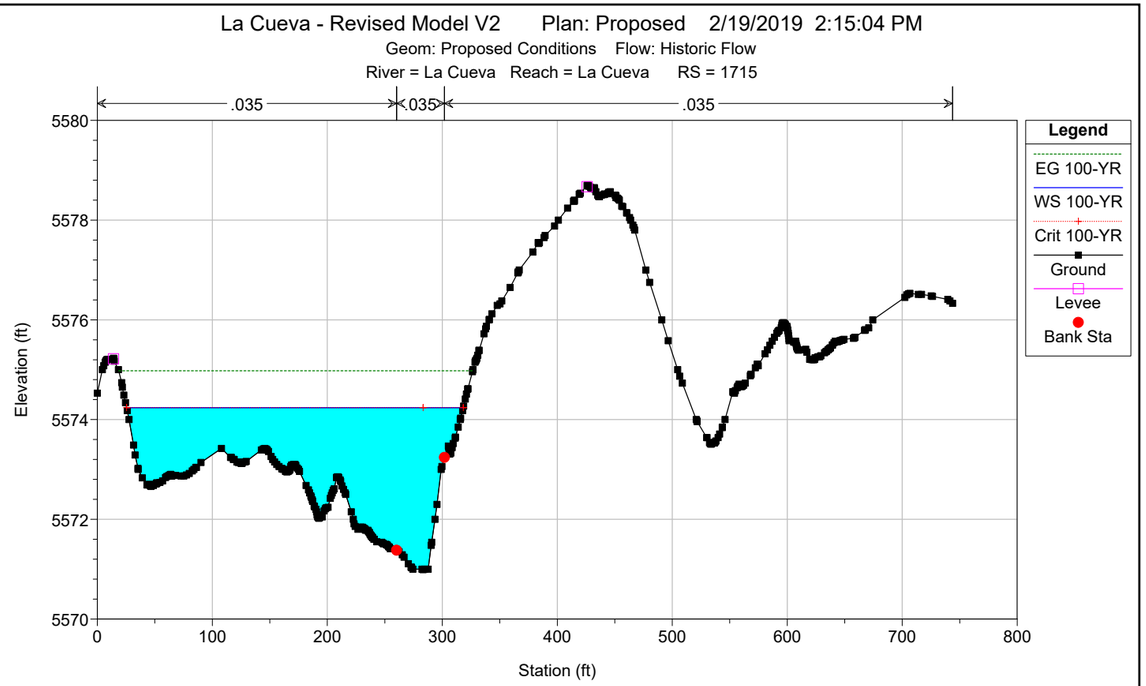









La Cueva - Revised Model V2 Plan: Proposed 2/19/2019 2:15:04 PM
Geom: Proposed Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 1850
.035
.035
.035
Legend
EG 100-YR
WS 100-YR
Crit 100-YR
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)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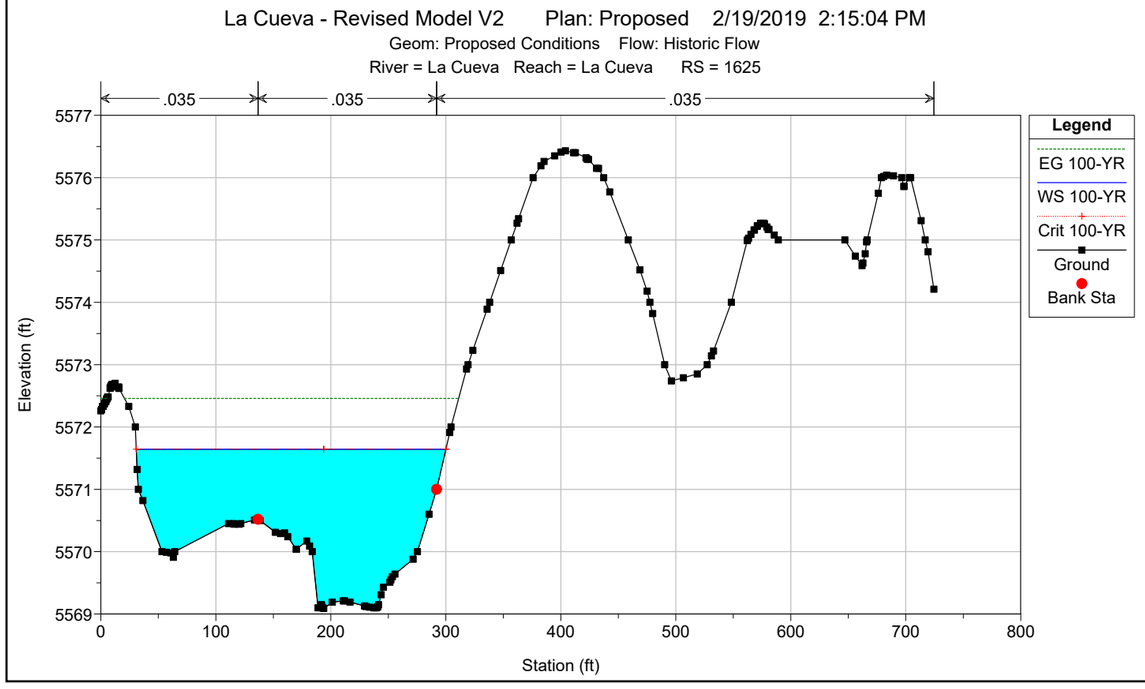
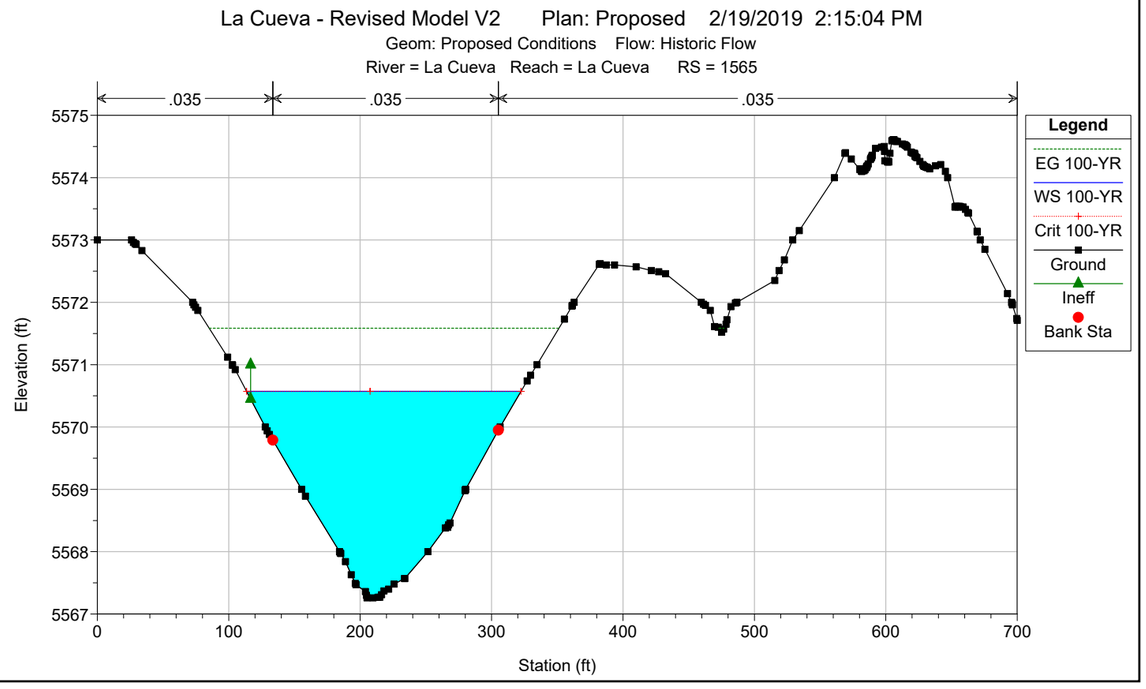
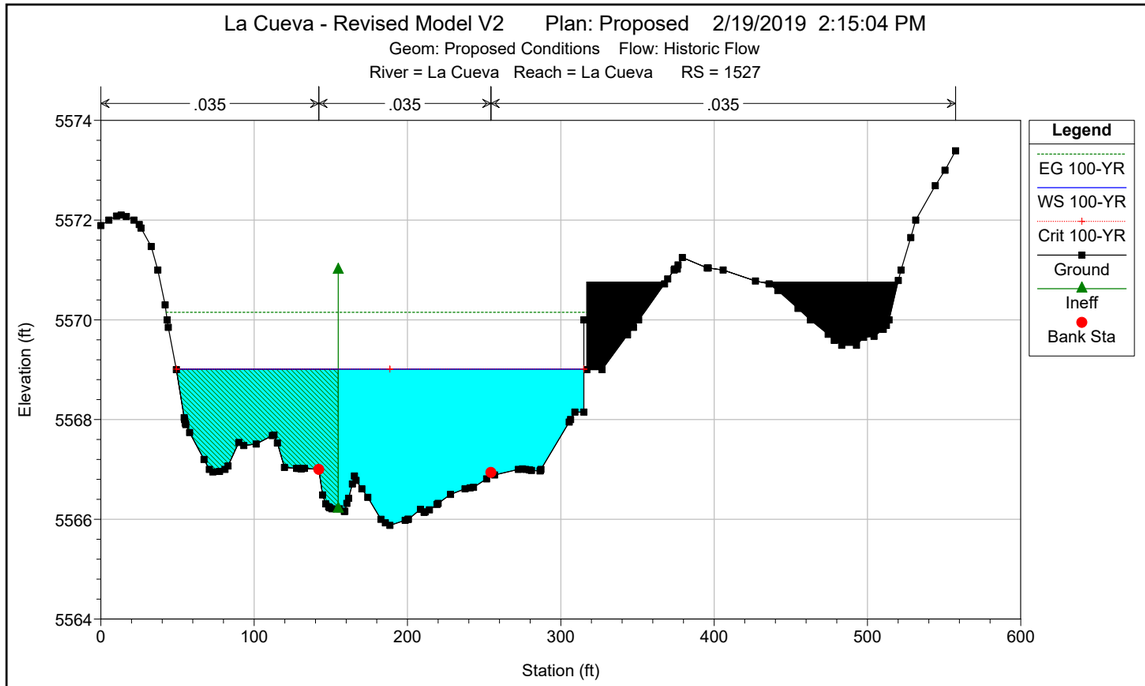
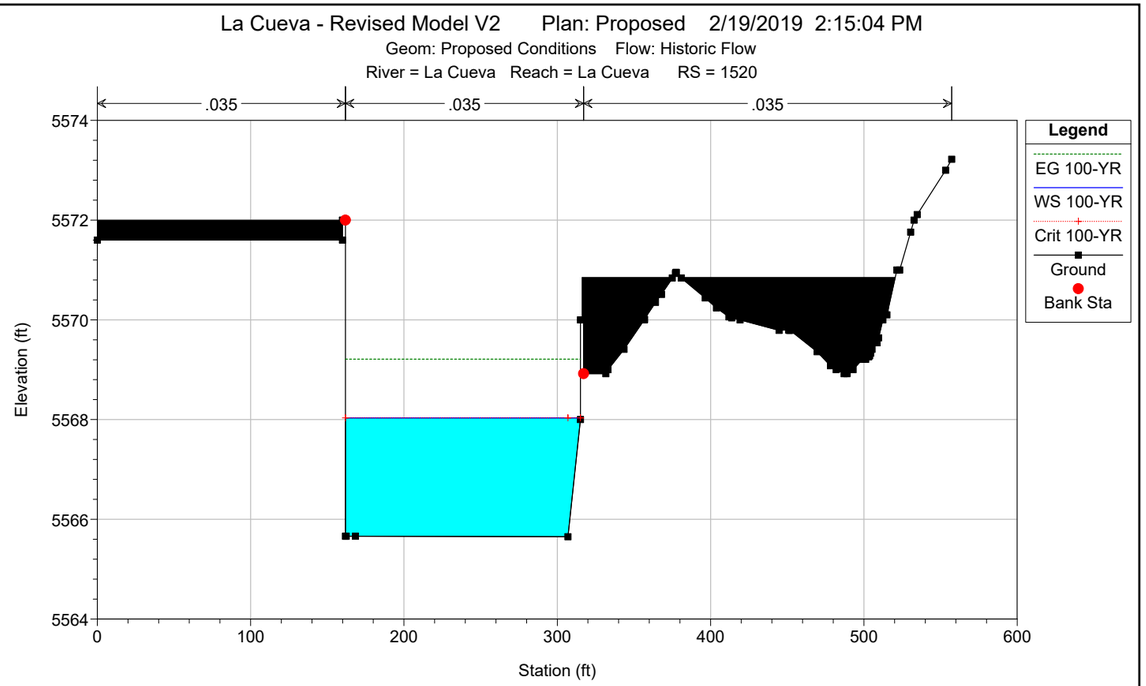
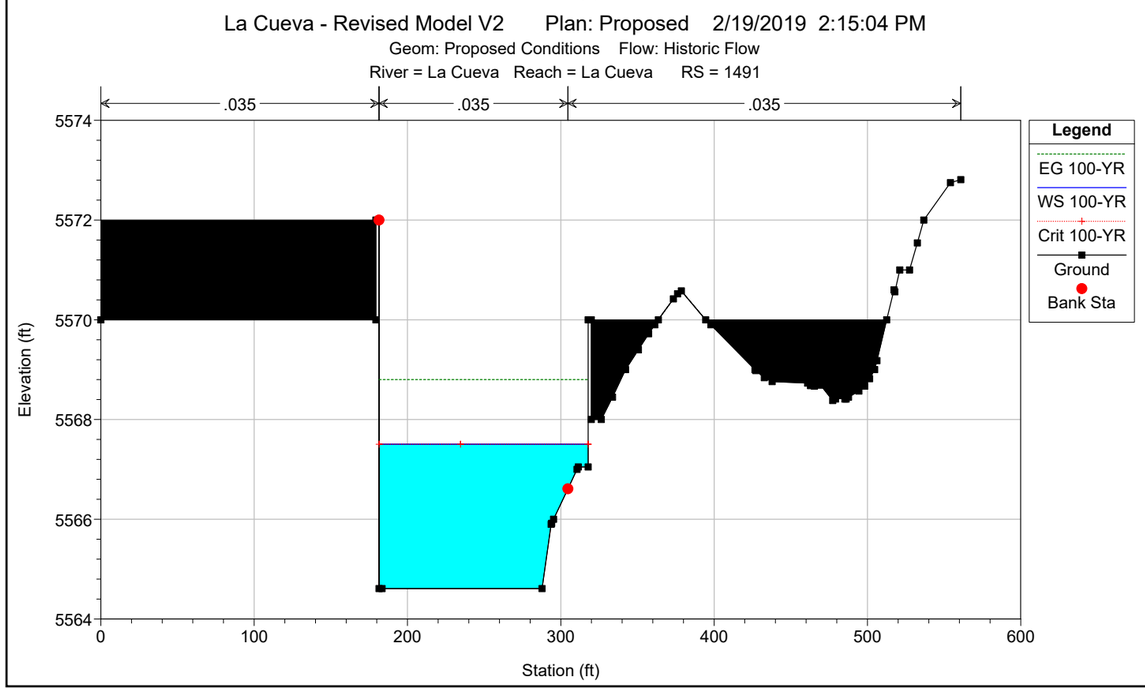
Geom: Proposed Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 1715
.035
.035
.035
Legend
EG 100-YR
WS 100-YR
Crit 100-YR
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

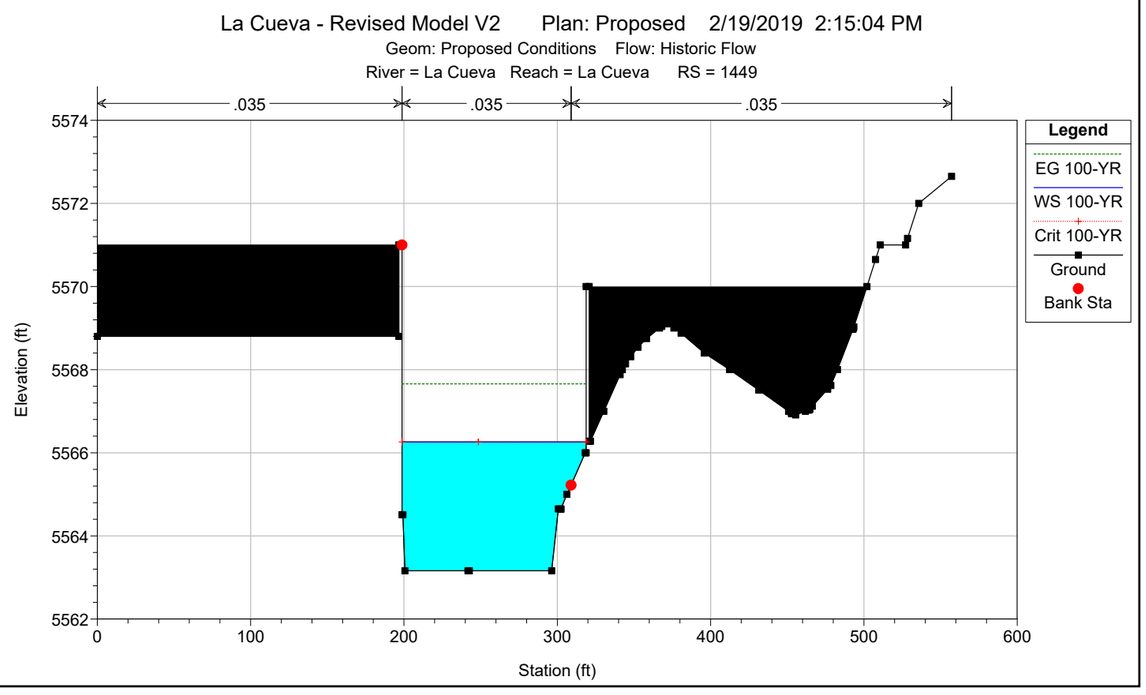

La Cueva - Revised Model V2 Plan: Proposed 2/19/2019 2:15:04 PM
Geom: Proposed Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 1625
.035
.035
.035
Legend
EG 100-YR
WS 100-YR
Crit 100-YR
Ground
Bank Sta
Elevation (ft)
Station (ft)


La Cueva - Revised Model V2 Plan: Proposed 2/19/2019 2:15:04 PM
Geom: Proposed Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 1565
.035
.035
.035
Legend
EG 100-YR
WS 100-YR
Crit 100-YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

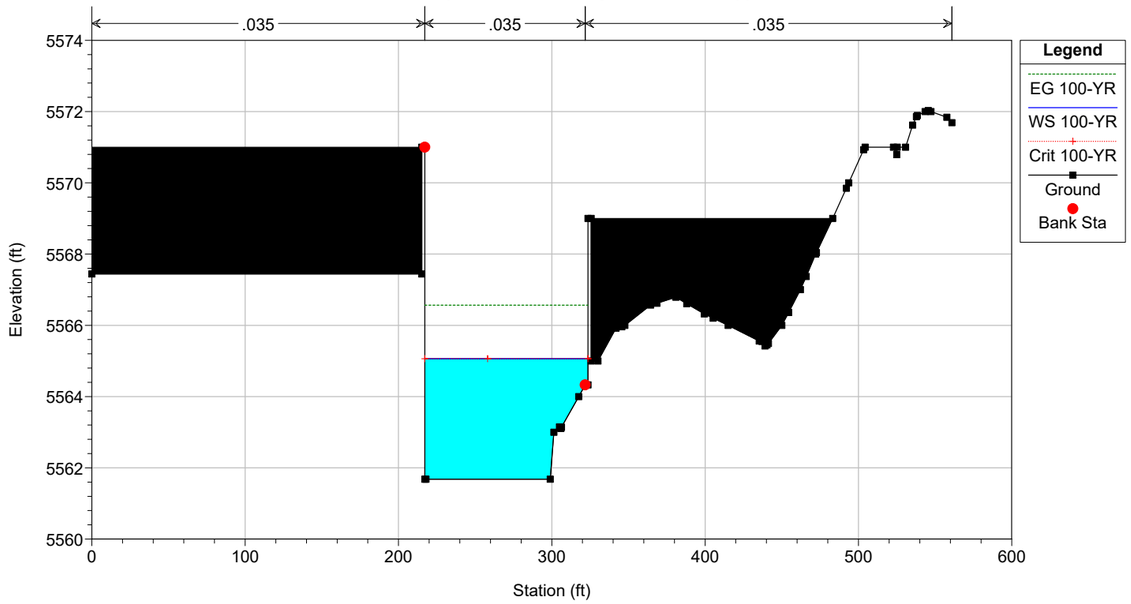

La Cueva - Revised Model V2 Plan: Proposed 2/19/2019 2:15:04 PM
Geom: Proposed Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 1527
.035
.035
.035
Legend
EG 100-YR
WS 100-YR
Crit 100-YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
5574
5572
5570
5568
5566
5564
0
100
200
300
400
500
600


La Cueva - Revised Model V2 Plan: Proposed 2/19/2019 2:15:04 PM
Geom: Proposed Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 1520
.035
.035
.035
Legend
EG 100-YR
WS 100-YR
Crit 100-YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
5574
5572
5570
5568
5566
5564
0
100
200
300
400
500
600

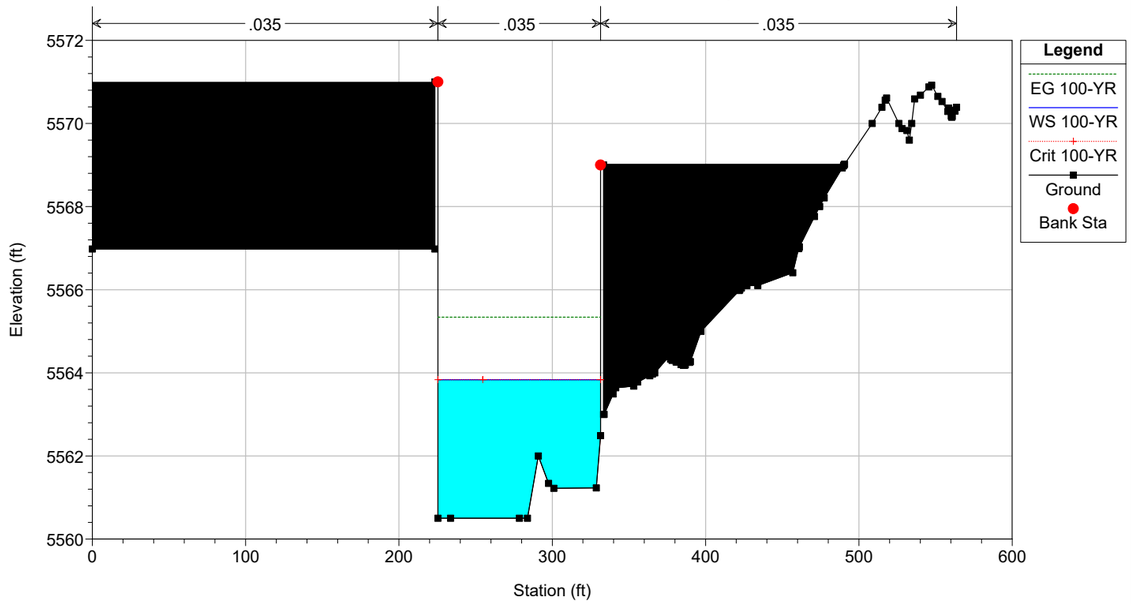

La Cueva - Revised Model V2 Plan: Proposed 2/19/2019 2:15:04 PM
Geom: Proposed Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 1491
.035
.035
.035
Legend
EG 100-YR
WS 100-YR
Crit 100-YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
5574
5572
5570
5568
5566
5564
0
100
200
300
400
500
600


La Cueva - Revised Model V2 Plan: Proposed 2/19/2019 2:15:04 PM
Geom: Proposed Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 1449
.035
.035
.035
Legend
EG 100-YR
WS 100-YR
Crit 100-YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
5574
5572
5570
5568
5566
5564
5562
0
100
200
300
400
500
600

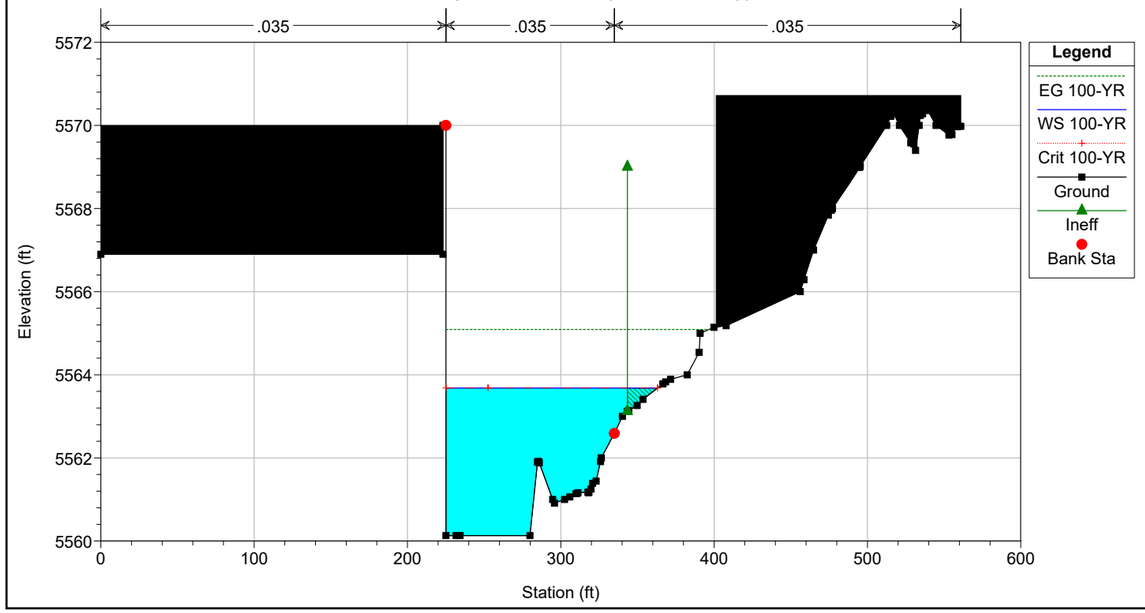
La Cueva - Revised Model V2 Plan: Proposed 2/19/2019 2:15:04 PM
Geom: Proposed Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 1406



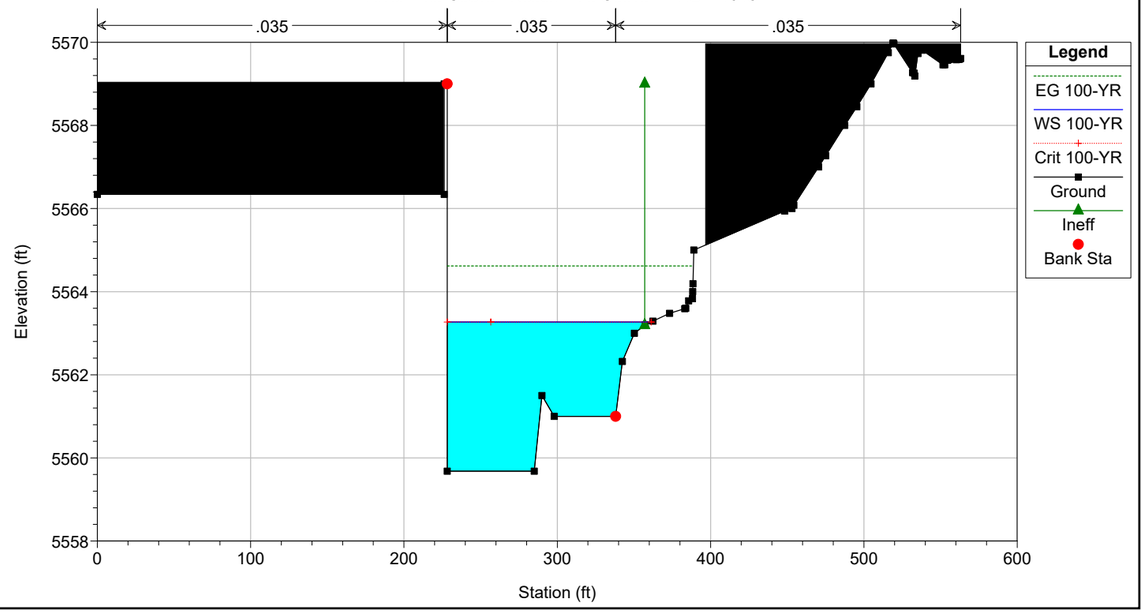
La Cueva - Revised Model V2 Plan: Proposed 2/19/2019 2:15:04 PM
Geom: Proposed Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 1372



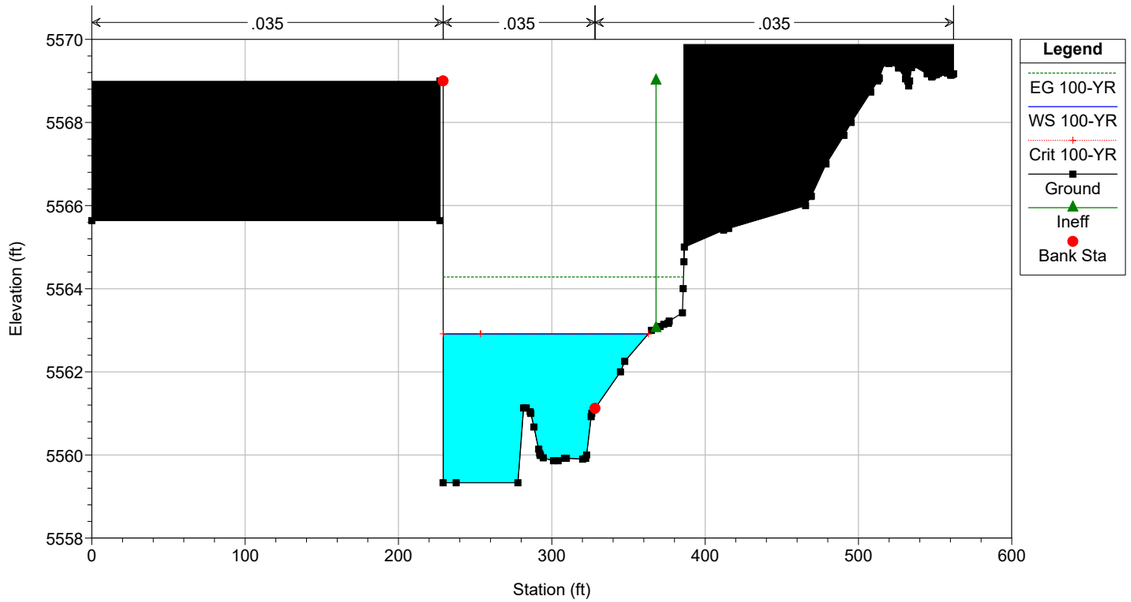
La Cueva - Revised Model V2 Plan: Proposed 2/19/2019 2:15:04 PM
Geom: Proposed Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 1361



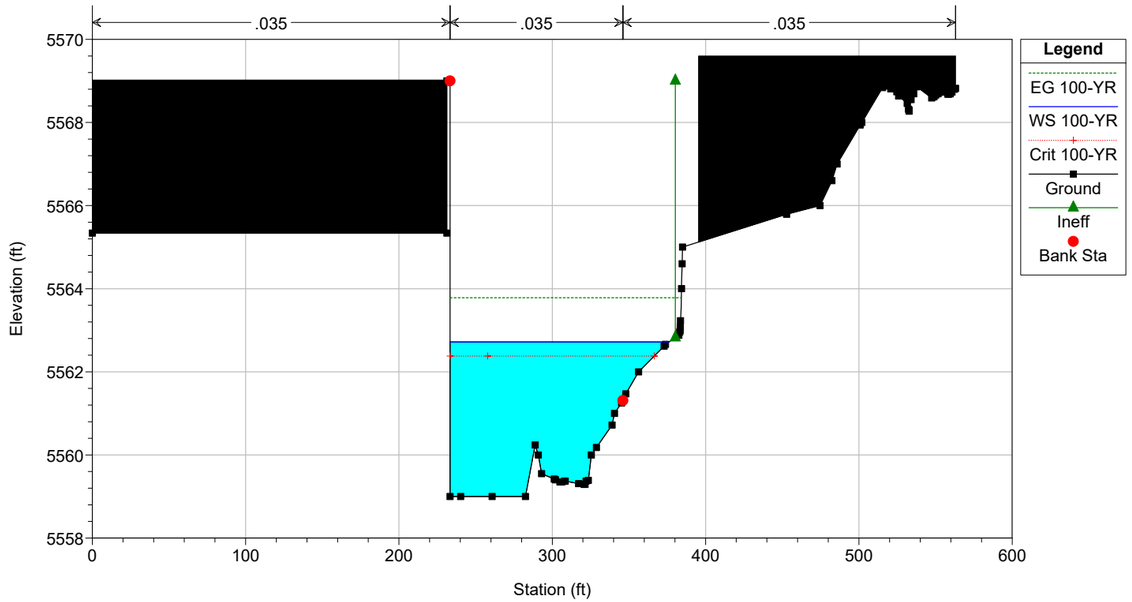
La Cueva - Revised Model V2 Plan: Proposed 2/19/2019 2:15:04 PM
Geom: Proposed Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 1348



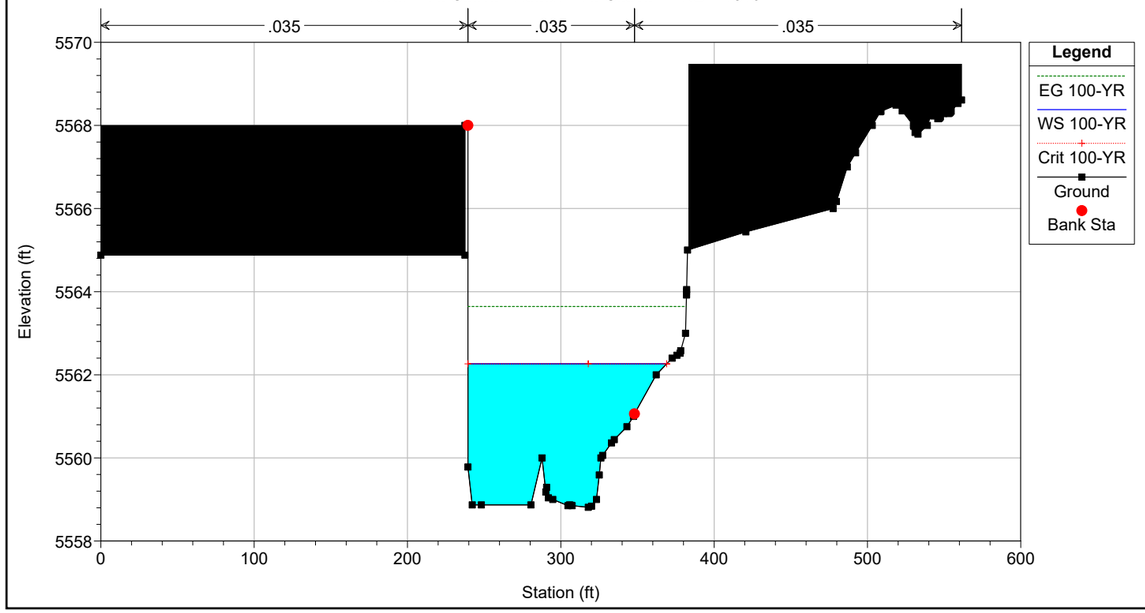
La Cueva - Revised Model V2 Plan: Proposed 2/19/2019 2:15:04 PM
Geom: Proposed Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 1338



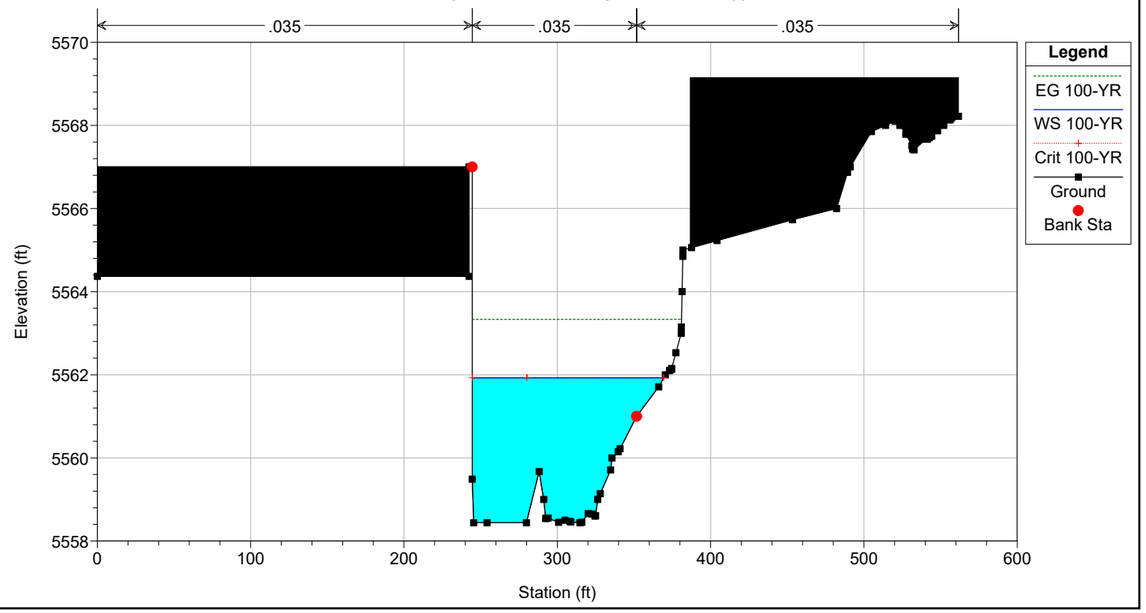
La Cueva - Revised Model V2 Plan: Proposed 2/19/2019 2:15:04 PM
Geom: Proposed Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 1327



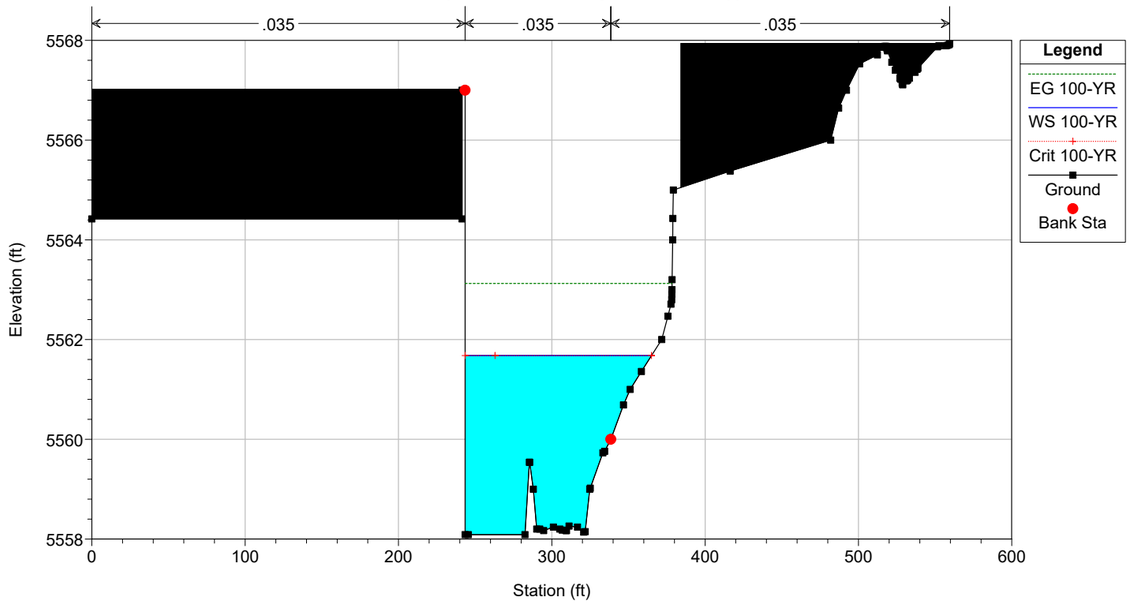
La Cueva - Revised Model V2 Plan: Proposed 2/19/2019 2:15:04 PM
Geom: Proposed Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 1316



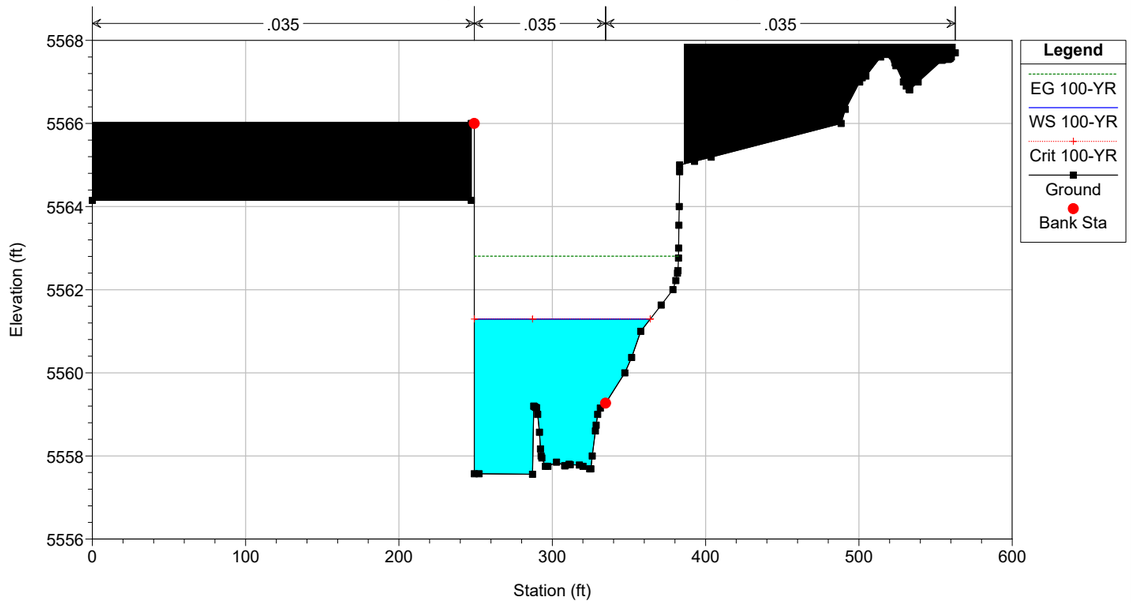
La Cueva - Revised Model V2 Plan: Proposed 2/19/2019 2:15:04 PM
Geom: Proposed Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 1307



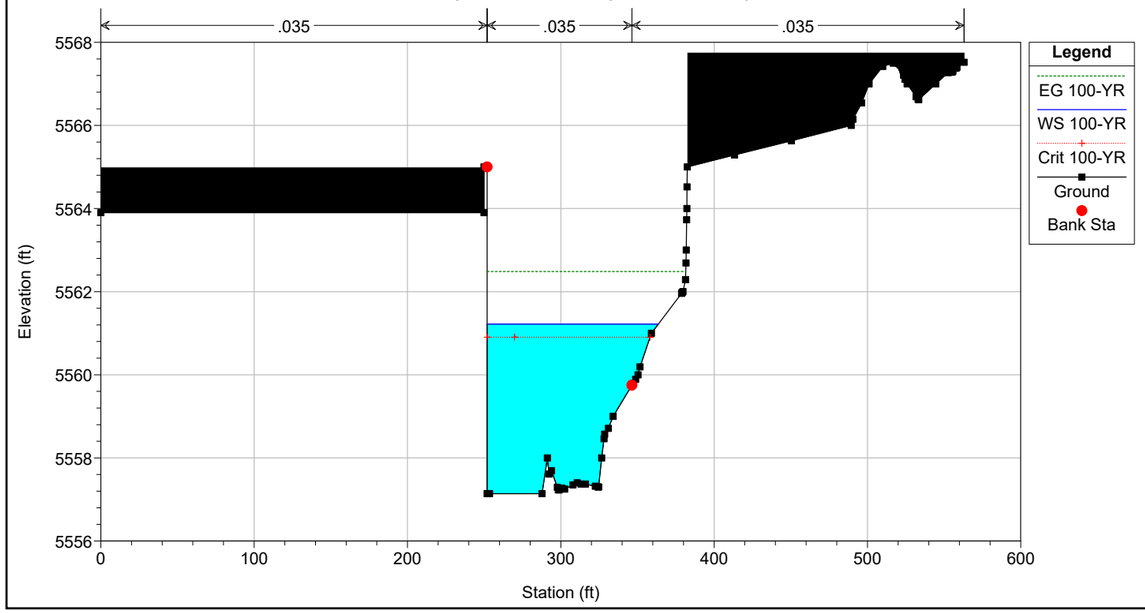
La Cueva - Revised Model V2 Plan: Proposed 2/19/2019 2:15:04 PM
Geom: Proposed Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 1301



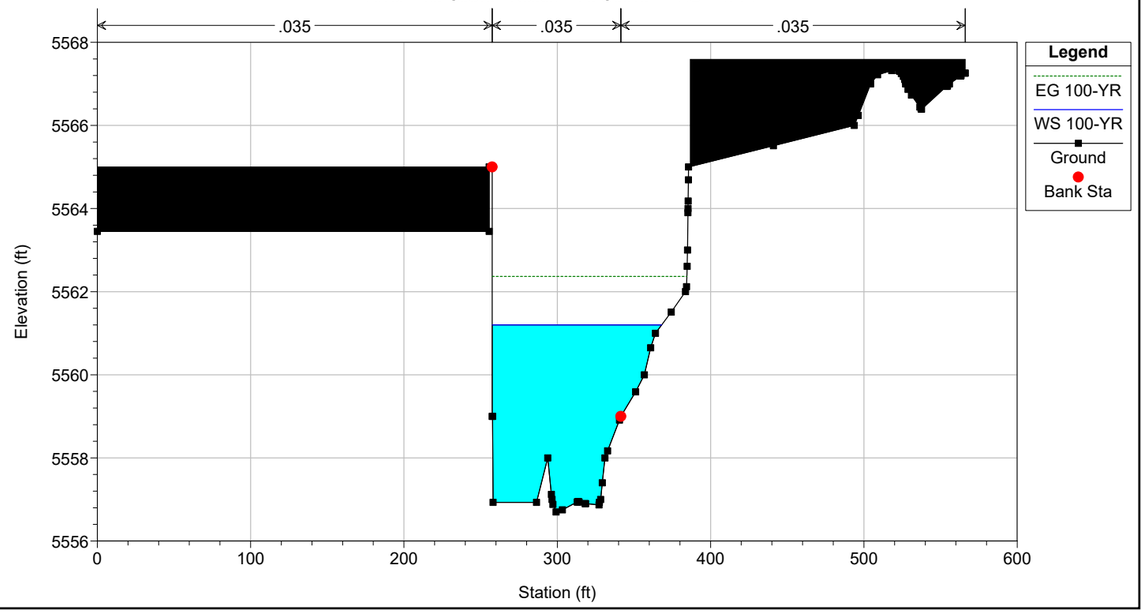
La Cueva - Revised Model V2 Plan: Proposed 2/19/2019 2:15:04 PM
Geom: Proposed Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 1292

