FRA-33-27.51 PID 119387
FRA-33-25.09 L/R and FRA-33-25.03 L/R Over Big Walnut Creek and Walnut Creek Overflow Hydrology and Hydraulics Report

ODOT DISTRICT 6

JUNE 9, 2025

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Table of Contents

PROJECT DESCRIPTION 3

SITE DESCRIPTION 4

EXISTING STRUCTURES........ 6

Bridges over Big Walnut Creek Overflow 6

Bridges over Big Walnut Creek 7

PROPOSED STRUCTURE 7

DESIGN CRITERIA AND DESIGN DATA........ 8

HYDRAULIC ANALYSIS 10

SCOUR ANALYSIS........ 14

RESULTS SUMMARY 15

CONCLUSION........ 18

LIST OF APPENDICES

Appendix A – Stage 1 Bridge Site Plans, Typical Sections and Existing Condition Pictures

Appendix B – FIRMette and Flood Insurance Study Reports (relevant pages), FIRM Panel

Appendix C – USGS StreamStats Report

Appendix D – Existing and Proposed Hydraulic Summaries and Profiles

Appendix E – Existing Cross Sections

Appendix F – Proposed Cross Sections

Appendix G – Scour Analysis Reports *(not yet included, will be done during detailed design when soil properties become available)*

PROJECT DESCRIPTION

The purpose of this project is to widen US 33 to reduce congestion and improve safety on the corridor, which is Southeast of Columbus, OH near the major highway interchange of IR 270 and US 33.

The portion of the project pertaining to this Hydrology and Hydraulics study is immediately Southeast of the interchange. The study area is solely within City of Columbus limits and is flanked by Franklin County to the North and the Village of Groveport to the South. US 33 carries vehicular traffic over the studied waterways and is a US Route with a functional classification of 2 – Principal Arterial Freeway. Eastbound and Westbound routes are on the National Highway System, and Eastbound traffic, leaving the City of Columbus, is a Priority System. According to ODOT Transportation Information Mapping System (TIMS), the AADT for Eastbound traffic is 80,703, and for Westbound traffic is 7,878. Refer to Figure 1 for an aerial picture and additional descriptions of the project location.

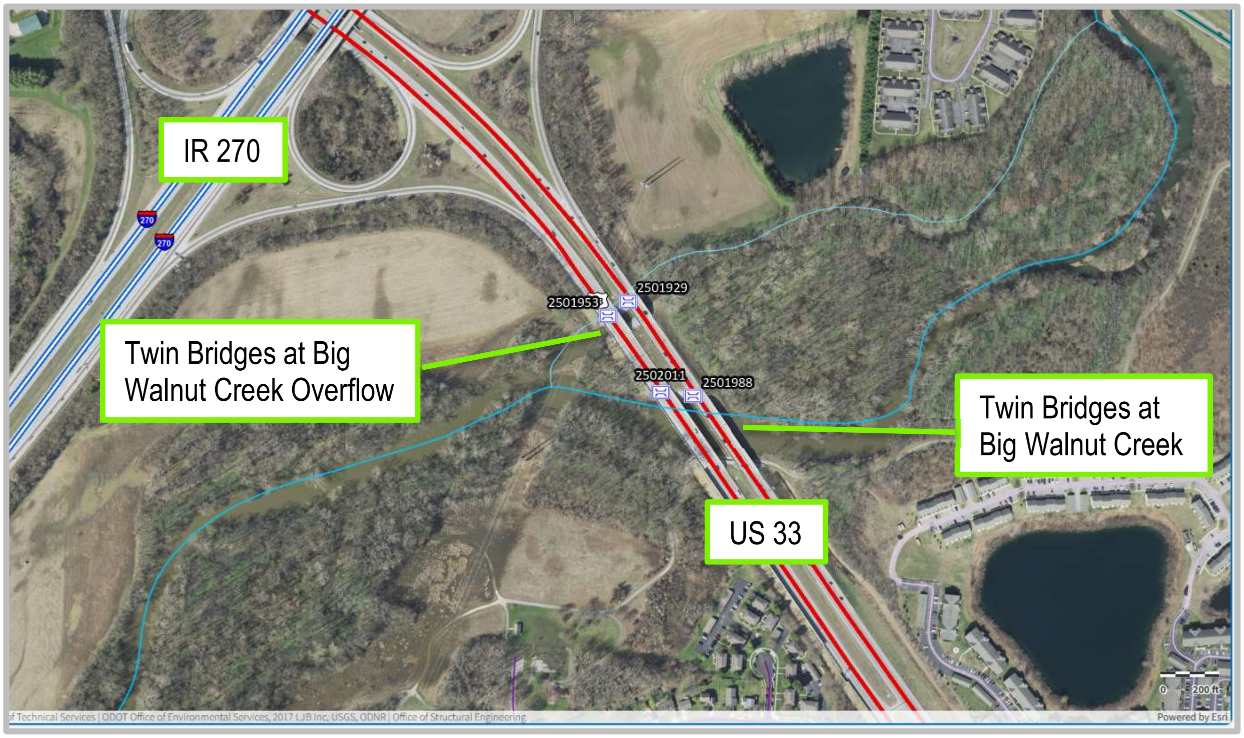


Figure 1 – Project Location (ODOT TIMS)

SITE DESCRIPTION

Big Walnut Creek in the vicinity of the subject bridges runs on a moderately meandering alignment in a wide floodplain with light and sharp bends, some sediment islands and moderate to heavy vegetation throughout. Open areas of floodplain are present to the North and West, and the floodplain overall is sandwiched between interstate 270 to the Northwest and developed land with numerous buildings to the Southeast. Approximately 2,700 feet upstream from the primary roadway crossing for Big Walnut Creek, the creek divides into an overflow branch that runs on a less meandered alignment through the floodplain and crosses the subject roadway through a relief bridge. The overflow branch rejoins the primary creek approximately 250 feet downstream from the relief bridge crossing.

The twin structures at Big Walnut Creek have a high skew with respect to the channel crossing, while the twin structures at the overflow creek have no skew with respect to that channel crossing. Both channels are in good condition with well graded and vegetated banks and robust rock channel protection armoring the banks beneath all existing bridges. There are no known, significant erosion concerns, and a reconnaissance of the sites uncovered no significant problems. The main channel beds consist of moderate to coarse gravel (overflow channel), moderate to fine gravel (primary creek), silt, clay and some sand. Normal flow conditions at the overflow branch result in a narrow flow width and shallow depths, exposing numerous stones and rocks throughout. Normal flow conditions at the primary creek have a wider width and are deeper, however much of the end spans of each bridge remain dry under these conditions. A recreational bike path crosses beneath the fourth (and last) span of the bridges over Big Walnut Creek. Refer to Figures 2 and 3 for the conditions of the existing channels and project sites at the bridges.

Figure 2 – Channel and Site Condition – Big Walnut Creek Overflow Bridges

Figure 3 – Channel and Site Condition – Big Walnut Creek Main Bridges

EXISTING STRUCTURES

Bridges over Big Walnut Creek Overflow

The existing twin structures spanning the overflow branch of Big Walnut Creek are three-span, continuous reinforced concrete slab structures with stub concrete abutments and capped pile piers. Deep foundations at the abutments are 12-inch cast-in-place piles, and at the piers are 16-inch cast-in-place piles. The Eastbound structure carries 4 lanes of traffic, while the Westbound structure carries 3 lanes of traffic, and both have superelevated or superelevation transitions through their pavement cross-sections. The Eastbound structure has an out-to-out width of 63′-4″, and the Westbound structure 51′-4″, with approximately 36-feet between the two bridges. The overall bridge length for each is approximately 91.50′, with idealized center-to-center bearing spans of 28.50′, 34.33′, and 28.50′. According to survey, the existing structure depth averages approximately 1.75′, with low chord elevations of 740.40 and 739.45 on the upstream and downstream faces, respectively. Original construction occurred in 1963, with the latest major reconstruction occurring in 2018 (structure widening and parapet upgrade). Original construction plans and rehabilitation plans are both available and were used to gather information for this analysis.

Bridges over Big Walnut Creek

The existing twin structures over the primary branch of Big Walnut Creek are four-span, prestressed concrete I-beam bridges with reinforced concrete decks and substructures on deep foundations of 12-inch cast-in-place piles (abutments) and 14-inch cast-in-place piles (piers). The Eastbound structure carries 4 lanes of traffic, while the Westbound structure carries 3 lanes of traffic, and both have crowned pavement cross-sections at their respective E.B. and W.B. centerlines. The Eastbound structure has an out-to-out width of 63′-4″, and the Westbound structure 51′-4″, with approximately 36-feet between the two bridges. The overall bridge length for each is approximately 303.18′, with center-to-center bearing spans of 73′-7″, 74′-5″, 74′-5″, and 73′-7″. According to survey, the existing structure depth averages approximately 5.76′, with low chord elevations of 736.78 and 737.01 on the upstream and downstream faces, respectively. Original construction occurred in 1963, with the latest major reconstruction occurring in 2018 (structure widening and parapet upgrade). Original construction plans and rehabilitation plans are both available and were used to gather information for this analysis.

PROPOSED STRUCTURE

This project rehabilitates the subject structures via additional widening aimed to reduce congestion and improve safety on the US 33 corridor Southeast of Columbus, OH. Refer to other project documents for more in-depth narratives on overall roadway improvements, purpose and need. Westbound structures are both widened to the inside only on the divided highway, by 24′-3″. Eastbound structures are widened both to the inside and outside. Inside widening for the Eastbound structures is approximately 15′ and 13′ for the overflow and primary Big Walnut Creek bridges, respectively. Outside widening for the Eastbound structures varies for the overflow bridge from approximately 12′ to 14′ and is approximately 5′-8″ for the primary Big Walnut Creek bridge. The widened slab bridge (over the Big Walnut Creek overflow) matches the existing slab depth, and the widened prestressed I-beam bridge (over Big Walnut Creek) utilizes the same beam section as the existing beams. As such, the only change to chord geometry in the proposed hydraulic analysis is a drop in low chord accounting for the widened section and the resulting elevation lowering due to pavement cross slopes. Existing roadway profiles are maintained. Refer to the Hydraulic Analysis section of this report for the tabulated high and low chord elevations, as well as other reported data for the proposed structure.

All substructure units will be widened to accommodate the widened superstructure elements and will match the existing types and general cross-sectional areas for the abutments and piers, resulting in no changes to section geometry for substructures in the hydraulic model. Refer to Appendix A for relevant Stage 1 (preliminary design) bridge plan sheets.

DESIGN CRITERIA AND DESIGN DATA

US 33, which is conveyed by the subject bridges, has a current AADT for Eastbound traffic of 80,703, and for Westbound traffic of 7,878. These values are projected to grow due to continued growth and highway use in the area. Per ODOT’s Location and Design Manual (L&D), Volume 2, Section 1004.2, interstate, freeway and expressway structures should be designed to clear a 50-year frequency event (2% AEP) and checked for the 100-year frequency event (1% AEP). US 33 is a Principal Arterial Freeway. As such, the 50-year and 100-year flow profiles are used in this analysis.

A FEMA Flood Insurance Study (FIS) is available for this project location, which was last revised in 2011. From the FIS, flow data is available at two locations near the subject study area, below the confluence of Alum Creek (1.65 miles downstream) and at Refugee Road (2.60 miles upstream). Although the location below the confluence of Alum Creek is closer, it is not appropriate for use in this analysis because the discharge from Alum Creek is included and could not be practically removed from consideration. Therefore, peak discharges reported at Refugee Road are used in this analysis. It should be noted that flow data from USGS StreamStats was also analyzed and explored for this study, however discharges are significantly lower than discharges reported by FEMA (approximately 30% lower) and therefore they are not used.

According to the FIS, several methodologies were used to determine peak discharge-frequency relationships for Big Walnut Creek, and the exact modeling methodology and program are not clear from the study. A FIS Data Request was submitted to FEMA to gather any available hydrologic and hydraulic backup data that might exist for Big Walnut Creek; however, a response was not yet received by the time this preliminary report was written, several months after the request. If any data is received, it can be incorporated into a final report, but it's probable that no existing data from the FIS is available.

The model was created using project-specific survey data for the channel and immediately surrounding areas, as well as the existing bridges, and supplemented using LiDAR data from the Ohio Geographically Referenced Information Program (OGRIP). The OGRIP data source deemed most appropriate was elevation data from 3DEP+, dated 2021. Terrain information was merged, giving preference to surveyed information where available, to create a single digital terrain model from which all channel cross sections were created. LiDAR extents were approximately 1,000-3,000 feet in all directions from the subject bridges to make sure the floodplain areas were accurately incorporated into the hydraulic model.

Relevant FIS information is available in Appendix B, and the StreamStats report for this site is available in Appendix C. Flow data used in the analysis is presented in Table 1.

FLOW PROFILE	PEAK DISCHARGE (CFS)
2% Annual Chance (50-year) (FEMA FIS)	21,200
1% Annual Chance (100-year) (FEMA FIS)	25,300

Table 1 – Flow Profiles Considered

The US 33 bridges over Big Walnut Creek and the Big Walnut Creek overflow are in a FEMA Zone AE, a regulatory floodway in which a base flood elevation (BFE) is provided. A FIRMette is available in Appendix B. HEC-RAS models used for this hydrology and hydraulics report are submitted with this report and are available on request.

HYDRAULIC ANALYSIS

The Big Walnut Creek hydraulic analysis spans approximately 1800-feet upstream from the bridge crossings and 2200-feet downstream. The analysis was completed using HEC-RAS version 6.4.1 with modeling assistance from the software program GeoHECRAS version 5.0.0.1613. Project survey and all elevations in the hydraulic model match the same vertical datum used in the FIS, NAVD88. Flow data from the FEMA FIS was used for both discharge values considered in the analysis. Three profiles were analyzed in total, one for the 50-year discharge, and two for the 100-year discharge (one where the downstream boundary condition, B.C., was set as normal depth with channel slope as the boundary detail, and one where the downstream boundary condition was set to a known water surface elevation corresponding to a FEMA cross-section at the same location). The downstream-most cross-section in the hydraulic model is set at the same location as published cross-section AU in the FEMA FIS (refer to Appendix B). Results were compared for the two 100-year scenarios, and it was determined that strong agreement had been reached between the 100-year, normal depth boundary condition profile and published water surface elevations at the existing bridges. Table 2 summarizes the comparison between existing, corrected effective model results and the published FEMA data, demonstrating that calibration to FEMA has been achieved. The published water surface elevation on the upstream face of the existing Big Walnut Creek bridge is 735.0 feet, which was the target elevation for calibration at the structure. Table 3 shows the resulting comparison at the first published FEMA cross-section upstream from the bridges, AW.

FLOW PROFILE	DOWNSTREAM B.C.	FEMA ELEV. AT AU	W.S. ELEV. @ U.S. FACE OF BIG WALNUT CREEK BRIDGE	ELEV. DIFFERENCE (MODEL RESULTS – FEMA)
100-year (FEMA FIS)	Normal Depth	734.04	735.07	0.07 feet
100-year (FEMA FIS)	Known W.S.	729.80 (set)	733.58	-1.42 feet

Table 2 – Existing, Corrected Effective Results and FEMA Results (profile with best agreement)

FLOW PROFILE	DOWNSTREAM B.C.	FEMA ELEV. AT AW	W.S. ELEV. @ U.S. FACE OF BIG WALNUT CREEK BRIDGE	ELEV. DIFFERENCE (MODEL RESULTS – FEMA)
100-year (FEMA FIS)	Normal Depth	736.90	736.06	-0.84 feet
100-year (FEMA FIS)	Known W.S.	736.90	735.08	-1.82 feet

Table 3 – Existing, Corrected Effective Results and FEMA Results (profile with best agreement)

Manning's roughness coefficients were assigned for main channel and overbank regions corresponding to the published ranges in the FEMA FIS and available aerial imagery, which are still well correlated between the two. Ineffective flow areas throughout the analysis area were appropriately modeled based on elevation data in the generated cross-sections. Refer to the model cross sections provided in Appendices E and F for the specific channel and overbank roughness coefficients chosen and the designated ineffective flow areas.

The roadway and bridge crossing elevation data (high and low chords, where applicable) were generated from available survey data, and from LiDAR data where gaps were present in survey data. The overflow branch of Big Walnut Creek is not an individually studied stream, either by FEMA or USGS StreamStats. Therefore, the overflow branch cannot be modeled as its own reach in HEC-RAS. Instead, the analysis utilizes a multiple bridge opening computational method (refer to available HEC-RAS user literature for associated limitations with this method). Horizontal stationing / direction in HEC-RAS is reversed from conventional forward stationing (in the figure below, left-to-right represents East-to-West, instead of a conventional West-to-East layout). Figure 4 presents the existing bridge model, profiled at the upstream face cross section and depicting both crossings.

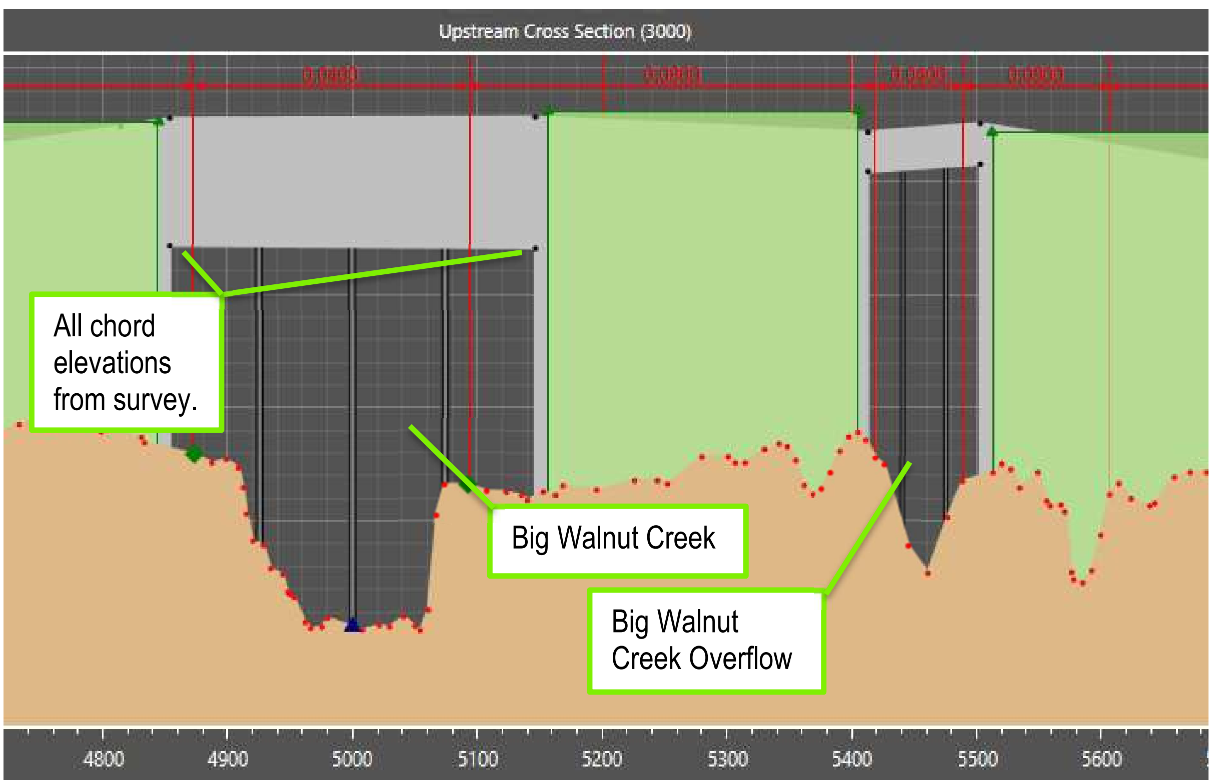


Figure 4 – Existing Bridge Roadway Crossings, Upstream Face Shown

Cross-section spacing varies from approximately 250 feet to 700 feet, as needed to generate an accurately calculated 1D model through the bridge opening system. Attention was given to intentionally place the modeled cross-sections at or close to locations of FEMA-modeled cross-sections, when possible, to assist with results comparisons for both this model and any future models that may leverage this existing-conditions analysis. Figure 5 presents a plan view of the existing hydraulic model.

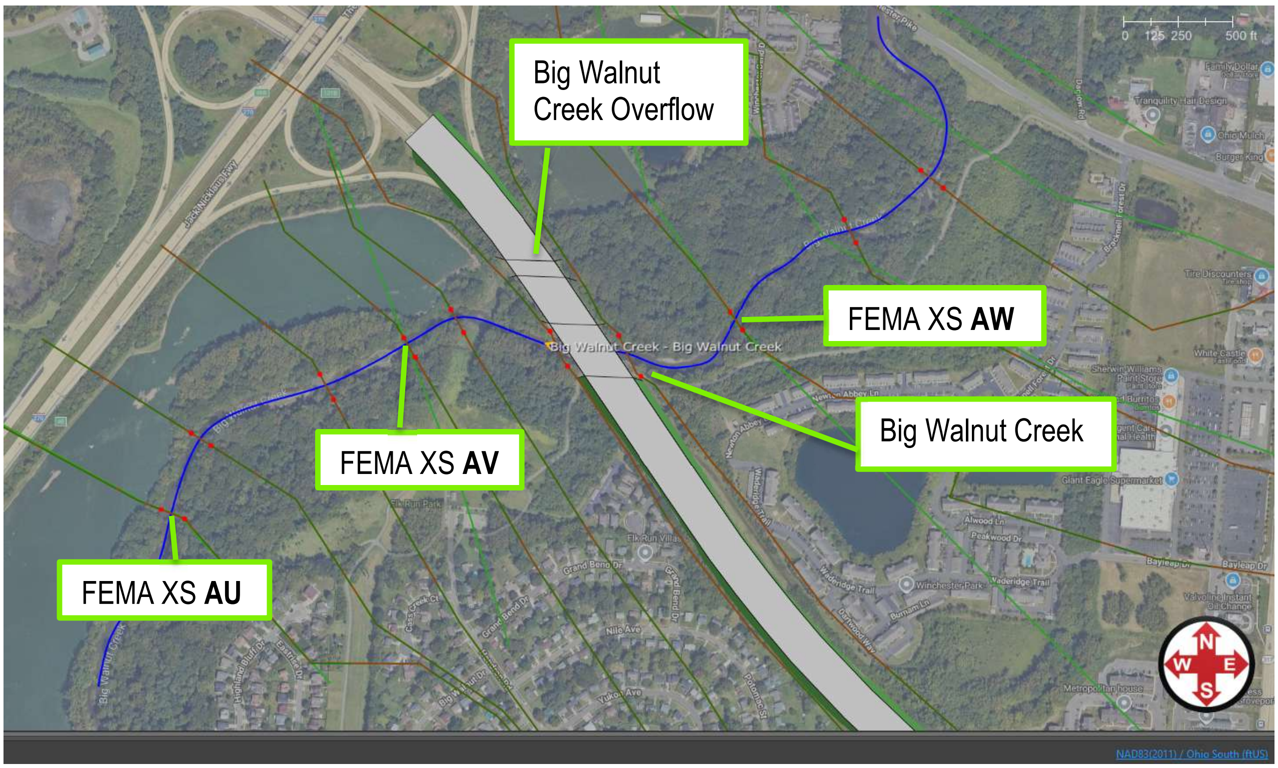


Figure 5 – Plan View of Existing Model in GeoHECRAS

All three profiles previously discussed for this hydraulic analysis are used to check the rise condition between existing and proposed models. Because the scenario utilizing the normal depth downstream boundary condition achieved reasonable elevation agreement compared to FEMA data, these two profiles (50-year and 100-year, with downstream B.C.'s set to normal depth) are used to assess freeboard results and comparison between the existing and proposed models. The elevations at the bridge using the known downstream water surface elevation are substantially lower than the other scenarios, negating a relevant freeboard check for that scenario.

Because the overflow branch of Big Walnut Creek could not be modeled separately, and instead the parameters and analysis are all driven by the primary crossing at Big Walnut Creek, the proposed structure geometry was driven by those primary bridges, specifically with respect to the proposed bridge width. Relevant high and low chord geometries could be input directly for each crossing. The proposed left structures (Westbound) are not widened to the outside, so the existing low chords on the upstream faces of both bridges remained the same. The outside widening of the right structures (Eastbound) resulted in a drop in the low chord elevations of 0.07 feet and 0.24 feet for the primary Big Walnut Creek bridges and the overflow bridges, respectively. The modeled roadway width, parallel to flow, increased from 180-feet (existing) to 185-feet (proposed), representing the lesser widening of the primary bridges. Widening to the inside (aside from considering low chord changes, which did not control) cannot be picked up in a 1D HEC-RAS model because the twin structures are modeled as a single bridge opening.

SCOUR ANALYSIS

Soil borings and the resulting geotechnical analysis have not yet been completed at first writing of this report and are scheduled during the detailed design phase for this project. Without project soil borings, D50 particle sizes and other relevant soil properties are not available, and therefore detailed scour calculations cannot yet be completed. The scour analysis will be completed during detailed design and added to this report when it's made final, using the FHWA Hydraulic Toolbox and the latest guidance in Hydraulic Engineering Circular 18 (HEC-18). There are not any known problems with scour at any of the subject bridges, and a site reconnaissance did not turn up any significant concerns with scour in the existing condition.

RESULTS SUMMARY

The proposed widening at the four bridges in this study results in very little change from the existing geometry, either in terms of width or chord elevations, compared to the overall geometry as it impacts stream flow. As such, it is not surprising to see no change in water surface elevations for the scenarios considered, and very little change to flow velocities. Additionally, a freeboard comparison between the existing, corrective effective model and the proposed conditions model yields little change, and results in an acceptable value for the proposed bridges. Tables 4 and 5 present the freeboard comparison for the two models, taken at both the upstream and downstream face bridge sections, for the primary bridge and the overflow bridge, respectively.

FLOW PROFILE AND LOCATION	EXISTING FREEBOARD (FT)	PROPOSED FREEBOARD (FT)
2% Annual Chance (50-year) (FIS) – U.S.	3.08	3.07
1% Annual Chance (100-year) (FIS) – U.S.	1.94	1.94
2% Annual Chance (50-year) (FIS) – D.S.	3.76	3.71
1% Annual Chance (100-year) (FIS) – D.S.	1.99	1.93

Table 4 – Freeboard Analysis – Bridge over Big Walnut Creek

FLOW PROFILE AND LOCATION	EXISTING FREEBOARD (FT)	PROPOSED FREEBOARD (FT)
2% Annual Chance (50-year) (FIS) – U.S.	6.47	6.46
1% Annual Chance (100-year) (FIS) – U.S.	5.33	5.33
2% Annual Chance (50-year) (FIS) – D.S.	6.43	6.21
1% Annual Chance (100-year) (FIS) – D.S.	4.66	4.43

Table 5 – Freeboard Analysis – Bridge over Big Walnut Creek Overflow

Figure 6 shows a representative cross-section of the proposed conditions model, upstream face of both bridges and the corresponding freeboard.

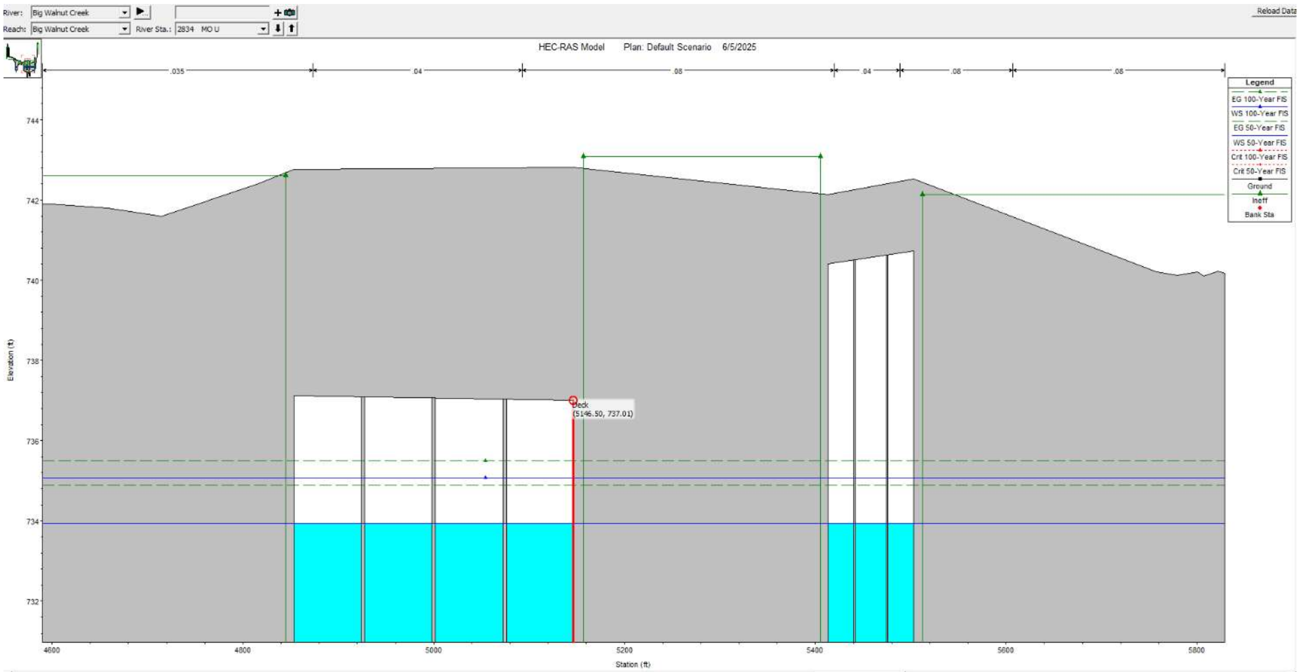


Figure 6 – Freeboard, Upstream Face of Proposed Bridges

A no-rise analysis has been completed for the 100-year profiles and scenarios considered in this study at all cross-sections throughout the hydraulic model. That is, for the 100-year discharge with the normal depth downstream boundary condition and the 100-year discharge with the known water surface elevation downstream boundary condition. Table 6 presents the results and comparison in water surface elevations at all cross-sections, and Table 7 presents the results and comparison in flow velocity at all cross-sections.

These tables demonstrate that there is no rise in elevations or detrimental effects to flow velocity for the 100-year flows. Because no-rise is achieved for both of the 100-year scenarios at all cross-sections, the proposed structure widening is acceptable. Refer to the two summary tables in Appendix D for all values. Values are reported for the design flow profile (50-year); however, those are not used to measure the water surface rise/no-rise conditions.

RESULTS SUMMARY – WATER SURFACE ELEVATIONS			
MODELED CROSS SECTION STATION (BOUNDARY CONDITION)	EXISTING W.S. ELEVATION	PROPOSED W.S. ELEVATION	DIFFERENCE
4764 - (normal depth)	736.55	736.55	0.00
4764 - (known W.S.)	735.83	735.83	0.00
4315 - (normal depth)	736.25	736.25	0.00
4315 - (known W.S.)	735.39	735.39	0.00
3622 - (normal depth)	736.06	736.06	0.00
3622 - (known W.S.)	735.08	735.08	0.00
3000 - (normal depth)	734.95	734.95	0.00
3000 - (known W.S.)	733.50	733.50	0.00
2676 - (normal depth)	733.94	733.94	0.00
2676 - (known W.S.)	730.99	730.99	0.00
2181 - (normal depth)	734.42	734.42	0.00
2181 - (known W.S.)	731.70	731.70	0.00
1927 - (normal depth)	734.39	734.39	0.00
1927 - (known W.S.)	731.58	731.58	0.00
1505 - (normal depth)	734.34	734.34	0.00
1505 - (known W.S.)	731.40	731.40	0.00
865 - (normal depth)	734.19	734.19	0.00
865 - (known W.S.)	730.84	730.84	0.00
492 - (normal depth)	734.04	734.04	0.00
492 - (known W.S.)	729.80	729.80	0.00

Table 6 – No-Rise Analysis / Water Surface Elevation Results

RESULTS SUMMARY – FLOW VELOCITY (FT/S)			
MODELED CROSS SECTION STATION (BOUNDARY CONDITION)	EXISTING VELOCITY	PROPOSED VELOCITY	DIFFERENCE
4764 - (normal depth)	5.20	5.20	0.00
4764 - (known W.S.)	5.94	5.94	0.00
4315 - (normal depth)	3.91	3.91	0.00
4315 - (known W.S.)	4.51	4.51	0.00
3622 - (normal depth)	2.42	2.42	0.00
3622 - (known W.S.)	2.91	2.91	0.00
3000 - (normal depth)	7.80	7.80	0.00
3000 - (known W.S.)	9.12	9.11	0.01
2676 - (normal depth)	9.19	9.19	0.00
2676 - (known W.S.)	13.16	13.16	0.00
2181 - (normal depth)	3.04	3.04	0.00
2181 - (known W.S.)	5.08	5.08	0.00
1927 - (normal depth)	2.71	2.71	0.00
1927 - (known W.S.)	4.54	4.54	0.00
1505 - (normal depth)	2.40	2.40	0.00
1505 - (known W.S.)	3.81	3.81	0.00
865 - (normal depth)	3.40	3.40	0.00
865 - (known W.S.)	6.03	6.03	0.00
492 - (normal depth)	4.04	4.04	0.00
492 - (known W.S.)	8.90	8.90	0.00

Table 7 – Flow Velocity Comparison

CONCLUSION

The proposed results presented in this analysis and report demonstrate acceptable freeboard conditions between the existing and proposed structures, as well as no-rise in water surface elevations for the 100-year flow profiles. Additionally, flow velocities are not negatively impacted, and in fact have almost no change between existing and proposed conditions. For all these reasons, the proposed bridge widening project is acceptable from a hydraulics and hydrology standpoint, and a no-rise certification can be implemented with this project.

Appendix A – Stage 1 Bridge Plans and Existing Photos

Photo 1 – Bridge over Big Walnut Creek Overflow

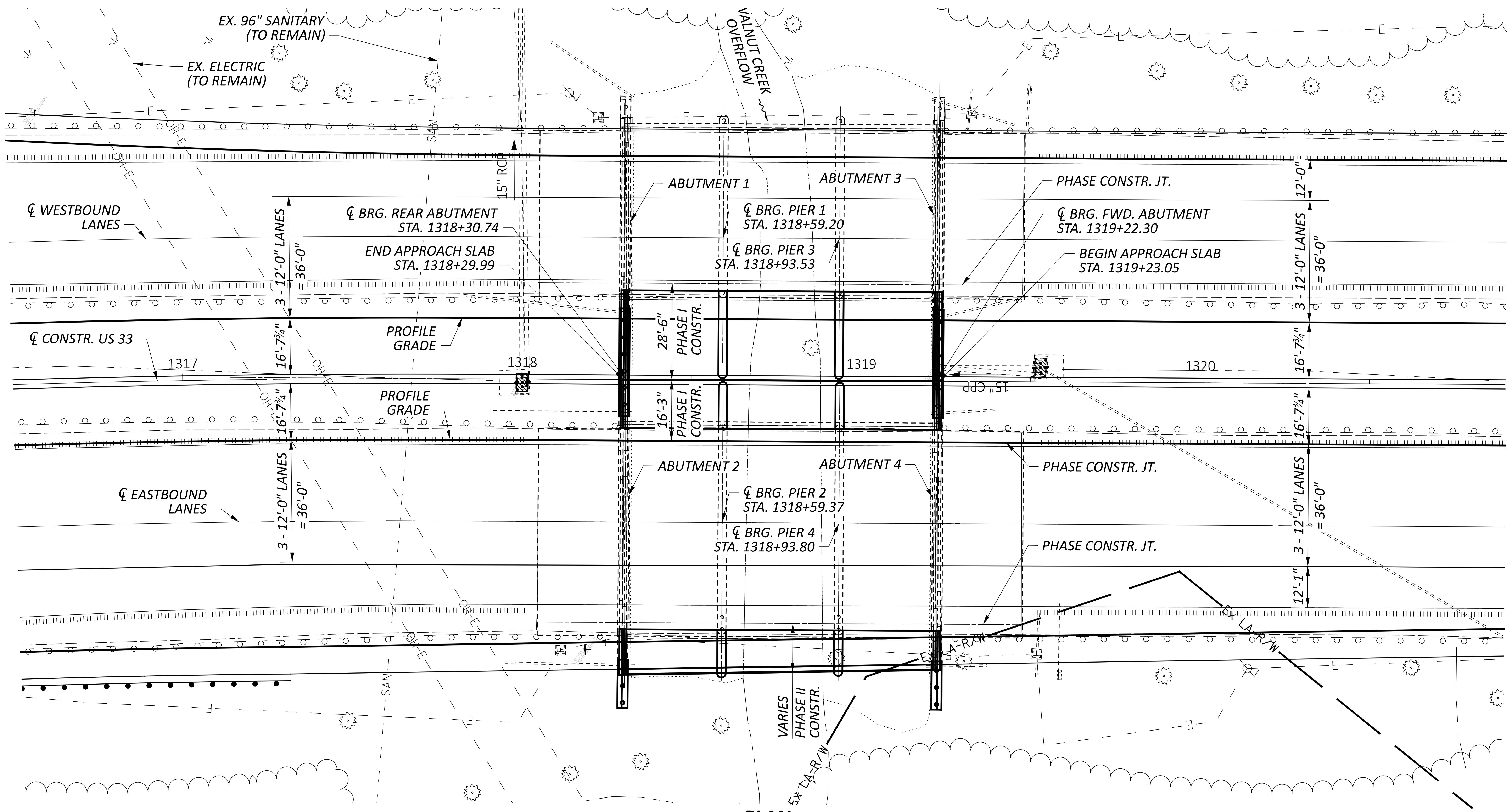
Photo 2 – Bridge over Big Walnut Creek Overflow, Existing Bridge and Channel Condition

Photo 3 – Bridge over Big Walnut Creek Overflow, Existing Bridge and Channel Condition

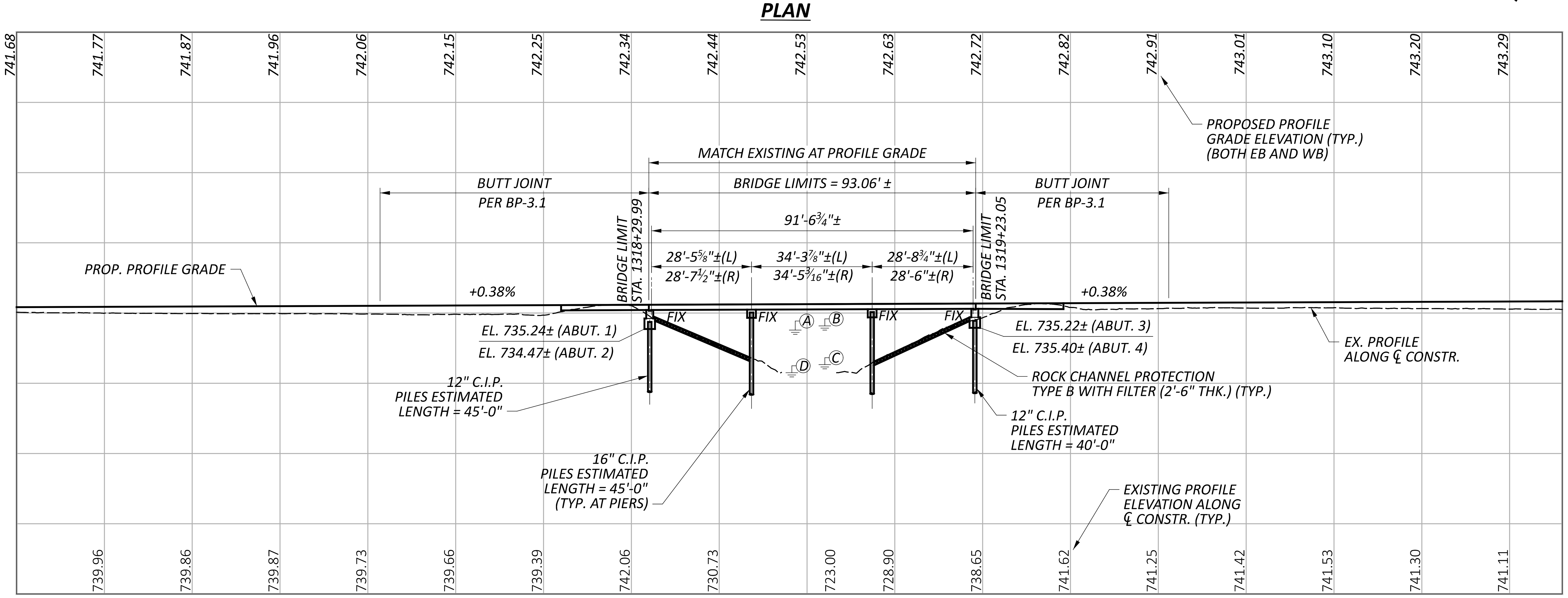
Photo 4 – Bridge over Big Walnut Creek, Looking Southeast

Photo 5 – Bridge over Big Walnut Creek, Looking East

Photo 6 – Bridge over Big Walnut Creek, Looking West



PLAN



PROFILE ALONG PROFILE GRADE

BENCHMARK DATA

BM #1 STA. ,	ELEV. ,	OFFSET ,	
BM #2 STA. ,	ELEV. ,	OFFSET ,	
BM #3 STA. ,	ELEV. ,	OFFSET ,	
BM #4 STA. ,	ELEV. ,	OFFSET ,	

FOR ADDITIONAL BENCHMARK INFORMATION. SEE ROADWAY PLAN SHEET 2 OF 705.

NOTES

EARTHWORK LIMITS SHOWN ARE APPROXIMATE. ACTUAL SLOPES SHALL CONFORM TO PLAN CROSS SECTIONS.

