A G E N D A
COMMISSION ON STORM WATER ISSUES MEETING

September 7, 2021 at 6:30 p.m.
Heman Park Community Center
975 Pennsylvania Ave., University City, Missouri 63130

1. **MEETING CALLED TO ORDER**

2. **ROLL CALL**

3. **APPROVAL OF AGENDA**

4. **APPROVAL OF MINUTES –** See Attachment #1 for Draft Minutes (August 3, 2021)

5. **CITIZEN PARTICIPATION**

6. **NEW BUSINESS**

7. **OLD BUSINESS**
   a. Floodproofing Survey – Update and Discussion
   b. Relief Map Project – Update
   c. US Army Corps of Engineers Upper River Des Peres Flood Risk Management Draft General Reevaluation Report – Update to Commission (See Attachment #2)
   d. Flooding Early Warning System – Update

8. **SUBCOMMITTEE REPORTS**
   a. Flood Early Warning System
   b. Communications

9. **MISCELLANEOUS BUSINESS**
   a. Conditional Letter of Map Revision – Info (See Attachment #3)
   b. Request Form for Citizen Communication - Discussion

10. **COUNCIL LIAISON COMMENTS**

11. **ADJOURNMENT**

Please call (314) 505-8572 or email salpaslan@ucitymo.org to confirm your attendance.

Storm Water Task Force
6801 Delmar Boulevard, University City, Missouri 63130,
Phone: (314) 505-8560, Fax: (314) 862-0694

ATTACHMENT #1

Draft: MINUTES OF THE STORMWATER COMMISSION
August 3, 2021

1. **Call to Order.** The eleventh meeting of the Stormwater Commission (Commission) was called to order at 6:39 PM by Chair Todd Thompson.

2. **Attendance-Roll Call.** The following Commission members were present in person at the Heman Park Community Center: Bob Criss, Mark Holly, Todd Thompson, Eric Stein, Eric Karch. Also in attendance were Tim Cusick, Councilman, Sinan Alpaslan, Director of Public Works, John Mulligan, City Attorney.

3. **Agenda.** The following agenda was **accepted** without objection: *Roll Call; Approval of Agenda; Approval of Minutes; Citizen Participation; New Business – telephone call to Chairman Thompson with Councilman Clay & Hales Lewis Family on Plymouth Ave; Old Business – Floodproofing Survey, Relief Map, Critique of USACE proposal, Flood Early Warning System; Subcommittee Reports – FEWS, Communications; Miscellaneous Business – Sherwood Lake Update; Council Liaison Comments; Adjournment.*

4. **Minutes.** The minutes of the July 6, 2021, Commission meetings were accepted with no exceptions, but with comment from Councilman Chriss that motion to accept model should be reconsidered. (**Moved** and Second: Messrs. Karch, Thompson)

5. **Citizen Comments.** There were no citizen comments.
   - Lewis Family on Plymouth Ave
     - Thompson will send additional info via email
6. **New Business.**
   - USACE coordination
     - Mood of the Commission seems to be a Locally Selected Plan involving buyouts for those properties that make sense, and floodproofing & elevations elsewhere. There is interest in detention basins, but not a good sense that the property owners will agree, and some concern for their efficacy in larger storms.
     - Councilman Cusick and City Manager support the Commission's interest in a locally selected plan.
     - Commissioner Karch requested to USACE on July 30 – provide the latest model with the proposed DB3 & DB4 and with a GIS shapefile associated with the TSP (25-year flood extent for Alternative 6). He will remind USACE and cc Mr. Alpaslan. (post meeting…data received 8/5).
     - Commission expressed concern that USACE will not provide a list of addresses for the 500 properties involved in TSP (floodproofing/elevation, even though they USACE agree that a survey of homeowners on floodproofing participation is a good idea to get a better handle on whether that plan is even feasible. Ms. Buchanan conveyed at the end of July that "I asked the economics folks about this and the answer came down from their section chief that sharing individual addresses outside USACE would not be possible. However, we could provide maps and include the structure points overlaid with parcel outlines so that it is pretty evident where the structures are at." City (City Manager in coordination with Mr. Alpasan) will contact Section Chief to express our concern, and to ask why this is not possible.
     - Wide ranging discussion including:
       - Non-federal cost is 35% ($25M) – how does the City come up with that money? Grants are a possibility.
       - Locally Preferred Plan – when do we have to suggest that? Seems to be in mid-October…same timeframe as finalizing GRR. Some question as to whether indicating preference for LPP would reduce/remove federal funding.

- Concern that the Corps process is moving too fast for us to be able to digest and review their study, and provide feedback that will be incorporated.
- Concern that the Corps study may not provide specific recommendation to the City on a cost-effective solution to flooding.

- August 17 Public Meeting:
  - The second public meeting to be led by the USACE.
  - Chairman Thompson will make a brief statement at the beginning. The Corps effort is specific to river flooding, and the City is conducting a parallel Stormwater Master Planning effort to address other non-river stormwater problems. Please be on the lookout for a survey that the Commission will be conducting to support these efforts. We conducted one survey in 2019, and compiled MSD complaint records. Our upcoming survey hopes to gather greater detail from anyone experiencing stormwater problems in U City AND to get feedback on the Corps of Engineers plan that they will present tonight.
  - Commission will develop a series of questions via email to be asked at this meeting.

7. Old Business and Subcommittee Reports.

- Floodproofing survey
  - Stein made motion (provided ahead via July 27 email) to publish/mail survey (Moved and Second: Messrs. Karch, Holly)
  - Motion amended to add bullet to request that City Manager request from the Section Chief a list of addresses associated with 500 properties listed in TSP.
- Mr. Holly reported on the 3-D relief map:
  - Printing is progressing quickly
  - Decided to purchase pre-made stands
  - Artist Proposals were submitted to Sinan; Sinan needs W-9
- Critique of USACE study (presented by Dr. Chriss). Some key points include:
  - Inadequate lit review.
  - References to irrelevant geologic and hydrologic elements (karst where our watershed has none, topographic maps in Illinois, rainfall totals not specific to our watershed) that are representative of the lack of understanding of our watershed, and a lack of attention to detail.
  - Serious concerns with hydrologic modeling - use of 24-hour rainfall durations, when Commissioners (thru independent peer-reviewed studies as well as work on the City's flood warning system) have demonstrated that a rainfall intensity of 1.5 inches/hour is instead responsible for flooding of the RdP watershed to our City.
  - General concern that the Corps has not demonstrated interest in hearing or incorporating our concerns, and is more concerned with schedule.
- Flood Warning System – 3rd pole received by City, and ready to install
- Communication – No report.
- Sherwood Lake – Not discussed.
- Delayed to a future meeting was Mr. Karch's email message about discussion of Corps recommendations and alternatives.

8. Council Cusick Comments.

- Deconstruction at Olive / 170 is underway. Earthmoving from North to South side of Olive has been permitting to take place through the night with adequate safety precautions.
- Opening for 7th person on Stormwater Commission is still available, and we are encouraged.

9. Adjournment was at 9:15 by motion (Messrs. Holly and Stein).

Intended Attachments:
Agenda

Minutes Preparation. Minutes were prepared by Eric Karch.

https://d.docs.live.net/f313a1058be2a6a7/Documents/U_City_StorwmaterTaskForce/20210803_StrmWtrCommMin_DRAFT.docx

https://www.dropbox.com/home/UCity%20Stormwater%20Taskforce/CommissionMinutesDrafts

CIVIL WORKS PROJECT DELIVERY PROCESS

ATTACHMENT #2

Request for Federal Engagement

- Problem Identification
- Congress Authorizes Study
- Congress Appropriates Study Funds
- Willing Non-Federal Sponsor (NFS) Identified

Study Phase

- Execute Feasibility Cost Share Agreement (FCSA)
- Conduct Study (3 years)
- Stakeholder Engagement
- Chief's Report Approval

Preconstruction Engineering & Design (PED)

- Congress Appropriates PED Funds
- Execute Design Agreement
- Perform Requisite Design, Environmental Update, etc.

Construction Phase 65/35

- Congress Authorizes Project
- Congress Appropriates Construction Funds
- Congress Provides Construction New Start
- Willing Sponsor
- Execute Project Partnership Agreement (PPA)
- NFS Acquires Land Easements, Rights-Of-Way, Relocation, and Disposal Areas (LERRD)
- Initiate Construction
- Congress Appropriates Funding to Complete Construction (multi-year)

Operation & Maintenance

- Non-Federal Sponsor Assumes Operations and Maintenance, Repair, Replacement and Rehabilitation (OMRR&R)

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Brentwood Bound

Building a Bright Future

Funding

The Brentwood Bound Plan will be funded through a combination of grant funding, partnerships, funding from Certificates of Participation, and a one-half of one percent economic development sales tax.

Brentwood Bound Total Investment

Funding from Certificates of Participation: $39.2 million
Funding supported by Economic Development Sales Tax: $40.4 million
Additional Funding from Grants and Partnerships: $5 million
Anticipated Total Project Cost: $79.6 million

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METRO EAST LEVEES CASE STUDY

- 1993 Flood revealed poor levee system performance.
- Levee Districts financially incapable to address repairs.
- 2007 FEMA announced intent to de-accredit levee system as protecting against 1% food.
- Illinois General Assembly approved ¼ percent sales tax to pay for improvements
- To date over $170M in Federal and non-Federal investment.

Subtotal	$199.95
Shipping	$0.00
SAINT CLAIR CO FLOOD PREVENTION SL	$0.50
IL STATE TAX	$12.50
SAINT CLAIR CO METRO EAST PARK AND RECREATION DISTRICT SP	$0.20

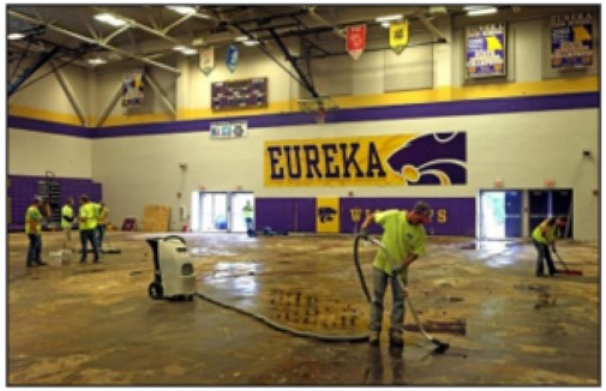
Eureka, MO

- City experienced two floods of record within 16-month period, which damaged homes, businesses, school, and critical infrastructure.
- City experienced three unprecedented flash floods in summer 2019.
- City continues to partner in a cost shared Feasibility Study to evaluate structural and non-structural flood risk-reduction measures in flood-prone areas of the community.

Proposition E

- Passed by 71 percent in April 2018.
- Adds a ½ cent sales tax for a 20-year period
- Expected to generate about $15.9 million in revenue to support public safety projects.
    - $10 meal would increase by 5 cents
    - Six Flags season pass would increase by 99 cents

Eureka High School flooding in May 2017. School closed for seven days due to flooding and recovery.



Eureka High School gymnasium post flood recovery.

Eureka downtown area impacted by Meramec River flooding for the second time in 16 months.

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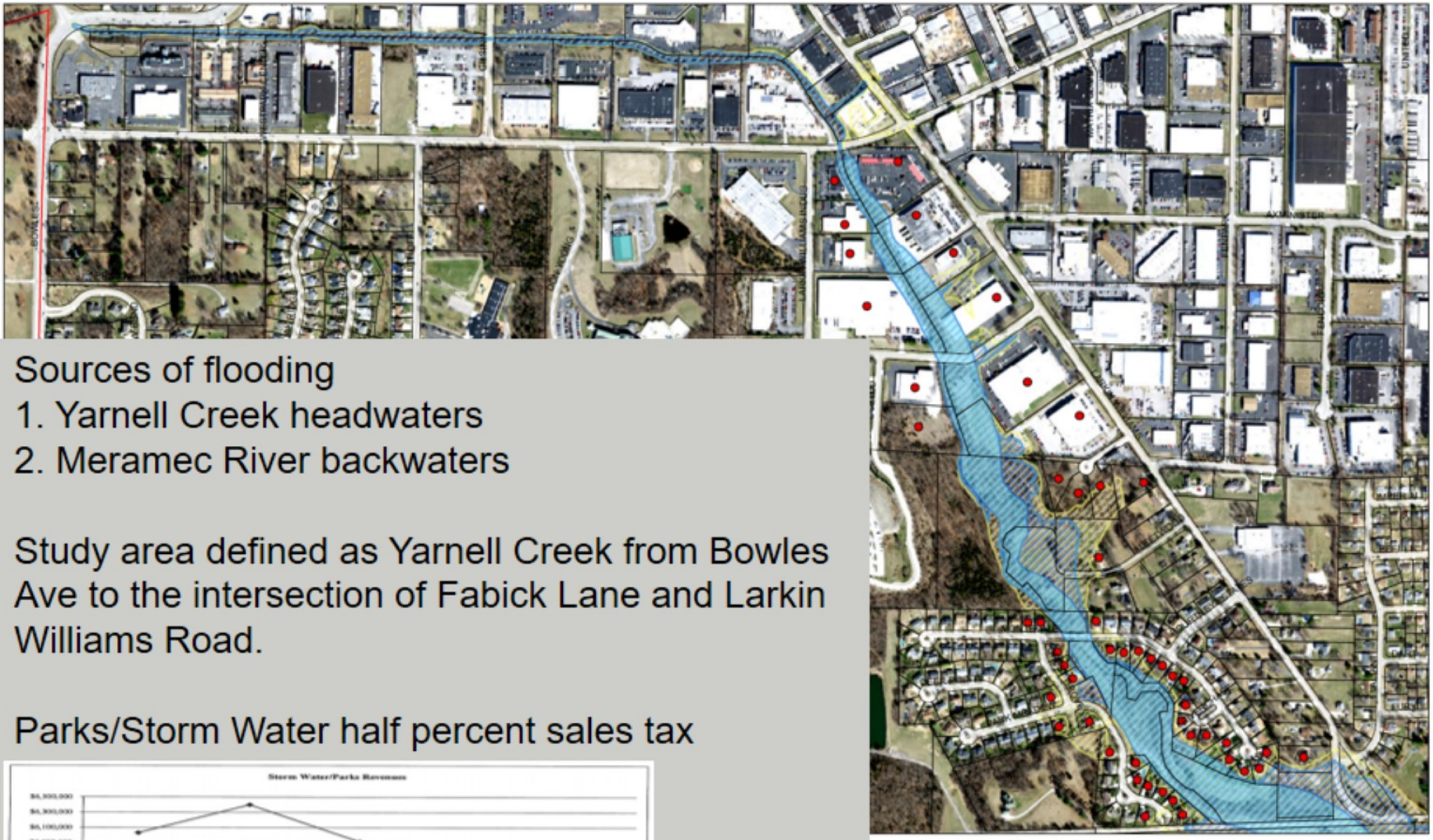
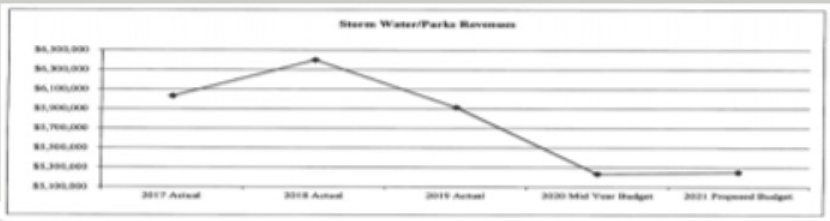
FENTON MISSOURI YARNELL CREEK



Sources of flooding
1. Yarnell Creek headwaters
2. Meramec River backwaters

Study area defined as Yarnell Creek from Bowles Ave to the intersection of Fabick Lane and Larkin Williams Road.

Parks/Storm Water half percent sales tax



BRIC Notice of Funding Opportunity

FEMA released the BRIC Notice of Funding Opportunity NOFO on Aug. 9, 2021.

This funding opportunity is posted on grants.gov and provides detailed program information and other grant application and administration requirements.

The application period to apply for fiscal year 2021 (FY 2021) BRIC funding will open on Sept. 30, 2021, and close at 3 p.m. Eastern Time on Jan. 28, 2022. FEMA encourages subapplicants and applicants to apply. There is $1 billion available in BRIC funding. Applications submitted after the deadline will not be considered for funding.

Get Details on the Application Requirements

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Community Development Block Grants - Mitigation

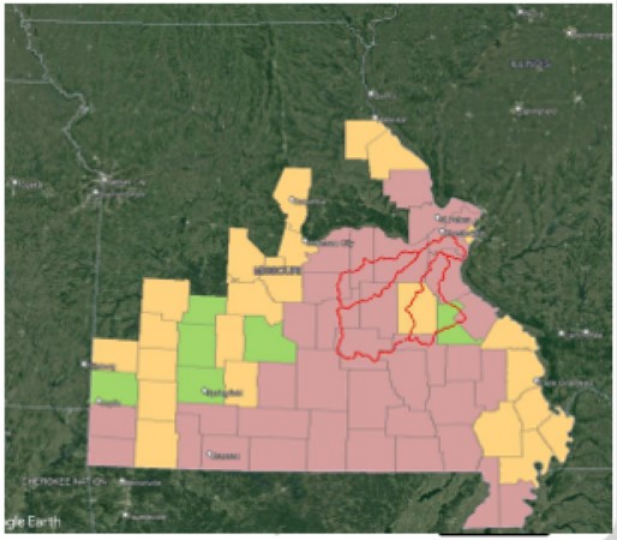
In 2018, the U.S. Congress created Community Development Block Grant Mitigation (CDBG-MIT) funds to help states impacted by disasters that happened from 2015 to 2017. In August 2019, the U.S. Department of Housing and Urban Development (HUD) released the rules for how states can use CDBG-MIT funds.

Request Application

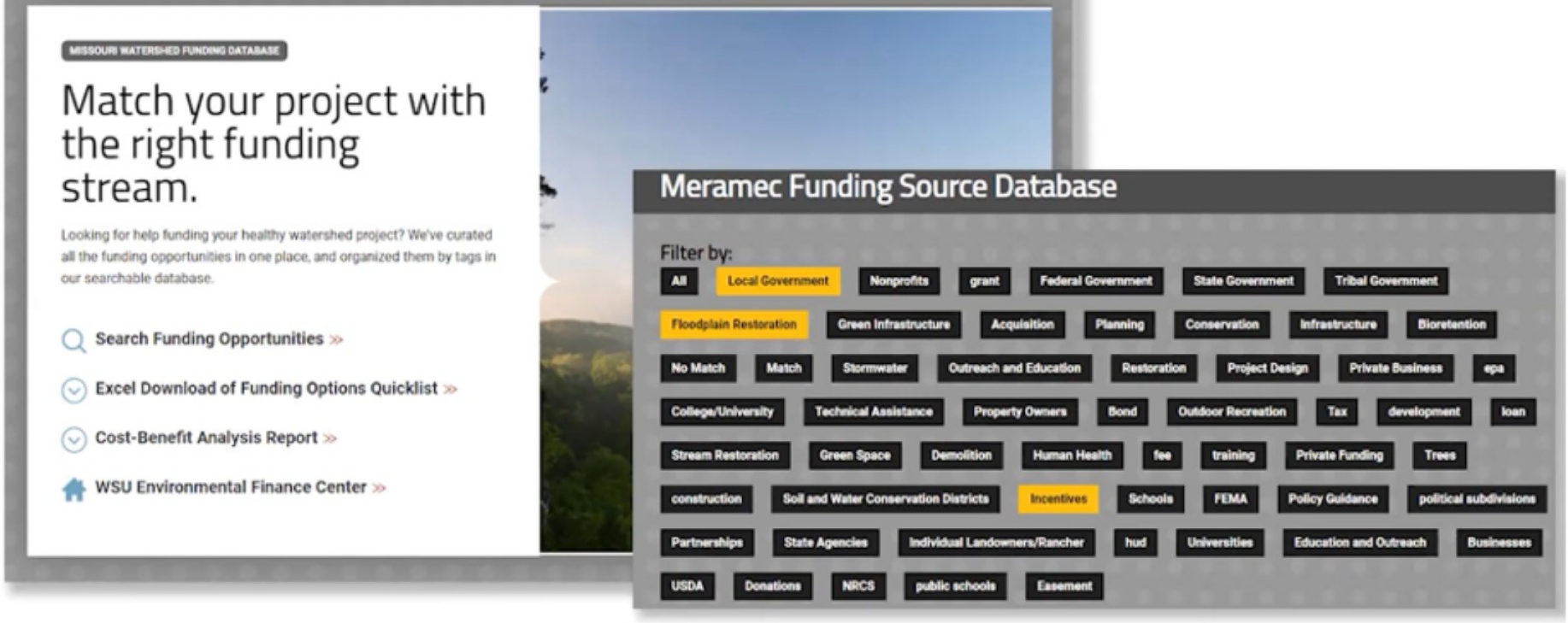
Because of damage from storms like the 2017 floods, HUD made $41.5 million in CDBG-MIT funds available to Missouri.

On May 19, 2021, the Department of Economic Development announced that it will award $18.8 million to 29 recipients through its Community Development Block Grant Mitigation Program to help communities recently affected by disasters become more resilient.

A second round of MIT applications are projected to open in late 2021.



EFC's Missouri Healthy Watershed Funding Search Tool



www.wichita.edu/mowatershedfunding

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ATTACHMENT #3

U.S. DEPARTMENT OF HOMELAND SECURITY
FEDERAL EMERGENCY MANAGEMENT AGENCY

OVERVIEW & CONCURRENCE FORM

O.M.B No. 1660-0016
Expires February 28, 2014

PAPERWORK BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 1 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing, reviewing, and submitting the form. You are not required to respond to this collection of information unless it displays a valid OMB control number. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Department of Homeland Security, Federal Emergency Management Agency, 1800 South Bell Street, Arlington, VA 20958-3005, Paperwork Reduction Project (1660-0016). Submission of the form is required to obtain or retain benefits under the National Flood Insurance Program. **Please do not send your completed survey to the above address.**

PRIVACY ACT STATEMENT

AUTHORITY: The National Flood Insurance Act of 1968, Public Law 90-448, as amended by the Flood Disaster Protection Act of 1973, Public Law 93-234.

PRINCIPAL PURPOSE(S): This information is being collected for the purpose of determining an applicant's eligibility to request changes to National Flood Insurance Program (NFIP) Flood Insurance Rate Maps (FIRM).

ROUTINE USE(S): The information on this form may be disclosed as generally permitted under 5 U.S.C § 552a(b) of the Privacy Act of 1974, as amended. This includes using this information as necessary and authorized by the routine uses published in DHS/FEMA/NFIP/LOMA-1 National Flood Insurance Program (NFIP); Letter of Map Amendment (LOMA) February 15, 2006, 71 FR 7990.

DISCLOSURE: The disclosure of information on this form is voluntary; however, failure to provide the information requested may delay or prevent FEMA from processing a determination regarding a requested change to a (NFIP) Flood Insurance Rate Maps (FIRM).

A. REQUESTED RESPONSE FROM DHS-FEMA

This request is for a (check one):

☒ CLOMR: A letter from DHS-FEMA commenting on whether a proposed project, if built as proposed, would justify a map revision, or proposed hydrology changes (See 44 CFR Ch. 1, Parts 60, 65 & 72).

☐ LOMR: A letter from DHS-FEMA officially revising the current NFIP map to show the changes to floodplains, regulatory floodway or flood elevations. (See 44 CFR Ch. 1, Parts 60, 65 & 72)

B. OVERVIEW

1. The NFIP map panel(s) affected for all impacted communities is (are):

Community No.	Community Name	State	Map No.	Panel No.	Effective Date
Example: 480301 480287	City of Katy Harris County	TX TX	48473C 48201C	0005D 0220G	02/08/83 09/28/90
290390	University City, City of	MO	29189C	0211K	02/04/15

2. a. Flooding Source: Southwest Branch River Des Peres

   b. Types of Flooding: ☒ Riverine ☐ Coastal ☐ Shallow Flooding (e.g., Zones AO and AH)
   ☐ Alluvial fan ☐ Lakes ☐ Other (Attach Description)

3. Project Name/Identifier: Market at Olive

4. FEMA zone designations affected: AE (choices: A, AH, AO, A1-A30, A99, AE, AR, V, V1-V30, VE, B, C, D, X)

5. Basis for Request and Type of Revision:

   a. The basis for this revision request is (check all that apply)

   ☐ Physical Change ☐ Improved Methodology/Data ☐ Regulatory Floodway Revision ☐ Base Map Changes
   ☐ Coastal Analysis ☒ Hydraulic Analysis ☐ Hydrologic Analysis ☐ Corrections
   ☐ Weir-Dam Changes ☐ Levee Certification ☐ Alluvial Fan Analysis ☐ Natural Changes
   ☐ New Topographic Data ☐ Other (Attach Description)

   Note: A photograph and narrative description of the area of concern is not required, but is very helpful during review.

b. The area of revision encompasses the following structures (check all that apply)

Structures: ☐ Channelization ☐ Levee/Floodwall ☐ Bridge/Culvert

☐ Dam ☒ Fill ☐ Other (Attach Description)

6. ☒ Documentation of ESA compliance is submitted (required to initiate CLOMR review). Please refer to the instructions for more information.

C. REVIEW FEE

Has the review fee for the appropriate request category been included? ☒ Yes Fee amount: $6750

☐ No, Attach Explanation

Please see the DHS-FEMA Web site at http://www.fema.gov/plan/prevent/fhm/frm_fees.shtm **for Fee Amounts and Exemptions.**

D. SIGNATURE

All documents submitted in support of this request are correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

Name: Leonard Meers	Company: Grimes Consulting	
Mailing Address: 12300 Old Tesson, Suite 300F St. Louis, MO 63128	Daytime Telephone No.: 314.849.6100	Fax No.: 314.849.6010
	E-Mail Address: lennym@grimesconsulting.com	
Signature of Requester (required):	Date: 04/06/21	

As the community official responsible for floodplain management, I hereby acknowledge that we have received and reviewed this Letter of Map Revision (LOMR) or conditional LOMR request. Based upon the community's review, we find the completed or proposed project meets or is designed to meet all of the community floodplain management requirements, including the requirements for when fill is placed in the regulatory floodway, and that all necessary Federal, State, and local permits have been, or in the case of a conditional LOMR, will be obtained. For Conditional LOMR requests, the applicant has documented Endangered Species Act (ESA) compliance to FEMA prior to FEMA's review of the Conditional LOMR application. For LOMR requests, I acknowledge that compliance with Sections 9 and 10 of the ESA has been achieved independently of FEMA's process. For actions authorized, funded, or being carried out by Federal or State agencies, documentation from the agency showing its compliance with Section 7(a)(2) of the ESA will be submitted. In addition, we have determined that the land and any existing or proposed structures to be removed from the SFHA are or will be reasonably safe from flooding as defined in 44CFR 65.2(c), and that we have available upon request by FEMA, all analyses and documentation used to make this determination.

Community Official's Name and Title:	Community Name:	
Mailing Address:	Daytime Telephone No.:	Fax No.:
	E-Mail Address:	
Community Official's Signature (required):	Date:	

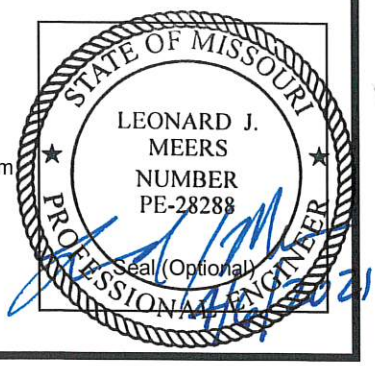
CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR

This certification is to be signed and sealed by a licensed land surveyor, registered professional engineer, or architect authorized by law to certify elevation information data, hydrologic and hydraulic analysis, and any other supporting information as per NFIP regulations paragraph 65.2(b) and as described in the MT-2 Forms Instructions. All documents submitted in support of this request are correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

Certifier's Name: Leonard Meers	License No.: E-28288	Expiration Date: 12/31/2021	
Company Name: Grimes Consulting	Telephone No.: 314.849.6100	Fax No.: 31.849.6010	
Signature:	Date: 04/06/21	E-Mail Address: lennym@grimesconsulting.com	

Ensure the forms that are appropriate to your revision request are included in your submittal.

Form Name and (Number)	Required if …
☒ Riverine Hydrology and Hydraulics Form (Form 2)	New or revised discharges or water-surface elevations
☐ Riverine Structures Form (Form 3)	Channel is modified, addition/revision of bridge/culverts, addition/revision of levee/floodwall, addition/revision of dam
☐ Coastal Analysis Form (Form 4)	New or revised coastal elevations
☐ Coastal Structures Form (Form 5)	Addition/revision of coastal structure
☐ Alluvial Fan Flooding Form (Form 6)	Flood control measures on alluvial fans



U.S. DEPARTMENT OF HOMELAND SECURITY
FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE HYDROLOGY & HYDRAULICS FORM

O.M.B No. 1660-0016
Expires February 28, 2014

PAPERWORK BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 3.5 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing, reviewing, and submitting the form. You are not required to respond to this collection of information unless a valid OMB control number appears in the upper right corner of this form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Department of Homeland Security, Federal Emergency Management Agency, 1800 South Bell Street, Arlington VA 20958-3005, Paperwork Reduction Project (1660-0016). Submission of the form is required to obtain or retain benefits under the National Flood Insurance Program. **Please do not send your completed survey to the above address.**

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DISCLOSURE: The disclosure of information on this form is voluntary; however, failure to provide the information requested may delay or prevent FEMA from processing a determination regarding a requested change to a NFIP Flood Insurance Rate Maps (FIRM).

Flooding Source: Southwest Branch River Des Peres

Note: Fill out one form for each flooding source studied

A. HYDROLOGY

1. Reason for New Hydrologic Analysis (check all that apply)

☐ Not revised (skip to section B) ☐ No existing analysis ☐ Improved data
☐ Alternative methodology ☒ Proposed Conditions (CLOMR) ☐ Changed physical condition of watershed

2. Comparison of Representative 1%-Annual-Chance Discharges

Location	Drainage Area (Sq. Mi.)	Effective/FIS (cfs)	Revised (cfs)
Section 4485.9	0.69	872.82	870
Section 2797.2 F	1.81	1632.82	1630

3. Methodology for New Hydrologic Analysis (check all that apply)

☐ Statistical Analysis of Gage Records ☐ Precipitation/Runoff Model → Specify Model: _____
☐ Regional Regression Equations ☒ Other (please attach description)

Please enclose all relevant models in digital format, maps, computations (including computation of parameters), and documentation to support the new analysis.

4. Review/Approval of Analysis

If your community requires a regional, state, or federal agency to review the hydrologic analysis, please attach evidence of approval/review.

5. Impacts of Sediment Transport on Hydrology

Is the hydrology for the revised flooding source(s) affected by sediment transport? ☐ Yes ☐ No

If yes, then fill out Section F (Sediment Transport) of Form 3. If No, then attach your explanation..

B. HYDRAULICS

1. Reach to be Revised

	Description	Cross Section	Water-Surface Elevations (ft.) Effective	Proposed/Revised
Downstream Limit*	420' downstream of McKnight Road	2797.2 F	544.25	544.25
Upstream Limit*	1200' upstream of Mcknight	4485.9	557.48	557.48

*Proposed/Revised elevations must tie-into the Effective elevations within 0.5 foot at the downstream and upstream limits of revision.

2. Hydraulic Method/Model Used: HEC-RAS 5.03

3. Pre-Submittal Review of Hydraulic Models*

DHS-FEMA has developed two review programs, CHECK-2 and CHECK-RAS, to aid in the review of HEC-2 and HEC-RAS hydraulic models, respectively. We recommend that you review your HEC-2 and HEC-RAS models with CHECK-2 and CHECK-RAS.

4.

Models Submitted	Natural Run File Name:	Natural Run Plan Name:	Floodway Run File Name:	Floodway Run Plan Name:	Datum
Duplicate Effective Model*	SW River Des Peres	Existing			NAVD88
Corrected Effective Model*					
Existing or Pre-Project Conditions Model	SW River Des Peres	Existing			NAVD88
Revised or Post-Project Conditions Model	SW River Des Peres	Proposed			NAVD88
Other - (attach description)	SW River Des Peres	FLOODWAY			NAVD88

* For details, refer to the corresponding section of the instructions.

☒ Digital Models Submitted? (Required)

C. MAPPING REQUIREMENTS

A **certified topographic work map** must be submitted showing the following information (where applicable): the boundaries of the effective, existing, and proposed conditions 1%-annual-chance floodplain (for approximate Zone A revisions) or the boundaries of the 1%- and 0.2%-annual-chance floodplains and regulatory floodway (for detailed Zone AE, AO, and AH revisions); location and alignment of all cross sections with stationing control indicated; stream, road, and other alignments (e.g., dams, levees, etc.); current community easements and boundaries; boundaries of the requester's property; certification of a registered professional engineer registered in the subject State; location and description of reference marks; and the referenced vertical datum (NGVD, NAVD, etc.).

☐ Digital Mapping (GIS/CADD) Data Submitted (preferred)

Topographic Information: Topo Survey

Source: field survey Date: 2019

Accuracy: 0.1'

Note that the boundaries of the existing or proposed conditions floodplains and regulatory floodway to be shown on the revised FIRM and/or FBFM must tie-in with the effective floodplain and regulatory floodway boundaries. Please attach **a copy of the effective FIRM and/or FBFM**, at the same scale as the original, annotated to show the boundaries of the revised 1%-and 0.2%-annual-chance floodplains and regulatory floodway that tie-in with the boundaries of the effective 1%-and 0.2%-annual-chance floodplain and regulatory floodway at the upstream and downstream limits of the area on revision.

☒ Annotated FIRM and/or FBFM (Required)

D. COMMON REGULATORY REQUIREMENTS*

1. For LOMR/CLOMR requests, do Base Flood Elevations (BFEs) increase? ☐ Yes ☒ No

   a. For CLOMR requests, if either of the following is true, please submit **evidence of compliance with Section 65.12 of the NFIP regulations**:

   - The proposed project encroaches upon a regulatory floodway and would result in increases above 0.00 foot compared to pre-project conditions.
   - The proposed project encroaches upon a SFHA with or without BFEs established and would result in increases above 1.00 foot compared to pre-project conditions.

   b. Does this LOMR request cause increase in the BFE and/or SFHA compared with the effective BFEs and/or SFHA? ☐ Yes ☒ No

   If Yes, please attach **proof of property owner notification and acceptance (if available)**. Elements of and examples of property owner notifications can be found in the MT-2 Form 2 Instructions.

2. Does the request involve the placement or proposed placement of fill? ☒ Yes ☐ No

   If Yes, the community must be able to certify that the area to be removed from the special flood hazard area, to include any structures or proposed structures, meets all of the standards of the local floodplain ordinances, and is reasonably safe from flooding in accordance with the NFIP regulations set forth at 44 CFR 60.3(A)(3), 65.5(a)(4), and 65.6(a)(14). Please see the MT-2 instructions for more information.

3. For LOMR requests, is the regulatory floodway being revised? ☒ Yes ☐ No

   If Yes, attach **evidence of regulatory floodway revision notification**. As per Paragraph 65.7(b)(1) of the NFIP Regulations, notification is required for requests involving revisions to the regulatory floodway. (Not required for revisions to approximate 1%-annual-chance floodplains [studied Zone A designation] unless a regulatory floodway is being established. Elements and examples of regulatory floodway revision notification can be found in the MT-2 Form 2 Instructions.)

4. For CLOMR requests, please submit documentation to FEMA and the community to show that you have complied with Sections 9 and 10 of the Endangered Species Act (ESA).

