

**REGULAR COUNCIL MEETING**

**Tuesday, February 27, 2024 6:00pm**

**<https://us06web.zoom.us/j/88982525535?pwd=VzlXOU5tald0YkgySUdTcldqSUVGOT09>**

**Meeting ID: 889 8252 5535    Passcode: 675736**

**One tap mobile 929-205-6099**

1. Call to Order – 6:00 p.m.
2. Adjustments to the Agenda
3. Visitors and Communications
4. Consent Agenda
  - A. Approval of Minutes
    - i. Regular City Council Meeting of Tuesday, February 6, 2024
  - B. City Warrants:
    - i. Ratification of City Warrants from Week of February 14, 2024
    - ii. Ratification of City Warrants from Week of February 21, 2024
    - iii. Approval of City Warrants from Week of February 28, 2024
  - C. Clerk's Office Licenses and Permits
5. City Clerk & Treasurer Report
6. Liquor/Cannabis Control Boards
7. City Manager's Report
8. New Business
  - A. Select Annual Report cover photo and dedication (Manager)
  - B. Authorize Manager to negotiate and execute a mediation contract (Stockwell)
  - C. Next steps on flood resiliency, recovery and buyouts (Manager)
  - D. City response to trestle alternatives (Manager)
9. Upcoming Business
10. Round Table
11. Executive Session – real estate, litigation
12. Adjourn

The next meeting of the City Council is scheduled for Tuesday, February March 12, 2024.

*The portion of this meeting starting at 6:00pm will be re-broadcast on Wednesday at 9:00 a.m. and 12:00 noon CVTV Link for meetings online [cvtv723.org/](http://cvtv723.org/)*



## City of Barre, Vermont

6 N. Main St., Suite 2  
Barre, VT 05641  
[www.barrecity.org](http://www.barrecity.org)

**R. Nicolas Storellicastro**  
City Manager  
(802) 476-0240  
[citymanager@barrecity.org](mailto:citymanager@barrecity.org)

### MEMO

**TO:** City Council  
**FR:** The Manager  
**DATE:** 2/23/2024  
**SUBJECT:** Packet Memo re: 2/27/24 Council Meeting Agenda Items

Councilors:

The following notes apply to packet support materials for the Subject Council Meeting Agenda. As a reminder, the next regular Council after Tuesday will be Tuesday, March 12, 2024 at 6:00PM.

#### **8-A Select Annual Report cover photo and dedication**

The packet includes several options for photos to grace the cover of the Annual Report. We also request that Council decide on a dedication for the Annual Report. While staff has ideas we are prepared to propose, we prefer to hear first the Council's suggestions for a dedication.

#### **8-B Authorize the Manager to execute a mediation/facilitation contract (Councilor Stockwell)**

There is no memo in the packet for this item. This is a follow-up from two prior Council agenda items regarding Councilor Stockwell's proposal to undergo professional mediation/facilitation. Council has separately received the open meetings law advice I received from VLCT, which provided that while executive session would be permissible only if a supermajority of the Council makes a specific finding that premature general public knowledge would clearly place the public body or a person at a substantial disadvantage. VLCT also suggested that such a finding would be "difficult" and "unlikely" but not necessarily impermissible.

#### **8-C Next steps on flood resiliency, recovery and buyouts (Manager)**

The packet includes a presentation to guide conversations on next steps in our City's recovery from the July 2023 flood.

#### **8-D City response to trestle alternatives (Manager)**

The packet includes a draft report from the Agency of Transportation (AOT) regarding alternatives for the railroad trestle. On Thursday, February 22, 2024 AOT held a public meeting to hear from members of the public about this topic. A public comment period is open through March 7, 2024. I will seek Council's input on broad parameters of a statement that can be submitted as public comment by the City of Barre.

## Ground Rules for Interaction with each other, staff, and the general public

- Rules may be reviewed periodically
- Practice mutual respect
  - Assume good intent and explain impact
  - Ask clarifying questions
  - If off course, interrupt and redirect
- Think, then A.C.T.
  - Alternatives – Identify all choices
  - Consequences – Project outcomes
  - Tell your story – Prepare your defense
- Ethics checks
  - Is it legal?
  - Is it in scope (Charter, ordinance, policy)?
  - Is it balanced?
- “ELMO” – Enough, Let’s Move On
  - Honor time limits
  - Be attentive, not repetitive
- Be open-minded to different solutions or ideas
  - Remarks must be relevant and appropriate to the discussion; stay on subject
  - Don’t leave with “silent disagreement”
  - Decisions agreed on by consensus when possible, majority when necessary
  - All decisions of Council are final
- No blame
  - Articulate expectations of each other
  - We all deeply care about the City in our own way
  - Debate issues, not personalities
- Electronics
  - No texting, email, or videogames during the meeting

**Regular Meeting of the Barre City Council  
Held February 6, 2024**

The Regular Meeting of the Barre City Council was called to order in person and via video platform by Mayor Jake Hemmerick at 6:00 PM at City Hall, Barre, Vermont. In attendance were: From Ward I, Councilor Thom Lauzon; from Ward II, Councilor Michael Boutin; and from Ward III, Councilors Michael Deering and Samn Stockwell. City staff members present were City Manager Nicolas Storrellicastro, Public Works Director Brian Baker, and Clerk/Treasurer Carol Dawes.

**Absent:** From Ward I, Councilor Emel Cambel; and from Ward II, Councilor Teddy Waszazak.

**Adjustments to the Agenda:**

- Move new agenda item on ordinance changes from FOP negotiations to the consent agenda.
- Add update on geotechnical report on Pike Street landslide under new agenda.

**Visitors and Communications:** NONE

**Approval of Consent Agenda:**

Council approved the following consent agenda items on motion of Councilor Lauzon, seconded by Councilor Stockwell. **Motion carried.**

- A. Approval of Minutes:
  - i. Special meeting of January 23, 2024
  - ii. Regular meeting of January 23, 2024.
- B. City Warrants as presented:
  1. Ratification of Week 2024-05, dated January 31, 2024:
    - i. Accounts Payable: \$251,703.75
    - ii. Payroll (gross): \$158,659.90
  2. Approval of Week 2024-06, dated February 7, 2024:
    - i. Accounts Payable: \$257,325.81
    - ii. Payroll (gross): \$145,684.44
- C. 2024 Clerk's Office Licenses & Permits:
  - i. Waste Disposal Collector licenses:
    - i. Casella Waste Systems Inc., 25 pick-up vehicles
- D. Authorize the Manager to execute a lease with Nelson's Ace Hardware
- E. Approve resolution #2024-03A: Headworks loan RFA-356-1.0
- F. Approve resolution #2024-03B: Headworks loan RFA-357-1.0
- G. Discuss changes to ordinance from FOP contract negotiations – Council acknowledges awareness of changes being drafted for first reading (moved to here under adjustments)

**City Clerk & Treasurer Report –**

City Clerk/Treasurer Dawes reported on the following:

- Accepting absentee ballot requests for all 2024 elections. Information on requesting ballots, running for elected office, and registering to vote is on the election section of the City's website.
- Third quarter property taxes are due by February 15<sup>th</sup>.
- There are free COVID tests available in City Hall and the Public Safety Building. First come, first served while supplies last.

**Liquor Control Board/Cannabis Control Board –**

Council approved entity changes to 2<sup>nd</sup> class liquor license for Omsanidev Vermont LLC, dba Grab N Go, at 377 N. Main Street on motion of Councilor Lauzon, seconded by Councilor Stockwell. **Motion carried with Councilor Boutin abstaining.**



### **City Manager's Report –**

Manager Storrellicastro reported on the following:

- The North End public engagement meetings have been completed, and the next step is to synthesize results from the surveys. The results will be presented to Council on 2/27 for discussion on north end redevelopment. There was requests for seeking technical expertise and developing visual aids for the north end redevelopment plans; noting a concept should be completed by March 31<sup>st</sup>. Councilors asked to have a map of the area identifying potential buyout properties.
- Lobbying efforts continue at the statehouse, with a focus on flood recovery.
- There will be a hazard mitigation plan public meeting at Alumni Hall on March 7<sup>th</sup>.
- Received first FEMA reimbursement payments totaling \$130,000 for the emergency actions taken on Portland and Oswald Streets.
- Working on the application for the USDA Emergency Waterway Protection Program funding for 52 W. Patterson Street. The City will serve as the fiscal agent and the property owner is responsible for the local match.
- Last week's meeting with those who received tentative substantial damage letters went well, and there is ongoing follow-up in the permitting office. There will be another meeting in 2-3 months.
- There were two structural fires in the City in the past few days, with 70 people-hours of mutual aid provided by surrounding area departments. There was no damage to abutting properties. The owners of both apartment buildings are helping displaced tenants relocate.

There was discussion on technical assistance from VT Emergency Management with regards to establishing updated appraisals for properties under consideration for substantial damage.

### **New Business –**

#### **A) Volunteer Coordinator report.**

Flood recovery volunteer coordinator Adam Jacobs gave a PowerPoint presentation on flood-related volunteer activities over the past several months. Mr. Jacobs reviewed maps of the impacted areas and various volunteer projects, and noted a number of groups from out of the area and out of state provided assistance. A crisis cleanup web platform allowed for collaboration of cleanup efforts around the state, and Barre City has an above-average project completion rate. He spoke of what was done well, and what was learned that will make future efforts more successful, including extending service-focused volunteer efforts over a longer period of time.

There was discussion on sources of information for where the needs were greatest, how the City could support volunteer work better, and future coordination efforts.

#### **C) Certify 2023 TIF annual report.**

Clerk Dawes reviewed the 2023 annual TIF report and noted it allows the City to reflect on business growth and changes over the past year. There was discussion on the work the TIF Action Team is doing reviewing the decade-old TIF plan with an eye to changes in needs and potential new projects, and the need for additional extensions in light of the impact from the flooding.

Clerk Dawes said statute calls for TIF report to be presented to the Council. Council accepted the 2023 TIF annual report, and named Clerk Dawes as TIF queen on motion of Councilor Lauzon, seconded by Councilor Boutin. **Motion carried.** Clerk/TIF Queen Dawes accepted the title with grace and humility.

#### **D) Approve changes to the Grants Management Policy.**

Manager Storrellicastro reviewed the proposed revisions, noting the amendments would allow administrative acceptance of funding programs that come through as grants, such as support from FEMA.

The proposed language also streamlines the process by having Council approve applying and accepting grants at the same time, with Council being notified when a grant is accepted.

Council approved the grant policy revisions on motion of Councilor Lauzon, seconded by Councilor Boutin. **Motion carried.**

**B) Approve mediation/facilitation contract.**

Mediator Emily Gould introduced herself and reviewed her cv, noting she has experience as a government attorney, and mediation work in alternative dispute resolution. Ms. Gould said mediation provides legal protections for all parties, and functions on three principals of confidentiality, voluntariness, and empowerment. She said the approach would be to help determine what factors are taken into consideration when making decisions, balancing tasks with relationships in leadership.

There was discussion on process and purpose, whether the work is appropriate to be done in executive session, and possible revisions to the proposal.

Jolen Mulvaney, chair of the Justice, Equity, Diversity, Inclusion and Belonging Committee, said the City is just starting the VLCT cohort program to make the community more welcoming. VLCT is the funder for the mediation, and any changes to the agreement might need review.

Council asked that VLCT be given updated information on the premise of the meeting, and ask for their opinion on whether the work qualifies for executive session. Further review will be held at the February 27<sup>th</sup> Council meeting.

**E) Discuss changes to ordinance from FOP contract negotiations.**

Moved to consent agenda under adjustments

**Added) Sanborn Head geotechnical report on Pike Street landslides.** (added under adjustments)

Manager Storrellicastro said the report shows that 36 and 44 Pike Streets are endangered by the City-owned slope behind the houses, and the factor for safety is not met. Substantial reinforcement of the bank would be required to allow the houses to stay, and that is deemed impractical. The report says the homes across the street at the ends of George and Howard Streets are safe without the need for any intervention. The Manager said his recommendation for buyouts of 36 and 44 Pike Street will come before Council at the next meeting. Public Works Director Brian Baker agreed with the Manager's assessment of the report.

There was discussion on maintaining the street as a snow plow turnaround, ongoing monitoring of the area in question, checking with the City's insurers on potential liability and requirements for allowing or disallowing public access to the area, and other landslide areas being reviewed. Manager Storrellicastro said there will be an inspection of 106 Currier Street on Friday.

**Upcoming Business –**

The February 27<sup>th</sup> meeting will include additional discussion on mediation, survey results on the north end redevelopment, the first proposed buyouts, and a proposed public contact notification system.

Amy Galford said bill H.526 would call for the reconstruction or reengineering of the Berlin Street Bridge to mitigate its impact during high water events.

Bernadette Rose said the Willey Street Bridge acted as a dam during the July flooding, and should be looked at. Ms. Rose said there is pending legislation to remove the railroad trestle from the Stevens Branch, and she wondered what action is being taken on these issues.

**Round Table –**

Councilor Lauzon said Nelson’s Hardware should decorate their new wood pellet silo with the World Cow. He said the Barre Community Relief Fund is evaluating the last round of 100 applications, and they are hoping to approve \$1,500 in funding for each one. He noted people can apply for casualty losses on their income taxes, and he is partnering with the state to do some webinars on the subject.

Councilor Deering said he had a wonderful time at the Aldrich Library with his 4-year-old son.

Councilor Stockwell said she attended all the public engagement meetings held in the different wards, and last week’s substantial damage meeting. She noted there are 121 homeless children in the Barre City schools, and housing makes for a better world.

**Executive Session –** Councilor Boutin made the motion to find that premature general public knowledge of personnel issues to be discussed would clearly place the City of Barre at a substantial disadvantage should the discussions be public. The motion was seconded by Councilor Lauzon. **Motion carried.**

Council went into executive session at 8:10 PM to discuss personnel under the provisions of 1 VSA § 313 on motion of Councilor Boutin, seconded by Councilor Lauzon. Manager Storellicastro was invited into the executive session. **Motion carried.**

Council came out of executive session at 8:35 PM on motion of Councilor Lauzon, seconded by Councilor Boutin. **Motion carried.**

The meeting adjourned at 8:35 PM on motion of Councilor Lauzon, seconded by Councilor Boutin. **Motion carried.**

The open portion of the meeting was recorded on the video platform.

Respectfully submitted,

Carolyn S. Dawes, City Clerk

Options for Annual Report Cover

#1







#3

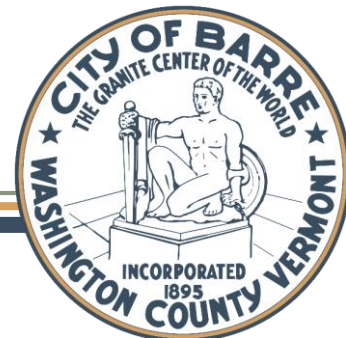


#4



# NEXT STEPS ON FLOOD RESILIENCY, RECOVERY & BUYOUTS

FEBRUARY 27, 2024





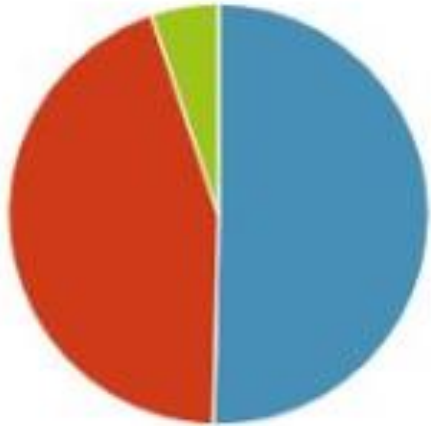
# PUBLIC FEEDBACK PROCESS

- City Council directed the City to put together a public engagement process
- The City hosted public forums for residents to provide feedback and become informed on flood recovery
  - Citywide meeting at Old Labor Hall (150 attendees)
  - Ward 1 meeting at Spaulding High School (32 attendees)
  - Ward 2 meeting at the Brook Street School (45 attendees)
  - Ward 3 meeting at the Mutuo Soccorso (62 attendees)
- Survey was posted on the City website
  - 142 responses
- Canvassing
- Email: [NorthEndFloodRecovery@barrecity.org](mailto:NorthEndFloodRecovery@barrecity.org)



# WHO RESPONDED?

Do you live in the North End?



- Yes
- No, I live elsewhere in Barre
- I do not live in Barre but I'm connected.

Your Ward



- Ward 3
- Ward 1
- Ward 2
- Not sure
- I do not live in Barre

Were you affected by flooding?

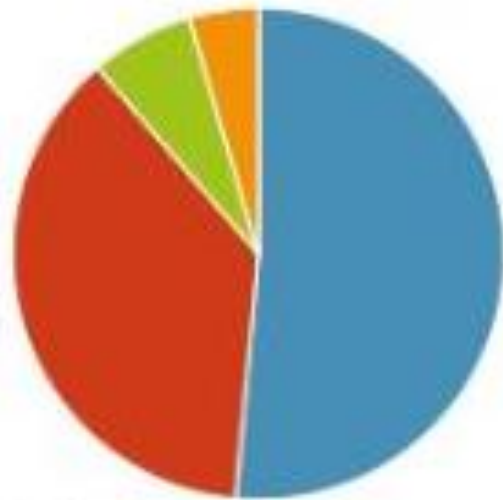


- Yes
- No



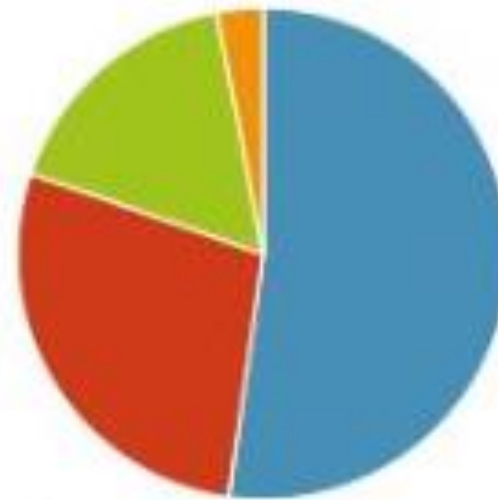
# ARE YOU AWARE OF AND OPEN TO NORTH END REDEVELOPMENT?

Aware of plans to develop?

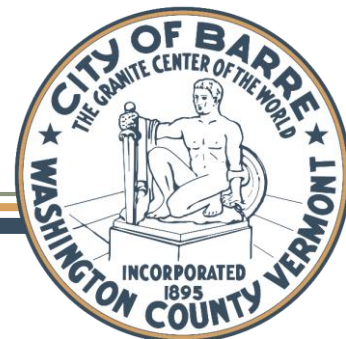


- Yes, I've been following the news
- Somewhat
- I'm not sure
- No

Are you open to change?



- Yes, I'm open to changes
- Yes, with reservations
- I'm not sure
- No

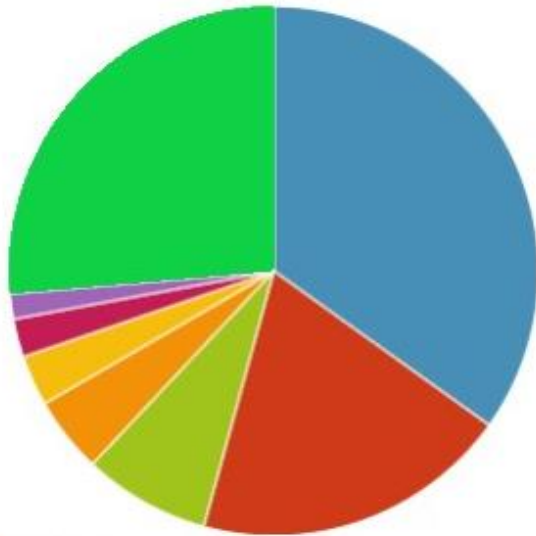


# WHAT DEVELOPMENT WOULD YOU MOST AND LEAST LIKE TO SEE?

## redevelopment questions

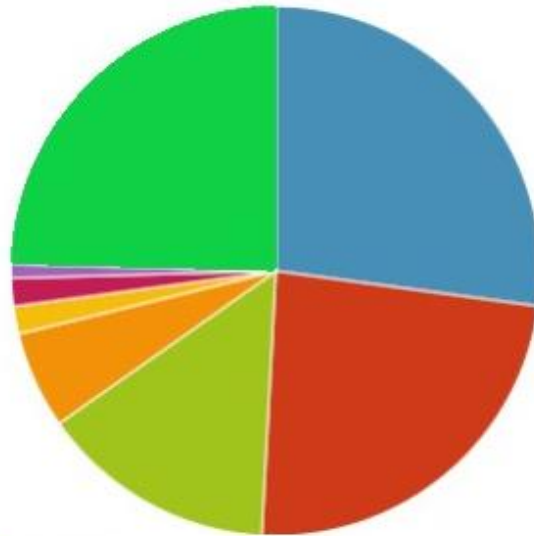
What people would most and least like to see in redevelopment.

MOST like to see



- A mix of 1+2+3.
- A mix of 1+2 only
- A mix of 2+3 only
- Not sure
- Apartment buildings
- Single-family homes
- multi-family homes
- Other

LEAST like to see

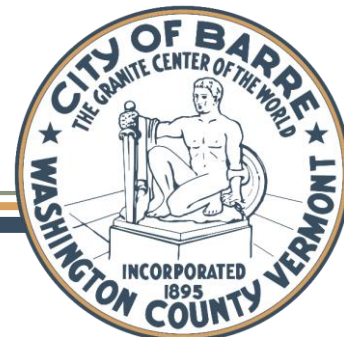


- A mix of 2+3 only
- Not sure
- A mix of 1+2 only
- apartment buildings
- A mix of 1+2+3.
- single family homes
- no apartment buildings
- Other

1+ = single family homes  
 2+ = multi-unit homes  
 3+ = apartment buildings

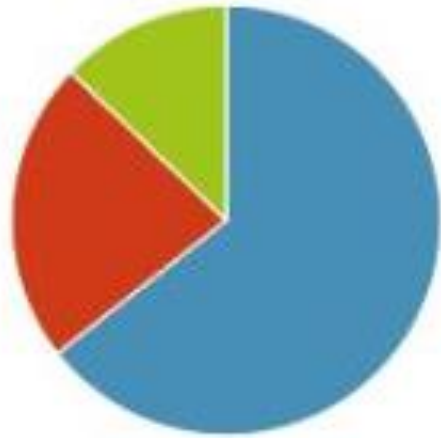
Result	MOST	LEAST
<u>1+2+3</u>	45	2
<u>1+2</u>	25	17
<u>2+3</u>	10	32
<u>Apartment Buildings</u>	4	8
<u>Multi-family</u>	2	0
<u>Single-family</u>	3	2
<u>Other</u>	34	29
<u>Not sure</u>	6	28

Emerging consensus on mix of all housing types as both the MOST PREFERRED and LEAST OPPOSED.



# WHAT LAND USES DO YOU SUPPORT?

Green areas and rec use?



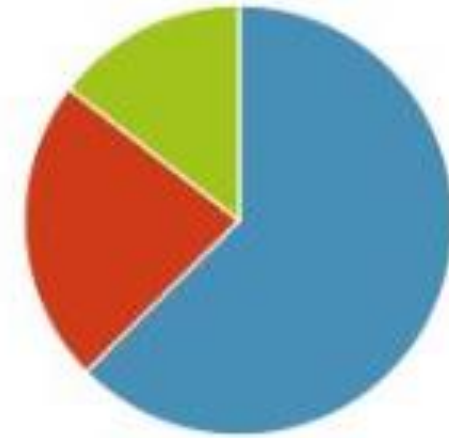
- A mix of playing fields and gardens
- Playing/ball fields
- Community gardens

walking/bike paths?

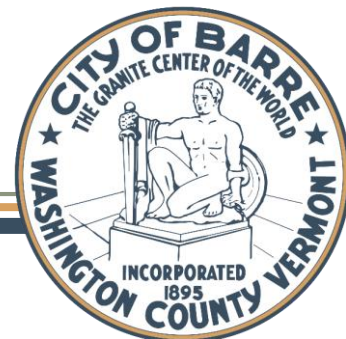


- Yes
- Not sure
- Not really

Strategically placed bus stops?



- Yes
- Not really
- Not sure





# RESIDENT PERCEPTIONS OF THE CITY

Is Barre safe?



- Agree
- Disagree
- Not sure

Are City Services responsive?

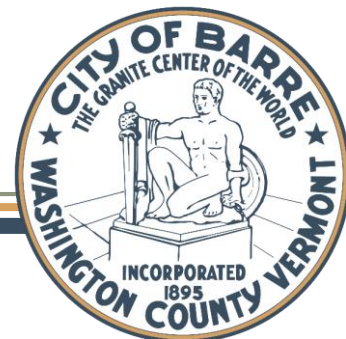


- Agree
- Disagree
- Not sure

Is Barre walkable?



- Disagree
- Agree
- Not sure



# RESIDENT PERCEPTIONS OF THE CITY

Parks and outdoor areas good?



- Agree
- Not sure
- Disagree

Downtown is accessible?



- Agree
- Disagree
- Not Sure



# PERCEPTIONS OF PRE- AND POST-FLOOD SERVICES

Services were good pre-flood

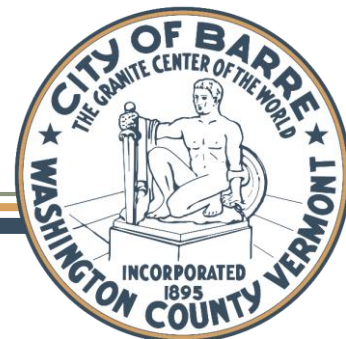


- Agree
- Not sure
- Disagree

services were good post-flood



- Agree
- Not sure
- Disagree





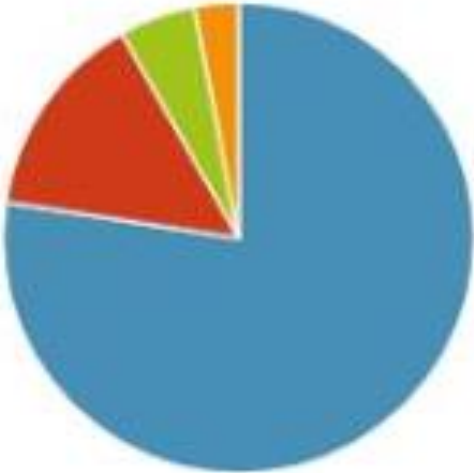
# WHAT DO YOU LIKE ABOUT YOUR NEIGHBORHOOD?

I like my neighbors



- Yes
- No
- Not Sure

Kids like their school



- This does not apply to me
- Yes
- No
- Not Sure

well located bus stops



- Yes
- No
- Not Sure



# WHAT DO YOU LIKE ABOUT YOUR NEIGHBORHOOD?

it's convenient



- Yes
- No
- Not Sure

"my people" are here

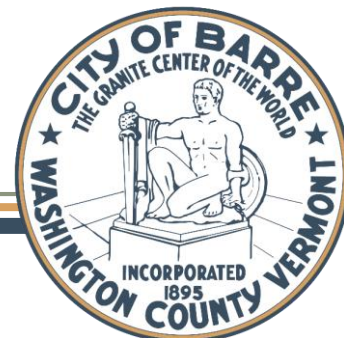


- Yes
- No
- Not Sure

It's my home



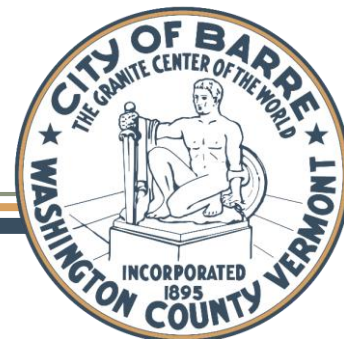
- Yes
- No
- Not Sure



# KEY THEMES FROM WARD MEETINGS

## Housing

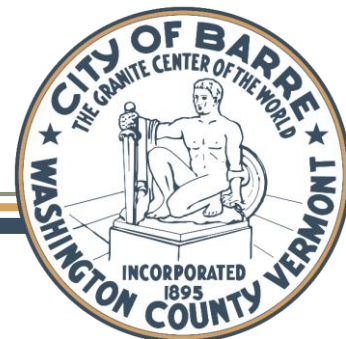
- Mixed use housing with services (childcare, playgrounds)
- Pathways to home ownership
- Housing for people who go through buyouts
- Develop vacant lots, in-fill housing
- Walkability to the downtown
- Financial support for damaged homes



# KEY THEMES FROM WARD MEETINGS

## Quality of Life Issues

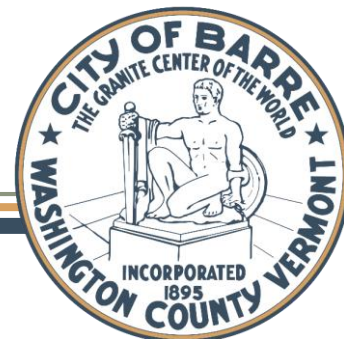
- Playgrounds, green space as floodplain
- Parks, community gardens, sport fields
- Satellite library, coffee shop, grocery store
- Walking paths



# KEY THEMES FROM WARD MEETINGS

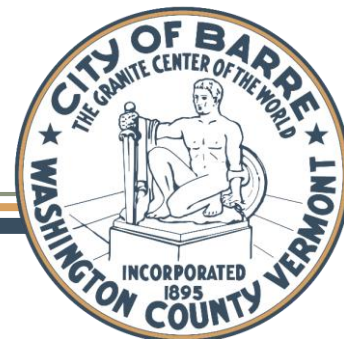
## Resiliency

- Fix low bridges, remove the trestle
- Create more floodplain
- Upsize culverts
- Work regionally with the state/other municipalities
- Remove dams



# WHAT DID WE HEAR?

- Support for all types of housing
- Floodplain for mitigation/ green space
- Remove obstacles in the river (bridges/ trestle)



# SUMMARY OF BUYOUT INTAKES

Type	Number	Average Assessment	Total Taxes	Estimated Buyout
Flooding	52	\$121,405	\$202,520	\$13,989,573
Landslide	5	\$102,016	\$16,894	\$1,248,104

“Estimated Buyout” refers to the cost to the City. It **DOES NOT** equate to the amount a homeowner would be paid for the buyout. The purchase price is one of many inputs into the estimated buyout cost to the municipality.

“Estimated Buyout” is determined by the following formula:  
**(Assessed Value + 30%) + \$117,000 ancillary costs**

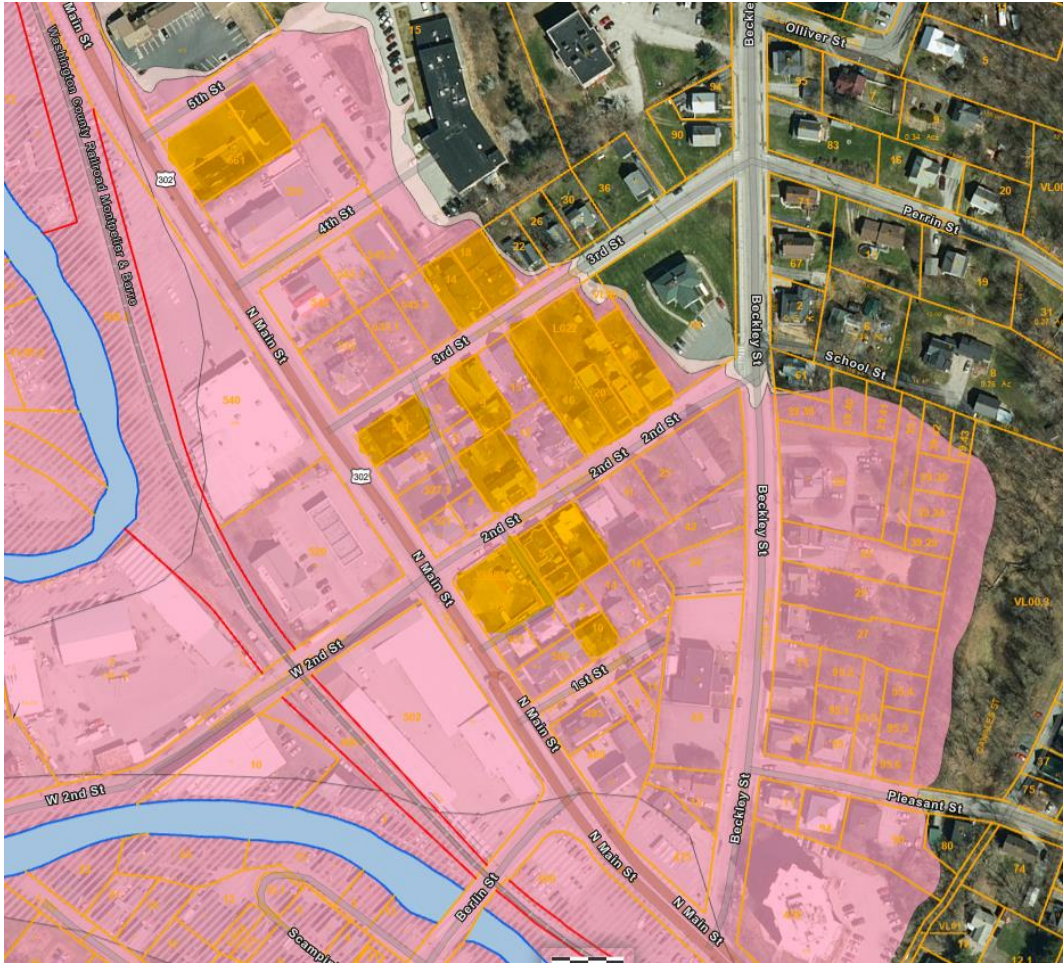
Ancillary costs include:

- Archeological resource assessment
- Property appraisal
- Title search and closing document development
- Up to \$31,000 additional to purchase offer per HMA Guidance
- Demolition and debris removal
- Final site work (seeding, grading)

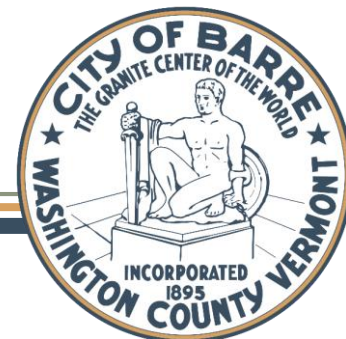




# NORTH END AREA



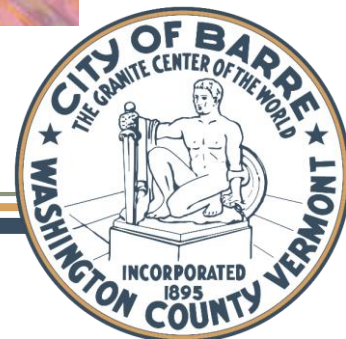
Address	Taxes	Estimated Buyout
515 N Main Street	\$3,074	\$222,300
561 N Main Street	\$6,984	\$356,200
567 N Main Street	\$7,401	\$370,500
10 First Street	\$2,968	\$226,564
7 Hawes Place	\$2,592	\$205,790
5 Second Street	\$1,328	\$162,500
7 Second Street	\$4,995	\$288,080
8 Second Street	\$4,967	\$287,118
16 Second Street	\$3,668	\$252,434
20 Second Street	\$2,900	\$224,068
27 & 24 Second Street	\$1,886	\$186,615
26 Second Street	\$3,241	\$246,740
531 N Main & 1 Third Street	\$5,368	\$313,040
9 Third Street	\$2,645	\$207,610
14 Third Street	\$2,868	\$256,490
18 Third Street	\$3,795	\$247,000
	<b><u>\$60,680</u></b>	<b><u>\$4,053,049</u></b>





# VINE/SCAMPINI/BERLIN AREA

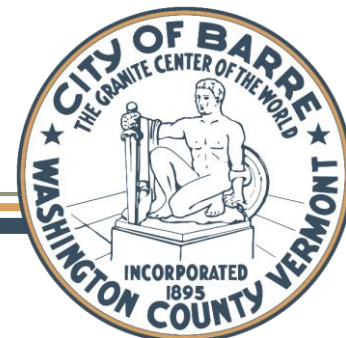
Address	Taxes	Estimated Buyout
12 Scampini Square	\$3,837	\$248,430
25 Scampini Square	\$2,658	\$215,150
19 Vine Street	\$2,100	\$231,400
21 Vine Street	\$2,987	\$219,310
23 Vine Street	\$2,159	\$270,920
21 Berlin Street	\$3,210	\$246,610
23 Berlin Street	\$2,727	\$217,685
10 W Second Street	\$13,417	\$576,550
19 W Second Street	\$2,797	\$212,810
	<b><u>\$35,981</u></b>	<b><u>\$2,438,865</u></b>



# GUNNERS BROOK AREA



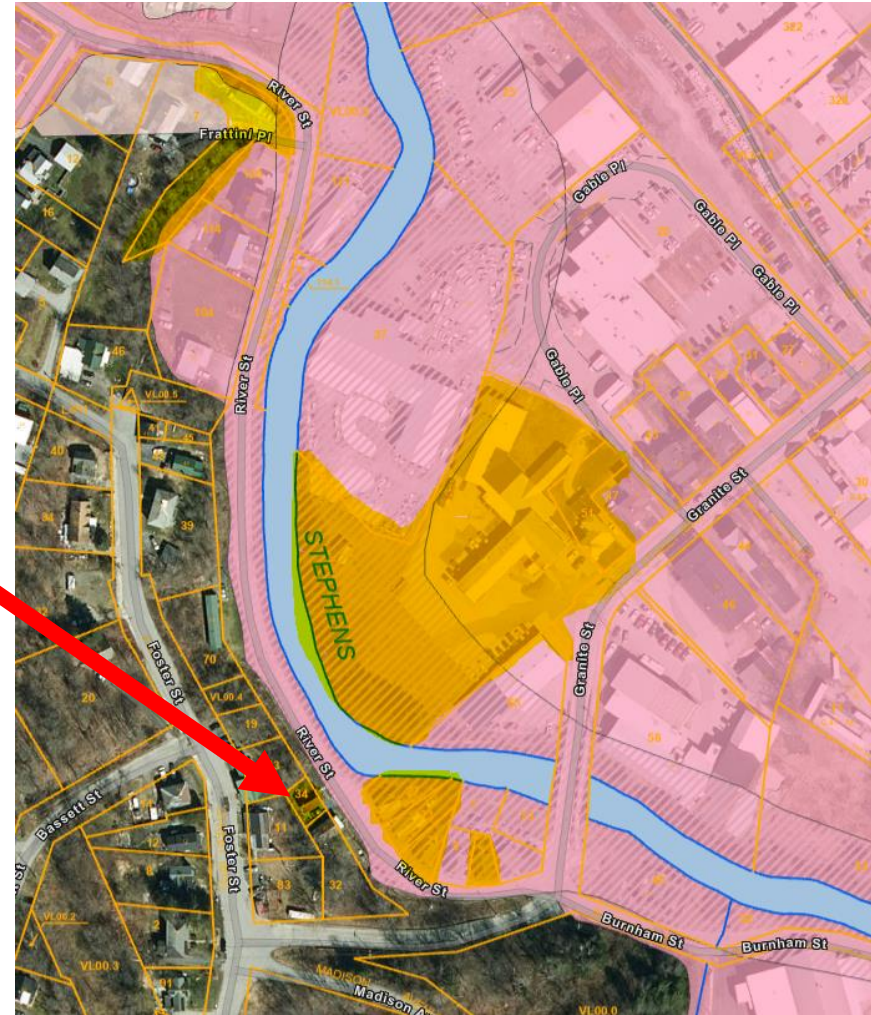
Address	Taxes	Estimated Buyout
7 Harrington Avenue	\$4,406	\$267,917
9 Harrington Avenue	\$5,963	\$321,230
12 Harrington Avenue	\$5,116	\$292,240
32 Maple Avenue	\$2,209	\$192,660
62 Maple Avenue	\$4,471	\$270,140
80 Maple Avenue	\$3,461	\$235,560
100 Brook Street	\$1,528	\$279,240
3 Dix Place	\$4,617	\$288,340
	<b><u>\$31,771</u></b>	<b><u>\$2,147,327</u></b>





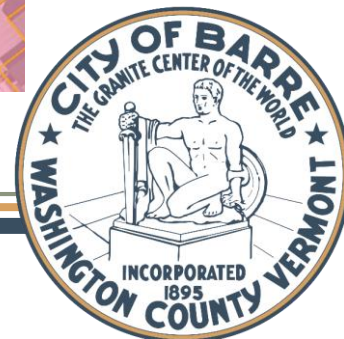
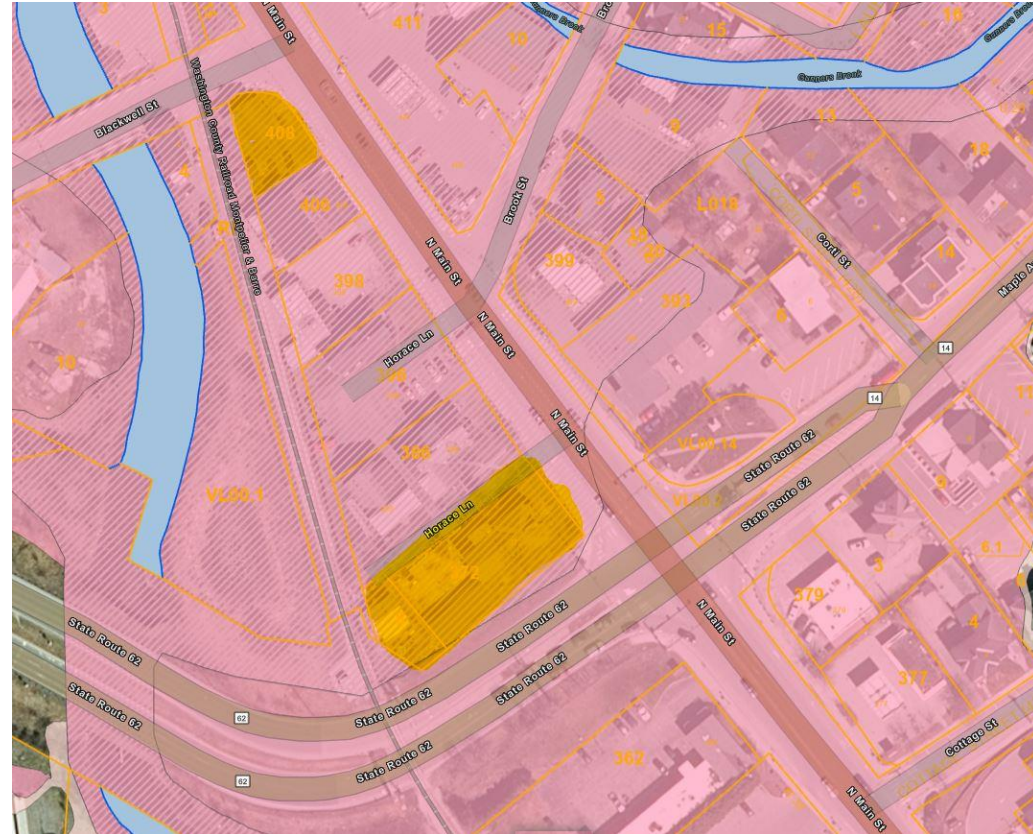
# RIVER/GRANITE STREET

Address	Taxes	Estimated Buyout
5 River Street	\$2,060	\$193,500
21 River Street	\$2,331	\$203,060
23 River Street	\$2,465	\$208,000
27 River Street	\$2,415	\$199,706
34 River Street	\$3,643	\$252,720
130 River Street	\$1,785	\$182,910
51 Granite Street	\$6,361	\$334,880
53 Granite Street	\$13,022	\$563,030
	<b><u>\$34,082</u></b>	<b><u>\$2,137,356</u></b>



# N. MAIN STREET AREA

Address	Taxes	Estimated Buyout
372 N Main Street	\$10,877	\$302,500
408 N Main Street	\$4,644	\$131,900
8 Horace Lane	\$950	\$69,400
	<b><u>\$16,471</u></b>	<b><u>\$1,005,940</u></b>





# BROOKLYN STREET AREA



Address	Taxes	Estimated Buyout
5 Brooklyn Street	\$1,712	\$232,206
11 Brooklyn Street	\$4,236	\$262,080
15 Brooklyn Street	\$3,663	\$242,450
	<b><u>\$9,610</u></b>	<b><u>\$736,736</u></b>



# WASHINGTON STREET AREA



Address	Taxes	Estimated Buyout
395 & 400 Washington Street	\$5,794	\$503,100
	<b><u>\$5,794</u></b>	<b><u>\$503,100</u></b>

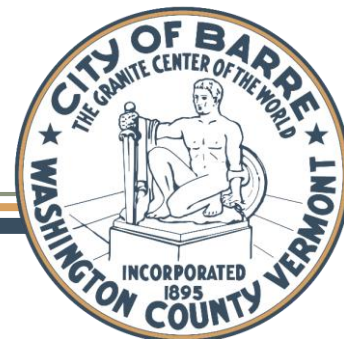




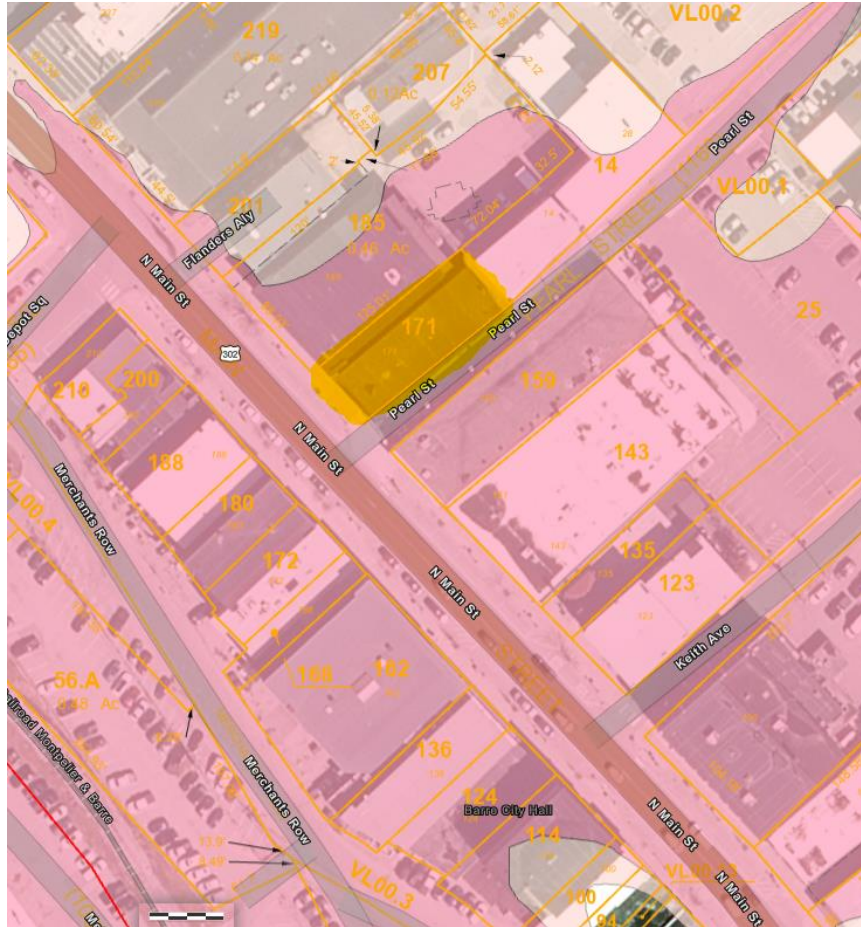
# CURRIER PARK AREA



Address	Taxes	Estimated Buyout
30 Park Street	\$5,721	\$330,460
	<u>\$5,721</u>	<u>\$330,460</u>



# DOWNTOWN AREA



Address	Taxes	Estimated Buyout
171 N Main Street	\$7,591	\$377,000
	<u>\$7,591</u>	<u>\$377,000</u>



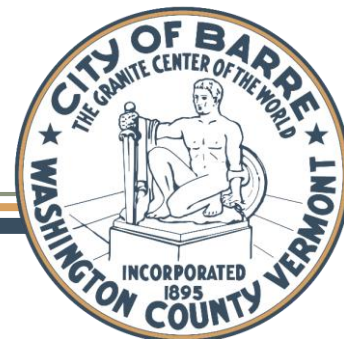


# OLD RAILBED AREA



Address	Taxes	Estimated Buyout
36 Pike Street	\$1,913	\$224,185
44 Pike Street	\$2,817	\$223,834
25 Oswald Street	\$3,651	\$251,810
15 Howard Street	\$4,167	\$259,740
	<b><u>\$12,548</u></b>	<b><u>\$959,569</u></b>

Impacted by  
landslides.



# PORTLAND STREET LANDSLIDE

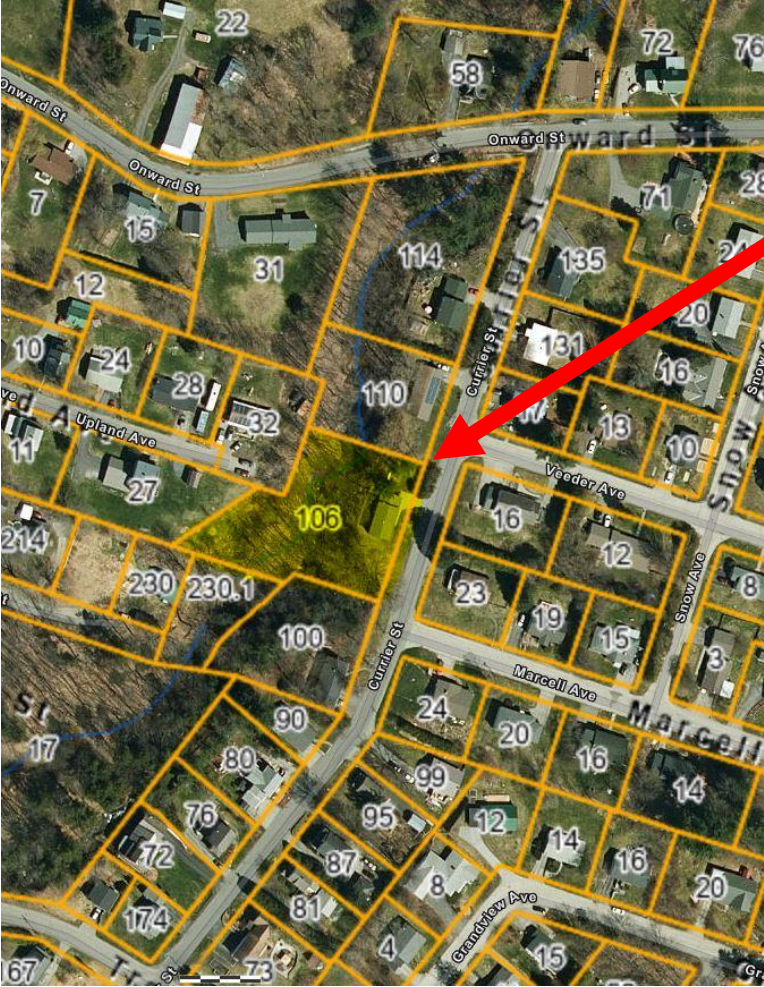


Address	Taxes	Estimated Buyout
5 Portland Street	\$2,759	\$218,855
	<u>\$2,759</u>	<u>\$218,855</u>





# CURRIER STREET LANDSLIDE



Address	Taxes	Estimated Buyout
106 Currier Street	\$5,754	\$329,420
	<u>\$5,754</u>	<u>\$329,420</u>



# POTENTIAL NEXT STEPS

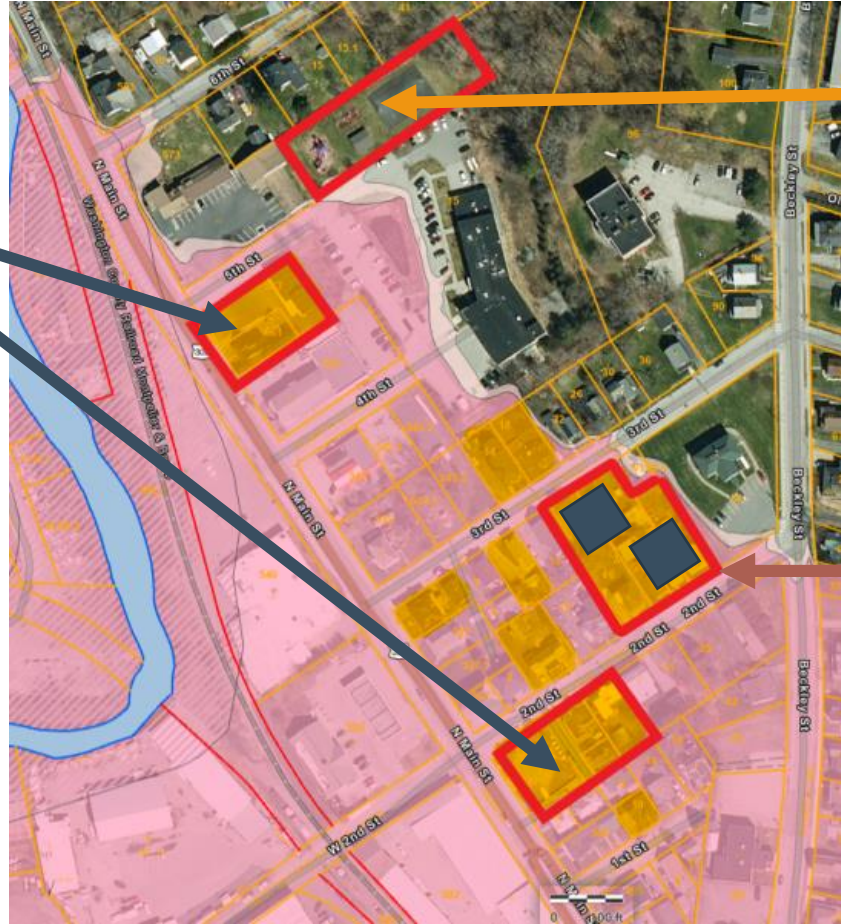
- Reimagine the North End
  - Mixed housing
  - Realistic, credible, short-term solutions
  - Floodplain + green space
- Buyouts + citywide floodplain/mitigation
  - Balance between City interest and resident needs
  - River science- and data-based approach
  - Prioritize river-adjacent properties + clusters + citywide mitigation value
  - Advocate for removal of trestle



# REIMAGINE THE NORTH END

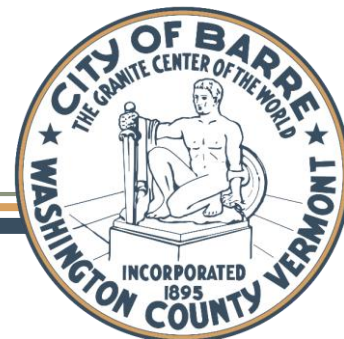
Build floodplain along N Main Street and relocate Wobby Playground.

Housing Math:  
28-30 units (Seminary Street)  
28-30 units (Wobby Playground)  
+ 12 units (2<sup>nd</sup> and 3<sup>rd</sup> Streets)  
**68 – 72 new units**



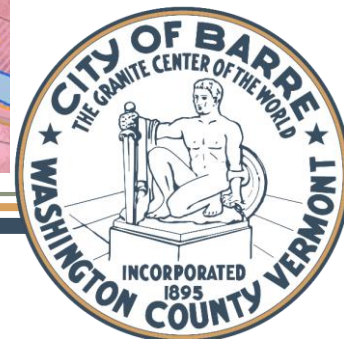
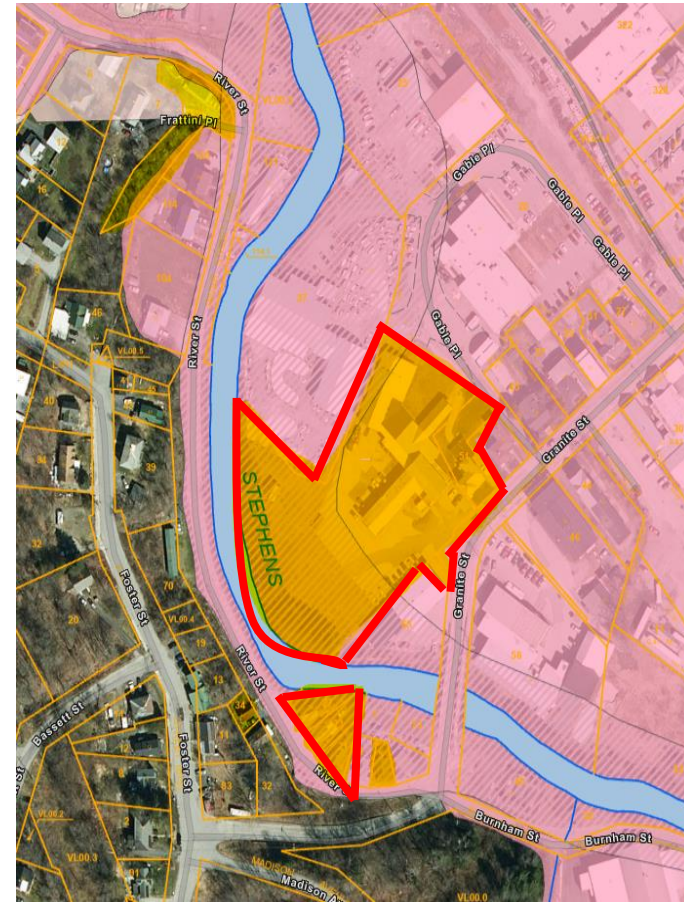
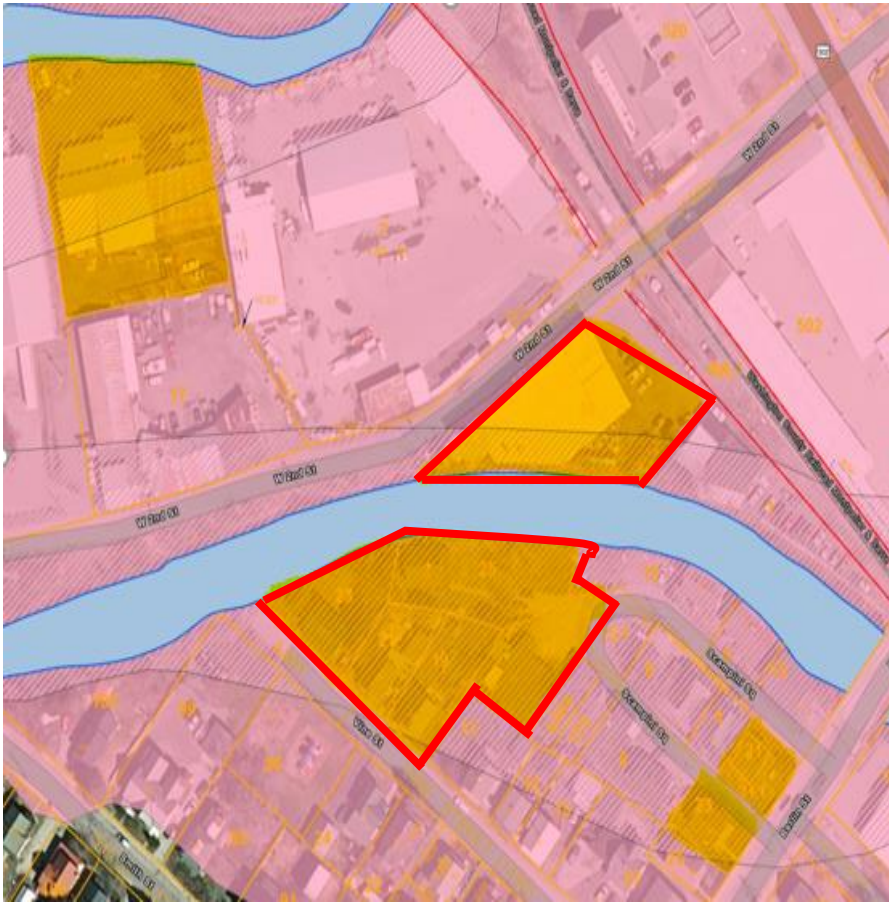
Seek letters of interest for Wobby Playground. Same acreage as Seminary Street parking lot that has generated a 28-30 unit proposal.

Buy out a cluster of properties on N. Main between Second and Third Street that is out of the floodway. Footprint is 6 units per building.





# BUYOUTS AND CITYWIDE FLOODPLAIN MITIGATION





# BUYOUTS AND CITYWIDE FLOODPLAIN MITIGATION

## Vine/Scampini Area Mitigation

Address	Taxes	Estimated Buyout
12 Scampini Square	\$3,837	\$248,430
25 Scampini Square	\$2,658	\$215,150
19 Vine Street	\$2,100	\$231,400
21 Vine Street	\$2,987	\$219,310
23 Vine Street	\$2,159	\$270,920
10 W Second Street	\$13,417	\$576,550
	<b><u>\$27,158</u></b>	<b><u>\$1,761,760</u></b>

## Gunners Brook Mitigation

Address	Taxes	Estimated Buyout
7 Harrington Avenue	\$4,406	\$267,917
9 Harrington Avenue	\$5,963	\$321,230
12 Harrington Avenue	\$5,116	\$292,240
	<b><u>\$15,485</u></b>	<b><u>\$881,387</u></b>

## River/Granite Mitigation

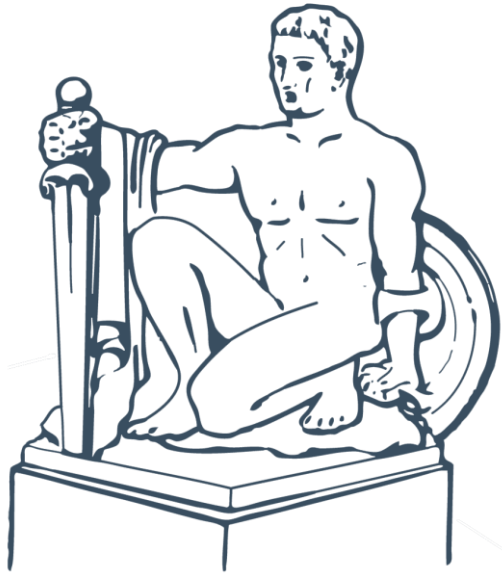
Address	Taxes	Estimated Buyout
21 River Street	\$2,331	\$203,060
23 River Street	\$2,465	\$208,000
27 River Street	\$2,415	\$199,706
51 Granite Street	\$6,361	\$334,880
53 Granite Street	\$13,022	\$563,030
	<b><u>\$26,594</u></b>	<b><u>\$1,508,676</u></b>



# WHAT WAS IT WE HAD HEARD?

- Support for all types of housing
  - 68-72 potential new housing units, 40-42 in the North End
- Floodplain for mitigation/green space
  - Relocate Wobby Playground
  - Floodplain along Vine/Scampini, Gunners Brook, River/Granite Streets
- Remove obstacles in the river (bridges/trestle)
  - Submit public comment to AOT





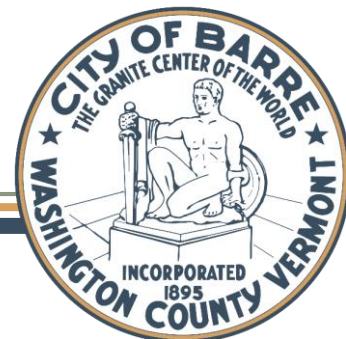
THANK YOU

QUESTIONS/DISCUSSION?

[WWW.BARRECITY.ORG](http://WWW.BARRECITY.ORG)



@BARRECITYVT





## **Alternatives Analysis Report**

Barre City WACR(22) - Bridge 308 over Stevens Branch  
WACR Montpelier Barre Subdivision MP 6.9, Barre City, VT

February 2, 2024

Prepared For:

Vermont Agency of Transportation, Rail & Aviation Bureau



## Barre City WACR(22) - Bridge 308 over Stevens Branch WACR Montpelier Barre Subdivision MP 6.9, Barre City, VT

Jacobs Project No: E2X88322  
Document Title: Alternatives Analysis Report  
Revision: 0 (DRAFT)  
Date: February 2, 2024  
Client Name: Vermont Agency of Transportation  
Client No:  
Project Manager: John Wilson, P.E.  
Author: John Blackburn / John Wilson  
File Name: Bridge 308 Alternatives Analysis Report

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**Table of Contents**

1.0 Executive Summary ..... 1

2.0 Introduction..... 6

    2.1 Background ..... 6

    2.2 Existing Bridge ..... 6

    2.3 Environmental Resources ..... 7

    2.4 Right-Of-Way and Adjacent Properties ..... 8

    2.5 Information provided by Barre City..... 8

    2.6 Site Utilities..... 8

    2.7 Site Description and Location ..... 8

3.0 Proposed Alternatives Descriptions ..... 12

    3.1 Bridge Alternative 1 – No Action ..... 12

    3.2 Bridge Alternative 2 – Bridge Repair..... 12

    3.3 Design Alternative 3 – New Two-Span Structure..... 13

    3.4 Bridge Alternative 4 – New Single-Span Structure ..... 15

    3.5 Bridge Alternative 5 – Remove Superstructure and Piers ..... 16

    3.6 Design Alternative 6 – Remove Superstructure, Piers and Abutment 1 ..... 16

4.0 Conclusions..... 16

**Appendices**

- A Existing Conditions Site Photographs
- B Alternatives Comparison Matrix
- C Bridge Alternatives CADD Plans
- D Alternatives Project Costs
- E Hydrology / Hydraulics Report
- F Water Surface Profiles at Bridge
- G Letters of Support
- H Local & Regional Input Questionnaire



## 1.0 Executive Summary

The Vermont Agency of Transportation has received a FEMA Building Resilient Infrastructure and Communities (BRIC) Grant to study the alternatives available for Bridge 308. Bridge 308 is located on the WACR Montpelier Barre Subdivision at Mile Post 6.9 in Barre City, Vermont. The existing bridge and several repair, replacement, and removal alternatives were evaluated as part of this assignment. The bridge is currently closed to rail traffic because of ice damage to one of the piers in 2019.

The Scope of Work for this assignment consists of the following:

- Review existing hydraulic data and obtain additional data such as survey and resource evaluation.
- Present the intent of the project at a Local Concerns Meeting.
- Complete hydrologic and hydraulic analysis of the bridge site to determine the flood elevations and velocities of the existing condition.
- Determine specifics of the proposed alternatives sufficient to create hydraulic modeling.
- Complete hydraulic analysis of each proposed bridge alternative and compare to existing condition to summarize downstream and upstream effects of each alternative.
- Provide cost estimates for each of the proposed alternatives.
- Present alternatives at a Public Informational Meeting.
- Determine preferred alternative and complete a FEMA Benefit Cost

This report will compare and summarize several alternatives including “do nothing”, repair, replacement, and removal. The report will consider hydraulics (with and without debris modeling), environmental impacts, effects to rail traffic, effects to adjacent facilities/property, project costs, bridge maintenance, and structure service life.

Bridge 308 has a span length of 89'-3" from center to center of bearings with three 29'-0" spans. The bridge superstructure consists of an open timber deck supported by rolled steel beams. The bridge substructures consist of two abutments and two timber pile bent piers. The bridge spans the Stevens Branch and was constructed in 1950 and was rehabilitated in 2013.

The area bounding the river in the vicinity of Bridge 308 is located within Zone AE, as delineated by the National Flood Insurance Program (NFIP). A Hydrology/Hydraulic models of the existing bridge and several alternatives was developed and located in Appendix E. The alternatives considered as part of this report include:

- Alternative #1: Existing bridge remains in place. Debris is not modeled.
- Alternative #1A: Same as Alternative 1, with debris modeling.
- Alternative #2: Bridge Repair - replace damaged piers.
- Alternative #2A: Same as Alternative #2, with debris modeling
- Alternative #3: New 2 span bridge – one pier at the center of the span.
- Alternative #3A: Same as Alternative #3, with debris modeling.
- Alternative #4: New single span bridge – no piers.
- Alternative #5: Removal of the existing superstructure and piers.
- Alternative #6: Removal of the existing superstructure, piers, and abutment 1.

Water surface elevations were calculated for each alternative for several annual chance flood events. The increase or decrease of water surface elevations are captured in the chart below.

Annual Chance Flood	Water Surface Elevation Difference at Bridge (ft)								
	Alt 1	Alt 1A	Alt 2	Alt 2A	Alt 3	Alt 3A	Alt 4	Alt 5	Alt 6
50%	-	5.44	-0.05	5.44	-0.10	1.74	-0.016	-0.013	-0.013
20%	-	2.51	-0.07	2.50	0.24	2.54	-0.039	-1.26	-1.26
10%	-	0.38	0.00	0.39	-0.01	0.08	0.05	0.08	0.08
2%	-	-0.14	0.00	-0.14	-0.02	0.01	-0.014	-0.09	-0.09
1%	-	0.05	0.00	0.05	-0.01	0.02	-0.14	-0.09	-0.09
0.2%	-	0.03	0.00	-0.13	-0.01	0.01	-0.02	-0.10	-0.10

Comparing the water surface elevation differences to the existing condition (without debris modeling), it is evident that the alternatives do not have a significant impact on the calculated water surface elevations throughout all flood events. Alternatives 5 and 6 reduces the water surface elevation by up to 1.26 feet for the two smallest flood events, but only inches for Alternatives 2, 3 and 4. For the remainder of the larger storm events, the maximum difference in all alternatives is 1 ¼”.

The debris modeling performed in Alternatives 1A, 2A, and 3A indicates that water surface elevations in the smaller 50% and 20% floods increase by as much as 5.44 feet, while larger floods are essentially unaffected. Alternatives 4, 5 and 6 do not have piers within the channel and water surface elevations are reduced by as much as 1.26 feet for the smaller 50% and 20% floods, while larger flood events are essentially unaffected.

In all alternatives, with and without debris modeling, the 50% and 20% annual chance flood surfaces will remain within the confines of the stream channel, all larger events will overtop the bridge. In the 10% chance and larger flood events, the bridge is entirely inundated, and water is flowing over the bridge and across the floodplain, thus the bridge opening becomes a minimal pathway for the water and largely unaffected by the alternatives analyzed.

We offer the following overall hydraulic study observations:

1. Based on water surface elevation differences without debris modeling, hydraulics has little effect on the alternative to be chosen. The exception to this is alternative 4 (new single span structure) which increases the elevation of the track bed so significantly it would create a dam effect across the flood plain and broaden the extents of the upstream flood area.
2. Considering water surface elevations with debris modeling at the piers for Alternatives 1A, 2A and 3A, smaller flood events are negatively impacted, while larger storm events are essentially unaffected.
3. Considering water surface elevations by removing the piers for Alternatives 4, 5 and 6, smaller flood events are slightly improved, while larger storm events are essentially unaffected.

Based on the data obtained during this study, we offer the following observations for each alternative:

- Alternative 1 (Existing bridge remains in place, debris is not modeled) The 10%, 2%, 1%, and 0.2% floods all overtop the existing structure. We do not recommend this alternative, if the bridge is not put back in service, we recommend alternative 6, remove the superstructure, piers, and abutment 1.
- Alternative 1A (Same as Alternative 1, with debris modeling) The water surface elevation with debris modeling is most impacted in the smaller 50% and 20% annual chance floods. Although the 50% and 20% flood events do increase the water surface elevations, the flood events are contained within the channel banks. The 10%, 2%, 1%, and 0.2% floods were not affected.
- Alternative 2 (Bridge repair - replace damaged piers, debris not modeled) The water surface elevations for the smaller 50% and 20% annual chance floods decreased slightly compared to the existing bridge while the 10%, 2%, 1%, and 0.2% floods provided the same results as alternative 1.
- Alternative 2A, (Same as Alternative 2, with debris modeling) The water surface elevations were nearly identical to the water surface elevations in Alternative 1A as both options contain 2 piers in the channel. Like alternative 1A, the water surface elevation with debris modeling is most impacted in the smaller 50% and 20% annual chance floods. Although the 50% and 20% flood events do increase the water surface elevations with debris modeled, the flood events are contained within the channel banks. The 10%, 2%, 1%, and 0.2% floods were not affected.

Alternative 2 (and 2A) includes replacing the existing double row of timber piles with a single row of steel piles. Although the hydraulic modeling yields similar water surface elevations, engineering judgment tells us that the proposed single row of piles will be less susceptible to debris/ice build-up versus the existing double row of timber piles. The superstructure is re-used so structure life expectancy is 25 years, making alternative 2 is a viable option for rehabilitation.

- Alternative 3 (New 2 span bridge – one pier at the center of the span, debris not modeled) The removal of one pier in the flow area results in a slight decrease of the water surface elevations for the 50% flood and a slight increase in the 20% flood. The larger 10%, 2%, 1%, and 0.2% floods are similar to alternative 1 and is expected to overtop the bridge structure.
- Alternative 3A (Same as Alternative 3, with debris modeling) The water surface elevation is reduced by 3.7 feet during the 50% flood and essentially unchanged for the 20% storm as compared to Alternative 1A. The water surface elevations in 10% and larger floods were not affected when compared to alternative 1A and alternative 3.

Alternative 3 (and 3A) includes replacing both existing piers containing double row of timber piles with a pier located at the center of the span comprised of a single row of steel piles. Although the hydraulic modeling yields similar water surface elevations without debris modeling, modeling with debris is improved for the smallest flood event. This alternative will perform better during debris/ice build-up versus alternative 2 as a single pier will be less susceptible to logs spanning the two piers within the main portion of the channel. The superstructure will be replaced so the structure life expectancy is extended to 75 years.

- **Alternative 4 (New single span bridge – no piers)** The water surface elevation at and upstream of the bridge are decreased in all floods, except for the 10% flood, by only as much as 2 inches. Water surface elevations are decreased with no pier (thus no debris) in the channel but is offset by the deeper bridge superstructure since the 10% and larger flood events will overtop the bridge. This alternative is not recommended as the increased structure depth increases track elevation by 2.67 feet, creating a dam effect across the flood plain.
- **Alternative 5 (Removal of the existing superstructure and piers)** The water surface elevations at and upstream of the bridge decreased slightly in all floods, most notably in the 20% flood.
- **Alternative 6 (Removal of the existing superstructure, piers, and abutment 1)** produced similar results as Alternative 5, as the existing abutments do not significantly obstruct the riverbanks. If the bridge is not put back in service, this alternative is recommended as it removes the piers from the channel and removes abutment 1 now rather than in a future project as the abutment will deteriorate over time.

Estimated project cost per Alternative:

Alternative	Project Cost
<b>BRIDGE ALTERNATIVE 1 (No Action)</b>	\$ 10,000.00
<b>BRIDGE ALTERNATIVE 2 (Bridge Repair)</b>	\$ 824,600.00
<b>BRIDGE ALTERNATIVE 3 (New Two-Span Structure)</b>	\$ 1,995,825.00
<b>BRIDGE ALTERNATIVE 4 (New Single-Span Structure)</b>	\$ 3,996,731.25
<b>BRIDGE ALTERNATIVE 5 (Remove Superstructure and Piers)</b>	\$ 325,000.00
<b>BRIDGE ALTERNATIVE 6 (Remove Superstructure, Piers and Abutment 1)</b>	\$ 399,750.00

#### Recommendation Statements:

1. For reasons stated previously, Alternatives 1, 4 and 5 should not be considered for further development.
2. If the bridge is to be removed permanently from service, we recommend alternative 6 is chosen. Rather than keeping abutment 1 in place, as depicted in alternative 5, it will deteriorate over time and will require future removal.
3. Should the most immediately cost-effective solution be desired, we recommend alternative 2 is chosen. The existing superstructure to remain will receive minor repairs and strengthening to extend the service life of the structure to 25 years. The two smallest flood events are negatively impacted while considering debris and ice, however, the water surface of the events is contained within the limits of the channel banks.
4. Should a longer-term solution be desired, and funding become available, we recommend alternative 3 is chosen as it extends the service life of the structure to 75 years by providing new substructures and superstructure. In addition, this alternative will provide better hydraulic flow characteristics considering the structure depth can be slightly reduced and debris potential is improved with a single pier.

## Conclusion:

Alternative 3 is recommended for further advancement and consideration for the following reasons:

- Alternative 3 restores rail service to a customer, mitigating truck traffic on local roads.
- The structure depth is slightly reduced, improving hydraulic flow versus existing conditions.
- Two existing piers are replaced with a single pier, mitigating larger logs from spanning the piers.
- Service life of the structure is extended from 25 years (alternative 2) to 75 years for alternative 3.
- Top of rail profile is maintained and does not need to be elevated, mitigating adverse effects to the flood plain and adjacent roadway crossings.
- Environmental resource impacts are limited to the work within the waterway to remove the existing piers, similar to other alternatives.
- New bridge design allows bridge capacity to be met throughout the service life of the structure.
- Due to the new structure and single pier, bridge maintenance, channel maintenance, bridge repairs and bridge replacement is mitigated or reduced to minimal maintenance for 75 years.

DRAFT



## 2.0 Introduction

### 2.1 Background

Located on the Vermont Rail System in Barre City, Vermont, Bridge 308 is a 3-span deck plate girder structure that crosses the Stevens Branch of the Winooski River. The bridge was constructed in 1950 and was rehabilitated in 2013. Bridge 308 has a span length of 89'-3" from center to center of bearings. At the abutment 1 and piers, the beams bear on steel bearings which are set on top of timber pile bents, abutment 2 is a concrete abutment.

Previously, Jacobs completed an in-depth inspection and load rating report for Bridge 308 in 2013. In 2019 Jacobs completed an emergency inspection of Bridge 308, observing damage to the structure and prepared recommendations in a field observation report. A special inspection report was also completed for the bridge after being closed due to ice damage.

Since the ice damaged the timber pile bents, the bridge has been closed to rail traffic. The bridge provides railroad access to the Granite Industries of Vermont property located on the south side of Stevens Branch. The track terminates approximately 130 feet west of Bridge 308.

At Bridge 308, the area bounding the river is located within Zone AE, as delineated by the National Flood Insurance Program (NFIP). Zone AE areas are Special Flood Hazard Areas subject to inundation by the 1% Annual Chance Flood (100-year flood), with base flood elevations determined. The Flood Profile for Stevens Branch in the Flood Insurance Study indicates a flood elevation of 589.7 at Bridge 308 for the 1% Annual Chance Flood (100-year flood). For additional information, please see the Hydrology and Hydraulics Report contained in Appendix E.

Stevens Branch has a history of flooding in Barre City with several significant events since 1927. Most recently, in July 2023, Stevens Branch and the surrounding area flooded again after significant rainfall.

### 2.2 Existing Bridge

Bridge No. 308 is located on the Vermont Rail System, WACR Montpelier Barre Subdivision at Mile Post 6.9 in Barre City, Vermont. Bridge 308 is a 3-span deck plate girder structure that crosses the Stevens Branch. The bridge superstructure is in satisfactory condition and consists of an open timber deck supported by rolled steel beams with no skew. Beams are numbered 1 and 2 from north to south, and are spaced at 6'-6", centered under the rail. The bridge substructure consists of two abutments and two timber pile bent piers, both piers are in serious condition. Abutment 1 at the west bank of the Stevens Branch is a timber pile bent and concrete block retaining wall in satisfactory condition. Abutment 2 is a concrete abutment is in good condition and located near the top of the east riverbank, it was reconstructed as part of a rehabilitation of the bridge in 2013. The 2013 rehabilitation project included installation of walls and large stone riprap along the east riverbank, upstream, downstream and in front of Abutment 2. Pier 1 is located within the river channel near the west bank and consists of two rows of (5) 12" diameter timber piles with 10" high steel cross beam cap beams. A similar configuration exists at Pier 2 in the river channel near the bottom of the east bank. Pier 1 was previously repaired using a steel H-pile and steel channels. Both piers have sustained damage to the timber piles resulting from ice/debris, prompting the closure of the bridge.

Bridge 308 has a span length of 89'-3" from center to center of bearings with three 29'-0" spans. At the abutments and piers, the beams bear on steel bearings which are set on top of timber pile bents.

The skew angle of the piers and abutments compared to the river flow path was measured to be approximately 18 degrees.

The vertical clearance from the bottom of the existing bridge structure to the riverbed is approximately 12 feet, although this value can vary across the channel. The total depth of the existing superstructure, including deck and girders, is approximately 3.96 feet.

## 2.3 Environmental Resources

The following Environmental Resource Determinations have been made for this projects area:

- **Archaeological Resources:** There are no known or expected archaeological sites in the Area of Potential Effect.
- **Historic Resources:** There are no historic buildings, structures, or landscapes in the Area of Potential Effect.
- **Wetlands/Watercourses:** No wetlands will be impacted. The Stevens Branch flows north-westerly through the project site. There will be minor temporal impacts to the river during the removal of the existing piles and the installation of the new steel piles. Work will likely qualify for the VT COE General Permit.
- **Aquatic Organism Passage:** There are no state/federal listed species with mapped presence within this area.
- **Agricultural Soils:** No prime agricultural soils will be impacted because of this project.
- **Wildlife Habitat:** No impacts to wildlife habitat are anticipated.
- **Rare, Threatened and Endangered Species:** The project is within the northern long-eared bat, *Myotis septentrionalis* (state endangered, federally T) range. No documented roosts or hibernacula are within 1-mile of the project area. Potential suitable habitat for this species varies. Typically, suitable habitat consists of forested areas that have trees (dead or alive)  $\geq 3$ " DBH that exhibit cracking, peeling bark, holes, crevices, and bridges, etc. Riparian zones and hedge rows are used as travel corridors for this species. There is adjacent potential suitable habitat although no impacts are anticipated.
- **6(f) Properties:** There aren't any 6(f) Properties within the project area.
- **Hazardous Waste:** A known hazardous waste site is identified within the proposed project area (hazardous waste site #870030). However, due to project scope, impacts to these sites are not anticipated. Coordination with the Hazard Waste Coordinator is not recommended at this time.
- **Contaminated Soils:** The proposed project is located within a mapped Urban Background Soils area (See ANR Atlas Map dated 03/09/2023 in the folder). Additional coordination with the Hazard Waste coordinator is recommended. Disturbed soils within this project should be expected to be kept on site or follow notice to bidders' guidance.
- **Wild Scenic Rivers:** There aren't any designated Wild Scenic Rivers within the project area.
- **Act 250 Permits:** There aren't any Act 250 Permits within the project area.
- **FEMA Floodplains:** There are FEMA Floodplains mapped within the project area and a Flood Hazard Area/ River Corridor Permit may be required if there are impacts.
- **River Corridor:** There are River Corridors mapped within the project area and a Flood Hazard Area/ River Corridor Permit may be required if there are impacts. An ANR river management engineer consultation is recommended.
- **Protected Lands:** There aren't any Protected Lands within the project area.
- **US Coast Guard:** There aren't any US Coast Guard navigable waterways within the project area.
- **Lakes and Ponds:** There aren't any lakes or ponds within the project area.
- **Scenic Highway/ Byway:** There aren't any Scenic Highway/ Byways within the project area.

- Environmental Justice: There is an EJ low-income population within the proposed projects area based upon the EPA EJ Screen online mapping tool. The proposed projects scope will help to provide the determination of adverse impacts and effects to this low-income population in the project area.
- Operation Stormwater Considerations: There are no Operation Stormwater concerns for this site.

## 2.4 Right-Of-Way and Adjacent Properties

The proposed work depicted in all alternatives presented in this report is contained within the railroad Right-Of-Way. Access and staging areas located to the east of the bridge includes access to the rail corridor from West 2<sup>nd</sup> Street and a staging area at the east approach and contained within the Railroad Right-Of-Way. Contractor access and staging areas located to the west of the project would necessitate an agreement with the property owners of Granite Industries. No other properties are envisioned to be affected because of the proposed alternatives.

## 2.5 Information provided by Barre City

The 2017 Barre City Hazard Mitigation Plan had two action items related to this project.

- Create local flood hazard maps which indicate flooding potential beyond FEMA's 100-year flood plan. The 2017 updated indicated that this task has not been done yet, and the new FIRM maps were issued March 2013, so we have new models for interpretation of our local areas; the City will reconsider this task at a later date, and is a low priority.
- Reengineer RR trestle on Vanetti Place. The 2017 update states the following: The City approached VTrans to complete this task as it falls to their jurisdiction. The railroad now uses this trestle with the reactivation of the train, and we have contingency plans in place where the DPW inspects quarterly to keep an eye on the debris that may build up and remove any of it.

VTrans provided Barre City with a Local and Regional Input Questionnaire that was filled out by representatives of the city and returned to VTrans, the questionnaire is contained in Appendix H

## 2.6 Site Utilities

There are numerous utilities within the project area. Barre City owns both water lines and sewer lines; there are overhead aerial lines identified as being owned by Charter Communications, Consolidated Communications, Green Mountain Power, and Vermont Telephone Company. It is anticipated that these utilities would not require adjustment as part of this project.

## 2.7 Site Description and Location

Bridge No. 308 is located along an 800-foot-long siding on the WACR Montpelier Barre Subdivision at Mile Post 6.9 in Barre City. The siding terminates on the west side of Stevens Branch on the Granite Industries of Vermont property. The bridge is situated approximately 300 feet west of the W. 2<sup>nd</sup> Street railroad crossing.

Stevens Branch is a tributary of the Winooski River. Stevens Branch originates in the town of Williamstown, and generally flows in a north to northwesterly direction through Barre Town, Barre City, and Berlin where it joins the Winooski River. The total length of Stevens Branch is approximately 13 miles, with a vertical drop of approximately 1,000 feet. Major tributaries of Stevens Branch include Martin Brook, Jail Branch, Gunners Brook, and Pond Brook.

In the vicinity of Bridge 308, Stevens Branch is confined with steep banks on both sides of the river. Upstream of the bridge, there is a retaining wall along the east side of the river which supports the back parking lot of the adjacent Hutchins Roofing Company property. The wall is constructed of concrete and stone; the concrete segment extends south from the existing east bridge abutment for approximately 58 feet and then connects to the stone segment of the wall. On the north side of Stevens Branch upstream of the bridge, the bank slopes are wooded and typically range between 1(Horiz.):1(Vert.) and 1.5(Horiz.):1(Vert.). Downstream of the bridge, the riverbanks on both sides are wooded and typically range between 1(Horiz.):1(Vert.) and 1.5(Horiz.):1(Vert.). The river curves to the left as it flows under Bridge 308 from an easterly heading to a northerly heading. Stone riprap has been placed on the sloped banks in the vicinity of both bridge abutments in past years. The bottom of the river channel is generally clean with boulders and cobbles of various sizes, with no vegetative growth.

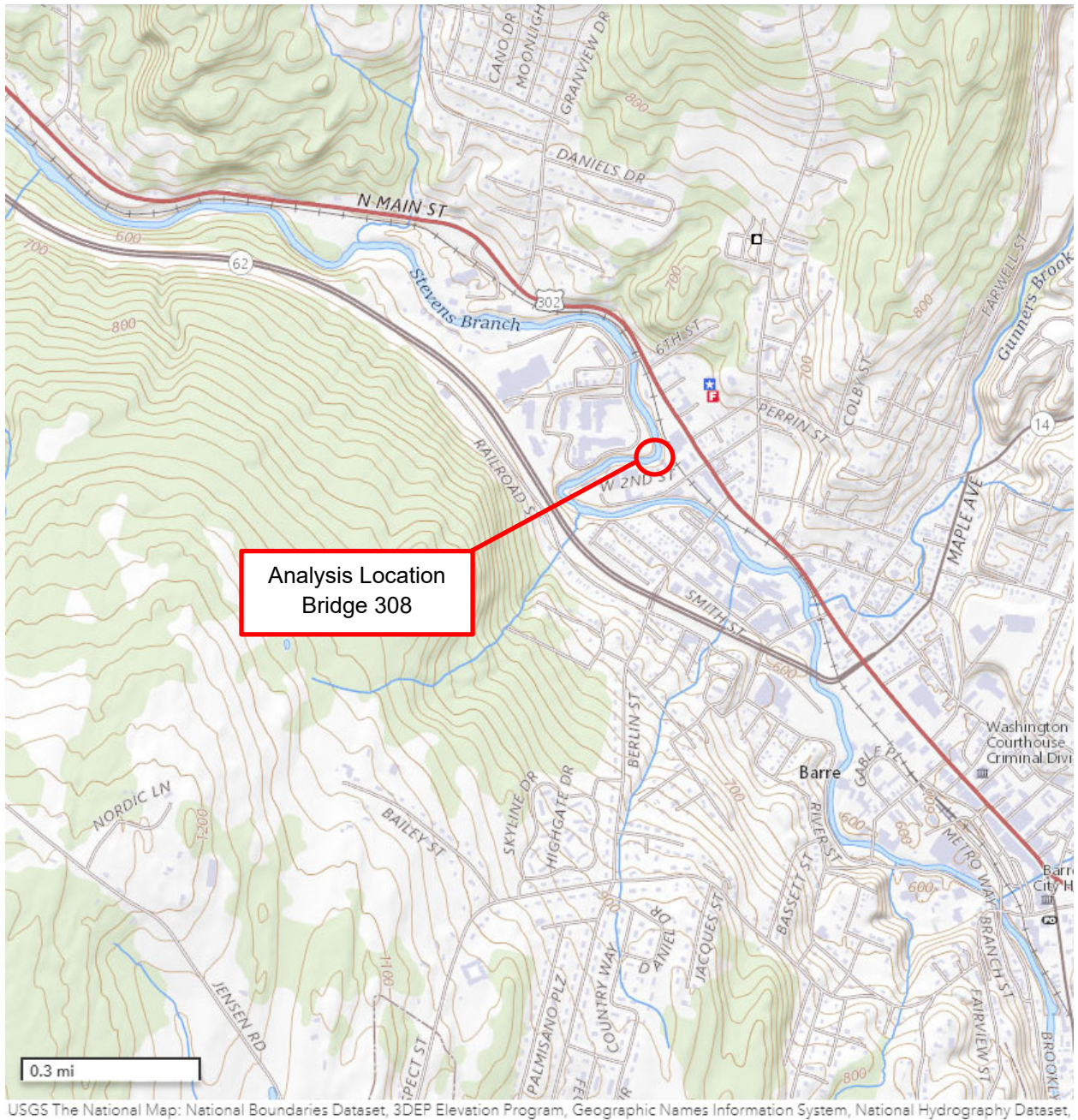
In the vicinity of Bridge 308, the Zone AE floodplain defined by FEMA extends into the surrounding neighborhoods. On the east side of Stevens Branch, the floodplain encompasses West Second Street and North Main Street. On the west side of Stevens Branch, the floodplain encompasses Vanetti Place and the Granite Industries of Vermont property. The floodplain areas are largely developed, with a mix of industrial, commercial, and residential properties.

A USGS map and aerial image showing the project location are included on the following pages.

Photos of Bridge 308 and Stevens Branch at the bridge are included in Appendix A.

DRAFT





USGS Quadrangle Map, Barre West, VT, 2018 (Source: USGS Map Service Center)





Aerial Photo (Source: Google Earth, 2022)

### 3.0 Proposed Alternatives Descriptions

#### 3.1 Bridge Alternative 1 – No Action

The No Action or “Do Nothing” alternative keeps all elements of the structure in place. Since the closure of the bridge in 2019, this alternative has been exercised until a proposed alternative can be advanced.

This option is not recommended as a long-term solution but will be satisfactory until a proposed alternative is chosen, provided the integrity of the existing piers are able to support the existing superstructure. Should rail traffic be restored over the bridge, a repair or replacement alternative will be chosen. If the bridge is not placed back into service and permanently closed, we recommend alternative 6 – Remove Superstructure, Pier and Abutment 1 is chosen to mitigate further deterioration of the bridge elements and alleviate debris/ice build-up maintenance efforts.

Pros:

- Least expensive option

Cons:

- Does not re-establish rail traffic
- Increases local truck traffic for movement of goods by the customers once served by rail
- Does not improve ice/debris build-up
- Ice/debris maintenance is still required
- Future removal will still be required as the existing bridge elements deteriorate / fail

#### 3.2 Bridge Alternative 2 – Bridge Repair

This rehabilitation alternative involves replacing both damaged piers, retaining the existing superstructure with minor rehabilitation, and both existing abutments. The proposed replacement for the piers consists of a single row of steel pile as opposed to a double row of timber piles similar to the existing. Considering the curved geometry of the channel and future ice flows, there is high probability that ice related damages to this bent will continue to occur if a timber system were constructed. The proposed pile replacement consists of an HP14x117 cap beam with four (4) HP12 x 84 steel piles. The new piles would be driven to bedrock, cut to the required design elevation, and then be joined to the new cap beam by field welds. Angles can be attached to the front of the piles to break up ice and limits the catching of debris. Steel-on-steel sole & bearing plates like those currently used on the existing piers are proposed.

The existing bridge services Granite Industries, Inc. where the spur track ends a short distance beyond the bridge to the west. The bridge therefore routinely carries train car loading only and sees no engine loads. The bridge superstructure is currently deficient for 286K cars with a normal rating percentage of 94% at 10 mph due to minor section losses. The normal rating percentage however of a 263K car is 103% at 10 mph. Although the existing superstructure is 69 years old (Built 1950), it has only minor deterioration and is adequate for remaining in service to Granite Industries for the foreseeable future provided loadings are restricted to 263K cars at 10 mph or a rehabilitation is proposed. The proposed pier replacement was designed for the 286-kip car due to the limitation of the existing superstructure but can be redesigned for the Cooper E-80 loading and adding 2 additional piles to ensure they are adequate for future strengthening or replacement of the superstructure. The profile of the bridge will remain unchanged and thereby avoid a need for modification of the adjacent roadway crossing.

The existing timber piles conflict with the proposed pile locations and must be extracted. The pile extraction process and new steel pile driving work involves the use of a crane which at a minimum requires the superstructure spans to be temporarily removed. Based on a readily available Grove GMK5275 crane, spans 2 & 3 could both be lifted in their entirety from the east approach, however, span 1 would need to be lifted from the west approach unless a larger capacity crane was utilized at the east approach.

Rehabilitation Alternative 2 – Bridge Repair is intended to be an economized solution that can quickly return the existing bridge back to active service while extending its remaining service life and providing increased durability against future ice/debris loadings.

Pros:

- Re-establishes rail traffic thus reducing local truck traffic for the customers served by rail.
- Cost of Alternative 2 is less than Alternatives 3 & 4 if re-establishing rail traffic.
- Alternative 1 can be designed and constructed in a reduced amount of time compared with Alternatives 3 & 4.
- Service life of the structure is extended by 25 years.
- Replacing the piers with consideration of future design loading allows for the piers to be maintained for a future superstructure replacement.
- Improves resiliency for ice/debris build-up with single row of piles rather than double row of piles.
- Superstructure rehabilitation will allow 286 kip cars over the bridge and remove the current load restriction limiting the car weights to the 263 kip car.
- The profile is unchanged, and modification of adjacent roadway crossing is not needed.
- There will be no impacts on adjacent properties, utilities, or environmental resources.

Cons:

- This solution provides an extension of the current bridges service life of 25 years, which is considerably less than the service lives provided by Alternatives 3 and 4 of 75 years.
- The steel piles proposed for the piers will have an increased ice flow durability, however the possibility of larger logs “spanning” across the piers still exists.

### 3.3 Design Alternative 3 – New Two-Span Structure

This rehabilitation consists of removing the existing three superstructure spans and replacing them with two new 45' span superstructures with a single steel pile bent pier. The proposed superstructure would consist of six (6) steel plate girders supporting an open deck. The proposed steel pile bent would consist of an HP14x117 cap beam supported by six (6) HP12x84 piles; each pile in-line with the overhead girder. The proposed bearings would consist of steel-on-steel sole and slide plates similar to the existing bridge. The Pier and Superstructure as shown was sized for Copper E-80 loading but could be designed for a reduced loading due to the structures specific weight requirements.



Due to the larger superstructure loads, the existing timber bent at Abutment 1 requires replacement with a new steel pile bent similar to the proposed center pier. This work would also include temporarily removing the new riprap placed in 2013, removing the existing bent cap and extracting the existing timber piles. It is assumed that Abutment 2 has sufficient capacity to accommodate the new superstructure loads. The existing timber Pier 1 and Pier 2 would be removed with the timber piles cut to the bottom of the channel.

The proposed structure depth of the superstructure is reduced slightly compared to the existing bridge and will improve the hydraulic flow slightly. The elimination of a pier will also improve the horizontal hydraulic opening slightly but improve ice/debris build-up for the smaller flood events. The profile of the bridge will remain unchanged and thereby avoid a need for modification of the adjacent roadway crossing.

The proposed superstructure, abutment 1 and center pier in this Alternative reflect Cooper E-80 design loading. This higher design load was selected to ensure the superstructure can be salvaged and used elsewhere should Granite Industries (the sole user of the bridge) no longer require service in the future. However, the proposed superstructure and pier could be economized for 286K car loading with the number of piles at Abutment 1 reduced from 4 piles to 3 piles and center the center pier reduced from 6 piles to 4 piles.

Removal of existing spans/pile bents and timber pile extractions would be completed in a similar fashion as Alternative 2.

#### Pros:

- Re-establishes rail traffic thus reducing local truck traffic for the customers served by rail.
- Service life of the structure is extended to 75 years.
- This option is significantly less expensive than Alternative 4 when considering bridge replacement.
- Improves resiliency and hydraulic performance for ice/debris build-up with a single pier in the channel versus 2 piers.
- There would be no load carrying capacity restriction of the bridge.
- There will be no impacts on adjacent properties, utilities, or environmental resources.
- Hydraulic characteristics of the brook will be slightly improved due to a single pier.
- Bridge and channel maintenance is significantly reduced if not completely mitigated due to the structure being new and this option only having one pier in the channel.
- If in the future, the bridge was no longer servicing rail customers, the new replacement superstructure spans could likely be re-used in another location, alleviating some risk associated with this investment.

#### Cons:

- The cost of Alternative 3 is more than Alternative 2 when considering re-establishing rail traffic.
- The steel piers will have increased durability and significantly reduce ice/debris build-up; however, a pier will still be placed in the channel.
- This alternative requires longer design, fabrication, and construction durations relative to Alternative 2.

### 3.4 Bridge Alternative 4 – New Single-Span Structure

This rehabilitation alternative involves replacing the existing superstructure and constructing a single 90' span replacement superstructure to eliminate piers within the channel. The proposed superstructure would consist of four (4) steel plate girders supporting an open timber deck. The bridge would be designed to accommodate Cooper E80 loading. Due to the longer span lengths, rocker type steel bearings will be required with a stainless steel/PTFE assemblies provided at the expansion end of the bridge.

The existing timber Piers 1 and 2 would be removed and the timber piles cut down to the bottom of the channel. Due to the larger superstructure loads, the existing timber Bent 1 at Abutment 1 would require replacement with a new steel pile bent. Abutment 2 would be retained and is satisfactory for the heavier design loads if expansion bearings are placed at abutment 2. The proposed steel pile bent piers would consist of a steel cap beam supported by six (6) HP12x84 piles.

The required depth of superstructure would be approximately 32" greater than the existing bridge. To maintain the hydraulic opening, the proposed bottom of superstructure would match the existing structure, thereby resulting in the track vertical profile increasing accordingly. To accommodate this increase in vertical profile, abutment 2 would require new timber retainers to accommodate the additional fill and ballast. For this cost alternatives report, we assume the existing precast concrete block wall at Abutment 1 and the 2013 constructed Abutment 2 can accommodate the additional earth and ballast loads associated with the profile increase.

The increase in vertical profile will cause significant undesirable impacts to both the east and west approaches including the adjacent properties and roadways crossings.

- i. The west approach within the Granite Industries yard would require a grading change that results in the yard being pitched and possibly changing its drainage characteristics in the vicinity of a main structure.
- ii. The east approach is abutted by existing buildings and the West 2nd Street crossing that cannot undergo a 32" +/- grade change without having design impacts that are very undesirable.
- iii. The increase in profile would lift the track bed up accordingly, which would create a dam effect across the flood plain.

The girders would be delivered to the staging area and picked from the east approach. Due to the girders being significantly heavier than the picks considered in Alternatives 2 & 3, the assumed Grove GMK5275 is adequate to pick each girder and place one at a time.

#### Pros:

- Re-establishes rail traffic thus reducing local truck traffic for the customers served by rail.
- Service life of the structure is extended to 75 years.
- Improves resiliency and hydraulic performance for ice/debris build-up without pier in the channel.
- There would be no load carrying capacity restriction of the bridge.
- Hydraulic characteristics of the channel will be improved slightly by eliminating both piers.
- Bridge and channel maintenance is significantly reduced if not completely mitigated due to the structure being new and this option having no piers in the channel.
- If in the future, the bridge was no longer servicing rail customers, the new replacement superstructure spans could likely be re-used in another location.

Cons:

- There will be significant impacts to the adjacent properties and utilities due to the significant increase in profile.
- The increase in profile and subsequent building up of the track bed will create a dam effect within the flood plain.
- This alternative requires a longer design, manufacturing, and construction duration relative to Alternatives 2 and 3.
- This option is significantly more expensive than Alternatives 2 and 3 when considering bridge replacement.

### **3.5 Bridge Alternative 5 – Remove Superstructure and Piers**

This alternative removes the existing superstructure and piers but maintains the existing abutments for potential future re-use.

This alternative was investigated to determine if removing the channel constrictions would positively affect the hydraulics of the channel, while maintaining the existing abutments for future re-use. The analysis indicated that removing the bridge has little effect on the hydraulics as the bridge is just a small portion of the flood plain as the bridge is overtopped and the hydraulic flow extends beyond the channel banks. This option slightly improves channel flow when considering ice and debris in the modeling.

Should rail traffic be restored in the future, a replacement alternative will be chosen at that time. It should be noted that a future bridge replacement that utilizes abutment 1 may require a span arrangement similar to the existing geometry, as an increase in span length would require replacement of abutment 1 due to increased loading.

Pros:

- Second least expensive option
- Slightly improves ice/debris build-up

Cons:

- Does not re-establish rail traffic
- Increases local truck traffic for movement of goods by the customers once served by rail
- Future removal of abutment 1 required if the bridge is not replaced in the future.

### **3.6 Design Alternative 6 – Remove Superstructure, Piers, and Abutment 1**

This alternative is similar to Alternative 5, with the exception that Abutment 1 will also be removed. Pros and Cons for Alternative 6 are similar to Alternative 5.

Removal of Abutment 1 had no effect on hydraulics as compared to Alternative 5. Abutment 2 will remain in place as it is integral with the retaining walls located on the westerly embankment.

If the bridge is not placed back into service and permanently closed, we recommend this alternative is chosen as abutment 1 will deteriorate over time and eventually require removal.

## **4.0 Conclusions**

Please see the Executive Summary for proposed recommendation statements and conclusion.

**APPENDIX A**

**Existing Conditions Site Photographs**

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Looking downstream at Stevens Branch from Bridge 308



Looking upstream at Stevens Branch from Bridge 308





Looking downstream along Stevens Branch at Bridge 308



Looking upstream along Stevens Branch at Bridge 308



Looking at Pier 1 from west bank

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**APPENDIX B**

**Alternatives Comparison Matrix**

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# Bridge 308 Alternatives Comparison Matrix



	Alternative 1	Alternative 1A	Alternative 2	Alternative 2A	Alternative 3	Alternative 3A	Alternative 4	Alternative 5	Alternative 6
<b>Structure Alternate Description</b>	Existing Bridge Remains in Place (Free Flow Model) - No action	Existing Bridge Remains in Place (Debris Model) - No action	Repair the Damaged Piers (Free Flow Model) - Exist. superstructure remains - Replace damaged pier 2 - Replace pier 1	Repair the Damaged Pier (Debris Model) - Exist. superstructure remains - Replace damaged pier 2 - Replace pier 1	New 2-Span Bridge (Free Flow Model) - Exist. superstructure removed - Remove both existing piers - New superstructure - New center pier	New 2-Span Bridge (Debris Model) - Exist. superstructure removed - Remove both existing piers - New superstructure - New center pier	New Single Span Bridge (Free Flow Model) - Exist. superstructure removed - Remove both existing piers - New superstructure - No piers	Remove Existing Superstructure and Piers (Free Flow Model) - Exist. superstructure removed - Remove both existing piers - No piers	Remove Existing Superstructure, Piers and Abutment 1 (Free Flow Model) - Exist. superstructure removed - Remove both existing piers - Remove existing abutment 1 - No piers
<b>Proposed Superstructure Type</b>	Existing to remain	Existing to remain	Existing to remain	Existing to remain	New steel deck girders	New steel deck girders	New steel girders	Existing to be removed	Existing to be removed
<b>Proposed Pier(s) within Channel</b>	2 Existing	2 Existing	2 new in existing location	2 new in existing location	1 at center of channel	1 at center of channel	None	None	None
<b>Proposed Substructure</b>	<ul style="list-style-type: none"> <li>Existing abutments to remain</li> <li>Existing piers to remain</li> </ul>	<ul style="list-style-type: none"> <li>Existing abutments to remain</li> <li>Existing piers to remain</li> </ul>	<ul style="list-style-type: none"> <li>Existing abutments to remain</li> <li>Existing piers to be replaced in existing location</li> </ul>	<ul style="list-style-type: none"> <li>Existing abutments to remain</li> <li>Existing piers to be replaced in existing location</li> </ul>	<ul style="list-style-type: none"> <li>Abutment 1 to be replaced</li> <li>Abutment 2 to remain</li> <li>New center pier</li> </ul>	<ul style="list-style-type: none"> <li>Abutment 1 to be replaced</li> <li>Abutment 2 to remain</li> <li>New center pier</li> </ul>	<ul style="list-style-type: none"> <li>Abutment 1 to be replaced</li> <li>Abutment 2 to be remain</li> </ul>	<ul style="list-style-type: none"> <li>Existing abutments to remain</li> </ul>	<ul style="list-style-type: none"> <li>Abutment 2 to remain</li> </ul>
<b>PROJECT DELINEATORS</b>	<b>Alternative 1</b>	<b>Alternative 1A</b>	<b>Alternative 2</b>	<b>Alternative 2A</b>	<b>Alternative 3</b>	<b>Alternative 3A</b>	<b>Alternative 4</b>	<b>Alternative 5</b>	<b>Alternative 6</b>
Bridge returned to Service for Rail Traffic?	NO	NO	YES	YES	YES	YES	YES	NO	NO
Water Surface Elevation - Q2 (Change V. Existing Condition)	EL. 580.47 (N/A)	EL. 585.91 (N/A)	EL. 580.42 (Lowered 0.05 feet)	EL. 585.91 (No Change)	EL. 580.37 (Lowered 0.10 feet)	EL. 582.21 (Lowered 3.70 feet)	EL. 580.31 (Lowered 0.16 feet)	EL. 580.34 (Lowered 0.13 feet)	EL. 580.34 (Lowered 0.13 feet)
Water Surface Elevation - Q5 (Change V. Existing Condition)	EL. 584.00 (N/A)	EL. 586.51 (N/A)	EL. 583.93 (Lowered 0.07 feet)	EL. 586.50 (Lowered 0.01 feet)	EL. 584.24 (Increased 0.24 feet)	EL. 586.54 (Increased 0.03 feet)	EL. 583.61 (Lowered 0.39 feet)	EL. 582.74 (Lowered 1.26 feet)	EL. 582.74 (Lowered 1.26 feet)
Water Surface Elevation - Q10 (Change V. Existing Condition)	EL. 586.97 (N/A)	EL. 587.35 (N/A)	EL. 586.97 (No Change)	EL. 587.36 (Increased 0.01 feet)	EL. 586.96 (Lowered 0.01 feet)	EL. 587.05 (Lowered 0.30 feet)	EL. 587.02 (Increased 0.05 feet)	EL. 587.05 (Increased 0.08 Feet)	EL. 587.05 (Increased 0.08 Feet)
Water Surface Elevation - Q50 (Change V. Existing Condition)	EL. 589.60 (N/A)	EL. 589.46 (N/A)	EL. 589.60 (No Change)	EL. 589.46 (No Change)	EL. 589.58 (Lowered 0.02 feet)	EL. 589.61 (Lowered 0.15 feet)	EL. 589.46 (Lowered 0.14 feet)	EL. 589.51 (Lowered 0.09 Feet)	EL. 589.51 (Lowered 0.09 Feet)
Water Surface Elevation - Q100 (Change V. Existing Condition)	EL. 590.49 (N/A)	EL. 590.54 (N/A)	EL. 590.49 (No Change)	EL. 590.54 (No Change)	EL. 590.48 (Lowered 0.01 feet)	EL. 590.51 (Lowered 0.03 feet)	EL. 590.35 (Lowered 0.14 feet)	EL. 590.40 (Lowered 0.09 Feet)	EL. 590.40 (Lowered 0.09 Feet)
Water Surface Elevation - Q500 (Change V. Existing Condition)	EL. 592.00 (N/A)	EL. 592.03 (N/A)	EL. 592.00 (No Change)	EL. 591.87 (Lowered 0.06 feet)	EL. 591.99 (Lowered 0.01 feet)	EL. 592.01 (Lowered 0.02 feet)	EL. 591.98 (Lowered 0.02 feet)	EL. 591.90 (Lowered 0.10 Feet)	EL. 591.90 (Lowered 0.10 Feet)
<b>Note: Water Surface Elevations for Alternatives 2, 3, 4, 5 and 6 (Free Flow Model) compared to Alternative 1. Water Surface Elevations for Alternatives 2A and 3A (Debris Model) compared to Alternative 1A.</b>									
Is Debris/Ice Buildup Improved	NO - Requires Debris Removal	NO - Requires Debris Removal	Slightly - Will Require Debris Removal	Slightly - Will Require Debris Removal	Slightly - Center Pier Only	Slightly - Center Pier Only	YES (No Piers)	YES (No Piers)	YES (No Piers)

# Bridge 308 Alternatives Comparison Matrix



	Alternative 1	Alternative 1A	Alternative 2	Alternative 2A	Alternative 3	Alternative 3A	Alternative 4	Alternative 5	Alternative 6
Improves Bridge Maintenance	NO – Existing Condition	NO – Existing Condition	YES - New Piers; Debris Removal Reduced	YES - New Piers; Debris Removal Reduced	YES; New Center Pier and Superstructure	YES; New Center Pier and Superstructure	YES; No Piers and new Superstructure	YES Bridge Removed	YES Bridge Removed
Improves Service Life	NO – No Action	NO – No Action	Yes, new piers enhance services life to 25 yrs; can be used for future superstructure repl.	Yes, new piers enhance services life to 25 yrs; can be used for future superstructure repl.	Yes, new substructures and superstructure provides 75-year service life	Yes, new substructures and superstructure provides 75-year service life	Yes, new abutment and superstructure provides 75-year service life	Bridge Removed	Bridge Removed
Permanent Property Impacts	No Permanent Construction Impacts. No Action Alternative	No Permanent Construction Impacts. No Action Alternative	No, temporary construction impacts only	No, temporary construction impacts only	No, temporary construction impacts only	No, temporary construction impacts only	Increase in rail profile effects adjacent properties	No, temporary construction impacts only	No, temporary construction impacts only
Summary of environmental impacts	Does not improve ice/debris buildup	Does not improve ice/debris buildup	Slightly Reduces Ice/debris buildup. Work in water during construction	Slightly Reduces Ice/debris buildup. Work in water during construction	Reduces Ice/debris buildup. Work in water during construction	Reduces Ice/debris buildup. Work in water during construction	Rail profile increase creates dam effect within floodway. Work in water during construction	Work in water during construction	Work in water during construction
Cultural resource impacts	NO	NO	NO	NO	NO	NO	POSSIBLE	NO	NO
Will meets AREMA/VTrans standards	NO	NO	YES	YES	YES	YES	YES	N/A	N/A
City travel way impacts	YES Increase truck traffic for loading/unloading granite customer	YES Increase truck traffic for loading/unloading granite customer	NO	NO	NO	NO	YES Roadway revised at crossing to meet increased rail profile	YES Increase truck traffic for loading/unloading granite customer	YES Increase truck traffic for loading/unloading granite customer
Monetary impact to railroad customer	YES	YES	NO	NO	NO	NO	NO	YES	YES
City utility impacts (Aerial & Underground)	NO	NO	NO	NO	NO	NO	POSSIBLE	NO	NO
City drainage system impacts	NO	NO	NO	NO	NO	NO	YES	NO	NO
Current 2024 Construction Cost	\$10,000 Annually	\$10,000 Annually	\$824,600	\$824,600	\$1,995,825	\$1,995,825	\$3,996,731	\$325,000	\$399,750
Shading Key	Desirable	Neutral	Not Desirable						

**APPENDIX C:**  
**Bridge Alternatives CADD Plans**

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# STATE OF VERMONT AGENCY OF TRANSPORTATION



## PROPOSED IMPROVEMENT BRIDGE PROJECT

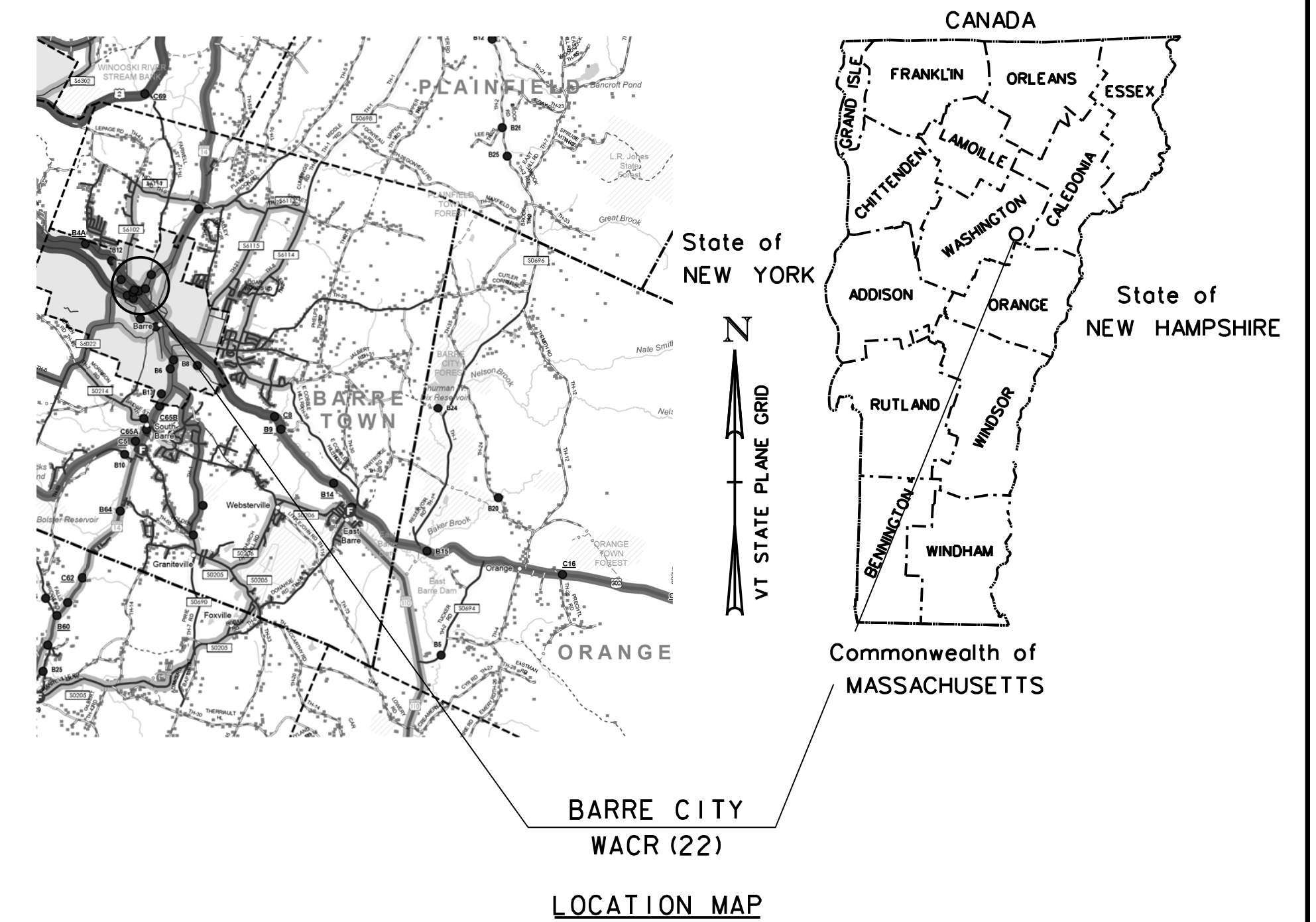
CITY OF BARRE  
COUNTY OF WASHINGTON

WASHINGTON COUNTY RAILROAD (WACR) BRIDGE NO. 308

PROJECT LOCATION : WACR BRIDGE NO. 308 OVER STEVENS BRANCH AT MILE POST 6.90

PROJECT DESCRIPTION : BRIDGE ALTERNATIVES ANALYSIS

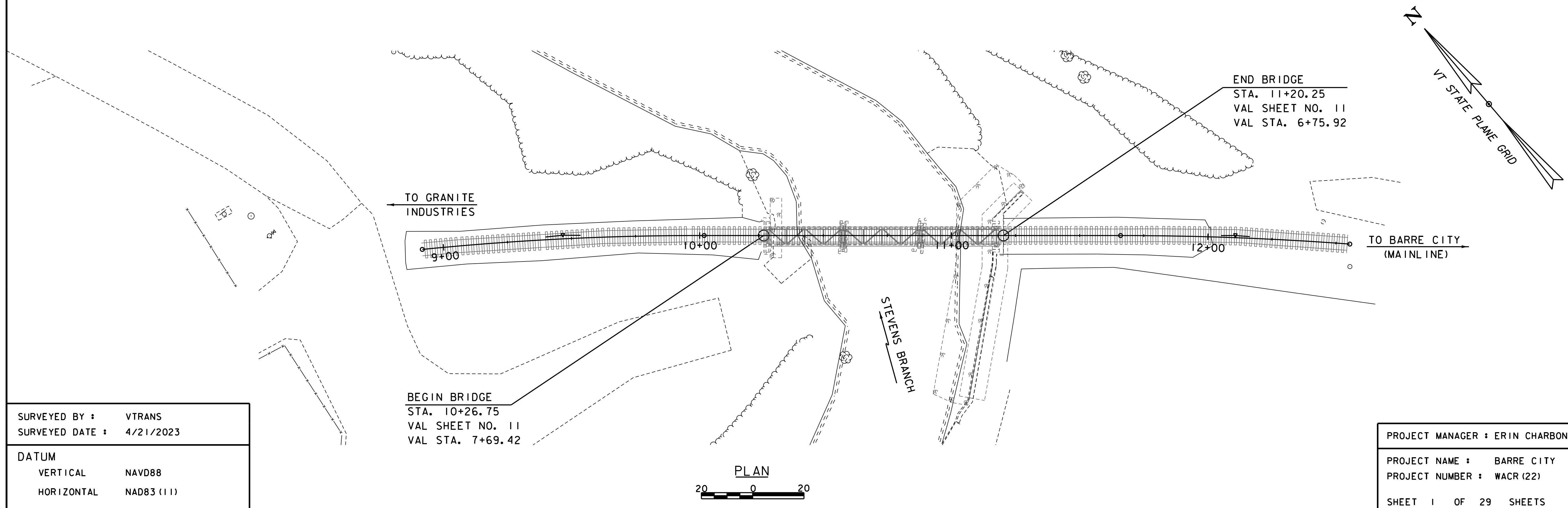
LENGTH OF STRUCTURE : 93.5 FEET



### BRIDGE ALTERNATIVES ANALYSIS

#### INDEX OF SHEETS

- 1 TITLE SHEET
- 2 SYMBOLOGY LEGEND
- 3 TIE SHEET
- 4 BORING INFORMATION SHEET
- 5 BORING LOG SHEET 1
- 6 TRAFFIC CONTROL PLAN
- 7 EXISTING CONDITIONS SITE PLAN
- 8 EXISTING CONDITIONS PIER ELEVATIONS
- 9 ALTERNATIVE 1 PLAN
- 10 ALTERNATIVE 1 ELEVATION AND SECTION
- 11 ALTERNATIVE 2 PLAN
- 12 ALTERNATIVE 2 ELEVATION AND SECTION
- 13 ALTERNATIVE 3 PLAN
- 14 ALTERNATIVE 3 ELEVATION AND SECTION
- 15 ALTERNATIVE 4 PLAN
- 16 ALTERNATIVE 4 ELEVATION AND SECTION
- 17 ALTERNATIVE 5 PLAN
- 18 ALTERNATIVE 5 ELEVATION AND SECTION
- 19 ALTERNATIVE 6 PLAN
- 20 ALTERNATIVE 6 ELEVATION AND SECTION
- 21 - 28 CHANNEL CROSS SECTIONS 1 - 8
- 29 AREA OF DISTURBANCE



SURVEYED BY :	VTRANS
SURVEYED DATE :	4/21/2023
DATUM	
VERTICAL	NAVD88
HORIZONTAL	NAD83 (11)

PROJECT MANAGER : ERIN CHARBONNEAU	
PROJECT NAME :	BARRE CITY
PROJECT NUMBER :	WACR (22)
SHEET 1 OF 29 SHEETS	



**GENERAL INFORMATION**

**SYMBOLGY LEGEND NOTE**

THE SYMBOLGY ON THIS SHEET IS INTENDED TO COVER STANDARD CONVENTIONAL SYMBOLGY. THE SYMBOLGY IS USED FOR EXISTING & PROPOSED FEATURES WITH HEAVIER LINEWEIGHT, IN COMBINATION WITH PROJECT ANNOTATION, AS NOTED ON PROJECT PLAN SHEETS. THIS LEGEND SHEET COVERS THE BASICS. SYMBOLGY ON PLANS MAY VARY, PLAN ANNOTATIONS AND NOTES SHOULD BE USED TO CLARIFY AS NEEDED.

**R. O. W. ABBREVIATIONS (CODES) & SYMBOLS**

POINT CODE	DESCRIPTION
CH	CHANNEL EASEMENT
CONST	CONSTRUCTION EASEMENT
CUL	CULVERT EASEMENT
D&C	DISCONNECT & CONNECT
DIT	DITCH EASEMENT
DR	DRAINAGE EASEMENT
DRIVE	DRIVEWAY EASEMENT
EC	EROSION CONTROL
HWY	HIGHWAY EASEMENT
I&M	INSTALL & MAINTAIN EASEMENT
LAND	LANDSCAPE EASEMENT
R&RES	REMOVE & RESET
R&REP	REMOVE & REPLACE
R.T.& I.	RIGHT, TITLE, AND INTEREST
SR	SLOPE RIGHT
UE	UTILITY EASEMENT
(P)	PERMANENT EASEMENT
(T)	TEMPORARY EASEMENT
■	BNDNS BOUND SET
▣	BNDNS BOUND TO BE SET
◎	IPNF IRON PIN FOUND
●	IPNS IRON PIN TO BE SET
⊠	CALC EXISTING ROW POINT
○	PROW PROPOSED ROW POINT
[LENGTH]	LENGTH CARRIED ON NEXT SHEET

**COMMON TOPOGRAPHIC POINT SYMBOLS**

POINT CODE	DESCRIPTION
⊕	APL BOUND APPARENT LOCATION
◻	BM BENCHMARK
◻	BND BOUND
⊠	CB CATCH BASIN
⊕	COMB COMBINATION POLE
⊠	DITHR DROP INLET THROATED DNC
⊕	EL ELECTRIC POWER POLE
◊	FPOLE FLAGPOLE
○	GASFIL GAS FILLER
○	GP GUIDE POST
×	GSO GAS SHUT OFF
◊	GUY GUY POLE
◊	GUYW GUY WIRE
×	GV GATE VALVE
⊕	H TREE HARDWOOD
△	HCTRL CONTROL HORIZONTAL
△	HVCTRL CONTROL HORIZ. & VERTICAL
◇	HYD HYDRANT
◊	IP IRON PIN
◊	IPIPE IRON PIPE
⊕	LI LIGHT - STREET OR YARD
⊕	MB MAILBOX
○	MH MANHOLE (MH)
◻	MM MILE MARKER
◻	PM PARKING METER
◻	PMK PROJECT MARKER
◊	POST POST STONE/WOOD
⊕	RRSIG RAILROAD SIGNAL
⊕	RRSL RAILROAD SWITCH LEVER
⊕	S TREE SOFTWOOD
⊕	SAT SATELLITE DISH
⊕	SHRUB SHRUB
⊕	SIGN SIGN
⊕	STUMP STUMP
⊕	TEL TELEPHONE POLE
◊	TIE TIE
⊕	TSIGN SIGN W/DOUBLE POST
⊕	VCTRL CONTROL VERTICAL
◊	WELL WELL
×	WSO WATER SHUT OFF

THESE ARE COMMON VAOT SURVEY POINT SYMBOLS FOR EXISTING FEATURES, ALSO USED FOR PROPOSED FEATURES WITH HEAVIER LINEWEIGHT, IN COMBINATION WITH PROPOSED ANNOTATION.

**PROPOSED GEOMETRY CODES**

CODE	DESCRIPTION
PC	POINT OF CURVATURE
PI	POINT OF INTERSECTION
CC	CENTER OF CURVE
PT	POINT OF TANGENCY
PCC	POINT OF COMPOUND CURVE
PRC	POINT OF REVERSE CURVE
POB	POINT OF BEGINNING
POE	POINT OF ENDING
STA	STATION PREFIX
AH	AHEAD STATION SUFFIX
BK	BACK STATION SUFFIX
D	CURVE DEGREE OF (100FT)
R	CURVE RADIUS OF
T	CURVE TANGENT LENGTH
L	CURVE LENGTH OF
E	CURVE EXTERNAL DISTANCE
CB	CHORD BEARING

**UTILITY SYMBOLGY**

**UNDERGROUND UTILITIES**

— UGU —	UTILITY (GENERIC-UNKNOWN)
— UT —	TELEPHONE
— UE —	ELECTRIC
— UC —	CABLE (TV)
— UEC —	ELECTRIC+CABLE
— UET —	ELECTRIC+TELEPHONE
— UCT —	CABLE+TELEPHONE
— UECT —	ELECTRIC+CABLE+TELEPHONE
— G —	GAS LINE
— W —	WATER LINE
— S —	SANITARY SEWER (SEPTIC)

**ABOVE GROUND UTILITIES (AERIAL)**

— AGU —	UTILITY (GENERIC-UNKNOWN)
— T —	TELEPHONE
— E —	ELECTRIC
— C —	CABLE (TV)
— EC —	ELECTRIC+CABLE
— ET —	ELECTRIC+TELEPHONE
— AER E&T —	ELECTRIC+TELEPHONE
— CT —	CABLE+TELEPHONE
— ECT —	ELECTRIC+CABLE+TELEPHONE
—	UTILITY POLE GUY WIRE

**PROJECT CONSTRUCTION SYMBOLGY**

**PROJECT DESIGN & LAYOUT SYMBOLGY**

— — — CZ — — —	CLEAR ZONE
—————	PLAN LAYOUT MATCHLINE

**PROJECT CONSTRUCTION FEATURES**

▲ —▲—▲—▲—▲	TOP OF CUT SLOPE
○ —○—○—○—○	TOE OF FILL SLOPE
⊗ ⊗ ⊗ ⊗ ⊗	STONE FILL
-----	BOTTOM OF DITCH
-----	CULVERT PROPOSED
-----	STRUCTURE SUBSURFACE
PDF — PDF	PROJECT DEMARCATION FENCE
BF — BF	BARRIER FENCE
XXXXXXXXXXXXXXXXXXXX	TREE PROTECTION ZONE (TPZ)
//// //// //// ////	STRIPING LINE REMOVAL
~~~~~	SHEET PILES

**CONVENTIONAL BOUNDARY SYMBOLGY**

**BOUNDARY LINES**

—————	TOWN BOUNDARY LINE
—————	COUNTY BOUNDARY LINE
—————	STATE BOUNDARY LINE
~~~~~	PROPOSED STATE R.O.W. (LIMITED ACCESS)
~~~~~	PROPOSED STATE R.O.W.
~~~~~	STATE ROW (LIMITED ACCESS)
~~~~~	STATE ROW
~~~~~	TOWN ROW
-----	PERMANENT EASEMENT LINE (P)
-----	TEMPORARY EASEMENT LINE (T)
-----	SURVEY LINE
— P —	PROPERTY LINE (P/L)
— SR —	SLOPE RIGHTS
6f — 6f	6F PROPERTY BOUNDARY
4f — 4f	4F PROPERTY BOUNDARY
HAZ — HAZ	HAZARDOUS WASTE

**EPSC LAYOUT PLAN SYMBOLGY**

**EPSC MEASURES**

ONNOONNOONNO	FILTER CURTAIN
— — — — —	SILT FENCE
— — — — —	SILT FENCE WOVEN WIRE
— — — — —	CHECK DAM
▣	DISTURBED AREAS REQUIRING RE-VEGETATION
⊠	EROSION MATTING

SEE EPSC DETAIL SHEETS FOR ADDITIONAL SYMBOLGY

**ENVIRONMENTAL RESOURCES**

— — — — —	WETLAND BOUNDARY
-----	RIPARIAN BUFFER ZONE
-----	WETLAND BUFFER ZONE
-----	SOIL TYPE BOUNDARY
— T&E —	THREATENED & ENDANGERED SPECIES
HAZ — HAZ	HAZARDOUS WASTE AREA
— AG —	AGRICULTURAL LAND
— HABITAT —	FISH & WILDLIFE HABITAT
— FLOOD PLAIN —	FLOOD PLAIN
— OHW —	ORDINARY HIGH WATER (OHW)
— — — — —	STORM WATER
— — — — —	USDA FOREST SERVICE LANDS
— — — — —	WILDLIFE HABITAT SUIT/CONN

**ARCHEOLOGICAL & HISTORIC**

— ARCH —	ARCHEOLOGICAL BOUNDARY
— HISTORIC DIST —	HISTORIC DISTRICT BOUNDARY
— HISTORIC —	HISTORIC AREA
Ⓜ	HISTORIC STRUCTURE

**CONVENTIONAL TOPOGRAPHIC SYMBOLGY**

**EXISTING FEATURES**

-----	ROAD EDGE PAVEMENT
-----	ROAD EDGE GRAVEL
-----	DRIVEWAY EDGE
-----	DITCH
-----	FOUNDATION
— x — x — x — x — x —	FENCE (EXISTING)
— □ — □ — □ — □ — □ —	FENCE WOOD POST
— ○ — ○ — ○ — ○ — ○ —	FENCE STEEL POST
~~~~~	GARDEN
— — — — —	ROAD GUARDRAIL
	RAILROAD TRACKS
-----	CULVERT (EXISTING)
-----	STONE WALL
-----	WALL
~~~~~	WOOD LINE
~~~~~	BRUSH LINE
~~~~~	HEDGE
~~~~~	BODY OF WATER EDGE
~~~~~	LEDGE EXPOSED

PROJECT NAME: BARRE CITY

PROJECT NUMBER: WACR(22)

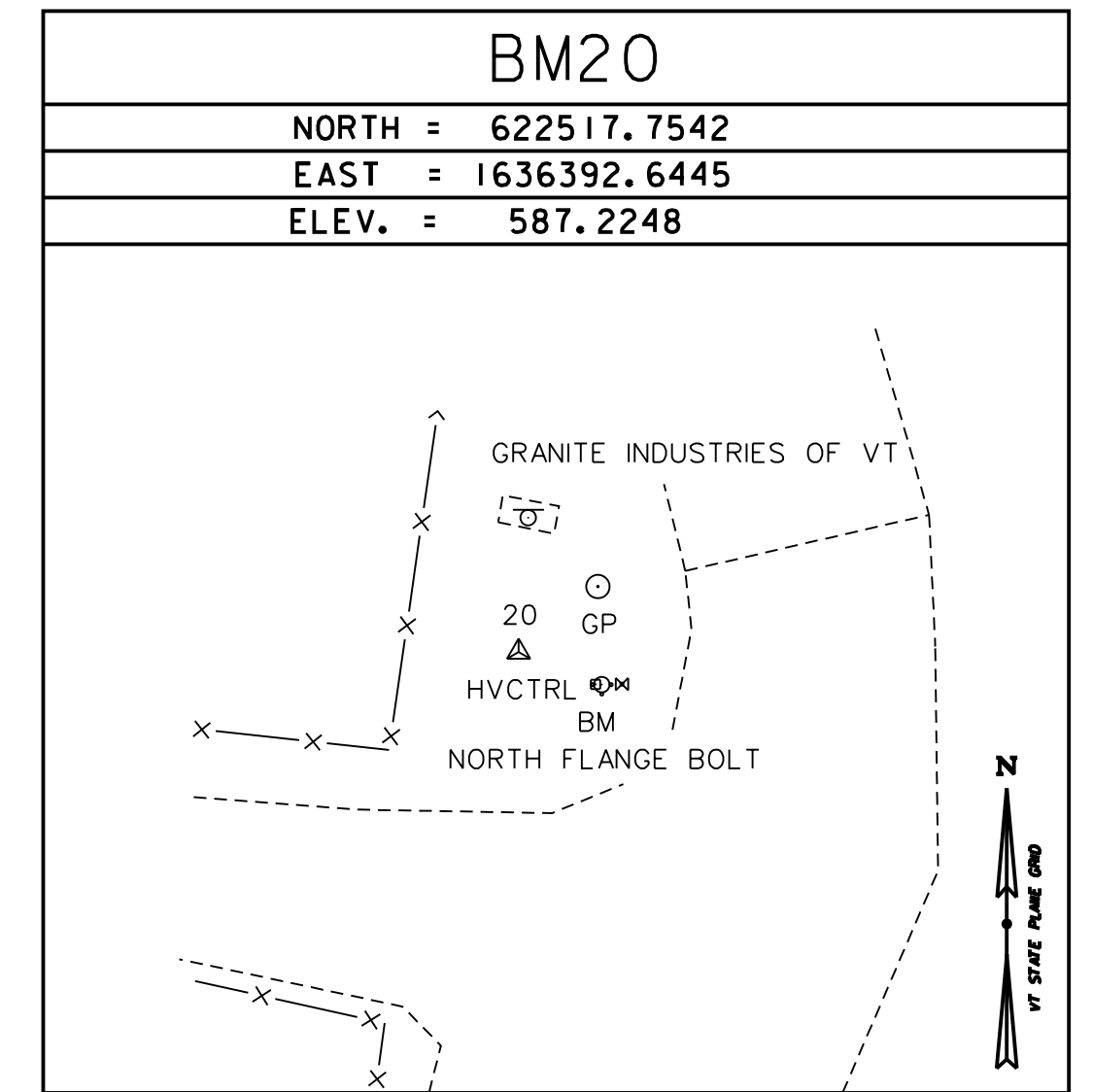
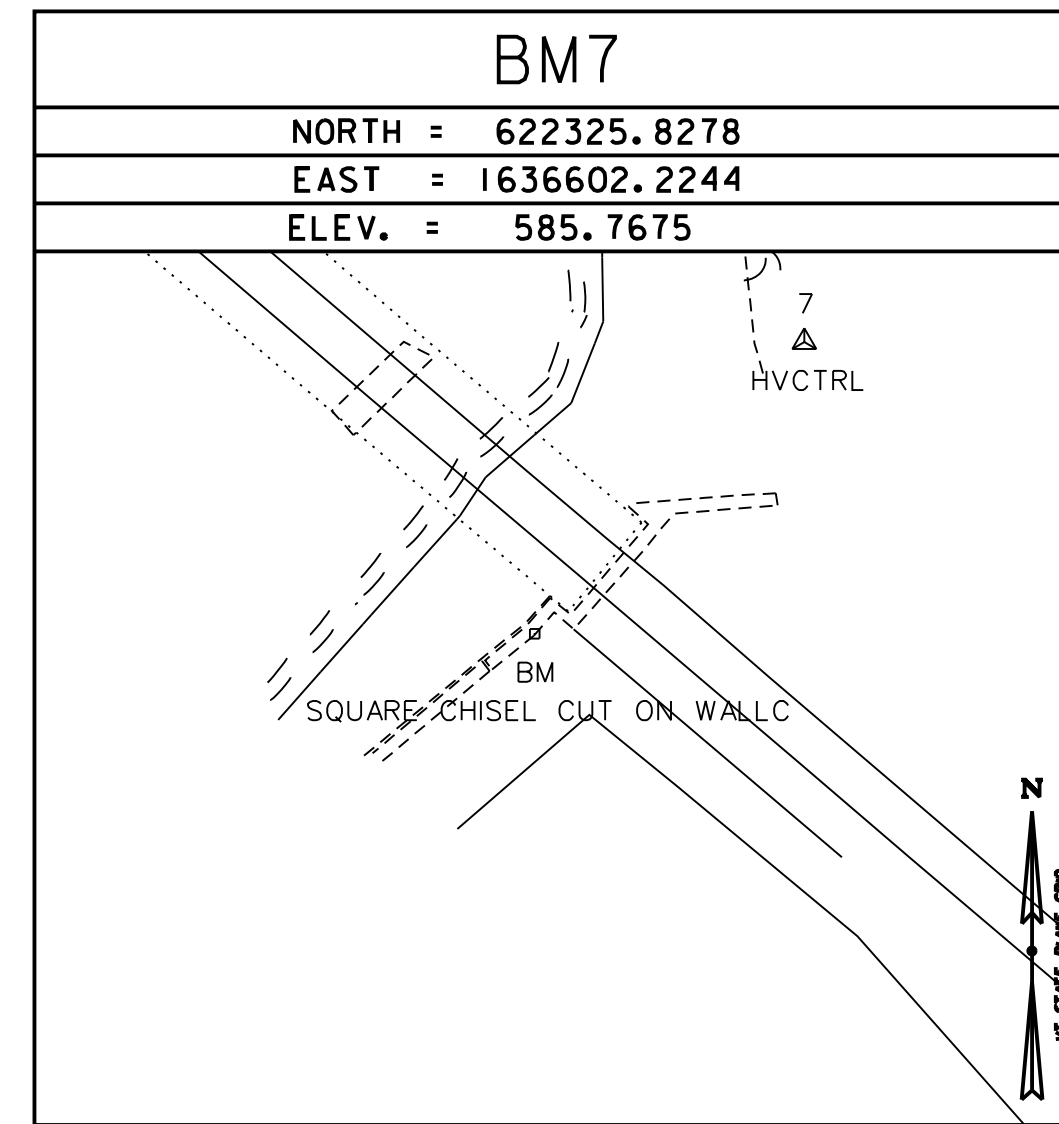
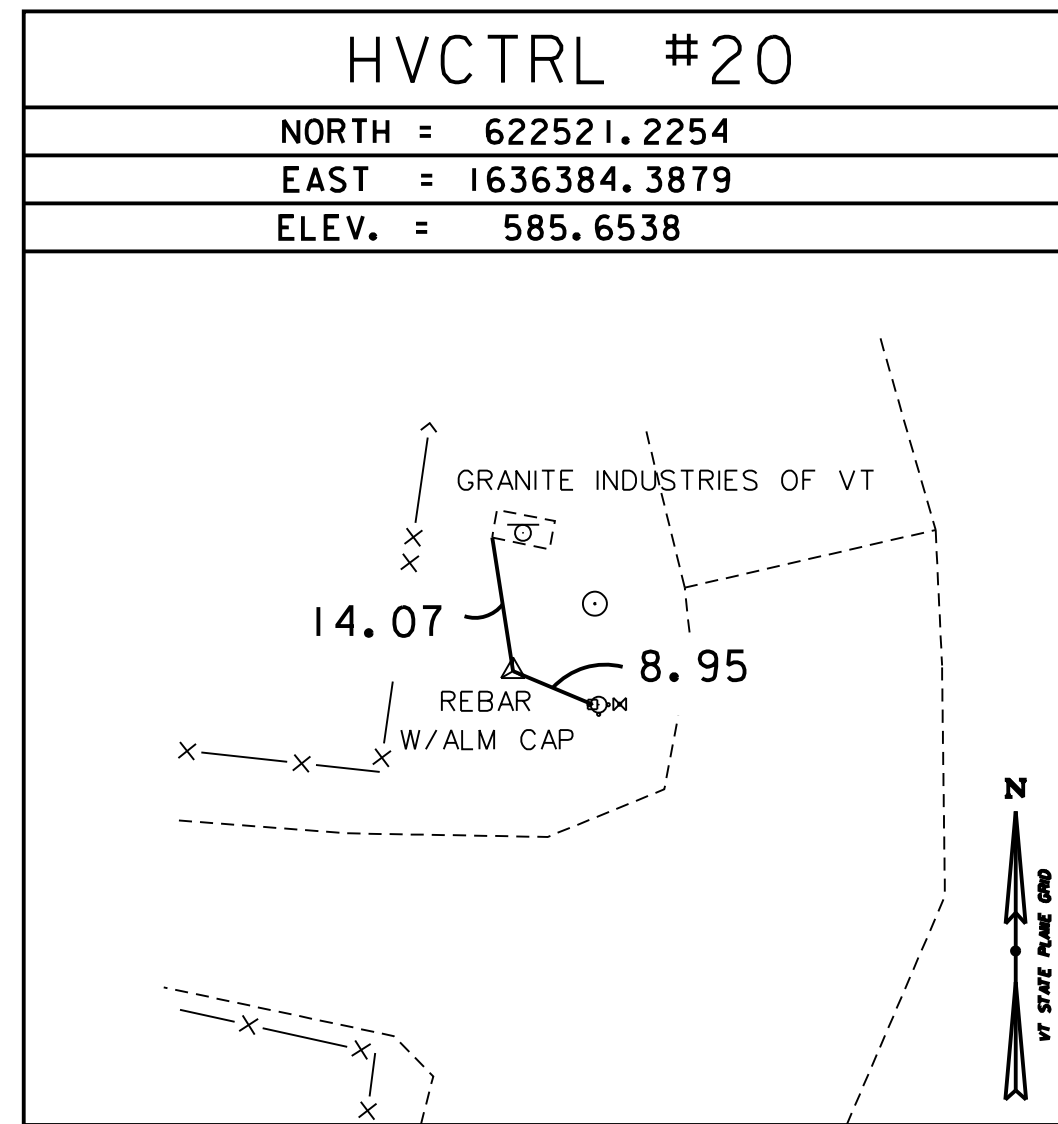
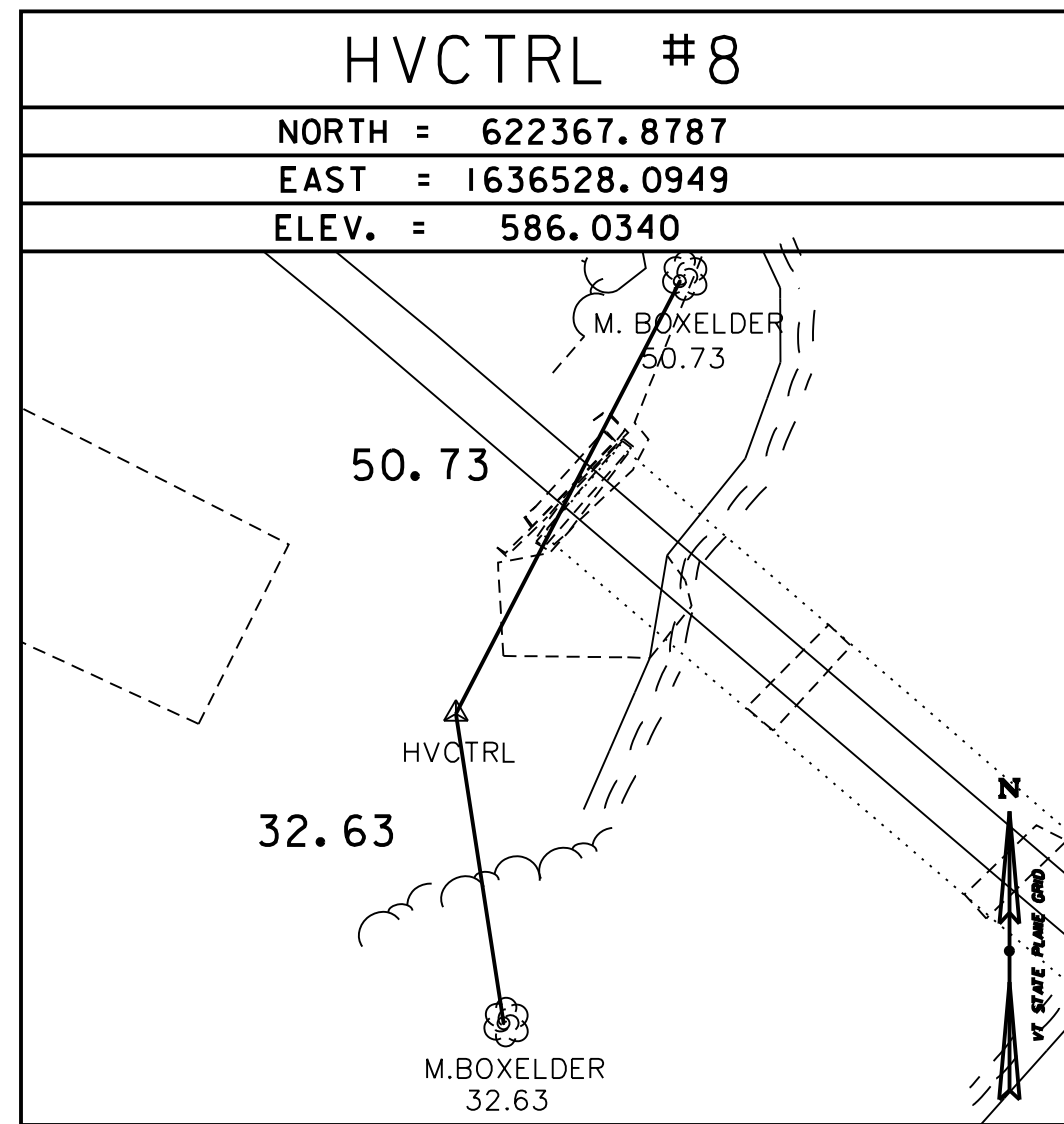
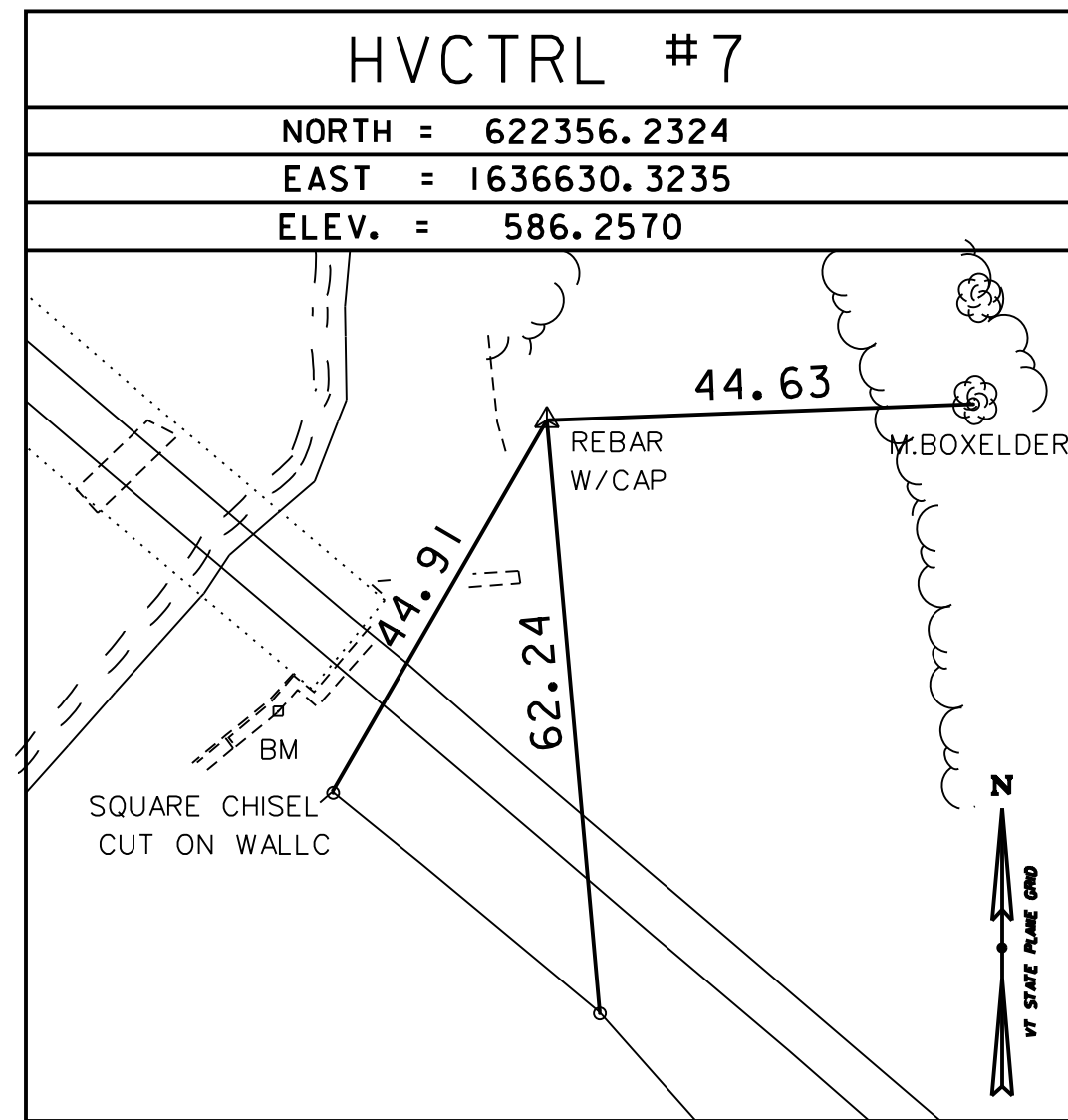
FILE NAME: z22g361leg.dgn  
PROJECT LEADER: J. WILSON  
DESIGNED BY: A. WALL  
SYMBOLGY LEGEND

PLOT DATE: 1/18/2024  
DRAWN BY: S. GUNN  
CHECKED BY: J. WILSON  
SHEET 2 OF 29

NETWORK CONTROL

\* NETWORK CONTROL TAKEN FROM VHB BOUNDARY SURVEY

LOCAL CONTROL



\* CONTROL ESTABLISHED ON 6/30/2019 BY GH AND TC

ALIGNMENT TIES

NORTH =	
EAST =	
ELEV. =	

NORTH =	
EAST =	
ELEV. =	

NORTH =	
EAST =	
ELEV. =	

NORTH =	
EAST =	
ELEV. =	

NORTH =	
EAST =	
ELEV. =	

DATUM	
VERTICAL	NAVD88
HORIZONTAL	NAD83(2011)
ADJUSTMENT	LEAST SQU.

PROJECT NAME: BARRE CITY	
PROJECT NUMBER: WACR (22)	
FILE NAME: 22G361TI.DGN	PLOT DATE: 1/18/2024
PROJECT LEADER: E.CHARBONNEAU	DRAWN BY: G. HITCHCOCK
DESIGNED BY: VTRANS	CHECKED BY: L. MACCORMACK
TIE SHEET	SHEET 3 OF 29

**SOIL CLASSIFICATION**

**AASHTO**

- A1 Gravel and Sand
- A3 Fine Sand
- A2 Silty or Clayey Gravel and Sand
- A4 Silty Soil - Low Compressibility
- A5 Silty Soil - Highly Compressible
- A6 Clayey Soil - Low Compressibility
- A7 Clayey Soil - Highly Compressible

**ROCK QUALITY DESIGNATION**

R.Q.D. (%)	ROCK DESCRIPTION
<25	Very Poor
25 to 50	Poor
51 to 75	Fair
76 to 90	Good
>90	Excellent

**SHEAR STRENGTH**

UNDRAINED SHEAR STRENGTH IN P.S.F.	CONSISTENCY
<250	Very Soft
250-500	Soft
500-1000	Med. Stiff
1000-2000	Stiff
2000-4000	Very Stiff
>4000	Hard

**CORRELATION GUIDE OF "N" TO DENSITY/CONSISTENCY**

DENSITY (GRANULAR SOILS)		CONSISTENCY (COHESIVE SOILS)	
N	DESCRIPTIVE TERM	N	DESCRIPTIVE TERM
<5	Very Loose	<2	Very Soft
5-10	Loose	2-4	Soft
11-24	Med. Dense	5-8	Med. Stiff
25-50	Dense	9-15	Stiff
>50	Very Dense	16-30	Very Stiff
		31-60	Hard
		>60	Very Hard

**COMMONLY USED SYMBOLS**

- ▼ Water Elevation
- ⊕ Standard Penetration Boring
- ⊗ Auger Boring
- ⊙ Rod Sounding
- S Sample
- N Standard Penetration Test  
Blow Count Per Foot For:  
2" O. D. Sampler  
1 3/8" I. D. Sampler  
Hammer Weight Of 140 Lbs.  
Hammer Fall Of 30"
- VS Field Vane Shear Test
- US Undisturbed Soil Sample
- B Blast
- DC Diamond Core
- MD Mud Drill
- WA Wash Ahead
- HSA Hollow Stem Auger  
Core Size 1 1/2"
- AX Core Size 1 5/8"
- BX Core Size 1 3/8"
- NX Core Size 2 1/8"
- M Double Tube Core Barrel Used
- LL Liquid Limit
- PL Plastic Limit
- PI Plasticity Index
- NP Non Plastic
- w Moisture Content (Dry Wgt. Basis)
- D Dry
- M Moist
- MTW Moist To Wet
- W Wet
- Sat Saturated
- Bo Boulder
- Gr Gravel
- Sa Sand
- Si Silt
- Cl Clay
- HP Hardpan
- Le Ledge
- NLTD No Ledge To Depth
- CNPF Can Not Penetrate Further
- TLOB Top of Ledge Or Boulder
- NR No Recovery
- Rec. Recovery
- 1/2 Rec. Percent Recovery
- ROD Rock Quality Designation
- CBR California Bearing Ratio
- < Less Than
- > Greater Than
- R Refusal (N > 100)
- VTSPG NAD83 - See Note 7

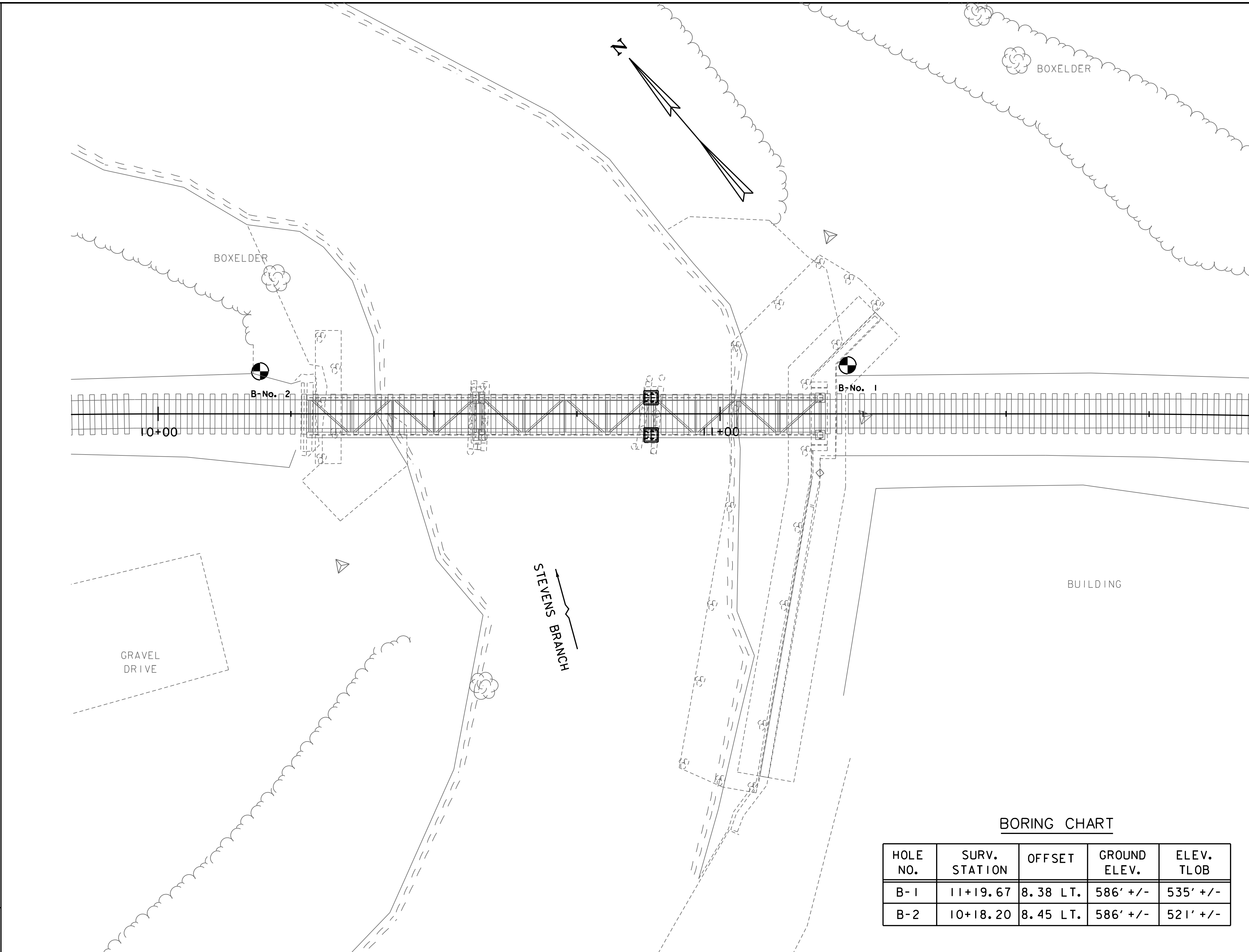
**COLOR**

blk	Black	pnk	Pink
bl	Blue	pu	Purple
brn	Brown	rd	Red
dk	Dark	tn	Tan
gry	Gray	wh	White
gn	Green	yel	Yellow
lt	Light	mltc	Multicolored
or	Orange		

**DEFINITIONS (AASHTO)**

- BEDROCK (LEDGE)** - Rock in its native location of indefinite thickness.
- BOULDER** - A rock fragment with an average dimension > 12 inches.
- COBBLE** - Rock fragments with an average dimension between 3 and 12 inches.
- GRAVEL** - Rounded particles of rock < 3" and > 0.075" (\*10 sieve).
- SAND** - Particles of rock < 0.075" (\*10 sieve) and > 0.0029" (\*200 sieve).
- SILT** - Soil < 0.0029" (\*200 sieve), non or slightly plastic and exhibits no strength when air-dried.
- CLAY** - Fine grained soil, exhibits plasticity when moist and considerable strength when air-dried.

- VARVED** - Alternate layers of silt and clay.
- HARDPAN** - Extremely dense soil, cemented layer, not softened when wet.
- MUCK** - Soft organic soil (containing > 10% organic material).
- MOISTURE CONTENT** - Weight of water divided by dry weight of soil.
- FLOWING SAND** - Granular soil so saturated (loose) that it flows into drill casing during extraction of wash rod.
- STRIKE** - Angle from magnetic north to line of intersection of bed with a horizontal plane.
- DIP** - Inclination of bed with a horizontal plane.



**BORING CHART**

HOLE NO.	SURV. STATION	OFFSET	GROUND ELEV.	ELEV. TLOB
B-1	11+19.67	8.38 LT.	586' +/-	535' +/-
B-2	10+18.20	8.45 LT.	586' +/-	521' +/-

**GENERAL NOTES**

- The subsurface explorations shown herein were made between 8-13-01 and 8-24-01 by the Agency.
- Soil and rock classifications, properties and descriptions are based on engineering interpretation from available subsurface information by the Agency and may not necessarily reflect actual variations in subsurface conditions that may be encountered between individual boring or sample locations.
- Observed water levels and/or conditions indicated are as recorded at the time of exploration and may vary according to the prevailing rainfall, methods of exploration and other factors.
- Engineering judgment was exercised in preparing the subsurface information presented herein. Analysis and interpretation of subsurface data was performed and interpreted for Agency design and estimating purposes. Presentation of the information in the Contract is intended to provide the Contractor access to the same data available to the Agency. The subsurface information is presented in good faith and is not intended as a substitute for personal investigation, independent interpretation, independent analysis or judgment by the Contractor.
- Pictorial structure details shown on the boring plan layout or soils profile are for illustrative purposes only and may not accurately portray final contract details..

SCALE 1" = 10' - 0"  
10 0 10

PROJECT NAME: BARRE CITY  
PROJECT NUMBER: WACR(22)

FILE NAME: z22g361bdr\_bor.dgn  
PROJECT LEADER: J. WILSON  
DESIGNED BY: A. WALL  
BORING INFORMATION SHEET

PLOT DATE: 1/18/2024  
DRAWN BY: S. GUNN  
CHECKED BY: J. WILSON  
SHEET 4 OF 29





# BORING LOG INFORMATION

STATE OF VERMONT AGENCY OF TRANSPORTATION MATERIALS & RESEARCH DIVISION SUBSURFACE INFORMATION		HOLE NO.: B-1 SHEET 1 OF 2 DATE STARTED: 9/24/01 DATE COMPLETED: 9/26/01							
PROJECT NAME: BARRE SITE NAME: WCRR STATION: 1+19.67 GROUND EL.: 586' +/-		PROJECT NUMBER: GRANITE IND. BRIDGE SITE NO.: SPUR LINE BR STATION: 8.38 LT G.W. DEPTH:							
BORING CREW CREW CHIEF: RUSSELL DRILLER: YOUNG LOGGER: SOMERS		BORING RIG: TRUCK BORING TYPE: WASH BORE SAMPLE TYPE: SPLIT BARREL							
DEPTH	SYMBOL	CLASSIFICATION OF MATERIALS (Description)	BLOWS PER FOOT	M.C. %	GRAVEL %	SAND %	FINES %	LL	PI
5		BXDC, 4.5'-7.0', No Sample, Boulder							
10		A-2-4, GrSa, brn, Moist, Rec. = 0.75'	20	15.6	29	53.6	17.4		
15		A-1-b, GrSa, brn, Moist, Rec. = 0.70'	9	16.8	32.7	54.3	13		
20		A-3, Sa, gry, Moist, Rec. = 0.33'	37	25.5	17.9	73.7	8.4		
25		A-4, Si, gry, Moist, Rec. = 0.50'	6	30.9	0.4	2.3	97.3		
30		A-4, Si, gry, Moist, Rec. = 0.75'	12	27.6	10.1	4.1	85.8		
35		A-4, Si, gry, MTW, Rec. = 1.33'	9	29.6		3.7	96.3		
40		A-4, Si, gry, MTW, Rec. = 2.00'	7	34.9		1	99		
45		A-4, Si, gry, Moist, Rec. = 1.50'	8	35.7		1.7	98.3		

STATE OF VERMONT AGENCY OF TRANSPORTATION MATERIALS & RESEARCH DIVISION SUBSURFACE INFORMATION		HOLE NO.: B-1 SHEET 2 OF 2 DATE STARTED: 9/24/01 DATE COMPLETED: 9/26/01							
PROJECT NAME: BARRE SITE NAME: WCRR STATION: 1+19.67 GROUND EL.: 586' +/-		PROJECT NUMBER: GRANITE IND. BRIDGE SITE NO.: SPUR LINE BR STATION: 8.38 LT G.W. DEPTH:							
BORING CREW CREW CHIEF: RUSSELL DRILLER: YOUNG LOGGER: SOMERS		BORING RIG: TRUCK BORING TYPE: WASH BORE SAMPLE TYPE: SPLIT BARREL							
DEPTH	SYMBOL	CLASSIFICATION OF MATERIALS (Description)	BLOWS PER FOOT	M.C. %	GRAVEL %	SAND %	FINES %	LL	PI
55		A-4, Si, gry, Moist, Rec. = 1.00'	R	36.8	0.1	4.1	95.8		
		Run#1: BXMDC, 51.0'-56.0', Rec. = 3.90', See Geologist's Report.	RUN	REC%	RQD%	Dip°			
			1	78	78	-			
60		A-4, Si, gry, Moist, Rec. = 3.00', See Geologist's Report.	2	60	0	20			
Hole stopped @ 61.0'									
DRILLER'S NOTES: 1. Top of bedrock @ 51.0' 2. Hole caved in (9/26/01). 3. (Run#2) More core was in hole, but could not retrieve it.									
GEOLOGIST'S REPORT: Run#1: Light gray meta-limestone, Hard, Unweathered, Competent. Run#2: Gray phyllitic slate with quartz veins, Moderately hard, Unweathered, Poor RQD may be due to mechanical breakage.									