DESIGN TRAFFIC:
2030 ADT = 91,000 2030 ADTT = 8190
2050 ADT = 113,000 2050 ADTT = 10,170

HYDRAULIC DATA

DRAINAGE AREA = 254 SQ. MILES
(A) Q(50) = 21,200 CFS V(50) = 6.91 FT/S HWE = 733.94
(B) Q(100) = 25,300 CFS V(100) = 7.80 FT/S HWE = 735.07
(C) ORDINARY HIGH WATER MARK = 725.50 (LT), 725.30 (RT)
(D) NORMAL WATER ELEVATION = 723.0
STRUCTURE CLEARS THE 50 YEAR DESIGN HW50 BY 6.46 FT

EXISTING STRUCTURE

TYPE: CONTINUOUS REINFORCED CONCRETE SLAB WITH CAPPED PILE SUBSTRUCTURE
SPANS: 28'-5⅝", 34'-3⅞", 28'-9¼" C/C BEARINGS (LEFT)
28'-7⁹⁄₁₆", 34'-5³⁄₁₆", 28'-6" C/C BEARINGS (RIGHT)
ROADWAY: 48'-0" (L), 60'-0" (R) TOE/TOE PARAPET
LOADING: HS20-44 AND ALTERNATE MILITARY (SUPERSTRUCTURE ONLY)
SKEW: NONE
WEARING SURFACE: 1" MONOLITHIC CONCRETE AND 4¼" SDC OVERLAY
APPROACH SLABS: 25'-0" LONG (AS-1-81)
ALIGNMENT: TANGENT
CROWN: VARIES
STRUCTURE FILE NUMBER: 2501929 (L), 2501953 (R)
DATE BUILT: 1963
DISPOSITION: WIDEN BRIDGE AND APPROACH SLAB

PROPOSED STRUCTURE

TYPE: CONTINUOUS REINFORCED CONCRETE SLAB WITH CAPPED PILE SUBSTRUCTURE
SPANS: 28'-5⅝"±, 34'-3⅞"±, 28'-9¼"± C/C BEARINGS (LEFT)
28'-7⁹⁄₁₆"±, 34'-5³⁄₁₆"±, 28'-6"± C/C BEARINGS (RIGHT)
ROADWAY: VARIES
LOADING: HL93 AND 60 PSF FUTURE WEARING SURFACE
SKEW: NONE
WEARING SURFACE: 4¼" SDC OVERLAY
APPROACH SLABS: 25' LONG (AS-1-15, AS-2-15)
ALIGNMENT: TANGENT
CROWN: VARIES
DECK AREA: 15058 SF
COORDINATES: LATITUDE 39°53'57.55"
LONGITUDE -82°53'41.05"

SITE PLAN
BRIDGE NO. FRA-033-2503 L/R
OVER BIG WALNUT CREEK OVERFLOW

SFN 2501929 (L)
2501953 (R)
DESIGN AGENCY

DESIGNER	CHECKER
NRP	AMT
REVIEWER	
DWS 05/28/25	
PROJECT ID	
121811	
SUBSET	TOTAL
1	6
SHEET	TOTAL
P.679	P.705

FRA/FAI-33-22.99/0.00

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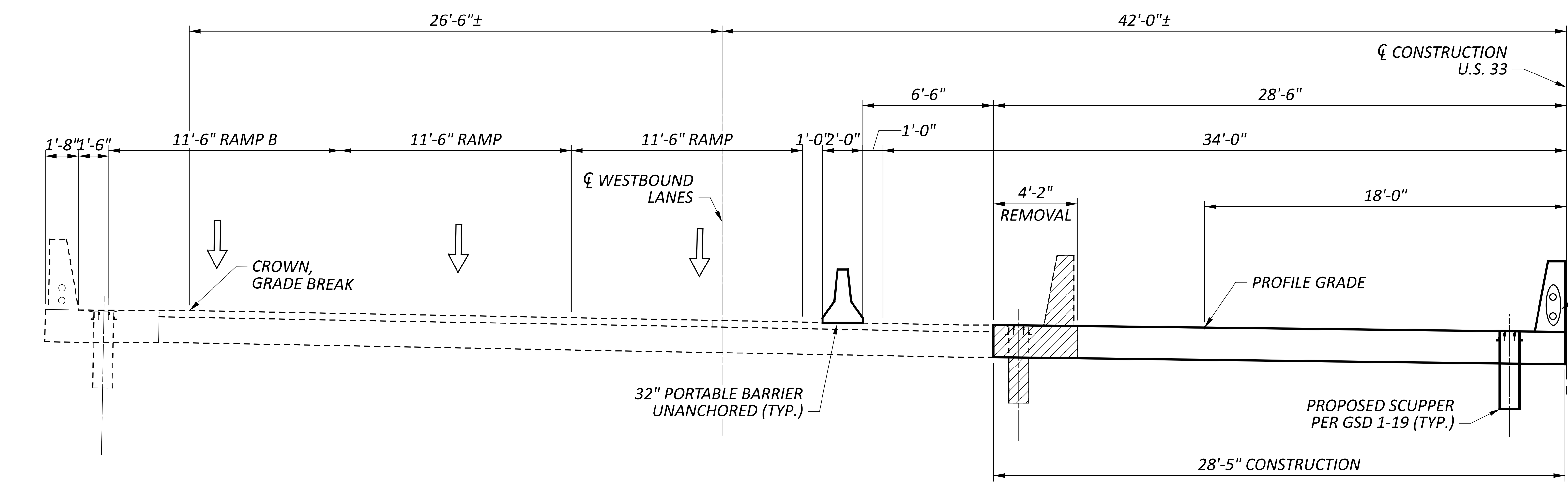
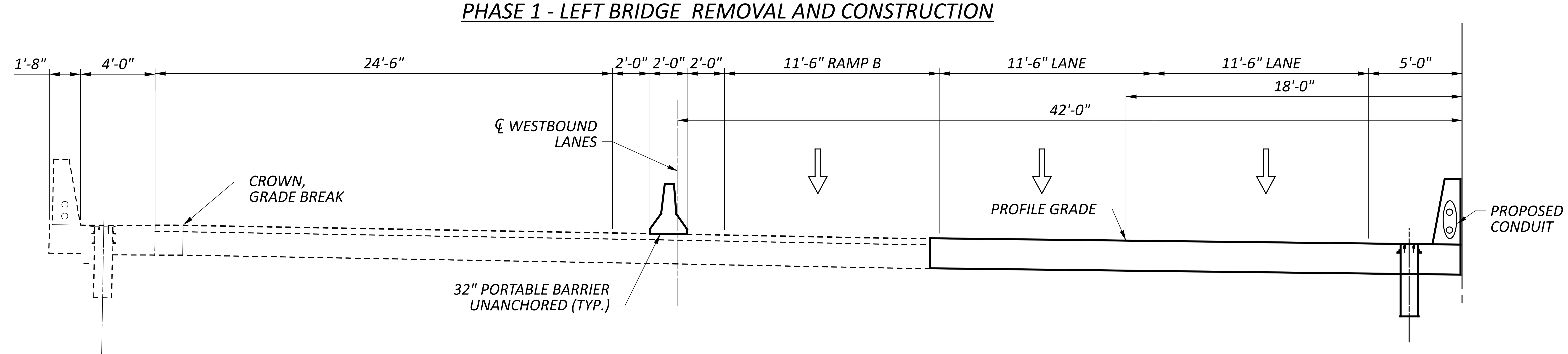
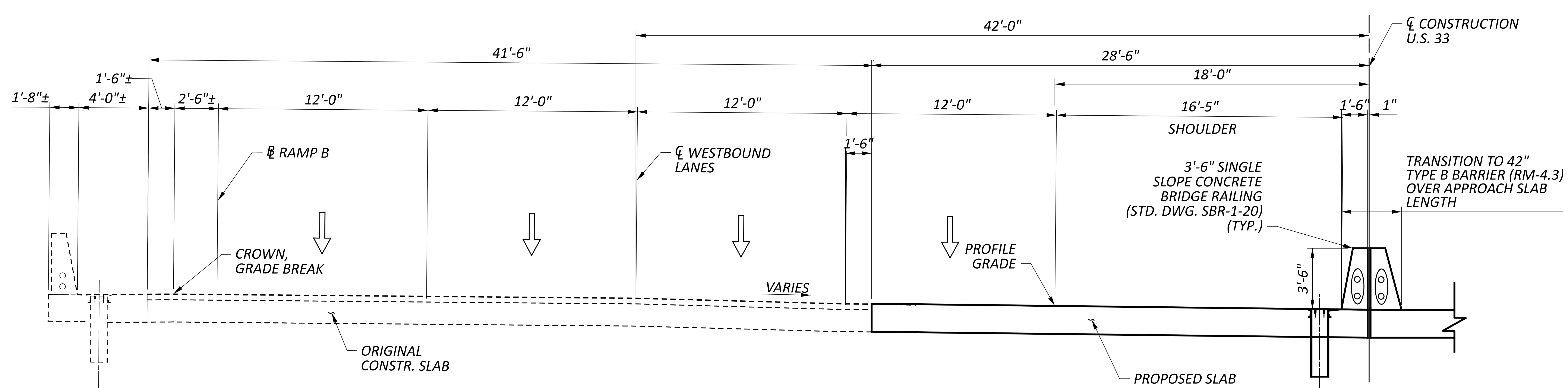


PHASE 1 - LEFT BRIDGE REMOVAL AND CONSTRUCTION



PHASE 2B - LEFT BRIDGE REMOVAL AND CONSTRUCTION

(NOTE: LANE CONFIGURATION FOR PAVEMENT CONSTRUCTION, SLAB ENDS AND PORTIONS OF ABUTMENT TO BE REPLACED NO WORK ON MOST OF THE BRIDGE DECK IN THIS PHASE. SEE PHASE 2A ON THE RIGHT BRIDGE.)



FINAL CONFIGURATION - LEFT BRIDGE

ITEM 202, PORTION OF STRUCTURE REMOVED, OVER 20 FOOT SPAN, AS PER PLAN

SUGGESTED SEQUENCE OF CONSTRUCTION:

PHASE 1 - REMOVAL AND CONSTRUCTION

1. INSTALL PB AND SHIFT TRAFFIC AS SHOWN. INSTALL SHORING AT SLAB ENDS.
2. ON THE LEFT BRIDGE SOUTH (RIGHT) SIDE, REMOVE 4'-2" OF THE FULL DEPTH SLAB, EXISTING RAILING AND PORTION OF ABUTMENTS AND PIERS.
3. CONSTRUCT PORTION OF ABUTMENTS AND PIERS, CONSTRUCT 28'-5" FULL DEPTH SLAB, SLAB END RECONSTRUCTION AND PARAPET AT SOUTH (RIGHT) SIDE.

PHASE 2B - REMOVAL AND CONSTRUCTION

1. PHASE 2A SHOULD BE COMPLETE BEFORE STARTING PHASE 2B. SEE RIGHT BRIDGE PHASE CONSTRUCTION DETAILS.
2. INSTALL PB AND SHIFT TRAFFIC AS SHWON, INSTALL SHORING AT SLAB ENDS.
3. ON THE LEFT BRIDGE NORTH (LEFT) SIDE, REMOVE PORTIONS OF SLAB ENDS AND ABUTMENTS.
4. CONSTRUCT PORTION OF SLAB ENDS AND ABUTMENTS.

PHASE CONSTRUCTION DETAILS- LEFT BRIDGE
BRIDGE NO. FRA-033-2503L
OVER BIG WALNUT CREEK OVERFLOW

SFN	2501929
DESIGN AGENCY	
DESIGNER: SS	CHECKER: AMT
REVIEWER: DWS 05/28/25	
PROJECT ID: 121811	
SUBSET: 2	TOTAL: 6
SHEET: P.680	TOTAL: P.705

FRA/FAI-33-22.99/0.00
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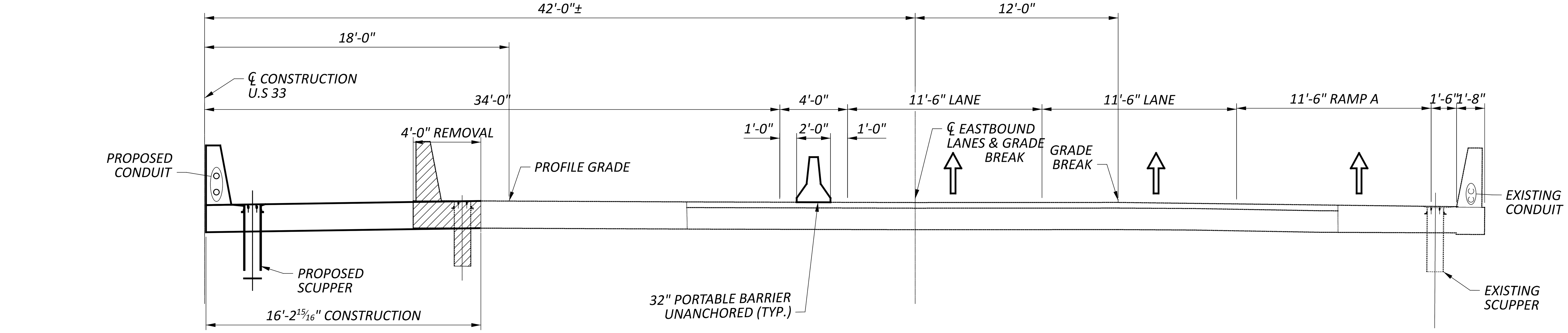
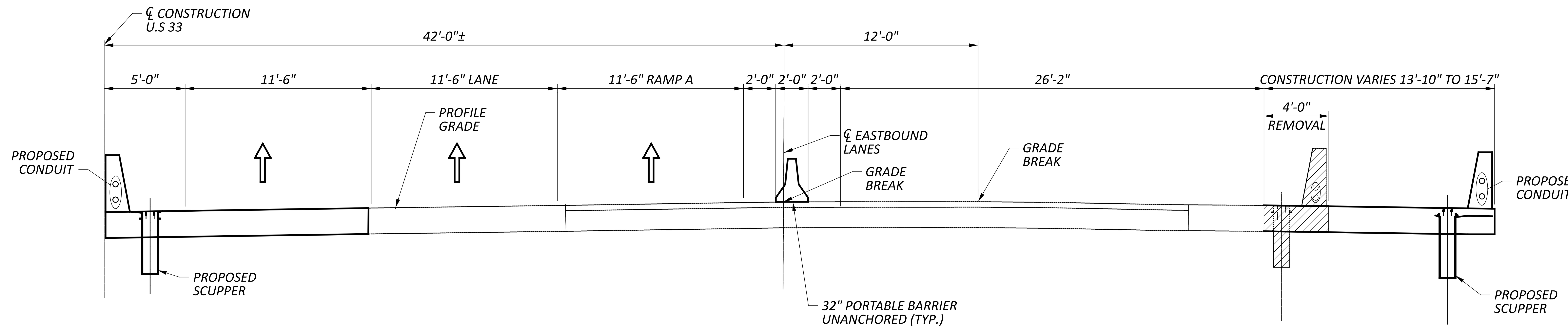
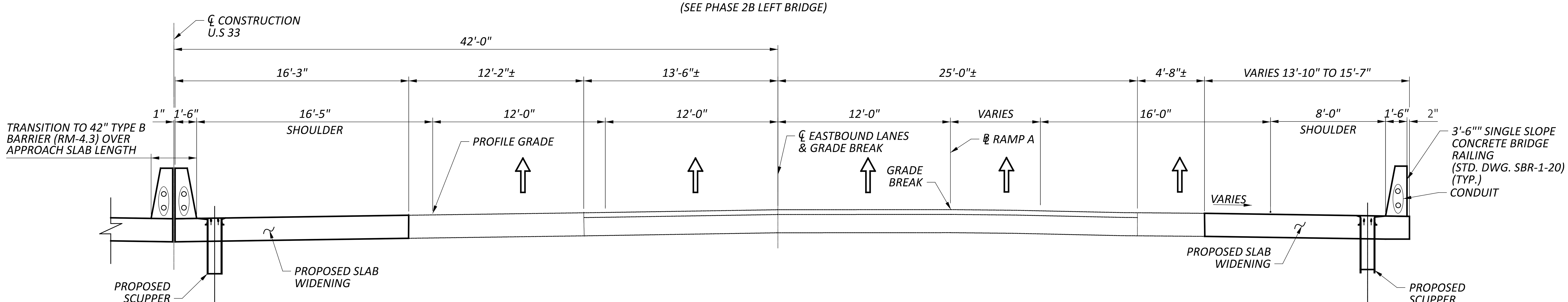


PHASE 1 - RIGHT BRIDGE REMOVAL AND CONSTRUCTION



PHASE 2A - RIGHT BRIDGE REMOVAL AND CONSTRUCTION

(SEE PHASE 2B LEFT BRIDGE)



FINAL CONFIGURATION - RIGHT BRIDGE

ITEM 202, PORTION OF STRUCTURE REMOVED, OVER 20 FOOT SPAN, AS PER PLAN

SUGGESTED SEQUENCE OF CONSTRUCTION:

PHASE 1 - REMOVAL AND CONSTRUCTION

1. INSTALL PB AND SHIFT TRAFFIC AS SHOWN, INSTALL SHORING AT SLAB ENDS.
2. ON THE RIGHT BRIDGE NORTH (LEFT) SIDE, REMOVE 4'-0" OF THE FULL DEPTH SLAB, EXISTING RAILING AND PORTION OF SLAB ENDS, ABUTMENTS AND PIERS.
3. CONSTRUCT PORTION OF ABUTMENTS AND PIERS, CONSTRUCT 16'-3" FULL DEPTH SLAB, SLAB END RECONSTRUCTION AND PARAPET AT NORTH (LEFT) SIDE.

PHASE 2A - REMOVAL AND CONSTRUCTION

1. INSTALL PB AND SHIFT TRAFFIC AS SHOWN, INSTALL SHORING AT SLAB ENDS.
2. ON THE RIGHT BRIDGE SOUTH (RIGHT) SIDE, REMOVE 4'-0" OF THE FULL DEPTH SLAB, EXISTING RAILING AND PORTION OF SLAB ENDS, ABUTMENTS AND PIERS.
3. CONSTRUCT PORTION OF ABUTMENTS AND PIERS, CONSTRUCT VARIABLE WIDTH FULL DEPTH SLAB, SLAB END RECONSTRUCTION AND PARAPET ON THE SOUTH (RIGHT) SIDE.

PHASE CONSTRUCTION DETAILS - RIGHT BRIDGE
BRIDGE NO. FRA-033-2503R
OVER BIG WALNUT CREEK OVERFLOW

SFN	2501953
DESIGN AGENCY	
DESIGNER: SS	CHECKER: AMT
REVIEWER: DWS 05/28/25	
PROJECT ID: 121811	
SUBSET: 3	TOTAL: 6
SHEET: P.681	TOTAL: P.705

FRA/FAI-33-22.99/0.00

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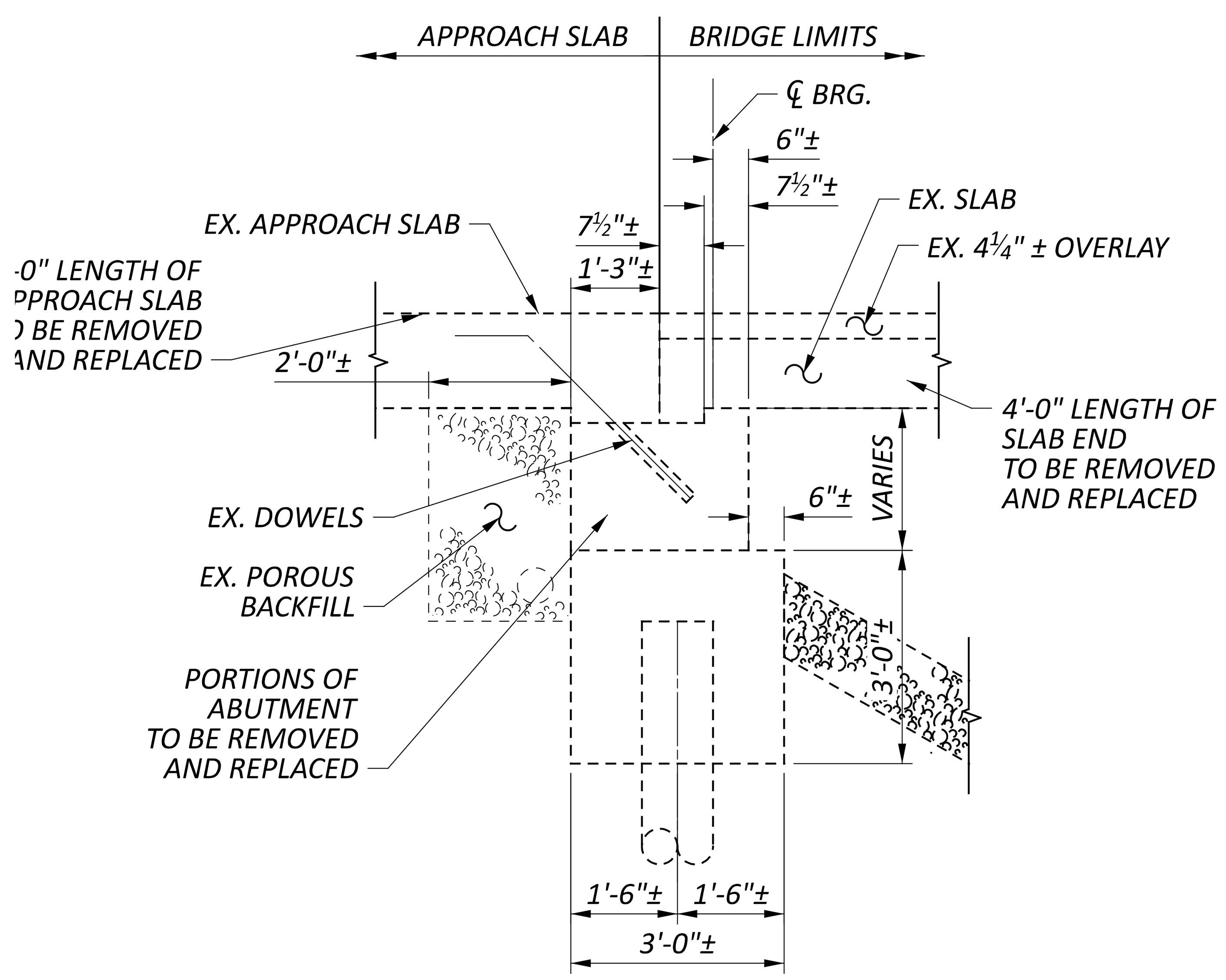
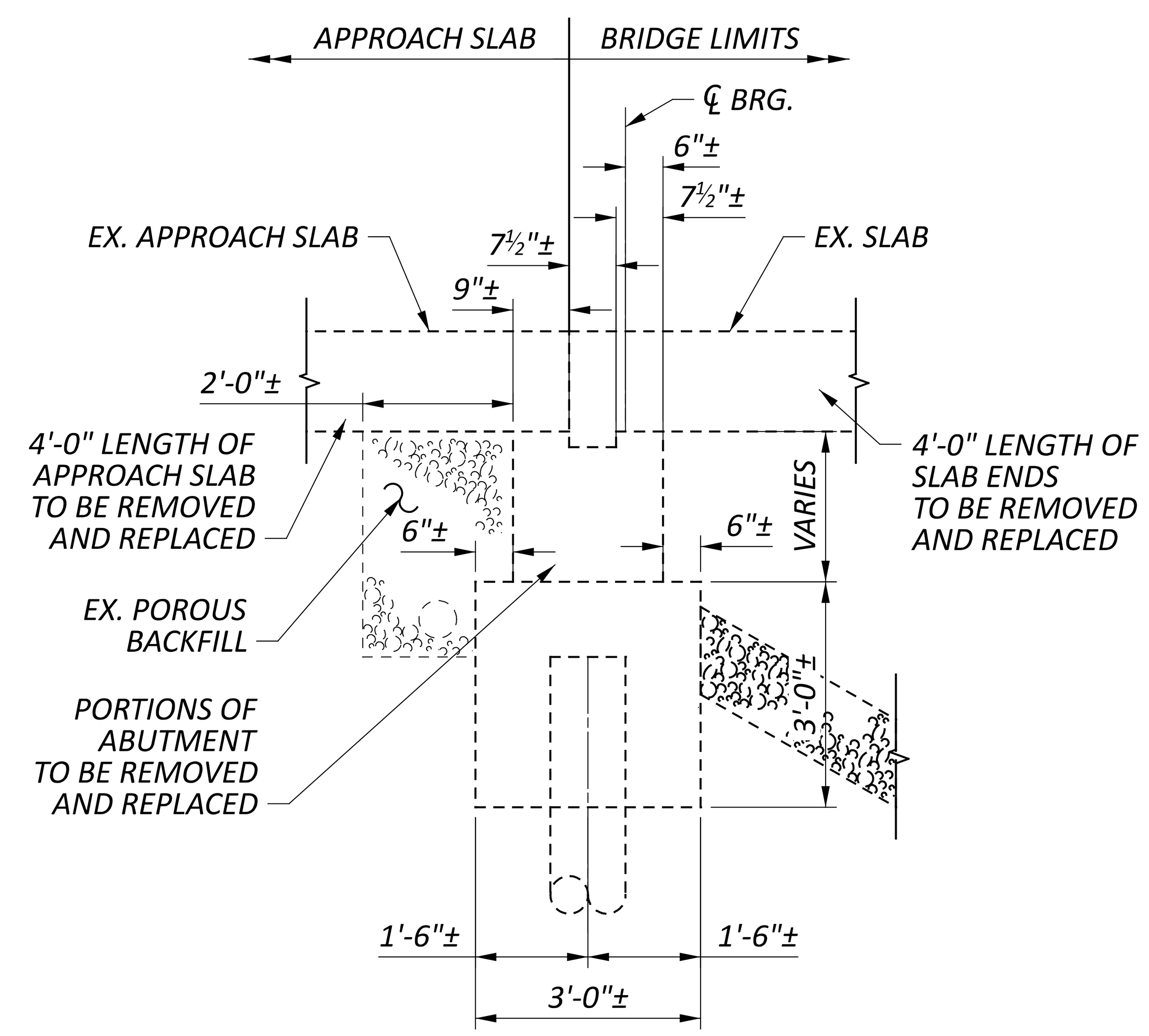
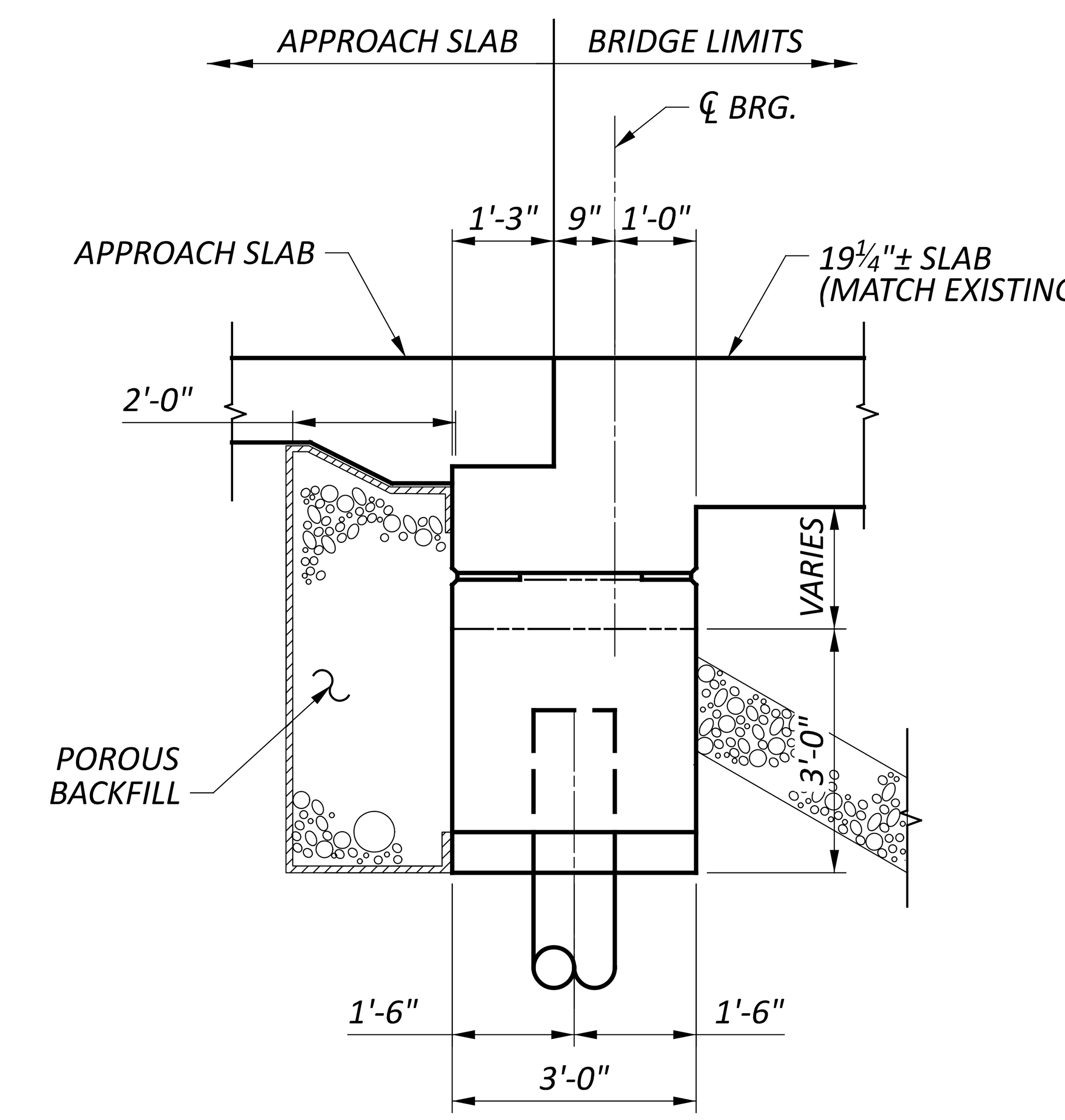


EXISTING ABUTMENT SECTION
ORIGINAL 1963 CONSTRUCTION
WITH 2018 REHABILITATION



EXISTING ABUTMENT SECTION
2018 REHABILITATION WIDENING

NOTE: REPLACEMENTS WILL BE SIMILAR TO
PROPOSED ABUTMENT SECTION WIDENING



PROPOSED ABUTMENT SECTION
WIDENING

ABUTMENT SECTIONS
BRIDGE NO. FRA-033-2503 L/R
OVER BIG WALNUT CREEK OVERFLOW

SFN L - 2501929
R - 2501953

DESIGN AGENCY

DESIGNER	CHECKER
MSR	AMT
REVIEWER	
DWS 05/28/25	
PROJECT ID	
121811	
SUBSET	TOTAL
4	6
SHEET	TOTAL
P.682	P.705

FRA/FAI-33-22.99/0.00

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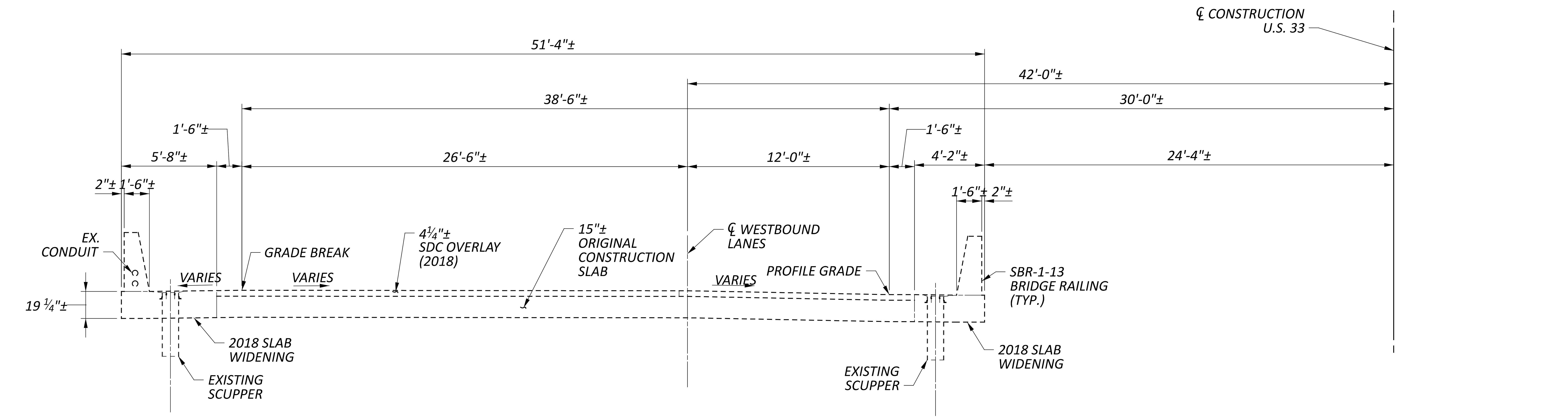
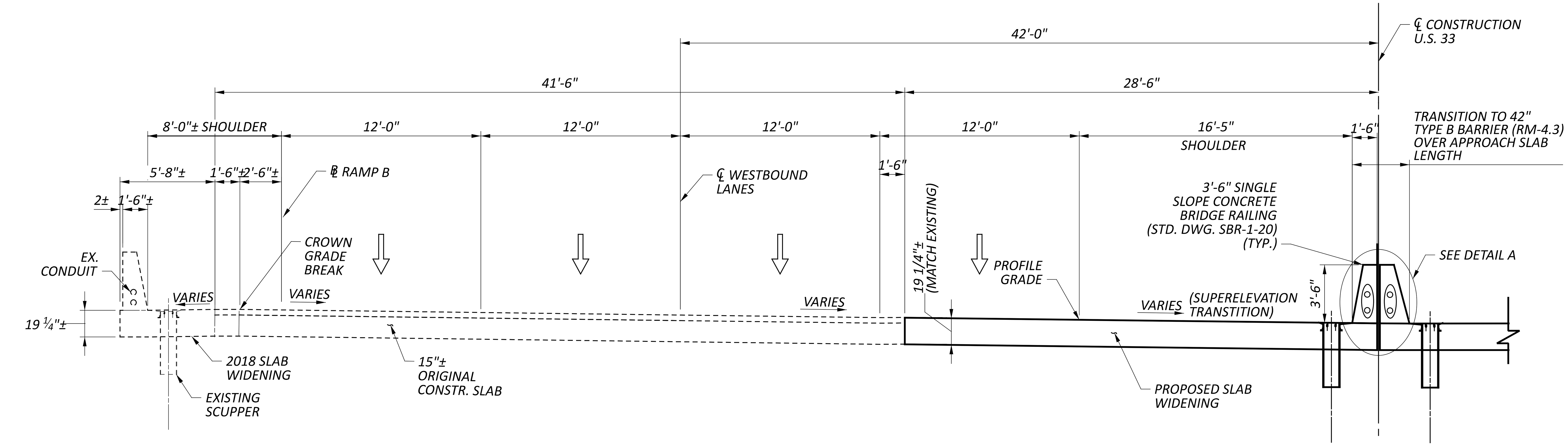
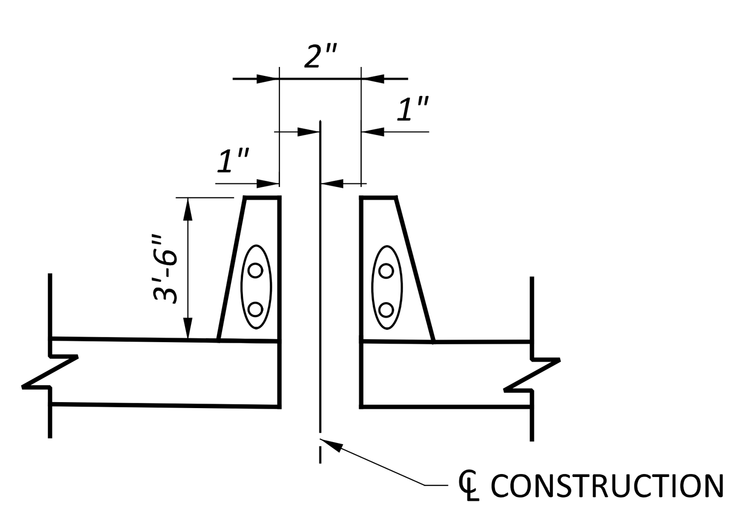


LEFT BRIDGE - EXISTING TYPICAL SECTION



LEFT BRIDGE - PROPOSED TYPICAL SECTION



DETAIL A

TRANSVERSE SECTIONS - LEFT BRIDGE
BRIDGE NO. FRA-033-2503L
OVER BIG WALNUT CREEK OVERFLOW

FRA/FAI-33-22.99/0.00

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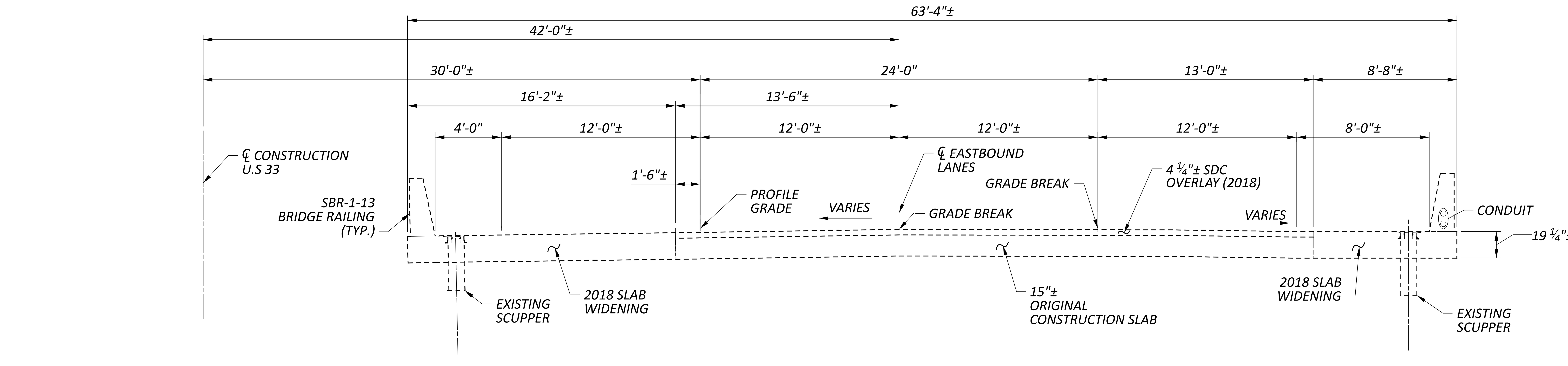
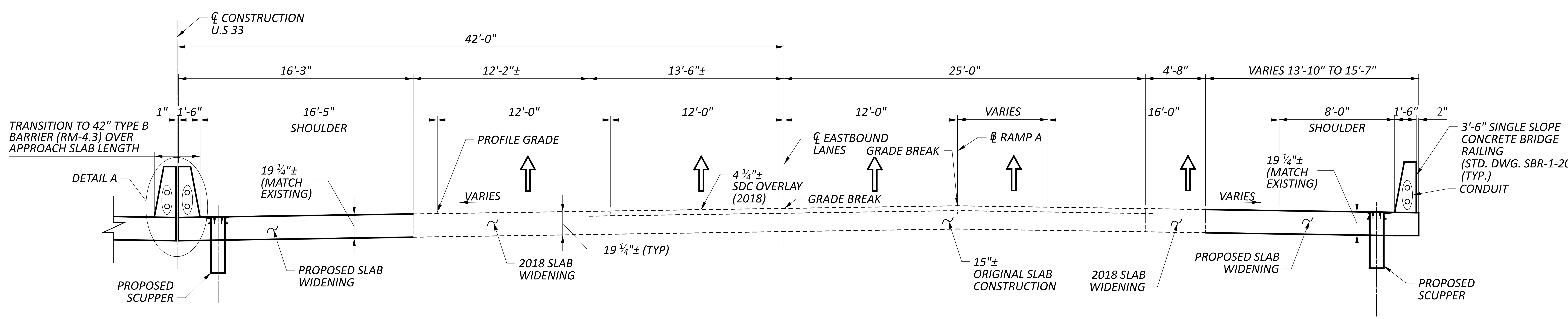
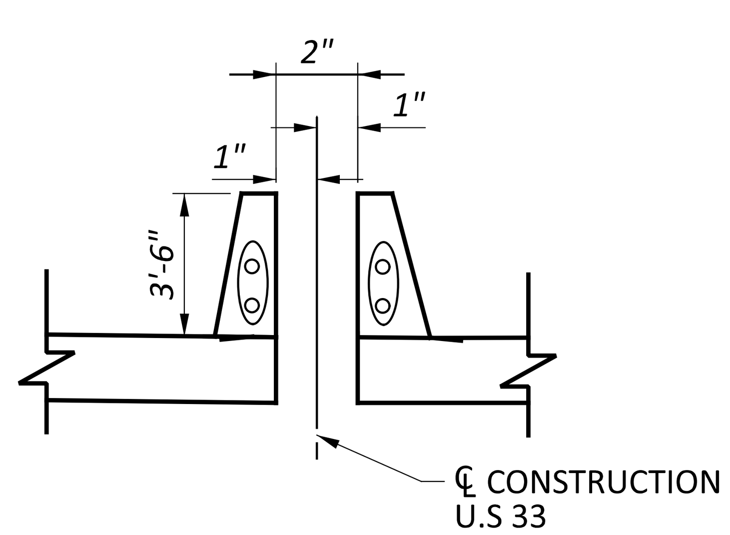
SFN	2501929
DESIGN AGENCY	LJB
DESIGNER AKD	CHECKER SS
REVIEWER AMT 05/28/25	
PROJECT ID 121811	
SUBSET 5	TOTAL 6
SHEET P.683	TOTAL P.705



RIGHT BRIDGE - EXISTING TYPICAL SECTION



RIGHT BRIDGE - PROPSED TYPICAL SECTION



DETAIL A

TRANSVERSE SECTION - RIGHT BRIDGE
BRIDGE NO. FRA-033-2503R
OVER BIG WALNUT CREEK OVERFLOW

SFN	2501953
DESIGN AGENCY	
DESIGNER	AKD
CHECKER	SS
REVIEWER	AMT 05/28/25
PROJECT ID	121811
SUBSET	6
TOTAL	6
SHEET	P.684
TOTAL	P.705

FRA/FAI-33-22.99/0.00

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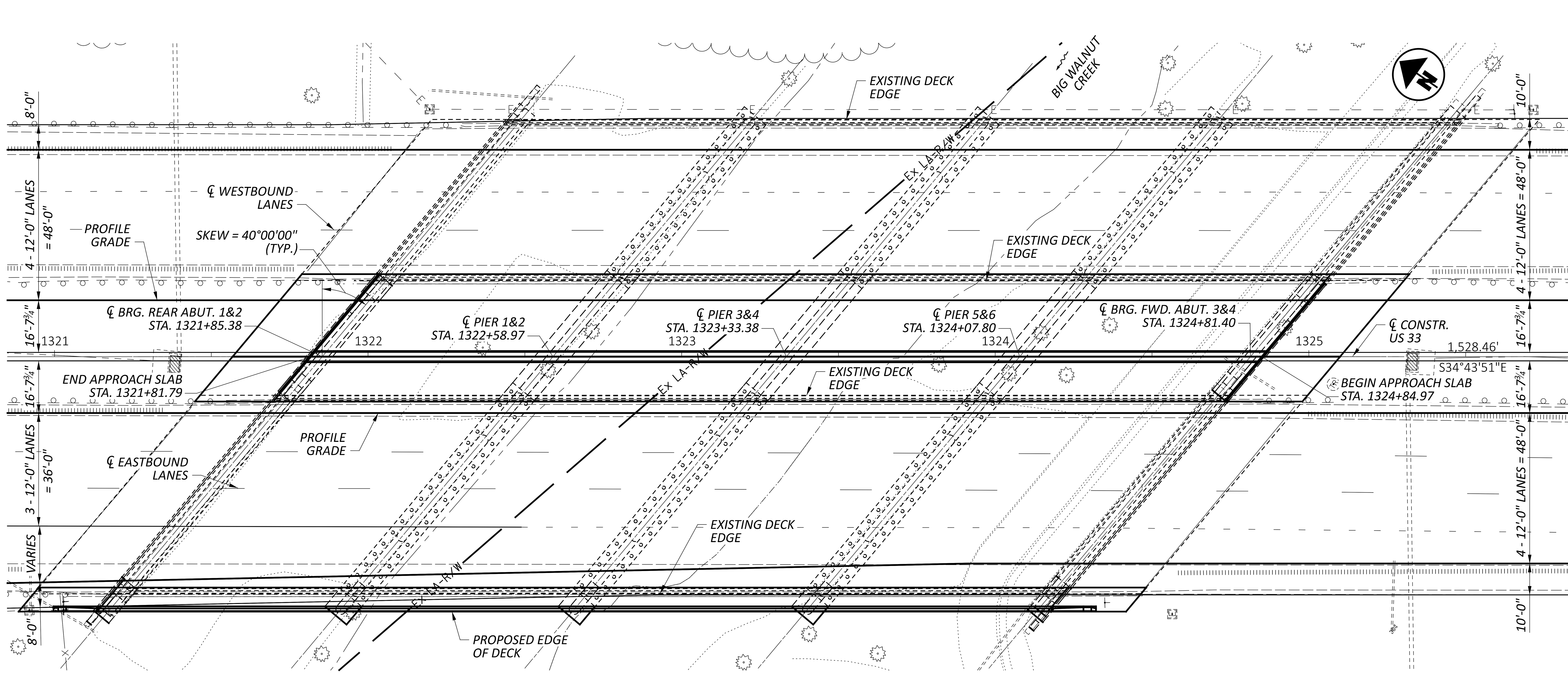
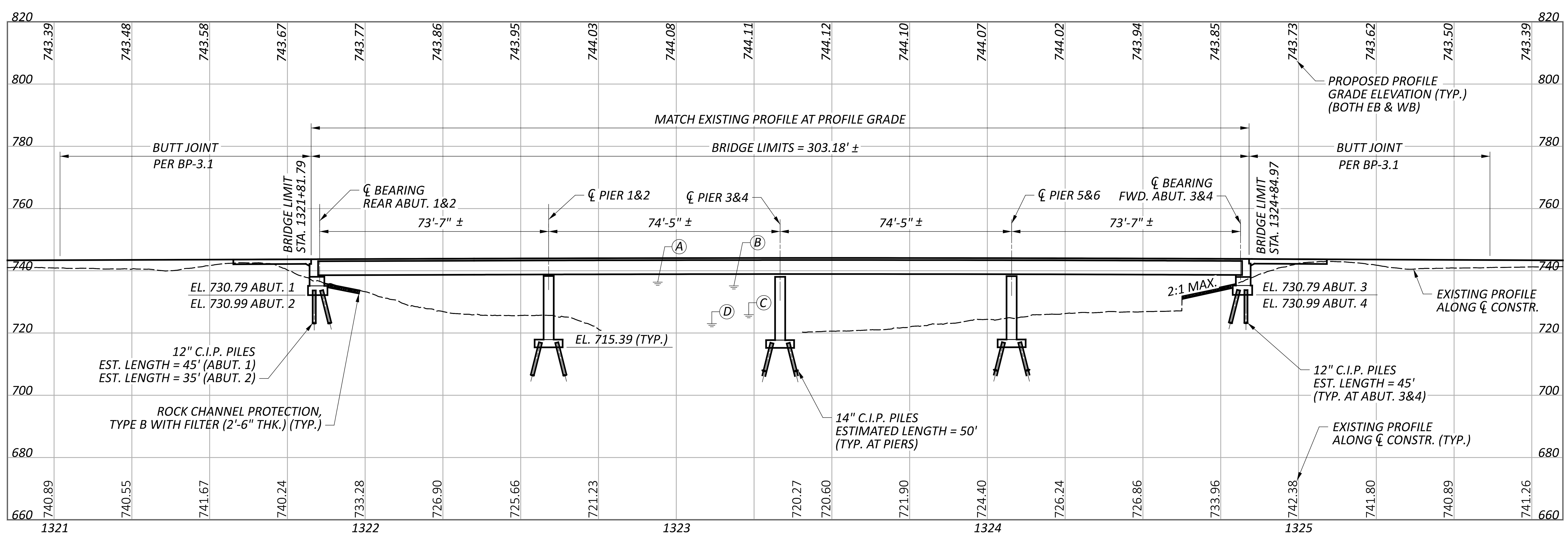


PLAN



PROFILE ALONG PROFILE GRADE

BENCHMARK DATA

BM #1 STA. ,
BM #2 STA. ,
BM #3 STA. ,
BM #4 STA. ,

FOR ADDITIONAL BENCHMARK INFORMATION. SEE ROADWAY PLAN SHEET 2 OF 705.