For actions authorized, funded, or being carried out by Federal or State agencies, please submit documentation from the agency showing its compliance with Section 7(a)(2) of the ESA. Please see the MT-2 instructions for more detail.

* Not inclusive of all applicable regulatory requirements. For details, see 44 CFR parts 60 and 65.

“NO-RISE” 44 CFR 60.3 (d) (2) CERTIFICATION

THIS IS TO CERTIFY THAT I AM A DULY QUALIFIED REGISTERED PROFESSIONAL ENGINEER LICENSED TO PRACTICE IN THE STATE OF MISSOURI

IT IS FURTHER TO CERTIFY THAT THE ATTACHED TECHNICAL DATA SUPPORTS THE FACT THAT

PROPOSED MARKET AT OLIVE WILL NOT IMPACT THE 100-YEAR FLOODELEVATIONS, FLOODWAY ELEVATIONS, OR FLOODWAY WIDTHS ON SOUTHWEST BRANCH RIVER DES PERES AT PUBLISHED SECTIONS IN THE FLOOD INSURANCE STUDY FOR UNIVERSITY CITY, MISSOURI REVISED FEBRUARY 4, 2015 AND WILL NOT IMPACT THE 100-YEAR FLOOD ELEVATIONS, FLOODWAY ELEVATIONS, OR FLOODWAY WIDTHS AT UNPUBLISHED CROSS-SECTIONS IN THE VICINITY OF THE PROPOSED DEVELOPMENT.

ATTACHED ARE THE FOLLOWING DOCUMENTS THAT SUPPORT MY FINDINGS:

Date: 12/17/2020

SIGNATURE: 

Leonard Meers, Vice President

FLOOD STUDY REPORT

Market at Olive

Prepared for:

Novus Companies
Contact: Jon Browne
20 Allen Ave.
Suite 400
Webster Groves, MO 63119

Prepared by:

GRIMES CONSULTING, INC.
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GRIMES PROJECT #3082
20FLPLS-00039
10/21/20

Leonard J. Meers
Professional Engineer
E-28288

“NO-RISE” 44 CFR 60.3 (d) (2) CERTIFICATION

THIS IS TO CERTIFY THAT I AM A DULY QUALIFIED REGISTERED PROFESSIONAL ENGINEER LICENSED TO PRACTICE IN THE STATE OF MISSOURI

IT IS FURTHER TO CERTIFY THAT THE ATTACHED TECHNICAL DATA SUPPORTS THE FACT THAT

PROPOSED MARKET AT OLIVE WILL NOT IMPACT THE 100-YEAR FLOODELEVATIONS, FLOODWAY ELEVATIONS, OR FLOODWAY WIDTHS ON SOUTHWEST BRANCH RIVER DES PERES AT PUBLISHED SECTIONS IN THE FLOOD INSURANCE STUDY FOR UNIVERSITY CITY, MISSOURI REVISED FEBRUARY 4, 2015 AND WILL NOT IMPACT THE 100-YEAR FLOOD ELEVATIONS, FLOODWAY ELEVATIONS, OR FLOODWAY WIDTHS AT UNPUBLISHED CROSS-SECTIONS IN THE VICINITY OF THE PROPOSED DEVELOPMENT.

ATTACHED ARE THE FOLLOWING DOCUMENTS THAT SUPPORT MY FINDINGS:

DATE: 08/02/2021

SIGNATURE:_____

Leonard Meers, Vice President

Flood Study Report

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I. BACKGROUND

The existing land consists of residential and commercial lots along a section of the Southwest Branch River Des Peres tributary from 420' downstream of McKnight Road to approximately 1700' upstream. (River Sections 4918.3 upstream to Section 2797.2 downstream) There is an existing culvert at McKnight Road at section 3126.6 that is to remain as used in place.

The proposed Market at Olive redevelopment project consists of the construction of several buildings with surrounding parking along a portion of the Southwest Branch River Des Peres. On the south side of Olive Blvd there is planned fill to be in the floodplain.

II. PROPOSED DEVELOPMENT

The plans attached to this submittal show the proposed conditions as consisting of fill in the floodplain on the east and west sides of Southwest Branch River Des Peres.

III. HYDROLOGIC ANALYSIS

This study adopts the hydrologic analysis from the Wood PLC study as the existing conditions and flow data for this study from 420' downstream of McKnight Road (section 2797.2) to approximately 1700' upstream at section 4918.3. The proposed conditions were prepared by modifying the existing cross section to reflect the proposed conditions. The sections upstream of 4485.9 and downstream of 2797.2 are from the Wood PLC study and contain no new improvements.

The existing soil for this area consists of approx. 75% Urban Land-Harvester (2 to 9% slopes) and 25% Fishpot-Urban Land (0 to 5% slopes).

Steady flow conditions were used in the calculations using HEC-RAS Version 5.0.5. An Existing Conditions Model and a Proposed Condition Model were created using this version of HEC-RAS. We accept the model provided by Wood PLC as the existing site and therefore do not have a Duplicate Effective Model.

TABLE 1 - COMPARISON OF EXISTING/PROPOSED 100 YEAR FLOOD ELEVATIONS

Cross Section	100 Year Discharge (cfs)	Distance to D.S. Cross Section (ft)	Exist. HEC-RAS BFE (ngvd)	Prop. HEC-RAS BFE (ngvd)	Exist./Prop. Difference (ft)	Exist. Channel Velocity (ft/s)	Prop. Channel Velocity (ft/s)	Percent Difference (%)
4918.3	2900	31.40	575.28	575.28	0.00	3.79	3.79	0.00
4886.9	2900	32.10	574.82	574.82	0.00	6.23	6.23	0.00
4854.8	2900	36.10	574.83	574.83	0.00	6.06	6.06	0.00
4818.7	2900	84.70	572.84	572.84	0.00	12.48	12.48	0.00
4734	Culvert	48.80						
4685.2	2900	199.30	566.22	566.22	0.00	17.60	17.60	0.00
4485.9	2900	147.00	561.59	561.59	0.00	14.60	14.60	0.00
4338.9	2900	200.70	560.66	560.66	0.00	14.61	14.61	0.00
4138.2	2900	184.30	559.38	559.38	0.00	14.62	14.62	0.00
3953.9	2900	203.10	558.21	558.21	0.00	14.61	14.61	0.00
3750.8	2900	144.20	557.67	557.68	0.01	13.12	13.09	-0.23
3606.6	2900	154.00	558.11	558.06	-0.05	10.91	11.06	1.37
3452.6	2900	130.90	558.25	558.29	0.04	9.75	9.63	-1.23
3321.7	2900	60.90	558.49	558.49	0.00	8.28	8.27	-0.12
3260.8	2900	44.20	558.54	558.54	0.00	8.06	8.06	0.00
3216.6	Culvert	59.40						
3157.2	2900	65.70	551.96	551.96	0.00	5.89	5.89	0.00
3091.5	2900	294.30	552.03	552.03	0.00	4.23	4.23	0.00
2797.2	3200		551.50	551.50	0.00	6.20	6.20	0.00

IV. SUMMARY

The following items are reiterated:

- Proposed construction consists of fill in the floodplain on the east and west sides of Southwest Branch River Des Peres.
- Modeling was performed from McKnight Road 420’ downstream (section 2797.2) to approximately 1700’ upstream of McKnight Road (Section 4918.3).
- Both existing and proposed condition models have been included.
- The percent change in velocities is within reason and tolerable.

V. EXISTING CONDITIONS MODEL

HEC-RAS Plan: EX River: SOUTHWEST RIV... Reach: Lower Profile: P100yr

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)	
Lower	4918.3	P100yr	2900.00	559.14	575.28	565.49	575.46	0.000041	3.79	2054.54	440.66	0.17
Lower	4886.9 K	P100yr	2900.00	558.43	574.82	566.62	575.35	0.000111	6.23	830.97	687.53	0.28
Lower	4854.8	P100yr	2900.00	557.06	574.83	565.54	575.35	0.000100	6.06	766.11	715.29	0.26
Lower	4818.7	P100yr	2900.00	555.36	572.84	569.27	574.88	0.000769	12.48	429.34	168.83	0.54
Lower	4734		Culvert									
Lower	4685.2 J	P100yr	2900.00	553.97	566.22	566.22	570.91	0.001793	17.60	228.63	43.99	0.94
Lower	4485.9	P100yr	2900.00	552.62	561.59	561.59	564.90	0.002093	14.60	203.67	35.19	1.00
Lower	4338.9	P100yr	2900.00	551.69	560.66	560.66	563.97	0.002096	14.61	203.09	34.71	1.00
Lower	4138.2 I	P100yr	2900.00	550.42	559.38	559.38	562.70	0.002102	14.62	201.31	33.39	1.00
Lower	3953.9	P100yr	2900.00	549.25	558.21	558.21	561.53	0.002099	14.61	202.73	34.51	1.00
Lower	3750.8	P100yr	2900.00	547.96	557.67	556.95	560.34	0.001468	13.12	231.75	38.89	0.85
Lower	3606.6 H	P100yr	2900.00	547.04	558.11	556.12	559.93	0.000810	10.91	335.91	63.13	0.65
Lower	3452.6	P100yr	2900.00	546.06	558.25	555.05	559.72	0.000550	9.75	331.97	144.50	0.55
Lower	3321.7	P100yr	2900.00	545.23	558.49	553.60	559.54	0.000371	8.28	432.00	158.34	0.43
Lower	3260.8 G	P100yr	2900.00	544.89	558.54	553.03	559.44	0.000306	8.06	508.94	253.54	0.39
Lower	3216.6		Culvert									
Lower	3157.2	P100yr	2900.00	540.75	551.96	546.65	552.48	0.001476	5.89	553.28	79.07	0.32
Lower	3091.5	P100yr	2900.00	539.34	552.03		552.28	0.000685	4.23	1033.32	257.32	0.22
Lower	2797.2 F	P100yr	3200.00	538.24	551.50	546.09	551.99	0.001272	6.20	826.19	261.03	0.31

Plan: EX SOUTHWEST RIV... Lower RS: 4918.3 Profile: P100yr

E.G. Elev (ft)	575.46	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.19	Wt. n-Val.	0.100	0.015	0.100
W.S. Elev (ft)	575.28	Reach Len. (ft)	31.40	31.40	31.70
Crit W.S. (ft)	565.49	Flow Area (sq ft)	513.96	639.03	901.55
E.G. Slope (ft/ft)	0.000041	Area (sq ft)	513.96	639.03	1488.48
Q Total (cfs)	2900.00	Flow (cfs)	174.43	2421.06	304.51
Top Width (ft)	440.66	Top Width (ft)	75.44	42.40	322.82
Vel Total (ft/s)	1.41	Avg. Vel. (ft/s)	0.34	3.79	0.34
Max Chl Dpth (ft)	16.14	Hydr. Depth (ft)	6.81	15.07	6.67
Conv. Total (cfs)	450731.3	Conv. (cfs)	27111.0	376291.6	47328.7
Length Wtd. (ft)	31.42	Wetted Per. (ft)	76.84	44.09	135.76
Min Ch El (ft)	559.14	Shear (lb/sq ft)	0.02	0.04	0.02
Alpha	6.02	Stream Power (lb/ft s)	0.01	0.14	0.01
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	6.99	14.73	3.55
C & E Loss (ft)	0.10	Cum SA (acres)	3.16	1.50	1.28

Plan: EX SOUTHWEST RIV... Lower RS: 4886.9 Profile: P100yr

E.G. Elev (ft)	575.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.54	Wt. n-Val.	0.068	0.015	0.100
W.S. Elev (ft)	574.82	Reach Len. (ft)	31.70	32.10	32.30
Crit W.S. (ft)	566.62	Flow Area (sq ft)	229.90	412.26	188.81
E.G. Slope (ft/ft)	0.000111	Area (sq ft)	1080.36	412.26	1514.77
Q Total (cfs)	2900.00	Flow (cfs)	219.90	2568.86	111.24
Top Width (ft)	687.53	Top Width (ft)	305.19	26.79	355.55
Vel Total (ft/s)	3.49	Avg. Vel. (ft/s)	0.96	6.23	0.59
Max Chl Dpth (ft)	16.39	Hydr. Depth (ft)	8.70	15.39	7.90
Conv. Total (cfs)	275492.3	Conv. (cfs)	20890.1	244034.9	10567.3
Length Wtd. (ft)	32.08	Wetted Per. (ft)	27.44	28.22	25.83
Min Ch El (ft)	558.43	Shear (lb/sq ft)	0.06	0.10	0.05
Alpha	2.83	Stream Power (lb/ft s)	0.06	0.63	0.03
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	6.42	14.35	2.45
C & E Loss (ft)	0.01	Cum SA (acres)	3.02	1.47	1.03

Plan: EX SOUTHWEST RIV... Lower RS: 4854.8 Profile: P100yr

E.G. Elev (ft)	575.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.51	Wt. n-Val.	0.060	0.015	0.060
W.S. Elev (ft)	574.83	Reach Len. (ft)	36.10	36.10	36.90
Crit W.S. (ft)	565.54	Flow Area (sq ft)	254.39	430.57	81.16
E.G. Slope (ft/ft)	0.000100	Area (sq ft)	1032.68	430.57	1203.63
Q Total (cfs)	2900.00	Flow (cfs)	228.72	2608.26	63.02
Top Width (ft)	715.29	Top Width (ft)	320.97	25.91	368.41
Vel Total (ft/s)	3.79	Avg. Vel. (ft/s)	0.90	6.06	0.78
Max Chl Dpth (ft)	17.77	Hydr. Depth (ft)	7.27	16.62	7.51
Conv. Total (cfs)	289751.3	Conv. (cfs)	22852.0	260602.5	6296.9
Length Wtd. (ft)	36.12	Wetted Per. (ft)	36.82	28.51	14.64
Min Ch El (ft)	557.06	Shear (lb/sq ft)	0.04	0.09	0.03
Alpha	2.31	Stream Power (lb/ft s)	0.04	0.57	0.03
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	5.65	14.04	1.45
C & E Loss (ft)	0.46	Cum SA (acres)	2.80	1.45	0.76

Plan: EX SOUTHWEST RIV... Lower RS: 4818.7 Profile: P100yr

E.G. Elev (ft)	574.88	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.04	Wt. n-Val.	0.060	0.015	0.060
W.S. Elev (ft)	572.84	Reach Len. (ft)	132.20	133.50	132.80
Crit W.S. (ft)	569.27	Flow Area (sq ft)	168.27	195.23	65.84
E.G. Slope (ft/ft)	0.000769	Area (sq ft)	243.20	195.23	115.57
Q Total (cfs)	2900.00	Flow (cfs)	363.75	2435.93	100.33
Top Width (ft)	168.83	Top Width (ft)	109.79	11.59	47.45
Vel Total (ft/s)	6.75	Avg. Vel. (ft/s)	2.16	12.48	1.52
Max Chl Dpth (ft)	17.48	Hydr. Depth (ft)	6.87	16.85	4.35
Conv. Total (cfs)	104548.9	Conv. (cfs)	13113.7	87818.4	3616.9
Length Wtd. (ft)	133.50	Wetted Per. (ft)	30.14	20.18	19.93
Min Ch El (ft)	555.36	Shear (lb/sq ft)	0.27	0.46	0.16
Alpha	2.88	Stream Power (lb/ft s)	0.58	5.80	0.24
Frctn Loss (ft)		Cum Volume (acre-ft)	5.12	13.78	0.89
C & E Loss (ft)		Cum SA (acres)	2.62	1.44	0.58

Plan: EX SOUTHWEST RIV... Lower RS: 4685.2 Profile: P100yr

E.G. Elev (ft)	570.91	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.69	Wt. n-Val.	0.100	0.015	0.100
W.S. Elev (ft)	566.22	Reach Len. (ft)	194.70	199.30	205.70
Crit W.S. (ft)	566.22	Flow Area (sq ft)	45.90	160.58	22.15
E.G. Slope (ft/ft)	0.001793	Area (sq ft)	47.64	160.58	22.15
Q Total (cfs)	2900.00	Flow (cfs)	53.09	2825.98	20.94
Top Width (ft)	43.99	Top Width (ft)	20.82	14.70	8.47
Vel Total (ft/s)	12.68	Avg. Vel. (ft/s)	1.16	17.60	0.95
Max Chl Dpth (ft)	12.25	Hydr. Depth (ft)	2.83	10.92	2.62
Conv. Total (cfs)	68488.4	Conv. (cfs)	1253.8	66740.2	494.5
Length Wtd. (ft)	199.28	Wetted Per. (ft)	18.42	18.69	12.03
Min Ch El (ft)	553.97	Shear (lb/sq ft)	0.28	0.96	0.21
Alpha	1.88	Stream Power (lb/ft s)	0.32	16.93	0.19
Frctn Loss (ft)	0.39	Cum Volume (acre-ft)	5.12	12.65	0.89
C & E Loss (ft)	0.69	Cum SA (acres)	2.42	1.40	0.50

Plan: EX SOUTHWEST RIV... Lower RS: 4485.9 Profile: P100yr

E.G. Elev (ft)	564.90	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.31	Wt. n-Val.	0.100	0.015	0.100
W.S. Elev (ft)	561.59	Reach Len. (ft)	142.70	147.00	148.00
Crit W.S. (ft)	561.59	Flow Area (sq ft)	2.11	198.43	3.13
E.G. Slope (ft/ft)	0.002093	Area (sq ft)	2.11	198.43	3.13
Q Total (cfs)	2900.00	Flow (cfs)	1.15	2896.96	1.89
Top Width (ft)	35.19	Top Width (ft)	2.14	29.88	3.17
Vel Total (ft/s)	14.24	Avg. Vel. (ft/s)	0.55	14.60	0.60
Max Chl Dpth (ft)	8.97	Hydr. Depth (ft)	0.98	6.64	0.99
Conv. Total (cfs)	63396.1	Conv. (cfs)	25.2	63329.5	41.3
Length Wtd. (ft)	147.00	Wetted Per. (ft)	2.91	34.31	3.73
Min Ch El (ft)	552.62	Shear (lb/sq ft)	0.09	0.76	0.11
Alpha	1.05	Stream Power (lb/ft s)	0.05	11.03	0.07
Frctn Loss (ft)	0.31	Cum Volume (acre-ft)	5.01	11.83	0.83
C & E Loss (ft)	0.00	Cum SA (acres)	2.37	1.30	0.47

Plan: EX SOUTHWEST RIV... Lower RS: 4338.9 Profile: P100yr

E.G. Elev (ft)	563.97	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.31	Wt. n-Val.	0.100	0.015	0.100
W.S. Elev (ft)	560.66	Reach Len. (ft)	196.90	200.70	204.10
Crit W.S. (ft)	560.66	Flow Area (sq ft)	2.10	198.36	2.64
E.G. Slope (ft/ft)	0.002096	Area (sq ft)	2.10	198.36	2.64
Q Total (cfs)	2900.00	Flow (cfs)	1.15	2897.32	1.53
Top Width (ft)	34.71	Top Width (ft)	2.13	29.88	2.70
Vel Total (ft/s)	14.28	Avg. Vel. (ft/s)	0.55	14.61	0.58
Max Chl Dpth (ft)	8.97	Hydr. Depth (ft)	0.98	6.64	0.98
Conv. Total (cfs)	63348.3	Conv. (cfs)	25.1	63289.7	33.4
Length Wtd. (ft)	200.70	Wetted Per. (ft)	2.90	34.32	3.34
Min Ch El (ft)	551.69	Shear (lb/sq ft)	0.09	0.76	0.10
Alpha	1.05	Stream Power (lb/ft s)	0.05	11.05	0.06
Frctn Loss (ft)	0.42	Cum Volume (acre-ft)	5.00	11.16	0.82
C & E Loss (ft)	0.00	Cum SA (acres)	2.36	1.20	0.46

Plan: EX SOUTHWEST RIV... Lower RS: 4138.2 Profile: P100yr

E.G. Elev (ft)	562.70	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.32	Wt. n-Val.	0.100	0.015	0.100
W.S. Elev (ft)	559.38	Reach Len. (ft)	189.80	184.30	178.30
Crit W.S. (ft)	559.38	Flow Area (sq ft)	0.39	198.22	2.71
E.G. Slope (ft/ft)	0.002102	Area (sq ft)	0.39	198.22	2.71
Q Total (cfs)	2900.00	Flow (cfs)	0.09	2898.42	1.50
Top Width (ft)	33.39	Top Width (ft)	0.39	29.88	3.12
Vel Total (ft/s)	14.41	Avg. Vel. (ft/s)	0.23	14.62	0.55
Max Chl Dpth (ft)	8.96	Hydr. Depth (ft)	0.98	6.63	0.87
Conv. Total (cfs)	63251.6	Conv. (cfs)	1.9	63217.0	32.6
Length Wtd. (ft)	184.30	Wetted Per. (ft)	2.00	34.31	3.71
Min Ch El (ft)	550.42	Shear (lb/sq ft)	0.03	0.76	0.10
Alpha	1.03	Stream Power (lb/ft s)	0.01	11.08	0.05
Frctn Loss (ft)	0.39	Cum Volume (acre-ft)	5.00	10.25	0.81
C & E Loss (ft)	0.00	Cum SA (acres)	2.36	1.06	0.45

Plan: EX SOUTHWEST RIV... Lower RS: 3953.9 Profile: P100yr

E.G. Elev (ft)	561.53	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.32	Wt. n-Val.	0.100	0.015	0.100
W.S. Elev (ft)	558.21	Reach Len. (ft)	209.90	203.10	198.10
Crit W.S. (ft)	558.21	Flow Area (sq ft)	2.55	198.28	1.90
E.G. Slope (ft/ft)	0.002099	Area (sq ft)	2.55	198.28	1.90
Q Total (cfs)	2900.00	Flow (cfs)	1.45	2897.54	1.01
Top Width (ft)	34.51	Top Width (ft)	2.69	29.88	1.94
Vel Total (ft/s)	14.31	Avg. Vel. (ft/s)	0.57	14.61	0.53
Max Chl Dpth (ft)	8.96	Hydr. Depth (ft)	0.95	6.64	0.98
Conv. Total (cfs)	63300.7	Conv. (cfs)	31.6	63247.1	22.1
Length Wtd. (ft)	203.10	Wetted Per. (ft)	3.34	34.31	2.76
Min Ch El (ft)	549.25	Shear (lb/sq ft)	0.10	0.76	0.09
Alpha	1.04	Stream Power (lb/ft s)	0.06	11.06	0.05
Frctn Loss (ft)	0.35	Cum Volume (acre-ft)	4.99	9.41	0.80
C & E Loss (ft)	0.19	Cum SA (acres)	2.35	0.93	0.44

Plan: EX SOUTHWEST RIV... Lower RS: 3750.8 Profile: P100yr

E.G. Elev (ft)	560.34	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.67	Wt. n-Val.	0.100	0.015	0.100
W.S. Elev (ft)	557.67	Reach Len. (ft)	144.20	144.20	144.10
Crit W.S. (ft)	556.95	Flow Area (sq ft)	6.35	220.52	4.87
E.G. Slope (ft/ft)	0.001468	Area (sq ft)	6.35	220.52	4.87
Q Total (cfs)	2900.00	Flow (cfs)	3.83	2893.35	2.82
Top Width (ft)	38.89	Top Width (ft)	5.14	29.88	3.87
Vel Total (ft/s)	12.51	Avg. Vel. (ft/s)	0.60	13.12	0.58
Max Chl Dpth (ft)	9.71	Hydr. Depth (ft)	1.24	7.38	1.26
Conv. Total (cfs)	75684.4	Conv. (cfs)	100.1	75510.7	73.5
Length Wtd. (ft)	144.20	Wetted Per. (ft)	5.83	34.31	4.75
Min Ch El (ft)	547.96	Shear (lb/sq ft)	0.10	0.59	0.09
Alpha	1.10	Stream Power (lb/ft s)	0.06	7.73	0.05
Frctn Loss (ft)	0.15	Cum Volume (acre-ft)	4.97	8.43	0.78
C & E Loss (ft)	0.26	Cum SA (acres)	2.33	0.79	0.42

Plan: EX SOUTHWEST RIV... Lower RS: 3606.6 Profile: P100yr

E.G. Elev (ft)	559.93	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.82	Wt. n-Val.	0.100	0.015	0.100
W.S. Elev (ft)	558.11	Reach Len. (ft)	153.90	154.00	154.00
Crit W.S. (ft)	556.12	Flow Area (sq ft)	65.52	261.16	9.22
E.G. Slope (ft/ft)	0.000810	Area (sq ft)	65.52	261.16	9.22
Q Total (cfs)	2900.00	Flow (cfs)	46.47	2848.79	4.74
Top Width (ft)	63.13	Top Width (ft)	27.81	29.88	5.44
Vel Total (ft/s)	8.63	Avg. Vel. (ft/s)	0.71	10.91	0.51
Max Chl Dpth (ft)	11.07	Hydr. Depth (ft)	2.36	8.74	1.70
Conv. Total (cfs)	101898.8	Conv. (cfs)	1632.9	100099.3	166.5
Length Wtd. (ft)	154.00	Wetted Per. (ft)	30.17	34.32	6.88
Min Ch El (ft)	547.04	Shear (lb/sq ft)	0.11	0.38	0.07
Alpha	1.57	Stream Power (lb/ft s)	0.08	4.20	0.03
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	4.85	7.64	0.76
C & E Loss (ft)	0.11	Cum SA (acres)	2.28	0.69	0.41

Plan: EX SOUTHWEST RIV... Lower RS: 3452.6 Profile: P100yr

E.G. Elev (ft)	559.72	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.46	Wt. n-Val.	0.100	0.015	0.100
W.S. Elev (ft)	558.25	Reach Len. (ft)	131.00	130.90	131.00
Crit W.S. (ft)	555.05	Flow Area (sq ft)	20.41	294.80	16.75
E.G. Slope (ft/ft)	0.000550	Area (sq ft)	273.99	294.80	16.75
Q Total (cfs)	2900.00	Flow (cfs)	18.02	2873.83	8.15
Top Width (ft)	144.50	Top Width (ft)	106.18	29.88	8.44
Vel Total (ft/s)	8.74	Avg. Vel. (ft/s)	0.88	9.75	0.49
Max Chl Dpth (ft)	12.19	Hydr. Depth (ft)	4.27	9.87	1.99
Conv. Total (cfs)	123616.3	Conv. (cfs)	768.1	122500.7	347.4
Length Wtd. (ft)	130.90	Wetted Per. (ft)	5.07	34.31	10.16
Min Ch El (ft)	546.06	Shear (lb/sq ft)	0.14	0.30	0.06
Alpha	1.23	Stream Power (lb/ft s)	0.12	2.88	0.03
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	4.25	6.65	0.71
C & E Loss (ft)	0.12	Cum SA (acres)	2.04	0.59	0.38

Plan: EX SOUTHWEST RIV... Lower RS: 3321.7 Profile: P100yr

E.G. Elev (ft)	559.54	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.05	Wt. n-Val.	0.100	0.015	0.100
W.S. Elev (ft)	558.49	Reach Len. (ft)	62.20	60.90	58.80
Crit W.S. (ft)	553.60	Flow Area (sq ft)	38.84	344.73	48.44
E.G. Slope (ft/ft)	0.000371	Area (sq ft)	213.71	344.73	48.44
Q Total (cfs)	2900.00	Flow (cfs)	23.73	2853.32	22.95
Top Width (ft)	158.34	Top Width (ft)	106.88	29.88	21.58
Vel Total (ft/s)	6.71	Avg. Vel. (ft/s)	0.61	8.28	0.47
Max Chl Dpth (ft)	13.26	Hydr. Depth (ft)	3.41	11.54	2.24
Conv. Total (cfs)	150642.8	Conv. (cfs)	1232.7	148217.9	1192.1
Length Wtd. (ft)	60.96	Wetted Per. (ft)	12.44	38.12	22.72
Min Ch El (ft)	545.23	Shear (lb/sq ft)	0.07	0.21	0.05
Alpha	1.50	Stream Power (lb/ft s)	0.04	1.73	0.02
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	3.52	5.69	0.61
C & E Loss (ft)	0.08	Cum SA (acres)	1.72	0.50	0.34

Plan: EX SOUTHWEST RIV... Lower RS: 3260.8 Profile: P100yr

E.G. Elev (ft)	559.44	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.90	Wt. n-Val.	0.022	0.015	0.100
W.S. Elev (ft)	558.54	Reach Len. (ft)	103.80	103.60	104.00
Crit W.S. (ft)	553.03	Flow Area (sq ft)	140.58	315.90	52.45
E.G. Slope (ft/ft)	0.000306	Area (sq ft)	372.79	315.90	52.45
Q Total (cfs)	2900.00	Flow (cfs)	326.32	2545.86	27.82
Top Width (ft)	253.54	Top Width (ft)	213.57	23.80	16.17
Vel Total (ft/s)	5.70	Avg. Vel. (ft/s)	2.32	8.06	0.53
Max Chl Dpth (ft)	13.65	Hydr. Depth (ft)	2.79	13.27	3.24
Conv. Total (cfs)	165678.5	Conv. (cfs)	18642.7	145446.4	1589.5
Length Wtd. (ft)	103.60	Wetted Per. (ft)	52.65	31.53	18.76
Min Ch El (ft)	544.89	Shear (lb/sq ft)	0.05	0.19	0.05
Alpha	1.77	Stream Power (lb/ft s)	0.12	1.54	0.03
Frctn Loss (ft)		Cum Volume (acre-ft)	3.10	5.23	0.55
C & E Loss (ft)		Cum SA (acres)	1.49	0.46	0.31

Plan: EX SOUTHWEST RIV... Lower RS: 3157.2 Profile: P100yr

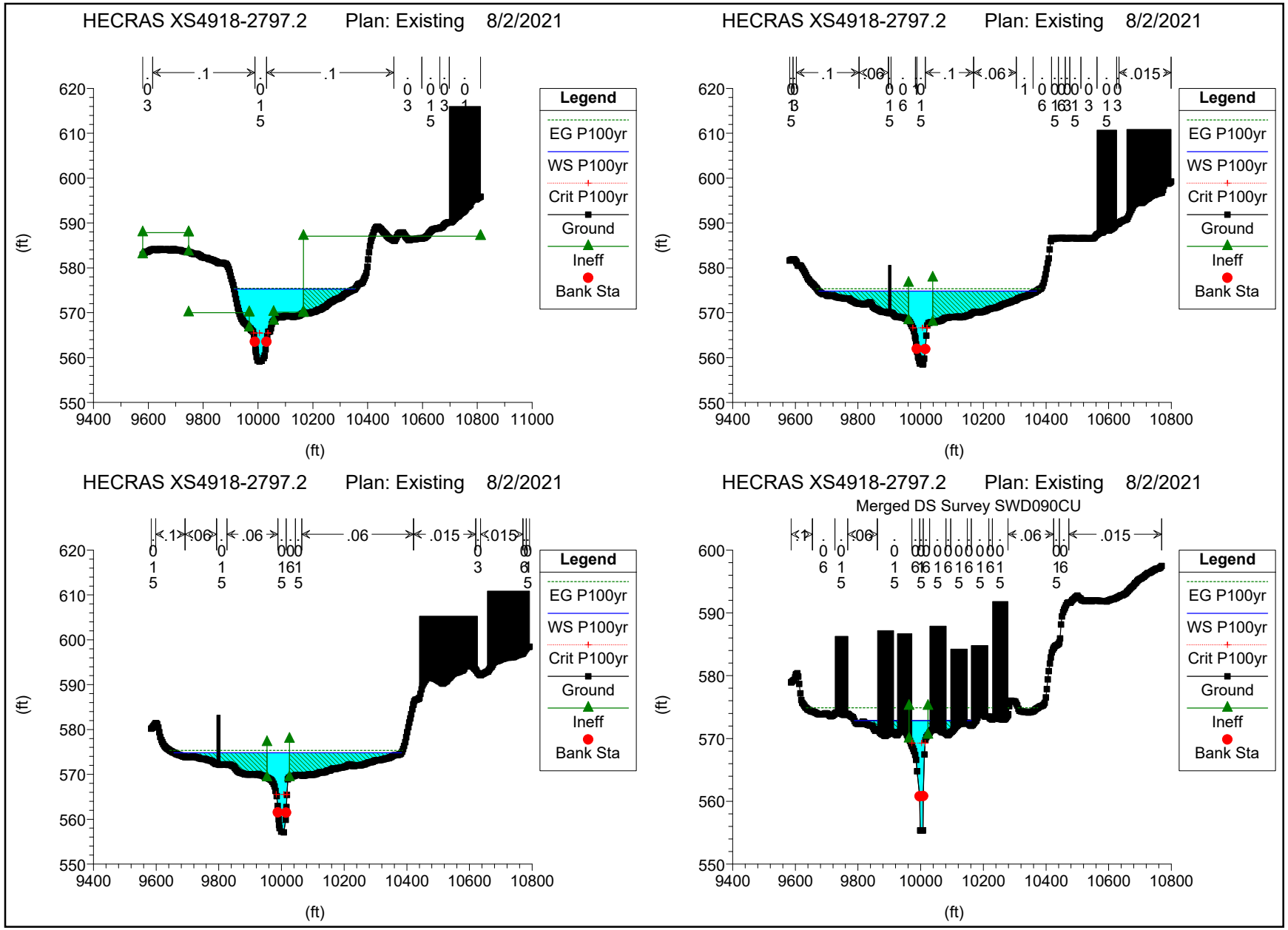
E.G. Elev (ft)	552.48	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.52	Wt. n-Val.	0.100	0.045	0.100
W.S. Elev (ft)	551.96	Reach Len. (ft)	62.30	65.70	67.20
Crit W.S. (ft)	546.65	Flow Area (sq ft)	40.05	476.68	36.56
E.G. Slope (ft/ft)	0.001476	Area (sq ft)	41.30	476.68	36.56
Q Total (cfs)	2900.00	Flow (cfs)	50.40	2805.37	44.23
Top Width (ft)	79.07	Top Width (ft)	23.44	46.22	9.41
Vel Total (ft/s)	5.24	Avg. Vel. (ft/s)	1.26	5.89	1.21
Max Chl Dpth (ft)	11.21	Hydr. Depth (ft)	4.09	10.31	3.88
Conv. Total (cfs)	75479.7	Conv. (cfs)	1311.8	73016.7	1151.1
Length Wtd. (ft)	65.58	Wetted Per. (ft)	12.23	47.71	11.85
Min Ch El (ft)	540.75	Shear (lb/sq ft)	0.30	0.92	0.28
Alpha	1.22	Stream Power (lb/ft s)	0.38	5.42	0.34
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	3.10	4.33	0.55
C & E Loss (ft)	0.13	Cum SA (acres)	1.21	0.38	0.28

Plan: EX SOUTHWEST RIV... Lower RS: 3091.5 Profile: P100yr

E.G. Elev (ft)	552.28	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.25	Wt. n-Val.	0.100	0.045	0.100
W.S. Elev (ft)	552.03	Reach Len. (ft)	267.80	294.30	269.80
Crit W.S. (ft)		Flow Area (sq ft)	340.91	623.01	69.40
E.G. Slope (ft/ft)	0.000685	Area (sq ft)	340.91	623.01	69.40
Q Total (cfs)	2900.00	Flow (cfs)	196.61	2632.78	70.61
Top Width (ft)	257.32	Top Width (ft)	187.59	55.94	13.80
Vel Total (ft/s)	2.81	Avg. Vel. (ft/s)	0.58	4.23	1.02
Max Chl Dpth (ft)	12.69	Hydr. Depth (ft)	1.82	11.14	5.03
Conv. Total (cfs)	110814.3	Conv. (cfs)	7513.0	100603.3	2698.0
Length Wtd. (ft)	290.42	Wetted Per. (ft)	188.74	57.61	16.40
Min Ch El (ft)	539.34	Shear (lb/sq ft)	0.08	0.46	0.18
Alpha	2.06	Stream Power (lb/ft s)	0.04	1.95	0.18
Frctn Loss (ft)	0.27	Cum Volume (acre-ft)	2.83	3.50	0.46
C & E Loss (ft)	0.02	Cum SA (acres)	1.06	0.30	0.27