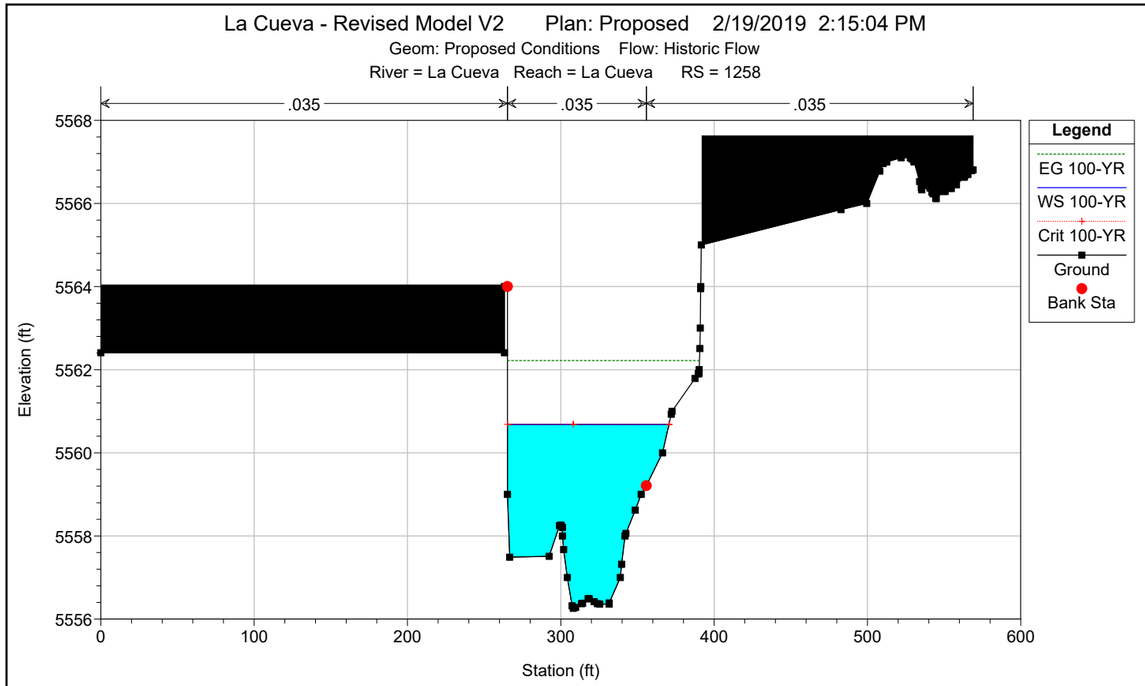


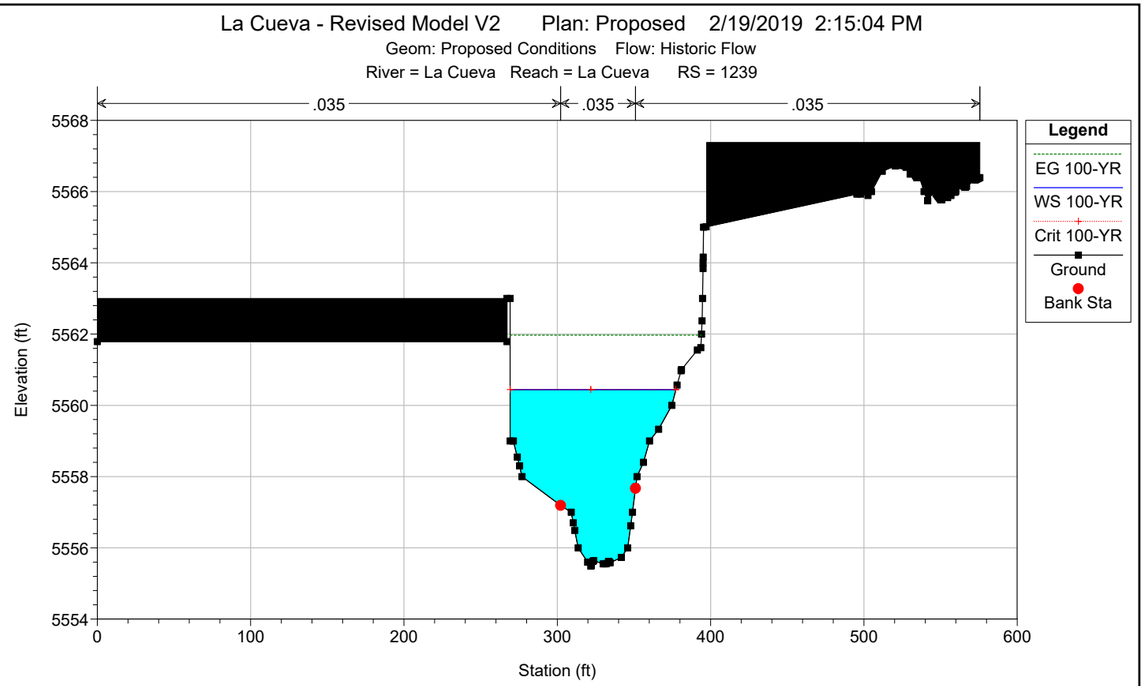
La Cueva - Revised Model V2 Plan: Proposed 2/19/2019 2:15:04 PM
Geom: Proposed Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 1282

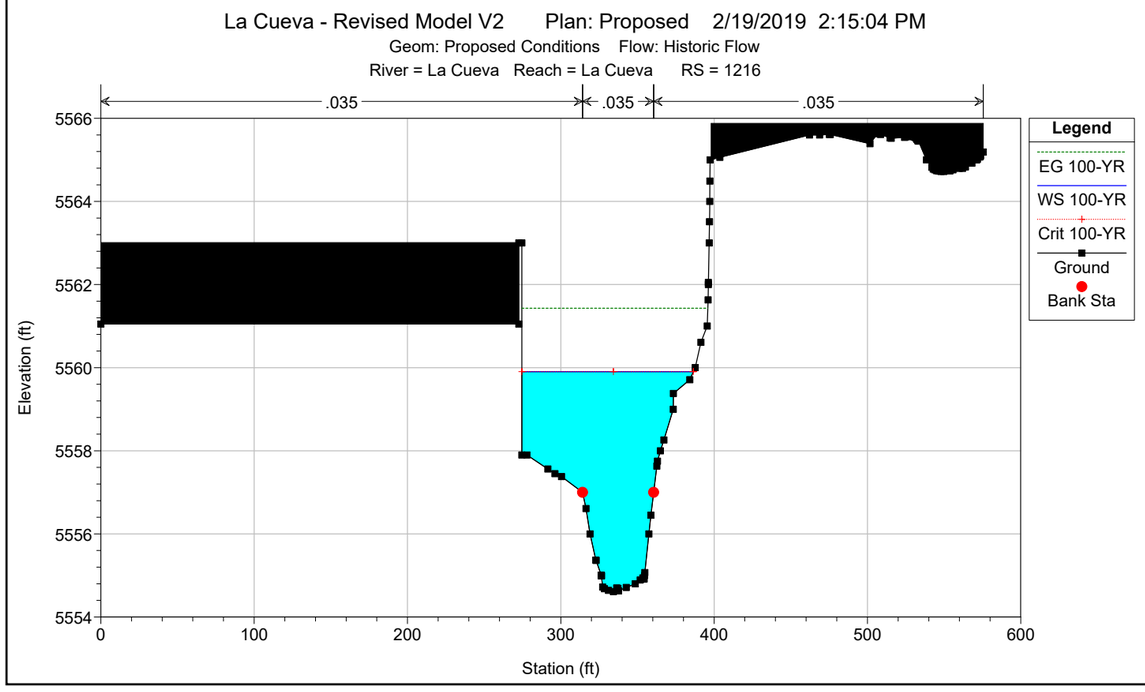


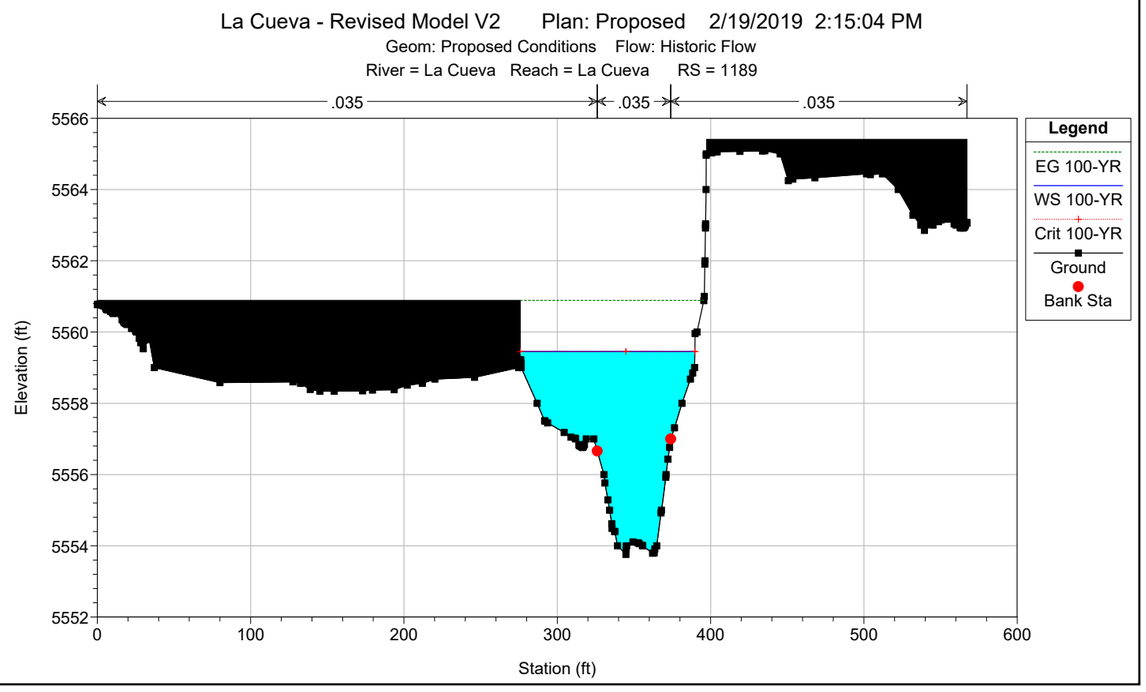
La Cueva - Revised Model V2 Plan: Proposed 2/19/2019 2:15:04 PM
Geom: Proposed Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 1271



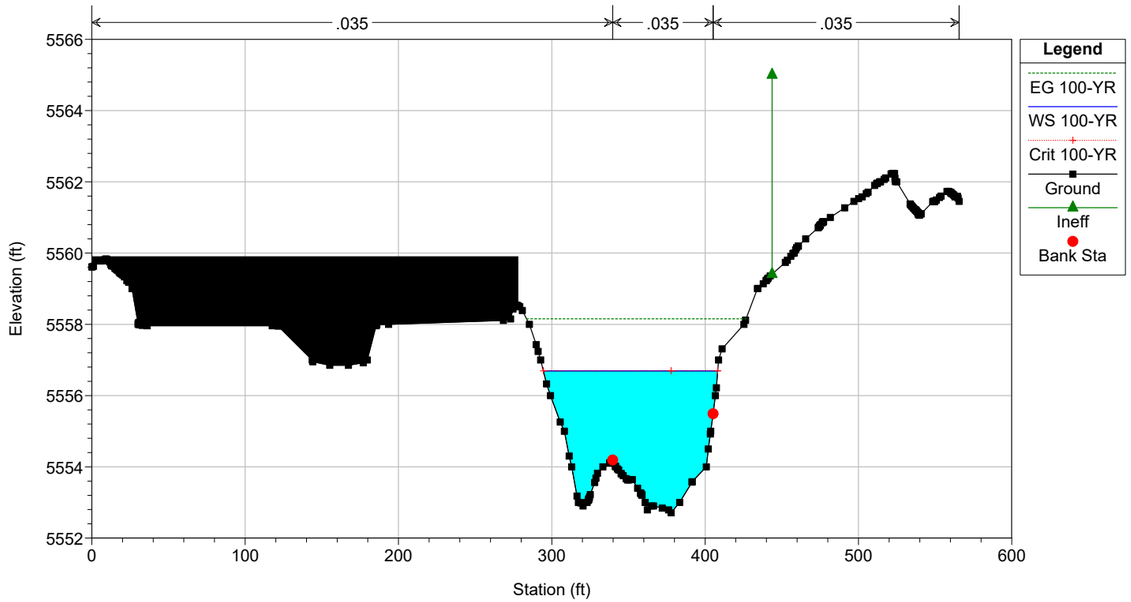

La Cueva - Revised Model V2 Plan: Proposed 2/19/2019 2:15:04 PM
Geom: Proposed Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 1258
.035
.035
.035
Legend
EG 100-YR
WS 100-YR
Crit 100-YR
Ground
Bank Sta
Elevation (ft)
Station (ft)


La Cueva - Revised Model V2 Plan: Proposed 2/19/2019 2:15:04 PM
Geom: Proposed Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 1239
.035
.035
.035
Legend
EG 100-YR
WS 100-YR
Crit 100-YR
Ground
Bank Sta
Elevation (ft)
Station (ft)

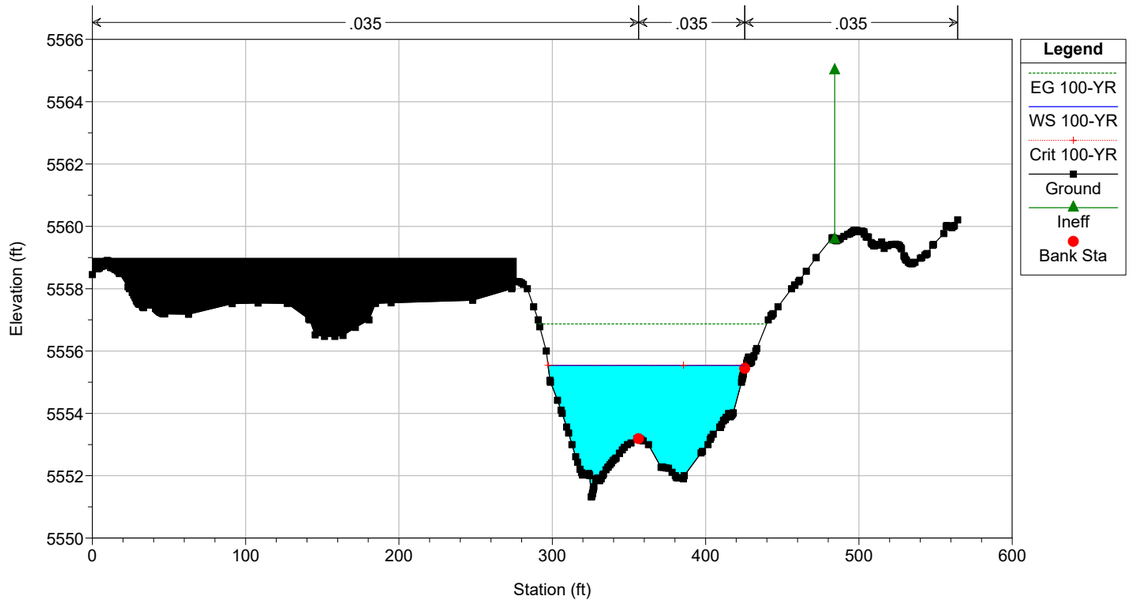

La Cueva - Revised Model V2 Plan: Proposed 2/19/2019 2:15:04 PM
Geom: Proposed Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 1216
.035
.035
.035
Legend
EG 100-YR
WS 100-YR
Crit 100-YR
Ground
Bank Sta
Elevation (ft)
Station (ft)


La Cueva - Revised Model V2 Plan: Proposed 2/19/2019 2:15:04 PM
Geom: Proposed Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 1189
.035
.035
.035
Legend
EG 100-YR
WS 100-YR
Crit 100-YR
Ground
Bank Sta
Elevation (ft)
Station (ft)

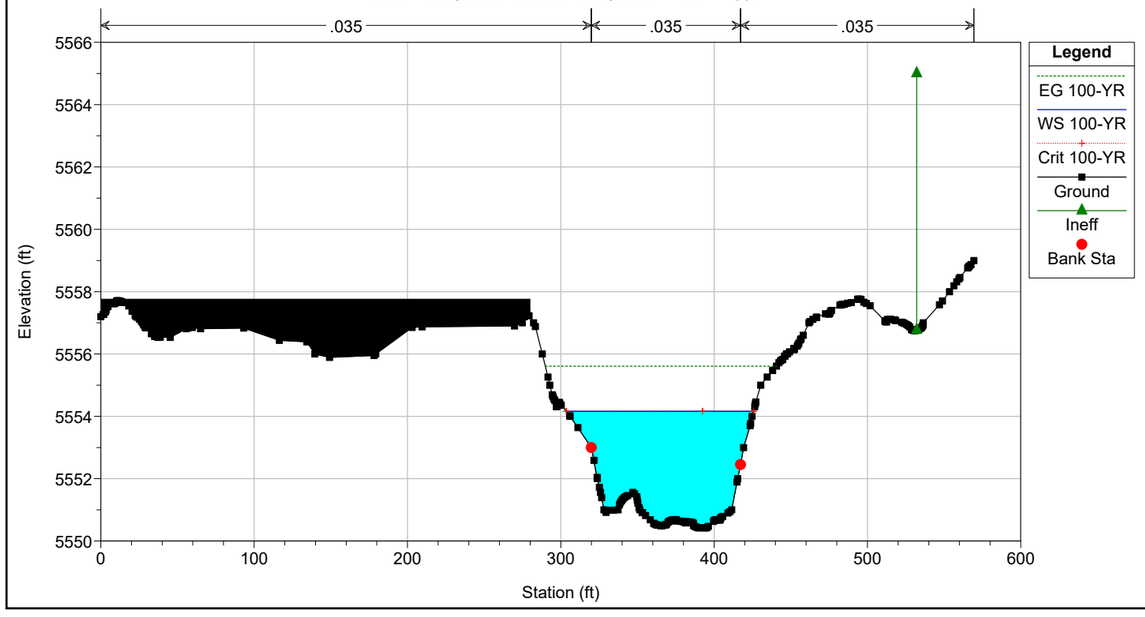
La Cueva - Revised Model V2 Plan: Proposed 2/19/2019 2:15:04 PM
Geom: Proposed Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 1143



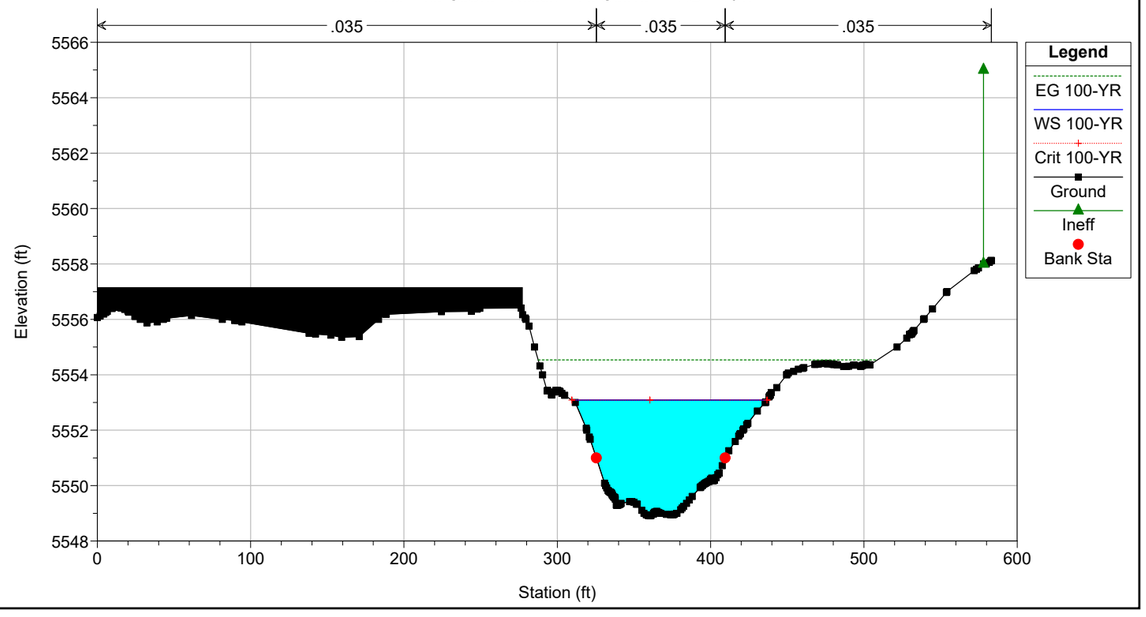
La Cueva - Revised Model V2 Plan: Proposed 2/19/2019 2:15:04 PM
Geom: Proposed Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 1104



La Cueva - Revised Model V2 Plan: Proposed 2/19/2019 2:15:04 PM
Geom: Proposed Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 1057



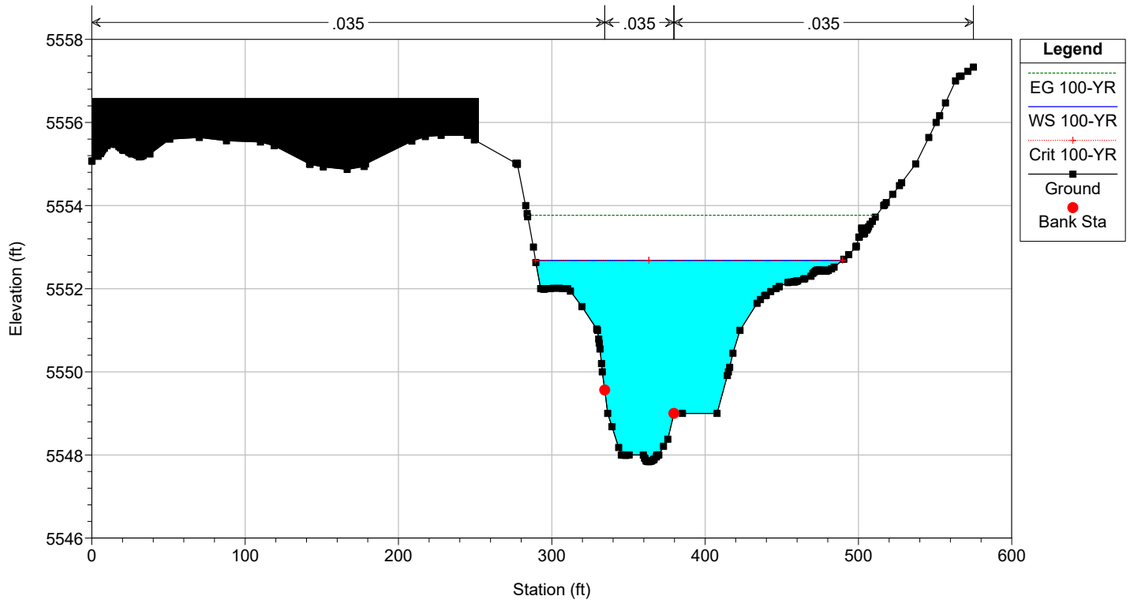
La Cueva - Revised Model V2 Plan: Proposed 2/19/2019 2:15:04 PM
Geom: Proposed Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 1012



La Cueva - Revised Model V2 Plan: Proposed 2/19/2019 2:15:04 PM

Geom: Proposed Conditions Flow: Historic Flow

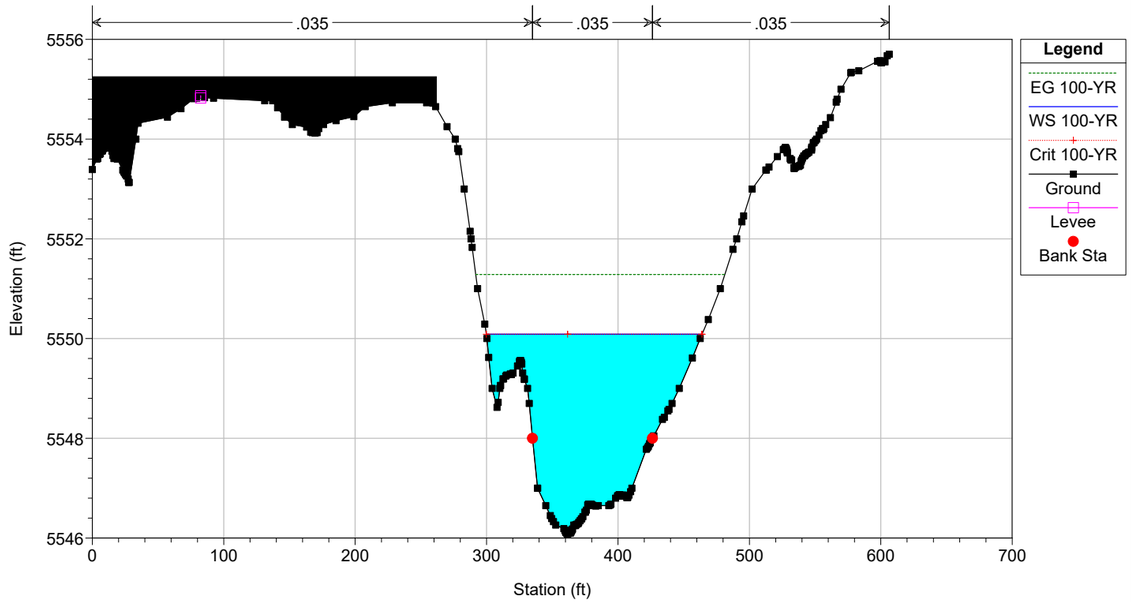
River = La Cueva Reach = La Cueva RS = 975



La Cueva - Revised Model V2 Plan: Proposed 2/19/2019 2:15:04 PM

Geom: Proposed Conditions Flow: Historic Flow

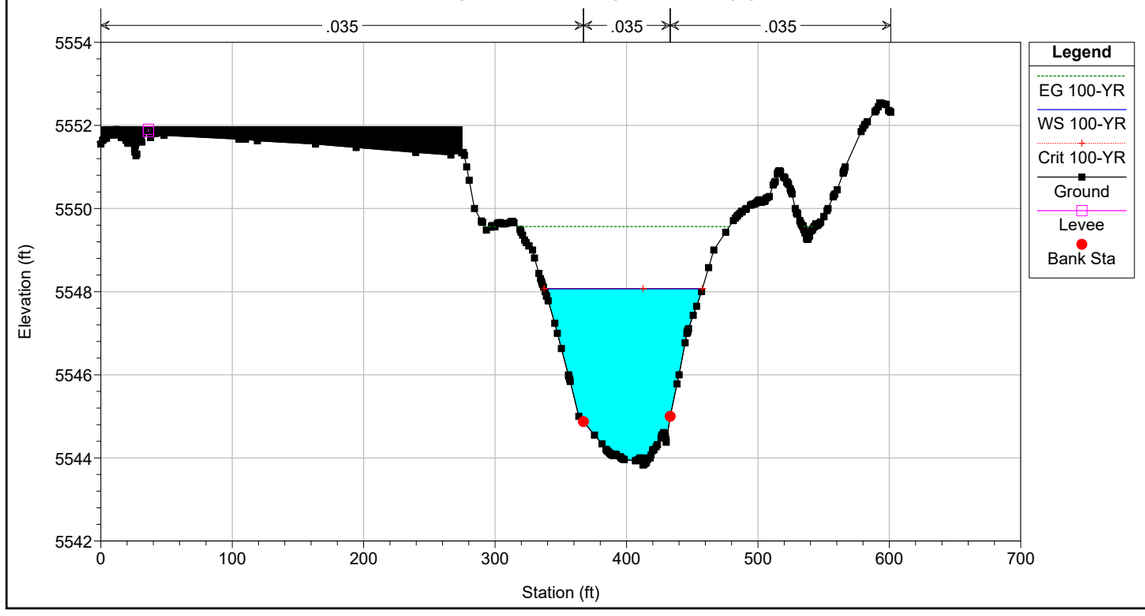
River = La Cueva Reach = La Cueva RS = 916



La Cueva - Revised Model V2 Plan: Proposed 2/19/2019 2:15:04 PM

Geom: Proposed Conditions Flow: Historic Flow

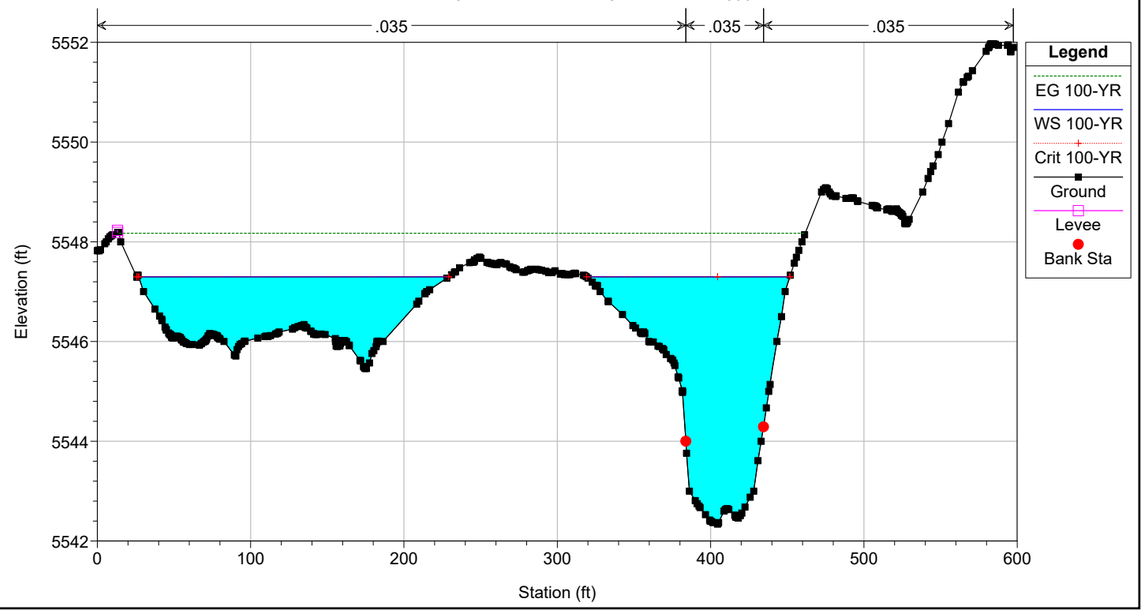
River = La Cueva Reach = La Cueva RS = 848

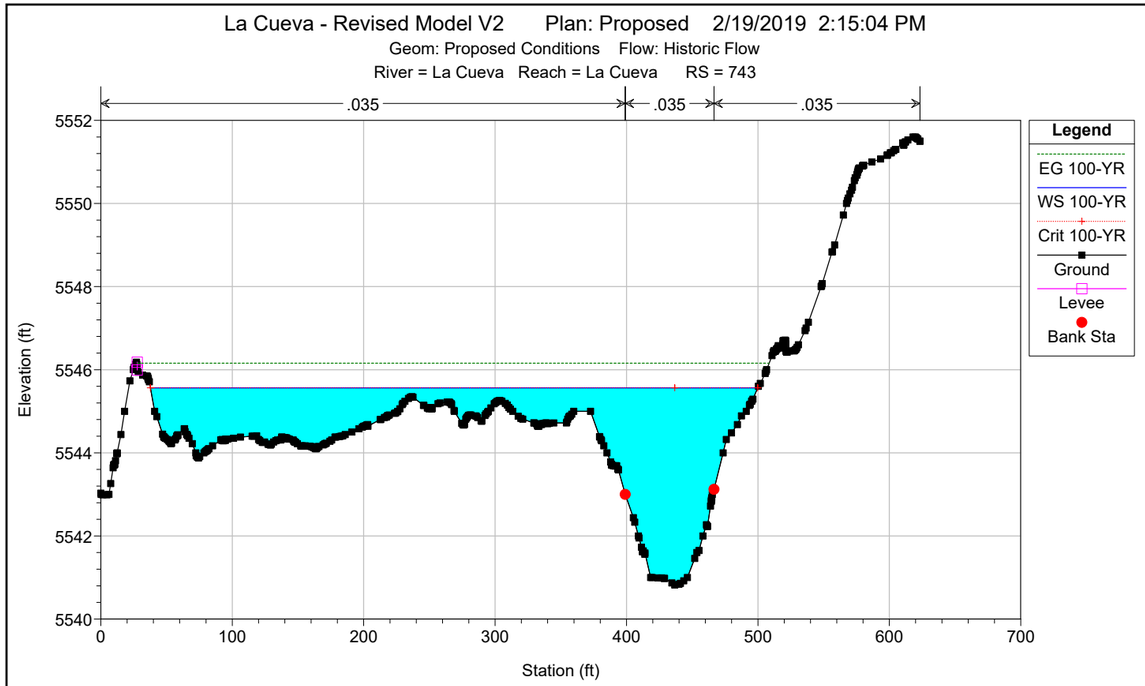


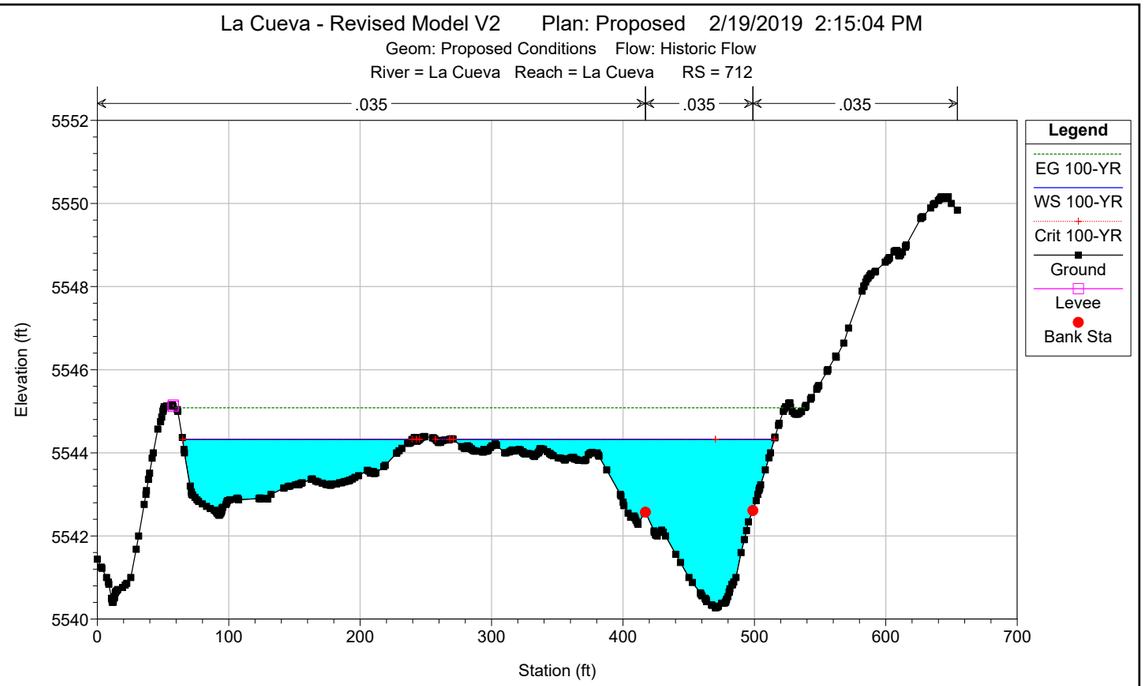
La Cueva - Revised Model V2 Plan: Proposed 2/19/2019 2:15:04 PM

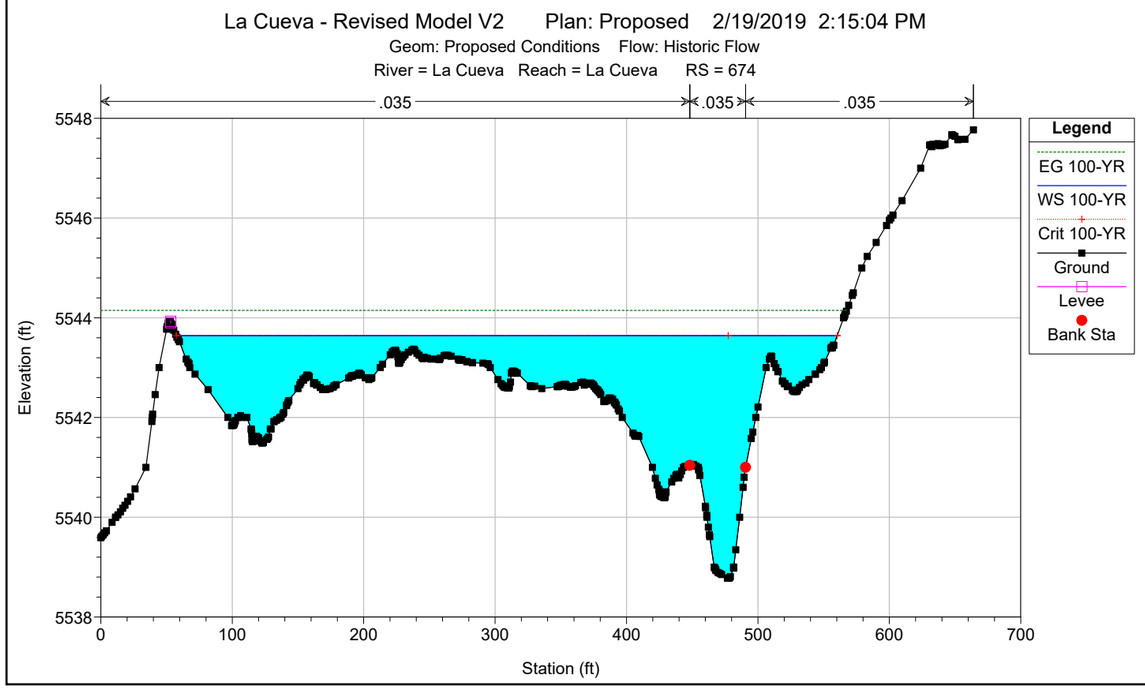
Geom: Proposed Conditions Flow: Historic Flow

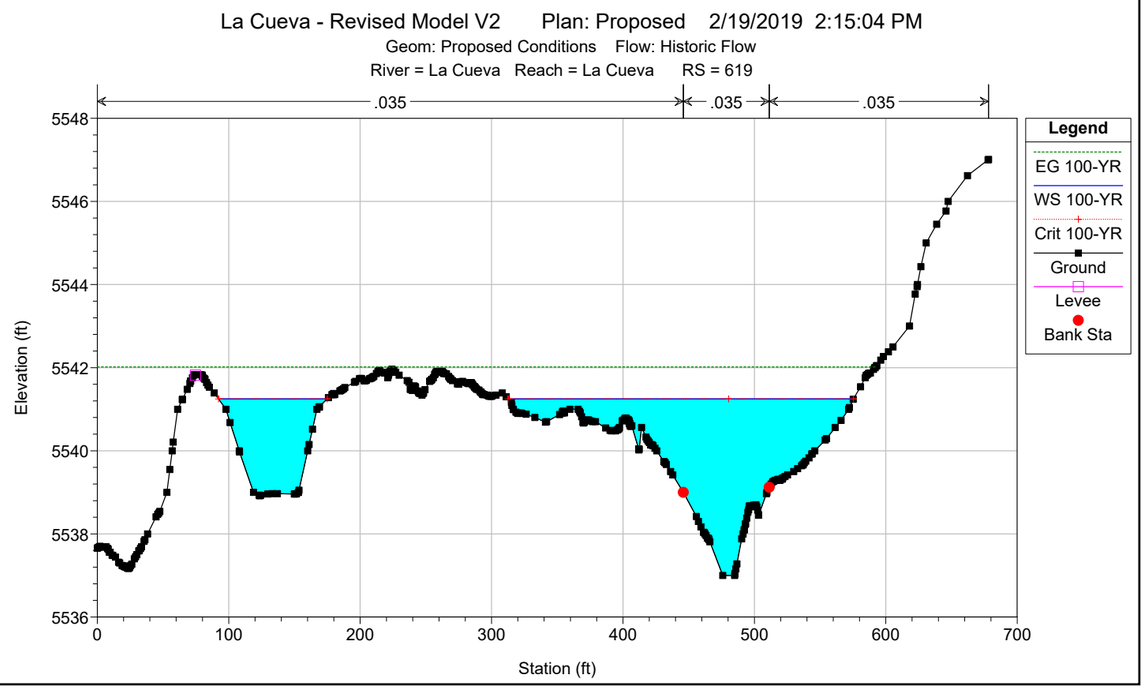
River = La Cueva Reach = La Cueva RS = 805

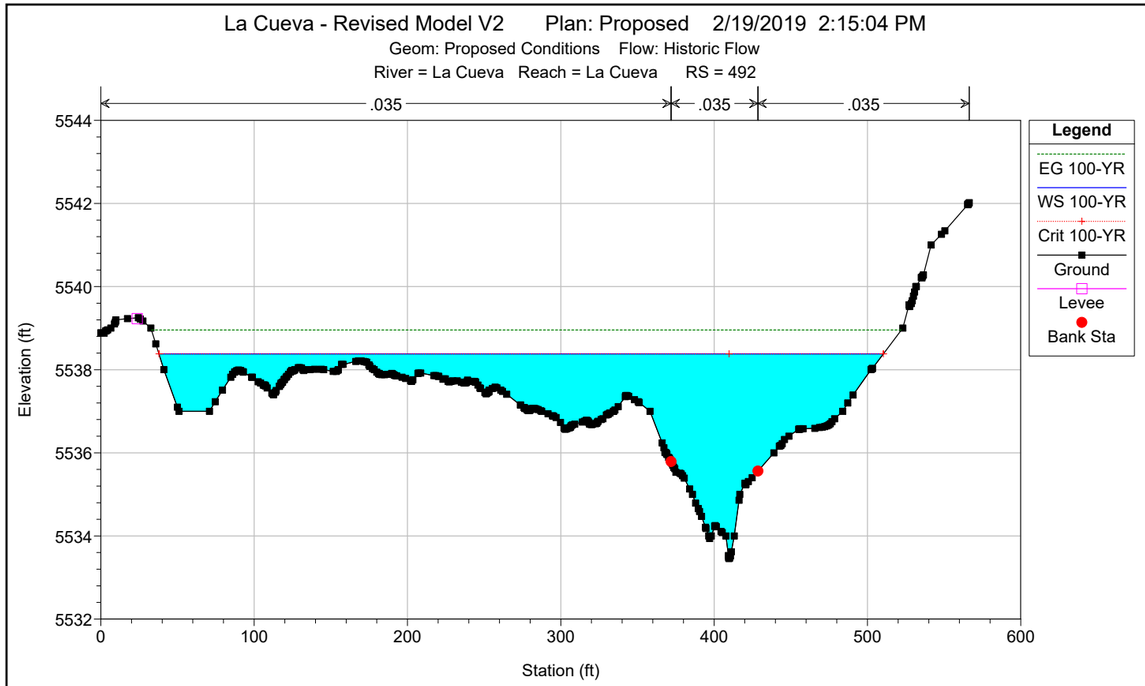


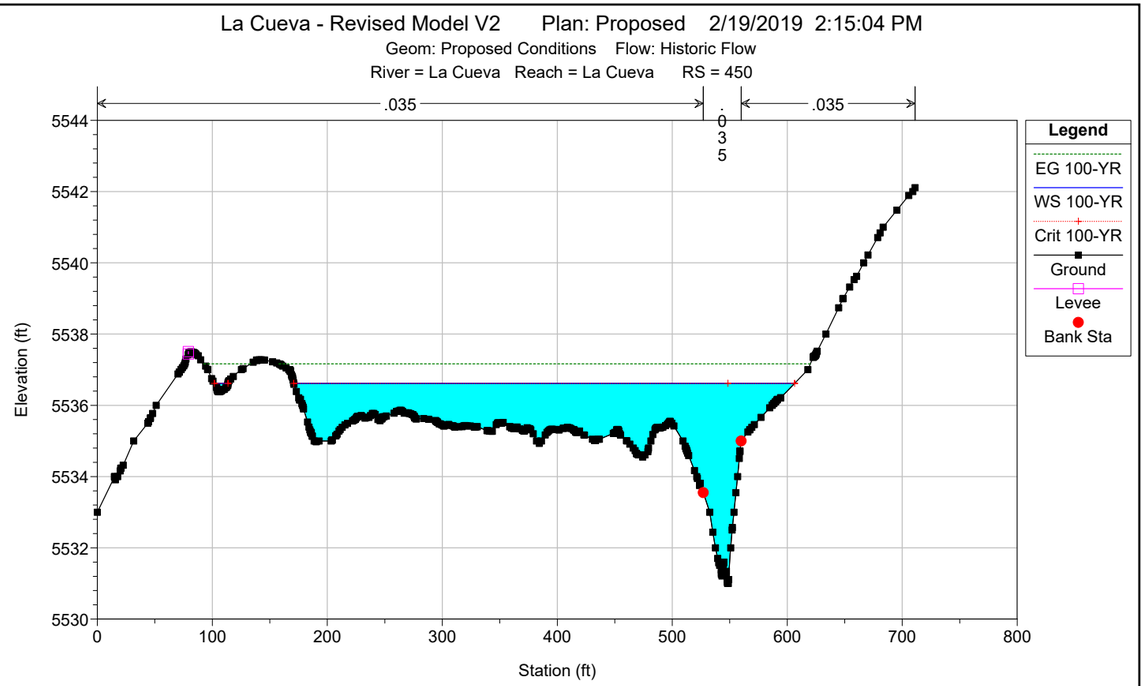

La Cueva - Revised Model V2 Plan: Proposed 2/19/2019 2:15:04 PM
Geom: Proposed Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 743
.035
.035
.035
Legend
EG 100-YR
WS 100-YR
Crit 100-YR
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

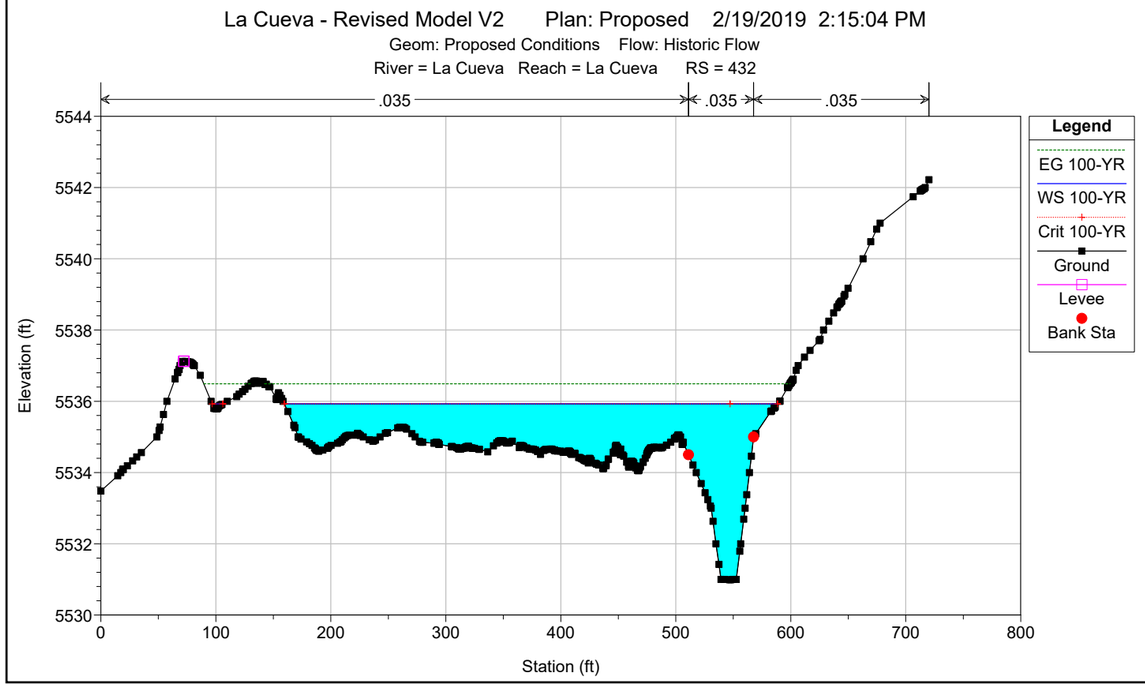

La Cueva - Revised Model V2 Plan: Proposed 2/19/2019 2:15:04 PM
Geom: Proposed Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 712
.035
.035
.035
Legend
EG 100-YR
WS 100-YR
Crit 100-YR
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

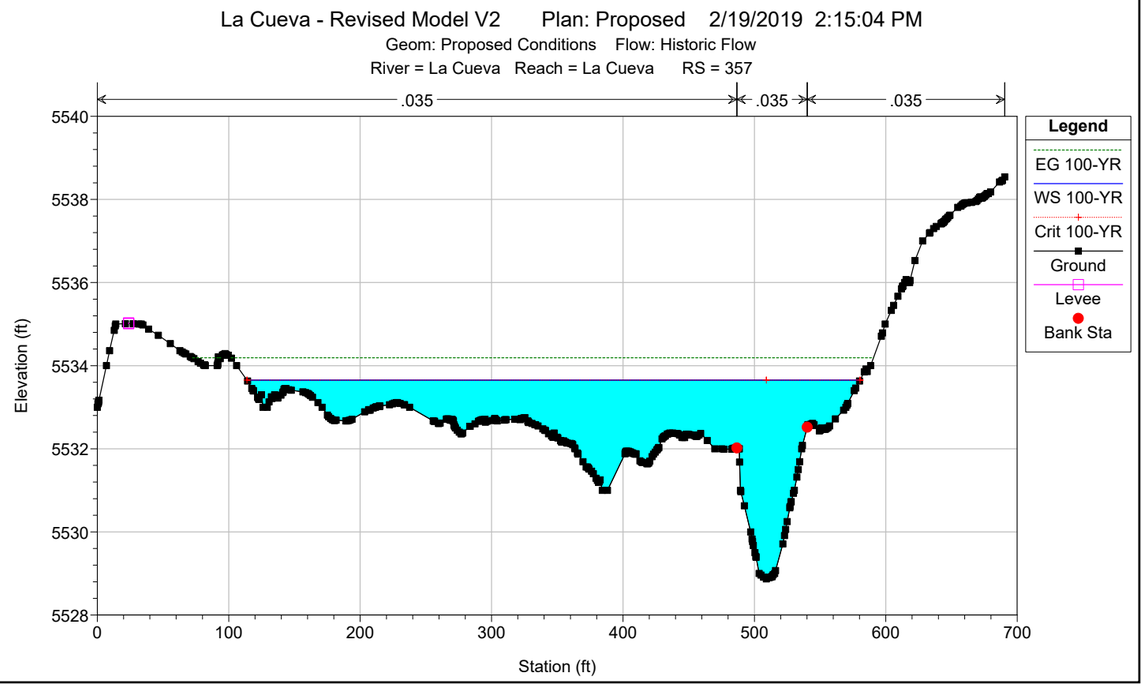

La Cueva - Revised Model V2 Plan: Proposed 2/19/2019 2:15:04 PM
Geom: Proposed Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 674
.035
.035
.035
Legend
EG 100-YR
WS 100-YR
Crit 100-YR
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