NOTES

EARTHWORK LIMITS SHOWN ARE APPROXIMATE. ACTUAL SLOPE SHALL CONFORM TO PLAN CROSS SECTIONS.

DESIGN TRAFFIC:

2030 ADT =	91,000	2030 ADTT =	8190
2050 ADT =	113,000	2050 ADTT =	10,170

HYDRAULIC DATA

DRAINAGE AREA = 254 SQ. MILES
(A) Q (50) = 21,200 CFS, V(50) = 6.91 FT/S, HWE = 733.94
(B) Q (100) = 25,300 CFS, V(100) = 7.80 FT/S, HWE = 735.07
(C) ORDINARY HIGH WATER MARK = 725.90(LT), 725.70(RT)
(D) NORMAL WATER ELEVATION = 723.00
STRUCTURE CLEARS THE 50 YEAR DESIGN HW50 BY 3.07 FT

EXISTING STRUCTURE

TYPE: PRESTRESSED CONCRETE I-BEAMS WITH REINFORCED CONCRETE DECK AND SUBSTRUCTURE

SPANS: 73'-7"±, 74'-5"±, 74'-5"±, 73'-7"± C/C BRG.

ROADWAY: 48'-0"±(L), 60'-0"±(R) TOE/TOE PARAPET

LOADING: HS20 AND ALTERNATE MILITARY

SKEW: 40° LEFT FORWARD

WEARING SURFACE: 1" MONOLITHIC CONCRETE AND 3½" SDC

APPROACH SLABS: 25'-0"± LONG (AS-1-81)

ALIGNMENT: TANGENT

CROWN: 0.016

STRUCTURE FILE NUMBER: 2501988 (L), 2502011(R)

DATE BUILT: 1963

DISPOSITION: WIDEN BRIDGE AND APPROACH SLAB

PROPOSED STRUCTURE

TYPE: PRESTRESSED CONCRETE I-BEAMS WITH REINFORCED CONCRETE DECK AND SUBSTRUCTURE

SPANS: 73'-7", 74'-5", 74'-5", 73'-7" C/C BRG.

ROADWAY: VARIES

LOADING: HS20 AND ALTERNATE MILITARY

SKEW: 40° LEFT FORWARD

WEARING SURFACE: 1" MONOLITHIC CONCRETE AND 3½" SDC

APPROACH SLABS: 25'-0" LONG (AS-1-81)

ALIGNMENT: TANGENT

CROWN: 0.016

DECK AREA: 48205 SF

COORDINATES: LATITUDE 39°53'53.74"
LONGITUDE -82°53'38.05"

SITE PLAN
BRIDGE NO. FRA-033-2509 L/R
US 33 OVER BIG WALNUT CREEK

SFN 2501988 (L) 2502011(R)

DESIGN AGENCY

DESIGNER	CHECKER
SS	AMT
REVIEWER DWS 05/28/25	
PROJECT ID 121811	
SUBSET 1	TOTAL 6
SHEET P.685	TOTAL P.705

FRA/FAI-33-22.99/0.00

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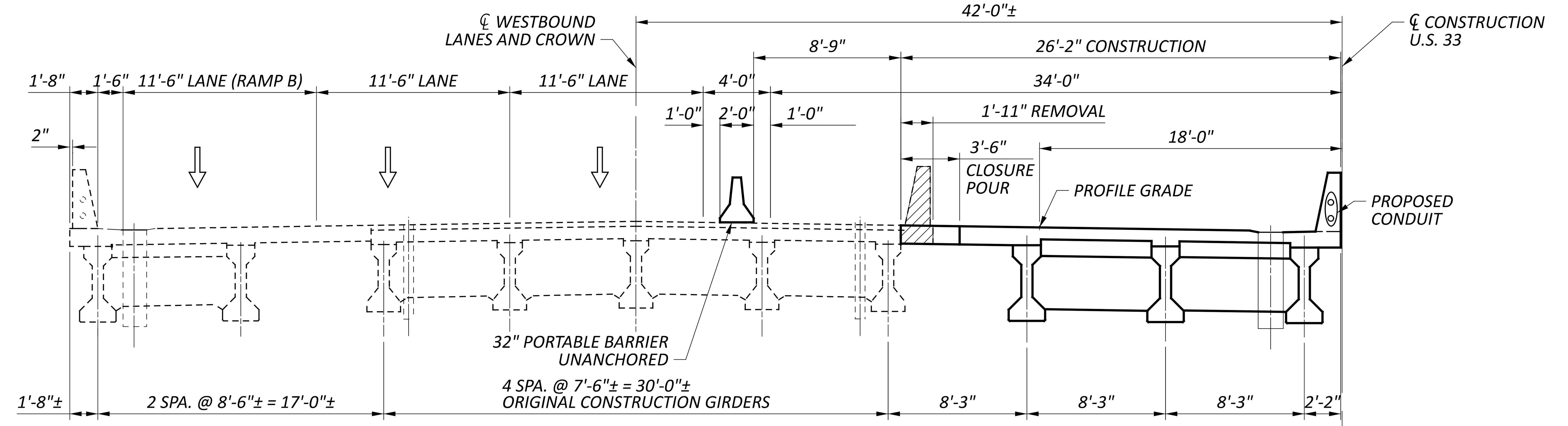
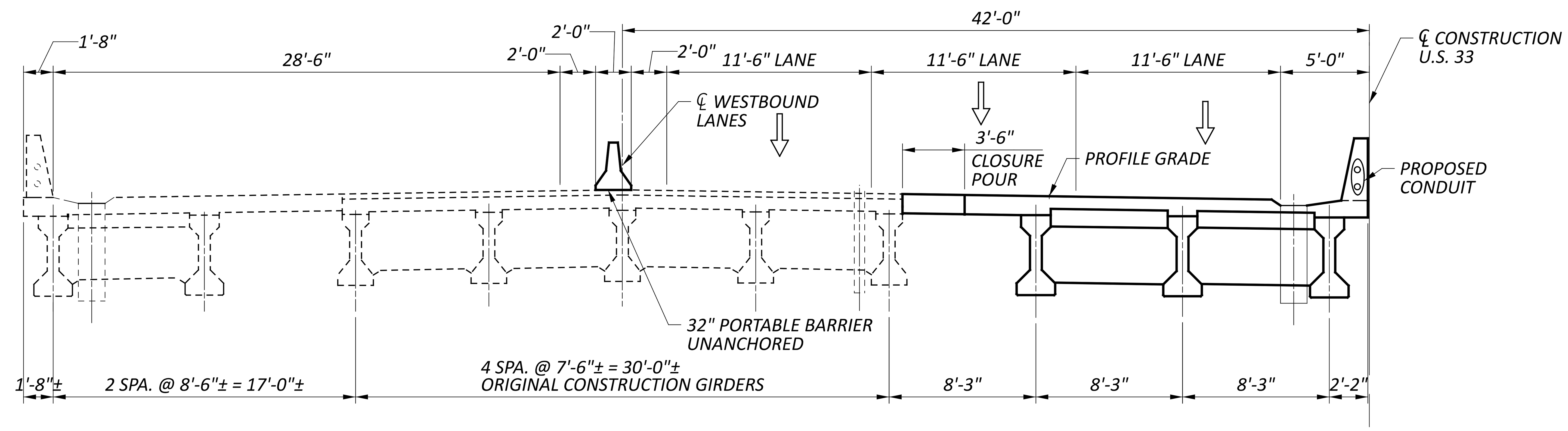
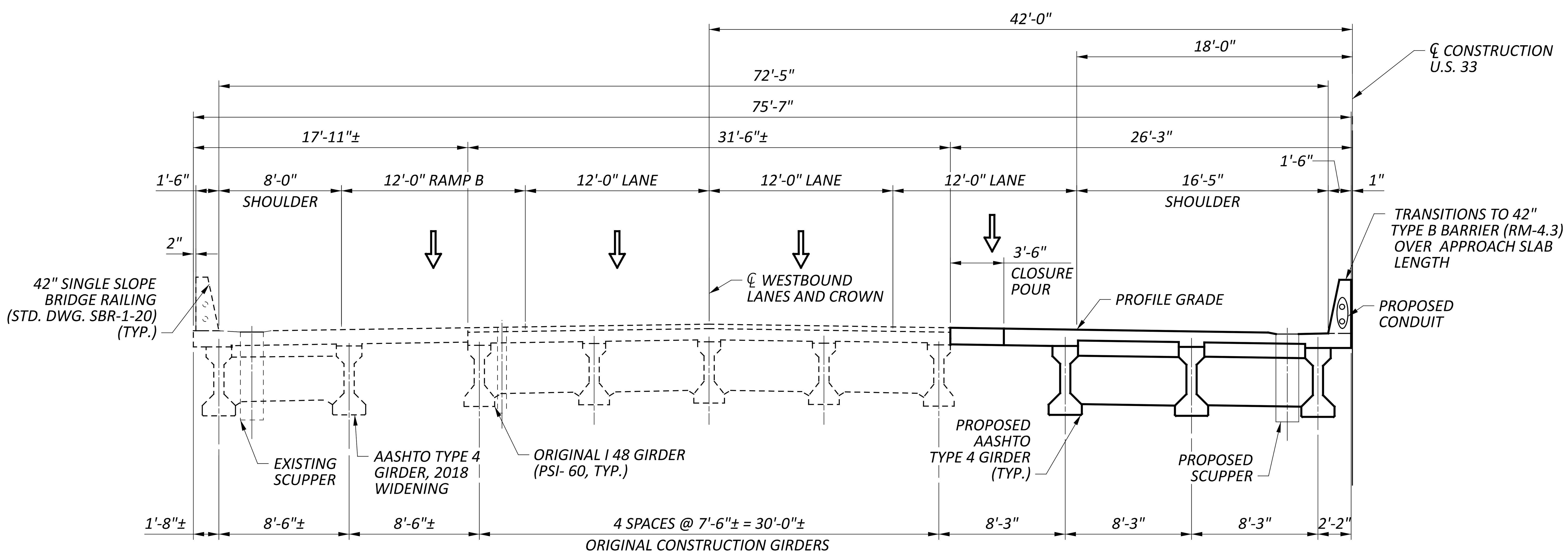


PHASE 1 - LEFT BRIDGE REMOVAL AND CONSTRUCTION



PHASE 2B - LEFT BRIDGE REMOVAL AND CONSTRUCTION

(LANE CONFIGURATION FOR PAVEMENT CONSTRUCTION, NO BRIDGE DECK WORK IN THIS PHASE. SEE PHASE 2A ON THE RIGHT BRIDGE.)



FINAL CONFIGURATION - LEFT BRIDGE

ITEM 202, PORTION OF STRUCTURE REMOVED, OVER 20 FOOT SPAN, AS PER PLAN

LEFT BRIDGE OVER BIG WALNUT CREEK - SFN 2501988

SUGGESTED SEQUENCE OF CONSTRUCTION

PHASE 1 – REMOVAL AND CONSTRUCTION

1. INSTALL PB AND SHIFT TRAFFIC AS SHOWN.
2. ON THE RIGHT SIDE OF THE LEFT BRIDGE, REMOVE 1'-11" OF THE DECK, EXISTING BRIDGE RAILING, AND PORTIONS OF ABUTMENTS AND PIERS.
3. AFTER SIMILAR REMOVALS ON THE RIGHT BRIDGE, INSTALL ALL ABUTMENT AND PIER PILES FOR BOTH BRIDGES.
4. CONSTRUCT WIDENED PORTIONS OF ABUTMENTS AND PIERS FOR BOTH BRIDGES.
5. INSTALL NEW BEARINGS, BEAMS, AND DIAPHRAGMS. CONSTRUCT 22'-8" OF THE DECK WIDENING UP TO THE CLOSURE POUR AND THE BRIDGE RAILING.
6. CONSTRUCT THE CLOSURE POUR.
7. SEAL CONCRETE SURFACES AND BRIDGE DECK.

PHASE 2B – REMOVAL AND CONSTRUCTION

1. PHASE 2A SHALL BE COMPLETE BEFORE STARTING PHASE 2B. SEE RIGHT BRIDGE PHASE CONSTRUCTION DETAILS.
2. INSTALL PB AND SHIFT TRAFFIC AS SHOWN.
3. SEAL CONCRETE SURFACES AND BRIDGE DECK.

FINAL CONFIGURATION

1. REMOVE PB. SHIFT TRAFFIC TO FINAL CONFIGURATION AS SHOWN.

PHASE CONSTRUCTION DETAILS - LEFT BRIDGE
BRIDGE NO. FRA-033-2509L
US 33 OVER BIG WALNUT CREEK

SFN 2501988	
DESIGN AGENCY	
DESIGNER SS	CHECKER AMT
REVIEWER DWS 05/28/25	
PROJECT ID 121811	
SUBSET 2	TOTAL 6
SHEET P.686	TOTAL P.705

FRA/FAI-33-22.99/0.00

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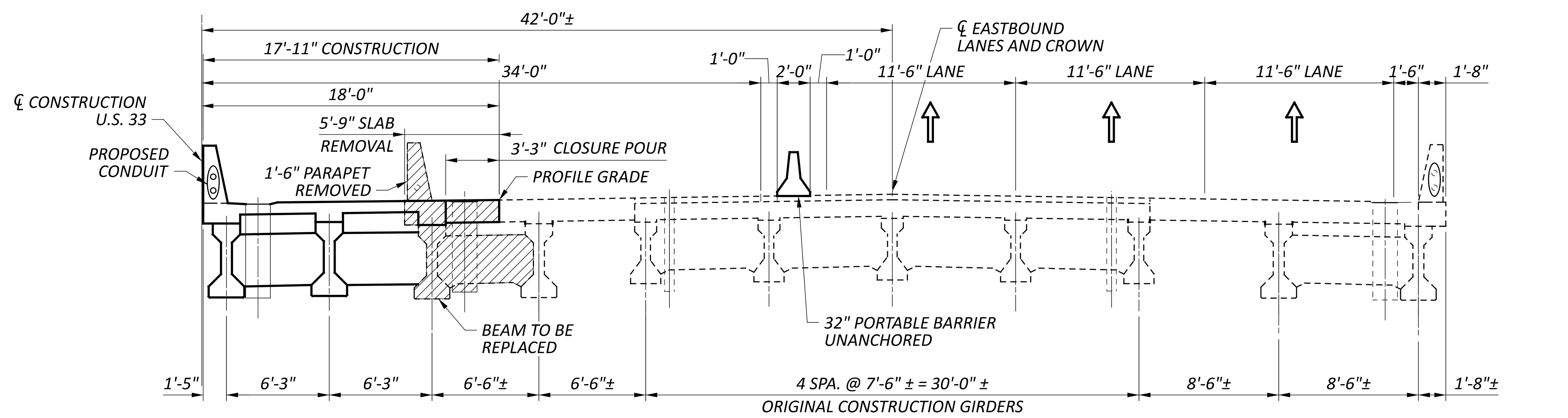
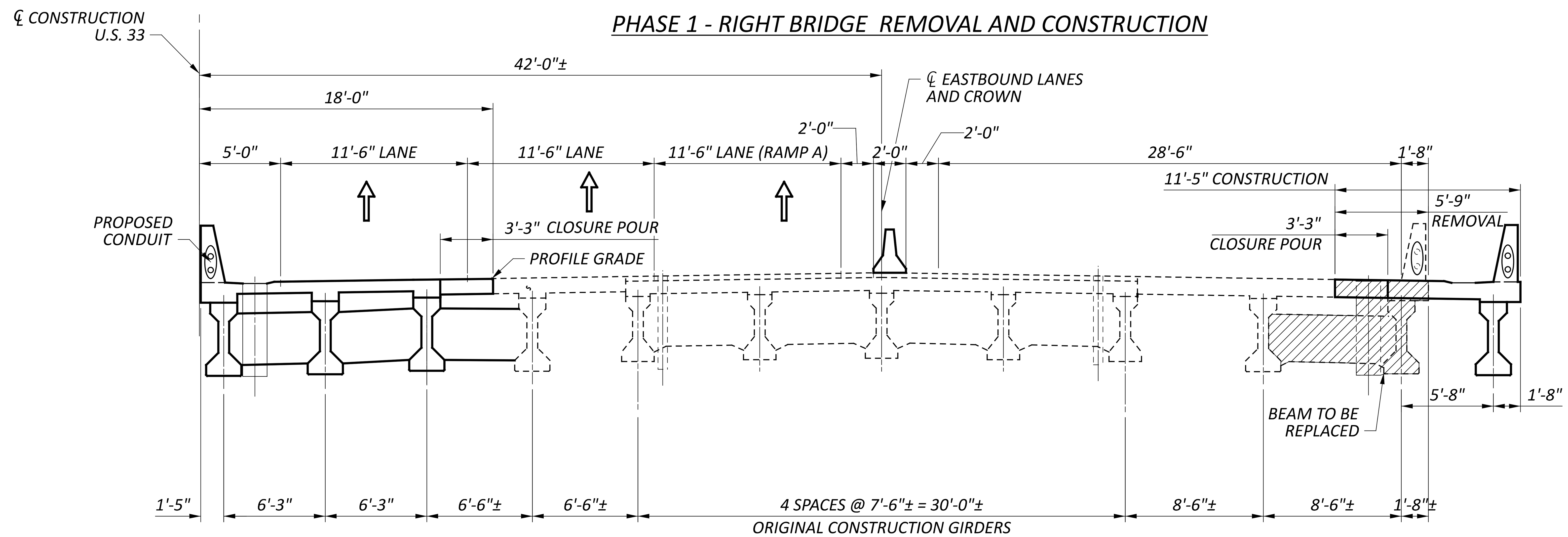
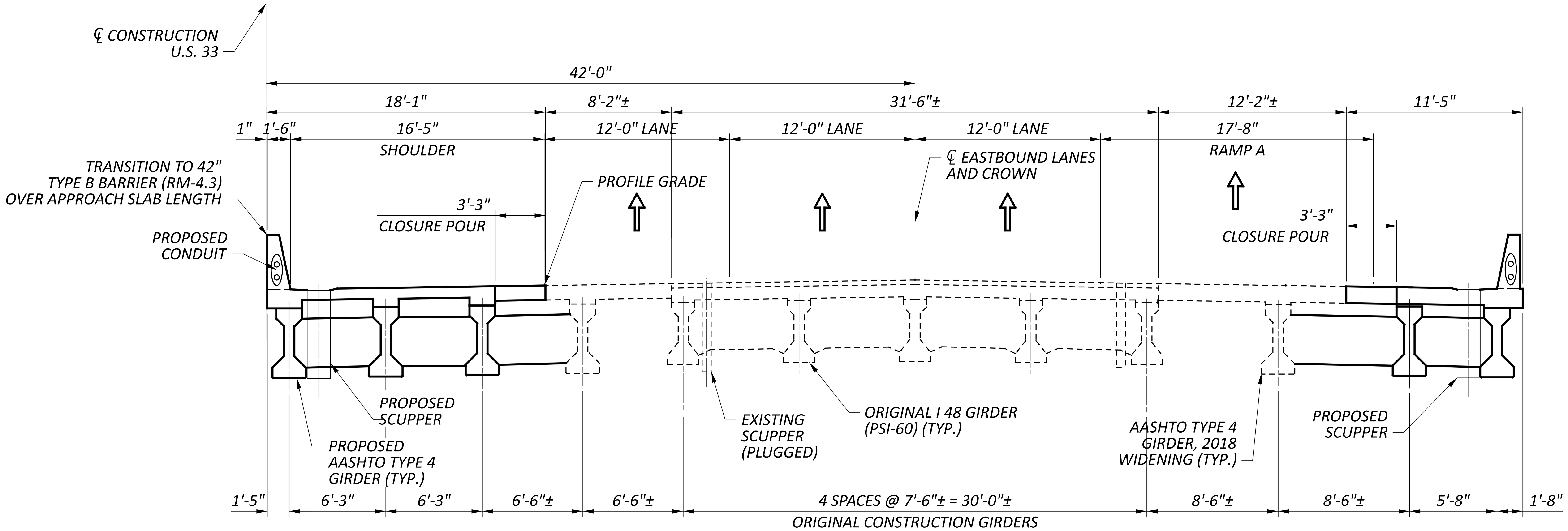


PHASE 1 - RIGHT BRIDGE REMOVAL AND CONSTRUCTION



PHASE 2 - RIGHT BRIDGE REMOVAL AND CONSTRUCTION



FINAL CONFIGURATION - RIGHT BRIDGE

ITEM 202, PORTION OF STRUCTURE REMOVED, OVER 20 FOOT SPAN, AS PER PLAN

RIGHT BRIDGE OVER BIG WALNUT CREEK - SFN 2502011

SUGGESTED SEQUENCE OF CONSTRUCTION

PHASE 1 – REMOVAL AND CONSTRUCTION

1. INSTALL PB AND SHIFT TRAFFIC AS SHOWN.
2. ON THE LEFT SIDE OF THE RIGHT BRIDGE, REMOVE 5'-9" OF THE DECK, EXISTING BRIDGE RAILING, FASCIA BEAM AND PORTIONS OF ABUTMENTS AND PIERS.
3. AFTER SIMILAR REMOVALS ON THE LEFT BRIDGE, INSTALL ALL ABUTMENT AND PIER PILES FOR BOTH BRIDGES.
4. CONSTRUCT WIDENED PORTIONS OF ABUTMENTS AND PIERS FOR BOTH BRIDGES.
5. INSTALL NEW BEARINGS, BEAMS, AND DIAPHRAGMS. CONSTRUCT 14'-9" OF THE DECK WIDENING UP TO THE CLOSURE POUR AND THE BRIDGE RAILING.
6. CONSTRUCT THE CLOSURE POUR.
7. SEAL CONCRETE SURFACES AND BRIDGE DECK.

PHASE 2A – REMOVAL AND CONSTRUCTION

1. INSTALL PB AND SHIFT TRAFFIC AS SHOWN.
2. ON THE RIGHT SIDE OF THE RIGHT BRIDGE, REMOVE 5'-9" OF THE DECK, EXISTING BRIDGE RAILING, FASCIA BEAM AND PORTIONS OF ABUTMENTS AND PIERS.
3. CONSTRUCT WIDENED PORTIONS OF ABUTMENTS AND PIERS, IF NOT PERFORMED IN THE PREVIOUS PHASE.
4. INSTALL NEW BEARINGS, BEAMS, AND DIAPHRAGMS. CONSTRUCT 8'-2" OF THE DECK WIDENING UP TO THE CLOSURE POUR AND THE BRIDGE RAILING.
5. CONSTRUCT THE CLOSURE POUR.
6. SEAL CONCRETE SURFACES AND BRIDGE DECK.

FINAL CONFIGURATION

2. REMOVE PB. SHIFT TRAFFIC TO FINAL CONFIGURATION AS SHOWN.

PHASE CONSTRUCTION DETAILS - RIGHT BRIDGE
BRIDGE NO. FRA-033-2509R
US 33 OVER BIG WALNUT CREEK

SFN	2502011
DESIGN AGENCY	LJB
DESIGNER SS	CHECKER AMT
REVIEWER	DWS 05/28/25
PROJECT ID	121811
SUBSET 3	TOTAL 6
SHEET P.687	TOTAL P.705

FRA/FAI-33-22.99/0.00

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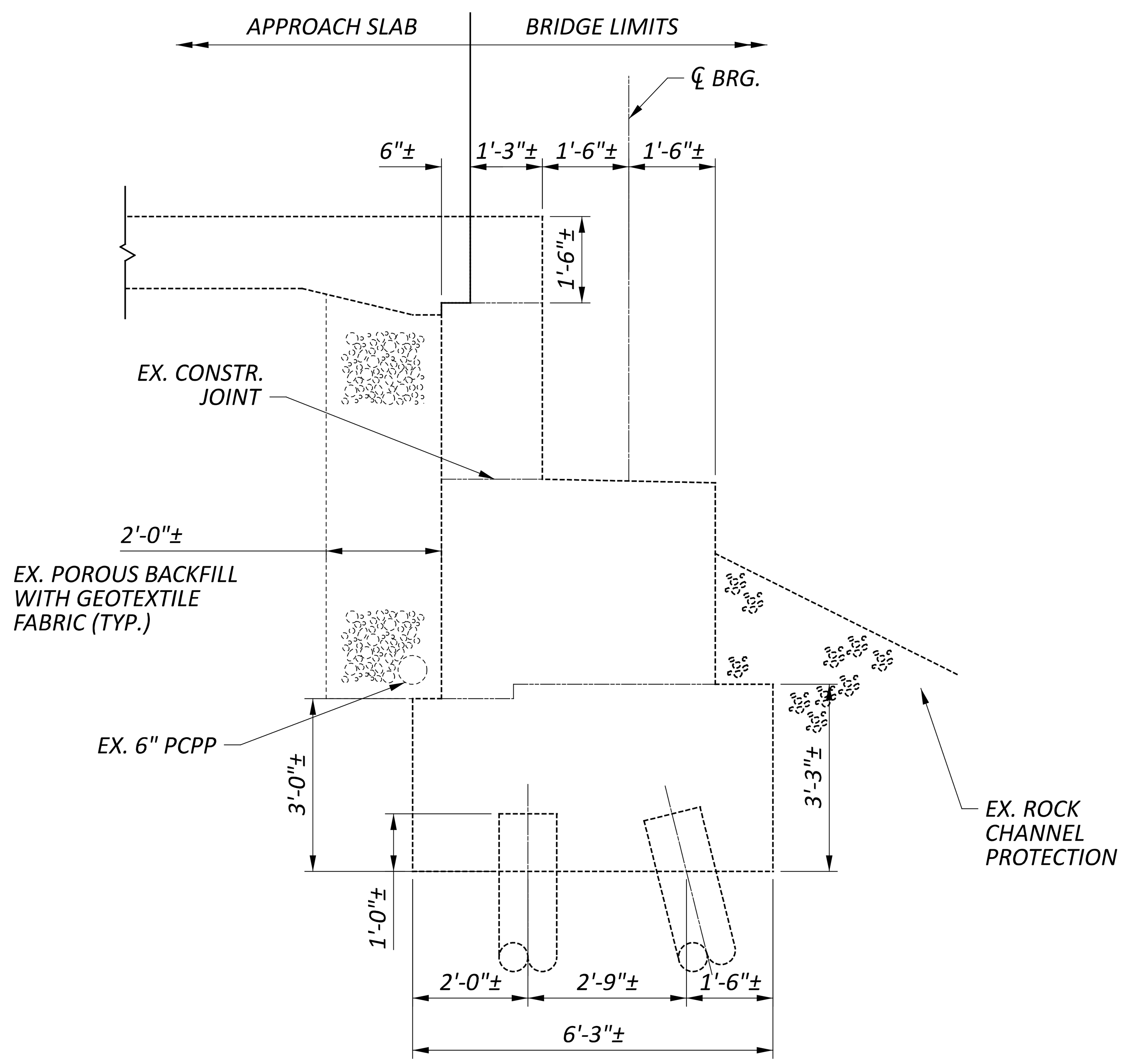
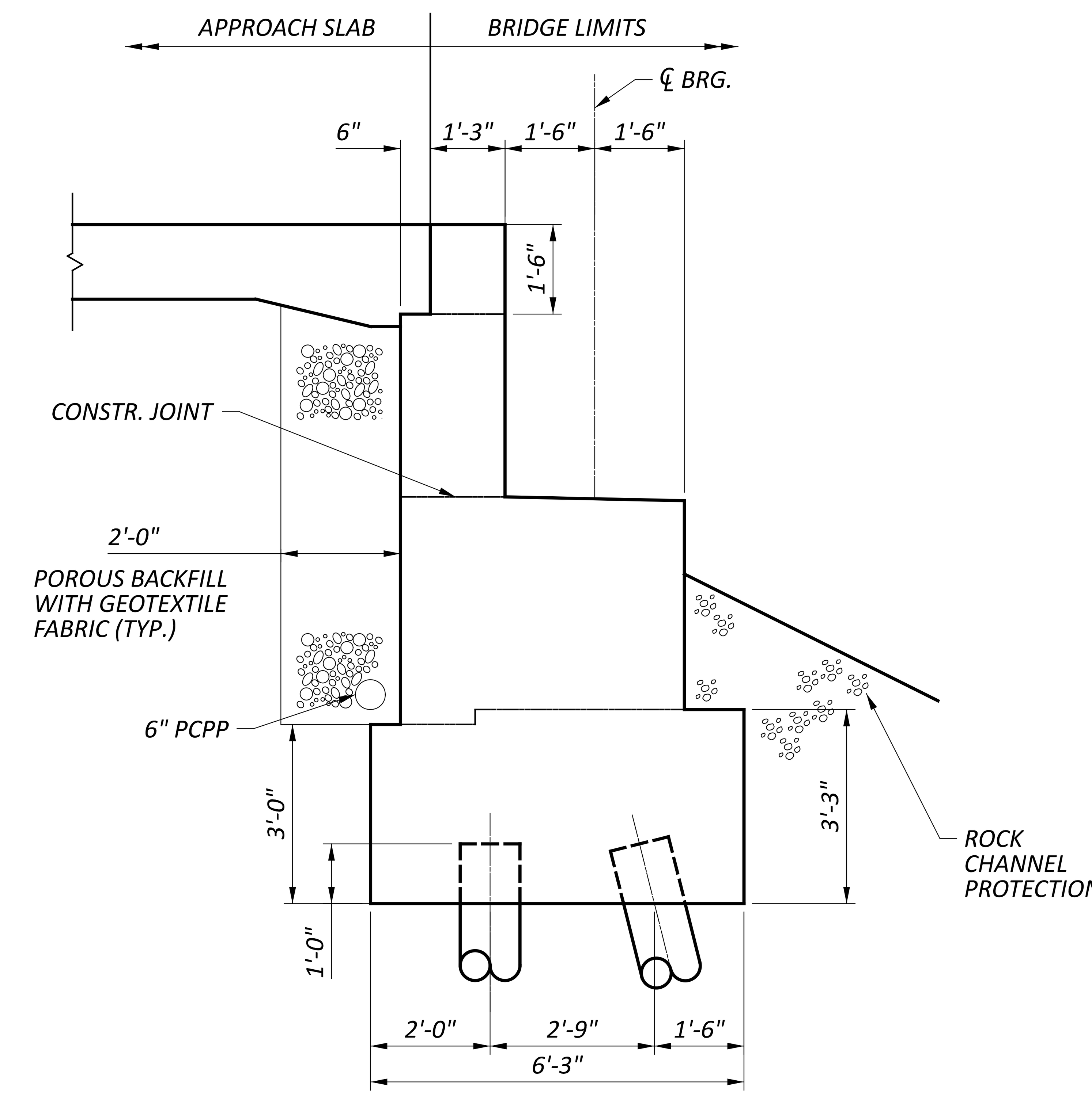


EXISTING ABUTMENT SECTION
2018 REHABILITATION WIDENING AND
1963 ORIGINAL CONSTRUCTION (SIMILAR)



PROPOSED ABUTMENT SECTION
WIDENING

ABUTMENT SECTIONS
BRIDGE NO. FRA-033-2509 L/R
US 33 OVER BIG WALNUT CREEK

SFN 2501988 - L
2502011 - R

DESIGN AGENCY

DESIGNER	CHECKER
MSR	AMT

REVIEWER
DWS 05/28/25

PROJECT ID
121811

SUBSET	TOTAL
4	6

SHEET	TOTAL
P.688	P.705

FRA/FAI-33-22.99/0.00

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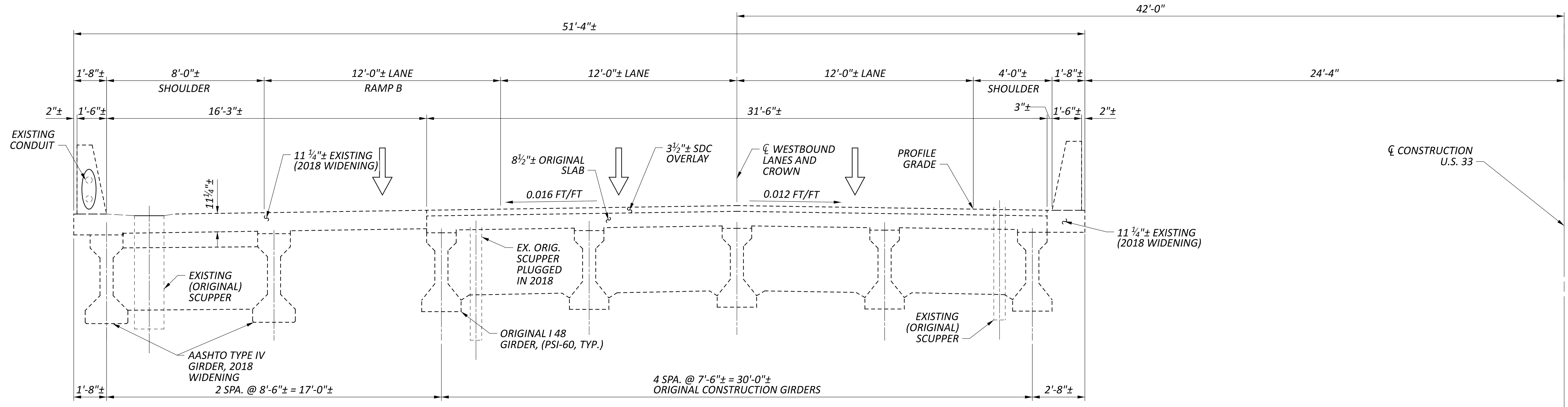
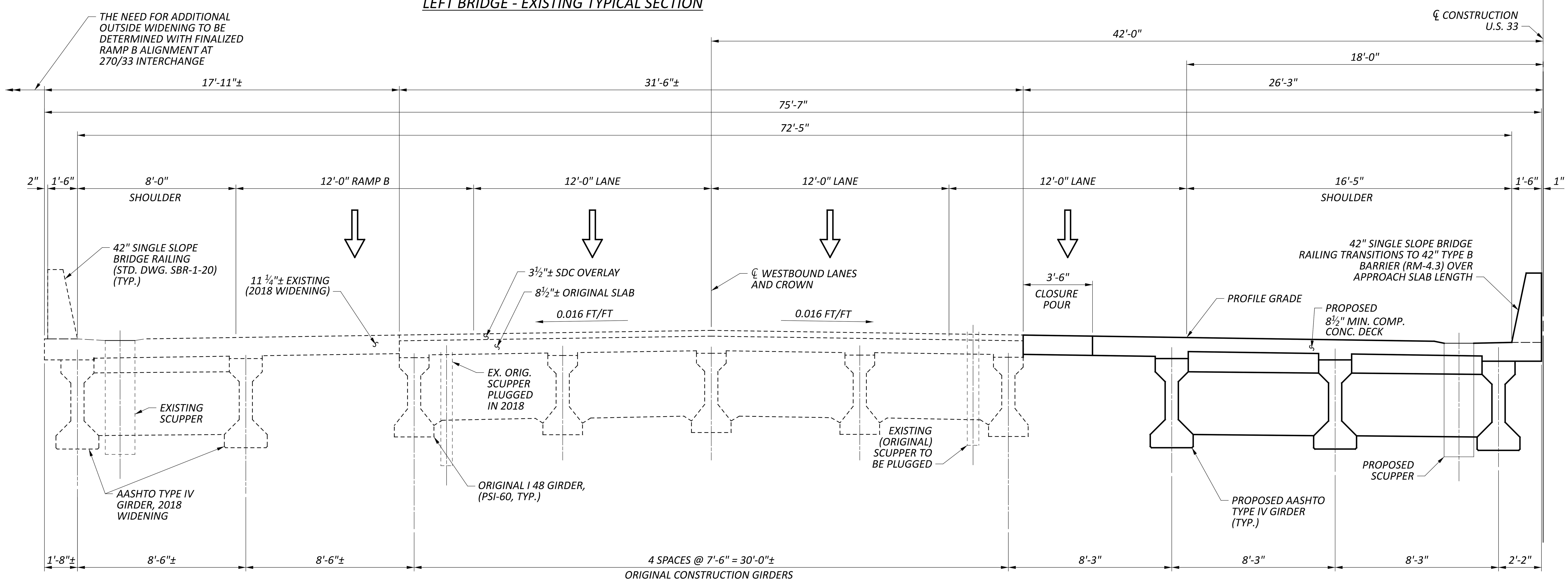


LEFT BRIDGE - EXISTING TYPICAL SECTION



LEFT BRIDGE - PROPOSED TYPICAL SECTION

TRANSVERSE SECTIONS - LEFT BRIDGE
BRIDGE NO. FRA-033-2509 L
US 33 OVER BIG WALNUT CREEK

SFN	2501988
DESIGNER	MSR
CHECKER	AMT
REVIEWER	DWS 05/28/25
PROJECT ID	121811
SUBSET / TOTAL	5 / 6
SHEET / TOTAL	P.689 / P.705

FRA/FAI-33-22.99/0.00

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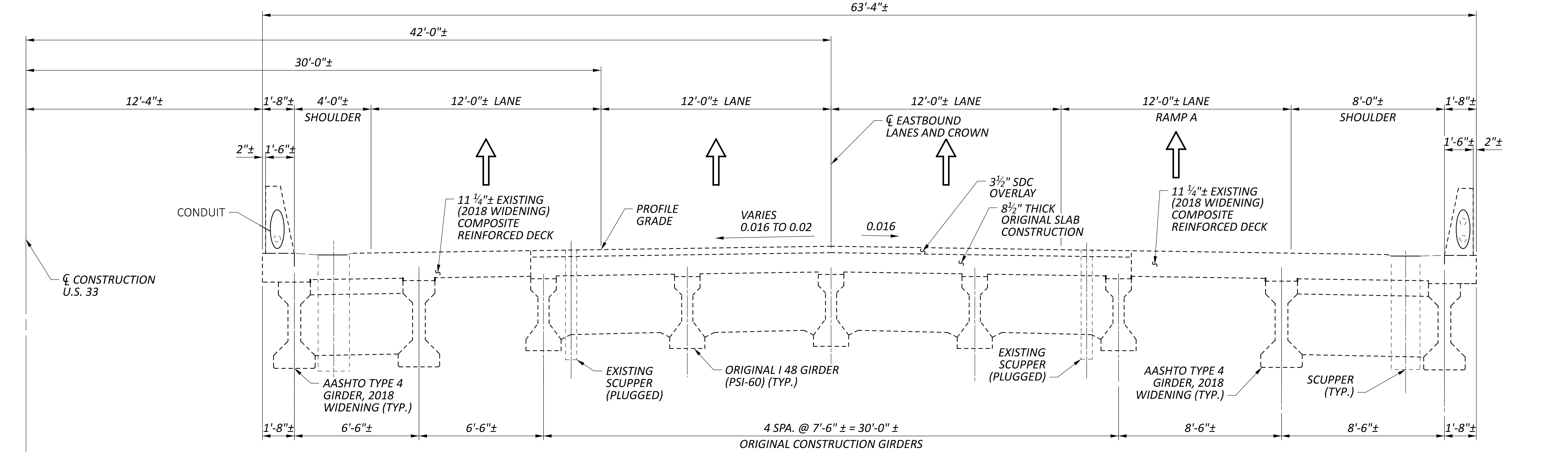
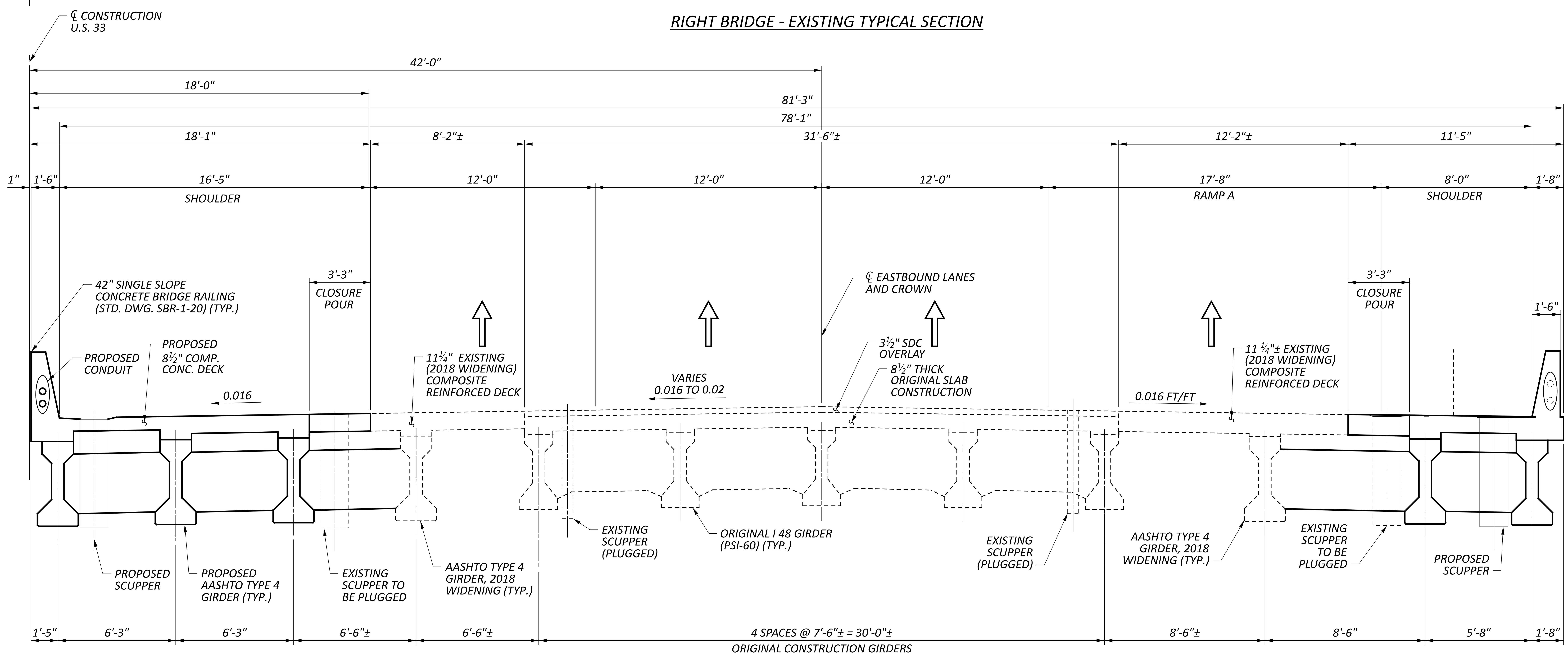


