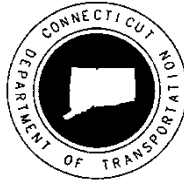


CONNECTICUT DEPARTMENT OF TRANSPORTATION
Reconstruction of I-84
Washington Avenue to Pierpont Road
Waterbury, CT
ConnDOT Project No. 151-273
Federal Aid Project No. NHI-84-2 (172) 33



HYDRAULIC ANALYSIS
FOR DESIGN
REPORT

BEAVER POND BROOK

Waterbury, Connecticut

July 2006
Revised October 2013

Prepared By:

Conn. Department of Transportation - Hydraulics & Drainage
2800 Berlin Turnpike
Newington, CT 06131-7546

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
Study Background	3
Discharges	8
Hydraulic Analysis	10
– Tailwater Relationship	
Existing (Pre-project) Condition	19
– Development of Existing Condition Model	
– Hydraulic Condition At And In The Vicinity of Individual Structures	
– Areas of Flooding	
Proposed (Post-project) Condition	30
– Development of Proposed Condition Model	
– Comparison of Water Surface Profile & Area of Flooding To Existing Condition	
– Hydraulic Condition At And In The Vicinity of Individual Structures	
– Effects on Storage And Discharges	
Natural Condition	48
– Development of Proposed Condition Model	
– Water Surface Profile Comparison To Proposed Condition	
Water Handling (Temporary Hydraulic Facilities)	52
Summary	52

LIST OF FIGURES AND PLOTS

<u>Figure</u>	<u>Page</u>
Figure 1- Project Location Map	5
Figure 2- Beaver Pond Brook Project Site/Structures Location Plan	6
Figure 3- Existing And Proposed Flood Boundary Map*	13
Figure 4- Proposed Flood Boundary Map*	16
Figure 5- The 100-year Flood Profile Plot: Proposed vs. Existing Conditions.....	45
Figure 6- The 500-year Flood Profile Plot: Proposed vs. Existing Conditions.....	47
Figure 7- The 100-year Flood Profile Plot: Proposed vs. Natural Conditions	51

* Larger scale plots of these maps are included separately.

LIST OF TABLES

<u>Tables</u>	<u>Page</u>
Table 1- Beaver Pond Brook Structure Numbers.....	4
Table 2A- Beaver Pond Brook Discharges	8
Table 2B- Description of Changing Discharges.....	9
Table 3- Tailwater Condition	11
Table 4- The 100-Year Base Flood Profile Comparison: Proposed vs. Existing Conditions	44
Table 5- The 500-Year Base Flood Profile Comparison: Proposed vs. Existing Conditions	46
Table 6- The 100-Year Base Flood Profile Comparison: Proposed vs. Natural Conditions.....	50
Table 7- Summary of Hydraulic Conditions At Waterway Crossings	53

APPENDIX

<u>Appendix</u>	<u>Content</u>
A	Discharge Estimation For 2- and 25-Year Storms
B	Hydraulic Backup -Part 1: HEC-RAS Input Report -Part 2: Output Tables, Cross-Section And Water Surface Profile Plots
C	Manning's Roughness Coefficient Computation For Proposed Culverts with Baffles
D	Return Frequency Estimation (<100-YR) for Overtopping Condition & Overtopping Condition Model Output
E	Cross Section Location Plan
F	Structure Plans
Rear Pocket	Hydraulic Analyses CD (HEC-RAS data files)

Study Background

State Project No. 151-273, the Reconstruction of Interstate 84 in the City of Waterbury from Washington Avenue east to Pierpont Road, results in partially relocating the Beaver Pond Brook.

The Beaver Pond Brook is a typical urban watercourse which has experienced significant alterations by man. In the 1960's as part of the original construction of I-84, a majority of the brook was channelized into a riprapped, trapezoidal channel. The present alignment of the brook is now roughly parallel to I-84. Within the project limits, the total length of the watercourse is approximately 2,900 meters from its confluence with the Mad River to Pierpont Road. Except for an area downstream of Mulloy Road for approximately 550 meters, it generally lacks floodplain area.

The relocation is proposed primarily in two separate locations for a combined length of approximately 845 meters. One of these locations is upstream of the existing I-84 Structure No. 01227 (referred to as the "westerly I-84" structure in this report) for an approximate length of 155 meters to accommodate the southerly realignment of the highway in this area.

The other location is in the vicinity of the Interchange 25 (Scott Road) where an approximately 690-meter long section of the existing channel will be relocated northerly. The relocation will lengthen the channel by approximately 15 meters to 705 meters. In addition to the relocation, four (4) new waterway crossings replacing three (3) existing structures will be constructed as well as extending one (1) existing culvert and removal of one (1) existing bridge crossing. These waterway crossings and the limits of the brook relocation are shown in Figure 2.

This report has been prepared to describe the effects and consequent changes to the hydraulic characteristics of the Beaver Pond Brook based on the hydraulic analyses that were performed and documented herein.

The final hydraulic modeling for the project and related reports have been prepared by the Hydraulic and Drainage Section of the Connecticut Department of Transportation (ConnDOT), based on the design plans for the roadway reconstruction, including the river relocation and hydraulic structures, that were prepared by Ammann & Whitney (formerly Berger, Lehman Associates, P.C. – BLA) of Rye, NY, the prime consultant engineer for State Project No. 151-273.

The survey and design plans for State. Project No. 151-273 were developed in Metric units. Accordingly, all the hydraulic models were developed, analyzed and completed in the Metric. The primary control for the project survey was based on the North American Datum of 1983 (NAD-83) for the horizontal coordinates. All elevation data are referenced to National Geodetic Vertical Datum of 1929 (NGVD-29).

The Beaver Pond Brook was previously studied in detail as a part of the City of Waterbury Flood Insurance Study (FIS), effective date May 1979 in which the regulatory floodplains and

floodways were established. Due to the project's involvement in the regulated areas, obtaining a Flood Management Certification (FMC) from the Connecticut Department of Environmental Protection (DEP) is required as well as a Conditional Letter of Map Revision (CLOMR) from the Federal Emergency Management Agency (FEMA). For these requirements, a separate report entitled "*Beaver Pond Brook Floodplain/Floodway Analysis Report for FEMA CLOMR & CTDEP Flood Management Certification*" has been prepared using different hydraulic models in the U.S. Customary units.

For the ease of distinguishing these different models, the models developed for the conformance to the regulatory requirements are referred to as "Floodway Models"; the models included in this report as "Design Models".

To avoid confusion between existing and proposed crossings in the report, the existing structures are referred to as "Structure" followed by the ConnDOT bridge numbers, whereas proposed crossings are called out either as "Bridge" or "Culvert" depending on the proposed type (e.g. existing Structure No. 01227 versus proposed Culvert No. 01227; see Table 1).

Table 1- Beaver Pond Brook Structure Numbers

Structure Number*		Roadway
Existing	Proposed	
Structure No. 03727	Culvert No. 03727	Harpers Ferry Road
Structure No. 01227	Culvert No. 01227	Westerly I-84 crossing
none	Culvert No. 003	Reidville Drive over East Mountain Brook
Structure No. 02537	Culvert No. 02537	Easterly I-84 crossing
n/a	Culvert No. 06622	Plank Road East
Structure No. 151-014	Culvert No. 014	Scott Road
Structure No. 02536	n/a	Exit 25 Westbound Off-Ramp
Structure No. 151-005	none	Mulloy Road
Structure No. 151-006	none	Pierpont Road

*Listed from downstream to upstream

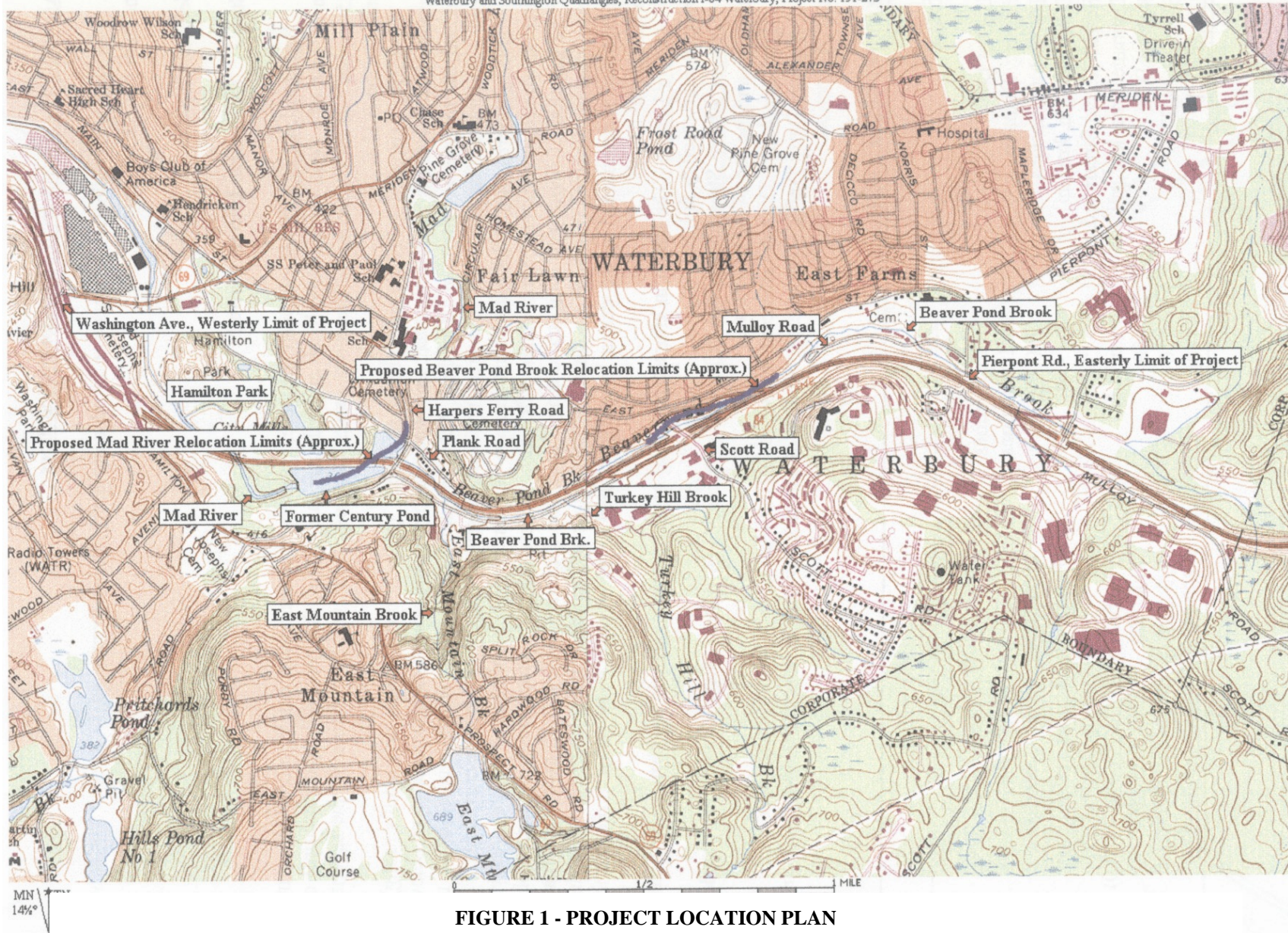


FIGURE 1 - PROJECT LOCATION PLAN

Discharges

All the discharges included in the hydraulic analysis are shown in Table 2A.

Table 2A- Beaver Pond Brook Discharges

Cross Section Sta., Proposed (Existing, if different)	Drainage Area sq. km. (sq. mi.)	Peak Discharges, cms (cfs)							
		Low Fish Passage	High Fish Passage	2-yr	10-yr	25-yr	50-yr	100-yr	500-yr
BPB 8+178	2.8 (1.1)	0.01 (0.35)	0.51 (18)	3.8 (134)	5.81 (205)	7.93 (280)	9.63 (340)	11.61 (410)	17.41 (615)
BPB 7+937	4.4 (1.7)	0.01 (0.35)	0.51 (18)	5.6 (198)	8.64 (305)	11.6 (410)	14.58 (515)	17.7 (625)	26.62 (940)
BPB 7+698	6.5 (2.5)	0.01 (0.35)	0.51 (18)	7.88 (278)	12.18 (430)	16.2 (572)	20.25 (715)	24.64 (870)	37.24 (1,315)
BPB 7+120*	7.3 (2.8)	0.01 (0.35)	0.51 (18)	8.72 (308)	13.45 (475)	17.9 (632)	22.51 (795)	27.33 (965)	41.34 (1,460)
BPB 6+473 (6+457)	7.8 (3.0)	0.01 (0.35)	0.51 (18)	9.4 (332)	14.58 (515)	19.5 (689)	24.49 (865)	29.87 (1,055)	45.17 (1,595)
BPB 5+878	12.4 (4.8)	0.023 (0.81)	0.935 (33)	14.5 (512)	22.51 (795)	30.1 (1,063)	37.8 (1,335)	46.01 (1,625)	69.8 (2,465)
BPB 5+355 (5+296)	14.8 (5.7)	0.023 (0.81)	0.935 (33)	17.41 (615)	27.04 (955)	36.2 (1,278)	45.59 (1,610)	55.5 (1,960)	84.24 (2,975)

* This location is not listed in the published FIS, but included in the effective FIS data.

As part of Project No. 151-273, BLA (Ammann & Whitney) has prepared a report entitled "*Hydrologic Report, Beaver Pond Brook*" in which several methods were employed to determine and evaluate the discharges for various frequency storms. The report recommends using the discharges utilized in the 1979 FIS. Since the original FIS included only the 10-, 50-, 100- and 500-year discharges, the 2-, 25-year and Fish Passage discharges had to be determined separately. Using the known FIS discharges, BLA has developed correlational equations for each location (see Appendix A). The 2- and 25-year discharges were estimated based on these

equations. The computations for the Fish Passage discharges are included in the Final River Relocation Report.

The cross section stations in Table 2A represent where the applicable discharges change. These are further described in the following Table 2B.

Table 2B- Location of Changing Discharges

Cross Section Sta., Proposed (Existing, if different)	Source & Location
BPB 8+722	Upstream Study Limit
BPB 7+937	Downstream of Unnamed Tributary (Just upstream of the Pierpont Road crossing, Structure No. 151-006)
BPB 7+698	Upstream of Unnamed Tributary (Just upstream of the Mulloy Road crossing, Structure No. 151-005)
BPB 7+120	Upstream of Unnamed Tributary (approximately 230 m or 750 ft upstream of the existing Westbound Exit 25 Off-Ramp Structure No. 02536)
BPB 6+473 (6+457)	Upstream of Turkey Hill Brook (approximately 98 m or 320 ft downstream of the easterly I-84 Structure No. 02537)
BPB 5+878	Upstream of East Mountain Brook (approximately 56 m or 185 ft upstream of the existing westerly I-84 Structure No. 01227 in the Existing Condition; In the Proposed Condition, just upstream of the Proposed Culvert No. 01227)
BPB 5+355 (5+296)	Mouth at Mad River

Hydraulic Analysis

The hydraulic analyses for this project were performed using the U. S. Army Corps of Engineers (USACOE) computer program HEC-RAS version 4.1.0. Separate hydraulic models were developed for the existing (pre-project), proposed (post-project) and natural¹ conditions.

In developing the Existing and Proposed Condition models, the hydraulic cross sections were obtained from the project digital terrain models or “surface-models” with reference to one common baseline. This makes comparison of the data feasible in the HEC-RAS environment. However, the orientation and other geometry data such as the distances along the main channel and floodplains are entered consistent with the represented condition. For the common baseline, the stream centerline developed for the final proposed (post-project) condition was used.

The limits of the HEC-RAS models were established in consideration of the proposed construction activities and by estimating the resulting hydraulic effects. The Beaver Pond Brook study begins at the confluence with the Mad River as the downstream limit, and ends at the Sta. 8+722 as the upstream limit, approximately 150 meters (500 ft) east of the I-84 Westbound Exit 25A Off-Ramp crossing (Structure No. 06580). The confluence is obviously the utmost location that can be set as the downstream limit for this tributary watercourse. Beyond it, the effects of the project are reflected in the separate study of the Mad River.

In the case of the upstream limit, it was selected to match the upstream limit of the Floodway Models to ensure consistency and also to document the effects of the I-84 Westbound Exit 25A Off-Ramp crossing. This bridge was constructed in 2006 spanning the floodway. As a major portion of the Beaver Pond Brook (by more than 80% by length) studied in the original FIS will be affected by the project and, thus, be updated, it was decided to extend the hydraulic analysis beyond the current project limit, to include the entire limit of the originally studied reach incorporating the recently constructed Ex 25A Off-Ramp bridge as well as correcting discrepancies of the FIS to the actual condition.

To maintain consistency with the original FIS analysis and the Floodway Models, all cross sections in these models were input as if looking upstream.

Although the intended purposes for the Floodway and Design Models are different, much effort was made to keep their geometric data identical, except for the units, as they represent the same physical conditions.

¹ The natural condition model is intended to show the floodplain in the vicinity of the project as it would be without any artificial encroachments or modifications. The natural profile is generally developed by removing the bridges, culverts and any approach embankments in the existing condition model.

Tailwater Relationship

For all the models in the study, the upstream boundary condition was set to "Critical Depth". For the downstream boundary, however, differing conditions had to be used for different models. For each of the Existing and Proposed Condition geometry models, the computed water surface elevations of the Mad River in the vicinity of the confluence were used as the starting water surface elevations. Because of the differences in the watershed area and in the anticipated time-to-peak between the Mad River (main) and the Beaver Pond Brook (tributary), the joint probability of flood magnitudes had to be considered, in accordance with the ConnDOT Drainage Manual. The ratio of the watershed areas is 3.2 based 46.62 and 14.76 km² for the main and tributary respectively. Using Table 8-3 of the manual, the following tailwater conditions were assumed:

Table 3. Tailwater Condition

Flood Recurrence (year)		Tailwater Elevation (m) - Mad River at River Station 2+020 -	
Beaver Pond Brook	Mad River	Existing*	Proposed**
Fish Low Pass.	Fish Low Pass.	110.82	111.27
Fish High Pass.	Fish High Pass.	111.20	111.50
2	2	111.95	112.22
10	10	112.94	112.83
25	10	112.94	112.83
50	25	113.59	113.41
100	500	114.20	113.93
500	100	115.19	114.42

* Also used for the Natural Condition 1 model which is based on the Existing Condition geometry. These elevation are significantly lower than the elevation stated in the July 2006 version of this report. The hydraulic survey of the Mad River was partially updated since that date which showed degradation of the riverbed. As the results, it affected the starting water surface elevation of the brook.

** Also used for the Natural Condition 2 model which partially incorporates the Proposed Condition geometry.

The Mad River hydraulic data can be found in the separate "*Hydraulic Analysis For Design Report, Mad River*".

In performing the hydraulic analyses, both the subcritical and supercritical conditions were considered (the "Mixed Flow Regime" setting in the HEC-RAS).

Once the analyses were completed, the results were depicted on the flood boundary maps in the following pages. Figure 3 shows both the existing and proposed condition flood boundaries based on the 100- and 500-year floods. Figure 4 shows the flood boundaries just for the proposed condition. More detailed discussions on these figures are included in the narratives for the Existing and Proposed Condition models.

The narratives are followed by the tabulated results of the hydraulic analyses which were prepared for comparing the proposed to existing, and the proposed to natural conditions.

The HEC-RAS input data and output tables are included in the Appendix B. An electronic copy of the HEC-RAS data files are also enclosed in the back of this report.

The hydraulic models included in this report are mainly used to:

- design five culverts along the Beaver Pond Brook
- estimate scour potential along retaining walls adjacent to the watercourse
- design stable channel sections
- design fish habitat enhancements

This report is intended to describe the design aspect of the waterway crossings and the resulting water surface profiles along the brook. The stream habitat enhancement features and design elements for channel stability are described in the *Final River Relocation Report*.

FIGURE 2. BEAVER POND BROOK PROJECT SITE/ STRUCTURE LOCATION PLAN

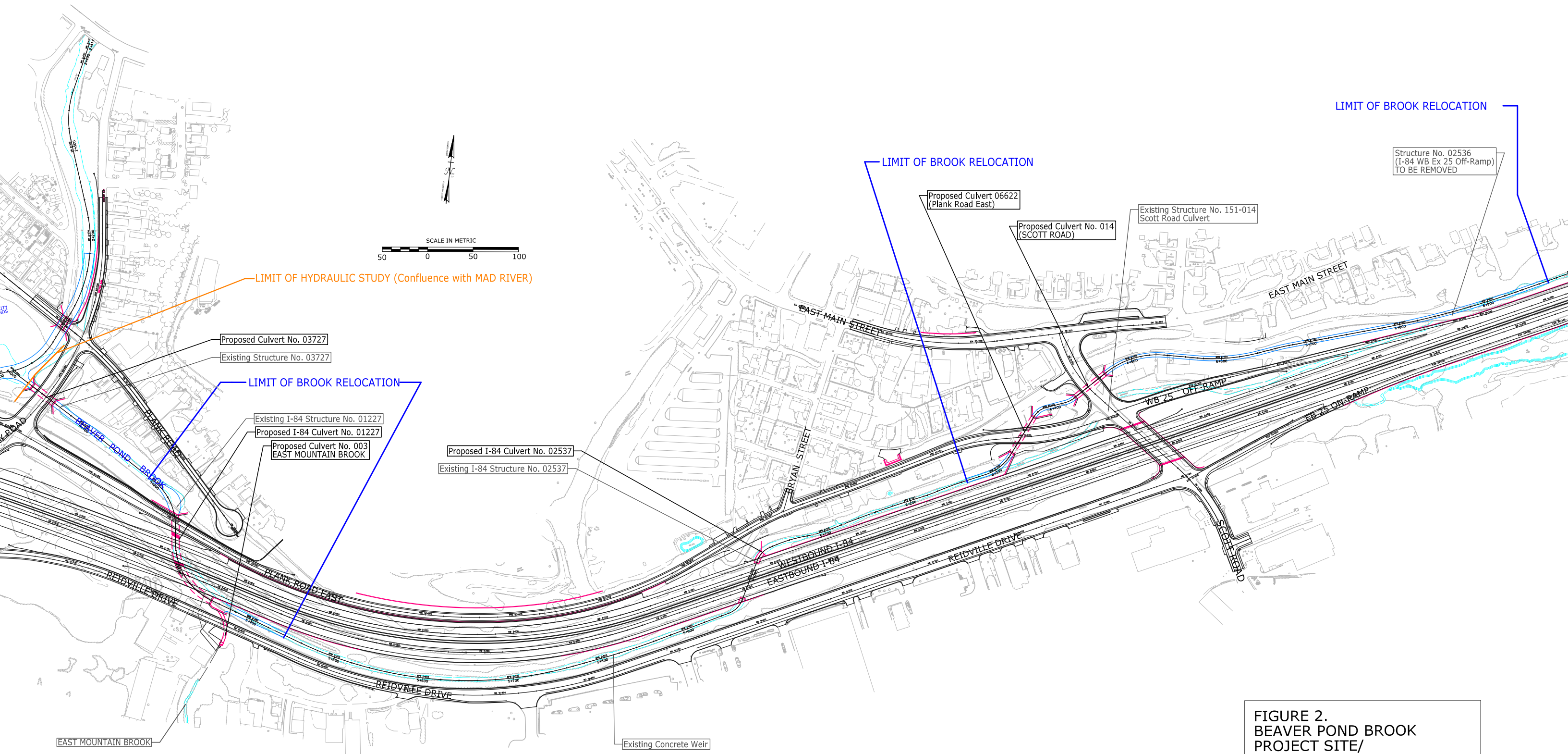
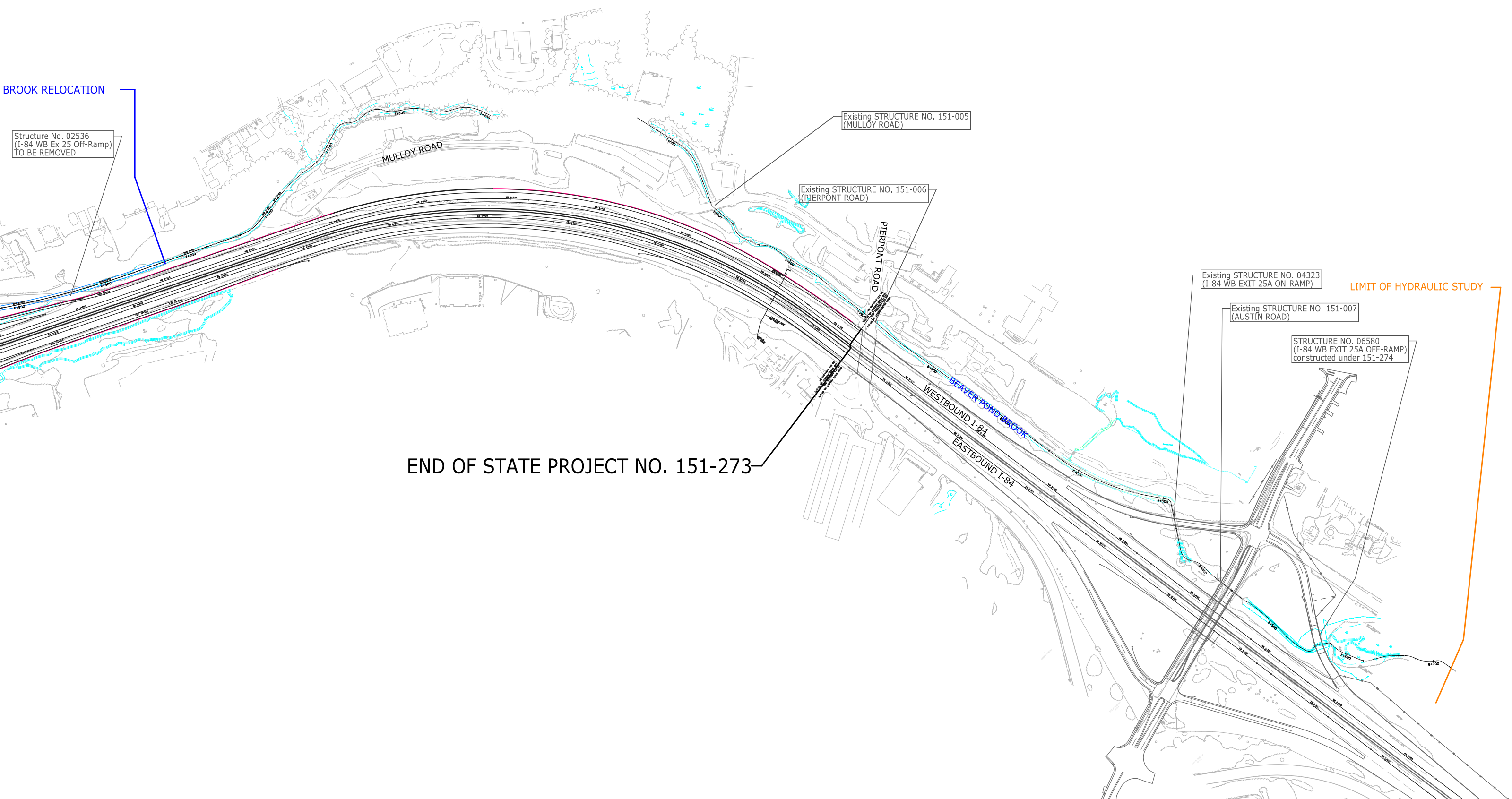


FIGURE 2.
BEAVER POND BROOK
PROJECT SITE/
STRUCTURE LOCATION PLAN
Sheet 1/2

FIGURE 2.
BEAVER POND BROOK
PROJECT SITE/
STRUCTURE LOCATION PLAN
Sheet 2/2

FIGURE 2. BEAVER POND BROOK PROJECT SITE/ STRUCTURE LOCATION PLAN



BROOK RELOCATION

Structure No. 02536
(I-84 WB Ex 25 Off-Ramp)
TO BE REMOVED

Existing STRUCTURE NO. 151-005
(MULLOY ROAD)

Existing STRUCTURE NO. 151-006
(PIERPONT ROAD)

Existing STRUCTURE NO. 04323
(I-84 WB EXIT 25A ON-RAMP)

LIMIT OF HYDRAULIC STUDY

Existing STRUCTURE NO. 151-007
(AUSTIN ROAD)

STRUCTURE NO. 06580
(I-84 WB EXIT 25A OFF-RAMP)
constructed under 151-274

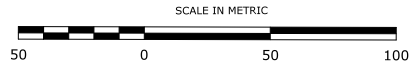
END OF STATE PROJECT NO. 151-273

FIGURE 3. BEAVER POND BROOK EXISTING AND PROPOSED FLOOD BOUNDARY MAP

NOTE: THE FLOOD BOUNDARIES ALONG THE PLANK AND HARPERS FERRY ROADS HAVE BEEN DELINEATED CONSIDERING BOTH THE MAD RIVER AND BEAVER POND BROOK HYDRAULIC CONDITIONS, GENERALLY ADOPTING WHICHEVER PRODUCE HIGHER WATER SURFACE ELEVATION.

FLOOD BOUNDARY/PLAIN	EXISTING	PROPOSED*
500-YEAR		
100-YEAR		
STREAM		
CROSS SECTION		
PROPOSED STRUCTURE		
HIGHWAY/PROPERTY LINE(EX.)		
EASEMENT/TAKING LINE		

*SHADING FOR PROPOSED CONDITION SHOWN ONLY FOR THE AREA BEYOND EXISTING CONDITION



LIMIT OF HYDRAULIC STUDY (Confluence with MAD RIVER)

Proposed Culvert No. 03727

Existing Structure No. 03727

Existing I-84 Structure No. 01227

Proposed I-84 Culvert No. 01227

Proposed Culvert No. 003
EAST MOUNTAIN BROOK

Proposed I-84 Culvert No. 02537

Existing I-84 Structure No. 02537

FIGURE 3.
EXISTING & PROPOSED
FLOOD BOUNDARY MAP
Sheet 1/3

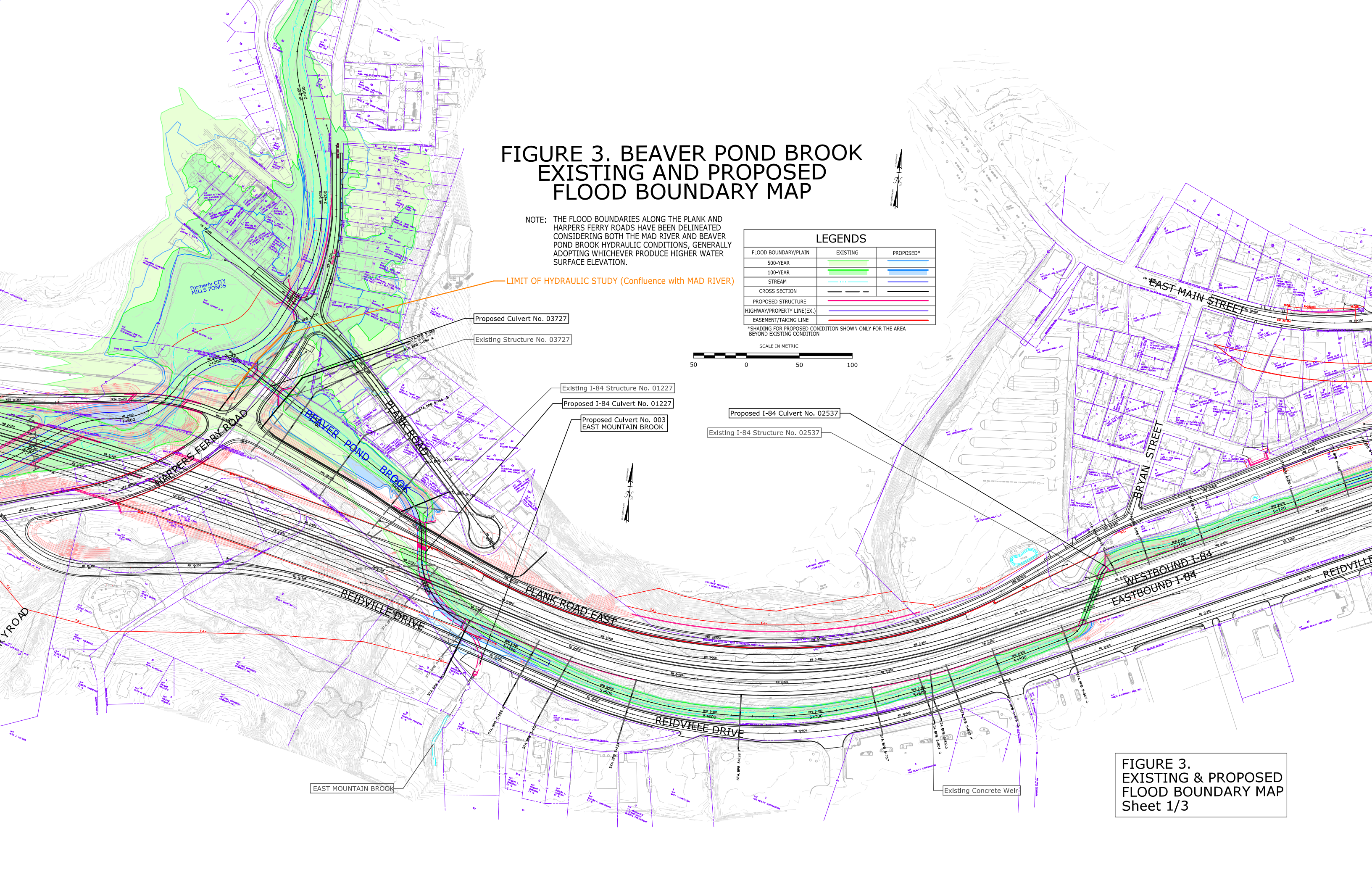
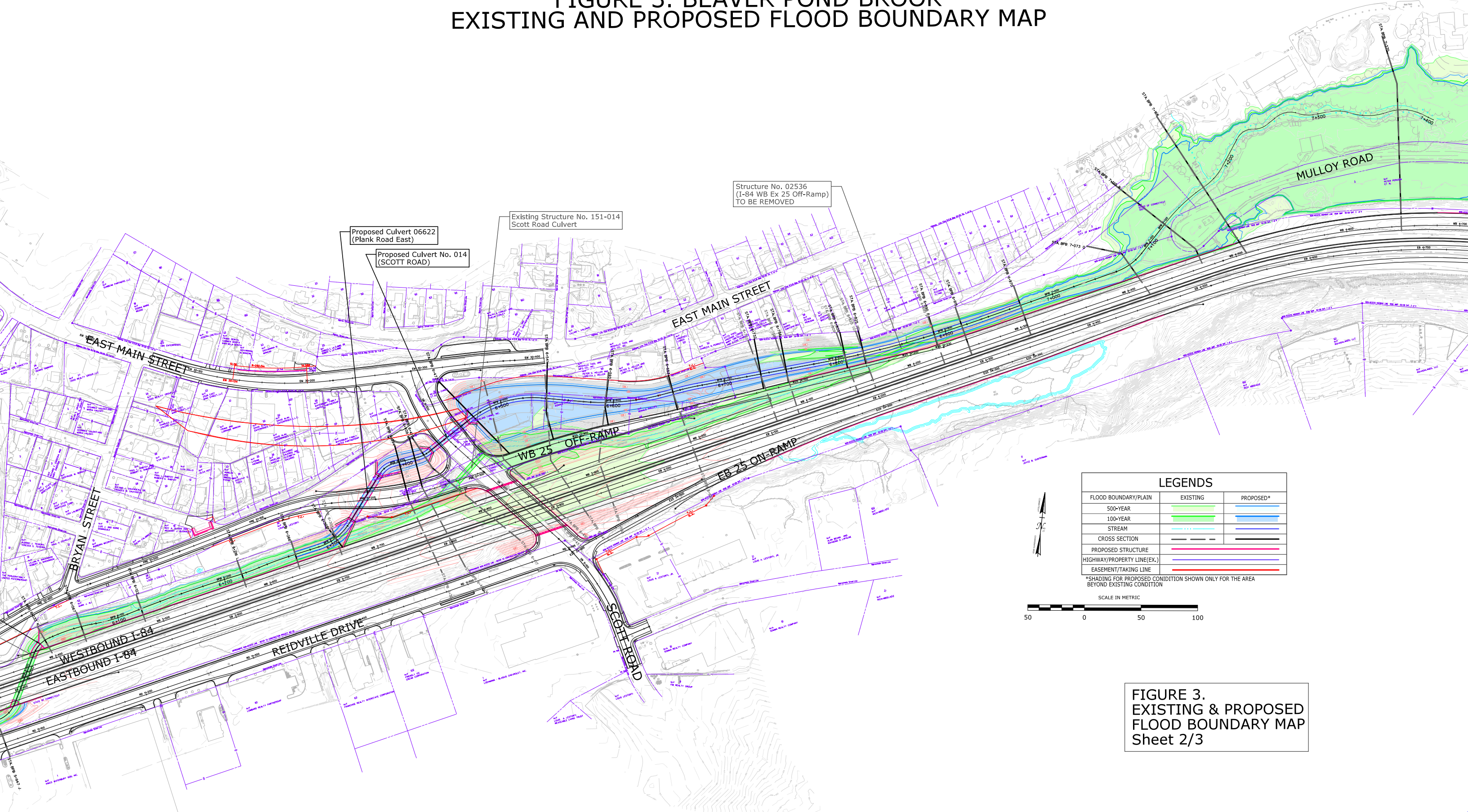
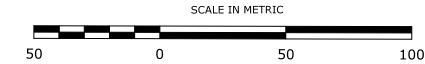


FIGURE 3. BEAVER POND BROOK EXISTING AND PROPOSED FLOOD BOUNDARY MAP



LEGENDS		
FLOOD BOUNDARY/PLAIN	EXISTING	PROPOSED*
500-YEAR	█	█
100-YEAR	█	█
STREAM	—	—
CROSS SECTION	—	—
PROPOSED STRUCTURE	—	—
HIGHWAY/PROPERTY LINE(EX.)	—	—
EASEMENT/TAKING LINE	—	—

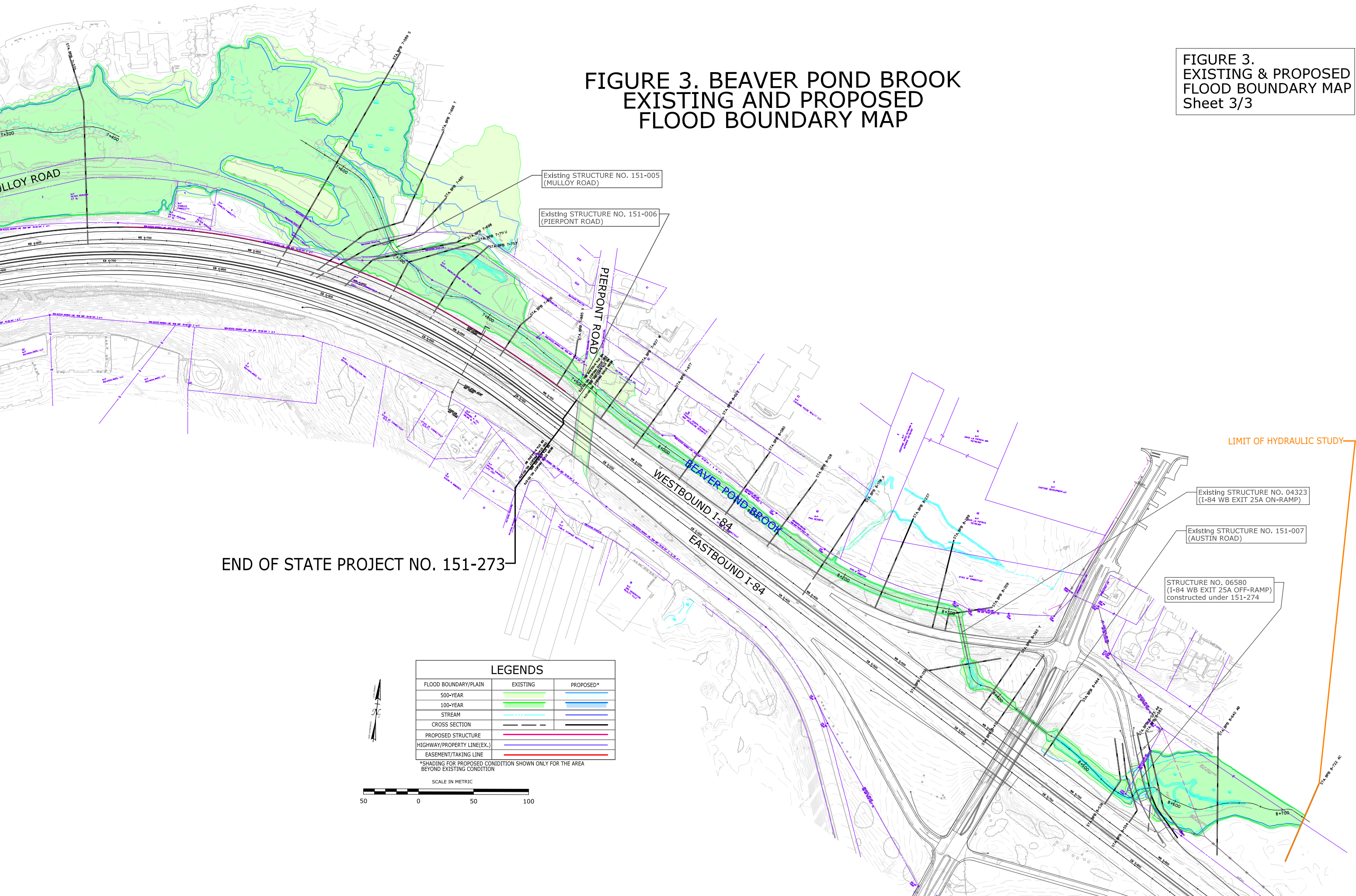
*SHADING FOR PROPOSED CONDITION SHOWN ONLY FOR THE AREA BEYOND EXISTING CONDITION



**FIGURE 3.
EXISTING & PROPOSED
FLOOD BOUNDARY MAP
Sheet 2/3**

FIGURE 3. BEAVER POND BROOK EXISTING AND PROPOSED FLOOD BOUNDARY MAP

FIGURE 3.
EXISTING & PROPOSED
FLOOD BOUNDARY MAP
Sheet 3/3



END OF STATE PROJECT NO. 151-273

LEGENDS		
FLOOD BOUNDARY/PLAIN	EXISTING	PROPOSED*
500-YEAR	[Green line]	[Blue line]
100-YEAR	[Light Green line]	[Light Blue line]
STREAM	[Blue dashed line]	[Blue solid line]
CROSS SECTION	[Black dashed line]	[Black solid line]
PROPOSED STRUCTURE	[Red line]	[Red line]
HIGHWAY/PROPERTY LINE(EX.)	[Purple line]	[Purple line]
EASEMENT/TAKING LINE	[Red line]	[Red line]

*SHADING FOR PROPOSED CONDITION SHOWN ONLY FOR THE AREA BEYOND EXISTING CONDITION

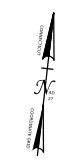
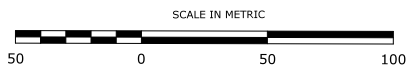
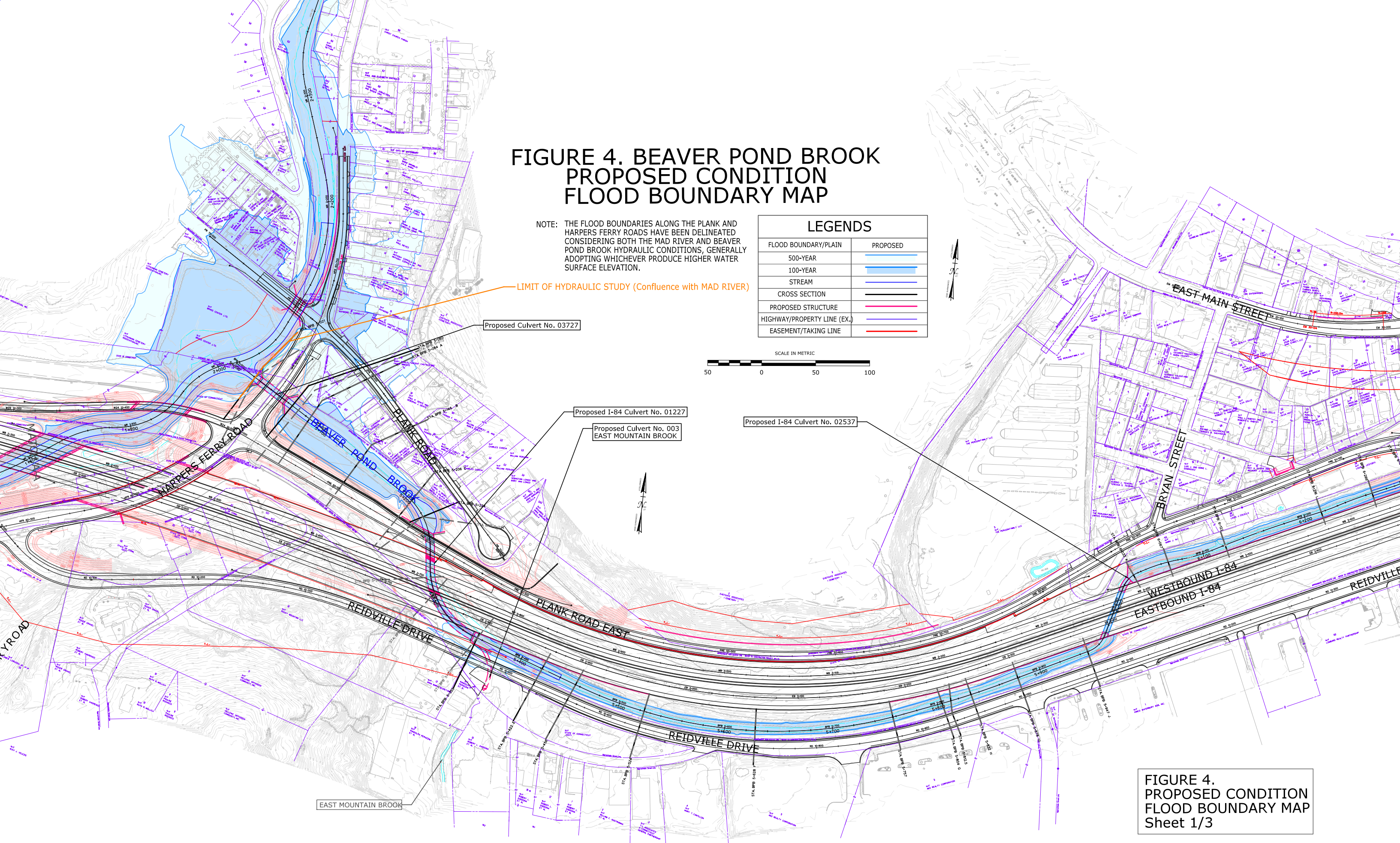


FIGURE 4. BEAVER POND BROOK PROPOSED CONDITION FLOOD BOUNDARY MAP

NOTE: THE FLOOD BOUNDARIES ALONG THE PLANK AND HARPERS FERRY ROADS HAVE BEEN DELINEATED CONSIDERING BOTH THE MAD RIVER AND BEAVER POND BROOK HYDRAULIC CONDITIONS, GENERALLY ADOPTING WHICHEVER PRODUCE HIGHER WATER SURFACE ELEVATION.

LEGENDS	
FLOOD BOUNDARY/PLAIN	PROPOSED
500-YEAR	
100-YEAR	
STREAM	
CROSS SECTION	
PROPOSED STRUCTURE	
HIGHWAY/PROPERTY LINE (EX.)	
EASEMENT/TAKING LINE	



LIMIT OF HYDRAULIC STUDY (Confluence with MAD RIVER)

Proposed Culvert No. 03727

Proposed I-84 Culvert No. 01227

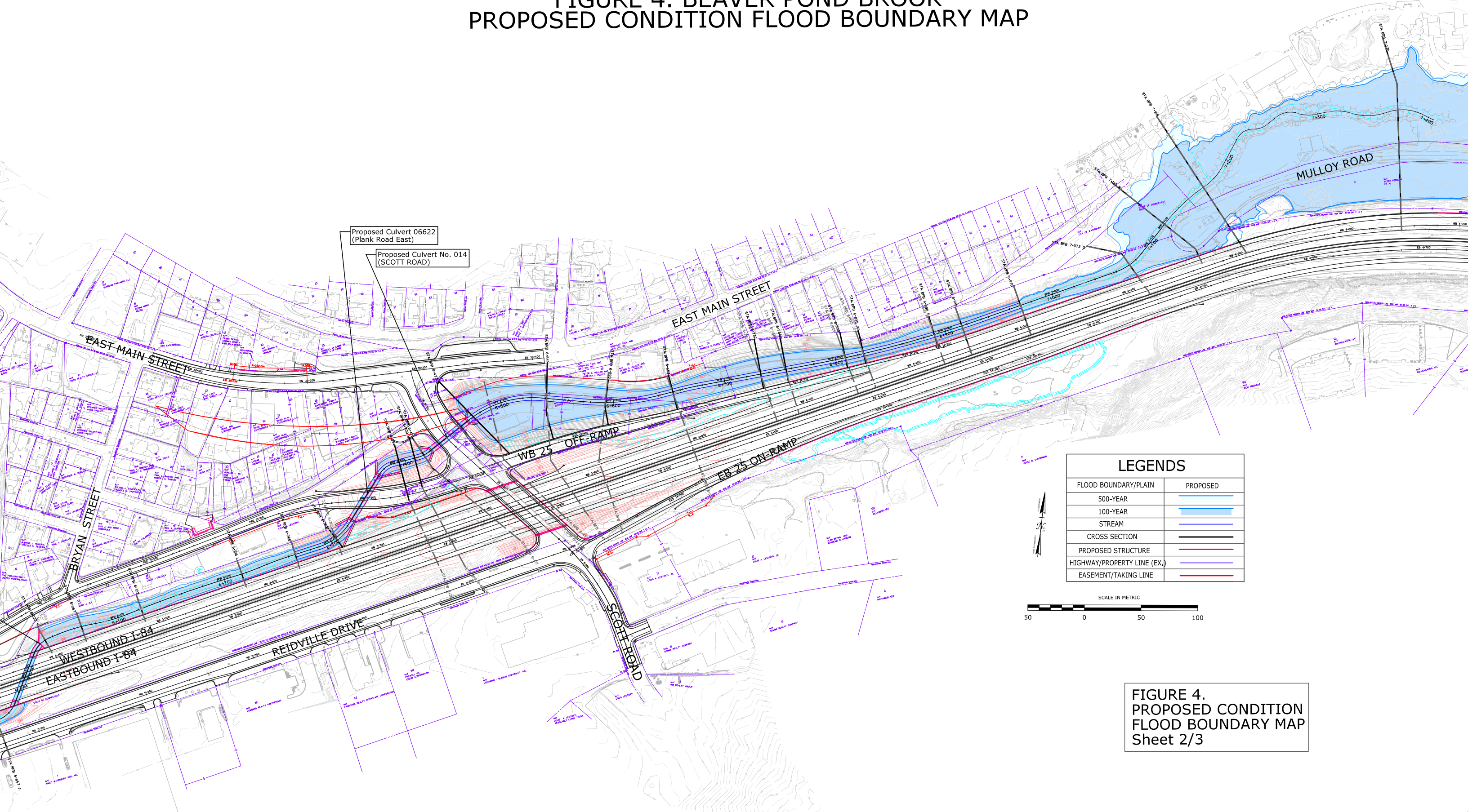
Proposed Culvert No. 003
EAST MOUNTAIN BROOK

Proposed I-84 Culvert No. 02537

EAST MOUNTAIN BROOK

FIGURE 4.
PROPOSED CONDITION
FLOOD BOUNDARY MAP
Sheet 1/3

FIGURE 4. BEAVER POND BROOK
PROPOSED CONDITION FLOOD BOUNDARY MAP



Proposed Culvert 06622
(Plank Road East)

Proposed Culvert No. 014
(SCOTT ROAD)

LEGENDS	
FLOOD BOUNDARY/PLAIN	PROPOSED
500-YEAR	
100-YEAR	
STREAM	
CROSS SECTION	
PROPOSED STRUCTURE	
HIGHWAY/PROPERTY LINE (EX.)	
EASEMENT/TAKING LINE	

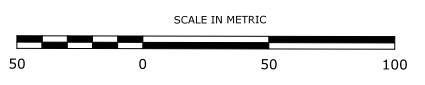
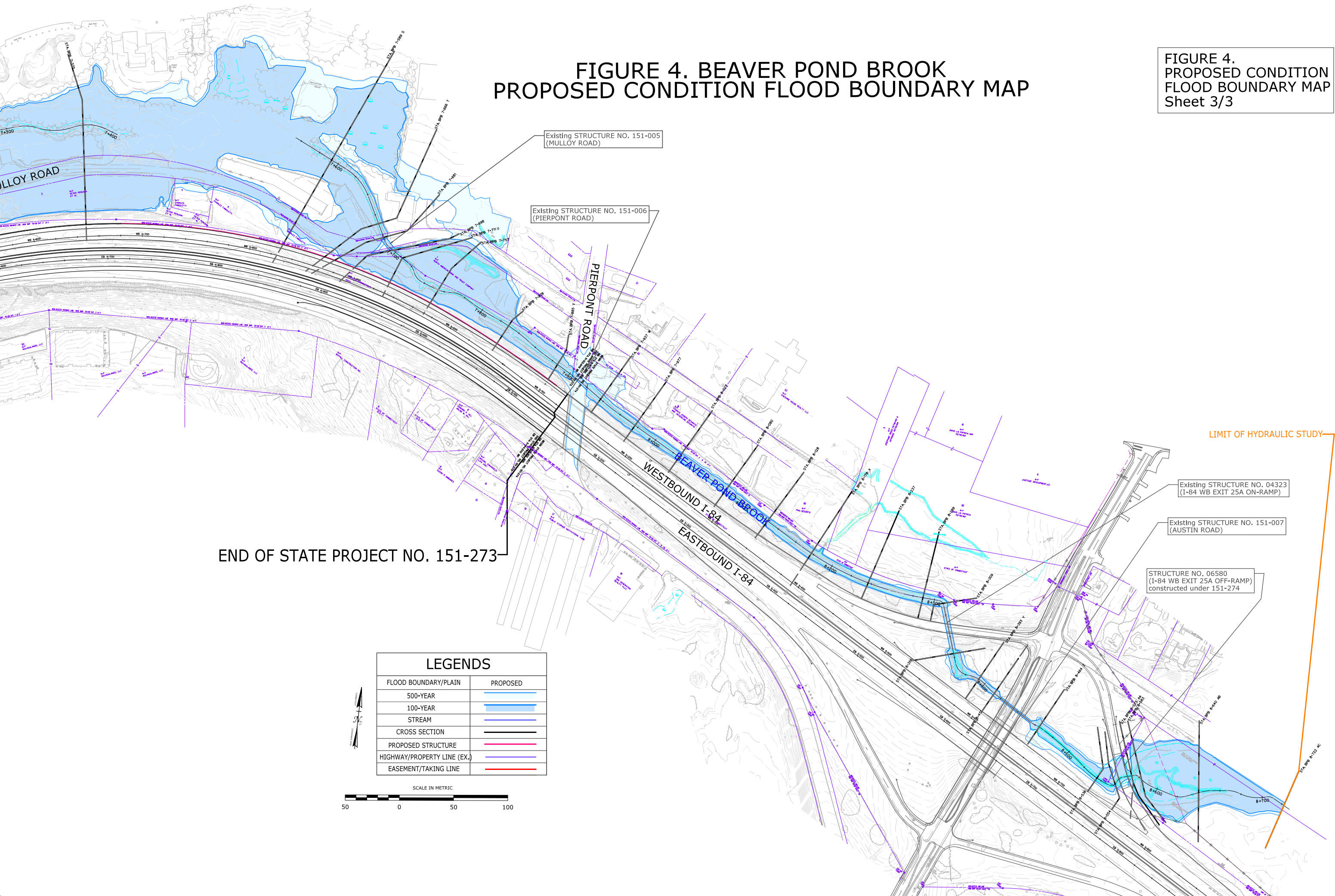


FIGURE 4.
PROPOSED CONDITION
FLOOD BOUNDARY MAP
Sheet 2/3

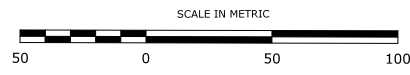
FIGURE 4. BEAVER POND BROOK PROPOSED CONDITION FLOOD BOUNDARY MAP

FIGURE 4.
PROPOSED CONDITION
FLOOD BOUNDARY MAP
Sheet 3/3



END OF STATE PROJECT NO. 151-273

LEGENDS	
FLOOD BOUNDARY/PLAIN	PROPOSED
500-YEAR	
100-YEAR	
STREAM	
CROSS SECTION	
PROPOSED STRUCTURE	
HIGHWAY/PROPERTY LINE (EX.)	
EASEMENT/TAKING LINE	



Existing (Pre-Project) Condition

DEVELOPMENT OF EXISTING CONDITION MODEL

In developing the Existing Condition model, a total of seventy-one (71) stream cross sections were utilized excluding the internal sections at the waterway crossings. These cross sections have been located to accurately portray the existing river; and in some areas, to provide a matching section to a section in the Proposed Condition model. Nonetheless, not all the cross sections in the Proposed Condition model could feasibly be matched with an existing condition section because of the proposed river relocation and the new bridge locations. This is discussed further in the Proposed Condition description.

There are a few cross sections in both the Existing and Proposed condition models that do not extend far enough to fully contain the 0.2% annual chance (500-year) flood. Regardless, the computed flood elevations are deemed accurate because the areas beyond the cross section limits are not likely to actively convey the flood flow due to obstructions. These obstructions are reflected in the model using Ineffective Flow Area and Obstruction settings in the HEC-RAS program.

Except for the boundary sections, the location of these cross sections match the sections included in the Floodway Models. A Cross Section Location Plan is included in Appendix E.

The Digital Terrain Model (DTM) surface file from which the cross sections were cut was developed from the project survey information. The project survey/base map was generated with the photogrammetry mapping based on April 1998 flight from Aero-Metric, Inc. (Sheboygan, WI). This was then partially edited with ground survey data from AI Engineers, Inc (Middletown, CT). Where the survey coverage was not sufficient to accurately portray the geometry of the river, additional hydraulic cross-sectional surveys were performed by Ammann & Whitney initially, then by the ConnDOT survey forces. The hydraulic survey for the portion from Pierpont Road to approximately 500' upstream of I-84 Westbound Exit 25A Off-Ramp was performed by AI Engineers, Inc.

The bank stations for each section were generally set at the physical location of the top of channel banks. In some situations, however, it had to be set at a point along the channel bank similar to the Floodway Models. In the Floodway Models, such setting was necessary, as the encroachment stations had to be set on the river bank matching the effective Floodway encroachment width. See the *Beaver Pond Brook Floodplain/Floodway Analysis Report* for more detailed discussion on the Floodway encroachment and bank station setting.

For the main channel, a Manning's roughness coefficient of 0.04 was generally used, consistent with the Floodway Model. For the floodplain areas and upper portion of the channel banks, the Manning's roughness coefficients ranging from 0.02 to 0.08 were applied depending on the coverage type.

Throughout the model, the Ineffective Flow Area and Blocked Obstruction features in the HEC-RAS were utilized to incorporate the effects of buildings and other obstructions on the floodplains. At waterway crossings, the ineffective flow areas were set consistent with the recommendations in the HEC-RAS manual.

HYDRAULIC CONDITION AT AND IN THE VICINITY OF INDIVIDUAL STRUCTURES

Review of the Existing Condition analysis indicates that three (3) among the nine (9) existing waterway structures within the study limits would be overtopped by the 100-year flood. These are the Mulloy Road, westerly I-84 and Harpers Ferry Road crossings. In the event of the 500-year flood, three (3) additional crossings including the Pierpont Road, Westbound Exit 25 Off-Ramp and Scott Road structures would be overtopped by the flow; or only the Austin Road, Westbound Exit 25A On-Ramp and easterly I-84 crossings will not be overtopped. The hydraulic conditions at these crossings as well as at all the other structures are discussed below.

I-84 Westbound Exit 25A Off-Ramp to Austin Road, Structure No. 06580:

This is the most upstream hydraulic crossing within the studied reach of the Beaver Pond Brook. Although this bridge currently exists, it was not included in the model. Instead, it will be included in the Proposed Condition model only, so that the hydraulic effects of the structure can be determined by comparing the Existing and Proposed Condition models. A more detailed description is provided in the proposed condition narrative.

Austin Road Crossing, Structure No. 151-007:

This structure consists of a single cell, 37.3 m (122 ft) long concrete box culvert (rigid bottom) with an 2.44 m (8 ft) wide, 2.13 m (7 ft) tall opening. There are concrete wingwalls at both ends, and the top edge of the inlet is beveled. The structure appears to be in an overall good condition.

The analysis of the culvert indicates that it is hydraulically adequate conveying the 100-year design discharge with 1.1 m (3.6 ft) of freeboard to the I-84 WB pavement on the south side of the channel bank. The flow velocity at the outlet is 4.25 m/s (13.94 ft/s), which is relatively high. Nonetheless, the existing outlet condition appears stable. There is a rock outcrop at the outlet of the culvert which may be keeping the outlet stable.

I-84 Westbound Exit 25A On-Ramp from Austin Road, Structure No. 04323:

The culvert is consisted of 39 m (128 ft) long, twin 2.13 m (7') wide by 1.83 m (6') high concrete boxes. There are concrete wingwalls at both ends. This culvert was installed in 1980 when the Westbound Exit 25A On-Ramp was original constructed. The condition of the culvert is rated 7 (NBIS Item No. 62), according to the 2011 inspection report.

Similar to the Austin Road crossing, the analysis of the existing culvert indicates that it is hydraulically adequate with a freeboard of 4 m (13.2 ft) from the 100-year upstream water surface elevation. Similarly, the controlling point for the freeboard is the I-84 WB pavement on the south side of the channel bank. With respect to the top of the opening at the inlet, there is an underclearance of approximately one foot.

The average flow velocity through the twin boxes at the downstream end is 4.75 m/s (15.8 ft/s), which is high. Furthermore, immediately downstream of the culvert, the channel bends southwesterly by 110°. However, as the outlet channel is lined with Standard Riprap, there is no sign of degradation or erosion.

Pierpont Road Crossing, Structure No. 151-006:

This crossing is located near the eastern end of the project limit well beyond the limits of channel relocation and outside of the area physically affected by the subject project, which is discussed in detail in the description section for the Proposed Condition.

The crossing appears to be a concrete bridge with many resemblances to a culvert structure. As it has a 0.3-m (one-foot) wide pier at the center of the opening with natural streambed material at the bottom, it was modeled as a bridge. The pier has a semi-circular nose shape with tail. In the event of the 100-year discharge, however, the analysis indicates the shape of the pier would become somewhat irrelevant as the flow submerges the structure's low chord, and a pressure flow condition arises through the bridge. .

Depending whether the downstream end is submerged or not, the pressure flow condition can be described using either the orifice or sluice gate equation. In this case, the HEC-RAS program resorted to using the orifice flow equation with both ends of the structure being fully submerged. Regardless, the culvert fully conveys the design discharge while keeping the flow within the upstream channel banks

The computed 100-year outlet flow velocity was 2.8 m/s (9.2 ft/s). The water surface elevation upstream of the bridge (RS 7+937) was 141.29 M (463.54 FT). Based on this elevation, the flood flow would be at or contained within the State Non-Access Highway Line.

On the other hand, the analysis indicates the 500-year flood would not be contained causing the flow to pass over the roadway. The resulting 500-year elevation was 141.72 M (464.95 FT) with the velocity increased to 3.35 m/s (11 ft/s). There is a private property immediate upstream of the bridge on the north side. A residential building in the property would be affected by the flood. Over the Pierpont Road, the flow would spread approximately 100-meter (~330-ft) wide at the vertical sag of the road which is located directly above the bridge.

There is existing riprap on the channel banks on both sides of the brook, and appears stable.

Mulloy Road Crossing, Structure No. 151-005:

This crossing is also located well beyond the limits of the channel relocation and outside of the area physically affected by the project. Similar to the Pierpont Road structure, this crossing was modeled as a bridge with a 0.3-m (one-foot) wide pier at the center of the opening. The pier has a semi-circular nose shape.

The results of the analysis indicates that this structure is not adequate to convey the 100-year discharge, and thus would generate an overflow onto the roadway creating a pressure flow condition through the structure. The computed flow velocity through the opening was 2.57 m/s (8.4 ft/s).

Roughly 19% of the 100-year discharge would form weir flow over the road with the water surface elevation at 140.51 M (461 FT). The overflow would occur over the southerly approach to the bridge crossing. From the bridge, Mulloy Road runs westerly, approximately 520 meters (1,700 ft) between the I-84 embankment and the Beaver Pond Brook, and ends with a cul-de-sac. Downstream of the bridge, the overflow would mainly remain on the road, and gradually return to the channel until it completely merges with the main channel flow after the road ends.

Several private properties along Mulloy Road downstream of the bridge would be affected by the flood flow. Immediately downstream of the brook, there are commercial buildings on both sides. One on the east (north) side would not directly be affected by the flood, but could potential be affected by the backwater that escapes the main channel approximately 120 meters downstream of the bridge and swells toward where a low lying wetland area exists north of the brook. This wetland area extends easterly close to the commercial property. The flood delineation in this area is included in the flood boundary depicted in Figure 3.

On the west (south) side of the brook, a used car dealer/repair shop sits on a lower ground elevation, and could entirely be inundated by the flood flow. The analysis actually showed that as low as the 3-year water surface would come into contact with the building.

Just downstream of this commercial building, there a 3-story residential building that would be affected by the 100-year flow. The building appears to be a 20-unit apartment or condominium, each consisting of a garage in the first level. As it sits on a higher ground than the automobile shop, the extent of flood inundation would be less.

In the event of the 500-year flood, the overflow over the crossing would increase to 38% of the total flow with the water surface elevation at 140.76 M (461.8 FT), while the flow velocity increases to 2.74 m/s (9 ft/s) through the opening.

The storm frequency at which the overflow would begin to occur is approximately 72-year (see Appendix D).

I-84 Westbound Exit 25 Off-Ramp, Structure No. 02536:

Aligned on a 70° skew with the roadway, the crossing consists of a twin 2.44 m by 2.44 m (8 ft by 8 ft) concrete box that measures approximately 28.6 m (94 ft) in length along the brook.

The size of the culvert provides the total opening area of 11.9 m² (128 sq. ft.). This opening would be fully utilized in the 100-year flood event with 2.3 m/s (7.5 ft/s) outlet flow velocity and 0.2 m (0.7 ft) freeboard to the ground elevation at which the overflow begins. The computed upstream water surface elevation was 139.26 M (456.88 FT).

Downstream of the culvert, however, the flood would rise slightly above the top of the northerly channel bank allowing the flow to spread onto a low point of the off-ramp for a length of approximately 30 meters (100 ft). This area would not actively convey the flow, but rather create a shallow pool on the road.

In the case of the 500-year discharge, the upstream water surface elevation was 139.96 M (459.2 FT), which is a 0.7 m (2.3 ft) higher than the 100-year elevation. The increase would cause the flow to rise above the road and be conveyed over the ramp. The overflow amounts to 18% of the total flow, based on the analysis. Although the overflow would inundate the off-ramp for an approximate length of 145 m (475 ft), it should not affect the main I-84 travel lanes.

Scott Road Crossing, Structure No. 151-014:

The crossing consists of a twin 2.44 m by 2.44 m (8 ft by 8 ft) concrete box culvert dated 1952. The culvert is approximately 33.4 m (109 ft) long on a slope of 3%. This steep gradient has apparently contributed to the formation of large scour hole downstream of the concrete outlet apron. The resulting pool is approximately 8 meters (26 ft.) long by one meter (3 ft.) deep and has caused the culvert to be perched 0.6 m (2 ft.) above the normal level of the pool. The analysis indicates that the 100-year flow velocity at the outlet would be 6.38 m/s (20.9 ft/s) with entirely supercritical flow condition inside the culvert.

Similar to the Exit 25 Off-Ramp crossing, the total opening area of the structure is 11.9 m² (128 sq. ft.). This opening, which is inlet controlled, is hydraulically adequate to convey the 100-year flow. Although the roadway directly above the culvert is elevated approximately 6.5 meters (21 ft) above the invert of the culvert, the actual elevation at the overflow would occur is lower. The critical control elevation of the overflow is 138.1 M (453 FT) which is at the lowest top elevation of the ground that forms a berm between the

brook and the I-84 immediately upstream of the crossing. Above this elevation, the overflow would escape onto the I-84 pavement under the Scott Road overpass just south the culvert.

Such overflow would not occur with the 100-year discharge as the water surface elevation be at 0.9-m (3-ft) freeboard to this control elevation. However, in the case of the 500-year discharge, the constrictions at the crossing would generate significant upstream backwater causing the water surface elevation to rise above the southerly channel bank and spread onto the I-84 pavement. The extent of the flooding is discussed in the later section *Area of Flooding*.

Easterly I-84 Crossing, Structure No. 02537:

The structure consists of a twin 2.44 m by 2.44 m (8 ft by 8 ft) concrete box culvert with a length of approximately 46.2 m (152 ft). The crossing is severely skewed to the watercourse, at approximately 55° at the upstream side. At the downstream end of the structure, the crossing is skewed approximately 50° to the brook.

The hydraulic analysis indicates that the existing structure is hydraulically adequate for the 100-year discharge, as well as for the 500-year. The computed 100-year upstream elevation was 129.8 M (425.9 FT) which is 1.6 meters (5.2 ft) lower than the adjacent I-84 pavement elevation. Both the 100- and 500-year flood levels are confined to the channelized reach of the Beaver Pond Brook constructed as part of the original I-84 project.

The outlet flow velocity was relatively high at 4.46 m/s (14.63 ft/s). Even for the 2-year discharge, the analysis revealed high velocity at 3.25 m/s (10.7 ft/s). This supports the existence of a scour hole observed downstream of the culvert. The culvert is currently perched approximately 0.2 m (8 in.) above the normal pool elevation of the scour hole.

Westerly I-84 Crossing, Structure No. 01227:

The structure consists of a twin 3.048 m by 3.048 m (10 ft by 10 ft) concrete box culvert with a length of approximately 44.2 meters (145 ft). The crossing is severely skewed at an approximate 50° angle to the watercourse at the upstream end and again by the same amount at the downstream end. The analysis indicates that the 100-year flow velocities upstream and downstream of the structure would be 4.47 m/s (14.7 ft./s) and 4.22 m/s (13.8 ft/s) respectively.

The skew combined with high flow velocity due to steep gradient of the upstream channel has contributed to the formation of a gravel bar upstream; and to the downstream, the formation of a moderate size scour hole with the boxes perched 0.15 to 0.3 m (6-12 inches) above the elevation of the normal outlet pool. The formation of the scour hole has also affected the stability of the northerly channel bank 15 meters (50 feet)

downstream of the outlet. The bank is protected by large riprap (larger than standard size) at a slope steeper than 2H to 1V. There is evidence that minor undermining of the toe of the slope has occurred. Residential buildings are situated in very close proximity to the top of the slope and could possibly be affected by a slope failure.

The analysis also indicates that the 100-year discharge could overtop the inlet of the structure, though such overflow would be less than 0.1% of the total flow or 0.09 CMS (3.18 CFS). The overflow would continue westerly in the roadside swale south of the I-84. Since the overflow portion is relatively small and is well within in a range that can be intercepted by storm drainage inlets in the swale and directed back into the main channel, the delineation of the 100-year flood excluded the overflow path. As mentioned above, the hydraulic capacity of the existing structure is affected by an accumulation of gravel at the inlet of the easterly culvert barrel. During larger flood events it is probable that at least a portion of this gravel will be transported downstream due to increased channel velocities, temporarily improving the capacity of the crossing. Without considering the transient nature of the streambed, the culvert can convey up to 84-year frequency storm before the incipient condition occurs.

In the case of the 500-year flood, the overflow would increase to nearly 12% of the total flow or 10.17 CMS (359 CFS). The path of the 500-year overflow is discussed in the section *Area of Flooding*.

Harpers Ferry Road Crossing, Structure No. 03727:

The structure consists of a 30.6 m (100 ft) long, twin 3.048 m by 3.048 m (10 ft by 10 ft) concrete box culvert dated 1952.

This is the most downstream structure in the Beaver Pond Brook, and is located just upstream of the confluence with the Mad River. As the river affects the hydraulic condition through the structure, the tailwater condition had to be set reflecting the backwater from the river. In setting the tailwater condition, the joint probability of flood magnitudes from these two watercourses was considered, as discussed previously. Particularly for the 100-year flood analysis, it required using the 50-year backwater.

The hydraulic model indicates that the existing structure can adequately convey the 100-year flow. However, the computed upstream water surface elevation was higher than the critical elevation which is at the top of the northerly channel bank (this location is shown in Appendix D). Above this elevation, the flow could breach onto the northern floodplain where the existing grading is such that the overflow would continue in its northerly path toward the intersection of Harpers Ferry and Plank Roads, approximately 73 meters (240 ft) north of the culvert. From the intersection, the overflow would then eventually enter the Mad River. Thus, the 100-year discharge would actually cause an overflow that is routed northerly inundating a commercial property and a sag point of the road. In the hydraulic model, however, it is assumed that the flow is fully conveyed through the structure, as the path of the overflow falls within the ineffective flow region that was set

due to various physical constrictions on the floodplain. Due to such constrictions, the resulting conveyance of flow in the overflow path will be minimal. Further analysis of the model indicates that the culvert structure is capable of conveying up to a 74-year frequency flood before the overflow occurs.

In the case of the 500-year flood, the overflow would occur not only onto the northern floodplain, but also southerly onto the existing I-84. South of the culvert crossing, Harpers Ferry Road makes an overpass over I-84. Although Harpers Ferry Road directly above the culvert is elevated at least 7 meters (23 feet) above the channel bottom, the I-84 pavement is elevated just 3.5 meters (11.5 ft). Therefore, the overflow would be split around the structure toward north and south. The northerly flow would take the path as described above. Southerly, the overflow would travel under the Harpers Ferry Road overpass. Due to all the constrictions on the northern floodplain, the overflow would mainly be conveyed over the I-84 pavement as weir flow. This could amount to approximately 45% of the total flow, according to the model.

Among the studied flood magnitudes, the overtopping discharge (75-year) produced the highest flow velocity at the outlet with 5.32 m/s (17.5 ft/s). The 100- and 500-year velocities were 3.33 m/s (10.9 ft/s) and 3.15 m/s (10.3 ft/s) respectively

The results of the hydraulic analysis, specifically the water surface elevation and velocity data for the existing condition are tabulated in Tables 4 and 5 for the 100- and 500-year discharges respectively. These tables also contain the result of the proposed condition analysis for comparison, and are included in the narrative section for the Proposed Condition. The data particularly for the waterway crossings are summarized in Table 7 which is include in the *Summary* section.

For all the other flood magnitudes and for more detailed results of the analyses, see the HEC-RAS output tables included in Appendix B.

AREAS OF FLOODING

The map shown in Figure 3 has been prepared showing both the existing and proposed flood boundaries based on the 100- and 500-year floods. The existing condition boundaries have been delineated using the flood elevations determined at each cross section plotted along the contour lines developed from the project survey. Between the cross sections, the flood boundaries were interpolated.

The delineated width of flood generally matches the computed top width of flow except where the flood rises above the available data in a cross section. In such cases, the flood boundaries were extended to where the flood elevation matches the ground elevation. As indicated earlier, the computed elevation is still deemed adequate, as the area beyond the data included in a cross section does not contribute to the active conveyance of flow due to the significant constrictions.

The narrative included in this section of the report describes the flooding pattern between waterway structures and for the areas that were not discussed in the sections for the individual structures.

Upstream of the I-84 WB Exit 25A Off-Ramp, there is an existing berm which constricts, narrows and leads the flood flow into a channelized section of the brook. Before the Off-Ramp was constructed, this berm or dam had existed. This is the condition presented in the Existing Condition model. The model indicates the 100-year flood in the floodplain upstream of the berm would have been as wide as 75 meters (246 ft). It would narrow to 14 m (46 ft) wide at the entrance to the constricted section and then contract further to a width of approximately 6 m (20 ft). Along the changes in the flood width, the average channel velocity would increase from 0.24 m/s (0.8 ft/s) to 2.53 m/s (8.3 ft/s) and then to 4.23 m/s (13.9 ft/s).

The floodplain upstream of the berm was bordered by a private, access roadway along its northern edge. However, the water surface elevation would not have risen to the roadway elevation.

Downstream of the berm, the brook is confined and conveyed in the channelized section through the Austin Road crossing, through the Exit 25A On-Ramp crossings and as it approaches the Pierpont Road crossing. However, as indicated earlier, at the Pierpont Road crossing, the 500-year surges out of the channel and passes over the local road.

Downstream of the Pierpont Road crossing, more specifically 58 meters (190 ft) upstream of the Mulloy Road crossing (RS 7757), the 100-year flood boundary would widen to 64 meters (210 ft). In the vicinity of this location, there appears to a culvert under the road connecting this flood plain to a wetland north of Mulloy Road. The pipe would likely provide some flood relief and additional storage area as the water surface rises close to the top of the bank. This, however, was not included in the hydraulic model, in order to consider more restrictive condition (pipe being blocked and ineffective) and thus more conservative results. As indicated earlier, the flood flows would overtop the crossing in both the 100- and 500-year storm conditions. Especially in the case of the 500-year flood, even before reaching the crossing, it would surge higher than the Mulloy Road elevation, spreading northerly for a length of approximately 45 m (150 ft) along the road before it drops down and then approach the crossing, where it would overtop the road again. Due to the surge upstream of the crossing, the "super flood" would enter the northern wetland area even if the relief pipe is blocked. In the analysis, the storage gained in the wetland was again not considered. As it is discussed later, the flood storage aspect was assessed only for the areas where the flood storages volumes are physically affected by the project.

Downstream of the Mulloy Road crossing to 200 meters upstream of the Westbound Exit 25 Off-Ramp crossing, the 100-year flood would widen as much as 120 meter (400 ft) before being narrowed again and contained in the channel section. As described earlier, a number of private properties would be inundated by the flood within this area. In addition to the two commercial and one condominium/apartment buildings, there is one other private building at approximately 400 meters (1,300 ft) upstream of the exit ramp crossing that could be subjected to flooding at a lower magnitude storm than the design frequency. In fact, the model indicates that a storm event

greater than the 2-year frequency would inundate the property due to the inadequate hydraulic capacity of the adjacent channel section. The 100-year flood would inundates the entire property. There are other properties that would be partially affected by the 100-year flood. For these properties, minor buildings and structures such as sheds and swimming pools could be affected.

From 200 meters (650 ft) upstream of the ramp to the Scott Road crossing, the 100-year flood would be mostly contained within the channel except immediately upstream of the Scott Road. Upstream of Scott Road, the width of flow would change from approximately 10-12 meters (33 ft-40 ft) to 40 meters (130 ft). In case of the 500-year flood, the flow would extend above the natural floodplain and overflow further southerly onto the I-84 pavement. The overflow would likely to begin approximately 147 meters (380 ft) upstream of the crossing or 100 meters (330 ft) east of the Scott Road overpass over the Interstate route, and continue westerly along I-84. Once it passes under the Scott Road overpass, the flow on the Westbound section of I-84 would mostly return to the channel; however, on the Eastbound section, the flow could remain being diverted from the main channel and continue its westerly path in the roadside swale until it reaches the location downstream of the Easterly I-84 Structure No. 02537 where it can converge with the main channel flow. Nonetheless, in the hydraulic model as well as in the flood delineation, the diversion was not considered, as it was assumed that all the overflow returns back into the channel immediately downstream of the crossing. This approach is deemed more conservative in computing the flow velocity and water surface profile of the main channel. Even with the full flow, the model indicates that the downstream channel from Scott Road to the easterly I-84 crossing would adequately convey both the 100- and 500-year flows.

Similarly, from the easterly to westerly I-84 crossings, these large magnitude flood flows would mostly be contained within the channel, except at the immediate upstream of the westerly crossing. As indicated earlier, the 100-year discharge would result in an overflow over the inlet of the structure, but not in a significant amount to be considered in delineating the flood boundary. For the 500-year discharge, on the other hand, the overflow would be more significant based on its volume. As it cannot cross the I-84 and return to the main channel downstream of the crossing, the overflow would instead continue westerly in the roadside swale along the southern edge of the I-84 with some encroachment onto the pavement with an average flow width of 10 meters (33 ft). Nevertheless, it was assumed in the hydraulic model that the overflow in its entirety would return to the channel immediately downstream of the crossing, which is deemed to produce more conservative results.

Downstream of the westerly I-84 crossing to the Harpers Ferry Road crossing, the 100-year flood would mostly be contained within the channel except at the approach to the Harpers Ferry Road crossing. There the 100-year flood would begin to spread northerly, partially inundating a private property (for the region south of Plank Road only). Then, just upstream of the Harpers Ferry Road crossing, it breaches northerly inundating a property³ taken by the State and creating a shallow pool near the intersection with Plank Road, which is a sag point of the road, before finally overflowing into the Mad River. The flood boundary in this area was delineated

³ Mainly on the south side of Plank Road. These exclude the ones affected by the Mad River flow. For the information on additional properties being affected at this location, see the *Hydraulic Analysis For Design Report, Mad River*.

considering both the Mad River and the Beaver Pond Brook hydraulic conditions - mainly adopting whichever produced higher water surface elevation. As the results, the extent of the depicted flood boundary may be wider than suggested by the Beaver Pond Brook model.

In the case of the 500-year flood, at approximately 95 meters (312 ft) downstream of the westerly I-84 crossing, the “superflood” would spread in both the north and south directions. Northerly, the overflow would affect one additional private property³. Southerly, the flood would inundate both directions of I-84 and combine with the overflow from the westerly I-84 crossing (Structure No. 01227). The combined overflow would continue westerly and pass under the Harpers Ferry Road overpass and enter the Mad River downstream of the Structure No. 05774 (easterly I-84 crossing over Mad River). The 500-year flow from the Mad River would also overtop the Structure No. 05774. Accordingly, the overflow from the Beaver Pond Brook would combine with the Mad River overflow before entering the river downstream. The combination of these overflows would completely inundate the I-84 pavement for a length of approximately 300 meters (985 ft).

Proposed (Post-Project) Condition

DEVELOPMENT OF PROPOSED CONDITION MODEL

The Proposed Condition Model has been developed from sixty-eight (68) stream cross sections, excluding internal sections at the waterway crossings. As described previously, the total number of cross-sections is different compared to the Existing Condition because not all the sections in the Existing Condition model could feasibly be matched with a proposed condition section due to the new structure locations along with the brook relocation. For example, Sections 5281 and 5296 in the Existing Condition are located within the span of the proposed easterly I-84 Culvert No. 01227. This culvert is bound by the Sections 5224 and 5355 in the Proposed Condition model, and placing additional sections between them is not possible in the HEC-RAS.

The number of cross sections within the main relocation limits is twenty (20). Although most of these sections have a corresponding section in the existing condition model (by the River Station number), their exact location and orientation are not truly the same due to the relocation. In placing these Proposed Condition sections, the intent was to have at least one common point or intersection with an existing cross section where the comparison of the pre- and post-project conditions may be critical while abiding by the general practices of cutting sections - normal to direction of flow and sufficient coverage to contain all flow ranges of the study. This ensures that the cross sections in the Existing and Proposed Condition models at a common river station are placed at a reasonably comparable location.

Some of the sections were at first cut from the DTM surface file of the project survey; then, modified to reflect the proposed changes. For other sections, particularly within the proposed relocation limits, a merged three-dimensional surface file of the proposed design over the original survey was used.

The Manning's roughness coefficient for the main channel including the relocation limits was set at 0.04 consistent with the existing condition model. This is within the recommended range of roughness for the proposed Standard Riprap channel banks, gravel streambed with occasionally placed boulders, and other in-stream features. See the *Final River Relocation Report* and the design plans for the detailed aspect of the proposed channel design.

The Ineffective Flow Area and Blocked Obstruction settings were consistently used to reflect the buildings and other obstructions on floodplains as well as at the waterway crossing.

COMPARISON OF WATER SURFACE PROFILE AND AREA OF FLOODING TO EXISTING CONDITION

As indicated earlier, the Figure 3 depicts both the existing and proposed condition flood boundaries illustrating how this project affects the area of flooding in the event of the high magnitude storms. In addition, a map showing only the proposed condition flood boundaries has been prepared to provide a clearer depiction of the post-construction condition, which is shown in Figure 4. Whereas the existing flooding limits were drawn based on the contour lines developed from the project survey, the proposed condition flooding limits were established based on the design contour lines provided by Ammann & Whitney. These flooding limits match the computed top width of flow at most cross sections included in the model. In some cases, however, the flooding would occur wider than the computed width if it rises beyond the available data in a cross section. In such cases, the flood boundaries were extended to where the flood elevation matches the ground elevation. Between the cross sections, the flood boundaries were interpolated.

For comparison of the flood profiles, Figures 5 and 6 have been prepared for the 100- and 500-year floods respectively. These were developed based on the data reflected in the Tables 4 and 5. Reviewing these figures indicates that the proposed 100-year flood profile will generally be either lower or closely matching that of the existing condition. The lowering of the water surface elevation is immediately evident near the upstream limit of the study. However, the decrease is not resulting from the subject State project. As this area is affected by the I-84 Westbound Exit 25A Off-Ramp structure, the hydraulic condition for this upstream end of the reach will be discussed later in the separate section for that structure.

Where the project does affect the flood elevation, many areas will see lowering of the water surface. Among such areas, the vicinity of the existing I-84 Westbound Exit 25 Off-Ramp crossing (Structure No. 02536) reveals the most significant decrease, which may be attributed to the proposed removal of the structure and the downstream channel relocation which involves lowering the streambed. Upstream of the off-ramp structure (at Section 6890), the decrease in the 100-year water surface elevation will be 1.54 m (5.05 ft). In the case of the 500-year flood, the decrease will be 1.86 m (6.1 ft), which is found to be the greatest within the study limit. These decreases gradually diminish and converge with the existing flood profile at the downstream end of the Mulloy Road bridge, approximately 840 meters (2,750 ft) upstream of the structure. The effects of removing the off-ramp crossing and relocating the channel can reach this far upstream because of the relatively flat gradient of the existing channel. This gradient will not be altered by the proposed work. Note that the retaining walls (No. 109 and 111) are proposed along the northern edge of I-84 in the vicinity of the Exit 25 Ramp and Mulloy/Pierpont Roads such that the fill necessary for the construction of the I-84 does not encroach into the floodplain in this upstream region. Therefore, the changes in the water surface elevation that occur here are mainly due to the removal of the off-ramp crossing and channel relocation.

The decrease in the flood elevation in this reach affects numerous private properties situated along the brook that would be impacted by both the 100- and 500-year or only by the 500-year flood. They will likely see the flood level receding, though most of them will continually be

impacted by the floods to some degrees. Among these properties, one private property will seem to benefit most from the decrease. This property, which is located between the channel and the roadway approximately 90 meters (300 ft) downstream of the Mulloy Road crossing (Section 7589), consists of the 3-story residential building mentioned in the existing condition description. In the existing condition, the 100-year flood would come in contact with the building. The proposed condition decreases the water surface elevation such that a buffer for an average distance of 5 meters (15 ft) around the building will be created. Conversely, the properties near the eastern end of the project limits will see little differences in flooding along the brook.

Toward the downstream side of the off-ramp structure, the decrease in the flood elevation becomes greater. Between Sections 6809 to 6732, approximately 33 to 108 meters (108 to 354 feet) downstream, the decrease will peak at around 1.7 m (5.6 ft) in the 100-year flood. Then, it will reduce to one meter (3.3 ft) upstream of the Scott Road crossing (Culvert No. 014). The extent or size of the 100-year flood floodplain, on the other hand, will increase, as it spreads onto the floodplain terrace that will be purposely created upstream of the Scott Road crossing within the relocation limit. The terrace will encourage the development of a floodplain wetland vegetative community similar in character to the one found along the current stream alignment immediately upstream of Scott Road. The design aspect of the terrace is described more in details in the *River Relocation Report*.

In the case of the 500-year flood, the area of flooding in the vicinity of the Interchange 25 (Scott Road) will be reduced largely due to elimination of the overflow that would have spread across the I-84 in the existing condition. One of the factors that involve preventing the overflow is the decrease in the water surface elevation as the result of the relocating the channel northerly and lowering its thalweg elevation. Although the amount of decrease gradually reduces from 1.86 m at the exit ramp site to 1.3 m (4.3 ft) upstream of the Scott Road crossing, the decrease is more than sufficient to contain the flow within the flood terrace.

Due to the channel relocation, the 500-year floodplain as well as the 100-year will predominantly be situated north of the existing floodplain between East Main Street and the new exit ramp, except where they match at the relocation limits. All the properties that are fully or partially affected by the new floodplain within the relocation limits have been acquired by the State or already belong to the existing State's ROW.

Downstream of the Scott Road culvert, and as the flow approaches the new Plank Road East crossing (Culvert No. 06622), the flow depth increases due the constriction from the structure. The Existing Condition flood profile, on the contrary, makes a steep decline as the gradient of the channel steepens. These differences result in the higher Proposed Condition flood profiles than the Existing Condition from Sections 6409 to 6266, or from 35 m (116 ft) upstream to 59 m (195 ft) downstream of the Plank Road East culvert. Between these sections, an increase of 1.11 m (3.64 ft) in the 100-year flood elevation will occur at the upstream station of the Plank Road East culvert (Section 6394). For the 500-year flood, the increase will be 1.64 m (5.38 ft). These are the greatest increases that occur within the studied limits. However, as the geometry of the proposed channel here has been designed to adequately contain the flood flows, the resulting 500-year water surface will still be 2 m (6.5 ft) below the top of the channel bank

The 100-year flood profiles for the Existing and Proposed Conditions briefly converge at Section 6266 (which is the downstream relocation limit), then rises higher again, as it approaches the easterly I-84 crossing (Culvert No. 02537) because of the additional energy losses associated with the proposed lengthening, increased roughness and reduced hydraulic opening of the culvert due to the installation of baffles. The increase at the upstream section of the culvert (Section 6033) will be 0.23 m (0.75 ft). For the 500-year flood, it will be 0.38 m (1.25 ft) which will be contained within the main channel, about 1.2 m (4 ft) below the top of the channel bank.

Just downstream of the culvert at Section 5947, the analysis indicates that the Existing and Proposed Condition profiles will converge (0.00 ft difference) at Section 5947, but also indicates that the Proposed Condition velocity will be lower due to the larger flow area from the slight widening of the channel.

Approximately 154 meters (505 ft) downstream of the proposed easterly I-84 culvert, there is an existing concrete weir that will remain physically unchanged in the post-project condition. The 100-year Proposed Condition water surface profile upstream of and over the weir will also remain the same as the Existing Condition.

At approximately 461 meters (1,514 ft) downstream of the weir, a new westerly I-84 Culvert No. 01227 is proposed placing its inlet approximately 75 meters (246 ft) upstream of the existing I-84 structure due to the extended length to accommodate the new Plank Road East extension and the realignment/widening of I-84. Consequently, the confluence with East Mountain Brook will also be relocated approximately 25 meters (82 ft) upstream, just upstream of the new culvert between Sections 5355 and 5422. This changes the flow condition at the Section 5355, as it will be subjected to the additional flow from the East Mountain Brook, whereas only the Beaver Pond Brook flows through in the existing condition.

Although the hydraulic opening will be larger than the existing structure, the extended length and increased interior roughness of the proposed crossing combined with the additional flow from the East Mountain Brook will produce an increase of 0.71 m (2.33 ft) in the 100-year flood profile upstream of the culvert. The effects of the increase or backwater gradually diminish ending at approximately 277 m (910 ft) upstream of the culvert. Nonetheless, the 100-year floodplain for the proposed condition will still be confined within the main channel and inside the State's Non-Access Highway Lines, as it is with the existing condition.

On the other hand, in the case of the 500-year flood, the increase at the inlet becomes 0.9 m (3 ft) and causes the water surface to rise above the channel bank and above the realigned Reidville Drive roadway elevation. The overflow will spread southerly across the road; but no diversion of flow will occur, as the inlet happens to be located near vertical sag of the realigned roadway which confines the flooding to this location. The area of flooding will be limited within the State's ROW.

From the inside of the westerly I-84 culvert at its upstream end to the confluence with the Mad River, the 100-year Proposed Condition flood profile will drop and stay below the existing profile. This is primarily due to the lowered tailwater condition at the confluence and increased hydraulic capacity of the new Harpers Ferry Road Culvert No. 03727. Between the westerly I-

84 crossing and the Harpers Ferry Road culvert, the maximum decrease will be 0.3 m (0.98 ft) occurring at Section 5145, about at the midpoint between Harpers Ferry Road and the westerly I-84 crossing. The decrease is sufficient enough to prevent the overflow toward the intersection of Plank and Harpers Ferry Roads, though the intersection will still be flooded by the overflow from the Mad River. The 100-year flood will rise above the southerly main channel bank and spread into the excavated area of the existing I-84 embankment, adjacent to the proposed Plank Road East's north embankment. Northerly, the flood flow will spread, in limited locations, up to 12 meters (40 ft) beyond the existing non-access highway line, as it would in the existing condition. Two (2) properties (#30 & #31 Plank Road) located southeast quadrant of the intersection have been acquired by the State. Next to these properties toward east, one more property (#29) will be affected by the 100-year flood. The degree of flooding in this property will, however, be less than the existing condition.

In the case of the 500-year flood, although the depth and extent of flooding will be less than the existing condition, the flooding pattern north of the brook will not be changed much affecting the same number of private properties. This minimal change north of the brook can be attributed to significant change that will occur south of the brook. In the proposed condition, the southerly spread of the 500-year overflow will be curtailed by the Plank Road East's embankment which will be constructed over the existing I-84. The I-84 at this site will be reconstructed in a new alignment south of the existing location, and will no longer be affected by the "super flood". Since this new geometry limits the conveyance on south side of the brook, it is balanced by increasing the proportionality of the conveyance toward the north side. However, with the lower tailwater condition (the Mad River backwater) and the greater hydraulic opening at the Harpers Ferry Road crossing, the 500-year flood profile will still be lowered by 0.1 m (0.33 ft) just upstream of the crossing.

The lowered 500-year flood profile briefly converges with the existing profile at Section 5145. Upstream of the section to the downstream of the westerly I-84 crossing, it returns below the existing profile and remain contained within the channelized section.

Within the studied limits, the overall area inside the 100-year flood boundary will be reduced by approximately 2% from 104,195 m² (25.8 acres) to 102,025 m² (25.2 acres). In the case of the 500-year flood, the areal reduction will be 17% from 152,660 m² (37.2 acres) to 125,624 m² (31.0 acres). The effects of the loss of flood storage are discussed in the section following the descriptions for the individual structures.

The Tables 4 and 5 showing the results of the Existing and Proposed Conditions hydraulic analyses accompanied by Figures 5 and 6 illustrating the differences in the flood profiles are provided in the following pages. These show the 100-year design and 500-year check flood profiles. As indicated previously, for all the other flood magnitudes and for more detailed results of the analyses, see the HEC-RAS output tables in Appendix B.

The hydraulic conditions at the proposed waterway crossings are discussed in the following section.

HYDRAULIC CONDITION AT AND IN THE VICINITY OF INDIVIDUAL STRUCTURES

Review of the Proposed Condition analysis indicates that one (1) waterway structure among the ten (10) within the studied limits will still be overtopped by the 100-year flood, which is two (2) less than the existing condition. The overtopped structure is the Mulloy Road bridge. In the event of a 500-year storm, two (2) additional structures which are the Pierpont and Harpers Ferry Road crossings will be overtopped by the flood flow, which represents three (3) less than the existing condition. Among the structures to be replaced under this project, only the Harpers Ferry Road crossing will be overtopped under the 500-year. In the case of the 100-year design discharge, all of the proposed structures are hydraulically adequate. The post-project hydraulic conditions at these crossings as well as at all the other structures are discussed below.

I-84 Westbound Exit 25A Off-Ramp to Austin Road, Structure No. 06580:

Under the previously State Project No. 151-274, the I-84 Westbound Off-Ramp to Austin Road including Bridge No. 06580 was constructed in 2006. In the pre-construction condition before the bridge was built, there was a berm with a 4.3-m (14-ft) wide bottom opening (Section 8573) which abruptly narrowed the wide 100-year upstream floodplain, as described previously.

The berm in large part still exists today, as the new bridge was built just downstream of it with the intention of not affecting it. Based on the latest hydraulic survey, on the other hand, the southern portion of the berm had been impacted by the construction of the ramp and was partially removed. This increased the opening width resulting in a general decrease in the upstream water surface elevation. At the immediate upstream section, on the other hand, the analysis shows a brief increase. For example, the decrease (from Sections 8583 to 8722 or upstream limit of the hydraulic study) is as much as 0.16 m (0.5 ft) in the 100-year and 0.12 m (0.4 ft) in the 500-year flood.

At the immediate upstream Section 8573, on the other hand, an increase of 0.13 m (0.4 ft) occurs for the 100-year flow. On the contrary to the hydraulic grade line elevation (water surface elevation), the energy gradeline elevation at this section is actually lower, just as the further upstream locations. Thus, the difference in the velocity head is translating into the brief increase. The velocity decreases from 2.53 to 1.52 m/s (8.3 to 5 ft/s) at Section 8573. The larger flow area is attributing to the decrease in the flow velocity.

Although the general upstream flood elevations will be lowered, it is not expected to significantly change the flood storage value of the floodplain considering its size and the degree of the decrease in respect to the overall drainage area.

Austin Road Crossing, Structure No. 151-007:

This structure will not be affected physically or hydraulically by this project. Under the Project No. 151-274, the I-84 Westbound south of the brook was widened and its profile

altered which is reflected as the difference between the Existing and Proposed Condition models.

Upstream of the structure at Section 8464, lowering the pavement and the adjacent fill slope caused the 500-year floodplain to expand wider than the condition before the construction was completed. Nonetheless, it did not affect the flood elevation.

The 100-year flood is contained within the main channel and thus was not affected by the construction. The flow velocity through the crossing will not be changed.

I-84 Westbound Exit 25A On-Ramp from Austin Road, Structure No. 04323:

This structure too will not be affected by the project physically or hydraulically. Under the Project No. 151-274, the Westbound Exit 25A On-Ramp was raised by as much as 0.9 m (3 ft). The fill slope from the raised ramp matched back to the original slope near the 500-year flood elevation. Therefore, the construction did not affect any of the analyzed flow conditions.

Pierpont Road Crossing, Structure No. 151-006:

There are no proposed physical changes to this crossing except for the construction of the retaining walls for the widening of I-84. The walls are however located such that they do not encroach into the floodplain. The analysis indicates that this structure will not be hydraulically affected under the 100-year flood and by a miniscule degree under the 500-year flood, as the effects of the removal of the existing downstream structure at the Westbound Exit 25 Off-Ramp (Structure No. 02536) and the channel relocation work reaches this far.

As described in the Existing Condition section, the 500-year flood overtops the structure and flows over the road. The elevation of the overtopping flow will not change at the crossing; however, immediately downstream of the crossing, the model shows an increase of 0.01 m, which appears to be extending from the Mulloy Road crossing. The increase is not large enough to have any significant impact on any private properties.

Mulloy Road Crossing, Structure No. 151-005:

Similar to the Pierpont Road crossing, no physical changes to this crossing are proposed. The hydraulic condition at this crossing is affected only by the removal of the downstream Structure No. 02536 and the channel relocation work. The 100-year water surface elevation at and upstream of the crossing will remain same as the existing condition. Downstream of the crossing, it will be lowered by 0.02 m (0.06 ft), which is extended from the decrease occurring from the farther downstream work.

Although the overtopping elevation over the structure will remain the same as the existing condition for the 100-year flood, the analysis indicates the overtopping flow will be lower or the flow passing through the bridge will be higher in the proposed condition, as the downstream tailwater condition is lower. The decrease in the overtopping flow will be reduced from 4.57 to 4.26 CMS (161.4 to 150.4 cfs). This represents a 2% reduction in the percentage of the overflow to the total flow, from 19% to 17%. As more of the 100-year flow will pass through the bridge opening, the velocity will increase by 0.05 m/s (0.16 ft/s) to 2.62 m/s (8.6 ft/s). This increase in the flow velocity will not adversely affect the area, as there rather appears to be an issue of sediment accumulation due to the relatively flat gradient of the channel.

For the 500-year flood, the overtopping flood elevation will also be lowered by 0.21 m (0.69 ft). The decrease in the water surface elevation also occurs at the upstream face; however, further upstream, the decrease changes to an increase in the range of 0.01 to 0.02 m extending to the Pierpont Road crossing. This appears to be due to the change in the overflow volume not at the crossing but at the further upstream location, in the vicinity of Section 7698 to 7757 where the "superflood" passes over Mulloy Road briefly and enters the northern wetland. The amount of the overflow into the wetland will be reduced, as the Mulloy Road structure conveys more flow through its opening. The reduction in the northerly overflow seems to cause the increase in the upstream flood elevation. Although this is how the one-dimensional hydraulic model simulates the flood condition, the increase is not likely to occur in reality. Nonetheless, even if such increase is to occur, it is not substantial enough to pose adverse impact on the nearby private properties.

Scott Road Crossing, Culvert No. 014:

The proposed structure will consist of a twin 2.5 m (8.2 ft) wide by 3.0 m (9.8 ft) high concrete box culvert with a length of 43 meters (141 ft). The structure will be located within the 705 m (2,310 ft) reach of the relocated Beaver Pond Brook. The relocation is proposed as an alternative to constructing a single, 540 m (1770 ft) long culvert in the vicinity of I-84 Exit 25. Instead, two much shorter culverts are proposed: Culvert Nos. 014 and 06622. The Culvert No. 014 will be located 50 m (164 ft) upstream of the Culvert No. 06622, Plank Road East.

To reduce the gradient of the proposed structure, the upstream invert of the proposed crossing has been lowered approximately one meter (3 ft) below the existing Scott Road culvert. The resulting slope of the Culvert No. 014 is 2%. Additional flattening was not pursued due to construction concerns relating to increased excavation depths.

The proposed culvert barrels will be fitted with 220-mm (8.7-inch) high concrete baffles to serve as internal energy dissipation elements and also facilitate fish passage. Using the procedure from "Design Considerations and Calculations for Fishway through Box Culverts", September 1976, a composite Manning's n-value of 0.031 was computed and

used in the analysis. The computations of the roughness value at all the proposed crossings are included Appendix C.

Using the baffles, the resulting 100-year flow velocity will be 3.88 m/s (12.73 ft/s) at the outlet, which is significantly lower than the velocity of 6.38 m/s (20.9 ft/s) at the existing Scott Road structure's outlet. The 100-year water surface elevation upstream of the culvert (Section 6473) will be 136.15 M (446.7 FT). This is 3.8 meters (12.3 ft) below the design control point which is at the vertical sag of the proposed sidewalk at the upstream side of the crossing. The 500-year flood elevation will be 3 m (9.8 ft) below the control point, and 1.30 m (4.3 ft) lower than that Existing Condition flood elevation.

Plank Road East, Culvert No.06622:

The proposed structure will consist of a twin 2.5 m (8.2 ft) wide by 3.0 m (9.8 ft) high concrete box culvert with a length of 48 meters (157 ft). As indicated earlier, this culvert will be located within the 705-m (2,310-ft) reach of the relocated Beaver Pond Brook, 50 meters (164 ft) downstream of the proposed Culvert No. 014. This culvert will also be fitted with 220-mm (8.7-inch) high concrete baffles providing a composite Manning's n-value of 0.031.

The resulting outlet flow velocity will also be 3.88 m/s (12.73 ft/s). The 100-year water surface elevation upstream of the culvert (Section 6394) will be 134.22 M (440.35 FT), which is 1.11 m (3.64 ft) higher than the Existing Condition. The increase is the direct result of placing of the new structure where there is no comparable existing structure, as well as setting the thalweg elevation higher due to the channel relocation. The increase will still be contained within the channel, as indicated earlier. The 500-year upstream water surface elevation will be 135.05 M (443.1 FT).

Easterly I-84 Crossing, Culvert No. 02537

The crossing will consist of upstream and downstream extensions to the existing twin 2.44 m by 2.44 m (8 ft by 8 ft) concrete box culvert. The extensions are needed to accommodate two additional travel lanes (one in each direction) along the I-84. The extension will be approximately 11 m (36 ft) at the upstream end and 3.5 meters (11.5 ft) on the downstream side. The overall length of the crossing will be increased to approximately 61 m (200 ft).

The upstream portion of the proposed structure will have a curved alignment to eliminate the current skewed configuration. This is expected to improve hydraulic entrance conditions and lessen the potential accumulation of gravel at the upstream end which could reduce conveyance. Also at the inlet, the top edge of the culvert barrels will be beveled to improve the entrance loss coefficient to 0.2.

The westerly barrel will be fitted with 220-mm (8.7-inch) high concrete baffles. This provides the composite Manning's roughness of 0.032 for the studied flow conditions.

With the baffles and extensions at both ends, the hydraulic losses through the crossing will be increased resulting in the upstream 100-year water surface elevation to rise to 130.03 M (426.6 FT) from 129.8 M (425.85 FT). The 500-year water surface elevation at the upstream will be 131.24 M (430.58 FT), rising from 130.86 M (429.33 FT) of the Existing Condition. In both the 100- and 500-year flood conditions, the flow will be contained within the main channel.

With the rise in the water surface elevation, the resulting upstream channel flow velocity will be reduced. The most significant reduction will occur at the immediate upstream section by 0.23 m/s (0.8 ft/s), which is from 1.26 m/s (4.1 ft/s) to 1.03 m/s (3.4 ft/s). Along with the proposed riprap revetment, the velocity reduction will minimize the potential for undermining at the toe of slope.

The outlet flow velocity for each barrel of the culvert will be different as only one of them will be fitted with the baffles. For the west barrel, the one with baffles, the outlet velocity will be 3.79 m/s (12.43 ft/s), which is 0.67 m/s (2.2 ft/s) lower than the existing condition. However, the velocity outlet of the east barrel will be 4.6 m/s (15.09 ft/s) or 0.14 m/s (0.46 ft/s) higher than the existing condition. In order to provide a stable channel downstream, a rock ramp is proposed approximately 11 m (36 ft) downstream of the culvert which consist of a series of three concave (pointing upstream) boulder weirs installed across the channel and backfilled with rounded stone riprap. The boulder weirs provide structural support for the ramp while the rounded stone riprap is placed to simulate a natural streambed and minimize potential subsurface flow conditions. More detailed aspect of this design is described in the *River Relocation Report*.

Westerly I-84 Crossing, Culvert No. 01227:

This structure will consist of a twin 3.5m (11.5 ft) wide by 3.3 m (10.8 ft) high concrete box culvert. To facilitate construction staging, the proposed culvert will be situated approximately 1.5 m (5 ft) west of the existing crossing. The length of the proposed structure will be increased to 113 meters (371 ft) to accommodate both the realignment of the Interstate and the extension of Plank Road East to Harpers Ferry Road. The length of the channel relocation upstream of the proposed culvert is approximately 88 meters which is necessary to match into the existing channel.

The upstream portion of the proposed structure will have a curved alignment to eliminate the current skewed configuration. This is expected to alleviate the existing gravel deposition condition and improve hydraulic conveyance. Also at the inlet, the top edge of the culvert barrels will be beveled to improve the entrance loss coefficient to 0.2. To improve exit flow conditions, the proposed outlet channel from Culvert No. 01227 will have a curved alignment that matches into the existing watercourse. This culvert will also be fitted with 220-mm (8.7-inch) high concrete baffles providing a composite

Manning's n-value of 0.031. The resulting outlet flow velocity is 3.57 m/s (11.7 ft/s) which is 0.65 m/s (2.1 ft/s) lower than the existing condition. Downstream of the culvert, a preformed scour hole will be constructed to further dissipate the energy. The northerly bank will be flattened to 2H to 1V and protected with a toed-in Standard Riprap revetment. This design combined with the reduction in the flow energy will provide improved protection of the bank and, thus, of the residential properties on the north side of the channel.

Although the hydraulic opening of the proposed culvert is larger than the existing structure, the 156 % increase in length combined with the increased roughness from the baffles will generate a greater hydraulic loss through the structure. The friction loss through the structure for the 100-year flow will be 1.87 m (6.1 ft), as opposed to 0.15 m (0.5 ft) through the existing structure. Moreover, as described earlier, shifting the outlet of the East Mountain Brook northerly just upstream of the proposed culvert places additional flow at the inlet location. These conditions will produce the 100-year water surface elevation of 117.95 M (386.98 FT) at the upstream station of culvert (Section 5355), which is 0.71 m (2.33 ft) higher than the existing condition. It will still be contained within the main channel.

The water surface elevation and the increase there for the 500-year flood are 118.84 M (389.9 FT) and 0.85 m (2.8 ft) respectively. As discussed previously, from the inlet to the upstream Section 5422, the flow overtops the southerly channel bank and causes flooding on Reidville Drive. In the existing condition, as the inlet is located close to the drainage swale parallel to the I-84 Eastbound, the overflow would have been carried westerly by the swale and eventually enter Mad River. In the proposed condition, on the other hand, no diversion of flow will occur. Although the flood water surface will elevate above the vertical sag point of the realigned Reidville Drive near the inlet and spread across the road, the geometry of the sag confines the flooding to this location.

Harpers Ferry Road Crossing, Culvert No. 03727

A structural investigation of the existing culvert indicated that extending the boxes to accommodate the realignment of Harpers Ferry Road is not practical due to inadequate capacity. Accordingly, a new culvert is proposed which will consist of twin 3.5 m wide by 3.7 m high (11.5 ft by 12.1 ft) concrete boxes. The length of the proposed culvert will be 31.5 meters (103 ft) which is approximately the same as the existing structure. However, the proposed structure will be located 8 meters (26 ft) downstream of the existing crossing to accommodate the realignment of Harpers Ferry Road. Also, to facilitate construction staging, the centerline of the proposed culvert will be shifted 1.2 m (4 ft) southerly of the existing structure's alignment.

This culvert will also be fitted with 8.7-inch (220-mm) high concrete baffles, but backfilled with 600 mm (2 ft) of gravel streambed material as well. The baffles will help retain the gravel inside the culverts. The baffles will also serve as internal energy dissipation elements and facilitate fish passage if the gravel is eroded away. The culvert's

internal roughness value was estimated with the consideration of the streambed material in-place. The composite Manning's n-value of 0.029 was used for the analysis.

As this culvert is affected by the backwater from the Mad River, the tailwater condition for the 100-year flood analysis had to be set based on the 50-year water surface elevation of the river, as indicated earlier. This tailwater condition will be lower in the proposed condition as the proposed work along the Mad River results in a lower water surface profile at the confluence. Refer to the *Hydraulic Analysis For Design Report, Mad River* for the detailed hydraulic analysis of the river.

Anyway, the lower tailwater condition combined with the larger hydraulic opening of the proposed culvert allows the conveyance of the 100-year discharge through the crossing without causing flooding in the area north of the brook. The 100-year water surface elevation upstream of the culvert (Section 5065) will be 114.79 M (376.6 FT) which is 0.3 m (1.0 ft) below the critical design control elevation. The control is the lowest top elevation of the northern channel bank. Northerly from this point away from the channel, the grading of the existing ground is such that the flow will be directed to the intersection of Plank and Harpers Ferry Roads.

The outlet flow velocity for the 100-year discharge will be 3.01 m/s (9.9 ft/s) which is 0.32 m/s (1.1 ft/s) lower than the existing condition.

In the case of the 500-year flood, the water surface will rise to the elevation of 115.82 M (380 FT) or 0.72 m (2.4 ft) above the top of the northern channel. Hence, the overflow onto the northern floodplain will continually occur in the similar pattern as the existing condition, but to a less extent. Southerly, the flood will be blocked from entering the I-84 pavement by the new Plank Road East embankment, which will be constructed between the Beaver Pond Brook and the realigned I-84.

EFFECTS ON STORAGE AND DISCHARGES

It is anticipated that the proposed changes along the Beaver Pond Brook will decrease the effective flood storage volume resulting in an increase in the peak discharge throughout the studied reach, especially at the confluence with the Mad River. It is estimated that the increase could be as much as 10 to 20% in the case of the 100-year discharge.

Starting at the upstream limit of the brook relocation, the removal of the Westbound Exit 25 Off-Ramp Structure No. 02536 will eliminate the existing constriction resulting in lower water surface elevations at the upstream reach, as demonstrated in the HEC-RAS models. Approximately 220 meters upstream of the structure, the floodplain widens significantly providing roughly 51,200 m³ (41.5 ac-ft) of storage before the structure begins to overtop. With the removal, less flood flow will be detained in the floodplain resulting in a higher peak discharge at the existing ramp site along with a faster time-to-peak.

The reduction in the flood storage will be slightly compensated downstream of the off-ramp crossing, upstream of the Scott Road Culvert No. 014. Here, the available flood storage will be increased significantly with the proposed floodplain terrace. However, as the opening size of the proposed culvert which serves as the main outlet is larger than the existing Scott Road structure, it will not be effective in detaining and reducing the peak flow until a larger magnitude flood such as the 500-year discharge is directed to the crossing. Therefore, the increase in the peak discharge resulting at the removal site of the Exit 25 crossing will be maintained through this location.

The increase will continually be passed downstream through the Plank Road East culvert and both the easterly and westerly I-84 crossings. No change in the effective flood storage is anticipated at these crossings, as the immediate upstream areas lack any significant flood storage, and as the flood flows are confined to the trapezoidal channel in both the existing and proposed conditions.

At the Harpers Ferry Road crossing, the available physical storage will be slightly increased due to the proposed westerly realignment of the road and thus resulting in a somewhat larger floodplain area east of the crossing. As the depth of storage on the floodplain is relatively shallow due to a negligible difference between the top elevation of the channel bank to the minimum elevation where the weir flow over the road begins to occur, the storage of flood flow will mainly take place in the channel which does not have significant volume. Hence, the increase in the peak discharge from the upstream reach will likely pass through the crossing, again without being changed much.

In summarizing the above, it can be concluded that the removal of the Westbound Exit 25 Off-Ramp crossing will cause an increase in the peak flow, and that the increase will mostly be transferred to the Mad River at a faster time-to-peak.

Although the peak discharge through the reach will increase, the resulting flood width and boundary will not be much different than computed in the HEC-RAS models and shown on the Figure 3 and 4. At the confluence with the Mad River, a greater decrease in the water surface

elevation is rather anticipated than indicated in the models. As the Mad River which has a larger watershed area would have a longer time-to-peak, the faster time-to-peak from the Beaver Pond Brook will further stretch the time differential between these watercourses. This means that when the peak flow from the Mad River reaches the confluence, the discharge from the Beaver Pond Brook may be lower in the proposed condition since the brook's peak flow shall already have passed through sooner than in the existing condition. The reduction in the river's peak discharge translates to a lower backwater and tailwater to the brook. Then, the lower tailwater condition compensates for the increase in the peak flow at and upstream of the Harpers Ferry Road culvert.

For the upstream locations of the westerly and easterly I-84 culverts as well as the Plank Road East culvert, the channel will adequately convey the increase in the 100-year design discharge, as it has the sufficient capacity to handle even the 500-year discharge as modeled in the hydraulic analysis. The 500-year discharge is roughly 50% larger than the 100-year discharge.

Upstream of the Scott Road crossing, even with the increase in the peak flow due to the reduced detention at the Exit 25 ramp crossing, the resulting water surface elevation is anticipated lower than the existing condition.

Once the increased peak discharge enters the Mad River, how it affects the river hydraulics is discussed in the *Hydraulic Analysis for Design Report, Mad River*.