Plan: EX SOUTHWEST RIV... Lower RS: 2797.2 Profile: P100yr

E.G. Elev (ft)	551.99	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.49	Wt. n-Val.	0.100	0.045	0.100
W.S. Elev (ft)	551.50	Reach Len. (ft)			
Crit W.S. (ft)	546.09	Flow Area (sq ft)	332.48	413.46	80.26
E.G. Slope (ft/ft)	0.001272	Area (sq ft)	578.13	413.46	80.26
Q Total (cfs)	3200.00	Flow (cfs)	590.17	2565.49	44.35
Top Width (ft)	261.03	Top Width (ft)	156.20	33.02	71.81
Vel Total (ft/s)	3.87	Avg. Vel. (ft/s)	1.78	6.20	0.55
Max Chl Dpth (ft)	13.26	Hydr. Depth (ft)	6.24	12.52	1.12
Conv. Total (cfs)	89730.3	Conv. (cfs)	16548.7	71938.2	1243.5
Length Wtd. (ft)		Wetted Per. (ft)	54.23	34.18	75.39
Min Ch El (ft)	538.24	Shear (lb/sq ft)	0.49	0.96	0.08
Alpha	2.10	Stream Power (lb/ft s)	0.86	5.96	0.05
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			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WS P100yr
Crit P100yr
Ground
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HECRAS XS4918-2797.2 Plan: Existing 8/2/2021
Legend
EG P100yr
WS P100yr
Crit P100yr
Ground
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HECRAS XS4918-2797.2 Plan: Existing 8/2/2021
Legend
EG P100yr
WS P100yr
Crit P100yr
Ground
Ineff
Bank Sta
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HECRAS XS4918-2797.2 Plan: Existing 8/2/2021
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Legend
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WS P100yr
Crit P100yr
Ground
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Bank Sta
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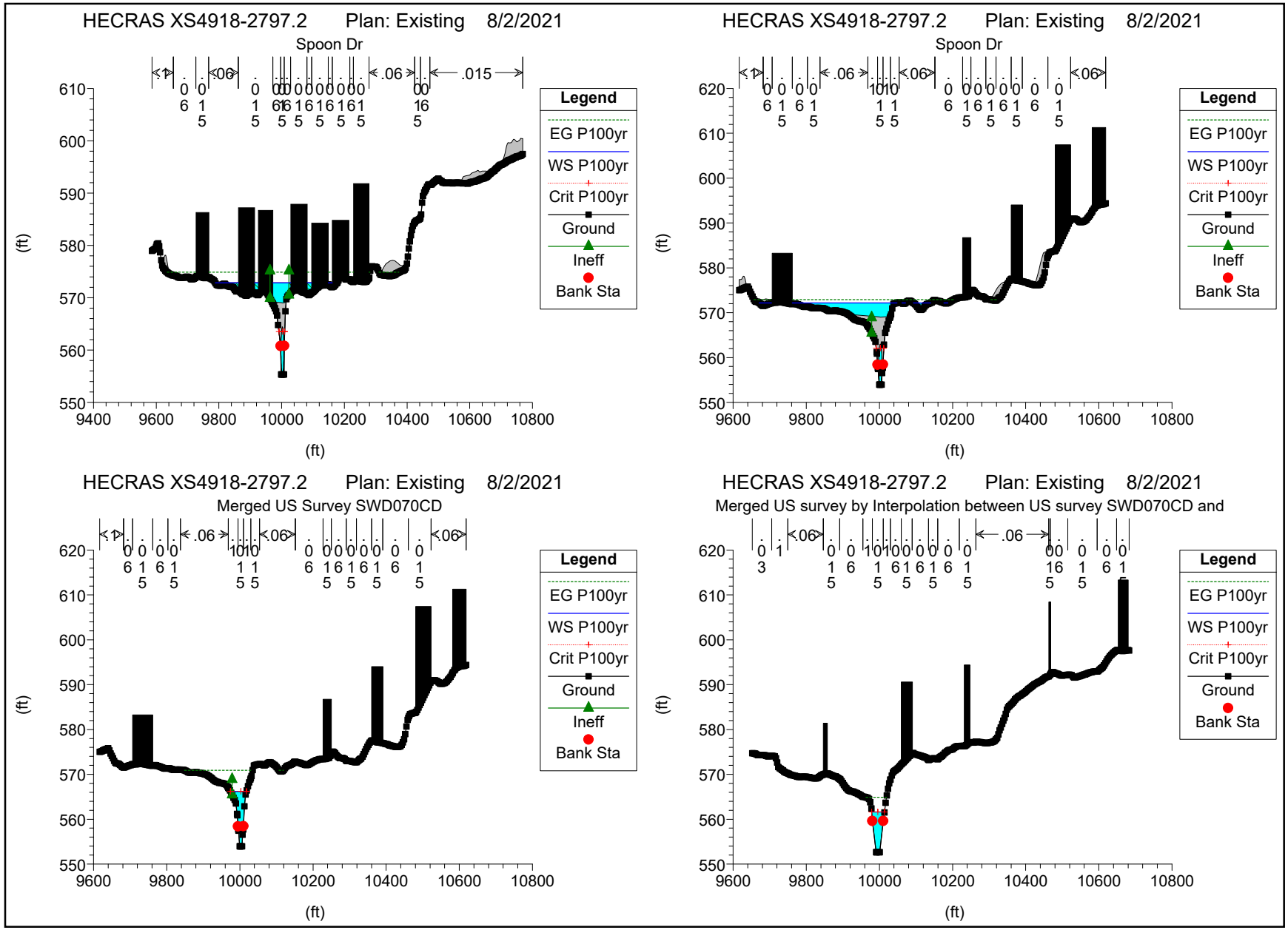
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Spoon Dr
Legend
EG P100yr
WS P100yr
Crit P100yr
Ground
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Bank Sta
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HECRAS XS4918-2797.2 Plan: Existing 8/2/2021
Spoon Dr
Legend
EG P100yr
WS P100yr
Crit P100yr
Ground
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HECRAS XS4918-2797.2 Plan: Existing 8/2/2021
Merged US Survey SWD070CD
Legend
EG P100yr
WS P100yr
Crit P100yr
Ground
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HECRAS XS4918-2797.2 Plan: Existing 8/2/2021
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WS P100yr
Crit P100yr
Ground
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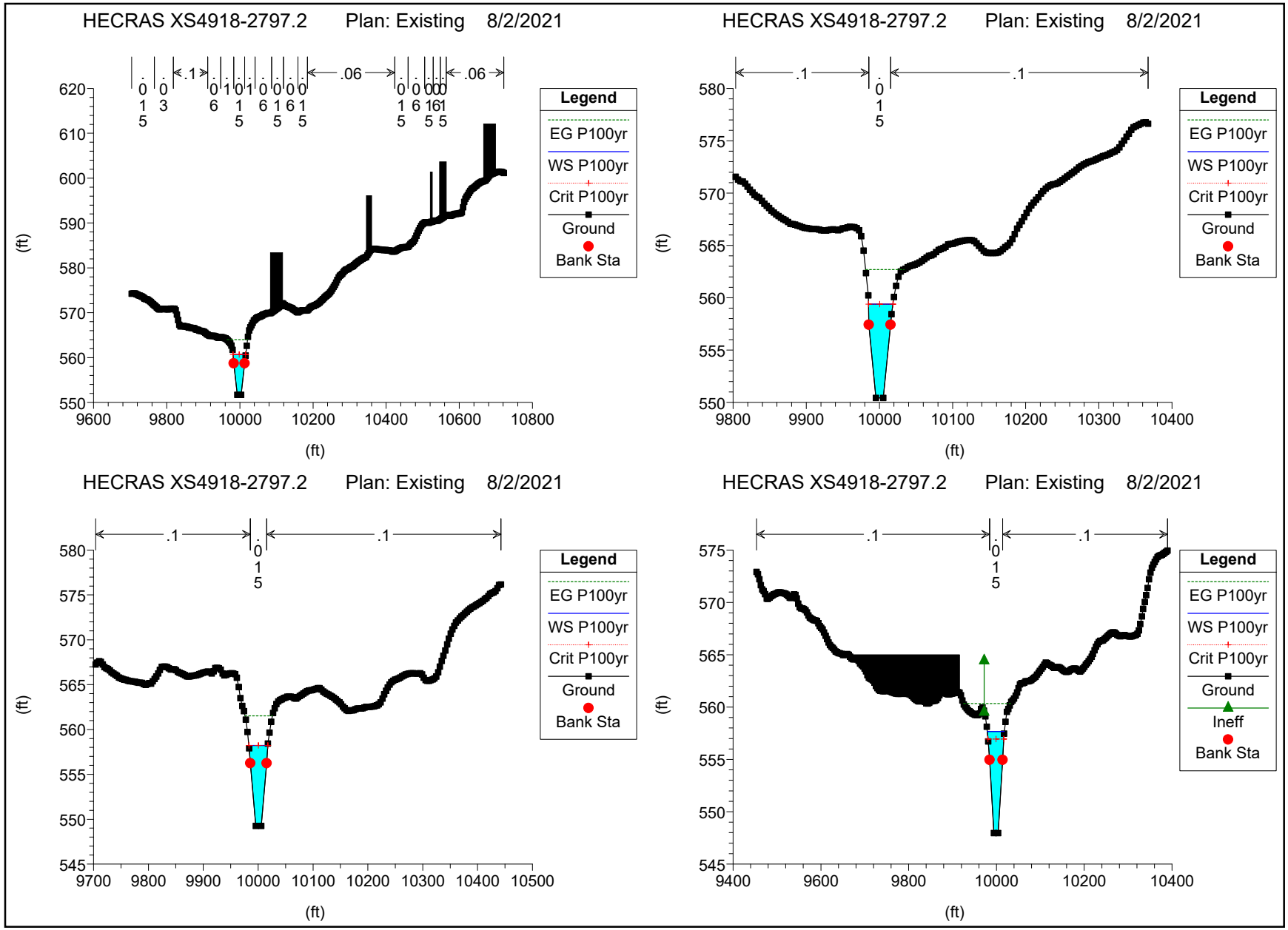
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Legend
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WS P100yr
Crit P100yr
Ground
Bank Sta
HECRAS XS4918-2797.2 Plan: Existing 8/2/2021
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EG P100yr
WS P100yr
Crit P100yr
Ground
Bank Sta
HECRAS XS4918-2797.2 Plan: Existing 8/2/2021
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WS P100yr
Crit P100yr
Ground
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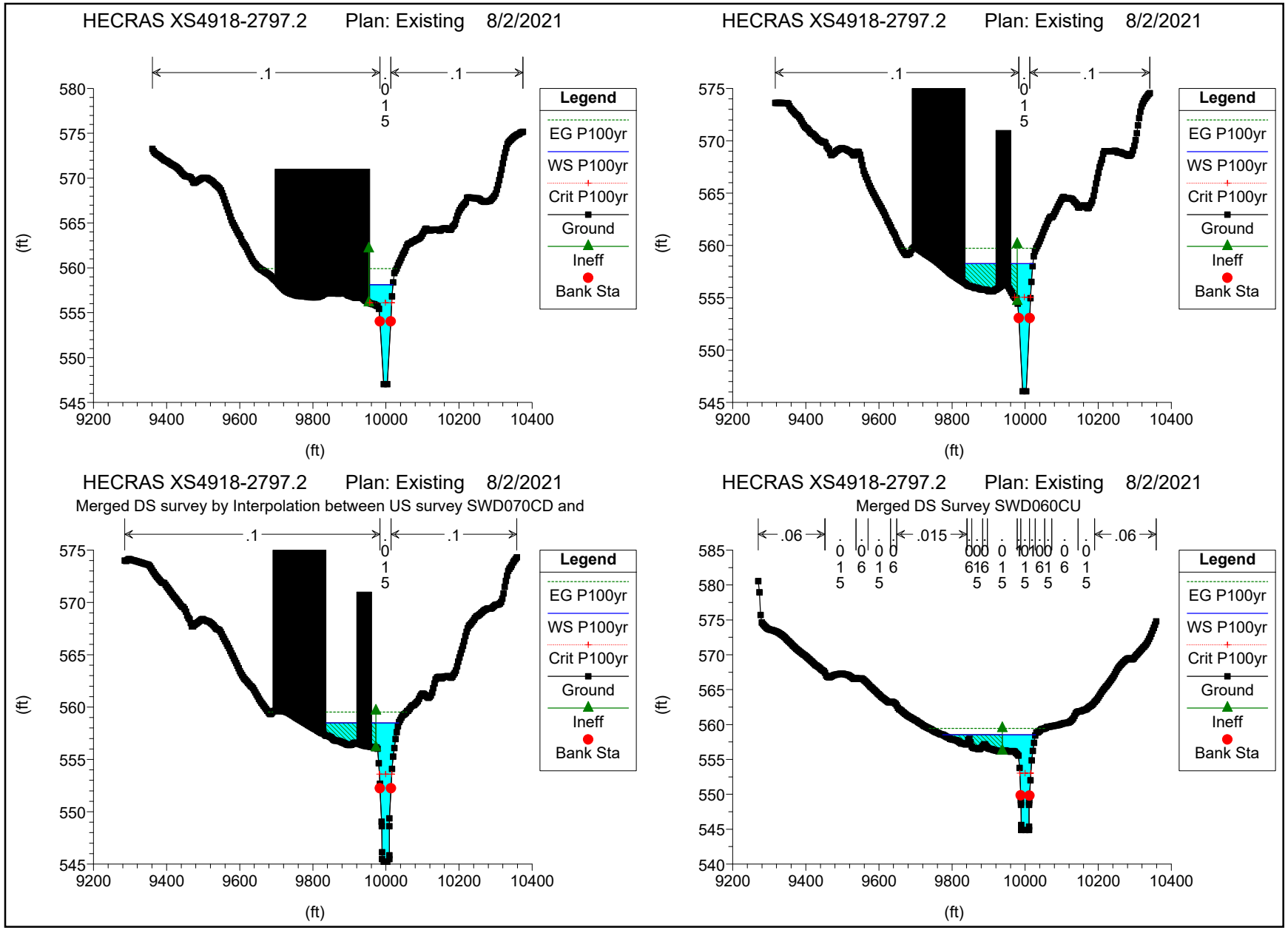
WS P100yr
Crit P100yr
Ground
Ineff
Bank Sta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Legend
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WS P100yr
Crit P100yr
Ground
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Bank Sta
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HECRAS XS4918-2797.2 Plan: Existing 8/2/2021
HECRAS XS4918-2797.2 Plan: Existing 8/2/2021
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HECRAS XS4918-2797.2 Plan: Existing 8/2/2021
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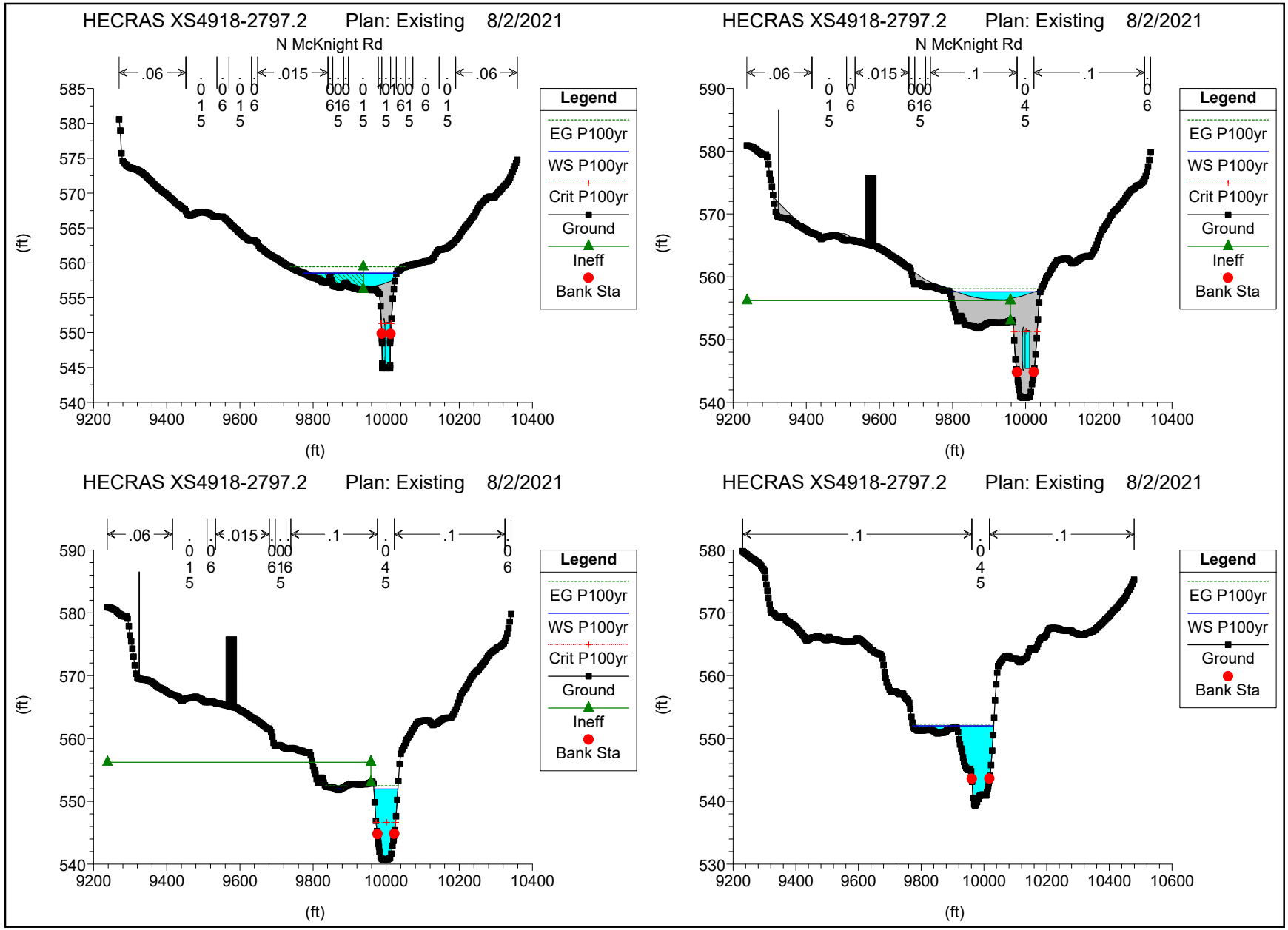
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Legend
EG P100yr
WS P100yr
Crit P100yr
Ground
Ineff
Bank Sta
(ft)
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HECRAS XS4918-2797.2 Plan: Existing 8/2/2021
N McKnight Rd
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Legend
EG P100yr
WS P100yr
Crit P100yr
Ground
Ineff
Bank Sta
(ft)
(ft)
HECRAS XS4918-2797.2 Plan: Existing 8/2/2021
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Legend
EG P100yr
WS P100yr
Crit P100yr
Ground
Ineff
Bank Sta
(ft)
(ft)
HECRAS XS4918-2797.2 Plan: Existing 8/2/2021
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Legend
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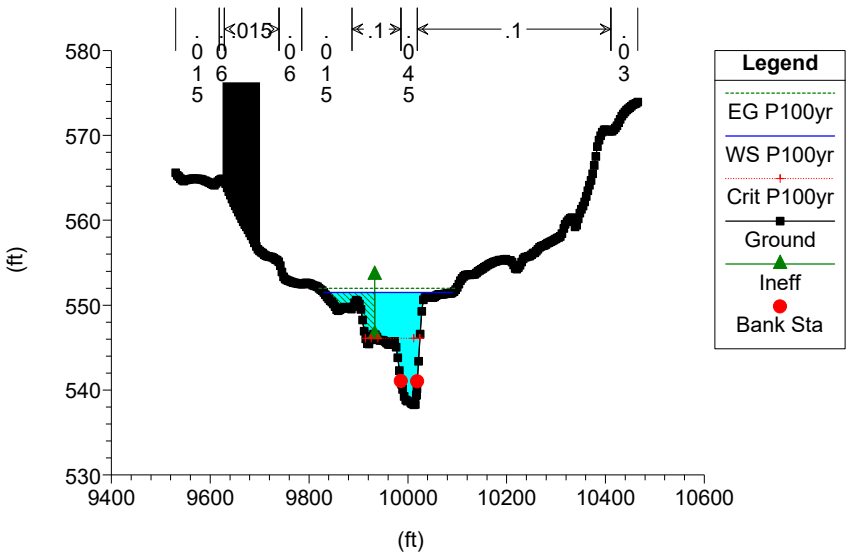
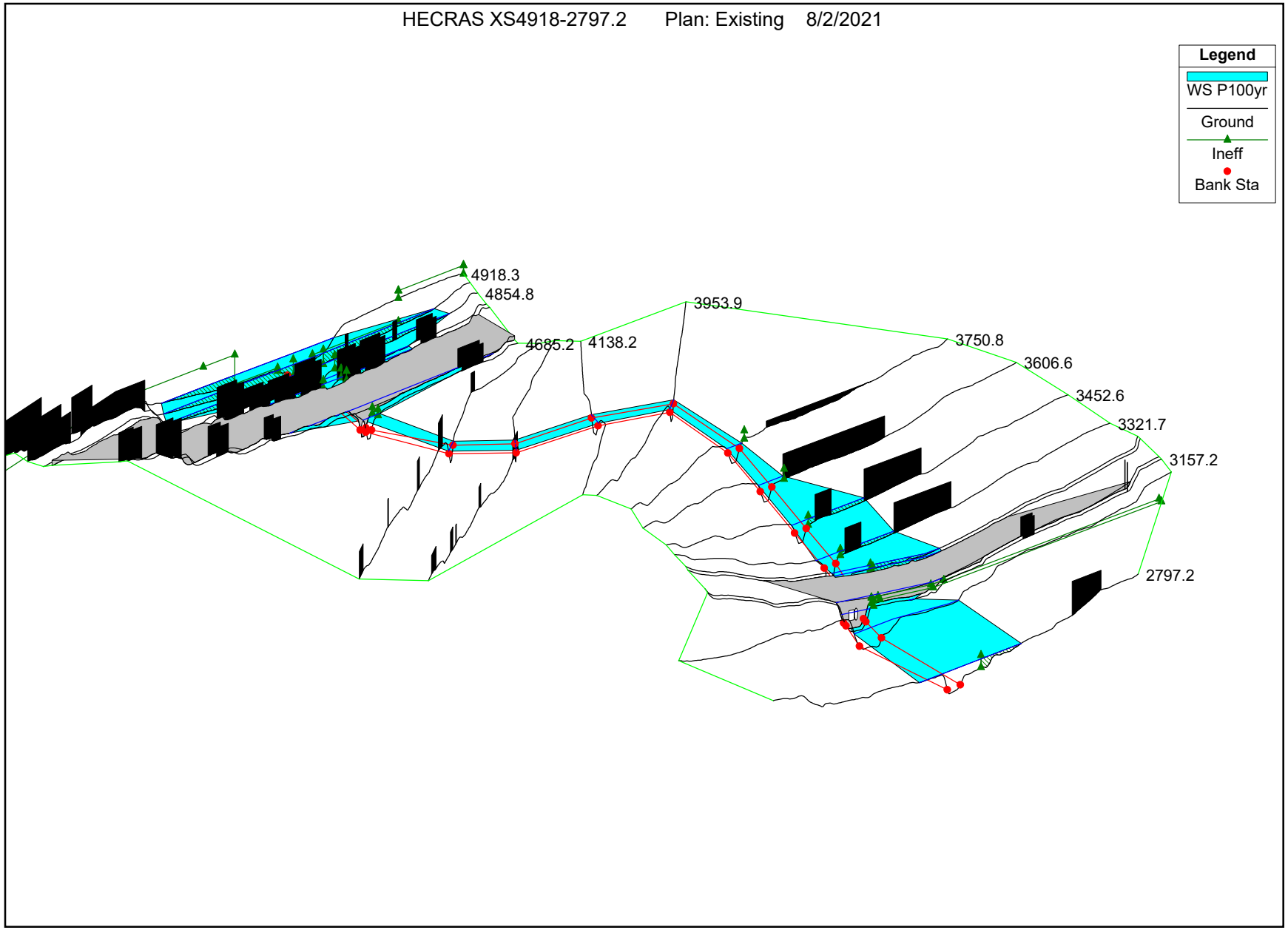
WS P100yr
Ground
Bank Sta
(ft)
(ft)

HECRAS XS4918-2797.2 Plan: Existing 8/2/2021

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Legend
WS P100yr
Ground
Ineff
Bank Sta
4918.3
4854.8
4685.2
4138.2
3953.9
3750.8
3606.6
3452.6
3321.7
3157.2
2797.2

VI. Proposed Conditions Model

HEC-RAS Plan: PR River: SOUTHWEST RIV... Reach: Lower Profile: P100yr

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)	
Lower	4918.3	P100yr	2900.00	559.14	575.28	565.49	575.46	0.000041	3.79	2054.54	440.66	0.17
Lower	4886.9 K	P100yr	2900.00	558.43	574.82	566.62	575.35	0.000111	6.23	830.97	687.53	0.28
Lower	4854.8	P100yr	2900.00	557.06	574.83	565.54	575.35	0.000100	6.06	766.11	715.29	0.26
Lower	4818.7	P100yr	2900.00	555.36	572.84	569.27	574.88	0.000769	12.48	429.34	168.83	0.54
Lower	4734		Culvert									
Lower	4685.2 J	P100yr	2900.00	553.97	566.22	566.22	570.91	0.001793	17.60	228.63	43.99	0.94
Lower	4485.9	P100yr	2900.00	552.62	561.59	561.59	564.90	0.002093	14.60	203.67	35.19	1.00
Lower	4338.9	P100yr	2900.00	551.69	560.66	560.66	563.97	0.002096	14.61	203.09	34.71	1.00
Lower	4138.2 I	P100yr	2900.00	550.42	559.38	559.38	562.70	0.002102	14.62	201.31	33.39	1.00
Lower	3953.9	P100yr	2900.00	549.25	558.21	558.21	561.53	0.002099	14.61	202.73	34.51	1.00
Lower	3750.8	P100yr	2900.00	547.96	557.68	556.94	560.34	0.001457	13.09	236.43	43.28	0.85
Lower	3606.6 H	P100yr	2900.00	547.04	558.06		559.95	0.000838	11.06	300.68	48.34	0.66
Lower	3452.6	P100yr	2900.00	546.06	558.29		559.70	0.000535	9.63	373.41	56.62	0.54
Lower	3321.7	P100yr	2900.00	545.23	558.49	553.60	559.53	0.000370	8.27	446.11	204.60	0.43
Lower	3260.8 G	P100yr	2900.00	544.89	558.54	553.03	559.44	0.000306	8.06	508.94	253.54	0.39
Lower	3216.6		Culvert									
Lower	3157.2	P100yr	2900.00	540.75	551.96	546.65	552.48	0.001476	5.89	553.28	79.07	0.32
Lower	3091.5	P100yr	2900.00	539.34	552.03		552.28	0.000685	4.23	1033.32	257.32	0.22
Lower	2797.2 F	P100yr	3200.00	538.24	551.50	546.09	551.99	0.001272	6.20	826.19	261.03	0.31

Plan: PR SOUTHWEST RIV... Lower RS: 4918.3 Profile: P100yr

E.G. Elev (ft)	575.46	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.19	Wt. n-Val.	0.100	0.015	0.100
W.S. Elev (ft)	575.28	Reach Len. (ft)	31.40	31.40	31.70
Crit W.S. (ft)	565.49	Flow Area (sq ft)	513.96	639.03	901.55
E.G. Slope (ft/ft)	0.000041	Area (sq ft)	513.96	639.03	1488.48
Q Total (cfs)	2900.00	Flow (cfs)	174.43	2421.06	304.51
Top Width (ft)	440.66	Top Width (ft)	75.44	42.40	322.82
Vel Total (ft/s)	1.41	Avg. Vel. (ft/s)	0.34	3.79	0.34
Max Chl Dpth (ft)	16.14	Hydr. Depth (ft)	6.81	15.07	6.67
Conv. Total (cfs)	450731.3	Conv. (cfs)	27111.0	376291.6	47328.7
Length Wtd. (ft)	31.42	Wetted Per. (ft)	76.84	44.09	135.76
Min Ch El (ft)	559.14	Shear (lb/sq ft)	0.02	0.04	0.02
Alpha	6.02	Stream Power (lb/ft s)	0.01	0.14	0.01
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	5.84	14.73	4.81
C & E Loss (ft)	0.10	Cum SA (acres)	2.65	1.50	1.57

Plan: PR SOUTHWEST RIV... Lower RS: 4886.9 Profile: P100yr

E.G. Elev (ft)	575.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.54	Wt. n-Val.	0.068	0.015	0.100
W.S. Elev (ft)	574.82	Reach Len. (ft)	31.70	32.10	32.30
Crit W.S. (ft)	566.62	Flow Area (sq ft)	229.90	412.26	188.81
E.G. Slope (ft/ft)	0.000111	Area (sq ft)	1080.36	412.26	1514.77
Q Total (cfs)	2900.00	Flow (cfs)	219.90	2568.86	111.24
Top Width (ft)	687.53	Top Width (ft)	305.19	26.79	355.55
Vel Total (ft/s)	3.49	Avg. Vel. (ft/s)	0.96	6.23	0.59
Max Chl Dpth (ft)	16.39	Hydr. Depth (ft)	8.70	15.39	7.90
Conv. Total (cfs)	275492.3	Conv. (cfs)	20890.1	244034.9	10567.3
Length Wtd. (ft)	32.08	Wetted Per. (ft)	27.44	28.22	25.83
Min Ch El (ft)	558.43	Shear (lb/sq ft)	0.06	0.10	0.05
Alpha	2.83	Stream Power (lb/ft s)	0.06	0.63	0.03
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	5.27	14.35	3.72
C & E Loss (ft)	0.01	Cum SA (acres)	2.51	1.47	1.32

Plan: PR SOUTHWEST RIV... Lower RS: 4854.8 Profile: P100yr

E.G. Elev (ft)	575.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.51	Wt. n-Val.	0.060	0.015	0.060
W.S. Elev (ft)	574.83	Reach Len. (ft)	36.10	36.10	36.90
Crit W.S. (ft)	565.54	Flow Area (sq ft)	254.39	430.57	81.16
E.G. Slope (ft/ft)	0.000100	Area (sq ft)	1032.68	430.57	1203.63
Q Total (cfs)	2900.00	Flow (cfs)	228.72	2608.26	63.02
Top Width (ft)	715.29	Top Width (ft)	320.97	25.91	368.41
Vel Total (ft/s)	3.79	Avg. Vel. (ft/s)	0.90	6.06	0.78
Max Chl Dpth (ft)	17.77	Hydr. Depth (ft)	7.27	16.62	7.51
Conv. Total (cfs)	289751.3	Conv. (cfs)	22852.0	260602.5	6296.9
Length Wtd. (ft)	36.12	Wetted Per. (ft)	36.82	28.51	14.64
Min Ch El (ft)	557.06	Shear (lb/sq ft)	0.04	0.09	0.03
Alpha	2.31	Stream Power (lb/ft s)	0.04	0.57	0.03
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	4.50	14.04	2.71
C & E Loss (ft)	0.46	Cum SA (acres)	2.28	1.45	1.05

Plan: PR SOUTHWEST RIV... Lower RS: 4818.7 Profile: P100yr

E.G. Elev (ft)	574.88	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.04	Wt. n-Val.	0.060	0.015	0.060
W.S. Elev (ft)	572.84	Reach Len. (ft)	132.20	133.50	132.80
Crit W.S. (ft)	569.27	Flow Area (sq ft)	168.27	195.23	65.84
E.G. Slope (ft/ft)	0.000769	Area (sq ft)	243.20	195.23	115.57
Q Total (cfs)	2900.00	Flow (cfs)	363.75	2435.93	100.33
Top Width (ft)	168.83	Top Width (ft)	109.79	11.59	47.45
Vel Total (ft/s)	6.75	Avg. Vel. (ft/s)	2.16	12.48	1.52
Max Chl Dpth (ft)	17.48	Hydr. Depth (ft)	6.87	16.85	4.35
Conv. Total (cfs)	104548.9	Conv. (cfs)	13113.7	87818.4	3616.9
Length Wtd. (ft)	133.50	Wetted Per. (ft)	30.14	20.18	19.93
Min Ch El (ft)	555.36	Shear (lb/sq ft)	0.27	0.46	0.16
Alpha	2.88	Stream Power (lb/ft s)	0.58	5.80	0.24
Frctn Loss (ft)		Cum Volume (acre-ft)	3.97	13.78	2.15
C & E Loss (ft)		Cum SA (acres)	2.11	1.44	0.87

Plan: PR SOUTHWEST RIV... Lower RS: 4685.2 Profile: P100yr

E.G. Elev (ft)	570.91	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.69	Wt. n-Val.	0.100	0.015	0.100
W.S. Elev (ft)	566.22	Reach Len. (ft)	194.70	199.30	205.70
Crit W.S. (ft)	566.22	Flow Area (sq ft)	45.90	160.58	22.15
E.G. Slope (ft/ft)	0.001793	Area (sq ft)	47.64	160.58	22.15
Q Total (cfs)	2900.00	Flow (cfs)	53.09	2825.98	20.94
Top Width (ft)	43.99	Top Width (ft)	20.82	14.70	8.47
Vel Total (ft/s)	12.68	Avg. Vel. (ft/s)	1.16	17.60	0.95
Max Chl Dpth (ft)	12.25	Hydr. Depth (ft)	2.83	10.92	2.62
Conv. Total (cfs)	68488.4	Conv. (cfs)	1253.8	66740.2	494.5
Length Wtd. (ft)	199.28	Wetted Per. (ft)	18.42	18.69	12.03
Min Ch El (ft)	553.97	Shear (lb/sq ft)	0.28	0.96	0.21
Alpha	1.88	Stream Power (lb/ft s)	0.32	16.93	0.19
Frctn Loss (ft)	0.39	Cum Volume (acre-ft)	3.97	12.65	2.15
C & E Loss (ft)	0.69	Cum SA (acres)	1.91	1.40	0.79

Plan: PR SOUTHWEST RIV... Lower RS: 4485.9 Profile: P100yr

E.G. Elev (ft)	564.90	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.31	Wt. n-Val.	0.100	0.015	0.100
W.S. Elev (ft)	561.59	Reach Len. (ft)	142.70	147.00	148.00
Crit W.S. (ft)	561.59	Flow Area (sq ft)	2.11	198.43	3.13
E.G. Slope (ft/ft)	0.002093	Area (sq ft)	2.11	198.43	3.13
Q Total (cfs)	2900.00	Flow (cfs)	1.15	2896.96	1.89
Top Width (ft)	35.19	Top Width (ft)	2.14	29.88	3.17
Vel Total (ft/s)	14.24	Avg. Vel. (ft/s)	0.55	14.60	0.60
Max Chl Dpth (ft)	8.97	Hydr. Depth (ft)	0.98	6.64	0.99
Conv. Total (cfs)	63396.1	Conv. (cfs)	25.2	63329.5	41.3
Length Wtd. (ft)	147.00	Wetted Per. (ft)	2.91	34.31	3.73
Min Ch El (ft)	552.62	Shear (lb/sq ft)	0.09	0.76	0.11
Alpha	1.05	Stream Power (lb/ft s)	0.05	11.03	0.07
Frctn Loss (ft)	0.31	Cum Volume (acre-ft)	3.86	11.83	2.09
C & E Loss (ft)	0.00	Cum SA (acres)	1.86	1.30	0.76