RIGHT BRIDGE - EXISTING TYPICAL SECTION



RIGHT BRIDGE - PROPOSED TYPICAL SECTION

TRANSVERSE SECTION - RIGHT BRIDGE
BRIDGE NO. FRA -33-2509R
US 33 OVER BIG WALNUT CREEK

SFN	2502011
DESIGN AGENCY	LJB
DESIGNER	AKD
CHECKER	SS
REVIEWER	AMT 05/28/25
PROJECT ID	121811
SUBSET	6
TOTAL	6
SHEET	P.690
TOTAL	P.705

FRA/FAI-33-22.99/0.00

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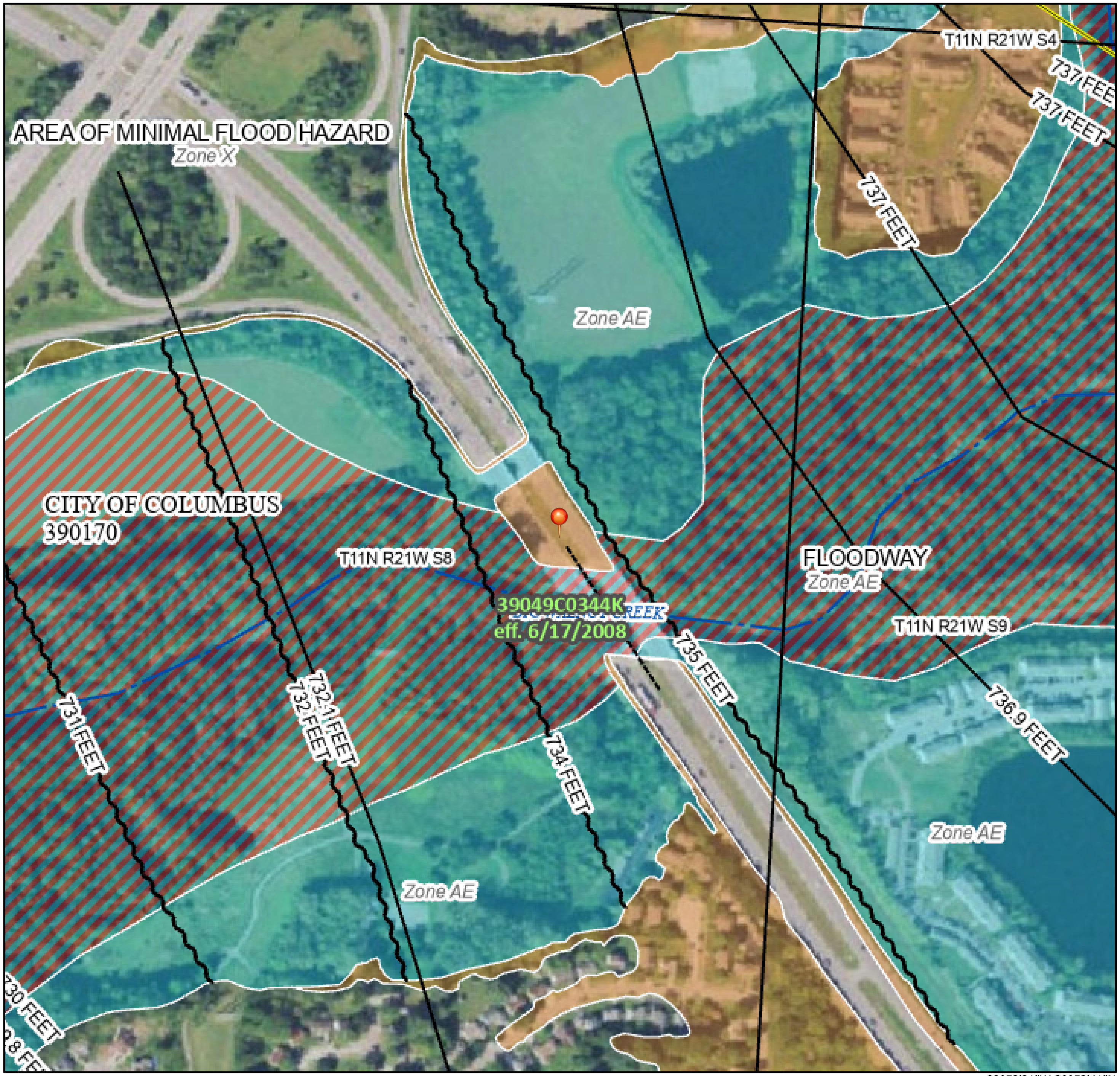
Appendix B – FIRMette, FIS Report Sheets, FIRM Panel

National Flood Hazard Layer FIRMette

FEMA

82°53'58"W 39°54'9"N



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

1:6,000

82°53'21"W 39°53'41"N

Basemap Imagery Source: USGS National Map 2023

Legend

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

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

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

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

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

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

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

N

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

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

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 1/31/2025 at 3:16 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

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

FLOOD INSURANCE STUDY

VOLUME 1 of 4

FRANKLIN COUNTY, OHIO
AND INCORPORATED AREAS

COMMUNITY NAME	COMMUNITY NUMBER
BEXLEY, CITY OF	390168
BRICE, VILLAGE OF	390898
CANAL WINCHESTER, VILLAGE OF	390169
COLUMBUS, CITY OF	390170
DUBLIN, CITY OF	390673
FRANKLIN COUNTY (UNINCORPORATED AREAS)	390167
GAHANNA, CITY OF	390171
GRANDVIEW HEIGHTS, CITY OF	390172
GROVE CITY, CITY OF	390173
GROVEPORT, VILLAGE OF	390174
HARRISBURG, VILLAGE OF	390897
HILLIARD, CITY OF	390175
LOCKBOURNE, VILLAGE OF	390691
MARBLE CLIFF, VILLAGE OF	390896
*MINERVA PARK, VILLAGE OF	390791
NEW ALBANY, VILLAGE OF	390895
OBETZ, VILLAGE OF	390176
REYNOLDSBURG, CITY OF	390177
RIVERLEA, VILLAGE OF	390692
UPPER ARLINGTON, CITY OF	390178
URBANCREST, VILLAGE OF	390893

COMMUNITY NAME	COMMUNITY NUMBER
VALLEYVIEW, VILLAGE OF	390669
WESTERVILLE, CITY OF	390179
WHITEHALL, CITY OF	390180
WORTHINGTON, CITY OF	390181

* NO SPECIAL FLOOD HAZARD AREAS IDENTIFIED WITHIN COMMUNITY

REVISED:
June 16 2011

Federal Emergency Management Agency
FLOOD INSURANCE STUDY NUMBER
39049CV001D

NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study (FIS) report may not contain all data available within the Community Map Repository. Please contact the Community Map Repository for any additional data.

The Federal Emergency Management Agency (FEMA) may revise and republish part or all of this FIS report at any time. In addition, FEMA may revise part of this FIS report by the Letter of Map Revision process, which does not involve republication or redistribution of the FIS report. Therefore, users should consult with community officials and check the Community Map Repository to obtain the most current FIS report components.

Effective Date: August 2, 1995

Revised Date(s): July 16, 1997
April 21, 1999
March 16, 2004
September 19, 2007
June 17, 2008
June 16, 2011

TABLE OF CONTENTS

Volume 1

Section **Page No.**

1.0 INTRODUCTION ... 1
1.1 Purpose of Study ... 1
1.2 Authority and Acknowledgements ... 2
1.3 Coordination ... 6
2.0 AREA STUDIED ... 7
2.1 Scope of Study ... 7
2.2 Community Description ... 17
2.3 Principal Flood Problems ... 18
2.4 Flood Protection Measures ... 21
3.0 ENGINEERING METHODS ... 22
3.1 Hydrologic Analyses ... 23
3.2 Hydraulic Analyses ... 34
3.3 Vertical Datum ... 41
4.0 FLOODPLAIN MANAGEMENT APPLICATIONS ... 42
4.1 Floodplain Boundaries ... 42
4.2 Floodways ... 43

Volume 2

4.2 Floodways ... 101
5.0 INSURANCE APPLICATION ... 118
6.0 FLOOD INSURANCE RATE MAP (FIRM) ... 118
7.0 OTHER STUDIES ... 123
8.0 LOCATION OF DATA ... 124
9.0 BIBLIOGRAPHY AND REFERENCES ... 125

TABLE OF CONTENTS

Volume 2 (Continued)

LIST OF TABLES

Table **Page No.**

Table 1. CCO Meeting Dates for Prior FISs 6

Table 2. Streams Studied by Detailed Methods 8

Table 3. Limits of Detailed Studies 8

Table 4. Previously Incorporated Letters of Map Revision 10

Table 5. Previously Incorporated Letters of Map Change 12

Table 6. Incorporated Letters of Map Revision and Letters of Map Amendment 15

Table 7. Summary of Discharges 26

Table 8. Summary of Roughness Coefficients 38

Table 9. Floodway Data 47

Table 10. Flood Insurance Zones 118

Table 11. Community Map History 120

LIST OF FIGURES

Figure **Page No.**

Figure 1. Floodway Schematic 46

LIST OF EXHIBITS

Exhibit 1 – Flood Profiles ....Panels

Alum Creek	01P-04P
Barbee Ditch	05P-07P
Barnes Ditch	08P-10P
Baumgardner Ditch	11P–12P
Beem Ditch	13P-16P
Big Darby Creek	17P-21P
Big Run	22P-24P
Big Walnut Creek	25P-31P
Billingsley Ditch	32P-35P
Bishop Run	36P-37P

planners to further promote sound land use and floodplain development. Minimum floodplain management requirements for participation in the NFIP are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

In some States or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the State (or other jurisdictional agency) will be able to explain them.

The Digital Flood Insurance Rate Map (DFIRM) and FIS Report for this countywide study have been produced in digital format. Flood hazard information was converted to meet the FEMA DFIRM database specifications and Geographic Information System (GIS) format requirements. The flood hazard information was created and is provided in a digital format so that it can be incorporated into a local GIS and be accessed more easily by the community.

1.2 Authority and Acknowledgements

The sources of authority for this FIS report are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The August 2, 1995, countywide FIS report was prepared to include incorporated communities within Franklin County in a countywide FIS report. Information on the authority and acknowledgments for each jurisdiction included in this countywide FIS report, as compiled from their previously printed FIS reports, is shown below.

City of Bexley

The hydrologic and hydraulic analyses for the FIS report dated May 1978 were prepared by the U.S. Army Corps of Engineers (USACE), Huntington District, for the Federal Insurance Administration (FIA), under Inter-Agency Agreement No. IAA-H-7-76, Project Order No. 7. That work was completed in April 1977.

Village of Canal Winchester

The hydrologic and hydraulic analyses for the FIS report dated December 1979, were prepared by Burgess & Niple, Ltd., for the FIA, under Contract No. H-3981. That work was completed in December 1978.

City of Columbus

The hydrologic and hydraulic analyses for the FIRM dated July 5, 1983, were prepared by the USACE, Huntington District, for the Federal Emergency Management Agency (FEMA), under Inter-Agency Agreement No. H-7-76, Project Order No. 8; and No. H-1077, Project Order No. 1. The analyses for the Little Walnut Creek basin were performed under Inter-Agency Agreement No. H 18 78, Project Order No. 38. The work for both analyses was completed in November 1980. For the revision dated January 16, 1987, the hydrologic and hydraulic analyses were performed by the U.S. Department of Agriculture, Soil Conservation Service (SCS); the Ohio Department of Natural Resources (ODNR); and Burgess & Niple, Limited.

Table 1. CCO Meeting Dates for Prior FISs

Community Name	Initial CCO Date	Final CCO Date
Franklin County, Unincorporated Areas	November 21, 1974	January 20, 1982

* Data not available.

For the July 16, 1997 revision, FEMA notified the Village of Canal Winchester that a revision would be prepared using information developed by Dewberry & Davis.

For the April 21, 1999, revision, Franklin County was notified by FEMA in a letter dated March 27, 1997, that its countywide FIS report would be revised using the analyses prepared for Delaware County.

For the March 2004 revision, the results of the study were reviewed at the final CCO meeting held on August 27, 2002, and attended by representatives of FEMA, the ODNR, the USACE, Huntington District and local officials and residents of Marble Cliff, Upper Arlington, Columbus, Grandview Heights, and the Unincorporated Areas of Franklin County.

For the June 17, 2008 FIS report, an initial CCO meeting was held on August 17, 2005. The meeting was attended by representatives from FEMA, Franklin County, communities within Franklin County, and Fuller, Mossbarger, Scott, and May Engineers, Inc. (FMSM). The final CCO meeting was held on January 30, 2007. The meeting was attended by representatives from communities throughout the county as well as representatives from ODNR, FEMA, and the study contractor.

No final CCO meeting was held for this revised countywide FIS report.

2.0 AREA STUDIED

2.1 Scope of Study

This FIS report covers the geographic area of Franklin County, Ohio.

All or portions of the flooding sources listed in Table 2 were studied by detailed methods. Limits of detailed study are indicated on the Flood Profiles (Exhibit 1) and on the FIRM (Exhibit 2).

Table 2. Streams Studied by Detailed Methods

Alum Creek	French Run	Plum Run Tributary
Barbee Ditch	French Run (Lateral G-A)	Powell Ditch
Barnes Ditch	Georges Creek,	Rhodes Ditch
Baumgardner Ditch	Georges Creek Overland Flow	Rocky Fork Creek
Beem Ditch	Grant Run	Scioto Big Run
Big Darby Creek	Grove City Creek 1	Scioto River
Big Run	Grove City Creek 2	Scioto River Divided Flow Reach
Big Walnut Creek	Haines Ditch	Snyder Run
Billingsley Ditch	Hamilton Ditch	South Fork Dry Run
Bishop Run	Hayden Run	South Fork Georges Creek
Blacklick Creek	Hellbranch Run	South Fork Georges Creek
Blacklick Creek Lateral D	Indian Run	Spring Run
Blacklick Creek Lateral G-B	Lisle Ditch	Sugar Run
Blacklick Creek Lateral K	Little Darby Creek	Swisher Creek
Blacklick Creek Tributary C	Little Walnut Creek	Sycamore Run
Blau Ditch	Marsh Run	Tributary S-4
Brown Run	Martin Grove Ditch	Tri-County Ditch
Bush Ditch	Mason Run	Tudor Ditch
Clover Groff Ditch	McCoy Ditch	Turkey Run
Coble-Bowman Ditch	Molcomb Ditch	Turkey Run (Near Robinwood Avenue)
Cosgray Ditch	Mulberry Run	Tussing-Bachman Ditch
Cramer Ditch	North Fork Indian Run	Utzinger Ditch
Dry Run	Olentangy River	West Water Run
Dysar Ditch	Orders & Wallace Ditch	Whims Ditch
Early Run	Patzer Ditch	
Faust County Ditch	Plum Run	

As part of the August 2, 1995, countywide FIS report, updated analyses were included for the flooding sources shown in Table 3.

Table 3. Limits of Detailed Studies

Flooding Source	Limits of Detailed Study
Barbee Ditch	From its confluence with Barnes Ditch US to Trabue Road.
Barnes Ditch	From its confluence with the Scioto River US to Wilson Road.
Big Run	From its confluence with Little Walnut Creek to the county boundary.
Bishop Run	From its confluence with Little Walnut Creek to the county boundary.
Blacklick Creek	From Central College Road to a point approximately 0.69 US of Walnut Street.
Blau Ditch	From its confluence with Dry Run to a point approximately 1,200 feet US of Maclam Drive.
Clover Groff Ditch	From Interstate Route 70 to Elliott Road (within the unincorporated areas of Franklin County).
Cosgray Ditch	From its confluence with the Scioto River to a point approximately 0.42 mile US of Wilcox Road.

Table 7. Summary of Discharges

Flooding Source and Location	Drainage Area (square miles)	Peak Discharges (cfs)				
		10-percent-annual-chance	2-percent-annual-chance	1-percent-annual-chance	0.2-percent-annual-chance	
Alum Creek (continued)						
Approximately 2.6 miles US of Park Road	131.9	1,800	2,800	3,600	6,200	
At Interstate Route 71	127.0	1,800	1,800	2,360	4,200	
At Africa Gage, approximately 0.5 mile US of Interstate Route 71	122.0	1,800	1,800	2,360	4,200	
Barbee Ditch						
At confluence with Barnes Ditch	3.6	902	1,358	1,579	2,244	
At Trabue Road	3.1	867	1,289	1,497	2,105	
Barnes Ditch						
At confluence with the Scioto River	7.0	1,648	2,457	2,872	4,012	
At confluence of Barbee Ditch	6.4	1,532	2,283	2,665	3,725	
At confluence of Synder Run	2.7	796	1,187	1,379	1,949	
At Wilson Road	1.5	568	834	964	1,353	
Beem Ditch						
At confluence with Big Walnut Creek	1.5	480	775	910	1,200	
At Hamilton Road	1.1	330	530	630	830	
Big Darby Creek						
Just US of confluence of Hellbranch Run	457	17,800	30,800	38,000	58,000	
DS of confluence of Little Darby Creek	253	16,000	27,900	34,200	52,500	
Big Darby Creek (continued)						
Just US of West Broad Street Bridge	247	10,400	17,400	20,900	31,200	
At county boundary	200	8,500	14,100	16,900	25,300	
Big Run						
At confluence with Little Walnut Creek	8.40	911	1,217	1,374	1,958	
Above confluence of Lisle Ditch	6.30	698	779	808	879	
Approximately 0.5 mile above Berger Road	5.60	1,024	1,635	1,908	2,884	
At county boundary	3.72	774	1,245	1,456	2,219	
Big Walnut Creek						
At mouth	557	16,900	25,800	30,700	46,700	
At USGS gaging station approximately 10.5 miles US of mouth	554	16,500	25,200	30,000	45,600	
Below confluence of Alum Creek	534	16,100	25,000	29,400	43,200	1.65 mi. DS
At Refugee Road	254	14,000	21,200	25,300	37,400	2.60 mi. US - USED
Approximately 1.5 miles US of Refugee Road	248	12,000	19,800	24,000	36,300	
Below confluence of Rocky Fork Creek	236	11,500	19,000	23,000	32,800	
At Morse Road	198	10,000	17,200	21,000	32,200	
At USGS gaging station approximately 5.0 miles US of Morse Road	190	9,100	15,800	19,500	30,200	

Table 8. Summary of Roughness Coefficients

Stream	Channel "n"	Overbank "n"
Alum Creek	0.036-0.050	0.042-0.140
Barbee Ditch	0.035-0.055	0.080-0.150
Barnes Ditch	0.035-0.050	0.060-0.200
Baumgardner Ditch	0.030-0.048	0.030-0.080
Beem Ditch	0.035-0.040	0.030-0.110
Big Darby Creek	0039-0.064	0.043-0.068
Big Run	0035-0.040	0.045-0.300
Big Walnut Creek	0.035-0.050	0.020-0.085
Billingsley Ditch	0.040-0.050	0.550-0.070
Bishop Run	0.030-0.035	0.040-0.080
Blacklick Creek	0.025-0.062	0.035-0.100
Blacklick Creek Lateral D	0.045-0.072	0.042-0.091
Blacklick Creek Lateral G-B	0.075	0.092
Blacklick Creek Lateral K	0.049-0.078	0.032-0.083
Blacklick Creek Tributary C	0.075	0.083-0.090
Blau Ditch	0.040-0.055	0.080-0.160
Brown Run	0.030-0.060	0.035-0.110
Clover Groff Ditch	0.028-0.036	0.045-0.070
Coble-Bowman Ditch	0.058-0.073	0.090-0.105
Cosgray Ditch	0.030-0.060	0.080-0.200
Cramer Ditch	0.035-0.055	0.060-0.120
Dry Run	0.040-0.060	0.080-0.160
Dysar Ditch	0.036-0.063	0.060-0.095
Early Run	0.045-0.050	0.050-0.075
French Run	0.048-0.061	0.065-0.085
French Run (Lateral G-A)	0.028-0.059	0.034-0.090
Georges Creek	030-0.050	0.030-0.100
Grant Run	0.012-0.048	0.060-0.078
Grove City Creek 1	0.040-0.075	0.030-0.075
Grove City Creek 2	0.020-0.045	0.040-0.080
Haines Ditch	0.050	0.085-0.090
Hamilton Ditch	0.035-0.045	0.050-0.075
Hayden Run	0.030-0.050	0.040-0.075
Faust County Ditch	0.030-0.050	0.040-0.150
Hellbranch Run	0.035-0.040	0.045-0.065
McCoy Ditch	0.035-0.040	0.045-0.065
Indian Run	0.025-0.050	0.055-0.100
North Fork Indian Run	0.025-0.050	0.055-0.100
Lisle Ditch	0.035-0.040	0.060-0.070
Little Darby Creek	0.045-0.060	0.053-0.079
Little Walnut Creek	0.030-0.050	0.030-0.080
Marsh Run	0.030-0.048	0.030-0.080
Martin Grove Ditch	0.042-0.083	0.041-0.076
Mason Run	0.035-0.054	0.043-0.090
Molcomb Ditch	0.035-0.050	0.045-0.150
Mulberry Run	0.040-0.075	0.030-0.075
West Water Run	0.020-0.045	0.004-0.080
Olentangy River	0.032-0.062	0.025-0.138

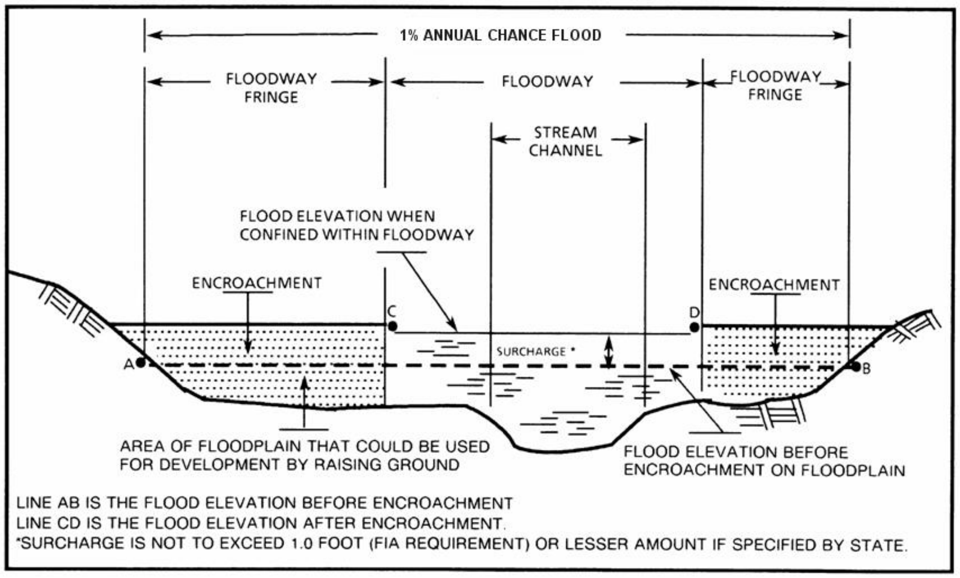


Figure 1. Floodway Schematic

FLOODING SOURCE		FLOODWAY				1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	WIDTH REDUCED FROM PRIOR STUDY	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE (FEET)
Big Walnut Creek									
A	1.920	2,948/2,770[2]		16,555	1.9	693.2	693.2[3]	693.7	0.5
B	3.081	2,303		8,775	3.5	695.7	695.7	696.2	0.5
C	3.383	1,301		13,290	2.3	697.4	697.4	697.9	0.5
D	3.468	1,888		15,928	1.9	697.7	697.7	698.2	0.5
E	3.976	1,577		13,841	2.2	698.6	698.6	699.1	0.5
F	4.115	1,110		9,855	3.1	698.8	698.8	699.3	0.5
G	4.200	1,101		8,926	3.4	699.1	699.1	699.6	0.5
H	4.277	1,414		9,543	3.2	699.5	699.5	700.0	0.5
I	4.626	1,300		12,452	2.5	700.8	700.8	701.3	0.5
J	5.054	721		5,679	5.4	702.1	702.1	702.5	0.4
K	5.249	1,260		5,552	5.5	704.2	704.2	704.6	0.4
L	5.510	2,788		20,875	1.5	706.7	706.7	706.9	0.2
M	5.701	3,340		25,725	1.2	706.9	706.9	707.1	0.2
N	6.391	3,070		18,874	1.6	707.5	707.5	707.7	0.2
O	6.678	2,148		16,116	1.9	707.8	707.8	708.1	0.3
P	6.901	1,608		13,279	2.3	708.9	708.9	709.2	0.3
Q	7.420	3,004		16,925	1.8	709.9	709.9	710.3	0.4
R	7.846	2,718		11,826	2.6	710.4	710.4	710.8	0.4
S	7.983	2,974		8,450	3.6	710.9	710.9	711.3	0.4
T	8.282	2,534		11,598	2.6	712.5	712.5	712.8	0.3
U	8.563	2,552		12,457	2.5	713.5	713.5	713.9	0.4
V	8.913	2,195		15,155	2.0	714.4	714.4	714.7	0.3
W	9.238	1,579		13,301	2.3	714.9	714.9	715.3	0.4
X	9.314	973		11,335	2.6	715.3	715.3	715.7	0.4
Y	9.591	1,203		11,350	2.6	715.8	715.8	716.2	0.4
Z	10.055	1,980		18,183	1.6	716.3	716.3	716.8	0.5

[1]Miles above mouth [2]Total width/width within county boundary [3]Elevation without considering backwater effect from Scioto River

Table 9

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, OHIO
AND INCORPORATED AREAS

FLOODWAY DATA

Big Walnut Creek

FLOODING SOURCE		FLOODWAY				1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	WIDTH REDUCED FROM PRIOR STUDY	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE (FEET)
Big Walnut Creek									
AA	10.340	1,429		11,290	2.7	716.7	716.7	717.2	0.5
AB	10.514	805		7,594	4.0	718.4	718.4	718.6	0.2
AC	10.712	660		9,115	3.3	719.8	719.8	720.0	0.2
AD	10.837	208		4,366	6.9	719.8	719.8	720.2	0.4
AE	10.989	1,225		11,222	2.7	720.5	720.5	720.9	0.4
AF	11.329	1,608		8,712	3.4	721.2	721.2	721.6	0.4
AG	11.668	1,454		13,668	2.2	723.1	723.1	723.5	0.4
AH	11.842	1,289		9,765	3.1	723.2	723.2	723.6	0.4
AI	12.059	1,246		9,367	3.2	723.7	723.7	724.2	0.5
AJ	12.332	1,535		9,837	3.0	724.3	724.3	724.8	0.5
AK	12.513	307		6,166	4.9	724.6	724.6	725.0	0.4
AL	12.526	468		8,475	3.5	724.8	724.8	725.2	0.4
AM	12.640	1,323		14,342	2.1	725.2	725.2	725.7	0.5
AN	13.000	1,675		15,194	2.0	725.6	725.6	726.1	0.5
AO	13.390	1,703		17,253	1.7	725.9	725.9	726.4	0.5
AP	13.680	2,509		16,755	1.8	726.2	726.2	726.7	0.5
AQ	14.503	215		4,160	7.1	727.4	727.4	727.8	0.4
AR	15.385	1,845		11,351	2.4	728.4	728.4	728.8	0.4
AS	15.656	1,950		12,723	2.1	728.7	728.7	729.1	0.4
AT	15.695	1,599		9,733	2.8	728.9	728.9	729.3	0.4
AU	15.995	1,113		6,303	4.3	729.8	729.8	730.2	0.4
AV	16.295	1,219		6,970	4.2	732.1	732.1	732.4	0.3
AW	16.587	1,042		9,293	2.9	736.9	736.9	737.1	0.2
AX	16.695	1,264		13,273	2.0	737.0	737.0	737.3	0.3
AY	16.845	1,014		7,613	3.5	737.0	737.0	737.4	0.4
AZ	17.039	281		4,490	5.6	737.6	737.6	737.8	0.2

[1]Miles above mouth

Table 9

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, OHIO
AND INCORPORATED AREAS

FLOODWAY DATA

Big Walnut Creek

Cross-sections within studied area.

FLOODING SOURCE		FLOODWAY				1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	WIDTH REDUCED FROM PRIOR STUDY	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE (FEET)
Big Walnut Creek									
BA	17.104	1,382		12,269	2.0	738.1	738.1	738.4	0.3
BB	17.232	1,607		11,947	2.1	738.2	738.2	738.5	0.3
BC	17.492	1,047		6,351	4.0	738.6	738.6	739.0	0.4
BD	17.592	1,224		7,143	3.6	739.2	739.2	739.7	0.5
BE	17.692	1,189		6,712	3.8	739.6	739.6	740.1	0.5
BF	17.990	1,266		7,812	3.3	742.2	742.2	742.6	0.4
BG	18.087	1,066		8,737	2.9	742.7	742.7	743.1	0.4
BH	18.262	1,177		8,342	3.1	743.1	743.1	743.5	0.4
BI	18.389	1,519	225[2]	9,665	2.6	743.6	743.6	744.0	0.4
BJ	18.490	1,214		7,923	3.2	743.8	743.8	744.2	0.4
BK	18.590	1,847		8,588	3.0	744.2	744.2	744.7	0.5
BL	18.689	1,463		7,498	3.4	744.6	744.6	745.0	0.4
BM	18.810	1,321		6,068	4.2	744.9	744.9	745.4	0.5
BN	19.023	918		5,693	4.4	747.0	747.0	747.3	0.3
BO	19.105	1,507		8,563	3.0	747.6	747.6	748.0	0.4
BP	19.312	1,284		7,265	3.5	748.2	748.2	748.6	0.4
BQ	19.559	1,561		9,099	2.8	749.2	749.2	749.7	0.5
BR	20.050	644		3,537	7.2	751.4	751.4	751.5	0.1
BS	20.184	1,140		7,297	3.5	753.5	753.5	754.0	0.5
BT	20.385	1,246		7,095	3.6	754.8	754.8	755.2	0.4
BU	20.981	1,008		8,254	2.9	761.0	761.0	761.4	0.4
BV	21.211	1,235		10,197	2.4	761.4	761.4	761.9	0.5
BW	21.493	1,716		10,564	2.3	762.4	762.4	762.8	0.4
BX	21.548	1,474		9,053	2.7	762.5	762.5	762.9	0.4
BY	21.617	1,224		9,003	2.7	762.6	762.6	763.0	0.4
BZ	21.725	859		7,668	3.1	762.8	762.8	763.2	0.4

[1]Miles above mouth [2]See explanation in Section 4.2

Table 9

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, OHIO
AND INCORPORATED AREAS

FLOODWAY DATA

Big Walnut Creek

FLOODING SOURCE		FLOODWAY				1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE [1]	WIDTH (FEET)	WIDTH REDUCED FROM PRIOR STUDY	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE (FEET)
Big Walnut Creek									
CA	21.822	745		6,537	3.7	763.1	763.1	763.5	0.4
CB	21.945	775		5,508	4.4	763.7	763.7	764.1	0.4
CC	22.110	955		7,161	3.4	764.7	764.7	765.2	0.5
CD	22.246	220		3,717	6.3	765.1	765.1	765.5	0.4
CE	22.343	375	96[2]	4,480	5.3	766.0	766.0	766.5	0.5
CF	22.492	650		7,176	3.3	766.8	766.8	767.3	0.5
CG	22.571	600		6,012	3.9	766.9	766.9	767.4	0.5
CH	22.650	650		5,431	4.3	767.2	767.2	767.7	0.5
CI	22.850	650		6,304	3.7	768.3	768.3	768.8	0.5
CJ	23.173	650		7,213	3.3	769.9	769.9	770.3	0.4
CK	23.339	906		8,497	2.8	770.9	770.9	771.3	0.4
CL	23.461	1,175		11,534	2.0	771.3	771.3	771.7	0.4
CM	23.593	1,110		10,941	2.2	771.7	771.7	772.1	0.4
CN	23.673	1,167		10,792	2.2	772.0	772.0	772.4	0.4
CO	23.752	842		10,392	2.3	772.3	772.3	772.7	0.4
CP	23.827	1,051		10,381	2.3	772.4	772.4	772.8	0.4
CQ	24.031	1,447		6,484	3.6	773.1	773.1	773.5	0.4
CR	24.257	900		5,263	4.5	775.7	775.7	776.0	0.3
CS	24.450	506		5,375	4.3	776.9	776.9	777.4	0.5
CT	24.575	590		6,382	3.6	777.7	777.7	778.2	0.5
CU	24.665	503		5,610	4.1	778.0	778.0	778.4	0.4
CV	24.763	229		3,249	7.2	778.0	778.0	778.4	0.4
CW	24.868	377		3,608	6.4	778.9	778.9	779.3	0.4
CX	25.094	1,124		9,021	2.5	781.2	781.2	781.5	0.3
CY	25.416	1,027		10,002	2.3	781.8	781.8	782.2	0.4
CZ	25.575	805		8,285	2.8	782.1	782.1	782.5	0.4

[1]Miles above mouth [2]See explanation in Section 4.2

Table 9

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, OHIO
AND INCORPORATED AREAS

FLOODWAY DATA

Big Walnut Creek

FLOODING SOURCE		FLOODWAY				1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	WIDTH REDUCED FROM PRIOR STUDY	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE (FEET)
Big Walnut Creek									
DA	25.832	1,346		11,490	2.0	782.4	782.4	782.8	0.4
DB	26.018	1,402		12,275	1.9	782.5	782.5	782.9	0.4
DC	26.074	1,037		5,402	4.3	782.9	782.9	783.4	0.5
DD	26.279	1,132		8,570	2.7	784.2	784.2	784.7	0.5
DE	26.640	658		6,082	3.8	786.6	786.6	787.0	0.4
DF	26.808	842		8,771	2.6	787.2	787.2	787.6	0.4
DG	26.966	859		6,736	3.4	787.6	787.6	788.0	0.4
DH	27.125	557		3,690	6.2	788.5	788.5	788.9	0.4
DI	27.495	886		7,249	3.2	791.8	791.8	792.1	0.3
DJ	27.696	1,474		13,475	1.7	792.3	792.3	792.6	0.3
DK	28.003	854		4,995	4.2	792.6	792.6	793.0	0.4
DL	28.563	558		5,803	3.6	796.1	796.1	796.6	0.5
DM	28.787	869		6,457	3.3	797.1	797.1	797.6	0.5
DN	29.103	573		5,273	4.0	798.8	798.8	799.3	0.5
DO	29.349	805		7,712	2.7	800.0	800.0	800.5	0.5
DP	29.608	790		7,037	3.0	800.8	800.8	801.3	0.5
DQ	29.799	541		5,020	4.2	801.5	801.5	802.0	0.5
DR	30.042	494		5,170	4.1	802.9	802.9	803.4	0.5
DS	30.370	1,129		7,999	2.6	804.4	804.4	804.9	0.5
DT	30.704	809		7,210	2.9	805.5	805.5	805.9	0.4
DU	31.006	1,150		6,126	3.4	806.5	806.5	806.9	0.4
DV	31.574	650		5,659	3.7	808.4	808.4	808.6	0.2
DW	31.904	523		4,515	4.7	809.5	809.5	810.0	0.5
DX	32.408	697		6,522	3.2	814.9	814.9	815.3	0.4
DY	33.178	2,585		14,759	1.4	815.7	815.7	816.2	0.5
DZ	33.431	1,132		5,262	4.0	816.1	816.1	816.5	0.4

[1]Miles above mouth

Table 9

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, OHIO
AND INCORPORATED AREAS

FLOODWAY DATA

Big Walnut Creek

FLOODING SOURCE		FLOODWAY				1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	WIDTH REDUCED FROM PRIOR STUDY	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE (FEET)
Big Walnut Creek									
EA	33.600[1]	534		4,217	5.0	816.7	816.7	817.1	0.4
EB	33.808[1]	578		4,385	4.8	817.9	817.9	818.4	0.5
EC	34.100[1]	600		5,064	4.1	819.4	819.4	819.9	0.5
ED	34.443[1]	179		3,166	6.6	822.2	822.2	822.2	0.0
EE	34.516[1]	930		9,399	2.1	822.9	822.9	822.9	0.0
EF	34.576[1]	904		8,639	2.3	823.0	823.0	823.1	0.1
EG	34.678[1]	465		3,002	6.5	823.0	823.0	823.1	0.1
EH	34.914[1]	864		5,058	3.9	824.9	824.9	825.4	0.5
EI	35.187[1]	302		3,217	6.1	826.4	826.4	826.9	0.5
EJ	35.485[1]	566		5,415	3.6	828.0	828.0	828.5	0.5
EK	35.641[1]	326		3,578	5.4	828.2	828.2	828.7	0.5
EL	35.838[1]	333		3,370	5.8	829.1	829.1	829.6	0.5
EM	35.920[1]	396		4,185	4.7	829.6	829.6	830.1	0.5
EN	36.039[1]	722		4,996	3.9	830.2	830.2	830.7	0.5
EO	36.358[1]	804		5,784	3.4	831.3	831.2	831.8	0.5
EP	36.650[1]	188		3,081	6.3	831.7	831.7	832.0	0.3
EQ	36.824[1]	580		6,391	3.1	833.8	833.8	834.2	0.4
ER	36.984[1]	705		10,137	1.9	834.1	834.1	834.5	0.4
Billingsley Ditch									
A-C*									
D	1,610[2]	18		81	10.7	835.2	835.2	835.7	0.5
E	1,790[2]	29		124	7.0	840.6	840.6	841.1	0.5
G	2,410[2]	49		193	4.5	847.0	847.0	847.5	0.5
H	2,830[2]	43		111	7.8	850.8	850.8	851.3	0.5
I	2,900[2]	90		356	2.4	852.8	852.8	853.3	0.5

[1]Miles above mouth [2]Feet above confluence with Scioto River *Data not available - floodway coincident with channel banks

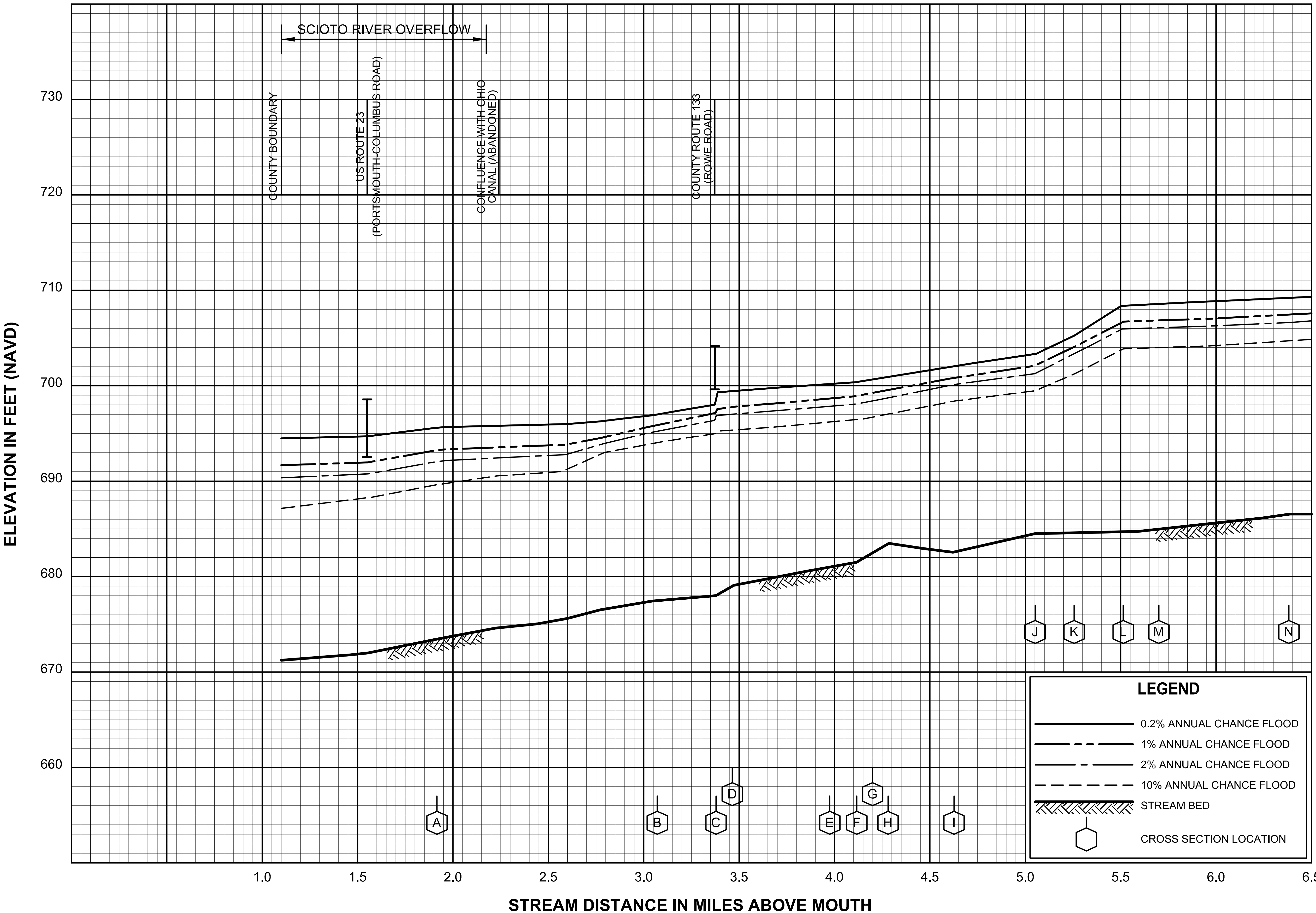
Table 9

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, OHIO
AND INCORPORATED AREAS