**TABLE 4. Proposed versus Existing Condition
100-Year Discharge (CT DOT Q)
Beaver Pond Brook, Waterbury**

NGVD-29

FEMA Sta.	River Sta.	Metric						English					
		Existing Condition		Proposed Condition		Difference		Existing Condition		Proposed Condition		Difference	
		W.S. Elev. (m) (1)	Velocity (m/s) (2)	W.S. Elev. (m) (3)	Velocity (m/s) (4)	W.S. Elev. (m) (3) - (1)	Velocity (m/s) (4) - (2)	W.S. Elev. (ft) (5)	Velocity (fps) (6)	W.S. Elev. (ft) (7)	Velocity (fps) (8)	W.S. Elev. (ft) (7) - (5)	Velocity (fps) (8) - (6)
AC 5229.0	8722	149.92	1.99	149.83	2.31	-0.09	0.32	491.86	6.5	491.57	7.6	-0.30	1.1
AB 5228.0	8640	149.98	0.26	149.82	0.31	-0.16	0.05	492.06	0.9	491.54	1.0	-0.52	0.2
	8583	149.97	0.24	149.81	0.29	-0.16	0.05	492.03	0.8	491.50	1.0	-0.53	0.2
AA 5227.0	8573	149.55	2.53	149.68	1.52	0.13	-1.01	490.65	8.3	491.08	5.0	0.43	-3.3
REMAIN	8565.5	I-84 WB OFF-RAMP CROSSING (STRUCTURE NO. 06580 - Constructed Under 151-274)											
	8554	148.13	4.23	148.58	1.82	0.45	-2.41	485.99	13.9	487.47	6.0	1.48	-7.9
	8536	148.48	1.58	148.48	1.58	0.00	0.00	487.14	5.2	487.14	5.2	0.00	0.0
Z 5226.0	8464	148.2	1.39	148.2	1.39	0.00	0.00	486.22	4.6	486.22	4.6	0.00	0.0
REMAIN	8435.5	EXISTING AUSTIN ROAD CROSSING (STRUCTURE NO. 151-007)											
	8412	146.71	2.64	146.71	2.64	0.00	0.00	481.33	8.7	481.33	8.7	0.00	0.0
Y 5225.0	8393	144.87	4.74	144.87	4.74	0.00	0.00	475.30	15.6	475.30	15.6	0.00	0.0
	8356	144.69	1.02	144.69	1.02	0.00	0.00	474.71	3.3	474.71	3.3	0.00	0.0
REMAIN	8332.5	EXISTING I-84 WB ON-RAMP CROSSING (STRUCTURE NO. 04323)											
	8309	143.63	1.35	143.63	1.35	0.00	0.00	471.23	4.4	471.23	4.4	0.00	0.0
	8289	143.49	1.61	143.49	1.61	0.00	0.00	470.77	5.3	470.77	5.3	0.00	0.0
	8237	143.07	1.90	143.07	1.90	0.00	0.00	469.39	6.2	469.39	6.2	0.00	0.0
X 5224.0	8178	142.75	1.46	142.75	1.46	0.00	0.00	468.34	4.8	468.34	4.8	0.00	0.0
	8128	142.18	2.36	142.18	2.36	0.00	0.00	466.47	7.7	466.47	7.7	0.00	0.0
	8080	141.83	1.88	141.83	1.88	0.00	0.00	465.32	6.2	465.32	6.2	0.00	0.0
	8027	141.4	2.12	141.4	2.12	0.00	0.00	463.91	7.0	463.91	7.0	0.00	0.0
	7977	141.35	1.06	141.35	1.06	0.00	0.00	463.75	3.5	463.75	3.5	0.00	0.0
W 5223.0	7937	141.29	1.11	141.29	1.11	0.00	0.00	463.55	3.6	463.55	3.6	0.00	0.0
REMAIN	7911.5	EXISTING PIERPONT ROAD (STRUCTURE NO. 151-006)											
V 5222.0	7885	140.75	1.14	140.75	1.14	0.00	0.00	461.78	3.7	461.78	3.7	0.00	0.0
	7826	140.65	1.03	140.65	1.03	0.00	0.00	461.45	3.4	461.45	3.4	0.00	0.0
	7757	140.66	0.31	140.66	0.31	0.00	0.00	461.48	1.0	461.48	1.0	0.00	0.0
U 5221.0	7711	140.66	0.30	140.66	0.30	0.00	0.00	461.48	1.0	461.48	1.0	0.00	0.0
5220.8	7698	140.51	1.48	140.51	1.48	0.00	0.00	460.99	4.9	460.99	4.9	0.00	0.0
REMAIN	7689.5	EXISTING MULLOY ROAD (STRUCTURE NO. 151-005)											
5220.2	7681	140.12	1.92	140.1	1.94	-0.02	0.02	459.71	6.3	459.65	6.4	-0.06	0.1
T 5220.0	7666	140.02	2.21	139.99	2.27	-0.03	0.06	459.38	7.3	459.29	7.4	-0.10	0.2
S 5219.0	7589	139.73	1.00	139.58	1.18	-0.15	0.18	458.43	3.3	457.94	3.9	-0.49	0.6
	7370	139.7	0.25	139.54	0.29	-0.16	0.04	458.33	0.8	457.81	1.0	-0.53	0.1
	7168	139.65	0.71	139.46	0.80	-0.19	0.09	458.17	2.3	457.55	2.6	-0.62	0.3
R 5218.0	7120	139.63	0.86	139.4	1.17	-0.23	0.31	458.10	2.8	457.35	3.8	-0.75	1.0
Q 5217.5	7073	139.53	1.22	139.25	1.47	-0.28	0.25	457.78	4.0	456.86	4.8	-0.92	0.8
	6970	139.37	1.33	138.19	3.00	-1.18	1.67	457.25	4.4	453.38	9.8	-3.87	5.5
	6915	139.29	1.44	137.86	2.16	-1.43	0.72	456.99	4.7	452.30	7.1	-4.69	2.4
P 5217.0	6890	139.26	1.27	137.72	2.14	-1.54	0.87	456.89	4.2	451.84	7.0	-5.05	2.9
REMOVE	6859.5	Existing I-84 Westbound Exit 25 Off-Ramp (Structure No. 02536)											
O 5216.0	6825	138.89	1.38	137.28	2.28	-1.61	0.90	455.68	4.5	450.39	7.5	-5.28	3.0
	6809	138.84	1.26	137.17	2.27	-1.67	1.01	455.51	4.1	450.03	7.4	-5.48	3.3
	6756	138.54	1.52	136.88	2.09	-1.66	0.57	454.53	5.0	449.08	6.9	-5.45	1.9
	6732	138.44	1.52	136.77	1.99	-1.67	0.47	454.20	5.0	448.72	6.5	-5.48	1.5
	6653	137.97	1.72	136.37	2.02	-1.6	0.30	452.66	5.6	447.41	6.6	-5.25	1.0
	6593	137.28	2.35	136.23	1.59	-1.05	-0.76	450.39	7.7	446.95	5.2	-3.44	-2.5
	6541	137.19	1.86	136.22	1.00	-0.97	-0.86	450.10	6.1	446.92	3.3	-3.18	-2.8
N 5214.0	6490 (PR 6473)	137.16	1.28	136.15	1.01	-1.01	-0.27	450.00	4.2	446.69	3.3	-3.31	-0.9
	6457	137.14	1.21					449.93	4.0				
NEW	6445.5	Proposed Culvert No. 014, Scott Road											
REMOVE	6441.5	Existing Scott Road Structure No. 151-014											
	6417	134.32	1.86	134.25	2.35	-0.07	0.49	440.68	6.1	440.45	7.7	-0.23	1.6
M 5213.0	6409	133.64	3.39	134.23	2.03	0.59	-1.36	438.45	11.1	440.39	6.7	1.94	-4.5
	6394	133.11	3.75	134.22	1.60	1.11	-2.15	436.71	12.3	440.35	5.2	3.64	-7.1
NEW	6349.5	Proposed Culvert No. 06622, Plank Road East											
	6305	131.67	3.19	131.73	2.99	0.06	-0.20	431.99	10.5	432.19	9.8	0.20	-0.7
	6266	131.1	3.05	131.1	3.05	0.00	0.00	430.12	10.0	430.12	10.0	0.00	0.0
L 5212.0	6216	130.75	2.35	130.76	2.34	0.01	-0.01	428.97	7.7	429.00	7.7	0.03	0.0
	6122	130.1	2.10	130.24	1.91	0.14	-0.19	426.84	6.9	427.30	6.3	0.46	-0.6
	6067	129.85	1.54	130.06	1.31	0.21	-0.23	426.02	5.1	426.71	4.3	0.69	-0.8
K 5211.0	6033	129.8	1.26	130.03	1.03	0.23	-0.23	425.85	4.1	426.61	3.4	0.75	-0.8
EXTEND	5993.5	Proposed Culvert No. 02537, Easterly I-84 crossing (Existing I-84 Structure No. 02537)											
J 5210.0	5947	128.01	2.49	128.01	2.47	0.00	-0.02	419.98	8.2	419.98	8.1	0.00	-0.1
I 5209.0	5878	127.58	2.22	127.58	2.22	0.00	0.00	418.57	7.3	418.57	7.3	0.00	0.0
H 5208.9	5832	127.13	2.83	127.13	2.83	0.00	0.00	417.09	9.3	417.09	9.3	0.00	0.0
REMAIN	5812.5 (EX&PR 5813)	Existing Concrete Weir											
5208.2	5812 (EX&PR 5812.5)	126.75	2.14	126.75	2.14	0.00	0.00	415.85	7.0	415.85	7.0	0.00	0.0
G 5208.1	5804	126.2	3.44	126.2	3.44	0.00	0.00	414.04	11.3	414.04	11.3	0.00	0.0
	5757	125.31	3.05	125.31	3.05	0	0.00	411.12	10.0	411.12	10.0	0.00	0.0
F 5208.0	5628	122.68	3.57	122.68	3.57	0	0.00	402.49	11.7	402.49	11.7	0.00	0.0
	5524	119.78	2.68	119.65	2.92	-0.13	0.24	392.98	8.8	392.55	9.6	-0.43	0.8
	5456	118.23	3.54	118.35	3.21	0.12	-0.33	387.89	11.6	388.29	10.5	0.39	-1.1
E 5207.0	5422	117.67	3.18	118.13	2.22	0.46	-0.96	386.06	10.4	387.57	7.3	1.51	-3.2
	5355	117.24	2.39	117.95	1.89	0.71	-0.50	384.65	7.8	386.98	6.2	2.33	-1.6
REPLACE	5295.5	Proposed Culvert No. 01227, Westerly I-84 crossing (Replaces Ex. I-84 Structure No. 01227)											
D 5206.0	5296	116.99	2.03					383.83	6.7				
	5281	116.98	1.83					383.79	6.0				
REPLACE	5254.5	Ex. I-84 Structure No. 01227											
	5224	115.58	1.64	115.44	1.21	-0.14	-0.43	379.20	5.4	378.74	4.0	-0.46	-1.4
C 5205.1	5206	115.38	2.19	115.27	1.91	-0.11	-0.28	378.54	7.2	378.18	6.3	-0.36	-0.9
B 5205.0	5145	115.14	2.11	114.84	2.52	-0.3	0.41	377.76	6.9	376.77	8.3	-0.98	1.3
A 5204.9	5084	115.05	1.81	114.81	1.61	-0.24	-0.20	377.46	5.9	376.67	5.3	-0.79	-0.7
	5072	115.07	1.42					377.53	4.7				
	5065			114.79	1.47					376.61	4.8		
REPLACE	5050.5 (PR 5242.5)	Proposed Culvert No. 03727, Harpers Ferry Road (Existing Structure No. 03727)											
5204.0	5021	114.2	1.05	113.93	1.53	-0.27	0.48	374.67	3.4	373.79	5.0	-0.89	1.6

Figure 5- The 100-Year Flood Profile Plot: Proposed vs. Existing Conditions

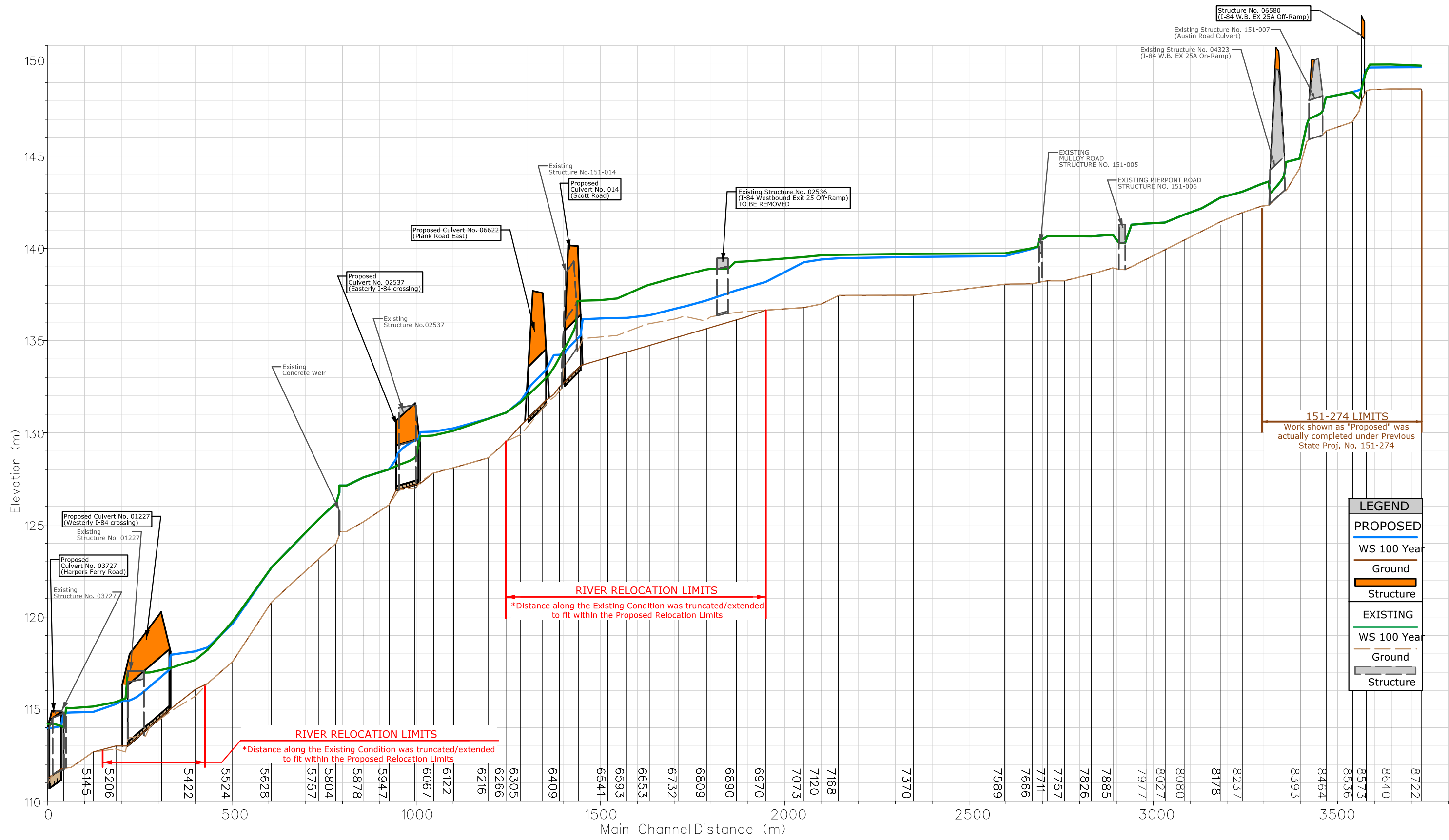


FIGURE 5

**TABLE 5. Proposed versus Existing Condition
500-Year Discharge (CT DOT Q)
Beaver Pond Brook, Waterbury**

NGVD-29

FEMA Sta.	River Sta.	Metric						English						
		Existing Condition		Proposed Condition		Difference		Existing Condition		Proposed Condition		Difference		
		W.S. Elev. (m) (1)	Velocity (m/s) (2)	W.S. Elev. (m) (3)	Velocity (m/s) (4)	W.S. Elev. (m) (3) - (1)	Velocity (m/s) (4) - (2)	W.S. Elev. (ft) (5)	Velocity (fps) (6)	W.S. Elev. (ft) (7)	Velocity (fps) (8)	W.S. Elev. (ft) (7) - (5)	Velocity (fps) (8) - (6)	
AC 5229.0	8722	150.02	2.52	150.02	2.52	0	0.00	492.19	8.3	492.19	8.3	0.00	0.0	
AB 5228.0	8640	150.11	0.33	150	0.38	-0.11	0.05	492.49	1.1	492.13	1.2	-0.36	0.2	
	8583	150.11	0.32	149.99	0.36	-0.12	0.04	492.49	1.1	492.09	1.2	-0.39	0.1	
AA 5227.0	8573	149.76	2.43	149.65	2.42	-0.11	-0.01	491.34	8.0	490.98	7.9	-0.36	0.0	
REMAIN	8565.5	I-84 WB OFF-RAMP CROSSING(STRUCTURE NO. 06580 - Constructed Under 151-274)												
	8554	149.06	1.34	149.06	1.34	0	0.00	489.04	4.4	489.04	4.4	0.00	0.0	
	8536	149.02	1.30	149.02	1.30	0	0.00	488.91	4.3	488.91	4.3	0.00	0.0	
Z 5226.0	8464	148.93	1.10	148.93	1.10	0	0.00	488.62	3.6	488.62	3.6	0.00	0.0	
REMAIN	8435.5	EXISTING AUSTIN ROAD CROSSING(STRUCTURE NO. 151-007)												
	8412	146.95	2.94	146.95	2.94	0	0.00	482.12	9.6	482.12	9.6	0.00	0.0	
Y 5225.0	8393	145.02	5.16	145.02	5.16	0	0.00	475.79	16.9	475.79	16.9	0.00	0.0	
	8356	145.18	1.03	145.18	1.03	0	0.00	476.31	3.4	476.31	3.4	0.00	0.0	
REMAIN	8332.5	EXISTING I-84 WB ON-RAMP CROSSING(STRUCTURE NO. 04323)												
	8309	143.89	1.61	143.89	1.61	0	0.00	472.08	5.3	472.08	5.3	0.00	0.0	
	8289	143.77	1.78	143.77	1.78	0	0.00	471.69	5.8	471.69	5.8	0.00	0.0	
	8237	143.37	2.14	143.37	2.14	0	0.00	470.37	7.0	470.37	7.0	0.00	0.0	
X 5224.0	8178	143.07	1.55	143.07	1.55	0	0.00	469.39	5.1	469.39	5.1	0.00	0.0	
	8128	142.42	2.70	142.42	2.70	0	0.00	467.26	8.9	467.26	8.9	0.00	0.0	
	8080	142.11	2.16	142.11	2.16	0	0.00	466.24	7.1	466.24	7.1	0.00	0.0	
	8027	141.82	2.14	141.82	2.14	0	0.00	465.29	7.0	465.29	7.0	0.00	0.0	
	7977	141.8	1.18	141.8	1.17	0	-0.01	465.22	3.9	465.22	3.8	0.00	0.0	
W 5223.0	7937	141.72	1.33	141.72	1.33	0	0.00	464.96	4.4	464.96	4.4	0.00	0.0	
REMAIN	7911.5	EXISTING PIERPONT ROAD (STRUCTURE NO. 151-006)												
V 5222.0	7885	140.95	1.47	140.96	1.46	0.01	-0.01	462.43	4.8	462.47	4.8	0.03	0.0	
	7826	140.82	1.33	140.83	1.32	0.01	-0.01	462.01	4.4	462.04	4.3	0.03	0.0	
	7757	140.84	0.42	140.86	0.36	0.02	-0.06	462.07	1.4	462.14	1.2	0.06	-0.2	
U 5221.0	7711	140.83	0.28	140.85	0.27	0.02	-0.01	462.04	0.9	462.11	0.9	0.06	0.0	
	7698	140.76	1.30	140.55	2.16	-0.21	0.86	461.81	4.3	461.12	7.1	-0.69	2.8	
REMAIN	7689.5	EXISTING MULLOY ROAD (STRUCTURE NO. 151-005)												
	7681	140.27	2.68	140.16	2.84	-0.11	0.16	460.20	8.8	459.84	9.3	-0.36	0.5	
T 5220.0	7666	140.36	1.59	140.24	1.89	-0.12	0.30	460.50	5.2	460.11	6.2	-0.39	1.0	
S 5219.0	7589	140.35	0.36	139.97	1.16	-0.38	0.80	460.47	1.2	459.22	3.8	-1.25	2.6	
	7370	140.32	0.26	139.93	0.32	-0.39	0.06	460.37	0.9	459.09	1.1	-1.28	0.2	
	7168	140.29	0.54	139.87	0.74	-0.42	0.20	460.27	1.8	458.89	2.4	-1.38	0.7	
R 5218.0	7120	140.28	0.60	139.84	0.98	-0.44	0.38	460.24	2.0	458.79	3.2	-1.44	1.2	
Q 5217.5	7073	140.21	1.22	139.67	1.68	-0.54	0.46	460.01	4.0	458.24	5.5	-1.77	1.5	
	6970	140.06	1.48	138.49	3.49	-1.57	2.01	459.51	4.9	454.36	11.5	-5.15	6.6	
	6915	139.98	1.59	138.22	2.50	-1.76	0.91	459.25	5.2	453.48	8.2	-5.77	3.0	
P 5217.0	6890	139.96	1.41	138.1	2.46	-1.86	1.05	459.19	4.6	453.08	8.1	-6.10	3.4	
REMOVE	6859.5	Existing I-84 Westbound Exit 25 Off-Ramp (Structure No. 02536)												
O 5216.0	6825	139.37	1.48	137.62	2.69	-1.75	1.21	457.25	4.9	451.51	8.8	-5.74	4.0	
	6809	139.31	1.46	137.53	2.62	-1.78	1.16	457.05	4.8	451.21	8.6	-5.84	3.8	
	6756	138.99	1.73	137.33	2.16	-1.66	0.43	456.00	5.7	450.56	7.1	-5.45	1.4	
	6732	138.87	1.79	137.27	2.00	-1.6	0.21	455.61	5.9	450.36	6.6	-5.25	0.7	
	6653	138.43	1.95	137.06	1.89	-1.37	-0.06	454.17	6.4	449.67	6.2	-4.49	-0.2	
	6593	138.26	1.57	137.02	1.44	-1.24	-0.13	453.61	5.2	449.54	4.7	-4.07	-0.4	
	6541	138.23	1.37	137.02	0.93	-1.21	-0.44	453.51	4.5	449.54	3.1	-3.97	-1.4	
N 5214.0	6490(PR 6473)	138.26	0.51	136.96	1.09	-1.3	0.58	453.61	1.7	449.34	3.6	-4.26	1.9	
	6457	138.25	0.54					453.58	1.8					
NEW	6445.5	Proposed Culvert No. 014, Scott Road												
REMOVE	6441.5	Existing Scott Road Structure No. 151-014												
	6417	134.82	2.13	135.04	2.07	0.22	-0.06	442.32	7.0	443.05	6.8	0.72	-0.2	
M 5213.0	6409	134.04	3.75	135.04	1.82	1	-1.93	439.76	12.3	443.05	6.0	3.28	-6.3	
	6394	133.4	4.28	135.04	1.53	1.64	-2.75	437.66	14.0	443.05	5.0	5.38	-9.0	
NEW	6349.5	Proposed Culvert No. 06622, Plank Road East												
	6305	131.98	3.73	132.03	3.46	0.05	-0.27	433.01	12.2	433.17	11.4	0.16	-0.9	
	6266	131.53	3.19	131.62	2.99	0.09	-0.20	431.53	10.5	431.82	9.8	0.30	-0.7	
L 5212.0	6216	131.24	2.60	131.46	2.30	0.22	-0.30	430.58	8.5	431.30	7.5	0.72	-1.0	
	6122	130.94	1.91	131.28	1.66	0.34	-0.25	429.59	6.3	430.71	5.4	1.12	-0.8	
	6067	130.89	1.30	131.25	1.09	0.36	-0.21	429.43	4.3	430.61	3.6	1.18	-0.7	
K 5211.0	6033	130.86	1.20	131.24	0.96	0.38	-0.24	429.33	3.9	430.58	3.2	1.25	-0.8	
EXTEND	5993.5	Proposed Culvert No. 02537, Easterly I-84 crossing (Existing I-84 Structure No. 02537)												
J 5210.0	5947	128.48	2.75	128.48	2.73	0.00	-0.02	421.52	9.0	421.52	9.0	0.00	-0.1	
I 5209.0	5878	128.13	2.47	128.13	2.47	0	0.00	420.37	8.1	420.37	8.1	0.00	0.0	
H 5208.9	5832	127.23	4.05	127.23	4.05	0.00	0.00	417.42	13.3	417.42	13.3	0.00	0.0	
REMAIN	5812.5(EX&PR 5813)	Existing Concrete Weir												
	5208.2	5812(EX&PR 5812.5)	127.23	2.60	127.23	2.60	0.00	0.00	417.42	8.5	417.42	8.5	0.00	0.0
G 5208.1	5804	126.64	3.83	126.64	3.83	0.00	0.00	415.49	12.6	415.49	12.6	0.00	0.0	
	5757	125.71	3.72	125.71	3.72	0	0.00	412.43	12.2	412.43	12.2	0.00	0.0	
F 5208.0	5628	123.11	4.05	123.11	4.05	0.00	0.00	403.90	13.3	403.90	13.3	0.00	0.0	
	5524	120.3	2.95	119.63	4.49	-0.67	1.54	394.69	9.7	392.49	14.7	-2.20	5.1	
	5456	118.65	4.02	119.05	3.22	0.4	-0.80	389.27	13.2	390.58	10.6	1.31	-2.6	
E 5207.0	5422	118.14	3.60	119.06	2.04	0.92	-1.56	387.60	11.8	390.62	6.7	3.02	-5.1	
	5355	117.99	2.41	118.84	2.19	0.85	-0.22	387.11	7.9	389.90	7.2	2.79	-0.7	
REPLACE	5295.5	Proposed Culvert No. 01227, Westerly I-84 crossing (Replaces Ex. I-84 Structure No. 01227)												
D 5206.0	5296	117.81	2.16					386.52	7.1					
	5281	117.79	2.11					386.45	6.9					
REPLACE	5254.5	Ex. I-84 Structure No. 01227												
	5224	116.2	1.97	116.12	1.39	-0.08	-0.58	381.23	6.5	380.97	4.6	-0.26	-1.9	
C 5205.1	5206	116.01	2.37	115.95	1.98	-0.06	-0.39	380.61	7.8	380.41	6.5	-0.20	-1.3	
B 5205.0	5145	115.84	2.20	115.82	1.96	-0.02	-0.24	380.05	7.2	379.99	6.4	-0.07	-0.8	
A 5204.9	5084	115.93	1.07	115.83	1.30	-0.1	0.23	380.35	3.5	380.02	4.3	-0.33	0.8	
	5072	115.91	1.22					380.28	4.0					
	5065			115.82	1.20					379.99	3.9			
REPLACE	5050.5(PR 5242.5)	Proposed Culvert No. 03727, Harpers Ferry Road (Existing Structure No. 03727)												
5204.0	5021	115.19	1.10	114.42	1.88	-0.77	0.78	377.92	3.6	375.39	6.2	-2.53	2.6	

Figure 6- The 500-Year Flood Profile Plot: Proposed vs. Existing Conditions

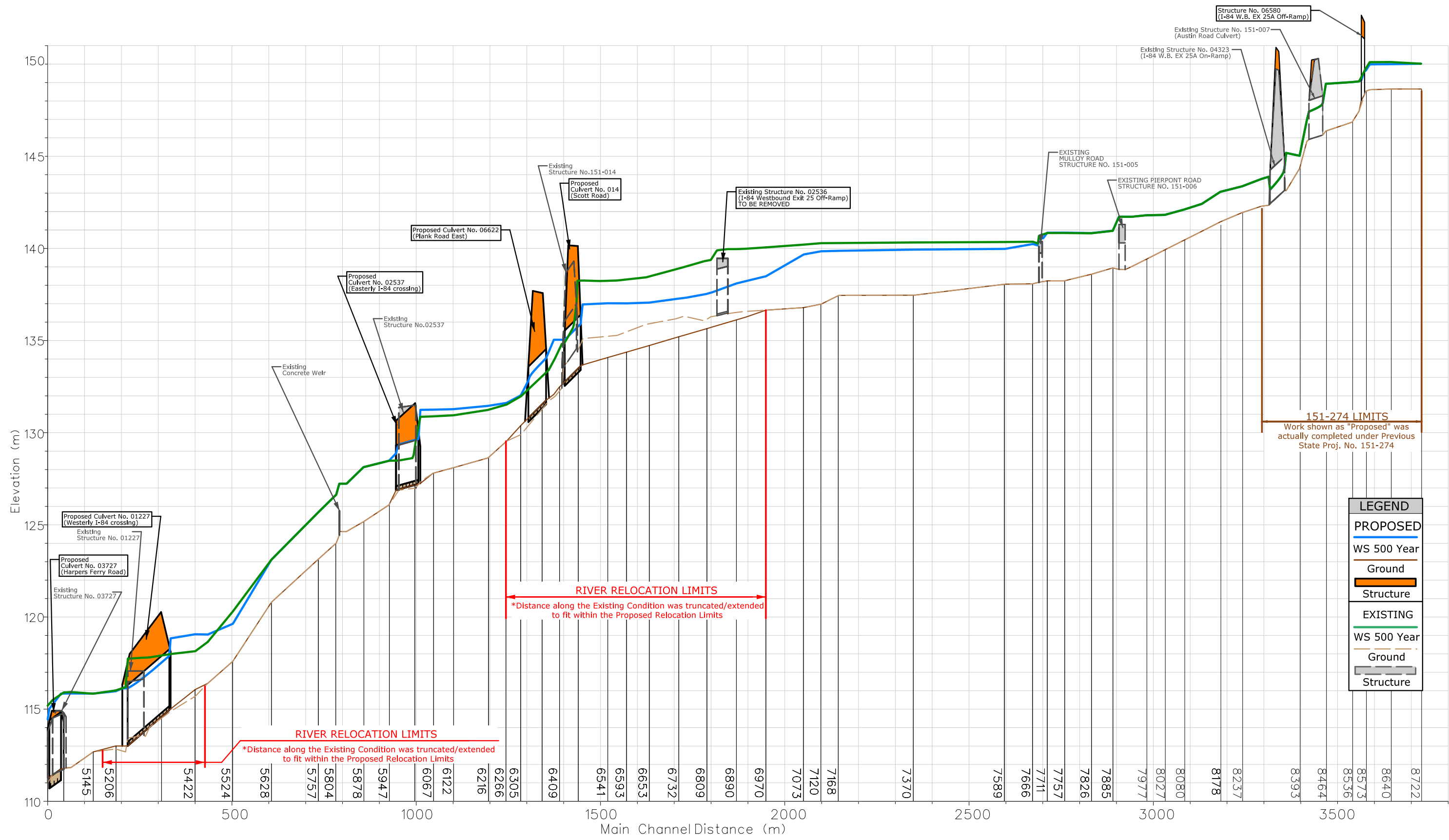


FIGURE 6

Natural Condition

DEVELOPMENT OF NATURAL CONDITION MODELS

Section 9.3.6 of the ConnDOT 2000 *Drainage Manual* recommends, for large structures (drainage area greater than 25.9 km²), that the proposed 100-year water surface profile should be no more than one foot above the natural profile. This design criterion has been established to insure that proposed structures do not cause excessive upstream backwater.

It is often difficult to model "natural" cross sections in urban areas where typically, over a long period of time, watercourses have been repeatedly realigned and altered with significant fill placed within their floodplains. For the Beaver Pond Brook, a Natural Conditions model was at first created by first deleting all existing bridges, bridge approach embankments and accompanying ineffective flow areas from the Existing Condition model. Then, a secondary Natural Condition model was also developed incorporating segments of the relocated channel geometry from the Proposed Condition. The proposed channel was not used in its entirety as it defeats the intended purpose of comparing to the "natural" channel geometry. Only where the relocation is so significant that the comparison of the water surface elevation between the Natural and Proposed Conditions is considered not feasible, as they represents completely different physical locations. The secondary Natural Condition model allows to evaluate the effects of the proposed structures in the brook.

WATER SURFACE PROFILE COMPARISON TO PROPOSED CONDITION

The comparisons of the Proposed to Natural Conditions 100-year flood profiles are shown on Figure 7 and in Table 6. The profile plots show that all the proposed waterway crossings and the existing concrete weir will cause increases greater than 0.3 m (one foot) over the "natural" condition.

Upstream of the Scott Road Culvert No. 014, the maximum increase will be 1.21 m (4.0 ft) based on the comparison to the "natural" condition model developed from the relocated channel geometry. The comparison to the model developed from the existing channel geometry will yield a decrease of 0.06 m (0.2 ft) at the same corresponding location, instead of the increase. As the intended purpose of comparing the proposed and natural condition profiles is to assess the backwater effect of a hydraulic crossing, the increase resulting from the differing channel geometry should be disregarded. Accordingly, the aforementioned increase, based on the relocated geometry, was considered for this location.

Now, there are several alternatives that can reduce the increase to the required range. These alternatives, however, involve widening the culvert that would be incompatible with the upstream reach. Widening the upstream channel along with the widening of the culvert will require additional easements and takes from the private properties located on the northern side of the relocated brook, and thus found impractical. Furthermore, the culvert will act as an outlet to the purposely created floodplain terrace. Increasing the size of the outlet reduces its detention

capability in the event of the "super flood", and thus is deemed undesirable. As the greater-than-one-foot increase over the natural has no adverse impact on any private properties and roadways, no change to the proposed design is recommended.

Between the Scott Road crossing and the Plank Road East Culvert No. 06622, the proposed water surface profile will be entirely above the "natural" condition profile by a maximum of 0.92 m (3.02 ft). Upstream of the easterly I-84 Culvert No.02537, the increase over the "natural" will be 1.23 m (4.04 ft) which is greatest within the study limits. The increases upstream of the easterly I-84 Culvert No. 01227 and upstream of Harpers Ferry Road will be 0.92 m (3.02 ft) and 0.74 m (2.43 ft) respectively.

These increases over the Natural Condition profile were investigated; and, as with the Scott Road culvert, it was recommended that the "one-foot-over-natural" guideline be waived because designing the structures to limit the increase to 0.3 m (one foot) would result in an overly wide culvert and channel. Such culvert and channel would be incompatible with the upstream reach, and in some situations be prone to aggrading streambed conditions.

At the existing concrete weir across from the BJ's Wholesale Club, the increase will be 0.39 m (1.28 ft). Removing this structure would steepen an already steep gradient of the Beaver Pond Brook, and thus was not considered.

The backwater or the increases over the natural at all these crossings are contained within the main channel and pose no adverse impact on any private properties, building and roadways.

**TABLE 6. Proposed versus Natural Condition
100-Year (DOT) Discharge Water Surface Elevation
Beaver Pond Brook, Waterbury**

NGVD-29

FEMA Sta.	River Sta.	Metric						English				
		Natural 1 (from EX)	Natural 2 (using relocated PR segm.)	Proposed	Difference		Natural 1 (from EX)	Natural 2 (using relocated PR segm.)	Proposed	Difference		
		(m) (1)	(m) (2)	(m) (3)	(3) - (2)	(3) - (1)	(ft) (5)	(ft) (6)	(ft) (7)	(7) - (6)	(7) - (5)	
AC 5229.0	8722	149.84	149.84	149.83	-0.01	-0.01	491.60	491.60	491.6	-0.03	-0.03	
AB 5228.0	8640	149.86	149.86	149.82	-0.04	-0.04	491.67	491.67	491.5	-0.13	-0.13	
	8583	149.86	149.86	149.81	-0.05	-0.05	491.67	491.67	491.5	-0.16	-0.16	
AA 5227.0	8573	149.59	149.59	149.68	0.09	0.09	490.78	490.78	491.1	0.30	0.30	
REMAIN	8565.5	I-84 WB OFF-RAMP CROSSING(STRUCTURE NO. 06580 - Constructed Under 151-274)										
	8554	148.09	148.09	148.58	0.49	0.49	485.86	485.86	487.5	1.61	1.61	
	8536	148.48	148.48	148.48	0.00	0.00	487.14	487.14	487.1	0.00	0.00	
Z 5226.0	8464	147.69	147.69	148.20	0.51	0.51	484.55	484.55	486.2	1.67	1.67	
REMAIN	8435.5	EXISTING AUSTIN ROAD CROSSING(STRUCTURE NO. 151-007)										
	8412	146.71	146.71	146.71	0.00	0.00	481.33	481.33	481.3	0.00	0.00	
Y 5225.0	8393	144.85	144.85	144.87	0.02	0.02	475.23	475.23	475.3	0.06	0.06	
	8356	143.98	143.98	144.69	0.71	0.71	472.38	472.38	474.7	2.33	2.33	
REMAIN	8332.5	EXISTING I-84 WB ON-RAMP CROSSING(STRUCTURE NO. 04323)										
	8309	143.65	143.65	143.63	-0.02	-0.02	471.29	471.29	471.2	-0.07	-0.07	
	8289	143.49	143.49	143.49	0.00	0.00	470.77	470.77	470.8	0.00	0.00	
	8237	143.07	143.07	143.07	0.00	0.00	469.39	469.39	469.4	0.00	0.00	
X 5224.0	8178	142.75	142.75	142.75	0.00	0.00	468.34	468.34	468.3	0.00	0.00	
	8128	142.18	142.18	142.18	0.00	0.00	466.47	466.47	466.5	0.00	0.00	
	8080	141.87	141.87	141.83	-0.04	-0.04	465.45	465.45	465.3	-0.13	-0.13	
	8027	141.23	141.23	141.40	0.17	0.17	463.35	463.35	463.9	0.56	0.56	
	7977	140.93	140.93	141.35	0.42	0.42	462.37	462.37	463.7	1.38	1.38	
W 5223.0	7937	140.71	140.70	141.29	0.59	0.58	461.65	461.61	463.6	1.94	1.90	
REMAIN	7911.5	EXISTING PIERPONT ROAD (STRUCTURE NO. 151-006)										
V 5222.0	7885	140.58	140.58	140.75	0.17	0.17	461.22	461.22	461.8	0.56	0.56	
	7826	140.40	140.39	140.65	0.26	0.25	460.63	460.60	461.5	0.85	0.82	
	7757	140.42	140.41	140.66	0.25	0.24	460.70	460.66	461.5	0.82	0.79	
U 5221.0	7711	140.42	140.41	140.66	0.25	0.24	460.70	460.66	461.5	0.82	0.79	
5220.8	7698	140.26	140.25	140.51	0.26	0.25	460.17	460.14	461.0	0.85	0.82	
REMAIN	7689.5	EXISTING MULLOY ROAD (STRUCTURE NO. 151-005)										
5220.2	7681	140.21	140.19	140.10	-0.09	-0.11	460.01	459.94	459.6	-0.29	-0.36	
T 5220.0	7666	140.00	139.97	139.99	0.02	-0.01	459.32	459.22	459.3	0.07	-0.03	
S 5219.0	7589	139.76	139.58	139.58	0.00	-0.18	458.53	457.94	457.9	0.00	-0.59	
	7370	139.74	139.54	139.54	0.00	-0.20	458.47	457.81	457.8	0.00	-0.66	
	7168	139.69	139.45	139.46	0.01	-0.23	458.30	457.51	457.5	0.03	-0.75	
R 5218.0	7120	139.67	139.40	139.40	0.00	-0.27	458.24	457.35	457.3	0.00	-0.89	
Q 5217.5	7073	139.58	139.25	139.25	0.00	-0.33	457.94	456.86	456.9	0.00	-1.08	
	6970	139.37	138.20	138.19	-0.01	-1.18	457.25	453.41	453.4	-0.03	-3.87	
	6915	139.19	137.86	137.86	0.00	-1.33	456.66	452.30	452.3	0.00	-4.36	
P 5217.0	6890	139.12	137.72	137.72	0.00	-1.40	456.43	451.84	451.8	0.00	-4.59	
REMOVE	6859.5	Existing I-84 Westbound Exit 25 Off-Ramp (Structure No. 02536)										
O 5216.0	6825	138.90	137.27	137.28	0.01	-1.62	455.71	450.36	450.4	0.03	-5.32	
	6809	138.85	137.17	137.17	0.00	-1.68	455.55	450.03	450.0	0.00	-5.51	
	6756	138.58	136.88	136.88	0.00	-1.70	454.66	449.08	449.1	0.00	-5.58	
	6732	138.47	136.77	136.77	0.00	-1.70	454.30	448.72	448.7	0.00	-5.58	
	6653	138.00	136.26	136.37	0.11	-1.63	452.76	447.05	447.4	0.36	-5.35	
	6593	137.09	135.87	136.23	0.36	-0.86	449.77	445.77	446.9	1.18	-2.82	
	6541	136.75	135.38	136.22	0.84	-0.53	448.66	444.16	446.9	2.76	-1.74	
N 5214.0	6490(PR 6473)	136.21	134.94	136.15	1.21	-0.06	446.88	442.72	446.7	3.97	-0.20	
	6457	135.79	133.92				445.51	439.37				
NEW	6445.5	Proposed Culvert No. 014, Scott Road										
REMOVE	6441.5	Existing Scott Road Structure No. 151-014										
	6417	134.23	133.92	134.25	0.33	0.02	440.39	439.37	440.5	1.08	0.07	
M 5213.0	6409	133.64	133.70	134.23	0.53	0.59	438.45	438.65	440.4	1.74	1.94	
	6394	133.09	133.30	134.22	0.92	1.13	436.65	437.34	440.4	3.02	3.71	
NEW	6349.5	Proposed Culvert No. 06622, Plank Road East										
	6305	131.60	131.71	131.73	0.02	0.13	431.76	432.12	432.2	0.07	0.43	
	6266	130.95	131.13	131.10	-0.03	0.15	429.63	430.22	430.1	-0.10	0.49	
L 5212.0	6216	130.80	130.80	130.76	-0.04	-0.04	429.13	429.13	429.0	-0.13	-0.13	
	6122	130.07	130.07	130.24	0.17	0.17	426.74	426.74	427.3	0.56	0.56	
	6067	129.34	129.34	130.06	0.72	0.72	424.34	424.34	426.7	2.36	2.36	
K 5211.0	6033	128.80	128.80	130.03	1.23	1.23	422.57	422.57	426.6	4.04	4.04	
EXTEND	5993.5	Proposed Culvert No. 02537, Easterly I-84 crossing (Existing I-84 Structure No. 02537)										
J 5210.0	5947	128.13	128.13	128.01	-0.12	-0.12	420.37	420.37	420.0	-0.39	-0.39	
I 5209.0	5878	127.71	127.71	127.58	-0.13	-0.13	419.00	419.00	418.6	-0.43	-0.43	
H 5208.9	5832	126.74	126.74	127.13	0.39	0.39	415.81	415.81	417.1	1.28	1.28	
REMAIN	5812.5(EX&PR 5813)	Existing Concrete Weir										
5208.2	5812(EX&PR 5812.5)	126.69	126.69	126.75	0.06	0.06	415.65	415.65	415.8	0.20	0.20	
G 5208.1	5804	126.30	126.30	126.20	-0.10	-0.10	414.37	414.37	414.0	-0.33	-0.33	
	5757	125.50	125.50	125.31	-0.19	-0.19	411.75	411.75	411.1	-0.62	-0.62	
F 5208.0	5628	122.70	122.70	122.68	-0.02	-0.02	402.56	402.56	402.5	-0.07	-0.07	
	5524	119.75	119.67	119.65	-0.02	-0.10	392.88	392.62	392.6	-0.06	-0.33	
	5456	118.28	118.42	118.35	-0.07	0.07	388.06	388.52	388.3	-0.23	0.23	
E 5207.0	5422	117.78	118.15	118.13	-0.02	0.35	386.42	387.63	387.6	-0.06	1.15	
	5355	117.03	116.97	117.95	0.98	0.92	383.96	383.76	387.0	3.22	3.02	
REPLACE	5295.5	Proposed Culvert No. 01227, Westerly I-84 crossing (Replaces Ex. I-84 Structure No. 01227)										
D 5206.0	5296	116.12	116.12				380.97	380.97				
	5281	115.73	115.73				379.69	379.69				
REPLACE	5254.5	Ex. I-84 Structure No. 01227										
	5224	115.53	115.53	115.44	-0.09	-0.09	379.04	379.04	378.7	-0.30	-0.30	
C 5205.1	5206	115.27	115.26	115.27	0.01	0.00	378.18	378.15	378.2	0.03	0.00	
B 5205.0	5145	114.65	114.79	114.84	0.05	0.19	376.15	376.61	376.8	0.16	0.62	
A 5204.9	5084	114.07	113.78	114.81	1.03	0.74	374.25	373.29	376.7	3.38	2.43	
	5072	114.18	113.91				374.61	373.72				
	5065			114.79					376.6			
REPLACE	5050.5(PR 5242.5)	Proposed Culvert No. 03727, Harpers Ferry Road (Existing Structure No. 03727)										
5204.0	5021	114.20	113.93	113.93	0.00	-0.27	374.67	373.79	373.8	0.00	-0.89	

Natural 1: Developed from the Existing Condition model by removing all the existing man-made structures that cross the Beaver Pond Brook within the studied reach. The existing concrete weir was also removed completely from the model.

Natural 2: Where the brook will be relocated/realigned significantly such that the representative cross sections for the proposed condition had to be cut from different locations than the existing/natural condition models, the direct comparison of the water surface profiles between the proposed and natural conditions is not viable. Accordingly, a secondary natural condition model was created by partially incorporating the proposed channel geometry to the initial natural condition model.

Notes: This table is intended to show the combined effects of all the proposed structures over the natural condition (no waterway crossings) within the study limits. For the backwater caused by a culvert and only by the culvert at the location, see Table 7.

Figure 7- The 100-Year Flood Profile Plot: Proposed vs. Natural Conditions

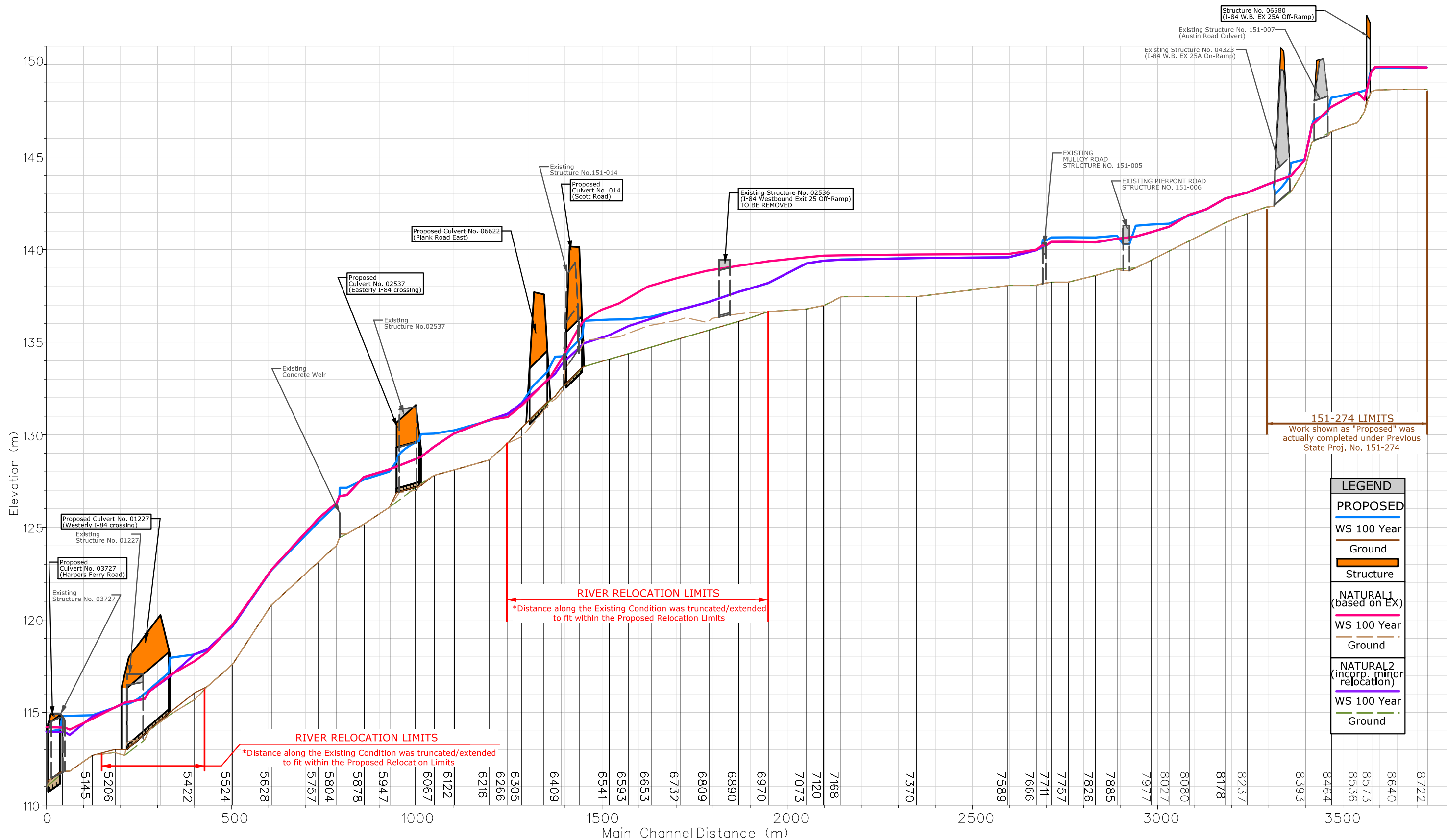


FIGURE 7

Water Handling (Temporary Hydraulic Facilities)

A separate report has been prepared for the water handling aspect of the river relocation. The report details a water handling plan of which the intent is to suggest a method of construction for the Contractor that will enable him to complete his work, provide protection of his work during construction and minimize potential flooding of adjacent roadways and properties. See the *Temporary Hydraulic Facilities* reports for details.

Summary

This hydraulic study validates that all the proposed waterway structures over the Beaver Pond Brook under the State Project No. 151-273 will adequately convey the 100-year design flow with a minimum vertical clearance of 0.3 m (1.0 ft) to the upstream control features. The resulting hydraulic conditions at these waterway crossings are summarized in Table 7.

The study also demonstrates that, although the proposed changes under this project will result in an increase in the 100-year flood elevation at several locations, it will not adversely impact any roads, buildings and adjacent private properties. Instead, the project alleviates the flooding potential for a number of private properties by decreasing the water surface elevations. Such locations are upstream of the Harpers Ferry Road culvert and in the vicinity of Mulloy Road crossing. Where an increase is anticipated, the flood flow will be contained within the channel section of the brook and within the State ROW.

The increases in the 500-year flood elevation will also be mostly contained within the channel section except for one location. Upstream of the westerly I-84 Culvert No. 01227, the 500-year flood will overflow southerly onto Reidville Drive. However, the flooding from this overflow will still be contained within the State ROW. Furthermore, in the proposed condition, the 500-year flood will no longer overflow onto the I-84 pavement upstream of the Scott Road and Harpers Ferry Road crossings, at which the potential currently exists.

The greater-than-one-foot increases in the 100-year flood elevation over the "natural" condition (no man-made crossings in the brook) require an exemption from the State requirements. It is reiterated that these increases will be contained within the main channel and pose no adverse impact on any private properties, building and roadways.

Table 7. Summary of Hydraulic Conditions At Waterway Crossings Over Beaver Pond Brook Based on The 100-Year Design Discharge

METRIC UNITS

NGVD-29

Structure(Bridge/Culvert)		PROPOSED								EXISTING							
No.	Crossing Road	U/S Water Surface Elevation	D/S Water Surface Elevation	Backwater** (if culvert)		U/S Control Elevation	Free-board to U/S control	Bridge Opening Velocity/ Culvert Outlet Velocity	Overtop. Freq. if less than 100 year	U/S Water Surface Elevation	D/S Water Surface Elevation	Backwater** (if culvert)		U/S Control Elevation	Free-board to U/S control	Bridge Opening Velocity/ Culvert Outlet Velocity	Overtop. Freq. if less than 100 year
				Low Chord (for brdg)	Under-clearance (for brdg)							Low Chord (for brdg)	Under-clearance (for brdg)				
		(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m/s)	(year)	(m)	(m)	(m)	(m)	(m)	(m)	(m/s)
06580	WB EX 25A Off-Ramp (exist.)	149.68	148.58	150.83	2.3	152.25	2.6	2.04	N/A	N/A (currently exists, but presented as Proposed, as it was constructed under Prev. Proj. 151-274)							
151-007	Austin Road (existing)	148.20	146.71	0.51		149.1	0.9	4.25	N/A	148.20	146.71	0.51		149.3	1.1	4.25	N/A
04323	WB EX 25A On-Ramp (exist.)	144.69	143.63	0.71		148.99	4.3	4.75	N/A	144.69	143.63	0.71		148.72	4.0	4.75	N/A
151-006	Pierpont Road (existing)	141.29	140.75	140.3	none	141.45	0.16	2.8	N/A	141.29	140.75	140.3	none	141.45	0.16	2.8	N/A
151-005	Mulloy Road (existing)	140.51	140.10	139.75	none	140.07	Exceeds	2.62	74	140.51	140.12	139.75	none	140.07	Exceeds	2.57	72
02536	WB Exit 25 Off-Ramp	(none)								139.26	138.89	0.14		139.46	0.2	2.30	N/A
014	Scott Road	136.15	134.25	1.27		139.9	3.8	3.88	N/A	137.14	134.32	1.36		138.08	0.9	6.38	N/A
06622	Plank Road East	134.22	131.73	0.91		136.7	2.5	3.88	N/A	N/A (does not exist)							
02537	Easterly I-84	130.03	128.01	1.27		131.6	1.6	4.2*	N/A	129.80	128.01	0.58		131.38	1.6	4.46	N/A
01227	Westerly I-84	117.95	115.44	1.47		118.87	0.9	3.57	N/A	116.98	115.58	1.0		117.07	0.1	4.22	87
03727	Harpers Ferry Road	114.79	113.93	0.83		115.1	0.31	3.01	N/A	139.96	114.20	25.69		114.964	Exceeds	3.33	75

ENGLISH UNITS

NGVD-29

Structure(Bridge/Culvert)		PROPOSED								EXISTING							
No.	Crossing Road	U/S Water Surface Elevation	D/S Water Surface Elevation	Backwater** (if culvert)		U/S Control Elevation	Free-board to U/S control	Bridge Opening Velocity/ Culvert Outlet Velocity	Overtop. Freq. if less than 100 year	U/S Water Surface Elevation	D/S Water Surface Elevation	Backwater** (if culvert)		U/S Control Elevation	Free-board to U/S control	Bridge Opening Velocity/ Culvert Outlet Velocity	Overtop. Freq. if less than 100 year
				Low Chord (for brdg)	Under-clearance (for brdg)							Low Chord (for brdg)	Under-clearance (for brdg)				
		(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft/s)	(year)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft/s)
06580	WB EX 25A Off-Ramp (exist.)	491.07	487.46	494.8	7.38	499.5	8.4	6.69	N/A	N/A (currently exists, but presented as Proposed, as it was constructed under Prev. Proj. 151-274)							
151-007	Austin Road (existing)	486.21	481.33	1.7		489.2	3.0	13.94	N/A	486.21	481.33	1.7		489.8	3.6	13.94	N/A
04323	WB EX 25A On-Ramp (exist.)	474.70	471.22	2.3		488.8	14.1	15.58	N/A	474.70	471.22	2.3		487.9	13.2	15.58	N/A
151-006	Pierpont Road (existing)	463.54	461.77	460.3	none	464.1	0.5	9.19	N/A	463.54	461.77	460.3	none	464.1	0.5	9.19	N/A
151-005	Mulloy Road (existing)	460.99	459.64	458.5	none	459.5	Exceeds	8.60	74	460.99	459.71	458.5	none	459.5	Exceeds	8.43	72
02536	WB Exit 25 Off-Ramp	(none)								456.88	455.67	0.5		457.5	0.7	7.55	N/A
014	Scott Road	446.68	440.45	4.2		459.0	12.3	12.73	N/A	449.93	440.68	4.5		453.0	3.1	20.93	N/A
06622	Plank Road East	440.35	432.18	3.0		448.5	8.1	12.73	N/A	N/A (does not exist)							
02537	Easterly I-84	426.60	419.98	4.2		431.8	5.2	13.8*	N/A	425.85	419.98	1.9		431.0	5.2	14.63	N/A
01227	Westerly I-84	386.97	378.74	4.8		390.0	3.0	11.71	N/A	383.79	379.19	3.3		384.1	0.3	13.84498	87
03727	Harpers Ferry Road	376.60	373.78	2.7		377.6	1.0	9.88	N/A	459.18	374.67	84.3		377.2	Exceeds	10.93	75

* Average of 3.79 m/s (12.4 ft/s) and 4.6 m/s (15.1 ft/s) from the west and east barrels respectively.

** The Backwater here represents an increase in the upstream water surface elevation caused by the specific culvert only. For evaluating the combined effects of all the proposed structures over the natural condition (no waterway crossings) within the study limits, see Table 6.

APPENDIX A. DISCHARGE ESTIMATION FOR 2- & 25-YEAR STORMS

BEAVER POND BROOK

Design Discharges (from 1979 FIS for Waterbury, CT)

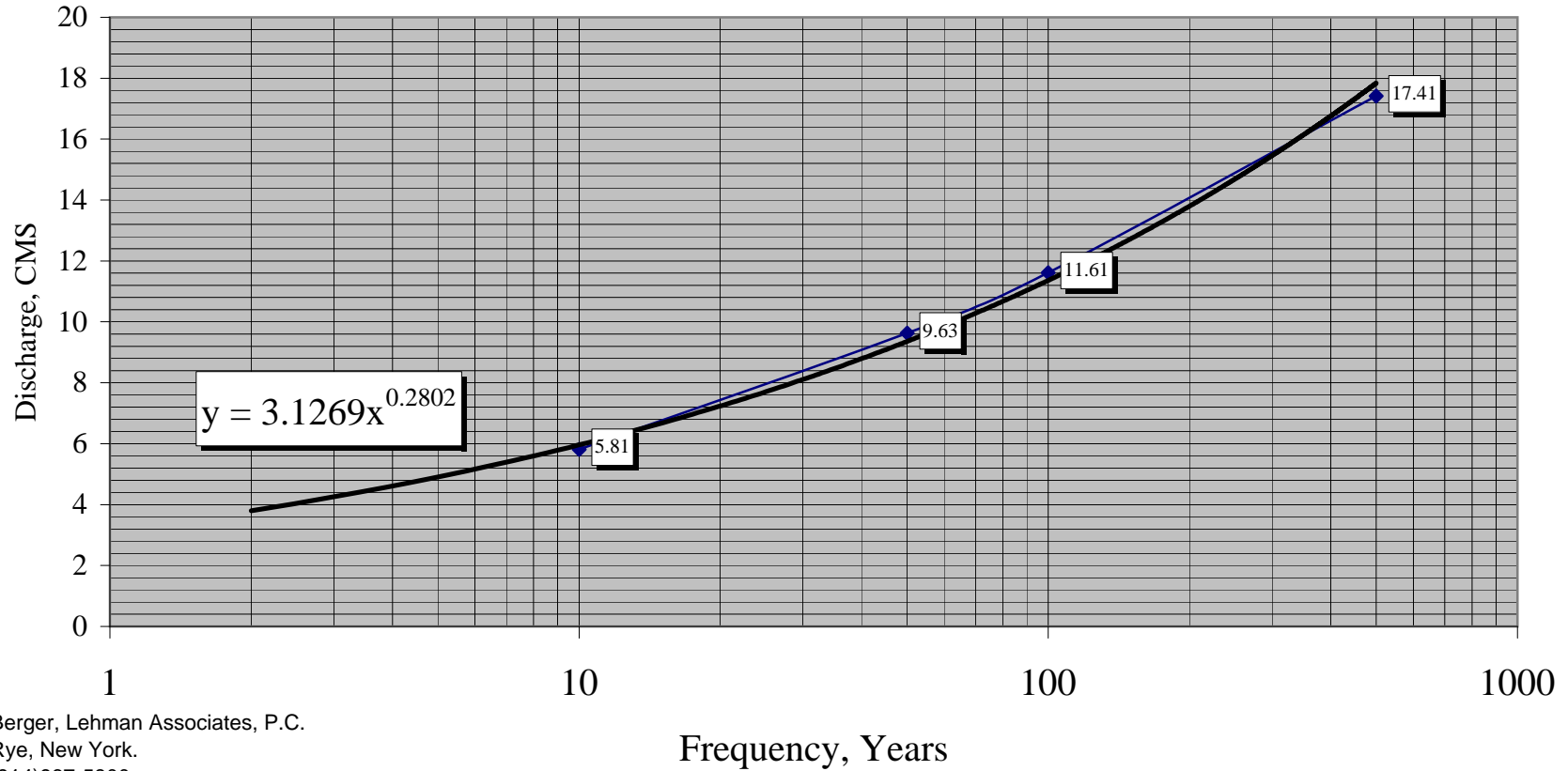
Cross Section	Discharge, CMS			
	Frequency, Years			
	10	50	100	500
8178	5.81	9.63	11.61	17.41
7937	8.64	14.58	17.70	26.62
7698	12.18	20.25	24.64	37.24
7120	13.45	22.51	27.33	41.34
6462	14.58	24.49	29.87	45.17
5878	22.51	37.80	46.01	69.80
5296	27.04	45.59	55.50	84.24

Discharge-Frequency Correlation

Cross Section	Correlation Equation (Y:discharge; X:freq.)	Discharge, CMS	
		Frequency, Years	
		2	25
8178	$y = 3.1269x^{0.2802}$	3.8	7.9
7937	$y = 4.5901x^{0.2874}$	5.6	11.6
7698	$y = 6.4635x^{0.2856}$	7.9	16.2
7120	$y = 7.1298x^{0.2868}$	8.7	17.9
6462	$y = 7.6958x^{0.289}$	9.4	19.5
5878	$y = 11.87x^{0.2891}$	14.5	30.1
5296	$y = 14.234x^{0.2903}$	17.4	36.2

Beaver Pond Brook
Rating Table

Cross Section 8178

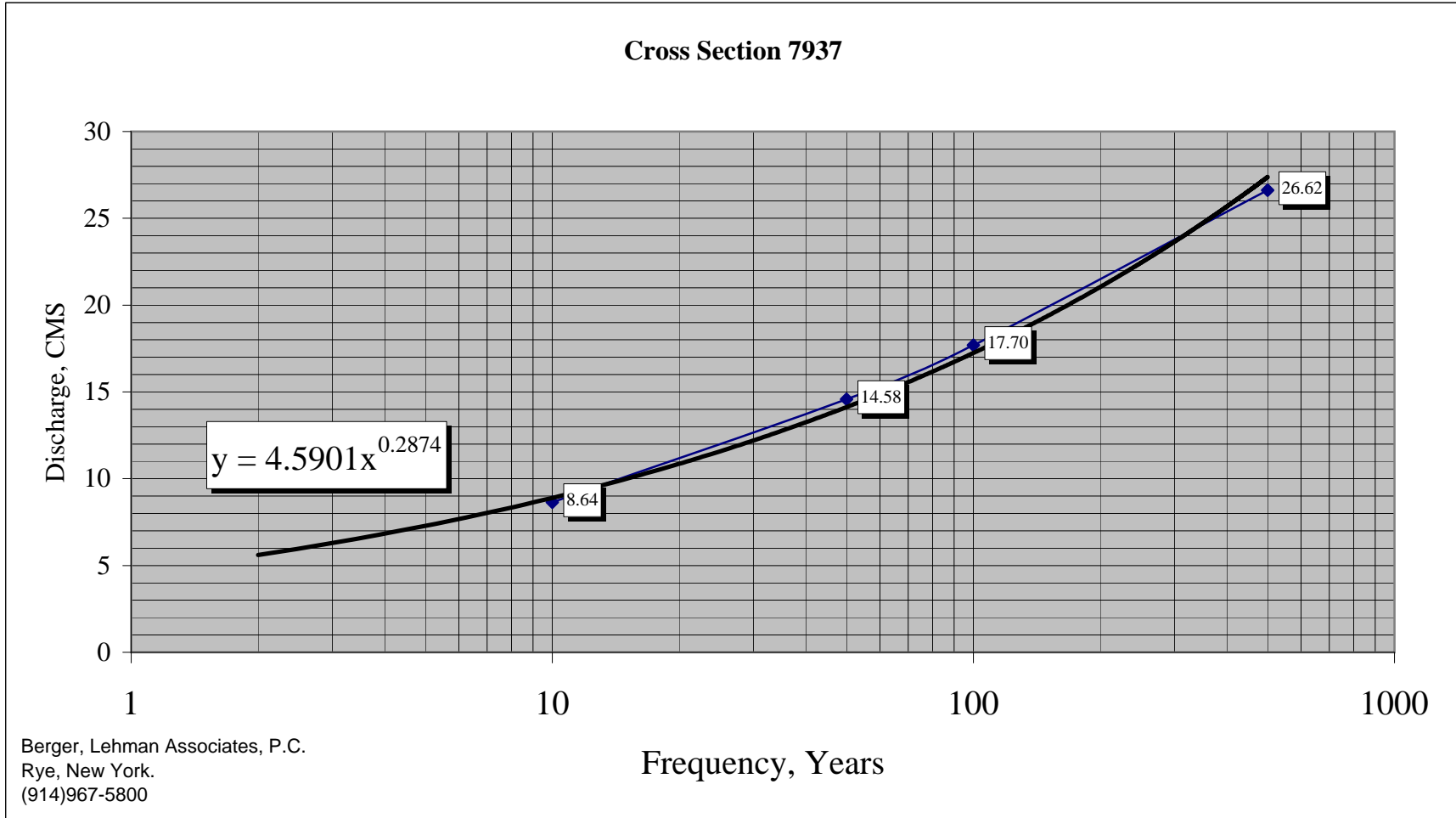


Berger, Lehman Associates, P.C.
Rye, New York.
(914)967-5800

Using $y = 3.1269x^{0.2802}$

X (Freq.)	Y (Discharge)
2 -YR	3.80 CMS
25 -YR	7.93 CMS

Beaver Pond Brook
Rating Table

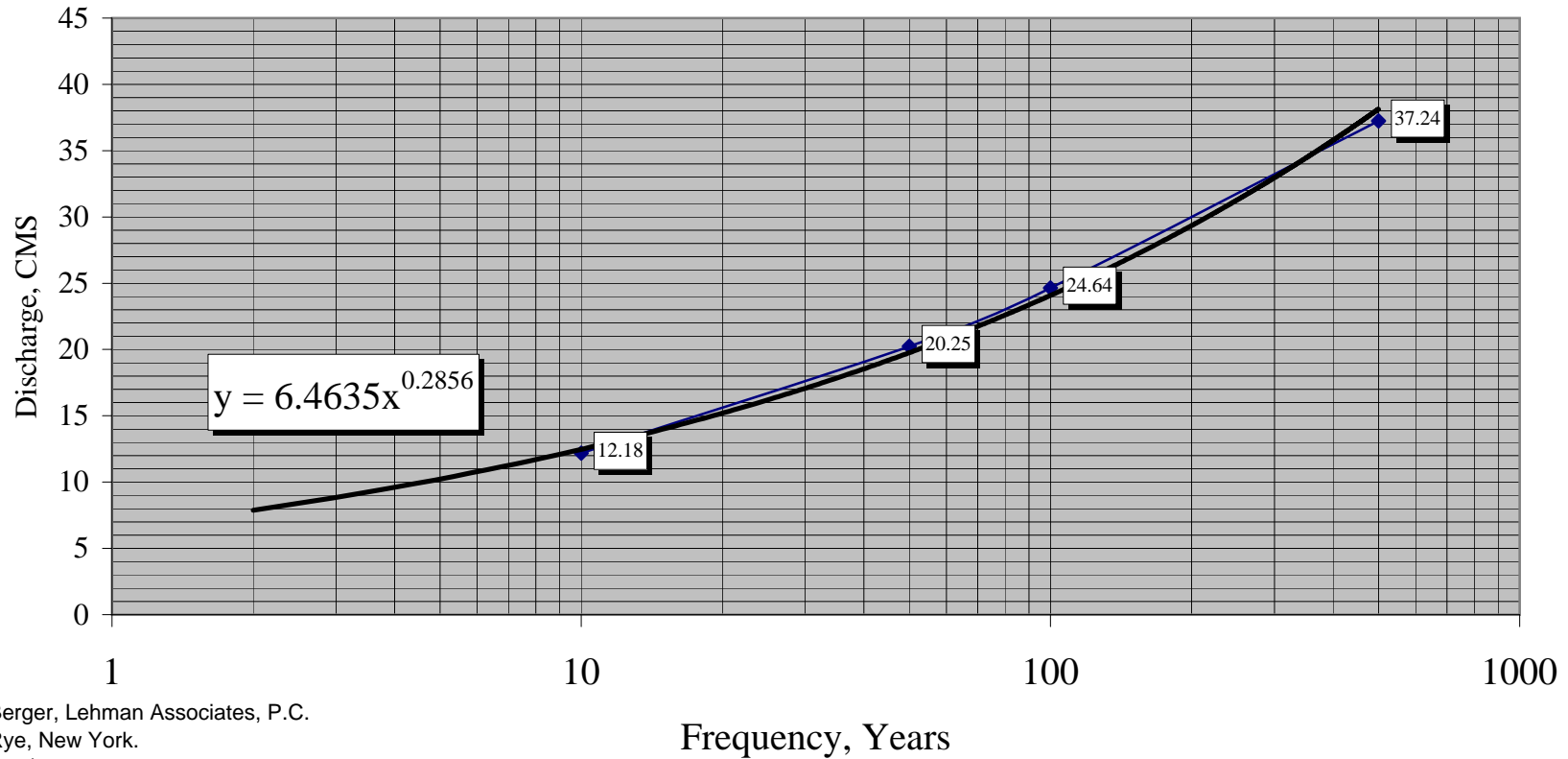


Using $y = 4.5901x^{0.2874}$

X (Freq.)	Y (Discharge)
2 -YR	5.60 CMS
25 -YR	11.58 CMS

Beaver Pond Brook
Rating Table

Cross Section 7698



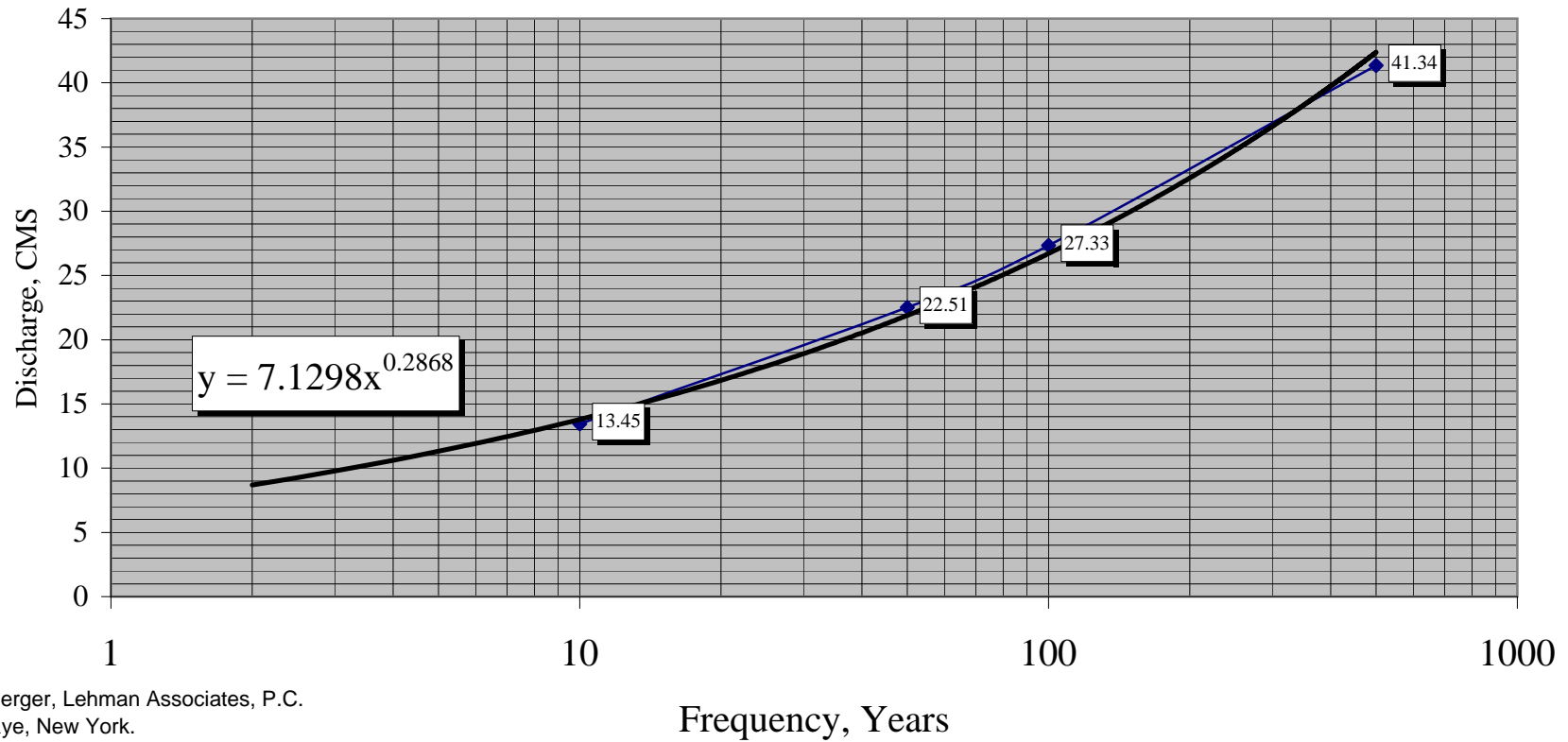
Berger, Lehman Associates, P.C.
Rye, New York.
(914)967-5800

Using $y = 6.4635x^{0.2856}$

X (Freq.)	Y (Discharge)
2 -YR	7.88 CMS
25 -YR	16.21 CMS

Beaver Pond Brook
Rating Table

Cross Section 7120



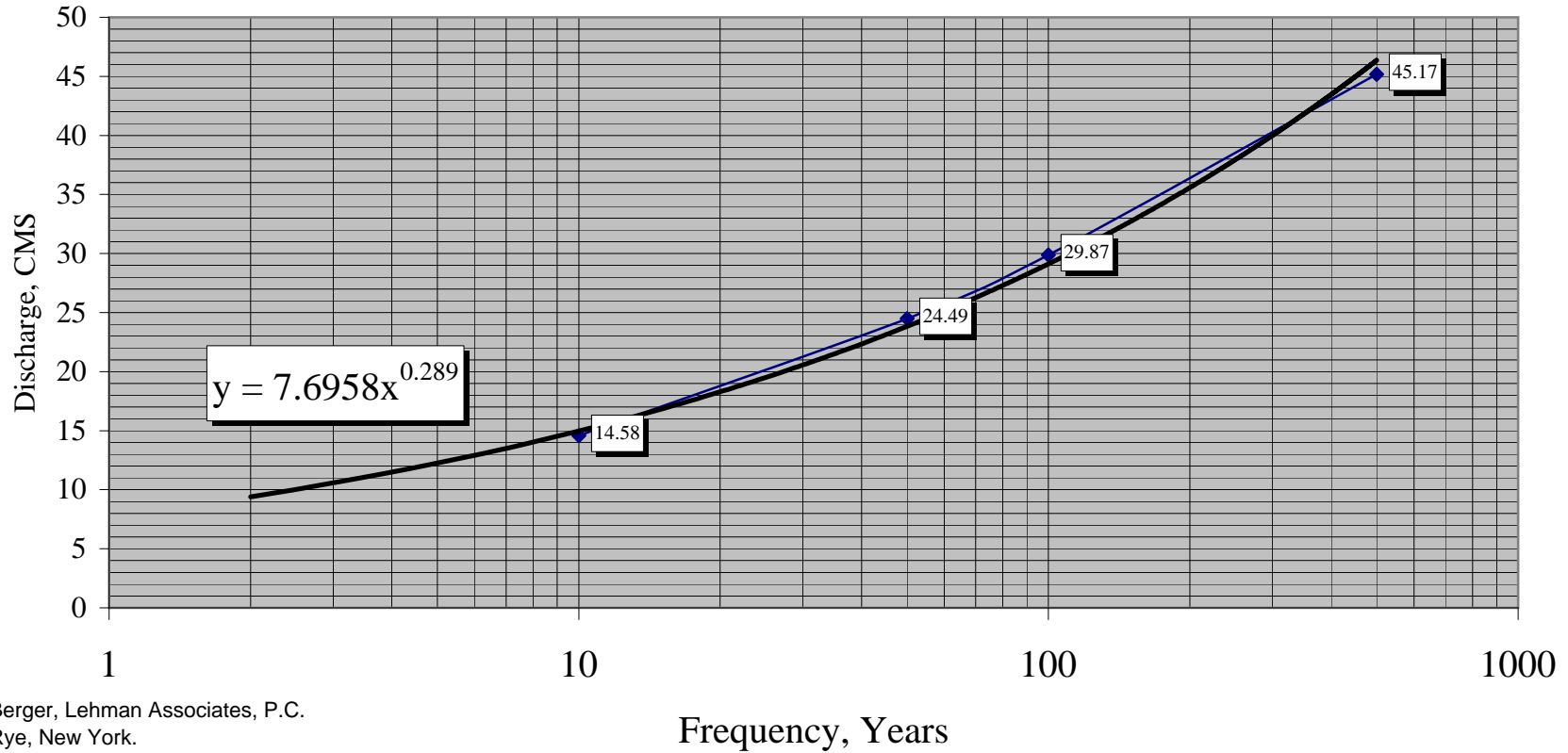
Berger, Lehman Associates, P.C.
Rye, New York.
(914)967-5800

Using $y = 7.1298x^{0.2868}$

X (Freq.)	Y (Discharge)
2 -YR	8.72 CMS
25 -YR	17.95 CMS

Beaver Pond Brook
Rating Table

Cross Section 6462



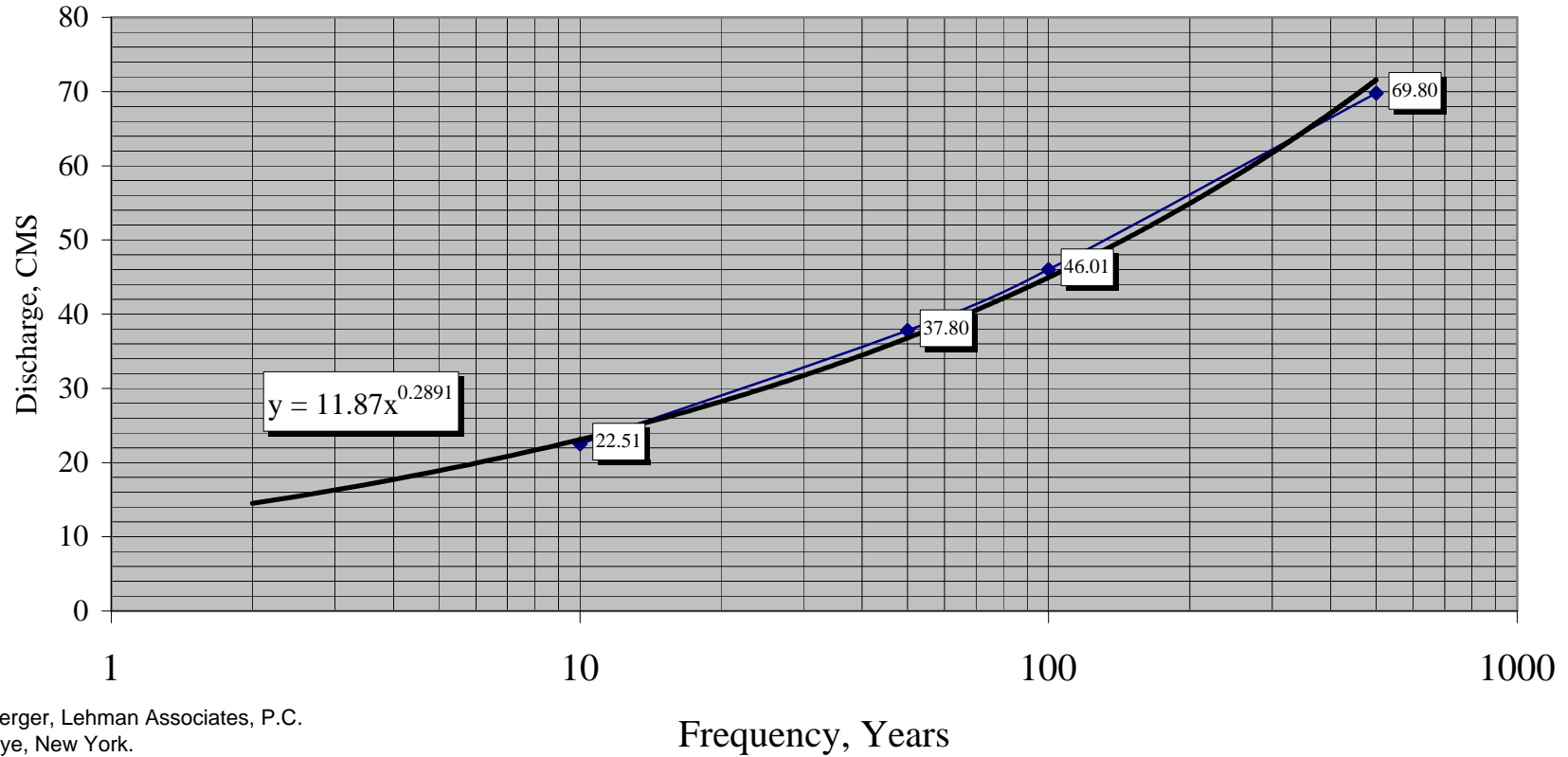
Berger, Lehman Associates, P.C.
Rye, New York.
(914)967-5800

Using $y = 7.6958x^{0.289}$

X (Freq.)	Y (Discharge)
2 -YR	9.40 CMS
25 -YR	19.51 CMS

Beaver Pond Brook
Rating Table

Cross Section 5878



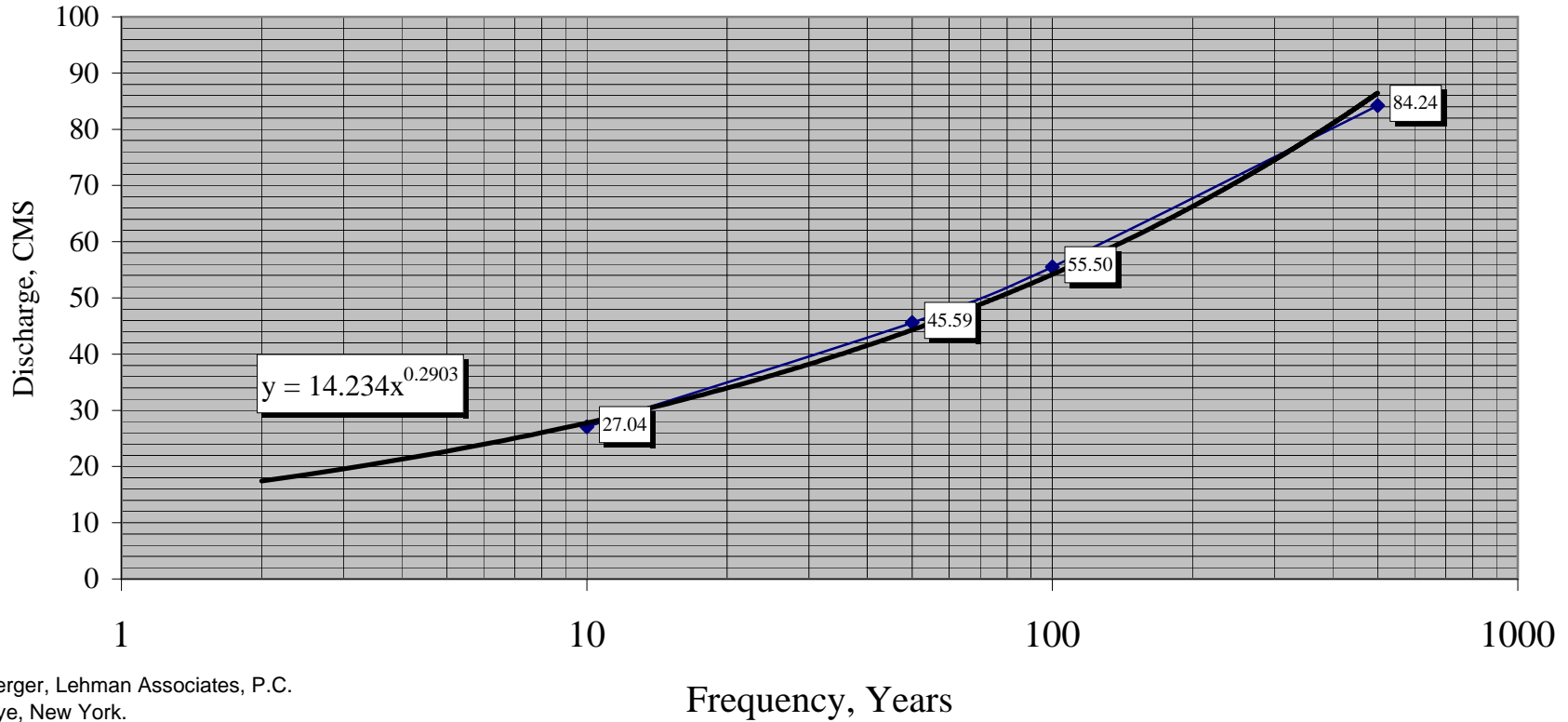
Berger, Lehman Associates, P.C.
Rye, New York.
(914)967-5800

Using $y = 11.87x^{0.2891}$

X (Freq.)	Y (Discharge)
2 -YR	14.50 CMS
25 -YR	30.10 CMS

Beaver Pond Brook
Rating Table

Cross Section 5296



Berger, Lehman Associates, P.C.
Rye, New York.
(914)967-5800

Using $y = 14.234x^{0.2903}$

X (Freq.)	Y (Discharge)
2 -YR	17.41 CMS
25 -YR	36.24 CMS

Appendix B. Hydraulic Backup

Part 1: HEC-RAS Input Report

- Proposed Condition , Design Q 1 ~ 53

Part 2: HEC-RAS Output Tables, Cross-Section & Water Surface Profile Plots

- Proposed Condition ("Standard 1" output) 1
- Proposed Condition ("Six XS Bridge" output) 12
- Proposed Condition ("Culvert Only" output) 15
- Existing Condition ("Standard 1" output) 22
- Existing Condition ("Six XS Bridge" output) 34
- Existing Condition ("Culvert Only" output) 36
- Natural Condition 1 - based on Existing geometry ("Standard 1" output) 43
- Natural Condition 2 - partially using Proposed geometry ("Standard 1" output) 44
- Cross Section Plots (100-YR Existing and Proposed) 45
- Water Surface Profiles Plots (Proposed Condition 10, 50, 100 & 500-YR) 75
- Water Surface Profiles Plots (Existing Condition 10, 50, 100 & 500-YR) 76

Part 1: HEC-RAS Input Report

Proposed Condition, Design Q

HEC-RAS Version 4.1.0 Jan 2010
U. S. Army Corps of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

```
X      X XXXXXX   XXXX       XXXX       XX       XXXX
X      X X                X X       X X       X X       X
X      X X                X X       X X       X X       X
XXXXXXXX XXXX   X                XXX XXXX   XXXXXX   XXXX
X      X X                X X       X X       X X       X
X      X X                X X       X X       X X       X
X      X XXXXXX   XXXX       X X       X X       X XXXXX
```

PROJECT DATA

Project Title: Beaver Pond Brook, 151-273, Metric
Project File : 151273BPB_DOT_Metric.prj
Run Date and Time: 10/4/2013 3:49:40 PM

Project in SI units

Project Description:

Beaver Pond Brook, Waterbury, Reconstruction of I-84 from Washington Ave. to Pierpont Rd.

ConnDOT Project No. 151-273

All cross sections input looking upstream consistent with 1979 Waterbury FIS.

Photographs are attached to the Existing Conditions Model.

Expand AND scroll through all text boxes to review complete annotations.

Design discharges are as reported in the 1979 Waterbury FIS.

Starting water surface elevations assumed backwater conditions from the Mad River.

Recommend using "View Cross Sections" when comparing the EXISTING, NATURAL and PROPOSED conditions, instead of "Profile Plot". Due to the relocation of the brook, the overall channel length in the proposed condition differs from the existing. This makes comparing these different models in the Profile Plot impractical, which matches the downstream end adequately, but the upstream end would be off by the difference in the total channel length.

PLAN DATA

Plan Title: PROPOSED - DOT

Plan File : C:\Users\Won\Documents\151-273\Beaver Pond Brook_DOT
DESIGN_Rev03\151273BPB_DOT_Metric.p18

Geometry Title: PROPOSED (New Survey)

Geometry File : C:\Users\Won\Documents\151-273\Beaver Pond Brook_DOT
DESIGN_Rev03\151273BPB_DOT_Metric.g10

Flow Title : Design Q's with Backwater (Proposed)

Flow File : C:\Users\Won\Documents\151-273\Beaver Pond Brook_DOT
DESIGN_Rev03\151273BPB_DOT_Metric.f11

Plan Description:

Note: Use "View Cross Sections" when comparing the EXISTING and PROPOSED conditions, instead of "Profile Plot". Due to the relocation of the brook, the overall channel length in the proposed condition differs from the existing. This makes comparing the existing and proposed water surface elevations in the Profile Plot impractical, which matches the downstream end adequately, but the upstream end would be off by the difference in the total channel length.

Plan Summary Information:

Number of: Cross Sections = 68 Multiple Openings = 0
 Culverts = 7 Inline Structures = 1
 Bridges = 3 Lateral Structures = 0

Computational Information

Water surface calculation tolerance = 0.01
 Critical depth calculation tolerance = 0.01
 Maximum number of iterations = 20
 Maximum difference tolerance = 0.3
 Flow tolerance factor = 0.001

Computation Options

Critical depth computed only where necessary
 Conveyance Calculation Method: At breaks in n values only
 Friction Slope Method: Average Conveyance
 Computational Flow Regime: Mixed Flow

FLOW DATA

Flow Title: Design Q's with Backwater (Proposed)
 Flow File : C:\Users\Won\Documents\151-273\Beaver Pond Brook_DOT
 DESIGN_Rev03\151273BPB_DOT_Metric.f11

Flow Data (m3/s)

River	Reach	RS	Fish Low Pass. 25 Year	Fish High Pass. 50 Year	2 Year
3 Year	5 Year	10 Year			
Beaver Pond Brk	Reach-1	8722	.01	.51	3.8
4.3	4.9	5.81	7.93	9.63	5.6
Beaver Pond Brk	Reach-1	7937	.01	.51	5.6
6.3	7.3	8.64	11.6	14.58	7.88
Beaver Pond Brk	Reach-1	7698	.01	.51	7.88
8.8	10.2	12.18	16.2	20.25	8.72
Beaver Pond Brk	Reach-1	7120	.01	.51	8.72
9.8	11.3	13.45	17.9	22.51	9.4
Beaver Pond Brk	Reach-1	6473	.01	.51	9.4
10.6	12.3	14.58	19.5	24.49	14.5
Beaver Pond Brk	Reach-1	5878	.023	.935	14.5
16.3	18.9	22.51	30.1	37.8	17.41
Beaver Pond Brk	Reach-1	5355	.023	.935	17.41
19.6	22.7	27.04	36.2	45.59	

River	Reach	RS	100 Year	500 Year
Beaver Pond Brk	Reach-1	8722	11.61	17.41
Beaver Pond Brk	Reach-1	7937	17.7	26.62
Beaver Pond Brk	Reach-1	7698	24.64	37.24
Beaver Pond Brk	Reach-1	7120	27.33	41.34
Beaver Pond Brk	Reach-1	6473	29.87	45.17
Beaver Pond Brk	Reach-1	5878	46.01	69.8
Beaver Pond Brk	Reach-1	5355	55.5	84.24

Boundary Conditions

River	Reach	Profile	Upstream	
Downstream				
Beaver Pond Brk	Reach-1	Fish Low Pass.	Critical	Known WS =
111.27				
Beaver Pond Brk	Reach-1	Fish High Pass.	Critical	Known WS
= 111.5				
Beaver Pond Brk	Reach-1	2 Year	Critical	Known WS =
112.22				

Beaver Pond Brk Reach-1	3 Year	Critical	Known WS
= 112.3			
Beaver Pond Brk Reach-1	5 Year	Critical	Known WS =
112.51			
Beaver Pond Brk Reach-1	10 Year	Critical	Known WS =
112.83			
Beaver Pond Brk Reach-1	25 Year	Critical	Known WS =
112.83			
Beaver Pond Brk Reach-1	50 Year	Critical	Known WS =
113.41			
Beaver Pond Brk Reach-1	100 Year	Critical	Known WS =
113.93			
Beaver Pond Brk Reach-1	500 Year	Critical	Known WS =
114.42			

GEOMETRY DATA

Geometry Title: PROPOSED (New Survey)
 Geometry File : C:\Users\Won\Documents\151-273\Beaver Pond Brook_DOT
 DESIGN_Rev03\151273BPB_DOT_Metric.g10

CROSS SECTION

RIVER: Beaver Pond Brk
 REACH: Reach-1 RS: 8722

INPUT

Description: FEMA STATION 5229, CROSS SECTION AC
 Station Elevation Data num= 59

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-34.518	152.13	-25.14	152.06	-19.44	152.03	-15.67	152.14	-12.838	152.3		
-10.208	152.29	-4.59	152.16	-4	152.1	-3.99	152.4	-3.64	152.4		
-3.63	151.95	-3.3	151.56	-2.6	149.96	-2.32	149.32	0	148.65		
1.31	149.2	2.112	149.29	7.32	149.87	14.882	150.3	21.242	150.73		
21.362	150.74	21.442	150.75	21.462	150.75	21.472	150.75	21.492	150.75		
21.502	150.75	21.522	150.75	26.592	150.91	26.622	150.91	26.642	150.91		
26.682	150.91	26.722	150.91	26.742	150.91	26.762	150.91	26.812	150.91		
26.852	150.91	26.872	150.91	26.922	150.91	26.952	150.91	26.982	150.91		
27.032	150.91	27.082	150.91	27.102	150.91	27.152	150.91	27.182	150.91		
27.212	150.91	27.262	150.91	27.302	150.91	27.332	150.91	27.372	150.9		
27.392	150.9	27.422	150.9	27.462	150.9	28.672	150.88	33.002	150.94		
35.232	150.93	38.922	150.94	41.612	150.94	42.592	150.92				

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-34.518	.02	-25.14	.04	-19.44	.02	-4.59	.06	-2.32	.04
14.882	.09								

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

-2.6	7.32	78	82.25	94.5	.3	.5
------	------	----	-------	------	----	----

CROSS SECTION

RIVER: Beaver Pond Brk
 REACH: Reach-1 RS: 8640

INPUT

Description: FEMA STATION 5228, CROSS SECTION AB
 Station Elevation Data num= 61

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-66.217	151.51	-65.117	151.47	-64.297	151.47	-62.65	151.35	-60.837	151.37		
-60.727	151.37	-60.647	151.37	-55.367	151.49	-54.507	151.49	-50.947	151.41		
-49.33	151.38	-46.247	151.49	-46.137	151.49	-45.967	151.51	-44.637	151.57		
-43.497	150.23	-42.307	149.69	-41.167	149.52	-39.737	149.28	-38.717	149.23		
-33.207	149.12	-32.237	148.99	-31.597	148.87	-29.337	149.09	-26.577	149.23		
-25.817	149.22	-21.987	149.16	-18.637	149.16	-11.247	149.18	-6.547	149.14		
-4.247	149.13	-.907	149.12	-.857	149.12	.193	148.83	1.013	148.77		
1.313	148.73	3.513	148.65	4.273	148.75	5.263	148.89	6.813	149.1		
10.773	149.56	11.563	149.62	12.973	149.82	14.313	150	15.043	150.11		
15.313	150.15	15.383	150.15	19.763	150.63	21.803	150.6	23.783	150.62		
27.773	150.83	29.503	150.88	33.653	150.97	33.943	150.98	36.013	151.09		
36.553	151.12	36.563	151.12	37.733	151.12	38.373	151.13	43.593	151.19		

45.203 151.27

Manning's n Values		num= 6		Sta n Val		Sta n Val		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-66.217	.04	-62.65	.02	-49.33	.04	-46.247	.08	-41.167	.04		
10.773	.09										

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	-42.307	11.563		47.3	56.9	60.6		.1	.3

CROSS SECTION

RIVER: Beaver Pond Brk
REACH: Reach-1 RS: 8583

INPUT

Description:

Station Elevation Data		num= 54		Sta Elev		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-55.36	151.86	-53.88	151.74	-51.26	151.5	-43.8	151.02	-43.57	151		
-40.95	150.5	-38.81	150.15	-37.71	150	-35.04	149.64	-34.55	149.62		
-32.75	149.58	-32.72	149.58	-31.47	149.72	-30.36	149.62	-29.1	149.42		
-28.61	149.36	-27.8	149.207	-26.92	149.04	-26.8	149.03	-25.42	149.15		
-25.01	149.15	-23.82	149.08	-18.1	149.15	-15.28	149.15	-14.32	149.13		
-4.97	148.88	-4.62	148.85	-3.84	148.83	.74	148.61	3.09	148.68		
8.52	148.79	9.28	148.8	10.17	148.84	11.72	148.9	14.14	148.97		
15.77	149.02	18.59	149.06	21.12	149.07	22.72	149.31	25.01	149.4		
29.52	149.51	30.26	149.6	31.81	149.78	33.3	149.91	34.04	149.92		
35.1	149.91	35.84	149.85	36.09	149.85	36.28	149.86	36.65	149.88		
37.16	149.94	40.36	150.36	44.44	150.56	46.17	150.53				

Manning's n Values		num= 5		Sta n Val		Sta n Val		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-55.36	.09	-28.61	.06	-18.1	.04	18.59	.06	22.72	.09		

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	-15.28	18.59		19.7	10.7	10.7		.3	.5

CROSS SECTION

RIVER: Beaver Pond Brk
REACH: Reach-1 RS: 8573

INPUT

Description: U/S of Bridge No. 06580, I-84 OffRamp to Austin Rd (FEMA AA, STA 5227)

Station Elevation Data		num= 66		Sta Elev		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-51.32	151.81	-48.49	151.5	-48.34	151.49	-47.48	151.47	-46.43	151.42		
-46.02	151.41	-43.49	151.36	-41.25	151.24	-37.54	151.03	-37.13	151		
-34.39	150.87	-33.81	150.84	-29.53	150.6	-28.29	150.58	-25.95	150.52		
-24.99	150.5	-23.35	150.48	-23.01	150.47	-22.5	150.49	-21.79	150.5		
-21.55	150.52	-20.44	150.53	-19.33	150.55	-19.01	150.57	-18.89	150.57		
-18.81	150.57	-17.08	150.55	-15.32	150.5	-14.74	150.46	-14.14	150.34		
-13.37	150.32	-12.7	150.24	-11.17	150.15	-8.81	150.09	-7.15	150.04		
-6.55	150	-6.1	149.98	-5.4	149.93	-5.21	149.9	-4.73	149.75		
-3.95	149.5	-3.17	149.22	-2.54	149	-2.09	148.85	0	148.53		
2.17	148.83	2.23	149	2.58	149.34	2.86	149.56	2.96	149.63		
4.83	149.5	6.59	149.39	7.84	149.07	10.55	149.06	11.72	149.05		
17.6	149.42	18.23	149.44	19.08	149.47	19.32	149.47	24.44	149.57		
28.96	149.64	30	150.57	32.07	150.54	38.88	151.4	46.31	151.41		
52.38	151.51										

Manning's n Values		num= 5		Sta n Val		Sta n Val		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-51.32	.09	-4.73	.04	2.58	.06	6.59	.04	19.08	.06		

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	-4.73	2.96		14.9	18.2	17.8		.3	.5

Ineffective Flow		num= 3		Permanent	
Sta L	Sta R	Elev			
-51.32	-30	151.81	F		
2.96	10.5	149.63	F		
10.5	52.38	151.5	F		

BRIDGE

RIVER: Beaver Pond Brk
 REACH: Reach-1 RS: 8565.5

INPUT

Description: Bridge No. 06580, I-84 Off-Ramp to Austin Rd
 Distance from Upstream XS = 3.25
 Deck/Roadway Width = 9
 Weir Coefficient = 1.4

Upstream Deck/Roadway Coordinates

num= 13														
Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
-143.909	154.414		0		-69.099	153.494		0		-49.099	153.299		0	
-32.874	153.103		0		-32.873	154.173		0		-21.12	154.062		151.364	
7.95	153.543	150.828			20.052	153.453		0		47.152	153.402		0	
47.153	152.332		0		50.9	152.262		0		60.9	152.423		0	
70.9	152.643		0											

Upstream Bridge Cross Section Data

Station Elevation Data num= 36											
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-52	153.2	-32.61	152.63	-30.99	152.62	-24.22	150.5	-21.71	149.65		
-21.34	149.66	-19.17	149.28	-17.46	149.26	-17.39	149.26	-4.74	149.09		
-4.02	149.09	-3.74	149.05	-3.3	148.97	-2.51	148.6	-1.17	148.36		
-.3	148.56	1.18	149.25	1.65	149.37	3.45	149.71	3.77	149.78		
4.33	149.277	5.04	148.64	5.55	148.67	7.98	149.14	9.51	149.18		
10.38	149.23	19.07	149.74	19.15	149.74	19.3	149.75	19.98	149.78		
28.66	149.99	29.21	150.01	30.97	151.6	38.4	151.9	38.92	151.93		
50.94	152.2										

Manning's n Values

num= 6									
Sta	n	Sta	n	Sta	n	Sta	n	Sta	n
-52	.06	-30.99	.09	-4.02	.04	1.18	.06	4.33	.04
7.98	.06								

Bank Sta: Left Right Coeff Contr. Expan.

-4.02	1.65		.3	.5
-------	------	--	----	----

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
-51.32	-30	151.81	F
2.96	10.5	149.63	F
10.5	52.38	151.5	F

Downstream Deck/Roadway Coordinates

num= 15														
Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
-143.909	154.414		0		-69.099	153.666		0		-49.099	153.466		0	
-32.874	153.304		0		-32.873	154.341		0		-21.81	154.254		151.544	
8.73	153.937	151.18			14.907	153.807		0		14.908	152.826		0	
20.9	152.732		0		30.9	152.657		0		40.9	152.642		0	
50.9	152.686		0		60.9	152.79		0		70.9	152.952		0	

Downstream Bridge Cross Section Data

Station Elevation Data num= 30											
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-51	153.3	-31.47	152.94	-23.51	149.64	-23.15	149.51	-21.06	149.31		
-20.97	149.3	-16.78	148.66	-16.12	148.65	-11.73	148.54	-10.92	148.53		
-8.28	148.44	-5.74	148.36	-5.49	148.31	-5.14	148.3	-3.88	148.24		
-.45	148.09	.56	148.03	1.91	148.06	4.87	148.35	6.14	148.44		
6.52	148.86	6.67	148.88	9.43	149.69	11.45	150.65	11.69	150.76		
15.45	152.51	16.02	152.53	27.71	152.52	30.65	152.5	51	152.4		

Manning's n Values

num= 6									
Sta	n	Sta	n	Sta	n	Sta	n	Sta	n
-51	.06	-31.47	.09	-16.78	.04	6.14	.06	6.52	.09
15.45	.06								

Bank Sta: Left Right Coeff Contr. Expan.

-5.74	4.87		.3	.5
-------	------	--	----	----

Ineffective Flow num= 4

Sta L	Sta R	Elev	Permanent
-49.156	-28.96	150.89	F
-28.96	-6.576	148.73	F
9.42	9.93	149.77	F
9.93	26.37	151.5	F

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
 Downstream Embankment side slope = 0 horiz. to 1.0 vertical
 Maximum allowable submergence for weir flow = .98
 Elevation at which weir flow begins =
 Energy head used in spillway design =
 Spillway height used in design =
 Weir crest shape = Broad Crested

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data

Energy

Selected Low Flow Methods = Highest Energy Answer

High Flow Method

Pressure and Weir flow

Submerged Inlet Cd =

Submerged Inlet + Outlet Cd = .8

Max Low Cord =

Additional Bridge Parameters

Add Friction component to Momentum

Do not add Weight component to Momentum

Class B flow critical depth computations use critical depth

inside the bridge at the upstream end

Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION

RIVER: Beaver Pond Brk

REACH: Reach-1

RS: 8554

INPUT

Description: D/S of Bridge No. 06580, I-84 OffRamp to Austin Rd.

Station Elevation Data		num= 51		Sta		Elev		Sta		Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-49.156	150.89	-47.056	150.8	-39.656	150.7	-38.486	150.69	-38.086	150.68		
-34.726	150.5	-30.306	150.05	-29.906	150.02	-28.876	150.02	-26.986	149.93		
-26.716	149.91	-26.136	149.81	-23.886	149.5	-19.646	148.91	-17.946	148.68		
-17.206	148.61	-15.956	148.56	-13.696	148.53	-12.556	148.52	-11.066	148.54		
-10.246	148.58	-9.176	148.65	-7.946	148.7	-6.576	148.73	-6.506	148.72		
-5.406	148.5	-2.666	148	-2.296	147.74	-2.006	147.67	-.866	147.45		
1.454	147.59	2.154	147.66	2.344	148	3.274	148.34	4.414	148.77		
5.474	149.14	6.314	149.41	6.494	149.46	6.814	149.54	7.474	149.6		
9.424	149.77	10.184	149.72	11.014	149.58	11.564	149.5	11.954	149.5		
13.654	149.69	17.304	149.98	17.914	150.04	18.83	150.18	21.44	151.34		
26.374	151.5										

Manning's n Values

num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-49.156	.09	-6.576	.04	4.414	.09	18.83	.06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 -6.576 4.414 25.4 18.9 5.7 .3 .5

Ineffective Flow num= 4

Sta L	Sta R	Elev	Permanent
-49.156	-28.96	150.89	F
-28.96	-6.576	148.73	F
9.42	9.93	149.77	F
9.93	26.37	151.5	F

CROSS SECTION

RIVER: Beaver Pond Brk

REACH: Reach-1

RS: 8536

INPUT

Description:

Station Elevation Data		num= 45		Sta		Elev		Sta		Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-48.816	150.96	-47.926	150.91	-46.986	150.86	-41.476	150.62	-41.326	150.62		
-40.016	150.59	-34.886	150.49	-33.986	150.48	-30.996	150.42	-27.126	150.3		
-26.396	150.28	-25.546	150.19	-22.816	150.08	-19.086	149.92	-17.526	149.56		
-17.226	149.5	-15.036	149.08	-14.616	149	-11.296	148.54	-11.056	148.5		

-10.806	148.47	-10.286	148.44	-8.766	148.4	-7.606	148.36	-7.036	148.25
-4.576	148.2	-3.626	147.98	-3.516	147.96	-1.726	147.47	-1.126	147.05
.704	146.85	1.424	147.45	1.474	147.49	1.504	147.5	1.784	147.69
2.904	148.5	3.224	148.75	3.694	148.85	4.294	149	4.774	149.08
6.534	149.38	7.384	149.5	9.86	149.83	12.89	150.56	14.974	150.75

Manning's n Values num= 4
 Sta n Val Sta n Val Sta n Val Sta n Val
 -48.816 .09 -7.606 .04 2.904 .09 9.86 .06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 -4.576 2.904 71 71.2 66.2 .1 .3

CROSS SECTION

RIVER: Beaver Pond Brk
 REACH: Reach-1 RS: 8464

INPUT
 Description: U/S of Austin Road Str No. 151007 (FEMA Section Z, Sta 5226)
 Station Elevation Data num= 39

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-41.48	152.85	-39.04	152.82	-32.63	152.66	-31.08	152.67	-28.9	152.76
-27.17	152.85	-25.02	152.99	-20.69	152.99	-20.17	152.91	-19.54	152.87
-15.04	152.5	-12.24	151	-11.25	150.5	-10.17	150	-7.54	149
-5.58	148.34	-4.62	148.06	-4.11	147.91	-2.72	147.48	-1.9	147.11
-1.69	147	-1.66	146.97	-.98	146.57	-.84	146.52	-1.01	146.37
1.23	146.42	1.69	146.98	1.71	147	2.36	147.5	3.07	148
3.58	148.31	3.92	148.51	4.64	148.5	4.82	148.55	7.97	148.5
8.12	148.5	11.127	148.75	17	148.933	18.98	149.1		

Manning's n Values num= 4
 Sta n Val Sta n Val Sta n Val Sta n Val
 -41.48 .09 -5.58 .04 4.64 .09 11.127 .06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 -5.58 3.92 55.4 51.8 57 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 -41.48 -7.97 152.5 F
 12.25 18.98 149.32 F

CULVERT

RIVER: Beaver Pond Brk
 REACH: Reach-1 RS: 8435.5

INPUT
 Description: Austin Road Str No. 151007
 Distance from Upstream XS = 20.17
 Deck/Roadway Width = 18.8
 Weir Coefficient = 1.4
 Upstream Deck/Roadway Coordinates

Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
-69.53	154.48				-55.94	154.68				-45.94	154.83			
-35.94	154.98				-25.94	155.13				-15.94	155.28			
-5.94	155.43				4.06	155.58				9.06	155.58			
9.82	154.94				9.97	154.91				10.11	154.88			
10.29	154.83				10.38	154.8				12.12	154			
13.07	153.5				13.93	153				16.62	151.5			
17.57	151				18.57	150.5				19.63	150			
20.74	149.5				21.08	149.36				21.3	149.28			
22.4	149.31				25.14	149.45				29.34	149.45			
29.67	149.44				32.93	149.34				33.61	149.37			
33.64	150.69				33.68	150.84				34.31	154.29			
34.93	154.24				44.28	153.66				45.18	149.4			
45.35	149.4				45.54	149.37				46.29	149.42			
49.56	149.47				49.9	149.47				54.22	149.38			
56.85	149.34				56.96	149.42				57.12	149.5			
58.14	150				59.18	150.5				60.2	151			
61.13	151.5				62.19	152				62.43	152.12			

Upstream Bridge Cross Section Data
 Station Elevation Data num= 39

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-41.48	152.85	-39.04	152.82	-32.63	152.66	-31.08	152.67	-28.9	152.76
-27.17	152.85	-25.02	152.99	-20.69	152.99	-20.17	152.91	-19.54	152.87
-15.04	152.5	-12.24	151	-11.25	150.5	-10.17	150	-7.54	149
-5.58	148.34	-4.62	148.06	-4.11	147.91	-2.72	147.48	-1.9	147.11
-1.69	147	-1.66	146.97	-.98	146.57	-.84	146.52	1.01	146.37
1.23	146.42	1.69	146.98	1.71	147	2.36	147.5	3.07	148
3.58	148.31	3.92	148.51	4.64	148.5	4.82	148.55	7.97	148.5
8.12	148.5	11.127	148.75	17	148.933	18.98	149.1		

Manning's n	Val	num=	4
Sta	n Val	Sta	n Val
-41.48	.09	-5.58	.04
		4.64	.09
		11.127	.06

Bank Sta:	Left	Right	Coeff	Contr.	Expan.
	-5.58	3.92		.3	.5

Ineffective Flow	num=	2
Sta L	Sta R	Elev
-41.48	-7.97	152.5
12.25	18.98	149.32

Downstream Deck/Roadway	Coordinates													
num=	51													
Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
-69.53	154.48				-55.94	154.68				-45.94	154.83			
-35.94	154.98				-25.94	155.13				-15.94	155.28			
-5.94	155.43				4.06	155.58				9.06	155.58			
9.82	154.94				9.97	154.91				10.11	154.88			
10.29	154.83				10.38	154.8				12.12	154			
13.07	153.5				13.93	153				16.62	151.5			
17.57	151				18.57	150.5				19.63	150			
20.74	149.5				21.08	149.36				21.3	149.28			
22.4	149.31				25.14	149.45				29.34	149.45			
29.67	149.44				32.93	149.34				33.61	149.37			
33.64	150.69				33.68	150.84				34.31	154.29			
34.93	154.24				44.28	153.66				45.18	149.4			
45.35	149.4				45.54	149.37				46.29	149.42			
49.56	149.47				49.9	149.47				54.22	149.38			
56.85	149.34				56.96	149.42				57.12	149.5			
58.14	150				59.18	150.5				60.2	151			
61.13	151.5				62.19	152				62.43	152.12			

Downstream Bridge Cross Section Data									
Station	Elevation	Data	num=	39					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-39.1	152.33	-25.35	149.43	-24.622	149.35	-23.282	149.17	-22.232	149
-21.692	148.93	-20.832	148.85	-19.622	148.89	-14.982	148.78	-13.942	148.72
-10.842	148.57	-9.412	148.51	-8.092	148.47	-7.452	148.43	-6.872	148.36
-6.842	148.35	-6.212	148.09	-5.482	147.86	-2.732	145.98	-2.552	145.85
-2.542	145.84	-.912	145.81	-.882	145.8	-.852	145.81	2.008	146.07
2.208	146.21	2.508	147	3.258	147.5	4.208	147.93	4.788	148.2
4.898	148.23	5.868	148.35	6.908	148.55	7.668	148.62	8.148	148.68
9.268	148.74	13.05	149.01	16.65	148.518	19.158	148.746		

Manning's n	Val	num=	4
Sta	n Val	Sta	n Val
-39.1	.08	-6.212	.04
		4.208	.08
		13.05	.04

Bank Sta:	Left	Right	Coeff	Contr.	Expan.
	-5.482	4.208		.3	.5

Ineffective Flow	num=	2
Sta L	Sta R	Elev
-39.1	-4.14	149.5
4	19.158	149.15

Upstream Embankment side slope = 2.8 horiz. to 1.0 vertical
Downstream Embankment side slope = 1.5 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow = .98
Elevation at which weir flow begins =
Energy head used in spillway design =
Spillway height used in design =
Weir crest shape = Broad Crested

Number of Culverts = 1

Culvert Name	Shape	Ri se	Span
151007	Box	2.13	2.44

FHWA Chart # 9 - flared wingwalls and Inlet top edge bevel
 FHWA Scale # 1 - 45 deg Wingwall flare; inlet top edge bevel = 0.043D
 Solution Criteria = Highest U.S. EG
 Culvert Upstrm Dist Length Top n Bottom n Depth Blocked Entrance Loss Coef Exit Loss Coef

	8.58	37.27	.012	.012	0		.2		1
--	------	-------	------	------	---	--	----	--	---

Upstream Elevation = 146.15
 Centerline Station = 0
 Downstream Elevation = 145.915
 Centerline Station = 0

CROSS SECTION

RIVER: Beaver Pond Brk
 REACH: Reach-1 RS: 8412

INPUT

Description: D/S of Austin Road Str No. 151007

Station Elevation Data		num= 39		Sta Elev		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-39.1	152.33	-25.35	149.43	-24.622	149.35	-23.282	149.17	-22.232	149		
-21.692	148.93	-20.832	148.85	-19.622	148.89	-14.982	148.78	-13.942	148.72		
-10.842	148.57	-9.412	148.51	-8.092	148.47	-7.452	148.43	-6.872	148.36		
-6.842	148.35	-6.212	148.09	-5.482	147.86	-2.732	145.98	-2.552	145.85		
-2.542	145.84	-.912	145.81	-.882	145.8	-.852	145.81	2.008	146.07		
2.208	146.21	2.508	147	3.258	147.5	4.208	147.93	4.788	148.2		
4.898	148.23	5.868	148.35	6.908	148.55	7.668	148.62	8.148	148.68		
9.268	148.74	13.05	149.01	16.65	148.518	19.158	148.746				

Manning's n Values		num= 4		Sta n Val		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-39.1	.08	-6.212	.04	4.208	.08	13.05	.04		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	-5.482	4.208		19.25	19.5	19.5	.3	.5

Ineffective Flow		num= 2		Sta L		Sta R		Elev	
Sta L	Sta R	Elev	Permanent	Sta L	Sta R	Elev	Permanent	Sta L	Sta R
-39.1	-4.14	149.5	F						
4	19.158	149.15	F						

CROSS SECTION

RIVER: Beaver Pond Brk
 REACH: Reach-1 RS: 8393

INPUT

Description: FEMA STATION 5225, CROSS SECTION Y

Station Elevation Data		num= 35		Sta Elev		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-41.242	153.12	-30.58	148.15	-29.292	148.08	-26.292	147.95	-24.912	147.91		
-21.982	147.8	-21.362	147.77	-20.362	147.75	-18.882	147.61	-13.772	147.04		
-13.522	147.01	-9.122	146.67	-8.152	146.62	-7.352	146.6	-5.442	146.62		
-4.962	146.63	-4.772	146.5	-3.592	145.69	-3.342	145.54	-2.892	144.5		
-.352	144.34	.118	144.36	2.208	144.51	3.048	145	5.358	145.86		
5.718	145.96	5.798	146	7.34	146.595	9.688	147.5	10.748	147.91		
11.368	148	12.348	148.12	13.544	148.25	20.856	148.729	21.548	148.787		

Manning's n Values		num= 4		Sta n Val		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-41.242	.08	-5.442	.04	7.34	.06	13.544	.04		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	-4.962	7.34		41	36.6	29.8	.1	.3

CROSS SECTION

RIVER: Beaver Pond Brk
 REACH: Reach-1 RS: 8356

INPUT

Description: U/S of Str 04323 , I-84 WB On-Ramp from Austin Rd

Station Elevation Data		num= 50		Sta Elev		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-29.394	148.78	-24.93	147.66	-22.404	147.33	-19.304	146.89	-16.574	146.5		

-14.804	146.25	-13.974	146.12	-13.164	145.96	-10.804	145.48	-10.554	145.43
-7.954	145.1	-6.624	145.04	-5.894	144.68	-4.784	144.18	-3.274	143.41
-3.204	143.32	-1.604	143.17	-1.374	143.13	-.984	143.17	.566	143.36
1.686	143.42	1.846	143.43	3.016	143.59	3.036	143.61	3.226	143.7
4.846	144.55	5.556	144.77	6.326	145.09	6.806	145.13	8.206	145.27
8.676	145.4	10.536	145.49	11.326	145.5	13.216	145.5	14.476	145.57
18.096	145.83	20.246	145.96	20.446	145.98	21.736	146.13	22.086	146.17
24.876	146.5	26.186	146.74	27.116	146.88	27.246	146.91	27.316	146.92
27.866	147	29.346	147.19	30.95	147.49	35.07	148.887	36.72	148.987

Manning's n Values										
Sta	n Val	Sta	num=	5	Sta	n Val	Sta	n Val	Sta	n Val
-29.394	.08	-6.624	.04	6.326	.08	21.736	.06	30.95	.04	

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	-6.624	6.326		53	47.4	50		.3	.5
Ineffective Flow			num=	2					
Sta L	Sta R	Elev	Permanent						
-29.394	-5.47	152	F						
7.54	36.72	148	F						

CULVERT

RIVER: Beaver Pond Brk
 REACH: Reach-1 RS: 8332.5

INPUT

Description: Str 04323, I-84 WB On-Ramp from Austin Rd
 Distance from Upstream XS = 19.82
 Deck/Roadway Width = 7.9
 Weir Coefficient = 1.4
 Upstream Deck/Roadway Coordinates

num=	13													
Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
-80.04	154.39				-70.04	154.18				-60.04	153.93			
-50.04	153.66				-40.04	153.35				-30.04	153.02			
34.69	150.75				39.69	150.58				49.69	150.26			
59.69	149.97				69.69	149.7				79.69	149.47			
89.69	149.26													

Upstream Bridge Cross Section Data

Station Elevation Data													
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-29.394	148.78	-24.93	147.66	-22.404	147.33	-19.304	146.89	-16.574	146.5				
-14.804	146.25	-13.974	146.12	-13.164	145.96	-10.804	145.48	-10.554	145.43				
-7.954	145.1	-6.624	145.04	-5.894	144.68	-4.784	144.18	-3.274	143.41				
-3.204	143.32	-1.604	143.17	-1.374	143.13	-.984	143.17	.566	143.36				
1.686	143.42	1.846	143.43	3.016	143.59	3.036	143.61	3.226	143.7				
4.846	144.55	5.556	144.77	6.326	145.09	6.806	145.13	8.206	145.27				
8.676	145.4	10.536	145.49	11.326	145.5	13.216	145.5	14.476	145.57				
18.096	145.83	20.246	145.96	20.446	145.98	21.736	146.13	22.086	146.17				
24.876	146.5	26.186	146.74	27.116	146.88	27.246	146.91	27.316	146.92				
27.866	147	29.346	147.19	30.95	147.49	35.07	148.887	36.72	148.987				

Manning's n Values										
Sta	n Val	Sta	num=	5	Sta	n Val	Sta	n Val	Sta	n Val
-29.394	.08	-6.624	.04	6.326	.08	21.736	.06	30.95	.04	

Bank Sta:	Left	Right	Coeff	Contr.	Expan.
	-6.624	6.326		.3	.5
Ineffective Flow			num=	2	
Sta L	Sta R	Elev	Permanent		
-29.394	-5.47	152	F		
7.54	36.72	148	F		

Downstream Deck/Roadway Coordinates

num=	13													
Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
-80.04	154.14				-70.04	153.93				-60.04	153.68			
-50.04	153.41				-40.04	153.1				-30.04	152.77			
34.69	150.5				39.69	150.33				49.69	150.01			
59.69	149.72				69.69	149.45				79.69	149.22			
89.69	149.01													

Downstream Bridge Cross Section Data

Station Elevation Data num= 33

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-31.529	146.93	-28.359	146.78	-23.429	146.27	-20.989	145.94	-17.919	145.61
-11.969	144.97	-11.339	144.95	-10.369	144.82	-9.519	144.66	-7.269	144.25
-6.809	144.16	-6.389	144.07	-5.689	143.91	-4.009	143.64	-3.399	143.04
-2.799	142.6	-1.309	142.36	-.959	142.34	-.149	142.4	1.861	142.52
2.821	142.66	4.971	142.86	5.401	142.95	8.521	143.48	8.561	143.48
8.721	143.52	10.091	143.88	10.141	143.9	10.431	144.05	22.571	150.78
23.071	150.92	23.101	150.94	23.271	150.93				

Manning's n Values num= 4
 Sta n Val Sta n Val Sta n Val Sta n Val
 -31.529 .08 -4.009 .04 8.721 .08 22.571 .04

Bank Sta: Left Right Coeff Contr. Expan.
 -4.009 8.721 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 -31.529 -5.8 146.93 F
 4.44 23.271 146.93 F

Upstream Embankment side slope = 2.2 horiz. to 1.0 vertical
 Downstream Embankment side slope = 2 horiz. to 1.0 vertical
 Maximum allowable submergence for weir flow = .98
 Elevation at which weir flow begins =
 Energy head used in spillway design =
 Spillway height used in design =
 Weir crest shape = Broad Crested

Number of Culverts = 2

Culvert Name Shape Rise Span
 #2-East Cell Box 1.83 2.13
 FHWA Chart # 8 - flared wingwalls
 FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
 Solution Criteria = Highest U.S. EG

Culvert	Upstrm Dist	Length	Top n	Bottom n	Depth Blocked	Entrance Loss Coef	Exit Loss Coef
	4.5	38.95	.012	.012	0	.5	1

Upstream Elevation = 143.15
 Centerline Station = -1.21
 Downstream Elevation = 142.44
 Centerline Station = -1.21

Culvert Name Shape Rise Span
 #1-West Cell Box 1.83 2.13
 FHWA Chart # 8 - flared wingwalls
 FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
 Solution Criteria = Highest U.S. EG

Culvert	Upstrm Dist	Length	Top n	Bottom n	Depth Blocked	Entrance Loss Coef	Exit Loss Coef
	4.5	38.95	.012	.012	0	.5	1

Upstream Elevation = 143.145
 Centerline Station = 1.21
 Downstream Elevation = 142.41
 Centerline Station = 1.21

CROSS SECTION

RIVER: Beaver Pond Brk
 REACH: Reach-1 RS: 8309

INPUT

Description: D/S of Str 04323, I-84 WB On-Ramp from Austin Rd

Station	Elevation	Data	num=	33					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-31.529	146.93	-28.359	146.78	-23.429	146.27	-20.989	145.94	-17.919	145.61
-11.969	144.97	-11.339	144.95	-10.369	144.82	-9.519	144.66	-7.269	144.25
-6.809	144.16	-6.389	144.07	-5.689	143.91	-4.009	143.64	-3.399	143.04
-2.799	142.6	-1.309	142.36	-.959	142.34	-.149	142.4	1.861	142.52
2.821	142.66	4.971	142.86	5.401	142.95	8.521	143.48	8.561	143.48
8.721	143.52	10.091	143.88	10.141	143.9	10.431	144.05	22.571	150.78
23.071	150.92	23.101	150.94	23.271	150.93				

Manning's n Values num= 4
 Sta n Val Sta n Val Sta n Val Sta n Val
 -31.529 .08 -4.009 .04 8.721 .08 22.571 .04

Bank Sta: Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
-4.009	8.721		11.4	19.7		.3	.5
Ineffective Flow	num=		2				
Sta L	Sta R	Elev	Permanent				
-31.529	-5.8	146.93	F				
4.44	23.271	146.93	F				

CROSS SECTION

RIVER: Beaver Pond Brk
 REACH: Reach-1 RS: 8289

INPUT

Description:

Station Elevation Data	num=	32
Sta Elev Sta Elev Sta Elev		
-30.774 146.44 -28.904 146.39 -28.114 146.34 -24.304 146.15 -22.734 145.9		
-21.134 145.54 -19.904 145.41 -19.394 145.38 -17.184 144.92 -16.154 144.83		
-15.474 144.78 -9.604 144.26 -4.994 143.86 -4.674 143.73 -4.584 143.7		
-2.794 143.02 -2.094 142.59 -1.844 142.45 .066 142.3 .106 142.29		
.166 142.3 2.276 142.45 3.916 142.95 4.156 143.12 4.836 143.41		
4.956 143.48 5.776 143.94 12.676 147.43 18.156 150.31 18.266 150.4		
18.606 150.48 18.896 150.48		

Manning's n Values	num=	4
Sta n Val Sta n Val		
-30.774 .08 -4.994 .04 4.956 .08 18.156 .04		

Bank Sta: Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
-4.994	4.956		53.3	52.4		.1	.3

CROSS SECTION

RIVER: Beaver Pond Brk
 REACH: Reach-1 RS: 8237

INPUT

Description:

Station Elevation Data	num=	29
Sta Elev Sta Elev Sta Elev		
-43.1 145.96 -38.6 145.75 -35.7 145.64 -35.43 145.6 -31.88 144.77		
-25.36 144.36 -16.33 144.06 -14.71 143.91 -12.98 143.86 -11.49 143.8		
-10.3 143.77 -5.51 143.46 -5.43 143.46 -5.37 143.45 -4.13 142.82		
-3.76 142.63 -2.99 142.35 -1.87 141.94 1.66 141.94 1.77 142.08		
2.3 142.52 3.33 143.01 3.98 143.3 5.33 143.88 14.63 148.77		
14.86 148.91 14.98 148.93 15.56 149.04 15.67 149.04		

Manning's n Values	num=	5
Sta n Val Sta n Val		
-43.1 .08 -16.33 .02 -12.98 .08 -2.99 .04 2.3 .08		

Bank Sta: Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
-3.76	2.3		60.3	59.1		.1	.3

CROSS SECTION

RIVER: Beaver Pond Brk
 REACH: Reach-1 RS: 8178

INPUT

Description: FEMA STATION 5224, CROSS SECTION X.

The retaining wall on the right side (right of station 11.8) was constructed under the State Project No 151-274.

Station Elevation Data	num=	50
Sta Elev Sta Elev Sta Elev		
-61.76 145.52 -59.86 145.53 -57.55 145.48 -56.62 144.82 -53.22 143.19		
-48.96 143.22 -40.85 143.19 -39.38 143.18 -29.23 143.14 -25.85 143.15		
-24.46 143.14 -23.86 143.16 -20.73 143.4 -19.77 143.68 -18.06 143.69		
-16.91 143.66 -14.83 143.57 -13.73 143.53 -10.99 143.38 -10.46 143.39		
-9.4 143.42 -9.34 143.42 -9.1 143.4 -5.34 143.04 -5.31 143.03		
-4.77 142.87 -3.92 142.47 -2.57 141.87 -2 141.62 -1.95 141.59		
.57 141.44 1.63 141.51 2.2 141.85 2.49 141.97 4.46 142.5		

4.99	142.7	5.815	143.105	9.02	144.63	11.69	145.97	11.87	146.06
11.89	148.38	11.93	148.82	11.93	148.87	11.98	149.47	12.01	149.47
12.28	149.47	12.29	149.4	12.37	148.66	12.38	148.64	12.5	148.48

Manning's n Values			num=	3	
Sta	n Val	Sta	n Val	Sta	n Val
-61.76	.08	-4.77	.04	4.99	.08

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	-5.34	5.815		50	50.1	50.4		.1	.3
Ineffective Flow			num=	1					
Sta L	Sta R	Elev	Permanent						
-61.76	-18.065	143.69	F						

CROSS SECTION

RIVER: Beaver Pond Brk
 REACH: Reach-1 RS: 8128

INPUT

Description:
 Station Elevation Data num= 58

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-55.99	145.15	-51.92	144.86	-49.69	144.61	-49.66	144.6	-49.53	144.6
-44.7	144.18	-40.34	143.13	-38.82	142.8	-38.06	143	-32.55	143.64
-30.6	143.5	-29.91	143.45	-23.71	143.56	-23.22	143.54	-22.4	143.92
-19.69	145.36	-19.41	145.54	-19.11	145.65	-18.79	145.74	-18.04	146.02
-17.69	146.08	-16.98	145.89	-16.57	145.68	-16.44	145.59	-15.83	145.22
-15.69	145.1	-14.35	144.01	-13.46	143.54	-12.35	143.47	-11.66	143.43
-11.12	143.37	-10.54	143.33	-7.99	143.22	-7.85	143.22	-7.57	143.17
-5.1	142.69	-3.47	142.38	-2.8	142.12	-.5	141.23	.9	140.93
2.13	141.22	2.99	141.63	3.41	141.88	6.85	143.07	7.78	143.4
9.67	144.04	13.09	145.71	14.9	146.66	14.92	148.09	14.96	148.53
14.96	148.58	15.01	149.18	15.04	149.18	15.31	149.18	15.32	149.11
15.4	148.37	15.41	148.35	15.53	148.19				

Manning's n Values			num=	8					
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val		
-55.99	.06	-30.6	.08	-16.57	.04	-13.46	.02	-11.66	.08
-2.8	.04	3.41	.08	14.9	.02				

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	-2.8	3.41		47.7	47.9	48.1		.1	.3
Ineffective Flow			num=	1					
Sta L	Sta R	Elev	Permanent						
-55.99	-13.46	143.5	F						

CROSS SECTION

RIVER: Beaver Pond Brk
 REACH: Reach-1 RS: 8080

INPUT

Description:
 Station Elevation Data num= 76

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-51.25	144.3	-51.21	144.3	-50.5	144.32	-48.5	144.35	-46.14	144.5
-46.03	144.5	-44.45	144.51	-41.12	144.5	-39.45	144.48	-38.71	144.47
-35.43	144.38	-35.01	144.36	-34.86	144.34	-31.8	144.19	-30.67	144.12
-30.44	144.12	-28.72	144.13	-28.57	144.13	-28.1	144.12	-27.78	144.1
-27.34	144.08	-27.2	144.08	-25.85	143.95	-22.65	143.56	-21.68	143.56
-17.5	143.65	-17.35	143.66	-17.1	143.66	-14.51	143.65	-13.17	143.57
-12.8	143.56	-12.56	143.56	-12.11	143.54	-11.9	143.54	-11.12	143.5
-10.65	143.48	-10.31	143.47	-10.18	143.44	-10.15	143.44	-10.12	143.43
-9.73	143.25	-7.07	142.44	-5.55	142	-4.96	141.79	-4.17	141.5
-2.46	140.84	-2.37	140.8	-1.803	140.51	-.503	140.45	.697	140.51
1.02	140.85	1.05	140.89	1.08	140.91	1.18	141	1.76	141.5
1.87	141.59	3.35	142	5.09	142.5	6.1	143	7.12	143.5
8.2	144	9.24	144.5	10.31	145	11.63	145.5	12.97	146
16.39	147.49	16.41	147.85	16.45	148.29	16.45	148.34	16.5	148.94
16.53	148.94	16.8	148.94	16.81	148.87	16.89	148.13	16.9	148.11
17.02	147.95								

Manning's n Values			num=	7			
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val

-51.25	.06	-22.65	.02	-13.17	.08	-4.17	.04	1.87	.06
5.09	.08	16.39	.02						
Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	-4.17	1.87		52.7	52.7	52.7		.1	.3

CROSS SECTION

RIVER: Beaver Pond Brk
 REACH: Reach-1 RS: 8027

INPUT

Description:
 Station Elevation Data num= 57

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-52.4	143.94	-51.91	143.94	-50.38	144	-49.78	144	-46.73	144.01
-43.27	143.85	-40.4	143.88	-39.42	143.87	-35.53	143.84	-35.28	143.83
-34.57	143.83	-33.04	143.76	-32.69	143.74	-32.67	143.76	-32.32	143.76
-30.83	143.74	-28.9	143.69	-26.85	143.63	-26.11	143.59	-24.92	143.59
-23.74	143.57	-22.93	143.56	-22.58	143.56	-22.37	143.57	-21.74	143.55
-19.68	143.38	-19.04	143.39	-17.94	143.41	-12.03	143.34	-9.82	143.34
-8.14	143.28	-6.4	142.52	-6.17	142.4	-3.2	140.987	-2.24	140.53
-.5	139.92	1.46	140.52	2.33	141.19	2.38	141.21	3.97	141.79
4.48	142	5.21	142.3	6	142.58	9.61	143.88	10.28	144.27
15.05	147.08	15.38	147.27	15.4	147.52	15.44	147.96	15.44	148.01
15.49	148.61	15.52	148.61	15.79	148.61	15.8	148.54	15.88	147.8
15.89	147.78	16.01	147.62						

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-52.4	.08	-3.2	.04	3.97	.06	5.21	.08	15.38	.02

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	-3.2	2.33		50.1	50.1	50.1		.1	.3
Ineffective Flow	num= 1								
Sta L	Sta R	Elev	Permanent						
-52.4	-12.9	147	F						

CROSS SECTION

RIVER: Beaver Pond Brk
 REACH: Reach-1 RS: 7977

INPUT

Description:
 Station Elevation Data num= 42

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-49.51	143.49	-45.31	143.42	-44.8	143.42	-41.45	143.35	-37.46	143.24
-34.65	143.05	-30.7	142.86	-29.48	142.75	-24.83	142.59	-23.3	142.66
-20.12	142.47	-18.03	142.41	-16.88	142.41	-15.07	142.63	-13.64	142.71
-12.59	142.7	-10.22	142.56	-9.89	142.55	-8.13	142.46	-7.05	142.47
-6.49	142.41	-6.04	142.36	-3.12	140.74	-1.18	139.76	.43	139.41
2.37	139.76	3.2	140.1	3.46	140.2	4.5	140.75	6.03	141.56
12.01	144.74	13.99	145.85	14.01	147.54	14.05	147.98	14.05	148.03
14.1	148.63	14.13	148.63	14.4	148.63	14.41	148.56	14.49	147.82
14.5	147.8	14.62	147.64						

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-49.51	.06	-18.03	.02	-15.07	.06	-3.12	.04	3.2	.08
13.99	.02								

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	-3.12	4.5		40	40	40		.1	.3
Ineffective Flow	num= 1								
Sta L	Sta R	Elev	Permanent						
-49.51	-21.71	147	F						

CROSS SECTION

RIVER: Beaver Pond Brk
 REACH: Reach-1 RS: 7937

INPUT

Description: U/S of PIERPONT ROAD (FEMA W -STA 5223)
STRUCTURE NO.

151-006

The retaining wall on the right side (right of station 12.9) was constructed under the State Project No 151-274.