STATE OF VERMONT AGENCY OF TRANSPORTATION MATERIALS & RESEARCH DIVISION SUBSURFACE INFORMATION		HOLE NO.: B-2 SHEET 1 OF 2 DATE STARTED: 9/18/01 DATE COMPLETED: 9/18/01							
PROJECT NAME: BARRE SITE NAME: WCRR STATION: 0+18.20 GROUND EL.: 586' +/-		PROJECT NUMBER: GRANITE IND. BRIDGE SITE NO.: SPUR LINE BR STATION: 8.45 LT G.W. DEPTH: 14.7 (09/18/01)							
BORING CREW CREW CHIEF: SOMERS DRILLER: YOUNG LOGGER: RUSSELL		BORING RIG: TRUCK BORING TYPE: WASH BORE SAMPLE TYPE: SPLIT BARREL							
DEPTH	SYMBOL	CLASSIFICATION OF MATERIALS (Description)	BLOWS PER FOOT	M.C. %	GRAVEL %	SAND %	FINES %	LL	PI
5		A-1-b, GrSa, brn, Dry, Rec. = 0.21'	10	13.4	32.5	49.6	17.9		
10		No Rec., Stone in end of Sampler.	16						
15		A-1-b, SaGr, gry, Moist, Rec. = 0.29'	26	10.3	44.6	43.5	11.9		
		18.0'-19.5', Boulders							
20		20.0'-22.0', No Rec., Stone in end of Sampler.	29						
25		Visual Classification: A-2-4, SiSa, brn, Moist, Rec. = To little to measure.	8						
30		No Rec.	8						
35		Visual Classification: A-4, SaSi, gry, Moist, Rec. = To little to measure.	14						
40		A-4, Si, gry, Moist, Rec. = 0.43'	5	35.5		1.5	98.5		
45		No Sample.	18						

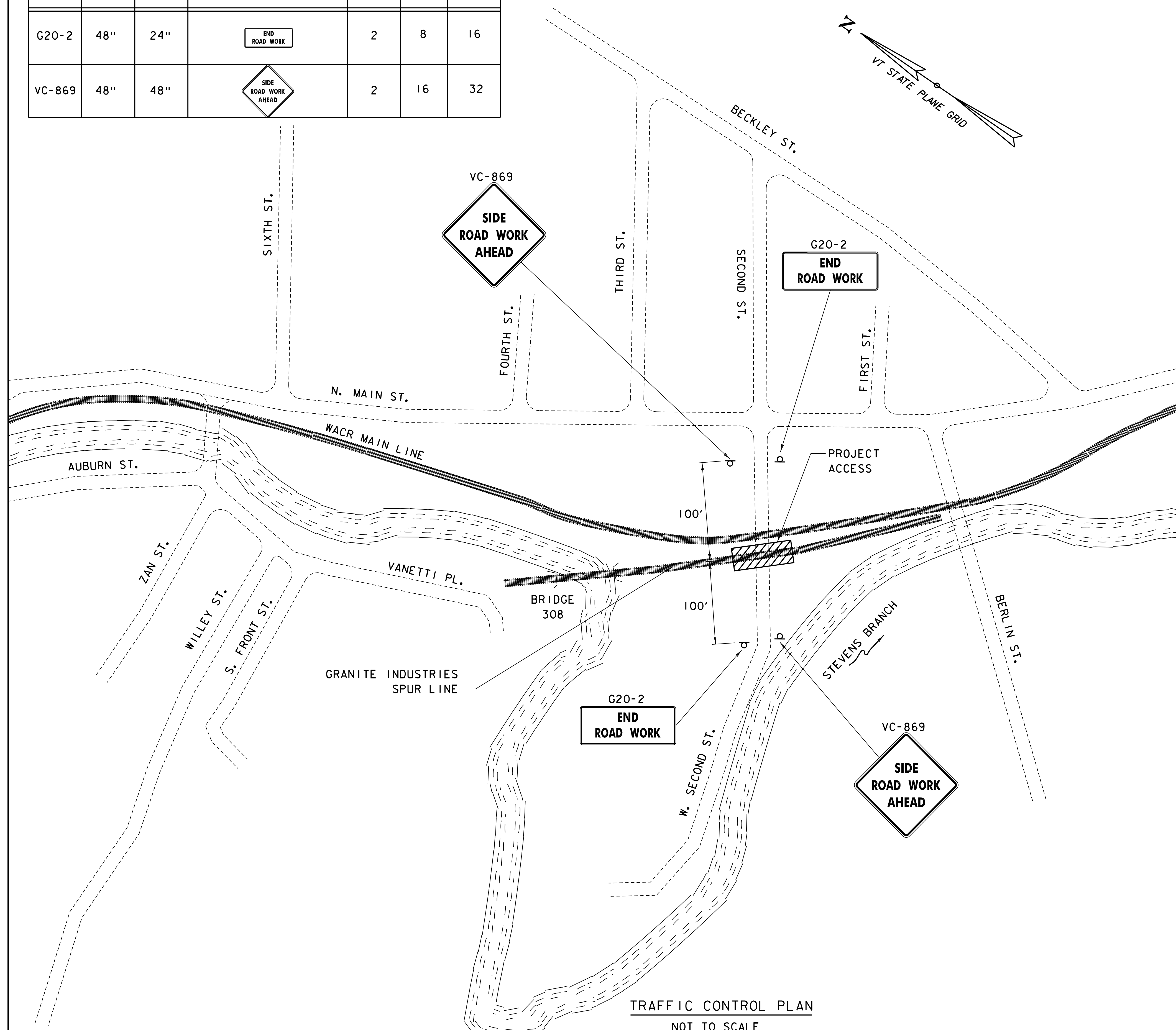
STATE OF VERMONT AGENCY OF TRANSPORTATION MATERIALS & RESEARCH DIVISION SUBSURFACE INFORMATION		HOLE NO.: B-2 SHEET 2 OF 2 DATE STARTED: 9/18/01 DATE COMPLETED: 9/18/01							
PROJECT NAME: BARRE SITE NAME: WCRR STATION: 0+18.20 GROUND EL.: 586' +/-		PROJECT NUMBER: GRANITE IND. BRIDGE SITE NO.: SPUR LINE BR STATION: 8.45 LT G.W. DEPTH: 14.7 (09/18/01)							
BORING CREW CREW CHIEF: SOMERS DRILLER: YOUNG LOGGER: RUSSELL		BORING RIG: TRUCK BORING TYPE: WASH BORE SAMPLE TYPE: SPLIT BARREL							
DEPTH	SYMBOL	CLASSIFICATION OF MATERIALS (Description)	BLOWS PER FOOT	M.C. %	GRAVEL %	SAND %	FINES %	LL	PI
55		A-4, Si, gry, MTW, Rec. = 2.00'	5	35.6	2.4	1.7	95.9		
60		A-4, Si, gry, MTW, Rec. = 1.33', 60.0'-60.8', No Sample, Boulders	R						
Top of bedrock @ 65.0'									
65		Run#1: BXGDC, 65.0'-69.0', Rec. = 0.60', See Geologist's Report.	RUN	REC%	RQD%	Dip°			
			1	15	0	20			
70		Run#2: BXGDC, 69.0'-74.0', Rec. = 2.25', See Geologist's Report.	2	45	45	45			
75		Run#3: BXGDC, 74.0'-79.0', Rec. = 4.33', See Geologist's Report.	3	87	87	-			
DRILLER'S NOTES: 1. Top of bedrock @ 65.0' 2. Water @ 14.7' (09/18/01)									
GEOLOGIST'S REPORT: Run #1: Gray slate, Moderately hard, Unweathered, Poor Recovery. Run #2: Gray phyllitic slate, Moderately hard, Unweathered, Poor recovery may be due to mechanical breakage while drilling. RQD value is questionable. Run#3: Above 74.15' is the same as Run#2. Below 74.15' is Light gray meta-limestone, Hard, Unweathered, Competent. Breaks due to mechanical breakage during drilling.									

PROJECT NAME: BARRE CITY  
PROJECT NUMBER: WACR(22)  
FILE NAME: z22g361bor.dgn  
PROJECT LEADER: J. WILSON  
DESIGNED BY: A. WALL  
BORING LOG SHEET 1  
PLOT DATE: 1/18/2024  
DRAWN BY: S. GUNN  
CHECKED BY: J. WILSON  
SHEET 5 OF 29





IDENTIFICATION NUMBER	SIZE OF SIGN		TEXT	NUMBER OF SIGNS REQUIRED	UNIT AREA (S.F.)	TOTAL AREA (S.F.)
	WIDTH	HEIGHT				
G20-2	48"	24"	END ROAD WORK	2	8	16
VC-869	48"	48"	SIDE ROAD WORK AHEAD	2	16	32



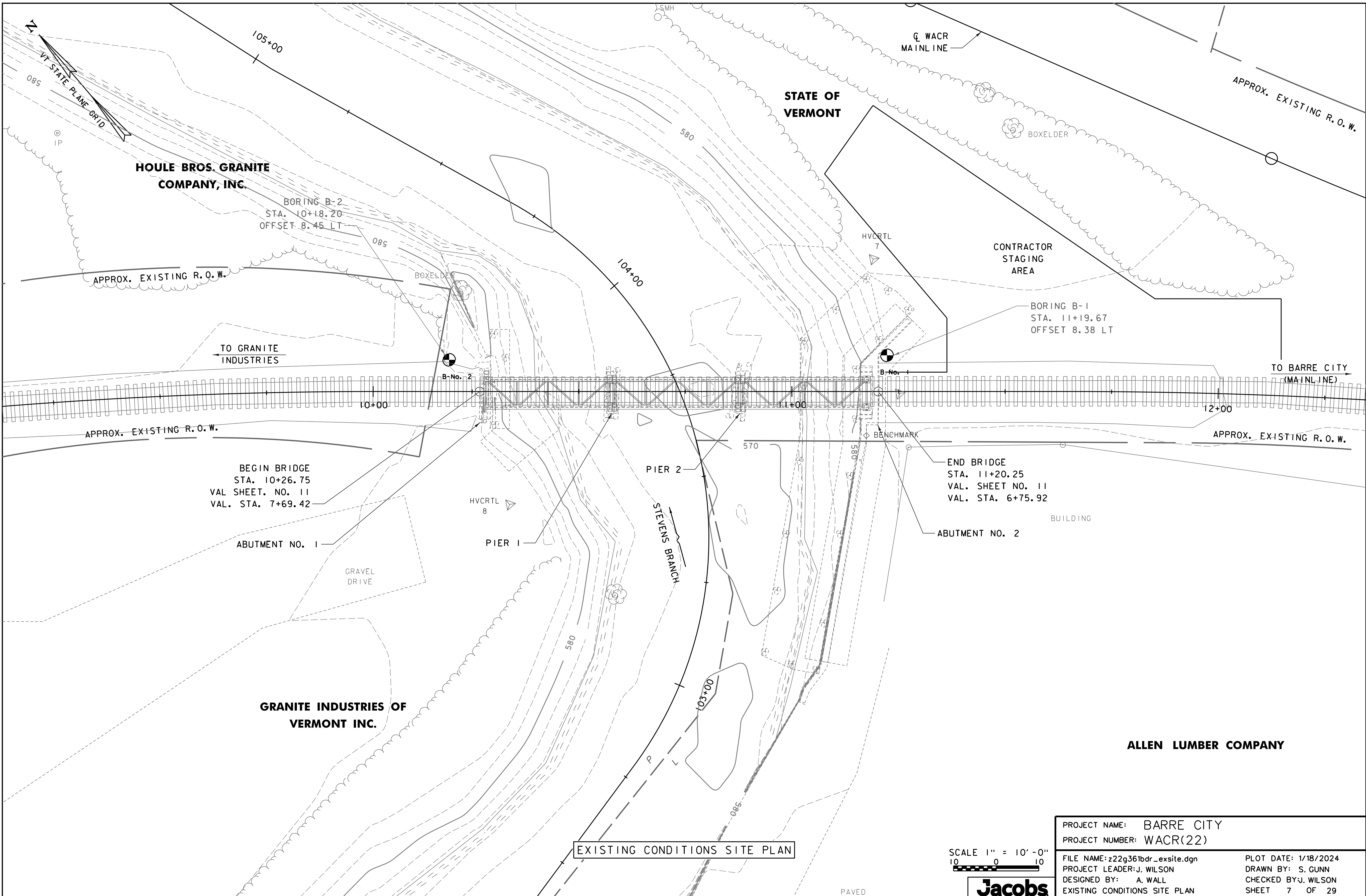
**TRAFFIC CONTROL NOTES:**

- SIGNS SHALL BE INSTALLED SO AS NOT TO OBSTRUCT EXISTING SIGNS.
- ALL SIGNS SHALL BE IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (MUTCD) AND THE "STANDARD HIGHWAY SIGNS" BOOK (SHS) PUBLISHED BY THE FEDERAL HIGHWAY ADMINISTRATION (FHWA).
- CONSTRUCTION SIGNS SHALL BE ERECTED BEFORE THE START OF ANY WORK AND SHALL BE COVERED UNTIL WORK COMMENCES, DURING PERIODS OF INACTIVITY OR UPON COMPLETION OF THE WORK. EACH SIGN SHALL BE ERECTED IN A NEAT AND WORKMANLIKE MANNER.
- CONSTRUCTION SIGNS INSTALLED ON POSTS SHALL BE SET SECURELY IN THE GROUND. THE BOTTOM OF A SIGN SHALL BE AT LEAST SEVEN FEET ABOVE THE EDGE OF PAVEMENT AND THE NEAREST EDGE OF A SIGN SHALL BE AT LEAST SIX FEET OUTSIDE THE SHOULDER POINT, FOUR FEET OUTSIDE GUARDRAIL, OR TWO FEET OUTSIDE CURBING OR SIDEWALK.
- ALL VEGETATION THAT INTERFERES WITH VISIBILITY OF THE SIGNS SHALL BE REMOVED.
- SIGNS SHALL BE REMOVED UPON COMPLETION OF THE WORK AT THE DISCRETION OF THE ENGINEER.
- ROLL UP CONSTRUCTION SIGNS SHALL HAVE RETROREFLECTIVE SHEETING EQUAL TO OR EXCEEDING THE "AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS" (AASHTO) M 268 ["AMERICAN SOCIETY FOR TESTING AND MATERIALS" (ASTM) D 4956J TYPE VI, UNLESS OTHERWISE NOTED.
- SOLID SUBSTRATE CONSTRUCTION SIGNS SHALL HAVE RETROREFLECTIVE SHEETING EQUAL TO OR EXCEEDING THE "AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS" (AASHTO) M 268 ["AMERICAN SOCIETY FOR TESTING AND MATERIALS" (ASTM) D 4956J TYPE VII, TYPE VIII AND TYPE IX REQUIREMENTS, UNLESS OTHERWISE NOTED.
- WHERE CONSTRUCTION SIGN INSTALLATIONS ARE NOT PROTECTED BY GUARDRAIL OR OTHER APPROVED TRAFFIC BARRIERS, ALL SIGN STANDS AND POST INSTALLATIONS SHALL MEET "NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM" (NCHRP) REPORT 350 OR THE AASHTO "MANUAL FOR ASSESSING SAFETY HARDWARE" (MASH). THE APPROPRIATE RESOURCE SHALL BE DETERMINED AS DESCRIBED IN THE MASH PUBLICATION. NO SIGN POSTS SHALL EXTEND OVER THE TOP OF THE SIGN INSTALLED ON SAID POSTS. WHEN ANCHORS ARE INSTALLED, STUBS SHALL NOT BE GREATER THAN FOUR INCHES ABOVE EXISTING GROUND.
- ALL COSTS ASSOCIATED WITH TRAFFIC CONTROL ON PUBLIC ROADS TO GAIN ACCESS TO THE JOB SITE OR ACCESS TO THE RAIL CORRIDOR, BUT NOT FLAGGERS OR UNIFORMED OFFICERS, WILL BE PAID FOR UNDER ITEM 641.11, "TRAFFIC CONTROL, ALL-INCLUSIVE". FLAGGERS WILL BE PAID FOR UNDER ITEM 630.15, "FLAGGERS" AND SHALL BE UTILIZED WHEN DIRECTED BY THE ENGINEER. UNIFORMED TRAFFIC OFFICERS WILL BE PAID FOR UNDER ITEM 630.10, "UNIFORMED TRAFFIC OFFICERS" AND SHALL BE UTILIZED WHEN DIRECTED BY THE ENGINEER.
- IF NO FLAGGER ACTIVITY OCCURS FOR A PERIOD OF 15 MINUTES OR GREATER, FLAGGER SYMBOL SIGNS SHALL BE TURNED AWAY FROM APPROACHING TRAFFIC OR LAID DOWN. A TRAVEL LANE MUST REMAIN OPEN AT ALL TIMES TO ACCOMMODATE EMERGENCY VEHICLES.
- THE CONTRACTOR SHALL PROVIDE ACCESS THROUGH THE WORK ZONE FOR EMERGENCY VEHICLES OR COORDINATE EMERGENCY ROUTES PRIOR TO START OF CONSTRUCTION.
- BICYCLIST ACCOMMODATIONS SHOULD BE TAKEN TO ENSURE THAT OBSTACLES, EQUIPMENT, CONSTRUCTION MATERIALS, TRAFFIC CONTROL DEVICES, ETC. DO NOT ENCROACH INTO THE BICYCLE PATH OF TRAVEL. IT IS IMPORTANT THAT CYCLIST ROUTES ARE FREE FROM RUTS, SAND AND MUD TO PREVENT CYCLIST'S CRASHES.

TRAFFIC CONTROL PLAN  
NOT TO SCALE

PROJECT NAME: BARRE CITY	PLOT DATE: 1/18/2024
PROJECT NUMBER: WACR(22)	DRAWN BY: S. GUNN
FILE NAME: z22g361tcp.dgn	CHECKED BY: J. WILSON
PROJECT LEADER: J. WILSON	SHEET 6 OF 29
DESIGNED BY: A. WALL	
TRAFFIC CONTROL PLAN	





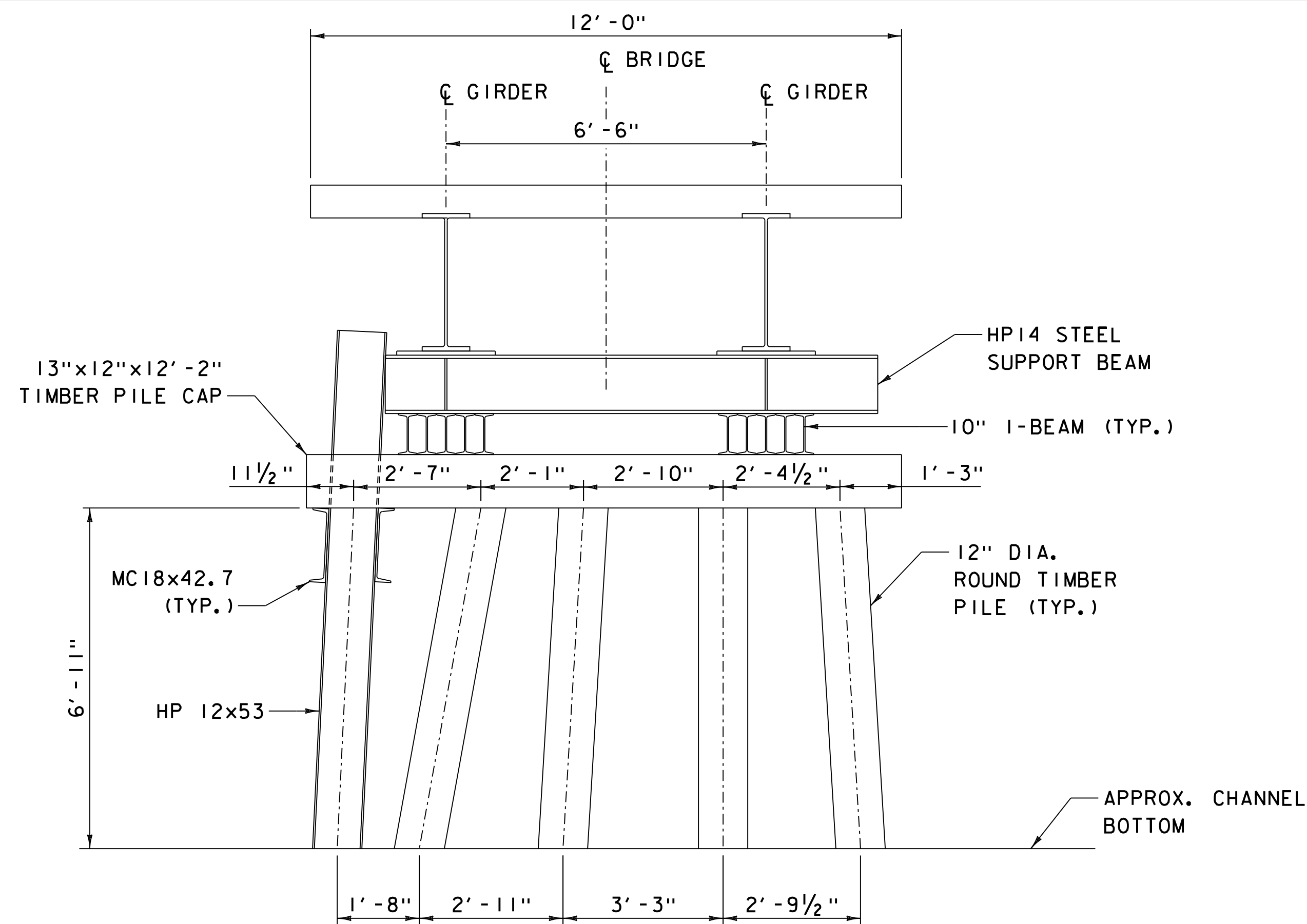
EXISTING CONDITIONS SITE PLAN

SCALE 1" = 10' - 0"



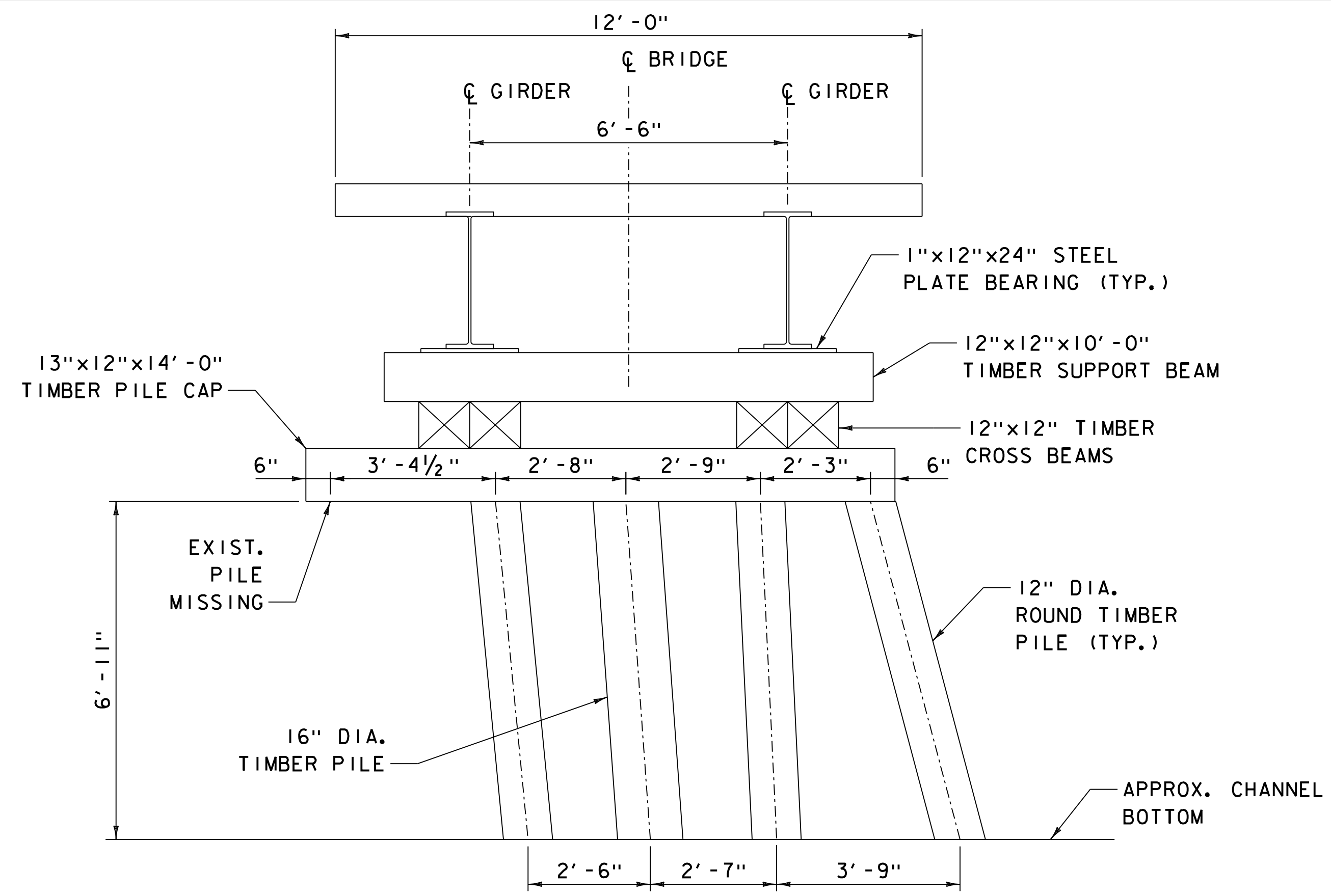
Jacobs

PROJECT NAME: BARRE CITY	PLOT DATE: 1/18/2024
PROJECT NUMBER: WACR(22)	DRAWN BY: S. GUNN
FILE NAME: z22g36lbrd_exsite.dgn	CHECKED BY: J. WILSON
PROJECT LEADER: J. WILSON	SHEET 7 OF 29
DESIGNED BY: A. WALL	
EXISTING CONDITIONS SITE PLAN	



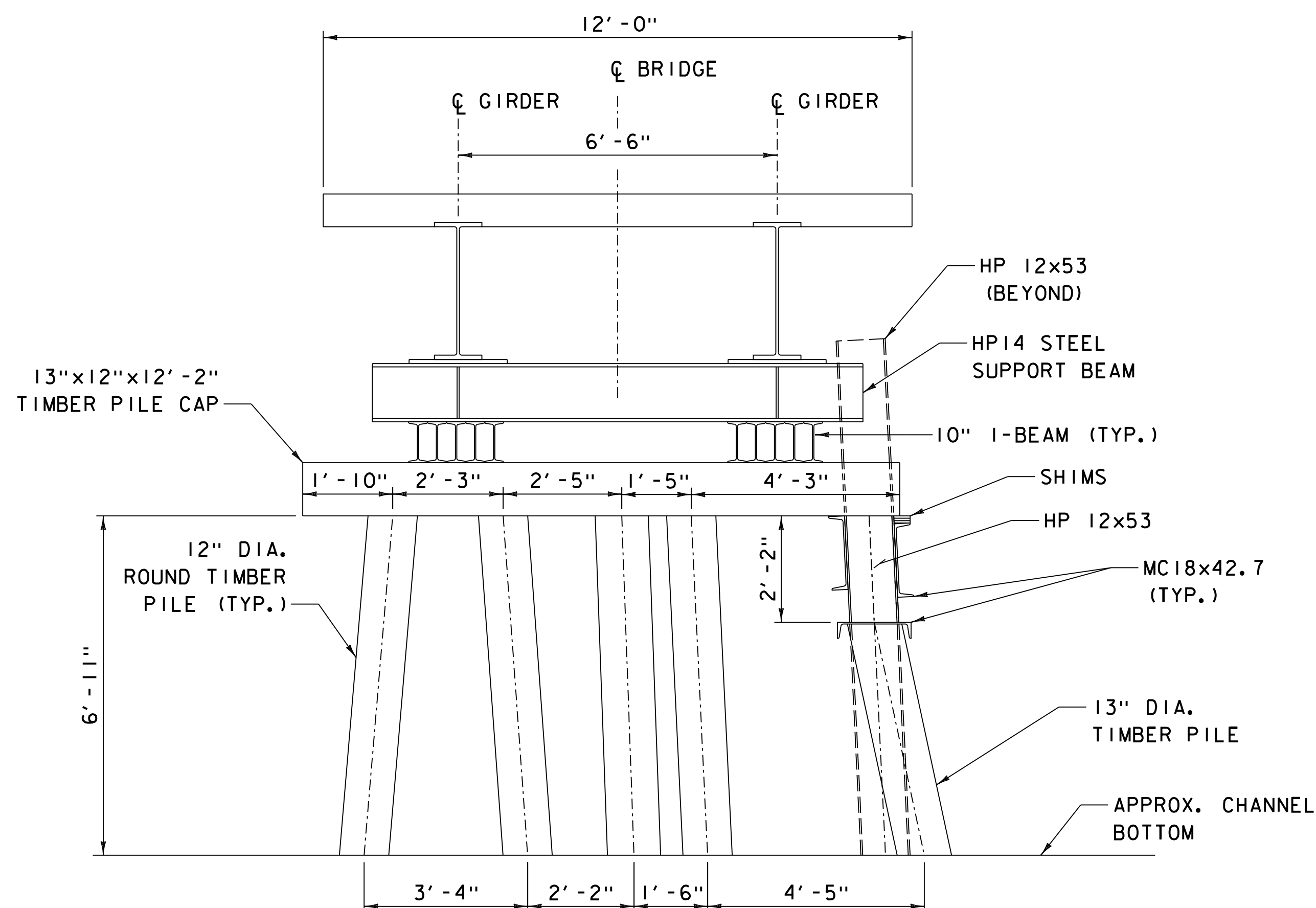
EXISTING PILE BENT 1 - EAST ELEVATION

SCALE: 1/2" = 1'-0"



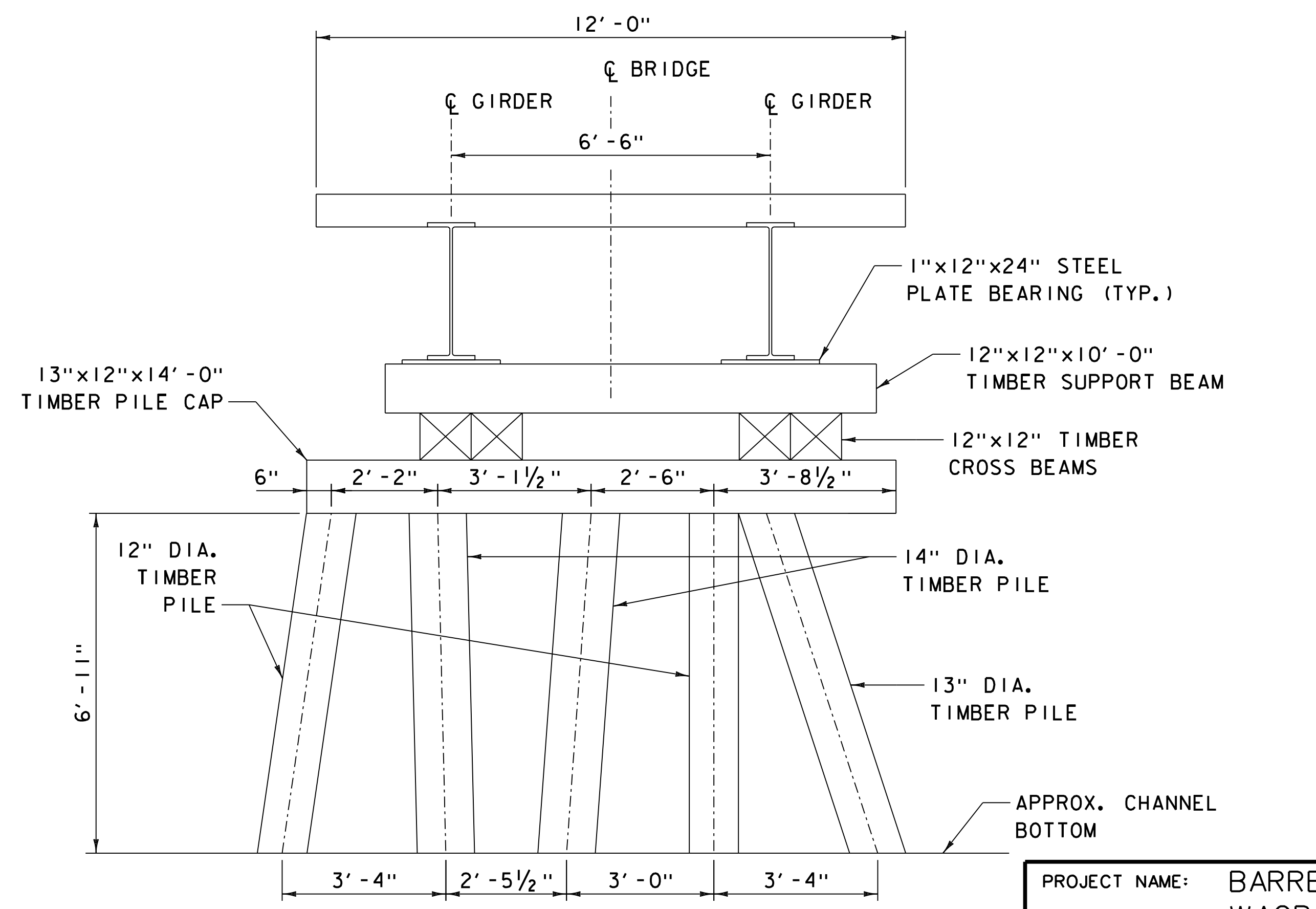
EXISTING PILE BENT 2 - EAST ELEVATION

SCALE: 1/2" = 1'-0"



EXISTING PILE BENT 1 - WEST ELEVATION

SCALE: 1/2" = 1'-0"



EXISTING PILE BENT 2 - WEST ELEVATION

SCALE: 1/2" = 1'-0"

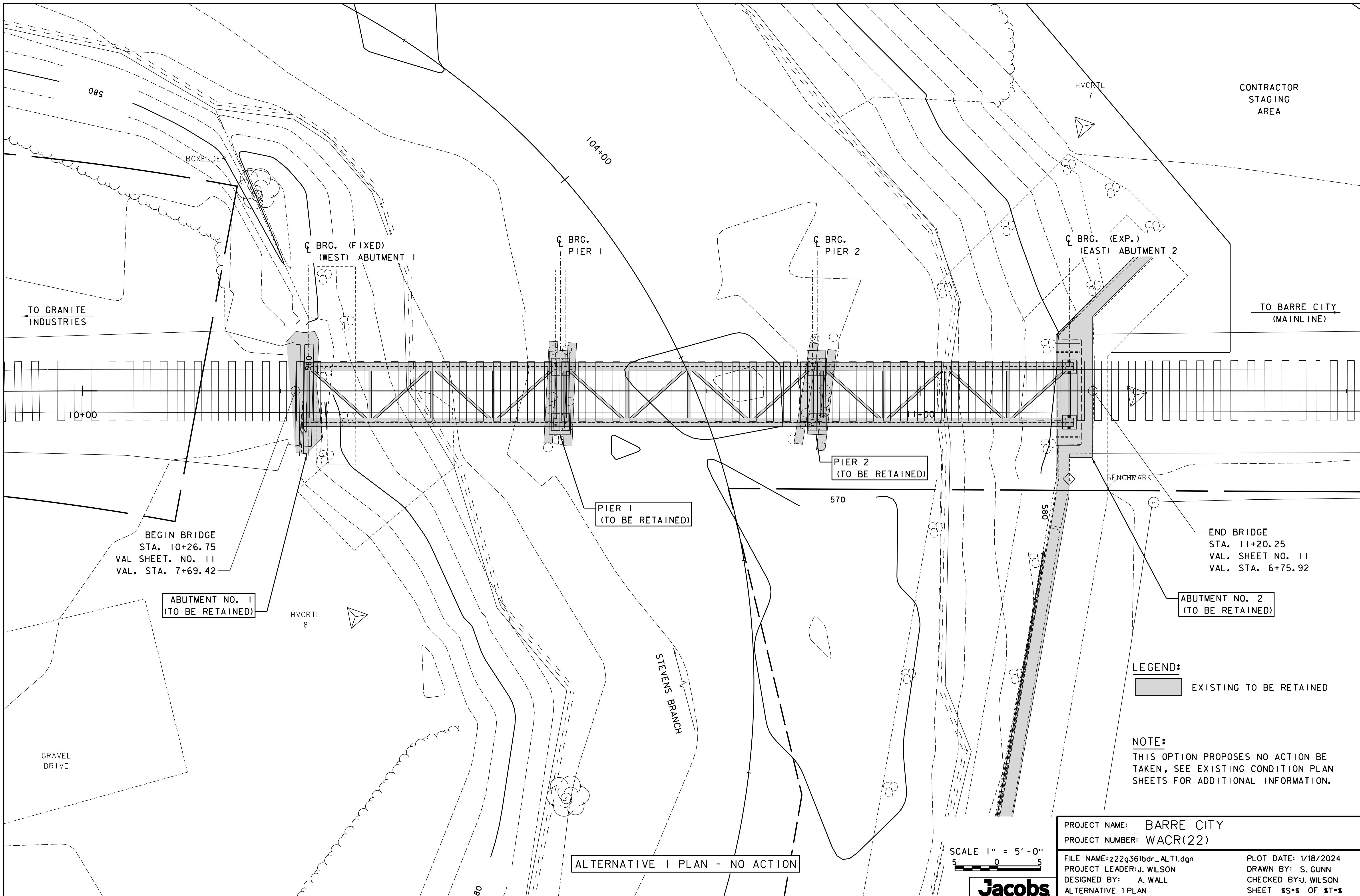
EXISTING CONDITIONS PIER ELEVATIONS



PROJECT NAME: BARRE CITY  
PROJECT NUMBER: WACR(22)

FILE NAME: z22g361typ1.dgn  
PROJECT LEADER: J. WILSON  
DESIGNED BY: A. WALL  
EXISTING CONDITIONS PIER ELEVATIONS

PLOT DATE: 1/18/2024  
DRAWN BY: S. GUNN  
CHECKED BY: J. WILSON  
SHEET 8 OF 29



TO GRANITE INDUSTRIES

TO BARRE CITY (MAIN LINE)

BEGIN BRIDGE  
STA. 10+26.75  
VAL SHEET. NO. 11  
VAL. STA. 7+69.42

END BRIDGE  
STA. 11+20.25  
VAL. SHEET NO. 11  
VAL. STA. 6+75.92

ABUTMENT NO. 1  
(TO BE RETAINED)

ABUTMENT NO. 2  
(TO BE RETAINED)

PIER 1  
(TO BE RETAINED)

PIER 2  
(TO BE RETAINED)

**LEGEND:**  
 EXISTING TO BE RETAINED

**NOTE:**  
 THIS OPTION PROPOSES NO ACTION BE TAKEN, SEE EXISTING CONDITION PLAN SHEETS FOR ADDITIONAL INFORMATION.

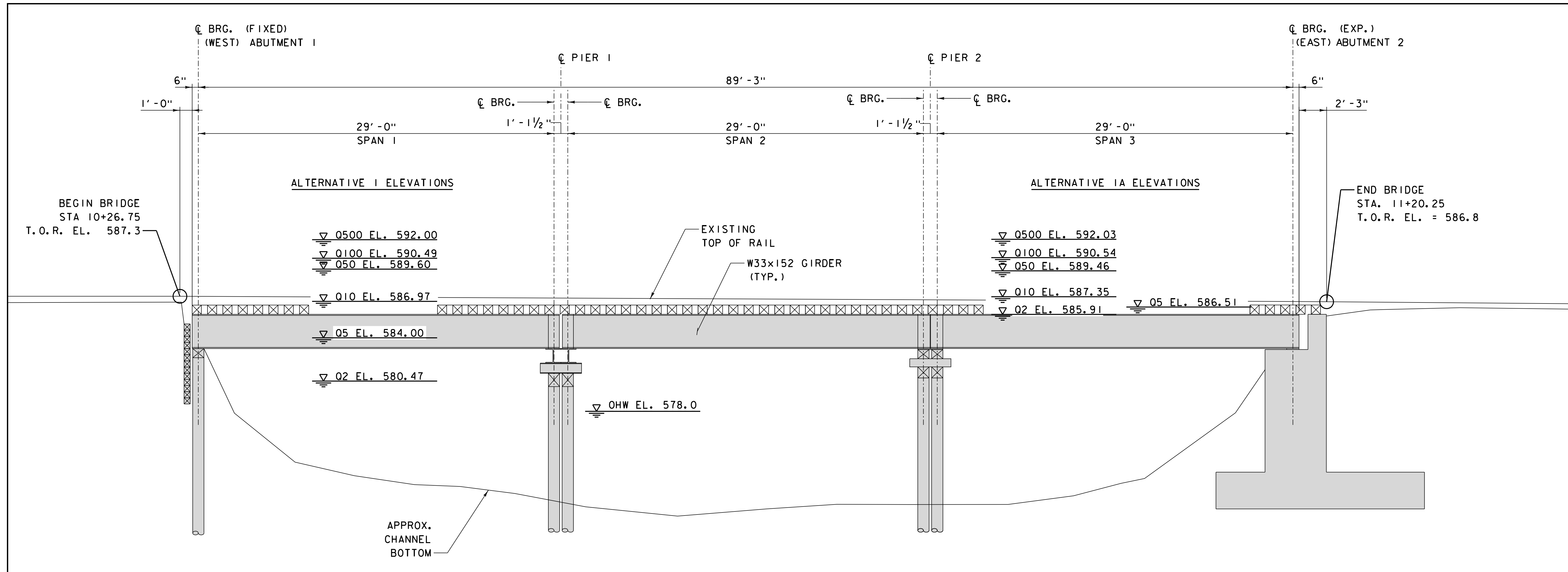
ALTERNATIVE 1 PLAN - NO ACTION

SCALE 1" = 5'-0"  
 5 0 5

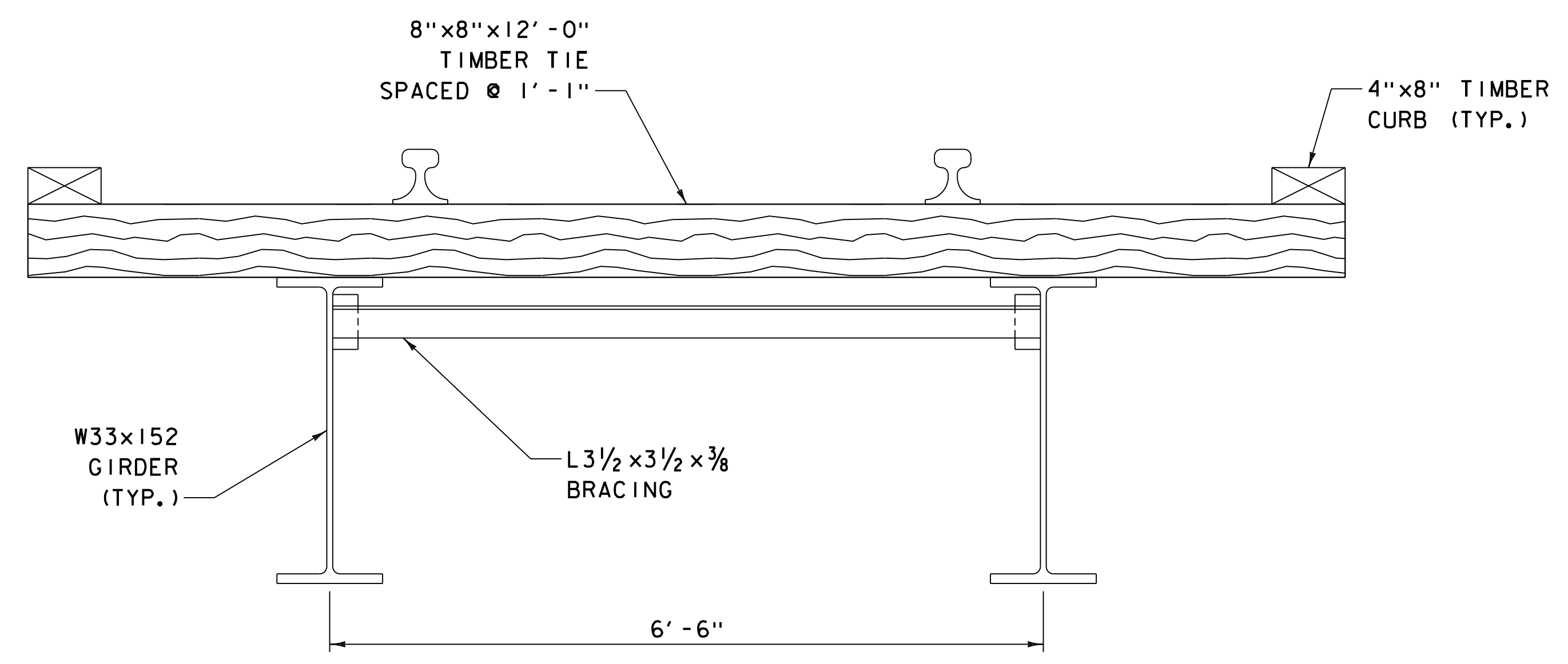


PROJECT NAME: BARRE CITY	PLOT DATE: 1/18/2024
PROJECT NUMBER: WACR(22)	DRAWN BY: S. GUNN
FILE NAME: z22g36lbrd_AL1.dgn	CHECKED BY: J. WILSON
PROJECT LEADER: J. WILSON	SHEET 55 OF 58
DESIGNED BY: A. WALL	
ALTERNATIVE 1 PLAN	





ALTERNATIVE I BRIDGE ELEVATION  
SCALE: 1/4" = 1'-0"



ALTERNATIVE I BRIDGE SECTION  
SCALE: 1" = 1'-0"

ALTERNATIVE I ELEVATION AND SECTION

LEGEND:

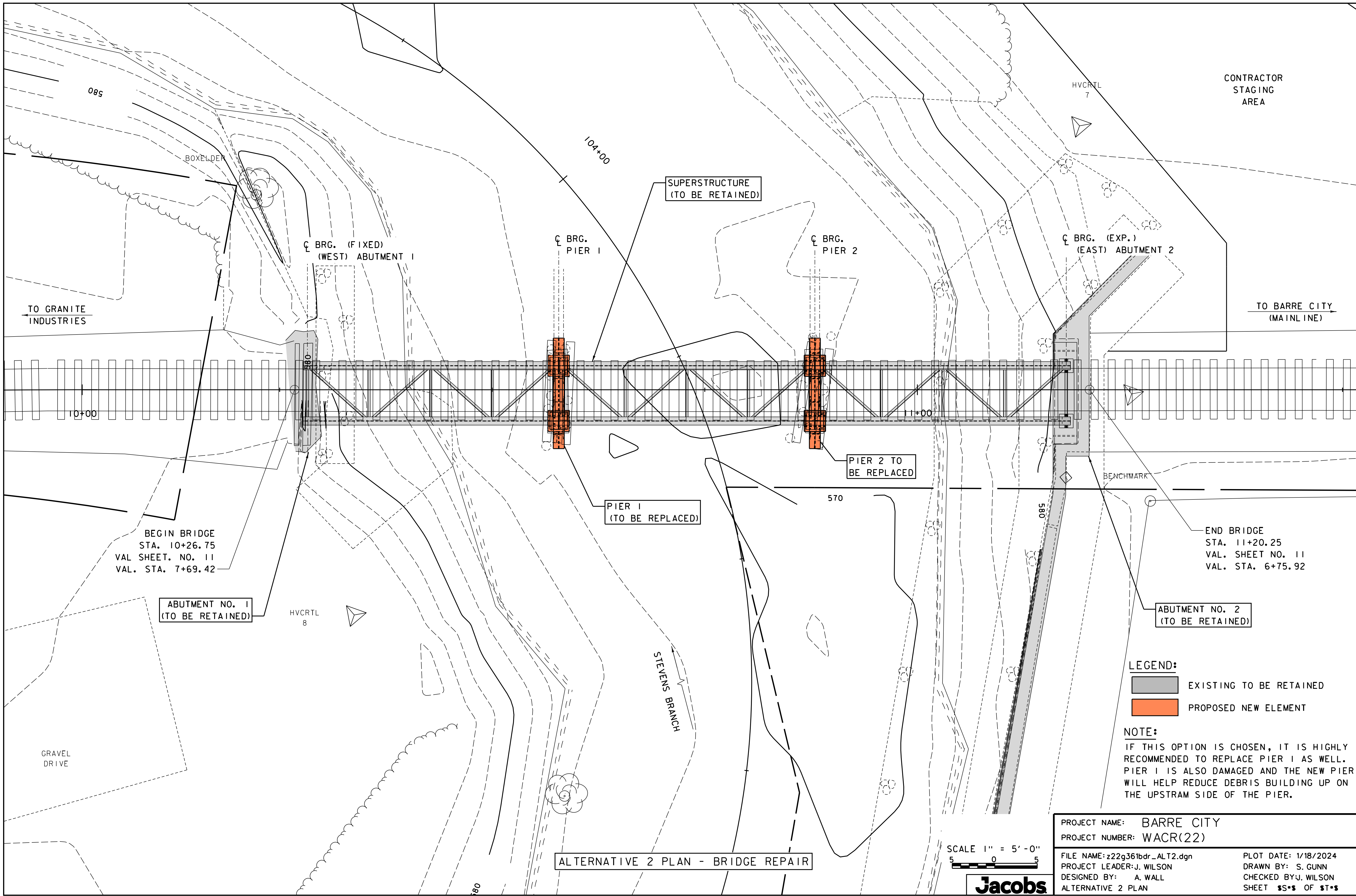
EXISTING TO BE RETAINED

NOTE:

DL OF EACH BRIDGE SPAN (INCLUDING 2 GIRDERS, BRIDGE TIES AND TRACK) IS 28,000 POUNDS OR 7,000 POUNDS PER GIRDER END REACTION.

PROJECT NAME: BARRE CITY	PLOT DATE: 1/18/2024
PROJECT NUMBER: WACR(22)	DRAWN BY: S. GUNN
FILE NAME: z22g361elev_ALT1.dgn	CHECKED BY: J. WILSON
PROJECT LEADER: J. WILSON	DESIGNED BY: A. WALL
ALTERNATIVE 1 ELEVATION AND SECTION	SHEET 55 OF 58





CONTRACTOR STAGING AREA

SUPERSTRUCTURE (TO BE RETAINED)

BRG. (FIXED) (WEST) ABUTMENT 1

BRG. PIER 1

BRG. PIER 2

BRG. (EXP.) (EAST) ABUTMENT 2

TO GRANITE INDUSTRIES

TO BARRE CITY (MAINLINE)

BEGIN BRIDGE  
STA. 10+26.75  
VAL SHEET. NO. 11  
VAL. STA. 7+69.42

ABUTMENT NO. 1 (TO BE RETAINED)

PIER 1 (TO BE REPLACED)

PIER 2 TO BE REPLACED

END BRIDGE  
STA. 11+20.25  
VAL. SHEET NO. 11  
VAL. STA. 6+75.92

ABUTMENT NO. 2 (TO BE RETAINED)

LEGEND:

- EXISTING TO BE RETAINED
- PROPOSED NEW ELEMENT

NOTE:

IF THIS OPTION IS CHOSEN, IT IS HIGHLY RECOMMENDED TO REPLACE PIER 1 AS WELL. PIER 1 IS ALSO DAMAGED AND THE NEW PIER WILL HELP REDUCE DEBRIS BUILDING UP ON THE UPSTREAM SIDE OF THE PIER.

PROJECT NAME: BARRE CITY  
PROJECT NUMBER: WACR(22)

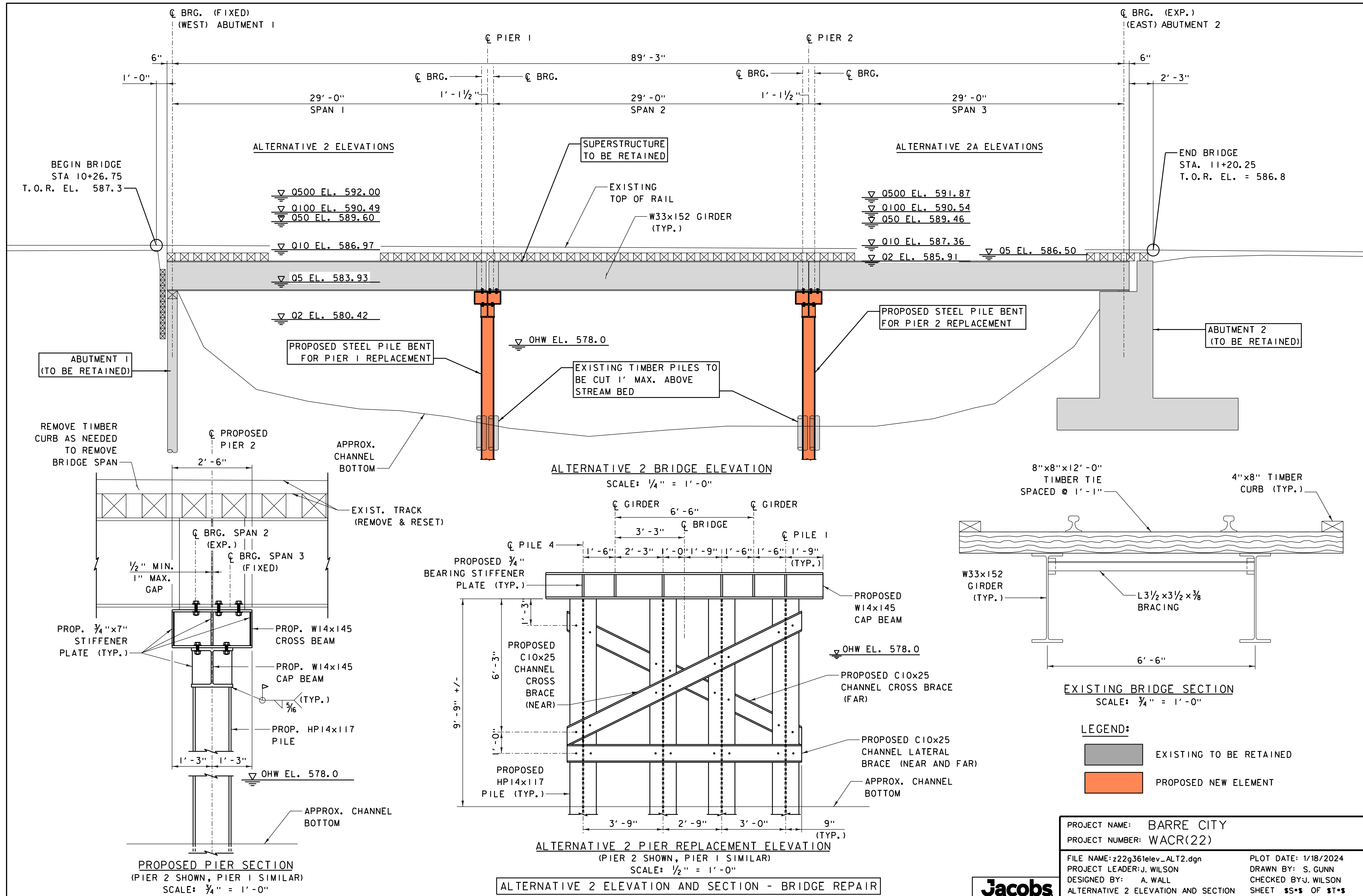
FILE NAME: z22g36lbr\_ALT2.dgn  
PROJECT LEADER: J. WILSON  
DESIGNED BY: A. WALL  
ALTERNATIVE 2 PLAN

PLOT DATE: 1/18/2024  
DRAWN BY: S. GUNN  
CHECKED BY: J. WILSON  
SHEET 55 OF 58

SCALE 1" = 5'-0"



ALTERNATIVE 2 PLAN - BRIDGE REPAIR

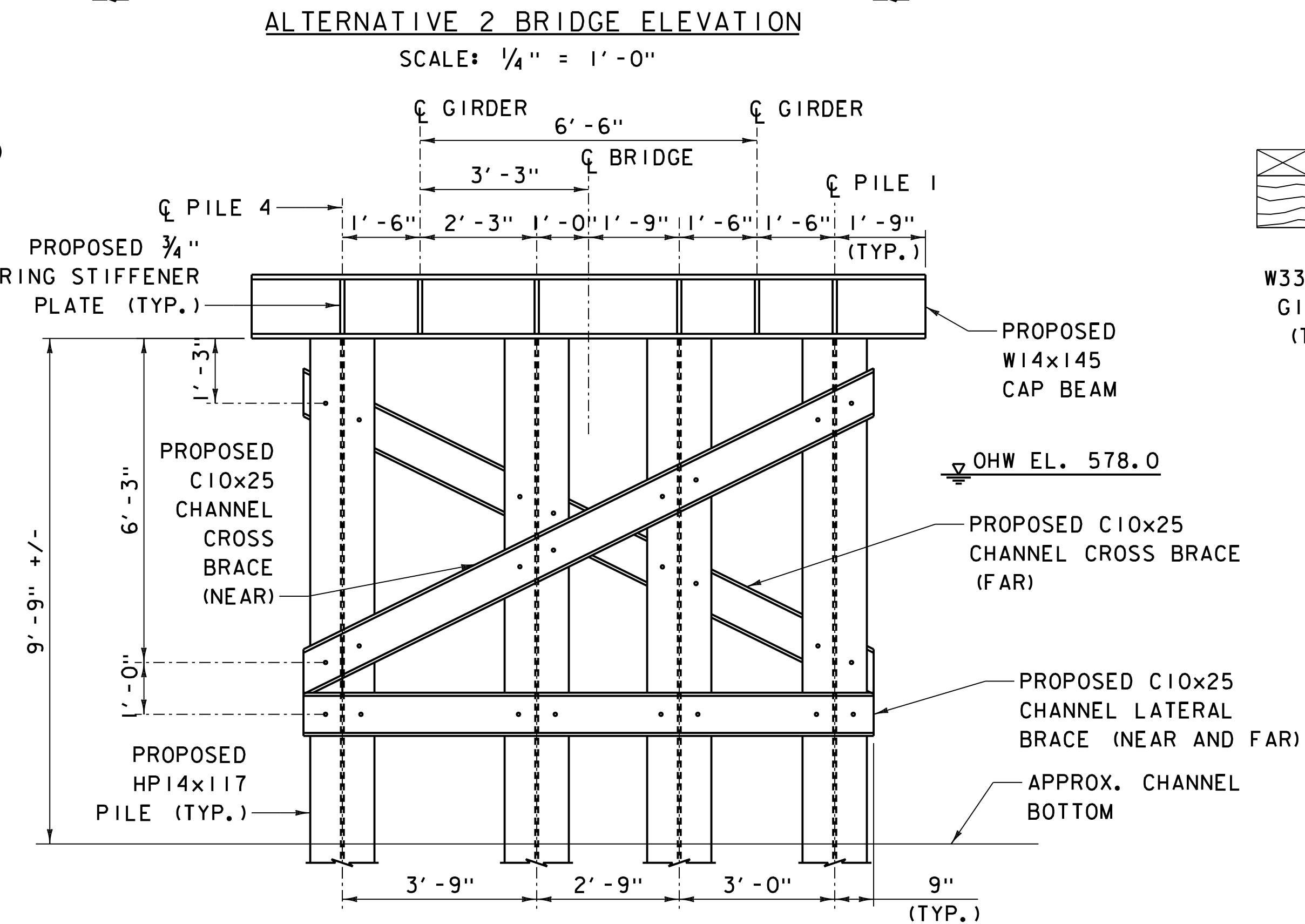


ALTERNATIVE 2 ELEVATIONS

ALTERNATIVE 2A ELEVATIONS

ALTERNATIVE 2 BRIDGE ELEVATION  
SCALE: 1/4" = 1'-0"

EXISTING BRIDGE SECTION  
SCALE: 1/4" = 1'-0"



ALTERNATIVE 2 PIER REPLACEMENT ELEVATION  
(PIER 2 SHOWN, PIER 1 SIMILAR)  
SCALE: 1/2" = 1'-0"

PROPOSED PIER SECTION  
(PIER 2 SHOWN, PIER 1 SIMILAR)  
SCALE: 3/4" = 1'-0"

ALTERNATIVE 2 ELEVATION AND SECTION - BRIDGE REPAIR

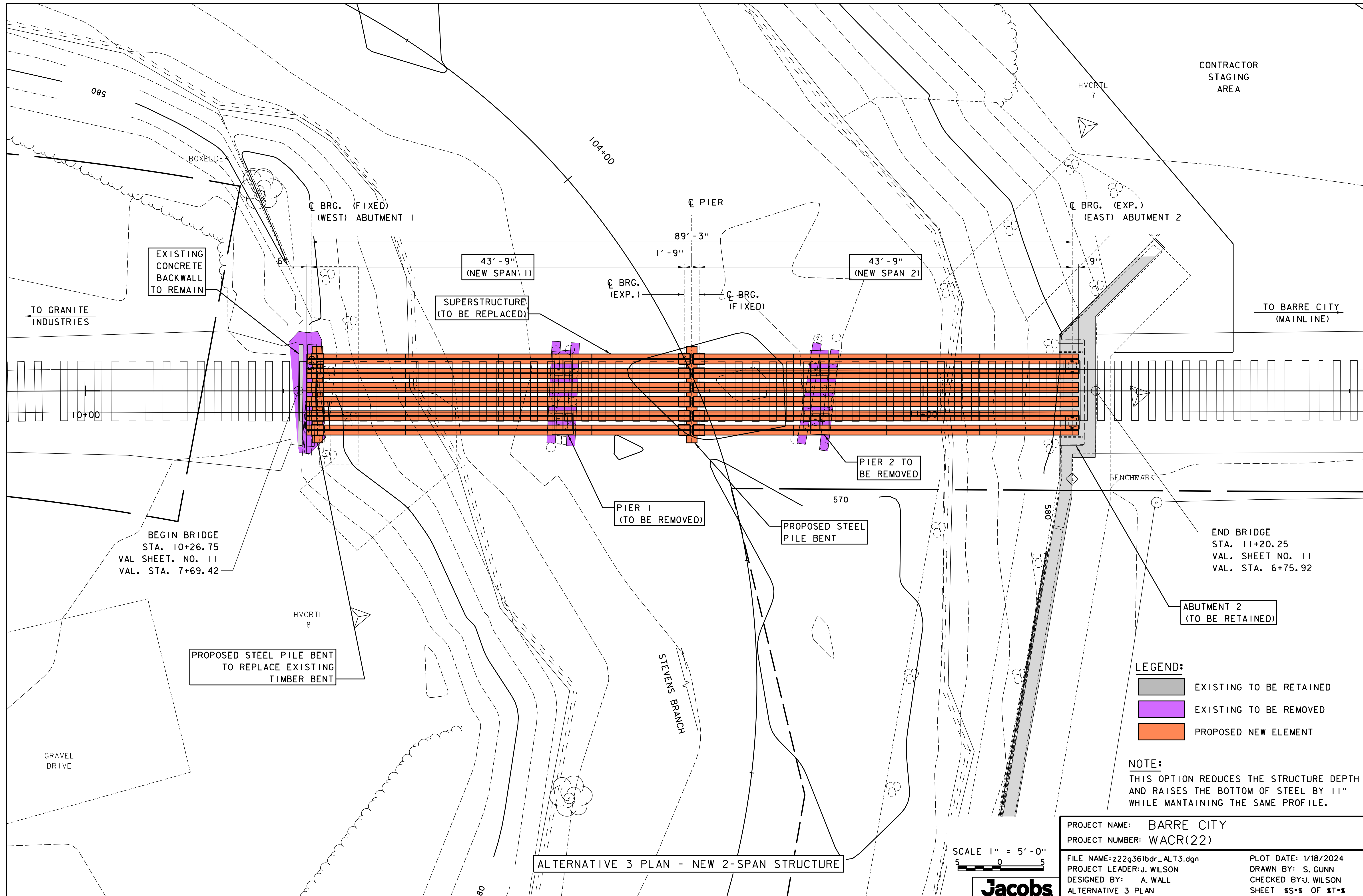
- LEGEND:**
- EXISTING TO BE RETAINED
  - PROPOSED NEW ELEMENT

PROJECT NAME: BARRE CITY  
 PROJECT NUMBER: WACR(22)  
 FILE NAME: z22g361elev\_ALT2.dgn  
 PROJECT LEADER: J. WILSON  
 DESIGNED BY: A. WALL  
 ALTERNATIVE 2 ELEVATION AND SECTION

PLOT DATE: 1/18/2024  
 DRAWN BY: S. GUNN  
 CHECKED BY: J. WILSON  
 SHEET 55 OF 58







ALTERNATIVE 3 PLAN - NEW 2-SPAN STRUCTURE

SCALE 1" = 5'-0"  
 5 0 5



PROJECT NAME: BARRE CITY  
 PROJECT NUMBER: WACR(22)  
 FILE NAME: z22g361bdr\_ALT3.dgn  
 PROJECT LEADER: J. WILSON  
 DESIGNED BY: A. WALL  
 ALTERNATIVE 3 PLAN

PLOT DATE: 1/18/2024  
 DRAWN BY: S. GUNN  
 CHECKED BY: J. WILSON  
 SHEET 55 OF 58

- LEGEND:**
- EXISTING TO BE RETAINED
  - EXISTING TO BE REMOVED
  - PROPOSED NEW ELEMENT

**NOTE:**  
 THIS OPTION REDUCES THE STRUCTURE DEPTH AND RAISES THE BOTTOM OF STEEL BY 11" WHILE MAINTAINING THE SAME PROFILE.

BEGIN BRIDGE  
 STA. 10+26.75  
 VAL SHEET. NO. 11  
 VAL. STA. 7+69.42

END BRIDGE  
 STA. 11+20.25  
 VAL. SHEET NO. 11  
 VAL. STA. 6+75.92

EXISTING CONCRETE BACKWALL TO REMAIN

SUPERSTRUCTURE (TO BE REPLACED)

PIER 1 (TO BE REMOVED)

PIER 2 TO BE REMOVED

ABUTMENT 2 (TO BE RETAINED)

PROPOSED STEEL PILE BENT

PROPOSED STEEL PILE BENT TO REPLACE EXISTING TIMBER BENT

BENCHMARK

CONTRACTOR STAGING AREA

TO GRANITE INDUSTRIES

TO BARRE CITY (MAINLINE)

STEVENS BRANCH

GRAVEL DRIVE

BOXELDER

HVCRTL 7

HVCRTL 8

104+00

10+00

11+00

580

570

6'

89'-3"

1'-9"

43'-9"  
(NEW SPAN 1)

43'-9"  
(NEW SPAN 2)

9"

CL BRG. (FIXED)  
(WEST) ABUTMENT 1

CL PIER

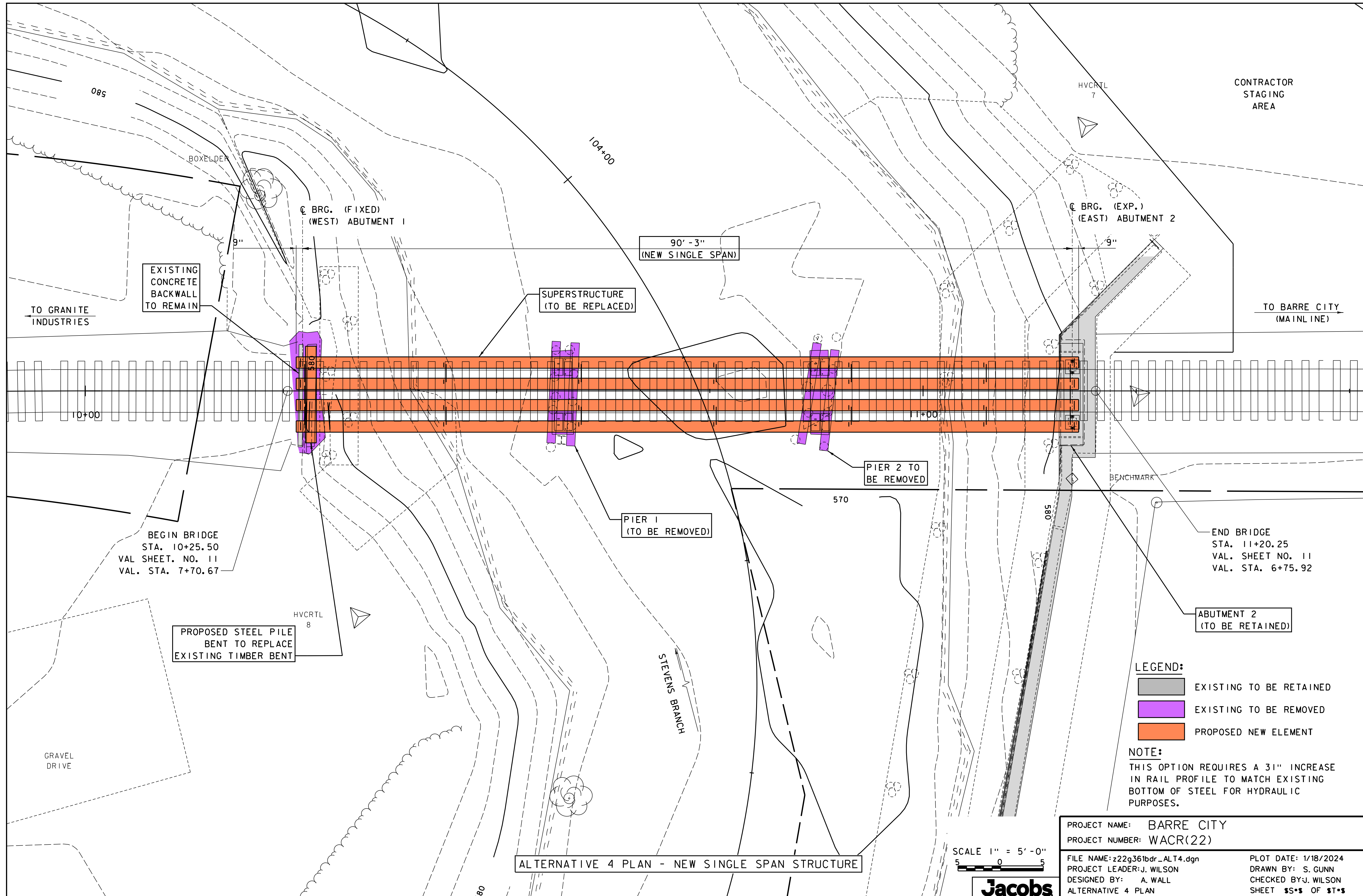
CL BRG. (EXP.)  
(EAST) ABUTMENT 2

CL BRG. (EXP.)

CL BRG. (FIXED)







ALTERNATIVE 4 PLAN - NEW SINGLE SPAN STRUCTURE

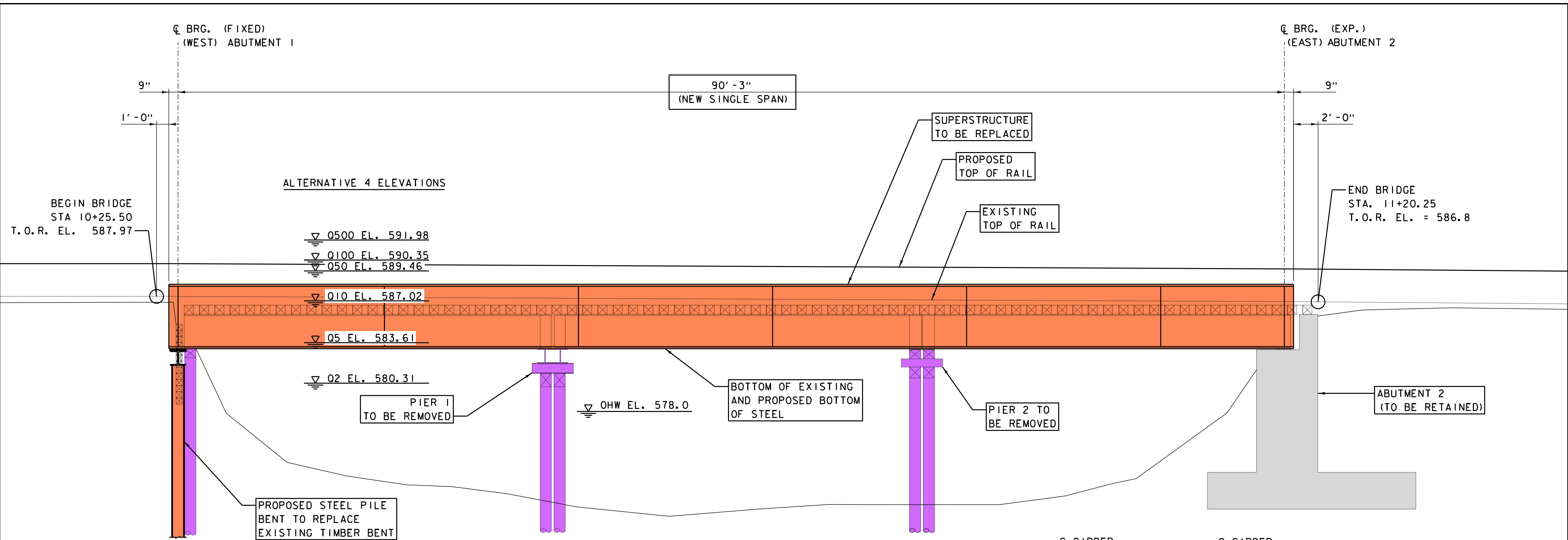
SCALE 1" = 5'-0"  
 5 0 5



PROJECT NAME: BARRE CITY  
 PROJECT NUMBER: WACR(22)  
 FILE NAME: z22g361bdr\_ALT4.dgn  
 PROJECT LEADER: J. WILSON  
 DESIGNED BY: A. WALL  
 ALTERNATIVE 4 PLAN

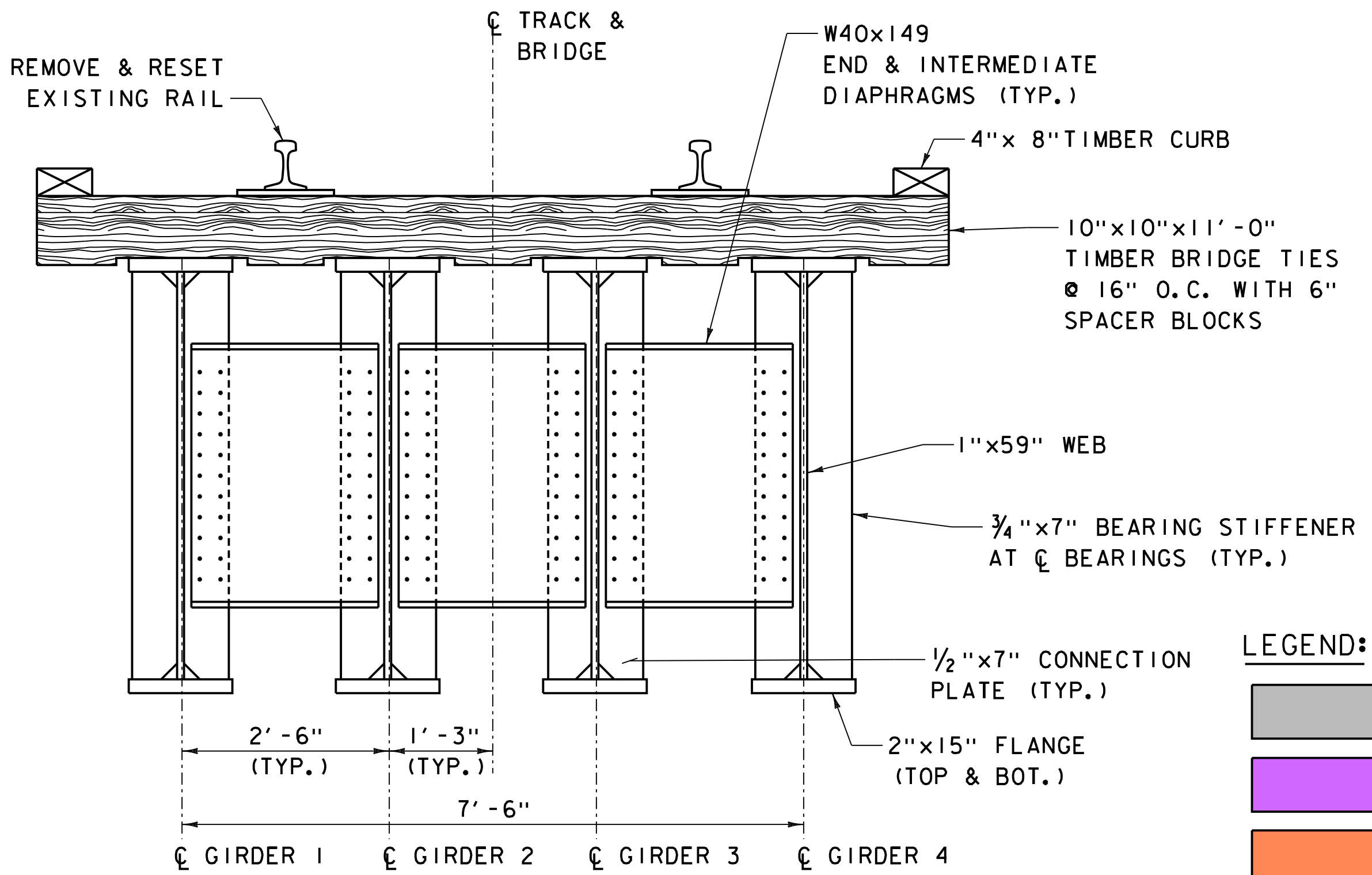
PLOT DATE: 1/18/2024  
 DRAWN BY: S. GUNN  
 CHECKED BY: J. WILSON  
 SHEET 55 OF 58





ALTERNATIVE 4 ELEVATIONS

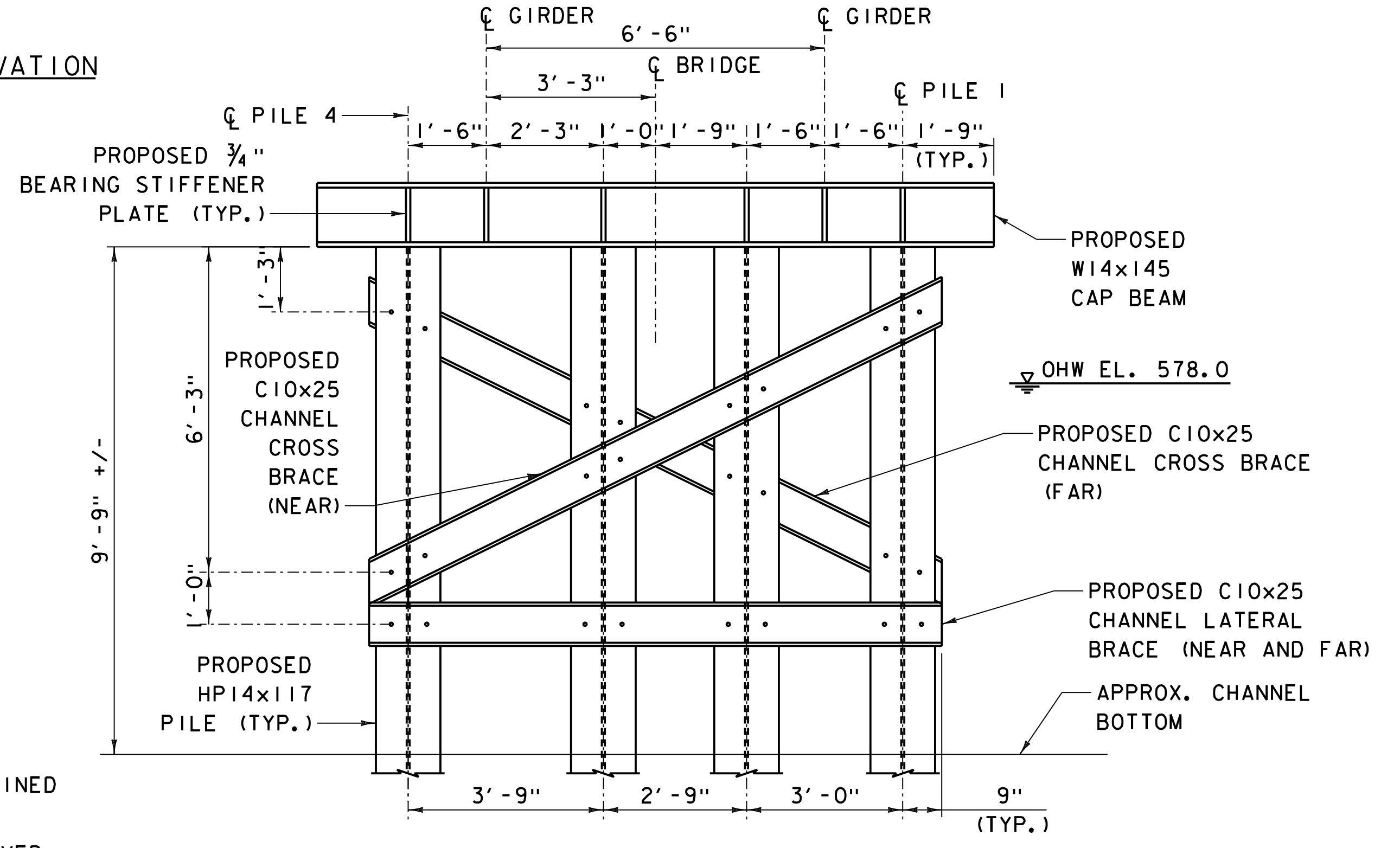
ALTERNATIVE 4 BRIDGE ELEVATION  
SCALE: 1/4" = 1'-0"



PROPOSED BRIDGE SECTION  
SCALE: 3/4" = 1'-0"

**LEGEND:**

- EXISTING TO BE RETAINED
- EXISTING TO BE REMOVED
- PROPOSED NEW ELEMENT



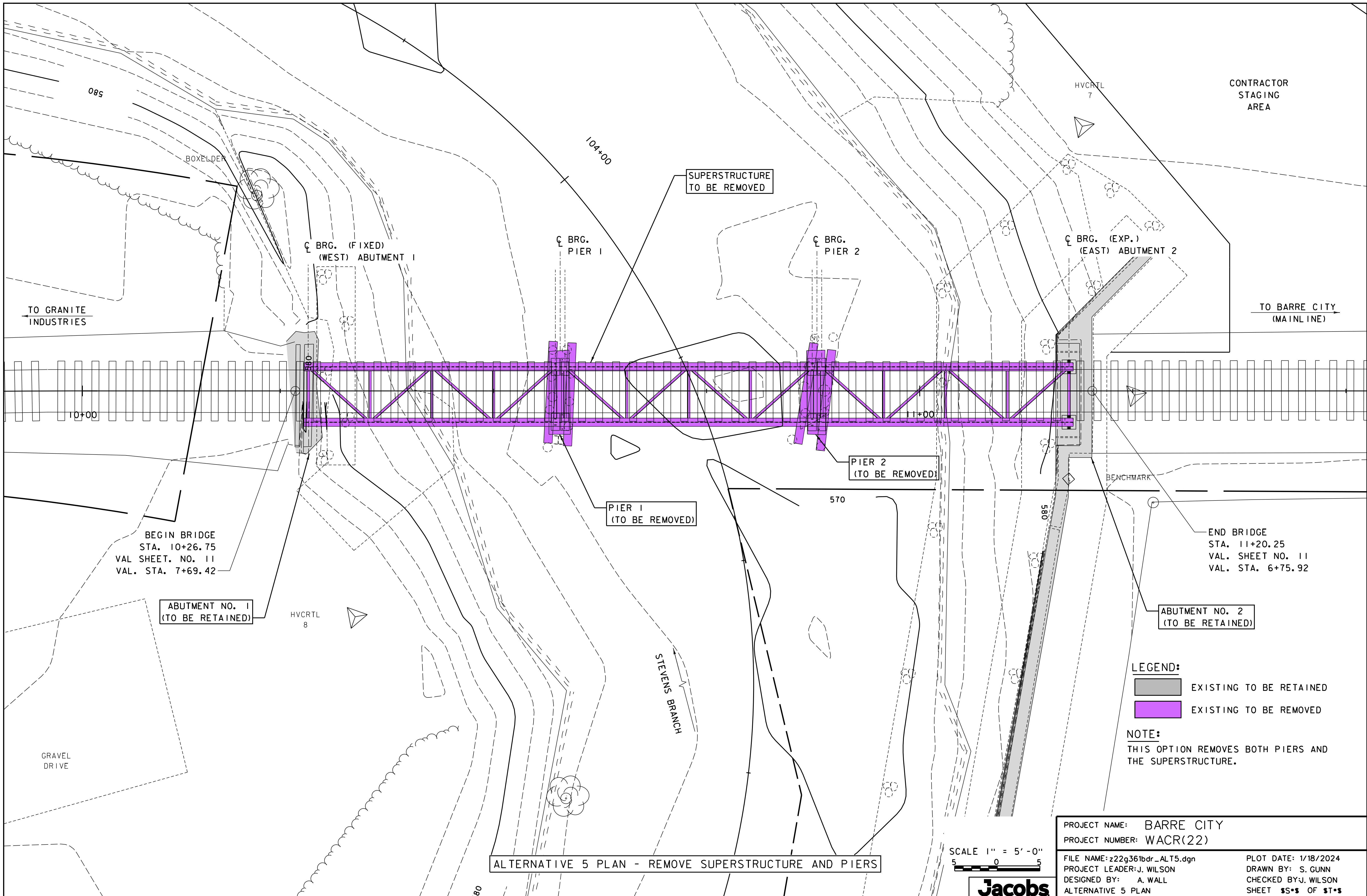
PROPOSED ABUTMENT 1 ELEVATION  
SCALE: 1/4" = 1'-0"

NOTE: PROPOSED ABUTMENT 1 SECTION VIEW SIMILAR TO ALTERNATIVE 2 PIER SECTION.

ALTERNATIVE 4 ELEVATION AND SECTION - NEW SINGLE SPAN STRUCTURE

PROJECT NAME: BARRE CITY	PLOT DATE: 1/18/2024
PROJECT NUMBER: WACR(22)	DRAWN BY: S. GUNN
FILE NAME: z22g361elev_ALT4.dgn	CHECKED BY: J. WILSON
PROJECT LEADER: J. WILSON	SHEET 55 OF 58
DESIGNED BY: A. WALL	





SUPERSTRUCTURE  
TO BE REMOVED

☐ BRG. (FIXED)  
(WEST) ABUTMENT 1

☐ BRG.  
PIER 1

☐ BRG.  
PIER 2

☐ BRG. (EXP.)  
(EAST) ABUTMENT 2

TO GRANITE  
INDUSTRIES

TO BARRE CITY  
(MAIN LINE)

10+00

11+00

PIER 2  
(TO BE REMOVED)

PIER 1  
(TO BE REMOVED)

BEGIN BRIDGE  
STA. 10+26.75  
VAL SHEET. NO. 11  
VAL. STA. 7+69.42

ABUTMENT NO. 1  
(TO BE RETAINED)

END BRIDGE  
STA. 11+20.25  
VAL. SHEET NO. 11  
VAL. STA. 6+75.92

ABUTMENT NO. 2  
(TO BE RETAINED)

**LEGEND:**

- EXISTING TO BE RETAINED
- EXISTING TO BE REMOVED

**NOTE:**

THIS OPTION REMOVES BOTH PIERS AND  
THE SUPERSTRUCTURE.

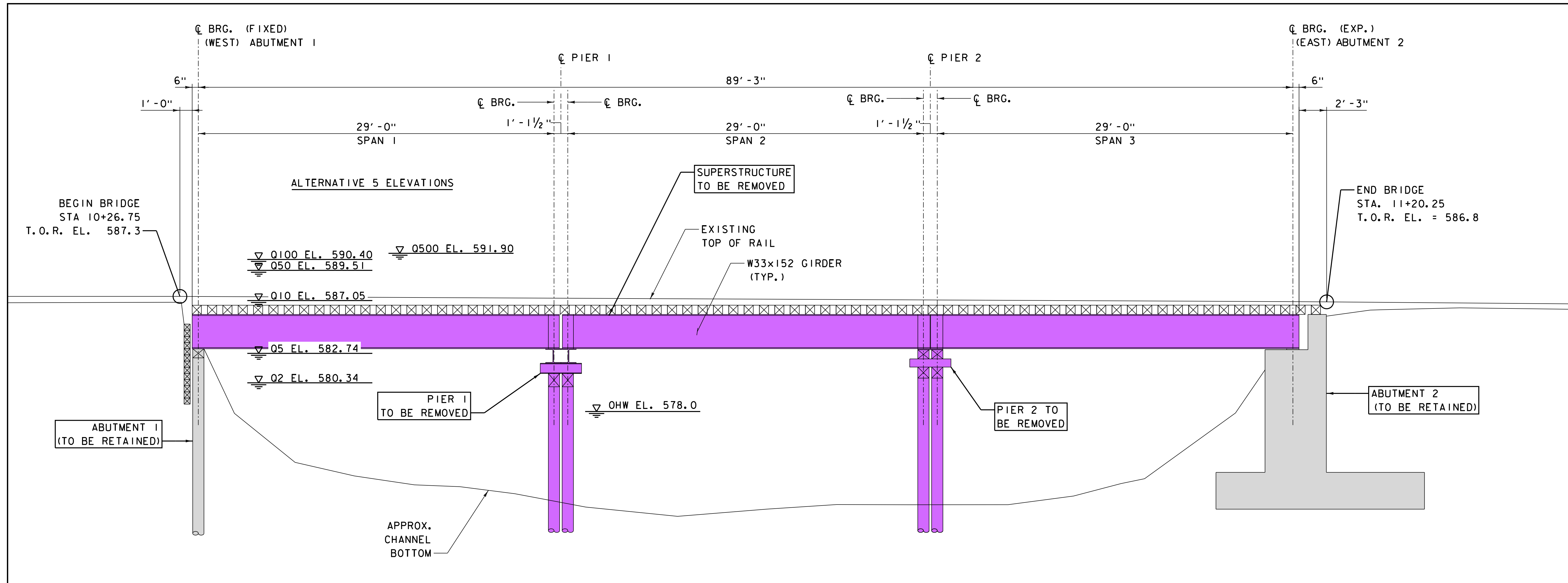
**ALTERNATIVE 5 PLAN - REMOVE SUPERSTRUCTURE AND PIERS**

SCALE 1" = 5'-0"  
5 0 5

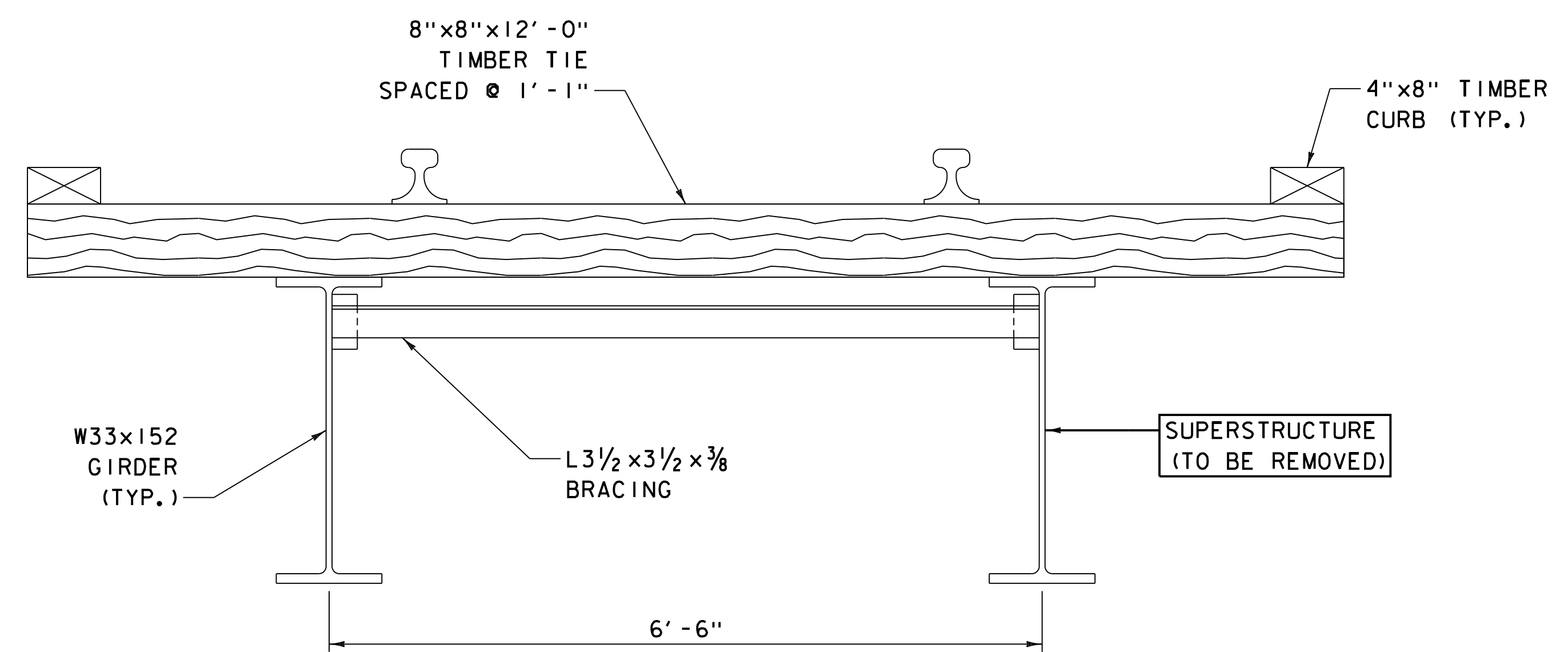


PROJECT NAME: BARRE CITY	PLOT DATE: 1/18/2024
PROJECT NUMBER: WACR(22)	DRAWN BY: S. GUNN
FILE NAME: z22g361bdr_ALT5.dgn	CHECKED BY: J. WILSON
PROJECT LEADER: J. WILSON	SHEET 55 OF 58
DESIGNED BY: A. WALL	
ALTERNATIVE 5 PLAN	





ALTERNATIVE 5 BRIDGE ELEVATION  
SCALE: 1/4" = 1'-0"



EXISTING BRIDGE SECTION  
SCALE: 1" = 1'-0"

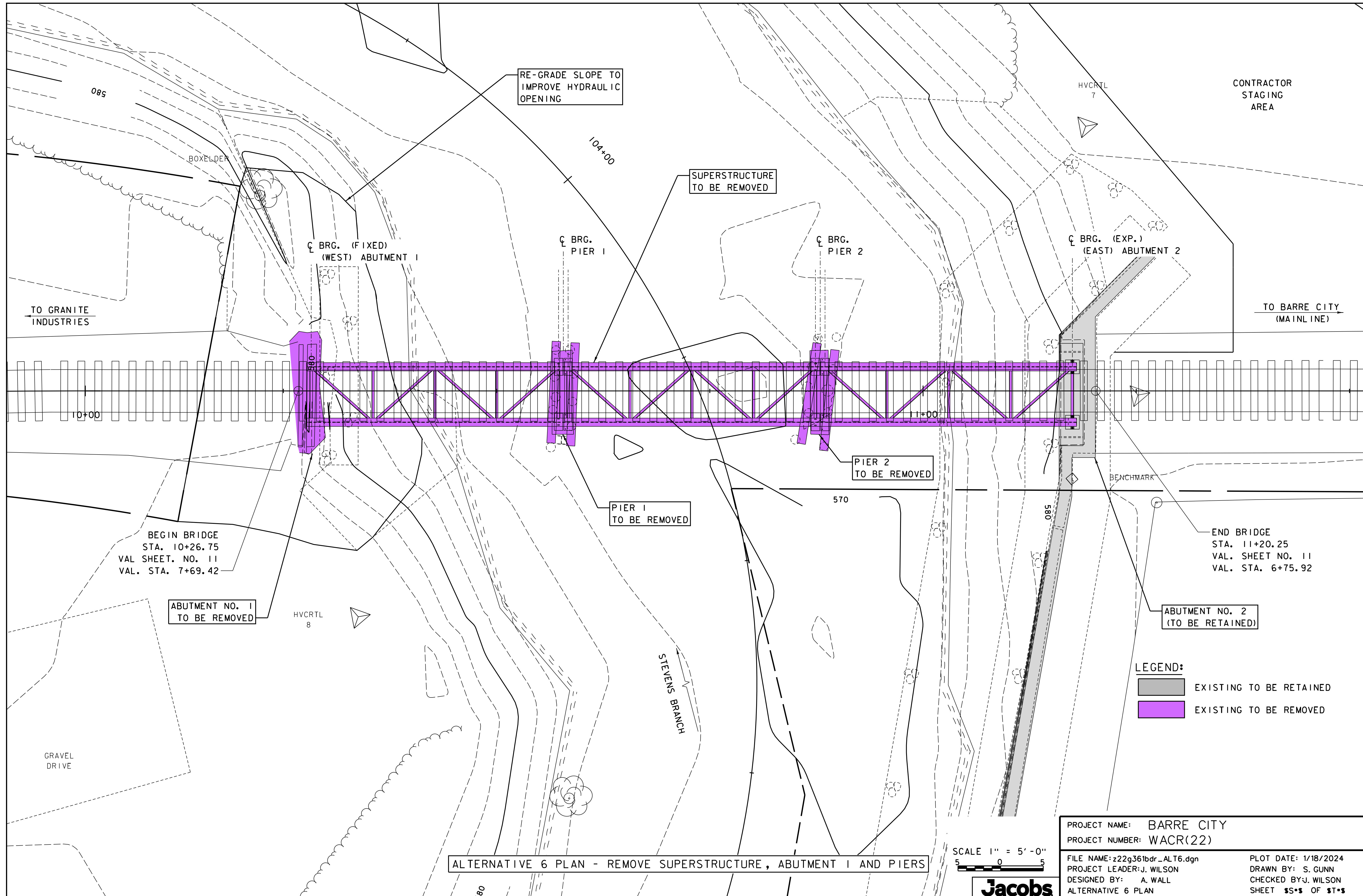
**LEGEND:**

	EXISTING TO BE RETAINED
	PROPOSED NEW ELEMENT

PROJECT NAME: BARRE CITY	PLOT DATE: 1/18/2024
PROJECT NUMBER: WACR(22)	DRAWN BY: S. GUNN
FILE NAME: z22g361elev_ALT5.dgn	CHECKED BY: J. WILSON
PROJECT LEADER: J. WILSON	DESIGNED BY: A. WALL
ALTERNATIVE 5 ELEVATION AND SECTION	SHEET 55 OF 58

ALTERNATIVE 5 ELEVATION AND SECTION - REMOVE SUPERSTRUCTURE AND PIERS





ALTERNATIVE 6 PLAN - REMOVE SUPERSTRUCTURE, ABUTMENT 1 AND PIERS

SCALE 1" = 5'-0"  
 5 0 5



PROJECT NAME: BARRE CITY  
 PROJECT NUMBER: WACR(22)

FILE NAME: z22g361bdr\_ALT6.dgn  
 PROJECT LEADER: J. WILSON  
 DESIGNED BY: A. WALL  
 ALTERNATIVE 6 PLAN

PLOT DATE: 1/18/2024  
 DRAWN BY: S. GUNN  
 CHECKED BY: J. WILSON  
 SHEET 55 OF 58

BEGIN BRIDGE  
 STA. 10+26.75  
 VAL SHEET. NO. 11  
 VAL. STA. 7+69.42

END BRIDGE  
 STA. 11+20.25  
 VAL. SHEET NO. 11  
 VAL. STA. 6+75.92

ABUTMENT NO. 1  
 TO BE REMOVED

ABUTMENT NO. 2  
 (TO BE RETAINED)

PIER 1  
 TO BE REMOVED

PIER 2  
 TO BE REMOVED

SUPERSTRUCTURE  
 TO BE REMOVED

RE-GRADE SLOPE TO  
 IMPROVE HYDRAULIC  
 OPENING

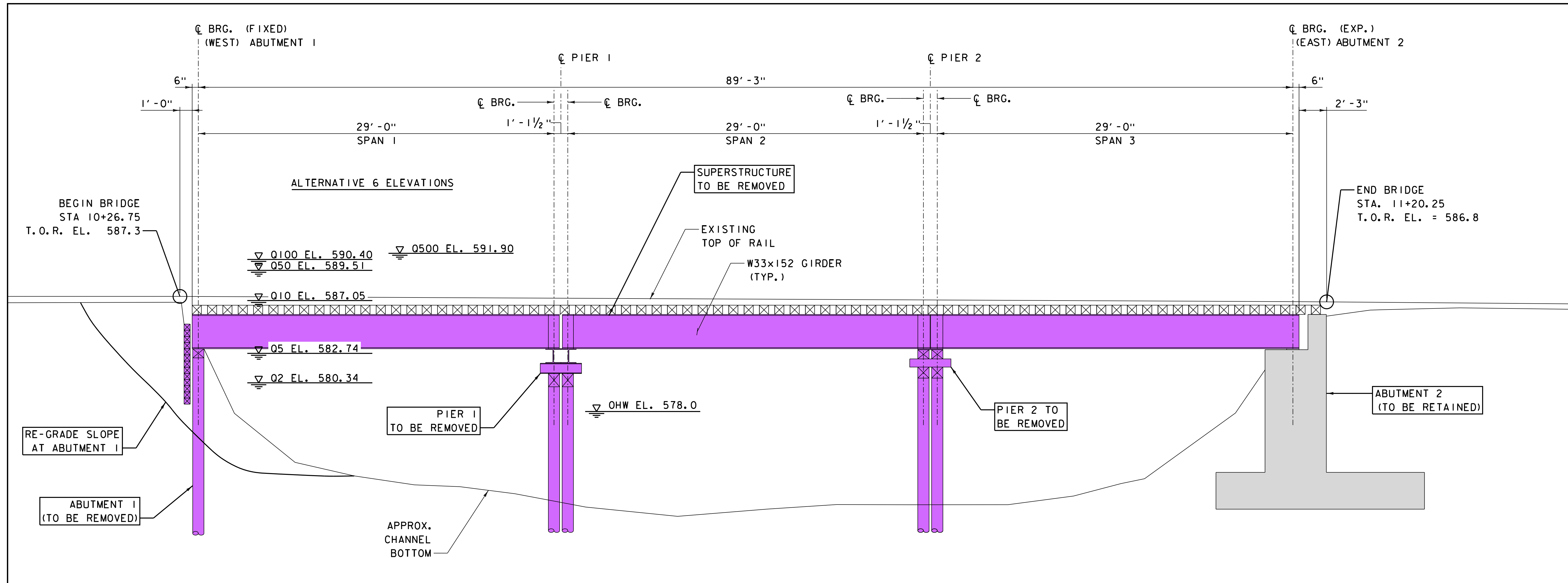
CONTRACTOR  
 STAGING  
 AREA

TO GRANITE  
 INDUSTRIES

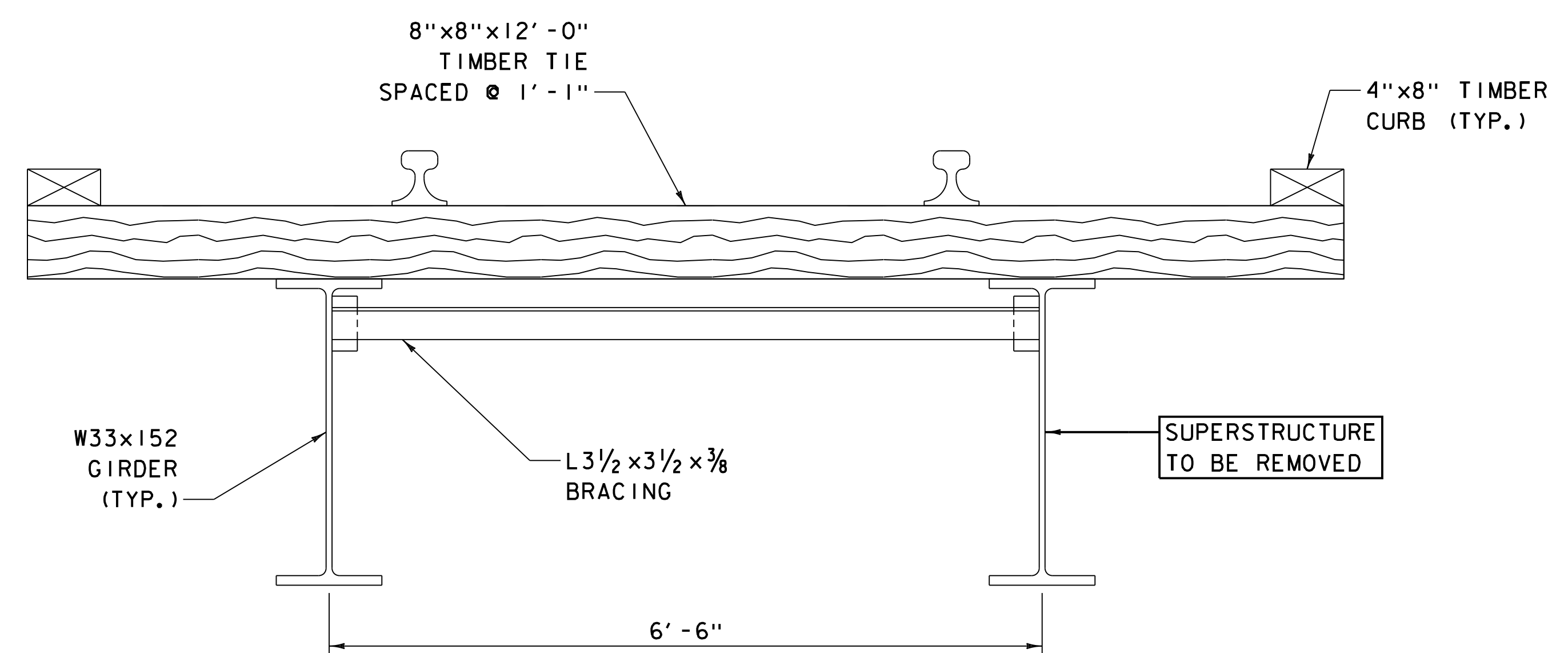
TO BARRE CITY  
 (MAIN LINE)

LEGEND:

- EXISTING TO BE RETAINED
- EXISTING TO BE REMOVED



ALTERNATIVE 6 BRIDGE ELEVATION  
SCALE: 1/4" = 1'-0"



EXISTING BRIDGE SECTION  
SCALE: 1" = 1'-0"

**LEGEND:**

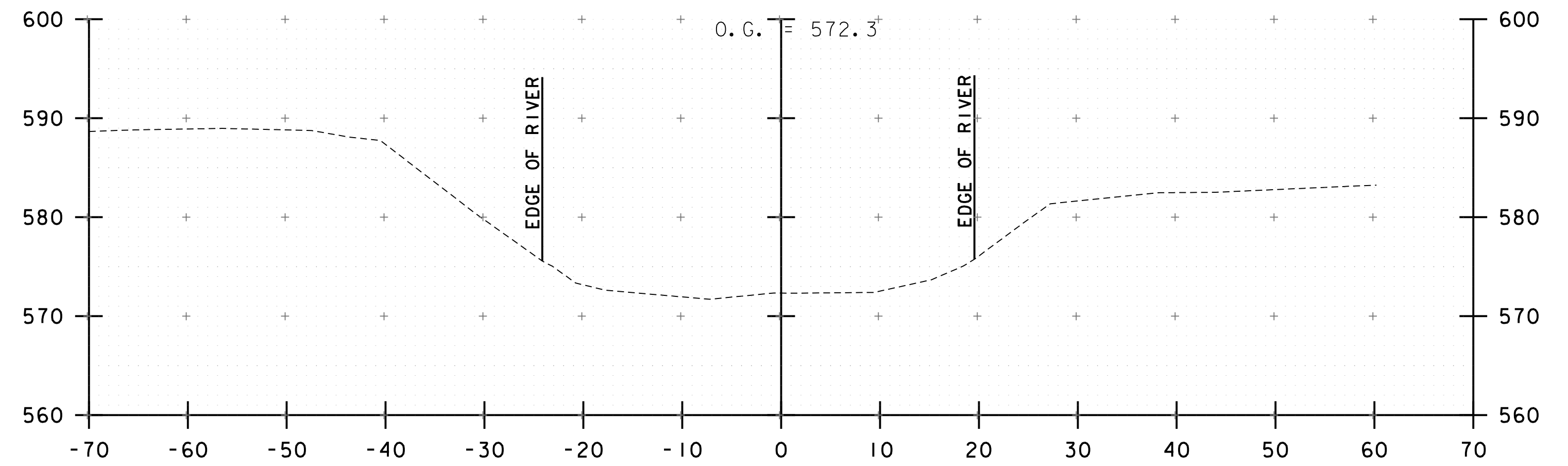
	EXISTING TO BE RETAINED
	PROPOSED NEW ELEMENT

ALTERNATIVE 6 ELEVATION AND SECTION - REMOVE SUPERSTRUCTURE, ABUTMENT 1 AND PIERS

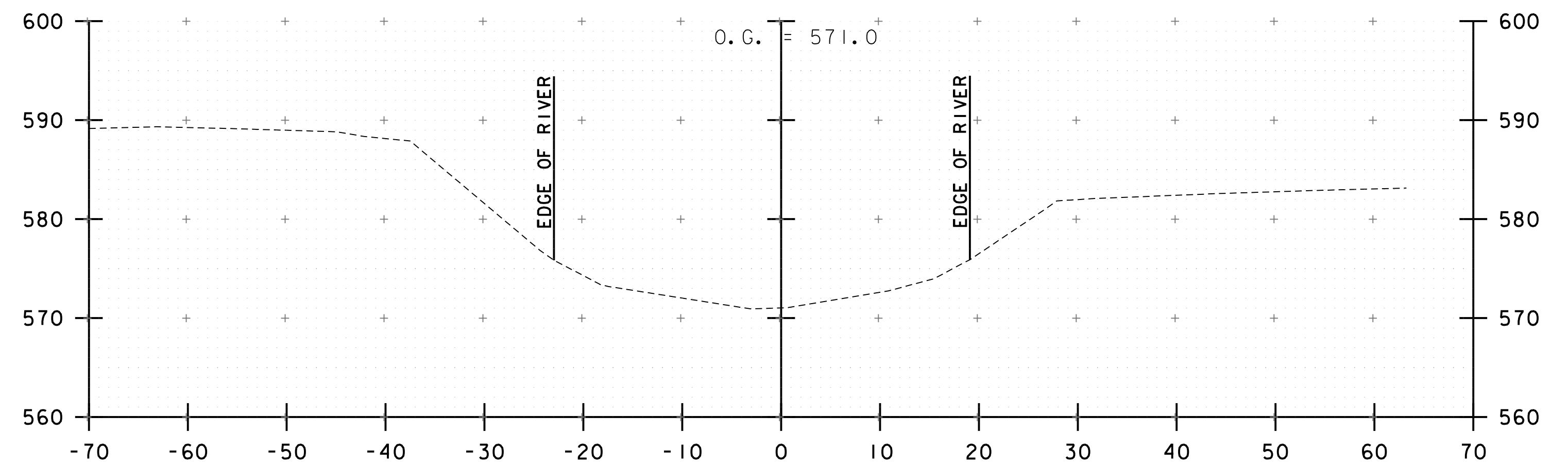


PROJECT NAME: BARRE CITY	PLOT DATE: 1/18/2024
PROJECT NUMBER: WACR(22)	DRAWN BY: S. GUNN
FILE NAME: z22g361elev_ALT6.dgn	CHECKED BY: J. WILSON
DESIGNED BY: A. WALL	SHEET 55 OF 58

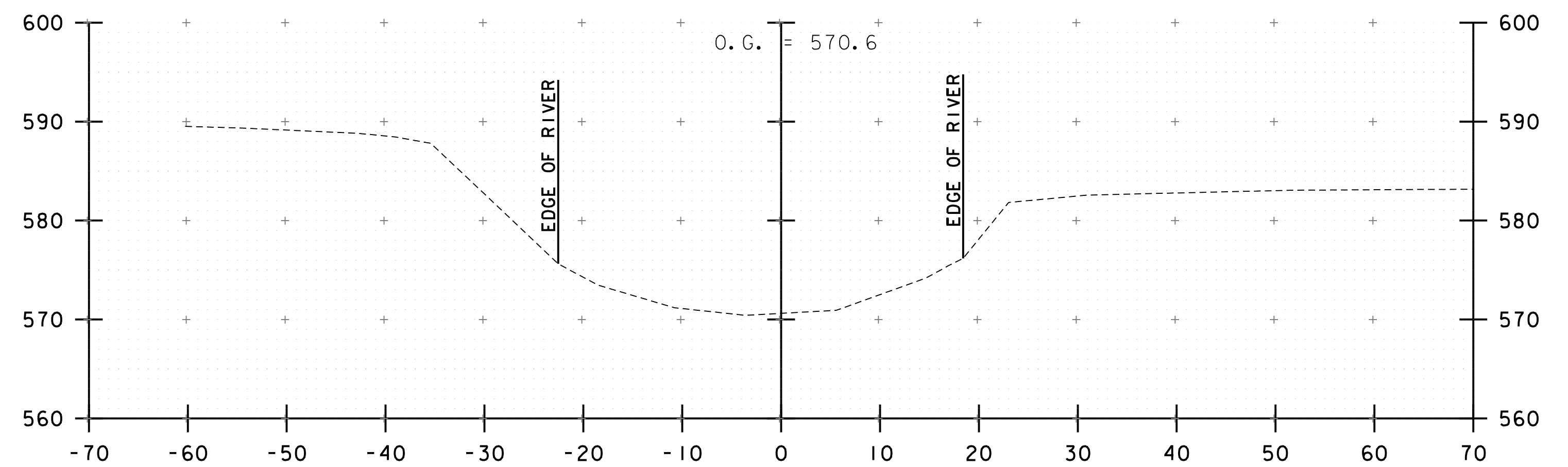




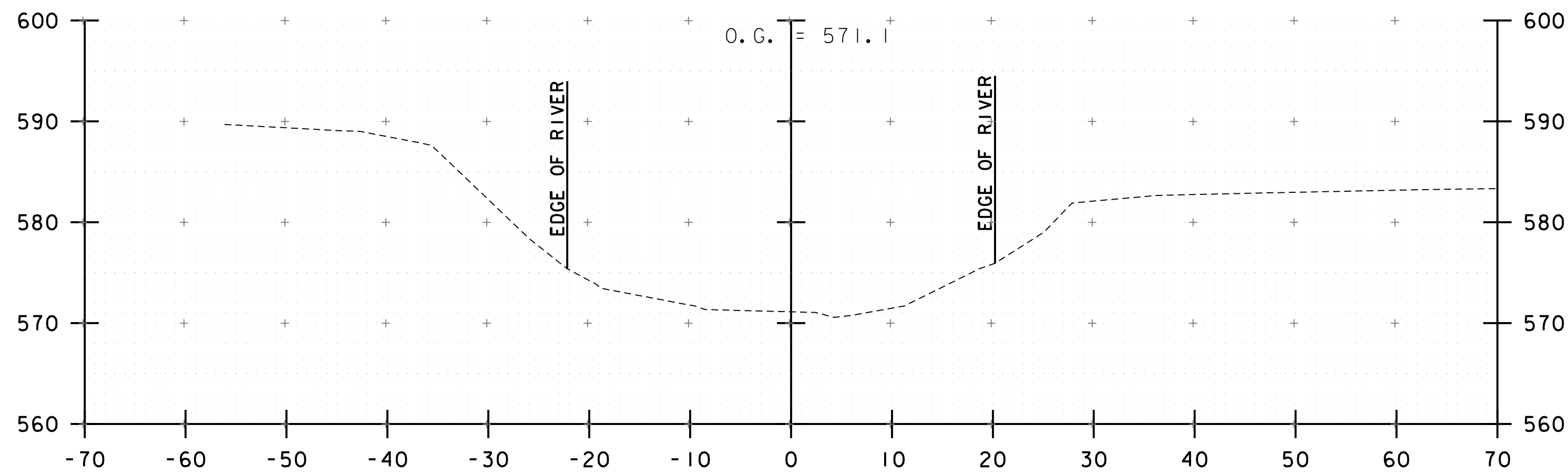
101+00



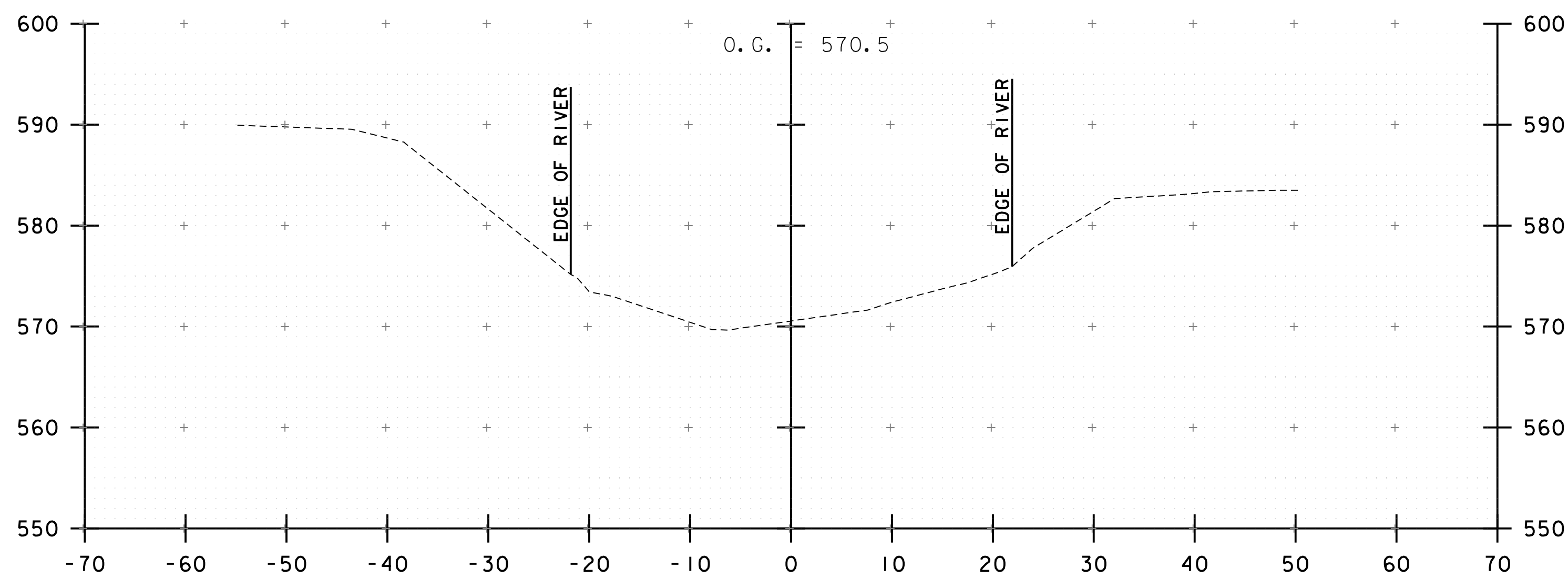
100+75



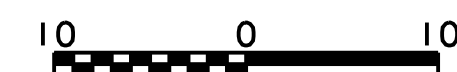
100+50



100+25



100+00

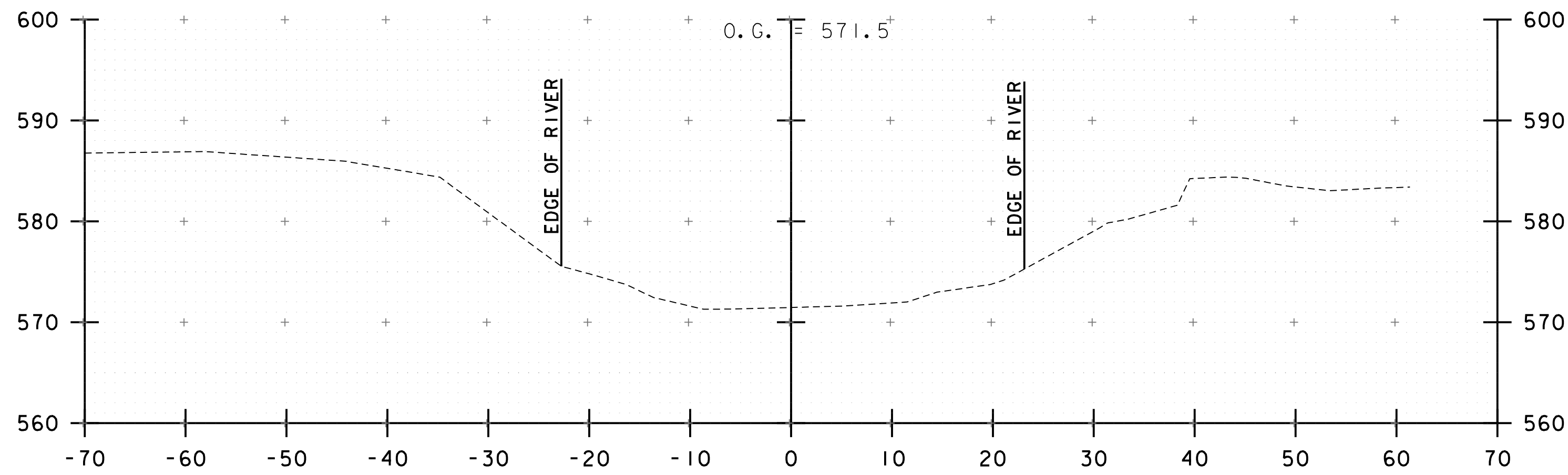


STA. 100+00 TO STA. 101+00

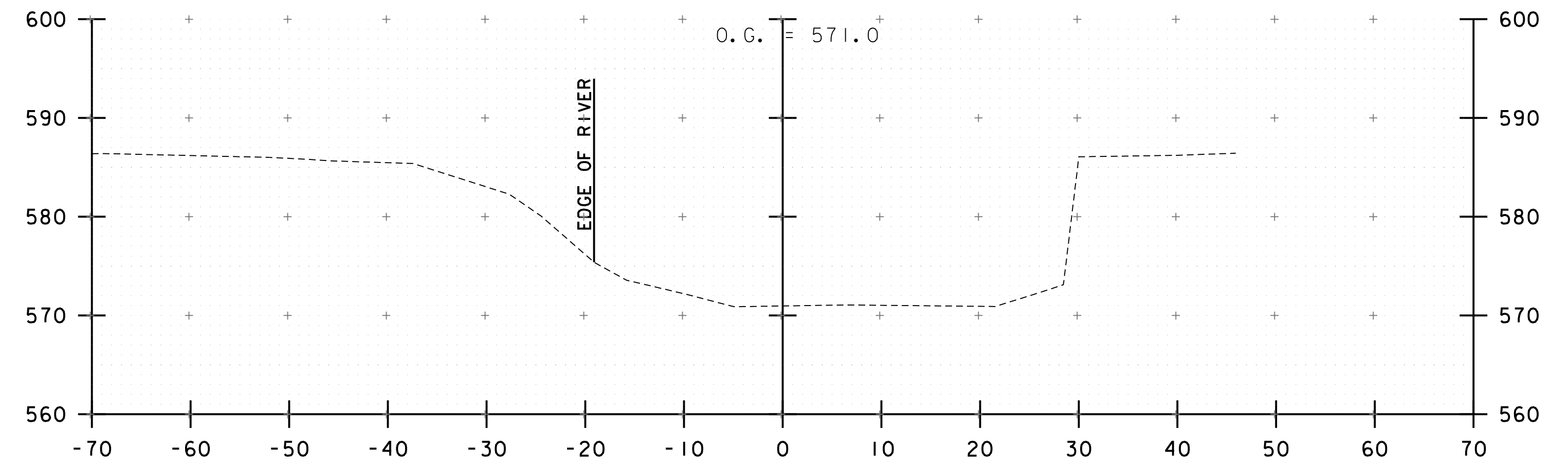


PROJECT NAME: BARRE CITY	PLOT DATE: 1/18/2024
PROJECT NUMBER: WACR(22)	DRAWN BY: S. GUNN
FILE NAME: z22g361xs2.dgn	CHECKED BY: J. WILSON
PROJECT LEADER: J. WILSON	SHEET 21 OF 29
DESIGNED BY: A. WALL	
CHANNEL CROSS SECTIONS 1	

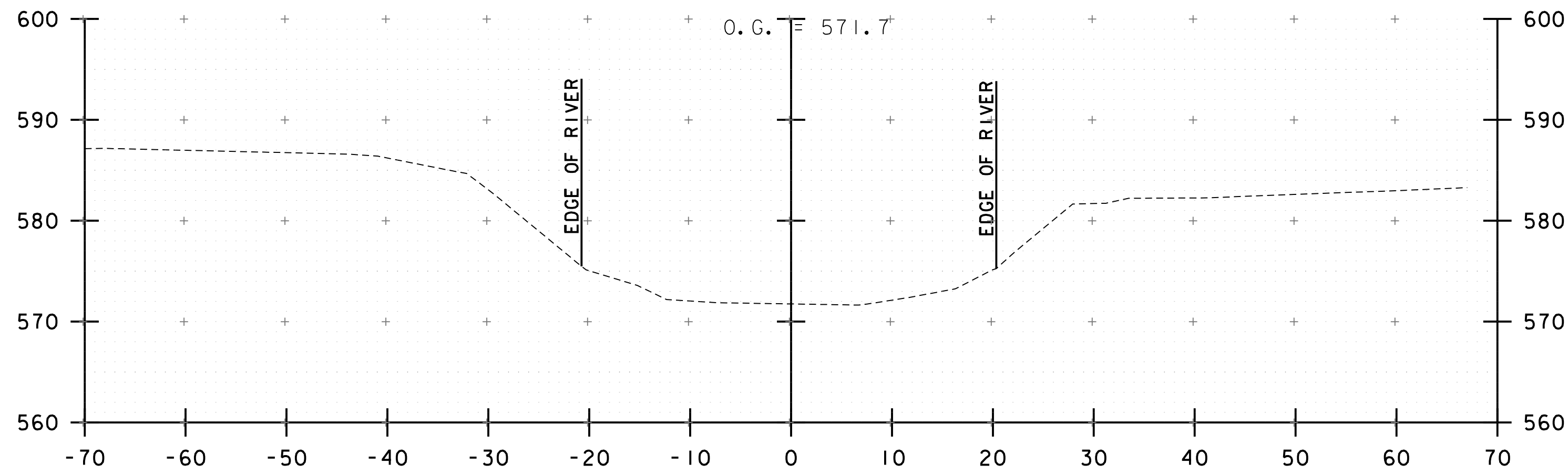




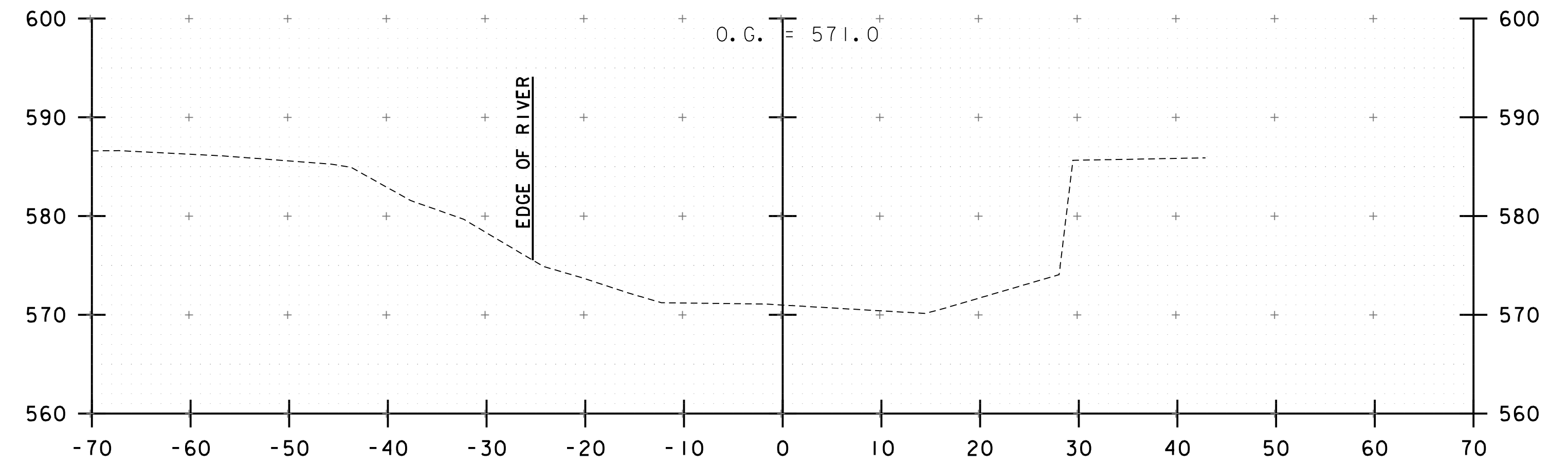
101+75



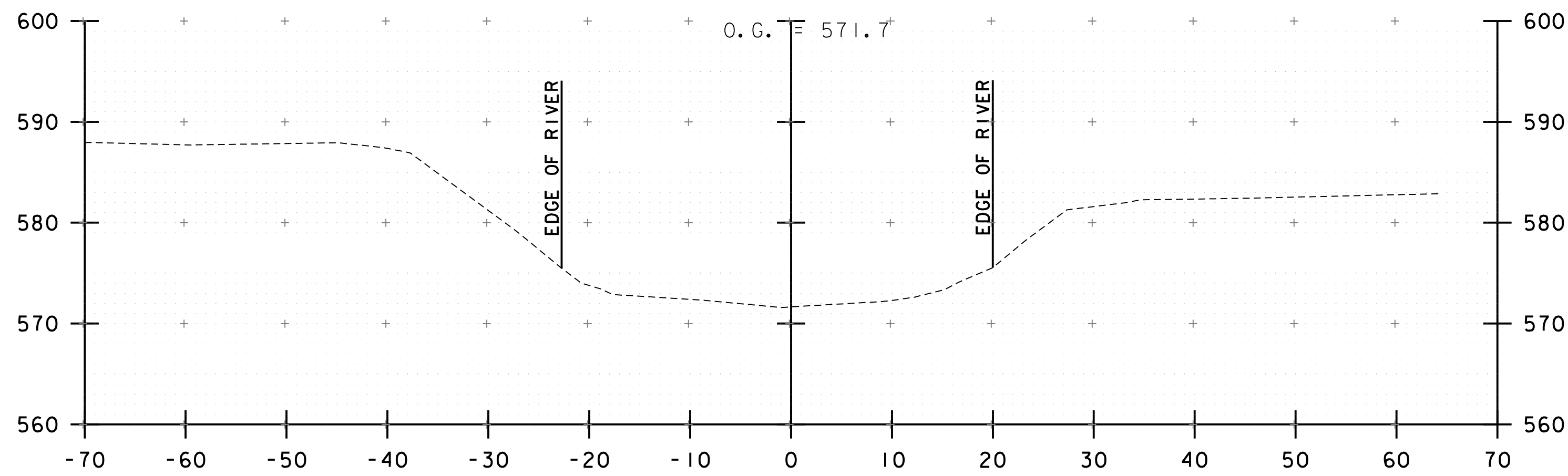
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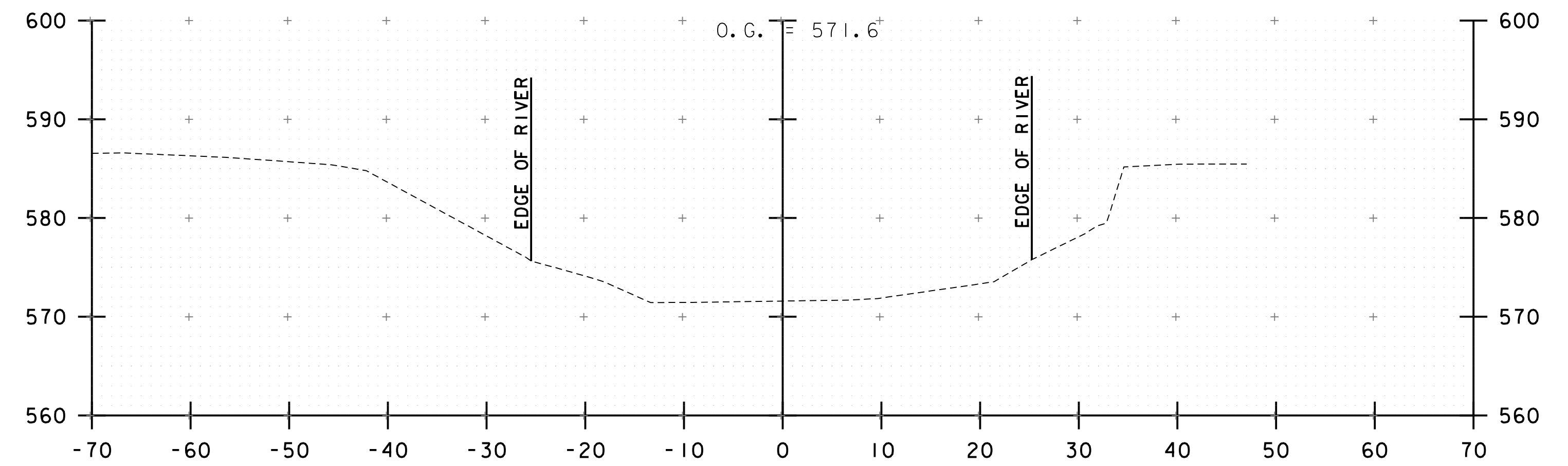
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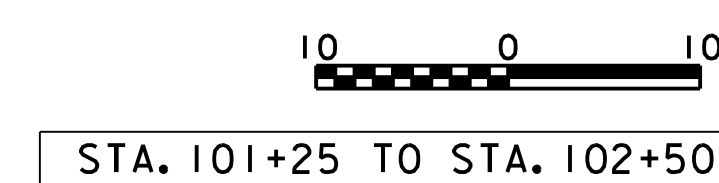
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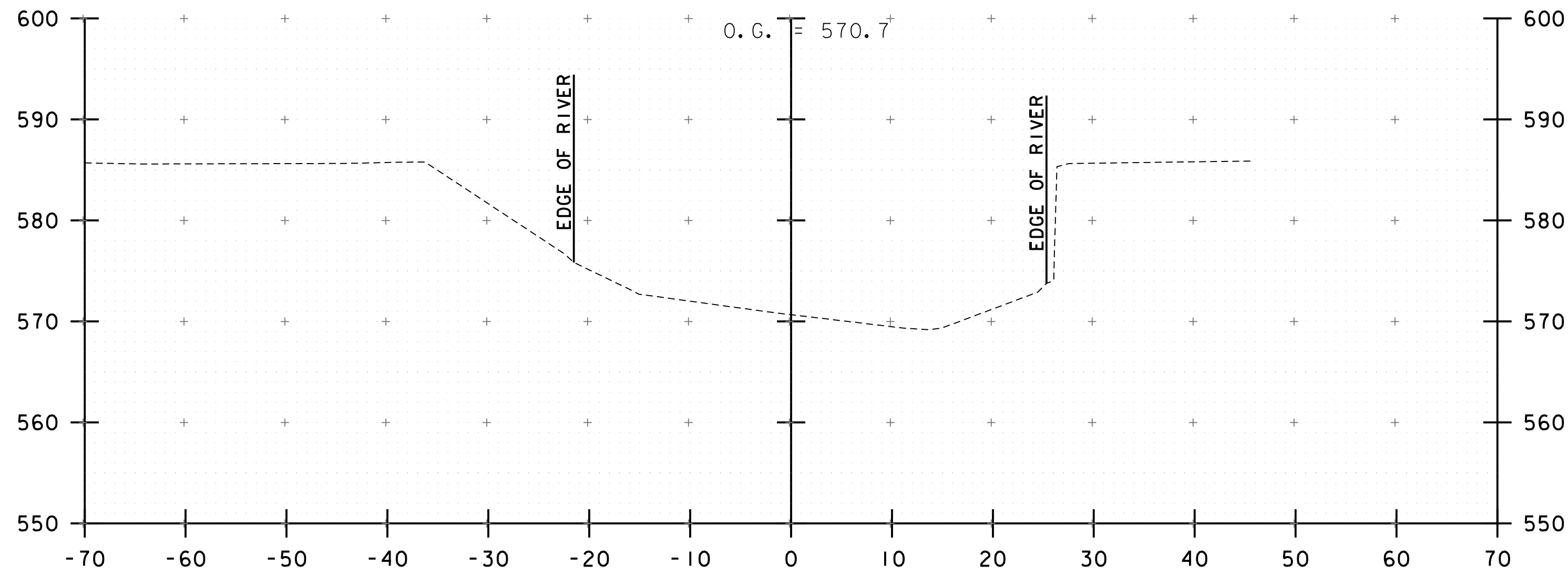
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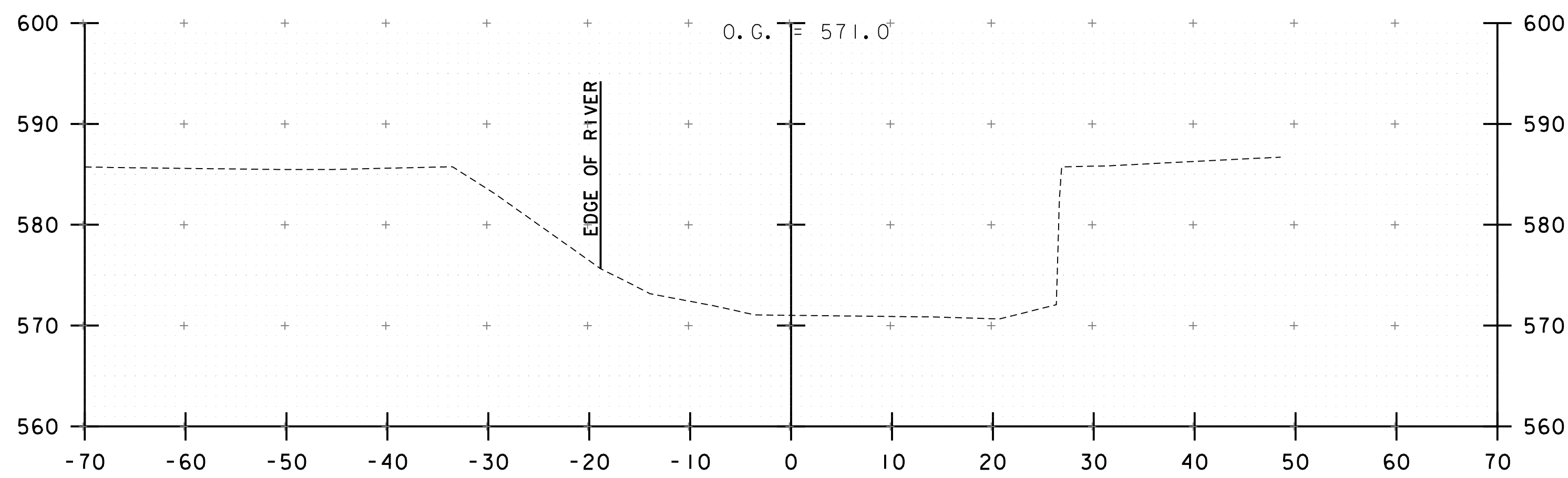
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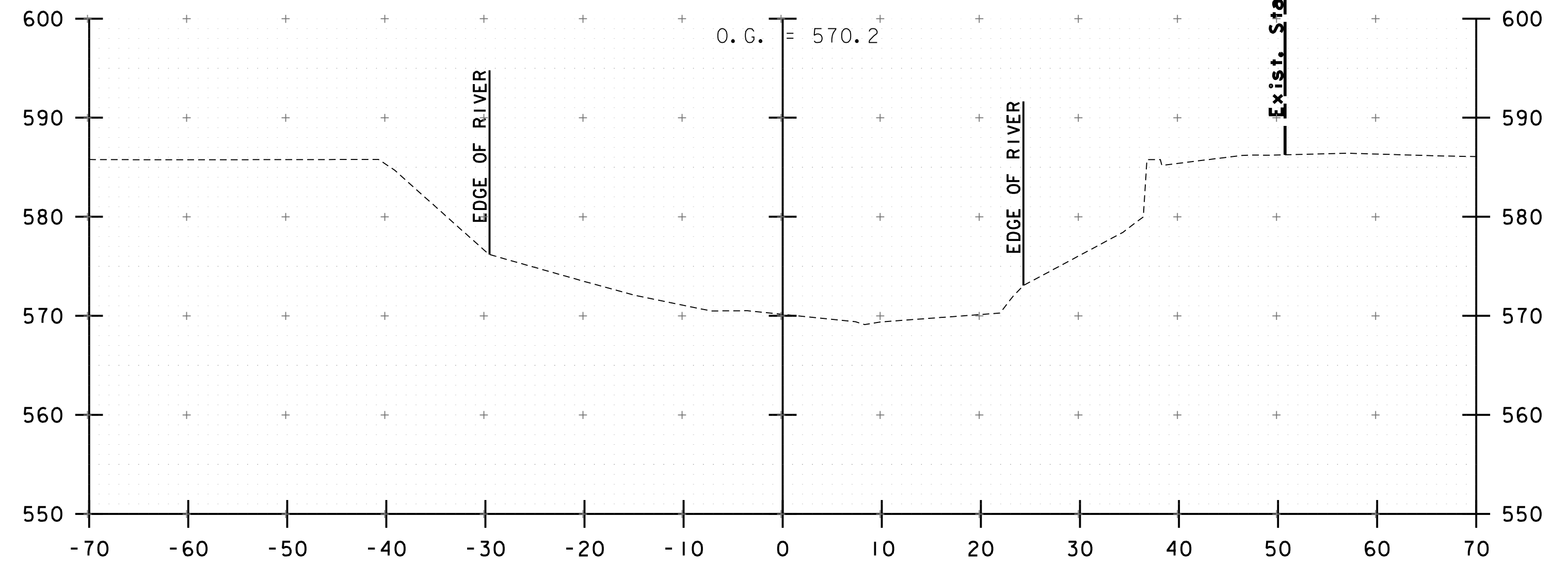
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PROJECT NUMBER: WACR(22)	
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DESIGNED BY: A. WALL	CHECKED BY: J. WILSON
CHANNEL CROSS SECTIONS 2	SHEET 22 OF 29



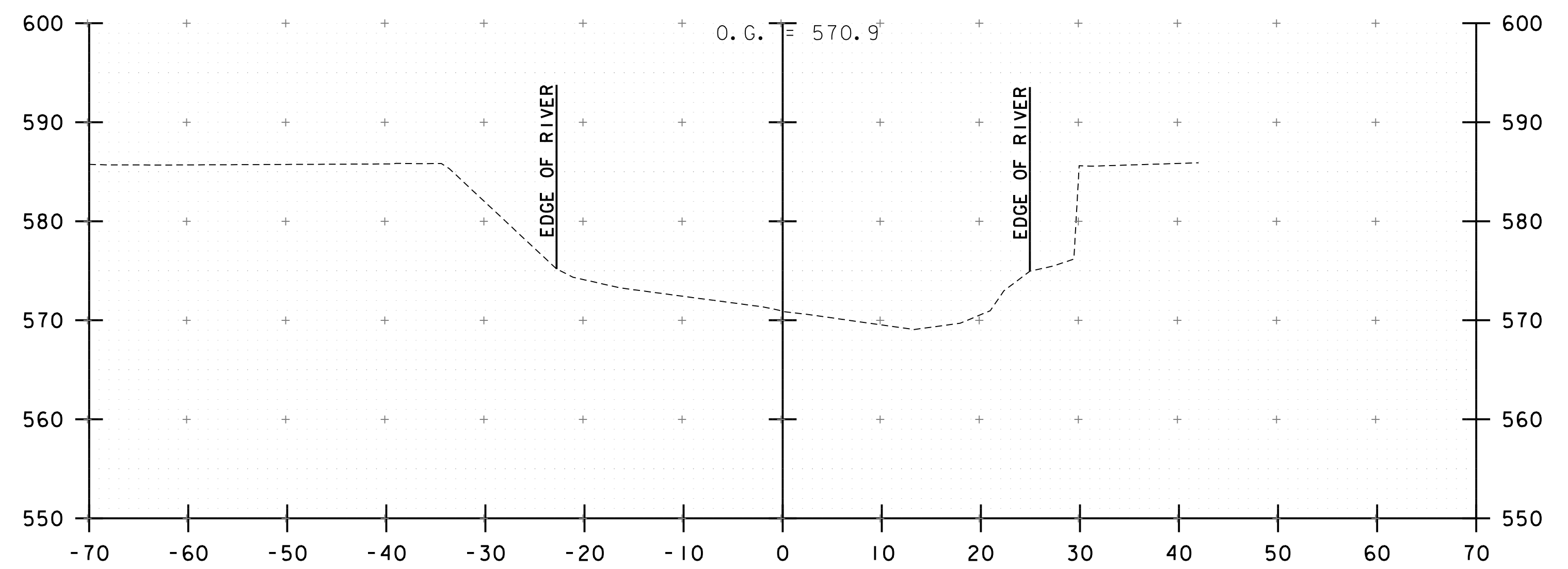
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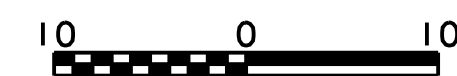
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103+50



103+25



STA. 102+75 TO STA. 103+50



PROJECT NAME: BARRE CITY

PROJECT NUMBER: WACR(22)

FILE NAME: z22g361xs2.dgn

PROJECT LEADER: J. WILSON

DESIGNED BY: A. WALL

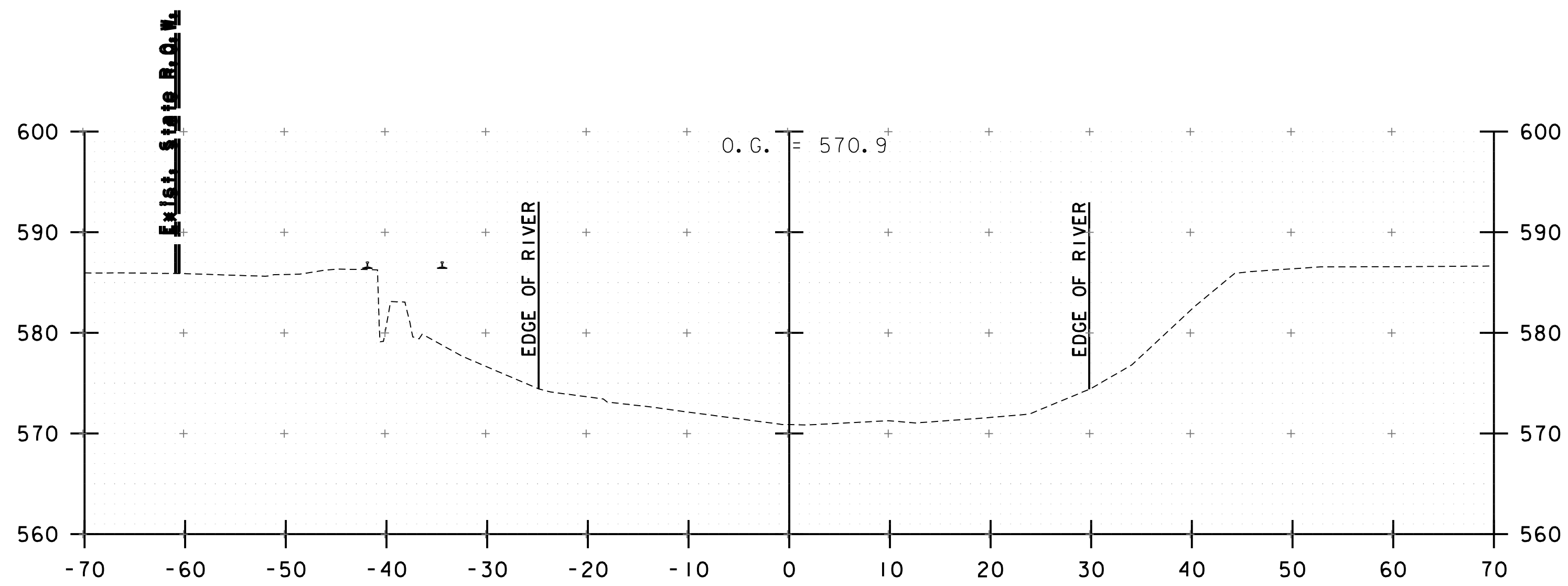
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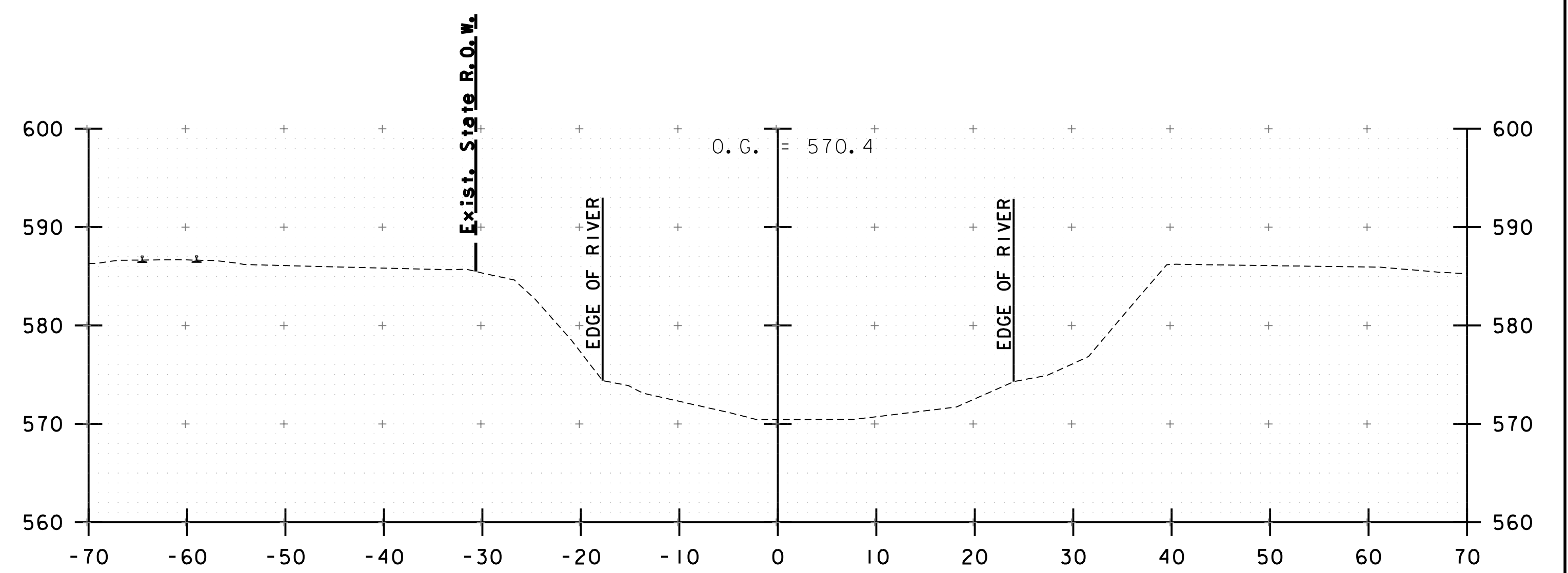
DRAWN BY: S. GUNN

CHECKED BY: J. WILSON

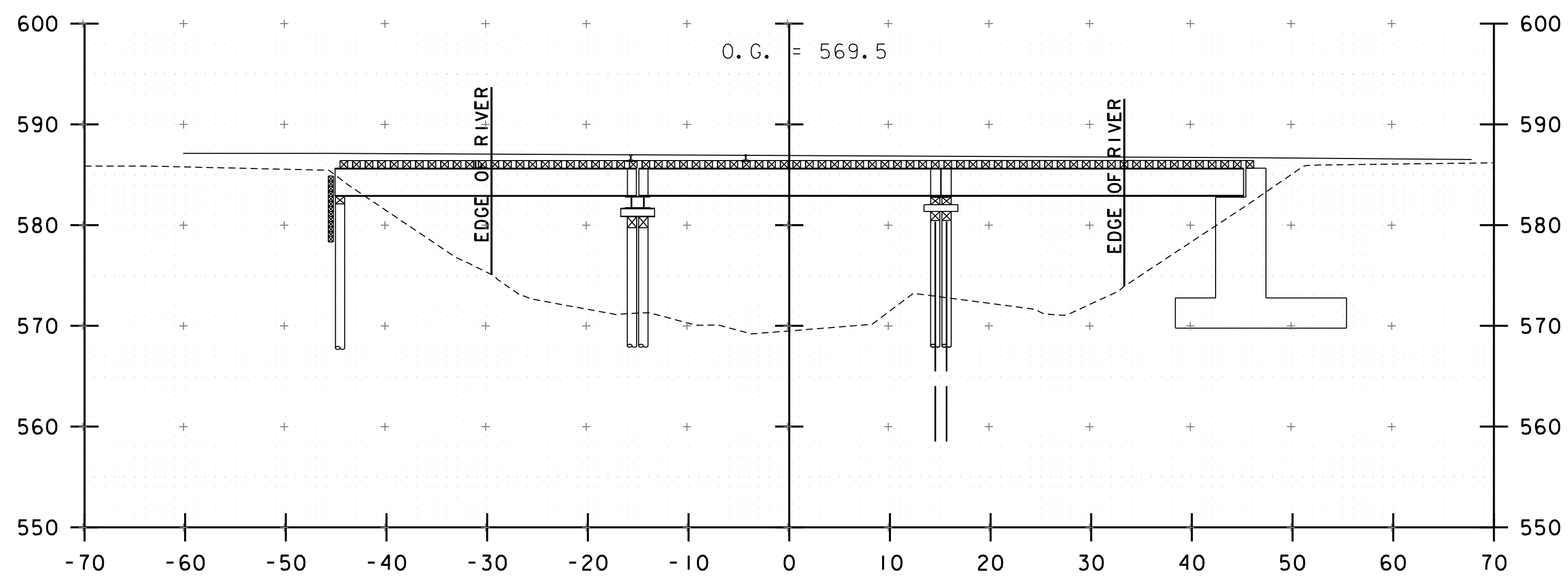
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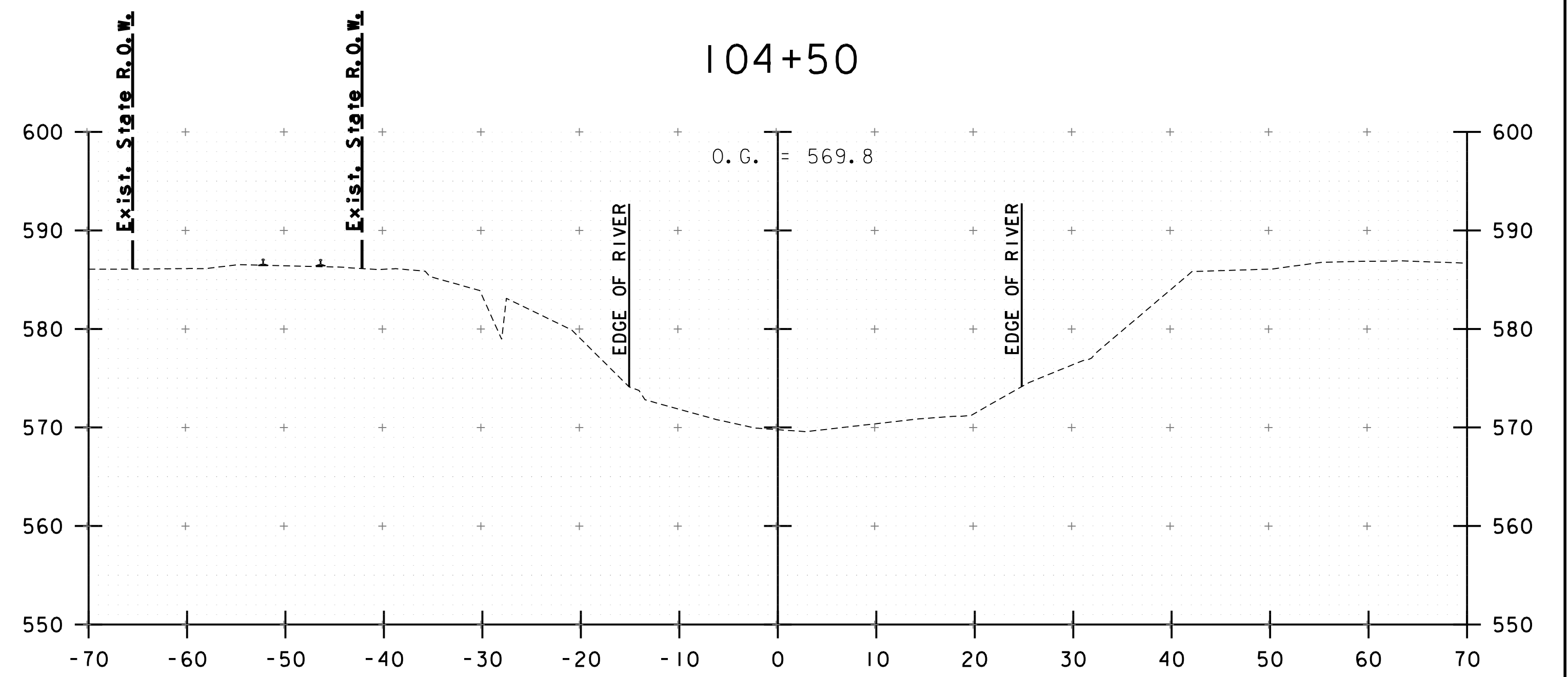
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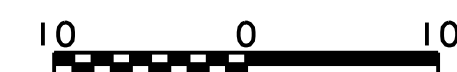
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103+75



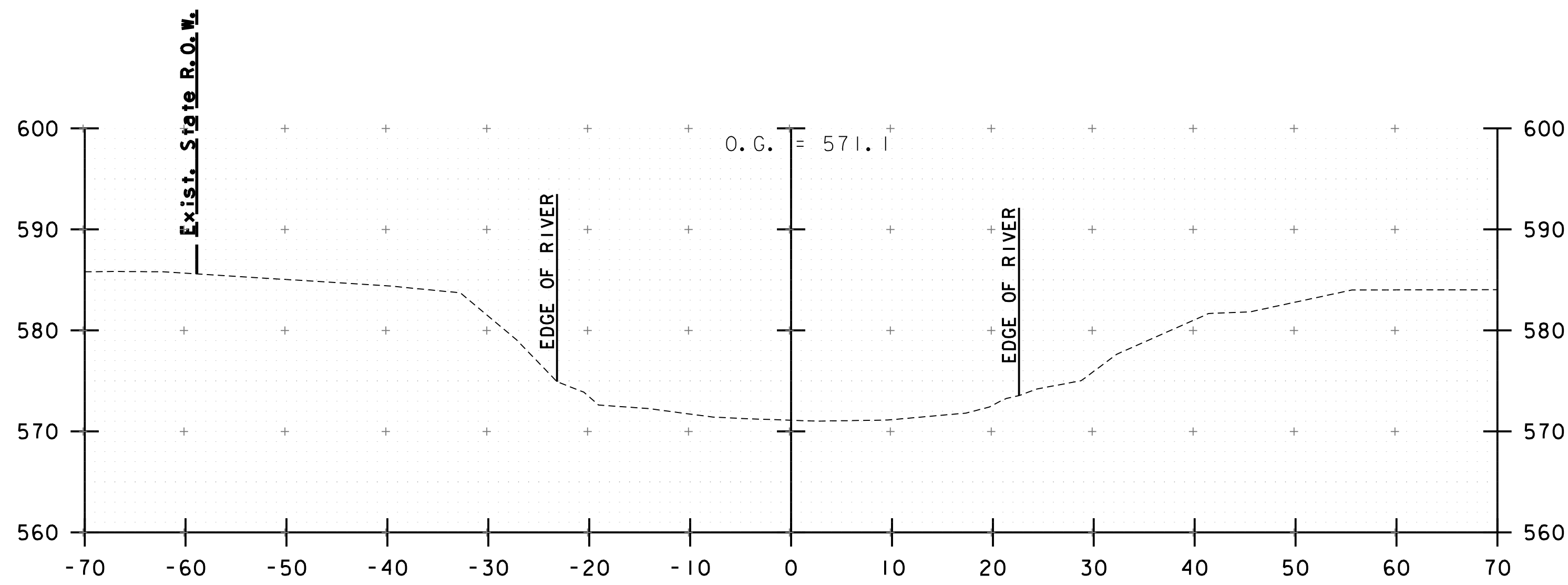
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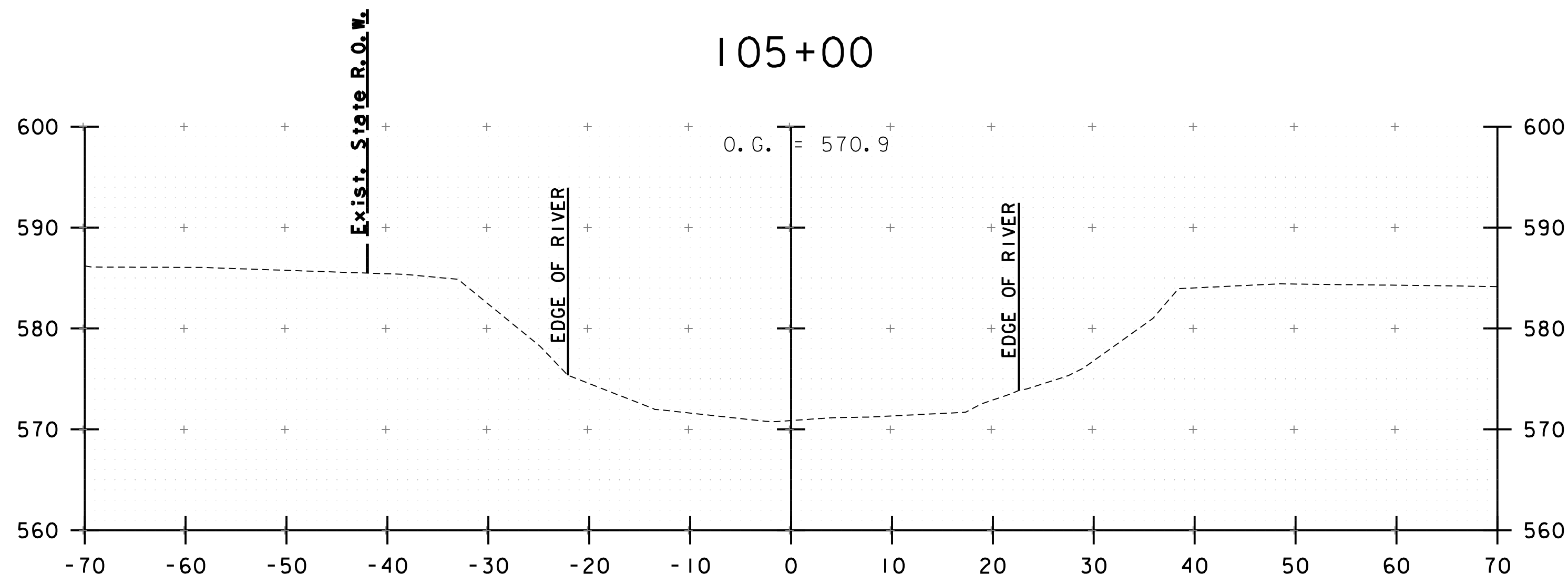
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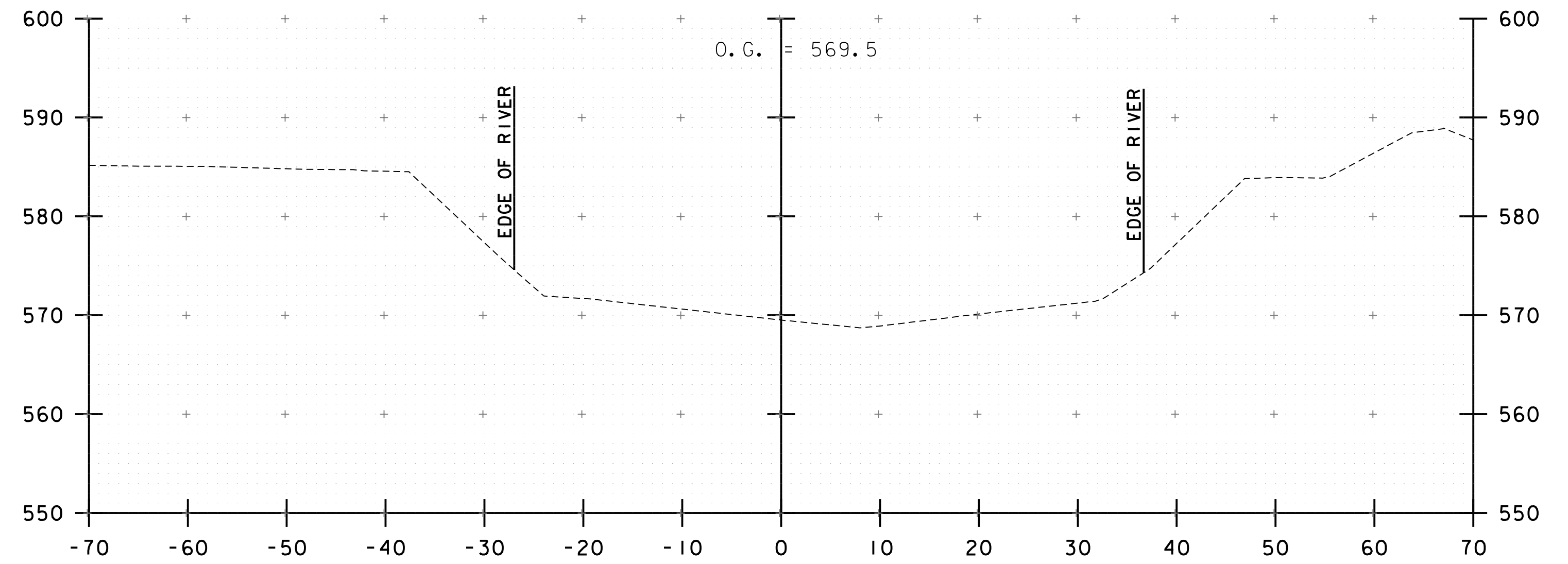
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FILE NAME: z22g361xs2.dgn	CHECKED BY: J. WILSON
PROJECT LEADER: J. WILSON	SHEET 24 OF 29
DESIGNED BY: A. WALL	
CHANNEL CROSS SECTIONS 4	



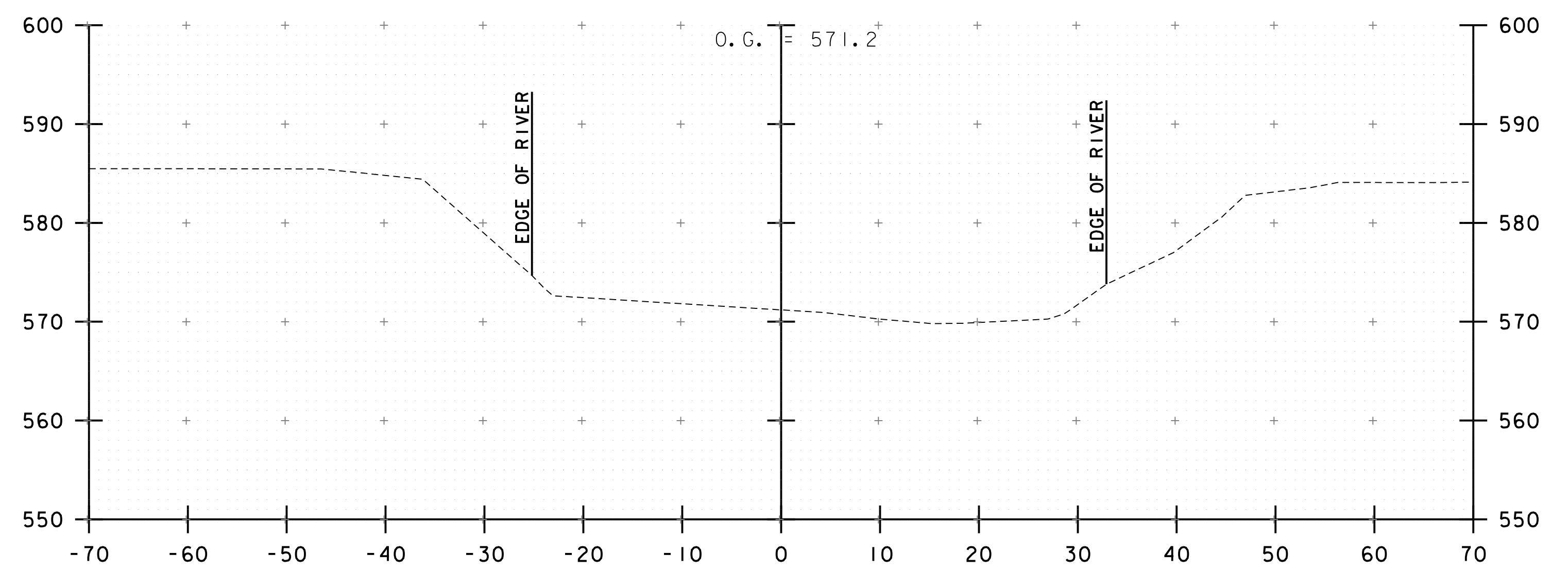
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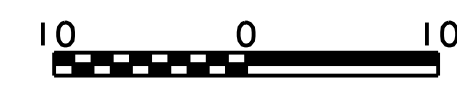
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105+50