FLOODWAY DATA

Big Walnut Creek, Billingsley Ditch



FLOOD PROFILES

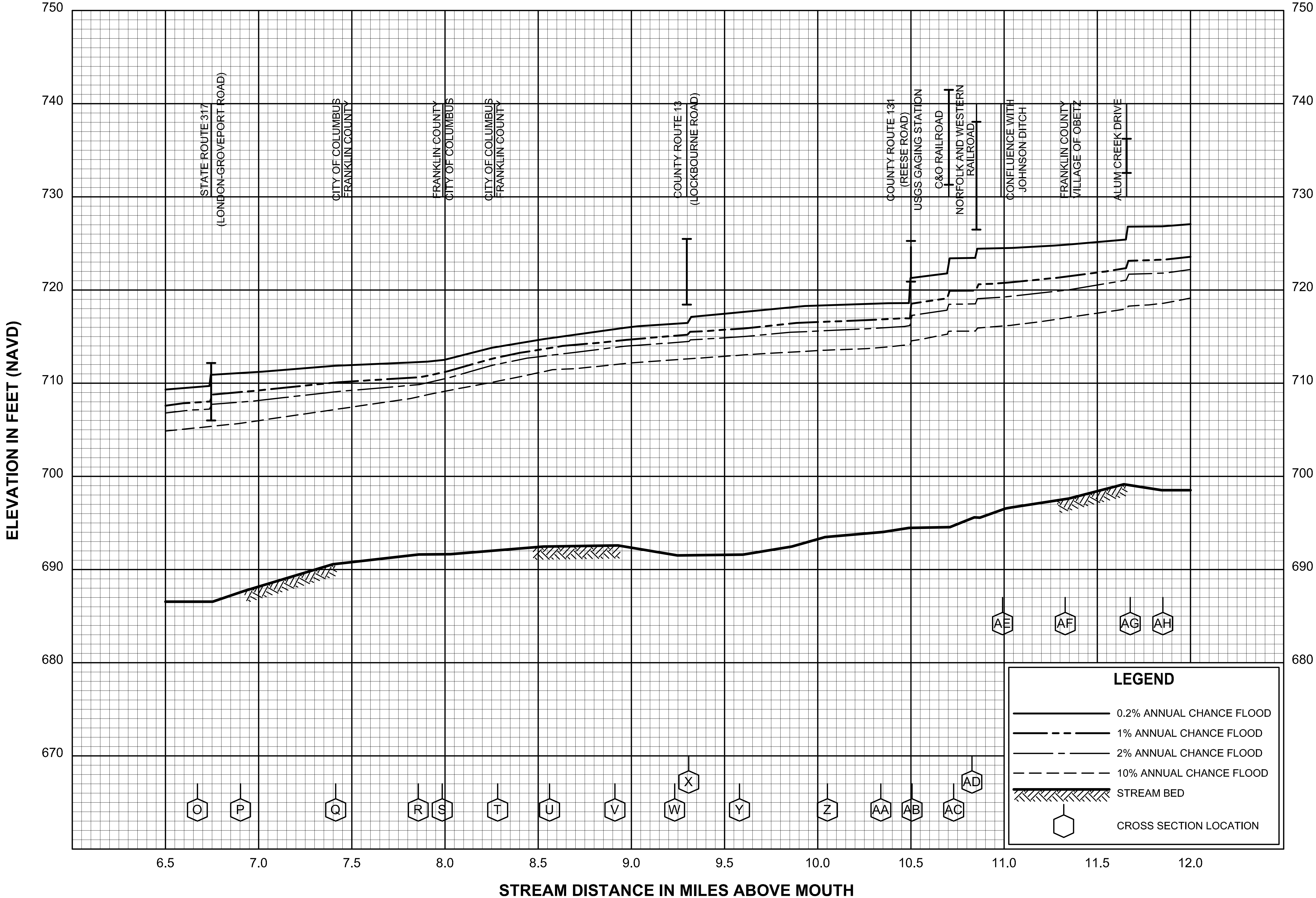
BIG WALNUT CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, OH

AND INCORPORATED AREAS

25P



FLOOD PROFILES

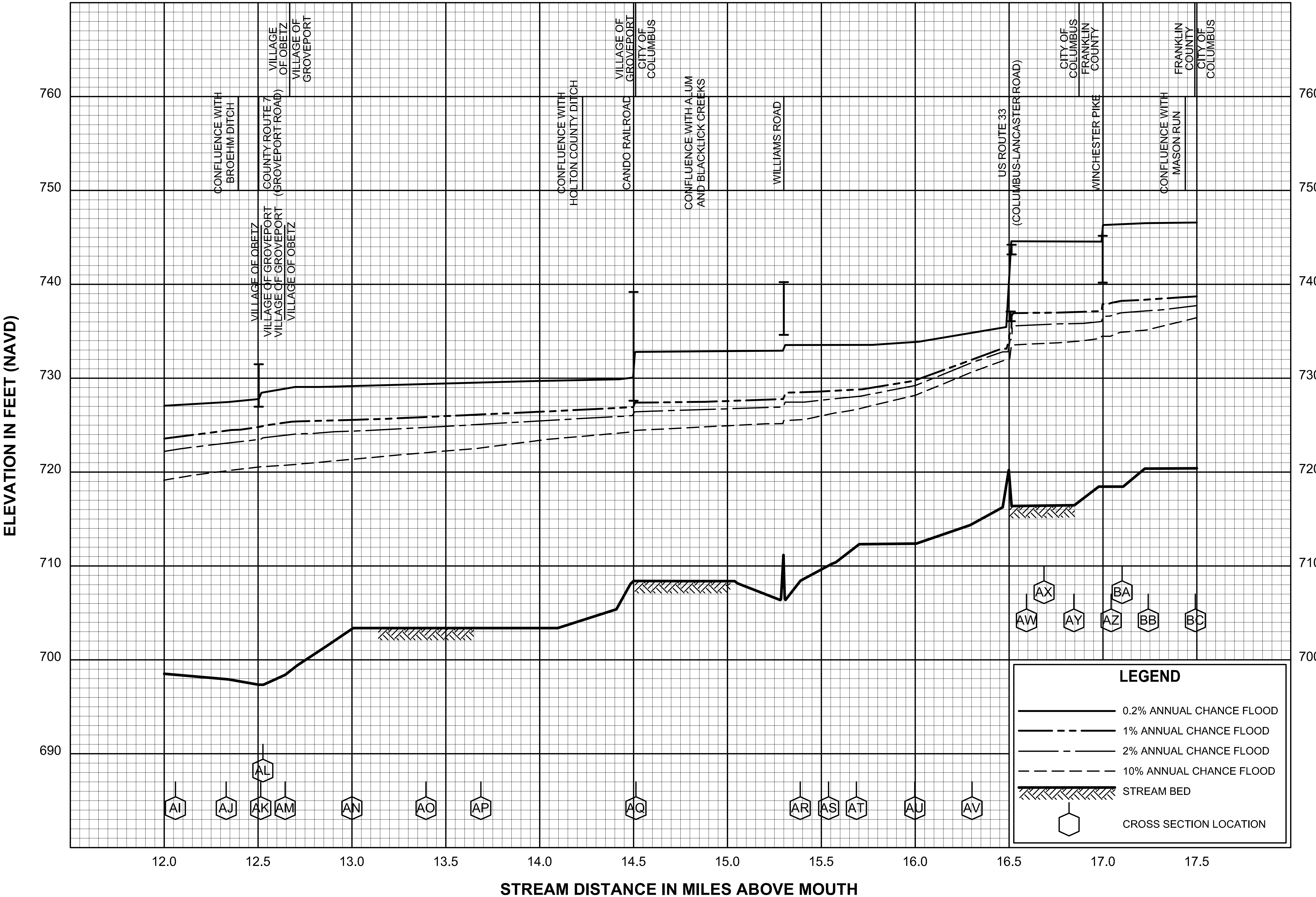
BIG WALNUT CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, OH

AND INCORPORATED AREAS

26P



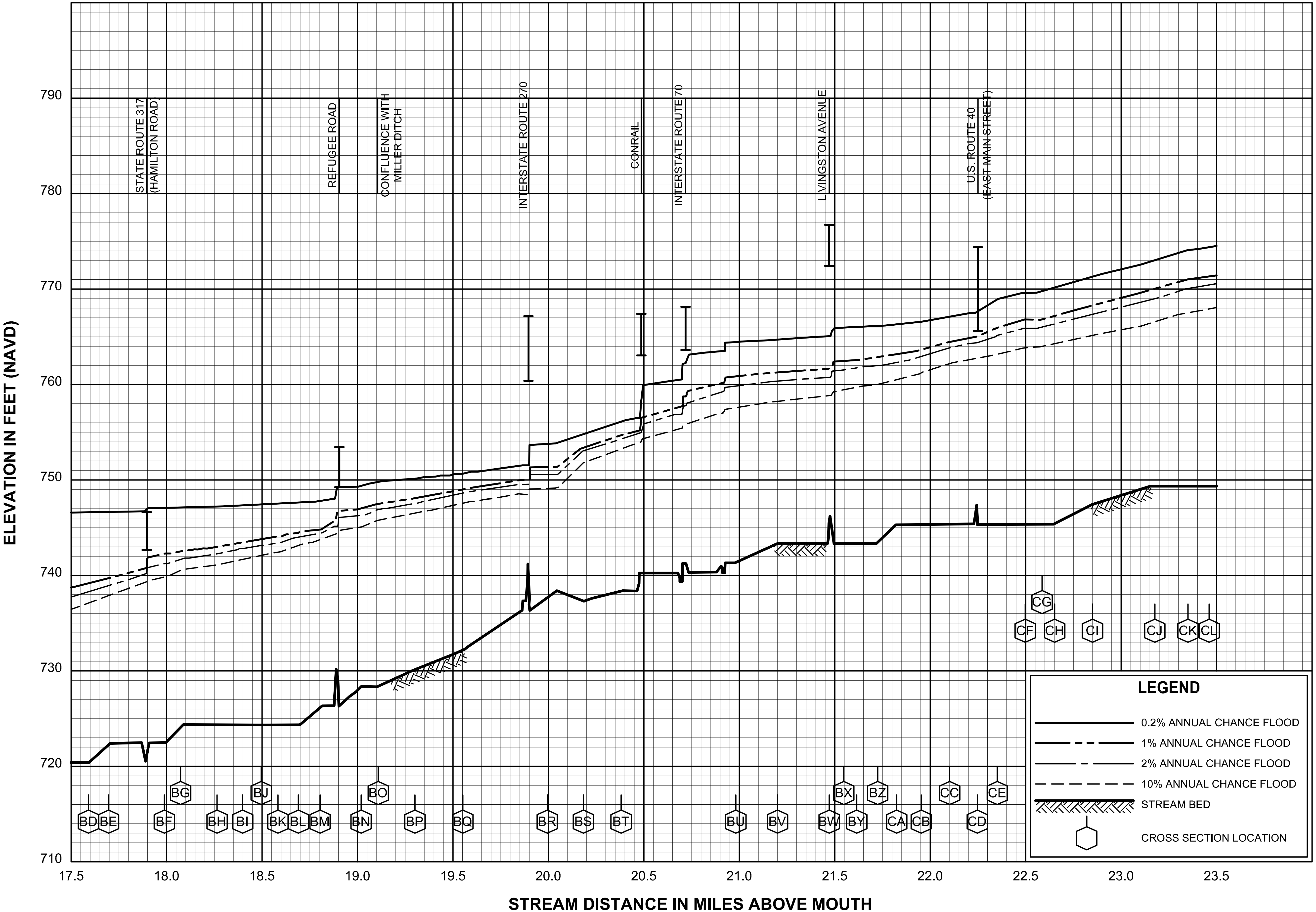
FLOOD PROFILES

BIG WALNUT CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, OH

AND INCORPORATED AREAS



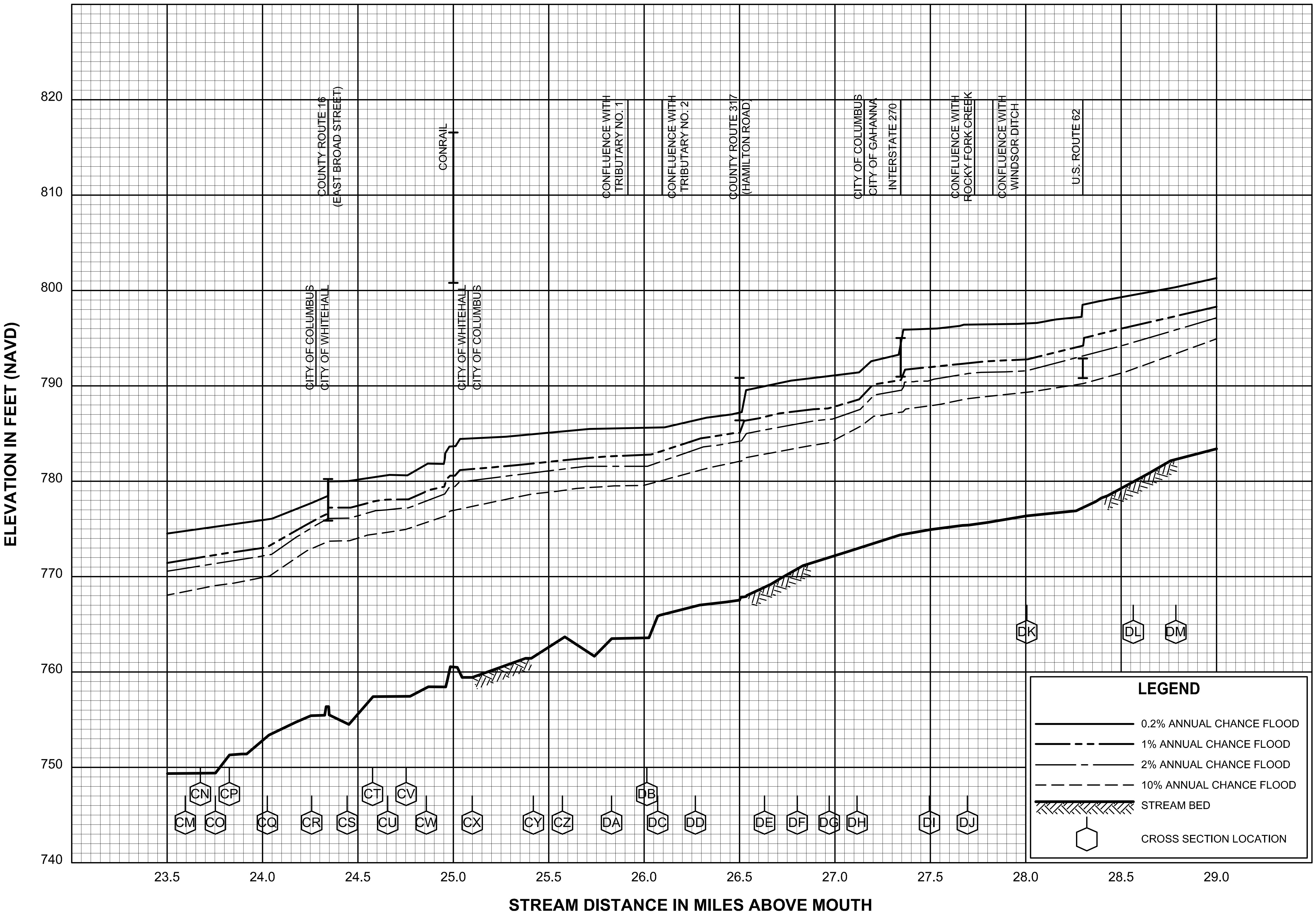
FLOOD PROFILES

BIG WALNUT CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, OH

AND INCORPORATED AREAS



FLOOD PROFILES

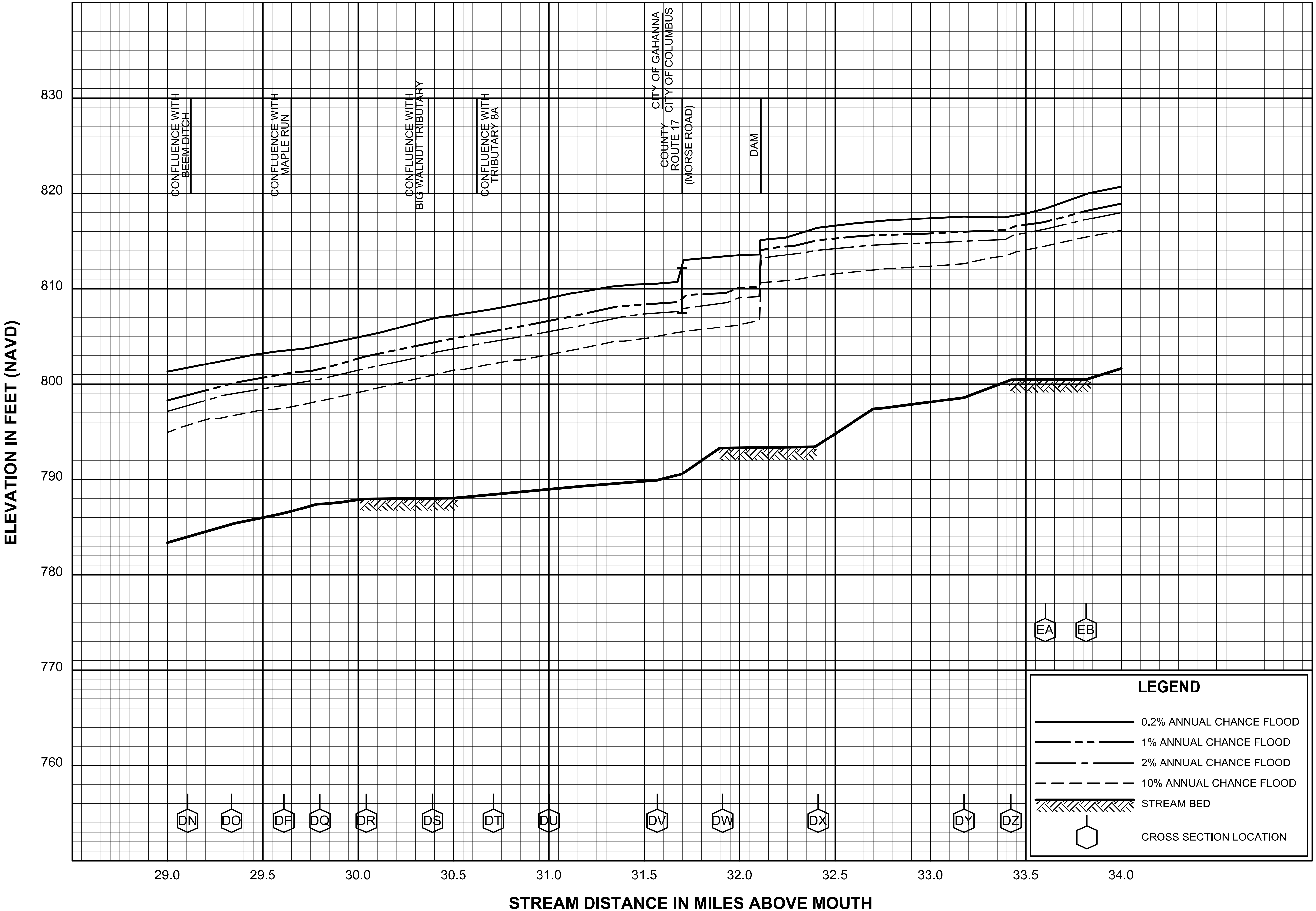
BIG WALNUT CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, OH

AND INCORPORATED AREAS

29P



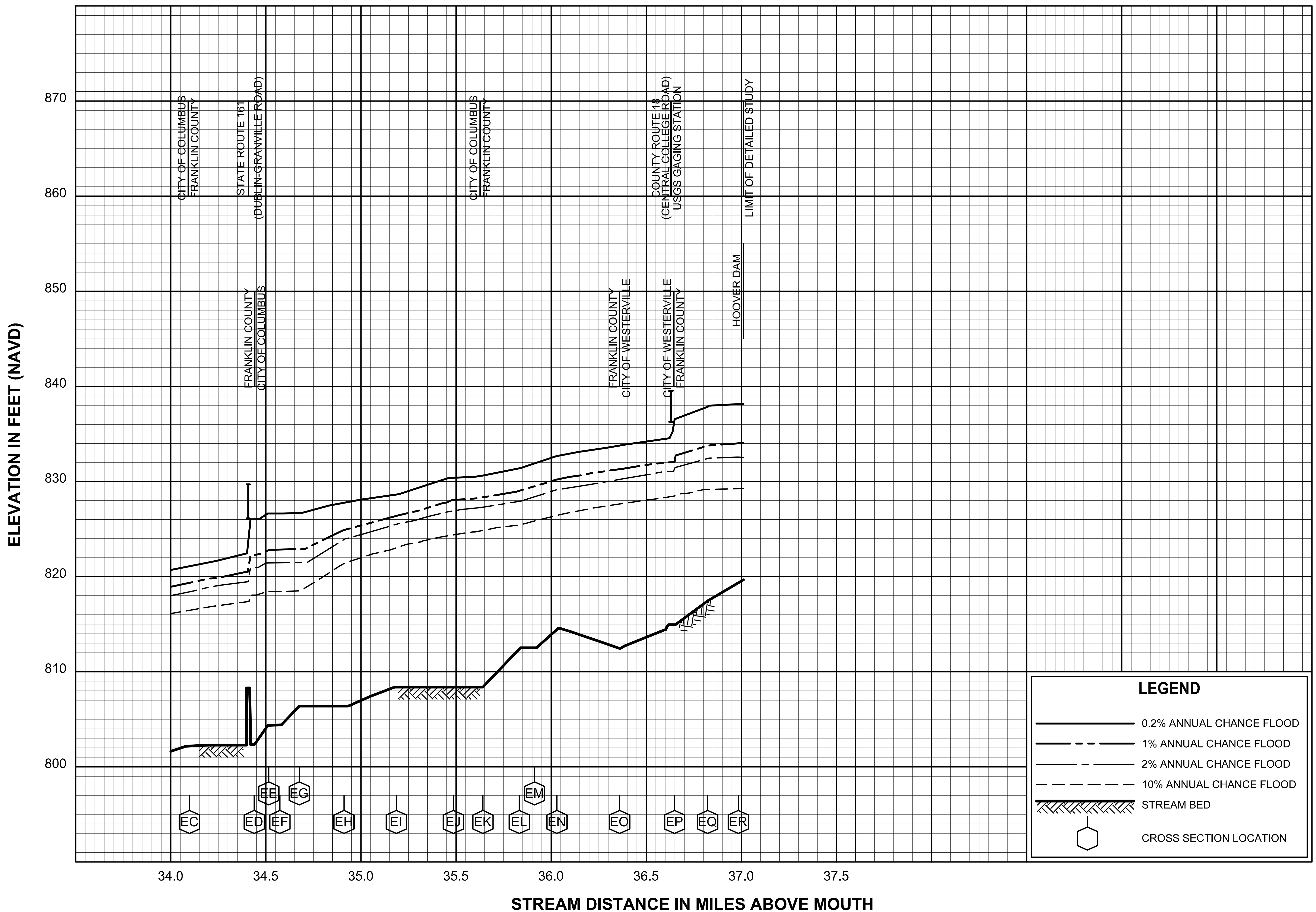
FLOOD PROFILES

BIG WALNUT CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, OH

AND INCORPORATED AREAS



FLOOD PROFILES

BIG WALNUT CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, OH

AND INCORPORATED AREAS

local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

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

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

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

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

The **projection** used in the preparation of this map was Ohio State Plane South Zone 5001 (FIPSZONE 3402). The **horizontal datum** was NAD83. Differences in datum, spheroid, projection or state plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

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

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

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

Base map information shown on this FIRM was provided in digital format by Franklin County. This information was produced at a scale of 1:1,200 from aerial photography dated 2004.

This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

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

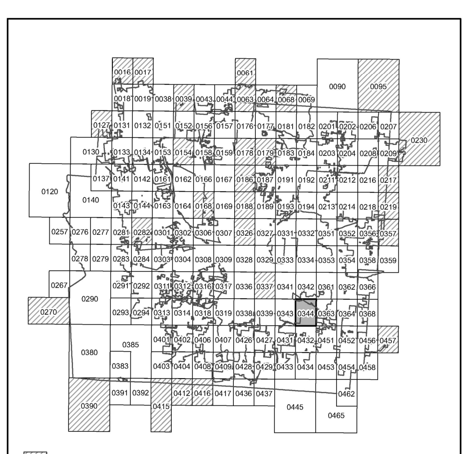
Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which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

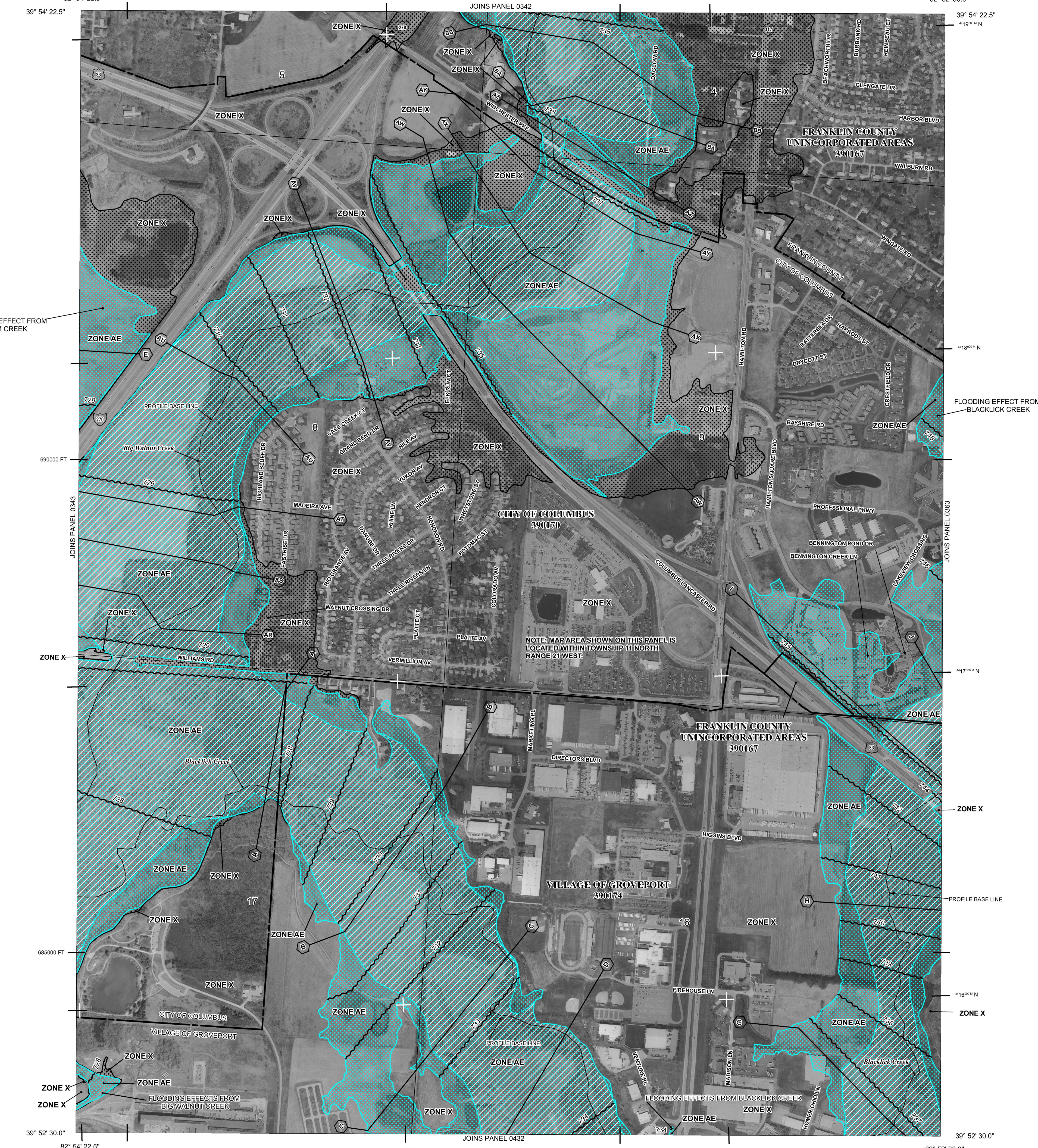
Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at http://msc.fema.gov/.

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

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

PANEL INDEX





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

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

FLOODWAY AREAS IN ZONE AE

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

OTHER FLOOD AREAS

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

OTHER AREAS

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

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

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

	1% annual chance floodplain boundary
	0.2% annual chance floodplain boundary
	Floodway boundary
	Zone D boundary
	CBRS and OPA boundary
	Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
513	Base Flood Elevation line and value; elevation in feet*
(EL 10)	Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

A — A	Cross section line
23 - - - 23	Transect line
85° 03' 45.0", 41° 24' 22.5"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
4587000 M	1000-meter Universal Transverse Mercator grid values, zone 17
2250000 FT	5000-foot grid ticks: Ohio State Plane South Coordinate System, 5001 Zone (FIPSZONE 3402) Lambert Conformal Conic
KA0015 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
• M1.5	River Mile

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

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

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
7/16/1997
4/21/1999
3/16/2004
9/19/2007

June 17, 2008 - to update corporate limits, to change Special Flood Hazard Areas, to update map format, to add roads and road names, to incorporate previously issued Letters of Map Revision, and to reflect updated topographic information.

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

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

MAP SCALE 1" = 500'

250 0 500 1000 FEET

150 0 150 300 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0344K

FIRM
FLOOD INSURANCE RATE MAP
FRANKLIN COUNTY, OHIO
AND INCORPORATED AREAS

PANEL 344 OF 465

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
COLUMBUS, CITY OF	390170	0344	K
FRANKLIN COUNTY	390167	0344	K
GROVEPORT, VILLAGE OF	390174	0344	K

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

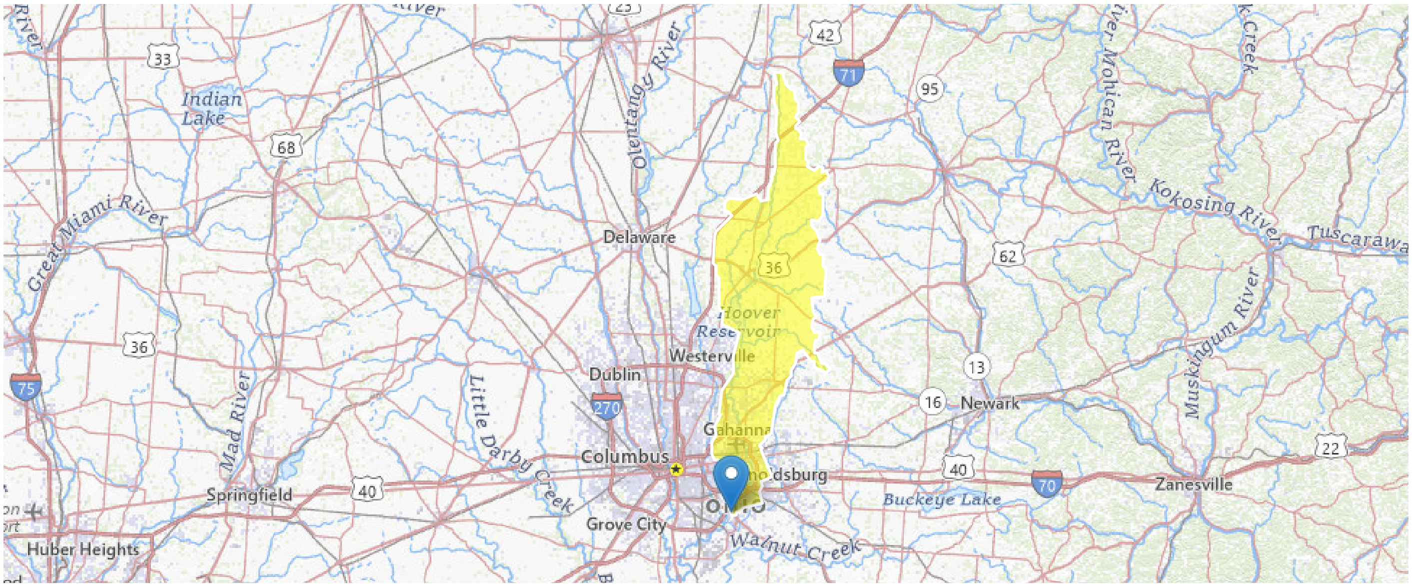
MAP NUMBER 39049C0344K

MAP REVISED JUNE 17, 2008

Appendix C – USGS StreamStats Report

FRA-33 StreamStats Report - Big Walnut Creek

Region ID: OH
Workspace ID: OH20250519193432326000
Clicked Point (Latitude, Longitude): 39.89807, -82.89376
NHD Stream GNIS Name of Click Point: Big Walnut Creek
Time: 2025-05-19 15:34:55 -0400



Collapse All

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
CSL1085LFP	Change in elevation divided by length between points 10 and 85 percent of distance along the longest flow path to the basin divide, LFP from 2D grid	8.33	feet per mi
DRNAREA	Area that drains to a point on a stream	271	square miles
FOREST	Percentage of area covered by forest	23.4	percent
LAT_CENT	Latitude of Basin Centroid	40.2036	decimal degrees
LC92STOR	Percentage of water bodies and wetlands determined from the NLCD	2.75	percent
LONG_CENT	Longitude Basin Centroid	82.825	decimal degrees
LONG_OUT	Longitude of Basin Outlet	-82.893805	degrees
OH_SVI2024	Mapped Ohio Streamflow Variability Index as defined in SIR 2024-5075	0.67	Log base 10
OHREGA	Ohio Region A Indicator	1	dimensionless
OHREGC	Ohio Region C Indicator	0	dimensionless
PRECIPCENT	Mean Annual Precip at Basin Centroid	37.2	inches
STREAM_VARG	Streamflow variability index as defined in WRIR 02-4068, computed from regional grid	0.57	dimensionless

Peak-Flow Statistics

Peak-Flow Statistics Parameters [Peak Flow Full Model Reg A SIR2019 5018]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
CSL1085LFP	Stream Slope 10 and 85 Longest Flow Path	8.33	feet per mi	1.53	516
DRNAREA	Drainage Area	271	square miles	0.04	5989
LC92STOR	Percent Storage from NLCD1992	2.75	percent	0	25.35
OHREGA	Ohio Region A Indicator 1 if in A else 0	1	dimensionless	0	1
OHREGC	Ohio Region C Indicator 1 if in C else 0	0	dimensionless	0	1

Peak-Flow Statistics Flow Report [Peak Flow Full Model Reg A SIR2019 5018]

PIL: Lower 90% Prediction Interval, PIU: Upper 90% Prediction Interval, ASEp: Average Standard Error of Prediction, SE: Standard Error, PC: Percent Correct, RMSE: Root Mean Squared Error, PseudoR^2: Pseudo R Squared (other -- see report)

Statistic	Value	Unit	PIL	PIU	ASEp
50-percent AEP flood	5890	ft^3/s	3120	11100	40.1
20-percent AEP flood	8750	ft^3/s	4850	15800	37.2
10-percent AEP flood	10800	ft^3/s	5950	19600	37.6
4-percent AEP flood	13700	ft^3/s	7500	25000	38.1
2-percent AEP flood	15900	ft^3/s	8610	29300	37.8
1-percent AEP flood	18300	ft^3/s	9810	34100	39.6
0.2-percent AEP flood	24100	ft^3/s	12800	45300	40.3

Peak-Flow Statistics Citations

Koltun, G.F.,2019, Flood-frequency estimates for Ohio streamgages based on data through water year 2015 and techniques for estimating flood-frequency characteristics of rural, unregulated Ohio streams: U.S. Geological Survey Scientific Investigations Report 2019–5018, 25 p. (https://dx.doi.org/10.3133/sir20195018)

Low-Flow Statistics

Low-Flow Statistics Parameters [Statewide annual one day ten year low flow with SVI less than or equal to 0.71 from SIR 2024-5075]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	271	square miles	0.21	540
OH_SVI2024	Mapped Ohio Streamflow Variability Index	0.67	Log base 10 cubic feet per second	0.41	1.23

Low-Flow Statistics Parameters [Statewide annual seven day ten year low flow with SVI less than or equal to 0.76 from SIR 2024-5075]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	271	square miles	0.21	540
OH_SVI2024	Mapped Ohio Streamflow Variability Index	0.67	Log base 10 cubic feet per second	0.41	1.23

Low-Flow Statistics Parameters [Statewide annual thirty day ten year low flow with SVI less than or equal to 0.87 from SIR

2024-5075]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	271	square miles	0.21	540
OH_SVI2024	Mapped Ohio Streamflow Variability Index	0.67	Log base 10 cubic feet per second	0.41	1.23

Low-Flow Statistics Parameters [Statewide annual ninety day ten year low flow with SVI less than or equal to 1.00 from SIR 2024-5075]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	271	square miles	0.21	540
OH_SVI2024	Mapped Ohio Streamflow Variability Index	0.67	Log base 10 cubic feet per second	0.41	1.23

Low-Flow Statistics Flow Report [Statewide annual one day ten year low flow with SVI less than or equal to 0.71 from SIR 2024-5075]

PIL: Lower 90% Prediction Interval, PIU: Upper 90% Prediction Interval, ASEp: Average Standard Error of Prediction, SE: Standard Error, PC: Percent Correct, RMSE: Root Mean Squared Error, PseudoR^2: Pseudo R Squared (other -- see report)

Statistic	Value	Unit	RMSE	PseudoR^2
1 Day 10 Year Low Flow	0.585	ft^3/s	1	0.85

Low-Flow Statistics Flow Report [Statewide annual seven day ten year low flow with SVI less than or equal to 0.76 from SIR 2024-5075]

PIL: Lower 90% Prediction Interval, PIU: Upper 90% Prediction Interval, ASEp: Average Standard Error of Prediction, SE: Standard Error, PC: Percent Correct, RMSE: Root Mean Squared Error, PseudoR^2: Pseudo R Squared (other -- see report)

Statistic	Value	Unit	RMSE	PseudoR^2
7 Day 10 Year Low Flow	1.05	ft^3/s	1	0.89

Low-Flow Statistics Flow Report [Statewide annual thirty day ten year low flow with SVI less than or equal to 0.87 from SIR 2024-5075]

PIL: Lower 90% Prediction Interval, PIU: Upper 90% Prediction Interval, ASEp: Average Standard Error of Prediction, SE: Standard Error, PC: Percent Correct, RMSE: Root Mean Squared Error, PseudoR^2: Pseudo R Squared (other -- see report)

Statistic	Value	Unit	RMSE	PseudoR^2
30 Day 10 Year Low Flow	3.17	ft^3/s	1.1	0.88

Low-Flow Statistics Flow Report [Statewide annual ninety day ten year low flow with SVI less than or equal to 1.00 from SIR 2024-5075]

PIL: Lower 90% Prediction Interval, PIU: Upper 90% Prediction Interval, ASEp: Average Standard Error of Prediction, SE: Standard Error, PC: Percent Correct, RMSE: Root Mean Squared Error, PseudoR^2: Pseudo R Squared (other -- see report)

Statistic	Value	Unit	RMSE	PseudoR^2
90 Day 10 Year Low Flow	9.44	ft^3/s	2.12	0.85

Low-Flow Statistics Flow Report [Area-Averaged]

PIL: Lower 90% Prediction Interval, PIU: Upper 90% Prediction Interval, ASEp: Average Standard Error of Prediction, SE: Standard Error, PC: Percent Correct, RMSE: Root Mean Squared Error, PseudoR^2: Pseudo R Squared (other -- see report)

Statistic	Value	Unit	RMSE	PseudoR^2
1 Day 10 Year Low Flow	0.585	ft^3/s	1	0.85
7 Day 10 Year Low Flow	1.05	ft^3/s	1	0.89
30 Day 10 Year Low Flow	3.17	ft^3/s	1.1	0.88
90 Day 10 Year Low Flow	9.44	ft^3/s	2.12	0.85

Low-Flow Statistics Citations

Branden L. VonIns and G.F. Koltun 2024, Low-flow statistics computed for streamflow gages and methods for estimating selected low-flow statistics for ungaged stream locations in Ohio, water years 1975–2020: U.S. Geological Survey Scientific Investigations Report 2024–5075 (https://doi.org/10.3133/sir20245075)

Flow-Duration Statistics

Flow-Duration Statistics Parameters [Statewide 80% duration flow from SIR 2024-5075]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	271	square miles	0.21	540
LONG_OUT	Longitude of Basin Outlet	-82.893805	decimal degrees	-86.0944222	-79.7825507
OH_SVI2024	Mapped Ohio Streamflow Variability Index	0.67	Log base 10 cubic feet per second	0.41	1.23

Flow-Duration Statistics Flow Report [Statewide 80% duration flow from SIR 2024-5075]

PIL: Lower 90% Prediction Interval, PIU: Upper 90% Prediction Interval, ASEp: Average Standard Error of Prediction, SE: Standard Error, PC: Percent Correct, RMSE: Root Mean Squared Error, PseudoR^2: Pseudo R Squared (other -- see report)

Statistic	Value	Unit	RMSE	PseudoR^2
80 Percent Duration	28.1	ft^3/s	8	0.84

Flow-Duration Statistics Citations

Branden L. VonIns and G.F. Koltun 2024, Low-flow statistics computed for streamflow gages and methods for estimating selected low-flow statistics for ungaged stream locations in Ohio, water years 1975–2020: U.S. Geological Survey Scientific Investigations Report 2024–5075 (https://doi.org/10.3133/sir20245075)

Annual Flow Statistics

Annual Flow Statistics Parameters [Low Flow LatLE 41.2 wri02 4068]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	271	square miles	0.12	7422
LAT_CENT	Latitude of Basin Centroid	40.2036	decimal degrees	38.68	41.2
PRECIPCENT	Mean Annual Precip at Basin Centroid	37.2	inches	34	43.2

Annual Flow Statistics Flow Report [Low Flow LatLE 41.2 wri02 4068]

PIL: Lower 90% Prediction Interval, PIU: Upper 90% Prediction Interval, ASEp: Average Standard Error of Prediction, SE: Standard Error, PC: Percent Correct, RMSE: Root Mean Squared Error, PseudoR^2: Pseudo R Squared (other -- see report)

Statistic	Value	Unit	SE	ASEp
Mean Annual Flow	278	ft^3/s	11.4	11.4

Annual Flow Statistics Citations

Koltun, G. F., and Whitehead, M. T.,2002, Techniques for Estimating Selected Streamflow Characteristics of Rural, Unregulated Streams in Ohio: U. S. Geological Survey Water-Resources Investigations Report 02-4068, 50 p (https://pubs.er.usgs.gov/publication/wri024068)