Station Elevation Data num= 54									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-47.63	142.8	-47.52	142.8	-45.95	142.71	-41.91	142.41	-37.89	142.23
-33.79	142.1	-29.86	141.91	-26.88	141.63	-25.84	141.61	-24.93	141.66
-24.77	141.64	-23.92	141.66	-23.82	141.66	-20.52	141.64	-19.3	141.62
-16.57	141.55	-16.12	141.54	-12.82	141.55	-12.43	141.55	-9.55	141.63
-9.15	141.64	-7.66	141.75	-7.63	141.75	-7.58	141.74	-5.84	141.47
-5.72	141.47	-5.09	141.38	-4.84	141.06	-4.53	140.765	-3.99	140.25
-3.18	139.51	-1.72	139.23	-.69	139.04	.52	139.05	1.42	139.01
2.19	139.24	2.21	139.22	4.36	140.71	5.09	141.174	6.64	142.16
8.49	142.96	11.08	144.2	12.33	144.71	14.12	145.44	14.14	147.85
14.18	148.29	14.18	148.34	14.23	148.94	14.26	148.94	14.53	148.94
14.54	148.87	14.62	148.13	14.63	148.11	14.75	147.95		

Manning's n Values num= 6									
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-47.63	.04	-26.88	.02	-7.66	.08	-3.99	.04	4.36	.08
14.12	.02								

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	-4.53	4.36		51	51.03	51.93		.3	.5
Ineffective Flow			num=						
			1						
Sta L	Sta R	Elev	Permanent						
-47.63	-6.2	145	F						

BRIDGE

RIVER: Beaver Pond Brk
REACH: Reach-1 RS: 7911.5

INPUT
Description: EXISTING PIERPONT ROAD STRUCTURE NO. 151-006
DATA FROM 1979

WATERBURY FIS
Distance from Upstream XS = 17.3
Deck/Roadway Width = 16.8
Weir Coefficient = 1.55
Upstream Deck/Roadway Coordinates

num= 35														
Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
-64.53	142.56		138		-62.17	142.51		138		-60.41	142.48		138	
-51.27	142.36		138		-50.48	142.35		138		-33.38	141.9		138	
-31.87	141.86		138		-27.31	141.74		138		-26.05	141.72		138	
-8.46	141.3		138		-8.04	141.3		138		-7.17	141.3		138	
-7.17	141.927		138		-3.01	141.931		138		-2.69	141.92		138	
-2.69	141.92	140.299			2.01	141.82	140.299			2.01	141.82		138	
6.34	141.735		138		6.34	141.35		138		7.34	141.35		138	
7.45	141.35		138		15.67	141.28		138		15.8	141.28		138	
18.69	141.23		138		22.1	141.26		138		23.53	141.28		138	
24.7	141.29		138		38.92	141.44		138		41.3	141.46		138	
42.62	141.48		138		43.36	141.49		138		49.86	141.57		138	
52.12	141.6		138		58.86	141.68		138						

Upstream Bridge Cross Section Data
Station Elevation Data num= 55

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-60.47	144.24	-60.25	144.21	-57.4	143.15	-55.54	142.36	-54.98	142.41
-52.34	142.53	-50.61	142.56	-45.79	142.58	-43.1	142.38	-40.69	142.23
-37.82	142.02	-34.83	141.81	-32.5	141.71	-27.7	141.64	-25.91	141.71
-24.97	141.73	-22.9	141.59	-18.03	141.5	-12.65	141.14	-11.23	141.09
-10.57	141.09	-8.58	141.12	-7.87	141.12	-4.3	141.21	-3.87	140.8
-3.86	139.8	-3.85	138.99	-1	138.85	1.56	138.85	2.54	138.86
4.85	139.98	6.86	140.95	7.68	141.32	9.11	141.3	14.02	141.3
16.77	141.44	16.79	141.52	17.5	141.47	18.23	141.79	18.31	141.87
21.75	147	22.74	147.3	23.72	147.68	23.8	147.62	23.97	147.7
24.85	147.83	24.89	147.75	24.99	147.66	25.09	147.6	25.12	147.65
27.59	147.61	27.91	147.62	32.15	147.58	33.13	147.59	33.17	147.58

Manning's n Values num= 7									
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-60.47	.04	-45.79	.02	-8.58	.08	-3.87	.04	4.85	.08

21.75 .04 24.85 .02

Bank Sta: Left Right Coeff Contr. Expan.
 -3.86 4.85 .3 .5
 Ineffective Flow num= 1
 Sta L Sta R Elev Permanent
 -60.47 -6.2 145 F

Downstream Deck/Roadway Coordinates
 num= 34

Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
-64.53	142.56	138	-62.17	142.51	138	-60.41	142.48	138						
-51.27	142.36	138	-50.48	142.35	138	-33.38	141.9	138						
-31.87	141.86	138	-27.31	141.74	138	-26.05	141.72	138						
-8.46	141.3	138	-8.04	141.3	138	-7.194	141.3	138						
-7.194	141.936	138	-3.43	141.88	138	-3.43	141.88	140.299						
1.27	141.81	140.299	1.27	141.81	138	6.63	141.735	138						
6.63	141.35	138	7.34	141.35	138	7.45	141.35	138						
15.67	141.28	138	15.8	141.28	138	18.69	141.23	138						
22.1	141.26	138	23.53	141.28	138	24.7	141.29	138						
38.92	141.44	138	41.3	141.46	138	42.62	141.48	138						
43.36	141.49	138	49.86	141.57	138	52.12	141.6	138						
58.86	141.68	138												

Downstream Bridge Cross Section Data
 Station Elevation Data num= 52

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-49.77	142.16	-48.65	142.2	-46.55	142.3	-45.59	142.23	-44.37	142.15
-42.95	142.07	-41.69	141.97	-41.01	141.93	-40.85	141.93	-40.13	141.95
-39.06	141.93	-38.32	141.92	-37.28	141.9	-36.2	141.89	-36.04	141.9
-35.51	141.91	-35.19	141.88	-31.37	141.83	-29.93	141.82	-28.06	141.76
-23.36	141.65	-21.56	141.55	-19.78	141.45	-18.52	141.45	-16.9	141.44
-16.51	141.42	-12.42	141.22	-11.51	141.29	-9.47	141.24	-9.33	141.23
-7.52	140.51	-5.38	139.69	-3.48	138.86	1.32	138.86	2.81	139.48
6.34	140.99	6.98	141.05	7.84	141.12	8.97	141.12	11.16	142.13
12.46	142.89	13.28	143.2	14.14	143.47	15.22	144.93	15.97	145.59
16.99	146.13	20.63	147.67	20.79	147.73	20.87	147.74	21.8	147.75
22.17	147.71	22.45	147.68						

Manning's n Values num= 10

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-49.77	.04	-45.59	.02	-38.32	.04	-37.28	.08	-31.37	.04
-12.42	.06	-7.52	.04	2.81	.06	16.99	.04	21.8	.02

Bank Sta: Left Right Coeff Contr. Expan.
 -5.38 2.81 .3 .5
 Ineffective Flow num= 1
 Sta L Sta R Elev Permanent
 -49.77 -18.6 145 F

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
 Downstream Embankment side slope = 0 horiz. to 1.0 vertical
 Maximum allowable submergence for weir flow = .95
 Elevation at which weir flow begins = 141.427
 Energy head used in spillway design =
 Spillway height used in design =
 Weir crest shape = Broad Crested

Number of Piers = 1

Pier Data
 Pier Station Upstream= -.34 Downstream= -1.08
 Upstream num= 2

Width	Elev	Width	Elev
.305	138.836	.305	140.299

 Downstream num= 2

Width	Elev	Width	Elev
.305	138.836	.305	140.299

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data
 Energy
 Momentum Cd = 1.33
 Yarnell KVal = .9
 Selected Low Flow Methods = Highest Energy Answer

High Flow Method
 Pressure and Weir flow
 Submerged Inlet Cd =
 Submerged Inlet + Outlet Cd = .8164966
 Max Low Cord = 140.299

Additional Bridge Parameters
 Add Friction component to Momentum
 Do not add Weight component to Momentum
 Class B flow critical depth computations use critical depth
 inside the bridge at the upstream end
 Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION

RIVER: Beaver Pond Brk
 REACH: Reach-1 RS: 7885

INPUT
 Description: D/S of PIERPONT ROAD (FEMA V -STA 5222)
 STRUCTURE NO. 151-006

Station Elevation Data				num=	40				
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-29.4	141.76	-28.53	141.71	-27.45	141.7	-27.26	141.7	-27.02	141.74
-24.58	141.93	-19.29	141.72	-17.88	141.65	-17.52	141.62	-16.84	141.57
-15.52	141.49	-13.94	141.38	-12.02	141.39	-11.76	141.39	-11.48	141.28
-9.42	140.65	-8.41	140.34	-5.52	139.46	-3	139.21	-1.92	139.02
-.05	138.94	1.02	139.08	1.83	139.18	2.76	140.23	4.97	140.26
5.34	140.35	7.76	141.74	10.62	142.9	12.66	143.79	14.45	144.56
15.1	144.88	15.86	145.26	15.88	145.77	15.89	148.5	15.93	149.05
16.23	149.05	16.25	148.89	16.32	148.24	16.34	148.2	16.44	148.06

Manning's n Values				num=	7				
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-29.4	.04	-27.26	.02	-13.94	.04	-12.02	.08	-8.41	.04
2.76	.08	15.86	.02						

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	-8.41	2.76		57.6	57.5	54.7		.3	.5
Ineffective Flow	Sta L	Sta R	Elev	num=	1				
	-29.4	-18.6	145	Permanent	F				

CROSS SECTION

RIVER: Beaver Pond Brk
 REACH: Reach-1 RS: 7826

INPUT
 Description: D/S End Prop. Retaining Wall No. 111
 Station Elevation Data num= 39

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-18.95	142.15	-18.61	142.1	-17.91	142.06	-14.6	141.4	-13.74	141.14
-13.28	141	-13	140.98	-11.25	140.82	-10.71	140.67	-9.54	140.44
-7.5	140.3	-6.77	140.1	-4.41	139.43	-3.91	139.29	-2.06	138.76
-1.42	138.6	1.04	138.76	1.4	138.93	2.8	139.705	4.02	140.38
5.26	140.12	7.12	139.75	7.44	139.77	8.34	139.85	8.6	139.88
8.68	139.88	9.04	139.91	10.52	140.09	11.5	140.81	16.25	143.41
17.66	144.11	18.33	144.41	19.23	144.84	19.25	148.14	19.3	149.24
19.6	149.33	19.68	148.62	19.69	148.52	19.74	148.44		

Manning's n Values				num=	5				
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-18.95	.02	-11.25	.08	-4.41	.04	2.8	.08	19.23	.02

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	-6.77	4.02		74	74	74		.1	.3
Ineffective Flow	Sta L	Sta R	Elev	num=	2				
	-18.95	-18.7	146	Permanent	F				
	4.02	19.74	140.38	F					

CROSS SECTION

RIVER: Beaver Pond Brk
 REACH: Reach-1 RS: 7757

INPUT
 Description: 58m U/S of EXISTING MULLOY ROAD

Station Elevation Data num= 47									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-59.99	140.86	-56.38	140.79	-56.12	140.79	-55.95	140.78	-52.8	140.63
-51.68	140.6	-50.83	140.6	-49.3	140.32	-47.67	140.03	-44.4	139.06
-43.65	138.88	-43.1	138.78	-35.46	138.78	-30.6	138.77	-26.09	138.83
-23.58	138.82	-20.89	138.83	-14.39	139.1	-12.09	139.15	-11.62	139.17
-11.41	139.16	-10.93	139.19	-6.89	139.24	-4.59	139.16	-2.24	138.75
.16	138.24	.94	138.49	2.76	138.76	3.14	138.84	3.9	139.01
4.67	139.24	5.84	139.22	7.19	139.23	7.36	139.21	11.24	141.13
12.42	141.6	13.37	142.15	13.53	142.24	13.59	143.8	13.6	148.31
13.61	148.48	13.65	148.97	13.95	148.97	13.97	148.78	14.04	148.15
14.06	148.11	14.16	147.97						

Manning's n Values num= 5									
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-59.99	.02	-52.8	.08	-4.59	.04	3.9	.08	13.53	.02

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	-6.89	4.67		22	46	41		.1	.3
Ineffective Flow num= 3									
Sta L	Sta R	Elev	Permanent						
-59.99	-59.25	145	F						
-59.25	-37.2	140.85	F						
-37.2	-6.89	139.24	F						

CROSS SECTION

RIVER: Beaver Pond Brk
 REACH: Reach-1 RS: 7711

INPUT
 Description: 13.4m U/S MULLOY ROAD (FEMA U -STA 5221)

Station Elevation Data num= 54									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-66.51	140.83	-63.45	140.79	-60.78	140.72	-58.69	140.65	-55.04	140.5
-54.81	140.49	-53.66	140.46	-52.82	140.42	-47.94	139.68	-47.51	139.63
-42.29	139.13	-41.18	139.12	-39.56	138.88	-38.4	138.78	-27.66	138.78
-27.06	138.8	-26.69	138.8	-22.41	139.01	-21.78	139.02	-20.94	139.04
-18.97	139.05	-13.85	138.85	-11.82	138.85	-8.77	138.83	-7.21	138.83
-6.84	138.82	-6.7	138.82	-6.41	138.81	-5.58	138.75	-4.77	138.24
-2.59	138.49	.91	138.69	2.35	138.77	5.23	138.94	9.04	139.09
9.37	139.09	10.9	139.14	12.82	139.21	17.35	139.53	19.53	139.84
21	139.95	22.8	140.78	24.56	141.54	24.77	141.62	24.87	141.67
24.95	141.7	25	141.72	25.11	141.76	25.13	147.48	25.18	148.76
25.48	148.7	25.56	147.95	25.57	147.93	25.69	147.77		

Manning's n Values num= 5									
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-66.51	.02	-55.04	.08	-6.41	.04	5.23	.08	25.11	.02

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	-18.97	5.23		12.3	11.1	15.5		.3	.5
Ineffective Flow num= 3									
Sta L	Sta R	Elev	Permanent						
-66.51	-63.05	144	F						
-63.05	-20.9	140.78	F						
21.4	23.5	140.78	F						

CROSS SECTION

RIVER: Beaver Pond Brk
 REACH: Reach-1 RS: 7698

INPUT
 Description: U/S of MULLOY RD. (FEMA STATION 5220.8)

Station Elevation Data num= 81									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-62.64	140.78	-59.41	140.74	-57.63	140.74	-54.59	140.64	-52.83	140.55

-51.68	140.52	-51.55	140.51	-51.34	140.51	-49	140.42	-46.26	140.41
-43.6	140.37	-42.93	140.26	-41.03	140.23	-36.62	140.08	-35.02	140.03
-32.01	140.22	-31.86	140.23	-31.11	140.23	-30.75	140.24	-28.81	140.18
-28.29	140.21	-26.07	140.35	-25.48	140.34	-24.94	140.35	-24.08	140.37
-20.62	140.41	-19.39	140.44	-18.12	140.46	-16.27	140.44	-14.47	140.35
-12.56	140.32	-11.55	140.3	-10.59	140.29	-9.87	140.26	-8.13	140.13
-7.07	140	-6.01	139.93	-5.45	139.9	-3.52	139.95	-3.3	139.95
-3.23	139.82	-2.2	138.3	-.83	138.2	3.28	138.3	5.08	140.03
5.16	140.09	5.24	140.1	5.91	140.18	6.22	140.2	7.68	140.32
8.19	140.36	10.19	140.31	11.52	140.38	17.04	140.36	18.79	140.41
19.73	140.42	20.98	140.38	21.82	140.33	22.92	140.22	24.52	140.15
26.66	139.96	26.82	139.96	28.79	139.94	32.76	139.89	34.42	140.04
35.43	140.13	36.89	140.29	38.13	140.43	39.26	140.52	39.9	140.76
40.22	140.9	40.39	140.97	40.46	140.99	40.47	145.51	40.48	147.94
40.51	148.35	40.53	148.59	40.86	148.59	40.91	148.21	40.96	147.78
41.02	147.7								

Manning's n Values	num=	5
Sta n Val Sta n Val Sta n Val	Sta n Val	Sta n Val
-62.64 .02 -52.83 .08 -2.2 .04	3.28	.08 40.46 .02

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.
-3.3	5.16	14.5	14.5	14.5	.3	.5	
Ineffective Flow	num=	4					
Sta L Sta R Elev Permanent							
-62.64 -57.54 144 F							
-57.54 -3.3 140.737 F							
4.9 40.53 140.42 T							
40.53 41.02 148.59 F							

BRIDGE

RIVER: Beaver Pond Brk
 REACH: Reach-1 RS: 7689.5

INPUT

Description: EXISTING MULLOY ROAD STRUCTURE NO. 151-005
 DATA FROM 1979

WATERBURY FIS

Distance from Upstream XS = 2.76
 Deck/Roadway Width = 8.75
 Weir Coefficient = 1.55

Upstream Deck/Roadway Coordinates

num=	50	
Sta Hi Cord Lo Cord	Sta Hi Cord Lo Cord	Sta Hi Cord Lo Cord
-46.73 140.59 138	-45.18 140.59 138	-43.03 140.54 138
-42.75 140.54 138	-42.56 140.53 138	-39.98 140.58 138
-38.7 140.59 138	-35.23 140.63 138	-34.98 140.63 138
-30.59 140.68 138	-27.12 140.77 138	-26.65 140.78 138
-20.58 140.79 138	-19.47 140.79 138	-15.21 140.76 138
-11.73 140.73 138	-11.56 140.73 138	-7.65 140.69 138
-3.3 140.69 138	-3.3 141.65 138	-2.76 141.65 138
-2.2 141.64 138	-2.2 141.64 139.751	3.28 141.55 139.751
3.28 141.55 138	4.6 141.54 138	5.16 141.54 138
5.16 140.53 138	5.41 140.53 138	5.49 140.54 138
8.57 140.49 138	8.63 140.49 138	8.99 140.48 138
10.97 140.45 138	13.37 140.41 138	16.1 140.36 138
47.42 140.42 138	49.17 141 138	50.39 141.44 138
52.89 142.03 138	58.11 143.84 138	59.86 144.44 138
60.59 144.79 138	63.29 145.92 138	64.63 146.41 138
65.01 146.54 138	66.5 147.15 138	67.7 147.15 138
68.98 147.16 138	70.04 147.19 138	

Upstream Bridge Cross Section Data

Station Elevation Data	num=	63
Sta Elev Sta Elev Sta Elev Sta Elev		
-30.75 140.24 -28.81 140.18 -28.29 140.21 -26.07 140.35 -25.48 140.34		
-24.94 140.35 -24.08 140.37 -20.62 140.41 -19.39 140.44 -18.12 140.46		
-16.27 140.44 -14.47 140.35 -12.56 140.32 -11.55 140.3 -10.59 140.29		
-9.87 140.26 -8.13 140.13 -7.07 140 -6.01 139.93 -5.45 139.9		
-3.52 139.95 -3.3 139.95 -3.23 139.82 -2.2 138.3 -1.83 138.2		
3.28 138.3 5.08 140.03 5.16 140.09 5.24 140.1 5.91 140.18		
6.22 140.2 7.68 140.32 8.19 140.36 10.19 140.31 11.52 140.38		
17.04 140.36 18.79 140.41 19.73 140.42 20.98 140.38 21.82 140.33		
22.92 140.22 24.52 140.15 26.66 139.96 26.82 139.96 28.79 139.94		
32.76 139.89 34.42 140.04 35.43 140.13 36.89 140.29 38.13 140.43		

39.26	140.52	39.9	140.76	40.22	140.9	40.39	140.97	40.46	140.99
40.47	145.51	40.48	147.94	40.51	148.35	40.53	148.59	40.86	148.59
40.91	148.21	40.96	147.78	41.02	147.7				

Manning's n	Values	num=	4				
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-30.75	.08	-2.2	.04	3.28	.08	40.46	.02

Bank Sta:	Left	Right	Coeff	Contr.	Expan.
	-3.3	5.16		.3	.5

Ineffective Flow	num=	4	
Sta L	Sta R	Elev	Permanent
-62.64	-57.54	144	F
-57.54	-3.3	140.737	F
4.9	40.53	140.42	T
40.53	41.02	148.59	F

Downstream Deck/Roadway	Coordinates								
num=	51								
Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
-46.73	140.59	138	-45.18	140.59	138	-43.03	140.54	138	
-42.75	140.54	138	-42.56	140.53	138	-39.98	140.58	138	
-38.7	140.59	138	-35.23	140.63	138	-34.98	140.63	138	
-30.59	140.68	138	-27.12	140.77	138	-26.65	140.78	138	
-20.58	140.79	138	-19.47	140.79	138	-15.21	140.76	138	
-11.73	140.73	138	-11.56	140.73	138	-7.65	140.69	138	
-5.58	140.69	138	-5.58	141.65	138	-2.76	141.65	138	
-2.11	141.64	138	-2.11	141.64	139.751	3.37	141.55	139.751	
3.37	141.55	138	4.48	141.54	138	4.48	140.54	0	
4.6	140.54	138	5.41	140.53	138	5.49	140.54	138	
8.57	140.49	138	8.63	140.49	138	8.99	140.48	138	
10.97	140.45	138	13.37	140.41	138	16.1	140.36	138	
47.42	140.42	138	49.17	141	138	50.39	141.44	138	
52.89	142.03	138	58.11	143.84	138	59.86	144.44	138	
60.59	144.79	138	63.29	145.92	138	64.63	146.41	138	
65.01	146.54	138	66.5	147.15	138	67.7	147.15	138	
68.98	147.16	138	70.04	147.19	138	71.93	147.13	138	

Downstream Bridge Cross Section Data									
Station	Elevation	Data	num=	50					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-30.96	140.53	-28.58	140.57	-22.93	140.63	-22.19	140.62	-21.28	140.62
-17.83	140.6	-14.73	140.58	-12.4	140.51	-9.06	140.5	-6.32	140.41
-6.08	140.4	-5.58	140.41	-2.11	138.25	-.74	138.15	3.37	138.25
3.9	138.99	4.48	139.78	4.49	139.79	6.54	139.66	7.48	139.85
10.3	140.14	12.31	140.1	12.61	140.11	14.37	140.1	17.52	140.09
18.62	140.1	19.23	140.11	20.39	140.11	23.77	140.13	26.29	140.12
31.48	140.04	34.68	139.98	35.54	140.04	36.43	140.16	36.46	140.16
39.63	140.12	40.45	140.09	44.34	140.03	44.85	140.07	45.17	140.1
48.79	140.47	48.8	140.47	49.87	140.74	50.07	140.79	50.16	140.8
50.17	145.76	50.18	147.84	50.22	148.28	50.24	148.5	50.64	148.5

Manning's n	Values	num=	8						
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-30.96	.02	-9.06	.08	-2.11	.04	3.37	.08	6.54	.04
10.3	.02	36.46	.04	40.45	.08				

Bank Sta:	Left	Right	Coeff	Contr.	Expan.
	-5.58	4.48		.3	.5

Ineffective Flow	num=	6	
Sta L	Sta R	Elev	Permanent
-66.49	-22.7	145	F
-22.7	-3	140.5	F
4	11.7	140.5	F
11.7	19.6	145	F
19.6	50.07	140.4	F
50.07	50.64	148.5	F

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
Downstream Embankment side slope = 0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow = .95
Elevation at which weir flow begins = 140.726
Energy head used in spillway design =
Spillway height used in design =
Weir crest shape = Broad Crested

Number of Piers = 1

Pier Data
 Pier Station Upstream= .54 Downstream= .63
 Upstream num= 2
 Width Elev Width Elev
 .305 138.166 .305 139.751
 Downstream num= 2
 Width Elev Width Elev
 .305 138.166 .305 139.751

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data

Energy
 Momentum Cd = 1.33
 Yarnell KVal = .9

Selected Low Flow Methods = Highest Energy Answer

High Flow Method

Pressure and Weir flow
 Submerged Inlet Cd =
 Submerged Inlet + Outlet Cd = .8164966
 Max Low Cord = 139.751

Additional Bridge Parameters

Add Friction component to Momentum
 Do not add Weight component to Momentum
 Class B flow critical depth computations use critical depth
 inside the bridge at the upstream end
 Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION

RIVER: Beaver Pond Brk
 REACH: Reach-1 RS: 7681

INPUT

Description: D/S of MULLOY RD (FEMA STATION 5220.2)
 STRUCTURE NO. 151-005

Station Elevation Data num= 71									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-66.49	139.82	-66.04	139.82	-62.97	139.91	-61.8	139.96	-61.3	139.99
-59.98	139.98	-59.42	139.97	-57.71	139.98	-57.34	140	-55.86	140.01
-54.7	140.07	-52.4	140.2	-51.96	140.21	-51.18	140.25	-48.85	140.22
-48.78	140.22	-48.15	140.21	-47.13	140.24	-41.2	140.41	-40.48	140.42
-36.81	140.46	-30.96	140.53	-28.58	140.57	-22.93	140.63	-22.19	140.62
-21.28	140.62	-17.83	140.6	-14.73	140.58	-12.4	140.51	-9.06	140.5
-6.32	140.41	-6.08	140.4	-5.58	140.41	-2.11	138.25	-.74	138.15
3.37	138.25	3.9	138.99	4.48	139.78	4.49	139.79	6.54	139.66
7.48	139.85	10.3	140.14	12.31	140.1	12.61	140.11	14.37	140.1
17.52	140.09	18.62	140.1	19.23	140.11	20.39	140.11	23.77	140.13
26.29	140.12	31.48	140.04	34.68	139.98	35.54	140.04	36.43	140.16
36.46	140.16	39.63	140.12	40.45	140.09	44.34	140.03	44.85	140.07
45.17	140.1	48.79	140.47	48.8	140.47	49.87	140.74	50.07	140.79
50.16	140.8	50.17	145.76	50.18	147.84	50.22	148.28	50.24	148.5
50.64	148.5								

Manning's n Values num= 8									
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-66.49	.02	-9.06	.08	-2.11	.04	3.37	.08	6.54	.04
10.3	.02	36.46	.04	40.45	.08				

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 -5.58 4.48 13.6 13.6 13.6 .3 .5

Ineffective Flow num= 6			
Sta L	Sta R	Elev	Permanent
-66.49	-22.7	145	F
-22.7	-3	140.5	F
4	11.7	140.5	F
11.7	19.6	145	F
19.6	50.07	140.4	F
50.07	50.64	148.5	F

CROSS SECTION

RIVER: Beaver Pond Brk
 REACH: Reach-1 RS: 7666

INPUT

Description: 14.8m D/S MULLOY ROAD (FEMA T -STA 5220)

STRUCTURE NO. 151-005

Station Elevation Data num= 86

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-107.14	142.08	-98.1	141.26	-96.98	141.16	-96.29	141.14	-88.07	140.84
-78.46	140.49	-74.48	140.35	-71.03	140.24	-65.08	139.96	-64.1	139.93
-57.14	139.78	-52.86	139.73	-50.55	139.71	-48.86	139.73	-34.11	140.43
-32.64	140.47	-29.24	140.56	-21.32	140.61	-19.88	140.67	-19.38	140.68
-18.41	140.66	-17.61	140.64	-17.45	140.63	-12.35	140.52	-9.32	140.42
-6.7	140.35	-5.2	140.3	-4.83	140.26	-4.19	140.23	-4.02	140.15
-1.1	138.86	-.15	138.47	1.58	138.08	3.44	138.2	4.55	138.87
6.92	139.24	7.55	139.28	7.63	139.28	7.7	139.29	7.87	139.3
7.92	139.3	7.95	139.31	8.02	139.31	8.15	139.32	8.26	139.33
8.44	139.34	9.36	139.41	9.67	139.43	9.72	139.43	11.7	139.45
13.73	139.51	16.7	139.55	17.34	139.56	23.86	139.72	25.13	139.72
26.5	139.71	26.66	139.71	27.13	139.69	30.72	139.68	34.03	139.66
34.92	139.67	36.96	139.71	40.03	139.8	40.84	139.77	42.81	139.74
43.81	139.71	45.27	139.67	46.86	139.9	47.72	140.01	48.45	140.06
52.2	140.22	56.19	140.8	56.81	140.86	58.02	140.99	58.55	141.04
58.59	141.05	58.76	141.06	58.78	147.79	58.79	147.98	58.84	148.43
59.2	148.45	59.28	147.85	59.3	147.63	59.4	147.51	59.45	147.45
59.46	147.45								

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-107.14	.04	-48.86	.02	-6.7	.08	-1.1	.04	4.55	.08
9.67	.02	45.27	.08						

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

	-1.1	4.55	80.8	75.6	73.8	.3	.5
--	------	------	------	------	------	----	----

Ineffective Flow num= 5 Permanent

Sta L	Sta R	Elev	
-80	-45	140.5	F
-45	-16.4	145	T
9.6	31	145	T
31	58.84	140.1	F
58.84	75.01	148.43	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
-40	-20	145	13	26	145

CROSS SECTION

RIVER: Beaver Pond Brk
 REACH: Reach-1 RS: 7589

INPUT

Description: FEMA STATION 5219, CROSS SECTION S

Station Elevation Data num= 75

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-115.68	141.8	-112.77	141.71	-108.66	141.62	-105.15	141.54	-98.77	140.92
-90.81	140.14	-81.23	139.54	-62.73	138.91	-59.56	138.89	-51.59	138.83
-48.68	138.8	-45.49	138.78	-38.32	138.99	-25.24	139.33	-22.27	139.68
-21.84	139.73	-18.79	139.81	-14.86	139.88	-13.21	139.93	-12.26	139.89
-7.93	139.89	-5.78	139.68	-3.25	138.85	-2.21	138.28	-.46	138.06
1.38	138.26	2.19	138.87	8.66	138.92	14.43	138.65	16.26	138.48
17.31	138.61	20.23	139.87	21.28	139.79	22.08	139.79	22.4	139.76
24.16	139.75	26.93	139.7	27.51	139.7	28.74	139.74	31.04	139.8
31.54	139.82	33.34	139.87	46.53	139.78	49.56	139.76	50.31	139.73
52.48	139.65	56.9	139.47	57.27	139.45	58.28	139.41	58.9	139.38
59.42	139.33	62.39	139.44	62.79	139.45	62.8	139.45	62.89	139.44
66.45	139.27	71.16	139.47	71.83	139.53	73.67	139.53	79.2	139.65
80.06	139.8	86.11	140.27	87.04	140.36	87.39	140.35	87.74	140.34
87.99	140.38	88.24	140.4	88.88	140.4	89.53	140.8	89.54	147.6
89.59	148.25	89.9	148.25	89.99	147.44	90.12	147.25	90.124	147.18

Manning's n Values num= 10

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-115.68	.08	-18.79	.04	-12.26	.02	-7.93	.08	-3.25	.04
2.19	.08	22.08	.04	27.51	.02	66.45	.08	89.54	.02

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

--	--	--	--	--	--	--	--	--	--

	-7.93	20.23		247.2	247.2	247.2		.1	.3
Ineffective Flow	num=		4						
Sta L	Sta R	Elev	Permanent						
-91	-13.21	139.93	T						
8.659997	21	138.92	F						
22.08	49.56	145	T						
49.56	82	140	F						
Blocked Obstructions	num=		2						
Sta L	Sta R	Elev	Sta L	Sta R	Elev				
22.08	22.5	142	37	48	145				

CROSS SECTION

RIVER: Beaver Pond Brk
 REACH: Reach-1 RS: 7370

INPUT

Description:

Station Elevation Data	num=		72								
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev		
-67.07	141.74	-63.73	141.74	-59.75	141.7	-53.07	141.73	-52.19	141.72		
-48.72	141.71	-44.25	141.36	-42.78	141.31	-40.57	140.72	-30.94	138.7		
-25.32	138.21	-23.26	138.19	-20.13	138.2	-18.74	138.08	-17.3	138.06		
-12.64	137.89	-7.31	137.72	-4.22	137.64	-3.96	137.61	0	137.5		
.15	137.5	1.61	137.46	3.13	137.77	7	138.456	7.87	138.61		
9.14	138.83	12.92	138.6	13.72	138.55	13.95	138.55	17.53	138.58		
23.22	138.73	23.83	138.75	24.31	138.75	24.73	138.77	29.68	138.92		
31.96	138.88	33.56	138.81	34.5	138.62	35.93	138.31	36.65	138.41		
37.04	138.46	39.04	138.44	40.36	138.44	41.43	138.42	43.4	138.38		
45.89	138.5	46.47	138.53	46.78	138.53	49.12	138.61	52.03	138.65		
53.35	138.65	54.68	138.78	55.56	138.81	57.63	138.69	58.69	138.72		
62	138.86	64.9	139.03	67.28	139.13	70.38	139.19	74.22	139.26		
74.82	139.26	75.56	139.29	77.84	139.33	78.53	139.37	78.78	139.38		
79.05	139.38	79.23	139.4	80.26	140.25	84.67	144.16	85.74	144.32		
89	145.95	92.02	146.2								

Manning's n Values	num=		11						
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-67.07	.03	-42.78	.08	-17.3	.06	-7.31	.04	1.61	.08
9.14	.03	29.68	.04	37.04	.02	43.4	.04	78.53	.08
89	.04								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.
-20.13	7	210	203.8	200		.1	.3
Ineffective Flow	num=		3				
Sta L	Sta R	Elev	Permanent				
9.14	33.6	140	T				
33.6	62.7	139.15	F				
62.7	80	140	T				

CROSS SECTION

RIVER: Beaver Pond Brk
 REACH: Reach-1 RS: 7168

INPUT

Description:

Station Elevation Data	num=		104								
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev		
-74.69	142	-74.19	141.93	-72.97	141.74	-68.37	141.38	-65.47	141.13		
-62.28	140.77	-59.34	140.3	-57.48	139.99	-55.9	139.84	-52.49	139.66		
-49.73	139.7	-47.85	139.81	-44.66	139.56	-40.57	139.23	-38.58	139.16		
-33.84	139.32	-28.76	138.57	-28.1	138.56	-27.43	138.57	-20.43	138.76		
-17.66	138.64	-15.85	138.71	-12.65	138.75	-11.55	138.73	-11.27	138.72		
-11	138.71	-9.73	138.68	-7.61	138.65	-7.3	138.54	-5.75	138.07		
-5.27	137.92	-3.69	137.45	0	137.45	2.18	137.45	3.55	138.04		
4.18	138.31	4.31	138.36	5.11	138.44	5.97	138.53	6.19	138.53		
7.39	138.51	10.96	138.59	11.5	138.59	11.93	138.6	13.25	138.69		
16.48	138.84	17.42	138.94	20.44	139.09	20.84	139.11	23.81	139.06		
24.39	139.03	25.11	139.02	26.06	139.01	26.68	139.03	26.85	139.05		
29.54	139.05	29.98	139.04	30.37	139.04	30.84	139.05	31.27	139.06		
31.6	139.05	32.48	139.08	34.96	139.12	34.97	139.12	36.33	140.1		
36.61	140.19	38.44	140.59	39.42	140.82	39.82	140.85	40.62	140.16		
41.26	139.9	42.13	139.37	43.07	139.03	43.29	138.91	44.17	139.18		
45.57	139.55	45.83	139.63	49.41	139.72	50.5	139.71	52.9	139.63		

53.84	139.64	55.19	139.7	55.57	139.71	56.67	140.06	57.57	140.33
57.58	140.34	57.59	140.34	57.66	140.36	57.69	140.37	57.72	144.76
57.73	144.82	57.78	145.42	58.09	145.42	58.11	145.26	58.18	144.6
58.21	144.56	58.31	144.42	61.03	144.43	62.06	144.43	63.37	144.37
64.6	144.31	65.82	144.25	68.13	144.14	68.73	144.11		

Manning's n Values		num=		6					
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-74.69	.08	-5.75	.04	3.55	.08	17.42	.02	34.97	.08
57.57	.02								

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	-7.61	4.31		48.6	47.5	46.6		.1	.3
Ineffective Flow	num=		4						
Sta L	Sta R	Elev	Permanent						
-58	-12.65	140	T						
6.2	14	140	T						
14	39.84	139.15	F						
39.84	57.7	140.85	F						

CROSS SECTION

RIVER: Beaver Pond Brk
REACH: Reach-1 RS: 7120

INPUT

Description:	FEMA	Station	5218,	Cross	Section	R				
Station	Elevation	Data	num=	91						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
-60.15	142.02	-58.48	141.82	-55.72	141.46	-53.62	141.13	-51.96	140.62	
-50.71	140.62	-47.57	140.16	-46.75	140.1	-45.01	140	-44.35	139.98	
-43.69	139.95	-42.93	139.94	-42.33	139.93	-41.69	139.91	-39.86	139.86	
-38.78	139.82	-37.27	139.78	-35.99	139.74	-35.1	139.71	-33.81	139.61	
-33.16	139.57	-32.36	139.52	-31.46	139.48	-28.92	139.26	-25.82	139.05	
-24.85	138.99	-23.78	138.93	-18.97	138.57	-17.53	138.47	-17.16	138.44	
-13.22	138.35	-10.36	138.33	-7.62	138.32	-6.64	138.32	-4.26	138.36	
-3.28	138	-1.85	137.2	-.04	136.98	1.77	137.2	3.71	138.36	
4.71	138.8	5.51	139.01	8.15	139.3	8.72	139.39	10.89	139.46	
11.19	139.47	11.54	139.46	12.8	139.44	13.38	139.44	14.06	139.43	
15.37	139.42	15.64	139.41	15.78	139.42	17.41	139.42	18.25	139.41	
18.83	139.41	19.79	139.4	20.45	139.4	21.54	139.39	22.88	139.39	
23.79	139.38	24.19	139.39	25.09	139.37	25.78	139.38	26.49	139.38	
27.73	139.4	28.03	139.4	28.44	139.41	29.8	139.44	31.61	139.47	
31.95	139.48	32.14	139.48	33.24	139.32	33.79	139.23	35.02	139.22	
35.97	139.15	39.01	138.8	39.63	139.13	41.02	139.8	41.06	139.83	
41.14	139.87	41.23	139.92	41.26	143.88	41.28	144.13	41.31	144.53	
41.43	144.54	41.62	144.54	41.67	144	41.7	143.72	41.79	143.6	
41.83	143.54									

Manning's n Values		num=		10					
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-60.15	.04	-50.71	.08	-17.53	.06	-4.26	.04	3.71	.08
5.51	.04	11.54	.02	32.14	.04	39.01	.06	41.23	.02

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	-4.26	3.71		47	47.4	48.3		.1	.3
Ineffective Flow	num=		1						
Sta L	Sta R	Elev	Permanent						
10.89	41.83	139.48	F						

CROSS SECTION

RIVER: Beaver Pond Brk
REACH: Reach-1 RS: 7073

INPUT

Description:	FEMA	STATION	5217.5,	CROSS	SECTION	Q				
Station	Elevation	Data	num=	43						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
-43.5	141.26	-41.76	141.15	-39.7	141.12	-38.43	141.17	-34.25	141.22	
-32.45	141.28	-30.96	141.23	-30.21	141.12	-28.89	140.99	-25.98	140.84	
-25.19	140.79	-23.09	140.65	-22.89	140.64	-21.34	140.47	-20.06	140.32	
-18.8	140.13	-18.15	140.07	-17.05	139.94	-14.95	139.67	-12.63	139.5	
-12.29	139.48	-6.16	139.06	-4.25	138.5	-2.69	137.92	-1.68	137.2	
-.49	136.95	1.13	136.79	2.71	137	3.94	137.31	5.21	138.91	

5.4	138.93	8.72	139.12	9.29	139.17	12.24	140.3	12.29	141.6
12.33	142.57	12.37	143.1	12.38	143.23	12.69	143.23	12.7	143.15
12.78	142.41	12.79	142.4	12.91	142.23				

Manning's n Values									
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-43.5	.08	-2.69	.04	5.21	.08	12.24	.02		
Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.									
	-6.16	5.21		101.5	102.8	103.5		.1	.3
Ineffective Flow num= 1									
Sta L	Sta R	Elev	Permanent						
12.38	12.91	143.23	F						

CROSS SECTION

RIVER: Beaver Pond Brk
REACH: Reach-1 RS: 6970

INPUT

Description: Upstream Limit of Proposed Brook Relocation

Station Elevation Data num= 39									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-18.25	141.73	-15.26	141.49	-11.72	141.28	-9.84	141.41	-9.12	140.91
-9.08	140.89	-8.71	140.68	-7.38	139.93	-6.69	139.54	-5.09	138.74
-4.37	138.35	-3.84	138.09	-.64	136.7	.92	136.65	2.47	136.7
3.98	137.62	4.95	138.096	5.59	138.41	5.72	138.47	6.03	138.66
7.83	139.7	8.6	140.15	8.87	141.05	8.88	141.21	8.92	141.71
9.22	141.71	9.28	141.09	9.3	140.89	9.4	140.76	9.43	140.71
12.27	140.77	13.03	140.78	16.02	140.84	16.63	140.86	19.76	140.9
20.23	140.91	23.51	140.86	23.83	140.86	26.73	140.8		

Manning's n Values									
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-18.25	.08	-5.09	.04	5.59	.08	8.6	.02		
Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.									
	-3.84	4.95		54.9	54.9	54.9		.1	.3
Ineffective Flow num= 2									
Sta L	Sta R	Elev	Permanent						
-18.25	-9.84	141.41	F						
8.92	26.73	141.71	F						

CROSS SECTION

RIVER: Beaver Pond Brk
REACH: Reach-1 RS: 6915

INPUT

Description: 43m U/S Existing Exit 25 WB Off-Ramp

Station Elevation Data num= 33									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-17.5	141.89	-17.15	141.85	-13.97	141.19	-11.74	140.72	-11.51	140.67
-6.75	138.29	-5.08	137.45	-4.8	137.46	-2.4	136.26	0	136.26
2.4	136.26	4.8	137.46	5.86	137.99	7.4	138.77	8.44	139.29
8.45	140.6	8.49	141.14	8.5	141.25	8.8	141.25	8.87	140.57
8.88	140.44	8.9	140.41	9.01	140.26	12.08	140.31	12.61	140.32
15.77	140.39	16.21	140.4	19.46	140.45	19.81	140.45	23.15	140.4
23.41	140.4	23.65	140.39	26.37	140.34				

Manning's n Values									
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-17.5	.08	-6.75	.04	8.44	.02				
Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.									
	-4.8	4.8		25.5	25.5	25.5		.1	.3
Ineffective Flow num= 2									
Sta L	Sta R	Elev	Permanent						
-17.5	-4.8	137.46	F						
8.5	26.37	141.25	F						

CROSS SECTION

RIVER: Beaver Pond Brk

REACH: Reach-1 RS: 6890

INPUT

Description: U/S of Existing Exit 25 WB Off-Ramp (FEMA P)

Structure No. 02536

-TO BE REMOVED

Station Elevation Data		num=		15							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-16.46	141.44	-14.55	141.03	-14.29	140.97	-6.82	137.24	-4.8	137.32		
-2.4	136.12	0	136.12	2.4	136.12	4.8	137.32	8.8	139.32		
8.97	140.46	9.02	141.09	9.32	141.11	9.41	140.3	9.53	140.12		

Manning's n Values		num=		4							
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-16.46	.08	-4.8	.04	4.8	.08	8.8	.02				

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	-4.8	4.8		64.6	64.6	64.6	.3	.5

Ineffective Flow		num=		2							
Sta L	Sta R	Elev	Permanent	Sta L	Sta R	Elev	Permanent	Sta L	Sta R	Elev	Permanent
-16.46	-4.8	137.32	F								
9.02	9.53	141.09	F								

CROSS SECTION

RIVER: Beaver Pond Brk REACH: Reach-1 RS: 6825

INPUT

Description: D/S of Existing Exit 25 WB Off-Ramp (FEMA O)

Structure No. 02536

-TO BE REMOVED

Station Elevation Data		num=		31							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-20.04	142.97	-16.18	142.04	-14.54	141.67	-14.4	141.62	-12.38	140.42		
-12.34	140.41	-12.25	140.37	-11.99	140.25	-11.21	139.9	-11.1	139.86		
-11.08	139.86	-10.88	139.8	-10.83	139.78	-10.75	139.75	-10.66	139.73		
-10.58	139.7	-10.44	139.66	-9.69	139.36	-4.8	136.93	-2.4	135.74		
0	135.74	2.4	135.74	4.8	136.94	8.33	138.7	8.37	140.63		
8.38	140.71	8.68	140.71	8.69	140.61	8.76	139.9	8.87	139.74		
8.89	139.72										

Manning's n Values		num=		4							
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-20.04	.08	-4.8	.04	4.8	.08	8.33	.02				

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	-4.8	4.8		16.5	16.5	16.5	.3	.5

Ineffective Flow		num=		1							
Sta L	Sta R	Elev	Permanent	Sta L	Sta R	Elev	Permanent	Sta L	Sta R	Elev	Permanent
8.38	8.89	140.71	F								

CROSS SECTION

RIVER: Beaver Pond Brk REACH: Reach-1 RS: 6809

INPUT

Description: 34m D/S Existing Exit 25 WB Off-Ramp

Structure No. 02536

-TO BE REMOVED

Station Elevation Data		num=		25							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-22.89	143.06	-20.96	142.59	-18.81	142.07	-18.72	142.05	-18.67	142		
-18.29	141.99	-17.96	141.99	-17.54	141.95	-17.3	141.74	-15.61	141.25		
-6.66	136.77	-4.8	136.84	-2.4	135.64	0	135.64	2.4	135.64		
4.8	136.84	8.63	138.76	8.64	139.95	8.65	140.09	8.69	140.6		
8.99	140.6	9.06	139.95	9.08	139.79	9.1	139.75	9.2	139.61		

Manning's n Values		num=		4							
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-22.89	.08	-4.8	.04	4.8	.08	8.63	.02				

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	-4.8	4.8		53.3	53.3	53.3	.3	.5

Ineffective Flow		num=		2							
Sta L	Sta R	Elev	Permanent	Sta L	Sta R	Elev	Permanent	Sta L	Sta R	Elev	Permanent

-22.89 -4.8 136.84 T
 8.69 9.2 140.6 F

CROSS SECTION

RIVER: Beaver Pond Brk
 REACH: Reach-1 RS: 6756

INPUT

Description: D/S End Prop. Retaining Wall No. 109

Station Elevation Data		num= 19		Station Elevation Data		num= 19		Station Elevation Data		num= 19	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-29.58	144.7	-27.98	144.29	-27.93	144.24	-27.5	143.5	-27.29	143.39		
-26.5	143	-25.5	142.5	-24.5	142	-23.5	141.5	-22.5	141		
-18.8	139.45	-12.37	136.23	-4.8	136.53	-2.4	135.33	0	135.33		
2.4	135.33	4.8	136.53	10	139.13	11.76	139.22				

Manning's n Values		num= 3		Manning's n Values		num= 3	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-29.58	.08	-4.8	.04	4.8	.08		

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	-4.8	4.8		22.7	22.7	22.7		.1	.3

Ineffective Flow		num= 1		Permanent	
Sta L	Sta R	Elev	Permanent	Sta L	Sta R
-29.58	-4.8	136.53	F		

CROSS SECTION

RIVER: Beaver Pond Brk
 REACH: Reach-1 RS: 6732

INPUT

Description: 273m U/S of Scott Road

Station Elevation Data		num= 20		Station Elevation Data		num= 20		Station Elevation Data		num= 20	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-31.26	143.86	-30.75	143.7	-28.82	143.67	-28.17	143.3	-27.12	142.73		
-26.58	142.44	-23.56	141.06	-22.05	140.45	-21.15	140	-18.9	139.25		
-12.56	136.08	-4.8	136.39	-2.4	135.19	0	135.19	2.4	135.19		
4.8	136.39	5.8	136.35	11.15	139.03	12.6	139.06	13	139.07		

Manning's n Values		num= 4		Manning's n Values		num= 4	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-31.26	.08	-4.8	.04	4.8	.08	12.6	.04

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	-4.8	4.8		78	79.2	79		.1	.3

Ineffective Flow		num= 2		Permanent	
Sta L	Sta R	Elev	Permanent	Sta L	Sta R
-31.26	-4.8	136.39	F		
4.8	13	136.39	F		

CROSS SECTION

RIVER: Beaver Pond Brk
 REACH: Reach-1 RS: 6653

INPUT

Description: 193.7m U/S Proposed Scott Road Culvert

Station Elevation Data		num= 19		Station Elevation Data		num= 19		Station Elevation Data		num= 19	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-14.92	140.73	-13.81	139.9	-13.21	139.73	-12.96	139.68	-12.93	139.68		
-12.8	139.59	-12.69	139.51	-12.67	139.5	-11.37	139.27	-4.8	135.94		
-2.4	134.73	0	134.73	2.4	134.73	4.8	135.93	8.94	135.77		
15.53	139.06	15.56	139.07	16.26	139.08	16.27	139.08				

Manning's n Values		num= 4		Manning's n Values		num= 4	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-14.92	.08	-4.8	.04	4.8	.08	15.56	.04

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	-4.8	4.8		58	60.2	62.5		.1	.3

Ineffective Flow		num= 2		Permanent	
Sta L	Sta R	Elev	Permanent	Sta L	Sta R

-14.92 -4.8 135.94 F
 4.8 16.27 135.93 F

CROSS SECTION

RIVER: Beaver Pond Brk
 REACH: Reach-1 RS: 6593

INPUT

Description: 133.5m U/S of Scott Road

Station Elevation Data num= 32									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-19.98	139.05	-19.84	139.02	-18.81	139	-18.65	139	-18.47	138.96
-18.19	138.99	-18.18	138.96	-18.11	138.86	-17.69	138.87	-17.3	138.88
-17.27	138.86	-16.41	138.5	-10.46	135.5	-10.27	135.36	-7.01	135.5
-4.8	135.58	-4.67	135.5	-2.66	134.5	-2.4	134.38	0	134.38
2.4	134.38	4.8	135.58	6.87	135.5	8.35	135.44	14.77	138.65
15.37	139	16.36	139.5	17.36	140	18.6	140.71	19.68	140.8
19.8	140.82	19.98	140.82						

Manning's n Values num= 4									
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-19.98	.08	-4.8	.04	4.8	.08	19.68	.04		

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 -4.8 4.8 52 52.3 53 .1 .3

Ineffective Flow num= 2									
Sta L	Sta R	Elev	Permanent	Sta L	Sta R	Elev	Permanent	Sta L	Sta R
-19.98	-4.8	135.58	F	4.8	19.98	135.58	F		

CROSS SECTION

RIVER: Beaver Pond Brk
 REACH: Reach-1 RS: 6541

INPUT

Description: 81m U/S of Scott Road

Station Elevation Data num= 30									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-31.47	142.33	-31.31	142.32	-31.3	142.33	-31.28	142.45	-30.87	142.47
-27.78	142.47	-26.86	142.52	-24.68	141.69	-19.69	139.33	-18.39	138.71
-18.16	138.62	-17.75	138.56	-17.55	138.56	-16.93	138.57	-10.73	135.5
-10.13	135.17	-5	135.37	-4.26	135	-2.4	134.08	0	134.08
2.4	134.08	4.26	135	5	135.37	14.61	135	20.9	134.76
21.37	135	35.15	142	35.54	142.1	35.87	142.12	36.74	142.2

Manning's n Values num= 5									
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-31.47	.04	-31.28	.08	-5	.04	5	.08	35.87	.04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 -5 5 71.3 68.2 64.9 .1 .3

Ineffective Flow num= 2									
Sta L	Sta R	Elev	Permanent	Sta L	Sta R	Elev	Permanent	Sta L	Sta R
-31.47	-5	135.37	F	5	36.74	135.37	F		

CROSS SECTION

RIVER: Beaver Pond Brk
 REACH: Reach-1 RS: 6473

INPUT

Description: U/S of Scott Rd Culvert (comparable FEMA Sec .N)

Culvert No. 014

Station Elevation Data num= 51									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-42.94	139.98	-42.09	139.99	-41.86	139.99	-41.11	140.02	-40.59	140.03
-40.22	140.07	-39.37	140.15	-39.33	140.16	-39.3	140.16	-37.67	140.98
-37.42	141.1	-37.36	141.1	-36.64	141.11	-36.34	141.11	-34.93	141.13
-32.81	141.06	-32.31	141.05	-31.38	141.02	-29.38	141	-23.15	138
-20.98	137	-18.53	136	-17.09	135.5	-15.04	135	-12.69	134.61
-6.94	134.61	-6.93	135.5	-6.45	135.5	-6.44	134.59	-4.1	134.5

-2.4	133.68	0	133.68	2.4	133.68	3.08	134	3.44	134.2
6.38	134.5	8.43	134.5	21.73	134.48	23.72	134.5	26.34	135
28.16	135.5	29.36	136	30.75	136.5	32.05	137	33.29	137.5
34.49	138	42.37	141.5	43.82	142	44.24	142.13	44.61	142.19
45.38	142.32								

Manning's n Values num= 5
 Sta n Val Sta n Val Sta n Val Sta n Val
 -42.94 .04 -37.67 .08 -6.44 .04 21.73 .08 44.24 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 -6.44 6.38 54.6 55.3 55.6 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 -42.94 -6.44 140.21 F
 8.35 45.38 141 F

CULVERT

RIVER: Beaver Pond Brk
 REACH: Reach-1 RS: 6445.5

INPUT

Description: Proposed Culvert No. 014 - Scott Road
 A composite Manning's

roughness of the concrete culvert and baffle is applied.
 Distance from Upstream XS = 13
 Deck/Roadway Width = 26
 Weir Coefficient = 1.44

Upstream Deck/Roadway Coordinates num= 10

Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
-44.42	140.26	0	-34.42	140.15	0	-24.42	140.13	0						
-14.42	140.21	0	-4.42	140.38	0	5.58	140.64	0						
15.58	140.99	0	25.58	141.44	0	35.58	141.97	0						
45.58	142.55	0												

Upstream Bridge Cross Section Data

Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-27.3	141	-21.96	139	-13.4	137	-11.53	136.85	-8	137
-3.235	137.2	-3.23	138.1	-2.83	138.1	-2.829	133.62	2.789	133.62
2.79	138.1	3.19	138.1	3.195	137.5	16.46	138	25.15	138.5
36.6	142	38.3	142.5						

Manning's n Values num= 3
 Sta n Val Sta n Val
 -27.3 .08 -3.23 .02 3.19 .08

Bank Sta: Left Right Coeff Contr. Expan.
 -2.83 2.79 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 -27.3 -6.44 140.21 F
 8.35 38.3 141 F

Downstream Deck/Roadway Coordinates

num= 10

Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
-44.42	140.26	0	-34.42	140.15	0	-24.42	140.13	0						
-14.42	140.21	0	-4.42	140.38	0	5.58	140.64	0						
15.58	140.99	0	25.58	141.44	0	35.58	141.97	0						
45.58	142.55	0												

Downstream Bridge Cross Section Data

Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-19.88	139.24	-12.96	138.5	-11.2	138	-6.78	137	-3.235	136.9
-3.23	137.3	-2.83	137.3	-2.825	132.76	2.795	132.76	2.8	137.3
3.2	137.3	3.25	136.9	7.18	137	10.14	137.5	12.82	138.5
15.3	139	18.57	140.5						

Manning's n Values num= 3
 Sta n Val Sta n Val
 -19.88 .08 -3.23 .02 3.25 .08

Bank Sta: Left Right Coeff Contr. Expan.
 -2.83 2.8 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 -19.88 -7 140 F
 6.2 18.57 140 F

Upstream Embankment side slope = 2 horiz. to 1.0 vertical
 Downstream Embankment side slope = 2 horiz. to 1.0 vertical
 Maximum allowable submergence for weir flow = .95
 Elevation at which weir flow begins =
 Energy head used in spillway design =
 Spillway height used in design =
 Weir crest shape = Broad Crested

Number of Culverts = 1

Culvert Name Shape Rise Span
 014 Box 3 2.5
 FHWA Chart # 8 - flared wingwalls
 FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
 Solution Criteria = Highest U.S. EG

Culvert	Upstrm Dist	Length	Top n	Bottom n	Depth Blocked	Entrance Loss Coef	Exit Loss Coef
014	5.53	43	.031	.031	.22	.4	1

Number of Barrels = 2
 Upstream Elevation = 133.4
 Centerline Stations

Sta. Sta.
 -1.4 1.4

Downstream Elevation = 132.54

Centerline Stations
 Sta. Sta.
 -1.4 1.4

CROSS SECTION

RIVER: Beaver Pond Brk
 REACH: Reach-1 RS: 6417

INPUT

Description: D/S of Scott Road Culvert
 Culvert No. 014

Station Elevation Data		num= 37		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-18.38	138.68	-18.3	138.68	-15.12	138.5	-13.52	138	-8.15	135.5
-6.93	135	-6.17	134.77	-5.89	134.72	-5.57	134.69	-5.45	134.69
-4.54	133.93	-4.33	133.66	-4.2	133.5	-3.83	133.31	-2.55	132.63
-.29	132.64	0	132.64	2.25	132.64	3.09	132.98	6.41	134.64
7.12	135	13.15	138	13.65	138.25	14.19	138.5	15.88	138.76
16.37	138.98	19.95	140.54	20.45	140.78	20.63	140.88	21.27	140.9
24.95	141.04	25.16	141.06	27.12	141.18	28.13	141.21	34.45	141.39
42.35	141.41	43.61	141.38						

Manning's n Values		num= 6		Sta n Val		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-18.38	.04	-15.12	.08	-5.57	.04	6.41	.08	20.63	.04
24.95	.02								

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 -5.57 6.41 6.4 8.6 11.1 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 -18.38 -7 140 F
 6.2 43.61 140 F

CROSS SECTION

RIVER: Beaver Pond Brk
 REACH: Reach-1 RS: 6409

INPUT

Description: (comp. FEMA Sec M, STATION 5213)

Station Elevation Data		num= 25		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

-17.79	138.57	-16.9	138.59	-15.57	138.5	-13.48	138	-12.79	137.66
-12.31	137.41	-7.37	134.943	-5.86	134.189	-3.48	133	-2.4	132.46
0	132.46	2.4	132.46	2.41	132.47	3.48	133	5.86	134.192
7.36	134.943	13.48	138	19	140.55	19.71	140.61	21.85	140.62
22.58	140.56	23.05	140.52	25.49	140.55	26.95	140.58	27.05	140.58

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-17.79	.08	-7.37	.04	7.36	.08	19.71	.04	22.58	.02

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

-5.86	5.86	14.2	14.2	14.2	.3	.5
-------	------	------	------	------	----	----

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-17.79	-9.1	138	F
8.9	27.05	138	F

CROSS SECTION

RIVER: Beaver Pond Brk
REACH: Reach-1 RS: 6394

INPUT

Description: U/S of Prop. Plank Road East Culvert No. 06622

Station Elevation Data num= 30

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-15.05	137.99	-14.89	137.96	-14.52	137.9	-13.04	137.5	-12.56	137.26
-7.2	134.58	-6.21	134.083	-4.05	133	-3.48	132.72	-3.04	132.5
-2.41	132.08	0	132.08	2.41	132.08	4.05	133	6.25	134.1
8.3	135.125	13.07	137.51	14.04	138	15.04	138.5	18.5	140.02
19.43	140.1	21.35	140.1	22.53	140	22.81	140	26.46	140.07
28.56	140.1	29.77	140.13	31.31	140.11	33.07	140.08	34.93	140.06

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val		
-15.05	.08	-7.2	.04	8.3	.08	19.43	.04	22.53	.02

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

-6.21	6.25	89.7	89.7	89.7	.3	.5
-------	------	------	------	------	----	----

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-15.05	-13.1	137.56	F
8.3	34.93	138.55	F

CULVERT

RIVER: Beaver Pond Brk
REACH: Reach-1 RS: 6349.5

INPUT

Description: Proposed Culvert No. 06622 - Plank Road East
A composite

Manning's roughness of the concrete culvert and baffle is applied.

Distance from Upstream XS = 30
Deck/Roadway Width = 27
Weir Coefficient = 1.44

Upstream Deck/Roadway Coordinates

num= 4

Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
-16.05	137.39	0	-6.05	137.97	0	3.96	138.52	0						
13.96	138.78	0												

Upstream Bridge Cross Section Data

Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-12.88	137	-4.4	132.76	-2.4	131.76	2.4	131.76	4.4	132.76
12.88	137								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-12.88	.08	-4.4	.04	4.4	.08

Bank Sta: Left Right Coeff Contr. Expan.

-4.4	4.4	.3	.5
------	-----	----	----

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-12.88	-13.1	137.56	F
8.3	12.88	138.55	F

Downstream Deck/Roadway Coordinates

num=	4				
Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
-16.05	137.39	0	-6.05	137.97	0
13.96	138.78	0			

Downstream Bridge Cross Section Data

Station Elevation Data	num=	6							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-10.8	135	-4.4	131.8	-2.4	130.8	2.4	130.8	2.8	131
2.8	135								

Manning's n Values

num=	2
Sta n Val	Sta n Val
-10.8	.08
-4.4	.04

Bank Sta: Left Right Coeff Contr. Expan.

	-4.4	2.8	.3	.5
--	------	-----	----	----

Ineffective Flow

num=	2		
Sta L	Sta R	Elev	Permanent
-10.8	-9.4	135.5	F
6.76	2.8	136.02	F

Upstream Embankment side slope = 3 horiz. to 1.0 vertical
Downstream Embankment side slope = 3 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow = .95
Elevation at which weir flow begins =
Energy head used in spillway design =
Spillway height used in design =
Weir crest shape = Broad Crested

Number of Culverts = 1

Culvert Name	Shape	Rise	Span
06622	Box	3	2.5

FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG

Culvert Upstrm Dist	Length	Top n	Bottom n	Depth Blocked	Entrance Loss Coef	Exit Loss
21.1	48	.031	.031	.22	.4	1

Number of Barrels = 2
Upstream Elevation = 131.54
Centerline Stations
Sta. Sta.
-1.4 1.4
Downstream Elevation = 130.58
Centerline Stations
Sta. Sta.
-1.4 1.4

CROSS SECTION

RIVER: Beaver Pond Brk
REACH: Reach-1 RS: 6305

INPUT

Description: D/S of Prop. Plank Road East Culvert No. 06622

Station Elevation Data	num=	17							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-11	134.7	-9.3	133.85	-7.38	132.888	-5.13	131.76	-2.39	130.39
0	130.39	2.4	130.39	5.05	131.713	9.55	133.96	9.57	134.4
9.61	135.28	9.64	136.02	9.95	136.02	10	135.57	10.04	135.21
10.11	135.09	10.18	134.95						

Manning's n Values

num=	3
Sta n Val	Sta n Val
-11	.08
-7.38	.04
9.55	.02

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

	-5.13	5.05	37	38.7	40	.3	.5
--	-------	------	----	------	----	----	----

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-11	-9.4	135.5	F
6.76	10.18	136.02	F

CROSS SECTION

RIVER: Beaver Pond Brk
 REACH: Reach-1 RS: 6266

INPUT

Description: D/S End of Proposed Brook Relocation

Station		Elevation		Data		num= 26		Sta	Elev	Sta	Elev
-12.34	134.14	-10.7	134.08	-10.22	134.06	-8.57	133.29	-8.11	133.07	-8.11	133.07
-7.64	132.79	-6.3	132.03	-5.03	131.31	-3.27	130.41	-1.74	129.6	-1.74	129.6
-.01	129.54	.43	129.54	1.71	129.58	2.82	130.09	5.66	131.6	5.66	131.6
6.81	132.16	6.83	132.64	6.85	133.13	6.93	134.87	6.96	135.28	6.96	135.28
6.98	135.52	7.28	135.52	7.33	135.02	7.36	134.71	7.41	134.64	7.41	134.64
7.49	134.53										

Manning's n Values		num= 4		Sta	n Val	Sta	n Val
-12.34	.04	-10.22	.08	-6.3	.04	6.81	.02

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	-6.3	6.81		50.3	50.3		.1	.3

Ineffective Flow		num= 1		Sta L	Sta R	Elev	Permanent
6.98	7.49	135.52	F				

CROSS SECTION

RIVER: Beaver Pond Brk
 REACH: Reach-1 RS: 6216

INPUT

Description: FEMA STATION 5212, CROSS SECTION L

Station		Elevation		Data		num= 30		Sta	Elev	Sta	Elev
-12.65	133.53	-11.9	133.49	-11.3	133.4	-9.02	133.14	-8.78	133.11	-8.78	133.11
-7.67	132.48	-6.63	131.86	-5.64	131.27	-4.57	130.559	-2.93	129.47	-2.93	129.47
-1.86	129.22	-1.3	128.8	-.06	128.63	1.58	128.74	2.09	129.22	2.09	129.22
4.52	130.49	5.63	131.16	5.71	131.21	5.74	131.23	5.75	131.23	5.75	131.23
5.77	131.24	5.777	132.59	5.784	134.27	5.8	134.63	5.83	134.92	5.83	134.92
6.13	134.92	6.17	134.47	6.21	134.11	6.27	134.03	6.34	133.93	6.34	133.93

Manning's n Values		num= 4		Sta	n Val	Sta	n Val
-12.65	.04	-9.02	.08	-5.64	.04	5.71	.02

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	-4.57	4.52		94	94		.1	.3

CROSS SECTION

RIVER: Beaver Pond Brk
 REACH: Reach-1 RS: 6122

INPUT

Description: 95m U/S Prop I-84 Culvert No. 02537

Station		Elevation		Data		num= 29		Sta	Elev	Sta	Elev
-12.81	132.7	-12.7	132.7	-11.6	132.64	-9.69	132.31	-8.7	132.23	-8.7	132.23
-7.15	131.21	-7.06	131.16	-6.66	130.91	-5.6	130.19	-4.48	129.43	-4.48	129.43
-4.37	129.43	-4.12	129.38	-1.24	128.32	-.9	128.1	.9	128.2	.9	128.2
2	128.3	2.42	128.32	4.35	129.3	5.31	129.81	5.33	129.82	5.33	129.82
5.34	131.67	5.34	133.14	5.37	133.5	5.39	133.79	5.69	133.79	5.69	133.79
5.74	133.34	5.78	132.98	5.83	132.9	5.9	132.8				

Manning's n Values		num= 5		Sta	n Val	Sta	n Val
-12.81	.04	-9.69	.08	-4.48	.04	4.35	.08

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.

-5.6 5.31 55.2 55.2 55.2 .1 .3

Ineffective Flow num= 1
 Sta L Sta R Elev Permanent
 5.39 5.9 133.79 F

CROSS SECTION

RIVER: Beaver Pond Brk
 REACH: Reach-1 RS: 6067

INPUT

Description: 40m U/S Prop I-84 Culvert No. 02537
 Station Elevation Data num= 33

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-13.11	132.47	-12.52	132.47	-12.5	132.45	-11.82	132.24	-11.54	132.17
-9.2	130.37	-8.82	130.12	-8.75	130.07	-7.44	129.66	-4.46	128.7
-4.44	128.69	-2.58	128.1	-2.28	128.03	-2.18	128	-1.07	127.86
.49	127.8	2.46	127.87	3.26	128.02	3.29	128.04	4.63	128.73
4.64	128.73	5.16	128.96	7.42	129.962	7.43	130.16	7.44	130.24
7.52	132.48	7.54	132.84	7.57	133.13	7.87	133.13	7.92	132.68
7.95	132.32	8.01	132.24	8.08	132.14				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-13.11	.04	-11.82	.08	-4.46	.04	4.64	.08	7.42	.02

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 -7.44 7.42 35.8 34.3 32.8 .1 .3

Ineffective Flow num= 1
 Sta L Sta R Elev Permanent
 7.57 8.08 133.13 F

CROSS SECTION

RIVER: Beaver Pond Brk
 REACH: Reach-1 RS: 6033

INPUT

Description: U/S of I-84 Culvert No. 02537 (FEMA K -STA 5211)
 Easterly I-84

crossing over Beaver Pond Brook

Station Elevation Data num= 20

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-13.36	132.48	-10.39	131.01	-10.01	130.82	-9.37	130.55	-7.99	129.85
-3.02	127.35	-2.82	127.25	0	127.25	.3	127.25	2.87	127.42
6.3	129.36	6.54	129.47	6.55	132.08	6.58	132.38	6.6	132.74
6.91	132.74	6.95	132.31	6.99	131.92	7.05	131.84	7.12	131.74

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-13.36	.08	-7.99	.04	6.54	.02

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 -7.99 6.54 85.2 85.2 85.2 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 -13.36 -10.5 132.9 T
 6.6 7.12 132.74 T

CULVERT

RIVER: Beaver Pond Brk
 REACH: Reach-1 RS: 5996.5

INPUT

Description: Proposed Culvert No. 02537, Easterly I-84 crossing
 Extension of

existing 8 ft by 8 ft culverts.
 A composite Manning's roughness
 of the concrete culvert and baffle is applied for the westerly
 cell.

Distance from Upstream XS = 14.07
 Deck/Roadway Width = 51.81

Weir Coefficient = 1.45
 Upstream Deck/Roadway Coordinates
 num= 7

Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
-12.04	131.6		0		-2.54	131.6		0		-2.54	131.8		0	
5.1	131.8		0		5.1	132.71		0		5.66	132.71		0	
9.26	132.85		0											

Upstream Bridge Cross Section Data
 Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-13.4	132.84	-12.25	131.84	-11.1	130.84	-9.9	129.84	-8.76	129.34
-7.53	128.84	-6.1	128.34	-4.8	127.84	-3.1	127.4	-2.54	127.22
2.65	127.22	3	127.4	3.9	127.8	5.1	128.31	5.1	132.707
5.66	132.707	9.26	132.85						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-13.4	.08	-2.54	.04	5.1	.02

Bank Sta: Left Right Coeff Contr. Expan.
 -2.54 2.65 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 -13.4 -10.5 132.9 T
 6.6 9.26 132.74 T

Downstream Deck/Roadway Coordinates
 num= 61

Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
-69.21	133.33		0		-68.08	133.23		0		-68.05	133.23		0	
-68.02	133.22		0		-67.92	133.16		0		-67.59	133		0	
-66.82	132.62		0		-65.03	132.58		0		-63.56	132.48		0	
-60.68	132.3				-58.39	132.03				-57.96	131.98			
-56.61	131.8				-55.7	131.75				-54.6	131.68			
-53.55	131.16				-52.55	130.66				-50.89	130.8			
-48.65	130.98				-47.49	131.03				-45.04	131.13			
-44.25	131.15				-41.44	131.2				-41.01	131.21			
-37.84	131.26				-37.77	131.26				-37.1	131.25			
-34.24	131.21				-31.28	131.15				-30.64	131.14			
-30.54	131.28				-30.51	131.32				-30.43	132.03			
-30.41	132.21				-30.17	132.21				-30.11	132.21			
-29.58	132.21				-28.79	132.22				-28.17	132.23			
-28.12	132.23				-27.86	132.23				-27.85	132.1			
-27.76	131.34				-27.74	131.31				-27.64	131.16			
-27.15	131.17				-24.04	131.23				-20.75	131.28			
-20.43	131.28				-17.04	131.23				-16.83	131.23			
-13.34	131.16				-13.23	131.16				-9.63	131.02			
-9.37	132.01				-9.07	132.01				-8.07	132.02			
1.93	132.13				11.93	132.25				21.93	132.37			
26.92	132.43													

Downstream Bridge Cross Section Data
 Station Elevation Data num= 59

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-69.21	133.33	-68.08	133.23	-68.05	133.23	-68.02	133.22	-67.92	133.16
-67.59	133	-66.82	132.62	-65.03	132.58	-63.56	132.48	-60.68	132.3
-58.39	132.03	-57.96	131.98	-56.61	131.8	-55.7	131.75	-54.6	131.68
-53.55	131.16	-52.55	130.66	-50.89	130.8	-48.65	130.98	-47.49	131.03
-45.04	131.13	-44.25	131.15	-41.44	131.2	-41.01	131.21	-37.84	131.26
-37.77	131.26	-37.1	131.25	-34.24	131.21	-31.28	131.15	-30.64	131.14
-30.54	131.28	-30.51	131.32	-30.43	132.03	-30.41	132.21	-30.17	132.21
-30.11	132.21	-29.58	132.21	-28.79	132.22	-28.17	132.23	-28.12	132.23
-27.86	132.23	-27.85	132.1	-27.76	131.34	-27.74	131.31	-27.64	131.16
-27.15	131.17	-24.04	131.23	-20.75	131.28	-20.43	131.28	-17.04	131.23
-16.83	131.23	-13.34	131.16	-13.23	131.16	-12.04	130.8	-2.6	126.88
2.59	126.88	5.1	128.31	11	131.26	26.92	131.43		

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-69.21	.04	-67.59	.06	-52.55	.04	-48.65	.02	-12.04	.08
-2.6	.04								

Bank Sta: Left Right Coeff Contr. Expan.
 -2.6 2.59 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent

-30 -6.82 132 F
 21.23 34.2 131.37 F

Upstream Embankment side slope = 6 horiz. to 1.0 vertical
 Downstream Embankment side slope = 0 horiz. to 1.0 vertical
 Maximum allowable submergence for weir flow = .95
 Elevation at which weir flow begins =
 Energy head used in spillway design =
 Spillway height used in design =
 Weir crest shape = Broad Crested

Number of Culverts = 2

Culvert Name Shape Rise Span
 02537 West Box 2.44 2.44
 FHWA Chart # 9 - flared wingwalls and Inlet top edge bevel
 FHWA Scale # 2 - Wingwall flared 18 to 33.7 deg.; inlet top edge bevel=0.083D
 Solution Criteria = Highest U.S. EG
 Culvert Upstrm Dist Length Top n Bottom n Depth Blocked Entrance Loss Coef Exit Loss
 Coef
 5.26 60.62 .032 .032 .22 .2 1
 Upstream Elevation = 127.22
 Centerline Station = -1.32
 Downstream Elevation = 126.88
 Centerline Station = -1.38

Culvert Name Shape Rise Span
 02537 East Box 2.44 2.44
 FHWA Chart # 9 - flared wingwalls and Inlet top edge bevel
 FHWA Scale # 2 - Wingwall flared 18 to 33.7 deg.; inlet top edge bevel=0.083D
 Solution Criteria = Highest U.S. EG
 Culvert Upstrm Dist Length Top n Bottom n Depth Blocked Entrance Loss Coef Exit Loss
 Coef
 5.25 60.7 .012 .012 .22 .2 1
 Upstream Elevation = 127.22
 Centerline Station = 1.43
 Downstream Elevation = 126.88
 Centerline Station = 1.37

CROSS SECTION

RIVER: Beaver Pond Brk
 REACH: Reach-1 RS: 5947

INPUT
 Description: D/S of I-84 Culvert No. 02537 (FEMA J -STA 5210)
 Easterly I-84

crossing over Beaver Pond Brook

Station	Elevation	Data	num=	40	Sta	Elev	Sta	Elev	Sta	Elev
-7.33	131.01	-7.21	131.18	-7.201	131.19	-7.196	131.23	-7.12	132	
-6.82	132	-6.81	131.96	-6.77	131.35	-6.75	131.01	-6.68	128.6	
-5.58	128.05	-2.72	126.62	-2.27	126.56	-1.65	126.21	-.33	126.17	
1.43	126.08	2.43	126.52	3.82	128	5.79	129	6.79	129.5	
11.01	131	12.23	131.1	12.94	131.16	13.43	131.2	14.14	131.23	
14.63	131.25	16.62	131.29	17.93	131.31	19.21	131.33	21.23	131.37	
22.59	131.35	25.86	131.33	27.63	131.35	30.04	131.37	30.05	131.38	
30.25	131.39	30.5	131.37	32.15	131.38	32.46	131.39	34.2	131.3	

Manning's n	Values	num=	6	Sta	n Val	Sta	n Val	Sta	n Val
-7.33	.02	-6.82	.04	6.79	.08	12.23	.04	13.43	.02
27.63	.04								

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 -5.58 3.82 69 69 69 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 -30 -6.82 132 F
 21.23 34.2 131.37 F

CROSS SECTION

RIVER: Beaver Pond Brk
 REACH: Reach-1 RS: 5878

INPUT

Description: FEMA STATION 5209, CROSS SECTION I
 Just downstream of confluence
 with Turkey Hill Brook.

FEMA HEC-2 incorrectly locates this cross
 section upstream of the confluence.

Station Elevation Data		num= 53		Sta		Elev		Sta		Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-9.48	130.55	-9.46	130.55	-9.36	130.71	-9.34	130.73	-9.33	130.84		
-9.25	131.55	-8.95	131.55	-8.94	131.46	-8.9	130.89	-8.883	129.6		
-8.88	129.52	-8.87	128.66	-8.86	128.14	-8.85	128.14	-8.33	127.96		
-7.97	127.75	-7.1	127.31	-6.49	127.17	-5.83	127.03	-5.46	126.91		
-3.1	125.87	-2.53	125.55	-	125.17	3.03	125.63	3.75	125.94		
4.08	126.22	5.94	126.78	5.96	126.8	8.26	128.35	8.86	128.65		
10.02	129.21	10.23	129.22	11.18	129.3	11.43	129.32	12.38	129.36		
12.62	129.37	15.27	129.42	15.92	129.44	18.6	129.48	19.22	129.49		
22.18	129.44	22.82	129.43	23.12	129.45	24.73	129.51	25.33	129.48		
25.57	129.48	25.83	129.47	26.36	129.47	26.85	129.46	27.28	129.45		
27.61	129.44	31.23	129.33	32.05	129.33						

Manning's n Values		num= 6		Sta		n Val		Sta		n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-9.48	.02	-8.86	.08	-5.46	.04	5.94	.08	10.02	.04		
11.43	.02										

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	-7.1	5.94		46	46		.1	.3
Ineffective Flow	num=	Sta L	Sta R	Elev	Permanent			
	2	-9.48	-8.95	131.55	F			
		19.22	32.05	129.49	F			

CROSS SECTION

RIVER: Beaver Pond Brk
 REACH: Reach-1 RS: 5832

INPUT

Description: U/S of Conc. Weir across from BJ's (FEMA H - STA
 5208.9)

Downstream of confluence with Turkey Hill Brook.
 FEMA

HEC-2 incorrectly locates this cross section upstream of the
 confluence.

Station Elevation Data		num= 41		Sta		Elev		Sta		Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-10.68	130.35	-10.67	130.35	-10.62	130.43	-10.55	130.53	-10.5	130.99		
-10.46	131.35	-10.16	131.35	-10.13	130.97	-10.11	130.69	-10.04	129.35		
-10.02	128.88	-9.57	128.69	-6.23	127.26	-5.3	126.609	-3.56	125.39		
-2.84	125.1	-	124.64	2.21	125.49	3.23	125.88	3.94	126.41		
4.3	126.55	4.77	126.9	6.44	127.86	9.54	128.1	10.24	128.16		
10.74	128.2	11.45	128.23	11.94	128.25	13.92	128.29	15.24	128.31		
16.53	128.34	18.54	128.37	19.91	128.38	22.14	128.38	22.59	128.42		
23.34	128.48	24.73	128.48	24.91	128.56	25.59	128.69	26.67	128.87		
28.73	129.3										

Manning's n Values		num= 8		Sta		n Val		Sta		n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-10.68	.02	-10.02	.08	-5.3	.04	3.94	.08	9.54	.04		
10.24	.02	22.14	.04	24.73	.08						

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	-5.3	3.23		18.5	19.6		.3	.5

INLINE STRUCTURE

RIVER: Beaver Pond Brk
 REACH: Reach-1 RS: 5813

INPUT

Description: Existing Concrete Weir
 Across from BJ's Wholesale Club

Distance from Upstream XS = 19

Deck/Roadway Width = .4
 Weir Coefficient = 2.14
 Weir Embankment Coordinates num = 7
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 -10 125.82 -4.35999 125.813 -3.42 125.784 -.599999 125.7533. 120001 125.781
 4.13 125.801 10 125.81

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
 Downstream Embankment side slope = 0 horiz. to 1.0 vertical
 Maximum allowable submergence for weir flow = .95
 Elevation at which weir flow begins = 125.821
 Weir crest shape = Broad Crested

CROSS SECTION

RIVER: Beaver Pond Brk
 REACH: Reach-1 RS: 5812.5

INPUT

Description: D/S of Concrete Weir Across from BJ's

Station Elevation Data num= 49
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 -11.3 130.21 -11.18 130.37 -11.17 130.38 -11.09 131.11 -11.08 131.2
 -10.78 131.2 -10.74 130.61 -10.73 130.54 -10.7 129.9 -10.65 128.58
 -10.59 128.43 -6.5 126.92 -5.09 126.2 -4.85 125.97 -4.43 124.883
 -3.46 124.64 -.52 124.445 3.24 124.584 4.18 124.617 5.6 126.245
 7.13 128 7.83 128.07 8.91 128.16 9.48 128.22 10.23 127.85
 10.33 127.81 10.48 127.82 11.55 127.9 11.62 127.91 11.64 127.91
 12.76 127.95 13.05 127.96 16.06 128.02 16.48 128.03 19.36 128.09
 19.96 128.1 22.97 128.16 23.21 128.18 24.17 128.26 24.43 128.24
 25.37 128.16 25.77 128.36 25.94 128.45 26.11 128.48 26.82 128.6
 27.89 128.88 30.71 129.74 33.12 130.45 33.28 130.49

Manning's n Values num= 8
 Sta n Val Sta n Val Sta n Val Sta n Val Sta n Val
 -11.3 .02 -10.59 .08 -4.85 .04 5.6 .08 7.83 .04
 10.23 .02 24.17 .04 27.89 .08

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 -5.09 5.6 9.5 8.5 7.6 .3 .5
 Ineffective Flow num= 1
 Sta L Sta R Elev Permanent
 9.48 33.28 128.22 F

CROSS SECTION

RIVER: Beaver Pond Brk
 REACH: Reach-1 RS: 5804

INPUT

Description: 9m D/S Concrete Weir (FEMA G -STA 5208.1)

Station Elevation Data num= 48
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 -11.55 130.08 -11.49 130.08 -11.47 130.11 -11.36 130.26 -11.29 130.94
 -11.28 131.08 -10.98 131.08 -10.97 130.97 -10.93 130.42 -10.89 129.71
 -10.88 129.37 -10.85 128.44 -10.25 128.16 -9.25 127.7 -7.12 126.67
 -6.56 126.19 -5.6 125.555 -4.11 124.57 -3.7 124.34 -1.62 124.01
 .83 125.22 1.8 125.31 2.99 125.4 3.34 125.64 4.23 125.86
 5.92 126.99 6.37 127.27 6.85 127.53 11.54 127.82 11.62 127.83
 12.74 127.87 12.82 127.88 15.94 127.95 16.12 127.96 19.29 128.03
 19.43 128.04 19.57 128.04 23.03 128.13 24.2 128.22 24.23 128.23
 25.66 128.24 26.02 128.42 26.04 128.43 26.83 128.56 30.13 129.58
 30.96 129.86 33.25 130.62 33.85 130.75

Manning's n Values num= 8
 Sta n Val Sta n Val Sta n Val Sta n Val Sta n Val
 -11.55 .02 -10.85 .08 -5.6 .04 .83 .08 6.85 .04
 11.54 .02 23.03 .04 26.83 .08

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 -6.56 4.23 47 47.2 48 .3 .5

CROSS SECTION

RIVER: Beaver Pond Brk
 REACH: Reach-1 RS: 5757

INPUT
 Description: D/S End Prop. Retaining Wall No.107
 The right side of the cross section models Reidville Drive.

Station Elevation Data		num= 47		Sta Elev		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-14.63	129.42	-13.8	129.35	-13.44	129.32	-11.89	128.55	-8.68	126.97		
-7.4	126.32	-7.31	126.24	-7.27	126.16	-7.12	126.21	-6.75	125.96		
-5.33	124.94	-4.5	124.288	-3.05	123.16	.01	123.2	.29	123.2		
1.41	123.21	1.55	123.33	2.74	124.268	3.63	124.97	5.14	126.16		
6.31	126.53	7.74	127	8.93	127.38	10.01	127.45	10.12	127.46		
11.21	127.55	11.33	127.56	12.41	127.59	12.77	127.6	15.71	127.7		
16.13	127.71	19.01	127.8	19.53	127.82	22.61	127.92	22.8	127.94		
23.81	128.02	25.22	128.02	25.79	128.31	29.72	130.28	29.86	130.34		
30.07	130.4	30.2	130.43	30.23	130.43	30.24	130.42	30.38	130.44		
30.43	130.46	30.85	130.52								

Manning's n Values		num= 8		Sta n Val		Sta n Val		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-14.63	.04	-13.44	.08	-4.5	.04	2.74	.08	8.93	.04		
11.33	.02	22.8	.04	25.79	.08						

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 -5.33 3.63 126.7 128.6 129.3 .1 .3
 Ineffective Flow num= 1
 Sta L Sta R Elev Permanent
 10.49 30.85 127.85 F

CROSS SECTION

RIVER: Beaver Pond Brk
 REACH: Reach-1 RS: 5628

INPUT
 Description: FEMA STATION 5208, CROSS SECTION F

Station Elevation Data		num= 46		Sta Elev		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-20.11	127.19	-20.03	127.18	-19.13	127.11	-17.68	127.05	-17.14	127.03		
-16.83	127.01	-16.77	127.01	-16.36	126.97	-15.68	126.92	-9.77	124.18		
-7.99	123.31	-6.8	122.482	-5.59	121.64	-3.87	121.32	-2.9	120.89		
-1.22	120.8	-.16	120.94	.48	121.4	1.91	121.49	3.1	122.48		
4.59	123.72	7.18	124.59	7.86	124.836	8	124.85	8.5	124.89		
9.2	124.95	9.7	124.96	10.4	124.98	11.19	125.01	12.25	125.04		
14.21	125.11	15.65	125.15	17.7	125.22	19.25	125.27	19.9	125.29		
20.57	125.31	21.47	125.36	22.14	125.4	22.81	125.35	23.34	125.31		
25.82	125.73	26.16	125.81	26.67	126.03	30.22	127.51	31.07	127.86		
31.33	127.96										

Manning's n Values		num= 8		Sta n Val		Sta n Val		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-20.11	.04	-15.68	.08	-5.59	.04	1.91	.08	7.86	.04		
9.2	.02	23.34	.04	26.67	.08						

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 -6.8 3.1 103.6 104.6 107.1 .1 .3
 Ineffective Flow num= 1
 Sta L Sta R Elev Permanent
 22.14 31.33 125.4 F

CROSS SECTION

RIVER: Beaver Pond Brk
 REACH: Reach-1 RS: 5524

INPUT
 Description: U/S End Prop. Retaining Wall No.118
 170m U/S proposed I-84
 Culvert No. 01227.
 The right side of the cross section models Reidville Drive.

Station Elevation Data num= 53

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-16.88	124.86	-16.85	124.86	-16.73	125.1	-16.72	125.12	-16.65	125.86
-16.64	125.93	-16.34	125.93	-16.32	125.53	-16.3	124.65	-16.18	124.63
-15.96	124.6	-15.05	124.46	-9.73	121.56	-8.13	120.673	-7.06	120.08
-5.36	119.23	-4.27	118.664	-2.51	117.75	-1	117.7	2	117.6
2.61	117.78	3.81	118.74	5.96	120.55	8.33	121.3207	8.97	121.37
9.9	121.45	10.17	121.47	11.1	121.5	11.37	121.51	11.64	121.52
11.71	121.52	12.52	121.55	15.26	121.63	16.11	121.66	18.86	121.75
20.37	121.8	20.86	121.82	22.26	121.82	23.61	121.82	26.08	121.94
29.44	122.09	31.67	122.1	32.57	122.36	34.71	122.43	35.77	122.47
37.38	122.11	39.5	122.2	41.32	122.49	41.67	122.55	42.04	122.59
43.65	122.91	44.06	122.86	44.84	122.62				

Manning's n	Values	num=	8
Sta	n Val	Sta	n Val
-16.88	.02	-16.3	.08
9.9	.02	20.86	.04
		22.26	.06

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	-8.13	5.96		67	68.1		.1	.3
Ineffective Flow	num=	1	Permanent	F				
Sta L	Sta R	Elev						
35.77	44.84	122.47						

CROSS SECTION

RIVER: Beaver Pond Brk
 REACH: Reach-1 RS: 5456

INPUT

Description: 103m Upstream Proposed I-84 Culvert No. 01227

Station	Elevation	Data	num=	64					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-11.09	123.35	-11.08	123.35	-11.07	123.37	-10.95	123.53	-10.872	124.29
-10.866	124.35	-10.562	124.35	-10.558	124.3	-10.51	123.69	-10.46	122.72
-10.34	121.66	-10.3	121.1	-10.27	120.97	-10.13	120.9	-9.66	120.64
-6.51	118.9	-5.25	118.22	-4.2	117.654	-2.45	116.71	-2.35	116.65
-.6	116.4	1.7	116.5	2.91	116.65	4.2	117.615	5	118.214
6.17	119.09	6.22	119.12	6.29	119.15	9.03	119.99	9.36	120
11.32	120.09	11.34	119.94	12.55	119.98	14.78	120.01	16.16	120.03
17.52	120.05	19.78	120.07	20.88	120.03	20.98	120.02	21.53	120
21.69	120.15	21.7	120.15	24.5	120.1	25.89	119.52	27.2	118.93
29.24	118.08	30.34	117.78	33.47	117.95	33.83	117.95	36.71	120.17
37.26	120.44	37.28	120.44	37.6	120.45	42.63	120.48	43.19	120.47
44.01	120.47	46.58	120.32	46.75	120.31	49.01	120.39	51.11	120.31
52.75	120.3	54.46	120.28	55.95	120.3	57.47	120.28		

Manning's n	Values	num=	9
Sta	n Val	Sta	n Val
-11.09	.02	-10.27	.08
11.34	.02	21.69	.04
		25.89	.06
		37.26	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	-5.25	5		34.3	34.3		.1	.3
Ineffective Flow	num=	2	Permanent	F				
Sta L	Sta R	Elev						
9.360001	22.4	120						
24.5	37.5	120.1						

CROSS SECTION

RIVER: Beaver Pond Brk
 REACH: Reach-1 RS: 5422

INPUT

Description: FEMA STATION 5207, CROSS SECTION E

Station	Elevation	Data	num=	57					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-8.52	122.3	-8.44	122.3	-8.38	122.39	-8.31	122.48	-8.27	122.92
-8.23	123.3	-7.92	123.3	-7.9	122.95	-7.87	122.64	-7.77	118.76
-7.76	118.49	-7.34	118.28	-6.95	118.09	-5.19	117.21	-2.9	116.06
2.94	116.06	5.25	117.2	7.05	118.09	8.01	118.56	8.83	118.96
9.25	119.16	9.69	119.2	11.85	119.37	12.3	119.41	12.38	119.26
13.07	119.28	13.58	119.3	14.62	119.32	17.2	119.35	17.34	119.35
17.75	119.34	20.05	119.3	20.81	119.29	21.19	119.28	22.02	119.24

22.08	119.3	22.17	119.39	22.86	119.4	23.2	119.45	23.6	119.45
24.19	119.47	25.13	119.48	25.94	119.52	26.18	119.38	29.72	119.4
33.24	119.49	33.84	119.5	34.34	119.52	38.1	119.64	40.67	119.69
41.4	119.7	43.46	119.69	46.05	119.66	46.9	119.66	50.44	119.74
52.52	119.79	54.88	119.83						

Manning's n Values num= 9

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-8.52	.02	-7.76	.08	-5.19	.04	5.25	.08	9.69	.04
12.38	.02	22.02	.04	26.18	.02	41.4	.04		

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

-6.95	7.05	67	66.5	65.5	.1	.3
-------	------	----	------	------	----	----

Ineffective Flow num= 4

Sta L	Sta R	Elev	Permanent
-8.52	-8.23	123.3	F
12.3	22.9	119.41	F
25.94	34.5	119.52	F
41.4	48.9	119.7	F

CROSS SECTION

RIVER: Beaver Pond Brk
REACH: Reach-1 RS: 5355

INPUT

Description: U/S of Prop I-84 Culvert No.01227
Most westerly I-84 crossing
over Beaver Pond Brook

Station Elevation Data num= 51

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-4.84	120.45	-4.75	120.45	-4.71	120.5	-4.62	120.63	-4.56	121.2
-4.54	121.44	-4.24	121.44	-4.2	120.98	-4.19	120.79	-4.18	120.65
-4.04	115.01	0	115.01	5.929	115.01	5.934	120.3	6.33	120.3
6.34	117.95	6.73	118	10.37	118.5	12.5	118.78	13.7	118.88
14.15	118.92	14.23	118.77	14.61	118.78	15.5	118.81	17.82	118.85
19.1	118.87	21.07	118.84	22.7	118.81	23.32	118.79	23.9	118.76
23.95	118.76	24.21	118.75	24.35	118.9	24.37	118.9	25.04	119
25.65	119.05	26.2	119.09	27.23	119.14	30.8	119.32	30.98	119.33
32.43	119.31	32.84	119.31	38.76	119.5	40.7	119.56	42.9	119.68
43.72	119.73	44.43	119.79	46.72	119.95	49.91	120.19	51.05	120.27
51.41	120.29								

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-4.84	.02	-4.18	.04	5.934	.02	6.34	.04	14.15	.02
23.32	.04	32.43	.02						

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

-4.18	5.934	131	131	131	.3	.5
-------	-------	-----	-----	-----	----	----

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-4.84	-4.24	121.44	F
5.93	51.41	120.3	F

CULVERT

RIVER: Beaver Pond Brk
REACH: Reach-1 RS: 5295.5

INPUT

Description: Proposed Culvert No.01227, Westerly I-84 crossing
A composite

Manning's roughness of the concrete culvert and baffle is applied for the westerly cell.

Distance from Upstream XS = 25.8

Deck/Roadway Width = 85.23

Weir Coefficient = 1.45

Upstream Deck/Roadway Coordinates

num= 8

Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
-7.96	120.41	0	-4.36	120.27	0	-4.36	121.34	0		6	120.3	0		
-3.8	121.34	0	-3.8	120.3	0									
6	119.35	0	15.8	118.93	0									

Upstream Bridge Cross Section Data

Station	Elevation	Data	num=	7	Sta	Elev	Sta	Elev	Sta	Elev
-7.96	120.41	-4.36	120.27	-4.36	121.34	-3.8	121.34	-3.8	114.95	
3.8	114.95	3.8	120.3							

Manning's n Values num= 2

Station	n Val	Sta	n Val
-7.96	.02	-3.8	.04

Bank Sta: Left Right Coeff Contr. Expan.

-3.8	3.8	.3	.5
------	-----	----	----

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-7.96	-4.24	121.44	F
5.93	3.8	120.3	F

Downstream Deck/Roadway Coordinates

num=	9	Sta Hi	Cord	Lo	Cord	Sta Hi	Cord	Lo	Cord	Sta Hi	Cord	Lo	Cord
-15	118	0	-13	118	0	-4.36	118	0					
-4.36	118	0	-3.8	118	0	-3.8	118.5	0					
6	118.5	0	6	118.5	0	15.8	118.5	0					

Downstream Bridge Cross Section Data

Station	Elevation	Data	num=	6	Sta	Elev	Sta	Elev	Sta	Elev
-15	118	-13	117.82	-3.8	113	3.8	113	7.8	115	
15.8	118.93									

Manning's n Values num= 2

Station	n Val	Sta	n Val
-15	.04	7.8	.08

Bank Sta: Left Right Coeff Contr. Expan.

-3.8	3.8	.3	.5
------	-----	----	----

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-15	-20.3	118.29	F
7.1	15.8	118.19	F

Upstream Embankment side slope = 12 horiz. to 1.0 vertical
 Downstream Embankment side slope = 12 horiz. to 1.0 vertical
 Maximum allowable submergence for weir flow = .95
 Elevation at which weir flow begins =
 Energy head used in spillway design =
 Spillway height used in design =
 Weir crest shape = Broad Crested

Number of Culverts = 1

Culvert Name	Shape	Rise	Span	Top n	Bottom n	Depth Blocked	Entrance Loss Coef	Exit Loss Coef
01227	Box	3.3	3.5	.031	.031	.22	.2	1

FHWA Chart # 9 - flared wingwalls and Inlet top edge bevel
 FHWA Scale # 2 - Wingwall flared 18 to 33.7 deg.; inlet top edge bevel=0.083D
 Solution Criteria = Highest U.S. EG

Number of Barrels = 2
 Upstream Elevation = 114.95
 Centerline Stations
 Sta. Sta.
 -2.05 2.05
 Downstream Elevation = 113
 Centerline Stations
 Sta. Sta.
 -2.05 2.05

CROSS SECTION

RIVER: Beaver Pond Brk
 REACH: Reach-1 RS: 5224

INPUT
 Description: D/S of I-84 Culvert No. 01227

Station Elevation Data										num=	24
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-34.4	118.29	-33.83	118.3	-33.81	118.3	-33.77	118.29	-32.75	118.12		
-32.32	118.11	-31.73	118.1	-27.39	117.96	-25.12	117.9	-21.1	117.66		
-20.78	117.5	-15.57	115	-14.1	114.5	-11.09	113	0	113		
3.44	113	4.48	113.5	6.44	114.5	11.4	117	11.52	117.06		
11.521	118.5	12.03	118.5	12.76	118.45	13.25	118.46				

Manning's n Values						num=	3
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-34.4	.08	-14.1	.04	6.44	.08		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	-14.1	6.44		23.3	18.3		.3	.5
Ineffective Flow	num=		2					
Sta L	Sta R	Elev	Permanent					
-34.4	-20.3	118.29	F					
7.1	13.25	118.19	F					

CROSS SECTION

RIVER: Beaver Pond Brk
 REACH: Reach-1 RS: 5206

INPUT
 Description: 32.6m D/S I-84 Culvert No.01227 (FEMA C -STA 5205.1)
 Most

westerly I-84 crossing over Beaver Pond Brook
 Left ineffective area added to model flow obstructions from buildings and right ineffective area added to model the the I-84 median barrier.

Station Elevation Data										num=	28
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-33.12	117.63	-32.85	117.59	-32.5	117.53	-28.68	117.51	-27.37	117.51		
-24.18	117.48	-22.48	117.45	-17.43	117.28	-16.68	117.2	-16.39	117.27		
-16.11	117.27	-15.87	117.11	-14.8	116.9	-13	116	-11.54	115.5		
-10.4	115	-9.14	114.5	-7.7	114	-6.51	113.5	-4.6	113		
2.39	113	3.45	113.5	7.46	115.5	8.61	116	11.58	116.5		
12.95	117	15.07	118	16.18	118.18						

Manning's n Values										num=	5
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-33.12	.02	-22.48	1	-17.43	.08	-11.54	.04	7.46	.08		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	-13	8.61		59	60.5		.3	.5
Ineffective Flow	num=		2					
Sta L	Sta R	Elev	Permanent					
-33.12	-15.86	120	T					
8.51	16.18	118.2	F					
Blocked Obstructions	num=		1					
Sta L	Sta R	Elev						
-22	-18	120						

CROSS SECTION

RIVER: Beaver Pond Brk
 REACH: Reach-1 RS: 5145

INPUT
 Description: FEMA Station 5205, Cross Section B
 Left ineffective area added to model flow obstructions from buildings and right ineffective area added to model the the I-84 median barrier.

Station Elevation Data										num=	55
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-73.45	117.64	-72.52	117.59	-69.12	117.4	-64.08	117.12	-62.91	117.07		
-61.75	117.01	-60.87	116.96	-58.57	116.82	-58.06	116.7	-57.95	116.67		
-56.37	116.7	-54.58	116.72	-54.15	116.71	-51.2	116.64	-50.76	116.74		
-50.59	116.78	-50.43	116.78	-49.44	116.79	-48.9	116.8	-48.74	116.82		
-47.82	116.97	-47.03	116.97	-45.15	117.03	-42.91	117.03	-41.82	117.02		
-41.79	117.02	-41.71	117.01	-39.9	116.96	-31.92	116.84	-30.23	116.81		
-27.64	116.69	-25.83	116.65	-24.71	116.65	-21.99	116.45	-20.98	116.34		
-19.74	116.21	-16.7	115.74	-16.26	115.67	-13.1	115.32	-12.6	115.54		
-11.47	115.27	-10.22	114.88	-8.66	114.389	-4.53	113.09	-3.55	112.87		

-1.1	112.71	-.54	112.68	2.9	113.13	4.62	114.37	8.35	114.5
18.28	114.77	25.32	118.27	26.4	118.36	27.05	118.41	27.57	118.46

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-73.45	.04	-57.95	.02	-51.2	.04	-21.99	.08	-10.22	.04
4.62	.06	26.4	.04						

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

	-8.66	4.62		60.6	60.6	60.6		.1	.3
--	-------	------	--	------	------	------	--	----	----

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-73.45	-15.35	120	T
-15.35	-12.6	115.54	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
-42.2	-31.4	120

CROSS SECTION

RIVER: Beaver Pond Brk
 REACH: Reach-1 RS: 5084

INPUT
 Description: 27m U/S Harpers Ferry Road (FEMA A -STA 5204.9)
 Culvert No. 03727

Left ineffective area added to model flow obstructions from buildings and right ineffective area added to model the the I-84 median barrier.

Station Elevation Data num= 78

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-112.97	115.84	-111.77	115.82	-109.97	115.7	-105.58	115.56	-101	115.54
-98.38	115.58	-94.59	115.65	-89.9	115.6	-86.69	115.53	-80.86	115.4
-79.28	115.36	-74.92	115.19	-74.68	115.21	-74.61	115.21	-74.55	115.13
-72.29	115.27	-70.77	115.27	-66.73	115.12	-65.59	115.1	-65.47	115.21
-65.42	115.24	-64.51	115.29	-64.33	115.3	-64.1	115.32	-64.07	115.32
-64.05	115.34	-64.03	115.32	-63.99	115.32	-63.08	115.39	-60.47	115.58
-60.26	115.58	-59.36	115.54	-58.49	115.53	-54.67	115.51	-48.74	115.48
-47.37	115.44	-45.99	115.3	-45.78	115.28	-44.95	115.3	-44.02	115.28
-43.54	115.25	-42.8	115.23	-42.54	115.21	-41.08	115.19	-40.57	115.18
-40.3	115.18	-38.8	115.16	-38.57	115.16	-36.79	115.12	-36.05	115.12
-34.9	115.14	-33.36	115.16	-32.08	115.14	-31.87	115.14	-22.1	114.96
-20.91	114.98	-20.4	114.98	-18.93	114.99	-16.45	114.98	-15.91	114.96
-15.35	114.93	-10.73	114.64	-10.53	114.51	-8.15	114.3	-7.21	114.03
-3.5	112.18	-.83	112.05	.98	111.83	3.2	112.03	3.5	112.18
7.18	114	7.5	114.18	23.02	114.5	24.44	114.7	33.96	119.46
34.93	119.5	35.83	119.58	36.06	119.6				

Manning's n Values num= 10

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-112.97	.04	-74.68	.02	-66.73	.04	-59.36	.1	-45.99	.02
-32.08	.06	-16.45	.08	-7.21	.04	7.5	.06	34.93	.04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

	-7.21	7.5		19.3	20	20.8		.3	.5
--	-------	-----	--	------	----	------	--	----	----

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-112.97	-33.34	118	T
-33.34	-32.6	115.2	T

Blocked Obstructions num= 1

Sta L	Sta R	Elev
-60	-47	118

CROSS SECTION

RIVER: Beaver Pond Brk
 REACH: Reach-1 RS: 5065

INPUT
 Description: U/S of Harpers Ferry Road Culvert No. 03727

Station Elevation Data num= 88

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-131.08	118.32	-130.7	118.11	-127.6	116.71	-125.46	116.22	-123.45	115.81
-121.42	115.68	-120.29	115.62	-116.18	115.52	-111.92	115.53	-107.89	115.54

-101.55	115.57	-100.93	115.52	-100.73	115.53	-97.19	115.5	-94.41	115.46
-92.04	115.4	-88.43	115.35	-87.8	115.33	-85.65	115.23	-84.93	115.19
-83.46	115.1	-82.89	115.07	-82.8	115.08	-82.58	115.11	-81.91	115.1
-80.96	115.07	-80.28	114.96	-80.15	114.93	-78.14	114.96	-77.48	114.97
-76.58	114.99	-75.97	114.97	-75.52	114.96	-74.46	114.94	-73.01	114.91
-72.93	114.92	-72.36	115.04	-72.2	115.04	-70.92	115.06	-70.57	115.07
-70.37	115.03	-69.99	114.97	-69.88	114.96	-68.48	114.97	-67.21	114.97
-60.21	115.14	-58.45	115.14	-58.08	115.15	-50.81	115.11	-48.87	115.12
-47.71	115.12	-46.38	115.13	-45.23	115.13	-38.86	115	-38.71	115
-37.91	114.99	-31.32	114.95	-31.3	114.91	-31.27	114.82	-27.58	114.82
-23.93	114.86	-20.12	114.89	-19.67	114.91	-19.63	114.91	-14.21	115.07
-14.15	115.07	-14.09	115.08	-13.66	115.09	-13.6	115.1	-12.95	115.22
-10.25	115.22	-9.84	115	-7.98	114.051	-3.96	112	-3.5	111.85
0	111.85	3.5	111.85	3.97	112	7.876	114	8.2	114.15
9.675	114.5	10.34	114.6	11.014	114.5	13.069	114.4	15.192	114.5
22.85	115	33.25	119.5	37.01	120.25				

Manning's n Values		num= 8		Sta n Val		Sta n Val		Sta n Val	
-131.08	.08	-121.42	.04	-80.15	.02	-73.01	.04	-31.32	.08
-10.25	.04	8.2	.06	33.25	.04				

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	-7.98	7.876		43.9	43.2	42.4		.3	.5

Ineffective Flow	num= 3		Permanent	
Sta L	Sta R	Elev		
-131.08	-47	118	F	
-44.99	-12.74	115.15	F	
8.94	37.01	115	F	

Blocked Obstructions	num= 2		Sta L		Sta R	Elev
	Sta L	Sta R	Elev			
	-92.3	-88.9	118	-57.42	-49.07	118

CULVERT

RIVER: Beaver Pond Brk
 REACH: Reach-1 RS: 5042.5

INPUT

Description: Proposed Culvert No. 03727 - Harpers Ferry Road
 A composite

Manning's roughness of the concrete culvert filled with natural streambed material is applied.
 The vertical wall on the downstream section represents the limit of effective flow region.

Distance from Upstream XS = 11.8
 Deck/Roadway Width = 20
 Weir Coefficient = 1.45
 Upstream Deck/Roadway Coordinates

num= 323		Sta Hi Cord		Lo Cord		Sta Hi Cord		Lo Cord		Sta Hi Cord		Lo Cord	
-121.252	114.793	0	-121.211	114.793	0	-121.105	114.791	0					
-120.197	114.781	0	-119.314	114.77	0	-119.183	114.769	0					
-119.05	114.767	0	-118.17	114.757	0	-118.025	114.755	0					
-117.157	114.745	0	-116.305	114.735	0	-116.144	114.733	0					
-115.301	114.723	0	-115.132	114.721	0	-114.972	114.719	0					
-114.188	114.71		-114.12	114.71		-113.291	114.701						
-113.111	114.699		-112.929	114.697		-112.101	114.689						
-111.916	114.687		-111.357	114.682		-111.11	114.675						
-109.667	114.653		-109.565	114.651		-109.549	114.651						
-109.538	114.65		-109.488	114.65		-108.356	114.642						
-107.924	114.636		-106.963	114.629		-106.136	114.62						
-105.522	114.616		-104.687	114.608		-104.447	114.606						
-103.65	114.6		-103.458	114.598		-103.367	114.596						
-102.465	114.585		-101.831	114.579		-101.254	114.578						
-100.691	114.575		-100.167	114.572		-99.579	114.576						
-98.924	114.581		-96.663	114.582		-96.054	114.586						
-95.404	114.588		-94.803	114.592		-94.147	114.594						
-93.237	114.599		-93.014	114.6		-92.367	114.603						
-92.31	114.603		-91.571	114.607		-91.403	114.607						
-90.729	114.611		-89.456	114.619		-89.231	114.62						
-88.995	114.621		-88.382	114.625		-88.09	114.626						
-87.395	114.63		-86.603	114.633		-85.778	114.638						
-85.013	114.642		-84.452	114.647		-84.064	114.65						
-82.785	114.658		-82.579	114.659		-82.135	114.663						
-81.647	114.668		-81.483	114.669		-80.759	114.677						

-80.194	114.683	-78.864	114.7	-78.611	114.703
-78.423	114.705	-76.388	114.727	-74.224	114.75
-73.896	114.754	-73.81	114.755	-73.738	114.755
-73.542	114.758	-73.468	114.758	-71.774	114.777
-71.212	114.783	-70.398	114.792	-70.106	114.795
-69.894	114.798	-69.812	114.798	-69.68	114.8
-67.077	114.849	-67.041	114.85	-65.403	114.883
-64.669	114.897	-64.481	114.901	-64.158	114.908
-63.83	114.915	-63.443	114.923	-63.282	114.927
-62.436	114.945	-62.395	114.946	-61.689	114.961
-61.474	114.966	-60.457	114.989	-60.435	114.99
-59.443	115.012	-59.405	115.013	-58.43	115.037
-57.484	115.059	-57.418	115.061	-57.35	115.063
-56.406	115.086	-55.485	115.11	-55.394	115.112
-54.485	115.136	-54.382	115.138	-53.484	115.162
-53.371	115.165	-53.254	115.169	-52.359	115.193
-52.103	115.2	-51.48	115.217	-51.349	115.221
-51.216	115.225	-50.338	115.249	-49.47	115.274
-49.328	115.279	-48.463	115.304	-48.317	115.308
-47.456	115.334	-47.307	115.339	-47.156	115.343
-46.297	115.37	-45.44	115.396	-45.286	115.401
-45.133	115.406	-44.276	115.433	-43.419	115.461
-43.266	115.466	-42.408	115.494	-42.256	115.499
-42.105	115.504	-41.246	115.533	-41.097	115.538
-40.235	115.567	-40.09	115.572	-39.225	115.602
-38.351	115.633	-38.215	115.638	-37.335	115.669
-37.204	115.674	-37.075	115.679	-36.193	115.711
-36.071	115.715	-35.182	115.748	-34.277	115.782
-34.171	115.786	-34.066	115.79	-33.159	115.824
-33.065	115.828	-32.481	115.85	-32.148	115.864
-31.237	115.9	-31.136	115.904	-31.035	115.909
-30.125	115.946	-29.23	115.983	-29.114	115.988
-28.997	115.993	-28.103	116.03	-27.221	116.068
-27.093	116.073	-26.963	116.079	-26.082	116.117
-25.208	116.155	-25.072	116.161	-24.934	116.167
-24.061	116.206	-23.193	116.245	-23.051	116.252
-22.183	116.291	-22.041	116.298	-21.898	116.304
-21.03	116.344	-20.162	116.385	-20.02	116.391
-19.879	116.398	-19.01	116.439	-18.137	116.481
-17.999	116.487	-17.123	116.53	-16.989	116.536
-16.107	116.579	-15.978	116.586	-15.851	116.592
-14.968	116.636	-14.846	116.642	-13.957	116.687
-13.071	116.731	-13.056	116.732	-12.946	116.738
-12.053	116.784	-11.935	116.791	-11.814	116.797
-10.924	116.844	-10.046	116.891	-9.913	116.898
-9.778	116.905	-8.902	116.952	-8.762	116.96
-7.892	117.007	-7.03	117.055	-6.882	117.063
-6.732	117.071	-5.871	117.119	-5.719	117.128
-4.861	117.176	-4.006	117.225	-3.851	117.234
-3.696	117.243	-2.841	117.292	-2.686	117.301
-1.831	117.35	-.974	117.4	-.821	117.409
.039	117.46	.19	117.469	.34	117.478
1.2	117.529	1.346	117.538	2.21	117.59
3.083	117.643	3.221	117.652	4.1	117.705
4.231	117.714	5	117.761	5.118	117.768
5.242	117.776	6.137	117.832	6.253	117.839
6.581	117.86	7.151	117.896	7.264	117.904
7.378	117.911	8.275	117.969	8.389	117.976
9.285	118.034	9.4	118.042	10.296	118.1
10.41	118.108	11.307	118.167	11.418	118.175
12.317	118.234	13.222	118.295	13.328	118.302
14.238	118.364	14.339	118.371	14.439	118.378
15.35	118.44	16.272	118.503	16.361	118.509
17.291	118.574	17.373	118.58	17.453	118.585
18.384	118.65	19.332	118.717	19.396	118.722
19.459	118.726	20.408	118.794	20.46	118.798
21.42	118.866	21.462	118.869	22.433	118.939
22.684	118.957	23.437	119.011	23.447	119.011
23.457	119.012	23.874	119.042	24.352	119.076
24.514	119.086	24.585	119.091	24.998	119.119
25.352	119.144	25.927	119.18	26.218	119.2
26.513	119.223	27.293	119.277	27.632	119.3
28.426	119.354	28.758	119.375	29.094	119.4
29.587	119.436	30.117	119.472	30.344	119.485
30.484	119.5	31.73	119.591	31.817	119.6
32.609	119.655	32.858	119.672	33.63	119.726
34.354	119.777	34.653	119.797	34.972	119.819

35.676	119.868	36.333	119.914	36.7	119.939
37.093	119.966	37.724	120.01	38.312	120.051
38.75	120.081	39.223	120.113	39.777	120.152
40.29	120.187	40.804	120.222	41.279	120.255
41.832	120.293	42.268	120.323	42.862	120.364
43.258	120.391	43.346	120.397		

Upstream Bridge Cross Section Data

Station Elevation Data num= 121

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-121.252	114.793	-121.211	114.793	-121.105	114.791	-120.197	114.781	-119.314	114.77
-119.183	114.769	-119.05	114.767	-118.17	114.757	-118.025	114.755	-117.157	114.745
-116.305	114.735	-116.144	114.733	-115.301	114.723	-115.132	114.721	-114.972	114.719
-114.188	114.71	-114.12	114.71	-113.291	114.701	-113.111	114.699	-112.929	114.697
-112.101	114.689	-111.916	114.687	-111.357	114.682	-111.11	114.675	-109.667	114.653
-109.565	114.651	-109.549	114.651	-109.538	114.65	-109.488	114.65	-108.356	114.642
-107.924	114.636	-106.963	114.629	-106.136	114.62	-105.522	114.616	-104.687	114.608
-104.447	114.606	-103.65	114.6	-103.458	114.598	-103.367	114.596	-102.465	114.585
-101.831	114.579	-101.254	114.578	-100.691	114.575	-100.167	114.572	-99.579	114.576
-98.924	114.581	-96.663	114.582	-96.054	114.586	-95.404	114.588	-94.803	114.592
-94.147	114.594	-93.237	114.599	-93.014	114.6	-92.367	114.603	-92.31	114.603
-91.571	114.607	-91.403	114.607	-90.729	114.611	-89.456	114.619	-89.231	114.62
-88.995	114.621	-88.382	114.625	-88.09	114.626	-87.395	114.63	-86.603	114.633
-85.778	114.638	-85.013	114.642	-84.452	114.647	-84.064	114.65	-82.785	114.658
-82.579	114.659	-82.135	114.663	-81.647	114.668	-81.483	114.669	-80.759	114.677
-80.194	114.683	-78.864	114.7	-78.611	114.703	-78.423	114.705	-76.388	114.727
-74.224	114.75	-73.896	114.754	-73.81	114.755	-73.738	114.755	-73.542	114.758
-73.468	114.758	-71.774	114.777	-71.212	114.783	-70.398	114.792	-70.106	114.795
-69.894	114.798	-69.812	114.798	-69.68	114.8	-67.077	114.849	-67.041	114.85
-65.403	114.883	-64.669	114.897	-64.481	114.901	-64.158	114.908	-63.83	114.915
-63.443	114.923	-63.282	114.927	-62.436	114.945	-62.395	114.946	-61.689	114.961
-61.474	114.966	-60.457	114.989	-60.435	114.99	-59.443	115.012	-59.405	115.013
-58.43	115.037	-29.7	115.05	-16.7	115.1	-9.83	115	-4.83	112.5
-3.8	111.75	3.8	111.75	4.82	112.5	9.82	115	25.61	115
31.61	118								

Manning's n Values

num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-121.252	.02	-58.43	.06	-9.83	.04	9.82	.06

Bank Sta: Left Right Coeff Contr. Expan.
-9.83 9.82 .3 .5

Ineffective Flow num= 3
Sta L Sta R Elev Permanent
-131.08 -47 118 F
-44.99 -12.74 115.15 F
8.94 37.01 115 F

Blocked Obstructions num= 2
Sta L Sta R Elev Sta L Sta R Elev
-92.3 -88.9 118 -57.42 -49.07 118

Downstream Deck/Roadway Coordinates

num= 299

Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
-126.252	114.793			0	-126.211	114.793			0	-126.105	114.791			0
-125.197	114.781			0	-124.314	114.77			0	-124.183	114.769			0
-124.05	114.767			0	-123.17	114.757			0	-123.025	114.755			0
-122.157	114.745			0	-121.305	114.735			0	-121.144	114.733			0
-120.301	114.723			0	-120.132	114.721			0	-119.972	114.719			0
-119.188	114.71				-119.12	114.71				-118.291	114.701			
-118.111	114.699				-117.929	114.697				-117.101	114.689			
-116.916	114.687				-116.357	114.682				-116.11	114.675			
-114.667	114.653				-114.565	114.651				-114.549	114.651			
-114.538	114.65				-114.488	114.65				-113.356	114.642			
-112.924	114.636				-111.963	114.629				-111.136	114.62			
-110.522	114.616				-109.687	114.608				-109.447	114.606			
-108.65	114.6				-108.458	114.598				-108.367	114.596			
-107.465	114.585				-106.831	114.579				-106.254	114.578			
-105.691	114.575				-105.167	114.572				-104.579	114.576			
-103.924	114.581				-101.663	114.582				-101.054	114.586			
-100.404	114.588				-99.803	114.592				-99.147	114.594			
-98.237	114.599				-98.014	114.6				-97.367	114.603			
-97.31	114.603				-96.571	114.607				-96.403	114.607			
-95.729	114.611				-94.456	114.619				-94.231	114.62			
-93.995	114.621				-93.382	114.625				-93.09	114.626			
-92.395	114.63				-91.603	114.633				-90.778	114.638			
-90.013	114.642				-89.452	114.647				-89.064	114.65			

-87.785	114.658	-87.579	114.659	-87.135	114.663
-86.647	114.668	-86.483	114.669	-85.759	114.677
-85.194	114.683	-83.864	114.7	-83.611	114.703
-83.423	114.705	-81.388	114.727	-79.224	114.75
-78.896	114.754	-78.81	114.755	-78.738	114.755
-78.542	114.758	-78.468	114.758	-76.774	114.777
-76.212	114.783	-75.398	114.792	-75.106	114.795
-74.894	114.798	-74.812	114.798	-74.68	114.8
-74.68	114.8	-72.077	114.849	-72.041	114.85
-70.403	114.883	-69.669	114.897	-69.481	114.901
-69.158	114.908	-68.83	114.915	-68.443	114.923
-68.282	114.927	-67.436	114.945	-67.395	114.946
-66.689	114.961	-66.474	114.966	-65.457	114.989
-65.435	114.99	-64.443	115.012	-64.405	115.013
-63.43	115.037	-62.484	115.059	-62.418	115.061
-62.35	115.063	-61.406	115.086	-60.485	115.11
-60.394	115.112	-59.485	115.136	-59.382	115.138
-58.484	115.162	-58.371	115.165	-58.254	115.169
-57.359	115.193	-57.103	115.2	-56.48	115.217
-56.349	115.221	-56.216	115.225	-55.338	115.249
-54.47	115.274	-54.328	115.279	-53.463	115.304
-53.317	115.308	-52.456	115.334	-52.307	115.339
-52.156	115.343	-51.297	115.37	-50.44	115.396
-50.286	115.401	-50.133	115.406	-49.276	115.433
-48.419	115.461	-48.266	115.466	-47.408	115.494
-47.256	115.499	-47.105	115.504	-46.246	115.533
-46.097	115.538	-45.235	115.567	-45.09	115.572
-44.225	115.602	-43.351	115.633	-43.215	115.638
-42.335	115.669	-42.204	115.674	-42.075	115.679
-41.193	115.711	-41.071	115.715	-40.182	115.748
-39.277	115.782	-39.171	115.786	-39.066	115.79
-38.159	115.824	-38.065	115.828	-37.481	115.85
-37.148	115.864	-36.237	115.9	-36.136	115.904
-36.035	115.909	-35.125	115.946	-34.23	115.983
-34.114	115.988	-33.997	115.993	-33.103	116.03
-32.221	116.068	-32.093	116.073	-31.963	116.079
-31.082	116.117	-30.208	116.155	-30.072	116.161
-29.934	116.167	-29.061	116.206	-28.193	116.245
-28.051	116.252	-27.183	116.291	-27.041	116.298
-26.898	116.304	-26.03	116.344	-25.162	116.385
-25.02	116.391	-24.879	116.398	-24.01	116.439
-23.137	116.481	-22.999	116.487	-22.123	116.53
-21.989	116.536	-21.107	116.579	-20.978	116.586
-20.851	116.592	-19.968	116.636	-19.846	116.642
-18.957	116.687	-18.071	116.731	-18.056	116.732
-17.946	116.738	-17.053	116.784	-16.935	116.791
-16.814	116.797	-15.924	116.844	-15.046	116.891
-14.913	116.898	-14.778	116.905	-13.902	116.952
-13.762	116.96	-12.892	117.007	-12.03	117.055
-11.882	117.063	-11.732	117.071	-10.871	117.119
-10.719	117.128	-9.861	117.176	-9.006	117.225
-8.851	117.234	-8.696	117.243	-7.841	117.292
-7.686	117.301	-6.831	117.35	-5.974	117.4
-5.821	117.409	-4.961	117.46	-4.81	117.469
-4.66	117.478	-3.8	117.529	-3.654	117.538
-2.79	117.59	-1.917	117.643	-1.779	117.652
-.9	117.705	-.769	117.714	0	117.761
.118	117.768	.242	117.776	1.137	117.832
1.253	117.839	1.581	117.86	2.151	117.896
2.264	117.904	2.378	117.911	3.275	117.969
3.389	117.976	4.285	118.034	4.4	118.042
5.296	118.1	5.41	118.108	6.307	118.167
6.418	118.175	7.317	118.234	8.222	118.295
8.328	118.302	9.238	118.364	9.339	118.371
9.439	118.378	10.35	118.44	11.272	118.503
11.361	118.509	12.291	118.574	12.373	118.58
12.453	118.585	13.384	118.65	14.332	118.717
14.396	118.722	14.459	118.726	15.408	118.794
15.46	118.798	16.42	118.866	16.462	118.869
17.433	118.939	17.684	118.957	18.437	119.011
18.447	119.011	18.457	119.012	18.874	119.042
19.352	119.076	19.514	119.086	19.585	119.091
19.998	119.119	20.352	119.144	20.927	119.18
21.218	119.2	21.513	119.223	22.293	119.277
22.632	119.3	23.426	119.354	23.758	119.375
24.094	119.4	24.587	119.436	25.117	119.472
25.344	119.485	25.484	119.5		

Downstream Bridge Cross Section Data

Station Elevation Data num= 42									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-81.388	118	-81.388	114.727	-79.224	114.75	-78.896	114.754	-78.81	114.755
-78.738	114.755	-78.542	114.758	-78.468	114.758	-76.774	114.777	-76.212	114.783
-75.398	114.792	-75.106	114.795	-74.894	114.798	-74.812	114.798	-74.68	114.8
-72.077	114.849	-72.041	114.85	-70.403	114.883	-69.669	114.897	-69.481	114.901
-69.158	114.908	-68.83	114.915	-68.443	114.923	-68.282	114.927	-67.436	114.945
-67.395	114.946	-66.689	114.961	-66.474	114.966	-65.457	114.989	-65.435	114.99
-64.443	115.012	-64.405	115.013	-63.43	115.037	-29.7	115.05	-16.7	115.1
-12.7	114.91	-11.4	114.5	-7.2	113	-3.8	111.3	3.8	111.3
6.1	112.8	15.5	118.5						

Manning's n Values num= 4							
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-81.388	.02	-63.43	.08	-7.2	.04	6.1	.08

Bank Sta:	Left	Right	Coeff	Contr.	Expan.
	-7.2	6.1		.3	.5
Ineffective Flow num= 2					
Sta L	Sta R	Elev	Permanent		
-81.388	-8.86	114.9	F		
8.69	15.5	117	F		

Upstream Embankment side slope = 20 horiz. to 1.0 vertical
 Downstream Embankment side slope = 12 horiz. to 1.0 vertical
 Maximum allowable submergence for weir flow = .95
 Elevation at which weir flow begins =
 Energy head used in spillway design =
 Spillway height used in design =
 Weir crest shape = Broad Crested

Number of Culverts = 1

Culvert Name	Shape	Rise	Span						
03727	Box	3.7	3.5						
FHWA Chart # 8 - flared wingwalls									
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.									
Solution Criteria = Highest U.S. EG									
Culvert	Upstrm Dist	Length	Top n	Bottom n	Depth Blocked	Entrance Loss Coef	Exit Loss Coef		
	7	31.5	.029	.029	.6	.4			1

Number of Barrels = 2
 Upstream Elevation = 111.15
 Centerline Stations
 Sta. Sta.
 -2.05 2.05
 Downstream Elevation = 110.7
 Centerline Stations
 Sta. Sta.
 -2.05 2.05

CROSS SECTION

RIVER: Beaver Pond Brk
 REACH: Reach-1 RS: 5021

INPUT
 Description: Confluence with the Mad River; D/S of Harpers Ferry Road
 Culvert

No. 03727
 14m downstream of Harpers Ferry Road
 FEMA Station 5204
 Right ineffective area added to model the the I-84 median barrier.