105+25



STA. 104+75 TO STA. 105+50



PROJECT NAME: BARRE CITY

PROJECT NUMBER: WACR(22)

FILE NAME: z22g361xs2.dgn

PROJECT LEADER: J. WILSON

DESIGNED BY: A. WALL

CHANNEL CROSS SECTIONS 5

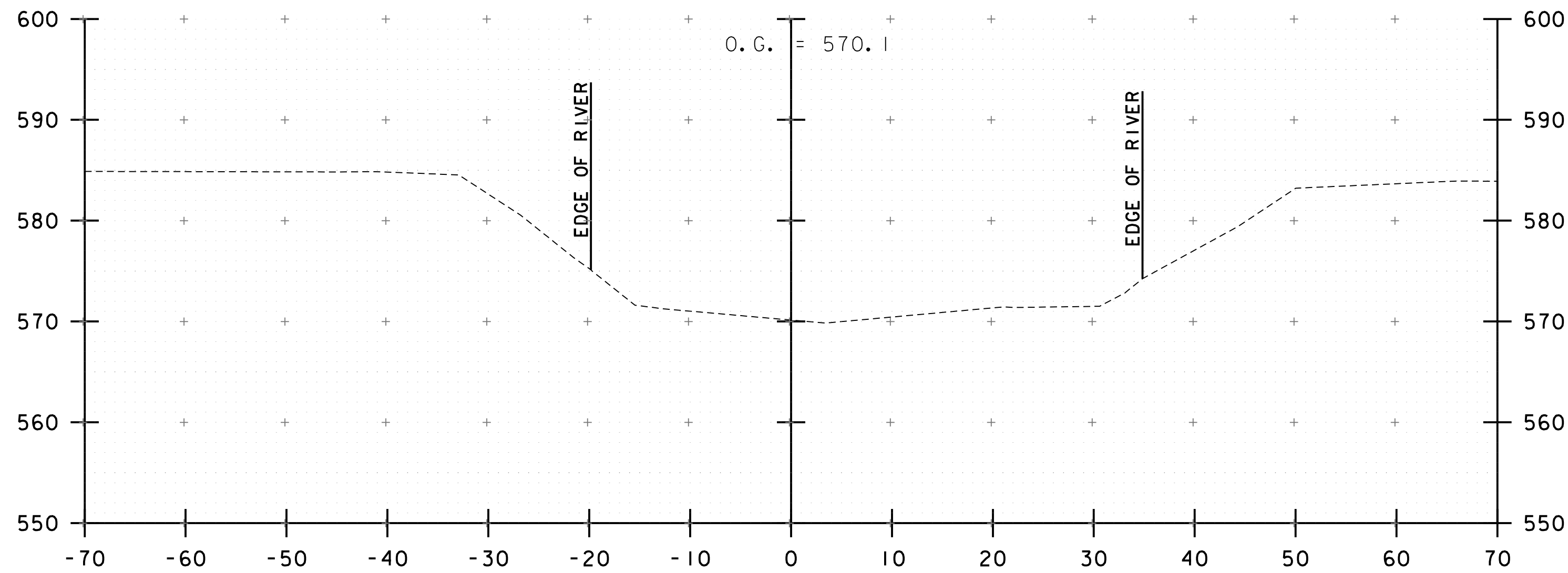
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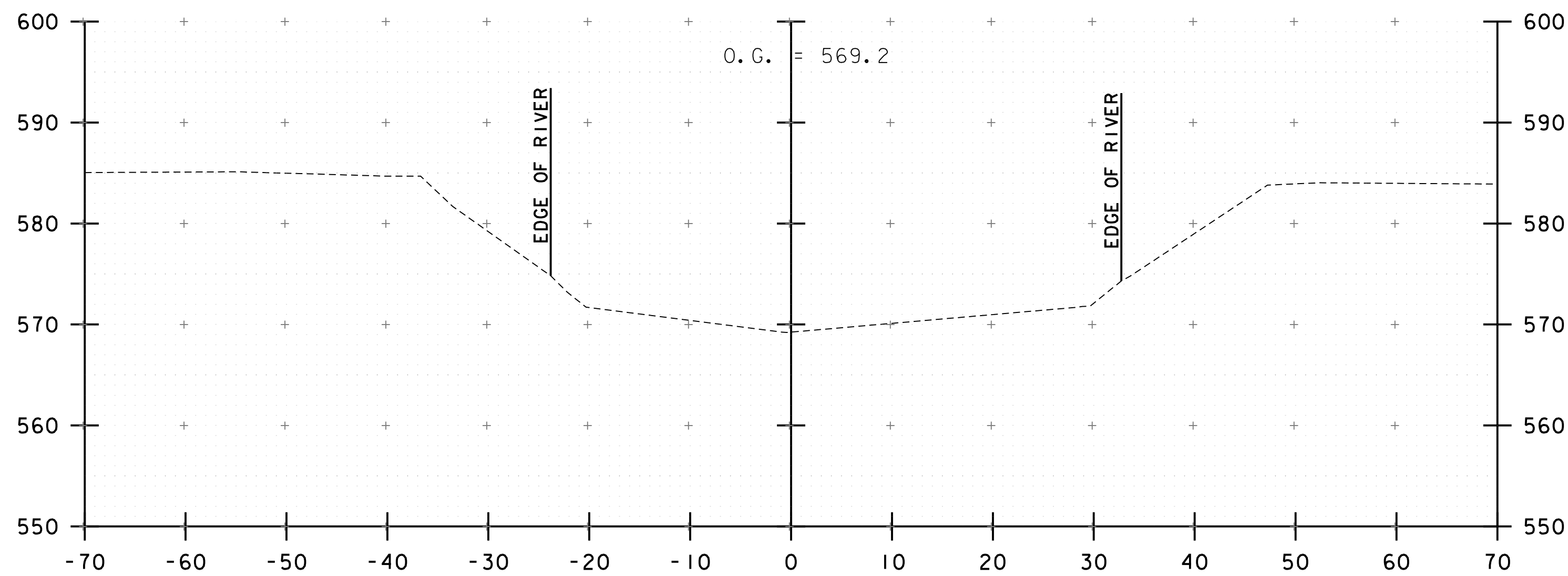
CHECKED BY: J. WILSON

SHEET 25 OF 29

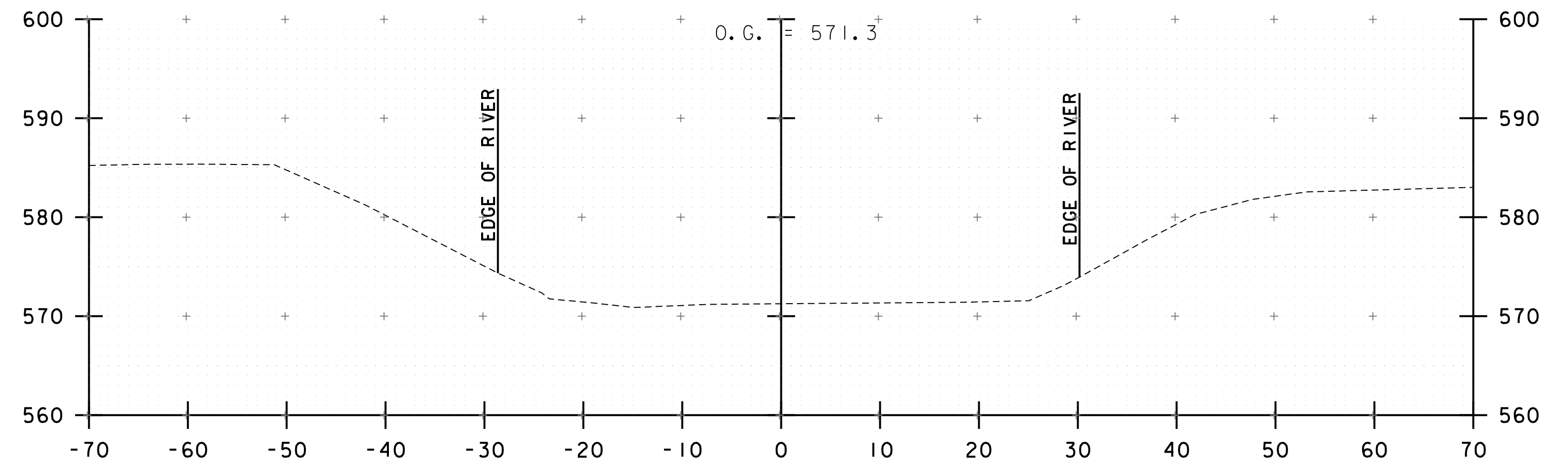




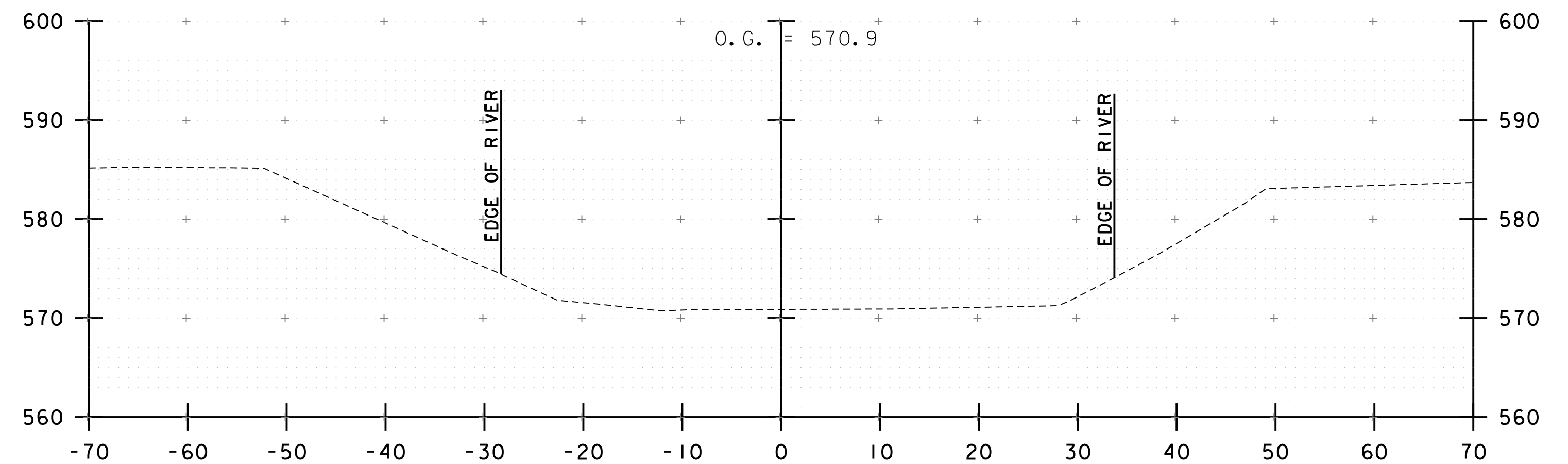
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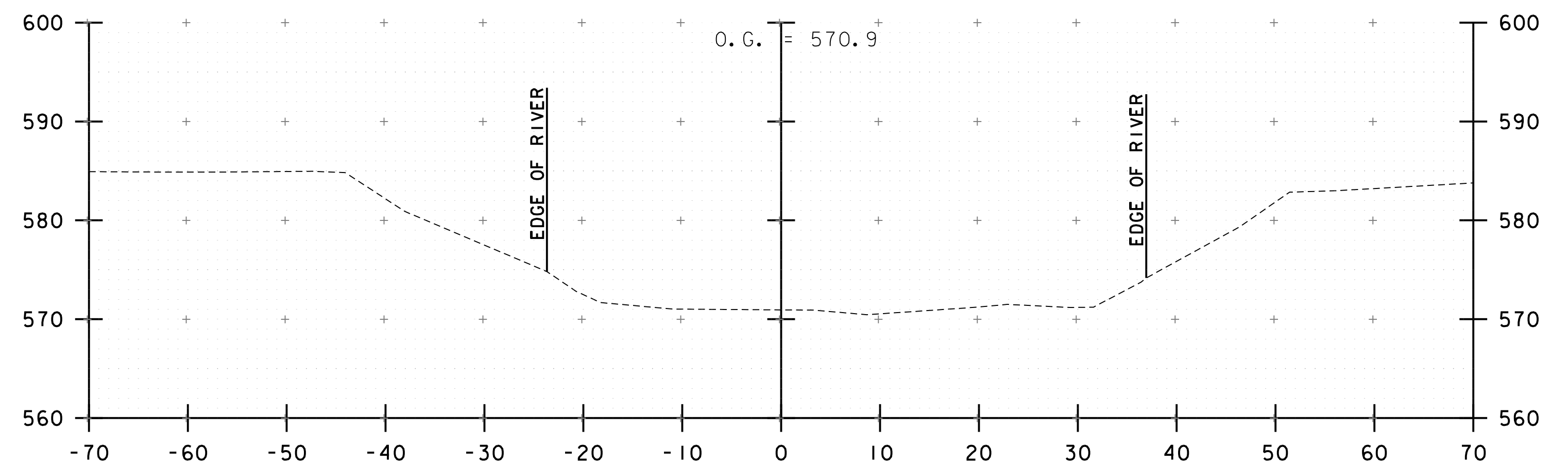
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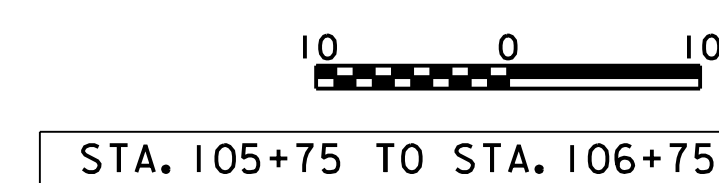
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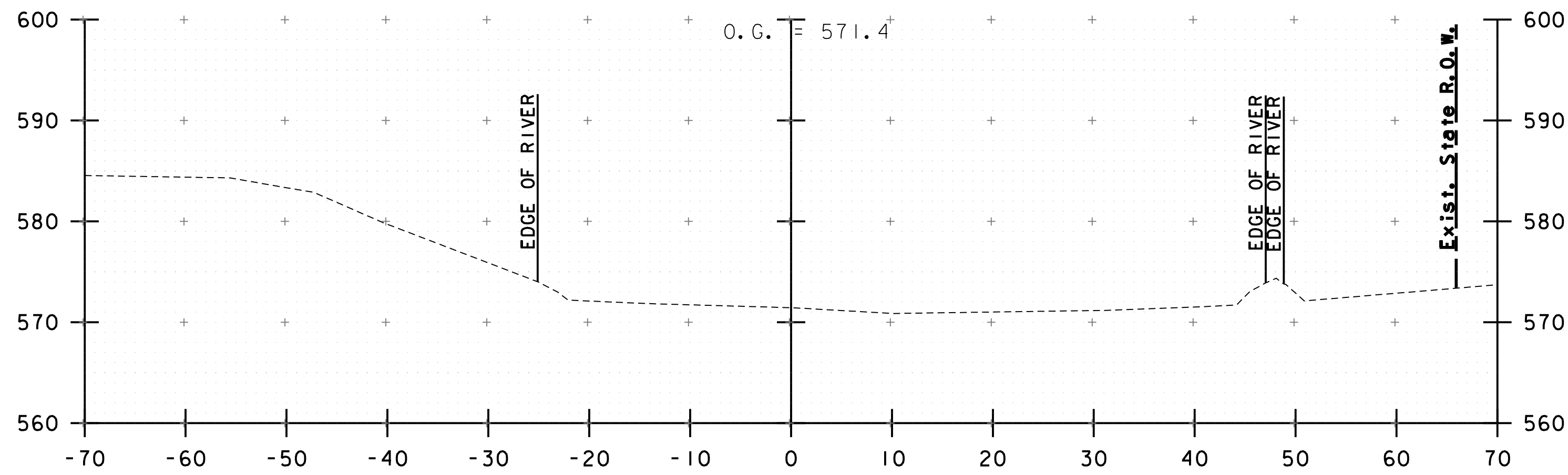
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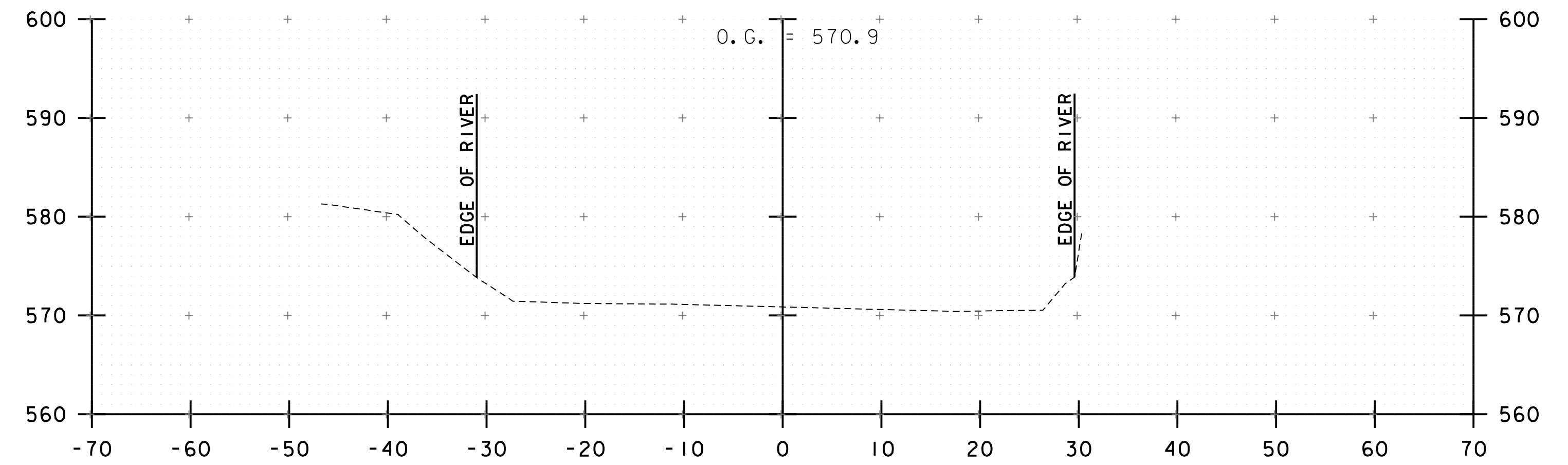
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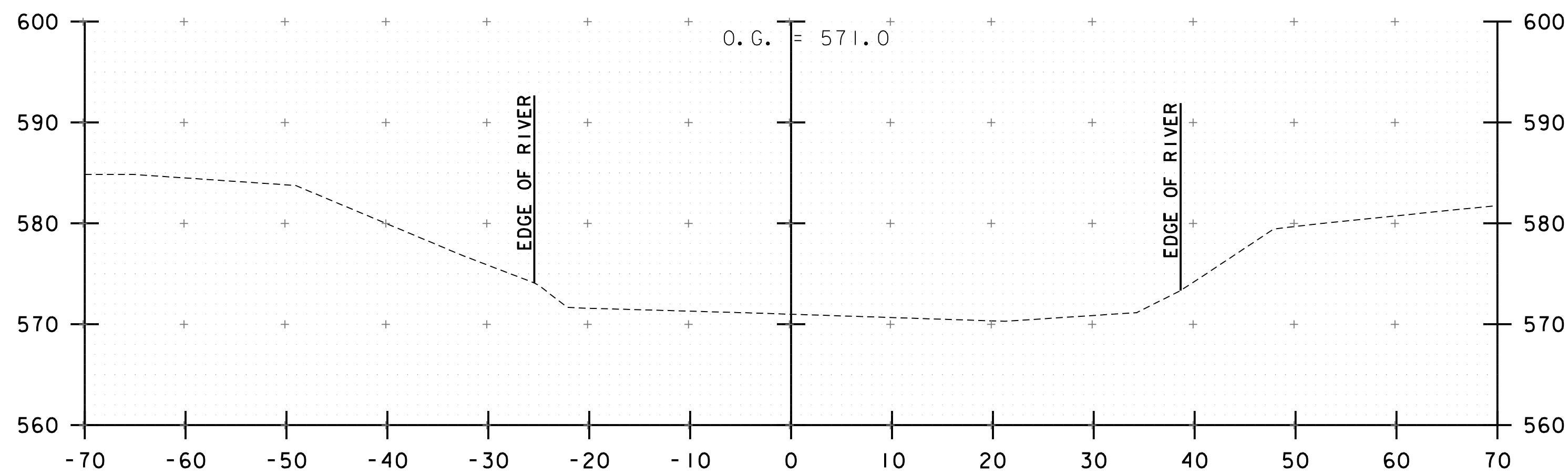
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PROJECT LEADER: J. WILSON	DRAWN BY: S. GUNN
DESIGNED BY: A. WALL	CHECKED BY: J. WILSON
CHANNEL CROSS SECTIONS 6	SHEET 26 OF 29



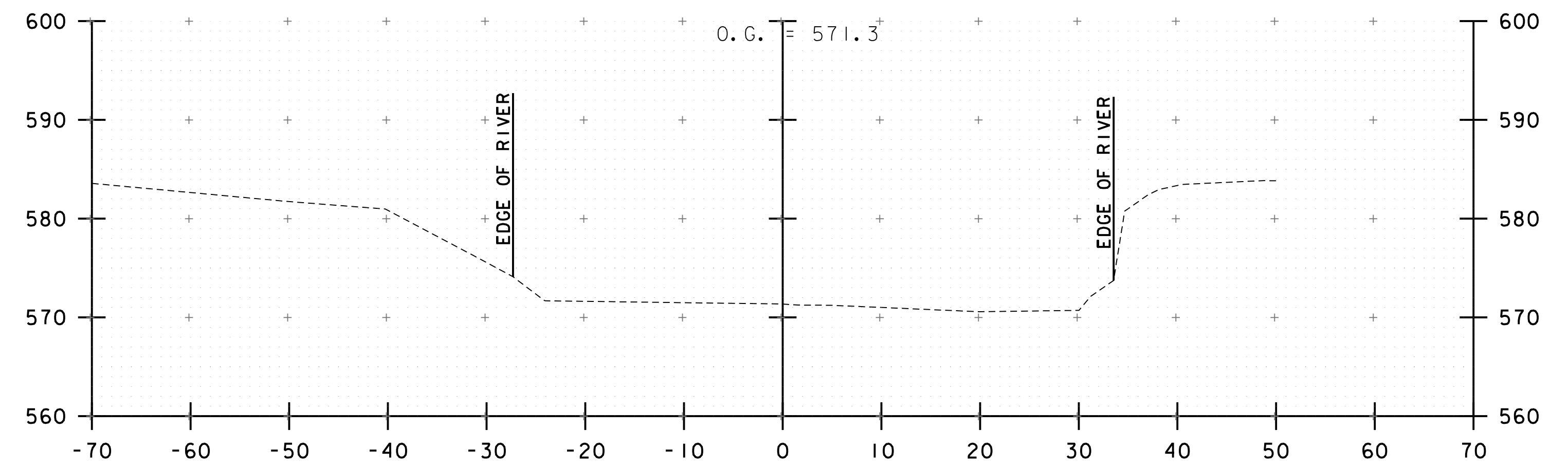
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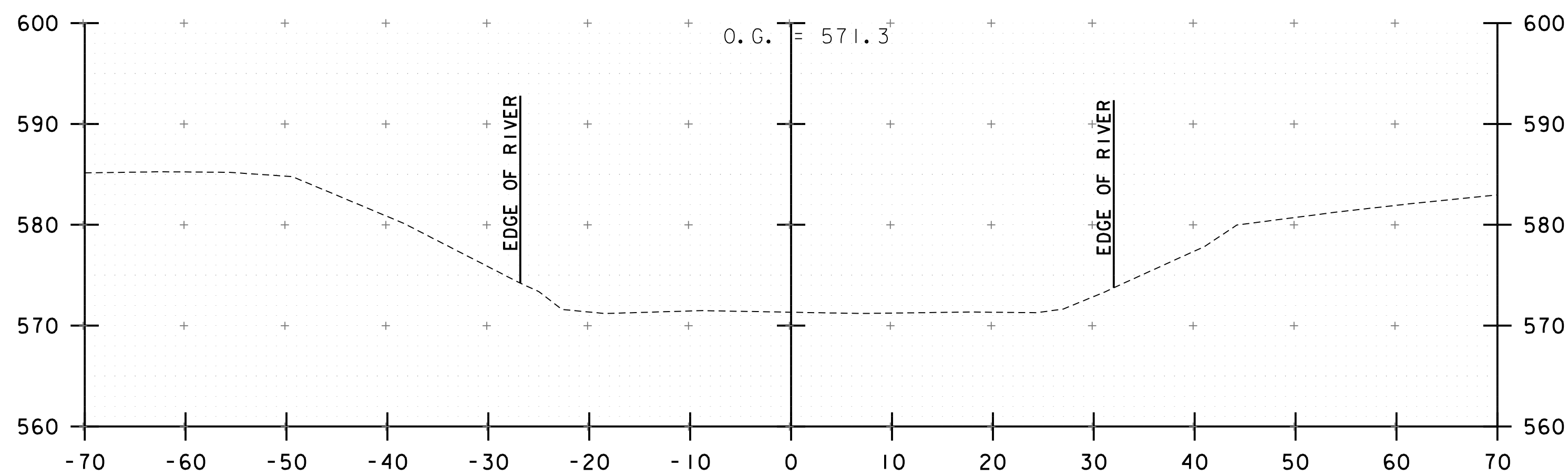
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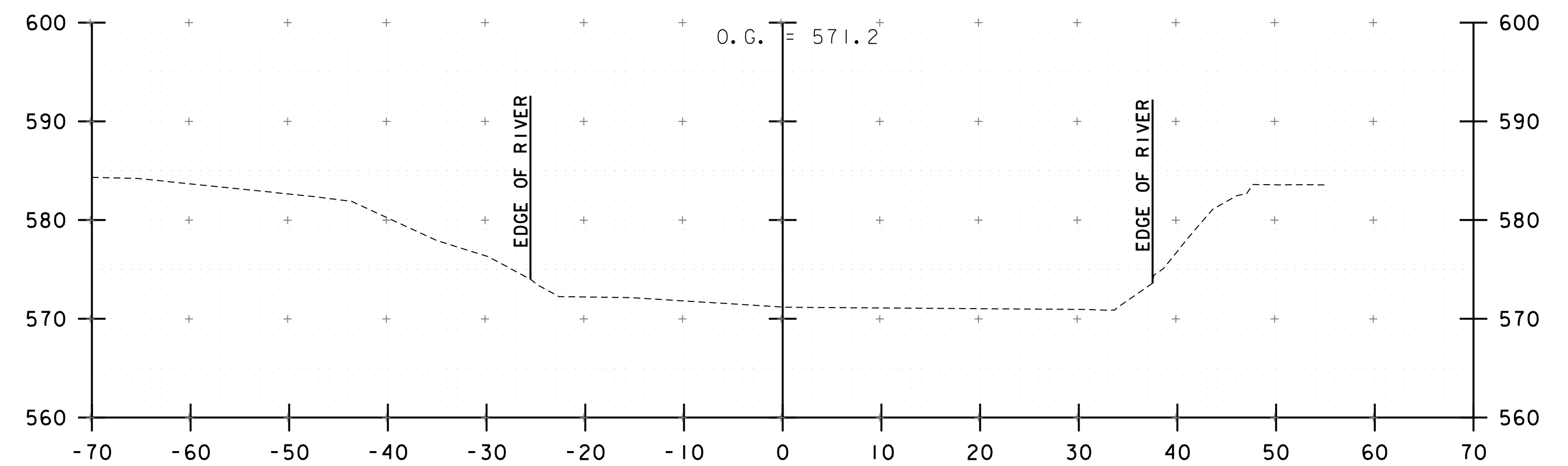
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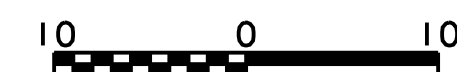
108+00



107+00



107+75



STA. 107+00 TO STA. 108+25



PROJECT NAME: BARRE CITY

PROJECT NUMBER: WACR(22)

FILE NAME: z22g361xs2.dgn

PROJECT LEADER: J. WILSON

DESIGNED BY: A. WALL

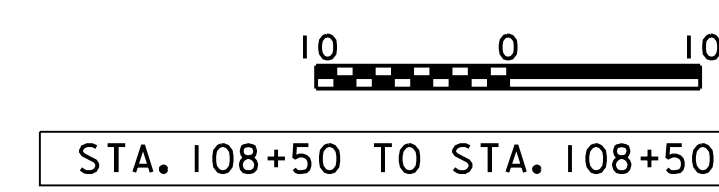
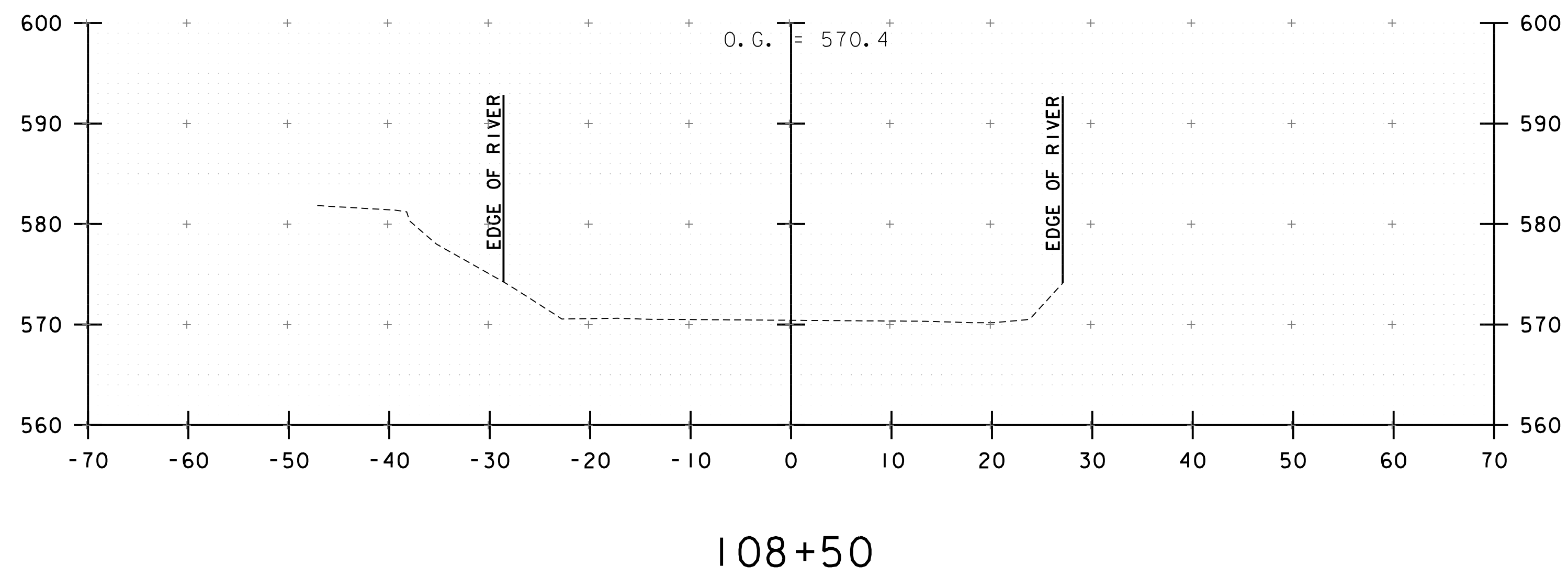
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PLOT DATE: 1/18/2024

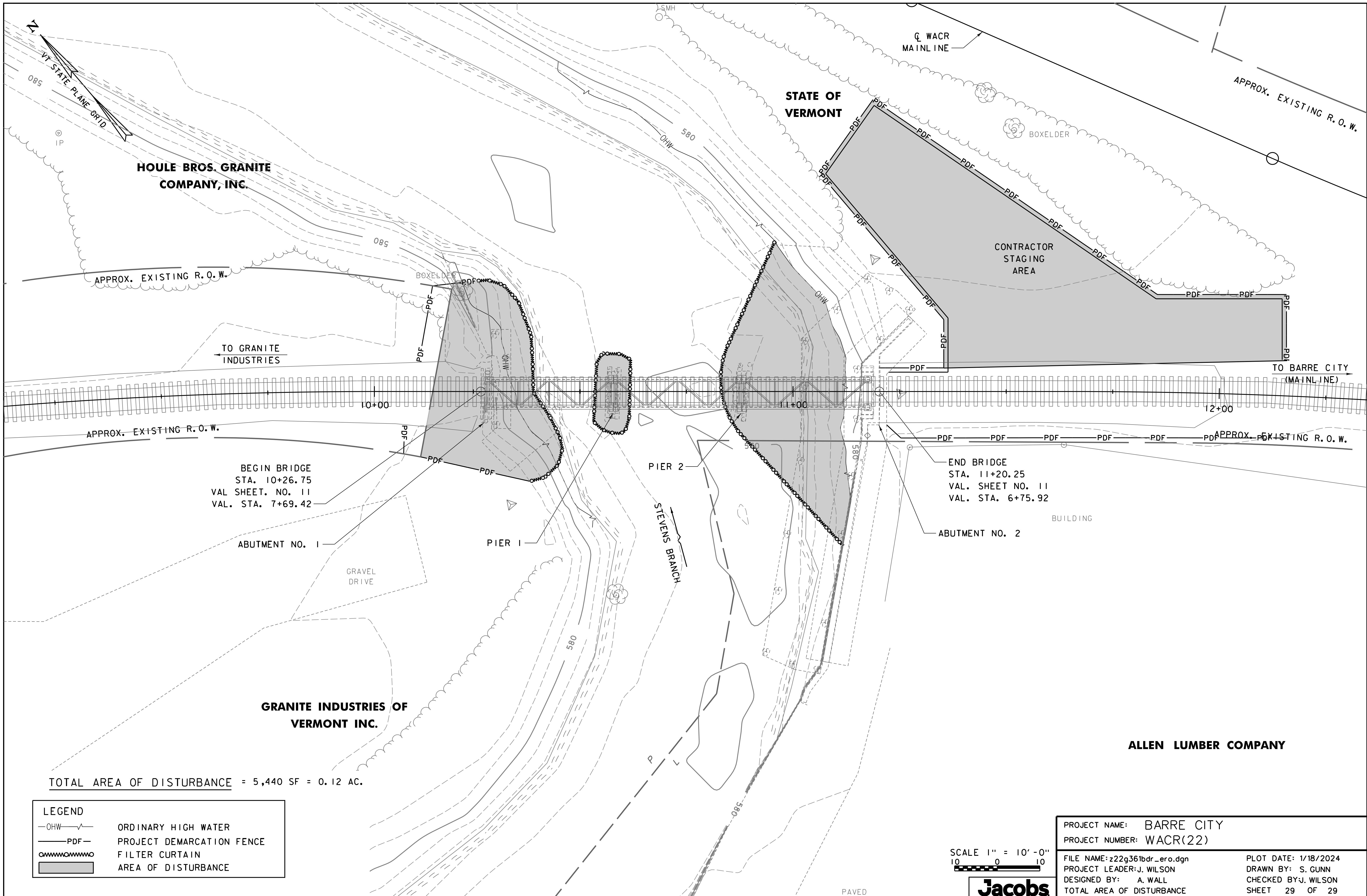
DRAWN BY: S. GUNN

CHECKED BY: J. WILSON

SHEET 27 OF 29



PROJECT NAME: BARRE CITY	PLOT DATE: 1/18/2024
PROJECT NUMBER: WACR(22)	DRAWN BY: S. GUNN
FILE NAME: z22g361xs2.dg	CHECKED BY: J. WILSON
PROJECT LEADER: J. WILSON	SHEET 28 OF 29
DESIGNED BY: A. WALL	
CHANNEL CROSS SECTIONS 8	



**HOULE BROS. GRANITE  
COMPANY, INC.**

BEGIN BRIDGE  
STA. 10+26.75  
VAL SHEET NO. 11  
VAL. STA. 7+69.42

**GRANITE INDUSTRIES OF  
VERMONT INC.**

**STATE OF  
VERMONT**

CONTRACTOR  
STAGING  
AREA

**ALLEN LUMBER COMPANY**

TOTAL AREA OF DISTURBANCE = 5,440 SF = 0.12 AC.

LEGEND	
	ORDINARY HIGH WATER
	PROJECT DEMARCATION FENCE
	FILTER CURTAIN
	AREA OF DISTURBANCE

SCALE 1" = 10'-0"  
10 0 10



PROJECT NAME: BARRE CITY	PLOT DATE: 1/18/2024
PROJECT NUMBER: WACR(22)	DRAWN BY: S. GUNN
FILE NAME: z22g36lbr_ero.dgn	CHECKED BY: J. WILSON
PROJECT LEADER: J. WILSON	SHEET 29 OF 29
DESIGNED BY: A. WALL	
TOTAL AREA OF DISTURBANCE	



**APPENDIX D:**  
**Alternatives Project Costs**

DRAFT

## Bridge 308 Alternatives Project Cost Comparison



Alternative	Project Cost
BRIDGE ALTERNATIVE 1 (No Action)	\$ 10,000.00
BRIDGE ALTERNATIVE 2 (Bridge Repair)	\$ 824,600.00
BRIDGE ALTERNATIVE 3 (New Two-Span Structure)	\$ 1,995,825.00
BRIDGE ALTERNATIVE 4 (New Single-Span Structure)	\$ 3,996,731.25
BRIDGE ALTERNATIVE 5 (Remove Superstructure and Piers)	\$ 325,000.00
BRIDGE ALTERNATIVE 6 (Remove Superstructure, Piers and Abutment 1)	\$ 399,750.00

**VERMONT AGENCY OF TRANSPORTATION**

**Rail and Aviation Bureau**

**BRIDGE ALTERNATIVE 1 (No Action)**

TOWN	<u>Barre</u>	MILEPOST	<u>6.90</u>	BRIDGE NO.	<u>308</u>	RAILROAD	<u>WACR (M&amp;B)</u>
BRIDGE TYPE	<u>Through Girder</u>			BRIDGE OVER	<u>Stevens Branch</u>		
NO. TRACKS	<u>1</u>	NO. SPANS	<u>3</u>	TOTAL LENGTH	<u>93.5'</u>		
DATE BUILT	<u>1950</u>	HORIZ. TRACK ALIGNMENT	<u>Tangent</u>	SPAN	<u>29'-29'-29'</u>		
<b>Repairs and Rehabilitation</b>		<b>Option</b>	<b>Description</b>			<b>Cost</b>	
1) Annual Removal of Debris		-	Assume debris is removed as needed, use \$2500 per occurrence 4 times annually			\$	<b>10,000.00</b>
<b>Total Construction Cost</b>						\$	<b>10,000.00</b>
<b>Engineering Cost (15%)</b>						\$	-
<b>Construction Engineering and Contingency Cost (30%)</b>						\$	-
<b>Total Estimated Project Cost for Alternative Listed (Annual Cost)</b>						\$	<b>10,000.00</b>

**VERMONT AGENCY OF TRANSPORTATION**

**Rail and Aviation Bureau**

**BRIDGE ALTERNATIVE 2 (Bridge Repair)**

TOWN	<u>Barre</u>	MILEPOST	<u>6.90</u>	BRIDGE NO.	<u>308</u>	RAILROAD	<u>WACR (M&amp;B)</u>
BRIDGE TYPE	<u>Through Girder</u>			BRIDGE OVER	<u>Stevens Branch</u>		
NO. TRACKS	<u>1</u>	NO. SPANS	<u>3</u>	TOTAL LENGTH	<u>93.5'</u>		
DATE BUILT	<u>1950</u>	HORIZ. TRACK ALIGNMENT	<u>Tangent</u>	SPAN	<u>29'-29'-29'</u>		

<b>Repairs and Rehabilitation</b>	<b>Option</b>	<b>Description</b>	<b>Cost</b>
1) Removal	-	Remove and Reset all 3 Spans / Shoring Superstructure Removal/Disposal of Both Piers. Includes Crane Cost	\$ 128,000.00
2) Erosion Controls and Track Work	-	Erosion Controls and Stabilization of Disturbed Areas Clearing and Grubbing Remove and Reset Railroad Tracks Surface and Align Railroad Tracks	\$ 30,000.00
3) Pile Driving Preparation and Testing	-	Furnishing Equipment for Pile Driving Dynamic Pile Load Testing	\$ 45,000.00
4) Superstructure Rehabilitation	-	New Bearings Misc Steel Repairs Selected Timber Tie Replacement	\$ 90,000.00
5) Substructure (Construct 2 Piers)	-	Install Piles and Pier Cap Beam Cost includes Crane	\$ 176,000.00
6) Traffic Control, Railroad Flaggers	-	Traffic Control Railroad Flaggers	\$ 25,000.00
7) Mobilization / Demobilization Site Access / Staging Areas	-	Mobilization Demobilization Access and Staging Areas Field Office and CPM Schedules	\$ 95,000.00
<b>Total Construction Cost</b>			\$ 589,000.00
<b>Engineering Cost (15%)</b>			\$ 88,350.00
<b>Construction Engineering and Contingency Cost (25%)</b>			\$ 147,250.00
<b>Total Estimated Project Cost for Alternative Listed</b>			\$ 824,600.00



**VERMONT AGENCY OF TRANSPORTATION**

**Rail and Aviation Bureau**

**BRIDGE ALTERNATIVE 3 (New Two-Span Structure)**

TOWN	<u>Barre</u>	MILEPOST	<u>6.90</u>	BRIDGE NO.	<u>308</u>	RAILROAD	<u>WACR (M&amp;B)</u>
BRIDGE TYPE	<u>Through Girder</u>			BRIDGE OVER	<u>Stevens Branch</u>		
NO. TRACKS	<u>1</u>	NO. SPANS	<u>3</u>	TOTAL LENGTH	<u>93.5'</u>		
DATE BUILT	<u>1950</u>	HORIZ. TRACK ALIGNMENT	<u>Tangent</u>	SPAN	<u>43.75' - 43.75'</u>		

<b>Repairs and Rehabilitation</b>	<b>Option</b>	<b>Description</b>	<b>Cost</b>
1) Removal	-	Removal & Disposal of 3 Existing Superstructure Spans Remove 2 Piers and Abutment 1	\$ 168,125.00
2) Erosion Controls and Track Work	-	Erosion Controls and Stabilization of Disturbed Areas Clearing and Grubbing Remove and Reset Railroad Tracks Surface and Align Railroad Tracks	\$ 30,000.00
3) Pile Driving Preparation and Testing	-	Furnishing Equipment for Pile Driving Dynamic Pile Load Testing	\$ 60,000.00
4) Superstructure	-	Install Two Spans of Deck Plate Girders (Both Spans 43.75')	\$ 643,125.00
5) Superstructure	-	Timber Ties, Spacer Blocks and Guard Timbers.	\$ 80,000.00
6) Substructure (Abutment 1 Steel Pile Bent)	-	Install Piles and Abutment Cap Beam Cost includes Crane	\$ 101,000.00
7) Substructure (Center Pier)	-	Install Piles and Pier Cap Beam Cost includes Crane	\$ 118,000.00
8) Traffic Control, Railroad Flaggers	-	Traffic Control Railroad Flaggers	\$ 40,000.00
7) Bearings	-	12 Expansion Bearings 12 Fixed Bearings	\$ 120,000.00
8) Mobilization / Demobilization Site Access / Staging Areas	-	Mobilization Demobilization Access and Staging Areas Field Office and CPM Schedules	\$ 175,000.00
<b>Total Construction Cost</b>			\$ 1,535,250.00
<b>Engineering Cost (10%)</b>			\$ 153,525.00
<b>Construction Engineering and Contingency Cost (20%)</b>			\$ 307,050.00
<b>Total Estimated Project Cost for Alternative Listed</b>			\$ 1,995,825.00

**VERMONT AGENCY OF TRANSPORTATION**

**Rail and Aviation Bureau**

**BRIDGE ALTERNATIVE 4 (New Single-Span Structure)**

TOWN	<u>Barre</u>	MILEPOST	<u>6.90</u>	BRIDGE NO.	<u>308</u>	RAILROAD	<u>WACR (M&amp;B)</u>
BRIDGE TYPE	<u>Through Girder</u>			BRIDGE OVER	<u>Stevens Branch</u>		
NO. TRACKS	<u>1</u>	NO. SPANS	<u>3</u>	TOTAL LENGTH	<u>94.75'</u>		
DATE BUILT	<u>1950</u>	HORIZ. TRACK ALIGNMENT	<u>Tangent</u>	SPAN	<u>90.25'</u>		

<b>Repairs and Rehabilitation</b>	<b>Option</b>	<b>Description</b>	<b>Cost</b>
1) Removal	-	Removal & Disposal of 3 Existing Superstructure Spans Remove 2 Piers and Abutment 1	\$ 168,125.00
2) Erosion Controls and Final Track Work	-	Erosion Controls and Stabilization of Disturbed Areas Clearing and Grubbing Remove and Reset Railroad Tracks Surface and Align Railroad Tracks	\$ 75,000.00
3) Pile Driving Preparation and Testing	-	Furnishing Equipment for Pile Driving Dynamic Pile Load Testing	\$ 45,000.00
4) Superstructure	-	Install Single Span Deck Plate Girder (Span = 94.75')	\$ 557,250.00
5) Superstructure	-	Timber deck.	\$ 81,000.00
6) Substructure (Abutment 1 Steel Pile Bent)	-	Install Piles and Abutment Cap Beam Cost includes Crane	\$ 123,000.00
7) Traffic Control, Railroad Flaggers	-	Traffic Control Railroad Flaggers	\$ 55,000.00
8) Bearings	-	4 Expansion Bearings 4 Fixed Bearings	\$ 70,000.00
7) Impacts Due to Vertical Profile Increase (Both Tack and Roadway)	-	Changes to E. & W. Approach Track Grading at Each Approach Re-Engineered Roadway Crossing	\$ 1,750,000.00
8) Mobilization / Demobilization Site Access / Staging Areas	-	Mobilization Demobilization Access and Staging Areas Field Office and CPM Schedules	\$ 325,000.00
<b>Total Construction Cost</b>			\$ 3,249,375.00
<b>Engineering Cost (8%)</b>			\$ 259,950.00
<b>Construction Engineering and Contingency Cost (15%)</b>			\$ 487,406.25
<b>Total Estimated Project Cost for Alternative Listed</b>			\$ 3,996,731.25

**VERMONT AGENCY OF TRANSPORTATION**

**Rail and Aviation Bureau**

**BRIDGE ALTERNATIVE 5 (Remove Superstructure and Piers)**

TOWN	<u>Barre</u>	MILEPOST	<u>6.90</u>	BRIDGE NO.	<u>308</u>	RAILROAD	<u>WACR (M&amp;B)</u>
BRIDGE TYPE	<u>Through Girder</u>			BRIDGE OVER	<u>Stevens Branch</u>		
NO. TRACKS	<u>1</u>	NO. SPANS	<u>3</u>	TOTAL LENGTH	<u>93.5'</u>		
DATE BUILT	<u>1950</u>	HORIZ. TRACK ALIGNMENT	<u>Tangent</u>	SPAN	<u>29'-29'-29'</u>		
<b>Repairs and Rehabilitation</b>		<b>Option</b>	<b>Description</b>			<b>Cost</b>	
1) Removal	-	Removal & Disposal of 3 Existing Superstructure Spans Remove 2 Piers			\$	<b>160,000.00</b>	
2) Erosion Controls and Track Removal	-	Erosion Controls and Stabilization of Disturbed Areas Clearing and Grubbing Remove Railroad Tracks Regrading within Track Limits			\$	<b>35,000.00</b>	
3) Traffic Control, Railroad Flaggers	-	Traffic Control Railroad Flaggers			\$	<b>15,000.00</b>	
4) Mobilization / Demobilization Site Access / Staging Areas	-	Mobilization Demobilization Access and Staging Areas Field Office and CPM Schedules			\$	<b>40,000.00</b>	
<b>Total Construction Cost</b>					\$	<b>250,000.00</b>	
<b>Engineering Cost (10%)</b>					\$	<b>25,000.00</b>	
<b>Construction Engineering and Contingency Cost (20%)</b>					\$	<b>50,000.00</b>	
<b>Total Estimated Project Cost for Alternative Listed</b>					\$	<b>325,000.00</b>	

**VERMONT AGENCY OF TRANSPORTATION**

**Rail and Aviation Bureau**

**BRIDGE ALTERNATIVE 6 (Remove Superstructure, Piers and Abutment 1)**

TOWN	<u>Barre</u>	MILEPOST	<u>6.90</u>	BRIDGE NO.	<u>308</u>	RAILROAD	<u>WACR (M&amp;B)</u>
BRIDGE TYPE	<u>Through Girder</u>			BRIDGE OVER	<u>Stevens Branch</u>		
NO. TRACKS	<u>1</u>	NO. SPANS	<u>3</u>	TOTAL LENGTH	<u>93.5'</u>		
DATE BUILT	<u>1950</u>	HORIZ. TRACK ALIGNMENT	<u>Tangent</u>	SPAN	<u>29'-29'-29'</u>		

<b>Repairs and Rehabilitation</b>	<b>Option</b>	<b>Description</b>	<b>Cost</b>
1) Removal	-	Removal & Disposal of 3 Existing Superstructure Spans Remove 2 Piers and Abutment 1	\$ 180,000.00
2) Erosion Controls and Track Removal	-	Erosion Controls and Stabilization of Disturbed Areas Clearing and Grubbing Remove Railroad Tracks Regrading within Track Limits	\$ 40,000.00
3) Traffic Control, Railroad Flaggers	-	Traffic Control Railroad Flaggers	\$ 20,000.00
4) Regrade Slope and Re-install Riprap at Abutment 1	-	Excavate Abutment 1 Slope to Widen Channel Place riprap removed during excavation of the slope	\$ 22,500.00
8) Mobilization / Demobilization Site Access / Staging Areas	-	Mobilization Demobilization Access and Staging Areas Field Office and CPM Schedules	\$ 45,000.00
<b>Total Construction Cost</b>			\$ 307,500.00
<b>Engineering Cost (10%)</b>			\$ 30,750.00
<b>Construction Engineering and Contingency Cost (20%)</b>			\$ 61,500.00
<b>Total Estimated Project Cost for Alternative Listed</b>			\$ 399,750.00



**APPENDIX E:**  
**Hydrology / Hydraulics Report**

DRAFT



## **Hydrologic/Hydraulic Report**

Barre City WACR(22) - Bridge 308 over Stevens Branch  
WACR Montpelier Barre Subdivision MP 6.9, Barre City, VT

December 27, 2023

Prepared For:

Vermont Agency of Transportation, Rail & Aviation Bureau



## Project Name

Project No: E2X88322  
Document Title: Hydrologic/Hydraulic Report  
Revision: 2  
Date: December 27, 2023  
Client Name: VTrans  
Client No:  
Project Manager: John Wilson, P.E.  
Author: John Blackburn  
File Name: Bridge 308 Hydraulic Report

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**Table of Contents**

1.0 Executive Summary ..... 1

2.0 Introduction..... 3

    2.1 Background ..... 3

    2.2 Site Location..... 3

3.0 Data Sources and References..... 6

    3.1 Data Sources..... 6

    3.2 References..... 6

    3.3 Design Criteria..... 6

4.0 Hydrologic Analysis..... 7

    4.1 Watershed Description ..... 7

    4.2 River Channel and Floodplain..... 7

    4.3 Flood History ..... 7

    4.4 Hydrologic Study Approach..... 7

5.0 Hydraulic Analysis ..... 10

    5.1 General Hydraulic Model Approach ..... 10

    5.2 Existing Bridge ..... 11

    5.3 Alternatives for Bridge 308..... 12

6.0 Conclusions..... 15

    6.1 Conclusions..... 15

**Appendices**

A Existing Conditions Site Photos

B FEMA Flood Insurance Rate Map (FIRMETTE from Panel 50023C0434E)

C FEMA Flood Profile for Stevens Branch

D Summary of Discharges for Stevens Branch

E USGS StreamStats Delineation

F Hydrologic Calculations

G HEC-RAS Results for Existing Bridge without Debris Modeling (Alternative 1) and with Debris Modeling (Alternative 1A)

H HEC-RAS Results for Alternatives 2-6



## 1.0 Executive Summary

A hydrologic/hydraulic analysis was completed for Bridge 308, which is located on the Vermont Rail System, WACR Montpelier Barre Subdivision at Mile Post 6.9 in Barre City, Vermont. The existing bridge and several repair, replacement, and removal alternatives were evaluated. The bridge is currently closed to rail traffic as a result of ice damage to one of the piers in 2019.

The intent of this hydrologic/hydraulic report is to provide hydraulic data for several various proposed alternatives. This report makes no recommendations regarding future plans for Bridge 308. In addition, this report analyzed the hydraulic conditions of Stevens Branch in the immediate vicinity of Bridge 308 only. The analysis does not include other structures upstream or downstream of Bridge 308, nor does it include identify, analyze, and recommended solutions to flooding issues along Stevens Branch in Barre City.

Bridge 308 has a span length of 89'-3" from center to center of bearings with three 29'-0" spans. The bridge superstructure consists of an open timber deck supported by rolled steel beams. The bridge substructure consists of two timber pile bents with concrete backwall abutments. The bridge was constructed in 1950 and was rehabilitated in 2013.

The area bounding the river in the vicinity of Bridge 308 is located within Zone AE, as delineated by the National Flood Insurance Program (NFIP). The Flood Profile for Stevens Branch included in the FEMA Flood Insurance Study (FIS) indicates an elevation of approximately 89.7 at Bridge 308 for the 1% Annual Chance Flood (100-year flood).

A hydrologic analysis of the upstream watershed was completed to determine flow rates at the bridge by using various analytical methods described in the VTrans Hydraulic Manual and comparing those to peak discharges published in the FEMA Flood Insurance Study (FIS). The estimated peak discharge for the 1% Annual chance flood (100-year flood) is 12,400 cfs.

Hydraulic models of the existing bridge and several potential bridge alternatives were developed using HEC-RAS software. The 50%, 20%, 10%, 2%, 1%, and 0.2% Annual chance floods (2-year, 5-year, 10-year, 25-year, 50-year, and 100--year return frequencies) were included in the models. The alternatives include::

- Alternative #1: Existing bridge remains in place. Debris is not modeled.
- Alternative #1A: Existing bridge remains in place with debris modeling.
- Alternative #2: Replace damaged piers.
- Alternative #2A: Same as Alternative #2, with debris modeling
- Alternative #3: New 2 span bridge – one pier at the center of the span.
- Alternative #3A: Same as Alternative #3, with debris modeling.
- Alternative #4: New 1 span bridge – no piers.
- Alternative #5: Removal of the existing superstructure and piers.
- Alternative #6: Removal of the existing superstructure, piers, and abutments.

Alternative 1 is the existing conditions model without considering debris in the model. The 10%, 2%, 1%, and 0.2% floods all overtop the existing structure.

For Alternative 1A, the water surface elevation with debris modeling most impacted was in the smallest floods, the 50% and 20% Annual chance floods. The 10%, 2%, 1%, and 0.2% floods were not affected.

For Alternative 2, the water surface elevations for smaller floods decreased slightly compared to the existing bridge and have the same results for the 10% and greater annual chance of flood events.

Alternative 2A, which included debris modeling at the piers, resulted in water surface elevations that were identical or nearly identical to the elevations in Alternative 1A. Similar to 1A, the water surface elevations in larger floods were not affected when compared to Alternative 2.

With Alternative 3, the removal of one pier in the flow area results in less of an impact on water surface elevations in larger floods compared to smaller floods. The 10%, 2%, 1%, and 0.2% floods are expected to overtop the bridge structure. The water surface elevation decreased by 0.10 feet in the 50% flood.

Alternative 3A, which included debris modeling at the pier, resulted in a decrease in water surface elevation of 3.7 feet during the 50% flood compared to Alternative 1A. The water surface elevations in larger floods were not affected when compared to Alternative 3.

For Alternative 4, the water surface elevation at and upstream of the bridge decreased in all floods except for the 10% flood. This may be attributed to the deeper bridge superstructure. Water surface elevations in the smaller floods decreased, since there is no pier in the river.

For Alternative 5, bridge removal, the water surface elevations upstream of the bridge decreased in all floods. The 10% flood decreased by 0.02 feet while the 1% flood decreased by 0.13 feet.

Alternative 6 produced similar results as Alternative 5, as the existing abutments do not significantly obstruct the riverbanks.

The debris modeling performed in Alternatives 1A, 2A, and 3A indicates that water surface elevations in smaller floods such as the 50% and 20% floods are most impacted, while larger floods are not impacted. In the larger floods, the bridge is entirely inundated and water is flowing across the floodplain.

## **2.0 Introduction**

### **2.1 Background**

Located on the Vermont Rail System in Barre City, Vermont, Bridge 308 is a 3-span deck plate girder structure that crosses the Stevens Branch of the Winooks River. The bridge was constructed in 1950 and was rehabilitated in 2013. Bridge 308 has a span length of 89'-3" from center to center of bearings. At the abutments and piers, the beams bear on steel bearings which are set on top of timber pile bents.

Previously, Jacobs completed an in-depth inspection and load rating report for Bridge 308 in 2013. In 2019 Jacobs completed an emergency inspection of Bridge 308, observing damage to the structure and prepared recommendations in a field observation report. A special inspection report was also completed for the bridge after being closed due to ice damage.

Since the ice damaged one of the timber pile bents, the bridge has been closed to rail traffic. The bridge provides railroad access to the Granite Industries of Vermont property located on the south side of Stevens Branch. The track terminates approximately 130 feet west of Bridge 308.

At Bridge 308, the area bounding the river is located within Zone AE, as delineated by the National Flood Insurance Program (NFIP). Zone AE areas are Special Flood Hazard Areas subject to inundation by the 1% Annual Chance Flood (100-year flood), with base flood elevations determined. The Flood Profile for Stevens Branch in the Flood Insurance Study indicates a flood elevation of 589.7 at Bridge 308 for the 1% Annual Chance Flood (100-year flood). A Firmette of the area is included in Appendix B and Flood Profiles are included in Appendix C.

Stevens Branch has a history of flooding in Barre City with a number of significant events since 1927. Most recently, in July 2023, Stevens Branch and the surrounding area flooded again after significant rainfall.

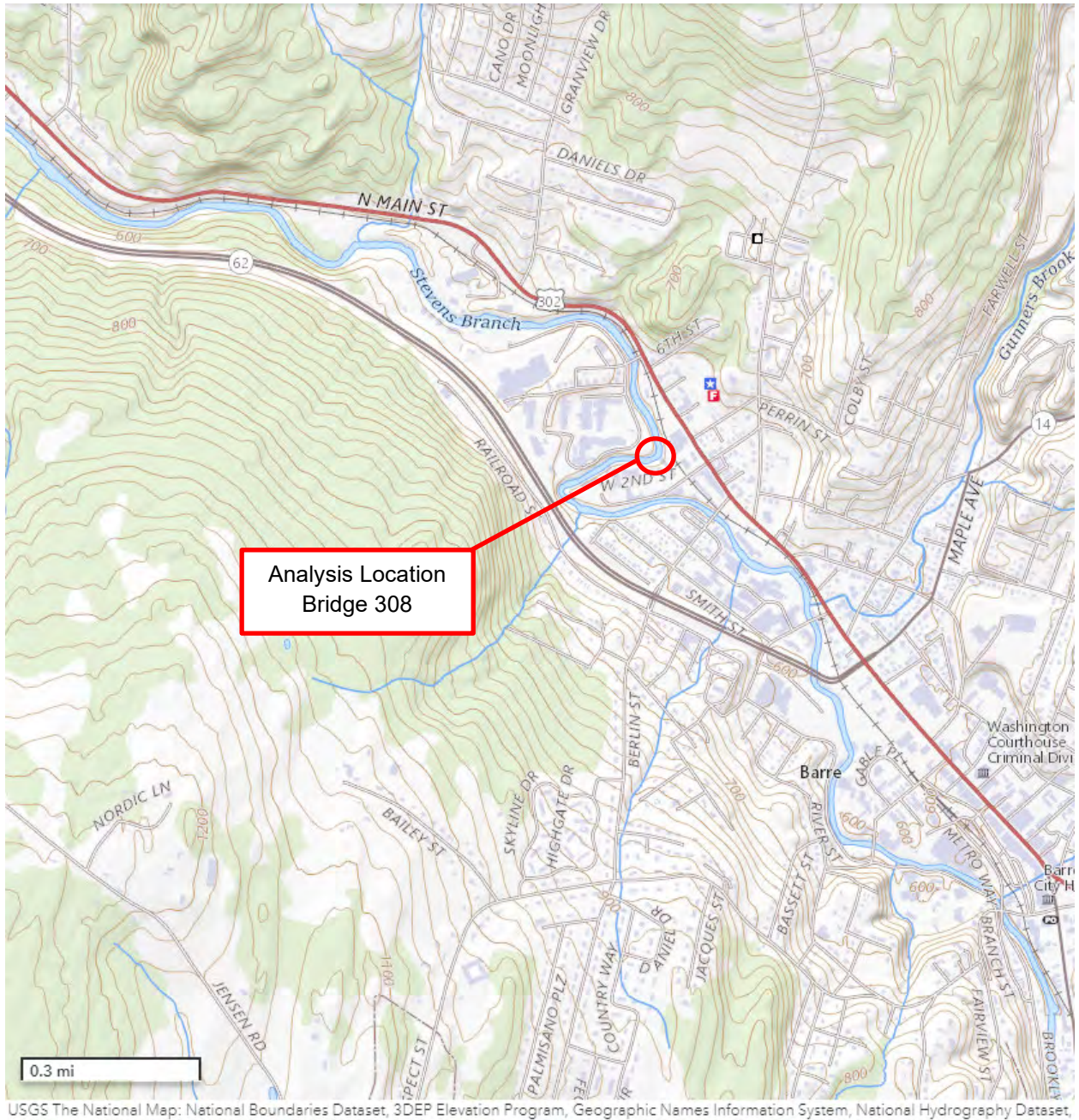
This report and the analyses included herein were prepared in accordance with the Hydraulic Manual, dated March 28, 2015 and published by the Vermont Agency of Transportation.

### **2.2 Site Location**

Bridge No. 308 is located along an 800 foot long siding on the WACR Montpelier Barre Subdivision at Mile Post 6.9 in Barre City. The siding terminates on the west side of Stevens Branch on the Granite Industries of Vermont property. The bridge is situated approximately 300 feet west of the W. 2<sup>nd</sup> Street railroad crossing.

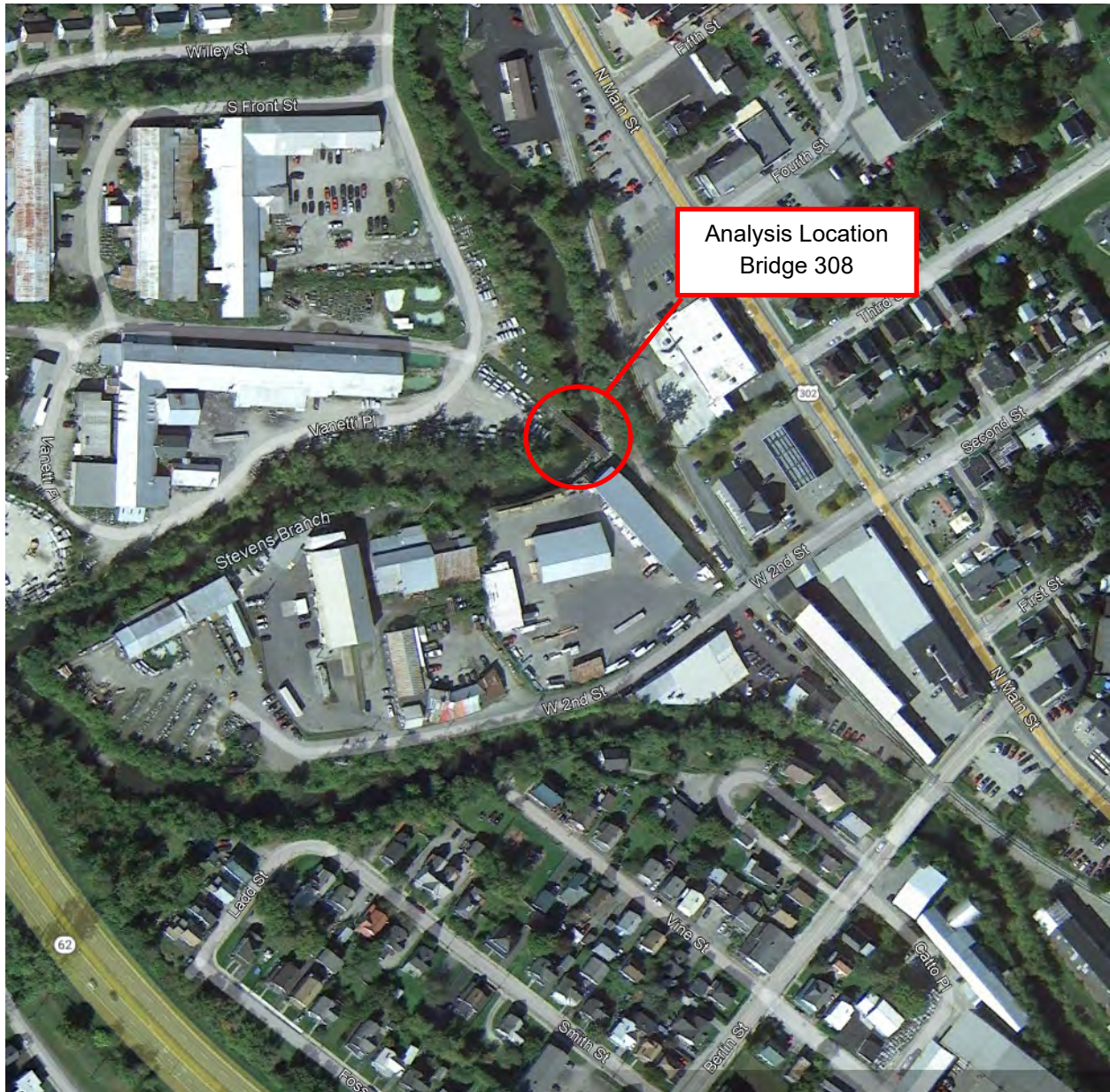
A USGS map and aerial image showing the project location are included on the next page. Elevations in this report are based on NAVD 88.

Photos of Bridge 308 and Stevens Branch at the bridge are included in Appendix A.



USGS Quadrangle Map, Barre West, VT, 2018 (Source: USGS Map Service Center)





Aerial Photo (Source: Google Earth, 2022)

### 3.0 Data Sources and References

#### 3.1 Data Sources

Data sources utilized for the hydrologic and hydraulic analysis of this project include:

- Topographic ground survey (provided by Vermont Agency of Transportation), performed in Spring 2023.
- USGS Topographic Map, Barre West, 2018, 7.5 Minute Series.
- National Flood Insurance Program (NFIP), Flood Insurance Study (FIS) 50023CV001A for Washington County, Vermont, March 19, 2013.
- National Flood Insurance Program (NFIP), Flood Insurance Rate Map (FIRM): Map Number 50023C0434E, Barre, VT March 19, 2013.
- StreamStats, USGS.

All elevations referenced in the report are in feet, vertical datum NAVD 88.

#### 3.2 References

References utilized for the hydrologic and hydraulic analysis of this project include:

- Hydraulics Manual, May 28, 2015, published by Vermont Agency of Transportation.
- HEC-RAS River Analysis System, Hydraulic Reference Manual, version 6.4.1, June 2023, published by US Army Corps of Engineers Hydrologic Engineering Center.
- HEC-RAS Mapper User's Manual, December 2020, published by US Army Corps of Engineers Hydrologic Engineering Center.
- Hydraulic Engineering Circular No. 9 – Debris Control Structures, Evaluation and Countermeasures, Third Edition, October 2005, published by FHWA.

Uses of these references are discussed in further detail in the methodology portions of this report.

#### 3.3 Design Criteria

Table 6-1 of the VTrans Hydraulics Manual lists the Minimum Design Frequency for various roadway classifications. For railroads, the Annual Exceedance Probability (AEP) used for design purposes is 2% (50 year return frequency).

Section 6.5.1.2 of the Hydraulics Manual defines freeboard, the vertical distance between the bottom of the bridge structure and the water surface elevation. The minimum freeboard required is 1.0 ft for the design frequency.

## 4.0 Hydrologic Analysis

### 4.1 Watershed Description

Stevens Branch is a tributary of the Winooski River. Stevens Branch originates in the town of Williamstown, and generally flows in a north to northwesterly direction through Barre Town, Barre City, and Berlin where it joins the Winooski River. The total length of Stevens Branch is approximately 13 miles, with a vertical drop of approximately 1,000 feet. Major tributaries of Stevens Branch include Martin Brook, Jail Branch, Gunners Brook, and Pond Brook.

As noted in the FEMA Flood Insurance Study, “The terrain of the Stevens Branch watershed is mountainous, and there are many steep-gradient tributary streams. Slopes vary from gently sloping to steep, and soils are moderately-drained to well-drained. The soils are loamy and silty with hardpan or bedrock in some locations.”

### 4.2 River Channel and Floodplain

In the vicinity of Bridge 308, Stevens Branch is confined with steep banks on both sides of the river. Upstream of the bridge, there is a retaining wall along the east side of the river which supports the back parking lot of the adjacent Hutchins Roofing Company property. The wall is constructed of concrete and stone; the concrete segment extends south from the existing east bridge abutment for approximately 58 feet and then connects to the stone segment of the wall. On the north side of Stevens Branch upstream of the bridge, the bank slopes are wooded and typically range between 1(Horiz.):1(Vert.) and 1.5(Horiz.):1(Vert.). Downstream of the bridge, the riverbanks on both sides are wooded and typically range between 1(Horiz.):1(Vert.) and 1.5(Horiz.):1(Vert.). The river curves to the left as it flows under Bridge 308 from an easterly heading to a northerly heading. Stone riprap has been placed on the sloped banks in the vicinity of both bridge abutments in past years. The bottom of the river channel is generally clean with boulders and cobbles of various sizes, with no vegetative growth.

In the vicinity of Bridge 308, the Zone AE floodplain defined by FEMA extends into the surrounding neighborhoods. On the east side of Stevens Branch, the floodplain encompasses West Second Street and North Main Street. On the west side of Stevens Branch, the floodplain encompasses Vanetti Place and the Granite Industries of Vermont property. The floodplain areas are largely developed, with a mix of industrial, commercial, and residential properties.

### 4.3 Flood History

Stevens Branch has a history of flooding within the City of Barre and surrounding communities. Damaging flooding has occurred on a number of occasions since the 1927 Flood. Recent flooding events have occurred in July 2007, August 2011, July 2015, and July 2023.

Flood flow regulation is provided by the East Barre Dam, located on Jail Branch. The dam was constructed in 1936 and modified in 1961. The controls runoff from 38.8 square miles and discharges through a fixed opening near the base of the dam. Up to 12,000 acre-feet of storage is provided by the dam.

### 4.4 Hydrologic Study Approach

The VTrans Hydraulic Manual includes several methodologies for determining runoff rates. In addition, the FEMA Flood Insurance Study provides flow rates for various recurrence intervals. To determine estimated flow rates in Stevens Branch at Bridge 308, several different methods were



chosen and then compared to the flow rates published in the FIS. From Table 4.3 of the Hydraulic Manual, for a watershed of 95.1 square miles, the following methodologies are suitable:

- Bulletin 17B
- USGS Regression
- NETC Regression

For the USGS Regression and NETC Regression methods, USGS StreamStats was utilized to determine the size of the contributing watershed, annual precipitation, and percentage of standing water. The contributing watershed area is approximately 95.1 square miles. The StreamStats output is included in Appendix E. Appendix F contains hydrologic calculations using the two methods. Bulletin 17B was not used in this analysis, as there are no nearby gage sites. The nearest downstream site is on the Winooski River, while the nearest upstream site is approximately 6.22 miles upstream on Jail Branch.

Table 4 of the FIS provides peak charges for the 10%, 2%, 1%, and 0.2% Annual Chance Floods along Stevens Branch. Bridge 308 is situated between the two locations listed in Table 3.1.

**Table 3.1 Peak Discharges published in the FIS for Stevens Branch**

Location	Drainage Area (sq. miles)	Peak Discharges (cfs)			
		10% Annual Chance Flood (10-Year Flood)	2% Annual Chance Flood (50-Year Flood)	1% Annual chance Flood (100-Year Flood)	0.2% Annual Chance Flood (500-Year Flood)
At City of Barre – Town of Barre corporate limits	96.9	7,770	11,090	12,490	15,090
Below Gunners Brook in City of Barre	94.4	7,730	11,020	12,370	14,930

To determine peak discharges at Bridge 308, a linear interpolation was applied to the upstream and downstream peak discharges using the watershed area of 95.1 square miles determined by StreamStats. Calculated values were rounded to the nearest 10. The resultant estimated flow rates are listed in Table 3.2.

**Table 3.2 Estimated Peak Discharges at Bridge 308 from FIS Flow Data**

Location	Drainage Area (sq. miles)	Peak Discharges (cfs)			
		10% Annual Chance Flood (10-Year Flood)	2% Annual Chance Flood (50-Year Flood)	1% Annual Chance Flood (100-Year Flood)	0.2% Annual Chance Flood (500-Year Flood)
Bridge 308	95.1	7,740	11,040	12,400	14,980



Table 3.3 compares estimated flow rates from the USGS Regression method, NETC Regression method, and the FIS at Bridge 308.

**Table 3.3 Comparison of Estimated Peak Discharges**

Method	Peak Discharges (cfs)					
	50% Annual Chance Flood (2-Year Flood)	20% Annual Chance Flood (5-Year Flood)	10% Annual Chance Flood (10-Year Flood)	2% Annual Chance Flood (50-Year Flood)	1% Annual Chance Flood (100-Year Flood)	0.2% Annual Chance Flood (500-Year Flood)
USGS Regression (StreamStats)	2,401	3,609	4,511	6,927	8,092	11,311
NETC Regression	2,524	4,024	5,411	8,863	10,544	16,063
FEMA FIS (Estimated at Bridge 308)	N/A	N/A	7,740	11,040	12,400	14,980

The estimated peak discharge rates published in the FIS were higher for the 10%, 2%, and 1% Annual Chance Flood flow rates calculated by both the USGS Regression and NETC Regression methods. One important component of the watershed that is not accounted for by the USGS Regression and NETC Regression methods is the presence of the East Barre Reservoir, located on Jail Branch in East Barre. There is no lake at the East Barre Dam. The flood storage area is typically empty and is utilized only for flood storage purposes.

For the 10% Annual Chance Flood and higher, the peak discharge rates from the FEMA FIS will be used for the hydraulic analyses. For the 50% and 20% Annual Chance Floods, the NETC Regression Method will be used. Compared to the USGS Regression flow rates, the NETC Method flow rates are more conservative and closer to the published FEMA flow rates for the other floods. Table 3.4 contains the final flow rates used in this analysis.

**Table 3.4 Summary of Estimated Peak Discharges for Bridge 308 Analysis**

	50% Annual Chance Flood (2-Year Flood)	20% Annual Chance Flood (5-Year Flood)	10% Annual Chance Flood (10-Year Flood)	2% Annual Chance Flood (50-Year Flood)	1% Annual Chance Flood (100-Year Flood)	0.2% Annual Chance Flood (500-Year Flood)
Peak Discharge Flow Rate (cfs)	2,524	4,024	7,740	11,040	12,400	14,980

## 5.0 Hydraulic Analysis

### 5.1 General Hydraulic Model Approach

The U.S. Army Corps of Engineers (USACOE), Hydrologic Engineering Center River Analysis System (HEC-RAS) program, Version 6.4.1, was utilized for the hydraulic analysis of the existing conditions and the proposed conditions. The river model extends for a distance of approximately 750 feet downstream and 2,300 feet upstream of Bridge 308.

RAS Mapper was used for the geometric data used in the model. The topographic survey provided detailed topography at and around the bridge and for the bridge structure and track.

The following Manning's "n" values were selected for the analyses:

- Channel: 0.035
- Overbanks: 0.120

Table A.6 of the VTrans Hydraulics Manual a Manning's n range of 0.040 – 0.050 for "Mountain streams, no vegetation in channel, banks usually steep, trees and brush along banks submerged at high stage." For Stevens Branch, Table 6 of the FIS lists "n" values of 0.035 for the channel and 0.025 – 0.100 for the overbank. Because this model is located in Barre City, the overbank areas are largely developed. From the National Land Cover Database (NLCD), the overbank areas are defined as Developed, High Intensity and Developed, Medium Intensity. An "n" value of 0.12 falls within the range of both NLCD land cover types included in the HEC-RAS 2D Manual.

Contraction and expansion coefficients were held constant at 0.1 and 0.3 values, respectively at open stream cross sections and increased to 0.2 and 0.4, respectively at sections near the bridge site. Normal depth was selected for the upstream and downstream boundary conditions using the existing river profile through the site and as shown in the FIS profile. A subcritical flow regime was selected for the steady flow analysis.

As shown in the FIRMETTE, the land surrounding Stevens Branch in the vicinity of Bridge 308 is denoted as Zone AE, which is susceptible to flooding during the 1% Annual Chance Flood. The HEC-RAS hydraulic model developed for this analysis attempts to replicate the flow patterns in the FIS as much as possible. It should be noted that the topography used by RAS Mapper is not exactly the same as the topography presented in the FIS.

The Flood Zone along in the vicinity of Bridge 308 in Barre City encompasses a wide area to the west and east of Stevens Branch. Upstream of Bridge 308, the river winds through a 180-degree curve. The defined Flood Zone encompasses a peninsular area of land bordered by the river upstream of the bridge, as well as land to the east of Route 302. Once the river begins to overtop its well-defined banks, it appears that the flood water would shortcut the circuitous section of the river channel.

Ineffective flow areas were defined along the west side of Stevens Branch to account for the space between obstructions (buildings). Ineffective flow areas are used to describe portions of a cross section in which water will pond and the velocity of that water, in the downstream direction is close to zero.

According to the FIS Profile, the approximate water levels at Bridge 308 are 586.3, 588.8, 589.7, and 591.0 for the 10%, 2% chance, 1% chance and 0.2% Annual Chance Floods respectively. The existing bridge elevation and structure depth shown in the FEMA FIS profile is consistent with the elevations obtained from topographic survey used in this analysis and field measurements of the structure.

For Alternatives 1A, 2A, and 3A, the HEC-RAS analysis was run both with floating debris accumulation modeling turned on at the pier(s). A typical channel width of 35 feet was measured for Stevens Branch in the vicinity of Bridge 308. Using HEC-9, the resultant calculated design log length for simulated debris is 35 feet. The pier debris option in HEC-RAS blocks out a rectangular shaped area in front of the given pier(s). The assumed debris height used for the purpose of this report extends for the full height of the pier, from the stream bed to the top of water surface in smaller events or top of pier in larger events that overtop the bridge superstructure.

## **5.2 Existing Bridge**

Bridge No. 308 is located on the Vermont Rail System, WACR Montpelier Barre Subdivision at Mile Post 6.9 in Barre City, Vermont. Bridge 308 is a 3-span deck plate girder structure that crosses the Stevens Branch. The bridge superstructure consists of an open timber deck supported by rolled steel beams with no skew. Beams are numbered 1 and 2 from north to south, and are spaced at 6'-6", centered under the rail. The bridge substructure consists of two timber pile bents with concrete backwall abutments which are labelled West (1) and East (2) and two timber pile bents. Concrete wingwalls are labelled Northeast and Southeast at the East Abutment. The bridge was constructed in 1950 and was rehabilitated in 2013. Bridge 308 has a span length of 89'-3" from center to center of bearings with three 29'-0" spans. At the abutments and piers, the beams bear on steel bearings which are set on top of timber pile bents.

The skew angle of the piers and abutments compared to the river flow path was measured to be approximately 18 degrees.

The vertical clearance from the bottom of the existing bridge structure to the riverbed is approximately 12 feet, although this value can vary across the channel. The total depth of the existing superstructure, including deck and girders, is approximately 3.96 feet.

The bridge has been closed to rail traffic since 2019 as a result of ice damage to one of the piers. Jacobs completed an in-depth inspection and load rating report for Bridge 308 in 2013. Subsequently, in 2019, Jacobs completed an emergency inspection of Bridge 308, observing damage to the structure and prepared recommendations in a field observation report.

### **5.2.1 Hydraulic Performance of Existing Bridge**

The 10%, 1%, and 0.2% Annual Chance Floods are all expected to overtop Bridge 308 as demonstrated in the HEC-RAS results. These results are generally consistent with the FIS profile except for the 10% Annual Chance Flood, which partially submerges the structure but does not overtop it. The 50% and 20% Annual Chance Floods remain below the bridge structure.

Results from the HEC-RAS analysis for the existing bridge are included in Appendix G, including a river schematic, river profile, table of hydraulic calculated values at the bridge, and river hydraulic data. Table 4-1 displays the water surface elevations for various flood frequencies at Bridge 308 both without debris (Alternative 1) and with debris (Alternative 1A).

Modeling debris increased the water surface elevations most in floods less severe than the 10% flood compared to no debris. Larger floods, including the 2%, 1% and 0.2% floods, were affected by approximately 0.5 inches or less. The 10% chance flood increased by approximately 4.5 inches.

**Table 4-1: Summary of Existing Bridge Hydraulic Performance**

Annual Chance Flood (Return Frequency)	Peak Flow (cfs)	WS Elev w/o Debris Modeling (ft)	WS Elev with Debris Modeling (ft)	Water Surface Elevation Difference (ft)
50% (2-year)	2,524	580.47	585.91	5.44
20% (5-year)	4,024	584.00	586.51	2.51
10% (10-year)	7,740	586.97	587.35	0.38
2% (50-Year)	11,040	589.60	589.46	0.14
1% (100-Year)	12,400	590.49	590.54	0.05
0.2% (500-Year)	14,980	592.00	592.03	0.03

### 5.3 Alternatives for Bridge 308

Nine different alternatives were evaluated for Bridge 308. The alternatives include:

- Alternative 1 – No Action. The existing abutments, piers, and superstructure remain.
- Alternative 1A – Same as Alternative 1, except that debris modeling is turned on in HEC-RAS for the piers.
- Alternative 2 – Replace damaged piers with new steel pile bents. The existing abutments and superstructure remain.
- Alternative 2A – Same as Alternative 2, except that debris modeling is turned on in HEC-RAS for the piers.
- Alternative 3 – New 2 span structure. The new overall structure depth is 3.11 feet. The two existing piers are removed and replaced with a single pier in the center of the total bridge span. At Abutment 1, the concrete backwall remains and the timber pile bent is replaced with a steel pile bent. Abutment 2 remains in place. The track rails remain at the existing elevation.
- Alternative 3A – Same as Alternative 3, except that debris modeling is turned on in HEC-RAS for the piers.
- Alternative 4 – New single span structure. The new overall structure depth is 5.96 feet. The two existing piers are removed. At Abutment 1, the concrete backwall remains and the timber pile bent is replaced with a steel pile bent. Abutment 2 remains in place. The track is raised by approximately 2.67 feet to account for the deeper superstructure.
- Alternative 5 – Remove Existing Bridge and Piers. The existing abutments remain in place.
- Alternative 6 – Remove Existing Bridge, Piers, and Abutment 1; Abutment 2 remains in place.

#### 5.3.1 Hydraulic Performance of Proposed Alternatives

Alternative 2 produced water surface elevations very similar to the existing bridge. The water surface elevations decreased by approximately 0.05 feet and 0.07 feet in the 50% flood and 20% flood, respectively. This can be attribute to the smaller pier size. The 10% flood and high floods remained the same.

For Alternative 2A, the water surface elevations remained identical or nearly identical to the results for Alternative 1A.

For Alternative 3, the 10%, 1%, and 0.2% Annual Chance Floods are all expected to overtop the new two span bridge structure. At lower flow rates, the removal of one pier and shallower



superstructure has a more notable impact on water surface elevation than larger floods. As the flow rate increases in larger floods, the pier and bridge structure become smaller obstructions in the overall flow area. In the 50% Annual Chance Flood, the calculated drop in water surface elevation is 0.10 feet.

For Alternative 3A, the water surface elevations decreased in smaller floods and remained nearly identical in larger floods when compared to the existing condition (Alternative 1A), which is similar to the trend observed in Alternative 3.

The results for Alternative 4 indicate that the proposed bridge will increase water surface elevations at and upstream of the bridge for floods that crest near the same elevation as the bridge structure. The 10% annual flood increased by approximately 0.05 feet, while smaller floods and larger floods recorded decreases between 0.02 to 0.39 feet.

For Alternative 5, the water surface elevations upstream of Bridge 308 decreased in all floods. The amount of the decrease varies depending on the flood. For the 50% Annual Chance Flood, the water surface elevation decreased by approximately 0.30 feet at river section 4962, which is 300 feet upstream of the bridge. For the 1% Annual Chance Flood, the decrease at the same river station is approximately 0.13 feet. As the flow rate increases in larger floods, the bridge structure becomes a smaller obstruction compared to the flow area.

The difference in water surface elevations between Alternatives 5 and 6 is negligible. Removal of the Abutment 1 does not have an effect on water surface elevations. The abutments are perched high on the riverbanks and do not protrude into the river flow in a significant manner. Abutment 2 is also in line with the retaining wall on the upstream side of the bridge.

Results from the HEC-RAS analyses for Alternatives 2, 2A, 3, 3A, 4, 5, and 6 are included in Appendix H. For Alternatives 2, 2A, 3, 3A, and 4, there is a river profile, river cross sections, a bridge data summary, and a river cross section data summary. For Alternatives 5 and 6, there is a river profile, river cross sections, and a river cross section data summary.

A summary of water surface elevations for the different alternatives at the bridge from the HEC-RAS analyses are included in Table 4.2.

**Table 4-2: Water Surface Elevations at Bridge 308**

Annual Chance Flood	WS Elev (ft)								
	Alt 1	Alt 1A	Alt 2	Alt 2A	Alt 3	Alt 3A	Alt 4	Alt 5	Alt 6
50%	580.47	585.91	580.42	585.91	580.37	582.21	580.31	-	-
20%	584.00	586.51	583.93	586.50	584.24	586.54	583.61	-	-
10%	586.97	587.35	586.97	587.36	586.96	587.05	587.02	-	-
2%	589.60	589.46	589.60	589.46	589.58	589.61	589.46	-	-
1%	590.49	590.54	590.49	590.54	590.48	590.51	590.35	-	-
0.2%	592.00	592.03	592.00	591.87	591.99	592.01	591.98	-	-

A summary of water surface elevations for the different alternative at river section 4962, upstream from the bridge, is included in Table 4.3.

**Table 4-3: Water Surface Elevations Upstream of Bridge 308**

Annual Chance Flood	Water Surface Elevation (ft)								
	Alt 1	Alt 1A	Alt 2	Alt 2A	Alt 3	Alt 3A	Alt 4	Alt 5	Alt 6
50%	579.97	585.88	579.91	585.88	579.83	582.00	579.76	579.67	579.67
20%	583.70	586.48	583.61	586.47	583.98	586.51	583.21	582.02	582.02
10%	586.99	587.43	586.99	587.45	586.97	587.09	587.04	586.97	586.97
2%	589.85	589.72	589.85	589.72	589.83	589.87	589.72	589.72	589.72
1%	590.74	590.78	590.74	590.78	590.72	590.75	590.61	590.61	590.61
0.2%	592.23	592.25	592.23	592.11	592.22	592.24	592.21	592.09	592.09

A summary of water surface elevations for the different alternative at river section 3921, downstream from the bridge, is included in Table 4.4.

**Table 4-4: Water Surface Elevations Downstream of Bridge 308**

Annual Chance Flood	Water Surface Elevation (ft)								
	Alt 1	Alt 1A	Alt 2	Alt 2A	Alt 3	Alt 3A	Alt 4	Alt 5	Alt 6
50%	580.30	580.30	580.30	580.30	580.30	580.30	580.30	580.33	580.33
20%	582.70	582.70	582.70	582.70	582.70	582.70	582.70	582.74	582.74
10%	587.06	587.06	587.06	587.06	587.06	587.06	587.06	587.10	587.10
2%	589.51	589.51	589.51	589.51	589.51	589.51	589.51	589.55	589.55
1%	590.40	590.40	590.40	590.40	590.40	590.40	590.40	590.43	590.43
0.2%	591.88	591.88	591.88	591.88	591.88	591.88	591.88	591.92	591.92

## 6.0 Conclusions

### 6.1 Conclusions

This report analyzes the hydraulics of Bridge 308 and Stevens Branch in the immediate vicinity of the bridge only. Other river crossing structures, river bank data, flood plain characteristics, and other conditions or factors either upstream or downstream of the bridge are beyond the scope of this study and may influence water surface elevations. This report makes no recommendations regarding future plans for Bridge 308.

Alternative 1, which leaves the bridge in its current state, has no effect on the river hydraulics.

Alternative 2, with smaller piers that replace the existing piers, showed a minor decrease in water surface elevations in the 50% and 20% floods.

The debris modeling performed in Alternatives 1A, 2A, and 3A indicates that water surface elevations in smaller floods are most impacted, while larger floods are not impacted. In the larger floods, the bridge is entirely inundated and water is flowing across the floodplain.

With Alternative 3, the removal of one pier in the river results in less of an impact on water surface elevations in larger floods compared to smaller floods. The 10%, 2%, 1%, and 0.2% floods are expected to overtop the bridge structure. The water surface elevation decreased by 0.10 feet in the 50% flood.

Alternative 4, which removes both existing piers but requires a deeper bridge structure, decreases the water surface elevation only slightly for all floods analyzed in this report except for the 10% flood.

Alternative 5, which removes the piers and bridge structure, and Alternative 6, which also removes the abutments, both result in similar decreases in water surface elevations across all floods upstream of the bridge when compared to alternatives with piers.

In general, alternatives that reduce or remove bridge piers result in decreases in water surface elevations in the 50% and 20% floods. The maximum decrease observed in the results for free flow (non-debris models) was 0.39 feet with Alternative 4. However, the removal, repair, or reduced number of piers has little to no effect on floods greater than the 10% flood. Alternatives that model debris have higher water surface elevations compared to the free flow non-debris alternatives for the 50% and 20% floods, but are unaffected by larger storm events.

A summary of changes in water surface elevations at Bridge 308 are included in Table 6.1.

**Table 6-1: Change in Water Surface Elevations at Bridge 308**

Annual Chance Flood	Water Surface Elevation Difference at Bridge (ft)								
	Alt 1	Alt 1A	Alt 2	Alt 2A	Alt 3	Alt 3A	Alt 4	Alt 5	Alt 6
50%	-	5.44	-0.05	5.44	-0.10	1.74	-.016	-.013	-.013
20%	-	2.51	-0.07	2.50	0.24	2.54	-.039	-1.26	-1.26
10%	-	0.38	0.00	0.39	-0.01	0.08	0.05	0.08	0.08
2%	-	-0.14	0.00	-0.14	-0.02	0.01	-.014	-0.09	-0.09
1%	-	0.05	0.00	0.05	-0.01	0.02	-0.14	-0.09	-0.09
0.2%	-	0.03	0.00	-0.13	-0.01	0.01	-0.02	-0.10	-0.10

**APPENDIX A**  
**Existing Conditions Site Photographs**





Looking downstream at Stevens Branch from Bridge 308



Looking upstream at Stevens Branch from Bridge 308





Looking downstream along Stevens Branch at Bridge 308



Looking upstream along Stevens Branch at Bridge 308



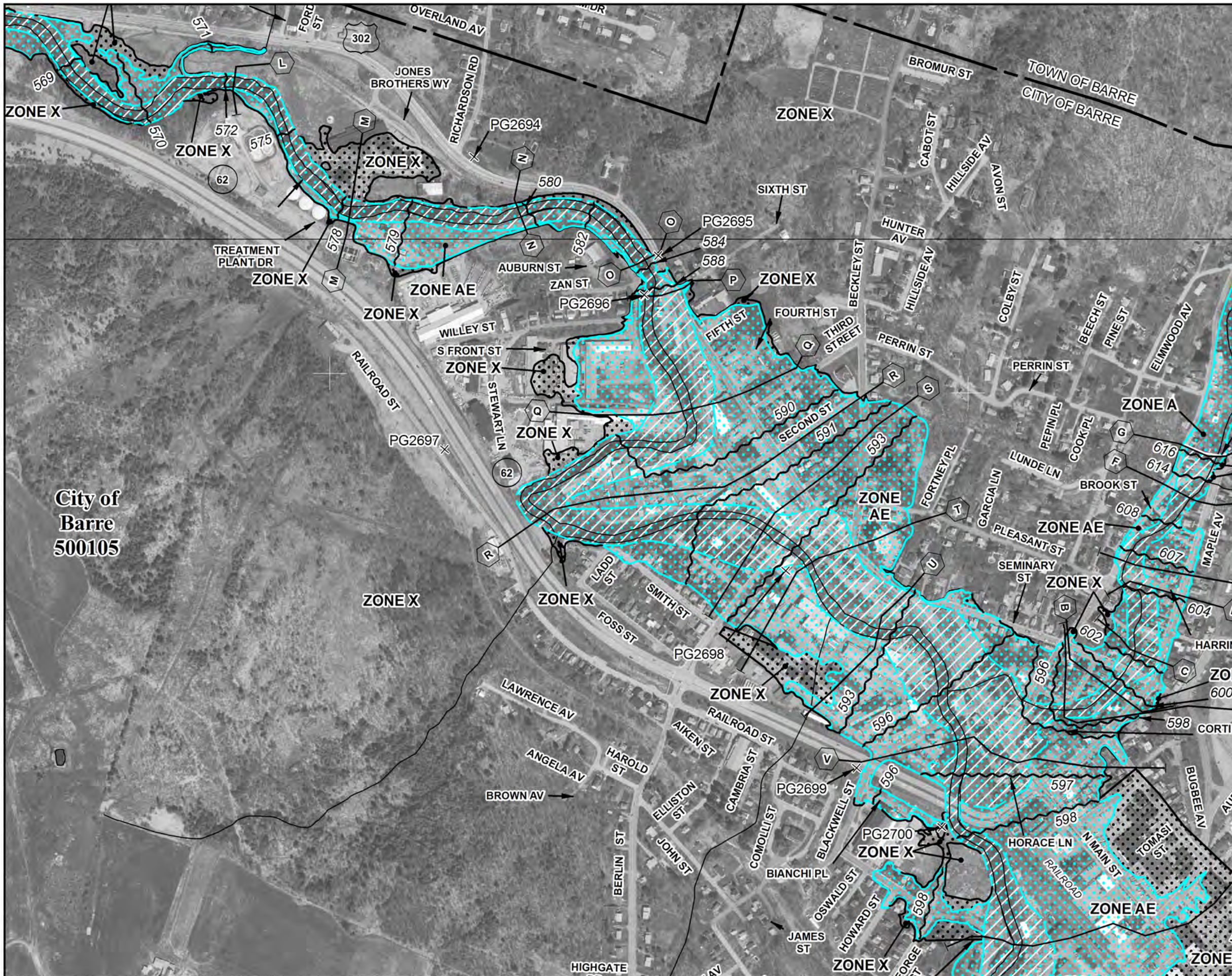
Looking at Pier 1 from west bank

**APPENDIX B**

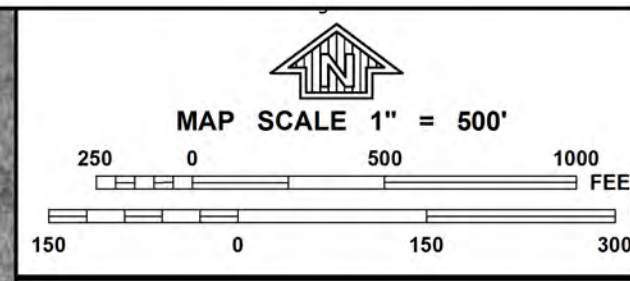
**FEMA Flood Insurance Rate Map**

**(FIRMETTE from Map Number 50023C0434E, March 19, 2013)**





City of Barre  
500105



PANEL 0434E

**FIRM**  
FLOOD INSURANCE RATE MAP

WASHINGTON COUNTY,  
VERMONT  
(ALL JURISDICTIONS)

**PANEL 434 OF 580**  
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
BARRE, CITY OF	500105	0434	E
BARRE, TOWN OF	500273	0434	E

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**  
50023C0434E

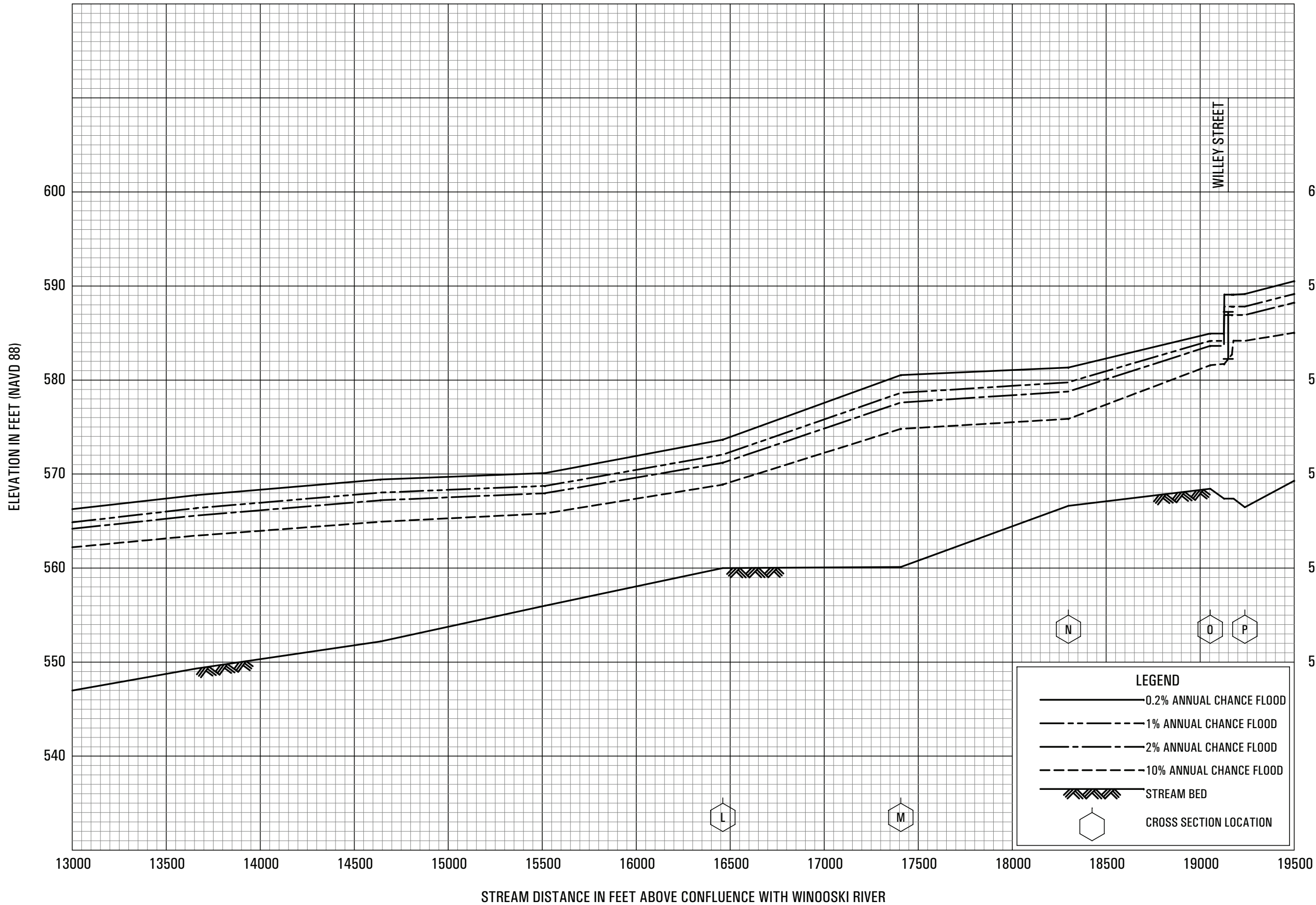
**EFFECTIVE DATE**  
MARCH 19, 2013

Federal Emergency Management Agency

This is an official FIRMette showing a portion of the above-referenced flood map created from the MSC FIRMette Web tool. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For additional information about how to make sure the map is current, please see the Flood Hazard Mapping Updates Overview Fact Sheet available on the FEMA Flood Map Service Center home page at <https://msc.fema.gov>.



**APPENDIX C:**  
**FEMA Flood Profile for Stevens Branch**  
**(From FEMA Flood Insurance Study, Volume 3 of 3, March 19, 2013)**

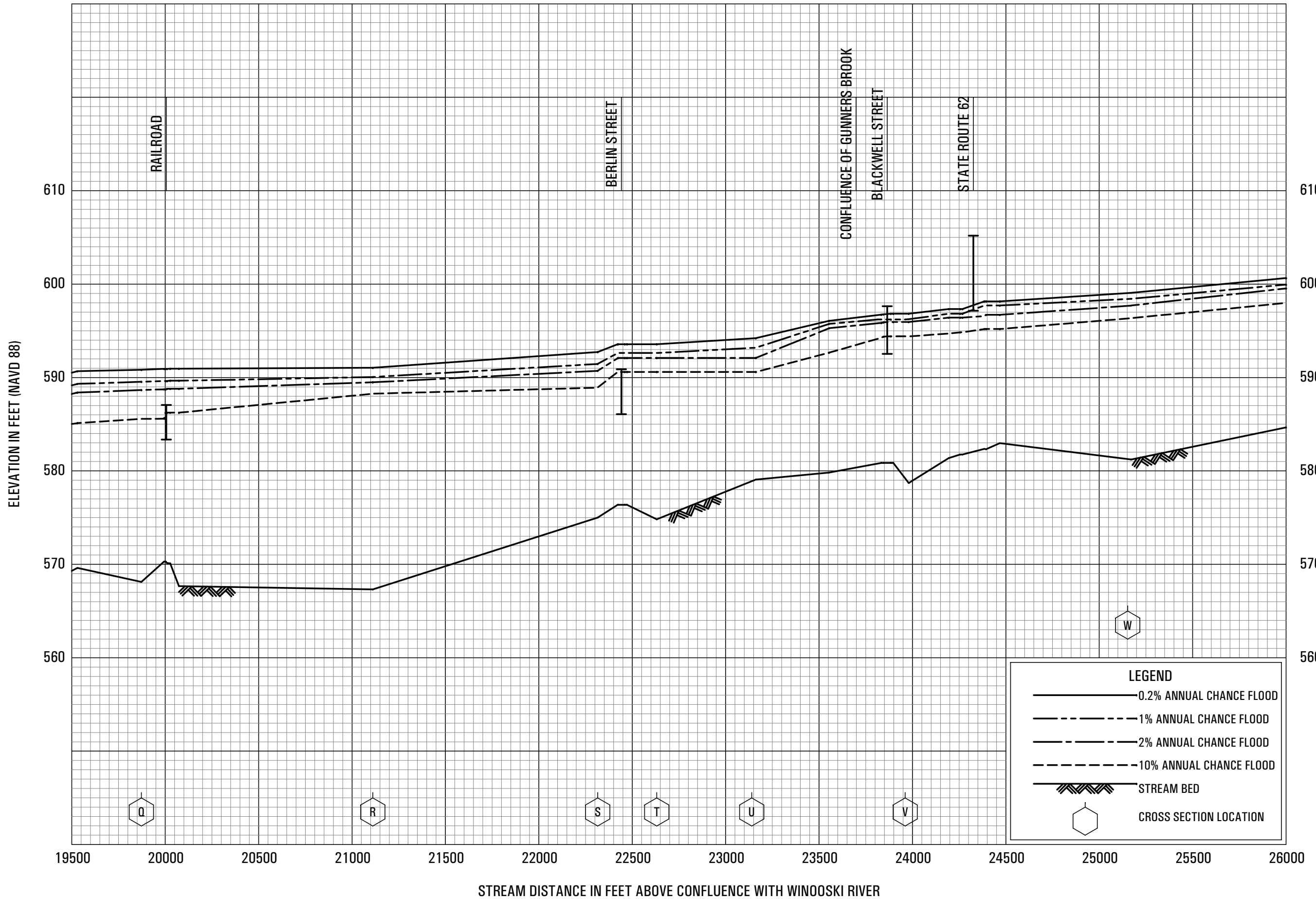


FLOOD PROFILES

STEVENS BRANCH

FEDERAL EMERGENCY MANAGEMENT AGENCY  
 WASHINGTON COUNTY, VT  
 (ALL JURISDICTIONS)

68P



**FLOOD PROFILES**

**STEVENS BRANCH**

FEDERAL EMERGENCY MANAGEMENT AGENCY

**WASHINGTON COUNTY, VT**

(ALL JURISDICTIONS)



**APPENDIX D:**  
**Summary of Discharges (Table 4) for Stevens Branch**  
**(From FEMA Flood Insurance Study, Volume 1 of 3, March 19, 2013)**

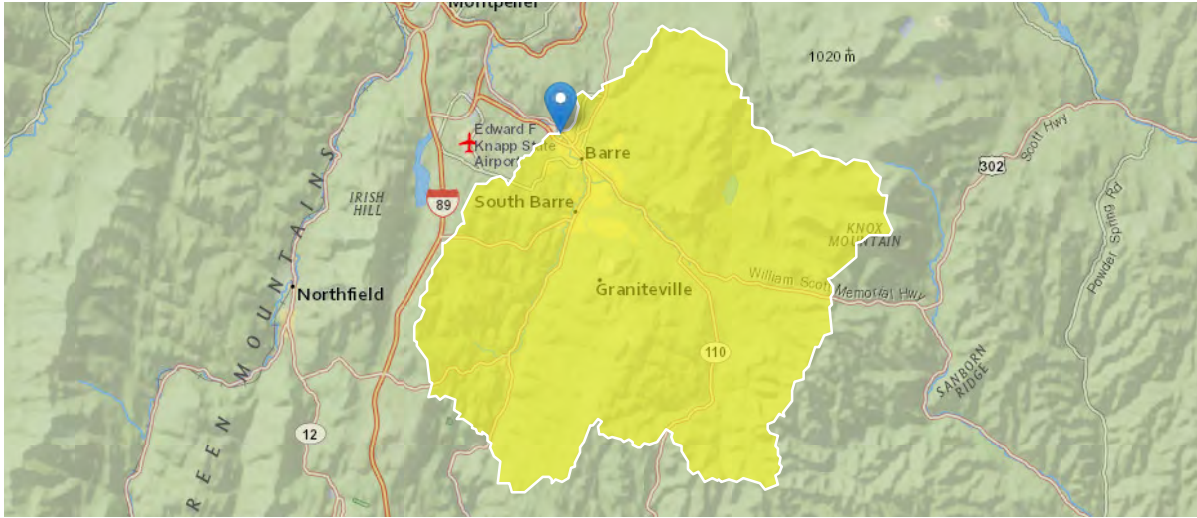
TABLE 4 - SUMMARY OF DISCHARGES – continued

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs)			
		10-PERCENT	2-PERCENT	1-PERCENT	0.2-PERCENT
STEVENS BRANCH					
Above Winooski River in City of Montpelier	115.2	9,260	13,250	14,790	18,100
Below Berlin Pond Brook in Town of Berlin	114.2	9,260	13,250	14,710	18,100
Below Unnamed Tributary in Town of Berlin	99.6	7,820	11,180	12,610	15,240
At City of Barre-Town of Barre corporate limits	96.9	7,770	11,090	12,490	15,090
Below Gunners Brook in City of Barre	94.4	7,730	11,020	12,370	14,930
Above Gunners Brook in City of Barre	86.3	6,430	9,160	10,340	12,480
Below Jail Branch in City of Barre	83.2	6,050	8,590	9,690	11,690
Above Jail Branch in City of Barre	34.8	5,020	7,260	8,110	9,920
At City of Barre-Town of Barre corporate limits	34.6	5,020	7,260	8,100	9,920
At I-89 Access Road (Route 63) in Town of Barre	30.5	4,730	6,820	7,680	9,300
At Town of Barre- Williamstown corporate limits	24.1	3,860	5,590	6,290	7,610
Below Brook 1 in Williamstown	15.6	3,000	4,320	4,860	5,830
Below Brook 2 in Williamstown	12.1	2,530	3,620	4,070	4,860
Approximately 400 feet upstream of Meadow Street in Williamstown	8.2	1,770	2,530	2,850	3,400
At Landfill Access Road in Williamstown	4.7	1,100	1,570	1,770	2,100
Approximately 200 feet downstream of State Route 14 Bridge just north of Limehurst Pond Campground in Williamstown	2.1	520	740	830	990
At upstream end of Cutter Pond in Williamstown	1.0	240	340	390	460

**APPENDIX E:**  
**USGS StreamStats Delineation**

# StreamStats Report

**Region ID:** VT  
**Workspace ID:** VT20230926171507734000  
**Clicked Point (Latitude, Longitude):** 44.20740, -72.51483  
**Time:** 2023-09-26 13:15:35 -0400



[-] Collapse All

## Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	95.1	square miles
LC06STOR	Percentage of water bodies and wetlands determined from the NLCD 2006	1.45	percent
PRECPRIS10	Basin average mean annual precipitation for 1981 to 2010 from PRISM	41.9	inches

## General Disclaimers

The delineation point is in an exclusion area. **WARNING!** U.S. Army Corp of Engineers flood control reservoir upstream of this location. The regression equations are not applicable.

**USGS Data Disclaimer:** Unless otherwise stated, all data, metadata and related materials are considered to satisfy the quality standards relative to the purpose for which the data were collected. Although these data and associated metadata have been reviewed for accuracy and completeness and approved for release by the U.S. Geological Survey (USGS), no warranty expressed or implied is made regarding the display or utility of the data for other purposes, nor on all computer systems, nor shall the act of distribution constitute any such warranty.

**USGS Software Disclaimer:** This software has been approved for release by the U.S. Geological Survey (USGS). Although the software has been subjected to rigorous review, the USGS reserves the right to update the software as needed pursuant to further analysis and review. No warranty, expressed or implied, is made by the USGS or the U.S. Government as to the functionality of the software and related material nor shall the fact of release constitute any such warranty. Furthermore, the software is released on condition that neither the USGS nor the U.S. Government shall be held liable for any damages resulting from its authorized or unauthorized use.

**USGS Product Names Disclaimer:** Any use of trade, firm, or product names is for descriptive purposes only and does not imply endorsement by the U.S. Government.

Application Version: 4.17.0  
 StreamStats Services Version: 1.2.22  
 NSS Services Version: 2.2.1



**APPENDIX F:**  
**Hydrologic Calculations**  
**(USGS Regression and NETC Regression Methods)**



2 EXECUTIVE PARK DRIVE  
BEDFORD, NH  
603-666-7181

JOB NO. E2X88322 - Bridge 308 over Stevens Brook

SHEET NO. 1 OF 1

CALCULATED BY: JRB DATE: 12/4/2023

CHECKED BY: \_\_\_\_\_ DATE: \_\_\_\_\_

**Determine Flow Rates at Bridge 308 using the US Geological Survey (USGS) Regression Equation Method for Ungaged Sites:**

Reference:

"Hydraulics Manual", Section 4.7, Vermont Agency of Transportation, May 28, 2015

- 1) Use USGS StreamStats to determine drainage area (A), percentage of basin with land cover categorized as wetlands or open water plus 1.0% (W), and average annual precipitation (p).

See attached output report from StreamStats.

A = 95.1 sq. mi.  
W = 2.45 % (1.45% + 1.0% = 2.45%)  
p = 41.9 in

- 2) Use regression equations from Table 4-9b to estimate flow rate (Q) for various storm events:

**Table 4-9b. USGS Regression Equations for Peak Flows**

Annual Exceedance Probability (%)	Function	Root-Mean-Square Error (log units)
50%	$Q_{50} = 0.145 A^{0.900} W^{-0.274} p^{1.569}$	0.147
20%	$Q_{20} = 0.179 A^{0.884} W^{-0.277} p^{1.642}$	0.152
10%	$Q_{10} = 0.199 A^{0.875} W^{-0.280} p^{1.685}$	0.162
4%	$Q_4 = 0.219 A^{0.866} W^{-0.286} p^{1.740}$	0.177
2%	$Q_2 = 0.237 A^{0.860} W^{-0.291} p^{1.774}$	0.186
1%	$Q_1 = 0.251 A^{0.854} W^{-0.297} p^{1.809}$	0.195
0.5%	$Q_{0.5} = 0.266 A^{0.849} W^{-0.301} p^{1.840}$	0.208
0.2%	$Q_{0.2} = 0.289 A^{0.844} W^{-0.309} p^{1.876}$	0.224

Annual Exceedance Probability		Flow Rate, Q(cfs)
50%	2 year	2401
20%	5 year	3609
10%	10 year	4511
4%	25 year	5820
2%	50 year	6927
1%	100 year	8092
0.2%	500 year	11311



2 EXECUTIVE PARK DRIVE  
BEDFORD, NH  
603-666-7181

JOB NO. E2X88322 - Bridge 308 over Stevens Brook

SHEET NO. 1 OF 1

CALCULATED BY: JRB DATE: 12/4/2023

CHECKED BY: \_\_\_\_\_ DATE: \_\_\_\_\_

**Determine Flow Rates at Bridge 308 using the New England Transportation Consortium (NETC) Regression Equation Method for Ungaged Sites in Steep Watersheds:**

Reference:

"Hydraulics Manual", Section 4.8, Vermont Agency of Transportation, May 28, 2015

- 1) Use USGS StreamStats to determine drainage area (A) and average annual precipitation (p).

See attached output report from StreamStats.

A = 95.1 sq. mi.  
p = 41.9 in

- 2) Use regression equations from Table 4-10b to estimate flow rate (Q) for various storm events:

**Table 4-10b. Regression Equations for Peak Flows**

Annual Exceedance Probability (%)	Function	Root-Mean-Square Error (log units)
50%	$Q_{50} = 0.01601 A^{0.889} p^{2.12}$	0.171
20%	$Q_{20} = 0.01965 A^{0.889} p^{2.19}$	0.165
10%	$Q_{10} = 0.02430 A^{0.891} p^{2.21}$	0.169
4%	$Q_4 = 0.03387 A^{0.893} p^{2.20}$	0.180
2%	$Q_2 = 0.04372 A^{0.895} p^{2.18}$	0.193
1%	$Q_1 = 0.05765 A^{0.897} p^{2.15}$	0.206
0.2%	$Q_{0.2} = 0.111 A^{0.903} p^{2.08}$	0.243

Annual Exceedance Probability		Flow Rate, Q(cfs)
50%	2 year	2524
20%	5 year	4024
10%	10 year	5411
4%	25 year	7332
2%	50 year	8863
1%	100 year	10544
0.2%	500 year	16063

**APPENDIX G:**

**HEC-RAS Results for Existing Bridge without and with Debris Modeling**

**River Profile**

**River Cross Sections**

**Bridge Summary Table**

**River Cross Section Data Summary**



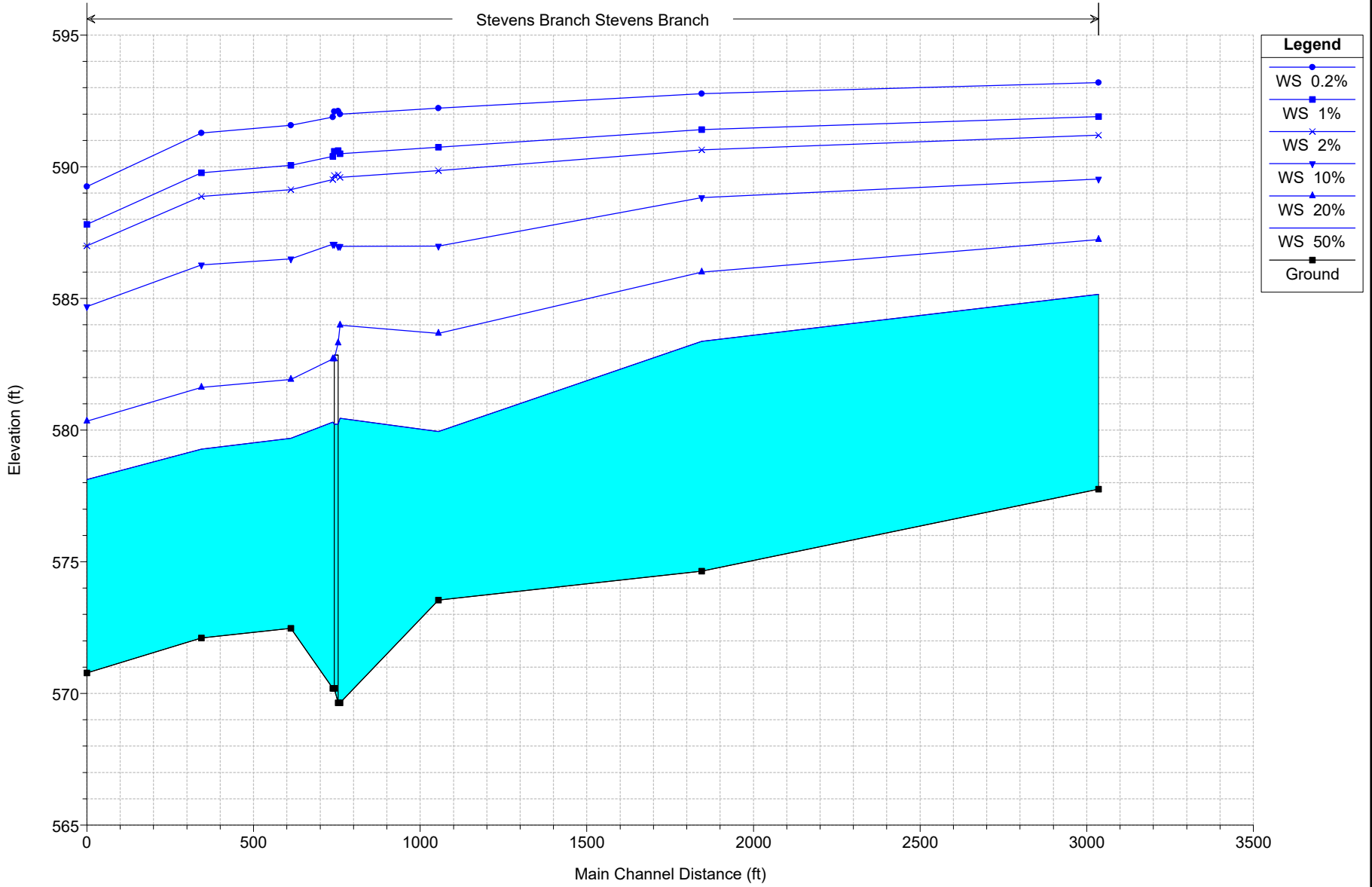


# HEC-RAS Results for Alternative 1

# Bridge 308

Geom: Alternative 1 - Existing Condition

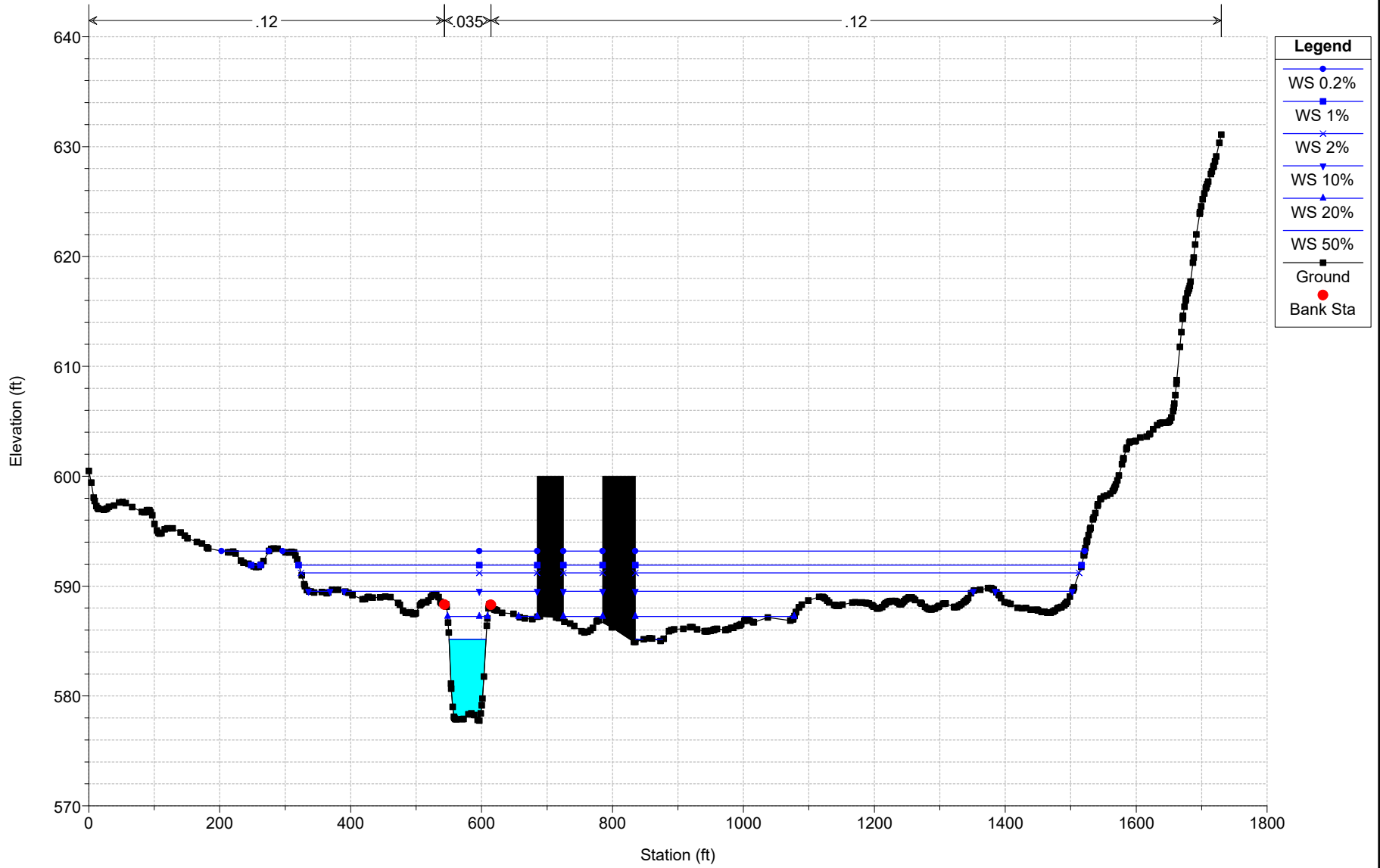
Stevens Branch Stevens Branch



# Bridge 308

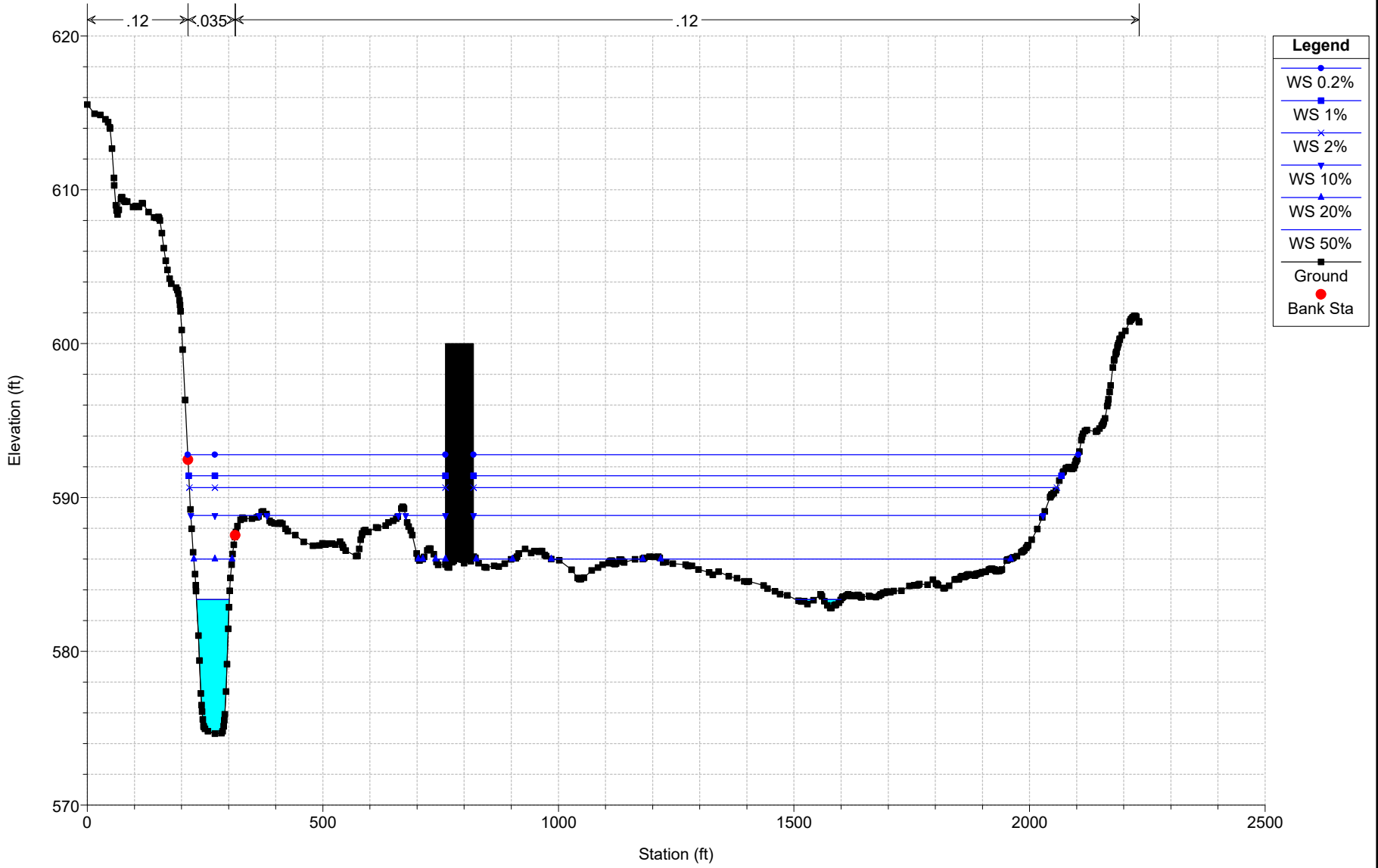
Geom: Alternative 1 - Existing Condition

RS = 11459

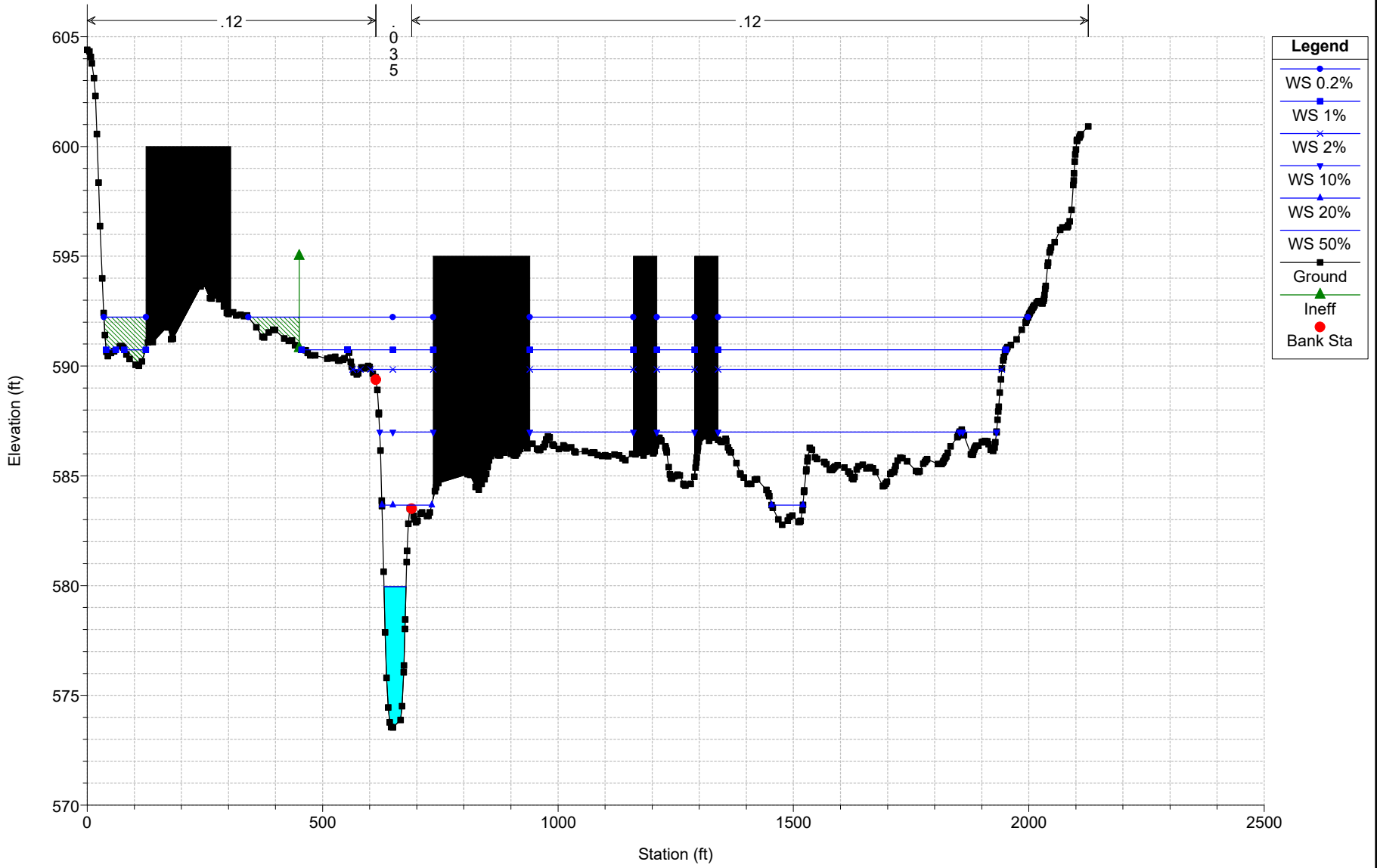




Bridge 308  
Geom: Alternative 1 - Existing Condition  
RS = 7552



Bridge 308  
 Geom: Alternative 1 - Existing Condition  
 RS = 4962



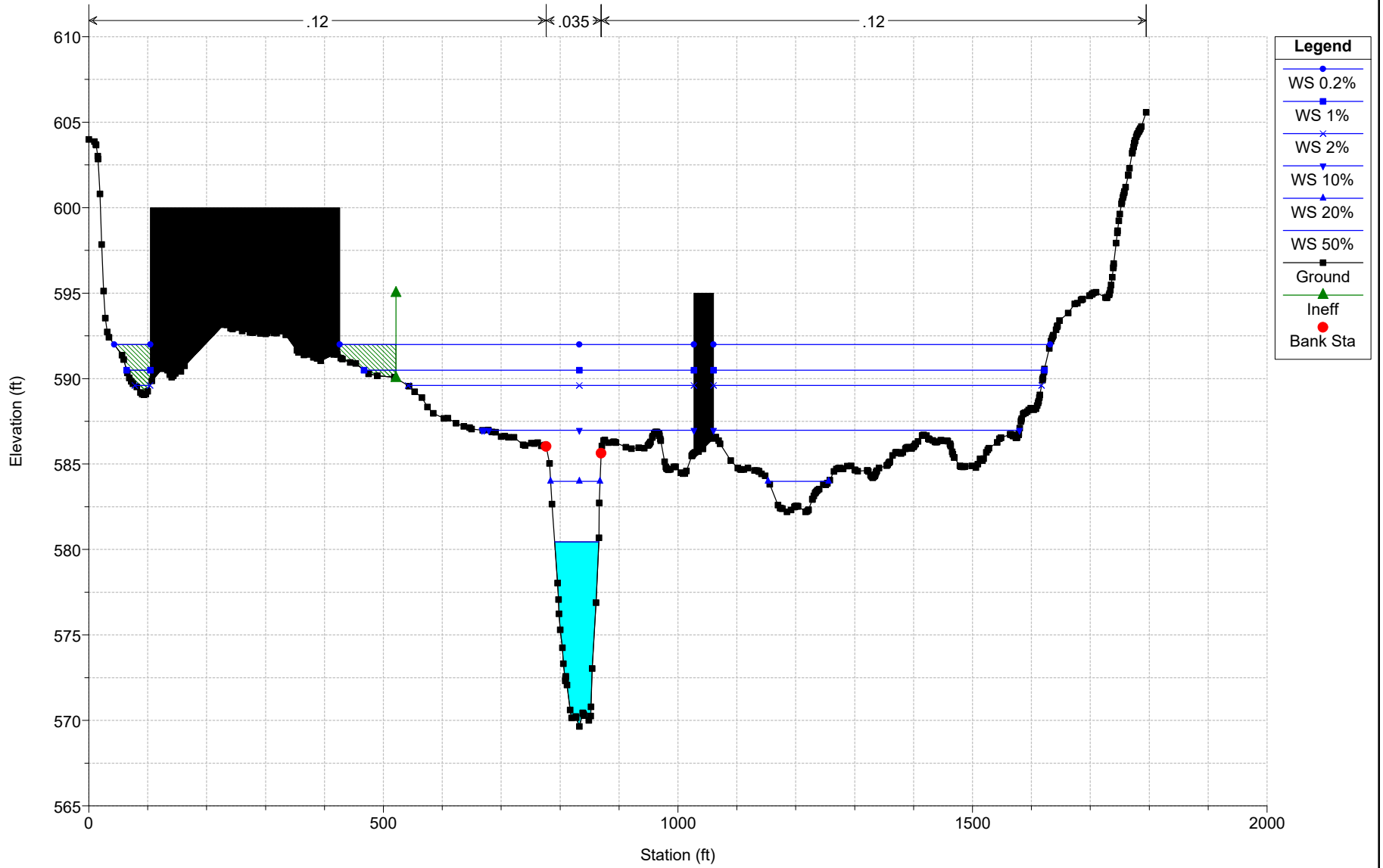
**Legend**

- WS 0.2%
- WS 1%
- WS 2%
- WS 10%
- WS 20%
- WS 50%
- Ground
- Ineff
- Bank Sta

# Bridge 308

Geom: Alternative 1 - Existing Condition

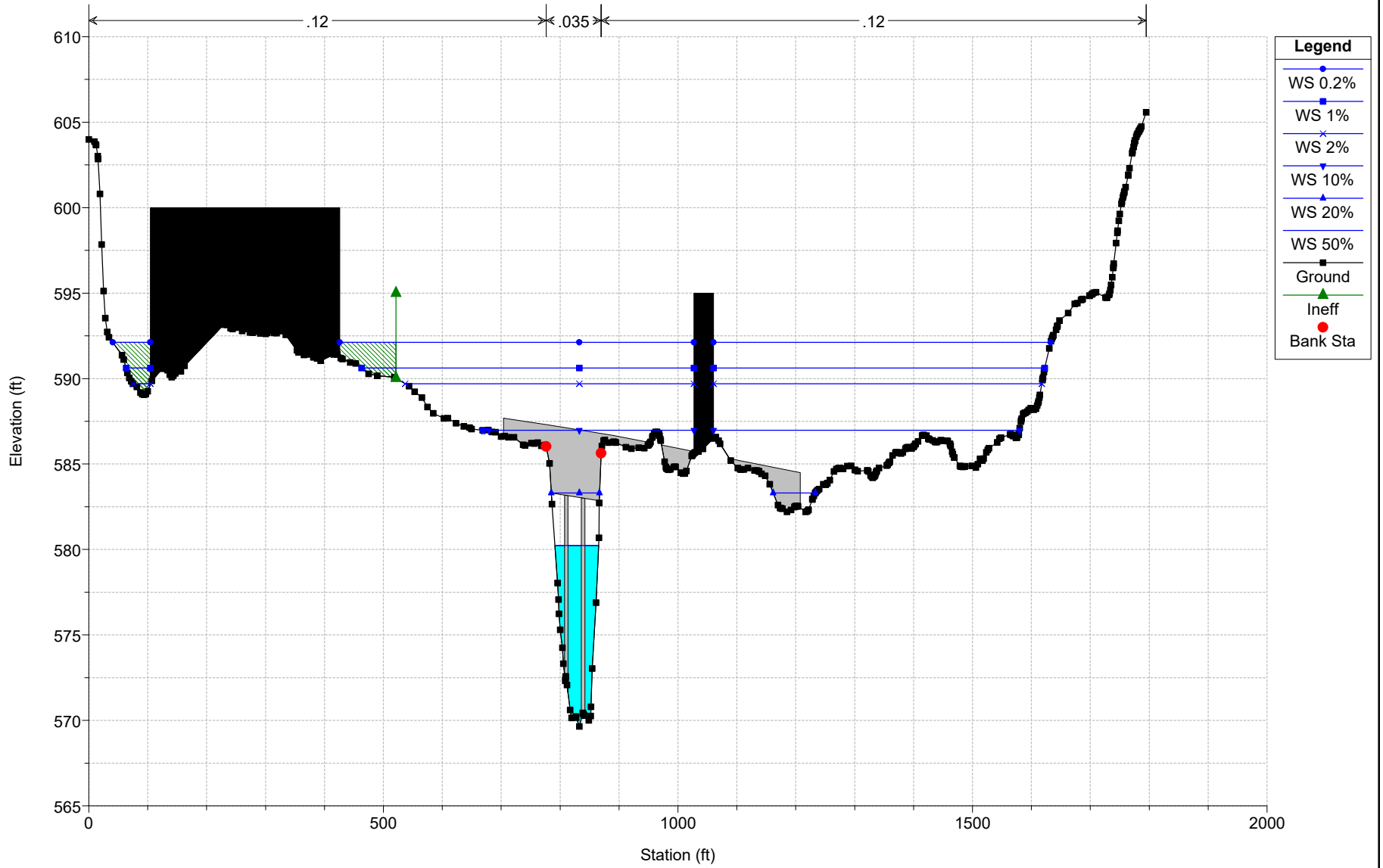
RS = 3994



# Bridge 308

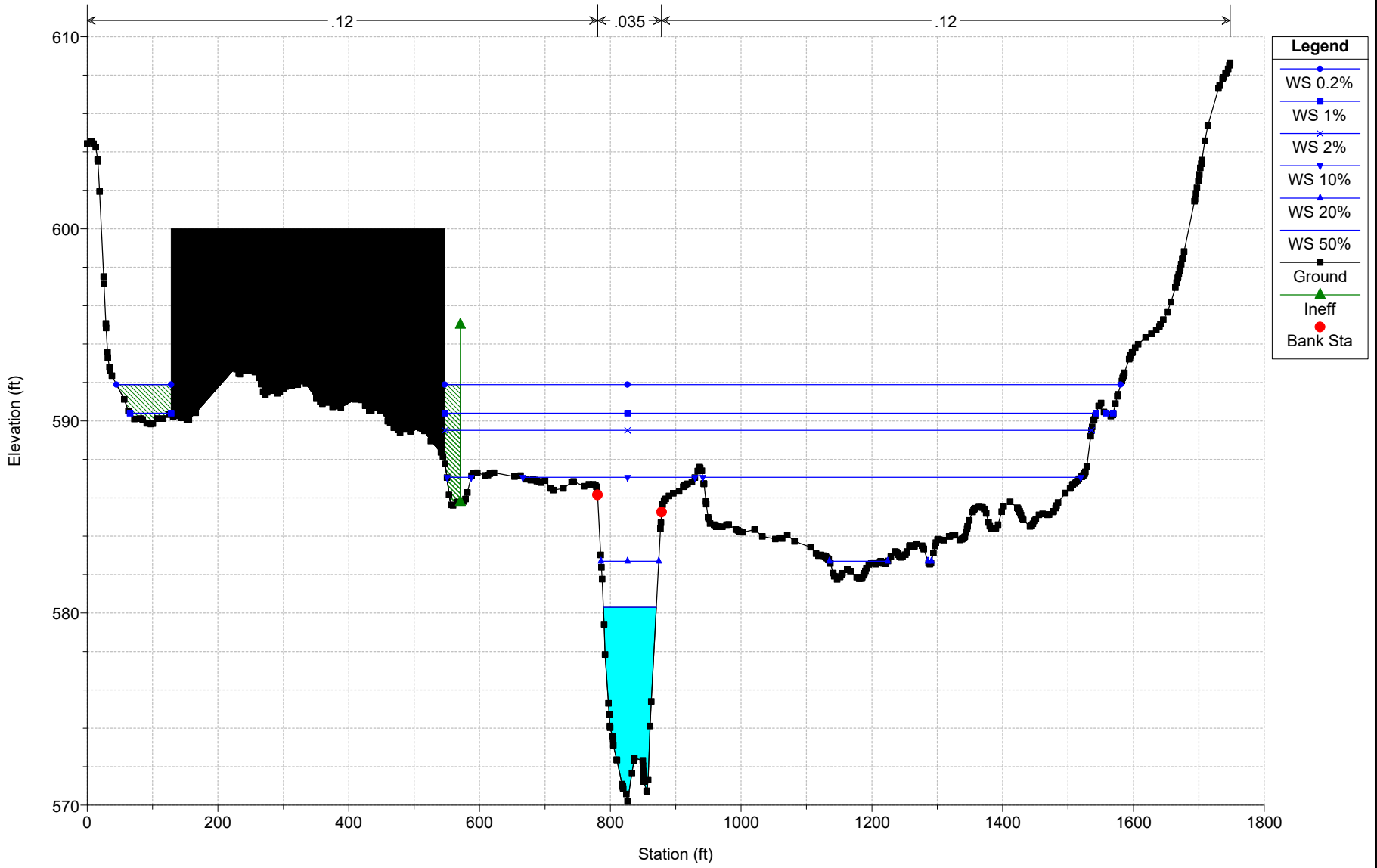
Geom: Alternative 1 - Existing Condition

RS = 3990 BR

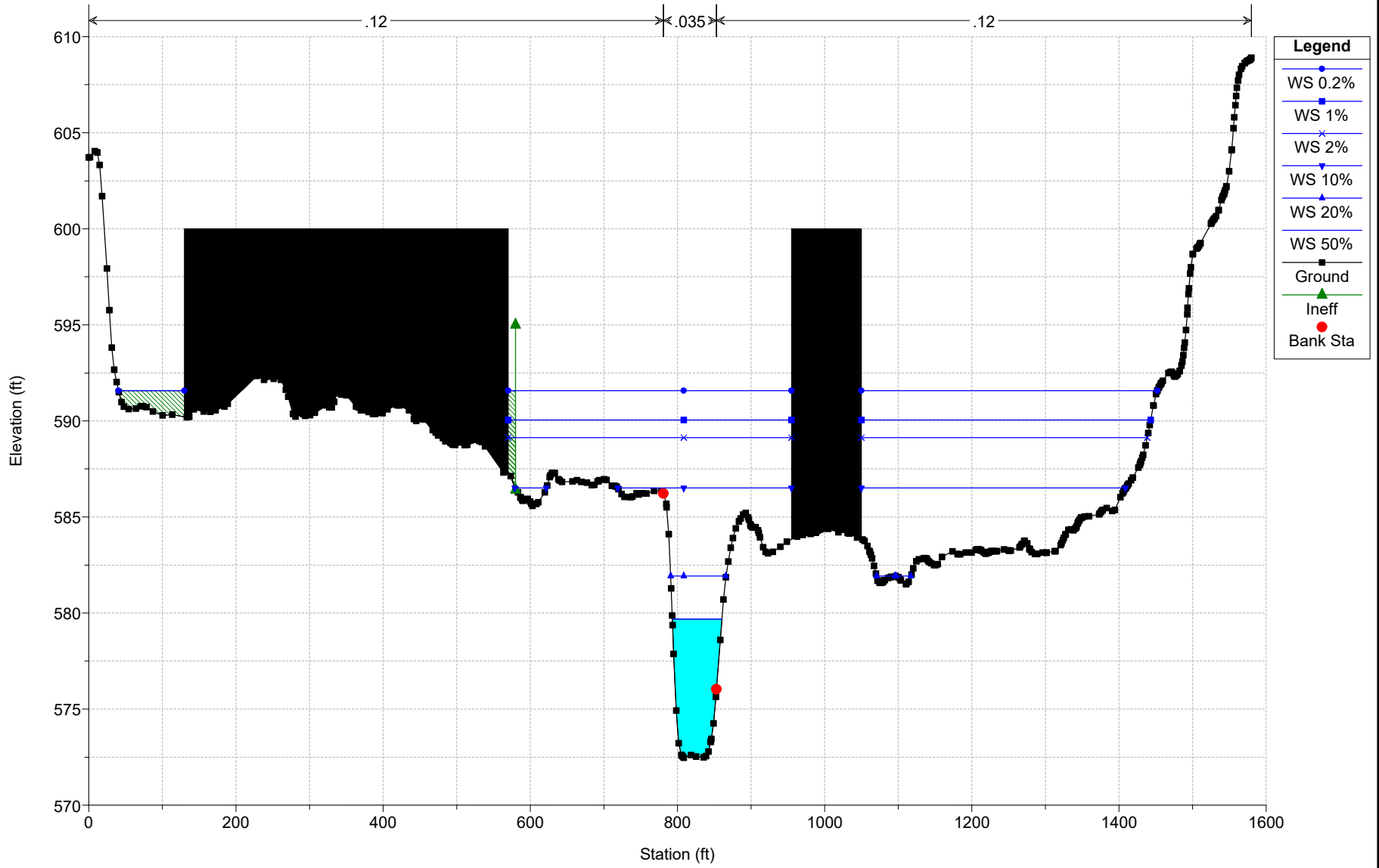




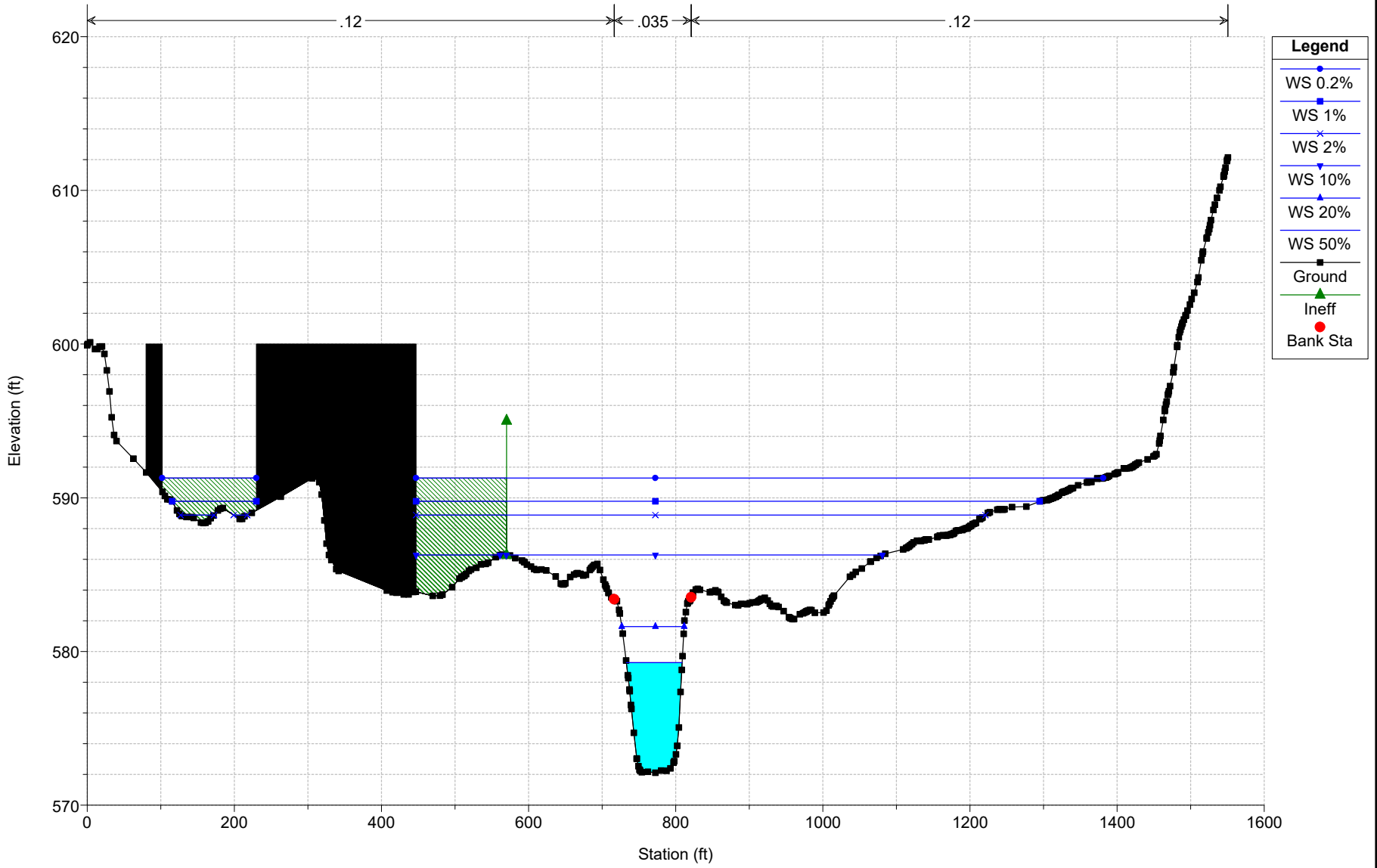
Bridge 308  
Geom: Alternative 1 - Existing Condition  
RS = 3921



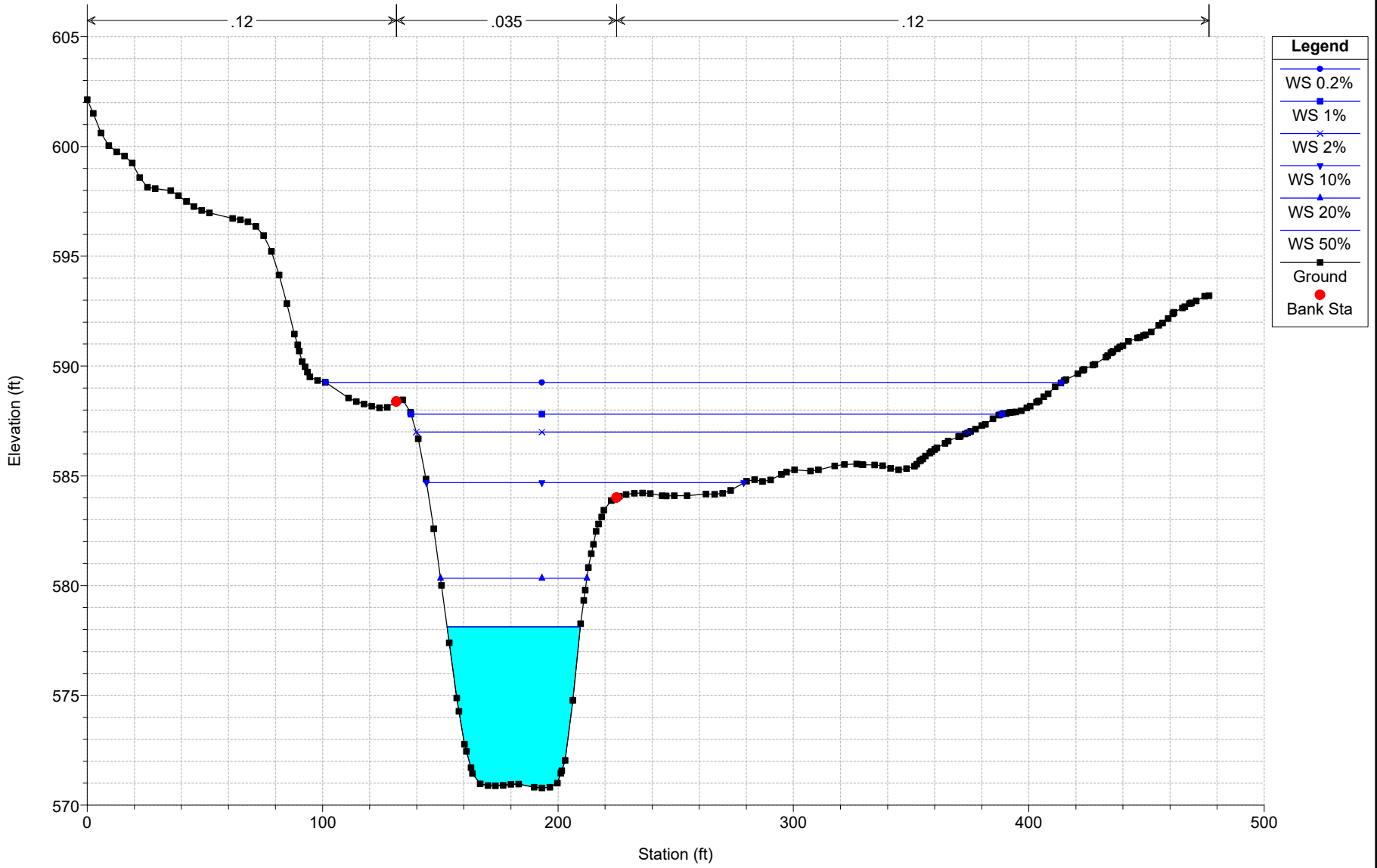
Bridge 308  
Geom: Alternative 1 - Existing Condition  
RS = 3508



Bridge 308  
Geom: Alternative 1 - Existing Condition  
RS = 2628



Bridge 308  
Geom: Alternative 1 - Existing Condition  
RS = 1501





Plan: Alt 1 Ex\_Cond Stevens Branch Stevens Branch RS: 3990 Profile: 50%

E.G. US. (ft)	580.75	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	580.45	E.G. Elev (ft)	580.70	580.66
Q Total (cfs)	2524.00	W.S. Elev (ft)	580.23	580.22
Q Bridge (cfs)	2524.00	Crit W.S. (ft)	575.81	576.29
Q Weir (cfs)		Max Chl Dpth (ft)	10.59	10.03
Weir Sta Lft (ft)		Vel Total (ft/s)	5.52	5.33
Weir Sta Rgt (ft)		Flow Area (sq ft)	457.32	473.65
Weir Submerg		Froude # Chl	0.36	0.30
Weir Max Depth (ft)		Specif Force (cu ft)	2445.51	2280.87
Min EI Weir Flow (ft)	586.81	Hydr Depth (ft)	7.31	7.04
Min EI Prs (ft)	582.85	W.P. Total (ft)	104.30	108.94
Delta EG (ft)	0.15	Conv. Total (cfs)	52011.1	53566.0
Delta WS (ft)	0.15	Top Width (ft)	62.53	67.27
BR Open Area (sq ft)	645.64	Frctn Loss (ft)	0.03	0.01
BR Open Vel (ft/s)	5.52	C & E Loss (ft)	0.01	0.06
BR Sluice Coef		Shear Total (lb/sq ft)	0.64	0.60
BR Sel Method	Energy only	Power Total (lb/ft s)	3.56	3.21

Plan: Alt 1 Ex\_Cond Stevens Branch Stevens Branch RS: 3990 Profile: 20%

E.G. US. (ft)	584.31	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	583.98	E.G. Elev (ft)	584.31	583.10
Q Total (cfs)	4024.00	W.S. Elev (ft)	583.31	582.70
Q Bridge (cfs)	4024.00	Crit W.S. (ft)	577.53	577.82
Q Weir (cfs)		Max Chl Dpth (ft)	13.67	12.51
Weir Sta Lft (ft)		Vel Total (ft/s)	6.05	6.23
Weir Sta Rgt (ft)		Flow Area (sq ft)	664.85	646.37
Weir Submerg		Froude # Chl	0.30	0.31
Weir Max Depth (ft)		Specif Force (cu ft)	4511.69	4027.12
Min EI Weir Flow (ft)	586.81	Hydr Depth (ft)	26.27	7.42
Min EI Prs (ft)	582.85	W.P. Total (ft)	221.26	142.09
Delta EG (ft)	1.21	Conv. Total (cfs)	61078.7	81362.9
Delta WS (ft)	1.28	Top Width (ft)	25.30	87.15
BR Open Area (sq ft)	645.64	Frctn Loss (ft)		
BR Open Vel (ft/s)	6.23	C & E Loss (ft)		
BR Sluice Coef	0.32	Shear Total (lb/sq ft)	0.81	0.69
BR Sel Method	Press Only	Power Total (lb/ft s)	4.93	4.32

Plan: Alt 1 Ex\_Cond Stevens Branch Stevens Branch RS: 3990 Profile: 10%

E.G. US. (ft)	587.52	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	586.98	E.G. Elev (ft)	587.52	587.46
Q Total (cfs)	7740.00	W.S. Elev (ft)	586.98	587.06
Q Bridge (cfs)	2797.40	Crit W.S. (ft)	580.79	580.65
Q Weir (cfs)	4942.60	Max Chl Dpth (ft)	17.33	16.88
Weir Sta Lft (ft)	617.07	Vel Total (ft/s)	4.58	3.99
Weir Sta Rgt (ft)	1582.36	Flow Area (sq ft)	1688.90	1940.57
Weir Submerg	0.85	Froude # Chl	0.33	0.29
Weir Max Depth (ft)	5.32	Specif Force (cu ft)	8975.41	9236.00
Min EI Weir Flow (ft)	586.81	Hydr Depth (ft)	2.29	2.63
Min EI Prs (ft)	582.85	W.P. Total (ft)	937.77	939.94
Delta EG (ft)	0.06	Conv. Total (cfs)		
Delta WS (ft)	-0.09	Top Width (ft)	738.16	757.67
BR Open Area (sq ft)	645.64	Frctn Loss (ft)		
BR Open Vel (ft/s)	4.33	C & E Loss (ft)		

Plan: Alt 1 Ex\_Cond Stevens Branch Stevens Branch RS: 3990 Profile: 10% (Continued)

BR Sluice Coef		Shear Total (lb/sq ft)		
BR Sel Method	Press/Weir	Power Total (lb/ft s)		

Plan: Alt 1 Ex\_Cond Stevens Branch Stevens Branch RS: 3990 Profile: 2%

E.G. US. (ft)	590.01	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	589.60	E.G. Elev (ft)	589.93	589.88
Q Total (cfs)	11040.00	W.S. Elev (ft)	589.70	589.67
Q Bridge (cfs)	3661.73	Crit W.S. (ft)	582.88	582.75
Q Weir (cfs)		Max Chl Dpth (ft)	20.06	19.49
Weir Sta Lft (ft)		Vel Total (ft/s)	2.56	2.51
Weir Sta Rgt (ft)		Flow Area (sq ft)	4318.51	4393.51
Weir Submerg		Froude # Chl	0.15	0.15
Weir Max Depth (ft)		Specif Force (cu ft)	16439.65	17101.65
Min El Weir Flow (ft)	586.81	Hydr Depth (ft)	4.12	4.55
Min El Prs (ft)	582.85	W.P. Total (ft)	1253.49	1169.91
Delta EG (ft)	0.16	Conv. Total (cfs)	183112.6	194430.3
Delta WS (ft)	0.09	Top Width (ft)	1077.13	990.02
BR Open Area (sq ft)	645.64	Frctn Loss (ft)	0.04	0.00
BR Open Vel (ft/s)	5.67	C & E Loss (ft)	0.01	0.03
BR Sluice Coef		Shear Total (lb/sq ft)	0.78	0.76
BR Sel Method	Energy only	Power Total (lb/ft s)	2.00	1.90

Plan: Alt 1 Ex\_Cond Stevens Branch Stevens Branch RS: 3990 Profile: 1%

E.G. US. (ft)	590.88	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	590.49	E.G. Elev (ft)	590.79	590.75
Q Total (cfs)	12400.00	W.S. Elev (ft)	590.61	590.59
Q Bridge (cfs)	3143.37	Crit W.S. (ft)	582.96	582.93
Q Weir (cfs)		Max Chl Dpth (ft)	20.97	20.40
Weir Sta Lft (ft)		Vel Total (ft/s)	2.35	2.35
Weir Sta Rgt (ft)		Flow Area (sq ft)	5286.30	5283.03
Weir Submerg		Froude # Chl	0.13	0.13
Weir Max Depth (ft)		Specif Force (cu ft)	20800.40	21534.09
Min El Weir Flow (ft)	586.81	Hydr Depth (ft)	4.95	5.33
Min El Prs (ft)	582.85	W.P. Total (ft)	1276.11	1194.45
Delta EG (ft)	0.16	Conv. Total (cfs)	240122.4	251425.0
Delta WS (ft)	0.10	Top Width (ft)	1167.89	1080.78
BR Open Area (sq ft)	645.64	Frctn Loss (ft)	0.03	0.00
BR Open Vel (ft/s)	4.87	C & E Loss (ft)	0.00	0.03
BR Sluice Coef		Shear Total (lb/sq ft)	0.69	0.67
BR Sel Method	Energy only	Power Total (lb/ft s)	1.62	1.58

Plan: Alt 1 Ex\_Cond Stevens Branch Stevens Branch RS: 3990 Profile: 0.2%

E.G. US. (ft)	592.34	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	592.00	E.G. Elev (ft)	592.25	592.23
Q Total (cfs)	14980.00	W.S. Elev (ft)	592.12	592.10
Q Bridge (cfs)	2576.37	Crit W.S. (ft)	587.97	587.87
Q Weir (cfs)		Max Chl Dpth (ft)	22.48	21.91
Weir Sta Lft (ft)		Vel Total (ft/s)	2.17	2.20
Weir Sta Rgt (ft)		Flow Area (sq ft)	6904.44	6799.74
Weir Submerg		Froude # Chl	0.11	0.11
Weir Max Depth (ft)		Specif Force (cu ft)	30060.61	30759.68
Min El Weir Flow (ft)	586.81	Hydr Depth (ft)	6.40	6.72
Min El Prs (ft)	582.85	W.P. Total (ft)	1289.34	1215.65

Plan: Alt 1 Ex\_Cond Stevens Branch Stevens Branch RS: 3990 Profile: 0.2% (Continued)

Delta EG (ft)	0.15	Conv. Total (cfs)	351149.5	358312.3
Delta WS (ft)	0.11	Top Width (ft)	1237.38	1122.32
BR Open Area (sq ft)	645.64	Frctn Loss (ft)	0.02	0.00
BR Open Vel (ft/s)	3.99	C & E Loss (ft)	0.00	0.03
BR Sluice Coef		Shear Total (lb/sq ft)	0.61	0.61
BR Sel Method	Energy only	Power Total (lb/ft s)	1.32	1.34

Plan: Alt 1 Ex\_Cond Stevens Branch Stevens Branch RS: 11459 Profile: 50%

E.G. Elev (ft)	585.95	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.79	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	585.15	Reach Len. (ft)	1191.60	1191.00	1181.80
Crit W.S. (ft)	582.65	Flow Area (sq ft)		352.91	2.15
E.G. Slope (ft/ft)	0.002799	Area (sq ft)		352.91	2.15
Q Total (cfs)	2524.00	Flow (cfs)		2523.71	0.30
Top Width (ft)	79.61	Top Width (ft)		56.44	23.17
Vel Total (ft/s)	7.11	Avg. Vel. (ft/s)		7.15	0.14
Max Chl Dpth (ft)	7.39	Hydr. Depth (ft)		6.25	0.09
Conv. Total (cfs)	47708.5	Conv. (cfs)		47702.9	5.6
Length Wtd. (ft)	1190.99	Wetted Per. (ft)		62.12	23.41
Min Ch El (ft)	577.76	Shear (lb/sq ft)		0.99	0.02
Alpha	1.01	Stream Power (lb/ft s)		7.10	0.00
Frctn Loss (ft)	2.05	Cum Volume (acre-ft)		28.25	0.45
C & E Loss (ft)	0.12	Cum SA (acres)		4.37	1.84

Plan: Alt 1 Ex\_Cond Stevens Branch Stevens Branch RS: 11459 Profile: 20%

E.G. Elev (ft)	588.19	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.96	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	587.24	Reach Len. (ft)	1191.60	1191.00	1181.80
Crit W.S. (ft)	584.22	Flow Area (sq ft)		474.78	311.63
E.G. Slope (ft/ft)	0.002724	Area (sq ft)		474.78	311.63
Q Total (cfs)	4024.00	Flow (cfs)		3823.57	200.43
Top Width (ft)	392.35	Top Width (ft)		61.23	331.12
Vel Total (ft/s)	5.12	Avg. Vel. (ft/s)		8.05	0.64
Max Chl Dpth (ft)	9.48	Hydr. Depth (ft)		7.75	0.94
Conv. Total (cfs)	77096.7	Conv. (cfs)		73256.7	3840.0
Length Wtd. (ft)	1190.06	Wetted Per. (ft)		68.52	334.60
Min Ch El (ft)	577.76	Shear (lb/sq ft)		1.18	0.16
Alpha	2.35	Stream Power (lb/ft s)		9.49	0.10
Frctn Loss (ft)	1.68	Cum Volume (acre-ft)		40.61	30.78
C & E Loss (ft)	0.19	Cum SA (acres)		5.03	26.47

Plan: Alt 1 Ex\_Cond Stevens Branch Stevens Branch RS: 11459 Profile: 10%

E.G. Elev (ft)	590.55	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.02	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	589.54	Reach Len. (ft)	1191.60	1191.00	1181.80
Crit W.S. (ft)	588.47	Flow Area (sq ft)	136.13	629.37	1612.70
E.G. Slope (ft/ft)	0.002992	Area (sq ft)	136.13	629.37	1612.70
Q Total (cfs)	7740.00	Flow (cfs)	82.19	5848.68	1809.13
Top Width (ft)	1021.64	Top Width (ft)	186.34	70.80	764.50
Vel Total (ft/s)	3.25	Avg. Vel. (ft/s)	0.60	9.29	1.12
Max Chl Dpth (ft)	11.78	Hydr. Depth (ft)	0.73	8.89	2.11
Conv. Total (cfs)	141506.0	Conv. (cfs)	1502.7	106928.0	33075.3
Length Wtd. (ft)	1187.82	Wetted Per. (ft)	186.54	78.62	777.55
Min Ch El (ft)	577.76	Shear (lb/sq ft)	0.14	1.50	0.39
Alpha	6.19	Stream Power (lb/ft s)	0.08	13.90	0.43
Frctn Loss (ft)	1.30	Cum Volume (acre-ft)	4.56	58.52	158.50
C & E Loss (ft)	0.25	Cum SA (acres)	4.93	5.81	59.57