Monthly Flow Statistics

Monthly Flow Statistics Parameters [Low Flow LatLE 41.2 wri02 4068]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	271	square miles	0.12	7422
FOREST	Percent Forest	23.4	percent	0	99.1
LAT_CENT	Latitude of Basin Centroid	40.2036	decimal degrees	38.68	41.2
LC92STOR	Percent Storage from NLCD1992	2.75	percent	0	19
PRECIPCENT	Mean Annual Precip at Basin Centroid	37.2	inches	34	43.2
STREAM_VARG	Streamflow Variability Index from Grid	0.57	dimensionless	0.25	1.13

Monthly Flow Statistics Flow Report [Low Flow LatLE 41.2 wri02 4068]

PIL: Lower 90% Prediction Interval, PIU: Upper 90% Prediction Interval, ASEp: Average Standard Error of Prediction, SE: Standard Error, PC: Percent Correct, RMSE: Root Mean Squared Error, PseudoR^2: Pseudo R Squared (other -- see report)

Statistic	Value	Unit	SE	ASEp
January Mean Flow	422	ft^3/s	16.6	16.6
February Mean Flow	431	ft^3/s	11.9	11.9
March Mean Flow	531	ft^3/s	14	14
April Mean Flow	446	ft^3/s	11.2	11.2
May Mean Flow	322	ft^3/s	19.5	19.5
June Mean Flow	211	ft^3/s	27	27
July Mean Flow	123	ft^3/s	28.2	28.2
August Mean Flow	82.9	ft^3/s	36.8	36.8
September Mean Flow	58.5	ft^3/s	43.6	43.6
October Mean Flow	64.9	ft^3/s	50.8	50.8
November Mean Flow	152	ft^3/s	37.5	37.5
December Mean Flow	283	ft^3/s	21.8	21.8

Monthly Flow Statistics Citations

Koltun, G. F., and Whitehead, M. T.,2002, Techniques for Estimating Selected Streamflow Characteristics of Rural, Unregulated Streams in Ohio: U. S. Geological Survey Water-Resources Investigations Report 02-4068, 50 p (https://pubs.er.usgs.gov/publication/wri024068)

Seasonal Flow Statistics

Seasonal Flow Statistics Parameters [Statewide May to November one day ten year low flow with SVI less than or equal to 0.71 from SIR 2024-5075]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	271	square miles	0.21	540
OH_SVI2024	Mapped Ohio Streamflow Variability Index	0.67	Log base 10 cubic feet per second	0.41	1.23

Seasonal Flow Statistics Parameters [Statewide May to November seven day ten year low flow with SVI less than or equal to

0.77 from SIR 2024-5075]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	271	square miles	0.21	540
OH_SVI2024	Mapped Ohio Streamflow Variability Index	0.67	Log base 10 cubic feet per second	0.41	1.23

Seasonal Flow Statistics Parameters [Statewide May to November thirty day ten year low flow with SVI less than or equal to 0.86 from SIR 2024-5075]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	271	square miles	0.21	540
OH_SVI2024	Mapped Ohio Streamflow Variability Index	0.67	Log base 10 cubic feet per second	0.41	1.23

Seasonal Flow Statistics Parameters [Statewide May to November ninety day ten year low flow with SVI less than or equal to 1.00 from SIR 2024-5075]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	271	square miles	0.21	540
OH_SVI2024	Mapped Ohio Streamflow Variability Index	0.67	Log base 10 cubic feet per second	0.41	1.23

Seasonal Flow Statistics Parameters [Statewide September to November one day ten year low flow with SVI less than or equal to 0.72 from SIR 2024-5075]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	271	square miles	0.21	540
OH_SVI2024	Mapped Ohio Streamflow Variability Index	0.67	Log base 10 cubic feet per second	0.41	1.23

Seasonal Flow Statistics Parameters [Statewide September to November seven day ten year low flow with SVI less than or equal to 0.76 from SIR 2024-5075]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	271	square miles	0.21	540
OH_SVI2024	Mapped Ohio Streamflow Variability Index	0.67	Log base 10 cubic feet per second	0.41	1.23

Seasonal Flow Statistics Parameters [Statewide September to November thirty day ten year low flow with SVI less than or equal to 0.87 from SIR 2024-5075]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	271	square miles	0.21	540
OH_SVI2024	Mapped Ohio Streamflow Variability Index	0.67	Log base 10 cubic feet per second	0.41	1.23

Seasonal Flow Statistics Parameters [Statewide September to November ninety day ten year low flow from SIR 2024-5075]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	271	square miles	0.21	540
LONG_OUT	Longitude of Basin Outlet	-82.893805	decimal degrees	-86.0944222	-79.7825507
OH_SVI2024	Mapped Ohio Streamflow Variability Index	0.67	Log base 10 cubic feet per second	0.41	1.23

Seasonal Flow Statistics Parameters [Statewide December to February low flows from SIR 2024-5075]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	271	square miles	0.21	540
LONG_OUT	Longitude of Basin Outlet	-82.893805	decimal degrees	-86.0944222	-79.7825507
OH_SVI2024	Mapped Ohio Streamflow Variability Index	0.67	Log base 10 cubic feet per second	0.41	1.23

Seasonal Flow Statistics Flow Report [Statewide May to November one day ten year low flow with SVI less than or equal to 0.71 from SIR 2024-5075]

PIL: Lower 90% Prediction Interval, PIU: Upper 90% Prediction Interval, ASEp: Average Standard Error of Prediction, SE: Standard Error, PC: Percent Correct, RMSE: Root Mean Squared Error, PseudoR^2: Pseudo R Squared (other -- see report)

Statistic	Value	Unit	RMSE	PseudoR^2
1 Day 10 Year lowflow May to Nov	0.585	ft^3/s	1	0.87

Seasonal Flow Statistics Flow Report [Statewide May to November seven day ten year low flow with SVI less than or equal to 0.77 from SIR 2024-5075]

PIL: Lower 90% Prediction Interval, PIU: Upper 90% Prediction Interval, ASEp: Average Standard Error of Prediction, SE: Standard Error, PC: Percent Correct, RMSE: Root Mean Squared Error, PseudoR^2: Pseudo R Squared (other -- see report)

Statistic	Value	Unit	RMSE	PseudoR^2
7 Day 10 Year lowflow May to Nov	1.05	ft^3/s	0.98	0.9

Seasonal Flow Statistics Flow Report [Statewide May to November thirty day ten year low flow with SVI less than or equal to 0.86 from SIR 2024-5075]

PIL: Lower 90% Prediction Interval, PIU: Upper 90% Prediction Interval, ASEp: Average Standard Error of Prediction, SE: Standard Error, PC: Percent Correct, RMSE: Root Mean Squared Error, PseudoR^2: Pseudo R Squared (other -- see report)

Statistic	Value	Unit	RMSE	PseudoR^2
30 Day 10 Year lowflow May to Nov	3.18	ft^3/s	0.99	0.89

Seasonal Flow Statistics Flow Report [Statewide May to November ninety day ten year low flow with SVI less than or equal to 1.00 from SIR 2024-5075]

PIL: Lower 90% Prediction Interval, PIU: Upper 90% Prediction Interval, ASEp: Average Standard Error of Prediction, SE: Standard Error, PC: Percent Correct, RMSE: Root Mean Squared Error, PseudoR^2: Pseudo R Squared (other -- see report)

Statistic	Value	Unit	RMSE	PseudoR^2
90 Day 10 Year lowflow May to Nov	9.44	ft^3/s	2.05	0.86

Seasonal Flow Statistics Flow Report [Statewide September to November one day ten year low flow with SVI less than or equal to 0.72 from SIR 2024-5075]

PIL: Lower 90% Prediction Interval, PIU: Upper 90% Prediction Interval, ASEp: Average Standard Error of Prediction, SE: Standard Error, PC: Percent Correct, RMSE: Root Mean Squared Error, PseudoR^2: Pseudo R Squared (other -- see report)

Statistic	Value	Unit	RMSE	PseudoR^2
1 Day 10 Year lowflow Sep to Nov	0.856	ft^3/s	1.09	0.88

Seasonal Flow Statistics Flow Report [Statewide September to November seven day ten year low flow with SVI less than or equal to 0.76 from SIR 2024-5075]

PIL: Lower 90% Prediction Interval, PIU: Upper 90% Prediction Interval, ASEp: Average Standard Error of Prediction, SE: Standard Error, PC: Percent Correct, RMSE: Root Mean Squared Error, PseudoR^2: Pseudo R Squared (other -- see report)

Statistic	Value	Unit	RMSE	PseudoR^2
7 Day 10 Year lowflow Sep to Nov	1.29	ft^3/s	1.04	0.91

Seasonal Flow Statistics Flow Report [Statewide September to November thirty day ten year low flow with SVI less than or equal to 0.87 from SIR 2024-5075]

PIL: Lower 90% Prediction Interval, PIU: Upper 90% Prediction Interval, ASEp: Average Standard Error of Prediction, SE: Standard Error, PC: Percent Correct, RMSE: Root Mean Squared Error, PseudoR^2: Pseudo R Squared (other -- see report)

Statistic	Value	Unit	RMSE	PseudoR^2
30 Day 10 Year lowflow Sep to Nov	3.98	ft^3/s	1.5	0.85

Seasonal Flow Statistics Flow Report [Statewide September to November ninety day ten year low flow from SIR 2024-5075]

PIL: Lower 90% Prediction Interval, PIU: Upper 90% Prediction Interval, ASEp: Average Standard Error of Prediction, SE: Standard Error, PC: Percent Correct, RMSE: Root Mean Squared Error, PseudoR^2: Pseudo R Squared (other -- see report)

Statistic	Value	Unit	RMSE	PseudoR^2
90 Day 10 Year lowflow Sep to Nov	21.9	ft^3/s	10.2	0.74

Seasonal Flow Statistics Flow Report [Statewide December to February low flows from SIR 2024-5075]

PIL: Lower 90% Prediction Interval, PIU: Upper 90% Prediction Interval, ASEp: Average Standard Error of Prediction, SE: Standard Error, PC: Percent Correct, RMSE: Root Mean Squared Error, PseudoR^2: Pseudo R Squared (other -- see report)

Statistic	Value	Unit	RMSE	PseudoR^2
1 Day 10 Year lowflow Dec to Feb	18.6	ft^3/s	7.35	0.77
7 Day 10 Year lowflow Dec to Feb	23.6	ft^3/s	8.1	0.8
30 Day 10 Year lowflow Dec to Feb	61.3	ft^3/s	18.9	0.78
90 Day 10 Year lowflow Dec to Feb	255	ft^3/s	62.4	0.83

Seasonal Flow Statistics Flow Report [Area-Averaged]

PIL: Lower 90% Prediction Interval, PIU: Upper 90% Prediction Interval, ASEp: Average Standard Error of Prediction, SE: Standard Error, PC: Percent Correct, RMSE: Root Mean Squared Error, PseudoR^2: Pseudo R Squared (other -- see report)

Statistic	Value	Unit	RMSE	PseudoR^2
1 Day 10 Year lowflow May to Nov	0.585	ft^3/s	1	0.87
7 Day 10 Year lowflow May to Nov	1.05	ft^3/s	0.98	0.9
30 Day 10 Year lowflow May to Nov	3.18	ft^3/s	0.99	0.89
90 Day 10 Year lowflow May to Nov	9.44	ft^3/s	2.05	0.86
1 Day 10 Year lowflow Sep to Nov	0.856	ft^3/s	1.09	0.88
7 Day 10 Year lowflow Sep to Nov	1.29	ft^3/s	1.04	0.91
30 Day 10 Year lowflow Sep to Nov	3.98	ft^3/s	1.5	0.85
90 Day 10 Year lowflow Sep to Nov	21.9	ft^3/s	10.2	0.74
1 Day 10 Year lowflow Dec to Feb	18.6	ft^3/s	7.35	0.77
7 Day 10 Year lowflow Dec to Feb	23.6	ft^3/s	8.1	0.8
30 Day 10 Year lowflow Dec to Feb	61.3	ft^3/s	18.9	0.78
90 Day 10 Year lowflow Dec to Feb	255	ft^3/s	62.4	0.83

Seasonal Flow Statistics Citations

Branden L. VonIns and G.F. Koltun 2024, Low-flow statistics computed for streamflow gages and methods for estimating selected low-flow statistics for ungaged stream locations in Ohio, water years 1975–2020: U.S. Geological Survey Scientific Investigations Report 2024–5075 (https://doi.org/10.3133/sir20245075)

General Flow Statistics

General Flow Statistics Parameters [Statewide harmonic mean flow with SVI less than or equal to 0.91 from SIR 2024-5075]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	271	square miles	0.21	540
OH_SVI2024	Mapped Ohio Streamflow Variability Index	0.67	Log base 10 cubic feet per second	0.41	1.23

General Flow Statistics Flow Report [Statewide harmonic mean flow with SVI less than or equal to 0.91 from SIR 2024-5075]

PIL: Lower 90% Prediction Interval, PIU: Upper 90% Prediction Interval, ASEp: Average Standard Error of Prediction, SE: Standard Error, PC: Percent Correct, RMSE: Root Mean Squared Error, PseudoR^2: Pseudo R Squared (other -- see report)

Statistic	Value	Unit	RMSE	PseudoR^2
Harmonic Mean Streamflow adjusted for proportion of zero flow days	23.2	ft^3/s	8.21	0.84

General Flow Statistics Citations

Branden L. VonIns and G.F. Koltun 2024, Low-flow statistics computed for streamflow gages and methods for estimating selected low-flow statistics for ungaged stream locations in Ohio, water years 1975–2020: U.S. Geological Survey Scientific Investigations Report 2024–5075 (https://doi.org/10.3133/sir20245075)

Flow Percentile Statistics

Flow Percentile Statistics Parameters [Low Flow LatLE 41.2 wri02 4068]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	271	square miles	0.12	7422
LAT_CENT	Latitude of Basin Centroid	40.2036	decimal degrees	38.68	41.2
LC92STOR	Percent Storage from NLCD1992	2.75	percent	0	19
LONG_CENT	Longitude of Basin Centroid	82.825	decimal degrees	80.53	84.6
STREAM_VARG	Streamflow Variability Index from Grid	0.57	dimensionless	0.25	1.13

Flow Percentile Statistics Flow Report [Low Flow LatLE 41.2 wri02 4068]

PIL: Lower 90% Prediction Interval, PIU: Upper 90% Prediction Interval, ASEp: Average Standard Error of Prediction, SE: Standard Error, PC: Percent Correct, RMSE: Root Mean Squared Error, PseudoR^2: Pseudo R Squared (other -- see report)

Statistic	Value	Unit	SE	ASEp
25th Percentile Flow	38.1	ft^3/s	29.2	29.2
50th Percentile Flow Median	101	ft^3/s	40.3	40.3
75th Percentile Flow	278	ft^3/s	47.9	47.9

Flow Percentile Statistics Citations

Koltun, G. F., and Whitehead, M. T.,2002, Techniques for Estimating Selected Streamflow Characteristics of Rural, Unregulated Streams in Ohio: U. S. Geological Survey Water-Resources Investigations Report 02-4068, 50 p (https://pubs.er.usgs.gov/publication/wri024068)

Bankfull Statistics

Bankfull Statistics Parameters [Interior Plains D Bieger 2015]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	271	square miles	0.19305	59927.7393

Bankfull Statistics Parameters [Central Lowland P Bieger 2015]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	271	square miles	0.200772	59927.66594

Bankfull Statistics Parameters [USA Bieger 2015]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	271	square miles	0.07722	59927.7393

Bankfull Statistics Flow Report [Interior Plains D Bieger 2015]

Statistic	Value	Unit
Bieger_D_channel_width	83.8	ft
Bieger_D_channel_depth	4.36	ft
Bieger_D_channel_cross_sectional_area	304	ft^2

Bankfull Statistics Flow Report [Central Lowland P Bieger 2015]

Statistic	Value	Unit
Bieger_P_channel_width	90.8	ft
Bieger_P_channel_depth	4.8	ft
Bieger_P_channel_cross_sectional_area	274	ft^2

Bankfull Statistics Flow Report [USA Bieger 2015]

Statistic	Value	Unit
Bieger_USA_channel_width	89	ft
Bieger_USA_channel_depth	3.98	ft
Bieger_USA_channel_cross_sectional_area	352	ft^2

Bankfull Statistics Flow Report [Area-Averaged]

Statistic	Value	Unit
Bieger_D_channel_width	83.8	ft
Bieger_D_channel_depth	4.36	ft
Bieger_D_channel_cross_sectional_area	304	ft^2
Bieger_P_channel_width	90.8	ft
Bieger_P_channel_depth	4.8	ft
Bieger_P_channel_cross_sectional_area	274	ft^2
Bieger_USA_channel_width	89	ft
Bieger_USA_channel_depth	3.98	ft
Bieger_USA_channel_cross_sectional_area	352	ft^2

Bankfull Statistics Citations

Bieger, Katrin; Rathjens, Hendrik; Allen, Peter M.; and Arnold, Jeffrey G.,2015, Development and Evaluation of Bankfull Hydraulic Geometry Relationships for the Physiographic Regions of the United States, Publications from USDA-ARS / UNL Faculty, 17p. (https://digitalcommons.unl.edu/usdaarsfacpub/1515?utm_source=digitalcommons.unl.edu%2Fusdaarsfacpub%2F1515&utm_medium=PDF&utm_campaign=PDFCoverPages)

Probability Statistics

Probability Statistics Parameters [Statewide seasonal low flow probability of being greater than 0.01 cubic feet per second from SIR 2024-5075]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	271	square miles	0.21	540
OH_SVI2024	Mapped Ohio Streamflow Variability Index	0.67	Log base 10 cubic feet per second	0.41	1.23

Probability Statistics Flow Report [Statewide seasonal low flow probability of being greater than 0.01 cubic feet per second from SIR 2024-5075]

PIL: Lower 90% Prediction Interval, PIU: Upper 90% Prediction Interval, ASEp: Average Standard Error of Prediction, SE: Standard Error, PC: Percent Correct, RMSE: Root Mean Squared Error, PseudoR^2: Pseudo R Squared (other -- see report)

Statistic	Value	Unit	PC
Probability that Apr-Mar 1-day, 10-yr low flow is over 0.01	0.984	dim	86.2
Probability that Apr-Mar 7-day, 10-yr low flow is over 0.01	0.995	dim	86.2
Probability that Apr-Mar 30-day, 10-yr low flow is over 0.01	0.993	dim	93.1
Probability that May-Nov 1-day, 10-yr low flow is over 0.01	0.983	dim	84.4
Probability that May-Nov 7-day, 10-yr low flow is over 0.01	0.995	dim	86.2
Probability that May-Nov 30-day, 10-yr low flow is over 0.01	0.993	dim	93.1
Probability that Sep-Nov 1-day, 10-yr low flow is over 0.01	0.995	dim	86.2
Probability that Sep-Nov 7-day, 10-yr low flow is over 0.01	0.995	dim	86.2
Probability that Sep-Nov 30-day, 10-yr low flow is over 0.01	0.991	dim	94.8

Probability Statistics Citations

Branden L. VonIns and G.F. Koltun 2024, Low-flow statistics computed for streamflow gages and methods for estimating selected low-flow statistics for ungaged stream locations in Ohio, water years 1975–2020: U.S. Geological Survey Scientific Investigations Report 2024–5075 (https://doi.org/10.3133/sir20245075)

Maximum Probable Flood Statistics

Maximum Probable Flood Statistics Parameters [Crippen Bue Region 6]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	271	square miles	0.1	10000

Maximum Probable Flood Statistics Flow Report [Crippen Bue Region 6]

Statistic	Value	Unit
Maximum Flood Crippen Bue Regional	252000	ft^3/s

Maximum Probable Flood Statistics Citations

Crippen, J.R. and Bue, Conrad D.1977, Maximum Floodflows in the Conterminous United States, Geological Survey Water-Supply Paper 1887, 52p. (https://pubs.usgs.gov/wsp/1887/report.pdf)

NHD Features of Delineated Basin

NHD Streams Intersecting Basin Delineation Boundary

This functionality attempts to find the stream name at the delineation point. The name of the nearest intersecting National Hydrography Dataset (NHD) stream is selected by default to appear in the report above. NHD streams do not correspond to the StreamStats stream grid and may not be accurate. If you would like a different stream to appear in the above section, please make a selection below.

GNIS ID	GNIS Name	Distance from Clicked Point (ft)	Feature Type	Selected Stream Name
01066576	Big Walnut Creek	82.44	Artificial Path	✔ Big Walnut Creek

Watershed Boundary Dataset (WBD) HUC 8 Intersecting Basin Delineation Boundary

This functionality attempts to find the intersecting HUC 8 of the delineated watershed. HUC boundaries do not correspond to the StreamStats data and may not be accurate.

HUC 8	Name
05060001	Upper Scioto
05040006	Licking
05040003	Walhonding

NHD Hydrologic Features Citations

U.S. Geological Survey, 2022, USGS TNM - National Hydrography Dataset, accessed July 21, 2022 at URL https://hydro.nationalmap.gov/arcgis/rest/services/nhd/MapServer/6. (https://hydro.nationalmap.gov/arcgis/rest/services/nhd/MapServer/6) U.S. Geological Survey, 2022, USGS TNM - National Hydrography Dataset, accessed July 21, 2022 at URL https://hydro.nationalmap.gov/arcgis/rest/services/wbd/MapServer/4. (https://hydro.nationalmap.gov/arcgis/rest/services/wbd/MapServer/4)

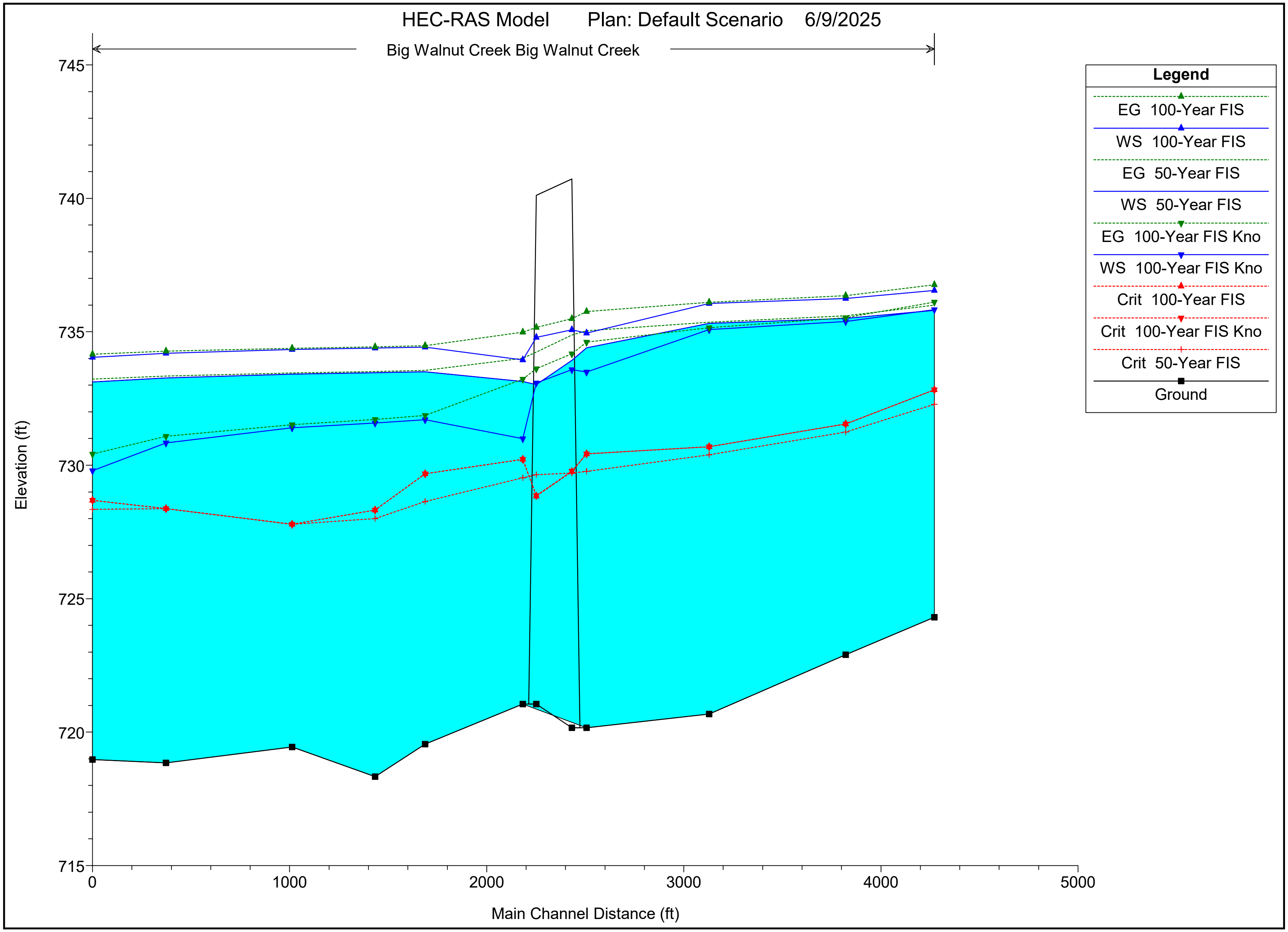
Application Version: 4.29.1
StreamStats Services Version: 1.2.22
NSS Services Version: 2.2.1

Appendix D – Existing & Proposed Hydraulic Summaries & Profiles

Existing Results Summary

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Big Walnut Creek	4764	50-Year FIS	21200.00	724.30	735.80	732.28	736.00	0.001189	5.01	6998.16	1299.93	0.27
Big Walnut Creek	4764	100-Year FIS	25300.00	724.30	736.55	732.83	736.76	0.001174	5.20	7958.00	1330.63	0.27
Big Walnut Creek	4764	100-Year FIS Kno	25300.00	724.30	735.83	732.83	736.11	0.001667	5.94	7037.92	1301.76	0.32
Big Walnut Creek	4315	50-Year FIS	21200.00	722.90	735.50	731.24	735.60	0.000610	3.70	9768.86	1661.15	0.19
Big Walnut Creek	4315	100-Year FIS	25300.00	722.90	736.25	731.54	736.35	0.000624	3.91	10894.94	1788.33	0.20
Big Walnut Creek	4315	100-Year FIS Kno	25300.00	722.90	735.39	731.54	735.53	0.000916	4.51	9594.37	1649.54	0.24
Big Walnut Creek	3622	50-Year FIS	21200.00	720.68	735.31	730.39	735.36	0.000206	2.33	12855.46	2138.75	0.11
Big Walnut Creek	3622	100-Year FIS	25300.00	720.68	736.06	730.70	736.11	0.000207	2.42	14339.74	2149.16	0.12
Big Walnut Creek	3622	100-Year FIS Kno	25300.00	720.68	735.08	730.70	735.15	0.000330	2.91	12401.37	2135.44	0.14
Big Walnut Creek	3000	50-Year FIS	21200.00	720.16	734.40	729.77	735.04	0.001241	6.92	3910.35	2805.65	0.36
Big Walnut Creek	3000	100-Year FIS	25300.00	720.16	734.95	730.42	735.76	0.001482	7.80	4140.87	2834.31	0.40
Big Walnut Creek	3000	100-Year FIS Kno	25300.00	720.16	733.50	730.42	734.61	0.002409	9.12	3531.29	2756.94	0.50
Big Walnut Creek	2834		Mult Open									
Big Walnut Creek	2676	50-Year FIS	21200.00	721.05	733.13	729.53	734.01	0.001946	8.40	3574.62	2834.66	0.45
Big Walnut Creek	2676	100-Year FIS	25300.00	721.05	733.94	730.22	734.98	0.002114	9.19	3913.74	3039.60	0.48
Big Walnut Creek	2676	100-Year FIS Kno	25300.00	721.05	730.99	730.22	733.23	0.006403	13.16	2679.50	2648.50	0.79
Big Walnut Creek	2181	50-Year FIS	21200.00	719.55	733.50	728.64	733.55	0.000184	2.96	13478.42	2073.38	0.14
Big Walnut Creek	2181	100-Year FIS	25300.00	719.55	734.42	729.68	734.48	0.000177	3.04	15311.09	2158.70	0.14
Big Walnut Creek	2181	100-Year FIS Kno	25300.00	719.55	731.70	729.68	731.87	0.000653	5.08	9931.81	1996.58	0.26
Big Walnut Creek	1927	50-Year FIS	21200.00	718.33	733.47	728.00	733.51	0.000135	2.64	14418.78	2001.44	0.12
Big Walnut Creek	1927	100-Year FIS	25300.00	718.33	734.39	728.32	734.44	0.000132	2.71	16274.82	2107.23	0.12
Big Walnut Creek	1927	100-Year FIS Kno	25300.00	718.33	731.58	728.32	731.71	0.000487	4.54	10668.26	1987.14	0.23
Big Walnut Creek	1505	50-Year FIS	21200.00	719.44	733.41	727.79	733.45	0.000122	2.29	14291.28	1815.28	0.11
Big Walnut Creek	1505	100-Year FIS	25300.00	719.44	734.34	727.79	734.38	0.000123	2.40	15972.24	1859.45	0.11
Big Walnut Creek	1505	100-Year FIS Kno	25300.00	719.44	731.40	727.79	731.52	0.000421	3.81	10662.01	1797.84	0.20
Big Walnut Creek	865	50-Year FIS	21200.00	718.85	733.27	728.38	733.34	0.000258	3.25	11166.58	1545.04	0.16
Big Walnut Creek	865	100-Year FIS	25300.00	718.85	734.19	728.38	734.27	0.000258	3.40	12553.60	1578.76	0.16
Big Walnut Creek	865	100-Year FIS Kno	25300.00	718.85	730.84	728.38	731.08	0.001173	6.03	7530.44	1475.65	0.33
Big Walnut Creek	492	50-Year FIS	21200.00	718.97	733.12	728.35	733.23	0.000344	3.87	10098.35	1384.06	0.19
Big Walnut Creek	492	100-Year FIS	25300.00	718.97	734.04	728.69	734.16	0.000344	4.04	11303.03	1423.57	0.19
Big Walnut Creek	492	100-Year FIS Kno	25300.00	718.97	729.80	728.69	730.42	0.002661	8.90	5781.22	1347.93	0.49

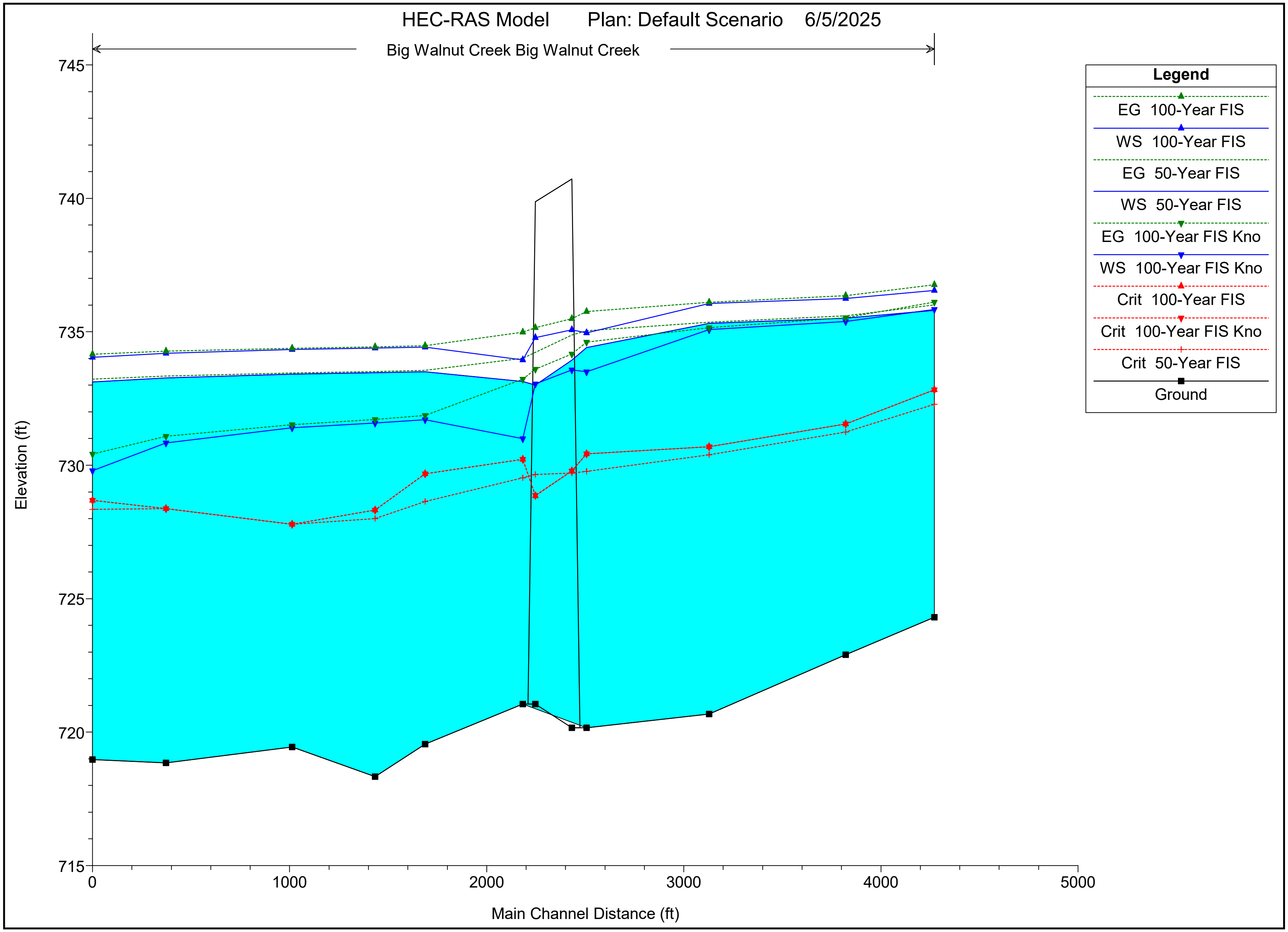
Existing Profile



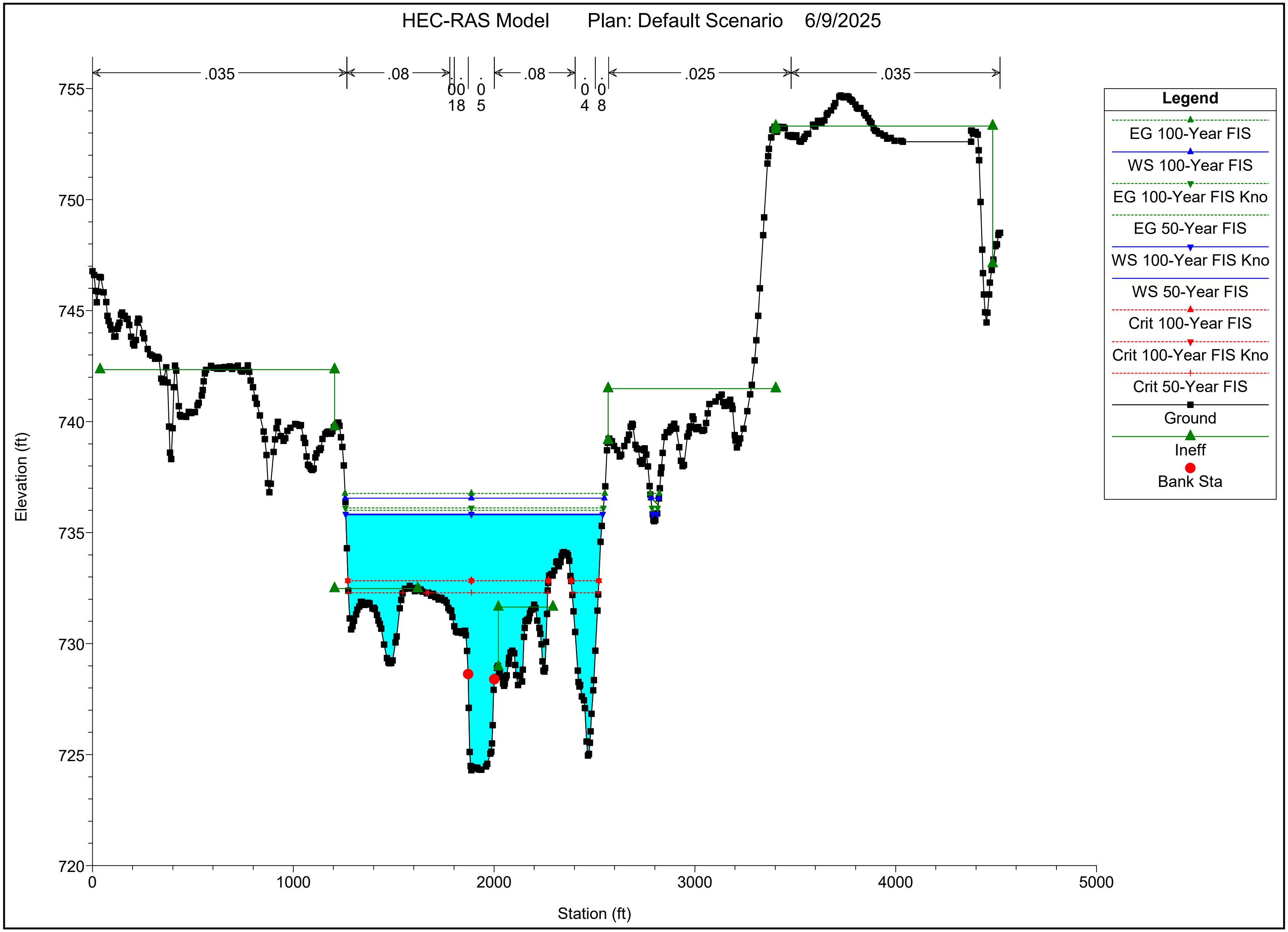
Proposed Results Summary

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Big Walnut Creek	4764	50-Year FIS	21200.00	724.30	735.81	732.28	736.00	0.001188	5.01	7001.83	1300.10	0.27
Big Walnut Creek	4764	100-Year FIS	25300.00	724.30	736.55	732.83	736.76	0.001173	5.20	7959.57	1330.68	0.27
Big Walnut Creek	4764	100-Year FIS Kno	25300.00	724.30	735.83	732.83	736.12	0.001666	5.94	7039.49	1301.83	0.32
Big Walnut Creek	4315	50-Year FIS	21200.00	722.90	735.51	731.24	735.60	0.000609	3.70	9773.93	1661.48	0.19
Big Walnut Creek	4315	100-Year FIS	25300.00	722.90	736.25	731.54	736.36	0.000624	3.91	10897.16	1788.45	0.20
Big Walnut Creek	4315	100-Year FIS Kno	25300.00	722.90	735.39	731.54	735.53	0.000916	4.51	9596.76	1649.72	0.24
Big Walnut Creek	3622	50-Year FIS	21200.00	720.68	735.31	730.39	735.36	0.000206	2.33	12862.86	2138.80	0.11
Big Walnut Creek	3622	100-Year FIS	25300.00	720.68	736.06	730.70	736.11	0.000207	2.42	14343.03	2149.18	0.12
Big Walnut Creek	3622	100-Year FIS Kno	25300.00	720.68	735.08	730.70	735.15	0.000329	2.91	12405.24	2135.47	0.14
Big Walnut Creek	3000	50-Year FIS	21200.00	720.16	734.41	729.77	735.04	0.001239	6.91	3912.36	2805.92	0.36
Big Walnut Creek	3000	100-Year FIS	25300.00	720.16	734.95	730.42	735.76	0.001481	7.80	4141.81	2834.65	0.40
Big Walnut Creek	3000	100-Year FIS Kno	25300.00	720.16	733.50	730.42	734.61	0.002406	9.11	3532.69	2757.11	0.50
Big Walnut Creek	2834		Mult Open									
Big Walnut Creek	2676	50-Year FIS	21200.00	721.05	733.13	729.53	734.01	0.001946	8.40	3574.62	2834.66	0.45
Big Walnut Creek	2676	100-Year FIS	25300.00	721.05	733.94	730.22	734.98	0.002114	9.19	3913.74	3039.60	0.48
Big Walnut Creek	2676	100-Year FIS Kno	25300.00	721.05	730.99	730.22	733.23	0.006403	13.16	2679.50	2648.50	0.79
Big Walnut Creek	2181	50-Year FIS	21200.00	719.55	733.50	728.64	733.55	0.000184	2.96	13478.42	2073.38	0.14
Big Walnut Creek	2181	100-Year FIS	25300.00	719.55	734.42	729.68	734.48	0.000177	3.04	15311.09	2158.70	0.14
Big Walnut Creek	2181	100-Year FIS Kno	25300.00	719.55	731.70	729.68	731.87	0.000653	5.08	9931.81	1996.58	0.26
Big Walnut Creek	1927	50-Year FIS	21200.00	718.33	733.47	728.00	733.51	0.000135	2.64	14418.78	2001.44	0.12
Big Walnut Creek	1927	100-Year FIS	25300.00	718.33	734.39	728.32	734.44	0.000132	2.71	16274.82	2107.23	0.12
Big Walnut Creek	1927	100-Year FIS Kno	25300.00	718.33	731.58	728.32	731.71	0.000487	4.54	10668.26	1987.14	0.23
Big Walnut Creek	1505	50-Year FIS	21200.00	719.44	733.41	727.79	733.45	0.000122	2.29	14291.28	1815.28	0.11
Big Walnut Creek	1505	100-Year FIS	25300.00	719.44	734.34	727.79	734.38	0.000123	2.40	15972.24	1859.45	0.11
Big Walnut Creek	1505	100-Year FIS Kno	25300.00	719.44	731.40	727.79	731.52	0.000421	3.81	10662.01	1797.84	0.20
Big Walnut Creek	865	50-Year FIS	21200.00	718.85	733.27	728.38	733.34	0.000258	3.25	11166.58	1545.04	0.16
Big Walnut Creek	865	100-Year FIS	25300.00	718.85	734.19	728.38	734.27	0.000258	3.40	12553.60	1578.76	0.16
Big Walnut Creek	865	100-Year FIS Kno	25300.00	718.85	730.84	728.38	731.08	0.001173	6.03	7530.44	1475.65	0.33
Big Walnut Creek	492	50-Year FIS	21200.00	718.97	733.12	728.35	733.23	0.000344	3.87	10098.35	1384.06	0.19
Big Walnut Creek	492	100-Year FIS	25300.00	718.97	734.04	728.69	734.16	0.000344	4.04	11303.03	1423.57	0.19
Big Walnut Creek	492	100-Year FIS Kno	25300.00	718.97	729.80	728.69	730.42	0.002661	8.90	5781.22	1347.93	0.49