Station Elevation Data num= 74									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-57.2	114.89	-55.87	114.85	-55.33	114.78	-53.06	114.5	-51.19	114.29
-45.95	113.79	-38.43	113.39	-36.19	113.34	-34.36	113.31	-32.4	113.33
-29.34	113.37	-26.15	113.48	-22.98	113.66	-19.95	113.89	-16.82	114.15
-14.98	114.23	-13.22	114.25	-12.65	114.28	-11.8	114.25	-11.16	114.14
-10.75	114.09	-10.29	114	-9.89	113.85	-9.65	113.86	-9.57	114.1
-9.5	114.2	-8.86	114.2	-8.71	113.55	-8.68	113.42	-8.15	113.18
-5.62	112	-4.54	111.3	0	111.3	4.06	111.3	5.58	112

8.14	113.1	8.47	113.23	8.67	113.31	8.69	113.73	8.75	114.17
8.89	114.15	9.39	114.09	9.44	114	9.45	114	9.56	113.78
9.65	113.78	9.91	113.77	10.48	113.8	11.04	113.83	11.37	113.86
11.63	113.88	13.45	113.97	13.6	113.97	13.94	114	15.79	114.19
16.71	114.33	18.51	114.62	20.11	115	22.37	115.21	23.26	115.33
26.34	115.5	29.2	116.17	29.64	116.28	29.99	116.38	31.08	116.71
35.12	118.02	37.15	118.7	39.09	119.39	40.7	120	41.34	120.24
42.02	120.5	43.67	120.83	44.23	121	48.5	121.66		

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 -57.2 .08 -8.86 .04 8.67 .08

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 -8.68 8.67 0 0 0 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 -57.2 -8.86 114.9 F
 8.69 48.5 117 F

SUMMARY OF MANNING'S N VALUES

River: Beaver Pond Brk

n7	Reach n8	River Sta. n9 n10	n1 n11	n2	n3	n4	n5	n6
Reach-1		8722	.02	.04	.02	.06	.04	.09
Reach-1		8640	.04	.02	.04	.08	.04	.09
Reach-1		8583	.09	.06	.04	.06	.09	
Reach-1		8573	.09	.04	.06	.04	.06	
Reach-1		8565.5	Bridge					
Reach-1		8554	.09	.04	.09	.06		
Reach-1		8536	.09	.04	.09	.06		
Reach-1		8464	.09	.04	.09	.06		
Reach-1		8435.5	Culvert					
Reach-1		8412	.08	.04	.08	.04		
Reach-1		8393	.08	.04	.06	.04		
Reach-1		8356	.08	.04	.08	.06	.04	
Reach-1		8332.5	Culvert					
Reach-1		8309	.08	.04	.08	.04		
Reach-1		8289	.08	.04	.08	.04		
Reach-1		8237	.08	.02	.08	.04	.08	
Reach-1		8178	.08	.04	.08			
Reach-1		8128	.06	.08	.04	.02	.08	.04
Reach-1	.02	8080	.06	.02	.08	.04	.06	.08
Reach-1		8027	.08	.04	.06	.08	.02	
Reach-1		7977	.06	.02	.06	.04	.08	.02
Reach-1		7937	.04	.02	.08	.04	.08	.02
Reach-1		7911.5	Bridge					
Reach-1		7885	.04	.02	.04	.08	.04	.08
Reach-1		7826	.02	.08	.04	.08	.02	
Reach-1		7757	.02	.08	.04	.08	.02	
Reach-1		7711	.02	.08	.04	.08	.02	
Reach-1		7698	.02	.08	.04	.08	.02	
Reach-1		7689.5	Bridge					
Reach-1		7681	.02	.08	.04	.08	.04	.02
Reach-1	.08	7666	.04	.02	.08	.04	.08	.02
Reach-1		7589	.08	.04	.02	.08	.04	.08
Reach-1	.02	.08	.02					
Reach-1		7370	.03	.08	.06	.04	.08	.03
Reach-1	.02	.04	.08	.04				
Reach-1		7168	.08	.04	.08	.02	.08	.02
Reach-1		7120	.04	.08	.06	.04	.08	.04
Reach-1	.04	.06	.02					
Reach-1		7073	.08	.04	.08	.02		
Reach-1		6970	.08	.04	.08	.02		
Reach-1		6915	.08	.04	.02			
Reach-1		6890	.08	.04	.08	.02		
Reach-1		6825	.08	.04	.08	.02		

Reach-1	6809	.08	.04	.08	.02		
Reach-1	6756	.08	.04	.08			
Reach-1	6732	.08	.04	.08	.04		
Reach-1	6653	.08	.04	.08	.04		
Reach-1	6593	.08	.04	.08	.04		
Reach-1	6541	.04	.08	.04	.08	.04	
Reach-1	6473	.04	.08	.04	.08	.04	
Reach-1	6445.5						
Reach-1	6417		.04	.08	.04	.08	.04
Reach-1	6409	.08	.04	.08	.04	.02	.02
Reach-1	6394	.08	.04	.08	.04	.02	
Reach-1	6349.5						
Reach-1	6305	.08	.04	.02			
Reach-1	6266	.04	.08	.04	.02		
Reach-1	6216	.04	.08	.04	.02		
Reach-1	6122	.04	.08	.04	.08	.02	
Reach-1	6067	.04	.08	.04	.08	.02	
Reach-1	6033	.08	.04	.02			
Reach-1	5996.5						
Reach-1	5947	.02	.04	.08	.04	.02	.04
Reach-1	5878	.02	.08	.04	.08	.04	.02
Reach-1	5832	.02	.08	.04	.08	.04	.02
Reach-1	.04	.08					
Reach-1	5813						
Reach-1	5812.5		.02	.08	.04	.08	.04
Reach-1	.04	.08					
Reach-1	5804	.02	.08	.04	.08	.04	.02
Reach-1	.04	.08					
Reach-1	5757	.04	.08	.04	.08	.04	.02
Reach-1	.04	.08					
Reach-1	5628	.04	.08	.04	.08	.04	.02
Reach-1	.04	.08					
Reach-1	5524	.02	.08	.04	.08	.04	.02
Reach-1	.04	.06					
Reach-1	5456	.02	.08	.04	.08	.04	.02
Reach-1	.04	.06	.04				
Reach-1	5422	.02	.08	.04	.08	.04	.02
Reach-1	.04	.02	.04				
Reach-1	5355	.02	.04	.02	.04	.02	.04
Reach-1	.02						
Reach-1	5295.5						
Reach-1	5224	.08	.04	.08			
Reach-1	5206	.02	.01	.08	.04	.08	
Reach-1	5145	.04	.02	.04	.08	.04	.06
Reach-1	.04						
Reach-1	5084	.04	.02	.04	.01	.02	.06
Reach-1	.08	.04	.06	.04			
Reach-1	5065	.08	.04	.02	.04	.08	.04
Reach-1	.06	.04					
Reach-1	5042.5						
Reach-1	5021	.08	.04	.08			

SUMMARY OF REACH LENGTHS

River: Beaver Pond Brk

Reach	River Sta.	Left	Channel	Right
Reach-1	8722	78	82.25	94.5
Reach-1	8640	47.3	56.9	60.6
Reach-1	8583	19.7	10.7	10.7
Reach-1	8573	14.9	18.2	17.8
Reach-1	8565.5			
Reach-1	8554	25.4	18.9	5.7
Reach-1	8536	71	71.2	66.2
Reach-1	8464	55.4	51.8	57
Reach-1	8435.5			
Reach-1	8412	19.25	19.5	19.5
Reach-1	8393	41	36.6	29.8
Reach-1	8356	53	47.4	50
Reach-1	8332.5			
Reach-1	8309	11.4	19.7	28.2
Reach-1	8289	53.3	52.4	51.4
Reach-1	8237	60.3	59.1	58.1

Reach-1	8178	50	50.1	50.4
Reach-1	8128	47.7	47.9	48.1
Reach-1	8080	52.7	52.7	52.7
Reach-1	8027	50.1	50.1	50.1
Reach-1	7977	40	40	40
Reach-1	7937	51	51.03	51.93
Reach-1	7911.5	Bridge		
Reach-1	7885	57.6	57.5	54.7
Reach-1	7826	74	74	74
Reach-1	7757	22	46	41
Reach-1	7711	12.3	11.1	15.5
Reach-1	7698	14.5	14.5	14.5
Reach-1	7689.5	Bridge		
Reach-1	7681	13.6	13.6	13.6
Reach-1	7666	80.8	75.6	73.8
Reach-1	7589	247.2	247.2	247.2
Reach-1	7370	210	203.8	200
Reach-1	7168	48.6	47.5	46.6
Reach-1	7120	47	47.4	48.3
Reach-1	7073	101.5	102.8	103.5
Reach-1	6970	54.9	54.9	54.9
Reach-1	6915	25.5	25.5	25.5
Reach-1	6890	64.6	64.6	64.6
Reach-1	6825	16.5	16.5	16.5
Reach-1	6809	53.3	53.3	53.3
Reach-1	6756	22.7	22.7	22.7
Reach-1	6732	78	79.2	79
Reach-1	6653	58	60.2	62.5
Reach-1	6593	52	52.3	53
Reach-1	6541	71.3	68.2	64.9
Reach-1	6473	54.6	55.3	55.6
Reach-1	6445.5	Culvert		
Reach-1	6417	6.4	8.6	11.1
Reach-1	6409	14.2	14.2	14.2
Reach-1	6394	89.7	89.7	89.7
Reach-1	6349.5	Culvert		
Reach-1	6305	37	38.7	40
Reach-1	6266	50.3	50.3	50.3
Reach-1	6216	94	94	94
Reach-1	6122	55.2	55.2	55.2
Reach-1	6067	35.8	34.3	32.8
Reach-1	6033	85.2	85.2	85.2
Reach-1	5996.5	Culvert		
Reach-1	5947	69	69	69
Reach-1	5878	46	46	46
Reach-1	5832	18.5	19.6	20.5
Reach-1	5813	Inl Struct		
Reach-1	5812.5	9.5	8.5	7.6
Reach-1	5804	47	47.2	48
Reach-1	5757	126.7	128.6	129.3
Reach-1	5628	103.6	104.6	107.1
Reach-1	5524	67	68.1	71
Reach-1	5456	34.3	34.3	34.3
Reach-1	5422	67	66.5	65.5
Reach-1	5355	131	131	131
Reach-1	5295.5	Culvert		
Reach-1	5224	23.3	18.3	16.7
Reach-1	5206	59	60.5	60.5
Reach-1	5145	60.6	60.6	60.6
Reach-1	5084	19.3	20	20.8
Reach-1	5065	43.9	43.2	42.4
Reach-1	5042.5	Culvert		
Reach-1	5021	0	0	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Beaver Pond Brk

Reach	River Sta.	Contr.	Expan.
Reach-1	8722	.3	.5
Reach-1	8640	.1	.3
Reach-1	8583	.3	.5
Reach-1	8573	.3	.5

Reach-1	8565.5	Bridge		
Reach-1	8554		.3	.5
Reach-1	8536		.1	.3
Reach-1	8464		.3	.5
Reach-1	8435.5	Culvert		
Reach-1	8412		.3	.5
Reach-1	8393		.1	.3
Reach-1	8356		.3	.5
Reach-1	8332.5	Culvert		
Reach-1	8309		.3	.5
Reach-1	8289		.1	.3
Reach-1	8237		.1	.3
Reach-1	8178		.1	.3
Reach-1	8128		.1	.3
Reach-1	8080		.1	.3
Reach-1	8027		.1	.3
Reach-1	7977		.1	.3
Reach-1	7937		.3	.5
Reach-1	7911.5	Bridge		
Reach-1	7885		.3	.5
Reach-1	7826		.1	.3
Reach-1	7757		.1	.3
Reach-1	7711		.3	.5
Reach-1	7698		.3	.5
Reach-1	7689.5	Bridge		
Reach-1	7681		.3	.5
Reach-1	7666		.3	.5
Reach-1	7589		.1	.3
Reach-1	7370		.1	.3
Reach-1	7168		.1	.3
Reach-1	7120		.1	.3
Reach-1	7073		.1	.3
Reach-1	6970		.1	.3
Reach-1	6915		.1	.3
Reach-1	6890		.3	.5
Reach-1	6825		.3	.5
Reach-1	6809		.3	.5
Reach-1	6756		.1	.3
Reach-1	6732		.1	.3
Reach-1	6653		.1	.3
Reach-1	6593		.1	.3
Reach-1	6541		.1	.3
Reach-1	6473		.3	.5
Reach-1	6445.5	Culvert		
Reach-1	6417		.3	.5
Reach-1	6409		.3	.5
Reach-1	6394		.3	.5
Reach-1	6349.5	Culvert		
Reach-1	6305		.3	.5
Reach-1	6266		.1	.3
Reach-1	6216		.1	.3
Reach-1	6122		.1	.3
Reach-1	6067		.1	.3
Reach-1	6033		.3	.5
Reach-1	5996.5	Culvert		
Reach-1	5947		.3	.5
Reach-1	5878		.1	.3
Reach-1	5832		.3	.5
Reach-1	5813	Inl Struct		
Reach-1	5812.5		.3	.5
Reach-1	5804		.3	.5
Reach-1	5757		.1	.3
Reach-1	5628		.1	.3
Reach-1	5524		.1	.3
Reach-1	5456		.1	.3
Reach-1	5422		.1	.3
Reach-1	5355		.3	.5
Reach-1	5295.5	Culvert		
Reach-1	5224		.3	.5
Reach-1	5206		.3	.5
Reach-1	5145		.1	.3
Reach-1	5084		.3	.5
Reach-1	5065		.3	.5
Reach-1	5042.5	Culvert		
Reach-1	5021		.3	.5

BEAVER POND BROOK - PROPOSED CONDITION, DESIGN DISCHARGE (W/ BACKWATER)
HEC-RAS 4.1.0 - "Standard Table 1" Output

HEC-RAS Plan: PR_DOT River: Beaver Pond Brk Reach: Reach-1													
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude #	Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)		
Reach-1	8722	Fish Low Pa	0.01	148.65	148.8	148.72	148.81	0.001089	0.14	0.07	0.9		0.17
Reach-1	8722	Fish High Pa	0.51	148.65	149.21	149.01	149.22	0.003081	0.56	0.9	3.29		0.34
Reach-1	8722	2 Year	3.8	148.65	149.45	149.45	149.63	0.025202	1.86	2.04	5.91		1.01
Reach-1	8722	3 Year	4.3	148.65	149.48	149.48	149.67	0.025249	1.92	2.24	6.23		1.02
Reach-1	8722	5 Year	4.9	148.65	149.52	149.52	149.72	0.024973	1.96	2.5	6.6		1.02
Reach-1	8722	10 Year	5.81	148.65	149.58	149.58	149.78	0.024754	2.03	2.86	7.1		1.02
Reach-1	8722	25 Year	7.93	148.65	149.7	149.68	149.92	0.022409	2.09	3.79	8.24		0.99
Reach-1	8722	50 Year	9.63	148.65	149.79	149.76	150.01	0.019993	2.09	4.6	9.12		0.94
Reach-1	8722	100 Year	11.61	148.65	149.83	149.84	150.11	0.023159	2.31	5.02	9.54		1.02
Reach-1	8722	500 Year	17.41	148.65	150.02	150.02	150.34	0.019401	2.52	7.07	12.6		0.97
Reach-1	8640	Fish Low Pa	0.01	148.65	148.74		148.74	0.000649	0.08	0.13	2.88		0.12
Reach-1	8640	Fish High Pa	0.51	148.65	148.97		148.98	0.002571	0.39	1.32	7.75		0.3
Reach-1	8640	2 Year	3.8	148.65	149.4	149.09	149.41	0.000547	0.26	14.7	49.88		0.15
Reach-1	8640	3 Year	4.3	148.65	149.47	149.17	149.47	0.000364	0.24	18.04	50.84		0.13
Reach-1	8640	5 Year	4.9	148.65	149.52	149.19	149.53	0.000299	0.24	20.8	51.63		0.12
Reach-1	8640	10 Year	5.81	148.65	149.6	149.2	149.6	0.000232	0.23	24.97	53.04		0.11
Reach-1	8640	25 Year	7.93	148.65	149.75		149.75	0.000177	0.24	32.92	54.91		0.1
Reach-1	8640	50 Year	9.63	148.65	149.86		149.86	0.000154	0.25	38.82	55.91		0.09
Reach-1	8640	100 Year	11.61	148.65	149.82	149.27	149.83	0.00026	0.31	37.02	55.6		0.12
Reach-1	8640	500 Year	17.41	148.65	150	149.34	150	0.000277	0.38	46.88	57.28		0.13
Reach-1	8583	Fish Low Pa	0.01	148.61	148.67	148.64	148.67	0.002328	0.11	0.09	3.11		0.21
Reach-1	8583	Fish High Pa	0.51	148.61	148.89		148.9	0.00089	0.21	2.48	17.05		0.17
Reach-1	8583	2 Year	3.8	148.61	149.39		149.39	0.000151	0.2	21.93	53.57		0.09
Reach-1	8583	3 Year	4.3	148.61	149.46		149.46	0.000121	0.19	25.77	56.74		0.08
Reach-1	8583	5 Year	4.9	148.61	149.51		149.52	0.000112	0.2	28.97	59.24		0.08
Reach-1	8583	10 Year	5.81	148.61	149.59		149.6	0.000101	0.2	33.81	61.21		0.08
Reach-1	8583	25 Year	7.93	148.61	149.74		149.74	0.000094	0.22	43.42	67.29		0.08
Reach-1	8583	50 Year	9.63	148.61	149.85		149.85	0.00009	0.23	50.72	69.2		0.08
Reach-1	8583	100 Year	11.61	148.61	149.81		149.82	0.000151	0.29	48.22	68.51		0.1
Reach-1	8583	500 Year	17.41	148.61	149.99		149.99	0.000182	0.36	60.71	75.12		0.11
Reach-1	8573	Fish Low Pa	0.01	148.53	148.59	148.58	148.6	0.039068	0.46	0.02	0.78		0.86
Reach-1	8573	Fish High Pa	0.51	148.53	148.78	148.78	148.85	0.03291	1.14	0.45	3.51		1.02
Reach-1	8573	2 Year	3.8	148.53	149.26	149.12	149.36	0.008903	1.38	2.75	13.71		0.64
Reach-1	8573	3 Year	4.3	148.53	149.34	149.15	149.43	0.007276	1.34	3.21	15.57		0.59
Reach-1	8573	5 Year	4.9	148.53	149.38	149.19	149.48	0.007658	1.41	3.47	16.58		0.6
Reach-1	8573	10 Year	5.81	148.53	149.45	149.25	149.56	0.007952	1.49	3.89	19.18		0.62
Reach-1	8573	25 Year	7.93	148.53	149.54	149.37	149.69	0.010113	1.76	4.49	25.23		0.7
Reach-1	8573	50 Year	9.63	148.53	149.59	149.46	149.79	0.01193	1.97	4.9	29.54		0.76
Reach-1	8573	100 Year	11.61	148.53	149.68	149.55	149.78	0.006445	1.52	8.34	33.51		0.56
Reach-1	8573	500 Year	17.41	148.53	149.65	149.65	149.91	0.017059	2.42	7.84	33.37		0.91
Reach-1	8565.5	Bridge											
Reach-1	8554	Fish Low Pa	0.01	147.45	147.49	147.49	147.51	0.059291	0.48	0.02	0.96		1.02
Reach-1	8554	Fish High Pa	0.51	147.45	147.66	147.66	147.72	0.035648	1.1	0.46	4.11		1.04
Reach-1	8554	2 Year	3.8	147.45	148.03	147.98	148.18	0.016112	1.71	2.22	5.3		0.84
Reach-1	8554	3 Year	4.3	147.45	148.09	148.02	148.24	0.014726	1.69	2.54	5.77		0.81
Reach-1	8554	5 Year	4.9	147.45	148.15	148.06	148.3	0.013565	1.68	2.91	6.28		0.79
Reach-1	8554	10 Year	5.81	147.45	148.24	148.13	148.38	0.012125	1.67	3.48	6.98		0.76
Reach-1	8554	25 Year	7.93	147.45	148.36	148.25	148.53	0.012213	1.8	4.41	8		0.77
Reach-1	8554	50 Year	9.63	147.45	148.46	148.34	148.63	0.011615	1.84	5.22	8.78		0.76
Reach-1	8554	100 Year	11.61	147.45	148.58	148.42	148.75	0.009986	1.82	6.37	16.14		0.72
Reach-1	8554	500 Year	17.41	147.45	149.06	148.63	149.15	0.002856	1.34	17.56	26.01		0.42
Reach-1	8536	Fish Low Pa	0.01	146.85	146.95	146.92	146.96	0.002717	0.18	0.06	1.08		0.25
Reach-1	8536	Fish High Pa	0.51	146.85	147.29	147.14	147.31	0.003892	0.65	0.79	2.71		0.38
Reach-1	8536	2 Year	3.8	146.85	147.92		147.99	0.004979	1.17	3.25	5.47		0.48
Reach-1	8536	3 Year	4.3	146.85	147.98		148.05	0.004965	1.2	3.59	5.8		0.49
Reach-1	8536	5 Year	4.9	146.85	148.04		148.12	0.00503	1.24	3.96	6.15		0.49
Reach-1	8536	10 Year	5.81	146.85	148.13		148.21	0.00504	1.29	4.51	6.65		0.5
Reach-1	8536	25 Year	7.93	146.85	148.22		148.34	0.006511	1.53	5.18	8.18		0.57
Reach-1	8536	50 Year	9.63	146.85	148.32		148.46	0.006217	1.61	6.16	10.08		0.57
Reach-1	8536	100 Year	11.61	146.85	148.48		148.6	0.004897	1.58	7.98	13.76		0.52
Reach-1	8536	500 Year	17.41	146.85	149.02		149.1	0.001811	1.3	16.85	19.18		0.34
Reach-1	8464	Fish Low Pa	0.01	146.37	146.42	146.42	146.43	0.05582	0.5	0.02	0.82		1.01
Reach-1	8464	Fish High Pa	0.51	146.37	146.62	146.62	146.7	0.032509	1.29	0.4	2.45		1.03
Reach-1	8464	2 Year	3.8	146.37	147.07	147.07	147.31	0.023191	2.17	1.75	3.61		1

HEC-RAS Plan: PR_DOT River: Beaver Pond Brk Reach: Reach-1												
Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
Reach-1	8464	3 Year	4.3	146.37	147.11	147.11	147.37	0.023371	2.25	1.91	3.75	1.01
Reach-1	8464	5 Year	4.9	146.37	147.17	147.17	147.44	0.022385	2.29	2.14	3.96	0.99
Reach-1	8464	10 Year	5.81	146.37	147.24	147.24	147.53	0.022192	2.38	2.44	4.22	1
Reach-1	8464	25 Year	7.93	146.37	147.65	147.4	147.81	0.008413	1.77	4.48	5.86	0.65
Reach-1	8464	50 Year	9.63	146.37	147.92	147.5	148.04	0.005358	1.55	6.22	7.11	0.53
Reach-1	8464	100 Year	11.61	146.37	148.2	147.61	148.29	0.003645	1.39	8.37	8.48	0.45
Reach-1	8464	500 Year	17.41	146.37	148.93	147.89	148.99	0.001189	1.1	18.57	24.28	0.28
Reach-1	8435.5		Culvert									
Reach-1	8412	Fish Low Pa	0.01	145.8	145.82	145.84	147.27	69.91727	5.33	0	0.46	26.56
Reach-1	8412	Fish High Pa	0.51	145.8	145.93	145.99	146.12	0.158294	1.91	0.27	3.15	2.09
Reach-1	8412	2 Year	3.8	145.8	146.3	146.3	146.48	0.023747	1.91	1.99	5.43	1.01
Reach-1	8412	3 Year	4.3	145.8	146.33	146.33	146.53	0.022523	1.96	2.19	5.5	0.99
Reach-1	8412	5 Year	4.9	145.8	146.36	146.36	146.58	0.023044	2.07	2.37	5.56	1.01
Reach-1	8412	10 Year	5.81	145.8	146.42	146.42	146.66	0.022181	2.17	2.68	5.66	1
Reach-1	8412	25 Year	7.93	145.8	146.53	146.53	146.82	0.021582	2.38	3.33	5.87	1.01
Reach-1	8412	50 Year	9.63	145.8	146.62	146.62	146.94	0.020576	2.5	3.85	6.03	1
Reach-1	8412	100 Year	11.61	145.8	146.71	146.71	147.06	0.020241	2.64	4.4	6.2	1
Reach-1	8412	500 Year	17.41	145.8	146.95	146.95	147.39	0.019166	2.94	5.91	6.63	0.99
Reach-1	8393	Fish Low Pa	0.01	144.34	144.38	144.37	144.39	0.019335	0.28	0.04	1.5	0.59
Reach-1	8393	Fish High Pa	0.51	144.34	144.51	144.53	144.57	0.044579	1.08	0.47	5.11	1.13
Reach-1	8393	2 Year	3.8	144.34	144.62	144.8	145.3	0.19709	3.67	1.04	5.34	2.66
Reach-1	8393	3 Year	4.3	144.34	144.64	144.83	145.38	0.195753	3.83	1.12	5.38	2.68
Reach-1	8393	5 Year	4.9	144.34	144.66	144.87	145.44	0.177643	3.9	1.26	5.43	2.59
Reach-1	8393	10 Year	5.81	144.34	144.69	144.92	145.54	0.167742	4.07	1.43	5.5	2.55
Reach-1	8393	25 Year	7.93	144.34	144.76	145.03	145.73	0.146157	4.36	1.82	5.65	2.45
Reach-1	8393	50 Year	9.63	144.34	144.81	145.11	145.88	0.136173	4.57	2.11	5.76	2.41
Reach-1	8393	100 Year	11.61	144.34	144.87	145.2	146.02	0.125283	4.74	2.45	5.88	2.35
Reach-1	8393	500 Year	17.41	144.34	145.02	145.42	146.38	0.106941	5.16	3.37	6.23	2.24
Reach-1	8356	Fish Low Pa	0.01	143.13	143.18	143.18	143.19	0.065924	0.53	0.02	0.79	1.09
Reach-1	8356	Fish High Pa	0.51	143.13	143.36	143.36	143.42	0.033466	1.11	0.46	3.8	1.02
Reach-1	8356	2 Year	3.8	143.13	143.85	143.66	143.91	0.005308	1.07	3.55	7.64	0.5
Reach-1	8356	3 Year	4.3	143.13	143.91	143.69	143.97	0.004535	1.06	4.07	7.89	0.47
Reach-1	8356	5 Year	4.9	143.13	143.99	143.72	144.05	0.003896	1.05	4.68	8.19	0.44
Reach-1	8356	10 Year	5.81	143.13	144.1	143.77	144.15	0.003248	1.04	5.59	8.61	0.41
Reach-1	8356	25 Year	7.93	143.13	144.33	143.86	144.38	0.002434	1.03	7.68	9.54	0.37
Reach-1	8356	50 Year	9.63	143.13	144.5	143.93	144.55	0.002032	1.03	9.38	10.24	0.34
Reach-1	8356	100 Year	11.61	143.13	144.69	144.01	144.74	0.00168	1.02	11.34	11.2	0.32
Reach-1	8356	500 Year	17.41	143.13	145.18	144.2	145.24	0.001114	1.03	17.03	15.93	0.27
Reach-1	8332.5		Culvert									
Reach-1	8309	Fish Low Pa	0.01	142.34	142.42	142.38	142.42	0.00141	0.12	0.09	1.94	0.18
Reach-1	8309	Fish High Pa	0.51	142.34	142.54	142.54	142.6	0.033995	1.05	0.49	4.49	1.01
Reach-1	8309	2 Year	3.8	142.34	143.1	142.84	143.14	0.002878	0.88	4.32	9.75	0.38
Reach-1	8309	3 Year	4.3	142.34	143.15	142.85	143.19	0.002851	0.92	4.68	10.06	0.38
Reach-1	8309	5 Year	4.9	142.34	143.2	142.89	143.24	0.002843	0.96	5.08	10.41	0.39
Reach-1	8309	10 Year	5.81	142.34	143.27	142.93	143.32	0.002848	1.03	5.65	10.9	0.39
Reach-1	8309	25 Year	7.93	142.34	143.41	143.02	143.48	0.002888	1.16	6.85	11.92	0.4
Reach-1	8309	50 Year	9.63	142.34	143.52	143.08	143.6	0.002938	1.25	7.71	12.6	0.41
Reach-1	8309	100 Year	11.61	142.34	143.63	143.16	143.72	0.00302	1.35	8.61	13.12	0.43
Reach-1	8309	500 Year	17.41	142.34	143.89	143.35	144.02	0.003172	1.61	11.01	15.66	0.45
Reach-1	8289	Fish Low Pa	0.01	142.29	142.35		142.35	0.01223	0.25	0.04	1.46	0.48
Reach-1	8289	Fish High Pa	0.51	142.29	142.57	142.5	142.59	0.006239	0.62	0.83	4.71	0.47
Reach-1	8289	2 Year	3.8	142.29	142.97		143.05	0.006563	1.2	3.16	6.67	0.56
Reach-1	8289	3 Year	4.3	142.29	143.02		143.1	0.006392	1.24	3.46	6.81	0.56
Reach-1	8289	5 Year	4.9	142.29	143.07		143.15	0.00638	1.29	3.79	7	0.56
Reach-1	8289	10 Year	5.81	142.29	143.13		143.23	0.006377	1.36	4.27	7.28	0.57
Reach-1	8289	25 Year	7.93	142.29	143.28		143.39	0.00632	1.48	5.37	8	0.58
Reach-1	8289	50 Year	9.63	142.29	143.38		143.5	0.006172	1.54	6.23	8.52	0.58
Reach-1	8289	100 Year	11.61	142.29	143.49		143.63	0.005976	1.61	7.2	9.02	0.57
Reach-1	8289	500 Year	17.41	142.29	143.77		143.93	0.005385	1.78	9.85	10.24	0.57
Reach-1	8237	Fish Low Pa	0.01	141.94	141.96	141.96	141.96	0.005051	0.13	0.07	3.6	0.3
Reach-1	8237	Fish High Pa	0.51	141.94	142.11		142.14	0.011496	0.77	0.66	4.15	0.62
Reach-1	8237	2 Year	3.8	141.94	142.57		142.66	0.008689	1.27	3	6.02	0.57
Reach-1	8237	3 Year	4.3	141.94	142.62		142.71	0.008686	1.31	3.31	6.26	0.56
Reach-1	8237	5 Year	4.9	141.94	142.67		142.77	0.008503	1.36	3.62	6.47	0.56
Reach-1	8237	10 Year	5.81	141.94	142.74		142.85	0.008351	1.45	4.06	6.74	0.57
Reach-1	8237	25 Year	7.93	141.94	142.88		143.01	0.008259	1.63	5.01	7.29	0.58

HEC-RAS Plan: PR_DOT River: Beaver Pond Brk Reach: Reach-1												
Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
Reach-1	8237	50 Year	9.63	141.94	142.97		143.13	0.008322	1.77	5.71	7.67	0.6
Reach-1	8237	100 Year	11.61	141.94	143.07		143.25	0.008298	1.9	6.52	8.09	0.61
Reach-1	8237	500 Year	17.41	141.94	143.37		143.59	0.007456	2.14	9.1	9.35	0.6
Reach-1	8178	Fish Low Pa	0.01	141.44	141.49	141.48	141.49	0.013894	0.25	0.04	1.59	0.51
Reach-1	8178	Fish High Pa	0.51	141.44	141.74	141.63	141.75	0.004304	0.57	0.9	4.27	0.4
Reach-1	8178	2 Year	3.8	141.44	142.22	141.96	142.28	0.004743	1.08	3.52	6.77	0.48
Reach-1	8178	3 Year	4.3	141.44	142.27	142	142.33	0.004792	1.12	3.84	7.05	0.49
Reach-1	8178	5 Year	4.9	141.44	142.32	142.04	142.39	0.004841	1.16	4.21	7.36	0.49
Reach-1	8178	10 Year	5.81	141.44	142.39	142.1	142.47	0.004893	1.22	4.75	7.79	0.5
Reach-1	8178	25 Year	7.93	141.44	142.54	142.22	142.63	0.004907	1.33	5.97	8.62	0.51
Reach-1	8178	50 Year	9.63	141.44	142.64	142.3	142.74	0.004854	1.4	6.88	9.11	0.51
Reach-1	8178	100 Year	11.61	141.44	142.75	142.39	142.86	0.004883	1.46	7.93	9.61	0.51
Reach-1	8178	500 Year	17.41	141.44	143.07	142.6	143.19	0.005354	1.55	11.21	11.38	0.49
Reach-1	8128	Fish Low Pa	0.01	140.93	141.02	140.99	141.03	0.006775	0.26	0.04	0.83	0.39
Reach-1	8128	Fish High Pa	0.51	140.93	141.24	141.24	141.31	0.025229	1.16	0.44	2.72	0.92
Reach-1	8128	2 Year	3.8	140.93	141.67	141.65	141.85	0.018446	1.87	2.03	4.7	0.91
Reach-1	8128	3 Year	4.3	140.93	141.72	141.68	141.9	0.017619	1.91	2.26	4.9	0.9
Reach-1	8128	5 Year	4.9	140.93	141.77	141.73	141.96	0.016776	1.94	2.52	5.13	0.88
Reach-1	8128	10 Year	5.81	140.93	141.85	141.79	142.05	0.015761	1.99	2.92	5.45	0.87
Reach-1	8128	25 Year	7.93	140.93	141.99	141.92	142.22	0.014599	2.14	3.73	6.17	0.86
Reach-1	8128	50 Year	9.63	140.93	142.08	142.01	142.34	0.01411	2.25	4.34	6.69	0.86
Reach-1	8128	100 Year	11.61	140.93	142.18	142.1	142.46	0.013348	2.36	5.02	7.23	0.85
Reach-1	8128	500 Year	17.41	140.93	142.42	142.34	142.78	0.012245	2.7	6.89	8.62	0.85
Reach-1	8080	Fish Low Pa	0.01	140.45	140.49		140.5	0.021875	0.28	0.04	1.73	0.62
Reach-1	8080	Fish High Pa	0.51	140.45	140.74		140.76	0.006313	0.71	0.71	3.16	0.48
Reach-1	8080	2 Year	3.8	140.45	141.32		141.39	0.005275	1.21	3.13	5.24	0.5
Reach-1	8080	3 Year	4.3	140.45	141.37		141.45	0.005256	1.25	3.43	5.45	0.5
Reach-1	8080	5 Year	4.9	140.45	141.44		141.52	0.005257	1.3	3.78	5.69	0.51
Reach-1	8080	10 Year	5.81	140.45	141.51		141.61	0.005369	1.37	4.24	5.98	0.52
Reach-1	8080	25 Year	7.93	140.45	141.65		141.78	0.005583	1.56	5.12	6.69	0.54
Reach-1	8080	50 Year	9.63	140.45	141.75		141.9	0.005676	1.69	5.81	7.31	0.56
Reach-1	8080	100 Year	11.61	140.45	141.83		142.01	0.006293	1.88	6.4	7.81	0.59
Reach-1	8080	500 Year	17.41	140.45	142.11		142.34	0.006036	2.16	8.84	9.66	0.61
Reach-1	8027	Fish Low Pa	0.01	139.92	140.04	139.99	140.04	0.004676	0.25	0.04	0.7	0.33
Reach-1	8027	Fish High Pa	0.51	139.92	140.39	140.28	140.42	0.006874	0.76	0.67	2.86	0.5
Reach-1	8027	2 Year	3.8	139.92	140.76	140.71	140.93	0.016522	1.83	2.07	4.49	0.86
Reach-1	8027	3 Year	4.3	139.92	140.8	140.75	140.98	0.016707	1.91	2.25	4.62	0.87
Reach-1	8027	5 Year	4.9	139.92	140.83	140.79	141.04	0.018371	2.05	2.39	4.72	0.92
Reach-1	8027	10 Year	5.81	139.92	140.9	140.86	141.13	0.01743	2.11	2.75	4.98	0.91
Reach-1	8027	25 Year	7.93	139.92	141.06	141	141.31	0.015248	2.22	3.57	5.51	0.87
Reach-1	8027	50 Year	9.63	139.92	141.17	141.08	141.44	0.01391	2.31	4.2	5.88	0.85
Reach-1	8027	100 Year	11.61	139.92	141.4	141.18	141.63	0.008256	2.12	5.68	6.97	0.68
Reach-1	8027	500 Year	17.41	139.92	141.82	141.43	142.04	0.005259	2.14	9.03	8.99	0.58
Reach-1	7977	Fish Low Pa	0.01	139.41	139.47	139.47	139.49	0.051235	0.54	0.02	0.61	0.99
Reach-1	7977	Fish High Pa	0.51	139.41	139.7	139.7	139.77	0.031071	1.2	0.43	2.94	1.01
Reach-1	7977	2 Year	3.8	139.41	140.25	140.07	140.34	0.008276	1.3	2.92	5.72	0.58
Reach-1	7977	3 Year	4.3	139.41	140.33	140.11	140.41	0.007585	1.29	3.34	6	0.55
Reach-1	7977	5 Year	4.9	139.41	140.46	140.15	140.53	0.005728	1.18	4.14	6.5	0.47
Reach-1	7977	10 Year	5.81	139.41	140.55	140.21	140.62	0.005677	1.22	4.77	6.86	0.47
Reach-1	7977	25 Year	7.93	139.41	140.69	140.33	140.78	0.006631	1.38	5.75	7.39	0.5
Reach-1	7977	50 Year	9.63	139.41	141.04	140.42	141.11	0.002884	1.14	8.59	8.71	0.35
Reach-1	7977	100 Year	11.61	139.41	141.35	140.51	141.41	0.001791	1.06	11.49	9.86	0.28
Reach-1	7977	500 Year	17.41	139.41	141.8	140.75	141.87	0.001531	1.17	16.27	11.51	0.27
Reach-1	7937	Fish Low Pa	0.01	139.01	139.11	139.05	139.11	0.00023	0.06	0.17	2.79	0.08
Reach-1	7937	Fish High Pa	0.51	139.01	139.42	139.2	139.42	0.001163	0.36	1.43	5.19	0.22
Reach-1	7937	2 Year	5.6	139.01	140.17	139.64	140.21	0.001723	0.88	6.36	7.49	0.31
Reach-1	7937	3 Year	6.3	139.01	140.24	139.67	140.29	0.001732	0.91	6.89	7.67	0.31
Reach-1	7937	5 Year	7.3	139.01	140.38	139.72	140.42	0.001636	0.92	7.93	8	0.3
Reach-1	7937	10 Year	8.64	139.01	140.46	139.79	140.51	0.001886	1.01	8.57	8.2	0.31
Reach-1	7937	25 Year	11.6	139.01	140.55	139.92	140.63	0.002742	1.24	9.35	8.43	0.38
Reach-1	7937	50 Year	14.58	139.01	140.96	140.04	141.02	0.001693	1.13	13.01	9.48	0.3
Reach-1	7937	100 Year	17.7	139.01	141.29	140.15	141.35	0.001258	1.11	16.26	10.28	0.27
Reach-1	7937	500 Year	26.62	139.01	141.72	140.43	141.81	0.001355	1.33	21.17	33.11	0.29
Reach-1	7911.5		Bridge									
Reach-1	7885	Fish Low Pa	0.01	138.94	139.01	138.98	139.01	0.002152	0.13	0.08	2.22	0.21
Reach-1	7885	Fish High Pa	0.51	138.94	139.22	139.14	139.23	0.006288	0.61	0.84	4.92	0.47

HEC-RAS Plan: PR_DOT River: Beaver Pond Brk Reach: Reach-1												
Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
Reach-1	7885	2 Year	5.6	138.94	139.88	139.53	139.92	0.002836	0.95	5.89	9.33	0.38
Reach-1	7885	3 Year	6.3	138.94	139.94	139.56	139.99	0.002724	0.97	6.47	9.59	0.38
Reach-1	7885	5 Year	7.3	138.94	140.07	139.61	140.12	0.002136	0.94	7.8	10.15	0.34
Reach-1	7885	10 Year	8.64	138.94	140.15	139.66	140.2	0.002227	1	8.64	10.49	0.35
Reach-1	7885	25 Year	11.6	138.94	140.37	139.77	140.42	0.001959	1.05	11.27	13.87	0.34
Reach-1	7885	50 Year	14.58	138.94	140.62	139.87	140.67	0.001428	1.04	14.85	15.11	0.3
Reach-1	7885	100 Year	17.7	138.94	140.75	139.97	140.81	0.001475	1.14	16.89	15.77	0.31
Reach-1	7885	500 Year	26.62	138.94	140.96	140.2	141.06	0.002004	1.46	20.35	16.83	0.37
Reach-1	7826	Fish Low Pa	0.01	138.6	138.65	138.65	138.66	0.062077	0.5	0.02	0.88	1.05
Reach-1	7826	Fish High Pa	0.51	138.6	138.95	138.82	138.96	0.003675	0.55	0.93	4.14	0.37
Reach-1	7826	2 Year	5.6	138.6	139.66	139.29	139.72	0.004216	1.06	5.26	7.96	0.42
Reach-1	7826	3 Year	6.3	138.6	139.72	139.34	139.79	0.0044	1.09	5.76	8.28	0.42
Reach-1	7826	5 Year	7.3	138.6	139.91	139.39	139.96	0.0036	0.99	7.36	11.95	0.35
Reach-1	7826	10 Year	8.64	138.6	139.97	139.46	140.03	0.004323	1.09	7.92	13.06	0.38
Reach-1	7826	25 Year	11.6	138.6	140.2	139.59	140.26	0.004128	1.13	10.28	16.6	0.36
Reach-1	7826	50 Year	14.58	138.6	140.52	139.71	140.56	0.002183	0.96	17.92	21.06	0.27
Reach-1	7826	100 Year	17.7	138.6	140.65	139.82	140.7	0.00219	1.03	20.76	21.91	0.28
Reach-1	7826	500 Year	26.62	138.6	140.83	140.08	140.91	0.003098	1.32	24.76	22.92	0.34
Reach-1	7757	Fish Low Pa	0.01	138.24	138.4	138.3	138.4	0.000569	0.11	0.09	1.21	0.12
Reach-1	7757	Fish High Pa	0.51	138.24	138.78	138.56	138.79	0.001672	0.39	1.29	10.71	0.25
Reach-1	7757	2 Year	5.6	138.24	139.66	139.03	139.66	0.000196	0.24	33.37	54.71	0.08
Reach-1	7757	3 Year	6.3	138.24	139.73	139.07	139.73	0.000189	0.24	36.29	55.05	0.08
Reach-1	7757	5 Year	7.3	138.24	139.91	139.11	139.92	0.000128	0.23	44.88	56.06	0.07
Reach-1	7757	10 Year	8.64	138.24	139.98	139.17	139.98	0.000147	0.25	47.76	56.4	0.08
Reach-1	7757	25 Year	11.6	138.24	140.21	139.24	140.22	0.000136	0.28	58.71	58.09	0.07
Reach-1	7757	50 Year	14.58	138.24	140.53	139.24	140.53	0.000104	0.28	73.47	60.46	0.07
Reach-1	7757	100 Year	17.7	138.24	140.66	139.24	140.66	0.000118	0.31	79.78	63.75	0.07
Reach-1	7757	500 Year	26.62	138.24	140.86	139.29	140.86	0.00014	0.36	110.9	70.43	0.08
Reach-1	7711	Fish Low Pa	0.01	138.24	138.3	138.3	138.32	0.039882	0.49	0.02	0.65	0.88
Reach-1	7711	Fish High Pa	0.51	138.24	138.65	138.53	138.66	0.004727	0.53	0.97	5.6	0.4
Reach-1	7711	2 Year	5.6	138.24	139.66	138.92	139.66	0.000155	0.23	28.44	65.96	0.08
Reach-1	7711	3 Year	6.3	138.24	139.72	138.94	139.72	0.000154	0.24	30.96	66.88	0.08
Reach-1	7711	5 Year	7.3	138.24	139.91	138.96	139.91	0.00011	0.23	38.61	69.91	0.07
Reach-1	7711	10 Year	8.64	138.24	139.97	138.99	139.97	0.000129	0.25	41.18	70.9	0.07
Reach-1	7711	25 Year	11.6	138.24	140.21	139.05	140.21	0.000122	0.27	51.16	72.98	0.07
Reach-1	7711	50 Year	14.58	138.24	140.52	139.1	140.53	0.000095	0.27	64.52	77.85	0.07
Reach-1	7711	100 Year	17.7	138.24	140.66	139.15	140.66	0.000107	0.3	70.13	81.4	0.07
Reach-1	7711	500 Year	26.62	138.24	140.85	139.27	140.86	0.000078	0.27	136.2	89.48	0.06
Reach-1	7698	Fish Low Pa	0.01	138.2	138.27	138.23	138.27	0.00058	0.07	0.15	4.05	0.11
Reach-1	7698	Fish High Pa	0.51	138.2	138.64	138.35	138.65	0.000448	0.23	2.25	6.07	0.12
Reach-1	7698	2 Year	7.88	138.2	139.6	138.83	139.64	0.002613	0.89	8.85	7.71	0.27
Reach-1	7698	3 Year	8.8	138.2	139.66	138.87	139.7	0.002871	0.95	9.3	7.81	0.28
Reach-1	7698	5 Year	10.2	138.2	139.85	138.94	139.89	0.002613	0.94	10.82	8.14	0.26
Reach-1	7698	10 Year	12.18	138.2	139.89	139.02	139.95	0.003407	1.09	11.16	8.23	0.3
Reach-1	7698	25 Year	16.2	138.2	140.1	139.17	140.18	0.003779	1.26	12.9	26.61	0.32
Reach-1	7698	50 Year	20.25	138.2	140.41	139.31	140.5	0.003258	1.31	15.41	77.78	0.31
Reach-1	7698	100 Year	24.64	138.2	140.51	139.45	140.62	0.004026	1.48	19.44	90.79	0.34
Reach-1	7698	500 Year	37.24	138.2	140.55	139.8	140.81	0.008325	2.16	21.15	92.26	0.49
Reach-1	7689.5		Bridge									
Reach-1	7681	Fish Low Pa	0.01	138.15	138.21	138.18	138.21	0.001538	0.1	0.1	3.37	0.18
Reach-1	7681	Fish High Pa	0.51	138.15	138.59	138.3	138.59	0.000479	0.23	2.25	6.26	0.12
Reach-1	7681	2 Year	7.88	138.15	139.51	138.78	139.55	0.002004	0.92	8.57	8.42	0.27
Reach-1	7681	3 Year	8.8	138.15	139.56	138.82	139.61	0.002175	0.99	8.93	8.54	0.28
Reach-1	7681	5 Year	10.2	138.15	139.62	138.88	139.68	0.002541	1.09	9.32	8.67	0.3
Reach-1	7681	10 Year	12.18	138.15	139.7	138.96	139.78	0.002971	1.23	9.89	9.64	0.33
Reach-1	7681	25 Year	16.2	138.15	139.85	139.1	139.96	0.003741	1.48	10.95	13.62	0.38
Reach-1	7681	50 Year	20.25	138.15	139.98	139.24	140.13	0.004501	1.71	11.84	20.22	0.42
Reach-1	7681	100 Year	24.64	138.15	140.1	139.37	140.29	0.005306	1.94	12.68	43.23	0.46
Reach-1	7681	500 Year	37.24	138.15	140.16	139.71	140.57	0.010813	2.84	13.12	64.28	0.66
Reach-1	7666	Fish Low Pa	0.01	138.08	138.21	138.13	138.21	0.000259	0.06	0.16	2.42	0.08
Reach-1	7666	Fish High Pa	0.51	138.08	138.57	138.31	138.58	0.000929	0.35	1.45	4.46	0.2
Reach-1	7666	2 Year	7.88	138.08	139.44	138.93	139.52	0.002228	1.21	7.81	13.54	0.37
Reach-1	7666	3 Year	8.8	138.08	139.49	138.98	139.57	0.002356	1.28	8.39	15.53	0.38
Reach-1	7666	5 Year	10.2	138.08	139.53	139.05	139.63	0.002751	1.42	8.91	15.63	0.42
Reach-1	7666	10 Year	12.18	138.08	139.61	139.14	139.72	0.003121	1.57	9.8	15.79	0.45
Reach-1	7666	25 Year	16.2	138.08	139.75	139.31	139.9	0.003669	1.83	11.55	37.39	0.49
Reach-1	7666	50 Year	20.25	138.08	139.87	139.5	140.06	0.004151	2.05	13.1	52.21	0.53

HEC-RAS Plan: PR_DOT River: Beaver Pond Brk Reach: Reach-1												
Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
Reach-1	7666	100 Year	24.64	138.08	139.99	139.62	140.21	0.00457	2.27	14.67	60.41	0.57
Reach-1	7666	500 Year	37.24	138.08	140.24	139.93	140.36	0.002612	1.89	27.01	74.66	0.44
Reach-1	7589	Fish Low Pa	0.01	138.06	138.11	138.11	138.12	0.075844	0.55	0.02	0.79	1.17
Reach-1	7589	Fish High Pa	0.51	138.06	138.29	138.29	138.36	0.032281	1.12	0.46	3.65	1.01
Reach-1	7589	2 Year	7.88	138.06	138.92	138.92	139.03	0.064132	1.43	5.52	43.96	0.9
Reach-1	7589	3 Year	8.8	138.06	138.94	138.92	139.05	0.067228	1.51	5.82	44.94	0.93
Reach-1	7589	5 Year	10.2	138.06	139.03	138.95	139.12	0.033828	1.29	7.91	51.71	0.69
Reach-1	7589	10 Year	12.18	138.06	139.15	138.99	139.22	0.019431	1.16	10.54	60.29	0.54
Reach-1	7589	25 Year	16.2	138.06	139.24	139.06	139.32	0.019839	1.29	12.56	66.73	0.56
Reach-1	7589	50 Year	20.25	138.06	139.42	139.12	139.49	0.012277	1.2	16.92	88.12	0.46
Reach-1	7589	100 Year	24.64	138.06	139.58	139.18	139.65	0.00958	1.18	20.86	105.71	0.41
Reach-1	7589	500 Year	37.24	138.06	139.97	139.34	140.04	0.006448	1.16	35.36	159.04	0.35
Reach-1	7370	Fish Low Pa	0.01	137.46	137.56	137.49	137.56	0.000183	0.04	0.23	4.36	0.06
Reach-1	7370	Fish High Pa	0.51	137.46	137.84	137.62	137.84	0.000442	0.18	2.81	14.53	0.13
Reach-1	7370	2 Year	7.88	137.46	138.7	137.96	138.7	0.000292	0.32	27.67	69.8	0.11
Reach-1	7370	3 Year	8.8	137.46	138.77	137.99	138.77	0.000279	0.32	30.5	78.81	0.11
Reach-1	7370	5 Year	10.2	137.46	138.86	138.02	138.86	0.000274	0.34	34.22	88.91	0.11
Reach-1	7370	10 Year	12.18	137.46	138.98	138.06	138.99	0.000266	0.35	39.28	96.36	0.1
Reach-1	7370	25 Year	16.2	137.46	139.18	138.14	139.18	0.000139	0.28	64.48	102.93	0.08
Reach-1	7370	50 Year	20.25	137.46	139.37	138.2	139.38	0.000118	0.28	78.58	112.76	0.07
Reach-1	7370	100 Year	24.64	137.46	139.54	138.26	139.54	0.000112	0.29	90.58	114.33	0.07
Reach-1	7370	500 Year	37.24	137.46	139.93	138.41	139.94	0.000106	0.32	119.99	116.7	0.07
Reach-1	7168	Fish Low Pa	0.01	137.45	137.47	137.46	137.47	0.003367	0.1	0.1	5.97	0.24
Reach-1	7168	Fish High Pa	0.51	137.45	137.59	137.54	137.61	0.007265	0.56	0.91	6.69	0.49
Reach-1	7168	2 Year	7.88	137.45	138.54	137.97	138.57	0.002118	0.81	9.86	15.94	0.28
Reach-1	7168	3 Year	8.8	137.45	138.61	138.01	138.65	0.002071	0.83	10.87	22.82	0.28
Reach-1	7168	5 Year	10.2	137.45	138.7	138.06	138.74	0.002038	0.87	12.22	34.57	0.28
Reach-1	7168	10 Year	12.18	137.45	138.83	138.13	138.87	0.001899	0.9	14.51	46.73	0.28
Reach-1	7168	25 Year	16.2	137.45	139.06	138.25	139.11	0.001647	0.96	18.96	61.27	0.26
Reach-1	7168	50 Year	20.25	137.45	139.29	138.36	139.32	0.001061	0.85	28.97	77.6	0.22
Reach-1	7168	100 Year	24.64	137.45	139.46	138.47	139.49	0.000809	0.8	36.02	82.19	0.19
Reach-1	7168	500 Year	37.24	137.45	139.87	138.76	139.9	0.000527	0.74	52.45	106.98	0.16
Reach-1	7120	Fish Low Pa	0.01	136.98	137.03	137.03	137.04	0.064412	0.53	0.02	0.79	1.08
Reach-1	7120	Fish High Pa	0.51	136.98	137.32	137.22	137.34	0.004353	0.58	0.87	4.05	0.4
Reach-1	7120	2 Year	8.72	136.98	138.37	137.87	138.44	0.003182	1.23	7.34	17.67	0.42
Reach-1	7120	3 Year	9.8	136.98	138.45	137.92	138.53	0.002831	1.24	9.01	21.22	0.4
Reach-1	7120	5 Year	11.3	136.98	138.56	138	138.63	0.002389	1.22	11.45	23.02	0.38
Reach-1	7120	10 Year	13.45	136.98	138.71	138.09	138.78	0.001888	1.19	15.12	25.4	0.34
Reach-1	7120	25 Year	17.9	136.98	138.98	138.26	139.04	0.001356	1.15	22.58	32.08	0.3
Reach-1	7120	50 Year	22.51	136.98	139.22	138.54	139.27	0.001092	1.14	30.32	40.49	0.28
Reach-1	7120	100 Year	27.33	136.98	139.4	138.65	139.45	0.001012	1.17	37.05	53.85	0.27
Reach-1	7120	500 Year	41.34	136.98	139.84	138.88	139.87	0.000536	0.98	72.17	80.54	0.2
Reach-1	7073	Fish Low Pa	0.01	136.79	136.9	136.84	136.9	0.000804	0.1	0.1	1.88	0.14
Reach-1	7073	Fish High Pa	0.51	136.79	137.22	137.02	137.23	0.001465	0.38	1.34	5.28	0.24
Reach-1	7073	2 Year	8.72	136.79	138.25	137.61	138.3	0.002513	1.05	8.3	8.26	0.33
Reach-1	7073	3 Year	9.8	136.79	138.33	137.66	138.39	0.002649	1.09	9.01	8.55	0.34
Reach-1	7073	5 Year	11.3	136.79	138.44	137.73	138.51	0.002814	1.13	9.98	8.94	0.34
Reach-1	7073	10 Year	13.45	136.79	138.59	137.81	138.66	0.003033	1.18	11.35	9.52	0.35
Reach-1	7073	25 Year	17.9	136.79	138.85	137.98	138.94	0.00345	1.28	13.98	10.62	0.36
Reach-1	7073	50 Year	22.51	136.79	139.08	138.14	139.18	0.003663	1.36	16.74	14.53	0.36
Reach-1	7073	100 Year	27.33	136.79	139.25	138.28	139.36	0.003694	1.47	19.53	18.41	0.37
Reach-1	7073	500 Year	41.34	136.79	139.67	138.65	139.81	0.003532	1.68	28.87	25.57	0.38
Reach-1	6970	Fish Low Pa	0.01	136.65	136.69	136.68	136.69	0.008476	0.18	0.06	2.65	0.39
Reach-1	6970	Fish High Pa	0.51	136.65	136.86	136.81	136.89	0.012201	0.82	0.62	3.74	0.64
Reach-1	6970	2 Year	8.72	136.65	137.55	137.47	137.77	0.014002	2.11	4.14	6.46	0.84
Reach-1	6970	3 Year	9.8	136.65	137.6	137.53	137.85	0.014029	2.18	4.49	6.67	0.85
Reach-1	6970	5 Year	11.3	136.65	137.67	137.59	137.94	0.01406	2.27	4.98	6.98	0.86
Reach-1	6970	10 Year	13.45	136.65	137.77	137.69	138.06	0.014062	2.37	5.67	7.39	0.87
Reach-1	6970	25 Year	17.9	136.65	137.93	137.85	138.27	0.01462	2.6	6.9	8.08	0.9
Reach-1	6970	50 Year	22.51	136.65	138.07	138.01	138.47	0.015158	2.79	8.06	8.68	0.92
Reach-1	6970	100 Year	27.33	136.65	138.19	138.15	138.65	0.015194	3	9.11	9.17	0.94
Reach-1	6970	500 Year	41.34	136.65	138.49	138.49	139.1	0.014546	3.49	12.08	10.38	0.96
Reach-1	6915	Fish Low Pa	0.01	136.26	136.28	136.28	136.28	0.00656	0.13	0.08	4.86	0.32
Reach-1	6915	Fish High Pa	0.51	136.26	136.44	136.36	136.45	0.005459	0.55	0.92	5.51	0.43
Reach-1	6915	2 Year	8.72	136.26	137.17	136.9	137.28	0.005643	1.45	6.01	8.43	0.55
Reach-1	6915	3 Year	9.8	136.26	137.23	136.94	137.34	0.005653	1.5	6.52	8.67	0.55
Reach-1	6915	5 Year	11.3	136.26	137.31	137	137.43	0.005664	1.57	7.21	8.98	0.56

HEC-RAS Plan: PR_DOT River: Beaver Pond Brk Reach: Reach-1												
Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
Reach-1	6915	10 Year	13.45	136.26	137.41	137.08	137.55	0.005677	1.65	8.15	9.39	0.57
Reach-1	6915	25 Year	17.9	136.26	137.58	137.24	137.75	0.005695	1.83	9.81	10.36	0.58
Reach-1	6915	50 Year	22.51	136.26	137.72	137.37	137.93	0.005715	2.01	11.36	10.94	0.6
Reach-1	6915	100 Year	27.33	136.26	137.86	137.5	138.1	0.005683	2.16	12.94	11.5	0.61
Reach-1	6915	500 Year	41.34	136.26	138.22	137.81	138.53	0.005498	2.5	17.36	12.94	0.62
Reach-1	6890	Fish Low Pa	0.01	136.12	136.14	136.14	136.14	0.00518	0.12	0.08	4.87	0.29
Reach-1	6890	Fish High Pa	0.51	136.12	136.3	136.22	136.31	0.005717	0.56	0.91	5.5	0.44
Reach-1	6890	2 Year	8.72	136.12	137.02	136.76	137.13	0.005893	1.47	5.92	8.39	0.56
Reach-1	6890	3 Year	9.8	136.12	137.08	136.8	137.2	0.005894	1.52	6.43	8.63	0.56
Reach-1	6890	5 Year	11.3	136.12	137.15	136.86	137.28	0.005895	1.59	7.11	8.94	0.57
Reach-1	6890	10 Year	13.45	136.12	137.26	136.95	137.4	0.005895	1.67	8.04	9.81	0.58
Reach-1	6890	25 Year	17.9	136.12	137.43	137.09	137.6	0.00582	1.84	10	12.21	0.59
Reach-1	6890	50 Year	22.51	136.12	137.58	137.23	137.78	0.005674	2	11.9	12.81	0.59
Reach-1	6890	100 Year	27.33	136.12	137.72	137.37	137.95	0.005534	2.14	13.81	13.4	0.6
Reach-1	6890	500 Year	41.34	136.12	138.1	137.67	138.39	0.005236	2.46	19.07	14.89	0.61
Reach-1	6825	Fish Low Pa	0.01	135.74	135.76	135.75	135.76	0.006572	0.13	0.08	4.86	0.32
Reach-1	6825	Fish High Pa	0.51	135.74	135.91	135.84	135.93	0.006454	0.58	0.87	5.48	0.47
Reach-1	6825	2 Year	8.72	135.74	136.64	136.37	136.75	0.005876	1.47	5.93	8.41	0.56
Reach-1	6825	3 Year	9.8	135.74	136.7	136.42	136.82	0.005875	1.52	6.44	8.65	0.56
Reach-1	6825	5 Year	11.3	135.74	136.78	136.48	136.9	0.005874	1.59	7.12	8.96	0.57
Reach-1	6825	10 Year	13.45	135.74	136.88	136.56	137.02	0.005873	1.67	8.06	9.37	0.57
Reach-1	6825	25 Year	17.9	135.74	137.03	136.72	137.21	0.006165	1.88	9.54	9.98	0.6
Reach-1	6825	50 Year	22.51	135.74	137.16	136.86	137.38	0.006456	2.09	10.87	10.51	0.63
Reach-1	6825	100 Year	27.33	135.74	137.28	136.97	137.55	0.006716	2.28	12.19	11	0.65
Reach-1	6825	500 Year	41.34	135.74	137.62	137.28	137.99	0.006736	2.69	16.18	12.37	0.68
Reach-1	6809	Fish Low Pa	0.01	135.64	135.66	135.65	135.66	0.005653	0.12	0.08	4.87	0.3
Reach-1	6809	Fish High Pa	0.51	135.64	135.82	135.74	135.83	0.005637	0.56	0.91	5.51	0.44
Reach-1	6809	2 Year	8.72	135.64	136.54	136.27	136.65	0.005786	1.46	5.96	8.41	0.55
Reach-1	6809	3 Year	9.8	135.64	136.6	136.32	136.72	0.005796	1.52	6.47	8.65	0.56
Reach-1	6809	5 Year	11.3	135.64	136.68	136.38	136.81	0.005805	1.58	7.15	8.96	0.57
Reach-1	6809	10 Year	13.45	135.64	136.78	136.46	136.92	0.005817	1.66	8.08	9.67	0.57
Reach-1	6809	25 Year	17.9	135.64	136.93	136.62	137.11	0.006221	1.88	9.68	11.95	0.6
Reach-1	6809	50 Year	22.51	135.64	137.05	136.75	137.27	0.006519	2.09	11.22	12.46	0.63
Reach-1	6809	100 Year	27.33	135.64	137.17	136.89	137.43	0.006738	2.27	12.75	12.94	0.65
Reach-1	6809	500 Year	41.34	135.64	137.53	137.2	137.87	0.006387	2.62	17.57	14.35	0.66
Reach-1	6756	Fish Low Pa	0.01	135.33	135.35	135.35	135.35	0.006044	0.13	0.08	4.87	0.31
Reach-1	6756	Fish High Pa	0.51	135.33	135.5	135.43	135.52	0.005948	0.57	0.9	5.5	0.45
Reach-1	6756	2 Year	8.72	135.33	136.22	135.97	136.34	0.005966	1.48	5.9	8.38	0.56
Reach-1	6756	3 Year	9.8	135.33	136.28	136.01	136.4	0.005958	1.53	6.4	10.1	0.57
Reach-1	6756	5 Year	11.3	135.33	136.36	136.07	136.49	0.00594	1.59	7.09	12.54	0.57
Reach-1	6756	10 Year	13.45	135.33	136.46	136.15	136.61	0.005954	1.68	8.01	15.7	0.58
Reach-1	6756	25 Year	17.9	135.33	136.62	136.31	136.78	0.005817	1.82	11.41	18.11	0.58
Reach-1	6756	50 Year	22.51	135.33	136.75	136.44	136.93	0.0057	1.96	13.87	18.65	0.59
Reach-1	6756	100 Year	27.33	135.33	136.88	136.61	137.08	0.005598	2.09	16.27	19.15	0.6
Reach-1	6756	500 Year	41.34	135.33	137.33	136.87	137.54	0.003958	2.16	25.37	20.97	0.53
Reach-1	6732	Fish Low Pa	0.01	135.19	135.21	135.21	135.21	0.006926	0.13	0.08	4.86	0.33
Reach-1	6732	Fish High Pa	0.51	135.19	135.36	135.29	135.37	0.007057	0.6	0.85	5.46	0.49
Reach-1	6732	2 Year	8.72	135.19	136.09	135.83	136.2	0.005738	1.46	5.98	8.81	0.55
Reach-1	6732	3 Year	9.8	135.19	136.15	135.87	136.27	0.005747	1.51	6.49	10.66	0.56
Reach-1	6732	5 Year	11.3	135.19	136.23	135.93	136.36	0.005742	1.58	7.17	13.08	0.56
Reach-1	6732	10 Year	13.45	135.19	136.33	136.01	136.47	0.005793	1.66	8.09	16.18	0.57
Reach-1	6732	25 Year	17.9	135.19	136.5	136.17	136.65	0.00535	1.77	12	19.48	0.56
Reach-1	6732	50 Year	22.51	135.19	136.64	136.3	136.81	0.005134	1.89	14.78	20.04	0.56
Reach-1	6732	100 Year	27.33	135.19	136.77	136.47	136.96	0.004938	1.99	17.52	20.58	0.56
Reach-1	6732	500 Year	41.34	135.19	137.27	136.73	137.45	0.003187	2	28.36	22.59	0.48
Reach-1	6653	Fish Low Pa	0.01	134.73	134.75	134.75	134.75	0.004963	0.12	0.08	4.87	0.29
Reach-1	6653	Fish High Pa	0.51	134.73	134.92	134.83	134.93	0.004683	0.53	0.97	5.54	0.4
Reach-1	6653	2 Year	8.72	134.73	135.63	135.37	135.74	0.005882	1.47	5.92	8.38	0.56
Reach-1	6653	3 Year	9.8	134.73	135.69	135.4	135.81	0.005878	1.52	6.43	8.62	0.56
Reach-1	6653	5 Year	11.3	134.73	135.77	135.47	135.89	0.005896	1.59	7.1	8.92	0.57
Reach-1	6653	10 Year	13.45	134.73	135.87	135.55	136.01	0.005814	1.67	8.08	12.18	0.57
Reach-1	6653	25 Year	17.9	134.73	136.02	135.7	136.19	0.00608	1.86	10.27	14.4	0.6
Reach-1	6653	50 Year	22.51	134.73	136.17	135.84	136.37	0.005802	2	12.48	15	0.6
Reach-1	6653	100 Year	27.33	134.73	136.37	136	136.57	0.004783	2.02	15.55	15.79	0.56
Reach-1	6653	500 Year	41.34	134.73	137.06	136.29	137.23	0.002415	1.89	27.39	18.53	0.42
Reach-1	6593	Fish Low Pa	0.01	134.38	134.4	134.4	134.4	0.006924	0.13	0.08	4.87	0.33
Reach-1	6593	Fish High Pa	0.51	134.38	134.54	134.48	134.56	0.008579	0.64	0.8	5.44	0.53

HEC-RAS Plan: PR_DOT River: Beaver Pond Brk Reach: Reach-1												
Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
Reach-1	6593	2 Year	8.72	134.38	135.28	135.02	135.39	0.005737	1.46	5.98	8.44	0.55
Reach-1	6593	3 Year	9.8	134.38	135.34	135.06	135.46	0.00574	1.51	6.49	8.68	0.56
Reach-1	6593	5 Year	11.3	134.38	135.43	135.12	135.55	0.005639	1.56	7.22	10.61	0.56
Reach-1	6593	10 Year	13.45	134.38	135.54	135.2	135.67	0.005453	1.63	8.27	16.68	0.56
Reach-1	6593	25 Year	17.9	134.38	135.7	135.35	135.85	0.005262	1.77	11.8	19.71	0.56
Reach-1	6593	50 Year	22.51	134.38	135.94	135.49	136.08	0.003605	1.69	16.82	20.7	0.48
Reach-1	6593	100 Year	27.33	134.38	136.23	135.68	136.34	0.002419	1.59	22.93	21.84	0.41
Reach-1	6593	500 Year	41.34	134.38	137.02	135.93	137.1	0.001157	1.44	41.35	24.98	0.3
Reach-1	6541	Fish Low Pa	0.01	134.08	134.1	134.09	134.1	0.00312	0.1	0.1	4.88	0.23
Reach-1	6541	Fish High Pa	0.51	134.08	134.29	134.18	134.31	0.002909	0.45	1.12	5.67	0.32
Reach-1	6541	2 Year	8.72	134.08	134.99	134.72	135.09	0.005681	1.45	6.01	14.83	0.55
Reach-1	6541	3 Year	9.8	134.08	135.05	134.76	135.16	0.005647	1.5	6.53	16.79	0.55
Reach-1	6541	5 Year	11.3	134.08	135.15	134.82	135.26	0.005265	1.53	7.41	19.92	0.54
Reach-1	6541	10 Year	13.45	134.08	135.28	134.9	135.41	0.004734	1.55	8.7	27.45	0.52
Reach-1	6541	25 Year	17.9	134.08	135.61	135.05	135.66	0.001914	1.18	23.16	33.51	0.35
Reach-1	6541	50 Year	22.51	134.08	135.91	135.19	135.95	0.001165	1.07	33.44	34.71	0.28
Reach-1	6541	100 Year	27.33	134.08	136.22	135.32	136.25	0.000789	1	44.39	35.95	0.24
Reach-1	6541	500 Year	41.34	134.08	137.02	135.57	137.05	0.000415	0.93	74.65	39.16	0.18
Reach-1	6473	Fish Low Pa	0.01	133.68	133.69	133.69	133.69	0.015056	0.16	0.06	4.85	0.47
Reach-1	6473	Fish High Pa	0.51	133.68	133.78	133.78	133.83	0.03371	0.98	0.52	5.24	0.99
Reach-1	6473	2 Year	9.4	133.68	134.78	134.36	134.83	0.002563	0.99	9.71	38.41	0.38
Reach-1	6473	3 Year	10.6	133.68	134.88	134.41	134.93	0.002054	0.97	11.2	39.55	0.34
Reach-1	6473	5 Year	12.3	133.68	135.02	134.47	135.07	0.001595	0.95	13.26	41.05	0.31
Reach-1	6473	10 Year	14.58	133.68	135.19	134.59	135.24	0.001259	0.94	15.8	42.38	0.28
Reach-1	6473	25 Year	19.5	133.68	135.53	134.69	135.58	0.000909	0.96	20.8	45.41	0.25
Reach-1	6473	50 Year	24.49	133.68	135.84	134.79	135.89	0.000739	0.98	25.41	47.06	0.23
Reach-1	6473	100 Year	29.87	133.68	136.15	134.88	136.21	0.000631	1.01	30.03	48.7	0.22
Reach-1	6473	500 Year	45.17	133.68	136.96	135.12	137.02	0.000475	1.09	41.95	52.83	0.2
Reach-1	6445.5	Culvert										
Reach-1	6417	Fish Low Pa	0.01	132.63	132.65	132.65	132.65	0.052974	0.24	0.04	4.85	0.83
Reach-1	6417	Fish High Pa	0.51	132.63	132.76	132.74	132.79	0.020198	0.83	0.61	5.33	0.79
Reach-1	6417	2 Year	9.4	132.63	133.06	133.3	133.84	0.098299	3.92	2.4	6.6	2.07
Reach-1	6417	3 Year	10.6	132.63	133.08	133.34	133.96	0.104816	4.17	2.54	6.68	2.16
Reach-1	6417	5 Year	12.3	132.63	133.13	133.41	134.05	0.096076	4.25	2.89	6.88	2.09
Reach-1	6417	10 Year	14.58	132.63	133.5	133.49	133.83	0.018492	2.56	5.7	8.33	0.99
Reach-1	6417	25 Year	19.5	132.63	133.68	133.65	134.05	0.016083	2.68	7.28	8.85	0.94
Reach-1	6417	50 Year	24.49	132.63	133.95	133.79	134.27	0.010915	2.51	9.74	9.6	0.8
Reach-1	6417	100 Year	29.87	132.63	134.25	133.93	134.53	0.007662	2.35	12.72	10.54	0.68
Reach-1	6417	500 Year	45.17	132.63	135.04	134.28	135.26	0.003396	2.07	22.12	14.23	0.48
Reach-1	6409	Fish Low Pa	0.01	132.46	132.47	132.47	132.47	0.011335	0.15	0.07	4.84	0.41
Reach-1	6409	Fish High Pa	0.51	132.46	132.58	132.56	132.62	0.022519	0.87	0.59	5.26	0.83
Reach-1	6409	2 Year	9.4	132.46	133.13	133.13	133.4	0.020031	2.3	4.08	7.46	0.99
Reach-1	6409	3 Year	10.6	132.46	133.17	133.17	133.46	0.019882	2.38	4.45	7.66	1
Reach-1	6409	5 Year	12.3	132.46	133.24	133.24	133.55	0.019577	2.48	4.95	7.92	1
Reach-1	6409	10 Year	14.58	132.46	133.32	133.32	133.66	0.019041	2.59	5.63	8.25	1
Reach-1	6409	25 Year	19.5	132.46	133.59	133.49	133.9	0.012533	2.43	8.01	9.33	0.84
Reach-1	6409	50 Year	24.49	132.46	133.91	133.63	134.16	0.007815	2.19	11.16	10.6	0.68
Reach-1	6409	100 Year	29.87	132.46	134.23	133.77	134.44	0.005311	2.03	14.73	11.87	0.58
Reach-1	6409	500 Year	45.17	132.46	135.04	134.1	135.21	0.002198	1.82	25.73	15.13	0.4
Reach-1	6394	Fish Low Pa	0.01	132.08	132.09	132.09	132.09	0.125003	0.31	0.03	4.84	1.22
Reach-1	6394	Fish High Pa	0.51	132.08	132.18	132.18	132.23	0.033332	0.98	0.52	5.16	0.99
Reach-1	6394	2 Year	9.4	132.08	132.7	132.76	133.04	0.027202	2.59	3.63	6.95	1.14
Reach-1	6394	3 Year	10.6	132.08	132.75	132.81	133.11	0.026774	2.67	3.96	7.13	1.15
Reach-1	6394	5 Year	12.3	132.08	132.95	132.87	133.21	0.014214	2.25	5.47	7.9	0.86
Reach-1	6394	10 Year	14.58	132.08	133.18	132.96	133.38	0.00856	1.97	7.39	8.81	0.69
Reach-1	6394	25 Year	19.5	132.08	133.56	133.12	133.72	0.00505	1.77	11.01	10.32	0.55
Reach-1	6394	50 Year	24.49	132.08	133.89	133.28	134.03	0.003632	1.67	14.66	11.65	0.48
Reach-1	6394	100 Year	29.87	132.08	134.22	133.42	134.35	0.002656	1.6	18.68	12.95	0.42
Reach-1	6394	500 Year	45.17	132.08	135.04	133.77	135.16	0.00134	1.53	30.78	16.26	0.32
Reach-1	6349.5	Culvert										
Reach-1	6305	Fish Low Pa	0.01	130.39	130.4	130.4	130.4	0.018638	0.18	0.06	4.84	0.52
Reach-1	6305	Fish High Pa	0.51	130.39	130.53	130.49	130.55	0.01366	0.74	0.69	5.33	0.66
Reach-1	6305	2 Year	9.4	130.39	130.95	131.05	131.36	0.037293	2.85	3.3	7.03	1.33
Reach-1	6305	3 Year	10.6	130.39	130.99	131.11	131.43	0.036095	2.93	3.62	7.21	1.32
Reach-1	6305	5 Year	12.3	130.39	131.05	131.17	131.52	0.035081	3.04	4.05	7.44	1.31
Reach-1	6305	10 Year	14.58	130.39	131.31	131.26	131.6	0.015102	2.39	6.11	8.48	0.9

HEC-RAS Plan: PR_DOT River: Beaver Pond Brk Reach: Reach-1												
Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
Reach-1	6305	25 Year	19.5	130.39	131.45	131.42	131.81	0.016092	2.66	7.33	9.03	0.94
Reach-1	6305	50 Year	24.49	130.39	131.58	131.56	132	0.016309	2.86	8.57	9.57	0.96
Reach-1	6305	100 Year	29.87	130.39	131.73	131.7	132.18	0.015776	2.99	9.99	10.14	0.96
Reach-1	6305	500 Year	45.17	130.39	132.03	132.02	132.63	0.014908	3.46	13.2	11.34	0.98
Reach-1	6266	Fish Low Pa	0.01	129.54	129.57	129.57	129.58	0.012814	0.21	0.05	2.47	0.47
Reach-1	6266	Fish High Pa	0.51	129.54	129.69	129.69	129.75	0.033024	1.1	0.46	3.86	1.01
Reach-1	6266	2 Year	9.4	129.54	130.34	130.34	130.65	0.020421	2.44	3.85	6.45	1.01
Reach-1	6266	3 Year	10.6	129.54	130.41	130.41	130.72	0.01963	2.49	4.25	6.68	1
Reach-1	6266	5 Year	12.3	129.54	130.48	130.48	130.82	0.019225	2.58	4.76	6.96	1
Reach-1	6266	10 Year	14.58	129.54	130.58	130.57	130.94	0.018115	2.66	5.49	7.35	0.98
Reach-1	6266	25 Year	19.5	129.54	130.78	130.75	131.17	0.016352	2.77	7.03	8.12	0.95
Reach-1	6266	50 Year	24.49	129.54	130.95	130.91	131.38	0.015632	2.9	8.43	8.75	0.94
Reach-1	6266	100 Year	29.87	129.54	131.1	131.06	131.57	0.015413	3.05	9.8	9.33	0.95
Reach-1	6266	500 Year	45.17	129.54	131.62	131.42	132.07	0.010783	2.99	15.12	11.26	0.82
Reach-1	6216	Fish Low Pa	0.01	128.63	128.68	128.67	128.69	0.02576	0.35	0.03	1.13	0.69
Reach-1	6216	Fish High Pa	0.51	128.63	128.92	128.85	128.95	0.008034	0.76	0.67	3.23	0.54
Reach-1	6216	2 Year	9.4	128.63	129.91	129.61	130.05	0.006483	1.65	5.7	7.02	0.58
Reach-1	6216	3 Year	10.6	128.63	129.99	129.67	130.13	0.006488	1.7	6.22	7.26	0.59
Reach-1	6216	5 Year	12.3	128.63	130.07		130.24	0.006667	1.79	6.86	7.56	0.6
Reach-1	6216	10 Year	14.58	128.63	130.19		130.37	0.006647	1.88	7.77	7.96	0.61
Reach-1	6216	25 Year	19.5	128.63	130.41		130.62	0.006702	2.04	9.58	8.7	0.62
Reach-1	6216	50 Year	24.49	128.63	130.59		130.83	0.006614	2.18	11.24	9.31	0.63
Reach-1	6216	100 Year	29.87	128.63	130.76		131.04	0.0064	2.34	12.85	9.84	0.63
Reach-1	6216	500 Year	45.17	128.63	131.46		131.72	0.003633	2.3	20.43	11.72	0.51
Reach-1	6122	Fish Low Pa	0.01	128.1	128.18	128.15	128.19	0.002236	0.14	0.07	1.66	0.22
Reach-1	6122	Fish High Pa	0.51	128.1	128.45	128.33	128.47	0.00355	0.54	0.95	4.28	0.36
Reach-1	6122	2 Year	9.4	128.1	129.18	128.99	129.34	0.008714	1.76	5.34	7.71	0.68
Reach-1	6122	3 Year	10.6	128.1	129.23	129.05	129.4	0.009422	1.87	5.66	7.9	0.71
Reach-1	6122	5 Year	12.3	128.1	129.32	129.12	129.51	0.009132	1.92	6.41	8.33	0.7
Reach-1	6122	10 Year	14.58	128.1	129.45	129.21	129.64	0.008927	1.92	7.6	9.16	0.67
Reach-1	6122	25 Year	19.5	128.1	129.73	129.38	129.92	0.008251	1.9	10.28	10.09	0.6
Reach-1	6122	50 Year	24.49	128.1	129.98	129.52	130.17	0.007211	1.9	12.88	10.63	0.55
Reach-1	6122	100 Year	29.87	128.1	130.24	129.67	130.42	0.006151	1.91	15.64	11	0.51
Reach-1	6122	500 Year	45.17	128.1	131.28	130	131.42	0.00225	1.66	27.88	12.59	0.34
Reach-1	6067	Fish Low Pa	0.01	127.8	127.83	127.83	127.84	0.063351	0.39	0.03	1.67	1
Reach-1	6067	Fish High Pa	0.51	127.8	127.96	127.96	128.01	0.033479	1.02	0.5	4.78	1
Reach-1	6067	2 Year	9.4	127.8	128.63	128.51	128.8	0.011201	1.83	5.14	8.67	0.76
Reach-1	6067	3 Year	10.6	127.8	128.73	128.56	128.89	0.009115	1.75	6.07	9.2	0.69
Reach-1	6067	5 Year	12.3	127.8	128.87	128.62	129.01	0.008295	1.65	7.43	9.96	0.61
Reach-1	6067	10 Year	14.58	127.8	129.05	128.7	129.18	0.007386	1.57	9.29	10.92	0.54
Reach-1	6067	25 Year	19.5	127.8	129.4	128.86	129.51	0.005917	1.45	13.46	12.8	0.45
Reach-1	6067	50 Year	24.49	127.8	129.72	128.99	129.82	0.004773	1.37	17.85	14.53	0.39
Reach-1	6067	100 Year	29.87	127.8	130.06	129.12	130.15	0.003426	1.31	23.01	16.14	0.34
Reach-1	6067	500 Year	45.17	127.8	131.25	129.44	131.31	0.001104	1.09	43.27	17.82	0.21
Reach-1	6033	Fish Low Pa	0.01	127.25	127.45	127.27	127.45	0.000002	0.01	0.98	6.16	0.01
Reach-1	6033	Fish High Pa	0.51	127.25	127.61	127.37	127.62	0.000532	0.25	2.01	6.75	0.15
Reach-1	6033	2 Year	9.4	127.25	128.62	127.9	128.66	0.001314	0.88	10.68	10.52	0.28
Reach-1	6033	3 Year	10.6	127.25	128.72	127.95	128.76	0.001279	0.9	11.75	10.9	0.28
Reach-1	6033	5 Year	12.3	127.25	128.85	128.01	128.9	0.001227	0.93	13.26	11.41	0.27
Reach-1	6033	10 Year	14.58	127.25	129.02	128.09	129.07	0.001161	0.95	15.29	12.06	0.27
Reach-1	6033	25 Year	19.5	127.25	129.37	128.25	129.42	0.001033	0.99	19.69	13.36	0.26
Reach-1	6033	50 Year	24.49	127.25	129.69	128.39	129.75	0.000895	1.01	24.18	14.22	0.25
Reach-1	6033	100 Year	29.87	127.25	130.03	128.52	130.09	0.00074	1.03	29.13	14.9	0.23
Reach-1	6033	500 Year	45.17	127.25	131.24	128.85	131.29	0.000347	0.96	48.53	17.4	0.17
Reach-1	5996.5		Culvert									
Reach-1	5947	Fish Low Pa	0.01	126.08	126.13	126.13	126.14	0.051268	0.45	0.02	0.98	0.95
Reach-1	5947	Fish High Pa	0.51	126.08	126.29	126.29	126.35	0.030458	1.09	0.47	3.69	0.98
Reach-1	5947	2 Year	9.4	126.08	127.05	126.95	127.28	0.013057	2.11	4.46	6.51	0.81
Reach-1	5947	3 Year	10.6	126.08	127.13	127.01	127.36	0.012262	2.14	4.96	6.73	0.8
Reach-1	5947	5 Year	12.3	126.08	127.22	127.08	127.47	0.011668	2.2	5.6	7.01	0.78
Reach-1	5947	10 Year	14.58	126.08	127.34	127.18	127.6	0.01083	2.25	6.49	7.37	0.76
Reach-1	5947	25 Year	19.5	126.08	127.62	127.36	127.88	0.008793	2.26	8.61	8.17	0.7
Reach-1	5947	50 Year	24.49	126.08	127.83	127.52	128.11	0.008113	2.34	10.46	8.81	0.69
Reach-1	5947	100 Year	29.87	126.08	128.01	127.68	128.32	0.008122	2.47	12.07	9.35	0.69
Reach-1	5947	500 Year	45.17	126.08	128.48	128.06	128.85	0.006617	2.73	16.85	11.19	0.66
Reach-1	5878	Fish Low Pa	0.02	125.17	125.82	125.25	125.82	0	0.01	2.55	6.5	0

HEC-RAS Plan: PR_DOT River: Beaver Pond Brk Reach: Reach-1												
Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
Reach-1	5878	Fish High Pa	0.93	125.17	125.93	125.5	125.93	0.000387	0.29	3.23	6.94	0.14
Reach-1	5878	2 Year	14.5	125.17	126.68	126.24	126.8	0.004237	1.49	9.74	10.57	0.5
Reach-1	5878	3 Year	16.3	125.17	126.75	126.3	126.88	0.004412	1.56	10.47	10.95	0.51
Reach-1	5878	5 Year	18.9	125.17	126.84	126.39	126.98	0.004602	1.66	11.42	11.31	0.52
Reach-1	5878	10 Year	22.51	125.17	126.95	126.5	127.11	0.004892	1.78	12.68	11.75	0.54
Reach-1	5878	25 Year	30.1	125.17	127.18	126.7	127.37	0.005938	1.95	15.52	13.04	0.56
Reach-1	5878	50 Year	37.8	125.17	127.39	126.88	127.61	0.006278	2.08	18.38	14.08	0.56
Reach-1	5878	100 Year	46.01	125.17	127.58	127.03	127.83	0.006038	2.22	21.11	14.74	0.57
Reach-1	5878	500 Year	69.8	125.17	128.13	127.43	128.44	0.005003	2.47	29.78	16.75	0.54
Reach-1	5832	Fish Low Pa	0.02	124.64	125.82	124.74	125.82	0	0	5.02	7.26	0
Reach-1	5832	Fish High Pa	0.93	124.64	125.92	125.04	125.92	0.000066	0.16	5.74	7.6	0.06
Reach-1	5832	2 Year	14.5	124.64	126.57	125.87	126.65	0.002181	1.31	11.24	9.56	0.37
Reach-1	5832	3 Year	16.3	124.64	126.62	125.94	126.72	0.002411	1.41	11.77	9.71	0.39
Reach-1	5832	5 Year	18.9	124.64	126.69	126.02	126.81	0.002734	1.55	12.44	9.9	0.42
Reach-1	5832	10 Year	22.51	124.64	126.77	126.14	126.93	0.003171	1.74	13.29	10.14	0.46
Reach-1	5832	25 Year	30.1	124.64	126.92	126.35	127.14	0.004094	2.11	14.81	10.55	0.53
Reach-1	5832	50 Year	37.8	124.64	127.04	126.55	127.34	0.005068	2.46	16.08	10.93	0.59
Reach-1	5832	100 Year	46.01	124.64	127.13	126.72	127.53	0.006282	2.83	17.11	11.22	0.66
Reach-1	5832	500 Year	69.8	124.64	127.23	127.17	128.05	0.012	4.05	18.26	11.54	0.93
Reach-1	5813	Inl Struct										
Reach-1	5812.5	Fish Low Pa	0.02	124.45	124.49	124.5	124.5	0.045281	0.45	0.05	2.08	0.92
Reach-1	5812.5	Fish High Pa	0.93	124.45	124.68	124.65	124.71	0.017382	0.87	1.07	7.83	0.75
Reach-1	5812.5	2 Year	14.5	124.45	125.79	125.22	125.88	0.002534	1.27	11.39	9.99	0.38
Reach-1	5812.5	3 Year	16.3	124.45	125.87	125.27	125.96	0.002624	1.34	12.17	10.09	0.39
Reach-1	5812.5	5 Year	18.9	124.45	125.98	125.34	126.08	0.00276	1.43	13.22	10.22	0.4
Reach-1	5812.5	10 Year	22.51	124.45	126.12	125.44	126.24	0.003017	1.54	14.66	10.49	0.41
Reach-1	5812.5	25 Year	30.1	124.45	126.35	125.62	126.51	0.003367	1.75	17.19	11.08	0.44
Reach-1	5812.5	50 Year	37.8	124.45	126.56	125.79	126.75	0.003534	1.95	19.55	11.66	0.46
Reach-1	5812.5	100 Year	46.01	124.45	126.75	125.95	126.98	0.003736	2.14	21.84	12.21	0.48
Reach-1	5812.5	500 Year	69.8	124.45	127.23	126.38	127.57	0.004131	2.6	28.09	13.81	0.53
Reach-1	5804	Fish Low Pa	0.02	124.01	124.11	124.11	124.13	0.021778	0.5	0.05	0.87	0.7
Reach-1	5804	Fish High Pa	0.93	124.01	124.4	124.4	124.51	0.02874	1.47	0.64	2.99	1.02
Reach-1	5804	2 Year	14.5	124.01	125.4	125.4	125.75	0.033316	2.6	5.57	8.36	1.02
Reach-1	5804	3 Year	16.3	124.01	125.46	125.46	125.83	0.032695	2.68	6.09	8.54	1.01
Reach-1	5804	5 Year	18.9	124.01	125.55	125.55	125.94	0.031912	2.77	6.82	8.79	1
Reach-1	5804	10 Year	22.51	124.01	125.65	125.65	126.08	0.033098	2.92	7.7	9.1	1.01
Reach-1	5804	25 Year	30.1	124.01	125.86	125.86	126.34	0.035704	3.08	9.77	10.28	1.01
Reach-1	5804	50 Year	37.8	124.01	126.02	126.02	126.57	0.034877	3.29	11.51	10.78	1.01
Reach-1	5804	100 Year	46.01	124.01	126.2	126.18	126.8	0.032877	3.44	13.46	11.31	0.98
Reach-1	5804	500 Year	69.8	124.01	126.64	126.58	127.38	0.027338	3.83	18.66	12.47	0.94
Reach-1	5757	Fish Low Pa	0.02	123.16	123.21	123.2	123.21	0.016906	0.25	0.09	4.26	0.55
Reach-1	5757	Fish High Pa	0.93	123.16	123.4	123.35	123.44	0.012128	0.93	1.01	5	0.66
Reach-1	5757	2 Year	14.5	123.16	124.23	124.12	124.53	0.012967	2.39	6.06	7.13	0.83
Reach-1	5757	3 Year	16.3	123.16	124.32	124.19	124.62	0.012997	2.45	6.65	7.33	0.82
Reach-1	5757	5 Year	18.9	123.16	124.44	124.28	124.76	0.013263	2.48	7.62	7.66	0.79
Reach-1	5757	10 Year	22.51	123.16	124.63	124.4	124.94	0.013113	2.49	9.05	8.12	0.75
Reach-1	5757	25 Year	30.1	123.16	124.94	124.63	125.28	0.013322	2.56	11.76	8.93	0.71
Reach-1	5757	50 Year	37.8	123.16	125.14	124.84	125.54	0.013268	2.79	13.59	9.46	0.72
Reach-1	5757	100 Year	46.01	123.16	125.31	125.02	125.79	0.013726	3.05	15.24	9.91	0.75
Reach-1	5757	500 Year	69.8	123.16	125.71	125.48	126.41	0.015344	3.72	19.41	10.98	0.82
Reach-1	5628	Fish Low Pa	0.02	120.8	120.87	120.86	120.88	0.019383	0.37	0.06	1.81	0.63
Reach-1	5628	Fish High Pa	0.93	120.8	121.08	121.08	121.18	0.027643	1.39	0.67	3.36	1
Reach-1	5628	2 Year	14.5	120.8	121.9	121.9	122.24	0.025598	2.58	5.63	8.37	1
Reach-1	5628	3 Year	16.3	120.8	121.96	121.96	122.32	0.026175	2.67	6.11	8.52	1
Reach-1	5628	5 Year	18.9	120.8	122.05	122.05	122.43	0.026085	2.75	6.88	8.75	0.99
Reach-1	5628	10 Year	22.51	120.8	122.14	122.14	122.57	0.027371	2.9	7.75	9.01	1
Reach-1	5628	25 Year	30.1	120.8	122.34	122.34	122.84	0.028635	3.14	9.6	9.54	1
Reach-1	5628	50 Year	37.8	120.8	122.52	122.52	123.09	0.029268	3.35	11.3	10	1
Reach-1	5628	100 Year	46.01	120.8	122.68	122.68	123.33	0.028019	3.57	12.93	10.42	1
Reach-1	5628	500 Year	69.8	120.8	123.11	123.11	123.94	0.024529	4.05	17.67	11.56	0.98
Reach-1	5524	Fish Low Pa	0.02	117.6	117.65	117.65	117.67	0.055831	0.51	0.04	1.73	1.02
Reach-1	5524	Fish High Pa	0.93	117.6	117.82	117.83	117.9	0.035729	1.26	0.74	5.31	1.08
Reach-1	5524	2 Year	14.5	117.6	118.39	118.55	118.97	0.038289	3.37	4.3	7.13	1.38
Reach-1	5524	3 Year	16.3	117.6	118.45	118.62	119.06	0.037096	3.46	4.71	7.31	1.37
Reach-1	5524	5 Year	18.9	117.6	118.52	118.7	119.19	0.036791	3.61	5.23	7.53	1.38
Reach-1	5524	10 Year	22.51	117.6	118.62	118.81	119.33	0.034623	3.73	6.03	7.86	1.36
Reach-1	5524	25 Year	30.1	117.6	119.22	119.03	119.59	0.015376	2.66	11.32	9.74	0.79

HEC-RAS Plan: PR_DOT River: Beaver Pond Brk Reach: Reach-1												
Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
Reach-1	5524	50 Year	37.8	117.6	119.48	119.22	119.86	0.015476	2.72	13.88	10.54	0.76
Reach-1	5524	100 Year	46.01	117.6	119.65	119.4	120.09	0.01724	2.92	15.77	11.1	0.78
Reach-1	5524	500 Year	69.8	117.6	119.63	119.84	120.66	0.040945	4.49	15.55	11.04	1.21
Reach-1	5456	Fish Low Pa	0.02	116.4	116.48	116.45	116.49	0.005155	0.22	0.11	2.52	0.34
Reach-1	5456	Fish High Pa	0.93	116.4	116.72	116.65	116.76	0.008405	0.81	1.16	5.48	0.56
Reach-1	5456	2 Year	14.5	116.4	117.44	117.38	117.75	0.015082	2.46	5.91	7.77	0.9
Reach-1	5456	3 Year	16.3	116.4	117.49	117.45	117.83	0.015803	2.59	6.31	7.93	0.93
Reach-1	5456	5 Year	18.9	116.4	117.56	117.53	117.95	0.016509	2.74	6.89	8.16	0.95
Reach-1	5456	10 Year	22.51	116.4	117.66	117.64	118.1	0.017388	2.92	7.72	8.48	0.98
Reach-1	5456	25 Year	30.1	116.4	117.87	117.86	118.38	0.020368	3.15	9.55	11.13	0.98
Reach-1	5456	50 Year	37.8	116.4	118.11	118.05	118.63	0.020673	3.2	11.8	14.75	0.94
Reach-1	5456	100 Year	46.01	116.4	118.35	118.23	118.88	0.017923	3.21	14.34	16.45	0.87
Reach-1	5456	500 Year	69.8	116.4	119.05	118.65	119.57	0.010492	3.22	22.55	21.22	0.71
Reach-1	5422	Fish Low Pa	0.02	116.06	116.07	116.07	116.08	0.053047	0.31	0.07	5.89	0.89
Reach-1	5422	Fish High Pa	0.93	116.06	116.2	116.2	116.26	0.029395	1.11	0.85	6.4	0.97
Reach-1	5422	2 Year	14.5	116.06	116.84	116.84	117.16	0.01933	2.52	5.76	8.96	1
Reach-1	5422	3 Year	16.3	116.06	116.9	116.9	117.24	0.018948	2.6	6.28	9.2	1
Reach-1	5422	5 Year	18.9	116.06	116.97	116.97	117.34	0.018632	2.7	7	9.5	1.01
Reach-1	5422	10 Year	22.51	116.06	117.07	117.07	117.48	0.018134	2.82	7.97	9.91	1
Reach-1	5422	25 Year	30.1	116.06	117.35	117.27	117.74	0.015178	2.76	10.91	11.03	0.89
Reach-1	5422	50 Year	37.8	116.06	117.76	117.43	118.06	0.01099	2.39	15.79	12.69	0.69
Reach-1	5422	100 Year	46.01	116.06	118.13	117.6	118.39	0.008599	2.22	20.77	14.18	0.58
Reach-1	5422	500 Year	69.8	116.06	119.06	118	119.27	0.003826	2.04	35.36	16.82	0.42
Reach-1	5355	Fish Low Pa	0.02	115.01	115.19	115.02	115.19	0.000003	0.01	1.77	9.97	0.01
Reach-1	5355	Fish High Pa	0.93	115.01	115.36	115.11	115.36	0.000503	0.27	3.5	9.98	0.14
Reach-1	5355	2 Year	17.41	115.01	116.47	115.68	116.54	0.001842	1.2	14.55	10.01	0.32
Reach-1	5355	3 Year	19.6	115.01	116.57	115.74	116.65	0.001872	1.26	15.6	10.01	0.32
Reach-1	5355	5 Year	22.7	115.01	116.71	115.81	116.8	0.001906	1.33	17.02	10.01	0.33
Reach-1	5355	10 Year	27.04	115.01	116.9	115.92	117.01	0.001938	1.43	18.93	10.02	0.33
Reach-1	5355	25 Year	36.2	115.01	117.27	116.11	117.4	0.002002	1.6	22.58	10.03	0.34
Reach-1	5355	50 Year	45.59	115.01	117.61	116.3	117.77	0.002049	1.75	26.02	10.04	0.35
Reach-1	5355	100 Year	55.5	115.01	117.95	116.48	118.13	0.002086	1.89	29.41	10.04	0.35
Reach-1	5355	500 Year	84.24	115.01	118.84	116.94	119.09	0.00215	2.19	38.39	23.5	0.36
Reach-1	5295.5		Culvert									
Reach-1	5224	Fish Low Pa	0.02	113	113.04	113.01	113.04	0.000187	0.04	0.58	14.69	0.06
Reach-1	5224	Fish High Pa	0.93	113	113.31	113.08	113.31	0.000329	0.2	4.67	15.79	0.12
Reach-1	5224	2 Year	17.41	113	114.42	113.51	114.45	0.000636	0.7	24.7	20.22	0.2
Reach-1	5224	3 Year	19.6	113	114.51	113.56	114.54	0.000652	0.74	26.5	20.58	0.21
Reach-1	5224	5 Year	22.7	113	114.63	113.61	114.66	0.000653	0.78	28.96	21.16	0.21
Reach-1	5224	10 Year	27.04	113	114.77	113.68	114.81	0.000664	0.85	32.15	21.89	0.22
Reach-1	5224	25 Year	36.2	113	115.03	113.82	115.08	0.000716	0.97	37.82	23.12	0.23
Reach-1	5224	50 Year	45.59	113	115.25	113.95	115.31	0.000771	1.09	42.87	24.01	0.24
Reach-1	5224	100 Year	55.5	113	115.44	114.08	115.52	0.000838	1.21	47.43	24.8	0.26
Reach-1	5224	500 Year	84.24	113	116.12	114.4	116.21	0.000785	1.39	63.78	27.54	0.26
Reach-1	5206	Fish Low Pa	0.02	113	113.03	113.01	113.03	0.001523	0.1	0.23	7.18	0.18
Reach-1	5206	Fish High Pa	0.93	113	113.29	113.12	113.3	0.001685	0.41	2.26	8.7	0.26
Reach-1	5206	2 Year	17.41	113	114.33	113.76	114.41	0.002516	1.24	14.05	13.77	0.39
Reach-1	5206	3 Year	19.6	113	114.41	113.82	114.5	0.002549	1.29	15.21	14.17	0.4
Reach-1	5206	5 Year	22.7	113	114.53	113.89	114.62	0.002571	1.35	16.82	14.71	0.4
Reach-1	5206	10 Year	27.04	113	114.67	113.99	114.77	0.002615	1.43	18.92	15.34	0.41
Reach-1	5206	25 Year	36.2	113	114.9	114.18	115.03	0.002841	1.6	22.6	16.39	0.44
Reach-1	5206	50 Year	45.59	113	115.1	114.35	115.25	0.003055	1.76	25.96	17.27	0.46
Reach-1	5206	100 Year	55.5	113	115.27	114.51	115.46	0.003323	1.91	28.99	18.01	0.48
Reach-1	5206	500 Year	84.24	113	115.95	114.91	116.16	0.003483	1.98	42.46	21.38	0.45
Reach-1	5145	Fish Low Pa	0.02	112.68	112.74	112.74	112.75	0.058553	0.57	0.04	1.39	1.07
Reach-1	5145	Fish High Pa	0.93	112.68	112.94	112.94	113.01	0.029314	1.19	0.79	5.34	0.99
Reach-1	5145	2 Year	17.41	112.68	113.67	113.67	114.01	0.018518	2.57	6.79	10.04	1
Reach-1	5145	3 Year	19.6	112.68	113.73	113.73	114.09	0.018379	2.65	7.39	10.31	1
Reach-1	5145	5 Year	22.7	112.68	113.81	113.81	114.2	0.017983	2.75	8.24	10.68	1
Reach-1	5145	10 Year	27.04	112.68	113.92	113.92	114.34	0.017482	2.87	9.41	11.17	1
Reach-1	5145	25 Year	36.2	112.68	114.19	114.12	114.61	0.013974	2.89	12.52	12.38	0.92
Reach-1	5145	50 Year	45.59	112.68	114.48	114.3	114.88	0.010005	2.78	16.56	16.78	0.8
Reach-1	5145	100 Year	55.5	112.68	114.84	114.47	115.16	0.005818	2.52	25.13	28.54	0.64
Reach-1	5145	500 Year	84.24	112.68	115.82	114.98	115.99	0.001867	1.96	56.58	37.64	0.39
Reach-1	5084	Fish Low Pa	0.02	111.83	111.95	111.89	111.96	0.001528	0.15	0.15	2.41	0.2
Reach-1	5084	Fish High Pa	0.93	111.83	112.22	112.12	112.24	0.005501	0.64	1.46	7.16	0.45

HEC-RAS Plan: PR_DOT River: Beaver Pond Brk Reach: Reach-1												
Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
Reach-1	5084	2 Year	17.41	111.83	113.16	112.84	113.32	0.005798	1.74	10.02	10.96	0.58
Reach-1	5084	3 Year	19.6	111.83	113.27	112.9	113.43	0.005296	1.74	11.24	11.4	0.56
Reach-1	5084	5 Year	22.7	111.83	113.42	112.98	113.58	0.004706	1.75	13	12.01	0.54
Reach-1	5084	10 Year	27.04	111.83	113.62	113.09	113.78	0.004109	1.75	15.45	12.8	0.51
Reach-1	5084	25 Year	36.2	111.83	114.02		114.18	0.003161	1.73	20.94	14.42	0.46
Reach-1	5084	50 Year	45.59	111.83	114.39		114.54	0.002384	1.72	27.65	26.9	0.41
Reach-1	5084	100 Year	55.5	111.83	114.81		114.94	0.001561	1.61	41.98	38.12	0.34
Reach-1	5084	500 Year	84.24	111.83	115.83		115.9	0.000621	1.3	98.01	126.07	0.23
Reach-1	5065	Fish Low Pa	0.02	111.85	111.86	111.86	111.87	0.037142	0.26	0.09	7.08	0.74
Reach-1	5065	Fish High Pa	0.93	111.85	111.98	111.98	112.03	0.028323	1.01	0.92	7.77	0.94
Reach-1	5065	2 Year	17.41	111.85	113.1	112.63	113.2	0.003461	1.42	12.22	12.24	0.46
Reach-1	5065	3 Year	19.6	111.85	113.22	112.68	113.32	0.003177	1.43	13.67	12.69	0.44
Reach-1	5065	5 Year	22.7	111.85	113.38	112.76	113.48	0.002857	1.44	15.73	13.31	0.42
Reach-1	5065	10 Year	27.04	111.85	113.58	112.87	113.69	0.002544	1.46	18.55	14.12	0.41
Reach-1	5065	25 Year	36.2	111.85	114	113.06	114.1	0.002038	1.46	24.73	15.74	0.37
Reach-1	5065	50 Year	45.59	111.85	114.37	113.24	114.48	0.001584	1.48	30.99	17.74	0.34
Reach-1	5065	100 Year	55.5	111.85	114.79	113.4	114.9	0.001202	1.47	38.52	29.08	0.31
Reach-1	5065	500 Year	84.24	111.85	115.82	113.83	115.88	0.00049	1.2	106.55	136.52	0.21
Reach-1	5042.5		Culvert									
Reach-1	5021	Fish Low Pa	0.02	111.3	111.31	111.31	111.31	0.05835	0.27	0.08	8.64	0.89
Reach-1	5021	Fish High Pa	0.93	111.3	111.5	111.41	111.51	0.003982	0.52	1.79	9.34	0.38
Reach-1	5021	2 Year	17.41	111.3	112.22	112.01	112.39	0.007859	1.83	9.5	12.18	0.66
Reach-1	5021	3 Year	19.6	111.3	112.3	112.06	112.48	0.007462	1.87	10.49	12.54	0.65
Reach-1	5021	5 Year	22.7	111.3	112.51	112.14	112.66	0.00512	1.72	13.22	13.48	0.55
Reach-1	5021	10 Year	27.04	111.3	112.83	112.23	112.95	0.003125	1.52	17.76	14.91	0.45
Reach-1	5021	25 Year	36.2	111.3	112.83	112.42	113.04	0.0056	2.04	17.76	14.91	0.6
Reach-1	5021	50 Year	45.59	111.3	113.41	112.59	113.55	0.002655	1.68	27.16	27.96	0.43
Reach-1	5021	100 Year	55.5	111.3	113.93	112.75	114.05	0.001515	1.53	36.22	49.1	0.34
Reach-1	5021	500 Year	84.24	111.3	114.42	113.15	114.6	0.001726	1.88	44.82	69.62	0.37

BEAVER POND BROOK - PROPOSED CONDITION, DESIGN DISCHARGE (W/ BACKWATER)
HEC-RAS 4.1.0 - "Six XS Bridge" Output

HEC-RAS Plan: PR_DOT River: Beaver Pond Brk Reach: Reach-1												
Reach	River Sta	Profile	E.G. Elev (m)	W.S. Elev (m)	Crit W.S. (m)	Frctn Loss (m)	C & E Loss (m)	Top Width (m)	Q Left (m3/s)	Q Channel (m3/s)	Q Right (m3/s)	Vel Chnl (m/s)
Reach-1	8583	Fish Low Pa	148.67	148.67	148.64	0.06	0	3.11		0.01		0.11
Reach-1	8583	Fish High Pa	148.9	148.89		0.03	0.02	17.05		0.51		0.21
Reach-1	8583	2 Year	149.39	149.39		0.01	0.03	53.57	0.31	3.39	0.1	0.2
Reach-1	8583	3 Year	149.46	149.46		0	0.03	56.74	0.42	3.75	0.13	0.19
Reach-1	8583	5 Year	149.52	149.51		0	0.03	59.24	0.52	4.21	0.17	0.2
Reach-1	8583	10 Year	149.6	149.59		0	0.03	61.21	0.69	4.88	0.24	0.2
Reach-1	8583	25 Year	149.74	149.74		0	0.05	67.29	1.07	6.44	0.42	0.22
Reach-1	8583	50 Year	149.85	149.85		0	0.06	69.2	1.41	7.65	0.57	0.23
Reach-1	8583	100 Year	149.82	149.81		0.01	0.03	68.51	1.66	9.29	0.66	0.29
Reach-1	8583	500 Year	149.99	149.99		0.01	0.08	75.12	2.75	13.53	1.12	0.36
Reach-1	8573	Fish Low Pa	148.6	148.59	148.58	0.15	0	0.78		0.01		0.46
Reach-1	8573	Fish High Pa	148.85	148.78	148.78	0.1	0	3.51		0.51		1.14
Reach-1	8573	2 Year	149.36	149.26	149.12	0.04	0.03	13.71		3.8		1.38
Reach-1	8573	3 Year	149.43	149.34	149.15			15.57		4.3		1.34
Reach-1	8573	5 Year	149.48	149.38	149.19			16.58		4.9		1.41
Reach-1	8573	10 Year	149.56	149.45	149.25			19.18		5.81		1.49
Reach-1	8573	25 Year	149.69	149.54	149.37			25.23		7.93		1.76
Reach-1	8573	50 Year	149.79	149.59	149.46			29.54		9.63		1.97
Reach-1	8573	100 Year	149.78	149.68	149.55			33.51		8.38	3.23	1.52
Reach-1	8573	500 Year	149.91	149.65	149.65	0.03	0.07	33.37		12.75	4.66	2.42
Reach-1	8565.5 BR U	Fish Low Pa	148.44	148.42	148.42			0.59		0.01		0.57
Reach-1	8565.5 BR U	Fish High Pa	148.73	148.64	148.65	0.12	0.01	2.45		0.51		1.37
Reach-1	8565.5 BR U	2 Year	149.28	149.08	149.08			7.93		3.8		1.98
Reach-1	8565.5 BR U	3 Year	149.33	149.14	149.14			12.5	0.02	4.28		1.98
Reach-1	8565.5 BR U	5 Year	149.38	149.2	149.2			17.72	0.12	4.78		1.91
Reach-1	8565.5 BR U	10 Year	149.44	149.29	149.29			24.34	0.46	5.35		1.8
Reach-1	8565.5 BR U	25 Year	149.54	149.37	149.37			25.25	1.21	6.72	0	1.96
Reach-1	8565.5 BR U	50 Year	149.61	149.43	149.43			25.87	1.82	7.81	0	2.1
Reach-1	8565.5 BR U	100 Year	149.68	149.48	149.48			26.54	2.59	9.01	0.01	2.23
Reach-1	8565.5 BR U	500 Year	149.76	149.63	149.63	0.05	0	28.37	3.74	9	4.67	1.84
Reach-1	8565.5 BR D	Fish Low Pa	148.07	148.06	148.06	0.63	0	1.72		0.01		0.42
Reach-1	8565.5 BR D	Fish High Pa	148.25	148.17	148.19	0.48	0.01	5.24		0.51		1.27
Reach-1	8565.5 BR D	2 Year	148.74	148.29	148.41	0.46	0.08	9.13		3.8		2.99
Reach-1	8565.5 BR D	3 Year	148.55	148.43	148.43			14.15	0.03	4.25	0.02	1.53
Reach-1	8565.5 BR D	5 Year	148.58	148.46	148.46			14.93	0.05	4.81	0.05	1.59
Reach-1	8565.5 BR D	10 Year	148.63	148.49	148.49			15.86	0.08	5.64	0.09	1.68
Reach-1	8565.5 BR D	25 Year	148.73	148.55	148.55			18.55	0.17	7.55	0.21	1.86
Reach-1	8565.5 BR D	50 Year	148.8	148.61	148.61			20.65	0.25	9.05	0.33	1.97
Reach-1	8565.5 BR D	100 Year	148.87	148.65	148.65			22.68	0.35	10.8	0.47	2.11
Reach-1	8565.5 BR D	500 Year	149.17	149.12	148.77	0.29	0.18	27.29	5.45	11.03	0.93	1.1
Reach-1	8554	Fish Low Pa	147.51	147.49	147.49	0.14	0	0.96		0.01		0.48
Reach-1	8554	Fish High Pa	147.72	147.66	147.66	0.17	0.02	4.11		0.51		1.1
Reach-1	8554	2 Year	148.18	148.03	147.98	0.16	0.04	5.3		3.8		1.71
Reach-1	8554	3 Year	148.24	148.09	148.02	0.15	0.04	5.77		4.3		1.69
Reach-1	8554	5 Year	148.3	148.15	148.06	0.15	0.03	6.28		4.9		1.68
Reach-1	8554	10 Year	148.38	148.24	148.13	0.14	0.03	6.98		5.81		1.67
Reach-1	8554	25 Year	148.53	148.36	148.25	0.16	0.02	8		7.93		1.8
Reach-1	8554	50 Year	148.63	148.46	148.34	0.16	0.02	8.78		9.63		1.84
Reach-1	8554	100 Year	148.75	148.58	148.42	0.13	0.02	16.14		11.61		1.82
Reach-1	8554	500 Year	149.15	149.06	148.63	0.04	0	26.01	1.94	15.45	0.02	1.34
Reach-1	8536	Fish Low Pa	146.96	146.95	146.92	0.52	0	1.08		0.01		0.18
Reach-1	8536	Fish High Pa	147.31	147.29	147.14	0.61	0.01	2.71		0.51		0.65
Reach-1	8536	2 Year	147.99	147.92		0.66	0.02	5.47		3.8		1.17
Reach-1	8536	3 Year	148.05	147.98		0.66	0.02	5.8		4.3		1.2
Reach-1	8536	5 Year	148.12	148.04		0.66	0.02	6.15		4.9		1.24
Reach-1	8536	10 Year	148.21	148.13		0.66	0.02	6.65		5.81		1.29
Reach-1	8536	25 Year	148.34	148.22		0.52	0	8.18	0	7.93		1.53
Reach-1	8536	50 Year	148.46	148.32		0.41	0	10.08	0.1	9.53		1.61
Reach-1	8536	100 Year	148.6	148.48		0.3	0.01	13.76	0.52	11.09		1.58
Reach-1	8536	500 Year	149.1	149.02		0.1	0	19.18	2.96	14.4	0.04	1.3
Reach-1	7977	Fish Low Pa	139.49	139.47	139.47	0.03	0	0.61		0.01		0.54
Reach-1	7977	Fish High Pa	139.77	139.7	139.7	0.13	0.02	2.94		0.51		1.2

HEC-RAS Plan: PR_DOT River: Beaver Pond Brk Reach: Reach-1												
Reach	River Sta	Profile	E.G. Elev (m)	W.S. Elev (m)	Crit W.S. (m)	Frctn Loss (m)	C & E Loss (m)	Top Width (m)	Q Left (m3/s)	Q Channel (m3/s)	Q Right (m3/s)	Vel Chnl (m/s)
Reach-1	7977	2 Year	140.34	140.25	140.07	0.11	0.01	5.72		3.8		1.3
Reach-1	7977	3 Year	140.41	140.33	140.11	0.11	0.01	6		4.3		1.29
Reach-1	7977	5 Year	140.53	140.46	140.15	0.1	0.01	6.5		4.9		1.18
Reach-1	7977	10 Year	140.62	140.55	140.21	0.11	0.01	6.86		5.81		1.22
Reach-1	7977	25 Year	140.78	140.69	140.33	0.15	0.01	7.39		7.93		1.38
Reach-1	7977	50 Year	141.11	141.04	140.42	0.08	0	8.71	0.02	9.6	0.01	1.14
Reach-1	7977	100 Year	141.41	141.35	140.51	0.06	0	9.86	0.1	11.44	0.07	1.06
Reach-1	7977	500 Year	141.87	141.8	140.75	0.06	0	11.51	0.39	16.71	0.3	1.17
Reach-1	7937	Fish Low Pa	139.11	139.11	139.05			2.79		0.01		0.06
Reach-1	7937	Fish High Pa	139.42	139.42	139.2			5.19		0.51		0.36
Reach-1	7937	2 Year	140.21	140.17	139.64			7.49		5.6		0.88
Reach-1	7937	3 Year	140.29	140.24	139.67			7.67		6.3		0.91
Reach-1	7937	5 Year	140.42	140.38	139.72			8		7.3		0.92
Reach-1	7937	10 Year	140.51	140.46	139.79			8.2		8.64		1.01
Reach-1	7937	25 Year	140.63	140.55	139.92			8.43		11.6		1.24
Reach-1	7937	50 Year	141.02	140.96	140.04			9.48	0	14.57	0.01	1.13
Reach-1	7937	100 Year	141.35	141.29	140.15			10.28	0.02	17.63	0.05	1.11
Reach-1	7937	500 Year	141.81	141.72	140.43			33.11	0.15	26.26	0.21	1.33
Reach-1	7911.5 BR U	Fish Low Pa	138.9	138.9	138.86			3.81		0.01		0.06
Reach-1	7911.5 BR U	Fish High Pa	139.16	139.16	138.98			4.39		0.51		0.4
Reach-1	7911.5 BR U	2 Year	140	139.93	139.42			4.39		5.6		1.2
Reach-1	7911.5 BR U	3 Year	140.09	140	139.46			4.39		6.3		1.26
Reach-1	7911.5 BR U	5 Year	140.42	140.3	139.52			4.39		7.3		1.16
Reach-1	7911.5 BR U	10 Year	140.35	140.24	139.6			4.39		8.64		1.43
Reach-1	7911.5 BR U	25 Year	140.63	140.3	139.76			4.39		11.6		1.84
Reach-1	7911.5 BR U	50 Year	141.02	140.3	139.9			4.39		14.58		2.32
Reach-1	7911.5 BR U	100 Year	141.35	140.3	140.05			4.39		17.7		2.81
Reach-1	7911.5 BR U	500 Year	141.81	141.72	141.89			29.77		21.04	5.49	3.32
Reach-1	7911.5 BR D	Fish Low Pa	138.9	138.9	138.87			4.39		0.01		0.06
Reach-1	7911.5 BR D	Fish High Pa	139.13	139.12	138.97			4.39		0.51		0.45
Reach-1	7911.5 BR D	2 Year	139.93	139.84	139.41			4.39		5.6		1.3
Reach-1	7911.5 BR D	3 Year	140.01	139.92	139.45			4.39		6.3		1.36
Reach-1	7911.5 BR D	5 Year	140.12	140.07	139.52			4.39		7.3		1.37
Reach-1	7911.5 BR D	10 Year	140.26	140.14	139.6			4.39		8.64		1.53
Reach-1	7911.5 BR D	25 Year	140.42	140.3	139.75			4.39		11.6		1.83
Reach-1	7911.5 BR D	50 Year	140.67	140.3	139.9			4.39		14.58		2.3
Reach-1	7911.5 BR D	100 Year	140.81	140.3	140.04			4.39		17.7		2.8
Reach-1	7911.5 BR D	500 Year	141.81	141.72	141.73			22.4		21.04	5.49	3.32
Reach-1	7885	Fish Low Pa	139.01	139.01	138.98	0.35	0	2.22		0.01		0.13
Reach-1	7885	Fish High Pa	139.23	139.22	139.14	0.27	0	4.92		0.51		0.61
Reach-1	7885	2 Year	139.92	139.88	139.53	0.2	0	9.33		5.6		0.95
Reach-1	7885	3 Year	139.99	139.94	139.56	0.2	0	9.59		6.3		0.97
Reach-1	7885	5 Year	140.12	140.07	139.61	0.16	0	10.15		7.3		0.94
Reach-1	7885	10 Year	140.2	140.15	139.66	0.17	0	10.49		8.64		1
Reach-1	7885	25 Year	140.42	140.37	139.77	0.16	0	13.87	0	11.56	0.04	1.05
Reach-1	7885	50 Year	140.67	140.62	139.87	0.1	0.01	15.11	0.02	14.35	0.22	1.04
Reach-1	7885	100 Year	140.81	140.75	139.97	0.1	0.01	15.77	0.04	17.28	0.38	1.14
Reach-1	7885	500 Year	141.06	140.96	140.2	0.14	0.01	16.83	0.16	25.65	0.82	1.46
Reach-1	7826	Fish Low Pa	138.66	138.65	138.65	0.14	0	0.88		0.01		0.5
Reach-1	7826	Fish High Pa	138.96	138.95	138.82	0.18	0	4.14		0.51		0.55
Reach-1	7826	2 Year	139.72	139.66	139.29	0.04	0.02	7.96		5.6		1.06
Reach-1	7826	3 Year	139.79	139.72	139.34	0.04	0.02	8.28		6.3		1.09
Reach-1	7826	5 Year	139.96	139.91	139.39	0.03	0.01	11.95		7.3		0.99
Reach-1	7826	10 Year	140.03	139.97	139.46	0.03	0.02	13.06		8.64		1.09
Reach-1	7826	25 Year	140.26	140.2	139.59	0.03	0.02	16.6	0	11.6		1.13
Reach-1	7826	50 Year	140.56	140.52	139.71	0.02	0.01	21.06	0.1	13.14	1.34	0.96
Reach-1	7826	100 Year	140.7	140.65	139.82	0.02	0.01	21.91	0.24	15.52	1.94	1.03
Reach-1	7826	500 Year	140.91	140.83	140.08	0.03	0.02	22.92	0.66	22.54	3.42	1.32
Reach-1	7711	Fish Low Pa	138.32	138.3	138.3	0.02	0.01	0.65		0.01		0.49
Reach-1	7711	Fish High Pa	138.66	138.65	138.53	0.01	0.01	5.6		0.51		0.53
Reach-1	7711	2 Year	139.66	139.66	138.92	0.01	0.01	65.96	0.13	4.95	0.51	0.23
Reach-1	7711	3 Year	139.72	139.72	138.94	0.01	0.01	66.88	0.16	5.51	0.63	0.24
Reach-1	7711	5 Year	139.91	139.91	138.96	0	0.01	69.91	0.2	6.23	0.87	0.23
Reach-1	7711	10 Year	139.97	139.97	138.99	0.01	0.02	70.9	0.24	7.32	1.08	0.25
Reach-1	7711	25 Year	140.21	140.21	139.05	0.01	0.02	72.98	0.34	9.5	1.75	0.27

HEC-RAS Plan: PR_DOT River: Beaver Pond Brk Reach: Reach-1												
Reach	River Sta	Profile	E.G. Elev (m)	W.S. Elev (m)	Crit W.S. (m)	Frctn Loss (m)	C & E Loss (m)	Top Width (m)	Q Left (m3/s)	Q Channel (m3/s)	Q Right (m3/s)	Vel Chnl (m/s)
Reach-1	7711	50 Year	140.53	140.52	139.1	0	0.03	77.85	0.45	11.54	2.59	0.27
Reach-1	7711	100 Year	140.66	140.66	139.15	0	0.03	81.4	0.55	13.85	3.3	0.3
Reach-1	7711	500 Year	140.86	140.85	139.27	0	0.07	89.48	9.3	13.88	3.45	0.27
Reach-1	7698	Fish Low Pa	138.27	138.27	138.23			4.05		0.01		0.07
Reach-1	7698	Fish High Pa	138.65	138.64	138.35			6.07		0.51		0.23
Reach-1	7698	2 Year	139.64	139.6	138.83			7.71		7.88		0.89
Reach-1	7698	3 Year	139.7	139.66	138.87			7.81		8.8		0.95
Reach-1	7698	5 Year	139.89	139.85	138.94			8.14		10.2		0.94
Reach-1	7698	10 Year	139.95	139.89	139.02			8.23		12.18		1.09
Reach-1	7698	25 Year	140.18	140.1	139.17			26.61		16.2		1.26
Reach-1	7698	50 Year	140.5	140.41	139.31			77.78		20.25		1.31
Reach-1	7698	100 Year	140.62	140.51	139.45			90.79		24.13	0.51	1.48
Reach-1	7698	500 Year	140.81	140.55	139.8			92.26		35.91	1.33	2.16
Reach-1	7689.5 BR U	Fish Low Pa	138.27	138.27	138.23			3.64		0.01		0.08
Reach-1	7689.5 BR U	Fish High Pa	138.64	138.64	138.35			5.17		0.51		0.25
Reach-1	7689.5 BR U	2 Year	139.64	139.57	138.87			5.17		7.88		1.16
Reach-1	7689.5 BR U	3 Year	139.7	139.62	138.92			5.17		8.8		1.24
Reach-1	7689.5 BR U	5 Year	139.89	139.75	138.99					10.2		1.31
Reach-1	7689.5 BR U	10 Year	139.95	139.75	139.07					12.18		1.57
Reach-1	7689.5 BR U	25 Year	140.18	139.75	139.25					16.2		2.09
Reach-1	7689.5 BR U	50 Year	140.5	139.75	139.41					20.25		2.61
Reach-1	7689.5 BR U	100 Year	140.62	140.51	139.57			32.11		20.38	4.36	2.62
Reach-1	7689.5 BR U	500 Year	140.78	140.55	140.88			34.19	0.45	22.84	10.92	2.94
Reach-1	7689.5 BR D	Fish Low Pa	138.21	138.21	138.18			3.07		0.01		0.1
Reach-1	7689.5 BR D	Fish High Pa	138.59	138.59	138.3			5.17		0.51		0.26
Reach-1	7689.5 BR D	2 Year	139.56	139.49	138.82			5.17		7.88		1.18
Reach-1	7689.5 BR D	3 Year	139.62	139.54	138.87			5.17		8.8		1.27
Reach-1	7689.5 BR D	5 Year	139.68	139.62	138.93			5.17		10.2		1.39
Reach-1	7689.5 BR D	10 Year	139.78	139.7	139.03			5.17		12.18		1.57
Reach-1	7689.5 BR D	25 Year	139.96	139.75	139.2					16.2		2.02
Reach-1	7689.5 BR D	50 Year	140.13	139.75	139.36					20.25		2.52
Reach-1	7689.5 BR D	100 Year	140.59	140.51	139.52			40.63		20.38	4.36	2.54
Reach-1	7689.5 BR D	500 Year	140.78	140.55	140.68			43.34	0.45	22.84	10.92	2.85
Reach-1	7681	Fish Low Pa	138.21	138.21	138.18	0.01	0	3.37		0.01		0.1
Reach-1	7681	Fish High Pa	138.59	138.59	138.3	0.01	0	6.26		0.51		0.23
Reach-1	7681	2 Year	139.55	139.51	138.78	0.03	0.01	8.42		7.88		0.92
Reach-1	7681	3 Year	139.61	139.56	138.82	0.03	0.01	8.54		8.8		0.99
Reach-1	7681	5 Year	139.68	139.62	138.88	0.04	0.01	8.67		10.2		1.09
Reach-1	7681	10 Year	139.78	139.7	138.96	0.04	0.01	9.64		12.18		1.23
Reach-1	7681	25 Year	139.96	139.85	139.1	0.05	0.01	13.62		16.2		1.48
Reach-1	7681	50 Year	140.13	139.98	139.24	0.06	0.01	20.22		20.25		1.71
Reach-1	7681	100 Year	140.29	140.1	139.37	0.07	0.01	43.23		24.64		1.94
Reach-1	7681	500 Year	140.57	140.16	139.71	0.06	0.14	64.28		37.24		2.84
Reach-1	7666	Fish Low Pa	138.21	138.21	138.13	0.07	0	2.42		0.01		0.06
Reach-1	7666	Fish High Pa	138.58	138.57	138.31	0.21	0.02	4.46		0.51		0.35
Reach-1	7666	2 Year	139.52	139.44	138.93	0.48	0.01	13.54	0.09	7.5	0.28	1.21
Reach-1	7666	3 Year	139.57	139.49	138.98	0.51	0.01	15.53	0.12	8.29	0.39	1.28
Reach-1	7666	5 Year	139.63	139.53	139.05	0.5	0.01	15.63	0.15	9.52	0.53	1.42
Reach-1	7666	10 Year	139.72	139.61	139.14	0.48	0.02	15.79	0.22	11.18	0.78	1.57
Reach-1	7666	25 Year	139.9	139.75	139.31	0.54	0.03	37.39	0.37	14.45	1.38	1.83
Reach-1	7666	50 Year	140.06	139.87	139.5	0.5	0.06	52.21	0.55	17.64	2.06	2.05
Reach-1	7666	100 Year	140.21	139.99	139.62	0.48	0.08	60.41	0.78	21.01	2.84	2.27
Reach-1	7666	500 Year	140.36	140.24	139.93	0.29	0.03	74.66	0.98	20.14	16.12	1.89

BEAVER POND BROOK - PROPOSED CONDITION, DESIGN DISCHARGE (W/ BACKWATER)
HEC-RAS 4.1.0 - "Culvert Only" Output

HEC-RAS	Plan: PR_DOT	River: Beaver Pond Brk	Reach: Reach-1										
Reach	River Sta	Profile	E.G. US. (m)	W.S. US. (m)	E.G. IC (m)	E.G. OC (m)	Min El Weir Flow (m)	Q Culv Group (m3/s)	Q Weir (m3/s)	Delta WS (m)	Culv Vel US (m/s)	Culv Vel DS (m/s)	
Reach-1	8435.5 151007	Fish Low Pa	146.17	146.42	146.17	146.17	150.31	0.01		0.58	0.34	0.36	
Reach-1	8435.5 151007	Fish High Pa	146.42	146.62	146.42	146.41	150.31	0.51		0.63	1.27	1.58	
Reach-1	8435.5 151007	2 Year	147.17	147.07	147.17	147.15	150.31	3.8		0.77	2.48	3.12	
Reach-1	8435.5 151007	3 Year	147.26	147.11	147.26	147.24	150.31	4.3		0.78	2.59	3.24	
Reach-1	8435.5 151007	5 Year	147.36	147.17	147.36	147.34	150.31	4.9		0.81	2.7	3.36	
Reach-1	8435.5 151007	10 Year	147.5	147.24	147.5	147.48	150.31	5.81		0.82	2.86	3.52	
Reach-1	8435.5 151007	25 Year	147.81	147.65	147.81	147.79	150.31	7.93		1.12	3.17	3.84	
Reach-1	8435.5 151007	50 Year	148.04	147.92	148.04	148.02	150.31	9.63		1.3	3.38	4.04	
Reach-1	8435.5 151007	100 Year	148.29	148.2	148.29	148.26	150.31	11.61		1.49	3.6	4.25	
Reach-1	8435.5 151007	500 Year	148.99	148.93	148.99	148.92	150.31	17.41		1.99	4.12	4.72	

Culvert Output

File Type Options Help

River: Beaver Pond Brk Profile: 100 Year Culv Group: 151007

Reach: Reach-1 RS: 8435.5 Plan: PR_DOT

Plan: PR_DOT Beaver Pond Brk Reach-1 RS: 8435.5 Culv Group: 151007 Profile: 100 Year

Q Culv Group (m3/s)	11.61	Culv Full Len (m)	
# Barrels	1	Culv Vel US (m/s)	3.60
Q Barrel (m3/s)	11.61	Culv Vel DS (m/s)	4.25
E.G. US. (m)	148.29	Culv Inv El Up (m)	146.15
W.S. US. (m)	148.20	Culv Inv El Dn (m)	145.92
E.G. DS (m)	147.06	Culv Frctn Ls (m)	0.18
W.S. DS (m)	146.71	Culv Exit Loss (m)	0.89
Delta EG (m)	1.23	Culv Entr Loss (m)	0.16
Delta WS (m)	1.49	Q Weir (m3/s)	
E.G. IC (m)	148.29	Weir Sta Lft (m)	
E.G. OC (m)	148.26	Weir Sta Rgt (m)	
Culvert Control	Inlet	Weir Submerg	
Culv WS Inlet (m)	147.47	Weir Max Depth (m)	
Culv WS Outlet (m)	147.03	Weir Avg Depth (m)	
Culv Nml Depth (m)	1.05	Weir Flow Area (m2)	
Culv Crt Depth (m)	1.32	Min El Weir Flow (m)	150.31

Errors, Warnings and Notes

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

Note: During the supercritical calculations a hydraulic jump occurred at the outlet of (leaving) the culvert.

Warning: During the supercritical analysis, the program could not converge on a supercritical answer in the downstream cross section. The program used the solution with the least error.

Note: The flow in the culvert is entirely supercritical.

Select Profile

HEC-RAS Plan: PR_DOT River: Beaver Pond Brk Reach: Reach-1												
Reach	River Sta	Profile	E.G. US.	W.S. US.	E.G. IC	E.G. OC	Min El Weir Flow	Q Culv Group	Q Weir	Delta WS	Culv Vel US	Culv Vel DS
			(m)	(m)	(m)	(m)	(m)	(m ³ /s)	(m ³ /s)	(m)	(m/s)	(m/s)
Reach-1	8332.5 #2-East Cell	Fish Low Pa	143.16	143.18	143.15	143.16	150.91	0		0.76	0.28	0.37
Reach-1	8332.5 #1-West Ce	Fish Low Pa	143.16	143.18	143.14	143.16	150.91	0.01		0.76	0.38	0.18
Reach-1	8332.5 #2-East Cell	Fish High Pass.					150.91					
Reach-1	8332.5 #1-West Ce	Fish High Pass.					150.91					
Reach-1	8332.5 #2-East Cell	2 Year	143.91	143.85	143.8	143.9	150.91	1.86		0.75	2.05	3.57
Reach-1	8332.5 #1-West Ce	2 Year	143.91	143.85	143.82	143.91	150.91	1.94		0.75	2.08	3.65
Reach-1	8332.5 #2-East Cell	3 Year	143.97	143.91	143.86	143.96	150.91	2.11		0.77	2.13	3.7
Reach-1	8332.5 #1-West Ce	3 Year	143.97	143.91	143.88	143.98	150.91	2.19		0.77	2.16	3.78
Reach-1	8332.5 #2-East Cell	5 Year	144.05	143.99	143.93	144.03	150.91	2.4		0.79	2.23	3.83
Reach-1	8332.5 #1-West Ce	5 Year	144.05	143.99	143.95	144.05	150.91	2.5		0.79	2.26	3.92
Reach-1	8332.5 #2-East Cell	10 Year	144.15	144.1	144.03	144.14	150.91	2.84		0.83	2.36	4.01
Reach-1	8332.5 #1-West Ce	10 Year	144.15	144.1	144.05	144.16	150.91	2.97		0.83	2.39	4.1
Reach-1	8332.5 #2-East Cell	25 Year	144.38	144.33	144.24	144.37	150.91	3.89		0.91	2.62	4.34
Reach-1	8332.5 #1-West Ce	25 Year	144.38	144.33	144.27	144.4	150.91	4.04		0.91	2.65	4.42
Reach-1	8332.5 #2-East Cell	50 Year	144.56	144.5	144.4	144.54	150.91	4.73		0.98	2.79	4.54
Reach-1	8332.5 #1-West Ce	50 Year	144.56	144.5	144.43	144.57	150.91	4.9		0.98	2.83	4.63
Reach-1	8332.5 #2-East Cell	100 Year	144.74	144.69	144.58	144.73	150.91	5.72		1.06	2.98	4.75
Reach-1	8332.5 #1-West Ce	100 Year	144.74	144.69	144.6	144.76	150.91	5.89		1.06	3.01	4.83
Reach-1	8332.5 #2-East Cell	500 Year	145.24	145.18	145.06	145.23	150.91	8.66		1.29	3.42	5.21
Reach-1	8332.5 #1-West Ce	500 Year	145.24	145.18	145.07	145.24	150.91	8.75		1.29	3.43	5.27

Culvert Output

File Type Options Help

River: Beaver Pond Brk Profile: 100 Year Culv Group: #1-West Cell

Reach: Reach-1 RS: 8332.5 Plan: PR_DOT

Plan: PR_DOT	Beaver Pond Brk	Reach-1	RS: 8332.5	Culv Group: #1-West Cell	Profile: 100 Year
Q Culv Group (m ³ /s)	5.89	Culv Full Len (m)			
# Barrels	1	Culv Vel US (m/s)		3.01	
Q Barrel (m ³ /s)	5.89	Culv Vel DS (m/s)		4.83	
E.G. US. (m)	144.74	Culv Inv El Up (m)	143.15		
W.S. US. (m)	144.69	Culv Inv El Dn (m)	142.41		
E.G. DS. (m)	143.72	Culv Frctn Ls (m)	0.36		
W.S. DS. (m)	143.63	Culv Exit Loss (m)	0.45		
Delta EG (m)	1.02	Culv Entr Loss (m)	0.23		
Delta WS (m)	1.06	Q Weir (m ³ /s)			
E.G. IC (m)	144.60	Weir Sta Lft (m)			
E.G. OC (m)	144.76	Weir Sta Rgt (m)			
Culvert Control		Weir Submerg			
Culv WS Inlet (m)	144.07	Weir Max Depth (m)			
Culv WS Outlet (m)	142.98	Weir Avg Depth (m)			
Culv Nml Depth (m)	0.50	Weir Flow Area (m ²)			
Culv Cr Depth (m)	0.92	Min El Weir Flow (m)	150.91		

Errors, Warnings and Notes

Warning: At least one culvert in the culvert group has supercritical flow at the outlet. However, since more than one culvert in the culvert group has flow, the program cannot determine if the downstream cross section should be subcritical or supercritical flow. The program used the downstream subcritical answer, even though it may not be valid.

Note: Multiple critical depths were found at this location. The critical depth with the lowest valid water surface was used.

Note: The flow in the culvert is entirely supercritical.

Select opening

Culvert Output

File Type Options Help

River: Beaver Pond Brk Profile: 100 Year Culv Group: #2-East Cell

Reach: Reach-1 RS: 8332.5 Plan: PR_DOT

Plan: PR_DOT	Beaver Pond Brk	Reach-1	RS: 8332.5	Culv Group: #2-East Cell	Profile: 100 Year
Q Culv Group (m ³ /s)	5.72	Culv Full Len (m)			
# Barrels	1	Culv Vel US (m/s)		2.98	
Q Barrel (m ³ /s)	5.72	Culv Vel DS (m/s)		4.75	
E.G. US. (m)	144.74	Culv Inv El Up (m)	143.15		
W.S. US. (m)	144.69	Culv Inv El Dn (m)	142.44		
E.G. DS. (m)	143.72	Culv Frctn Ls (m)	0.35		
W.S. DS. (m)	143.63	Culv Exit Loss (m)	0.43		
Delta EG (m)	1.02	Culv Entr Loss (m)	0.23		
Delta WS (m)	1.06	Q Weir (m ³ /s)			
E.G. IC (m)	144.58	Weir Sta Lft (m)			
E.G. OC (m)	144.73	Weir Sta Rgt (m)			
Culvert Control		Weir Submerg			
Culv WS Inlet (m)	144.05	Weir Max Depth (m)			
Culv WS Outlet (m)	143.01	Weir Avg Depth (m)			
Culv Nml Depth (m)	0.49	Weir Flow Area (m ²)			
Culv Cr Depth (m)	0.90	Min El Weir Flow (m)	150.91		

Errors, Warnings and Notes

Warning: At least one culvert in the culvert group has supercritical flow at the outlet. However, since more than one culvert in the culvert group has flow, the program cannot determine if the downstream cross section should be subcritical or supercritical flow. The program used the downstream subcritical answer, even though it may not be valid.

Note: Multiple critical depths were found at this location. The critical depth with the lowest valid water surface was used.

Note: The flow in the culvert is entirely supercritical.