Plan: Alt 1 Ex\_Cond Stevens Branch Stevens Branch RS: 11459 Profile: 2%

E.G. Elev (ft)	591.94	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.74	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	591.20	Reach Len. (ft)	1191.60	1191.00	1181.80
Crit W.S. (ft)	589.98	Flow Area (sq ft)	491.63	747.08	2943.05
E.G. Slope (ft/ft)	0.002157	Area (sq ft)	491.63	747.08	2943.05
Q Total (cfs)	11040.00	Flow (cfs)	483.78	6608.38	3947.84
Top Width (ft)	1098.59	Top Width (ft)	219.29	70.80	808.50
Vel Total (ft/s)	2.64	Avg. Vel. (ft/s)	0.98	8.85	1.34
Max Chl Dpth (ft)	13.44	Hydr. Depth (ft)	2.24	10.55	3.64
Conv. Total (cfs)	237722.0	Conv. (cfs)	10417.2	142296.9	85008.0
Length Wtd. (ft)	1186.76	Wetted Per. (ft)	219.63	78.62	828.35
Min Ch El (ft)	577.76	Shear (lb/sq ft)	0.30	1.28	0.48
Alpha	6.82	Stream Power (lb/ft s)	0.30	11.32	0.64
Frctn Loss (ft)	0.98	Cum Volume (acre-ft)	17.19	71.44	286.54
C & E Loss (ft)	0.18	Cum SA (acres)	6.82	6.02	63.15

Plan: Alt 1 Ex\_Cond Stevens Branch Stevens Branch RS: 11459 Profile: 1%

E.G. Elev (ft)	592.54	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.64	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	591.91	Reach Len. (ft)	1191.60	1191.00	1181.80
Crit W.S. (ft)	590.36	Flow Area (sq ft)	649.52	797.13	3516.09
E.G. Slope (ft/ft)	0.001848	Area (sq ft)	649.52	797.13	3516.09
Q Total (cfs)	12400.00	Flow (cfs)	701.90	6814.53	4883.57
Top Width (ft)	1120.33	Top Width (ft)	237.14	70.80	812.38
Vel Total (ft/s)	2.50	Avg. Vel. (ft/s)	1.08	8.55	1.39
Max Chl Dpth (ft)	14.15	Hydr. Depth (ft)	2.74	11.26	4.33
Conv. Total (cfs)	288483.4	Conv. (cfs)	16329.5	158538.7	113615.2
Length Wtd. (ft)	1186.45	Wetted Per. (ft)	237.57	78.62	835.13
Min Ch El (ft)	577.76	Shear (lb/sq ft)	0.32	1.17	0.49
Alpha	6.57	Stream Power (lb/ft s)	0.34	10.00	0.67
Frctn Loss (ft)	0.86	Cum Volume (acre-ft)	23.88	76.35	337.24
C & E Loss (ft)	0.16	Cum SA (acres)	9.71	6.06	64.09

Plan: Alt 1 Ex\_Cond Stevens Branch Stevens Branch RS: 11459 Profile: 0.2%

E.G. Elev (ft)	593.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.52	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	593.19	Reach Len. (ft)	1191.60	1191.00	1181.80
Crit W.S. (ft)	590.85	Flow Area (sq ft)	993.99	888.37	4566.21
E.G. Slope (ft/ft)	0.001454	Area (sq ft)	993.99	888.37	4566.21
Q Total (cfs)	14980.00	Flow (cfs)	1101.85	7241.17	6636.97
Top Width (ft)	1207.86	Top Width (ft)	319.68	70.80	817.38
Vel Total (ft/s)	2.32	Avg. Vel. (ft/s)	1.11	8.15	1.45
Max Chl Dpth (ft)	15.43	Hydr. Depth (ft)	3.11	12.55	5.59
Conv. Total (cfs)	392890.6	Conv. (cfs)	28899.0	189919.2	174072.4
Length Wtd. (ft)	1186.04	Wetted Per. (ft)	320.31	78.62	845.44
Min Ch El (ft)	577.76	Shear (lb/sq ft)	0.28	1.03	0.49
Alpha	6.14	Stream Power (lb/ft s)	0.31	8.36	0.71
Frctn Loss (ft)	0.71	Cum Volume (acre-ft)	40.27	84.98	428.39
C & E Loss (ft)	0.12	Cum SA (acres)	12.95	6.12	66.13

Plan: Alt 1 Ex\_Cond Stevens Branch Stevens Branch RS: 7552 Profile: 50%

E.G. Elev (ft)	583.78	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.41	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	583.37	Reach Len. (ft)	852.90	789.50	477.70
Crit W.S. (ft)		Flow Area (sq ft)		493.30	18.10
E.G. Slope (ft/ft)	0.001166	Area (sq ft)		493.30	18.10
Q Total (cfs)	2524.00	Flow (cfs)		2520.82	3.18
Top Width (ft)	147.30	Top Width (ft)		69.53	77.77
Vel Total (ft/s)	4.94	Avg. Vel. (ft/s)		5.11	0.18
Max Chl Dpth (ft)	8.73	Hydr. Depth (ft)		7.10	0.23
Conv. Total (cfs)	73904.2	Conv. (cfs)		73811.2	93.0
Length Wtd. (ft)	789.30	Wetted Per. (ft)		74.56	77.80
Min Ch El (ft)	574.64	Shear (lb/sq ft)		0.48	0.02
Alpha	1.07	Stream Power (lb/ft s)		2.46	0.00
Frctn Loss (ft)	1.93	Cum Volume (acre-ft)		16.68	0.18
C & E Loss (ft)	0.14	Cum SA (acres)		2.65	0.47

Plan: Alt 1 Ex\_Cond Stevens Branch Stevens Branch RS: 7552 Profile: 20%

E.G. Elev (ft)	586.32	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.32	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	586.00	Reach Len. (ft)	852.90	789.50	477.70
Crit W.S. (ft)		Flow Area (sq ft)		689.59	1318.44
E.G. Slope (ft/ft)	0.000862	Area (sq ft)		689.59	1318.44
Q Total (cfs)	4024.00	Flow (cfs)		3400.25	623.75
Top Width (ft)	1126.28	Top Width (ft)		81.40	1044.87
Vel Total (ft/s)	2.00	Avg. Vel. (ft/s)		4.93	0.47
Max Chl Dpth (ft)	11.36	Hydr. Depth (ft)		8.47	1.26
Conv. Total (cfs)	137097.6	Conv. (cfs)		115846.4	21251.2
Length Wtd. (ft)	764.11	Wetted Per. (ft)		87.61	1045.44
Min Ch El (ft)	574.64	Shear (lb/sq ft)		0.42	0.07
Alpha	5.12	Stream Power (lb/ft s)		2.09	0.03
Frctn Loss (ft)	1.24	Cum Volume (acre-ft)		24.69	8.67
C & E Loss (ft)	0.10	Cum SA (acres)		3.08	7.80

Plan: Alt 1 Ex\_Cond Stevens Branch Stevens Branch RS: 7552 Profile: 10%

E.G. Elev (ft)	589.00	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.17	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	588.83	Reach Len. (ft)	852.90	789.50	477.70
Crit W.S. (ft)		Flow Area (sq ft)		941.79	5209.32
E.G. Slope (ft/ft)	0.000560	Area (sq ft)		941.79	5209.32
Q Total (cfs)	7740.00	Flow (cfs)		4195.66	3544.34
Top Width (ft)	1716.87	Top Width (ft)		93.86	1623.01
Vel Total (ft/s)	1.26	Avg. Vel. (ft/s)		4.46	0.68
Max Chl Dpth (ft)	14.19	Hydr. Depth (ft)		10.03	3.21
Conv. Total (cfs)	327004.9	Conv. (cfs)		177261.1	149743.8
Length Wtd. (ft)	688.27	Wetted Per. (ft)		100.89	1629.66
Min Ch El (ft)	574.64	Shear (lb/sq ft)		0.33	0.11
Alpha	6.93	Stream Power (lb/ft s)		1.45	0.08
Frctn Loss (ft)	0.74	Cum Volume (acre-ft)	2.70	37.04	65.95
C & E Loss (ft)	0.10	Cum SA (acres)	2.39	3.56	27.18

Plan: Alt 1 Ex\_Cond Stevens Branch Stevens Branch RS: 7552 Profile: 2%

E.G. Elev (ft)	590.77	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.13	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	590.64	Reach Len. (ft)	852.90	789.50	477.70
Crit W.S. (ft)		Flow Area (sq ft)		1114.51	8220.10
E.G. Slope (ft/ft)	0.000435	Area (sq ft)		1114.51	8220.10
Q Total (cfs)	11040.00	Flow (cfs)		4783.16	6256.84
Top Width (ft)	1780.97	Top Width (ft)		96.94	1684.04
Vel Total (ft/s)	1.18	Avg. Vel. (ft/s)		4.29	0.76
Max Chl Dpth (ft)	16.00	Hydr. Depth (ft)		11.50	4.88
Conv. Total (cfs)	529281.2	Conv. (cfs)		229315.0	299966.1
Length Wtd. (ft)	631.65	Wetted Per. (ft)		104.46	1694.44
Min Ch El (ft)	574.64	Shear (lb/sq ft)		0.29	0.13
Alpha	5.94	Stream Power (lb/ft s)		1.24	0.10
Frctn Loss (ft)	0.44	Cum Volume (acre-ft)	10.46	45.99	135.11
C & E Loss (ft)	0.03	Cum SA (acres)	3.82	3.73	29.34

Plan: Alt 1 Ex\_Cond Stevens Branch Stevens Branch RS: 7552 Profile: 1%

E.G. Elev (ft)	591.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.11	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	591.41	Reach Len. (ft)	852.90	789.50	477.70
Crit W.S. (ft)		Flow Area (sq ft)		1189.41	9516.55
E.G. Slope (ft/ft)	0.000386	Area (sq ft)		1189.41	9516.55
Q Total (cfs)	12400.00	Flow (cfs)		4971.54	7428.46
Top Width (ft)	1792.07	Top Width (ft)		98.20	1693.87
Vel Total (ft/s)	1.16	Avg. Vel. (ft/s)		4.18	0.78
Max Chl Dpth (ft)	16.77	Hydr. Depth (ft)		12.11	5.62
Conv. Total (cfs)	631508.7	Conv. (cfs)		253191.1	378317.6
Length Wtd. (ft)	620.31	Wetted Per. (ft)		105.94	1705.84
Min Ch El (ft)	574.64	Shear (lb/sq ft)		0.27	0.13
Alpha	5.49	Stream Power (lb/ft s)		1.13	0.10
Frctn Loss (ft)	0.37	Cum Volume (acre-ft)	15.00	49.20	160.44
C & E Loss (ft)	0.03	Cum SA (acres)	6.47	3.75	30.10

Plan: Alt 1 Ex\_Cond Stevens Branch Stevens Branch RS: 7552 Profile: 0.2%

E.G. Elev (ft)	592.88	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	592.78	Reach Len. (ft)	852.90	789.50	477.70
Crit W.S. (ft)		Flow Area (sq ft)	0.09	1325.19	11862.88
E.G. Slope (ft/ft)	0.000324	Area (sq ft)	0.09	1325.19	11862.88
Q Total (cfs)	14980.00	Flow (cfs)	0.01	5385.65	9594.34
Top Width (ft)	1830.40	Top Width (ft)	0.54	99.90	1729.95
Vel Total (ft/s)	1.14	Avg. Vel. (ft/s)	0.06	4.06	0.81
Max Chl Dpth (ft)	18.14	Hydr. Depth (ft)	0.17	13.27	6.86
Conv. Total (cfs)	832845.5	Conv. (cfs)	0.3	299426.8	533418.3
Length Wtd. (ft)	607.51	Wetted Per. (ft)	0.64	107.93	1744.71
Min Ch El (ft)	574.64	Shear (lb/sq ft)	0.00	0.25	0.14
Alpha	4.93	Stream Power (lb/ft s)	0.00	1.01	0.11
Frctn Loss (ft)	0.30	Cum Volume (acre-ft)	26.67	54.72	205.52
C & E Loss (ft)	0.02	Cum SA (acres)	8.57	3.78	31.57

Plan: Alt 1 Ex\_Cond Stevens Branch Stevens Branch RS: 4962 Profile: 50%

E.G. Elev (ft)	581.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.76	Wt. n-Val.		0.035	
W.S. Elev (ft)	579.95	Reach Len. (ft)	96.20	295.10	381.80
Crit W.S. (ft)	579.33	Flow Area (sq ft)		236.91	
E.G. Slope (ft/ft)	0.008022	Area (sq ft)		236.91	
Q Total (cfs)	2524.00	Flow (cfs)		2524.00	
Top Width (ft)	47.10	Top Width (ft)		47.10	
Vel Total (ft/s)	10.65	Avg. Vel. (ft/s)		10.65	
Max Chl Dpth (ft)	6.41	Hydr. Depth (ft)		5.03	
Conv. Total (cfs)	28180.3	Conv. (cfs)		28180.3	
Length Wtd. (ft)	295.10	Wetted Per. (ft)		50.52	
Min Ch El (ft)	573.54	Shear (lb/sq ft)		2.35	
Alpha	1.00	Stream Power (lb/ft s)		25.02	
Frctn Loss (ft)	0.52	Cum Volume (acre-ft)		10.06	0.08
C & E Loss (ft)	0.44	Cum SA (acres)		1.59	0.04

Plan: Alt 1 Ex\_Cond Stevens Branch Stevens Branch RS: 4962 Profile: 20%

E.G. Elev (ft)	584.98	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.32	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	583.67	Reach Len. (ft)	96.20	295.10	381.80
Crit W.S. (ft)	581.10	Flow Area (sq ft)		432.12	59.33
E.G. Slope (ft/ft)	0.004104	Area (sq ft)		432.12	59.33
Q Total (cfs)	4024.00	Flow (cfs)		3992.43	31.57
Top Width (ft)	172.26	Top Width (ft)		63.28	108.98
Vel Total (ft/s)	8.19	Avg. Vel. (ft/s)		9.24	0.53
Max Chl Dpth (ft)	10.13	Hydr. Depth (ft)		6.83	0.54
Conv. Total (cfs)	62810.5	Conv. (cfs)		62317.7	492.8
Length Wtd. (ft)	295.85	Wetted Per. (ft)		69.02	109.11
Min Ch El (ft)	573.54	Shear (lb/sq ft)		1.60	0.14
Alpha	1.26	Stream Power (lb/ft s)		14.82	0.07
Frctn Loss (ft)	0.38	Cum Volume (acre-ft)		14.52	1.11
C & E Loss (ft)	0.30	Cum SA (acres)		1.77	1.47

Plan: Alt 1 Ex\_Cond Stevens Branch Stevens Branch RS: 4962 Profile: 10%

E.G. Elev (ft)	588.16	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.17	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	586.99	Reach Len. (ft)	96.20	295.10	381.80
Crit W.S. (ft)	585.89	Flow Area (sq ft)		649.69	1492.17
E.G. Slope (ft/ft)	0.002889	Area (sq ft)		649.69	1492.17
Q Total (cfs)	7740.00	Flow (cfs)		6258.57	1481.43
Top Width (ft)	998.57	Top Width (ft)		68.12	930.45
Vel Total (ft/s)	3.61	Avg. Vel. (ft/s)		9.63	0.99
Max Chl Dpth (ft)	13.45	Hydr. Depth (ft)		9.54	1.60
Conv. Total (cfs)	143990.2	Conv. (cfs)		116430.7	27559.5
Length Wtd. (ft)	307.27	Wetted Per. (ft)		74.91	938.80
Min Ch El (ft)	573.54	Shear (lb/sq ft)		1.56	0.29
Alpha	5.76	Stream Power (lb/ft s)		15.07	0.28
Frctn Loss (ft)	0.45	Cum Volume (acre-ft)	2.70	22.62	29.21
C & E Loss (ft)	0.19	Cum SA (acres)	2.39	2.09	13.18



Plan: Alt 1 Ex\_Cond Stevens Branch Stevens Branch RS: 4962 Profile: 2%

E.G. Elev (ft)	590.30	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.45	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	589.85	Reach Len. (ft)	96.20	295.10	381.80
Crit W.S. (ft)	587.66	Flow Area (sq ft)	4.95	855.56	4189.97
E.G. Slope (ft/ft)	0.001267	Area (sq ft)	4.95	855.56	4189.97
Q Total (cfs)	11040.00	Flow (cfs)	0.71	6118.03	4921.26
Top Width (ft)	1052.46	Top Width (ft)	28.03	75.90	948.53
Vel Total (ft/s)	2.19	Avg. Vel. (ft/s)	0.14	7.15	1.17
Max Chl Dpth (ft)	16.31	Hydr. Depth (ft)	0.18	11.27	4.42
Conv. Total (cfs)	310166.5	Conv. (cfs)	19.9	171884.8	138261.8
Length Wtd. (ft)	321.66	Wetted Per. (ft)	28.05	83.11	974.41
Min Ch El (ft)	573.54	Shear (lb/sq ft)	0.01	0.81	0.34
Alpha	6.06	Stream Power (lb/ft s)	0.00	5.82	0.40
Frctn Loss (ft)	0.28	Cum Volume (acre-ft)	10.41	28.14	67.07
C & E Loss (ft)	0.01	Cum SA (acres)	3.55	2.16	14.90

Plan: Alt 1 Ex\_Cond Stevens Branch Stevens Branch RS: 4962 Profile: 1%

E.G. Elev (ft)	591.12	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.39	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	590.74	Reach Len. (ft)	96.20	295.10	381.80
Crit W.S. (ft)	588.00	Flow Area (sq ft)	80.25	922.84	5033.92
E.G. Slope (ft/ft)	0.001058	Area (sq ft)	103.72	922.84	5033.92
Q Total (cfs)	12400.00	Flow (cfs)	23.85	6343.05	6033.10
Top Width (ft)	1256.17	Top Width (ft)	223.28	75.90	956.99
Vel Total (ft/s)	2.05	Avg. Vel. (ft/s)	0.30	6.87	1.20
Max Chl Dpth (ft)	17.20	Hydr. Depth (ft)	0.51	12.16	5.26
Conv. Total (cfs)	381206.8	Conv. (cfs)	733.3	195001.1	185472.4
Length Wtd. (ft)	323.64	Wetted Per. (ft)	157.56	83.11	988.24
Min Ch El (ft)	573.54	Shear (lb/sq ft)	0.03	0.73	0.34
Alpha	5.89	Stream Power (lb/ft s)	0.01	5.04	0.40
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)	13.98	30.05	80.66
C & E Loss (ft)	0.00	Cum SA (acres)	4.28	2.17	15.56

Plan: Alt 1 Ex\_Cond Stevens Branch Stevens Branch RS: 4962 Profile: 0.2%

E.G. Elev (ft)	592.55	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.33	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	592.23	Reach Len. (ft)	96.20	295.10	381.80
Crit W.S. (ft)	588.52	Flow Area (sq ft)	323.55	1035.94	6500.89
E.G. Slope (ft/ft)	0.000843	Area (sq ft)	559.46	1035.94	6500.89
Q Total (cfs)	14980.00	Flow (cfs)	183.41	6866.72	7929.87
Top Width (ft)	1440.72	Top Width (ft)	360.96	75.90	1003.86
Vel Total (ft/s)	1.91	Avg. Vel. (ft/s)	0.57	6.63	1.22
Max Chl Dpth (ft)	18.69	Hydr. Depth (ft)	1.98	13.65	6.48
Conv. Total (cfs)	515793.8	Conv. (cfs)	6315.2	236436.0	273042.6
Length Wtd. (ft)	324.48	Wetted Per. (ft)	163.49	83.11	1044.08
Min Ch El (ft)	573.54	Shear (lb/sq ft)	0.10	0.66	0.33
Alpha	5.76	Stream Power (lb/ft s)	0.06	4.35	0.40
Frctn Loss (ft)	0.21	Cum Volume (acre-ft)	21.19	33.32	104.83
C & E Loss (ft)	0.00	Cum SA (acres)	5.03	2.19	16.58

Plan: Alt 1 Ex\_Cond Stevens Branch Stevens Branch RS: 3994 Profile: 50%

E.G. Elev (ft)	580.75	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.29	Wt. n-Val.		0.035	
W.S. Elev (ft)	580.45	Reach Len. (ft)	6.00	6.00	6.00
Crit W.S. (ft)	575.10	Flow Area (sq ft)		579.89	
E.G. Slope (ft/ft)	0.000761	Area (sq ft)		579.89	
Q Total (cfs)	2524.00	Flow (cfs)		2524.00	
Top Width (ft)	75.06	Top Width (ft)		75.06	
Vel Total (ft/s)	4.35	Avg. Vel. (ft/s)		4.35	
Max Chl Dpth (ft)	10.81	Hydr. Depth (ft)		7.73	
Conv. Total (cfs)	91510.4	Conv. (cfs)		91510.4	
Length Wtd. (ft)	6.00	Wetted Per. (ft)		80.92	
Min Ch El (ft)	569.64	Shear (lb/sq ft)		0.34	
Alpha	1.00	Stream Power (lb/ft s)		1.48	
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		7.30	0.08
C & E Loss (ft)	0.04	Cum SA (acres)		1.18	0.04

Plan: Alt 1 Ex\_Cond Stevens Branch Stevens Branch RS: 3994 Profile: 20%

E.G. Elev (ft)	584.31	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.33	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	583.98	Reach Len. (ft)	6.00	6.00	6.00
Crit W.S. (ft)	576.62	Flow Area (sq ft)		859.59	114.56
E.G. Slope (ft/ft)	0.000615	Area (sq ft)		859.59	114.56
Q Total (cfs)	4024.00	Flow (cfs)		3986.21	37.79
Top Width (ft)	186.58	Top Width (ft)		83.80	102.78
Vel Total (ft/s)	4.13	Avg. Vel. (ft/s)		4.64	0.33
Max Chl Dpth (ft)	14.34	Hydr. Depth (ft)		10.26	1.11
Conv. Total (cfs)	162255.6	Conv. (cfs)		160732.0	1523.6
Length Wtd. (ft)	6.00	Wetted Per. (ft)		93.00	102.91
Min Ch El (ft)	569.64	Shear (lb/sq ft)		0.35	0.04
Alpha	1.25	Stream Power (lb/ft s)		1.65	0.01
Frctn Loss (ft)		Cum Volume (acre-ft)		10.15	0.35
C & E Loss (ft)		Cum SA (acres)		1.27	0.55

Plan: Alt 1 Ex\_Cond Stevens Branch Stevens Branch RS: 3994 Profile: 10%

E.G. Elev (ft)	587.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.54	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	586.98	Reach Len. (ft)	6.00	6.00	6.00
Crit W.S. (ft)	579.48	Flow Area (sq ft)	53.56	1127.20	1267.42
E.G. Slope (ft/ft)	0.000884	Area (sq ft)	53.56	1127.20	1267.42
Q Total (cfs)	7740.00	Flow (cfs)	13.20	7005.07	721.73
Top Width (ft)	871.36	Top Width (ft)	101.38	93.01	676.96
Vel Total (ft/s)	3.16	Avg. Vel. (ft/s)	0.25	6.21	0.57
Max Chl Dpth (ft)	17.33	Hydr. Depth (ft)	0.53	12.12	1.87
Conv. Total (cfs)	260291.9	Conv. (cfs)	443.9	235576.5	24271.5
Length Wtd. (ft)	6.00	Wetted Per. (ft)	101.40	103.20	679.59
Min Ch El (ft)	569.64	Shear (lb/sq ft)	0.03	0.60	0.10
Alpha	3.50	Stream Power (lb/ft s)	0.01	3.75	0.06
Frctn Loss (ft)		Cum Volume (acre-ft)	2.64	16.60	17.11
C & E Loss (ft)		Cum SA (acres)	2.27	1.55	6.14

Plan: Alt 1 Ex\_Cond Stevens Branch Stevens Branch RS: 3994 Profile: 2%

E.G. Elev (ft)	590.01	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.41	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	589.60	Reach Len. (ft)	6.00	6.00	6.00
Crit W.S. (ft)	581.57	Flow Area (sq ft)	553.62	1371.14	3095.04
E.G. Slope (ft/ft)	0.000629	Area (sq ft)	561.97	1371.14	3095.04
Q Total (cfs)	11040.00	Flow (cfs)	304.78	8192.66	2542.56
Top Width (ft)	1067.63	Top Width (ft)	260.22	93.01	714.40
Vel Total (ft/s)	2.20	Avg. Vel. (ft/s)	0.55	5.98	0.82
Max Chl Dpth (ft)	19.96	Hydr. Depth (ft)	2.36	14.74	4.33
Conv. Total (cfs)	440023.6	Conv. (cfs)	12147.6	326536.5	101339.5
Length Wtd. (ft)	6.00	Wetted Per. (ft)	234.70	103.20	722.47
Min Ch El (ft)	569.64	Shear (lb/sq ft)	0.09	0.52	0.17
Alpha	5.51	Stream Power (lb/ft s)	0.05	3.12	0.14
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	9.79	20.60	35.14
C & E Loss (ft)	0.07	Cum SA (acres)	3.23	1.59	7.61

Plan: Alt 1 Ex\_Cond Stevens Branch Stevens Branch RS: 3994 Profile: 1%

E.G. Elev (ft)	590.88	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.38	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	590.49	Reach Len. (ft)	6.00	6.00	6.00
Crit W.S. (ft)	582.35	Flow Area (sq ft)	778.08	1454.54	3737.68
E.G. Slope (ft/ft)	0.000572	Area (sq ft)	834.79	1454.54	3737.68
Q Total (cfs)	12400.00	Flow (cfs)	484.42	8618.67	3296.92
Top Width (ft)	1162.05	Top Width (ft)	349.85	93.01	719.19
Vel Total (ft/s)	2.08	Avg. Vel. (ft/s)	0.62	5.93	0.88
Max Chl Dpth (ft)	20.85	Hydr. Depth (ft)	3.05	15.64	5.20
Conv. Total (cfs)	518386.9	Conv. (cfs)	20251.4	360306.8	137828.8
Length Wtd. (ft)	6.00	Wetted Per. (ft)	255.33	103.20	729.13
Min Ch El (ft)	569.64	Shear (lb/sq ft)	0.11	0.50	0.18
Alpha	5.71	Stream Power (lb/ft s)	0.07	2.98	0.16
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	12.94	22.00	42.22
C & E Loss (ft)	0.08	Cum SA (acres)	3.65	1.60	8.22

Plan: Alt 1 Ex\_Cond Stevens Branch Stevens Branch RS: 3994 Profile: 0.2%

E.G. Elev (ft)	592.34	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.35	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	592.00	Reach Len. (ft)	6.00	6.00	6.00
Crit W.S. (ft)	584.19	Flow Area (sq ft)	1161.59	1594.28	4825.56
E.G. Slope (ft/ft)	0.000503	Area (sq ft)	1417.18	1594.28	4825.56
Q Total (cfs)	14980.00	Flow (cfs)	886.04	9419.45	4674.52
Top Width (ft)	1234.00	Top Width (ft)	411.84	93.01	729.15
Vel Total (ft/s)	1.98	Avg. Vel. (ft/s)	0.76	5.91	0.97
Max Chl Dpth (ft)	22.36	Hydr. Depth (ft)	4.55	17.14	6.62
Conv. Total (cfs)	667663.0	Conv. (cfs)	39491.0	419827.5	208344.5
Length Wtd. (ft)	6.00	Wetted Per. (ft)	255.33	103.20	742.21
Min Ch El (ft)	569.64	Shear (lb/sq ft)	0.14	0.49	0.20
Alpha	5.71	Stream Power (lb/ft s)	0.11	2.87	0.20
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	19.01	24.41	55.19
C & E Loss (ft)	0.08	Cum SA (acres)	4.18	1.62	8.99

Plan: Alt 1 Ex\_Cond Stevens Branch Stevens Branch RS: 3921 Profile: 50%

E.G. Elev (ft)	580.60	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.29	Wt. n-Val.		0.035	
W.S. Elev (ft)	580.30	Reach Len. (ft)	21.20	125.90	180.00
Crit W.S. (ft)	575.67	Flow Area (sq ft)		582.54	
E.G. Slope (ft/ft)	0.000827	Area (sq ft)		582.54	
Q Total (cfs)	2524.00	Flow (cfs)		2524.00	
Top Width (ft)	81.27	Top Width (ft)		81.27	
Vel Total (ft/s)	4.33	Avg. Vel. (ft/s)		4.33	
Max Chl Dpth (ft)	10.12	Hydr. Depth (ft)		7.17	
Conv. Total (cfs)	87756.6	Conv. (cfs)		87756.6	
Length Wtd. (ft)	126.02	Wetted Per. (ft)		87.15	
Min Ch EI (ft)	570.19	Shear (lb/sq ft)		0.35	
Alpha	1.00	Stream Power (lb/ft s)		1.50	
Frctn Loss (ft)	0.16	Cum Volume (acre-ft)		7.05	0.08
C & E Loss (ft)	0.08	Cum SA (acres)		1.14	0.04

Plan: Alt 1 Ex\_Cond Stevens Branch Stevens Branch RS: 3921 Profile: 20%

E.G. Elev (ft)	583.10	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.41	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	582.70	Reach Len. (ft)	21.20	125.90	180.00
Crit W.S. (ft)	577.01	Flow Area (sq ft)		785.33	41.44
E.G. Slope (ft/ft)	0.000877	Area (sq ft)		785.33	41.44
Q Total (cfs)	4024.00	Flow (cfs)		4015.05	8.95
Top Width (ft)	183.16	Top Width (ft)		88.47	94.69
Vel Total (ft/s)	4.87	Avg. Vel. (ft/s)		5.11	0.22
Max Chl Dpth (ft)	12.51	Hydr. Depth (ft)		8.88	0.44
Conv. Total (cfs)	135845.6	Conv. (cfs)		135543.6	302.0
Length Wtd. (ft)	126.22	Wetted Per. (ft)		95.81	94.80
Min Ch EI (ft)	570.19	Shear (lb/sq ft)		0.45	0.02
Alpha	1.10	Stream Power (lb/ft s)		2.30	0.01
Frctn Loss (ft)	0.16	Cum Volume (acre-ft)		9.80	0.34
C & E Loss (ft)	0.10	Cum SA (acres)		1.25	0.53

Plan: Alt 1 Ex\_Cond Stevens Branch Stevens Branch RS: 3921 Profile: 10%

E.G. Elev (ft)	587.46	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.40	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	587.06	Reach Len. (ft)	21.20	125.90	180.00
Crit W.S. (ft)	579.64	Flow Area (sq ft)	55.60	1197.93	1779.79
E.G. Slope (ft/ft)	0.000663	Area (sq ft)	79.98	1197.93	1779.79
Q Total (cfs)	7740.00	Flow (cfs)	10.95	6559.58	1169.46
Top Width (ft)	878.09	Top Width (ft)	151.28	97.77	629.04
Vel Total (ft/s)	2.55	Avg. Vel. (ft/s)	0.20	5.48	0.66
Max Chl Dpth (ft)	16.88	Hydr. Depth (ft)	0.42	12.25	2.83
Conv. Total (cfs)	300520.7	Conv. (cfs)	425.3	254688.8	45406.7
Length Wtd. (ft)	134.79	Wetted Per. (ft)	131.01	106.89	630.02
Min Ch EI (ft)	570.19	Shear (lb/sq ft)	0.02	0.46	0.12
Alpha	3.91	Stream Power (lb/ft s)	0.00	2.54	0.08
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)	2.63	16.20	16.49
C & E Loss (ft)	0.07	Cum SA (acres)	2.24	1.52	5.80

Plan: Alt 1 Ex\_Cond Stevens Branch Stevens Branch RS: 3921 Profile: 2%

E.G. Elev (ft)	589.85	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.34	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	589.51	Reach Len. (ft)	21.20	125.90	180.00
Crit W.S. (ft)	581.54	Flow Area (sq ft)	558.45	1437.35	3373.49
E.G. Slope (ft/ft)	0.000524	Area (sq ft)	639.77	1437.35	3373.49
Q Total (cfs)	11040.00	Flow (cfs)	303.61	7896.79	2839.60
Top Width (ft)	989.21	Top Width (ft)	233.77	97.77	657.67
Vel Total (ft/s)	2.06	Avg. Vel. (ft/s)	0.54	5.49	0.84
Max Chl Dpth (ft)	19.32	Hydr. Depth (ft)	2.66	14.70	5.13
Conv. Total (cfs)	482407.9	Conv. (cfs)	13266.7	345060.9	124080.2
Length Wtd. (ft)	137.38	Wetted Per. (ft)	210.15	106.89	658.97
Min Ch El (ft)	570.19	Shear (lb/sq ft)	0.09	0.44	0.17
Alpha	5.15	Stream Power (lb/ft s)	0.05	2.42	0.14
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	9.50	20.07	33.61
C & E Loss (ft)	0.05	Cum SA (acres)	3.10	1.54	7.26

Plan: Alt 1 Ex\_Cond Stevens Branch Stevens Branch RS: 3921 Profile: 1%

E.G. Elev (ft)	590.72	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.32	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	590.40	Reach Len. (ft)	21.20	125.90	180.00
Crit W.S. (ft)	582.43	Flow Area (sq ft)	744.43	1523.94	3959.44
E.G. Slope (ft/ft)	0.000486	Area (sq ft)	866.26	1523.94	3959.44
Q Total (cfs)	12400.00	Flow (cfs)	472.05	8382.81	3545.14
Top Width (ft)	1069.46	Top Width (ft)	296.65	97.77	675.04
Vel Total (ft/s)	1.99	Avg. Vel. (ft/s)	0.63	5.50	0.90
Max Chl Dpth (ft)	20.21	Hydr. Depth (ft)	3.55	15.59	5.87
Conv. Total (cfs)	562692.6	Conv. (cfs)	21420.9	380398.7	160873.0
Length Wtd. (ft)	137.55	Wetted Per. (ft)	210.15	106.89	676.41
Min Ch El (ft)	570.19	Shear (lb/sq ft)	0.11	0.43	0.18
Alpha	5.22	Stream Power (lb/ft s)	0.07	2.38	0.16
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	12.52	21.43	40.36
C & E Loss (ft)	0.04	Cum SA (acres)	3.48	1.55	7.86

Plan: Alt 1 Ex\_Cond Stevens Branch Stevens Branch RS: 3921 Profile: 0.2%

E.G. Elev (ft)	592.19	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.31	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	591.88	Reach Len. (ft)	21.20	125.90	180.00
Crit W.S. (ft)	585.01	Flow Area (sq ft)	1056.59	1669.28	4990.37
E.G. Slope (ft/ft)	0.000446	Area (sq ft)	1322.20	1669.28	4990.37
Q Total (cfs)	14980.00	Flow (cfs)	810.99	9351.54	4817.47
Top Width (ft)	1117.25	Top Width (ft)	317.28	97.77	702.20
Vel Total (ft/s)	1.94	Avg. Vel. (ft/s)	0.77	5.60	0.97
Max Chl Dpth (ft)	21.70	Hydr. Depth (ft)	5.03	17.07	7.11
Conv. Total (cfs)	709252.4	Conv. (cfs)	38397.7	442763.8	228090.9
Length Wtd. (ft)	137.47	Wetted Per. (ft)	210.15	106.89	703.71
Min Ch El (ft)	570.19	Shear (lb/sq ft)	0.14	0.43	0.20
Alpha	5.29	Stream Power (lb/ft s)	0.11	2.44	0.19
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	18.32	23.77	52.79
C & E Loss (ft)	0.04	Cum SA (acres)	3.99	1.57	8.62



Plan: Alt 1 Ex\_Cond Stevens Branch Stevens Branch RS: 3508 Profile: 50%

E.G. Elev (ft)	580.36	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.67	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	579.68	Reach Len. (ft)	245.30	268.30	311.80
Crit W.S. (ft)	577.03	Flow Area (sq ft)		380.68	13.46
E.G. Slope (ft/ft)	0.002190	Area (sq ft)		380.68	13.46
Q Total (cfs)	2524.00	Flow (cfs)		2513.13	10.87
Top Width (ft)	67.33	Top Width (ft)		60.01	7.32
Vel Total (ft/s)	6.40	Avg. Vel. (ft/s)		6.60	0.81
Max Chl Dpth (ft)	7.21	Hydr. Depth (ft)		6.34	1.84
Conv. Total (cfs)	53928.9	Conv. (cfs)		53696.6	232.3
Length Wtd. (ft)	268.39	Wetted Per. (ft)		62.86	8.18
Min Ch El (ft)	572.47	Shear (lb/sq ft)		0.83	0.23
Alpha	1.06	Stream Power (lb/ft s)		5.47	0.18
Frctn Loss (ft)	0.53	Cum Volume (acre-ft)		5.65	0.05
C & E Loss (ft)	0.05	Cum SA (acres)		0.94	0.03

Plan: Alt 1 Ex\_Cond Stevens Branch Stevens Branch RS: 3508 Profile: 20%

E.G. Elev (ft)	582.84	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.91	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	581.92	Reach Len. (ft)	245.30	268.30	311.80
Crit W.S. (ft)	578.50	Flow Area (sq ft)		517.50	44.24
E.G. Slope (ft/ft)	0.002114	Area (sq ft)		517.50	44.24
Q Total (cfs)	4024.00	Flow (cfs)		3985.13	38.87
Top Width (ft)	120.78	Top Width (ft)		62.28	58.50
Vel Total (ft/s)	7.16	Avg. Vel. (ft/s)		7.70	0.88
Max Chl Dpth (ft)	9.45	Hydr. Depth (ft)		8.31	0.76
Conv. Total (cfs)	87511.2	Conv. (cfs)		86666.0	845.3
Length Wtd. (ft)	268.51	Wetted Per. (ft)		66.05	59.87
Min Ch El (ft)	572.47	Shear (lb/sq ft)		1.03	0.10
Alpha	1.14	Stream Power (lb/ft s)		7.96	0.09
Frctn Loss (ft)	0.50	Cum Volume (acre-ft)		7.91	0.16
C & E Loss (ft)	0.09	Cum SA (acres)		1.03	0.21

Plan: Alt 1 Ex\_Cond Stevens Branch Stevens Branch RS: 3508 Profile: 10%

E.G. Elev (ft)	587.26	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.75	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	586.51	Reach Len. (ft)	245.30	268.30	311.80
Crit W.S. (ft)	581.44	Flow Area (sq ft)	41.18	819.43	1440.17
E.G. Slope (ft/ft)	0.001410	Area (sq ft)	41.23	819.43	1440.17
Q Total (cfs)	7740.00	Flow (cfs)	10.99	6312.59	1416.42
Top Width (ft)	637.97	Top Width (ft)	104.95	72.20	460.83
Vel Total (ft/s)	3.36	Avg. Vel. (ft/s)	0.27	7.70	0.98
Max Chl Dpth (ft)	14.04	Hydr. Depth (ft)	0.40	11.35	3.13
Conv. Total (cfs)	206095.5	Conv. (cfs)	292.6	168087.3	37715.6
Length Wtd. (ft)	273.68	Wetted Per. (ft)	104.04	77.15	468.25
Min Ch El (ft)	572.47	Shear (lb/sq ft)	0.03	0.94	0.27
Alpha	4.29	Stream Power (lb/ft s)	0.01	7.20	0.27
Frctn Loss (ft)	0.34	Cum Volume (acre-ft)	2.60	13.29	9.84
C & E Loss (ft)	0.04	Cum SA (acres)	2.18	1.28	3.55

Plan: Alt 1 Ex\_Cond Stevens Branch Stevens Branch RS: 3508 Profile: 2%

E.G. Elev (ft)	589.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.58	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	589.13	Reach Len. (ft)	245.30	268.30	311.80
Crit W.S. (ft)	584.94	Flow Area (sq ft)	534.78	1008.89	2697.26
E.G. Slope (ft/ft)	0.000979	Area (sq ft)	557.13	1008.89	2697.26
Q Total (cfs)	11040.00	Flow (cfs)	397.88	7440.40	3201.73
Top Width (ft)	773.49	Top Width (ft)	210.90	72.20	490.39
Vel Total (ft/s)	2.60	Avg. Vel. (ft/s)	0.74	7.37	1.19
Max Chl Dpth (ft)	16.66	Hydr. Depth (ft)	2.66	13.97	5.50
Conv. Total (cfs)	352750.3	Conv. (cfs)	12713.0	237735.7	102301.6
Length Wtd. (ft)	276.50	Wetted Per. (ft)	201.05	77.15	503.20
Min Ch El (ft)	572.47	Shear (lb/sq ft)	0.16	0.80	0.33
Alpha	5.47	Stream Power (lb/ft s)	0.12	5.90	0.39
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)	9.21	16.54	21.06
C & E Loss (ft)	0.00	Cum SA (acres)	2.99	1.29	4.89

Plan: Alt 1 Ex\_Cond Stevens Branch Stevens Branch RS: 3508 Profile: 1%

E.G. Elev (ft)	590.59	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.54	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	590.05	Reach Len. (ft)	245.30	268.30	311.80
Crit W.S. (ft)	585.96	Flow Area (sq ft)	720.01	1075.46	3151.52
E.G. Slope (ft/ft)	0.000885	Area (sq ft)	751.58	1075.46	3151.52
Q Total (cfs)	12400.00	Flow (cfs)	620.90	7867.67	3911.44
Top Width (ft)	778.03	Top Width (ft)	210.90	72.20	494.93
Vel Total (ft/s)	2.51	Avg. Vel. (ft/s)	0.86	7.32	1.24
Max Chl Dpth (ft)	17.58	Hydr. Depth (ft)	3.58	14.90	6.37
Conv. Total (cfs)	416792.0	Conv. (cfs)	20869.7	264450.2	131472.2
Length Wtd. (ft)	277.11	Wetted Per. (ft)	201.05	77.15	509.67
Min Ch El (ft)	572.47	Shear (lb/sq ft)	0.20	0.77	0.34
Alpha	5.49	Stream Power (lb/ft s)	0.17	5.63	0.42
Frctn Loss (ft)	0.24	Cum Volume (acre-ft)	12.13	17.68	25.67
C & E Loss (ft)	0.00	Cum SA (acres)	3.36	1.30	5.44

Plan: Alt 1 Ex\_Cond Stevens Branch Stevens Branch RS: 3508 Profile: 0.2%

E.G. Elev (ft)	592.08	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.50	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	591.58	Reach Len. (ft)	245.30	268.30	311.80
Crit W.S. (ft)	586.70	Flow Area (sq ft)	1025.89	1185.39	3911.23
E.G. Slope (ft/ft)	0.000787	Area (sq ft)	1165.83	1185.39	3911.23
Q Total (cfs)	14980.00	Flow (cfs)	1055.99	8722.98	5201.03
Top Width (ft)	876.85	Top Width (ft)	300.54	72.20	504.11
Vel Total (ft/s)	2.45	Avg. Vel. (ft/s)	1.03	7.36	1.33
Max Chl Dpth (ft)	19.11	Hydr. Depth (ft)	5.11	16.42	7.76
Conv. Total (cfs)	534113.5	Conv. (cfs)	37651.5	311018.6	185443.4
Length Wtd. (ft)	278.14	Wetted Per. (ft)	201.05	77.15	522.04
Min Ch El (ft)	572.47	Shear (lb/sq ft)	0.25	0.75	0.37
Alpha	5.38	Stream Power (lb/ft s)	0.26	5.55	0.49
Frctn Loss (ft)	0.21	Cum Volume (acre-ft)	17.71	19.65	34.39
C & E Loss (ft)	0.01	Cum SA (acres)	3.84	1.33	6.13

Plan: Alt 1 Ex\_Cond Stevens Branch Stevens Branch RS: 2628 Profile: 50%

E.G. Elev (ft)	579.78	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.50	Wt. n-Val.		0.035	
W.S. Elev (ft)	579.28	Reach Len. (ft)	382.10	343.40	269.80
Crit W.S. (ft)	576.32	Flow Area (sq ft)		445.41	
E.G. Slope (ft/ft)	0.001784	Area (sq ft)		445.41	
Q Total (cfs)	2524.00	Flow (cfs)		2524.00	
Top Width (ft)	75.70	Top Width (ft)		75.70	
Vel Total (ft/s)	5.67	Avg. Vel. (ft/s)		5.67	
Max Chl Dpth (ft)	7.17	Hydr. Depth (ft)		5.88	
Conv. Total (cfs)	59761.7	Conv. (cfs)		59761.7	
Length Wtd. (ft)	343.40	Wetted Per. (ft)		79.28	
Min Ch El (ft)	572.11	Shear (lb/sq ft)		0.63	
Alpha	1.00	Stream Power (lb/ft s)		3.55	
Frctn Loss (ft)	0.78	Cum Volume (acre-ft)		3.11	
C & E Loss (ft)	0.03	Cum SA (acres)		0.52	

Plan: Alt 1 Ex\_Cond Stevens Branch Stevens Branch RS: 2628 Profile: 20%

E.G. Elev (ft)	582.25	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.63	Wt. n-Val.		0.035	
W.S. Elev (ft)	581.62	Reach Len. (ft)	382.10	343.40	269.80
Crit W.S. (ft)	577.68	Flow Area (sq ft)		633.47	
E.G. Slope (ft/ft)	0.001653	Area (sq ft)		633.47	
Q Total (cfs)	4024.00	Flow (cfs)		4024.00	
Top Width (ft)	84.88	Top Width (ft)		84.88	
Vel Total (ft/s)	6.35	Avg. Vel. (ft/s)		6.35	
Max Chl Dpth (ft)	9.51	Hydr. Depth (ft)		7.46	
Conv. Total (cfs)	98959.9	Conv. (cfs)		98959.9	
Length Wtd. (ft)	343.40	Wetted Per. (ft)		89.75	
Min Ch El (ft)	572.11	Shear (lb/sq ft)		0.73	
Alpha	1.00	Stream Power (lb/ft s)		4.63	
Frctn Loss (ft)	0.75	Cum Volume (acre-ft)		4.37	
C & E Loss (ft)	0.05	Cum SA (acres)		0.58	

Plan: Alt 1 Ex\_Cond Stevens Branch Stevens Branch RS: 2628 Profile: 10%

E.G. Elev (ft)	586.88	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.61	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	586.27	Reach Len. (ft)	382.10	343.40	269.80
Crit W.S. (ft)	580.37	Flow Area (sq ft)	164.12	1094.69	689.44
E.G. Slope (ft/ft)	0.001098	Area (sq ft)	344.46	1094.69	689.44
Q Total (cfs)	7740.00	Flow (cfs)	72.53	7125.51	541.96
Top Width (ft)	625.57	Top Width (ft)	261.19	104.60	259.78
Vel Total (ft/s)	3.97	Avg. Vel. (ft/s)	0.44	6.51	0.79
Max Chl Dpth (ft)	14.16	Hydr. Depth (ft)	1.12	10.47	2.65
Conv. Total (cfs)	233581.5	Conv. (cfs)	2189.0	215037.0	16355.5
Length Wtd. (ft)	340.95	Wetted Per. (ft)	146.80	109.99	259.99
Min Ch El (ft)	572.11	Shear (lb/sq ft)	0.08	0.68	0.18
Alpha	2.47	Stream Power (lb/ft s)	0.03	4.44	0.14
Frctn Loss (ft)	0.58	Cum Volume (acre-ft)	1.51	7.39	2.22
C & E Loss (ft)	0.09	Cum SA (acres)	1.15	0.73	0.97

Plan: Alt 1 Ex\_Cond Stevens Branch Stevens Branch RS: 2628 Profile: 2%

E.G. Elev (ft)	589.45	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.58	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	588.88	Reach Len. (ft)	382.10	343.40	269.80
Crit W.S. (ft)	582.32	Flow Area (sq ft)	546.05	1367.20	1573.04
E.G. Slope (ft/ft)	0.000861	Area (sq ft)	1060.90	1367.20	1573.04
Q Total (cfs)	11040.00	Flow (cfs)	476.33	9139.98	1423.69
Top Width (ft)	837.72	Top Width (ft)	333.22	104.60	399.91
Vel Total (ft/s)	3.17	Avg. Vel. (ft/s)	0.87	6.69	0.91
Max Chl Dpth (ft)	16.77	Hydr. Depth (ft)	3.72	13.07	3.93
Conv. Total (cfs)	376218.8	Conv. (cfs)	16232.2	311470.4	48516.1
Length Wtd. (ft)	338.45	Wetted Per. (ft)	146.80	109.99	400.17
Min Ch El (ft)	572.11	Shear (lb/sq ft)	0.20	0.67	0.21
Alpha	3.70	Stream Power (lb/ft s)	0.17	4.47	0.19
Frctn Loss (ft)	0.49	Cum Volume (acre-ft)	4.65	9.22	5.78
C & E Loss (ft)	0.13	Cum SA (acres)	1.46	0.75	1.70

Plan: Alt 1 Ex\_Cond Stevens Branch Stevens Branch RS: 2628 Profile: 1%

E.G. Elev (ft)	590.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.58	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	589.77	Reach Len. (ft)	382.10	343.40	269.80
Crit W.S. (ft)	583.84	Flow Area (sq ft)	676.72	1460.43	1960.05
E.G. Slope (ft/ft)	0.000818	Area (sq ft)	1390.03	1460.43	1960.05
Q Total (cfs)	12400.00	Flow (cfs)	664.01	9946.55	1789.45
Top Width (ft)	962.17	Top Width (ft)	384.06	104.60	473.51
Vel Total (ft/s)	3.03	Avg. Vel. (ft/s)	0.98	6.81	0.91
Max Chl Dpth (ft)	17.66	Hydr. Depth (ft)	4.62	13.96	4.14
Conv. Total (cfs)	433425.3	Conv. (cfs)	23209.5	347668.1	62547.6
Length Wtd. (ft)	337.53	Wetted Per. (ft)	146.80	109.99	473.78
Min Ch El (ft)	572.11	Shear (lb/sq ft)	0.24	0.68	0.21
Alpha	4.08	Stream Power (lb/ft s)	0.23	4.62	0.19
Frctn Loss (ft)	0.48	Cum Volume (acre-ft)	6.10	9.87	7.38
C & E Loss (ft)	0.13	Cum SA (acres)	1.68	0.76	1.97

Plan: Alt 1 Ex\_Cond Stevens Branch Stevens Branch RS: 2628 Profile: 0.2%

E.G. Elev (ft)	591.86	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.57	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	591.28	Reach Len. (ft)	382.10	343.40	269.80
Crit W.S. (ft)	585.05	Flow Area (sq ft)	898.75	1618.85	2739.83
E.G. Slope (ft/ft)	0.000748	Area (sq ft)	1989.00	1618.85	2739.83
Q Total (cfs)	14980.00	Flow (cfs)	1018.57	11288.78	2672.66
Top Width (ft)	1062.34	Top Width (ft)	397.60	104.60	560.14
Vel Total (ft/s)	2.85	Avg. Vel. (ft/s)	1.13	6.97	0.98
Max Chl Dpth (ft)	19.17	Hydr. Depth (ft)	6.13	15.48	4.89
Conv. Total (cfs)	547737.8	Conv. (cfs)	37243.4	412769.8	97724.6
Length Wtd. (ft)	335.51	Wetted Per. (ft)	146.80	109.99	560.43
Min Ch El (ft)	572.11	Shear (lb/sq ft)	0.29	0.69	0.23
Alpha	4.55	Stream Power (lb/ft s)	0.32	4.79	0.22
Frctn Loss (ft)	0.45	Cum Volume (acre-ft)	8.83	11.01	10.59
C & E Loss (ft)	0.14	Cum SA (acres)	1.88	0.78	2.32

Plan: Alt 1 Ex\_Cond Stevens Branch Stevens Branch RS: 1501 Profile: 50%

E.G. Elev (ft)	578.96	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.84	Wt. n-Val.		0.035	
W.S. Elev (ft)	578.12	Reach Len. (ft)			
Crit W.S. (ft)	575.76	Flow Area (sq ft)		343.65	
E.G. Slope (ft/ft)	0.003000	Area (sq ft)		343.65	
Q Total (cfs)	2524.00	Flow (cfs)		2524.00	
Top Width (ft)	56.60	Top Width (ft)		56.60	
Vel Total (ft/s)	7.34	Avg. Vel. (ft/s)		7.34	
Max Chl Dpth (ft)	7.34	Hydr. Depth (ft)		6.07	
Conv. Total (cfs)	46079.4	Conv. (cfs)		46079.4	
Length Wtd. (ft)		Wetted Per. (ft)		61.22	
Min Ch El (ft)	570.78	Shear (lb/sq ft)		1.05	
Alpha	1.00	Stream Power (lb/ft s)		7.72	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Plan: Alt 1 Ex\_Cond Stevens Branch Stevens Branch RS: 1501 Profile: 20%

E.G. Elev (ft)	581.45	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.11	Wt. n-Val.		0.035	
W.S. Elev (ft)	580.34	Reach Len. (ft)			
Crit W.S. (ft)	577.36	Flow Area (sq ft)		475.20	
E.G. Slope (ft/ft)	0.003000	Area (sq ft)		475.20	
Q Total (cfs)	4024.00	Flow (cfs)		4024.00	
Top Width (ft)	62.21	Top Width (ft)		62.21	
Vel Total (ft/s)	8.47	Avg. Vel. (ft/s)		8.47	
Max Chl Dpth (ft)	9.56	Hydr. Depth (ft)		7.64	
Conv. Total (cfs)	73466.4	Conv. (cfs)		73466.4	
Length Wtd. (ft)		Wetted Per. (ft)		68.38	
Min Ch El (ft)	570.78	Shear (lb/sq ft)		1.30	
Alpha	1.00	Stream Power (lb/ft s)		11.02	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Plan: Alt 1 Ex\_Cond Stevens Branch Stevens Branch RS: 1501 Profile: 10%

E.G. Elev (ft)	586.20	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.52	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	584.69	Reach Len. (ft)			
Crit W.S. (ft)	580.55	Flow Area (sq ft)		781.30	26.87
E.G. Slope (ft/ft)	0.003002	Area (sq ft)		781.30	26.87
Q Total (cfs)	7740.00	Flow (cfs)		7728.56	11.44
Top Width (ft)	134.77	Top Width (ft)		80.76	54.01
Vel Total (ft/s)	9.58	Avg. Vel. (ft/s)		9.89	0.43
Max Chl Dpth (ft)	13.91	Hydr. Depth (ft)		9.67	0.50
Conv. Total (cfs)	141273.9	Conv. (cfs)		141065.0	208.9
Length Wtd. (ft)		Wetted Per. (ft)		89.09	54.03
Min Ch El (ft)	570.78	Shear (lb/sq ft)		1.64	0.09
Alpha	1.07	Stream Power (lb/ft s)		16.26	0.04
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			



Plan: Alt 1 Ex\_Cond Stevens Branch Stevens Branch RS: 1501 Profile: 2%

E.G. Elev (ft)	588.83	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.84	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	586.99	Reach Len. (ft)			
Crit W.S. (ft)	582.87	Flow Area (sq ft)		972.25	293.00
E.G. Slope (ft/ft)	0.003000	Area (sq ft)		972.25	293.00
Q Total (cfs)	11040.00	Flow (cfs)		10729.31	310.69
Top Width (ft)	234.94	Top Width (ft)		85.15	149.79
Vel Total (ft/s)	8.73	Avg. Vel. (ft/s)		11.04	1.06
Max Chl Dpth (ft)	16.21	Hydr. Depth (ft)		11.42	1.96
Conv. Total (cfs)	201552.3	Conv. (cfs)		195880.1	5672.1
Length Wtd. (ft)		Wetted Per. (ft)		94.05	149.89
Min Ch El (ft)	570.78	Shear (lb/sq ft)		1.94	0.37
Alpha	1.55	Stream Power (lb/ft s)		21.37	0.39
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Plan: Alt 1 Ex\_Cond Stevens Branch Stevens Branch RS: 1501 Profile: 1%

E.G. Elev (ft)	589.74	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.92	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	587.81	Reach Len. (ft)			
Crit W.S. (ft)	583.95	Flow Area (sq ft)		1043.00	421.69
E.G. Slope (ft/ft)	0.003000	Area (sq ft)		1043.00	421.69
Q Total (cfs)	12400.00	Flow (cfs)		11862.80	537.20
Top Width (ft)	251.04	Top Width (ft)		87.36	163.68
Vel Total (ft/s)	8.47	Avg. Vel. (ft/s)		11.37	1.27
Max Chl Dpth (ft)	17.03	Hydr. Depth (ft)		11.94	2.58
Conv. Total (cfs)	226400.3	Conv. (cfs)		216592.1	9808.2
Length Wtd. (ft)		Wetted Per. (ft)		96.41	163.80
Min Ch El (ft)	570.78	Shear (lb/sq ft)		2.03	0.48
Alpha	1.73	Stream Power (lb/ft s)		23.04	0.61
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Plan: Alt 1 Ex\_Cond Stevens Branch Stevens Branch RS: 1501 Profile: 0.2%

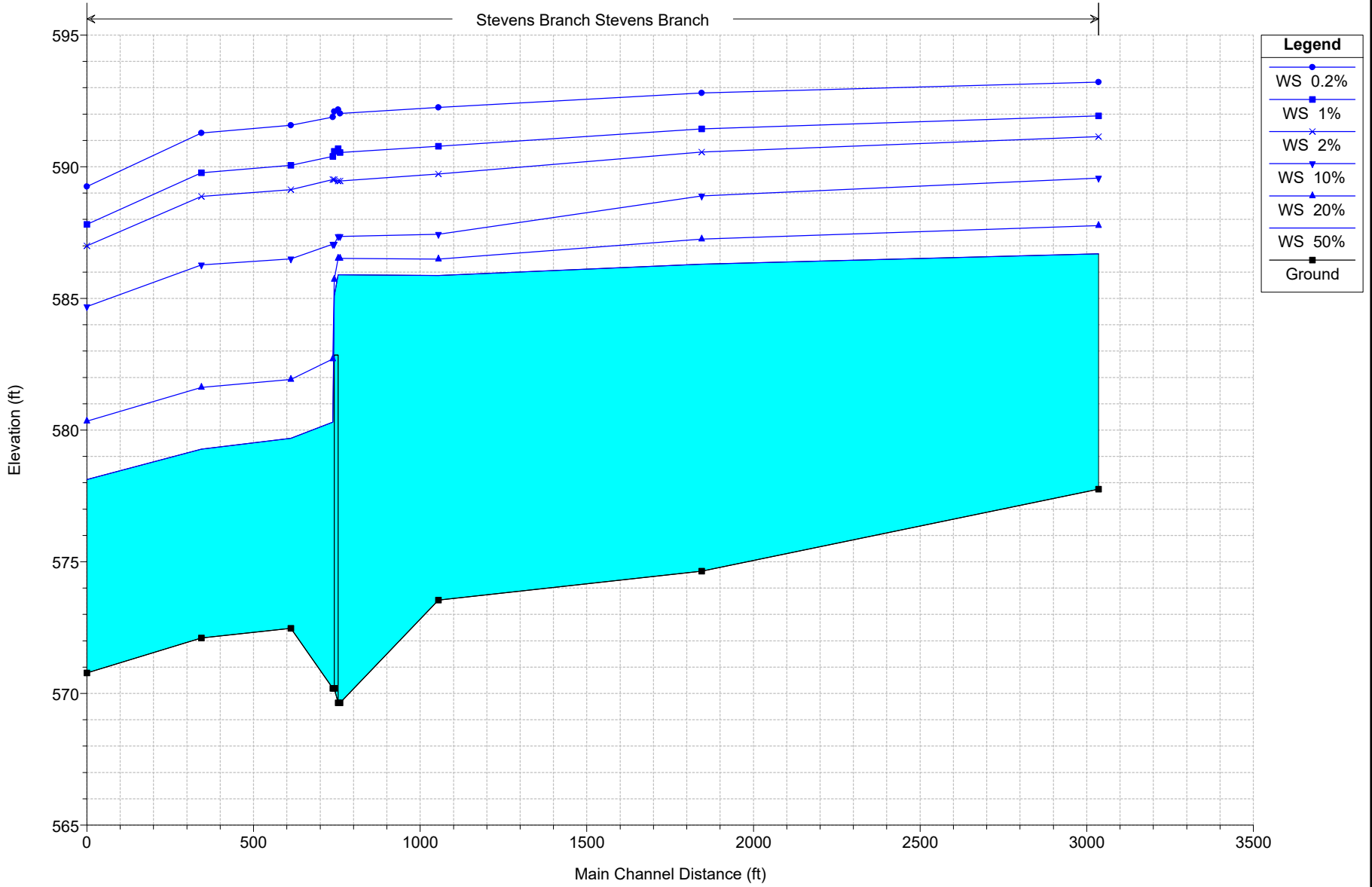
E.G. Elev (ft)	591.26	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.02	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	589.25	Reach Len. (ft)			
Crit W.S. (ft)	585.90	Flow Area (sq ft)	23.68	1174.44	679.83
E.G. Slope (ft/ft)	0.003006	Area (sq ft)	23.68	1174.44	679.83
Q Total (cfs)	14980.00	Flow (cfs)	13.70	13883.31	1082.99
Top Width (ft)	312.49	Top Width (ft)	30.04	93.50	188.95
Vel Total (ft/s)	7.98	Avg. Vel. (ft/s)	0.58	11.82	1.59
Max Chl Dpth (ft)	18.47	Hydr. Depth (ft)	0.79	12.56	3.60
Conv. Total (cfs)	273227.7	Conv. (cfs)	250.0	253224.5	19753.2
Length Wtd. (ft)		Wetted Per. (ft)	30.08	102.61	189.13
Min Ch El (ft)	570.78	Shear (lb/sq ft)	0.15	2.15	0.67
Alpha	2.04	Stream Power (lb/ft s)	0.09	25.39	1.07
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

# HEC-RAS Results for Alternative 1A

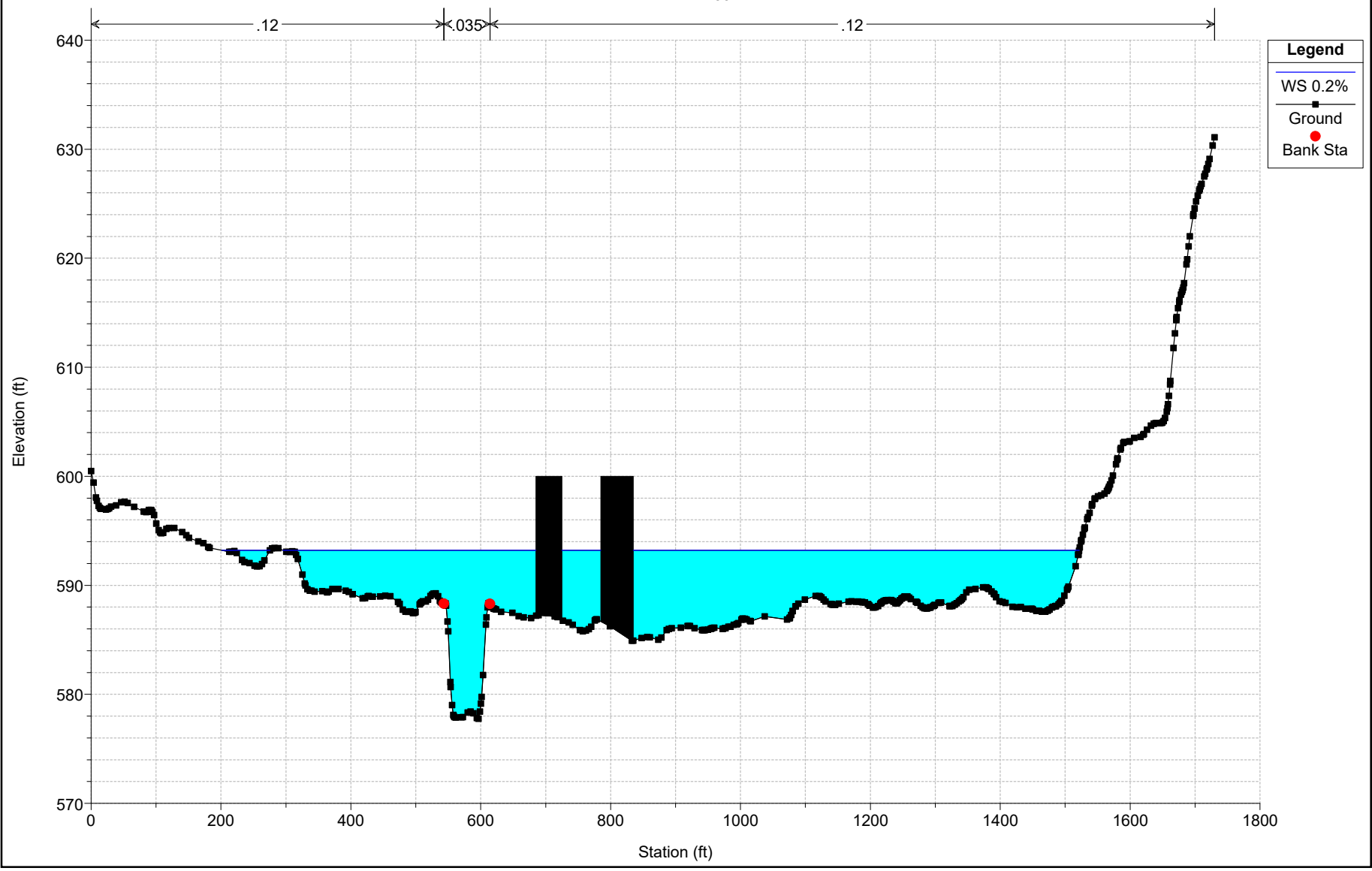
# Bridge 308

Geom: Alternative 1A - Existing Cond w/ Debris

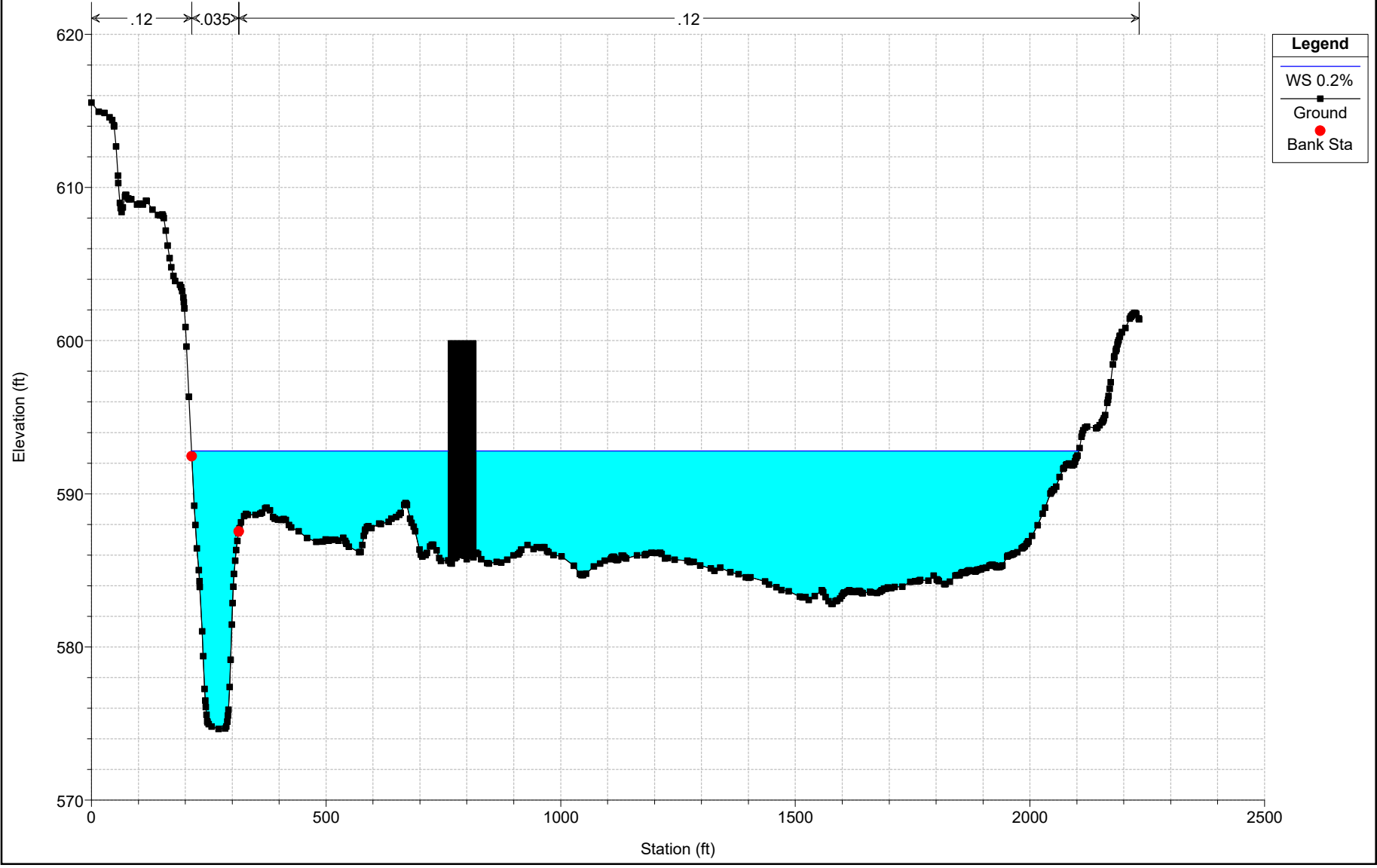
Stevens Branch Stevens Branch



Bridge 308  
Geom: Alternative 1A - Existing Cond w/ Debris  
RS = 11459

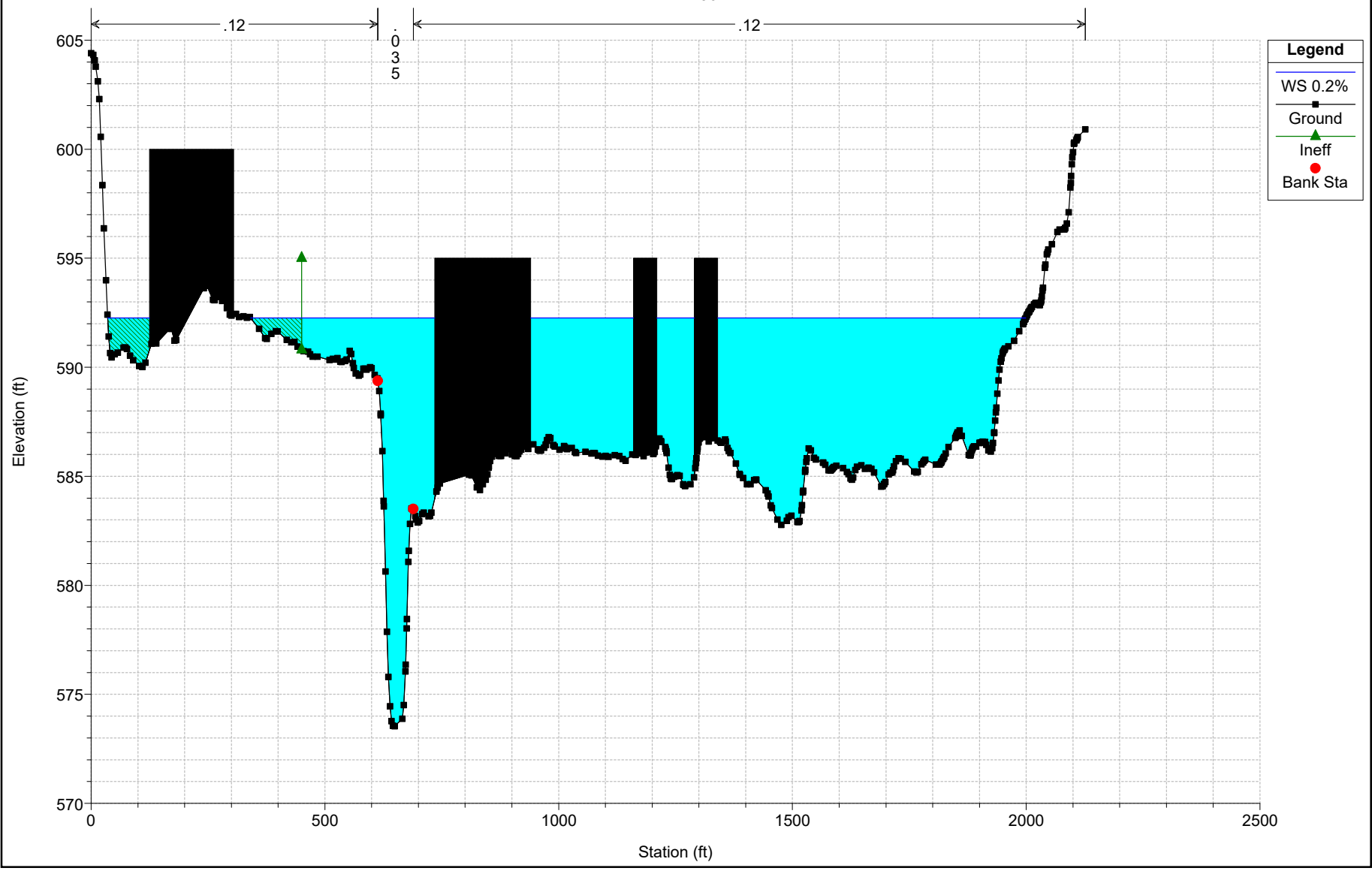


Bridge 308  
Geom: Alternative 1A - Existing Cond w/ Debris  
RS = 7552





Bridge 308  
Geom: Alternative 1A - Existing Cond w/ Debris  
RS = 4962

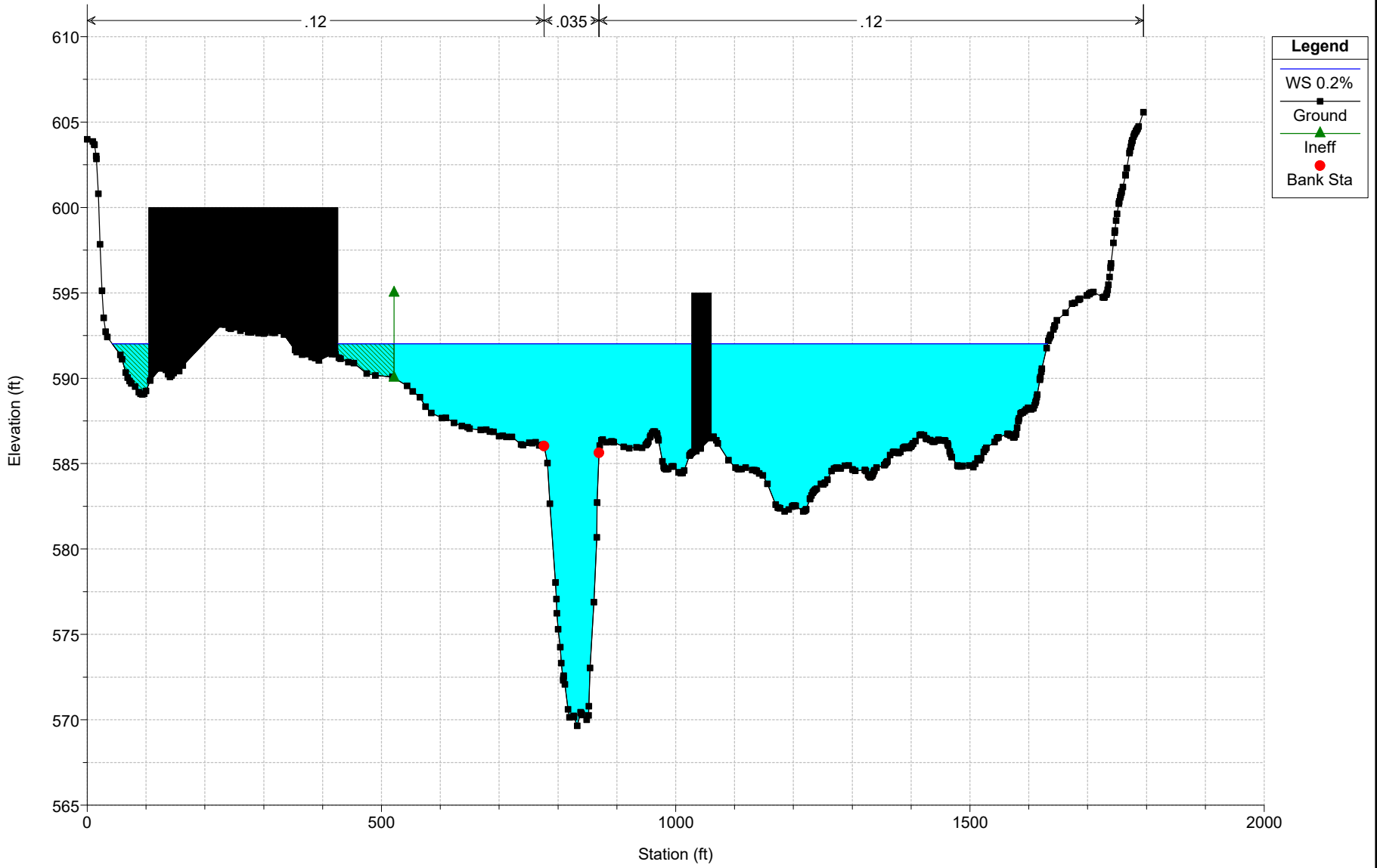


Legend	
WS 0.2%	(Cyan line)
Ground	(Black line with square markers)
Ineff	(Green line with triangle marker)
Bank Sta	(Red line with circle marker)

# Bridge 308

Geom: Alternative 1A - Existing Cond w/ Debris

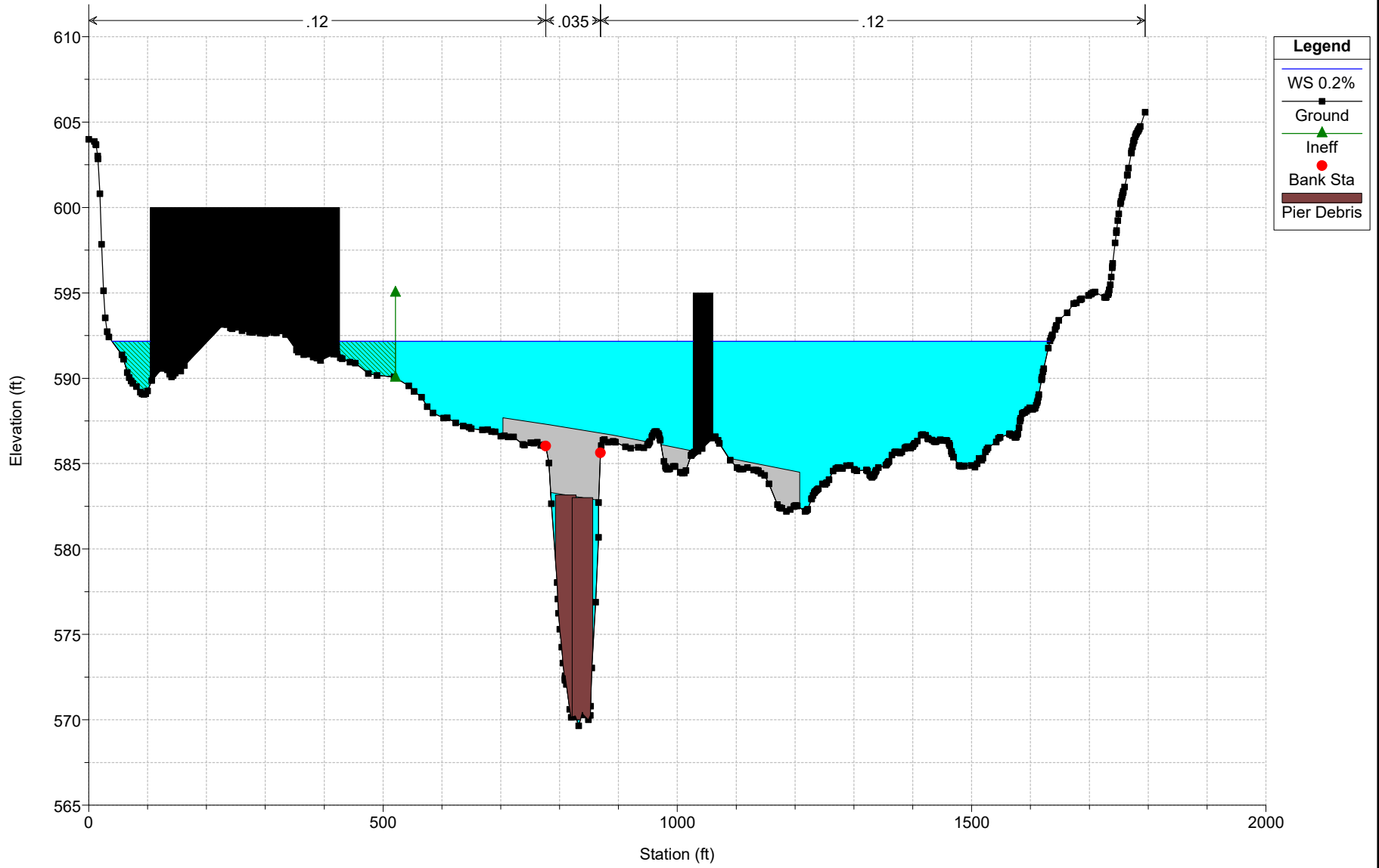
RS = 3994



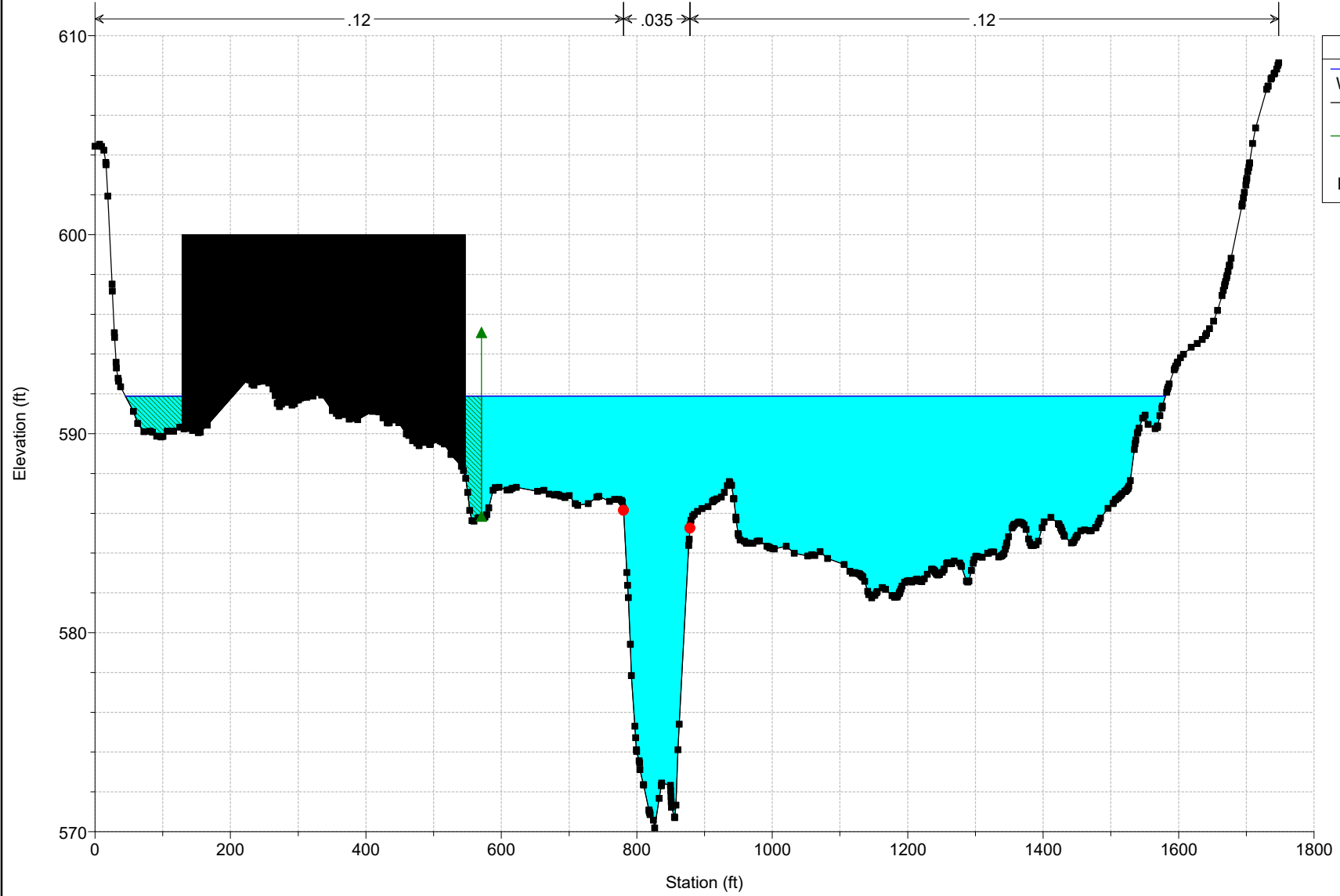
# Bridge 308

Geom: Alternative 1A - Existing Cond w/ Debris

RS = 3990 BR



Bridge 308  
Geom: Alternative 1A - Existing Cond w/ Debris  
RS = 3921

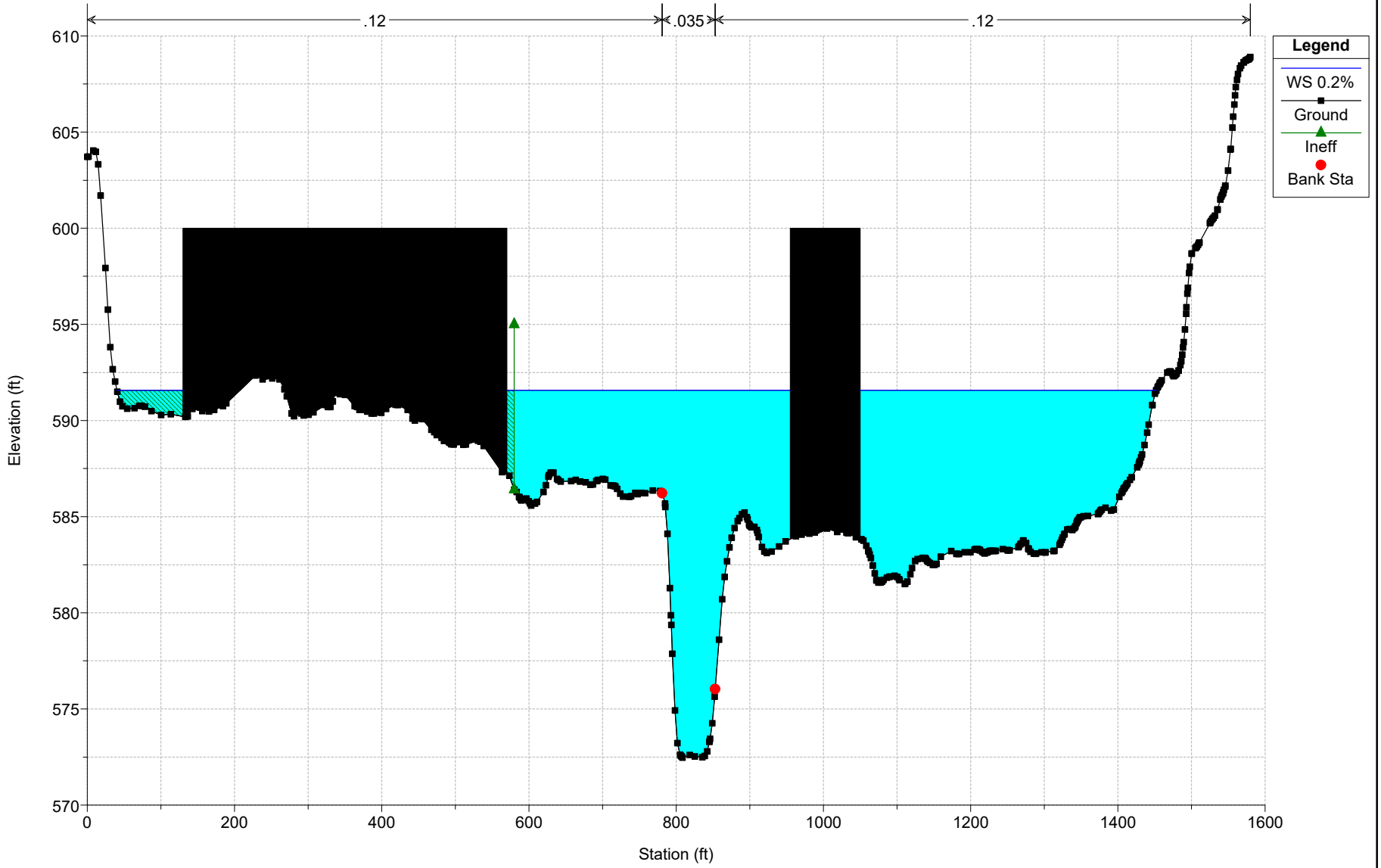


Legend	
WS 0.2%	Blue line
Ground	Black line with square markers
Ineff	Green line with triangle
Bank Sta	Red dot

# Bridge 308

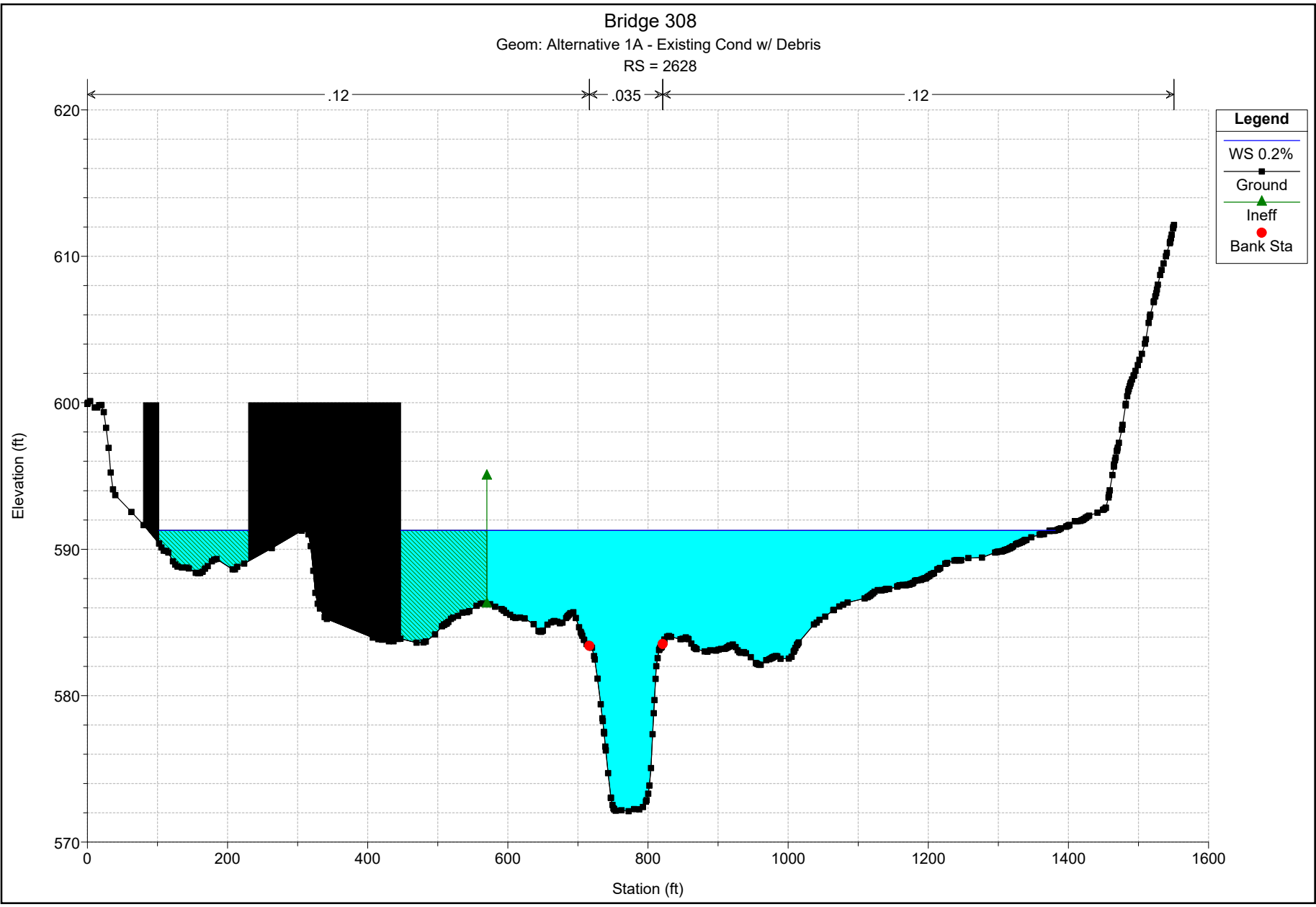
Geom: Alternative 1A - Existing Cond w/ Debris

RS = 3508





Bridge 308  
Geom: Alternative 1A - Existing Cond w/ Debris  
RS = 2628

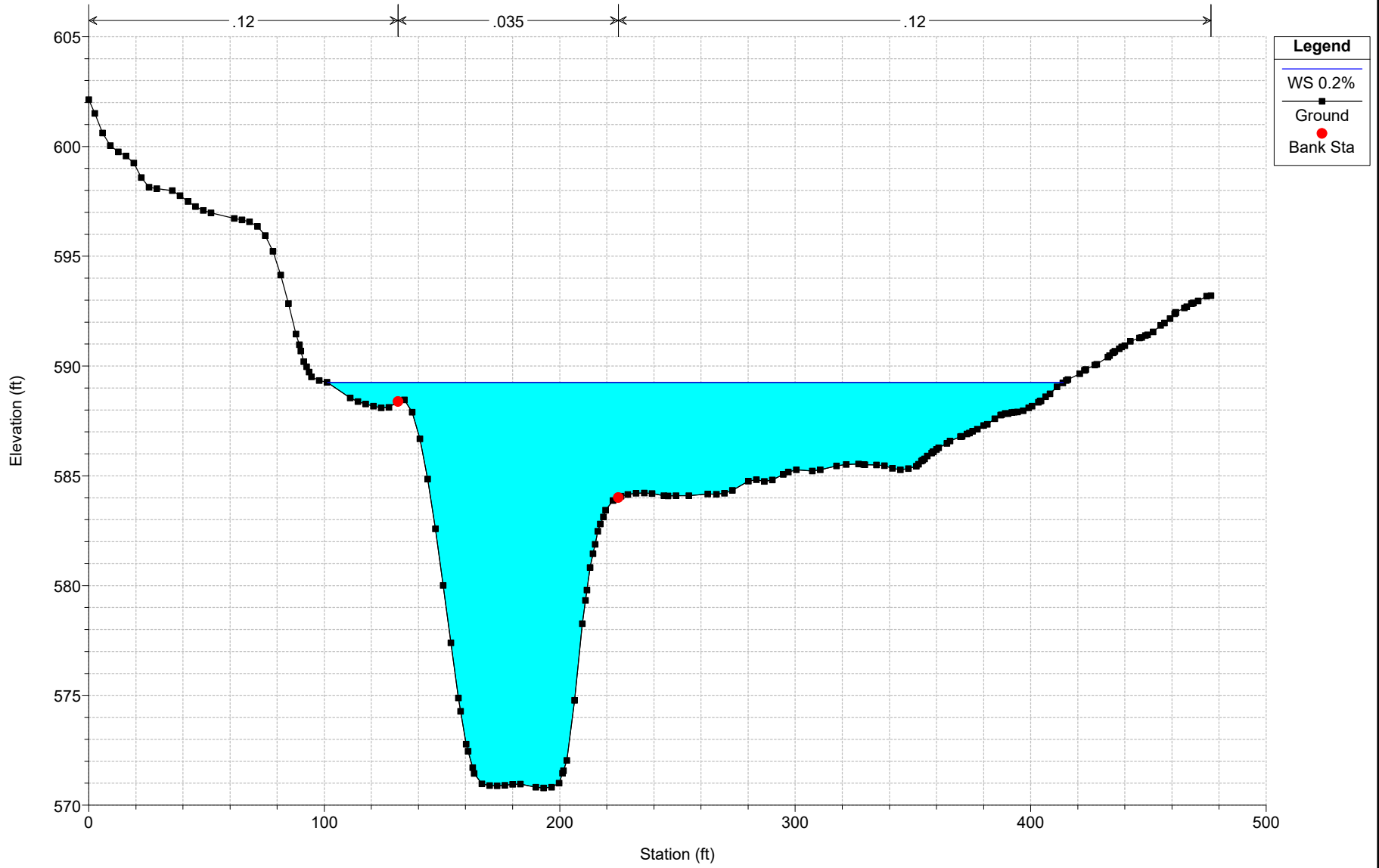


- Legend**
- WS 0.2%
  - Ground
  - Ineff
  - Bank Sta

# Bridge 308

Geom: Alternative 1A - Existing Cond w/ Debris

RS = 1501



Plan: Alt 1A Ex\_Cond, Debris Stevens Branch Stevens Branch RS: 3990 Profile: 50%

E.G. US. (ft)	585.98	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	585.90	E.G. Elev (ft)	585.98	585.60
Q Total (cfs)	2524.00	W.S. Elev (ft)	585.90	585.10
Q Bridge (cfs)	958.18	Crit W.S. (ft)	585.94	576.29
Q Weir (cfs)	1565.83	Max Chl Dpth (ft)	16.26	14.92
Weir Sta Lft (ft)	991.41	Vel Total (ft/s)	4.68	2.66
Weir Sta Rgt (ft)	1530.12	Flow Area (sq ft)	539.38	948.33
Weir Submerg	0.00	Froude # Chl	0.24	0.16
Weir Max Depth (ft)	3.78	Specif Force (cu ft)	1509.86	5346.39
Min El Weir Flow (ft)	586.81	Hydr Depth (ft)	1.36	3.44
Min El Prs (ft)	582.85	W.P. Total (ft)	568.48	477.49
Delta EG (ft)	5.39	Conv. Total (cfs)		
Delta WS (ft)	5.60	Top Width (ft)	397.09	275.71
BR Open Area (sq ft)	93.03	Frctn Loss (ft)		
BR Open Vel (ft/s)	10.30	C & E Loss (ft)		
BR Sluice Coef	0.46	Shear Total (lb/sq ft)		
BR Sel Method	Press/Weir	Power Total (lb/ft s)		

Plan: Alt 1A Ex\_Cond, Debris Stevens Branch Stevens Branch RS: 3990 Profile: 20%

E.G. US. (ft)	586.69	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	586.52	E.G. Elev (ft)	586.69	586.29
Q Total (cfs)	4024.00	W.S. Elev (ft)	586.52	585.72
Q Bridge (cfs)	1028.25	Crit W.S. (ft)	586.30	577.82
Q Weir (cfs)	2995.75	Max Chl Dpth (ft)	16.88	15.53
Weir Sta Lft (ft)	696.78	Vel Total (ft/s)	4.81	3.43
Weir Sta Rgt (ft)	1577.95	Flow Area (sq ft)	836.70	1173.32
Weir Submerg	0.01	Froude # Chl	0.22	0.23
Weir Max Depth (ft)	4.49	Specif Force (cu ft)	2154.09	6350.44
Min El Weir Flow (ft)	586.81	Hydr Depth (ft)	1.46	2.64
Min El Prs (ft)	582.85	W.P. Total (ft)	743.35	645.51
Delta EG (ft)	3.59	Conv. Total (cfs)		
Delta WS (ft)	3.82	Top Width (ft)	571.21	451.44
BR Open Area (sq ft)	93.03	Frctn Loss (ft)		
BR Open Vel (ft/s)	11.05	C & E Loss (ft)		
BR Sluice Coef	0.48	Shear Total (lb/sq ft)		
BR Sel Method	Press/Weir	Power Total (lb/ft s)		

Plan: Alt 1A Ex\_Cond, Debris Stevens Branch Stevens Branch RS: 3990 Profile: 10%

E.G. US. (ft)	587.82	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	587.35	E.G. Elev (ft)	587.82	587.47
Q Total (cfs)	7740.00	W.S. Elev (ft)	587.35	587.06
Q Bridge (cfs)	520.94	Crit W.S. (ft)	587.04	580.65
Q Weir (cfs)	7219.06	Max Chl Dpth (ft)	17.71	16.88
Weir Sta Lft (ft)	593.62	Vel Total (ft/s)	5.37	3.99
Weir Sta Rgt (ft)	1584.86	Flow Area (sq ft)	1441.41	1940.57
Weir Submerg	0.67	Froude # Chl	0.23	0.29
Weir Max Depth (ft)	5.62	Specif Force (cu ft)	3767.66	9236.00
Min El Weir Flow (ft)	586.81	Hydr Depth (ft)	1.68	2.63
Min El Prs (ft)	582.85	W.P. Total (ft)	1032.68	939.94
Delta EG (ft)	0.37	Conv. Total (cfs)		
Delta WS (ft)	0.29	Top Width (ft)	858.03	757.67
BR Open Area (sq ft)	93.03	Frctn Loss (ft)		
BR Open Vel (ft/s)	5.60	C & E Loss (ft)		

Plan: Alt 1A Ex\_Cond, Debris Stevens Branch Stevens Branch RS: 3990 Profile: 10% (Continued)

BR Sluice Coef		Shear Total (lb/sq ft)		
BR Sel Method	Press/Weir	Power Total (lb/ft s)		

Plan: Alt 1A Ex\_Cond, Debris Stevens Branch Stevens Branch RS: 3990 Profile: 2%

E.G. US. (ft)	589.89	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	589.46	E.G. Elev (ft)	589.89	589.85
Q Total (cfs)	11040.00	W.S. Elev (ft)	589.46	589.51
Q Bridge (cfs)	368.46	Crit W.S. (ft)	587.40	582.75
Q Weir (cfs)	10671.54	Max Chl Dpth (ft)	19.82	19.32
Weir Sta Lft (ft)	527.62	Vel Total (ft/s)	3.14	2.61
Weir Sta Rgt (ft)	1618.61	Flow Area (sq ft)	3513.11	4237.77
Weir Submerg	0.98	Froude # Chl	0.13	0.15
Weir Max Depth (ft)	7.69	Specif Force (cu ft)	8743.29	16455.68
Min El Weir Flow (ft)	586.81	Hydr Depth (ft)	3.39	4.39
Min El Prs (ft)	582.85	W.P. Total (ft)	1216.00	1169.09
Delta EG (ft)	0.04	Conv. Total (cfs)		
Delta WS (ft)	-0.05	Top Width (ft)	1056.68	989.21
BR Open Area (sq ft)	93.03	Frctn Loss (ft)		
BR Open Vel (ft/s)	3.96	C & E Loss (ft)		
BR Sluice Coef		Shear Total (lb/sq ft)		
BR Sel Method	Press/Weir	Power Total (lb/ft s)		

Plan: Alt 1A Ex\_Cond, Debris Stevens Branch Stevens Branch RS: 3990 Profile: 1%

E.G. US. (ft)	590.91	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	590.54	E.G. Elev (ft)	590.80	590.75
Q Total (cfs)	12400.00	W.S. Elev (ft)	590.68	590.59
Q Bridge (cfs)	176.04	Crit W.S. (ft)	587.53	582.93
Q Weir (cfs)		Max Chl Dpth (ft)	21.04	20.40
Weir Sta Lft (ft)		Vel Total (ft/s)	2.58	2.35
Weir Sta Rgt (ft)		Flow Area (sq ft)	4812.28	5283.03
Weir Submerg		Froude # Chl	0.11	0.13
Weir Max Depth (ft)		Specif Force (cu ft)	13758.74	21534.09
Min El Weir Flow (ft)	586.81	Hydr Depth (ft)	4.50	5.33
Min El Prs (ft)	582.85	W.P. Total (ft)	1250.61	1194.45
Delta EG (ft)	0.20	Conv. Total (cfs)	175919.0	251425.0
Delta WS (ft)	0.14	Top Width (ft)	1171.62	1080.78
BR Open Area (sq ft)	93.03	Frctn Loss (ft)	0.04	0.00
BR Open Vel (ft/s)	1.89	C & E Loss (ft)	0.01	0.03
BR Sluice Coef		Shear Total (lb/sq ft)	1.19	0.67
BR Sel Method	Energy only	Power Total (lb/ft s)	3.08	1.58

Plan: Alt 1A Ex\_Cond, Debris Stevens Branch Stevens Branch RS: 3990 Profile: 0.2%

E.G. US. (ft)	592.37	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	592.03	E.G. Elev (ft)	592.27	592.23
Q Total (cfs)	14980.00	W.S. Elev (ft)	592.17	592.10
Q Bridge (cfs)	132.59	Crit W.S. (ft)	587.86	587.87
Q Weir (cfs)		Max Chl Dpth (ft)	22.53	21.91
Weir Sta Lft (ft)		Vel Total (ft/s)	2.34	2.20
Weir Sta Rgt (ft)		Flow Area (sq ft)	6404.76	6799.74
Weir Submerg		Froude # Chl	0.09	0.11
Weir Max Depth (ft)		Specif Force (cu ft)	22173.99	30759.68
Min El Weir Flow (ft)	586.81	Hydr Depth (ft)	5.94	6.72
Min El Prs (ft)	582.85	W.P. Total (ft)	1263.65	1215.65

Plan: Alt 1A Ex\_Cond, Debris Stevens Branch Stevens Branch RS: 3990 Profile: 0.2% (Continued)

Delta EG (ft)	0.18	Conv. Total (cfs)	277763.8	358312.3
Delta WS (ft)	0.14	Top Width (ft)	1238.75	1122.32
BR Open Area (sq ft)	93.03	Frctn Loss (ft)	0.03	0.00
BR Open Vel (ft/s)	1.43	C & E Loss (ft)	0.01	0.03
BR Sluice Coef		Shear Total (lb/sq ft)	0.92	0.61
BR Sel Method	Energy only	Power Total (lb/ft s)	2.15	1.34



Plan: Alt 1A Ex\_Cond, Debris Stevens Branch Stevens Branch RS: 11459 Profile: 50%

E.G. Elev (ft)	587.16	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.47	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	586.70	Reach Len. (ft)	1191.60	1191.00	1181.80
Crit W.S. (ft)	582.65	Flow Area (sq ft)		442.19	165.12
E.G. Slope (ft/ft)	0.001372	Area (sq ft)		442.19	165.12
Q Total (cfs)	2524.00	Flow (cfs)		2458.42	65.58
Top Width (ft)	268.94	Top Width (ft)		59.53	209.41
Vel Total (ft/s)	4.16	Avg. Vel. (ft/s)		5.56	0.40
Max Chl Dpth (ft)	8.94	Hydr. Depth (ft)		7.43	0.79
Conv. Total (cfs)	68151.4	Conv. (cfs)		66380.6	1770.8
Length Wtd. (ft)	1190.05	Wetted Per. (ft)		66.51	211.30
Min Ch El (ft)	577.76	Shear (lb/sq ft)		0.57	0.07
Alpha	1.74	Stream Power (lb/ft s)		3.17	0.03
Frctn Loss (ft)	0.65	Cum Volume (acre-ft)		40.20	42.60
C & E Loss (ft)	0.11	Cum SA (acres)		5.00	32.46

Plan: Alt 1A Ex\_Cond, Debris Stevens Branch Stevens Branch RS: 11459 Profile: 20%

E.G. Elev (ft)	588.50	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.74	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	587.76	Reach Len. (ft)	1191.60	1191.00	1181.80
Crit W.S. (ft)	584.22	Flow Area (sq ft)	3.90	507.68	498.88
E.G. Slope (ft/ft)	0.002088	Area (sq ft)	3.90	507.68	498.88
Q Total (cfs)	4024.00	Flow (cfs)	0.71	3665.64	357.65
Top Width (ft)	475.96	Top Width (ft)	21.28	63.13	391.56
Vel Total (ft/s)	3.98	Avg. Vel. (ft/s)	0.18	7.22	0.72
Max Chl Dpth (ft)	10.00	Hydr. Depth (ft)	0.18	8.04	1.27
Conv. Total (cfs)	88065.9	Conv. (cfs)	15.6	80223.1	7827.2
Length Wtd. (ft)	1189.19	Wetted Per. (ft)	21.30	70.70	397.20
Min Ch El (ft)	577.76	Shear (lb/sq ft)	0.02	0.94	0.16
Alpha	3.00	Stream Power (lb/ft s)	0.00	6.76	0.12
Frctn Loss (ft)	0.93	Cum Volume (acre-ft)	0.07	46.45	76.61
C & E Loss (ft)	0.18	Cum SA (acres)	0.35	5.31	43.38

Plan: Alt 1A Ex\_Cond, Debris Stevens Branch Stevens Branch RS: 11459 Profile: 10%

E.G. Elev (ft)	590.57	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.00	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	589.57	Reach Len. (ft)	1191.60	1191.00	1181.80
Crit W.S. (ft)	588.47	Flow Area (sq ft)	141.84	631.52	1635.91
E.G. Slope (ft/ft)	0.002932	Area (sq ft)	141.84	631.52	1635.91
Q Total (cfs)	7740.00	Flow (cfs)	85.61	5823.06	1831.33
Top Width (ft)	1026.92	Top Width (ft)	190.18	70.80	765.93
Vel Total (ft/s)	3.21	Avg. Vel. (ft/s)	0.60	9.22	1.12
Max Chl Dpth (ft)	11.81	Hydr. Depth (ft)	0.75	8.92	2.14
Conv. Total (cfs)	142937.8	Conv. (cfs)	1581.0	107536.9	33819.9
Length Wtd. (ft)	1187.79	Wetted Per. (ft)	190.38	78.62	779.11
Min Ch El (ft)	577.76	Shear (lb/sq ft)	0.14	1.47	0.38
Alpha	6.23	Stream Power (lb/ft s)	0.08	13.56	0.43
Frctn Loss (ft)	1.26	Cum Volume (acre-ft)	4.71	59.08	166.03
C & E Loss (ft)	0.25	Cum SA (acres)	5.06	5.84	59.77

Plan: Alt 1A Ex\_Cond, Debris Stevens Branch Stevens Branch RS: 11459 Profile: 2%

E.G. Elev (ft)	591.90	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.76	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	591.14	Reach Len. (ft)	1191.60	1191.00	1181.80
Crit W.S. (ft)	589.98	Flow Area (sq ft)	479.10	743.03	2896.82
E.G. Slope (ft/ft)	0.002229	Area (sq ft)	479.10	743.03	2896.82
Q Total (cfs)	11040.00	Flow (cfs)	471.51	6657.44	3911.05
Top Width (ft)	1097.97	Top Width (ft)	219.00	70.80	808.17
Vel Total (ft/s)	2.68	Avg. Vel. (ft/s)	0.98	8.96	1.35
Max Chl Dpth (ft)	13.38	Hydr. Depth (ft)	2.19	10.49	3.58
Conv. Total (cfs)	233842.6	Conv. (cfs)	9987.2	141013.9	82841.6
Length Wtd. (ft)	1186.79	Wetted Per. (ft)	219.35	78.62	827.78
Min Ch El (ft)	577.76	Shear (lb/sq ft)	0.30	1.32	0.49
Alpha	6.83	Stream Power (lb/ft s)	0.30	11.78	0.66
Frctn Loss (ft)	1.02	Cum Volume (acre-ft)	16.92	70.92	281.60
C & E Loss (ft)	0.19	Cum SA (acres)	6.71	6.02	63.12

Plan: Alt 1A Ex\_Cond, Debris Stevens Branch Stevens Branch RS: 11459 Profile: 1%

E.G. Elev (ft)	592.56	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.63	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	591.93	Reach Len. (ft)	1191.60	1191.00	1181.80
Crit W.S. (ft)	590.36	Flow Area (sq ft)	654.88	798.73	3534.38
E.G. Slope (ft/ft)	0.001826	Area (sq ft)	654.88	798.73	3534.38
Q Total (cfs)	12400.00	Flow (cfs)	706.63	6797.13	4896.25
Top Width (ft)	1121.68	Top Width (ft)	238.41	70.80	812.48
Vel Total (ft/s)	2.49	Avg. Vel. (ft/s)	1.08	8.51	1.39
Max Chl Dpth (ft)	14.17	Hydr. Depth (ft)	2.75	11.28	4.35
Conv. Total (cfs)	290187.1	Conv. (cfs)	16536.6	159067.6	114582.9
Length Wtd. (ft)	1186.44	Wetted Per. (ft)	238.84	78.62	835.31
Min Ch El (ft)	577.76	Shear (lb/sq ft)	0.31	1.16	0.48
Alpha	6.56	Stream Power (lb/ft s)	0.34	9.86	0.67
Frctn Loss (ft)	0.85	Cum Volume (acre-ft)	24.07	76.38	338.94
C & E Loss (ft)	0.15	Cum SA (acres)	9.82	6.06	64.12

Plan: Alt 1A Ex\_Cond, Debris Stevens Branch Stevens Branch RS: 11459 Profile: 0.2%

E.G. Elev (ft)	593.72	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.51	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	593.21	Reach Len. (ft)	1191.60	1191.00	1181.80
Crit W.S. (ft)	590.85	Flow Area (sq ft)	999.93	889.67	4581.33
E.G. Slope (ft/ft)	0.001442	Area (sq ft)	999.93	889.67	4581.33
Q Total (cfs)	14980.00	Flow (cfs)	1104.64	7229.54	6645.82
Top Width (ft)	1210.52	Top Width (ft)	322.27	70.80	817.44
Vel Total (ft/s)	2.31	Avg. Vel. (ft/s)	1.10	8.13	1.45
Max Chl Dpth (ft)	15.45	Hydr. Depth (ft)	3.10	12.57	5.60
Conv. Total (cfs)	394489.9	Conv. (cfs)	29090.0	190385.9	175014.0
Length Wtd. (ft)	1186.03	Wetted Per. (ft)	322.91	78.62	845.58
Min Ch El (ft)	577.76	Shear (lb/sq ft)	0.28	1.02	0.49
Alpha	6.14	Stream Power (lb/ft s)	0.31	8.28	0.71
Frctn Loss (ft)	0.70	Cum Volume (acre-ft)	40.48	84.97	429.71
C & E Loss (ft)	0.12	Cum SA (acres)	13.00	6.12	66.14

Plan: Alt 1A Ex\_Cond, Debris Stevens Branch Stevens Branch RS: 7552 Profile: 50%

E.G. Elev (ft)	586.41	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.11	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	586.30	Reach Len. (ft)	852.90	789.50	477.70
Crit W.S. (ft)		Flow Area (sq ft)		713.95	1646.34
E.G. Slope (ft/ft)	0.000292	Area (sq ft)		713.95	1646.34
Q Total (cfs)	2524.00	Flow (cfs)		2066.25	457.75
Top Width (ft)	1239.01	Top Width (ft)		83.20	1155.81
Vel Total (ft/s)	1.07	Avg. Vel. (ft/s)		2.89	0.28
Max Chl Dpth (ft)	11.66	Hydr. Depth (ft)		8.58	1.42
Conv. Total (cfs)	147817.0	Conv. (cfs)		121008.9	26808.2
Length Wtd. (ft)	746.98	Wetted Per. (ft)		89.50	1156.90
Min Ch El (ft)	574.64	Shear (lb/sq ft)		0.15	0.03
Alpha	6.01	Stream Power (lb/ft s)		0.42	0.01
Frctn Loss (ft)	0.29	Cum Volume (acre-ft)		24.40	18.03
C & E Loss (ft)	0.01	Cum SA (acres)		3.04	13.94

Plan: Alt 1A Ex\_Cond, Debris Stevens Branch Stevens Branch RS: 7552 Profile: 20%

E.G. Elev (ft)	587.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.13	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	587.25	Reach Len. (ft)	852.90	789.50	477.70
Crit W.S. (ft)		Flow Area (sq ft)		796.44	2869.30
E.G. Slope (ft/ft)	0.000408	Area (sq ft)		796.44	2869.30
Q Total (cfs)	4024.00	Flow (cfs)		2799.76	1224.24
Top Width (ft)	1468.68	Top Width (ft)		89.27	1379.41
Vel Total (ft/s)	1.10	Avg. Vel. (ft/s)		3.52	0.43
Max Chl Dpth (ft)	12.61	Hydr. Depth (ft)		8.92	2.08
Conv. Total (cfs)	199302.4	Conv. (cfs)		138667.7	60634.8
Length Wtd. (ft)	720.51	Wetted Per. (ft)		95.90	1382.64
Min Ch El (ft)	574.64	Shear (lb/sq ft)		0.21	0.05
Alpha	7.18	Stream Power (lb/ft s)		0.74	0.02
Frctn Loss (ft)	0.44	Cum Volume (acre-ft)	0.02	28.62	30.92
C & E Loss (ft)	0.03	Cum SA (acres)	0.06	3.22	19.36

Plan: Alt 1A Ex\_Cond, Debris Stevens Branch Stevens Branch RS: 7552 Profile: 10%

E.G. Elev (ft)	589.06	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.16	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	588.89	Reach Len. (ft)	852.90	789.50	477.70
Crit W.S. (ft)		Flow Area (sq ft)		947.51	5308.32
E.G. Slope (ft/ft)	0.000541	Area (sq ft)		947.51	5308.32
Q Total (cfs)	7740.00	Flow (cfs)		4159.41	3580.59
Top Width (ft)	1721.51	Top Width (ft)		93.98	1627.54
Vel Total (ft/s)	1.24	Avg. Vel. (ft/s)		4.39	0.67
Max Chl Dpth (ft)	14.25	Hydr. Depth (ft)		10.08	3.26
Conv. Total (cfs)	332913.1	Conv. (cfs)		178904.5	154008.5
Length Wtd. (ft)	680.01	Wetted Per. (ft)		101.02	1634.32
Min Ch El (ft)	574.64	Shear (lb/sq ft)		0.32	0.11
Alpha	6.90	Stream Power (lb/ft s)		1.39	0.07
Frctn Loss (ft)	0.66	Cum Volume (acre-ft)	2.77	37.49	71.83
C & E Loss (ft)	0.07	Cum SA (acres)	2.46	3.59	27.30

Plan: Alt 1A Ex\_Cond, Debris Stevens Branch Stevens Branch RS: 7552 Profile: 2%

E.G. Elev (ft)	590.69	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.13	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	590.56	Reach Len. (ft)	852.90	789.50	477.70
Crit W.S. (ft)		Flow Area (sq ft)		1106.64	8083.33
E.G. Slope (ft/ft)	0.000453	Area (sq ft)		1106.64	8083.33
Q Total (cfs)	11040.00	Flow (cfs)		4825.76	6214.24
Top Width (ft)	1779.87	Top Width (ft)		96.80	1683.07
Vel Total (ft/s)	1.20	Avg. Vel. (ft/s)		4.36	0.77
Max Chl Dpth (ft)	15.92	Hydr. Depth (ft)		11.43	4.80
Conv. Total (cfs)	518967.9	Conv. (cfs)		226849.1	292118.8
Length Wtd. (ft)	633.36	Wetted Per. (ft)		104.30	1693.30
Min Ch El (ft)	574.64	Shear (lb/sq ft)		0.30	0.13
Alpha	5.99	Stream Power (lb/ft s)		1.31	0.10
Frctn Loss (ft)	0.46	Cum Volume (acre-ft)	10.37	45.63	132.65
C & E Loss (ft)	0.03	Cum SA (acres)	3.71	3.72	29.32

Plan: Alt 1A Ex\_Cond, Debris Stevens Branch Stevens Branch RS: 7552 Profile: 1%

E.G. Elev (ft)	591.55	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.11	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	591.44	Reach Len. (ft)	852.90	789.50	477.70
Crit W.S. (ft)		Flow Area (sq ft)		1192.27	9565.87
E.G. Slope (ft/ft)	0.000381	Area (sq ft)		1192.27	9565.87
Q Total (cfs)	12400.00	Flow (cfs)		4957.99	7442.01
Top Width (ft)	1792.53	Top Width (ft)		98.24	1694.28
Vel Total (ft/s)	1.15	Avg. Vel. (ft/s)		4.16	0.78
Max Chl Dpth (ft)	16.80	Hydr. Depth (ft)		12.14	5.65
Conv. Total (cfs)	635549.8	Conv. (cfs)		254116.9	381432.8
Length Wtd. (ft)	619.90	Wetted Per. (ft)		105.99	1706.31
Min Ch El (ft)	574.64	Shear (lb/sq ft)		0.27	0.13
Alpha	5.48	Stream Power (lb/ft s)		1.11	0.10
Frctn Loss (ft)	0.37	Cum Volume (acre-ft)	15.12	49.16	161.23
C & E Loss (ft)	0.03	Cum SA (acres)	6.56	3.75	30.11

Plan: Alt 1A Ex\_Cond, Debris Stevens Branch Stevens Branch RS: 7552 Profile: 0.2%

E.G. Elev (ft)	592.90	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	592.80	Reach Len. (ft)	852.90	789.50	477.70
Crit W.S. (ft)		Flow Area (sq ft)	0.10	1327.42	11901.53
E.G. Slope (ft/ft)	0.000321	Area (sq ft)	0.10	1327.42	11901.53
Q Total (cfs)	14980.00	Flow (cfs)	0.01	5377.25	9602.74
Top Width (ft)	1830.65	Top Width (ft)	0.58	99.90	1730.17
Vel Total (ft/s)	1.13	Avg. Vel. (ft/s)	0.06	4.05	0.81
Max Chl Dpth (ft)	18.16	Hydr. Depth (ft)	0.18	13.29	6.88
Conv. Total (cfs)	836488.8	Conv. (cfs)	0.4	300267.8	536220.6
Length Wtd. (ft)	607.32	Wetted Per. (ft)	0.68	107.93	1744.97
Min Ch El (ft)	574.64	Shear (lb/sq ft)	0.00	0.25	0.14
Alpha	4.92	Stream Power (lb/ft s)	0.00	1.00	0.11
Frctn Loss (ft)	0.30	Cum Volume (acre-ft)	26.80	54.66	206.12
C & E Loss (ft)	0.02	Cum SA (acres)	8.59	3.78	31.58

Plan: Alt 1A Ex\_Cond, Debris Stevens Branch Stevens Branch RS: 4962 Profile: 50%

E.G. Elev (ft)	586.10	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.22	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	585.87	Reach Len. (ft)	96.20	295.10	381.80
Crit W.S. (ft)	579.33	Flow Area (sq ft)		574.94	602.00
E.G. Slope (ft/ft)	0.000560	Area (sq ft)		574.94	602.00
Q Total (cfs)	2524.00	Flow (cfs)		2293.31	230.69
Top Width (ft)	625.76	Top Width (ft)		66.14	559.62
Vel Total (ft/s)	2.14	Avg. Vel. (ft/s)		3.99	0.38
Max Chl Dpth (ft)	12.33	Hydr. Depth (ft)		8.69	1.08
Conv. Total (cfs)	106700.3	Conv. (cfs)		96948.1	9752.2
Length Wtd. (ft)	301.24	Wetted Per. (ft)		72.63	563.04
Min Ch El (ft)	573.54	Shear (lb/sq ft)		0.28	0.04
Alpha	3.15	Stream Power (lb/ft s)		1.10	0.01
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)		12.72	5.70
C & E Loss (ft)	0.04	Cum SA (acres)		1.69	4.53

Plan: Alt 1A Ex\_Cond, Debris Stevens Branch Stevens Branch RS: 4962 Profile: 20%

E.G. Elev (ft)	586.92	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.42	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	586.49	Reach Len. (ft)	96.20	295.10	381.80
Crit W.S. (ft)	581.10	Flow Area (sq ft)		616.01	1042.35
E.G. Slope (ft/ft)	0.001039	Area (sq ft)		616.01	1042.35
Q Total (cfs)	4024.00	Flow (cfs)		3467.59	556.41
Top Width (ft)	911.46	Top Width (ft)		67.15	844.32
Vel Total (ft/s)	2.43	Avg. Vel. (ft/s)		5.63	0.53
Max Chl Dpth (ft)	12.95	Hydr. Depth (ft)		9.17	1.23
Conv. Total (cfs)	124858.6	Conv. (cfs)		107594.0	17264.7
Length Wtd. (ft)	304.33	Wetted Per. (ft)		73.82	849.79
Min Ch El (ft)	573.54	Shear (lb/sq ft)		0.54	0.08
Alpha	4.64	Stream Power (lb/ft s)		3.05	0.04
Frctn Loss (ft)	0.15	Cum Volume (acre-ft)	0.02	15.82	9.47
C & E Loss (ft)	0.08	Cum SA (acres)	0.06	1.80	7.17

Plan: Alt 1A Ex\_Cond, Debris Stevens Branch Stevens Branch RS: 4962 Profile: 10%

E.G. Elev (ft)	588.32	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.89	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	587.44	Reach Len. (ft)	96.20	295.10	381.80
Crit W.S. (ft)	585.89	Flow Area (sq ft)		680.36	1911.27
E.G. Slope (ft/ft)	0.002229	Area (sq ft)		680.36	1911.27
Q Total (cfs)	7740.00	Flow (cfs)		5884.90	1855.10
Top Width (ft)	1007.90	Top Width (ft)		68.99	938.91
Vel Total (ft/s)	2.99	Avg. Vel. (ft/s)		8.65	0.97
Max Chl Dpth (ft)	13.90	Hydr. Depth (ft)		9.86	2.04
Conv. Total (cfs)	163939.2	Conv. (cfs)		124646.7	39292.5
Length Wtd. (ft)	310.17	Wetted Per. (ft)		75.89	950.00
Min Ch El (ft)	573.54	Shear (lb/sq ft)		1.25	0.28
Alpha	6.40	Stream Power (lb/ft s)		10.79	0.27
Frctn Loss (ft)	0.37	Cum Volume (acre-ft)	2.77	22.74	32.24
C & E Loss (ft)	0.13	Cum SA (acres)	2.46	2.11	13.23



Plan: Alt 1A Ex\_Cond, Debris Stevens Branch Stevens Branch RS: 4962 Profile: 2%

E.G. Elev (ft)	590.20	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.48	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	589.72	Reach Len. (ft)	96.20	295.10	381.80
Crit W.S. (ft)	587.66	Flow Area (sq ft)	1.89	845.75	4067.50
E.G. Slope (ft/ft)	0.001351	Area (sq ft)	1.89	845.75	4067.50
Q Total (cfs)	11040.00	Flow (cfs)	0.20	6196.70	4843.10
Top Width (ft)	1043.34	Top Width (ft)	19.48	75.90	947.96
Vel Total (ft/s)	2.25	Avg. Vel. (ft/s)	0.11	7.33	1.19
Max Chl Dpth (ft)	16.18	Hydr. Depth (ft)	0.10	11.14	4.29
Conv. Total (cfs)	300403.6	Conv. (cfs)	5.5	168615.0	131783.0
Length Wtd. (ft)	321.25	Wetted Per. (ft)	19.49	83.11	973.05
Min Ch El (ft)	573.54	Shear (lb/sq ft)	0.01	0.86	0.35
Alpha	6.10	Stream Power (lb/ft s)	0.00	6.29	0.42
Frctn Loss (ft)	0.29	Cum Volume (acre-ft)	10.35	27.94	66.03
C & E Loss (ft)	0.01	Cum SA (acres)	3.52	2.16	14.90

Plan: Alt 1A Ex\_Cond, Debris Stevens Branch Stevens Branch RS: 4962 Profile: 1%

E.G. Elev (ft)	591.16	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.38	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	590.78	Reach Len. (ft)	96.20	295.10	381.80
Crit W.S. (ft)	588.00	Flow Area (sq ft)	86.53	925.82	5071.49
E.G. Slope (ft/ft)	0.001041	Area (sq ft)	112.66	925.82	5071.49
Q Total (cfs)	12400.00	Flow (cfs)	22.81	6324.92	6052.27
Top Width (ft)	1264.76	Top Width (ft)	230.81	75.90	958.05
Vel Total (ft/s)	2.04	Avg. Vel. (ft/s)	0.26	6.83	1.19
Max Chl Dpth (ft)	17.24	Hydr. Depth (ft)	0.54	12.20	5.29
Conv. Total (cfs)	384358.6	Conv. (cfs)	707.0	196051.3	187600.3
Length Wtd. (ft)	323.72	Wetted Per. (ft)	161.41	83.11	989.54
Min Ch El (ft)	573.54	Shear (lb/sq ft)	0.03	0.72	0.33
Alpha	5.90	Stream Power (lb/ft s)	0.01	4.94	0.40
Frctn Loss (ft)	0.24	Cum Volume (acre-ft)	14.01	29.97	80.97
C & E Loss (ft)	0.00	Cum SA (acres)	4.30	2.17	15.57

Plan: Alt 1A Ex\_Cond, Debris Stevens Branch Stevens Branch RS: 4962 Profile: 0.2%

E.G. Elev (ft)	592.58	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.32	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	592.26	Reach Len. (ft)	96.20	295.10	381.80
Crit W.S. (ft)	588.52	Flow Area (sq ft)	328.11	1038.06	6528.91
E.G. Slope (ft/ft)	0.000834	Area (sq ft)	569.54	1038.06	6528.91
Q Total (cfs)	14980.00	Flow (cfs)	186.73	6853.14	7940.13
Top Width (ft)	1442.38	Top Width (ft)	362.07	75.90	1004.42
Vel Total (ft/s)	1.90	Avg. Vel. (ft/s)	0.57	6.60	1.22
Max Chl Dpth (ft)	18.72	Hydr. Depth (ft)	2.01	13.68	6.50
Conv. Total (cfs)	518577.1	Conv. (cfs)	6464.2	237241.8	274871.1
Length Wtd. (ft)	324.48	Wetted Per. (ft)	163.49	83.11	1044.81
Min Ch El (ft)	573.54	Shear (lb/sq ft)	0.10	0.65	0.33
Alpha	5.76	Stream Power (lb/ft s)	0.06	4.30	0.40
Frctn Loss (ft)	0.21	Cum Volume (acre-ft)	21.22	33.23	105.06
C & E Loss (ft)	0.00	Cum SA (acres)	5.04	2.19	16.59

Plan: Alt 1A Ex\_Cond, Debris Stevens Branch Stevens Branch RS: 3994 Profile: 50%

E.G. Elev (ft)	585.98	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	585.90	Reach Len. (ft)	6.00	6.00	6.00
Crit W.S. (ft)	575.10	Flow Area (sq ft)		1027.29	638.77
E.G. Slope (ft/ft)	0.000140	Area (sq ft)		1027.29	638.77
Q Total (cfs)	2524.00	Flow (cfs)		2397.37	126.63
Top Width (ft)	520.22	Top Width (ft)		92.35	427.87
Vel Total (ft/s)	1.51	Avg. Vel. (ft/s)		2.33	0.20
Max Chl Dpth (ft)	16.26	Hydr. Depth (ft)		11.12	1.49
Conv. Total (cfs)	213404.1	Conv. (cfs)		202697.4	10706.7
Length Wtd. (ft)	6.00	Wetted Per. (ft)		102.53	428.69
Min Ch El (ft)	569.64	Shear (lb/sq ft)		0.09	0.01
Alpha	2.25	Stream Power (lb/ft s)		0.20	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)		7.29	0.26
C & E Loss (ft)		Cum SA (acres)		1.15	0.20

Plan: Alt 1A Ex\_Cond, Debris Stevens Branch Stevens Branch RS: 3994 Profile: 20%

E.G. Elev (ft)	586.69	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.17	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	586.52	Reach Len. (ft)	6.00	6.00	6.00
Crit W.S. (ft)	576.62	Flow Area (sq ft)	17.18	1085.05	969.41
E.G. Slope (ft/ft)	0.000283	Area (sq ft)	17.18	1085.05	969.41
Q Total (cfs)	4024.00	Flow (cfs)	1.69	3718.32	303.99
Top Width (ft)	760.18	Top Width (ft)	53.07	93.01	614.10
Vel Total (ft/s)	1.94	Avg. Vel. (ft/s)	0.10	3.43	0.31
Max Chl Dpth (ft)	16.88	Hydr. Depth (ft)	0.32	11.67	1.58
Conv. Total (cfs)	239250.2	Conv. (cfs)	100.3	221076.0	18073.9
Length Wtd. (ft)	6.00	Wetted Per. (ft)	53.08	103.20	615.75
Min Ch El (ft)	569.64	Shear (lb/sq ft)	0.01	0.19	0.03
Alpha	2.88	Stream Power (lb/ft s)	0.00	0.64	0.01
Frctn Loss (ft)		Cum Volume (acre-ft)	0.00	10.06	0.65
C & E Loss (ft)		Cum SA (acres)	0.01	1.26	0.77

Plan: Alt 1A Ex\_Cond, Debris Stevens Branch Stevens Branch RS: 3994 Profile: 10%

E.G. Elev (ft)	587.82	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.47	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	587.35	Reach Len. (ft)	6.00	6.00	6.00
Crit W.S. (ft)	579.48	Flow Area (sq ft)	104.45	1162.42	1524.12
E.G. Slope (ft/ft)	0.000755	Area (sq ft)	104.45	1162.42	1524.12
Q Total (cfs)	7740.00	Flow (cfs)	27.78	6813.43	898.80
Top Width (ft)	922.99	Top Width (ft)	151.14	93.01	678.84
Vel Total (ft/s)	2.77	Avg. Vel. (ft/s)	0.27	5.86	0.59
Max Chl Dpth (ft)	17.71	Hydr. Depth (ft)	0.69	12.50	2.25
Conv. Total (cfs)	281694.1	Conv. (cfs)	1010.9	247971.8	32711.3
Length Wtd. (ft)	6.00	Wetted Per. (ft)	151.17	103.20	682.26
Min Ch El (ft)	569.64	Shear (lb/sq ft)	0.03	0.53	0.11
Alpha	3.94	Stream Power (lb/ft s)	0.01	3.11	0.06
Frctn Loss (ft)		Cum Volume (acre-ft)	2.65	16.50	17.18
C & E Loss (ft)		Cum SA (acres)	2.29	1.56	6.14

Plan: Alt 1A Ex\_Cond, Debris Stevens Branch Stevens Branch RS: 3994 Profile: 2%

E.G. Elev (ft)	589.89	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.44	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	589.46	Reach Len. (ft)	6.00	6.00	6.00
Crit W.S. (ft)	581.57	Flow Area (sq ft)	520.98	1358.06	2994.58
E.G. Slope (ft/ft)	0.000664	Area (sq ft)	526.15	1358.06	2994.58
Q Total (cfs)	11040.00	Flow (cfs)	286.69	8279.44	2473.88
Top Width (ft)	1056.68	Top Width (ft)	249.96	93.01	713.70
Vel Total (ft/s)	2.27	Avg. Vel. (ft/s)	0.55	6.10	0.83
Max Chl Dpth (ft)	19.82	Hydr. Depth (ft)	2.27	14.60	4.20
Conv. Total (cfs)	428507.9	Conv. (cfs)	11127.5	321359.2	96021.3
Length Wtd. (ft)	6.00	Wetted Per. (ft)	229.97	103.20	721.47
Min Ch El (ft)	569.64	Shear (lb/sq ft)	0.09	0.55	0.17
Alpha	5.46	Stream Power (lb/ft s)	0.05	3.32	0.14
Frctn Loss (ft)		Cum Volume (acre-ft)	9.77	20.47	35.08
C & E Loss (ft)		Cum SA (acres)	3.23	1.59	7.61

Plan: Alt 1A Ex\_Cond, Debris Stevens Branch Stevens Branch RS: 3994 Profile: 1%

E.G. Elev (ft)	590.91	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.38	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	590.54	Reach Len. (ft)	6.00	6.00	6.00
Crit W.S. (ft)	582.35	Flow Area (sq ft)	789.05	1458.54	3768.59
E.G. Slope (ft/ft)	0.000563	Area (sq ft)	849.86	1458.54	3768.59
Q Total (cfs)	12400.00	Flow (cfs)	492.07	8592.09	3315.84
Top Width (ft)	1164.20	Top Width (ft)	351.75	93.01	719.44
Vel Total (ft/s)	2.06	Avg. Vel. (ft/s)	0.62	5.89	0.88
Max Chl Dpth (ft)	20.90	Hydr. Depth (ft)	3.09	15.68	5.24
Conv. Total (cfs)	522374.0	Conv. (cfs)	20729.4	361958.3	139686.3
Length Wtd. (ft)	6.00	Wetted Per. (ft)	255.33	103.20	729.47
Min Ch El (ft)	569.64	Shear (lb/sq ft)	0.11	0.50	0.18
Alpha	5.71	Stream Power (lb/ft s)	0.07	2.93	0.16
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	12.95	21.89	42.23
C & E Loss (ft)	0.10	Cum SA (acres)	3.65	1.60	8.22

Plan: Alt 1A Ex\_Cond, Debris Stevens Branch Stevens Branch RS: 3994 Profile: 0.2%

E.G. Elev (ft)	592.37	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.34	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	592.03	Reach Len. (ft)	6.00	6.00	6.00
Crit W.S. (ft)	584.19	Flow Area (sq ft)	1169.20	1597.06	4847.32
E.G. Slope (ft/ft)	0.000499	Area (sq ft)	1429.48	1597.06	4847.33
Q Total (cfs)	14980.00	Flow (cfs)	891.52	9402.20	4686.28
Top Width (ft)	1234.83	Top Width (ft)	412.46	93.01	729.36
Vel Total (ft/s)	1.97	Avg. Vel. (ft/s)	0.76	5.89	0.97
Max Chl Dpth (ft)	22.39	Hydr. Depth (ft)	4.58	17.17	6.65
Conv. Total (cfs)	670830.0	Conv. (cfs)	39923.6	421046.7	209859.8
Length Wtd. (ft)	6.00	Wetted Per. (ft)	255.33	103.20	742.48
Min Ch El (ft)	569.64	Shear (lb/sq ft)	0.14	0.48	0.20
Alpha	5.70	Stream Power (lb/ft s)	0.11	2.84	0.20
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	19.02	24.30	55.20
C & E Loss (ft)	0.10	Cum SA (acres)	4.18	1.62	8.99

Plan: Alt 1A Ex\_Cond, Debris Stevens Branch Stevens Branch RS: 3921 Profile: 50%

E.G. Elev (ft)	580.60	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.29	Wt. n-Val.		0.035	
W.S. Elev (ft)	580.30	Reach Len. (ft)	21.20	125.90	180.00
Crit W.S. (ft)	575.67	Flow Area (sq ft)		582.54	
E.G. Slope (ft/ft)	0.000827	Area (sq ft)		582.54	
Q Total (cfs)	2524.00	Flow (cfs)		2524.00	
Top Width (ft)	81.27	Top Width (ft)		81.27	
Vel Total (ft/s)	4.33	Avg. Vel. (ft/s)		4.33	
Max Chl Dpth (ft)	10.12	Hydr. Depth (ft)		7.17	
Conv. Total (cfs)	87756.6	Conv. (cfs)		87756.6	
Length Wtd. (ft)	126.02	Wetted Per. (ft)		87.15	
Min Ch El (ft)	570.19	Shear (lb/sq ft)		0.35	
Alpha	1.00	Stream Power (lb/ft s)		1.50	
Frctn Loss (ft)	0.16	Cum Volume (acre-ft)		7.05	0.08
C & E Loss (ft)	0.08	Cum SA (acres)		1.14	0.04

Plan: Alt 1A Ex\_Cond, Debris Stevens Branch Stevens Branch RS: 3921 Profile: 20%

E.G. Elev (ft)	583.10	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.41	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	582.70	Reach Len. (ft)	21.20	125.90	180.00
Crit W.S. (ft)	577.01	Flow Area (sq ft)		785.33	41.44
E.G. Slope (ft/ft)	0.000877	Area (sq ft)		785.33	41.44
Q Total (cfs)	4024.00	Flow (cfs)		4015.05	8.95
Top Width (ft)	183.16	Top Width (ft)		88.47	94.69
Vel Total (ft/s)	4.87	Avg. Vel. (ft/s)		5.11	0.22
Max Chl Dpth (ft)	12.51	Hydr. Depth (ft)		8.88	0.44
Conv. Total (cfs)	135845.6	Conv. (cfs)		135543.6	302.0
Length Wtd. (ft)	126.22	Wetted Per. (ft)		95.81	94.80
Min Ch El (ft)	570.19	Shear (lb/sq ft)		0.45	0.02
Alpha	1.10	Stream Power (lb/ft s)		2.30	0.01
Frctn Loss (ft)	0.16	Cum Volume (acre-ft)		9.80	0.34
C & E Loss (ft)	0.10	Cum SA (acres)		1.25	0.53

Plan: Alt 1A Ex\_Cond, Debris Stevens Branch Stevens Branch RS: 3921 Profile: 10%

E.G. Elev (ft)	587.46	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.40	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	587.06	Reach Len. (ft)	21.20	125.90	180.00
Crit W.S. (ft)	579.64	Flow Area (sq ft)	55.60	1197.93	1779.79
E.G. Slope (ft/ft)	0.000663	Area (sq ft)	79.98	1197.93	1779.79
Q Total (cfs)	7740.00	Flow (cfs)	10.95	6559.58	1169.46
Top Width (ft)	878.09	Top Width (ft)	151.28	97.77	629.04
Vel Total (ft/s)	2.55	Avg. Vel. (ft/s)	0.20	5.48	0.66
Max Chl Dpth (ft)	16.88	Hydr. Depth (ft)	0.42	12.25	2.83
Conv. Total (cfs)	300520.7	Conv. (cfs)	425.3	254688.8	45406.7
Length Wtd. (ft)	134.79	Wetted Per. (ft)	131.01	106.89	630.02
Min Ch El (ft)	570.19	Shear (lb/sq ft)	0.02	0.46	0.12
Alpha	3.91	Stream Power (lb/ft s)	0.00	2.54	0.08
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)	2.63	16.20	16.49
C & E Loss (ft)	0.07	Cum SA (acres)	2.24	1.52	5.80

Plan: Alt 1A Ex\_Cond, Debris Stevens Branch Stevens Branch RS: 3921 Profile: 2%

E.G. Elev (ft)	589.85	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.34	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	589.51	Reach Len. (ft)	21.20	125.90	180.00
Crit W.S. (ft)	581.54	Flow Area (sq ft)	558.45	1437.35	3373.49
E.G. Slope (ft/ft)	0.000524	Area (sq ft)	639.77	1437.35	3373.49
Q Total (cfs)	11040.00	Flow (cfs)	303.61	7896.79	2839.60
Top Width (ft)	989.21	Top Width (ft)	233.77	97.77	657.67
Vel Total (ft/s)	2.06	Avg. Vel. (ft/s)	0.54	5.49	0.84
Max Chl Dpth (ft)	19.32	Hydr. Depth (ft)	2.66	14.70	5.13
Conv. Total (cfs)	482407.9	Conv. (cfs)	13266.7	345060.9	124080.2
Length Wtd. (ft)	137.38	Wetted Per. (ft)	210.15	106.89	658.97
Min Ch El (ft)	570.19	Shear (lb/sq ft)	0.09	0.44	0.17
Alpha	5.15	Stream Power (lb/ft s)	0.05	2.42	0.14
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	9.50	20.07	33.61
C & E Loss (ft)	0.05	Cum SA (acres)	3.10	1.54	7.26

Plan: Alt 1A Ex\_Cond, Debris Stevens Branch Stevens Branch RS: 3921 Profile: 1%

E.G. Elev (ft)	590.72	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.32	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	590.40	Reach Len. (ft)	21.20	125.90	180.00
Crit W.S. (ft)	582.43	Flow Area (sq ft)	744.43	1523.94	3959.44
E.G. Slope (ft/ft)	0.000486	Area (sq ft)	866.26	1523.94	3959.44
Q Total (cfs)	12400.00	Flow (cfs)	472.05	8382.81	3545.14
Top Width (ft)	1069.46	Top Width (ft)	296.65	97.77	675.04
Vel Total (ft/s)	1.99	Avg. Vel. (ft/s)	0.63	5.50	0.90
Max Chl Dpth (ft)	20.21	Hydr. Depth (ft)	3.55	15.59	5.87
Conv. Total (cfs)	562692.6	Conv. (cfs)	21420.9	380398.7	160873.0
Length Wtd. (ft)	137.55	Wetted Per. (ft)	210.15	106.89	676.41
Min Ch El (ft)	570.19	Shear (lb/sq ft)	0.11	0.43	0.18
Alpha	5.22	Stream Power (lb/ft s)	0.07	2.38	0.16
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	12.52	21.43	40.36
C & E Loss (ft)	0.04	Cum SA (acres)	3.48	1.55	7.86

Plan: Alt 1A Ex\_Cond, Debris Stevens Branch Stevens Branch RS: 3921 Profile: 0.2%

E.G. Elev (ft)	592.19	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.31	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	591.88	Reach Len. (ft)	21.20	125.90	180.00
Crit W.S. (ft)	585.01	Flow Area (sq ft)	1056.59	1669.28	4990.37
E.G. Slope (ft/ft)	0.000446	Area (sq ft)	1322.20	1669.28	4990.37
Q Total (cfs)	14980.00	Flow (cfs)	810.99	9351.54	4817.47
Top Width (ft)	1117.25	Top Width (ft)	317.28	97.77	702.20
Vel Total (ft/s)	1.94	Avg. Vel. (ft/s)	0.77	5.60	0.97
Max Chl Dpth (ft)	21.70	Hydr. Depth (ft)	5.03	17.07	7.11
Conv. Total (cfs)	709252.4	Conv. (cfs)	38397.7	442763.8	228090.9
Length Wtd. (ft)	137.47	Wetted Per. (ft)	210.15	106.89	703.71
Min Ch El (ft)	570.19	Shear (lb/sq ft)	0.14	0.43	0.20
Alpha	5.29	Stream Power (lb/ft s)	0.11	2.44	0.19
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	18.32	23.77	52.79
C & E Loss (ft)	0.04	Cum SA (acres)	3.99	1.57	8.62



Plan: Alt 1A Ex\_Cond, Debris Stevens Branch Stevens Branch RS: 3508 Profile: 50%

E.G. Elev (ft)	580.36	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.67	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	579.68	Reach Len. (ft)	245.30	268.30	311.80
Crit W.S. (ft)	577.03	Flow Area (sq ft)		380.68	13.46
E.G. Slope (ft/ft)	0.002190	Area (sq ft)		380.68	13.46
Q Total (cfs)	2524.00	Flow (cfs)		2513.13	10.87
Top Width (ft)	67.33	Top Width (ft)		60.01	7.32
Vel Total (ft/s)	6.40	Avg. Vel. (ft/s)		6.60	0.81
Max Chl Dpth (ft)	7.21	Hydr. Depth (ft)		6.34	1.84
Conv. Total (cfs)	53928.9	Conv. (cfs)		53696.6	232.3
Length Wtd. (ft)	268.39	Wetted Per. (ft)		62.86	8.18
Min Ch El (ft)	572.47	Shear (lb/sq ft)		0.83	0.23
Alpha	1.06	Stream Power (lb/ft s)		5.47	0.18
Frctn Loss (ft)	0.53	Cum Volume (acre-ft)		5.65	0.05
C & E Loss (ft)	0.05	Cum SA (acres)		0.94	0.03

Plan: Alt 1A Ex\_Cond, Debris Stevens Branch Stevens Branch RS: 3508 Profile: 20%

E.G. Elev (ft)	582.84	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.91	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	581.92	Reach Len. (ft)	245.30	268.30	311.80
Crit W.S. (ft)	578.50	Flow Area (sq ft)		517.50	44.24
E.G. Slope (ft/ft)	0.002114	Area (sq ft)		517.50	44.24
Q Total (cfs)	4024.00	Flow (cfs)		3985.13	38.87
Top Width (ft)	120.78	Top Width (ft)		62.28	58.50
Vel Total (ft/s)	7.16	Avg. Vel. (ft/s)		7.70	0.88
Max Chl Dpth (ft)	9.45	Hydr. Depth (ft)		8.31	0.76
Conv. Total (cfs)	87511.2	Conv. (cfs)		86666.0	845.3
Length Wtd. (ft)	268.51	Wetted Per. (ft)		66.05	59.87
Min Ch El (ft)	572.47	Shear (lb/sq ft)		1.03	0.10
Alpha	1.14	Stream Power (lb/ft s)		7.96	0.09
Frctn Loss (ft)	0.50	Cum Volume (acre-ft)		7.91	0.16
C & E Loss (ft)	0.09	Cum SA (acres)		1.03	0.21

Plan: Alt 1A Ex\_Cond, Debris Stevens Branch Stevens Branch RS: 3508 Profile: 10%

E.G. Elev (ft)	587.26	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.75	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	586.51	Reach Len. (ft)	245.30	268.30	311.80
Crit W.S. (ft)	581.44	Flow Area (sq ft)	41.18	819.43	1440.17
E.G. Slope (ft/ft)	0.001410	Area (sq ft)	41.23	819.43	1440.17
Q Total (cfs)	7740.00	Flow (cfs)	10.99	6312.59	1416.42
Top Width (ft)	637.97	Top Width (ft)	104.95	72.20	460.83
Vel Total (ft/s)	3.36	Avg. Vel. (ft/s)	0.27	7.70	0.98
Max Chl Dpth (ft)	14.04	Hydr. Depth (ft)	0.40	11.35	3.13
Conv. Total (cfs)	206095.5	Conv. (cfs)	292.6	168087.3	37715.6
Length Wtd. (ft)	273.68	Wetted Per. (ft)	104.04	77.15	468.25
Min Ch El (ft)	572.47	Shear (lb/sq ft)	0.03	0.94	0.27
Alpha	4.29	Stream Power (lb/ft s)	0.01	7.20	0.27
Frctn Loss (ft)	0.34	Cum Volume (acre-ft)	2.60	13.29	9.84
C & E Loss (ft)	0.04	Cum SA (acres)	2.18	1.28	3.55

Plan: Alt 1A Ex\_Cond, Debris Stevens Branch Stevens Branch RS: 3508 Profile: 2%

E.G. Elev (ft)	589.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.58	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	589.13	Reach Len. (ft)	245.30	268.30	311.80
Crit W.S. (ft)	584.94	Flow Area (sq ft)	534.78	1008.89	2697.26
E.G. Slope (ft/ft)	0.000979	Area (sq ft)	557.13	1008.89	2697.26
Q Total (cfs)	11040.00	Flow (cfs)	397.88	7440.40	3201.73
Top Width (ft)	773.49	Top Width (ft)	210.90	72.20	490.39
Vel Total (ft/s)	2.60	Avg. Vel. (ft/s)	0.74	7.37	1.19
Max Chl Dpth (ft)	16.66	Hydr. Depth (ft)	2.66	13.97	5.50
Conv. Total (cfs)	352750.3	Conv. (cfs)	12713.0	237735.7	102301.6
Length Wtd. (ft)	276.50	Wetted Per. (ft)	201.05	77.15	503.20
Min Ch El (ft)	572.47	Shear (lb/sq ft)	0.16	0.80	0.33
Alpha	5.47	Stream Power (lb/ft s)	0.12	5.90	0.39
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)	9.21	16.54	21.06
C & E Loss (ft)	0.00	Cum SA (acres)	2.99	1.29	4.89

Plan: Alt 1A Ex\_Cond, Debris Stevens Branch Stevens Branch RS: 3508 Profile: 1%

E.G. Elev (ft)	590.59	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.54	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	590.05	Reach Len. (ft)	245.30	268.30	311.80
Crit W.S. (ft)	585.96	Flow Area (sq ft)	720.01	1075.46	3151.52
E.G. Slope (ft/ft)	0.000885	Area (sq ft)	751.58	1075.46	3151.52
Q Total (cfs)	12400.00	Flow (cfs)	620.90	7867.67	3911.44
Top Width (ft)	778.03	Top Width (ft)	210.90	72.20	494.93
Vel Total (ft/s)	2.51	Avg. Vel. (ft/s)	0.86	7.32	1.24
Max Chl Dpth (ft)	17.58	Hydr. Depth (ft)	3.58	14.90	6.37
Conv. Total (cfs)	416792.0	Conv. (cfs)	20869.7	264450.2	131472.2
Length Wtd. (ft)	277.11	Wetted Per. (ft)	201.05	77.15	509.67
Min Ch El (ft)	572.47	Shear (lb/sq ft)	0.20	0.77	0.34
Alpha	5.49	Stream Power (lb/ft s)	0.17	5.63	0.42
Frctn Loss (ft)	0.24	Cum Volume (acre-ft)	12.13	17.68	25.67
C & E Loss (ft)	0.00	Cum SA (acres)	3.36	1.30	5.44

Plan: Alt 1A Ex\_Cond, Debris Stevens Branch Stevens Branch RS: 3508 Profile: 0.2%

E.G. Elev (ft)	592.08	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.50	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	591.58	Reach Len. (ft)	245.30	268.30	311.80
Crit W.S. (ft)	586.70	Flow Area (sq ft)	1025.89	1185.39	3911.23
E.G. Slope (ft/ft)	0.000787	Area (sq ft)	1165.83	1185.39	3911.23
Q Total (cfs)	14980.00	Flow (cfs)	1055.99	8722.98	5201.03
Top Width (ft)	876.85	Top Width (ft)	300.54	72.20	504.11
Vel Total (ft/s)	2.45	Avg. Vel. (ft/s)	1.03	7.36	1.33
Max Chl Dpth (ft)	19.11	Hydr. Depth (ft)	5.11	16.42	7.76
Conv. Total (cfs)	534113.5	Conv. (cfs)	37651.5	311018.6	185443.4
Length Wtd. (ft)	278.14	Wetted Per. (ft)	201.05	77.15	522.04
Min Ch El (ft)	572.47	Shear (lb/sq ft)	0.25	0.75	0.37
Alpha	5.38	Stream Power (lb/ft s)	0.26	5.55	0.49
Frctn Loss (ft)	0.21	Cum Volume (acre-ft)	17.71	19.65	34.39
C & E Loss (ft)	0.01	Cum SA (acres)	3.84	1.33	6.13

Plan: Alt 1A Ex\_Cond, Debris Stevens Branch Stevens Branch RS: 2628 Profile: 50%

E.G. Elev (ft)	579.78	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.50	Wt. n-Val.		0.035	
W.S. Elev (ft)	579.28	Reach Len. (ft)	382.10	343.40	269.80
Crit W.S. (ft)	576.32	Flow Area (sq ft)		445.41	
E.G. Slope (ft/ft)	0.001784	Area (sq ft)		445.41	
Q Total (cfs)	2524.00	Flow (cfs)		2524.00	
Top Width (ft)	75.70	Top Width (ft)		75.70	
Vel Total (ft/s)	5.67	Avg. Vel. (ft/s)		5.67	
Max Chl Dpth (ft)	7.17	Hydr. Depth (ft)		5.88	
Conv. Total (cfs)	59761.7	Conv. (cfs)		59761.7	
Length Wtd. (ft)	343.40	Wetted Per. (ft)		79.28	
Min Ch El (ft)	572.11	Shear (lb/sq ft)		0.63	
Alpha	1.00	Stream Power (lb/ft s)		3.55	
Frctn Loss (ft)	0.78	Cum Volume (acre-ft)		3.11	
C & E Loss (ft)	0.03	Cum SA (acres)		0.52	

Plan: Alt 1A Ex\_Cond, Debris Stevens Branch Stevens Branch RS: 2628 Profile: 20%

E.G. Elev (ft)	582.25	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.63	Wt. n-Val.		0.035	
W.S. Elev (ft)	581.62	Reach Len. (ft)	382.10	343.40	269.80
Crit W.S. (ft)	577.68	Flow Area (sq ft)		633.47	
E.G. Slope (ft/ft)	0.001653	Area (sq ft)		633.47	
Q Total (cfs)	4024.00	Flow (cfs)		4024.00	
Top Width (ft)	84.88	Top Width (ft)		84.88	
Vel Total (ft/s)	6.35	Avg. Vel. (ft/s)		6.35	
Max Chl Dpth (ft)	9.51	Hydr. Depth (ft)		7.46	
Conv. Total (cfs)	98959.9	Conv. (cfs)		98959.9	
Length Wtd. (ft)	343.40	Wetted Per. (ft)		89.75	
Min Ch El (ft)	572.11	Shear (lb/sq ft)		0.73	
Alpha	1.00	Stream Power (lb/ft s)		4.63	
Frctn Loss (ft)	0.75	Cum Volume (acre-ft)		4.37	
C & E Loss (ft)	0.05	Cum SA (acres)		0.58	

Plan: Alt 1A Ex\_Cond, Debris Stevens Branch Stevens Branch RS: 2628 Profile: 10%

E.G. Elev (ft)	586.88	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.61	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	586.27	Reach Len. (ft)	382.10	343.40	269.80
Crit W.S. (ft)	580.37	Flow Area (sq ft)	164.12	1094.69	689.44
E.G. Slope (ft/ft)	0.001098	Area (sq ft)	344.46	1094.69	689.44
Q Total (cfs)	7740.00	Flow (cfs)	72.53	7125.51	541.96
Top Width (ft)	625.57	Top Width (ft)	261.19	104.60	259.78
Vel Total (ft/s)	3.97	Avg. Vel. (ft/s)	0.44	6.51	0.79
Max Chl Dpth (ft)	14.16	Hydr. Depth (ft)	1.12	10.47	2.65
Conv. Total (cfs)	233581.5	Conv. (cfs)	2189.0	215037.0	16355.5
Length Wtd. (ft)	340.95	Wetted Per. (ft)	146.80	109.99	259.99
Min Ch El (ft)	572.11	Shear (lb/sq ft)	0.08	0.68	0.18
Alpha	2.47	Stream Power (lb/ft s)	0.03	4.44	0.14
Frctn Loss (ft)	0.58	Cum Volume (acre-ft)	1.51	7.39	2.22
C & E Loss (ft)	0.09	Cum SA (acres)	1.15	0.73	0.97

Plan: Alt 1A Ex\_Cond, Debris Stevens Branch Stevens Branch RS: 2628 Profile: 2%

E.G. Elev (ft)	589.45	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.58	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	588.88	Reach Len. (ft)	382.10	343.40	269.80
Crit W.S. (ft)	582.32	Flow Area (sq ft)	546.05	1367.20	1573.04
E.G. Slope (ft/ft)	0.000861	Area (sq ft)	1060.90	1367.20	1573.04
Q Total (cfs)	11040.00	Flow (cfs)	476.33	9139.98	1423.69
Top Width (ft)	837.72	Top Width (ft)	333.22	104.60	399.91
Vel Total (ft/s)	3.17	Avg. Vel. (ft/s)	0.87	6.69	0.91
Max Chl Dpth (ft)	16.77	Hydr. Depth (ft)	3.72	13.07	3.93
Conv. Total (cfs)	376218.8	Conv. (cfs)	16232.2	311470.4	48516.1
Length Wtd. (ft)	338.45	Wetted Per. (ft)	146.80	109.99	400.17
Min Ch El (ft)	572.11	Shear (lb/sq ft)	0.20	0.67	0.21
Alpha	3.70	Stream Power (lb/ft s)	0.17	4.47	0.19
Frctn Loss (ft)	0.49	Cum Volume (acre-ft)	4.65	9.22	5.78
C & E Loss (ft)	0.13	Cum SA (acres)	1.46	0.75	1.70

Plan: Alt 1A Ex\_Cond, Debris Stevens Branch Stevens Branch RS: 2628 Profile: 1%

E.G. Elev (ft)	590.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.58	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	589.77	Reach Len. (ft)	382.10	343.40	269.80
Crit W.S. (ft)	583.84	Flow Area (sq ft)	676.72	1460.43	1960.05
E.G. Slope (ft/ft)	0.000818	Area (sq ft)	1390.03	1460.43	1960.05
Q Total (cfs)	12400.00	Flow (cfs)	664.01	9946.55	1789.45
Top Width (ft)	962.17	Top Width (ft)	384.06	104.60	473.51
Vel Total (ft/s)	3.03	Avg. Vel. (ft/s)	0.98	6.81	0.91
Max Chl Dpth (ft)	17.66	Hydr. Depth (ft)	4.62	13.96	4.14
Conv. Total (cfs)	433425.3	Conv. (cfs)	23209.5	347668.1	62547.6
Length Wtd. (ft)	337.53	Wetted Per. (ft)	146.80	109.99	473.78
Min Ch El (ft)	572.11	Shear (lb/sq ft)	0.24	0.68	0.21
Alpha	4.08	Stream Power (lb/ft s)	0.23	4.62	0.19
Frctn Loss (ft)	0.48	Cum Volume (acre-ft)	6.10	9.87	7.38
C & E Loss (ft)	0.13	Cum SA (acres)	1.68	0.76	1.97

Plan: Alt 1A Ex\_Cond, Debris Stevens Branch Stevens Branch RS: 2628 Profile: 0.2%

E.G. Elev (ft)	591.86	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.57	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	591.28	Reach Len. (ft)	382.10	343.40	269.80
Crit W.S. (ft)	585.05	Flow Area (sq ft)	898.75	1618.85	2739.83
E.G. Slope (ft/ft)	0.000748	Area (sq ft)	1989.00	1618.85	2739.83
Q Total (cfs)	14980.00	Flow (cfs)	1018.57	11288.78	2672.66
Top Width (ft)	1062.34	Top Width (ft)	397.60	104.60	560.14
Vel Total (ft/s)	2.85	Avg. Vel. (ft/s)	1.13	6.97	0.98
Max Chl Dpth (ft)	19.17	Hydr. Depth (ft)	6.13	15.48	4.89
Conv. Total (cfs)	547737.8	Conv. (cfs)	37243.4	412769.8	97724.6
Length Wtd. (ft)	335.51	Wetted Per. (ft)	146.80	109.99	560.43
Min Ch El (ft)	572.11	Shear (lb/sq ft)	0.29	0.69	0.23
Alpha	4.55	Stream Power (lb/ft s)	0.32	4.79	0.22
Frctn Loss (ft)	0.45	Cum Volume (acre-ft)	8.83	11.01	10.59
C & E Loss (ft)	0.14	Cum SA (acres)	1.88	0.78	2.32

Plan: Alt 1A Ex\_Cond, Debris Stevens Branch Stevens Branch RS: 1501 Profile: 50%

E.G. Elev (ft)	578.96	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.84	Wt. n-Val.		0.035	
W.S. Elev (ft)	578.12	Reach Len. (ft)			
Crit W.S. (ft)	575.76	Flow Area (sq ft)		343.65	
E.G. Slope (ft/ft)	0.003000	Area (sq ft)		343.65	
Q Total (cfs)	2524.00	Flow (cfs)		2524.00	
Top Width (ft)	56.60	Top Width (ft)		56.60	
Vel Total (ft/s)	7.34	Avg. Vel. (ft/s)		7.34	
Max Chl Dpth (ft)	7.34	Hydr. Depth (ft)		6.07	
Conv. Total (cfs)	46079.4	Conv. (cfs)		46079.4	
Length Wtd. (ft)		Wetted Per. (ft)		61.22	
Min Ch El (ft)	570.78	Shear (lb/sq ft)		1.05	
Alpha	1.00	Stream Power (lb/ft s)		7.72	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Plan: Alt 1A Ex\_Cond, Debris Stevens Branch Stevens Branch RS: 1501 Profile: 20%

E.G. Elev (ft)	581.45	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.11	Wt. n-Val.		0.035	
W.S. Elev (ft)	580.34	Reach Len. (ft)			
Crit W.S. (ft)	577.36	Flow Area (sq ft)		475.20	
E.G. Slope (ft/ft)	0.003000	Area (sq ft)		475.20	
Q Total (cfs)	4024.00	Flow (cfs)		4024.00	
Top Width (ft)	62.21	Top Width (ft)		62.21	
Vel Total (ft/s)	8.47	Avg. Vel. (ft/s)		8.47	
Max Chl Dpth (ft)	9.56	Hydr. Depth (ft)		7.64	
Conv. Total (cfs)	73466.4	Conv. (cfs)		73466.4	
Length Wtd. (ft)		Wetted Per. (ft)		68.38	
Min Ch El (ft)	570.78	Shear (lb/sq ft)		1.30	
Alpha	1.00	Stream Power (lb/ft s)		11.02	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Plan: Alt 1A Ex\_Cond, Debris Stevens Branch Stevens Branch RS: 1501 Profile: 10%

E.G. Elev (ft)	586.20	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.52	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	584.69	Reach Len. (ft)			
Crit W.S. (ft)	580.55	Flow Area (sq ft)		781.30	26.87
E.G. Slope (ft/ft)	0.003002	Area (sq ft)		781.30	26.87
Q Total (cfs)	7740.00	Flow (cfs)		7728.56	11.44
Top Width (ft)	134.77	Top Width (ft)		80.76	54.01
Vel Total (ft/s)	9.58	Avg. Vel. (ft/s)		9.89	0.43
Max Chl Dpth (ft)	13.91	Hydr. Depth (ft)		9.67	0.50
Conv. Total (cfs)	141273.9	Conv. (cfs)		141065.0	208.9
Length Wtd. (ft)		Wetted Per. (ft)		89.09	54.03
Min Ch El (ft)	570.78	Shear (lb/sq ft)		1.64	0.09
Alpha	1.07	Stream Power (lb/ft s)		16.26	0.04
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			



Plan: Alt 1A Ex\_Cond, Debris Stevens Branch Stevens Branch RS: 1501 Profile: 2%

E.G. Elev (ft)	588.83	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.84	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	586.99	Reach Len. (ft)			
Crit W.S. (ft)	582.87	Flow Area (sq ft)		972.25	293.00
E.G. Slope (ft/ft)	0.003000	Area (sq ft)		972.25	293.00
Q Total (cfs)	11040.00	Flow (cfs)		10729.31	310.69
Top Width (ft)	234.94	Top Width (ft)		85.15	149.79
Vel Total (ft/s)	8.73	Avg. Vel. (ft/s)		11.04	1.06
Max Chl Dpth (ft)	16.21	Hydr. Depth (ft)		11.42	1.96
Conv. Total (cfs)	201552.3	Conv. (cfs)		195880.1	5672.1
Length Wtd. (ft)		Wetted Per. (ft)		94.05	149.89
Min Ch El (ft)	570.78	Shear (lb/sq ft)		1.94	0.37
Alpha	1.55	Stream Power (lb/ft s)		21.37	0.39
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Plan: Alt 1A Ex\_Cond, Debris Stevens Branch Stevens Branch RS: 1501 Profile: 1%