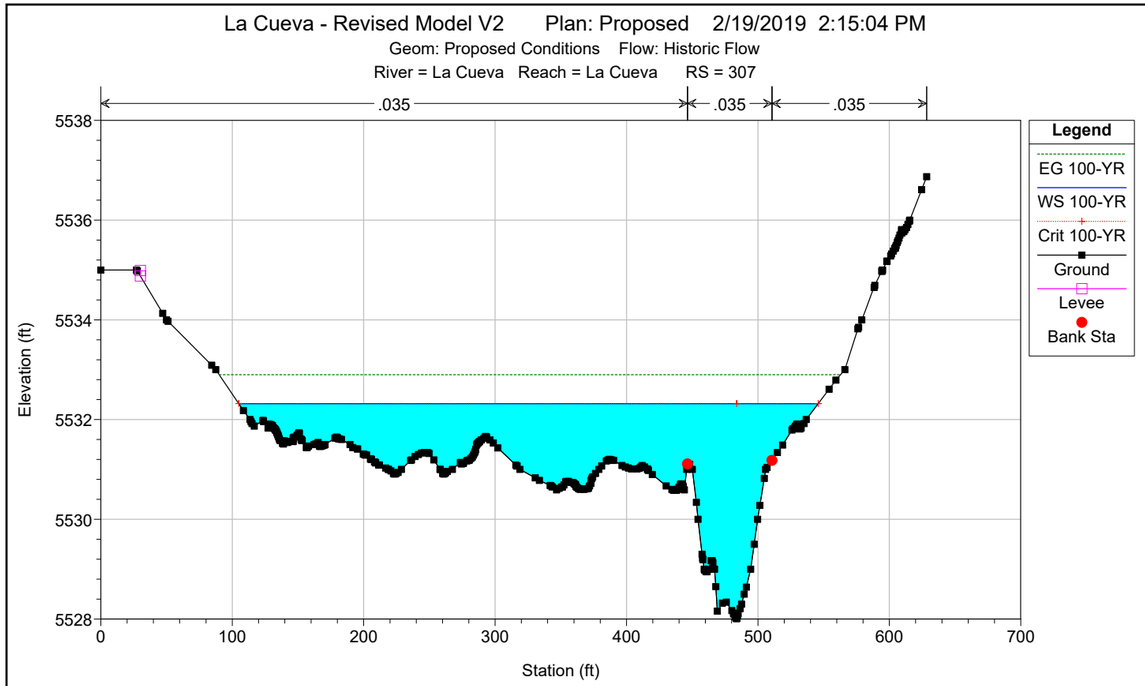

La Cueva - Revised Model V2 Plan: Proposed 2/19/2019 2:15:04 PM
Geom: Proposed Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 619
.035
.035
.035
Legend
EG 100-YR
WS 100-YR
Crit 100-YR
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

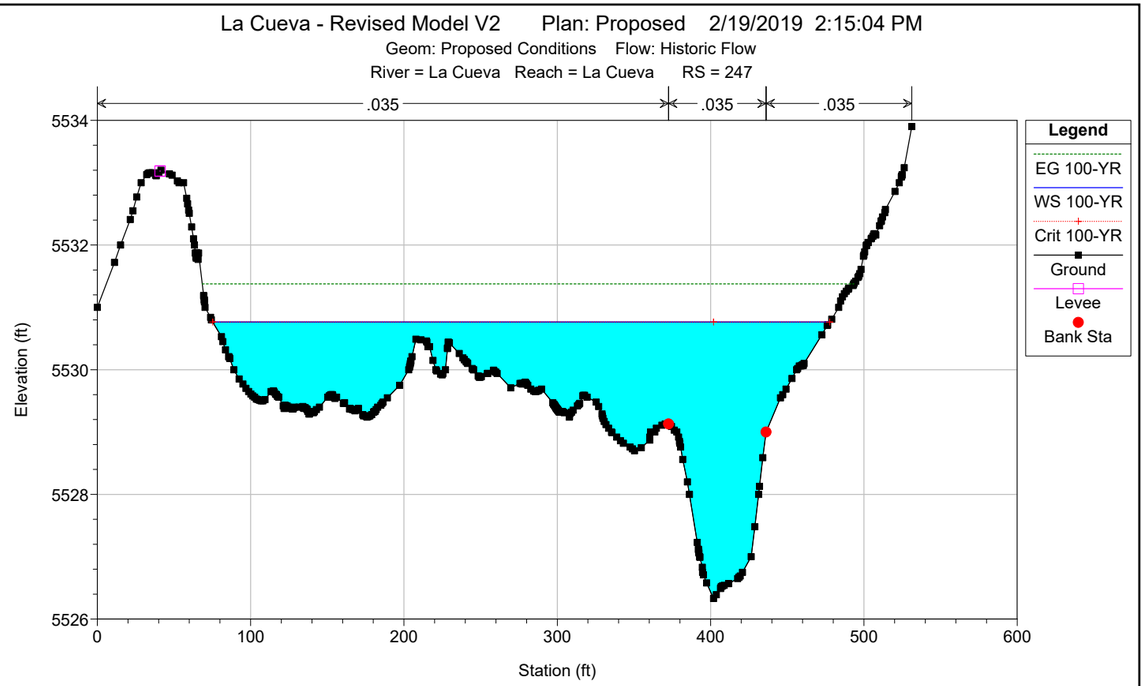

La Cueva - Revised Model V2 Plan: Proposed 2/19/2019 2:15:04 PM
Geom: Proposed Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 492
.035
.035
.035
Legend
EG 100-YR
WS 100-YR
Crit 100-YR
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

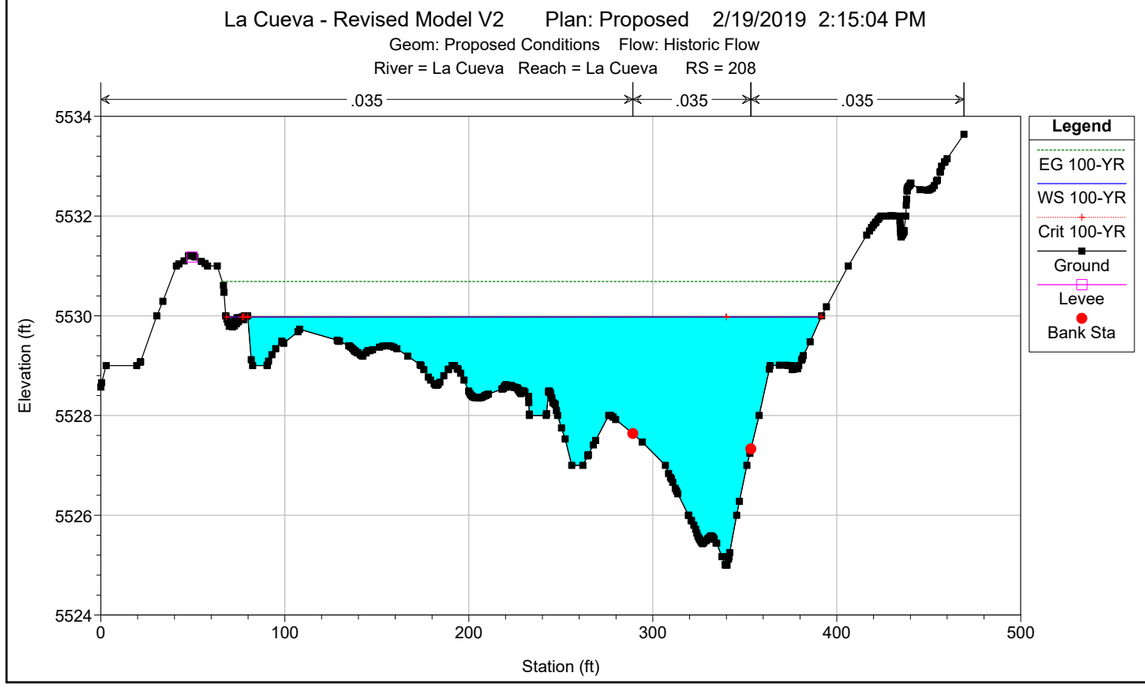

La Cueva - Revised Model V2 Plan: Proposed 2/19/2019 2:15:04 PM
Geom: Proposed Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 450
.035
.035
Legend
EG 100-YR
WS 100-YR
Crit 100-YR
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

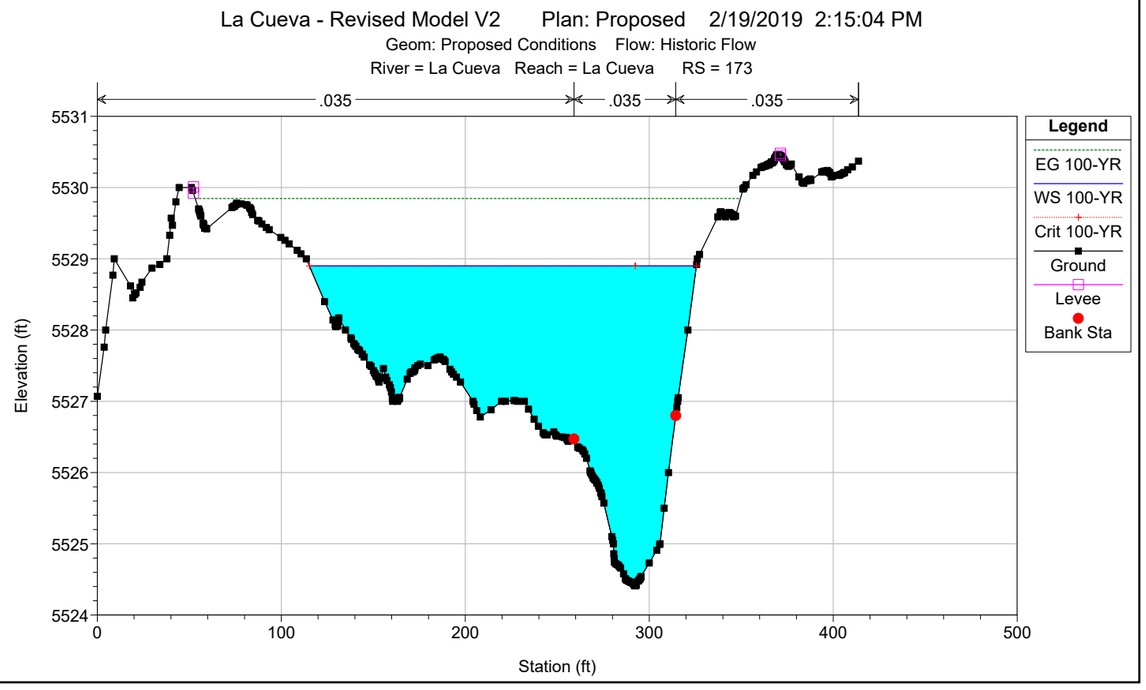

La Cueva - Revised Model V2 Plan: Proposed 2/19/2019 2:15:04 PM
Geom: Proposed Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 432
.035
.035
.035
Legend
EG 100-YR
WS 100-YR
Crit 100-YR
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

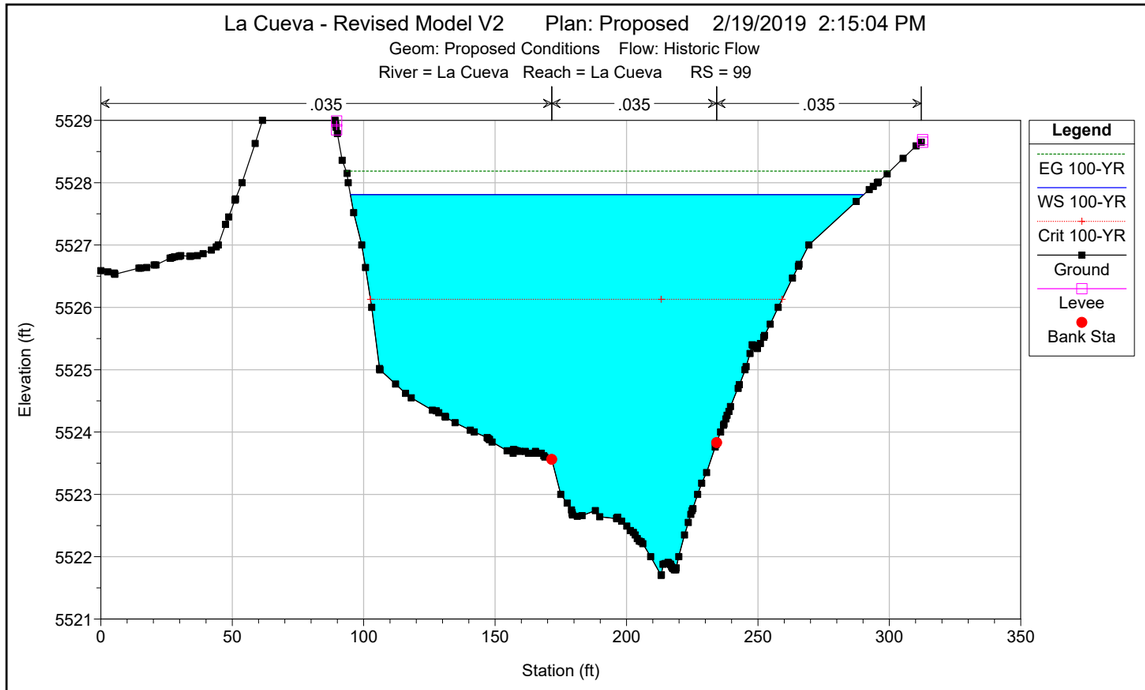

La Cueva - Revised Model V2 Plan: Proposed 2/19/2019 2:15:04 PM
Geom: Proposed Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 357
.035
.035
.035
Legend
EG 100-YR
WS 100-YR
Crit 100-YR
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

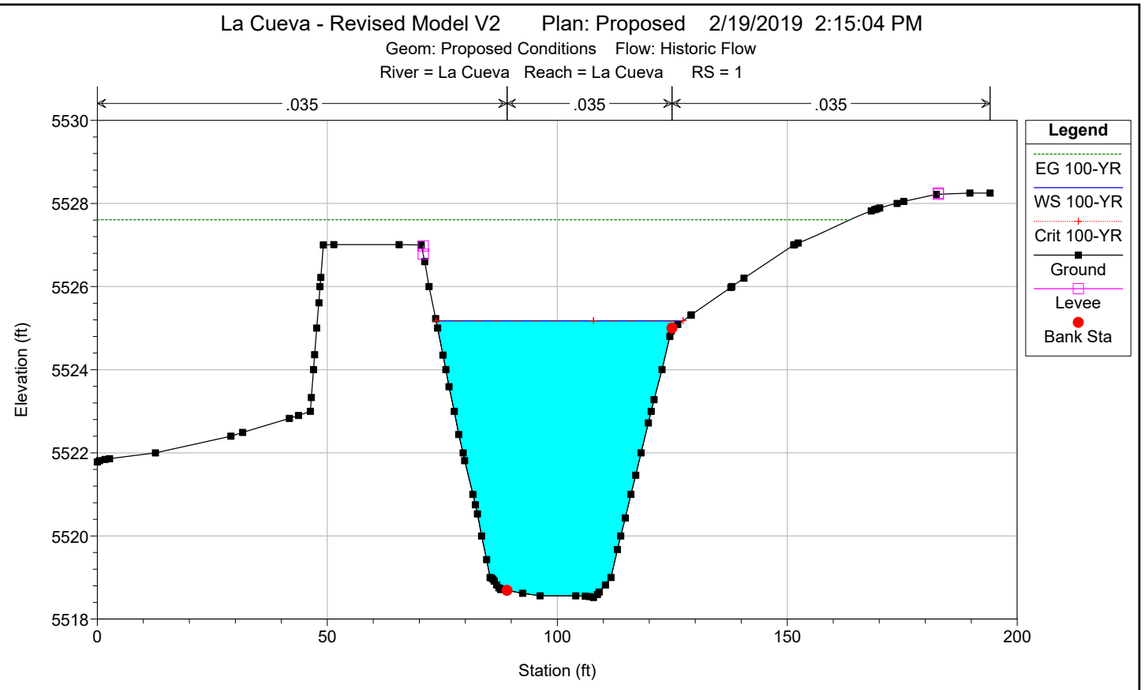

La Cueva - Revised Model V2 Plan: Proposed 2/19/2019 2:15:04 PM
Geom: Proposed Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 307
.035
.035
.035
Legend
EG 100-YR
WS 100-YR
Crit 100-YR
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)


La Cueva - Revised Model V2 Plan: Proposed 2/19/2019 2:15:04 PM
Geom: Proposed Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 247
.035
.035
.035
Legend
EG 100-YR
WS 100-YR
Crit 100-YR
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)


La Cueva - Revised Model V2 Plan: Proposed 2/19/2019 2:15:04 PM
Geom: Proposed Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 208
.035
.035
.035
Legend
EG 100-YR
WS 100-YR
Crit 100-YR
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

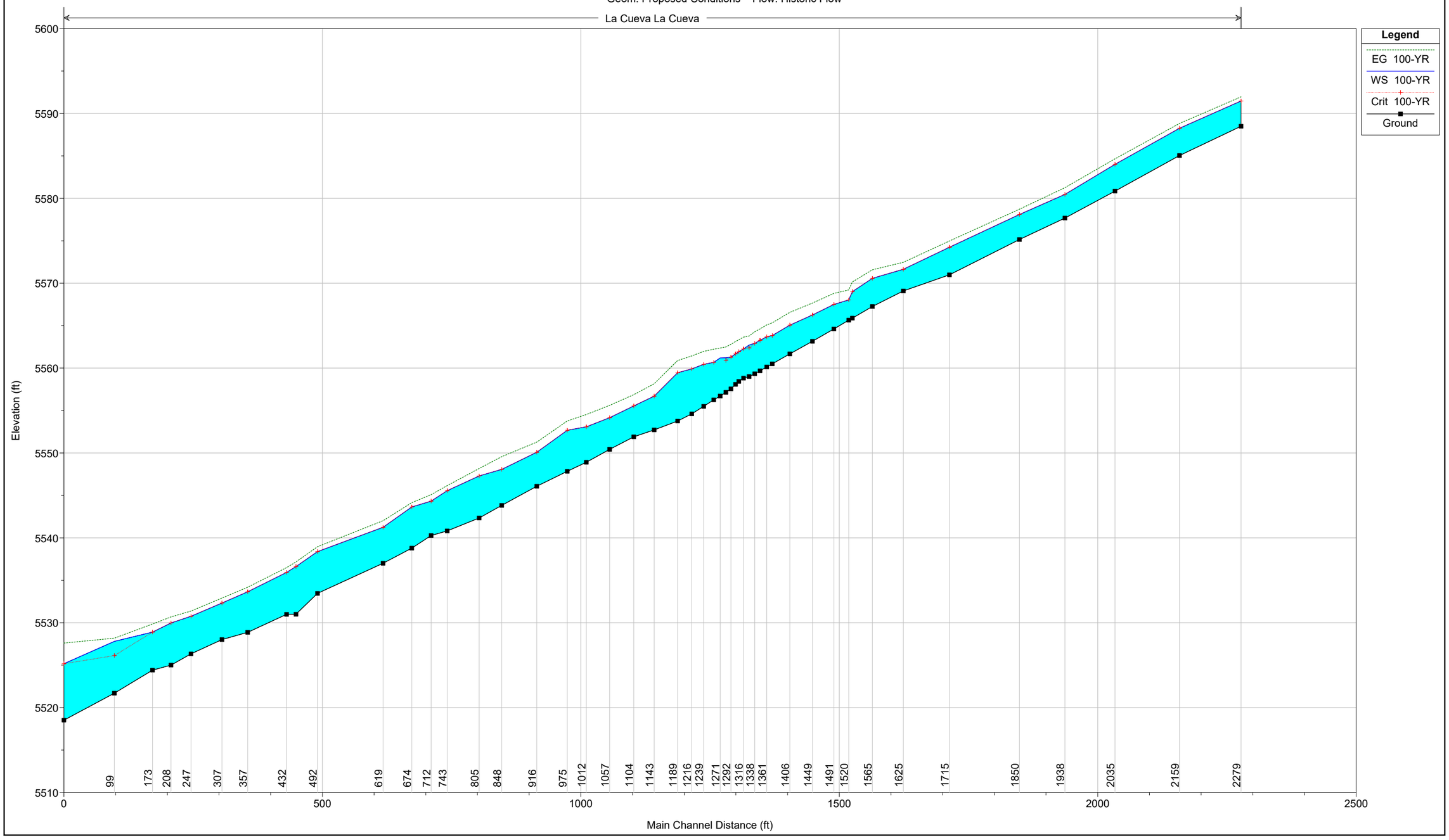

La Cueva - Revised Model V2 Plan: Proposed 2/19/2019 2:15:04 PM
Geom: Proposed Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 173
.035
.035
.035
Legend
EG 100-YR
WS 100-YR
Crit 100-YR
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)


La Cueva - Revised Model V2 Plan: Proposed 2/19/2019 2:15:04 PM
Geom: Proposed Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 99
.035
.035
.035
Elevation (ft)
Station (ft)
Legend
EG 100-YR
WS 100-YR
Crit 100-YR
Ground
Levee
Bank Sta


La Cueva - Revised Model V2 Plan: Proposed 2/19/2019 2:15:04 PM
Geom: Proposed Conditions Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 1
.035
.035
.035
Elevation (ft)
Station (ft)
Legend
EG 100-YR
WS 100-YR
Crit 100-YR
Ground
Levee
Bank Sta

La Cueva - Revised Model V2 Plan: Proposed 2/19/2019 2:14:49 PM

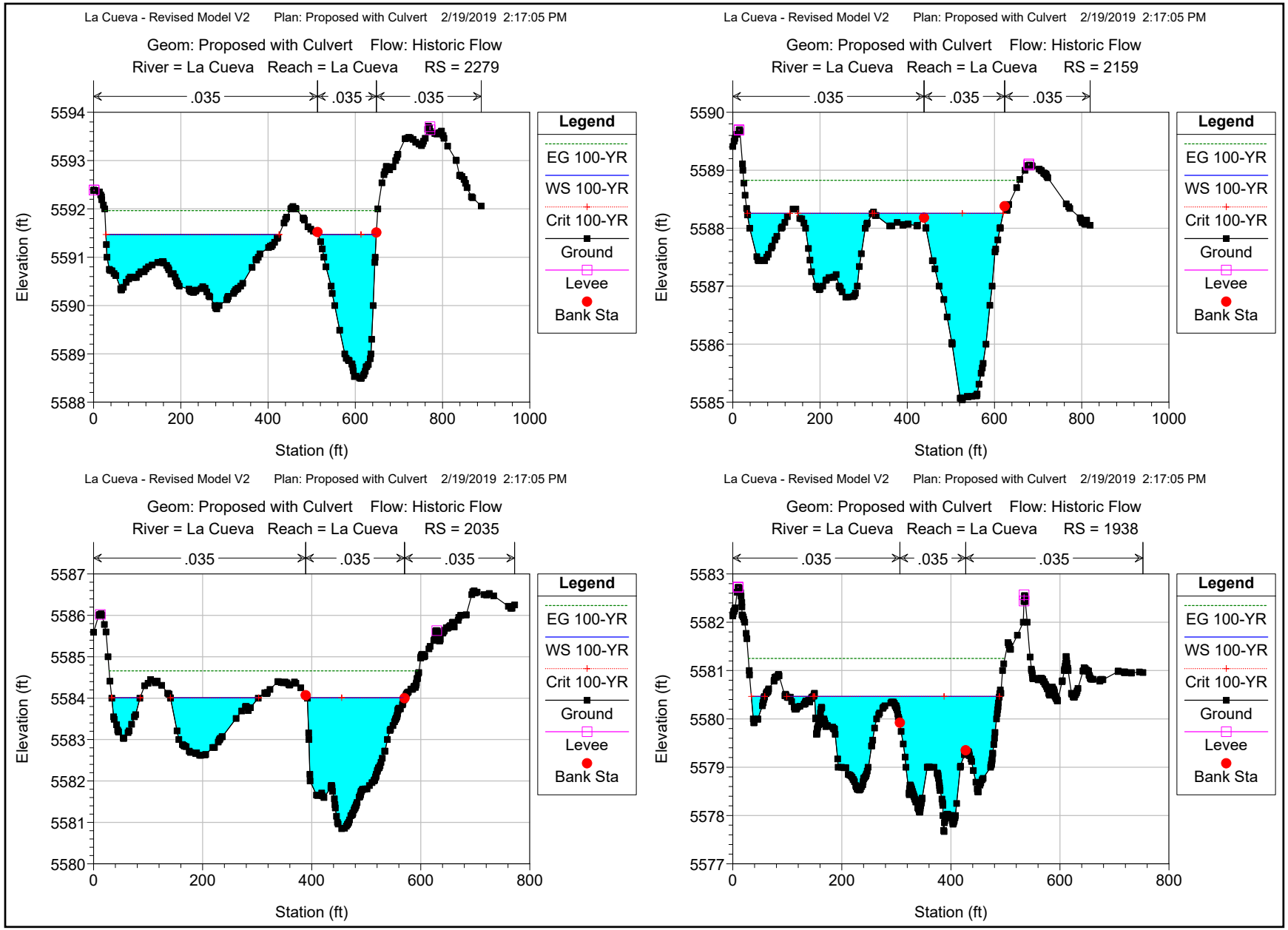
Geom: Proposed Conditions Flow: Historic Flow



HEC-RAS Plan: Proposed River: La Cueva Reach: La Cueva Profile: 100-YR

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)	
La Cueva	2279	100-YR	3090.00	5588.49	5591.47	5591.47	5591.96	0.010567	6.69	601.96	530.19	0.86
La Cueva	2159	100-YR	3090.00	5585.04	5588.26	5588.26	5588.83	0.010815	6.71	562.55	564.37	0.86
La Cueva	2035	100-YR	3090.00	5580.85	5584.01	5584.01	5584.66	0.011100	7.00	517.57	392.77	0.88
La Cueva	1938	100-YR	3090.00	5577.67	5580.46	5580.46	5581.25	0.015831	8.04	464.35	411.80	1.04
La Cueva	1850	100-YR	3090.00	5575.15	5578.10	5578.10	5578.72	0.010308	7.06	529.34	377.97	0.86
La Cueva	1715	100-YR	3090.00	5570.99	5574.24	5574.24	5574.98	0.011016	8.74	476.99	292.83	0.93
La Cueva	1625	100-YR	3090.00	5569.09	5571.64	5571.64	5572.46	0.013924	7.66	435.41	269.35	0.98
La Cueva	1565	100-YR	3090.00	5567.26	5570.57	5570.57	5571.58	0.012795	8.11	389.96	208.85	0.96
La Cueva	1527	100-YR	3090.00	5565.88	5569.01	5569.01	5570.15	0.012252	9.03	369.32	265.80	0.98
La Cueva	1520	100-YR	3090.00	5565.65	5568.03	5568.03	5569.21	0.014048	8.70	354.99	153.29	1.01
La Cueva	1491	100-YR	3090.00	5564.61	5567.51	5567.51	5568.80	0.012675	9.16	342.25	136.34	0.98
La Cueva	1449	100-YR	3090.00	5563.16	5566.26	5566.26	5567.66	0.012358	9.51	328.93	120.11	0.98
La Cueva	1406	100-YR	3090.00	5561.68	5565.06	5565.06	5566.57	0.013039	9.84	314.89	106.45	1.00
La Cueva	1372	100-YR	3090.00	5560.50	5563.84	5563.84	5565.34	0.013443	9.84	314.16	106.08	1.01
La Cueva	1361	100-YR	3090.00	5560.13	5563.68	5563.68	5565.09	0.012707	9.55	327.48	138.07	0.98
La Cueva	1348	100-YR	3090.00	5559.68	5563.27	5563.27	5564.62	0.012082	9.38	337.39	133.01	0.96
La Cueva	1338	100-YR	3090.00	5559.33	5562.91	5562.91	5564.28	0.011592	9.53	341.00	133.84	0.95
La Cueva	1327	100-YR	3090.00	5559.00	5562.72	5562.38	5563.78	0.008426	8.33	382.76	142.81	0.82
La Cueva	1316	100-YR	3090.00	5558.81	5562.26	5562.26	5563.64	0.012104	9.47	333.89	129.65	0.97
La Cueva	1307	100-YR	3090.00	5558.44	5561.93	5561.93	5563.33	0.012179	9.54	329.85	124.89	0.97
La Cueva	1301	100-YR	3090.00	5558.09	5561.68	5561.68	5563.13	0.011562	9.74	329.17	121.61	0.95
La Cueva	1292	100-YR	3090.00	5557.56	5561.29	5561.29	5562.81	0.011746	10.05	323.43	114.71	0.96
La Cueva	1282	100-YR	3090.00	5557.14	5561.22	5560.91	5562.49	0.008936	9.07	348.43	111.68	0.85
La Cueva	1271	100-YR	3090.00	5556.70	5561.20		5562.37	0.007242	8.81	367.97	110.53	0.78
La Cueva	1258	100-YR	3090.00	5556.26	5560.68	5560.68	5562.22	0.011635	10.02	315.85	105.32	0.97
La Cueva	1239	100-YR	3090.00	5555.49	5560.44	5560.44	5561.97	0.009093	10.76	332.66	108.12	0.91
La Cueva	1216	100-YR	3090.00	5554.61	5559.90	5559.90	5561.43	0.008314	10.78	339.34	111.87	0.88
La Cueva	1189	100-YR	3090.00	5553.76	5559.45	5559.45	5560.89	0.007668	10.46	351.92	113.83	0.84
La Cueva	1143	100-YR	3090.00	5552.71	5556.69	5556.69	5558.16	0.012055	10.24	323.89	113.69	1.00
La Cueva	1104	100-YR	3090.00	5551.90	5555.54	5555.54	5556.87	0.013344	9.15	334.39	129.07	1.01
La Cueva	1057	100-YR	3090.00	5550.42	5554.16	5554.16	5555.61	0.011186	9.72	328.16	122.11	0.96
La Cueva	1012	100-YR	3090.00	5548.91	5553.09	5553.09	5554.54	0.010165	9.89	336.27	127.27	0.93
La Cueva	975	100-YR	3090.00	5547.84	5552.68	5552.68	5553.77	0.007265	9.78	433.21	200.15	0.82
La Cueva	916	100-YR	3090.00	5546.08	5550.09	5550.09	5551.28	0.009383	9.15	378.45	164.18	0.88
La Cueva	848	100-YR	3090.00	5543.83	5548.07	5548.07	5549.57	0.009984	10.37	335.88	120.44	0.93
La Cueva	805	100-YR	3090.00	5542.34	5547.30	5547.30	5548.17	0.005949	8.90	535.04	334.90	0.74
La Cueva	743	100-YR	3090.00	5540.82	5545.57	5545.57	5546.16	0.004729	7.37	653.17	462.18	0.65
La Cueva	712	100-YR	3090.00	5540.27	5544.33	5544.33	5545.09	0.008485	8.20	535.24	432.29	0.83
La Cueva	674	100-YR	3090.00	5538.78	5543.64	5543.64	5544.15	0.005678	7.83	683.63	502.95	0.70
La Cueva	619	100-YR	3090.00	5537.00	5541.25	5541.25	5542.02	0.008483	8.48	511.81	345.29	0.84
La Cueva	492	100-YR	3090.00	5533.46	5538.38	5538.38	5538.96	0.005945	7.71	639.07	472.56	0.71
La Cueva	450	100-YR	3090.00	5531.00	5536.61	5536.61	5537.17	0.006206	8.38	637.38	447.46	0.73
La Cueva	432	100-YR	3090.00	5530.99	5535.93	5535.93	5536.49	0.006967	7.76	608.66	438.34	0.75
La Cueva	357	100-YR	3090.00	5528.87	5533.65	5533.65	5534.19	0.006423	7.70	641.33	466.51	0.73
La Cueva	307	100-YR	3090.00	5528.01	5532.32	5532.32	5532.90	0.007796	7.74	595.10	440.97	0.79
La Cueva	247	100-YR	3090.00	5526.33	5530.77	5530.77	5531.38	0.006672	7.79	592.68	402.44	0.75
La Cueva	208	100-YR	3090.00	5525.00	5529.98	5529.98	5530.69	0.006513	8.08	539.71	321.11	0.75
La Cueva	173	100-YR	3090.00	5524.41	5528.90	5528.90	5529.85	0.008580	9.16	438.88	210.34	0.85
La Cueva	99	100-YR	3090.00	5521.70	5527.81	5526.13	5528.19	0.001891	5.55	672.35	195.27	0.43
La Cueva	1	100-YR	3090.00	5518.52	5525.18	5525.18	5527.61	0.010654	13.01	250.75	53.71	1.00

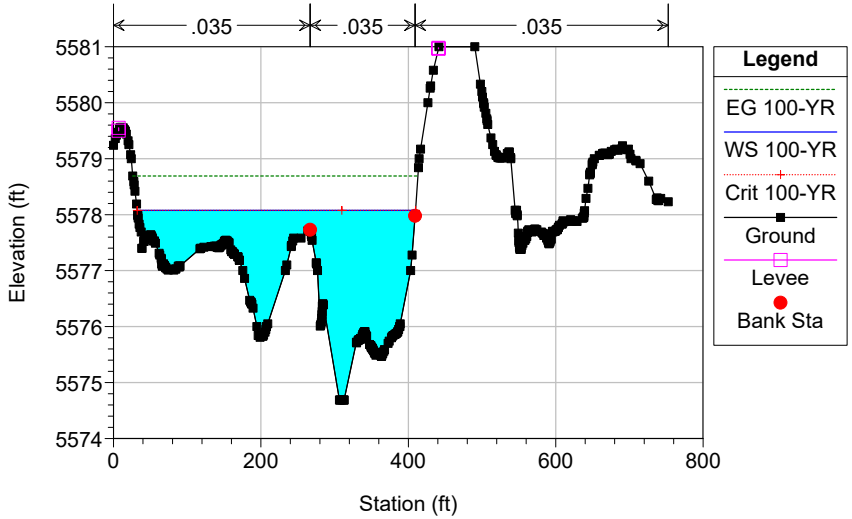
PROPOSED CONDITIONS WITHA A CULVERT UNDER VENTURA STREET



La Cueva - Revised Model V2 Plan: Proposed with Culvert 2/19/2019 2:17:05 PM

Geom: Proposed with Culvert Flow: Historic Flow

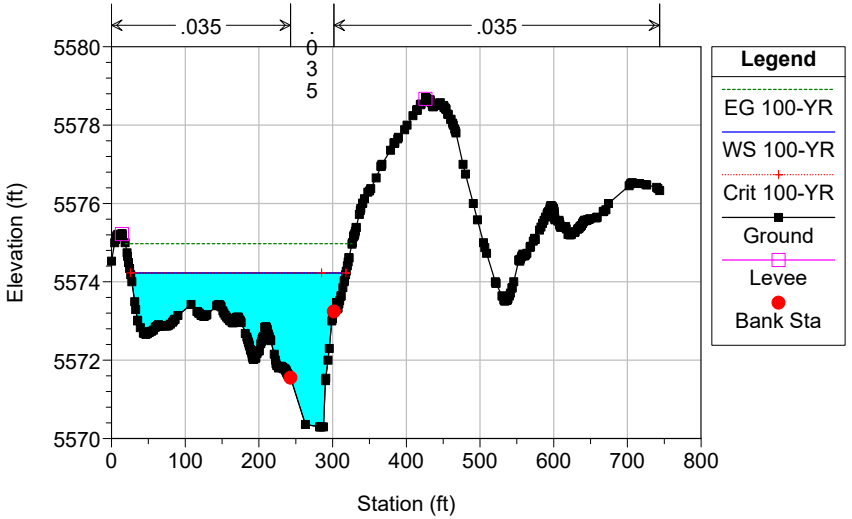
River = La Cueva Reach = La Cueva RS = 1850



La Cueva - Revised Model V2 Plan: Proposed with Culvert 2/19/2019 2:17:05 PM

Geom: Proposed with Culvert Flow: Historic Flow

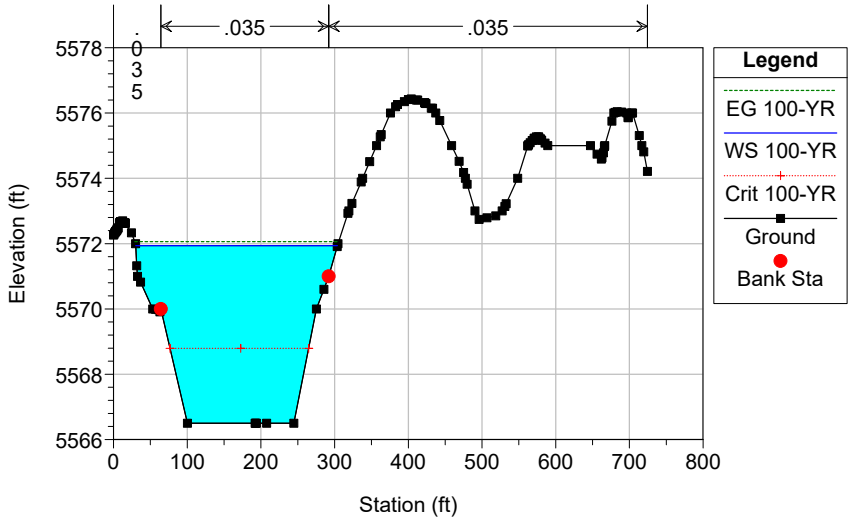
River = La Cueva Reach = La Cueva RS = 1715



La Cueva - Revised Model V2 Plan: Proposed with Culvert 2/19/2019 2:17:05 PM

Geom: Proposed with Culvert Flow: Historic Flow

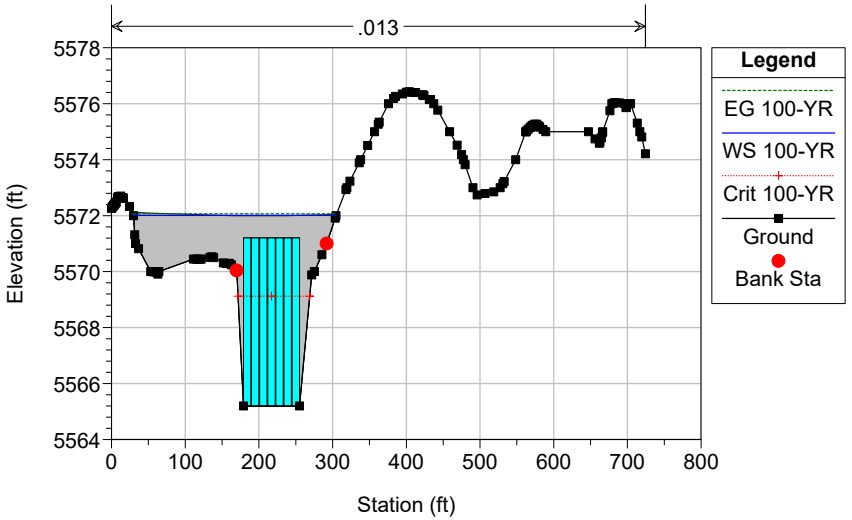
River = La Cueva Reach = La Cueva RS = 1625

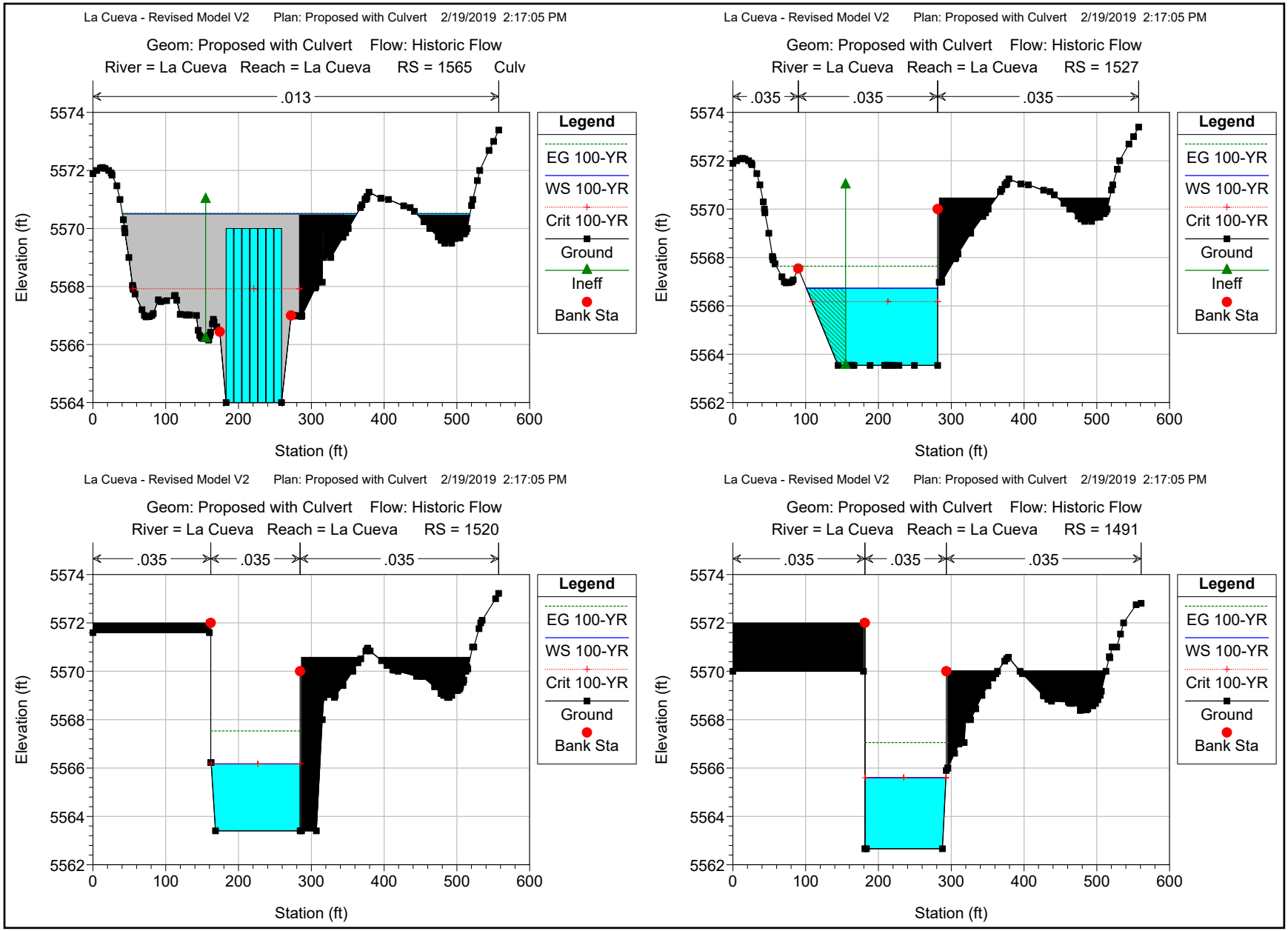


La Cueva - Revised Model V2 Plan: Proposed with Culvert 2/19/2019 2:17:05 PM

Geom: Proposed with Culvert Flow: Historic Flow

River = La Cueva Reach = La Cueva RS = 1565 Culv

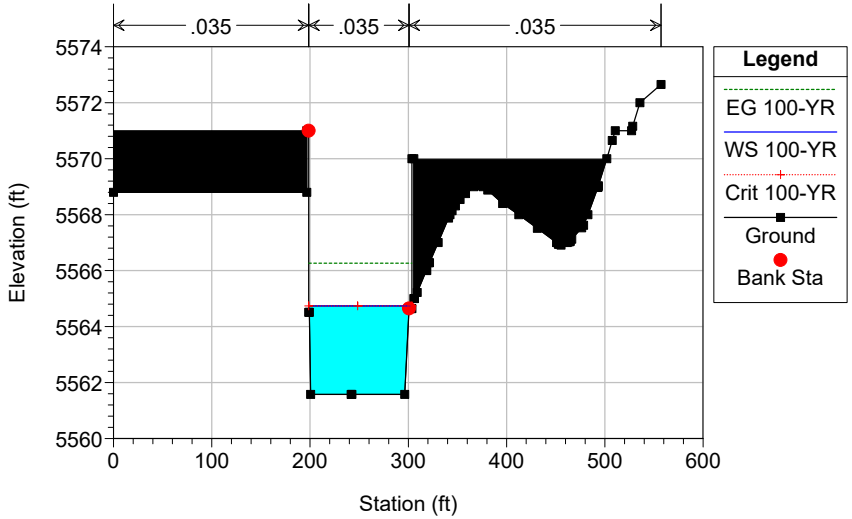



La Cueva - Revised Model V2 Plan: Proposed with Culvert 2/19/2019 2:17:05 PM
Geom: Proposed with Culvert Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 1565 Culv
.013
Elevation (ft)
Station (ft)
Legend
EG 100-YR
WS 100-YR
Crit 100-YR
Ground
Ineff
Bank Sta
La Cueva - Revised Model V2 Plan: Proposed with Culvert 2/19/2019 2:17:05 PM
Geom: Proposed with Culvert Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 1527
.035
.035
.035
Elevation (ft)
Station (ft)
Legend
EG 100-YR
WS 100-YR
Crit 100-YR
Ground
Ineff
Bank Sta
La Cueva - Revised Model V2 Plan: Proposed with Culvert 2/19/2019 2:17:05 PM
Geom: Proposed with Culvert Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 1520
.035
.035
.035
Elevation (ft)
Station (ft)
Legend
EG 100-YR
WS 100-YR
Crit 100-YR
Ground
Bank Sta
La Cueva - Revised Model V2 Plan: Proposed with Culvert 2/19/2019 2:17:05 PM
Geom: Proposed with Culvert Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 1491
.035
.035
.035
Elevation (ft)
Station (ft)
Legend
EG 100-YR
WS 100-YR
Crit 100-YR
Ground
Bank Sta

La Cueva - Revised Model V2 Plan: Proposed with Culvert 2/19/2019 2:17:05 PM

Geom: Proposed with Culvert Flow: Historic Flow

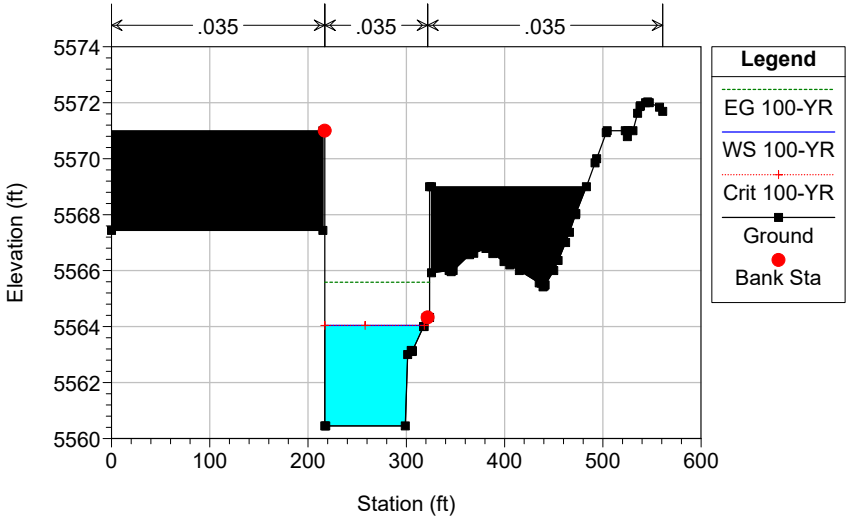
River = La Cueva Reach = La Cueva RS = 1449



La Cueva - Revised Model V2 Plan: Proposed with Culvert 2/19/2019 2:17:05 PM

Geom: Proposed with Culvert Flow: Historic Flow

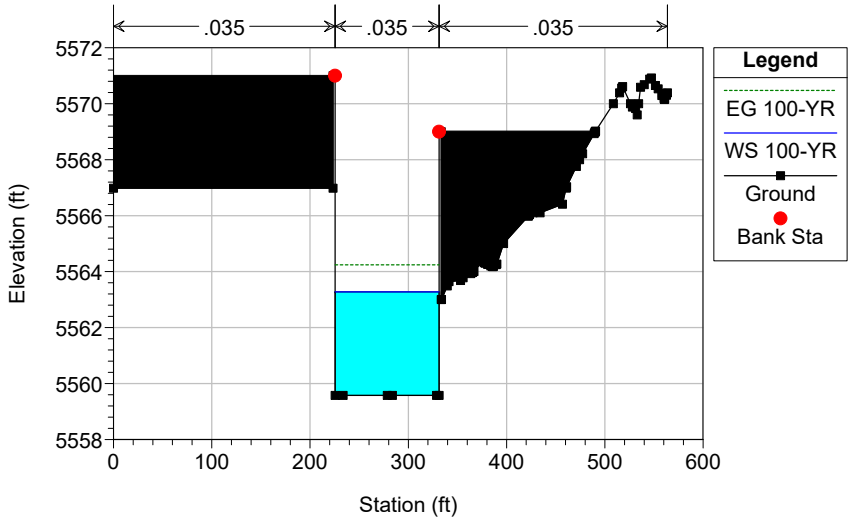
River = La Cueva Reach = La Cueva RS = 1406



La Cueva - Revised Model V2 Plan: Proposed with Culvert 2/19/2019 2:17:05 PM

Geom: Proposed with Culvert Flow: Historic Flow

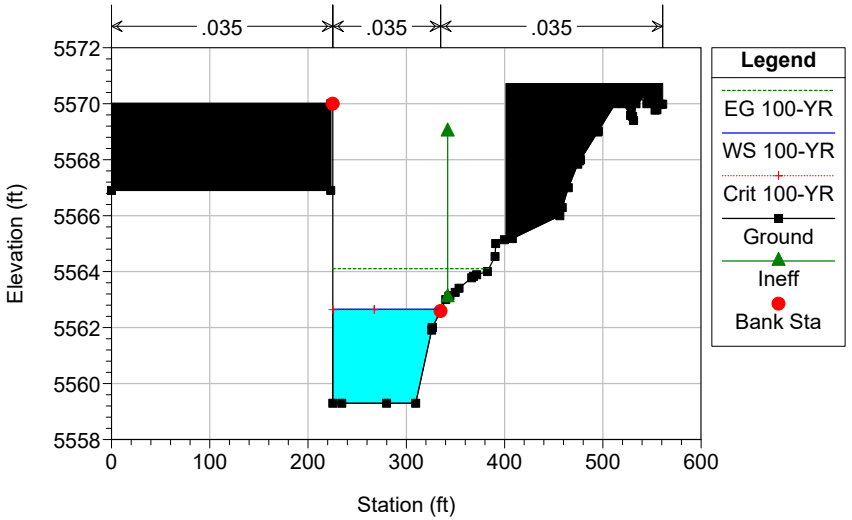
River = La Cueva Reach = La Cueva RS = 1372