Enter to move to next downstream river station location

HEC-RAS Plan: PR_DOT River: Beaver Pond Brk Reach: Reach-1												
Reach	River Sta	Profile	E.G. US. (m)	W.S. US. (m)	E.G. IC (m)	E.G. OC (m)	Min El Weir Flow (m)	Q Culv Group (m3/s)	Q Weir (m3/s)	Delta WS (m)	Culv Vel US (m/s)	Culv Vel DS (m/s)
Reach-1	6445.5 014	Fish Low Pa	133.63	133.69	133.6	133.63	140.21	0.01		1.05	0.21	0.27
Reach-1	6445.5 014	Fish High Pa	133.79	133.78	133.75	133.79	140.21	0.51		1.03	0.98	1
Reach-1	6445.5 014	2 Year	134.83	134.78	134.71	134.83	140.21	9.4		1.48	2.64	2.68
Reach-1	6445.5 014	3 Year	134.93	134.88	134.81	134.93	140.21	10.6		1.53	2.75	2.78
Reach-1	6445.5 014	5 Year	135.07	135.02	134.94	135.07	140.21	12.3		1.61	2.89	2.89
Reach-1	6445.5 014	10 Year	135.24	135.19	135.1	135.24	140.21	14.58		1.69	3.03	3.06
Reach-1	6445.5 014	25 Year	135.58	135.53	135.44	135.58	140.21	19.5		1.85	3.28	3.37
Reach-1	6445.5 014	50 Year	135.89	135.84	135.75	135.89	140.21	24.49		1.89	3.47	3.64
Reach-1	6445.5 014	100 Year	136.21	136.15	136.07	136.21	140.21	29.87		1.91	3.63	3.88
Reach-1	6445.5 014	500 Year	137.02	136.96	136.9	137.02	140.21	45.17		1.92	3.96	3.96

Culvert Output

File Type Options Help

River: Beaver Pond Brk Profile: 100 Year Culv Group: 014

Reach: Reach-1 RS: 6445.5 Plan: PR_DOT

Plan: PR_DOT Beaver Pond Brk Reach-1 RS: 6445.5 Culv Group: 014 Profile: 100 Year

Q Culv Group (m3/s)	29.87	Culv Full Len (m)	
# Barrels	2	Culv Vel US (m/s)	3.63
Q Barrel (m3/s)	14.94	Culv Vel DS (m/s)	3.88
E.G. US. (m)	136.21	Culv Inv El Up (m)	133.40
W.S. US. (m)	136.15	Culv Inv El Dn (m)	132.54
E.G. DS (m)	134.53	Culv Frctn Ls (m)	0.87
W.S. DS (m)	134.25	Culv Exit Loss (m)	0.54
Delta EG (m)	1.68	Culv Entr Loss (m)	0.27
Delta WS (m)	1.91	Q Weir (m3/s)	
E.G. IC (m)	136.07	Weir Sta Lft (m)	
E.G. OC (m)	136.21	Weir Sta Rgt (m)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (m)	135.26	Weir Max Depth (m)	
Culv WS Outlet (m)	134.30	Weir Avg Depth (m)	
Culv Nml Depth (m)	1.86	Weir Flow Area (m2)	
Culv Crt Depth (m)	1.76	Min El Weir Flow (m)	140.21

Errors, Warnings and Notes

Enter to move to next downstream river station location

HEC-RAS Plan: PR_DOT River: Beaver Pond Brk Reach: Reach-1												
Reach	River Sta	Profile	E.G. US. (m)	W.S. US. (m)	E.G. IC (m)	E.G. OC (m)	Min El Weir Flow (m)	Q Culv Group (m3/s)	Q Weir (m3/s)	Delta WS (m)	Culv Vel US (m/s)	Culv Vel DS (m/s)
Reach-1	6349.5 06622	Fish Low Pa	132.09	132.09	131.74	131.77	137.7	0.01		1.68	0.21	0.27
Reach-1	6349.5 06622	Fish High Pa	131.93	132.18	131.89	131.93	137.7	0.51		1.66	0.98	1
Reach-1	6349.5 06622	2 Year	133.04	132.7	132.85	132.97	137.7	9.4		1.58	2.64	2.68
Reach-1	6349.5 06622	3 Year	133.11	132.75	132.95	133.07	137.7	10.6		1.58	2.75	2.78
Reach-1	6349.5 06622	5 Year	133.21	132.95	133.08	133.21	137.7	12.3		1.71	2.89	2.89
Reach-1	6349.5 06622	10 Year	133.38	133.18	133.24	133.38	137.7	14.58		1.87	3.03	3.06
Reach-1	6349.5 06622	25 Year	133.72	133.56	133.58	133.72	137.7	19.5		2.11	3.28	3.37
Reach-1	6349.5 06622	50 Year	134.03	133.89	133.89	134.03	137.7	24.49		2.3	3.47	3.64
Reach-1	6349.5 06622	100 Year	134.35	134.22	134.21	134.35	137.7	29.87		2.49	3.63	3.88
Reach-1	6349.5 06622	500 Year	135.16	135.04	135.04	135.16	137.7	45.17		3.02	3.96	4.46

Culvert Output

File Type Options Help

River: Beaver Pond Brk Profile: 100 Year Culv Group: 06622

Reach: Reach-1 RS: 6349.5 Plan: PR_DOT

Plan: PR_DOT Beaver Pond Brk Reach-1 RS: 6349.5 Culv Group: 06622 Profile: 100 Year

Q Culv Group (m3/s)	29.87	Culv Full Len (m)	
# Barrels	2	Culv Vel US (m/s)	3.63
Q Barrel (m3/s)	14.94	Culv Vel DS (m/s)	3.88
E.G. US. (m)	134.35	Culv Inv El Up (m)	131.54
W.S. US. (m)	134.22	Culv Inv El Dn (m)	130.58
E.G. DS (m)	132.18	Culv Frctn Ls (m)	0.97
W.S. DS (m)	131.73	Culv Exit Loss (m)	0.92
Delta EG (m)	2.16	Culv Entr Loss (m)	0.27
Delta WS (m)	2.49	Q Weir (m3/s)	
E.G. IC (m)	134.21	Weir Sta Lt (m)	
E.G. OC (m)	134.35	Weir Sta Rgt (m)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (m)	133.41	Weir Max Depth (m)	
Culv WS Outlet (m)	132.34	Weir Avg Depth (m)	
Culv Nml Depth (m)	1.86	Weir Flow Area (m2)	
Culv Crt Depth (m)	1.76	Min El Weir Flow (m)	137.70

Errors, Warnings and Notes

Enter to move to next downstream river station location

HEC-RAS Plan: PR_DOT River: Beaver Pond Brk Reach: Reach-1												
Reach	River Sta	Profile	E.G. US.	W.S. US.	E.G. IC	E.G. OC	Min El Weir Flow	Q Culv Group	Q Weir	Delta WS	Culv Vel US	Culv Vel DS
			(m)	(m)	(m)	(m)	(m)	(m ³ /s)	(m ³ /s)	(m)	(m/s)	(m/s)
Reach-1	5996.5	02537 West	Fish Low Pa	127.45	127.45	127.45	127.45	131.6	0	1.33	0.12	0.22
Reach-1	5996.5	02537 East	Fish Low Pa	127.45	127.45	127.45	127.46	131.6	0.01	1.33	0.31	0.31
Reach-1	5996.5	02537 West	Fish High Pa	127.62	127.61	127.59	127.62	131.6	0.24	1.33	0.63	0.99
Reach-1	5996.5	02537 East	Fish High Pa	127.62	127.61	127.61	127.61	131.6	0.27	1.33	1.03	1.2
Reach-1	5996.5	02537 West	2 Year	128.66	128.62	128.5	128.66	131.6	4.37	1.57	1.71	2.6
Reach-1	5996.5	02537 East	2 Year	128.66	128.62	128.61	128.65	131.6	5.03	1.57	2.73	3.35
Reach-1	5996.5	02537 West	3 Year	128.76	128.72	128.59	128.77	131.6	4.93	1.59	1.78	2.71
Reach-1	5996.5	02537 East	3 Year	128.76	128.72	128.71	128.75	131.6	5.67	1.59	2.84	3.47
Reach-1	5996.5	02537 West	5 Year	128.9	128.85	128.71	128.91	131.6	5.71	1.63	1.87	2.84
Reach-1	5996.5	02537 East	5 Year	128.9	128.85	128.84	128.89	131.6	6.59	1.63	2.98	3.62
Reach-1	5996.5	02537 West	10 Year	129.07	129.02	128.86	129.08	131.6	6.75	1.68	1.97	3.01
Reach-1	5996.5	02537 East	10 Year	129.07	129.02	129.01	129.07	131.6	7.83	1.68	3.16	3.79
Reach-1	5996.5	02537 West	25 Year	129.42	129.37	129.17	129.44	131.6	9.05	1.75	2.17	3.31
Reach-1	5996.5	02537 East	25 Year	129.42	129.37	129.34	129.41	131.6	10.45	1.75	3.48	4.1
Reach-1	5996.5	02537 West	50 Year	129.75	129.69	129.43	129.74	131.6	11.16	1.86	2.33	3.55
Reach-1	5996.5	02537 East	50 Year	129.75	129.69	129.68	129.76	131.6	13.33	1.86	3.77	4.37
Reach-1	5996.5	02537 West	100 Year	130.09	130.03	129.71	130.09	131.6	13.56	2.02	2.5	3.79
Reach-1	5996.5	02537 East	100 Year	130.09	130.03	130.01	130.09	131.6	16.31	2.02	4.03	4.6
Reach-1	5996.5	02537 West	500 Year	131.29	131.24	130.2	131.29	131.6	18.2	2.76	3.36	4.18
Reach-1	5996.5	02537 East	500 Year	131.29	131.24	131.31	131.28	131.6	26.97	2.76	4.98	4.98

Culvert Output

File Type Options Help

River: Beaver Pond Brk Profile: 100 Year Culv Group: 02537 West

Reach: Reach-1 RS: 5996.5 Plan: PR_DOT

Plan: PR_DOT	Beaver Pond Brk	Reach-1	RS: 5996.5	Culv Group: 02537 West	Profile: 100 Year
Q Culv Group (m ³ /s)	13.56	Culv Full Len (m)			5.68
# Barrels	1	Culv Vel US (m/s)			2.50
Q Barrel (m ³ /s)	13.56	Culv Vel DS (m/s)			3.79
E.G. US. (m)	130.09	Culv Inv El Up (m)			127.22
W.S. US. (m)	130.03	Culv Inv El Dn (m)			126.88
E.G. DS (m)	128.32	Culv Frctn Ls (m)			0.73
W.S. DS (m)	128.01	Culv Exit Loss (m)			0.97
Delta EG (m)	1.77	Culv Entr Loss (m)			0.06
Delta WS (m)	2.02	Q Weir (m ³ /s)			
E.G. IC (m)	129.71	Weir Sta Lft (m)			
E.G. OC (m)	130.09	Weir Sta Rgt (m)			
Culvert Control	Outlet	Weir Submerg			
Culv WS Inlet (m)	129.66	Weir Max Depth (m)			
Culv WS Outlet (m)	128.57	Weir Avg Depth (m)			
Culv Nml Depth (m)	2.44	Weir Flow Area (m ²)			
Culv Crt Depth (m)	1.69	Min El Weir Flow (m)			131.60

Errors, Warnings and Notes

Warning: At least one culvert in the culvert group has supercritical flow at the outlet. However, since more than one culvert in the culvert group has flow, the program cannot determine if the downstream cross section should be subcritical or supercritical flow. The program used the downstream subcritical answer, even though it may not be valid.

Note: Multiple critical depths were found at this location. The critical depth with the lowest valid water surface was used.

Note: The normal depth exceeds the height of the culvert. The program assumes that the normal depth is equal to the height of the culvert.

Enter to move to next downstream river station location

Culvert Output

File Type Options Help

River: Beaver Pond Brk Profile: 100 Year Culv Group: 02537 East

Reach: Reach-1 RS: 5996.5 Plan: PR_DOT

Plan: PR_DOT	Beaver Pond Brk	Reach-1	RS: 5996.5	Culv Group: 02537 East	Profile: 100 Year
Q Culv Group (m ³ /s)	16.31	Culv Full Len (m)			4.03
# Barrels	1	Culv Vel US (m/s)			4.60
Q Barrel (m ³ /s)	16.31	Culv Vel DS (m/s)			127.22
E.G. US. (m)	130.09	Culv Inv El Up (m)			126.88
W.S. US. (m)	130.03	Culv Inv El Dn (m)			0.30
E.G. DS (m)	128.32	Culv Frctn Ls (m)			1.31
W.S. DS (m)	128.01	Culv Exit Loss (m)			0.17
Delta EG (m)	1.77	Culv Entr Loss (m)			
Delta WS (m)	2.02	Q Weir (m ³ /s)			
E.G. IC (m)	130.01	Weir Sta Lft (m)			
E.G. OC (m)	130.09	Weir Sta Rgt (m)			
Culvert Control	Outlet	Weir Submerg			
Culv WS Inlet (m)	129.10	Weir Max Depth (m)			
Culv WS Outlet (m)	128.55	Weir Avg Depth (m)			
Culv Nml Depth (m)	1.64	Weir Flow Area (m ²)			
Culv Crt Depth (m)	1.88	Min El Weir Flow (m)			131.60

Errors, Warnings and Notes

Warning: At least one culvert in the culvert group has supercritical flow at the outlet. However, since more than one culvert in the culvert group has flow, the program cannot determine if the downstream cross section should be subcritical or supercritical flow. The program used the downstream subcritical answer, even though it may not be valid.

Note: Multiple critical depths were found at this location. The critical depth with the lowest valid water surface was used.

Warning: During the supercritical analysis, the program could not converge on a supercritical answer in the downstream cross section. The program used the solution with the least error.

Select opening

HEC-RAS Plan: PR_DOT River: Beaver Pond Brk Reach: Reach-1												
Reach	River Sta	Profile	E.G. US. (m)	W.S. US. (m)	E.G. IC (m)	E.G. OC (m)	Min El Weir Flow (m)	Q Culv Group (m3/s)	Q Weir (m3/s)	Delta WS (m)	Culv Vel US (m/s)	Culv Vel DS (m/s)
Reach-1	5295.5 01227	Fish Low Pa	115.19	115.19	115.19	115.19	120.3	0.02		2.15	0.24	0.32
Reach-1	5295.5 01227	Fish High Pa	115.36	115.36	115.36	115.36	120.3	0.93		2.05	1.02	1.09
Reach-1	5295.5 01227	2 Year	116.54	116.47	116.5	116.54	120.3	17.41		2.05	2.9	2.07
Reach-1	5295.5 01227	3 Year	116.65	116.57	116.6	116.65	120.3	19.6		2.06	3.02	2.17
Reach-1	5295.5 01227	5 Year	116.81	116.71	116.75	116.81	120.3	22.7		2.09	3.17	2.31
Reach-1	5295.5 01227	10 Year	117.01	116.9	116.95	117.01	120.3	27.04		2.13	3.33	2.49
Reach-1	5295.5 01227	25 Year	117.4	117.27	117.33	117.4	120.3	36.2		2.24	3.61	2.86
Reach-1	5295.5 01227	50 Year	117.77	117.61	117.69	117.77	120.3	45.59		2.36	3.83	3.21
Reach-1	5295.5 01227	100 Year	118.13	117.95	118.04	118.13	120.3	55.5		2.51	4.03	3.57
Reach-1	5295.5 01227	500 Year	119.09	118.84	118.97	119.09	120.3	84.24		2.73	4.42	4.16

Culvert Output

File Type Options Help

River: Beaver Pond Brk Profile: 100 Year Culv Group: 01227

Reach: Reach-1 RS: 5295.5 Plan: PR_DOT

Plan: PR_DOT Beaver Pond Brk Reach-1 RS: 5295.5 Culv Group: 01227 Profile: 100 Year

Q Culv Group (m3/s)	55.50	Culv Full Len (m)	
# Barrels	2	Culv Vel US (m/s)	4.03
Q Barrel (m3/s)	27.75	Culv Vel DS (m/s)	3.57
E.G. US. (m)	118.13	Culv Inv El Up (m)	114.95
W.S. US. (m)	117.95	Culv Inv El Dn (m)	113.00
E.G. DS (m)	115.52	Culv Frctn Ls (m)	1.87
W.S. DS (m)	115.44	Culv Exit Loss (m)	0.57
Delta EG (m)	2.61	Culv Entr Loss (m)	0.17
Delta WS (m)	2.51	Q Weir (m3/s)	
E.G. IC (m)	118.04	Weir Sta Lft (m)	
E.G. OC (m)	118.13	Weir Sta Rgt (m)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (m)	117.14	Weir Max Depth (m)	
Culv WS Outlet (m)	115.44	Weir Avg Depth (m)	
Culv Nml Depth (m)	2.19	Weir Flow Area (m2)	
Culv Crt Depth (m)	2.08	Min El Weir Flow (m)	120.30

Errors, Warnings and Notes

Enter to move to next downstream river station location

HEC-RAS Plan: PR_DOT River: Beaver Pond Brk Reach: Reach-1												
Reach	River Sta	Profile	E.G. US. (m)	W.S. US. (m)	E.G. IC (m)	E.G. OC (m)	Min El Weir Flow (m)	Q Culv Group (m3/s)	Q Weir (m3/s)	Delta WS (m)	Culv Vel US (m/s)	Culv Vel DS (m/s)
Reach-1	5042.5	03727	Fish Low Pa	111.77	111.86	111.74	111.77	115.35	0.02	0.55	0.24	0.32
Reach-1	5042.5	03727	Fish High Pa	111.96	111.98	111.91	111.96	115.35	0.93	0.47	1.02	0.67
Reach-1	5042.5	03727	2 Year	113.2	113.1	113.08	113.2	115.35	17.41	0.88	2.87	2.7
Reach-1	5042.5	03727	3 Year	113.32	113.22	113.19	113.32	115.35	19.6	0.92	2.97	2.8
Reach-1	5042.5	03727	5 Year	113.48	113.38	113.35	113.48	115.35	22.7	0.87	3.1	2.68
Reach-1	5042.5	03727	10 Year	113.69	113.58	113.56	113.69	115.35	27.04	0.75	3.22	2.53
Reach-1	5042.5	03727	25 Year	114.1	114	113.96	114.1	115.35	36.2	1.17	3.54	3.38
Reach-1	5042.5	03727	50 Year	114.48	114.37	114.35	114.48	115.35	45.59	0.96	3.57	3.09
Reach-1	5042.5	03727	100 Year	114.9	114.79	114.73	114.9	115.35	55.5	0.86	3.43	3.01
Reach-1	5042.5	03727	500 Year	115.88	115.82	115.86	115.88	115.35	80.6	3.64	3.71	3.71

Culvert Output

File Type Options Help

River: Beaver Pond Brk Profile: 100 Year Culv Group: 03727

Reach: Reach-1 RS: 5042.5 Plan: PR_DOT

Plan: PR_DOT Beaver Pond Brk Reach-1 RS: 5042.5 Culv Group: 03727 Profile: 100 Year

Q Culv Group (m3/s)	55.50	Culv Full Len (m)	
# Barrels	2	Culv Vel US (m/s)	3.43
Q Barrel (m3/s)	27.75	Culv Vel DS (m/s)	3.01
E.G. US. (m)	114.90	Culv Inv El Up (m)	111.15
W.S. US. (m)	114.79	Culv Inv El Dn (m)	110.70
E.G. DS (m)	114.05	Culv Frctn Ls (m)	0.27
W.S. DS (m)	113.93	Culv Exit Loss (m)	0.34
Delta EG (m)	0.85	Culv Entr Loss (m)	0.24
Delta WS (m)	0.86	Q Weir (m3/s)	
E.G. IC (m)	114.73	Weir Sta Lft (m)	
E.G. OC (m)	114.90	Weir Sta Rgt (m)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (m)	114.06	Weir Max Depth (m)	
Culv WS Outlet (m)	113.93	Weir Avg Depth (m)	
Culv Nml Depth (m)	2.61	Weir Flow Area (m2)	
Culv Cit Depth (m)	2.46	Min El Weir Flow (m)	115.35

Errors, Warnings and Notes

Select River Station

BEAVER POND BROOK - EXISTING CONDITION, DESIGN DISCHARGE (W/ BACKWATER)
HEC-RAS 4.1.0 - "Standard Table 1" Output

HEC-RAS Plan: EX_DOT River: Beaver Pond Brk Reach: Reach-1													
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl	
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)		
Reach-1	8722	Fish Low Pa	0.01	148.65	148.81	148.72	148.81	0.000938	0.14	0.07	0.93		0.15
Reach-1	8722	Fish High Pa	0.51	148.65	149.21	149.01	149.22	0.00308	0.56	0.9	3.29		0.34
Reach-1	8722	2 Year	3.8	148.65	149.47	149.45	149.63	0.021875	1.76	2.15	6.09		0.95
Reach-1	8722	3 Year	4.3	148.65	149.48	149.48	149.67	0.025174	1.91	2.25	6.23		1.02
Reach-1	8722	5 Year	4.9	148.65	149.52	149.52	149.72	0.024905	1.96	2.5	6.6		1.02
Reach-1	8722	10 Year	5.81	148.65	149.58	149.58	149.78	0.024634	2.03	2.87	7.11		1.02
Reach-1	8722	25 Year	7.93	148.65	149.68	149.69	149.92	0.024058	2.15	3.69	8.12		1.02
Reach-1	8722	50 Year	9.63	148.65	149.79	149.76	150.01	0.020144	2.1	4.59	9.11		0.94
Reach-1	8722	100 Year	11.61	148.65	149.92	149.84	150.12	0.014956	1.99	5.85	10.72		0.83
Reach-1	8722	500 Year	17.41	148.65	150.02	150.02	150.34	0.019446	2.52	7.06	12.6		0.97
Reach-1	8640	Fish Low Pa	0.01	148.65	148.73	148.69	148.73	0.00078	0.08	0.12	2.84		0.13
Reach-1	8640	Fish High Pa	0.51	148.65	148.97	148.83	148.98	0.00257	0.39	1.32	7.75		0.3
Reach-1	8640	2 Year	3.8	148.65	149.38	149.1	149.39	0.000678	0.28	13.75	49.6		0.17
Reach-1	8640	3 Year	4.3	148.65	149.43	149.18	149.44	0.000505	0.26	16.28	50.33		0.15
Reach-1	8640	5 Year	4.9	148.65	149.49	149.19	149.49	0.000395	0.26	19.08	51.14		0.13
Reach-1	8640	10 Year	5.81	148.65	149.57	149.21	149.57	0.000295	0.25	23.22	52.38		0.12
Reach-1	8640	25 Year	7.93	148.65	149.74	149.24	149.74	0.000189	0.25	32.22	54.79		0.1
Reach-1	8640	50 Year	9.63	148.65	149.85	149.26	149.86	0.000155	0.25	38.76	55.9		0.09
Reach-1	8640	100 Year	11.61	148.65	149.98	149.28	149.98	0.000133	0.26	45.79	57.1		0.09
Reach-1	8640	500 Year	17.41	148.65	150.11	149.34	150.12	0.000182	0.33	53.56	58.31		0.11
Reach-1	8583	Fish Low Pa	0.01	148.61	148.67		148.67	0.002496	0.12	0.09	3.07		0.22
Reach-1	8583	Fish High Pa	0.51	148.61	148.89		148.9	0.000882	0.21	2.48	17.08		0.17
Reach-1	8583	2 Year	3.8	148.61	149.37		149.37	0.000177	0.21	20.78	52.84		0.09
Reach-1	8583	3 Year	4.3	148.61	149.42		149.42	0.000155	0.21	23.65	54.95		0.09
Reach-1	8583	5 Year	4.9	148.61	149.48		149.48	0.000139	0.21	26.86	57.65		0.09
Reach-1	8583	10 Year	5.81	148.61	149.56		149.56	0.000122	0.21	31.71	59.9		0.08
Reach-1	8583	25 Year	7.93	148.61	149.73		149.73	0.0001	0.22	42.54	67.07		0.08
Reach-1	8583	50 Year	9.63	148.61	149.85		149.85	0.000091	0.23	50.64	69.18		0.08
Reach-1	8583	100 Year	11.61	148.61	149.97		149.98	0.000084	0.24	59.72	74.93		0.07
Reach-1	8583	500 Year	17.41	148.61	150.11		150.11	0.000124	0.32	69.79	76.91		0.09
Reach-1	8573	Fish Low Pa	0.01	148.53	148.58	148.58	148.6	0.054985	0.52	0.02	0.73		1.01
Reach-1	8573	Fish High Pa	0.51	148.53	148.78	148.78	148.85	0.03291	1.14	0.45	3.51		1.02
Reach-1	8573	2 Year	3.8	148.53	149.12	149.12	149.31	0.022597	1.91	1.99	5.24		0.99
Reach-1	8573	3 Year	4.3	148.53	149.15	149.15	149.36	0.0233	2	2.14	5.36		1.01
Reach-1	8573	5 Year	4.9	148.53	149.19	149.19	149.41	0.022346	2.06	2.38	5.53		1
Reach-1	8573	10 Year	5.81	148.53	149.25	149.25	149.49	0.021807	2.15	2.7	5.75		1
Reach-1	8573	25 Year	7.93	148.53	149.37	149.37	149.65	0.020992	2.33	3.4	8.5		1
Reach-1	8573	50 Year	9.63	148.53	149.46	149.46	149.76	0.02026	2.43	3.96	11.2		1
Reach-1	8573	100 Year	11.61	148.53	149.55	149.55	149.88	0.019576	2.53	4.58	14.04		1
Reach-1	8573	500 Year	17.41	148.53	149.76	149.76	150.03	0.013942	2.43	9.07	18.33		0.87
Reach-1	8554	Fish Low Pa	0.01	147.45	147.49	147.49	147.51	0.065619	0.49	0.02	0.94		1.07
Reach-1	8554	Fish High Pa	0.51	147.45	147.61	147.66	147.77	0.130779	1.75	0.29	3.42		1.91
Reach-1	8554	2 Year	3.8	147.45	147.81	147.98	148.38	0.123011	3.36	1.13	4.64		2.17
Reach-1	8554	3 Year	4.3	147.45	147.84	148.02	148.43	0.112064	3.41	1.26	4.69		2.1
Reach-1	8554	5 Year	4.9	147.45	147.86	148.06	148.5	0.109563	3.54	1.38	4.74		2.09
Reach-1	8554	10 Year	5.81	147.45	147.9	148.13	148.6	0.103983	3.7	1.57	4.82		2.07
Reach-1	8554	25 Year	7.93	147.45	147.99	148.25	148.79	0.092309	3.96	2	4.99		2
Reach-1	8554	50 Year	9.63	147.45	148.06	148.34	148.91	0.0899	4.09	2.35	5.49		2
Reach-1	8554	100 Year	11.61	147.45	148.13	148.42	149.04	0.08862	4.23	2.74	6.05		2.01
Reach-1	8554	500 Year	17.41	147.45	149.06	148.63	149.15	0.002854	1.34	17.56	26.01		0.42
Reach-1	8536	Fish Low Pa	0.01	146.85	146.95	146.9	146.96	0.002717	0.18	0.06	1.08		0.25
Reach-1	8536	Fish High Pa	0.51	146.85	147.29	147.13	147.31	0.003892	0.65	0.79	2.71		0.38
Reach-1	8536	2 Year	3.8	146.85	147.92	147.61	147.99	0.004979	1.17	3.25	5.47		0.48
Reach-1	8536	3 Year	4.3	146.85	147.98	147.65	148.05	0.004965	1.2	3.59	5.8		0.49
Reach-1	8536	5 Year	4.9	146.85	148.04	147.71	148.12	0.00503	1.24	3.96	6.15		0.49
Reach-1	8536	10 Year	5.81	146.85	148.13	147.78	148.21	0.00504	1.29	4.51	6.65		0.5
Reach-1	8536	25 Year	7.93	146.85	148.22	147.92	148.34	0.006511	1.53	5.18	8.18		0.57
Reach-1	8536	50 Year	9.63	146.85	148.32	148.02	148.46	0.006217	1.61	6.16	10.08		0.57
Reach-1	8536	100 Year	11.61	146.85	148.48	148.12	148.6	0.004897	1.58	7.98	13.76		0.52
Reach-1	8536	500 Year	17.41	146.85	149.02		149.1	0.00181	1.3	16.85	19.18		0.34
Reach-1	8464	Fish Low Pa	0.01	146.37	146.42	146.42	146.43	0.05582	0.5	0.02	0.82		1.01
Reach-1	8464	Fish High Pa	0.51	146.37	146.62	146.62	146.7	0.032509	1.29	0.4	2.45		1.03
Reach-1	8464	2 Year	3.8	146.37	147.07	147.07	147.31	0.023191	2.17	1.75	3.61		1

HEC-RAS Plan: EX_DOT River: Beaver Pond Brk Reach: Reach-1												
Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
Reach-1	8464	3 Year	4.3	146.37	147.11	147.11	147.37	0.023371	2.25	1.91	3.75	1.01
Reach-1	8464	5 Year	4.9	146.37	147.17	147.17	147.44	0.022385	2.29	2.14	3.96	0.99
Reach-1	8464	10 Year	5.81	146.37	147.24	147.24	147.53	0.022192	2.38	2.44	4.22	1
Reach-1	8464	25 Year	7.93	146.37	147.65	147.4	147.81	0.008413	1.77	4.48	5.86	0.65
Reach-1	8464	50 Year	9.63	146.37	147.92	147.5	148.04	0.005358	1.55	6.22	7.11	0.53
Reach-1	8464	100 Year	11.61	146.37	148.2	147.61	148.29	0.003645	1.39	8.37	8.48	0.45
Reach-1	8464	500 Year	17.41	146.37	148.93	147.89	148.99	0.001195	1.1	18.53	20.56	0.28
Reach-1	8435.5		Culvert									
Reach-1	8412	Fish Low Pa	0.01	145.8	145.82	145.84	147.27	69.91727	5.33	0	0.46	26.56
Reach-1	8412	Fish High Pa	0.51	145.8	145.93	145.99	146.12	0.158294	1.91	0.27	3.15	2.09
Reach-1	8412	2 Year	3.8	145.8	146.3	146.3	146.48	0.023747	1.91	1.99	5.43	1.01
Reach-1	8412	3 Year	4.3	145.8	146.33	146.33	146.53	0.022523	1.96	2.19	5.5	0.99
Reach-1	8412	5 Year	4.9	145.8	146.36	146.36	146.58	0.023044	2.07	2.37	5.56	1.01
Reach-1	8412	10 Year	5.81	145.8	146.42	146.42	146.66	0.022181	2.17	2.68	5.66	1
Reach-1	8412	25 Year	7.93	145.8	146.53	146.53	146.82	0.021582	2.38	3.33	5.87	1.01
Reach-1	8412	50 Year	9.63	145.8	146.62	146.62	146.94	0.020576	2.5	3.85	6.03	1
Reach-1	8412	100 Year	11.61	145.8	146.71	146.71	147.06	0.020241	2.64	4.4	6.2	1
Reach-1	8412	500 Year	17.41	145.8	146.95	146.95	147.39	0.019166	2.94	5.91	6.63	0.99
Reach-1	8393	Fish Low Pa	0.01	144.34	144.38	144.37	144.39	0.019335	0.28	0.04	1.5	0.59
Reach-1	8393	Fish High Pa	0.51	144.34	144.51	144.53	144.57	0.044579	1.08	0.47	5.11	1.13
Reach-1	8393	2 Year	3.8	144.34	144.62	144.8	145.3	0.196909	3.66	1.04	5.34	2.66
Reach-1	8393	3 Year	4.3	144.34	144.64	144.83	145.38	0.193525	3.82	1.13	5.38	2.66
Reach-1	8393	5 Year	4.9	144.34	144.66	144.87	145.44	0.177915	3.9	1.26	5.43	2.59
Reach-1	8393	10 Year	5.81	144.34	144.69	144.92	145.54	0.167647	4.07	1.43	5.5	2.55
Reach-1	8393	25 Year	7.93	144.34	144.76	145.03	145.73	0.146157	4.36	1.82	5.65	2.45
Reach-1	8393	50 Year	9.63	144.34	144.81	145.11	145.88	0.136173	4.57	2.11	5.76	2.41
Reach-1	8393	100 Year	11.61	144.34	144.87	145.2	146.02	0.125283	4.74	2.45	5.88	2.35
Reach-1	8393	500 Year	17.41	144.34	145.02	145.42	146.38	0.106941	5.16	3.37	6.23	2.24
Reach-1	8356	Fish Low Pa	0.01	143.13	143.18	143.18	143.19	0.065924	0.53	0.02	0.79	1.09
Reach-1	8356	Fish High Pa	0.51	143.13	143.36	143.36	143.42	0.033466	1.11	0.46	3.8	1.02
Reach-1	8356	2 Year	3.8	143.13	143.85	143.66	143.91	0.005308	1.07	3.55	7.64	0.5
Reach-1	8356	3 Year	4.3	143.13	143.91	143.69	143.97	0.004535	1.06	4.07	7.89	0.47
Reach-1	8356	5 Year	4.9	143.13	143.99	143.72	144.05	0.003896	1.05	4.68	8.19	0.44
Reach-1	8356	10 Year	5.81	143.13	144.1	143.77	144.15	0.003248	1.04	5.59	8.61	0.41
Reach-1	8356	25 Year	7.93	143.13	144.33	143.86	144.38	0.002434	1.03	7.68	9.54	0.37
Reach-1	8356	50 Year	9.63	143.13	144.5	143.93	144.55	0.002032	1.03	9.38	10.24	0.34
Reach-1	8356	100 Year	11.61	143.13	144.69	144.01	144.74	0.00168	1.02	11.34	11.2	0.32
Reach-1	8356	500 Year	17.41	143.13	145.18	144.2	145.24	0.001114	1.03	17.03	15.93	0.27
Reach-1	8332.5		Culvert									
Reach-1	8309	Fish Low Pa	0.01	142.34	142.42	142.38	142.42	0.00144	0.12	0.08	1.93	0.18
Reach-1	8309	Fish High Pa	0.51	142.34	142.54	142.54	142.6	0.033995	1.05	0.49	4.49	1.01
Reach-1	8309	2 Year	3.8	142.34	143.1	142.84	143.14	0.002878	0.88	4.32	9.75	0.38
Reach-1	8309	3 Year	4.3	142.34	143.15	142.85	143.19	0.002851	0.92	4.68	10.06	0.38
Reach-1	8309	5 Year	4.9	142.34	143.2	142.89	143.24	0.002843	0.96	5.08	10.41	0.39
Reach-1	8309	10 Year	5.81	142.34	143.27	142.93	143.32	0.002848	1.03	5.65	10.9	0.39
Reach-1	8309	25 Year	7.93	142.34	143.41	143.02	143.48	0.002888	1.16	6.85	11.92	0.4
Reach-1	8309	50 Year	9.63	142.34	143.52	143.08	143.6	0.002938	1.25	7.71	12.6	0.41
Reach-1	8309	100 Year	11.61	142.34	143.63	143.16	143.72	0.00302	1.35	8.61	13.12	0.43
Reach-1	8309	500 Year	17.41	142.34	143.89	143.35	144.02	0.003174	1.61	11.01	15.66	0.45
Reach-1	8289	Fish Low Pa	0.01	142.29	142.35		142.35	0.012098	0.25	0.04	1.46	0.48
Reach-1	8289	Fish High Pa	0.51	142.29	142.57	142.5	142.59	0.006248	0.62	0.83	4.71	0.47
Reach-1	8289	2 Year	3.8	142.29	142.97		143.05	0.006563	1.2	3.16	6.67	0.56
Reach-1	8289	3 Year	4.3	142.29	143.02		143.1	0.006392	1.24	3.46	6.81	0.56
Reach-1	8289	5 Year	4.9	142.29	143.07		143.15	0.00638	1.29	3.79	7	0.56
Reach-1	8289	10 Year	5.81	142.29	143.13		143.23	0.006377	1.36	4.27	7.28	0.57
Reach-1	8289	25 Year	7.93	142.29	143.28		143.39	0.00632	1.48	5.37	8	0.58
Reach-1	8289	50 Year	9.63	142.29	143.38		143.5	0.006172	1.54	6.23	8.52	0.58
Reach-1	8289	100 Year	11.61	142.29	143.49		143.63	0.005976	1.61	7.2	9.02	0.57
Reach-1	8289	500 Year	17.41	142.29	143.77		143.93	0.005384	1.78	9.86	10.34	0.57
Reach-1	8237	Fish Low Pa	0.01	141.94	141.96	141.96	141.96	0.005088	0.13	0.07	3.6	0.3
Reach-1	8237	Fish High Pa	0.51	141.94	142.11		142.14	0.011496	0.77	0.66	4.15	0.62
Reach-1	8237	2 Year	3.8	141.94	142.57		142.66	0.008689	1.27	3	6.02	0.57
Reach-1	8237	3 Year	4.3	141.94	142.62		142.71	0.008685	1.3	3.31	6.26	0.56
Reach-1	8237	5 Year	4.9	141.94	142.67		142.77	0.008503	1.36	3.62	6.47	0.56

HEC-RAS Plan: EX_DOT River: Beaver Pond Brk Reach: Reach-1												
Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
Reach-1	8237	10 Year	5.81	141.94	142.74		142.85	0.008351	1.45	4.06	6.74	0.57
Reach-1	8237	25 Year	7.93	141.94	142.88		143.01	0.00826	1.63	5.01	7.29	0.58
Reach-1	8237	50 Year	9.63	141.94	142.97		143.13	0.008322	1.77	5.71	7.67	0.6
Reach-1	8237	100 Year	11.61	141.94	143.07		143.25	0.008298	1.9	6.52	8.09	0.61
Reach-1	8237	500 Year	17.41	141.94	143.37		143.59	0.007453	2.14	9.1	9.32	0.6
Reach-1	8178	Fish Low Pa	0.01	141.44	141.49	141.48	141.49	0.013743	0.25	0.04	1.6	0.51
Reach-1	8178	Fish High Pa	0.51	141.44	141.74	141.63	141.75	0.004302	0.57	0.9	4.27	0.4
Reach-1	8178	2 Year	3.8	141.44	142.22	141.96	142.28	0.004743	1.08	3.52	6.77	0.48
Reach-1	8178	3 Year	4.3	141.44	142.27	142	142.33	0.004794	1.12	3.84	7.05	0.49
Reach-1	8178	5 Year	4.9	141.44	142.32	142.04	142.39	0.004841	1.16	4.21	7.36	0.49
Reach-1	8178	10 Year	5.81	141.44	142.39	142.1	142.47	0.004893	1.22	4.75	7.79	0.5
Reach-1	8178	25 Year	7.93	141.44	142.54	142.22	142.63	0.004907	1.33	5.97	8.62	0.51
Reach-1	8178	50 Year	9.63	141.44	142.64	142.3	142.74	0.004854	1.4	6.88	9.11	0.51
Reach-1	8178	100 Year	11.61	141.44	142.75	142.39	142.86	0.004883	1.46	7.93	9.61	0.51
Reach-1	8178	500 Year	17.41	141.44	143.07	142.6	143.19	0.005354	1.55	11.21	11.38	0.49
Reach-1	8128	Fish Low Pa	0.01	140.93	141.02	140.99	141.03	0.006789	0.26	0.04	0.83	0.39
Reach-1	8128	Fish High Pa	0.51	140.93	141.24	141.24	141.31	0.025242	1.16	0.44	2.72	0.92
Reach-1	8128	2 Year	3.8	140.93	141.67	141.65	141.85	0.018446	1.87	2.03	4.7	0.91
Reach-1	8128	3 Year	4.3	140.93	141.72	141.68	141.9	0.017584	1.91	2.26	4.9	0.9
Reach-1	8128	5 Year	4.9	140.93	141.77	141.73	141.96	0.016776	1.94	2.52	5.13	0.88
Reach-1	8128	10 Year	5.81	140.93	141.85	141.79	142.05	0.015762	1.99	2.92	5.45	0.87
Reach-1	8128	25 Year	7.93	140.93	141.99	141.92	142.22	0.0146	2.14	3.73	6.17	0.86
Reach-1	8128	50 Year	9.63	140.93	142.08	142.01	142.34	0.014105	2.25	4.34	6.69	0.86
Reach-1	8128	100 Year	11.61	140.93	142.18	142.1	142.46	0.013348	2.36	5.02	7.23	0.85
Reach-1	8128	500 Year	17.41	140.93	142.42	142.34	142.78	0.012246	2.7	6.89	8.62	0.85
Reach-1	8080	Fish Low Pa	0.01	140.45	140.49		140.5	0.021436	0.28	0.04	1.73	0.61
Reach-1	8080	Fish High Pa	0.51	140.45	140.74		140.76	0.006312	0.71	0.71	3.16	0.48
Reach-1	8080	2 Year	3.8	140.45	141.32		141.39	0.005275	1.21	3.13	5.24	0.5
Reach-1	8080	3 Year	4.3	140.45	141.37		141.45	0.005268	1.25	3.43	5.45	0.5
Reach-1	8080	5 Year	4.9	140.45	141.44		141.52	0.005257	1.3	3.78	5.69	0.51
Reach-1	8080	10 Year	5.81	140.45	141.51		141.61	0.005368	1.37	4.24	5.98	0.52
Reach-1	8080	25 Year	7.93	140.45	141.65		141.78	0.005582	1.56	5.12	6.69	0.54
Reach-1	8080	50 Year	9.63	140.45	141.75		141.9	0.005688	1.69	5.81	7.31	0.56
Reach-1	8080	100 Year	11.61	140.45	141.83		142.01	0.006293	1.88	6.4	7.81	0.59
Reach-1	8080	500 Year	17.41	140.45	142.11		142.34	0.006043	2.16	8.83	9.66	0.61
Reach-1	8027	Fish Low Pa	0.01	139.92	140.04	139.99	140.04	0.004684	0.25	0.04	0.7	0.33
Reach-1	8027	Fish High Pa	0.51	139.92	140.39	140.28	140.42	0.006881	0.76	0.67	2.86	0.5
Reach-1	8027	2 Year	3.8	139.92	140.76	140.71	140.93	0.016522	1.83	2.07	4.49	0.86
Reach-1	8027	3 Year	4.3	139.92	140.8	140.75	140.98	0.016695	1.91	2.26	4.62	0.87
Reach-1	8027	5 Year	4.9	139.92	140.83	140.79	141.04	0.018371	2.05	2.39	4.72	0.92
Reach-1	8027	10 Year	5.81	139.92	140.9	140.86	141.13	0.017441	2.11	2.75	4.98	0.91
Reach-1	8027	25 Year	7.93	139.92	141.06	141	141.31	0.015254	2.22	3.57	5.51	0.87
Reach-1	8027	50 Year	9.63	139.92	141.17	141.08	141.44	0.013803	2.3	4.21	5.89	0.84
Reach-1	8027	100 Year	11.61	139.92	141.4	141.18	141.63	0.008256	2.12	5.68	6.97	0.68
Reach-1	8027	500 Year	17.41	139.92	141.82	141.43	142.04	0.005279	2.14	9.02	8.98	0.58
Reach-1	7977	Fish Low Pa	0.01	139.41	139.47	139.47	139.49	0.051235	0.54	0.02	0.61	0.99
Reach-1	7977	Fish High Pa	0.51	139.41	139.7	139.7	139.77	0.031071	1.2	0.43	2.94	1.01
Reach-1	7977	2 Year	3.8	139.41	140.25	140.07	140.34	0.008276	1.3	2.92	5.72	0.58
Reach-1	7977	3 Year	4.3	139.41	140.33	140.11	140.41	0.007595	1.29	3.33	6	0.55
Reach-1	7977	5 Year	4.9	139.41	140.46	140.15	140.53	0.005728	1.18	4.14	6.5	0.47
Reach-1	7977	10 Year	5.81	139.41	140.55	140.21	140.62	0.005667	1.22	4.77	6.86	0.47
Reach-1	7977	25 Year	7.93	139.41	140.69	140.33	140.78	0.006619	1.38	5.75	7.39	0.5
Reach-1	7977	50 Year	9.63	139.41	141.04	140.42	141.11	0.002843	1.13	8.63	8.72	0.34
Reach-1	7977	100 Year	11.61	139.41	141.35	140.51	141.41	0.001791	1.06	11.49	9.86	0.28
Reach-1	7977	500 Year	17.41	139.41	141.8	140.75	141.87	0.001536	1.18	16.25	11.5	0.27
Reach-1	7937	Fish Low Pa	0.01	139.01	139.11	139.05	139.11	0.00023	0.06	0.17	2.79	0.08
Reach-1	7937	Fish High Pa	0.51	139.01	139.42	139.2	139.42	0.001163	0.36	1.43	5.19	0.22
Reach-1	7937	2 Year	5.6	139.01	140.17	139.64	140.21	0.001723	0.88	6.36	7.49	0.31
Reach-1	7937	3 Year	6.3	139.01	140.24	139.67	140.29	0.001735	0.92	6.88	7.67	0.31
Reach-1	7937	5 Year	7.3	139.01	140.38	139.72	140.42	0.001636	0.92	7.93	8	0.3
Reach-1	7937	10 Year	8.64	139.01	140.46	139.79	140.51	0.001883	1.01	8.58	8.2	0.31
Reach-1	7937	25 Year	11.6	139.01	140.55	139.92	140.63	0.002737	1.24	9.36	8.43	0.38
Reach-1	7937	50 Year	14.58	139.01	140.96	140.04	141.03	0.001671	1.12	13.06	9.5	0.3
Reach-1	7937	100 Year	17.7	139.01	141.29	140.15	141.35	0.001258	1.11	16.26	10.28	0.27
Reach-1	7937	500 Year	26.62	139.01	141.72	140.43	141.81	0.001359	1.33	21.14	33.05	0.29

HEC-RAS Plan: EX_DOT River: Beaver Pond Brk Reach: Reach-1												
Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
Reach-1	7911.5		Bridge									
Reach-1	7885	Fish Low Pa	0.01	138.94	139.01	138.98	139.01	0.002152	0.13	0.08	2.22	0.21
Reach-1	7885	Fish High Pa	0.51	138.94	139.22	139.14	139.23	0.006288	0.61	0.84	4.92	0.47
Reach-1	7885	2 Year	5.6	138.94	139.88	139.53	139.92	0.002836	0.95	5.89	9.33	0.38
Reach-1	7885	3 Year	6.3	138.94	139.94	139.56	139.99	0.002732	0.97	6.47	9.59	0.38
Reach-1	7885	5 Year	7.3	138.94	140.07	139.61	140.12	0.002134	0.94	7.8	10.15	0.34
Reach-1	7885	10 Year	8.64	138.94	140.16	139.66	140.21	0.002216	1	8.66	10.5	0.35
Reach-1	7885	25 Year	11.6	138.94	140.37	139.77	140.43	0.001954	1.05	11.28	13.88	0.34
Reach-1	7885	50 Year	14.58	138.94	140.62	139.87	140.67	0.001408	1.04	14.93	15.13	0.3
Reach-1	7885	100 Year	17.7	138.94	140.75	139.97	140.81	0.001475	1.14	16.89	15.77	0.31
Reach-1	7885	500 Year	26.62	138.94	140.95	140.2	141.06	0.002035	1.47	20.24	16.8	0.37
Reach-1	7826	Fish Low Pa	0.01	138.6	138.65	138.65	138.66	0.062077	0.5	0.02	0.88	1.05
Reach-1	7826	Fish High Pa	0.51	138.6	138.95	138.82	138.96	0.003675	0.55	0.93	4.14	0.37
Reach-1	7826	2 Year	5.6	138.6	139.66	139.29	139.72	0.004217	1.06	5.26	7.96	0.42
Reach-1	7826	3 Year	6.3	138.6	139.72	139.34	139.78	0.004422	1.1	5.74	8.27	0.42
Reach-1	7826	5 Year	7.3	138.6	139.91	139.39	139.96	0.003596	0.99	7.37	11.96	0.35
Reach-1	7826	10 Year	8.64	138.6	139.97	139.46	140.03	0.004293	1.09	7.95	13.11	0.38
Reach-1	7826	25 Year	11.6	138.6	140.2	139.59	140.26	0.004112	1.13	10.29	16.62	0.36
Reach-1	7826	50 Year	14.58	138.6	140.53	139.71	140.57	0.002138	0.95	18.06	21.1	0.27
Reach-1	7826	100 Year	17.7	138.6	140.65	139.82	140.7	0.00219	1.03	20.76	21.91	0.28
Reach-1	7826	500 Year	26.62	138.6	140.82	140.08	140.9	0.003174	1.33	24.54	22.8	0.34
Reach-1	7757	Fish Low Pa	0.01	138.24	138.39	138.3	138.39	0.000596	0.11	0.09	1.2	0.12
Reach-1	7757	Fish High Pa	0.51	138.24	138.78	138.56	138.79	0.001672	0.39	1.29	10.71	0.25
Reach-1	7757	2 Year	5.6	138.24	139.66	139.03	139.66	0.000196	0.24	33.37	54.71	0.08
Reach-1	7757	3 Year	6.3	138.24	139.73	139.07	139.73	0.000191	0.25	36.21	55.04	0.08
Reach-1	7757	5 Year	7.3	138.24	139.92	139.11	139.92	0.000128	0.23	44.9	56.07	0.07
Reach-1	7757	10 Year	8.64	138.24	139.98	139.17	139.98	0.000146	0.25	47.88	56.42	0.08
Reach-1	7757	25 Year	11.6	138.24	140.21	139.24	140.22	0.000136	0.28	58.77	58.1	0.07
Reach-1	7757	50 Year	14.58	138.24	140.53	139.24	140.54	0.000103	0.28	73.79	60.51	0.07
Reach-1	7757	100 Year	17.7	138.24	140.66	139.24	140.66	0.000118	0.31	79.78	63.75	0.07
Reach-1	7757	500 Year	26.62	138.24	140.84	139.29	140.84	0.000194	0.42	88.13	69.42	0.09
Reach-1	7711	Fish Low Pa	0.01	138.24	138.3	138.3	138.32	0.039882	0.49	0.02	0.65	0.88
Reach-1	7711	Fish High Pa	0.51	138.24	138.65	138.53	138.66	0.004727	0.53	0.97	5.6	0.4
Reach-1	7711	2 Year	5.6	138.24	139.66	138.92	139.66	0.000155	0.23	28.44	65.96	0.08
Reach-1	7711	3 Year	6.3	138.24	139.72	138.94	139.72	0.000155	0.24	30.89	66.86	0.08
Reach-1	7711	5 Year	7.3	138.24	139.91	138.96	139.91	0.00011	0.22	38.63	69.91	0.07
Reach-1	7711	10 Year	8.64	138.24	139.97	138.99	139.98	0.000127	0.25	41.29	70.93	0.07
Reach-1	7711	25 Year	11.6	138.24	140.21	139.05	140.21	0.000121	0.27	51.21	72.99	0.07
Reach-1	7711	50 Year	14.58	138.24	140.53	139.1	140.53	0.000093	0.27	64.81	78.03	0.06
Reach-1	7711	100 Year	17.7	138.24	140.66	139.15	140.66	0.000107	0.3	70.13	81.4	0.07
Reach-1	7711	500 Year	26.62	138.24	140.83	139.27	140.84	0.000081	0.28	134.63	89.44	0.06
Reach-1	7698	Fish Low Pa	0.01	138.2	138.27	138.23	138.27	0.000584	0.07	0.15	4.05	0.11
Reach-1	7698	Fish High Pa	0.51	138.2	138.64	138.35	138.65	0.000448	0.23	2.25	6.07	0.12
Reach-1	7698	2 Year	7.88	138.2	139.6	138.83	139.64	0.002613	0.89	8.85	7.71	0.27
Reach-1	7698	3 Year	8.8	138.2	139.66	138.87	139.7	0.002884	0.95	9.28	7.81	0.28
Reach-1	7698	5 Year	10.2	138.2	139.85	138.94	139.89	0.00261	0.94	10.83	8.14	0.26
Reach-1	7698	10 Year	12.18	138.2	139.89	139.02	139.95	0.003384	1.09	11.19	8.51	0.3
Reach-1	7698	25 Year	16.2	138.2	140.1	139.17	140.18	0.003767	1.25	12.91	26.73	0.32
Reach-1	7698	50 Year	20.25	138.2	140.42	139.31	140.5	0.003214	1.31	15.48	81.22	0.3
Reach-1	7698	100 Year	24.64	138.2	140.51	139.45	140.62	0.004026	1.48	19.44	90.79	0.34
Reach-1	7698	500 Year	37.24	138.2	140.76	139.8	140.84	0.002644	1.3	54.44	100.76	0.28
Reach-1	7689.5		Bridge									
Reach-1	7681	Fish Low Pa	0.01	138.15	138.21	138.18	138.21	0.001582	0.1	0.1	3.36	0.18
Reach-1	7681	Fish High Pa	0.51	138.15	138.59	138.3	138.59	0.000479	0.23	2.25	6.26	0.12
Reach-1	7681	2 Year	7.88	138.15	139.51	138.78	139.55	0.002004	0.92	8.57	8.42	0.27
Reach-1	7681	3 Year	8.8	138.15	139.56	138.82	139.61	0.002188	0.99	8.92	8.53	0.28
Reach-1	7681	5 Year	10.2	138.15	139.62	138.88	139.68	0.002547	1.1	9.31	8.66	0.3
Reach-1	7681	10 Year	12.18	138.15	139.7	138.96	139.77	0.002976	1.23	9.88	9.63	0.33
Reach-1	7681	25 Year	16.2	138.15	139.85	139.1	139.96	0.00373	1.48	10.96	13.68	0.38
Reach-1	7681	50 Year	20.25	138.15	139.98	139.24	140.13	0.004443	1.7	11.89	21.87	0.42
Reach-1	7681	100 Year	24.64	138.15	140.12	139.37	140.31	0.005115	1.92	12.82	53.19	0.45
Reach-1	7681	500 Year	37.24	138.15	140.27	139.71	140.64	0.008938	2.68	13.89	72.61	0.61
Reach-1	7666	Fish Low Pa	0.01	138.08	138.2	138.13	138.2	0.000265	0.06	0.15	2.42	0.08
Reach-1	7666	Fish High Pa	0.51	138.08	138.57	138.31	138.58	0.000929	0.35	1.45	4.46	0.2

HEC-RAS Plan: EX_DOT River: Beaver Pond Brk Reach: Reach-1													
Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl	
Reach-1	7666	2 Year	7.88	138.08	139.44	138.93	139.52	0.002227	1.21	7.81	13.55	0.37	
Reach-1	7666	3 Year	8.8	138.08	139.49	138.98	139.57	0.00238	1.29	8.36	15.52	0.38	
Reach-1	7666	5 Year	10.2	138.08	139.53	139.05	139.63	0.002762	1.42	8.89	15.62	0.42	
Reach-1	7666	10 Year	12.18	138.08	139.61	139.14	139.72	0.003127	1.57	9.79	15.79	0.45	
Reach-1	7666	25 Year	16.2	138.08	139.75	139.31	139.9	0.003647	1.82	11.57	38.03	0.49	
Reach-1	7666	50 Year	20.25	138.08	139.88	139.5	140.06	0.004058	2.04	13.22	52.9	0.53	
Reach-1	7666	100 Year	24.64	138.08	140.02	139.62	140.24	0.0042	2.21	15.15	62.39	0.54	
Reach-1	7666	500 Year	37.24	138.08	140.36	139.93	140.45	0.001708	1.59	31.66	82.22	0.36	
Reach-1	7589	Fish Low Pa	0.01	138.06	138.11	138.11	138.12	0.075844	0.55	0.02	0.79	1.17	
Reach-1	7589	Fish High Pa	0.51	138.06	138.29	138.29	138.36	0.032281	1.12	0.46	3.65	1.01	
Reach-1	7589	2 Year	7.88	138.06	138.92	138.92	139.03	0.064132	1.43	5.52	43.96	0.9	
Reach-1	7589	3 Year	8.8	138.06	138.94	138.92	139.05	0.062631	1.48	5.95	45.35	0.9	
Reach-1	7589	5 Year	10.2	138.06	139.04	138.95	139.12	0.031397	1.26	8.1	52.33	0.66	
Reach-1	7589	10 Year	12.18	138.06	139.16	138.99	139.23	0.017539	1.12	10.89	61.42	0.52	
Reach-1	7589	25 Year	16.2	138.06	139.29	139.06	139.36	0.014893	1.18	13.77	71.36	0.49	
Reach-1	7589	50 Year	20.25	138.06	139.52	139.12	139.57	0.008295	1.05	19.23	97.45	0.38	
Reach-1	7589	100 Year	24.64	138.06	139.73	139.18	139.78	0.005874	1	24.69	121.41	0.33	
Reach-1	7589	500 Year	37.24	138.06	140.35	139.34	140.36	0.000416	0.36	105.32	168.69	0.09	
Reach-1	7370	Fish Low Pa	0.01	137.46	137.57	137.49	137.57	0.000157	0.04	0.24	4.48	0.06	
Reach-1	7370	Fish High Pa	0.51	137.46	137.84	137.62	137.84	0.000441	0.18	2.81	14.54	0.13	
Reach-1	7370	2 Year	7.88	137.46	138.71	137.96	138.72	0.000273	0.31	28.38	72.14	0.1	
Reach-1	7370	3 Year	8.8	137.46	138.79	137.99	138.79	0.000259	0.31	31.39	81.38	0.1	
Reach-1	7370	5 Year	10.2	137.46	138.88	138.02	138.89	0.000253	0.33	35.21	90.78	0.1	
Reach-1	7370	10 Year	12.18	137.46	139.01	138.07	139.02	0.000242	0.34	40.66	97.07	0.1	
Reach-1	7370	25 Year	16.2	137.46	139.24	138.14	139.25	0.000112	0.26	69.21	106.78	0.07	
Reach-1	7370	50 Year	20.25	137.46	139.48	138.2	139.48	0.000087	0.25	86.5	113.99	0.06	
Reach-1	7370	100 Year	24.64	137.46	139.7	138.26	139.71	0.000075	0.25	102.86	115.33	0.06	
Reach-1	7370	500 Year	37.24	137.46	140.32	138.41	140.33	0.000055	0.26	163.01	119.02	0.05	
Reach-1	7168	Fish Low Pa	0.01	137.45	137.46	137.46	137.46	0.042247	0.21	0.05	5.92	0.74	
Reach-1	7168	Fish High Pa	0.51	137.45	137.59	137.54	137.61	0.007229	0.56	0.91	6.69	0.48	
Reach-1	7168	2 Year	7.88	137.45	138.57	137.97	138.6	0.001926	0.78	10.24	18.12	0.27	
Reach-1	7168	3 Year	8.8	137.45	138.64	138.01	138.68	0.001884	0.8	11.29	24.82	0.27	
Reach-1	7168	5 Year	10.2	137.45	138.74	138.06	138.77	0.0018	0.83	12.84	41.52	0.26	
Reach-1	7168	10 Year	12.18	137.45	138.88	138.13	138.91	0.001621	0.86	15.44	47.67	0.26	
Reach-1	7168	25 Year	16.2	137.45	139.15	138.26	139.19	0.001309	0.89	20.57	69.04	0.24	
Reach-1	7168	50 Year	20.25	137.45	139.41	138.36	139.44	0.000884	0.82	31.68	81.19	0.2	
Reach-1	7168	100 Year	24.64	137.45	139.65	138.47	139.67	0.000552	0.71	43.31	88.6	0.16	
Reach-1	7168	500 Year	37.24	137.45	140.29	138.76	140.3	0.000221	0.54	87.83	113.31	0.11	
Reach-1	7120	Fish Low Pa	0.01	136.98	137.07	137.03	137.07	0.00303	0.17	0.06	1.4	0.26	
Reach-1	7120	Fish High Pa	0.51	136.98	137.32	137.22	137.34	0.004419	0.59	0.87	4.04	0.4	
Reach-1	7120	2 Year	8.72	136.98	138.42	137.87	138.49	0.002521	1.15	8.42	20.28	0.38	
Reach-1	7120	3 Year	9.8	136.98	138.51	137.92	138.58	0.002199	1.14	10.33	22.2	0.36	
Reach-1	7120	5 Year	11.3	136.98	138.63	138	138.69	0.001844	1.12	12.99	24.05	0.33	
Reach-1	7120	10 Year	13.45	136.98	138.79	138.09	138.84	0.001441	1.08	17.09	26.59	0.3	
Reach-1	7120	25 Year	17.9	136.98	139.09	138.26	139.13	0.00098	1.02	26.02	35.82	0.26	
Reach-1	7120	50 Year	22.51	136.98	139.37	138.54	139.4	0.000742	0.99	35.83	45.92	0.23	
Reach-1	7120	100 Year	27.33	136.98	139.63	138.65	139.65	0.000469	0.86	55.33	74.68	0.19	
Reach-1	7120	500 Year	41.34	136.98	140.28	138.88	140.3	0.000162	0.6	110.38	90.33	0.11	
Reach-1	7073	Fish Low Pa	0.01	136.79	136.86		136.87	0.00598	0.21	0.05	1.29	0.35	
Reach-1	7073	Fish High Pa	0.51	136.79	137.2		137.21	0.001891	0.41	1.23	5.16	0.27	
Reach-1	7073	2 Year	8.72	136.79	138.33		138.37	0.002129	0.97	8.95	8.53	0.3	
Reach-1	7073	3 Year	9.8	136.79	138.41		138.47	0.00224	1.01	9.73	8.84	0.31	
Reach-1	7073	5 Year	11.3	136.79	138.53		138.59	0.002389	1.05	10.76	9.26	0.31	
Reach-1	7073	10 Year	13.45	136.79	138.69		138.75	0.002571	1.09	12.29	9.93	0.31	
Reach-1	7073	25 Year	17.9	136.79	138.99		139.06	0.002741	1.16	15.52	12.38	0.31	
Reach-1	7073	50 Year	22.51	136.79	139.27		139.34	0.002402	1.2	19.89	18.76	0.3	
Reach-1	7073	100 Year	27.33	136.79	139.53		139.6	0.002039	1.22	25.41	23.26	0.28	
Reach-1	7073	500 Year	41.34	136.79	140.21		140.27	0.00137	1.22	44.01	31.28	0.24	
Reach-1	6970	Fish Low Pa	0.01	136.65	136.72	136.68	136.72	0.000626	0.08	0.13	3.18	0.12	
Reach-1	6970	Fish High Pa	0.51	136.65	137.07	136.81	137.08	0.000839	0.34	1.51	4.59	0.19	
Reach-1	6970	2 Year	8.72	136.65	138.13	137.47	138.18	0.001691	1.01	8.7	8.92	0.31	
Reach-1	6970	3 Year	9.8	136.65	138.22	137.52	138.27	0.001623	1.04	9.51	9.25	0.31	
Reach-1	6970	5 Year	11.3	136.65	138.33	137.6	138.39	0.001561	1.09	10.58	9.69	0.31	
Reach-1	6970	10 Year	13.45	136.65	138.49	137.69	138.55	0.001458	1.14	12.18	10.4	0.31	
Reach-1	6970	25 Year	17.9	136.65	138.8	137.85	138.87	0.001263	1.21	15.61	11.57	0.3	
Reach-1	6970	50 Year	22.51	136.65	139.1	137.99	139.18	0.001124	1.27	19.21	12.67	0.29	

HEC-RAS Plan: EX_DOT River: Beaver Pond Brk Reach: Reach-1												
Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
Reach-1	6970	100 Year	27.33	136.65	139.37	138.13	139.46	0.001039	1.33	22.82	13.69	0.28
Reach-1	6970	500 Year	41.34	136.65	140.06	138.48	140.16	0.000906	1.48	32.98	16.29	0.27
Reach-1	6915	Fish Low Pa	0.01	136.58	136.66	136.63	136.66	0.002754	0.17	0.06	1.27	0.25
Reach-1	6915	Fish High Pa	0.51	136.58	136.98	136.83	136.99	0.003596	0.58	0.87	3.48	0.37
Reach-1	6915	2 Year	8.72	136.58	137.94	137.57	138.04	0.004288	1.34	6.56	8.83	0.48
Reach-1	6915	3 Year	9.8	136.58	138.05	137.63	138.14	0.003876	1.33	7.5	9.33	0.46
Reach-1	6915	5 Year	11.3	136.58	138.18	137.7	138.27	0.003185	1.32	8.77	9.82	0.42
Reach-1	6915	10 Year	13.45	136.58	138.36	137.79	138.45	0.002572	1.33	10.58	10.46	0.39
Reach-1	6915	25 Year	17.9	136.58	138.7	137.95	138.79	0.001909	1.35	14.32	11.68	0.35
Reach-1	6915	50 Year	22.51	136.58	139.01	138.08	139.1	0.001574	1.39	18.12	12.79	0.33
Reach-1	6915	100 Year	27.33	136.58	139.29	138.2	139.39	0.001397	1.44	21.86	13.81	0.32
Reach-1	6915	500 Year	41.34	136.58	139.98	138.53	140.1	0.001156	1.59	32.41	17.08	0.3
Reach-1	6890	Fish Low Pa	0.01	136.52	136.6	136.57	136.6	0.001444	0.1	0.1	2.79	0.17
Reach-1	6890	Fish High Pa	0.51	136.52	136.72	136.72	136.78	0.031848	1.13	0.45	3.46	1
Reach-1	6890	2 Year	8.72	136.52	137.85	137.34	137.92	0.00425	1.17	7.43	8.6	0.4
Reach-1	6890	3 Year	9.8	136.52	137.96	137.39	138.03	0.003834	1.16	8.43	9.1	0.38
Reach-1	6890	5 Year	11.3	136.52	138.11	137.46	138.18	0.003451	1.16	9.81	9.74	0.36
Reach-1	6890	10 Year	13.45	136.52	138.3	137.56	138.37	0.003112	1.17	11.76	10.58	0.34
Reach-1	6890	25 Year	17.9	136.52	138.66	137.72	138.73	0.00235	1.18	15.75	11.69	0.3
Reach-1	6890	50 Year	22.51	136.52	138.98	137.87	139.05	0.001947	1.22	19.61	12.46	0.28
Reach-1	6890	100 Year	27.33	136.52	139.26	138.01	139.34	0.001745	1.27	23.28	13.11	0.28
Reach-1	6890	500 Year	41.34	136.52	139.96	138.35	140.06	0.001482	1.41	33.54	20.61	0.27
Reach-1	6859.5		Culvert									
Reach-1	6825	Fish Low Pa	0.01	136.29	136.34	136.32	136.34	0.002268	0.12	0.08	2.67	0.21
Reach-1	6825	Fish High Pa	0.51	136.29	136.61	136.46	136.62	0.002357	0.47	1.09	4.46	0.3
Reach-1	6825	2 Year	8.72	136.29	137.75	137.1	137.8	0.003227	1.05	8.31	8.22	0.33
Reach-1	6825	3 Year	9.8	136.29	137.84	137.15	137.9	0.003283	1.07	9.14	8.52	0.33
Reach-1	6825	5 Year	11.3	136.29	137.97	137.22	138.03	0.003383	1.1	10.24	8.93	0.33
Reach-1	6825	10 Year	13.45	136.29	138.14	137.31	138.2	0.003548	1.14	11.77	9.57	0.33
Reach-1	6825	25 Year	17.9	136.29	138.43	137.48	138.51	0.003696	1.21	14.78	10.65	0.33
Reach-1	6825	50 Year	22.51	136.29	138.69	137.63	138.77	0.00334	1.28	17.71	12.43	0.32
Reach-1	6825	100 Year	27.33	136.29	138.89	137.78	138.99	0.003302	1.38	20.24	13.32	0.32
Reach-1	6825	500 Year	41.34	136.29	139.37	138.15	139.48	0.00279	1.48	30.37	26.7	0.31
Reach-1	6809	Fish Low Pa	0.01	136.07	136.34	136.11	136.34	0.000004	0.02	0.65	3.85	0.01
Reach-1	6809	Fish High Pa	0.51	136.07	136.6	136.29	136.6	0.000556	0.3	1.69	4.29	0.15
Reach-1	6809	2 Year	8.72	136.07	137.69	136.97	137.74	0.004187	1	8.74	8.67	0.32
Reach-1	6809	3 Year	9.8	136.07	137.78	137.03	137.84	0.004414	1.02	9.61	9.32	0.32
Reach-1	6809	5 Year	11.3	136.07	137.91	137.1	137.97	0.004495	1.04	10.83	9.98	0.32
Reach-1	6809	10 Year	13.45	136.07	138.08	137.2	138.13	0.004393	1.07	12.53	10.61	0.32
Reach-1	6809	25 Year	17.9	136.07	138.37	137.37	138.44	0.004287	1.13	15.84	11.73	0.31
Reach-1	6809	50 Year	22.51	136.07	138.63	137.54	138.7	0.004246	1.18	19.04	12.71	0.31
Reach-1	6809	100 Year	27.33	136.07	138.84	137.69	138.92	0.004322	1.26	21.76	15.77	0.31
Reach-1	6809	500 Year	41.34	136.07	139.31	138.05	139.42	0.004177	1.46	29.05	30.29	0.32
Reach-1	6756	Fish Low Pa	0.01	136.32	136.34	136.33	136.34	0.006798	0.14	0.07	4.28	0.33
Reach-1	6756	Fish High Pa	0.51	136.32	136.51	136.43	136.53	0.005411	0.57	0.9	5.1	0.43
Reach-1	6756	2 Year	8.72	136.32	137.4	136.99	137.49	0.004497	1.31	6.63	7.85	0.46
Reach-1	6756	3 Year	9.8	136.32	137.5	137.04	137.59	0.004358	1.32	7.41	8.21	0.44
Reach-1	6756	5 Year	11.3	136.32	137.63	137.1	137.72	0.004166	1.33	8.5	8.69	0.43
Reach-1	6756	10 Year	13.45	136.32	137.8	137.19	137.89	0.004227	1.34	10.02	9.34	0.41
Reach-1	6756	25 Year	17.9	136.32	138.09	137.36	138.19	0.004381	1.38	12.96	10.48	0.4
Reach-1	6756	50 Year	22.51	136.32	138.35	137.51	138.46	0.004488	1.42	15.82	11.48	0.39
Reach-1	6756	100 Year	27.33	136.32	138.54	137.66	138.66	0.004938	1.52	18.02	12.19	0.4
Reach-1	6756	500 Year	41.34	136.32	138.99	138.01	139.14	0.005728	1.73	23.88	23.53	0.42
Reach-1	6732	Fish Low Pa	0.01	136.18	136.21	136.19	136.21	0.005632	0.13	0.07	3.91	0.31
Reach-1	6732	Fish High Pa	0.51	136.18	136.42	136.3	136.44	0.003287	0.5	1.01	4.71	0.35
Reach-1	6732	2 Year	8.72	136.18	137.3	136.9	137.39	0.004606	1.33	6.56	7.95	0.47
Reach-1	6732	3 Year	9.8	136.18	137.4	136.95	137.49	0.00463	1.33	7.37	8.33	0.45
Reach-1	6732	5 Year	11.3	136.18	137.54	137.02	137.63	0.004593	1.33	8.51	8.83	0.43
Reach-1	6732	10 Year	13.45	136.18	137.7	137.11	137.8	0.004588	1.34	10.05	9.46	0.41
Reach-1	6732	25 Year	17.9	136.18	138	137.27	138.1	0.004631	1.38	13	10.57	0.4
Reach-1	6732	50 Year	22.51	136.18	138.26	137.43	138.36	0.004593	1.42	15.87	11.55	0.38
Reach-1	6732	100 Year	27.33	136.18	138.44	137.57	138.56	0.004667	1.52	18	12.21	0.39
Reach-1	6732	500 Year	41.34	136.18	138.87	137.92	139.03	0.004652	1.79	23.68	14.53	0.41
Reach-1	6653	Fish Low Pa	0.01	135.88	135.9	135.89	135.9	0.002924	0.11	0.09	4.03	0.23

HEC-RAS Plan: EX_DOT River: Beaver Pond Brk Reach: Reach-1												
Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
Reach-1	6653	Fish High Pa	0.51	135.88	136.07	136	136.09	0.006656	0.62	0.82	4.71	0.48
Reach-1	6653	2 Year	8.72	135.88	136.93	136.58	137.03	0.004656	1.43	6.11	7.12	0.49
Reach-1	6653	3 Year	9.8	135.88	137.01	136.62	137.12	0.004845	1.45	6.75	7.54	0.49
Reach-1	6653	5 Year	11.3	135.88	137.13	136.69	137.24	0.005147	1.47	7.68	8.01	0.48
Reach-1	6653	10 Year	13.45	135.88	137.29	136.77	137.4	0.00548	1.5	8.95	8.61	0.47
Reach-1	6653	25 Year	17.9	135.88	137.56	136.93	137.68	0.005976	1.57	11.43	9.7	0.46
Reach-1	6653	50 Year	22.51	135.88	137.8	137.1	137.93	0.006607	1.62	13.9	10.97	0.46
Reach-1	6653	100 Year	27.33	135.88	137.97	137.25	138.12	0.006483	1.72	15.93	11.94	0.46
Reach-1	6653	500 Year	41.34	135.88	138.43	137.62	138.62	0.00576	1.95	21.98	16.14	0.45
Reach-1	6593	Fish Low Pa	0.01	135.28	135.33	135.33	135.35	0.041705	0.46	0.02	0.79	0.89
Reach-1	6593	Fish High Pa	0.51	135.28	135.62	135.53	135.64	0.005283	0.59	0.86	4.51	0.43
Reach-1	6593	2 Year	8.72	135.28	136.47	136.14	136.59	0.007311	1.53	5.75	6.99	0.52
Reach-1	6593	3 Year	9.8	135.28	136.54	136.19	136.66	0.007558	1.59	6.2	7.18	0.53
Reach-1	6593	5 Year	11.3	135.28	136.62	136.26	136.76	0.00787	1.68	6.81	7.43	0.54
Reach-1	6593	10 Year	13.45	135.28	136.72	136.35	136.89	0.008399	1.8	7.61	7.74	0.56
Reach-1	6593	25 Year	17.9	135.28	136.85	136.52	137.08	0.010545	2.15	8.58	8.13	0.63
Reach-1	6593	50 Year	22.51	135.28	137.03	136.68	137.3	0.010201	2.32	10.12	8.74	0.63
Reach-1	6593	100 Year	27.33	135.28	137.28	136.83	137.56	0.00834	2.35	12.45	9.58	0.59
Reach-1	6593	500 Year	41.34	135.28	138.26	137.2	138.35	0.001988	1.57	39.61	57.5	0.31
Reach-1	6541	Fish Low Pa	0.01	135.19	135.24	135.21	135.24	0.000689	0.07	0.14	3.82	0.12
Reach-1	6541	Fish High Pa	0.51	135.19	135.49	135.33	135.5	0.001771	0.41	1.25	5.02	0.26
Reach-1	6541	2 Year	8.72	135.19	136.16	135.91	136.3	0.005499	1.65	5.99	14.96	0.56
Reach-1	6541	3 Year	9.8	135.19	136.19	135.97	136.35	0.006265	1.79	6.25	15.11	0.61
Reach-1	6541	5 Year	11.3	135.19	136.24	136.04	136.42	0.00673	1.93	6.8	15.46	0.63
Reach-1	6541	10 Year	13.45	135.19	136.34	136.14	136.54	0.006729	2.06	7.8	16.21	0.64
Reach-1	6541	25 Year	17.9	135.19	136.6	136.29	136.76	0.004296	1.92	13.66	17.36	0.53
Reach-1	6541	50 Year	22.51	135.19	136.89	136.46	137.03	0.003015	1.83	18.79	19.73	0.46
Reach-1	6541	100 Year	27.33	135.19	137.19	136.56	137.33	0.002475	1.86	25.72	29.03	0.43
Reach-1	6541	500 Year	41.34	135.19	138.23	136.83	138.29	0.000746	1.37	62.12	80.01	0.25
Reach-1	6490	Fish Low Pa	0.01	135.11	135.13	135.13	135.14	0.066677	0.31	0.03	3.11	0.96
Reach-1	6490	Fish High Pa	0.51	135.11	135.24	135.24	135.29	0.03761	0.98	0.52	5.71	1.04
Reach-1	6490	2 Year	8.72	135.11	135.76	135.7	135.93	0.013947	1.85	4.78	10.27	0.83
Reach-1	6490	3 Year	9.8	135.11	135.86	135.74	136.01	0.009657	1.72	5.86	10.99	0.71
Reach-1	6490	5 Year	11.3	135.11	135.99	135.79	136.12	0.006345	1.6	7.43	11.95	0.6
Reach-1	6490	10 Year	13.45	135.11	136.17	135.85	136.28	0.004306	1.52	9.6	13.17	0.51
Reach-1	6490	25 Year	17.9	135.11	136.51	135.98	136.61	0.00237	1.4	14.92	28.79	0.4
Reach-1	6490	50 Year	22.51	135.11	136.84	136.1	136.92	0.001562	1.32	20.42	35.45	0.34
Reach-1	6490	100 Year	27.33	135.11	137.16	136.21	137.24	0.001133	1.28	26.12	38.68	0.29
Reach-1	6490	500 Year	41.34	135.11	138.26	136.52	138.26	0.000098	0.51	120.36	90.48	0.09
Reach-1	6457	Fish Low Pa	0.01	134.39	134.57	134.43	134.57	0.000026	0.02	0.4	4.67	0.03
Reach-1	6457	Fish High Pa	0.51	134.39	134.73	134.59	134.74	0.002354	0.44	1.17	5.33	0.3
Reach-1	6457	2 Year	9.4	134.39	135.73	135.18	135.79	0.003072	1.02	9.2	10.04	0.34
Reach-1	6457	3 Year	10.6	134.39	135.83	135.22	135.89	0.002913	1.04	10.2	10.41	0.33
Reach-1	6457	5 Year	12.3	134.39	135.97	135.28	136.03	0.002741	1.06	11.59	10.9	0.32
Reach-1	6457	10 Year	14.58	134.39	136.15	135.37	136.21	0.002571	1.09	13.41	11.53	0.31
Reach-1	6457	25 Year	19.5	134.39	136.49	135.51	136.56	0.002327	1.13	17.21	12.8	0.29
Reach-1	6457	50 Year	24.49	134.39	136.82	135.66	136.89	0.002109	1.17	20.94	14.87	0.28
Reach-1	6457	100 Year	29.87	134.39	137.14	135.78	137.22	0.001796	1.21	24.87	19.9	0.26
Reach-1	6457	500 Year	45.17	134.39	138.25	136.11	138.26	0.000261	0.54	87.29	67.74	0.1
Reach-1	6441.5		Culvert									
Reach-1	6417	Fish Low Pa	0.01	132.42	132.43	132.45	133	21.66527	3.34	0	0.61	15.29
Reach-1	6417	Fish High Pa	0.51	132.42	132.49	132.56	133.24	2.292252	3.85	0.13	4.08	6.82
Reach-1	6417	2 Year	9.4	132.42	133.35	133.04	133.44	0.00575	1.32	7.12	8.99	0.47
Reach-1	6417	3 Year	10.6	132.42	133.43	133.08	133.52	0.005689	1.36	7.78	9.01	0.47
Reach-1	6417	5 Year	12.3	132.42	133.53	133.13	133.63	0.00554	1.41	8.74	9.04	0.46
Reach-1	6417	10 Year	14.58	132.42	133.66	133.2	133.77	0.005422	1.48	9.88	9.35	0.45
Reach-1	6417	25 Year	19.5	132.42	133.9	133.34	134.03	0.005037	1.62	12.22	10.26	0.45
Reach-1	6417	50 Year	24.49	132.42	134.11	133.47	134.26	0.004805	1.74	14.48	11.1	0.45
Reach-1	6417	100 Year	29.87	132.42	134.32	133.6	134.49	0.004618	1.86	16.88	11.91	0.45
Reach-1	6417	500 Year	45.17	132.42	134.82	133.94	135.05	0.004307	2.13	23.38	13.88	0.45
Reach-1	6409	Fish Low Pa	0.01	131.97	132.03	132.01	132.03	0.006534	0.22	0.05	1.33	0.37
Reach-1	6409	Fish High Pa	0.51	131.97	132.24	132.2	132.28	0.014546	0.88	0.58	3.66	0.7
Reach-1	6409	2 Year	9.4	131.97	132.87	132.87	133.19	0.020422	2.53	3.72	5.76	1.01
Reach-1	6409	3 Year	10.6	131.97	132.93	132.93	133.27	0.019694	2.59	4.09	5.91	1
Reach-1	6409	5 Year	12.3	131.97	133	133	133.38	0.019769	2.72	4.52	6.07	1.01

HEC-RAS Plan: EX_DOT River: Beaver Pond Brk Reach: Reach-1												
Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
Reach-1	6409	10 Year	14.58	131.97	133.11	133.11	133.51	0.019096	2.83	5.16	6.3	1
Reach-1	6409	25 Year	19.5	131.97	133.3	133.3	133.77	0.018602	3.05	6.39	6.73	1
Reach-1	6409	50 Year	24.49	131.97	133.47	133.47	134	0.017973	3.22	7.6	7.13	1
Reach-1	6409	100 Year	29.87	131.97	133.64	133.64	134.22	0.017698	3.39	8.81	7.51	1
Reach-1	6409	500 Year	45.17	131.97	134.04	134.04	134.76	0.017106	3.75	12.04	8.43	1
Reach-1	6394	Fish Low Pa	0.01	131.72	131.74	131.74	131.75	0.10551	0.33	0.03	3.6	1.16
Reach-1	6394	Fish High Pa	0.51	131.72	131.85	131.85	131.91	0.033809	1.06	0.48	4.3	1
Reach-1	6394	2 Year	9.4	131.72	132.48	132.5	132.83	0.023286	2.63	3.58	5.66	1.06
Reach-1	6394	3 Year	10.6	131.72	132.53	132.56	132.91	0.023387	2.73	3.89	5.82	1.07
Reach-1	6394	5 Year	12.3	131.72	132.61	132.65	133.02	0.023419	2.84	4.34	6.13	1.08
Reach-1	6394	10 Year	14.58	131.72	132.7	132.76	133.15	0.023968	2.98	4.9	6.54	1.1
Reach-1	6394	25 Year	19.5	131.72	132.85	132.95	133.4	0.025329	3.27	5.96	7.21	1.15
Reach-1	6394	50 Year	24.49	131.72	132.99	133.12	133.62	0.026206	3.51	6.98	7.78	1.18
Reach-1	6394	100 Year	29.87	131.72	133.11	133.27	133.83	0.027524	3.75	7.96	8.3	1.22
Reach-1	6394	500 Year	45.17	131.72	133.4	133.64	134.33	0.029566	4.28	10.56	9.53	1.3
Reach-1	6305	Fish Low Pa	0.01	129.9	129.95	129.93	129.96	0.003246	0.14	0.07	2.49	0.25
Reach-1	6305	Fish High Pa	0.51	129.9	130.19	130.09	130.21	0.005882	0.69	0.74	3.28	0.46
Reach-1	6305	2 Year	9.4	129.9	131	130.85	131.22	0.011304	2.06	4.56	6.08	0.76
Reach-1	6305	3 Year	10.6	129.9	131.06	130.91	131.3	0.011639	2.15	4.93	6.28	0.78
Reach-1	6305	5 Year	12.3	129.9	131.13	130.99	131.4	0.012186	2.28	5.4	6.54	0.8
Reach-1	6305	10 Year	14.58	129.9	131.22	131.1	131.52	0.012952	2.44	5.98	6.84	0.83
Reach-1	6305	25 Year	19.5	129.9	131.38	131.29	131.76	0.014729	2.76	7.07	7.36	0.9
Reach-1	6305	50 Year	24.49	129.9	131.52	131.47	131.98	0.015629	2.99	8.19	7.87	0.94
Reach-1	6305	100 Year	29.87	129.9	131.67	131.63	132.19	0.016199	3.19	9.37	8.37	0.96
Reach-1	6305	500 Year	45.17	129.9	131.98	132	132.69	0.017834	3.73	12.13	9.41	1.04
Reach-1	6266	Fish Low Pa	0.01	129.54	129.56	129.56	129.57	0.16204	0.53	0.02	1.58	1.54
Reach-1	6266	Fish High Pa	0.51	129.54	129.69	129.69	129.75	0.035781	1.13	0.45	3.86	1.05
Reach-1	6266	2 Year	9.4	129.54	130.35	130.35	130.65	0.020149	2.43	3.87	6.45	1
Reach-1	6266	3 Year	10.6	129.54	130.4	130.4	130.72	0.019757	2.5	4.24	6.67	1
Reach-1	6266	5 Year	12.3	129.54	130.48	130.47	130.82	0.019018	2.58	4.78	6.97	0.99
Reach-1	6266	10 Year	14.58	129.54	130.58	130.57	130.94	0.018071	2.65	5.5	7.35	0.98
Reach-1	6266	25 Year	19.5	129.54	130.78	130.74	131.17	0.016331	2.77	7.03	8.12	0.95
Reach-1	6266	50 Year	24.49	129.54	130.95	130.9	131.38	0.015621	2.9	8.43	8.75	0.94
Reach-1	6266	100 Year	29.87	129.54	131.1	131.05	131.57	0.015383	3.05	9.81	9.34	0.95
Reach-1	6266	500 Year	45.17	129.54	131.53	131.41	132.05	0.014123	3.19	14.14	10.93	0.9
Reach-1	6216	Fish Low Pa	0.01	128.63	128.7	128.67	128.7	0.005775	0.2	0.05	1.5	0.34
Reach-1	6216	Fish High Pa	0.51	128.63	128.95	128.85	128.98	0.005014	0.65	0.78	3.31	0.43
Reach-1	6216	2 Year	9.4	128.63	129.89	129.61	130.04	0.00704	1.7	5.54	6.93	0.61
Reach-1	6216	3 Year	10.6	128.63	129.96		130.12	0.007021	1.75	6.04	7.18	0.61
Reach-1	6216	5 Year	12.3	128.63	130.06		130.23	0.006841	1.81	6.79	7.53	0.61
Reach-1	6216	10 Year	14.58	128.63	130.19		130.37	0.006665	1.88	7.76	7.96	0.61
Reach-1	6216	25 Year	19.5	128.63	130.41		130.62	0.006673	2.03	9.59	8.71	0.62
Reach-1	6216	50 Year	24.49	128.63	130.6		130.84	0.006449	2.16	11.32	9.34	0.62
Reach-1	6216	100 Year	29.87	128.63	130.75		131.03	0.006543	2.35	12.76	9.81	0.64
Reach-1	6216	500 Year	45.17	128.63	131.24		131.58	0.005372	2.6	17.9	11.35	0.61
Reach-1	6122	Fish Low Pa	0.01	128.1	128.17	128.14	128.17	0.005608	0.2	0.05	1.4	0.34
Reach-1	6122	Fish High Pa	0.51	128.1	128.41		128.43	0.007047	0.67	0.76	4.07	0.5
Reach-1	6122	2 Year	9.4	128.1	129.24		129.37	0.007094	1.63	5.75	7.96	0.61
Reach-1	6122	3 Year	10.6	128.1	129.29	129.04	129.44	0.007482	1.72	6.16	8.19	0.63
Reach-1	6122	5 Year	12.3	128.1	129.35	129.12	129.52	0.008365	1.85	6.65	8.47	0.67
Reach-1	6122	10 Year	14.58	128.1	129.45	129.2	129.64	0.009045	1.93	7.56	9.14	0.68
Reach-1	6122	25 Year	19.5	128.1	129.68		129.89	0.009223	1.99	9.78	9.92	0.64
Reach-1	6122	50 Year	24.49	128.1	129.91		130.12	0.008944	2.01	12.16	10.7	0.6
Reach-1	6122	100 Year	29.87	128.1	130.1		130.33	0.008199	2.1	14.27	11.34	0.58
Reach-1	6122	500 Year	45.17	128.1	130.94		131.13	0.003511	1.91	24.89	13.95	0.42
Reach-1	6067	Fish Low Pa	0.01	127.8	127.85	127.83	127.85	0.006373	0.16	0.06	2.57	0.34
Reach-1	6067	Fish High Pa	0.51	127.8	128.02	127.96	128.04	0.007237	0.61	0.84	5.51	0.49
Reach-1	6067	2 Year	9.4	127.8	128.53	128.51	128.77	0.018	2.16	4.35	8.19	0.95
Reach-1	6067	3 Year	10.6	127.8	128.6	128.56	128.84	0.016552	2.17	4.87	8.51	0.92
Reach-1	6067	5 Year	12.3	127.8	128.7		128.93	0.01374	2.13	5.78	9.03	0.85
Reach-1	6067	10 Year	14.58	127.8	128.87		129.07	0.011927	1.98	7.35	9.92	0.74
Reach-1	6067	25 Year	19.5	127.8	129.21		129.37	0.009056	1.76	11.09	11.76	0.58
Reach-1	6067	50 Year	24.49	127.8	129.52		129.66	0.007136	1.63	15.06	13.45	0.49
Reach-1	6067	100 Year	29.87	127.8	129.85		129.97	0.004578	1.54	19.66	15.18	0.41
Reach-1	6067	500 Year	45.17	127.8	130.89		130.97	0.001598	1.3	37.82	19.37	0.26

HEC-RAS Plan: EX_DOT River: Beaver Pond Brk Reach: Reach-1												
Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
Reach-1	6033	Fish Low Pa	0.01	127.35	127.37	127.37	127.38	0.048701	0.28	0.04	2.99	0.84
Reach-1	6033	Fish High Pa	0.51	127.35	127.46	127.46	127.52	0.046477	1.06	0.48	5.43	1.14
Reach-1	6033	2 Year	9.4	127.35	128.31	128.01	128.42	0.005605	1.45	6.48	8.94	0.54
Reach-1	6033	3 Year	10.6	127.35	128.42	128.06	128.52	0.004694	1.41	7.5	9.39	0.5
Reach-1	6033	5 Year	12.3	127.35	128.57	128.13	128.66	0.003842	1.38	8.93	9.98	0.46
Reach-1	6033	10 Year	14.58	127.35	128.75	128.21	128.85	0.003113	1.34	10.87	10.75	0.43
Reach-1	6033	25 Year	19.5	127.35	129.12	128.37	129.21	0.002225	1.29	15.13	12.32	0.37
Reach-1	6033	50 Year	24.49	127.35	129.46	128.51	129.54	0.001581	1.26	19.46	13.76	0.32
Reach-1	6033	100 Year	29.87	127.35	129.8	128.65	129.88	0.001205	1.26	24.05	15.27	0.29
Reach-1	6033	500 Year	45.17	127.35	130.86	128.98	130.94	0.000604	1.2	39.89	19.63	0.22
Reach-1	5993.5		Culvert									
Reach-1	5947	Fish Low Pa	0.01	126.08	126.12	126.12	126.14	0.053578	0.46	0.02	0.98	0.97
Reach-1	5947	Fish High Pa	0.51	126.08	126.2	126.28	126.66	0.69948	3	0.17	3.1	4.09
Reach-1	5947	2 Year	9.4	126.08	126.68	126.96	127.59	0.092964	4.21	2.23	5.15	2.04
Reach-1	5947	3 Year	10.6	126.08	126.81	127.02	127.49	0.055752	3.66	2.89	5.56	1.62
Reach-1	5947	5 Year	12.3	126.08	126.77	127.1	127.82	0.09007	4.53	2.71	5.45	2.05
Reach-1	5947	10 Year	14.58	126.08	126.84	127.19	127.97	0.085781	4.69	3.11	5.69	2.02
Reach-1	5947	25 Year	19.5	126.08	126.98	127.38	128.25	0.079924	4.99	3.91	6.14	1.99
Reach-1	5947	50 Year	24.49	126.08	127.84	127.54	128.12	0.008399	2.36	10.39	8.98	0.7
Reach-1	5947	100 Year	29.87	126.08	128.01	127.7	128.33	0.008189	2.49	11.99	9.57	0.7
Reach-1	5947	500 Year	45.17	126.08	128.48	128.07	128.86	0.006611	2.75	16.81	11.17	0.66
Reach-1	5878	Fish Low Pa	0.02	125.17	125.82	125.25	125.82	0	0.01	2.55	6.5	0
Reach-1	5878	Fish High Pa	0.93	125.17	125.93	125.5	125.93	0.000387	0.29	3.23	6.94	0.14
Reach-1	5878	2 Year	14.5	125.17	126.68	126.24	126.79	0.004307	1.5	9.68	10.54	0.5
Reach-1	5878	3 Year	16.3	125.17	126.75	126.3	126.87	0.004444	1.56	10.44	10.94	0.51
Reach-1	5878	5 Year	18.9	125.17	126.84	126.39	126.98	0.004624	1.66	11.4	11.31	0.53
Reach-1	5878	10 Year	22.51	125.17	126.95	126.5	127.11	0.0049	1.78	12.67	11.75	0.54
Reach-1	5878	25 Year	30.1	125.17	127.18	126.7	127.37	0.005926	1.95	15.55	13.04	0.56
Reach-1	5878	50 Year	37.8	125.17	127.39	126.88	127.61	0.006261	2.08	18.41	14.08	0.56
Reach-1	5878	100 Year	46.01	125.17	127.58	127.05	127.83	0.006029	2.22	21.14	14.74	0.56
Reach-1	5878	500 Year	69.8	125.17	128.13	127.43	128.44	0.005	2.47	29.81	16.74	0.54
Reach-1	5832	Fish Low Pa	0.02	124.64	125.82	124.73	125.82	0	0	5.01	7.26	0
Reach-1	5832	Fish High Pa	0.93	124.64	125.92	125.04	125.92	0.000066	0.16	5.74	7.6	0.06
Reach-1	5832	2 Year	14.5	124.64	126.56	125.88	126.65	0.002223	1.32	11.17	9.54	0.37
Reach-1	5832	3 Year	16.3	124.64	126.62	125.94	126.72	0.002434	1.42	11.74	9.7	0.39
Reach-1	5832	5 Year	18.9	124.64	126.69	126.03	126.81	0.002751	1.56	12.42	9.9	0.42
Reach-1	5832	10 Year	22.51	124.64	126.77	126.14	126.93	0.003177	1.74	13.28	10.14	0.46
Reach-1	5832	25 Year	30.1	124.64	126.92	126.36	127.14	0.004095	2.11	14.81	10.55	0.53
Reach-1	5832	50 Year	37.8	124.64	127.04	126.56	127.34	0.005059	2.45	16.09	10.93	0.59
Reach-1	5832	100 Year	46.01	124.64	127.13	126.74	127.53	0.006281	2.83	17.11	11.22	0.66
Reach-1	5832	500 Year	69.8	124.64	127.23	127.18	128.05	0.011998	4.05	18.26	11.54	0.93
Reach-1	5813		Inl Struct									
Reach-1	5812.5	Fish Low Pa	0.02	124.45	124.49	124.49	124.5	0.045281	0.45	0.05	2.08	0.92
Reach-1	5812.5	Fish High Pa	0.93	124.45	124.67	124.65	124.71	0.017681	0.88	1.07	7.83	0.76
Reach-1	5812.5	2 Year	14.5	124.45	125.79	125.22	125.88	0.002539	1.27	11.38	9.99	0.38
Reach-1	5812.5	3 Year	16.3	124.45	125.87	125.27	125.96	0.00263	1.34	12.16	10.09	0.39
Reach-1	5812.5	5 Year	18.9	124.45	125.97	125.34	126.08	0.002773	1.43	13.2	10.22	0.4
Reach-1	5812.5	10 Year	22.51	124.45	126.11	125.44	126.23	0.003042	1.54	14.61	10.48	0.42
Reach-1	5812.5	25 Year	30.1	124.45	126.35	125.62	126.51	0.003381	1.76	17.17	11.07	0.44
Reach-1	5812.5	50 Year	37.8	124.45	126.56	125.79	126.75	0.003544	1.95	19.54	11.66	0.46
Reach-1	5812.5	100 Year	46.01	124.45	126.75	125.95	126.98	0.003734	2.14	21.84	12.21	0.48
Reach-1	5812.5	500 Year	69.8	124.45	127.23	126.38	127.57	0.004132	2.6	28.09	13.8	0.53
Reach-1	5804	Fish Low Pa	0.02	124.01	124.1	124.1	124.12	0.044774	0.66	0.03	0.76	0.99
Reach-1	5804	Fish High Pa	0.93	124.01	124.41	124.41	124.51	0.027856	1.45	0.64	3	1
Reach-1	5804	2 Year	14.5	124.01	125.4	125.4	125.75	0.033097	2.6	5.59	8.36	1.01
Reach-1	5804	3 Year	16.3	124.01	125.46	125.46	125.83	0.032364	2.67	6.11	8.55	1.01
Reach-1	5804	5 Year	18.9	124.01	125.55	125.55	125.94	0.031204	2.75	6.87	8.81	0.99
Reach-1	5804	10 Year	22.51	124.01	125.65	125.65	126.08	0.032458	2.9	7.77	9.14	1
Reach-1	5804	25 Year	30.1	124.01	125.86	125.86	126.34	0.03525	3.07	9.82	10.3	1
Reach-1	5804	50 Year	37.8	124.01	126.03	126.03	126.57	0.034574	3.28	11.54	10.79	1
Reach-1	5804	100 Year	46.01	124.01	126.2	126.2	126.8	0.032934	3.44	13.46	11.31	0.99
Reach-1	5804	500 Year	69.8	124.01	126.64	126.59	127.38	0.027309	3.83	18.66	12.48	0.94
Reach-1	5757	Fish Low Pa	0.02	123.16	123.21	123.2	123.21	0.009365	0.2	0.11	4.53	0.42
Reach-1	5757	Fish High Pa	0.93	123.16	123.4	123.35	123.44	0.012173	0.93	1.01	5	0.66

HEC-RAS Plan: EX_DOT River: Beaver Pond Brk Reach: Reach-1												
Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
Reach-1	5757	2 Year	14.5	123.16	124.23	124.12	124.52	0.013057	2.4	6.04	7.12	0.83
Reach-1	5757	3 Year	16.3	123.16	124.32	124.19	124.62	0.012959	2.45	6.66	7.34	0.82
Reach-1	5757	5 Year	18.9	123.16	124.45	124.28	124.76	0.013194	2.48	7.63	7.67	0.79
Reach-1	5757	10 Year	22.51	123.16	124.62	124.4	124.94	0.013139	2.49	9.04	8.12	0.75
Reach-1	5757	25 Year	30.1	123.16	124.95	124.63	125.28	0.013262	2.56	11.78	8.94	0.71
Reach-1	5757	50 Year	37.8	123.16	125.14	124.84	125.54	0.01328	2.79	13.58	9.46	0.73
Reach-1	5757	100 Year	46.01	123.16	125.31	125.02	125.79	0.013684	3.05	15.25	9.92	0.75
Reach-1	5757	500 Year	69.8	123.16	125.71	125.48	126.41	0.015416	3.72	19.38	10.97	0.82
Reach-1	5628	Fish Low Pa	0.02	120.8	120.86	120.86	120.87	0.050219	0.53	0.04	1.51	0.99
Reach-1	5628	Fish High Pa	0.93	120.8	121.08	121.08	121.18	0.027643	1.39	0.67	3.36	1
Reach-1	5628	2 Year	14.5	120.8	121.9	121.9	122.24	0.025598	2.58	5.63	8.37	1
Reach-1	5628	3 Year	16.3	120.8	121.96	121.96	122.32	0.026175	2.67	6.11	8.52	1
Reach-1	5628	5 Year	18.9	120.8	122.05	122.05	122.43	0.026085	2.75	6.88	8.75	0.99
Reach-1	5628	10 Year	22.51	120.8	122.14	122.14	122.57	0.027371	2.9	7.75	9.01	1
Reach-1	5628	25 Year	30.1	120.8	122.34	122.34	122.84	0.028635	3.14	9.6	9.54	1
Reach-1	5628	50 Year	37.8	120.8	122.52	122.52	123.09	0.029268	3.35	11.3	10	1
Reach-1	5628	100 Year	46.01	120.8	122.68	122.68	123.33	0.028019	3.57	12.93	10.42	1
Reach-1	5628	500 Year	69.8	120.8	123.11	123.11	123.94	0.024529	4.05	17.67	11.56	0.98
Reach-1	5524	Fish Low Pa	0.02	117.6	117.67	117.65	117.67	0.01559	0.32	0.07	2.19	0.56
Reach-1	5524	Fish High Pa	0.93	117.6	117.88	117.83	117.92	0.011815	0.89	1.05	5.48	0.65
Reach-1	5524	2 Year	14.5	117.6	118.39	118.55	118.97	0.038266	3.37	4.3	7.12	1.38
Reach-1	5524	3 Year	16.3	117.6	118.45	118.61	119.06	0.037077	3.46	4.71	7.31	1.37
Reach-1	5524	5 Year	18.9	117.6	118.52	118.7	119.19	0.036767	3.61	5.23	7.53	1.38
Reach-1	5524	10 Year	22.51	117.6	118.63	118.82	119.33	0.034585	3.73	6.03	7.86	1.36
Reach-1	5524	25 Year	30.1	117.6	119.24	119.03	119.59	0.014978	2.63	11.46	9.78	0.78
Reach-1	5524	50 Year	37.8	117.6	119.52	119.22	119.87	0.014532	2.65	14.28	10.66	0.73
Reach-1	5524	100 Year	46.01	117.6	119.78	119.4	120.14	0.014229	2.68	17.17	11.49	0.7
Reach-1	5524	500 Year	69.8	117.6	120.3	119.85	120.75	0.015529	2.95	23.67	13.13	0.7
Reach-1	5456	Fish Low Pa	0.02	116.4	116.47	116.45	116.47	0.019973	0.36	0.06	1.96	0.64
Reach-1	5456	Fish High Pa	0.93	116.4	116.65	116.65	116.73	0.028019	1.18	0.79	5.27	0.97
Reach-1	5456	2 Year	14.5	116.4	117.38	117.38	117.74	0.019314	2.68	5.42	7.56	1.01
Reach-1	5456	3 Year	16.3	116.4	117.45	117.45	117.83	0.018627	2.74	5.95	7.79	1
Reach-1	5456	5 Year	18.9	116.4	117.53	117.53	117.94	0.018405	2.85	6.63	8.06	1
Reach-1	5456	10 Year	22.51	116.4	117.64	117.64	118.1	0.018413	2.99	7.53	8.41	1.01
Reach-1	5456	25 Year	30.1	116.4	117.86	117.86	118.38	0.02096	3.2	9.41	10.76	1
Reach-1	5456	50 Year	37.8	116.4	118.05	118.05	118.63	0.022903	3.36	11.24	14.32	1
Reach-1	5456	100 Year	46.01	116.4	118.23	118.23	118.86	0.024694	3.54	13	15.57	1
Reach-1	5456	500 Year	69.8	116.4	118.65	118.65	119.47	0.021679	4.02	17.63	18.48	0.99
Reach-1	5422	Fish Low Pa	0.02	115.7	115.76	115.75	115.76	0.021498	0.35	0.07	2.18	0.65
Reach-1	5422	Fish High Pa	0.93	115.7	115.99	115.94	116.03	0.011553	0.89	1.05	5.48	0.65
Reach-1	5422	2 Year	14.5	115.7	116.81	116.67	117.06	0.011198	2.22	6.52	7.87	0.78
Reach-1	5422	3 Year	16.3	115.7	116.89	116.73	117.15	0.010969	2.29	7.13	8.11	0.78
Reach-1	5422	5 Year	18.9	115.7	117.03	116.82	117.29	0.009675	2.28	8.28	8.56	0.74
Reach-1	5422	10 Year	22.51	115.7	117.17	116.93	117.45	0.009296	2.36	9.52	9.01	0.73
Reach-1	5422	25 Year	30.1	115.7	117.38	117.15	117.73	0.010564	2.61	11.55	9.71	0.76
Reach-1	5422	50 Year	37.8	115.7	117.53	117.34	117.96	0.013355	2.91	13	10.18	0.82
Reach-1	5422	100 Year	46.01	115.7	117.67	117.53	118.19	0.01399	3.18	14.51	10.71	0.85
Reach-1	5422	500 Year	69.8	115.7	118.14	117.95	118.8	0.012214	3.6	19.98	12.46	0.84
Reach-1	5355	Fish Low Pa	0.02	114.9	114.95	114.93	114.95	0.007889	0.27	0.08	1.96	0.42
Reach-1	5355	Fish High Pa	0.93	114.9	115.25	115.17	115.3	0.010776	0.89	1.05	5.09	0.63
Reach-1	5355	2 Year	14.5	114.9	116.1	115.94	116.33	0.010562	2.13	6.81	8.52	0.76
Reach-1	5355	3 Year	16.3	114.9	116.14	116.01	116.41	0.011579	2.27	7.17	8.7	0.8
Reach-1	5355	5 Year	18.9	114.9	116.17	116.09	116.5	0.014378	2.56	7.38	8.8	0.89
Reach-1	5355	10 Year	22.51	114.9	116.24	116.21	116.64	0.016094	2.8	8.04	9.12	0.95
Reach-1	5355	25 Year	30.1	114.9	116.49	116.42	116.91	0.014071	2.89	10.43	10.17	0.91
Reach-1	5355	50 Year	37.8	114.9	116.86	116.6	117.21	0.00913	2.61	14.49	11.75	0.75
Reach-1	5355	100 Year	46.01	114.9	117.24	116.77	117.54	0.006021	2.39	19.32	13.33	0.62
Reach-1	5355	500 Year	69.8	114.9	117.99	117.18	118.29	0.003614	2.41	30.53	16.67	0.51
Reach-1	5296	Fish Low Pa	0.02	114.03	114.07	114.06	114.08	0.035799	0.43	0.05	1.92	0.83
Reach-1	5296	Fish High Pa	0.93	114.03	114.29	114.28	114.35	0.025574	1.13	0.83	5.36	0.92
Reach-1	5296	2 Year	17.41	114.03	115.09	115.09	115.48	0.018876	2.75	6.32	8.16	1
Reach-1	5296	3 Year	19.6	114.03	115.2	115.16	115.58	0.016367	2.71	7.22	8.54	0.94
Reach-1	5296	5 Year	22.7	114.03	115.38	115.26	115.72	0.012488	2.57	8.82	9.17	0.84
Reach-1	5296	10 Year	27.04	114.03	115.62	115.38	115.92	0.009176	2.42	11.16	10.02	0.73
Reach-1	5296	25 Year	36.2	114.03	116.1	115.61	116.36	0.006134	2.23	16.27	11.24	0.59
Reach-1	5296	50 Year	45.59	114.03	116.55	115.81	116.78	0.005231	2.11	21.58	12.46	0.51

HEC-RAS Plan: EX_DOT River: Beaver Pond Brk Reach: Reach-1												
Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
Reach-1	5296	100 Year	55.5	114.03	116.99	116	117.2	0.004739	2.03	27.28	13.63	0.46
Reach-1	5296	500 Year	84.24	114.03	117.81	116.48	118.05	0.003926	2.16	38.98	16.16	0.42
Reach-1	5281	Fish Low Pa	0.02	113.52	113.63	113.63	113.65	0.035697	0.65	0.04	0.65	0.89
Reach-1	5281	Fish High Pa	0.93	113.52	113.93	113.93	114.02	0.029568	1.37	0.68	3.65	1.01
Reach-1	5281	2 Year	17.41	113.52	115.02	114.81	115.23	0.008577	2.03	8.57	9.75	0.69
Reach-1	5281	3 Year	19.6	113.52	115.18	114.88	115.37	0.006568	1.94	10.1	10.08	0.62
Reach-1	5281	5 Year	22.7	113.52	115.37	114.96	115.55	0.005071	1.87	12.13	10.5	0.56
Reach-1	5281	10 Year	27.04	113.52	115.62	115.06	115.79	0.003749	1.83	14.92	11.99	0.49
Reach-1	5281	25 Year	36.2	113.52	116.1	115.28	116.27	0.002451	1.8	21.21	14.8	0.42
Reach-1	5281	50 Year	45.59	113.52	116.55	115.46	116.71	0.001852	1.81	27.28	16.99	0.38
Reach-1	5281	100 Year	55.5	113.52	116.98	115.65	117.15	0.001519	1.83	33.14	18.24	0.35
Reach-1	5281	500 Year	84.24	113.52	117.79	116.13	118.01	0.001431	2.11	44.2	22.75	0.36
Reach-1	5254.5		Culvert									
Reach-1	5224	Fish Low Pa	0.02	112.68	112.94	112.76	112.94	0.000071	0.05	0.43	3.28	0.05
Reach-1	5224	Fish High Pa	0.93	112.68	113.33	113.02	113.34	0.000966	0.31	2.97	11.37	0.2
Reach-1	5224	2 Year	17.41	112.68	114.49	113.69	114.54	0.001138	0.96	18.17	14.88	0.27
Reach-1	5224	3 Year	19.6	112.68	114.58	113.74	114.63	0.001172	1.01	19.39	15.01	0.28
Reach-1	5224	5 Year	22.7	112.68	114.69	113.81	114.75	0.001212	1.08	21	15.23	0.28
Reach-1	5224	10 Year	27.04	112.68	114.83	113.9	114.9	0.001281	1.18	22.96	15.52	0.3
Reach-1	5224	25 Year	36.2	112.68	115.08	114.07	115.17	0.001424	1.37	26.61	16.06	0.32
Reach-1	5224	50 Year	45.59	112.68	115.32	114.22	115.44	0.001497	1.52	30.27	16.58	0.33
Reach-1	5224	100 Year	55.5	112.68	115.58	114.37	115.72	0.001491	1.64	34.34	17.26	0.34
Reach-1	5224	500 Year	84.24	112.68	116.2	114.74	116.39	0.001581	1.97	44.17	18.56	0.36
Reach-1	5206	Fish Low Pa	0.02	112.84	112.94	112.89	112.94	0.00098	0.12	0.19	3.18	0.16
Reach-1	5206	Fish High Pa	0.93	112.84	113.29	113.07	113.3	0.001628	0.46	2.05	6.66	0.26
Reach-1	5206	2 Year	17.41	112.84	114.36	113.86	114.47	0.003687	1.49	11.69	11.41	0.47
Reach-1	5206	3 Year	19.6	112.84	114.43	113.93	114.56	0.003794	1.56	12.59	11.73	0.48
Reach-1	5206	5 Year	22.7	112.84	114.54	114.02	114.67	0.003932	1.64	13.81	12.16	0.49
Reach-1	5206	10 Year	27.04	112.84	114.66	114.12	114.81	0.004189	1.77	15.29	12.63	0.51
Reach-1	5206	25 Year	36.2	112.84	114.87	114.34	115.07	0.004677	2	18.09	13.41	0.55
Reach-1	5206	50 Year	45.59	112.84	115.1	114.52	115.34	0.004679	2.14	21.29	14.19	0.56
Reach-1	5206	100 Year	55.5	112.84	115.38	114.7	115.62	0.004382	2.19	25.36	15.12	0.54
Reach-1	5206	500 Year	84.24	112.84	116.01	115.14	116.3	0.004293	2.37	35.64	17.27	0.52
Reach-1	5145	Fish Low Pa	0.02	112.68	112.74	112.74	112.75	0.062388	0.58	0.04	1.38	1.1
Reach-1	5145	Fish High Pa	0.93	112.68	112.94	112.94	113.01	0.030328	1.2	0.78	5.32	1
Reach-1	5145	2 Year	17.41	112.68	113.72	113.67	114.01	0.015562	2.42	7.21	10.23	0.92
Reach-1	5145	3 Year	19.6	112.68	113.79	113.73	114.1	0.014964	2.47	7.93	10.55	0.91
Reach-1	5145	5 Year	22.7	112.68	113.88	113.81	114.21	0.014216	2.54	8.95	10.98	0.9
Reach-1	5145	10 Year	27.04	112.68	114.03	113.92	114.36	0.012452	2.55	10.61	11.65	0.85
Reach-1	5145	25 Year	36.2	112.68	114.39	114.12	114.68	0.008189	2.39	15.16	13.32	0.71
Reach-1	5145	50 Year	45.59	112.68	114.77	114.3	115.02	0.005547	2.21	20.6	15.05	0.6
Reach-1	5145	100 Year	55.5	112.68	115.14	114.47	115.37	0.003789	2.11	26.44	16.74	0.52
Reach-1	5145	500 Year	84.24	112.68	115.84	114.89	116.08	0.002591	2.2	42.14	49.52	0.45
Reach-1	5084	Fish Low Pa	0.02	111.83	111.96	111.89	111.96	0.001401	0.15	0.16	2.47	0.19
Reach-1	5084	Fish High Pa	0.93	111.83	112.22	112.11	112.25	0.005794	0.72	1.29	5.42	0.47
Reach-1	5084	2 Year	17.41	111.83	113.25	112.92	113.42	0.00597	1.82	9.59	9.8	0.59
Reach-1	5084	3 Year	19.6	111.83	113.38	112.98	113.55	0.005322	1.81	10.86	10.22	0.56
Reach-1	5084	5 Year	22.7	111.83	113.55	113.07	113.72	0.004435	1.8	12.68	11.2	0.52
Reach-1	5084	10 Year	27.04	111.83	113.78	113.18	113.94	0.003514	1.79	15.4	12.49	0.48
Reach-1	5084	25 Year	36.2	111.83	114.23	113.41	114.39	0.002479	1.81	21.72	16.28	0.42
Reach-1	5084	50 Year	45.59	111.83	114.66	113.6	114.81	0.001889	1.81	29.71	26.94	0.38
Reach-1	5084	100 Year	55.5	111.83	115.05	113.78	115.21	0.001542	1.81	39.67	60.09	0.35
Reach-1	5084	500 Year	84.24	111.83	115.93	114.27	115.97	0.000368	1.07	112.37	147.62	0.18
Reach-1	5072	Fish Low Pa	0.02	111.83	111.9	111.9	111.9	0.029211	0.3	0.08	3.94	0.7
Reach-1	5072	Fish High Pa	0.93	111.83	112.03	112.03	112.09	0.030516	1.07	0.88	7.19	0.97
Reach-1	5072	2 Year	17.41	111.83	113.24	112.69	113.34	0.002361	1.37	12.98	13.49	0.4
Reach-1	5072	3 Year	19.6	111.83	113.37	112.74	113.47	0.002123	1.39	14.47	13.95	0.38
Reach-1	5072	5 Year	22.7	111.83	113.55	112.82	113.65	0.001876	1.42	16.53	14.61	0.37
Reach-1	5072	10 Year	27.04	111.83	113.78	112.91	113.88	0.001628	1.45	19.33	16.17	0.35
Reach-1	5072	25 Year	36.2	111.83	114.23	113.11	114.34	0.00131	1.52	24.96	18.04	0.33
Reach-1	5072	50 Year	45.59	111.83	114.66	113.29	114.78	0.001124	1.58	30.46	24.67	0.31
Reach-1	5072	100 Year	55.5	111.83	115.07	113.46	115.16	0.000745	1.42	46.27	91.16	0.26
Reach-1	5072	500 Year	84.24	111.83	115.91	113.92	115.96	0.000398	1.22	107.48	169.71	0.2
Reach-1	5050.5		Culvert									

HEC-RAS Plan: EX_DOT River: Beaver Pond Brk Reach: Reach-1												
Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
Reach-1	5021	Fish Low Pa	0.02	110.98	111	111.03	111.25	2.828009	2.19	0.01	0.88	6.41
Reach-1	5021	Fish High Pa	0.93	110.98	111.12	111.2	111.47	0.399749	2.63	0.36	5.23	3.22
Reach-1	5021	2 Year	17.41	110.98	111.95	111.87	112.16	0.012674	2.03	8.6	13.85	0.82
Reach-1	5021	3 Year	19.6	110.98	112.35	111.92	112.44	0.003701	1.32	14.85	17.92	0.46
Reach-1	5021	5 Year	22.7	110.98	112.57	111.98	112.64	0.002394	1.2	18.92	18.91	0.38
Reach-1	5021	10 Year	27.04	110.98	112.94	112.07	112.99	0.001357	1.03	26.15	19.98	0.29
Reach-1	5021	25 Year	36.2	110.98	112.94	112.25	113.04	0.002432	1.38	26.15	19.98	0.39
Reach-1	5021	50 Year	45.59	110.98	113.59	112.4	113.66	0.001131	1.15	40.1	26.95	0.27
Reach-1	5021	100 Year	55.5	110.98	114.2	112.52	114.26	0.00065	1.05	54.68	38.72	0.21
Reach-1	5021	500 Year	84.24	110.98	115.19	112.85	115.25	0.000503	1.1	90.61	77.43	0.19

BEAVER POND BROOK - EXISTING CONDITION, DESIGN DISCHARGE (W/ BACKWATER)
HEC-RAS 4.1.0 - "Six XS Bridge" Output

HEC-RAS Plan: EX_DOT River: Beaver Pond Brk Reach: Reach-1												
Reach	River Sta	Profile	E.G. Elev (m)	W.S. Elev (m)	Crit W.S. (m)	Frctn Loss (m)	C & E Loss (m)	Top Width (m)	Q Left (m3/s)	Q Channel (m3/s)	Q Right (m3/s)	Vel Chnl (m/s)
Reach-1	7977	Fish Low Pa	139.49	139.47	139.47	0.03	0	0.61		0.01		0.54
Reach-1	7977	Fish High Pa	139.77	139.7	139.7	0.13	0.02	2.94		0.51		1.2
Reach-1	7977	2 Year	140.34	140.25	140.07	0.11	0.01	5.72		3.8		1.3
Reach-1	7977	3 Year	140.41	140.33	140.11	0.11	0.01	6		4.3		1.29
Reach-1	7977	5 Year	140.53	140.46	140.15	0.1	0.01	6.5		4.9		1.18
Reach-1	7977	10 Year	140.62	140.55	140.21	0.11	0.01	6.86		5.81		1.22
Reach-1	7977	25 Year	140.78	140.69	140.33	0.15	0.01	7.39		7.93		1.38
Reach-1	7977	50 Year	141.11	141.04	140.42	0.08	0	8.72	0.02	9.6	0.01	1.13
Reach-1	7977	100 Year	141.41	141.35	140.51	0.06	0	9.86	0.1	11.44	0.07	1.06
Reach-1	7977	500 Year	141.87	141.8	140.75	0.06	0	11.5	0.39	16.71	0.3	1.18
Reach-1	7937	Fish Low Pa	139.11	139.11	139.05			2.79		0.01		0.06
Reach-1	7937	Fish High Pa	139.42	139.42	139.2			5.19		0.51		0.36
Reach-1	7937	2 Year	140.21	140.17	139.64			7.49		5.6		0.88
Reach-1	7937	3 Year	140.29	140.24	139.67			7.67		6.3		0.92
Reach-1	7937	5 Year	140.42	140.38	139.72			8		7.3		0.92
Reach-1	7937	10 Year	140.51	140.46	139.79			8.2		8.64		1.01
Reach-1	7937	25 Year	140.63	140.55	139.92			8.43		11.6		1.24
Reach-1	7937	50 Year	141.03	140.96	140.04			9.5	0	14.57	0.01	1.12
Reach-1	7937	100 Year	141.35	141.29	140.15			10.28	0.02	17.63	0.05	1.11
Reach-1	7937	500 Year	141.81	141.72	140.43			33.05	0.15	26.26	0.21	1.33
Reach-1	7911.5 BR U	Fish Low Pa	138.9	138.9	138.86			3.81		0.01		0.06
Reach-1	7911.5 BR U	Fish High Pa	139.16	139.16	138.98			4.39		0.51		0.4
Reach-1	7911.5 BR U	2 Year	140	139.93	139.42			4.39		5.6		1.2
Reach-1	7911.5 BR U	3 Year	140.09	140	139.46			4.39		6.3		1.26
Reach-1	7911.5 BR U	5 Year	140.42	140.3	139.52			4.39		7.3		1.16
Reach-1	7911.5 BR U	10 Year	140.35	140.24	139.6			4.39		8.64		1.43
Reach-1	7911.5 BR U	25 Year	140.63	140.3	139.76					11.6		1.84
Reach-1	7911.5 BR U	50 Year	141.03	140.3	139.9					14.58		2.32
Reach-1	7911.5 BR U	100 Year	141.35	140.3	140.05					17.7		2.81
Reach-1	7911.5 BR U	500 Year	141.81	141.72	141.89			29.59		21.11	5.46	3.33
Reach-1	7911.5 BR D	Fish Low Pa	138.9	138.9	138.87			4.39		0.01		0.06
Reach-1	7911.5 BR D	Fish High Pa	139.13	139.12	138.97			4.39		0.51		0.45
Reach-1	7911.5 BR D	2 Year	139.93	139.84	139.41			4.39		5.6		1.3
Reach-1	7911.5 BR D	3 Year	140.01	139.91	139.45			4.39		6.3		1.36
Reach-1	7911.5 BR D	5 Year	140.12	140.07	139.52			4.39		7.3		1.37
Reach-1	7911.5 BR D	10 Year	140.26	140.15	139.6			4.39		8.64		1.53
Reach-1	7911.5 BR D	25 Year	140.43	140.3	139.75					11.6		1.83
Reach-1	7911.5 BR D	50 Year	140.67	140.3	139.9					14.58		2.3
Reach-1	7911.5 BR D	100 Year	140.81	140.3	140.04					17.7		2.8
Reach-1	7911.5 BR D	500 Year	141.81	141.72	141.73			22.32		21.11	5.46	3.33
Reach-1	7885	Fish Low Pa	139.01	139.01	138.98	0.35	0	2.22		0.01		0.13
Reach-1	7885	Fish High Pa	139.23	139.22	139.14	0.27	0	4.92		0.51		0.61
Reach-1	7885	2 Year	139.92	139.88	139.53	0.2	0	9.33		5.6		0.95
Reach-1	7885	3 Year	139.99	139.94	139.56	0.2	0	9.59		6.3		0.97
Reach-1	7885	5 Year	140.12	140.07	139.61	0.16	0	10.15		7.3		0.94
Reach-1	7885	10 Year	140.21	140.16	139.66	0.17	0	10.5		8.64		1
Reach-1	7885	25 Year	140.43	140.37	139.77	0.16	0	13.88	0	11.56	0.04	1.05
Reach-1	7885	50 Year	140.67	140.62	139.87	0.1	0.01	15.13	0.02	14.34	0.22	1.04
Reach-1	7885	100 Year	140.81	140.75	139.97	0.1	0.01	15.77	0.04	17.28	0.38	1.14
Reach-1	7885	500 Year	141.06	140.95	140.2	0.14	0.01	16.8	0.15	25.66	0.81	1.47
Reach-1	7826	Fish Low Pa	138.66	138.65	138.65	0.15	0	0.88		0.01		0.5
Reach-1	7826	Fish High Pa	138.96	138.95	138.82	0.18	0	4.14		0.51		0.55
Reach-1	7826	2 Year	139.72	139.66	139.29	0.04	0.02	7.96		5.6		1.06
Reach-1	7826	3 Year	139.78	139.72	139.34	0.04	0.02	8.27		6.3		1.1
Reach-1	7826	5 Year	139.96	139.91	139.39	0.03	0.01	11.96		7.3		0.99
Reach-1	7826	10 Year	140.03	139.97	139.46	0.03	0.02	13.11		8.64		1.09
Reach-1	7826	25 Year	140.26	140.2	139.59	0.03	0.02	16.62	0	11.6		1.13
Reach-1	7826	50 Year	140.57	140.53	139.71	0.02	0.01	21.1	0.11	13.12	1.36	0.95
Reach-1	7826	100 Year	140.7	140.65	139.82	0.02	0.01	21.91	0.24	15.52	1.94	1.03
Reach-1	7826	500 Year	140.9	140.82	140.08	0.04	0.02	22.8	0.64	22.59	3.39	1.33
Reach-1	7711	Fish Low Pa	138.32	138.3	138.3	0.02	0.01	0.65		0.01		0.49
Reach-1	7711	Fish High Pa	138.66	138.65	138.53	0.01	0.01	5.6		0.51		0.53

HEC-RAS Plan: EX_DOT River: Beaver Pond Brk Reach: Reach-1												
Reach	River Sta	Profile	E.G. Elev (m)	W.S. Elev (m)	Crit W.S. (m)	Frctn Loss (m)	C & E Loss (m)	Top Width (m)	Q Left (m3/s)	Q Channel (m3/s)	Q Right (m3/s)	Vel Chnl (m/s)
Reach-1	7711	2 Year	139.66	139.66	138.92	0.01	0.01	65.96	0.13	4.95	0.51	0.23
Reach-1	7711	3 Year	139.72	139.72	138.94	0.01	0.01	66.86	0.15	5.52	0.63	0.24
Reach-1	7711	5 Year	139.91	139.91	138.96	0	0.01	69.91	0.2	6.23	0.87	0.22
Reach-1	7711	10 Year	139.98	139.97	138.99	0.01	0.02	70.93	0.24	7.32	1.08	0.25
Reach-1	7711	25 Year	140.21	140.21	139.05	0.01	0.02	72.99	0.34	9.5	1.75	0.27
Reach-1	7711	50 Year	140.53	140.53	139.1	0	0.03	78.03	0.45	11.53	2.6	0.27
Reach-1	7711	100 Year	140.66	140.66	139.15	0	0.03	81.4	0.55	13.85	3.3	0.3
Reach-1	7711	500 Year	140.84	140.83	139.27	0	0.02	89.44	0.926	13.93	3.44	0.28
Reach-1	7698	Fish Low Pa	138.27	138.27	138.23			4.05		0.01		0.07
Reach-1	7698	Fish High Pa	138.65	138.64	138.35			6.07		0.51		0.23
Reach-1	7698	2 Year	139.64	139.6	138.83			7.71		7.88		0.89
Reach-1	7698	3 Year	139.7	139.66	138.87			7.81		8.8		0.95
Reach-1	7698	5 Year	139.89	139.85	138.94			8.14		10.2		0.94
Reach-1	7698	10 Year	139.95	139.89	139.02			8.51		12.18		1.09
Reach-1	7698	25 Year	140.18	140.1	139.17			26.73		16.2		1.25
Reach-1	7698	50 Year	140.5	140.42	139.31			81.22		20.25		1.31
Reach-1	7698	100 Year	140.62	140.51	139.45			90.79		24.13	0.51	1.48
Reach-1	7698	500 Year	140.84	140.76	139.8			100.76	9.8	23.87	3.57	1.3
Reach-1	7689.5 BR U	Fish Low Pa	138.27	138.27	138.23			3.64		0.01		0.08
Reach-1	7689.5 BR U	Fish High Pa	138.64	138.64	138.35			5.17		0.51		0.25
Reach-1	7689.5 BR U	2 Year	139.64	139.57	138.87			5.17		7.88		1.16
Reach-1	7689.5 BR U	3 Year	139.7	139.62	138.92			5.17		8.8		1.24
Reach-1	7689.5 BR U	5 Year	139.89	139.75	138.99					10.2		1.31
Reach-1	7689.5 BR U	10 Year	139.95	139.75	139.07					12.18		1.57
Reach-1	7689.5 BR U	25 Year	140.18	139.75	139.25					16.2		2.09
Reach-1	7689.5 BR U	50 Year	140.5	139.75	139.41					20.25		2.61
Reach-1	7689.5 BR U	100 Year	140.62	140.51	139.57			32.11		19.99	4.35	2.57
Reach-1	7689.5 BR U	500 Year	140.82	140.76	140.88			49.66	0.91	21.26	12.53	2.74
Reach-1	7689.5 BR D	Fish Low Pa	138.21	138.21	138.18			3.05		0.01		0.11
Reach-1	7689.5 BR D	Fish High Pa	138.59	138.59	138.3			5.17		0.51		0.26
Reach-1	7689.5 BR D	2 Year	139.56	139.49	138.82			5.17		7.88		1.18
Reach-1	7689.5 BR D	3 Year	139.62	139.54	138.87			5.17		8.8		1.27
Reach-1	7689.5 BR D	5 Year	139.68	139.62	138.93			5.17		10.2		1.39
Reach-1	7689.5 BR D	10 Year	139.77	139.7	139.03			5.17		12.18		1.57
Reach-1	7689.5 BR D	25 Year	139.96	139.75	139.2					16.2		2.02
Reach-1	7689.5 BR D	50 Year	140.13	139.75	139.36					20.25		2.52
Reach-1	7689.5 BR D	100 Year	140.59	140.51	139.52			40.63		19.99	4.35	2.49
Reach-1	7689.5 BR D	500 Year	140.82	140.68	140.68			43.89	0.91	21.26	12.53	2.65
Reach-1	7681	Fish Low Pa	138.21	138.21	138.18	0.01	0	3.36		0.01		0.1
Reach-1	7681	Fish High Pa	138.59	138.59	138.3	0.01	0	6.26		0.51		0.23
Reach-1	7681	2 Year	139.55	139.51	138.78	0.03	0.01	8.42		7.88		0.92
Reach-1	7681	3 Year	139.61	139.56	138.82	0.03	0.01	8.53		8.8		0.99
Reach-1	7681	5 Year	139.68	139.62	138.88	0.04	0.01	8.66		10.2		1.1
Reach-1	7681	10 Year	139.77	139.7	138.96	0.04	0.01	9.63		12.18		1.23
Reach-1	7681	25 Year	139.96	139.85	139.1	0.05	0.01	13.68		16.2		1.48
Reach-1	7681	50 Year	140.13	139.98	139.24	0.06	0.01	21.87		20.25		1.7
Reach-1	7681	100 Year	140.31	140.12	139.37	0.06	0.01	53.19		24.64		1.92
Reach-1	7681	500 Year	140.64	140.27	139.71	0.04	0.14	72.61		37.24		2.68
Reach-1	7666	Fish Low Pa	138.2	138.2	138.13	0.07	0	2.42		0.01		0.06
Reach-1	7666	Fish High Pa	138.58	138.57	138.31	0.21	0.02	4.46		0.51		0.35
Reach-1	7666	2 Year	139.52	139.44	138.93	0.48	0.01	13.55	0.09	7.5	0.28	1.21
Reach-1	7666	3 Year	139.57	139.49	138.98	0.5	0.01	15.52	0.12	8.29	0.39	1.29
Reach-1	7666	5 Year	139.63	139.53	139.05	0.5	0.01	15.62	0.15	9.52	0.53	1.42
Reach-1	7666	10 Year	139.72	139.61	139.14	0.47	0.03	15.79	0.21	11.18	0.78	1.57
Reach-1	7666	25 Year	139.9	139.75	139.31	0.49	0.04	38.03	0.37	14.44	1.39	1.82
Reach-1	7666	50 Year	140.06	139.88	139.5	0.42	0.07	52.9	0.56	17.61	2.08	2.04
Reach-1	7666	100 Year	140.24	140.02	139.62	0.37	0.08	62.39	0.81	20.89	2.94	2.21
Reach-1	7666	500 Year	140.45	140.36	139.93	0.06	0.04	82.22	0.83	18.12	18.29	1.59

BEAVER POND BROOK - EXISTING CONDITION, DESIGN DISCHARGE (W/ BACKWATER)
HEC-RAS 4.1.0 - "Culvert Only" Output

HEC-RAS	Plan: EX_DOT	River: Beaver Pond Brk	Reach: Reach-1										
Reach	River Sta	Profile	E.G. US.	W.S. US.	E.G. IC	E.G. OC	Min El Weir Flow	Q Culv Group	Q Weir	Delta WS	Culv Vel US	Culv Vel DS	
			(m)	(m)	(m)	(m)	(m)	(m3/s)	(m3/s)	(m)	(m/s)	(m/s)	
Reach-1	8435.5 151007	Fish Low Pa	146.17	146.42	146.17	146.17	150.31	0.01		0.58	0.34	0.36	
Reach-1	8435.5 151007	Fish High Pa	146.42	146.62	146.42	146.41	150.31	0.51		0.63	1.27	1.58	
Reach-1	8435.5 151007	2 Year	147.17	147.07	147.17	147.15	150.31	3.8		0.77	2.48	3.12	
Reach-1	8435.5 151007	3 Year	147.26	147.11	147.26	147.24	150.31	4.3		0.78	2.59	3.24	
Reach-1	8435.5 151007	5 Year	147.36	147.17	147.36	147.34	150.31	4.9		0.81	2.7	3.36	
Reach-1	8435.5 151007	10 Year	147.5	147.24	147.5	147.48	150.31	5.81		0.82	2.86	3.52	
Reach-1	8435.5 151007	25 Year	147.81	147.65	147.81	147.79	150.31	7.93		1.12	3.17	3.84	
Reach-1	8435.5 151007	50 Year	148.04	147.92	148.04	148.02	150.31	9.63		1.3	3.38	4.04	
Reach-1	8435.5 151007	100 Year	148.29	148.2	148.29	148.26	150.31	11.61		1.49	3.6	4.25	
Reach-1	8435.5 151007	500 Year	148.99	148.93	148.99	148.92	150.31	17.41		1.99	4.12	4.72	

Culvert Output

File Type Options Help

River: Beaver Pond Brk Profile: 100 Year Culv Group: 151007

Reach: Reach-1 RS: 8435.5 Plan: EX_DOT

Plan: EX_DOT Beaver Pond Brk Reach-1 RS: 8435.5 Culv Group: 151007 Profile: 100 Year

Q Culv Group (m3/s)	11.61	Culv Full Len (m)	
# Barrels	1	Culv Vel US (m/s)	3.60
Q Barrel (m3/s)	11.61	Culv Vel DS (m/s)	4.25
E.G. US. (m)	148.29	Culv Inv El Up (m)	146.15
W.S. US. (m)	148.20	Culv Inv El Dn (m)	145.92
E.G. DS (m)	147.06	Culv Frctn Ls (m)	0.18
W.S. DS (m)	146.71	Culv Exit Loss (m)	0.89
Delta EG (m)	1.23	Culv Entr Loss (m)	0.16
Delta WS (m)	1.49	Q Weir (m3/s)	
E.G. IC (m)	148.29	Weir Sta Lft (m)	
E.G. OC (m)	148.26	Weir Sta Rgt (m)	
Culvert Control	Inlet	Weir Submerg	
Culv WS Inlet (m)	147.47	Weir Max Depth (m)	
Culv WS Outlet (m)	147.03	Weir Avg Depth (m)	
Culv Nml Depth (m)	1.05	Weir Flow Area (m2)	
Culv Crt Depth (m)	1.32	Min El Weir Flow (m)	150.31

Errors, Warnings and Notes

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

Note: During the supercritical calculations a hydraulic jump occurred at the outlet of (leaving) the culvert.