E.G. Elev (ft)	589.74	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.92	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	587.81	Reach Len. (ft)			
Crit W.S. (ft)	583.95	Flow Area (sq ft)		1043.00	421.69
E.G. Slope (ft/ft)	0.003000	Area (sq ft)		1043.00	421.69
Q Total (cfs)	12400.00	Flow (cfs)		11862.80	537.20
Top Width (ft)	251.04	Top Width (ft)		87.36	163.68
Vel Total (ft/s)	8.47	Avg. Vel. (ft/s)		11.37	1.27
Max Chl Dpth (ft)	17.03	Hydr. Depth (ft)		11.94	2.58
Conv. Total (cfs)	226400.3	Conv. (cfs)		216592.1	9808.2
Length Wtd. (ft)		Wetted Per. (ft)		96.41	163.80
Min Ch El (ft)	570.78	Shear (lb/sq ft)		2.03	0.48
Alpha	1.73	Stream Power (lb/ft s)		23.04	0.61
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Plan: Alt 1A Ex\_Cond, Debris Stevens Branch Stevens Branch RS: 1501 Profile: 0.2%

E.G. Elev (ft)	591.26	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.02	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	589.25	Reach Len. (ft)			
Crit W.S. (ft)	585.90	Flow Area (sq ft)	23.68	1174.44	679.83
E.G. Slope (ft/ft)	0.003006	Area (sq ft)	23.68	1174.44	679.83
Q Total (cfs)	14980.00	Flow (cfs)	13.70	13883.31	1082.99
Top Width (ft)	312.49	Top Width (ft)	30.04	93.50	188.95
Vel Total (ft/s)	7.98	Avg. Vel. (ft/s)	0.58	11.82	1.59
Max Chl Dpth (ft)	18.47	Hydr. Depth (ft)	0.79	12.56	3.60
Conv. Total (cfs)	273227.7	Conv. (cfs)	250.0	253224.5	19753.2
Length Wtd. (ft)		Wetted Per. (ft)	30.08	102.61	189.13
Min Ch El (ft)	570.78	Shear (lb/sq ft)	0.15	2.15	0.67
Alpha	2.04	Stream Power (lb/ft s)	0.09	25.39	1.07
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

**APPENDIX H:**

**HEC-RAS Results for Alternatives 2 – 6**

**River Profile**

**River Cross Sections**

**Bridge Summary Table (Alternatives 2, 2A, 3, 3A, and 4)**

**River Cross Section Data Summary**

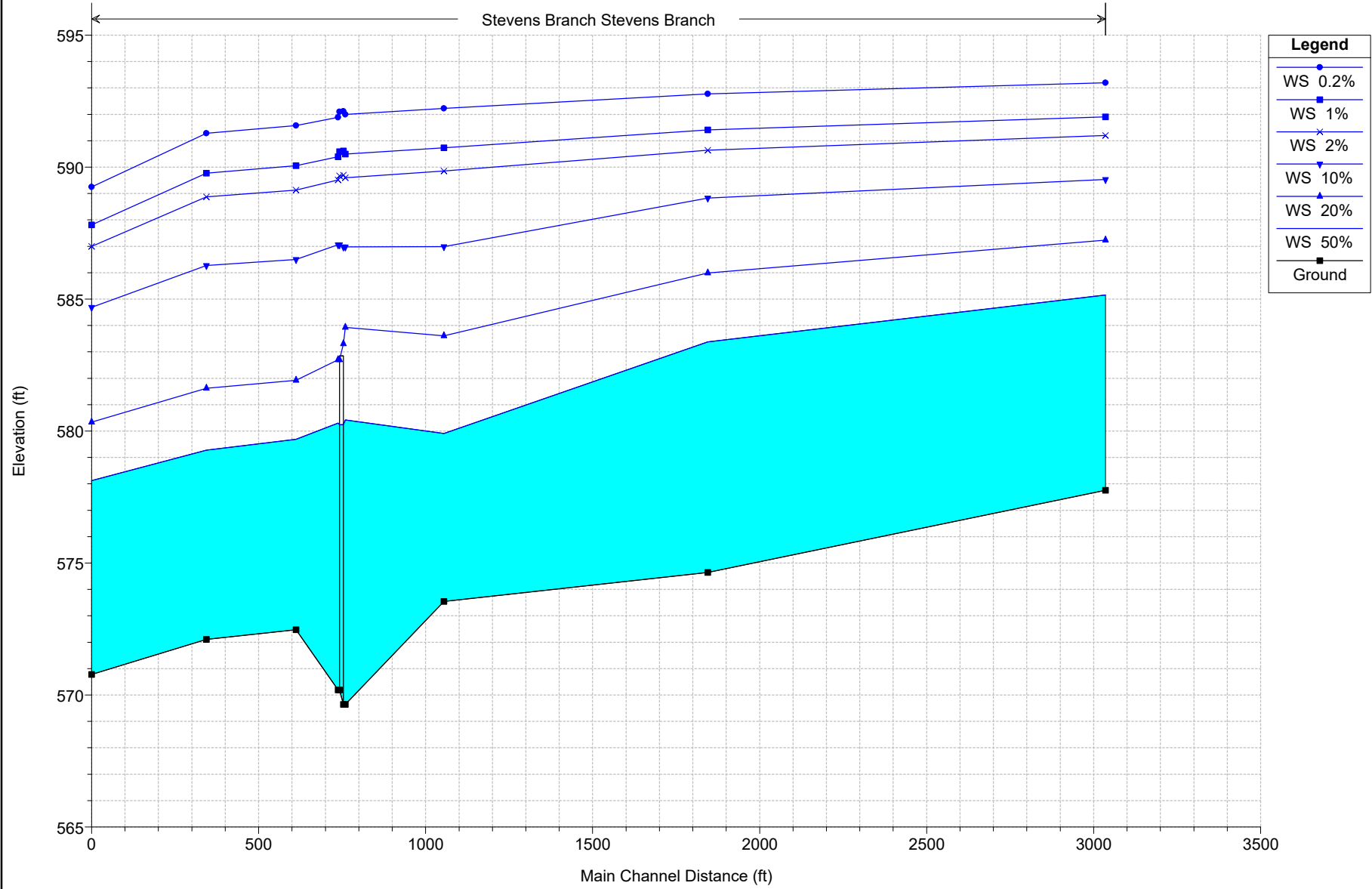


## HEC-RAS Results for Alternative 2A

# Bridge 308

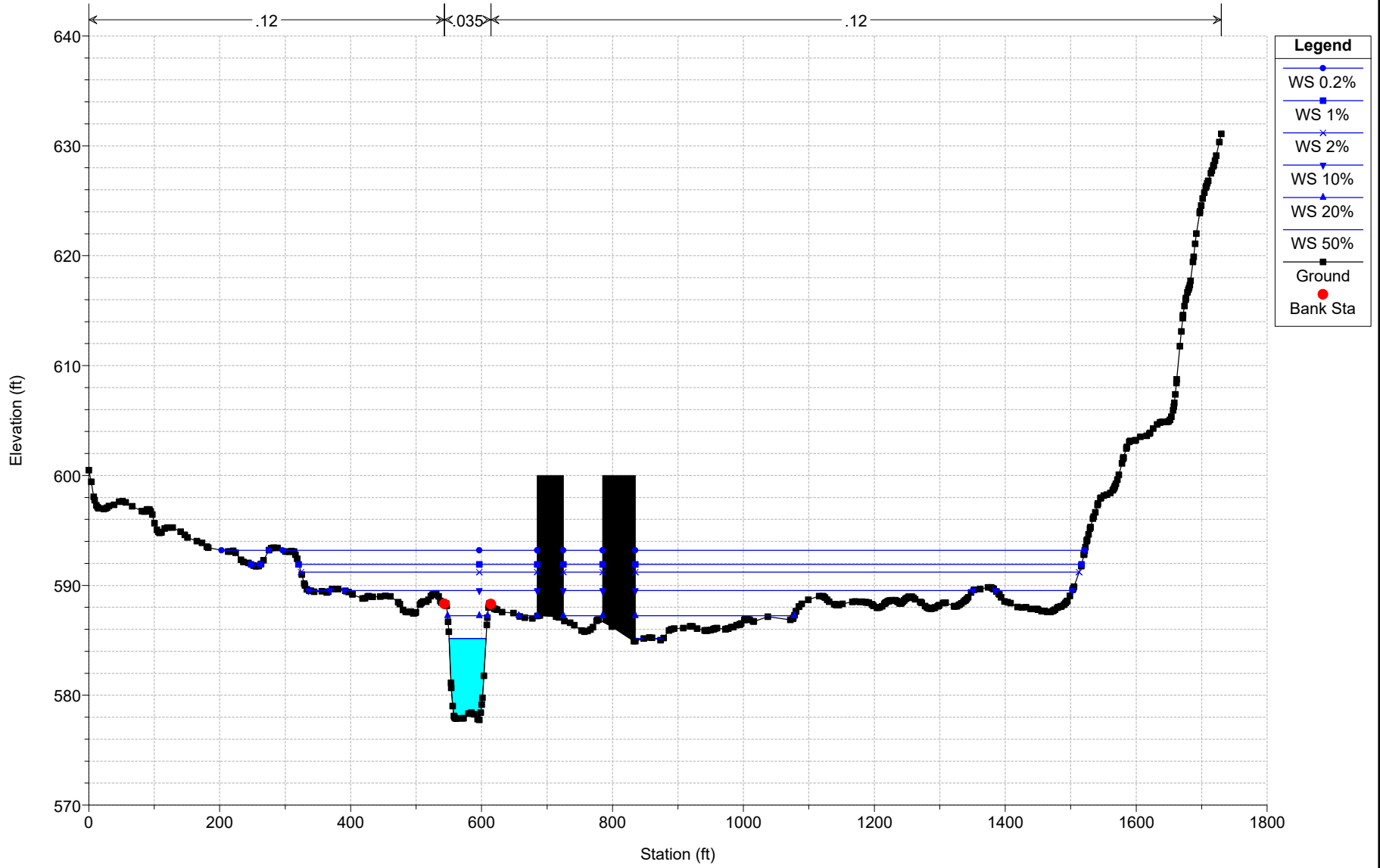
Geom: Alternative 2A - Replace Piers

Stevens Branch Stevens Branch

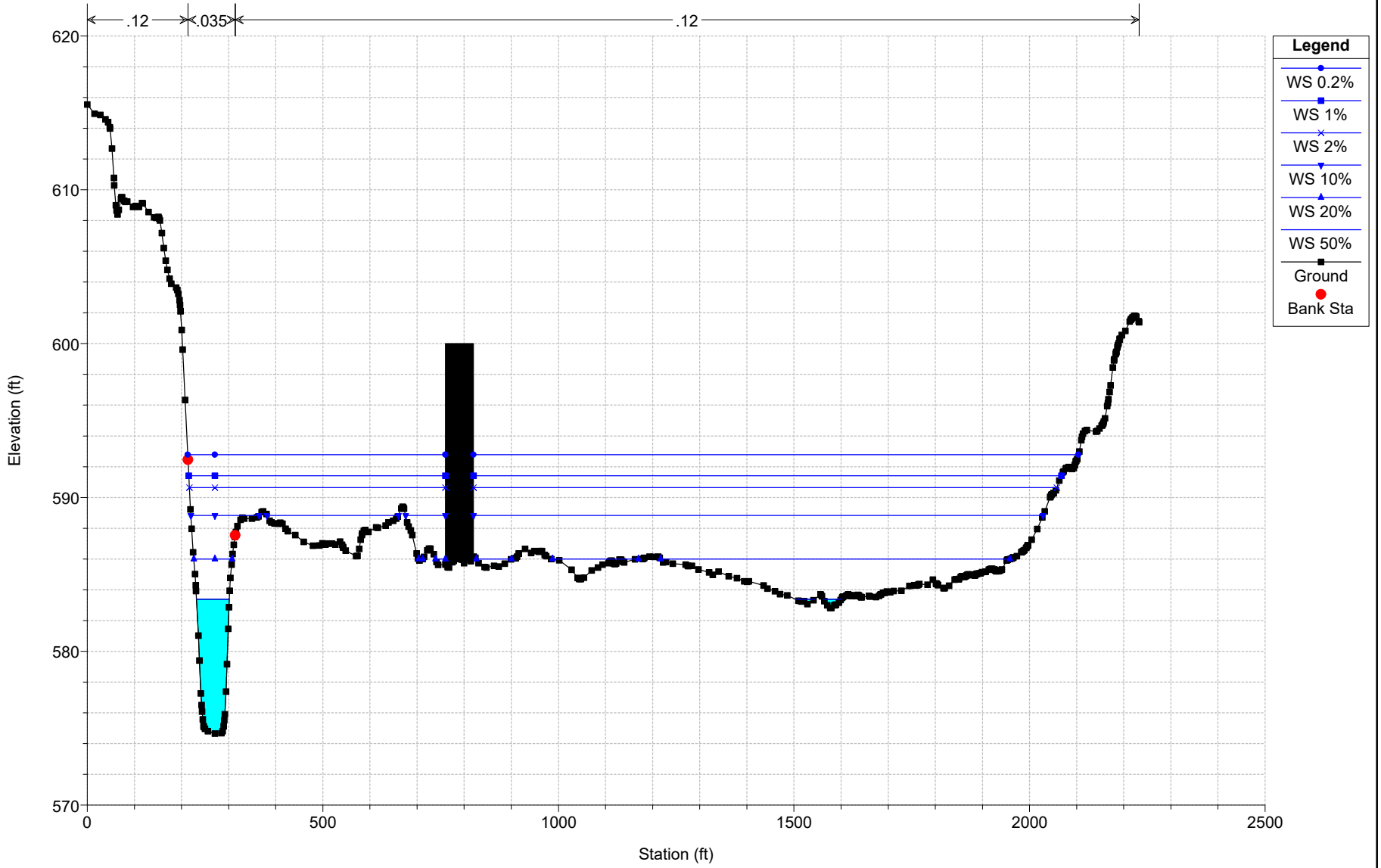




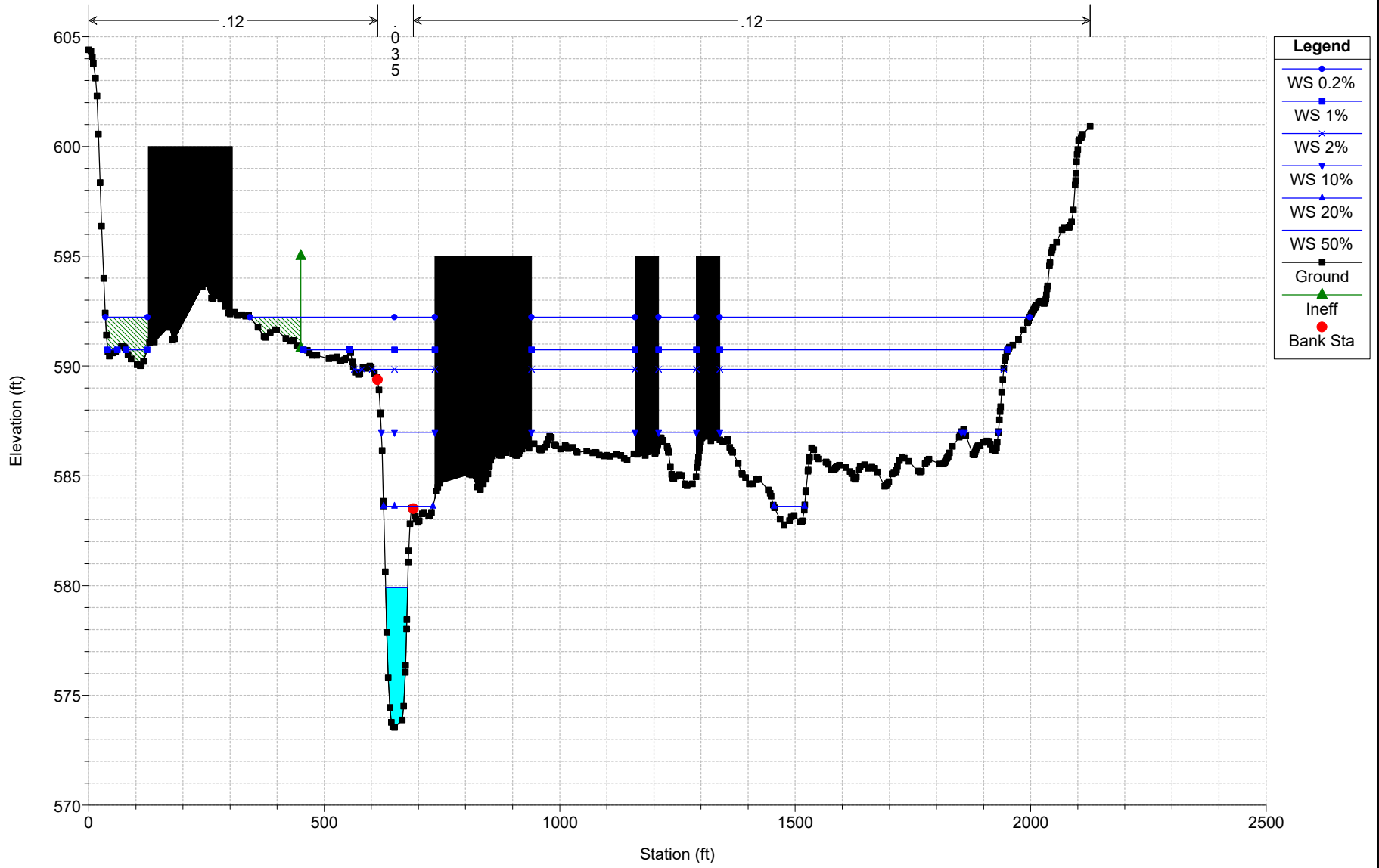
Bridge 308  
Geom: Alternative 2A - Replace Piers  
RS = 11459



Bridge 308  
Geom: Alternative 2A - Replace Piers  
RS = 7552



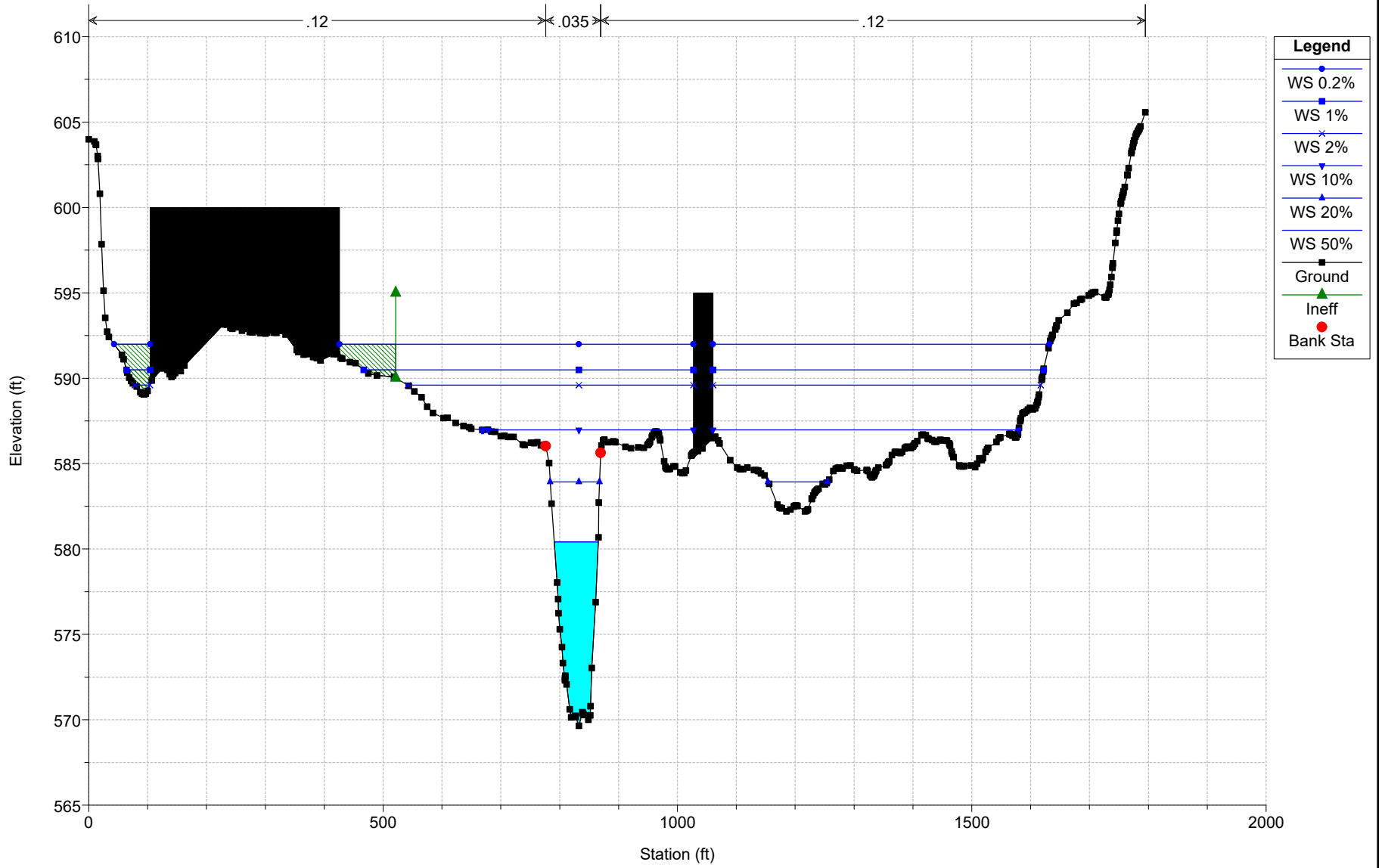
Bridge 308  
 Geom: Alternative 2A - Replace Piers  
 RS = 4962



# Bridge 308

Geom: Alternative 2A - Replace Piers

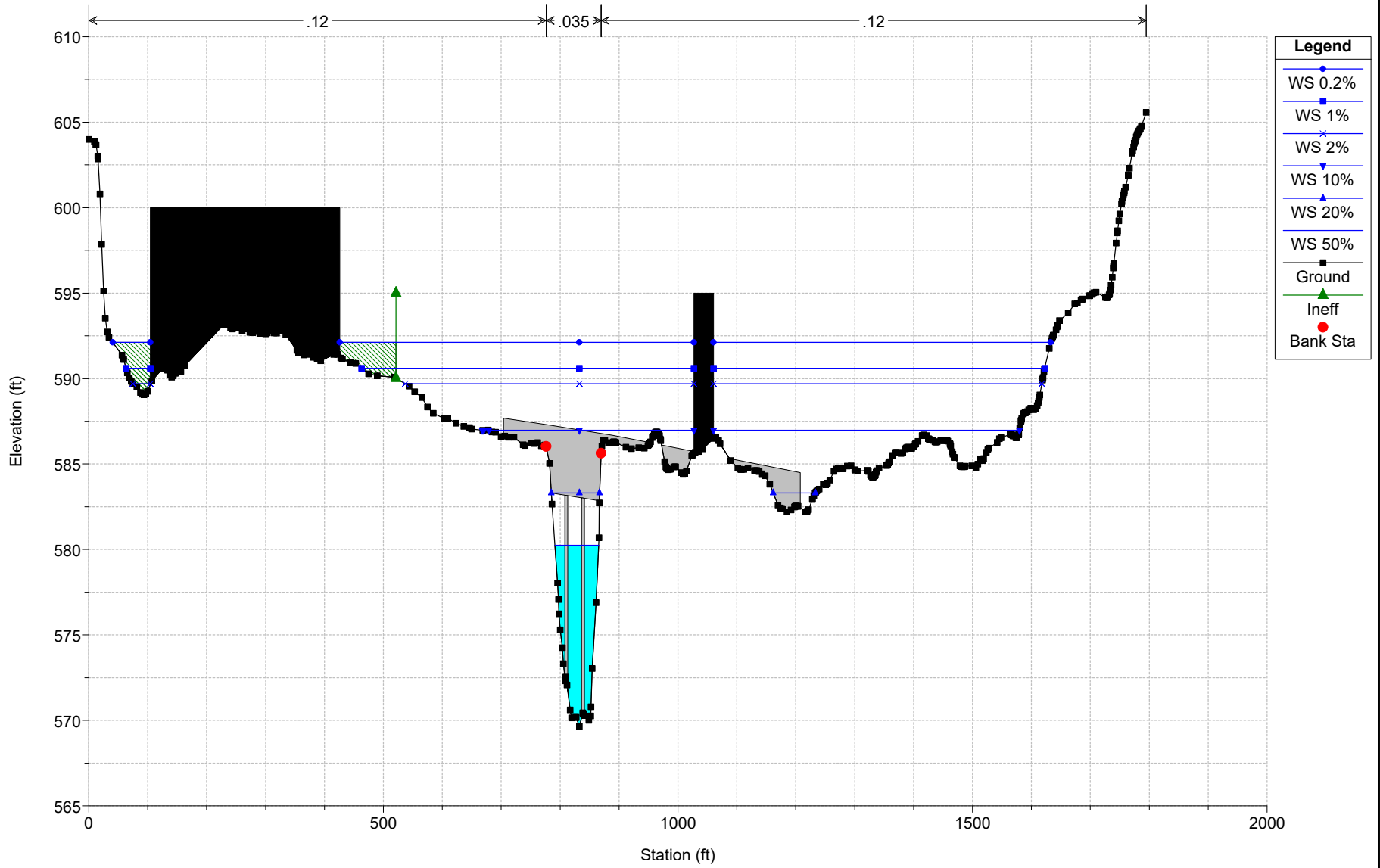
RS = 3994



# Bridge 308

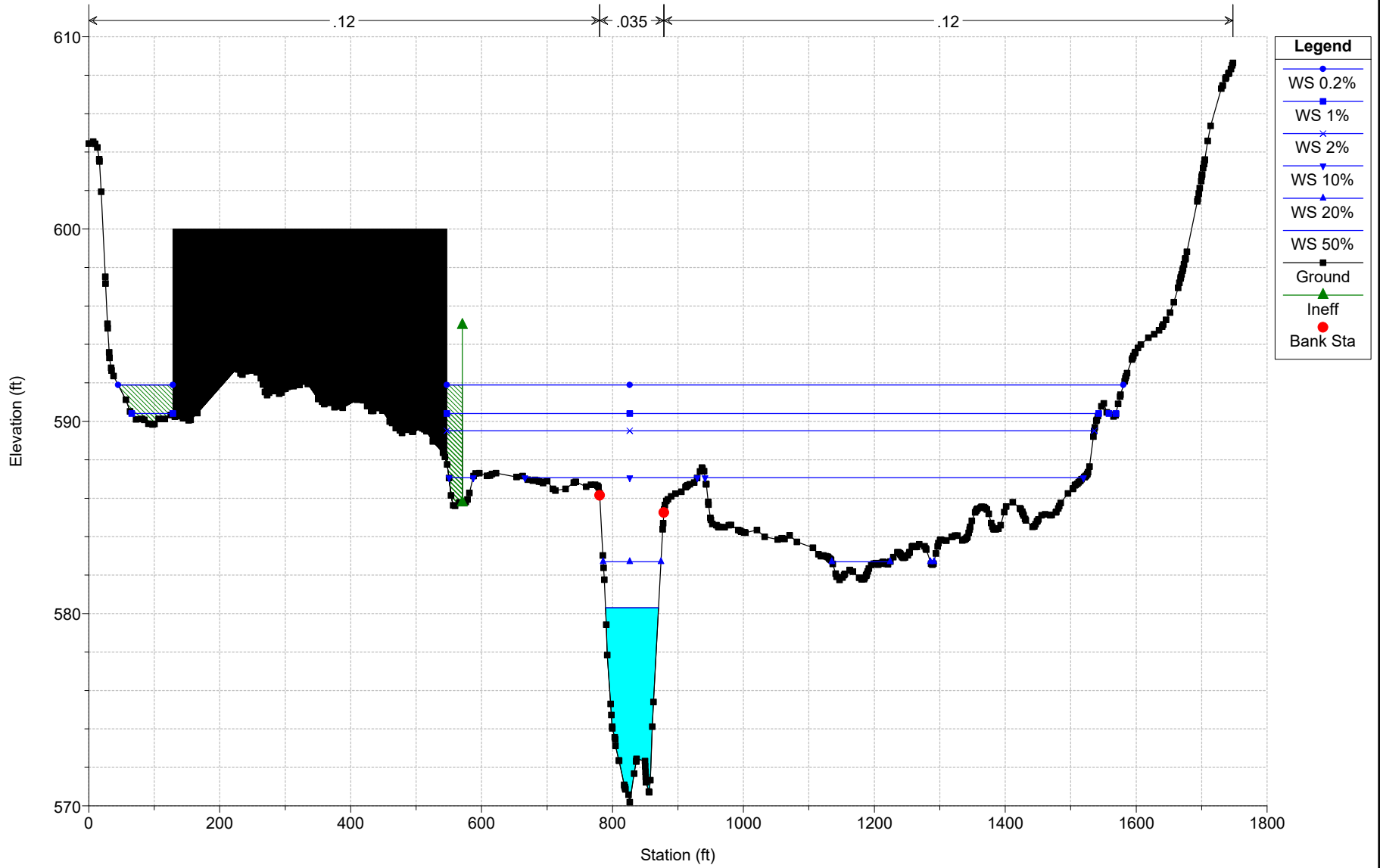
Geom: Alternative 2A - Replace Piers

RS = 3990 BR

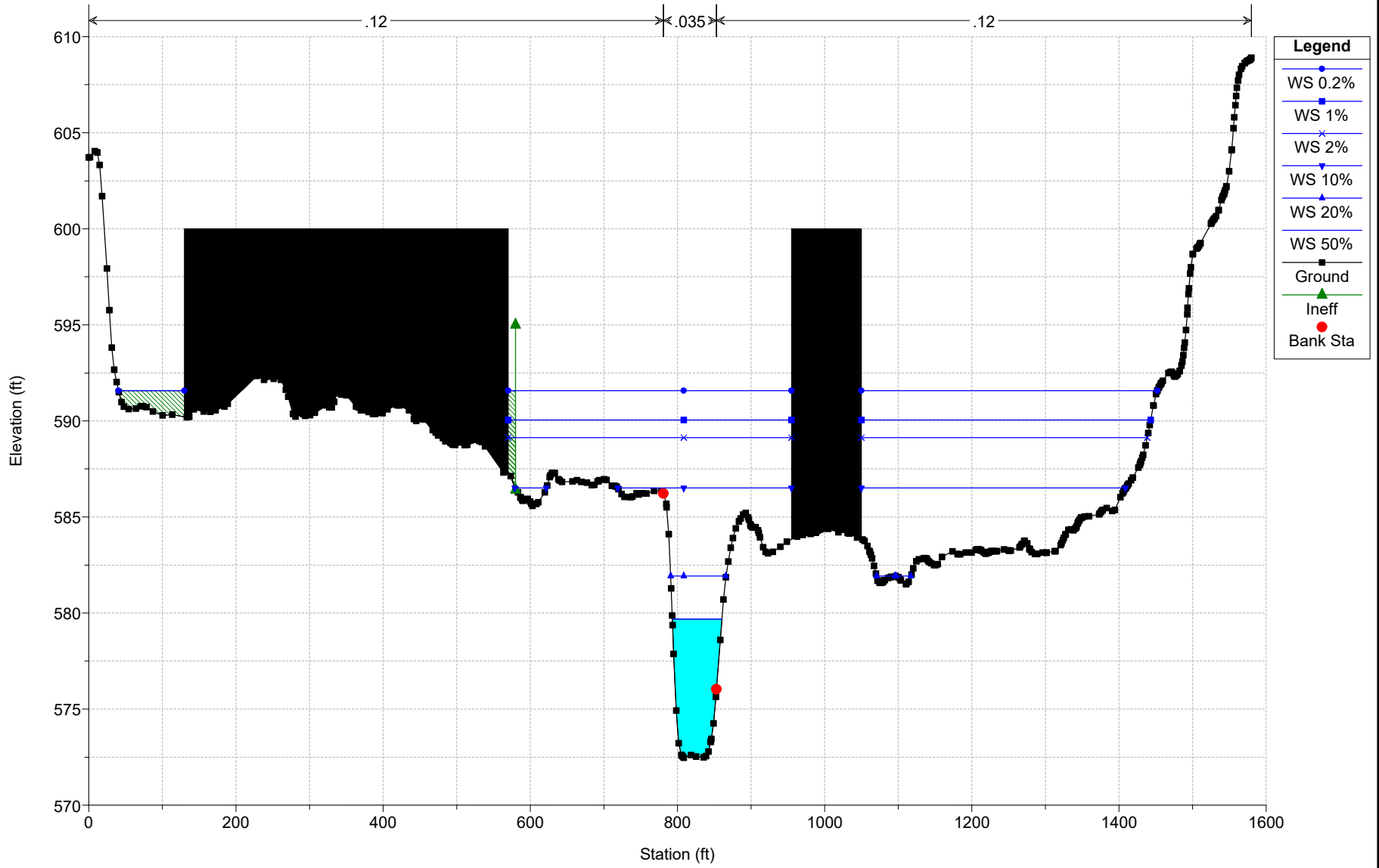




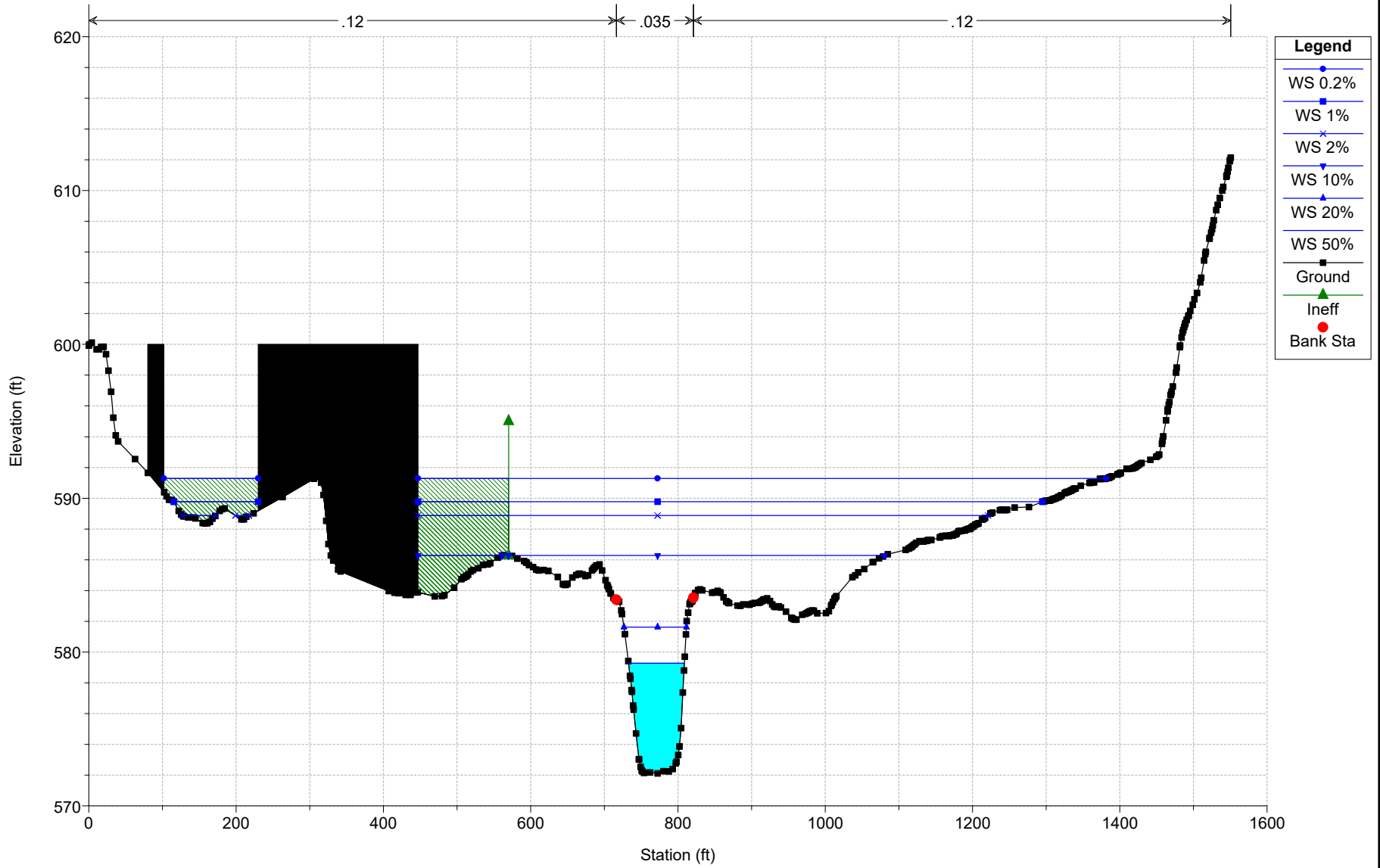
Bridge 308  
Geom: Alternative 2A - Replace Piers  
RS = 3921



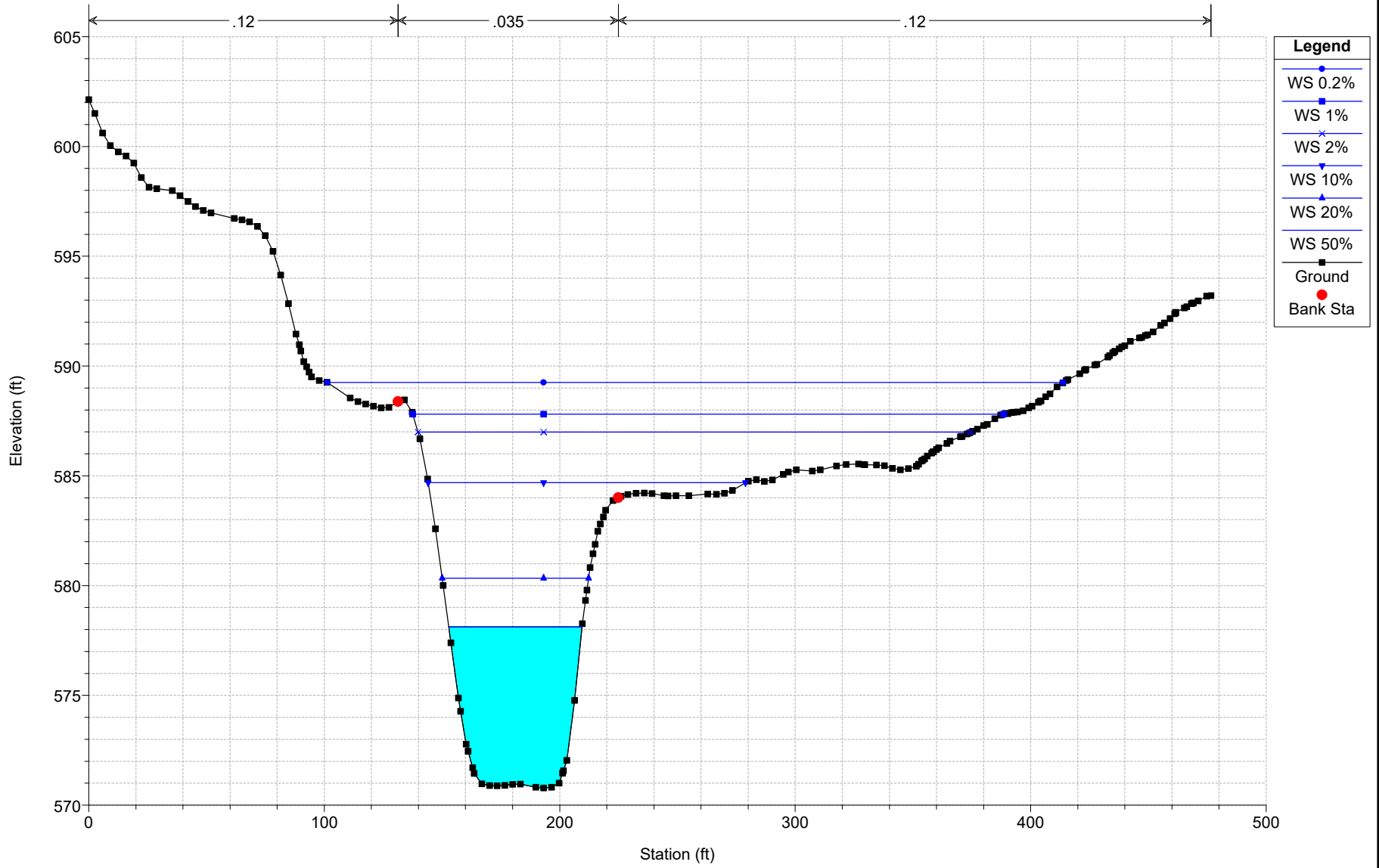
Bridge 308  
Geom: Alternative 2A - Replace Piers  
RS = 3508



Bridge 308  
Geom: Alternative 2A - Replace Piers  
RS = 2628



Bridge 308  
Geom: Alternative 2A - Replace Piers  
RS = 1501



Plan: Alt 2A Ex\_Cond, New Piers Stevens Branch Stevens Branch RS: 3990 Profile: 50%

E.G. US. (ft)	580.72	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	580.42	E.G. Elev (ft)	580.68	580.65
Q Total (cfs)	2524.00	W.S. Elev (ft)	580.25	580.24
Q Bridge (cfs)	2524.00	Crit W.S. (ft)	575.63	576.17
Q Weir (cfs)		Max Chl Dpth (ft)	10.61	10.05
Weir Sta Lft (ft)		Vel Total (ft/s)	5.29	5.14
Weir Sta Rgt (ft)		Flow Area (sq ft)	476.93	491.30
Weir Submerg		Froude # Chl	0.34	0.29
Weir Max Depth (ft)		Specif Force (cu ft)	2522.98	2345.78
Min El Weir Flow (ft)	586.81	Hydr Depth (ft)	7.39	7.10
Min El Prs (ft)	582.85	W.P. Total (ft)	106.39	110.72
Delta EG (ft)	0.12	Conv. Total (cfs)	55048.9	56323.6
Delta WS (ft)	0.12	Top Width (ft)	64.58	69.20
BR Open Area (sq ft)	669.59	Frctn Loss (ft)	0.02	0.01
BR Open Vel (ft/s)	5.29	C & E Loss (ft)	0.01	0.05
BR Sluice Coef		Shear Total (lb/sq ft)	0.59	0.56
BR Sel Method	Energy only	Power Total (lb/ft s)	3.11	2.86

Plan: Alt 2A Ex\_Cond, New Piers Stevens Branch Stevens Branch RS: 3990 Profile: 20%

E.G. US. (ft)	584.26	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	583.93	E.G. Elev (ft)	584.26	583.10
Q Total (cfs)	4024.00	W.S. Elev (ft)	583.31	582.70
Q Bridge (cfs)	4024.00	Crit W.S. (ft)	577.34	577.66
Q Weir (cfs)		Max Chl Dpth (ft)	13.67	12.51
Weir Sta Lft (ft)		Vel Total (ft/s)	5.84	6.03
Weir Sta Rgt (ft)		Flow Area (sq ft)	688.80	667.45
Weir Submerg		Froude # Chl	0.29	0.30
Weir Max Depth (ft)		Specif Force (cu ft)	4635.86	4119.68
Min El Weir Flow (ft)	586.81	Hydr Depth (ft)	27.22	7.50
Min El Prs (ft)	582.85	W.P. Total (ft)	225.17	143.74
Delta EG (ft)	1.16	Conv. Total (cfs)	64040.0	85100.8
Delta WS (ft)	1.23	Top Width (ft)	25.30	89.05
BR Open Area (sq ft)	669.59	Frctn Loss (ft)		
BR Open Vel (ft/s)	6.01	C & E Loss (ft)		
BR Sluice Coef	0.31	Shear Total (lb/sq ft)	0.75	0.65
BR Sel Method	Press Only	Power Total (lb/ft s)	4.41	3.91

Plan: Alt 2A Ex\_Cond, New Piers Stevens Branch Stevens Branch RS: 3990 Profile: 10%

E.G. US. (ft)	587.52	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	586.97	E.G. Elev (ft)	587.52	587.46
Q Total (cfs)	7740.00	W.S. Elev (ft)	586.97	587.06
Q Bridge (cfs)	2897.00	Crit W.S. (ft)	580.56	580.46
Q Weir (cfs)	4843.00	Max Chl Dpth (ft)	17.33	16.88
Weir Sta Lft (ft)	617.13	Vel Total (ft/s)	4.52	3.94
Weir Sta Rgt (ft)	1582.36	Flow Area (sq ft)	1711.60	1962.35
Weir Submerg	0.85	Froude # Chl	0.33	0.28
Weir Max Depth (ft)	5.32	Specif Force (cu ft)	9185.48	9432.89
Min El Weir Flow (ft)	586.81	Hydr Depth (ft)	2.32	2.66
Min El Prs (ft)	582.85	W.P. Total (ft)	940.08	943.49
Delta EG (ft)	0.06	Conv. Total (cfs)		
Delta WS (ft)	-0.09	Top Width (ft)	736.57	757.67
BR Open Area (sq ft)	669.59	Frctn Loss (ft)		
BR Open Vel (ft/s)	4.33	C & E Loss (ft)		



Plan: Alt 2A Ex\_Cond, New Piers Stevens Branch Stevens Branch RS: 3990 Profile: 10% (Continued)

BR Sluice Coef		Shear Total (lb/sq ft)		
BR Sel Method	Press/Weir	Power Total (lb/ft s)		

Plan: Alt 2A Ex\_Cond, New Piers Stevens Branch Stevens Branch RS: 3990 Profile: 2%

E.G. US. (ft)	590.01	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	589.60	E.G. Elev (ft)	589.93	589.88
Q Total (cfs)	11040.00	W.S. Elev (ft)	589.70	589.67
Q Bridge (cfs)	3779.98	Crit W.S. (ft)	582.80	582.49
Q Weir (cfs)		Max Chl Dpth (ft)	20.06	19.49
Weir Sta Lft (ft)		Vel Total (ft/s)	2.54	2.50
Weir Sta Rgt (ft)		Flow Area (sq ft)	4341.45	4415.52
Weir Submerg		Froude # Chl	0.15	0.15
Weir Max Depth (ft)		Specif Force (cu ft)	16740.09	17371.02
Min El Weir Flow (ft)	586.81	Hydr Depth (ft)	4.14	4.57
Min El Prs (ft)	582.85	W.P. Total (ft)	1257.35	1173.46
Delta EG (ft)	0.16	Conv. Total (cfs)	185937.2	197071.0
Delta WS (ft)	0.08	Top Width (ft)	1077.05	990.02
BR Open Area (sq ft)	669.59	Frctn Loss (ft)	0.04	0.00
BR Open Vel (ft/s)	5.65	C & E Loss (ft)	0.01	0.03
BR Sluice Coef		Shear Total (lb/sq ft)	0.76	0.74
BR Sel Method	Energy only	Power Total (lb/ft s)	1.93	1.84

Plan: Alt 2A Ex\_Cond, New Piers Stevens Branch Stevens Branch RS: 3990 Profile: 1%

E.G. US. (ft)	590.88	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	590.49	E.G. Elev (ft)	590.79	590.75
Q Total (cfs)	12400.00	W.S. Elev (ft)	590.61	590.59
Q Bridge (cfs)	3256.93	Crit W.S. (ft)	582.93	582.91
Q Weir (cfs)		Max Chl Dpth (ft)	20.97	20.40
Weir Sta Lft (ft)		Vel Total (ft/s)	2.34	2.34
Weir Sta Rgt (ft)		Flow Area (sq ft)	5309.28	5304.68
Weir Submerg		Froude # Chl	0.13	0.13
Weir Max Depth (ft)		Specif Force (cu ft)	21122.55	21822.06
Min El Weir Flow (ft)	586.81	Hydr Depth (ft)	4.97	5.35
Min El Prs (ft)	582.85	W.P. Total (ft)	1280.01	1197.99
Delta EG (ft)	0.16	Conv. Total (cfs)	243045.7	254138.8
Delta WS (ft)	0.10	Top Width (ft)	1167.84	1080.78
BR Open Area (sq ft)	669.59	Frctn Loss (ft)	0.03	0.00
BR Open Vel (ft/s)	4.86	C & E Loss (ft)	0.00	0.03
BR Sluice Coef		Shear Total (lb/sq ft)	0.67	0.66
BR Sel Method	Energy only	Power Total (lb/ft s)	1.57	1.54

Plan: Alt 2A Ex\_Cond, New Piers Stevens Branch Stevens Branch RS: 3990 Profile: 0.2%

E.G. US. (ft)	592.34	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	592.00	E.G. Elev (ft)	592.25	592.23
Q Total (cfs)	14980.00	W.S. Elev (ft)	592.12	592.10
Q Bridge (cfs)	2679.64	Crit W.S. (ft)	587.97	587.85
Q Weir (cfs)		Max Chl Dpth (ft)	22.48	21.91
Weir Sta Lft (ft)		Vel Total (ft/s)	2.16	2.20
Weir Sta Rgt (ft)		Flow Area (sq ft)	6927.74	6821.33
Weir Submerg		Froude # Chl	0.11	0.11
Weir Max Depth (ft)		Specif Force (cu ft)	30419.39	31079.97
Min El Weir Flow (ft)	586.81	Hydr Depth (ft)	6.42	6.74
Min El Prs (ft)	582.85	W.P. Total (ft)	1293.24	1219.20

Plan: Alt 2A Ex\_Cond, New Piers Stevens Branch Stevens Branch RS: 3990 Profile: 0.2% (Continued)

Delta EG (ft)	0.15	Conv. Total (cfs)	354229.3	361151.2
Delta WS (ft)	0.11	Top Width (ft)	1237.37	1122.31
BR Open Area (sq ft)	669.59	Frctn Loss (ft)	0.02	0.00
BR Open Vel (ft/s)	4.00	C & E Loss (ft)	0.00	0.03
BR Sluice Coef		Shear Total (lb/sq ft)	0.60	0.60
BR Sel Method	Energy only	Power Total (lb/ft s)	1.29	1.32

Plan: Alt 2A Ex\_Cond, New Piers Stevens Branch Stevens Branch RS: 11459 Profile: 50%

E.G. Elev (ft)	585.95	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.79	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	585.15	Reach Len. (ft)	1191.60	1191.00	1181.80
Crit W.S. (ft)	582.65	Flow Area (sq ft)		352.96	2.17
E.G. Slope (ft/ft)	0.002798	Area (sq ft)		352.96	2.17
Q Total (cfs)	2524.00	Flow (cfs)		2523.70	0.30
Top Width (ft)	79.72	Top Width (ft)		56.44	23.28
Vel Total (ft/s)	7.11	Avg. Vel. (ft/s)		7.15	0.14
Max Chl Dpth (ft)	7.39	Hydr. Depth (ft)		6.25	0.09
Conv. Total (cfs)	47718.3	Conv. (cfs)		47712.6	5.6
Length Wtd. (ft)	1190.99	Wetted Per. (ft)		62.12	23.52
Min Ch El (ft)	577.76	Shear (lb/sq ft)		0.99	0.02
Alpha	1.01	Stream Power (lb/ft s)		7.10	0.00
Frctn Loss (ft)	2.05	Cum Volume (acre-ft)		28.23	0.45
C & E Loss (ft)	0.12	Cum SA (acres)		4.37	1.85

Plan: Alt 2A Ex\_Cond, New Piers Stevens Branch Stevens Branch RS: 11459 Profile: 20%

E.G. Elev (ft)	588.19	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.96	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	587.23	Reach Len. (ft)	1191.60	1191.00	1181.80
Crit W.S. (ft)	584.22	Flow Area (sq ft)		474.54	310.34
E.G. Slope (ft/ft)	0.002730	Area (sq ft)		474.54	310.34
Q Total (cfs)	4024.00	Flow (cfs)		3824.67	199.33
Top Width (ft)	392.18	Top Width (ft)		61.22	330.96
Vel Total (ft/s)	5.13	Avg. Vel. (ft/s)		8.06	0.64
Max Chl Dpth (ft)	9.47	Hydr. Depth (ft)		7.75	0.94
Conv. Total (cfs)	77022.0	Conv. (cfs)		73206.6	3815.3
Length Wtd. (ft)	1190.07	Wetted Per. (ft)		68.51	334.42
Min Ch El (ft)	577.76	Shear (lb/sq ft)		1.18	0.16
Alpha	2.35	Stream Power (lb/ft s)		9.51	0.10
Frctn Loss (ft)	1.69	Cum Volume (acre-ft)		40.53	30.41
C & E Loss (ft)	0.19	Cum SA (acres)		5.03	26.12

Plan: Alt 2A Ex\_Cond, New Piers Stevens Branch Stevens Branch RS: 11459 Profile: 10%

E.G. Elev (ft)	590.55	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.02	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	589.54	Reach Len. (ft)	1191.60	1191.00	1181.80
Crit W.S. (ft)	588.47	Flow Area (sq ft)	136.13	629.37	1612.70
E.G. Slope (ft/ft)	0.002992	Area (sq ft)	136.13	629.37	1612.70
Q Total (cfs)	7740.00	Flow (cfs)	82.19	5848.68	1809.13
Top Width (ft)	1021.64	Top Width (ft)	186.34	70.80	764.50
Vel Total (ft/s)	3.25	Avg. Vel. (ft/s)	0.60	9.29	1.12
Max Chl Dpth (ft)	11.78	Hydr. Depth (ft)	0.73	8.89	2.11
Conv. Total (cfs)	141506.0	Conv. (cfs)	1502.7	106928.0	33075.3
Length Wtd. (ft)	1187.82	Wetted Per. (ft)	186.54	78.62	777.55
Min Ch El (ft)	577.76	Shear (lb/sq ft)	0.14	1.50	0.39
Alpha	6.19	Stream Power (lb/ft s)	0.08	13.90	0.43
Frctn Loss (ft)	1.30	Cum Volume (acre-ft)	4.56	58.53	158.47
C & E Loss (ft)	0.25	Cum SA (acres)	4.93	5.81	59.57

Plan: Alt 2A Ex\_Cond, New Piers Stevens Branch Stevens Branch RS: 11459 Profile: 2%

E.G. Elev (ft)	591.94	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.74	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	591.20	Reach Len. (ft)	1191.60	1191.00	1181.80
Crit W.S. (ft)	589.98	Flow Area (sq ft)	491.53	747.05	2942.66
E.G. Slope (ft/ft)	0.002157	Area (sq ft)	491.53	747.05	2942.66
Q Total (cfs)	11040.00	Flow (cfs)	483.68	6608.80	3947.53
Top Width (ft)	1098.58	Top Width (ft)	219.28	70.80	808.50
Vel Total (ft/s)	2.64	Avg. Vel. (ft/s)	0.98	8.85	1.34
Max Chl Dpth (ft)	13.44	Hydr. Depth (ft)	2.24	10.55	3.64
Conv. Total (cfs)	237688.8	Conv. (cfs)	10413.5	142285.9	84989.4
Length Wtd. (ft)	1186.76	Wetted Per. (ft)	219.63	78.62	828.35
Min Ch El (ft)	577.76	Shear (lb/sq ft)	0.30	1.28	0.48
Alpha	6.82	Stream Power (lb/ft s)	0.30	11.32	0.64
Frctn Loss (ft)	0.98	Cum Volume (acre-ft)	17.19	71.45	286.50
C & E Loss (ft)	0.18	Cum SA (acres)	6.82	6.02	63.15

Plan: Alt 2A Ex\_Cond, New Piers Stevens Branch Stevens Branch RS: 11459 Profile: 1%

E.G. Elev (ft)	592.54	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.64	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	591.91	Reach Len. (ft)	1191.60	1191.00	1181.80
Crit W.S. (ft)	590.36	Flow Area (sq ft)	649.42	797.10	3515.74
E.G. Slope (ft/ft)	0.001848	Area (sq ft)	649.42	797.10	3515.74
Q Total (cfs)	12400.00	Flow (cfs)	701.81	6814.87	4883.33
Top Width (ft)	1120.30	Top Width (ft)	237.12	70.80	812.38
Vel Total (ft/s)	2.50	Avg. Vel. (ft/s)	1.08	8.55	1.39
Max Chl Dpth (ft)	14.15	Hydr. Depth (ft)	2.74	11.26	4.33
Conv. Total (cfs)	288451.1	Conv. (cfs)	16325.6	158528.6	113596.9
Length Wtd. (ft)	1186.45	Wetted Per. (ft)	237.54	78.62	835.12
Min Ch El (ft)	577.76	Shear (lb/sq ft)	0.32	1.17	0.49
Alpha	6.57	Stream Power (lb/ft s)	0.34	10.00	0.67
Frctn Loss (ft)	0.86	Cum Volume (acre-ft)	23.88	76.36	337.20
C & E Loss (ft)	0.16	Cum SA (acres)	9.71	6.06	64.09

Plan: Alt 2A Ex\_Cond, New Piers Stevens Branch Stevens Branch RS: 11459 Profile: 0.2%

E.G. Elev (ft)	593.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.52	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	593.19	Reach Len. (ft)	1191.60	1191.00	1181.80
Crit W.S. (ft)	590.85	Flow Area (sq ft)	993.89	888.34	4565.96
E.G. Slope (ft/ft)	0.001454	Area (sq ft)	993.89	888.34	4565.96
Q Total (cfs)	14980.00	Flow (cfs)	1101.81	7241.37	6636.83
Top Width (ft)	1207.82	Top Width (ft)	319.64	70.80	817.38
Vel Total (ft/s)	2.32	Avg. Vel. (ft/s)	1.11	8.15	1.45
Max Chl Dpth (ft)	15.43	Hydr. Depth (ft)	3.11	12.55	5.59
Conv. Total (cfs)	392864.1	Conv. (cfs)	28895.9	189911.5	174056.8
Length Wtd. (ft)	1186.04	Wetted Per. (ft)	320.27	78.62	845.44
Min Ch El (ft)	577.76	Shear (lb/sq ft)	0.28	1.03	0.49
Alpha	6.14	Stream Power (lb/ft s)	0.31	8.36	0.71
Frctn Loss (ft)	0.71	Cum Volume (acre-ft)	40.27	84.99	428.36
C & E Loss (ft)	0.12	Cum SA (acres)	12.95	6.12	66.13

Plan: Alt 2A Ex\_Cond, New Piers Stevens Branch Stevens Branch RS: 7552 Profile: 50%

E.G. Elev (ft)	583.78	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.40	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	583.38	Reach Len. (ft)	852.90	789.50	477.70
Crit W.S. (ft)		Flow Area (sq ft)		493.47	18.29
E.G. Slope (ft/ft)	0.001165	Area (sq ft)		493.47	18.29
Q Total (cfs)	2524.00	Flow (cfs)		2520.78	3.22
Top Width (ft)	147.66	Top Width (ft)		69.53	78.13
Vel Total (ft/s)	4.93	Avg. Vel. (ft/s)		5.11	0.18
Max Chl Dpth (ft)	8.74	Hydr. Depth (ft)		7.10	0.23
Conv. Total (cfs)	73941.9	Conv. (cfs)		73847.7	94.3
Length Wtd. (ft)	789.30	Wetted Per. (ft)		74.57	78.15
Min Ch El (ft)	574.64	Shear (lb/sq ft)		0.48	0.02
Alpha	1.07	Stream Power (lb/ft s)		2.46	0.00
Frctn Loss (ft)	1.94	Cum Volume (acre-ft)		16.66	0.18
C & E Loss (ft)	0.14	Cum SA (acres)		2.65	0.47

Plan: Alt 2A Ex\_Cond, New Piers Stevens Branch Stevens Branch RS: 7552 Profile: 20%

E.G. Elev (ft)	586.31	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.32	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	585.99	Reach Len. (ft)	852.90	789.50	477.70
Crit W.S. (ft)		Flow Area (sq ft)		688.50	1304.51
E.G. Slope (ft/ft)	0.000868	Area (sq ft)		688.50	1304.51
Q Total (cfs)	4024.00	Flow (cfs)		3405.77	618.23
Top Width (ft)	1109.57	Top Width (ft)		81.32	1028.25
Vel Total (ft/s)	2.02	Avg. Vel. (ft/s)		4.95	0.47
Max Chl Dpth (ft)	11.35	Hydr. Depth (ft)		8.47	1.27
Conv. Total (cfs)	136603.5	Conv. (cfs)		115616.3	20987.2
Length Wtd. (ft)	764.51	Wetted Per. (ft)		87.52	1028.80
Min Ch El (ft)	574.64	Shear (lb/sq ft)		0.43	0.07
Alpha	5.09	Stream Power (lb/ft s)		2.11	0.03
Frctn Loss (ft)	1.26	Cum Volume (acre-ft)		24.63	8.50
C & E Loss (ft)	0.10	Cum SA (acres)		3.08	7.68

Plan: Alt 2A Ex\_Cond, New Piers Stevens Branch Stevens Branch RS: 7552 Profile: 10%

E.G. Elev (ft)	589.00	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.17	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	588.83	Reach Len. (ft)	852.90	789.50	477.70
Crit W.S. (ft)		Flow Area (sq ft)		941.79	5209.32
E.G. Slope (ft/ft)	0.000560	Area (sq ft)		941.79	5209.32
Q Total (cfs)	7740.00	Flow (cfs)		4195.66	3544.34
Top Width (ft)	1716.87	Top Width (ft)		93.86	1623.01
Vel Total (ft/s)	1.26	Avg. Vel. (ft/s)		4.46	0.68
Max Chl Dpth (ft)	14.19	Hydr. Depth (ft)		10.03	3.21
Conv. Total (cfs)	327004.9	Conv. (cfs)		177261.1	149743.8
Length Wtd. (ft)	688.31	Wetted Per. (ft)		100.89	1629.66
Min Ch El (ft)	574.64	Shear (lb/sq ft)		0.33	0.11
Alpha	6.93	Stream Power (lb/ft s)		1.45	0.08
Frctn Loss (ft)	0.74	Cum Volume (acre-ft)	2.70	37.05	65.93
C & E Loss (ft)	0.10	Cum SA (acres)	2.38	3.56	27.18

Plan: Alt 2A Ex\_Cond, New Piers Stevens Branch Stevens Branch RS: 7552 Profile: 2%

E.G. Elev (ft)	590.77	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.13	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	590.64	Reach Len. (ft)	852.90	789.50	477.70
Crit W.S. (ft)		Flow Area (sq ft)		1114.45	8218.97
E.G. Slope (ft/ft)	0.000435	Area (sq ft)		1114.45	8218.97
Q Total (cfs)	11040.00	Flow (cfs)		4783.51	6256.49
Top Width (ft)	1780.97	Top Width (ft)		96.93	1684.03
Vel Total (ft/s)	1.18	Avg. Vel. (ft/s)		4.29	0.76
Max Chl Dpth (ft)	16.00	Hydr. Depth (ft)		11.50	4.88
Conv. Total (cfs)	529195.7	Conv. (cfs)		229294.6	299901.1
Length Wtd. (ft)	631.67	Wetted Per. (ft)		104.46	1694.43
Min Ch El (ft)	574.64	Shear (lb/sq ft)		0.29	0.13
Alpha	5.94	Stream Power (lb/ft s)		1.24	0.10
Frctn Loss (ft)	0.44	Cum Volume (acre-ft)	10.46	46.00	135.09
C & E Loss (ft)	0.03	Cum SA (acres)	3.82	3.73	29.34

Plan: Alt 2A Ex\_Cond, New Piers Stevens Branch Stevens Branch RS: 7552 Profile: 1%

E.G. Elev (ft)	591.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.11	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	591.41	Reach Len. (ft)	852.90	789.50	477.70
Crit W.S. (ft)		Flow Area (sq ft)		1189.36	9515.62
E.G. Slope (ft/ft)	0.000386	Area (sq ft)		1189.36	9515.62
Q Total (cfs)	12400.00	Flow (cfs)		4971.80	7428.21
Top Width (ft)	1792.06	Top Width (ft)		98.20	1693.86
Vel Total (ft/s)	1.16	Avg. Vel. (ft/s)		4.18	0.78
Max Chl Dpth (ft)	16.77	Hydr. Depth (ft)		12.11	5.62
Conv. Total (cfs)	631432.4	Conv. (cfs)		253173.6	378258.8
Length Wtd. (ft)	620.32	Wetted Per. (ft)		105.94	1705.83
Min Ch El (ft)	574.64	Shear (lb/sq ft)		0.27	0.13
Alpha	5.49	Stream Power (lb/ft s)		1.13	0.10
Frctn Loss (ft)	0.37	Cum Volume (acre-ft)	14.99	49.20	160.43
C & E Loss (ft)	0.03	Cum SA (acres)	6.47	3.75	30.10

Plan: Alt 2A Ex\_Cond, New Piers Stevens Branch Stevens Branch RS: 7552 Profile: 0.2%

E.G. Elev (ft)	592.88	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	592.78	Reach Len. (ft)	852.90	789.50	477.70
Crit W.S. (ft)		Flow Area (sq ft)	0.09	1325.14	11862.14
E.G. Slope (ft/ft)	0.000324	Area (sq ft)	0.09	1325.14	11862.14
Q Total (cfs)	14980.00	Flow (cfs)	0.01	5385.81	9594.19
Top Width (ft)	1830.39	Top Width (ft)	0.54	99.90	1729.95
Vel Total (ft/s)	1.14	Avg. Vel. (ft/s)	0.06	4.06	0.81
Max Chl Dpth (ft)	18.14	Hydr. Depth (ft)	0.17	13.26	6.86
Conv. Total (cfs)	832776.0	Conv. (cfs)	0.3	299410.8	533364.9
Length Wtd. (ft)	607.51	Wetted Per. (ft)	0.64	107.93	1744.70
Min Ch El (ft)	574.64	Shear (lb/sq ft)	0.00	0.25	0.14
Alpha	4.93	Stream Power (lb/ft s)	0.00	1.01	0.11
Frctn Loss (ft)	0.30	Cum Volume (acre-ft)	26.67	54.73	205.51
C & E Loss (ft)	0.02	Cum SA (acres)	8.57	3.78	31.57



Plan: Alt 2A Ex\_Cond, New Piers Stevens Branch Stevens Branch RS: 4962 Profile: 50%

E.G. Elev (ft)	581.70	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.79	Wt. n-Val.		0.035	
W.S. Elev (ft)	579.91	Reach Len. (ft)	96.20	295.10	381.80
Crit W.S. (ft)	579.33	Flow Area (sq ft)		235.04	
E.G. Slope (ft/ft)	0.008210	Area (sq ft)		235.04	
Q Total (cfs)	2524.00	Flow (cfs)		2524.00	
Top Width (ft)	47.00	Top Width (ft)		47.00	
Vel Total (ft/s)	10.74	Avg. Vel. (ft/s)		10.74	
Max Chl Dpth (ft)	6.37	Hydr. Depth (ft)		5.00	
Conv. Total (cfs)	27856.0	Conv. (cfs)		27856.0	
Length Wtd. (ft)	295.10	Wetted Per. (ft)		50.39	
Min Ch El (ft)	573.54	Shear (lb/sq ft)		2.39	
Alpha	1.00	Stream Power (lb/ft s)		25.67	
Frctn Loss (ft)	0.53	Cum Volume (acre-ft)		10.06	0.08
C & E Loss (ft)	0.45	Cum SA (acres)		1.59	0.04

Plan: Alt 2A Ex\_Cond, New Piers Stevens Branch Stevens Branch RS: 4962 Profile: 20%

E.G. Elev (ft)	584.95	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.34	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	583.61	Reach Len. (ft)	96.20	295.10	381.80
Crit W.S. (ft)	581.10	Flow Area (sq ft)		428.29	52.80
E.G. Slope (ft/ft)	0.004229	Area (sq ft)		428.29	52.80
Q Total (cfs)	4024.00	Flow (cfs)		3997.20	26.80
Top Width (ft)	170.09	Top Width (ft)		63.19	106.90
Vel Total (ft/s)	8.36	Avg. Vel. (ft/s)		9.33	0.51
Max Chl Dpth (ft)	10.07	Hydr. Depth (ft)		6.78	0.49
Conv. Total (cfs)	61879.0	Conv. (cfs)		61466.9	412.1
Length Wtd. (ft)	295.77	Wetted Per. (ft)		68.91	107.02
Min Ch El (ft)	573.54	Shear (lb/sq ft)		1.64	0.13
Alpha	1.24	Stream Power (lb/ft s)		15.31	0.07
Frctn Loss (ft)	0.39	Cum Volume (acre-ft)		14.51	1.06
C & E Loss (ft)	0.30	Cum SA (acres)		1.77	1.46

Plan: Alt 2A Ex\_Cond, New Piers Stevens Branch Stevens Branch RS: 4962 Profile: 10%

E.G. Elev (ft)	588.16	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.17	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	586.99	Reach Len. (ft)	96.20	295.10	381.80
Crit W.S. (ft)	585.89	Flow Area (sq ft)		649.54	1490.12
E.G. Slope (ft/ft)	0.002893	Area (sq ft)		649.54	1490.12
Q Total (cfs)	7740.00	Flow (cfs)		6260.56	1479.45
Top Width (ft)	998.48	Top Width (ft)		68.11	930.37
Vel Total (ft/s)	3.62	Avg. Vel. (ft/s)		9.64	0.99
Max Chl Dpth (ft)	13.45	Hydr. Depth (ft)		9.54	1.60
Conv. Total (cfs)	143895.5	Conv. (cfs)		116391.0	27504.6
Length Wtd. (ft)	307.25	Wetted Per. (ft)		74.91	938.70
Min Ch El (ft)	573.54	Shear (lb/sq ft)		1.57	0.29
Alpha	5.76	Stream Power (lb/ft s)		15.10	0.28
Frctn Loss (ft)	0.45	Cum Volume (acre-ft)	2.70	22.63	29.19
C & E Loss (ft)	0.19	Cum SA (acres)	2.38	2.09	13.18

Plan: Alt 2A Ex\_Cond, New Piers Stevens Branch Stevens Branch RS: 4962 Profile: 2%

E.G. Elev (ft)	590.30	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.45	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	589.85	Reach Len. (ft)	96.20	295.10	381.80
Crit W.S. (ft)	587.66	Flow Area (sq ft)	4.92	855.47	4188.93
E.G. Slope (ft/ft)	0.001268	Area (sq ft)	4.92	855.47	4188.93
Q Total (cfs)	11040.00	Flow (cfs)	0.70	6118.69	4920.61
Top Width (ft)	1052.38	Top Width (ft)	27.96	75.90	948.53
Vel Total (ft/s)	2.19	Avg. Vel. (ft/s)	0.14	7.15	1.17
Max Chl Dpth (ft)	16.31	Hydr. Depth (ft)	0.18	11.27	4.42
Conv. Total (cfs)	310082.8	Conv. (cfs)	19.7	171856.9	138206.2
Length Wtd. (ft)	321.65	Wetted Per. (ft)	27.98	83.11	974.40
Min Ch El (ft)	573.54	Shear (lb/sq ft)	0.01	0.81	0.34
Alpha	6.06	Stream Power (lb/ft s)	0.00	5.83	0.40
Frctn Loss (ft)	0.28	Cum Volume (acre-ft)	10.41	28.15	67.06
C & E Loss (ft)	0.01	Cum SA (acres)	3.55	2.16	14.90

Plan: Alt 2A Ex\_Cond, New Piers Stevens Branch Stevens Branch RS: 4962 Profile: 1%

E.G. Elev (ft)	591.12	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.39	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	590.74	Reach Len. (ft)	96.20	295.10	381.80
Crit W.S. (ft)	588.00	Flow Area (sq ft)	80.13	922.79	5033.21
E.G. Slope (ft/ft)	0.001058	Area (sq ft)	103.56	922.79	5033.21
Q Total (cfs)	12400.00	Flow (cfs)	23.83	6343.42	6032.76
Top Width (ft)	1255.69	Top Width (ft)	222.83	75.90	956.97
Vel Total (ft/s)	2.05	Avg. Vel. (ft/s)	0.30	6.87	1.20
Max Chl Dpth (ft)	17.20	Hydr. Depth (ft)	0.51	12.16	5.26
Conv. Total (cfs)	381146.6	Conv. (cfs)	732.4	194981.5	185432.7
Length Wtd. (ft)	323.64	Wetted Per. (ft)	157.17	83.11	988.21
Min Ch El (ft)	573.54	Shear (lb/sq ft)	0.03	0.73	0.34
Alpha	5.89	Stream Power (lb/ft s)	0.01	5.04	0.40
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)	13.98	30.06	80.66
C & E Loss (ft)	0.00	Cum SA (acres)	4.28	2.17	15.56

Plan: Alt 2A Ex\_Cond, New Piers Stevens Branch Stevens Branch RS: 4962 Profile: 0.2%

E.G. Elev (ft)	592.55	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.33	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	592.23	Reach Len. (ft)	96.20	295.10	381.80
Crit W.S. (ft)	588.52	Flow Area (sq ft)	323.46	1035.90	6500.34
E.G. Slope (ft/ft)	0.000844	Area (sq ft)	559.26	1035.90	6500.34
Q Total (cfs)	14980.00	Flow (cfs)	183.35	6866.99	7929.67
Top Width (ft)	1440.69	Top Width (ft)	360.94	75.90	1003.85
Vel Total (ft/s)	1.91	Avg. Vel. (ft/s)	0.57	6.63	1.22
Max Chl Dpth (ft)	18.69	Hydr. Depth (ft)	1.98	13.65	6.48
Conv. Total (cfs)	515739.1	Conv. (cfs)	6312.3	236420.1	273006.7
Length Wtd. (ft)	324.48	Wetted Per. (ft)	163.49	83.11	1044.07
Min Ch El (ft)	573.54	Shear (lb/sq ft)	0.10	0.66	0.33
Alpha	5.76	Stream Power (lb/ft s)	0.06	4.35	0.40
Frctn Loss (ft)	0.21	Cum Volume (acre-ft)	21.19	33.33	104.83
C & E Loss (ft)	0.00	Cum SA (acres)	5.03	2.19	16.58

Plan: Alt 2A Ex\_Cond, New Piers Stevens Branch Stevens Branch RS: 3994 Profile: 50%

E.G. Elev (ft)	580.72	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.30	Wt. n-Val.		0.035	
W.S. Elev (ft)	580.42	Reach Len. (ft)	6.00	6.00	6.00
Crit W.S. (ft)	575.10	Flow Area (sq ft)		577.72	
E.G. Slope (ft/ft)	0.000769	Area (sq ft)		577.72	
Q Total (cfs)	2524.00	Flow (cfs)		2524.00	
Top Width (ft)	74.96	Top Width (ft)		74.96	
Vel Total (ft/s)	4.37	Avg. Vel. (ft/s)		4.37	
Max Chl Dpth (ft)	10.78	Hydr. Depth (ft)		7.71	
Conv. Total (cfs)	91024.8	Conv. (cfs)		91024.8	
Length Wtd. (ft)	6.00	Wetted Per. (ft)		80.81	
Min Ch El (ft)	569.64	Shear (lb/sq ft)		0.34	
Alpha	1.00	Stream Power (lb/ft s)		1.50	
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		7.31	0.08
C & E Loss (ft)	0.03	Cum SA (acres)		1.18	0.04

Plan: Alt 2A Ex\_Cond, New Piers Stevens Branch Stevens Branch RS: 3994 Profile: 20%

E.G. Elev (ft)	584.26	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.33	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	583.93	Reach Len. (ft)	6.00	6.00	6.00
Crit W.S. (ft)	576.62	Flow Area (sq ft)		855.38	109.43
E.G. Slope (ft/ft)	0.000624	Area (sq ft)		855.38	109.43
Q Total (cfs)	4024.00	Flow (cfs)		3988.28	35.72
Top Width (ft)	184.52	Top Width (ft)		83.66	100.86
Vel Total (ft/s)	4.17	Avg. Vel. (ft/s)		4.66	0.33
Max Chl Dpth (ft)	14.29	Hydr. Depth (ft)		10.23	1.08
Conv. Total (cfs)	161053.3	Conv. (cfs)		159623.7	1429.5
Length Wtd. (ft)	6.00	Wetted Per. (ft)		92.82	100.99
Min Ch El (ft)	569.64	Shear (lb/sq ft)		0.36	0.04
Alpha	1.24	Stream Power (lb/ft s)		1.67	0.01
Frctn Loss (ft)		Cum Volume (acre-ft)		10.16	0.35
C & E Loss (ft)		Cum SA (acres)		1.27	0.55

Plan: Alt 2A Ex\_Cond, New Piers Stevens Branch Stevens Branch RS: 3994 Profile: 10%

E.G. Elev (ft)	587.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.54	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	586.97	Reach Len. (ft)	6.00	6.00	6.00
Crit W.S. (ft)	579.48	Flow Area (sq ft)	53.39	1127.05	1266.26
E.G. Slope (ft/ft)	0.000885	Area (sq ft)	53.39	1127.05	1266.26
Q Total (cfs)	7740.00	Flow (cfs)	13.14	7005.93	720.93
Top Width (ft)	870.07	Top Width (ft)	100.10	93.01	676.96
Vel Total (ft/s)	3.16	Avg. Vel. (ft/s)	0.25	6.22	0.57
Max Chl Dpth (ft)	17.33	Hydr. Depth (ft)	0.53	12.12	1.87
Conv. Total (cfs)	260198.8	Conv. (cfs)	441.9	235521.2	24235.8
Length Wtd. (ft)	6.00	Wetted Per. (ft)	100.12	103.20	679.58
Min Ch El (ft)	569.64	Shear (lb/sq ft)	0.03	0.60	0.10
Alpha	3.50	Stream Power (lb/ft s)	0.01	3.75	0.06
Frctn Loss (ft)		Cum Volume (acre-ft)	2.64	16.61	17.11
C & E Loss (ft)		Cum SA (acres)	2.27	1.55	6.14

Plan: Alt 2A Ex\_Cond, New Piers Stevens Branch Stevens Branch RS: 3994 Profile: 2%

E.G. Elev (ft)	590.01	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.41	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	589.60	Reach Len. (ft)	6.00	6.00	6.00
Crit W.S. (ft)	581.57	Flow Area (sq ft)	553.35	1371.03	3094.21
E.G. Slope (ft/ft)	0.000630	Area (sq ft)	561.66	1371.03	3094.21
Q Total (cfs)	11040.00	Flow (cfs)	304.64	8193.36	2542.00
Top Width (ft)	1067.52	Top Width (ft)	260.11	93.01	714.40
Vel Total (ft/s)	2.20	Avg. Vel. (ft/s)	0.55	5.98	0.82
Max Chl Dpth (ft)	19.96	Hydr. Depth (ft)	2.36	14.74	4.33
Conv. Total (cfs)	439928.5	Conv. (cfs)	12139.6	326493.8	101295.2
Length Wtd. (ft)	6.00	Wetted Per. (ft)	234.64	103.20	722.46
Min Ch El (ft)	569.64	Shear (lb/sq ft)	0.09	0.52	0.17
Alpha	5.51	Stream Power (lb/ft s)	0.05	3.12	0.14
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	9.79	20.61	35.14
C & E Loss (ft)	0.07	Cum SA (acres)	3.23	1.59	7.61

Plan: Alt 2A Ex\_Cond, New Piers Stevens Branch Stevens Branch RS: 3994 Profile: 1%

E.G. Elev (ft)	590.88	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.38	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	590.49	Reach Len. (ft)	6.00	6.00	6.00
Crit W.S. (ft)	582.35	Flow Area (sq ft)	777.88	1454.47	3737.11
E.G. Slope (ft/ft)	0.000572	Area (sq ft)	834.51	1454.47	3737.11
Q Total (cfs)	12400.00	Flow (cfs)	484.28	8619.16	3296.56
Top Width (ft)	1162.01	Top Width (ft)	349.81	93.01	719.18
Vel Total (ft/s)	2.08	Avg. Vel. (ft/s)	0.62	5.93	0.88
Max Chl Dpth (ft)	20.85	Hydr. Depth (ft)	3.05	15.64	5.20
Conv. Total (cfs)	518313.4	Conv. (cfs)	20242.6	360276.3	137794.6
Length Wtd. (ft)	6.00	Wetted Per. (ft)	255.33	103.20	729.12
Min Ch El (ft)	569.64	Shear (lb/sq ft)	0.11	0.50	0.18
Alpha	5.71	Stream Power (lb/ft s)	0.07	2.98	0.16
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	12.94	22.01	42.22
C & E Loss (ft)	0.08	Cum SA (acres)	3.65	1.60	8.22

Plan: Alt 2A Ex\_Cond, New Piers Stevens Branch Stevens Branch RS: 3994 Profile: 0.2%

E.G. Elev (ft)	592.34	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.35	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	592.00	Reach Len. (ft)	6.00	6.00	6.00
Crit W.S. (ft)	584.19	Flow Area (sq ft)	1161.45	1594.23	4825.16
E.G. Slope (ft/ft)	0.000503	Area (sq ft)	1416.95	1594.23	4825.16
Q Total (cfs)	14980.00	Flow (cfs)	885.94	9419.77	4674.30
Top Width (ft)	1233.99	Top Width (ft)	411.83	93.01	729.15
Vel Total (ft/s)	1.98	Avg. Vel. (ft/s)	0.76	5.91	0.97
Max Chl Dpth (ft)	22.35	Hydr. Depth (ft)	4.55	17.14	6.62
Conv. Total (cfs)	667604.6	Conv. (cfs)	39483.1	419805.0	208316.6
Length Wtd. (ft)	6.00	Wetted Per. (ft)	255.33	103.20	742.21
Min Ch El (ft)	569.64	Shear (lb/sq ft)	0.14	0.49	0.20
Alpha	5.71	Stream Power (lb/ft s)	0.11	2.87	0.20
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	19.01	24.42	55.19
C & E Loss (ft)	0.08	Cum SA (acres)	4.18	1.62	8.99

Plan: Alt 2A Ex\_Cond, New Piers Stevens Branch Stevens Branch RS: 3921 Profile: 50%

E.G. Elev (ft)	580.60	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.29	Wt. n-Val.		0.035	
W.S. Elev (ft)	580.30	Reach Len. (ft)	21.20	125.90	180.00
Crit W.S. (ft)	575.67	Flow Area (sq ft)		582.54	
E.G. Slope (ft/ft)	0.000827	Area (sq ft)		582.54	
Q Total (cfs)	2524.00	Flow (cfs)		2524.00	
Top Width (ft)	81.27	Top Width (ft)		81.27	
Vel Total (ft/s)	4.33	Avg. Vel. (ft/s)		4.33	
Max Chl Dpth (ft)	10.12	Hydr. Depth (ft)		7.17	
Conv. Total (cfs)	87756.6	Conv. (cfs)		87756.6	
Length Wtd. (ft)	126.02	Wetted Per. (ft)		87.15	
Min Ch El (ft)	570.19	Shear (lb/sq ft)		0.35	
Alpha	1.00	Stream Power (lb/ft s)		1.50	
Frctn Loss (ft)	0.16	Cum Volume (acre-ft)		7.05	0.08
C & E Loss (ft)	0.08	Cum SA (acres)		1.14	0.04

Plan: Alt 2A Ex\_Cond, New Piers Stevens Branch Stevens Branch RS: 3921 Profile: 20%

E.G. Elev (ft)	583.10	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.41	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	582.70	Reach Len. (ft)	21.20	125.90	180.00
Crit W.S. (ft)	577.01	Flow Area (sq ft)		785.33	41.44
E.G. Slope (ft/ft)	0.000877	Area (sq ft)		785.33	41.44
Q Total (cfs)	4024.00	Flow (cfs)		4015.05	8.95
Top Width (ft)	183.16	Top Width (ft)		88.47	94.69
Vel Total (ft/s)	4.87	Avg. Vel. (ft/s)		5.11	0.22
Max Chl Dpth (ft)	12.51	Hydr. Depth (ft)		8.88	0.44
Conv. Total (cfs)	135845.6	Conv. (cfs)		135543.6	302.0
Length Wtd. (ft)	126.22	Wetted Per. (ft)		95.81	94.80
Min Ch El (ft)	570.19	Shear (lb/sq ft)		0.45	0.02
Alpha	1.10	Stream Power (lb/ft s)		2.30	0.01
Frctn Loss (ft)	0.16	Cum Volume (acre-ft)		9.80	0.34
C & E Loss (ft)	0.10	Cum SA (acres)		1.25	0.53

Plan: Alt 2A Ex\_Cond, New Piers Stevens Branch Stevens Branch RS: 3921 Profile: 10%

E.G. Elev (ft)	587.46	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.40	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	587.06	Reach Len. (ft)	21.20	125.90	180.00
Crit W.S. (ft)	579.64	Flow Area (sq ft)	55.60	1197.93	1779.79
E.G. Slope (ft/ft)	0.000663	Area (sq ft)	79.98	1197.93	1779.79
Q Total (cfs)	7740.00	Flow (cfs)	10.95	6559.58	1169.46
Top Width (ft)	878.09	Top Width (ft)	151.28	97.77	629.04
Vel Total (ft/s)	2.55	Avg. Vel. (ft/s)	0.20	5.48	0.66
Max Chl Dpth (ft)	16.88	Hydr. Depth (ft)	0.42	12.25	2.83
Conv. Total (cfs)	300520.7	Conv. (cfs)	425.3	254688.8	45406.6
Length Wtd. (ft)	134.79	Wetted Per. (ft)	131.01	106.89	630.02
Min Ch El (ft)	570.19	Shear (lb/sq ft)	0.02	0.46	0.12
Alpha	3.91	Stream Power (lb/ft s)	0.00	2.54	0.08
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)	2.63	16.20	16.49
C & E Loss (ft)	0.07	Cum SA (acres)	2.24	1.52	5.80

Plan: Alt 2A Ex\_Cond, New Piers Stevens Branch Stevens Branch RS: 3921 Profile: 2%

E.G. Elev (ft)	589.85	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.34	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	589.51	Reach Len. (ft)	21.20	125.90	180.00
Crit W.S. (ft)	581.54	Flow Area (sq ft)	558.45	1437.35	3373.49
E.G. Slope (ft/ft)	0.000524	Area (sq ft)	639.77	1437.35	3373.49
Q Total (cfs)	11040.00	Flow (cfs)	303.61	7896.79	2839.60
Top Width (ft)	989.21	Top Width (ft)	233.77	97.77	657.67
Vel Total (ft/s)	2.06	Avg. Vel. (ft/s)	0.54	5.49	0.84
Max Chl Dpth (ft)	19.32	Hydr. Depth (ft)	2.66	14.70	5.13
Conv. Total (cfs)	482407.9	Conv. (cfs)	13266.7	345060.9	124080.2
Length Wtd. (ft)	137.38	Wetted Per. (ft)	210.15	106.89	658.97
Min Ch El (ft)	570.19	Shear (lb/sq ft)	0.09	0.44	0.17
Alpha	5.15	Stream Power (lb/ft s)	0.05	2.42	0.14
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	9.50	20.07	33.61
C & E Loss (ft)	0.05	Cum SA (acres)	3.10	1.54	7.26

Plan: Alt 2A Ex\_Cond, New Piers Stevens Branch Stevens Branch RS: 3921 Profile: 1%

E.G. Elev (ft)	590.72	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.32	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	590.40	Reach Len. (ft)	21.20	125.90	180.00
Crit W.S. (ft)	582.43	Flow Area (sq ft)	744.43	1523.94	3959.43
E.G. Slope (ft/ft)	0.000486	Area (sq ft)	866.26	1523.94	3959.43
Q Total (cfs)	12400.00	Flow (cfs)	472.05	8382.81	3545.14
Top Width (ft)	1069.46	Top Width (ft)	296.65	97.77	675.04
Vel Total (ft/s)	1.99	Avg. Vel. (ft/s)	0.63	5.50	0.90
Max Chl Dpth (ft)	20.21	Hydr. Depth (ft)	3.55	15.59	5.87
Conv. Total (cfs)	562692.5	Conv. (cfs)	21420.9	380398.7	160872.9
Length Wtd. (ft)	137.55	Wetted Per. (ft)	210.15	106.89	676.41
Min Ch El (ft)	570.19	Shear (lb/sq ft)	0.11	0.43	0.18
Alpha	5.22	Stream Power (lb/ft s)	0.07	2.38	0.16
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	12.52	21.43	40.36
C & E Loss (ft)	0.04	Cum SA (acres)	3.48	1.55	7.86

Plan: Alt 2A Ex\_Cond, New Piers Stevens Branch Stevens Branch RS: 3921 Profile: 0.2%

E.G. Elev (ft)	592.19	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.31	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	591.88	Reach Len. (ft)	21.20	125.90	180.00
Crit W.S. (ft)	585.01	Flow Area (sq ft)	1056.59	1669.28	4990.37
E.G. Slope (ft/ft)	0.000446	Area (sq ft)	1322.20	1669.28	4990.37
Q Total (cfs)	14980.00	Flow (cfs)	810.99	9351.54	4817.47
Top Width (ft)	1117.25	Top Width (ft)	317.28	97.77	702.20
Vel Total (ft/s)	1.94	Avg. Vel. (ft/s)	0.77	5.60	0.97
Max Chl Dpth (ft)	21.70	Hydr. Depth (ft)	5.03	17.07	7.11
Conv. Total (cfs)	709252.4	Conv. (cfs)	38397.7	442763.8	228090.8
Length Wtd. (ft)	137.47	Wetted Per. (ft)	210.15	106.89	703.71
Min Ch El (ft)	570.19	Shear (lb/sq ft)	0.14	0.43	0.20
Alpha	5.29	Stream Power (lb/ft s)	0.11	2.44	0.19
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	18.32	23.77	52.79
C & E Loss (ft)	0.04	Cum SA (acres)	3.99	1.57	8.62



Plan: Alt 2A Ex\_Cond, New Piers Stevens Branch Stevens Branch RS: 3508 Profile: 50%

E.G. Elev (ft)	580.36	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.67	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	579.68	Reach Len. (ft)	245.30	268.30	311.80
Crit W.S. (ft)	577.03	Flow Area (sq ft)		380.68	13.46
E.G. Slope (ft/ft)	0.002190	Area (sq ft)		380.68	13.46
Q Total (cfs)	2524.00	Flow (cfs)		2513.13	10.87
Top Width (ft)	67.33	Top Width (ft)		60.01	7.32
Vel Total (ft/s)	6.40	Avg. Vel. (ft/s)		6.60	0.81
Max Chl Dpth (ft)	7.21	Hydr. Depth (ft)		6.34	1.84
Conv. Total (cfs)	53928.9	Conv. (cfs)		53696.6	232.3
Length Wtd. (ft)	268.39	Wetted Per. (ft)		62.86	8.18
Min Ch El (ft)	572.47	Shear (lb/sq ft)		0.83	0.23
Alpha	1.06	Stream Power (lb/ft s)		5.47	0.18
Frctn Loss (ft)	0.53	Cum Volume (acre-ft)		5.65	0.05
C & E Loss (ft)	0.05	Cum SA (acres)		0.94	0.03

Plan: Alt 2A Ex\_Cond, New Piers Stevens Branch Stevens Branch RS: 3508 Profile: 20%

E.G. Elev (ft)	582.84	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.91	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	581.92	Reach Len. (ft)	245.30	268.30	311.80
Crit W.S. (ft)	578.50	Flow Area (sq ft)		517.50	44.24
E.G. Slope (ft/ft)	0.002114	Area (sq ft)		517.50	44.24
Q Total (cfs)	4024.00	Flow (cfs)		3985.13	38.87
Top Width (ft)	120.78	Top Width (ft)		62.28	58.50
Vel Total (ft/s)	7.16	Avg. Vel. (ft/s)		7.70	0.88
Max Chl Dpth (ft)	9.45	Hydr. Depth (ft)		8.31	0.76
Conv. Total (cfs)	87511.2	Conv. (cfs)		86666.0	845.3
Length Wtd. (ft)	268.51	Wetted Per. (ft)		66.05	59.87
Min Ch El (ft)	572.47	Shear (lb/sq ft)		1.03	0.10
Alpha	1.14	Stream Power (lb/ft s)		7.96	0.09
Frctn Loss (ft)	0.50	Cum Volume (acre-ft)		7.91	0.16
C & E Loss (ft)	0.09	Cum SA (acres)		1.03	0.21

Plan: Alt 2A Ex\_Cond, New Piers Stevens Branch Stevens Branch RS: 3508 Profile: 10%

E.G. Elev (ft)	587.26	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.75	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	586.51	Reach Len. (ft)	245.30	268.30	311.80
Crit W.S. (ft)	581.44	Flow Area (sq ft)	41.18	819.43	1440.17
E.G. Slope (ft/ft)	0.001410	Area (sq ft)	41.23	819.43	1440.17
Q Total (cfs)	7740.00	Flow (cfs)	10.99	6312.59	1416.42
Top Width (ft)	637.97	Top Width (ft)	104.95	72.20	460.83
Vel Total (ft/s)	3.36	Avg. Vel. (ft/s)	0.27	7.70	0.98
Max Chl Dpth (ft)	14.04	Hydr. Depth (ft)	0.40	11.35	3.13
Conv. Total (cfs)	206095.5	Conv. (cfs)	292.6	168087.3	37715.6
Length Wtd. (ft)	273.68	Wetted Per. (ft)	104.04	77.15	468.25
Min Ch El (ft)	572.47	Shear (lb/sq ft)	0.03	0.94	0.27
Alpha	4.29	Stream Power (lb/ft s)	0.01	7.20	0.27
Frctn Loss (ft)	0.34	Cum Volume (acre-ft)	2.60	13.29	9.84
C & E Loss (ft)	0.04	Cum SA (acres)	2.18	1.28	3.55

Plan: Alt 2A Ex\_Cond, New Piers Stevens Branch Stevens Branch RS: 3508 Profile: 2%

E.G. Elev (ft)	589.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.58	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	589.13	Reach Len. (ft)	245.30	268.30	311.80
Crit W.S. (ft)	584.94	Flow Area (sq ft)	534.78	1008.89	2697.26
E.G. Slope (ft/ft)	0.000979	Area (sq ft)	557.13	1008.89	2697.26
Q Total (cfs)	11040.00	Flow (cfs)	397.88	7440.40	3201.73
Top Width (ft)	773.49	Top Width (ft)	210.90	72.20	490.39
Vel Total (ft/s)	2.60	Avg. Vel. (ft/s)	0.74	7.37	1.19
Max Chl Dpth (ft)	16.66	Hydr. Depth (ft)	2.66	13.97	5.50
Conv. Total (cfs)	352750.3	Conv. (cfs)	12713.0	237735.7	102301.6
Length Wtd. (ft)	276.50	Wetted Per. (ft)	201.05	77.15	503.20
Min Ch El (ft)	572.47	Shear (lb/sq ft)	0.16	0.80	0.33
Alpha	5.47	Stream Power (lb/ft s)	0.12	5.90	0.39
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)	9.21	16.54	21.06
C & E Loss (ft)	0.00	Cum SA (acres)	2.99	1.29	4.89

Plan: Alt 2A Ex\_Cond, New Piers Stevens Branch Stevens Branch RS: 3508 Profile: 1%

E.G. Elev (ft)	590.59	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.54	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	590.05	Reach Len. (ft)	245.30	268.30	311.80
Crit W.S. (ft)	585.96	Flow Area (sq ft)	720.01	1075.46	3151.52
E.G. Slope (ft/ft)	0.000885	Area (sq ft)	751.58	1075.46	3151.52
Q Total (cfs)	12400.00	Flow (cfs)	620.90	7867.67	3911.44
Top Width (ft)	778.03	Top Width (ft)	210.90	72.20	494.93
Vel Total (ft/s)	2.51	Avg. Vel. (ft/s)	0.86	7.32	1.24
Max Chl Dpth (ft)	17.58	Hydr. Depth (ft)	3.58	14.90	6.37
Conv. Total (cfs)	416792.0	Conv. (cfs)	20869.7	264450.2	131472.2
Length Wtd. (ft)	277.11	Wetted Per. (ft)	201.05	77.15	509.67
Min Ch El (ft)	572.47	Shear (lb/sq ft)	0.20	0.77	0.34
Alpha	5.49	Stream Power (lb/ft s)	0.17	5.63	0.42
Frctn Loss (ft)	0.24	Cum Volume (acre-ft)	12.13	17.68	25.67
C & E Loss (ft)	0.00	Cum SA (acres)	3.36	1.30	5.44

Plan: Alt 2A Ex\_Cond, New Piers Stevens Branch Stevens Branch RS: 3508 Profile: 0.2%

E.G. Elev (ft)	592.08	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.50	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	591.58	Reach Len. (ft)	245.30	268.30	311.80
Crit W.S. (ft)	586.70	Flow Area (sq ft)	1025.89	1185.39	3911.23
E.G. Slope (ft/ft)	0.000787	Area (sq ft)	1165.83	1185.39	3911.23
Q Total (cfs)	14980.00	Flow (cfs)	1055.99	8722.98	5201.03
Top Width (ft)	876.85	Top Width (ft)	300.54	72.20	504.11
Vel Total (ft/s)	2.45	Avg. Vel. (ft/s)	1.03	7.36	1.33
Max Chl Dpth (ft)	19.11	Hydr. Depth (ft)	5.11	16.42	7.76
Conv. Total (cfs)	534113.5	Conv. (cfs)	37651.5	311018.6	185443.4
Length Wtd. (ft)	278.14	Wetted Per. (ft)	201.05	77.15	522.04
Min Ch El (ft)	572.47	Shear (lb/sq ft)	0.25	0.75	0.37
Alpha	5.38	Stream Power (lb/ft s)	0.26	5.55	0.49
Frctn Loss (ft)	0.21	Cum Volume (acre-ft)	17.71	19.65	34.39
C & E Loss (ft)	0.01	Cum SA (acres)	3.84	1.33	6.13

Plan: Alt 2A Ex\_Cond, New Piers Stevens Branch Stevens Branch RS: 2628 Profile: 50%

E.G. Elev (ft)	579.78	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.50	Wt. n-Val.		0.035	
W.S. Elev (ft)	579.28	Reach Len. (ft)	382.10	343.40	269.80
Crit W.S. (ft)	576.32	Flow Area (sq ft)		445.41	
E.G. Slope (ft/ft)	0.001784	Area (sq ft)		445.41	
Q Total (cfs)	2524.00	Flow (cfs)		2524.00	
Top Width (ft)	75.70	Top Width (ft)		75.70	
Vel Total (ft/s)	5.67	Avg. Vel. (ft/s)		5.67	
Max Chl Dpth (ft)	7.17	Hydr. Depth (ft)		5.88	
Conv. Total (cfs)	59761.7	Conv. (cfs)		59761.7	
Length Wtd. (ft)	343.40	Wetted Per. (ft)		79.28	
Min Ch El (ft)	572.11	Shear (lb/sq ft)		0.63	
Alpha	1.00	Stream Power (lb/ft s)		3.55	
Frctn Loss (ft)	0.78	Cum Volume (acre-ft)		3.11	
C & E Loss (ft)	0.03	Cum SA (acres)		0.52	

Plan: Alt 2A Ex\_Cond, New Piers Stevens Branch Stevens Branch RS: 2628 Profile: 20%

E.G. Elev (ft)	582.25	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.63	Wt. n-Val.		0.035	
W.S. Elev (ft)	581.62	Reach Len. (ft)	382.10	343.40	269.80
Crit W.S. (ft)	577.68	Flow Area (sq ft)		633.47	
E.G. Slope (ft/ft)	0.001653	Area (sq ft)		633.47	
Q Total (cfs)	4024.00	Flow (cfs)		4024.00	
Top Width (ft)	84.88	Top Width (ft)		84.88	
Vel Total (ft/s)	6.35	Avg. Vel. (ft/s)		6.35	
Max Chl Dpth (ft)	9.51	Hydr. Depth (ft)		7.46	
Conv. Total (cfs)	98959.9	Conv. (cfs)		98959.9	
Length Wtd. (ft)	343.40	Wetted Per. (ft)		89.75	
Min Ch El (ft)	572.11	Shear (lb/sq ft)		0.73	
Alpha	1.00	Stream Power (lb/ft s)		4.63	
Frctn Loss (ft)	0.75	Cum Volume (acre-ft)		4.37	
C & E Loss (ft)	0.05	Cum SA (acres)		0.58	

Plan: Alt 2A Ex\_Cond, New Piers Stevens Branch Stevens Branch RS: 2628 Profile: 10%

E.G. Elev (ft)	586.88	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.61	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	586.27	Reach Len. (ft)	382.10	343.40	269.80
Crit W.S. (ft)	580.37	Flow Area (sq ft)	164.12	1094.69	689.44
E.G. Slope (ft/ft)	0.001098	Area (sq ft)	344.46	1094.69	689.44
Q Total (cfs)	7740.00	Flow (cfs)	72.53	7125.51	541.96
Top Width (ft)	625.57	Top Width (ft)	261.19	104.60	259.78
Vel Total (ft/s)	3.97	Avg. Vel. (ft/s)	0.44	6.51	0.79
Max Chl Dpth (ft)	14.16	Hydr. Depth (ft)	1.12	10.47	2.65
Conv. Total (cfs)	233581.5	Conv. (cfs)	2189.0	215037.0	16355.5
Length Wtd. (ft)	340.95	Wetted Per. (ft)	146.80	109.99	259.99
Min Ch El (ft)	572.11	Shear (lb/sq ft)	0.08	0.68	0.18
Alpha	2.47	Stream Power (lb/ft s)	0.03	4.44	0.14
Frctn Loss (ft)	0.58	Cum Volume (acre-ft)	1.51	7.39	2.22
C & E Loss (ft)	0.09	Cum SA (acres)	1.15	0.73	0.97

Plan: Alt 2A Ex\_Cond, New Piers Stevens Branch Stevens Branch RS: 2628 Profile: 2%

E.G. Elev (ft)	589.45	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.58	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	588.88	Reach Len. (ft)	382.10	343.40	269.80
Crit W.S. (ft)	582.32	Flow Area (sq ft)	546.05	1367.20	1573.04
E.G. Slope (ft/ft)	0.000861	Area (sq ft)	1060.90	1367.20	1573.04
Q Total (cfs)	11040.00	Flow (cfs)	476.33	9139.98	1423.69
Top Width (ft)	837.72	Top Width (ft)	333.22	104.60	399.91
Vel Total (ft/s)	3.17	Avg. Vel. (ft/s)	0.87	6.69	0.91
Max Chl Dpth (ft)	16.77	Hydr. Depth (ft)	3.72	13.07	3.93
Conv. Total (cfs)	376218.8	Conv. (cfs)	16232.2	311470.4	48516.1
Length Wtd. (ft)	338.45	Wetted Per. (ft)	146.80	109.99	400.17
Min Ch El (ft)	572.11	Shear (lb/sq ft)	0.20	0.67	0.21
Alpha	3.70	Stream Power (lb/ft s)	0.17	4.47	0.19
Frctn Loss (ft)	0.49	Cum Volume (acre-ft)	4.65	9.22	5.78
C & E Loss (ft)	0.13	Cum SA (acres)	1.46	0.75	1.70

Plan: Alt 2A Ex\_Cond, New Piers Stevens Branch Stevens Branch RS: 2628 Profile: 1%

E.G. Elev (ft)	590.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.58	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	589.77	Reach Len. (ft)	382.10	343.40	269.80
Crit W.S. (ft)	583.84	Flow Area (sq ft)	676.72	1460.43	1960.05
E.G. Slope (ft/ft)	0.000818	Area (sq ft)	1390.03	1460.43	1960.05
Q Total (cfs)	12400.00	Flow (cfs)	664.01	9946.55	1789.45
Top Width (ft)	962.17	Top Width (ft)	384.06	104.60	473.51
Vel Total (ft/s)	3.03	Avg. Vel. (ft/s)	0.98	6.81	0.91
Max Chl Dpth (ft)	17.66	Hydr. Depth (ft)	4.62	13.96	4.14
Conv. Total (cfs)	433425.3	Conv. (cfs)	23209.5	347668.1	62547.6
Length Wtd. (ft)	337.53	Wetted Per. (ft)	146.80	109.99	473.78
Min Ch El (ft)	572.11	Shear (lb/sq ft)	0.24	0.68	0.21
Alpha	4.08	Stream Power (lb/ft s)	0.23	4.62	0.19
Frctn Loss (ft)	0.48	Cum Volume (acre-ft)	6.10	9.87	7.38
C & E Loss (ft)	0.13	Cum SA (acres)	1.68	0.76	1.97

Plan: Alt 2A Ex\_Cond, New Piers Stevens Branch Stevens Branch RS: 2628 Profile: 0.2%

E.G. Elev (ft)	591.86	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.57	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	591.28	Reach Len. (ft)	382.10	343.40	269.80
Crit W.S. (ft)	585.05	Flow Area (sq ft)	898.75	1618.85	2739.83
E.G. Slope (ft/ft)	0.000748	Area (sq ft)	1989.00	1618.85	2739.83
Q Total (cfs)	14980.00	Flow (cfs)	1018.57	11288.78	2672.66
Top Width (ft)	1062.34	Top Width (ft)	397.60	104.60	560.14
Vel Total (ft/s)	2.85	Avg. Vel. (ft/s)	1.13	6.97	0.98
Max Chl Dpth (ft)	19.17	Hydr. Depth (ft)	6.13	15.48	4.89
Conv. Total (cfs)	547737.8	Conv. (cfs)	37243.4	412769.8	97724.6
Length Wtd. (ft)	335.51	Wetted Per. (ft)	146.80	109.99	560.43
Min Ch El (ft)	572.11	Shear (lb/sq ft)	0.29	0.69	0.23
Alpha	4.55	Stream Power (lb/ft s)	0.32	4.79	0.22
Frctn Loss (ft)	0.45	Cum Volume (acre-ft)	8.83	11.01	10.59
C & E Loss (ft)	0.14	Cum SA (acres)	1.88	0.78	2.32

Plan: Alt 2A Ex\_Cond, New Piers Stevens Branch Stevens Branch RS: 1501 Profile: 50%

E.G. Elev (ft)	578.96	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.84	Wt. n-Val.		0.035	
W.S. Elev (ft)	578.12	Reach Len. (ft)			
Crit W.S. (ft)	575.76	Flow Area (sq ft)		343.65	
E.G. Slope (ft/ft)	0.003000	Area (sq ft)		343.65	
Q Total (cfs)	2524.00	Flow (cfs)		2524.00	
Top Width (ft)	56.60	Top Width (ft)		56.60	
Vel Total (ft/s)	7.34	Avg. Vel. (ft/s)		7.34	
Max Chl Dpth (ft)	7.34	Hydr. Depth (ft)		6.07	
Conv. Total (cfs)	46079.4	Conv. (cfs)		46079.4	
Length Wtd. (ft)		Wetted Per. (ft)		61.22	
Min Ch El (ft)	570.78	Shear (lb/sq ft)		1.05	
Alpha	1.00	Stream Power (lb/ft s)		7.72	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Plan: Alt 2A Ex\_Cond, New Piers Stevens Branch Stevens Branch RS: 1501 Profile: 20%

E.G. Elev (ft)	581.45	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.11	Wt. n-Val.		0.035	
W.S. Elev (ft)	580.34	Reach Len. (ft)			
Crit W.S. (ft)	577.36	Flow Area (sq ft)		475.20	
E.G. Slope (ft/ft)	0.003000	Area (sq ft)		475.20	
Q Total (cfs)	4024.00	Flow (cfs)		4024.00	
Top Width (ft)	62.21	Top Width (ft)		62.21	
Vel Total (ft/s)	8.47	Avg. Vel. (ft/s)		8.47	
Max Chl Dpth (ft)	9.56	Hydr. Depth (ft)		7.64	
Conv. Total (cfs)	73466.4	Conv. (cfs)		73466.4	
Length Wtd. (ft)		Wetted Per. (ft)		68.38	
Min Ch El (ft)	570.78	Shear (lb/sq ft)		1.30	
Alpha	1.00	Stream Power (lb/ft s)		11.02	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Plan: Alt 2A Ex\_Cond, New Piers Stevens Branch Stevens Branch RS: 1501 Profile: 10%

E.G. Elev (ft)	586.20	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.52	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	584.69	Reach Len. (ft)			
Crit W.S. (ft)	580.55	Flow Area (sq ft)		781.30	26.87
E.G. Slope (ft/ft)	0.003002	Area (sq ft)		781.30	26.87
Q Total (cfs)	7740.00	Flow (cfs)		7728.56	11.44
Top Width (ft)	134.77	Top Width (ft)		80.76	54.01
Vel Total (ft/s)	9.58	Avg. Vel. (ft/s)		9.89	0.43
Max Chl Dpth (ft)	13.91	Hydr. Depth (ft)		9.67	0.50
Conv. Total (cfs)	141273.9	Conv. (cfs)		141065.0	208.9
Length Wtd. (ft)		Wetted Per. (ft)		89.09	54.03
Min Ch El (ft)	570.78	Shear (lb/sq ft)		1.64	0.09
Alpha	1.07	Stream Power (lb/ft s)		16.26	0.04
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Plan: Alt 2A Ex\_Cond, New Piers Stevens Branch Stevens Branch RS: 1501 Profile: 2%

E.G. Elev (ft)	588.83	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.84	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	586.99	Reach Len. (ft)			
Crit W.S. (ft)	582.87	Flow Area (sq ft)		972.25	293.00
E.G. Slope (ft/ft)	0.003000	Area (sq ft)		972.25	293.00
Q Total (cfs)	11040.00	Flow (cfs)		10729.31	310.69
Top Width (ft)	234.94	Top Width (ft)		85.15	149.79
Vel Total (ft/s)	8.73	Avg. Vel. (ft/s)		11.04	1.06
Max Chl Dpth (ft)	16.21	Hydr. Depth (ft)		11.42	1.96
Conv. Total (cfs)	201552.3	Conv. (cfs)		195880.1	5672.1
Length Wtd. (ft)		Wetted Per. (ft)		94.05	149.89
Min Ch El (ft)	570.78	Shear (lb/sq ft)		1.94	0.37
Alpha	1.55	Stream Power (lb/ft s)		21.37	0.39
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Plan: Alt 2A Ex\_Cond, New Piers Stevens Branch Stevens Branch RS: 1501 Profile: 1%

E.G. Elev (ft)	589.74	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.92	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	587.81	Reach Len. (ft)			
Crit W.S. (ft)	583.95	Flow Area (sq ft)		1043.00	421.69
E.G. Slope (ft/ft)	0.003000	Area (sq ft)		1043.00	421.69
Q Total (cfs)	12400.00	Flow (cfs)		11862.80	537.20
Top Width (ft)	251.04	Top Width (ft)		87.36	163.68
Vel Total (ft/s)	8.47	Avg. Vel. (ft/s)		11.37	1.27
Max Chl Dpth (ft)	17.03	Hydr. Depth (ft)		11.94	2.58
Conv. Total (cfs)	226400.3	Conv. (cfs)		216592.1	9808.2
Length Wtd. (ft)		Wetted Per. (ft)		96.41	163.80
Min Ch El (ft)	570.78	Shear (lb/sq ft)		2.03	0.48
Alpha	1.73	Stream Power (lb/ft s)		23.04	0.61
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Plan: Alt 2A Ex\_Cond, New Piers Stevens Branch Stevens Branch RS: 1501 Profile: 0.2%

E.G. Elev (ft)	591.26	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.02	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	589.25	Reach Len. (ft)			
Crit W.S. (ft)	585.90	Flow Area (sq ft)	23.68	1174.44	679.83
E.G. Slope (ft/ft)	0.003006	Area (sq ft)	23.68	1174.44	679.83
Q Total (cfs)	14980.00	Flow (cfs)	13.70	13883.31	1082.99
Top Width (ft)	312.49	Top Width (ft)	30.04	93.50	188.95
Vel Total (ft/s)	7.98	Avg. Vel. (ft/s)	0.58	11.82	1.59
Max Chl Dpth (ft)	18.47	Hydr. Depth (ft)	0.79	12.56	3.60
Conv. Total (cfs)	273227.7	Conv. (cfs)	250.0	253224.5	19753.2
Length Wtd. (ft)		Wetted Per. (ft)	30.08	102.61	189.13
Min Ch El (ft)	570.78	Shear (lb/sq ft)	0.15	2.15	0.67
Alpha	2.04	Stream Power (lb/ft s)	0.09	25.39	1.07
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

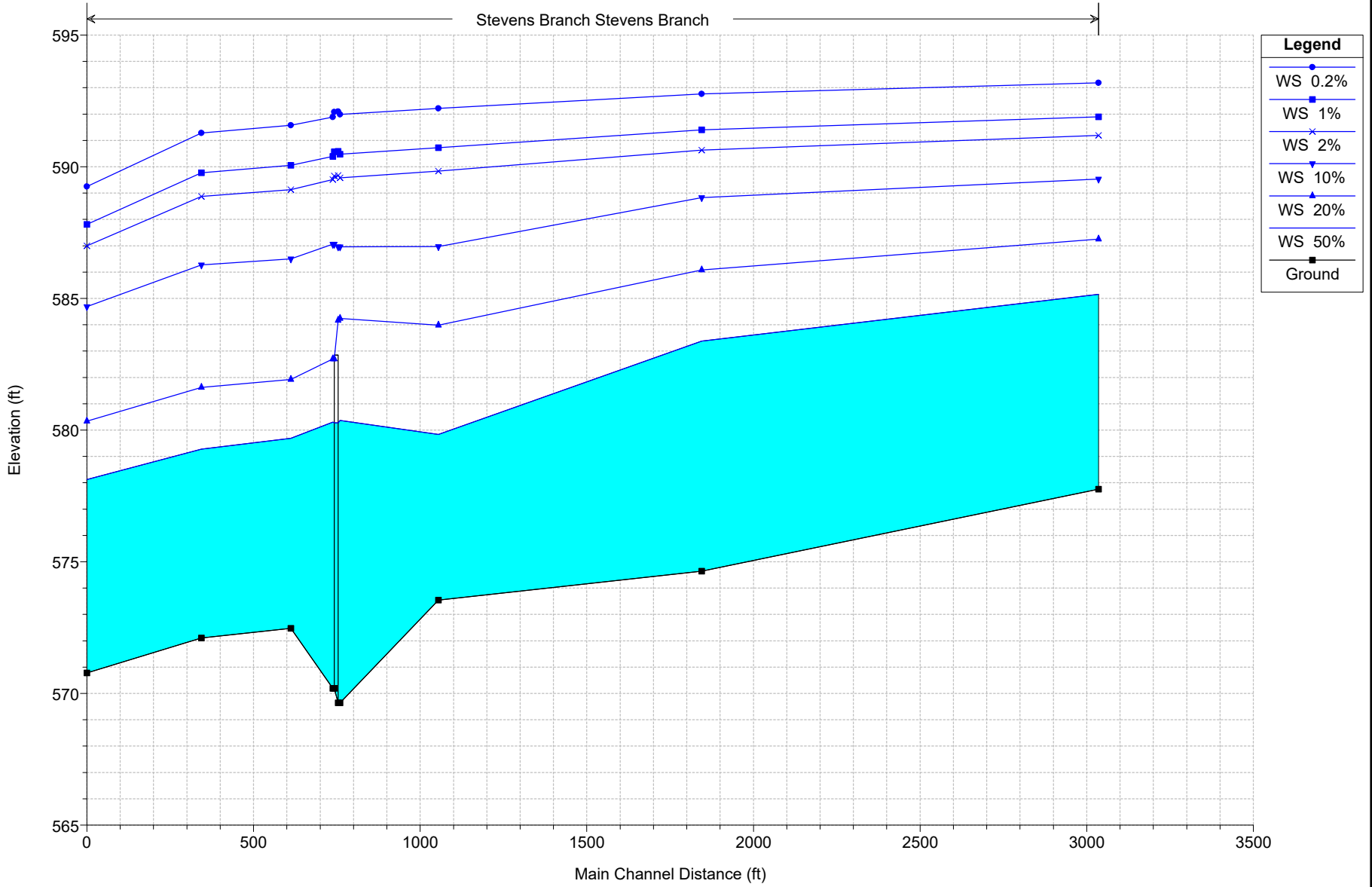


## HEC-RAS Results for Alternative 3

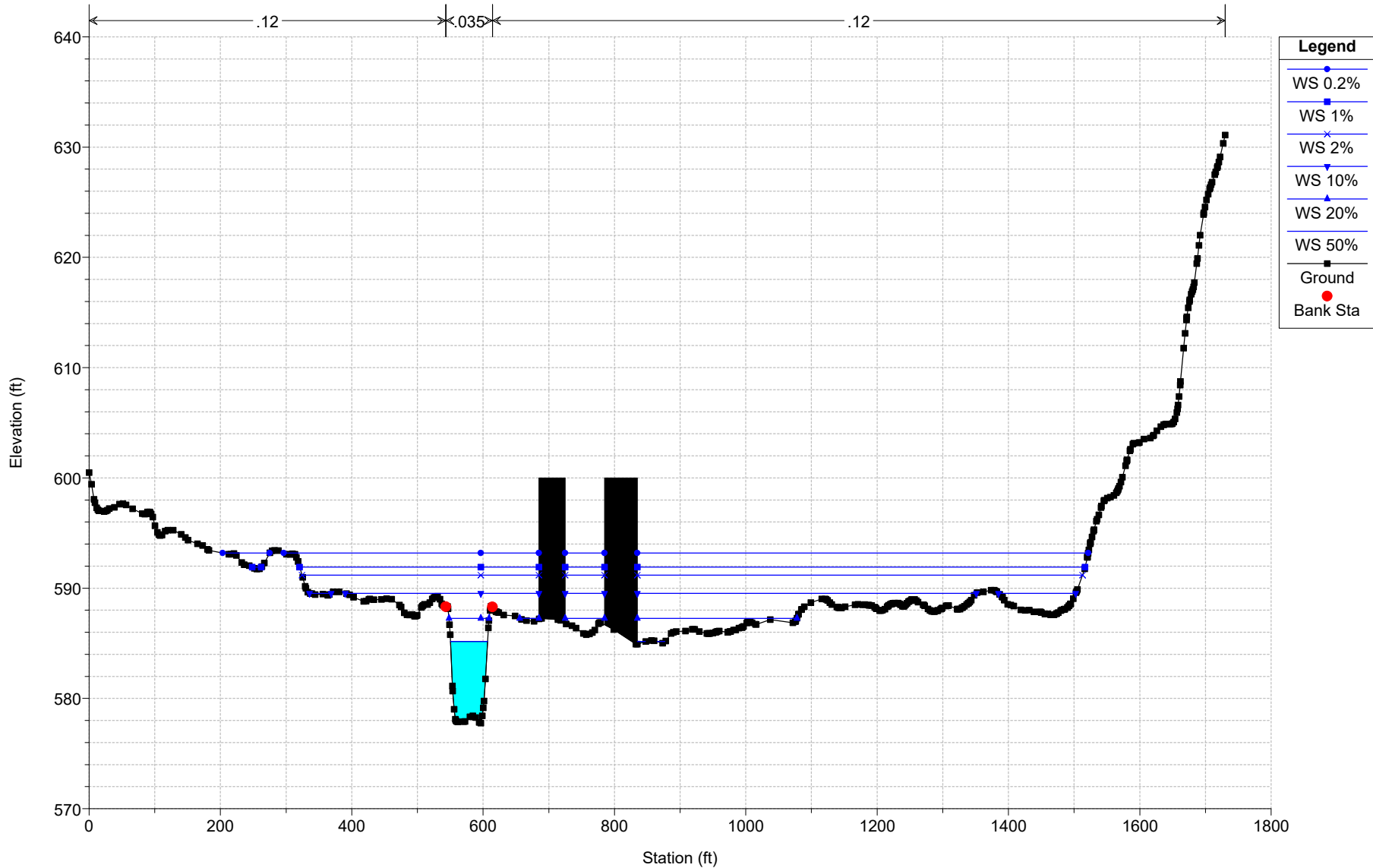
# Bridge 308

Geom: Alternative 3 - New 2 Span Bridge

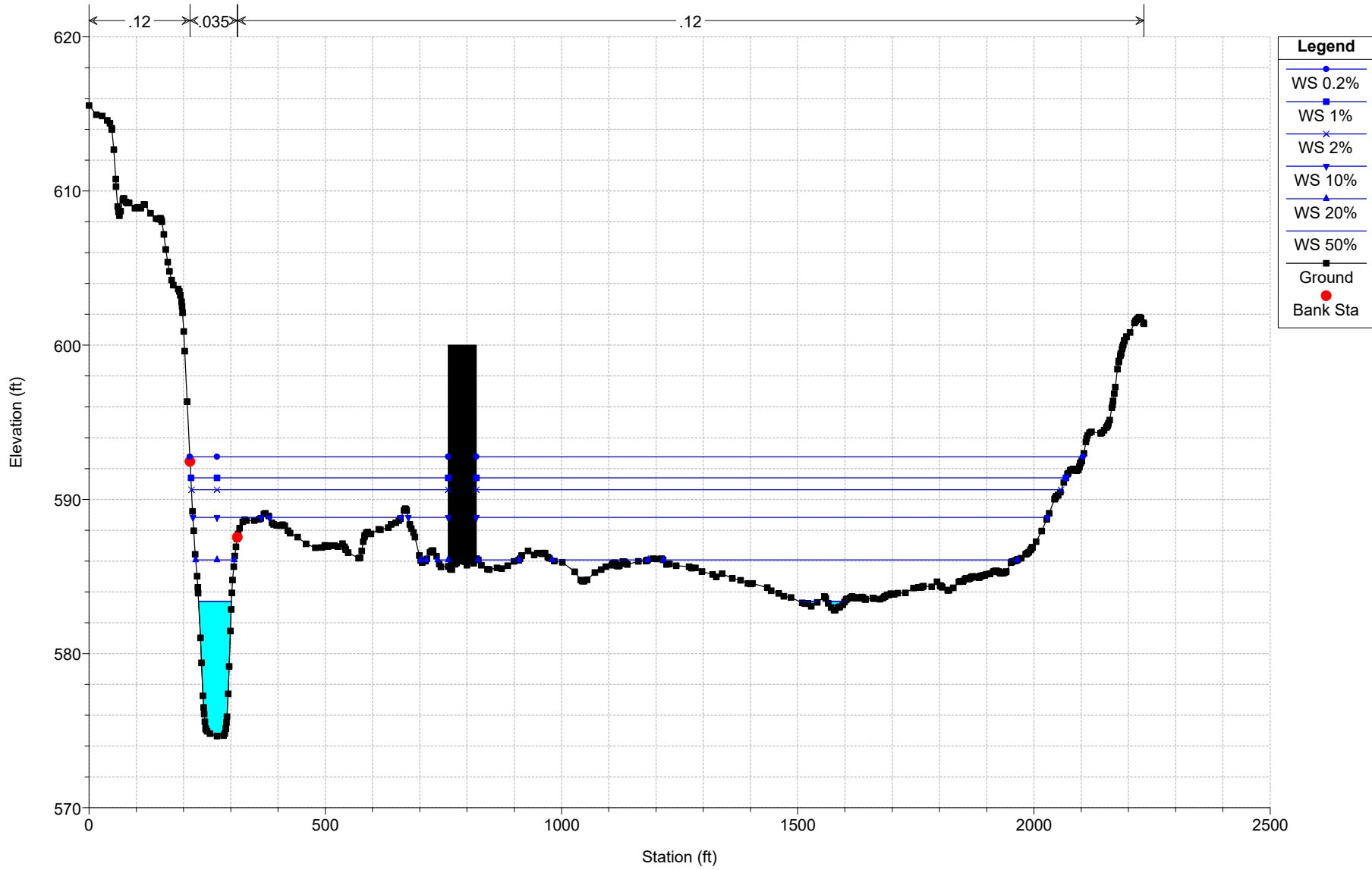
Stevens Branch Stevens Branch



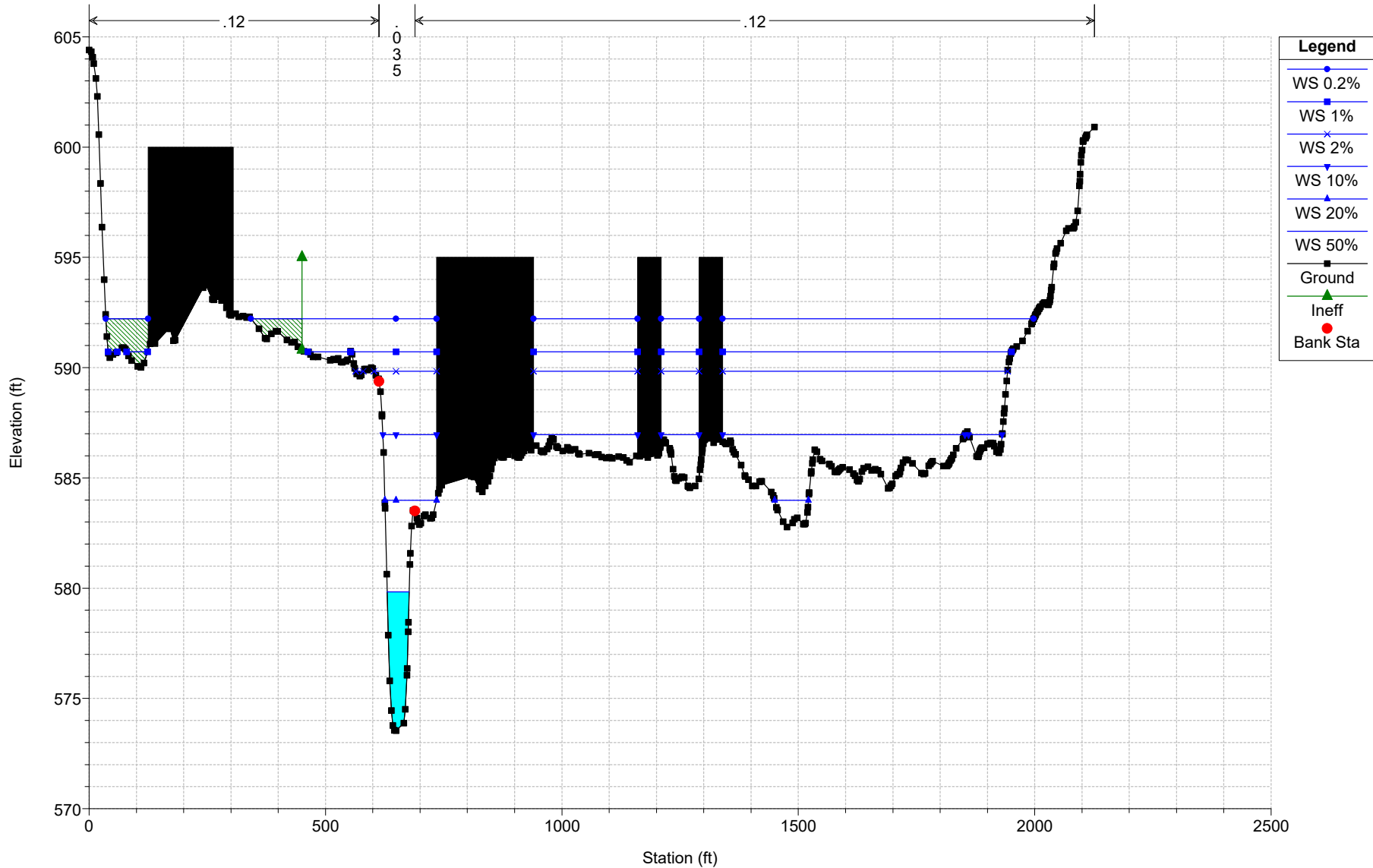
Bridge 308  
Geom: Alternative 3 - New 2 Span Bridge  
RS = 11459



Bridge 308  
Geom: Alternative 3 - New 2 Span Bridge  
RS = 7552



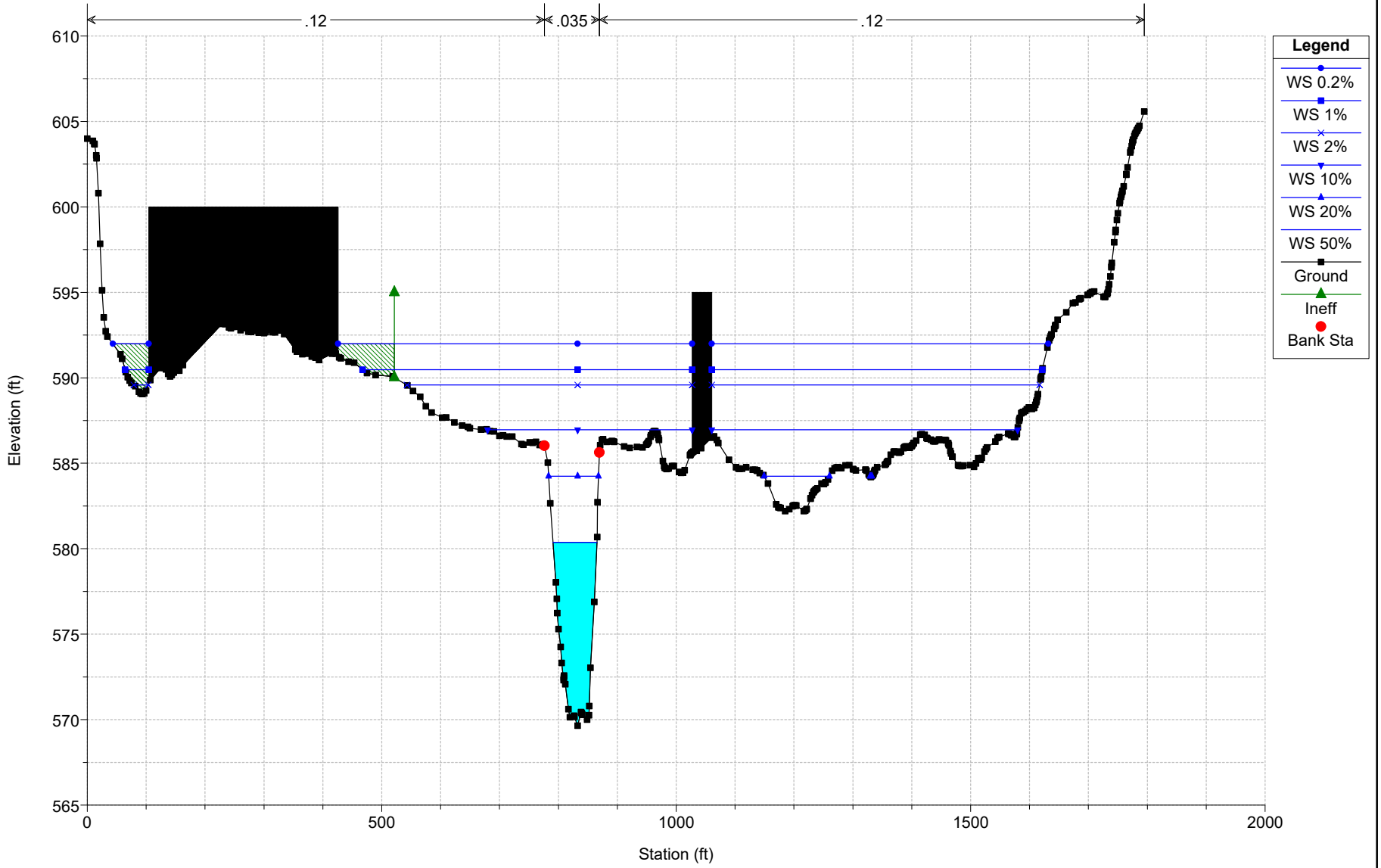
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 Geom: Alternative 3 - New 2 Span Bridge  
 RS = 4962



# Bridge 308

Geom: Alternative 3 - New 2 Span Bridge

RS = 3994

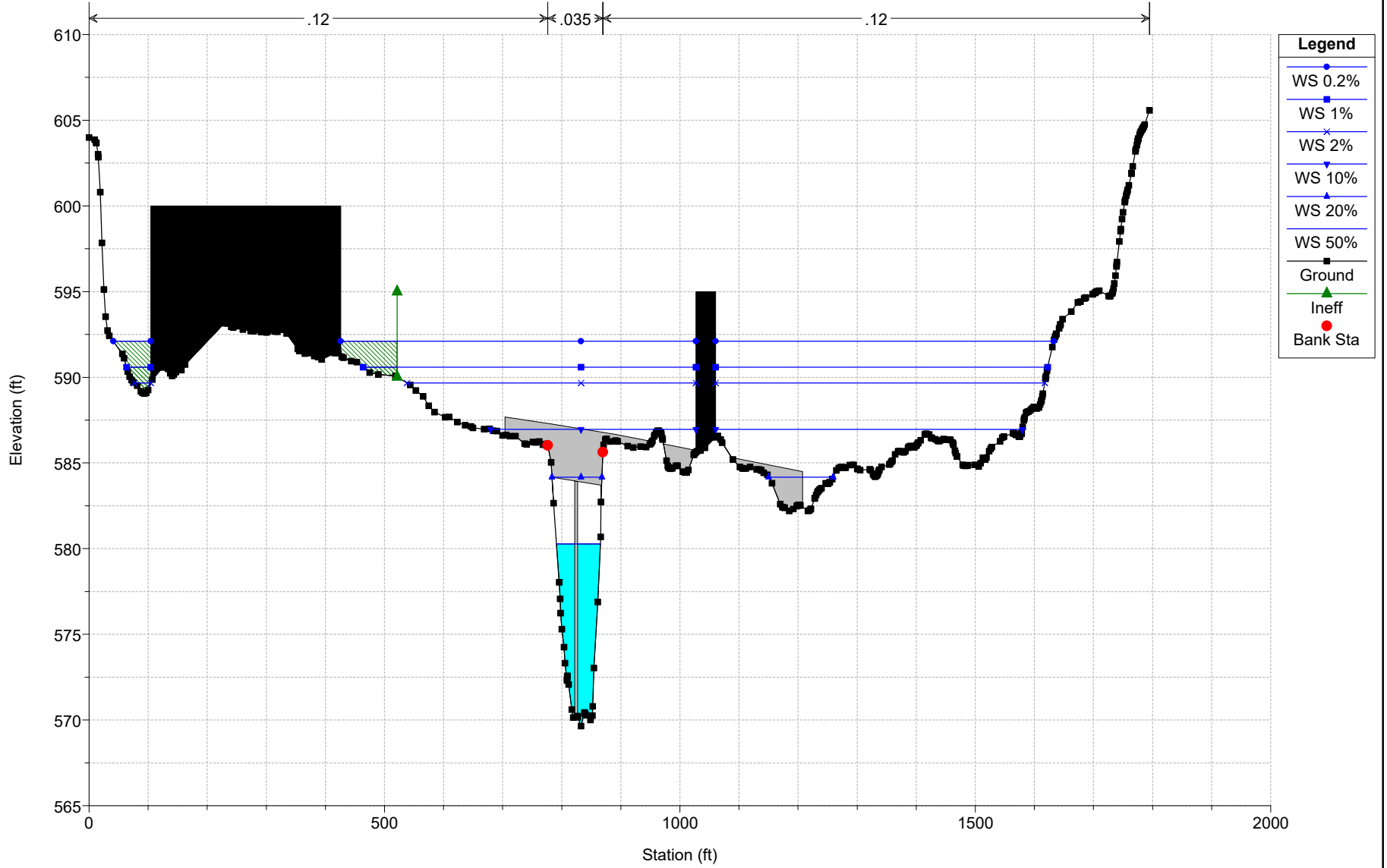




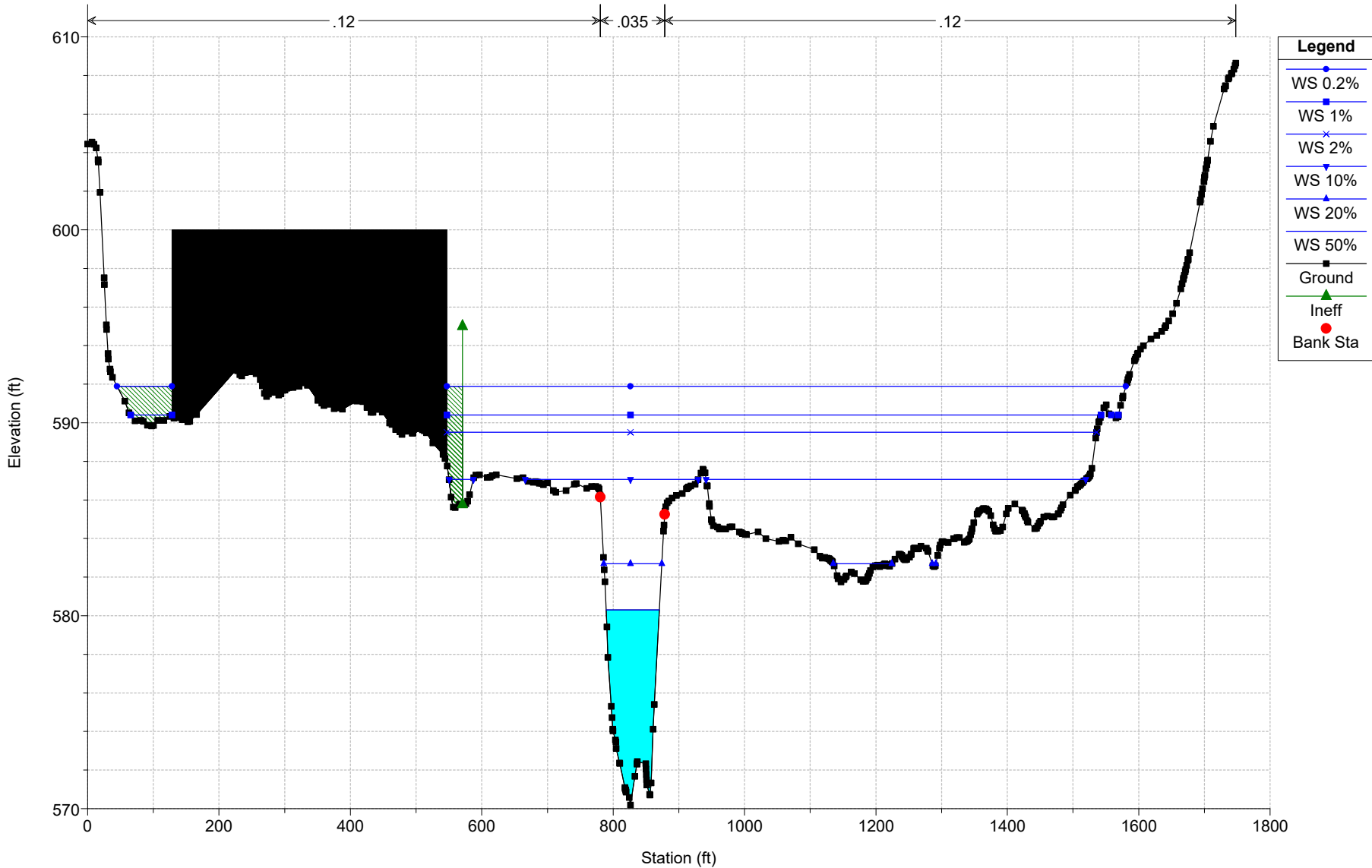
# Bridge 308

Geom: Alternative 3 - New 2 Span Bridge

RS = 3990 BR

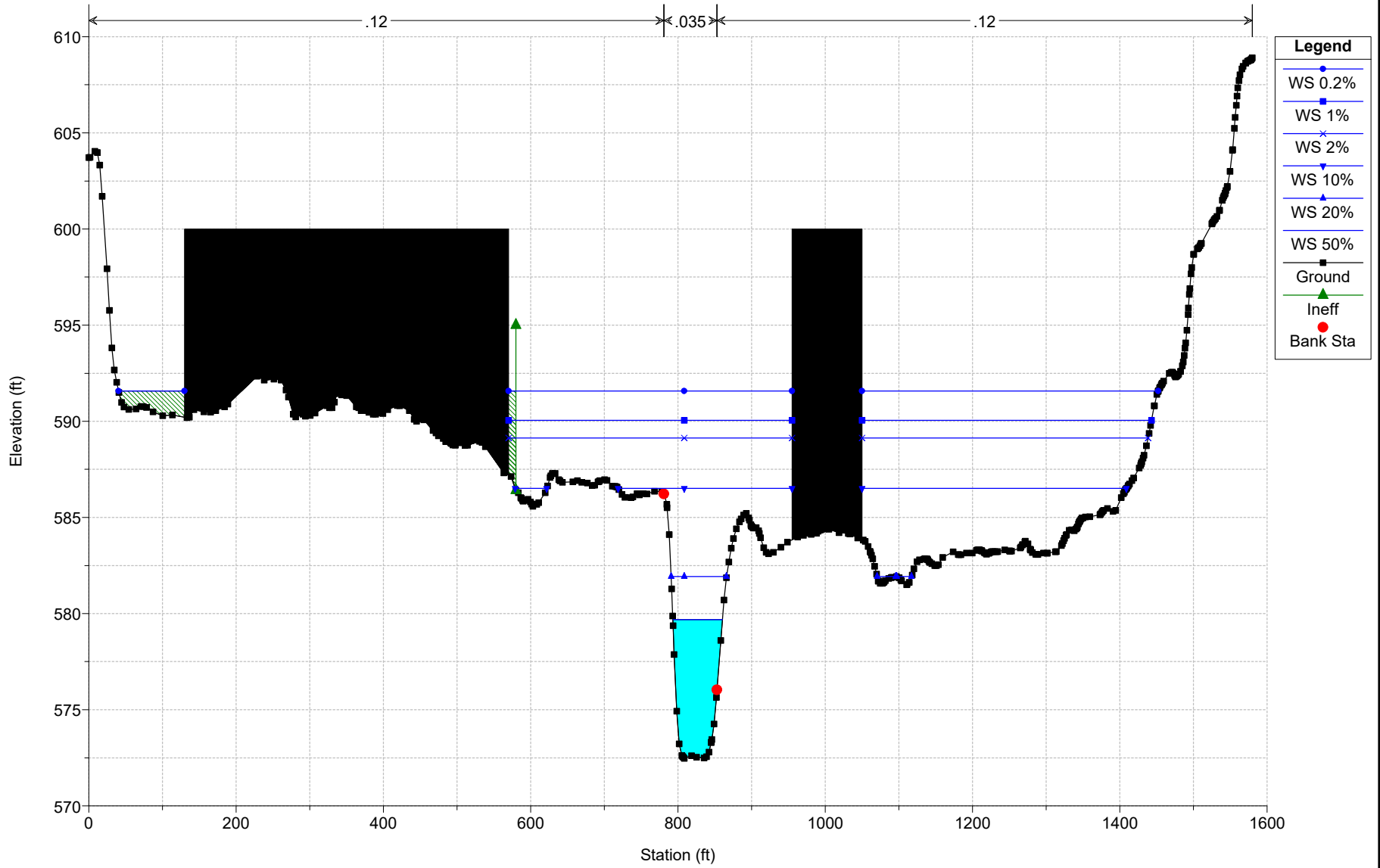


Bridge 308  
 Geom: Alternative 3 - New 2 Span Bridge  
 RS = 3921

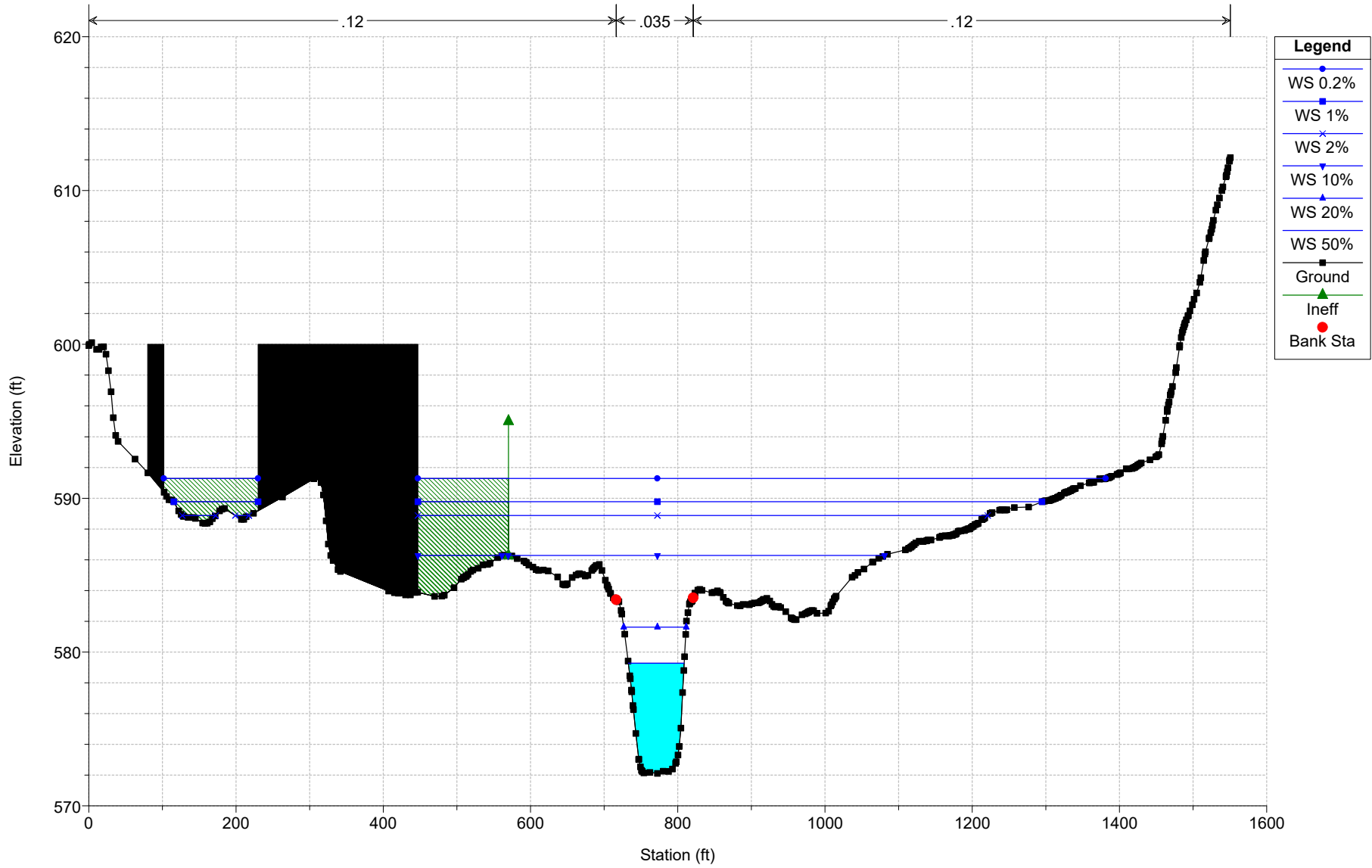


Legend	
WS 0.2%	Blue circle
WS 1%	Blue square
WS 2%	Blue cross
WS 10%	Blue inverted triangle
WS 20%	Blue triangle
WS 50%	Blue square
Ground	Black line with square markers
Ineff	Green triangle with vertical line
Bank Sta	Red circle

Bridge 308  
Geom: Alternative 3 - New 2 Span Bridge  
RS = 3508

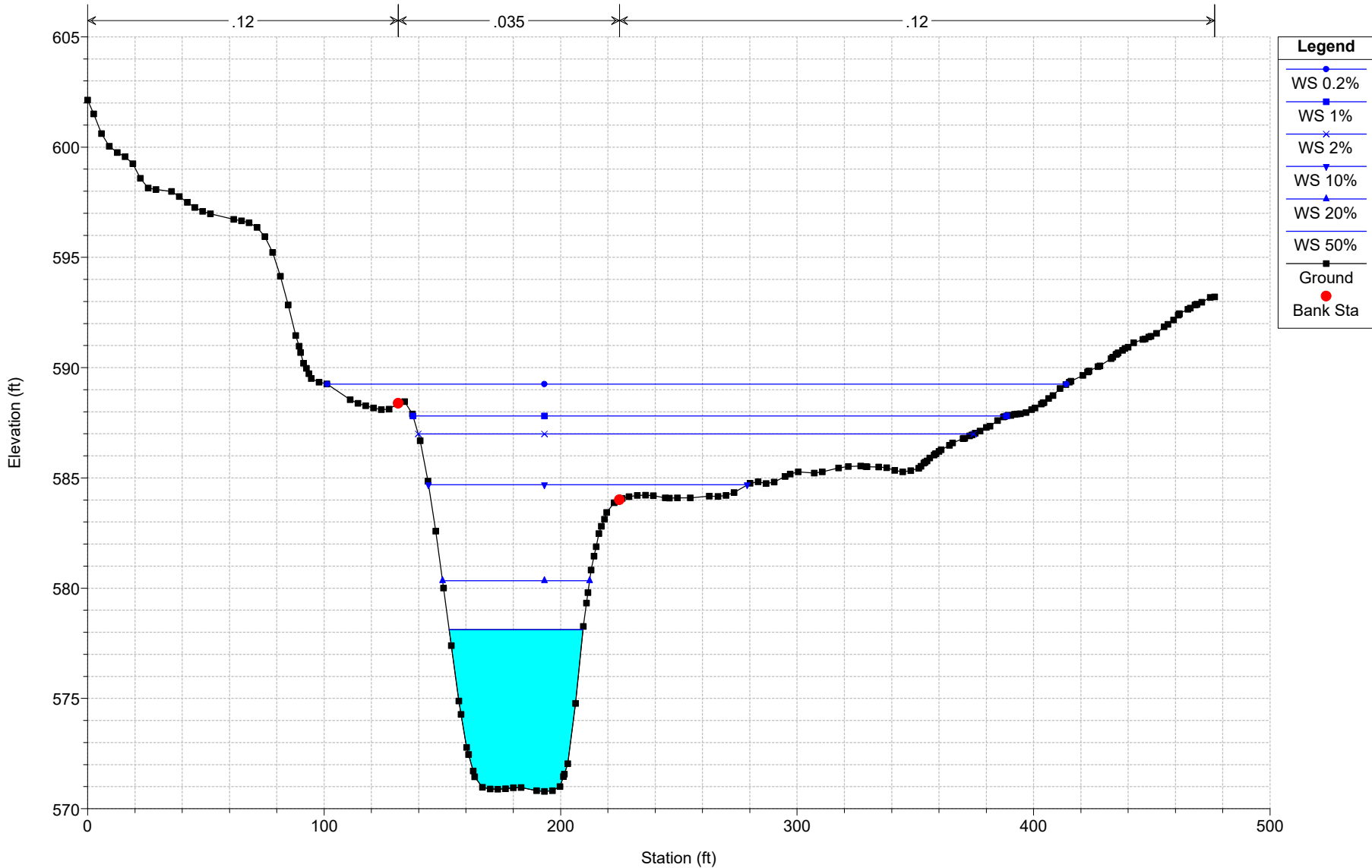


Bridge 308  
Geom: Alternative 3 - New 2 Span Bridge  
RS = 2628



Legend	
WS 0.2%	Blue line with circle marker
WS 1%	Blue line with square marker
WS 2%	Blue line with 'x' marker
WS 10%	Blue line with inverted triangle marker
WS 20%	Blue line with triangle marker
WS 50%	Solid blue line
Ground	Black dashed line
Ineff	Green line with triangle marker
Bank Sta	Red line with circle marker

Bridge 308  
Geom: Alternative 3 - New 2 Span Bridge  
RS = 1501



Plan: Alt 3 New 2 Span Stevens Branch Stevens Branch RS: 3990 Profile: 50%

E.G. US. (ft)	580.67	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	580.37	E.G. Elev (ft)	580.65	580.62
Q Total (cfs)	2524.00	W.S. Elev (ft)	580.28	580.28
Q Bridge (cfs)	2524.00	Crit W.S. (ft)	575.46	575.89
Q Weir (cfs)		Max Chl Dpth (ft)	10.64	10.09
Weir Sta Lft (ft)		Vel Total (ft/s)	4.88	4.70
Weir Sta Rgt (ft)		Flow Area (sq ft)	517.62	536.48
Weir Submerg		Froude # Chl	0.32	0.26
Weir Max Depth (ft)		Specif Force (cu ft)	2656.90	2516.52
Min EI Weir Flow (ft)	586.81	Hydr Depth (ft)	7.44	7.23
Min EI Prs (ft)	582.85	W.P. Total (ft)	95.52	98.32
Delta EG (ft)	0.07	Conv. Total (cfs)	67798.8	70594.1
Delta WS (ft)	0.06	Top Width (ft)	69.58	74.20
BR Open Area (sq ft)	787.65	Frctn Loss (ft)	0.02	0.00
BR Open Vel (ft/s)	4.88	C & E Loss (ft)	0.01	0.02
BR Sluice Coef		Shear Total (lb/sq ft)	0.47	0.44
BR Sel Method	Energy only	Power Total (lb/ft s)	2.29	2.05

Plan: Alt 3 New 2 Span Stevens Branch Stevens Branch RS: 3990 Profile: 20%

E.G. US. (ft)	584.56	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	584.24	E.G. Elev (ft)	584.56	583.10
Q Total (cfs)	4024.00	W.S. Elev (ft)	584.17	582.70
Q Bridge (cfs)	4024.00	Crit W.S. (ft)	577.05	577.29
Q Weir (cfs)		Max Chl Dpth (ft)	14.53	12.51
Weir Sta Lft (ft)		Vel Total (ft/s)	4.79	5.57
Weir Sta Rgt (ft)		Flow Area (sq ft)	840.19	721.92
Weir Submerg		Froude # Chl	0.23	0.28
Weir Max Depth (ft)		Specif Force (cu ft)	5502.97	4365.53
Min EI Weir Flow (ft)	586.81	Hydr Depth (ft)	16.33	7.68
Min EI Prs (ft)	582.85	W.P. Total (ft)	246.18	126.23
Delta EG (ft)	1.45	Conv. Total (cfs)	86063.2	107044.8
Delta WS (ft)	1.55	Top Width (ft)	51.44	93.99
BR Open Area (sq ft)	787.65	Frctn Loss (ft)		
BR Open Vel (ft/s)	5.11	C & E Loss (ft)		
BR Sluice Coef	0.27	Shear Total (lb/sq ft)	0.47	0.50
BR Sel Method	Press Only	Power Total (lb/ft s)	2.23	2.81

Plan: Alt 3 New 2 Span Stevens Branch Stevens Branch RS: 3990 Profile: 10%

E.G. US. (ft)	587.50	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	586.96	E.G. Elev (ft)	587.50	587.46
Q Total (cfs)	7740.00	W.S. Elev (ft)	586.96	587.06
Q Bridge (cfs)	3345.22	Crit W.S. (ft)	580.10	579.99
Q Weir (cfs)	4394.78	Max Chl Dpth (ft)	17.31	16.88
Weir Sta Lft (ft)	617.75	Vel Total (ft/s)	4.26	3.71
Weir Sta Rgt (ft)	1582.29	Flow Area (sq ft)	1817.14	2085.29
Weir Submerg	0.87	Froude # Chl	0.31	0.27
Weir Max Depth (ft)	5.30	Specif Force (cu ft)	9779.62	10167.95
Min EI Weir Flow (ft)	586.81	Hydr Depth (ft)	2.49	2.83
Min EI Prs (ft)	582.85	W.P. Total (ft)	927.58	933.97
Delta EG (ft)	0.05	Conv. Total (cfs)		
Delta WS (ft)	-0.11	Top Width (ft)	730.12	757.67
BR Open Area (sq ft)	787.65	Frctn Loss (ft)		
BR Open Vel (ft/s)	4.25	C & E Loss (ft)		



Plan: Alt 3 New 2 Span Stevens Branch Stevens Branch RS: 3990 Profile: 10% (Continued)

BR Sluice Coef		Shear Total (lb/sq ft)		
BR Sel Method	Press/Weir	Power Total (lb/ft s)		

Plan: Alt 3 New 2 Span Stevens Branch Stevens Branch RS: 3990 Profile: 2%

E.G. US. (ft)	589.99	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	589.58	E.G. Elev (ft)	589.92	589.88
Q Total (cfs)	11040.00	W.S. Elev (ft)	589.67	589.65
Q Bridge (cfs)	4566.45	Crit W.S. (ft)	582.12	581.94
Q Weir (cfs)		Max Chl Dpth (ft)	20.03	19.47
Weir Sta Lft (ft)		Vel Total (ft/s)	2.49	2.44
Weir Sta Rgt (ft)		Flow Area (sq ft)	4430.76	4519.30
Weir Submerg		Froude # Chl	0.16	0.15
Weir Max Depth (ft)		Specif Force (cu ft)	17689.64	18423.34
Min El Weir Flow (ft)	586.81	Hydr Depth (ft)	4.24	4.68
Min El Prs (ft)	582.85	W.P. Total (ft)	1249.83	1163.83
Delta EG (ft)	0.14	Conv. Total (cfs)	204399.2	217682.3
Delta WS (ft)	0.07	Top Width (ft)	1074.69	989.92
BR Open Area (sq ft)	787.65	Frctn Loss (ft)	0.03	0.00
BR Open Vel (ft/s)	5.80	C & E Loss (ft)	0.01	0.02
BR Sluice Coef		Shear Total (lb/sq ft)	0.65	0.62
BR Sel Method	Energy only	Power Total (lb/ft s)	1.61	1.52

Plan: Alt 3 New 2 Span Stevens Branch Stevens Branch RS: 3990 Profile: 1%

E.G. US. (ft)	590.86	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	590.48	E.G. Elev (ft)	590.78	590.75
Q Total (cfs)	12400.00	W.S. Elev (ft)	590.59	590.57
Q Bridge (cfs)	4025.81	Crit W.S. (ft)	583.06	582.71
Q Weir (cfs)		Max Chl Dpth (ft)	20.95	20.38
Weir Sta Lft (ft)		Vel Total (ft/s)	2.30	2.29
Weir Sta Rgt (ft)		Flow Area (sq ft)	5402.76	5409.79
Weir Submerg		Froude # Chl	0.14	0.13
Weir Max Depth (ft)		Specif Force (cu ft)	22178.10	22980.44
Min El Weir Flow (ft)	586.81	Hydr Depth (ft)	5.06	5.46
Min El Prs (ft)	582.85	W.P. Total (ft)	1273.81	1187.96
Delta EG (ft)	0.14	Conv. Total (cfs)	262812.7	276196.9
Delta WS (ft)	0.08	Top Width (ft)	1166.67	1080.09
BR Open Area (sq ft)	787.65	Frctn Loss (ft)	0.03	0.00
BR Open Vel (ft/s)	5.11	C & E Loss (ft)	0.00	0.03
BR Sluice Coef		Shear Total (lb/sq ft)	0.59	0.57
BR Sel Method	Energy only	Power Total (lb/ft s)	1.35	1.31

Plan: Alt 3 New 2 Span Stevens Branch Stevens Branch RS: 3990 Profile: 0.2%

E.G. US. (ft)	592.33	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	591.99	E.G. Elev (ft)	592.25	592.23
Q Total (cfs)	14980.00	W.S. Elev (ft)	592.10	592.08
Q Bridge (cfs)	3393.62	Crit W.S. (ft)	587.91	587.42
Q Weir (cfs)		Max Chl Dpth (ft)	22.46	21.89
Weir Sta Lft (ft)		Vel Total (ft/s)	2.13	2.16
Weir Sta Rgt (ft)		Flow Area (sq ft)	7027.04	6929.02
Weir Submerg		Froude # Chl	0.11	0.12
Weir Max Depth (ft)		Specif Force (cu ft)	31653.73	32418.47
Min El Weir Flow (ft)	586.81	Hydr Depth (ft)	6.52	6.85
Min El Prs (ft)	582.85	W.P. Total (ft)	1287.08	1209.55

Plan: Alt 3 New 2 Span Stevens Branch Stevens Branch RS: 3990 Profile: 0.2% (Continued)

Delta EG (ft)	0.14	Conv. Total (cfs)	376219.2	385603.4
Delta WS (ft)	0.10	Top Width (ft)	1236.88	1121.96
BR Open Area (sq ft)	787.65	Frctn Loss (ft)	0.02	0.00
BR Open Vel (ft/s)	4.31	C & E Loss (ft)	0.00	0.03
BR Sluice Coef		Shear Total (lb/sq ft)	0.54	0.54
BR Sel Method	Energy only	Power Total (lb/ft s)	1.15	1.17

Plan: Alt 3 New 2 Span Stevens Branch Stevens Branch RS: 11459 Profile: 50%

E.G. Elev (ft)	585.95	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.79	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	585.16	Reach Len. (ft)	1191.60	1191.00	1181.80
Crit W.S. (ft)	582.67	Flow Area (sq ft)		353.07	2.22
E.G. Slope (ft/ft)	0.002795	Area (sq ft)		353.07	2.22
Q Total (cfs)	2524.00	Flow (cfs)		2523.69	0.31
Top Width (ft)	79.98	Top Width (ft)		56.44	23.53
Vel Total (ft/s)	7.10	Avg. Vel. (ft/s)		7.15	0.14
Max Chl Dpth (ft)	7.40	Hydr. Depth (ft)		6.26	0.09
Conv. Total (cfs)	47739.9	Conv. (cfs)		47734.1	5.8
Length Wtd. (ft)	1190.99	Wetted Per. (ft)		62.13	23.77
Min Ch El (ft)	577.76	Shear (lb/sq ft)		0.99	0.02
Alpha	1.01	Stream Power (lb/ft s)		7.09	0.00
Frctn Loss (ft)	2.05	Cum Volume (acre-ft)		28.20	0.46
C & E Loss (ft)	0.12	Cum SA (acres)		4.37	1.87

Plan: Alt 3 New 2 Span Stevens Branch Stevens Branch RS: 11459 Profile: 20%

E.G. Elev (ft)	588.20	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.95	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	587.25	Reach Len. (ft)	1191.60	1191.00	1181.80
Crit W.S. (ft)	584.22	Flow Area (sq ft)		475.96	318.05
E.G. Slope (ft/ft)	0.002698	Area (sq ft)		475.96	318.05
Q Total (cfs)	4024.00	Flow (cfs)		3818.13	205.87
Top Width (ft)	393.21	Top Width (ft)		61.30	331.91
Vel Total (ft/s)	5.07	Avg. Vel. (ft/s)		8.02	0.65
Max Chl Dpth (ft)	9.49	Hydr. Depth (ft)		7.76	0.96
Conv. Total (cfs)	77468.2	Conv. (cfs)		73504.9	3963.3
Length Wtd. (ft)	1190.01	Wetted Per. (ft)		68.60	335.47
Min Ch El (ft)	577.76	Shear (lb/sq ft)		1.17	0.16
Alpha	2.38	Stream Power (lb/ft s)		9.37	0.10
Frctn Loss (ft)	1.63	Cum Volume (acre-ft)		41.14	32.93
C & E Loss (ft)	0.19	Cum SA (acres)		5.06	27.17

Plan: Alt 3 New 2 Span Stevens Branch Stevens Branch RS: 11459 Profile: 10%

E.G. Elev (ft)	590.55	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.02	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	589.54	Reach Len. (ft)	1191.60	1191.00	1181.80
Crit W.S. (ft)	588.47	Flow Area (sq ft)	136.10	629.36	1612.60
E.G. Slope (ft/ft)	0.002992	Area (sq ft)	136.10	629.36	1612.60
Q Total (cfs)	7740.00	Flow (cfs)	82.18	5848.78	1809.04
Top Width (ft)	1021.62	Top Width (ft)	186.32	70.80	764.49
Vel Total (ft/s)	3.25	Avg. Vel. (ft/s)	0.60	9.29	1.12
Max Chl Dpth (ft)	11.78	Hydr. Depth (ft)	0.73	8.89	2.11
Conv. Total (cfs)	141500.3	Conv. (cfs)	1502.4	106925.6	33072.3
Length Wtd. (ft)	1187.82	Wetted Per. (ft)	186.52	78.62	777.55
Min Ch El (ft)	577.76	Shear (lb/sq ft)	0.14	1.50	0.39
Alpha	6.19	Stream Power (lb/ft s)	0.08	13.90	0.43
Frctn Loss (ft)	1.30	Cum Volume (acre-ft)	4.56	58.55	158.20
C & E Loss (ft)	0.25	Cum SA (acres)	4.93	5.81	59.56

Plan: Alt 3 New 2 Span Stevens Branch Stevens Branch RS: 11459 Profile: 2%

E.G. Elev (ft)	591.93	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.74	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	591.19	Reach Len. (ft)	1191.60	1191.00	1181.80
Crit W.S. (ft)	589.98	Flow Area (sq ft)	489.76	746.48	2936.14
E.G. Slope (ft/ft)	0.002167	Area (sq ft)	489.76	746.48	2936.14
Q Total (cfs)	11040.00	Flow (cfs)	481.96	6615.66	3942.39
Top Width (ft)	1098.50	Top Width (ft)	219.24	70.80	808.45
Vel Total (ft/s)	2.65	Avg. Vel. (ft/s)	0.98	8.86	1.34
Max Chl Dpth (ft)	13.43	Hydr. Depth (ft)	2.23	10.54	3.63
Conv. Total (cfs)	237140.2	Conv. (cfs)	10352.5	142104.9	84682.9
Length Wtd. (ft)	1186.77	Wetted Per. (ft)	219.59	78.62	828.27
Min Ch El (ft)	577.76	Shear (lb/sq ft)	0.30	1.28	0.48
Alpha	6.82	Stream Power (lb/ft s)	0.30	11.39	0.64
Frctn Loss (ft)	0.99	Cum Volume (acre-ft)	17.15	71.44	285.81
C & E Loss (ft)	0.18	Cum SA (acres)	6.81	6.02	63.14

Plan: Alt 3 New 2 Span Stevens Branch Stevens Branch RS: 11459 Profile: 1%

E.G. Elev (ft)	592.54	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.64	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	591.90	Reach Len. (ft)	1191.60	1191.00	1181.80
Crit W.S. (ft)	590.36	Flow Area (sq ft)	647.54	796.54	3509.30
E.G. Slope (ft/ft)	0.001856	Area (sq ft)	647.54	796.54	3509.30
Q Total (cfs)	12400.00	Flow (cfs)	700.14	6821.02	4878.84
Top Width (ft)	1119.82	Top Width (ft)	236.67	70.80	812.35
Vel Total (ft/s)	2.50	Avg. Vel. (ft/s)	1.08	8.56	1.39
Max Chl Dpth (ft)	14.14	Hydr. Depth (ft)	2.74	11.25	4.32
Conv. Total (cfs)	287852.3	Conv. (cfs)	16252.9	158342.5	113256.8
Length Wtd. (ft)	1186.45	Wetted Per. (ft)	237.10	78.62	835.06
Min Ch El (ft)	577.76	Shear (lb/sq ft)	0.32	1.17	0.49
Alpha	6.57	Stream Power (lb/ft s)	0.34	10.05	0.68
Frctn Loss (ft)	0.87	Cum Volume (acre-ft)	23.81	76.36	336.60
C & E Loss (ft)	0.16	Cum SA (acres)	9.61	6.06	64.09