La Cueva - Revised Model V2 Plan: Proposed with Culvert 2/19/2019 2:17:05 PM

Geom: Proposed with Culvert Flow: Historic Flow

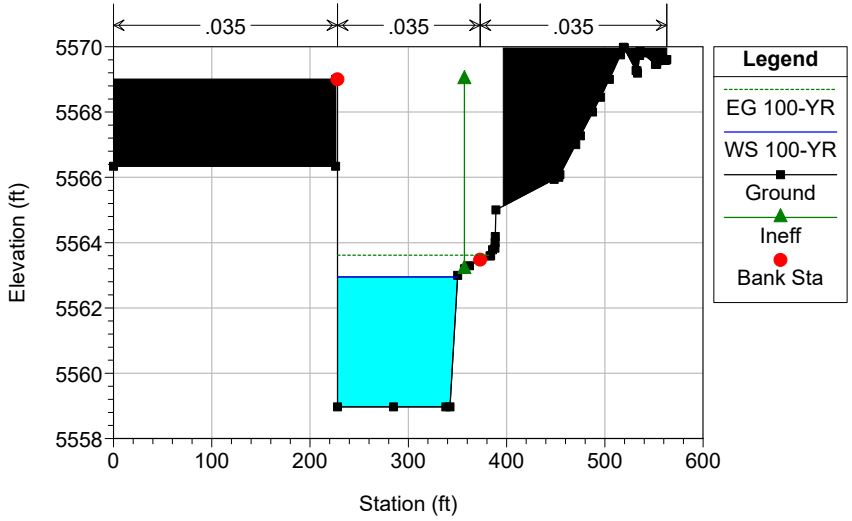
River = La Cueva Reach = La Cueva RS = 1361



La Cueva - Revised Model V2 Plan: Proposed with Culvert 2/19/2019 2:17:05 PM

Geom: Proposed with Culvert Flow: Historic Flow

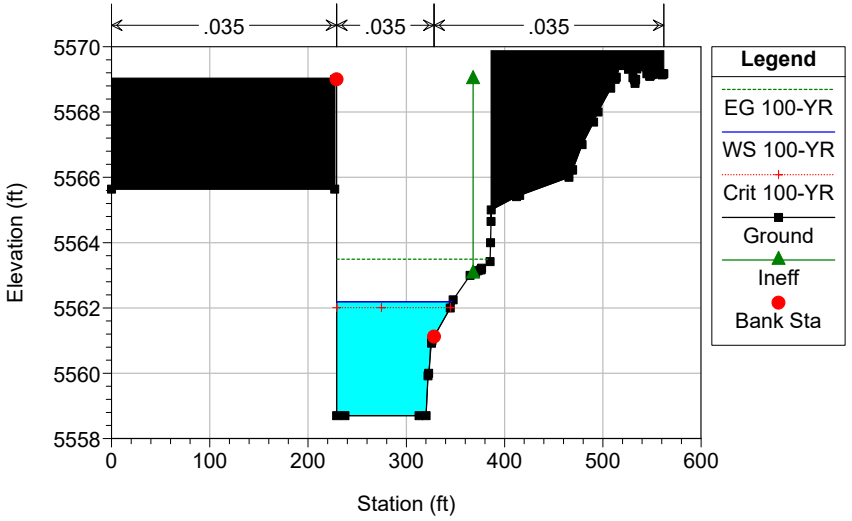
River = La Cueva Reach = La Cueva RS = 1348



La Cueva - Revised Model V2 Plan: Proposed with Culvert 2/19/2019 2:17:05 PM

Geom: Proposed with Culvert Flow: Historic Flow

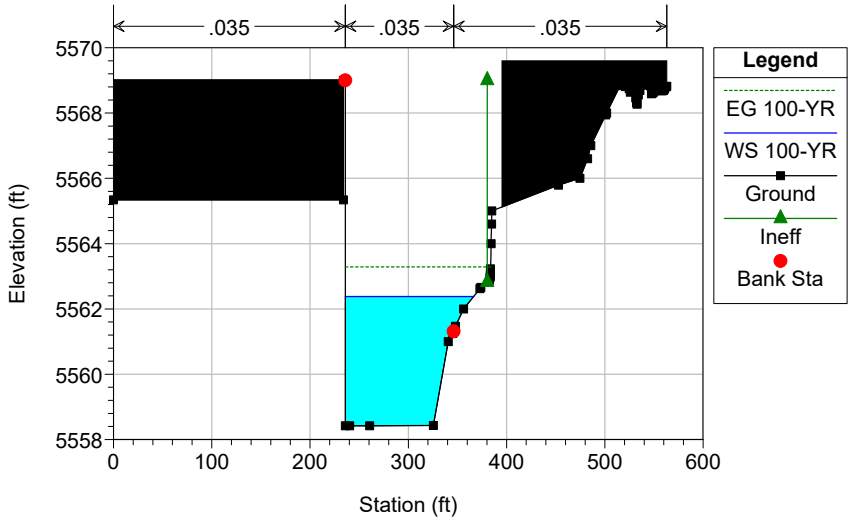
River = La Cueva Reach = La Cueva RS = 1338



La Cueva - Revised Model V2 Plan: Proposed with Culvert 2/19/2019 2:17:05 PM

Geom: Proposed with Culvert Flow: Historic Flow

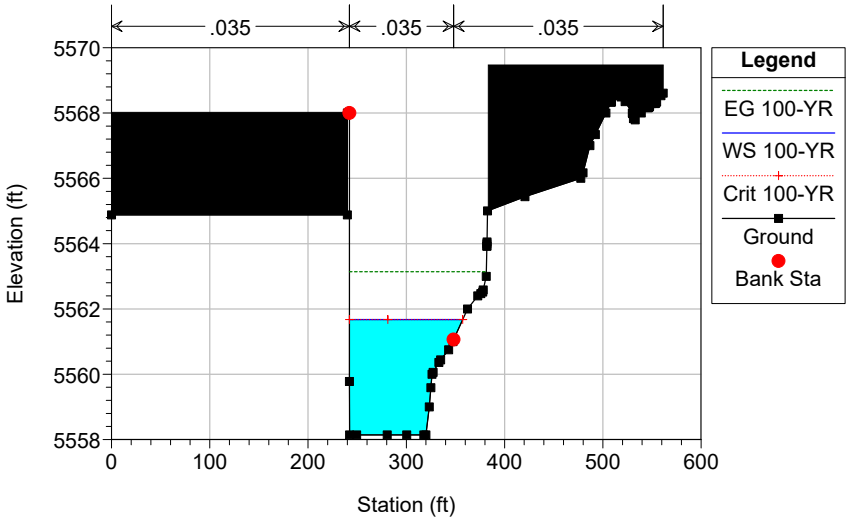
River = La Cueva Reach = La Cueva RS = 1327



La Cueva - Revised Model V2 Plan: Proposed with Culvert 2/19/2019 2:17:05 PM

Geom: Proposed with Culvert Flow: Historic Flow

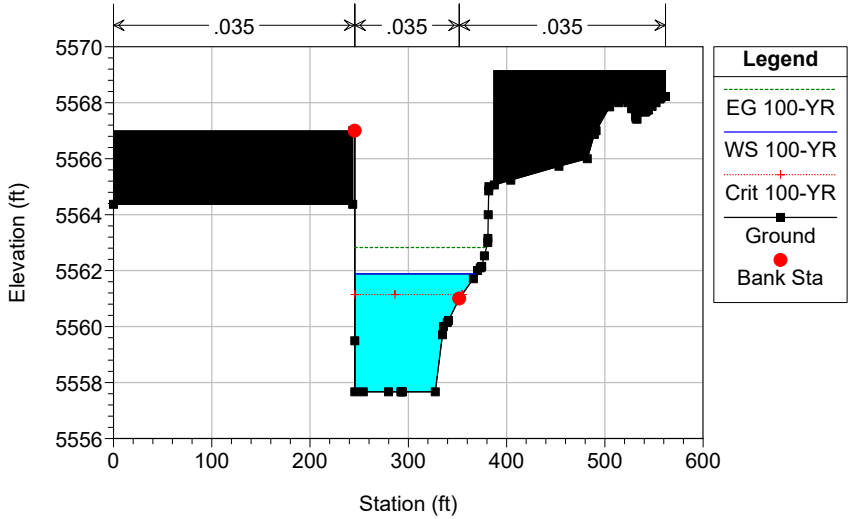
River = La Cueva Reach = La Cueva RS = 1316



La Cueva - Revised Model V2 Plan: Proposed with Culvert 2/19/2019 2:17:05 PM

Geom: Proposed with Culvert Flow: Historic Flow

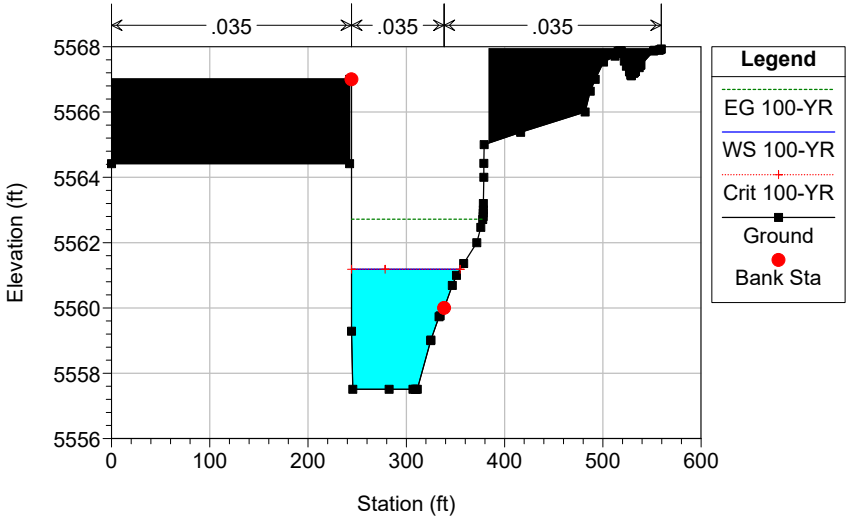
River = La Cueva Reach = La Cueva RS = 1307



La Cueva - Revised Model V2 Plan: Proposed with Culvert 2/19/2019 2:17:05 PM

Geom: Proposed with Culvert Flow: Historic Flow

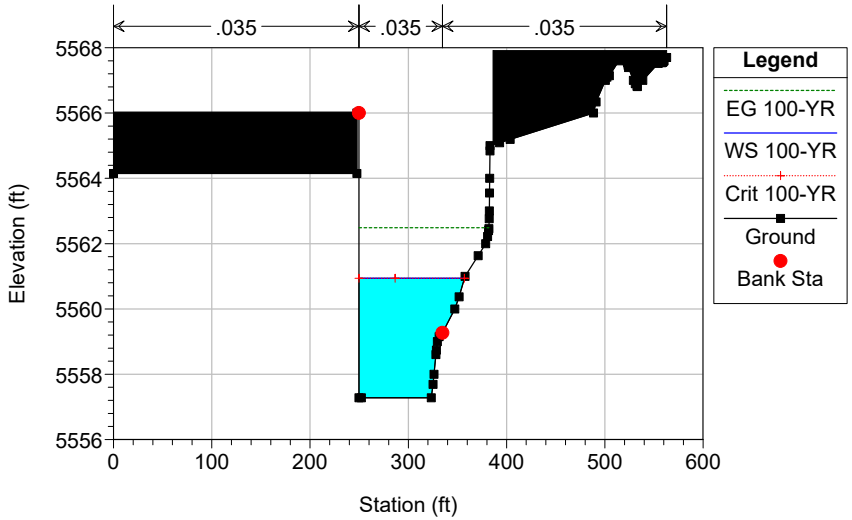
River = La Cueva Reach = La Cueva RS = 1301



La Cueva - Revised Model V2 Plan: Proposed with Culvert 2/19/2019 2:17:05 PM

Geom: Proposed with Culvert Flow: Historic Flow

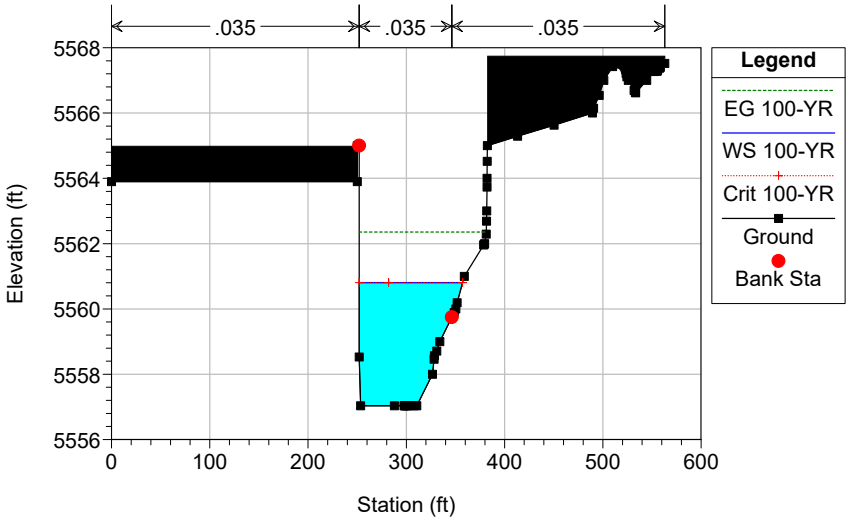
River = La Cueva Reach = La Cueva RS = 1292



La Cueva - Revised Model V2 Plan: Proposed with Culvert 2/19/2019 2:17:05 PM

Geom: Proposed with Culvert Flow: Historic Flow

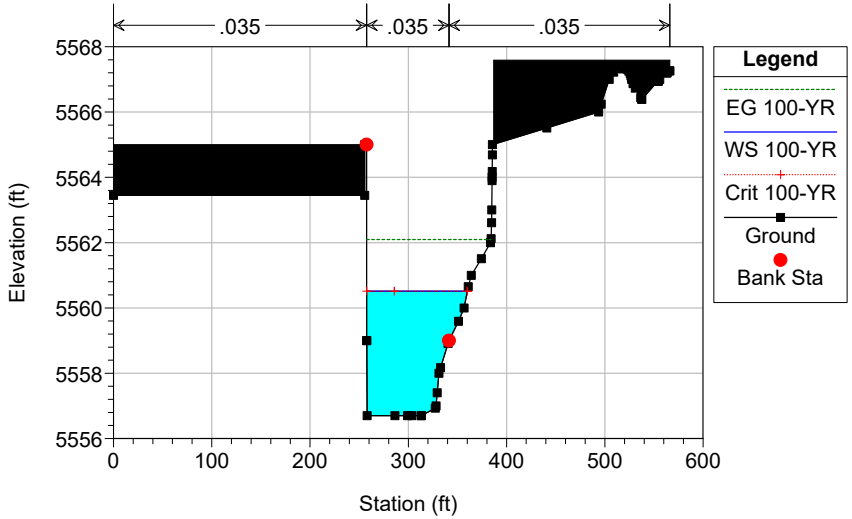
River = La Cueva Reach = La Cueva RS = 1282



La Cueva - Revised Model V2 Plan: Proposed with Culvert 2/19/2019 2:17:05 PM

Geom: Proposed with Culvert Flow: Historic Flow

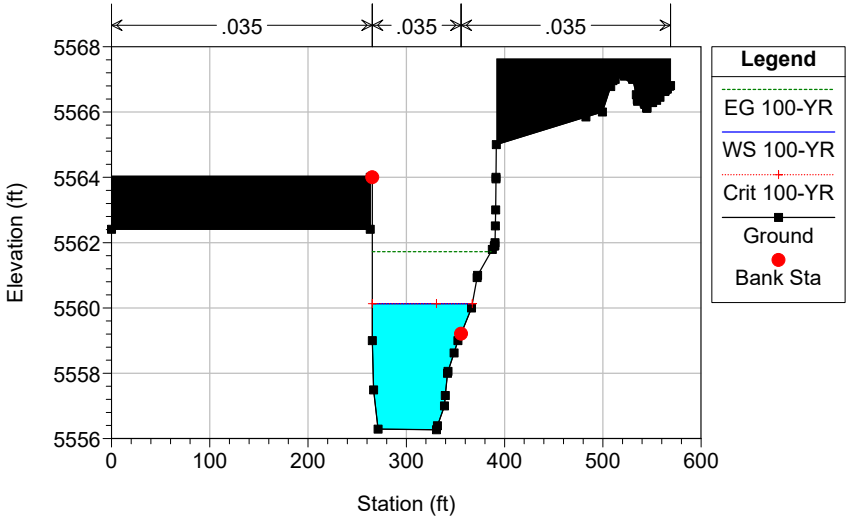
River = La Cueva Reach = La Cueva RS = 1271



La Cueva - Revised Model V2 Plan: Proposed with Culvert 2/19/2019 2:17:05 PM

Geom: Proposed with Culvert Flow: Historic Flow

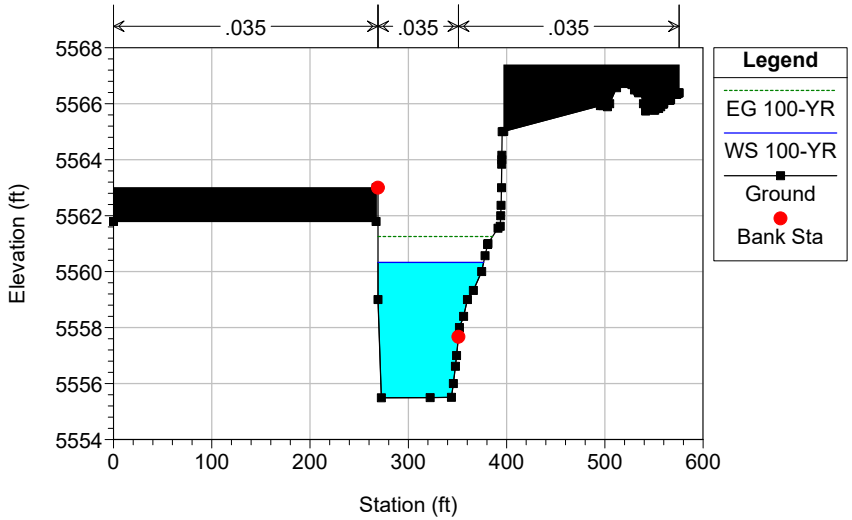
River = La Cueva Reach = La Cueva RS = 1258



La Cueva - Revised Model V2 Plan: Proposed with Culvert 2/19/2019 2:17:05 PM

Geom: Proposed with Culvert Flow: Historic Flow

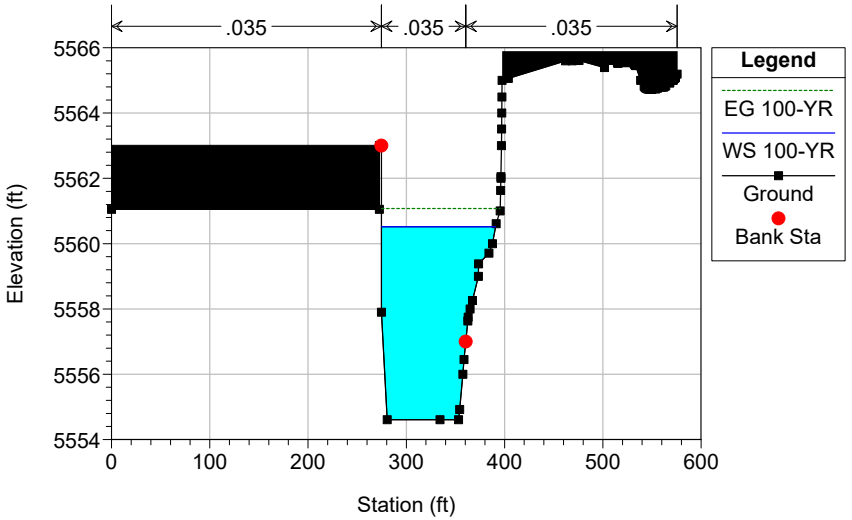
River = La Cueva Reach = La Cueva RS = 1239



La Cueva - Revised Model V2 Plan: Proposed with Culvert 2/19/2019 2:17:05 PM

Geom: Proposed with Culvert Flow: Historic Flow

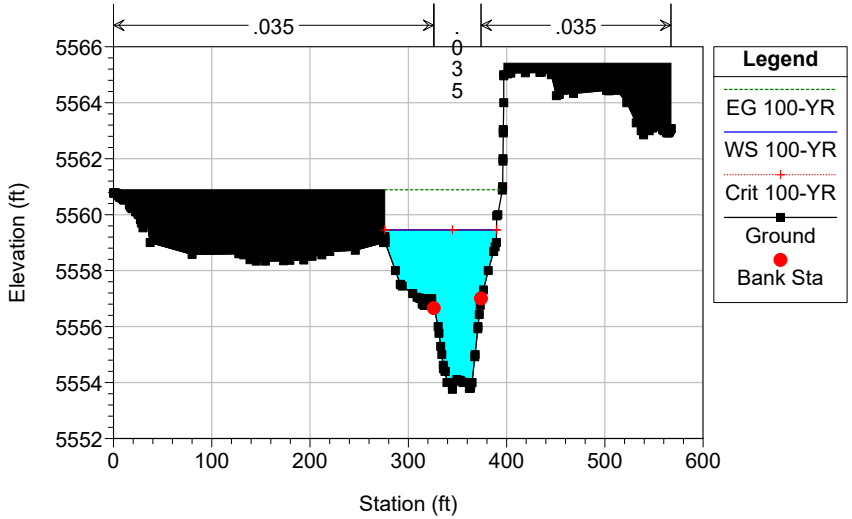
River = La Cueva Reach = La Cueva RS = 1216



La Cueva - Revised Model V2 Plan: Proposed with Culvert 2/19/2019 2:17:05 PM

Geom: Proposed with Culvert Flow: Historic Flow

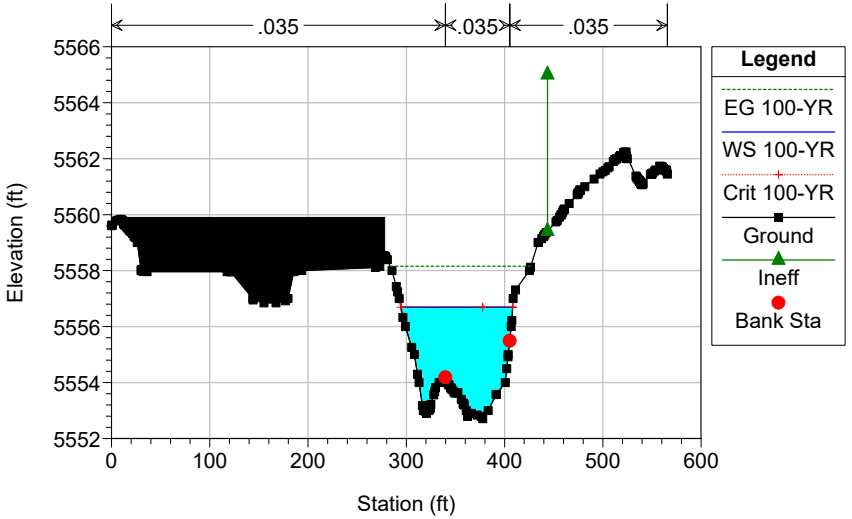
River = La Cueva Reach = La Cueva RS = 1189



La Cueva - Revised Model V2 Plan: Proposed with Culvert 2/19/2019 2:17:05 PM

Geom: Proposed with Culvert Flow: Historic Flow

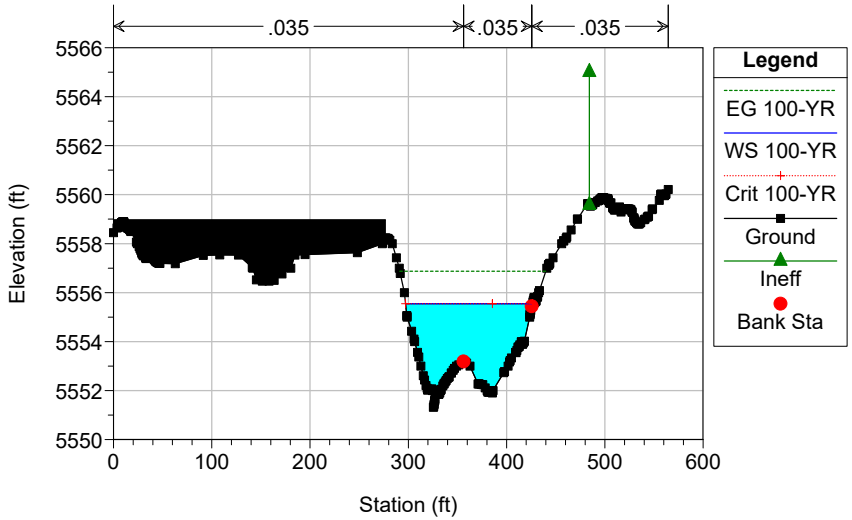
River = La Cueva Reach = La Cueva RS = 1143



La Cueva - Revised Model V2 Plan: Proposed with Culvert 2/19/2019 2:17:05 PM

Geom: Proposed with Culvert Flow: Historic Flow

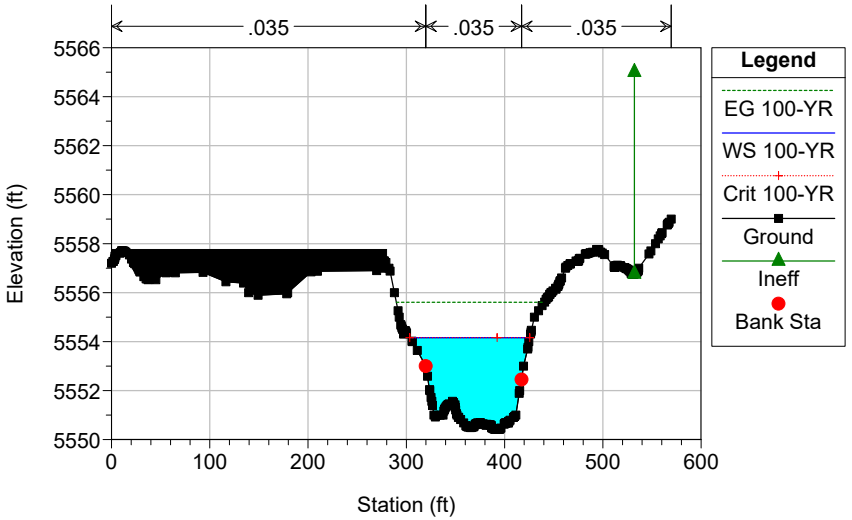
River = La Cueva Reach = La Cueva RS = 1104



La Cueva - Revised Model V2 Plan: Proposed with Culvert 2/19/2019 2:17:05 PM

Geom: Proposed with Culvert Flow: Historic Flow

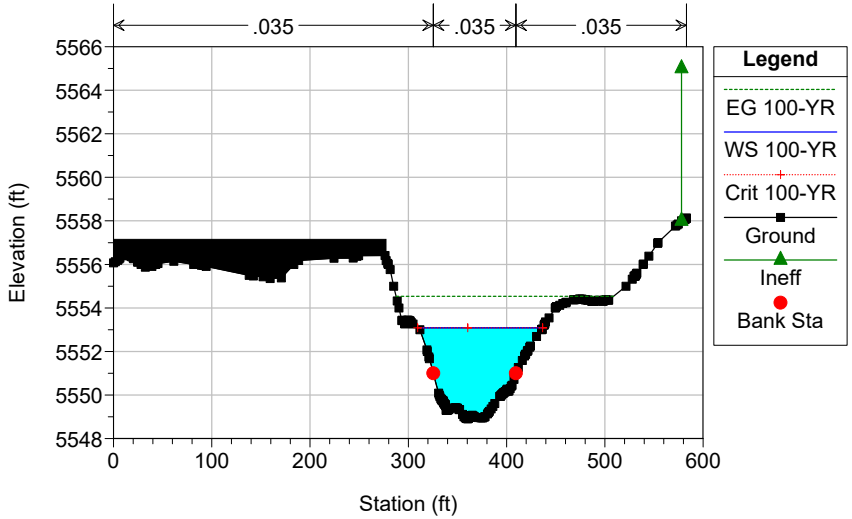
River = La Cueva Reach = La Cueva RS = 1057



La Cueva - Revised Model V2 Plan: Proposed with Culvert 2/19/2019 2:17:05 PM

Geom: Proposed with Culvert Flow: Historic Flow

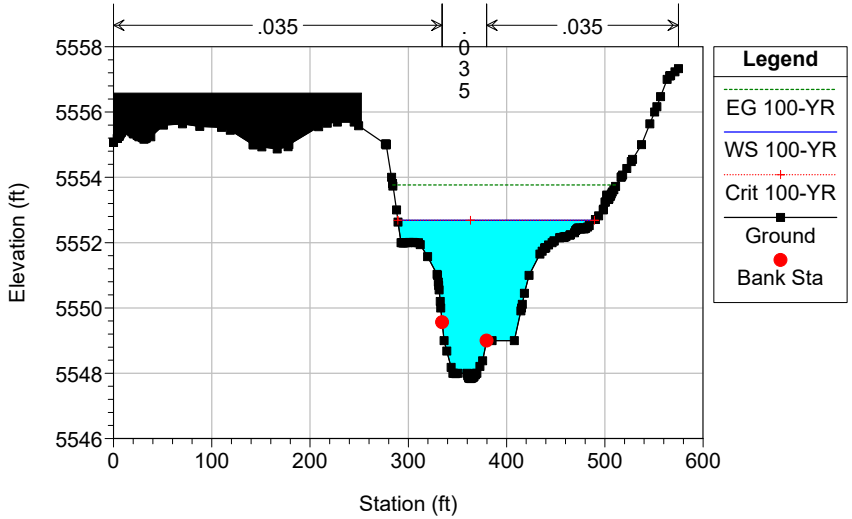
River = La Cueva Reach = La Cueva RS = 1012



La Cueva - Revised Model V2 Plan: Proposed with Culvert 2/19/2019 2:17:05 PM

Geom: Proposed with Culvert Flow: Historic Flow

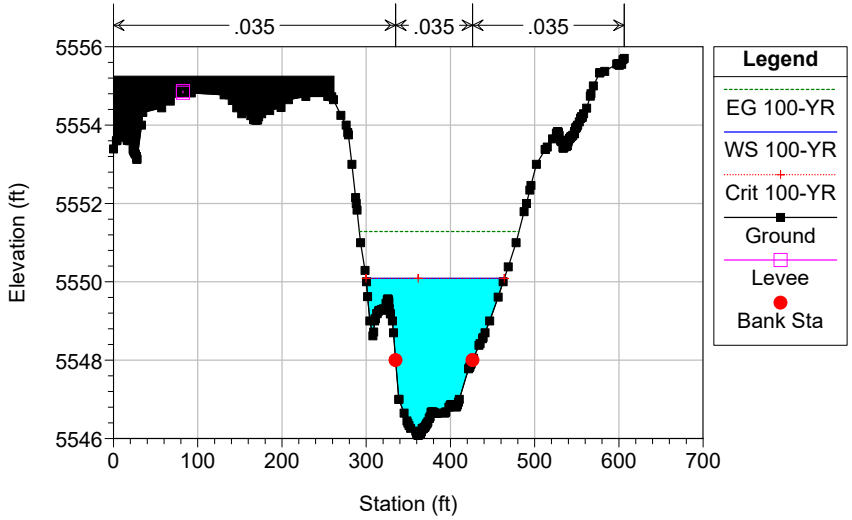
River = La Cueva Reach = La Cueva RS = 975



La Cueva - Revised Model V2 Plan: Proposed with Culvert 2/19/2019 2:17:05 PM

Geom: Proposed with Culvert Flow: Historic Flow

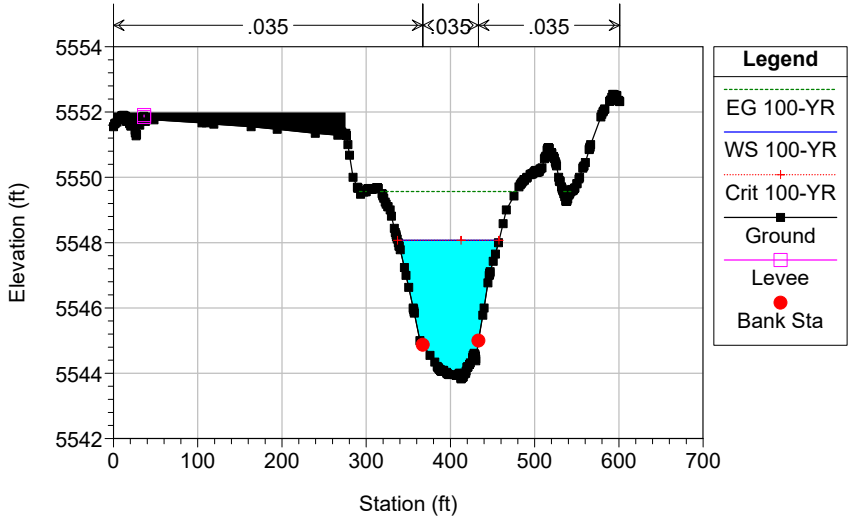
River = La Cueva Reach = La Cueva RS = 916

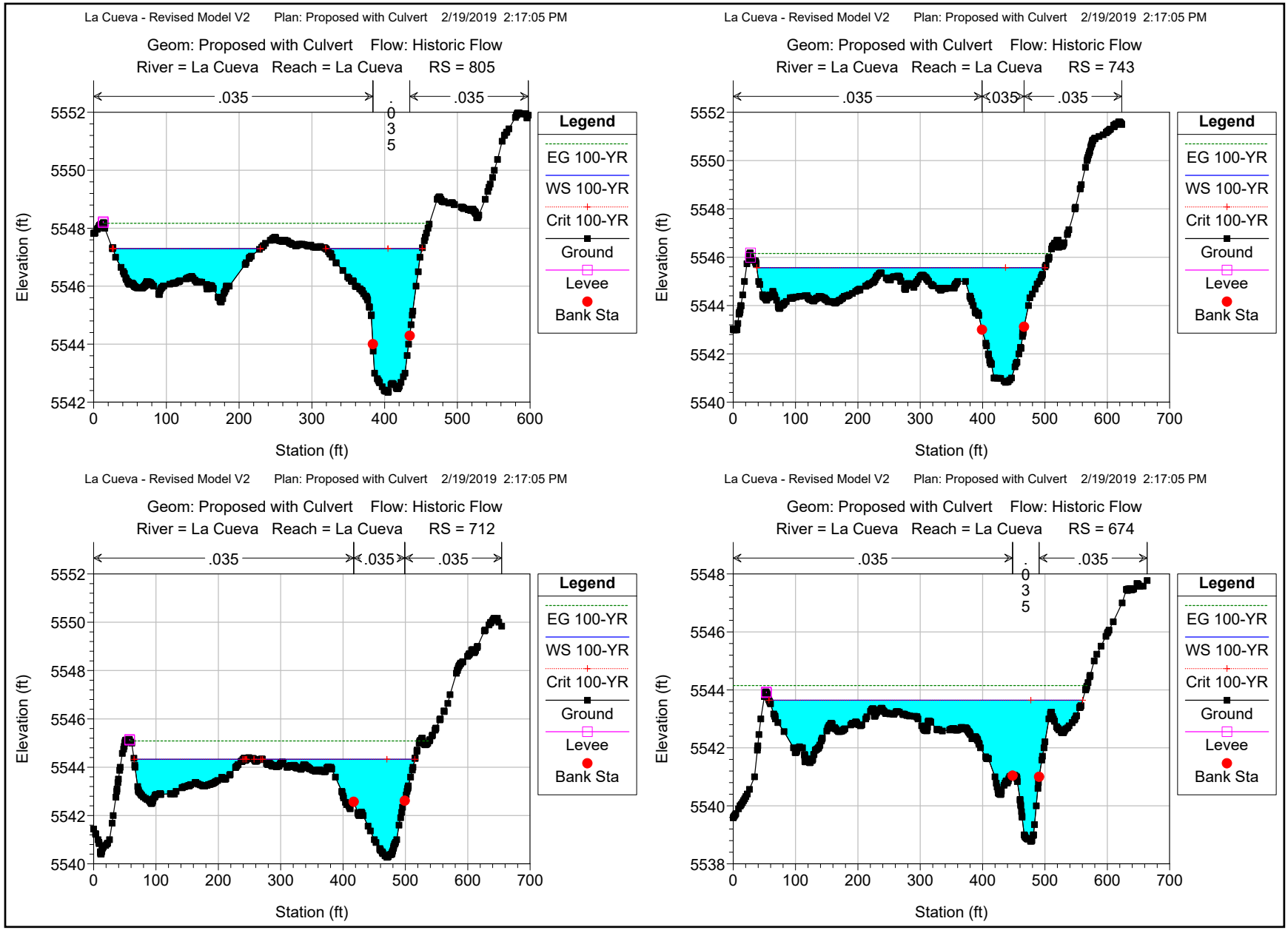


La Cueva - Revised Model V2 Plan: Proposed with Culvert 2/19/2019 2:17:05 PM

Geom: Proposed with Culvert Flow: Historic Flow

River = La Cueva Reach = La Cueva RS = 848

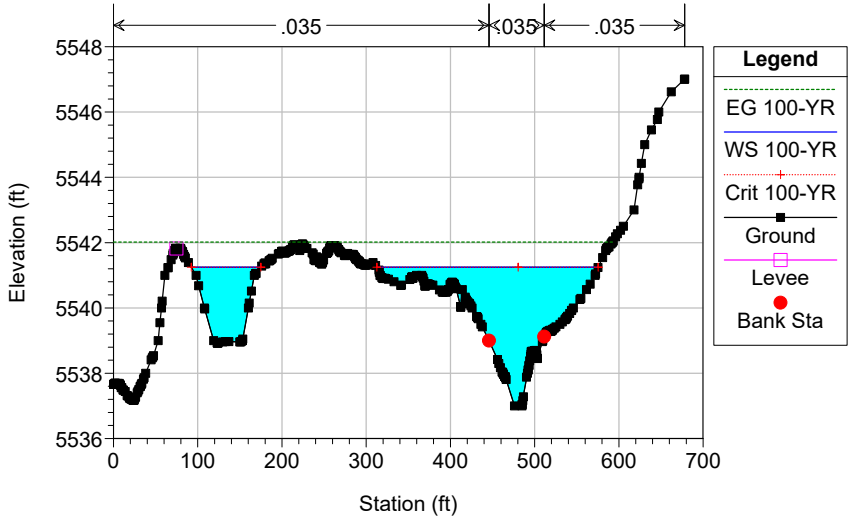



La Cueva - Revised Model V2 Plan: Proposed with Culvert 2/19/2019 2:17:05 PM
Geom: Proposed with Culvert Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 805
.035
.035
.035
Legend
EG 100-YR
WS 100-YR
Crit 100-YR
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
La Cueva - Revised Model V2 Plan: Proposed with Culvert 2/19/2019 2:17:05 PM
Geom: Proposed with Culvert Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 743
.035
.035
.035
Legend
EG 100-YR
WS 100-YR
Crit 100-YR
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
La Cueva - Revised Model V2 Plan: Proposed with Culvert 2/19/2019 2:17:05 PM
Geom: Proposed with Culvert Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 712
.035
.035
.035
Legend
EG 100-YR
WS 100-YR
Crit 100-YR
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
La Cueva - Revised Model V2 Plan: Proposed with Culvert 2/19/2019 2:17:05 PM
Geom: Proposed with Culvert Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 674
.035
.035
.035
Legend
EG 100-YR
WS 100-YR
Crit 100-YR
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

La Cueva - Revised Model V2 Plan: Proposed with Culvert 2/19/2019 2:17:05 PM

Geom: Proposed with Culvert Flow: Historic Flow

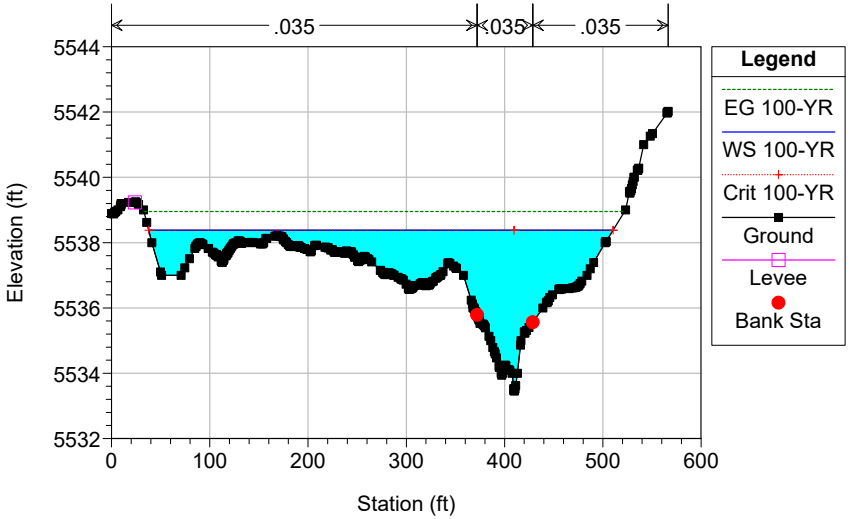
River = La Cueva Reach = La Cueva RS = 619



La Cueva - Revised Model V2 Plan: Proposed with Culvert 2/19/2019 2:17:05 PM

Geom: Proposed with Culvert Flow: Historic Flow

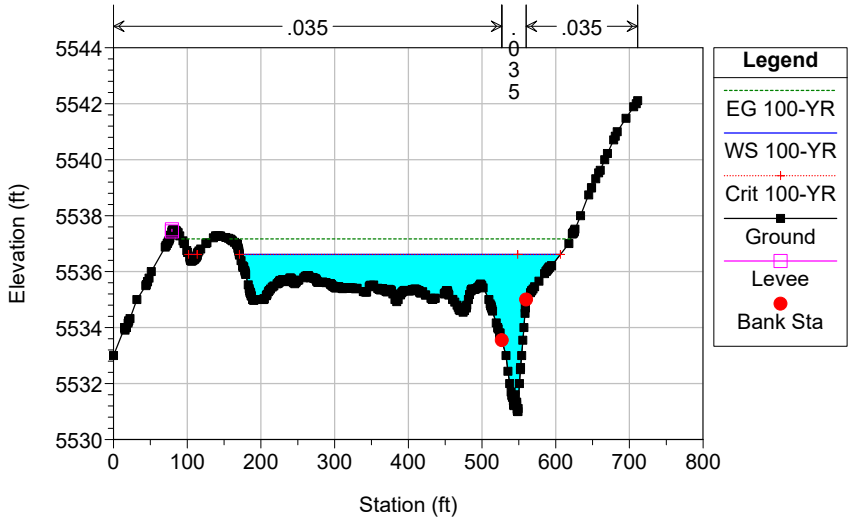
River = La Cueva Reach = La Cueva RS = 492



La Cueva - Revised Model V2 Plan: Proposed with Culvert 2/19/2019 2:17:05 PM

Geom: Proposed with Culvert Flow: Historic Flow

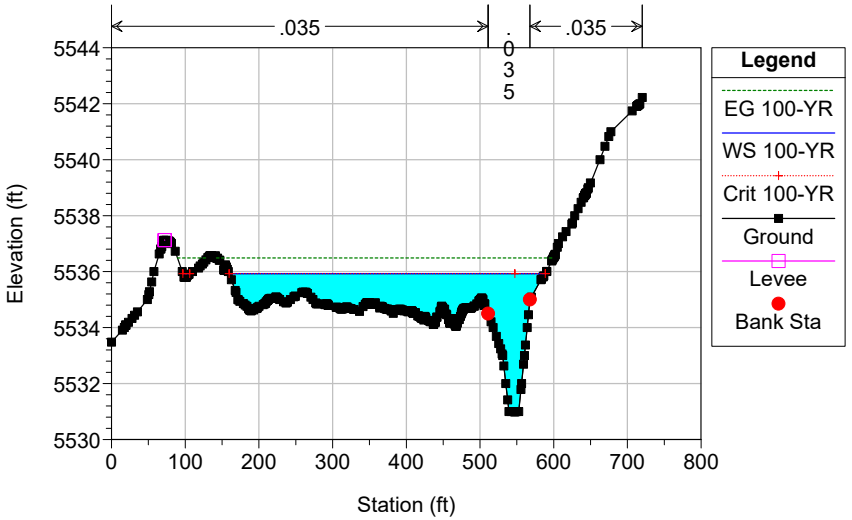
River = La Cueva Reach = La Cueva RS = 450

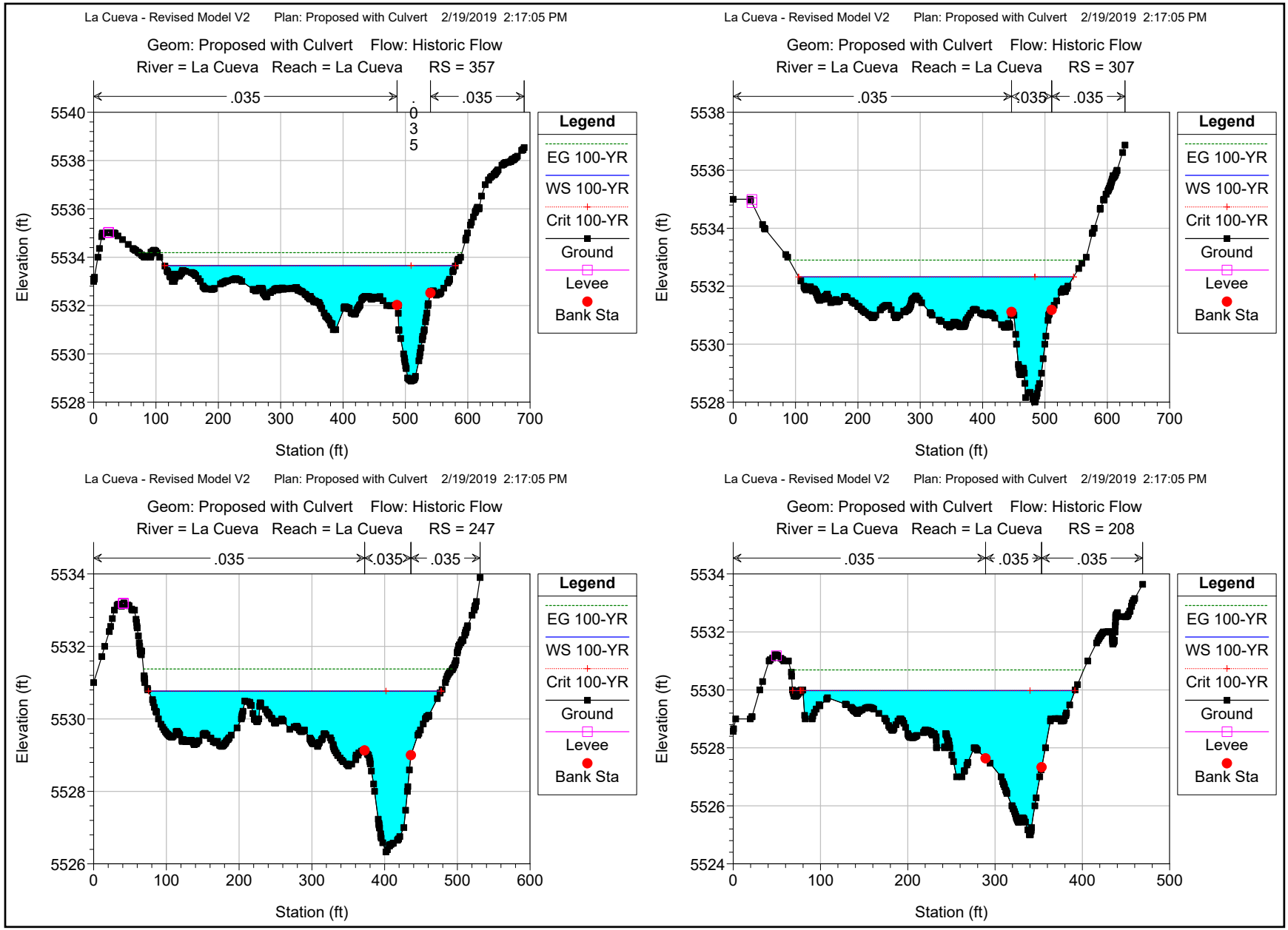


La Cueva - Revised Model V2 Plan: Proposed with Culvert 2/19/2019 2:17:05 PM

Geom: Proposed with Culvert Flow: Historic Flow

River = La Cueva Reach = La Cueva RS = 432

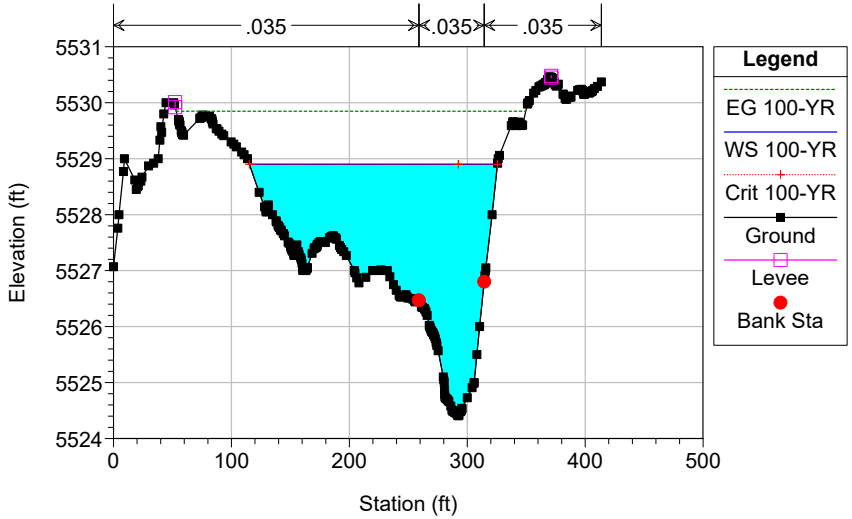



La Cueva - Revised Model V2 Plan: Proposed with Culvert 2/19/2019 2:17:05 PM
Geom: Proposed with Culvert Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 357
.035
.035
Legend
EG 100-YR
WS 100-YR
Crit 100-YR
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
La Cueva - Revised Model V2 Plan: Proposed with Culvert 2/19/2019 2:17:05 PM
Geom: Proposed with Culvert Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 307
.035
.035
.035
Legend
EG 100-YR
WS 100-YR
Crit 100-YR
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
La Cueva - Revised Model V2 Plan: Proposed with Culvert 2/19/2019 2:17:05 PM
Geom: Proposed with Culvert Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 247
.035
.035
.035
Legend
EG 100-YR
WS 100-YR
Crit 100-YR
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
La Cueva - Revised Model V2 Plan: Proposed with Culvert 2/19/2019 2:17:05 PM
Geom: Proposed with Culvert Flow: Historic Flow
River = La Cueva Reach = La Cueva RS = 208
.035
.035
.035
Legend
EG 100-YR
WS 100-YR
Crit 100-YR
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