Warning: During the supercritical analysis, the program could not converge on a supercritical answer in the downstream cross section. The program used the solution with the least error.

Note: The flow in the culvert is entirely supercritical.

Select Profile

HEC-RAS Plan: EX_DOT River: Beaver Pond Brk Reach: Reach-1												
Reach	River Sta	Profile	E.G. US.	W.S. US.	E.G. IC	E.G. OC	Min El Weir Flow	Q Culv Group	Q Weir	Delta WS	Culv Vel US	Culv Vel DS
			(m)	(m)	(m)	(m)	(m)	(m3/s)	(m3/s)	(m)	(m/s)	(m/s)
Reach-1	8332.5 #2-East Ce	Fish Low Pa	143.16	143.18	143.15	143.16	149.74	0		0.76	0.28	0.37
Reach-1	8332.5 #1-West Ce	Fish Low Pa	143.16	143.18	143.14	143.16	149.74	0.01		0.76	0.38	0.18
Reach-1	8332.5 #2-East Ce	Fish High Pass.					149.74					
Reach-1	8332.5 #1-West Ce	Fish High Pass.					149.74					
Reach-1	8332.5 #2-East Ce	2 Year	143.91	143.85	143.8	143.9	149.74	1.86		0.75	2.05	3.57
Reach-1	8332.5 #1-West Ce	2 Year	143.91	143.85	143.82	143.91	149.74	1.94		0.75	2.08	3.65
Reach-1	8332.5 #2-East Ce	3 Year	143.97	143.91	143.86	143.96	149.74	2.11		0.77	2.13	3.7
Reach-1	8332.5 #1-West Ce	3 Year	143.97	143.91	143.88	143.98	149.74	2.19		0.77	2.16	3.78
Reach-1	8332.5 #2-East Ce	5 Year	144.05	143.99	143.93	144.03	149.74	2.4		0.79	2.23	3.83
Reach-1	8332.5 #1-West Ce	5 Year	144.05	143.99	143.95	144.05	149.74	2.5		0.79	2.26	3.92
Reach-1	8332.5 #2-East Ce	10 Year	144.15	144.1	144.03	144.14	149.74	2.84		0.83	2.36	4.01
Reach-1	8332.5 #1-West Ce	10 Year	144.15	144.1	144.05	144.16	149.74	2.97		0.83	2.39	4.1
Reach-1	8332.5 #2-East Ce	25 Year	144.38	144.33	144.24	144.37	149.74	3.89		0.91	2.62	4.34
Reach-1	8332.5 #1-West Ce	25 Year	144.38	144.33	144.27	144.4	149.74	4.04		0.91	2.65	4.42
Reach-1	8332.5 #2-East Ce	50 Year	144.56	144.5	144.4	144.54	149.74	4.73		0.98	2.79	4.54
Reach-1	8332.5 #1-West Ce	50 Year	144.56	144.5	144.43	144.57	149.74	4.9		0.98	2.83	4.63
Reach-1	8332.5 #2-East Ce	100 Year	144.74	144.69	144.58	144.73	149.74	5.72		1.06	2.98	4.75
Reach-1	8332.5 #1-West Ce	100 Year	144.74	144.69	144.6	144.76	149.74	5.89		1.06	3.01	4.83
Reach-1	8332.5 #2-East Ce	500 Year	145.24	145.18	145.06	145.23	149.74	8.66		1.29	3.42	5.21
Reach-1	8332.5 #1-West Ce	500 Year	145.24	145.18	145.07	145.24	149.74	8.75		1.29	3.43	5.27

Culvert Output

File Type Options Help

River: Beaver Pond Brk Profile: 100 Year Culv Group: #1-West Cell

Reach: Reach-1 RS: 8332.5 Plan: EX_DOT

Plan: EX_DOT Beaver Pond Brk Reach-1 RS: 8332.5 Culv Group: #1-West Cell Profile: 100 Year			
Q Culv Group (m3/s)	5.89	Culv Full Len (m)	3.01
# Barrels	1	Culv Vel US (m/s)	4.83
Q Barrel (m3/s)	5.89	Culv Vel DS (m/s)	143.15
E.G. US. (m)	144.74	Culv Inv El Up (m)	142.41
W.S. US. (m)	144.69	Culv Frctn Ls (m)	0.36
E.G. DS (m)	143.72	Culv Exit Loss (m)	0.45
W.S. DS (m)	143.63	Culv Entr Loss (m)	0.23
Delta EG (m)	1.06	Q Weir (m3/s)	
Delta WS (m)	1.06	Weir Sta Lft (m)	
E.G. IC (m)	144.60	Weir Sta Rgt (m)	
E.G. OC (m)	144.76	Weir Submerg	
Culvert Control	Outlet	Weir Max Depth (m)	
Culv WS Inlet (m)	144.07	Weir Avg Depth (m)	
Culv WS Outlet (m)	142.98	Weir Flow Area (m2)	
Culv Nml Depth (m)	0.50	Min El Weir Flow (m)	149.74
Culv Crt Depth (m)	0.32		

Errors, Warnings and Notes

Warning: At least one culvert in the culvert group has supercritical flow at the outlet. However, since more than one culvert in the culvert group has flow, the program cannot determine if the downstream cross section should be subcritical or supercritical flow. The program used the downstream subcritical answer, even though it may not be valid.

Note: Multiple critical depths were found at this location. The critical depth with the lowest valid, water surface was used.

Note: The flow in the culvert is entirely supercritical.

Select opening

Culvert Output

File Type Options Help

River: Beaver Pond Brk Profile: 100 Year Culv Group: #2-East Cell

Reach: Reach-1 RS: 8332.5 Plan: EX_DOT

Plan: EX_DOT Beaver Pond Brk Reach-1 RS: 8332.5 Culv Group: #2-East Cell Profile: 100 Year			
Q Culv Group (m3/s)	5.72	Culv Full Len (m)	2.98
# Barrels	1	Culv Vel US (m/s)	4.75
Q Barrel (m3/s)	5.72	Culv Vel DS (m/s)	143.15
E.G. US. (m)	144.74	Culv Inv El Up (m)	142.41
W.S. US. (m)	144.69	Culv Frctn Ls (m)	0.35
E.G. DS (m)	143.72	Culv Exit Loss (m)	0.43
W.S. DS (m)	143.63	Culv Entr Loss (m)	0.23
Delta EG (m)	1.02	Q Weir (m3/s)	
Delta WS (m)	1.06	Weir Sta Lft (m)	
E.G. IC (m)	144.58	Weir Sta Rgt (m)	
E.G. OC (m)	144.73	Weir Submerg	
Culvert Control	Outlet	Weir Max Depth (m)	
Culv WS Inlet (m)	144.05	Weir Avg Depth (m)	
Culv WS Outlet (m)	143.01	Weir Flow Area (m2)	
Culv Nml Depth (m)	0.49	Min El Weir Flow (m)	149.74
Culv Crt Depth (m)	0.30		

Errors, Warnings and Notes

Warning: At least one culvert in the culvert group has supercritical flow at the outlet. However, since more than one culvert in the culvert group has flow, the program cannot determine if the downstream cross section should be subcritical or supercritical flow. The program used the downstream subcritical answer, even though it may not be valid.

Note: Multiple critical depths were found at this location. The critical depth with the lowest valid, water surface was used.

Note: The flow in the culvert is entirely supercritical.

Enter to move to next downstream river station location

HEC-RAS Plan: EX_DOT River: Beaver Pond Brk Reach: Reach-1												
Reach	River Sta	Profile	E.G. US.	W.S. US.	E.G. IC	E.G. OC	Min El Weir Flow	Q Culv Group	Q Weir	Delta WS	Culv Vel US	Culv Vel DS
			(m)	(m)	(m)	(m)	(m)	(m3/s)	(m3/s)	(m)	(m/s)	(m/s)
Reach-1	6859.5 02536	Fish Low Pa	136.6	136.6	136.6	136.6	139.46	0.01		0.26	0.25	0.27
Reach-1	6859.5 02536	Fish High Pa	136.77	136.72	136.77	136.77	139.46	0.51		0.11	1.01	0.62
Reach-1	6859.5 02536	2 Year	137.92	137.85	137.78	137.92	139.46	8.72		0.1	1.56	1.37
Reach-1	6859.5 02536	3 Year	138.03	137.96	137.88	138.03	139.46	9.8		0.12	1.62	1.43
Reach-1	6859.5 02536	5 Year	138.18	138.11	138.01	138.18	139.46	11.3		0.14	1.69	1.51
Reach-1	6859.5 02536	10 Year	138.37	138.3	138.18	138.37	139.46	13.45		0.16	1.79	1.63
Reach-1	6859.5 02536	25 Year	138.73	138.66	138.52	138.73	139.46	17.9		0.22	2	1.84
Reach-1	6859.5 02536	50 Year	139.05	138.98	138.83	139.05	139.46	22.51		0.29	2.21	2.05
Reach-1	6859.5 02536	100 Year	139.35	139.26	139.14	139.35	139.46	27.33		0.37	2.43	2.3
Reach-1	6859.5 02536	500 Year	140.06	139.96	139.82	140.06	139.46	33.94	7.4	0.59	2.85	2.85

Culvert Output

File Type Options Help

River: Beaver Pond Brk Profile: 100 Year Culv Group: 02536

Reach: Reach-1 RS: 6859.5 Plan: EX_DOT

Plan: EX_DOT Beaver Pond Brk Reach-1 RS: 6859.5 Culv Group: 02536 Profile: 100 Year

Q Culv Group (m3/s)	27.33	Culv Full Len (m)	3.60
# Barrels	2	Culv Vel US (m/s)	2.43
Q Barrel (m3/s)	13.67	Culv Vel DS (m/s)	2.30
E.G. US. (m)	139.35	Culv Inv El Up (m)	136.59
W.S. US. (m)	139.26	Culv Inv El Dn (m)	136.44
E.G. DS (m)	138.99	Culv Frctn Ls (m)	0.03
W.S. DS (m)	138.89	Culv Exit Loss (m)	0.17
Delta EG (m)	0.35	Culv Entr Loss (m)	0.15
Delta WS (m)	0.37	Q Weir (m3/s)	
E.G. IC (m)	139.14	Weir Sta Lt (m)	
E.G. OC (m)	139.35	Weir Sta Rgt (m)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (m)	138.89	Weir Max Depth (m)	
Culv WS Outlet (m)	138.88	Weir Avg Depth (m)	
Culv Nml Depth (m)	1.27	Weir Flow Area (m2)	
Culv Crt Depth (m)	1.47	Min El Weir Flow (m)	139.46

Errors, Warnings and Notes

Enter to move to next downstream river station location

HEC-RAS Plan: EX_DOT River: Beaver Pond Brk Reach: Reach-1												
Reach	River Sta	Profile	E.G. US. (m)	W.S. US. (m)	E.G. IC (m)	E.G. OC (m)	Min El Weir Flow (m)	Q Culv Group (m3/s)	Q Weir (m3/s)	Delta WS (m)	Culv Vel US (m/s)	Culv Vel DS (m/s)
Reach-1	6441.5 151-014	Fish Low Pa	134.57	134.57	134.53	134.57	140.08	0.01		2.12	0.27	0.34
Reach-1	6441.5 151-014	Fish High Pa	134.74	134.73	134.68	134.74	140.08	0.51		2.15	1.01	1.95
Reach-1	6441.5 151-014	2 Year	135.79	135.73	135.67	135.79	140.08	9.4		2.38	2.66	5.04
Reach-1	6441.5 151-014	3 Year	135.89	135.83	135.76	135.89	140.08	10.6		2.41	2.77	5.17
Reach-1	6441.5 151-014	5 Year	136.03	135.97	135.9	136.03	140.08	12.3		2.44	2.91	5.34
Reach-1	6441.5 151-014	10 Year	136.21	136.15	136.07	136.21	140.08	14.58		2.49	3.08	5.53
Reach-1	6441.5 151-014	25 Year	136.56	136.49	136.41	136.56	140.08	19.5		2.6	3.4	5.86
Reach-1	6441.5 151-014	50 Year	136.89	136.82	136.73	136.89	140.08	24.49		2.71	3.67	6.14
Reach-1	6441.5 151-014	100 Year	137.22	137.14	137.05	137.22	140.08	29.87		2.82	3.92	6.38
Reach-1	6441.5 151-014	500 Year	138.26	138.25	138.26	138.06	140.08	45.17		3.42	3.79	7.38

Culvert Output

File Type Options Help

River: Beaver Pond Brk Profile: 100 Year Culv Group: 151-014

Reach: Reach-1 RS: 6441.5 Plan: EX_DOT

Plan: EX_DOT Beaver Pond Brk Reach-1 RS: 6441.5 Culv Group: 151-014 Profile: 100 Year

Q Culv Group (m3/s)	29.87	Culv Full Len (m)	
# Barrels	2	Culv Vel US (m/s)	3.92
Q Barrel (m3/s)	14.94	Culv Vel DS (m/s)	6.38
E.G. US. (m)	137.22	Culv Inv El Up (m)	134.56
W.S. US. (m)	137.14	Culv Inv El Dn (m)	133.55
E.G. DS (m)	134.49	Culv Frctn Ls (m)	0.32
W.S. DS (m)	134.32	Culv Exit Loss (m)	2.09
Delta EG (m)	2.73	Culv Entr Loss (m)	0.31
Delta WS (m)	2.82	Q Weir (m3/s)	
E.G. IC (m)	137.05	Weir Sta Lft (m)	
E.G. OC (m)	137.22	Weir Sta Rgt (m)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (m)	136.12	Weir Max Depth (m)	
Culv WS Outlet (m)	134.51	Weir Avg Depth (m)	
Culv Nml Depth (m)	0.72	Weir Flow Area (m2)	
Culv Crt Depth (m)	1.56	Min El Weir Flow (m)	140.08

Errors, Warnings and Notes

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

Note: During the supercritical calculations a hydraulic jump occurred at the outlet of (leaving) the culvert.

Warning: During the supercritical analysis, the program could not converge on a supercritical answer in the downstream cross section. The program used the solution with the least error.

Note: The flow in the culvert is entirely supercritical.

Enter to move to next downstream river station location

HEC-RAS Plan: EX_DOT River: Beaver Pond Brk Reach: Reach-1												
Reach	River Sta	Profile	E.G. US. (m)	W.S. US. (m)	E.G. IC (m)	E.G. OC (m)	Min El Weir Flow (m)	Q Culv Group (m3/s)	Q Weir (m3/s)	Delta WS (m)	Culv Vel US (m/s)	Culv Vel DS (m/s)
Reach-1	5993.5	02537	Fish Low Pa	127.16	127.37	127.16	127.16	131.53	0.01	1.25	0.25	0.27
Reach-1	5993.5	02537	Fish High Pa	127.33	127.46	127.33	127.33	131.53	0.51	1.18	1.01	1.17
Reach-1	5993.5	02537	2 Year	128.42	128.31	128.4	128.42	131.53	9.4	1.26	2.66	3.25
Reach-1	5993.5	02537	3 Year	128.52	128.42	128.51	128.52	131.53	10.6	1.29	2.77	3.37
Reach-1	5993.5	02537	5 Year	128.66	128.57	128.65	128.66	131.53	12.3	1.35	2.91	3.52
Reach-1	5993.5	02537	10 Year	128.85	128.75	128.83	128.85	131.53	14.58	1.41	3.08	3.69
Reach-1	5993.5	02537	25 Year	129.21	129.12	129.19	129.21	131.53	19.5	1.5	3.4	3.99
Reach-1	5993.5	02537	50 Year	129.55	129.46	129.52	129.55	131.53	24.49	1.62	3.67	4.24
Reach-1	5993.5	02537	100 Year	129.89	129.8	129.86	129.89	131.53	29.87	1.79	3.92	4.46
Reach-1	5993.5	02537	500 Year	130.94	130.86	130.94	130.75	131.53	45.17	2.39	3.79	5.78

Culvert Output

File Type Options Help

River: Beaver Pond Brk Profile: 100 Year Culv Group: 02537

Reach: Reach-1 RS: 5993.5 Plan: EX_DOT

Plan: EX_DOT Beaver Pond Brk Reach-1 RS: 5993.5 Culv Group: 02537 Profile: 100 Year

Q Culv Group (m3/s)	29.87	Culv Full Len (m)	
# Barrels	2	Culv Vel US (m/s)	3.92
Q Barrel (m3/s)	14.94	Culv Vel DS (m/s)	4.46
E.G. US. (m)	129.89	Culv Inv El Up (m)	127.15
W.S. US. (m)	129.80	Culv Inv El Dn (m)	126.89
E.G. DS (m)	128.33	Culv Frctn Ls (m)	0.22
W.S. DS (m)	128.01	Culv Exit Loss (m)	0.95
Delta EG (m)	1.56	Culv Entr Loss (m)	0.39
Delta WS (m)	1.79	Q Weir (m3/s)	
E.G. IC (m)	129.86	Weir Sta Lft (m)	
E.G. OC (m)	129.89	Weir Sta Rgt (m)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (m)	128.71	Weir Max Depth (m)	
Culv WS Outlet (m)	128.26	Weir Avg Depth (m)	
Culv Nml Depth (m)	1.32	Weir Flow Area (m2)	
Culv Crt Depth (m)	1.56	Min El Weir Flow (m)	131.53

Errors, Warnings and Notes

Note: Multiple critical depths were found at this location. The critical depth with the lowest valid, water surface was used.

Note: During the supercritical calculations a hydraulic jump occurred at the outlet of (leaving) the culvert.

Warning: During the supercritical analysis, the program could not converge on a supercritical answer in the downstream cross section. The program used the solution with the least error.

Note: The flow in the culvert is entirely supercritical.

Enter to move to next downstream river station location

HEC-RAS Plan: EX_DOT River: Beaver Pond Brk Reach: Reach-1												
Reach	River Sta	Profile	E.G. US. (m)	W.S. US. (m)	E.G. IC (m)	E.G. OC (m)	Min El Weir Flow (m)	Q Culv Group (m3/s)	Q Weir (m3/s)	Delta WS (m)	Culv Vel US (m/s)	Culv Vel DS (m/s)
Reach-1	5254.5	01227	Fish Low Pa	113.61	113.63	113.61	113.61	117.07	0.02	0.69	0.28	0.33
Reach-1	5254.5	01227	Fish High Pa	113.82	113.93	113.82	113.82	117.07	0.93	0.6	1.15	1.19
Reach-1	5254.5	01227	2 Year	115.23	115.02	115.22	115.23	117.07	17.41	0.53	3.04	2.68
Reach-1	5254.5	01227	3 Year	115.37	115.18	115.35	115.37	117.07	19.6	0.6	3.16	2.8
Reach-1	5254.5	01227	5 Year	115.55	115.37	115.53	115.55	117.07	22.7	0.68	3.32	2.95
Reach-1	5254.5	01227	10 Year	115.79	115.62	115.77	115.79	117.07	27.04	0.79	3.52	3.17
Reach-1	5254.5	01227	25 Year	116.27	116.1	116.24	116.27	117.07	36.2	1.03	3.88	3.61
Reach-1	5254.5	01227	50 Year	116.71	116.55	116.69	116.71	117.07	45.59	1.23	4.19	3.96
Reach-1	5254.5	01227	100 Year	117.15	116.98	117.12	117.15	117.07	55.41	0.09	4.47	4.22
Reach-1	5254.5	01227	500 Year	118.01	117.79	118.01	117.92	117.07	74.07	10.17	4.57	4.39

Culvert Output

File Type Options Help

River: Beaver Pond Brk Profile: 100 Year Culv Group: 01227

Reach: Reach-1 RS: 5254.5 Plan: EX_DOT

Plan: EX_DOT Beaver Pond Brk Reach-1 RS: 5254.5 Culv Group: 01227 Profile: 100 Year

Q Culv Group (m3/s)	55.41	Culv Full Len (m)	
# Barrels	2	Culv Vel US (m/s)	4.47
Q Barrel (m3/s)	27.70	Culv Vel DS (m/s)	4.22
E.G. US. (m)	117.15	Culv Inv El Up (m)	113.59
W.S. US. (m)	116.98	Culv Inv El Dn (m)	113.43
E.G. DS (m)	115.72	Culv Frctn Ls (m)	0.15
W.S. DS (m)	115.58	Culv Exit Loss (m)	0.77
Delta EG (m)	1.43	Culv Entr Loss (m)	0.51
Delta WS (m)	1.40	Q Weir (m3/s)	0.09
E.G. IC (m)	117.12	Weir Sta Lft (m)	-3.45
E.G. OC (m)	117.15	Weir Sta Rgt (m)	1.35
Culvert Control	Outlet	Weir Submerg	0.00
Culv WS Inlet (m)	115.62	Weir Max Depth (m)	0.07
Culv WS Outlet (m)	115.58	Weir Avg Depth (m)	0.06
Culv Nml Depth (m)	2.01	Weir Flow Area (m2)	0.27
Culv Crt Depth (m)	2.03	Min El Weir Flow (m)	117.07

Errors, Warnings and Notes

Note: During supercritical analysis, the culvert direct step method went to normal depth. The program then assumed normal depth at the outlet.

Note: During the supercritical calculations a hydraulic jump occurred inside of the culvert.

Enter to move to next downstream river station location

HEC-RAS Plan: EX_DOT River: Beaver Pond Brk Reach: Reach-1												
Reach	River Sta	Profile	E.G. US. (m)	W.S. US. (m)	E.G. IC (m)	E.G. OC (m)	Min El Weir Flow (m)	Q Culv Group (m3/s)	Q Weir (m3/s)	Delta WS (m)	Culv Vel US (m/s)	Culv Vel DS (m/s)
Reach-1	5050.5	03727	Fish Low Pa	111.76	111.9	111.74	111.76	115.31	0.02	0.87	0.33	0.36
Reach-1	5050.5	03727	Fish High Pa	111.97	112.03	111.93	111.97	115.31	0.93	0.83	1.15	1.59
Reach-1	5050.5	03727	2 Year	113.34	113.24	113.21	113.34	115.31	17.41	1.29	3.04	4
Reach-1	5050.5	03727	3 Year	113.47	113.37	113.34	113.47	115.31	19.6	1.02	3.16	4.13
Reach-1	5050.5	03727	5 Year	113.65	113.55	113.51	113.65	115.31	22.7	0.98	3.32	4.29
Reach-1	5050.5	03727	10 Year	113.88	113.78	113.74	113.88	115.31	27.04	0.84	3.52	4.49
Reach-1	5050.5	03727	25 Year	114.34	114.23	114.18	114.34	115.31	36.2	1.29	3.88	4.84
Reach-1	5050.5	03727	50 Year	114.78	114.66	114.61	114.78	115.31	45.59	1.07	4.19	5.14
Reach-1	5050.5	03727	100 Year	115.16	115.07	115.03	115.16	115.31	55.5	0.87	4.01	3.33
Reach-1	5050.5	03727	500 Year	115.96	115.91	115.96	115.96	115.31	58.51	37.75	0.72	3.15

Culvert Output

File Type Options Help

River: Beaver Pond Brk Profile: 100 Year Culv Group: 03727

Reach: Reach-1 RS: 5050.5 Plan: EX_DOT

Plan: EX_DOT Beaver Pond Brk Reach-1 RS: 5050.5 Culv Group: 03727 Profile: 100 Year

Q Culv Group (m3/s)	55.50	Culv Full Len (m)	
# Barrels	2	Culv Vel US (m/s)	4.01
Q Barrel (m3/s)	27.75	Culv Vel DS (m/s)	3.33
E.G. US. (m)	115.16	Culv Inv El Up (m)	111.74
W.S. US. (m)	115.07	Culv Inv El Dn (m)	111.47
E.G. DS (m)	114.26	Culv Frctn Ls (m)	0.06
W.S. DS (m)	114.20	Culv Exit Loss (m)	0.51
Delta EG (m)	0.90	Culv Entr Loss (m)	0.33
Delta WS (m)	0.87	Q Weir (m3/s)	
E.G. IC (m)	115.03	Weir Sta Lft (m)	
E.G. OC (m)	115.16	Weir Sta Rgt (m)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (m)	114.01	Weir Max Depth (m)	
Culv WS Outlet (m)	114.20	Weir Avg Depth (m)	
Culv Nml Depth (m)	1.43	Weir Flow Area (m2)	
Culv Crt Depth (m)	2.04	Min El Weir Flow (m)	115.31

Errors, Warnings and Notes

Enter to move to next downstream river station location

BEAVER POND BROOK - NATURAL CONDITION 1 (based on Existing Geometry)

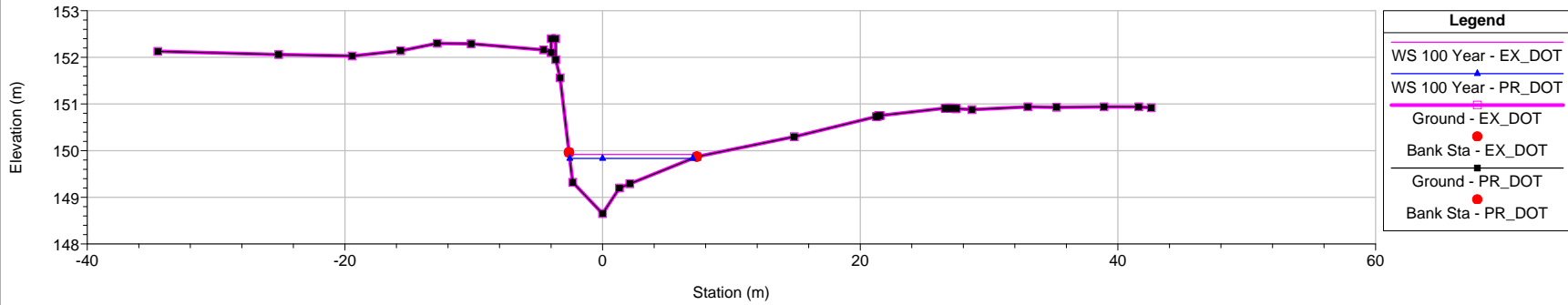
HEC-RAS 4.1.0 - "Standard Table 1" Output

HEC-RAS Plan: NT-DOT River: Beaver Pond Brk Reach: Reach-1													
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl	
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)		
Reach-1	8722	100 Year	11.61	148.65	149.84	149.84	150.11	0.023014	2.31	5.03	9.56		1.01
Reach-1	8640	100 Year	11.61	148.65	149.86	149.27	149.87	0.000216	0.3	39.27	55.98		0.11
Reach-1	8583	100 Year	11.61	148.61	149.86		149.86	0.000128	0.28	51.11	69.71		0.09
Reach-1	8573	100 Year	11.61	148.53	149.59	149.59	149.83	0.014893	2.25	6.05	15.13		0.87
Reach-1	8554	100 Year	11.61	147.45	148.09	148.42	149.17	0.109344	4.6	2.53	5.75		2.21
Reach-1	8536	100 Year	11.61	146.85	148.48	148.12	148.6	0.004956	1.58	7.94	13.73		0.52
Reach-1	8464	100 Year	11.61	146.37	147.69		148	0.01586	2.46	4.72	6.04		0.89
Reach-1	8412	100 Year	11.61	145.8	146.71	146.71	147.06	0.020545	2.65	4.37	6.19		1.01
Reach-1	8393	100 Year	11.61	144.34	144.85	145.2	146.12	0.147276	5	2.32	5.83		2.53
Reach-1	8356	100 Year	11.61	143.13	143.98	144.01	144.3	0.02235	2.5	4.64	8.17		1.06
Reach-1	8309	100 Year	11.61	142.34	143.65	143.15	143.7	0.002355	1.07	10.92	13.24		0.37
Reach-1	8289	100 Year	11.61	142.29	143.49		143.63	0.005976	1.61	7.2	9.02		0.57
Reach-1	8237	100 Year	11.61	141.94	143.07		143.25	0.008295	1.9	6.52	8.09		0.61
Reach-1	8178	100 Year	11.61	141.44	142.75	142.39	142.86	0.004875	1.46	7.93	9.62		0.51
Reach-1	8128	100 Year	11.61	140.93	142.18	142.1	142.46	0.013483	2.37	5.01	7.22		0.85
Reach-1	8080	100 Year	11.61	140.45	141.87		142.04	0.005462	1.8	6.73	8.08		0.56
Reach-1	8027	100 Year	11.61	139.92	141.23	141.18	141.57	0.015439	2.56	4.59	6.16		0.9
Reach-1	7977	100 Year	11.61	139.41	140.93		141.05	0.005944	1.53	7.67	8.3		0.49
Reach-1	7937	100 Year	17.7	139.01	140.71	140.15	140.84	0.004571	1.65	10.7	8.82		0.48
Reach-1	7885	100 Year	17.7	138.94	140.58	139.97	140.67	0.002318	1.31	14.35	14.94		0.38
Reach-1	7826	100 Year	17.7	138.6	140.4	139.82	140.48	0.004743	1.32	15.41	19.88		0.39
Reach-1	7757	100 Year	17.7	138.24	140.42	139.24	140.43	0.000144	0.31	83.51	59.68		0.08
Reach-1	7711	100 Year	17.7	138.24	140.42	139.06	140.42	0.000128	0.2	101.14	74.84		0.05
Reach-1	7698	100 Year	24.64	138.2	140.26	139.46	140.4	0.006391	1.68	15.95	46.37		0.41
Reach-1	7681	100 Year	24.64	138.15	140.21	139.38	140.29	0.004643	1.37	20.81	66		0.35
Reach-1	7666	100 Year	24.64	138.08	140	139.62	140.22	0.004447	2.25	14.83	61.02		0.56
Reach-1	7589	100 Year	24.64	138.06	139.76	139.18	139.81	0.005414	0.97	25.46	128.13		0.32
Reach-1	7370	100 Year	24.64	137.46	139.74	138.26	139.74	0.00007	0.24	105.19	115.51		0.06
Reach-1	7168	100 Year	24.64	137.45	139.69	138.47	139.71	0.00036	0.73	45.06	95.04		0.17
Reach-1	7120	100 Year	27.33	136.98	139.67	138.65	139.69	0.000404	0.81	58.75	75.36		0.17
Reach-1	7073	100 Year	27.33	136.79	139.58		139.65	0.001834	1.17	26.67	24.12		0.27
Reach-1	6970	100 Year	27.33	136.65	139.37	138.14	139.44	0.002283	1.2	22.76	13.67		0.3
Reach-1	6915	100 Year	27.33	136.58	139.19	138.22	139.28	0.003715	1.33	20.54	13.46		0.34
Reach-1	6890	100 Year	27.33	136.52	139.12	138.02	139.2	0.002782	1.27	21.68	13.73		0.31
Reach-1	6825	100 Year	27.33	136.29	138.9	137.78	139	0.003433	1.36	20.55	13.7		0.32
Reach-1	6809	100 Year	27.33	136.07	138.85	137.68	138.93	0.004212	1.25	21.93	17.12		0.31
Reach-1	6756	100 Year	27.33	136.32	138.58	137.66	138.69	0.004685	1.48	18.45	12.33		0.39
Reach-1	6732	100 Year	27.33	136.18	138.47	137.57	138.59	0.004867	1.48	18.44	12.34		0.39
Reach-1	6653	100 Year	27.33	135.88	138	137.25	138.15	0.006417	1.68	16.28	12.1		0.45
Reach-1	6593	100 Year	27.33	135.28	137.09	136.83	137.45	0.01296	2.69	10.65	8.94		0.72
Reach-1	6541	100 Year	27.33	135.19	136.75	136.56	137.01	0.006563	2.54	16.16	17.86		0.67
Reach-1	6490	100 Year	27.33	135.11	136.21	136.2	136.58	0.015316	2.72	10.12	13.44		0.99
Reach-1	6457	100 Year	29.87	134.39	135.79	135.79	136.27	0.028021	3.06	9.77	10.25		1
Reach-1	6417	100 Year	29.87	132.42	134.23	133.6	134.42	0.005512	1.96	15.85	11.57		0.49
Reach-1	6409	100 Year	29.87	131.97	133.64	133.64	134.22	0.017698	3.39	8.81	7.51		1
Reach-1	6394	100 Year	29.87	131.72	133.09	133.27	133.84	0.028842	3.82	7.82	8.23		1.25
Reach-1	6305	100 Year	29.87	129.9	131.6	131.63	132.19	0.019186	3.4	8.8	8.13		1.04
Reach-1	6266	100 Year	29.87	129.54	130.95	131.05	131.58	0.022804	3.52	8.49	8.78		1.14
Reach-1	6216	100 Year	29.87	128.63	130.8	130.36	131.06	0.006489	2.26	13.22	9.96		0.63
Reach-1	6122	100 Year	29.87	128.1	130.07		130.31	0.009844	2.15	13.9	11.23		0.62
Reach-1	6067	100 Year	29.87	127.8	129.34		129.62	0.016032	2.37	12.61	12.44		0.75
Reach-1	6033	100 Year	29.87	127.35	128.8		129.15	0.011508	2.63	11.37	10.95		0.82
Reach-1	5947	100 Year	29.87	126.08	128.13		128.39	0.006637	2.27	13.13	9.97		0.63
Reach-1	5878	100 Year	46.01	125.17	127.71	127.05	127.91	0.006612	1.98	23.2	15.22		0.51
Reach-1	5832	100 Year	46.01	124.64	126.74	126.74	127.38	0.019767	3.55	12.96	10.05		1
Reach-1	5812.5	100 Year	46.01	124.45	126.69	125.96	126.93	0.006003	2.18	21.06	12.03		0.53
Reach-1	5804	100 Year	46.01	124.01	126.3	126.2	126.81	0.028818	3.14	14.66	11.59		0.89
Reach-1	5757	100 Year	46.01	123.16	125.5	125.03	125.87	0.013567	2.69	17.12	10.41		0.67
Reach-1	5628	100 Year	46.01	120.8	122.7	122.7	123.32	0.030595	3.5	13.15	10.47		1
Reach-1	5524	100 Year	46.01	117.6	119.75	119.4	120.13	0.014893	2.73	16.83	11.4		0.72
Reach-1	5456	100 Year	46.01	116.4	118.28	118.23	118.87	0.022725	3.39	13.56	15.94		0.95
Reach-1	5422	100 Year	46.01	115.7	117.78	117.53	118.22	0.014007	2.94	15.66	11.1		0.79
Reach-1	5355	100 Year	46.01	114.9	117.03	116.77	117.42	0.010021	2.79	16.51	12.45		0.77
Reach-1	5296	100 Year	55.5	114.03	116.12	115.99	116.7	0.013902	3.36	16.51	11.29		0.89
Reach-1	5281	100 Year	55.5	113.52	115.73	115.73	116.38	0.067098	3.56	15.58	12.27		1.01
Reach-1	5224	100 Year	55.5	112.68	115.53	114.38	115.66	0.002546	1.59	34.83	17.11		0.36
Reach-1	5206	100 Year	55.5	112.84	115.27	114.7	115.55	0.005154	2.35	23.65	14.73		0.59
Reach-1	5145	100 Year	55.5	112.68	114.65	114.47	115.1	0.010632	2.96	18.77	14.49		0.83
Reach-1	5084	100 Year	55.5	111.83	114.07	113.78	114.54	0.00807	3.03	19.29	14.64		0.74
Reach-1	5072	100 Year	55.5	111.83	114.18	113.41	114.37	0.005086	1.92	28.84	17.93		0.48
Reach-1	5021	100 Year	55.5	110.98	114.2	112.52	114.25	0.000739	1.01	60.39	38.72		0.21

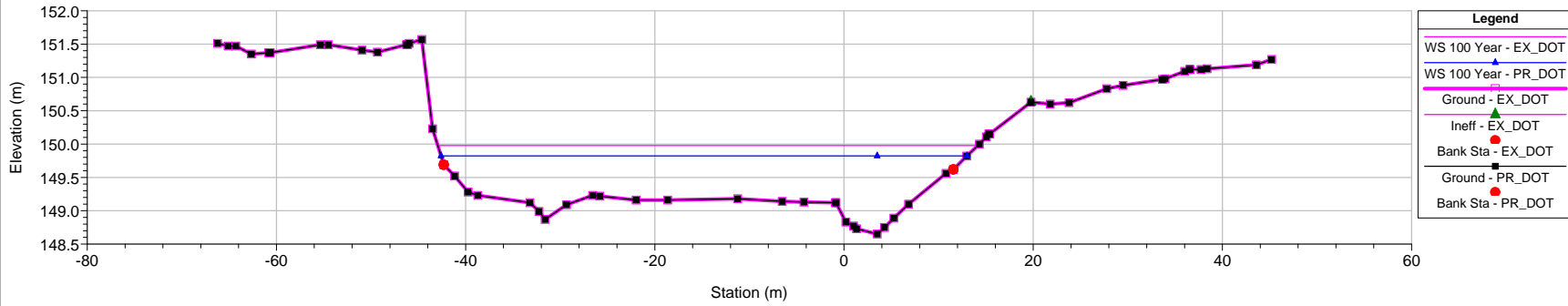
BEAVER POND BROOK - NATURAL CONDITION 2 (partially based on Proposed Geometry)
HEC-RAS 4.1.0 - "Standard Table 1" Output

HEC-RAS Plan: NT2-DOT River: Beaver Pond Brk Reach: Reach-1													
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude #	Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)		
Reach-1	8722	100 Year	11.61	148.65	149.84	149.84	150.11	0.023014	2.31	5.03	9.56		1.01
Reach-1	8640	100 Year	11.61	148.65	149.86	149.27	149.87	0.000216	0.3	39.27	55.98		0.11
Reach-1	8583	100 Year	11.61	148.61	149.86		149.86	0.000128	0.28	51.11	69.71		0.09
Reach-1	8573	100 Year	11.61	148.53	149.59	149.59	149.83	0.014893	2.25	6.05	15.13		0.87
Reach-1	8554	100 Year	11.61	147.45	148.09	148.42	149.17	0.109344	4.6	2.53	5.75		2.21
Reach-1	8536	100 Year	11.61	146.85	148.48	148.12	148.6	0.004956	1.58	7.94	13.73		0.52
Reach-1	8464	100 Year	11.61	146.37	147.69		148	0.01586	2.46	4.72	6.04		0.89
Reach-1	8412	100 Year	11.61	145.8	146.71	146.71	147.06	0.020545	2.65	4.37	6.19		1.01
Reach-1	8393	100 Year	11.61	144.34	144.85	145.2	146.12	0.147276	5	2.32	5.83		2.53
Reach-1	8356	100 Year	11.61	143.13	143.98	144.01	144.3	0.02235	2.5	4.64	8.17		1.06
Reach-1	8309	100 Year	11.61	142.34	143.65	143.15	143.7	0.002355	1.07	10.92	13.24		0.37
Reach-1	8289	100 Year	11.61	142.29	143.49		143.63	0.005976	1.61	7.2	9.02		0.57
Reach-1	8237	100 Year	11.61	141.94	143.07		143.25	0.008295	1.9	6.52	8.09		0.61
Reach-1	8178	100 Year	11.61	141.44	142.75	142.39	142.86	0.004874	1.46	7.93	9.62		0.51
Reach-1	8128	100 Year	11.61	140.93	142.18	142.1	142.46	0.013484	2.37	5.01	7.22		0.85
Reach-1	8080	100 Year	11.61	140.45	141.87		142.04	0.005463	1.8	6.73	8.08		0.56
Reach-1	8027	100 Year	11.61	139.92	141.23	141.18	141.57	0.015428	2.56	4.6	6.16		0.9
Reach-1	7977	100 Year	11.61	139.41	140.93		141.05	0.005979	1.53	7.65	8.3		0.49
Reach-1	7937	100 Year	17.7	139.01	140.7	140.15	140.84	0.004604	1.66	10.67	8.81		0.48
Reach-1	7885	100 Year	17.7	138.94	140.58	139.97	140.66	0.002356	1.31	14.26	14.91		0.38
Reach-1	7826	100 Year	17.7	138.6	140.39	139.82	140.47	0.004922	1.34	15.19	19.7		0.4
Reach-1	7757	100 Year	17.7	138.24	140.41	139.24	140.42	0.000147	0.31	82.88	59.6		0.08
Reach-1	7711	100 Year	17.7	138.24	140.41	139.06	140.41	0.000131	0.2	100.35	74.74		0.05
Reach-1	7698	100 Year	24.64	138.2	140.25	139.46	140.39	0.006597	1.7	15.71	44.63		0.42
Reach-1	7681	100 Year	24.64	138.15	140.19	139.38	140.28	0.005136	1.43	19.81	65.09		0.37
Reach-1	7666	100 Year	24.64	138.08	139.97	139.62	140.2	0.004804	2.31	14.4	59.32		0.58
Reach-1	7589	100 Year	24.64	138.06	139.58	139.18	139.65	0.009567	1.18	20.87	105.75		0.41
Reach-1	7370	100 Year	24.64	137.46	139.54	138.26	139.54	0.000112	0.29	90.67	114.33		0.07
Reach-1	7168	100 Year	24.64	137.45	139.45	138.47	139.49	0.000785	0.99	33.48	81.91		0.24
Reach-1	7120	100 Year	27.33	136.98	139.4	138.65	139.45	0.001011	1.17	37.1	54.13		0.27
Reach-1	7073	100 Year	27.33	136.79	139.25		139.36	0.003681	1.47	19.56	18.45		0.37
Reach-1	6970	100 Year	27.33	136.65	138.2	138.15	138.65	0.015466	2.96	9.23	9.22		0.94
Reach-1	6915	100 Year	27.33	136.26	137.86	137.5	138.1	0.005745	2.17	12.9	11.49		0.61
Reach-1	6890	100 Year	27.33	136.12	137.72	137.37	137.95	0.005639	2.15	13.72	13.37		0.6
Reach-1	6825	100 Year	27.33	135.74	137.27		137.54	0.006887	2.3	12.09	10.96		0.66
Reach-1	6809	100 Year	27.33	135.64	137.17	136.89	137.43	0.006899	2.29	12.69	12.9		0.66
Reach-1	6756	100 Year	27.33	135.33	136.88	136.61	137.08	0.005585	2.08	16.28	19.16		0.6
Reach-1	6732	100 Year	27.33	135.19	136.77	136.47	136.96	0.00492	1.99	17.55	20.59		0.56
Reach-1	6653	100 Year	27.33	134.73	136.26	136	136.5	0.006496	2.23	13.86	15.36		0.64
Reach-1	6593	100 Year	27.33	134.38	135.87	135.68	136.1	0.006665	2.21	15.33	20.41		0.65
Reach-1	6541	100 Year	27.33	134.08	135.38	135.32	135.65	0.011229	2.48	15.57	32.62		0.81
Reach-1	6473	100 Year	29.87	133.68	134.94		135.07	0.006058	1.88	21.91	40.71		0.61
Reach-1	6417	100 Year	29.87	132.63	133.92	133.92	134.43	0.017656	3.16	9.46	9.51		1.01
Reach-1	6409	100 Year	29.87	132.46	133.7	133.77	134.26	0.020819	3.3	9.06	9.77		1.09
Reach-1	6394	100 Year	29.87	132.08	133.3	133.41	133.93	0.024547	3.53	8.47	9.29		1.18
Reach-1	6305	100 Year	29.87	130.39	131.71	131.7	132.18	0.016858	3.06	9.77	10.06		0.99
Reach-1	6266	100 Year	29.87	129.54	131.13	131.05	131.58	0.014134	2.95	10.11	9.46		0.91
Reach-1	6216	100 Year	29.87	128.63	130.8		131.06	0.006489	2.26	13.22	9.96		0.63
Reach-1	6122	100 Year	29.87	128.1	130.07		130.31	0.009844	2.15	13.9	11.23		0.62
Reach-1	6067	100 Year	29.87	127.8	129.34		129.62	0.016032	2.37	12.61	12.44		0.75
Reach-1	6033	100 Year	29.87	127.35	128.8		129.15	0.011508	2.63	11.37	10.95		0.82
Reach-1	5947	100 Year	29.87	126.08	128.13		128.39	0.006637	2.27	13.13	9.97		0.63
Reach-1	5878	100 Year	46.01	125.17	127.71	127.05	127.91	0.006612	1.98	23.2	15.22		0.51
Reach-1	5832	100 Year	46.01	124.64	126.74	126.74	127.38	0.019767	3.55	12.96	10.05		1
Reach-1	5812.5	100 Year	46.01	124.45	126.69	125.96	126.93	0.006003	2.18	21.06	12.03		0.53
Reach-1	5804	100 Year	46.01	124.01	126.3	126.2	126.81	0.028813	3.14	14.66	11.59		0.89
Reach-1	5757	100 Year	46.01	123.16	125.5	125.03	125.86	0.013603	2.69	17.1	10.4		0.67
Reach-1	5628	100 Year	46.01	120.8	122.7	122.7	123.32	0.030595	3.5	13.15	10.47		1
Reach-1	5524	100 Year	46.01	117.6	119.67	119.4	120.09	0.016825	2.89	15.94	11.15		0.77
Reach-1	5456	100 Year	46.01	116.4	118.42	118.23	118.89	0.018195	3.07	15.01	16.88		0.83
Reach-1	5422	100 Year	46.01	115.7	118.15	117.53	118.42	0.00857	2.3	20.03	12.48		0.58
Reach-1	5355	100 Year	55.5	114.9	116.97	116.95	117.6	0.016064	3.51	15.83	12.22		0.98
Reach-1	5296	100 Year	55.5	114.03	116.12	115.99	116.7	0.013899	3.36	16.51	11.29		0.89
Reach-1	5281	100 Year	55.5	113.52	115.73	115.73	116.38	0.067131	3.56	15.58	12.26		1.01
Reach-1	5224	100 Year	55.5	112.68	115.53	114.38	115.66	0.002552	1.6	34.79	17.11		0.36
Reach-1	5206	100 Year	55.5	112.84	115.26	114.7	115.54	0.005187	2.35	23.6	14.72		0.59
Reach-1	5145	100 Year	55.5	112.68	114.79	114.47	115.15	0.008042	2.67	20.77	15.09		0.73
Reach-1	5084	100 Year	55.5	111.83	113.78	113.78	114.47	0.015095	3.67	15.44	12.51		0.98
Reach-1	5072	100 Year	55.5	111.83	113.94	113.41	114.2	0.00763	2.26	24.55	17.27		0.61
Reach-1	5021	100 Year	55.5	110.98	113.96	112.52	114.03	0.001077	1.14	51.75	33.45		0.25

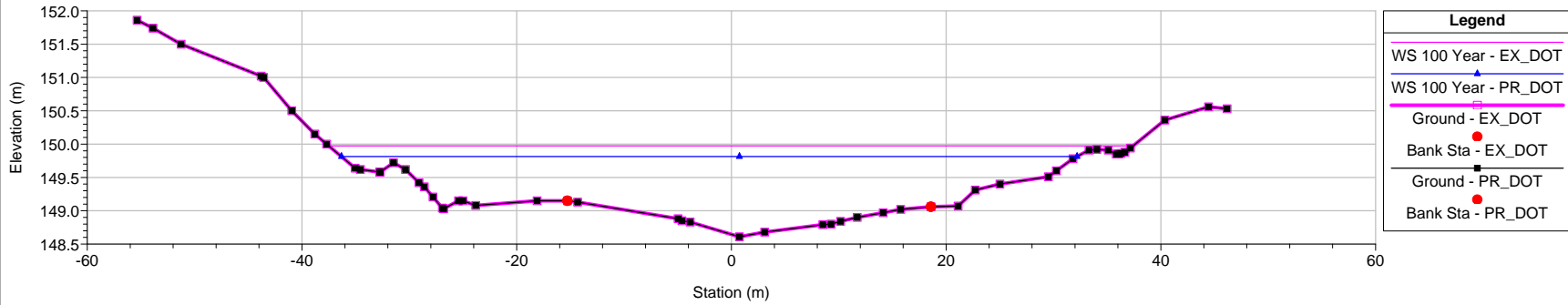
Beaver Pnd Brk, 151-273, Metric Plan: 1) PR_DOT 2) EX_DOT
 FEMA STATION 5229, CROSS SECTION AC



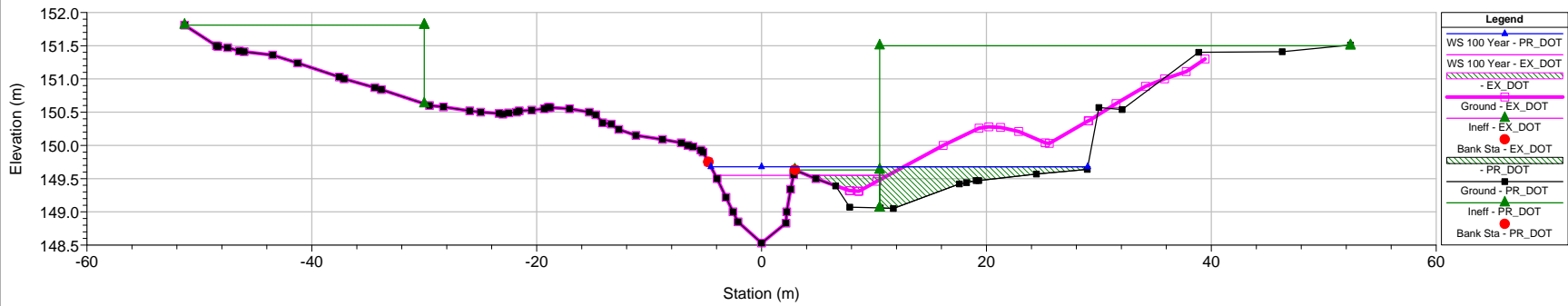
Beaver Pnd Brk, 151-273, Metric Plan: 1) PR_DOT 2) EX_DOT
 FEMA STATION 5228, CROSS SECTION AB



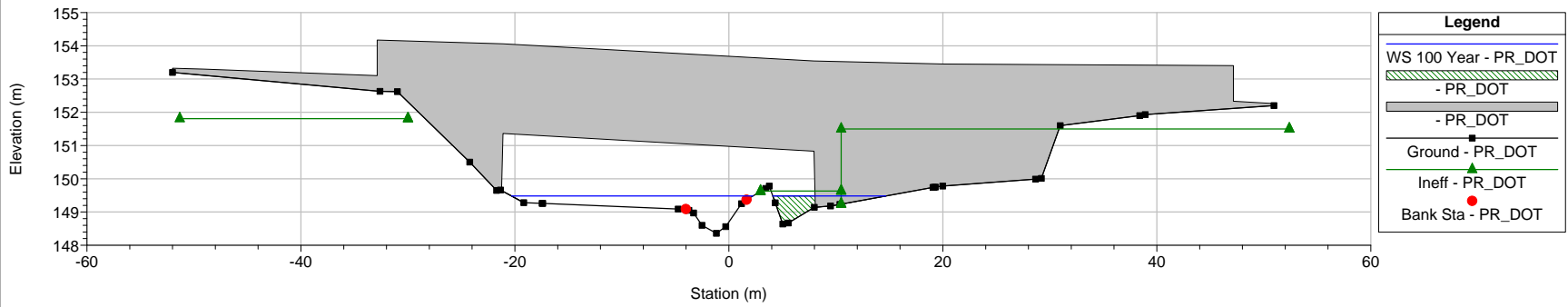
Beaver Pnd Brk, 151-273, Metric Plan: 1) PR_DOT 2) EX_DOT



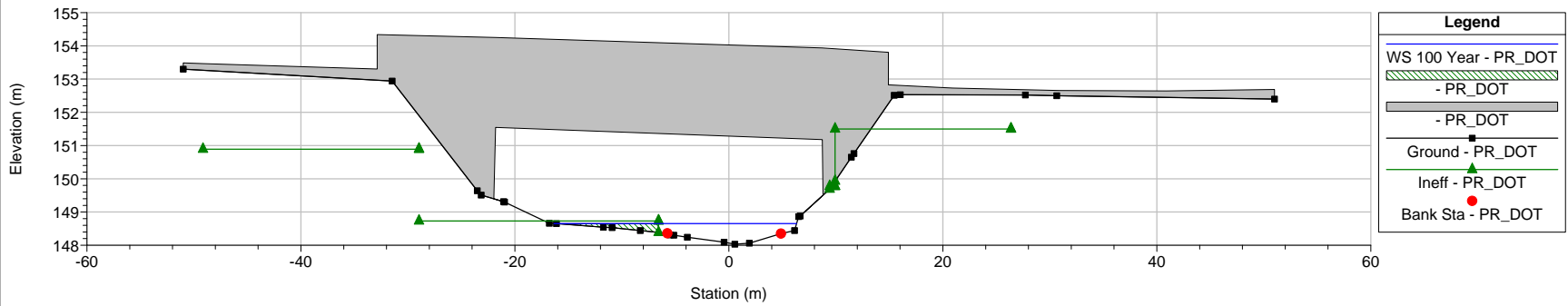
Beaver Pnd Brk, 151-273, Metric Plan: 1) PR_DOT 2) EX_DOT
 U/S of Bridge No. 06580, I-84 Off-Ramp to Austin Rd (FEMA AA, STA)

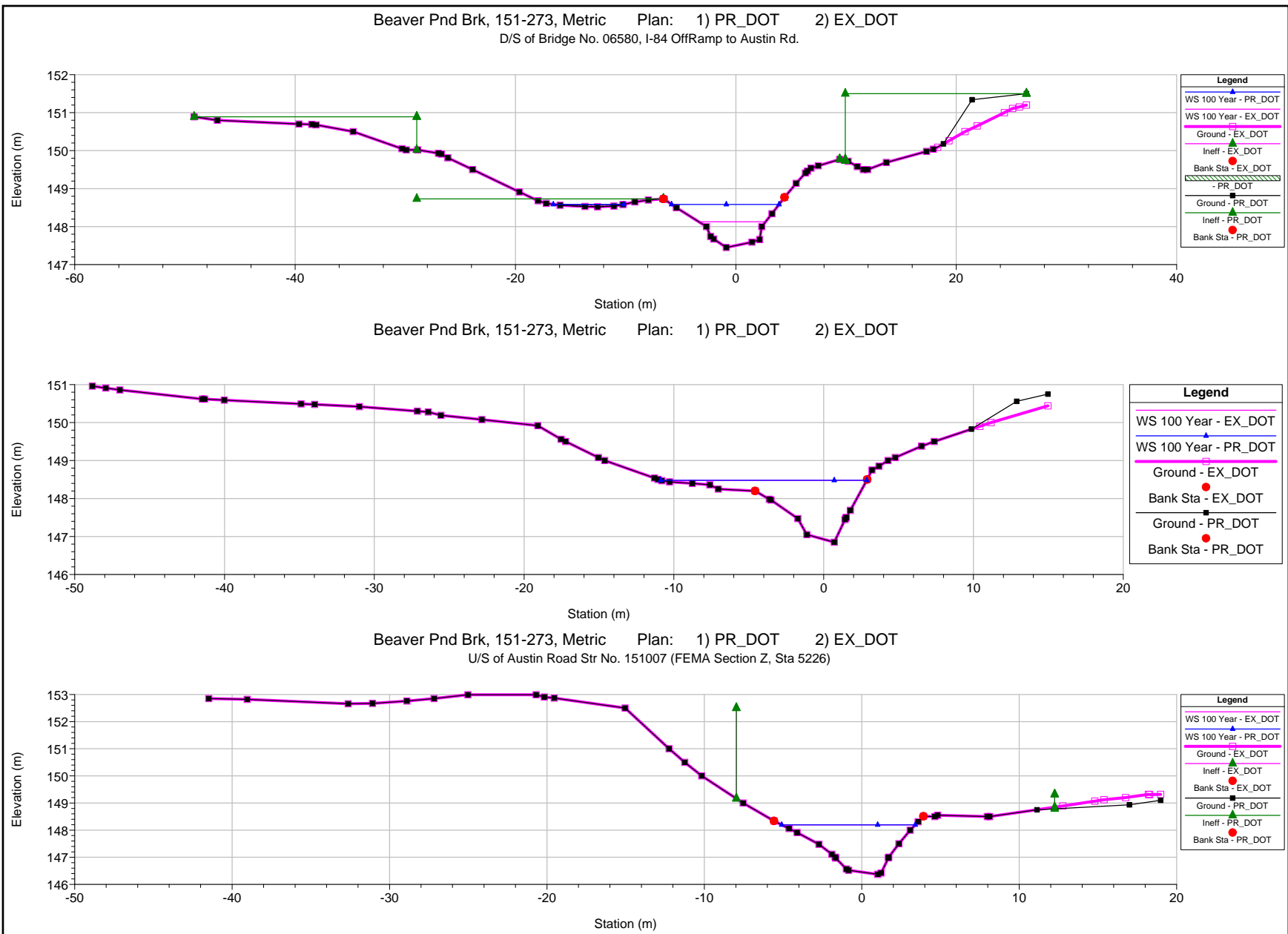


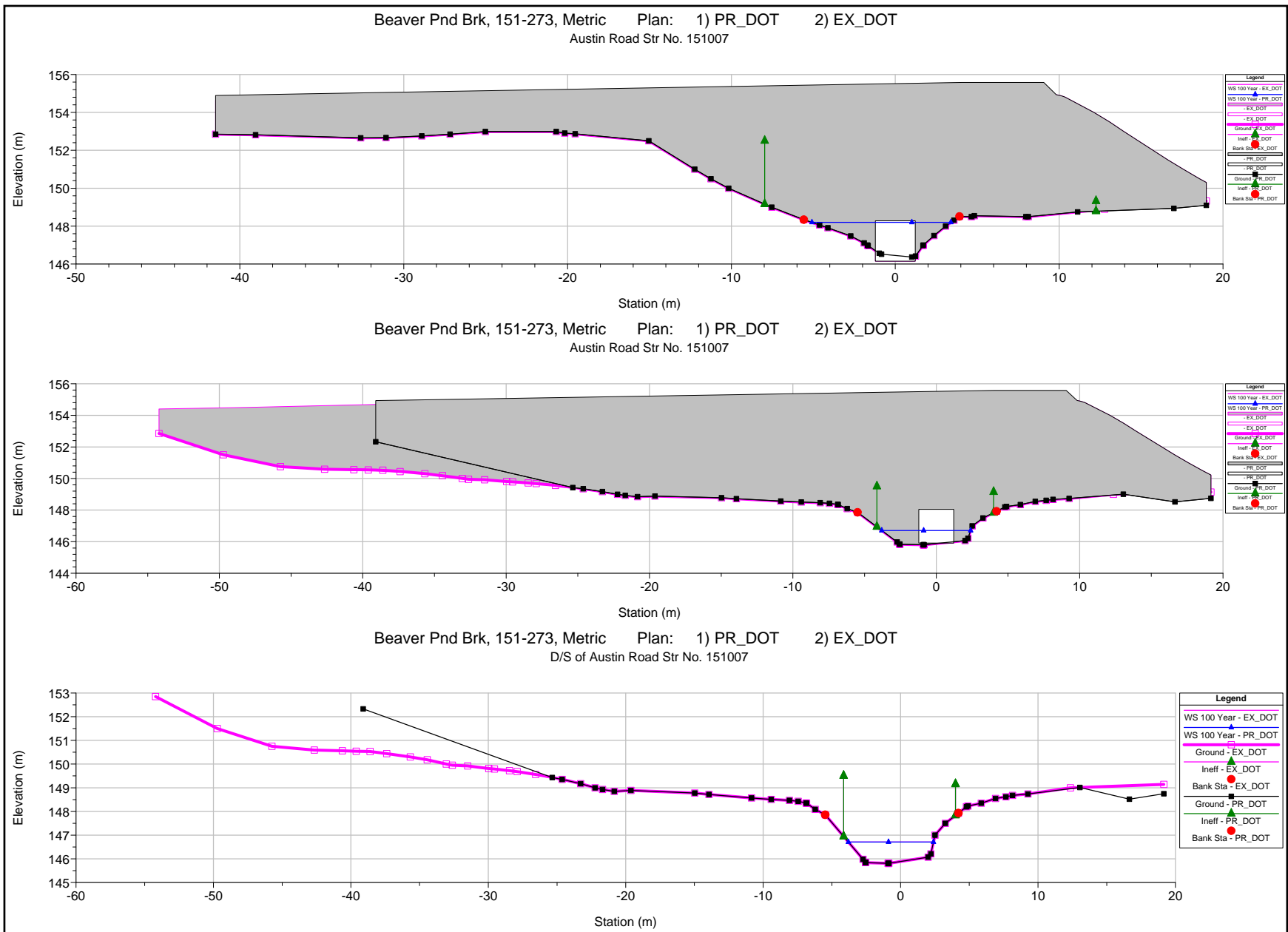
Beaver Pnd Brk, 151-273, Metric Plan: 1) PR_DOT 2) EX_DOT
 Bridge No. 06580, I-84 Off-Ramp to Austin Rd



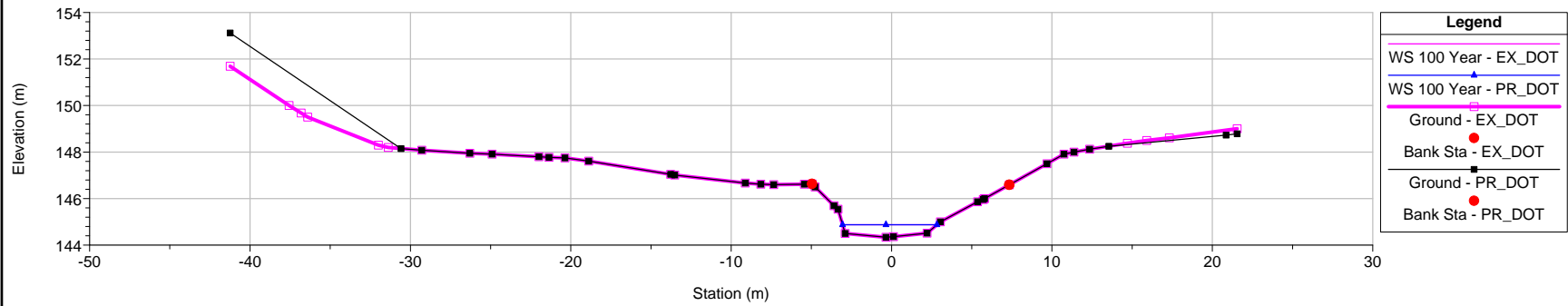
Beaver Pnd Brk, 151-273, Metric Plan: 1) PR_DOT 2) EX_DOT
 Bridge No. 06580, I-84 Off-Ramp to Austin Rd



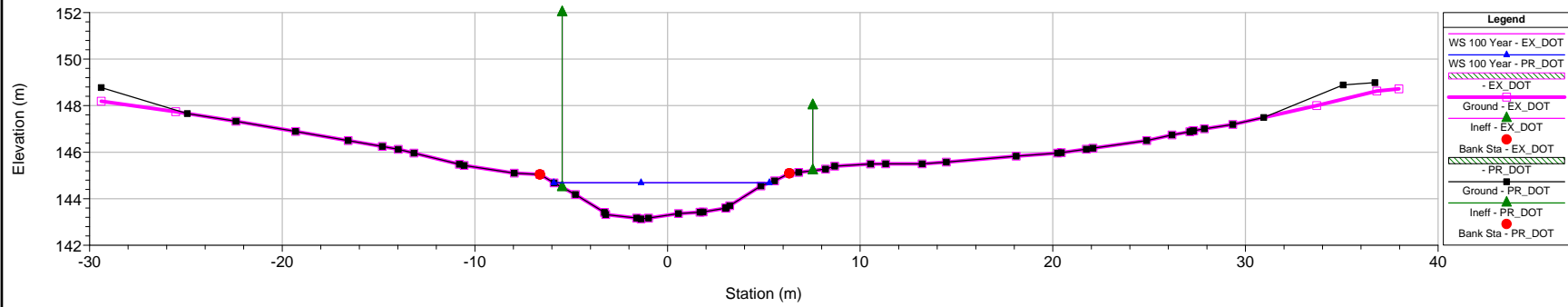




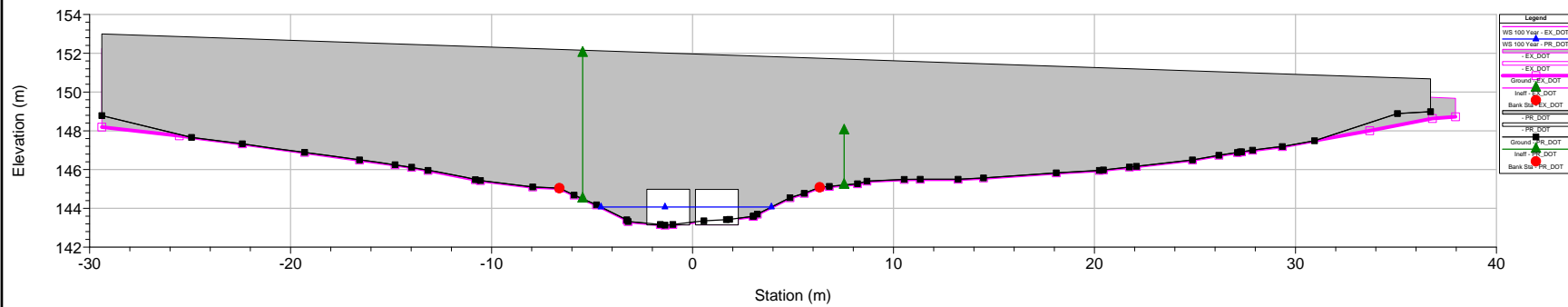
Beaver Pnd Brk, 151-273, Metric Plan: 1) PR_DOT 2) EX_DOT
 FEMA STATION 5225, CROSS SECTION Y



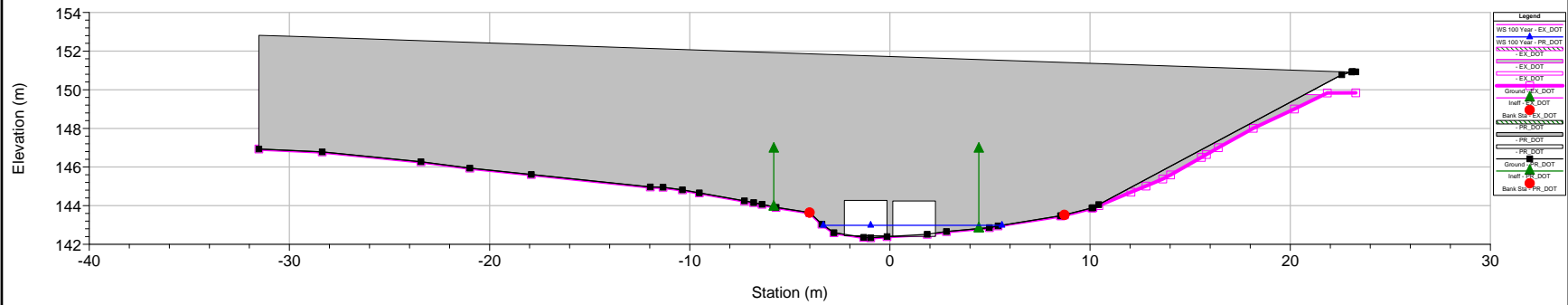
Beaver Pnd Brk, 151-273, Metric Plan: 1) PR_DOT 2) EX_DOT
 U/S of Str 04323 ,I-84 WB On-Ramp from Austin Rd



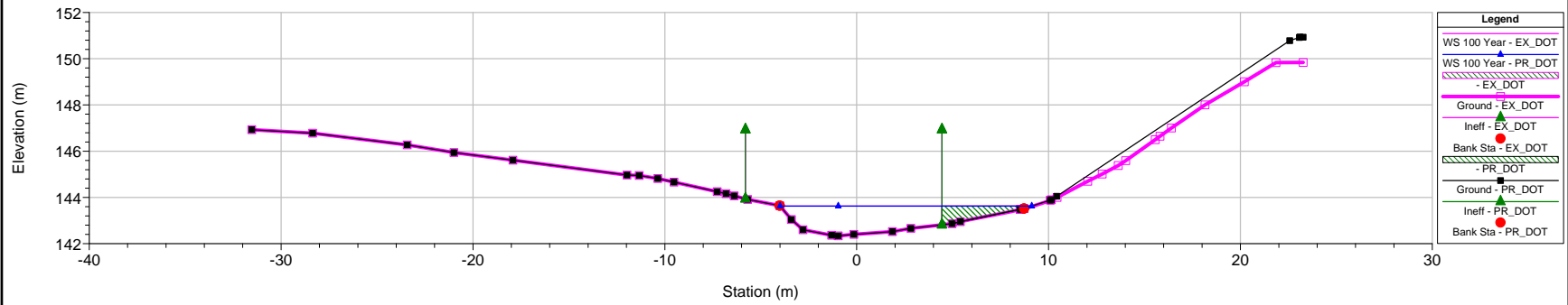
Beaver Pnd Brk, 151-273, Metric Plan: 1) PR_DOT 2) EX_DOT
 Str 04323, I-84 WB On-Ramp from Austin Rd



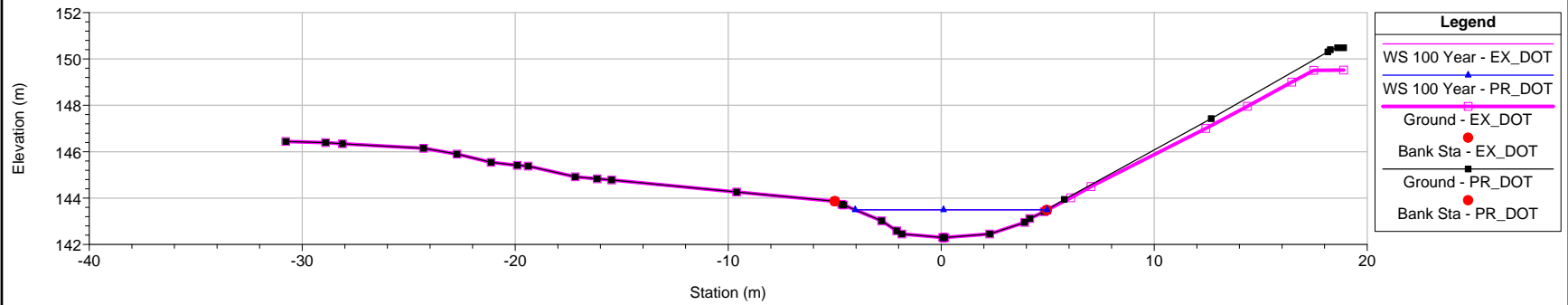
Beaver Pnd Brk, 151-273, Metric Plan: 1) PR_DOT 2) EX_DOT
Str 04323, I-84 WB On-Ramp from Austin Rd

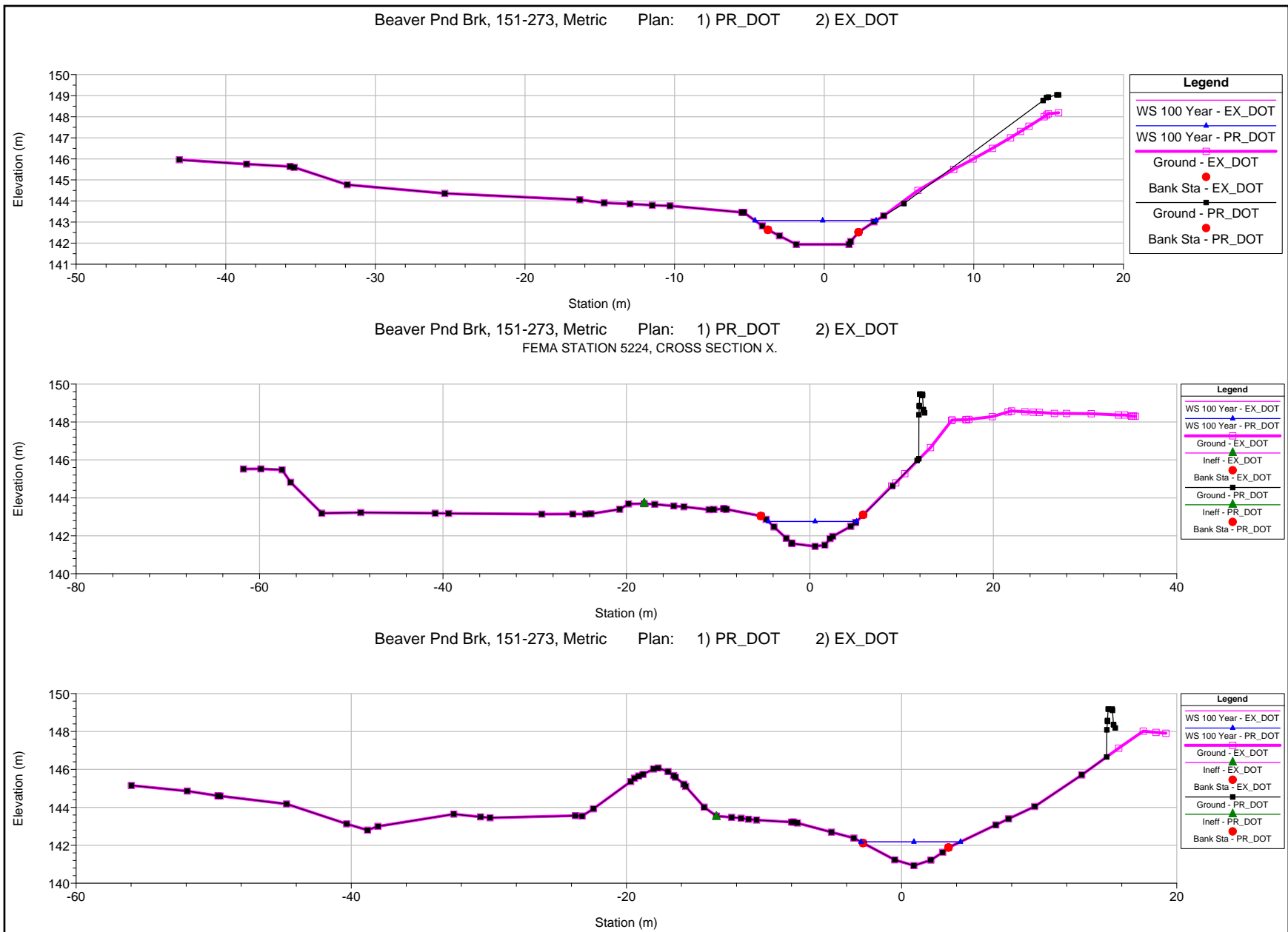


Beaver Pnd Brk, 151-273, Metric Plan: 1) PR_DOT 2) EX_DOT
D/S of Str 04323, I-84 WB On-Ramp from Austin Rd

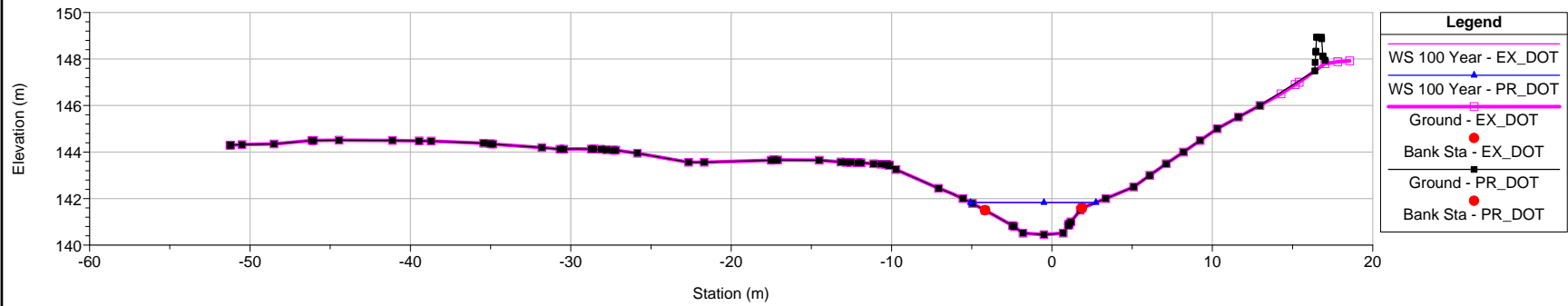


Beaver Pnd Brk, 151-273, Metric Plan: 1) PR_DOT 2) EX_DOT

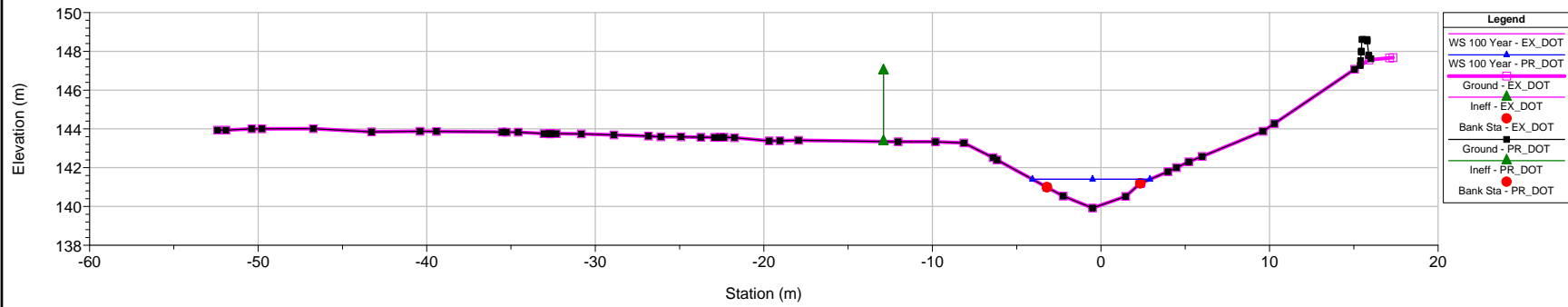




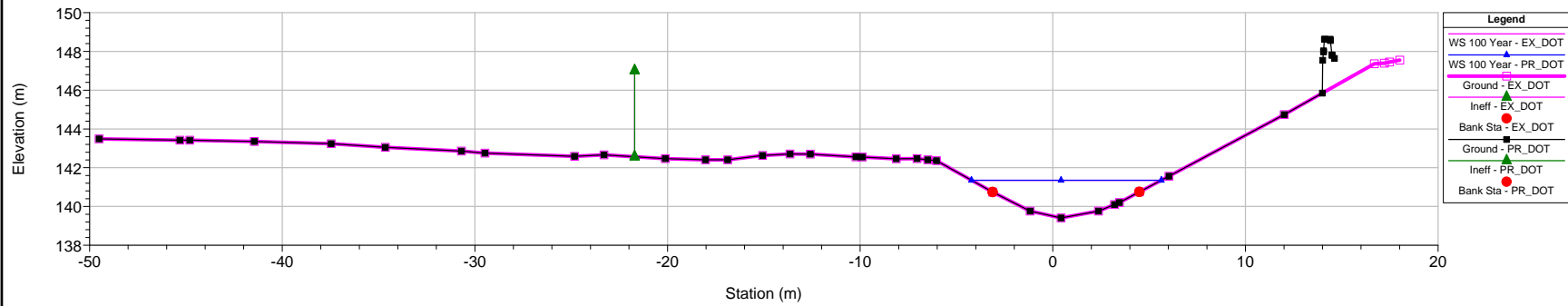
Beaver Pnd Brk, 151-273, Metric Plan: 1) PR_DOT 2) EX_DOT



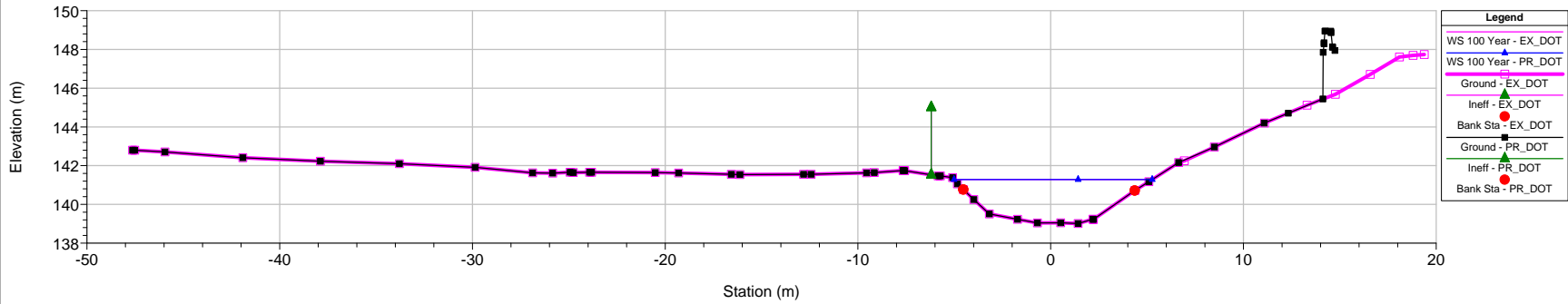
Beaver Pnd Brk, 151-273, Metric Plan: 1) PR_DOT 2) EX_DOT



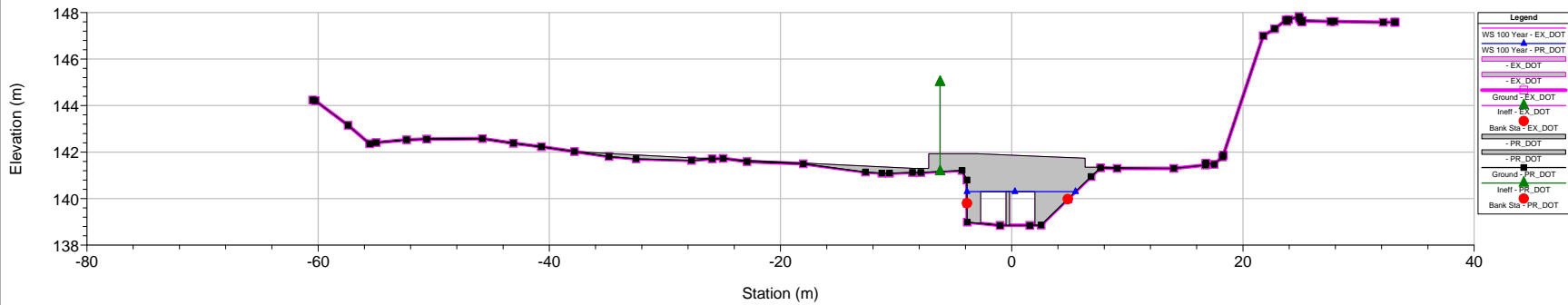
Beaver Pnd Brk, 151-273, Metric Plan: 1) PR_DOT 2) EX_DOT



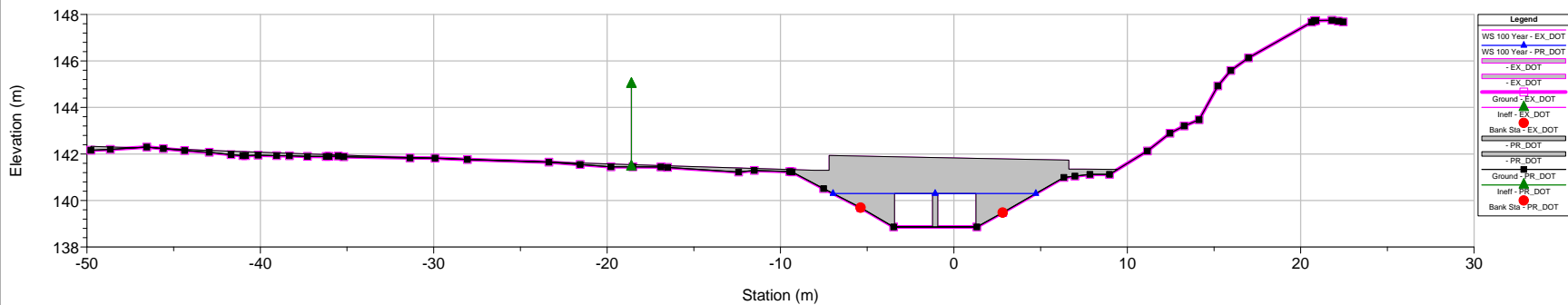
Beaver Pnd Brk, 151-273, Metric Plan: 1) PR_DOT 2) EX_DOT
 U/S of PIERPONT ROAD (FEMA W-STA 5223)



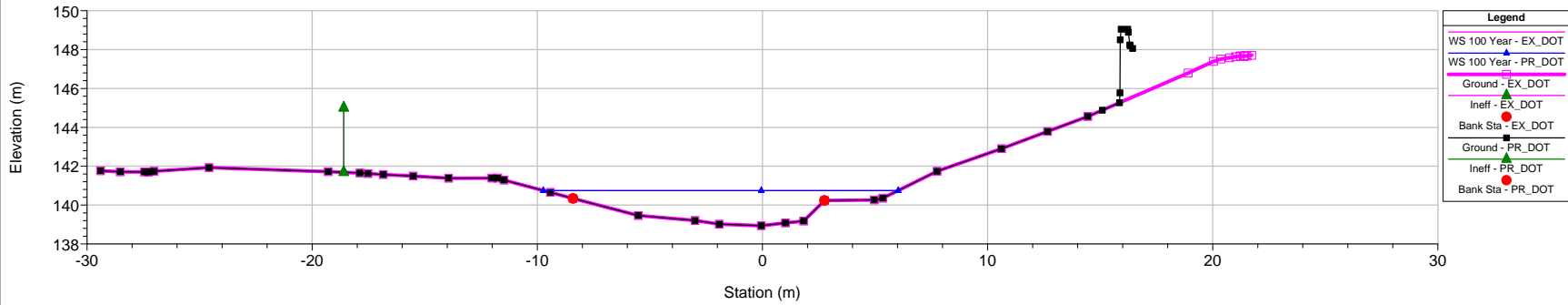
Beaver Pnd Brk, 151-273, Metric Plan: 1) PR_DOT 2) EX_DOT
 EXISTING PIERPONT ROAD STRUCTURE NO. 151-006



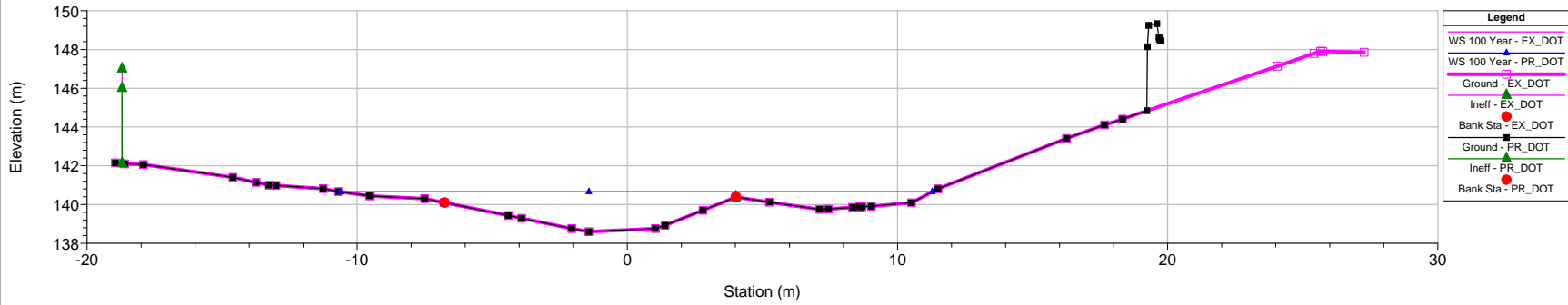
Beaver Pnd Brk, 151-273, Metric Plan: 1) PR_DOT 2) EX_DOT
 EXISTING PIERPONT ROAD STRUCTURE NO. 151-006



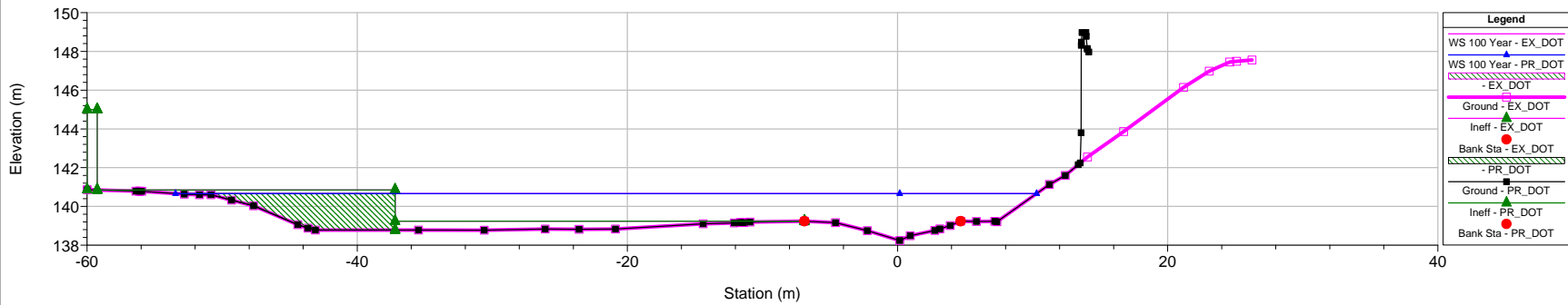
Beaver Pnd Brk, 151-273, Metric Plan: 1) PR_DOT 2) EX_DOT
D/S of PIERPONT ROAD (FEMA V -STA 5222)



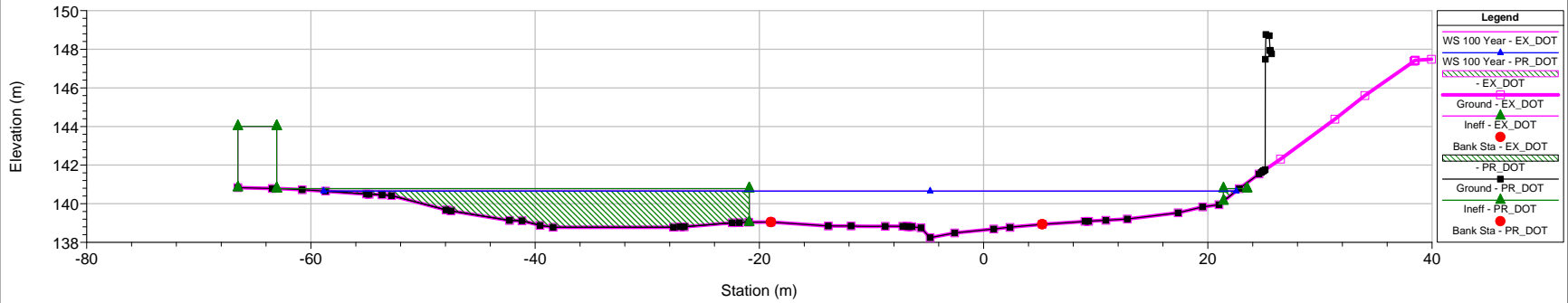
Beaver Pnd Brk, 151-273, Metric Plan: 1) PR_DOT 2) EX_DOT
D/S End Prop. Retaining Wall No.111



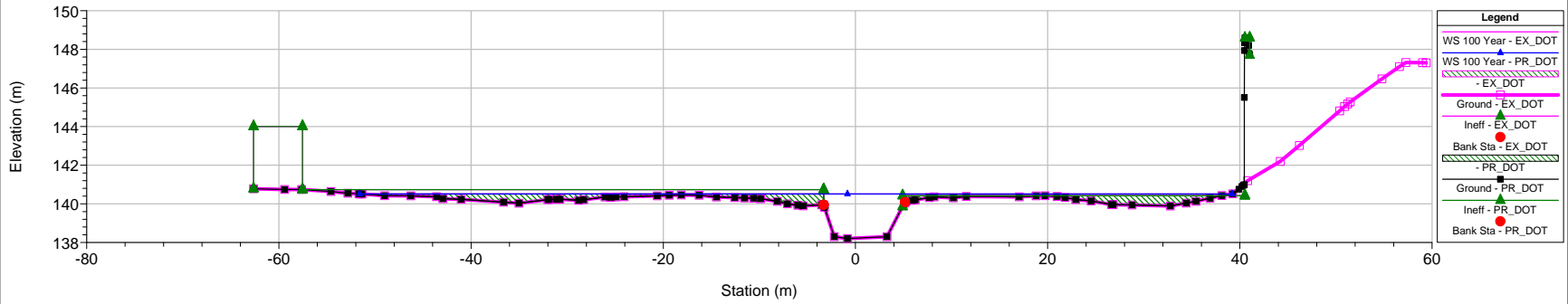
Beaver Pnd Brk, 151-273, Metric Plan: 1) PR_DOT 2) EX_DOT
58m U/S of EXISTING MULLOY ROAD



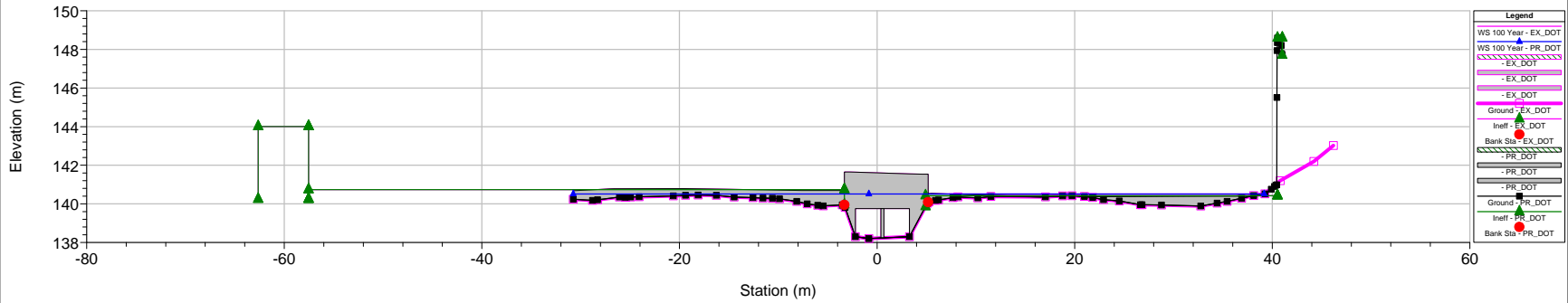
Beaver Pnd Brk, 151-273, Metric Plan: 1) PR_DOT 2) EX_DOT
 13.4m U/S MULLOY ROAD (FEMA U -STA 5221)



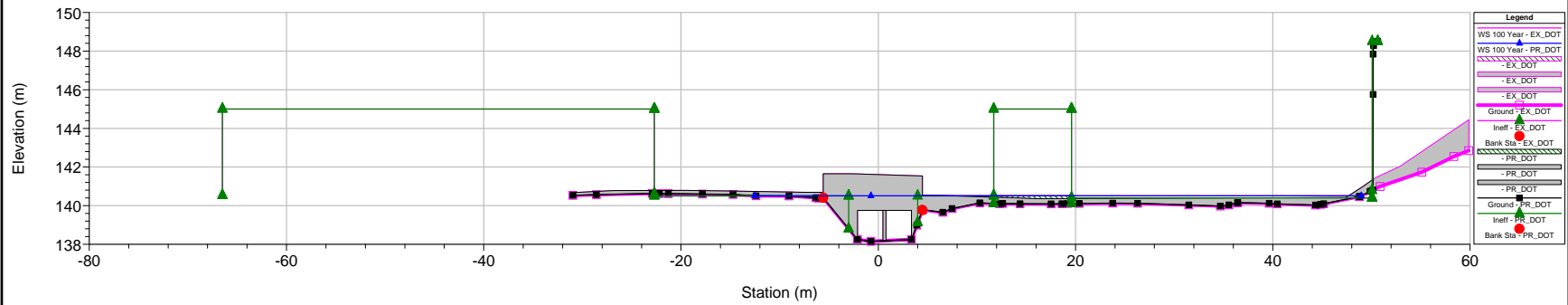
Beaver Pnd Brk, 151-273, Metric Plan: 1) PR_DOT 2) EX_DOT
 U/S of MULLOY RD. (FEMA STATION 5220.8)



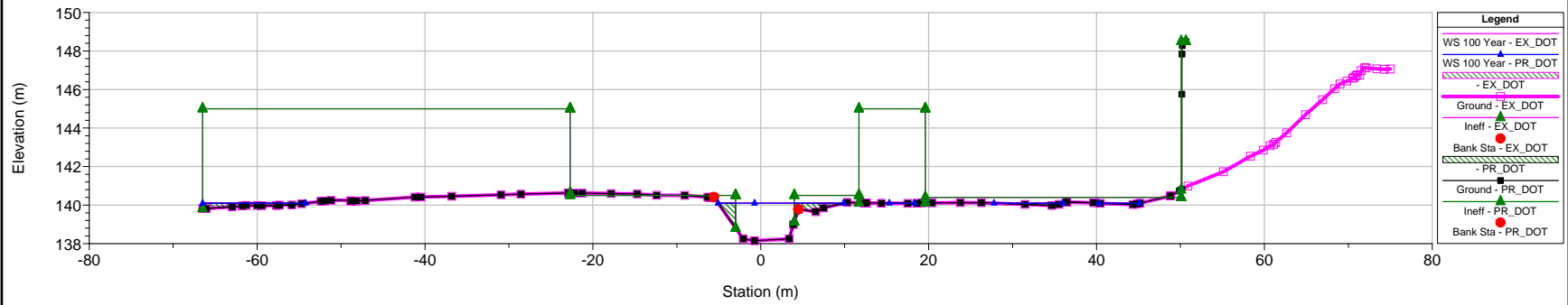
Beaver Pnd Brk, 151-273, Metric Plan: 1) PR_DOT 2) EX_DOT
 EXISTING MULLOY ROAD STRUCTURE NO. 151-005



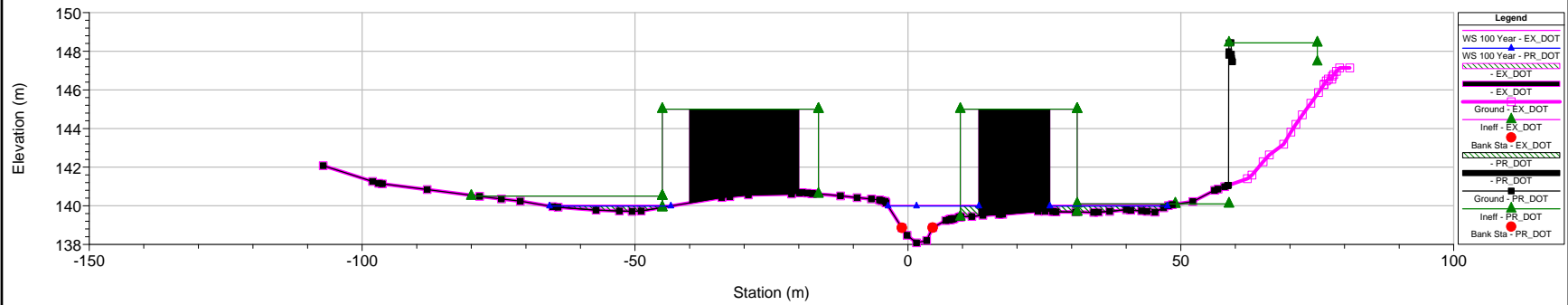
Beaver Pnd Brk, 151-273, Metric Plan: 1) PR_DOT 2) EX_DOT
 EXISTING MULLOY ROAD STRUCTURE NO. 151-005



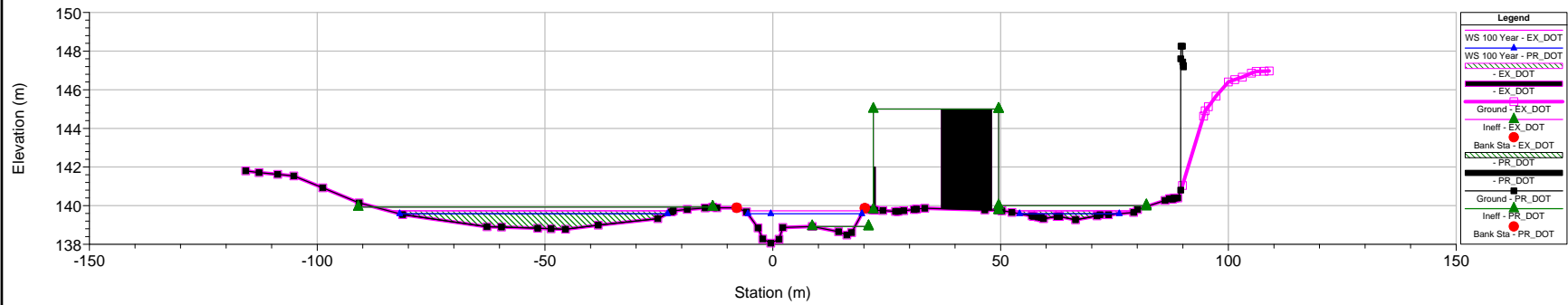
Beaver Pnd Brk, 151-273, Metric Plan: 1) PR_DOT 2) EX_DOT
 D/S of MULLOY RD (FEMA STATION 5220.2)



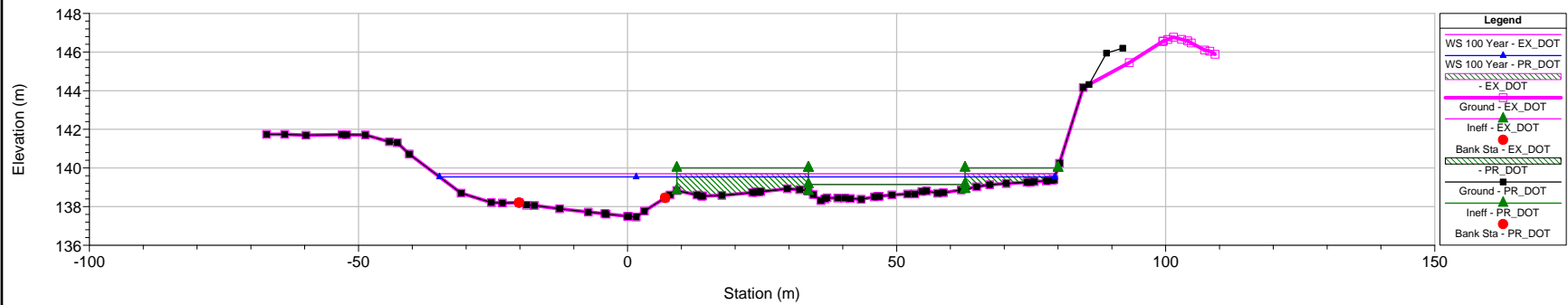
Beaver Pnd Brk, 151-273, Metric Plan: 1) PR_DOT 2) EX_DOT
 14.8m D/S MULLOY ROAD (FEMA T -STA 5220)



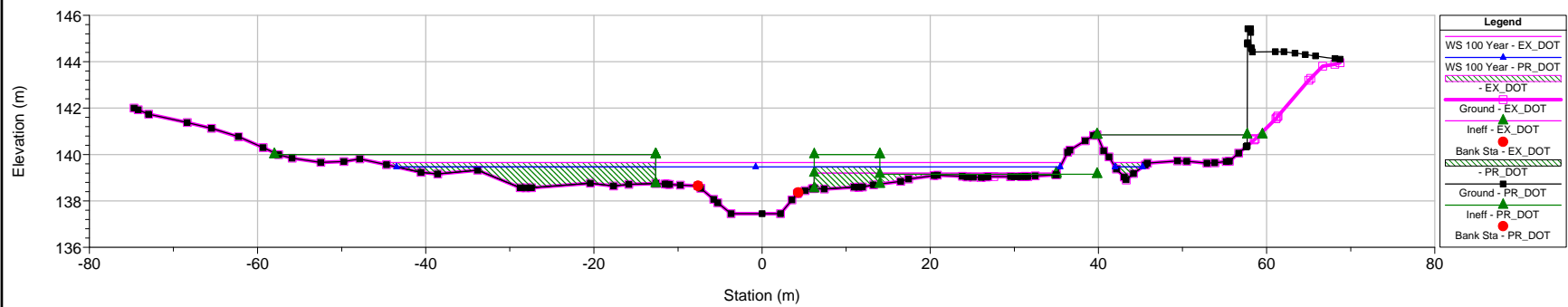
Beaver Pnd Brk, 151-273, Metric Plan: 1) PR_DOT 2) EX_DOT
 FEMA STATION 5219, CROSS SECTION S



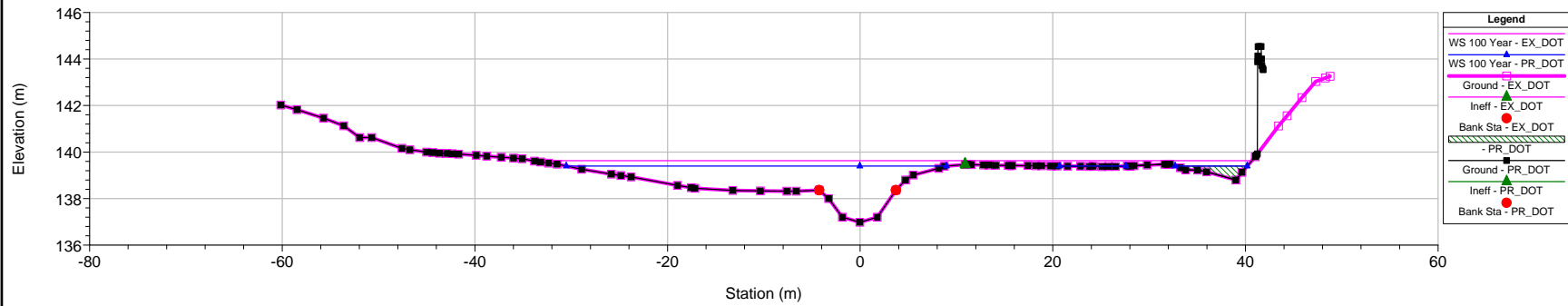
Beaver Pnd Brk, 151-273, Metric Plan: 1) PR_DOT 2) EX_DOT



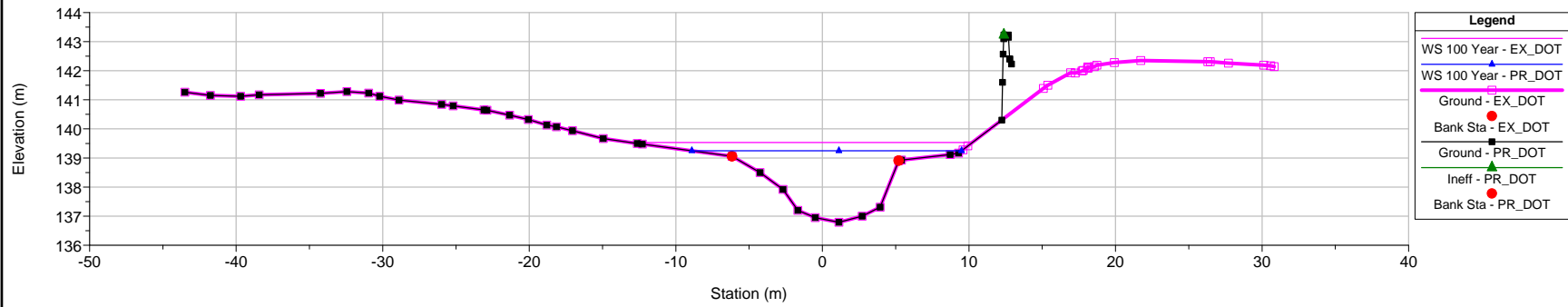
Beaver Pnd Brk, 151-273, Metric Plan: 1) PR_DOT 2) EX_DOT



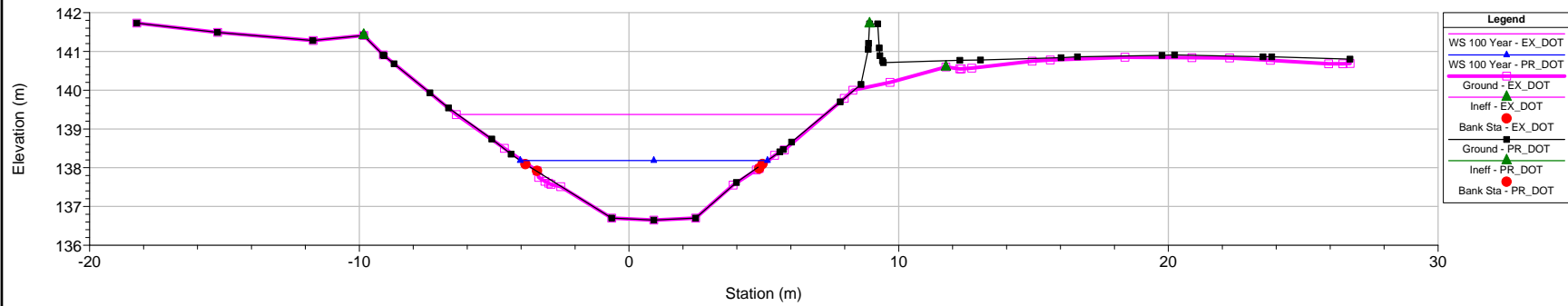
Beaver Pnd Brk, 151-273, Metric Plan: 1) PR_DOT 2) EX_DOT
 FEMA Station 5218, Cross Section R

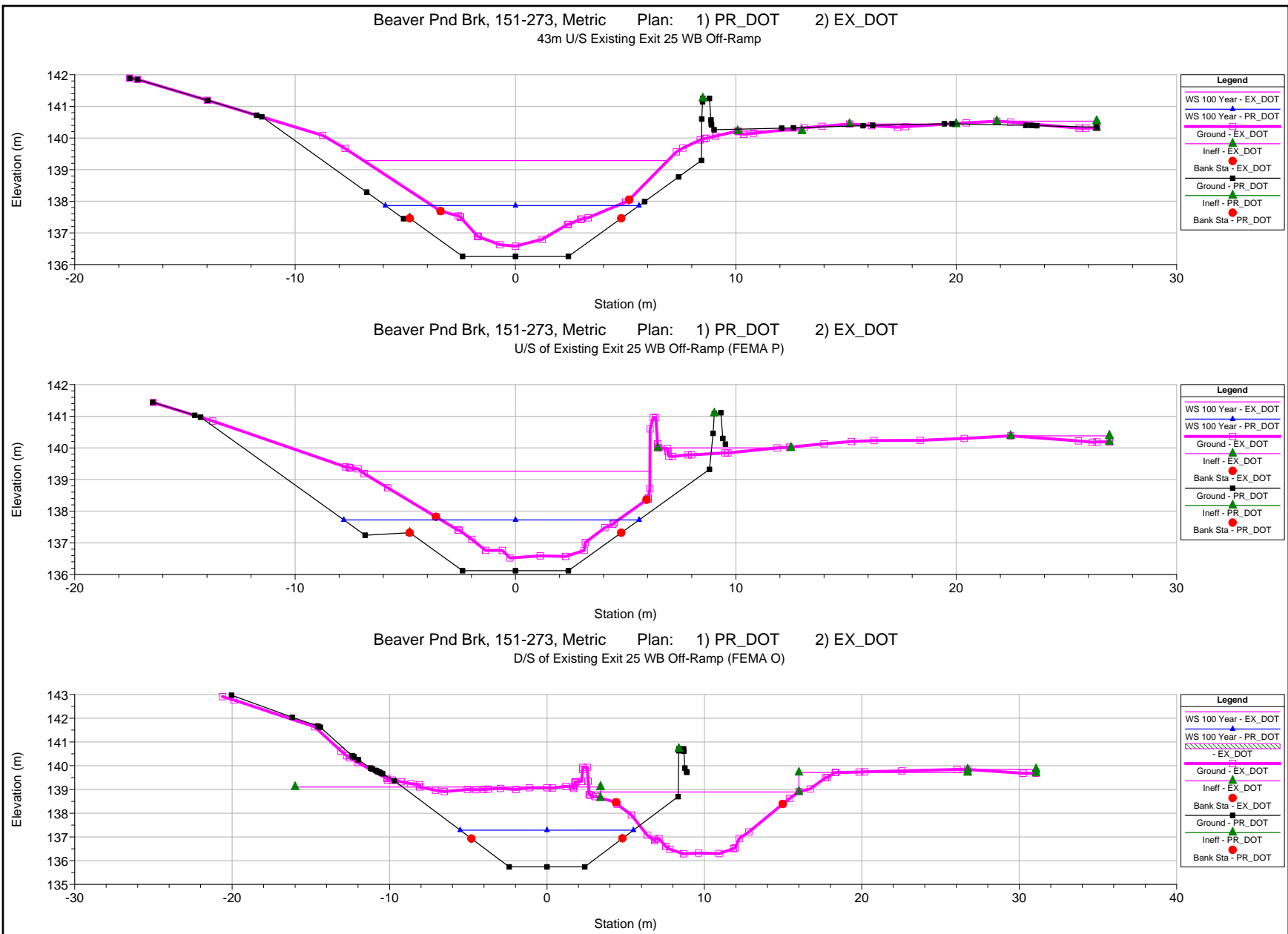


Beaver Pnd Brk, 151-273, Metric Plan: 1) PR_DOT 2) EX_DOT
 FEMA STATION 5217.5, CROSS SECTION Q

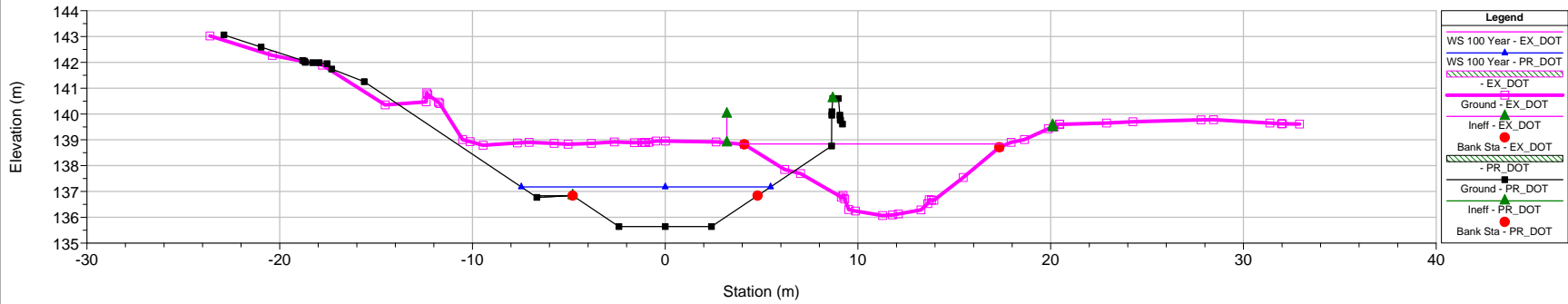


Beaver Pnd Brk, 151-273, Metric Plan: 1) PR_DOT 2) EX_DOT
 Upstream Limit of Proposed Brook Relocation

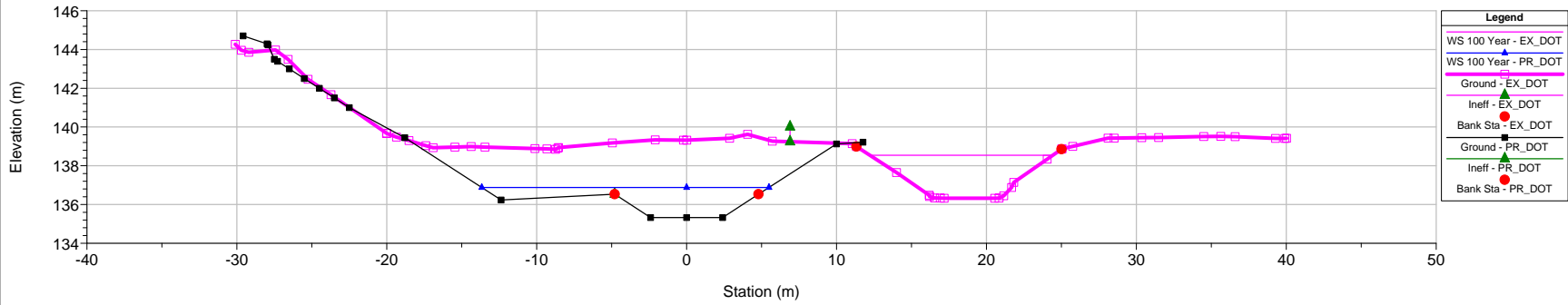




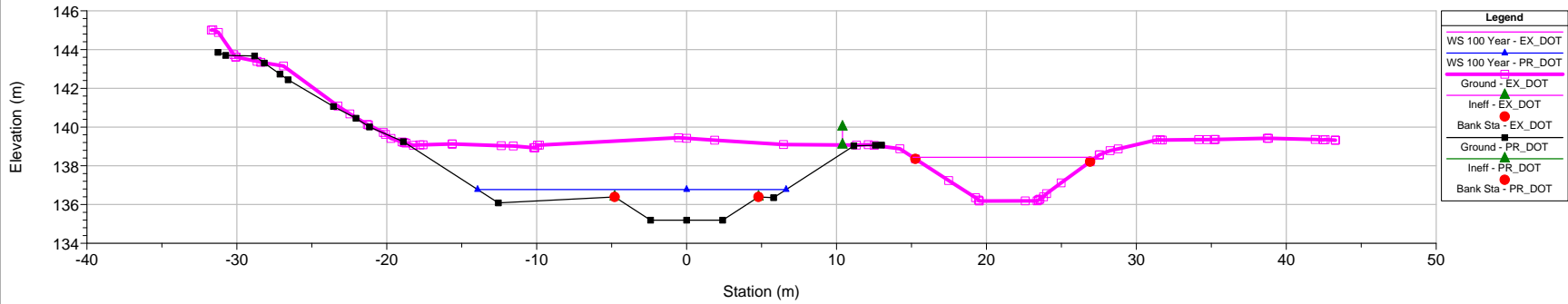
Beaver Pnd Brk, 151-273, Metric Plan: 1) PR_DOT 2) EX_DOT
34m D/S Existing Exit 25 WB Off-Ramp

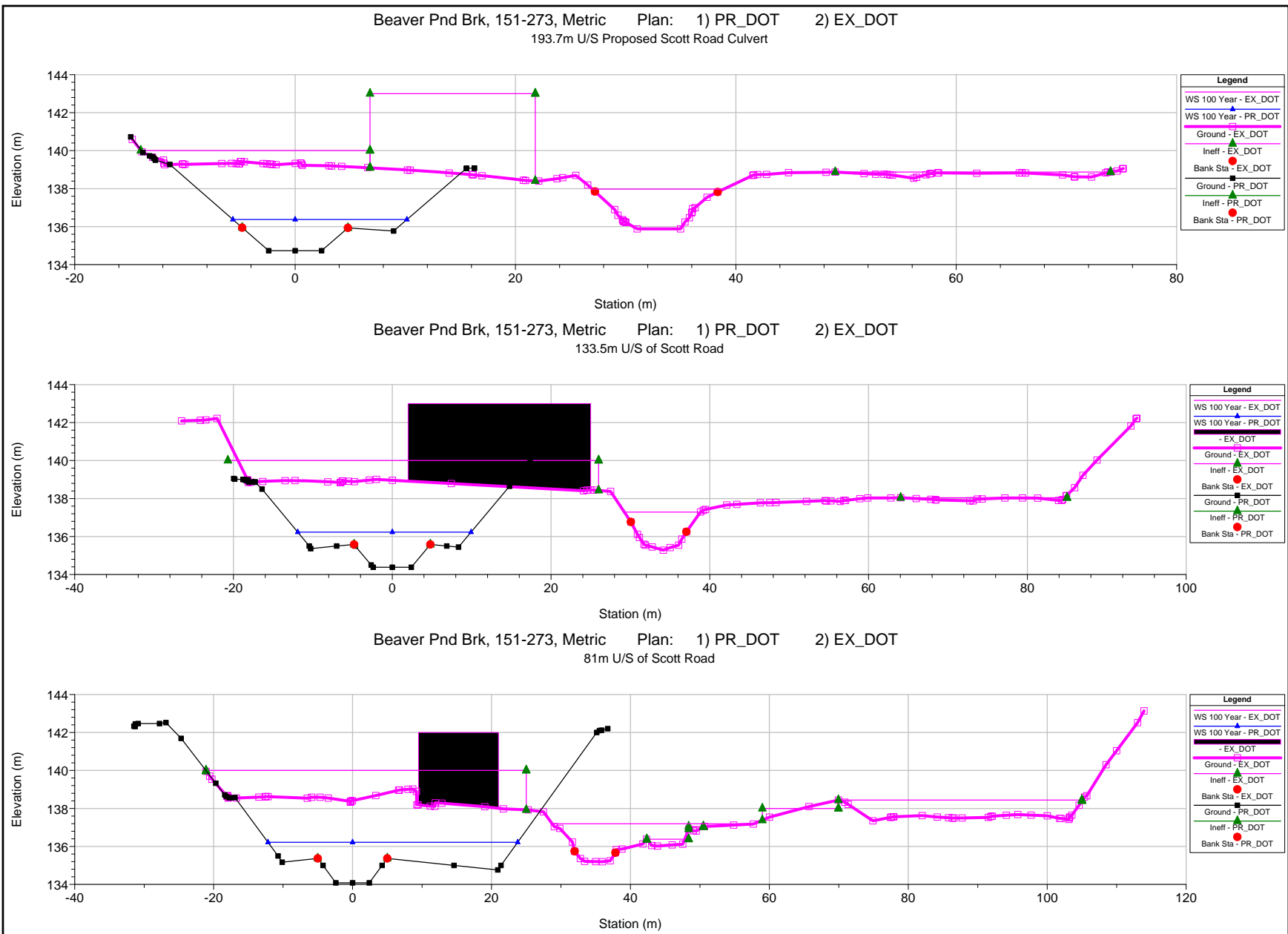


Beaver Pnd Brk, 151-273, Metric Plan: 1) PR_DOT 2) EX_DOT
D/S End Prop. Retaining Wall No.109

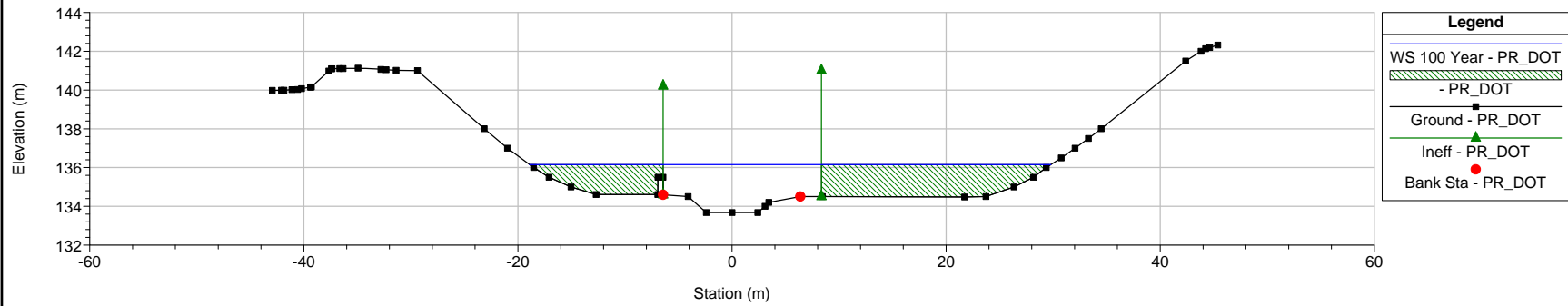


Beaver Pnd Brk, 151-273, Metric Plan: 1) PR_DOT 2) EX_DOT
273m U/S of Scott Road

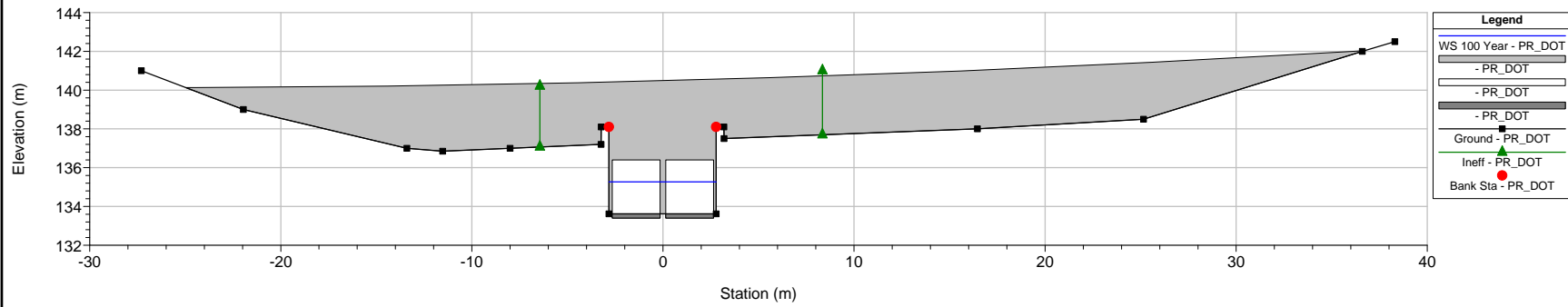




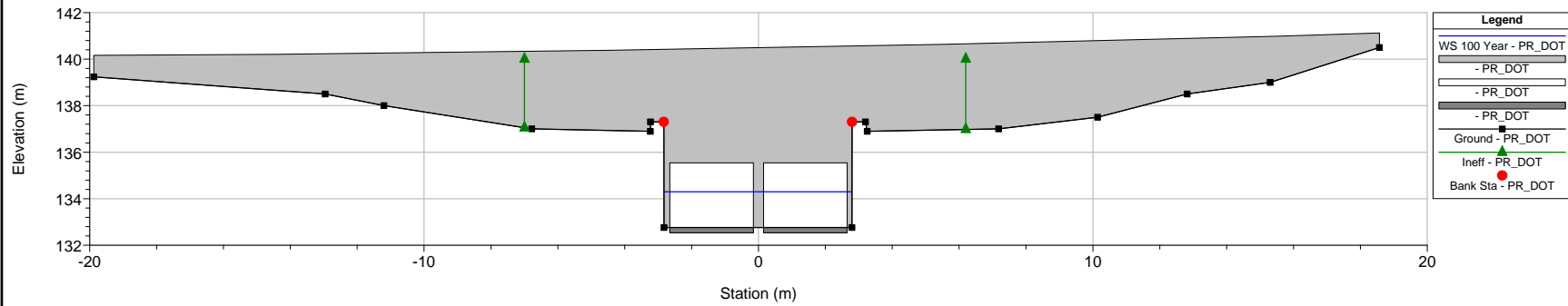
Beaver Pnd Brk, 151-273, Metric Plan: 1) PR_DOT 2) EX_DOT
 U/S of Scott Rd Culvert (comparable FEMA Sec.N)