Plan: Alt 3 New 2 Span Stevens Branch Stevens Branch RS: 11459 Profile: 0.2%

E.G. Elev (ft)	593.70	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.52	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	593.19	Reach Len. (ft)	1191.60	1191.00	1181.80
Crit W.S. (ft)	590.85	Flow Area (sq ft)	991.67	887.85	4560.27
E.G. Slope (ft/ft)	0.001458	Area (sq ft)	991.67	887.85	4560.27
Q Total (cfs)	14980.00	Flow (cfs)	1100.76	7245.76	6633.48
Top Width (ft)	1206.87	Top Width (ft)	318.71	70.80	817.36
Vel Total (ft/s)	2.33	Avg. Vel. (ft/s)	1.11	8.16	1.45
Max Chl Dpth (ft)	15.43	Hydr. Depth (ft)	3.11	12.54	5.58
Conv. Total (cfs)	392263.1	Conv. (cfs)	28824.1	189736.0	173703.0
Length Wtd. (ft)	1186.04	Wetted Per. (ft)	319.34	78.62	845.39
Min Ch El (ft)	577.76	Shear (lb/sq ft)	0.28	1.03	0.49
Alpha	6.14	Stream Power (lb/ft s)	0.31	8.39	0.71
Frctn Loss (ft)	0.71	Cum Volume (acre-ft)	40.19	84.99	427.87
C & E Loss (ft)	0.13	Cum SA (acres)	12.94	6.12	66.12

Plan: Alt 3 New 2 Span Stevens Branch Stevens Branch RS: 7552 Profile: 50%

E.G. Elev (ft)	583.79	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.40	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	583.38	Reach Len. (ft)	852.90	789.50	477.70
Crit W.S. (ft)		Flow Area (sq ft)		493.90	18.77
E.G. Slope (ft/ft)	0.001162	Area (sq ft)		493.90	18.77
Q Total (cfs)	2524.00	Flow (cfs)		2520.68	3.32
Top Width (ft)	148.57	Top Width (ft)		69.55	79.02
Vel Total (ft/s)	4.92	Avg. Vel. (ft/s)		5.10	0.18
Max Chl Dpth (ft)	8.74	Hydr. Depth (ft)		7.10	0.24
Conv. Total (cfs)	74037.3	Conv. (cfs)		73939.9	97.5
Length Wtd. (ft)	789.29	Wetted Per. (ft)		74.59	79.05
Min Ch El (ft)	574.64	Shear (lb/sq ft)		0.48	0.02
Alpha	1.07	Stream Power (lb/ft s)		2.45	0.00
Frctn Loss (ft)	1.96	Cum Volume (acre-ft)		16.62	0.18
C & E Loss (ft)	0.14	Cum SA (acres)		2.65	0.47

Plan: Alt 3 New 2 Span Stevens Branch Stevens Branch RS: 7552 Profile: 20%

E.G. Elev (ft)	586.38	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.30	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	586.08	Reach Len. (ft)	852.90	789.50	477.70
Crit W.S. (ft)		Flow Area (sq ft)		696.00	1401.73
E.G. Slope (ft/ft)	0.000823	Area (sq ft)		696.00	1401.73
Q Total (cfs)	4024.00	Flow (cfs)		3362.57	661.43
Top Width (ft)	1155.94	Top Width (ft)		81.88	1074.06
Vel Total (ft/s)	1.92	Avg. Vel. (ft/s)		4.83	0.47
Max Chl Dpth (ft)	11.44	Hydr. Depth (ft)		8.50	1.31
Conv. Total (cfs)	140253.2	Conv. (cfs)		117199.4	23053.7
Length Wtd. (ft)	761.53	Wetted Per. (ft)		88.11	1074.72
Min Ch El (ft)	574.64	Shear (lb/sq ft)		0.41	0.07
Alpha	5.31	Stream Power (lb/ft s)		1.96	0.03
Frctn Loss (ft)	1.14	Cum Volume (acre-ft)		25.12	9.61
C & E Loss (ft)	0.09	Cum SA (acres)		3.10	8.10

Plan: Alt 3 New 2 Span Stevens Branch Stevens Branch RS: 7552 Profile: 10%

E.G. Elev (ft)	589.00	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.17	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	588.83	Reach Len. (ft)	852.90	789.50	477.70
Crit W.S. (ft)		Flow Area (sq ft)		941.75	5208.73
E.G. Slope (ft/ft)	0.000560	Area (sq ft)		941.75	5208.73
Q Total (cfs)	7740.00	Flow (cfs)		4195.88	3544.12
Top Width (ft)	1716.84	Top Width (ft)		93.86	1622.98
Vel Total (ft/s)	1.26	Avg. Vel. (ft/s)		4.46	0.68
Max Chl Dpth (ft)	14.19	Hydr. Depth (ft)		10.03	3.21
Conv. Total (cfs)	326969.7	Conv. (cfs)		177251.3	149718.3
Length Wtd. (ft)	688.71	Wetted Per. (ft)		100.89	1629.63
Min Ch El (ft)	574.64	Shear (lb/sq ft)		0.33	0.11
Alpha	6.93	Stream Power (lb/ft s)		1.45	0.08
Frctn Loss (ft)	0.75	Cum Volume (acre-ft)	2.70	37.07	65.67
C & E Loss (ft)	0.10	Cum SA (acres)	2.38	3.56	27.17

Plan: Alt 3 New 2 Span Stevens Branch Stevens Branch RS: 7552 Profile: 2%

E.G. Elev (ft)	590.76	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.13	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	590.63	Reach Len. (ft)	852.90	789.50	477.70
Crit W.S. (ft)		Flow Area (sq ft)		1113.34	8199.75
E.G. Slope (ft/ft)	0.000438	Area (sq ft)		1113.34	8199.75
Q Total (cfs)	11040.00	Flow (cfs)		4789.44	6250.56
Top Width (ft)	1780.81	Top Width (ft)		96.92	1683.90
Vel Total (ft/s)	1.19	Avg. Vel. (ft/s)		4.30	0.76
Max Chl Dpth (ft)	15.99	Hydr. Depth (ft)		11.49	4.87
Conv. Total (cfs)	527740.5	Conv. (cfs)		228947.5	298793.0
Length Wtd. (ft)	631.90	Wetted Per. (ft)		104.44	1694.27
Min Ch El (ft)	574.64	Shear (lb/sq ft)		0.29	0.13
Alpha	5.95	Stream Power (lb/ft s)		1.25	0.10
Frctn Loss (ft)	0.44	Cum Volume (acre-ft)	10.45	46.01	134.75
C & E Loss (ft)	0.03	Cum SA (acres)	3.81	3.73	29.33

Plan: Alt 3 New 2 Span Stevens Branch Stevens Branch RS: 7552 Profile: 1%

E.G. Elev (ft)	591.51	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	591.40	Reach Len. (ft)	852.90	789.50	477.70
Crit W.S. (ft)		Flow Area (sq ft)		1188.35	9498.25
E.G. Slope (ft/ft)	0.000387	Area (sq ft)		1188.35	9498.25
Q Total (cfs)	12400.00	Flow (cfs)		4976.59	7423.41
Top Width (ft)	1791.90	Top Width (ft)		98.18	1693.72
Vel Total (ft/s)	1.16	Avg. Vel. (ft/s)		4.19	0.78
Max Chl Dpth (ft)	16.76	Hydr. Depth (ft)		12.10	5.61
Conv. Total (cfs)	630012.3	Conv. (cfs)		252848.0	377164.3
Length Wtd. (ft)	620.46	Wetted Per. (ft)		105.92	1705.66
Min Ch El (ft)	574.64	Shear (lb/sq ft)		0.27	0.13
Alpha	5.50	Stream Power (lb/ft s)		1.14	0.11
Frctn Loss (ft)	0.37	Cum Volume (acre-ft)	14.95	49.22	160.15
C & E Loss (ft)	0.03	Cum SA (acres)	6.37	3.75	30.09

Plan: Alt 3 New 2 Span Stevens Branch Stevens Branch RS: 7552 Profile: 0.2%

E.G. Elev (ft)	592.87	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	592.77	Reach Len. (ft)	852.90	789.50	477.70
Crit W.S. (ft)		Flow Area (sq ft)	0.09	1324.31	11847.67
E.G. Slope (ft/ft)	0.000325	Area (sq ft)	0.09	1324.31	11847.67
Q Total (cfs)	14980.00	Flow (cfs)	0.01	5388.97	9591.03
Top Width (ft)	1830.30	Top Width (ft)	0.53	99.90	1729.87
Vel Total (ft/s)	1.14	Avg. Vel. (ft/s)	0.06	4.07	0.81
Max Chl Dpth (ft)	18.13	Hydr. Depth (ft)	0.16	13.26	6.85
Conv. Total (cfs)	831414.3	Conv. (cfs)	0.3	299096.3	532317.6
Length Wtd. (ft)	607.58	Wetted Per. (ft)	0.62	107.93	1744.60
Min Ch El (ft)	574.64	Shear (lb/sq ft)	0.00	0.25	0.14
Alpha	4.93	Stream Power (lb/ft s)	0.00	1.01	0.11
Frctn Loss (ft)	0.30	Cum Volume (acre-ft)	26.62	54.75	205.29
C & E Loss (ft)	0.02	Cum SA (acres)	8.57	3.78	31.57



Plan: Alt 3 New 2 Span Stevens Branch Stevens Branch RS: 4962 Profile: 50%

E.G. Elev (ft)	581.68	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.85	Wt. n-Val.		0.035	
W.S. Elev (ft)	579.83	Reach Len. (ft)	96.20	295.10	381.80
Crit W.S. (ft)	579.33	Flow Area (sq ft)		231.41	
E.G. Slope (ft/ft)	0.008591	Area (sq ft)		231.41	
Q Total (cfs)	2524.00	Flow (cfs)		2524.00	
Top Width (ft)	46.81	Top Width (ft)		46.81	
Vel Total (ft/s)	10.91	Avg. Vel. (ft/s)		10.91	
Max Chl Dpth (ft)	6.29	Hydr. Depth (ft)		4.94	
Conv. Total (cfs)	27230.7	Conv. (cfs)		27230.7	
Length Wtd. (ft)	295.10	Wetted Per. (ft)		50.15	
Min Ch El (ft)	573.54	Shear (lb/sq ft)		2.47	
Alpha	1.00	Stream Power (lb/ft s)		26.99	
Frctn Loss (ft)	0.55	Cum Volume (acre-ft)		10.05	0.08
C & E Loss (ft)	0.46	Cum SA (acres)		1.59	0.04

Plan: Alt 3 New 2 Span Stevens Branch Stevens Branch RS: 4962 Profile: 20%

E.G. Elev (ft)	585.16	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.18	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	583.98	Reach Len. (ft)	96.20	295.10	381.80
Crit W.S. (ft)	581.10	Flow Area (sq ft)		451.99	94.76
E.G. Slope (ft/ft)	0.003520	Area (sq ft)		451.99	94.76
Q Total (cfs)	4024.00	Flow (cfs)		3963.51	60.50
Top Width (ft)	180.97	Top Width (ft)		63.74	117.23
Vel Total (ft/s)	7.36	Avg. Vel. (ft/s)		8.77	0.64
Max Chl Dpth (ft)	10.44	Hydr. Depth (ft)		7.09	0.81
Conv. Total (cfs)	67827.1	Conv. (cfs)		66807.4	1019.7
Length Wtd. (ft)	296.29	Wetted Per. (ft)		69.58	117.45
Min Ch El (ft)	573.54	Shear (lb/sq ft)		1.43	0.18
Alpha	1.40	Stream Power (lb/ft s)		12.52	0.11
Frctn Loss (ft)	0.34	Cum Volume (acre-ft)		14.71	1.40
C & E Loss (ft)	0.26	Cum SA (acres)		1.78	1.57

Plan: Alt 3 New 2 Span Stevens Branch Stevens Branch RS: 4962 Profile: 10%

E.G. Elev (ft)	588.15	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.19	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	586.97	Reach Len. (ft)	96.20	295.10	381.80
Crit W.S. (ft)	585.89	Flow Area (sq ft)		648.05	1469.74
E.G. Slope (ft/ft)	0.002931	Area (sq ft)		648.05	1469.74
Q Total (cfs)	7740.00	Flow (cfs)		6280.25	1459.75
Top Width (ft)	997.50	Top Width (ft)		68.07	929.43
Vel Total (ft/s)	3.65	Avg. Vel. (ft/s)		9.69	0.99
Max Chl Dpth (ft)	13.43	Hydr. Depth (ft)		9.52	1.58
Conv. Total (cfs)	142956.6	Conv. (cfs)		115995.3	26961.3
Length Wtd. (ft)	307.11	Wetted Per. (ft)		74.86	937.63
Min Ch El (ft)	573.54	Shear (lb/sq ft)		1.58	0.29
Alpha	5.72	Stream Power (lb/ft s)		15.35	0.28
Frctn Loss (ft)	0.45	Cum Volume (acre-ft)	2.70	22.67	29.05
C & E Loss (ft)	0.19	Cum SA (acres)	2.38	2.09	13.18

Plan: Alt 3 New 2 Span Stevens Branch Stevens Branch RS: 4962 Profile: 2%

E.G. Elev (ft)	590.29	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.45	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	589.83	Reach Len. (ft)	96.20	295.10	381.80
Crit W.S. (ft)	587.66	Flow Area (sq ft)	4.44	854.12	4172.02
E.G. Slope (ft/ft)	0.001279	Area (sq ft)	4.44	854.12	4172.02
Q Total (cfs)	11040.00	Flow (cfs)	0.61	6129.39	4910.00
Top Width (ft)	1051.13	Top Width (ft)	26.78	75.90	948.45
Vel Total (ft/s)	2.19	Avg. Vel. (ft/s)	0.14	7.18	1.18
Max Chl Dpth (ft)	16.29	Hydr. Depth (ft)	0.17	11.25	4.40
Conv. Total (cfs)	308726.3	Conv. (cfs)	17.1	171404.2	137304.9
Length Wtd. (ft)	321.59	Wetted Per. (ft)	26.80	83.11	974.21
Min Ch El (ft)	573.54	Shear (lb/sq ft)	0.01	0.82	0.34
Alpha	6.06	Stream Power (lb/ft s)	0.00	5.89	0.40
Frctn Loss (ft)	0.28	Cum Volume (acre-ft)	10.41	28.18	66.92
C & E Loss (ft)	0.01	Cum SA (acres)	3.54	2.16	14.90

Plan: Alt 3 New 2 Span Stevens Branch Stevens Branch RS: 4962 Profile: 1%

E.G. Elev (ft)	591.11	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.39	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	590.72	Reach Len. (ft)	96.20	295.10	381.80
Crit W.S. (ft)	588.00	Flow Area (sq ft)	77.98	921.72	5019.78
E.G. Slope (ft/ft)	0.001065	Area (sq ft)	100.49	921.72	5019.78
Q Total (cfs)	12400.00	Flow (cfs)	23.32	6350.40	6026.29
Top Width (ft)	1246.56	Top Width (ft)	214.08	75.90	956.58
Vel Total (ft/s)	2.06	Avg. Vel. (ft/s)	0.30	6.89	1.20
Max Chl Dpth (ft)	17.18	Hydr. Depth (ft)	0.52	12.14	5.25
Conv. Total (cfs)	379995.3	Conv. (cfs)	714.6	194606.5	184674.2
Length Wtd. (ft)	323.62	Wetted Per. (ft)	149.74	83.11	987.75
Min Ch El (ft)	573.54	Shear (lb/sq ft)	0.03	0.74	0.34
Alpha	5.89	Stream Power (lb/ft s)	0.01	5.08	0.41
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)	13.97	30.10	80.54
C & E Loss (ft)	0.00	Cum SA (acres)	4.27	2.17	15.56

Plan: Alt 3 New 2 Span Stevens Branch Stevens Branch RS: 4962 Profile: 0.2%

E.G. Elev (ft)	592.54	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.33	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	592.22	Reach Len. (ft)	96.20	295.10	381.80
Crit W.S. (ft)	588.52	Flow Area (sq ft)	321.76	1035.11	6489.87
E.G. Slope (ft/ft)	0.000847	Area (sq ft)	555.49	1035.11	6489.87
Q Total (cfs)	14980.00	Flow (cfs)	182.10	6872.09	7925.81
Top Width (ft)	1440.07	Top Width (ft)	360.53	75.90	1003.64
Vel Total (ft/s)	1.91	Avg. Vel. (ft/s)	0.57	6.64	1.22
Max Chl Dpth (ft)	18.68	Hydr. Depth (ft)	1.97	13.64	6.47
Conv. Total (cfs)	514699.8	Conv. (cfs)	6256.9	236118.9	272323.9
Length Wtd. (ft)	324.47	Wetted Per. (ft)	163.49	83.11	1043.79
Min Ch El (ft)	573.54	Shear (lb/sq ft)	0.10	0.66	0.33
Alpha	5.77	Stream Power (lb/ft s)	0.06	4.37	0.40
Frctn Loss (ft)	0.21	Cum Volume (acre-ft)	21.18	33.37	104.74
C & E Loss (ft)	0.00	Cum SA (acres)	5.03	2.19	16.58

Plan: Alt 3 New 2 Span Stevens Branch Stevens Branch RS: 3994 Profile: 50%

E.G. Elev (ft)	580.67	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.30	Wt. n-Val.		0.035	
W.S. Elev (ft)	580.37	Reach Len. (ft)	6.00	6.00	6.00
Crit W.S. (ft)	575.10	Flow Area (sq ft)		573.57	
E.G. Slope (ft/ft)	0.000785	Area (sq ft)		573.57	
Q Total (cfs)	2524.00	Flow (cfs)		2524.00	
Top Width (ft)	74.78	Top Width (ft)		74.78	
Vel Total (ft/s)	4.40	Avg. Vel. (ft/s)		4.40	
Max Chl Dpth (ft)	10.72	Hydr. Depth (ft)		7.67	
Conv. Total (cfs)	90101.3	Conv. (cfs)		90101.3	
Length Wtd. (ft)	6.00	Wetted Per. (ft)		80.59	
Min Ch EI (ft)	569.64	Shear (lb/sq ft)		0.35	
Alpha	1.00	Stream Power (lb/ft s)		1.53	
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		7.32	0.08
C & E Loss (ft)	0.01	Cum SA (acres)		1.18	0.04

Plan: Alt 3 New 2 Span Stevens Branch Stevens Branch RS: 3994 Profile: 20%

E.G. Elev (ft)	584.56	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.31	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	584.24	Reach Len. (ft)	6.00	6.00	6.00
Crit W.S. (ft)	576.62	Flow Area (sq ft)		881.85	142.97
E.G. Slope (ft/ft)	0.000569	Area (sq ft)		881.85	142.97
Q Total (cfs)	4024.00	Flow (cfs)		3974.16	49.84
Top Width (ft)	198.65	Top Width (ft)		84.56	114.09
Vel Total (ft/s)	3.93	Avg. Vel. (ft/s)		4.51	0.35
Max Chl Dpth (ft)	14.60	Hydr. Depth (ft)		10.43	1.25
Conv. Total (cfs)	168703.0	Conv. (cfs)		166613.5	2089.5
Length Wtd. (ft)	6.00	Wetted Per. (ft)		93.93	114.23
Min Ch EI (ft)	569.64	Shear (lb/sq ft)		0.33	0.04
Alpha	1.30	Stream Power (lb/ft s)		1.50	0.02
Frctn Loss (ft)		Cum Volume (acre-ft)		10.19	0.36
C & E Loss (ft)		Cum SA (acres)		1.28	0.55

Plan: Alt 3 New 2 Span Stevens Branch Stevens Branch RS: 3994 Profile: 10%

E.G. Elev (ft)	587.50	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.55	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	586.96	Reach Len. (ft)	6.00	6.00	6.00
Crit W.S. (ft)	579.48	Flow Area (sq ft)	51.72	1125.46	1254.69
E.G. Slope (ft/ft)	0.000891	Area (sq ft)	51.72	1125.46	1254.69
Q Total (cfs)	7740.00	Flow (cfs)	12.59	7014.52	712.89
Top Width (ft)	866.65	Top Width (ft)	96.77	93.01	676.86
Vel Total (ft/s)	3.18	Avg. Vel. (ft/s)	0.24	6.23	0.57
Max Chl Dpth (ft)	17.31	Hydr. Depth (ft)	0.53	12.10	1.85
Conv. Total (cfs)	259269.6	Conv. (cfs)	421.8	234967.8	23880.0
Length Wtd. (ft)	6.00	Wetted Per. (ft)	96.79	103.20	679.45
Min Ch EI (ft)	569.64	Shear (lb/sq ft)	0.03	0.61	0.10
Alpha	3.48	Stream Power (lb/ft s)	0.01	3.78	0.06
Frctn Loss (ft)		Cum Volume (acre-ft)	2.64	16.66	17.11
C & E Loss (ft)		Cum SA (acres)	2.27	1.55	6.14

Plan: Alt 3 New 2 Span Stevens Branch Stevens Branch RS: 3994 Profile: 2%

E.G. Elev (ft)	589.99	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.42	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	589.58	Reach Len. (ft)	6.00	6.00	6.00
Crit W.S. (ft)	581.57	Flow Area (sq ft)	548.80	1369.23	3080.35
E.G. Slope (ft/ft)	0.000634	Area (sq ft)	556.63	1369.23	3080.35
Q Total (cfs)	11040.00	Flow (cfs)	302.38	8205.05	2532.58
Top Width (ft)	1065.63	Top Width (ft)	258.32	93.01	714.30
Vel Total (ft/s)	2.21	Avg. Vel. (ft/s)	0.55	5.99	0.82
Max Chl Dpth (ft)	19.94	Hydr. Depth (ft)	2.35	14.72	4.31
Conv. Total (cfs)	438338.1	Conv. (cfs)	12005.8	325777.5	100554.8
Length Wtd. (ft)	6.00	Wetted Per. (ft)	233.71	103.20	722.32
Min Ch El (ft)	569.64	Shear (lb/sq ft)	0.09	0.53	0.17
Alpha	5.50	Stream Power (lb/ft s)	0.05	3.15	0.14
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	9.79	20.65	35.13
C & E Loss (ft)	0.07	Cum SA (acres)	3.23	1.59	7.61

Plan: Alt 3 New 2 Span Stevens Branch Stevens Branch RS: 3994 Profile: 1%

E.G. Elev (ft)	590.86	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.38	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	590.48	Reach Len. (ft)	6.00	6.00	6.00
Crit W.S. (ft)	582.35	Flow Area (sq ft)	773.97	1453.04	3726.09
E.G. Slope (ft/ft)	0.000575	Area (sq ft)	829.16	1453.04	3726.09
Q Total (cfs)	12400.00	Flow (cfs)	481.54	8628.68	3289.77
Top Width (ft)	1161.24	Top Width (ft)	349.14	93.01	719.09
Vel Total (ft/s)	2.08	Avg. Vel. (ft/s)	0.62	5.94	0.88
Max Chl Dpth (ft)	20.84	Hydr. Depth (ft)	3.03	15.62	5.18
Conv. Total (cfs)	516896.3	Conv. (cfs)	20073.3	359688.2	137134.8
Length Wtd. (ft)	6.00	Wetted Per. (ft)	255.33	103.20	729.00
Min Ch El (ft)	569.64	Shear (lb/sq ft)	0.11	0.51	0.18
Alpha	5.71	Stream Power (lb/ft s)	0.07	3.00	0.16
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	12.94	22.06	42.21
C & E Loss (ft)	0.08	Cum SA (acres)	3.65	1.60	8.22

Plan: Alt 3 New 2 Span Stevens Branch Stevens Branch RS: 3994 Profile: 0.2%

E.G. Elev (ft)	592.33	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.35	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	591.99	Reach Len. (ft)	6.00	6.00	6.00
Crit W.S. (ft)	584.19	Flow Area (sq ft)	1158.59	1593.19	4817.02
E.G. Slope (ft/ft)	0.000505	Area (sq ft)	1412.35	1593.19	4817.02
Q Total (cfs)	14980.00	Flow (cfs)	883.88	9426.24	4669.88
Top Width (ft)	1233.67	Top Width (ft)	411.59	93.01	729.07
Vel Total (ft/s)	1.98	Avg. Vel. (ft/s)	0.76	5.92	0.97
Max Chl Dpth (ft)	22.34	Hydr. Depth (ft)	4.54	17.13	6.61
Conv. Total (cfs)	666421.6	Conv. (cfs)	39321.6	419349.2	207750.7
Length Wtd. (ft)	6.00	Wetted Per. (ft)	255.33	103.20	742.10
Min Ch El (ft)	569.64	Shear (lb/sq ft)	0.14	0.49	0.20
Alpha	5.71	Stream Power (lb/ft s)	0.11	2.88	0.20
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	19.01	24.47	55.19
C & E Loss (ft)	0.08	Cum SA (acres)	4.18	1.62	8.99

Plan: Alt 3 New 2 Span Stevens Branch Stevens Branch RS: 3921 Profile: 50%

E.G. Elev (ft)	580.60	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.29	Wt. n-Val.		0.035	
W.S. Elev (ft)	580.30	Reach Len. (ft)	21.20	125.90	180.00
Crit W.S. (ft)	575.67	Flow Area (sq ft)		582.54	
E.G. Slope (ft/ft)	0.000827	Area (sq ft)		582.54	
Q Total (cfs)	2524.00	Flow (cfs)		2524.00	
Top Width (ft)	81.27	Top Width (ft)		81.27	
Vel Total (ft/s)	4.33	Avg. Vel. (ft/s)		4.33	
Max Chl Dpth (ft)	10.12	Hydr. Depth (ft)		7.17	
Conv. Total (cfs)	87756.6	Conv. (cfs)		87756.6	
Length Wtd. (ft)	126.02	Wetted Per. (ft)		87.15	
Min Ch EI (ft)	570.19	Shear (lb/sq ft)		0.35	
Alpha	1.00	Stream Power (lb/ft s)		1.50	
Frctn Loss (ft)	0.16	Cum Volume (acre-ft)		7.05	0.08
C & E Loss (ft)	0.08	Cum SA (acres)		1.14	0.04

Plan: Alt 3 New 2 Span Stevens Branch Stevens Branch RS: 3921 Profile: 20%

E.G. Elev (ft)	583.10	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.41	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	582.70	Reach Len. (ft)	21.20	125.90	180.00
Crit W.S. (ft)	577.01	Flow Area (sq ft)		785.33	41.44
E.G. Slope (ft/ft)	0.000877	Area (sq ft)		785.33	41.44
Q Total (cfs)	4024.00	Flow (cfs)		4015.05	8.95
Top Width (ft)	183.16	Top Width (ft)		88.47	94.69
Vel Total (ft/s)	4.87	Avg. Vel. (ft/s)		5.11	0.22
Max Chl Dpth (ft)	12.51	Hydr. Depth (ft)		8.88	0.44
Conv. Total (cfs)	135845.6	Conv. (cfs)		135543.6	302.0
Length Wtd. (ft)	126.22	Wetted Per. (ft)		95.81	94.80
Min Ch EI (ft)	570.19	Shear (lb/sq ft)		0.45	0.02
Alpha	1.10	Stream Power (lb/ft s)		2.30	0.01
Frctn Loss (ft)	0.16	Cum Volume (acre-ft)		9.80	0.34
C & E Loss (ft)	0.10	Cum SA (acres)		1.25	0.53

Plan: Alt 3 New 2 Span Stevens Branch Stevens Branch RS: 3921 Profile: 10%

E.G. Elev (ft)	587.46	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.40	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	587.06	Reach Len. (ft)	21.20	125.90	180.00
Crit W.S. (ft)	579.64	Flow Area (sq ft)	55.60	1197.93	1779.79
E.G. Slope (ft/ft)	0.000663	Area (sq ft)	79.98	1197.93	1779.79
Q Total (cfs)	7740.00	Flow (cfs)	10.95	6559.58	1169.46
Top Width (ft)	878.09	Top Width (ft)	151.28	97.77	629.04
Vel Total (ft/s)	2.55	Avg. Vel. (ft/s)	0.20	5.48	0.66
Max Chl Dpth (ft)	16.88	Hydr. Depth (ft)	0.42	12.25	2.83
Conv. Total (cfs)	300520.7	Conv. (cfs)	425.3	254688.8	45406.6
Length Wtd. (ft)	134.79	Wetted Per. (ft)	131.01	106.89	630.02
Min Ch EI (ft)	570.19	Shear (lb/sq ft)	0.02	0.46	0.12
Alpha	3.91	Stream Power (lb/ft s)	0.00	2.54	0.08
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)	2.63	16.20	16.49
C & E Loss (ft)	0.07	Cum SA (acres)	2.24	1.52	5.80

Plan: Alt 3 New 2 Span Stevens Branch Stevens Branch RS: 3921 Profile: 2%

E.G. Elev (ft)	589.85	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.34	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	589.51	Reach Len. (ft)	21.20	125.90	180.00
Crit W.S. (ft)	581.54	Flow Area (sq ft)	558.45	1437.35	3373.49
E.G. Slope (ft/ft)	0.000524	Area (sq ft)	639.77	1437.35	3373.49
Q Total (cfs)	11040.00	Flow (cfs)	303.61	7896.79	2839.60
Top Width (ft)	989.21	Top Width (ft)	233.77	97.77	657.67
Vel Total (ft/s)	2.06	Avg. Vel. (ft/s)	0.54	5.49	0.84
Max Chl Dpth (ft)	19.32	Hydr. Depth (ft)	2.66	14.70	5.13
Conv. Total (cfs)	482407.9	Conv. (cfs)	13266.7	345060.9	124080.2
Length Wtd. (ft)	137.38	Wetted Per. (ft)	210.15	106.89	658.97
Min Ch El (ft)	570.19	Shear (lb/sq ft)	0.09	0.44	0.17
Alpha	5.15	Stream Power (lb/ft s)	0.05	2.42	0.14
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	9.50	20.07	33.61
C & E Loss (ft)	0.05	Cum SA (acres)	3.10	1.54	7.26

Plan: Alt 3 New 2 Span Stevens Branch Stevens Branch RS: 3921 Profile: 1%

E.G. Elev (ft)	590.72	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.32	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	590.40	Reach Len. (ft)	21.20	125.90	180.00
Crit W.S. (ft)	582.43	Flow Area (sq ft)	744.43	1523.94	3959.43
E.G. Slope (ft/ft)	0.000486	Area (sq ft)	866.26	1523.94	3959.43
Q Total (cfs)	12400.00	Flow (cfs)	472.05	8382.81	3545.14
Top Width (ft)	1069.46	Top Width (ft)	296.65	97.77	675.04
Vel Total (ft/s)	1.99	Avg. Vel. (ft/s)	0.63	5.50	0.90
Max Chl Dpth (ft)	20.21	Hydr. Depth (ft)	3.55	15.59	5.87
Conv. Total (cfs)	562692.5	Conv. (cfs)	21420.9	380398.7	160872.9
Length Wtd. (ft)	137.55	Wetted Per. (ft)	210.15	106.89	676.41
Min Ch El (ft)	570.19	Shear (lb/sq ft)	0.11	0.43	0.18
Alpha	5.22	Stream Power (lb/ft s)	0.07	2.38	0.16
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	12.52	21.43	40.36
C & E Loss (ft)	0.04	Cum SA (acres)	3.48	1.55	7.86

Plan: Alt 3 New 2 Span Stevens Branch Stevens Branch RS: 3921 Profile: 0.2%

E.G. Elev (ft)	592.19	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.31	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	591.88	Reach Len. (ft)	21.20	125.90	180.00
Crit W.S. (ft)	585.01	Flow Area (sq ft)	1056.59	1669.28	4990.37
E.G. Slope (ft/ft)	0.000446	Area (sq ft)	1322.20	1669.28	4990.37
Q Total (cfs)	14980.00	Flow (cfs)	810.99	9351.54	4817.47
Top Width (ft)	1117.25	Top Width (ft)	317.28	97.77	702.20
Vel Total (ft/s)	1.94	Avg. Vel. (ft/s)	0.77	5.60	0.97
Max Chl Dpth (ft)	21.70	Hydr. Depth (ft)	5.03	17.07	7.11
Conv. Total (cfs)	709252.4	Conv. (cfs)	38397.7	442763.8	228090.8
Length Wtd. (ft)	137.47	Wetted Per. (ft)	210.15	106.89	703.71
Min Ch El (ft)	570.19	Shear (lb/sq ft)	0.14	0.43	0.20
Alpha	5.29	Stream Power (lb/ft s)	0.11	2.44	0.19
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	18.32	23.77	52.79
C & E Loss (ft)	0.04	Cum SA (acres)	3.99	1.57	8.62



Plan: Alt 3 New 2 Span Stevens Branch Stevens Branch RS: 3508 Profile: 50%

E.G. Elev (ft)	580.36	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.67	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	579.68	Reach Len. (ft)	245.30	268.30	311.80
Crit W.S. (ft)	577.03	Flow Area (sq ft)		380.68	13.46
E.G. Slope (ft/ft)	0.002190	Area (sq ft)		380.68	13.46
Q Total (cfs)	2524.00	Flow (cfs)		2513.13	10.87
Top Width (ft)	67.33	Top Width (ft)		60.01	7.32
Vel Total (ft/s)	6.40	Avg. Vel. (ft/s)		6.60	0.81
Max Chl Dpth (ft)	7.21	Hydr. Depth (ft)		6.34	1.84
Conv. Total (cfs)	53928.9	Conv. (cfs)		53696.6	232.3
Length Wtd. (ft)	268.39	Wetted Per. (ft)		62.86	8.18
Min Ch EI (ft)	572.47	Shear (lb/sq ft)		0.83	0.23
Alpha	1.06	Stream Power (lb/ft s)		5.47	0.18
Frctn Loss (ft)	0.53	Cum Volume (acre-ft)		5.65	0.05
C & E Loss (ft)	0.05	Cum SA (acres)		0.94	0.03

Plan: Alt 3 New 2 Span Stevens Branch Stevens Branch RS: 3508 Profile: 20%

E.G. Elev (ft)	582.84	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.91	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	581.92	Reach Len. (ft)	245.30	268.30	311.80
Crit W.S. (ft)	578.50	Flow Area (sq ft)		517.50	44.24
E.G. Slope (ft/ft)	0.002114	Area (sq ft)		517.50	44.24
Q Total (cfs)	4024.00	Flow (cfs)		3985.13	38.87
Top Width (ft)	120.78	Top Width (ft)		62.28	58.50
Vel Total (ft/s)	7.16	Avg. Vel. (ft/s)		7.70	0.88
Max Chl Dpth (ft)	9.45	Hydr. Depth (ft)		8.31	0.76
Conv. Total (cfs)	87511.2	Conv. (cfs)		86666.0	845.3
Length Wtd. (ft)	268.51	Wetted Per. (ft)		66.05	59.87
Min Ch EI (ft)	572.47	Shear (lb/sq ft)		1.03	0.10
Alpha	1.14	Stream Power (lb/ft s)		7.96	0.09
Frctn Loss (ft)	0.50	Cum Volume (acre-ft)		7.91	0.16
C & E Loss (ft)	0.09	Cum SA (acres)		1.03	0.21

Plan: Alt 3 New 2 Span Stevens Branch Stevens Branch RS: 3508 Profile: 10%

E.G. Elev (ft)	587.26	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.75	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	586.51	Reach Len. (ft)	245.30	268.30	311.80
Crit W.S. (ft)	581.44	Flow Area (sq ft)	41.18	819.43	1440.17
E.G. Slope (ft/ft)	0.001410	Area (sq ft)	41.23	819.43	1440.17
Q Total (cfs)	7740.00	Flow (cfs)	10.99	6312.59	1416.42
Top Width (ft)	637.97	Top Width (ft)	104.95	72.20	460.83
Vel Total (ft/s)	3.36	Avg. Vel. (ft/s)	0.27	7.70	0.98
Max Chl Dpth (ft)	14.04	Hydr. Depth (ft)	0.40	11.35	3.13
Conv. Total (cfs)	206095.5	Conv. (cfs)	292.6	168087.3	37715.6
Length Wtd. (ft)	273.68	Wetted Per. (ft)	104.04	77.15	468.25
Min Ch EI (ft)	572.47	Shear (lb/sq ft)	0.03	0.94	0.27
Alpha	4.29	Stream Power (lb/ft s)	0.01	7.20	0.27
Frctn Loss (ft)	0.34	Cum Volume (acre-ft)	2.60	13.29	9.84
C & E Loss (ft)	0.04	Cum SA (acres)	2.18	1.28	3.55

Plan: Alt 3 New 2 Span Stevens Branch Stevens Branch RS: 3508 Profile: 2%

E.G. Elev (ft)	589.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.58	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	589.13	Reach Len. (ft)	245.30	268.30	311.80
Crit W.S. (ft)	584.94	Flow Area (sq ft)	534.78	1008.89	2697.26
E.G. Slope (ft/ft)	0.000979	Area (sq ft)	557.13	1008.89	2697.26
Q Total (cfs)	11040.00	Flow (cfs)	397.88	7440.40	3201.73
Top Width (ft)	773.49	Top Width (ft)	210.90	72.20	490.39
Vel Total (ft/s)	2.60	Avg. Vel. (ft/s)	0.74	7.37	1.19
Max Chl Dpth (ft)	16.66	Hydr. Depth (ft)	2.66	13.97	5.50
Conv. Total (cfs)	352750.3	Conv. (cfs)	12713.0	237735.7	102301.6
Length Wtd. (ft)	276.50	Wetted Per. (ft)	201.05	77.15	503.20
Min Ch El (ft)	572.47	Shear (lb/sq ft)	0.16	0.80	0.33
Alpha	5.47	Stream Power (lb/ft s)	0.12	5.90	0.39
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)	9.21	16.54	21.06
C & E Loss (ft)	0.00	Cum SA (acres)	2.99	1.29	4.89

Plan: Alt 3 New 2 Span Stevens Branch Stevens Branch RS: 3508 Profile: 1%

E.G. Elev (ft)	590.59	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.54	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	590.05	Reach Len. (ft)	245.30	268.30	311.80
Crit W.S. (ft)	585.96	Flow Area (sq ft)	720.01	1075.46	3151.52
E.G. Slope (ft/ft)	0.000885	Area (sq ft)	751.58	1075.46	3151.52
Q Total (cfs)	12400.00	Flow (cfs)	620.90	7867.67	3911.44
Top Width (ft)	778.03	Top Width (ft)	210.90	72.20	494.93
Vel Total (ft/s)	2.51	Avg. Vel. (ft/s)	0.86	7.32	1.24
Max Chl Dpth (ft)	17.58	Hydr. Depth (ft)	3.58	14.90	6.37
Conv. Total (cfs)	416792.0	Conv. (cfs)	20869.7	264450.2	131472.2
Length Wtd. (ft)	277.11	Wetted Per. (ft)	201.05	77.15	509.67
Min Ch El (ft)	572.47	Shear (lb/sq ft)	0.20	0.77	0.34
Alpha	5.49	Stream Power (lb/ft s)	0.17	5.63	0.42
Frctn Loss (ft)	0.24	Cum Volume (acre-ft)	12.13	17.68	25.67
C & E Loss (ft)	0.00	Cum SA (acres)	3.36	1.30	5.44

Plan: Alt 3 New 2 Span Stevens Branch Stevens Branch RS: 3508 Profile: 0.2%

E.G. Elev (ft)	592.08	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.50	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	591.58	Reach Len. (ft)	245.30	268.30	311.80
Crit W.S. (ft)	586.70	Flow Area (sq ft)	1025.89	1185.39	3911.23
E.G. Slope (ft/ft)	0.000787	Area (sq ft)	1165.83	1185.39	3911.23
Q Total (cfs)	14980.00	Flow (cfs)	1055.99	8722.98	5201.03
Top Width (ft)	876.85	Top Width (ft)	300.54	72.20	504.11
Vel Total (ft/s)	2.45	Avg. Vel. (ft/s)	1.03	7.36	1.33
Max Chl Dpth (ft)	19.11	Hydr. Depth (ft)	5.11	16.42	7.76
Conv. Total (cfs)	534113.5	Conv. (cfs)	37651.5	311018.6	185443.4
Length Wtd. (ft)	278.14	Wetted Per. (ft)	201.05	77.15	522.04
Min Ch El (ft)	572.47	Shear (lb/sq ft)	0.25	0.75	0.37
Alpha	5.38	Stream Power (lb/ft s)	0.26	5.55	0.49
Frctn Loss (ft)	0.21	Cum Volume (acre-ft)	17.71	19.65	34.39
C & E Loss (ft)	0.01	Cum SA (acres)	3.84	1.33	6.13

Plan: Alt 3 New 2 Span Stevens Branch Stevens Branch RS: 2628 Profile: 50%

E.G. Elev (ft)	579.78	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.50	Wt. n-Val.		0.035	
W.S. Elev (ft)	579.28	Reach Len. (ft)	382.10	343.40	269.80
Crit W.S. (ft)	576.32	Flow Area (sq ft)		445.41	
E.G. Slope (ft/ft)	0.001784	Area (sq ft)		445.41	
Q Total (cfs)	2524.00	Flow (cfs)		2524.00	
Top Width (ft)	75.70	Top Width (ft)		75.70	
Vel Total (ft/s)	5.67	Avg. Vel. (ft/s)		5.67	
Max Chl Dpth (ft)	7.17	Hydr. Depth (ft)		5.88	
Conv. Total (cfs)	59761.7	Conv. (cfs)		59761.7	
Length Wtd. (ft)	343.40	Wetted Per. (ft)		79.28	
Min Ch El (ft)	572.11	Shear (lb/sq ft)		0.63	
Alpha	1.00	Stream Power (lb/ft s)		3.55	
Frctn Loss (ft)	0.78	Cum Volume (acre-ft)		3.11	
C & E Loss (ft)	0.03	Cum SA (acres)		0.52	

Plan: Alt 3 New 2 Span Stevens Branch Stevens Branch RS: 2628 Profile: 20%

E.G. Elev (ft)	582.25	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.63	Wt. n-Val.		0.035	
W.S. Elev (ft)	581.62	Reach Len. (ft)	382.10	343.40	269.80
Crit W.S. (ft)	577.68	Flow Area (sq ft)		633.47	
E.G. Slope (ft/ft)	0.001653	Area (sq ft)		633.47	
Q Total (cfs)	4024.00	Flow (cfs)		4024.00	
Top Width (ft)	84.88	Top Width (ft)		84.88	
Vel Total (ft/s)	6.35	Avg. Vel. (ft/s)		6.35	
Max Chl Dpth (ft)	9.51	Hydr. Depth (ft)		7.46	
Conv. Total (cfs)	98959.9	Conv. (cfs)		98959.9	
Length Wtd. (ft)	343.40	Wetted Per. (ft)		89.75	
Min Ch El (ft)	572.11	Shear (lb/sq ft)		0.73	
Alpha	1.00	Stream Power (lb/ft s)		4.63	
Frctn Loss (ft)	0.75	Cum Volume (acre-ft)		4.37	
C & E Loss (ft)	0.05	Cum SA (acres)		0.58	

Plan: Alt 3 New 2 Span Stevens Branch Stevens Branch RS: 2628 Profile: 10%

E.G. Elev (ft)	586.88	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.61	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	586.27	Reach Len. (ft)	382.10	343.40	269.80
Crit W.S. (ft)	580.37	Flow Area (sq ft)	164.12	1094.69	689.44
E.G. Slope (ft/ft)	0.001098	Area (sq ft)	344.46	1094.69	689.44
Q Total (cfs)	7740.00	Flow (cfs)	72.53	7125.51	541.96
Top Width (ft)	625.57	Top Width (ft)	261.19	104.60	259.78
Vel Total (ft/s)	3.97	Avg. Vel. (ft/s)	0.44	6.51	0.79
Max Chl Dpth (ft)	14.16	Hydr. Depth (ft)	1.12	10.47	2.65
Conv. Total (cfs)	233581.5	Conv. (cfs)	2189.0	215037.0	16355.5
Length Wtd. (ft)	340.95	Wetted Per. (ft)	146.80	109.99	259.99
Min Ch El (ft)	572.11	Shear (lb/sq ft)	0.08	0.68	0.18
Alpha	2.47	Stream Power (lb/ft s)	0.03	4.44	0.14
Frctn Loss (ft)	0.58	Cum Volume (acre-ft)	1.51	7.39	2.22
C & E Loss (ft)	0.09	Cum SA (acres)	1.15	0.73	0.97

Plan: Alt 3 New 2 Span Stevens Branch Stevens Branch RS: 2628 Profile: 2%

E.G. Elev (ft)	589.45	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.58	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	588.88	Reach Len. (ft)	382.10	343.40	269.80
Crit W.S. (ft)	582.32	Flow Area (sq ft)	546.05	1367.20	1573.04
E.G. Slope (ft/ft)	0.000861	Area (sq ft)	1060.90	1367.20	1573.04
Q Total (cfs)	11040.00	Flow (cfs)	476.33	9139.98	1423.69
Top Width (ft)	837.72	Top Width (ft)	333.22	104.60	399.91
Vel Total (ft/s)	3.17	Avg. Vel. (ft/s)	0.87	6.69	0.91
Max Chl Dpth (ft)	16.77	Hydr. Depth (ft)	3.72	13.07	3.93
Conv. Total (cfs)	376218.8	Conv. (cfs)	16232.2	311470.4	48516.1
Length Wtd. (ft)	338.45	Wetted Per. (ft)	146.80	109.99	400.17
Min Ch El (ft)	572.11	Shear (lb/sq ft)	0.20	0.67	0.21
Alpha	3.70	Stream Power (lb/ft s)	0.17	4.47	0.19
Frctn Loss (ft)	0.49	Cum Volume (acre-ft)	4.65	9.22	5.78
C & E Loss (ft)	0.13	Cum SA (acres)	1.46	0.75	1.70

Plan: Alt 3 New 2 Span Stevens Branch Stevens Branch RS: 2628 Profile: 1%

E.G. Elev (ft)	590.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.58	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	589.77	Reach Len. (ft)	382.10	343.40	269.80
Crit W.S. (ft)	583.84	Flow Area (sq ft)	676.72	1460.43	1960.05
E.G. Slope (ft/ft)	0.000818	Area (sq ft)	1390.03	1460.43	1960.05
Q Total (cfs)	12400.00	Flow (cfs)	664.01	9946.55	1789.45
Top Width (ft)	962.17	Top Width (ft)	384.06	104.60	473.51
Vel Total (ft/s)	3.03	Avg. Vel. (ft/s)	0.98	6.81	0.91
Max Chl Dpth (ft)	17.66	Hydr. Depth (ft)	4.62	13.96	4.14
Conv. Total (cfs)	433425.3	Conv. (cfs)	23209.5	347668.1	62547.6
Length Wtd. (ft)	337.53	Wetted Per. (ft)	146.80	109.99	473.78
Min Ch El (ft)	572.11	Shear (lb/sq ft)	0.24	0.68	0.21
Alpha	4.08	Stream Power (lb/ft s)	0.23	4.62	0.19
Frctn Loss (ft)	0.48	Cum Volume (acre-ft)	6.10	9.87	7.38
C & E Loss (ft)	0.13	Cum SA (acres)	1.68	0.76	1.97

Plan: Alt 3 New 2 Span Stevens Branch Stevens Branch RS: 2628 Profile: 0.2%

E.G. Elev (ft)	591.86	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.57	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	591.28	Reach Len. (ft)	382.10	343.40	269.80
Crit W.S. (ft)	585.05	Flow Area (sq ft)	898.75	1618.85	2739.83
E.G. Slope (ft/ft)	0.000748	Area (sq ft)	1989.00	1618.85	2739.83
Q Total (cfs)	14980.00	Flow (cfs)	1018.57	11288.78	2672.66
Top Width (ft)	1062.34	Top Width (ft)	397.60	104.60	560.14
Vel Total (ft/s)	2.85	Avg. Vel. (ft/s)	1.13	6.97	0.98
Max Chl Dpth (ft)	19.17	Hydr. Depth (ft)	6.13	15.48	4.89
Conv. Total (cfs)	547737.8	Conv. (cfs)	37243.4	412769.8	97724.6
Length Wtd. (ft)	335.51	Wetted Per. (ft)	146.80	109.99	560.43
Min Ch El (ft)	572.11	Shear (lb/sq ft)	0.29	0.69	0.23
Alpha	4.55	Stream Power (lb/ft s)	0.32	4.79	0.22
Frctn Loss (ft)	0.45	Cum Volume (acre-ft)	8.83	11.01	10.59
C & E Loss (ft)	0.14	Cum SA (acres)	1.88	0.78	2.32

Plan: Alt 3 New 2 Span Stevens Branch Stevens Branch RS: 1501 Profile: 50%

E.G. Elev (ft)	578.96	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.84	Wt. n-Val.		0.035	
W.S. Elev (ft)	578.12	Reach Len. (ft)			
Crit W.S. (ft)	575.76	Flow Area (sq ft)		343.65	
E.G. Slope (ft/ft)	0.003000	Area (sq ft)		343.65	
Q Total (cfs)	2524.00	Flow (cfs)		2524.00	
Top Width (ft)	56.60	Top Width (ft)		56.60	
Vel Total (ft/s)	7.34	Avg. Vel. (ft/s)		7.34	
Max Chl Dpth (ft)	7.34	Hydr. Depth (ft)		6.07	
Conv. Total (cfs)	46079.4	Conv. (cfs)		46079.4	
Length Wtd. (ft)		Wetted Per. (ft)		61.22	
Min Ch El (ft)	570.78	Shear (lb/sq ft)		1.05	
Alpha	1.00	Stream Power (lb/ft s)		7.72	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Plan: Alt 3 New 2 Span Stevens Branch Stevens Branch RS: 1501 Profile: 20%

E.G. Elev (ft)	581.45	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.11	Wt. n-Val.		0.035	
W.S. Elev (ft)	580.34	Reach Len. (ft)			
Crit W.S. (ft)	577.37	Flow Area (sq ft)		475.20	
E.G. Slope (ft/ft)	0.003000	Area (sq ft)		475.20	
Q Total (cfs)	4024.00	Flow (cfs)		4024.00	
Top Width (ft)	62.21	Top Width (ft)		62.21	
Vel Total (ft/s)	8.47	Avg. Vel. (ft/s)		8.47	
Max Chl Dpth (ft)	9.56	Hydr. Depth (ft)		7.64	
Conv. Total (cfs)	73466.4	Conv. (cfs)		73466.4	
Length Wtd. (ft)		Wetted Per. (ft)		68.38	
Min Ch El (ft)	570.78	Shear (lb/sq ft)		1.30	
Alpha	1.00	Stream Power (lb/ft s)		11.02	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Plan: Alt 3 New 2 Span Stevens Branch Stevens Branch RS: 1501 Profile: 10%

E.G. Elev (ft)	586.20	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.52	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	584.69	Reach Len. (ft)			
Crit W.S. (ft)	580.55	Flow Area (sq ft)		781.30	26.87
E.G. Slope (ft/ft)	0.003002	Area (sq ft)		781.30	26.87
Q Total (cfs)	7740.00	Flow (cfs)		7728.56	11.44
Top Width (ft)	134.77	Top Width (ft)		80.76	54.01
Vel Total (ft/s)	9.58	Avg. Vel. (ft/s)		9.89	0.43
Max Chl Dpth (ft)	13.91	Hydr. Depth (ft)		9.67	0.50
Conv. Total (cfs)	141273.9	Conv. (cfs)		141065.0	208.9
Length Wtd. (ft)		Wetted Per. (ft)		89.09	54.03
Min Ch El (ft)	570.78	Shear (lb/sq ft)		1.64	0.09
Alpha	1.07	Stream Power (lb/ft s)		16.26	0.04
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Plan: Alt 3 New 2 Span Stevens Branch Stevens Branch RS: 1501 Profile: 2%

E.G. Elev (ft)	588.83	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.84	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	586.99	Reach Len. (ft)			
Crit W.S. (ft)	582.87	Flow Area (sq ft)		972.25	293.00
E.G. Slope (ft/ft)	0.003000	Area (sq ft)		972.25	293.00
Q Total (cfs)	11040.00	Flow (cfs)		10729.31	310.69
Top Width (ft)	234.94	Top Width (ft)		85.15	149.79
Vel Total (ft/s)	8.73	Avg. Vel. (ft/s)		11.04	1.06
Max Chl Dpth (ft)	16.21	Hydr. Depth (ft)		11.42	1.96
Conv. Total (cfs)	201552.3	Conv. (cfs)		195880.1	5672.1
Length Wtd. (ft)		Wetted Per. (ft)		94.05	149.89
Min Ch El (ft)	570.78	Shear (lb/sq ft)		1.94	0.37
Alpha	1.55	Stream Power (lb/ft s)		21.37	0.39
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Plan: Alt 3 New 2 Span Stevens Branch Stevens Branch RS: 1501 Profile: 1%

E.G. Elev (ft)	589.74	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.92	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	587.81	Reach Len. (ft)			
Crit W.S. (ft)	583.95	Flow Area (sq ft)		1043.00	421.69
E.G. Slope (ft/ft)	0.003000	Area (sq ft)		1043.00	421.69
Q Total (cfs)	12400.00	Flow (cfs)		11862.80	537.20
Top Width (ft)	251.04	Top Width (ft)		87.36	163.68
Vel Total (ft/s)	8.47	Avg. Vel. (ft/s)		11.37	1.27
Max Chl Dpth (ft)	17.03	Hydr. Depth (ft)		11.94	2.58
Conv. Total (cfs)	226400.3	Conv. (cfs)		216592.1	9808.2
Length Wtd. (ft)		Wetted Per. (ft)		96.41	163.80
Min Ch El (ft)	570.78	Shear (lb/sq ft)		2.03	0.48
Alpha	1.73	Stream Power (lb/ft s)		23.04	0.61
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Plan: Alt 3 New 2 Span Stevens Branch Stevens Branch RS: 1501 Profile: 0.2%

E.G. Elev (ft)	591.26	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.02	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	589.25	Reach Len. (ft)			
Crit W.S. (ft)	585.90	Flow Area (sq ft)	23.68	1174.44	679.83
E.G. Slope (ft/ft)	0.003006	Area (sq ft)	23.68	1174.44	679.83
Q Total (cfs)	14980.00	Flow (cfs)	13.70	13883.31	1082.99
Top Width (ft)	312.49	Top Width (ft)	30.04	93.50	188.95
Vel Total (ft/s)	7.98	Avg. Vel. (ft/s)	0.58	11.82	1.59
Max Chl Dpth (ft)	18.47	Hydr. Depth (ft)	0.79	12.56	3.60
Conv. Total (cfs)	273227.7	Conv. (cfs)	250.0	253224.5	19753.2
Length Wtd. (ft)		Wetted Per. (ft)	30.08	102.61	189.13
Min Ch El (ft)	570.78	Shear (lb/sq ft)	0.15	2.15	0.67
Alpha	2.04	Stream Power (lb/ft s)	0.09	25.39	1.07
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

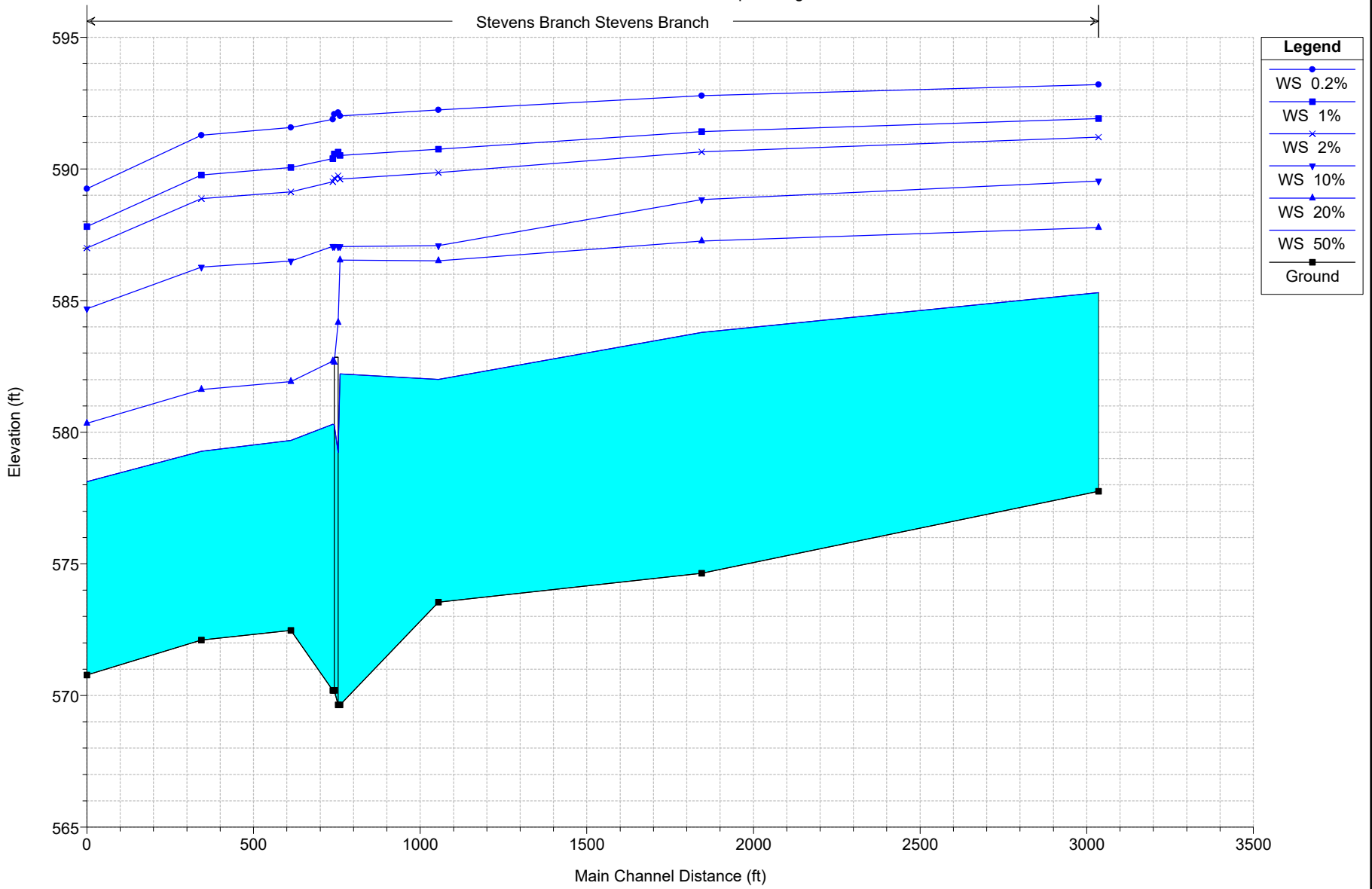


# HEC-RAS Results for Alternative 3A

# Bridge 308

Geom: Alternative 3A - New 2 Span Brdg, Debris

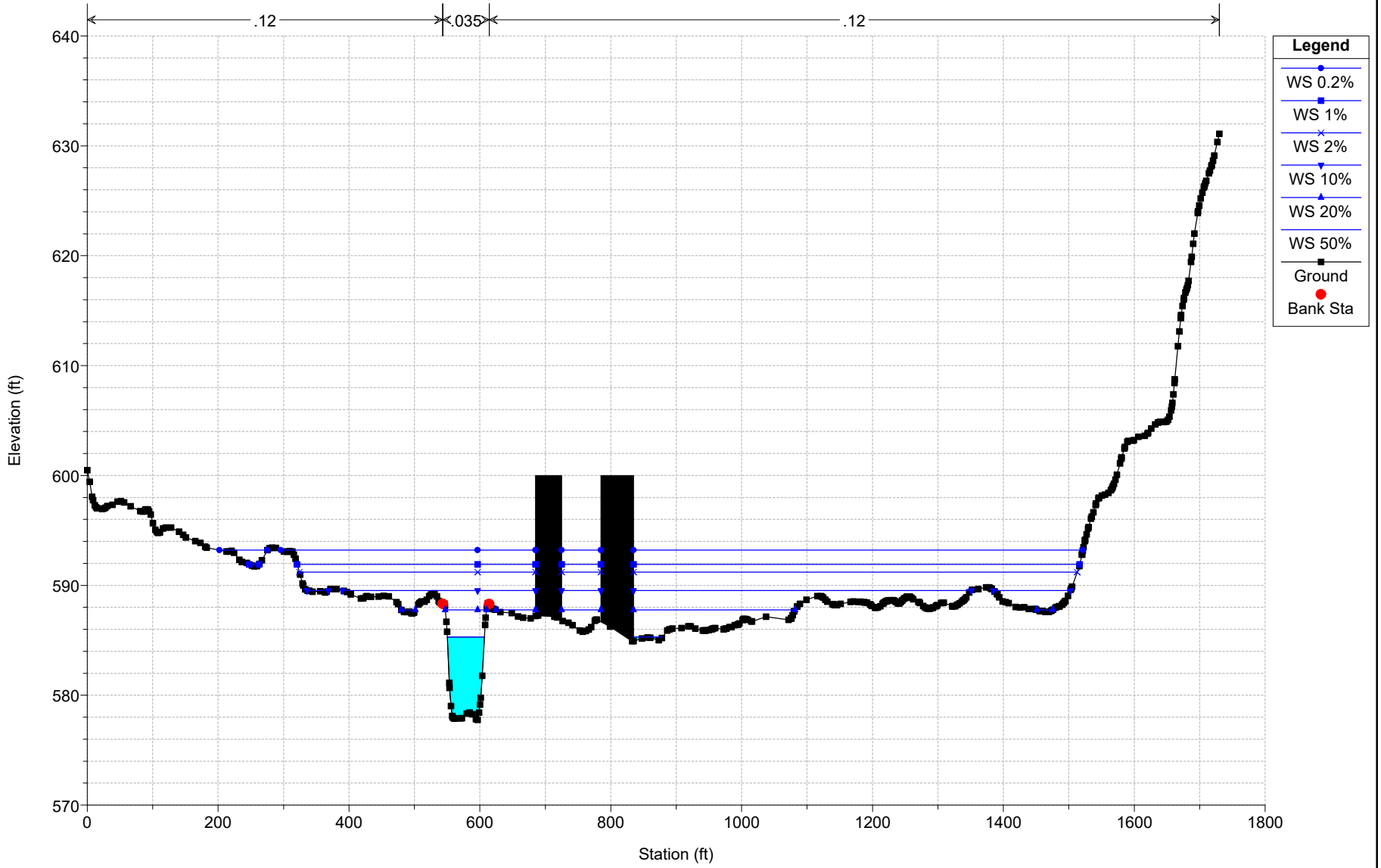
Stevens Branch Stevens Branch



# Bridge 308

Geom: Alternative 3A - New 2 Span Brdg, Debris

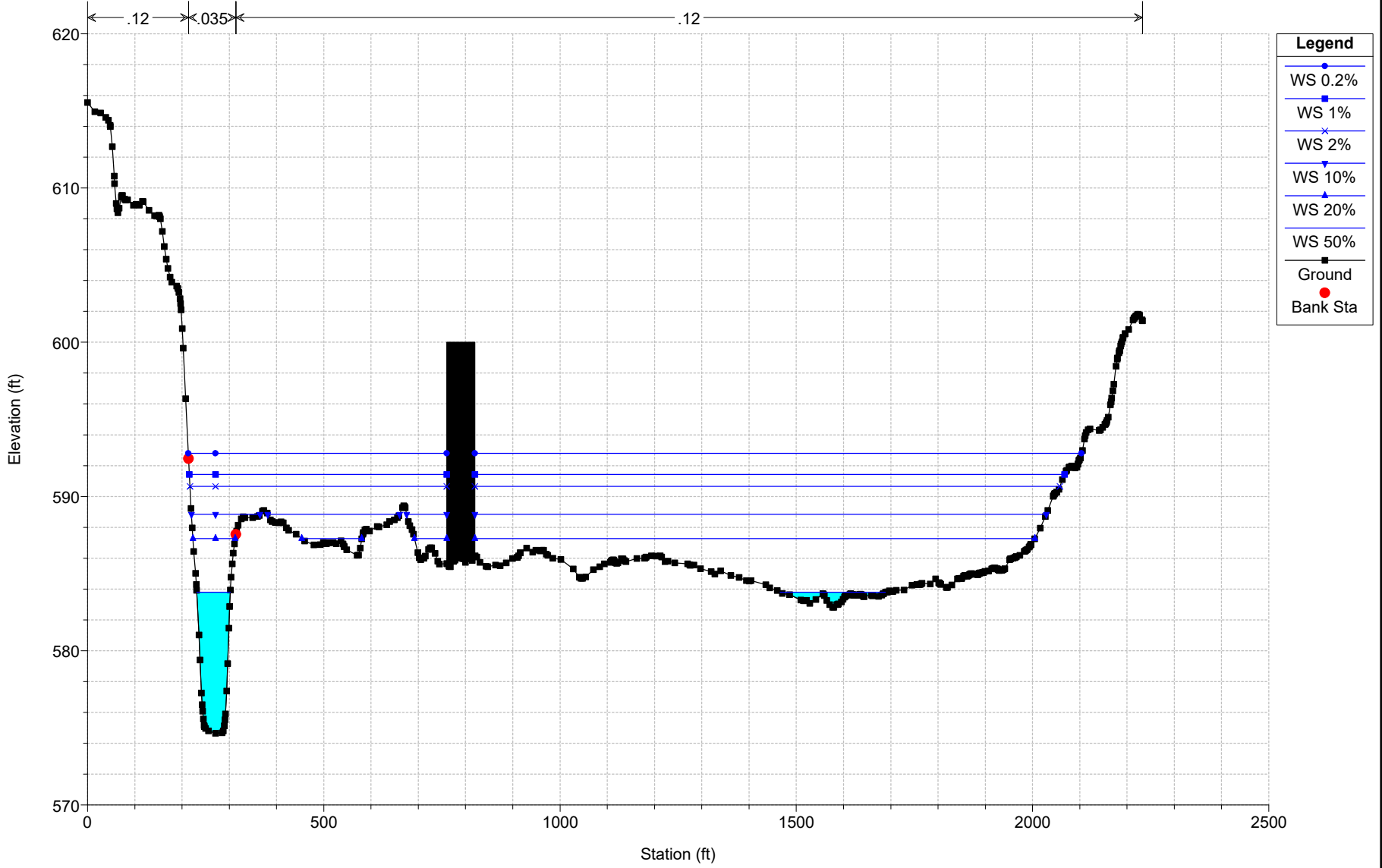
RS = 11459



# Bridge 308

Geom: Alternative 3A - New 2 Span Brdg, Debris

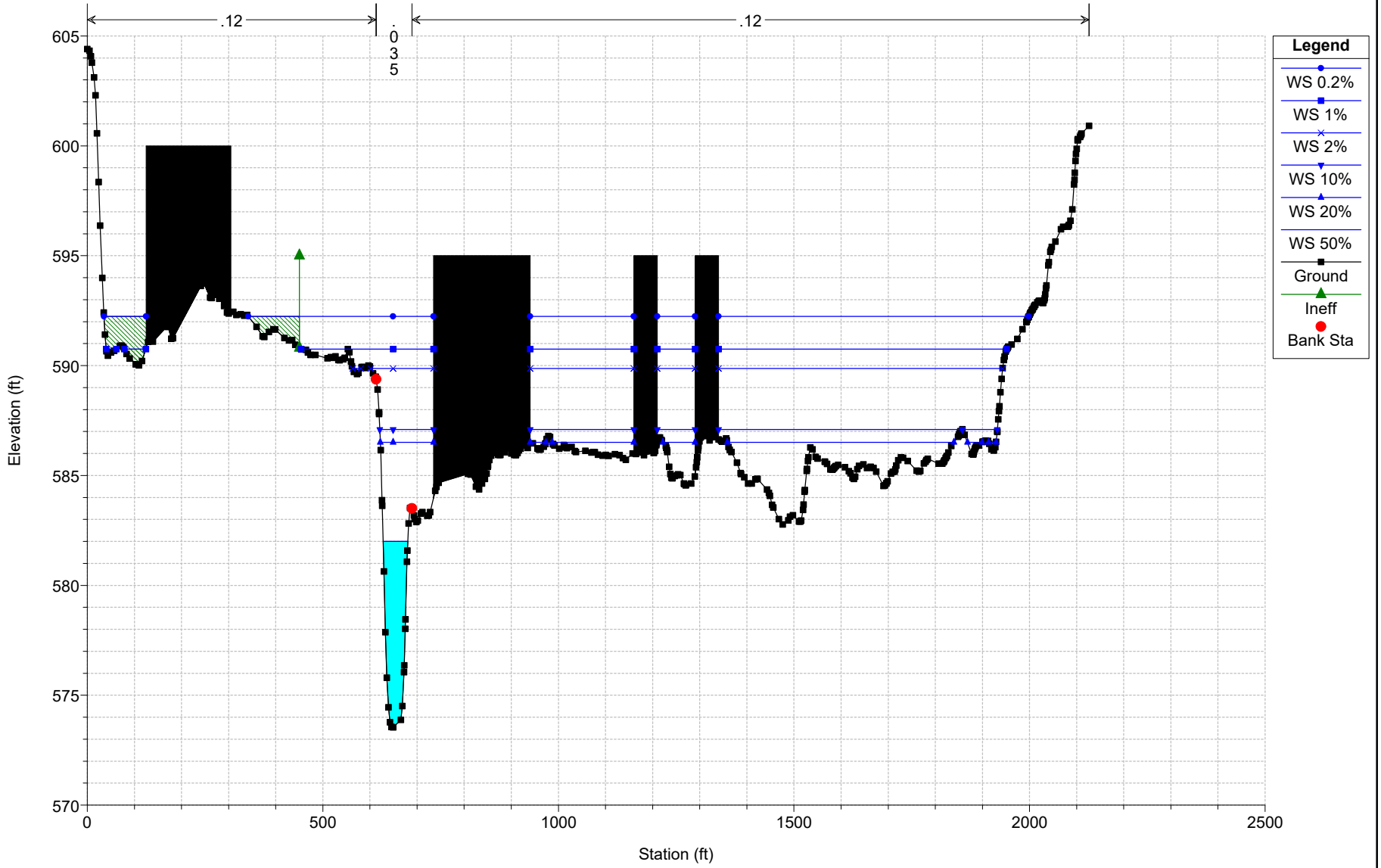
RS = 7552



# Bridge 308

Geom: Alternative 3A - New 2 Span Brdg, Debris

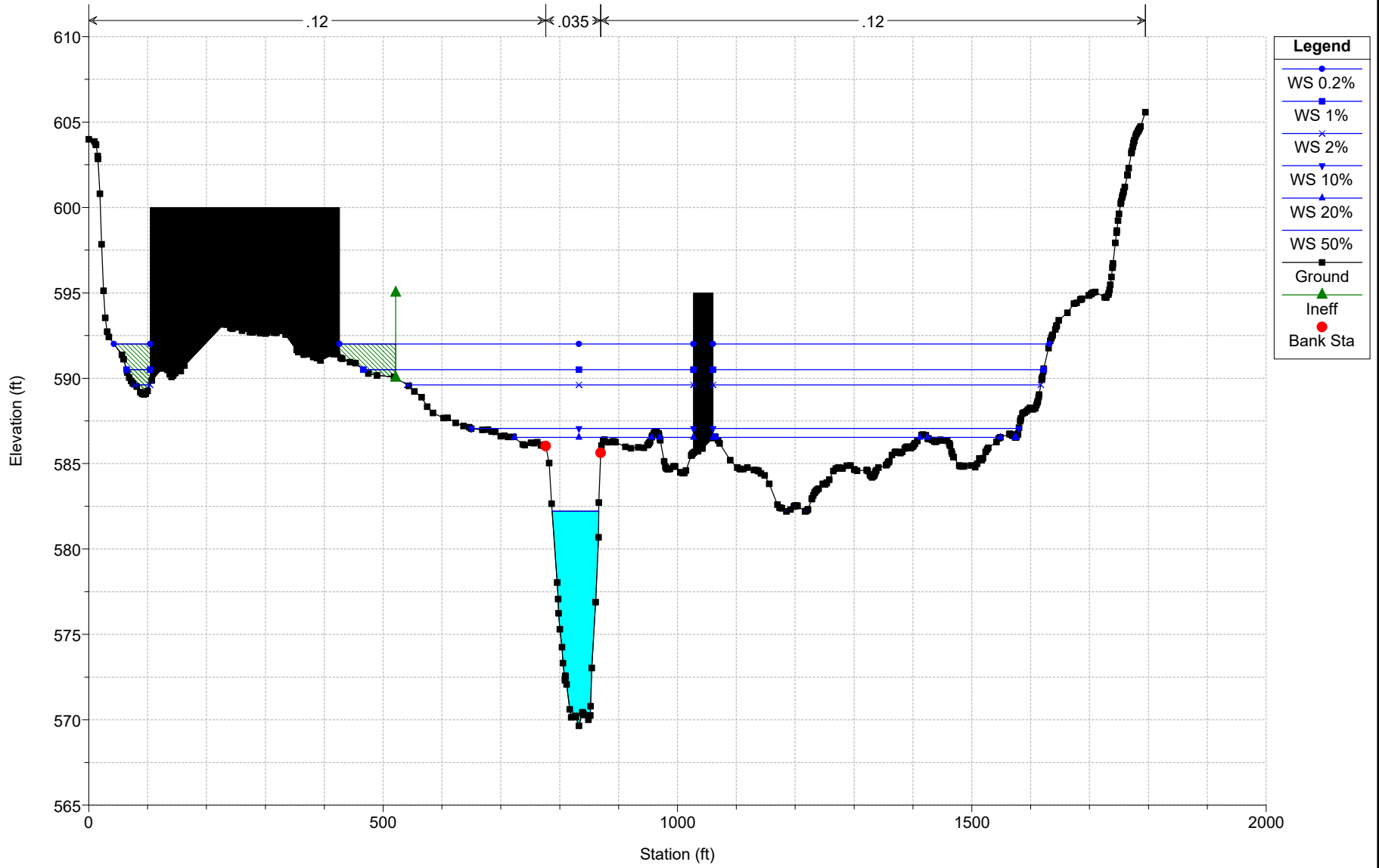
RS = 4962



# Bridge 308

Geom: Alternative 3A - New 2 Span Brdg, Debris

RS = 3994

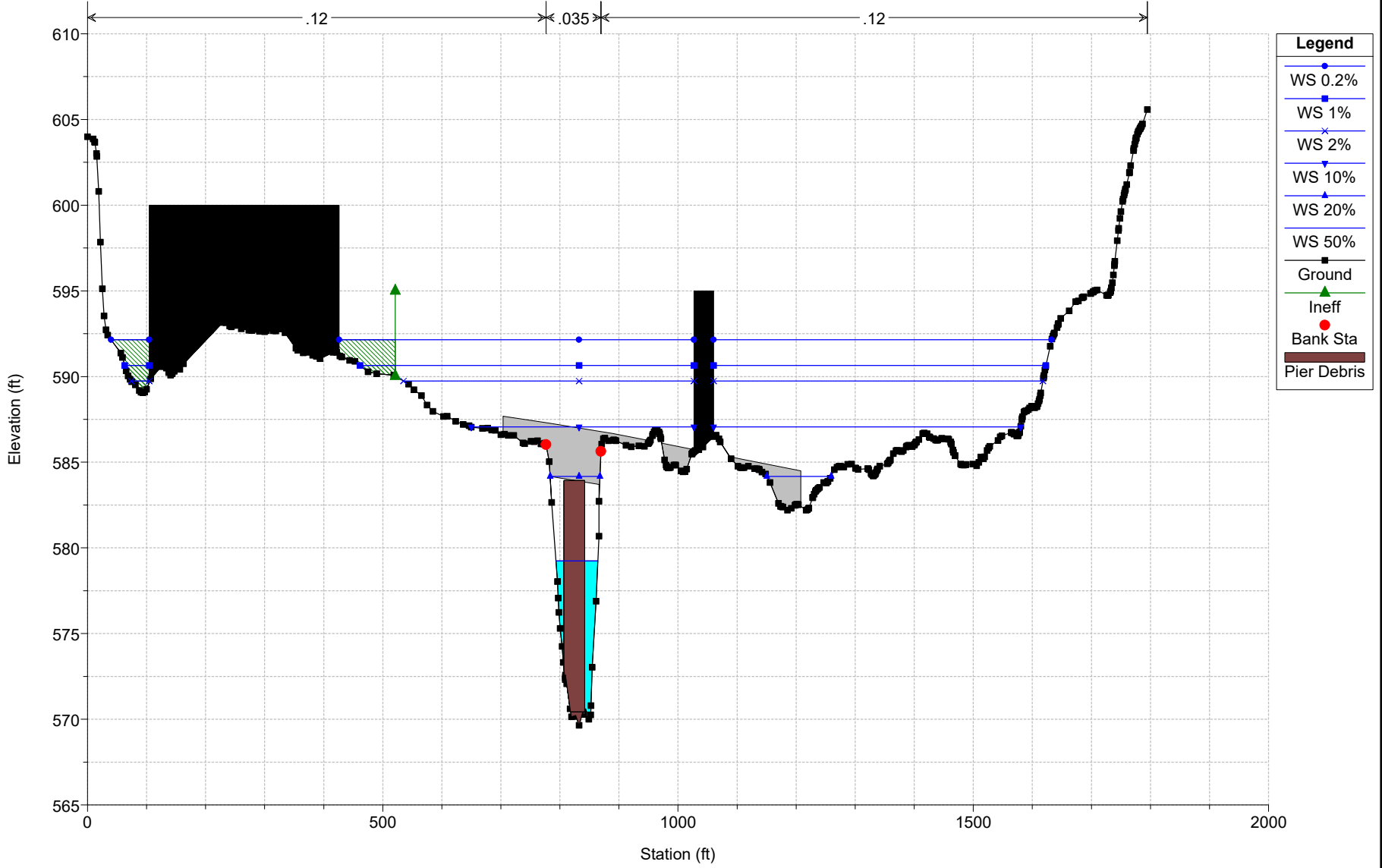




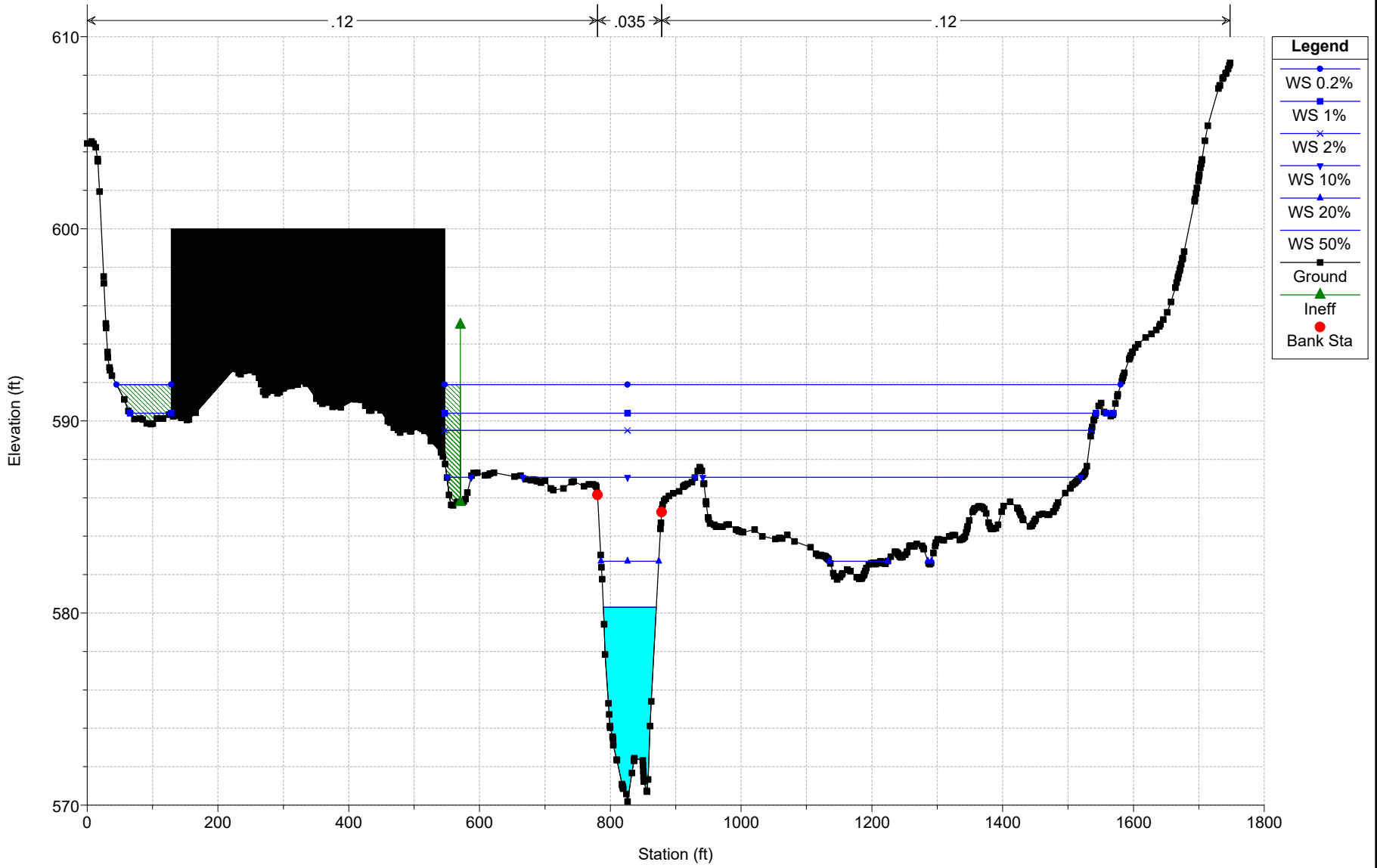
### Bridge 308

Geom: Alternative 3A - New 2 Span Brdg, Debris

RS = 3990 BR



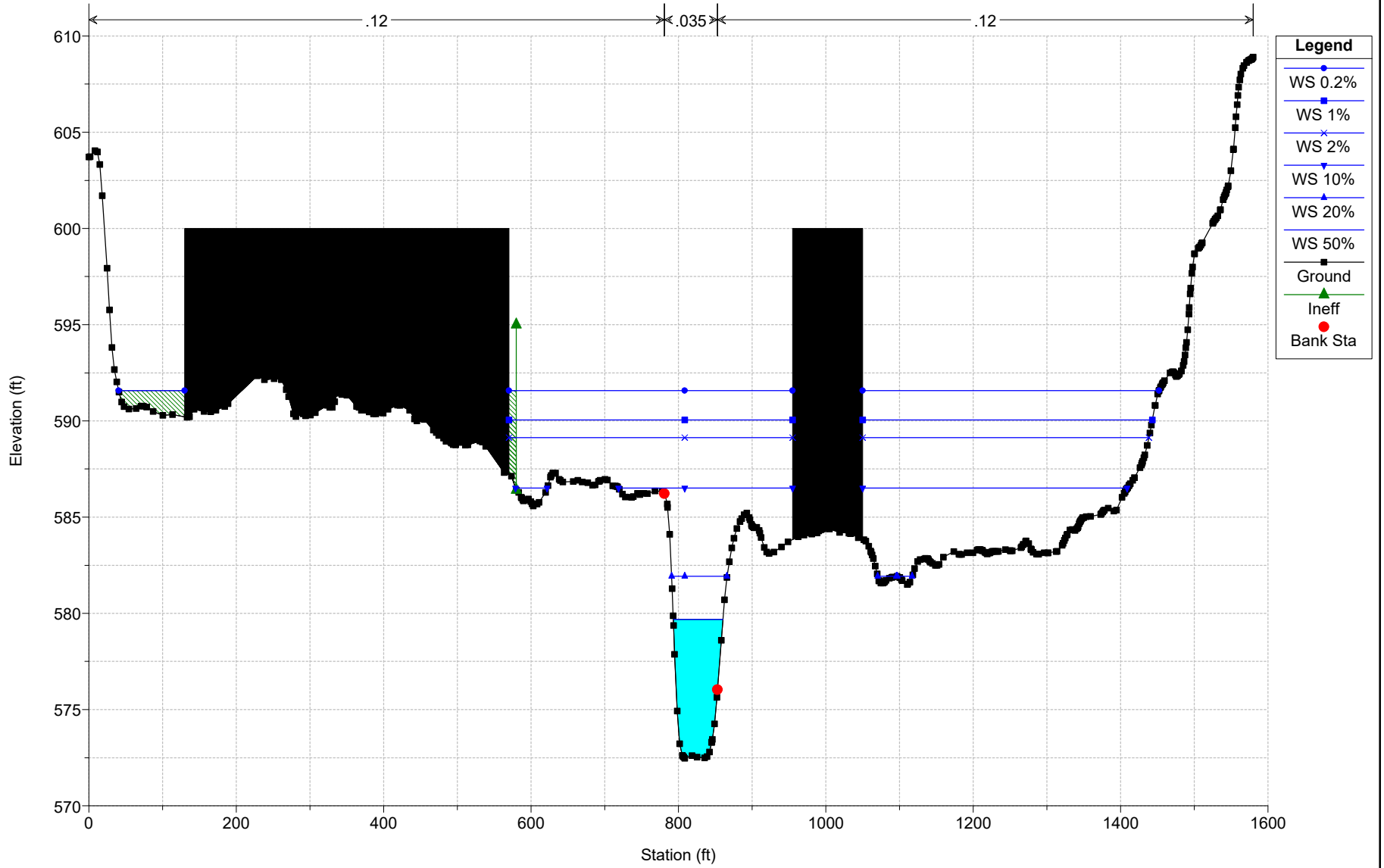
Bridge 308  
Geom: Alternative 3A - New 2 Span Brdg, Debris  
RS = 3921



# Bridge 308

Geom: Alternative 3A - New 2 Span Brdg, Debris

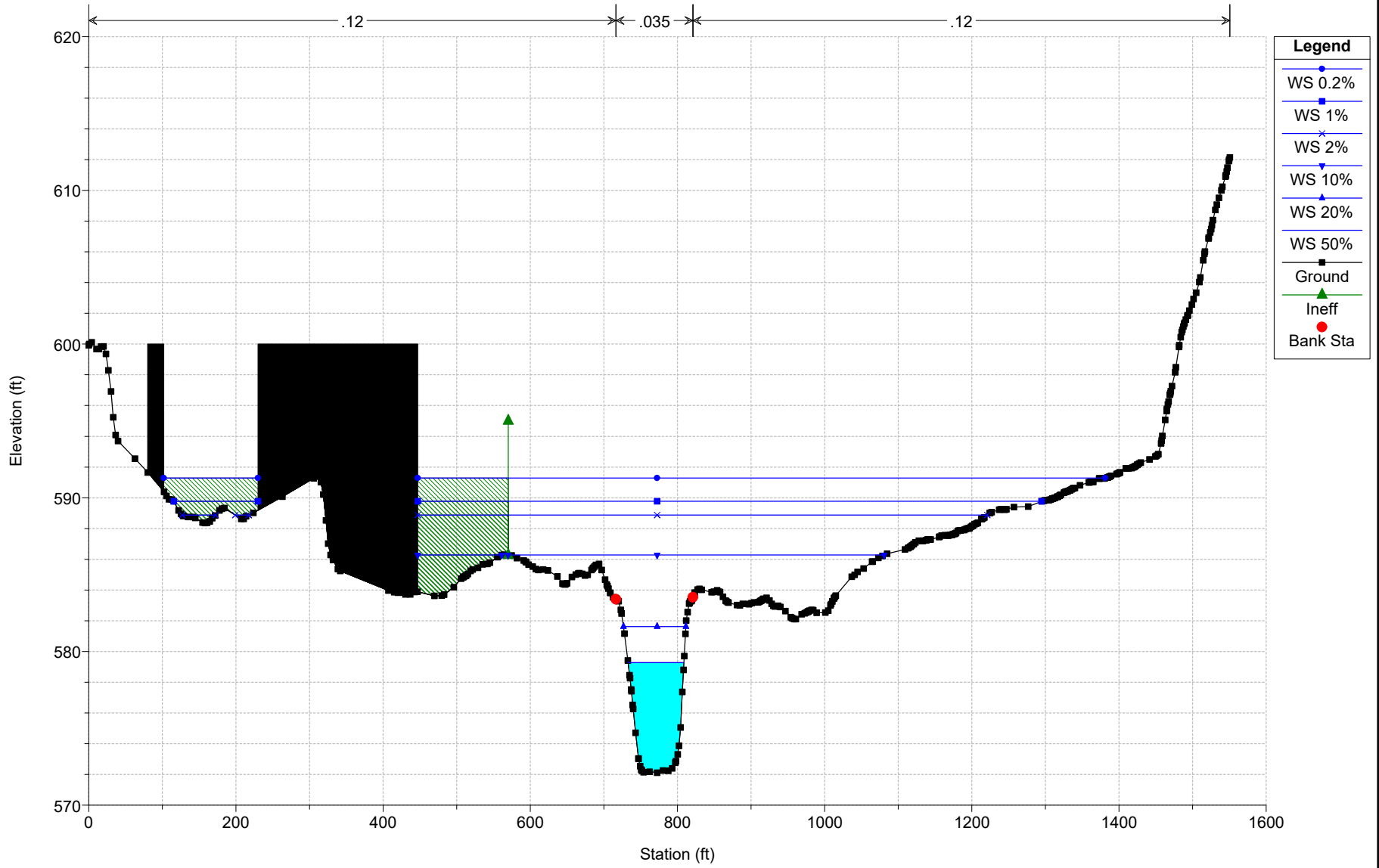
RS = 3508



# Bridge 308

Geom: Alternative 3A - New 2 Span Brdg, Debris

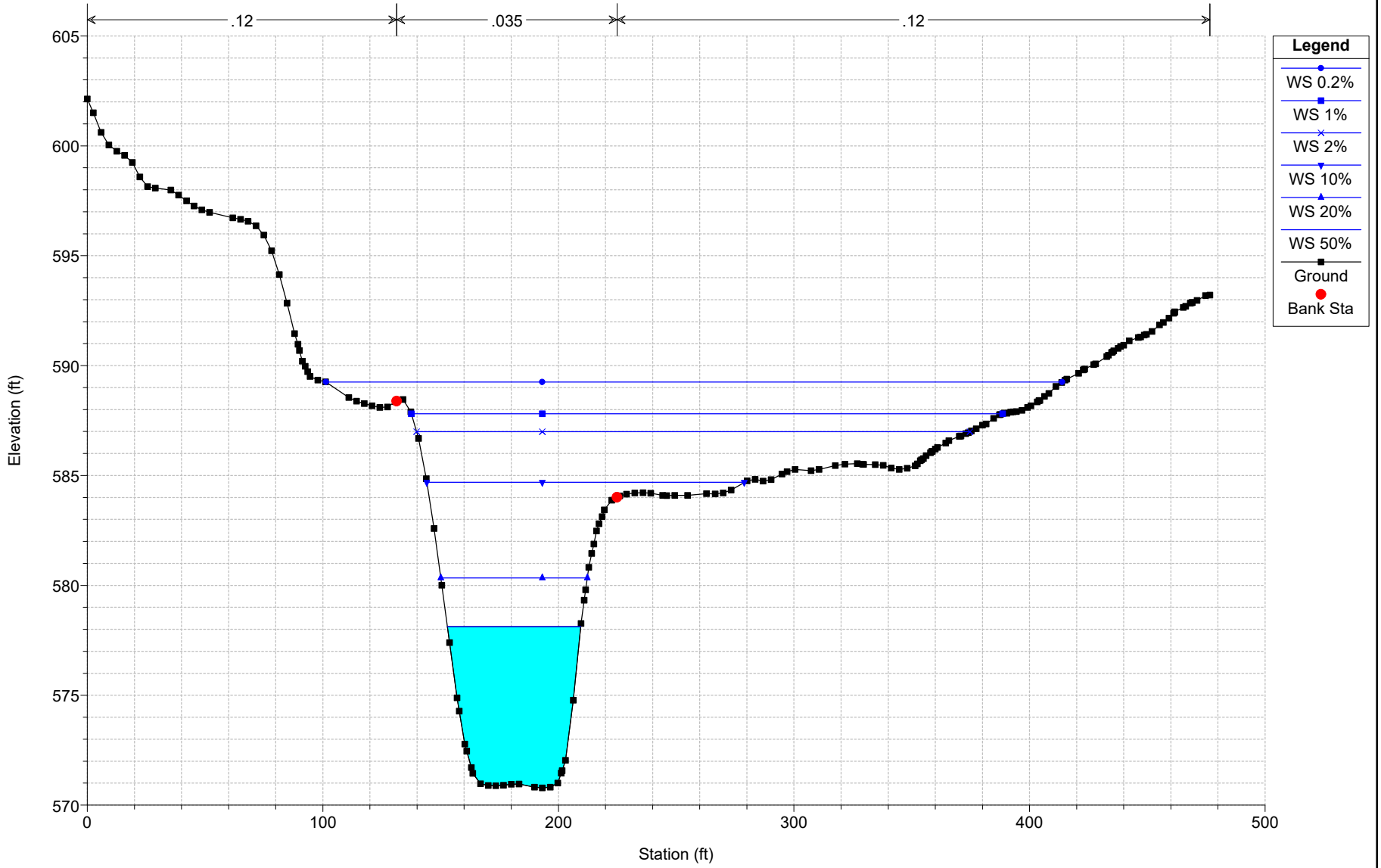
RS = 2628



# Bridge 308

Geom: Alternative 3A - New 2 Span Brdg, Debris

RS = 1501



Plan: Alt 3 New 2 Span, Debris Stevens Branch Stevens Branch RS: 3990 Profile: 50%

E.G. US. (ft)	582.41	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	582.21	E.G. Elev (ft)	581.90	580.62
Q Total (cfs)	2524.00	W.S. Elev (ft)	579.23	580.28
Q Bridge (cfs)	2524.00	Crit W.S. (ft)	579.23	575.89
Q Weir (cfs)		Max Chl Dpth (ft)	9.59	10.09
Weir Sta Lft (ft)		Vel Total (ft/s)	13.11	4.70
Weir Sta Rgt (ft)		Flow Area (sq ft)	192.57	536.48
Weir Submerg		Froude # Chl	1.00	0.26
Weir Max Depth (ft)		Specif Force (cu ft)	1715.18	2516.52
Min El Weir Flow (ft)	586.81	Hydr Depth (ft)	5.36	7.23
Min El Prs (ft)	582.85	W.P. Total (ft)	101.93	98.32
Delta EG (ft)	1.81	Conv. Total (cfs)	12493.9	70594.1
Delta WS (ft)	1.91	Top Width (ft)	35.96	74.20
BR Open Area (sq ft)	399.38	Frctn Loss (ft)	0.04	0.71
BR Open Vel (ft/s)	13.11	C & E Loss (ft)	0.93	0.74
BR Sluice Coef		Shear Total (lb/sq ft)	4.81	0.44
BR Sel Method	Energy only	Power Total (lb/ft s)	63.09	2.05

Plan: Alt 3 New 2 Span, Debris Stevens Branch Stevens Branch RS: 3990 Profile: 20%

E.G. US. (ft)	586.71	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	586.54	E.G. Elev (ft)	586.71	583.14
Q Total (cfs)	4024.00	W.S. Elev (ft)	584.17	582.65
Q Bridge (cfs)	4024.00	Crit W.S. (ft)	581.39	577.29
Q Weir (cfs)		Max Chl Dpth (ft)	14.53	12.46
Weir Sta Lft (ft)		Vel Total (ft/s)	8.90	5.61
Weir Sta Rgt (ft)		Flow Area (sq ft)	451.93	717.69
Weir Submerg		Froude # Chl	0.45	0.28
Weir Max Depth (ft)		Specif Force (cu ft)	3479.00	4336.08
Min El Weir Flow (ft)	586.81	Hydr Depth (ft)	8.79	7.95
Min El Prs (ft)	582.85	W.P. Total (ft)	252.46	122.38
Delta EG (ft)	3.60	Conv. Total (cfs)	27604.4	106305.4
Delta WS (ft)	3.84	Top Width (ft)	51.44	90.32
BR Open Area (sq ft)	399.38	Frctn Loss (ft)		
BR Open Vel (ft/s)	10.08	C & E Loss (ft)		
BR Sluice Coef	0.46	Shear Total (lb/sq ft)	2.37	0.52
BR Sel Method	Press Only	Power Total (lb/ft s)	21.15	2.94

Plan: Alt 3 New 2 Span, Debris Stevens Branch Stevens Branch RS: 3990 Profile: 10%

E.G. US. (ft)	587.58	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	587.05	E.G. Elev (ft)	587.58	587.46
Q Total (cfs)	7740.00	W.S. Elev (ft)	587.05	587.06
Q Bridge (cfs)	1846.97	Crit W.S. (ft)	587.31	579.99
Q Weir (cfs)	5893.03	Max Chl Dpth (ft)	17.41	16.88
Weir Sta Lft (ft)	614.20	Vel Total (ft/s)	5.15	3.71
Weir Sta Rgt (ft)	1582.74	Flow Area (sq ft)	1502.46	2085.29
Weir Submerg	0.77	Froude # Chl	0.34	0.27
Weir Max Depth (ft)	5.38	Specif Force (cu ft)	6352.73	10167.95
Min El Weir Flow (ft)	586.81	Hydr Depth (ft)	1.93	2.83
Min El Prs (ft)	582.85	W.P. Total (ft)	981.89	933.97
Delta EG (ft)	0.12	Conv. Total (cfs)		
Delta WS (ft)	-0.01	Top Width (ft)	777.86	757.67
BR Open Area (sq ft)	399.38	Frctn Loss (ft)		
BR Open Vel (ft/s)	4.62	C & E Loss (ft)		



Plan: Alt 3 New 2 Span, Debris Stevens Branch Stevens Branch RS: 3990 Profile: 10% (Continued)

BR Sluice Coef		Shear Total (lb/sq ft)		
BR Sel Method	Press/Weir	Power Total (lb/ft s)		

Plan: Alt 3 New 2 Span, Debris Stevens Branch Stevens Branch RS: 3990 Profile: 2%

E.G. US. (ft)	590.03	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	589.61	E.G. Elev (ft)	589.93	589.88
Q Total (cfs)	11040.00	W.S. Elev (ft)	589.74	589.65
Q Bridge (cfs)	1959.77	Crit W.S. (ft)	587.61	581.94
Q Weir (cfs)		Max Chl Dpth (ft)	20.10	19.47
Weir Sta Lft (ft)		Vel Total (ft/s)	2.68	2.44
Weir Sta Rgt (ft)		Flow Area (sq ft)	4113.80	4519.30
Weir Submerg		Froude # Chl	0.14	0.15
Weir Max Depth (ft)		Specif Force (cu ft)	13108.70	18423.34
Min El Weir Flow (ft)	586.81	Hydr Depth (ft)	3.92	4.68
Min El Prs (ft)	582.85	W.P. Total (ft)	1259.86	1163.83
Delta EG (ft)	0.18	Conv. Total (cfs)	151347.6	217682.3
Delta WS (ft)	0.10	Top Width (ft)	1080.13	989.92
BR Open Area (sq ft)	399.38	Frctn Loss (ft)	0.04	0.00
BR Open Vel (ft/s)	4.91	C & E Loss (ft)	0.01	0.02
BR Sluice Coef		Shear Total (lb/sq ft)	1.08	0.62
BR Sel Method	Energy only	Power Total (lb/ft s)	2.91	1.52

Plan: Alt 3 New 2 Span, Debris Stevens Branch Stevens Branch RS: 3990 Profile: 1%

E.G. US. (ft)	590.89	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	590.51	E.G. Elev (ft)	590.79	590.75
Q Total (cfs)	12400.00	W.S. Elev (ft)	590.64	590.57
Q Bridge (cfs)	1603.22	Crit W.S. (ft)	587.80	582.71
Q Weir (cfs)		Max Chl Dpth (ft)	21.00	20.38
Weir Sta Lft (ft)		Vel Total (ft/s)	2.44	2.29
Weir Sta Rgt (ft)		Flow Area (sq ft)	5075.65	5409.79
Weir Submerg		Froude # Chl	0.12	0.13
Weir Max Depth (ft)		Specif Force (cu ft)	17260.33	22980.44
Min El Weir Flow (ft)	586.81	Hydr Depth (ft)	4.75	5.46
Min El Prs (ft)	582.85	W.P. Total (ft)	1280.58	1187.96
Delta EG (ft)	0.17	Conv. Total (cfs)	205811.3	276196.9
Delta WS (ft)	0.11	Top Width (ft)	1169.58	1080.09
BR Open Area (sq ft)	399.38	Frctn Loss (ft)	0.03	0.00
BR Open Vel (ft/s)	4.01	C & E Loss (ft)	0.01	0.03
BR Sluice Coef		Shear Total (lb/sq ft)	0.90	0.57
BR Sel Method	Energy only	Power Total (lb/ft s)	2.19	1.31

Plan: Alt 3 New 2 Span, Debris Stevens Branch Stevens Branch RS: 3990 Profile: 0.2%

E.G. US. (ft)	592.36	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	592.01	E.G. Elev (ft)	592.26	592.23
Q Total (cfs)	14980.00	W.S. Elev (ft)	592.15	592.08
Q Bridge (cfs)	1252.97	Crit W.S. (ft)	588.12	587.42
Q Weir (cfs)		Max Chl Dpth (ft)	22.50	21.89
Weir Sta Lft (ft)		Vel Total (ft/s)	2.24	2.16
Weir Sta Rgt (ft)		Flow Area (sq ft)	6687.15	6929.02
Weir Submerg		Froude # Chl	0.10	0.12
Weir Max Depth (ft)		Specif Force (cu ft)	26170.57	32418.47
Min El Weir Flow (ft)	586.81	Hydr Depth (ft)	6.20	6.85
Min El Prs (ft)	582.85	W.P. Total (ft)	1293.76	1209.55

Plan: Alt 3 New 2 Span, Debris Stevens Branch Stevens Branch RS: 3990 Profile: 0.2% (Continued)

Delta EG (ft)	0.16	Conv. Total (cfs)	312733.5	385603.4
Delta WS (ft)	0.13	Top Width (ft)	1238.13	1121.96
BR Open Area (sq ft)	399.38	Frctn Loss (ft)	0.02	0.00
BR Open Vel (ft/s)	3.14	C & E Loss (ft)	0.01	0.03
BR Sluice Coef		Shear Total (lb/sq ft)	0.74	0.54
BR Sel Method	Energy only	Power Total (lb/ft s)	1.66	1.17

Plan: Alt 3 New 2 Span, Debris Stevens Branch Stevens Branch RS: 11459 Profile: 50%

E.G. Elev (ft)	586.06	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.76	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	585.30	Reach Len. (ft)	1191.60	1191.00	1181.80
Crit W.S. (ft)	582.65	Flow Area (sq ft)		361.38	7.44
E.G. Slope (ft/ft)	0.002606	Area (sq ft)		361.38	7.44
Q Total (cfs)	2524.00	Flow (cfs)		2522.57	1.43
Top Width (ft)	100.82	Top Width (ft)		56.69	44.12
Vel Total (ft/s)	6.84	Avg. Vel. (ft/s)		6.98	0.19
Max Chl Dpth (ft)	7.54	Hydr. Depth (ft)		6.37	0.17
Conv. Total (cfs)	49443.7	Conv. (cfs)		49415.8	27.9
Length Wtd. (ft)	1190.97	Wetted Per. (ft)		62.52	44.51
Min Ch El (ft)	577.76	Shear (lb/sq ft)		0.94	0.03
Alpha	1.04	Stream Power (lb/ft s)		6.56	0.01
Frctn Loss (ft)	1.79	Cum Volume (acre-ft)		30.73	1.71
C & E Loss (ft)	0.12	Cum SA (acres)		4.48	4.89

Plan: Alt 3 New 2 Span, Debris Stevens Branch Stevens Branch RS: 11459 Profile: 20%

E.G. Elev (ft)	588.51	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.74	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	587.77	Reach Len. (ft)	1191.60	1191.00	1181.80
Crit W.S. (ft)	584.22	Flow Area (sq ft)	4.03	508.05	501.17
E.G. Slope (ft/ft)	0.002082	Area (sq ft)	4.03	508.05	501.17
Q Total (cfs)	4024.00	Flow (cfs)	0.75	3663.77	359.48
Top Width (ft)	476.82	Top Width (ft)	21.45	63.15	392.22
Vel Total (ft/s)	3.97	Avg. Vel. (ft/s)	0.19	7.21	0.72
Max Chl Dpth (ft)	10.01	Hydr. Depth (ft)	0.19	8.05	1.28
Conv. Total (cfs)	88197.7	Conv. (cfs)	16.3	80302.3	7879.1
Length Wtd. (ft)	1189.18	Wetted Per. (ft)	21.47	70.72	397.88
Min Ch El (ft)	577.76	Shear (lb/sq ft)	0.02	0.93	0.16
Alpha	3.01	Stream Power (lb/ft s)	0.00	6.73	0.12
Frctn Loss (ft)	0.93	Cum Volume (acre-ft)	0.08	46.56	76.85
C & E Loss (ft)	0.18	Cum SA (acres)	0.36	5.32	43.27

Plan: Alt 3 New 2 Span, Debris Stevens Branch Stevens Branch RS: 11459 Profile: 10%

E.G. Elev (ft)	590.56	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.02	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	589.54	Reach Len. (ft)	1191.60	1191.00	1181.80
Crit W.S. (ft)	588.47	Flow Area (sq ft)	136.64	629.56	1614.80
E.G. Slope (ft/ft)	0.002986	Area (sq ft)	136.64	629.56	1614.80
Q Total (cfs)	7740.00	Flow (cfs)	82.50	5846.35	1811.15
Top Width (ft)	1022.12	Top Width (ft)	186.69	70.80	764.63
Vel Total (ft/s)	3.25	Avg. Vel. (ft/s)	0.60	9.29	1.12
Max Chl Dpth (ft)	11.78	Hydr. Depth (ft)	0.73	8.89	2.11
Conv. Total (cfs)	141635.2	Conv. (cfs)	1509.7	106983.1	33142.4
Length Wtd. (ft)	1187.82	Wetted Per. (ft)	186.88	78.62	777.70
Min Ch El (ft)	577.76	Shear (lb/sq ft)	0.14	1.49	0.39
Alpha	6.19	Stream Power (lb/ft s)	0.08	13.86	0.43
Frctn Loss (ft)	1.29	Cum Volume (acre-ft)	4.58	58.62	159.87
C & E Loss (ft)	0.25	Cum SA (acres)	4.97	5.82	59.64

Plan: Alt 3 New 2 Span, Debris Stevens Branch Stevens Branch RS: 11459 Profile: 2%

E.G. Elev (ft)	591.94	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.74	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	591.21	Reach Len. (ft)	1191.60	1191.00	1181.80
Crit W.S. (ft)	589.98	Flow Area (sq ft)	493.11	747.56	2948.48
E.G. Slope (ft/ft)	0.002148	Area (sq ft)	493.11	747.56	2948.48
Q Total (cfs)	11040.00	Flow (cfs)	485.22	6602.68	3952.11
Top Width (ft)	1098.66	Top Width (ft)	219.32	70.80	808.54
Vel Total (ft/s)	2.64	Avg. Vel. (ft/s)	0.98	8.83	1.34
Max Chl Dpth (ft)	13.45	Hydr. Depth (ft)	2.25	10.56	3.65
Conv. Total (cfs)	238179.8	Conv. (cfs)	10468.2	142447.8	85263.8
Length Wtd. (ft)	1186.76	Wetted Per. (ft)	219.67	78.62	828.42
Min Ch El (ft)	577.76	Shear (lb/sq ft)	0.30	1.28	0.48
Alpha	6.82	Stream Power (lb/ft s)	0.30	11.26	0.64
Frctn Loss (ft)	0.98	Cum Volume (acre-ft)	17.22	71.47	287.11
C & E Loss (ft)	0.18	Cum SA (acres)	6.84	6.02	63.15

Plan: Alt 3 New 2 Span, Debris Stevens Branch Stevens Branch RS: 11459 Profile: 1%

E.G. Elev (ft)	592.55	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.63	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	591.91	Reach Len. (ft)	1191.60	1191.00	1181.80
Crit W.S. (ft)	590.36	Flow Area (sq ft)	651.52	797.73	3522.93
E.G. Slope (ft/ft)	0.001839	Area (sq ft)	651.52	797.73	3522.93
Q Total (cfs)	12400.00	Flow (cfs)	703.67	6808.01	4888.32
Top Width (ft)	1120.83	Top Width (ft)	237.61	70.80	812.42
Vel Total (ft/s)	2.49	Avg. Vel. (ft/s)	1.08	8.53	1.39
Max Chl Dpth (ft)	14.15	Hydr. Depth (ft)	2.74	11.27	4.34
Conv. Total (cfs)	289119.9	Conv. (cfs)	16406.8	158736.4	113976.7
Length Wtd. (ft)	1186.45	Wetted Per. (ft)	238.04	78.62	835.20
Min Ch El (ft)	577.76	Shear (lb/sq ft)	0.31	1.17	0.48
Alpha	6.56	Stream Power (lb/ft s)	0.34	9.94	0.67
Frctn Loss (ft)	0.86	Cum Volume (acre-ft)	23.95	76.38	337.86
C & E Loss (ft)	0.16	Cum SA (acres)	9.76	6.06	64.10

Plan: Alt 3 New 2 Span, Debris Stevens Branch Stevens Branch RS: 11459 Profile: 0.2%

E.G. Elev (ft)	593.72	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.51	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	593.20	Reach Len. (ft)	1191.60	1191.00	1181.80
Crit W.S. (ft)	590.85	Flow Area (sq ft)	996.98	889.03	4573.84
E.G. Slope (ft/ft)	0.001448	Area (sq ft)	996.98	889.03	4573.84
Q Total (cfs)	14980.00	Flow (cfs)	1103.26	7235.29	6641.45
Top Width (ft)	1209.17	Top Width (ft)	320.96	70.80	817.41
Vel Total (ft/s)	2.32	Avg. Vel. (ft/s)	1.11	8.14	1.45
Max Chl Dpth (ft)	15.44	Hydr. Depth (ft)	3.11	12.56	5.60
Conv. Total (cfs)	393697.8	Conv. (cfs)	28995.4	190154.8	174547.6
Length Wtd. (ft)	1186.04	Wetted Per. (ft)	321.59	78.62	845.51
Min Ch El (ft)	577.76	Shear (lb/sq ft)	0.28	1.02	0.49
Alpha	6.14	Stream Power (lb/ft s)	0.31	8.32	0.71
Frctn Loss (ft)	0.71	Cum Volume (acre-ft)	40.37	85.01	429.06
C & E Loss (ft)	0.12	Cum SA (acres)	12.98	6.12	66.13

Plan: Alt 3 New 2 Span, Debris Stevens Branch Stevens Branch RS: 7552 Profile: 50%

E.G. Elev (ft)	584.15	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.36	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	583.79	Reach Len. (ft)	852.90	789.50	477.70
Crit W.S. (ft)		Flow Area (sq ft)		522.66	80.49
E.G. Slope (ft/ft)	0.000978	Area (sq ft)		522.66	80.49
Q Total (cfs)	2524.00	Flow (cfs)		2508.18	15.82
Top Width (ft)	293.38	Top Width (ft)		70.79	222.60
Vel Total (ft/s)	4.18	Avg. Vel. (ft/s)		4.80	0.20
Max Chl Dpth (ft)	9.15	Hydr. Depth (ft)		7.38	0.36
Conv. Total (cfs)	80701.0	Conv. (cfs)		80195.2	505.8
Length Wtd. (ft)	788.52	Wetted Per. (ft)		76.07	222.65
Min Ch EI (ft)	574.64	Shear (lb/sq ft)		0.42	0.02
Alpha	1.31	Stream Power (lb/ft s)		2.01	0.00
Frctn Loss (ft)	1.23	Cum Volume (acre-ft)		18.65	0.52
C & E Loss (ft)	0.05	Cum SA (acres)		2.74	1.28

Plan: Alt 3 New 2 Span, Debris Stevens Branch Stevens Branch RS: 7552 Profile: 20%

E.G. Elev (ft)	587.40	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.13	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	587.26	Reach Len. (ft)	852.90	789.50	477.70
Crit W.S. (ft)		Flow Area (sq ft)		797.33	2883.11
E.G. Slope (ft/ft)	0.000405	Area (sq ft)		797.33	2883.11
Q Total (cfs)	4024.00	Flow (cfs)		2794.63	1229.37
Top Width (ft)	1469.47	Top Width (ft)		89.34	1380.13
Vel Total (ft/s)	1.09	Avg. Vel. (ft/s)		3.50	0.43
Max Chl Dpth (ft)	12.62	Hydr. Depth (ft)		8.92	2.09
Conv. Total (cfs)	199945.8	Conv. (cfs)		138860.6	61085.2
Length Wtd. (ft)	720.04	Wetted Per. (ft)		95.97	1383.39
Min Ch EI (ft)	574.64	Shear (lb/sq ft)		0.21	0.05
Alpha	7.18	Stream Power (lb/ft s)		0.74	0.02
Frctn Loss (ft)	0.44	Cum Volume (acre-ft)	0.02	28.72	30.94
C & E Loss (ft)	0.03	Cum SA (acres)	0.06	3.24	19.23

Plan: Alt 3 New 2 Span, Debris Stevens Branch Stevens Branch RS: 7552 Profile: 10%

E.G. Elev (ft)	589.01	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.17	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	588.84	Reach Len. (ft)	852.90	789.50	477.70
Crit W.S. (ft)		Flow Area (sq ft)		942.30	5218.14
E.G. Slope (ft/ft)	0.000558	Area (sq ft)		942.30	5218.14
Q Total (cfs)	7740.00	Flow (cfs)		4192.40	3547.60
Top Width (ft)	1717.28	Top Width (ft)		93.87	1623.41
Vel Total (ft/s)	1.26	Avg. Vel. (ft/s)		4.45	0.68
Max Chl Dpth (ft)	14.20	Hydr. Depth (ft)		10.04	3.21
Conv. Total (cfs)	327529.1	Conv. (cfs)		177407.4	150121.7
Length Wtd. (ft)	686.43	Wetted Per. (ft)		100.90	1630.08
Min Ch EI (ft)	574.64	Shear (lb/sq ft)		0.33	0.11
Alpha	6.93	Stream Power (lb/ft s)		1.45	0.08
Frctn Loss (ft)	0.73	Cum Volume (acre-ft)	2.71	37.14	67.18
C & E Loss (ft)	0.09	Cum SA (acres)	2.42	3.57	27.25

Plan: Alt 3 New 2 Span, Debris Stevens Branch Stevens Branch RS: 7552 Profile: 2%

E.G. Elev (ft)	590.78	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.13	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	590.65	Reach Len. (ft)	852.90	789.50	477.70
Crit W.S. (ft)		Flow Area (sq ft)		1115.42	8235.93
E.G. Slope (ft/ft)	0.000433	Area (sq ft)		1115.42	8235.93
Q Total (cfs)	11040.00	Flow (cfs)		4778.30	6261.70
Top Width (ft)	1781.10	Top Width (ft)		96.95	1684.15
Vel Total (ft/s)	1.18	Avg. Vel. (ft/s)		4.28	0.76
Max Chl Dpth (ft)	16.01	Hydr. Depth (ft)		11.51	4.89
Conv. Total (cfs)	530480.8	Conv. (cfs)		229601.0	300879.8
Length Wtd. (ft)	631.46	Wetted Per. (ft)		104.48	1694.57
Min Ch El (ft)	574.64	Shear (lb/sq ft)		0.29	0.13
Alpha	5.93	Stream Power (lb/ft s)		1.24	0.10
Frctn Loss (ft)	0.43	Cum Volume (acre-ft)	10.47	46.00	135.39
C & E Loss (ft)	0.03	Cum SA (acres)	3.84	3.73	29.34

Plan: Alt 3 New 2 Span, Debris Stevens Branch Stevens Branch RS: 7552 Profile: 1%

E.G. Elev (ft)	591.53	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.11	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	591.42	Reach Len. (ft)	852.90	789.50	477.70
Crit W.S. (ft)		Flow Area (sq ft)		1190.47	9534.85
E.G. Slope (ft/ft)	0.000384	Area (sq ft)		1190.47	9534.85
Q Total (cfs)	12400.00	Flow (cfs)		4966.50	7433.50
Top Width (ft)	1792.24	Top Width (ft)		98.21	1694.03
Vel Total (ft/s)	1.16	Avg. Vel. (ft/s)		4.17	0.78
Max Chl Dpth (ft)	16.78	Hydr. Depth (ft)		12.12	5.63
Conv. Total (cfs)	633006.8	Conv. (cfs)		253534.5	379472.3
Length Wtd. (ft)	620.14	Wetted Per. (ft)		105.96	1706.01
Min Ch El (ft)	574.64	Shear (lb/sq ft)		0.27	0.13
Alpha	5.49	Stream Power (lb/ft s)		1.12	0.10
Frctn Loss (ft)	0.37	Cum Volume (acre-ft)	15.04	49.20	160.73
C & E Loss (ft)	0.03	Cum SA (acres)	6.51	3.75	30.10

Plan: Alt 3 New 2 Span, Debris Stevens Branch Stevens Branch RS: 7552 Profile: 0.2%

E.G. Elev (ft)	592.89	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	592.79	Reach Len. (ft)	852.90	789.50	477.70
Crit W.S. (ft)		Flow Area (sq ft)	0.10	1326.32	11882.52
E.G. Slope (ft/ft)	0.000322	Area (sq ft)	0.10	1326.32	11882.52
Q Total (cfs)	14980.00	Flow (cfs)	0.01	5381.38	9598.62
Top Width (ft)	1830.52	Top Width (ft)	0.56	99.90	1730.06
Vel Total (ft/s)	1.13	Avg. Vel. (ft/s)	0.06	4.06	0.81
Max Chl Dpth (ft)	18.15	Hydr. Depth (ft)	0.17	13.28	6.87
Conv. Total (cfs)	834696.1	Conv. (cfs)	0.3	299854.1	534841.6
Length Wtd. (ft)	607.41	Wetted Per. (ft)	0.66	107.93	1744.84
Min Ch El (ft)	574.64	Shear (lb/sq ft)	0.00	0.25	0.14
Alpha	4.92	Stream Power (lb/ft s)	0.00	1.00	0.11
Frctn Loss (ft)	0.30	Cum Volume (acre-ft)	26.74	54.72	205.82
C & E Loss (ft)	0.02	Cum SA (acres)	8.58	3.78	31.58

Plan: Alt 3 New 2 Span, Debris Stevens Branch Stevens Branch RS: 4962 Profile: 50%

E.G. Elev (ft)	582.87	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.86	Wt. n-Val.		0.035	
W.S. Elev (ft)	582.00	Reach Len. (ft)	96.20	295.10	381.80
Crit W.S. (ft)	579.33	Flow Area (sq ft)		338.97	
E.G. Slope (ft/ft)	0.002880	Area (sq ft)		338.97	
Q Total (cfs)	2524.00	Flow (cfs)		2524.00	
Top Width (ft)	52.54	Top Width (ft)		52.54	
Vel Total (ft/s)	7.45	Avg. Vel. (ft/s)		7.45	
Max Chl Dpth (ft)	8.46	Hydr. Depth (ft)		6.45	
Conv. Total (cfs)	47036.0	Conv. (cfs)		47036.0	
Length Wtd. (ft)	295.10	Wetted Per. (ft)		57.37	
Min Ch El (ft)	573.54	Shear (lb/sq ft)		1.06	
Alpha	1.00	Stream Power (lb/ft s)		7.91	
Frctn Loss (ft)	0.26	Cum Volume (acre-ft)		10.84	0.08
C & E Loss (ft)	0.20	Cum SA (acres)		1.62	0.05

Plan: Alt 3 New 2 Span, Debris Stevens Branch Stevens Branch RS: 4962 Profile: 20%

E.G. Elev (ft)	586.93	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.42	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	586.51	Reach Len. (ft)	96.20	295.10	381.80
Crit W.S. (ft)	581.10	Flow Area (sq ft)		617.17	1056.91
E.G. Slope (ft/ft)	0.001029	Area (sq ft)		617.17	1056.91
Q Total (cfs)	4024.00	Flow (cfs)		3460.44	563.56
Top Width (ft)	915.14	Top Width (ft)		67.18	847.96
Vel Total (ft/s)	2.40	Avg. Vel. (ft/s)		5.61	0.53
Max Chl Dpth (ft)	12.97	Hydr. Depth (ft)		9.19	1.25
Conv. Total (cfs)	125465.2	Conv. (cfs)		107894.0	17571.3
Length Wtd. (ft)	304.43	Wetted Per. (ft)		73.86	853.50
Min Ch El (ft)	573.54	Shear (lb/sq ft)		0.54	0.08
Alpha	4.69	Stream Power (lb/ft s)		3.01	0.04
Frctn Loss (ft)	0.15	Cum Volume (acre-ft)	0.02	15.90	9.34
C & E Loss (ft)	0.08	Cum SA (acres)	0.06	1.82	7.01

Plan: Alt 3 New 2 Span, Debris Stevens Branch Stevens Branch RS: 4962 Profile: 10%

E.G. Elev (ft)	588.19	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.10	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	587.09	Reach Len. (ft)	96.20	295.10	381.80
Crit W.S. (ft)	585.89	Flow Area (sq ft)		656.56	1586.09
E.G. Slope (ft/ft)	0.002723	Area (sq ft)		656.56	1586.09
Q Total (cfs)	7740.00	Flow (cfs)		6170.64	1569.36
Top Width (ft)	1005.03	Top Width (ft)		68.31	936.71
Vel Total (ft/s)	3.45	Avg. Vel. (ft/s)		9.40	0.99
Max Chl Dpth (ft)	13.55	Hydr. Depth (ft)		9.61	1.69
Conv. Total (cfs)	148332.2	Conv. (cfs)		118256.4	30075.8
Length Wtd. (ft)	307.96	Wetted Per. (ft)		75.13	945.69
Min Ch El (ft)	573.54	Shear (lb/sq ft)		1.49	0.29
Alpha	5.93	Stream Power (lb/ft s)		13.96	0.28
Frctn Loss (ft)	0.43	Cum Volume (acre-ft)	2.71	22.65	29.87
C & E Loss (ft)	0.17	Cum SA (acres)	2.42	2.10	13.21



Plan: Alt 3 New 2 Span, Debris Stevens Branch Stevens Branch RS: 4962 Profile: 2%

E.G. Elev (ft)	590.31	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.45	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	589.87	Reach Len. (ft)	96.20	295.10	381.80
Crit W.S. (ft)	587.66	Flow Area (sq ft)	5.37	856.67	4203.86
E.G. Slope (ft/ft)	0.001258	Area (sq ft)	5.37	856.67	4203.86
Q Total (cfs)	11040.00	Flow (cfs)	0.79	6109.28	4929.93
Top Width (ft)	1053.50	Top Width (ft)	29.00	75.90	948.59
Vel Total (ft/s)	2.18	Avg. Vel. (ft/s)	0.15	7.13	1.17
Max Chl Dpth (ft)	16.33	Hydr. Depth (ft)	0.19	11.29	4.43
Conv. Total (cfs)	311283.9	Conv. (cfs)	22.2	172257.3	139004.4
Length Wtd. (ft)	321.70	Wetted Per. (ft)	29.03	83.11	974.57
Min Ch El (ft)	573.54	Shear (lb/sq ft)	0.01	0.81	0.34
Alpha	6.06	Stream Power (lb/ft s)	0.00	5.77	0.40
Frctn Loss (ft)	0.28	Cum Volume (acre-ft)	10.42	28.13	67.18
C & E Loss (ft)	0.01	Cum SA (acres)	3.55	2.16	14.90

Plan: Alt 3 New 2 Span, Debris Stevens Branch Stevens Branch RS: 4962 Profile: 1%

E.G. Elev (ft)	591.14	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.38	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	590.75	Reach Len. (ft)	96.20	295.10	381.80
Crit W.S. (ft)	588.00	Flow Area (sq ft)	82.52	923.93	5047.59
E.G. Slope (ft/ft)	0.001052	Area (sq ft)	106.94	923.93	5047.59
Q Total (cfs)	12400.00	Flow (cfs)	21.33	6337.53	6041.14
Top Width (ft)	1260.18	Top Width (ft)	226.91	75.90	957.37
Vel Total (ft/s)	2.05	Avg. Vel. (ft/s)	0.26	6.86	1.20
Max Chl Dpth (ft)	17.21	Hydr. Depth (ft)	0.52	12.17	5.27
Conv. Total (cfs)	382286.2	Conv. (cfs)	657.5	195383.0	186245.6
Length Wtd. (ft)	323.69	Wetted Per. (ft)	159.85	83.11	988.71
Min Ch El (ft)	573.54	Shear (lb/sq ft)	0.03	0.73	0.34
Alpha	5.90	Stream Power (lb/ft s)	0.01	5.01	0.40
Frctn Loss (ft)	0.24	Cum Volume (acre-ft)	13.99	30.04	80.77
C & E Loss (ft)	0.00	Cum SA (acres)	4.29	2.17	15.56

Plan: Alt 3 New 2 Span, Debris Stevens Branch Stevens Branch RS: 4962 Profile: 0.2%

E.G. Elev (ft)	592.57	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.32	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	592.24	Reach Len. (ft)	96.20	295.10	381.80
Crit W.S. (ft)	588.52	Flow Area (sq ft)	325.87	1037.01	6515.11
E.G. Slope (ft/ft)	0.000839	Area (sq ft)	564.57	1037.01	6515.11
Q Total (cfs)	14980.00	Flow (cfs)	185.09	6859.82	7935.09
Top Width (ft)	1441.57	Top Width (ft)	361.52	75.90	1004.14
Vel Total (ft/s)	1.90	Avg. Vel. (ft/s)	0.57	6.61	1.22
Max Chl Dpth (ft)	18.70	Hydr. Depth (ft)	1.99	13.66	6.49
Conv. Total (cfs)	517205.6	Conv. (cfs)	6390.7	236844.9	273970.1
Length Wtd. (ft)	324.48	Wetted Per. (ft)	163.49	83.11	1044.45
Min Ch El (ft)	573.54	Shear (lb/sq ft)	0.10	0.65	0.33
Alpha	5.76	Stream Power (lb/ft s)	0.06	4.32	0.40
Frctn Loss (ft)	0.21	Cum Volume (acre-ft)	21.21	33.31	104.94
C & E Loss (ft)	0.00	Cum SA (acres)	5.04	2.19	16.59

Plan: Alt 3 New 2 Span, Debris Stevens Branch Stevens Branch RS: 3994 Profile: 50%

E.G. Elev (ft)	582.41	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.19	Wt. n-Val.		0.035	0.001
W.S. Elev (ft)	582.21	Reach Len. (ft)	6.00	6.00	6.00
Crit W.S. (ft)	575.10	Flow Area (sq ft)		716.02	0.02
E.G. Slope (ft/ft)	0.000414	Area (sq ft)		716.02	0.02
Q Total (cfs)	2524.00	Flow (cfs)		2524.00	0.00
Top Width (ft)	82.17	Top Width (ft)		79.11	3.06
Vel Total (ft/s)	3.52	Avg. Vel. (ft/s)		3.53	0.01
Max Chl Dpth (ft)	12.57	Hydr. Depth (ft)		9.05	0.01
Conv. Total (cfs)	124013.7	Conv. (cfs)		124013.7	0.0
Length Wtd. (ft)	6.00	Wetted Per. (ft)		86.89	3.06
Min Ch El (ft)	569.64	Shear (lb/sq ft)		0.21	
Alpha	1.00	Stream Power (lb/ft s)		0.75	
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		7.26	0.08
C & E Loss (ft)	0.50	Cum SA (acres)		1.17	0.04

Plan: Alt 3 New 2 Span, Debris Stevens Branch Stevens Branch RS: 3994 Profile: 20%

E.G. Elev (ft)	586.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.17	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	586.54	Reach Len. (ft)	6.00	6.00	6.00
Crit W.S. (ft)	576.62	Flow Area (sq ft)	18.03	1086.53	979.23
E.G. Slope (ft/ft)	0.000281	Area (sq ft)	18.03	1086.53	979.23
Q Total (cfs)	4024.00	Flow (cfs)	1.81	3715.16	307.03
Top Width (ft)	765.63	Top Width (ft)	53.63	93.01	618.98
Vel Total (ft/s)	1.93	Avg. Vel. (ft/s)	0.10	3.42	0.31
Max Chl Dpth (ft)	16.90	Hydr. Depth (ft)	0.34	11.68	1.58
Conv. Total (cfs)	239999.0	Conv. (cfs)	107.9	221579.3	18311.8
Length Wtd. (ft)	6.00	Wetted Per. (ft)	53.65	103.20	620.66
Min Ch El (ft)	569.64	Shear (lb/sq ft)	0.01	0.18	0.03
Alpha	2.90	Stream Power (lb/ft s)	0.00	0.63	0.01
Frctn Loss (ft)		Cum Volume (acre-ft)	0.00	10.13	0.42
C & E Loss (ft)		Cum SA (acres)	0.00	1.28	0.59

Plan: Alt 3 New 2 Span, Debris Stevens Branch Stevens Branch RS: 3994 Profile: 10%

E.G. Elev (ft)	587.58	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.53	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	587.05	Reach Len. (ft)	6.00	6.00	6.00
Crit W.S. (ft)	579.48	Flow Area (sq ft)	62.79	1134.51	1320.61
E.G. Slope (ft/ft)	0.000856	Area (sq ft)	62.79	1134.51	1320.61
Q Total (cfs)	7740.00	Flow (cfs)	14.24	6966.95	758.81
Top Width (ft)	897.15	Top Width (ft)	126.75	93.01	677.38
Vel Total (ft/s)	3.07	Avg. Vel. (ft/s)	0.23	6.14	0.57
Max Chl Dpth (ft)	17.41	Hydr. Depth (ft)	0.50	12.20	1.95
Conv. Total (cfs)	264549.4	Conv. (cfs)	486.8	238127.0	25935.7
Length Wtd. (ft)	6.00	Wetted Per. (ft)	126.77	103.20	680.17
Min Ch El (ft)	569.64	Shear (lb/sq ft)	0.03	0.59	0.10
Alpha	3.60	Stream Power (lb/ft s)	0.01	3.61	0.06
Frctn Loss (ft)		Cum Volume (acre-ft)	2.65	16.58	17.13
C & E Loss (ft)		Cum SA (acres)	2.28	1.55	6.14

Plan: Alt 3 New 2 Span, Debris Stevens Branch Stevens Branch RS: 3994 Profile: 2%

E.G. Elev (ft)	590.03	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.41	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	589.61	Reach Len. (ft)	6.00	6.00	6.00
Crit W.S. (ft)	581.57	Flow Area (sq ft)	557.35	1372.62	3106.38
E.G. Slope (ft/ft)	0.000626	Area (sq ft)	566.11	1372.62	3106.38
Q Total (cfs)	11040.00	Flow (cfs)	306.63	8183.13	2550.24
Top Width (ft)	1069.18	Top Width (ft)	261.69	93.01	714.48
Vel Total (ft/s)	2.19	Avg. Vel. (ft/s)	0.55	5.96	0.82
Max Chl Dpth (ft)	19.97	Hydr. Depth (ft)	2.37	14.76	4.35
Conv. Total (cfs)	441326.9	Conv. (cfs)	12257.8	327122.6	101946.6
Length Wtd. (ft)	6.00	Wetted Per. (ft)	235.46	103.20	722.58
Min Ch El (ft)	569.64	Shear (lb/sq ft)	0.09	0.52	0.17
Alpha	5.52	Stream Power (lb/ft s)	0.05	3.10	0.14
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	9.79	20.57	35.15
C & E Loss (ft)	0.09	Cum SA (acres)	3.23	1.59	7.61

Plan: Alt 3 New 2 Span, Debris Stevens Branch Stevens Branch RS: 3994 Profile: 1%

E.G. Elev (ft)	590.89	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.38	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	590.51	Reach Len. (ft)	6.00	6.00	6.00
Crit W.S. (ft)	582.35	Flow Area (sq ft)	782.10	1456.01	3749.01
E.G. Slope (ft/ft)	0.000569	Area (sq ft)	840.30	1456.01	3749.01
Q Total (cfs)	12400.00	Flow (cfs)	487.23	8608.90	3303.87
Top Width (ft)	1162.84	Top Width (ft)	350.54	93.01	719.28
Vel Total (ft/s)	2.07	Avg. Vel. (ft/s)	0.62	5.91	0.88
Max Chl Dpth (ft)	20.87	Hydr. Depth (ft)	3.06	15.65	5.21
Conv. Total (cfs)	519846.0	Conv. (cfs)	20426.1	360911.6	138508.3
Length Wtd. (ft)	6.00	Wetted Per. (ft)	255.33	103.20	729.26
Min Ch El (ft)	569.64	Shear (lb/sq ft)	0.11	0.50	0.18
Alpha	5.71	Stream Power (lb/ft s)	0.07	2.96	0.16
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	12.95	21.98	42.22
C & E Loss (ft)	0.09	Cum SA (acres)	3.65	1.60	8.22

Plan: Alt 3 New 2 Span, Debris Stevens Branch Stevens Branch RS: 3994 Profile: 0.2%

E.G. Elev (ft)	592.36	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.34	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	592.01	Reach Len. (ft)	6.00	6.00	6.00
Crit W.S. (ft)	584.19	Flow Area (sq ft)	1165.43	1595.69	4836.55
E.G. Slope (ft/ft)	0.000501	Area (sq ft)	1423.39	1595.69	4836.55
Q Total (cfs)	14980.00	Flow (cfs)	888.81	9410.73	4680.47
Top Width (ft)	1234.42	Top Width (ft)	412.15	93.01	729.26
Vel Total (ft/s)	1.97	Avg. Vel. (ft/s)	0.76	5.90	0.97
Max Chl Dpth (ft)	22.37	Hydr. Depth (ft)	4.57	17.16	6.63
Conv. Total (cfs)	669261.6	Conv. (cfs)	39709.3	420443.1	209109.3
Length Wtd. (ft)	6.00	Wetted Per. (ft)	255.33	103.20	742.35
Min Ch El (ft)	569.64	Shear (lb/sq ft)	0.14	0.48	0.20
Alpha	5.70	Stream Power (lb/ft s)	0.11	2.85	0.20
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	19.01	24.39	55.20
C & E Loss (ft)	0.09	Cum SA (acres)	4.18	1.62	8.99

Plan: Alt 3 New 2 Span, Debris Stevens Branch Stevens Branch RS: 3921 Profile: 50%

E.G. Elev (ft)	580.60	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.29	Wt. n-Val.		0.035	
W.S. Elev (ft)	580.30	Reach Len. (ft)	21.20	125.90	180.00
Crit W.S. (ft)	575.67	Flow Area (sq ft)		582.54	
E.G. Slope (ft/ft)	0.000827	Area (sq ft)		582.54	
Q Total (cfs)	2524.00	Flow (cfs)		2524.00	
Top Width (ft)	81.27	Top Width (ft)		81.27	
Vel Total (ft/s)	4.33	Avg. Vel. (ft/s)		4.33	
Max Chl Dpth (ft)	10.12	Hydr. Depth (ft)		7.17	
Conv. Total (cfs)	87756.6	Conv. (cfs)		87756.6	
Length Wtd. (ft)	126.02	Wetted Per. (ft)		87.15	
Min Ch El (ft)	570.19	Shear (lb/sq ft)		0.35	
Alpha	1.00	Stream Power (lb/ft s)		1.50	
Frctn Loss (ft)	0.16	Cum Volume (acre-ft)		7.05	0.08
C & E Loss (ft)	0.08	Cum SA (acres)		1.14	0.04

Plan: Alt 3 New 2 Span, Debris Stevens Branch Stevens Branch RS: 3921 Profile: 20%

E.G. Elev (ft)	583.10	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.41	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	582.70	Reach Len. (ft)	21.20	125.90	180.00
Crit W.S. (ft)	577.01	Flow Area (sq ft)		785.33	41.44
E.G. Slope (ft/ft)	0.000877	Area (sq ft)		785.33	41.44
Q Total (cfs)	4024.00	Flow (cfs)		4015.05	8.95
Top Width (ft)	183.16	Top Width (ft)		88.47	94.69
Vel Total (ft/s)	4.87	Avg. Vel. (ft/s)		5.11	0.22
Max Chl Dpth (ft)	12.51	Hydr. Depth (ft)		8.88	0.44
Conv. Total (cfs)	135845.6	Conv. (cfs)		135543.6	302.0
Length Wtd. (ft)	126.22	Wetted Per. (ft)		95.81	94.80
Min Ch El (ft)	570.19	Shear (lb/sq ft)		0.45	0.02
Alpha	1.10	Stream Power (lb/ft s)		2.30	0.01
Frctn Loss (ft)	0.16	Cum Volume (acre-ft)		9.80	0.34
C & E Loss (ft)	0.10	Cum SA (acres)		1.25	0.53

Plan: Alt 3 New 2 Span, Debris Stevens Branch Stevens Branch RS: 3921 Profile: 10%

E.G. Elev (ft)	587.46	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.40	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	587.06	Reach Len. (ft)	21.20	125.90	180.00
Crit W.S. (ft)	579.64	Flow Area (sq ft)	55.60	1197.93	1779.79
E.G. Slope (ft/ft)	0.000663	Area (sq ft)	79.98	1197.93	1779.79
Q Total (cfs)	7740.00	Flow (cfs)	10.95	6559.58	1169.46
Top Width (ft)	878.09	Top Width (ft)	151.28	97.77	629.04
Vel Total (ft/s)	2.55	Avg. Vel. (ft/s)	0.20	5.48	0.66
Max Chl Dpth (ft)	16.88	Hydr. Depth (ft)	0.42	12.25	2.83
Conv. Total (cfs)	300520.7	Conv. (cfs)	425.3	254688.8	45406.6
Length Wtd. (ft)	134.79	Wetted Per. (ft)	131.01	106.89	630.02
Min Ch El (ft)	570.19	Shear (lb/sq ft)	0.02	0.46	0.12
Alpha	3.91	Stream Power (lb/ft s)	0.00	2.54	0.08
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)	2.63	16.20	16.49
C & E Loss (ft)	0.07	Cum SA (acres)	2.24	1.52	5.80

Plan: Alt 3 New 2 Span, Debris Stevens Branch Stevens Branch RS: 3921 Profile: 2%

E.G. Elev (ft)	589.85	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.34	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	589.51	Reach Len. (ft)	21.20	125.90	180.00
Crit W.S. (ft)	581.54	Flow Area (sq ft)	558.45	1437.35	3373.49
E.G. Slope (ft/ft)	0.000524	Area (sq ft)	639.77	1437.35	3373.49
Q Total (cfs)	11040.00	Flow (cfs)	303.61	7896.79	2839.60
Top Width (ft)	989.21	Top Width (ft)	233.77	97.77	657.67
Vel Total (ft/s)	2.06	Avg. Vel. (ft/s)	0.54	5.49	0.84
Max Chl Dpth (ft)	19.32	Hydr. Depth (ft)	2.66	14.70	5.13
Conv. Total (cfs)	482407.9	Conv. (cfs)	13266.7	345060.9	124080.2
Length Wtd. (ft)	137.38	Wetted Per. (ft)	210.15	106.89	658.97
Min Ch El (ft)	570.19	Shear (lb/sq ft)	0.09	0.44	0.17
Alpha	5.15	Stream Power (lb/ft s)	0.05	2.42	0.14
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	9.50	20.07	33.61
C & E Loss (ft)	0.05	Cum SA (acres)	3.10	1.54	7.26

Plan: Alt 3 New 2 Span, Debris Stevens Branch Stevens Branch RS: 3921 Profile: 1%

E.G. Elev (ft)	590.72	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.32	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	590.40	Reach Len. (ft)	21.20	125.90	180.00
Crit W.S. (ft)	582.43	Flow Area (sq ft)	744.43	1523.94	3959.43
E.G. Slope (ft/ft)	0.000486	Area (sq ft)	866.26	1523.94	3959.43
Q Total (cfs)	12400.00	Flow (cfs)	472.05	8382.81	3545.14
Top Width (ft)	1069.46	Top Width (ft)	296.65	97.77	675.04
Vel Total (ft/s)	1.99	Avg. Vel. (ft/s)	0.63	5.50	0.90
Max Chl Dpth (ft)	20.21	Hydr. Depth (ft)	3.55	15.59	5.87
Conv. Total (cfs)	562692.5	Conv. (cfs)	21420.9	380398.7	160872.9
Length Wtd. (ft)	137.55	Wetted Per. (ft)	210.15	106.89	676.41
Min Ch El (ft)	570.19	Shear (lb/sq ft)	0.11	0.43	0.18
Alpha	5.22	Stream Power (lb/ft s)	0.07	2.38	0.16
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	12.52	21.43	40.36
C & E Loss (ft)	0.04	Cum SA (acres)	3.48	1.55	7.86

Plan: Alt 3 New 2 Span, Debris Stevens Branch Stevens Branch RS: 3921 Profile: 0.2%

E.G. Elev (ft)	592.19	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.31	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	591.88	Reach Len. (ft)	21.20	125.90	180.00
Crit W.S. (ft)	585.01	Flow Area (sq ft)	1056.59	1669.28	4990.37
E.G. Slope (ft/ft)	0.000446	Area (sq ft)	1322.20	1669.28	4990.37
Q Total (cfs)	14980.00	Flow (cfs)	810.99	9351.54	4817.47
Top Width (ft)	1117.25	Top Width (ft)	317.28	97.77	702.20
Vel Total (ft/s)	1.94	Avg. Vel. (ft/s)	0.77	5.60	0.97
Max Chl Dpth (ft)	21.70	Hydr. Depth (ft)	5.03	17.07	7.11
Conv. Total (cfs)	709252.4	Conv. (cfs)	38397.7	442763.8	228090.8
Length Wtd. (ft)	137.47	Wetted Per. (ft)	210.15	106.89	703.71
Min Ch El (ft)	570.19	Shear (lb/sq ft)	0.14	0.43	0.20
Alpha	5.29	Stream Power (lb/ft s)	0.11	2.44	0.19
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	18.32	23.77	52.79
C & E Loss (ft)	0.04	Cum SA (acres)	3.99	1.57	8.62

Plan: Alt 3 New 2 Span, Debris Stevens Branch Stevens Branch RS: 3508 Profile: 50%

E.G. Elev (ft)	580.36	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.67	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	579.68	Reach Len. (ft)	245.30	268.30	311.80
Crit W.S. (ft)	577.03	Flow Area (sq ft)		380.68	13.46
E.G. Slope (ft/ft)	0.002190	Area (sq ft)		380.68	13.46
Q Total (cfs)	2524.00	Flow (cfs)		2513.13	10.87
Top Width (ft)	67.33	Top Width (ft)		60.01	7.32
Vel Total (ft/s)	6.40	Avg. Vel. (ft/s)		6.60	0.81
Max Chl Dpth (ft)	7.21	Hydr. Depth (ft)		6.34	1.84
Conv. Total (cfs)	53928.9	Conv. (cfs)		53696.6	232.3
Length Wtd. (ft)	268.39	Wetted Per. (ft)		62.86	8.18
Min Ch EI (ft)	572.47	Shear (lb/sq ft)		0.83	0.23
Alpha	1.06	Stream Power (lb/ft s)		5.47	0.18
Frctn Loss (ft)	0.53	Cum Volume (acre-ft)		5.65	0.05
C & E Loss (ft)	0.05	Cum SA (acres)		0.94	0.03

Plan: Alt 3 New 2 Span, Debris Stevens Branch Stevens Branch RS: 3508 Profile: 20%

E.G. Elev (ft)	582.84	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.91	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	581.92	Reach Len. (ft)	245.30	268.30	311.80
Crit W.S. (ft)	578.50	Flow Area (sq ft)		517.50	44.24
E.G. Slope (ft/ft)	0.002114	Area (sq ft)		517.50	44.24
Q Total (cfs)	4024.00	Flow (cfs)		3985.13	38.87
Top Width (ft)	120.78	Top Width (ft)		62.28	58.50
Vel Total (ft/s)	7.16	Avg. Vel. (ft/s)		7.70	0.88
Max Chl Dpth (ft)	9.45	Hydr. Depth (ft)		8.31	0.76
Conv. Total (cfs)	87511.2	Conv. (cfs)		86666.0	845.3
Length Wtd. (ft)	268.51	Wetted Per. (ft)		66.05	59.87
Min Ch EI (ft)	572.47	Shear (lb/sq ft)		1.03	0.10
Alpha	1.14	Stream Power (lb/ft s)		7.96	0.09
Frctn Loss (ft)	0.50	Cum Volume (acre-ft)		7.91	0.16
C & E Loss (ft)	0.09	Cum SA (acres)		1.03	0.21

Plan: Alt 3 New 2 Span, Debris Stevens Branch Stevens Branch RS: 3508 Profile: 10%

E.G. Elev (ft)	587.26	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.75	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	586.51	Reach Len. (ft)	245.30	268.30	311.80
Crit W.S. (ft)	581.44	Flow Area (sq ft)	41.18	819.43	1440.17
E.G. Slope (ft/ft)	0.001410	Area (sq ft)	41.23	819.43	1440.17
Q Total (cfs)	7740.00	Flow (cfs)	10.99	6312.59	1416.42
Top Width (ft)	637.97	Top Width (ft)	104.95	72.20	460.83
Vel Total (ft/s)	3.36	Avg. Vel. (ft/s)	0.27	7.70	0.98
Max Chl Dpth (ft)	14.04	Hydr. Depth (ft)	0.40	11.35	3.13
Conv. Total (cfs)	206095.5	Conv. (cfs)	292.6	168087.3	37715.6
Length Wtd. (ft)	273.68	Wetted Per. (ft)	104.04	77.15	468.25
Min Ch EI (ft)	572.47	Shear (lb/sq ft)	0.03	0.94	0.27
Alpha	4.29	Stream Power (lb/ft s)	0.01	7.20	0.27
Frctn Loss (ft)	0.34	Cum Volume (acre-ft)	2.60	13.29	9.84
C & E Loss (ft)	0.04	Cum SA (acres)	2.18	1.28	3.55

Plan: Alt 3 New 2 Span, Debris Stevens Branch Stevens Branch RS: 3508 Profile: 2%

E.G. Elev (ft)	589.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.58	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	589.13	Reach Len. (ft)	245.30	268.30	311.80
Crit W.S. (ft)	584.94	Flow Area (sq ft)	534.78	1008.89	2697.26
E.G. Slope (ft/ft)	0.000979	Area (sq ft)	557.13	1008.89	2697.26
Q Total (cfs)	11040.00	Flow (cfs)	397.88	7440.40	3201.73
Top Width (ft)	773.49	Top Width (ft)	210.90	72.20	490.39
Vel Total (ft/s)	2.60	Avg. Vel. (ft/s)	0.74	7.37	1.19
Max Chl Dpth (ft)	16.66	Hydr. Depth (ft)	2.66	13.97	5.50
Conv. Total (cfs)	352750.3	Conv. (cfs)	12713.0	237735.7	102301.6
Length Wtd. (ft)	276.50	Wetted Per. (ft)	201.05	77.15	503.20
Min Ch El (ft)	572.47	Shear (lb/sq ft)	0.16	0.80	0.33
Alpha	5.47	Stream Power (lb/ft s)	0.12	5.90	0.39
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)	9.21	16.54	21.06
C & E Loss (ft)	0.00	Cum SA (acres)	2.99	1.29	4.89

Plan: Alt 3 New 2 Span, Debris Stevens Branch Stevens Branch RS: 3508 Profile: 1%

E.G. Elev (ft)	590.59	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.54	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	590.05	Reach Len. (ft)	245.30	268.30	311.80
Crit W.S. (ft)	585.96	Flow Area (sq ft)	720.01	1075.46	3151.52
E.G. Slope (ft/ft)	0.000885	Area (sq ft)	751.58	1075.46	3151.52
Q Total (cfs)	12400.00	Flow (cfs)	620.90	7867.67	3911.44
Top Width (ft)	778.03	Top Width (ft)	210.90	72.20	494.93
Vel Total (ft/s)	2.51	Avg. Vel. (ft/s)	0.86	7.32	1.24
Max Chl Dpth (ft)	17.58	Hydr. Depth (ft)	3.58	14.90	6.37
Conv. Total (cfs)	416792.0	Conv. (cfs)	20869.7	264450.2	131472.2
Length Wtd. (ft)	277.11	Wetted Per. (ft)	201.05	77.15	509.67
Min Ch El (ft)	572.47	Shear (lb/sq ft)	0.20	0.77	0.34
Alpha	5.49	Stream Power (lb/ft s)	0.17	5.63	0.42
Frctn Loss (ft)	0.24	Cum Volume (acre-ft)	12.13	17.68	25.67
C & E Loss (ft)	0.00	Cum SA (acres)	3.36	1.30	5.44

Plan: Alt 3 New 2 Span, Debris Stevens Branch Stevens Branch RS: 3508 Profile: 0.2%

E.G. Elev (ft)	592.08	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.50	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	591.58	Reach Len. (ft)	245.30	268.30	311.80
Crit W.S. (ft)	586.70	Flow Area (sq ft)	1025.89	1185.39	3911.23
E.G. Slope (ft/ft)	0.000787	Area (sq ft)	1165.83	1185.39	3911.23
Q Total (cfs)	14980.00	Flow (cfs)	1055.99	8722.98	5201.03
Top Width (ft)	876.85	Top Width (ft)	300.54	72.20	504.11
Vel Total (ft/s)	2.45	Avg. Vel. (ft/s)	1.03	7.36	1.33
Max Chl Dpth (ft)	19.11	Hydr. Depth (ft)	5.11	16.42	7.76
Conv. Total (cfs)	534113.5	Conv. (cfs)	37651.5	311018.6	185443.4
Length Wtd. (ft)	278.14	Wetted Per. (ft)	201.05	77.15	522.04
Min Ch El (ft)	572.47	Shear (lb/sq ft)	0.25	0.75	0.37
Alpha	5.38	Stream Power (lb/ft s)	0.26	5.55	0.49
Frctn Loss (ft)	0.21	Cum Volume (acre-ft)	17.71	19.65	34.39
C & E Loss (ft)	0.01	Cum SA (acres)	3.84	1.33	6.13



Plan: Alt 3 New 2 Span, Debris Stevens Branch Stevens Branch RS: 2628 Profile: 50%

E.G. Elev (ft)	579.78	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.50	Wt. n-Val.		0.035	
W.S. Elev (ft)	579.28	Reach Len. (ft)	382.10	343.40	269.80
Crit W.S. (ft)	576.32	Flow Area (sq ft)		445.41	
E.G. Slope (ft/ft)	0.001784	Area (sq ft)		445.41	
Q Total (cfs)	2524.00	Flow (cfs)		2524.00	
Top Width (ft)	75.70	Top Width (ft)		75.70	
Vel Total (ft/s)	5.67	Avg. Vel. (ft/s)		5.67	
Max Chl Dpth (ft)	7.17	Hydr. Depth (ft)		5.88	
Conv. Total (cfs)	59761.7	Conv. (cfs)		59761.7	
Length Wtd. (ft)	343.40	Wetted Per. (ft)		79.28	
Min Ch El (ft)	572.11	Shear (lb/sq ft)		0.63	
Alpha	1.00	Stream Power (lb/ft s)		3.55	
Frctn Loss (ft)	0.78	Cum Volume (acre-ft)		3.11	
C & E Loss (ft)	0.03	Cum SA (acres)		0.52	

Plan: Alt 3 New 2 Span, Debris Stevens Branch Stevens Branch RS: 2628 Profile: 20%

E.G. Elev (ft)	582.25	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.63	Wt. n-Val.		0.035	
W.S. Elev (ft)	581.62	Reach Len. (ft)	382.10	343.40	269.80
Crit W.S. (ft)	577.68	Flow Area (sq ft)		633.47	
E.G. Slope (ft/ft)	0.001653	Area (sq ft)		633.47	
Q Total (cfs)	4024.00	Flow (cfs)		4024.00	
Top Width (ft)	84.88	Top Width (ft)		84.88	
Vel Total (ft/s)	6.35	Avg. Vel. (ft/s)		6.35	
Max Chl Dpth (ft)	9.51	Hydr. Depth (ft)		7.46	
Conv. Total (cfs)	98959.9	Conv. (cfs)		98959.9	
Length Wtd. (ft)	343.40	Wetted Per. (ft)		89.75	
Min Ch El (ft)	572.11	Shear (lb/sq ft)		0.73	
Alpha	1.00	Stream Power (lb/ft s)		4.63	
Frctn Loss (ft)	0.75	Cum Volume (acre-ft)		4.37	
C & E Loss (ft)	0.05	Cum SA (acres)		0.58	

Plan: Alt 3 New 2 Span, Debris Stevens Branch Stevens Branch RS: 2628 Profile: 10%

E.G. Elev (ft)	586.88	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.61	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	586.27	Reach Len. (ft)	382.10	343.40	269.80
Crit W.S. (ft)	580.37	Flow Area (sq ft)	164.12	1094.69	689.44
E.G. Slope (ft/ft)	0.001098	Area (sq ft)	344.46	1094.69	689.44
Q Total (cfs)	7740.00	Flow (cfs)	72.53	7125.51	541.96
Top Width (ft)	625.57	Top Width (ft)	261.19	104.60	259.78
Vel Total (ft/s)	3.97	Avg. Vel. (ft/s)	0.44	6.51	0.79
Max Chl Dpth (ft)	14.16	Hydr. Depth (ft)	1.12	10.47	2.65
Conv. Total (cfs)	233581.5	Conv. (cfs)	2189.0	215037.0	16355.5
Length Wtd. (ft)	340.95	Wetted Per. (ft)	146.80	109.99	259.99
Min Ch El (ft)	572.11	Shear (lb/sq ft)	0.08	0.68	0.18
Alpha	2.47	Stream Power (lb/ft s)	0.03	4.44	0.14
Frctn Loss (ft)	0.58	Cum Volume (acre-ft)	1.51	7.39	2.22
C & E Loss (ft)	0.09	Cum SA (acres)	1.15	0.73	0.97

Plan: Alt 3 New 2 Span, Debris Stevens Branch Stevens Branch RS: 2628 Profile: 2%

E.G. Elev (ft)	589.45	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.58	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	588.88	Reach Len. (ft)	382.10	343.40	269.80
Crit W.S. (ft)	582.32	Flow Area (sq ft)	546.05	1367.20	1573.04
E.G. Slope (ft/ft)	0.000861	Area (sq ft)	1060.90	1367.20	1573.04
Q Total (cfs)	11040.00	Flow (cfs)	476.33	9139.98	1423.69
Top Width (ft)	837.72	Top Width (ft)	333.22	104.60	399.91
Vel Total (ft/s)	3.17	Avg. Vel. (ft/s)	0.87	6.69	0.91
Max Chl Dpth (ft)	16.77	Hydr. Depth (ft)	3.72	13.07	3.93
Conv. Total (cfs)	376218.8	Conv. (cfs)	16232.2	311470.4	48516.1
Length Wtd. (ft)	338.45	Wetted Per. (ft)	146.80	109.99	400.17
Min Ch El (ft)	572.11	Shear (lb/sq ft)	0.20	0.67	0.21
Alpha	3.70	Stream Power (lb/ft s)	0.17	4.47	0.19
Frctn Loss (ft)	0.49	Cum Volume (acre-ft)	4.65	9.22	5.78
C & E Loss (ft)	0.13	Cum SA (acres)	1.46	0.75	1.70

Plan: Alt 3 New 2 Span, Debris Stevens Branch Stevens Branch RS: 2628 Profile: 1%

E.G. Elev (ft)	590.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.58	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	589.77	Reach Len. (ft)	382.10	343.40	269.80
Crit W.S. (ft)	583.84	Flow Area (sq ft)	676.72	1460.43	1960.05
E.G. Slope (ft/ft)	0.000818	Area (sq ft)	1390.03	1460.43	1960.05
Q Total (cfs)	12400.00	Flow (cfs)	664.01	9946.55	1789.45
Top Width (ft)	962.17	Top Width (ft)	384.06	104.60	473.51
Vel Total (ft/s)	3.03	Avg. Vel. (ft/s)	0.98	6.81	0.91
Max Chl Dpth (ft)	17.66	Hydr. Depth (ft)	4.62	13.96	4.14
Conv. Total (cfs)	433425.3	Conv. (cfs)	23209.5	347668.1	62547.6
Length Wtd. (ft)	337.53	Wetted Per. (ft)	146.80	109.99	473.78
Min Ch El (ft)	572.11	Shear (lb/sq ft)	0.24	0.68	0.21
Alpha	4.08	Stream Power (lb/ft s)	0.23	4.62	0.19
Frctn Loss (ft)	0.48	Cum Volume (acre-ft)	6.10	9.87	7.38
C & E Loss (ft)	0.13	Cum SA (acres)	1.68	0.76	1.97

Plan: Alt 3 New 2 Span, Debris Stevens Branch Stevens Branch RS: 2628 Profile: 0.2%

E.G. Elev (ft)	591.86	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.57	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	591.28	Reach Len. (ft)	382.10	343.40	269.80
Crit W.S. (ft)	585.05	Flow Area (sq ft)	898.75	1618.85	2739.83
E.G. Slope (ft/ft)	0.000748	Area (sq ft)	1989.00	1618.85	2739.83
Q Total (cfs)	14980.00	Flow (cfs)	1018.57	11288.78	2672.66
Top Width (ft)	1062.34	Top Width (ft)	397.60	104.60	560.14
Vel Total (ft/s)	2.85	Avg. Vel. (ft/s)	1.13	6.97	0.98
Max Chl Dpth (ft)	19.17	Hydr. Depth (ft)	6.13	15.48	4.89
Conv. Total (cfs)	547737.8	Conv. (cfs)	37243.4	412769.8	97724.6
Length Wtd. (ft)	335.51	Wetted Per. (ft)	146.80	109.99	560.43
Min Ch El (ft)	572.11	Shear (lb/sq ft)	0.29	0.69	0.23
Alpha	4.55	Stream Power (lb/ft s)	0.32	4.79	0.22
Frctn Loss (ft)	0.45	Cum Volume (acre-ft)	8.83	11.01	10.59
C & E Loss (ft)	0.14	Cum SA (acres)	1.88	0.78	2.32

Plan: Alt 3 New 2 Span, Debris Stevens Branch Stevens Branch RS: 1501 Profile: 50%

E.G. Elev (ft)	578.96	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.84	Wt. n-Val.		0.035	
W.S. Elev (ft)	578.12	Reach Len. (ft)			
Crit W.S. (ft)	575.76	Flow Area (sq ft)		343.65	
E.G. Slope (ft/ft)	0.003000	Area (sq ft)		343.65	
Q Total (cfs)	2524.00	Flow (cfs)		2524.00	
Top Width (ft)	56.60	Top Width (ft)		56.60	
Vel Total (ft/s)	7.34	Avg. Vel. (ft/s)		7.34	
Max Chl Dpth (ft)	7.34	Hydr. Depth (ft)		6.07	
Conv. Total (cfs)	46079.4	Conv. (cfs)		46079.4	
Length Wtd. (ft)		Wetted Per. (ft)		61.22	
Min Ch El (ft)	570.78	Shear (lb/sq ft)		1.05	
Alpha	1.00	Stream Power (lb/ft s)		7.72	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Plan: Alt 3 New 2 Span, Debris Stevens Branch Stevens Branch RS: 1501 Profile: 20%

E.G. Elev (ft)	581.45	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.11	Wt. n-Val.		0.035	
W.S. Elev (ft)	580.34	Reach Len. (ft)			
Crit W.S. (ft)	577.36	Flow Area (sq ft)		475.20	
E.G. Slope (ft/ft)	0.003000	Area (sq ft)		475.20	
Q Total (cfs)	4024.00	Flow (cfs)		4024.00	
Top Width (ft)	62.21	Top Width (ft)		62.21	
Vel Total (ft/s)	8.47	Avg. Vel. (ft/s)		8.47	
Max Chl Dpth (ft)	9.56	Hydr. Depth (ft)		7.64	
Conv. Total (cfs)	73466.4	Conv. (cfs)		73466.4	
Length Wtd. (ft)		Wetted Per. (ft)		68.38	
Min Ch El (ft)	570.78	Shear (lb/sq ft)		1.30	
Alpha	1.00	Stream Power (lb/ft s)		11.02	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Plan: Alt 3 New 2 Span, Debris Stevens Branch Stevens Branch RS: 1501 Profile: 10%

E.G. Elev (ft)	586.20	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.52	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	584.69	Reach Len. (ft)			
Crit W.S. (ft)	580.55	Flow Area (sq ft)		781.30	26.87
E.G. Slope (ft/ft)	0.003002	Area (sq ft)		781.30	26.87
Q Total (cfs)	7740.00	Flow (cfs)		7728.56	11.44
Top Width (ft)	134.77	Top Width (ft)		80.76	54.01
Vel Total (ft/s)	9.58	Avg. Vel. (ft/s)		9.89	0.43
Max Chl Dpth (ft)	13.91	Hydr. Depth (ft)		9.67	0.50
Conv. Total (cfs)	141273.9	Conv. (cfs)		141065.0	208.9
Length Wtd. (ft)		Wetted Per. (ft)		89.09	54.03
Min Ch El (ft)	570.78	Shear (lb/sq ft)		1.64	0.09
Alpha	1.07	Stream Power (lb/ft s)		16.26	0.04
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Plan: Alt 3 New 2 Span, Debris Stevens Branch Stevens Branch RS: 1501 Profile: 2%

E.G. Elev (ft)	588.83	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.84	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	586.99	Reach Len. (ft)			
Crit W.S. (ft)	582.87	Flow Area (sq ft)		972.25	293.00
E.G. Slope (ft/ft)	0.003000	Area (sq ft)		972.25	293.00
Q Total (cfs)	11040.00	Flow (cfs)		10729.31	310.69
Top Width (ft)	234.94	Top Width (ft)		85.15	149.79
Vel Total (ft/s)	8.73	Avg. Vel. (ft/s)		11.04	1.06
Max Chl Dpth (ft)	16.21	Hydr. Depth (ft)		11.42	1.96
Conv. Total (cfs)	201552.3	Conv. (cfs)		195880.1	5672.1
Length Wtd. (ft)		Wetted Per. (ft)		94.05	149.89
Min Ch El (ft)	570.78	Shear (lb/sq ft)		1.94	0.37
Alpha	1.55	Stream Power (lb/ft s)		21.37	0.39
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Plan: Alt 3 New 2 Span, Debris Stevens Branch Stevens Branch RS: 1501 Profile: 1%

E.G. Elev (ft)	589.74	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.92	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	587.81	Reach Len. (ft)			
Crit W.S. (ft)	583.95	Flow Area (sq ft)		1043.00	421.69
E.G. Slope (ft/ft)	0.003000	Area (sq ft)		1043.00	421.69
Q Total (cfs)	12400.00	Flow (cfs)		11862.80	537.20
Top Width (ft)	251.04	Top Width (ft)		87.36	163.68
Vel Total (ft/s)	8.47	Avg. Vel. (ft/s)		11.37	1.27
Max Chl Dpth (ft)	17.03	Hydr. Depth (ft)		11.94	2.58
Conv. Total (cfs)	226400.3	Conv. (cfs)		216592.1	9808.2
Length Wtd. (ft)		Wetted Per. (ft)		96.41	163.80
Min Ch El (ft)	570.78	Shear (lb/sq ft)		2.03	0.48
Alpha	1.73	Stream Power (lb/ft s)		23.04	0.61
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Plan: Alt 3 New 2 Span, Debris Stevens Branch Stevens Branch RS: 1501 Profile: 0.2%

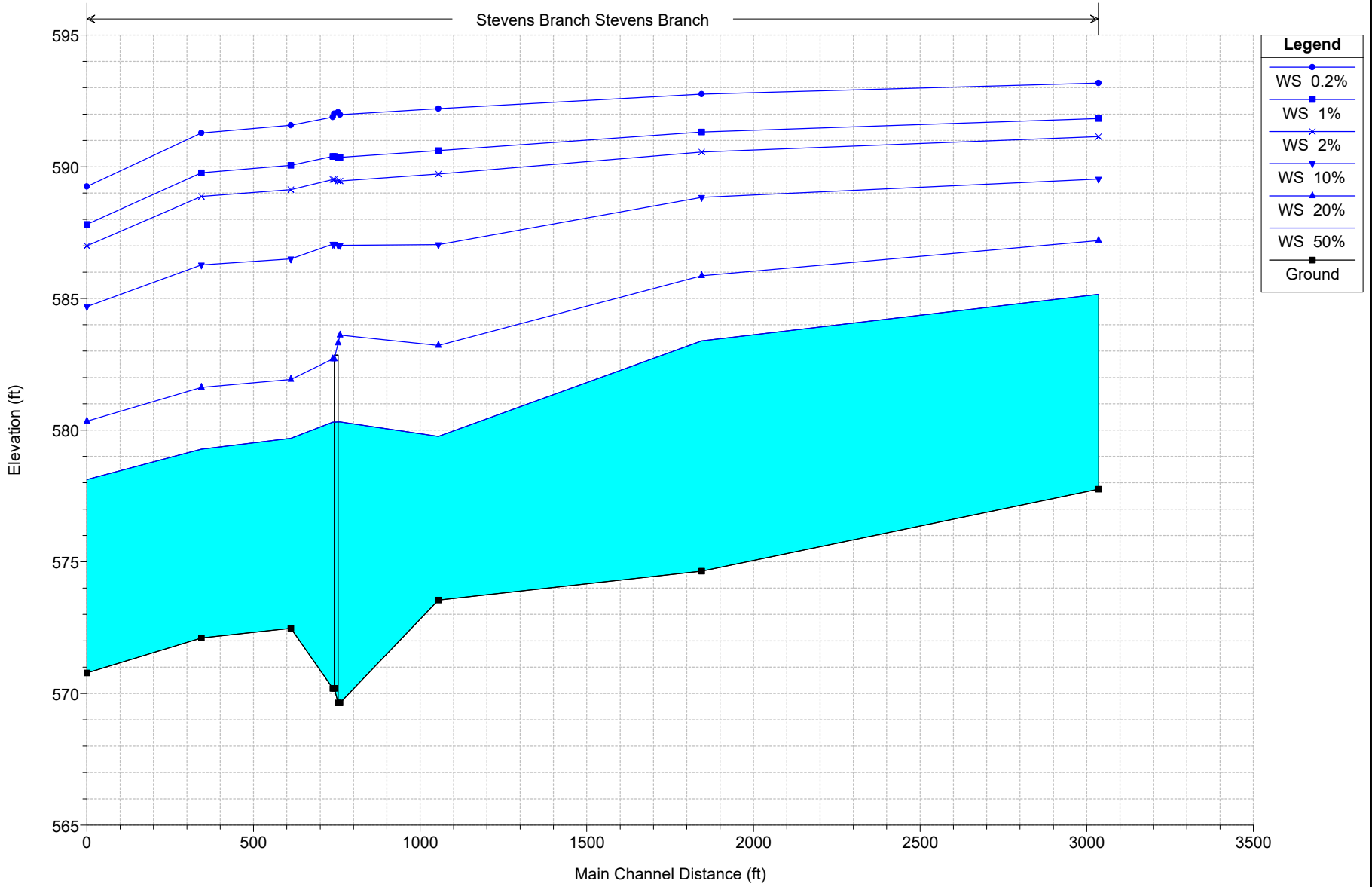
E.G. Elev (ft)	591.26	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.02	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	589.25	Reach Len. (ft)			
Crit W.S. (ft)	585.90	Flow Area (sq ft)	23.68	1174.44	679.83
E.G. Slope (ft/ft)	0.003006	Area (sq ft)	23.68	1174.44	679.83
Q Total (cfs)	14980.00	Flow (cfs)	13.70	13883.31	1082.99
Top Width (ft)	312.49	Top Width (ft)	30.04	93.50	188.95
Vel Total (ft/s)	7.98	Avg. Vel. (ft/s)	0.58	11.82	1.59
Max Chl Dpth (ft)	18.47	Hydr. Depth (ft)	0.79	12.56	3.60
Conv. Total (cfs)	273227.7	Conv. (cfs)	250.0	253224.5	19753.2
Length Wtd. (ft)		Wetted Per. (ft)	30.08	102.61	189.13
Min Ch El (ft)	570.78	Shear (lb/sq ft)	0.15	2.15	0.67
Alpha	2.04	Stream Power (lb/ft s)	0.09	25.39	1.07
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