La Cueva - Revised Model V2 Plan: Proposed with Culvert 2/19/2019 2:17:05 PM

Geom: Proposed with Culvert Flow: Historic Flow

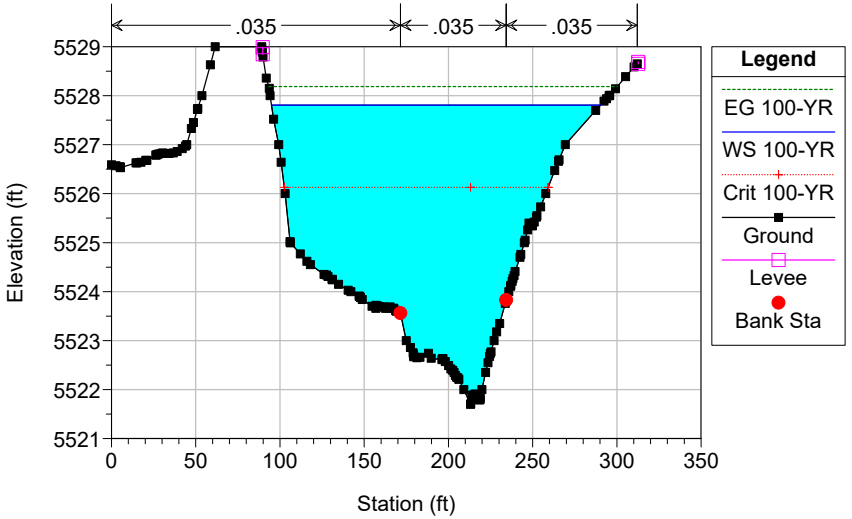
River = La Cueva Reach = La Cueva RS = 173



La Cueva - Revised Model V2 Plan: Proposed with Culvert 2/19/2019 2:17:05 PM

Geom: Proposed with Culvert Flow: Historic Flow

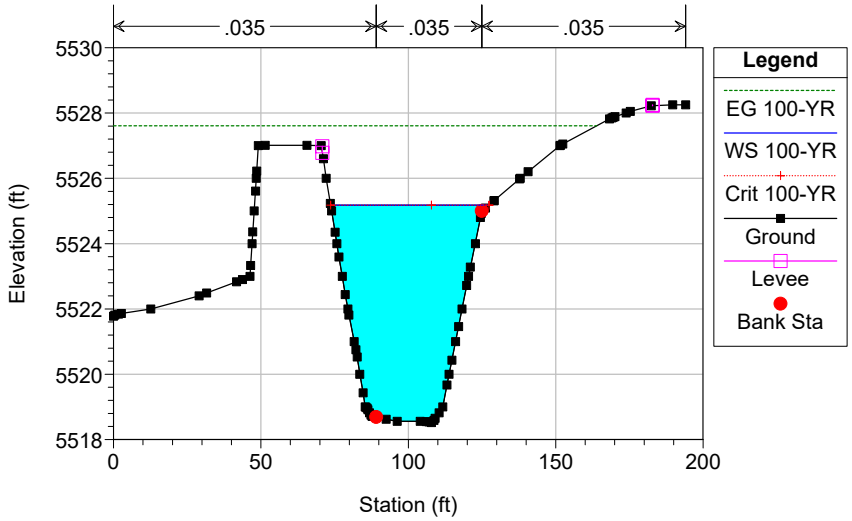
River = La Cueva Reach = La Cueva RS = 99

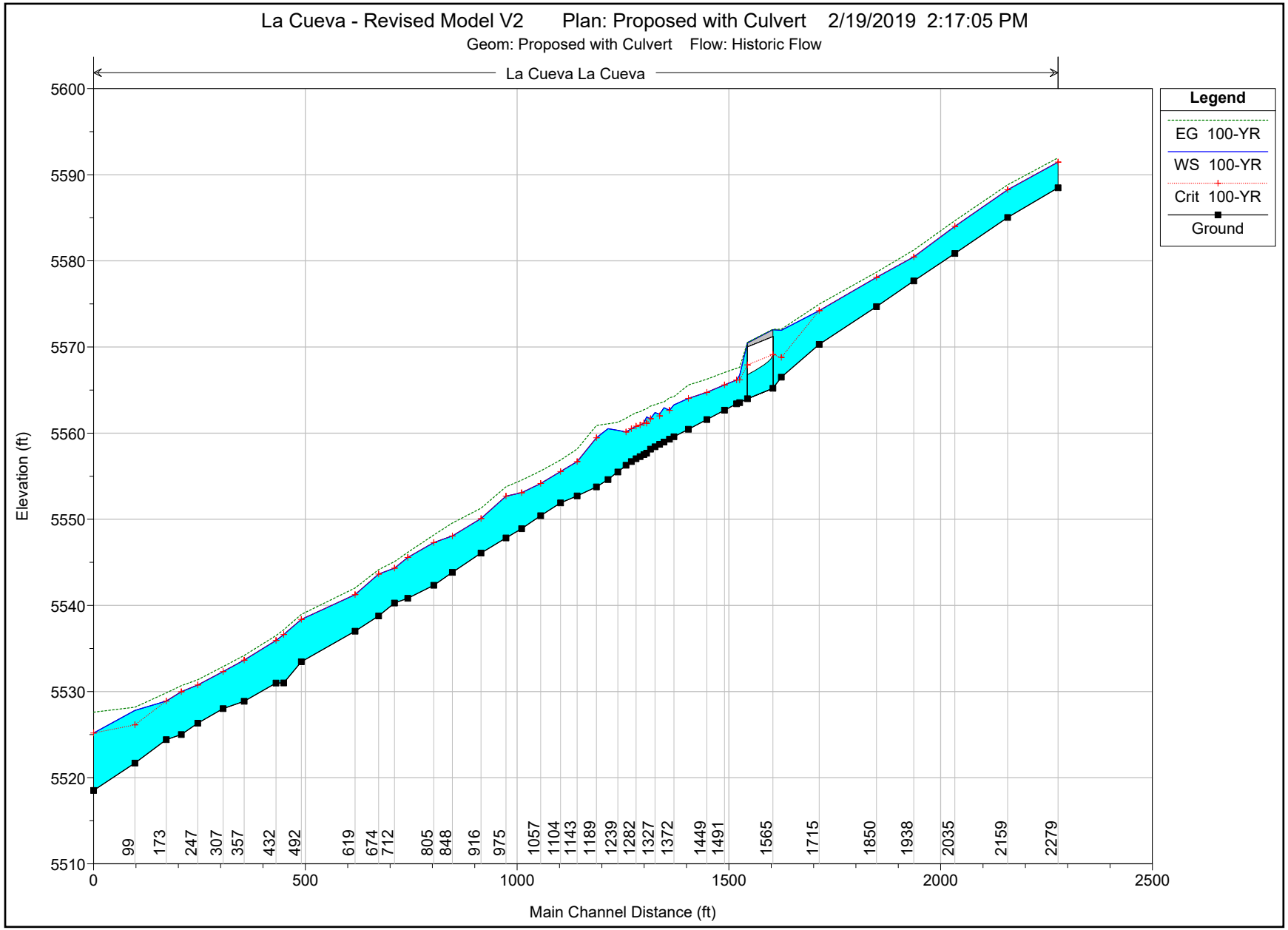


La Cueva - Revised Model V2 Plan: Proposed with Culvert 2/19/2019 2:17:05 PM

Geom: Proposed with Culvert Flow: Historic Flow

River = La Cueva Reach = La Cueva RS = 1




La Cueva - Revised Model V2 Plan: Proposed with Culvert 2/19/2019 2:17:05 PM
Geom: Proposed with Culvert Flow: Historic Flow
La Cueva La Cueva
Legend
EG 100-YR
WS 100-YR
Crit 100-YR
Ground
Elevation (ft)
Main Channel Distance (ft)
5600
5590
5580
5570
5560
5550
5540
5530
5520
5510
0
500
1000
1500
2000
2500
99
173
247
307
357
432
492
619
674
712
805
848
916
975
1057
1104
1143
1189
1239
1282
1327
1372
1449
1491
1565
1715
1850
1938
2035
2159
2279

HEC-RAS Plan: With Culvert River: La Cueva Reach: La Cueva Profile: 100-YR

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)	
La Cueva	2279	100-YR	3090.00	5588.49	5591.47	5591.47	5591.96	0.010567	6.69	601.96	530.19	0.86
La Cueva	2159	100-YR	3090.00	5585.04	5588.26	5588.26	5588.83	0.010815	6.71	562.55	564.37	0.86
La Cueva	2035	100-YR	3090.00	5580.85	5584.01	5584.01	5584.66	0.011100	7.00	517.57	392.77	0.88
La Cueva	1938	100-YR	3090.00	5577.67	5580.46	5580.46	5581.25	0.015831	8.04	464.35	411.80	1.04
La Cueva	1850	100-YR	3090.00	5574.69	5578.08	5578.08	5578.69	0.009675	7.01	535.29	377.62	0.84
La Cueva	1715	100-YR	3090.00	5570.30	5574.23	5574.23	5574.98	0.008308	8.45	502.24	292.55	0.83
La Cueva	1625	100-YR	3090.00	5566.50	5571.94	5568.80	5572.06	0.000588	2.86	1112.94	273.73	0.23
La Cueva	1565		Culvert									
La Cueva	1527	100-YR	3090.00	5563.54	5566.73	5566.18	5567.64	0.007176	7.66	403.38	180.39	0.76
La Cueva	1520	100-YR	3090.00	5563.40	5566.17	5566.17	5567.53	0.013347	9.35	330.43	122.12	1.00
La Cueva	1491	100-YR	3090.00	5562.66	5565.60	5565.60	5567.05	0.013240	9.66	319.79	111.21	1.00
La Cueva	1449	100-YR	3090.00	5561.58	5564.74	5564.74	5566.27	0.012809	9.92	311.77	104.89	1.00
La Cueva	1406	100-YR	3090.00	5560.45	5564.04	5564.04	5565.59	0.013247	9.98	309.63	101.33	1.01
La Cueva	1372	100-YR	3090.00	5559.58	5563.28		5564.25	0.006600	7.89	391.87	105.96	0.72
La Cueva	1361	100-YR	3090.00	5559.30	5562.65	5562.64	5564.10	0.012979	9.66	320.02	110.65	1.00
La Cueva	1348	100-YR	3090.00	5558.97	5562.95		5563.62	0.004165	6.56	471.12	122.26	0.59
La Cueva	1338	100-YR	3090.00	5558.70	5562.19	5562.01	5563.49	0.009857	9.20	343.08	117.75	0.89
La Cueva	1327	100-YR	3090.00	5558.42	5562.38		5563.29	0.006102	7.66	410.38	130.56	0.71
La Cueva	1316	100-YR	3090.00	5558.14	5561.67	5561.67	5563.14	0.012754	9.73	319.83	115.23	0.99
La Cueva	1307	100-YR	3090.00	5557.67	5561.88	5561.15	5562.83	0.006272	7.82	400.86	123.14	0.72
La Cueva	1301	100-YR	3090.00	5557.51	5561.18	5561.18	5562.72	0.011913	9.98	315.77	110.59	0.97
La Cueva	1292	100-YR	3090.00	5557.28	5560.94	5560.94	5562.49	0.011392	10.11	317.73	107.41	0.95
La Cueva	1282	100-YR	3090.00	5557.03	5560.81	5560.81	5562.36	0.012072	10.02	312.84	105.25	0.98
La Cueva	1271	100-YR	3090.00	5556.70	5560.51	5560.51	5562.10	0.011366	10.19	312.98	102.51	0.96
La Cueva	1258	100-YR	3090.00	5556.27	5560.13	5560.13	5561.72	0.011774	10.15	308.50	101.79	0.98
La Cueva	1239	100-YR	3090.00	5555.49	5560.33		5561.26	0.004579	7.83	412.86	107.46	0.64
La Cueva	1216	100-YR	3090.00	5554.61	5560.52		5561.08	0.002153	6.10	532.53	116.22	0.45
La Cueva	1189	100-YR	3090.00	5553.76	5559.45	5559.45	5560.89	0.007668	10.46	351.92	113.83	0.84
La Cueva	1143	100-YR	3090.00	5552.71	5556.69	5556.69	5558.16	0.012055	10.24	323.89	113.69	1.00
La Cueva	1104	100-YR	3090.00	5551.90	5555.54	5555.54	5556.87	0.013344	9.15	334.39	129.07	1.01
La Cueva	1057	100-YR	3090.00	5550.42	5554.16	5554.16	5555.61	0.011186	9.72	328.16	122.11	0.96
La Cueva	1012	100-YR	3090.00	5548.91	5553.09	5553.09	5554.54	0.010165	9.89	336.27	127.27	0.93
La Cueva	975	100-YR	3090.00	5547.84	5552.68	5552.68	5553.77	0.007265	9.78	433.21	200.15	0.82
La Cueva	916	100-YR	3090.00	5546.08	5550.09	5550.09	5551.28	0.009383	9.15	378.45	164.18	0.88
La Cueva	848	100-YR	3090.00	5543.83	5548.07	5548.07	5549.57	0.009984	10.37	335.88	120.44	0.93
La Cueva	805	100-YR	3090.00	5542.34	5547.30	5547.30	5548.17	0.005949	8.90	535.04	334.90	0.74
La Cueva	743	100-YR	3090.00	5540.82	5545.57	5545.57	5546.16	0.004729	7.37	653.17	462.18	0.65
La Cueva	712	100-YR	3090.00	5540.27	5544.33	5544.33	5545.09	0.008485	8.20	535.24	432.29	0.83
La Cueva	674	100-YR	3090.00	5538.78	5543.64	5543.64	5544.15	0.005678	7.83	683.63	502.95	0.70
La Cueva	619	100-YR	3090.00	5537.00	5541.25	5541.25	5542.02	0.008483	8.48	511.81	345.29	0.84
La Cueva	492	100-YR	3090.00	5533.46	5538.38	5538.38	5538.96	0.005945	7.71	639.07	472.56	0.71
La Cueva	450	100-YR	3090.00	5531.00	5536.61	5536.61	5537.17	0.006206	8.38	637.38	447.46	0.73
La Cueva	432	100-YR	3090.00	5530.99	5535.93	5535.93	5536.49	0.006967	7.76	608.66	438.34	0.75
La Cueva	357	100-YR	3090.00	5528.87	5533.65	5533.65	5534.19	0.006423	7.70	641.33	466.51	0.73
La Cueva	307	100-YR	3090.00	5528.01	5532.32	5532.32	5532.90	0.007796	7.74	595.10	440.97	0.79
La Cueva	247	100-YR	3090.00	5526.33	5530.77	5530.77	5531.38	0.006672	7.79	592.68	402.44	0.75
La Cueva	208	100-YR	3090.00	5525.00	5529.98	5529.98	5530.69	0.006513	8.08	539.71	321.11	0.75
La Cueva	173	100-YR	3090.00	5524.41	5528.90	5528.90	5529.85	0.008580	9.16	438.88	210.34	0.85
La Cueva	99	100-YR	3090.00	5521.70	5527.81	5526.13	5528.19	0.001891	5.55	672.35	195.27	0.43
La Cueva	1	100-YR	3090.00	5518.52	5525.18	5525.18	5527.61	0.010654	13.01	250.75	53.71	1.00

SIGNAL VILLAGE FINE SEDIMENT YIELD ANALYSIS USING MUSLE EQUATION

BASIN	AREA AC				PERCENT IMPERV	QP CFS	VOL AC-FT	WGHTD K	C	GAMMA	SLOPE %	N	LS	YS TONS	YS' TONS	CS PPM	QFS WASH LOAD
108	131.50				17%	404.63	15.57	0.150	0.20	400	4	0.4	0.69	795.91	660.60	30273	4.77
109	64.38				17%	216.30	7.55	0.150	0.20	400	4	0.4	0.69	373.69	310.16	29340	2.47
110	104.00				17%	275.61	11.74	0.150	0.20	400	4	0.4	0.69	548.03	454.87	27718	2.96
111.1	62.00				26%	195.97	7.70	0.150	0.20	400	4	0.4	0.69	357.51	264.56	24657	1.87

BED MATERIAL AND TOTAL SEDIMENT YIELD ANALYSIS USING MPM-WOO METHOD

a = 5.00E-04 n= 0.04
b = 3.85
c = 0.30
d = -2.50

BASIN	AREA AC	QP CFS	VOL AC-FT	YS' TONS	SED. VOL. AC-FT	Cfs PPM	q unit width	AVG. SLOPE	VEL FPS	DEPTH FT	WD FT	qs (unit width bed load) cfs/ft	QS BED LOAD cfs	QS TOTAL BED+WASH	BULKING FACTOR BED ONLY	Q BULK BED ONLY	SED VOL BED ONLY AC-FT
108	131.50	404.63	15.57	660.60	0.3033	30273	6.74	0.050	7.64	0.88	60.0	1.31	78.46	83.22	1.19	483.09	3.02
109	64.38	216.30	7.55	310.16	0.1424	29340	3.61	0.040	5.56	0.65	60.0	0.35	21.02	23.48	1.10	237.32	0.73
110	104.00	275.61	11.74	454.87	0.2088	27718	4.59	0.035	5.89	0.78	60.0	0.46	27.54	30.51	1.10	303.15	1.17
111.1	62.00	195.97	7.70	264.56	0.1215	24657	3.27	0.035	5.14	0.64	60.0	0.25	15.20	17.07	1.08	211.17	0.60

HEC-RAS RESULTS

HEC-RAS Plan: Pro. V2 River: La Cueva Reach: La Cueva Profile: PF 1

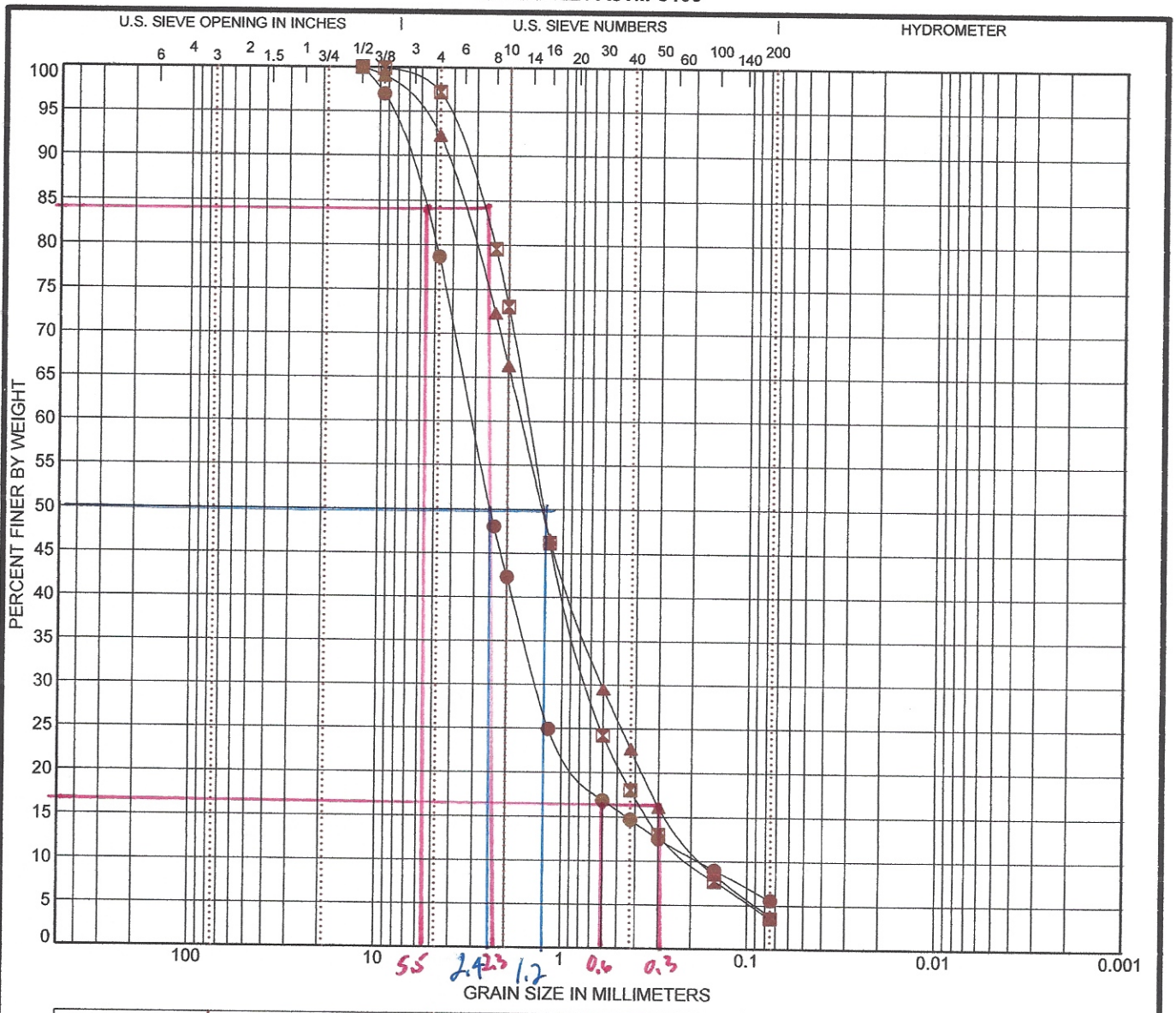
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
La Cueva	2279	PF 1	3090.00	5588.49	5590.53	5591.47	5596.02	0.137545	19.63	187.70	284.00	0.66 2.93
La Cueva	2159	PF 1	3090.00	5585.04	5587.85	5588.26	5589.01	0.024158	9.27	384.37	349.80	1.18 1.27
La Cueva	2035	PF 1	3090.00	5580.85	5583.40	5584.01	5585.20	0.038343	11.24	307.99	291.13	1.05 1.58
La Cueva	1938	PF 1	3090.00	5577.67	5580.11	5580.46	5581.50	0.035276	10.43	338.77	307.72	1.10 1.50
La Cueva	1850	PF 1	3090.00	5575.15	5577.74	5578.10	5578.92	0.023886	9.56	395.44	371.46	1.06 1.27
La Cueva	1715	PF 1	3090.00	5570.99	5573.79	5574.24	5575.30	0.029303	12.64	345.77	283.86	1.22 1.47
La Cueva	1625	PF 1	3090.00	5569.09	5571.33	5571.64	5572.59	0.027309	9.52	352.62	264.71	1.33 1.33
La Cueva	1565	PF 1	3090.00	5567.26	5570.57	5570.57	5571.58	0.012795	8.11	389.96	208.85	0.96
La Cueva	1527	PF 1	3090.00	5565.88	5568.34	5569.01	5570.67	0.036652	12.89	262.09	262.25	1.61
La Cueva	1520	PF 1	3090.00	5565.65	5567.15	5568.05	5570.24	0.067344	14.10	219.22	150.33	2.06
La Cueva	1491	PF 1	3090.00	5564.61	5567.17	5567.51	5568.88	0.019728	10.49	296.91	136.34	1.20
La Cueva	1449	PF 1	3090.00	5563.16	5565.68	5566.26	5567.89	0.026054	11.95	259.65	115.71	1.38
La Cueva	1406	PF 1	3090.00	5561.68	5564.52	5565.06	5566.77	0.025326	12.03	257.08	106.61	1.36
La Cueva	1372	PF 1	3090.00	5560.50	5563.31	5563.96	5565.81	0.029207	12.71	243.18	100.85	1.44
La Cueva	1361	PF 1	3090.00	5560.13	5563.38	5563.83	5565.41	0.021432	11.44	272.87	121.93	1.25
La Cueva	1348	PF 1	3090.00	5559.68	5562.83	5563.45	5565.05	0.025050	12.01	261.13	113.24	1.35
La Cueva	1338	PF 1	3090.00	5559.33	5562.46	5563.18	5564.79	0.024389	12.37	259.39	115.83	1.34
La Cueva	1327	PF 1	3090.00	5559.00	5561.71	5562.54	5564.43	0.035363	13.24	234.21	111.73	1.57
La Cueva	1316	PF 1	3090.00	5558.81	5561.69	5562.31	5563.98	0.026738	12.17	256.11	115.41	1.39
La Cueva	1307	PF 1	3090.00	5558.44	5561.25	5561.95	5563.70	0.029711	12.56	246.63	111.34	1.45
La Cueva	1301	PF 1	3090.00	5558.09	5560.97	5561.72	5563.51	0.027486	12.83	244.67	106.42	1.42
La Cueva	1292	PF 1	3090.00	5557.56	5560.53	5561.31	5563.24	0.028745	13.35	238.87	103.51	1.44
La Cueva	1282	PF 1	3090.00	5557.14	5560.10	5560.92	5562.93	0.032279	13.51	229.43	98.98	1.53
La Cueva	1271	PF 1	3090.00	5556.70	5560.09	5560.72	5562.52	0.022522	12.58	251.55	99.81	1.31
La Cueva	1258	PF 1	3090.00	5556.26	5560.68	5560.68	5562.23	0.011698	10.04	315.21	105.16	0.97
La Cueva	1239	PF 1	3090.00	5555.49	5560.27	5560.44	5561.99	0.010693	11.36	314.52	107.12	0.98
La Cueva	1216	PF 1	3090.00	5554.61	5559.25	5559.90	5561.63	0.015408	13.28	271.01	98.80	1.16
La Cueva	1189	PF 1	3090.00	5553.76	5558.73	5559.45	5561.19	0.015632	13.39	270.63	108.00	1.17
La Cueva	1143	PF 1	3090.00	5552.71	5555.43	5556.69	5559.73	0.065779	17.31	187.30	100.98	2.15
La Cueva	1104	PF 1	3090.00	5551.90	5554.81	5555.54	5557.34	0.036405	12.53	242.42	122.12	1.59
La Cueva	1057	PF 1	3090.00	5550.42	5553.49	5554.16	5555.90	0.025206	12.48	250.48	108.96	1.38
La Cueva	1012	PF 1	3090.00	5548.91	5552.39	5553.09	5554.83	0.022392	12.67	254.39	109.85	1.33

East of Ventura

West of Ventura

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Boring ID	Depth	USCS Classification	WC (%)	LL	PL	PI	Cc	Cu
● East of Ventura	0 - 1						3.35	17.00
⊠ South of Alameda	0 - 1	WELL-GRADED SAND (SW)					1.64	7.64
▲ West of Ventura	0 - 1	WELL-GRADED SAND (SW)					1.28	9.77

Boring ID	Depth	D_{100}	D_{60}	D_{30}	D_{10}	%Gravel	%Sand	%Silt	%Fines	%Clay
● East of Ventura	0 - 1	12.5	3.101	1.377	0.182	21.3	73.1		5.6	
⊠ South of Alameda	0 - 1	12.5	1.547	0.717	0.202	2.8	93.7		3.5	
▲ West of Ventura	0 - 1	12.5	1.689	0.612	0.173	7.8	88.5		3.8	

PROJECT: La Cueva Arroyo Sieve Analysis

SITE: Albuquerque, NM

Terracon
4905 Hawkins St NE
Albuquerque, NM

PROJECT NUMBER: 66185107

CLIENT: David B. Thompson
P.O. Box 65760

EXHIBIT: B-1

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: USCS-2 66185107 LA CUEVA ARROYO.GPJ TERRACON_DATATEMPLATE.GDT 6/28/18

ZELLER AND FULLERTON RELATION

$$q_s = .0064 \frac{n^{1.77} V^{4.32} G^{0.45}}{Y^{0.30} D_{50}^{0.61}}$$

EQN 3.40 in AMAFCA GUIDE

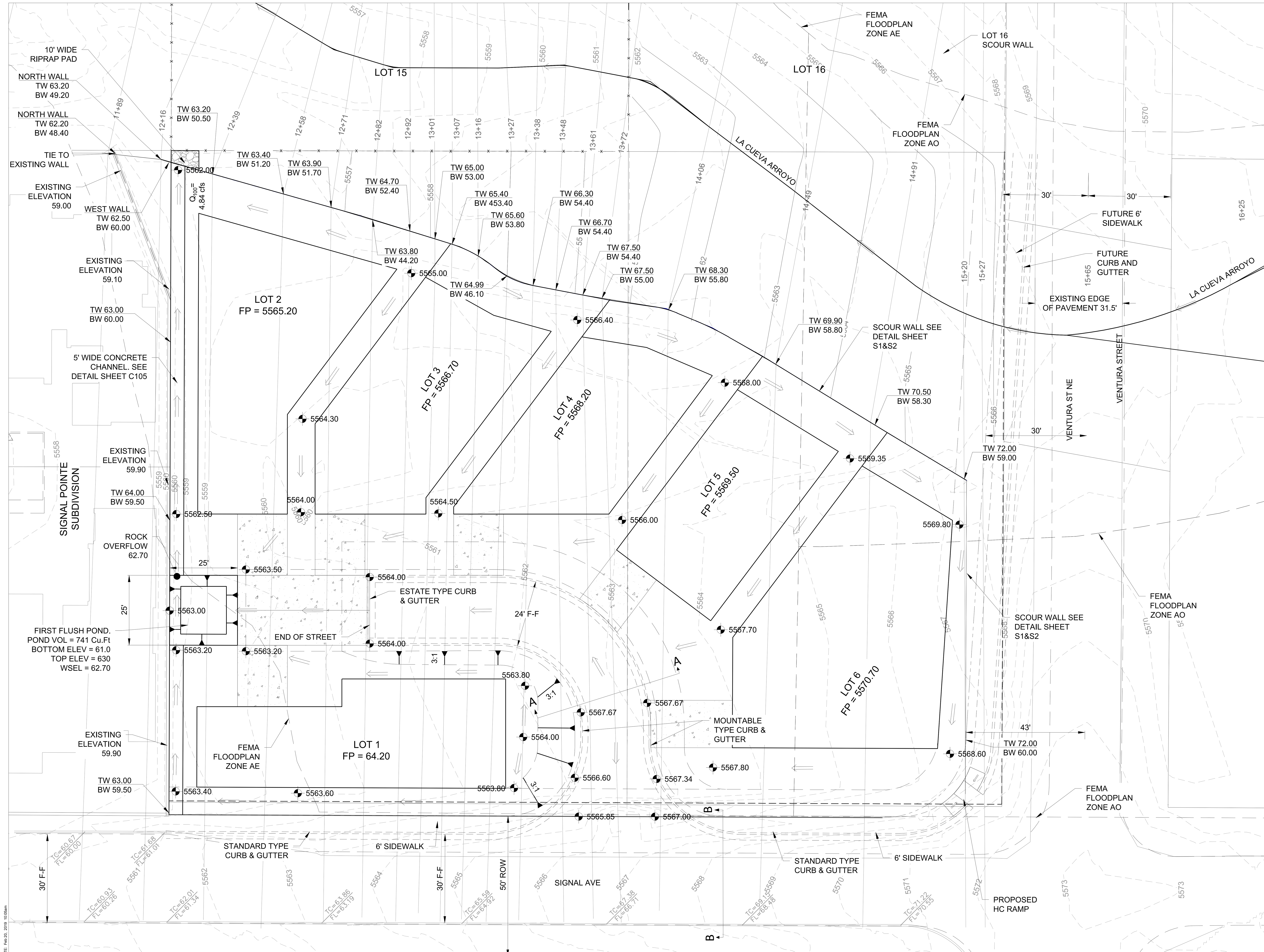
$$G = \frac{1}{2}\left(\frac{D_{84}}{D_{50}} + \frac{D_{50}}{D_{16}}\right)$$

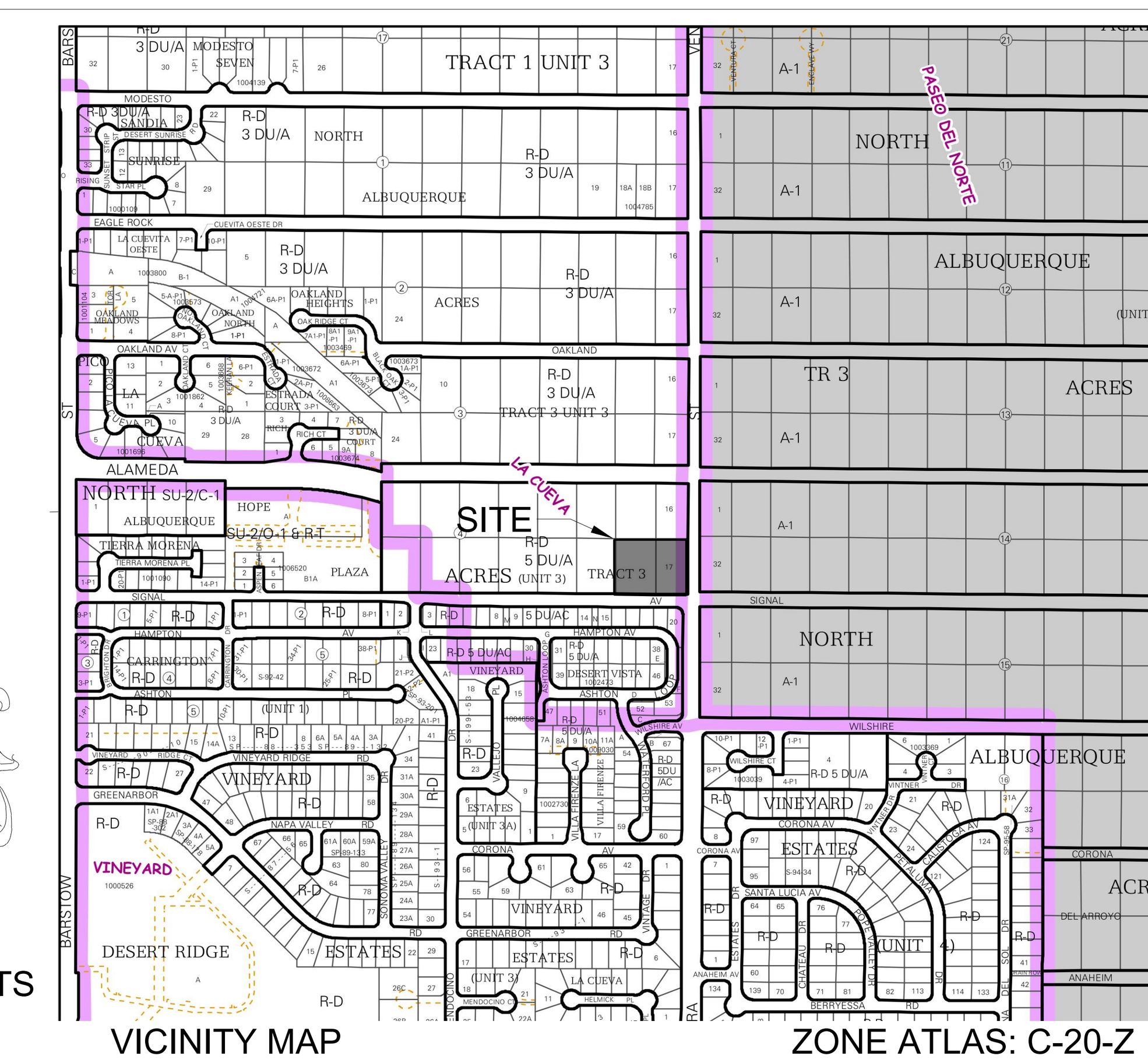
EQN 3.14 in AMAFCA GUIDE

Parameter	East of Ventura	West of Ventura
D_{16}	0.6mm	0.3mm
D_{50}	2.4mm	1.2mm
D_{84}	5.5mm	2.3mm
G	3.15mm	2.96mm
n	0.035	0.035
V_{avg} for reach	10.44 ft/s	12.30 ft/s
Y_{avg} (hydraulic depth)	1.16 ft	2.39 ft
D_{50}	2.4mm	1.2mm
q_s per unit width	0.4008 cfs/ft	0.9724 cfs/ft
Channel Width	160 ft	80 ft
Q_s per unit length	64 cfs/ft	77.8 cfs/ft
REACH LENGTH	534 ft	338 ft
Q_s TOTAL	34,176 cf	26,296 cf

34,176 − 26,296 = 7,880 CF sediment, therefore Channel West of Ventura is aggrading

$\frac{7,880}{(80 \times 330)}$ = 0.29 ft depth of aggradation





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 NORTH TO THE LA CUEVA ARROYO. THE TOTAL DISCHARGE FROM THE SUBDIVISION DURING A 100-YEAR, 6-HOUR STORM IS 4.84 CFS. THE FIRST FLUSH VOLUME FROM THE SUBDIVISION FOR A 0.34-INCH RAIN IS 741 CUBIC-FEET. A POND IS LOCATED AT THE END OF THE STREET ALONG THE WEST WALL OF THE SUBDIVISION TO RETAIN THE FIRST FLUSH VOLUME. THE POND WILL SPILL INTO THE CONCRETE CHANNEL DESCRIBED ABOVE.

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 6.65 FEET BELOW THE ARROYO BOTTOM TO PROTECT THE SUBDIVISION AGAINST SCOUR DURING STORM EVENTS. A HEC-RAS ANALYSIS WAS COMPLETED TO DETERMINE THE IMPROVEMENTS WITHIN THE LA CUEVA ARROYO TO BE CONSTRUCTED TO BOTH PROTECT THE SUBDIVISION AND TO REMOVE THE FLOOD HAZARD ZONE THROUGH A LOMR TO FEMA.

FIRST FLUSH CALCULATIONS:
(0.34in÷12in/ft) x (1.2ac x 43,560sf/ac x 0.500) = 741 cf

NOTE: REFER TO SHEET C-501 FOR STREET SECTIONS A-A & B-B

LEGEND

- CONCRETE DRIVEWAY
- FLOW ARROW
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- CURB & GUTTER
- FEMA FLOODPLAIN BOUNDARY
- PROPERTY LINE
- 15+79 HECRAS CROSS SECTIONS
- ARROYO CENTER LINE
- PROPOSED SCOUR WALL

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

N

0 20 SCALE IN FEET

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	25.00	25.00	50.00	1.73	0.17	7,559	0.20	8,650	4.84
TOTAL RUNOFF	1.20						0.17	7,559	0.20	8,650	4.84
EXCESS PRECIP.		0.66	0.92	1.29	2.36	E_i (in)					
PEAK DISCHARGE		1.87	2.6	3.45	5.02	Q_{Pi} (cfs)					

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

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

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P.O. BOX 65760
ALBUQUERQUE, NM 87193
tecnm@yahoo.com
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:

DAVID THOMPSON 9677 LICENSED PROFESSIONAL ENGINEER
2-20-19

SIGNAL VILLAGE

GRADING AND DRAINAGE PLAN

CITY/COUNTY REVIEW

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

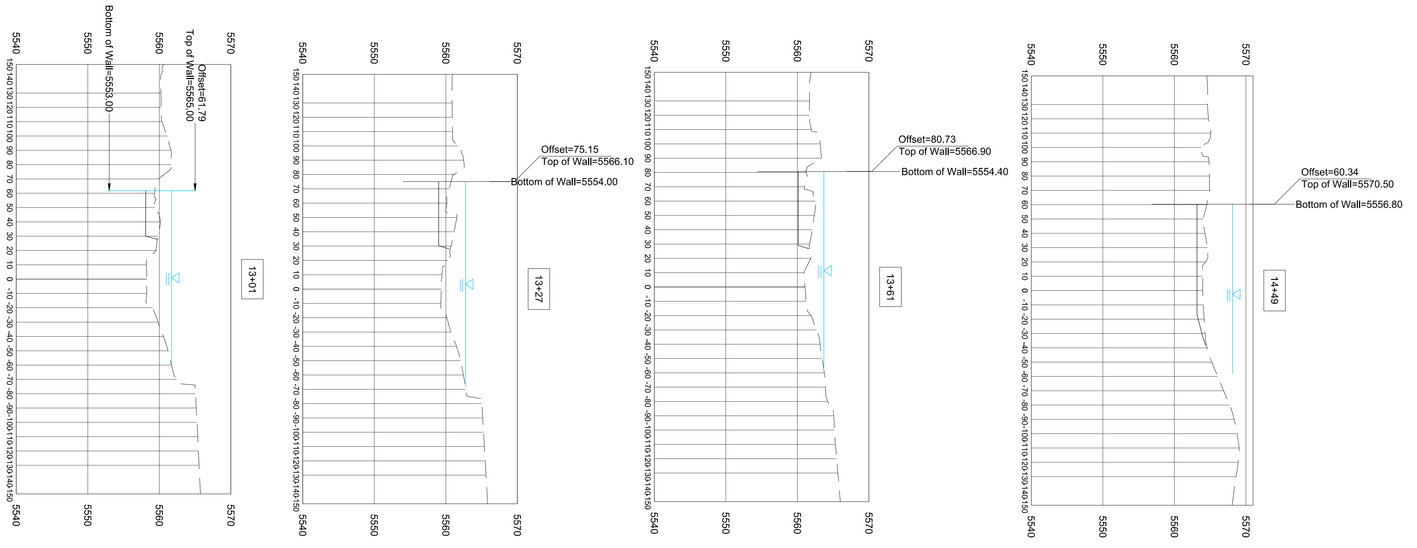
FOR CITY/COUNTY USE ONLY

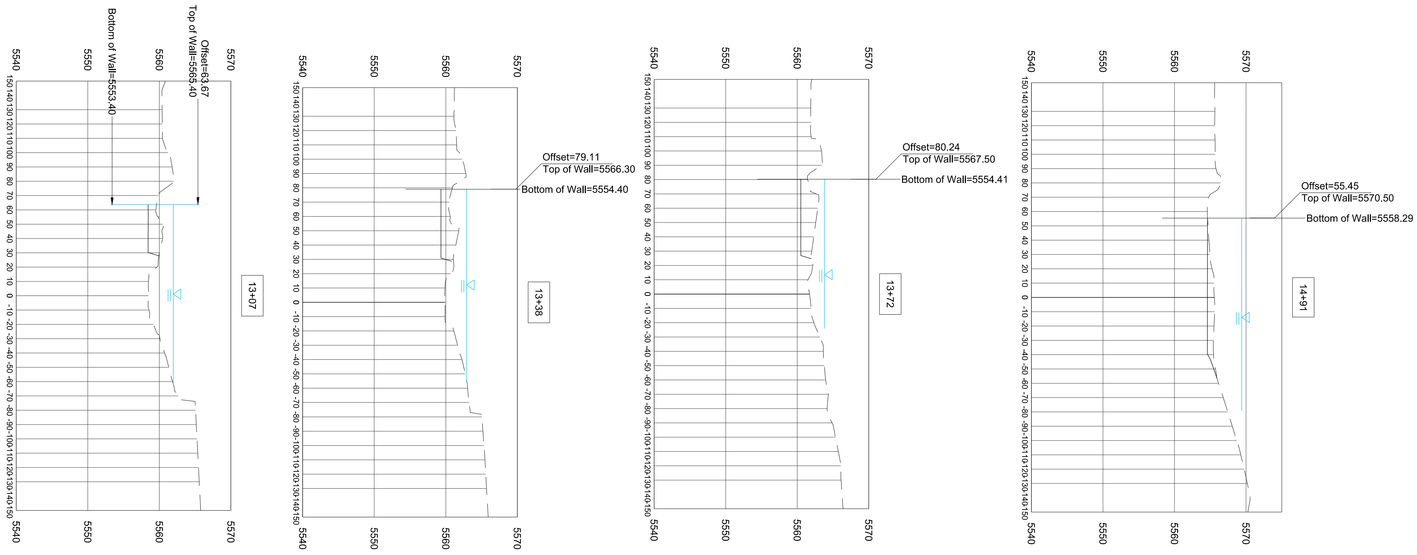
SHEET No.