Plan: PR SOUTHWEST RIV... Lower RS: 4338.9 Profile: P100yr

E.G. Elev (ft)	563.97	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.31	Wt. n-Val.	0.100	0.015	0.100
W.S. Elev (ft)	560.66	Reach Len. (ft)	196.90	200.70	204.10
Crit W.S. (ft)	560.66	Flow Area (sq ft)	2.10	198.36	2.64
E.G. Slope (ft/ft)	0.002096	Area (sq ft)	2.10	198.36	2.64
Q Total (cfs)	2900.00	Flow (cfs)	1.15	2897.32	1.53
Top Width (ft)	34.71	Top Width (ft)	2.13	29.88	2.70
Vel Total (ft/s)	14.28	Avg. Vel. (ft/s)	0.55	14.61	0.58
Max Chl Dpth (ft)	8.97	Hydr. Depth (ft)	0.98	6.64	0.98
Conv. Total (cfs)	63348.3	Conv. (cfs)	25.1	63289.7	33.4
Length Wtd. (ft)	200.70	Wetted Per. (ft)	2.90	34.32	3.34
Min Ch El (ft)	551.69	Shear (lb/sq ft)	0.09	0.76	0.10
Alpha	1.05	Stream Power (lb/ft s)	0.05	11.05	0.06
Frctn Loss (ft)	0.42	Cum Volume (acre-ft)	3.85	11.16	2.08
C & E Loss (ft)	0.00	Cum SA (acres)	1.85	1.20	0.75

Plan: PR SOUTHWEST RIV... Lower RS: 4138.2 Profile: P100yr

E.G. Elev (ft)	562.70	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.32	Wt. n-Val.	0.100	0.015	0.100
W.S. Elev (ft)	559.38	Reach Len. (ft)	189.80	184.30	178.30
Crit W.S. (ft)	559.38	Flow Area (sq ft)	0.39	198.22	2.71
E.G. Slope (ft/ft)	0.002102	Area (sq ft)	0.39	198.22	2.71
Q Total (cfs)	2900.00	Flow (cfs)	0.09	2898.42	1.50
Top Width (ft)	33.39	Top Width (ft)	0.39	29.88	3.12
Vel Total (ft/s)	14.41	Avg. Vel. (ft/s)	0.23	14.62	0.55
Max Chl Dpth (ft)	8.96	Hydr. Depth (ft)	0.98	6.63	0.87
Conv. Total (cfs)	63251.6	Conv. (cfs)	1.9	63217.0	32.6
Length Wtd. (ft)	184.30	Wetted Per. (ft)	2.00	34.31	3.71
Min Ch El (ft)	550.42	Shear (lb/sq ft)	0.03	0.76	0.10
Alpha	1.03	Stream Power (lb/ft s)	0.01	11.08	0.05
Frctn Loss (ft)	0.39	Cum Volume (acre-ft)	3.84	10.25	2.07
C & E Loss (ft)	0.00	Cum SA (acres)	1.84	1.06	0.74

Plan: PR SOUTHWEST RIV... Lower RS: 3953.9 Profile: P100yr

E.G. Elev (ft)	561.53	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.32	Wt. n-Val.	0.100	0.015	0.100
W.S. Elev (ft)	558.21	Reach Len. (ft)	209.90	203.10	198.10
Crit W.S. (ft)	558.21	Flow Area (sq ft)	2.55	198.28	1.90
E.G. Slope (ft/ft)	0.002099	Area (sq ft)	2.55	198.28	1.90
Q Total (cfs)	2900.00	Flow (cfs)	1.45	2897.54	1.01
Top Width (ft)	34.51	Top Width (ft)	2.69	29.88	1.94
Vel Total (ft/s)	14.31	Avg. Vel. (ft/s)	0.57	14.61	0.53
Max Chl Dpth (ft)	8.96	Hydr. Depth (ft)	0.95	6.64	0.98
Conv. Total (cfs)	63300.7	Conv. (cfs)	31.6	63247.1	22.1
Length Wtd. (ft)	203.11	Wetted Per. (ft)	3.34	34.31	2.76
Min Ch El (ft)	549.25	Shear (lb/sq ft)	0.10	0.76	0.09
Alpha	1.04	Stream Power (lb/ft s)	0.06	11.06	0.05
Frctn Loss (ft)	0.35	Cum Volume (acre-ft)	3.84	9.41	2.06
C & E Loss (ft)	0.20	Cum SA (acres)	1.84	0.93	0.73

Plan: PR SOUTHWEST RIV... Lower RS: 3750.8 Profile: P100yr

E.G. Elev (ft)	560.34	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.65	Wt. n-Val.	0.100	0.015	0.100
W.S. Elev (ft)	557.68	Reach Len. (ft)	144.20	144.20	144.10
Crit W.S. (ft)	556.94	Flow Area (sq ft)	10.59	220.92	4.92
E.G. Slope (ft/ft)	0.001457	Area (sq ft)	10.59	220.92	4.92
Q Total (cfs)	2900.00	Flow (cfs)	6.01	2891.15	2.84
Top Width (ft)	43.28	Top Width (ft)	9.49	29.88	3.91
Vel Total (ft/s)	12.27	Avg. Vel. (ft/s)	0.57	13.09	0.58
Max Chl Dpth (ft)	9.72	Hydr. Depth (ft)	1.12	7.39	1.26
Conv. Total (cfs)	75968.6	Conv. (cfs)	157.5	75736.7	74.4
Length Wtd. (ft)	144.20	Wetted Per. (ft)	10.57	34.31	4.79
Min Ch El (ft)	547.96	Shear (lb/sq ft)	0.09	0.59	0.09
Alpha	1.13	Stream Power (lb/ft s)	0.05	7.66	0.05
Frctn Loss (ft)	0.16	Cum Volume (acre-ft)	3.81	8.43	2.04
C & E Loss (ft)	0.23	Cum SA (acres)	1.81	0.79	0.71

Plan: PR SOUTHWEST RIV... Lower RS: 3606.6 Profile: P100yr

E.G. Elev (ft)	559.95	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.88	Wt. n-Val.	0.100	0.015	0.100
W.S. Elev (ft)	558.06	Reach Len. (ft)	153.90	154.00	154.00
Crit W.S. (ft)		Flow Area (sq ft)	31.92	259.79	8.97
E.G. Slope (ft/ft)	0.000838	Area (sq ft)	31.92	259.79	8.97
Q Total (cfs)	2900.00	Flow (cfs)	22.72	2872.62	4.65
Top Width (ft)	48.34	Top Width (ft)	13.12	29.88	5.34
Vel Total (ft/s)	9.64	Avg. Vel. (ft/s)	0.71	11.06	0.52
Max Chl Dpth (ft)	11.02	Hydr. Depth (ft)	2.43	8.69	1.68
Conv. Total (cfs)	100168.1	Conv. (cfs)	784.9	99222.4	160.8
Length Wtd. (ft)	154.00	Wetted Per. (ft)	14.99	34.32	6.77
Min Ch El (ft)	547.04	Shear (lb/sq ft)	0.11	0.40	0.07
Alpha	1.30	Stream Power (lb/ft s)	0.08	4.38	0.04
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	3.74	7.64	2.02
C & E Loss (ft)	0.14	Cum SA (acres)	1.77	0.69	0.70

Plan: PR SOUTHWEST RIV... Lower RS: 3452.6 Profile: P100yr

E.G. Elev (ft)	559.70	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.42	Wt. n-Val.	0.100	0.015	0.100
W.S. Elev (ft)	558.29	Reach Len. (ft)	131.00	130.90	131.00
Crit W.S. (ft)		Flow Area (sq ft)	60.45	295.76	17.20
E.G. Slope (ft/ft)	0.000535	Area (sq ft)	60.45	295.76	17.20
Q Total (cfs)	2900.00	Flow (cfs)	43.69	2848.60	7.71
Top Width (ft)	56.62	Top Width (ft)	16.89	29.88	9.85
Vel Total (ft/s)	7.77	Avg. Vel. (ft/s)	0.72	9.63	0.45
Max Chl Dpth (ft)	12.23	Hydr. Depth (ft)	3.58	9.90	1.75
Conv. Total (cfs)	125384.3	Conv. (cfs)	1888.8	123162.0	333.4
Length Wtd. (ft)	130.90	Wetted Per. (ft)	19.82	34.31	11.55
Min Ch El (ft)	546.06	Shear (lb/sq ft)	0.10	0.29	0.05
Alpha	1.51	Stream Power (lb/ft s)	0.07	2.77	0.02
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	3.57	6.65	1.97
C & E Loss (ft)	0.11	Cum SA (acres)	1.72	0.59	0.67

Plan: PR SOUTHWEST RIV... Lower RS: 3321.7 Profile: P100yr

E.G. Elev (ft)	559.53	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.05	Wt. n-Val.	0.100	0.015	0.100
W.S. Elev (ft)	558.49	Reach Len. (ft)	62.20	60.90	58.80
Crit W.S. (ft)	553.60	Flow Area (sq ft)	52.90	344.76	48.46
E.G. Slope (ft/ft)	0.000370	Area (sq ft)	52.90	344.76	627.12
Q Total (cfs)	2900.00	Flow (cfs)	25.40	2851.66	22.94
Top Width (ft)	204.60	Top Width (ft)	22.14	29.88	152.58
Vel Total (ft/s)	6.50	Avg. Vel. (ft/s)	0.48	8.27	0.47
Max Chl Dpth (ft)	13.26	Hydr. Depth (ft)	2.39	11.54	2.24
Conv. Total (cfs)	150752.0	Conv. (cfs)	1320.4	148238.9	1192.8
Length Wtd. (ft)	60.96	Wetted Per. (ft)	24.30	38.12	22.73
Min Ch El (ft)	545.23	Shear (lb/sq ft)	0.05	0.21	0.05
Alpha	1.59	Stream Power (lb/ft s)	0.02	1.73	0.02
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	3.40	5.69	1.00
C & E Loss (ft)	0.08	Cum SA (acres)	1.66	0.50	0.43

Plan: PR SOUTHWEST RIV... Lower RS: 3260.8 Profile: P100yr

E.G. Elev (ft)	559.44	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.90	Wt. n-Val.	0.022	0.015	0.100
W.S. Elev (ft)	558.54	Reach Len. (ft)	103.80	103.60	104.00
Crit W.S. (ft)	553.03	Flow Area (sq ft)	140.58	315.90	52.45
E.G. Slope (ft/ft)	0.000306	Area (sq ft)	372.79	315.90	52.45
Q Total (cfs)	2900.00	Flow (cfs)	326.32	2545.86	27.82
Top Width (ft)	253.54	Top Width (ft)	213.57	23.80	16.17
Vel Total (ft/s)	5.70	Avg. Vel. (ft/s)	2.32	8.06	0.53
Max Chl Dpth (ft)	13.65	Hydr. Depth (ft)	2.79	13.27	3.24
Conv. Total (cfs)	165678.5	Conv. (cfs)	18642.7	145446.4	1589.5
Length Wtd. (ft)	103.60	Wetted Per. (ft)	52.65	31.53	18.76
Min Ch El (ft)	544.89	Shear (lb/sq ft)	0.05	0.19	0.05
Alpha	1.77	Stream Power (lb/ft s)	0.12	1.54	0.03
Frctn Loss (ft)		Cum Volume (acre-ft)	3.10	5.23	0.55
C & E Loss (ft)		Cum SA (acres)	1.49	0.46	0.31

Plan: PR SOUTHWEST RIV... Lower RS: 3157.2 Profile: P100yr

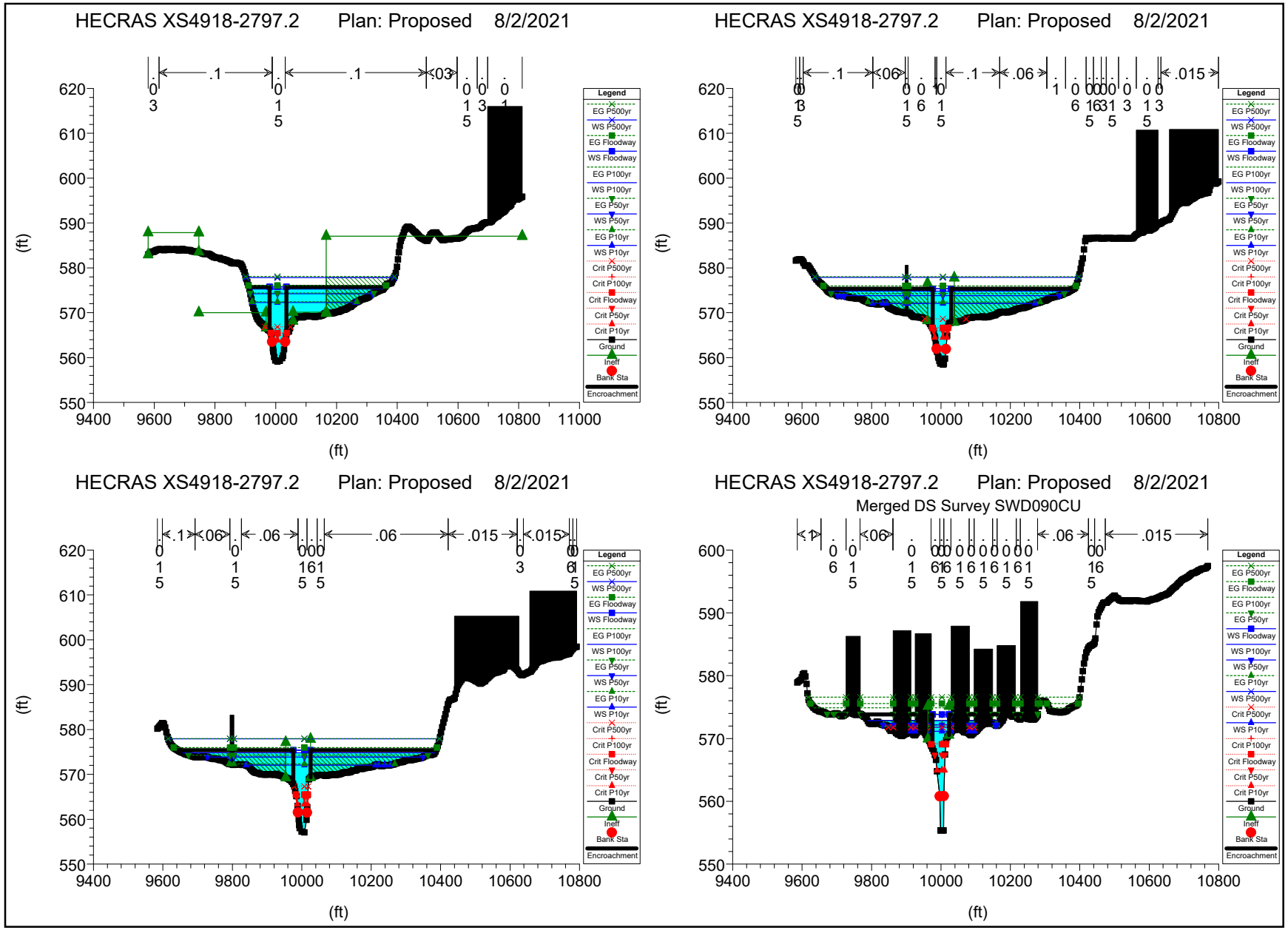
E.G. Elev (ft)	552.48	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.52	Wt. n-Val.	0.100	0.045	0.100
W.S. Elev (ft)	551.96	Reach Len. (ft)	62.30	65.70	67.20
Crit W.S. (ft)	546.65	Flow Area (sq ft)	40.05	476.68	36.56
E.G. Slope (ft/ft)	0.001476	Area (sq ft)	41.30	476.68	36.56
Q Total (cfs)	2900.00	Flow (cfs)	50.40	2805.37	44.23
Top Width (ft)	79.07	Top Width (ft)	23.44	46.22	9.41
Vel Total (ft/s)	5.24	Avg. Vel. (ft/s)	1.26	5.89	1.21
Max Chl Dpth (ft)	11.21	Hydr. Depth (ft)	4.09	10.31	3.88
Conv. Total (cfs)	75479.7	Conv. (cfs)	1311.8	73016.7	1151.1
Length Wtd. (ft)	65.58	Wetted Per. (ft)	12.23	47.71	11.85
Min Ch El (ft)	540.75	Shear (lb/sq ft)	0.30	0.92	0.28
Alpha	1.22	Stream Power (lb/ft s)	0.38	5.42	0.34
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	3.10	4.33	0.55
C & E Loss (ft)	0.13	Cum SA (acres)	1.21	0.38	0.28

Plan: PR SOUTHWEST RIV... Lower RS: 3091.5 Profile: P100yr

E.G. Elev (ft)	552.28	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.25	Wt. n-Val.	0.100	0.045	0.100
W.S. Elev (ft)	552.03	Reach Len. (ft)	267.80	294.30	269.80
Crit W.S. (ft)		Flow Area (sq ft)	340.91	623.01	69.40
E.G. Slope (ft/ft)	0.000685	Area (sq ft)	340.91	623.01	69.40
Q Total (cfs)	2900.00	Flow (cfs)	196.61	2632.78	70.61
Top Width (ft)	257.32	Top Width (ft)	187.59	55.94	13.80
Vel Total (ft/s)	2.81	Avg. Vel. (ft/s)	0.58	4.23	1.02
Max Chl Dpth (ft)	12.69	Hydr. Depth (ft)	1.82	11.14	5.03
Conv. Total (cfs)	110814.3	Conv. (cfs)	7513.0	100603.3	2698.0
Length Wtd. (ft)	290.42	Wetted Per. (ft)	188.74	57.61	16.40
Min Ch El (ft)	539.34	Shear (lb/sq ft)	0.08	0.46	0.18
Alpha	2.06	Stream Power (lb/ft s)	0.04	1.95	0.18
Frctn Loss (ft)	0.27	Cum Volume (acre-ft)	2.83	3.50	0.46
C & E Loss (ft)	0.02	Cum SA (acres)	1.06	0.30	0.27

Plan: PR SOUTHWEST RIV... Lower RS: 2797.2 Profile: P100yr

E.G. Elev (ft)	551.99	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.49	Wt. n-Val.	0.100	0.045	0.100
W.S. Elev (ft)	551.50	Reach Len. (ft)			
Crit W.S. (ft)	546.09	Flow Area (sq ft)	332.48	413.46	80.26
E.G. Slope (ft/ft)	0.001272	Area (sq ft)	578.13	413.46	80.26
Q Total (cfs)	3200.00	Flow (cfs)	590.17	2565.49	44.35
Top Width (ft)	261.03	Top Width (ft)	156.20	33.02	71.81
Vel Total (ft/s)	3.87	Avg. Vel. (ft/s)	1.78	6.20	0.55
Max Chl Dpth (ft)	13.26	Hydr. Depth (ft)	6.24	12.52	1.12
Conv. Total (cfs)	89730.3	Conv. (cfs)	16548.7	71938.2	1243.5
Length Wtd. (ft)		Wetted Per. (ft)	54.23	34.18	75.39
Min Ch El (ft)	538.24	Shear (lb/sq ft)	0.49	0.96	0.08
Alpha	2.10	Stream Power (lb/ft s)	0.86	5.96	0.05
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			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(ft)
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WS P500yr
EG Floodway
WS Floodway
EG P100yr
WS P100yr
EG P50yr
WS P50yr
EG P10yr
WS P10yr
Crit P500yr
Crit P100yr
Crit Floodway
Crit P50yr
Crit P10yr
Ground
Ineff
Bank Sta
Encroachment
HECRAS XS4918-2797.2 Plan: Proposed 8/2/2021
(ft)
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HECRAS XS4918-2797.2 Plan: Proposed 8/2/2021
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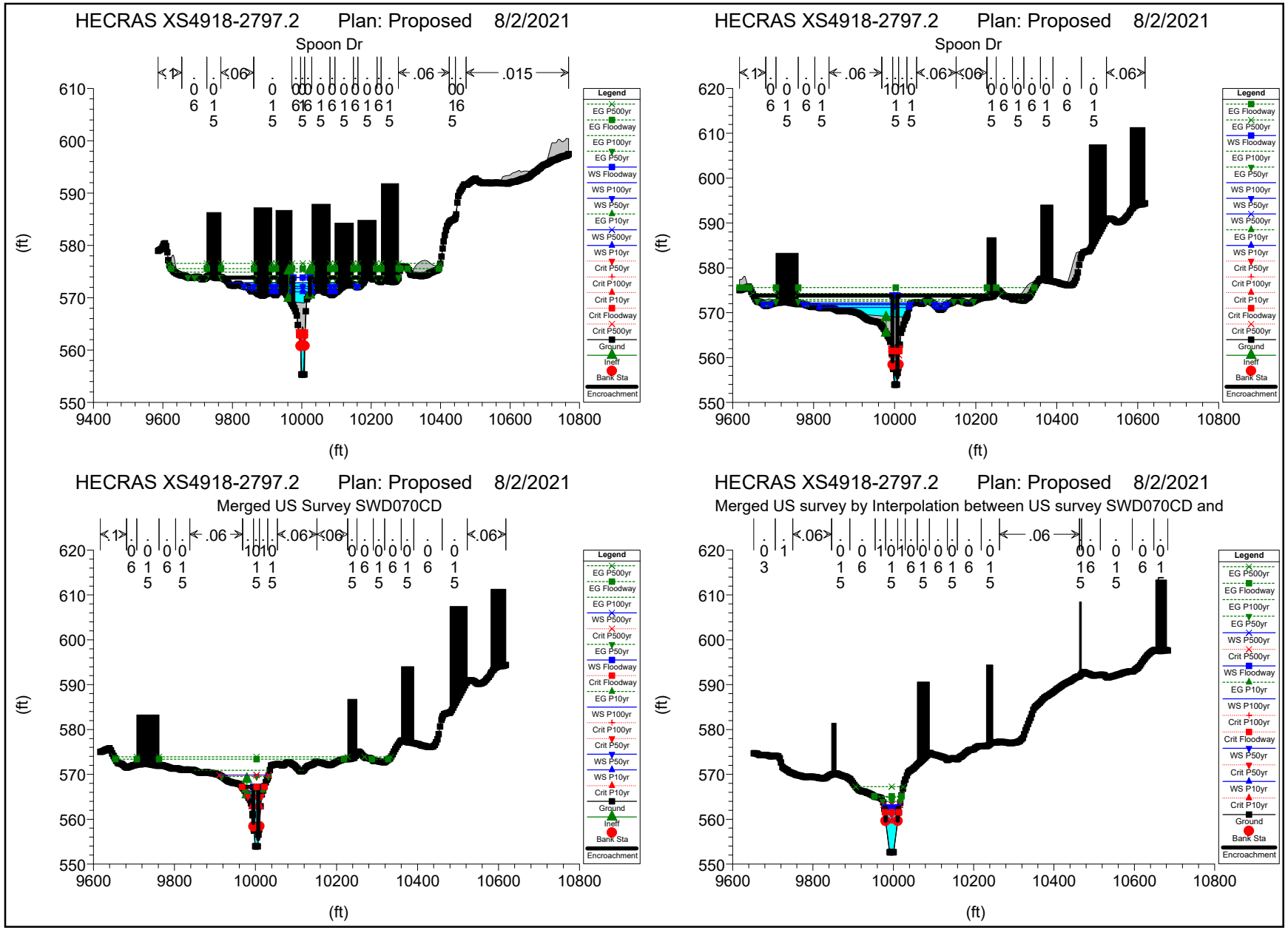
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(ft)
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EG Floodway
EG P100yr
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WS Floodway
WS P100yr
WS P50yr
EG P10yr
WS P500yr
WS P10yr
Crit P50yr
Crit P100yr
Crit P10yr
Crit Floodway
Crit P500yr
Ground
Ineff
Bank Sta
Encroachment
HECRAS XS4918-2797.2 Plan: Proposed 8/2/2021
Spoon Dr
(ft)
(ft)
HECRAS XS4918-2797.2 Plan: Proposed 8/2/2021
Merged US Survey SWD070CD
(ft)
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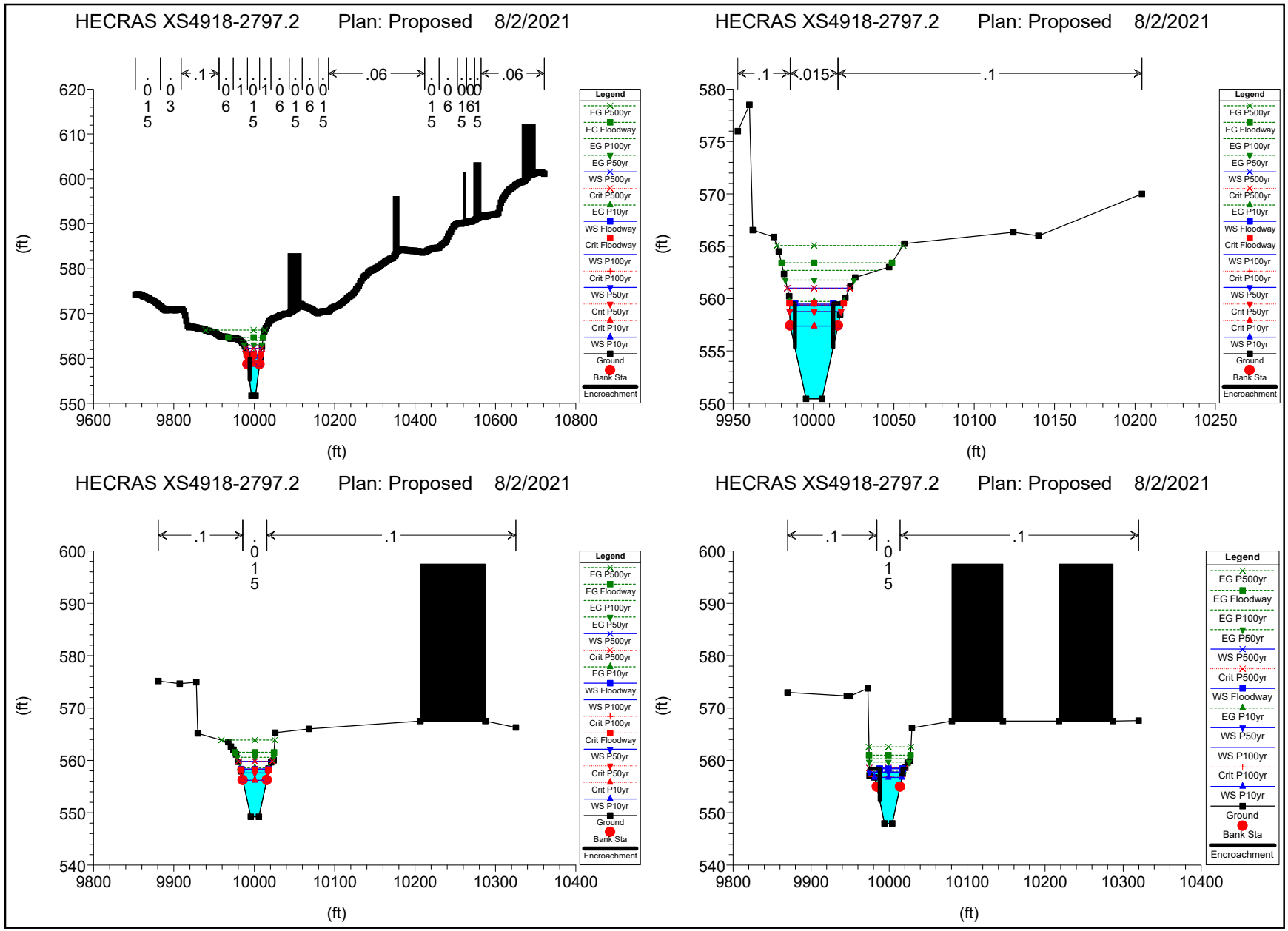
(ft)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EG P100yr
EG P50yr
WS P500yr
Crit P500yr
EG P10yr
WS Floodway
Crit Floodway
WS P100yr
Crit P100yr
WS P50yr
Crit P50yr
Crit P10yr
WS P10yr
Ground
Bank Sta
Encroachment
HECRAS XS4918-2797.2 Plan: Proposed 8/2/2021
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HECRAS XS4918-2797.2 Plan: Proposed 8/2/2021
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HECRAS XS4918-2797.2 Plan: Proposed 8/2/2021
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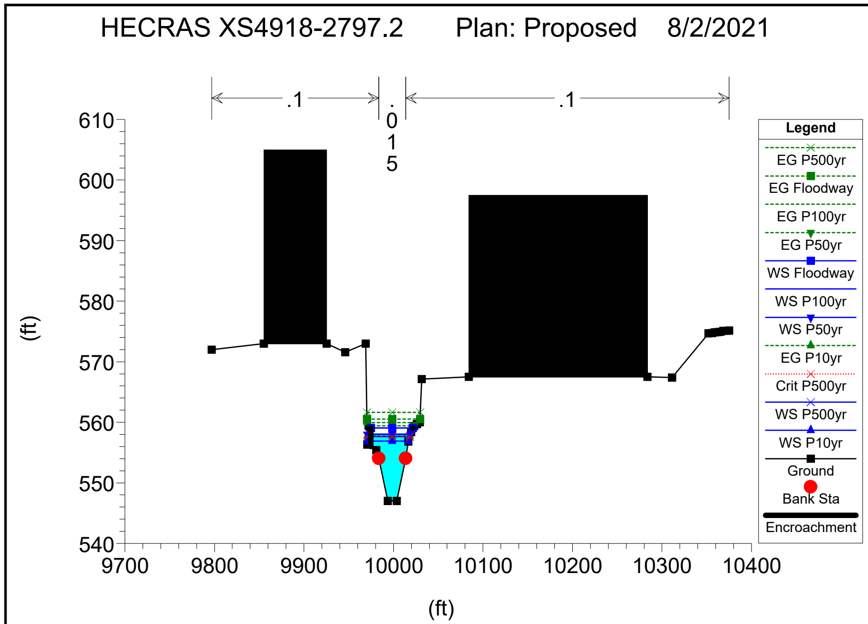
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Legend
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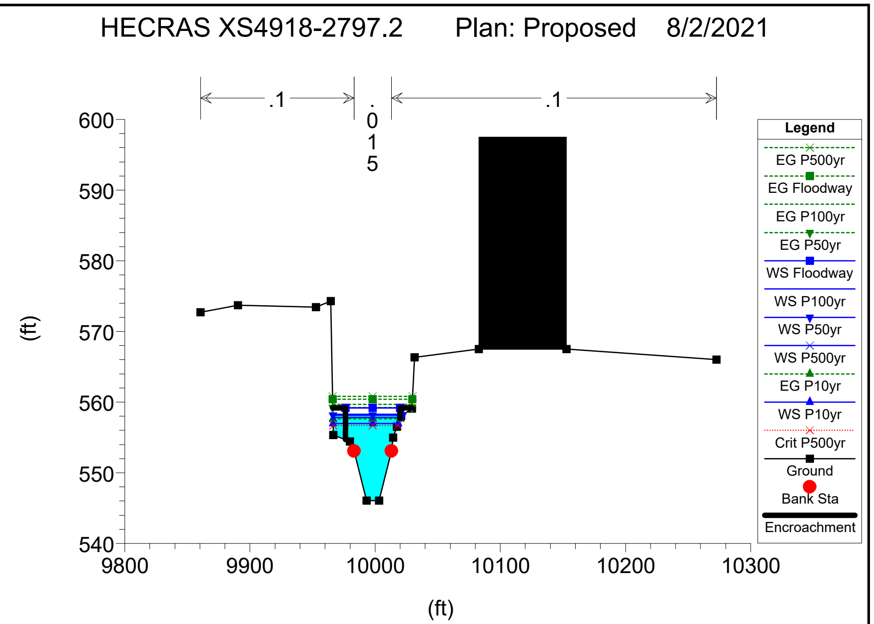
EG Floodway
EG P100yr
EG P50yr
WS Floodway
WS P100yr
WS P50yr
EG P10yr
Crit P500yr
WS P500yr
WS P10yr
Ground
Bank Sta
Encroachment
(ft)
(ft)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Legend
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EG Floodway
EG P100yr
EG P50yr
WS Floodway
WS P100yr
WS P50yr
WS P500yr
EG P10yr
WS P10yr
Crit P500yr
Ground
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Encroachment
(ft)
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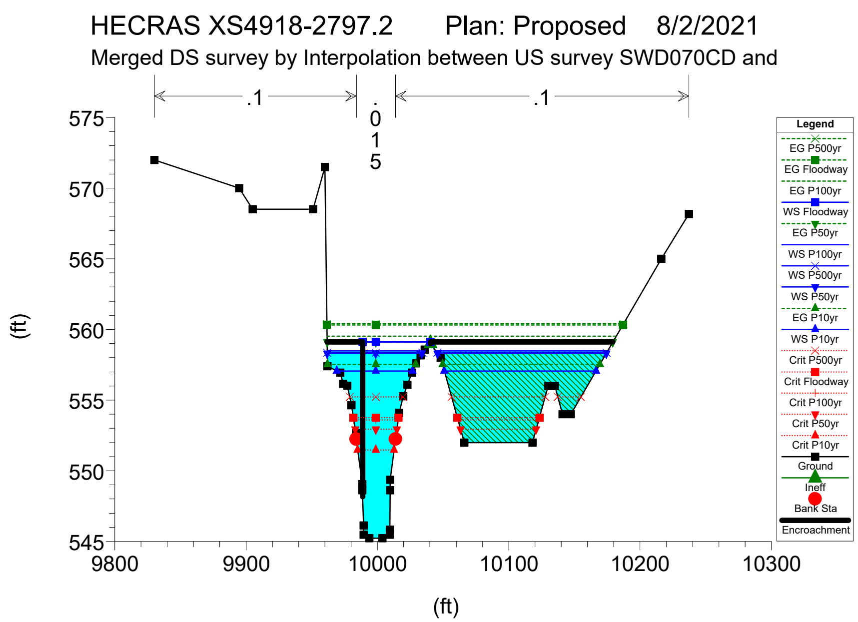
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Legend
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EG Floodway
EG P100yr
WS Floodway
EG P50yr
WS P100yr
WS P500yr
WS P50yr
EG P10yr
WS P10yr
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Crit P100yr
Crit P50yr
Crit P10yr
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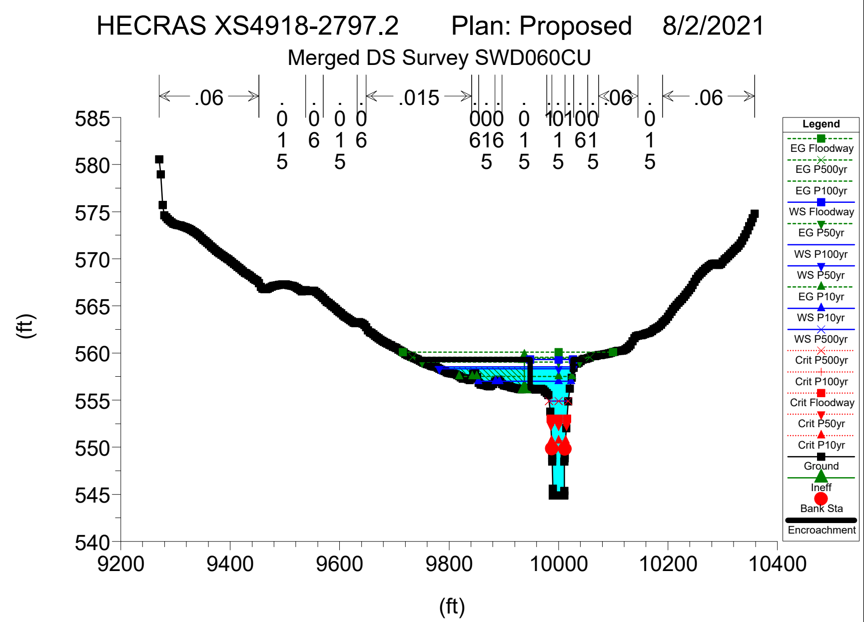
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EG P50yr
WS P100yr
WS P50yr
EG P10yr
WS P10yr
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Crit P50yr
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Ground
Ineff
Bank Sta
Encroachment
(ft)
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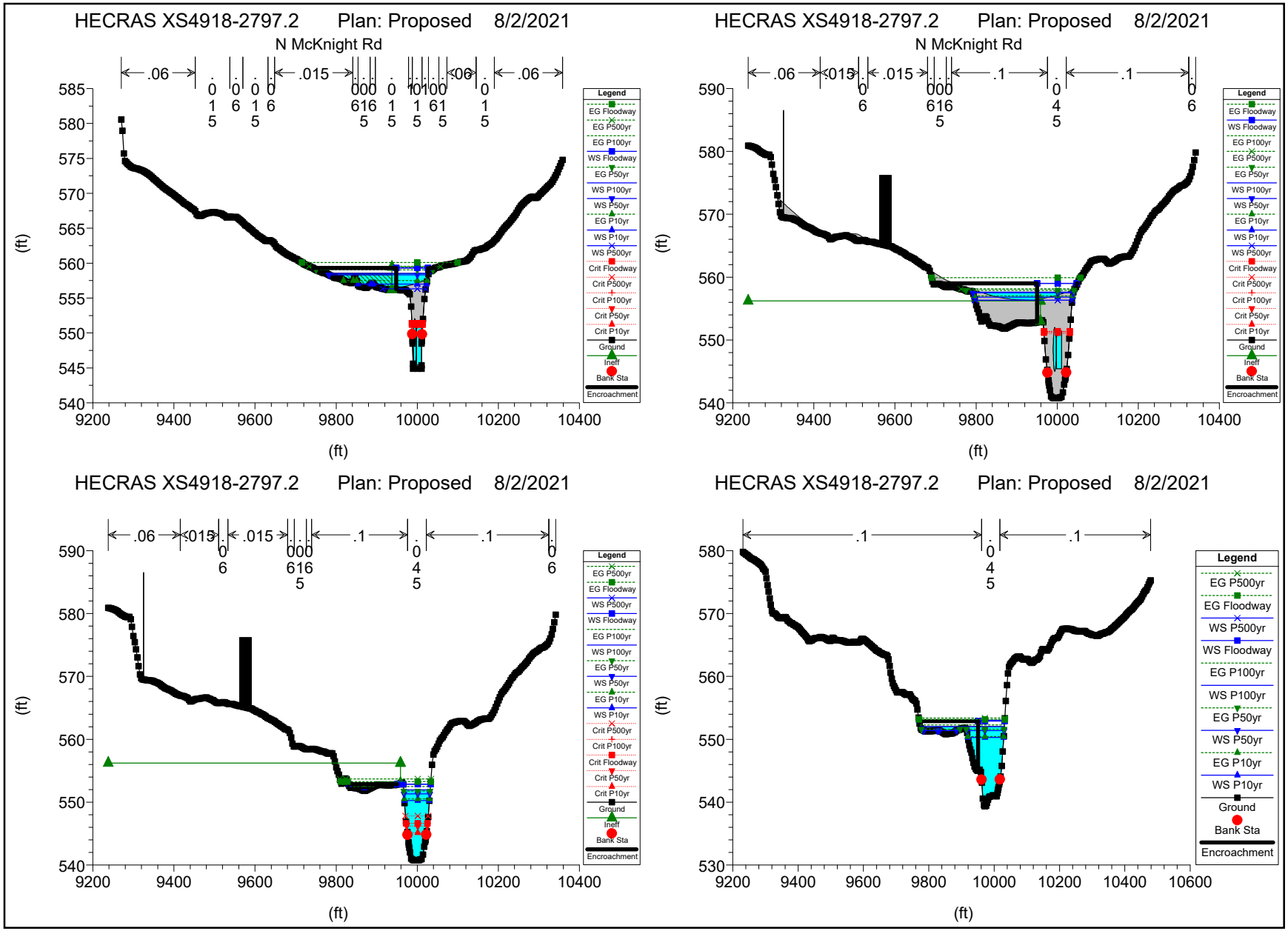
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N McKnight Rd
(ft)
(ft)
Legend
EG Floodway
EG P500yr
EG P100yr
WS Floodway
EG P50yr
WS P100yr
WS P50yr
EG P10yr
WS P10yr
WS P500yr
Crit Floodway
Crit P500yr
Crit P100yr
Crit P50yr
Crit P10yr
Ground
Ineff
Bank Sta
Encroachment
HECRAS XS4918-2797.2 Plan: Proposed 8/2/2021
N McKnight Rd
(ft)
(ft)
HECRAS XS4918-2797.2 Plan: Proposed 8/2/2021
(ft)
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HECRAS XS4918-2797.2 Plan: Proposed 8/2/2021
(ft)
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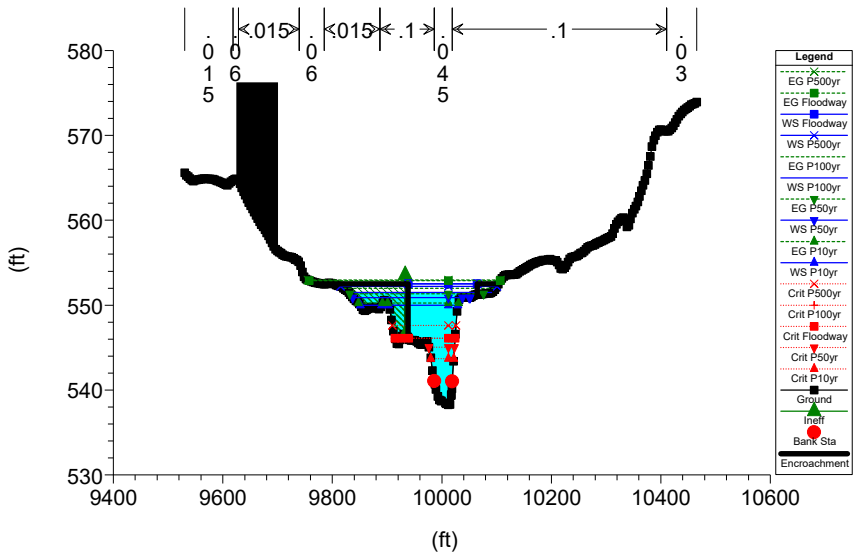
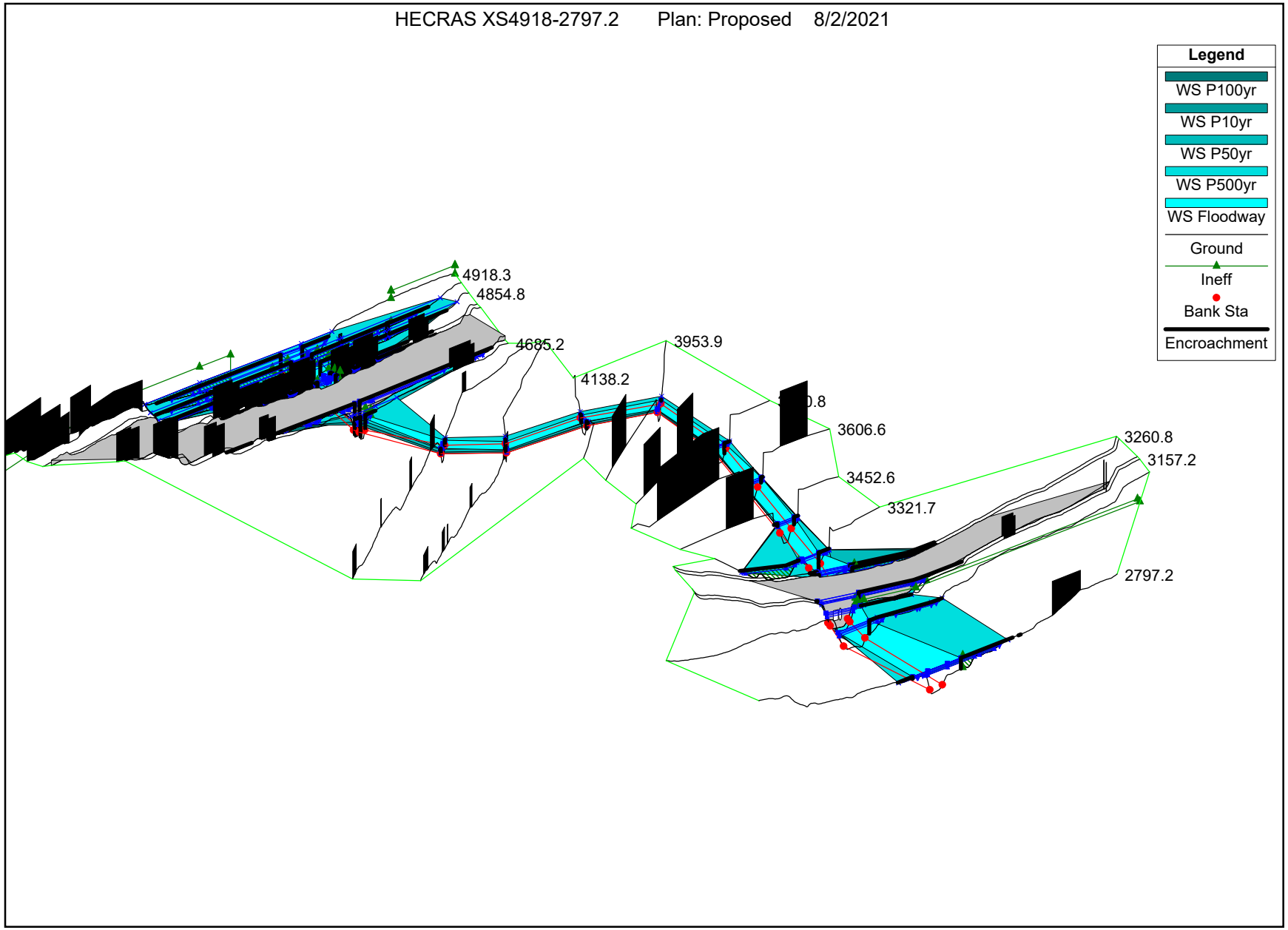
HECRAS XS4918-2797.2 Plan: Proposed 8/2/2021