## HEC-RAS Results for Alternative 4

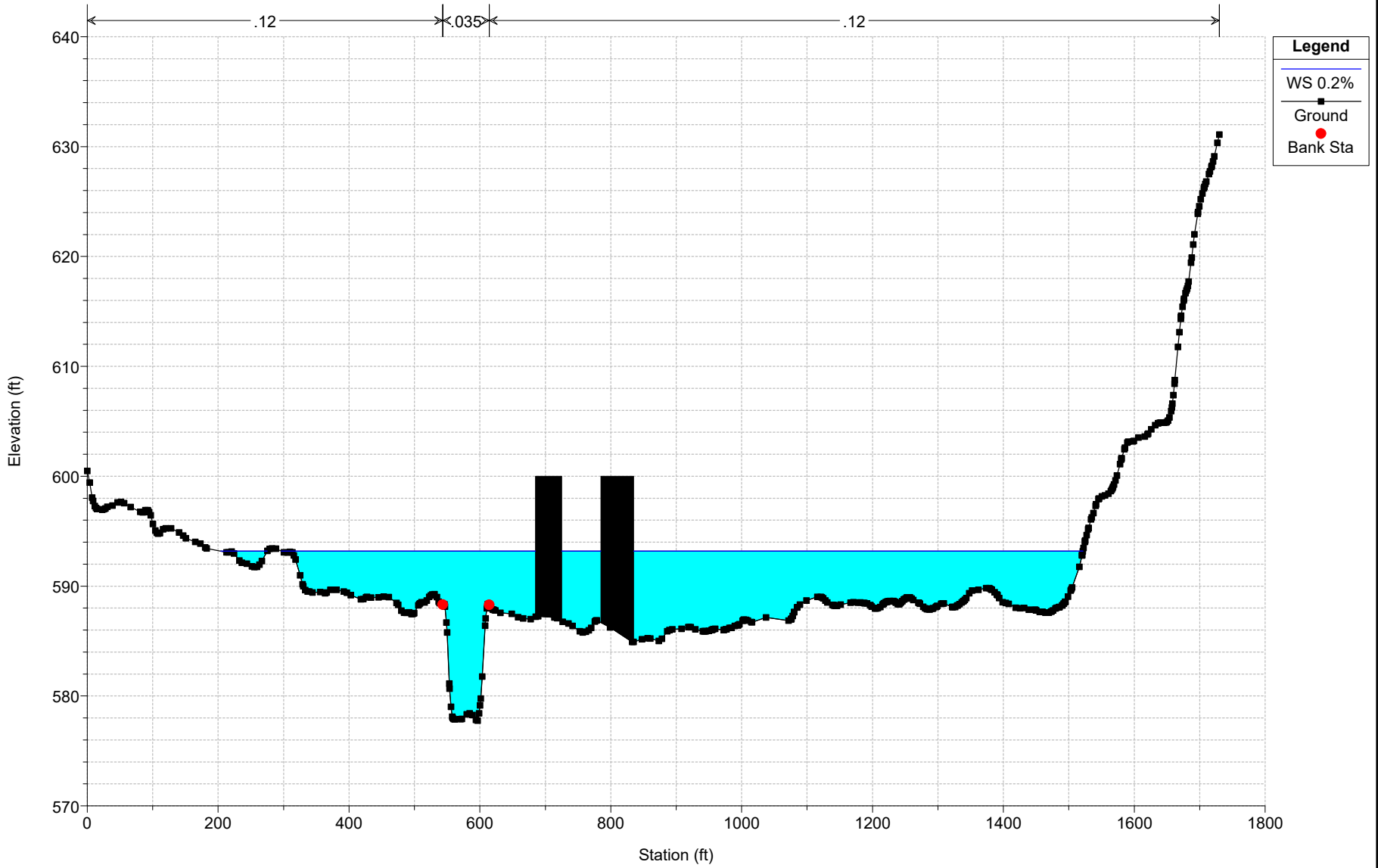
# Bridge 308

Geom: Alternative 4 - New 1 Span Bridge

Stevens Branch Stevens Branch

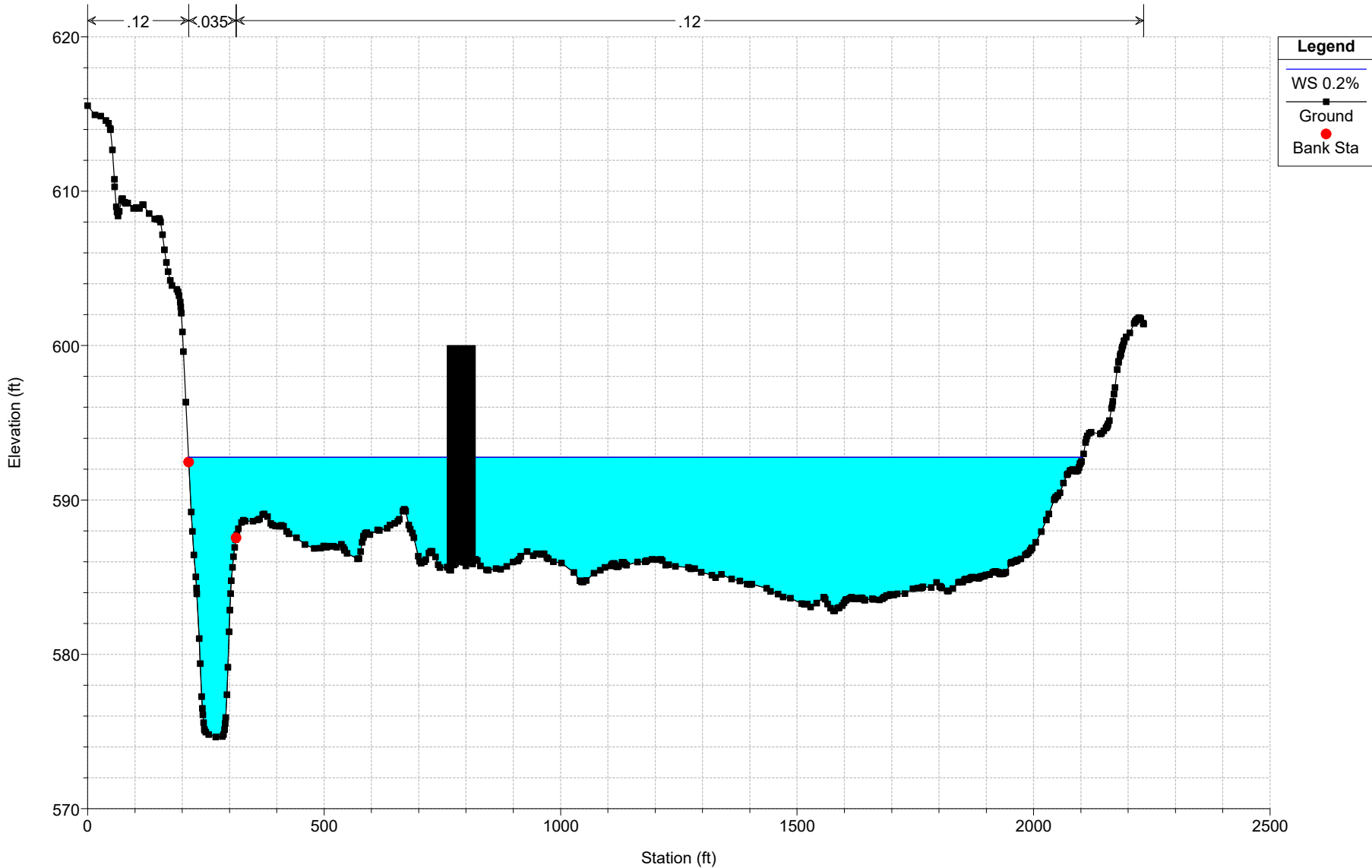


Bridge 308  
Geom: Alternative 4 - New 1 Span Bridge  
RS = 11459

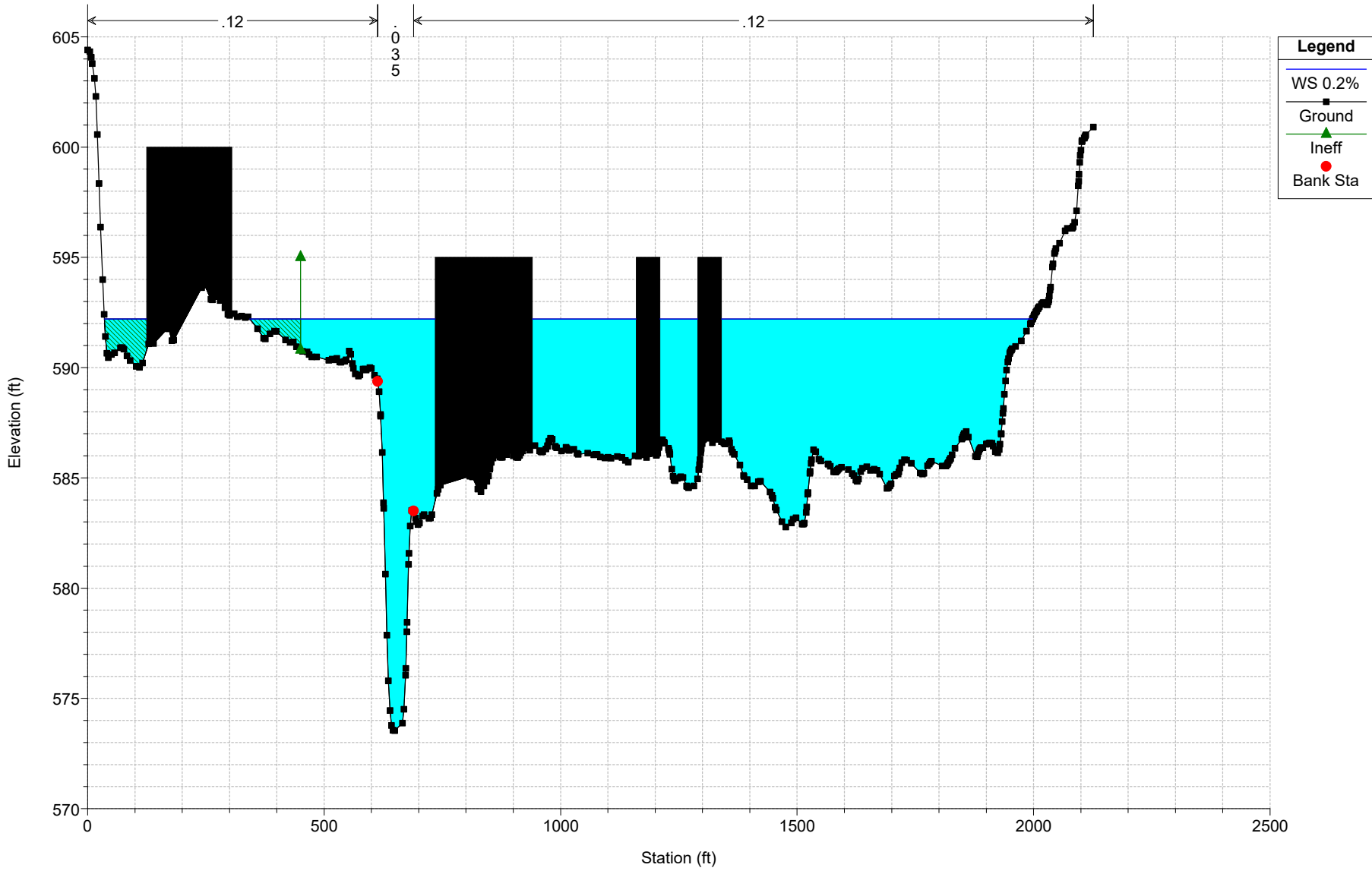




Bridge 308  
Geom: Alternative 4 - New 1 Span Bridge  
RS = 7552



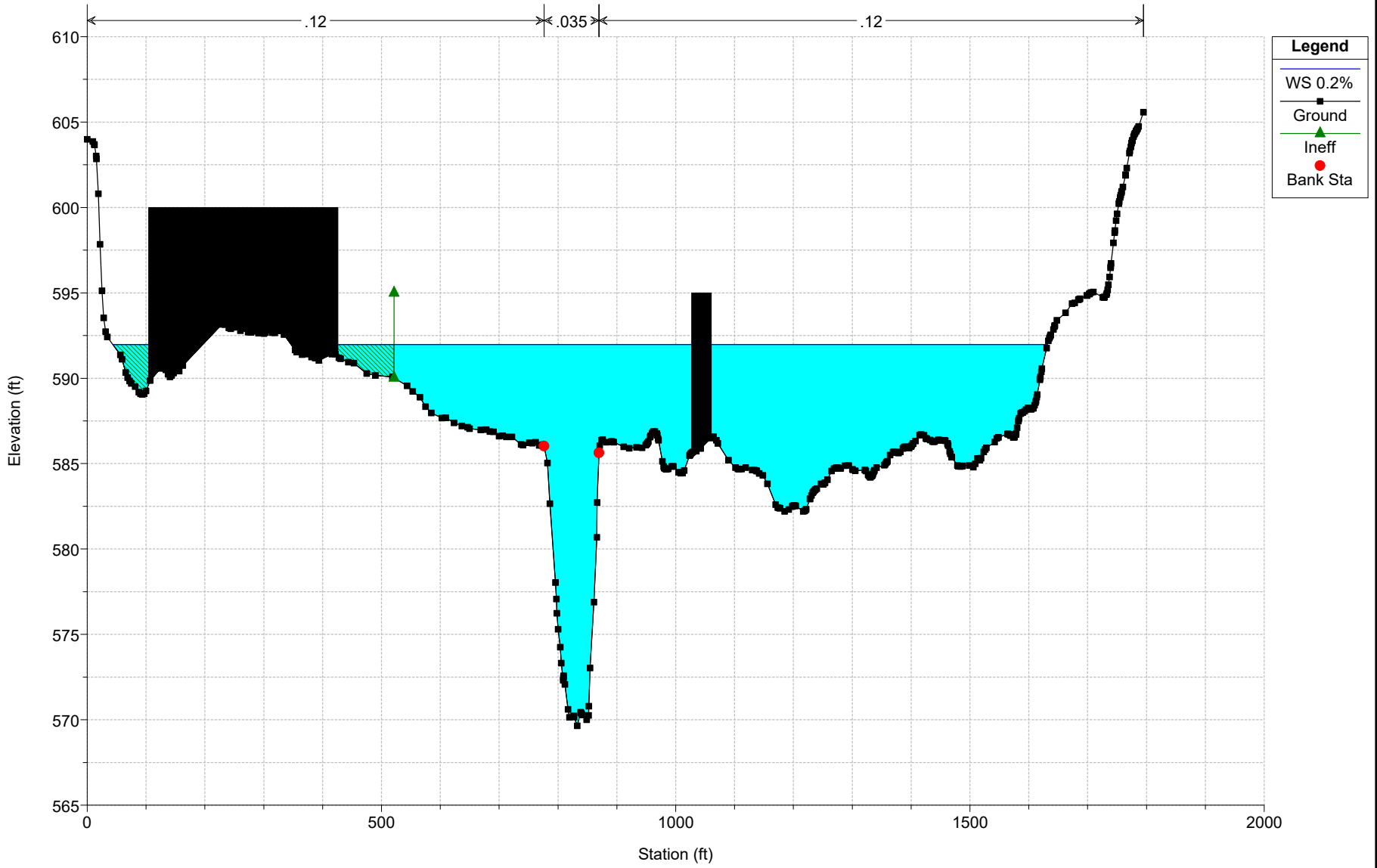
Bridge 308  
Geom: Alternative 4 - New 1 Span Bridge  
RS = 4962



# Bridge 308

Geom: Alternative 4 - New 1 Span Bridge

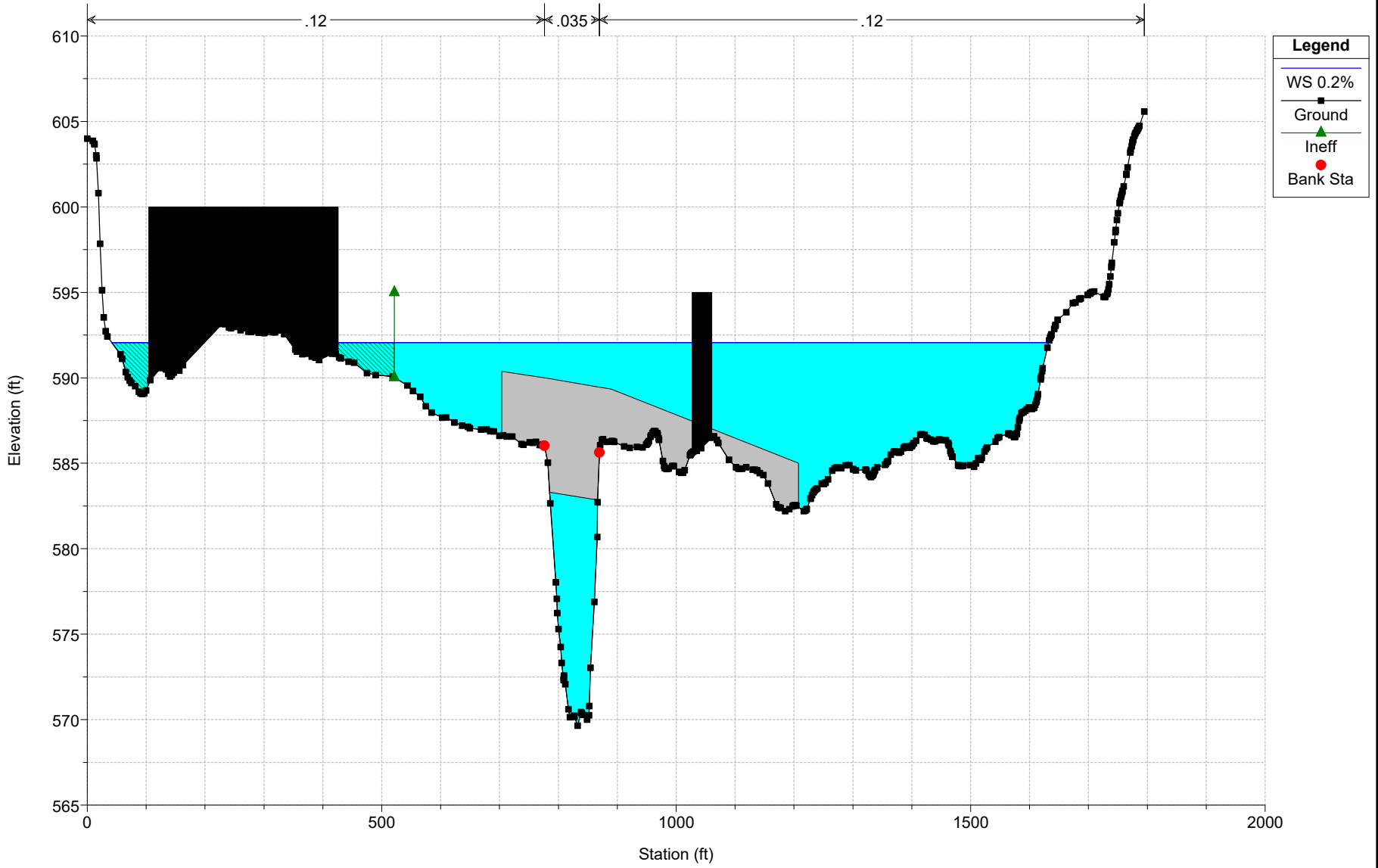
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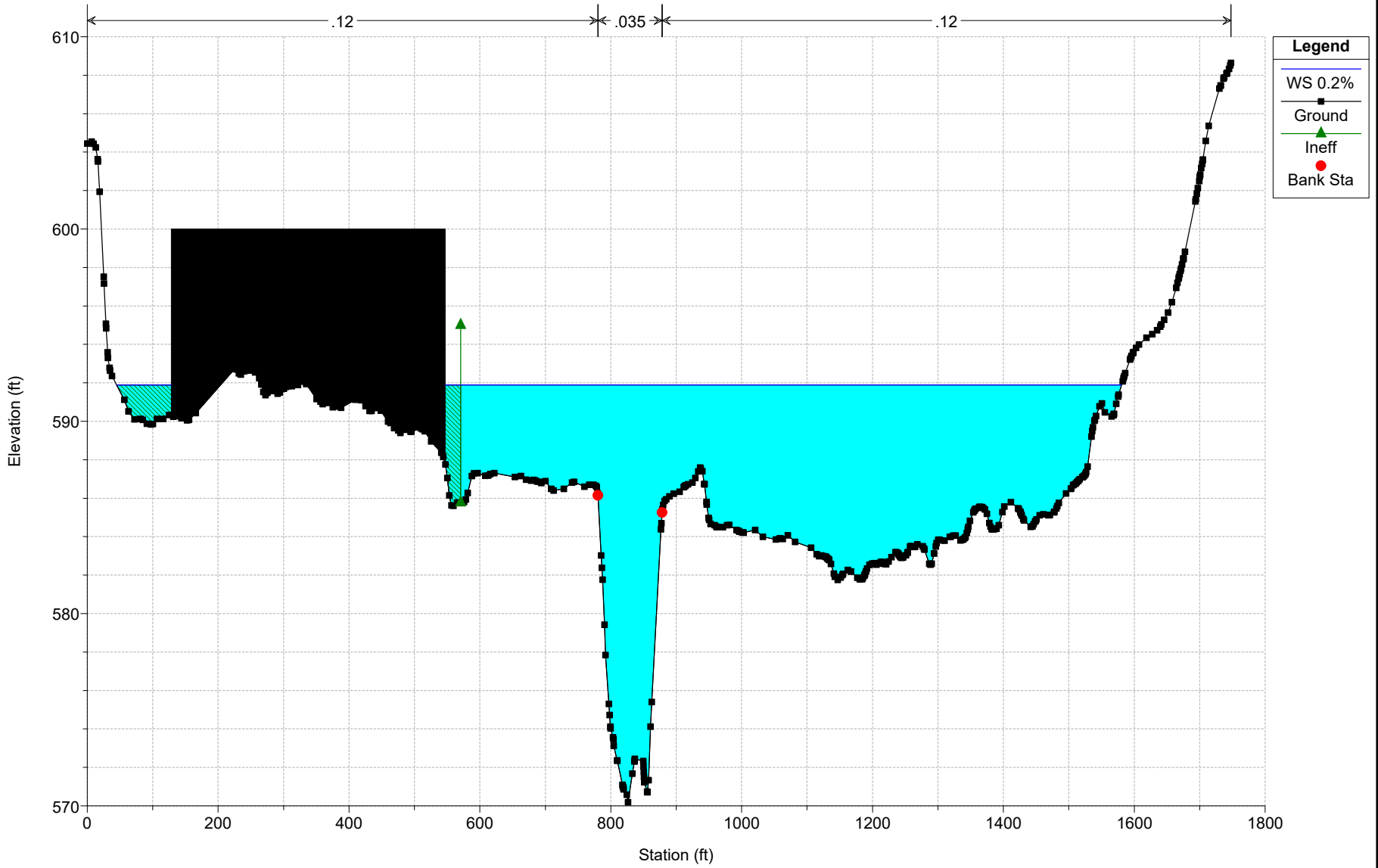
# Bridge 308

Geom: Alternative 4 - New 1 Span Bridge

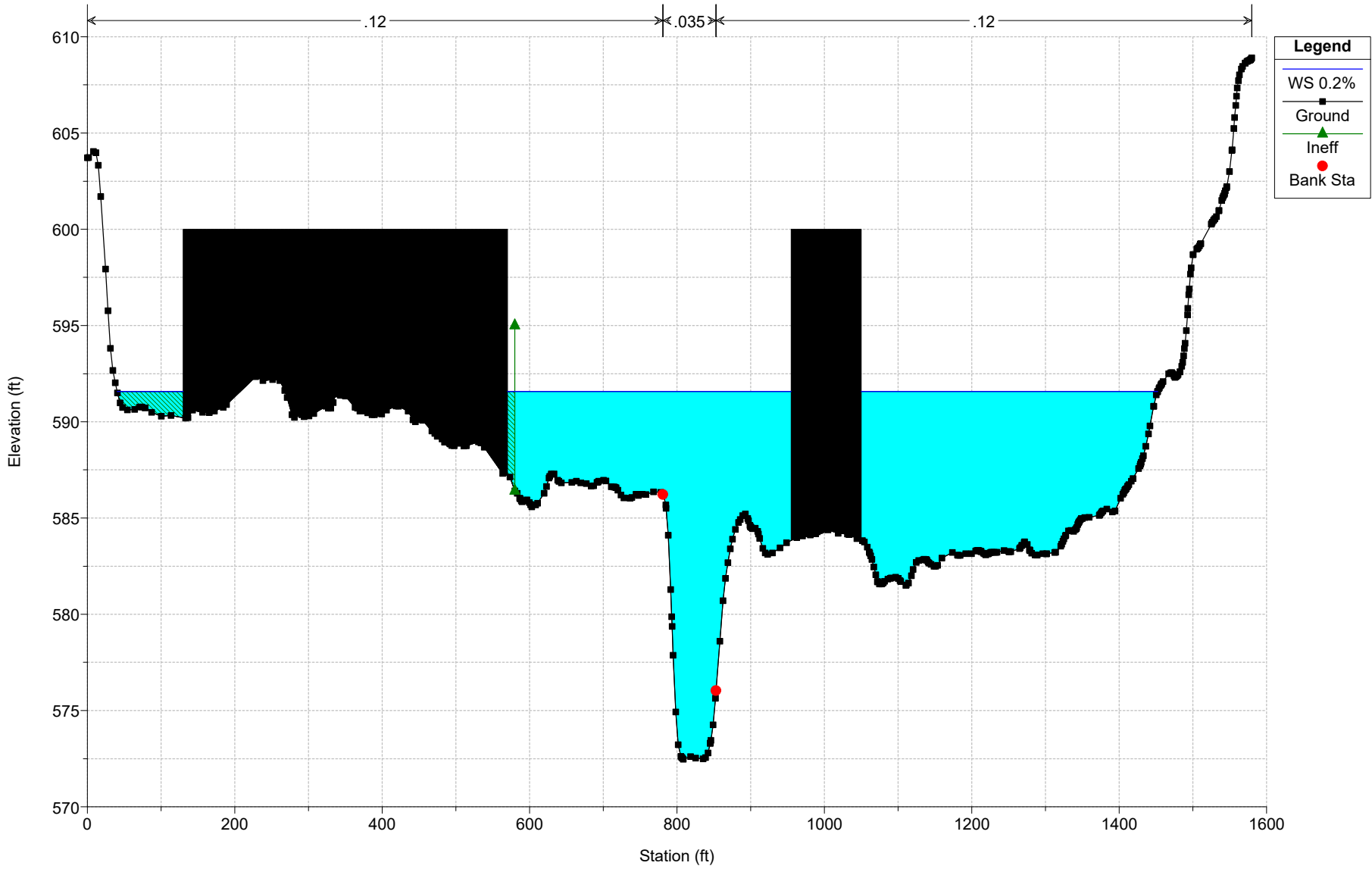
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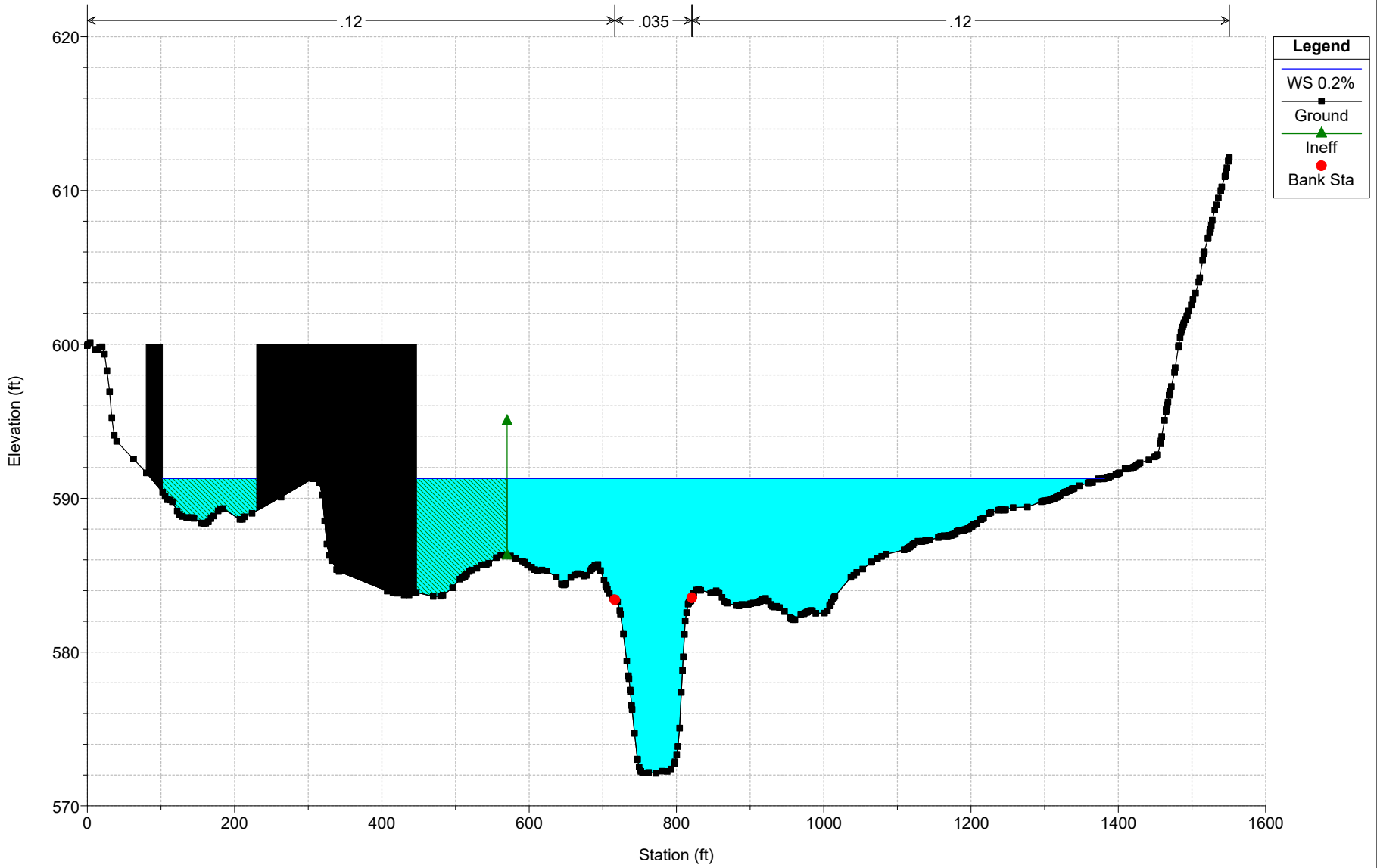
Bridge 308  
Geom: Alternative 4 - New 1 Span Bridge  
RS = 3921



Bridge 308  
Geom: Alternative 4 - New 1 Span Bridge  
RS = 3508

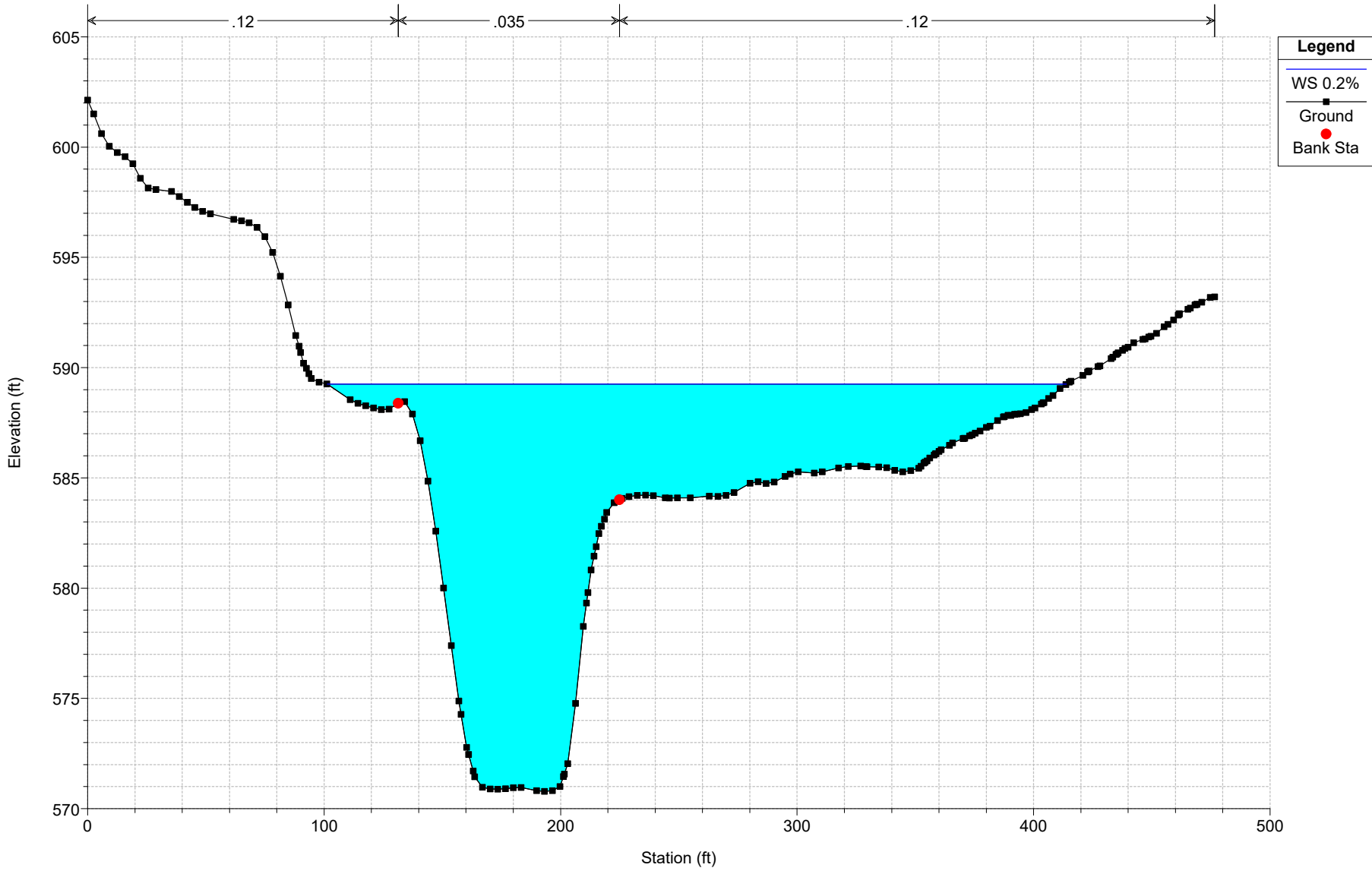


Bridge 308  
Geom: Alternative 4 - New 1 Span Bridge  
RS = 2628





Bridge 308  
Geom: Alternative 4 - New 1 Span Bridge  
RS = 1501



Plan: Alt 4 New 1 Span Stevens Branch Stevens Branch RS: 3990 Profile: 50%

E.G. US. (ft)	580.62	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	580.31	E.G. Elev (ft)	580.62	580.60
Q Total (cfs)	2524.00	W.S. Elev (ft)	580.31	580.31
Q Bridge (cfs)	2524.00	Crit W.S. (ft)	575.10	575.66
Q Weir (cfs)		Max Chl Dpth (ft)	10.67	10.12
Weir Sta Lft (ft)		Vel Total (ft/s)	4.43	4.34
Weir Sta Rgt (ft)		Flow Area (sq ft)	569.33	580.92
Weir Submerg		Froude # Chl	0.28	0.24
Weir Max Depth (ft)		Specif Force (cu ft)	2888.65	2686.75
Min El Weir Flow (ft)	586.81	Hydr Depth (ft)	7.63	7.34
Min El Prs (ft)	582.85	W.P. Total (ft)	80.36	86.21
Delta EG (ft)	0.02	Conv. Total (cfs)	89158.4	87984.5
Delta WS (ft)	0.01	Top Width (ft)	74.58	79.13
BR Open Area (sq ft)	785.22	Frctn Loss (ft)	0.01	0.00
BR Open Vel (ft/s)	4.43	C & E Loss (ft)	0.00	0.00
BR Sluice Coef		Shear Total (lb/sq ft)	0.35	0.35
BR Sel Method	Energy only	Power Total (lb/ft s)	1.57	1.50

Plan: Alt 4 New 1 Span Stevens Branch Stevens Branch RS: 3990 Profile: 20%

E.G. US. (ft)	583.97	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	583.61	E.G. Elev (ft)	583.97	583.10
Q Total (cfs)	4024.00	W.S. Elev (ft)	583.31	582.70
Q Bridge (cfs)	4024.00	Crit W.S. (ft)	576.62	577.02
Q Weir (cfs)		Max Chl Dpth (ft)	13.67	12.51
Weir Sta Lft (ft)		Vel Total (ft/s)	5.00	5.19
Weir Sta Rgt (ft)		Flow Area (sq ft)	804.43	775.83
Weir Submerg		Froude # Chl	0.24	0.26
Weir Max Depth (ft)		Specif Force (cu ft)	5239.60	4614.38
Min El Weir Flow (ft)	586.81	Hydr Depth (ft)	31.79	7.85
Min El Prs (ft)	582.85	W.P. Total (ft)	197.36	109.20
Delta EG (ft)	0.87	Conv. Total (cfs)	92247.5	135035.9
Delta WS (ft)	0.91	Top Width (ft)	25.30	98.87
BR Open Area (sq ft)	785.22	Frctn Loss (ft)		
BR Open Vel (ft/s)	5.12	C & E Loss (ft)		
BR Sluice Coef	0.27	Shear Total (lb/sq ft)	0.48	0.39
BR Sel Method	Press Only	Power Total (lb/ft s)	2.42	2.04

Plan: Alt 4 New 1 Span Stevens Branch Stevens Branch RS: 3990 Profile: 10%

E.G. US. (ft)	587.55	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	587.02	E.G. Elev (ft)	587.55	587.46
Q Total (cfs)	7740.00	W.S. Elev (ft)	587.02	587.06
Q Bridge (cfs)	3529.33	Crit W.S. (ft)	579.53	579.62
Q Weir (cfs)	4210.67	Max Chl Dpth (ft)	17.38	16.88
Weir Sta Lft (ft)	615.47	Vel Total (ft/s)	4.78	4.34
Weir Sta Rgt (ft)	1582.53	Flow Area (sq ft)	1617.94	1784.00
Weir Submerg	0.80	Froude # Chl	0.34	0.31
Weir Max Depth (ft)	5.35	Specif Force (cu ft)	10285.74	10500.66
Min El Weir Flow (ft)	586.81	Hydr Depth (ft)	2.86	3.45
Min El Prs (ft)	582.85	W.P. Total (ft)	740.59	698.05
Delta EG (ft)	0.09	Conv. Total (cfs)		
Delta WS (ft)	-0.04	Top Width (ft)	566.13	537.59
BR Open Area (sq ft)	785.22	Frctn Loss (ft)		
BR Open Vel (ft/s)	4.49	C & E Loss (ft)		
BR Sluice Coef		Shear Total (lb/sq ft)		
BR Sel Method	Press/Weir	Power Total (lb/ft s)		

Plan: Alt 4 New 1 Span Stevens Branch Stevens Branch RS: 3990 Profile: 2%

E.G. US. (ft)	589.89	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	589.46	E.G. Elev (ft)	589.89	589.85
Q Total (cfs)	11040.00	W.S. Elev (ft)	589.46	589.51
Q Bridge (cfs)	3108.53	Crit W.S. (ft)	581.56	581.48
Q Weir (cfs)	7931.47	Max Chl Dpth (ft)	19.82	19.32
Weir Sta Lft (ft)	570.63	Vel Total (ft/s)	3.28	3.17
Weir Sta Rgt (ft)	1538.33	Flow Area (sq ft)	3362.96	3481.51
Weir Submerg	0.97	Froude # Chl	0.24	0.23
Weir Max Depth (ft)	7.35	Specif Force (cu ft)	16182.51	16922.19
Min El Weir Flow (ft)	586.81	Hydr Depth (ft)	3.86	4.31
Min El Prs (ft)	582.85	W.P. Total (ft)	1053.38	990.79
Delta EG (ft)	0.04	Conv. Total (cfs)		
Delta WS (ft)	-0.06	Top Width (ft)	891.87	830.96
BR Open Area (sq ft)	785.22	Frctn Loss (ft)		
BR Open Vel (ft/s)	3.96	C & E Loss (ft)		
BR Sluice Coef		Shear Total (lb/sq ft)		
BR Sel Method	Press/Weir	Power Total (lb/ft s)		

Plan: Alt 4 New 1 Span Stevens Branch Stevens Branch RS: 3990 Profile: 1%

E.G. US. (ft)	590.76	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	590.35	E.G. Elev (ft)	590.76	590.72
Q Total (cfs)	12400.00	W.S. Elev (ft)	590.35	590.40
Q Bridge (cfs)	3016.66	Crit W.S. (ft)	582.33	582.19
Q Weir (cfs)	9383.34	Max Chl Dpth (ft)	20.71	20.21
Weir Sta Lft (ft)	570.63	Vel Total (ft/s)	2.93	2.91
Weir Sta Rgt (ft)	1571.50	Flow Area (sq ft)	4232.06	4268.20
Weir Submerg	0.97	Froude # Chl	0.17	0.17
Weir Max Depth (ft)	8.22	Specif Force (cu ft)	19259.28	20110.69
Min El Weir Flow (ft)	586.81	Hydr Depth (ft)	3.99	4.34
Min El Prs (ft)	582.85	W.P. Total (ft)	1246.09	1167.35
Delta EG (ft)	0.04	Conv. Total (cfs)		
Delta WS (ft)	-0.04	Top Width (ft)	1150.15	1069.46
BR Open Area (sq ft)	785.22	Frctn Loss (ft)		
BR Open Vel (ft/s)	3.84	C & E Loss (ft)		
BR Sluice Coef		Shear Total (lb/sq ft)		
BR Sel Method	Press/Weir	Power Total (lb/ft s)		

Plan: Alt 4 New 1 Span Stevens Branch Stevens Branch RS: 3990 Profile: 0.2%

E.G. US. (ft)	592.32	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	591.98	E.G. Elev (ft)	592.25	592.22
Q Total (cfs)	14980.00	W.S. Elev (ft)	592.07	592.02
Q Bridge (cfs)	4587.61	Crit W.S. (ft)	582.96	583.00
Q Weir (cfs)		Max Chl Dpth (ft)	22.42	21.83
Weir Sta Lft (ft)		Vel Total (ft/s)	2.47	2.54
Weir Sta Rgt (ft)		Flow Area (sq ft)	6066.46	5892.38
Weir Submerg		Froude # Chl	0.13	0.14
Weir Max Depth (ft)		Specif Force (cu ft)	28022.57	28342.88
Min El Weir Flow (ft)	586.81	Hydr Depth (ft)	5.63	5.83
Min El Prs (ft)	582.85	W.P. Total (ft)	1265.83	1195.80
Delta EG (ft)	0.13	Conv. Total (cfs)	295848.4	292373.8
Delta WS (ft)	0.09	Top Width (ft)	1235.92	1120.45
BR Open Area (sq ft)	785.22	Frctn Loss (ft)	0.03	0.00
BR Open Vel (ft/s)	5.84	C & E Loss (ft)	0.00	0.02
BR Sluice Coef		Shear Total (lb/sq ft)	0.77	0.81
BR Sel Method	Energy only	Power Total (lb/ft s)	1.89	2.05

Plan: Alt 4 New 1 Span Stevens Branch Stevens Branch RS: 11459 Profile: 50%

E.G. Elev (ft)	585.95	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.79	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	585.16	Reach Len. (ft)	1191.60	1191.00	1181.80
Crit W.S. (ft)	582.67	Flow Area (sq ft)		353.21	2.28
E.G. Slope (ft/ft)	0.002792	Area (sq ft)		353.21	2.28
Q Total (cfs)	2524.00	Flow (cfs)		2523.68	0.32
Top Width (ft)	80.32	Top Width (ft)		56.45	23.87
Vel Total (ft/s)	7.10	Avg. Vel. (ft/s)		7.14	0.14
Max Chl Dpth (ft)	7.40	Hydr. Depth (ft)		6.26	0.10
Conv. Total (cfs)	47769.3	Conv. (cfs)		47763.3	6.0
Length Wtd. (ft)	1190.99	Wetted Per. (ft)		62.14	24.11
Min Ch El (ft)	577.76	Shear (lb/sq ft)		0.99	0.02
Alpha	1.01	Stream Power (lb/ft s)		7.08	0.00
Frctn Loss (ft)	2.04	Cum Volume (acre-ft)		28.18	0.48
C & E Loss (ft)	0.12	Cum SA (acres)		4.37	1.89

Plan: Alt 4 New 1 Span Stevens Branch Stevens Branch RS: 11459 Profile: 20%

E.G. Elev (ft)	588.18	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.97	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	587.20	Reach Len. (ft)	1191.60	1191.00	1181.80
Crit W.S. (ft)	584.22	Flow Area (sq ft)		472.69	300.36
E.G. Slope (ft/ft)	0.002771	Area (sq ft)		472.69	300.36
Q Total (cfs)	4024.00	Flow (cfs)		3833.09	190.91
Top Width (ft)	390.84	Top Width (ft)		61.11	329.73
Vel Total (ft/s)	5.21	Avg. Vel. (ft/s)		8.11	0.64
Max Chl Dpth (ft)	9.44	Hydr. Depth (ft)		7.74	0.91
Conv. Total (cfs)	76447.1	Conv. (cfs)		72820.2	3626.9
Length Wtd. (ft)	1190.14	Wetted Per. (ft)		68.38	333.07
Min Ch El (ft)	577.76	Shear (lb/sq ft)		1.20	0.16
Alpha	2.31	Stream Power (lb/ft s)		9.70	0.10
Frctn Loss (ft)	1.77	Cum Volume (acre-ft)		39.93	27.46
C & E Loss (ft)	0.19	Cum SA (acres)		4.94	24.21

Plan: Alt 4 New 1 Span Stevens Branch Stevens Branch RS: 11459 Profile: 10%

E.G. Elev (ft)	590.56	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.02	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	589.54	Reach Len. (ft)	1191.60	1191.00	1181.80
Crit W.S. (ft)	588.47	Flow Area (sq ft)	136.33	629.45	1613.54
E.G. Slope (ft/ft)	0.002990	Area (sq ft)	136.33	629.45	1613.54
Q Total (cfs)	7740.00	Flow (cfs)	82.32	5847.75	1809.94
Top Width (ft)	1021.83	Top Width (ft)	186.48	70.80	764.55
Vel Total (ft/s)	3.25	Avg. Vel. (ft/s)	0.60	9.29	1.12
Max Chl Dpth (ft)	11.78	Hydr. Depth (ft)	0.73	8.89	2.11
Conv. Total (cfs)	141557.7	Conv. (cfs)	1505.5	106950.1	33102.1
Length Wtd. (ft)	1187.82	Wetted Per. (ft)	186.68	78.62	777.61
Min Ch El (ft)	577.76	Shear (lb/sq ft)	0.14	1.49	0.39
Alpha	6.19	Stream Power (lb/ft s)	0.08	13.88	0.43
Frctn Loss (ft)	1.30	Cum Volume (acre-ft)	4.57	58.65	159.12
C & E Loss (ft)	0.25	Cum SA (acres)	4.96	5.80	59.54

Plan: Alt 4 New 1 Span Stevens Branch Stevens Branch RS: 11459 Profile: 2%

E.G. Elev (ft)	591.90	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.76	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	591.14	Reach Len. (ft)	1191.60	1191.00	1181.80
Crit W.S. (ft)	589.98	Flow Area (sq ft)	479.09	743.03	2896.77
E.G. Slope (ft/ft)	0.002229	Area (sq ft)	479.09	743.03	2896.77
Q Total (cfs)	11040.00	Flow (cfs)	471.49	6657.49	3911.01
Top Width (ft)	1097.97	Top Width (ft)	219.00	70.80	808.17
Vel Total (ft/s)	2.68	Avg. Vel. (ft/s)	0.98	8.96	1.35
Max Chl Dpth (ft)	13.38	Hydr. Depth (ft)	2.19	10.49	3.58
Conv. Total (cfs)	233838.4	Conv. (cfs)	9986.7	141012.5	82839.2
Length Wtd. (ft)	1186.79	Wetted Per. (ft)	219.34	78.62	827.78
Min Ch El (ft)	577.76	Shear (lb/sq ft)	0.30	1.32	0.49
Alpha	6.83	Stream Power (lb/ft s)	0.30	11.78	0.66
Frctn Loss (ft)	1.02	Cum Volume (acre-ft)	16.86	71.00	281.39
C & E Loss (ft)	0.19	Cum SA (acres)	6.68	5.98	63.12

Plan: Alt 4 New 1 Span Stevens Branch Stevens Branch RS: 11459 Profile: 1%

E.G. Elev (ft)	592.50	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.66	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	591.84	Reach Len. (ft)	1191.60	1191.00	1181.80
Crit W.S. (ft)	590.36	Flow Area (sq ft)	633.04	792.17	3459.18
E.G. Slope (ft/ft)	0.001917	Area (sq ft)	633.04	792.17	3459.18
Q Total (cfs)	12400.00	Flow (cfs)	687.09	6869.42	4843.49
Top Width (ft)	1116.10	Top Width (ft)	233.20	70.80	812.10
Vel Total (ft/s)	2.54	Avg. Vel. (ft/s)	1.09	8.67	1.40
Max Chl Dpth (ft)	14.08	Hydr. Depth (ft)	2.71	11.19	4.26
Conv. Total (cfs)	283216.2	Conv. (cfs)	15693.2	156897.7	110625.3
Length Wtd. (ft)	1186.48	Wetted Per. (ft)	233.61	78.62	834.56
Min Ch El (ft)	577.76	Shear (lb/sq ft)	0.32	1.21	0.50
Alpha	6.59	Stream Power (lb/ft s)	0.35	10.46	0.69
Frctn Loss (ft)	0.90	Cum Volume (acre-ft)	23.21	75.86	331.59
C & E Loss (ft)	0.16	Cum SA (acres)	9.29	6.05	64.04

Plan: Alt 4 New 1 Span Stevens Branch Stevens Branch RS: 11459 Profile: 0.2%

E.G. Elev (ft)	593.70	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.52	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	593.18	Reach Len. (ft)	1191.60	1191.00	1181.80
Crit W.S. (ft)	590.85	Flow Area (sq ft)	989.71	887.41	4555.23
E.G. Slope (ft/ft)	0.001462	Area (sq ft)	989.71	887.41	4555.23
Q Total (cfs)	14980.00	Flow (cfs)	1099.83	7249.66	6630.52
Top Width (ft)	1206.03	Top Width (ft)	317.89	70.80	817.34
Vel Total (ft/s)	2.33	Avg. Vel. (ft/s)	1.11	8.17	1.46
Max Chl Dpth (ft)	15.42	Hydr. Depth (ft)	3.11	12.53	5.57
Conv. Total (cfs)	391731.1	Conv. (cfs)	28760.7	189580.5	173389.8
Length Wtd. (ft)	1186.04	Wetted Per. (ft)	318.52	78.62	845.34
Min Ch El (ft)	577.76	Shear (lb/sq ft)	0.28	1.03	0.49
Alpha	6.14	Stream Power (lb/ft s)	0.32	8.42	0.72
Frctn Loss (ft)	0.71	Cum Volume (acre-ft)	40.03	84.86	427.21
C & E Loss (ft)	0.13	Cum SA (acres)	12.92	6.12	66.12

Plan: Alt 4 New 1 Span Stevens Branch Stevens Branch RS: 7552 Profile: 50%

E.G. Elev (ft)	583.79	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.40	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	583.39	Reach Len. (ft)	852.90	789.50	477.70
Crit W.S. (ft)		Flow Area (sq ft)		494.44	19.38
E.G. Slope (ft/ft)	0.001158	Area (sq ft)		494.44	19.38
Q Total (cfs)	2524.00	Flow (cfs)		2520.54	3.46
Top Width (ft)	149.71	Top Width (ft)		69.58	80.14
Vel Total (ft/s)	4.91	Avg. Vel. (ft/s)		5.10	0.18
Max Chl Dpth (ft)	8.75	Hydr. Depth (ft)		7.11	0.24
Conv. Total (cfs)	74156.6	Conv. (cfs)		74055.0	101.6
Length Wtd. (ft)	789.29	Wetted Per. (ft)		74.62	80.16
Min Ch El (ft)	574.64	Shear (lb/sq ft)		0.48	0.02
Alpha	1.08	Stream Power (lb/ft s)		2.44	0.00
Frctn Loss (ft)	1.98	Cum Volume (acre-ft)		16.59	0.18
C & E Loss (ft)	0.15	Cum SA (acres)		2.65	0.48

Plan: Alt 4 New 1 Span Stevens Branch Stevens Branch RS: 7552 Profile: 20%

E.G. Elev (ft)	586.21	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.35	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	585.87	Reach Len. (ft)	852.90	789.50	477.70
Crit W.S. (ft)		Flow Area (sq ft)		678.50	1183.27
E.G. Slope (ft/ft)	0.000929	Area (sq ft)		678.50	1183.27
Q Total (cfs)	4024.00	Flow (cfs)		3460.48	563.52
Top Width (ft)	1030.22	Top Width (ft)		80.57	949.65
Vel Total (ft/s)	2.16	Avg. Vel. (ft/s)		5.10	0.48
Max Chl Dpth (ft)	11.23	Hydr. Depth (ft)		8.42	1.25
Conv. Total (cfs)	132001.5	Conv. (cfs)		113516.1	18485.3
Length Wtd. (ft)	767.50	Wetted Per. (ft)		86.73	950.05
Min Ch El (ft)	574.64	Shear (lb/sq ft)		0.45	0.07
Alpha	4.80	Stream Power (lb/ft s)		2.31	0.03
Frctn Loss (ft)	1.35	Cum Volume (acre-ft)		24.20	7.33
C & E Loss (ft)	0.12	Cum SA (acres)		3.00	6.85

Plan: Alt 4 New 1 Span Stevens Branch Stevens Branch RS: 7552 Profile: 10%

E.G. Elev (ft)	589.00	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.17	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	588.83	Reach Len. (ft)	852.90	789.50	477.70
Crit W.S. (ft)		Flow Area (sq ft)		942.00	5212.99
E.G. Slope (ft/ft)	0.000559	Area (sq ft)		942.00	5212.99
Q Total (cfs)	7740.00	Flow (cfs)		4194.30	3545.70
Top Width (ft)	1717.04	Top Width (ft)		93.86	1623.18
Vel Total (ft/s)	1.26	Avg. Vel. (ft/s)		4.45	0.68
Max Chl Dpth (ft)	14.19	Hydr. Depth (ft)		10.04	3.21
Conv. Total (cfs)	327222.8	Conv. (cfs)		177322.0	149900.9
Length Wtd. (ft)	687.25	Wetted Per. (ft)		100.90	1629.84
Min Ch El (ft)	574.64	Shear (lb/sq ft)		0.33	0.11
Alpha	6.93	Stream Power (lb/ft s)		1.45	0.08
Frctn Loss (ft)	0.73	Cum Volume (acre-ft)	2.71	37.16	66.52
C & E Loss (ft)	0.10	Cum SA (acres)	2.41	3.55	27.15



Plan: Alt 4 New 1 Span Stevens Branch Stevens Branch RS: 7552 Profile: 2%

E.G. Elev (ft)	590.69	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.13	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	590.56	Reach Len. (ft)	852.90	789.50	477.70
Crit W.S. (ft)		Flow Area (sq ft)		1106.63	8083.13
E.G. Slope (ft/ft)	0.000453	Area (sq ft)		1106.63	8083.13
Q Total (cfs)	11040.00	Flow (cfs)		4825.82	6214.18
Top Width (ft)	1779.87	Top Width (ft)		96.80	1683.07
Vel Total (ft/s)	1.20	Avg. Vel. (ft/s)		4.36	0.77
Max Chl Dpth (ft)	15.92	Hydr. Depth (ft)		11.43	4.80
Conv. Total (cfs)	518952.4	Conv. (cfs)		226845.4	292107.0
Length Wtd. (ft)	633.36	Wetted Per. (ft)		104.30	1693.30
Min Ch El (ft)	574.64	Shear (lb/sq ft)		0.30	0.13
Alpha	5.99	Stream Power (lb/ft s)		1.31	0.10
Frctn Loss (ft)	0.46	Cum Volume (acre-ft)	10.31	45.71	132.45
C & E Loss (ft)	0.03	Cum SA (acres)	3.69	3.69	29.32

Plan: Alt 4 New 1 Span Stevens Branch Stevens Branch RS: 7552 Profile: 1%

E.G. Elev (ft)	591.44	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	591.32	Reach Len. (ft)	852.90	789.50	477.70
Crit W.S. (ft)		Flow Area (sq ft)		1180.42	9361.33
E.G. Slope (ft/ft)	0.000401	Area (sq ft)		1180.42	9361.33
Q Total (cfs)	12400.00	Flow (cfs)		5014.90	7385.10
Top Width (ft)	1790.62	Top Width (ft)		98.05	1692.58
Vel Total (ft/s)	1.18	Avg. Vel. (ft/s)		4.25	0.79
Max Chl Dpth (ft)	16.68	Hydr. Depth (ft)		12.04	5.53
Conv. Total (cfs)	618864.4	Conv. (cfs)		250285.6	368578.8
Length Wtd. (ft)	621.63	Wetted Per. (ft)		105.76	1704.35
Min Ch El (ft)	574.64	Shear (lb/sq ft)		0.28	0.14
Alpha	5.54	Stream Power (lb/ft s)		1.19	0.11
Frctn Loss (ft)	0.39	Cum Volume (acre-ft)	14.55	48.90	157.68
C & E Loss (ft)	0.03	Cum SA (acres)	6.10	3.74	30.06

Plan: Alt 4 New 1 Span Stevens Branch Stevens Branch RS: 7552 Profile: 0.2%

E.G. Elev (ft)	592.86	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	592.76	Reach Len. (ft)	852.90	789.50	477.70
Crit W.S. (ft)		Flow Area (sq ft)	0.08	1323.56	11834.79
E.G. Slope (ft/ft)	0.000326	Area (sq ft)	0.08	1323.56	11834.79
Q Total (cfs)	14980.00	Flow (cfs)	0.00	5391.78	9588.21
Top Width (ft)	1830.21	Top Width (ft)	0.52	99.90	1729.80
Vel Total (ft/s)	1.14	Avg. Vel. (ft/s)	0.06	4.07	0.81
Max Chl Dpth (ft)	18.12	Hydr. Depth (ft)	0.16	13.25	6.84
Conv. Total (cfs)	830202.0	Conv. (cfs)	0.3	298816.3	531385.5
Length Wtd. (ft)	607.65	Wetted Per. (ft)	0.61	107.93	1744.52
Min Ch El (ft)	574.64	Shear (lb/sq ft)	0.00	0.25	0.14
Alpha	4.93	Stream Power (lb/ft s)	0.00	1.02	0.11
Frctn Loss (ft)	0.30	Cum Volume (acre-ft)	26.50	54.63	204.88
C & E Loss (ft)	0.02	Cum SA (acres)	8.56	3.78	31.57

Plan: Alt 4 New 1 Span Stevens Branch Stevens Branch RS: 4962 Profile: 50%

E.G. Elev (ft)	581.66	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.91	Wt. n-Val.		0.035	
W.S. Elev (ft)	579.76	Reach Len. (ft)	96.20	295.10	381.80
Crit W.S. (ft)	579.33	Flow Area (sq ft)		227.96	
E.G. Slope (ft/ft)	0.008977	Area (sq ft)		227.96	
Q Total (cfs)	2524.00	Flow (cfs)		2524.00	
Top Width (ft)	46.64	Top Width (ft)		46.64	
Vel Total (ft/s)	11.07	Avg. Vel. (ft/s)		11.07	
Max Chl Dpth (ft)	6.22	Hydr. Depth (ft)		4.89	
Conv. Total (cfs)	26640.0	Conv. (cfs)		26640.0	
Length Wtd. (ft)	295.10	Wetted Per. (ft)		49.92	
Min Ch El (ft)	573.54	Shear (lb/sq ft)		2.56	
Alpha	1.00	Stream Power (lb/ft s)		28.34	
Frctn Loss (ft)	0.56	Cum Volume (acre-ft)		10.04	0.08
C & E Loss (ft)	0.48	Cum SA (acres)		1.59	0.04

Plan: Alt 4 New 1 Span Stevens Branch Stevens Branch RS: 4962 Profile: 20%

E.G. Elev (ft)	584.74	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.53	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	583.21	Reach Len. (ft)	96.20	295.10	381.80
Crit W.S. (ft)	581.10	Flow Area (sq ft)		404.79	14.67
E.G. Slope (ft/ft)	0.004563	Area (sq ft)		404.79	14.67
Q Total (cfs)	4024.00	Flow (cfs)		4019.66	4.34
Top Width (ft)	131.75	Top Width (ft)		57.29	74.46
Vel Total (ft/s)	9.59	Avg. Vel. (ft/s)		9.93	0.30
Max Chl Dpth (ft)	9.67	Hydr. Depth (ft)		7.07	0.20
Conv. Total (cfs)	59571.7	Conv. (cfs)		59507.4	64.3
Length Wtd. (ft)	295.42	Wetted Per. (ft)		62.82	74.51
Min Ch El (ft)	573.54	Shear (lb/sq ft)		1.84	0.06
Alpha	1.07	Stream Power (lb/ft s)		18.23	0.02
Frctn Loss (ft)	0.42	Cum Volume (acre-ft)		14.38	0.76
C & E Loss (ft)	0.35	Cum SA (acres)		1.75	1.24

Plan: Alt 4 New 1 Span Stevens Branch Stevens Branch RS: 4962 Profile: 10%

E.G. Elev (ft)	588.17	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.13	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	587.04	Reach Len. (ft)	96.20	295.10	381.80
Crit W.S. (ft)	585.89	Flow Area (sq ft)		653.49	1544.03
E.G. Slope (ft/ft)	0.002796	Area (sq ft)		653.49	1544.03
Q Total (cfs)	7740.00	Flow (cfs)		6209.37	1530.63
Top Width (ft)	1001.65	Top Width (ft)		68.23	933.42
Vel Total (ft/s)	3.52	Avg. Vel. (ft/s)		9.50	0.99
Max Chl Dpth (ft)	13.50	Hydr. Depth (ft)		9.58	1.65
Conv. Total (cfs)	146387.8	Conv. (cfs)		117438.8	28949.0
Length Wtd. (ft)	307.66	Wetted Per. (ft)		75.04	942.12
Min Ch El (ft)	573.54	Shear (lb/sq ft)		1.52	0.29
Alpha	5.85	Stream Power (lb/ft s)		14.44	0.28
Frctn Loss (ft)	0.44	Cum Volume (acre-ft)	2.71	22.70	29.47
C & E Loss (ft)	0.18	Cum SA (acres)	2.41	2.08	13.13

Plan: Alt 4 New 1 Span Stevens Branch Stevens Branch RS: 4962 Profile: 2%

E.G. Elev (ft)	590.20	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.48	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	589.72	Reach Len. (ft)	96.20	295.10	381.80
Crit W.S. (ft)	587.66	Flow Area (sq ft)	1.88	845.73	4067.15
E.G. Slope (ft/ft)	0.001351	Area (sq ft)	1.88	845.73	4067.15
Q Total (cfs)	11040.00	Flow (cfs)	0.20	6196.93	4842.87
Top Width (ft)	1043.32	Top Width (ft)	19.46	75.90	947.96
Vel Total (ft/s)	2.25	Avg. Vel. (ft/s)	0.11	7.33	1.19
Max Chl Dpth (ft)	16.18	Hydr. Depth (ft)	0.10	11.14	4.29
Conv. Total (cfs)	300376.2	Conv. (cfs)	5.5	168605.9	131764.8
Length Wtd. (ft)	321.25	Wetted Per. (ft)	19.47	83.11	973.05
Min Ch El (ft)	573.54	Shear (lb/sq ft)	0.01	0.86	0.35
Alpha	6.10	Stream Power (lb/ft s)	0.00	6.29	0.42
Frctn Loss (ft)	0.29	Cum Volume (acre-ft)	10.29	28.02	65.83
C & E Loss (ft)	0.01	Cum SA (acres)	3.49	2.12	14.90

Plan: Alt 4 New 1 Span Stevens Branch Stevens Branch RS: 4962 Profile: 1%

E.G. Elev (ft)	591.02	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.41	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	590.61	Reach Len. (ft)	96.20	295.10	381.80
Crit W.S. (ft)	588.00	Flow Area (sq ft)	61.68	913.13	4911.64
E.G. Slope (ft/ft)	0.001120	Area (sq ft)	77.59	913.13	4911.64
Q Total (cfs)	12400.00	Flow (cfs)	17.95	6411.42	5970.63
Top Width (ft)	1221.42	Top Width (ft)	190.57	75.90	954.95
Vel Total (ft/s)	2.11	Avg. Vel. (ft/s)	0.29	7.02	1.22
Max Chl Dpth (ft)	17.07	Hydr. Depth (ft)	0.44	12.03	5.14
Conv. Total (cfs)	370551.5	Conv. (cfs)	536.5	191593.6	178421.4
Length Wtd. (ft)	323.45	Wetted Per. (ft)	139.95	83.11	985.43
Min Ch El (ft)	573.54	Shear (lb/sq ft)	0.03	0.77	0.35
Alpha	5.90	Stream Power (lb/ft s)	0.01	5.39	0.42
Frctn Loss (ft)	0.26	Cum Volume (acre-ft)	13.79	29.93	79.42
C & E Loss (ft)	0.00	Cum SA (acres)	4.24	2.17	15.55

Plan: Alt 4 New 1 Span Stevens Branch Stevens Branch RS: 4962 Profile: 0.2%

E.G. Elev (ft)	592.54	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.33	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	592.21	Reach Len. (ft)	96.20	295.10	381.80
Crit W.S. (ft)	588.52	Flow Area (sq ft)	320.22	1034.39	6480.44
E.G. Slope (ft/ft)	0.000850	Area (sq ft)	552.11	1034.39	6480.44
Q Total (cfs)	14980.00	Flow (cfs)	180.99	6876.72	7922.30
Top Width (ft)	1439.52	Top Width (ft)	360.16	75.90	1003.46
Vel Total (ft/s)	1.91	Avg. Vel. (ft/s)	0.57	6.65	1.22
Max Chl Dpth (ft)	18.67	Hydr. Depth (ft)	1.96	13.63	6.46
Conv. Total (cfs)	513762.4	Conv. (cfs)	6207.2	235847.7	271707.5
Length Wtd. (ft)	324.47	Wetted Per. (ft)	163.49	83.11	1043.56
Min Ch El (ft)	573.54	Shear (lb/sq ft)	0.10	0.66	0.33
Alpha	5.77	Stream Power (lb/ft s)	0.06	4.39	0.40
Frctn Loss (ft)	0.21	Cum Volume (acre-ft)	21.09	33.26	104.45
C & E Loss (ft)	0.00	Cum SA (acres)	5.03	2.19	16.58

Plan: Alt 4 New 1 Span Stevens Branch Stevens Branch RS: 3994 Profile: 50%

E.G. Elev (ft)	580.62	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.31	Wt. n-Val.		0.035	
W.S. Elev (ft)	580.31	Reach Len. (ft)	6.00	6.00	6.00
Crit W.S. (ft)	575.10	Flow Area (sq ft)		569.72	
E.G. Slope (ft/ft)	0.000800	Area (sq ft)		569.72	
Q Total (cfs)	2524.00	Flow (cfs)		2524.00	
Top Width (ft)	74.60	Top Width (ft)		74.60	
Vel Total (ft/s)	4.43	Avg. Vel. (ft/s)		4.43	
Max Chl Dpth (ft)	10.67	Hydr. Depth (ft)		7.64	
Conv. Total (cfs)	89245.2	Conv. (cfs)		89245.2	
Length Wtd. (ft)	6.00	Wetted Per. (ft)		80.38	
Min Ch El (ft)	569.64	Shear (lb/sq ft)		0.35	
Alpha	1.00	Stream Power (lb/ft s)		1.57	
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		7.34	0.08
C & E Loss (ft)	0.00	Cum SA (acres)		1.18	0.04

Plan: Alt 4 New 1 Span Stevens Branch Stevens Branch RS: 3994 Profile: 20%

E.G. Elev (ft)	583.97	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.36	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	583.61	Reach Len. (ft)	6.00	6.00	6.00
Crit W.S. (ft)	576.62	Flow Area (sq ft)		828.74	80.11
E.G. Slope (ft/ft)	0.000686	Area (sq ft)		828.74	80.11
Q Total (cfs)	4024.00	Flow (cfs)		3998.75	25.25
Top Width (ft)	166.23	Top Width (ft)		82.73	83.50
Vel Total (ft/s)	4.43	Avg. Vel. (ft/s)		4.83	0.32
Max Chl Dpth (ft)	13.97	Hydr. Depth (ft)		10.02	0.96
Conv. Total (cfs)	153631.7	Conv. (cfs)		152667.6	964.1
Length Wtd. (ft)	6.00	Wetted Per. (ft)		91.69	83.61
Min Ch El (ft)	569.64	Shear (lb/sq ft)		0.39	0.04
Alpha	1.18	Stream Power (lb/ft s)		1.87	0.01
Frctn Loss (ft)		Cum Volume (acre-ft)		10.20	0.35
C & E Loss (ft)		Cum SA (acres)		1.28	0.54

Plan: Alt 4 New 1 Span Stevens Branch Stevens Branch RS: 3994 Profile: 10%

E.G. Elev (ft)	587.55	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.54	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	587.02	Reach Len. (ft)	6.00	6.00	6.00
Crit W.S. (ft)	579.48	Flow Area (sq ft)	58.49	1131.26	1296.97
E.G. Slope (ft/ft)	0.000869	Area (sq ft)	58.49	1131.26	1296.97
Q Total (cfs)	7740.00	Flow (cfs)	13.27	6984.35	742.38
Top Width (ft)	889.49	Top Width (ft)	119.28	93.01	677.20
Vel Total (ft/s)	3.11	Avg. Vel. (ft/s)	0.23	6.17	0.57
Max Chl Dpth (ft)	17.38	Hydr. Depth (ft)	0.49	12.16	1.92
Conv. Total (cfs)	262632.8	Conv. (cfs)	450.3	236992.1	25190.4
Length Wtd. (ft)	6.00	Wetted Per. (ft)	119.30	103.20	679.91
Min Ch El (ft)	569.64	Shear (lb/sq ft)	0.03	0.59	0.10
Alpha	3.55	Stream Power (lb/ft s)	0.01	3.67	0.06
Frctn Loss (ft)		Cum Volume (acre-ft)	2.64	16.66	17.02
C & E Loss (ft)		Cum SA (acres)	2.28	1.53	6.07

Plan: Alt 4 New 1 Span Stevens Branch Stevens Branch RS: 3994 Profile: 2%

E.G. Elev (ft)	589.89	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.44	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	589.46	Reach Len. (ft)	6.00	6.00	6.00
Crit W.S. (ft)	581.57	Flow Area (sq ft)	520.89	1358.02	2994.32
E.G. Slope (ft/ft)	0.000664	Area (sq ft)	526.06	1358.02	2994.32
Q Total (cfs)	11040.00	Flow (cfs)	286.64	8279.67	2473.69
Top Width (ft)	1056.65	Top Width (ft)	249.94	93.01	713.70
Vel Total (ft/s)	2.27	Avg. Vel. (ft/s)	0.55	6.10	0.83
Max Chl Dpth (ft)	19.82	Hydr. Depth (ft)	2.27	14.60	4.20
Conv. Total (cfs)	428478.2	Conv. (cfs)	11124.8	321345.8	96007.6
Length Wtd. (ft)	6.00	Wetted Per. (ft)	229.96	103.20	721.47
Min Ch El (ft)	569.64	Shear (lb/sq ft)	0.09	0.55	0.17
Alpha	5.46	Stream Power (lb/ft s)	0.05	3.32	0.14
Frctn Loss (ft)		Cum Volume (acre-ft)	9.71	20.56	34.88
C & E Loss (ft)		Cum SA (acres)	3.20	1.55	7.61

Plan: Alt 4 New 1 Span Stevens Branch Stevens Branch RS: 3994 Profile: 1%

E.G. Elev (ft)	590.76	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.40	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	590.35	Reach Len. (ft)	6.00	6.00	6.00
Crit W.S. (ft)	582.35	Flow Area (sq ft)	742.39	1441.54	3637.17
E.G. Slope (ft/ft)	0.000602	Area (sq ft)	786.30	1441.54	3637.17
Q Total (cfs)	12400.00	Flow (cfs)	459.34	8706.49	3234.17
Top Width (ft)	1155.06	Top Width (ft)	343.67	93.01	718.38
Vel Total (ft/s)	2.13	Avg. Vel. (ft/s)	0.62	6.04	0.89
Max Chl Dpth (ft)	20.71	Hydr. Depth (ft)	2.91	15.50	5.06
Conv. Total (cfs)	505533.3	Conv. (cfs)	18726.8	354953.2	131853.3
Length Wtd. (ft)	6.00	Wetted Per. (ft)	255.33	103.20	728.03
Min Ch El (ft)	569.64	Shear (lb/sq ft)	0.11	0.52	0.19
Alpha	5.69	Stream Power (lb/ft s)	0.07	3.17	0.17
Frctn Loss (ft)		Cum Volume (acre-ft)	12.84	21.95	41.95
C & E Loss (ft)		Cum SA (acres)	3.65	1.60	8.21

Plan: Alt 4 New 1 Span Stevens Branch Stevens Branch RS: 3994 Profile: 0.2%

E.G. Elev (ft)	592.32	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.35	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	591.98	Reach Len. (ft)	6.00	6.00	6.00
Crit W.S. (ft)	584.19	Flow Area (sq ft)	1156.01	1592.25	4809.63
E.G. Slope (ft/ft)	0.000507	Area (sq ft)	1408.18	1592.25	4809.63
Q Total (cfs)	14980.00	Flow (cfs)	882.02	9432.13	4665.86
Top Width (ft)	1233.39	Top Width (ft)	411.38	93.01	729.00
Vel Total (ft/s)	1.98	Avg. Vel. (ft/s)	0.76	5.92	0.97
Max Chl Dpth (ft)	22.33	Hydr. Depth (ft)	4.53	17.12	6.60
Conv. Total (cfs)	665349.2	Conv. (cfs)	39175.5	418935.8	207237.9
Length Wtd. (ft)	6.00	Wetted Per. (ft)	255.33	103.20	742.01
Min Ch El (ft)	569.64	Shear (lb/sq ft)	0.14	0.49	0.21
Alpha	5.71	Stream Power (lb/ft s)	0.11	2.89	0.20
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	18.93	24.37	54.98
C & E Loss (ft)	0.06	Cum SA (acres)	4.18	1.62	8.99

Plan: Alt 4 New 1 Span Stevens Branch Stevens Branch RS: 3921 Profile: 50%

E.G. Elev (ft)	580.60	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.29	Wt. n-Val.		0.035	
W.S. Elev (ft)	580.30	Reach Len. (ft)	21.20	125.90	180.00
Crit W.S. (ft)	575.67	Flow Area (sq ft)		582.54	
E.G. Slope (ft/ft)	0.000827	Area (sq ft)		582.54	
Q Total (cfs)	2524.00	Flow (cfs)		2524.00	
Top Width (ft)	81.27	Top Width (ft)		81.27	
Vel Total (ft/s)	4.33	Avg. Vel. (ft/s)		4.33	
Max Chl Dpth (ft)	10.12	Hydr. Depth (ft)		7.17	
Conv. Total (cfs)	87756.6	Conv. (cfs)		87756.6	
Length Wtd. (ft)	126.02	Wetted Per. (ft)		87.15	
Min Ch EI (ft)	570.19	Shear (lb/sq ft)		0.35	
Alpha	1.00	Stream Power (lb/ft s)		1.50	
Frctn Loss (ft)	0.16	Cum Volume (acre-ft)		7.05	0.08
C & E Loss (ft)	0.08	Cum SA (acres)		1.14	0.04

Plan: Alt 4 New 1 Span Stevens Branch Stevens Branch RS: 3921 Profile: 20%

E.G. Elev (ft)	583.10	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.41	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	582.70	Reach Len. (ft)	21.20	125.90	180.00
Crit W.S. (ft)	577.01	Flow Area (sq ft)		785.33	41.44
E.G. Slope (ft/ft)	0.000877	Area (sq ft)		785.33	41.44
Q Total (cfs)	4024.00	Flow (cfs)		4015.05	8.95
Top Width (ft)	183.16	Top Width (ft)		88.47	94.69
Vel Total (ft/s)	4.87	Avg. Vel. (ft/s)		5.11	0.22
Max Chl Dpth (ft)	12.51	Hydr. Depth (ft)		8.88	0.44
Conv. Total (cfs)	135845.6	Conv. (cfs)		135543.6	302.0
Length Wtd. (ft)	126.22	Wetted Per. (ft)		95.81	94.80
Min Ch EI (ft)	570.19	Shear (lb/sq ft)		0.45	0.02
Alpha	1.10	Stream Power (lb/ft s)		2.30	0.01
Frctn Loss (ft)	0.16	Cum Volume (acre-ft)		9.80	0.34
C & E Loss (ft)	0.10	Cum SA (acres)		1.25	0.53

Plan: Alt 4 New 1 Span Stevens Branch Stevens Branch RS: 3921 Profile: 10%

E.G. Elev (ft)	587.46	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.40	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	587.06	Reach Len. (ft)	21.20	125.90	180.00
Crit W.S. (ft)	579.64	Flow Area (sq ft)	55.60	1197.93	1779.79
E.G. Slope (ft/ft)	0.000663	Area (sq ft)	79.98	1197.93	1779.79
Q Total (cfs)	7740.00	Flow (cfs)	10.95	6559.58	1169.46
Top Width (ft)	878.09	Top Width (ft)	151.28	97.77	629.04
Vel Total (ft/s)	2.55	Avg. Vel. (ft/s)	0.20	5.48	0.66
Max Chl Dpth (ft)	16.88	Hydr. Depth (ft)	0.42	12.25	2.83
Conv. Total (cfs)	300520.7	Conv. (cfs)	425.3	254688.8	45406.6
Length Wtd. (ft)	134.79	Wetted Per. (ft)	131.01	106.89	630.02
Min Ch EI (ft)	570.19	Shear (lb/sq ft)	0.02	0.46	0.12
Alpha	3.91	Stream Power (lb/ft s)	0.00	2.54	0.08
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)	2.63	16.20	16.49
C & E Loss (ft)	0.07	Cum SA (acres)	2.24	1.52	5.80

Plan: Alt 4 New 1 Span Stevens Branch Stevens Branch RS: 3921 Profile: 2%

E.G. Elev (ft)	589.85	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.34	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	589.51	Reach Len. (ft)	21.20	125.90	180.00
Crit W.S. (ft)	581.54	Flow Area (sq ft)	558.45	1437.35	3373.49
E.G. Slope (ft/ft)	0.000524	Area (sq ft)	639.77	1437.35	3373.49
Q Total (cfs)	11040.00	Flow (cfs)	303.61	7896.79	2839.60
Top Width (ft)	989.21	Top Width (ft)	233.77	97.77	657.67
Vel Total (ft/s)	2.06	Avg. Vel. (ft/s)	0.54	5.49	0.84
Max Chl Dpth (ft)	19.32	Hydr. Depth (ft)	2.66	14.70	5.13
Conv. Total (cfs)	482407.9	Conv. (cfs)	13266.7	345060.9	124080.2
Length Wtd. (ft)	137.38	Wetted Per. (ft)	210.15	106.89	658.97
Min Ch El (ft)	570.19	Shear (lb/sq ft)	0.09	0.44	0.17
Alpha	5.15	Stream Power (lb/ft s)	0.05	2.42	0.14
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	9.50	20.07	33.61
C & E Loss (ft)	0.05	Cum SA (acres)	3.10	1.54	7.26

Plan: Alt 4 New 1 Span Stevens Branch Stevens Branch RS: 3921 Profile: 1%

E.G. Elev (ft)	590.72	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.32	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	590.40	Reach Len. (ft)	21.20	125.90	180.00
Crit W.S. (ft)	582.43	Flow Area (sq ft)	744.43	1523.94	3959.43
E.G. Slope (ft/ft)	0.000486	Area (sq ft)	866.26	1523.94	3959.43
Q Total (cfs)	12400.00	Flow (cfs)	472.05	8382.81	3545.14
Top Width (ft)	1069.46	Top Width (ft)	296.65	97.77	675.04
Vel Total (ft/s)	1.99	Avg. Vel. (ft/s)	0.63	5.50	0.90
Max Chl Dpth (ft)	20.21	Hydr. Depth (ft)	3.55	15.59	5.87
Conv. Total (cfs)	562692.5	Conv. (cfs)	21420.9	380398.7	160872.9
Length Wtd. (ft)	137.55	Wetted Per. (ft)	210.15	106.89	676.41
Min Ch El (ft)	570.19	Shear (lb/sq ft)	0.11	0.43	0.18
Alpha	5.22	Stream Power (lb/ft s)	0.07	2.38	0.16
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	12.52	21.43	40.36
C & E Loss (ft)	0.04	Cum SA (acres)	3.48	1.55	7.86

Plan: Alt 4 New 1 Span Stevens Branch Stevens Branch RS: 3921 Profile: 0.2%

E.G. Elev (ft)	592.19	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.31	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	591.88	Reach Len. (ft)	21.20	125.90	180.00
Crit W.S. (ft)	585.01	Flow Area (sq ft)	1056.59	1669.28	4990.37
E.G. Slope (ft/ft)	0.000446	Area (sq ft)	1322.20	1669.28	4990.37
Q Total (cfs)	14980.00	Flow (cfs)	810.99	9351.54	4817.47
Top Width (ft)	1117.25	Top Width (ft)	317.28	97.77	702.20
Vel Total (ft/s)	1.94	Avg. Vel. (ft/s)	0.77	5.60	0.97
Max Chl Dpth (ft)	21.70	Hydr. Depth (ft)	5.03	17.07	7.11
Conv. Total (cfs)	709252.4	Conv. (cfs)	38397.7	442763.8	228090.8
Length Wtd. (ft)	137.47	Wetted Per. (ft)	210.15	106.89	703.71
Min Ch El (ft)	570.19	Shear (lb/sq ft)	0.14	0.43	0.20
Alpha	5.29	Stream Power (lb/ft s)	0.11	2.44	0.19
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	18.32	23.77	52.79
C & E Loss (ft)	0.04	Cum SA (acres)	3.99	1.57	8.62



Plan: Alt 4 New 1 Span Stevens Branch Stevens Branch RS: 3508 Profile: 50%

E.G. Elev (ft)	580.36	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.67	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	579.68	Reach Len. (ft)	245.30	268.30	311.80
Crit W.S. (ft)	577.03	Flow Area (sq ft)		380.68	13.46
E.G. Slope (ft/ft)	0.002190	Area (sq ft)		380.68	13.46
Q Total (cfs)	2524.00	Flow (cfs)		2513.13	10.87
Top Width (ft)	67.33	Top Width (ft)		60.01	7.32
Vel Total (ft/s)	6.40	Avg. Vel. (ft/s)		6.60	0.81
Max Chl Dpth (ft)	7.21	Hydr. Depth (ft)		6.34	1.84
Conv. Total (cfs)	53928.9	Conv. (cfs)		53696.6	232.3
Length Wtd. (ft)	268.39	Wetted Per. (ft)		62.86	8.18
Min Ch EI (ft)	572.47	Shear (lb/sq ft)		0.83	0.23
Alpha	1.06	Stream Power (lb/ft s)		5.47	0.18
Frctn Loss (ft)	0.53	Cum Volume (acre-ft)		5.65	0.05
C & E Loss (ft)	0.05	Cum SA (acres)		0.94	0.03

Plan: Alt 4 New 1 Span Stevens Branch Stevens Branch RS: 3508 Profile: 20%

E.G. Elev (ft)	582.84	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.91	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	581.92	Reach Len. (ft)	245.30	268.30	311.80
Crit W.S. (ft)	578.50	Flow Area (sq ft)		517.50	44.24
E.G. Slope (ft/ft)	0.002114	Area (sq ft)		517.50	44.24
Q Total (cfs)	4024.00	Flow (cfs)		3985.13	38.87
Top Width (ft)	120.78	Top Width (ft)		62.28	58.50
Vel Total (ft/s)	7.16	Avg. Vel. (ft/s)		7.70	0.88
Max Chl Dpth (ft)	9.45	Hydr. Depth (ft)		8.31	0.76
Conv. Total (cfs)	87511.2	Conv. (cfs)		86666.0	845.3
Length Wtd. (ft)	268.51	Wetted Per. (ft)		66.05	59.87
Min Ch EI (ft)	572.47	Shear (lb/sq ft)		1.03	0.10
Alpha	1.14	Stream Power (lb/ft s)		7.96	0.09
Frctn Loss (ft)	0.50	Cum Volume (acre-ft)		7.91	0.16
C & E Loss (ft)	0.09	Cum SA (acres)		1.03	0.21

Plan: Alt 4 New 1 Span Stevens Branch Stevens Branch RS: 3508 Profile: 10%

E.G. Elev (ft)	587.26	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.75	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	586.51	Reach Len. (ft)	245.30	268.30	311.80
Crit W.S. (ft)	581.44	Flow Area (sq ft)	41.18	819.43	1440.17
E.G. Slope (ft/ft)	0.001410	Area (sq ft)	41.23	819.43	1440.17
Q Total (cfs)	7740.00	Flow (cfs)	10.99	6312.59	1416.42
Top Width (ft)	637.97	Top Width (ft)	104.95	72.20	460.83
Vel Total (ft/s)	3.36	Avg. Vel. (ft/s)	0.27	7.70	0.98
Max Chl Dpth (ft)	14.04	Hydr. Depth (ft)	0.40	11.35	3.13
Conv. Total (cfs)	206095.5	Conv. (cfs)	292.6	168087.3	37715.6
Length Wtd. (ft)	273.68	Wetted Per. (ft)	104.04	77.15	468.25
Min Ch EI (ft)	572.47	Shear (lb/sq ft)	0.03	0.94	0.27
Alpha	4.29	Stream Power (lb/ft s)	0.01	7.20	0.27
Frctn Loss (ft)	0.34	Cum Volume (acre-ft)	2.60	13.29	9.84
C & E Loss (ft)	0.04	Cum SA (acres)	2.18	1.28	3.55

Plan: Alt 4 New 1 Span Stevens Branch Stevens Branch RS: 3508 Profile: 2%

E.G. Elev (ft)	589.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.58	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	589.13	Reach Len. (ft)	245.30	268.30	311.80
Crit W.S. (ft)	584.94	Flow Area (sq ft)	534.78	1008.89	2697.26
E.G. Slope (ft/ft)	0.000979	Area (sq ft)	557.13	1008.89	2697.26
Q Total (cfs)	11040.00	Flow (cfs)	397.88	7440.40	3201.73
Top Width (ft)	773.49	Top Width (ft)	210.90	72.20	490.39
Vel Total (ft/s)	2.60	Avg. Vel. (ft/s)	0.74	7.37	1.19
Max Chl Dpth (ft)	16.66	Hydr. Depth (ft)	2.66	13.97	5.50
Conv. Total (cfs)	352750.3	Conv. (cfs)	12713.0	237735.7	102301.6
Length Wtd. (ft)	276.50	Wetted Per. (ft)	201.05	77.15	503.20
Min Ch El (ft)	572.47	Shear (lb/sq ft)	0.16	0.80	0.33
Alpha	5.47	Stream Power (lb/ft s)	0.12	5.90	0.39
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)	9.21	16.54	21.06
C & E Loss (ft)	0.00	Cum SA (acres)	2.99	1.29	4.89

Plan: Alt 4 New 1 Span Stevens Branch Stevens Branch RS: 3508 Profile: 1%

E.G. Elev (ft)	590.59	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.54	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	590.05	Reach Len. (ft)	245.30	268.30	311.80
Crit W.S. (ft)	585.96	Flow Area (sq ft)	720.01	1075.46	3151.52
E.G. Slope (ft/ft)	0.000885	Area (sq ft)	751.58	1075.46	3151.52
Q Total (cfs)	12400.00	Flow (cfs)	620.90	7867.67	3911.44
Top Width (ft)	778.03	Top Width (ft)	210.90	72.20	494.93
Vel Total (ft/s)	2.51	Avg. Vel. (ft/s)	0.86	7.32	1.24
Max Chl Dpth (ft)	17.58	Hydr. Depth (ft)	3.58	14.90	6.37
Conv. Total (cfs)	416792.0	Conv. (cfs)	20869.7	264450.2	131472.2
Length Wtd. (ft)	277.11	Wetted Per. (ft)	201.05	77.15	509.67
Min Ch El (ft)	572.47	Shear (lb/sq ft)	0.20	0.77	0.34
Alpha	5.49	Stream Power (lb/ft s)	0.17	5.63	0.42
Frctn Loss (ft)	0.24	Cum Volume (acre-ft)	12.13	17.68	25.67
C & E Loss (ft)	0.00	Cum SA (acres)	3.36	1.30	5.44

Plan: Alt 4 New 1 Span Stevens Branch Stevens Branch RS: 3508 Profile: 0.2%

E.G. Elev (ft)	592.08	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.50	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	591.58	Reach Len. (ft)	245.30	268.30	311.80
Crit W.S. (ft)	586.70	Flow Area (sq ft)	1025.89	1185.39	3911.23
E.G. Slope (ft/ft)	0.000787	Area (sq ft)	1165.83	1185.39	3911.23
Q Total (cfs)	14980.00	Flow (cfs)	1055.99	8722.98	5201.03
Top Width (ft)	876.85	Top Width (ft)	300.54	72.20	504.11
Vel Total (ft/s)	2.45	Avg. Vel. (ft/s)	1.03	7.36	1.33
Max Chl Dpth (ft)	19.11	Hydr. Depth (ft)	5.11	16.42	7.76
Conv. Total (cfs)	534113.5	Conv. (cfs)	37651.5	311018.6	185443.4
Length Wtd. (ft)	278.14	Wetted Per. (ft)	201.05	77.15	522.04
Min Ch El (ft)	572.47	Shear (lb/sq ft)	0.25	0.75	0.37
Alpha	5.38	Stream Power (lb/ft s)	0.26	5.55	0.49
Frctn Loss (ft)	0.21	Cum Volume (acre-ft)	17.71	19.65	34.39
C & E Loss (ft)	0.01	Cum SA (acres)	3.84	1.33	6.13

Plan: Alt 4 New 1 Span Stevens Branch Stevens Branch RS: 2628 Profile: 50%

E.G. Elev (ft)	579.78	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.50	Wt. n-Val.		0.035	
W.S. Elev (ft)	579.28	Reach Len. (ft)	382.10	343.40	269.80
Crit W.S. (ft)	576.32	Flow Area (sq ft)		445.41	
E.G. Slope (ft/ft)	0.001784	Area (sq ft)		445.41	
Q Total (cfs)	2524.00	Flow (cfs)		2524.00	
Top Width (ft)	75.70	Top Width (ft)		75.70	
Vel Total (ft/s)	5.67	Avg. Vel. (ft/s)		5.67	
Max Chl Dpth (ft)	7.17	Hydr. Depth (ft)		5.88	
Conv. Total (cfs)	59761.7	Conv. (cfs)		59761.7	
Length Wtd. (ft)	343.40	Wetted Per. (ft)		79.28	
Min Ch El (ft)	572.11	Shear (lb/sq ft)		0.63	
Alpha	1.00	Stream Power (lb/ft s)		3.55	
Frctn Loss (ft)	0.78	Cum Volume (acre-ft)		3.11	
C & E Loss (ft)	0.03	Cum SA (acres)		0.52	

Plan: Alt 4 New 1 Span Stevens Branch Stevens Branch RS: 2628 Profile: 20%

E.G. Elev (ft)	582.25	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.63	Wt. n-Val.		0.035	
W.S. Elev (ft)	581.62	Reach Len. (ft)	382.10	343.40	269.80
Crit W.S. (ft)	577.68	Flow Area (sq ft)		633.47	
E.G. Slope (ft/ft)	0.001653	Area (sq ft)		633.47	
Q Total (cfs)	4024.00	Flow (cfs)		4024.00	
Top Width (ft)	84.88	Top Width (ft)		84.88	
Vel Total (ft/s)	6.35	Avg. Vel. (ft/s)		6.35	
Max Chl Dpth (ft)	9.51	Hydr. Depth (ft)		7.46	
Conv. Total (cfs)	98959.9	Conv. (cfs)		98959.9	
Length Wtd. (ft)	343.40	Wetted Per. (ft)		89.75	
Min Ch El (ft)	572.11	Shear (lb/sq ft)		0.73	
Alpha	1.00	Stream Power (lb/ft s)		4.63	
Frctn Loss (ft)	0.75	Cum Volume (acre-ft)		4.37	
C & E Loss (ft)	0.05	Cum SA (acres)		0.58	

Plan: Alt 4 New 1 Span Stevens Branch Stevens Branch RS: 2628 Profile: 10%

E.G. Elev (ft)	586.88	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.61	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	586.27	Reach Len. (ft)	382.10	343.40	269.80
Crit W.S. (ft)	580.37	Flow Area (sq ft)	164.12	1094.69	689.44
E.G. Slope (ft/ft)	0.001098	Area (sq ft)	344.46	1094.69	689.44
Q Total (cfs)	7740.00	Flow (cfs)	72.53	7125.51	541.96
Top Width (ft)	625.57	Top Width (ft)	261.19	104.60	259.78
Vel Total (ft/s)	3.97	Avg. Vel. (ft/s)	0.44	6.51	0.79
Max Chl Dpth (ft)	14.16	Hydr. Depth (ft)	1.12	10.47	2.65
Conv. Total (cfs)	233581.5	Conv. (cfs)	2189.0	215037.0	16355.5
Length Wtd. (ft)	340.95	Wetted Per. (ft)	146.80	109.99	259.99
Min Ch El (ft)	572.11	Shear (lb/sq ft)	0.08	0.68	0.18
Alpha	2.47	Stream Power (lb/ft s)	0.03	4.44	0.14
Frctn Loss (ft)	0.58	Cum Volume (acre-ft)	1.51	7.39	2.22
C & E Loss (ft)	0.09	Cum SA (acres)	1.15	0.73	0.97

Plan: Alt 4 New 1 Span Stevens Branch Stevens Branch RS: 2628 Profile: 2%

E.G. Elev (ft)	589.45	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.58	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	588.88	Reach Len. (ft)	382.10	343.40	269.80
Crit W.S. (ft)	582.32	Flow Area (sq ft)	546.05	1367.20	1573.04
E.G. Slope (ft/ft)	0.000861	Area (sq ft)	1060.90	1367.20	1573.04
Q Total (cfs)	11040.00	Flow (cfs)	476.33	9139.98	1423.69
Top Width (ft)	837.72	Top Width (ft)	333.22	104.60	399.91
Vel Total (ft/s)	3.17	Avg. Vel. (ft/s)	0.87	6.69	0.91
Max Chl Dpth (ft)	16.77	Hydr. Depth (ft)	3.72	13.07	3.93
Conv. Total (cfs)	376218.8	Conv. (cfs)	16232.2	311470.4	48516.1
Length Wtd. (ft)	338.45	Wetted Per. (ft)	146.80	109.99	400.17
Min Ch El (ft)	572.11	Shear (lb/sq ft)	0.20	0.67	0.21
Alpha	3.70	Stream Power (lb/ft s)	0.17	4.47	0.19
Frctn Loss (ft)	0.49	Cum Volume (acre-ft)	4.65	9.22	5.78
C & E Loss (ft)	0.13	Cum SA (acres)	1.46	0.75	1.70

Plan: Alt 4 New 1 Span Stevens Branch Stevens Branch RS: 2628 Profile: 1%

E.G. Elev (ft)	590.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.58	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	589.77	Reach Len. (ft)	382.10	343.40	269.80
Crit W.S. (ft)	583.84	Flow Area (sq ft)	676.72	1460.43	1960.05
E.G. Slope (ft/ft)	0.000818	Area (sq ft)	1390.03	1460.43	1960.05
Q Total (cfs)	12400.00	Flow (cfs)	664.01	9946.55	1789.45
Top Width (ft)	962.17	Top Width (ft)	384.06	104.60	473.51
Vel Total (ft/s)	3.03	Avg. Vel. (ft/s)	0.98	6.81	0.91
Max Chl Dpth (ft)	17.66	Hydr. Depth (ft)	4.62	13.96	4.14
Conv. Total (cfs)	433425.3	Conv. (cfs)	23209.5	347668.1	62547.6
Length Wtd. (ft)	337.53	Wetted Per. (ft)	146.80	109.99	473.78
Min Ch El (ft)	572.11	Shear (lb/sq ft)	0.24	0.68	0.21
Alpha	4.08	Stream Power (lb/ft s)	0.23	4.62	0.19
Frctn Loss (ft)	0.48	Cum Volume (acre-ft)	6.10	9.87	7.38
C & E Loss (ft)	0.13	Cum SA (acres)	1.68	0.76	1.97

Plan: Alt 4 New 1 Span Stevens Branch Stevens Branch RS: 2628 Profile: 0.2%

E.G. Elev (ft)	591.86	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.57	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	591.28	Reach Len. (ft)	382.10	343.40	269.80
Crit W.S. (ft)	585.05	Flow Area (sq ft)	898.75	1618.85	2739.83
E.G. Slope (ft/ft)	0.000748	Area (sq ft)	1989.00	1618.85	2739.83
Q Total (cfs)	14980.00	Flow (cfs)	1018.57	11288.78	2672.66
Top Width (ft)	1062.34	Top Width (ft)	397.60	104.60	560.14
Vel Total (ft/s)	2.85	Avg. Vel. (ft/s)	1.13	6.97	0.98
Max Chl Dpth (ft)	19.17	Hydr. Depth (ft)	6.13	15.48	4.89
Conv. Total (cfs)	547737.8	Conv. (cfs)	37243.4	412769.8	97724.6
Length Wtd. (ft)	335.51	Wetted Per. (ft)	146.80	109.99	560.43
Min Ch El (ft)	572.11	Shear (lb/sq ft)	0.29	0.69	0.23
Alpha	4.55	Stream Power (lb/ft s)	0.32	4.79	0.22
Frctn Loss (ft)	0.45	Cum Volume (acre-ft)	8.83	11.01	10.59
C & E Loss (ft)	0.14	Cum SA (acres)	1.88	0.78	2.32

Plan: Alt 4 New 1 Span Stevens Branch Stevens Branch RS: 1501 Profile: 50%

E.G. Elev (ft)	578.96	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.84	Wt. n-Val.		0.035	
W.S. Elev (ft)	578.12	Reach Len. (ft)			
Crit W.S. (ft)	575.76	Flow Area (sq ft)		343.65	
E.G. Slope (ft/ft)	0.003000	Area (sq ft)		343.65	
Q Total (cfs)	2524.00	Flow (cfs)		2524.00	
Top Width (ft)	56.60	Top Width (ft)		56.60	
Vel Total (ft/s)	7.34	Avg. Vel. (ft/s)		7.34	
Max Chl Dpth (ft)	7.34	Hydr. Depth (ft)		6.07	
Conv. Total (cfs)	46079.4	Conv. (cfs)		46079.4	
Length Wtd. (ft)		Wetted Per. (ft)		61.22	
Min Ch El (ft)	570.78	Shear (lb/sq ft)		1.05	
Alpha	1.00	Stream Power (lb/ft s)		7.72	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Plan: Alt 4 New 1 Span Stevens Branch Stevens Branch RS: 1501 Profile: 20%

E.G. Elev (ft)	581.45	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.11	Wt. n-Val.		0.035	
W.S. Elev (ft)	580.34	Reach Len. (ft)			
Crit W.S. (ft)	577.37	Flow Area (sq ft)		475.20	
E.G. Slope (ft/ft)	0.003000	Area (sq ft)		475.20	
Q Total (cfs)	4024.00	Flow (cfs)		4024.00	
Top Width (ft)	62.21	Top Width (ft)		62.21	
Vel Total (ft/s)	8.47	Avg. Vel. (ft/s)		8.47	
Max Chl Dpth (ft)	9.56	Hydr. Depth (ft)		7.64	
Conv. Total (cfs)	73466.4	Conv. (cfs)		73466.4	
Length Wtd. (ft)		Wetted Per. (ft)		68.38	
Min Ch El (ft)	570.78	Shear (lb/sq ft)		1.30	
Alpha	1.00	Stream Power (lb/ft s)		11.02	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Plan: Alt 4 New 1 Span Stevens Branch Stevens Branch RS: 1501 Profile: 10%

E.G. Elev (ft)	586.20	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.52	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	584.69	Reach Len. (ft)			
Crit W.S. (ft)	580.55	Flow Area (sq ft)		781.30	26.87
E.G. Slope (ft/ft)	0.003002	Area (sq ft)		781.30	26.87
Q Total (cfs)	7740.00	Flow (cfs)		7728.56	11.44
Top Width (ft)	134.77	Top Width (ft)		80.76	54.01
Vel Total (ft/s)	9.58	Avg. Vel. (ft/s)		9.89	0.43
Max Chl Dpth (ft)	13.91	Hydr. Depth (ft)		9.67	0.50
Conv. Total (cfs)	141273.9	Conv. (cfs)		141065.0	208.9
Length Wtd. (ft)		Wetted Per. (ft)		89.09	54.03
Min Ch El (ft)	570.78	Shear (lb/sq ft)		1.64	0.09
Alpha	1.07	Stream Power (lb/ft s)		16.26	0.04
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Plan: Alt 4 New 1 Span Stevens Branch Stevens Branch RS: 1501 Profile: 2%

E.G. Elev (ft)	588.83	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.84	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	586.99	Reach Len. (ft)			
Crit W.S. (ft)	582.87	Flow Area (sq ft)		972.25	293.00
E.G. Slope (ft/ft)	0.003000	Area (sq ft)		972.25	293.00
Q Total (cfs)	11040.00	Flow (cfs)		10729.31	310.69
Top Width (ft)	234.94	Top Width (ft)		85.15	149.79
Vel Total (ft/s)	8.73	Avg. Vel. (ft/s)		11.04	1.06
Max Chl Dpth (ft)	16.21	Hydr. Depth (ft)		11.42	1.96
Conv. Total (cfs)	201552.3	Conv. (cfs)		195880.1	5672.1
Length Wtd. (ft)		Wetted Per. (ft)		94.05	149.89
Min Ch El (ft)	570.78	Shear (lb/sq ft)		1.94	0.37
Alpha	1.55	Stream Power (lb/ft s)		21.37	0.39
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Plan: Alt 4 New 1 Span Stevens Branch Stevens Branch RS: 1501 Profile: 1%

E.G. Elev (ft)	589.74	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.92	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	587.81	Reach Len. (ft)			
Crit W.S. (ft)	583.95	Flow Area (sq ft)		1043.00	421.69
E.G. Slope (ft/ft)	0.003000	Area (sq ft)		1043.00	421.69
Q Total (cfs)	12400.00	Flow (cfs)		11862.80	537.20
Top Width (ft)	251.04	Top Width (ft)		87.36	163.68
Vel Total (ft/s)	8.47	Avg. Vel. (ft/s)		11.37	1.27
Max Chl Dpth (ft)	17.03	Hydr. Depth (ft)		11.94	2.58
Conv. Total (cfs)	226400.3	Conv. (cfs)		216592.1	9808.2
Length Wtd. (ft)		Wetted Per. (ft)		96.41	163.80
Min Ch El (ft)	570.78	Shear (lb/sq ft)		2.03	0.48
Alpha	1.73	Stream Power (lb/ft s)		23.04	0.61
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Plan: Alt 4 New 1 Span Stevens Branch Stevens Branch RS: 1501 Profile: 0.2%

E.G. Elev (ft)	591.26	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.02	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	589.25	Reach Len. (ft)			
Crit W.S. (ft)	585.90	Flow Area (sq ft)	23.68	1174.44	679.83
E.G. Slope (ft/ft)	0.003006	Area (sq ft)	23.68	1174.44	679.83
Q Total (cfs)	14980.00	Flow (cfs)	13.70	13883.31	1082.99
Top Width (ft)	312.49	Top Width (ft)	30.04	93.50	188.95
Vel Total (ft/s)	7.98	Avg. Vel. (ft/s)	0.58	11.82	1.59
Max Chl Dpth (ft)	18.47	Hydr. Depth (ft)	0.79	12.56	3.60
Conv. Total (cfs)	273227.7	Conv. (cfs)	250.0	253224.5	19753.2
Length Wtd. (ft)		Wetted Per. (ft)	30.08	102.61	189.13
Min Ch El (ft)	570.78	Shear (lb/sq ft)	0.15	2.15	0.67
Alpha	2.04	Stream Power (lb/ft s)	0.09	25.39	1.07
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

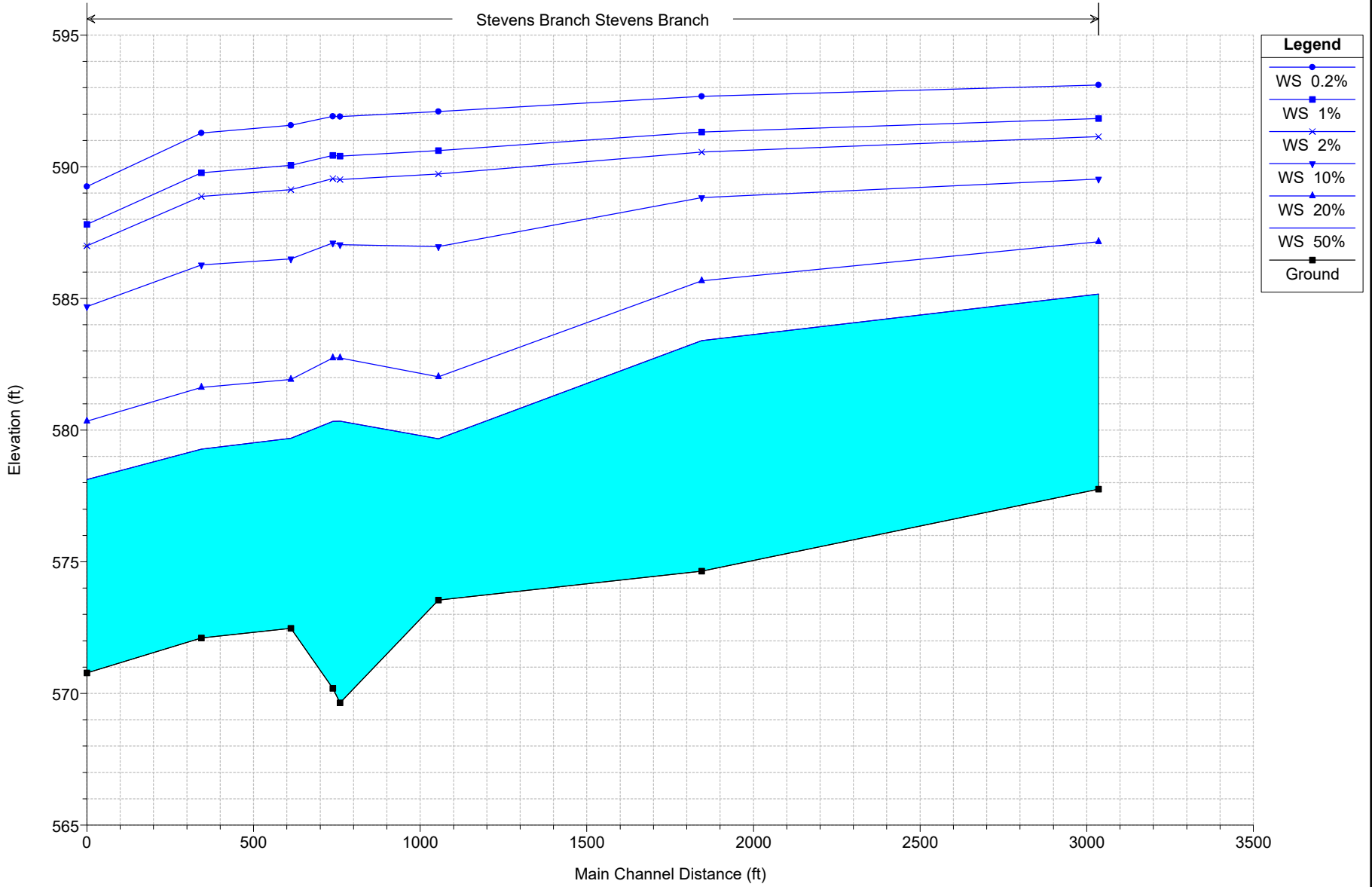
## HEC-RAS Results for Alternative 5



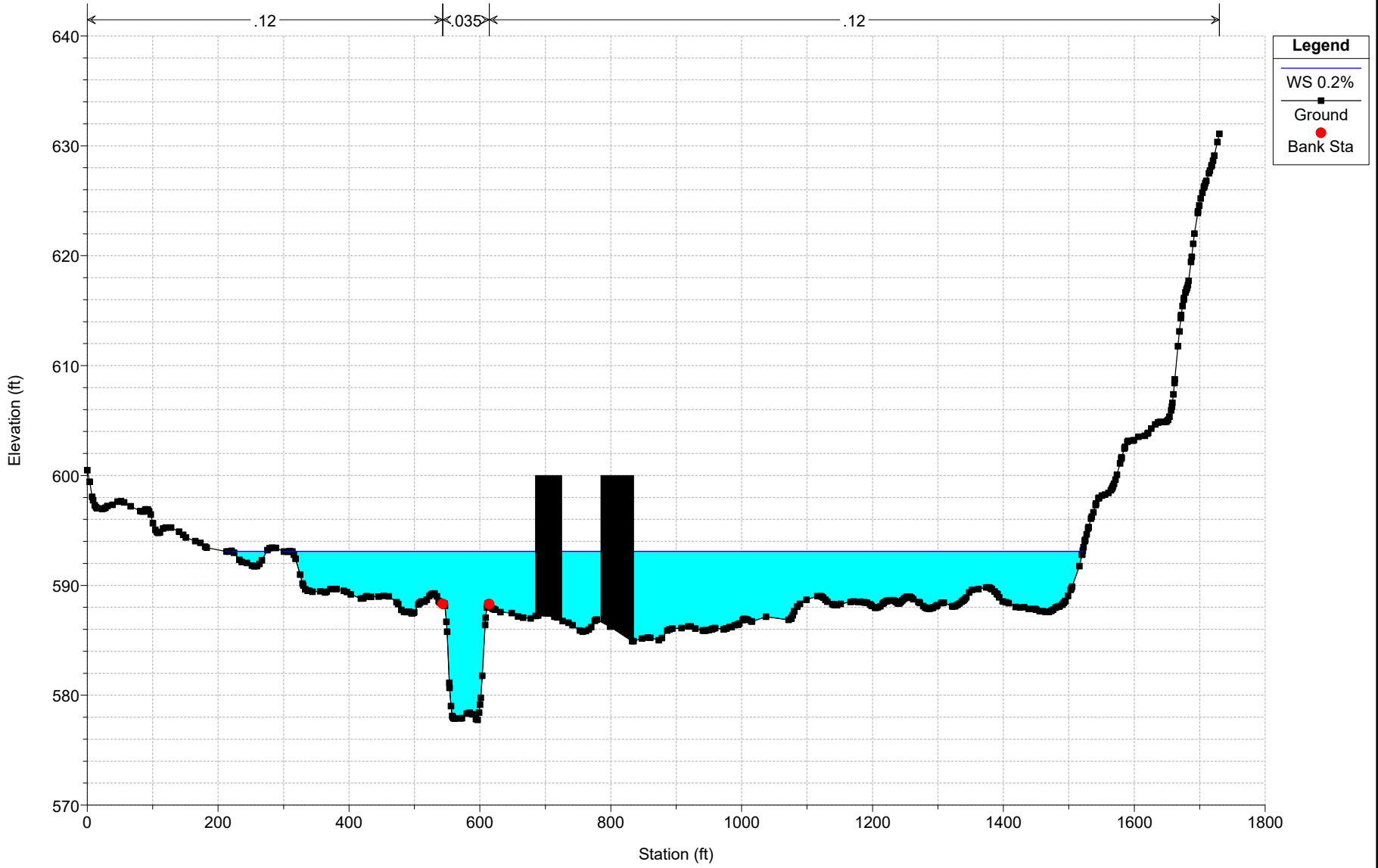
# Bridge 308

Geom: Alternative 5 - No bridge, piers

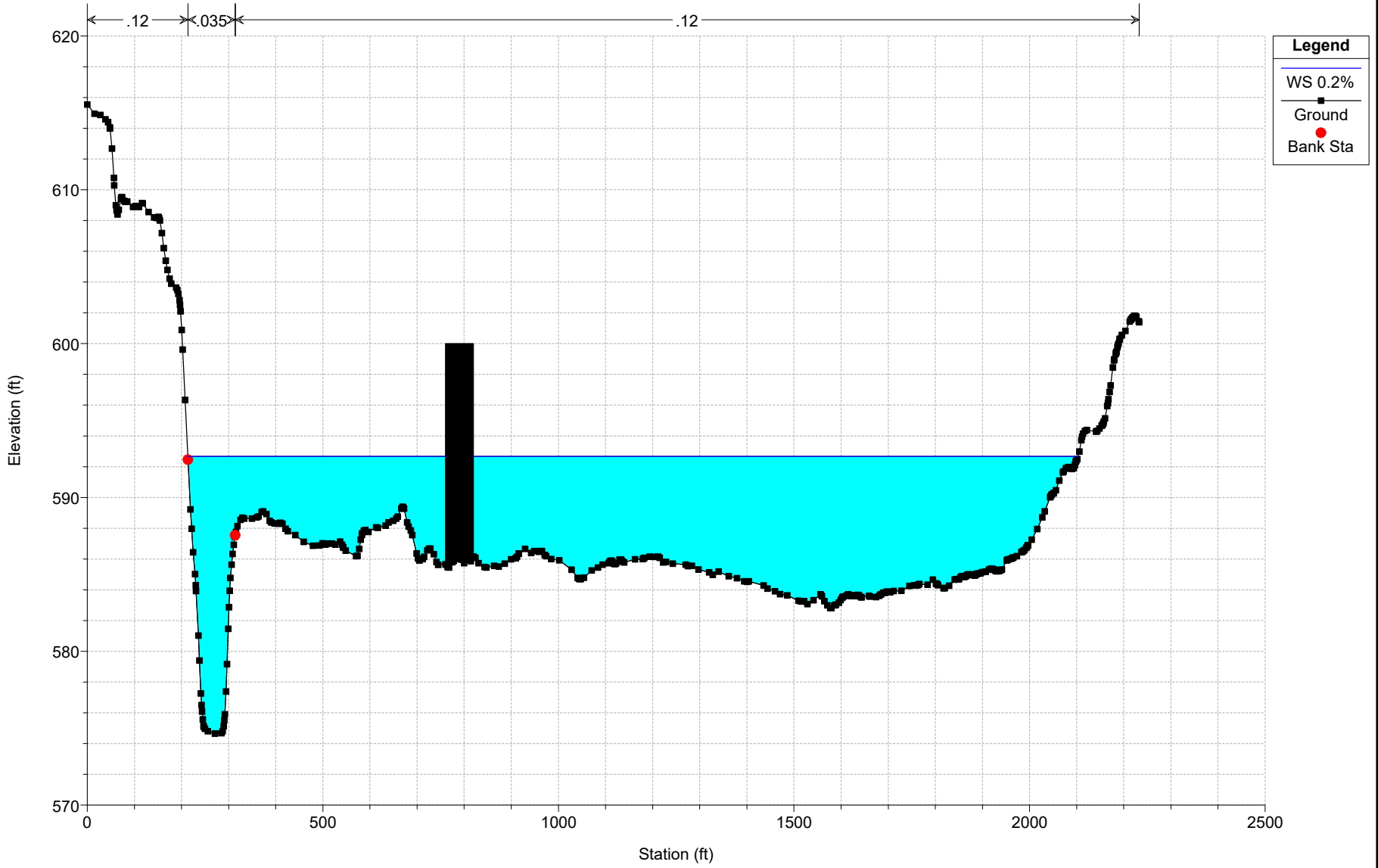
Stevens Branch Stevens Branch



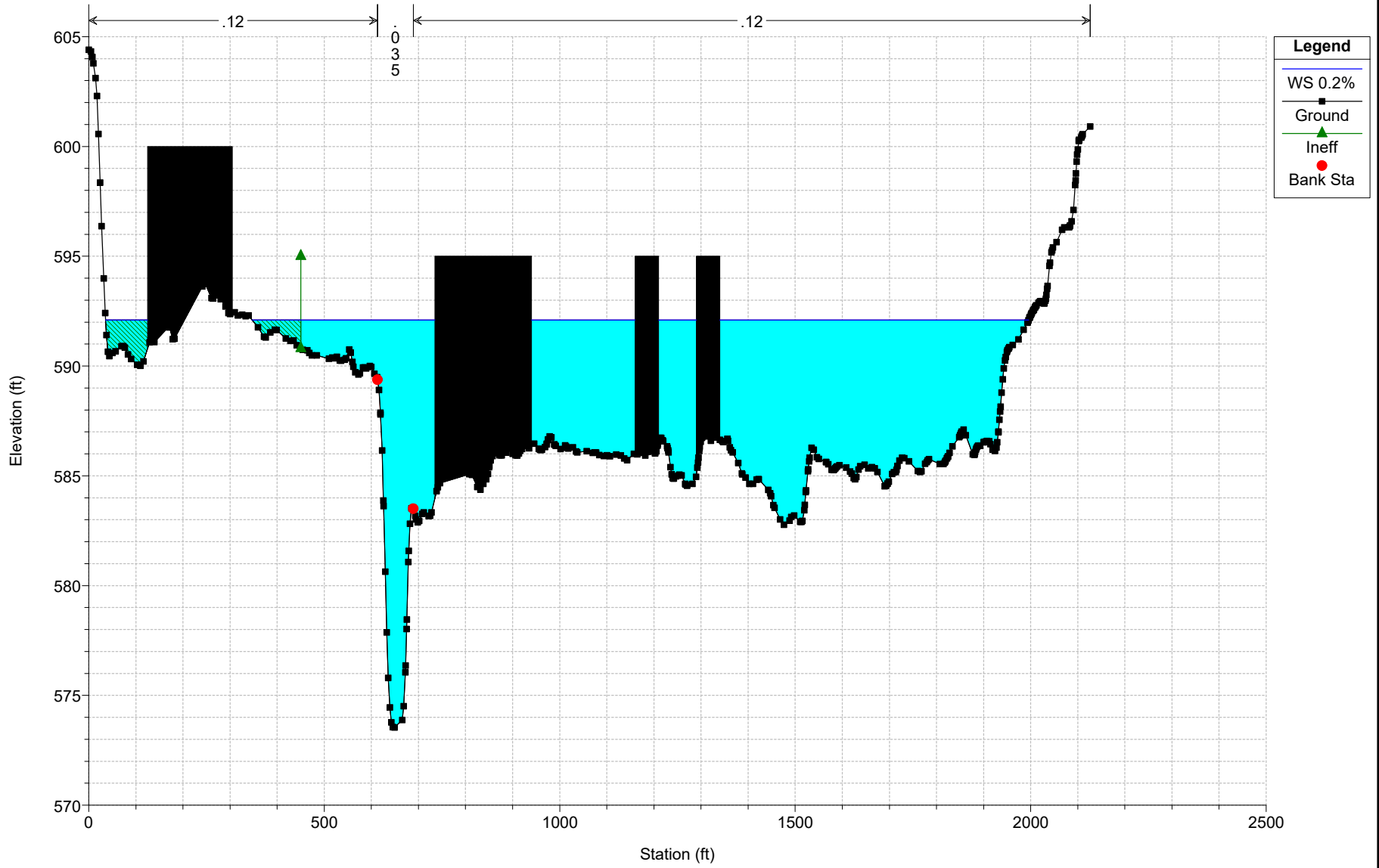
Bridge 308  
Geom: Alternative 5 - No bridge, piers  
RS = 11459



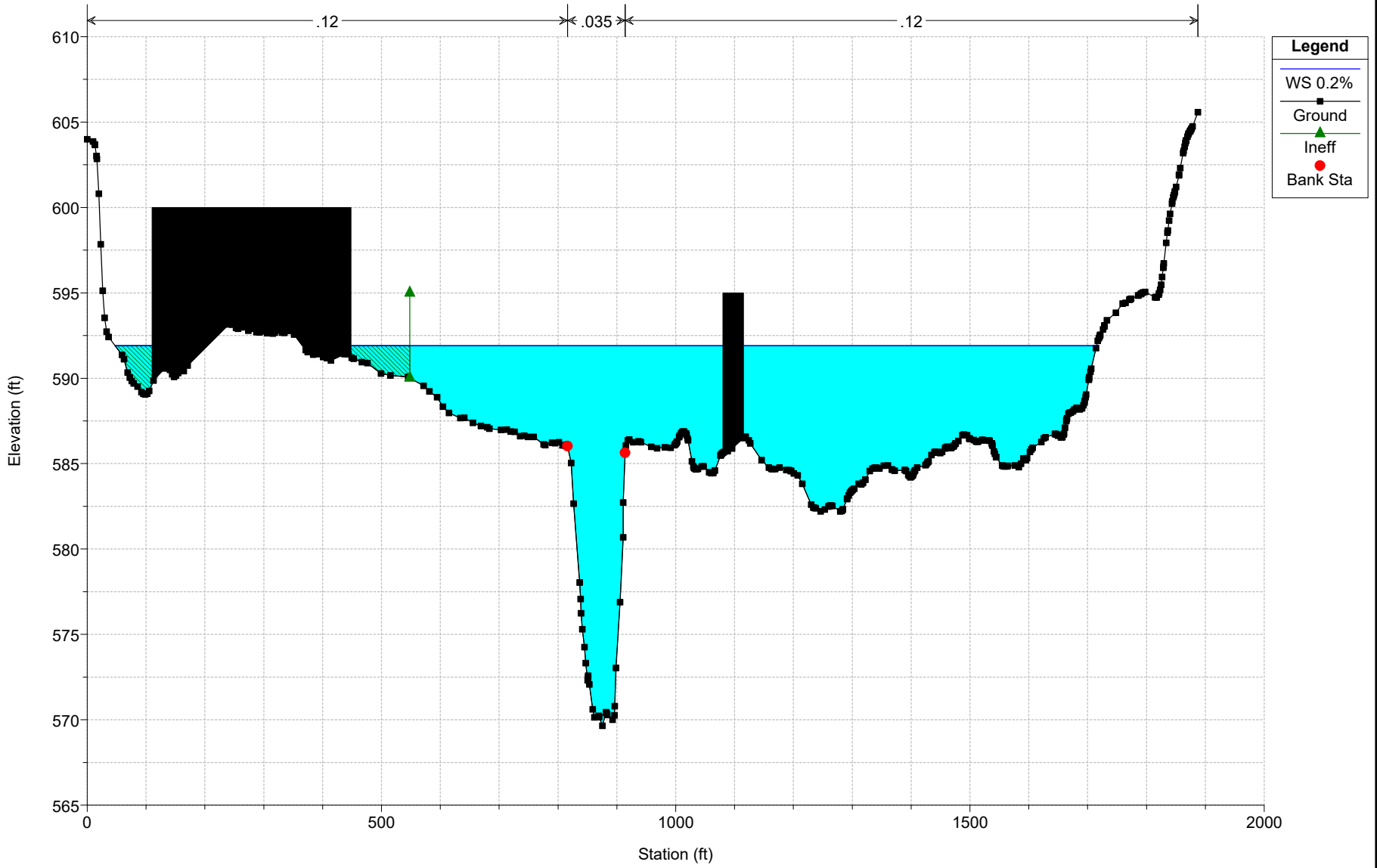
Bridge 308  
Geom: Alternative 5 - No bridge, piers  
RS = 7552



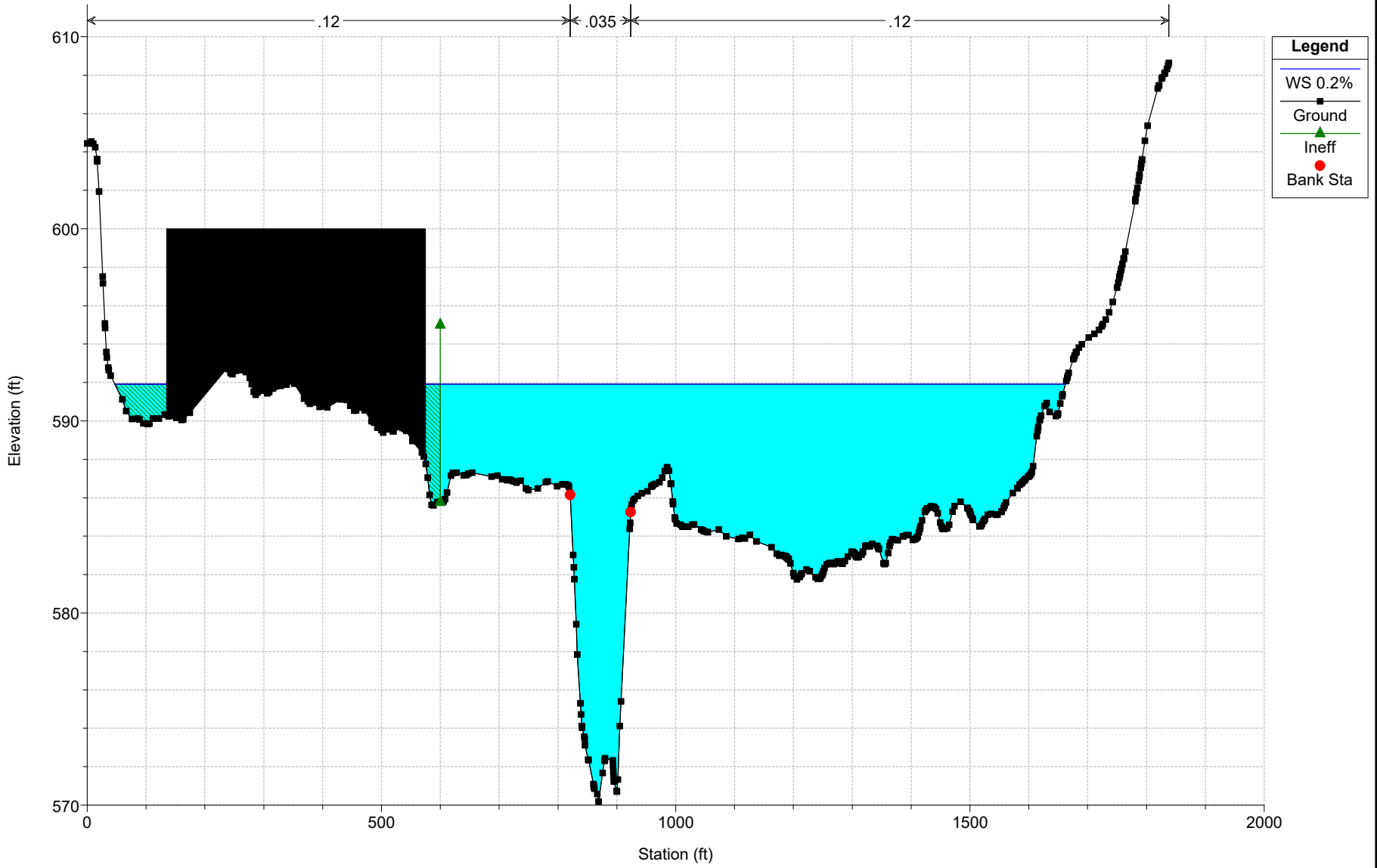
Bridge 308  
Geom: Alternative 5 - No bridge, piers  
RS = 4962



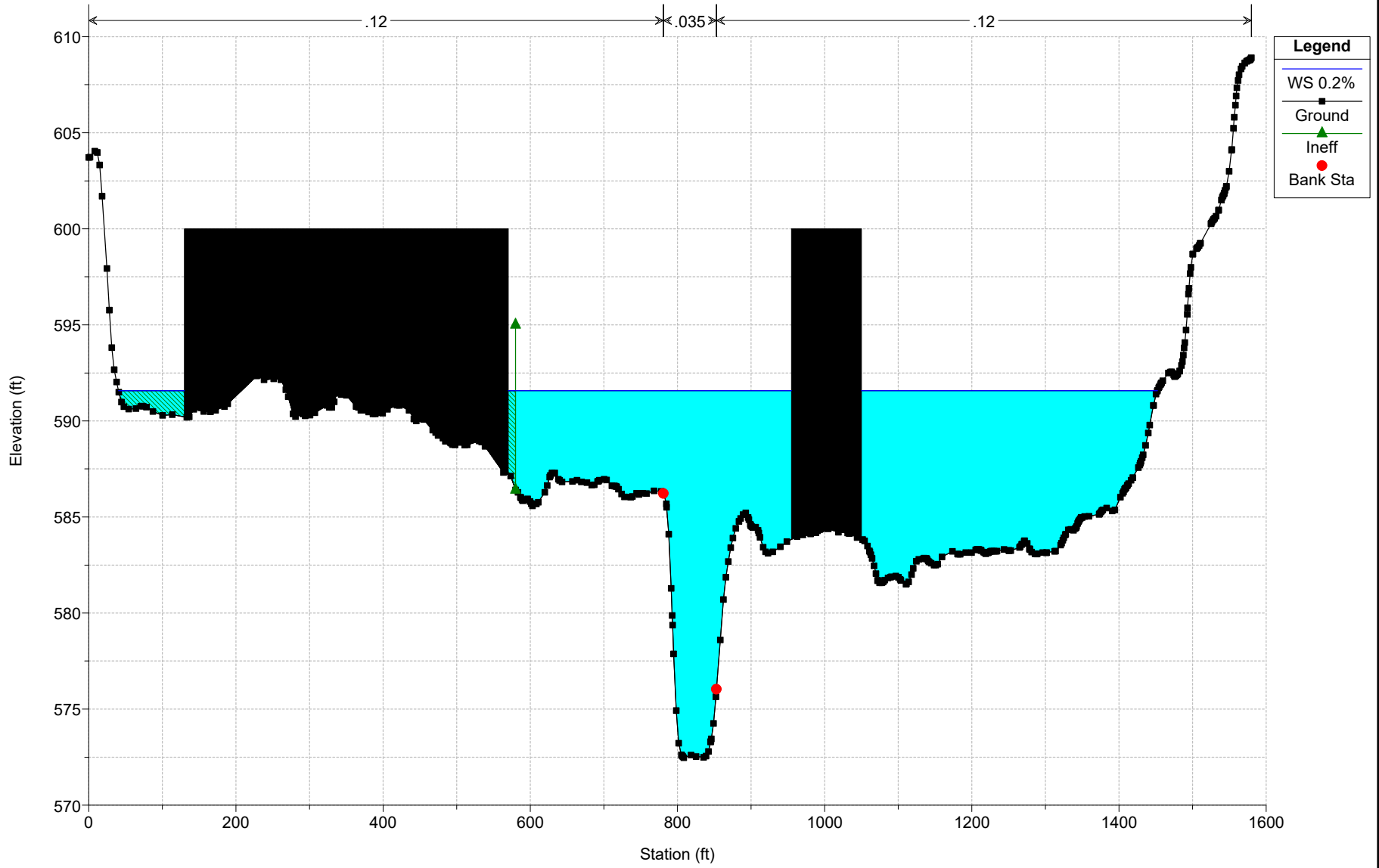
Bridge 308  
Geom: Alternative 5 - No bridge, piers  
RS = 3994



Bridge 308  
Geom: Alternative 5 - No bridge, piers  
RS = 3921

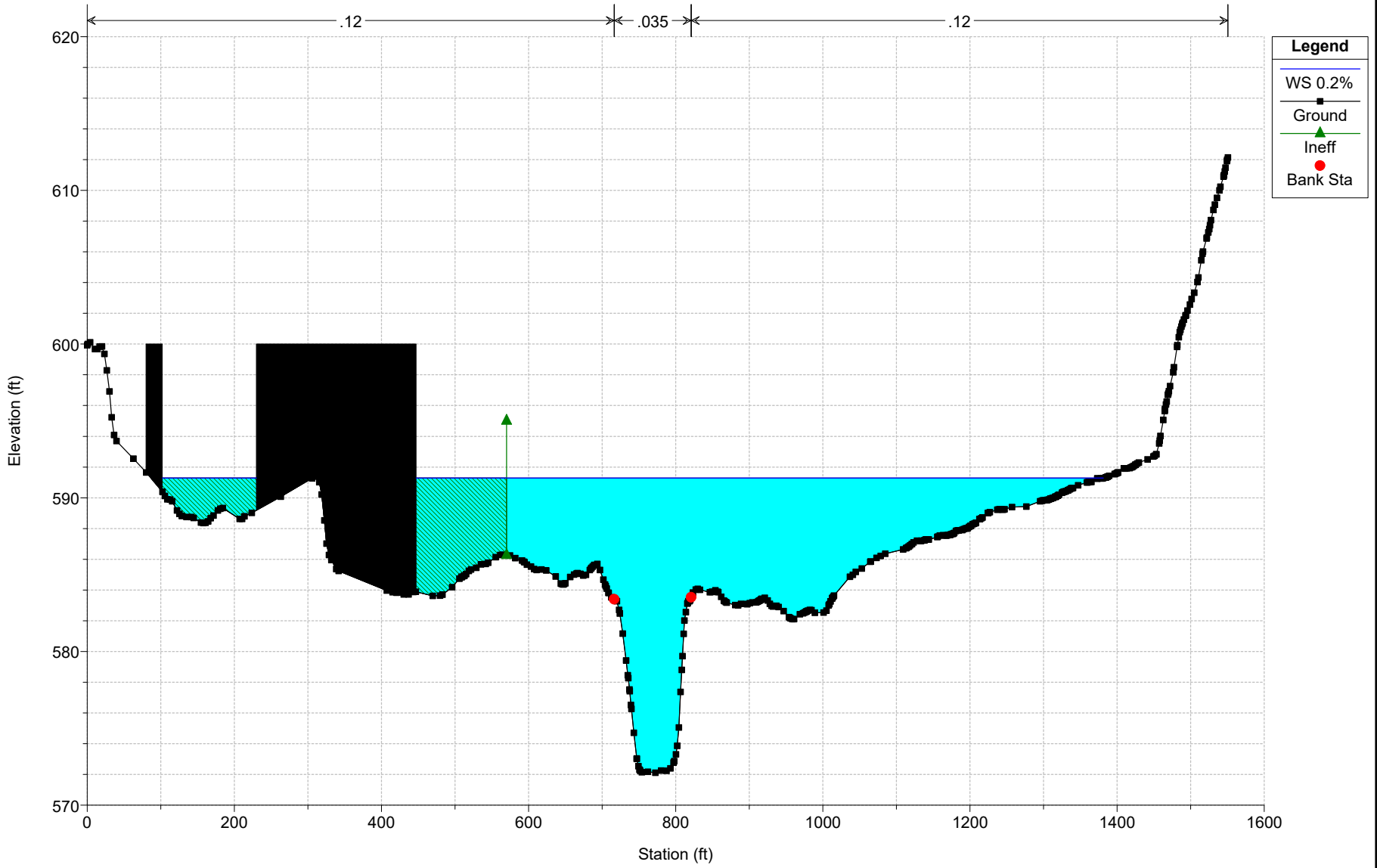


Bridge 308  
Geom: Alternative 5 - No bridge, piers  
RS = 3508

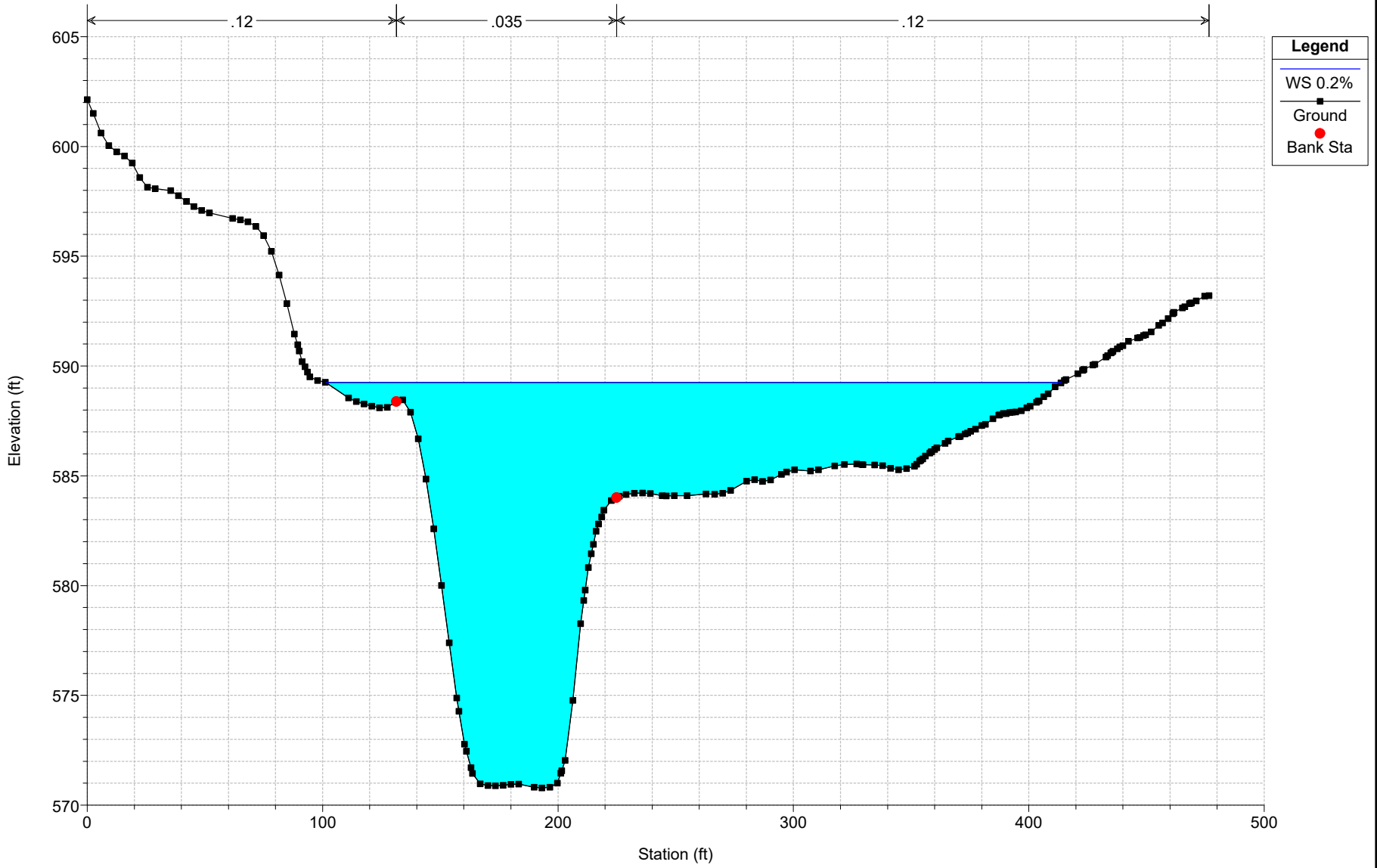




Bridge 308  
Geom: Alternative 5 - No bridge, piers  
RS = 2628



Bridge 308  
Geom: Alternative 5 - No bridge, piers  
RS = 1501



Plan: Alt 5 Remove Brdg & Pier Stevens Branch Stevens Branch RS: 11459 Profile: 50%

E.G. Elev (ft)	585.95	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.79	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	585.16	Reach Len. (ft)	1191.60	1191.00	1181.80
Crit W.S. (ft)	582.67	Flow Area (sq ft)		353.44	2.37
E.G. Slope (ft/ft)	0.002787	Area (sq ft)		353.44	2.37
Q Total (cfs)	2524.00	Flow (cfs)		2523.67	0.33
Top Width (ft)	80.84	Top Width (ft)		56.46	24.38
Vel Total (ft/s)	7.09	Avg. Vel. (ft/s)		7.14	0.14
Max Chl Dpth (ft)	7.40	Hydr. Depth (ft)		6.26	0.10
Conv. Total (cfs)	47814.1	Conv. (cfs)		47807.7	6.3
Length Wtd. (ft)	1190.99	Wetted Per. (ft)		62.15	24.63
Min Ch El (ft)	577.76	Shear (lb/sq ft)		0.99	0.02
Alpha	1.01	Stream Power (lb/ft s)		7.06	0.00
Frctn Loss (ft)	2.03	Cum Volume (acre-ft)		28.31	0.50
C & E Loss (ft)	0.12	Cum SA (acres)		4.39	1.93

Plan: Alt 5 Remove Brdg & Pier Stevens Branch Stevens Branch RS: 11459 Profile: 20%

E.G. Elev (ft)	588.15	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.00	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	587.16	Reach Len. (ft)	1191.60	1191.00	1181.80
Crit W.S. (ft)	584.22	Flow Area (sq ft)		469.88	285.27
E.G. Slope (ft/ft)	0.002834	Area (sq ft)		469.88	285.27
Q Total (cfs)	4024.00	Flow (cfs)		3845.71	178.29
Top Width (ft)	386.36	Top Width (ft)		60.94	325.41
Vel Total (ft/s)	5.33	Avg. Vel. (ft/s)		8.18	0.62
Max Chl Dpth (ft)	9.40	Hydr. Depth (ft)		7.71	0.88
Conv. Total (cfs)	75582.7	Conv. (cfs)		72233.8	3348.8
Length Wtd. (ft)	1190.24	Wetted Per. (ft)		68.19	328.61
Min Ch El (ft)	577.76	Shear (lb/sq ft)		1.22	0.15
Alpha	2.26	Stream Power (lb/ft s)		9.98	0.10
Frctn Loss (ft)	1.91	Cum Volume (acre-ft)		38.69	23.47
C & E Loss (ft)	0.18	Cum SA (acres)		4.88	21.36

Plan: Alt 5 Remove Brdg & Pier Stevens Branch Stevens Branch RS: 11459 Profile: 10%

E.G. Elev (ft)	590.55	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.02	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	589.54	Reach Len. (ft)	1191.60	1191.00	1181.80
Crit W.S. (ft)	588.47	Flow Area (sq ft)	136.11	629.36	1612.65
E.G. Slope (ft/ft)	0.002992	Area (sq ft)	136.11	629.36	1612.65
Q Total (cfs)	7740.00	Flow (cfs)	82.19	5848.73	1809.09
Top Width (ft)	1021.63	Top Width (ft)	186.33	70.80	764.50
Vel Total (ft/s)	3.25	Avg. Vel. (ft/s)	0.60	9.29	1.12
Max Chl Dpth (ft)	11.78	Hydr. Depth (ft)	0.73	8.89	2.11
Conv. Total (cfs)	141503.1	Conv. (cfs)	1502.6	106926.8	33073.8
Length Wtd. (ft)	1187.82	Wetted Per. (ft)	186.53	78.62	777.55
Min Ch El (ft)	577.76	Shear (lb/sq ft)	0.14	1.50	0.39
Alpha	6.19	Stream Power (lb/ft s)	0.08	13.90	0.43
Frctn Loss (ft)	1.30	Cum Volume (acre-ft)	4.63	59.05	160.05
C & E Loss (ft)	0.25	Cum SA (acres)	5.06	5.86	60.14

Plan: Alt 5 Remove Brdg & Pier Stevens Branch Stevens Branch RS: 11459 Profile: 2%

E.G. Elev (ft)	591.90	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.76	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	591.14	Reach Len. (ft)	1191.60	1191.00	1181.80
Crit W.S. (ft)	589.98	Flow Area (sq ft)	478.99	743.00	2896.43
E.G. Slope (ft/ft)	0.002230	Area (sq ft)	478.99	743.00	2896.43
Q Total (cfs)	11040.00	Flow (cfs)	471.40	6657.86	3910.74
Top Width (ft)	1097.96	Top Width (ft)	219.00	70.80	808.16
Vel Total (ft/s)	2.68	Avg. Vel. (ft/s)	0.98	8.96	1.35
Max Chl Dpth (ft)	13.38	Hydr. Depth (ft)	2.19	10.49	3.58
Conv. Total (cfs)	233809.6	Conv. (cfs)	9983.5	141002.9	82823.2
Length Wtd. (ft)	1186.79	Wetted Per. (ft)	219.34	78.62	827.78
Min Ch El (ft)	577.76	Shear (lb/sq ft)	0.30	1.32	0.49
Alpha	6.83	Stream Power (lb/ft s)	0.30	11.79	0.66
Frctn Loss (ft)	1.02	Cum Volume (acre-ft)	17.23	71.64	284.72
C & E Loss (ft)	0.19	Cum SA (acres)	6.82	6.04	63.72

Plan: Alt 5 Remove Brdg & Pier Stevens Branch Stevens Branch RS: 11459 Profile: 1%

E.G. Elev (ft)	592.50	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.66	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	591.84	Reach Len. (ft)	1191.60	1191.00	1181.80
Crit W.S. (ft)	590.36	Flow Area (sq ft)	633.00	792.16	3459.03
E.G. Slope (ft/ft)	0.001917	Area (sq ft)	633.00	792.16	3459.03
Q Total (cfs)	12400.00	Flow (cfs)	687.05	6869.57	4843.38
Top Width (ft)	1116.09	Top Width (ft)	233.19	70.80	812.10
Vel Total (ft/s)	2.54	Avg. Vel. (ft/s)	1.09	8.67	1.40
Max Chl Dpth (ft)	14.08	Hydr. Depth (ft)	2.71	11.19	4.26
Conv. Total (cfs)	283202.5	Conv. (cfs)	15691.6	156893.4	110617.5
Length Wtd. (ft)	1186.48	Wetted Per. (ft)	233.60	78.62	834.56
Min Ch El (ft)	577.76	Shear (lb/sq ft)	0.32	1.21	0.50
Alpha	6.59	Stream Power (lb/ft s)	0.35	10.46	0.69
Frctn Loss (ft)	0.90	Cum Volume (acre-ft)	23.71	76.53	335.45
C & E Loss (ft)	0.16	Cum SA (acres)	9.44	6.08	64.66

Plan: Alt 5 Remove Brdg & Pier Stevens Branch Stevens Branch RS: 11459 Profile: 0.2%

E.G. Elev (ft)	593.64	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.53	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	593.11	Reach Len. (ft)	1191.60	1191.00	1181.80
Crit W.S. (ft)	590.85	Flow Area (sq ft)	966.98	882.25	4495.68
E.G. Slope (ft/ft)	0.001503	Area (sq ft)	966.98	882.25	4495.68
Q Total (cfs)	14980.00	Flow (cfs)	1120.48	7279.52	6580.00
Top Width (ft)	1192.05	Top Width (ft)	304.17	70.80	817.08
Vel Total (ft/s)	2.36	Avg. Vel. (ft/s)	1.16	8.25	1.46
Max Chl Dpth (ft)	15.35	Hydr. Depth (ft)	3.18	12.46	5.50
Conv. Total (cfs)	386351.0	Conv. (cfs)	28898.3	187747.0	169705.7
Length Wtd. (ft)	1186.07	Wetted Per. (ft)	304.79	78.62	844.78
Min Ch El (ft)	577.76	Shear (lb/sq ft)	0.30	1.05	0.50
Alpha	6.12	Stream Power (lb/ft s)	0.35	8.69	0.73
Frctn Loss (ft)	0.74	Cum Volume (acre-ft)	39.93	85.14	426.66
C & E Loss (ft)	0.13	Cum SA (acres)	12.84	6.14	66.70

Plan: Alt 5 Remove Brdg & Pier Stevens Branch Stevens Branch RS: 7552 Profile: 50%

E.G. Elev (ft)	583.80	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.40	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	583.40	Reach Len. (ft)	852.90	789.50	477.70
Crit W.S. (ft)		Flow Area (sq ft)		495.26	20.34
E.G. Slope (ft/ft)	0.001153	Area (sq ft)		495.26	20.34
Q Total (cfs)	2524.00	Flow (cfs)		2520.33	3.67
Top Width (ft)	151.46	Top Width (ft)		69.61	81.85
Vel Total (ft/s)	4.90	Avg. Vel. (ft/s)		5.09	0.18
Max Chl Dpth (ft)	8.76	Hydr. Depth (ft)		7.11	0.25
Conv. Total (cfs)	74340.5	Conv. (cfs)		74232.4	108.1
Length Wtd. (ft)	789.27	Wetted Per. (ft)		74.66	81.88
Min Ch El (ft)	574.64	Shear (lb/sq ft)		0.48	0.02
Alpha	1.08	Stream Power (lb/ft s)		2.43	0.00
Frctn Loss (ft)	2.00	Cum Volume (acre-ft)		16.71	0.19
C & E Loss (ft)	0.16	Cum SA (acres)		2.67	0.49

Plan: Alt 5 Remove Brdg & Pier Stevens Branch Stevens Branch RS: 7552 Profile: 20%

E.G. Elev (ft)	586.06	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.39	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	585.67	Reach Len. (ft)	852.90	789.50	477.70
Crit W.S. (ft)		Flow Area (sq ft)		662.61	1003.88
E.G. Slope (ft/ft)	0.001033	Area (sq ft)		662.61	1003.88
Q Total (cfs)	4024.00	Flow (cfs)		3541.08	482.92
Top Width (ft)	922.64	Top Width (ft)		79.36	843.27
Vel Total (ft/s)	2.41	Avg. Vel. (ft/s)		5.34	0.48
Max Chl Dpth (ft)	11.03	Hydr. Depth (ft)		8.35	1.19
Conv. Total (cfs)	125229.9	Conv. (cfs)		110200.9	15029.0
Length Wtd. (ft)	770.79	Wetted Per. (ft)		85.46	843.44
Min Ch El (ft)	574.64	Shear (lb/sq ft)		0.50	0.08
Alpha	4.32	Stream Power (lb/ft s)		2.67	0.04
Frctn Loss (ft)	1.68	Cum Volume (acre-ft)		23.21	5.98
C & E Loss (ft)	0.18	Cum SA (acres)		2.96	5.51

Plan: Alt 5 Remove Brdg & Pier Stevens Branch Stevens Branch RS: 7552 Profile: 10%

E.G. Elev (ft)	589.00	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.17	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	588.83	Reach Len. (ft)	852.90	789.50	477.70
Crit W.S. (ft)		Flow Area (sq ft)		941.76	5208.93
E.G. Slope (ft/ft)	0.000560	Area (sq ft)		941.76	5208.93
Q Total (cfs)	7740.00	Flow (cfs)		4195.81	3544.19
Top Width (ft)	1716.85	Top Width (ft)		93.86	1622.99
Vel Total (ft/s)	1.26	Avg. Vel. (ft/s)		4.46	0.68
Max Chl Dpth (ft)	14.19	Hydr. Depth (ft)		10.03	3.21
Conv. Total (cfs)	326981.3	Conv. (cfs)		177254.6	149726.7
Length Wtd. (ft)	688.68	Wetted Per. (ft)		100.89	1629.64
Min Ch El (ft)	574.64	Shear (lb/sq ft)		0.33	0.11
Alpha	6.93	Stream Power (lb/ft s)		1.45	0.08
Frctn Loss (ft)	0.75	Cum Volume (acre-ft)	2.77	37.57	67.51
C & E Loss (ft)	0.10	Cum SA (acres)	2.51	3.61	27.75

Plan: Alt 5 Remove Brdg & Pier Stevens Branch Stevens Branch RS: 7552 Profile: 2%

E.G. Elev (ft)	590.69	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.13	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	590.56	Reach Len. (ft)	852.90	789.50	477.70
Crit W.S. (ft)		Flow Area (sq ft)		1106.57	8082.10
E.G. Slope (ft/ft)	0.000453	Area (sq ft)		1106.57	8082.10
Q Total (cfs)	11040.00	Flow (cfs)		4826.15	6213.85
Top Width (ft)	1779.86	Top Width (ft)		96.80	1683.06
Vel Total (ft/s)	1.20	Avg. Vel. (ft/s)		4.36	0.77
Max Chl Dpth (ft)	15.92	Hydr. Depth (ft)		11.43	4.80
Conv. Total (cfs)	518875.3	Conv. (cfs)		226826.9	292048.4
Length Wtd. (ft)	633.37	Wetted Per. (ft)		104.30	1693.29
Min Ch El (ft)	574.64	Shear (lb/sq ft)		0.30	0.13
Alpha	5.99	Stream Power (lb/ft s)		1.31	0.10
Frctn Loss (ft)	0.46	Cum Volume (acre-ft)	10.68	46.35	135.80
C & E Loss (ft)	0.03	Cum SA (acres)	3.83	3.75	29.92

Plan: Alt 5 Remove Brdg & Pier Stevens Branch Stevens Branch RS: 7552 Profile: 1%

E.G. Elev (ft)	591.44	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	591.32	Reach Len. (ft)	852.90	789.50	477.70
Crit W.S. (ft)		Flow Area (sq ft)		1180.39	9360.91
E.G. Slope (ft/ft)	0.000402	Area (sq ft)		1180.39	9360.91
Q Total (cfs)	12400.00	Flow (cfs)		5015.02	7384.99
Top Width (ft)	1790.62	Top Width (ft)		98.05	1692.57
Vel Total (ft/s)	1.18	Avg. Vel. (ft/s)		4.25	0.79
Max Chl Dpth (ft)	16.68	Hydr. Depth (ft)		12.04	5.53
Conv. Total (cfs)	618830.9	Conv. (cfs)		250277.9	368553.0
Length Wtd. (ft)	621.63	Wetted Per. (ft)		105.76	1704.35
Min Ch El (ft)	574.64	Shear (lb/sq ft)		0.28	0.14
Alpha	5.54	Stream Power (lb/ft s)		1.19	0.11
Frctn Loss (ft)	0.39	Cum Volume (acre-ft)	15.05	49.57	161.55
C & E Loss (ft)	0.03	Cum SA (acres)	6.25	3.77	30.68

Plan: Alt 5 Remove Brdg & Pier Stevens Branch Stevens Branch RS: 7552 Profile: 0.2%

E.G. Elev (ft)	592.77	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	592.67	Reach Len. (ft)	852.90	789.50	477.70
Crit W.S. (ft)		Flow Area (sq ft)	0.04	1314.54	11678.58
E.G. Slope (ft/ft)	0.000337	Area (sq ft)	0.04	1314.54	11678.58
Q Total (cfs)	14980.00	Flow (cfs)	0.00	5426.33	9553.67
Top Width (ft)	1829.20	Top Width (ft)	0.37	99.90	1728.93
Vel Total (ft/s)	1.15	Avg. Vel. (ft/s)	0.05	4.13	0.82
Max Chl Dpth (ft)	18.03	Hydr. Depth (ft)	0.11	13.16	6.75
Conv. Total (cfs)	815563.9	Conv. (cfs)	0.1	295428.4	520135.4
Length Wtd. (ft)	608.43	Wetted Per. (ft)	0.43	107.93	1743.47
Min Ch El (ft)	574.64	Shear (lb/sq ft)	0.00	0.26	0.14
Alpha	4.96	Stream Power (lb/ft s)	0.00	1.06	0.12
Frctn Loss (ft)	0.31	Cum Volume (acre-ft)	26.71	55.11	207.25
C & E Loss (ft)	0.02	Cum SA (acres)	8.67	3.81	32.16

Plan: Alt 5 Remove Brdg & Pier Stevens Branch Stevens Branch RS: 4962 Profile: 50%

E.G. Elev (ft)	581.64	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.98	Wt. n-Val.		0.035	
W.S. Elev (ft)	579.67	Reach Len. (ft)	96.20	295.10	381.80
Crit W.S. (ft)	579.33	Flow Area (sq ft)		223.74	
E.G. Slope (ft/ft)	0.009481	Area (sq ft)		223.74	
Q Total (cfs)	2524.00	Flow (cfs)		2524.00	
Top Width (ft)	46.42	Top Width (ft)		46.42	
Vel Total (ft/s)	11.28	Avg. Vel. (ft/s)		11.28	
Max Chl Dpth (ft)	6.13	Hydr. Depth (ft)		4.82	
Conv. Total (cfs)	25921.8	Conv. (cfs)		25921.8	
Length Wtd. (ft)	295.10	Wetted Per. (ft)		49.63	
Min Ch El (ft)	573.54	Shear (lb/sq ft)		2.67	
Alpha	1.00	Stream Power (lb/ft s)		30.10	
Frctn Loss (ft)	0.52	Cum Volume (acre-ft)		10.20	0.08
C & E Loss (ft)	0.51	Cum SA (acres)		1.61	0.04

Plan: Alt 5 Remove Brdg & Pier Stevens Branch Stevens Branch RS: 4962 Profile: 20%

E.G. Elev (ft)	584.20	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.18	Wt. n-Val.		0.035	
W.S. Elev (ft)	582.02	Reach Len. (ft)	96.20	295.10	381.80
Crit W.S. (ft)	581.10	Flow Area (sq ft)		339.90	
E.G. Slope (ft/ft)	0.007264	Area (sq ft)		339.90	
Q Total (cfs)	4024.00	Flow (cfs)		4024.00	
Top Width (ft)	52.59	Top Width (ft)		52.59	
Vel Total (ft/s)	11.84	Avg. Vel. (ft/s)		11.84	
Max Chl Dpth (ft)	8.48	Hydr. Depth (ft)		6.46	
Conv. Total (cfs)	47214.5	Conv. (cfs)		47214.5	
Length Wtd. (ft)	295.14	Wetted Per. (ft)		57.43	
Min Ch El (ft)	573.54	Shear (lb/sq ft)		2.68	
Alpha	1.00	Stream Power (lb/ft s)		31.77	
Frctn Loss (ft)	0.53	Cum Volume (acre-ft)		14.13	0.47
C & E Loss (ft)	0.53	Cum SA (acres)		1.77	0.89

Plan: Alt 5 Remove Brdg & Pier Stevens Branch Stevens Branch RS: 4962 Profile: 10%

E.G. Elev (ft)	588.15	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.19	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	586.97	Reach Len. (ft)	96.20	295.10	381.80
Crit W.S. (ft)	585.89	Flow Area (sq ft)		648.15	1471.11
E.G. Slope (ft/ft)	0.002929	Area (sq ft)		648.15	1471.11
Q Total (cfs)	7740.00	Flow (cfs)		6278.94	1461.06
Top Width (ft)	997.57	Top Width (ft)		68.07	929.49
Vel Total (ft/s)	3.65	Avg. Vel. (ft/s)		9.69	0.99
Max Chl Dpth (ft)	13.43	Hydr. Depth (ft)		9.52	1.58
Conv. Total (cfs)	143019.1	Conv. (cfs)		116021.7	26997.4
Length Wtd. (ft)	307.31	Wetted Per. (ft)		74.86	937.71
Min Ch El (ft)	573.54	Shear (lb/sq ft)		1.58	0.29
Alpha	5.72	Stream Power (lb/ft s)		15.34	0.28
Frctn Loss (ft)	0.41	Cum Volume (acre-ft)	2.77	23.16	30.89
C & E Loss (ft)	0.21	Cum SA (acres)	2.51	2.14	13.76



Plan: Alt 5 Remove Brdg & Pier Stevens Branch Stevens Branch RS: 4962 Profile: 2%

E.G. Elev (ft)	590.20	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.48	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	589.72	Reach Len. (ft)	96.20	295.10	381.80
Crit W.S. (ft)	587.66	Flow Area (sq ft)	1.86	845.66	4066.29
E.G. Slope (ft/ft)	0.001351	Area (sq ft)	1.86	845.66	4066.29
Q Total (cfs)	11040.00	Flow (cfs)	0.20	6197.49	4842.31
Top Width (ft)	1043.25	Top Width (ft)	19.40	75.90	947.96
Vel Total (ft/s)	2.25	Avg. Vel. (ft/s)	0.11	7.33	1.19
Max Chl Dpth (ft)	16.18	Hydr. Depth (ft)	0.10	11.14	4.29
Conv. Total (cfs)	300307.5	Conv. (cfs)	5.5	168582.8	131719.3
Length Wtd. (ft)	321.26	Wetted Per. (ft)	19.41	83.11	973.04
Min Ch El (ft)	573.54	Shear (lb/sq ft)	0.01	0.86	0.35
Alpha	6.10	Stream Power (lb/ft s)	0.00	6.29	0.42
Frctn Loss (ft)	0.27	Cum Volume (acre-ft)	10.66	28.66	69.19
C & E Loss (ft)	0.03	Cum SA (acres)	3.64	2.19	15.50

Plan: Alt 5 Remove Brdg & Pier Stevens Branch Stevens Branch RS: 4962 Profile: 1%

E.G. Elev (ft)	591.02	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.41	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	590.61	Reach Len. (ft)	96.20	295.10	381.80
Crit W.S. (ft)	588.00	Flow Area (sq ft)	61.62	913.10	4911.23
E.G. Slope (ft/ft)	0.001120	Area (sq ft)	77.51	913.10	4911.23
Q Total (cfs)	12400.00	Flow (cfs)	17.93	6411.65	5970.41
Top Width (ft)	1221.33	Top Width (ft)	190.48	75.90	954.94
Vel Total (ft/s)	2.11	Avg. Vel. (ft/s)	0.29	7.02	1.22
Max Chl Dpth (ft)	17.07	Hydr. Depth (ft)	0.44	12.03	5.14
Conv. Total (cfs)	370516.0	Conv. (cfs)	535.9	191582.3	178397.8
Length Wtd. (ft)	323.43	Wetted Per. (ft)	139.92	83.11	985.42
Min Ch El (ft)	573.54	Shear (lb/sq ft)	0.03	0.77	0.35
Alpha	5.90	Stream Power (lb/ft s)	0.01	5.39	0.42
Frctn Loss (ft)	0.24	Cum Volume (acre-ft)	14.29	30.60	83.29
C & E Loss (ft)	0.01	Cum SA (acres)	4.38	2.19	16.16

Plan: Alt 5 Remove Brdg & Pier Stevens Branch Stevens Branch RS: 4962 Profile: 0.2%

E.G. Elev (ft)	592.43	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.34	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	592.09	Reach Len. (ft)	96.20	295.10	381.80
Crit W.S. (ft)	588.52	Flow Area (sq ft)	301.54	1025.72	6365.83
E.G. Slope (ft/ft)	0.000889	Area (sq ft)	511.19	1025.72	6365.83
Q Total (cfs)	14980.00	Flow (cfs)	167.43	6934.06	7878.51
Top Width (ft)	1432.98	Top Width (ft)	355.64	75.90	1001.44
Vel Total (ft/s)	1.95	Avg. Vel. (ft/s)	0.56	6.76	1.24
Max Chl Dpth (ft)	18.55	Hydr. Depth (ft)	1.85	13.51	6.36
Conv. Total (cfs)	502410.8	Conv. (cfs)	5615.6	232559.7	264235.6
Length Wtd. (ft)	324.42	Wetted Per. (ft)	163.49	83.11	1040.85
Min Ch El (ft)	573.54	Shear (lb/sq ft)	0.10	0.68	0.34
Alpha	5.79	Stream Power (lb/ft s)	0.06	4.63	0.42
Frctn Loss (ft)	0.20	Cum Volume (acre-ft)	21.70	33.90	108.31
C & E Loss (ft)	0.01	Cum SA (acres)	5.19	2.22	17.19

Plan: Alt 5 Remove Brdg & Pier Stevens Branch Stevens Branch RS: 3994 Profile: 50%

E.G. Elev (ft)	580.61	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.27	Wt. n-Val.		0.035	
W.S. Elev (ft)	580.34	Reach Len. (ft)	36.70	22.30	43.50
Crit W.S. (ft)	574.96	Flow Area (sq ft)		600.80	
E.G. Slope (ft/ft)	0.000711	Area (sq ft)		600.80	
Q Total (cfs)	2524.00	Flow (cfs)		2524.00	
Top Width (ft)	78.52	Top Width (ft)		78.52	
Vel Total (ft/s)	4.20	Avg. Vel. (ft/s)		4.20	
Max Chl Dpth (ft)	10.70	Hydr. Depth (ft)		7.65	
Conv. Total (cfs)	94625.7	Conv. (cfs)		94625.7	
Length Wtd. (ft)	22.30	Wetted Per. (ft)		84.08	
Min Ch El (ft)	569.64	Shear (lb/sq ft)		0.32	
Alpha	1.00	Stream Power (lb/ft s)		1.33	
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)		7.40	0.08
C & E Loss (ft)	0.00	Cum SA (acres)		1.19	0.04

Plan: Alt 5 Remove Brdg & Pier Stevens Branch Stevens Branch RS: 3994 Profile: 20%