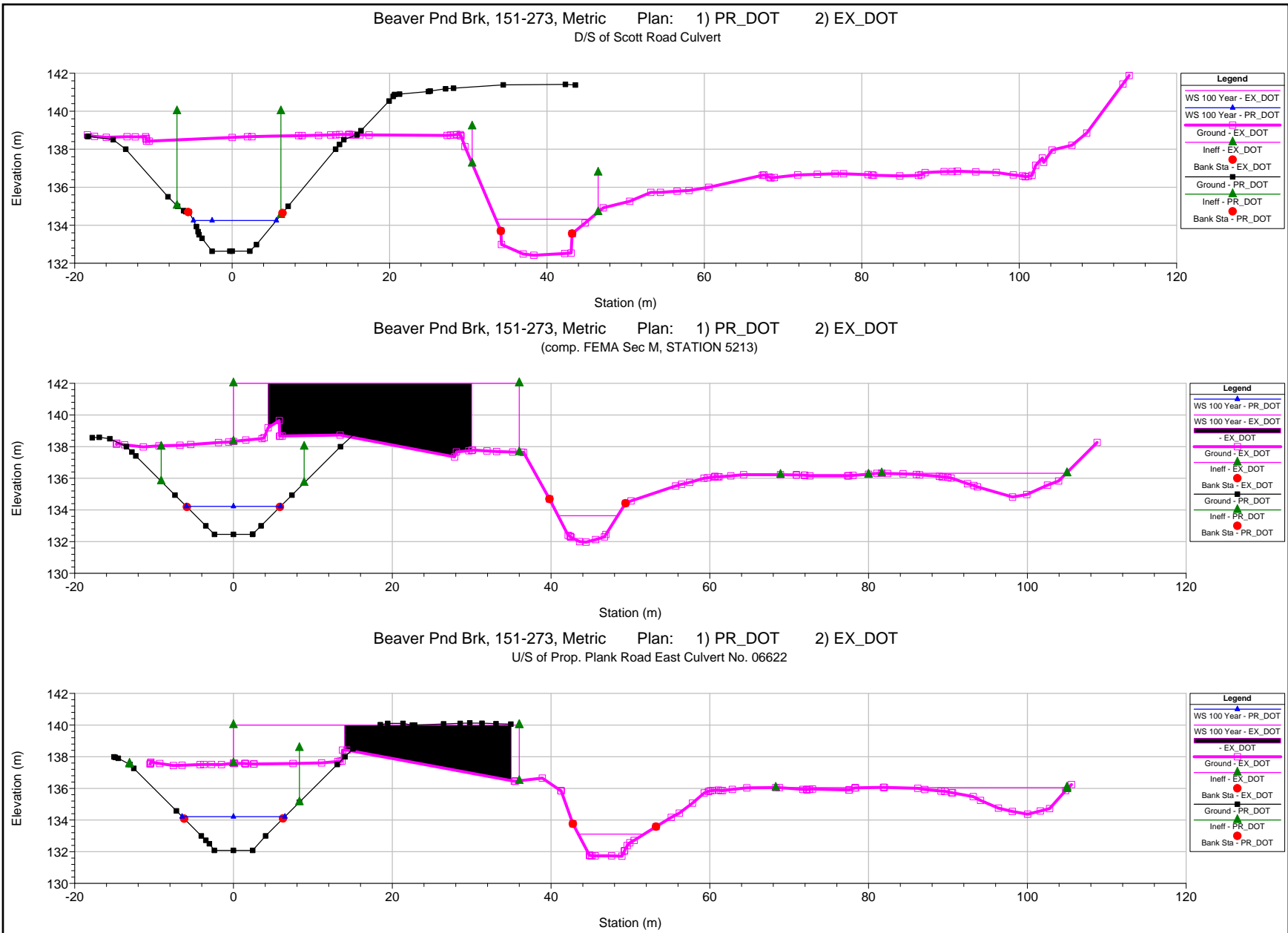


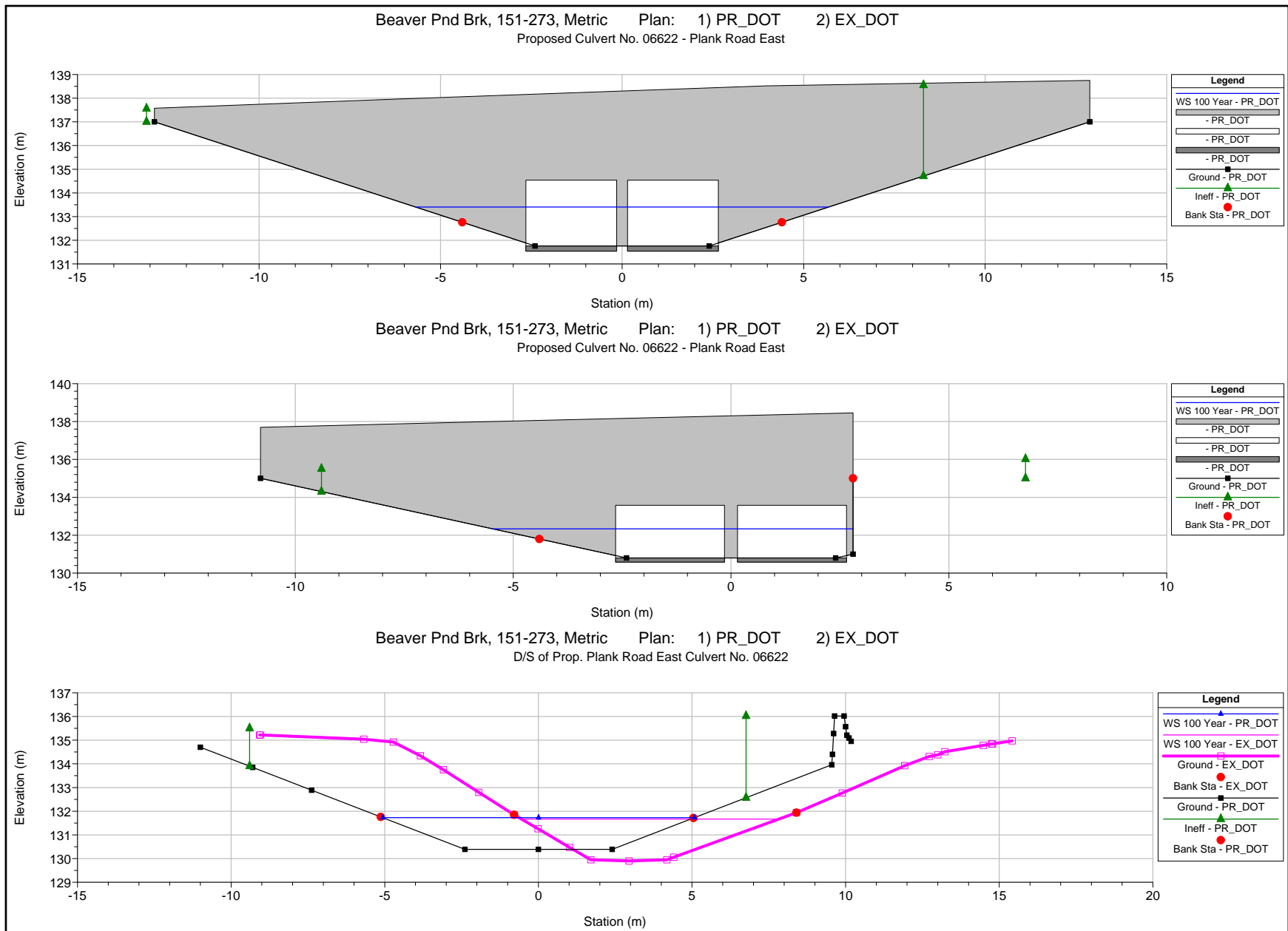
Beaver Pnd Brk, 151-273, Metric Plan: 1) PR_DOT 2) EX_DOT
 Proposed Culvert No. 014 - Scott Road

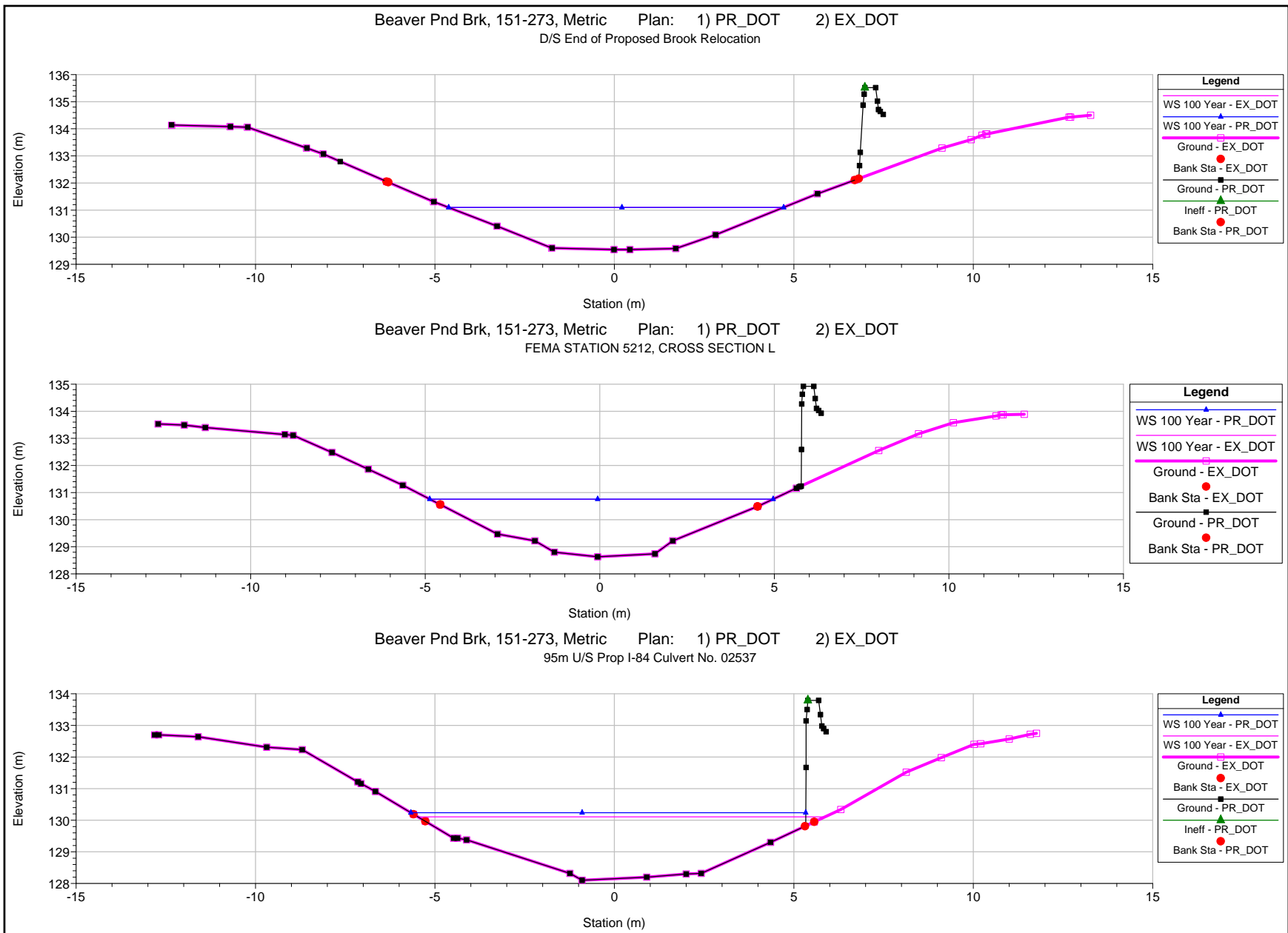


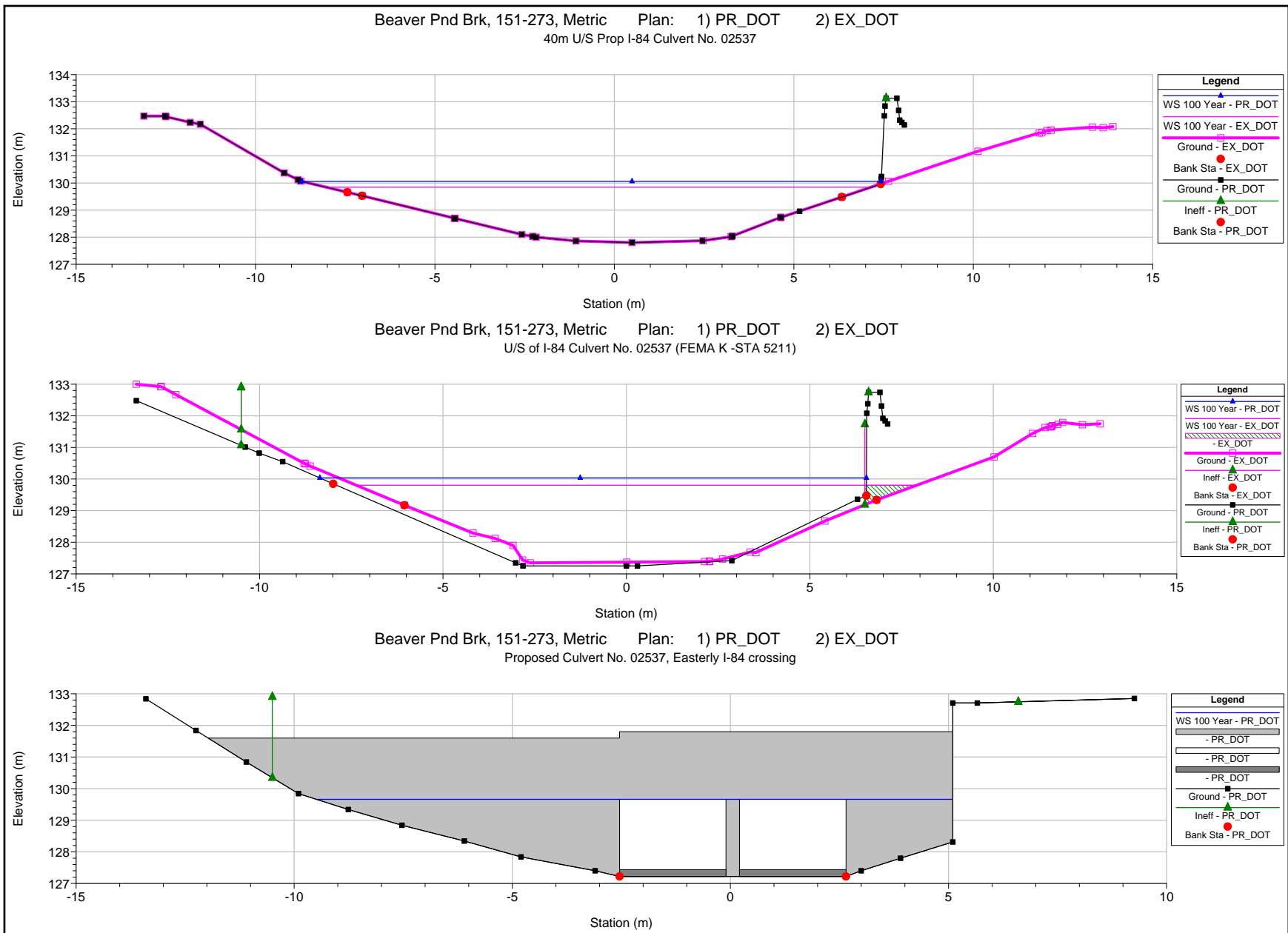
Beaver Pnd Brk, 151-273, Metric Plan: 1) PR_DOT 2) EX_DOT
 Proposed Culvert No. 014 - Scott Road



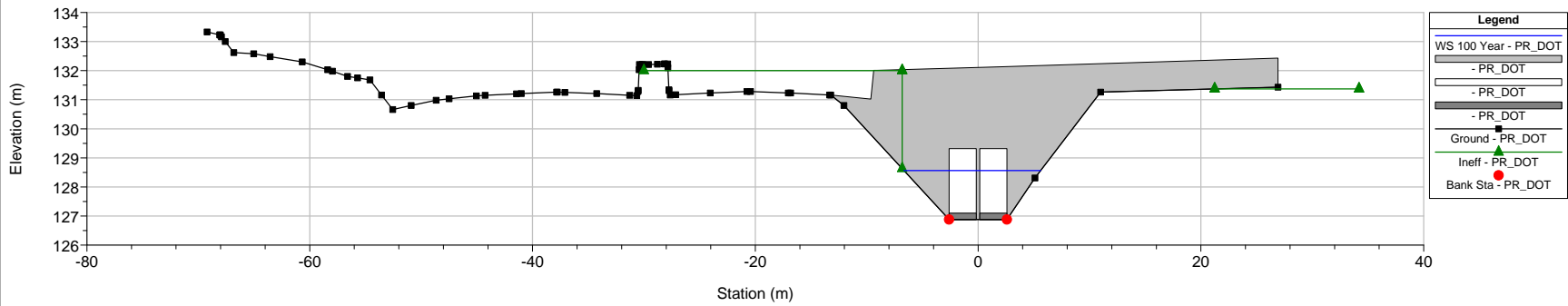




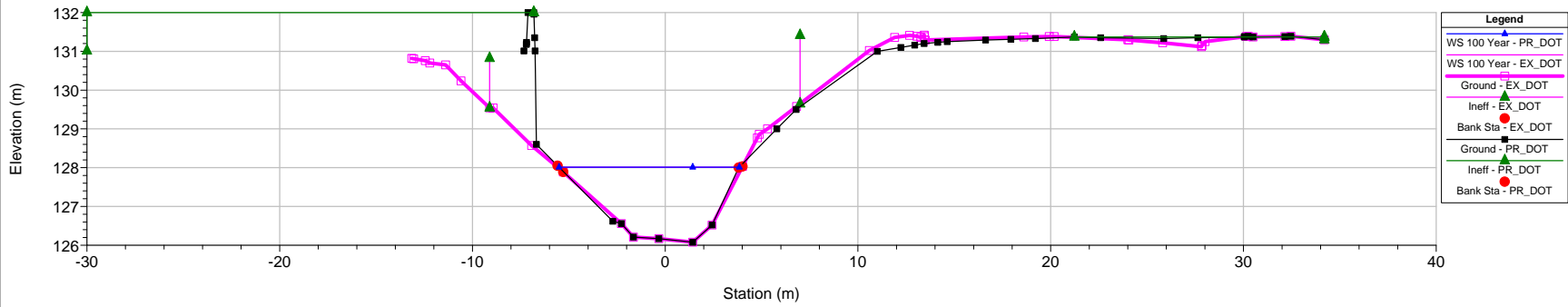




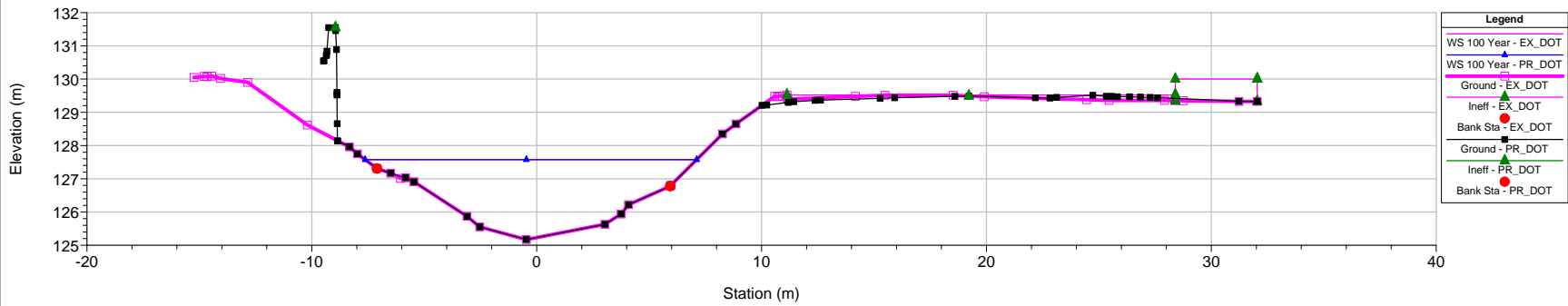
Beaver Pnd Brk, 151-273, Metric Plan: 1) PR_DOT 2) EX_DOT
 Proposed Culvert No. 02537, Easterly I-84 crossing

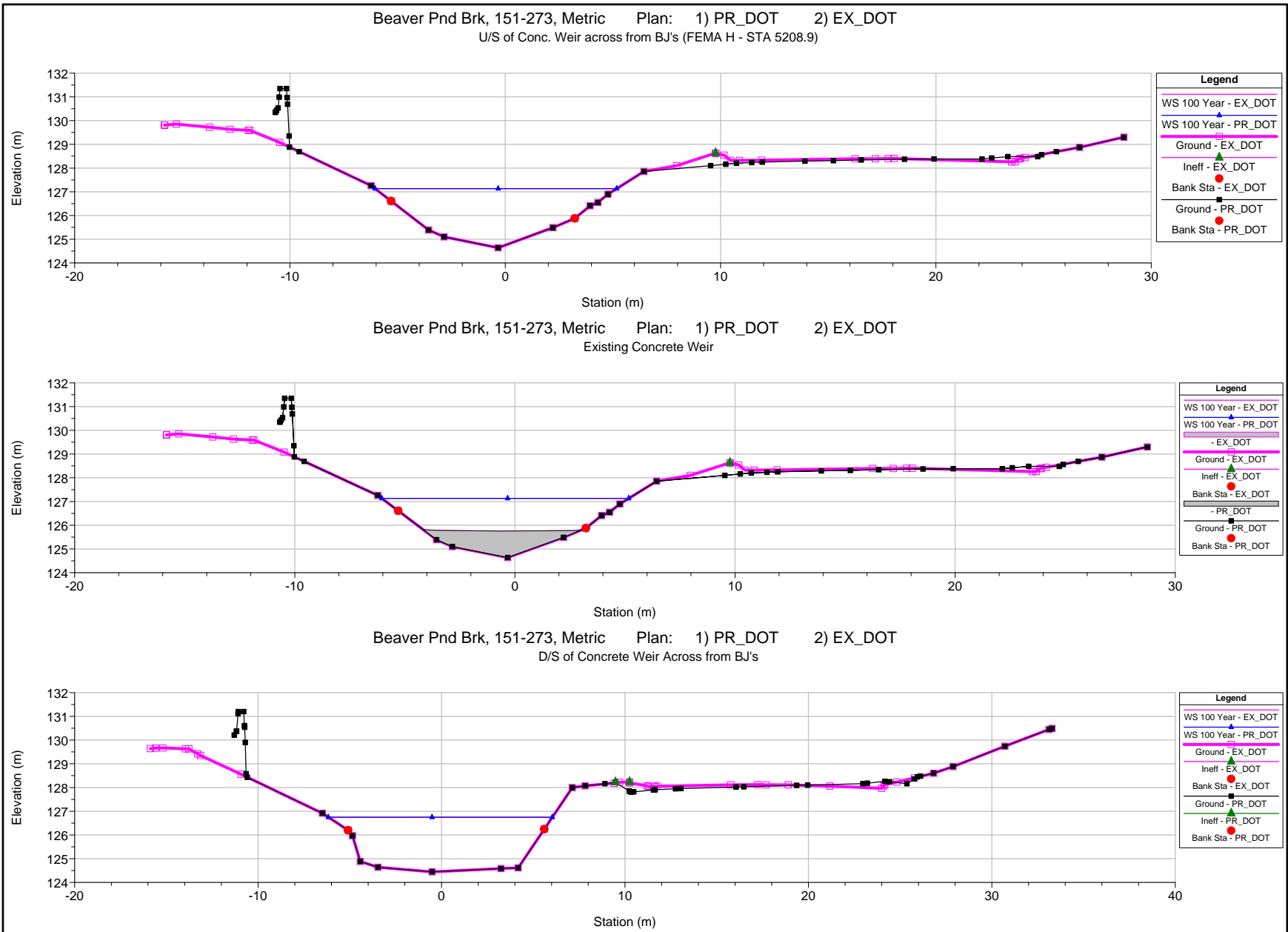


Beaver Pnd Brk, 151-273, Metric Plan: 1) PR_DOT 2) EX_DOT
 D/S of I-84 Culvert No. 02537 (FEMA J -STA 5210)

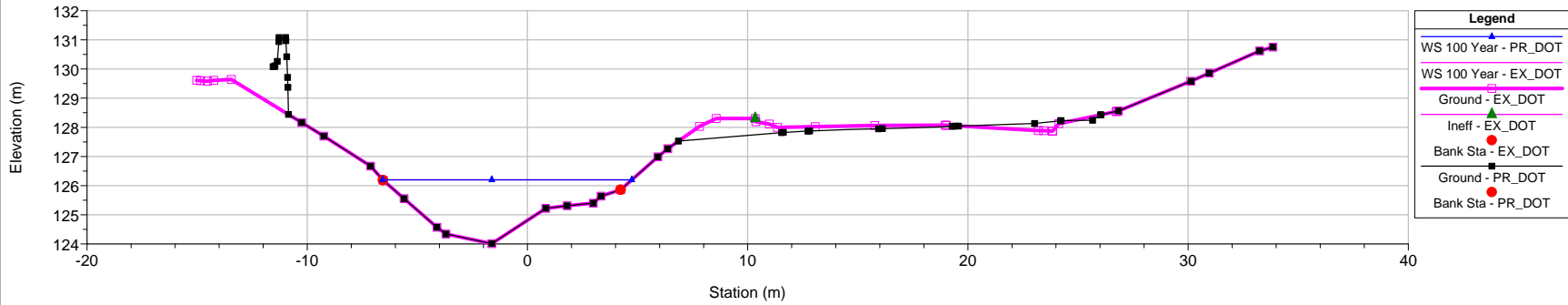


Beaver Pnd Brk, 151-273, Metric Plan: 1) PR_DOT 2) EX_DOT
 FEMA STATION 5209, CROSS SECTION I

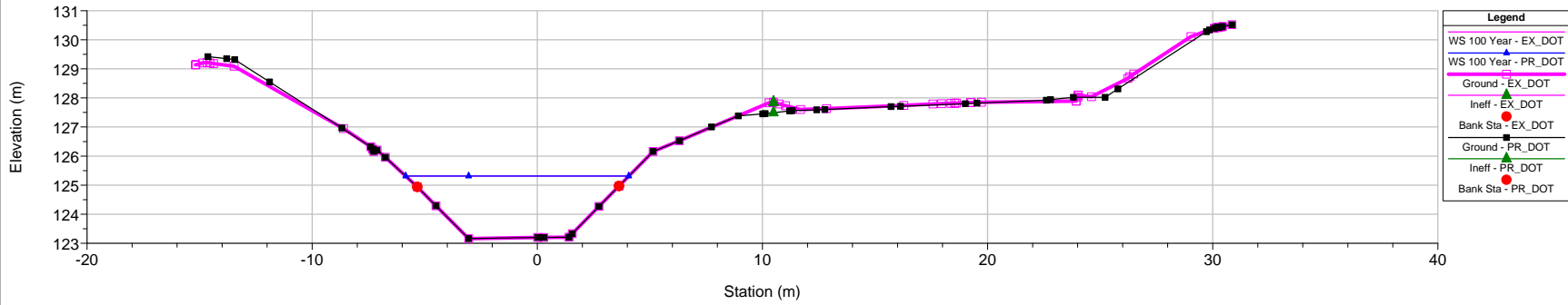




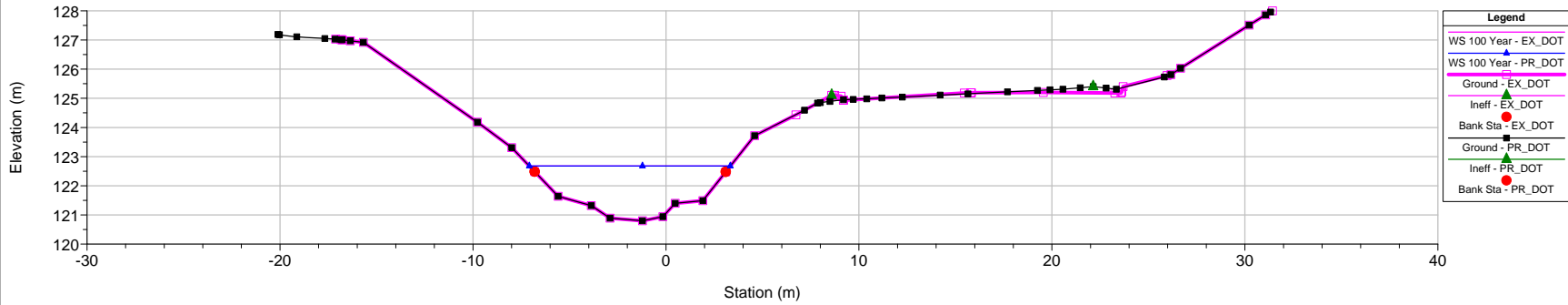
Beaver Pnd Brk, 151-273, Metric Plan: 1) PR_DOT 2) EX_DOT
 9m D/S Concrete Weir (FEMA G -STA 5208.1)

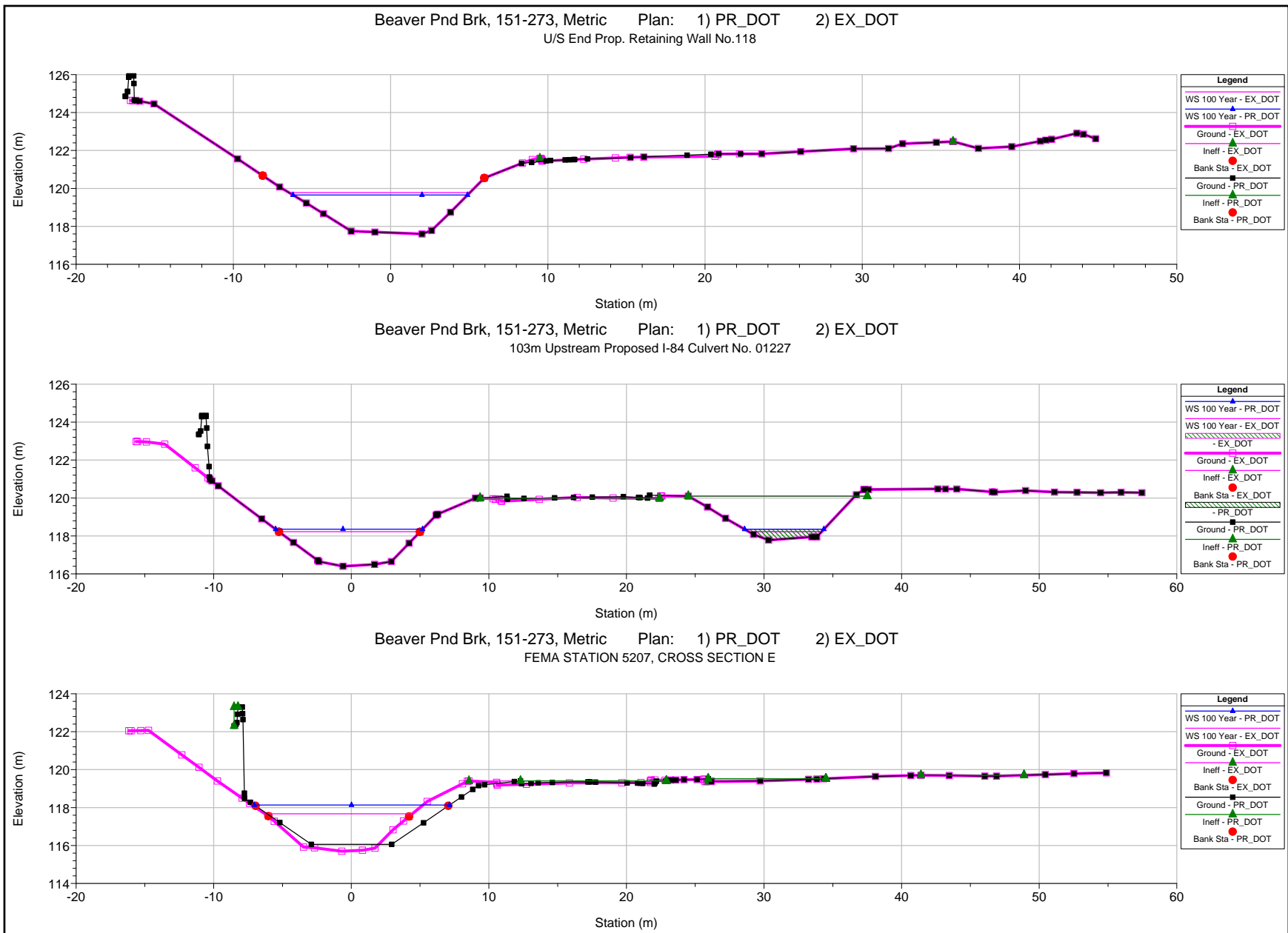


Beaver Pnd Brk, 151-273, Metric Plan: 1) PR_DOT 2) EX_DOT
 D/S End Prop. Retaining Wall No.107

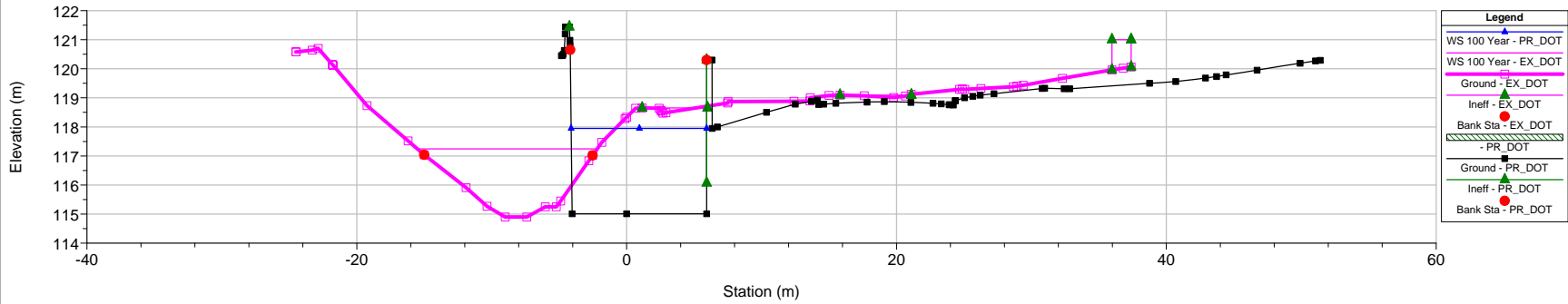


Beaver Pnd Brk, 151-273, Metric Plan: 1) PR_DOT 2) EX_DOT
 FEMA STATION 5208, CROSS SECTION F

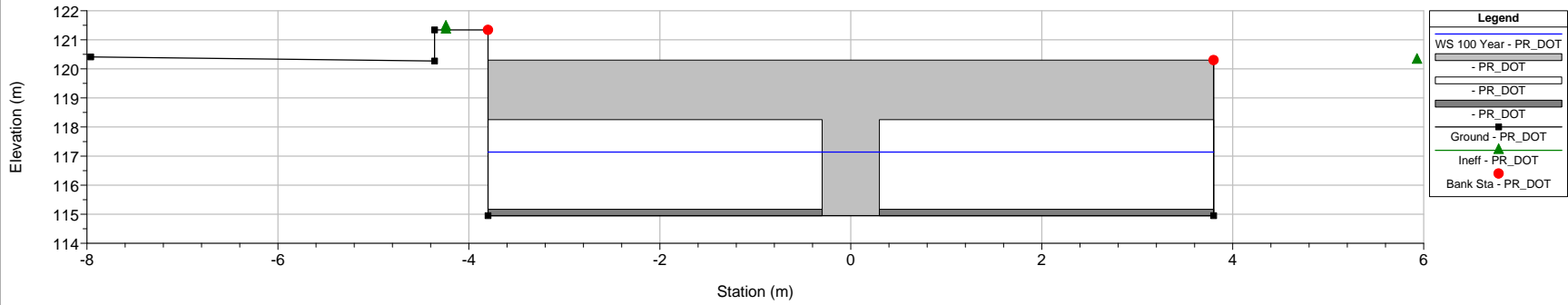




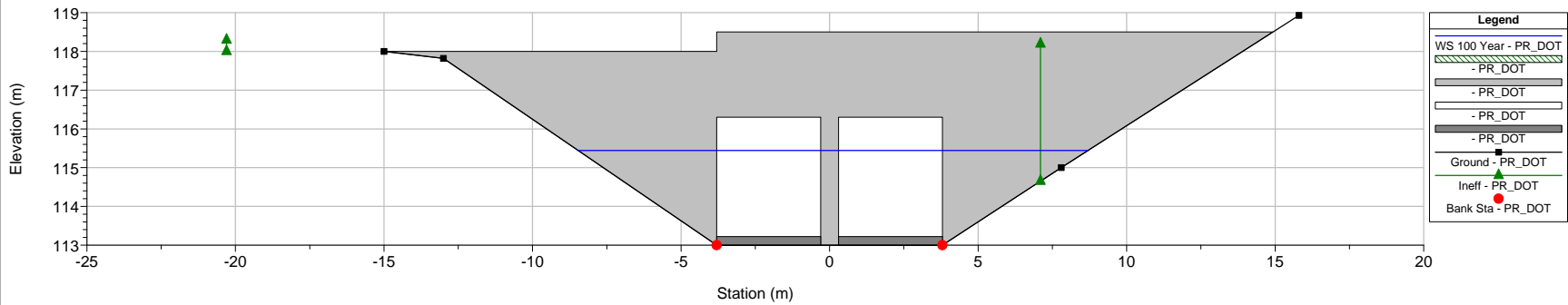
Beaver Pnd Brk, 151-273, Metric Plan: 1) PR_DOT 2) EX_DOT
 U/S of Prop I-84 Culvert No.01227



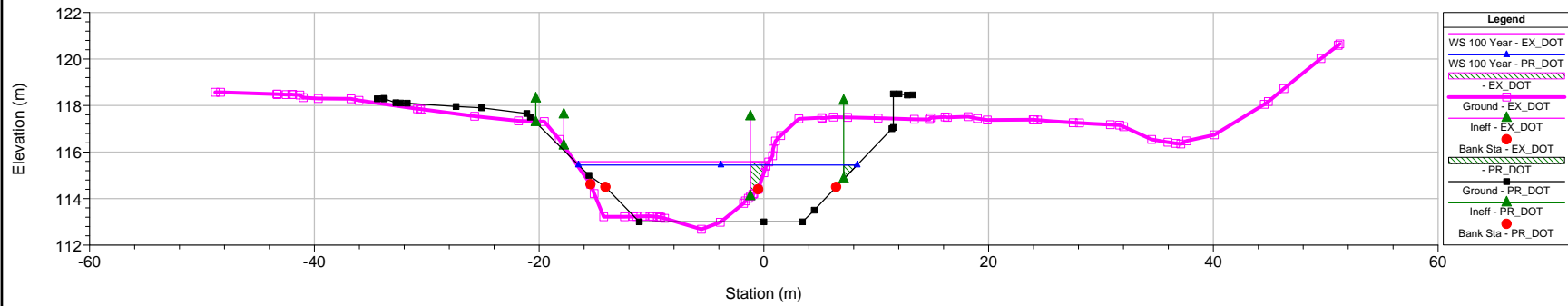
Beaver Pnd Brk, 151-273, Metric Plan: 1) PR_DOT 2) EX_DOT
 Proposed Culvert No.01227, Westerly I-84 crossing



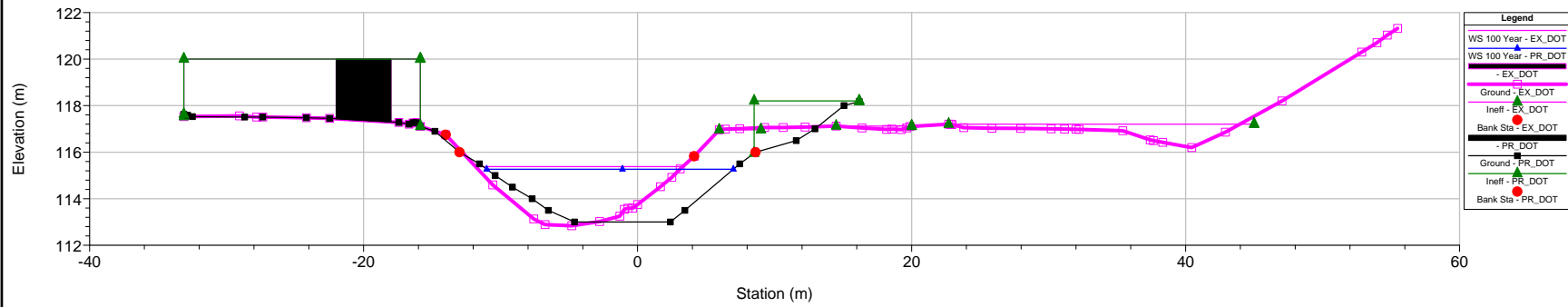
Beaver Pnd Brk, 151-273, Metric Plan: 1) PR_DOT 2) EX_DOT
 Proposed Culvert No.01227, Westerly I-84 crossing



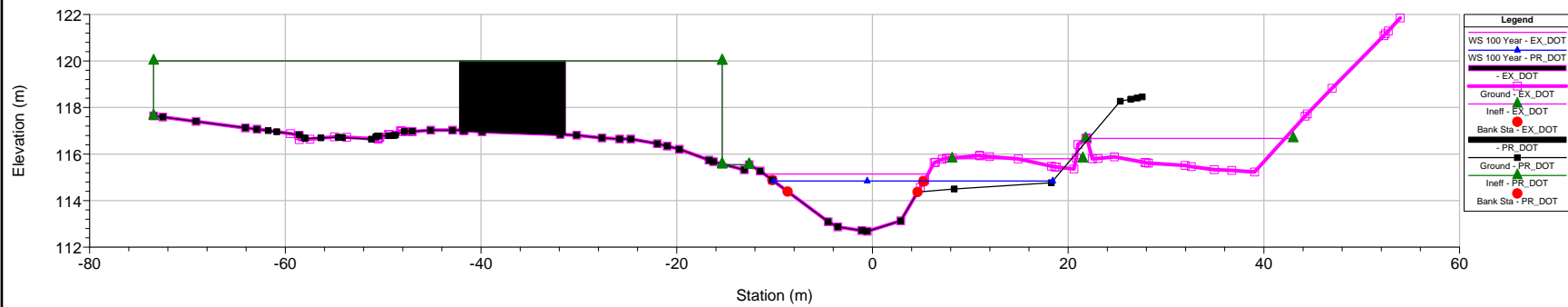
Beaver Pnd Brk, 151-273, Metric Plan: 1) PR_DOT 2) EX_DOT
D/S of I-84 Culvert No. 01227



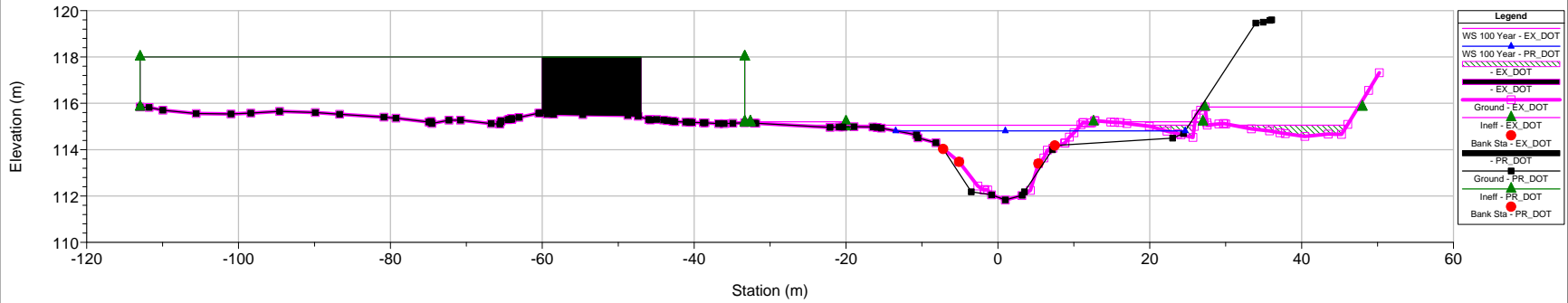
Beaver Pnd Brk, 151-273, Metric Plan: 1) PR_DOT 2) EX_DOT
32.6m D/S I-84 Culvert No.01227 (FEMA C - STA 5205.1)



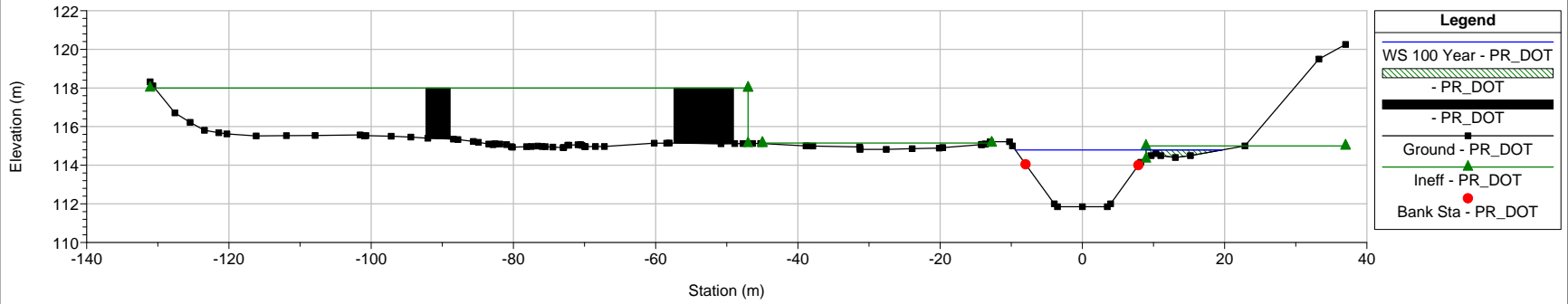
Beaver Pnd Brk, 151-273, Metric Plan: 1) PR_DOT 2) EX_DOT
FEMA Station 5205, Cross Section B



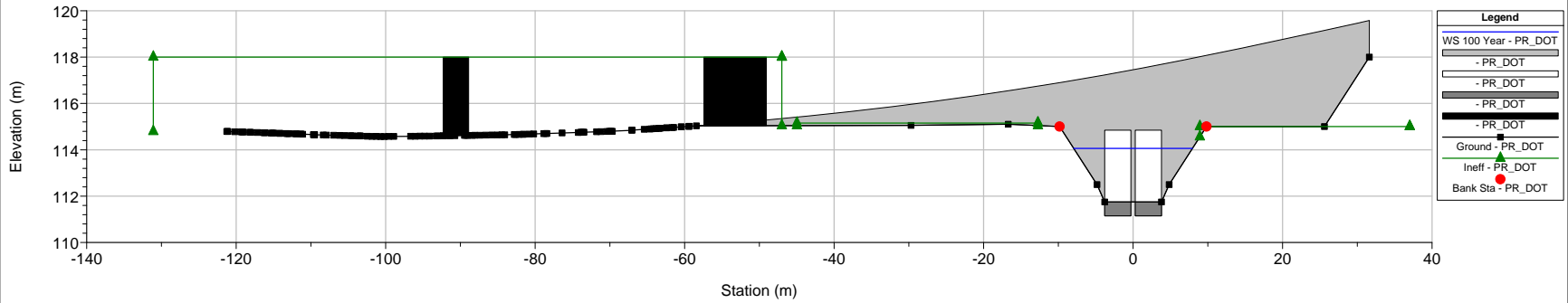
Beaver Pnd Brk, 151-273, Metric Plan: 1) PR_DOT 2) EX_DOT
 27m U/S Harpers Ferry Road (FEMA A -STA 5204.9)



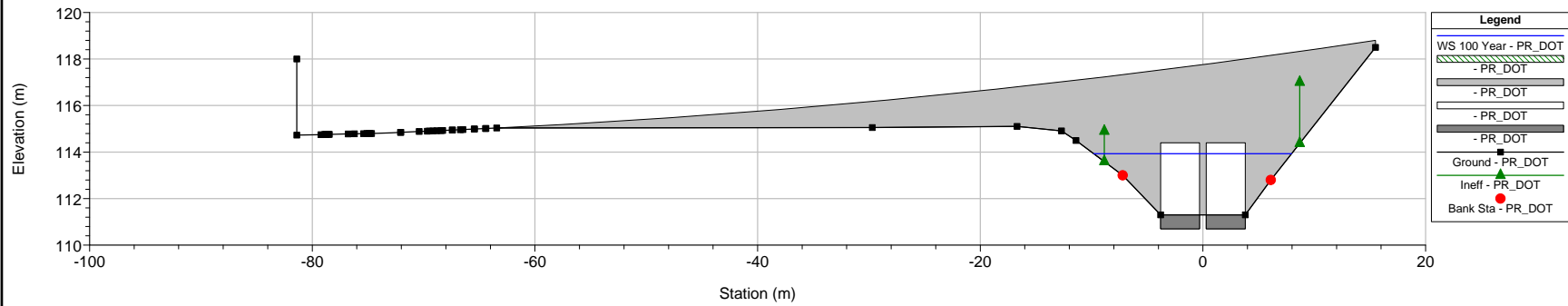
Beaver Pnd Brk, 151-273, Metric Plan: 1) PR_DOT 2) EX_DOT
 U/S of Harpers Ferry Road Culvert No. 03727



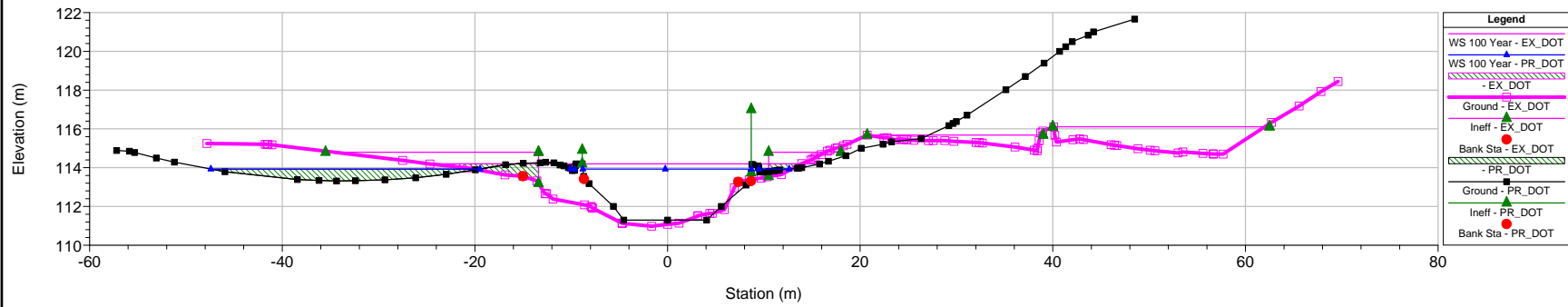
Beaver Pnd Brk, 151-273, Metric Plan: 1) PR_DOT 2) EX_DOT
 Proposed Culvert No. 03727 - Harpers Ferry Road



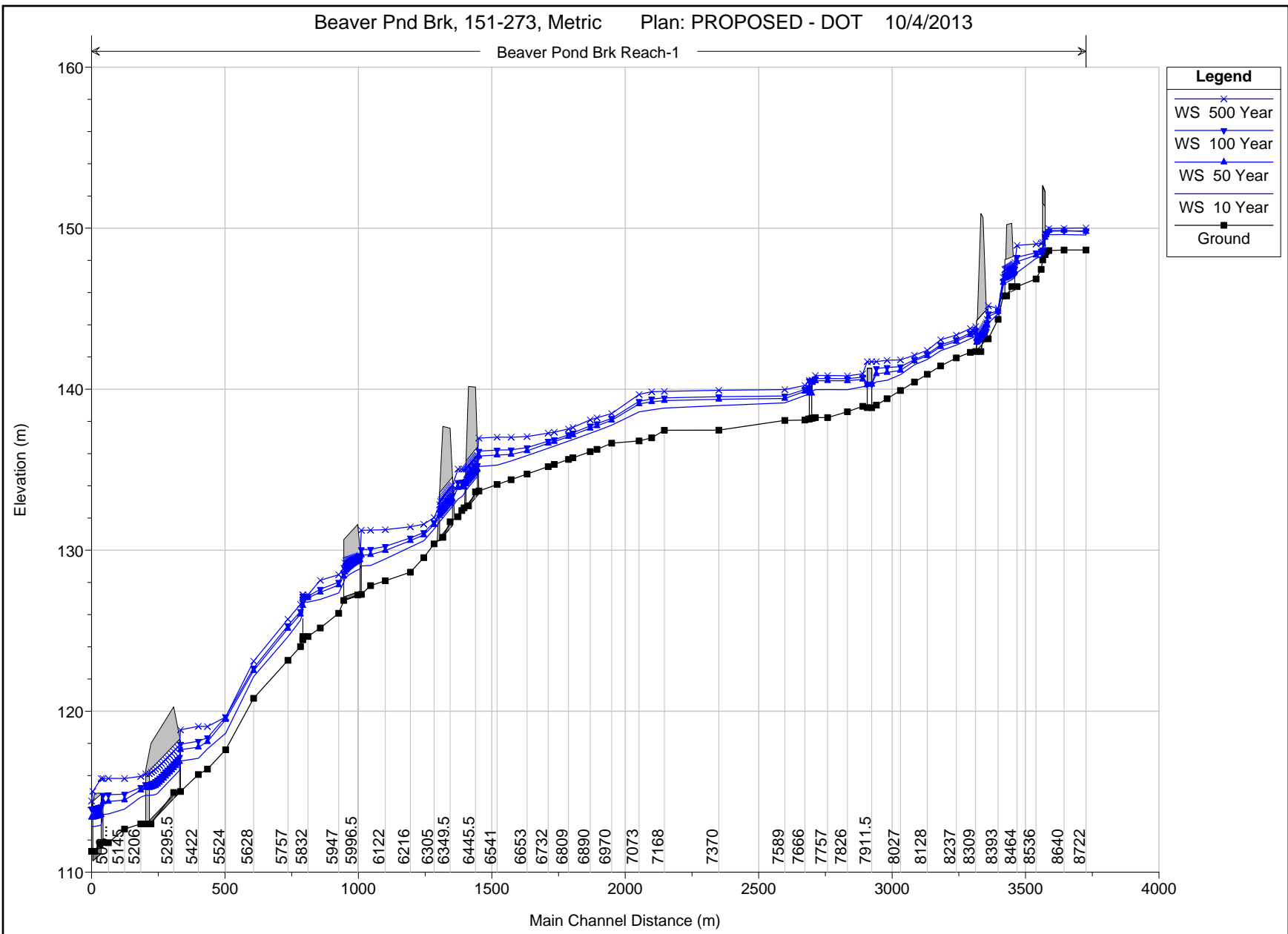
Beaver Pnd Brk, 151-273, Metric Plan: 1) PR_DOT 2) EX_DOT
 Proposed Culvert No. 03727 - Harpers Ferry Road



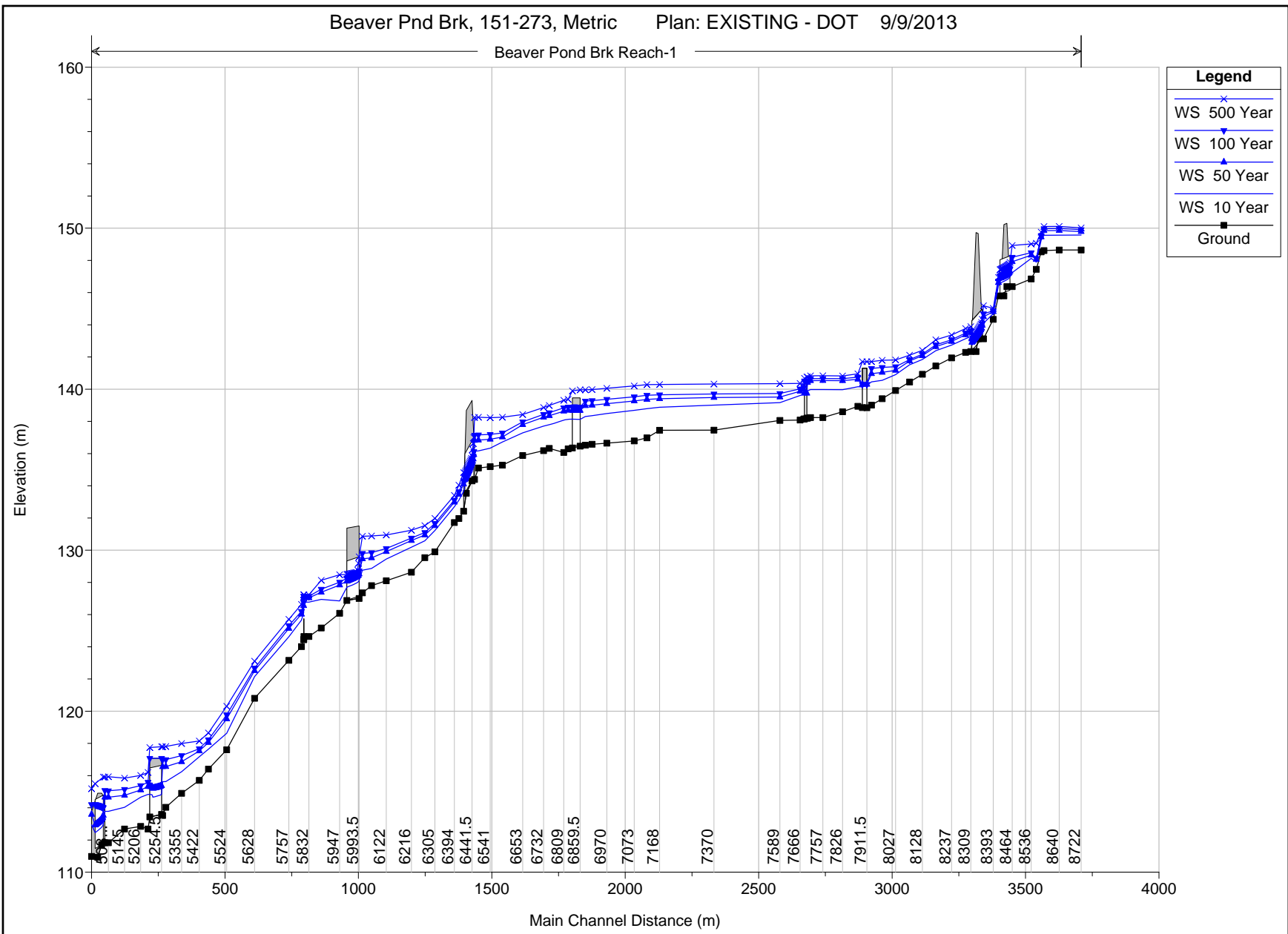
Beaver Pnd Brk, 151-273, Metric Plan: 1) PR_DOT 2) EX_DOT
 Confluence with the Mad River; D/S of Harpers Ferry Road



Beaver Pnd Brk, 151-273, Metric Plan: PROPOSED - DOT 10/4/2013



Beaver Pnd Brk, 151-273, Metric Plan: EXISTING - DOT 9/9/2013



**APPENDIX C. MANNING'S ROUGHNESS COEFFICIENT COMPUTATION
FOR PROPOSED CULVERTS WITH BAFFLES**

- Scott Road Culvert No. 014 1

- Plank Road East Culvert No. 06622 2

- Easterly I-84 Crossing - Culvert No. 02537's West Barrel 3

- Westerly I-84 Crossing - Culvert No. 01227 4

- Harpers Ferry Road Culvert No. 03727 5

PROJECT 151-273 MANNING'S ROUGHNESS COEFFICIENT COMPUTATION

Procedure from "Design Considerations and Calculations for Fishway Through Box Culverts,"
by F.M. Chang and J.M. Norman, September 1976

Culvert with Baffle Culvert No. 014 (Scott Road)

Project No.	151-273	Prepared by	W. SONG	Date	2/1/2006
Route No.	I-84	Checked by		Date	
Town	Waterbury	Stream	Beaver Pond Brook	Unit	Metric

Baffle Info

Ratio - Spacing:Baffle Height = 10:1
 Height: h = 22.0 cm 0.22 m
 Spacing: λ = 2.2 m
 Notch Width: = 15.0 cm 0.15 m
 Length: ℓ = 2 m

Culvert

Height: D = 3 m
 Span: B = 2.5 m
 h/D = 0.07
 λ/D = 0.73

Box Culvert Without Baffle

Friction Factor without baffle

$f_w = [2 \log_{10} (R_H / K_s) + 2.34]^2 = 0.065$
 $R_H = 0.31$ m (hydraulic radius)
 Normal Depth = 0.81 m (from HEC-RAS run w/o baffle)
 Q barrel = 14.94 cu.m/s
 Cross-Sectional Area = 2.0 sq.m (for box)
 Wetted Perimeter = 6.62 m (for box)
 $K_s = 0.049$ cm (for concrete pipe)

Box Culvert With Baffle

Friction Factor for baffle

$f_b = C_D (h/\lambda) (R_H/D) (f_w/2) [6.25 (\ln h/K_s)^2 + 30.0 (\ln h/K_s) + 42.2]$
 = 0.064
 $C_D = 1.90$ (Drag Coefficient)

Combined Friction Factor

$f_T = f_b + f_w = 0.128$

Adjusted Friction Factor for notch in baffle

$f'_T = f_w + (f_T - f_w) \ell/B = 0.124$

Manning's Roughness Coefficient

$n = 0.0926 R_H^{1/6} f_T^{1/2} = \boxed{0.0311}$ (100-YR)

$f_T = 0.124$ (= f'_T)
 $R_H = 0.74$ m (for concrete pipe)
 Normal Depth = 1.82 m (from HEC-RAS run w/ baffle)
 Q barrel = 14.94 cu.m/s
 Cross-Sectional Area = 4.6 sq.m (for box)
 Wetted Perimeter = 6.14 m (for box)
 Flowing Full - No

Design Freq.	WITHOUT BAFFLE								TH BAFFLE										
	Q in Barrel	Normal Depth	X-sec. Area	Wet. Perim.	R _H	K _s	f _w	n	Q in Barrel	Normal Depth	Full Flow	X-sec. Area	Wet. Perim.	R _H	C _D	f _b	f _T	f' _T	n
(Year)	(cu.m/s)	(m)	(sq.m)	(m)	(m)	(cm)			(cu.m/s)	(m)		(sq.m)	(m)	(m)					
10	7.29	0.49	1.2	5.98	0.20	0.049	0.078	0.020	7.29	1.18	No	2.4	4.42	0.54	1.90	0.051	0.129	0.126	0.030
25	9.75	0.6	1.5	6.2	0.24	0.049	0.072	0.020	9.75	1.41	No	3.0	4.88	0.61	1.90	0.056	0.128	0.125	0.030
50	12.25	0.71	1.8	6.42	0.28	0.049	0.068	0.019	12.25	1.63	No	3.5	5.32	0.66	1.90	0.060	0.128	0.124	0.030
100	14.94	0.81	2.0	6.62	0.31	0.049	0.065	0.019	14.94	1.86	No	4.1	5.78	0.71	1.90	0.064	0.128	0.124	0.031
500	22.58	1.1	2.8	7.2	0.38	0.049	0.059	0.019	22.58	2.5	No	5.7	7.06	0.81	1.90	0.072	0.131	0.127	0.032
Ave. =																			0.031

Recommendation: Use **0.031** for all flow conditions

PROJECT 151-273 MANNING'S ROUGHNESS COEFFICIENT COMPUTATION

Procedure from "Design Considerations and Calculations for Fishway Through Box Culverts,"
by F.M. Chang and J.M. Norman, September 1976

Culvert with Baffle Culvert No. 06622 (Plank Road East)

Project No.	151-273	Prepared by	W. SONG	Date	2/1/2006
Route No.	I-84	Checked by		Date	
Town	Waterbury	Stream	Beaver Pond Brook	Unit	Metric

Baffle Info

Ratio - Spacing:Baffle Height = 10:1
 Height: h = 22.0 cm
 Spacing: λ = 2.2 m
 Notch Width: = 15.0 cm
 Length: l = 2 m

Culvert

Height: D = 3 m
 Span: B = 2.5 m
 h/D = 0.07
 λ/D = 0.73

Box Culvert Without Baffle

Friction Factor without baffle

$f_w = [2 \log_{10} (R_H / K_s) + 2.34]^2 = 0.065$
 $R_H = 0.31$ m (hydraulic radius)
 Normal Depth = 0.81 m (from HEC-RAS run w/o baffle)
 Q barrel = 14.94 cu.m/s
 Cross-Sectional Area = 2.0 sq.m (for box)
 Wetted Perimeter = 6.62 m (for box)
 $K_s = 0.049$ cm (for concrete pipe)

Box Culvert With Baffle

Friction Factor for baffle

$f_b = C_D (h/\lambda) (R_H/D) (f_w/2) [6.25 (\ln h/K_s)^2 + 30.0 (\ln h/K_s) + 42.2]$
 = 0.064
 $C_D = 1.90$ (Drag Coefficient)

Combined Friction Factor

$f_T = f_b + f_w = 0.128$

Adjusted Friction Factor for notch in baffle

$f'_T = f_w + (f_T - f_w) l/B = 0.124$

Manning's Roughness Coefficient

$n = 0.0926 R_H^{1/6} f_T^{1/2} = 0.0314$ (100-YR)

$f_T = 0.124$ (= f'_T)

$R_H = 0.79$ m (for concrete pipe)

Normal Depth = 2.14 m (from HEC-RAS run w/ baffle)

Q barrel = 14.94 cu.m/s

Cross-Sectional Area = 5.4 sq.m (for box)

Wetted Perimeter = 6.78 m (for box)

Flowing Full - No

Design Freq.	WITHOUT BAFFLE								TH BAFFLE										
	Q in Barrel	Normal Depth	X-sec. Area	Wet. Perim.	R_H	K_s	f_w	n	Q in Barrel	Normal Depth	Full Flow	X-sec. Area	Wet. Perim.	R_H	C_D	f_b	f_T	f'_T	n
(Year)	(cu.m/s)	(m)	(sq.m)	(m)	(m)	(cm)			(cu.m/s)	(m)		(sq.m)	(m)	(m)					
10	7.29	0.49	1.2	5.98	0.20	0.049	0.078	0.020	7.29	1.18	No	2.4	4.42	0.54	1.90	0.051	0.129	0.126	0.030
25	9.75	0.6	1.5	6.2	0.24	0.049	0.072	0.020	9.75	1.41	No	3.0	4.88	0.61	1.90	0.056	0.128	0.125	0.030
50	12.25	0.71	1.8	6.42	0.28	0.049	0.068	0.019	12.25	1.63	No	3.5	5.32	0.66	1.90	0.060	0.128	0.124	0.030
100	14.94	0.81	2.0	6.62	0.31	0.049	0.065	0.019	14.94	1.86	No	4.1	5.78	0.71	1.90	0.064	0.128	0.124	0.031
500	22.58	1.1	2.8	7.2	0.38	0.049	0.059	0.019	22.58	2.5	No	5.7	7.06	0.81	1.90	0.072	0.131	0.127	0.032
Ave. =																			0.031

Recommendation: Use 0.031 for all flow conditions

PROJECT 151-273 MANNING'S ROUGHNESS COEFFICIENT COMPUTATION

Procedure from "Design Considerations and Calculations for Fishway Through Box Culverts,"
by F.M. Chang and J.M. Norman, September 1976

Culvert with Baffle Culvert No. 02537 (Easterly I-84 Crossing)

Project No.	151-273	Prepared by	W. SONG	Date	2/1/2006
Route No.	I-84	Checked by		Date	
Town	Waterbury	Stream	Beaver Pond Brook	Unit	Metric

Baffle Info

Ratio - Spacing:Baffle Height = 10:1
 Height: h = 22.0 cm 0.22 m
 Spacing: λ = 2.2 m
 Notch Width: = 15.0 cm 0.15 m
 Length: ℓ = 2 m

Culvert

Height: D = 2.44 m
 Span: B = 2.44 m
 h/D = 0.09
 λ/D = 0.90

Box Culvert Without Baffle

Friction Factor without baffle

$f_w = [2 \log_{10} (R_H / K_s) + 2.34]^2 = 0.056$
 $R_H = 0.43$ m (hydraulic radius)
 Normal Depth = 1.33 m (from HEC-RAS run w/o baffle)
 Q barrel = 14.94 cu.m/s
 Cross-Sectional Area = 3.2 sq.m (for box)
 Wetted Perimeter = 7.54 m (for box)
 $K_s = 0.049$ cm (for concrete pipe)

Box Culvert With Baffle

Friction Factor for baffle

$f_b = C_D (h/\lambda) (R_H/D) (f_w/2) [6.25 (\ln h/K_s)^2 + 30.0 (\ln h/K_s) + 42.2]$
 = 0.095
 $C_D = 1.90$ (Drag Coefficient)

Combined Friction Factor

$f_T = f_b + f_w = 0.151$

Adjusted Friction Factor for notch in baffle

$f'_T = f_w + (f_T - f_w) \ell/B = 0.145$

Manning's Roughness Coefficient

$n = 0.0926 R_H^{1/6} f_T^{1/2} = \boxed{0.0338}$ (100-YR)

$f_T = 0.145$ (= f'_T)
 $R_H = 0.78$ m (for concrete pipe)
 Normal Depth = 2.14 m (from HEC-RAS run w/ baffle)
 Q barrel = 14.94 cu.m/s
 Cross-Sectional Area = 5.2 sq.m (for box)
 Wetted Perimeter = 6.72 m (for box)
 Flowing Full - No

Design Freq.	WITHOUT BAFFLE								TH BAFFLE										
	Q in Barrel	Normal Depth	X-sec. Area	Wet. Perim.	R _H	K _s	f _w	n	Q in Barrel	Normal Depth	Full Flow	X-sec. Area	Wet. Perim.	R _H	C _D	f _b	f _T	f' _T	n
(Year)	(cu.m/s)	(m)	(sq.m)	(m)	(m)	(cm)			(cu.m/s)	(m)		(sq.m)	(m)	(m)					
10	7.29	0.78	1.9	6.44	0.30	0.049	0.066	0.019	6.75	1.75	No	3.7	5.5	0.68	1.90	0.077	0.142	0.138	0.032
25	9.75	0.97	2.4	6.82	0.35	0.049	0.061	0.019	9.05	2.15	No	4.7	6.3	0.75	1.90	0.084	0.145	0.140	0.033
50	12.25	1.14	2.8	7.16	0.39	0.049	0.058	0.019	11.16	2.44	Yes	5.4	9.32	0.58	1.90	0.090	0.148	0.142	0.032
100	14.94	1.33	3.2	7.54	0.43	0.049	0.056	0.019	13.56	2.44	Yes	5.4	9.32	0.58	1.90	0.095	0.151	0.145	0.032
500	22.59	1.83	4.5	8.54	0.52	0.049	0.052	0.019	18.20	2.44	Yes	5.4	9.32	0.58	1.90	0.107	0.158	0.152	0.033
Ave. =																			0.032

Recommendation: Use **0.032** for all flow conditions

PROJECT 151-273 MANNING'S ROUGHNESS COEFFICIENT COMPUTATION

Procedure from "Design Considerations and Calculations for Fishway Through Box Culverts,"
by F.M. Chang and J.M. Norman, September 1976

Culvert with Baffle Culvert No. 01227 (Westerly I-84 Crossing)

Project No.	151-273	Prepared by	W. SONG	Date	2/1/2006
Route No.	I-84	Checked by		Date	
Town	Waterbury	Stream	Beaver Pond Brook	Unit	Metric

Baffle Info

Ratio - Spacing:Baffle Height = 10:1
 Height: h = 22.0 cm = 0.22 m
 Spacing: λ = 2.2 m
 Notch Width: = 15.0 cm = 0.15 m
 Length: l = 3 m

Culvert

Height: D = 3.3 m
 Span: B = 3.5 m
 h/D = 0.07
 λ/D = 0.67

Box Culvert Without Baffle

Friction Factor without baffle

$f_w = [2 \log_{10} (R_H / K_s) + 2.34]^2 = 0.059$
 $R_H = 0.39$ m (hydraulic radius)
 Normal Depth = 0.99 m (from HEC-RAS run w/o baffle)
 Q barrel = 27.75 cu.m/s
 Cross-Sectional Area = 3.5 sq.m (for box)
 Wetted Perimeter = 8.98 m (for box)
 $K_s = 0.049$ cm (for concrete pipe)

Box Culvert With Baffle

Friction Factor for baffle

$f_b = C_D (h/\lambda) (R_H/D) (f_w/2) [6.25 (\ln h/K_s)^2 + 30.0 (\ln h/K_s) + 42.2]$
 = 0.066
 $C_D = 1.90$ (Drag Coefficient)

Combined Friction Factor

$f_T = f_b + f_w = 0.124$

Adjusted Friction Factor for notch in baffle

$f^*_T = f_w + (f_T - f_w) l/B = 0.122$

Manning's Roughness Coefficient

$n = 0.0926 R_H^{1/6} f_T^{1/2} = 0.0321$ (100-YR)

$f_T = 0.122$ (= f^*_T)

$R_H = 0.96$ m (for concrete pipe)

Normal Depth = 2.14 m (from HEC-RAS run w/ baffle)

Q barrel = 27.75 cu.m/s

Cross-Sectional Area = 7.5 sq.m (for box)

Wetted Perimeter = 7.78 m (for box)

Flowing Full - No

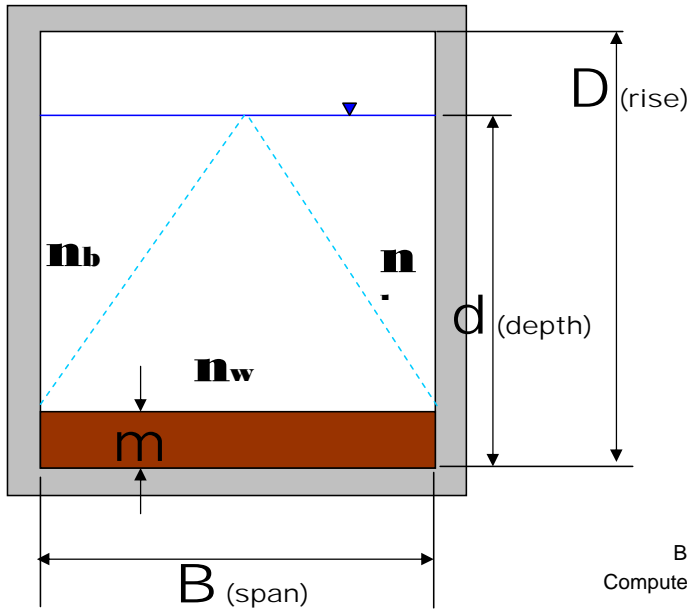
Design Freq.	WITHOUT BAFFLE								WITH BAFFLE										
	Q in Barrel	Normal Depth	X-sec. Area	Wet. Perim.	R_H	K_s	f_w	n	Q in Barrel	Normal Depth	Full Flow	X-sec. Area	Wet. Perim.	R_H	C_D	f_b	f_T	f^*_T	n
(Year)	(cu.m/s)	(m)	(sq.m)	(m)	(m)	(cm)			(cu.m/s)	(m)		(sq.m)	(m)	(m)					
10	13.52	0.6	2.1	8.2	0.26	0.049	0.070	0.020	13.52	1.38	No	4.1	5.82	0.70	1.90	0.052	0.123	0.120	0.030
25	18.1	0.73	2.6	8.46	0.30	0.049	0.065	0.019	18.10	1.65	No	5.0	6.36	0.79	1.90	0.057	0.122	0.120	0.031
50	22.8	0.86	3.0	8.72	0.35	0.049	0.061	0.019	22.80	1.92	No	6.0	6.9	0.86	1.90	0.062	0.123	0.121	0.031
100	27.75	0.99	3.5	8.98	0.39	0.049	0.059	0.019	27.75	2.19	No	6.9	7.44	0.93	1.90	0.066	0.124	0.122	0.032
500	42.12	1.33	4.7	9.66	0.48	0.049	0.053	0.019	42.12	3.3	Yes	10.8	13.16	0.82	1.90	0.075	0.129	0.125	0.032
Ave. =																			0.031

PROJECT 151-273 MANNING'S ROUGHNESS COEFFICIENT COMPUTATION

Culvert Filled with Natural Streambed Material

Culvert No. 03727 (Harpers Ferry Road)

Project No.	151-273	Prepared by	W. SONG	Date	2/1/2006
Route No.	I-84	Checked by		Date	
Town	Waterbury	Stream	Beaver Pond Brook	Unit	Metric



$$n = \frac{n_w}{\sqrt{1 + \frac{P_w}{P_b}}} \left[\left(\frac{P_w}{P_b} \right)^{3/4} + \left(\frac{n_b}{n_w} \right)^{3/2} \right]^{2/3}$$

where: n = composite roughness coefficient
 n_b = roughness coefficient of culvert bed
 n_w = roughness coefficient of culvert walls
 P_b = culvert bottom contribution to the wetted perimeter
 P_w = addition to the wetted perimeter from the walls and ceiling
 P = P_b + P_w = total wetted perimeter of the culvert opening.

$$P_b = B$$

$$P_w = 2d, \text{ if flowing partial}$$

$$= 2d + B, \text{ if flowing full}$$

Height: D	=	3.7 m	n _b =	0.035 (gravel)
Span: B	=	3.5 m	n _w =	0.012 (concrete)
Bedding Depth: m	=	0.6 m	P _b =	3.5
Computed Flow Depth: d	=	2.7 m	P _w =	4.2
Flowing Full -		<input type="checkbox"/> No	(100-YR) n =	0.0271

Design Freq. (Year)	Q in Barrel (cu.m/s)	Normal Depth (m)	Flowing Full	P _w	n
10	13.52	1.78	No	2.36	0.0308
25	18.1	2.06	No	2.92	0.0297
50	22.8	2.33	No	3.46	0.0289
100	27.75	2.61	No	4.02	0.0281
500	41.63	3.35	No	5.5	0.0263
				Ave. =	0.029

Recommendation: Use **0.029** for all flow conditions

APPENDIX D. Return Frequency Determination For Overtopping Condition

- MULLOY ROAD CROSSING
 - Proposed Condition 1
 - Existing Condition 3

- WESTERLY I-84 CROSSING
 - Structure No. 01227..... 5

- HARPERS FERRY ROAD CROSSING
 - Structure No. 03727 (Existing Condition) 7

NOTE: The correlational equations used in estimating the overtopping frquencies are different than the BLA developed equations used to estimate the 2- and 25-year discharges in Appendix A. It was found the BLA equations tend to estimate lower discharges compared to the "known" discharges when applied to the high frequency estimation. Accordingly, new correlational equations were developed which are suited for estimating the high frequency discharges.

Proposed Mulloy Road Structure Overtopping Flow

KNOWN DATA

Return Period (Years)	Probability of Exceedance	Discharge	
		(cfs)	(cms)
2			
10	0.1	430	12.18
25	0.04		
50	0.02	715	20.25
100	0.01	870	24.64
500	0.002	1315	37.24

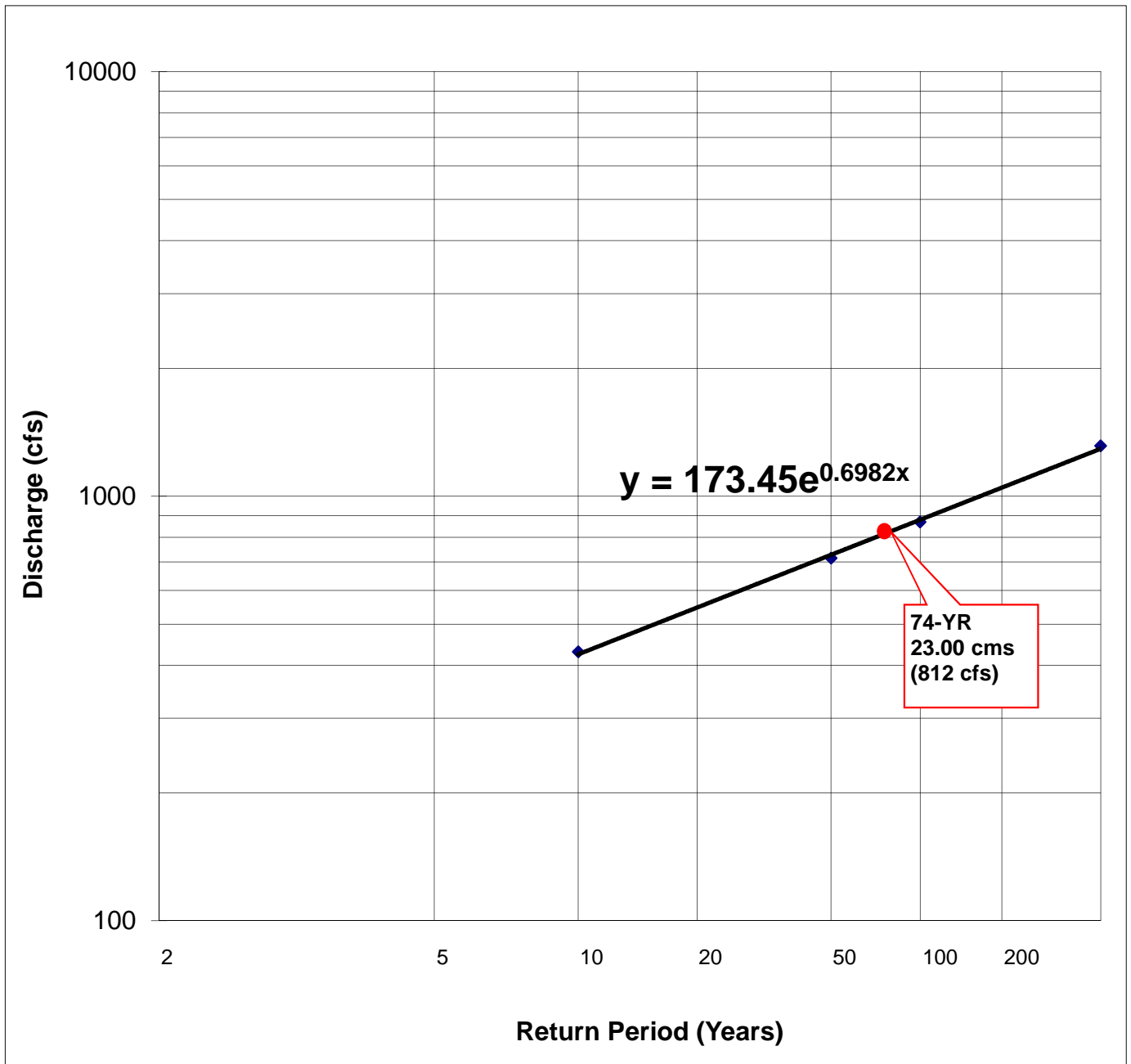
$$y = C \times \text{EXP}(p \times F) = 173.45e^{0.6982x}$$

$$= 812 \text{ cfs}$$

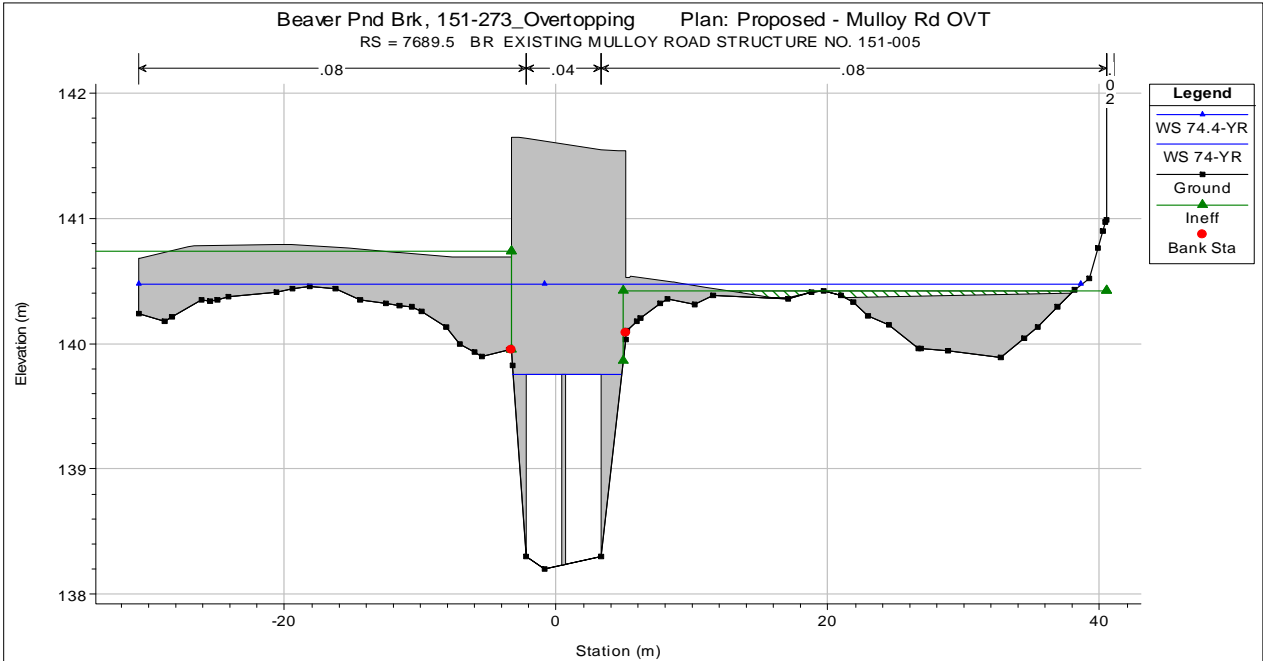
$$= 23.00 \text{ cms}$$

C = 173.45
 p = 0.6982
 y = discharge
 F = x-axis value of return frequency
 = 2.2111

F of 2.2111 equals to Return Frequency of 74-YR



Proposed Mulloy Road Structure Overtopping Flow HEC-RAS Output



Bridge Output

River: Beaver Pond Brk Profile: 74-YR
Reach: Reach-1 RS: 7689.5 Plan: PR_MulleyRd_OVT

Plan: PR_MulleyRd_OVT Beaver Pond Brk Reach-1 RS: 7689.5 Profile: 74-YR				
Element	Inside BR US	Inside BR DS		
E.G. US. (m)	140.72	140.23		
W.S. US. (m)	140.66	139.75		
Q Total (m3/s)	23.00	139.51		
Q Bridge (m3/s)	23.00	139.46		
Q Weir (m3/s)		1.60		
Weir Sta Lft (m)		2.87		
Weir Sta Rgt (m)		8.02		
Weir Submerg		0.72		
Weir Max Depth (m)		12.94		
Min El Weir Flow (m)	140.73			
Min El Prs (m)	139.75	16.49		
Delta EG (m)	0.49	124.0		
Delta WS (m)	0.60			
BR Open Area (m2)	7.76			
BR Open Vel (m/s)	2.96			
Coef of Q		176.33		
Br Sel Method	Press Only	-1472.25		

Errors, Warnings and Notes

- Note: Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow. The Yarnell answer has been disregarded.
- Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
- Note: The downstream water surface is above the minimum elevation required for orifice flow. The orifice flow equation was used for pressure flow.

help

Profile: 74.4-YR
RS: 7689.5 Plan: PR_MulleyRd_OVT

PR_MulleyRd_OVT Beaver Pond Brk Reach-1 RS: 7689.5 Profile: 74.4-YR				
Element	Inside BR US	Inside BR DS		
140.57	E.G. Elev (m)	140.57		
140.47	E.G. Elev (m)	140.54		
23.03	W.S. Elev (m)	140.47		
20.24	Crit W.S. (m)	139.52		
2.79	Max Chl Dpth (m)	2.27		
5.16	Vel Total (m/s)	0.00		
39.41	Flow Area (m2)	0.00		
0.00	Froude # Chl	0.61		
0.15	Specif Force (m3)	18.16		
140.73	Hydr Depth (m)	17.67		
139.75	W.P. Total (m)	45.34		
0.34	Conv. Total (m3/s)	44.47		
0.42	Top Width (m)			
7.76	Frctn Loss (m)	29.04		
2.61	C & E Loss (m)	37.97		
	Shear Total (N/m2)			
	Power Total (N/m s)	-1472.25		

Errors, Warnings and Notes

- Note: Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow. The Yarnell answer has been disregarded.
- Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
- Note: The downstream water surface is above the minimum elevation required for orifice flow. The orifice flow equation was used for pressure flow.

Weir flow begins to

Existing Mulloy Road Structure Overtopping Flow

KNOWN DATA

Return Period (Years)	Probability of Exceedance	Discharge	
		(cfs)	(cms)
2			
10	0.1	430	12.18
25	0.04		
50	0.02	715	20.25
100	0.01	870	24.64
500	0.002	1315	37.24

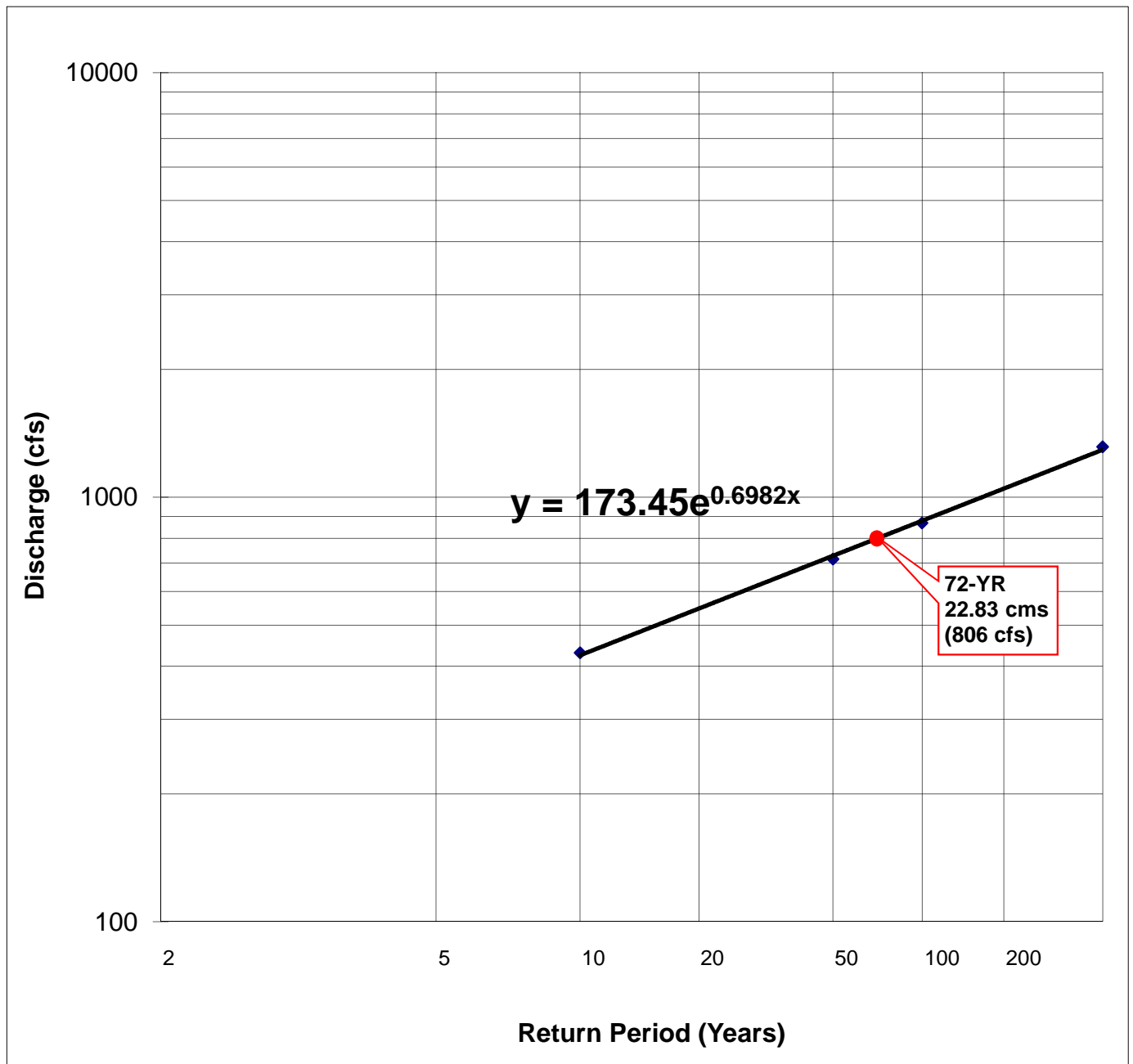
$$y = C \times \text{EXP}(p \times F) = 173.45e^{0.6982x}$$

$$= 806 \text{ cfs}$$

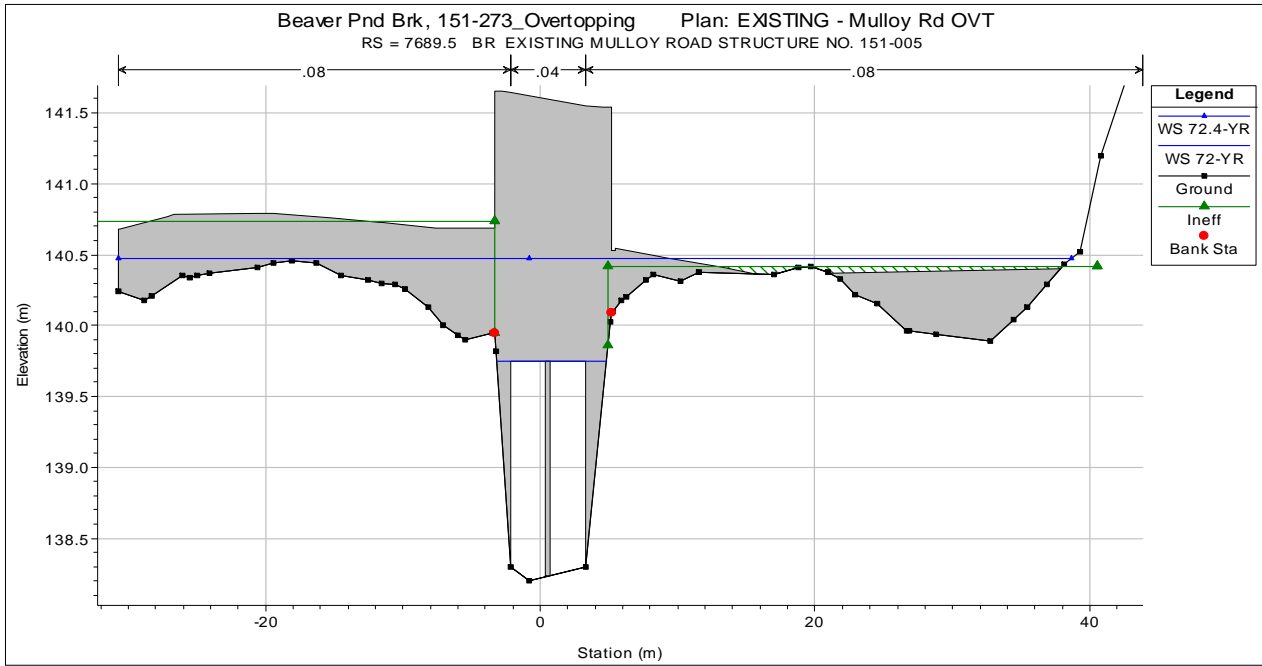
$$= 22.83 \text{ cms}$$

C = 173.45
 p = 0.6982
 y = discharge
 F = x-axis value of return frequency
 = 2.2004

F of 2.2004 equals to Return Frequency of 72-YR



Existing Mulloy Road Structure Overtopping Flow HEC-RAS Output



Bridge Output

River: Beaver Pond Brk Profile: 72-YR
Reach: Reach-1 RS: 7689.5 Plan: EX_MulloyRd_OVT

Plan: EX_MulloyRd_OVT Beaver Pond Brk Reach-1 RS: 7689.5 Profile: 72-YR		Element	Inside BR US	Inside BR DS
E.G. US. (m)	140.72	E.G. Elev (m)	140.72	140.24
W.S. US. (m)	140.66	W.S. Elev (m)	139.75	139.75
Q Total (m3/s)	22.83	Crit W.S. (m)	139.50	139.46
Q Bridge (m3/s)	22.83	Max Chl Dpth (m)	1.55	1.60
Q Weir (m3/s)		Vel Total (m/s)	2.94	2.85
Weir Sta Lft (m)		Flow Area (m2)	7.76	8.02
Weir Sta Rgt (m)		Froude # Chl	0.75	0.72
Weir Submerg		Specif Force (m3)	12.67	12.84
Weir Max Depth (m)		Hydr Depth (m)		
Min EI Weir Flow (m)	140.73	W.P. Total (m)	16.29	16.49
Min EI Prs (m)	139.75	Conv. Total (m3/s)	118.4	124.0
Delta EG (m)	0.49	Top Width (m)		
Delta WS (m)	0.53	Frctn Loss (m)		
BR Open Area (m2)	7.76	C & E Loss (m)		
BR Open Vel (m/s)	2.94	Shear Total (N/m2)	173.73	161.60
Coef of Q		Power Total (N/m.s)	-1472.25	-1482.30
Br Sel Method	Press Only			

Errors, Warnings and Notes

- Note: Yamell answer is not valid if the water surface is above the low chord or if there is weir flow. The Yamell answer has been disregarded.
- Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
- Note: The downstream water surface is above the minimum elevation required for orifice flow. The orifice flow equation was used for pressure flow.

Profile: 72.4-YR
RS: 7689.5 Plan: EX_MulloyRd_OVT

MulloyRd_OVT Beaver Pond Brk Reach-1 RS: 7689.5 Profile: 72.4-YR		Element	Inside BR US	Inside BR DS
140.58		E.G. Elev (m)	140.58	140.55
140.48		W.S. Elev (m)	140.48	140.48
22.86		Crit W.S. (m)	139.51	139.46
20.00		Max Chl Dpth (m)	2.28	2.33
		Vel Total (m/s)	0.00	0.00
		Flow Area (m2)		
		Froude # Chl	0.60	0.50
		Specif Force (m3)	18.07	17.56
		Hydr Depth (m)		
		W.P. Total (m)	45.69	44.49
		Conv. Total (m3/s)		
		Top Width (m)	29.39	38.28
		Frctn Loss (m)		
		C & E Loss (m)		
		Shear Total (N/m2)		
		Power Total (N/m.s)	-1472.25	-1482.30

Errors, Warnings and Notes

- Note: Yamell answer is not valid if the water surface is above the low chord or if there is weir flow. The Yamell answer has been disregarded.
- Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
- Note: The downstream water surface is above the minimum elevation required for orifice flow. The orifice flow equation was used for pressure flow.

Enter to move to next downstream river station location

Weir flow begins to

Existing Structure No. 01227 (Westerly I-84) Overtopping Flow

KNOWN DATA

Return Period (Years)	Probability of Exceedance	Discharge	
		(cfs)	(cms)
2			
10	0.1	955	27.04
25	0.04		
50	0.02	1610	45.59
100	0.01	1960	55.50
500	0.002	2975	84.24

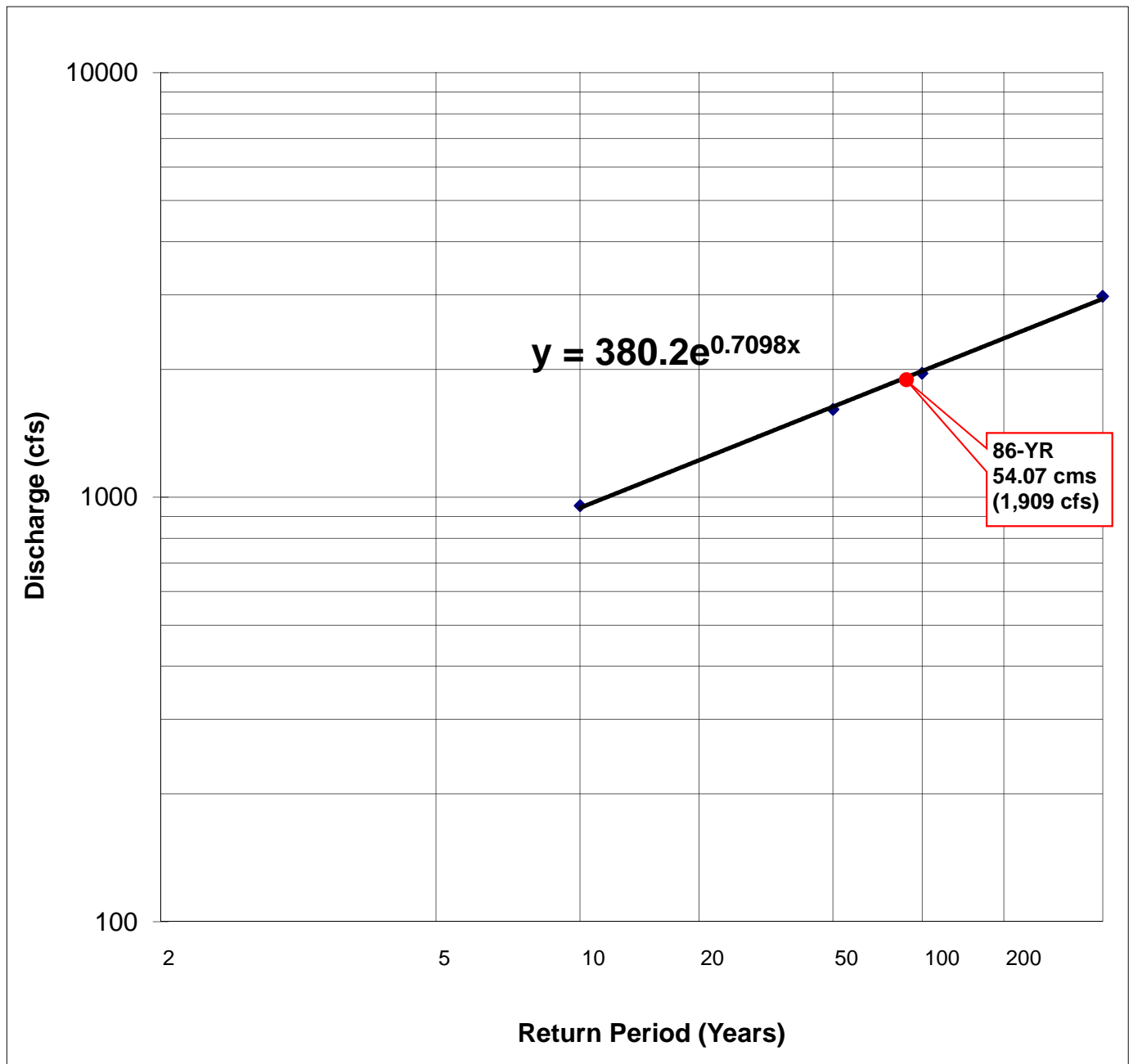
$$y = C \times \text{EXP}(p \times F) = 380.2e^{0.7098x}$$

$$= 1897 \text{ cfs}$$

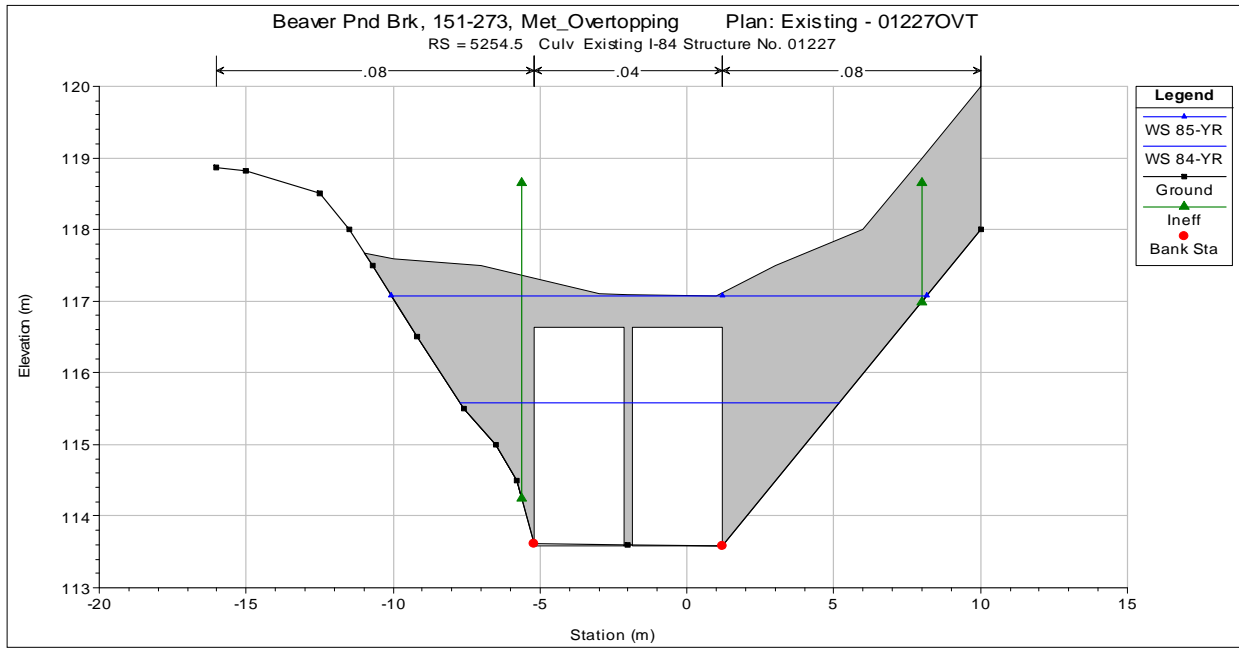
$$= 53.73 \text{ cms}$$

C = 380.2
 p = 0.7098
 y = discharge
 F = x-axis value of return frequency
 = 2.2647

F of 2.2647 equals to Return Frequency of 85-YR



Existing Structure No. 01227 (Westerly I-84) Overtopping Flow HEC-RAS Output



Culvert Output			
File	Type	Options	Help
River:	Beaver Pond Brk	Profile:	85-YR
Reach:	Reach-1	RS:	5254.5
Culv Group:	01227	Plan:	EX_01227_OVT
Plan: EX_01227_OVT Beaver Pond Brk Reach-1 RS: 5254.5 Culv Group: 01227 Profile: 85-YR			
Q Culv Group (m3/s)	53.73	Culv Full Len (m)	
# Barrels	2	Culv Vel US (m/s)	4.42
Q Barrel (m3/s)	26.86	Culv Vel DS (m/s)	4.16
E.G. US. (m)	117.08	Culv Inv El Up (m)	113.59
W.S. US. (m)	116.91	Culv Inv El Dn (m)	113.43
E.G. DS. (m)	115.68	Culv Frctn Ls (m)	0.15
W.S. DS. (m)	115.55	Culv Exit Loss (m)	0.75
Delta EG (m)	1.39	Culv Entr Loss (m)	0.50
Delta WS (m)	1.36	Q Weir (m3/s)	0.00
E.G. IC (m)	117.04	Weir Sta Lft (m)	0.39
E.G. OC (m)	117.08	Weir Sta Rgt (m)	1.02
Culvert Control	Outlet	Weir Submerg	0.00
Culv WS Inlet (m)	115.58	Weir Max Depth (m)	0.00
Culv WS Outlet (m)	115.55	Weir Avg Depth (m)	0.00
Culv Nml Depth (m)	1.96	Weir Flow Area (m2)	0.00
Culv Crt Depth (m)	1.99	Min El Weir Flow (m)	117.07

Weir flow begins to

Errors, Warnings and Notes	
Warning:	During the culvert inlet control computations, the program could not balance the culvert/weir flow. The reported inlet energy grade answer may not be valid.
Note:	During supercritical analysis, the culvert direct step method went to normal depth. The program then assumed normal depth at the outlet.
Note:	During the supercritical calculations a hydraulic jump occurred inside of the culvert.

Culvert Output			
File	Type	Options	Help
River:	Beaver Pond Brk	Profile:	84-YR
Reach:	Reach-1	RS:	5254.5
Culv Group:	01227	Plan:	EX_01227_OVT
Beaver Pond Brk Reach-1 RS: 5254.5 Culv Group: 01227 Profile: 84-YR			
Q Culv Group (m3/s)	53.55	Culv Full Len (m)	
# Barrels	2	Culv Vel US (m/s)	4.42
Q Barrel (m3/s)	26.77	Culv Vel DS (m/s)	4.15
E.G. US. (m)	117.07	Culv Inv El Up (m)	113.59
W.S. US. (m)	116.90	Culv Inv El Dn (m)	113.43
E.G. DS. (m)	115.68	Culv Frctn Ls (m)	0.15
W.S. DS. (m)	115.54	Culv Exit Loss (m)	0.75
Delta EG (m)	1.39	Culv Entr Loss (m)	0.50
Delta WS (m)	1.36	Q Weir (m3/s)	
E.G. IC (m)	117.04	Weir Sta Lft (m)	
E.G. OC (m)	117.07	Weir Sta Rgt (m)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (m)	115.58	Weir Max Depth (m)	
Culv WS Outlet (m)	115.54	Weir Avg Depth (m)	
Culv Nml Depth (m)	1.96	Weir Flow Area (m2)	
Culv Crt Depth (m)	1.99	Min El Weir Flow (m)	117.07

Existing Structure No. 03727 (Harpers Ferry Road) Overtopping Flow

KNOWN DATA

Return Period (Years)	Probability of Exceedance	Discharge	
		(cfs)	(cms)
0			
10	0.1	955	27.04
25	0.04		
50	0.02	1610	45.59
100	0.01	1960	55.50
500	0.002	2975	84.24

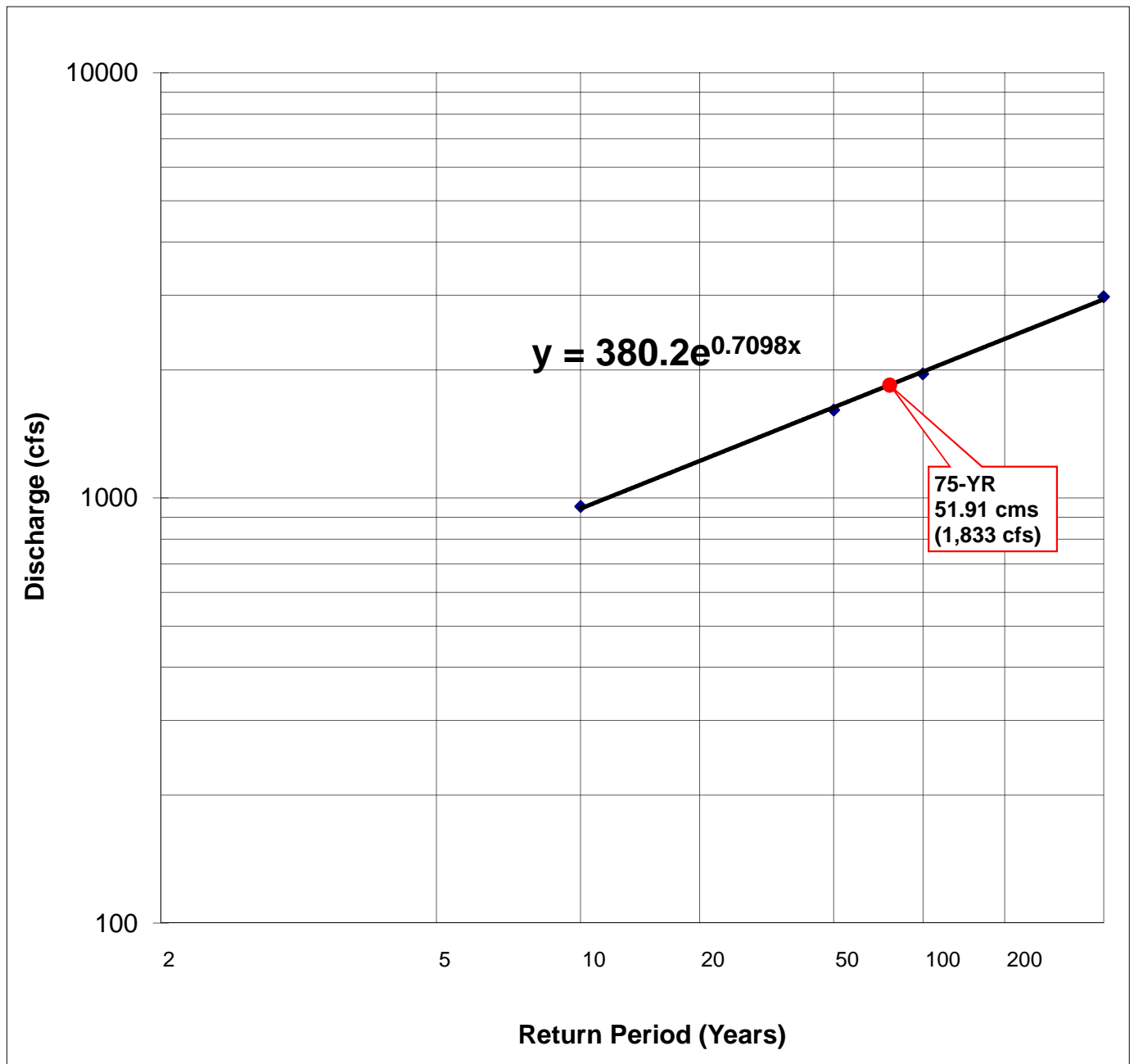
$$y = C \times \text{EXP}(p \times F) = 380.2e^{0.7098x}$$

$$= 1833 \text{ cfs}$$

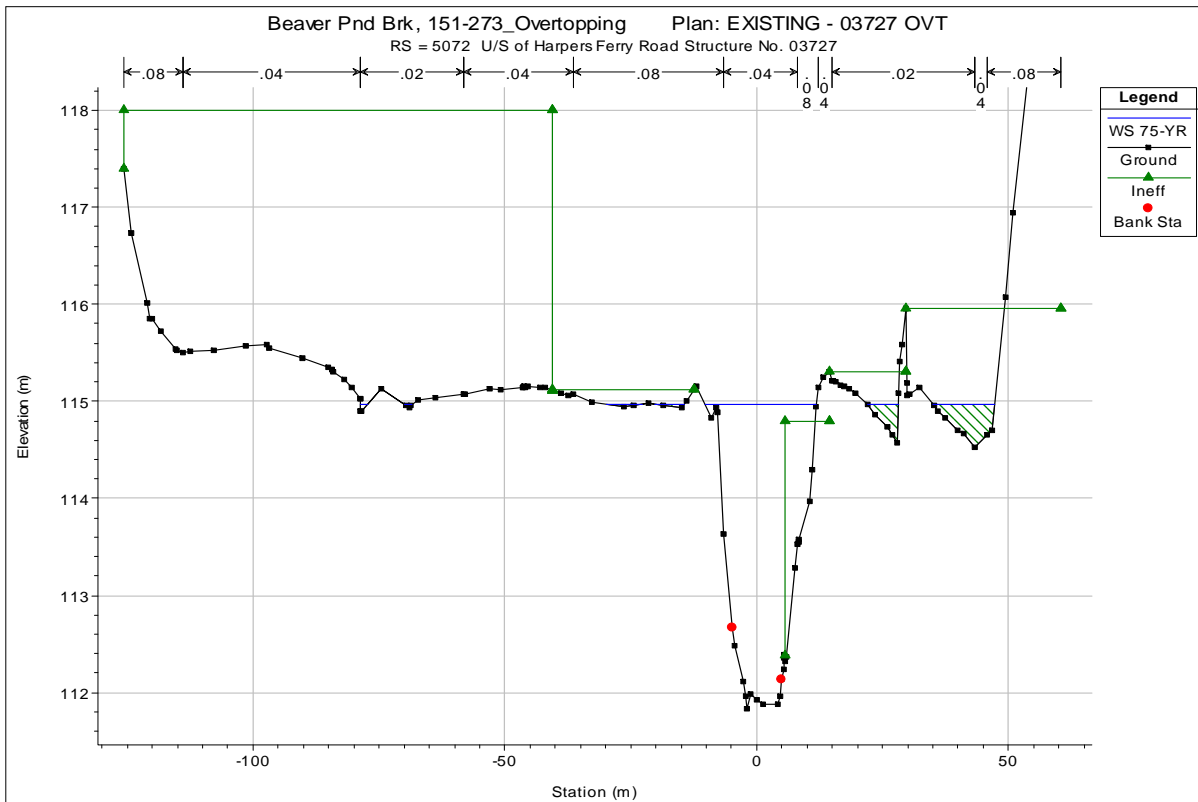
$$= 51.91 \text{ cms}$$

C = 380.2
 p = 0.7098
 y = discharge
 F = x-axis value of return frequency
 = 2.2164

F of 2.2164 equals to Return Frequency of 75-YR



Existing Structure No. 03727 (Harpers Ferry Road) Overtopping Flow HEC-RAS Output



Cross Section Output

File Type Options Help

River: Beaver Pond Brk Profile: 75-YR

Reach: Reach-1 RS: 5072 Plan: EX03727ovt

Plan: EX03727ovt Beaver Pond Brk Reach-1 RS: 5072 Profile: 75-YR

Element	Left OB	Channel	Right OB
E.G. Elev (m)	115.05		
Vel Head (m)	0.08		
W.S. Elev (m)	114.97		
Crit W.S. (m)	113.40		
E.G. Slope (m/m)	0.000742		
Q Total (m3/s)	51.91		
Top Width (m)	56.56		
Vel Total (m/s)	1.18		
Max Chl Dpth (m)	3.14		
Conv. Total (m3/s)	1906.1		
Length Wtd. (m)	50.00		
Min Ch El (m)	111.83		
Alpha	1.16		
Frctn Loss (m)			
C & E Loss (m)			
Wetted Per. (m)	6.18	10.00	7.80
Shear (N/m2)	4.72	21.04	10.26
Stream Power (N/m s)	2893.26	0.00	0.00
Cum Volume (1000 m3)		0.53	
Cum SA (1000 m2)	0.68	0.80	0.76

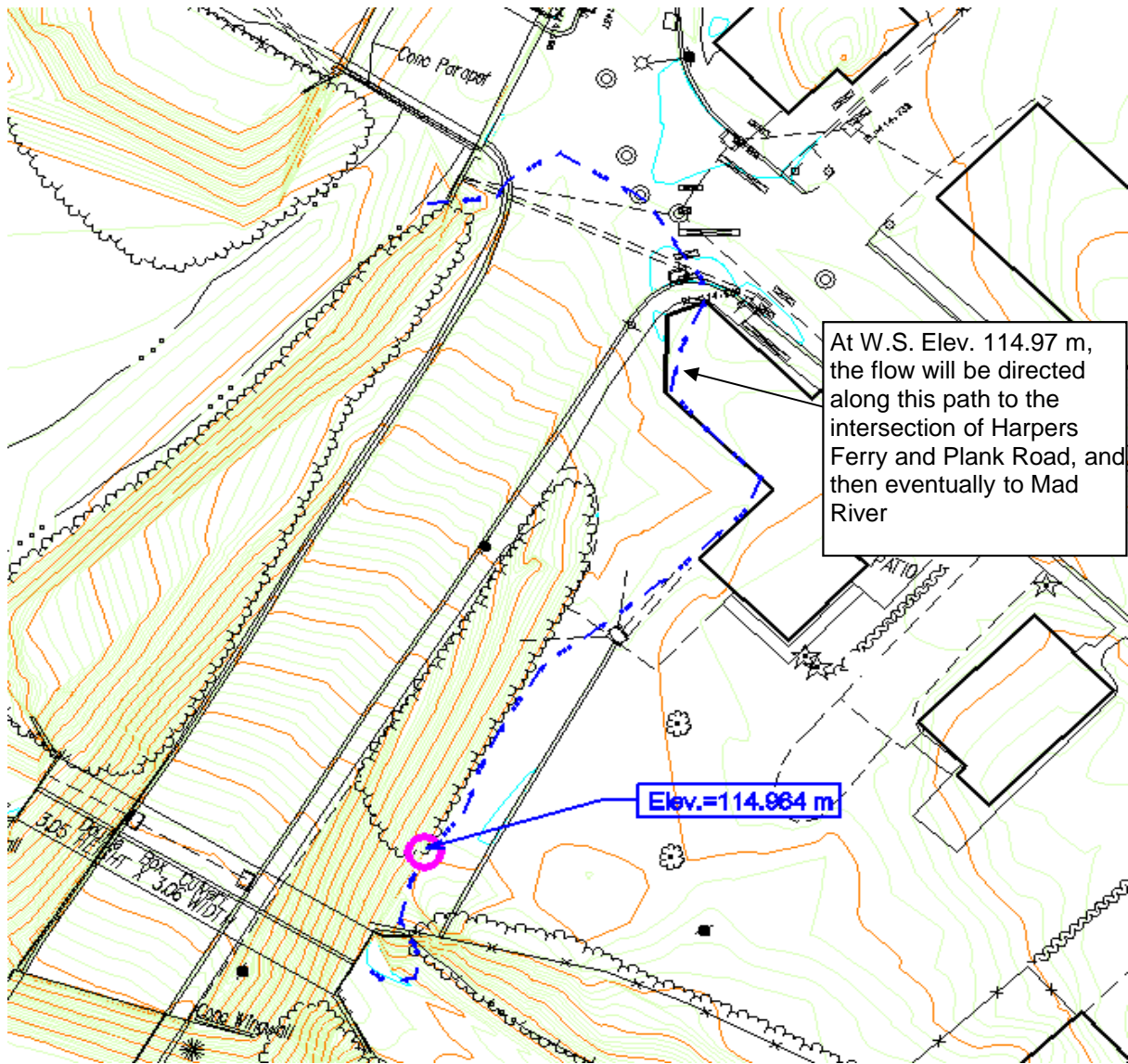
Errors, Warnings and Notes

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

Select Profile

Flow begins to enter Left

Existing Structure No. 03727 (Harpers Ferry Road) Overtopping Flow
Overtopping elevation

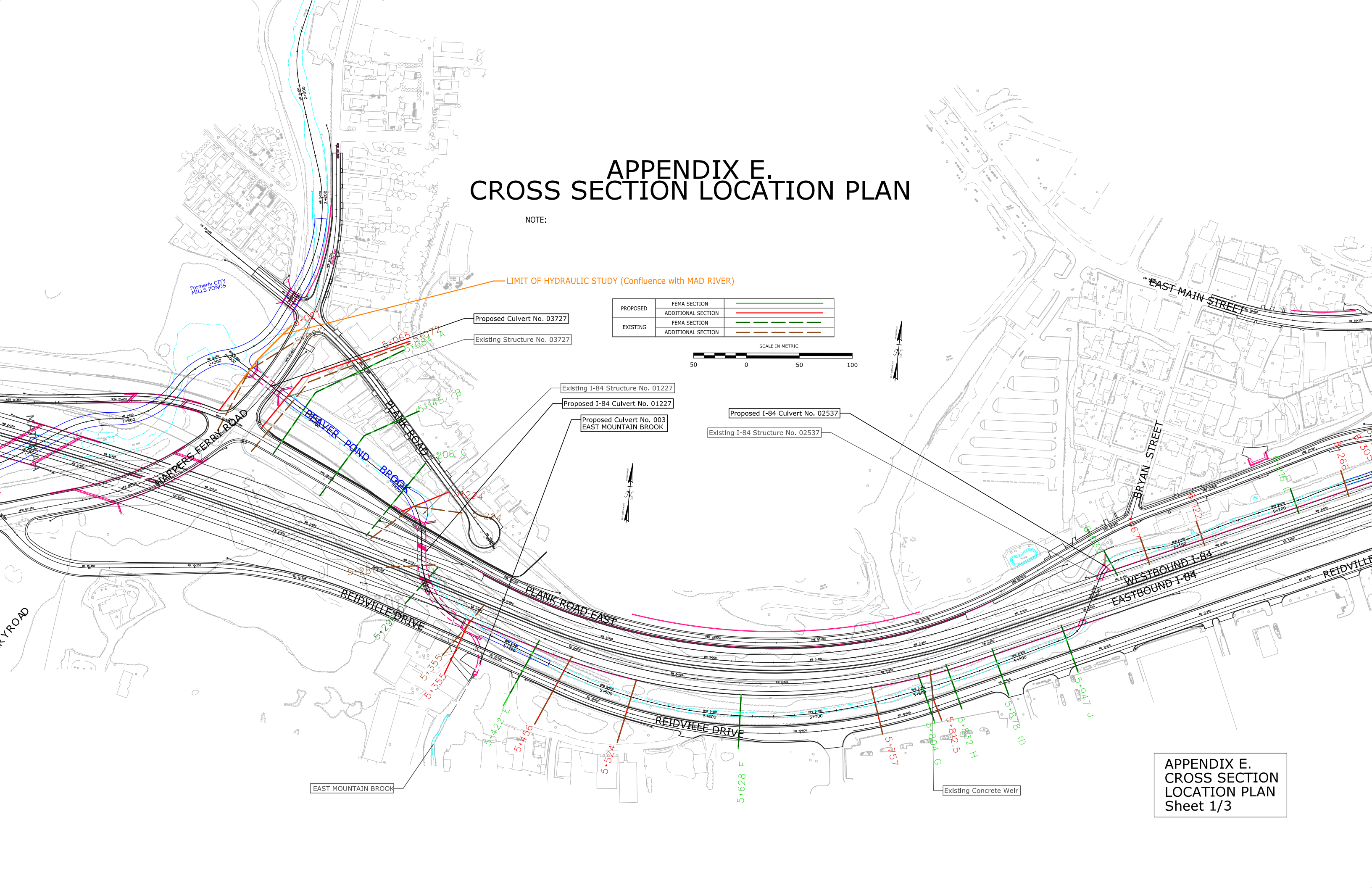
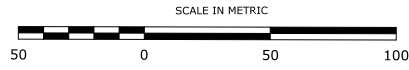


APPENDIX E. CROSS SECTION LOCATION PLAN

NOTE:

LIMIT OF HYDRAULIC STUDY (Confluence with MAD RIVER)

PROPOSED	FEMA SECTION	
	ADDITIONAL SECTION	
EXISTING	FEMA SECTION	
	ADDITIONAL SECTION	



Proposed Culvert No. 03727

Existing Structure No. 03727

Existing I-84 Structure No. 01227

Proposed I-84 Culvert No. 01227

Proposed Culvert No. 003
EAST MOUNTAIN BROOK

Proposed I-84 Culvert No. 02537

Existing I-84 Structure No. 02537

EAST MOUNTAIN BROOK

Existing Concrete Weir

APPENDIX E. CROSS SECTION LOCATION PLAN

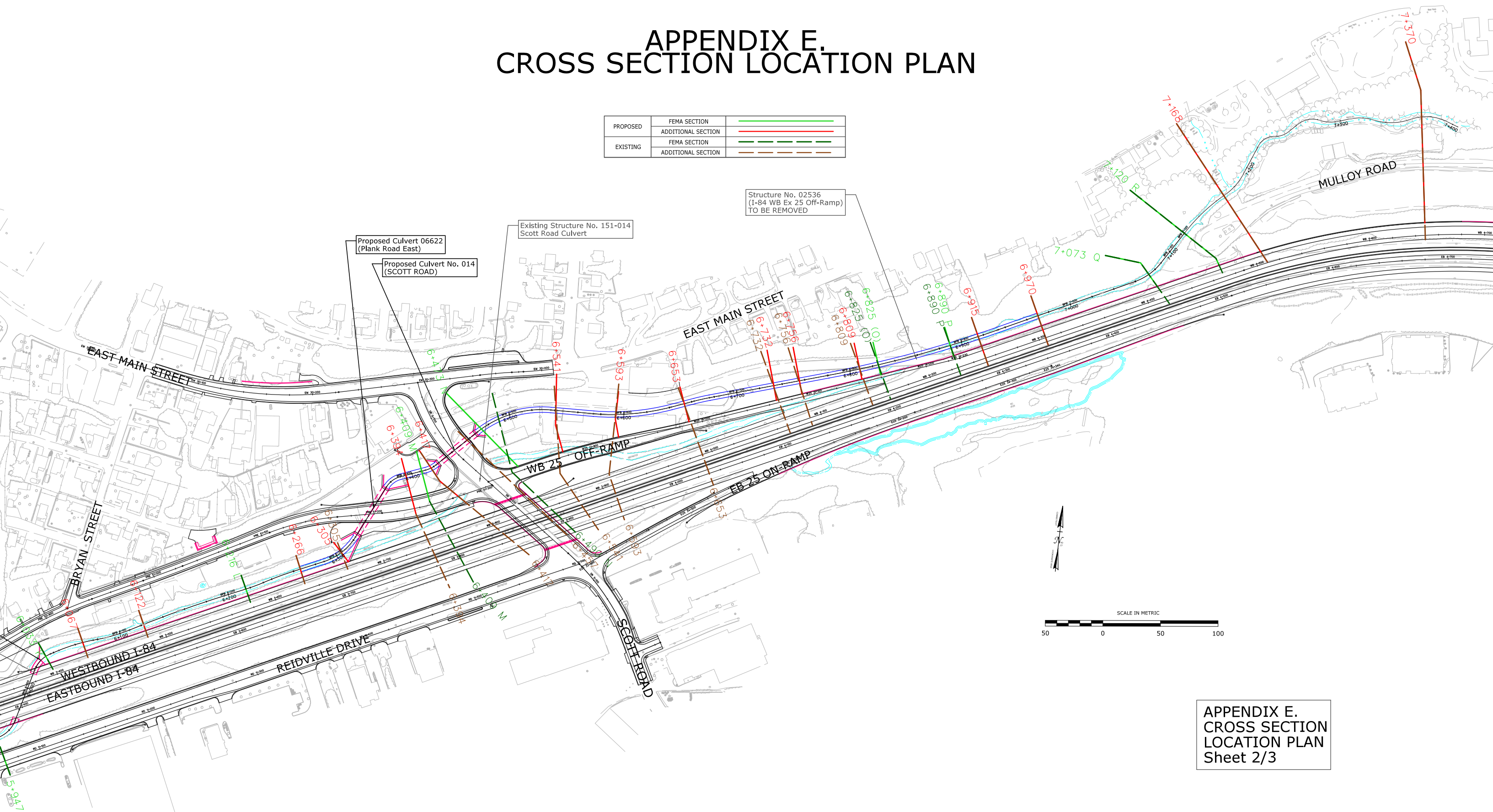
PROPOSED	FEMA SECTION	
	ADDITIONAL SECTION	
EXISTING	FEMA SECTION	
	ADDITIONAL SECTION	

Structure No. 02536
(I-84 WB Ex 25 Off-Ramp)
TO BE REMOVED

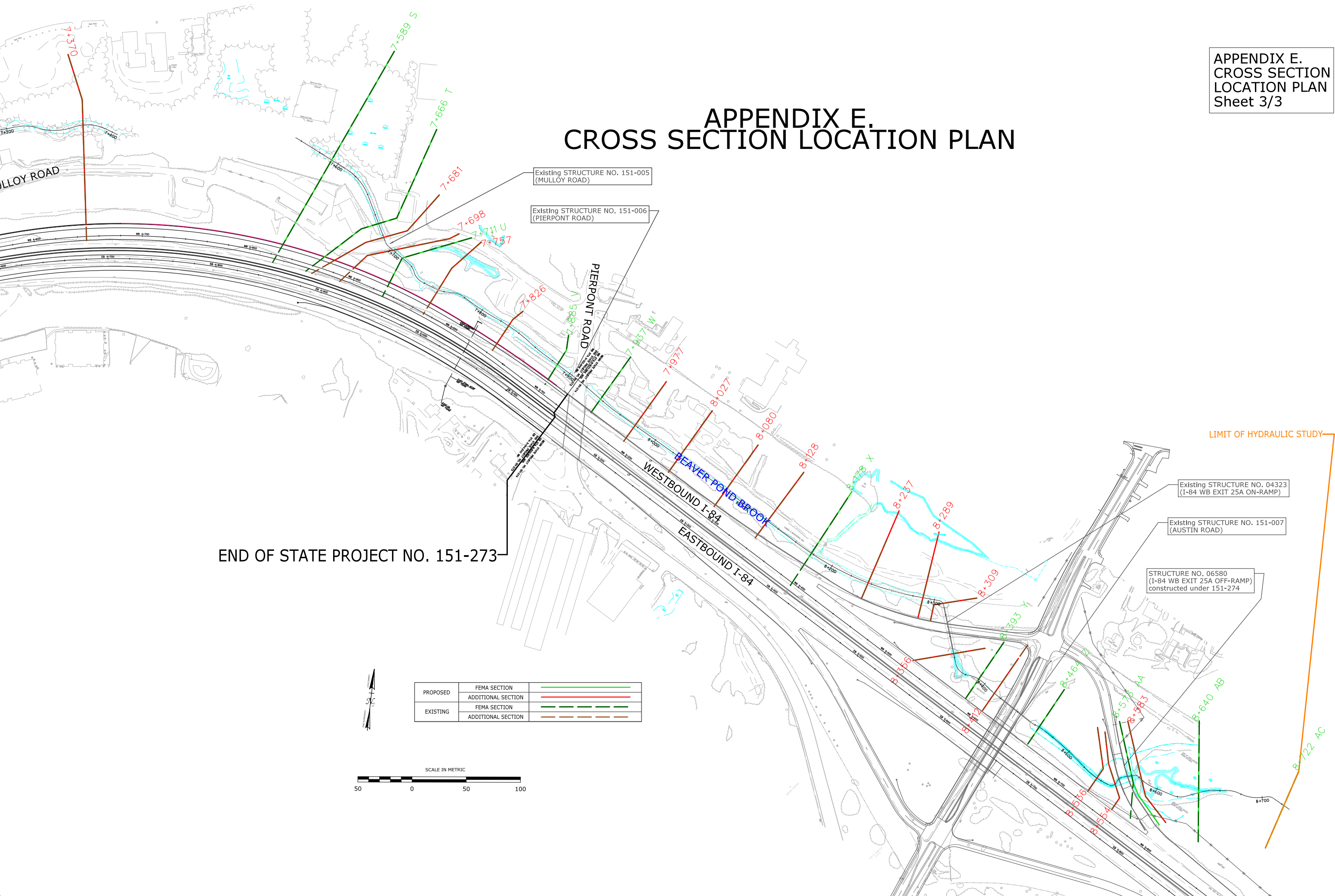
Proposed Culvert 06622
(Plank Road East)

Proposed Culvert No. 014
(SCOTT ROAD)

Existing Structure No. 151-014
Scott Road Culvert

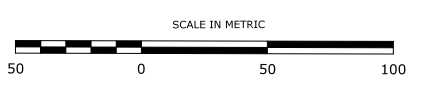


APPENDIX E. CROSS SECTION LOCATION PLAN



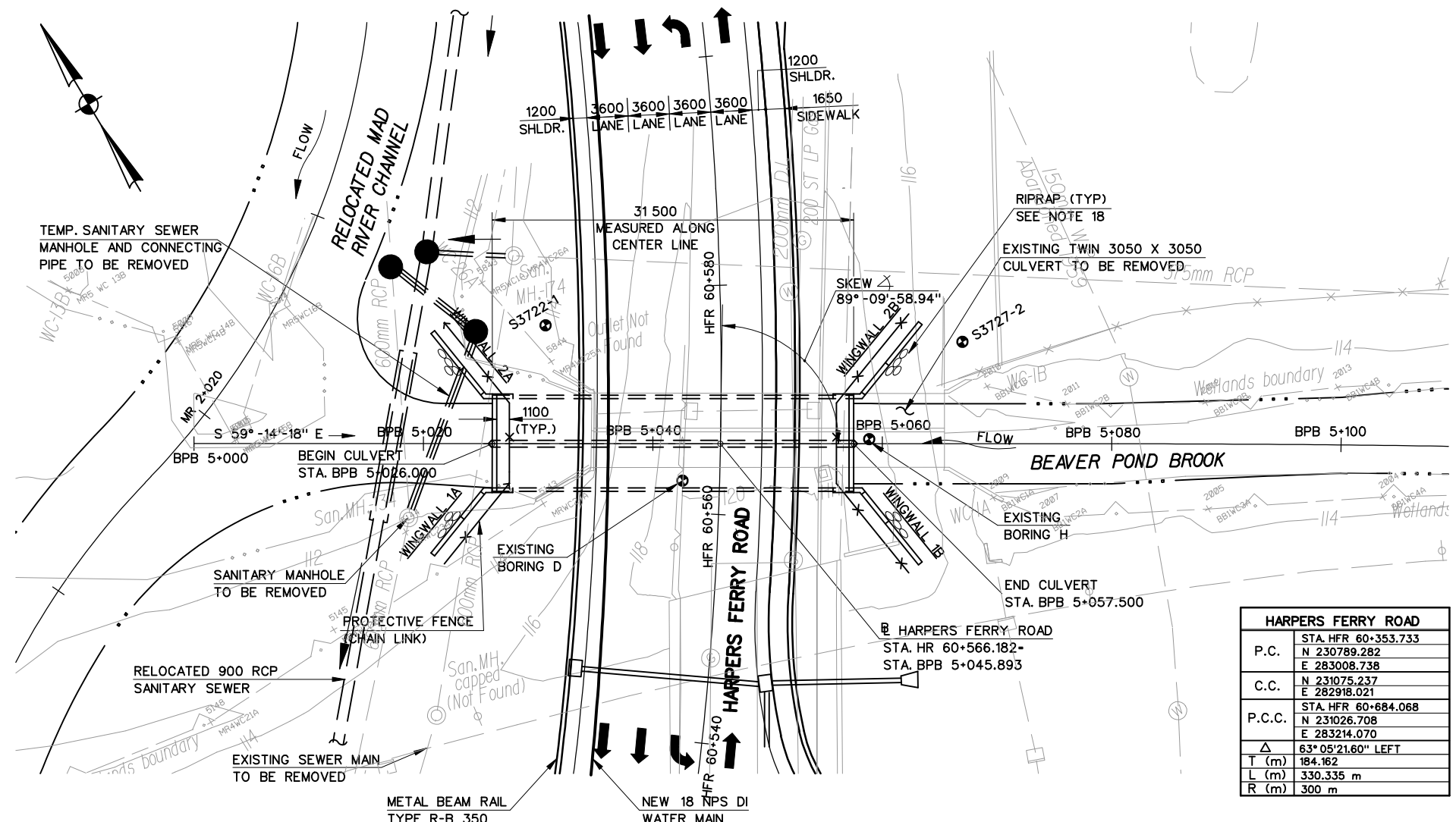
END OF STATE PROJECT NO. 151-273

PROPOSED	FEMA SECTION	———
	ADDITIONAL SECTION	———
EXISTING	FEMA SECTION	- - - - -
	ADDITIONAL SECTION	- - - - -



Appendix F. Structure Plans

- Culvert No. 03727: Harpers Ferry Road Crossing
- Culvert No. 01227: Westerly I-84 Crossing
- Culvert No. 02537: Easterly I-84 Crossing
- Culvert No. 06622: Plank Road East Crossing
- Culvert No. 151-014: Scott Road Crossing



BORING LEGEND

● - NEW BORING (2001)

PLAN
SCALE: 1:250

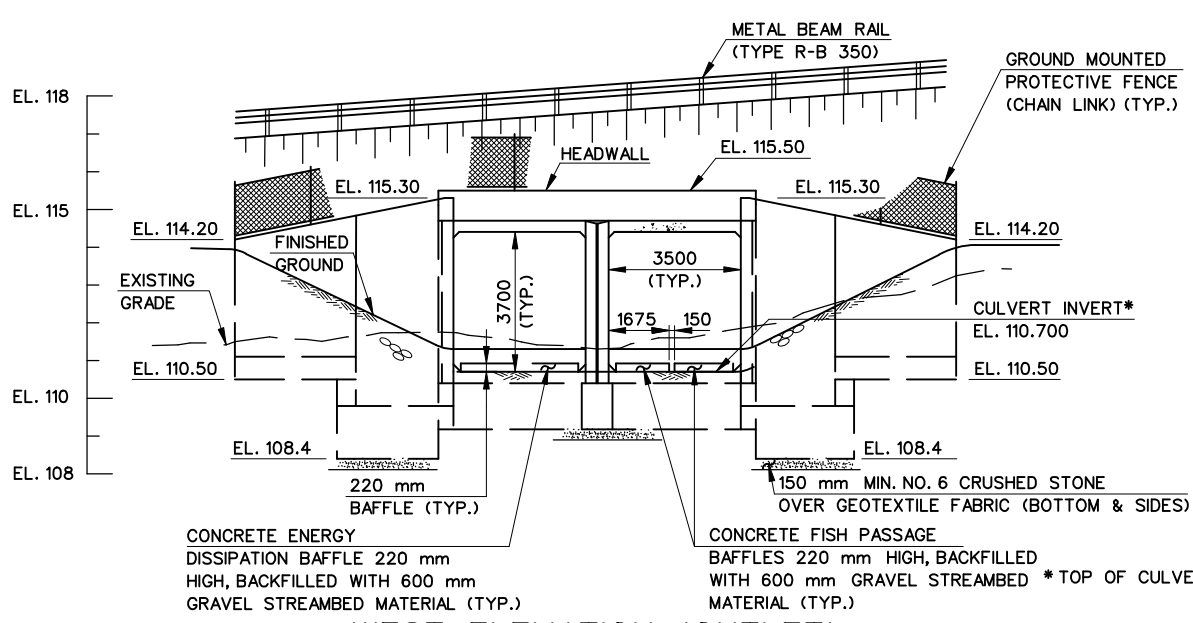
HARPERS FERRY ROAD	
P.C.	STA. HFR 60+353.733 N 230789.282 E 263008.738
C.C.	N 231075.237 E 262918.021
P.C.C.	STA. HFR 60+684.068 N 231026.708 E 263214.070
Δ	63° 05' 21.60" LEFT
T (m)	184.162
L (m)	330.335 m
R (m)	300 m

CURVE DATA

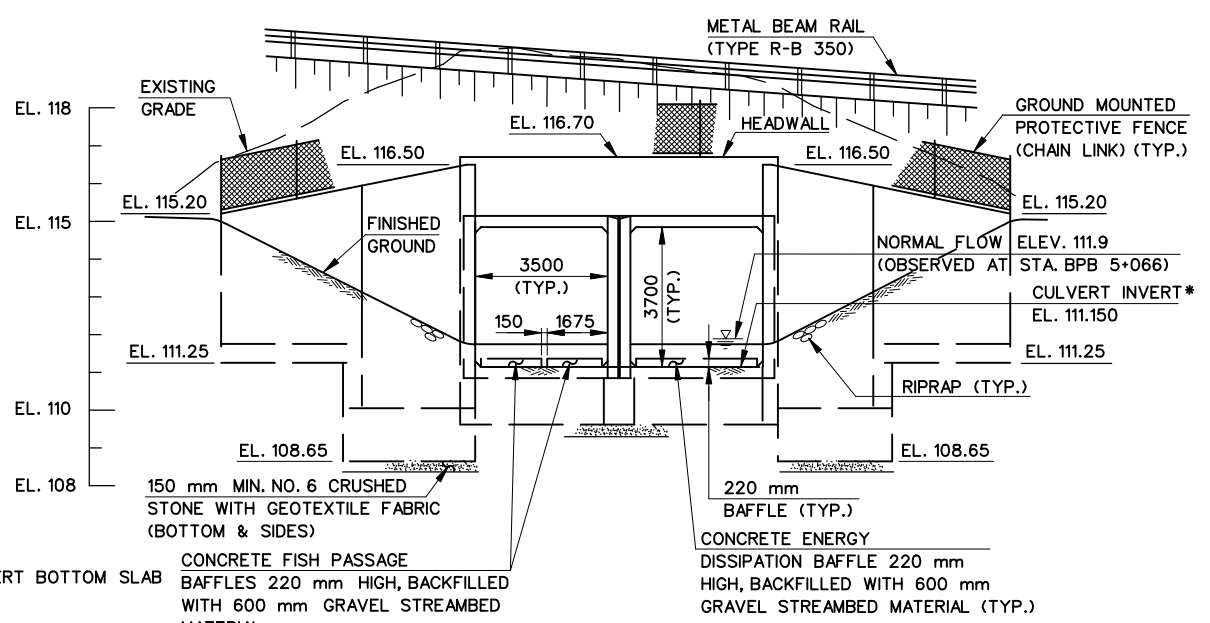
GENERAL NOTES

- SPECIFICATIONS:** CONNECTICUT DEPARTMENT OF TRANSPORTATION FORM 816 (2004) WITH SUPPLEMENTS THERETO DATED (- / - / -) AND SPECIAL PROVISIONS.
- DESIGN SPECIFICATIONS:** STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES (AASHTO-1996) BY THE STRENGTH DESIGN METHOD (LOAD FACTOR DESIGN).
- ALLOWABLE DESIGN STRESSES:** CLASS "A" CONCRETE BASED ON $f'_c = 21 \text{ MPa}$
REINFORCEMENT (ASTM A515M GRADE 420) $f_y = 414 \text{ MPa}$
- LIVE LOAD:** HS20.
- CLASS "A" CONCRETE:** CLASS "A" CONCRETE SHALL BE USED FOR THE ENTIRE STRUCTURE AND THE PARAPETS.
- JOINT SEAL:** SEE SPECIAL PROVISIONS.
- EXPOSED EDGES:** EXPOSED EDGES OF CONCRETE SHALL BE BEVELED 25 mm x 25 mm UNLESS DIMENSIONED OTHERWISE.
- CONCRETE COVER:** ALL REINFORCEMENT SHALL HAVE 50 mm COVER UNLESS DIMENSIONED OTHERWISE.
- REINFORCEMENT:** ALL REINFORCEMENT SHALL BE ASTM A615M GRADE 420.
- PERFORMED EXPANSION JOINT FILLER:** THE COST OF FURNISHING AND INSTALLING PERFORMED EXPANSION JOINT FILLER SHALL BE INCLUDED IN THE COST OF THE ITEM "CLASS 'A' CONCRETE."
- CONSTRUCTION JOINTS:** CONSTRUCTION JOINTS, OTHER THAN THOSE SHOWN ON THE PLANS, WILL NOT BE PERMITTED WITHOUT THE PRIOR APPROVAL OF THE ENGINEER.
- ELEVATIONS:** ALL ELEVATIONS ARE GIVEN IN METERS (m).
- DIMENSIONS:** ALL DIMENSIONS ARE GIVEN IN MILLIMETERS (mm).
- STATIONING:** STATIONS ARE GIVEN IN METERS (m).
- DECIMAL DIMENSIONS:** WHEN DIMENSIONS ARE GIVEN TO LESS THAN THREE DECIMAL PLACES, THE OMITTED DIGITS SHALL BE ASSUMED TO BE ZEROS.
- EXISTING DIMENSIONS AND ELEVATIONS:** DIMENSIONS AND ELEVATIONS OF THE EXISTING STRUCTURE SHOWN ON THESE PLANS ARE FOR GENERAL REFERENCE ONLY. THEY HAVE BEEN TAKEN FROM THE ORIGINAL DESIGN DRAWINGS AND A LIMITED FIELD SURVEY AND ARE NOT GUARANTEED. THE EXISTING DIMENSIONS AND ELEVATIONS HAVE BEEN CONVERTED FROM ENGLISH UNITS TO THEIR METRIC EQUIVALENT AND ROUNDED TO NEAREST MILLIMETER. THE CONTRACTOR SHALL TAKE ALL FIELD MEASUREMENTS TO ASSURE PROPER FIT OF THE FINISHED WORK AND SHALL ASSUME FULL RESPONSIBILITY FOR THEIR ACCURACY. WHEN SHOP DRAWINGS BASED ON FIELD MEASUREMENTS ARE SUBMITTED FOR APPROVAL THE FIELD MEASUREMENTS SHALL ALSO BE SUBMITTED FOR REFERENCE BY THE REVIEWER.
- EXISTING PLANS:** CULVERT NO. 03727 ORIGINALLY CONSTRUCTED UNDER CONTRACT NO. 182-13
- RIVER RELOCATION & GRADING PLANS:** REFER TO MAD RIVER AND BEAVER POND BROOK RELOCATION PLANS.
- SEQUENCE OF CONSTRUCTION OPERATIONS:** REFER TO THE MAINTENANCE AND PROTECTION OF TRAFFIC STAGING PLANS AND SECTION 1.08 - PROSECUTION AND PROGRESS SPECIFICATION FOR THE SEQUENCING OF CONSTRUCTION OPERATIONS.