Proposed Profile



Appendix E – Existing Cross Sections



HEC-RAS Model Plan: Default Scenario 6/9/2025
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.08
.025
.035
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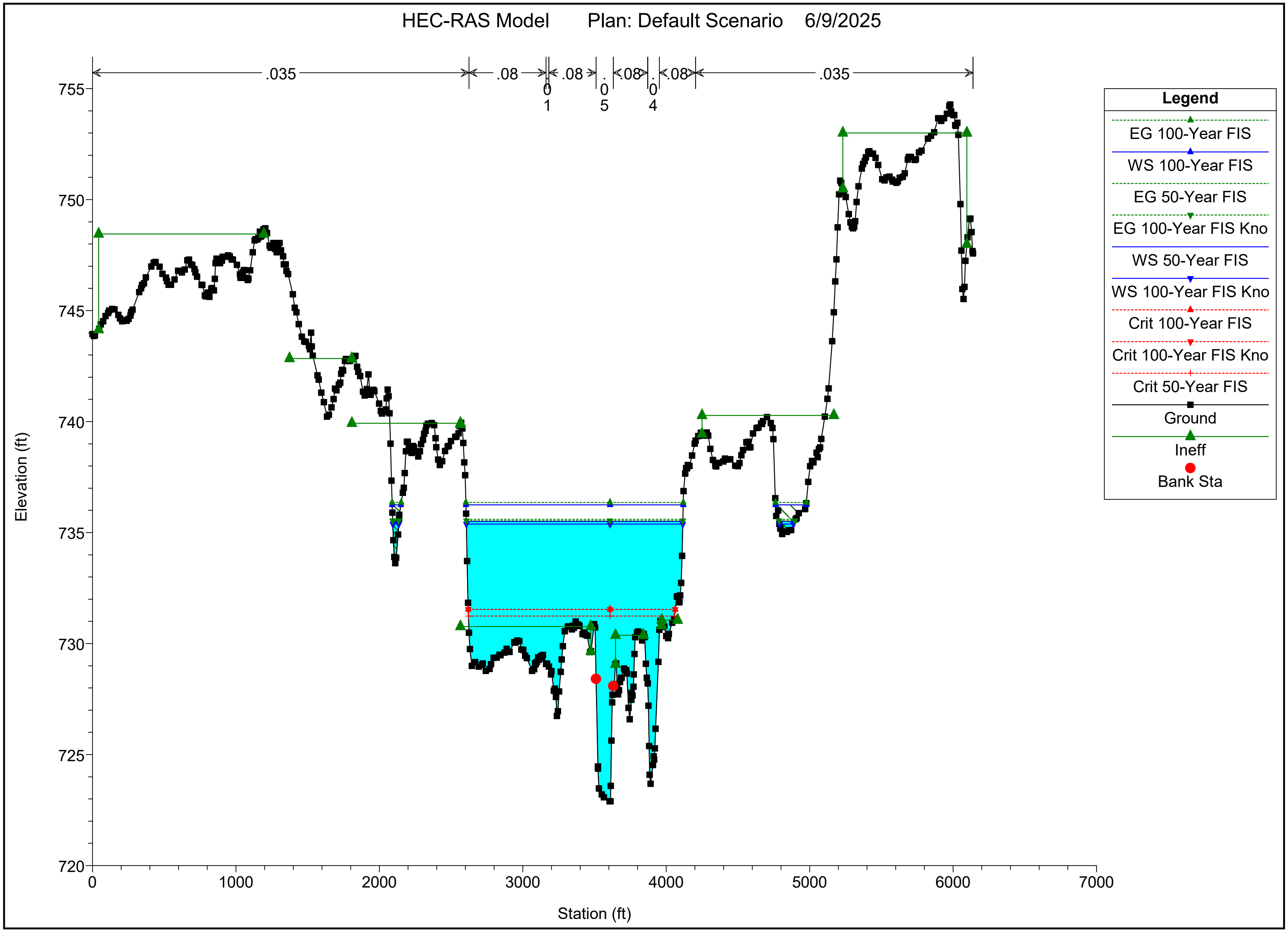
WS 100-Year FIS
EG 100-Year FIS Kno
EG 50-Year FIS
WS 100-Year FIS Kno
WS 50-Year FIS
Crit 100-Year FIS
Crit 100-Year FIS Kno
Crit 50-Year FIS
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)



HEC-RAS Model Plan: Default Scenario 6/9/2025
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.08
.08
.08
.035
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1
0
5
0
4
Elevation (ft)
Station (ft)
Legend
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WS 100-Year FIS
EG 50-Year FIS
EG 100-Year FIS Kno
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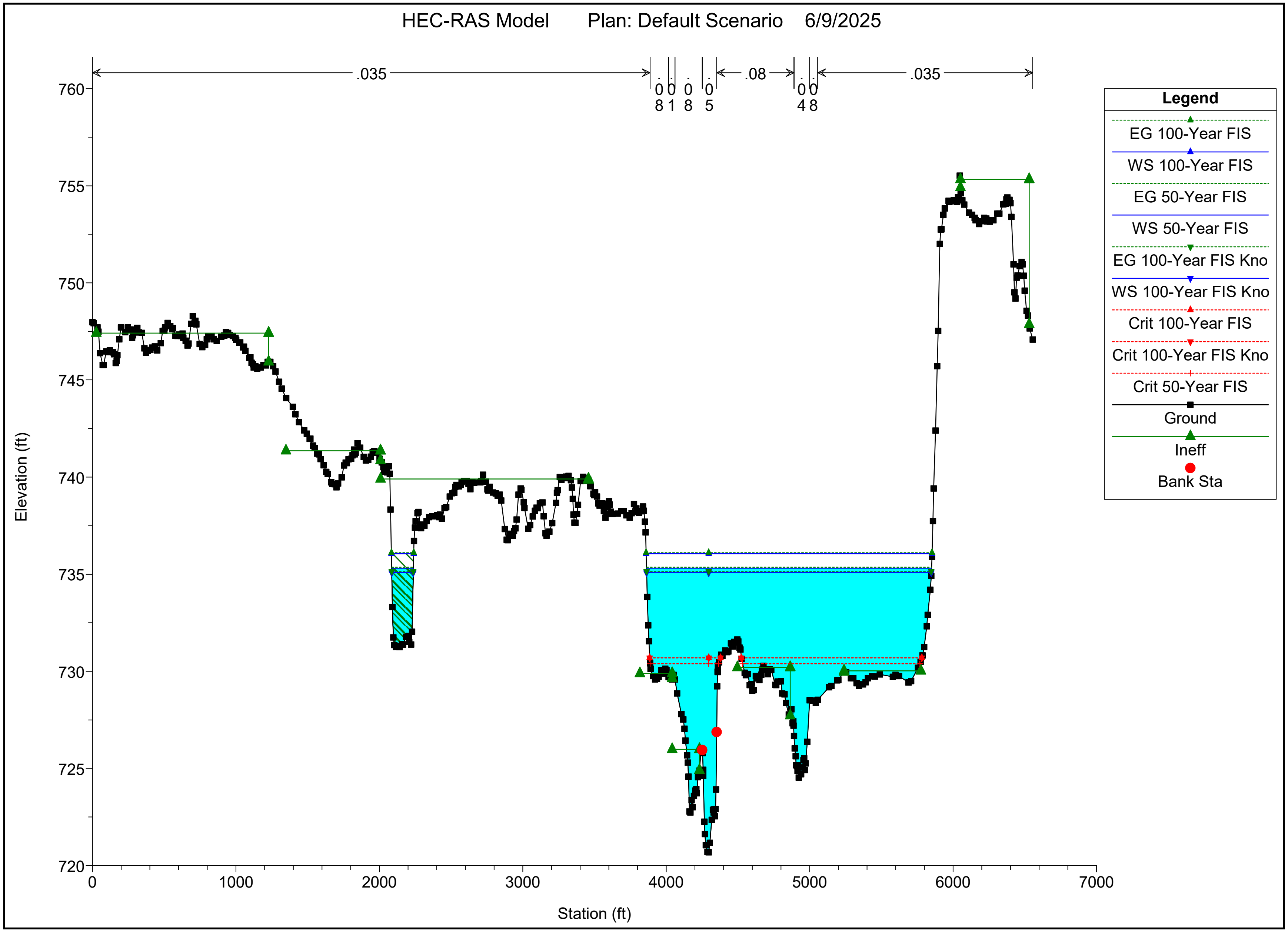
Ground
Ineff
Bank Sta



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WS 100-Year FIS
EG 50-Year FIS
WS 50-Year FIS
EG 100-Year FIS Kno
WS 100-Year FIS Kno
Crit 100-Year FIS
Crit 100-Year FIS Kno
Crit 50-Year FIS
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
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725
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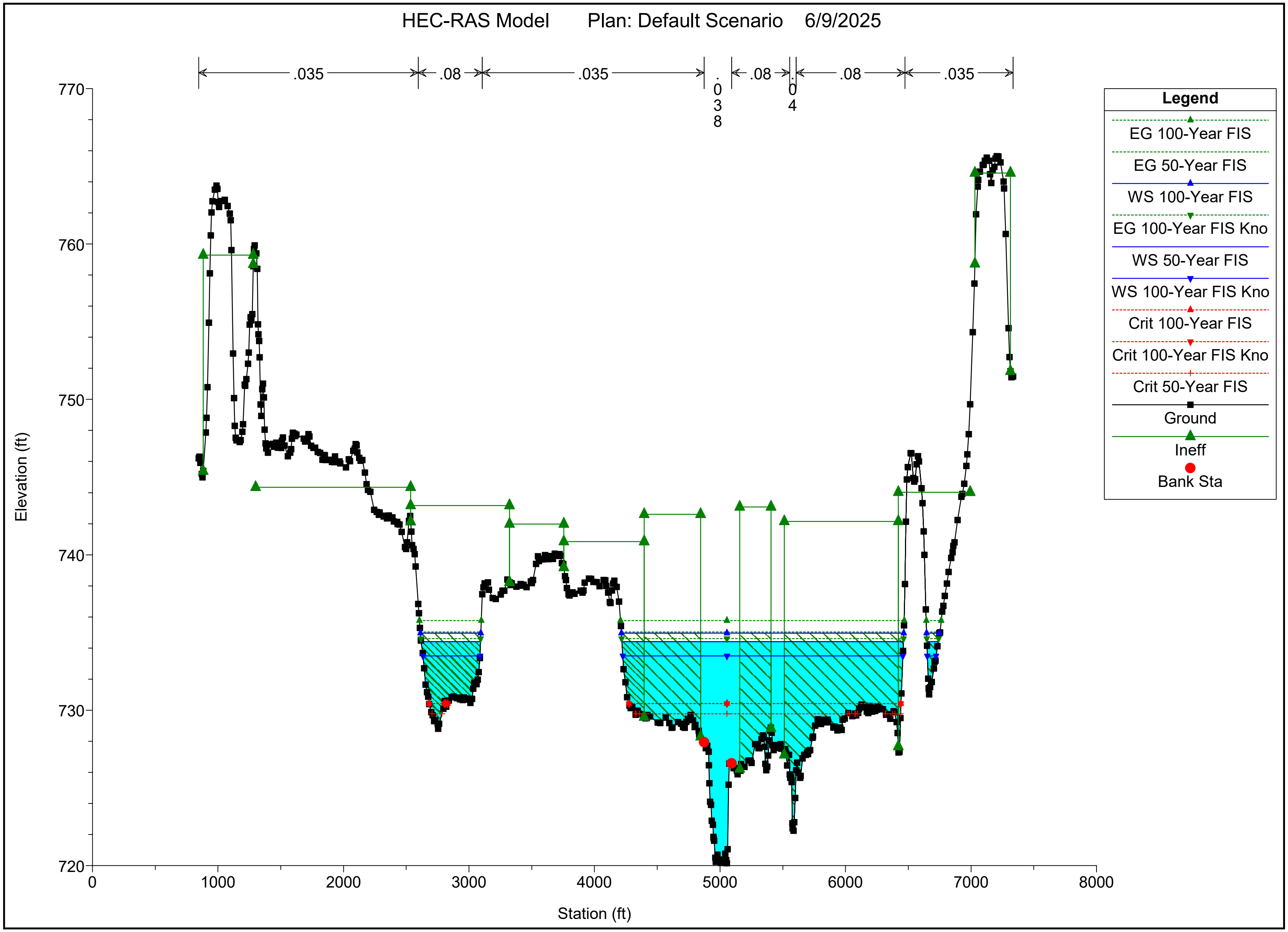
3000
4000
5000
6000
7000



HEC-RAS Model Plan: Default Scenario 6/9/2025
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.04
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EG 50-Year FIS
WS 100-Year FIS
EG 100-Year FIS Kno
WS 50-Year FIS
WS 100-Year FIS Kno
Crit 100-Year FIS
Crit 100-Year FIS Kno
Crit 50-Year FIS
Ground
Ineff
Bank Sta
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Station (ft)
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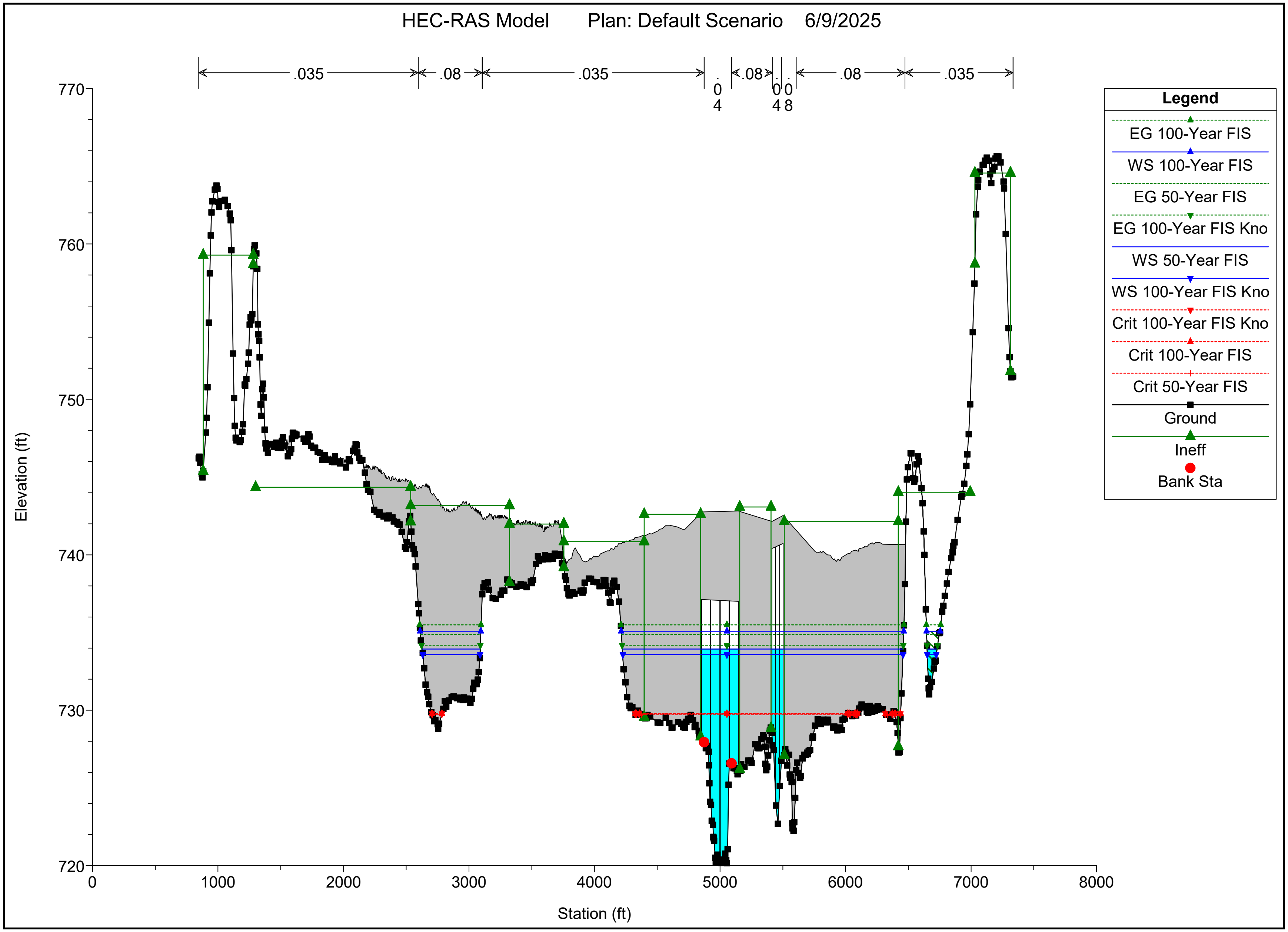
6000
7000
8000


HEC-RAS Model Plan: Default Scenario 6/9/2025
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4
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8
.08
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Legend
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WS 100-Year FIS
EG 50-Year FIS
EG 100-Year FIS Kno
WS 50-Year FIS
WS 100-Year FIS Kno
Crit 100-Year FIS Kno
Crit 100-Year FIS
Crit 50-Year FIS
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
770
760
750
740
730
720
0
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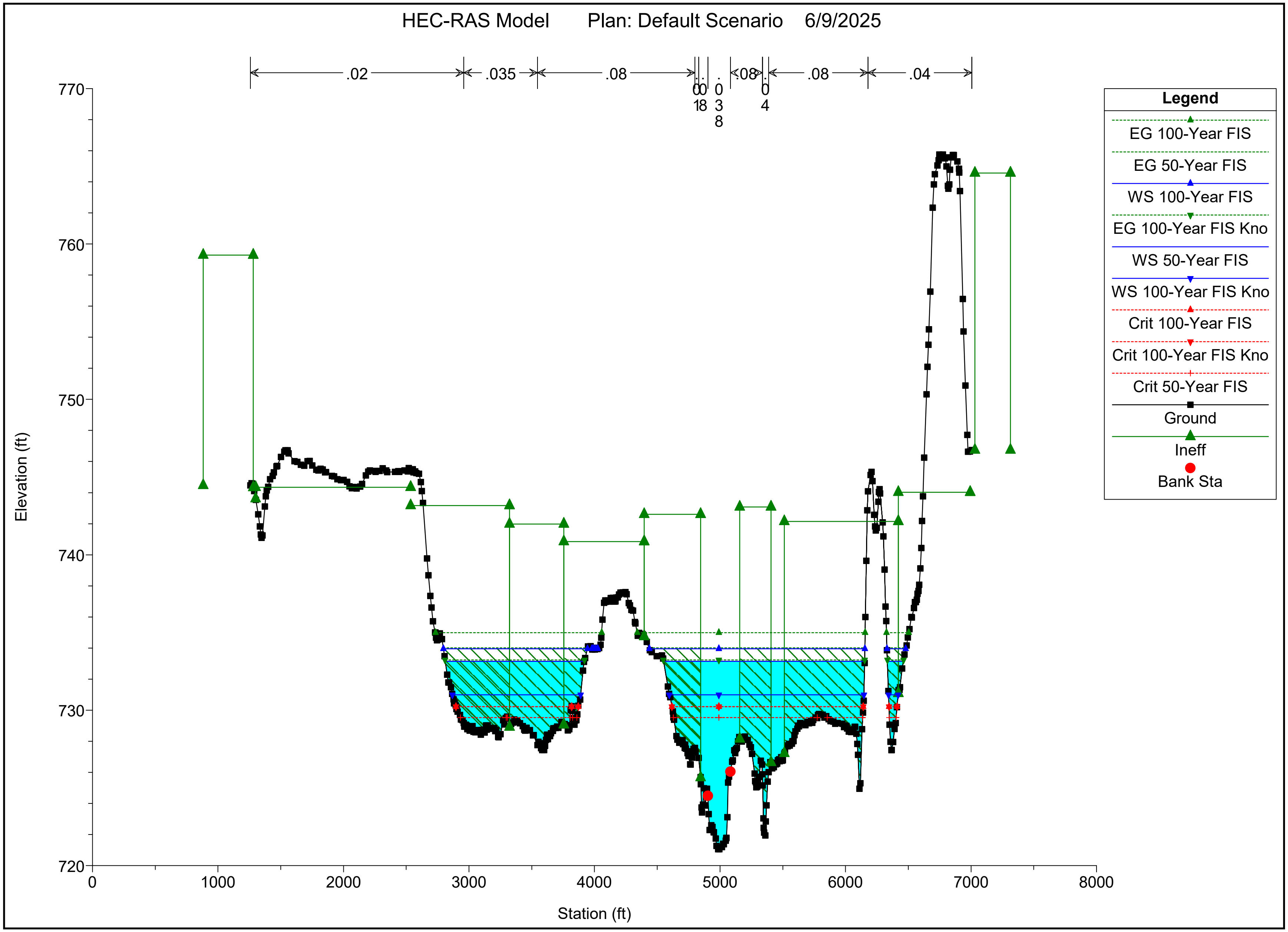

HEC-RAS Model Plan: Default Scenario 6/9/2025
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.08
.04
Legend
EG 100-Year FIS
EG 50-Year FIS
WS 100-Year FIS
EG 100-Year FIS Kno
WS 50-Year FIS
WS 100-Year FIS Kno
Crit 100-Year FIS
Crit 100-Year FIS Kno
Crit 50-Year FIS
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
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760
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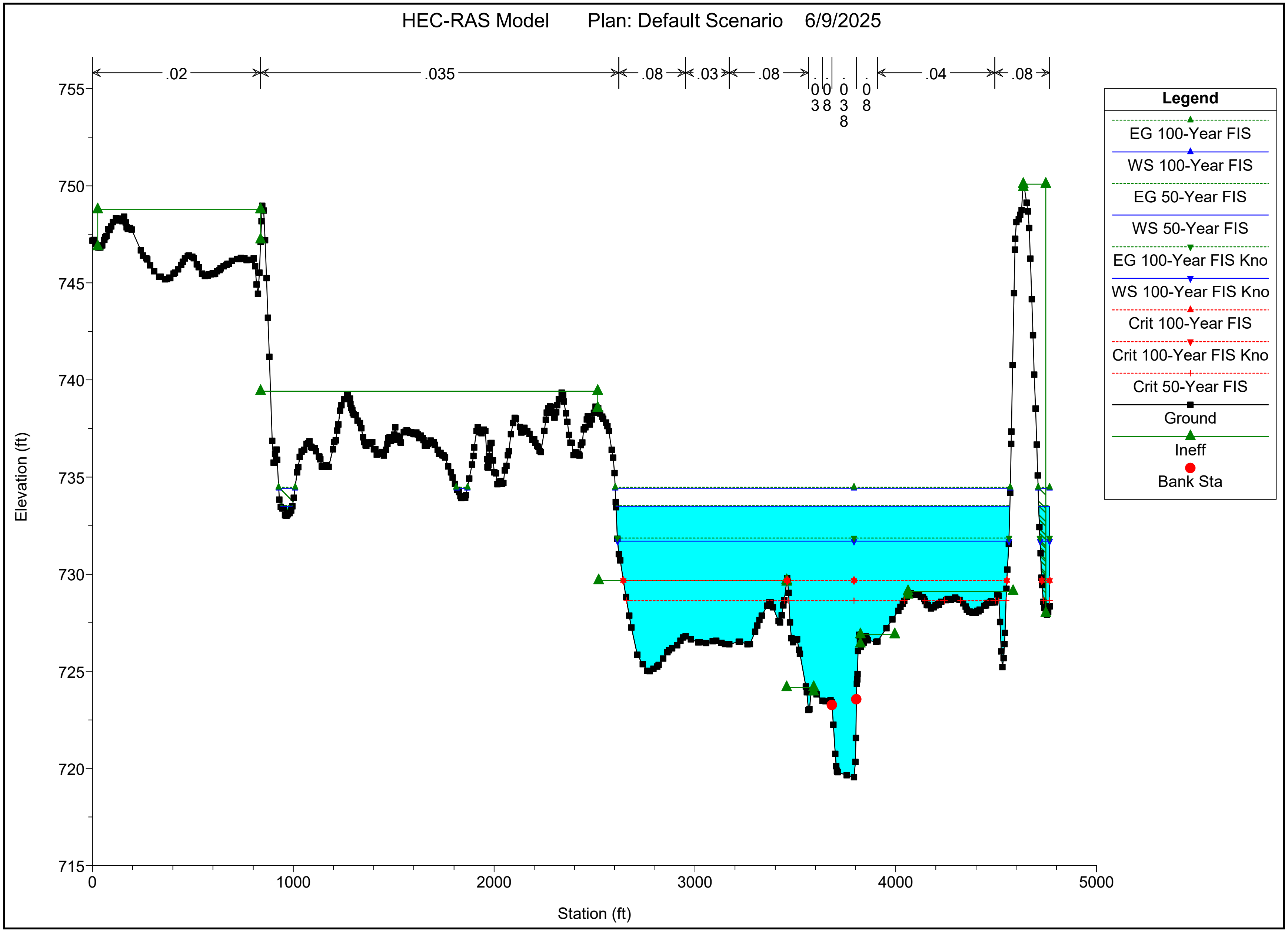

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.08
Legend
EG 100-Year FIS
WS 100-Year FIS
EG 50-Year FIS
WS 50-Year FIS
EG 100-Year FIS Kno
WS 100-Year FIS Kno
Crit 100-Year FIS
Crit 100-Year FIS Kno
Crit 50-Year FIS
Ground
Ineff
Bank Sta
Elevation (ft)
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745
740
735
730
725
720
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0
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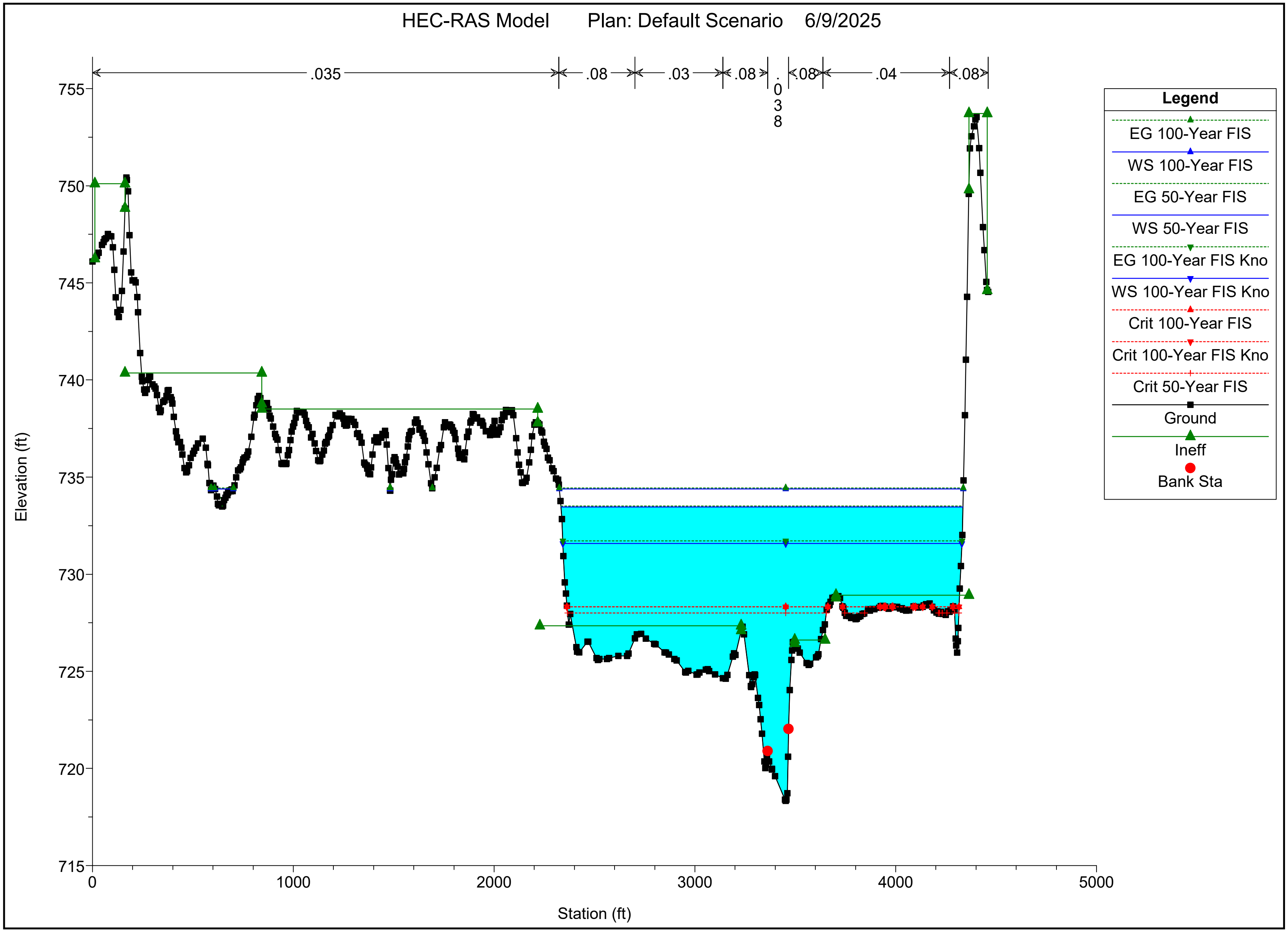
2000
3000
4000
5000
Station (ft)



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750
745
740
735
730
725
720
715
Elevation (ft)
0
1000
2000
3000
4000
5000
Station (ft)
Legend
EG 100-Year FIS
WS 100-Year FIS
EG 50-Year FIS
WS 50-Year FIS
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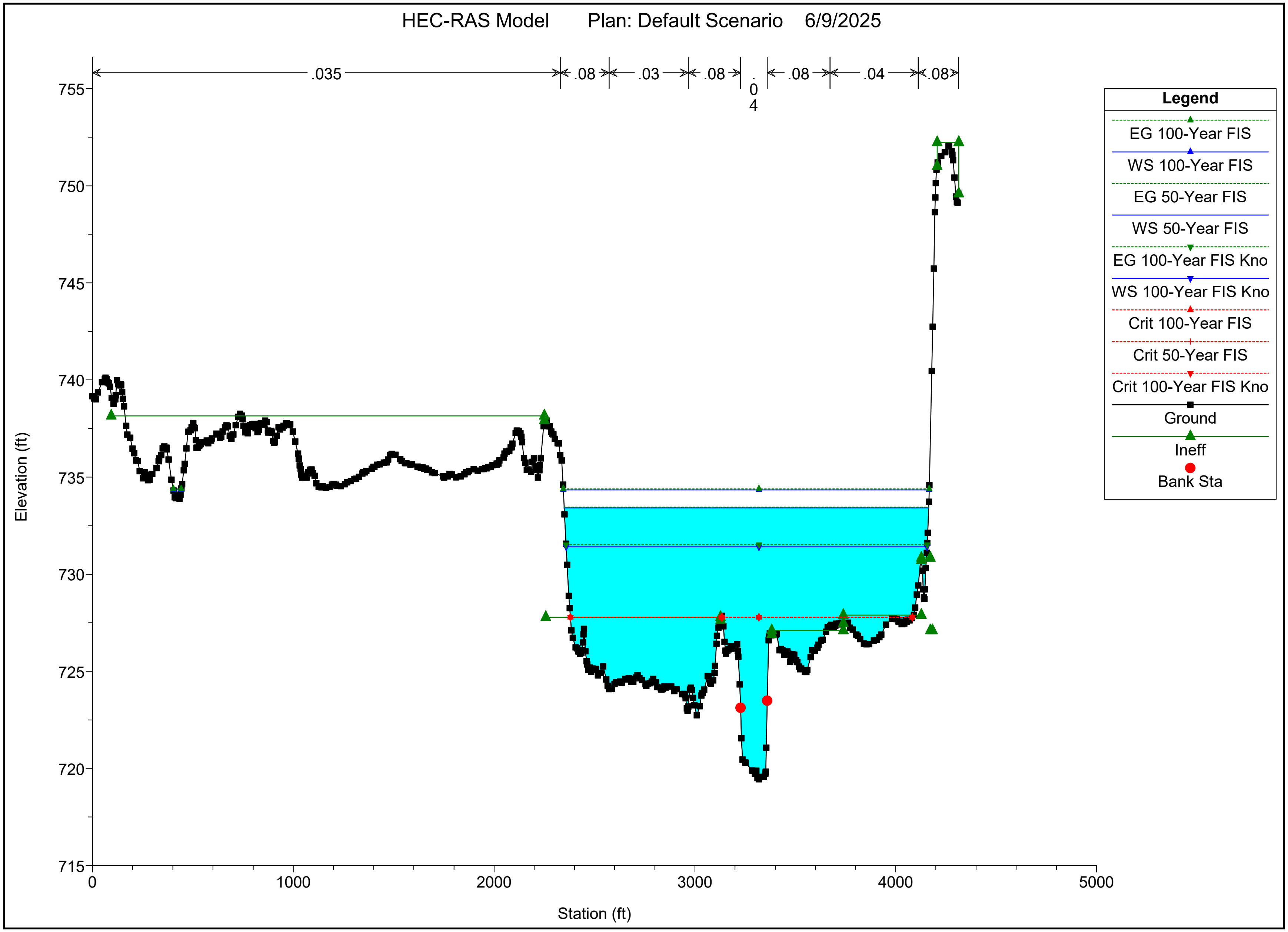
Crit 100-Year FIS
Crit 100-Year FIS Kno
Crit 50-Year FIS
Ground
Ineff
Bank Sta



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.04
.08
Legend
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WS 100-Year FIS
EG 50-Year FIS
WS 50-Year FIS
EG 100-Year FIS Kno
WS 100-Year FIS Kno
Crit 100-Year FIS
Crit 50-Year FIS
Crit 100-Year FIS Kno
Ground
Ineff
Bank Sta
Elevation (ft)
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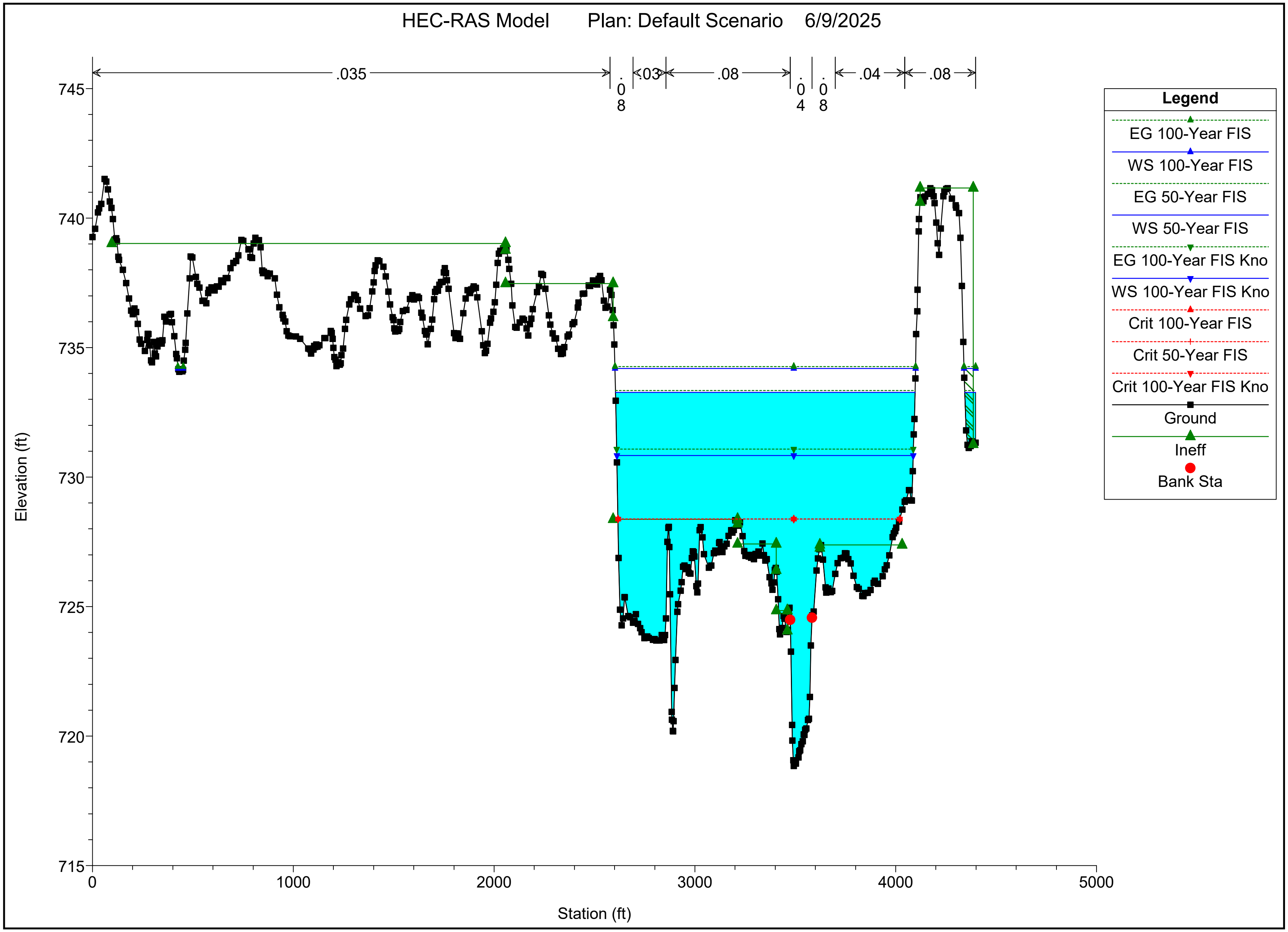
4000
5000
Station (ft)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.08
Legend
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WS 100-Year FIS
EG 50-Year FIS
WS 50-Year FIS
EG 100-Year FIS Kno
WS 100-Year FIS Kno
Crit 100-Year FIS
Crit 50-Year FIS
Crit 100-Year FIS Kno
Ground
Ineff
Bank Sta
Elevation (ft)
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725
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Station (ft)
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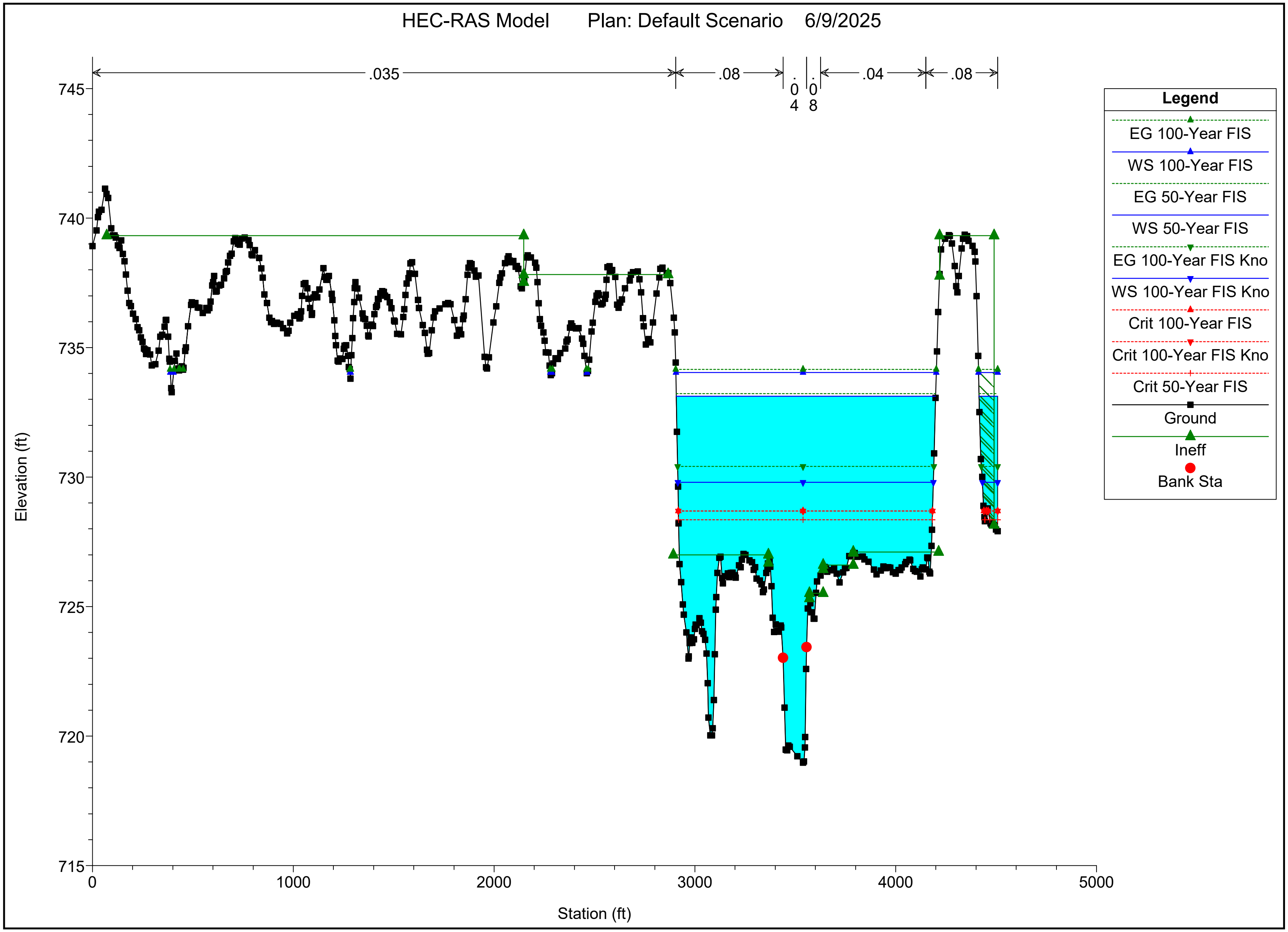

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Legend
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WS 100-Year FIS
EG 50-Year FIS
WS 50-Year FIS
EG 100-Year FIS Kno
WS 100-Year FIS Kno
Crit 100-Year FIS
Crit 100-Year FIS Kno
Crit 50-Year FIS
Ground
Ineff
Bank Sta
Elevation (ft)
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730
725
720
715
0
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2000
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4000
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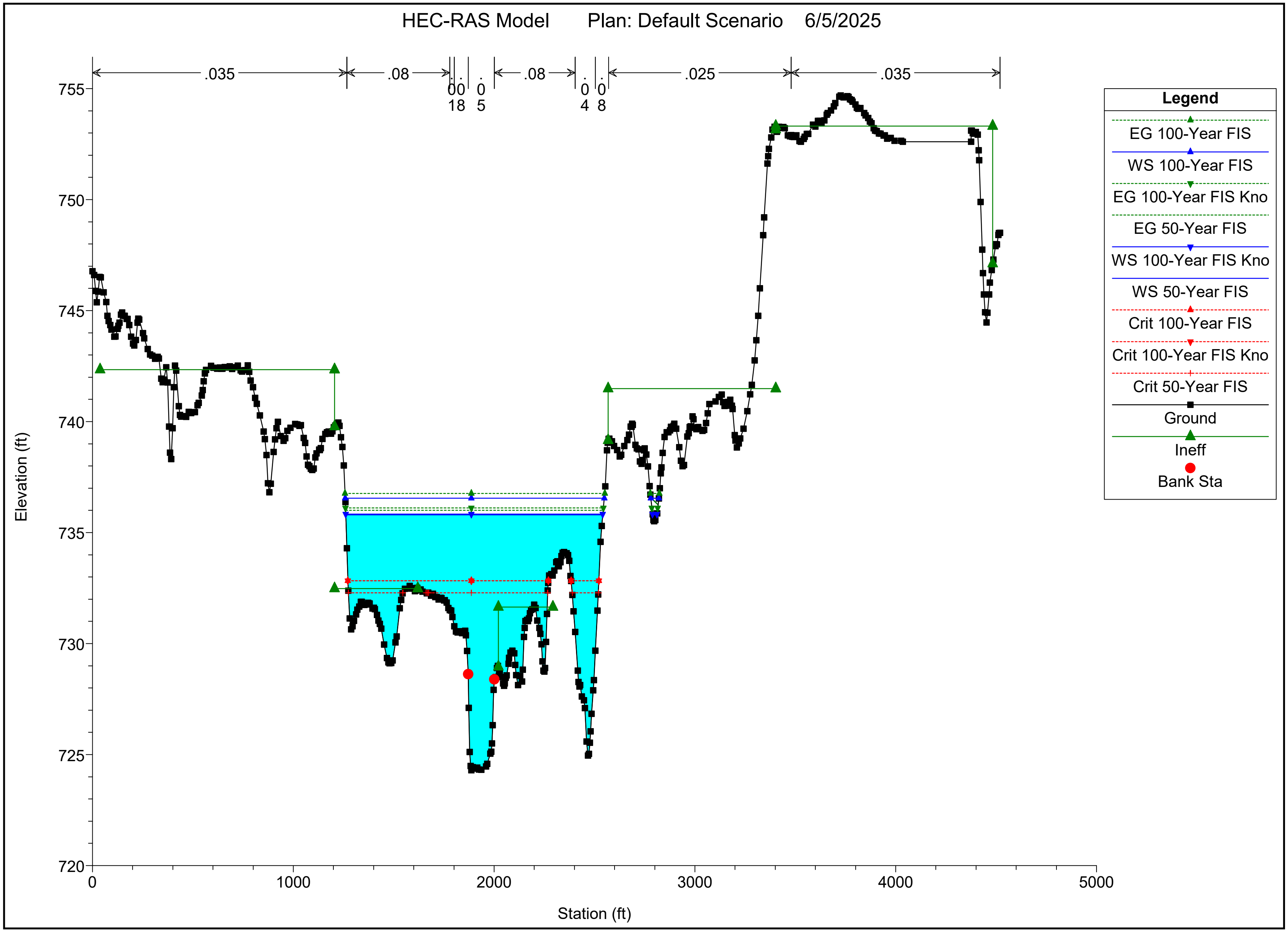
Station (ft)