E.G. Elev (ft)	583.13	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.40	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	582.74	Reach Len. (ft)	36.70	22.30	43.50
Crit W.S. (ft)	576.43	Flow Area (sq ft)		796.51	21.13
E.G. Slope (ft/ft)	0.000800	Area (sq ft)		796.51	21.13
Q Total (cfs)	4024.00	Flow (cfs)		4020.33	3.67
Top Width (ft)	144.77	Top Width (ft)		84.34	60.43
Vel Total (ft/s)	4.92	Avg. Vel. (ft/s)		5.05	0.17
Max Chl Dpth (ft)	13.09	Hydr. Depth (ft)		9.44	0.35
Conv. Total (cfs)	142234.6	Conv. (cfs)		142104.8	129.8
Length Wtd. (ft)	22.34	Wetted Per. (ft)		92.46	60.47
Min Ch El (ft)	569.64	Shear (lb/sq ft)		0.43	0.02
Alpha	1.05	Stream Power (lb/ft s)		2.17	0.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)		10.28	0.38
C & E Loss (ft)	0.01	Cum SA (acres)		1.30	0.62

Plan: Alt 5 Remove Brdg & Pier Stevens Branch Stevens Branch RS: 3994 Profile: 10%

E.G. Elev (ft)	587.53	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.48	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	587.05	Reach Len. (ft)	36.70	22.30	43.50
Crit W.S. (ft)	579.25	Flow Area (sq ft)	64.96	1192.11	1382.88
E.G. Slope (ft/ft)	0.000769	Area (sq ft)	64.96	1192.11	1382.88
Q Total (cfs)	7740.00	Flow (cfs)	13.90	6974.57	751.53
Top Width (ft)	942.04	Top Width (ft)	132.05	97.80	712.20
Vel Total (ft/s)	2.93	Avg. Vel. (ft/s)	0.21	5.85	0.54
Max Chl Dpth (ft)	17.40	Hydr. Depth (ft)	0.49	12.19	1.94
Conv. Total (cfs)	279037.7	Conv. (cfs)	501.2	251442.8	27093.7
Length Wtd. (ft)	24.97	Wetted Per. (ft)	132.07	107.65	714.93
Min Ch El (ft)	569.64	Shear (lb/sq ft)	0.02	0.53	0.09
Alpha	3.59	Stream Power (lb/ft s)	0.01	3.11	0.05
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	2.69	16.93	18.38
C & E Loss (ft)	0.05	Cum SA (acres)	2.37	1.58	6.56

Plan: Alt 5 Remove Brdg & Pier Stevens Branch Stevens Branch RS: 3994 Profile: 2%

E.G. Elev (ft)	589.90	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.39	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	589.51	Reach Len. (ft)	36.70	22.30	43.50
Crit W.S. (ft)	581.27	Flow Area (sq ft)	560.86	1433.21	3189.15
E.G. Slope (ft/ft)	0.000583	Area (sq ft)	567.48	1433.21	3189.15
Q Total (cfs)	11040.00	Flow (cfs)	292.67	8256.20	2491.13
Top Width (ft)	1114.71	Top Width (ft)	266.19	97.80	750.71
Vel Total (ft/s)	2.13	Avg. Vel. (ft/s)	0.52	5.76	0.78
Max Chl Dpth (ft)	19.87	Hydr. Depth (ft)	2.30	14.65	4.25
Conv. Total (cfs)	457038.2	Conv. (cfs)	12115.9	341793.5	103128.8
Length Wtd. (ft)	27.81	Wetted Per. (ft)	243.40	107.65	758.55
Min Ch El (ft)	569.64	Shear (lb/sq ft)	0.08	0.48	0.15
Alpha	5.50	Stream Power (lb/ft s)	0.04	2.79	0.12
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	10.04	20.94	37.39
C & E Loss (ft)	0.03	Cum SA (acres)	3.32	1.60	8.05

Plan: Alt 5 Remove Brdg & Pier Stevens Branch Stevens Branch RS: 3994 Profile: 1%

E.G. Elev (ft)	590.76	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.36	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	590.40	Reach Len. (ft)	36.70	22.30	43.50
Crit W.S. (ft)	581.98	Flow Area (sq ft)	793.48	1520.41	3860.64
E.G. Slope (ft/ft)	0.000531	Area (sq ft)	844.17	1520.41	3860.64
Q Total (cfs)	12400.00	Flow (cfs)	466.20	8688.91	3244.89
Top Width (ft)	1217.03	Top Width (ft)	363.59	97.80	755.64
Vel Total (ft/s)	2.01	Avg. Vel. (ft/s)	0.59	5.71	0.84
Max Chl Dpth (ft)	20.76	Hydr. Depth (ft)	2.96	15.55	5.11
Conv. Total (cfs)	538237.1	Conv. (cfs)	20235.8	377152.9	140848.4
Length Wtd. (ft)	28.65	Wetted Per. (ft)	268.46	107.65	765.34
Min Ch El (ft)	569.64	Shear (lb/sq ft)	0.10	0.47	0.17
Alpha	5.72	Stream Power (lb/ft s)	0.06	2.67	0.14
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	13.28	22.35	44.85
C & E Loss (ft)	0.03	Cum SA (acres)	3.77	1.61	8.67

Plan: Alt 5 Remove Brdg & Pier Stevens Branch Stevens Branch RS: 3994 Profile: 0.2%

E.G. Elev (ft)	592.23	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.32	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	591.90	Reach Len. (ft)	36.70	22.30	43.50
Crit W.S. (ft)	583.66	Flow Area (sq ft)	1195.94	1667.06	5001.30
E.G. Slope (ft/ft)	0.000466	Area (sq ft)	1449.19	1667.06	5001.30
Q Total (cfs)	14980.00	Flow (cfs)	865.45	9491.56	4622.99
Top Width (ft)	1294.73	Top Width (ft)	430.96	97.80	765.97
Vel Total (ft/s)	1.90	Avg. Vel. (ft/s)	0.72	5.69	0.92
Max Chl Dpth (ft)	22.26	Hydr. Depth (ft)	4.46	17.05	6.53
Conv. Total (cfs)	693970.0	Conv. (cfs)	40093.3	439710.2	214166.5
Length Wtd. (ft)	29.78	Wetted Per. (ft)	268.46	107.65	778.78
Min Ch El (ft)	569.64	Shear (lb/sq ft)	0.13	0.45	0.19
Alpha	5.74	Stream Power (lb/ft s)	0.09	2.56	0.17
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	19.54	24.78	58.49
C & E Loss (ft)	0.02	Cum SA (acres)	4.32	1.63	9.45

Plan: Alt 5 Remove Brdg & Pier Stevens Branch Stevens Branch RS: 3921 Profile: 50%

E.G. Elev (ft)	580.59	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.26	Wt. n-Val.		0.035	
W.S. Elev (ft)	580.33	Reach Len. (ft)	21.20	125.90	180.00
Crit W.S. (ft)	575.54	Flow Area (sq ft)		614.58	
E.G. Slope (ft/ft)	0.000735	Area (sq ft)		614.58	
Q Total (cfs)	2524.00	Flow (cfs)		2524.00	
Top Width (ft)	85.53	Top Width (ft)		85.53	
Vel Total (ft/s)	4.11	Avg. Vel. (ft/s)		4.11	
Max Chl Dpth (ft)	10.14	Hydr. Depth (ft)		7.19	
Conv. Total (cfs)	93101.6	Conv. (cfs)		93101.6	
Length Wtd. (ft)	126.02	Wetted Per. (ft)		91.18	
Min Ch EI (ft)	570.19	Shear (lb/sq ft)		0.31	
Alpha	1.00	Stream Power (lb/ft s)		1.27	
Frctn Loss (ft)	0.15	Cum Volume (acre-ft)		7.09	0.08
C & E Loss (ft)	0.08	Cum SA (acres)		1.15	0.04

Plan: Alt 5 Remove Brdg & Pier Stevens Branch Stevens Branch RS: 3921 Profile: 20%

E.G. Elev (ft)	583.10	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.36	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	582.74	Reach Len. (ft)	21.20	125.90	180.00
Crit W.S. (ft)	576.84	Flow Area (sq ft)		829.35	47.48
E.G. Slope (ft/ft)	0.000776	Area (sq ft)		829.35	47.48
Q Total (cfs)	4024.00	Flow (cfs)		4013.94	10.06
Top Width (ft)	194.90	Top Width (ft)		93.16	101.75
Vel Total (ft/s)	4.59	Avg. Vel. (ft/s)		4.84	0.21
Max Chl Dpth (ft)	12.55	Hydr. Depth (ft)		8.90	0.47
Conv. Total (cfs)	144416.7	Conv. (cfs)		144055.7	361.1
Length Wtd. (ft)	126.23	Wetted Per. (ft)		100.22	101.86
Min Ch EI (ft)	570.19	Shear (lb/sq ft)		0.40	0.02
Alpha	1.11	Stream Power (lb/ft s)		1.94	0.00
Frctn Loss (ft)	0.15	Cum Volume (acre-ft)		9.86	0.35
C & E Loss (ft)	0.11	Cum SA (acres)		1.26	0.54

Plan: Alt 5 Remove Brdg & Pier Stevens Branch Stevens Branch RS: 3921 Profile: 10%

E.G. Elev (ft)	587.46	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.35	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	587.10	Reach Len. (ft)	21.20	125.90	180.00
Crit W.S. (ft)	579.40	Flow Area (sq ft)	64.21	1263.84	1898.85
E.G. Slope (ft/ft)	0.000585	Area (sq ft)	90.73	1263.84	1898.85
Q Total (cfs)	7740.00	Flow (cfs)	12.34	6548.10	1179.56
Top Width (ft)	929.96	Top Width (ft)	162.99	102.80	664.17
Vel Total (ft/s)	2.40	Avg. Vel. (ft/s)	0.19	5.18	0.62
Max Chl Dpth (ft)	16.92	Hydr. Depth (ft)	0.45	12.29	2.86
Conv. Total (cfs)	319930.3	Conv. (cfs)	510.0	270663.4	48756.9
Length Wtd. (ft)	134.81	Wetted Per. (ft)	141.48	111.55	665.11
Min Ch EI (ft)	570.19	Shear (lb/sq ft)	0.02	0.41	0.10
Alpha	3.96	Stream Power (lb/ft s)	0.00	2.14	0.06
Frctn Loss (ft)	0.12	Cum Volume (acre-ft)	2.63	16.30	16.74
C & E Loss (ft)	0.08	Cum SA (acres)	2.24	1.53	5.88

Plan: Alt 5 Remove Brdg & Pier Stevens Branch Stevens Branch RS: 3921 Profile: 2%

E.G. Elev (ft)	589.85	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.30	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	589.55	Reach Len. (ft)	21.20	125.90	180.00
Crit W.S. (ft)	581.24	Flow Area (sq ft)	594.91	1514.91	3571.29
E.G. Slope (ft/ft)	0.000464	Area (sq ft)	681.29	1514.91	3571.29
Q Total (cfs)	11040.00	Flow (cfs)	307.25	7889.34	2843.42
Top Width (ft)	1040.30	Top Width (ft)	245.80	102.80	691.70
Vel Total (ft/s)	1.94	Avg. Vel. (ft/s)	0.52	5.21	0.80
Max Chl Dpth (ft)	19.36	Hydr. Depth (ft)	2.69	14.74	5.16
Conv. Total (cfs)	512294.6	Conv. (cfs)	14257.3	366092.8	131944.5
Length Wtd. (ft)	137.37	Wetted Per. (ft)	220.95	111.55	692.94
Min Ch El (ft)	570.19	Shear (lb/sq ft)	0.08	0.39	0.15
Alpha	5.18	Stream Power (lb/ft s)	0.04	2.05	0.12
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	9.51	20.19	34.01
C & E Loss (ft)	0.05	Cum SA (acres)	3.10	1.55	7.33

Plan: Alt 5 Remove Brdg & Pier Stevens Branch Stevens Branch RS: 3921 Profile: 1%

E.G. Elev (ft)	590.72	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.29	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	590.43	Reach Len. (ft)	21.20	125.90	180.00
Crit W.S. (ft)	581.98	Flow Area (sq ft)	790.00	1605.74	4186.54
E.G. Slope (ft/ft)	0.000431	Area (sq ft)	921.10	1605.74	4186.54
Q Total (cfs)	12400.00	Flow (cfs)	475.13	8379.62	3545.25
Top Width (ft)	1127.49	Top Width (ft)	312.69	102.80	711.99
Vel Total (ft/s)	1.88	Avg. Vel. (ft/s)	0.60	5.22	0.85
Max Chl Dpth (ft)	20.24	Hydr. Depth (ft)	3.58	15.62	5.88
Conv. Total (cfs)	596946.1	Conv. (cfs)	22873.2	403401.5	170671.4
Length Wtd. (ft)	137.54	Wetted Per. (ft)	220.95	111.55	713.30
Min Ch El (ft)	570.19	Shear (lb/sq ft)	0.10	0.39	0.16
Alpha	5.25	Stream Power (lb/ft s)	0.06	2.02	0.13
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	12.53	21.55	40.83
C & E Loss (ft)	0.05	Cum SA (acres)	3.49	1.55	7.93

Plan: Alt 5 Remove Brdg & Pier Stevens Branch Stevens Branch RS: 3921 Profile: 0.2%

E.G. Elev (ft)	592.19	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.28	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	591.92	Reach Len. (ft)	21.20	125.90	180.00
Crit W.S. (ft)	583.66	Flow Area (sq ft)	1117.90	1758.41	5270.36
E.G. Slope (ft/ft)	0.000397	Area (sq ft)	1400.71	1758.41	5270.36
Q Total (cfs)	14980.00	Flow (cfs)	813.00	9352.95	4814.05
Top Width (ft)	1175.53	Top Width (ft)	334.11	102.80	738.62
Vel Total (ft/s)	1.84	Avg. Vel. (ft/s)	0.73	5.32	0.91
Max Chl Dpth (ft)	21.73	Hydr. Depth (ft)	5.06	17.11	7.14
Conv. Total (cfs)	751690.9	Conv. (cfs)	40796.2	469327.5	241567.2
Length Wtd. (ft)	137.45	Wetted Per. (ft)	220.95	111.55	740.06
Min Ch El (ft)	570.19	Shear (lb/sq ft)	0.13	0.39	0.18
Alpha	5.31	Stream Power (lb/ft s)	0.09	2.08	0.16
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	18.33	23.90	53.36
C & E Loss (ft)	0.04	Cum SA (acres)	4.00	1.58	8.70

Plan: Alt 5 Remove Brdg & Pier Stevens Branch Stevens Branch RS: 3508 Profile: 50%

E.G. Elev (ft)	580.36	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.67	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	579.68	Reach Len. (ft)	245.30	268.30	311.80
Crit W.S. (ft)	577.03	Flow Area (sq ft)		380.68	13.46
E.G. Slope (ft/ft)	0.002190	Area (sq ft)		380.68	13.46
Q Total (cfs)	2524.00	Flow (cfs)		2513.13	10.87
Top Width (ft)	67.33	Top Width (ft)		60.01	7.32
Vel Total (ft/s)	6.40	Avg. Vel. (ft/s)		6.60	0.81
Max Chl Dpth (ft)	7.21	Hydr. Depth (ft)		6.34	1.84
Conv. Total (cfs)	53928.9	Conv. (cfs)		53696.6	232.3
Length Wtd. (ft)	268.39	Wetted Per. (ft)		62.86	8.18
Min Ch El (ft)	572.47	Shear (lb/sq ft)		0.83	0.23
Alpha	1.06	Stream Power (lb/ft s)		5.47	0.18
Frctn Loss (ft)	0.53	Cum Volume (acre-ft)		5.65	0.05
C & E Loss (ft)	0.05	Cum SA (acres)		0.94	0.03

Plan: Alt 5 Remove Brdg & Pier Stevens Branch Stevens Branch RS: 3508 Profile: 20%

E.G. Elev (ft)	582.84	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.91	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	581.92	Reach Len. (ft)	245.30	268.30	311.80
Crit W.S. (ft)	578.50	Flow Area (sq ft)		517.50	44.24
E.G. Slope (ft/ft)	0.002114	Area (sq ft)		517.50	44.24
Q Total (cfs)	4024.00	Flow (cfs)		3985.13	38.87
Top Width (ft)	120.78	Top Width (ft)		62.28	58.50
Vel Total (ft/s)	7.16	Avg. Vel. (ft/s)		7.70	0.88
Max Chl Dpth (ft)	9.45	Hydr. Depth (ft)		8.31	0.76
Conv. Total (cfs)	87511.2	Conv. (cfs)		86666.0	845.3
Length Wtd. (ft)	268.51	Wetted Per. (ft)		66.05	59.87
Min Ch El (ft)	572.47	Shear (lb/sq ft)		1.03	0.10
Alpha	1.14	Stream Power (lb/ft s)		7.96	0.09
Frctn Loss (ft)	0.50	Cum Volume (acre-ft)		7.91	0.16
C & E Loss (ft)	0.09	Cum SA (acres)		1.03	0.21

Plan: Alt 5 Remove Brdg & Pier Stevens Branch Stevens Branch RS: 3508 Profile: 10%

E.G. Elev (ft)	587.26	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.75	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	586.51	Reach Len. (ft)	245.30	268.30	311.80
Crit W.S. (ft)	581.44	Flow Area (sq ft)	41.18	819.43	1440.17
E.G. Slope (ft/ft)	0.001410	Area (sq ft)	41.23	819.43	1440.17
Q Total (cfs)	7740.00	Flow (cfs)	10.99	6312.59	1416.42
Top Width (ft)	637.97	Top Width (ft)	104.95	72.20	460.83
Vel Total (ft/s)	3.36	Avg. Vel. (ft/s)	0.27	7.70	0.98
Max Chl Dpth (ft)	14.04	Hydr. Depth (ft)	0.40	11.35	3.13
Conv. Total (cfs)	206095.5	Conv. (cfs)	292.6	168087.3	37715.6
Length Wtd. (ft)	273.68	Wetted Per. (ft)	104.04	77.15	468.25
Min Ch El (ft)	572.47	Shear (lb/sq ft)	0.03	0.94	0.27
Alpha	4.29	Stream Power (lb/ft s)	0.01	7.20	0.27
Frctn Loss (ft)	0.34	Cum Volume (acre-ft)	2.60	13.29	9.84
C & E Loss (ft)	0.04	Cum SA (acres)	2.18	1.28	3.55

Plan: Alt 5 Remove Brdg & Pier Stevens Branch Stevens Branch RS: 3508 Profile: 2%

E.G. Elev (ft)	589.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.58	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	589.13	Reach Len. (ft)	245.30	268.30	311.80
Crit W.S. (ft)	584.94	Flow Area (sq ft)	534.78	1008.89	2697.26
E.G. Slope (ft/ft)	0.000979	Area (sq ft)	557.13	1008.89	2697.26
Q Total (cfs)	11040.00	Flow (cfs)	397.88	7440.40	3201.73
Top Width (ft)	773.49	Top Width (ft)	210.90	72.20	490.39
Vel Total (ft/s)	2.60	Avg. Vel. (ft/s)	0.74	7.37	1.19
Max Chl Dpth (ft)	16.66	Hydr. Depth (ft)	2.66	13.97	5.50
Conv. Total (cfs)	352750.3	Conv. (cfs)	12713.0	237735.7	102301.6
Length Wtd. (ft)	276.50	Wetted Per. (ft)	201.05	77.15	503.20
Min Ch El (ft)	572.47	Shear (lb/sq ft)	0.16	0.80	0.33
Alpha	5.47	Stream Power (lb/ft s)	0.12	5.90	0.39
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)	9.21	16.54	21.06
C & E Loss (ft)	0.00	Cum SA (acres)	2.99	1.29	4.89

Plan: Alt 5 Remove Brdg & Pier Stevens Branch Stevens Branch RS: 3508 Profile: 1%

E.G. Elev (ft)	590.59	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.54	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	590.05	Reach Len. (ft)	245.30	268.30	311.80
Crit W.S. (ft)	585.96	Flow Area (sq ft)	720.01	1075.46	3151.52
E.G. Slope (ft/ft)	0.000885	Area (sq ft)	751.58	1075.46	3151.52
Q Total (cfs)	12400.00	Flow (cfs)	620.90	7867.67	3911.44
Top Width (ft)	778.03	Top Width (ft)	210.90	72.20	494.93
Vel Total (ft/s)	2.51	Avg. Vel. (ft/s)	0.86	7.32	1.24
Max Chl Dpth (ft)	17.58	Hydr. Depth (ft)	3.58	14.90	6.37
Conv. Total (cfs)	416792.0	Conv. (cfs)	20869.7	264450.2	131472.2
Length Wtd. (ft)	277.11	Wetted Per. (ft)	201.05	77.15	509.67
Min Ch El (ft)	572.47	Shear (lb/sq ft)	0.20	0.77	0.34
Alpha	5.49	Stream Power (lb/ft s)	0.17	5.63	0.42
Frctn Loss (ft)	0.24	Cum Volume (acre-ft)	12.13	17.68	25.67
C & E Loss (ft)	0.00	Cum SA (acres)	3.36	1.30	5.44

Plan: Alt 5 Remove Brdg & Pier Stevens Branch Stevens Branch RS: 3508 Profile: 0.2%

E.G. Elev (ft)	592.08	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.50	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	591.58	Reach Len. (ft)	245.30	268.30	311.80
Crit W.S. (ft)	586.70	Flow Area (sq ft)	1025.89	1185.39	3911.23
E.G. Slope (ft/ft)	0.000787	Area (sq ft)	1165.83	1185.39	3911.23
Q Total (cfs)	14980.00	Flow (cfs)	1055.99	8722.98	5201.03
Top Width (ft)	876.85	Top Width (ft)	300.54	72.20	504.11
Vel Total (ft/s)	2.45	Avg. Vel. (ft/s)	1.03	7.36	1.33
Max Chl Dpth (ft)	19.11	Hydr. Depth (ft)	5.11	16.42	7.76
Conv. Total (cfs)	534113.5	Conv. (cfs)	37651.5	311018.6	185443.4
Length Wtd. (ft)	278.14	Wetted Per. (ft)	201.05	77.15	522.04
Min Ch El (ft)	572.47	Shear (lb/sq ft)	0.25	0.75	0.37
Alpha	5.38	Stream Power (lb/ft s)	0.26	5.55	0.49
Frctn Loss (ft)	0.21	Cum Volume (acre-ft)	17.71	19.65	34.39
C & E Loss (ft)	0.01	Cum SA (acres)	3.84	1.33	6.13



Plan: Alt 5 Remove Brdg & Pier Stevens Branch Stevens Branch RS: 2628 Profile: 50%

E.G. Elev (ft)	579.78	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.50	Wt. n-Val.		0.035	
W.S. Elev (ft)	579.28	Reach Len. (ft)	382.10	343.40	269.80
Crit W.S. (ft)	576.32	Flow Area (sq ft)		445.41	
E.G. Slope (ft/ft)	0.001784	Area (sq ft)		445.41	
Q Total (cfs)	2524.00	Flow (cfs)		2524.00	
Top Width (ft)	75.70	Top Width (ft)		75.70	
Vel Total (ft/s)	5.67	Avg. Vel. (ft/s)		5.67	
Max Chl Dpth (ft)	7.17	Hydr. Depth (ft)		5.88	
Conv. Total (cfs)	59761.7	Conv. (cfs)		59761.7	
Length Wtd. (ft)	343.40	Wetted Per. (ft)		79.28	
Min Ch El (ft)	572.11	Shear (lb/sq ft)		0.63	
Alpha	1.00	Stream Power (lb/ft s)		3.55	
Frctn Loss (ft)	0.78	Cum Volume (acre-ft)		3.11	
C & E Loss (ft)	0.03	Cum SA (acres)		0.52	

Plan: Alt 5 Remove Brdg & Pier Stevens Branch Stevens Branch RS: 2628 Profile: 20%

E.G. Elev (ft)	582.25	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.63	Wt. n-Val.		0.035	
W.S. Elev (ft)	581.62	Reach Len. (ft)	382.10	343.40	269.80
Crit W.S. (ft)	577.68	Flow Area (sq ft)		633.47	
E.G. Slope (ft/ft)	0.001653	Area (sq ft)		633.47	
Q Total (cfs)	4024.00	Flow (cfs)		4024.00	
Top Width (ft)	84.88	Top Width (ft)		84.88	
Vel Total (ft/s)	6.35	Avg. Vel. (ft/s)		6.35	
Max Chl Dpth (ft)	9.51	Hydr. Depth (ft)		7.46	
Conv. Total (cfs)	98959.9	Conv. (cfs)		98959.9	
Length Wtd. (ft)	343.40	Wetted Per. (ft)		89.75	
Min Ch El (ft)	572.11	Shear (lb/sq ft)		0.73	
Alpha	1.00	Stream Power (lb/ft s)		4.63	
Frctn Loss (ft)	0.75	Cum Volume (acre-ft)		4.37	
C & E Loss (ft)	0.05	Cum SA (acres)		0.58	

Plan: Alt 5 Remove Brdg & Pier Stevens Branch Stevens Branch RS: 2628 Profile: 10%

E.G. Elev (ft)	586.88	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.61	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	586.27	Reach Len. (ft)	382.10	343.40	269.80
Crit W.S. (ft)	580.37	Flow Area (sq ft)	164.12	1094.69	689.44
E.G. Slope (ft/ft)	0.001098	Area (sq ft)	344.46	1094.69	689.44
Q Total (cfs)	7740.00	Flow (cfs)	72.53	7125.51	541.96
Top Width (ft)	625.57	Top Width (ft)	261.19	104.60	259.78
Vel Total (ft/s)	3.97	Avg. Vel. (ft/s)	0.44	6.51	0.79
Max Chl Dpth (ft)	14.16	Hydr. Depth (ft)	1.12	10.47	2.65
Conv. Total (cfs)	233581.5	Conv. (cfs)	2189.0	215037.0	16355.5
Length Wtd. (ft)	340.95	Wetted Per. (ft)	146.80	109.99	259.99
Min Ch El (ft)	572.11	Shear (lb/sq ft)	0.08	0.68	0.18
Alpha	2.47	Stream Power (lb/ft s)	0.03	4.44	0.14
Frctn Loss (ft)	0.58	Cum Volume (acre-ft)	1.51	7.39	2.22
C & E Loss (ft)	0.09	Cum SA (acres)	1.15	0.73	0.97

Plan: Alt 5 Remove Brdg & Pier Stevens Branch Stevens Branch RS: 2628 Profile: 2%

E.G. Elev (ft)	589.45	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.58	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	588.88	Reach Len. (ft)	382.10	343.40	269.80
Crit W.S. (ft)	582.32	Flow Area (sq ft)	546.05	1367.20	1573.04
E.G. Slope (ft/ft)	0.000861	Area (sq ft)	1060.90	1367.20	1573.04
Q Total (cfs)	11040.00	Flow (cfs)	476.33	9139.98	1423.69
Top Width (ft)	837.72	Top Width (ft)	333.22	104.60	399.91
Vel Total (ft/s)	3.17	Avg. Vel. (ft/s)	0.87	6.69	0.91
Max Chl Dpth (ft)	16.77	Hydr. Depth (ft)	3.72	13.07	3.93
Conv. Total (cfs)	376218.8	Conv. (cfs)	16232.2	311470.4	48516.1
Length Wtd. (ft)	338.45	Wetted Per. (ft)	146.80	109.99	400.17
Min Ch El (ft)	572.11	Shear (lb/sq ft)	0.20	0.67	0.21
Alpha	3.70	Stream Power (lb/ft s)	0.17	4.47	0.19
Frctn Loss (ft)	0.49	Cum Volume (acre-ft)	4.65	9.22	5.78
C & E Loss (ft)	0.13	Cum SA (acres)	1.46	0.75	1.70

Plan: Alt 5 Remove Brdg & Pier Stevens Branch Stevens Branch RS: 2628 Profile: 1%

E.G. Elev (ft)	590.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.58	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	589.77	Reach Len. (ft)	382.10	343.40	269.80
Crit W.S. (ft)	583.84	Flow Area (sq ft)	676.72	1460.43	1960.05
E.G. Slope (ft/ft)	0.000818	Area (sq ft)	1390.03	1460.43	1960.05
Q Total (cfs)	12400.00	Flow (cfs)	664.01	9946.55	1789.45
Top Width (ft)	962.17	Top Width (ft)	384.06	104.60	473.51
Vel Total (ft/s)	3.03	Avg. Vel. (ft/s)	0.98	6.81	0.91
Max Chl Dpth (ft)	17.66	Hydr. Depth (ft)	4.62	13.96	4.14
Conv. Total (cfs)	433425.3	Conv. (cfs)	23209.5	347668.1	62547.6
Length Wtd. (ft)	337.53	Wetted Per. (ft)	146.80	109.99	473.78
Min Ch El (ft)	572.11	Shear (lb/sq ft)	0.24	0.68	0.21
Alpha	4.08	Stream Power (lb/ft s)	0.23	4.62	0.19
Frctn Loss (ft)	0.48	Cum Volume (acre-ft)	6.10	9.87	7.38
C & E Loss (ft)	0.13	Cum SA (acres)	1.68	0.76	1.97

Plan: Alt 5 Remove Brdg & Pier Stevens Branch Stevens Branch RS: 2628 Profile: 0.2%

E.G. Elev (ft)	591.86	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.57	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	591.28	Reach Len. (ft)	382.10	343.40	269.80
Crit W.S. (ft)	585.05	Flow Area (sq ft)	898.75	1618.85	2739.83
E.G. Slope (ft/ft)	0.000748	Area (sq ft)	1989.00	1618.85	2739.83
Q Total (cfs)	14980.00	Flow (cfs)	1018.57	11288.78	2672.66
Top Width (ft)	1062.34	Top Width (ft)	397.60	104.60	560.14
Vel Total (ft/s)	2.85	Avg. Vel. (ft/s)	1.13	6.97	0.98
Max Chl Dpth (ft)	19.17	Hydr. Depth (ft)	6.13	15.48	4.89
Conv. Total (cfs)	547737.8	Conv. (cfs)	37243.4	412769.8	97724.6
Length Wtd. (ft)	335.51	Wetted Per. (ft)	146.80	109.99	560.43
Min Ch El (ft)	572.11	Shear (lb/sq ft)	0.29	0.69	0.23
Alpha	4.55	Stream Power (lb/ft s)	0.32	4.79	0.22
Frctn Loss (ft)	0.45	Cum Volume (acre-ft)	8.83	11.01	10.59
C & E Loss (ft)	0.14	Cum SA (acres)	1.88	0.78	2.32

Plan: Alt 5 Remove Brdg & Pier Stevens Branch Stevens Branch RS: 1501 Profile: 50%

E.G. Elev (ft)	578.96	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.84	Wt. n-Val.		0.035	
W.S. Elev (ft)	578.12	Reach Len. (ft)			
Crit W.S. (ft)	575.76	Flow Area (sq ft)		343.65	
E.G. Slope (ft/ft)	0.003000	Area (sq ft)		343.65	
Q Total (cfs)	2524.00	Flow (cfs)		2524.00	
Top Width (ft)	56.60	Top Width (ft)		56.60	
Vel Total (ft/s)	7.34	Avg. Vel. (ft/s)		7.34	
Max Chl Dpth (ft)	7.34	Hydr. Depth (ft)		6.07	
Conv. Total (cfs)	46079.4	Conv. (cfs)		46079.4	
Length Wtd. (ft)		Wetted Per. (ft)		61.22	
Min Ch El (ft)	570.78	Shear (lb/sq ft)		1.05	
Alpha	1.00	Stream Power (lb/ft s)		7.72	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Plan: Alt 5 Remove Brdg & Pier Stevens Branch Stevens Branch RS: 1501 Profile: 20%

E.G. Elev (ft)	581.45	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.11	Wt. n-Val.		0.035	
W.S. Elev (ft)	580.34	Reach Len. (ft)			
Crit W.S. (ft)	577.37	Flow Area (sq ft)		475.20	
E.G. Slope (ft/ft)	0.003000	Area (sq ft)		475.20	
Q Total (cfs)	4024.00	Flow (cfs)		4024.00	
Top Width (ft)	62.21	Top Width (ft)		62.21	
Vel Total (ft/s)	8.47	Avg. Vel. (ft/s)		8.47	
Max Chl Dpth (ft)	9.56	Hydr. Depth (ft)		7.64	
Conv. Total (cfs)	73466.4	Conv. (cfs)		73466.4	
Length Wtd. (ft)		Wetted Per. (ft)		68.38	
Min Ch El (ft)	570.78	Shear (lb/sq ft)		1.30	
Alpha	1.00	Stream Power (lb/ft s)		11.02	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Plan: Alt 5 Remove Brdg & Pier Stevens Branch Stevens Branch RS: 1501 Profile: 10%

E.G. Elev (ft)	586.20	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.52	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	584.69	Reach Len. (ft)			
Crit W.S. (ft)	580.55	Flow Area (sq ft)		781.30	26.87
E.G. Slope (ft/ft)	0.003002	Area (sq ft)		781.30	26.87
Q Total (cfs)	7740.00	Flow (cfs)		7728.56	11.44
Top Width (ft)	134.77	Top Width (ft)		80.76	54.01
Vel Total (ft/s)	9.58	Avg. Vel. (ft/s)		9.89	0.43
Max Chl Dpth (ft)	13.91	Hydr. Depth (ft)		9.67	0.50
Conv. Total (cfs)	141273.9	Conv. (cfs)		141065.0	208.9
Length Wtd. (ft)		Wetted Per. (ft)		89.09	54.03
Min Ch El (ft)	570.78	Shear (lb/sq ft)		1.64	0.09
Alpha	1.07	Stream Power (lb/ft s)		16.26	0.04
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Plan: Alt 5 Remove Brdg & Pier Stevens Branch Stevens Branch RS: 1501 Profile: 2%

E.G. Elev (ft)	588.83	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.84	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	586.99	Reach Len. (ft)			
Crit W.S. (ft)	582.87	Flow Area (sq ft)		972.25	293.00
E.G. Slope (ft/ft)	0.003000	Area (sq ft)		972.25	293.00
Q Total (cfs)	11040.00	Flow (cfs)		10729.31	310.69
Top Width (ft)	234.94	Top Width (ft)		85.15	149.79
Vel Total (ft/s)	8.73	Avg. Vel. (ft/s)		11.04	1.06
Max Chl Dpth (ft)	16.21	Hydr. Depth (ft)		11.42	1.96
Conv. Total (cfs)	201552.3	Conv. (cfs)		195880.1	5672.1
Length Wtd. (ft)		Wetted Per. (ft)		94.05	149.89
Min Ch El (ft)	570.78	Shear (lb/sq ft)		1.94	0.37
Alpha	1.55	Stream Power (lb/ft s)		21.37	0.39
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Plan: Alt 5 Remove Brdg & Pier Stevens Branch Stevens Branch RS: 1501 Profile: 1%

E.G. Elev (ft)	589.74	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.92	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	587.81	Reach Len. (ft)			
Crit W.S. (ft)	583.95	Flow Area (sq ft)		1043.00	421.69
E.G. Slope (ft/ft)	0.003000	Area (sq ft)		1043.00	421.69
Q Total (cfs)	12400.00	Flow (cfs)		11862.80	537.20
Top Width (ft)	251.04	Top Width (ft)		87.36	163.68
Vel Total (ft/s)	8.47	Avg. Vel. (ft/s)		11.37	1.27
Max Chl Dpth (ft)	17.03	Hydr. Depth (ft)		11.94	2.58
Conv. Total (cfs)	226400.3	Conv. (cfs)		216592.1	9808.2
Length Wtd. (ft)		Wetted Per. (ft)		96.41	163.80
Min Ch El (ft)	570.78	Shear (lb/sq ft)		2.03	0.48
Alpha	1.73	Stream Power (lb/ft s)		23.04	0.61
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Plan: Alt 5 Remove Brdg & Pier Stevens Branch Stevens Branch RS: 1501 Profile: 0.2%

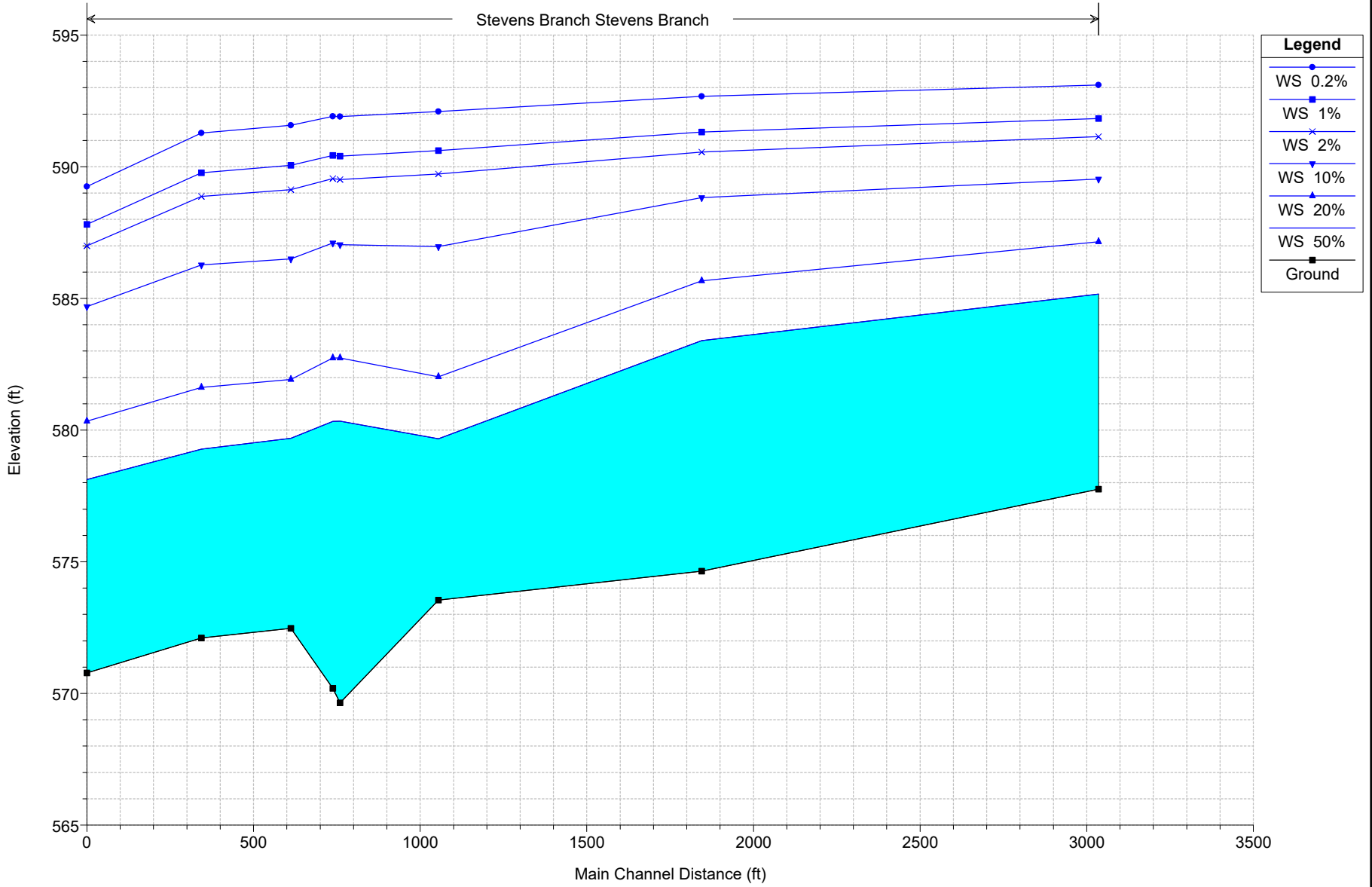
E.G. Elev (ft)	591.26	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.02	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	589.25	Reach Len. (ft)			
Crit W.S. (ft)	585.90	Flow Area (sq ft)	23.68	1174.44	679.83
E.G. Slope (ft/ft)	0.003006	Area (sq ft)	23.68	1174.44	679.83
Q Total (cfs)	14980.00	Flow (cfs)	13.70	13883.31	1082.99
Top Width (ft)	312.49	Top Width (ft)	30.04	93.50	188.95
Vel Total (ft/s)	7.98	Avg. Vel. (ft/s)	0.58	11.82	1.59
Max Chl Dpth (ft)	18.47	Hydr. Depth (ft)	0.79	12.56	3.60
Conv. Total (cfs)	273227.7	Conv. (cfs)	250.0	253224.5	19753.2
Length Wtd. (ft)		Wetted Per. (ft)	30.08	102.61	189.13
Min Ch El (ft)	570.78	Shear (lb/sq ft)	0.15	2.15	0.67
Alpha	2.04	Stream Power (lb/ft s)	0.09	25.39	1.07
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

## HEC-RAS Results for Alternative 6

# Bridge 308

Geom: Alternative 6 - No bridge, piers, abuts

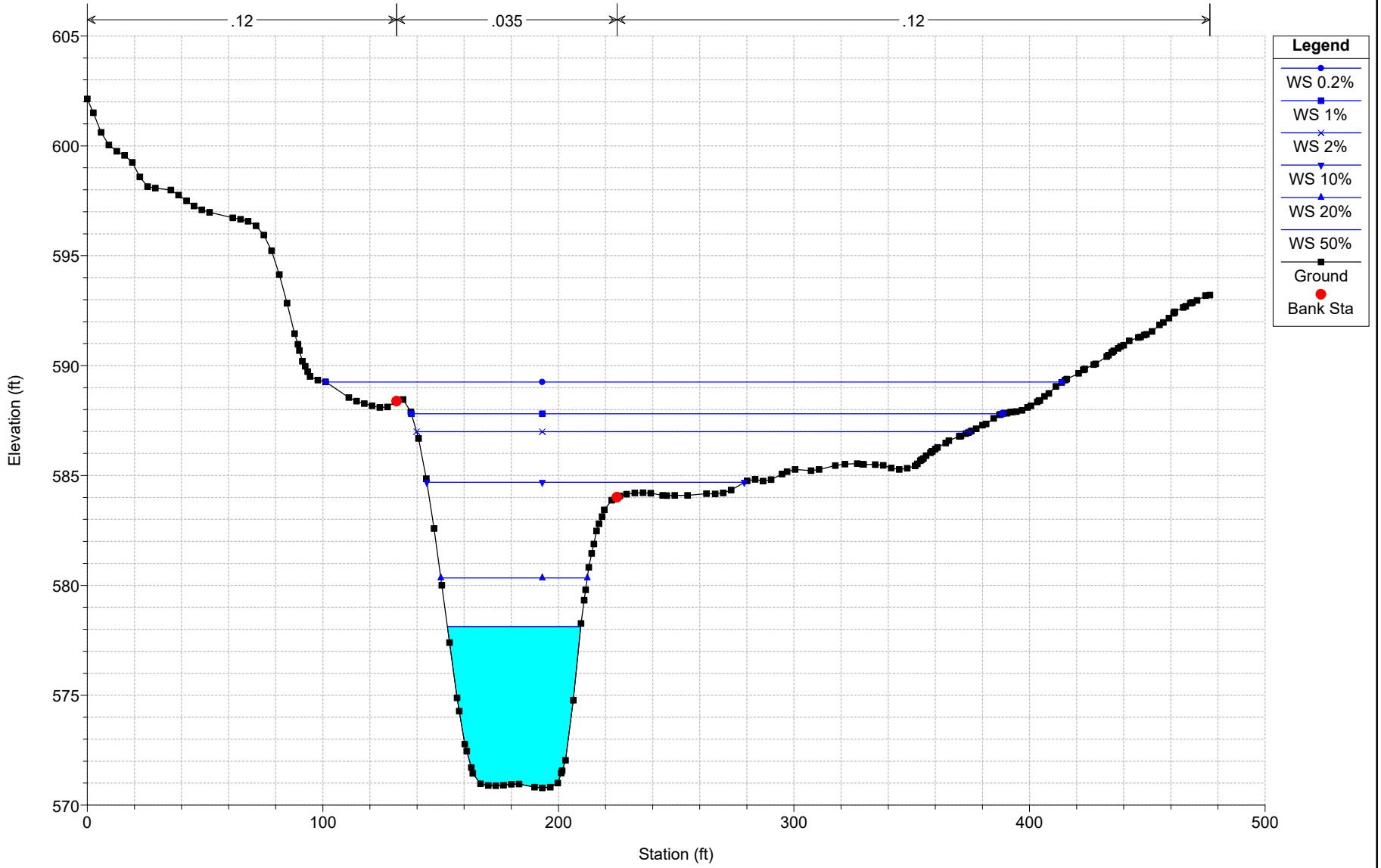
Stevens Branch Stevens Branch



# Bridge 308

Geom: Alternative 6 - No bridge, piers, abuts

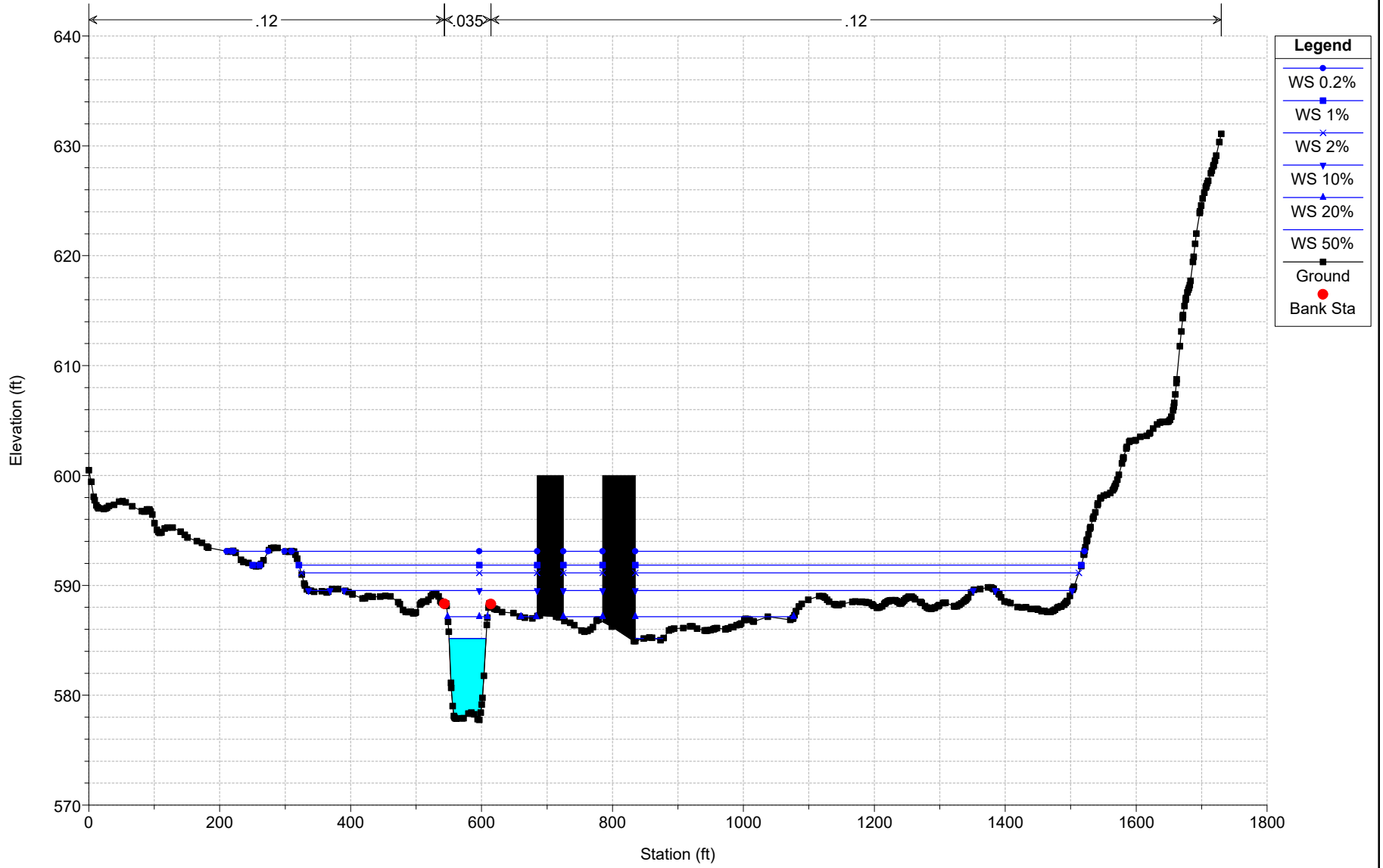
RS = 1501



# Bridge 308

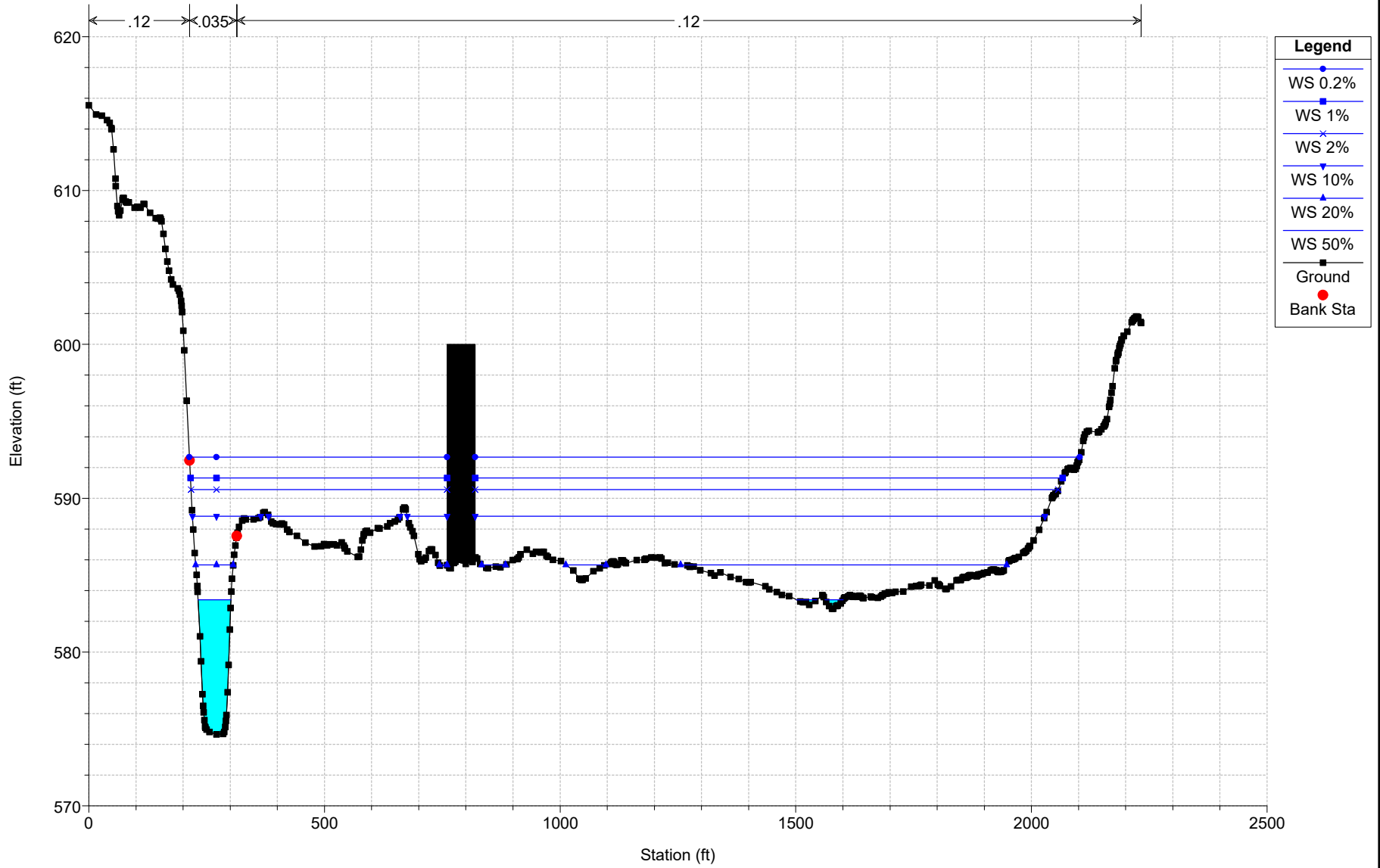
Geom: Alternative 6 - No bridge, piers, abuts

RS = 11459





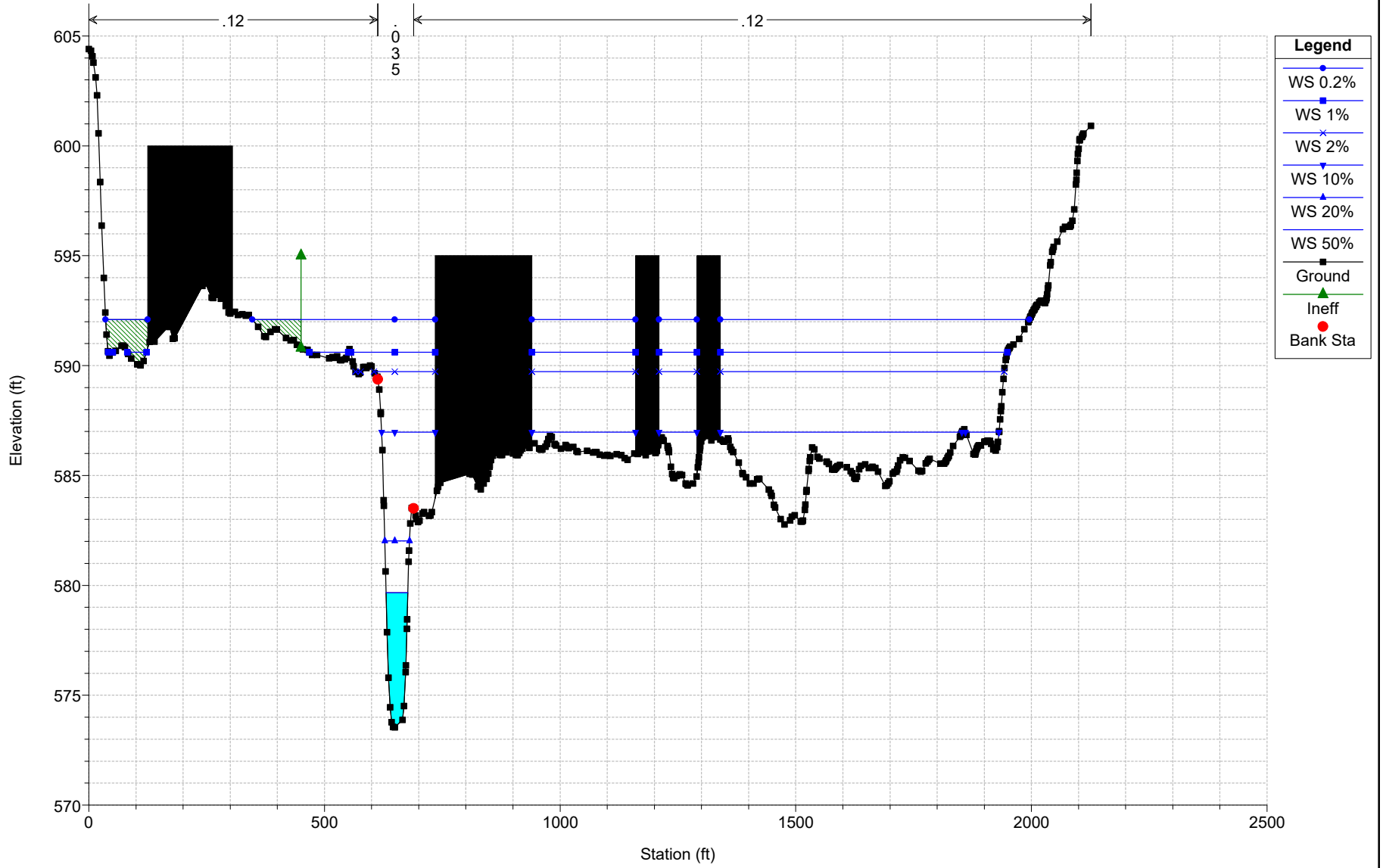
Bridge 308  
Geom: Alternative 6 - No bridge, piers, abuts  
RS = 7552



# Bridge 308

Geom: Alternative 6 - No bridge, piers, abuts

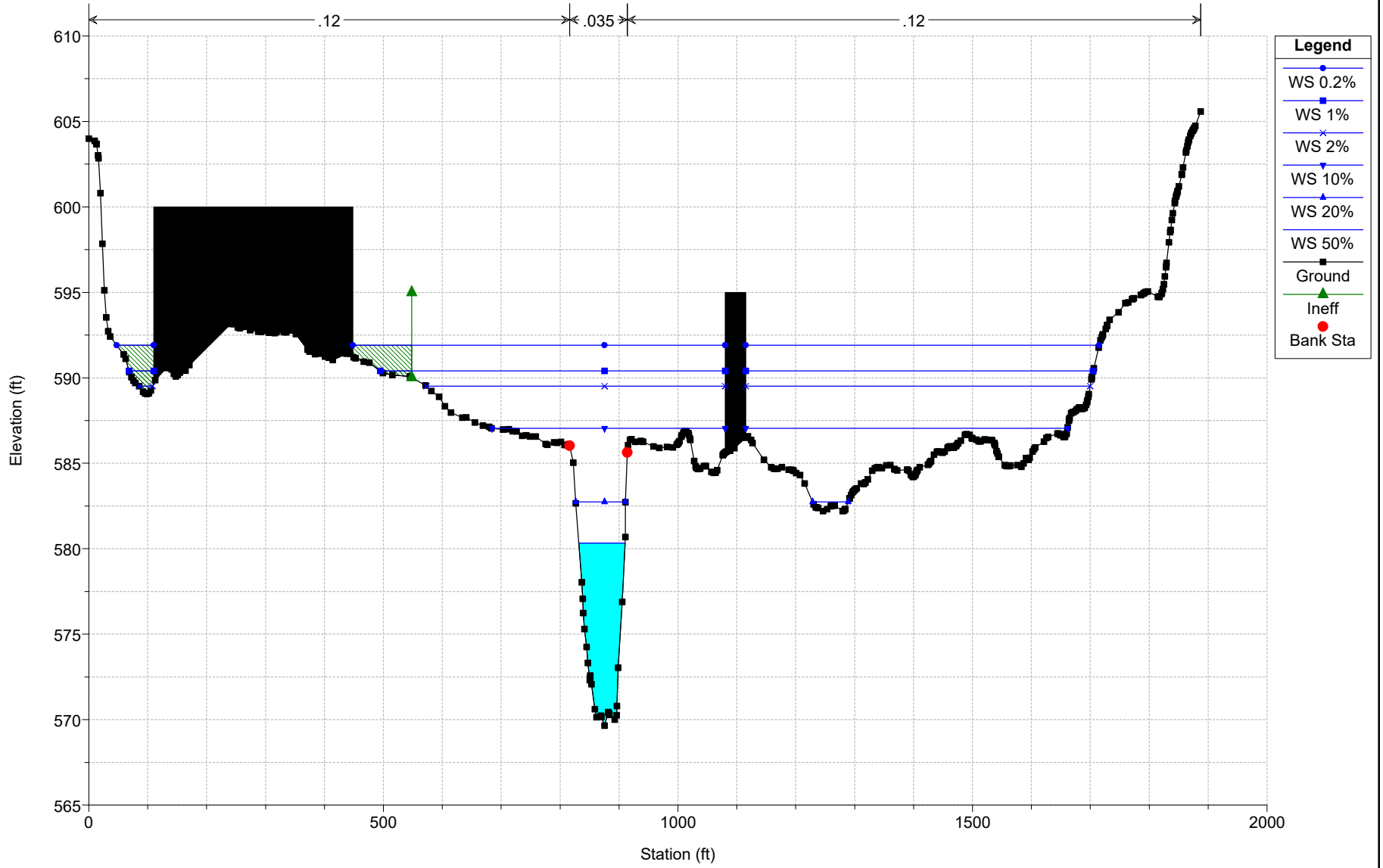
RS = 4962



# Bridge 308

Geom: Alternative 6 - No bridge, piers, abuts

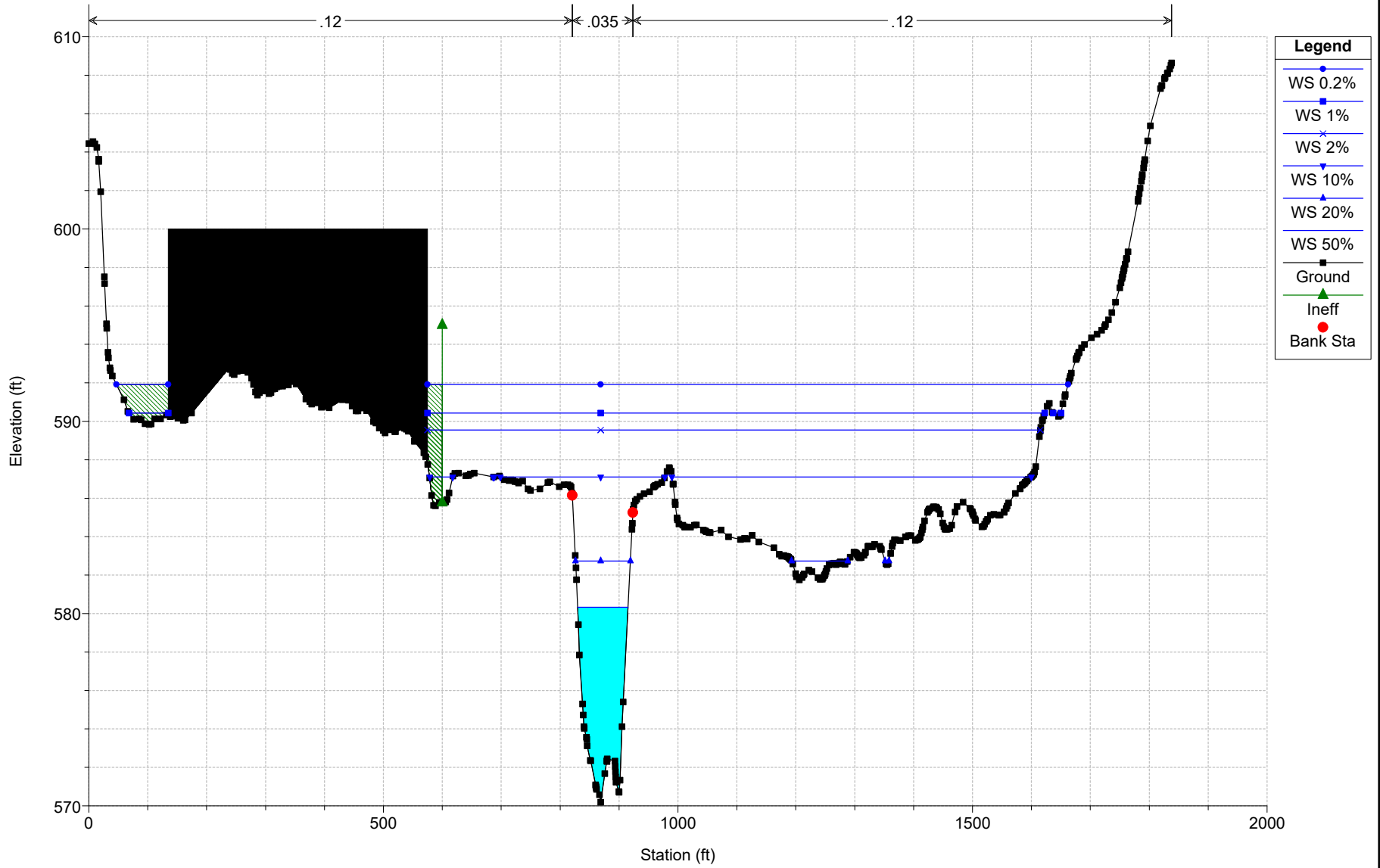
RS = 3994



# Bridge 308

Geom: Alternative 6 - No bridge, piers, abuts

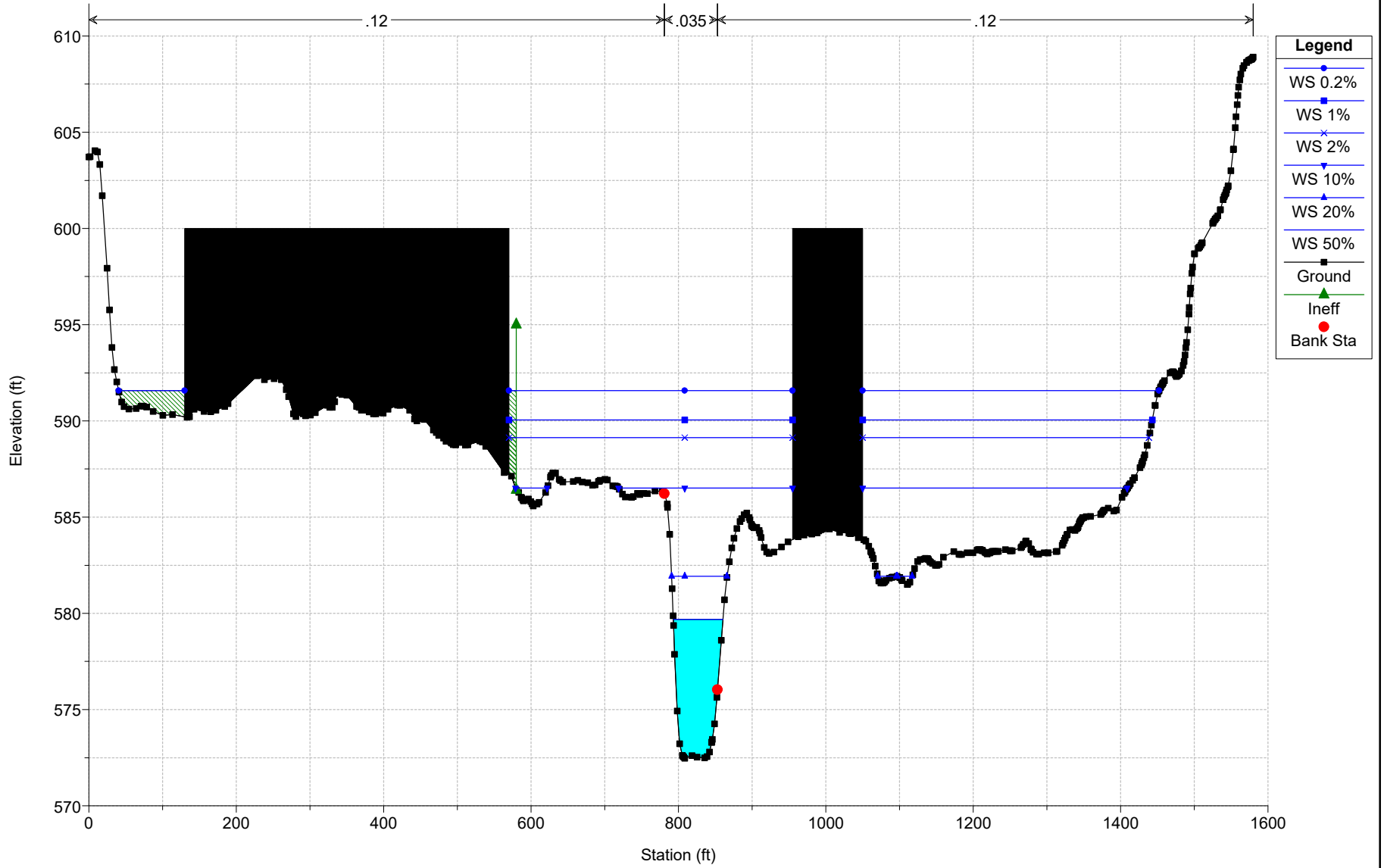
RS = 3921



# Bridge 308

Geom: Alternative 6 - No bridge, piers, abuts

RS = 3508





Plan: Alt 6 Remove Brdg, Pier, Abut Stevens Branch Stevens Branch RS: 11459 Profile: 50%

E.G. Elev (ft)	585.95	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.79	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	585.16	Reach Len. (ft)	1191.60	1191.00	1181.80
Crit W.S. (ft)	582.67	Flow Area (sq ft)		353.44	2.37
E.G. Slope (ft/ft)	0.002787	Area (sq ft)		353.44	2.37
Q Total (cfs)	2524.00	Flow (cfs)		2523.67	0.33
Top Width (ft)	80.84	Top Width (ft)		56.46	24.38
Vel Total (ft/s)	7.09	Avg. Vel. (ft/s)		7.14	0.14
Max Chl Dpth (ft)	7.40	Hydr. Depth (ft)		6.26	0.10
Conv. Total (cfs)	47814.1	Conv. (cfs)		47807.7	6.3
Length Wtd. (ft)	1190.99	Wetted Per. (ft)		62.15	24.63
Min Ch El (ft)	577.76	Shear (lb/sq ft)		0.99	0.02
Alpha	1.01	Stream Power (lb/ft s)		7.06	0.00
Frctn Loss (ft)	2.03	Cum Volume (acre-ft)		28.31	0.50
C & E Loss (ft)	0.12	Cum SA (acres)		4.39	1.93

Plan: Alt 6 Remove Brdg, Pier, Abut Stevens Branch Stevens Branch RS: 11459 Profile: 20%

E.G. Elev (ft)	588.15	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.00	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	587.16	Reach Len. (ft)	1191.60	1191.00	1181.80
Crit W.S. (ft)	584.22	Flow Area (sq ft)		469.88	285.27
E.G. Slope (ft/ft)	0.002834	Area (sq ft)		469.88	285.27
Q Total (cfs)	4024.00	Flow (cfs)		3845.71	178.29
Top Width (ft)	386.36	Top Width (ft)		60.94	325.41
Vel Total (ft/s)	5.33	Avg. Vel. (ft/s)		8.18	0.62
Max Chl Dpth (ft)	9.40	Hydr. Depth (ft)		7.71	0.88
Conv. Total (cfs)	75582.7	Conv. (cfs)		72233.8	3348.8
Length Wtd. (ft)	1190.24	Wetted Per. (ft)		68.19	328.61
Min Ch El (ft)	577.76	Shear (lb/sq ft)		1.22	0.15
Alpha	2.26	Stream Power (lb/ft s)		9.98	0.10
Frctn Loss (ft)	1.91	Cum Volume (acre-ft)		38.69	23.47
C & E Loss (ft)	0.18	Cum SA (acres)		4.88	21.36

Plan: Alt 6 Remove Brdg, Pier, Abut Stevens Branch Stevens Branch RS: 11459 Profile: 10%

E.G. Elev (ft)	590.55	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.02	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	589.54	Reach Len. (ft)	1191.60	1191.00	1181.80
Crit W.S. (ft)	588.47	Flow Area (sq ft)	136.11	629.36	1612.65
E.G. Slope (ft/ft)	0.002992	Area (sq ft)	136.11	629.36	1612.65
Q Total (cfs)	7740.00	Flow (cfs)	82.19	5848.73	1809.09
Top Width (ft)	1021.63	Top Width (ft)	186.33	70.80	764.50
Vel Total (ft/s)	3.25	Avg. Vel. (ft/s)	0.60	9.29	1.12
Max Chl Dpth (ft)	11.78	Hydr. Depth (ft)	0.73	8.89	2.11
Conv. Total (cfs)	141503.1	Conv. (cfs)	1502.6	106926.8	33073.8
Length Wtd. (ft)	1187.82	Wetted Per. (ft)	186.53	78.62	777.55
Min Ch El (ft)	577.76	Shear (lb/sq ft)	0.14	1.50	0.39
Alpha	6.19	Stream Power (lb/ft s)	0.08	13.90	0.43
Frctn Loss (ft)	1.30	Cum Volume (acre-ft)	4.63	59.05	160.05
C & E Loss (ft)	0.25	Cum SA (acres)	5.06	5.86	60.14

Plan: Alt 6 Remove Brdg, Pier, Abut Stevens Branch Stevens Branch RS: 11459 Profile: 2%

E.G. Elev (ft)	591.90	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.76	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	591.14	Reach Len. (ft)	1191.60	1191.00	1181.80
Crit W.S. (ft)	589.98	Flow Area (sq ft)	478.99	743.00	2896.43
E.G. Slope (ft/ft)	0.002230	Area (sq ft)	478.99	743.00	2896.43
Q Total (cfs)	11040.00	Flow (cfs)	471.40	6657.86	3910.74
Top Width (ft)	1097.96	Top Width (ft)	219.00	70.80	808.16
Vel Total (ft/s)	2.68	Avg. Vel. (ft/s)	0.98	8.96	1.35
Max Chl Dpth (ft)	13.38	Hydr. Depth (ft)	2.19	10.49	3.58
Conv. Total (cfs)	233809.6	Conv. (cfs)	9983.5	141002.9	82823.2
Length Wtd. (ft)	1186.79	Wetted Per. (ft)	219.34	78.62	827.78
Min Ch El (ft)	577.76	Shear (lb/sq ft)	0.30	1.32	0.49
Alpha	6.83	Stream Power (lb/ft s)	0.30	11.79	0.66
Frctn Loss (ft)	1.02	Cum Volume (acre-ft)	17.23	71.64	284.72
C & E Loss (ft)	0.19	Cum SA (acres)	6.82	6.04	63.72

Plan: Alt 6 Remove Brdg, Pier, Abut Stevens Branch Stevens Branch RS: 11459 Profile: 1%

E.G. Elev (ft)	592.50	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.66	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	591.84	Reach Len. (ft)	1191.60	1191.00	1181.80
Crit W.S. (ft)	590.36	Flow Area (sq ft)	633.00	792.16	3459.03
E.G. Slope (ft/ft)	0.001917	Area (sq ft)	633.00	792.16	3459.03
Q Total (cfs)	12400.00	Flow (cfs)	687.05	6869.57	4843.38
Top Width (ft)	1116.09	Top Width (ft)	233.19	70.80	812.10
Vel Total (ft/s)	2.54	Avg. Vel. (ft/s)	1.09	8.67	1.40
Max Chl Dpth (ft)	14.08	Hydr. Depth (ft)	2.71	11.19	4.26
Conv. Total (cfs)	283202.5	Conv. (cfs)	15691.6	156893.4	110617.5
Length Wtd. (ft)	1186.48	Wetted Per. (ft)	233.60	78.62	834.56
Min Ch El (ft)	577.76	Shear (lb/sq ft)	0.32	1.21	0.50
Alpha	6.59	Stream Power (lb/ft s)	0.35	10.46	0.69
Frctn Loss (ft)	0.90	Cum Volume (acre-ft)	23.71	76.53	335.45
C & E Loss (ft)	0.16	Cum SA (acres)	9.44	6.08	64.66

Plan: Alt 6 Remove Brdg, Pier, Abut Stevens Branch Stevens Branch RS: 11459 Profile: 0.2%

E.G. Elev (ft)	593.64	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.53	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	593.11	Reach Len. (ft)	1191.60	1191.00	1181.80
Crit W.S. (ft)	590.85	Flow Area (sq ft)	966.98	882.25	4495.68
E.G. Slope (ft/ft)	0.001503	Area (sq ft)	966.98	882.25	4495.68
Q Total (cfs)	14980.00	Flow (cfs)	1120.48	7279.52	6580.00
Top Width (ft)	1192.05	Top Width (ft)	304.17	70.80	817.08
Vel Total (ft/s)	2.36	Avg. Vel. (ft/s)	1.16	8.25	1.46
Max Chl Dpth (ft)	15.35	Hydr. Depth (ft)	3.18	12.46	5.50
Conv. Total (cfs)	386351.0	Conv. (cfs)	28898.3	187747.0	169705.7
Length Wtd. (ft)	1186.07	Wetted Per. (ft)	304.79	78.62	844.78
Min Ch El (ft)	577.76	Shear (lb/sq ft)	0.30	1.05	0.50
Alpha	6.12	Stream Power (lb/ft s)	0.35	8.69	0.73
Frctn Loss (ft)	0.74	Cum Volume (acre-ft)	39.93	85.14	426.66
C & E Loss (ft)	0.13	Cum SA (acres)	12.84	6.14	66.70



Plan: Alt 6 Remove Brdg, Pier, Abut Stevens Branch Stevens Branch RS: 7552 Profile: 50%

E.G. Elev (ft)	583.80	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.40	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	583.40	Reach Len. (ft)	852.90	789.50	477.70
Crit W.S. (ft)		Flow Area (sq ft)		495.26	20.34
E.G. Slope (ft/ft)	0.001153	Area (sq ft)		495.26	20.34
Q Total (cfs)	2524.00	Flow (cfs)		2520.33	3.67
Top Width (ft)	151.46	Top Width (ft)		69.61	81.85
Vel Total (ft/s)	4.90	Avg. Vel. (ft/s)		5.09	0.18
Max Chl Dpth (ft)	8.76	Hydr. Depth (ft)		7.11	0.25
Conv. Total (cfs)	74340.5	Conv. (cfs)		74232.4	108.1
Length Wtd. (ft)	789.27	Wetted Per. (ft)		74.66	81.88
Min Ch El (ft)	574.64	Shear (lb/sq ft)		0.48	0.02
Alpha	1.08	Stream Power (lb/ft s)		2.43	0.00
Frctn Loss (ft)	2.00	Cum Volume (acre-ft)		16.71	0.19
C & E Loss (ft)	0.16	Cum SA (acres)		2.67	0.49

Plan: Alt 6 Remove Brdg, Pier, Abut Stevens Branch Stevens Branch RS: 7552 Profile: 20%

E.G. Elev (ft)	586.06	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.39	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	585.67	Reach Len. (ft)	852.90	789.50	477.70
Crit W.S. (ft)		Flow Area (sq ft)		662.61	1003.88
E.G. Slope (ft/ft)	0.001033	Area (sq ft)		662.61	1003.88
Q Total (cfs)	4024.00	Flow (cfs)		3541.08	482.92
Top Width (ft)	922.64	Top Width (ft)		79.36	843.27
Vel Total (ft/s)	2.41	Avg. Vel. (ft/s)		5.34	0.48
Max Chl Dpth (ft)	11.03	Hydr. Depth (ft)		8.35	1.19
Conv. Total (cfs)	125229.9	Conv. (cfs)		110200.9	15029.0
Length Wtd. (ft)	770.79	Wetted Per. (ft)		85.46	843.44
Min Ch El (ft)	574.64	Shear (lb/sq ft)		0.50	0.08
Alpha	4.32	Stream Power (lb/ft s)		2.67	0.04
Frctn Loss (ft)	1.68	Cum Volume (acre-ft)		23.21	5.98
C & E Loss (ft)	0.18	Cum SA (acres)		2.96	5.51

Plan: Alt 6 Remove Brdg, Pier, Abut Stevens Branch Stevens Branch RS: 7552 Profile: 10%

E.G. Elev (ft)	589.00	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.17	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	588.83	Reach Len. (ft)	852.90	789.50	477.70
Crit W.S. (ft)		Flow Area (sq ft)		941.76	5208.93
E.G. Slope (ft/ft)	0.000560	Area (sq ft)		941.76	5208.93
Q Total (cfs)	7740.00	Flow (cfs)		4195.81	3544.19
Top Width (ft)	1716.85	Top Width (ft)		93.86	1622.99
Vel Total (ft/s)	1.26	Avg. Vel. (ft/s)		4.46	0.68
Max Chl Dpth (ft)	14.19	Hydr. Depth (ft)		10.03	3.21
Conv. Total (cfs)	326981.3	Conv. (cfs)		177254.6	149726.7
Length Wtd. (ft)	688.68	Wetted Per. (ft)		100.89	1629.64
Min Ch El (ft)	574.64	Shear (lb/sq ft)		0.33	0.11
Alpha	6.93	Stream Power (lb/ft s)		1.45	0.08
Frctn Loss (ft)	0.75	Cum Volume (acre-ft)	2.77	37.57	67.51
C & E Loss (ft)	0.10	Cum SA (acres)	2.51	3.61	27.75

Plan: Alt 6 Remove Brdg, Pier, Abut Stevens Branch Stevens Branch RS: 7552 Profile: 2%

E.G. Elev (ft)	590.69	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.13	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	590.56	Reach Len. (ft)	852.90	789.50	477.70
Crit W.S. (ft)		Flow Area (sq ft)		1106.57	8082.10
E.G. Slope (ft/ft)	0.000453	Area (sq ft)		1106.57	8082.10
Q Total (cfs)	11040.00	Flow (cfs)		4826.15	6213.85
Top Width (ft)	1779.86	Top Width (ft)		96.80	1683.06
Vel Total (ft/s)	1.20	Avg. Vel. (ft/s)		4.36	0.77
Max Chl Dpth (ft)	15.92	Hydr. Depth (ft)		11.43	4.80
Conv. Total (cfs)	518875.3	Conv. (cfs)		226826.9	292048.4
Length Wtd. (ft)	633.37	Wetted Per. (ft)		104.30	1693.29
Min Ch El (ft)	574.64	Shear (lb/sq ft)		0.30	0.13
Alpha	5.99	Stream Power (lb/ft s)		1.31	0.10
Frctn Loss (ft)	0.46	Cum Volume (acre-ft)	10.68	46.35	135.80
C & E Loss (ft)	0.03	Cum SA (acres)	3.83	3.75	29.92

Plan: Alt 6 Remove Brdg, Pier, Abut Stevens Branch Stevens Branch RS: 7552 Profile: 1%

E.G. Elev (ft)	591.44	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	591.32	Reach Len. (ft)	852.90	789.50	477.70
Crit W.S. (ft)		Flow Area (sq ft)		1180.39	9360.91
E.G. Slope (ft/ft)	0.000402	Area (sq ft)		1180.39	9360.91
Q Total (cfs)	12400.00	Flow (cfs)		5015.02	7384.99
Top Width (ft)	1790.62	Top Width (ft)		98.05	1692.57
Vel Total (ft/s)	1.18	Avg. Vel. (ft/s)		4.25	0.79
Max Chl Dpth (ft)	16.68	Hydr. Depth (ft)		12.04	5.53
Conv. Total (cfs)	618830.9	Conv. (cfs)		250277.9	368553.0
Length Wtd. (ft)	621.63	Wetted Per. (ft)		105.76	1704.35
Min Ch El (ft)	574.64	Shear (lb/sq ft)		0.28	0.14
Alpha	5.54	Stream Power (lb/ft s)		1.19	0.11
Frctn Loss (ft)	0.39	Cum Volume (acre-ft)	15.05	49.57	161.55
C & E Loss (ft)	0.03	Cum SA (acres)	6.25	3.77	30.68

Plan: Alt 6 Remove Brdg, Pier, Abut Stevens Branch Stevens Branch RS: 7552 Profile: 0.2%

E.G. Elev (ft)	592.77	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	592.67	Reach Len. (ft)	852.90	789.50	477.70
Crit W.S. (ft)		Flow Area (sq ft)	0.04	1314.54	11678.58
E.G. Slope (ft/ft)	0.000337	Area (sq ft)	0.04	1314.54	11678.58
Q Total (cfs)	14980.00	Flow (cfs)	0.00	5426.33	9553.67
Top Width (ft)	1829.20	Top Width (ft)	0.37	99.90	1728.93
Vel Total (ft/s)	1.15	Avg. Vel. (ft/s)	0.05	4.13	0.82
Max Chl Dpth (ft)	18.03	Hydr. Depth (ft)	0.11	13.16	6.75
Conv. Total (cfs)	815563.9	Conv. (cfs)	0.1	295428.4	520135.4
Length Wtd. (ft)	608.43	Wetted Per. (ft)	0.43	107.93	1743.47
Min Ch El (ft)	574.64	Shear (lb/sq ft)	0.00	0.26	0.14
Alpha	4.96	Stream Power (lb/ft s)	0.00	1.06	0.12
Frctn Loss (ft)	0.31	Cum Volume (acre-ft)	26.71	55.11	207.25
C & E Loss (ft)	0.02	Cum SA (acres)	8.67	3.81	32.16

Plan: Alt 6 Remove Brdg, Pier, Abut Stevens Branch Stevens Branch RS: 4962 Profile: 50%

E.G. Elev (ft)	581.64	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.98	Wt. n-Val.		0.035	
W.S. Elev (ft)	579.67	Reach Len. (ft)	96.20	295.10	381.80
Crit W.S. (ft)	579.33	Flow Area (sq ft)		223.74	
E.G. Slope (ft/ft)	0.009481	Area (sq ft)		223.74	
Q Total (cfs)	2524.00	Flow (cfs)		2524.00	
Top Width (ft)	46.42	Top Width (ft)		46.42	
Vel Total (ft/s)	11.28	Avg. Vel. (ft/s)		11.28	
Max Chl Dpth (ft)	6.13	Hydr. Depth (ft)		4.82	
Conv. Total (cfs)	25921.8	Conv. (cfs)		25921.8	
Length Wtd. (ft)	295.10	Wetted Per. (ft)		49.63	
Min Ch El (ft)	573.54	Shear (lb/sq ft)		2.67	
Alpha	1.00	Stream Power (lb/ft s)		30.10	
Frctn Loss (ft)	0.52	Cum Volume (acre-ft)		10.20	0.08
C & E Loss (ft)	0.51	Cum SA (acres)		1.61	0.04

Plan: Alt 6 Remove Brdg, Pier, Abut Stevens Branch Stevens Branch RS: 4962 Profile: 20%

E.G. Elev (ft)	584.20	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.18	Wt. n-Val.		0.035	
W.S. Elev (ft)	582.02	Reach Len. (ft)	96.20	295.10	381.80
Crit W.S. (ft)	581.10	Flow Area (sq ft)		339.90	
E.G. Slope (ft/ft)	0.007264	Area (sq ft)		339.90	
Q Total (cfs)	4024.00	Flow (cfs)		4024.00	
Top Width (ft)	52.59	Top Width (ft)		52.59	
Vel Total (ft/s)	11.84	Avg. Vel. (ft/s)		11.84	
Max Chl Dpth (ft)	8.48	Hydr. Depth (ft)		6.46	
Conv. Total (cfs)	47214.5	Conv. (cfs)		47214.5	
Length Wtd. (ft)	295.14	Wetted Per. (ft)		57.43	
Min Ch El (ft)	573.54	Shear (lb/sq ft)		2.68	
Alpha	1.00	Stream Power (lb/ft s)		31.77	
Frctn Loss (ft)	0.53	Cum Volume (acre-ft)		14.13	0.47
C & E Loss (ft)	0.53	Cum SA (acres)		1.77	0.89

Plan: Alt 6 Remove Brdg, Pier, Abut Stevens Branch Stevens Branch RS: 4962 Profile: 10%

E.G. Elev (ft)	588.15	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.19	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	586.97	Reach Len. (ft)	96.20	295.10	381.80
Crit W.S. (ft)	585.89	Flow Area (sq ft)		648.15	1471.11
E.G. Slope (ft/ft)	0.002929	Area (sq ft)		648.15	1471.11
Q Total (cfs)	7740.00	Flow (cfs)		6278.94	1461.06
Top Width (ft)	997.57	Top Width (ft)		68.07	929.49
Vel Total (ft/s)	3.65	Avg. Vel. (ft/s)		9.69	0.99
Max Chl Dpth (ft)	13.43	Hydr. Depth (ft)		9.52	1.58
Conv. Total (cfs)	143019.1	Conv. (cfs)		116021.7	26997.4
Length Wtd. (ft)	307.31	Wetted Per. (ft)		74.86	937.71
Min Ch El (ft)	573.54	Shear (lb/sq ft)		1.58	0.29
Alpha	5.72	Stream Power (lb/ft s)		15.34	0.28
Frctn Loss (ft)	0.41	Cum Volume (acre-ft)	2.77	23.16	30.89
C & E Loss (ft)	0.21	Cum SA (acres)	2.51	2.14	13.76

Plan: Alt 6 Remove Brdg, Pier, Abut Stevens Branch Stevens Branch RS: 4962 Profile: 2%

E.G. Elev (ft)	590.20	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.48	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	589.72	Reach Len. (ft)	96.20	295.10	381.80
Crit W.S. (ft)	587.66	Flow Area (sq ft)	1.86	845.66	4066.29
E.G. Slope (ft/ft)	0.001351	Area (sq ft)	1.86	845.66	4066.29
Q Total (cfs)	11040.00	Flow (cfs)	0.20	6197.49	4842.31
Top Width (ft)	1043.25	Top Width (ft)	19.40	75.90	947.96
Vel Total (ft/s)	2.25	Avg. Vel. (ft/s)	0.11	7.33	1.19
Max Chl Dpth (ft)	16.18	Hydr. Depth (ft)	0.10	11.14	4.29
Conv. Total (cfs)	300307.5	Conv. (cfs)	5.5	168582.8	131719.3
Length Wtd. (ft)	321.26	Wetted Per. (ft)	19.41	83.11	973.04
Min Ch El (ft)	573.54	Shear (lb/sq ft)	0.01	0.86	0.35
Alpha	6.10	Stream Power (lb/ft s)	0.00	6.29	0.42
Frctn Loss (ft)	0.27	Cum Volume (acre-ft)	10.66	28.66	69.19
C & E Loss (ft)	0.03	Cum SA (acres)	3.64	2.19	15.50

Plan: Alt 6 Remove Brdg, Pier, Abut Stevens Branch Stevens Branch RS: 4962 Profile: 1%

E.G. Elev (ft)	591.02	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.41	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	590.61	Reach Len. (ft)	96.20	295.10	381.80
Crit W.S. (ft)	588.00	Flow Area (sq ft)	61.62	913.10	4911.23
E.G. Slope (ft/ft)	0.001120	Area (sq ft)	77.51	913.10	4911.23
Q Total (cfs)	12400.00	Flow (cfs)	17.93	6411.65	5970.41
Top Width (ft)	1221.33	Top Width (ft)	190.48	75.90	954.94
Vel Total (ft/s)	2.11	Avg. Vel. (ft/s)	0.29	7.02	1.22
Max Chl Dpth (ft)	17.07	Hydr. Depth (ft)	0.44	12.03	5.14
Conv. Total (cfs)	370516.0	Conv. (cfs)	535.9	191582.3	178397.8
Length Wtd. (ft)	323.43	Wetted Per. (ft)	139.92	83.11	985.42
Min Ch El (ft)	573.54	Shear (lb/sq ft)	0.03	0.77	0.35
Alpha	5.90	Stream Power (lb/ft s)	0.01	5.39	0.42
Frctn Loss (ft)	0.24	Cum Volume (acre-ft)	14.29	30.60	83.29
C & E Loss (ft)	0.01	Cum SA (acres)	4.38	2.19	16.16

Plan: Alt 6 Remove Brdg, Pier, Abut Stevens Branch Stevens Branch RS: 4962 Profile: 0.2%

E.G. Elev (ft)	592.43	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.34	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	592.09	Reach Len. (ft)	96.20	295.10	381.80
Crit W.S. (ft)	588.52	Flow Area (sq ft)	301.54	1025.72	6365.83
E.G. Slope (ft/ft)	0.000889	Area (sq ft)	511.19	1025.72	6365.83
Q Total (cfs)	14980.00	Flow (cfs)	167.43	6934.06	7878.51
Top Width (ft)	1432.98	Top Width (ft)	355.64	75.90	1001.44
Vel Total (ft/s)	1.95	Avg. Vel. (ft/s)	0.56	6.76	1.24
Max Chl Dpth (ft)	18.55	Hydr. Depth (ft)	1.85	13.51	6.36
Conv. Total (cfs)	502410.8	Conv. (cfs)	5615.6	232559.7	264235.6
Length Wtd. (ft)	324.42	Wetted Per. (ft)	163.49	83.11	1040.85
Min Ch El (ft)	573.54	Shear (lb/sq ft)	0.10	0.68	0.34
Alpha	5.79	Stream Power (lb/ft s)	0.06	4.63	0.42
Frctn Loss (ft)	0.20	Cum Volume (acre-ft)	21.70	33.90	108.31
C & E Loss (ft)	0.01	Cum SA (acres)	5.19	2.22	17.19

Plan: Alt 6 Remove Brdg, Pier, Abut Stevens Branch Stevens Branch RS: 3994 Profile: 50%

E.G. Elev (ft)	580.61	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.27	Wt. n-Val.		0.035	
W.S. Elev (ft)	580.34	Reach Len. (ft)	36.70	22.30	43.50
Crit W.S. (ft)	574.96	Flow Area (sq ft)		600.80	
E.G. Slope (ft/ft)	0.000711	Area (sq ft)		600.80	
Q Total (cfs)	2524.00	Flow (cfs)		2524.00	
Top Width (ft)	78.52	Top Width (ft)		78.52	
Vel Total (ft/s)	4.20	Avg. Vel. (ft/s)		4.20	
Max Chl Dpth (ft)	10.70	Hydr. Depth (ft)		7.65	
Conv. Total (cfs)	94625.7	Conv. (cfs)		94625.7	
Length Wtd. (ft)	22.30	Wetted Per. (ft)		84.08	
Min Ch El (ft)	569.64	Shear (lb/sq ft)		0.32	
Alpha	1.00	Stream Power (lb/ft s)		1.33	
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)		7.40	0.08
C & E Loss (ft)	0.00	Cum SA (acres)		1.19	0.04

Plan: Alt 6 Remove Brdg, Pier, Abut Stevens Branch Stevens Branch RS: 3994 Profile: 20%

E.G. Elev (ft)	583.13	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.40	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	582.74	Reach Len. (ft)	36.70	22.30	43.50
Crit W.S. (ft)	576.43	Flow Area (sq ft)		796.51	21.13
E.G. Slope (ft/ft)	0.000800	Area (sq ft)		796.51	21.13
Q Total (cfs)	4024.00	Flow (cfs)		4020.33	3.67
Top Width (ft)	144.77	Top Width (ft)		84.34	60.43
Vel Total (ft/s)	4.92	Avg. Vel. (ft/s)		5.05	0.17
Max Chl Dpth (ft)	13.09	Hydr. Depth (ft)		9.44	0.35
Conv. Total (cfs)	142234.6	Conv. (cfs)		142104.8	129.8
Length Wtd. (ft)	22.34	Wetted Per. (ft)		92.46	60.47
Min Ch El (ft)	569.64	Shear (lb/sq ft)		0.43	0.02
Alpha	1.05	Stream Power (lb/ft s)		2.17	0.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)		10.28	0.38
C & E Loss (ft)	0.01	Cum SA (acres)		1.30	0.62

Plan: Alt 6 Remove Brdg, Pier, Abut Stevens Branch Stevens Branch RS: 3994 Profile: 10%

E.G. Elev (ft)	587.53	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.48	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	587.05	Reach Len. (ft)	36.70	22.30	43.50
Crit W.S. (ft)	579.25	Flow Area (sq ft)	64.96	1192.11	1382.88
E.G. Slope (ft/ft)	0.000769	Area (sq ft)	64.96	1192.11	1382.88
Q Total (cfs)	7740.00	Flow (cfs)	13.90	6974.57	751.53
Top Width (ft)	942.04	Top Width (ft)	132.05	97.80	712.20
Vel Total (ft/s)	2.93	Avg. Vel. (ft/s)	0.21	5.85	0.54
Max Chl Dpth (ft)	17.40	Hydr. Depth (ft)	0.49	12.19	1.94
Conv. Total (cfs)	279037.7	Conv. (cfs)	501.2	251442.8	27093.7
Length Wtd. (ft)	24.97	Wetted Per. (ft)	132.07	107.65	714.93
Min Ch El (ft)	569.64	Shear (lb/sq ft)	0.02	0.53	0.09
Alpha	3.59	Stream Power (lb/ft s)	0.01	3.11	0.05
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	2.69	16.93	18.38
C & E Loss (ft)	0.05	Cum SA (acres)	2.37	1.58	6.56

Plan: Alt 6 Remove Brdg, Pier, Abut Stevens Branch Stevens Branch RS: 3994 Profile: 2%

E.G. Elev (ft)	589.90	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.39	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	589.51	Reach Len. (ft)	36.70	22.30	43.50
Crit W.S. (ft)	581.27	Flow Area (sq ft)	560.86	1433.21	3189.15
E.G. Slope (ft/ft)	0.000583	Area (sq ft)	567.48	1433.21	3189.15
Q Total (cfs)	11040.00	Flow (cfs)	292.67	8256.20	2491.13
Top Width (ft)	1114.71	Top Width (ft)	266.19	97.80	750.71
Vel Total (ft/s)	2.13	Avg. Vel. (ft/s)	0.52	5.76	0.78
Max Chl Dpth (ft)	19.87	Hydr. Depth (ft)	2.30	14.65	4.25
Conv. Total (cfs)	457038.2	Conv. (cfs)	12115.9	341793.5	103128.8
Length Wtd. (ft)	27.81	Wetted Per. (ft)	243.40	107.65	758.55
Min Ch El (ft)	569.64	Shear (lb/sq ft)	0.08	0.48	0.15
Alpha	5.50	Stream Power (lb/ft s)	0.04	2.79	0.12
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	10.04	20.94	37.39
C & E Loss (ft)	0.03	Cum SA (acres)	3.32	1.60	8.05

Plan: Alt 6 Remove Brdg, Pier, Abut Stevens Branch Stevens Branch RS: 3994 Profile: 1%

E.G. Elev (ft)	590.76	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.36	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	590.40	Reach Len. (ft)	36.70	22.30	43.50
Crit W.S. (ft)	581.98	Flow Area (sq ft)	793.48	1520.41	3860.64
E.G. Slope (ft/ft)	0.000531	Area (sq ft)	844.17	1520.41	3860.64
Q Total (cfs)	12400.00	Flow (cfs)	466.20	8688.91	3244.89
Top Width (ft)	1217.03	Top Width (ft)	363.59	97.80	755.64
Vel Total (ft/s)	2.01	Avg. Vel. (ft/s)	0.59	5.71	0.84
Max Chl Dpth (ft)	20.76	Hydr. Depth (ft)	2.96	15.55	5.11
Conv. Total (cfs)	538237.1	Conv. (cfs)	20235.8	377152.9	140848.4
Length Wtd. (ft)	28.65	Wetted Per. (ft)	268.46	107.65	765.34
Min Ch El (ft)	569.64	Shear (lb/sq ft)	0.10	0.47	0.17
Alpha	5.72	Stream Power (lb/ft s)	0.06	2.67	0.14
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	13.28	22.35	44.85
C & E Loss (ft)	0.03	Cum SA (acres)	3.77	1.61	8.67

Plan: Alt 6 Remove Brdg, Pier, Abut Stevens Branch Stevens Branch RS: 3994 Profile: 0.2%

E.G. Elev (ft)	592.23	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.32	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	591.90	Reach Len. (ft)	36.70	22.30	43.50
Crit W.S. (ft)	583.66	Flow Area (sq ft)	1195.94	1667.06	5001.30
E.G. Slope (ft/ft)	0.000466	Area (sq ft)	1449.19	1667.06	5001.30
Q Total (cfs)	14980.00	Flow (cfs)	865.45	9491.56	4622.99
Top Width (ft)	1294.73	Top Width (ft)	430.96	97.80	765.97
Vel Total (ft/s)	1.90	Avg. Vel. (ft/s)	0.72	5.69	0.92
Max Chl Dpth (ft)	22.26	Hydr. Depth (ft)	4.46	17.05	6.53
Conv. Total (cfs)	693970.0	Conv. (cfs)	40093.3	439710.2	214166.5
Length Wtd. (ft)	29.78	Wetted Per. (ft)	268.46	107.65	778.78
Min Ch El (ft)	569.64	Shear (lb/sq ft)	0.13	0.45	0.19
Alpha	5.74	Stream Power (lb/ft s)	0.09	2.56	0.17
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	19.54	24.78	58.49
C & E Loss (ft)	0.02	Cum SA (acres)	4.32	1.63	9.45

Plan: Alt 6 Remove Brdg, Pier, Abut Stevens Branch Stevens Branch RS: 3921 Profile: 50%

E.G. Elev (ft)	580.59	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.26	Wt. n-Val.		0.035	
W.S. Elev (ft)	580.33	Reach Len. (ft)	21.20	125.90	180.00
Crit W.S. (ft)	575.54	Flow Area (sq ft)		614.58	
E.G. Slope (ft/ft)	0.000735	Area (sq ft)		614.58	
Q Total (cfs)	2524.00	Flow (cfs)		2524.00	
Top Width (ft)	85.53	Top Width (ft)		85.53	
Vel Total (ft/s)	4.11	Avg. Vel. (ft/s)		4.11	
Max Chl Dpth (ft)	10.14	Hydr. Depth (ft)		7.19	
Conv. Total (cfs)	93101.6	Conv. (cfs)		93101.6	
Length Wtd. (ft)	126.02	Wetted Per. (ft)		91.18	
Min Ch El (ft)	570.19	Shear (lb/sq ft)		0.31	
Alpha	1.00	Stream Power (lb/ft s)		1.27	
Frctn Loss (ft)	0.15	Cum Volume (acre-ft)		7.09	0.08
C & E Loss (ft)	0.08	Cum SA (acres)		1.15	0.04

Plan: Alt 6 Remove Brdg, Pier, Abut Stevens Branch Stevens Branch RS: 3921 Profile: 20%

E.G. Elev (ft)	583.10	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.36	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	582.74	Reach Len. (ft)	21.20	125.90	180.00
Crit W.S. (ft)	576.84	Flow Area (sq ft)		829.35	47.48
E.G. Slope (ft/ft)	0.000776	Area (sq ft)		829.35	47.48
Q Total (cfs)	4024.00	Flow (cfs)		4013.94	10.06
Top Width (ft)	194.90	Top Width (ft)		93.16	101.75
Vel Total (ft/s)	4.59	Avg. Vel. (ft/s)		4.84	0.21
Max Chl Dpth (ft)	12.55	Hydr. Depth (ft)		8.90	0.47
Conv. Total (cfs)	144416.7	Conv. (cfs)		144055.7	361.1
Length Wtd. (ft)	126.23	Wetted Per. (ft)		100.22	101.86
Min Ch El (ft)	570.19	Shear (lb/sq ft)		0.40	0.02
Alpha	1.11	Stream Power (lb/ft s)		1.94	0.00
Frctn Loss (ft)	0.15	Cum Volume (acre-ft)		9.86	0.35
C & E Loss (ft)	0.11	Cum SA (acres)		1.26	0.54

Plan: Alt 6 Remove Brdg, Pier, Abut Stevens Branch Stevens Branch RS: 3921 Profile: 10%

E.G. Elev (ft)	587.46	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.35	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	587.10	Reach Len. (ft)	21.20	125.90	180.00
Crit W.S. (ft)	579.40	Flow Area (sq ft)	64.21	1263.84	1898.85
E.G. Slope (ft/ft)	0.000585	Area (sq ft)	90.73	1263.84	1898.85
Q Total (cfs)	7740.00	Flow (cfs)	12.34	6548.10	1179.56
Top Width (ft)	929.96	Top Width (ft)	162.99	102.80	664.17
Vel Total (ft/s)	2.40	Avg. Vel. (ft/s)	0.19	5.18	0.62
Max Chl Dpth (ft)	16.92	Hydr. Depth (ft)	0.45	12.29	2.86
Conv. Total (cfs)	319930.3	Conv. (cfs)	510.0	270663.4	48756.9
Length Wtd. (ft)	134.81	Wetted Per. (ft)	141.48	111.55	665.11
Min Ch El (ft)	570.19	Shear (lb/sq ft)	0.02	0.41	0.10
Alpha	3.96	Stream Power (lb/ft s)	0.00	2.14	0.06
Frctn Loss (ft)	0.12	Cum Volume (acre-ft)	2.63	16.30	16.74
C & E Loss (ft)	0.08	Cum SA (acres)	2.24	1.53	5.88

Plan: Alt 6 Remove Brdg, Pier, Abut Stevens Branch Stevens Branch RS: 3921 Profile: 2%

E.G. Elev (ft)	589.85	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.30	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	589.55	Reach Len. (ft)	21.20	125.90	180.00
Crit W.S. (ft)	581.24	Flow Area (sq ft)	594.91	1514.91	3571.29
E.G. Slope (ft/ft)	0.000464	Area (sq ft)	681.29	1514.91	3571.29
Q Total (cfs)	11040.00	Flow (cfs)	307.25	7889.34	2843.42
Top Width (ft)	1040.30	Top Width (ft)	245.80	102.80	691.70
Vel Total (ft/s)	1.94	Avg. Vel. (ft/s)	0.52	5.21	0.80
Max Chl Dpth (ft)	19.36	Hydr. Depth (ft)	2.69	14.74	5.16
Conv. Total (cfs)	512294.6	Conv. (cfs)	14257.3	366092.8	131944.5
Length Wtd. (ft)	137.37	Wetted Per. (ft)	220.95	111.55	692.94
Min Ch El (ft)	570.19	Shear (lb/sq ft)	0.08	0.39	0.15
Alpha	5.18	Stream Power (lb/ft s)	0.04	2.05	0.12
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	9.51	20.19	34.01
C & E Loss (ft)	0.05	Cum SA (acres)	3.10	1.55	7.33

Plan: Alt 6 Remove Brdg, Pier, Abut Stevens Branch Stevens Branch RS: 3921 Profile: 1%

E.G. Elev (ft)	590.72	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.29	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	590.43	Reach Len. (ft)	21.20	125.90	180.00
Crit W.S. (ft)	581.98	Flow Area (sq ft)	790.00	1605.74	4186.54
E.G. Slope (ft/ft)	0.000431	Area (sq ft)	921.10	1605.74	4186.54
Q Total (cfs)	12400.00	Flow (cfs)	475.13	8379.62	3545.25
Top Width (ft)	1127.49	Top Width (ft)	312.69	102.80	711.99
Vel Total (ft/s)	1.88	Avg. Vel. (ft/s)	0.60	5.22	0.85
Max Chl Dpth (ft)	20.24	Hydr. Depth (ft)	3.58	15.62	5.88
Conv. Total (cfs)	596946.1	Conv. (cfs)	22873.2	403401.5	170671.4
Length Wtd. (ft)	137.54	Wetted Per. (ft)	220.95	111.55	713.30
Min Ch El (ft)	570.19	Shear (lb/sq ft)	0.10	0.39	0.16
Alpha	5.25	Stream Power (lb/ft s)	0.06	2.02	0.13
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	12.53	21.55	40.83
C & E Loss (ft)	0.05	Cum SA (acres)	3.49	1.55	7.93

Plan: Alt 6 Remove Brdg, Pier, Abut Stevens Branch Stevens Branch RS: 3921 Profile: 0.2%

E.G. Elev (ft)	592.19	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.28	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	591.92	Reach Len. (ft)	21.20	125.90	180.00
Crit W.S. (ft)	583.66	Flow Area (sq ft)	1117.90	1758.41	5270.36
E.G. Slope (ft/ft)	0.000397	Area (sq ft)	1400.71	1758.41	5270.36
Q Total (cfs)	14980.00	Flow (cfs)	813.00	9352.95	4814.05
Top Width (ft)	1175.53	Top Width (ft)	334.11	102.80	738.62
Vel Total (ft/s)	1.84	Avg. Vel. (ft/s)	0.73	5.32	0.91
Max Chl Dpth (ft)	21.73	Hydr. Depth (ft)	5.06	17.11	7.14
Conv. Total (cfs)	751690.9	Conv. (cfs)	40796.2	469327.5	241567.2
Length Wtd. (ft)	137.45	Wetted Per. (ft)	220.95	111.55	740.06
Min Ch El (ft)	570.19	Shear (lb/sq ft)	0.13	0.39	0.18
Alpha	5.31	Stream Power (lb/ft s)	0.09	2.08	0.16
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	18.33	23.90	53.36
C & E Loss (ft)	0.04	Cum SA (acres)	4.00	1.58	8.70



Plan: Alt 6 Remove Brdg, Pier, Abut Stevens Branch Stevens Branch RS: 3508 Profile: 50%

E.G. Elev (ft)	580.36	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.67	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	579.68	Reach Len. (ft)	245.30	268.30	311.80
Crit W.S. (ft)	577.03	Flow Area (sq ft)		380.68	13.46
E.G. Slope (ft/ft)	0.002190	Area (sq ft)		380.68	13.46
Q Total (cfs)	2524.00	Flow (cfs)		2513.13	10.87
Top Width (ft)	67.33	Top Width (ft)		60.01	7.32
Vel Total (ft/s)	6.40	Avg. Vel. (ft/s)		6.60	0.81
Max Chl Dpth (ft)	7.21	Hydr. Depth (ft)		6.34	1.84
Conv. Total (cfs)	53928.9	Conv. (cfs)		53696.6	232.3
Length Wtd. (ft)	268.39	Wetted Per. (ft)		62.86	8.18
Min Ch El (ft)	572.47	Shear (lb/sq ft)		0.83	0.23
Alpha	1.06	Stream Power (lb/ft s)		5.47	0.18
Frctn Loss (ft)	0.53	Cum Volume (acre-ft)		5.65	0.05
C & E Loss (ft)	0.05	Cum SA (acres)		0.94	0.03

Plan: Alt 6 Remove Brdg, Pier, Abut Stevens Branch Stevens Branch RS: 3508 Profile: 20%

E.G. Elev (ft)	582.84	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.91	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	581.92	Reach Len. (ft)	245.30	268.30	311.80
Crit W.S. (ft)	578.50	Flow Area (sq ft)		517.50	44.24
E.G. Slope (ft/ft)	0.002114	Area (sq ft)		517.50	44.24
Q Total (cfs)	4024.00	Flow (cfs)		3985.13	38.87
Top Width (ft)	120.78	Top Width (ft)		62.28	58.50
Vel Total (ft/s)	7.16	Avg. Vel. (ft/s)		7.70	0.88
Max Chl Dpth (ft)	9.45	Hydr. Depth (ft)		8.31	0.76
Conv. Total (cfs)	87511.2	Conv. (cfs)		86666.0	845.3
Length Wtd. (ft)	268.51	Wetted Per. (ft)		66.05	59.87
Min Ch El (ft)	572.47	Shear (lb/sq ft)		1.03	0.10
Alpha	1.14	Stream Power (lb/ft s)		7.96	0.09
Frctn Loss (ft)	0.50	Cum Volume (acre-ft)		7.91	0.16
C & E Loss (ft)	0.09	Cum SA (acres)		1.03	0.21

Plan: Alt 6 Remove Brdg, Pier, Abut Stevens Branch Stevens Branch RS: 3508 Profile: 10%

E.G. Elev (ft)	587.26	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.75	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	586.51	Reach Len. (ft)	245.30	268.30	311.80
Crit W.S. (ft)	581.44	Flow Area (sq ft)	41.18	819.43	1440.17
E.G. Slope (ft/ft)	0.001410	Area (sq ft)	41.23	819.43	1440.17
Q Total (cfs)	7740.00	Flow (cfs)	10.99	6312.59	1416.42
Top Width (ft)	637.97	Top Width (ft)	104.95	72.20	460.83
Vel Total (ft/s)	3.36	Avg. Vel. (ft/s)	0.27	7.70	0.98
Max Chl Dpth (ft)	14.04	Hydr. Depth (ft)	0.40	11.35	3.13
Conv. Total (cfs)	206095.5	Conv. (cfs)	292.6	168087.3	37715.6
Length Wtd. (ft)	273.68	Wetted Per. (ft)	104.04	77.15	468.25
Min Ch El (ft)	572.47	Shear (lb/sq ft)	0.03	0.94	0.27
Alpha	4.29	Stream Power (lb/ft s)	0.01	7.20	0.27
Frctn Loss (ft)	0.34	Cum Volume (acre-ft)	2.60	13.29	9.84
C & E Loss (ft)	0.04	Cum SA (acres)	2.18	1.28	3.55

Plan: Alt 6 Remove Brdg, Pier, Abut Stevens Branch Stevens Branch RS: 3508 Profile: 2%

E.G. Elev (ft)	589.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.58	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	589.13	Reach Len. (ft)	245.30	268.30	311.80
Crit W.S. (ft)	584.94	Flow Area (sq ft)	534.78	1008.89	2697.26
E.G. Slope (ft/ft)	0.000979	Area (sq ft)	557.13	1008.89	2697.26
Q Total (cfs)	11040.00	Flow (cfs)	397.88	7440.40	3201.73
Top Width (ft)	773.49	Top Width (ft)	210.90	72.20	490.39
Vel Total (ft/s)	2.60	Avg. Vel. (ft/s)	0.74	7.37	1.19
Max Chl Dpth (ft)	16.66	Hydr. Depth (ft)	2.66	13.97	5.50
Conv. Total (cfs)	352750.3	Conv. (cfs)	12713.0	237735.7	102301.6
Length Wtd. (ft)	276.50	Wetted Per. (ft)	201.05	77.15	503.20
Min Ch El (ft)	572.47	Shear (lb/sq ft)	0.16	0.80	0.33
Alpha	5.47	Stream Power (lb/ft s)	0.12	5.90	0.39
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)	9.21	16.54	21.06
C & E Loss (ft)	0.00	Cum SA (acres)	2.99	1.29	4.89

Plan: Alt 6 Remove Brdg, Pier, Abut Stevens Branch Stevens Branch RS: 3508 Profile: 1%

E.G. Elev (ft)	590.59	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.54	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	590.05	Reach Len. (ft)	245.30	268.30	311.80
Crit W.S. (ft)	585.96	Flow Area (sq ft)	720.01	1075.46	3151.52
E.G. Slope (ft/ft)	0.000885	Area (sq ft)	751.58	1075.46	3151.52
Q Total (cfs)	12400.00	Flow (cfs)	620.90	7867.67	3911.44
Top Width (ft)	778.03	Top Width (ft)	210.90	72.20	494.93
Vel Total (ft/s)	2.51	Avg. Vel. (ft/s)	0.86	7.32	1.24
Max Chl Dpth (ft)	17.58	Hydr. Depth (ft)	3.58	14.90	6.37
Conv. Total (cfs)	416792.0	Conv. (cfs)	20869.7	264450.2	131472.2
Length Wtd. (ft)	277.11	Wetted Per. (ft)	201.05	77.15	509.67
Min Ch El (ft)	572.47	Shear (lb/sq ft)	0.20	0.77	0.34
Alpha	5.49	Stream Power (lb/ft s)	0.17	5.63	0.42
Frctn Loss (ft)	0.24	Cum Volume (acre-ft)	12.13	17.68	25.67
C & E Loss (ft)	0.00	Cum SA (acres)	3.36	1.30	5.44

Plan: Alt 6 Remove Brdg, Pier, Abut Stevens Branch Stevens Branch RS: 3508 Profile: 0.2%

E.G. Elev (ft)	592.08	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.50	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	591.58	Reach Len. (ft)	245.30	268.30	311.80
Crit W.S. (ft)	586.70	Flow Area (sq ft)	1025.89	1185.39	3911.23
E.G. Slope (ft/ft)	0.000787	Area (sq ft)	1165.83	1185.39	3911.23
Q Total (cfs)	14980.00	Flow (cfs)	1055.99	8722.98	5201.03
Top Width (ft)	876.85	Top Width (ft)	300.54	72.20	504.11
Vel Total (ft/s)	2.45	Avg. Vel. (ft/s)	1.03	7.36	1.33
Max Chl Dpth (ft)	19.11	Hydr. Depth (ft)	5.11	16.42	7.76
Conv. Total (cfs)	534113.5	Conv. (cfs)	37651.5	311018.6	185443.4
Length Wtd. (ft)	278.14	Wetted Per. (ft)	201.05	77.15	522.04
Min Ch El (ft)	572.47	Shear (lb/sq ft)	0.25	0.75	0.37
Alpha	5.38	Stream Power (lb/ft s)	0.26	5.55	0.49
Frctn Loss (ft)	0.21	Cum Volume (acre-ft)	17.71	19.65	34.39
C & E Loss (ft)	0.01	Cum SA (acres)	3.84	1.33	6.13

Plan: Alt 6 Remove Brdg, Pier, Abut Stevens Branch Stevens Branch RS: 2628 Profile: 50%

E.G. Elev (ft)	579.78	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.50	Wt. n-Val.		0.035	
W.S. Elev (ft)	579.28	Reach Len. (ft)	382.10	343.40	269.80
Crit W.S. (ft)	576.32	Flow Area (sq ft)		445.41	
E.G. Slope (ft/ft)	0.001784	Area (sq ft)		445.41	
Q Total (cfs)	2524.00	Flow (cfs)		2524.00	
Top Width (ft)	75.70	Top Width (ft)		75.70	
Vel Total (ft/s)	5.67	Avg. Vel. (ft/s)		5.67	
Max Chl Dpth (ft)	7.17	Hydr. Depth (ft)		5.88	
Conv. Total (cfs)	59761.7	Conv. (cfs)		59761.7	
Length Wtd. (ft)	343.40	Wetted Per. (ft)		79.28	
Min Ch El (ft)	572.11	Shear (lb/sq ft)		0.63	
Alpha	1.00	Stream Power (lb/ft s)		3.55	
Frctn Loss (ft)	0.78	Cum Volume (acre-ft)		3.11	
C & E Loss (ft)	0.03	Cum SA (acres)		0.52	

Plan: Alt 6 Remove Brdg, Pier, Abut Stevens Branch Stevens Branch RS: 2628 Profile: 20%

E.G. Elev (ft)	582.25	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.63	Wt. n-Val.		0.035	
W.S. Elev (ft)	581.62	Reach Len. (ft)	382.10	343.40	269.80
Crit W.S. (ft)	577.68	Flow Area (sq ft)		633.47	
E.G. Slope (ft/ft)	0.001653	Area (sq ft)		633.47	
Q Total (cfs)	4024.00	Flow (cfs)		4024.00	
Top Width (ft)	84.88	Top Width (ft)		84.88	
Vel Total (ft/s)	6.35	Avg. Vel. (ft/s)		6.35	
Max Chl Dpth (ft)	9.51	Hydr. Depth (ft)		7.46	
Conv. Total (cfs)	98959.9	Conv. (cfs)		98959.9	
Length Wtd. (ft)	343.40	Wetted Per. (ft)		89.75	
Min Ch El (ft)	572.11	Shear (lb/sq ft)		0.73	
Alpha	1.00	Stream Power (lb/ft s)		4.63	
Frctn Loss (ft)	0.75	Cum Volume (acre-ft)		4.37	
C & E Loss (ft)	0.05	Cum SA (acres)		0.58	

Plan: Alt 6 Remove Brdg, Pier, Abut Stevens Branch Stevens Branch RS: 2628 Profile: 10%

E.G. Elev (ft)	586.88	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.61	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	586.27	Reach Len. (ft)	382.10	343.40	269.80
Crit W.S. (ft)	580.37	Flow Area (sq ft)	164.12	1094.69	689.44
E.G. Slope (ft/ft)	0.001098	Area (sq ft)	344.46	1094.69	689.44
Q Total (cfs)	7740.00	Flow (cfs)	72.53	7125.51	541.96
Top Width (ft)	625.57	Top Width (ft)	261.19	104.60	259.78
Vel Total (ft/s)	3.97	Avg. Vel. (ft/s)	0.44	6.51	0.79
Max Chl Dpth (ft)	14.16	Hydr. Depth (ft)	1.12	10.47	2.65
Conv. Total (cfs)	233581.5	Conv. (cfs)	2189.0	215037.0	16355.5
Length Wtd. (ft)	340.95	Wetted Per. (ft)	146.80	109.99	259.99
Min Ch El (ft)	572.11	Shear (lb/sq ft)	0.08	0.68	0.18
Alpha	2.47	Stream Power (lb/ft s)	0.03	4.44	0.14
Frctn Loss (ft)	0.58	Cum Volume (acre-ft)	1.51	7.39	2.22
C & E Loss (ft)	0.09	Cum SA (acres)	1.15	0.73	0.97

Plan: Alt 6 Remove Brdg, Pier, Abut Stevens Branch Stevens Branch RS: 2628 Profile: 2%

E.G. Elev (ft)	589.45	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.58	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	588.88	Reach Len. (ft)	382.10	343.40	269.80
Crit W.S. (ft)	582.32	Flow Area (sq ft)	546.05	1367.20	1573.04
E.G. Slope (ft/ft)	0.000861	Area (sq ft)	1060.90	1367.20	1573.04
Q Total (cfs)	11040.00	Flow (cfs)	476.33	9139.98	1423.69
Top Width (ft)	837.72	Top Width (ft)	333.22	104.60	399.91
Vel Total (ft/s)	3.17	Avg. Vel. (ft/s)	0.87	6.69	0.91
Max Chl Dpth (ft)	16.77	Hydr. Depth (ft)	3.72	13.07	3.93
Conv. Total (cfs)	376218.8	Conv. (cfs)	16232.2	311470.4	48516.1
Length Wtd. (ft)	338.45	Wetted Per. (ft)	146.80	109.99	400.17
Min Ch El (ft)	572.11	Shear (lb/sq ft)	0.20	0.67	0.21
Alpha	3.70	Stream Power (lb/ft s)	0.17	4.47	0.19
Frctn Loss (ft)	0.49	Cum Volume (acre-ft)	4.65	9.22	5.78
C & E Loss (ft)	0.13	Cum SA (acres)	1.46	0.75	1.70

Plan: Alt 6 Remove Brdg, Pier, Abut Stevens Branch Stevens Branch RS: 2628 Profile: 1%

E.G. Elev (ft)	590.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.58	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	589.77	Reach Len. (ft)	382.10	343.40	269.80
Crit W.S. (ft)	583.84	Flow Area (sq ft)	676.72	1460.43	1960.05
E.G. Slope (ft/ft)	0.000818	Area (sq ft)	1390.03	1460.43	1960.05
Q Total (cfs)	12400.00	Flow (cfs)	664.01	9946.55	1789.45
Top Width (ft)	962.17	Top Width (ft)	384.06	104.60	473.51
Vel Total (ft/s)	3.03	Avg. Vel. (ft/s)	0.98	6.81	0.91
Max Chl Dpth (ft)	17.66	Hydr. Depth (ft)	4.62	13.96	4.14
Conv. Total (cfs)	433425.3	Conv. (cfs)	23209.5	347668.1	62547.6
Length Wtd. (ft)	337.53	Wetted Per. (ft)	146.80	109.99	473.78
Min Ch El (ft)	572.11	Shear (lb/sq ft)	0.24	0.68	0.21
Alpha	4.08	Stream Power (lb/ft s)	0.23	4.62	0.19
Frctn Loss (ft)	0.48	Cum Volume (acre-ft)	6.10	9.87	7.38
C & E Loss (ft)	0.13	Cum SA (acres)	1.68	0.76	1.97

Plan: Alt 6 Remove Brdg, Pier, Abut Stevens Branch Stevens Branch RS: 2628 Profile: 0.2%

E.G. Elev (ft)	591.86	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.57	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	591.28	Reach Len. (ft)	382.10	343.40	269.80
Crit W.S. (ft)	585.05	Flow Area (sq ft)	898.75	1618.85	2739.83
E.G. Slope (ft/ft)	0.000748	Area (sq ft)	1989.00	1618.85	2739.83
Q Total (cfs)	14980.00	Flow (cfs)	1018.57	11288.78	2672.66
Top Width (ft)	1062.34	Top Width (ft)	397.60	104.60	560.14
Vel Total (ft/s)	2.85	Avg. Vel. (ft/s)	1.13	6.97	0.98
Max Chl Dpth (ft)	19.17	Hydr. Depth (ft)	6.13	15.48	4.89
Conv. Total (cfs)	547737.8	Conv. (cfs)	37243.4	412769.8	97724.6
Length Wtd. (ft)	335.51	Wetted Per. (ft)	146.80	109.99	560.43
Min Ch El (ft)	572.11	Shear (lb/sq ft)	0.29	0.69	0.23
Alpha	4.55	Stream Power (lb/ft s)	0.32	4.79	0.22
Frctn Loss (ft)	0.45	Cum Volume (acre-ft)	8.83	11.01	10.59
C & E Loss (ft)	0.14	Cum SA (acres)	1.88	0.78	2.32

Plan: Alt 6 Remove Brdg, Pier, Abut Stevens Branch Stevens Branch RS: 1501 Profile: 50%

E.G. Elev (ft)	578.96	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.84	Wt. n-Val.		0.035	
W.S. Elev (ft)	578.12	Reach Len. (ft)			
Crit W.S. (ft)	575.76	Flow Area (sq ft)		343.65	
E.G. Slope (ft/ft)	0.003000	Area (sq ft)		343.65	
Q Total (cfs)	2524.00	Flow (cfs)		2524.00	
Top Width (ft)	56.60	Top Width (ft)		56.60	
Vel Total (ft/s)	7.34	Avg. Vel. (ft/s)		7.34	
Max Chl Dpth (ft)	7.34	Hydr. Depth (ft)		6.07	
Conv. Total (cfs)	46079.4	Conv. (cfs)		46079.4	
Length Wtd. (ft)		Wetted Per. (ft)		61.22	
Min Ch El (ft)	570.78	Shear (lb/sq ft)		1.05	
Alpha	1.00	Stream Power (lb/ft s)		7.72	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Plan: Alt 6 Remove Brdg, Pier, Abut Stevens Branch Stevens Branch RS: 1501 Profile: 20%

E.G. Elev (ft)	581.45	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.11	Wt. n-Val.		0.035	
W.S. Elev (ft)	580.34	Reach Len. (ft)			
Crit W.S. (ft)	577.37	Flow Area (sq ft)		475.20	
E.G. Slope (ft/ft)	0.003000	Area (sq ft)		475.20	
Q Total (cfs)	4024.00	Flow (cfs)		4024.00	
Top Width (ft)	62.21	Top Width (ft)		62.21	
Vel Total (ft/s)	8.47	Avg. Vel. (ft/s)		8.47	
Max Chl Dpth (ft)	9.56	Hydr. Depth (ft)		7.64	
Conv. Total (cfs)	73466.4	Conv. (cfs)		73466.4	
Length Wtd. (ft)		Wetted Per. (ft)		68.38	
Min Ch El (ft)	570.78	Shear (lb/sq ft)		1.30	
Alpha	1.00	Stream Power (lb/ft s)		11.02	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Plan: Alt 6 Remove Brdg, Pier, Abut Stevens Branch Stevens Branch RS: 1501 Profile: 10%

E.G. Elev (ft)	586.20	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.52	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	584.69	Reach Len. (ft)			
Crit W.S. (ft)	580.55	Flow Area (sq ft)		781.30	26.87
E.G. Slope (ft/ft)	0.003002	Area (sq ft)		781.30	26.87
Q Total (cfs)	7740.00	Flow (cfs)		7728.56	11.44
Top Width (ft)	134.77	Top Width (ft)		80.76	54.01
Vel Total (ft/s)	9.58	Avg. Vel. (ft/s)		9.89	0.43
Max Chl Dpth (ft)	13.91	Hydr. Depth (ft)		9.67	0.50
Conv. Total (cfs)	141273.9	Conv. (cfs)		141065.0	208.9
Length Wtd. (ft)		Wetted Per. (ft)		89.09	54.03
Min Ch El (ft)	570.78	Shear (lb/sq ft)		1.64	0.09
Alpha	1.07	Stream Power (lb/ft s)		16.26	0.04
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Plan: Alt 6 Remove Brdg, Pier, Abut Stevens Branch Stevens Branch RS: 1501 Profile: 2%

E.G. Elev (ft)	588.83	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.84	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	586.99	Reach Len. (ft)			
Crit W.S. (ft)	582.87	Flow Area (sq ft)		972.25	293.00
E.G. Slope (ft/ft)	0.003000	Area (sq ft)		972.25	293.00
Q Total (cfs)	11040.00	Flow (cfs)		10729.31	310.69
Top Width (ft)	234.94	Top Width (ft)		85.15	149.79
Vel Total (ft/s)	8.73	Avg. Vel. (ft/s)		11.04	1.06
Max Chl Dpth (ft)	16.21	Hydr. Depth (ft)		11.42	1.96
Conv. Total (cfs)	201552.3	Conv. (cfs)		195880.1	5672.1
Length Wtd. (ft)		Wetted Per. (ft)		94.05	149.89
Min Ch El (ft)	570.78	Shear (lb/sq ft)		1.94	0.37
Alpha	1.55	Stream Power (lb/ft s)		21.37	0.39
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Plan: Alt 6 Remove Brdg, Pier, Abut Stevens Branch Stevens Branch RS: 1501 Profile: 1%

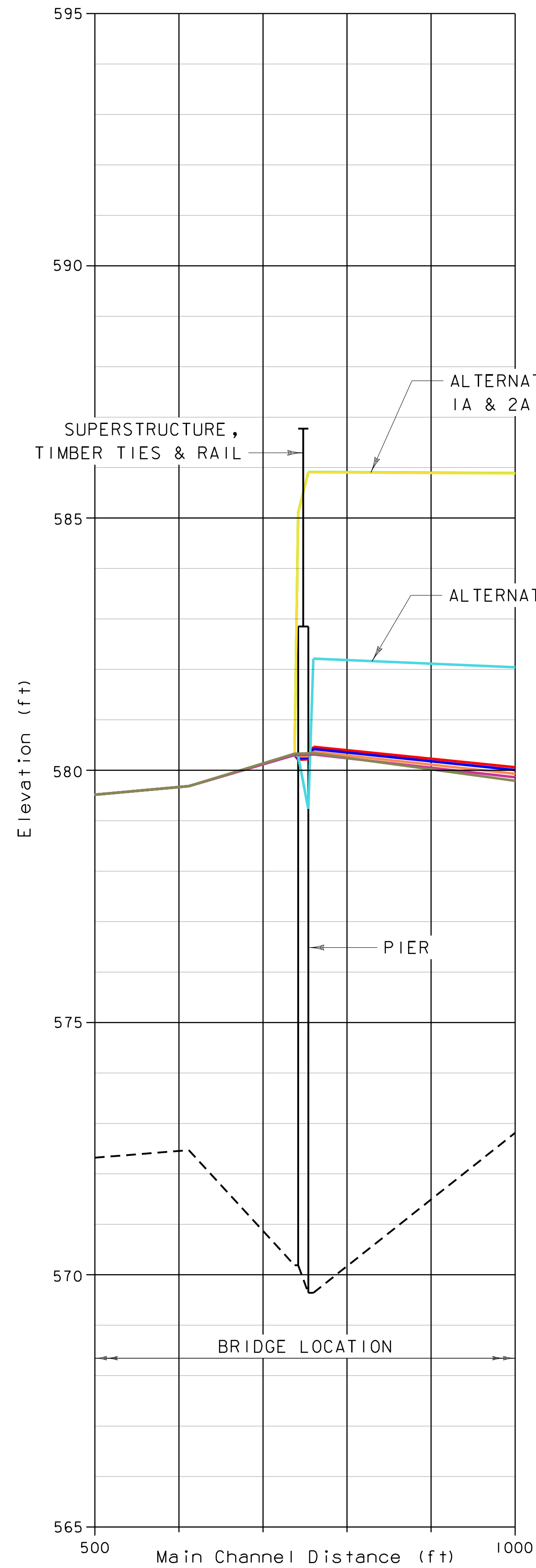
E.G. Elev (ft)	589.74	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.92	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	587.81	Reach Len. (ft)			
Crit W.S. (ft)	583.95	Flow Area (sq ft)		1043.00	421.69
E.G. Slope (ft/ft)	0.003000	Area (sq ft)		1043.00	421.69
Q Total (cfs)	12400.00	Flow (cfs)		11862.80	537.20
Top Width (ft)	251.04	Top Width (ft)		87.36	163.68
Vel Total (ft/s)	8.47	Avg. Vel. (ft/s)		11.37	1.27
Max Chl Dpth (ft)	17.03	Hydr. Depth (ft)		11.94	2.58
Conv. Total (cfs)	226400.3	Conv. (cfs)		216592.1	9808.2
Length Wtd. (ft)		Wetted Per. (ft)		96.41	163.80
Min Ch El (ft)	570.78	Shear (lb/sq ft)		2.03	0.48
Alpha	1.73	Stream Power (lb/ft s)		23.04	0.61
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Plan: Alt 6 Remove Brdg, Pier, Abut Stevens Branch Stevens Branch RS: 1501 Profile: 0.2%

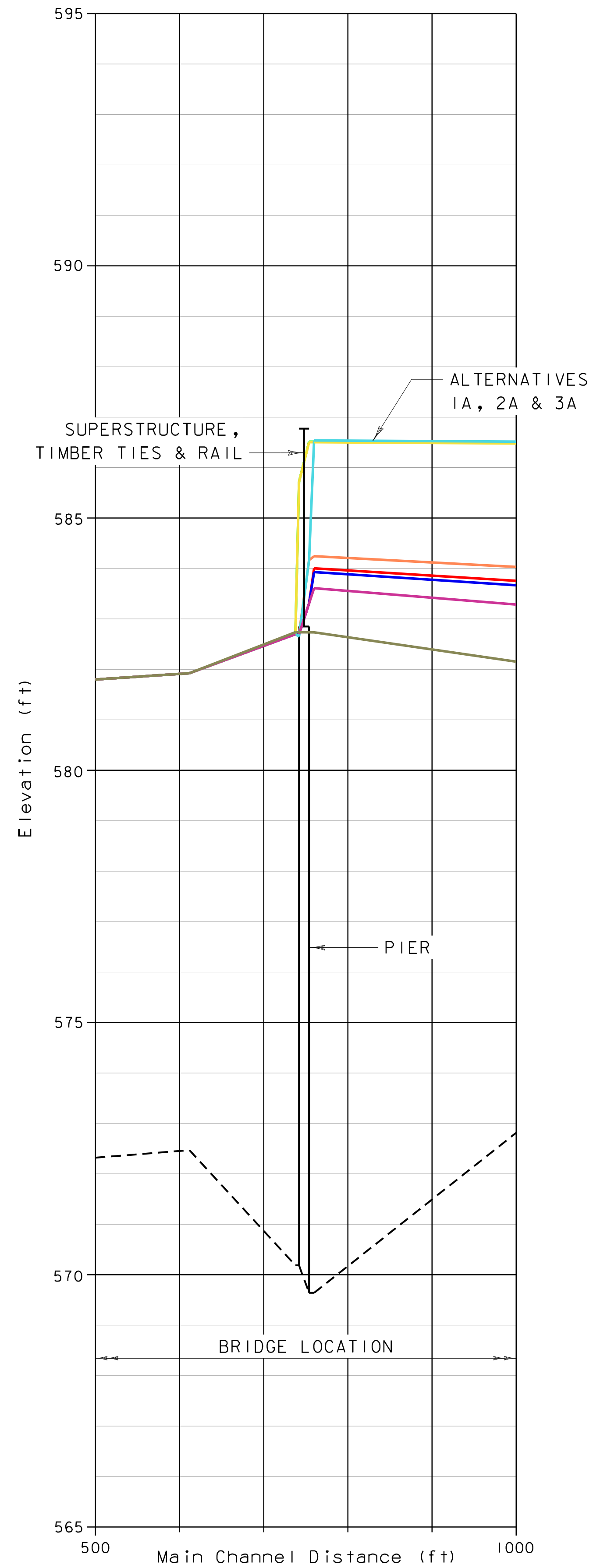
E.G. Elev (ft)	591.26	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.02	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	589.25	Reach Len. (ft)			
Crit W.S. (ft)	585.90	Flow Area (sq ft)	23.68	1174.44	679.83
E.G. Slope (ft/ft)	0.003006	Area (sq ft)	23.68	1174.44	679.83
Q Total (cfs)	14980.00	Flow (cfs)	13.70	13883.31	1082.99
Top Width (ft)	312.49	Top Width (ft)	30.04	93.50	188.95
Vel Total (ft/s)	7.98	Avg. Vel. (ft/s)	0.58	11.82	1.59
Max Chl Dpth (ft)	18.47	Hydr. Depth (ft)	0.79	12.56	3.60
Conv. Total (cfs)	273227.7	Conv. (cfs)	250.0	253224.5	19753.2
Length Wtd. (ft)		Wetted Per. (ft)	30.08	102.61	189.13
Min Ch El (ft)	570.78	Shear (lb/sq ft)	0.15	2.15	0.67
Alpha	2.04	Stream Power (lb/ft s)	0.09	25.39	1.07
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

**APPENDIX F:**  
**Water Surface Profiles at Bridge**

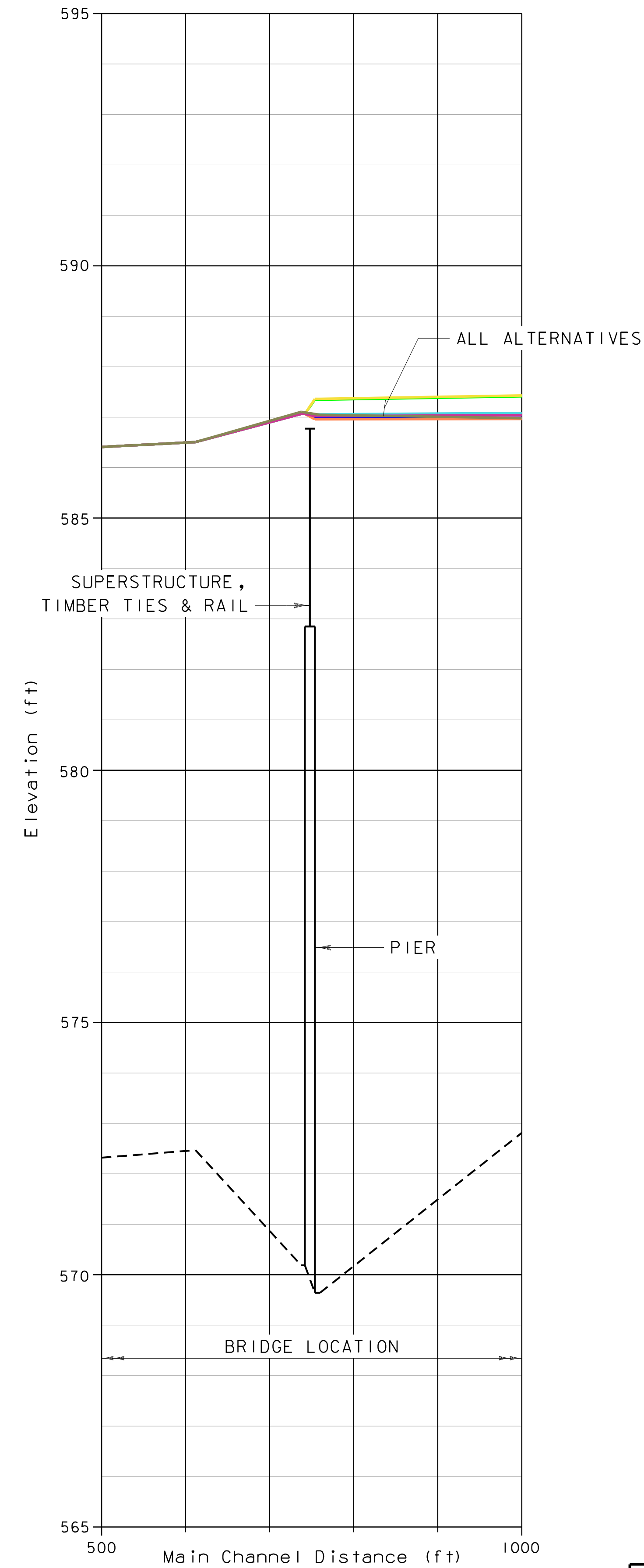
DRAFT



WS (Q2)



WS (Q5)



WS (Q10)

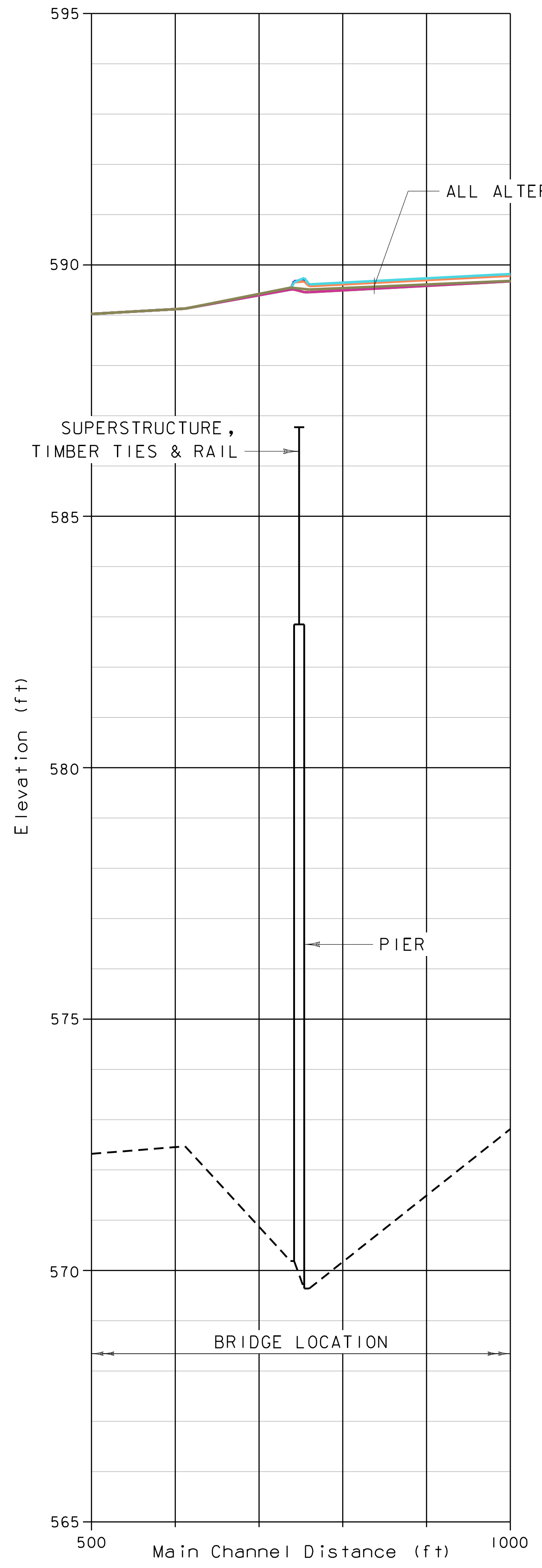
LEGEND	
---	EXISTING GROUND
—	ALTERNATIVE 1
—	ALTERNATIVE 1A
—	ALTERNATIVE 2
—	ALTERNATIVE 2A
—	ALTERNATIVE 3
—	ALTERNATIVE 3A
—	ALTERNATIVE 4
—	ALTERNATIVES 5 & 6

WATER SURFACE PROFILES AT BRIDGE 308  
 SCALE: 1' - 0" VERTICAL = 60' - 0" HORIZONTAL

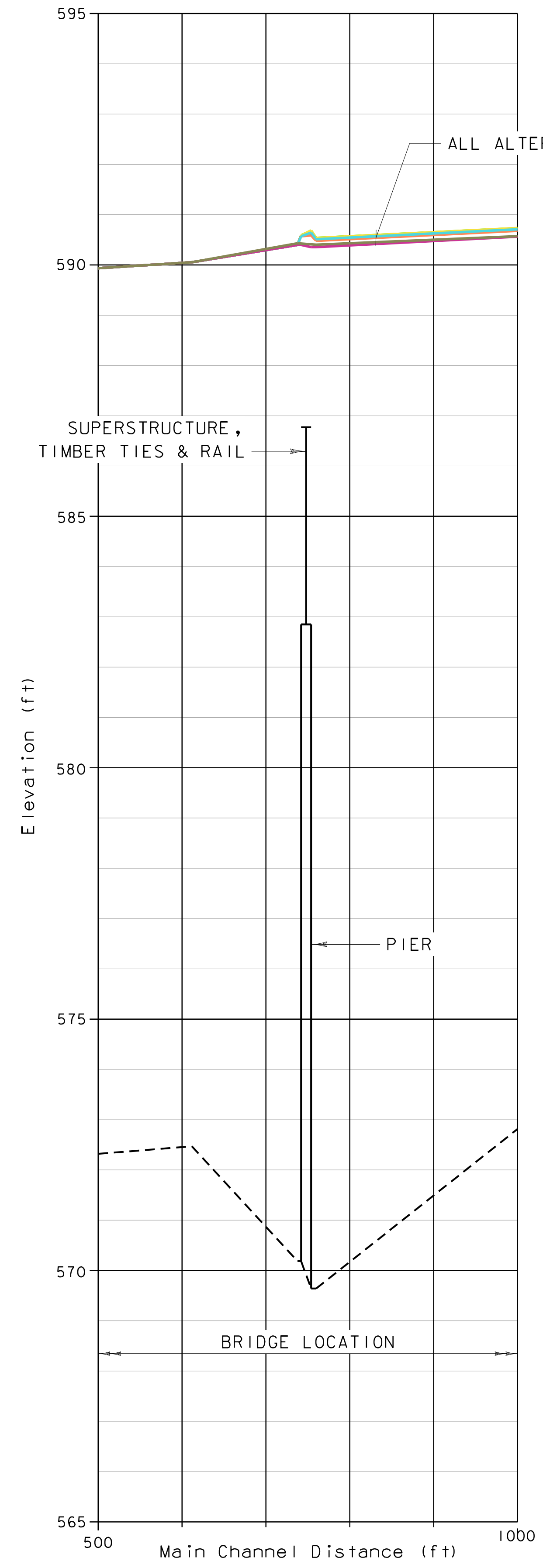
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PROJECT NUMBER: WACR(22)	DRAWN BY: S. GUNN
FILE NAME: z22g361hyd.dgn	CHECKED BY: J. WILSON
PROJECT LEADER: J. WILSON	SHEET 1 OF 2
DESIGNED BY: J. BLACKBURN	
FLOOD EVENT HYDROLOGY GRAPHS 1	



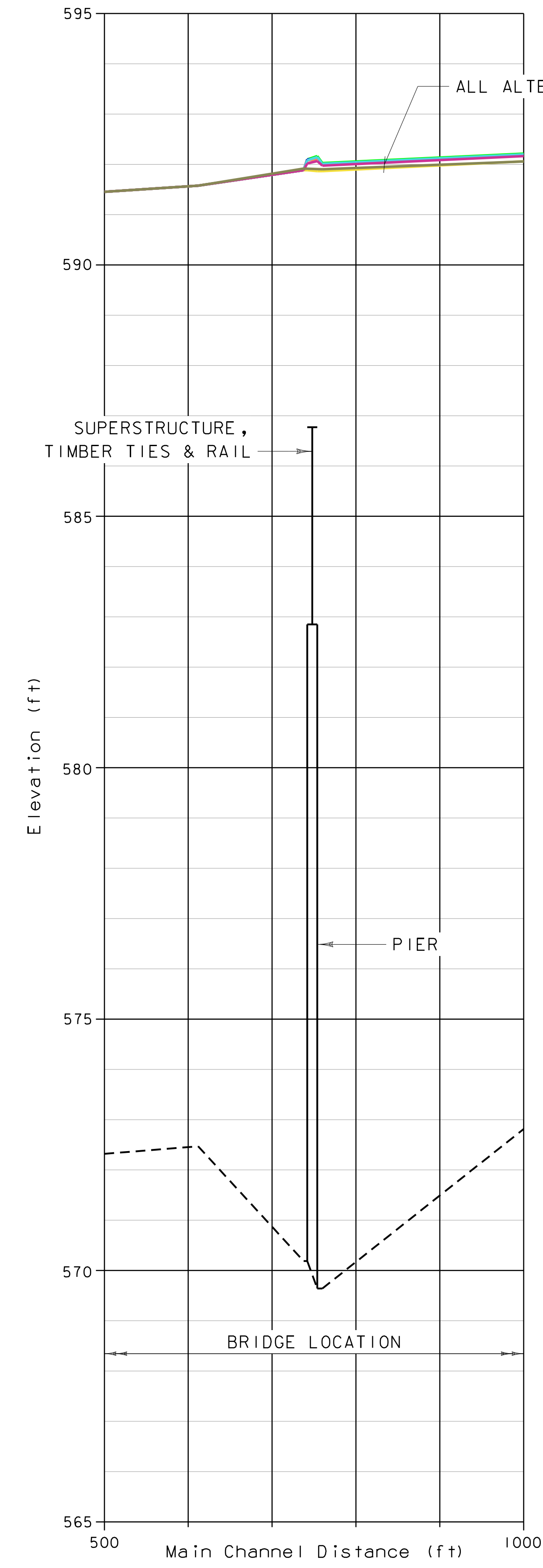




WS (Q50)



WS (Q100)



WS (Q500)

LEGEND	
---	EXISTING GROUND
—	ALTERNATIVE 1
—	ALTERNATIVE 1A
—	ALTERNATIVE 2
—	ALTERNATIVE 2A
—	ALTERNATIVE 3
—	ALTERNATIVE 3A
—	ALTERNATIVE 4
—	ALTERNATIVES 5 & 6

WATER SURFACE PROFILES AT BRIDGE 308  
 SCALE: 1' - 0" VERTICAL = 60' - 0" HORIZONTAL

PROJECT NAME: BARRE CITY	PLOT DATE: \$\$\$DATE\$\$\$
PROJECT NUMBER: WACR(22)	DRAWN BY: S. GUNN
FILE NAME: z22g361hyd.dgn	CHECKED BY: J. WILSON
PROJECT LEADER: J. WILSON	SHEET 2 OF 2
DESIGNED BY: J. BLACKBURN	
FLOOD EVENT HYDROLOGY GRAPHS 2	



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**APPENDIX G:**  
**Letters of Support**



**Granite Resources Incorporated**

P.O. Box 921515  
Norcross, GA 30010  
Tel: 770 447-9967

Vermont Rail System  
One Railway Lane  
Burlington, VT 05401

May 16, 2023

Re : Bridge over the Stevens Branch in Barre

Perry

I was pleased to receive your call about the possibility of the bridge over the Stevens Branch being brought back into service. As you know, we used to unload blocks on the Granite Industries of Vermont property when the bridge was in commission. Rehabilitating this bridge will allow us to continue to use rail, which is a much more environmentally friendly means of transportation. Direct access to the unloading site will reduce transload costs which will help us sustain, and potentially grow, our inbound rail business. I look forward to receiving news of your progress in this regard.

Regards

A handwritten signature in blue ink, appearing to read 'Keith Hart', is written over the typed name.

Keith Hart  
President



Perry Martel  
Vermont Rail System  
One Railway Lane  
Burlington, VT 05401

Mr. Martel,

I am writing today to share our support for the proposed rehabilitation/replacement of the bridge that crosses the Stevens Branch and terminates adjacent to our facility at 38 Vanetti Pl, Barre, VT 05641.

This bridge had been used for many years by the previous owner of Granite Industries of Vermont for landing material on the site. It would be our goal to continue this practice by shipping material from our Rock of Ages Quarry to the site which is the equivalent of 700 – 1,000 tractor trail loads a year at this time. In addition to bringing material in, we also see an opportunity to potentially remove waste granite material (Grout) which equals (5) 10-wheeler loads a day.

If you should have any questions or comments, please feel free to call me at 802.4767021 or email me at [kspaulding@swensongranite.com](mailto:kspaulding@swensongranite.com).

Thank you.

Kevin Spaulding  
Director of Manufacturing  
Swenson Granite Company/Granite Industries of Vermont  
PO Box 626  
Barre, Vermont 05641

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THE POLYCOR INC. FAMILY OF BRANDS



**APPENDIX H:**  
**Local & Regional Input Questionnaire**

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## Local & Regional Input Questionnaire

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### Project Summary

This project, WACR(22), focuses on Bridge 308 on the Washington County Railroad, Montpelier & Barre Division in Barre City Vermont. The bridge is currently closed due to ice damage of the pier limiting its capacity and is in need of either a major maintenance action, replacement or removal. The Vermont Agency of Transportation has received a FEMA Building Resilient Infrastructure and Communities (BRIC) Grant to study the alternatives available in this location. Potential options being considered for this project include:

- Bridge Rehabilitation.
- Bridge Replacement with a new 2-span structure.
- Bridge Replacement with a new single span structure.
- Bridge Removal while retaining existing substructure for potential future use.
- Bridge Removal including substructure.

### Community Considerations

1. Are there businesses (including agricultural operations and industrial parks) or delivery services (fuel or goods) that would be adversely impacted either by a bridge closure or due to work zone proximity?

The trestle with associated railroad tracks runs parallel to the RK Miles storage yard at 7 W. Second Street to the south of the river; and Global Values property on the north side of the river. Dependent upon placement of construction equipment, if not on the AOT property, the potential for disruptions in on-site traffic, truck traffic and placement of stored materials should be considered and discussed with these property owners.

Granite Importers stone storage would be effected for any work done, but not for closure/removal.

2. Are there important public buildings (town hall, schools, community center, senior center, library) or community facilities (recreational fields, town green, etc.) close to the project?

There are none of these within 100 feet of the trestle.

3. What other municipal operations could be adversely affected by the bridge closure or construction activities?

As noted in the City's Hazard Mitigation Plan, there is a contingency plan put in place by the City where the DPW inspects it quarterly for debris build-up and removal. This would not be any adverse affect; dependent on the chosen outcome, the City would be interested if this ongoing task would need to be maintained.

## Local & Regional Input Questionnaire

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4. Is there a local business association, chamber of commerce, regional development corporation, or other downtown group that we should be working with? If known, please provide name, organization, email, and phone number.

Barre Area Development Corporation – Aimee Green (802-503-5771; [aimee.green@badc.org](mailto:aimee.green@badc.org))

The Barre Partnership – Tracie Lewis (802-793,0204; [director@thebarrepartnership.com](mailto:director@thebarrepartnership.com))

Central Vermont Regional Planning Commission – Christian Meyer, Executive Director (802) 229-0389; [meyer@cvregion.com](mailto:meyer@cvregion.com)

Vermont Emergency Management – State Hazard Mitigation Office Stephanie A. Smith, cell (802) 989-6793; [Stephanie.A.Smith@vermont.gov](mailto:Stephanie.A.Smith@vermont.gov)

### Design Considerations

5. Are there any concerns with the alignment of the existing bridge? For example, if the bridge is located on a curve, has this created any problems that we should be aware of?

None noted.

6. Are there any concerns with the function of the existing bridge?

None noted.

7. Are there any special aesthetic considerations we should be aware of?

None noted.

8. Does the location have a history of flooding? If yes, please explain.

As noted in the City's Hazard Mitigation Plan, there was 1.5 – 3 inches of rainfall from a flood event on December 17-18, 2000; Severe results from snowpack melt from the Stevens Branch, resulting in buildup of water, ice and woody debris at the trestle.

Existing bridge has a history of retaining floating debris from the river. It is regularly monitored by City staff in an attempt to avoid a flood.

9. Are there any known Hazardous Material Sites near the project site?

A review of the ANR's Environmental Research Tool choosing Barre City as the designated Hazardous Site List, then reviewing the list and removing any Low priority sites, the closest one is Bellavance Trucking at 5 South Vine Street (UST gasoline release) with an open site project. Table is attached.

## Local & Regional Input Questionnaire

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10. Are there any known historic, archeological and/or other environmental resource issues near the project site?

There are no known historic or archeological sites within 100 feet of the property. Using the ANR Environmental Research Tool, there are no known Brownfield Sites, permitted UST's, permitted AST's, or former Dry Cleaner sites in the immediate vicinity of the property.

11. Are there any utilities (water, sewer, communications, power) attached to the existing bridge? Please provide any available documentation.

None noted.

12. Are there any existing, pending, or planned municipal utility projects (communications, lighting, drainage, water, wastewater, etc.) near the project that should be considered?

None noted.

13. Are there any other issues that are important for us to understand and consider?

The City has been a long-time supporter of removing the trestle, due to the flooding events and damage caused to it, as well as the threats to that neighborhood. With damage to the mid-stream pier from the February 4, 2019 event and many other debris backups before and since, the City has remained a staunch supporter of the removal of the trestle from this spur, so there is history of it being stated that the trestle replacement cost would be over \$1M, for a spur that isn't used. Many, many electronic communications have occurred by and between the former City Manager, a former City Mayor, Mr. Peter Anthony, representatives from AOT/VTrans, ANR, VEM, CVRPC.

### **Land Use & Zoning**

1. Please provide a copy of your existing and future land use map or zoning map, if applicable. These maps are attached. Also included is the City's most recent Hazard Mitigation Plan excerpt from the Update of 2012 Action Items, and the City's Municipal Plan with the Transportation portion excerpted out to show that the Venetti Place Trestle project has been on the City's ongoing desire to be removed for many years.
2. Are there any existing, pending or planned development proposals that would impact future transportation patterns near the bridge? If so, please explain.

The City had a Hazard Mitigation Grant for the culvert replacement across N. Main Street (on the other side of the river from the trestle), but has since not completed the project; Vermont Emergency Management is in the process of closing the grant, and the City intends to reapply for this project in the future.



## Local & Regional Input Questionnaire

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As for surrounding properties, there are no projects to our knowledge at this time; this does not preclude any property owners in the vicinity who may be working on future projects and have not brought them forth to the City's attention.

3. Is there any planned expansion of public transit or intercity transit service in the project area? Please provide the name and contact information for the relevant public transit provider.

At one point two years or so ago, there was conversation regarding a study for a commuter train between Barre and Montpelier; we believe this idea was released due to the "Granite Train" and its usage of the tracks.

### Communications

1. Please identify any local communication outlets that are available for us to use in communicating with the local population. Include weekly or daily newspapers, blogs, radio, public access TV, Facebook, Front Page Forum, etc. Also include any unconventional means such as local low-power FM.

*Times Argus, Montpelier Bridge, CVTV, City social media (Facebook, FPF), Aired Out podcast, Barre Community Fanpage Facebook.*

2. Other than people/organizations already referenced in this questionnaire, are there any others who should be kept in the loop as the project moves forward?

*Surrounding Property Owners? RK Miles (FHS Holdings, Inc.), Global Values, Swenson Granite; those in the Scampini Square neighborhood?*

*Representative Peter Anthony has a strong interest in this project and should continue to be engaged.*

# Bridge 308 Alternatives Comparison Matrix



	Alternative 1	Alternative 1A	Alternative 2	Alternative 2A	Alternative 3	Alternative 3A	Alternative 4	Alternative 5	Alternative 6
<b>Structure Alternate Description</b>	Existing Bridge Remains in Place (Free Flow Model) - No action	Existing Bridge Remains in Place (Debris Model) - No action	Repair the Damaged Piers (Free Flow Model) - Exist. superstructure remains - Replace damaged pier 2 - Recommend replacing pier 1	Repair the Damaged Pier (Debris Model) - Exist. superstructure remains - Replace damaged pier 2 - Recommend replacing pier 1	New 2-Span Bridge (Free Flow Model) - Exist. superstructure removed - Remove both existing piers - New superstructure - New center pier	New 2-Span Bridge (Debris Model) - Exist. superstructure removed - Remove both existing piers - New superstructure - New center pier	New Single Span Bridge (Free Flow Model) - Exist. superstructure removed - Remove both existing piers - New superstructure - No piers	Remove Existing Superstructure and Piers (Free Flow Model) - Exist. superstructure removed - Remove both existing piers - No piers	Remove Existing Superstructure, Piers and Abutment 1 (Free Flow Model) - Exist. superstructure removed - Remove both existing piers - Remove existing abutment 1 - No piers
<b>Proposed Superstructure Type</b>	Existing to remain	Existing to remain	Existing to remain	Existing to remain	New steel deck girders	New steel deck girders	New steel girders	Existing to be removed	Existing to be removed
<b>Proposed Pier(s) within Channel</b>	2 Existing	2 Existing	2 new in existing location	2 new in existing location	1 at center of channel	1 at center of channel	None	None	None
<b>Proposed Substructure</b>	<ul style="list-style-type: none"> <li>Existing abutments to remain</li> <li>Existing piers to remain</li> </ul>	<ul style="list-style-type: none"> <li>Existing abutments to remain</li> <li>Existing piers to remain</li> </ul>	<ul style="list-style-type: none"> <li>Existing abutments to remain</li> <li>Existing piers to be replaced in existing location</li> </ul>	<ul style="list-style-type: none"> <li>Existing abutments to remain</li> <li>Existing piers to be replaced in existing location</li> </ul>	<ul style="list-style-type: none"> <li>Abutment 1 to be replaced</li> <li>Abutment 2 to remain</li> <li>New center pier</li> </ul>	<ul style="list-style-type: none"> <li>Abutment 1 to be replaced</li> <li>Abutment 2 to remain</li> <li>New center pier</li> </ul>	<ul style="list-style-type: none"> <li>Abutment 1 to be replaced</li> <li>Abutment 2 to be remain</li> </ul>	<ul style="list-style-type: none"> <li>Existing abutments to remain</li> </ul>	<ul style="list-style-type: none"> <li>Abutment 2 to remain</li> </ul>
<b>PROJECT DELINEATORS</b>	<b>Alternative 1</b>	<b>Alternative 1A</b>	<b>Alternative 2</b>	<b>Alternative 2A</b>	<b>Alternative 3</b>	<b>Alternative 3A</b>	<b>Alternative 4</b>	<b>Alternative 5</b>	<b>Alternative 6</b>
Bridge returned to Service for Rail Traffic?	NO	NO	YES	YES	YES	YES	YES	NO	NO
Water Surface Elevation - Q2 (Change V. Existing Condition)	EL. 580.47 (N/A)	EL. 585.91 (N/A)	EL. 580.42 (Lowered 0.05 feet)	EL. 585.91 (No Change)	EL. 580.37 (Lowered 0.10 feet)	EL. 582.21 (Lowered 3.70 feet)	EL. 580.31 (Lowered 0.16 feet)	EL. 580.34 (Lowered 0.13 feet)	EL. 580.34 (Lowered 0.13 feet)
Water Surface Elevation - Q5 (Change V. Existing Condition)	EL. 584.00 (N/A)	EL. 586.51 (N/A)	EL. 583.93 (Lowered 0.07 feet)	EL. 586.50 (Lowered 0.01 feet)	EL. 584.24 (Increased 0.24 feet)	EL. 586.54 (Increased 0.03 feet)	EL. 583.61 (Lowered 0.39 feet)	EL. 582.74 (Lowered 1.26 feet)	EL. 582.74 (Lowered 1.26 feet)
Water Surface Elevation - Q10 (Change V. Existing Condition)	EL. 586.97 (N/A)	EL. 587.35 (N/A)	EL. 586.97 (No Change)	EL. 587.36 (Increased 0.01 feet)	EL. 586.96 (Lowered 0.01 feet)	EL. 587.05 (Lowered 0.30 feet)	EL. 587.02 (Increased 0.05 feet)	EL. 587.05 (Increased 0.08 Feet)	EL. 587.05 (Increased 0.08 Feet)
Water Surface Elevation - Q50 (Change V. Existing Condition)	EL. 589.60 (N/A)	EL. 589.46 (N/A)	EL. 589.60 (No Change)	EL. 589.46 (No Change)	EL. 589.58 (Lowered 0.02 feet)	EL. 589.61 (Lowered 0.15 feet)	EL. 589.46 (Lowered 0.14 feet)	EL. 589.51 (Lowered 0.09 Feet)	EL. 589.51 (Lowered 0.09 Feet)
Water Surface Elevation - Q100 (Change V. Existing Condition)	EL. 590.49 (N/A)	EL. 590.54 (N/A)	EL. 590.49 (No Change)	EL. 590.54 (No Change)	EL. 590.48 (Lowered 0.01 feet)	EL. 590.51 (Lowered 0.03 feet)	EL. 590.35 (Lowered 0.14 feet)	EL. 590.40 (Lowered 0.09 Feet)	EL. 590.40 (Lowered 0.09 Feet)
Water Surface Elevation - Q500 (Change V. Existing Condition)	EL. 592.00 (N/A)	EL. 592.03 (N/A)	EL. 592.00 (No Change)	EL. 591.87 (Lowered 0.06 feet)	EL. 591.99 (Lowered 0.01 feet)	EL. 592.01 (Lowered 0.02 feet)	EL. 591.98 (Lowered 0.02 feet)	EL. 591.90 (Lowered 0.10 Feet)	EL. 591.90 (Lowered 0.10 Feet)
<b>Note: Water Surface Elevations for Alternatives 2, 3, 4, 5 and 6 (Free Flow Model) compared to Alternative 1. Water Surface Elevations for Alternatives 2A and 3A (Debris Model) compared to Alternative 1A.</b>									
Is Debris/Ice Buildup Improved	NO - Requires Debris Removal	NO - Requires Debris Removal	Slightly - Will Require Debris Removal	Slightly - Will Require Debris Removal	Slightly - Center Pier Only	Slightly - Center Pier Only	YES (No Piers)	YES (No Piers)	YES (No Piers)

# Bridge 308 Alternatives Comparison Matrix



	Alternative 1	Alternative 1A	Alternative 2	Alternative 2A	Alternative 3	Alternative 3A	Alternative 4	Alternative 5	Alternative 6
Improves Bridge Maintenance	NO – Existing Condition	NO – Existing Condition	YES - New Piers; Debris Removal Reduced	YES - New Piers; Debris Removal Reduced	YES; New Center Pier and Superstructure	YES; New Center Pier and Superstructure	YES; No Piers and new Superstructure	YES Bridge Removed	YES Bridge Removed
Improves Service Life	NO – No Action	NO – No Action	Yes, new piers enhance services life to 25 yrs; can be used for future superstr. replacement	Yes, new piers enhance services life to 25 yrs; can be used for future superstr. replacement	Yes, new substructures and superstructure provides 75-year service life	Yes, new substructures and superstructure provides 75-year service life	Yes, new abutment and superstructure provides 75-year service life	Bridge Removed	Bridge Removed
Permanent Property Impacts	No Permanent Construction Impacts. No Action Alternative	No Permanent Construction Impacts. No Action Alternative	Reduces Ice/debris buildup		Reduces Ice/debris buildup		Increase in rail profile effects adjacent properties	Reduces Ice/debris buildup	Reduces Ice/debris buildup
Summary of environmental impacts	Does not improve ice/debris buildup	Does not improve ice/debris buildup	Slightly Reduces Ice/debris buildup. Work in water during construction	Slightly Reduces Ice/debris buildup. Work in water during construction	Reduces Ice/debris buildup. Work in water during construction	Reduces Ice/debris buildup. Work in water during construction	Rail profile increase creates dam effect within floodway. Work in water during construction	Work in water during construction	Work in water during construction
Cultural resource impacts	NO	NO	NO	NO	NO	NO	POSSIBLE	NO	NO
Will meets AREMA/VTrans standards	NO	NO	YES	YES	YES	YES	YES	N/A	N/A
City travel way impacts	YES Increase truck traffic for loading/unloading granite	YES Increase truck traffic for loading/unloading granite	NO	NO	NO	NO	YES Roadway revised at crossing to meet increased rail profile	YES Increase truck traffic for loading/unloading granite	YES Increase truck traffic for loading/unloading granite
Monetary impact to railroad customer	YES	YES	NO	NO	NO	NO	NO	YES	YES
City utility impacts (Aerial & Underground)	NO	NO	NO	NO	NO	NO	POSSIBLE	NO	NO
City drainage system impacts	NO	NO	NO	NO	NO	NO	YES	NO	NO
Current 2024 Construction Cost	\$10,000 Annually	\$10,000 Annually	\$450,000 (Pier 2 only)	\$450,000 (Pier 2 only)	\$1,995,000	\$1,995,000	\$3,995,000	\$325,000	\$400,000
Shading Key	Desirable	Neutral	Not Desirable						