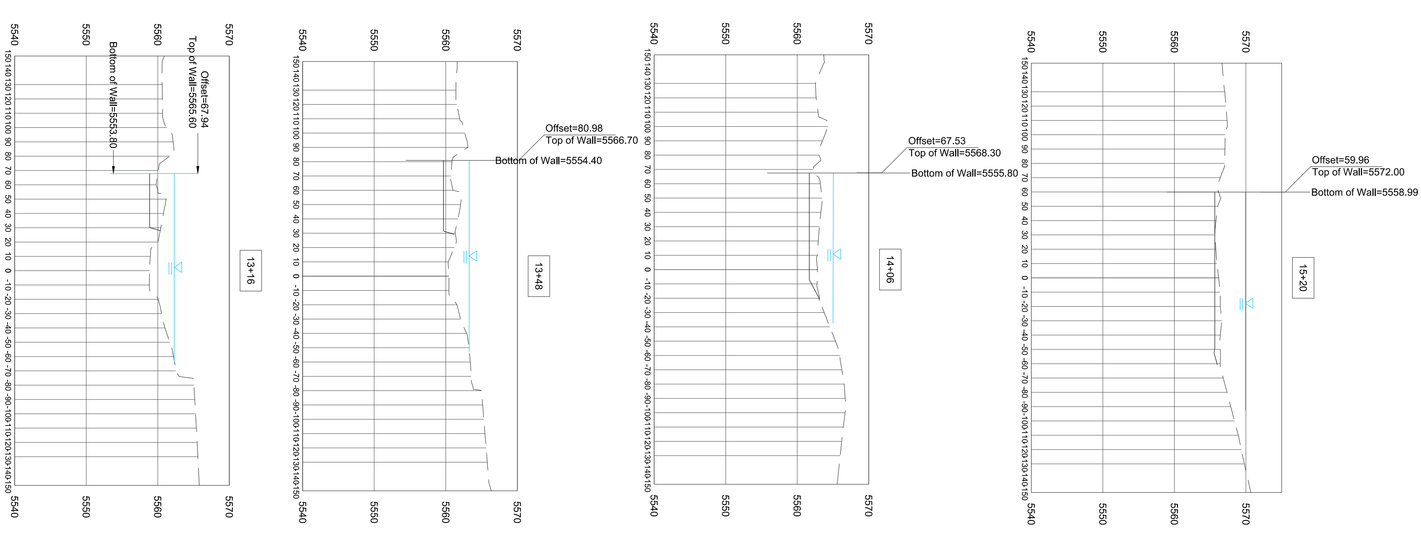
C101

NAME: L:\Active Projects\03384 La Cueva Arroyo\3. DWG\XREF\03384 DSGN.dwg PLOT DATE: Feb 20, 2019 10:16am

HORIZ 0
VERT 0
SCALE IN FEET
5 50







CITY/COUNTY REVIEW		
DEPARTMENT	SIGN-OFF	DATE
WASTEWATER MGMT. DIV.		
WATER SERVICES		
SUBDIVISION ENG.		
STREETS		
TRAFFIC		
FOR CITY/COUNTY USE ONLY		

SHEET No. C102

SIGNAL VILLAGE

CROSS SECTIONS 15+20 TO 13+01

NO.	REVISION	BY	DATE

PROJECT:	DRAWN BY: DEM
DATE:	CHECKED BY:
HORIZ. SCALE:	APPROVED BY:
VERT. SCALE:	FILE:

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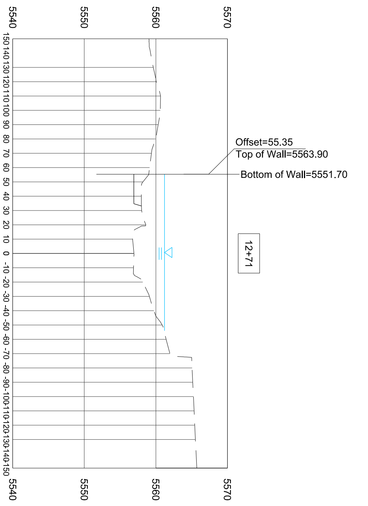
ALBUQUERQUE, NM 87193
PHONE: (505) 271-2198
FAX: (505) 830-8240

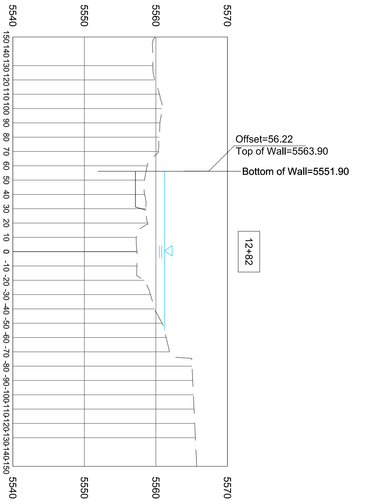
NAME: L:\Active Projects\033364 La Cueva Arroyo\3. DWG\XREF\033364 DSGN.dwg PLOT DATE: Feb 20, 2019 10:17am

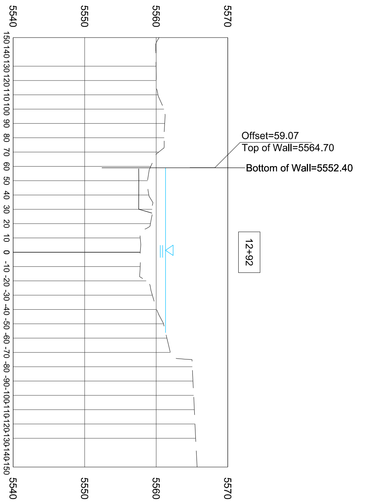
HORIZ 0
VERT 0
SCALE IN FEET
50
5

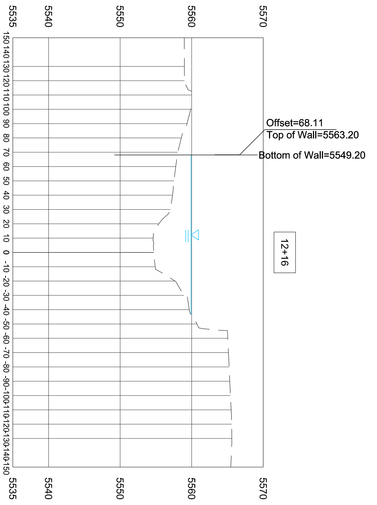
CROSS SECTION COORDINATES AT SIGNAL VILLAGE SCOUR WALL

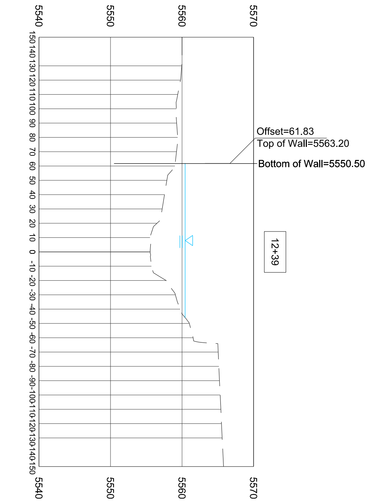
Arroyo Station	N	E
15+20	1522146.09	1553850.75
14+91	1522166.5	1553816.96
14+49	1522187.4	1553782.85
14+06	1522207.09	1553743.95
13+72	1522211.64	1553703.08
13+48	1522214.33	1553663.38
13+38	1522215.91	1553645.14
13+17	1522219.25	1553585.81
13+16	1522226.55	1553575.35
13+07	1522230.81	1553565.95
13+01	1522232.74	1553559.75
12+92	1522235.55	1553550.73
12+82	1522239.74	1553537.26
12+71	1522244.09	1553522.28
12+58	1522248.93	1553505.12
12+39	1522256.19	1553479.53
12+16	1522261.42	1553460.38

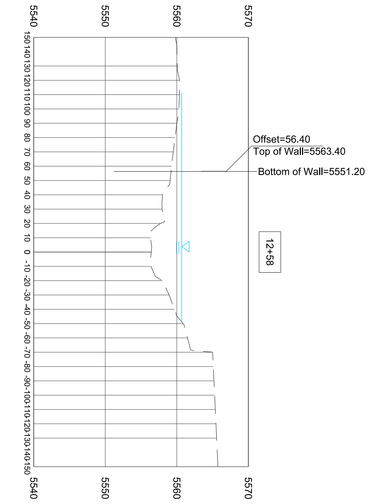


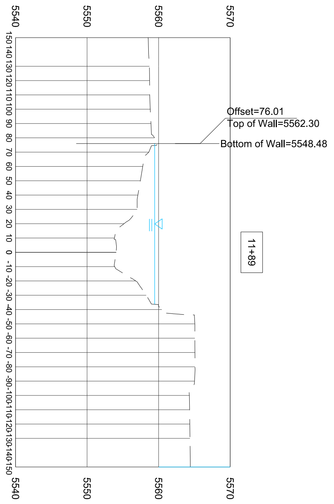












CITY/COUNTY REVIEW		
DEPARTMENT	SIGN-OFF	DATE
WASTEWATER MGMT. DIV.		
WATER SERVICES		
SUBDIVISION ENG.		
STREETS		
TRAFFIC		
FOR CITY/COUNTY USE ONLY		

SIGNAL VILLAGE

CROSS SECTIONS 12+92 TO 11+89

NO.	REVISION	BY	DATE

PROJECT:	DRAWN BY: DEM
DATE:	CHECKED BY:
HORIZ. SCALE:	APPROVED BY:
VERT. SCALE:	FILE:

Thompson Engineering Consultants, Inc.
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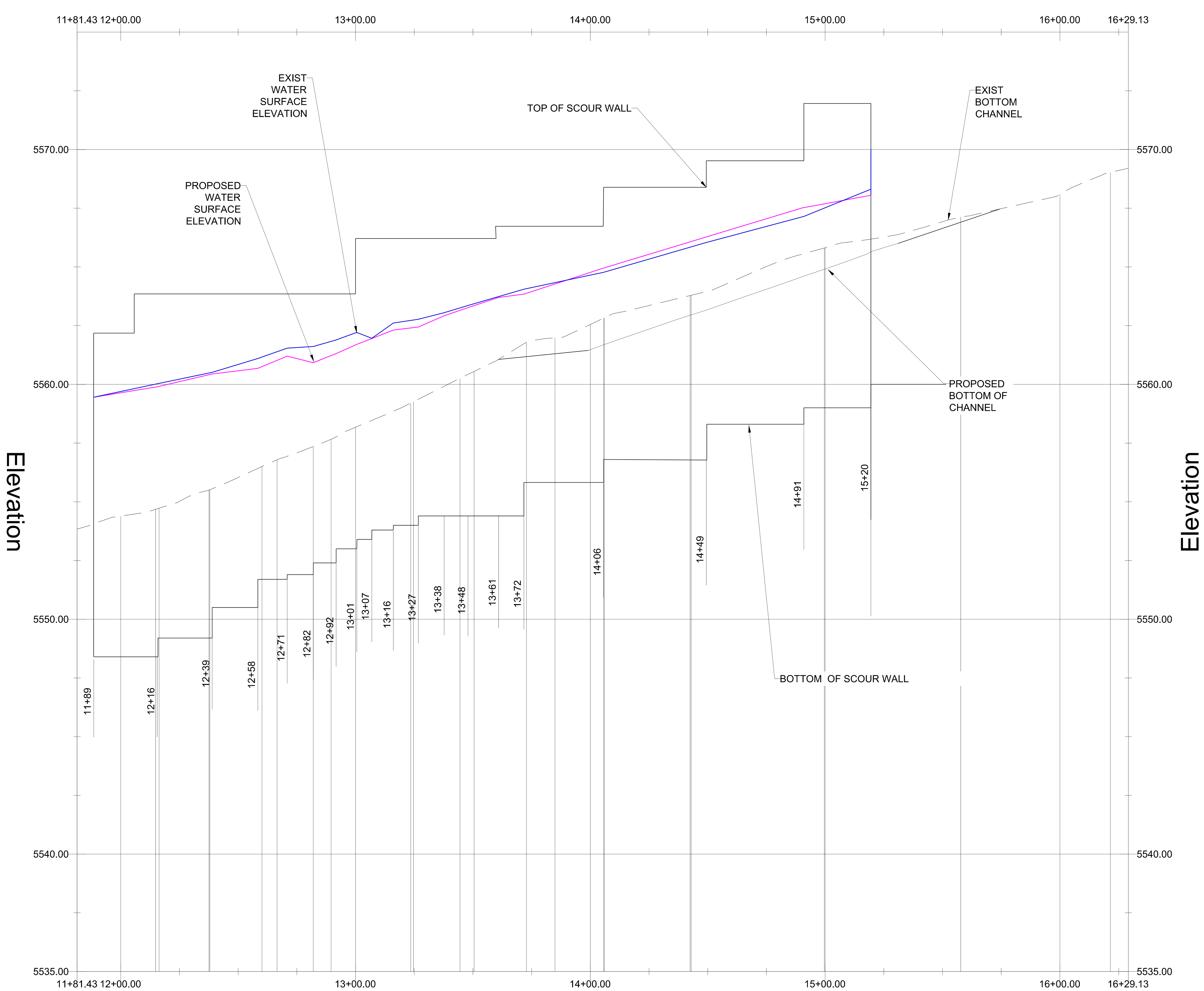
PHONE: (505) 271-2198
FAX: (505) 830-6240

SHEET No.
C103

Profile View of Subdivision North Scour Wall

Station



Station

HORZ 0 30
VERT 0 10
SCALE IN FEET

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FAX: (505) 830-9246

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PROJECT:
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VERT. SCALE:
DRAWN BY: DEM
CHECKED BY:
APPROVED BY:
FILE:

9677
PROFESSIONAL
2-20-19

SIGNAL VILLAGE

=NORTH SCOUR WALL PROFILE VIEW

CITY/COUNTY REVIEW

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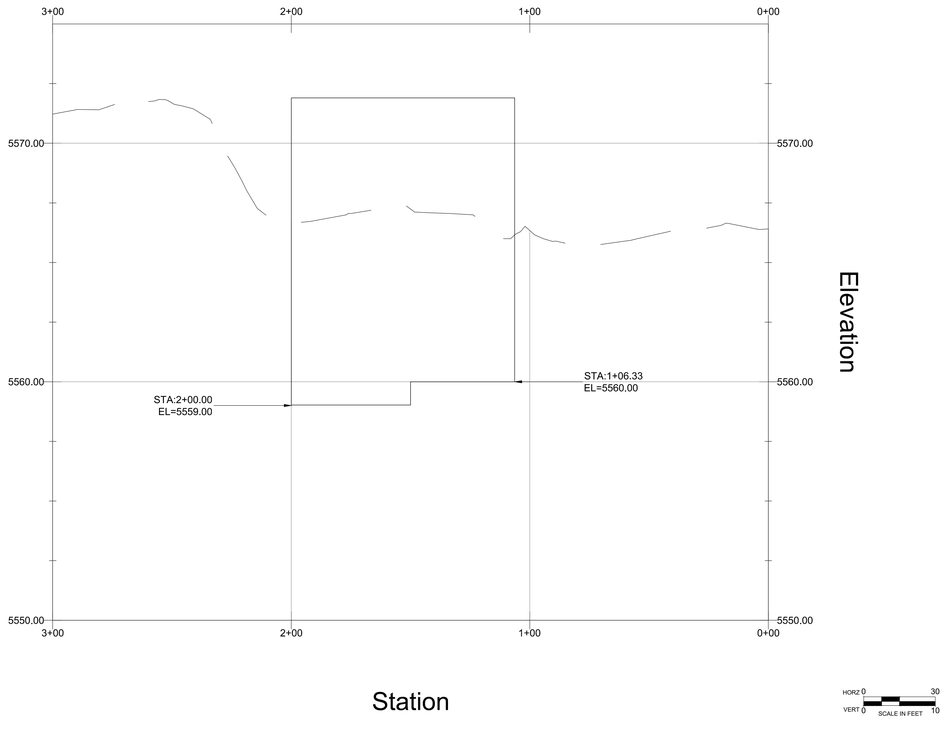
WATER SERVICES		
SUBDIVISION ENG.		
STREETS		
TRAFFIC		

FOR CITY/COUNTY USE ONLY

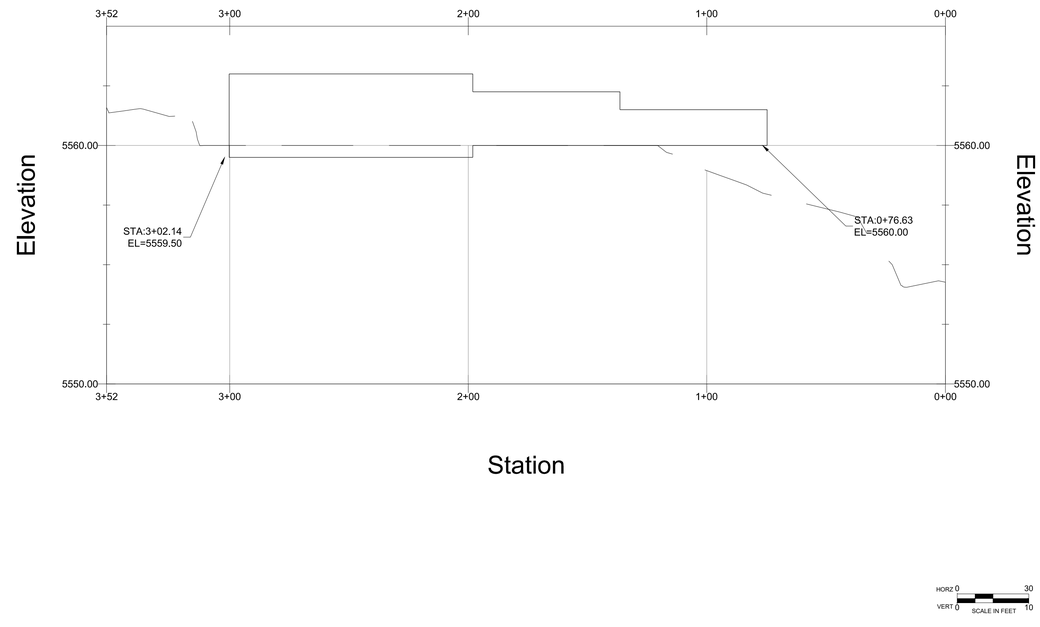
SHEET No.

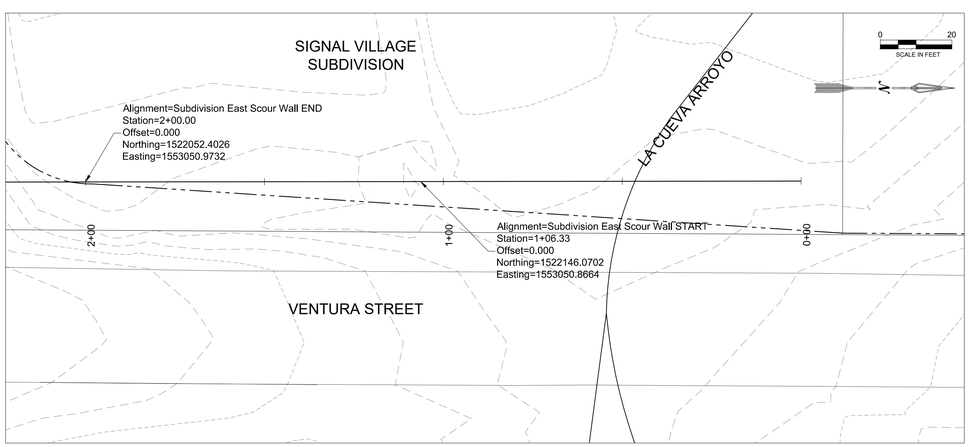
C104

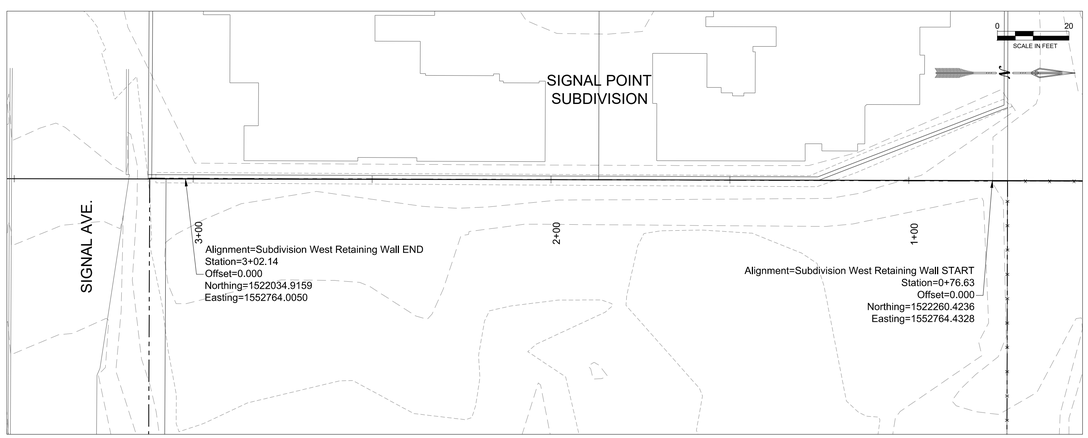
SUBDIVISION EAST SCOUR WALL



SUBDIVISION WEST RETAINING WALL







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NO.	REVISION	BY	DATE

PROJECT: SIGNAL VILLAGE
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DATE:
CHECKED BY:
HORIZ. SCALE:
APPROVED BY:
VERT. SCALE:
FILE:

DANIEL THOMPSON 9677 REGISTERED PROFESSIONAL ENGINEER
2-20-19

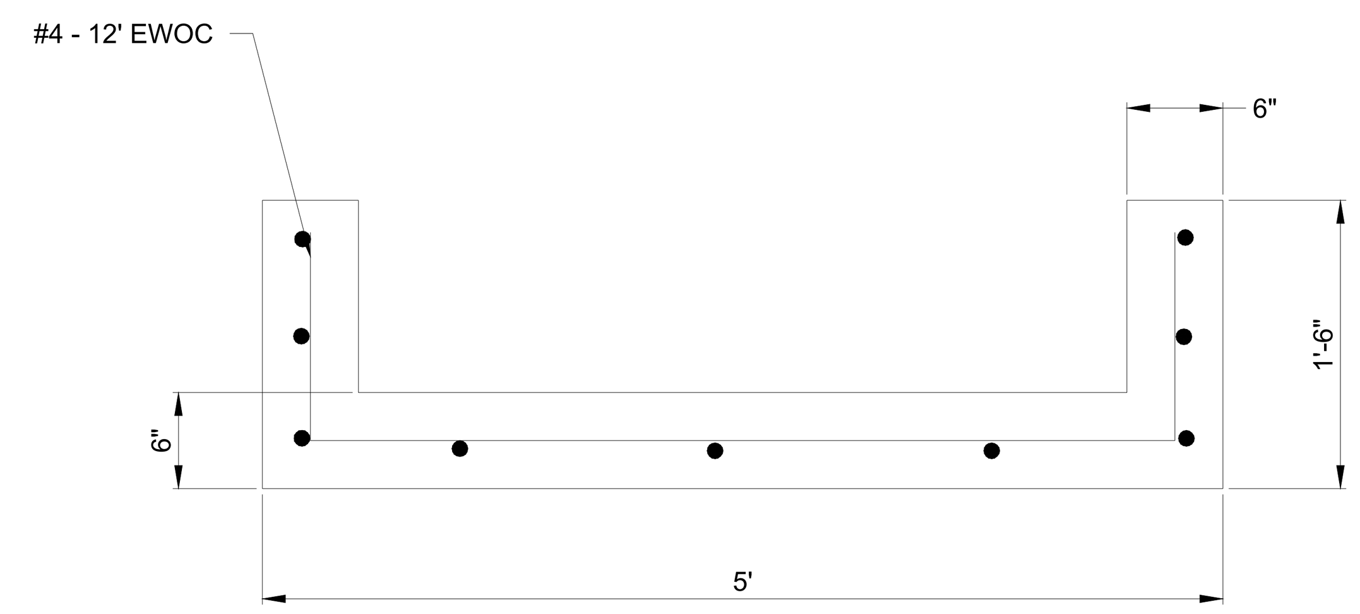
WEST AND EAST WALL
PLAN AND PROFILE

CITY/COUNTY REVIEW

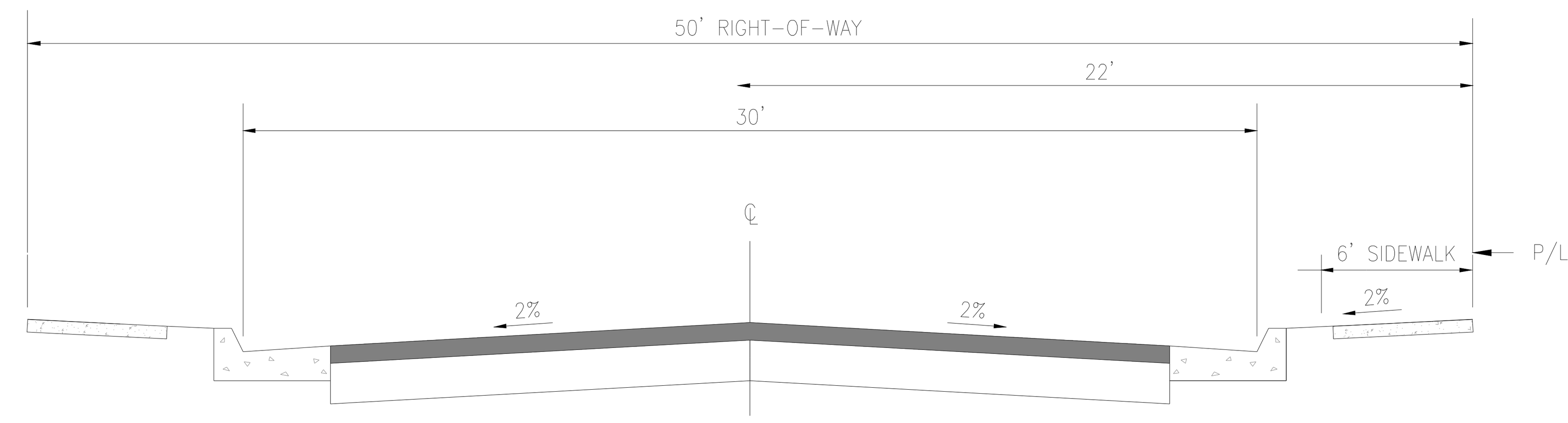
DEPARTMENT	SIGN-OFF	DATE
WASTEWATER MGMT. DIV.		
WATER SERVICES		
SUBDIVISION ENG.		
STREETS		
TRAFFIC		

FOR CITY/COUNTY USE ONLY

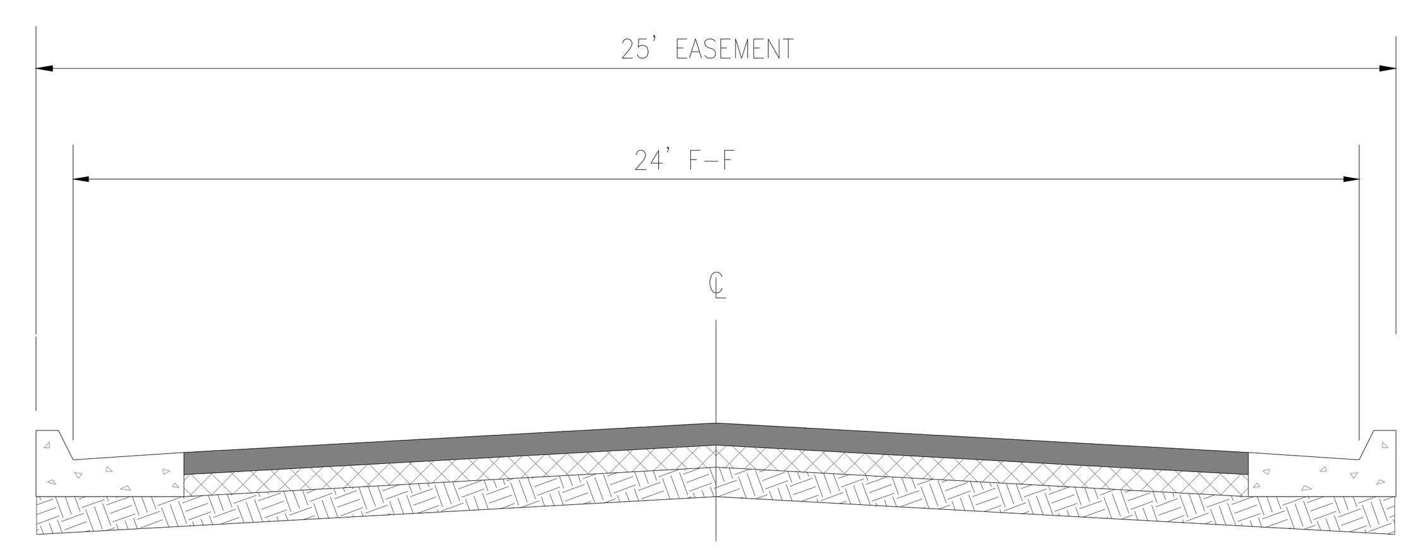
SHEET No.
C105



5' WIDE CONCRETE CHANNEL DETAIL
NTS



CROSS SECTION B-B
NTS



CROSS SECTION A-A
NTS

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NO.	REVISION	BY	DATE

DRAWN BY: DEM
CHECKED BY:
APPROVED BY:
FILE:
PROJECT:
DATE:
HORIZ. SCALE:
VERT. SCALE:

DAVID THOMPSON 9677 LICENSED PROFESSIONAL ENGINEER
2-20-19

SIGNAL VILLAGE

DETAILS

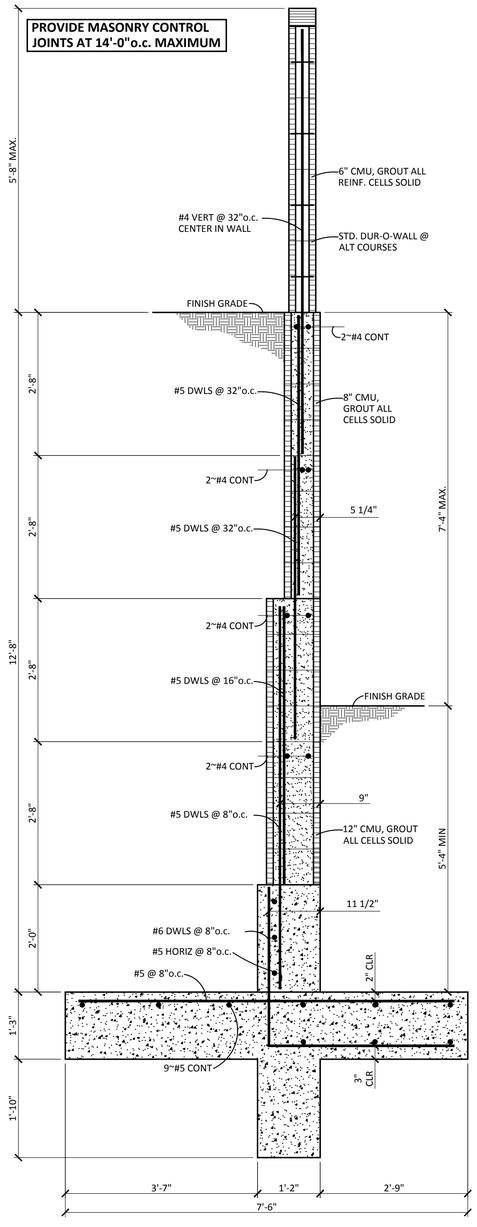
CITY/COUNTY REVIEW

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

FOR CITY/COUNTY USE ONLY

SHEET No.

C501



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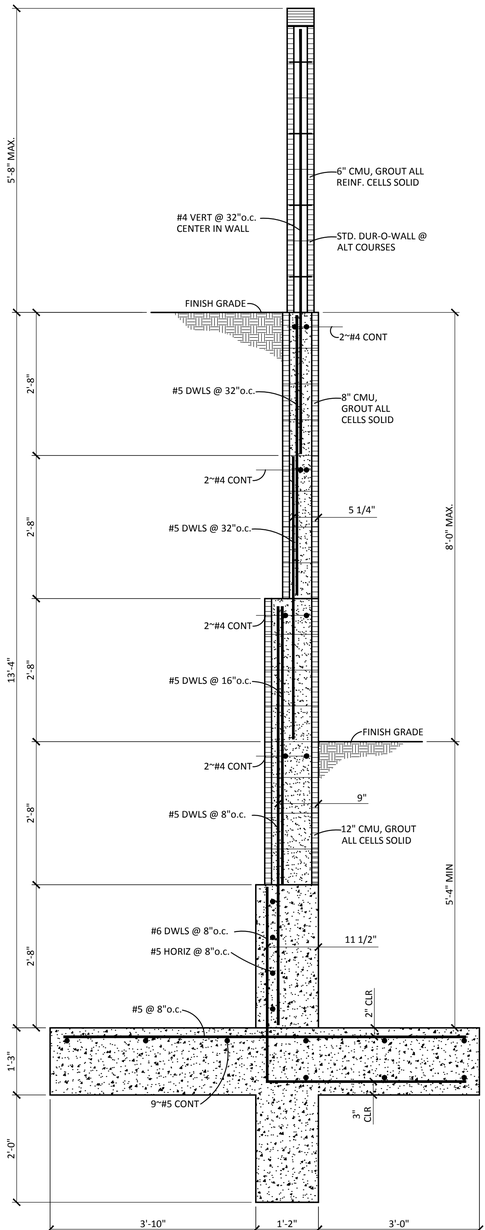

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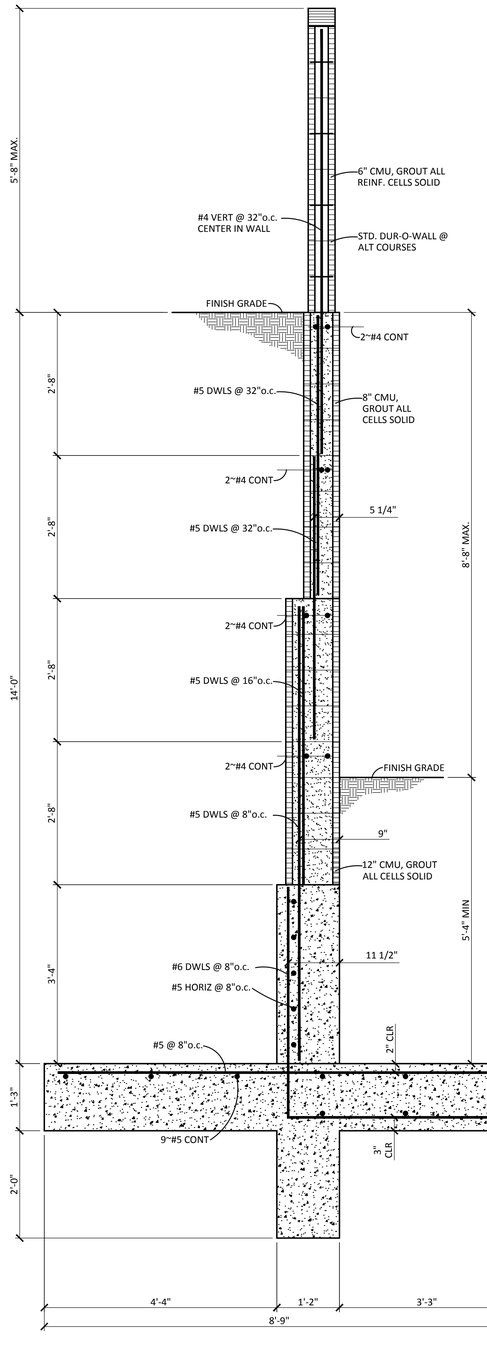
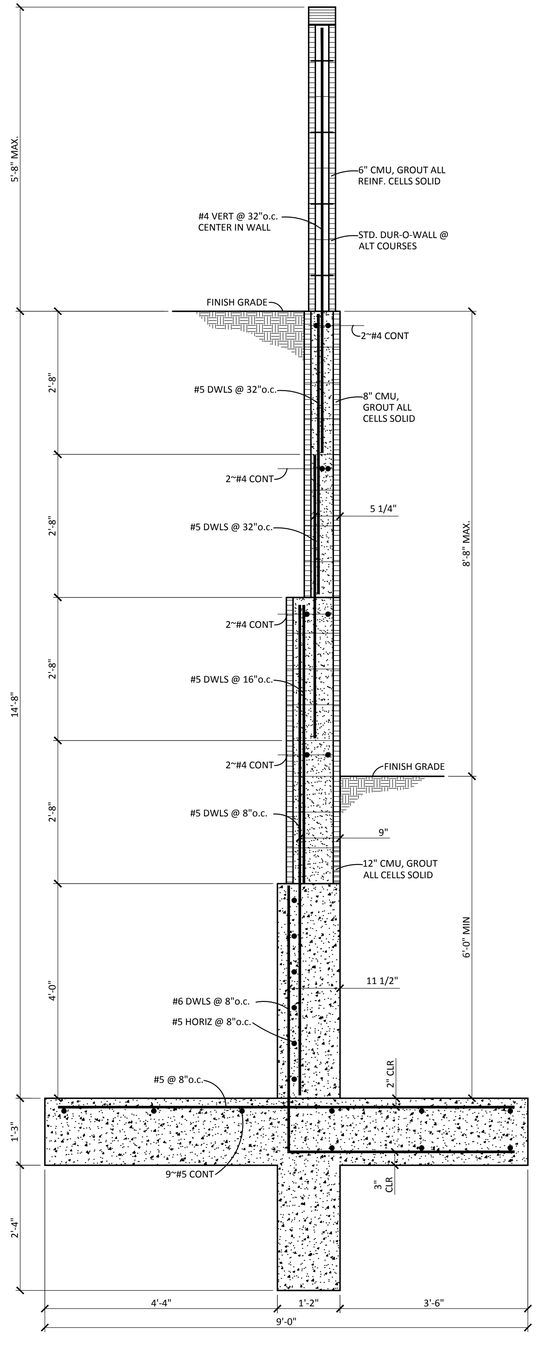
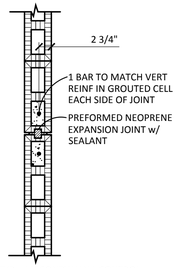


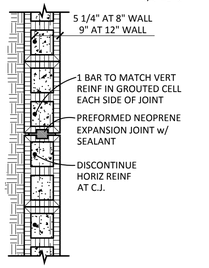
3 S1 3/4"=1'-0"



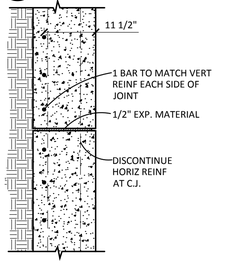
4 S1 3/4"=1'-0"



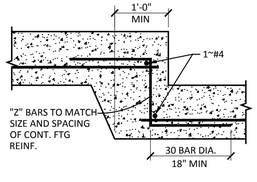
5 S1 TYP. MASONRY WALL CONTROL JOINT (MCJ) AT 6" CMU WALL 3/4"=1'-0"



6 S1 TYP. MASONRY WALL CONTROL JOINT (MCJ) AT 8" AND 12" CMU WALL 3/4"=1'-0"



7 S1 TYP. MASONRY WALL CONTROL JOINT (MCJ) AT 14" CONCRETE WALL 3/4"=1'-0"



8 S1 TYP. FOOTING STEP 3/4"=1'-0"

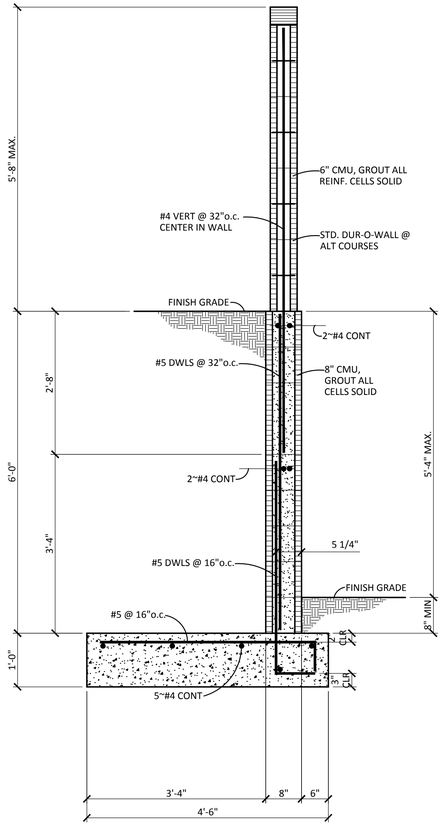
GENERAL STRUCTURAL NOTES

1. CODES AND MANUALS:
   International Building Code, 2015 Edition
   ACI 318-05
2. DESIGN LOADS:
   A. Equivalent Fluid Pressure = 35 pcf/ft
   B. Maximum allowable soil bearing pressure: 2,00psf
3. GENERAL:
   A. The Contractor shall verify all dimensions in the field.
   B. The Contractor shall be responsible for providing safe and adequate shoring for all parts of the structure during construction.
4. MATERIALS:
   A. Cast-in-place Concrete:
      1. All concrete shall conform to the Specifications for Structural Concrete, ACI 301
      2. Normal Weight Concrete:
         a. 3,000 psi @ 28 days
      3. The sides of all footings shall be FORMED. The use of earth forms is NOT allowed.
   B. Reinforcing Steel:
      1. All reinforcing steel shall conform to ASTM A615 Grade 60.
      2. Reinforcing steel shall be fabricated and placed in accordance with the Building Code Requirements for Reinforced Concrete ACI 318 and the Standard Manual ACI 315.
      3. Bar supports and spacers for rebar shall be provided in accordance with ACI 315.
      4. Where lapped splices in reinforcing occur, the minimun lap shall be made as follows:
         a. Vertical reinforcing: 40 bar dia. or 24" minimum.
         b. Horizontal reinforcing: 30 bar dia. or 18" minimum.
         c. Horizontal corner bars: 30 bar dia. or 18" minimum.
      5. Concrete cover for reinforcing shall be as follows:
         a. Concrete cast against and permanently exposed to earth.....3"
         b. Concrete exposed to earth or weather
            1. Bars larger than No. 5 .....2"
            2. Bars No. 5 or smaller ....1 1/2"
      6. The Contractor shall be responsible to see that all rebar is properly aligned and tied in place before placing concrete. All wall dowels and vertical steel shall be accurately located and secured in place so that it remains in the position during the concrete placing operation. Any rebar found to be improperly installed shall be removed and replaced at no additional cost to the Owner.
   C. Masonry:
      1. All masonry units shall have an average compressive strength of 1850 psi @ 28 days.
      2. All mortar shall be Type S with a strength of 2500 psi at 28 days.
      3. Grout shall have a minimum compressive strength of 3000 psi at 28 days.
      4. All hollow masonry to be reinforced shall be marked with keel at the bottom of the wall at the cells where dowels occur or rebar is to be placed and grouted.
      5. Cells containing rebar shall be grouted solid from the bottom to the top of the wall in accordance with IBC regulations. Cleanouts shall be provided at the bottom of walls at all cells to be grouted where the grout pour exceeds 4' in height.
      6. Lap all bars 40 diameters or 2'-0" minimum unless otherwise noted.
5. SITE GRADING AND EARTHWORK
   A. Foundation Preparation:
      Building areas shall be completely stripped of vegetation, existing construction and debris, and soft or muddy areas.
   B. Foundations:
      Over excavate beneath bottom elevation of all footings a minimum of three feet. The excavation shall extend a minimum of three feet laterally beyond the edge of all footings.
      The bottoms of excavations shall be scarified to a depth of 8", moistened within optimum moisture, +/-3%, and compacted to a minimum of 95% of standard proctor as determined by ASTM D698. The structural fill shall be thoroughly mixed within optimum moisture, +/-3%, placed in thin horizontal lifts, 8" max. loose depth, and compacted to a minimum of 95% of standard proctor as determined by ASTM D698.
   C. Backfills:
      All backfills should be thoroughly mixed within optimum moisture, +/-3%, placed in thin horizontal lifts, 8" max. loose depth, and compacted to a minimum of 95% of standard proctor, ASTM D698.
   D. Site Drainage:
      Provide positive surface drainage away from foundation excavations during construction.

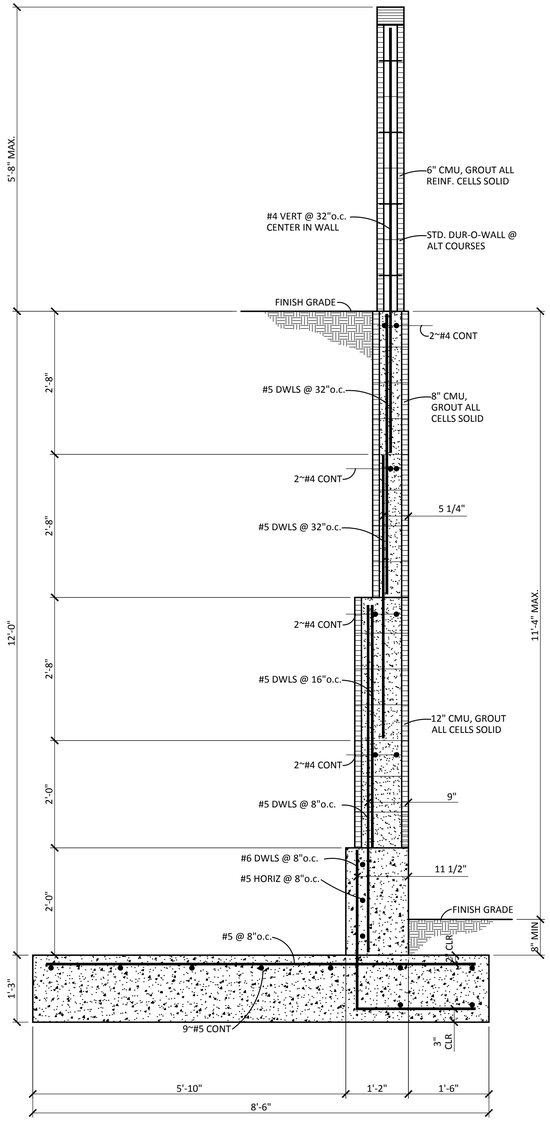
MacCORNACK ENGINEERING
1776 Montano Blvd. NW, SUITE 24
LOS RANCHOS de ALBUQUERQUE, NEW MEXICO 87107

DONALD A. MACCORNACK NEW MEXICO 9838 REGISTERED PROFESSIONAL ENGINEER 2-13-19

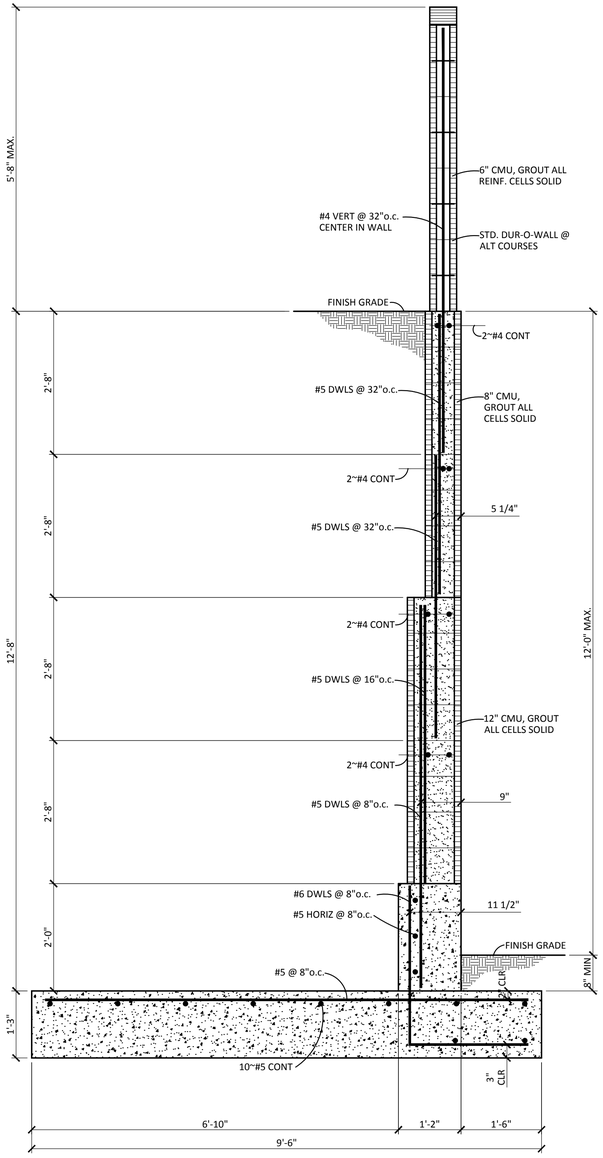
CLIENT:	**RBK REALTY INC** 8830 Keeran Lane NE Albuquerque, New Mexico
PROJECT:	SIGNAL VILLAGE SUBDIVISION North Albuquerque Acres Albuquerque, New Mexico
DRAWING:	RETAINING WALL SECTIONS AND GENERAL STRUCTURAL NOTES
JOB NO: R37-002	DATE: 2/13/19
SHEET NO:	S1



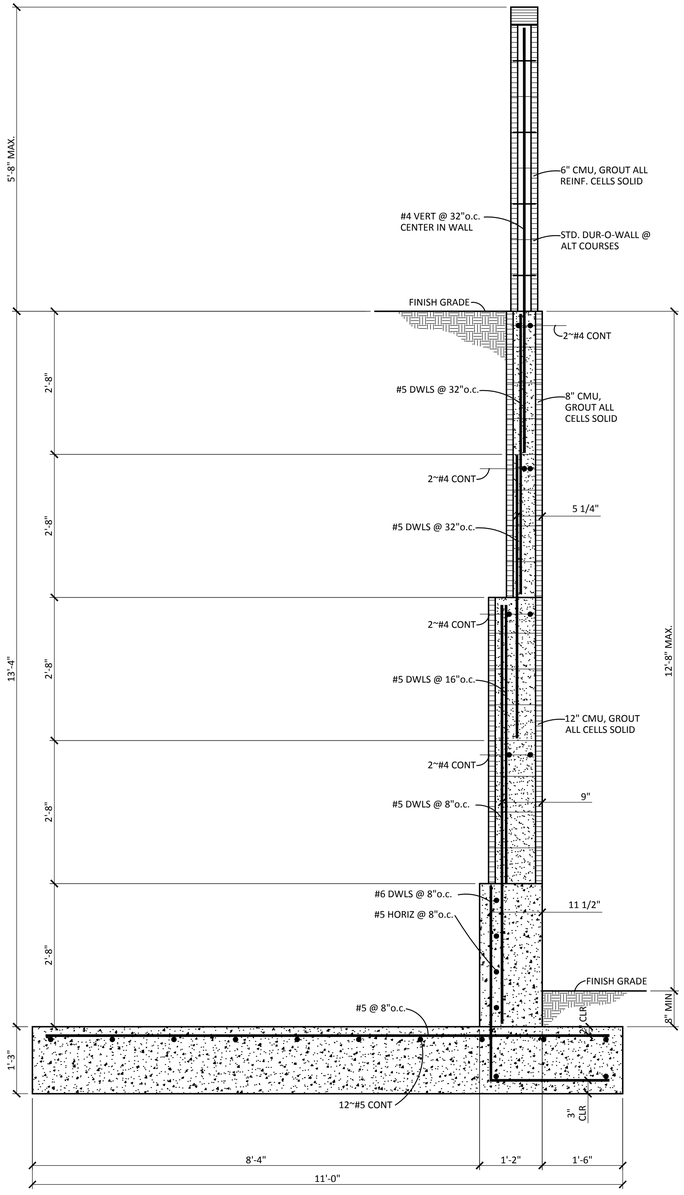
1 S2 3/4"=1'-0"



2 S2 3/4"=1'-0"



3 S2 3/4"=1'-0"



4 S2 3/4"=1'-0"

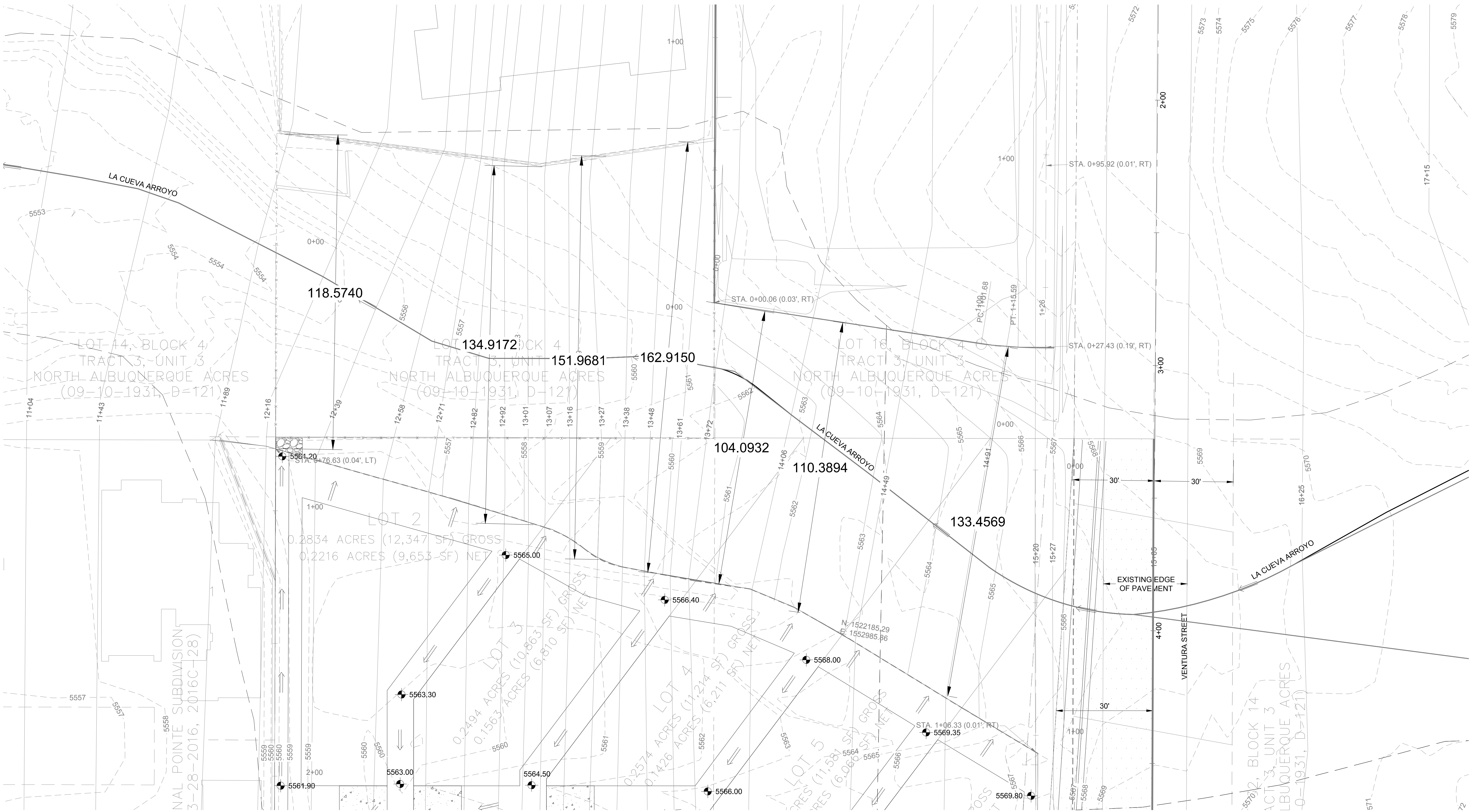
MacCORNACK ENGINEERING
1776 Montano Blvd. NW, SUITE 24
LOS RANCHOS de ALBUQUERQUE, NEW MEXICO 87107

CLIENT: **RBK REALTY INC**
8830 Keeran Lane NE
Albuquerque, New Mexico

PROJECT: SIGNAL VILLAGE SUBDIVISION
North Albuquerque Acres
Albuquerque, New Mexico

DRAWING: RETAINING WALL SECTIONS AND GENERAL STRUCTURAL NOTES

JOB NO:	DATE:	SHEET NO:
R37-002	2/13/19	S2



LA CUEVA ARROYO
118.5740
134.9172
151.9681
162.9150
104.0932
110.3894
133.4569
LOT 14, BLOCK 4
TRACT 3, UNIT 3
NORTH ALBUQUERQUE ACRES
(09-10-1931, D-121)
LOT 16, BLOCK 4
TRACT 3, UNIT 3
NORTH ALBUQUERQUE ACRES
(09-10-1931, D-121)
LOT 2
0.2834 ACRES (12,347 SF) GROSS
0.2216 ACRES (9,653 SF) NET
LOT 3
0.2494 ACRES (10,863 SF) GROSS
0.1563 ACRES (6,810 SF) NET
LOT 4
0.2574 ACRES (11,214 SF) GROSS
0.1426 ACRES (6,211 SF) NET
LOT 5
STA. 0+76.63 (0.04', LT)
STA. 0+00.06 (0.03', RT)
STA. 0+95.92 (0.01', RT)
STA. 0+27.43 (0.19', RT)
STA. 1+06.33 (0.01', RT)
N: 1522185.29
E: 1552985.86
EXISTING EDGE OF PAVEMENT
VENTURA STREET
30'
5561.20
5565.00
5566.40
5568.00
5563.30
5569.35
5563.00
5564.50
5566.00
5561.90
5569.80

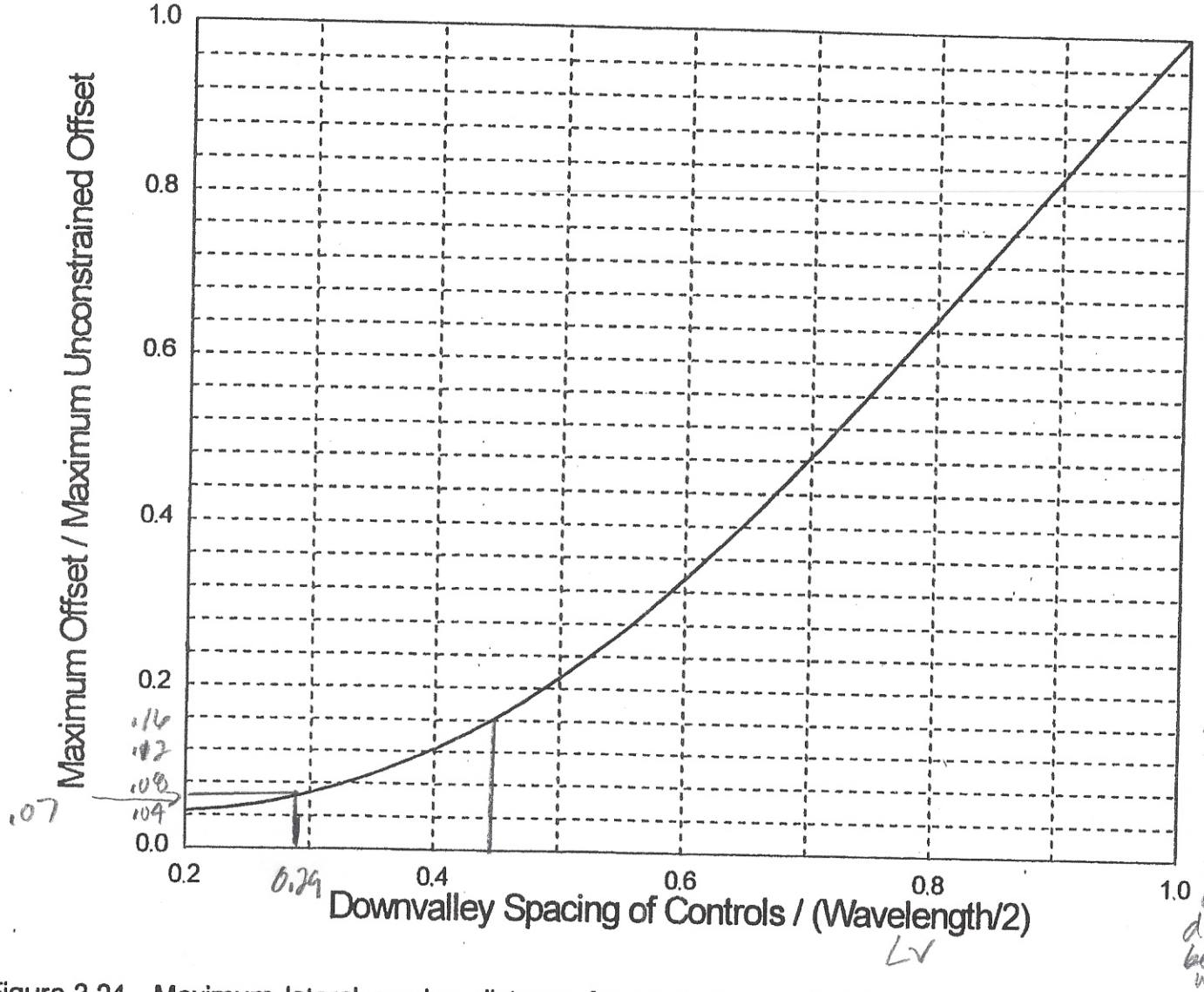


Figure 3.24. Maximum lateral erosion distance for control spaced at less than half the assumed unconstrained meander length.