FOR INFORMATIONAL PURPOSES ONLY



WEST ELEVATION (OUTLET)



EAST ELEVATION (INLET)

WATERSHED AREA	DESIGN FLOW FREQ.	DESIGN FLOW
15.1 km ²	100-YEAR	55.5 m ³ /s

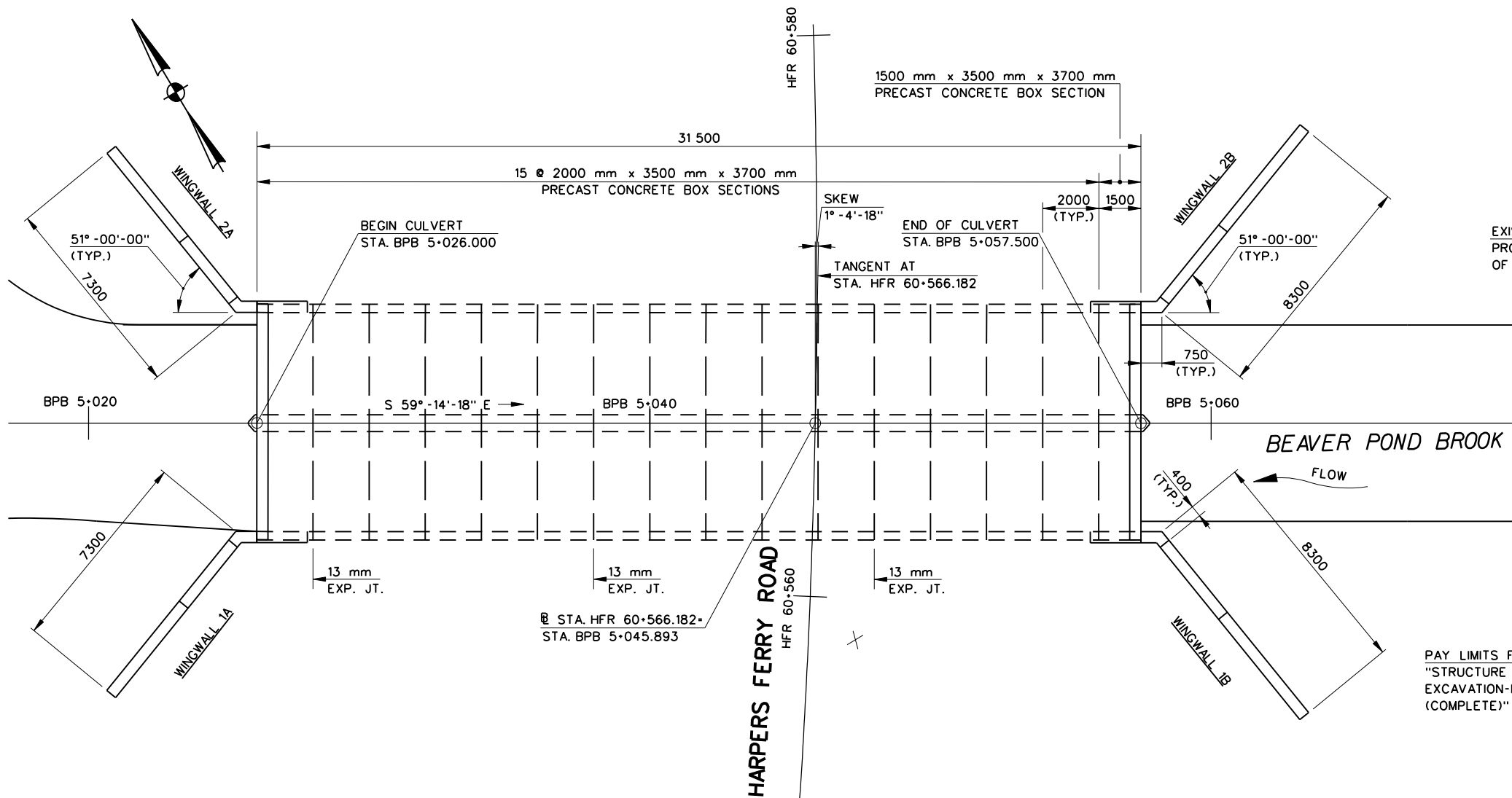
DESIGN FLOW ELEVATION	CULVERT INLET
	114.8

NOTICE TO BRIDGE INSPECTORS

THE DEPARTMENT'S BRIDGE SAFETY PROCEDURES REQUIRE THIS BRIDGE TO BE INSPECTED FOR, BUT NOT LIMITED TO, ALL APPROPRIATE COMPONENTS INDICATED IN THE GOVERNING MANUALS FOR BRIDGE INSPECTION. ATTENTION MUST BE GIVEN TO INSPECTING THE FOLLOWING SPECIAL COMPONENTS AND DETAILS. (THE LISTING OF COMPONENTS FOR SPECIFIC ATTENTION SHALL NOT BE CONSTRUED TO REDUCE THE IMPORTANCE OF INSPECTION OF ANY OTHER COMPONENT OF THE STRUCTURE.) THE FREQUENCY OF INSPECTION OF THIS STRUCTURE SHALL BE IN ACCORDANCE WITH THE GOVERNING MANUALS FOR BRIDGE INSPECTION, UNLESS OTHERWISE DIRECTED BY THE ENGINEER OF BRIDGES AND STRUCTURES.

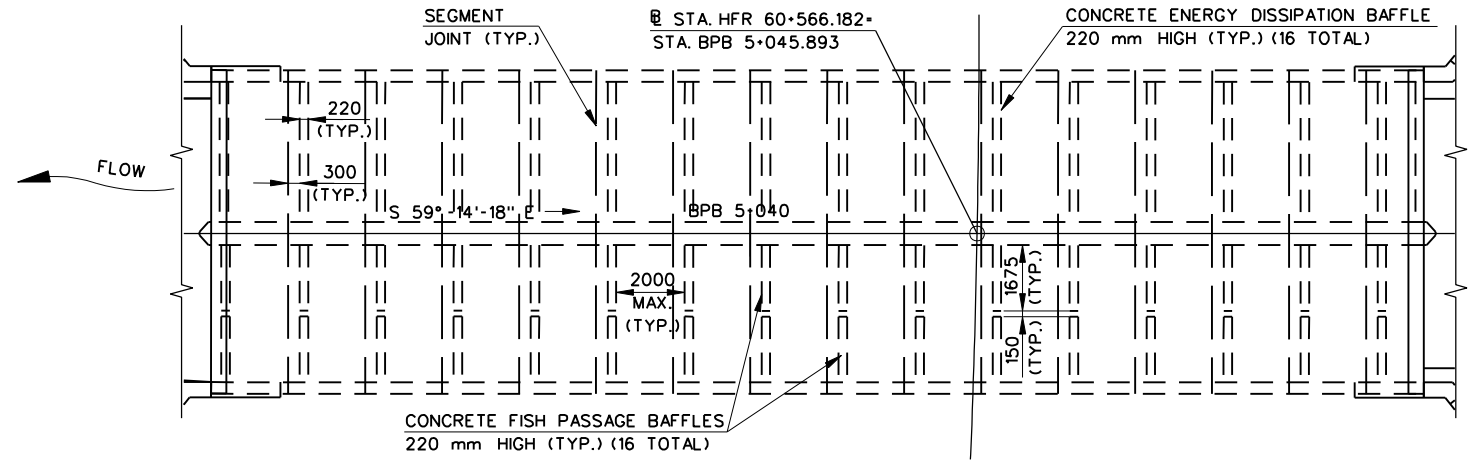
COMPONENT OR DETAIL	BRIDGE SHEET REFERENCE

<p>THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE TRUE CONDITIONS OR THE ACTUAL QUANTITIES OR DISTRIBUTION OF QUANTITIES OF WORK WHICH WILL BE REQUIRED</p>	<p>CADD ...0273F372701.BRG PLOTTED 7/17/2013</p>	<p>DESIGNER: H. DIERKS DRAFTER: A. PRESS CHECKED BY: N. VYAS DATE CHECKED:</p>	<p>STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION</p> <p>BERGER LEHMAN ASSOCIATES, P.C.</p>	<p>PROJECT TITLE: RECONSTRUCTION OF I-84 WATERBURY HARPERS FERRY RD. OVER BEAVER POND BROOK STRUCTURE NO. 151-273-3727</p>	<p>TOWN: WATERBURY</p>	<p>PROJECT NO.: 151-273</p>
<p>SCALE AS NOTED</p>	<p>DATE</p>	<p>DATE</p>	<p>DATE</p>	<p>PROJECT TITLE: RECONSTRUCTION OF I-84 WATERBURY HARPERS FERRY RD. OVER BEAVER POND BROOK STRUCTURE NO. 151-273-3727</p>	<p>DRAWING TITLE: PLAN AND ELEVATION</p>	<p>DRAWING NO.: S1</p>

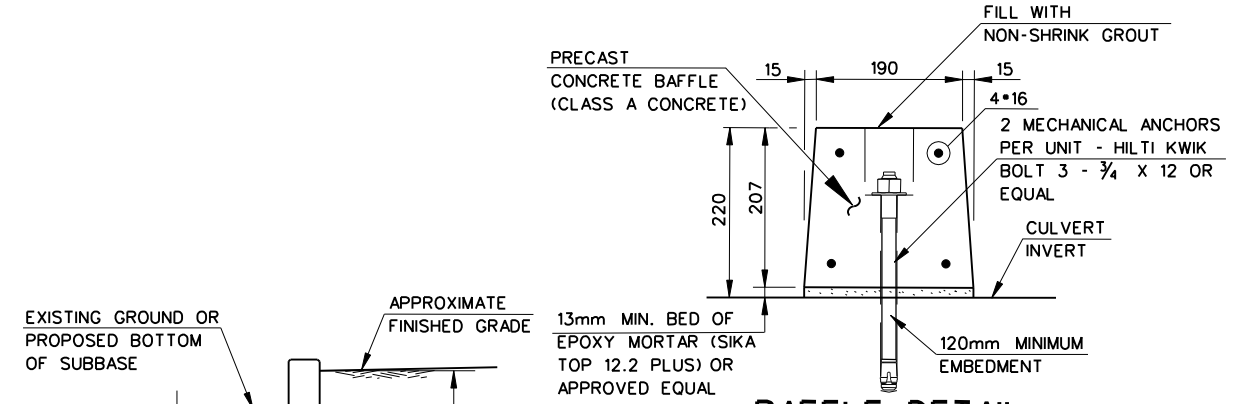


CULVERT LAYOUT
SCALE: 1:100

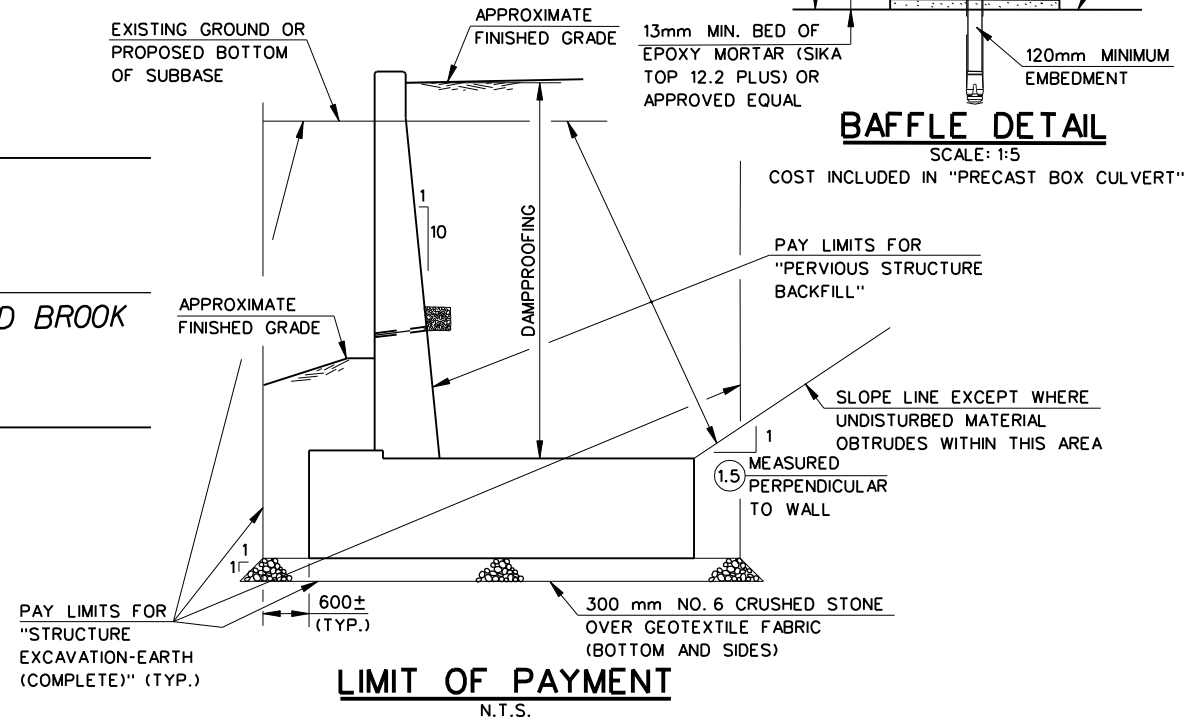
FOR INFORMATIONAL PURPOSES ONLY



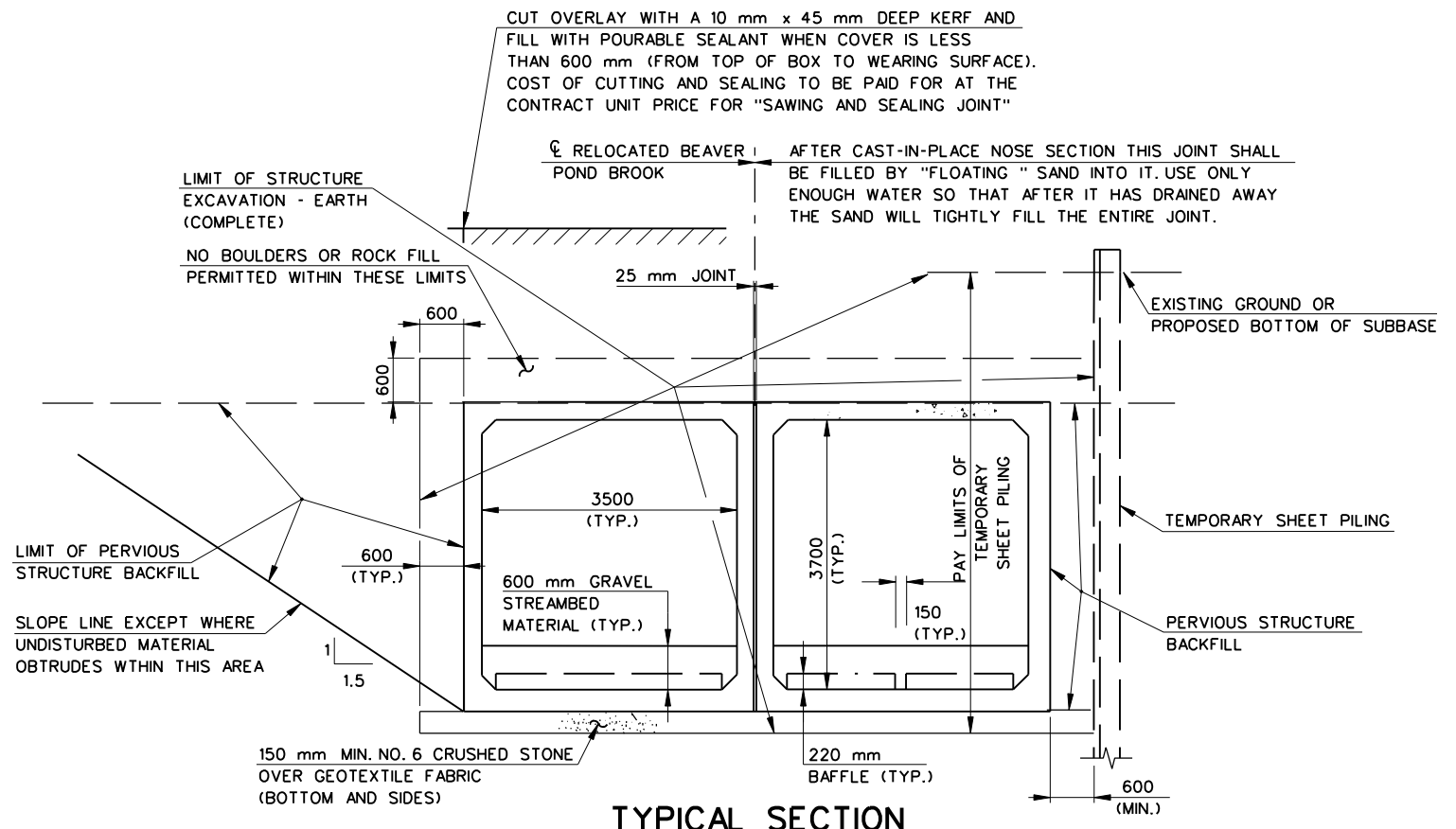
ENERGY DISSIPATERS AND FISH PASSAGE BAFFLES
SCALE: 1:100



BAFFLE DETAIL
SCALE: 1:5



LIMIT OF PAYMENT
N.T.S.



TYPICAL SECTION
SCALE: 1:50

MAXIMUM DESIGN FOUNDATION PRESSURE-0.9 MPa (ULTIMATE)

REV.	DATE	DESCRIPTION	SHEET NO.

THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE TRUE CONDITIONS OR THE ACTUAL QUANTITIES OR DISTRIBUTION OF QUANTITIES OF WORK WHICH WILL BE REQUIRED

CADD \$FILEABREVS	DESIGNER
PLOTTED \$DATES	H. DIERKS
SCALE AS NOTED	DRAFTER
	A. PRESS
	CHECKED BY:
	N. VYAS
	DATE CHECKED:

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

BERGER LEHMAN ASSOCIATES, P.C.

ENGINEER: BERGER LEHMAN ASSOCIATES, P.C.
APPROVED BY: _____ DATE: _____

PROJECT TITLE:
RECONSTRUCTION OF I-84 WATERBURY HARPERS FERRY RD. OVER BEAVER POND BROOK STRUCTURE NO. 151-273-3727

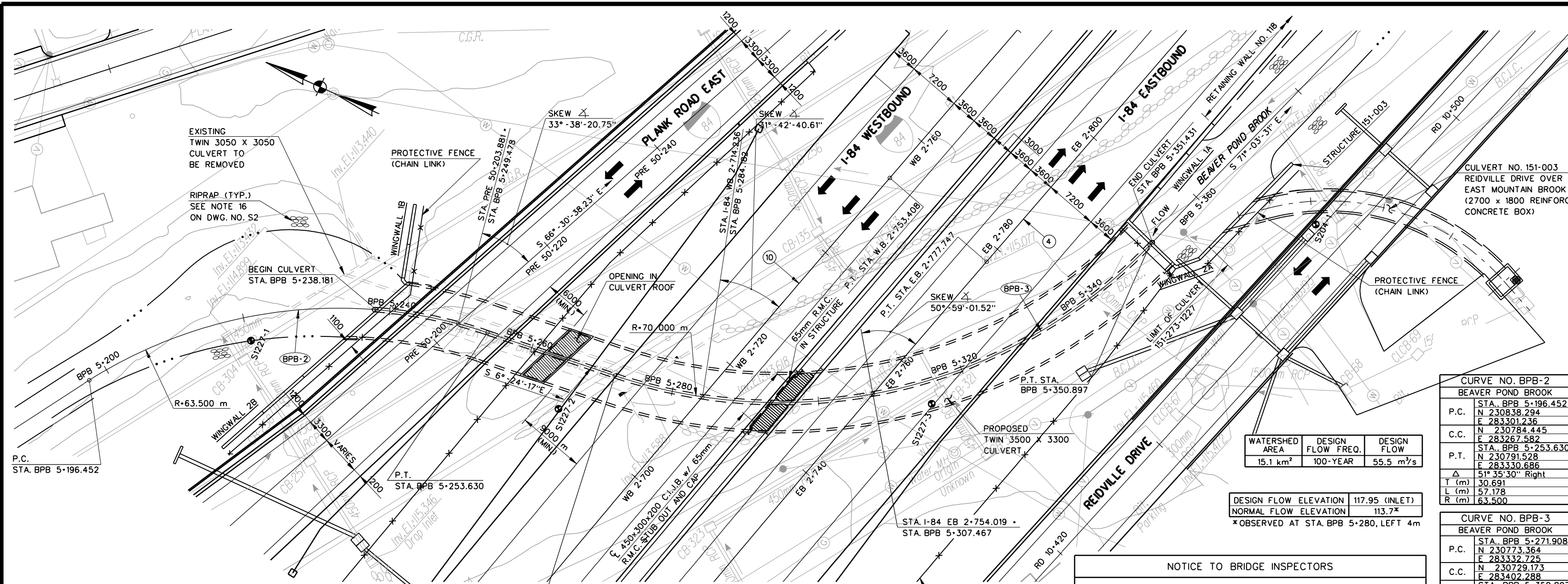
TOWN:
WATERBURY

DRAWING TITLE:
CULVERT LAYOUT AND TYPICAL SECTION

PROJECT NO.:
151-273

DRAWING NO.:
S5

SHEET NO.:



WATERSHED AREA	DESIGN FLOW FREQ.	DESIGN FLOW
15.1 km ²	100-YEAR	55.5 m ³ /s

DESIGN FLOW ELEVATION	117.95 (INLET)
NORMAL FLOW ELEVATION	113.7*

* OBSERVED AT STA. BPB 5+280, LEFT 4m

CURVE NO. BPB-2 BEAVER POND BROOK	
P.C.	STA. BPB 5+196.452 N 230838.294 E 283301.236
C.C.	N 230784.445 E 283267.582
P.T.	STA. BPB 5+253.630 N 230791.528 E 283330.686
Δ	51° 35' 30" Right
T (m)	30.691
L (m)	57.178
R (m)	63.500

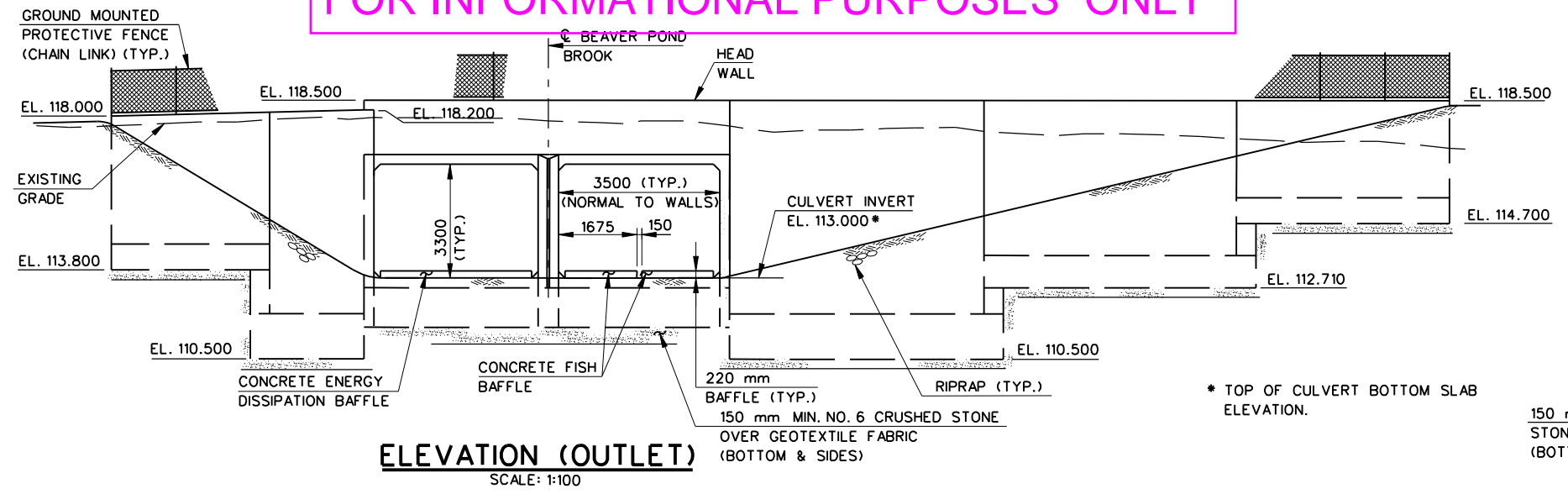
CURVE NO. BPB-3 BEAVER POND BROOK	
P.C.	STA. BPB 5+271.908 N 230773.364 E 283332.725
C.C.	N 230729.173 E 283402.288
P.T.	STA. BPB 5+350.897 N 230714.963 E 283379.566
Δ	64° 39' 14" Left
T (m)	44.298
L (m)	78.990
R (m)	70.000

NOTICE TO BRIDGE INSPECTORS

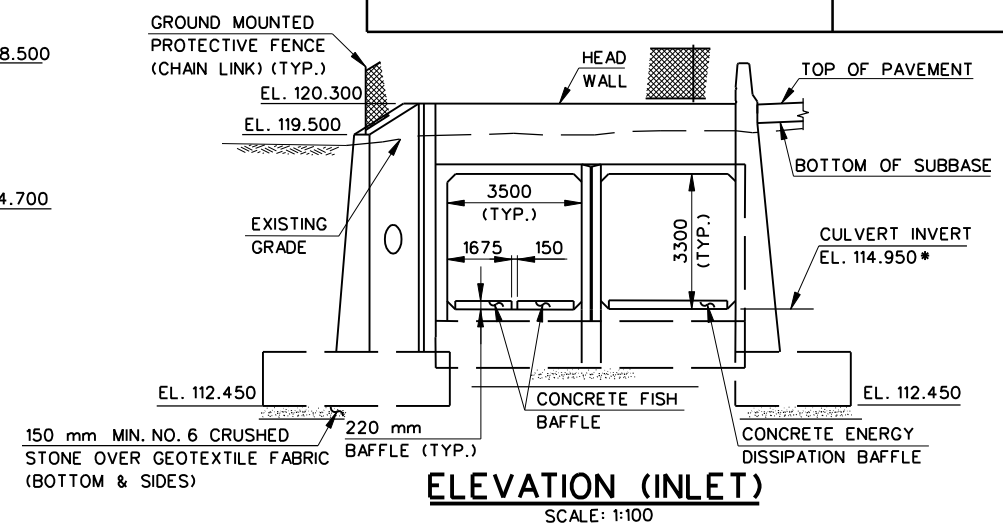
THE DEPARTMENT'S BRIDGE SAFETY PROCEDURES REQUIRE THIS BRIDGE TO BE INSPECTED FOR, BUT NOT LIMITED TO, ALL APPROPRIATE COMPONENTS INDICATED IN THE GOVERNING MANUALS FOR BRIDGE INSPECTION. ATTENTION MUST BE GIVEN TO INSPECTING THE FOLLOWING SPECIAL COMPONENTS AND DETAILS. (THE LISTING OF COMPONENTS FOR SPECIFIC ATTENTION SHALL NOT BE CONSTRUED TO REDUCE THE IMPORTANCE OF INSPECTION OF ANY OTHER COMPONENT OF THE STRUCTURE.) THE FREQUENCY OF INSPECTION OF THIS STRUCTURE SHALL BE IN ACCORDANCE WITH THE GOVERNING MANUALS FOR BRIDGE INSPECTION, UNLESS OTHERWISE DIRECTED BY THE ENGINEER OF BRIDGES AND STRUCTURES.

COMPONENT OR DETAIL	BRIDGE SHEET REFERENCE

FOR INFORMATIONAL PURPOSES ONLY



ELEVATION (OUTLET)
SCALE: 1:100



ELEVATION (INLET)
SCALE: 1:100

CURVE NO. 4 I-84 EASTBOUND	
P.C.	STA. EB 2+218.750 N 230849.287 E 282821.594
C.C.	N 226789.121 E 282251.463
P.T.	STA. EB 2+777.747 N 230734.117 E 283368.156
Δ	7° 48' 42.30" Right
T (m)	279.932
L (m)	558.997
R (m)	4100.000

CURVE NO. 10 I-84 WESTBOUND	
P.C.	STA. WB 2+192.038 N 230866.518 E 282824.014
C.C.	N 226789.121 E 282251.463
P.T.	STA. WB 2+753.408 N 230750.859 E 283372.895
Δ	7° 48' 42.30" Right
T (m)	281.120
L (m)	561.370
R (m)	4117.400

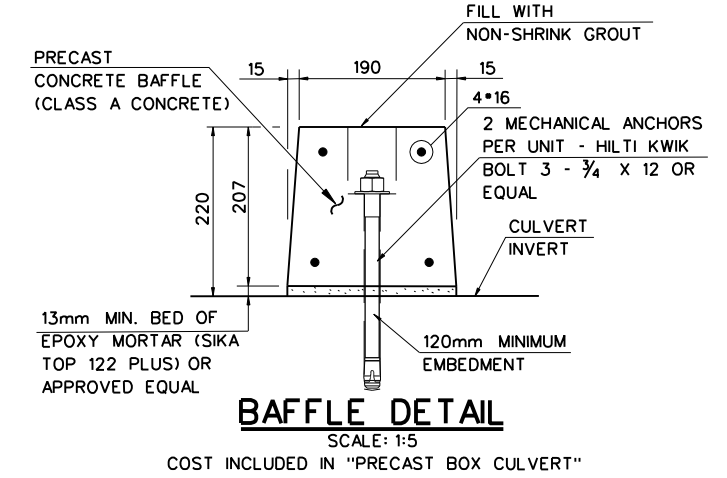
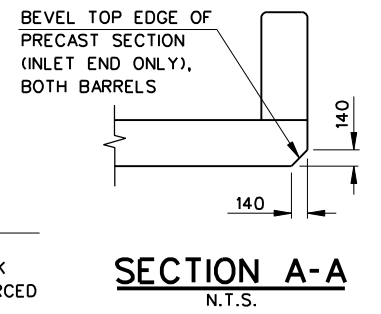
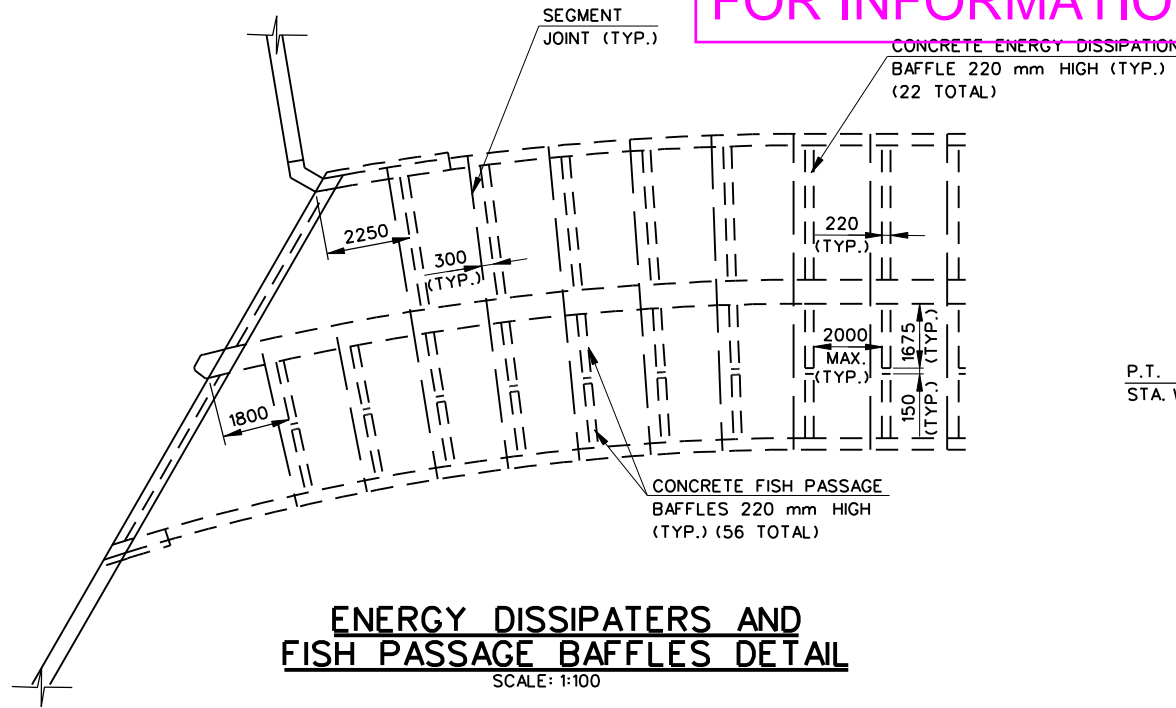
CURVE DATA

THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE TRUE CONDITIONS OR THE ACTUAL QUANTITIES OR DISTRIBUTION OF QUANTITIES OF WORK WHICH WILL BE REQUIRED	CADD ...0273122701.brg PLOTTED 11/3/2010	DESIGNER H. DIERKS DRAFTER A. PRESS CHECKED BY N. VYAS DATE CHECKED:	STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION ENGINEER BERGER LEHMAN ASSOCIATES, P.C. APPROVED BY:	PROJECT TITLE: RECONSTRUCTION OF I-84 WATERBURY I-84 OVER BEAVER POND BROOK STRUCTURE NO. 151-273-1227	TOWN: WATERBURY DRAWING TITLE: GENERAL PLAN AND ELEVATION	PROJECT NO.: 151-273 DRAWING NO.: S1 SHEET NO.:
	SCALE AS NOTED	DATE:	DATE:	PROJECT NO.: 151-273 DRAWING NO.: S1 SHEET NO.:		

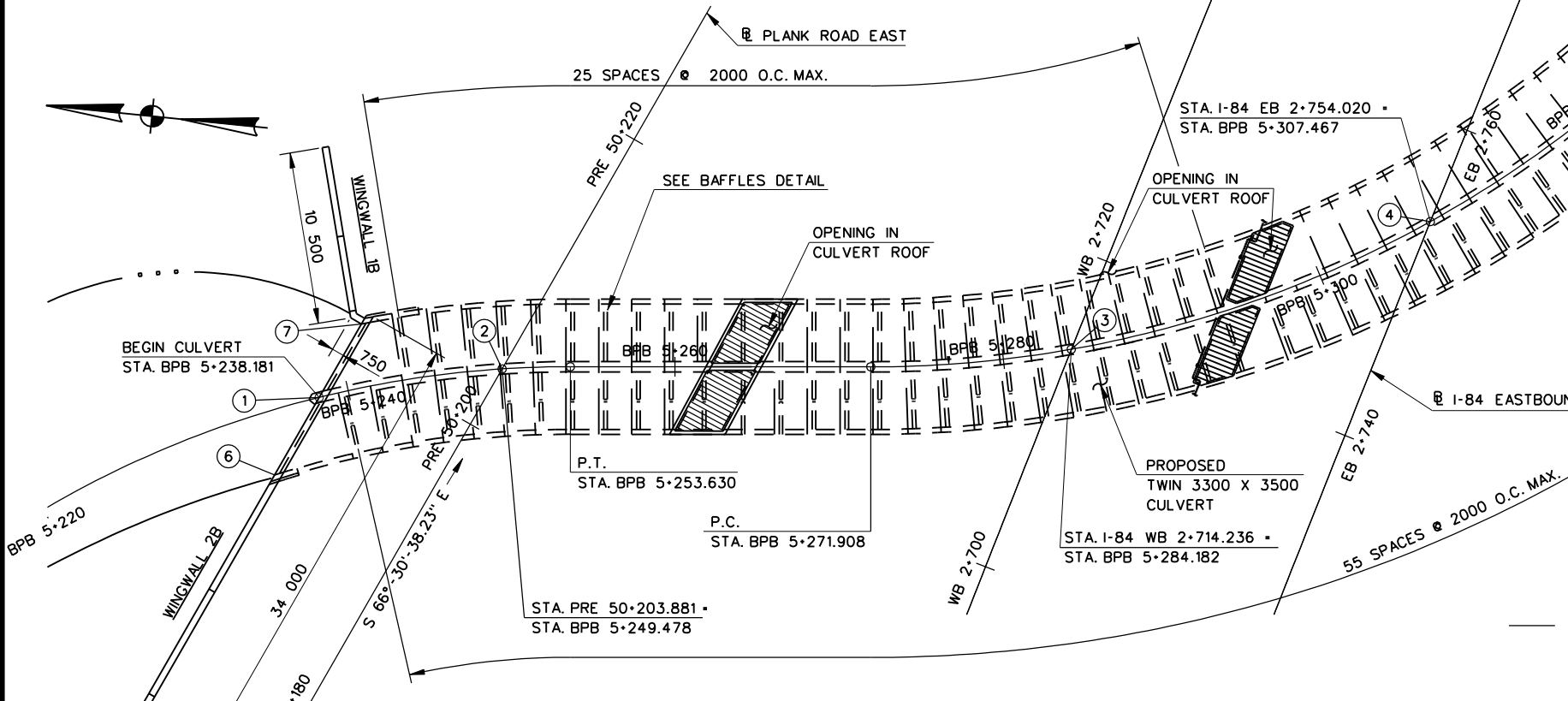
REV.	DATE	DESCRIPTION	SHEET NO.

FOR INFORMATIONAL PURPOSES ONLY

ENERGY DISSIPATORS AND FISH PASSAGE BAFFLES DETAIL
SCALE: 1:100



LAYOUT PLAN
SCALE: 1:200



WORKING POINT COORDINATES

LOCATION	W.P. NO.	NORTHING	EASTING
BPB BASE LINE AT OUTLET	1	230806.521	283327.121
BPB BASE LINE AT PLANK RD. EAST BASE LINE	2	230791.528	283330.689
BPB BASE LINE AT I-84 WB BASE LINE	3	230761.349	283335.154
BPB BASE LINE AT I-84 EB BASE LINE	4	230740.513	283345.307
BPB BASE LINE AT INLET	5	230714.790	283380.071
CULVERT OUTLET WEST CORNER	6	230808.482	283322.609
CULVERT OUTLET EAST CORNER	7	230804.719	283331.267
CULVERT INLET WEST CORNER	8	230710.523	283378.643
CULVERT INLET EAST CORNER	9	230718.394	283381.277

REV.	DATE	DESCRIPTION	SHEET NO.

THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE TRUE CONDITIONS OR THE ACTUAL QUANTITIES OR DISTRIBUTION OF QUANTITIES OF WORK WHICH WILL BE REQUIRED

CADD ...0273122704.BRG
PLOTTED 7/31/2013
SCALE AS NOTED

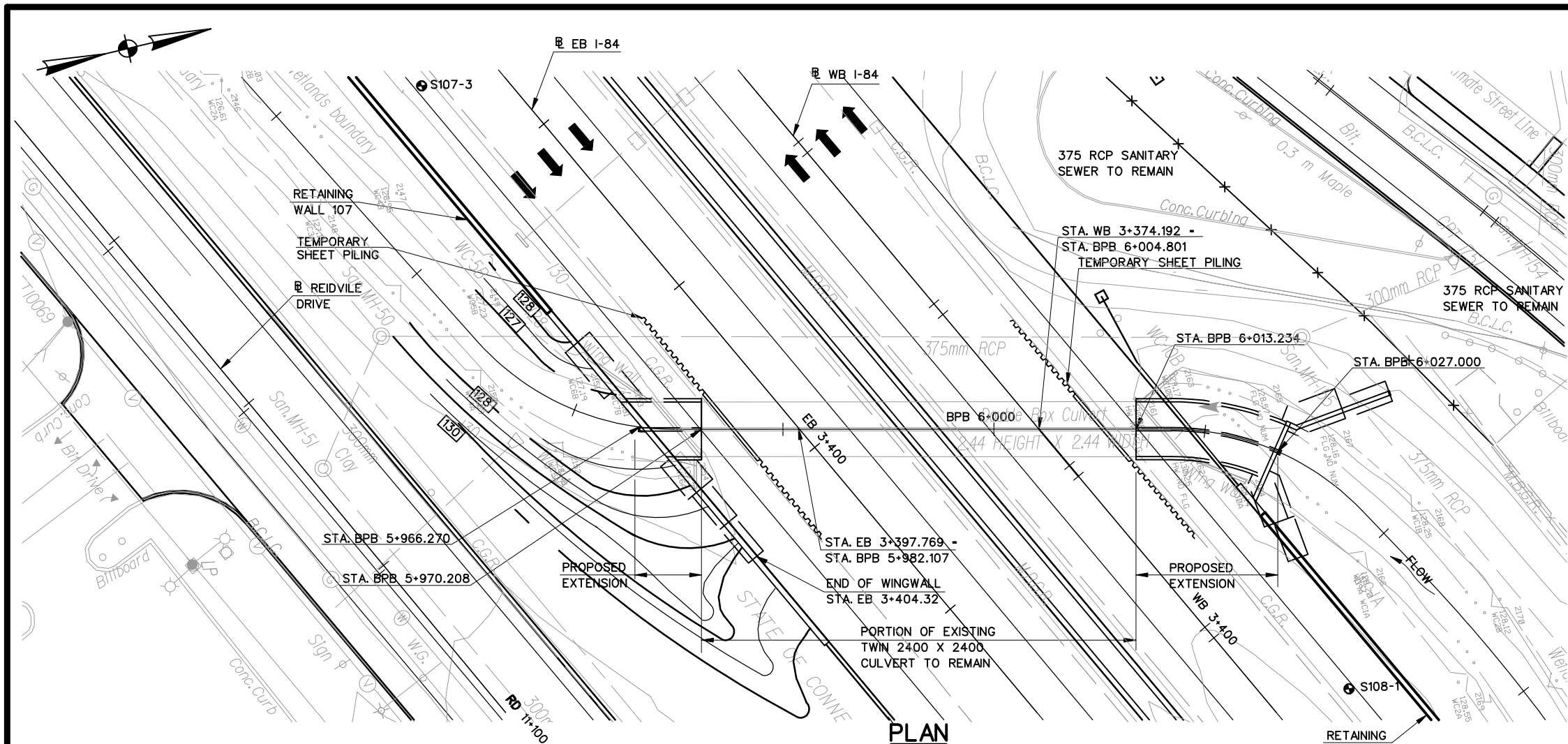
DESIGNER: H. DIERKS
DRAFTER: A. PRESS
CHECKED BY: N. VYAS
DATE CHECKED:

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
BERGER LEHMAN ASSOCIATES, P.C.
ENGINEER: BERGER LEHMAN ASSOCIATES, P.C.
APPROVED BY: DATE:

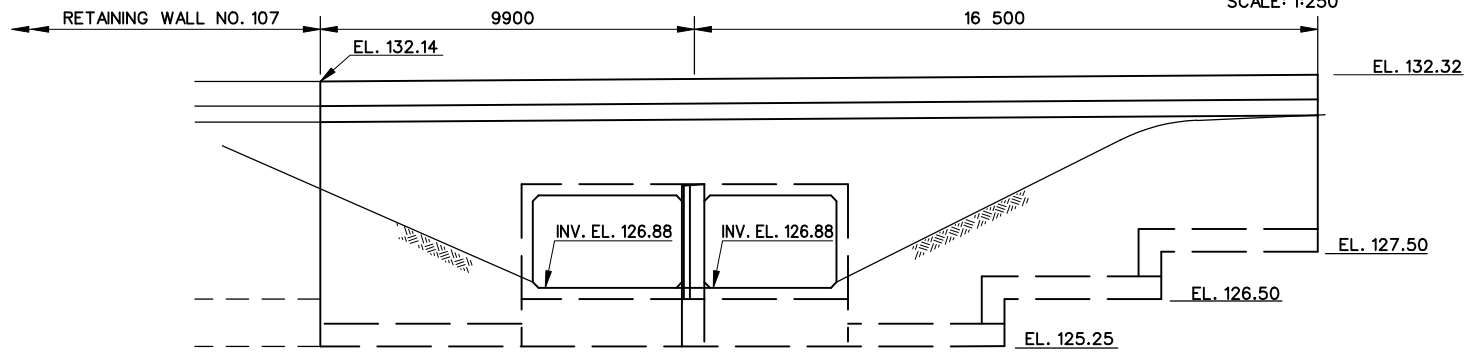
PROJECT TITLE: RECONSTRUCTION OF I-84 WATERBURY I-84 OVER BEAVER POND BROOK STRUCTURE NO. 151-273-1227

TOWN: WATERBURY
DRAWING TITLE: LAYOUT PLAN AND TYPICAL SECTION

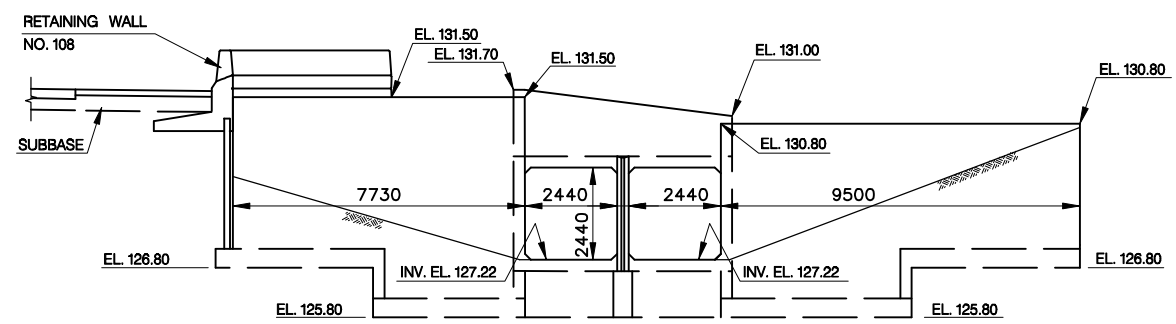
PROJECT NO.: 151-273
DRAWING NO.: S4
SHEET NO.:



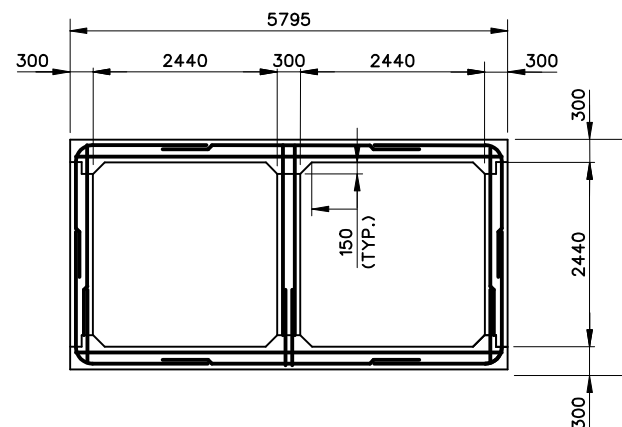
PLAN
SCALE: 1:250



ELEVATION (OUTLET)
SCALE: 1:100



ELEVATION (INLET)
SCALE: 1:100



EXISTING CROSS SECTION
SCALE: 1:50

BORING LEGEND

- ⊙ - NEW BORING (2001)
- ⊕ - EXISTING BORING (1955)

GENERAL NOTES

1. **SPECIFICATIONS:** CONNECTICUT DEPARTMENT OF TRANSPORTATION FORM 816 (2004) WITH SUPPLEMENTS THERETO DATED (- / - / -) AND SPECIAL PROVISIONS.
2. **DESIGN SPECIFICATIONS:** AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECOND EDITION 1998 WITH THE INTERIM SPECIFICATIONS UP TO AND INCLUDING 2001, AS SUPPLEMENTED BY THE CONNECTICUT DEPARTMENT OF TRANSPORTATION BRIDGE MANUAL (1997 METRIC EDITION).
3. **ALLOWABLE DESIGN STRESSES:**
CLASS "A" CONCRETE BASED ON $f'c = 21 \text{ MPa}$
REINFORCEMENT (ASTM A515M GRADE 420) $f_y = 414 \text{ MPa}$
4. **LIVE LOAD:** HL - 93.
5. **CLASS "A" CONCRETE:** CLASS "A" CONCRETE SHALL BE USED FOR THE ENTIRE STRUCTURE AND THE PARAPETS.
6. **JOINT SEAL:** SEE SPECIAL PROVISIONS.
7. **EXPOSED EDGES:** EXPOSED EDGES OF CONCRETE SHALL BE BEVELED 25 mm x 25 mm UNLESS DIMENSIONED OTHERWISE.
8. **CONCRETE COVER:** ALL REINFORCEMENT SHALL HAVE 50 mm COVER UNLESS DIMENSIONED OTHERWISE.
9. **REINFORCEMENT:** ALL REINFORCEMENT SHALL BE ASTM A615M GRADE 420.
10. **PREFORMED EXPANSION JOINT FILLER:** THE COST OF FURNISHING AND INSTALLING PREFORMED EXPANSION JOINT FILLER SHALL BE INCLUDED IN THE COST OF THE ITEM "CLASS 'A' CONCRETE."
11. **CONSTRUCTION JOINTS:** CONSTRUCTION JOINTS, OTHER THAN THOSE SHOWN ON THE PLANS, WILL NOT BE PERMITTED WITHOUT THE PRIOR APPROVAL OF THE ENGINEER.
12. **ELEVATIONS:** ALL ELEVATIONS ARE GIVEN IN METERS (m).
13. **DIMENSIONS:** ALL DIMENSIONS ARE GIVEN IN MILLIMETERS (mm).
14. **STATIONING:** STATIONS ARE GIVEN IN METERS (m).
15. **DECIMAL DIMENSIONS:** WHEN DIMENSIONS ARE GIVEN TO LESS THAN THREE DECIMAL PLACES, THE OMITTED DIGITS SHALL BE ASSUMED TO BE ZEROS.

EXISTING DIMENSIONS AND ELEVATIONS DIMENSIONS AND ELEVATIONS OF THE EXISTING STRUCTURE SHOWN ON THESE PLANS ARE FOR GENERAL REFERENCE ONLY. THEY HAVE BEEN TAKEN FROM THE ORIGINAL DESIGN DRAWINGS AND A LIMITED FIELD SURVEY AND ARE NOT GUARANTEED. THE EXISTING DIMENSIONS AND ELEVATIONS HAVE BEEN CONVERTED FROM ENGLISH UNITS TO THEIR METRIC EQUIVALENT AND ROUNDED TO NEAREST MILLIMETER. THE CONTRACTOR SHALL TAKE ALL FIELD MEASUREMENTS TO ASSURE PROPER FIT OF THE FINISHED WORK AND SHALL ASSUME FULL RESPONSIBILITY FOR THEIR ACCURACY. WHEN SHOP DRAWINGS BASED ON FIELD MEASUREMENTS ARE SUBMITTED FOR APPROVAL THE FIELD MEASUREMENTS SHALL ALSO BE SUBMITTED FOR REFERENCE BY THE REVIEWER.

EXISTING PLANS CULVERT NO. ORIGINALLY CONSTRUCTED UNDER CONTRACT NO.

INSPECTION OF FIELD WELDS		
METHOD	UNIT	QUAN.
ULTRASONIC	mm	-
MAGNETIC PARTICLE	mm	-

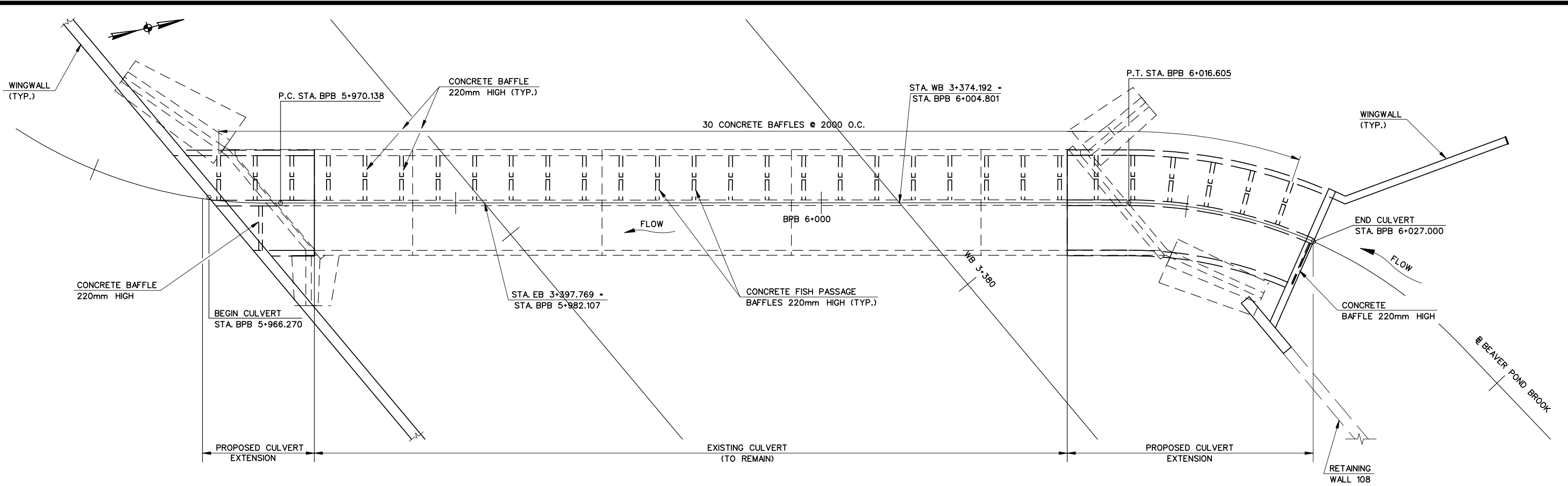
CULVERT INLET	
DESIGN FLOW ELEVATION	130.0
FREEBOARD (m)	N/A

WATERSHED AREA	DESIGN FLOW FREQ.	DESIGN FLOW
47.80 km ²	100-YEAR	29.9 m ³ /s

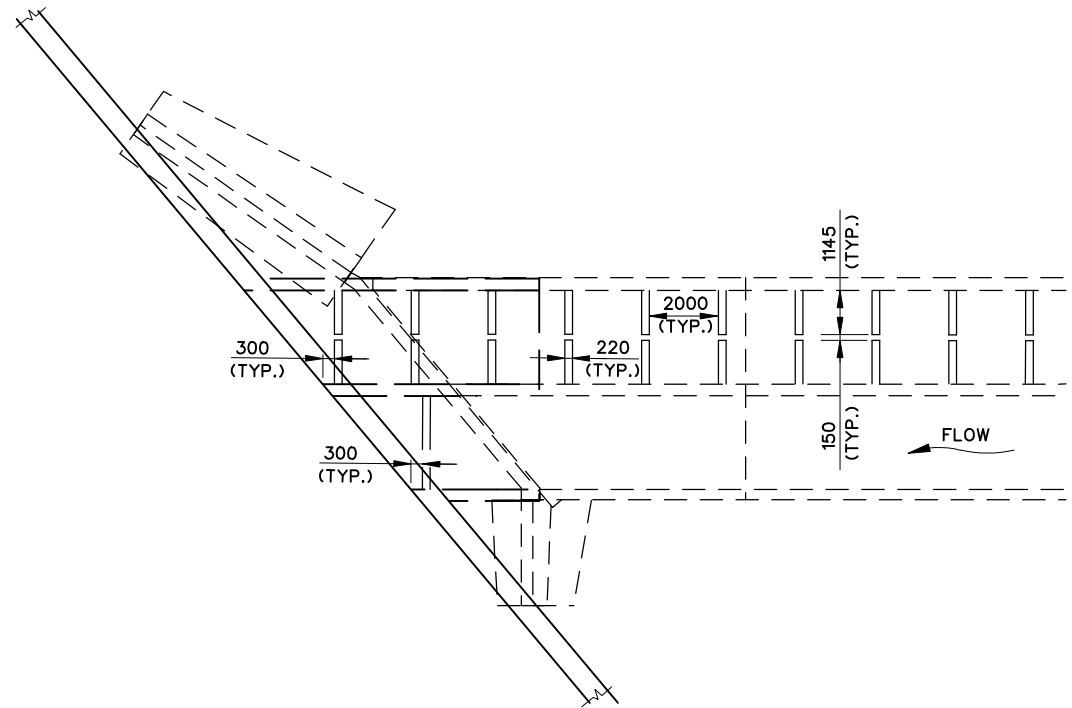
NOTICE TO BRIDGE INSPECTORS	
THE DEPARTMENT'S BRIDGE SAFETY PROCEDURES REQUIRE THIS BRIDGE TO BE INSPECTED FOR, BUT NOT LIMITED TO, ALL APPROPRIATE COMPONENTS INDICATED IN THE GOVERNING MANUALS FOR BRIDGE INSPECTION. ATTENTION MUST BE GIVEN TO INSPECTING THE FOLLOWING SPECIAL COMPONENTS AND DETAILS. (THE LISTING OF COMPONENTS FOR SPECIFIC ATTENTION SHALL NOT BE CONSTRUED TO REDUCE THE IMPORTANCE OF INSPECTION OF ANY OTHER COMPONENT OF THE STRUCTURE.) THE FREQUENCY OF INSPECTION OF THIS STRUCTURE SHALL BE IN ACCORDANCE WITH THE GOVERNING MANUALS FOR BRIDGE INSPECTION, UNLESS OTHERWISE DIRECTED BY THE ENGINEER OF BRIDGES AND STRUCTURES.	
COMPONENT OR DETAIL	BRIDGE SHEET REFERENCE

FOR INFORMATIONAL PURPOSES ONLY

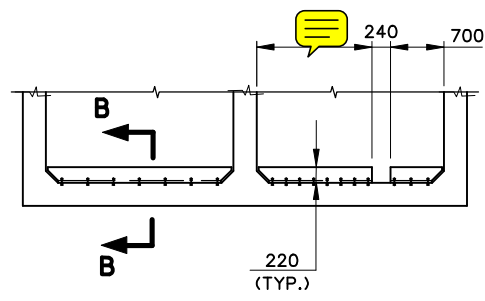
<p>THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE TRUE CONDITIONS OR THE ACTUAL QUANTITIES OR DISTRIBUTION OF QUANTITIES OF WORK WHICH WILL BE REQUIRED</p>	<p>CADD ...0273253701.brg PLOTTED 7/17/2013 SCALE AS NOTED</p>	<p>DESIGNER: H. DIERKS DRAFTER: M. OFFENBERG CHECKED BY: N. VYAS DATE CHECKED:</p>	<p>STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION</p> <p>ENGINEER: BERGER LEHMAN ASSOCIATES, P.C. APPROVED BY: DATE:</p>	<p>PROJECT TITLE: RECONSTRUCTION OF I-84 WATERBURY I-84 OVER BEAVER POND BROOK STRUCTURE NO. 151-0273-2537</p>	<p>TOWN: WATERBURY</p>	<p>PROJECT NO.: 151-273</p> <p>DRAWING NO.: 1</p> <p>SHEET NO.:</p>								
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>REV.</th> <th>DATE</th> <th>DESCRIPTION</th> <th>SHEET NO.</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	REV.	DATE	DESCRIPTION	SHEET NO.										
REV.	DATE	DESCRIPTION	SHEET NO.											



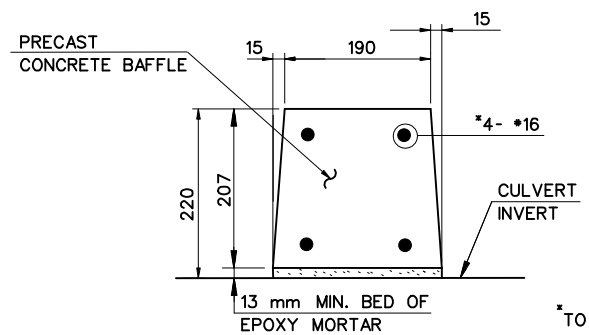
CULVERT BAFFLE LAYOUT
SCALE: 1:100



DETAIL LAYOUT
SCALE: 1:100



SECTION A-A
SCALE: 1:50
LOOKING DOWNSTREAM



BAFFLE DETAIL
SCALE: 1:5

NOTE

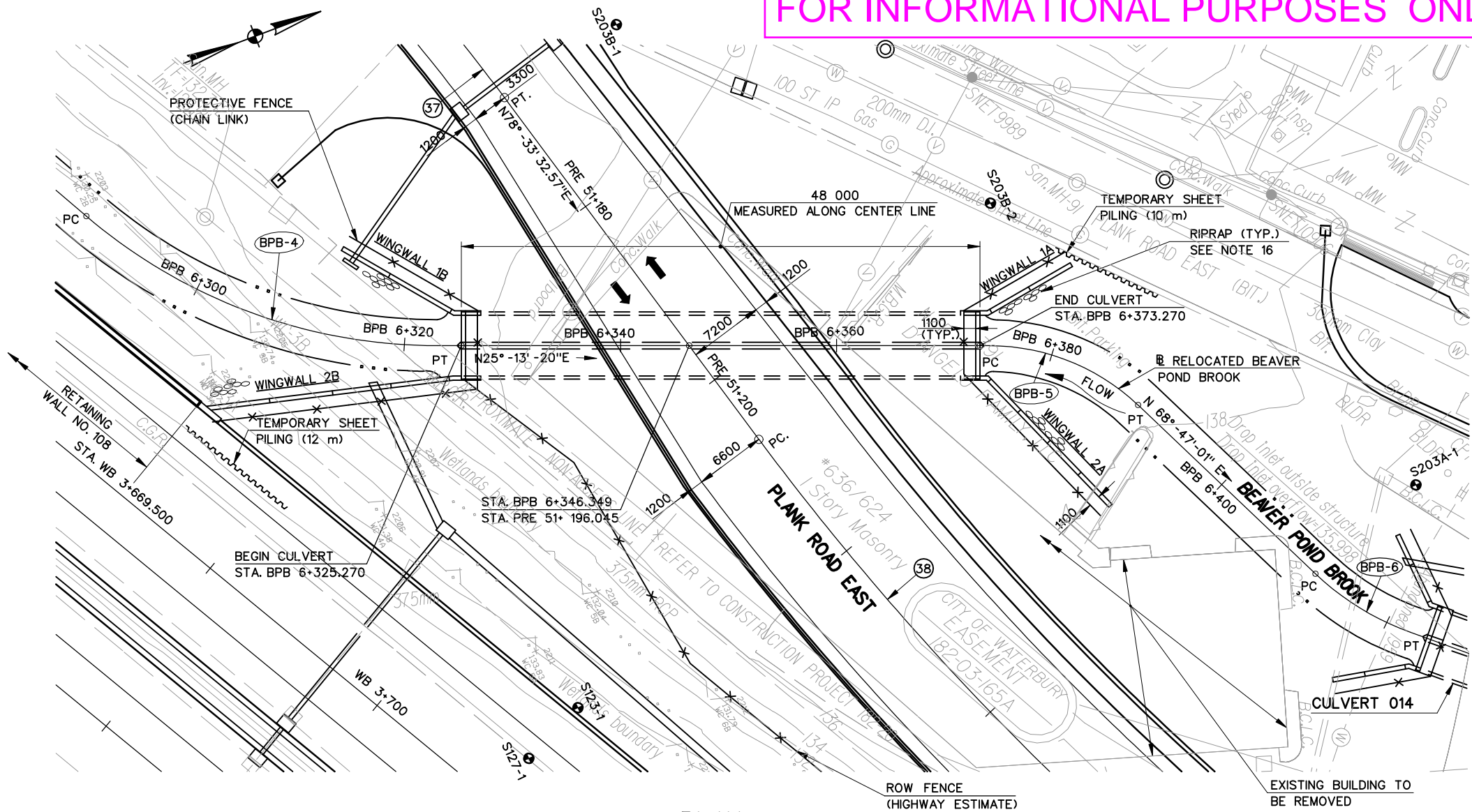
1. BAFFLES SHALL BE PRECAST CONCRETE CONFORMING TO THE REQUIREMENTS FOR CLASS "A" CONCRETE.
2. EPOXY MORTAR SHALL BE SIKA TOP 122 PLUS AS PRODUCED BY SIKA CORPORATION OR APPROVED EQUAL WITH A MINIMUM FLEXURAL STRENGTH OF 2000 PSI AS MEASURED BY ASTM C-293.
3. PAYMENT FOR BAFFLES AND EPOXY MORTAR SHALL BE AT THE UNIT PRICE FOR CLASS "A" CONCRETE.

* TO POSITION REBARS USE APPROVED SPACERS. COST OF SPACERS TO BE INCLUDED IN COST OF PROVIDING REBARS.

FOR INFORMATIONAL PURPOSES ONLY

THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE TRUE CONDITIONS OR THE ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.		CADD .../027312537011.dgn PLOTTED 7/15/2013	DESIGNER: H. DIERKS DRAFTER: A. PRESS CHECKED BY: N. VYAS DATE CHECKED:	STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION ENGINEER: BERGER LEHMAN ASSOCIATES, P.C. BY AJ ENGINEERS INC. APPROVED BY: DATE:	PROJECT TITLE: RECONSTRUCTION OF I-84 WATERBURY I-84 OVER BEAVER POND BROOK STRUCTURE NO. 151-0273-2537	TOWN: WATERBURY DRAWING TITLE: CULVERT BAFFLE LAYOUT	PROJECT NO.: 151-273 DRAWING NO.: S 11 SHEET NO.:
REV. DATE DESCRIPTION REVISIONS SHEET NO.	SCALE AS NOTED		.../D:\AI040108\027312537011.dgn 7/15/2013 3:36:29 PM				

FOR INFORMATIONAL PURPOSES ONLY



GENERAL NOTES

- SPECIFICATIONS:** CONNECTICUT DEPARTMENT OF TRANSPORTATION FORM 816 (2004) WITH SUPPLEMENTS THERETO DATED (- / - / -) AND SPECIAL PROVISIONS.
- DESIGN SPECIFICATIONS:** STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES (AASHTO-1996) BY THE STRENGTH DESIGN METHOD (LOAD FACTOR DESIGN).
- ALLOWABLE DESIGN STRESSES:**
CLASS "A" CONCRETE BASED ON $f'c = 21 \text{ MPa}$
REINFORCEMENT (ASTM A515M GRADE 420) $f_y = 414 \text{ MPa}$
- LIVE LOAD:** HS20.
- CLASS "A" CONCRETE:** CLASS "A" CONCRETE SHALL BE USED FOR THE ENTIRE STRUCTURE AND THE PARAPETS.
- JOINT SEAL:** SEE SPECIAL PROVISIONS.
- EXPOSED EDGES:** EXPOSED EDGES OF CONCRETE SHALL BE BEVELED 25 mm x 25 mm UNLESS DIMENSIONED OTHERWISE.
- CONCRETE COVER:** ALL REINFORCEMENT SHALL HAVE 50 mm COVER UNLESS DIMENSIONED OTHERWISE.
- REINFORCEMENT:** ALL REINFORCEMENT SHALL BE ASTM A615M GRADE 420.
- PREFORMED EXPANSION JOINT FILLER:** THE COST OF FURNISHING AND INSTALLING PREFORMED EXPANSION JOINT FILLER SHALL BE INCLUDED IN THE COST OF THE ITEM "CLASS 'A' CONCRETE".
- CONSTRUCTION JOINTS:** CONSTRUCTION JOINTS, OTHER THAN THOSE SHOWN ON THE PLANS, WILL NOT BE PERMITTED WITHOUT THE PRIOR APPROVAL OF THE ENGINEER.
- ELEVATIONS:** ALL ELEVATIONS ARE GIVEN IN METERS (m).
- DIMENSIONS:** ALL DIMENSIONS ARE GIVEN IN MILLIMETERS (mm).
- STATIONING:** STATIONS ARE GIVEN IN METERS (m).
- DECIMAL DIMENSIONS:** WHEN DIMENSIONS ARE GIVEN TO LESS THAN THREE DECIMAL PLACES, THE OMITTED DIGITS SHALL BE ASSUMED TO BE ZEROS.
- RIVER RELOCATIONS & GRADING PLAN:** SEE BEAVER POND BROOK RELOCATION PLANS.
- TRAFFIC:** ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE SPECIAL PROVISIONS "MAINTENANCE AND PROTECTION OF TRAFFIC" AND "SECTION 1.08 - PROSECUTION AND PROGRESS".
- SEQUENCE OF CONSTRUCTION OPERATIONS:** REFER TO MAINTENANCE AND PROTECTION OF TRAFFIC STAGING PLANS AND SECTION 1.08 - PROSECUTION AND PROGRESS SPECIFICATION FOR THE SEQUENCING OF CONSTRUCTION OPERATIONS

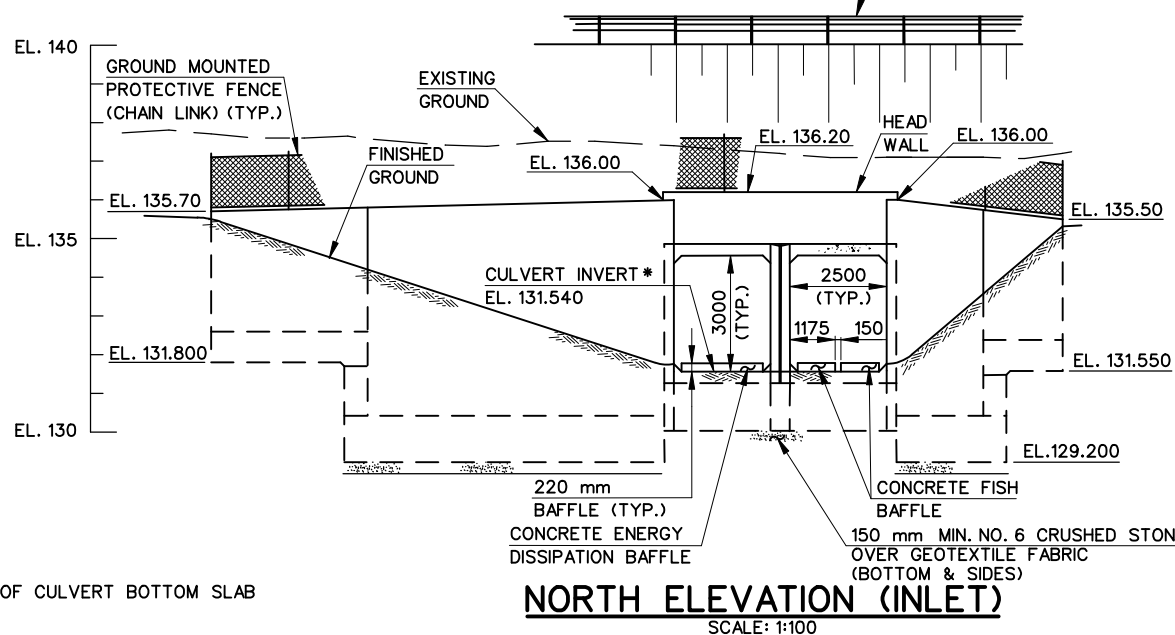
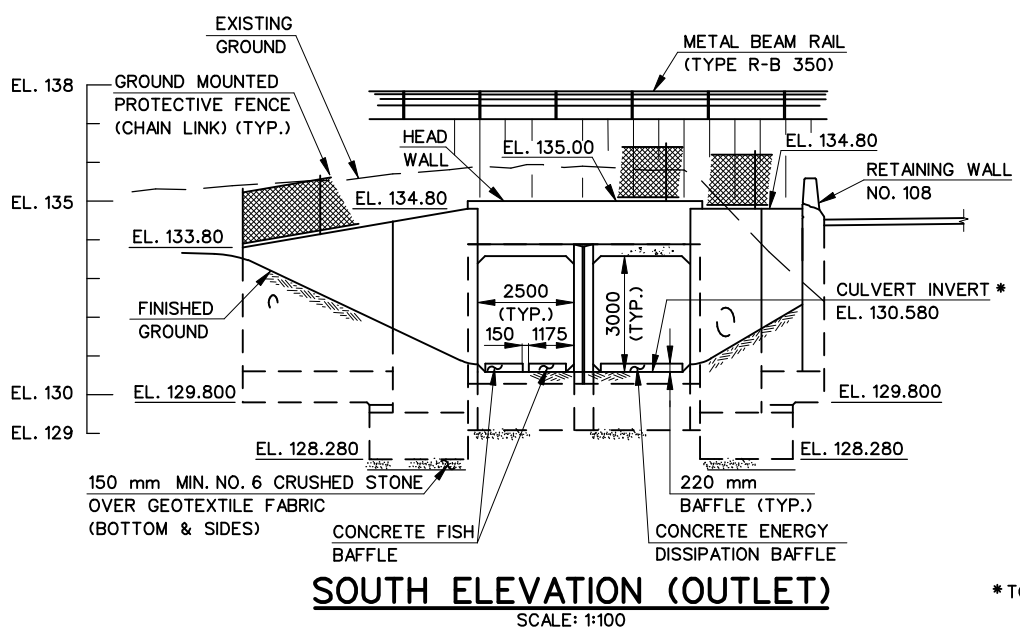
CURVE NO. BPB-4 BEAVER POND BROOK	
P.C.	STA. BPB 6+287.711
	N 230949.649
	E 284210.842
C.C.	N 230995.225
	E 284190.280
P.T.	STA. BPB 6+323.049
	N 230973.918
	E 284235.513
Δ	40° 29' 40" Left
T (m)	18.443
L (m)	35.338
R (m)	50.000

CURVE NO. BPB-5 BEAVER POND BROOK	
P.C.	STA. BPB 6+374.112
	N 231020.113
	E 284257.272
C.C.	N 231011.590
	E 284275.365
P.T.	STA. BPB 6+389.318
	N 231030.235
	E 284268.127
Δ	43° 33' 41" Right
T (m)	7.992
L (m)	15.206
R (m)	20.000

CURVE NO. 38 PLANK ROAD EAST	
P.C.	STA. PRE 51+206.869
	N 230997.144
	E 284256.050
C.C.	N 231251.978
	E 284204.477
P.T.	STA. PRE 51+269.851
	N 231016.955
	E 284315.673
Δ	13° 52' 45.16" Left
T (m)	31.646
L (m)	62.982
R (m)	260.000

BORING LEGEND
 - NEW BORING (2001)

PLAN
SCALE: 1:250



CURVE DATA

WATERSHED AREA	DESIGN FLOW FREQ.	DESIGN FLOW
7.9 km ²	100-YEAR	29.9 m ³ /s

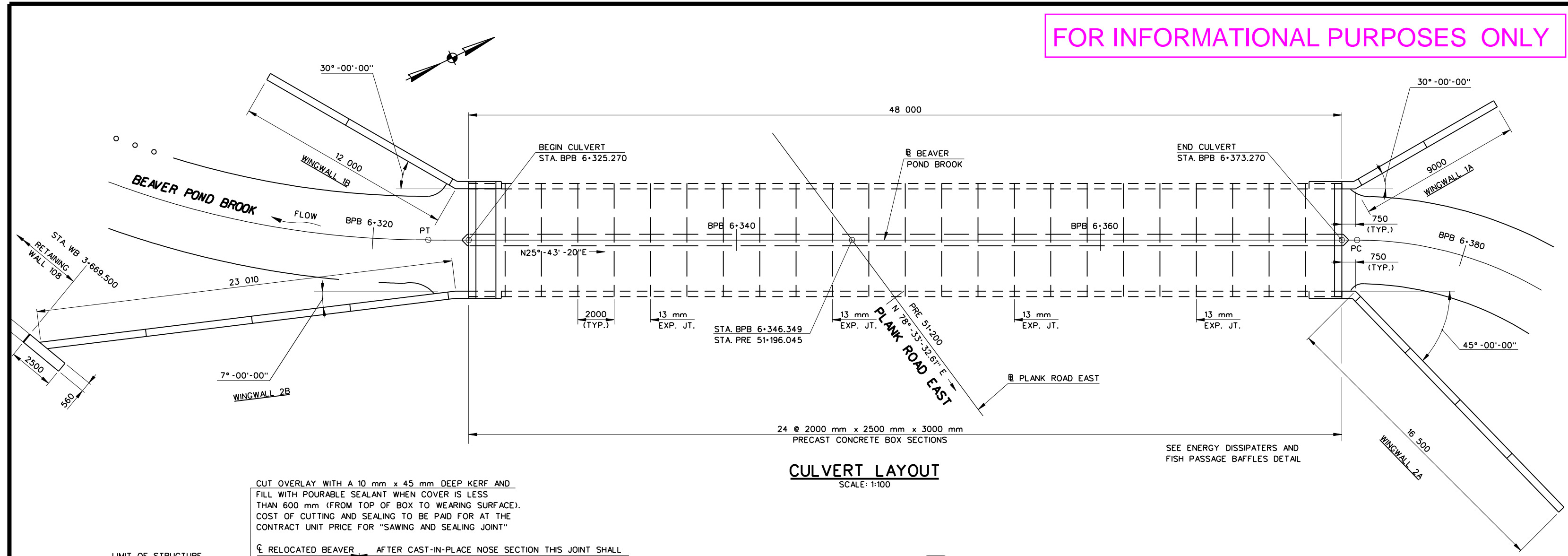
DESIGN FLOW ELEVATION	134.22 (INLET)
NORMAL FLOW ELEVATION	130.2 *

* OBSERVED AT STA. BPB 6+310, RIGHT 6m

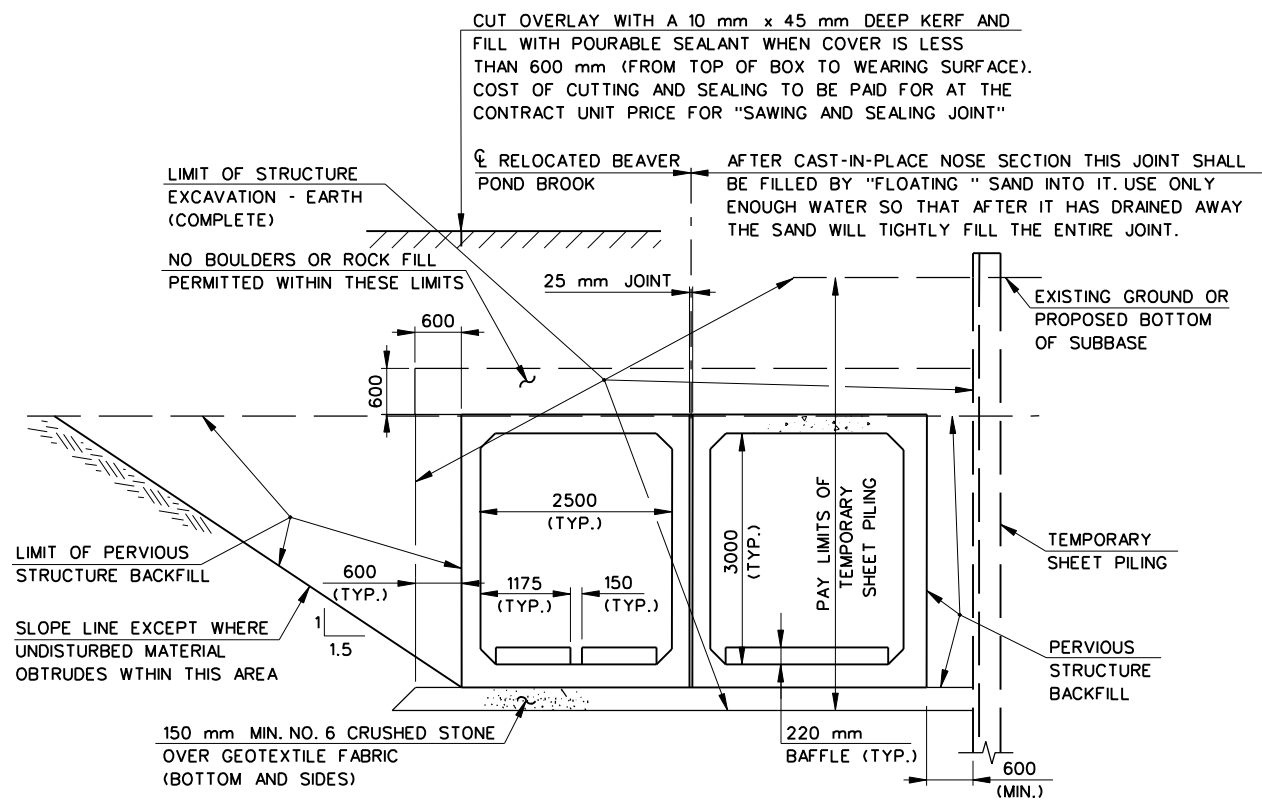
NOTICE TO BRIDGE INSPECTORS	
THE DEPARTMENT'S BRIDGE SAFETY PROCEDURES REQUIRE THIS BRIDGE TO BE INSPECTED FOR, BUT NOT LIMITED TO, ALL APPROPRIATE COMPONENTS INDICATED IN THE GOVERNING MANUALS FOR BRIDGE INSPECTION. ATTENTION MUST BE GIVEN TO INSPECTING THE FOLLOWING SPECIAL COMPONENTS AND DETAILS. (THE LISTING OF COMPONENTS FOR SPECIFIC ATTENTION SHALL NOT BE CONSTRUED TO REDUCE THE IMPORTANCE OF INSPECTION OF ANY OTHER COMPONENT OF THE STRUCTURE.) THE FREQUENCY OF INSPECTION OF THIS STRUCTURE SHALL BE IN ACCORDANCE WITH THE GOVERNING MANUALS FOR BRIDGE INSPECTION, UNLESS OTHERWISE DIRECTED BY THE ENGINEER OF BRIDGES AND STRUCTURES.	
COMPONENT OR DETAIL	BRIDGE SHEET REFERENCE

<p>THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE TRUE CONDITIONS OR THE ACTUAL QUANTITIES OR DISTRIBUTION OF QUANTITIES OF WORK WHICH WILL BE REQUIRED</p>	<p>CADD ...0273F203b01.brg PLOTTED 7/17/2013</p>	<p>DESIGNER: H. DIERKS DRAFTER: A. PRESS CHECKED BY: N. VYAS DATE CHECKED:</p>	<p>STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION</p>	<p>PROJECT TITLE: RECONSTRUCTION OF I-84 WATERBURY PLANK RD. EAST OVER BEAVER POND BROOK STRUCTURE NO. 151-0273-06622</p>	<p>TOWN: WATERBURY</p>	<p>PROJECT NO.: 151-273</p>
<p>SCALE AS NOTED</p>	<p>ENGINEER: BERGER LEHMAN ASSOCIATES, P.C.</p>	<p>APPROVED BY: _____ DATE: _____</p>	<p>ASSOCIATES, P.C.</p>	<p>DRAWING TITLE: GENERAL PLAN AND ELEVATION</p>	<p>DRAWING NO.: S1</p>	<p>SHEET NO.:</p>

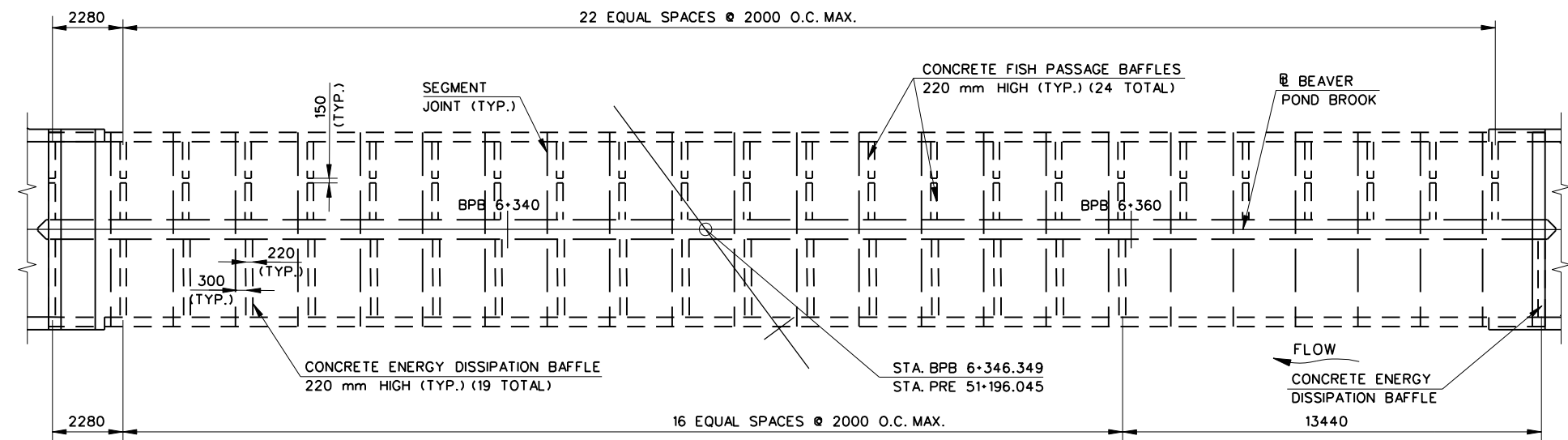
FOR INFORMATIONAL PURPOSES ONLY



CULVERT LAYOUT
SCALE: 1:100



TYPICAL SECTION
SCALE: 1:50
MAXIMUM DESIGN FOUNDATION PRESSURE-0.9 MPa (ULTIMATE)
(LOOKING UPSTREAM)



ENERGY DISSIPATORS AND FISH PASSAGE BAFFLES
SCALE: 1:100

NOTE: FOR BAFFLE DETAIL, SEE STR. DWG. S5

REV.	DATE	DESCRIPTION	SHEET NO.

THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE TRUE CONDITIONS OR THE ACTUAL QUANTITIES OR DISTRIBUTION OF QUANTITIES OF WORK WHICH WILL BE REQUIRED

CADD ..\02732\03103.brg
PLOTTED 1/13/210
SCALE AS NOTED

DESIGNER
H. DIERKS
DRAFTER
A. PRESS
CHECKED BY:
N. VYAS
DATE CHECKED:

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
BERGER LEHMAN ASSOCIATES, P.C.
ENGINEER
APPROVED BY: DATE:

PROJECT TITLE:
RECONSTRUCTION OF I-84 WATERBURY
PLANK RD. EAST OVER BEAVER POND BROOK
STRUCTURE NO. 151-0273-06622

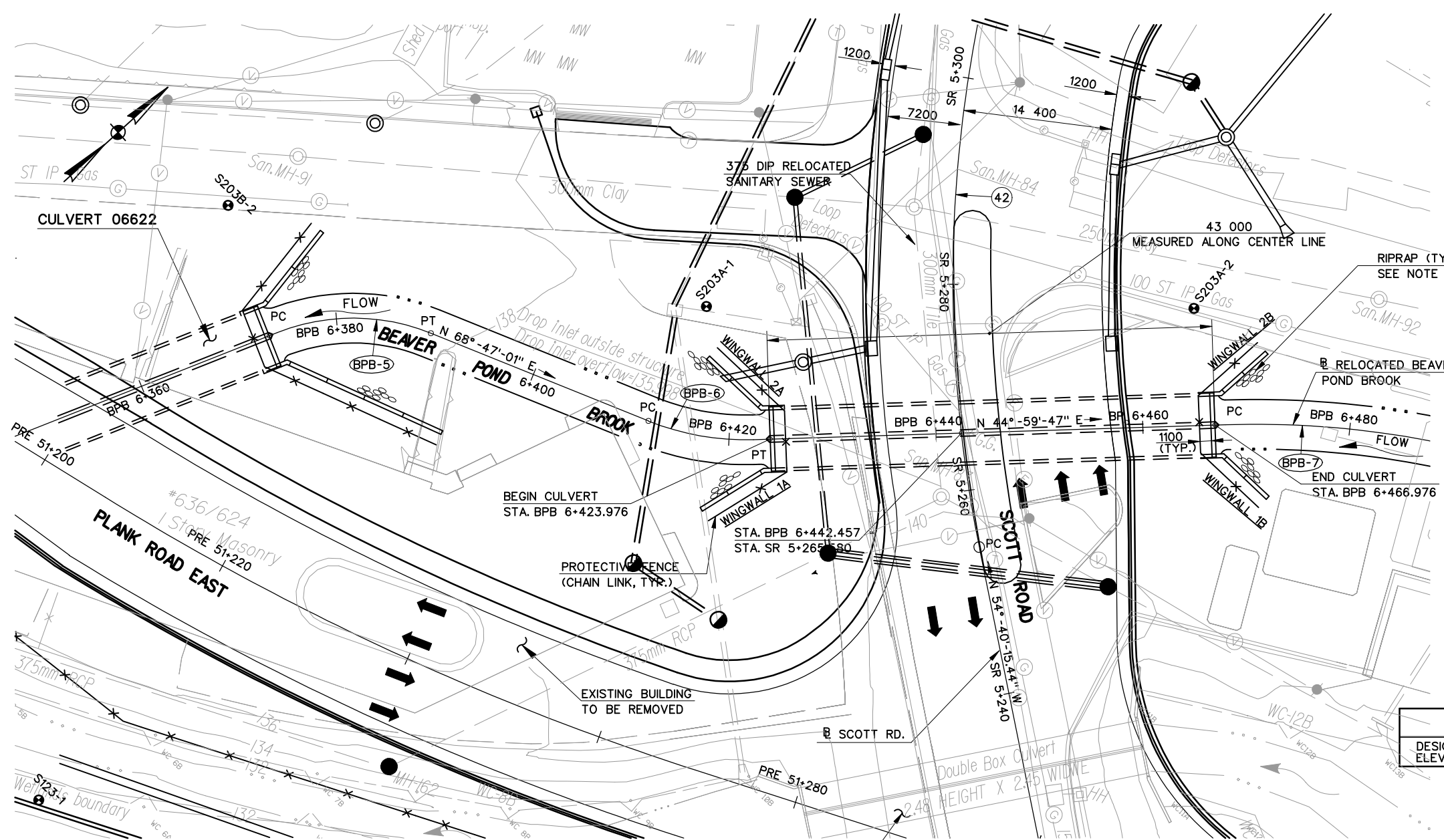
TOWN:
WATERBURY
DRAWING TITLE:
CULVERT LAYOUT AND TYPICAL SECTION

PROJECT NO.:
151-273
DRAWING NO.:
S3
SHEET NO.:

FOR INFORMATIONAL PURPOSES ONLY

GENERAL NOTES

- SPECIFICATIONS:** CONNECTICUT DEPARTMENT OF TRANSPORTATION FORM 816 (2004) WITH SUPPLEMENTS THERETO DATED (- / - / -) AND SPECIAL PROVISIONS.
- DESIGN SPECIFICATIONS:** STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES (AASHTO-1996) BY THE STRENGTH DESIGN METHOD (LOAD FACTOR DESIGN).
- ALLOWABLE DESIGN STRESSES:**
CLASS "A" CONCRETE BASED ON $f'c = 21 \text{ MPa}$
REINFORCEMENT (ASTM A515M GRADE 420) $f_y = 414 \text{ MPa}$
- LIVE LOAD:** HS20.
- CLASS "A" CONCRETE:** CLASS "A" CONCRETE SHALL BE USED FOR THE ENTIRE STRUCTURE AND THE PARAPETS.
- JOINT SEAL:** SEE SPECIAL PROVISIONS.
- EXPOSED EDGES:** EXPOSED EDGES OF CONCRETE SHALL BE BEVELED 25 mm x 25 mm UNLESS DIMENSIONED OTHERWISE.
- CONCRETE COVER:** ALL REINFORCEMENT SHALL HAVE 50 mm COVER UNLESS DIMENSIONED OTHERWISE.
- REINFORCEMENT:** ALL REINFORCEMENT SHALL BE ASTM A615M GRADE 420.
- PERFORMED EXPANSION JOINT FILLER:** THE COST OF FURNISHING AND INSTALLING PERFORMED EXPANSION JOINT FILLER SHALL BE INCLUDED IN THE COST OF THE ITEM "CLASS 'A' CONCRETE."
- CONSTRUCTION JOINTS:** CONSTRUCTION JOINTS, OTHER THAN THOSE SHOWN ON THE PLANS, WILL NOT BE PERMITTED WITHOUT THE PRIOR APPROVAL OF THE ENGINEER.
- ELEVATIONS:** ALL ELEVATIONS ARE GIVEN IN METERS (m).
- DIMENSIONS:** ALL DIMENSIONS ARE GIVEN IN MILLIMETERS (mm).
- STATIONING:** STATIONS ARE GIVEN IN METERS (m).
- DECIMAL DIMENSIONS:** WHEN DIMENSIONS ARE GIVEN TO LESS THAN THREE DECIMAL PLACES, THE OMITTED DIGITS SHALL BE ASSUMED TO BE ZEROS.
- RIVER RELOCATION & GRADING PLANS:** REFER TO BEAVER POND BROOK RELOCATION PLANS.
- SEQUENCE OF CONSTRUCTION OPERATIONS:** REFER TO THE MAINTENANCE AND PROTECTION OF TRAFFIC STAGING PLANS AND SECTION 1.08 - PROSECUTION AND PROGRESS SPECIFICATION FOR THE SEQUENCING OF CONSTRUCTION OPERATIONS.



DESIGN FLOW ELEVATION (m)	CULVERT INLET
	136.14

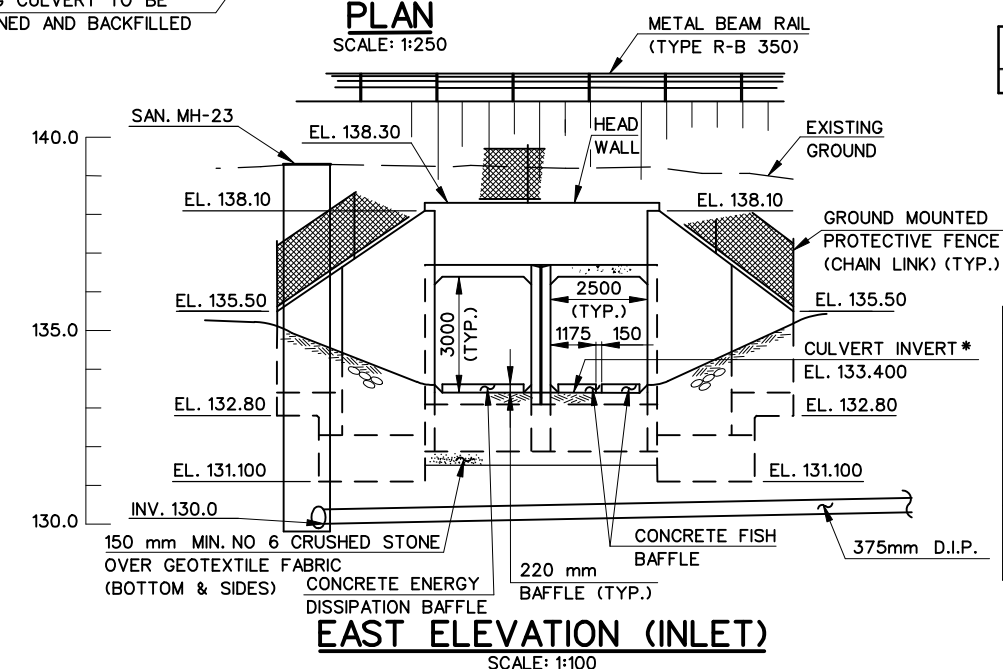
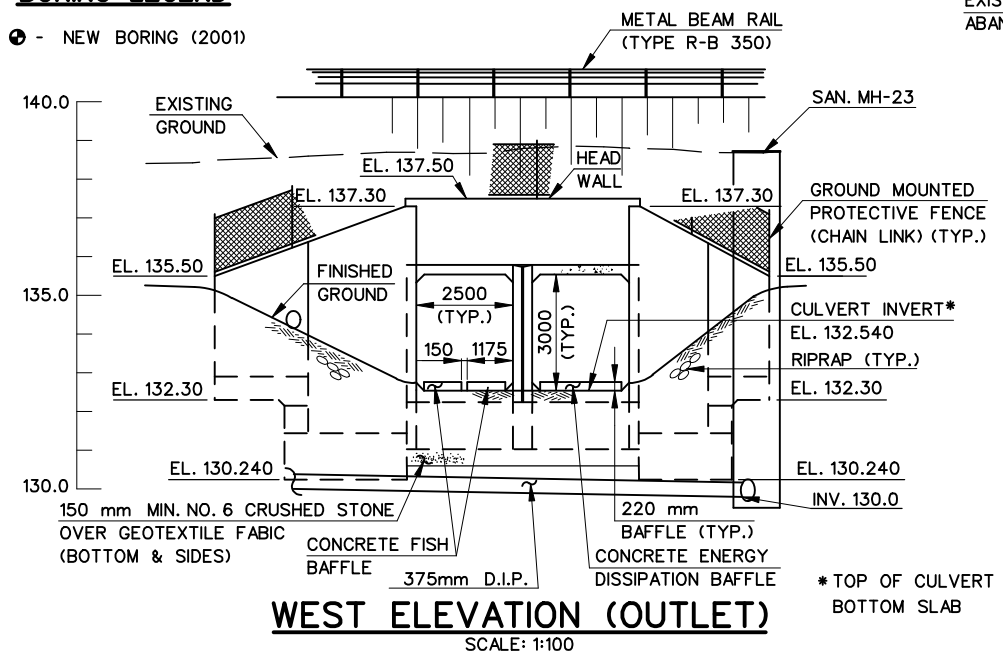
NOTICE TO BRIDGE INSPECTORS

THE DEPARTMENT'S BRIDGE SAFETY PROCEDURES REQUIRE THIS BRIDGE TO BE INSPECTED FOR, BUT NOT LIMITED TO, ALL APPROPRIATE COMPONENTS INDICATED IN THE GOVERNING MANUALS FOR BRIDGE INSPECTION. ATTENTION MUST BE GIVEN TO INSPECTING THE FOLLOWING SPECIAL COMPONENTS AND DETAILS. (THE LISTING OF COMPONENTS FOR SPECIFIC ATTENTION SHALL NOT BE CONSTRUED TO REDUCE THE IMPORTANCE OF INSPECTION OF ANY OTHER COMPONENT OF THE STRUCTURE.) THE FREQUENCY OF INSPECTION OF THIS STRUCTURE SHALL BE IN ACCORDANCE WITH THE GOVERNING MANUALS FOR BRIDGE INSPECTION, UNLESS OTHERWISE DIRECTED BY THE ENGINEER OF BRIDGES AND STRUCTURES.

COMPONENT OR DETAIL	BRIDGE SHEET REFERENCE

BORING LEGEND

● - NEW BORING (2001)



WATERSHED AREA	DESIGN FLOW FREQ.	DESIGN FLOW
7.9 km ²	100-YEAR	29.9 m ³ /s

CURVE NO. BPB-5	
BEAVER POND BROOK	
P.C.	STA. BPB 6+374.112
	N 231020.113
	E 284257.272
C.C.	N 231011.590
	E 284275.365
P.T.	STA. BPB 6+389.318
	N 231030.235
	E 284268.127
Δ	43° 33' 41" Right
T (m)	7.992
L (m)	15.206
R (m)	20.000

CURVE NO. BPB-6	
BEAVER POND BROOK	
P.C.	STA. BPB 6+411.980
	N 231038.436
	E 284289.254
C.C.	N 231061.742
	E 284280.207
P.T.	STA. BPB 6+422.359
	N 231044.065
	E 284297.886
Δ	23° 47' 14" Left
T (m)	5.265
L (m)	10.379
R (m)	25.000

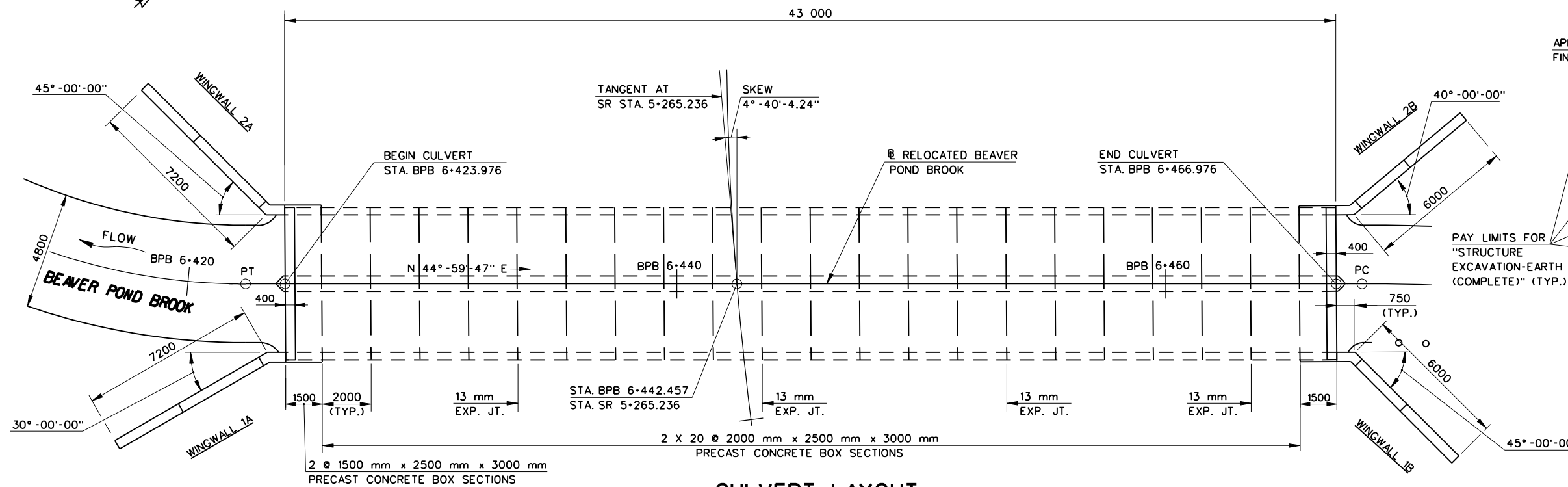
CURVE NO. BPB-7	
BEAVER POND BROOK	
P.C.	STA. BPB 6+468.032
	N 231076.362
	E 284330.179
C.C.	N 231012.726
	E 284393.822
P.T.	STA. BPB 6+536.234
	N 231102.692
	E 284391.333
Δ	43° 25' 08" Right
T (m)	35.833
L (m)	68.202
R (m)	90.000

CURVE NO. 42	
SCOTT ROAD	
P.C.	STA. SR 5+254.228
	N 231051.317
	E 284321.059
C.C.	N 231157.377
	E 284396.235
P.T.	STA. SR 5+332.824
	N 231112.849
	E 284274.098
Δ	34° 38' 24.65" Right
T (m)	40.541
L (m)	78.596
R (m)	130.000

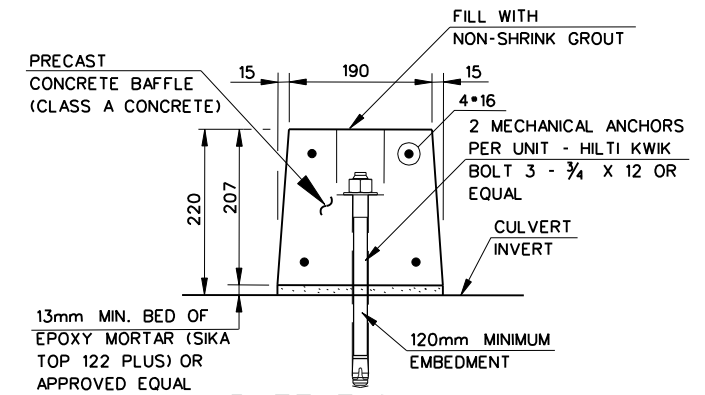
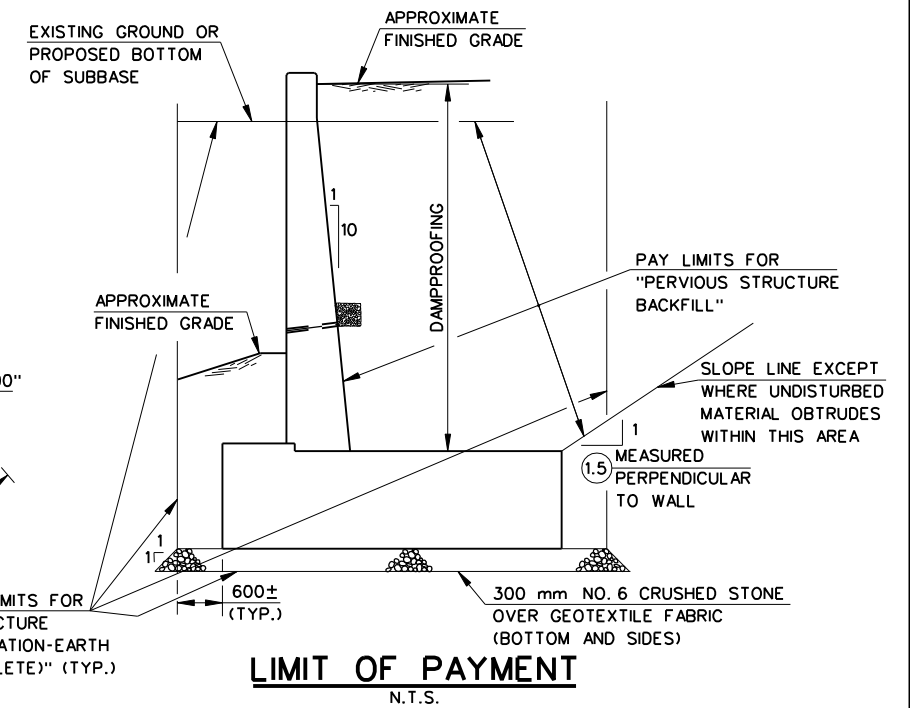
CURVE DATA

<p>THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE TRUE CONDITIONS OR THE ACTUAL QUANTITIES OR DISTRIBUTION OF QUANTITIES OF WORK WHICH WILL BE REQUIRED</p>	<p>CADD: 10273203a01.brg PLOTTED: 7/17/2013</p>	<p>DESIGNER: H. DIERKS DRAFTER: M. OFFENBERG CHECKED BY: N. VYAS DATE CHECKED:</p>	<p align="center">STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION</p> <p align="center">BERGER LEHMAN ASSOCIATES, P.C.</p>	<p>PROJECT TITLE: RECONSTRUCTION OF I-84 WATERBURY SCOTT RD. OVER BEAVER POND BROOK STRUCTURE NO. 151-014</p>	<p>TOWN: WATERBURY</p>	<p>PROJECT NO.: 151-273 DRAWING NO.: S1 SHEET NO.:</p>
<p>REV. DATE DESCRIPTION REVISIONS SHEET NO.</p>	<p>SCALE AS NOTED</p>	<p>APPROVED BY: DATE:</p>	<p>GENERAL PLAN AND ELEVATION</p>	<p>STRUCTURE NO. 151-014</p>	<p>GENERAL PLAN AND ELEVATION</p>	<p> </p>

FOR INFORMATIONAL PURPOSES ONLY



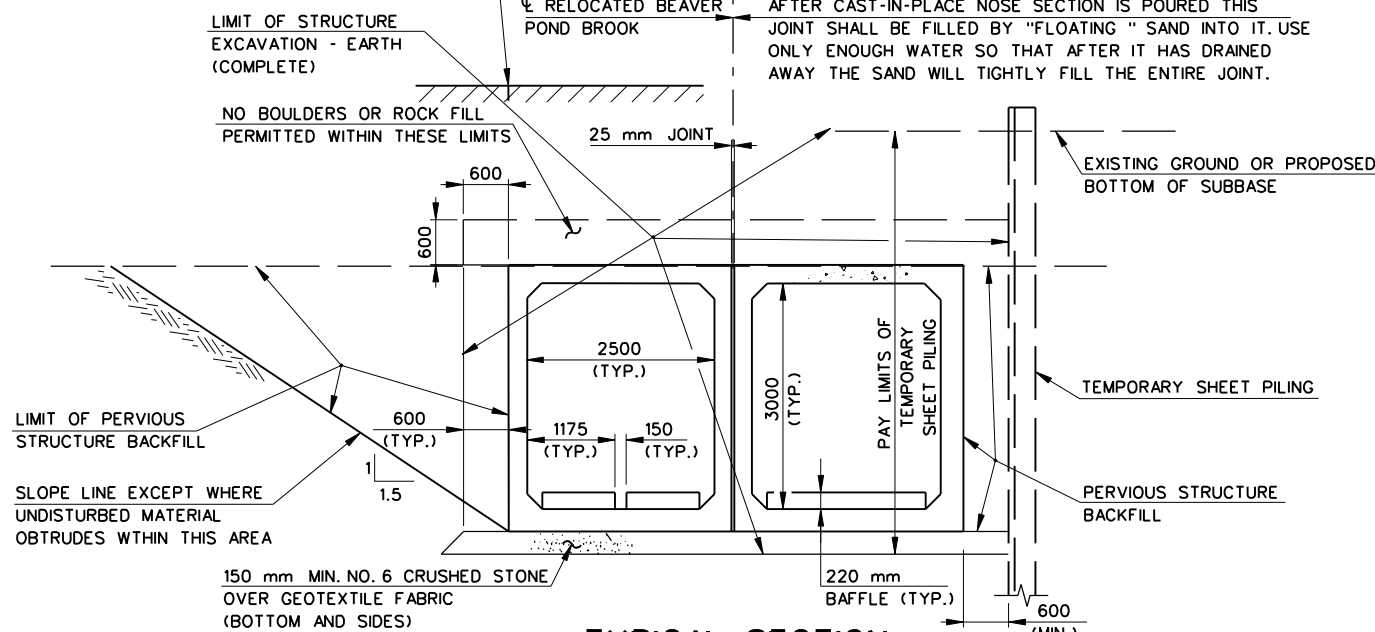
CULVERT LAYOUT
SCALE: 1:100



BAFFLE DETAIL
SCALE: 1:5
COST INCLUDED IN "PRECAST BOX CULVERT"

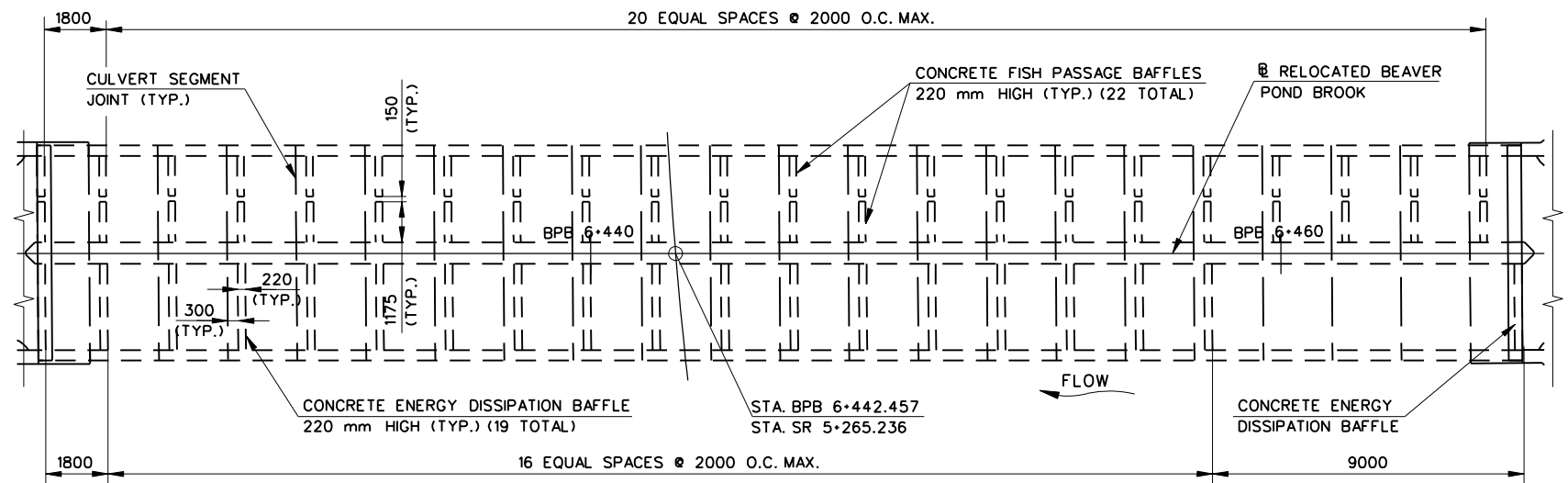
CUT OVERLAY WITH A 10 mm x 45 mm DEEP KERF AND FILL WITH POURABLE SEALANT WHEN COVER IS LESS THAN 600 mm (FROM TOP OF BOX TO WEARING SURFACE). COST OF CUTTING AND SEALING TO BE PAID FOR AT THE CONTRACT UNIT PRICE FOR "SAWING AND SEALING JOINT"

AFTER CAST-IN-PLACE NOSE SECTION IS POURED THIS JOINT SHALL BE FILLED BY "FLOATING" SAND INTO IT. USE ONLY ENOUGH WATER SO THAT AFTER IT HAS DRAINED AWAY THE SAND WILL TIGHTLY FILL THE ENTIRE JOINT.



TYPICAL SECTION

SCALE: 1:50
MAXIMUM DESIGN FOUNDATION PRESSURE 0.9 MPa (ULTIMATE)
(LOOKING UPSTREAM)



ENERGY DISSIPATORS AND FISH PASSAGE BAFFLES

SCALE: 1:100

REV. DATE DESCRIPTION SHEET NO.	THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE TRUE CONDITIONS OR THE ACTUAL QUANTITIES OR DISTRIBUTION OF QUANTITIES OF WORK WHICH WILL BE REQUIRED.	CADD: 10273F203A03 BRG	DESIGNER: H. DIERKS	STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION	PROJECT TITLE: RECONSTRUCTION OF I-84 WATERBURY SCOTT RD. OVER BEAVER POND BROOK STRUCTURE NO. 151-014	TOWN: WATERBURY	PROJECT NO.: 151-273
		PLOTTED 7/30/2013	DRAFTER: A. PRESS		BERGER LEHMAN ASSOCIATES, P.C.	DRAWING TITLE: CULVERT LAYOUT AND TYPICAL SECTION	DRAWING NO.: S3
SCALE AS NOTED		CHECKED BY: N. VYAS	ENGINEER: BERGER LEHMAN ASSOCIATES, P.C.	APPROVED BY:	DATE:	SHEET NO.:	