HECRAS XS4918-2797.2 Plan: Proposed 8/2/2021
Legend
WS P100yr
WS P10yr
WS P50yr
WS P500yr
WS Floodway
Ground
Ineff
Bank Sta
Encroachment
4918.3
4854.8
4685.2
4138.2
3953.9
3606.6
3452.6
3321.7
3260.8
3157.2
2797.2

VII. EXISTING FLOODWAY MODEL

HEC-RAS Plan: EX River: SOUTHWEST RIV... Reach: Lower Profile: Floodway

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)	
Lower	4918.3	Floodway	2900.00	559.14	575.78	565.48	576.07	0.000052	4.33	803.56	55.51	0.19
Lower	4886.9 K	Floodway	2900.00	558.43	575.36	566.61	575.97	0.000113	6.43	687.56	53.31	0.28
Lower	4854.8	Floodway	2900.00	557.06	575.39	565.54	575.95	0.000099	6.16	660.97	49.82	0.26
Lower	4818.7	Floodway	2900.00	555.36	573.83	569.09	575.58	0.000619	11.63	464.45	48.26	0.49
Lower	4734		Culvert									
Lower	4685.2 J	Floodway	2900.00	553.97	567.20	567.20	573.36	0.004118	19.93	151.35	12.49	1.00
Lower	4485.9	Floodway	2900.00	552.62	562.57	561.57	565.09	0.001640	12.74	227.60	29.88	0.81
Lower	4338.9	Floodway	2900.00	551.69	560.94	560.94	564.68	0.002527	15.51	190.26	28.00	1.00
Lower	4138.2 I	Floodway	2900.00	550.42	559.54	559.54	563.41	0.002823	15.77	183.86	23.88	1.00
Lower	3953.9	Floodway	2900.00	549.25	558.31	558.21	561.53	0.001999	14.40	205.90	33.88	0.98
Lower	3750.8	Floodway	2900.00	547.96	558.43	557.10	561.00	0.001454	12.86	232.10	29.09	0.77
Lower	3606.6 H	Floodway	2900.00	547.04	559.04	556.07	560.55	0.000587	9.93	337.56	46.88	0.56
Lower	3452.6	Floodway	2900.00	546.06	559.17	555.05	560.39	0.000407	8.90	369.91	43.88	0.48
Lower	3321.7	Floodway	2900.00	545.23	559.12	553.75	560.33	0.000542	8.88	386.29	51.75	0.44
Lower	3260.8 G	Floodway	2900.00	544.89	559.31	553.03	560.09	0.000250	7.56	545.69	78.32	0.36
Lower	3216.6		Culvert									
Lower	3157.2	Floodway	2900.00	540.75	552.85	546.65	553.28	0.001109	5.39	612.42	68.67	0.28
Lower	3091.5	Floodway	2900.00	539.34	552.89		553.14	0.000575	4.07	840.59	81.62	0.21
Lower	2797.2 F	Floodway	3200.00	538.24	552.50	546.09	552.91	0.000963	5.68	920.62	126.07	0.27

Plan: EX SOUTHWEST RIV... Lower RS: 4918.3 Profile: Floodway

E.G. Elev (ft)	576.07	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.29	Wt. n-Val.	0.100	0.015	0.100
W.S. Elev (ft)	575.78	Reach Len. (ft)	31.40	31.40	31.70
Crit W.S. (ft)	565.48	Flow Area (sq ft)	92.06	660.34	51.16
E.G. Slope (ft/ft)	0.000052	Area (sq ft)	92.06	660.34	51.16
Q Total (cfs)	2900.00	Flow (cfs)	28.25	2859.57	12.17
Top Width (ft)	55.51	Top Width (ft)	8.62	42.40	4.49
Vel Total (ft/s)	3.61	Avg. Vel. (ft/s)	0.31	4.33	0.24
Max Chl Dpth (ft)	16.64	Hydr. Depth (ft)	10.68	15.57	11.40
Conv. Total (cfs)	403060.3	Conv. (cfs)	3926.9	397441.4	1692.0
Length Wtd. (ft)	31.40	Wetted Per. (ft)	18.93	44.09	15.41
Min Ch El (ft)	559.14	Shear (lb/sq ft)	0.02	0.05	0.01
Alpha	1.42	Stream Power (lb/ft s)	0.00	0.21	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	2.11	15.27	1.31
C & E Loss (ft)	0.10	Cum SA (acres)	0.42	1.42	0.44

Plan: EX SOUTHWEST RIV... Lower RS: 4886.9 Profile: Floodway

E.G. Elev (ft)	575.97	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.61	Wt. n-Val.	0.081	0.015	0.100
W.S. Elev (ft)	575.36	Reach Len. (ft)	31.70	32.10	32.30
Crit W.S. (ft)	566.61	Flow Area (sq ft)	125.39	426.74	135.43
E.G. Slope (ft/ft)	0.000113	Area (sq ft)	125.39	426.74	135.43
Q Total (cfs)	2900.00	Flow (cfs)	90.81	2742.55	66.65
Top Width (ft)	53.31	Top Width (ft)	11.46	26.79	15.06
Vel Total (ft/s)	4.22	Avg. Vel. (ft/s)	0.72	6.43	0.49
Max Chl Dpth (ft)	16.93	Hydr. Depth (ft)	10.94	15.93	8.99
Conv. Total (cfs)	273324.3	Conv. (cfs)	8558.4	258484.4	6281.4
Length Wtd. (ft)	32.09	Wetted Per. (ft)	21.35	28.22	24.56
Min Ch El (ft)	558.43	Shear (lb/sq ft)	0.04	0.11	0.04
Alpha	2.20	Stream Power (lb/ft s)	0.03	0.68	0.02
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	2.03	14.88	1.24
C & E Loss (ft)	0.01	Cum SA (acres)	0.41	1.39	0.43

Plan: EX SOUTHWEST RIV... Lower RS: 4854.8 Profile: Floodway

E.G. Elev (ft)	575.95	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.56	Wt. n-Val.	0.060	0.015	0.060
W.S. Elev (ft)	575.39	Reach Len. (ft)	36.10	36.10	36.90
Crit W.S. (ft)	565.54	Flow Area (sq ft)	128.69	445.07	87.21
E.G. Slope (ft/ft)	0.000099	Area (sq ft)	128.69	445.07	87.21
Q Total (cfs)	2900.00	Flow (cfs)	101.36	2742.52	56.13
Top Width (ft)	49.82	Top Width (ft)	13.10	25.91	10.81
Vel Total (ft/s)	4.39	Avg. Vel. (ft/s)	0.79	6.16	0.64
Max Chl Dpth (ft)	18.33	Hydr. Depth (ft)	9.82	17.18	8.07
Conv. Total (cfs)	291207.0	Conv. (cfs)	10177.8	275393.2	5636.0
Length Wtd. (ft)	36.13	Wetted Per. (ft)	22.55	28.51	20.69
Min Ch El (ft)	557.06	Shear (lb/sq ft)	0.04	0.10	0.03
Alpha	1.87	Stream Power (lb/ft s)	0.03	0.60	0.02
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	1.94	14.56	1.16
C & E Loss (ft)	0.36	Cum SA (acres)	0.40	1.37	0.42

Plan: EX SOUTHWEST RIV... Lower RS: 4818.7 Profile: Floodway

E.G. Elev (ft)	575.58	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.75	Wt. n-Val.	0.060	0.015	0.060
W.S. Elev (ft)	573.83	Reach Len. (ft)	132.20	133.50	132.80
Crit W.S. (ft)	569.09	Flow Area (sq ft)	176.79	206.76	80.90
E.G. Slope (ft/ft)	0.000619	Area (sq ft)	176.79	206.76	81.17
Q Total (cfs)	2900.00	Flow (cfs)	368.65	2404.47	126.88
Top Width (ft)	48.26	Top Width (ft)	21.44	11.59	15.23
Vel Total (ft/s)	6.24	Avg. Vel. (ft/s)	2.09	11.63	1.57
Max Chl Dpth (ft)	18.47	Hydr. Depth (ft)	8.25	17.84	5.34
Conv. Total (cfs)	116541.5	Conv. (cfs)	14814.7	96627.8	5099.1
Length Wtd. (ft)	133.50	Wetted Per. (ft)	28.40	20.18	19.93
Min Ch El (ft)	555.36	Shear (lb/sq ft)	0.24	0.40	0.16
Alpha	2.89	Stream Power (lb/ft s)	0.50	4.61	0.25
Frctn Loss (ft)		Cum Volume (acre-ft)	1.81	14.29	1.09
C & E Loss (ft)		Cum SA (acres)	0.39	1.36	0.41

Plan: EX SOUTHWEST RIV... Lower RS: 4685.2 Profile: Floodway

E.G. Elev (ft)	573.36	Element	Left OB	Channel	Right OB
Vel Head (ft)	6.16	Wt. n-Val.	0.100	0.015	
W.S. Elev (ft)	567.20	Reach Len. (ft)	194.70	199.30	205.70
Crit W.S. (ft)	567.20	Flow Area (sq ft)	6.07	145.27	
E.G. Slope (ft/ft)	0.004118	Area (sq ft)	6.07	145.27	
Q Total (cfs)	2900.00	Flow (cfs)	4.42	2895.58	
Top Width (ft)	12.49	Top Width (ft)	0.72	11.77	
Vel Total (ft/s)	19.16	Avg. Vel. (ft/s)	0.73	19.93	
Max Chl Dpth (ft)	13.23	Hydr. Depth (ft)	8.44	12.34	
Conv. Total (cfs)	45189.1	Conv. (cfs)	68.8	45120.2	
Length Wtd. (ft)	199.30	Wetted Per. (ft)	9.11	26.17	
Min Ch El (ft)	553.97	Shear (lb/sq ft)	0.17	1.43	
Alpha	1.08	Stream Power (lb/ft s)	0.12	28.45	
Frctn Loss (ft)	0.49	Cum Volume (acre-ft)	1.81	13.13	1.09
C & E Loss (ft)	1.82	Cum SA (acres)	0.35	1.32	0.39

Plan: EX SOUTHWEST RIV... Lower RS: 4485.9 Profile: Floodway

E.G. Elev (ft)	565.09	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.52	Wt. n-Val.		0.015	
W.S. Elev (ft)	562.57	Reach Len. (ft)	142.70	147.00	148.00
Crit W.S. (ft)	561.57	Flow Area (sq ft)		227.60	
E.G. Slope (ft/ft)	0.001640	Area (sq ft)		227.60	
Q Total (cfs)	2900.00	Flow (cfs)		2900.00	
Top Width (ft)	29.88	Top Width (ft)		29.88	
Vel Total (ft/s)	12.74	Avg. Vel. (ft/s)		12.74	
Max Chl Dpth (ft)	9.95	Hydr. Depth (ft)		7.62	
Conv. Total (cfs)	71613.3	Conv. (cfs)		71613.3	
Length Wtd. (ft)	147.00	Wetted Per. (ft)		40.21	
Min Ch El (ft)	552.62	Shear (lb/sq ft)		0.58	
Alpha	1.00	Stream Power (lb/ft s)		7.38	
Frctn Loss (ft)	0.30	Cum Volume (acre-ft)	1.80	12.28	1.09
C & E Loss (ft)	0.12	Cum SA (acres)	0.35	1.22	0.39

Plan: EX SOUTHWEST RIV... Lower RS: 4338.9 Profile: Floodway

E.G. Elev (ft)	564.68	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.74	Wt. n-Val.		0.015	0.100
W.S. Elev (ft)	560.94	Reach Len. (ft)	196.90	200.70	204.10
Crit W.S. (ft)	560.94	Flow Area (sq ft)		186.80	3.46
E.G. Slope (ft/ft)	0.002527	Area (sq ft)		186.80	3.46
Q Total (cfs)	2900.00	Flow (cfs)		2897.59	2.41
Top Width (ft)	28.00	Top Width (ft)		24.88	3.12
Vel Total (ft/s)	15.24	Avg. Vel. (ft/s)		15.51	0.70
Max Chl Dpth (ft)	9.25	Hydr. Depth (ft)		7.51	1.11
Conv. Total (cfs)	57694.0	Conv. (cfs)		57646.0	48.0
Length Wtd. (ft)	200.70	Wetted Per. (ft)		33.97	3.84
Min Ch El (ft)	551.69	Shear (lb/sq ft)		0.87	0.14
Alpha	1.03	Stream Power (lb/ft s)		13.45	0.10
Frctn Loss (ft)	0.54	Cum Volume (acre-ft)	1.80	11.58	1.08
C & E Loss (ft)	0.01	Cum SA (acres)	0.35	1.13	0.38

Plan: EX SOUTHWEST RIV... Lower RS: 4138.2 Profile: Floodway

E.G. Elev (ft)	563.41	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.87	Wt. n-Val.		0.015	
W.S. Elev (ft)	559.54	Reach Len. (ft)	189.80	184.30	178.30
Crit W.S. (ft)	559.54	Flow Area (sq ft)		183.86	
E.G. Slope (ft/ft)	0.002823	Area (sq ft)		183.86	
Q Total (cfs)	2900.00	Flow (cfs)		2900.00	
Top Width (ft)	23.88	Top Width (ft)		23.88	
Vel Total (ft/s)	15.77	Avg. Vel. (ft/s)		15.77	
Max Chl Dpth (ft)	9.12	Hydr. Depth (ft)		7.70	
Conv. Total (cfs)	54581.8	Conv. (cfs)		54581.8	
Length Wtd. (ft)	184.30	Wetted Per. (ft)		35.44	
Min Ch El (ft)	550.42	Shear (lb/sq ft)		0.91	
Alpha	1.00	Stream Power (lb/ft s)		14.42	
Frctn Loss (ft)	0.43	Cum Volume (acre-ft)	1.80	10.73	1.07
C & E Loss (ft)	0.19	Cum SA (acres)	0.35	1.02	0.37

Plan: EX SOUTHWEST RIV... Lower RS: 3953.9 Profile: Floodway

E.G. Elev (ft)	561.53	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.22	Wt. n-Val.	0.100	0.015	0.100
W.S. Elev (ft)	558.31	Reach Len. (ft)	209.90	203.10	198.10
Crit W.S. (ft)	558.21	Flow Area (sq ft)	2.60	201.20	2.10
E.G. Slope (ft/ft)	0.001999	Area (sq ft)	2.60	201.20	2.10
Q Total (cfs)	2900.00	Flow (cfs)	1.55	2897.32	1.13
Top Width (ft)	33.88	Top Width (ft)	2.00	29.88	2.00
Vel Total (ft/s)	14.08	Avg. Vel. (ft/s)	0.60	14.40	0.54
Max Chl Dpth (ft)	9.06	Hydr. Depth (ft)	1.30	6.73	1.05
Conv. Total (cfs)	64868.8	Conv. (cfs)	34.7	64808.9	25.2
Length Wtd. (ft)	203.10	Wetted Per. (ft)	3.05	34.31	2.88
Min Ch El (ft)	549.25	Shear (lb/sq ft)	0.11	0.73	0.09
Alpha	1.04	Stream Power (lb/ft s)	0.06	10.53	0.05
Frctn Loss (ft)	0.34	Cum Volume (acre-ft)	1.79	9.91	1.07
C & E Loss (ft)	0.20	Cum SA (acres)	0.35	0.91	0.37

Plan: EX SOUTHWEST RIV... Lower RS: 3750.8 Profile: Floodway

E.G. Elev (ft)	561.00	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.57	Wt. n-Val.		0.015	0.100
W.S. Elev (ft)	558.43	Reach Len. (ft)	144.20	144.20	144.10
Crit W.S. (ft)	557.10	Flow Area (sq ft)		225.09	7.00
E.G. Slope (ft/ft)	0.001454	Area (sq ft)		225.09	7.00
Q Total (cfs)	2900.00	Flow (cfs)		2895.01	4.99
Top Width (ft)	29.09	Top Width (ft)		26.09	3.00
Vel Total (ft/s)	12.49	Avg. Vel. (ft/s)		12.86	0.71
Max Chl Dpth (ft)	10.47	Hydr. Depth (ft)		8.63	2.33
Conv. Total (cfs)	76063.8	Conv. (cfs)		75932.8	130.9
Length Wtd. (ft)	144.20	Wetted Per. (ft)		35.82	4.96
Min Ch El (ft)	547.96	Shear (lb/sq ft)		0.57	0.13
Alpha	1.06	Stream Power (lb/ft s)		7.33	0.09
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)	1.78	8.92	1.05
C & E Loss (ft)	0.31	Cum SA (acres)	0.34	0.78	0.36

Plan: EX SOUTHWEST RIV... Lower RS: 3606.6 Profile: Floodway

E.G. Elev (ft)	560.55	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.52	Wt. n-Val.	0.100	0.015	0.100
W.S. Elev (ft)	559.04	Reach Len. (ft)	153.90	154.00	154.00
Crit W.S. (ft)	556.07	Flow Area (sq ft)	33.22	288.93	15.41
E.G. Slope (ft/ft)	0.000587	Area (sq ft)	33.22	288.93	15.41
Q Total (cfs)	2900.00	Flow (cfs)	22.87	2869.55	7.58
Top Width (ft)	46.88	Top Width (ft)	9.00	29.88	8.00
Vel Total (ft/s)	8.59	Avg. Vel. (ft/s)	0.69	9.93	0.49
Max Chl Dpth (ft)	12.00	Hydr. Depth (ft)	3.69	9.67	1.93
Conv. Total (cfs)	119713.2	Conv. (cfs)	944.2	118456.0	313.0
Length Wtd. (ft)	154.00	Wetted Per. (ft)	12.56	34.32	9.64
Min Ch El (ft)	547.04	Shear (lb/sq ft)	0.10	0.31	0.06
Alpha	1.32	Stream Power (lb/ft s)	0.07	3.06	0.03
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	1.73	8.07	1.01
C & E Loss (ft)	0.09	Cum SA (acres)	0.33	0.68	0.34

Plan: EX SOUTHWEST RIV... Lower RS: 3452.6 Profile: Floodway

E.G. Elev (ft)	560.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.22	Wt. n-Val.	0.100	0.015	0.100
W.S. Elev (ft)	559.17	Reach Len. (ft)	131.00	130.90	131.00
Crit W.S. (ft)	555.05	Flow Area (sq ft)	24.81	322.27	22.84
E.G. Slope (ft/ft)	0.000407	Area (sq ft)	34.48	322.27	22.84
Q Total (cfs)	2900.00	Flow (cfs)	21.44	2866.75	11.81
Top Width (ft)	43.88	Top Width (ft)	7.00	29.88	7.00
Vel Total (ft/s)	7.84	Avg. Vel. (ft/s)	0.86	8.90	0.52
Max Chl Dpth (ft)	13.11	Hydr. Depth (ft)	5.19	10.79	3.26
Conv. Total (cfs)	143753.6	Conv. (cfs)	1062.9	142105.4	585.3
Length Wtd. (ft)	130.90	Wetted Per. (ft)	5.07	34.31	10.08
Min Ch El (ft)	546.06	Shear (lb/sq ft)	0.12	0.24	0.06
Alpha	1.27	Stream Power (lb/ft s)	0.11	2.12	0.03
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	1.61	6.99	0.94
C & E Loss (ft)	0.00	Cum SA (acres)	0.30	0.58	0.31

Plan: EX SOUTHWEST RIV... Lower RS: 3321.7 Profile: Floodway

E.G. Elev (ft)	560.33	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.21	Wt. n-Val.		0.015	0.100
W.S. Elev (ft)	559.12	Reach Len. (ft)	62.20	60.90	58.80
Crit W.S. (ft)	553.75	Flow Area (sq ft)		322.11	64.18
E.G. Slope (ft/ft)	0.000542	Area (sq ft)		322.11	64.18
Q Total (cfs)	2900.00	Flow (cfs)		2861.48	38.52
Top Width (ft)	51.75	Top Width (ft)		25.07	26.68
Vel Total (ft/s)	7.51	Avg. Vel. (ft/s)		8.88	0.60
Max Chl Dpth (ft)	13.89	Hydr. Depth (ft)		12.85	2.41
Conv. Total (cfs)	124538.6	Conv. (cfs)		122884.3	1654.3
Length Wtd. (ft)	60.95	Wetted Per. (ft)		42.62	28.09
Min Ch El (ft)	545.23	Shear (lb/sq ft)		0.26	0.08
Alpha	1.38	Stream Power (lb/ft s)		2.27	0.05
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	1.56	6.02	0.81
C & E Loss (ft)	0.21	Cum SA (acres)	0.29	0.49	0.26

Plan: EX SOUTHWEST RIV... Lower RS: 3260.8 Profile: Floodway

E.G. Elev (ft)	560.09	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.78	Wt. n-Val.	0.023	0.015	0.100
W.S. Elev (ft)	559.31	Reach Len. (ft)	103.80	103.60	104.00
Crit W.S. (ft)	553.03	Flow Area (sq ft)	148.65	334.11	62.93
E.G. Slope (ft/ft)	0.000250	Area (sq ft)	148.65	334.11	62.93
Q Total (cfs)	2900.00	Flow (cfs)	341.22	2524.72	34.06
Top Width (ft)	78.32	Top Width (ft)	40.30	23.80	14.22
Vel Total (ft/s)	5.31	Avg. Vel. (ft/s)	2.30	7.56	0.54
Max Chl Dpth (ft)	14.42	Hydr. Depth (ft)	3.69	14.04	4.43
Conv. Total (cfs)	183419.4	Conv. (cfs)	21581.7	159683.5	2154.2
Length Wtd. (ft)	103.60	Wetted Per. (ft)	45.70	31.53	18.00
Min Ch El (ft)	544.89	Shear (lb/sq ft)	0.05	0.17	0.05
Alpha	1.78	Stream Power (lb/ft s)	0.12	1.25	0.03
Frctn Loss (ft)		Cum Volume (acre-ft)	1.45	5.56	0.73
C & E Loss (ft)		Cum SA (acres)	0.26	0.46	0.23

Plan: EX SOUTHWEST RIV... Lower RS: 3157.2 Profile: Floodway

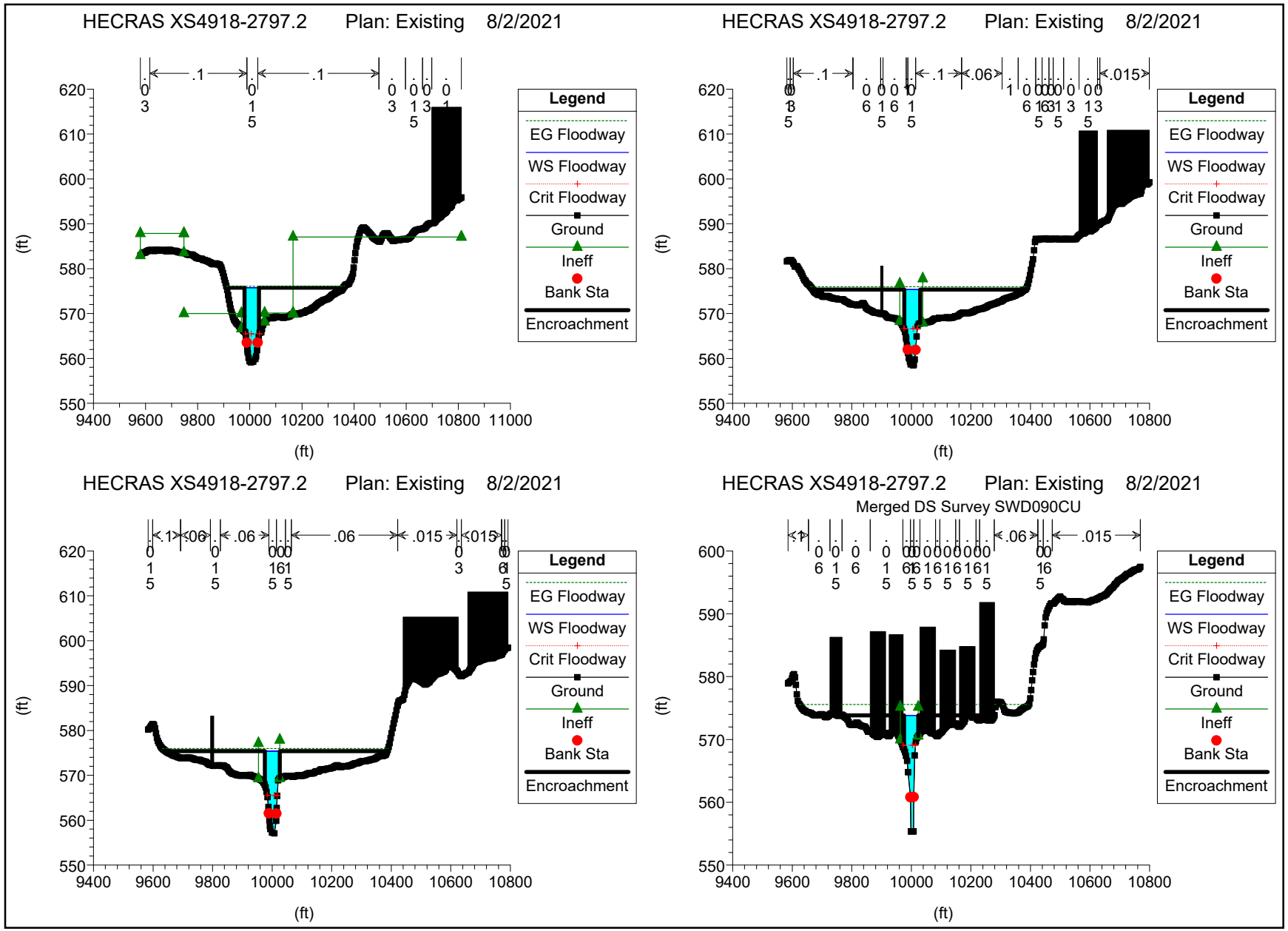
E.G. Elev (ft)	553.28	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.44	Wt. n-Val.	0.100	0.045	0.100
W.S. Elev (ft)	552.85	Reach Len. (ft)	62.30	65.70	67.20
Crit W.S. (ft)	546.65	Flow Area (sq ft)	49.20	517.85	45.37
E.G. Slope (ft/ft)	0.001109	Area (sq ft)	49.21	517.85	45.37
Q Total (cfs)	2900.00	Flow (cfs)	56.82	2791.94	51.24
Top Width (ft)	68.67	Top Width (ft)	12.09	46.22	10.36
Vel Total (ft/s)	4.74	Avg. Vel. (ft/s)	1.15	5.39	1.13
Max Chl Dpth (ft)	12.10	Hydr. Depth (ft)	4.47	11.20	4.38
Conv. Total (cfs)	87073.1	Conv. (cfs)	1705.9	83828.6	1538.6
Length Wtd. (ft)	65.65	Wetted Per. (ft)	13.80	47.71	13.16
Min Ch El (ft)	540.75	Shear (lb/sq ft)	0.25	0.75	0.24
Alpha	1.25	Stream Power (lb/ft s)	0.29	4.05	0.27
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	1.45	4.67	0.73
C & E Loss (ft)	0.10	Cum SA (acres)	0.20	0.38	0.20