LV = 360 FT

TABLE 1

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	COL 27	COL 28	COL 29	COL 30	COL 31	COL 32
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)	SPACING OF CNTRLS. (FT)	SPACING./ LV	MO/ MUO	MO (FT)	2(MO)/WD	VEL (FPS)	FROUDE	AREA (SF)	TOP WID (FT)	HYD DEP (FT)	YS/Y	YS (FT)	HECRAS DEPTH (FT)	HECRAS FROUDE	SEQ DEP (FT)	FRBRD (FT)	WALL HT (FT)	MIN CH. ELEV	BOTTOM WALL EL.	MIN. TOP WALL EL.	HEC-RAS STA.
1	1527	3090	618.0	0.0157	0.0359	60.1	719.5	359.7	168.8	198.8	133.5	0.37	0.11	21.9	0.73	12.89	2.27	262.09	262.25	1.00	3.00	3.00	2.46	1.61	3.29	1.70	9.99	5565.88	5561.88	5571.88	1527
2	1520	3090	618.0	0.0157	0.0359	60.1	719.5	359.7	168.8	198.8	133.5	0.37	0.11	21.9	0.73	14.10	2.06	219.22	150.33	1.46	2.59	3.78	1.50	2.06	3.62	1.68	11.09	5565.65	5560.87	5571.96	1520
3	1491	3090	618.0	0.0157	0.0359	60.1	719.5	359.7	168.8	198.8	133.5	0.37	0.11	21.9	0.73	10.49	1.25	296.91	136.34	2.18	1.42	3.09	2.56	1.20	3.15	1.65	9.89	5564.61	5560.52	5570.41	1491
4	1449	3090	618.0	0.0157	0.0359	60.1	719.5	359.7	168.8	198.8	120.0	0.33	0.08	15.9	0.53	11.95	1.41	259.65	115.71	2.24	1.60	3.59	2.52	1.38	3.67	1.68	10.95	5563.16	5558.57	5569.52	1449
5	1406	3090	618.0	0.0157	0.0359	60.1	719.5	359.7	168.8	198.8	110.4	0.31	0.07	13.9	0.46	12.03	1.37	257.08	106.61	2.41	1.55	3.74	2.84	1.36	4.01	1.70	11.45	5561.68	5556.94	5568.39	1406
6	1372	3090	618.0	0.0157	0.0359	60.1	719.5	359.7	168.8	198.8	104.0	0.29	0.06	11.9	0.40	12.71	1.44	243.18	100.85	2.41	1.65	3.97	2.81	1.44	4.25	1.71	11.93	5560.50	5555.53	5567.46	1372
7	1361	3090	618.0	0.0157	0.0359	60.1	719.5	359.7	168.8	198.8	162.9	0.45	0.16	31.8	1.06	11.44	1.35	272.87	121.93	2.24	1.53	3.42	3.25	1.25	4.00	1.70	11.12	5560.13	5555.71	5566.83	1361
8	1348	3090	618.0	0.0157	0.0359	60.1	719.5	359.7	168.8	198.8	162.9	0.45	0.16	31.8	1.06	12.01	1.39	261.13	113.24	2.31	1.58	3.65	3.15	1.35	4.24	1.71	11.60	5559.68	5555.03	5566.63	1348
9	1338	3090	618.0	0.0157	0.0359	60.1	719.5	359.7	168.8	198.8	162.9	0.45	0.16	31.8	1.06	12.37	1.46	259.39	115.83	2.24	1.66	3.72	3.13	1.34	4.16	1.72	11.60	5559.33	5554.61	5566.21	1338
10	1327	3090	618.0	0.0157	0.0359	60.1	719.5	359.7	168.8	198.8	152.0	0.42	0.13	25.8	0.86	13.24	1.61	234.21	111.73	2.10	1.87	3.92	2.71	1.57	4.34	1.72	11.98	5559.00	5554.08	5566.06	1327
11	1316	3090	618.0	0.0157	0.0359	60.1	719.5	359.7	168.8	198.8	152.0	0.42	0.13	25.8	0.86	12.17	1.44	256.11	115.41	2.22	1.64	3.64	2.88	1.39	4.05	1.70	11.40	5558.81	5554.17	5565.57	1316
12	1307	3090	618.0	0.0157	0.0359	60.1	719.5	359.7	168.8	198.8	134.9	0.37	0.11	21.9	0.73	12.56	1.49	246.63	111.34	2.22	1.70	3.77	2.81	1.45	4.16	1.71	11.64	5558.44	5553.67	5565.31	1307
13	1301	3090	618.0	0.0157	0.0359	60.1	719.5	359.7	168.8	198.8	134.9	0.37	0.11	21.9	0.73	12.83	1.49	244.67	106.42	2.30	1.71	3.93	2.88	1.42	4.19	1.72	11.84	5558.09	5553.16	5565.00	1301
14	1292	3090	618.0	0.0157	0.0359	60.1	719.5	359.7	168.8	198.8	134.9	0.37	0.11	21.9	0.73	13.35	1.55	238.87	103.51	2.31	1.78	4.12	2.97	1.44	4.35	1.74	12.20	5557.56	5552.44	5564.64	1292
15	1282	3090	618.0	0.0157	0.0359	60.1	719.5	359.7	168.8	198.8	130.0	0.36	0.10	19.9	0.66	13.51	1.56	229.43	98.98	2.32	1.81	4.19	2.96	1.31	3.93	1.74	11.86	5557.14	5551.95	5563.81	1282
16	1271	3090	618.0	0.0157	0.0359	60.1	719.5	359.7	168.8	198.8	130.0	0.36	0.10	19.9	0.66	12.58	1.40	251.55	99.81	2.52	1.59	4.00	3.39	1.31	4.45	1.73	12.18	5556.70	5551.70	5563.88	1271
17	1258	3090	618.0	0.0157	0.0359	60.1	719.5	359.7	168.8	198.8	125.0	0.35	0.09	17.9	0.60	10.04	1.02	315.21	105.16	3.00	1.19	3.56	4.42	0.97	4.42	1.69	11.67	5556.26	5551.70	5563.37	1258
18	1239	3090	618.0	0.0157	0.0359	60.1	719.5	359.7	168.8	198.8	125.0	0.35	0.09	17.9	0.60	11.36	1.17	314.52	107.12	2.94	1.33	3.91	4.78	0.98	4.78	1.73	12.42	5555.49	5550.58	5563.00	1239
19	1216	3090	618.0	0.0157	0.0359	60.1	719.5	359.7	168.8	198.8	118.6	0.33	0.08	15.9	0.53	13.28	1.41	271.01	98.80	2.74	1.61	4.41	4.64	1.16	5.23	1.79	13.43	5554.61	5549.20	5562.63	1216
20	1189	3090	618.0	0.0157	0.0359	60.1	719.5	359.7	168.8	198.8	118.6	0.33	0.08	15.9	0.53	13.39	1.49	270.63	108.00	2.51	1.71	4.28	4.97	1.17	5.54	1.80	13.62	5553.76	5548.48	5562.10	1189

COL 1	CHANNEL CROSS-SECTION NUMBER
COL 2	HEC-RAS CHANNEL STATION
COL 3	100-YEAR PEAK DISCHARGE, Q (CFS)
COL 4	DOMINANT DISCHARGE, QD = 0.2 Q100 (CFS)
COL 5	CRITICAL SLOPE, SC = 0.037 QD (^-0.133) (FT/FT)
COL 6	AVERAGE SLOPE OF THE CHANNEL (FT/FT)
COL 7	DOMINANT CHANNEL WIDTH, WD = 4.6QD(^0.4) (FT), SINCE SAVG>SC
COL 8	MEANDER WAVELENGTH, LAMDA = ((4)LOG(QD)+0.8)WD (FT) FOR 200 < QD < 2000 CFS
COL 9	DOWN-VALLEY LENGTH, LV = LAMDA/2 (FT)
COL 10	MAXIMUM LATERAL EROSION, DELTA MAX = (0.92+(4.6)LOG(QD))QD(^0.4) (FT) FOR 200 < QD < 2000 CFS
COL 11	EROSION SETBACK = WD/2 + DELTA MAX (FT)
COL 12	SPACING OF CONTROLS (DISTANCE BETWEEN PARALLEL SCOUR WALLS IN FT.)
COL 13	SPACING OF CONTROLS/DOWN-VALLEY LENGTH (LV)
COL 14	MAXIMUM OFFSET/MAXIMUM UNCONSTRAINED OFFSET (OR EROSION SETBACK), FROM FIGURE 3.24 AMAFCA SEDIMENT AND EROSION DESIGN GUIDE
COL 15	MAXIMUM OFFSET = (MO/MUO)MUO OR EROSION SETBACK, FT.
COL 16	2(MAXIMUM OFFSET)/DOMINANT CHANNEL WIDTH, IF LESS THAN 1.0 THEN HAVE PARALLEL SCOUR ACTING ON WALL, IF GREATER THAN 1.0 THEN HAVE PARALLEL AND IMPINGEMENT SCOUR ON WALL
COL 17	CHANNEL VELOCITY FROM HECRAS (FT/SEC)
COL 18	FROUDE NUMBER CALCULATED USING HYDRAULIC DEPTH
COL 19	CROSS-SECTIONAL AREA FROM HECRAS (SQ. FT)
COL 20	TOP WIDTH FROM HECRAS (FT)
COL 21	HYDRAULIC DEPTH, HD = A/TW (FT)
COL 22	RATIO OF SCOUR DEPTH TO FLOW DEPTH, YS/Y (SINCE COL 16 IS LESS THAN OR EQUAL TO 1.0, SCOUR ACTING ON THE WALLS IS PARALLEL SCOUR, YS/Y = 0.73 + (0.14)PI(FR^2)
COL 23	ESTIMATED SCOUR (FT)
COL 24	DEPTH OF FLOW FROM HECRAS (FT)
COL 25	FROUDE NUMBER FROM HECRAS
COL 26	SEQUENT DEPTH (FT)
COL 27	FREEBOARD (FT)
COL 28	SCOUR WALL HEIGHT = SCOUR DEPTH + SEQUENT DEPTH +FREEBOARD+ TWO FOOT FACTOR OF SAFTEY (FT)
COL 29	MINIMUM CHANNEL ELEVATION
COL 30	BOTTOM OF SCOUR WALL ELEVATION
COL 31	MINIMUM TOP OF WALL ELEVATION
COL 32	HEC-RAS CHANNEL STATION

TABLE 1

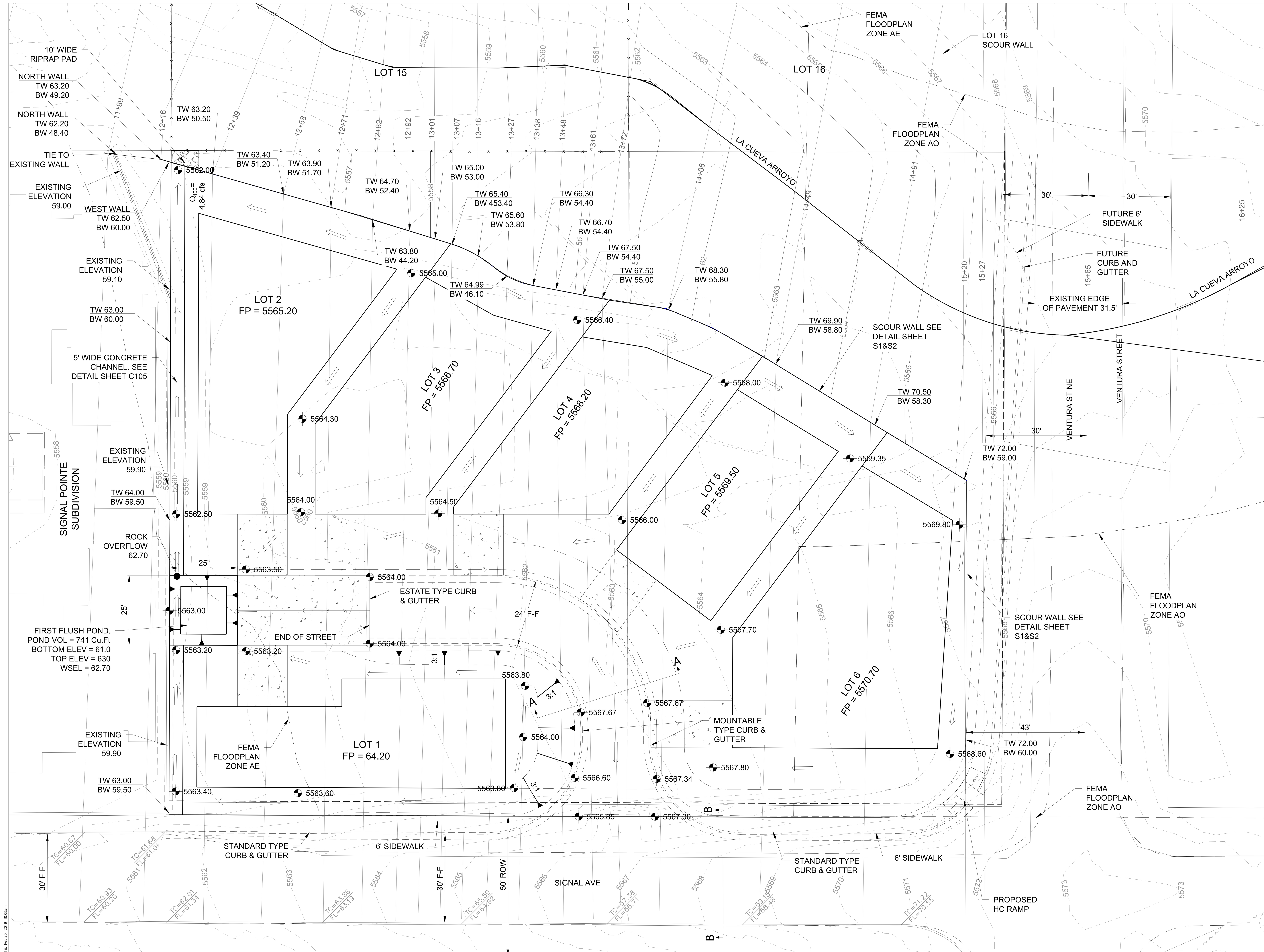
LA CUEVA ARROYO SCOUR ANALYSIS INCLUDING CHANNEL EXCAVATION WITH VERTICAL CONCRETE SCOUR WALL WITH VENTURA CULVERT

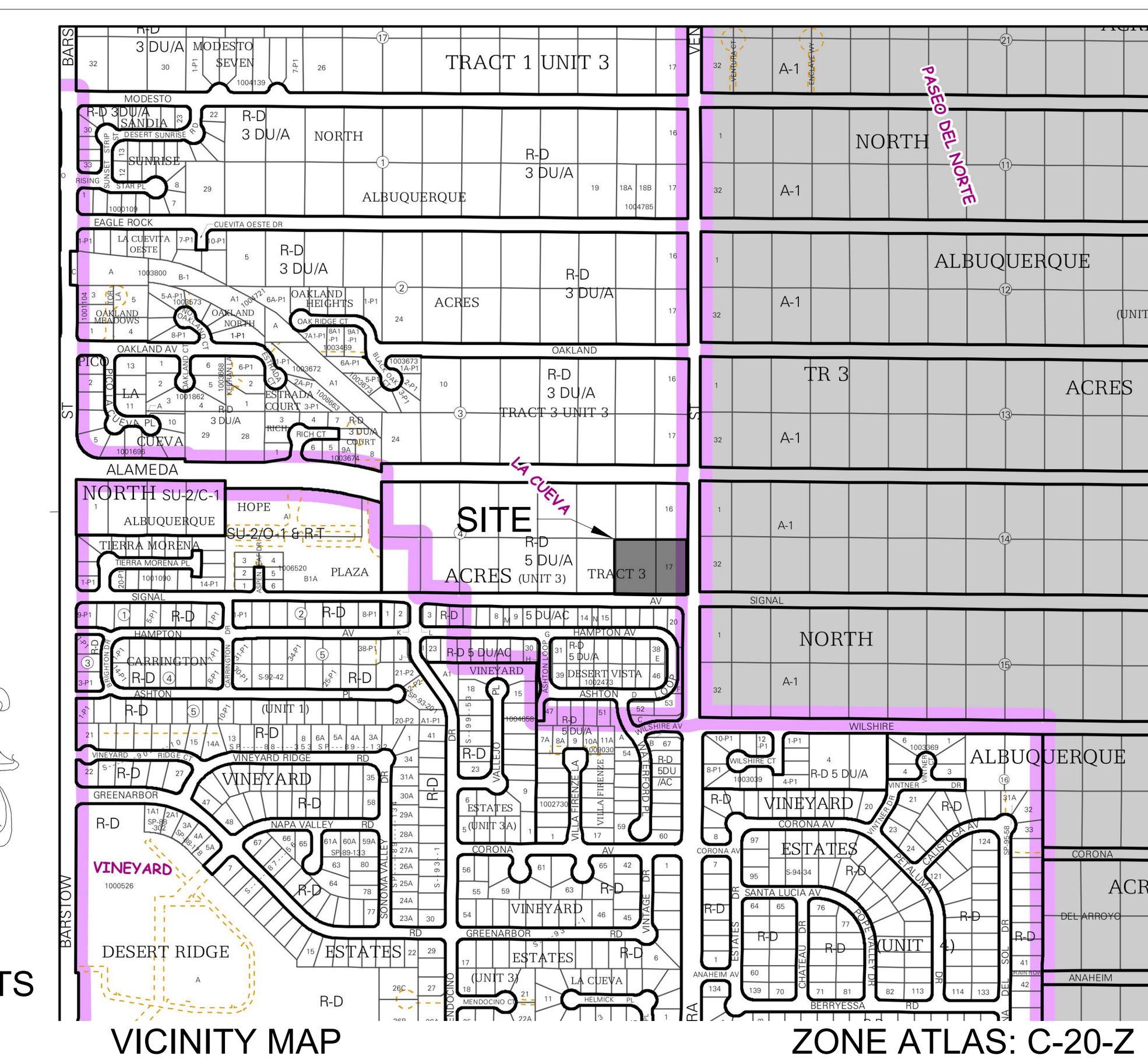
COL 1	COL 2	COL 3	COL 4	COL 5	COL 6	COL 7	COL 8	COL 9	COL 10	COL 11	COL 12	COL 13	COL 14	COL 15	COL 16	COL 17	COL 18	COL 19	COL 20	COL 21	COL 22	COL 23	COL 24	COL 25	COL 26	COL 27	COL 28	COL 29	COL 30	COL 31	COL 32
SEC. NO.	HEC-RAS STA.	Q100 (CFS)	QD (CFS)	SC (FT/FT)	SAVG (FT/FT)	WD (FT)	LAMDA	LV (FT)	DELTA MAX (FT)	EROS. SET. (FT)	SPACING OF CNTRLS. (FT)	SPACING./ LV	MO/ MUO	MO (FT)	2(MO)/WD	VEL (FPS)	FROUDE	AREA (SF)	TOP WID (FT)	HYD DEP (FT)	YS/Y	YS (FT)	HECRAS DEPTH (FT)	HECRAS FROUDE	SEQ DEP (FT)	FRBRD (FT)	WALL HT (FT)	MIN CH. ELEV	BOTTOM WALL EL.	MIN. TOP WALL EL.	HEC-RAS STA.
1	1527	3090	618.0	0.0157	0.0291	60.1	719.5	359.7	168.8	198.8	133.5	0.37	0.11	21.9	0.73	9.24	1.19	334.49	178.72	1.87	1.35	2.53	3.02	1.00	3.02	1.63	9.19	5563.54	5560.01	5569.19	1527
2	1520	3090	618.0	0.0157	0.0291	60.1	719.5	359.7	168.8	198.8	133.5	0.37	0.11	21.9	0.73	12.63	1.72	244.62	145.31	1.68	2.02	3.41	1.72	1.72	3.38	1.66	10.45	5563.40	5558.99	5569.44	1520
3	1491	3090	618.0	0.0157	0.0291	60.1	719.5	359.7	168.8	198.8	133.5	0.37	0.11	21.9	0.73	9.65	1.00	320.31	111.60	2.87	1.17	3.37	2.94	1.00	2.94	1.64	9.95	5562.66	5558.29	5568.24	1491
4	1449	3090	618.0	0.0157	0.0291	60.1	719.5	359.7	168.8	198.8	120.0	0.33	0.08	15.9	0.53	11.25	1.20	274.65	100.93	2.72	1.37	3.72	2.79	1.20	3.52	1.68	10.91	5561.58	5556.86	5567.78	1449
5	1406	3090	618.0	0.0157	0.0291	60.1	719.5	359.7	168.8	198.8	110.4	0.31	0.07	13.9	0.46	10.17	1.03	303.77	100.28	3.03	1.20	3.62	3.53	1.03	3.65	1.67	10.95	5560.45	5555.83	5566.77	1406
6	1372	3090	618.0	0.0157	0.0291	60.1	719.5	359.7	168.8	198.8	104.0	0.29	0.06	11.9	0.40	13.91	1.69	222.19	106.07	2.09	1.99	4.17	2.10	1.69	4.07	1.71	11.96	5559.58	5554.41	5566.36	1372
7	1361	3090	618.0	0.0157	0.0291	60.1	719.5	359.7	168.8	198.8	162.9	0.45	0.16	31.8	1.06	9.69	1.01	318.94	110.52	2.89	1.17	3.39	3.34	1.00	3.34	1.65	10.38	5559.30	5554.91	5565.29	1361
8	1348	3090	618.0	0.0157	0.0291	60.1	719.5	359.7	168.8	198.8	162.9	0.45	0.16	31.8	1.06	6.56	0.59	471.12	122.26	3.85	0.88	3.40	3.98	0.59	3.98	1.58	10.96	5558.97	5554.57	5565.53	1348
9	1338	3090	618.0	0.0157	0.0291	60.1	719.5	359.7	168.8	198.8	162.9	0.45	0.16	31.8	1.06	9.20	0.95	343.08	117.75	2.91	1.13	3.28	3.49	0.89	3.49	1.64	10.42	5558.70	5554.42	5564.83	1338
10	1327	3090	618.0	0.0157	0.0291	60.1	719.5	359.7	168.8	198.8	152.0	0.42	0.13	25.8	0.86	7.66	0.76	410.38	130.56	3.14	0.98	3.10	3.96	0.71	3.96	1.61	10.67	5558.42	5554.32	5564.99	1327
11	1316	3090	618.0	0.0157	0.0291	60.1	719.5	359.7	168.8	198.8	152.0	0.42	0.13	25.8	0.86	9.73	1.03	319.83	115.23	2.78	1.20	3.32	3.53	0.99	3.53	1.66	10.51	5558.14	5553.82	5564.33	1316
12	1307	3090	618.0	0.0157	0.0291	60.1	719.5	359.7	168.8	198.8	134.9	0.37	0.11	21.9	0.73	7.82	0.76	400.86	123.14	3.26	0.99	3.21	4.21	0.72	4.21	1.62	11.04	5557.67	5553.46	5564.50	1307
13	1301	3090	618.0	0.0157	0.0291	60.1	719.5	359.7	168.8	198.8	134.9	0.37	0.11	21.9	0.73	9.98	1.04	315.77	110.59	2.86	1.21	3.44	3.67	0.97	3.67	1.67	10.78	5557.51	5553.07	5563.85	1301
14	1292	3090	618.0	0.0157	0.0291	60.1	719.5	359.7	168.8	198.8	134.9	0.37	0.11	21.9	0.73	11.33	1.21	281.36	104.17	2.70	1.38	3.73	3.32	1.13	3.79	1.70	11.21	5557.28	5552.55	5563.77	1292
15	1282	3090	618.0	0.0157	0.0291	60.1	719.5	359.7	168.8	198.8	130.0	0.36	0.10	19.9	0.66	11.01	1.17	283.35	102.64	2.76	1.33	3.67	3.49	1.13	3.97	1.69	11.33	5557.03	5552.36	5563.69	1282
16	1271	3090	618.0	0.0157	0.0291	60.1	719.5	359.7	168.8	198.8	130.0	0.36	0.10	19.9	0.66	11.62	1.24	272.30	99.97	2.72	1.41	3.83	3.41	1.16	4.00	1.71	11.53	5556.70	5551.87	5563.40	1271
17	1258	3090	618.0	0.0157	0.0291	60.1	719.5	359.7	168.8	198.8	125.0	0.35	0.09	17.9	0.60	12.34	1.34	250.95	94.92	2.64	1.52	4.01	3.28	1.31	4.39	1.72	12.12	5556.27	5551.26	5563.38	1258
18	1239	3090	618.0	0.0157	0.0291	60.1	719.5	359.7	168.8	198.8	125.0	0.35	0.09	17.9	0.60	7.83	0.70	412.86	107.46	3.84	0.95	3.64	4.84	0.64	4.84	1.63	12.11	5555.49	5550.85	5562.96	1239
19	1216	3090	618.0	0.0157	0.0291	60.1	719.5	359.7	168.8	198.8	118.6	0.33	0.08	15.9	0.53	6.10	0.50	532.53	116.22	4.58	0.84	3.85	5.91	0.45	5.91	1.59	13.36	5554.61	5549.76	5563.11	1216
20	1189	3090	618.0	0.0157	0.0291	60.1	719.5	359.7	168.8	198.8	118.6	0.33	0.08	15.9	0.53	10.46	1.05	351.92	113.83	3.09	1.21	3.75	5.69	0.84	5.69	1.73	13.17	5553.76	5549.01	5562.18	1189

COL 1	CHANNEL CROSS-SECTION NUMBER
COL 2	HEC-RAS CHANNEL STATION
COL 3	100-YEAR PEAK DISCHARGE, Q (CFS)
COL 4	DOMINANT DISCHARGE, QD = 0.2 Q100 (CFS)
COL 5	CRITICAL SLOPE, SC = 0.037 QD (^-0.133) (FT/FT)
COL 6	AVERAGE SLOPE OF THE CHANNEL (FT/FT)
COL 7	DOMINANT CHANNEL WIDTH, WD = 4.6QD(^0.4) (FT), SINCE SAVG>SC
COL 8	MEANDER WAVELENGTH, LAMDA = ((4)LOG(QD)+0.8)WD (FT) FOR 200 < QD < 2000 CFS
COL 9	DOWN-VALLEY LENGTH, LV = LAMDA/2 (FT)
COL 10	MAXIMUM LATERAL EROSION, DELTA MAX = (0.92+(4.6)LOG(QD))QD(^0.4) (FT) FOR 200 < QD < 2000 CFS
COL 11	EROSION SETBACK = WD/2 + DELTA MAX (FT)
COL 12	SPACING OF CONTROLS (DISTANCE BETWEEN PARALLEL SCOUR WALLS IN FT.)
COL 13	SPACING OF CONTROLS/DOWN-VALLEY LENGTH (LV)
COL 14	MAXIMUM OFFSET/MAXIMUM UNCONSTRAINED OFFSET (OR EROSION SETBACK), FROM FIGURE 3.24 AMAFCA SEDIMENT AND EROSION DESIGN GUIDE
COL 15	MAXIMUM OFFSET = (MO/MUO)MUO OR EROSION SETBACK, FT.
COL 16	2(MAXIMUM OFFSET)/DOMINANT CHANNEL WIDTH, IF LESS THAN 1.0 THEN HAVE PARALLEL SCOUR ACTING ON WALL, IF GREATER THAN 1.0 THEN HAVE PARALLEL AND IMPINGEMENT SCOUR ON WALL
COL 17	CHANNEL VELOCITY FROM HECRAS (FT/SEC)
COL 18	FROUDE NUMBER CALCULATED USING HYDRAULIC DEPTH
COL 19	CROSS-SECTIONAL AREA FROM HECRAS (SQ. FT)
COL 20	TOP WIDTH FROM HECRAS (FT)
COL 21	HYDRAULIC DEPTH, HD = A/TW (FT)
COL 22	RATIO OF SCOUR DEPTH TO FLOW DEPTH, YS/Y (SINCE COL 16 IS LESS THAN OR EQUAL TO 1.0, SCOUR ACTING ON THE WALLS IS PARALLEL SCOUR, YS/Y = 0.73 + (0.14)PI(FR^2)
COL 23	ESTIMATED SCOUR (FT)
COL 24	DEPTH OF FLOW FROM HECRAS (FT)
COL 25	FROUDE NUMBER FROM HECRAS
COL 26	SEQUENT DEPTH (FT)
COL 27	FREEBOARD (FT)
COL 28	SCOUR WALL HEIGHT = SCOUR DEPTH + SEQUENT DEPTH +FREEBOARD+ TWO FOOT FACTOR OF SAFTEY (FT)
COL 29	MINIMUM CHANNEL ELEVATION
COL 30	BOTTOM OF SCOUR WALL ELEVATION
COL 31	MINIMUM TOP OF WALL ELEVATION
COL 32	HEC-RAS CHANNEL STATION

TABLE 1
WORST CASE SCOUR WALL HEIGHT

SEC. NO.	HEC-RAS STA.	MIN. CHANNEL ELEV.	BOTTOM WALL ELEV.	TOP WALL ELEV.	WALL HEIGHT (FT)	ADJUSTED BOTTOM WALL ELEV.	ADJUSTED TOP WALL ELEV.	ADJUSTED WALL HEIGHT (FT)	WALL DEPTH BELOW GRADE (FT)	HEC-RAS STA.
1	1527	5565.88	5560.01	5571.88	11.87	5560.00	5572.00	12.00	5.88	1527
2	1520	5565.65	5558.99	5571.96	12.97	5559.00	5572.00	13.00	6.65	1520
3	1491	5564.61	5558.29	5570.41	12.12	5558.30	5570.50	12.20	6.31	1491
4	1449	5563.16	5556.86	5569.52	12.66	5556.80	5569.60	12.80	6.36	1449
5	1406	5561.68	5555.83	5568.39	12.56	5555.80	5568.30	12.50	5.88	1406
6	1372	5560.50	5554.41	5567.46	13.05	5554.40	5567.50	13.10	6.10	1372
7	1361	5560.13	5554.91	5566.83	11.92	5554.40	5566.90	12.50	5.73	1361
8	1348	5559.68	5554.57	5566.63	12.06	5554.40	5566.70	12.30	5.28	1348
9	1338	5559.33	5554.42	5566.21	11.79	5554.40	5566.30	11.90	4.93	1338
10	1327	5559.00	5554.08	5566.06	11.98	5554.00	5566.10	12.10	5.00	1327
11	1316	5558.81	5553.82	5565.57	11.75	5553.80	5565.60	11.80	5.01	1316
12	1307	5558.44	5553.46	5565.31	11.85	5553.40	5565.40	12.00	5.04	1307
13	1301	5558.09	5553.07	5565.00	11.93	5553.00	5565.00	12.00	5.09	1301
14	1292	5557.56	5552.44	5564.64	12.20	5552.40	5564.70	12.30	5.16	1292
15	1282	5557.14	5551.95	5563.81	11.86	5551.90	5563.90	12.00	5.24	1282
16	1271	5556.70	5551.70	5563.88	12.18	5551.70	5563.90	12.20	5.00	1271
17	1258	5556.26	5551.26	5563.37	12.11	5551.20	5563.40	12.20	5.06	1258
18	1239	5555.49	5550.58	5563.00	12.42	5550.50	5563.20	12.70	4.99	1239
19	1216	5554.61	5549.20	5563.11	13.91	5549.20	5563.20	14.00	5.41	1216
20	1189	5553.76	5548.48	5562.18	13.70	5548.40	5562.20	13.80	5.36	1189





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 NORTH TO THE LA CUEVA ARROYO. THE TOTAL DISCHARGE FROM THE SUBDIVISION DURING A 100-YEAR, 6-HOUR STORM IS 4.84 CFS. THE FIRST FLUSH VOLUME FROM THE SUBDIVISION FOR A 0.34-INCH RAIN IS 741 CUBIC-FEET. A POND IS LOCATED AT THE END OF THE STREET ALONG THE WEST WALL OF THE SUBDIVISION TO RETAIN THE FIRST FLUSH VOLUME. THE POND WILL SPILL INTO THE CONCRETE CHANNEL DESCRIBED ABOVE.

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 6.65 FEET BELOW THE ARROYO BOTTOM TO PROTECT THE SUBDIVISION AGAINST SCOUR DURING STORM EVENTS. A HEC-RAS ANALYSIS WAS COMPLETED TO DETERMINE THE IMPROVEMENTS WITHIN THE LA CUEVA ARROYO TO BE CONSTRUCTED TO BOTH PROTECT THE SUBDIVISION AND TO REMOVE THE FLOOD HAZARD ZONE THROUGH A LOMR TO FEMA.

FIRST FLUSH CALCULATIONS:
(0.34in÷12in/ft) x (1.2ac x 43,560sf/ac x 0.500) = 741 cf

NOTE: REFER TO SHEET C-501 FOR STREET SECTIONS A-A & B-B

LEGEND

- CONCRETE DRIVEWAY
- FLOW ARROW
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- CURB & GUTTER
- FEMA FLOODPLAIN BOUNDARY
- PROPERTY LINE
- 15+79 HECRAS CROSS SECTIONS
- ARROYO CENTER LINE
- PROPOSED SCOUR WALL

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 SCALE IN FEET

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	25.00	25.00	50.00	1.73	0.17	7,559	0.20	8,650	4.84
TOTAL RUNOFF	1.20						0.17	7,559	0.20	8,650	4.84
EXCESS PRECIP.		0.66	0.92	1.29	2.36	E_i (in)					
PEAK DISCHARGE		1.87	2.6	3.45	5.02	Q_{Pi} (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

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

NO.	REVISION	BY	DATE

PROJECT:
DATE:
HORIZ. SCALE:
VERT. SCALE:
DRAWN BY: DEM
CHECKED BY:
APPROVED BY:
FILE:

9677 PROFESSIONAL 2-20-19

SIGNAL VILLAGE

GRADING AND DRAINAGE PLAN

CITY/COUNTY REVIEW

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

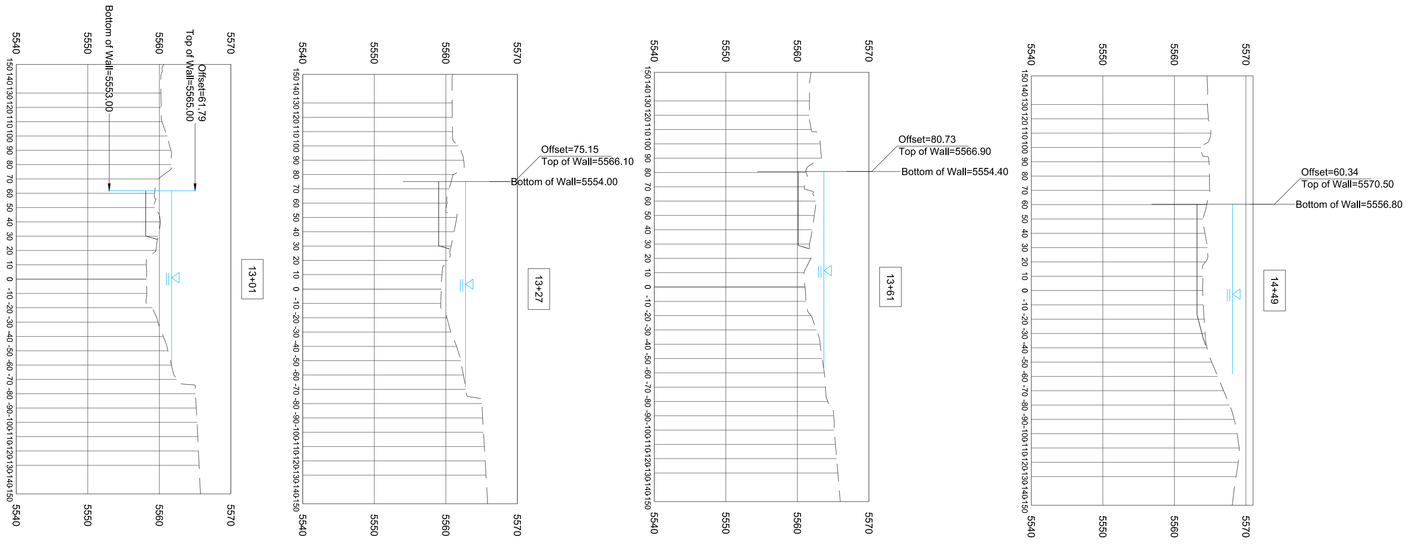
FOR CITY/COUNTY USE ONLY

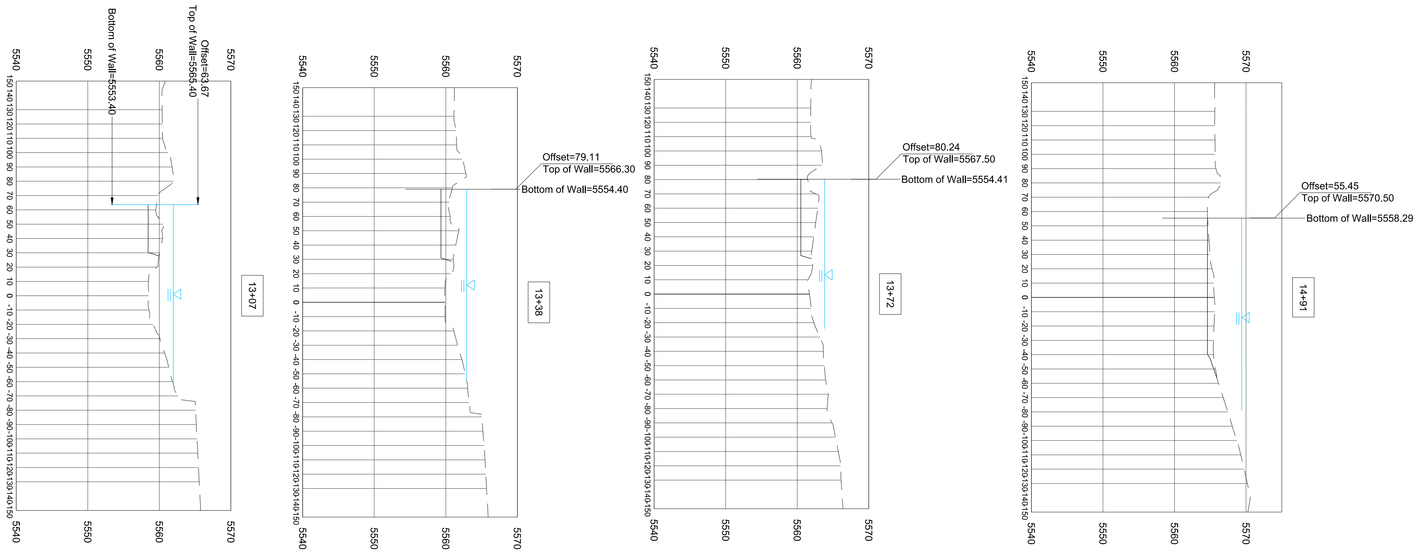
SHEET No.