Appendix F – Proposed Cross Sections



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.08
.00 18
.0 5
.08
.0 4
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.025
.035
Legend
EG 100-Year FIS
WS 100-Year FIS
EG 100-Year FIS Kno
EG 50-Year FIS
WS 100-Year FIS Kno
WS 50-Year FIS
Crit 100-Year FIS
Crit 100-Year FIS Kno
Crit 50-Year FIS
Ground
Ineff
Bank Sta
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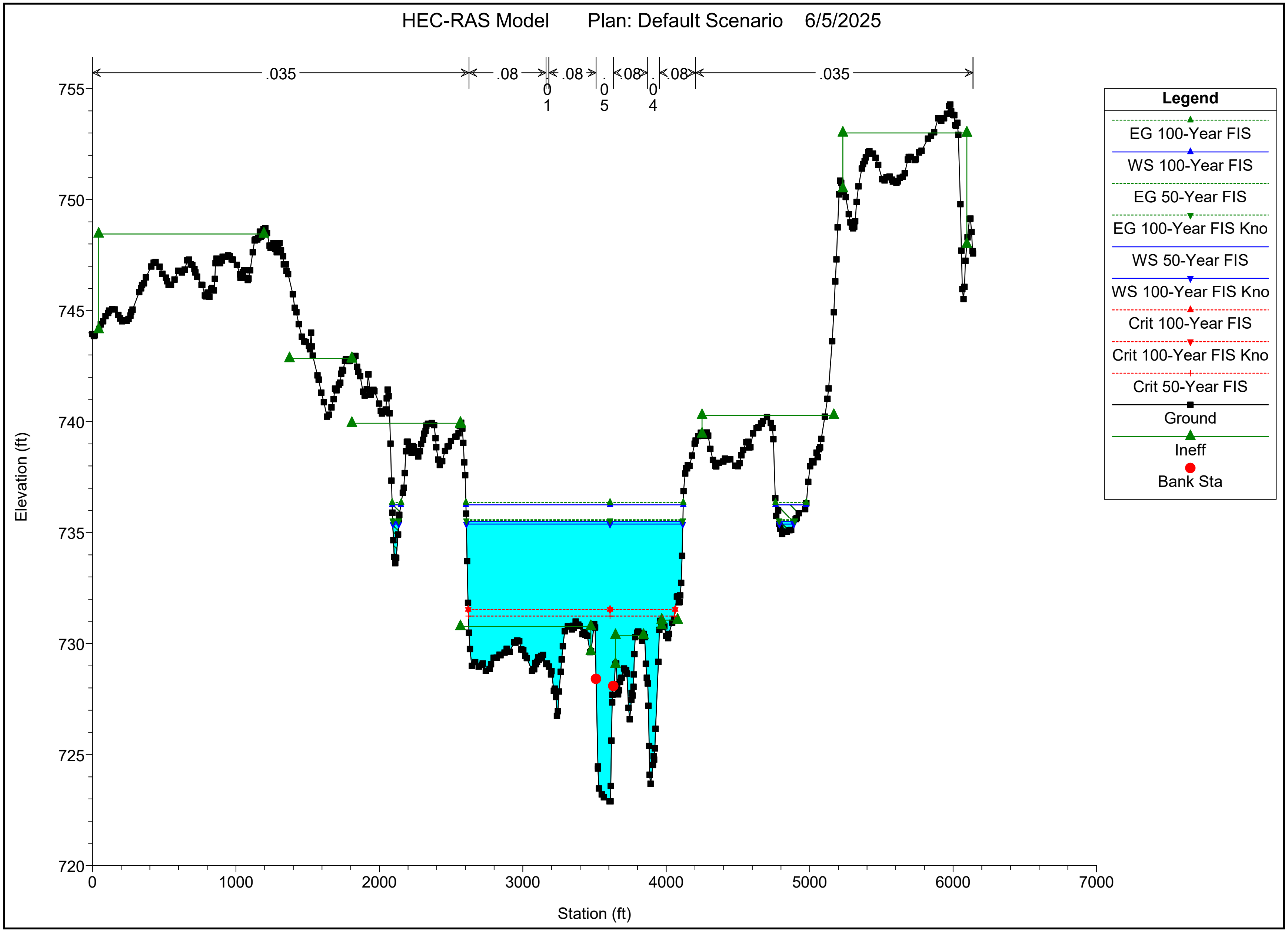
Station (ft)



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Elevation (ft)
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745
740
735
730
725
720
Station (ft)
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4000
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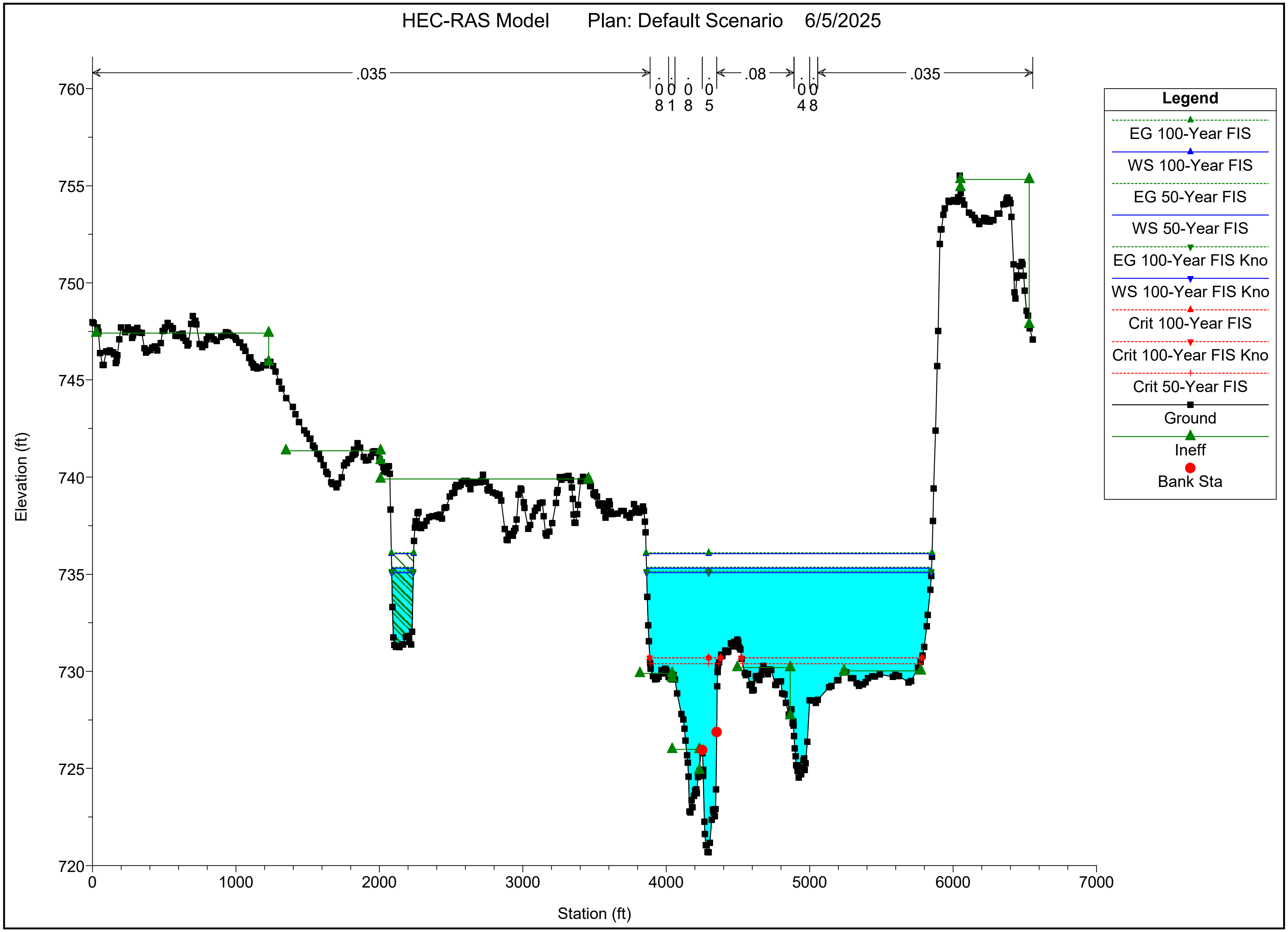
6000
7000
Legend
EG 100-Year FIS
WS 100-Year FIS
EG 50-Year FIS
EG 100-Year FIS Kno
WS 50-Year FIS
WS 100-Year FIS Kno
Crit 100-Year FIS
Crit 100-Year FIS Kno
Crit 50-Year FIS
Ground
Ineff
Bank Sta



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WS 50-Year FIS
EG 100-Year FIS Kno
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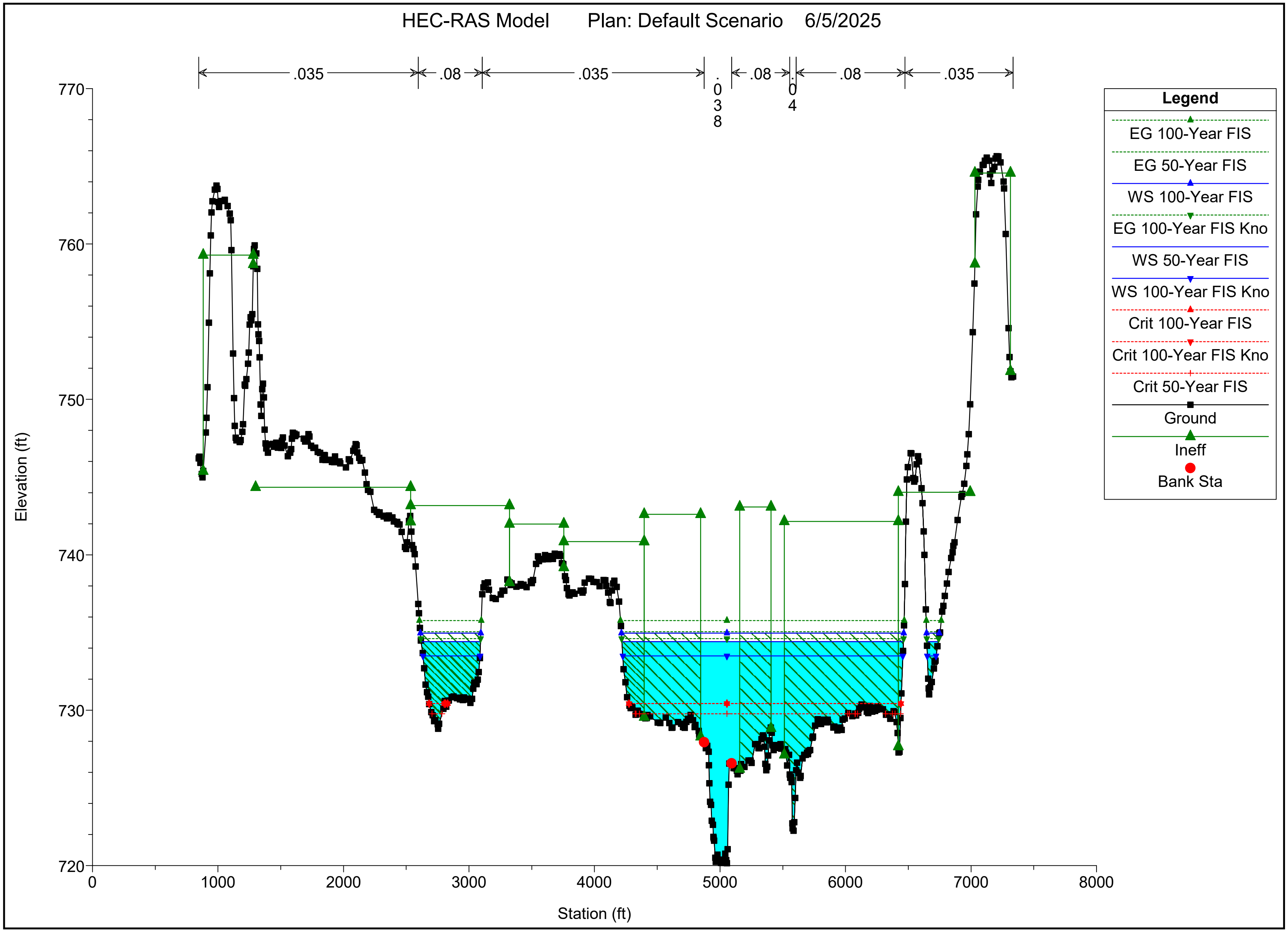
Crit 100-Year FIS Kno
Crit 50-Year FIS
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)



HEC-RAS Model Plan: Default Scenario 6/5/2025
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Legend
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EG 50-Year FIS
WS 100-Year FIS
EG 100-Year FIS Kno
WS 50-Year FIS
WS 100-Year FIS Kno
Crit 100-Year FIS
Crit 100-Year FIS Kno
Crit 50-Year FIS
Ground
Ineff
Bank Sta
Elevation (ft)
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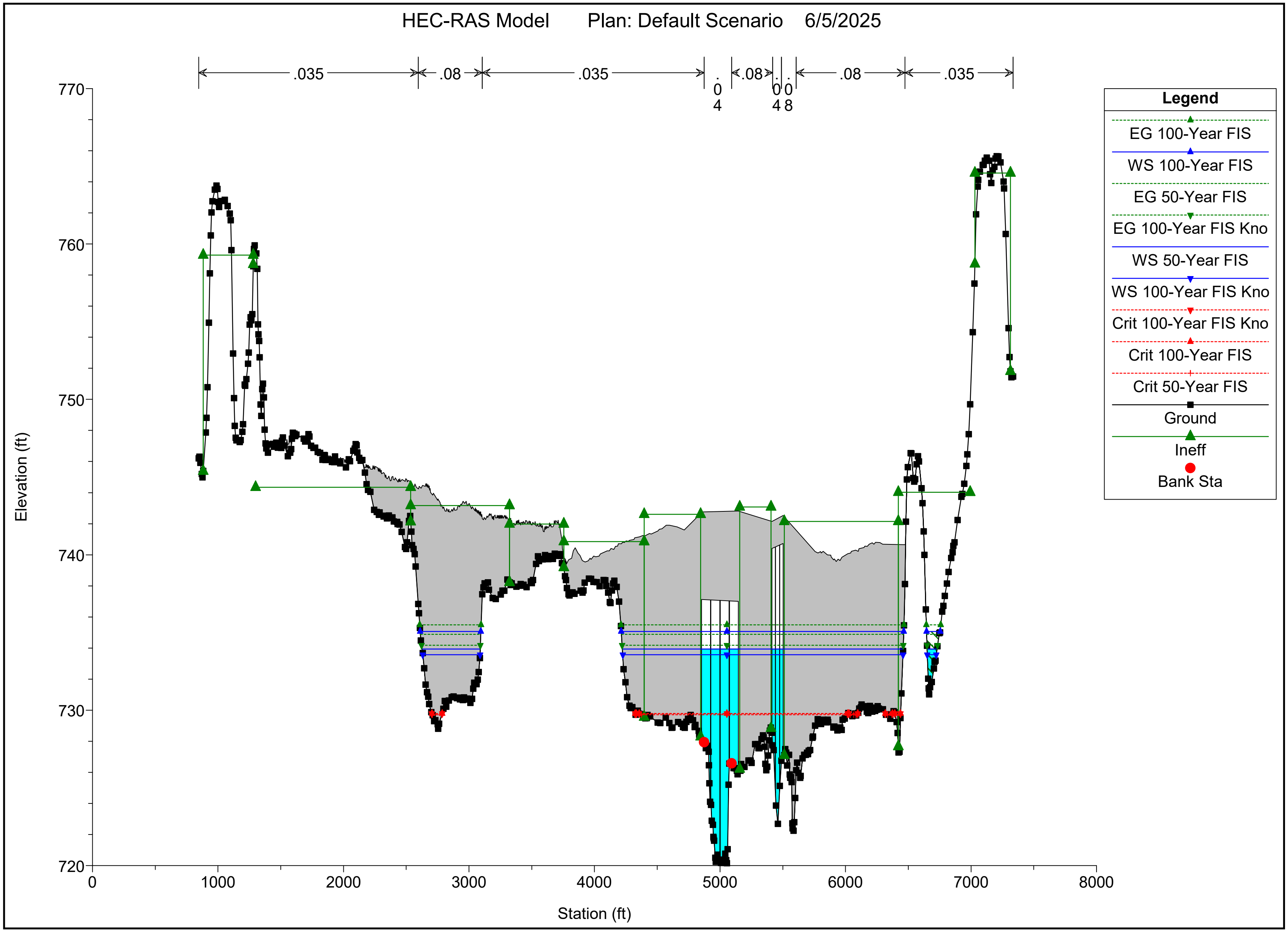
Station (ft)


HEC-RAS Model Plan: Default Scenario 6/5/2025
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Legend
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WS 100-Year FIS
EG 50-Year FIS
EG 100-Year FIS Kno
WS 50-Year FIS
WS 100-Year FIS Kno
Crit 100-Year FIS Kno
Crit 100-Year FIS
Crit 50-Year FIS
Ground
Ineff
Bank Sta
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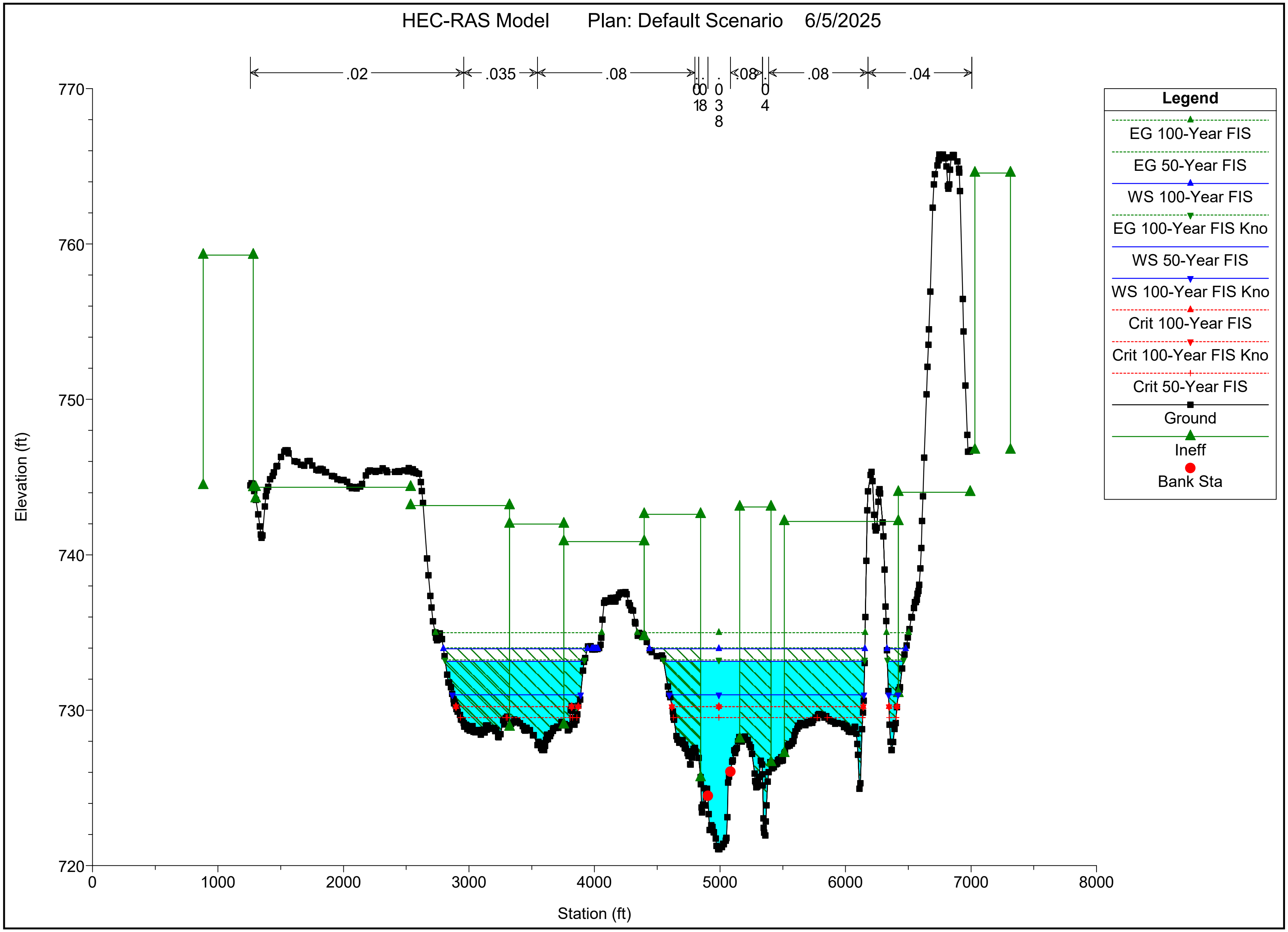
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Elevation (ft)
Station (ft)
Legend
EG 100-Year FIS
EG 50-Year FIS
WS 100-Year FIS
EG 100-Year FIS Kno
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Crit 100-Year FIS
Crit 100-Year FIS Kno
Crit 50-Year FIS
Ground
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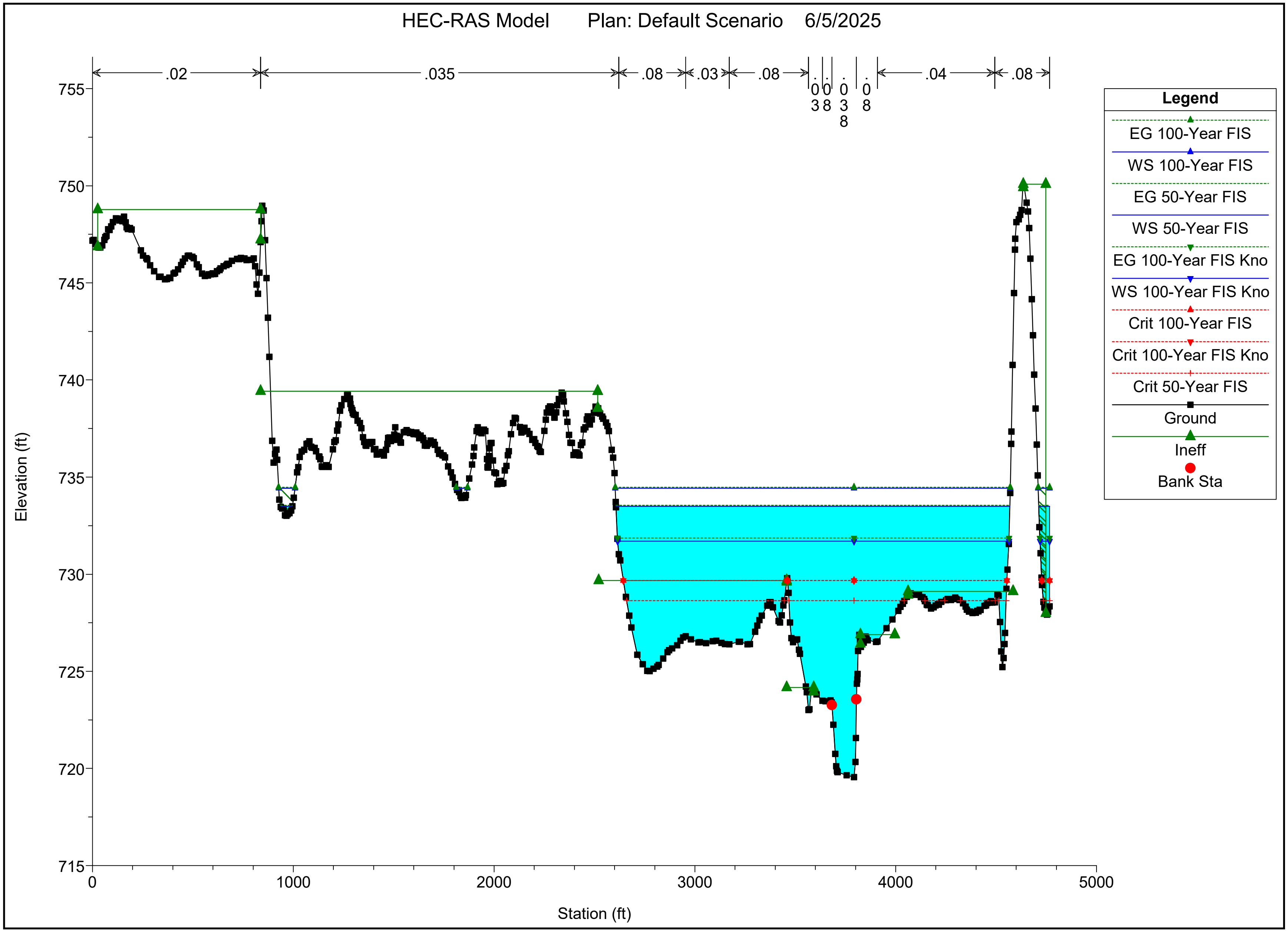

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Legend
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EG 50-Year FIS
WS 50-Year FIS
EG 100-Year FIS Kno
WS 100-Year FIS Kno
Crit 100-Year FIS
Crit 100-Year FIS Kno
Crit 50-Year FIS
Ground
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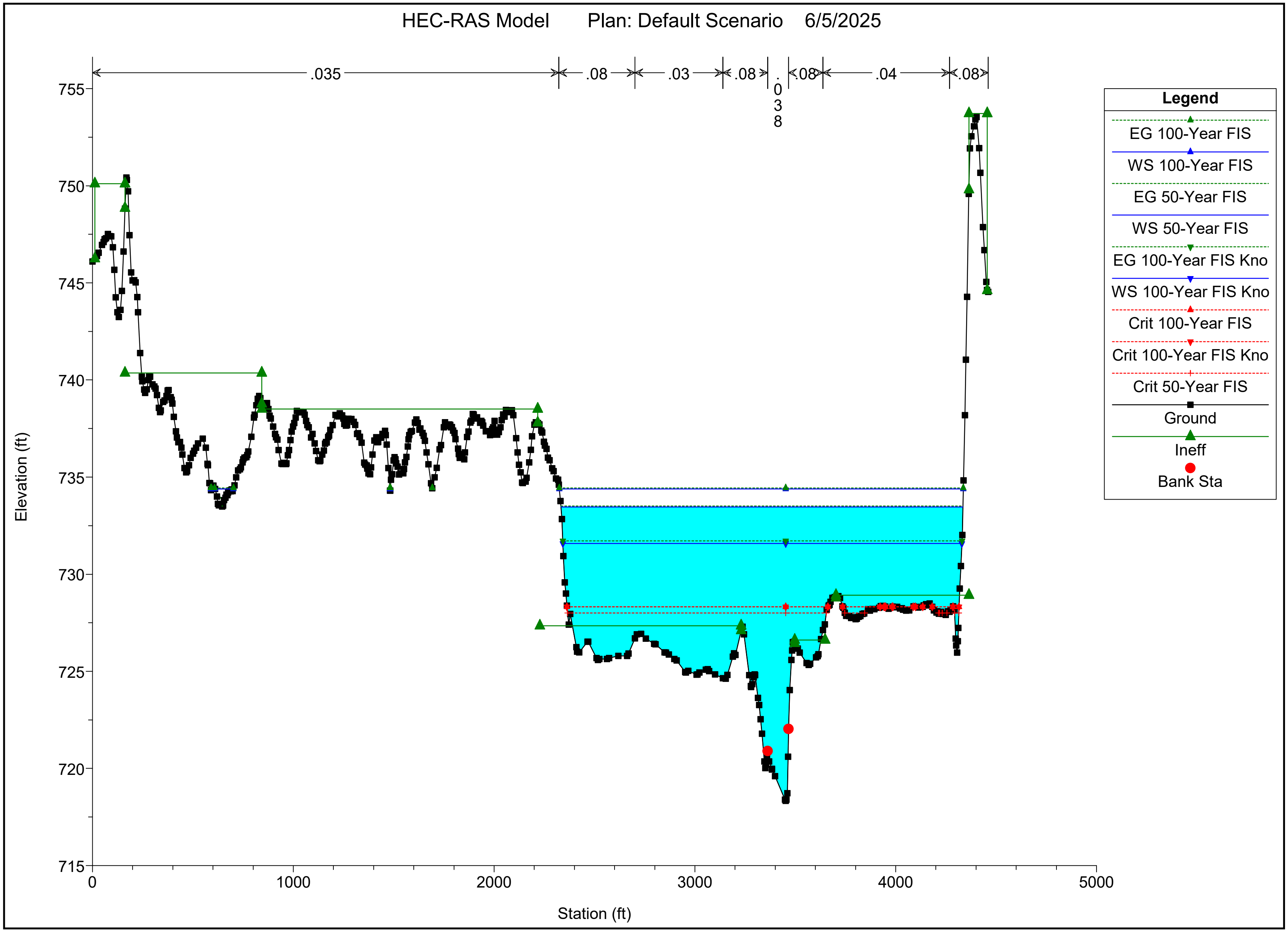
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Legend
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WS 100-Year FIS
EG 50-Year FIS
WS 50-Year FIS
EG 100-Year FIS Kno
WS 100-Year FIS Kno
Crit 100-Year FIS
Crit 100-Year FIS Kno
Crit 50-Year FIS
Ground
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Elevation (ft)
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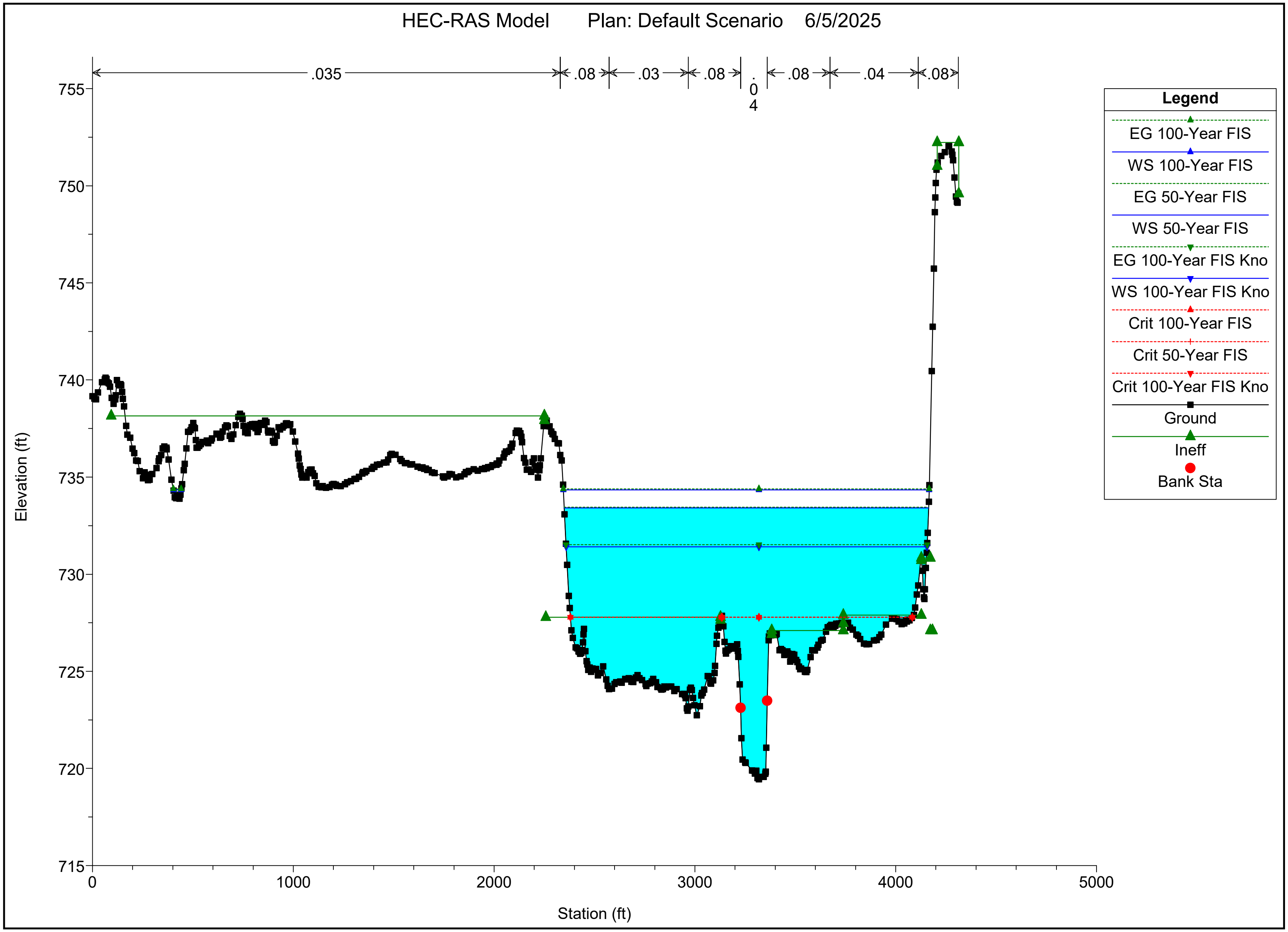
Station (ft)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EG 50-Year FIS
WS 50-Year FIS
EG 100-Year FIS Kno
WS 100-Year FIS Kno
Crit 100-Year FIS
Crit 50-Year FIS
Crit 100-Year FIS Kno
Ground
Ineff
Bank Sta
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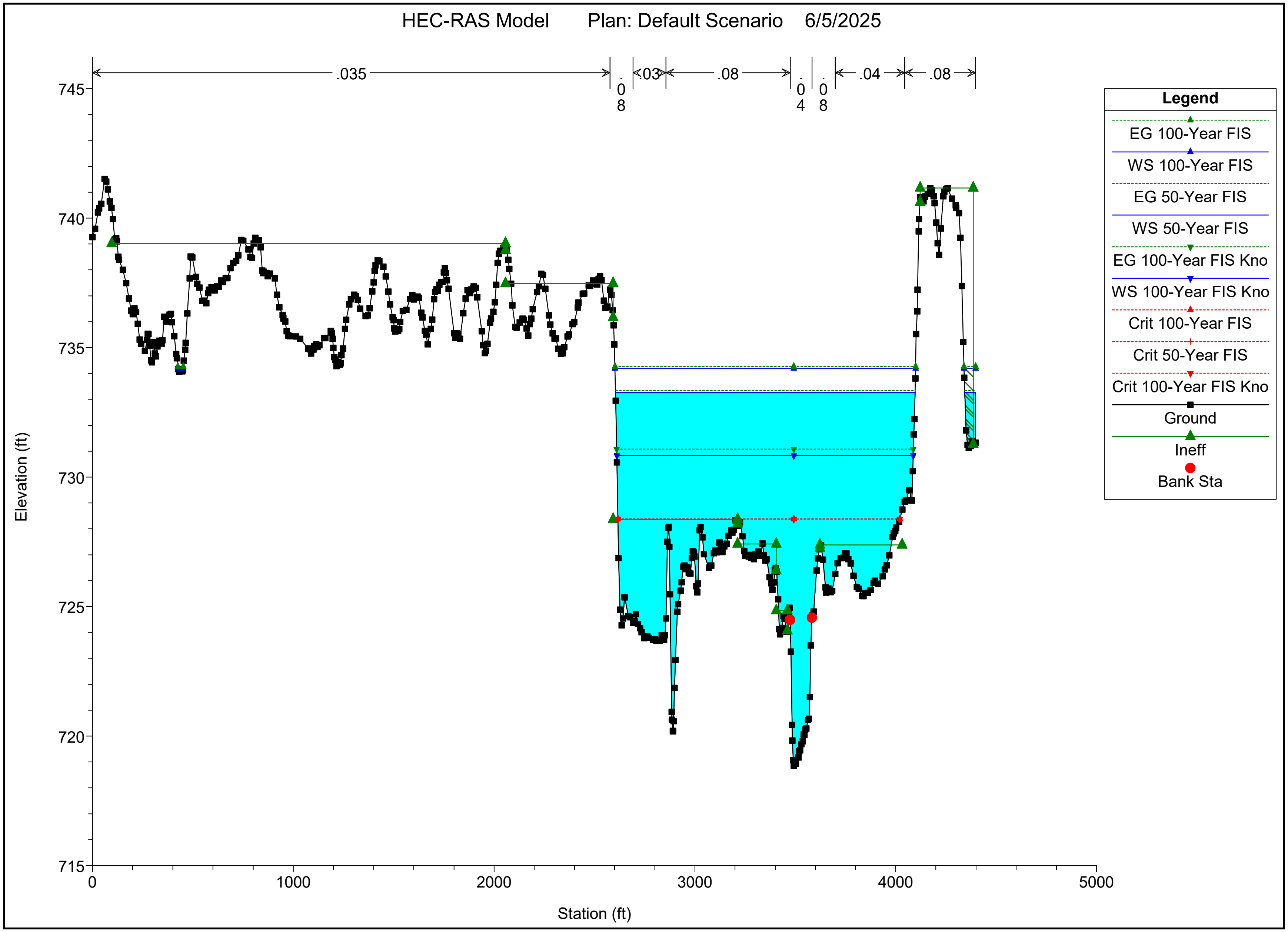
Station (ft)


HEC-RAS Model Plan: Default Scenario 6/5/2025
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Legend
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EG 50-Year FIS
WS 50-Year FIS
EG 100-Year FIS Kno
WS 100-Year FIS Kno
Crit 100-Year FIS
Crit 50-Year FIS
Crit 100-Year FIS Kno
Ground
Ineff
Bank Sta
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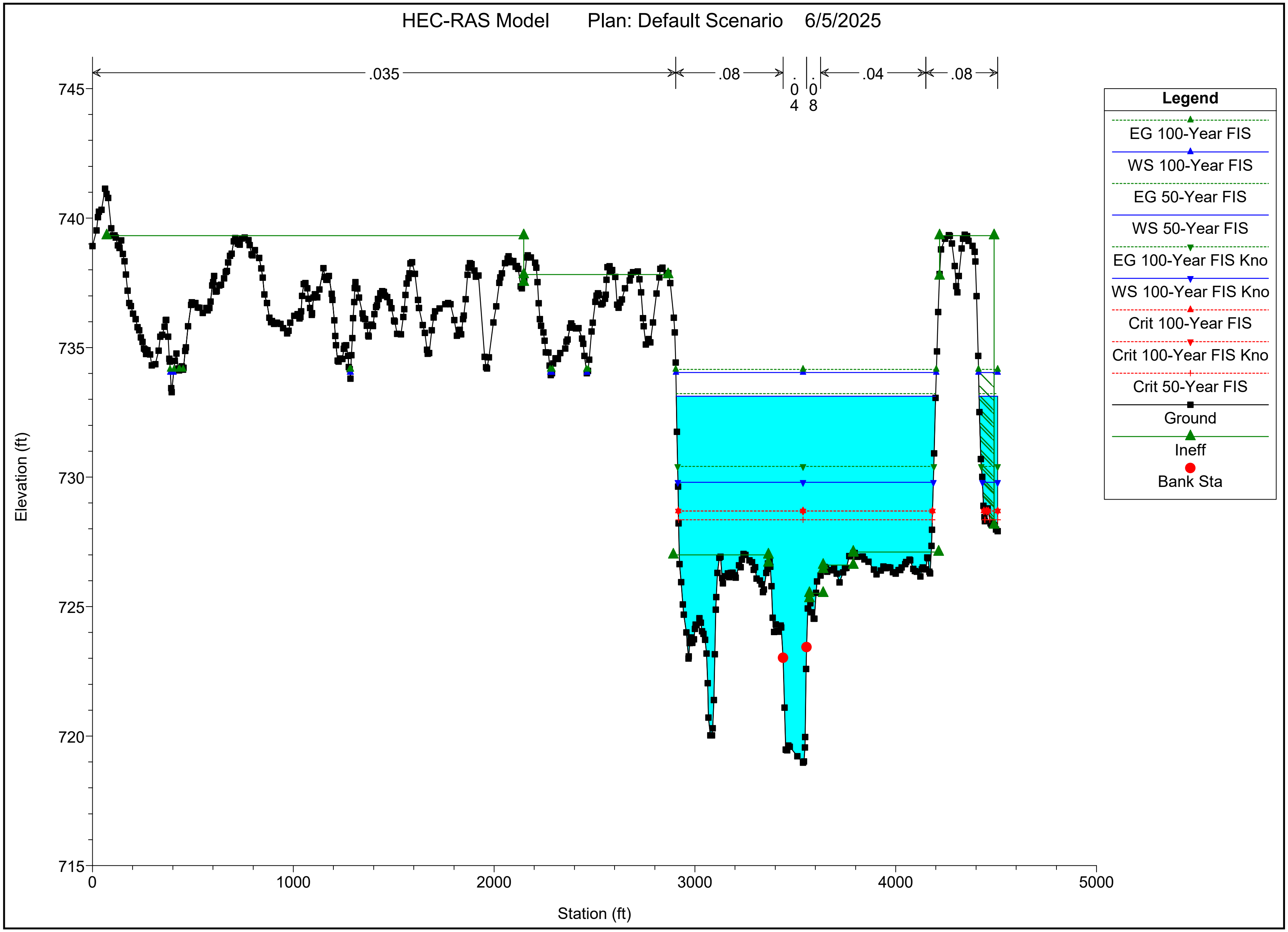
Station (ft)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4000
5000
Elevation (ft)
Station (ft)
Legend
EG 100-Year FIS
WS 100-Year FIS
EG 50-Year FIS
WS 50-Year FIS
EG 100-Year FIS Kno
WS 100-Year FIS Kno
Crit 100-Year FIS
Crit 100-Year FIS Kno
Crit 50-Year FIS
Ground
Ineff
Bank Sta

Appendix G – Scour Analysis Reports

Results to be included once soil properties are available, likely during detailed design after soil borings are obtained.