Plan: EX SOUTHWEST RIV... Lower RS: 3091.5 Profile: Floodway

E.G. Elev (ft)	553.14	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.24	Wt. n-Val.	0.100	0.045	0.100
W.S. Elev (ft)	552.89	Reach Len. (ft)	267.80	294.30	269.80
Crit W.S. (ft)		Flow Area (sq ft)	87.43	671.41	81.76
E.G. Slope (ft/ft)	0.000575	Area (sq ft)	87.43	671.41	81.76
Q Total (cfs)	2900.00	Flow (cfs)	85.97	2733.22	80.81
Top Width (ft)	81.62	Top Width (ft)	10.91	55.94	14.77
Vel Total (ft/s)	3.45	Avg. Vel. (ft/s)	0.98	4.07	0.99
Max Chl Dpth (ft)	13.55	Hydr. Depth (ft)	8.01	12.00	5.54
Conv. Total (cfs)	120917.9	Conv. (cfs)	3584.4	113964.0	3369.4
Length Wtd. (ft)	290.76	Wetted Per. (ft)	19.08	57.61	17.70
Min Ch El (ft)	539.34	Shear (lb/sq ft)	0.16	0.42	0.17
Alpha	1.32	Stream Power (lb/ft s)	0.16	1.70	0.16
Frctn Loss (ft)	0.22	Cum Volume (acre-ft)	1.35	3.78	0.63
C & E Loss (ft)	0.02	Cum SA (acres)	0.18	0.30	0.19

Plan: EX SOUTHWEST RIV... Lower RS: 2797.2 Profile: Floodway

E.G. Elev (ft)	552.91	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.41	Wt. n-Val.	0.100	0.045	0.100
W.S. Elev (ft)	552.50	Reach Len. (ft)			
Crit W.S. (ft)	546.09	Flow Area (sq ft)	352.87	446.48	121.28
E.G. Slope (ft/ft)	0.000963	Area (sq ft)	352.87	446.48	121.28
Q Total (cfs)	3200.00	Flow (cfs)	561.04	2537.91	101.04
Top Width (ft)	126.07	Top Width (ft)	47.90	33.02	45.15
Vel Total (ft/s)	3.48	Avg. Vel. (ft/s)	1.59	5.68	0.83
Max Chl Dpth (ft)	14.26	Hydr. Depth (ft)	7.37	13.52	2.69
Conv. Total (cfs)	103097.0	Conv. (cfs)	18075.6	81766.1	3255.3
Length Wtd. (ft)		Wetted Per. (ft)	55.13	34.18	49.95
Min Ch El (ft)	538.24	Shear (lb/sq ft)	0.38	0.79	0.15
Alpha	2.16	Stream Power (lb/ft s)	0.61	4.47	0.12
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			


HECRAS XS4918-2797.2 Plan: Existing 8/2/2021
Legend
EG Floodway
WS Floodway
Crit Floodway
Ground
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HECRAS XS4918-2797.2 Plan: Existing 8/2/2021
Legend
EG Floodway
WS Floodway
Crit Floodway
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HECRAS XS4918-2797.2 Plan: Existing 8/2/2021
Legend
EG Floodway
WS Floodway
Crit Floodway
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HECRAS XS4918-2797.2 Plan: Existing 8/2/2021
Merged DS Survey SWD090CU
Legend
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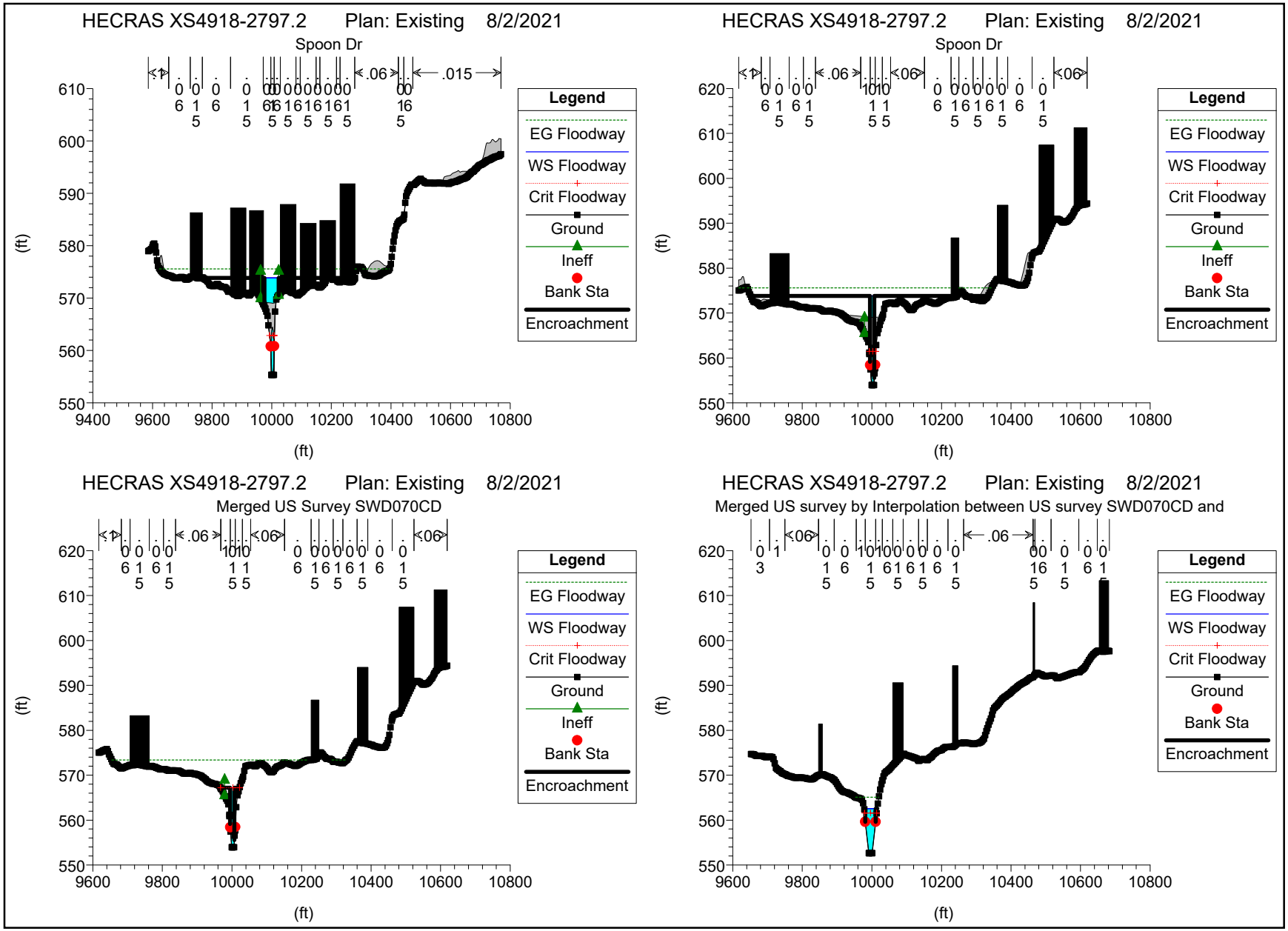
HECRAS XS4918-2797.2 Plan: Existing 8/2/2021
Spoon Dr
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Crit Floodway
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Encroachment
HECRAS XS4918-2797.2 Plan: Existing 8/2/2021
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WS Floodway
Crit Floodway
Ground
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Encroachment
HECRAS XS4918-2797.2 Plan: Existing 8/2/2021
Merged US Survey SWD070CD
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Legend
EG Floodway
WS Floodway
Crit Floodway
Ground
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Bank Sta
Encroachment
HECRAS XS4918-2797.2 Plan: Existing 8/2/2021
Merged US survey by Interpolation between US survey SWD070CD and
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EG Floodway
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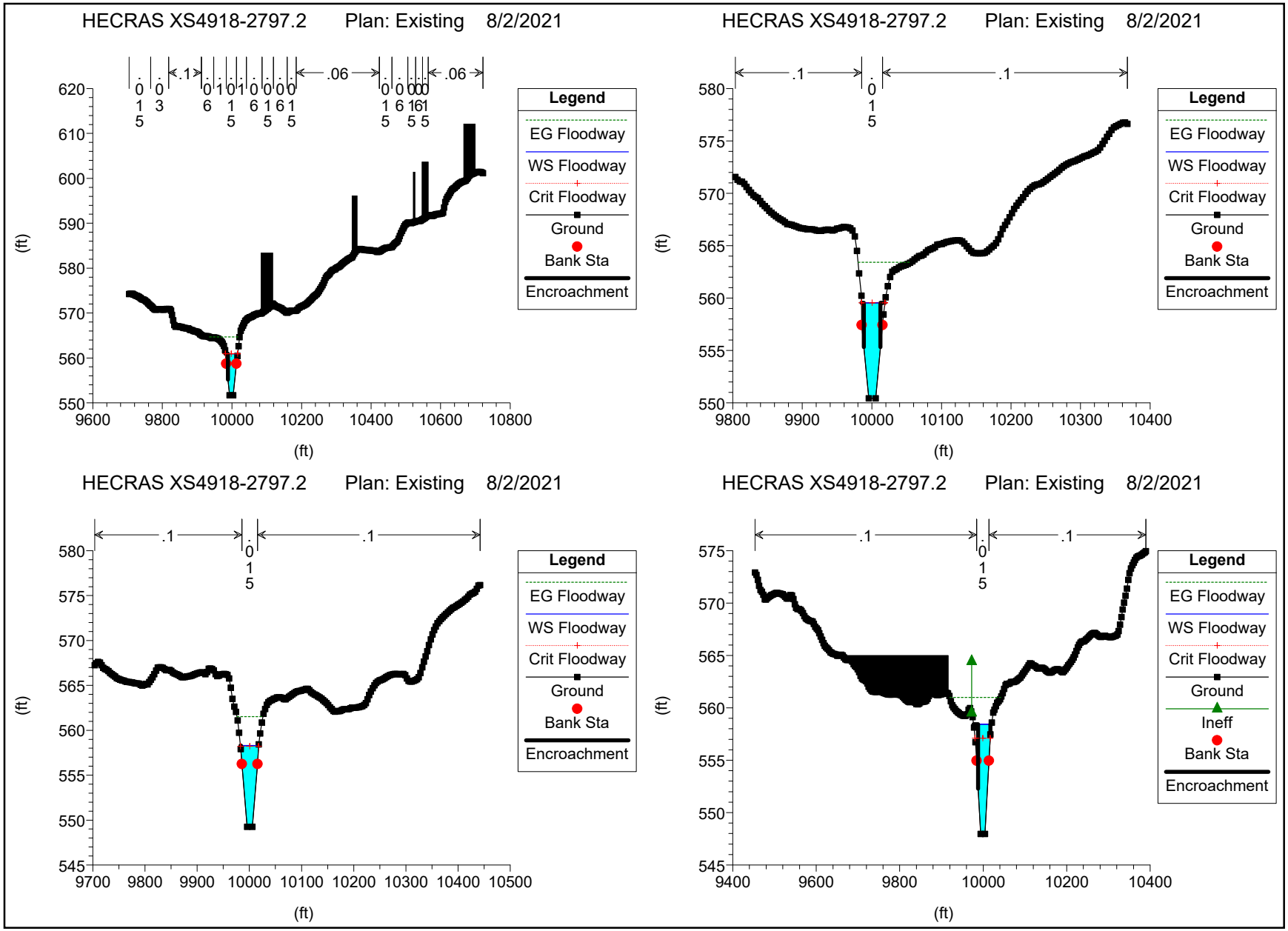
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Encroachment
HECRAS XS4918-2797.2 Plan: Existing 8/2/2021
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HECRAS XS4918-2797.2 Plan: Existing 8/2/2021
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HECRAS XS4918-2797.2 Plan: Existing 8/2/2021
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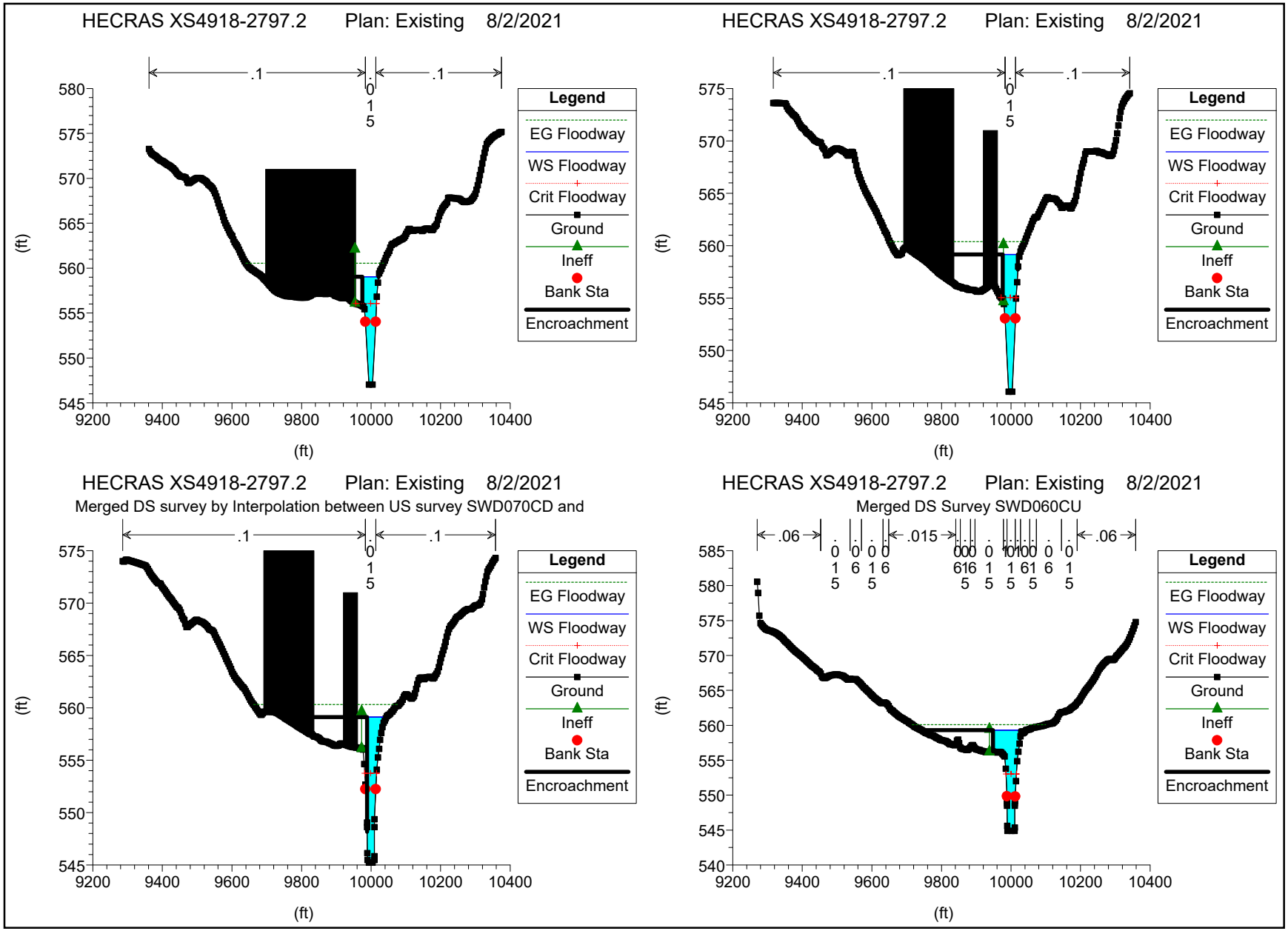
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Legend
EG Floodway
WS Floodway
Crit Floodway
Ground
Ineff
Bank Sta
Encroachment
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HECRAS XS4918-2797.2 Plan: Existing 8/2/2021
Merged DS survey by Interpolation between US survey SWD070CD and
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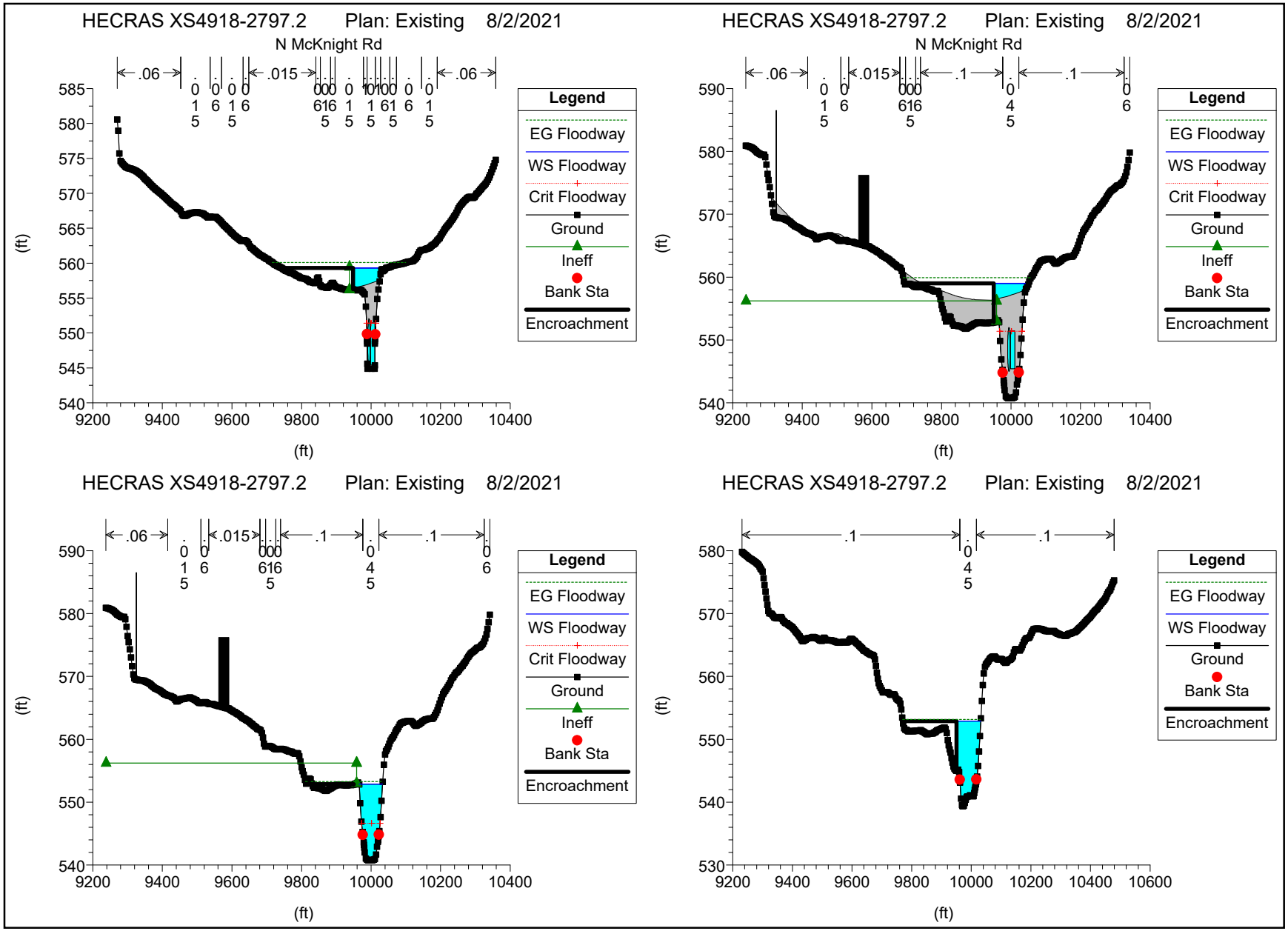
HECRAS XS4918-2797.2 Plan: Existing 8/2/2021
N McKnight Rd
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Legend
EG Floodway
WS Floodway
Crit Floodway
Ground
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Encroachment
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HECRAS XS4918-2797.2 Plan: Existing 8/2/2021
N McKnight Rd
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Crit Floodway
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HECRAS XS4918-2797.2 Plan: Existing 8/2/2021
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WS Floodway
Crit Floodway
Ground
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HECRAS XS4918-2797.2 Plan: Existing 8/2/2021
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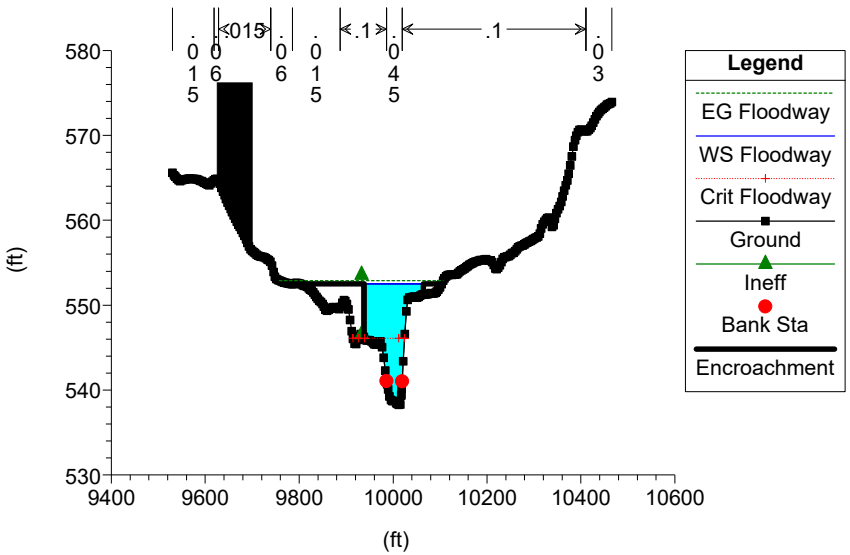
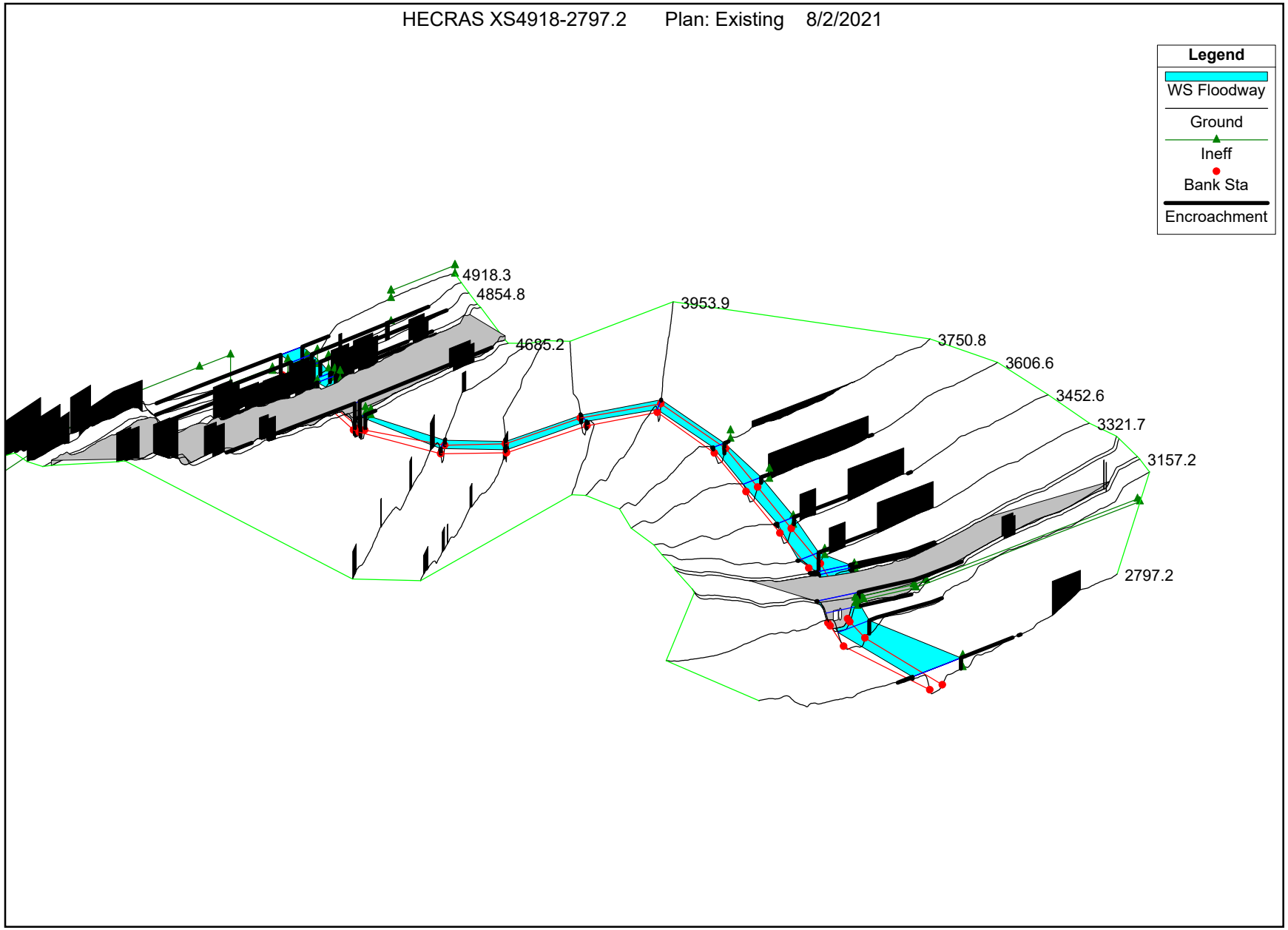
HECRAS XS4918-2797.2 Plan: Existing 8/2/2021




HECRAS XS4918-2797.2 Plan: Existing 8/2/2021
Legend
WS Floodway
Ground
Ineff
Bank Sta
Encroachment
4918.3
4854.8
4685.2
3953.9
3750.8
3606.6
3452.6
3321.7
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2797.2

VIII. PROPOSED FLOODWAY MODEL

HEC-RAS Plan: PR River: SOUTHWEST RIV... Reach: Lower Profile: Floodway

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)	
Lower	4918.3	Floodway	2900.00	559.14	575.78	565.48	576.07	0.000052	4.33	803.56	55.51	0.19
Lower	4886.9 K	Floodway	2900.00	558.43	575.36	566.61	575.97	0.000113	6.43	687.56	53.31	0.28
Lower	4854.8	Floodway	2900.00	557.06	575.39	565.54	575.95	0.000099	6.16	660.97	49.82	0.26
Lower	4818.7	Floodway	2900.00	555.36	573.83	569.09	575.58	0.000619	11.63	464.45	48.26	0.49
Lower	4734		Culvert									
Lower	4685.2 J	Floodway	2900.00	553.97	567.20	567.20	573.36	0.004118	19.93	151.35	12.49	1.00
Lower	4485.9	Floodway	2900.00	552.62	562.57	561.57	565.09	0.001640	12.74	227.60	29.88	0.81
Lower	4338.9	Floodway	2900.00	551.69	560.94	560.94	564.68	0.002527	15.51	190.26	28.00	1.00
Lower	4138.2 I	Floodway	2900.00	550.42	559.54	559.54	563.41	0.002823	15.77	183.86	23.88	1.00
Lower	3953.9	Floodway	2900.00	549.25	558.31	558.21	561.53	0.001999	14.40	205.90	33.88	0.98
Lower	3750.8	Floodway	2900.00	547.96	558.43		561.00	0.001454	12.86	232.10	29.09	0.77
Lower	3606.6 H	Floodway	2900.00	547.04	559.04		560.55	0.000587	9.93	337.37	46.88	0.56
Lower	3452.6	Floodway	2900.00	546.06	559.17		560.39	0.000407	8.89	380.13	43.88	0.48
Lower	3321.7	Floodway	2900.00	545.23	559.12	553.75	560.33	0.000542	8.88	385.95	51.75	0.44
Lower	3260.8 G	Floodway	2900.00	544.89	559.31	553.03	560.09	0.000250	7.56	545.69	78.32	0.36
Lower	3216.6		Culvert									
Lower	3157.2	Floodway	2900.00	540.75	552.85	546.65	553.28	0.001109	5.39	612.42	68.67	0.28
Lower	3091.5	Floodway	2900.00	539.34	552.89		553.14	0.000575	4.07	840.59	81.62	0.21
Lower	2797.2 F	Floodway	3200.00	538.24	552.50	546.09	552.91	0.000963	5.68	920.62	126.07	0.27

Plan: PR SOUTHWEST RIV... Lower RS: 4918.3 Profile: Floodway

E.G. Elev (ft)	576.07	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.29	Wt. n-Val.	0.100	0.015	0.100
W.S. Elev (ft)	575.78	Reach Len. (ft)	31.40	31.40	31.70
Crit W.S. (ft)	565.48	Flow Area (sq ft)	92.06	660.34	51.16
E.G. Slope (ft/ft)	0.000052	Area (sq ft)	92.06	660.34	51.16
Q Total (cfs)	2900.00	Flow (cfs)	28.25	2859.57	12.17
Top Width (ft)	55.51	Top Width (ft)	8.62	42.40	4.49
Vel Total (ft/s)	3.61	Avg. Vel. (ft/s)	0.31	4.33	0.24
Max Chl Dpth (ft)	16.64	Hydr. Depth (ft)	10.68	15.57	11.40
Conv. Total (cfs)	403060.3	Conv. (cfs)	3926.9	397441.4	1692.0
Length Wtd. (ft)	31.40	Wetted Per. (ft)	18.93	44.09	15.41
Min Ch El (ft)	559.14	Shear (lb/sq ft)	0.02	0.05	0.01
Alpha	1.42	Stream Power (lb/ft s)	0.00	0.21	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	2.11	15.27	1.31
C & E Loss (ft)	0.10	Cum SA (acres)	0.42	1.42	0.44

Plan: PR SOUTHWEST RIV... Lower RS: 4886.9 Profile: Floodway

E.G. Elev (ft)	575.97	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.61	Wt. n-Val.	0.081	0.015	0.100
W.S. Elev (ft)	575.36	Reach Len. (ft)	31.70	32.10	32.30
Crit W.S. (ft)	566.61	Flow Area (sq ft)	125.39	426.74	135.43
E.G. Slope (ft/ft)	0.000113	Area (sq ft)	125.39	426.74	135.43
Q Total (cfs)	2900.00	Flow (cfs)	90.81	2742.55	66.65
Top Width (ft)	53.31	Top Width (ft)	11.46	26.79	15.06
Vel Total (ft/s)	4.22	Avg. Vel. (ft/s)	0.72	6.43	0.49
Max Chl Dpth (ft)	16.93	Hydr. Depth (ft)	10.94	15.93	8.99
Conv. Total (cfs)	273324.3	Conv. (cfs)	8558.4	258484.4	6281.4
Length Wtd. (ft)	32.09	Wetted Per. (ft)	21.35	28.22	24.56
Min Ch El (ft)	558.43	Shear (lb/sq ft)	0.04	0.11	0.04
Alpha	2.20	Stream Power (lb/ft s)	0.03	0.68	0.02
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	2.03	14.88	1.24
C & E Loss (ft)	0.01	Cum SA (acres)	0.41	1.39	0.43

Plan: PR SOUTHWEST RIV... Lower RS: 4854.8 Profile: Floodway

E.G. Elev (ft)	575.95	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.56	Wt. n-Val.	0.060	0.015	0.060
W.S. Elev (ft)	575.39	Reach Len. (ft)	36.10	36.10	36.90
Crit W.S. (ft)	565.54	Flow Area (sq ft)	128.69	445.07	87.21
E.G. Slope (ft/ft)	0.000099	Area (sq ft)	128.69	445.07	87.21
Q Total (cfs)	2900.00	Flow (cfs)	101.36	2742.52	56.13
Top Width (ft)	49.82	Top Width (ft)	13.10	25.91	10.81
Vel Total (ft/s)	4.39	Avg. Vel. (ft/s)	0.79	6.16	0.64
Max Chl Dpth (ft)	18.33	Hydr. Depth (ft)	9.82	17.18	8.07
Conv. Total (cfs)	291207.0	Conv. (cfs)	10177.8	275393.2	5636.0
Length Wtd. (ft)	36.13	Wetted Per. (ft)	22.55	28.51	20.69
Min Ch El (ft)	557.06	Shear (lb/sq ft)	0.04	0.10	0.03
Alpha	1.87	Stream Power (lb/ft s)	0.03	0.60	0.02
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	1.94	14.56	1.16
C & E Loss (ft)	0.36	Cum SA (acres)	0.40	1.37	0.42

Plan: PR SOUTHWEST RIV... Lower RS: 4818.7 Profile: Floodway

E.G. Elev (ft)	575.58	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.75	Wt. n-Val.	0.060	0.015	0.060
W.S. Elev (ft)	573.83	Reach Len. (ft)	132.20	133.50	132.80
Crit W.S. (ft)	569.09	Flow Area (sq ft)	176.79	206.76	80.90
E.G. Slope (ft/ft)	0.000619	Area (sq ft)	176.79	206.76	81.17
Q Total (cfs)	2900.00	Flow (cfs)	368.65	2404.47	126.88
Top Width (ft)	48.26	Top Width (ft)	21.44	11.59	15.23
Vel Total (ft/s)	6.24	Avg. Vel. (ft/s)	2.09	11.63	1.57
Max Chl Dpth (ft)	18.47	Hydr. Depth (ft)	8.25	17.84	5.34
Conv. Total (cfs)	116541.5	Conv. (cfs)	14814.7	96627.8	5099.1
Length Wtd. (ft)	133.50	Wetted Per. (ft)	28.40	20.18	19.93
Min Ch El (ft)	555.36	Shear (lb/sq ft)	0.24	0.40	0.16
Alpha	2.89	Stream Power (lb/ft s)	0.50	4.61	0.25
Frctn Loss (ft)		Cum Volume (acre-ft)	1.81	14.29	1.09
C & E Loss (ft)		Cum SA (acres)	0.39	1.36	0.41