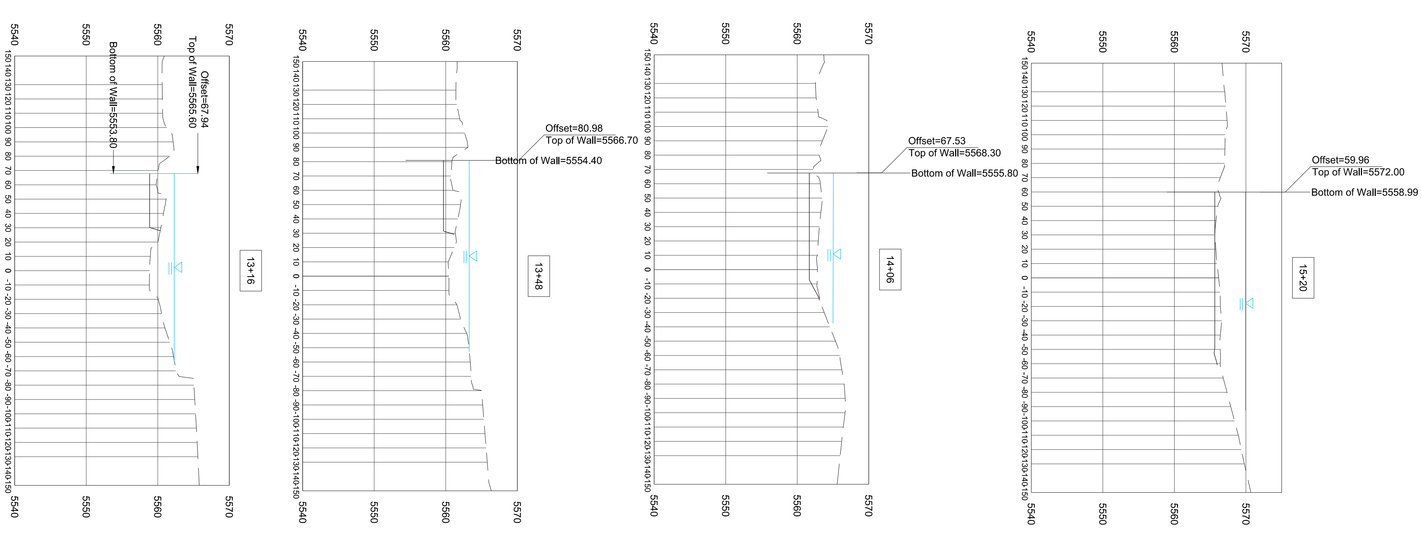
C101

NAME: L:\Active Projects\03384 La Cueva Arroyo\3. DWG\XREF\03384 DSGN.dwg PLOT DATE: Feb 20, 2019 10:16am

HORIZ 0
VERT 0
SCALE IN FEET
5 50







CITY/COUNTY REVIEW		
DEPARTMENT	SIGN-OFF	DATE
WASTEWATER MGMT. DIV.		
WATER SERVICES		
SUBDIVISION ENG.		
STREETS		
TRAFFIC		
FOR CITY/COUNTY USE ONLY		

SHEET No. C102

SIGNAL VILLAGE

CROSS SECTIONS 15+20 TO 13+01

NO.	REVISION	BY	DATE

PROJECT:	DRAWN BY: DEM
DATE:	CHECKED BY:
HORIZ. SCALE:	APPROVED BY:
VERT. SCALE:	FILE:

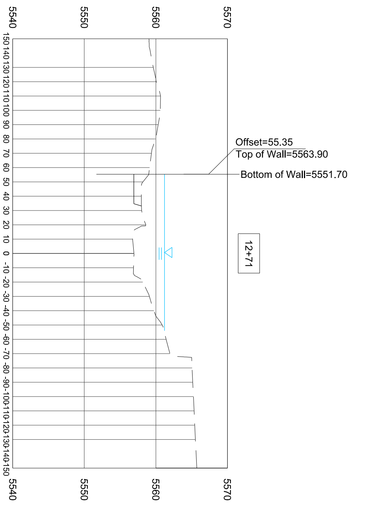
Thompson Engineering Consultants, Inc.
tecnm@yahoo.com
P.O. BOX 65760
ALBUQUERQUE, NM 87193
PHONE: (505) 271-2198
FAX: (505) 830-8240

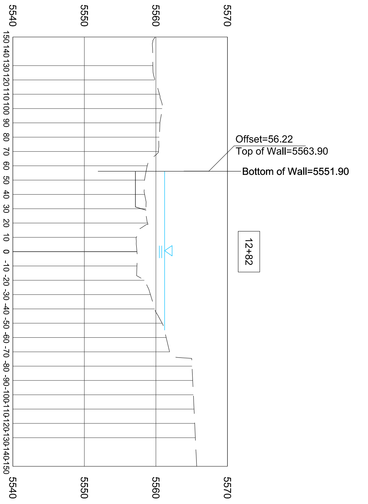
NAME: L:\Active Projects\033364 La Cueva Arroyo\3. DWG\XREF\033364 DSGN.dwg PLOT DATE: Feb 20, 2019 10:17am

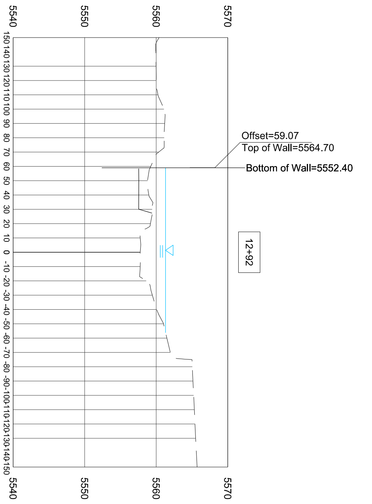
HORIZ 0
VERT 0
SCALE IN FEET
50
5

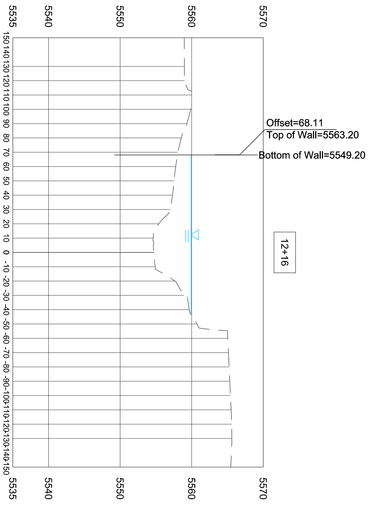
CROSS SECTION COORDINATES AT SIGNAL VILLAGE SCOUR WALL

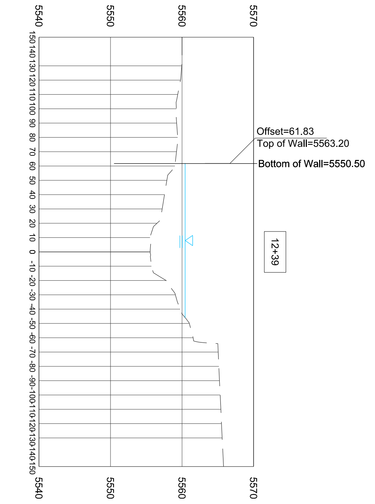
Arroyo Station	N	E
15+20	1522146.09	1553850.75
14+91	1522166.5	1553816.96
14+49	1522187.4	1553782.85
14+06	1522207.09	1553743.95
13+72	1522211.64	1553703.08
13+48	1522214.33	1553663.38
13+38	1522215.91	1553645.14
13+17	1522219.25	1553585.81
13+16	1522226.55	1553575.35
13+07	1522230.81	1553565.95
13+01	1522232.74	1553559.75
12+92	1522235.55	1553550.73
12+82	1522239.74	1553537.26
12+71	1522244.09	1553522.28
12+58	1522248.93	1553505.12
12+39	1522256.19	1553479.53
12+16	1522261.42	1553460.38

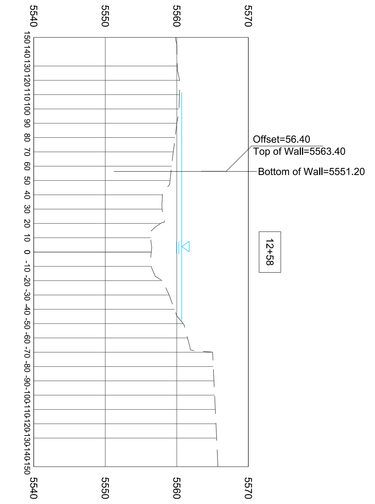


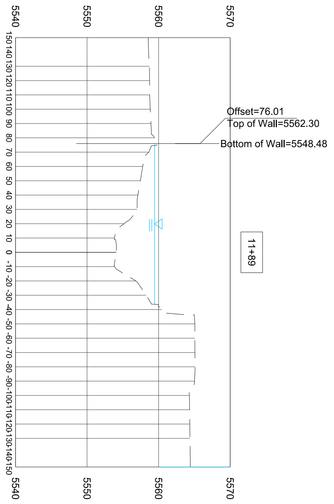












CITY/COUNTY REVIEW		
DEPARTMENT	SIGN-OFF	DATE
WASTEWATER MGMT. DIV.		
WATER SERVICES		
SUBDIVISION ENG.		
STREETS		
TRAFFIC		
FOR CITY/COUNTY USE ONLY		

SIGNAL VILLAGE

CROSS SECTIONS 12+92 TO 11+89

NO.	REVISION	BY	DATE

PROJECT:	DRAWN BY: DEM
DATE:	CHECKED BY:
HORIZ. SCALE:	APPROVED BY:
VERT. SCALE:	FILE:

Thompson Engineering Consultants, Inc.
tecnm@yahoo.com
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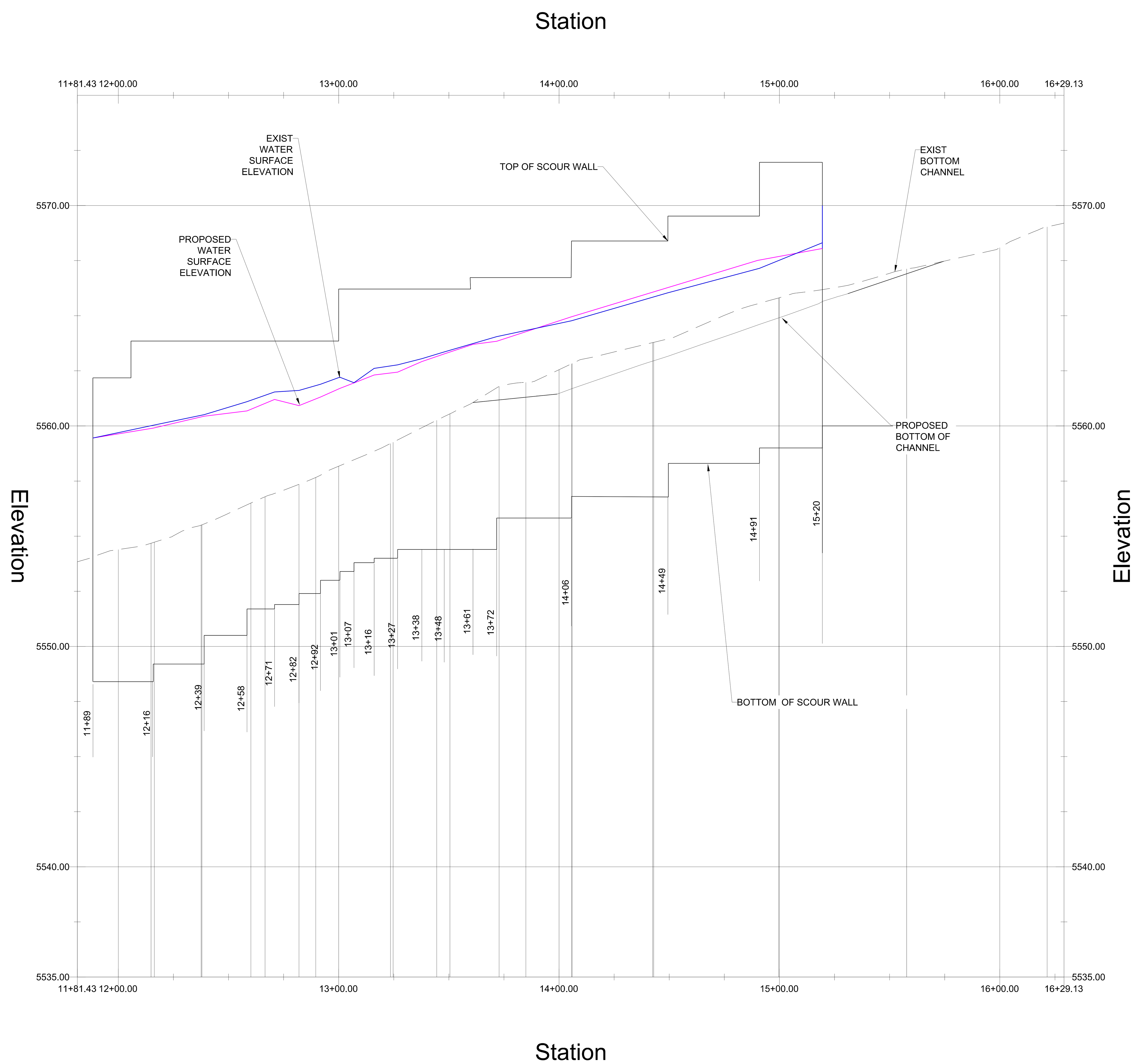
ALBUQUERQUE, NM 87193
PHONE: (505) 271-2198
FAX: (505) 830-6240

SHEET No.
C103

Profile View of Subdivision North Scour Wall



HORZ 0 30
VERT 0 10
SCALE IN FEET

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tecnm@yahoo.com
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NO.	REVISION	BY	DATE

PROJECT:
DATE:
HORIZ. SCALE:
VERT. SCALE:
DRAWN BY: DEM
CHECKED BY:
APPROVED BY:
FILE:

DAVID THOMPSON 9677 LICENSED PROFESSIONAL ENGINEER
2-20-19

SIGNAL VILLAGE

=NORTH SCOUR WALL PROFILE VIEW

CITY/COUNTY REVIEW

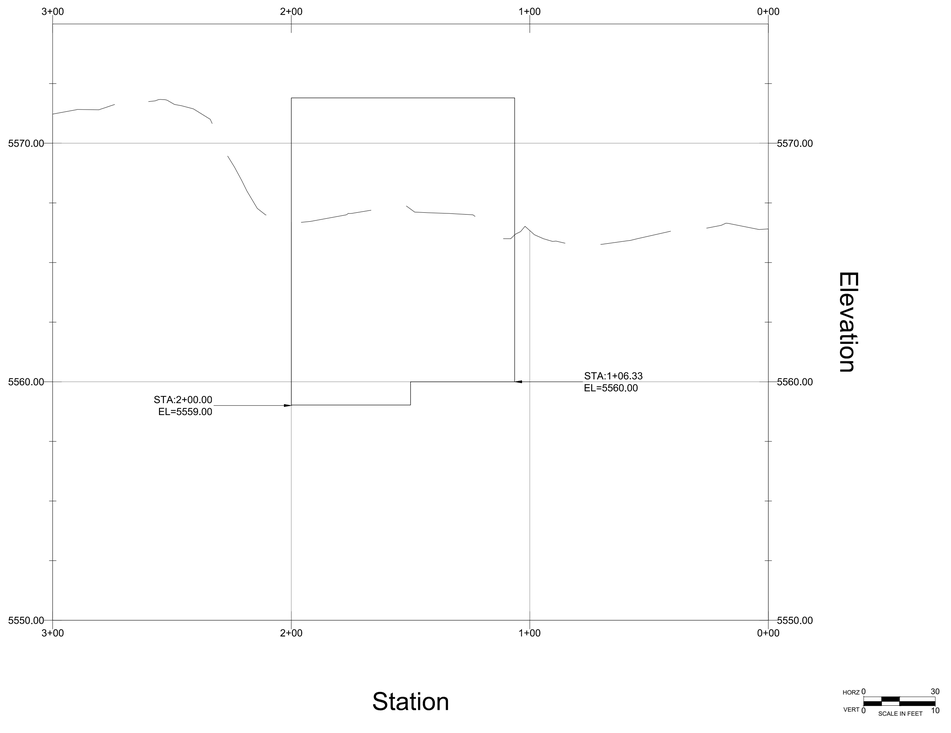
DEPARTMENT	SIGN-OFF	DATE
WASTEWATER MGMT. DIV.		
WATER SERVICES		
SUBDIVISION ENG.		
STREETS		
TRAFFIC		

FOR CITY/COUNTY USE ONLY

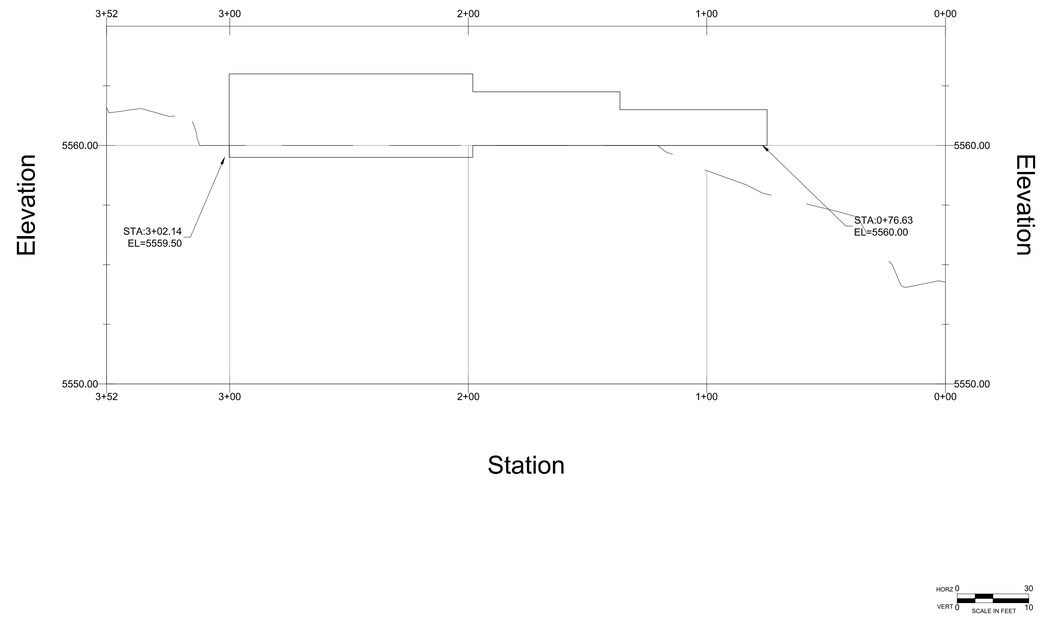
SHEET No.

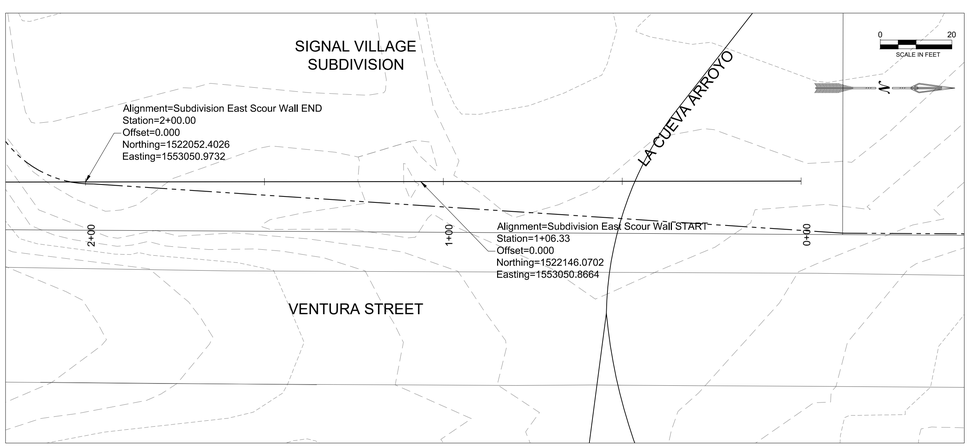
C104

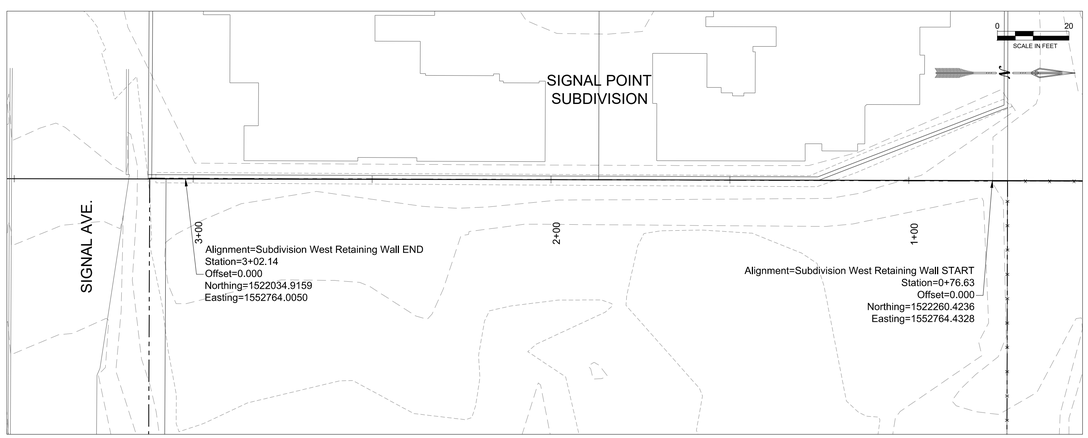
SUBDIVISION EAST SCOUR WALL



SUBDIVISION WEST RETAINING WALL







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NO.	REVISION	BY	DATE

PROJECT: SIGNAL VILLAGE
DRAWN BY: DEM
DATE:
CHECKED BY:
HORIZ. SCALE:
APPROVED BY:
VERT. SCALE:
FILE:

DANIEL THOMPSON 9677 REGISTERED PROFESSIONAL ENGINEER
2-20-19

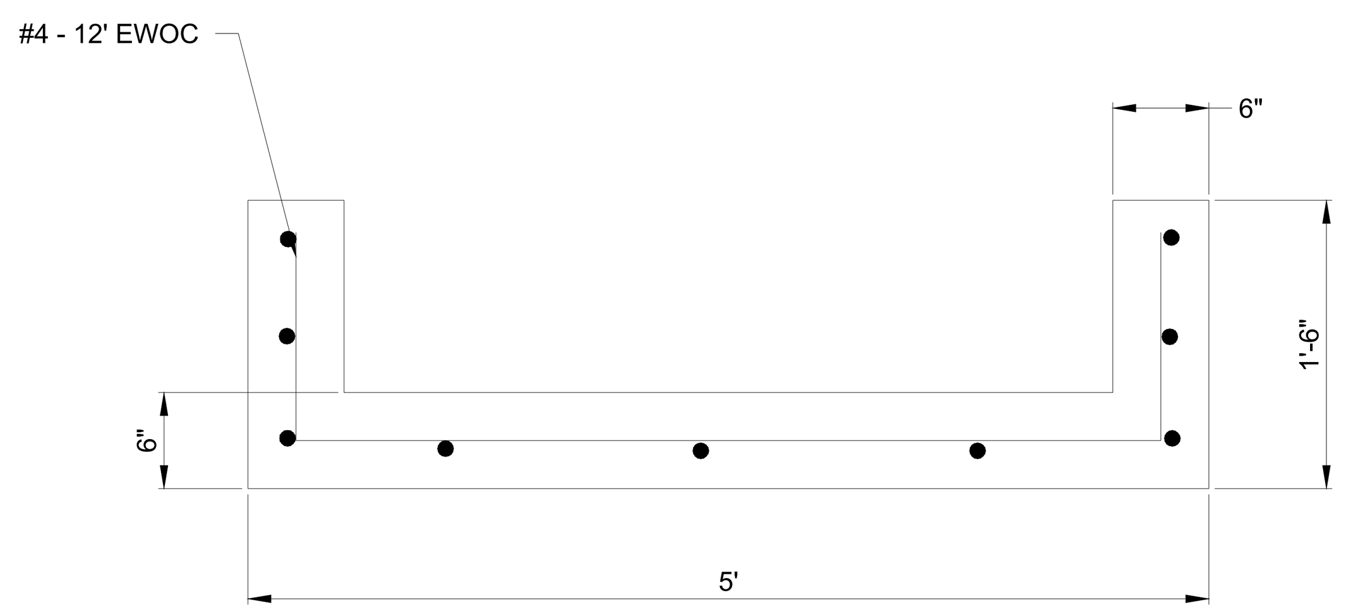
WEST AND EAST WALL
PLAN AND PROFILE

CITY/COUNTY REVIEW

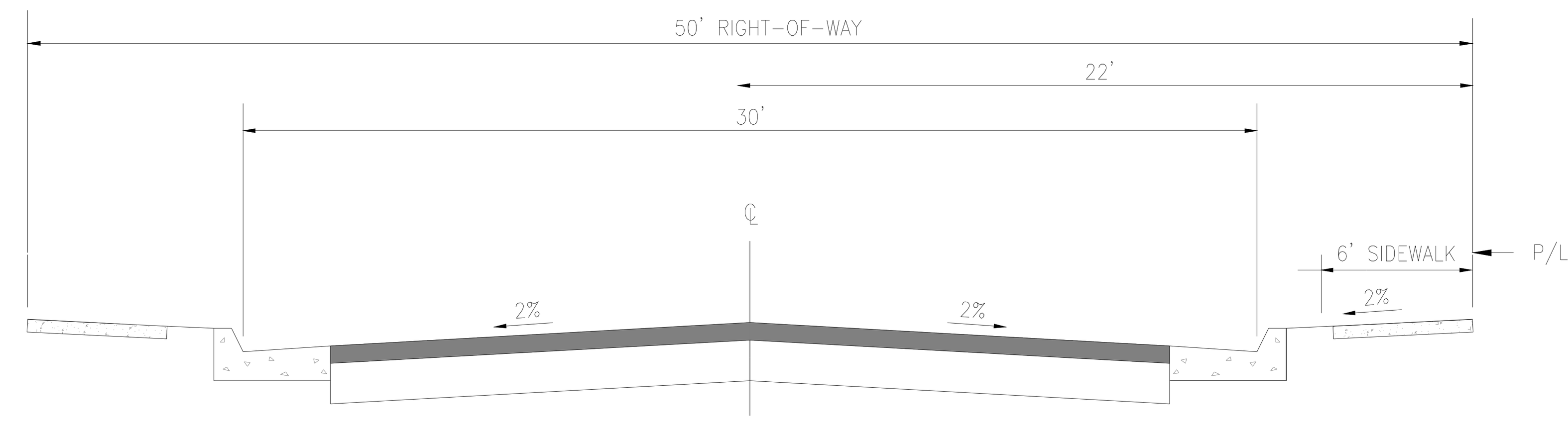
DEPARTMENT	SIGN-OFF	DATE
WASTEWATER MGMT. DIV.		
WATER SERVICES		
SUBDIVISION ENG.		
STREETS		
TRAFFIC		

FOR CITY/COUNTY USE ONLY

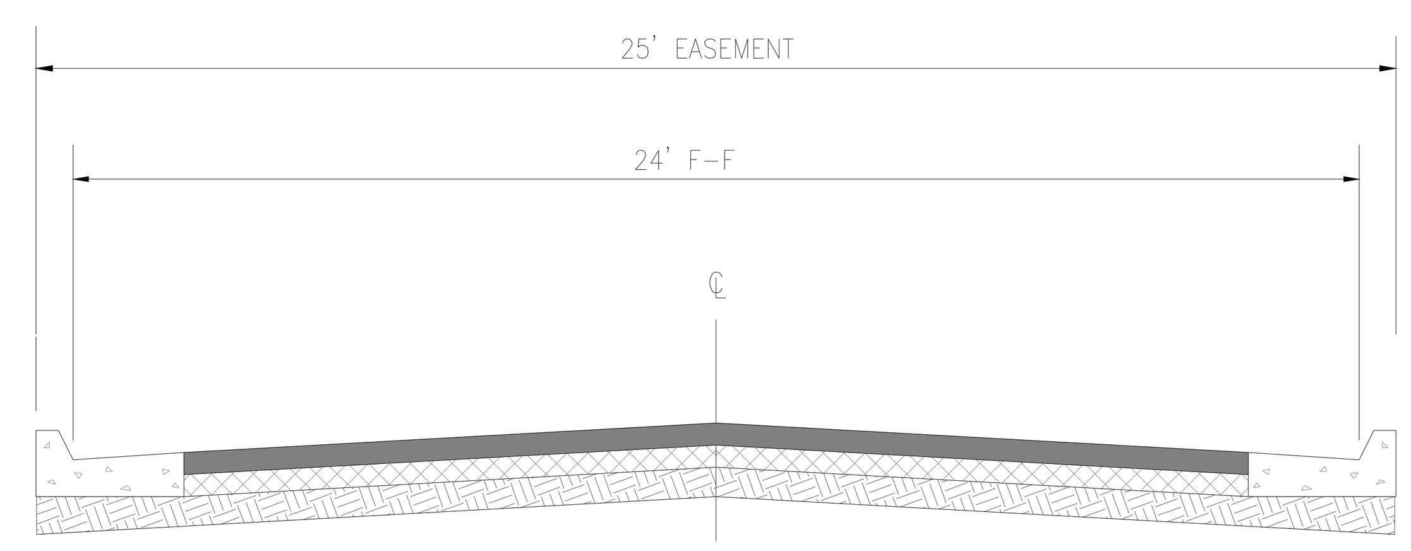
SHEET No.
C105



5' WIDE CONCRETE CHANNEL DETAIL
NTS



CROSS SECTION B-B
NTS



CROSS SECTION A-A
NTS

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NO.	REVISION	BY	DATE

PROJECT:
DATE:
HORIZ. SCALE:
VERT. SCALE:
DRAWN BY: DEM
CHECKED BY:
APPROVED BY:
FILE:

9677
2-20-19

SIGNAL VILLAGE

DETAILS

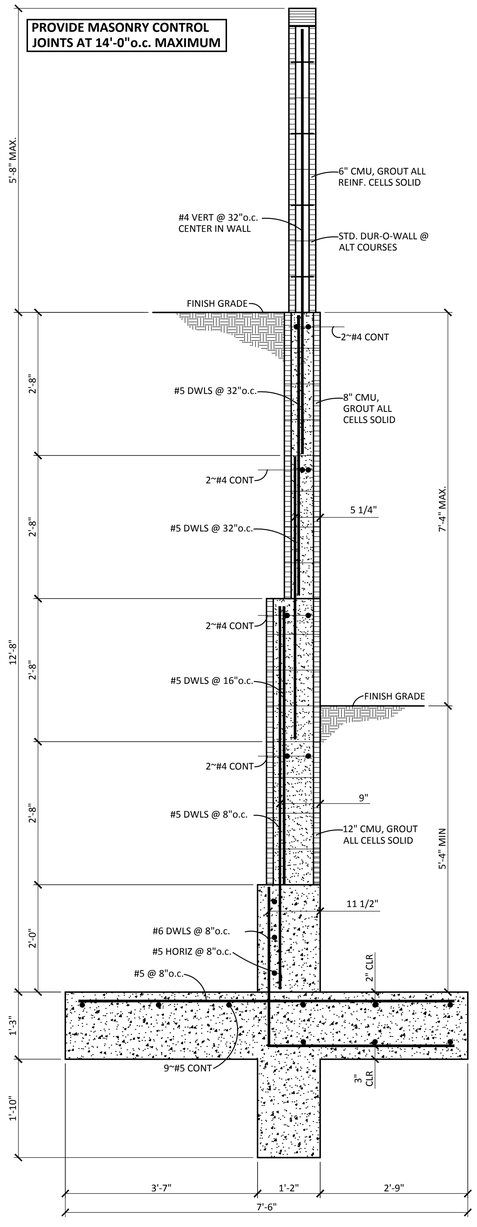
CITY/COUNTY REVIEW

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

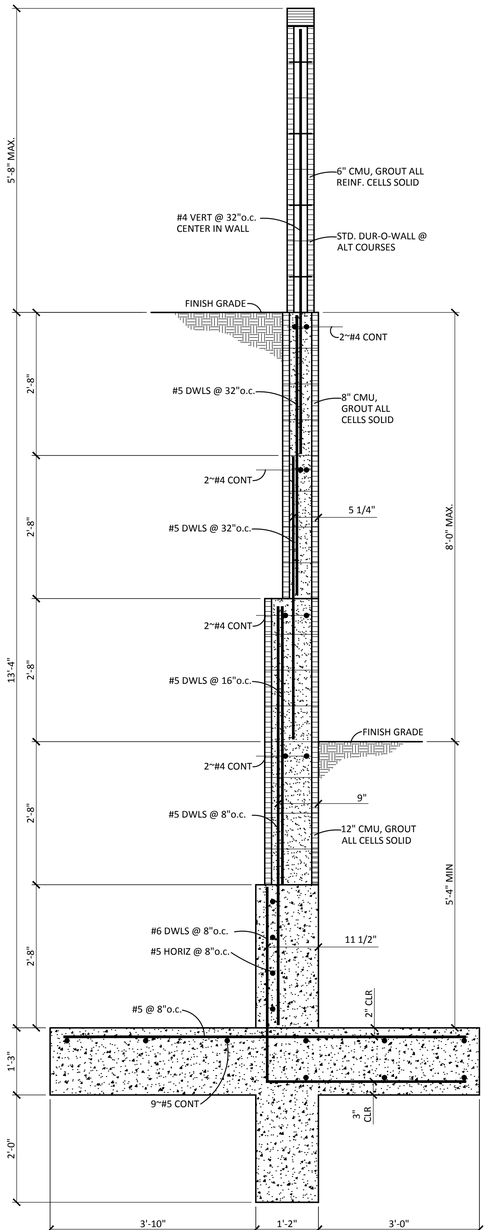
FOR CITY/COUNTY USE ONLY

SHEET No.

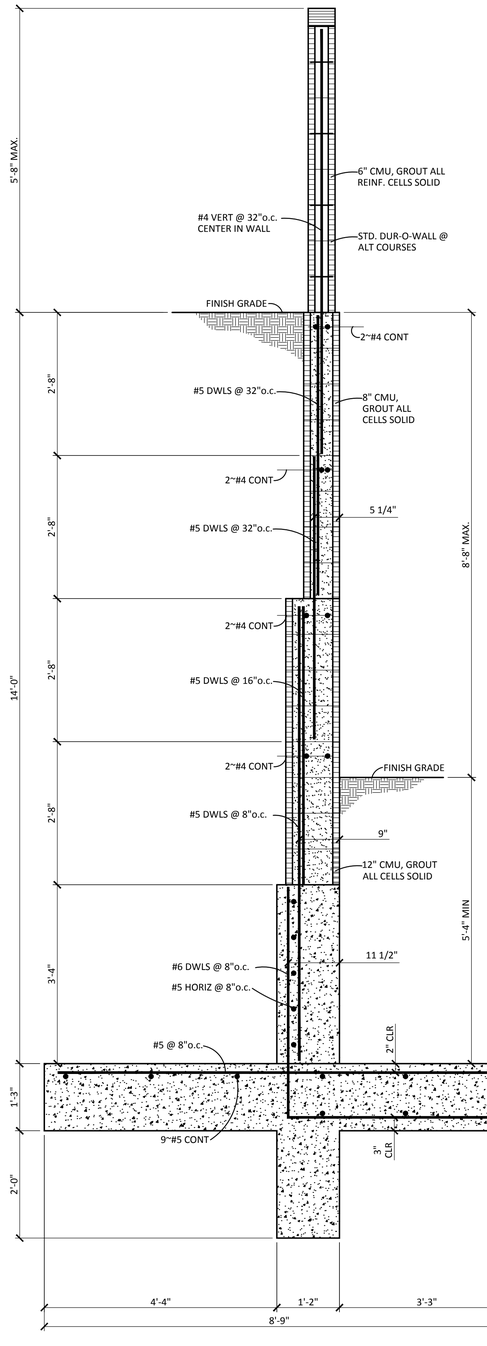
C501



1 S1 3/4"=1'-0"



2 S1 3/4"=1'-0"



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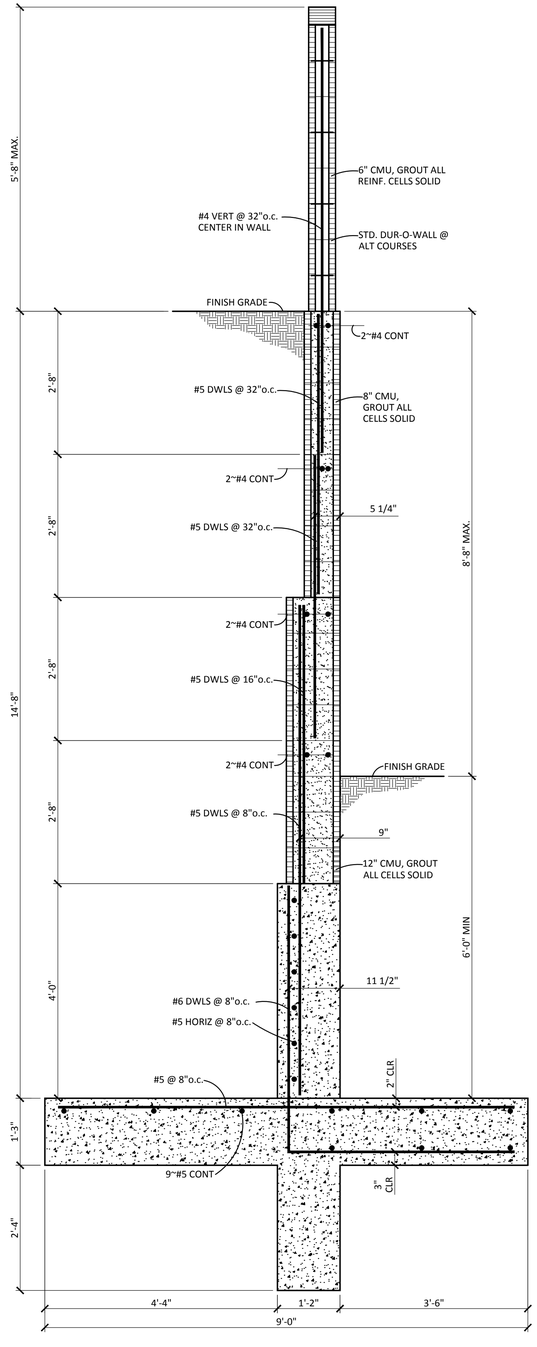

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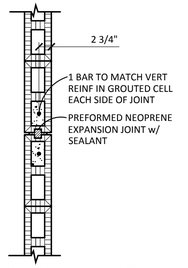
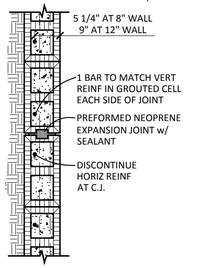
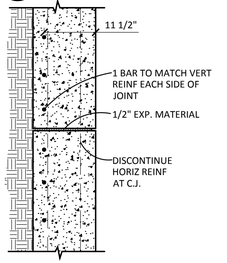


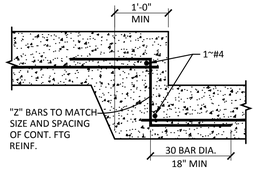
5 S1 TYP. MASONRY WALL CONTROL JOINT (MCJ) AT 6" CMU WALL 3/4"=1'-0"



6 S1 TYP. MASONRY WALL CONTROL JOINT (MCJ) AT 8" AND 12" CMU WALL 3/4"=1'-0"



7 S1 TYP. MASONRY WALL CONTROL JOINT (MCJ) AT 14" CONCRETE WALL 3/4"=1'-0"



8 S1 TYP. FOOTING STEP 3/4"=1'-0"

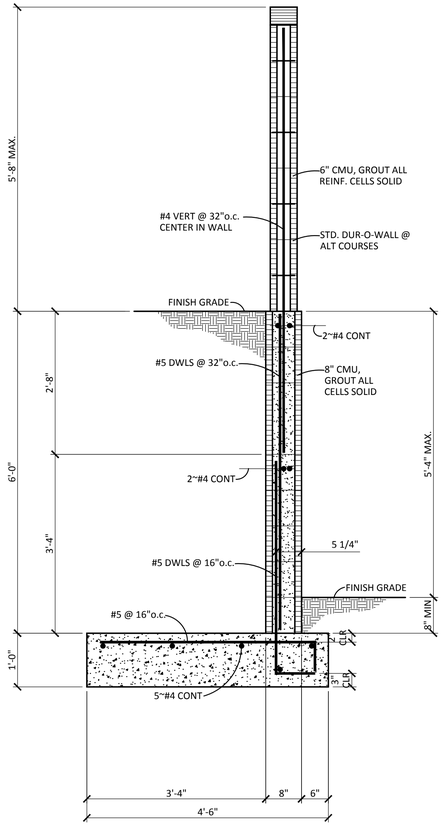
GENERAL STRUCTURAL NOTES

1. CODES AND MANUALS:
   International Building Code, 2015 Edition
   ACI 318-05
2. DESIGN LOADS:
   A. Equivalent Fluid Pressure = 35 pcf/ft
   B. Maximum allowable soil bearing pressure: 2,00psf
3. GENERAL:
   A. The Contractor shall verify all dimensions in the field.
   B. The Contractor shall be responsible for providing safe and adequate shoring for all parts of the structure during construction.
4. MATERIALS:
   A. Cast-in-place Concrete:
      1. All concrete shall conform to the Specifications for Structural Concrete, ACI 301
      2. Normal Weight Concrete:
         a. 3,000 psi @ 28 days
      3. The sides of all footings shall be FORMED. The use of earth forms is NOT allowed.
   B. Reinforcing Steel:
      1. All reinforcing steel shall conform to ASTM A615 Grade 60.
      2. Reinforcing steel shall be fabricated and placed in accordance with the Building Code Requirements for Reinforced Concrete ACI 318 and the Standard Manual ACI 315.
      3. Bar supports and spacers for rebar shall be provided in accordance with ACI 315.
      4. Where lapped splices in reinforcing occur, the minimun lap shall be made as follows:
         a. Vertical reinforcing: 40 bar dia. or 24" minimum.
         b. Horizontal reinforcing: 30 bar dia. or 18" minimum.
         c. Horizontal corner bars: 30 bar dia. or 18" minimum.
      5. Concrete cover for reinforcing shall be as follows:
         a. Concrete cast against and permanently exposed to earth.....3"
         b. Concrete exposed to earth or weather
            1. Bars larger than No. 5 .....2"
            2. Bars No. 5 or smaller ....1 1/2"
      6. The Contractor shall be responsible to see that all rebar is properly aligned and tied in place before placing concrete. All wall dowels and vertical steel shall be accurately located and secured in place so that it remains in the position during the concrete placing operation. Any rebar found to be improperly installed shall be removed and replaced at no additional cost to the Owner.
   C. Masonry:
      1. All masonry units shall have an average compressive strength of 1850 psi @ 28 days.
      2. All mortar shall be Type S with a strength of 2500 psi at 28 days.
      3. Grout shall have a minimum compressive strength of 3000 psi at 28 days.
      4. All hollow masonry to be reinforced shall be marked with keel at the bottom of the wall at the cells where dowels occur or rebar is to be placed and grouted.
      5. Cells containing rebar shall be grouted solid from the bottom to the top of the wall in accordance with IBC regulations. Cleanouts shall be provided at the bottom of walls at all cells to be grouted where the grout pour exceeds 4' in height.
      6. Lap all bars 40 diameters or 2'-0" minimum unless otherwise noted.
5. SITE GRADING AND EARTHWORK
   A. Foundation Preparation:
      Building areas shall be completely stripped of vegetation, existing construction and debris, and soft or muddy areas.
   B. Foundations:
      Over excavate beneath bottom elevation of all footings a minimum of three feet. The excavation shall extend a minimum of three feet laterally beyond the edge of all footings.
      The bottoms of excavations shall be scarified to a depth of 8", moistened within optimum moisture, +/-3%, and compacted to a minimum of 95% of standard proctor as determined by ASTM D698. The structural fill shall be thoroughly mixed within optimum moisture, +/-3%, placed in thin horizontal lifts, 8" max. loose depth, and compacted to a minimum of 95% of standard proctor as determined by ASTM D698.
   C. Backfills:
      All backfills should be thoroughly mixed within optimum moisture, +/-3%, placed in thin horizontal lifts, 8" max. loose depth, and compacted to a minimum of 95% of standard proctor, ASTM D698.
   D. Site Drainage:
      Provide positive surface drainage away from foundation excavations during construction.

MacCORNACK ENGINEERING
1776 Montano Blvd. NW, SUITE 24
LOS RANCHOS de ALBUQUERQUE, NEW MEXICO 87107

DONALD A. MACCORNACK NEW MEXICO 9838 REGISTERED PROFESSIONAL ENGINEER 2-13-19

CLIENT:	**RBK REALTY INC** 8830 Keeran Lane NE Albuquerque, New Mexico
PROJECT:	SIGNAL VILLAGE SUBDIVISION North Albuquerque Acres Albuquerque, New Mexico
DRAWING:	RETAINING WALL SECTIONS AND GENERAL STRUCTURAL NOTES
JOB NO: R37-002	DATE: 2/13/19
SHEET NO:	S1



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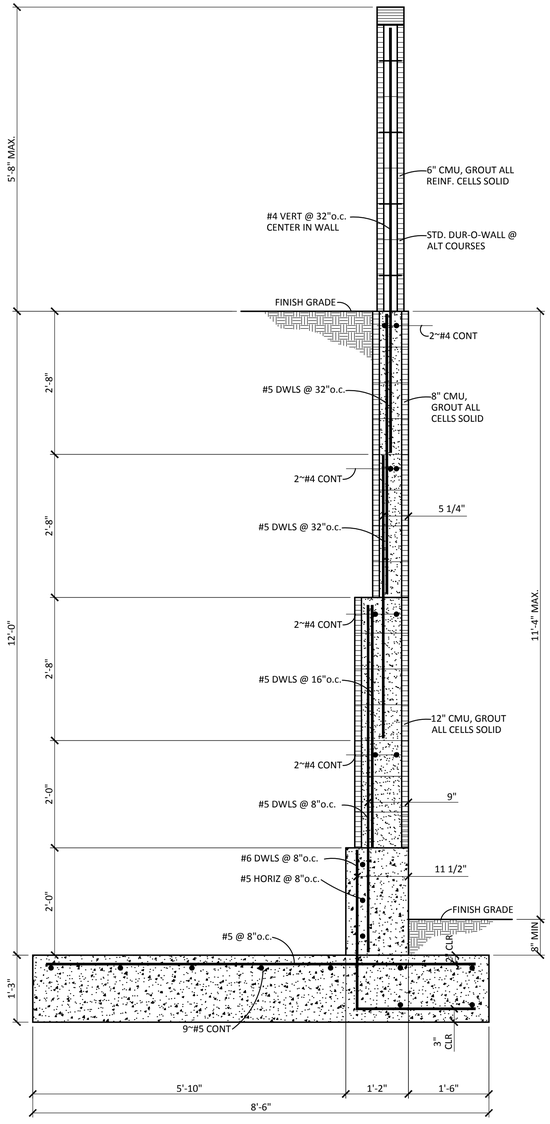

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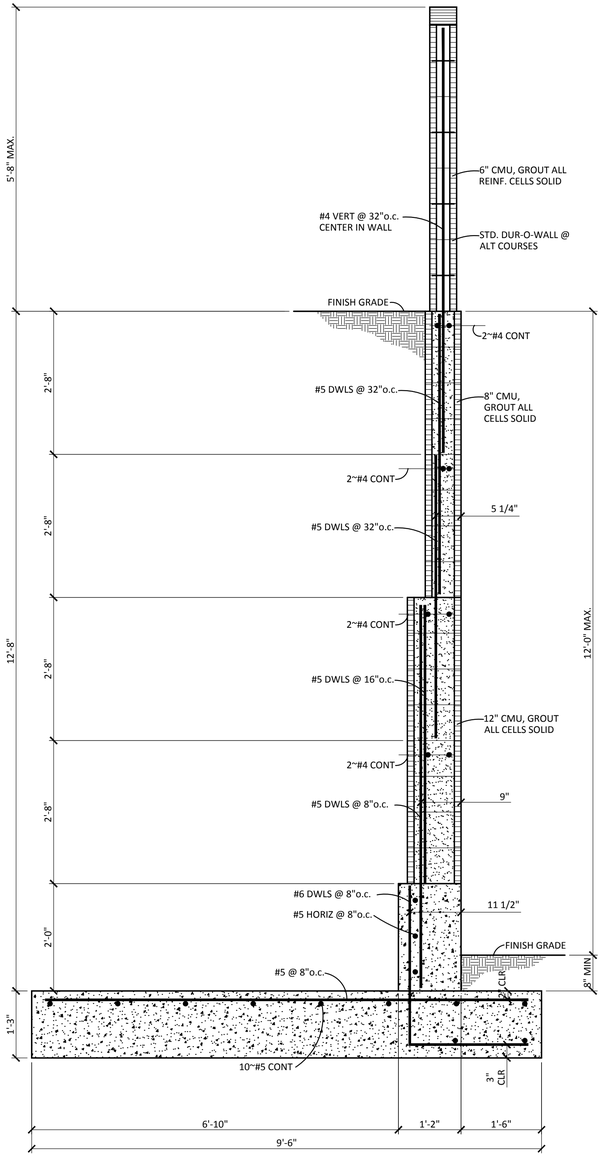

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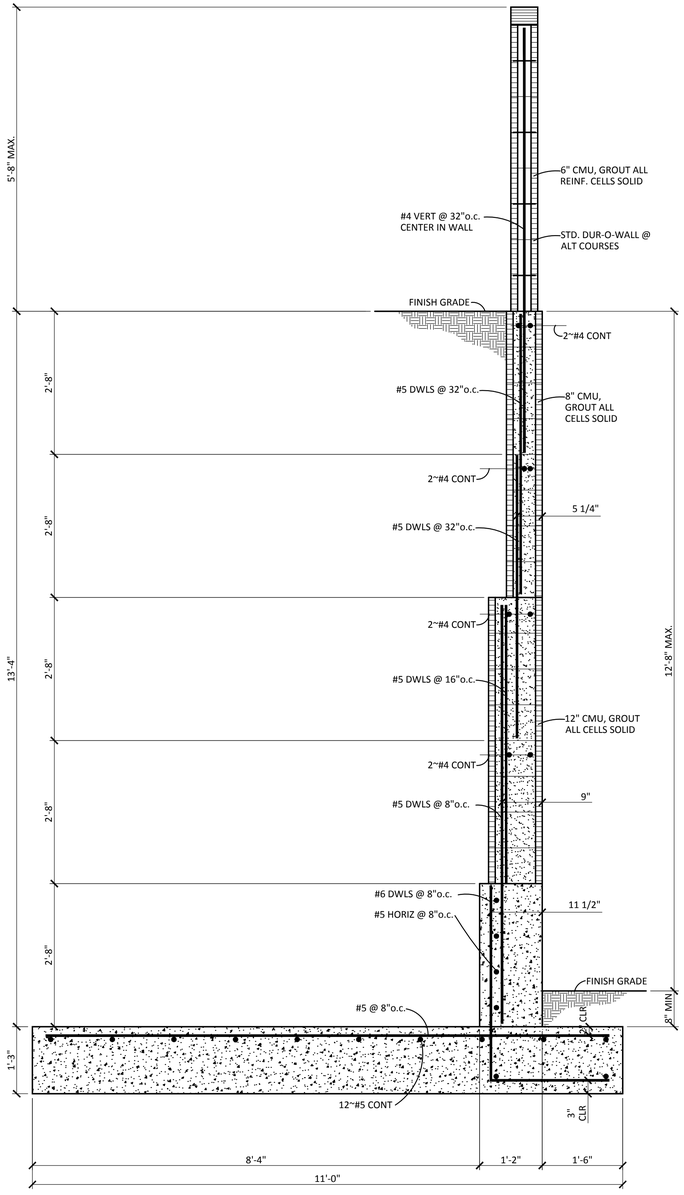

4 S2 3/4"=1'-0"

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1776 Montano Blvd. NW, SUITE 24
LOS RANCHOS de ALBUQUERQUE, NEW MEXICO 87107

CLIENT: **RBK REALTY INC**
8830 Keeran Lane NE
Albuquerque, New Mexico

PROJECT: SIGNAL VILLAGE SUBDIVISION
North Albuquerque Acres
Albuquerque, New Mexico

DRAWING: RETAINING WALL SECTIONS AND GENERAL STRUCTURAL NOTES

JOB NO:	DATE:	SHEET NO:
R37-002	2/13/19	S2