Plan: PR SOUTHWEST RIV... Lower RS: 4685.2 Profile: Floodway

E.G. Elev (ft)	573.36	Element	Left OB	Channel	Right OB
Vel Head (ft)	6.16	Wt. n-Val.	0.100	0.015	
W.S. Elev (ft)	567.20	Reach Len. (ft)	194.70	199.30	205.70
Crit W.S. (ft)	567.20	Flow Area (sq ft)	6.07	145.27	
E.G. Slope (ft/ft)	0.004118	Area (sq ft)	6.07	145.27	
Q Total (cfs)	2900.00	Flow (cfs)	4.42	2895.58	
Top Width (ft)	12.49	Top Width (ft)	0.72	11.77	
Vel Total (ft/s)	19.16	Avg. Vel. (ft/s)	0.73	19.93	
Max Chl Dpth (ft)	13.23	Hydr. Depth (ft)	8.44	12.34	
Conv. Total (cfs)	45189.1	Conv. (cfs)	68.8	45120.2	
Length Wtd. (ft)	199.30	Wetted Per. (ft)	9.11	26.17	
Min Ch El (ft)	553.97	Shear (lb/sq ft)	0.17	1.43	
Alpha	1.08	Stream Power (lb/ft s)	0.12	28.45	
Frctn Loss (ft)	0.49	Cum Volume (acre-ft)	1.81	13.13	1.09
C & E Loss (ft)	1.82	Cum SA (acres)	0.35	1.32	0.39

Plan: PR SOUTHWEST RIV... Lower RS: 4485.9 Profile: Floodway

E.G. Elev (ft)	565.09	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.52	Wt. n-Val.		0.015	
W.S. Elev (ft)	562.57	Reach Len. (ft)	142.70	147.00	148.00
Crit W.S. (ft)	561.57	Flow Area (sq ft)		227.60	
E.G. Slope (ft/ft)	0.001640	Area (sq ft)		227.60	
Q Total (cfs)	2900.00	Flow (cfs)		2900.00	
Top Width (ft)	29.88	Top Width (ft)		29.88	
Vel Total (ft/s)	12.74	Avg. Vel. (ft/s)		12.74	
Max Chl Dpth (ft)	9.95	Hydr. Depth (ft)		7.62	
Conv. Total (cfs)	71613.3	Conv. (cfs)		71613.3	
Length Wtd. (ft)	147.00	Wetted Per. (ft)		40.21	
Min Ch El (ft)	552.62	Shear (lb/sq ft)		0.58	
Alpha	1.00	Stream Power (lb/ft s)		7.38	
Frctn Loss (ft)	0.30	Cum Volume (acre-ft)	1.80	12.28	1.09
C & E Loss (ft)	0.12	Cum SA (acres)	0.35	1.22	0.39

Plan: PR SOUTHWEST RIV... Lower RS: 4338.9 Profile: Floodway

E.G. Elev (ft)	564.68	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.74	Wt. n-Val.		0.015	0.100
W.S. Elev (ft)	560.94	Reach Len. (ft)	196.90	200.70	204.10
Crit W.S. (ft)	560.94	Flow Area (sq ft)		186.80	3.46
E.G. Slope (ft/ft)	0.002527	Area (sq ft)		186.80	3.46
Q Total (cfs)	2900.00	Flow (cfs)		2897.59	2.41
Top Width (ft)	28.00	Top Width (ft)		24.88	3.12
Vel Total (ft/s)	15.24	Avg. Vel. (ft/s)		15.51	0.70
Max Chl Dpth (ft)	9.25	Hydr. Depth (ft)		7.51	1.11
Conv. Total (cfs)	57694.0	Conv. (cfs)		57646.0	48.0
Length Wtd. (ft)	200.70	Wetted Per. (ft)		33.97	3.84
Min Ch El (ft)	551.69	Shear (lb/sq ft)		0.87	0.14
Alpha	1.03	Stream Power (lb/ft s)		13.45	0.10
Frctn Loss (ft)	0.54	Cum Volume (acre-ft)	1.80	11.58	1.08
C & E Loss (ft)	0.01	Cum SA (acres)	0.35	1.13	0.38

Plan: PR SOUTHWEST RIV... Lower RS: 4138.2 Profile: Floodway

E.G. Elev (ft)	563.41	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.87	Wt. n-Val.		0.015	
W.S. Elev (ft)	559.54	Reach Len. (ft)	189.80	184.30	178.30
Crit W.S. (ft)	559.54	Flow Area (sq ft)		183.86	
E.G. Slope (ft/ft)	0.002823	Area (sq ft)		183.86	
Q Total (cfs)	2900.00	Flow (cfs)		2900.00	
Top Width (ft)	23.88	Top Width (ft)		23.88	
Vel Total (ft/s)	15.77	Avg. Vel. (ft/s)		15.77	
Max Chl Dpth (ft)	9.12	Hydr. Depth (ft)		7.70	
Conv. Total (cfs)	54581.8	Conv. (cfs)		54581.8	
Length Wtd. (ft)	184.30	Wetted Per. (ft)		35.44	
Min Ch El (ft)	550.42	Shear (lb/sq ft)		0.91	
Alpha	1.00	Stream Power (lb/ft s)		14.42	
Frctn Loss (ft)	0.43	Cum Volume (acre-ft)	1.80	10.73	1.07
C & E Loss (ft)	0.19	Cum SA (acres)	0.35	1.02	0.37

Plan: PR SOUTHWEST RIV... Lower RS: 3953.9 Profile: Floodway

E.G. Elev (ft)	561.53	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.22	Wt. n-Val.	0.100	0.015	0.100
W.S. Elev (ft)	558.31	Reach Len. (ft)	209.90	203.10	198.10
Crit W.S. (ft)	558.21	Flow Area (sq ft)	2.60	201.20	2.10
E.G. Slope (ft/ft)	0.001999	Area (sq ft)	2.60	201.20	2.10
Q Total (cfs)	2900.00	Flow (cfs)	1.55	2897.32	1.13
Top Width (ft)	33.88	Top Width (ft)	2.00	29.88	2.00
Vel Total (ft/s)	14.08	Avg. Vel. (ft/s)	0.60	14.40	0.54
Max Chl Dpth (ft)	9.06	Hydr. Depth (ft)	1.30	6.73	1.05
Conv. Total (cfs)	64868.8	Conv. (cfs)	34.7	64808.9	25.2
Length Wtd. (ft)	203.10	Wetted Per. (ft)	3.05	34.31	2.88
Min Ch El (ft)	549.25	Shear (lb/sq ft)	0.11	0.73	0.09
Alpha	1.04	Stream Power (lb/ft s)	0.06	10.53	0.05
Frctn Loss (ft)	0.34	Cum Volume (acre-ft)	1.79	9.91	1.07
C & E Loss (ft)	0.20	Cum SA (acres)	0.35	0.91	0.37

Plan: PR SOUTHWEST RIV... Lower RS: 3750.8 Profile: Floodway

E.G. Elev (ft)	561.00	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.57	Wt. n-Val.		0.015	0.100
W.S. Elev (ft)	558.43	Reach Len. (ft)	144.20	144.20	144.10
Crit W.S. (ft)		Flow Area (sq ft)		225.09	7.00
E.G. Slope (ft/ft)	0.001454	Area (sq ft)		225.09	7.00
Q Total (cfs)	2900.00	Flow (cfs)		2895.01	4.99
Top Width (ft)	29.09	Top Width (ft)		26.09	3.00
Vel Total (ft/s)	12.49	Avg. Vel. (ft/s)		12.86	0.71
Max Chl Dpth (ft)	10.47	Hydr. Depth (ft)		8.63	2.33
Conv. Total (cfs)	76063.8	Conv. (cfs)		75932.8	130.9
Length Wtd. (ft)	144.20	Wetted Per. (ft)		35.82	4.96
Min Ch El (ft)	547.96	Shear (lb/sq ft)		0.57	0.13
Alpha	1.06	Stream Power (lb/ft s)		7.33	0.09
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)	1.78	8.92	1.05
C & E Loss (ft)	0.31	Cum SA (acres)	0.34	0.78	0.36

Plan: PR SOUTHWEST RIV... Lower RS: 3606.6 Profile: Floodway

E.G. Elev (ft)	560.55	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.52	Wt. n-Val.	0.100	0.015	0.100
W.S. Elev (ft)	559.04	Reach Len. (ft)	153.90	154.00	154.00
Crit W.S. (ft)		Flow Area (sq ft)	33.04	288.93	15.41
E.G. Slope (ft/ft)	0.000587	Area (sq ft)	33.04	288.93	15.41
Q Total (cfs)	2900.00	Flow (cfs)	22.87	2869.55	7.58
Top Width (ft)	46.88	Top Width (ft)	9.00	29.88	8.00
Vel Total (ft/s)	8.60	Avg. Vel. (ft/s)	0.69	9.93	0.49
Max Chl Dpth (ft)	12.00	Hydr. Depth (ft)	3.67	9.67	1.93
Conv. Total (cfs)	119713.1	Conv. (cfs)	944.1	118456.0	313.0
Length Wtd. (ft)	154.00	Wetted Per. (ft)	12.39	34.32	9.64
Min Ch El (ft)	547.04	Shear (lb/sq ft)	0.10	0.31	0.06
Alpha	1.32	Stream Power (lb/ft s)	0.07	3.06	0.03
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	1.73	8.07	1.01
C & E Loss (ft)	0.09	Cum SA (acres)	0.33	0.68	0.34

Plan: PR SOUTHWEST RIV... Lower RS: 3452.6 Profile: Floodway

E.G. Elev (ft)	560.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.22	Wt. n-Val.	0.100	0.015	0.100
W.S. Elev (ft)	559.17	Reach Len. (ft)	131.00	130.90	131.00
Crit W.S. (ft)		Flow Area (sq ft)	35.01	322.28	22.84
E.G. Slope (ft/ft)	0.000407	Area (sq ft)	35.01	322.28	22.84
Q Total (cfs)	2900.00	Flow (cfs)	21.72	2866.48	11.81
Top Width (ft)	43.88	Top Width (ft)	7.00	29.88	7.00
Vel Total (ft/s)	7.63	Avg. Vel. (ft/s)	0.62	8.89	0.52
Max Chl Dpth (ft)	13.11	Hydr. Depth (ft)	5.00	10.79	3.26
Conv. Total (cfs)	143775.5	Conv. (cfs)	1076.7	142113.4	585.4
Length Wtd. (ft)	130.90	Wetted Per. (ft)	11.76	34.31	10.08
Min Ch El (ft)	546.06	Shear (lb/sq ft)	0.08	0.24	0.06
Alpha	1.34	Stream Power (lb/ft s)	0.05	2.12	0.03
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	1.61	6.99	0.94
C & E Loss (ft)	0.00	Cum SA (acres)	0.30	0.58	0.31

Plan: PR SOUTHWEST RIV... Lower RS: 3321.7 Profile: Floodway

E.G. Elev (ft)	560.33	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.21	Wt. n-Val.		0.015	0.100
W.S. Elev (ft)	559.12	Reach Len. (ft)	62.20	60.90	58.80
Crit W.S. (ft)	553.75	Flow Area (sq ft)		322.11	63.85
E.G. Slope (ft/ft)	0.000542	Area (sq ft)		322.11	63.85
Q Total (cfs)	2900.00	Flow (cfs)		2861.69	38.31
Top Width (ft)	51.75	Top Width (ft)		25.07	26.68
Vel Total (ft/s)	7.51	Avg. Vel. (ft/s)		8.88	0.60
Max Chl Dpth (ft)	13.89	Hydr. Depth (ft)		12.85	2.39
Conv. Total (cfs)	124526.7	Conv. (cfs)		122881.7	1645.0
Length Wtd. (ft)	60.95	Wetted Per. (ft)		42.62	27.96
Min Ch El (ft)	545.23	Shear (lb/sq ft)		0.26	0.08
Alpha	1.38	Stream Power (lb/ft s)		2.27	0.05
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	1.56	6.02	0.81
C & E Loss (ft)	0.21	Cum SA (acres)	0.29	0.49	0.26

Plan: PR SOUTHWEST RIV... Lower RS: 3260.8 Profile: Floodway

E.G. Elev (ft)	560.09	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.78	Wt. n-Val.	0.023	0.015	0.100
W.S. Elev (ft)	559.31	Reach Len. (ft)	103.80	103.60	104.00
Crit W.S. (ft)	553.03	Flow Area (sq ft)	148.65	334.11	62.93
E.G. Slope (ft/ft)	0.000250	Area (sq ft)	148.65	334.11	62.93
Q Total (cfs)	2900.00	Flow (cfs)	341.22	2524.72	34.06
Top Width (ft)	78.32	Top Width (ft)	40.30	23.80	14.22
Vel Total (ft/s)	5.31	Avg. Vel. (ft/s)	2.30	7.56	0.54
Max Chl Dpth (ft)	14.42	Hydr. Depth (ft)	3.69	14.04	4.43
Conv. Total (cfs)	183419.4	Conv. (cfs)	21581.7	159683.5	2154.2
Length Wtd. (ft)	103.60	Wetted Per. (ft)	45.70	31.53	18.00
Min Ch El (ft)	544.89	Shear (lb/sq ft)	0.05	0.17	0.05
Alpha	1.78	Stream Power (lb/ft s)	0.12	1.25	0.03
Frctn Loss (ft)		Cum Volume (acre-ft)	1.45	5.56	0.73
C & E Loss (ft)		Cum SA (acres)	0.26	0.46	0.23

Plan: PR SOUTHWEST RIV... Lower RS: 3157.2 Profile: Floodway

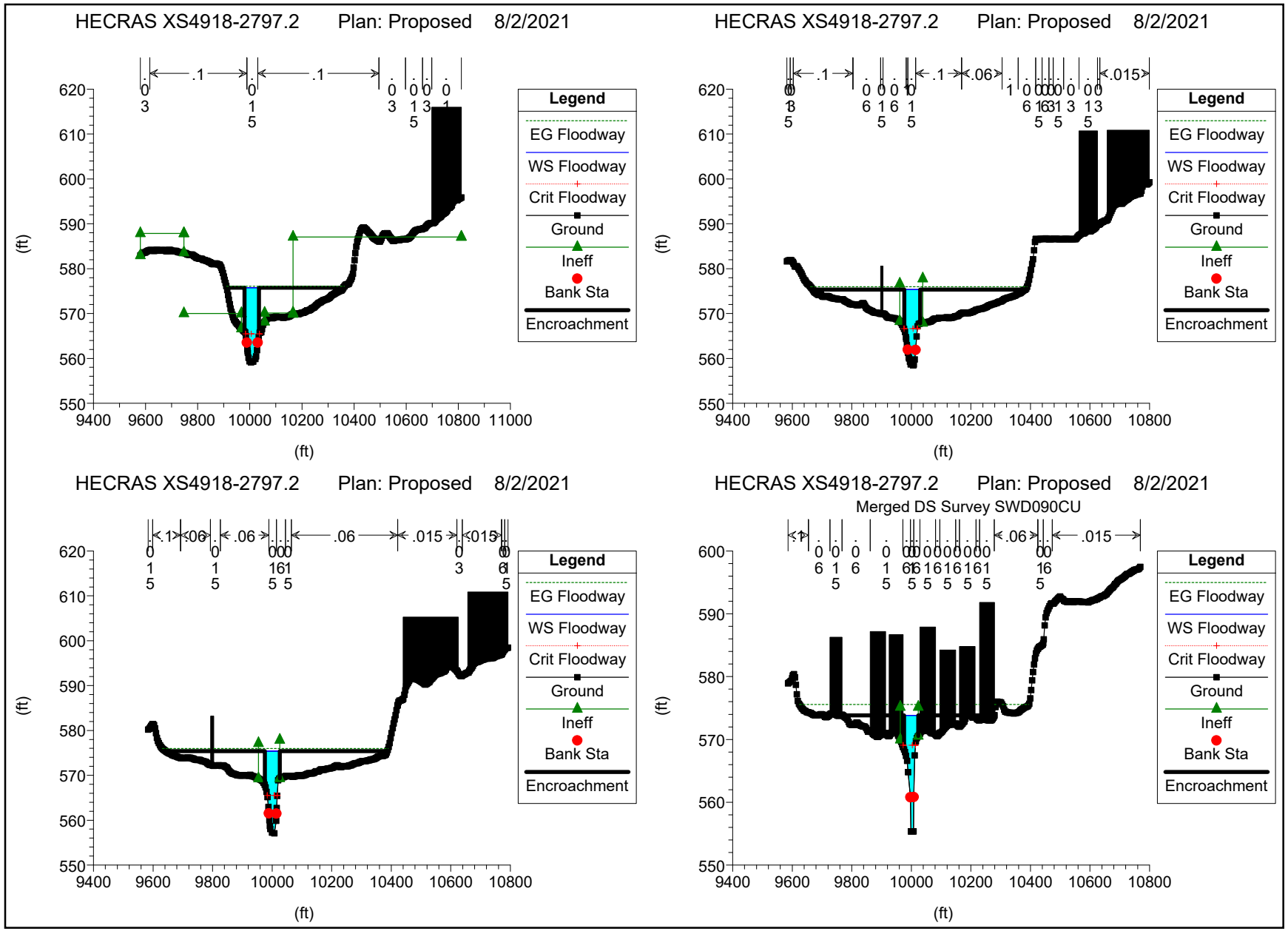
E.G. Elev (ft)	553.28	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.44	Wt. n-Val.	0.100	0.045	0.100
W.S. Elev (ft)	552.85	Reach Len. (ft)	62.30	65.70	67.20
Crit W.S. (ft)	546.65	Flow Area (sq ft)	49.20	517.85	45.37
E.G. Slope (ft/ft)	0.001109	Area (sq ft)	49.21	517.85	45.37
Q Total (cfs)	2900.00	Flow (cfs)	56.82	2791.94	51.24
Top Width (ft)	68.67	Top Width (ft)	12.09	46.22	10.36
Vel Total (ft/s)	4.74	Avg. Vel. (ft/s)	1.15	5.39	1.13
Max Chl Dpth (ft)	12.10	Hydr. Depth (ft)	4.47	11.20	4.38
Conv. Total (cfs)	87073.1	Conv. (cfs)	1705.9	83828.6	1538.6
Length Wtd. (ft)	65.65	Wetted Per. (ft)	13.80	47.71	13.16
Min Ch El (ft)	540.75	Shear (lb/sq ft)	0.25	0.75	0.24
Alpha	1.25	Stream Power (lb/ft s)	0.29	4.05	0.27
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	1.45	4.67	0.73
C & E Loss (ft)	0.10	Cum SA (acres)	0.20	0.38	0.20

Plan: PR SOUTHWEST RIV... Lower RS: 3091.5 Profile: Floodway

E.G. Elev (ft)	553.14	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.24	Wt. n-Val.	0.100	0.045	0.100
W.S. Elev (ft)	552.89	Reach Len. (ft)	267.80	294.30	269.80
Crit W.S. (ft)		Flow Area (sq ft)	87.43	671.41	81.76
E.G. Slope (ft/ft)	0.000575	Area (sq ft)	87.43	671.41	81.76
Q Total (cfs)	2900.00	Flow (cfs)	85.97	2733.22	80.81
Top Width (ft)	81.62	Top Width (ft)	10.91	55.94	14.77
Vel Total (ft/s)	3.45	Avg. Vel. (ft/s)	0.98	4.07	0.99
Max Chl Dpth (ft)	13.55	Hydr. Depth (ft)	8.01	12.00	5.54
Conv. Total (cfs)	120917.9	Conv. (cfs)	3584.4	113964.0	3369.4
Length Wtd. (ft)	290.76	Wetted Per. (ft)	19.08	57.61	17.70
Min Ch El (ft)	539.34	Shear (lb/sq ft)	0.16	0.42	0.17
Alpha	1.32	Stream Power (lb/ft s)	0.16	1.70	0.16
Frctn Loss (ft)	0.22	Cum Volume (acre-ft)	1.35	3.78	0.63
C & E Loss (ft)	0.02	Cum SA (acres)	0.18	0.30	0.19

Plan: PR SOUTHWEST RIV... Lower RS: 2797.2 Profile: Floodway

E.G. Elev (ft)	552.91	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.41	Wt. n-Val.	0.100	0.045	0.100
W.S. Elev (ft)	552.50	Reach Len. (ft)			
Crit W.S. (ft)	546.09	Flow Area (sq ft)	352.87	446.48	121.28
E.G. Slope (ft/ft)	0.000963	Area (sq ft)	352.87	446.48	121.28
Q Total (cfs)	3200.00	Flow (cfs)	561.04	2537.91	101.04
Top Width (ft)	126.07	Top Width (ft)	47.90	33.02	45.15
Vel Total (ft/s)	3.48	Avg. Vel. (ft/s)	1.59	5.68	0.83
Max Chl Dpth (ft)	14.26	Hydr. Depth (ft)	7.37	13.52	2.69
Conv. Total (cfs)	103097.0	Conv. (cfs)	18075.6	81766.1	3255.3
Length Wtd. (ft)		Wetted Per. (ft)	55.13	34.18	49.95
Min Ch El (ft)	538.24	Shear (lb/sq ft)	0.38	0.79	0.15
Alpha	2.16	Stream Power (lb/ft s)	0.61	4.47	0.12
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			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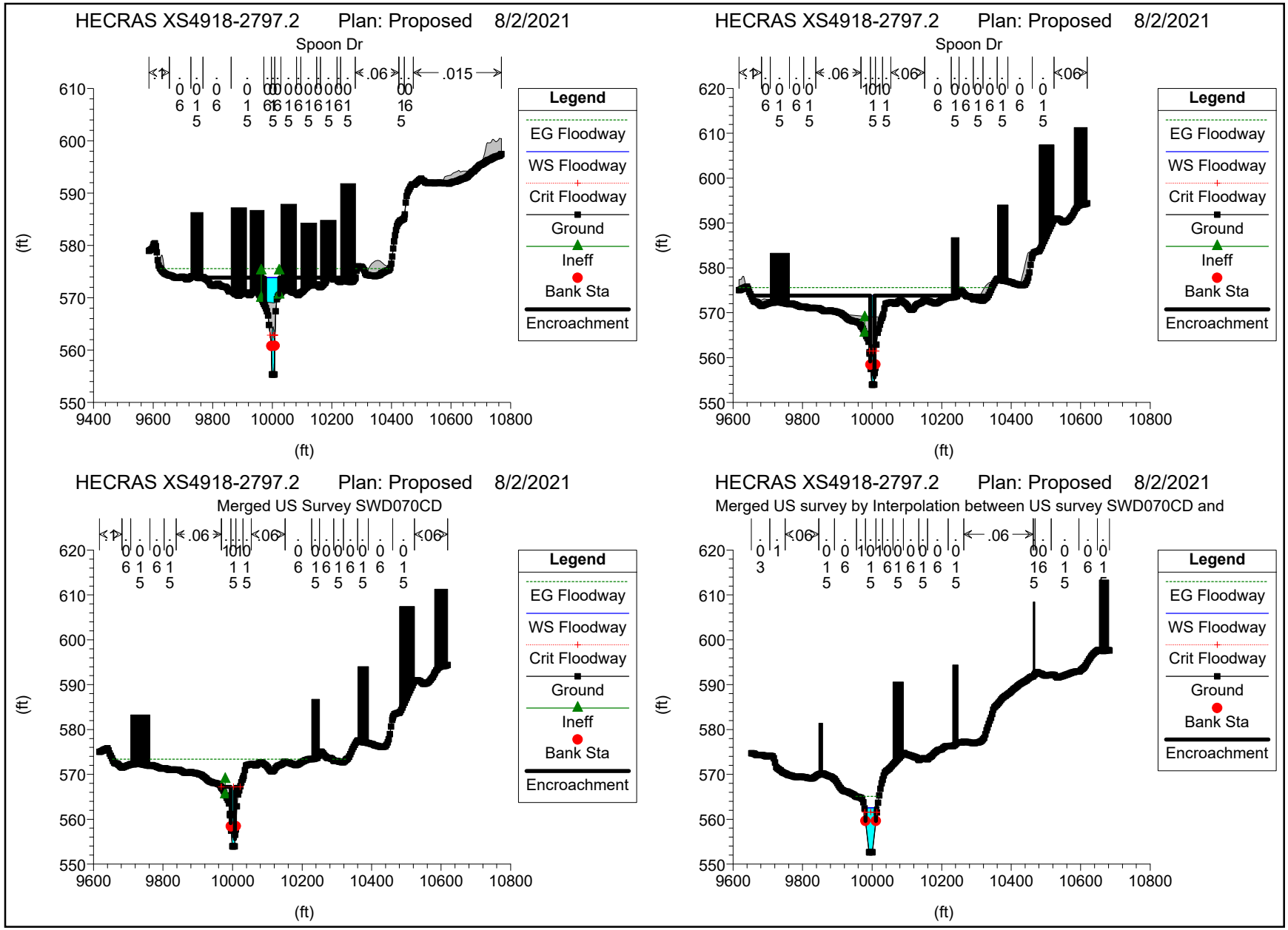
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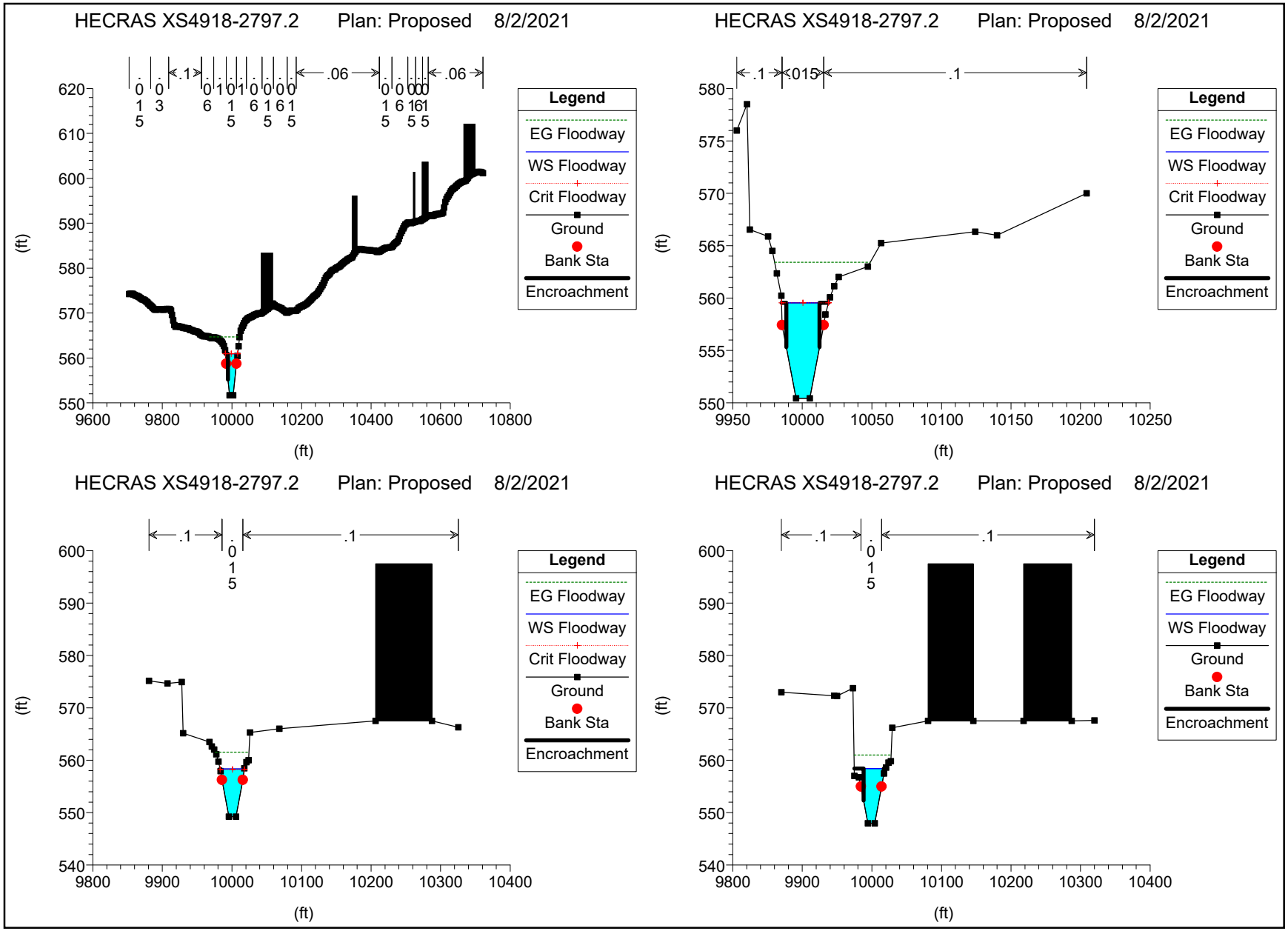
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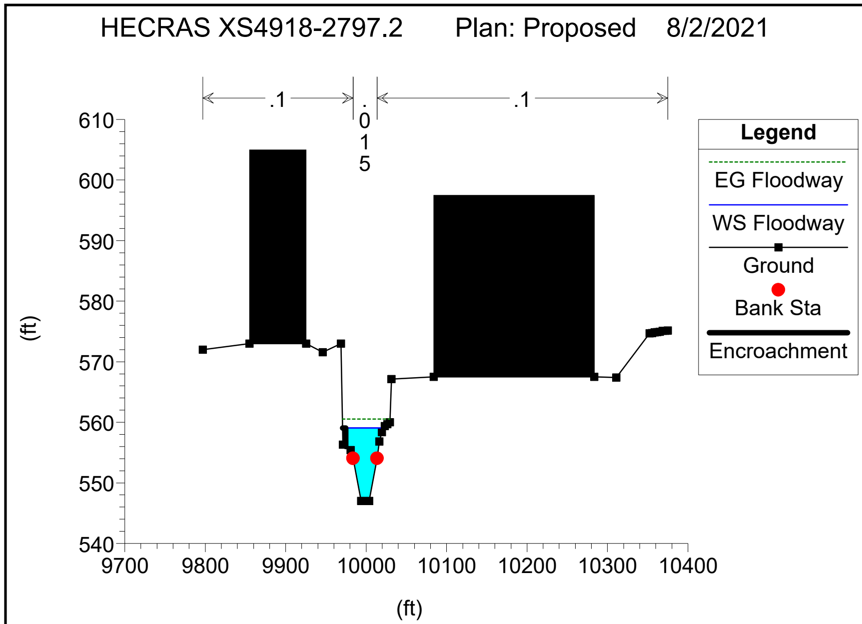
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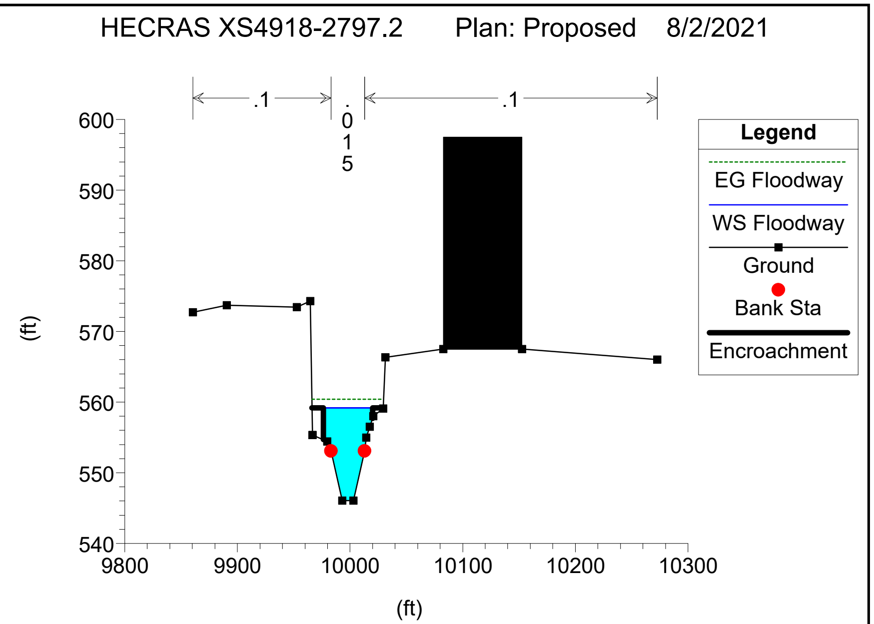
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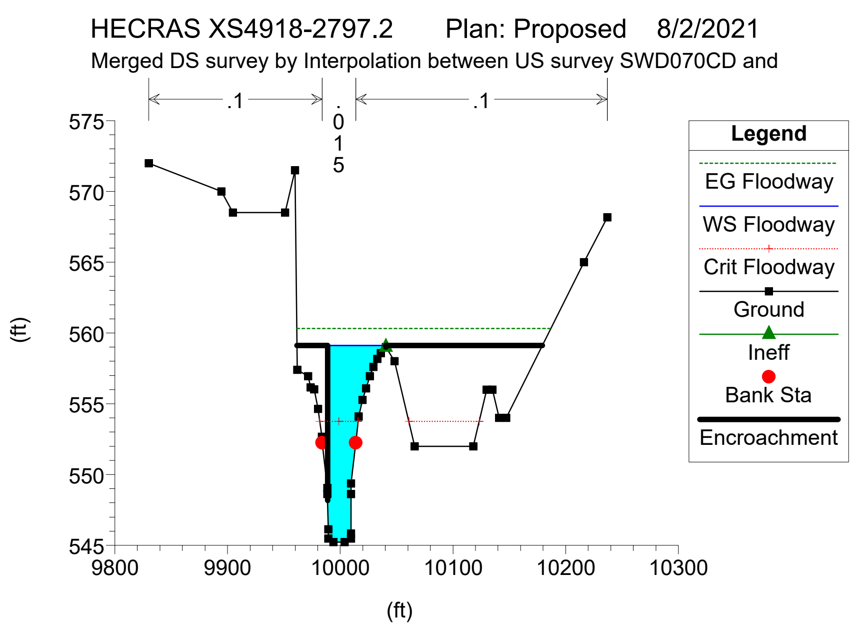
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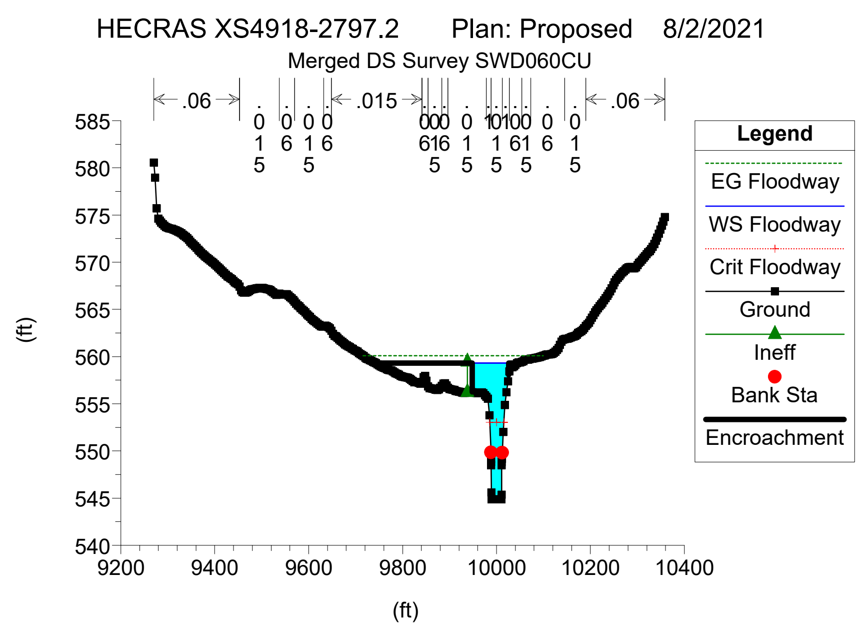
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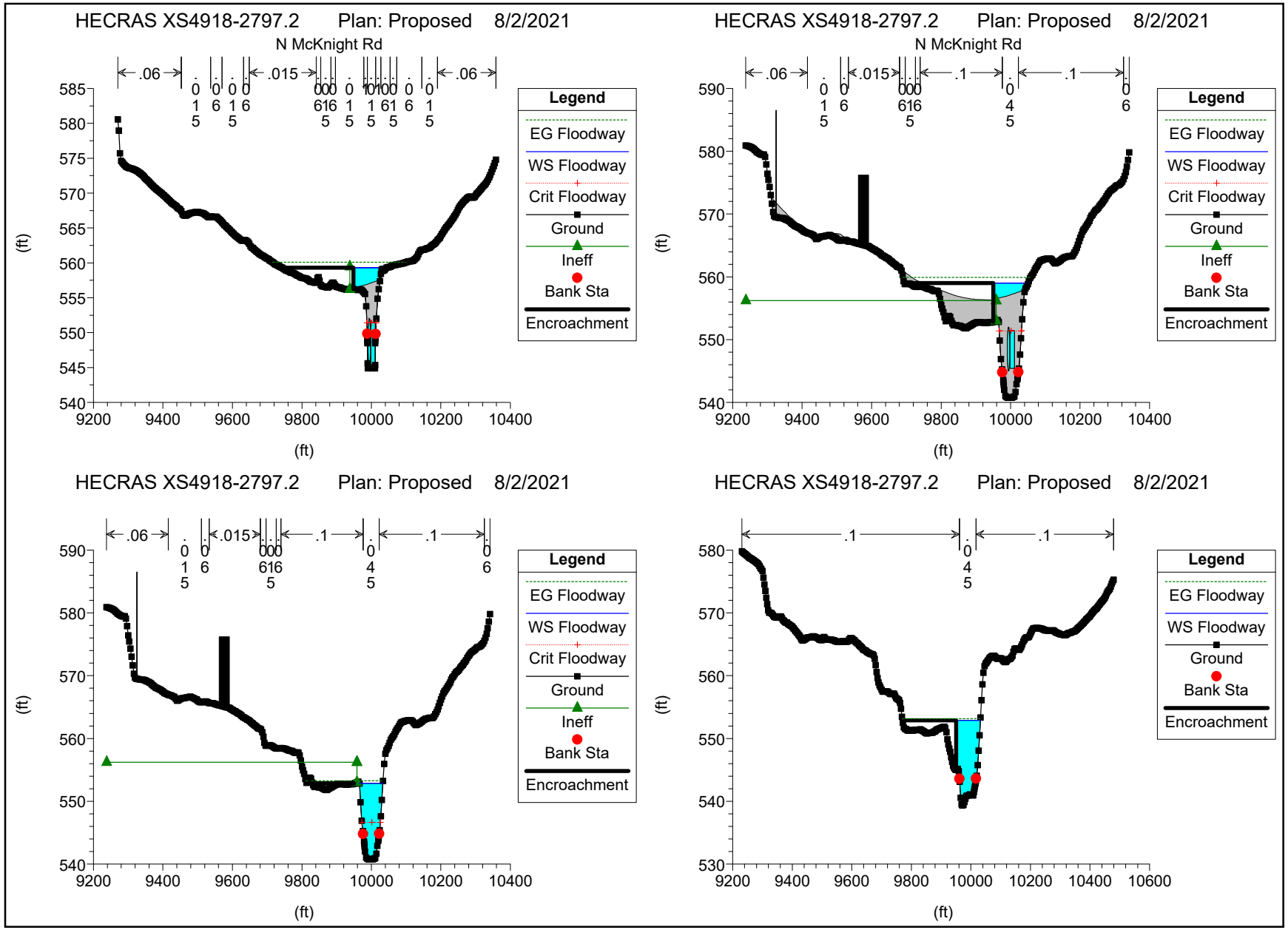
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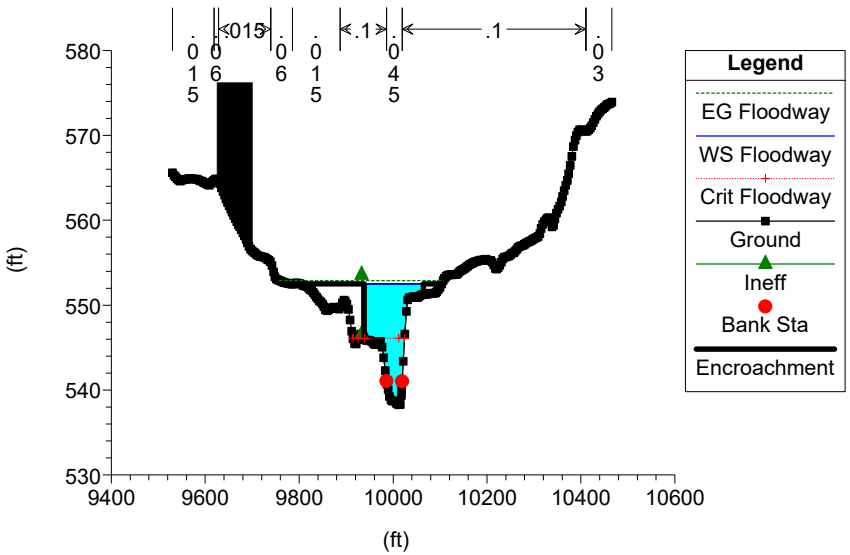

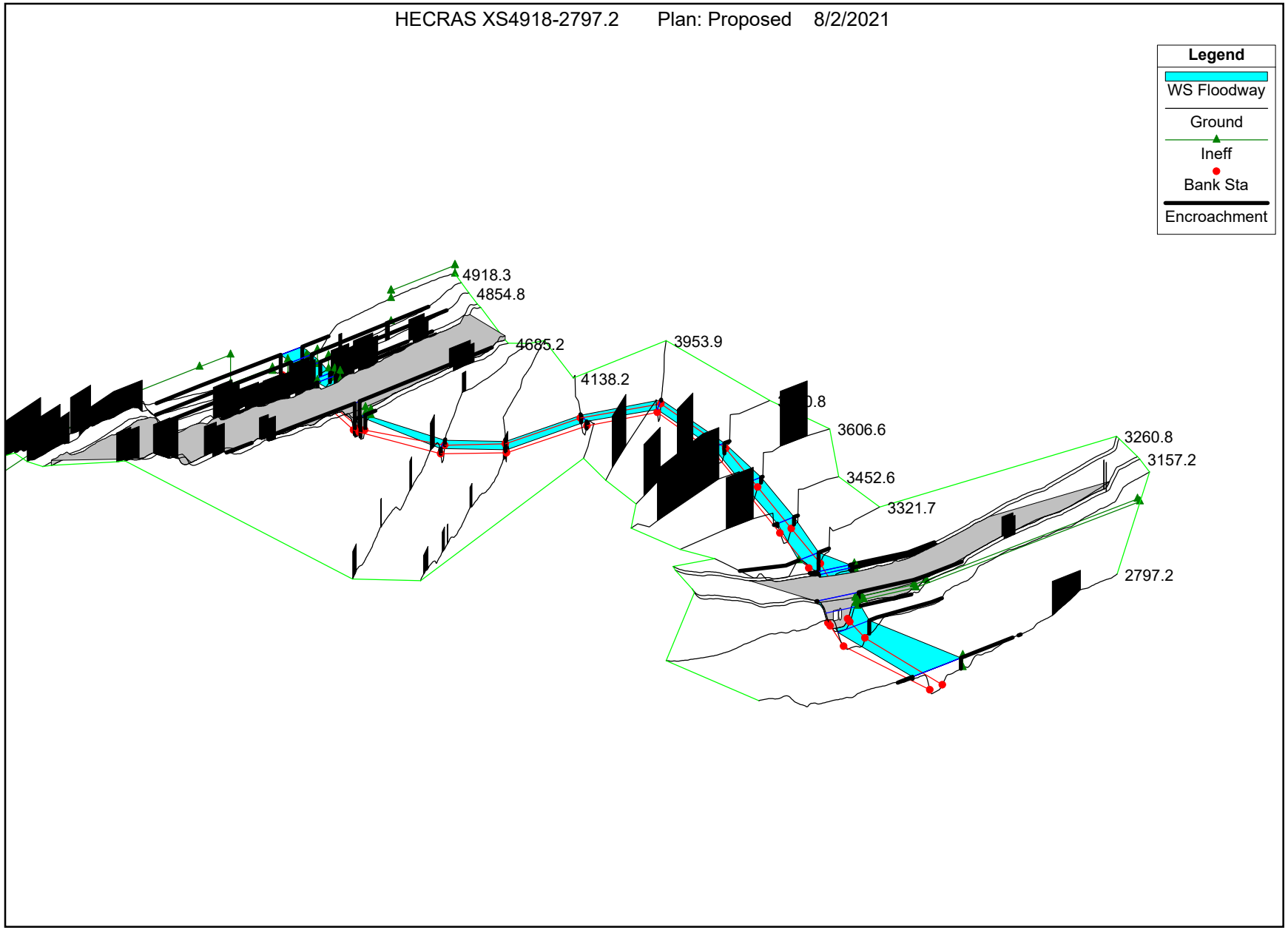
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XI. Appendix

A. FIRMette – FM29189C0278K

B. Site Plan

C. Upstream Drainage Area Table

National Flood Hazard Layer FIRMette

FEMA

38°40'40.89"N

90°21'57.11"W

90°21'19.66"W

38°40'12.80"N

Feet

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

1:6,000

Legend

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

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

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

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

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

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

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

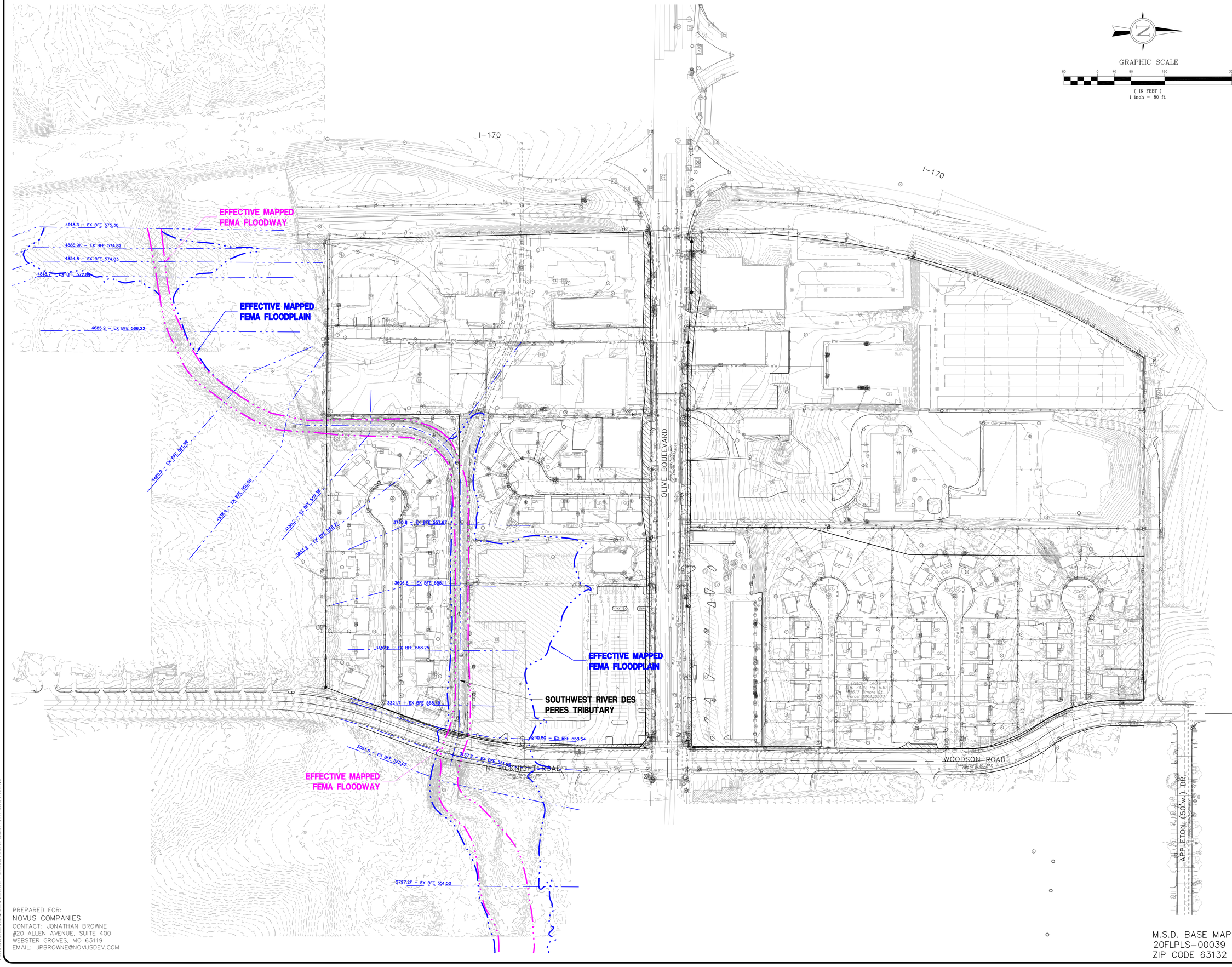
N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

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

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 9/5/2019 at 9:45:09 AM 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: basemap 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.



PREPARED FOR:
NOVUS COMPANIES
CONTACT: JONATHAN BROWNE
#20 ALLEN AVENUE, SUITE 400
WEBSTER GROVES, MO 63119
EMAIL: JPBROWNE@NOVUSDEV.COM

M.S.D. BASE MAP 17L/17K
20FLPLS-00039
ZIP CODE 63132

J:\3082\3082\Drawings\Engineering\Construction Plans\3082 Site.dwg7/28/2021 1:04 PMJacob Brockmeyer

LEONARD J. MEERS
NUMBER E-28288
REGISTERED PROFESSIONAL ENGINEER
STATE OF MISSOURI

7-28-21
LEONARD J. MEERS
PROFESSIONAL ENGINEER
E-28288

GRIMES CONSULTING, INC.
Civil Engineering & Surveying Services
12300 OLD TESSON ROAD
SUITE 3000
ST. LOUIS, MO 63128
PH: (314) 849-6100
FAX: (314) 849-6010
GRIMES CONSULTING, INC.
PROFESSIONAL ENGINEER CORPORATION, E-1470-D
PROFESSIONAL LAND SURVEYING CORPORATION, LS-34-D
www.grimesconsulting.com

REV. NO.	REMARKS	DATE

FLOOD PLANS FOR
MARKET AT OLIVE
UNIVERSITY CITY, MO 63132

SHEET TITLE
EXISTING TOPO MAP

JOB NUMBER:	3082
DRAWN BY:	JRB
DATE:	10/20/20
CHECKED BY:	JLW
DATE:	10/20/20
SHEET:	1/4

NOTES TO USERS

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

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

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

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

The **projection** used in the preparation of this map was Missouri State Plane coordinate system, east zone (FIPSZONE 2401). Transverse Mercator projection. Horizontal datum was NAD 83, GRS80 spheroid. Differences in datum, spheroid or projection used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242**, or visit its website at http://www.ngs.noaa.gov/.

Base map information shown on this map was provided in digital format by the U.S. Farm Service Agency, National Agricultural Imagery Program (NAIP), published in 2010 at a scale of 1:12000.

Based on updated topographic information, this map reflects more detailed and up-to-date **stream channel configurations and floodplain delineations** than those shown on the previous FIRM for this jurisdiction. As a result, the Flood Profiles and Floodway Data tables may reflect stream channel distances that differ from what is shown on the map. Also, the road to floodplain relationships for unrevised streams may differ from what is shown on previous maps.

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

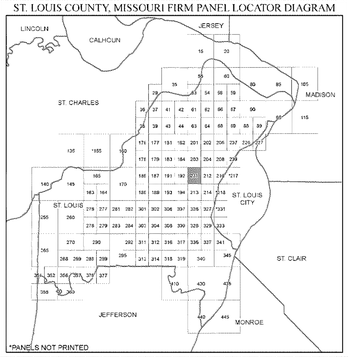
Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

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

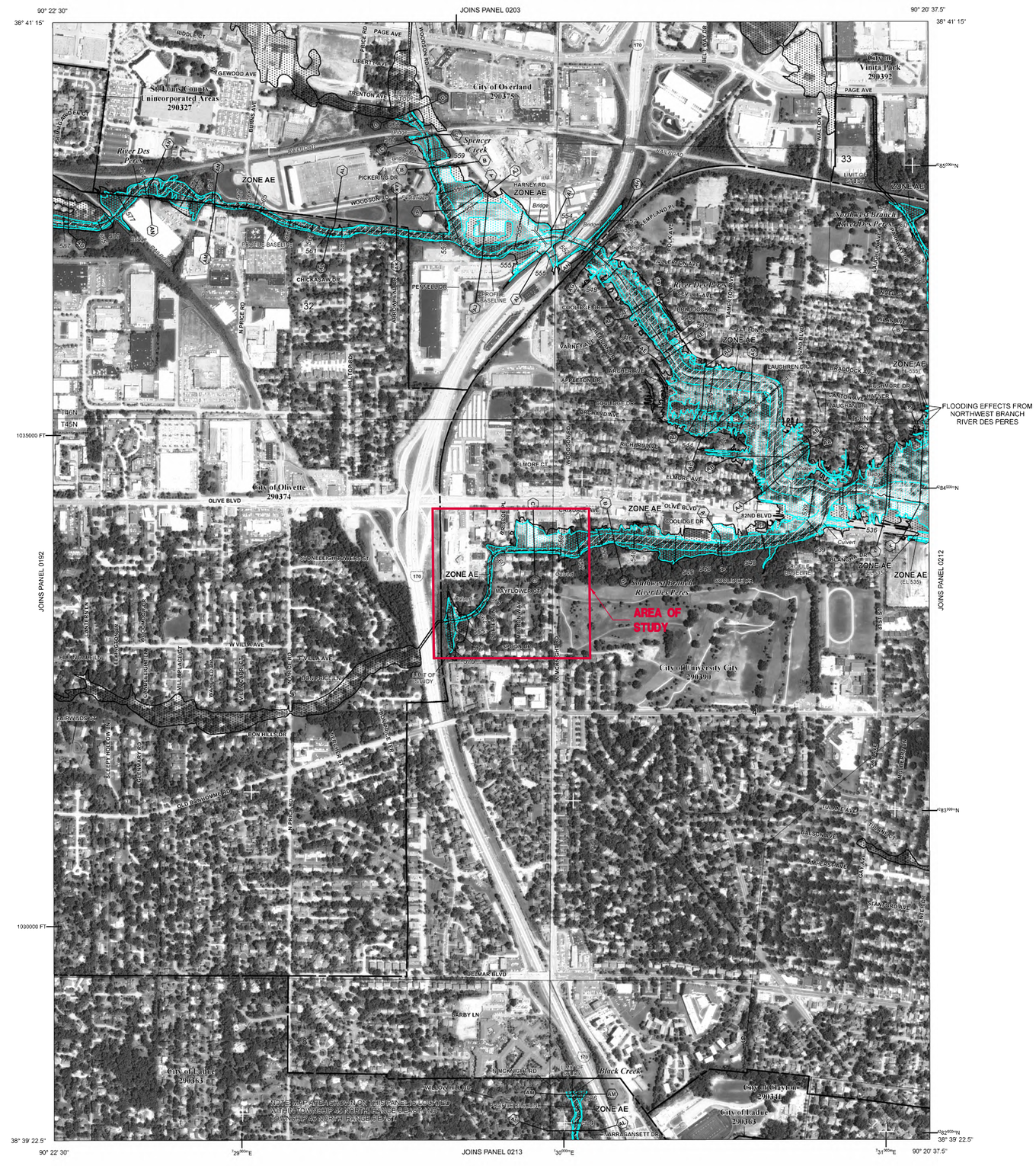
Contact the **FEMA Map Service Center (MSC)**, via the FEMA Map Information eXchange (FMIX) at 1-877-336-2627 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA MSC may also be reached by Fax at 1-800-358-9620 and its website at http://msc.fema.gov/.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/business/nfip.

ST. LOUIS COUNTY, MISSOURI FIRM PANEL LOCATOR DIAGRAM



*PANELS NOT PRINTED



LEGEND

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

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

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

FLOODWAY AREAS IN ZONE AE

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

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

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

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

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

	1% annual chance floodplain boundary
	0.2% annual chance floodplain boundary
	Floodway boundary
	Zone D boundary
	Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities.
	CBRS and OPA boundary
	International, State, or County boundary
	Corporate, Extraterritorial Jurisdiction, or Urban Growth boundary
	Area Not Included boundary
	Military Reservation, Native American Lands boundary
513 (EL 987)	Base Flood Elevation line and value; elevation in feet*
	Base Flood Elevation value where uniform within zone; elevation in feet*
	* Referenced to the North American Vertical Datum of 1988
A — A	Cross section line
23 — 23	Transect line
87°07'45", 32°22'30"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
4276000mE	1000-meter Universal Transverse Mercator grid values, zone 15
600000 FT	5000-foot grid ticks: Missouri State Plane coordinate system, east zone (FIPSZONE 2401), Transverse Mercator projection
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
● M1.5	River Mile
	Aqueduct, Culvert, Flume, Penstock, or Storm Sewer
	Road or Railroad Bridge

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
AUGUST 2, 1995

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

February 4, 2015 – to update corporate limits, to change Base Flood Elevations, to add Special Flood Hazard Areas, to change Special Flood Hazard Areas, to change zone designations, to add roads and road names, to incorporate previously issued Letters of Map Revision, to reflect updated topographic information.

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

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

MAP SCALE 1" = 500'
250 0 500 1000 FEET
150 0 150 300 METERS

NFIP NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0211K

FIRM
FLOOD INSURANCE RATE MAP

ST. LOUIS COUNTY, MISSOURI
AND INCORPORATED AREAS

PANEL 211 OF 445
(SEE LOCATOR DIAGRAM OR MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CLAYTON, CITY OF	290341	0211	K
LADUE, CITY OF	290363	0211	K
OLIVETTE, CITY OF	290374	0211	K
OVERLAND, CITY OF	290375	0211	K
ST. LOUIS COUNTY	290327	0211	K
UNIVERSITY CITY, CITY OF	290390	0211	K
VINITA PARK, CITY OF	290392	0211	K

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

MAP NUMBER
29189C0211K

MAP REVISED
FEBRUARY 4, 2015

Federal Emergency Management Agency

PREPARED FOR:
NOVUS COMPANIES
CONTACT: JONATHAN BROWNE
#20 ALLEN AVENUE, SUITE 400
WEBSTER GROVES, MO 63119
EMAIL: JPBROWNE@NOVUSDEV.COM

M.S.D. BASE MAP 17L/17K
20FLPLS-00039
ZIP CODE 63132

STATE OF MISSOURI
LEONARD J. MEERS
NUMBER E-28288
REGISTERED PROFESSIONAL ENGINEER
7-28-21
LEONARD J. MEERS
PROFESSIONAL ENGINEER
E-28288

GRIMES CONSULTING, INC.
Civil Engineering & Surveying Services
GRIMES CONSULTING, INC.
PROFESSIONAL ENGINEER CORPORATION, E-1470-D
PROFESSIONAL LAND SURVEYING CORPORATION, LS-34-D
12300 OLD TESSON ROAD
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REV. NO.	REMARKS	DATE

SHEET TITLE: FEMA FIRM MAP

FLOOD PLANS FOR
MARKET AT OLIVE
UNIVERSITY CITY, MO 63132

JOB NUMBER: 3082
DRAWN BY: JRB
DATE: 10/20/20
CHECKED BY: JLW
DATE: 10/20/20
SHEET: 2/4

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National Flood Hazard Layer FIRMette

FEMA

Legend

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

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

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

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

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

OTHER FEATURES
- 20.2 — Cross Sections with 1% Annual Chance
- 17.5 — 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

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

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

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 9/5/2019 at 9:45:09 AM 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: basemap 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.

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M.S.D. BASE MAP 17L/17K
20FLPLS-00039
ZIP CODE 63132

STATE OF MISSOURI
LEONARD J. MEERS
NUMBER E-28288
REGISTERED PROFESSIONAL ENGINEER
LEONARD J. MEERS
PROFESSIONAL ENGINEER
E-28288

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REV NO | REMARKS | DATE

FLOOD PLANS FOR
MARKET AT OLIVE
UNIVERSITY CITY, MO 63132

SHEET TITLE
FEMA FIRMETTE MAP

JOB NUMBER: 3082
DRAWN BY: JRB
DATE: 10/20/20
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SHEET: 3/4

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LEGEND

EXISTING

513
510

MINOR CONTOUR INTERVAL
MAJOR CONTOUR INTERVAL

PROPOSED

513
510

GRAPHIC SCALE

80 0 40 80 160 320

(IN FEET)
1 inch = 80 ft.

EARTHWORK NOTES:

OVERALL BULK CUT.....244,355.....+ CUBIC YARD

OVERALL BULK FILL.....252,395.....+ CUBIC YARD

THE ENGINEER HAS CALCULATED THE ABOVE QUANTITIES OF EARTHWORK TO BE REGARDED AS AN ESTIMATE OF THE BULK MOVEMENT OR REDISTRIBUTION OF SOILS ON THIS PROJECT. AS AN ESTIMATE, THESE QUANTITIES ARE INTENDED FOR GENERAL USE, AND THE ENGINEER ASSUMES NO LIABILITY FOR COST OVERRUNS DUE TO EXCESS EXCAVATED MATERIALS OR SHORTAGES OF MATERIALS AND LABOR.

THE QUANTITIES ESTIMATED FOR EACH OF THE IMPROVEMENT ITEMS LISTED ABOVE ARE BASED UPON THE HORIZONTAL AND VERTICAL LOCATION OF THE IMPROVEMENTS AS PROPOSED ON THE SITE ENGINEERING PLANS PREPARED BY GRIMES CONSULTING, INC.
ALL QUANTITIES SHALL BE VERIFIED BY THE CONTRACTOR. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO PROVIDE ALL LABOR AND EQUIPMENT NECESSARY TO MOVE REQUIRED QUNATITY OF MATERIALS TO COMPLETE THE PROJECT IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS.

THE ENGINEER'S EARTHWORK ESTIMATE DOES NOT INCLUDE ANY OF THE FOLLOWING ITEMS REQUIRING EARTHWORK THAT MAY BE NECESSARY FOR COMPLETION OF THE PROJECT: MISCELLANEOUS UNDERGROUND CONDUITS, INCLUDING SEWER LINES AND WATER MAINS LESS THAN TWENTY-FOUR INCHES IN DIAMETER; STANDARD MANHOLES; PROCESS OR TRANSFER PIPING; ELECTRICAL OR TELEPHONE CONDUITS; BASES FOR LIGHT STANDARDS; BUILDING FOOTINGS AND FOUNDATIONS, ETC.

THE ENGINEER ASSUMES NO RESPONSIBILITY FOR THE ACTUAL SIZE OF THE FIELD EXCAVATIONS MADE FOR THE INSTALLATION OF UNDERGROUND STRUCTURES, AND AS SUCH, THE ACTUAL QUANTITIES OF EARTHWORK FROM SUCH ITEMS MAY VARY FROM THE ESTIMATE SHOWN ABOVE.

THE ENGINEER ASSUMES NO RESPONSIBILITY FOR COSTS INCURRED DUE TO REMOVAL OF UNSUITABLE MATERIAL WHICH MUST BE REMOVED FROM SITE.

NOTE: FLOODPLAIN EARTHWORK IS INCLUDED IN THE OVERALL EARTHWORK

NOTE: COORDINATE SYSTEM: NAVD88 MISSOURI STATE PLANE

I-170

SOUTH LOT
20.42 ACRES
889,703 SQ. FT.

O FF=579.00
N FF=578.00
L FF=573.00
M FF=570.25
H FF=570.25
K FF=573.00
J FF=573.50
I FF=572.0
Q FF=567.50
111 STALLS
G FF=576.00
F FF=575.75

DETENTION WQ
RG F WQ
RG G WQ
RG H WQ
RG I WQ
DETENTION RG D WQ
RG A

A FF=593.00
SUBGRADE=592.00
COSTCO LOT
16.08 ACRES
700,348 SQ. FT.
734 STALLS
4.48 STALLS / 1,000 SF

B FF=594.00
NORTH LOT
C FF=594.00
493,558 SQ. FT.
D FF=593.00
E FF=593.00
RG B WQ
DETENTION
RG C WQ

OLIVE BOULEVARD
WOODSON ROAD
N. MCKNIGHT ROAD
APPLETON (50' w.) DR.

4918.3 – PR BFE 575.28
4886.9K – PR BFE 574.82
4854.8 – PR BFE 574.83
4818.7 – PR BFE 572.84
4685.2J – PR BFE 566.22
4495.3 – PR BFE 561.59
4336.9 – PR BFE 560.68
4136.9 – PR BFE 560.68
3963.9 – PR BFE 559.22
3750.8 – PR BFE 557.68
3506.6 – PR BFE 558.06
3452.6 – PR BFE 558.29
3157.2 – PR BFE 554.98
2991.5 – PR BFE 552.03
2797.2 – PR BFE 551.50

PROPOSED 500 YEAR FLOODPLAIN
PROPOSED 100 YEAR FLOODPLAIN
PROPOSED FLOODPWAY
EFFECTIVE MAPPED FEMA FLOODWAY
EFFECTIVE MAPPED FEMA FLOODPLAIN
SOUTHWEST RIVER DES PERES TRIBUTARY
FLOWLINE

CALL BEFORE YOU DIG–1–800–424–5555

NOTE: EXISTING UNDERGROUND UTILITIES, VERIFY LOCATION PRIOR TO CONSTRUCTION OR EXCAVATION

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MISSOURI STATE OF MISSOURI
LEONARD J. MEERS
NUMBER E-28288
REGISTERED PROFESSIONAL ENGINEER
7-28-21
LEONARD J. MEERS
PROFESSIONAL ENGINEER
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REV'S	REMARKS	DATE

FLOOD PLANS FOR
MARKET AT OLIVE
UNIVERSITY CITY, MO 63132

SHEET TITLE
TOPOGRAPHIC WORK MAP

JOB NUMBER: 3082
DRAWN BY: JRB
DATE: 10/20/20
CHECKED BY: JLW
DATE: 10/20/20
SHEET: 4/4

Summary of Discharges (cfs)								
Flooding Source	Location	Drainage Area (sq mi)	10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	1% Plus Annual Chance	0.2% Annual Chance
Sappington Creek	At Chileswood Dr	1.08	890	1,240	1,490	1,750	2,150	2,390
Sappington Creek	640 feet upstream of Chileswood Dr	0.62	550	750	900	1,060	1,300	1,450
Sappington Creek	250 feet downstream of Emil Ave	0.57	510	700	840	980	1,210	1,350
Sappington Creek	900 feet downstream of Sappington Rd	0.42	400	540	650	760	940	1,040
Sappington Creek	470 feet downstream of Sappington Rd. N.	0.30	310	410	490	580	710	790
Sebago Drainage	Just upstream of confluence	1.99	1,010	1,380	1,700	2,030	2,530	2,910
Sebago Drainage	At confluence with Warson Woods Creek	1.85	950	1,300	1,600	1,910	2,390	2,750
Sebago Drainage	400 feet upstream of Des Peres Ave	0.82	480	670	830	990	1,250	1,430
Sebago Drainage	150 feet upstream of Kenmont Rd	0.68	410	560	700	830	1,040	1,200
Sebago Drainage	400 feet upstream of Kenmont Rd	0.57	340	470	590	700	870	1,010
Sebago Drainage	1,200 feet upstream of Kenmont Rd	0.44	270	360	460	540	680	780
Sebago Drainage	2,000 feet upstream of Kenmont Rd	0.38	230	310	390	460	580	670
Shady Grove Creek	Just upstream of confluence	2.58	1,350	1,870	2,320	2,800	3,530	4,080
Shady Grove Creek	325 feet downstream of N Elm Ave	2.34	1,240	1,730	2,150	2,590	3,280	3,790
Shady Grove Creek	N Gore Ave	1.53	770	1,080	1,350	1,630	2,070	2,400
Shady Grove Creek	1425 feet upstream of S Rock Hill Rd	1.14	590	830	1,040	1,270	1,620	1,880
Shady Grove Creek	300 feet upstream of S Lola Dr.	0.57	300	420	530	640	820	940
Shady Grove Creek	550 feet upstream of S Lola Dr.	0.51	270	380	480	580	740	850
Southwest Branch River Des Peres	150 feet downsteram of Olive Blvd	1.30	1,020	1,250	1,480	1,730	2,060	2,230
Southwest Branch River Des Peres	300 feet upstream of N McKnight Rd	1.12	980	1,190	1,410	1,630	1,880	2,040

Summary of Discharges (cfs)								
Flooding Source	Location	Drainage Area (sq mi)	10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	1% Plus Annual Chance	0.2% Annual Chance
Southwest Branch River Des Peres	I-170	0.69	510	640	750	870	1,050	1,170
Southwest Branch River Des Peres	900 feet upstream of N Price Rd	0.52	390	490	580	680	820	910
Southwest Branch River Des Peres	600 feet downstream of Dielman Rd	0.39	310	380	450	530	640	710
Southwest Branch River Des Peres	800 feet upstream of Dielman Rd	0.30	250	310	360	430	520	580
Spencer Creek	Downstream of Spencer Creek Tributary 1 confluence	1.28	1,210	1,480	1,710	1,940	2,260	2,450
Spencer Creek	375 feet downstream of Price Rd	0.71	650	780	910	1,020	1,180	1,280
Spencer Creek	Page Ave	0.63	570	690	810	920	1,090	1,200
Spencer Creek	1,000 feet upstream of Page Ave	0.55	490	610	720	830	1,000	1,120
Spencer Creek Tributary 1	150 feet upstream of Liberty Ave	0.57	570	720	830	960	1,160	1,280
St George Creek	550 feet downstream of Hoffmeister Ave	1.78	1,240	1,690	2,050	2,430	3,040	3,400
St George Creek	300 feet upstream of Interstate 55	1.34	1,100	1,530	1,880	2,260	2,840	3,200
St George Creek	1,000 feet downstream of Lemona Dr	1.21	1,010	1,400	1,720	2,070	2,590	2,920
St George Creek	85 feet downstream of Lemona Dr	1.07	910	1,260	1,550	1,860	2,340	2,630
St George Creek	850 feet upstream of Lemona Dr	0.94	810	1,130	1,390	1,670	2,090	2,360
St George Creek	Approximately 1400 feet upstream of Lemona Dr.	0.79	710	980	1,200	1,440	1,810	2,030
St George Creek	1,700 feet downstream of Daisy Ln	0.49	460	630	770	930	1,160	1,300
St George Creek	1300 feet downstream of Daisy Ln	0.45	420	590	710	850	1,070	1,200
St George Creek	Upstream face of Daisy Ln	0.32	320	430	530	630	790	880