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

BEAVER POND BROOK

FLOODPLAIN/FLOODWAY ANALYSIS REPORT FOR CT DEEP FLOOD MANAGEMENT CERTIFICATION

Waterbury, Connecticut

June 2006
Revised October 2013

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* Larger scale plots of these maps are included separately.

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^ Three (3) separate versions of each table are provided – Two(2) in U.S. Customary Units (NGVD-29, NAVD-88) and one in Metric (NGVD-29).

APPENDIX

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Hydraulic Backup - HEC-RAS Input Report	Appendix A
Output Printouts and Cross Section Plots	Appendix B
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HEC-RAS Data CD	Rear Pocket

Figure 1- Project Location Map

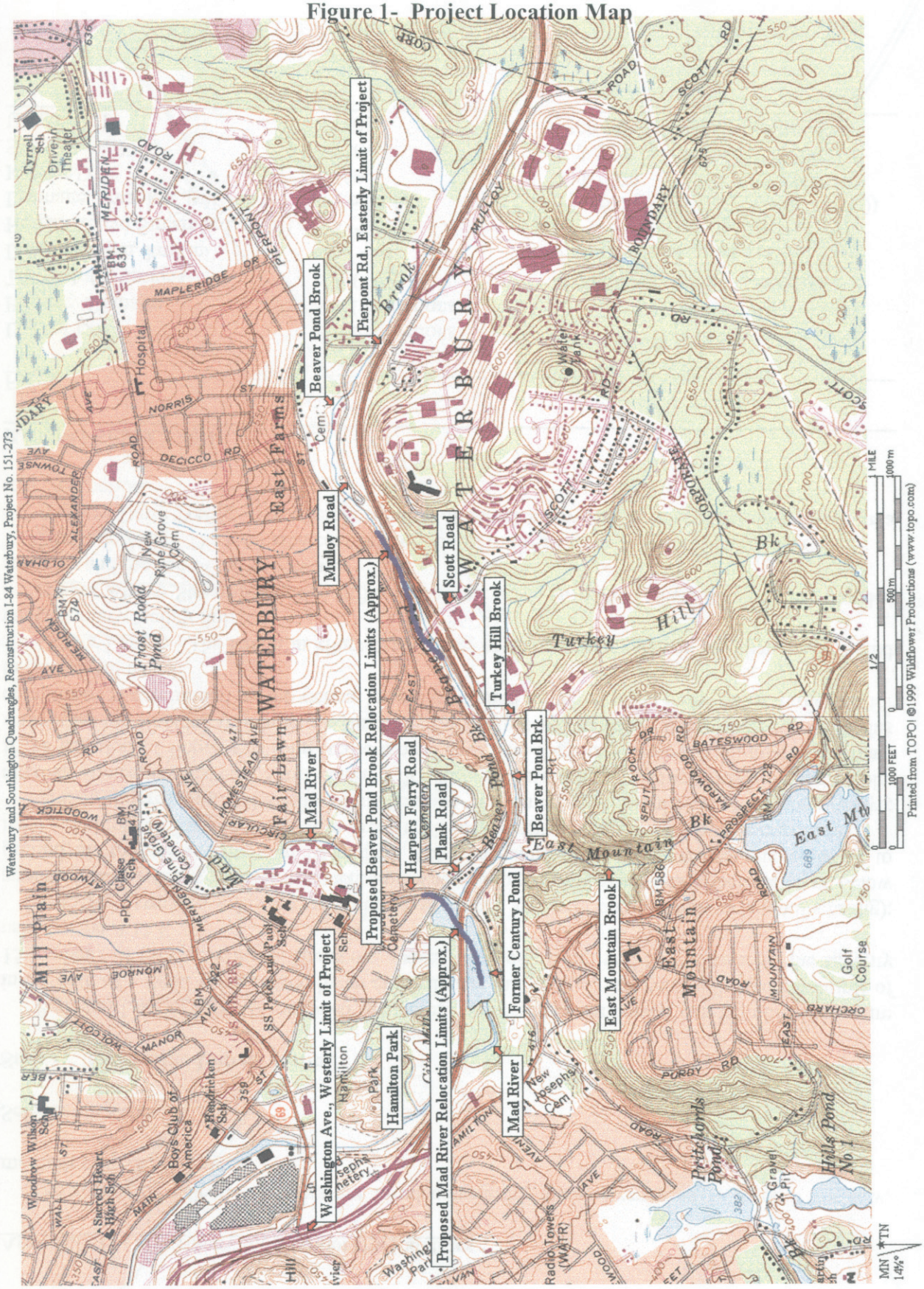

FIGURE 2. PROJECT AREA/CROSS SECTION LOCATION PLAN

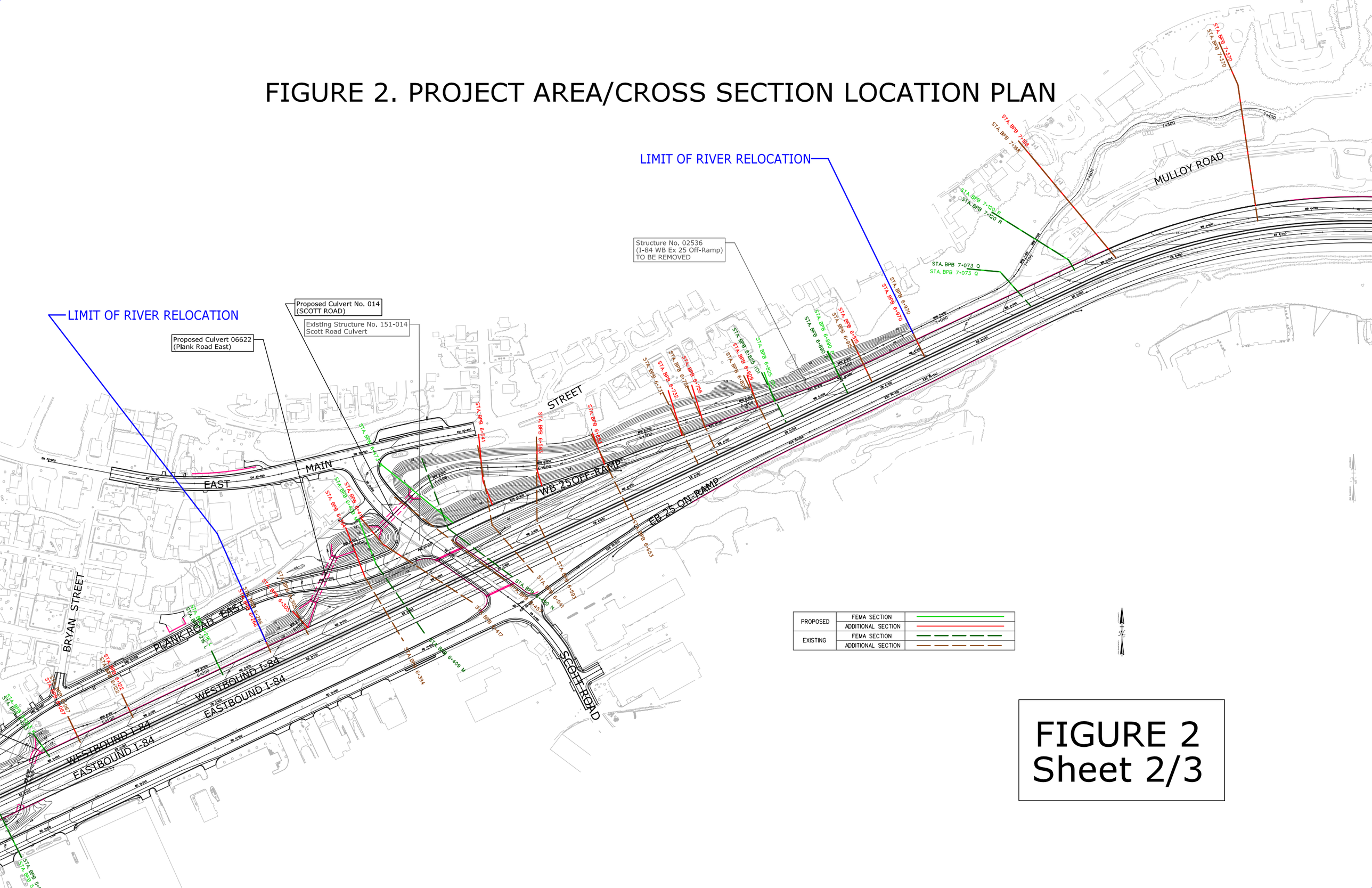

FIGURE 2
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FIGURE 2. PROJECT AREA/CROSS SECTION LOCATION PLAN

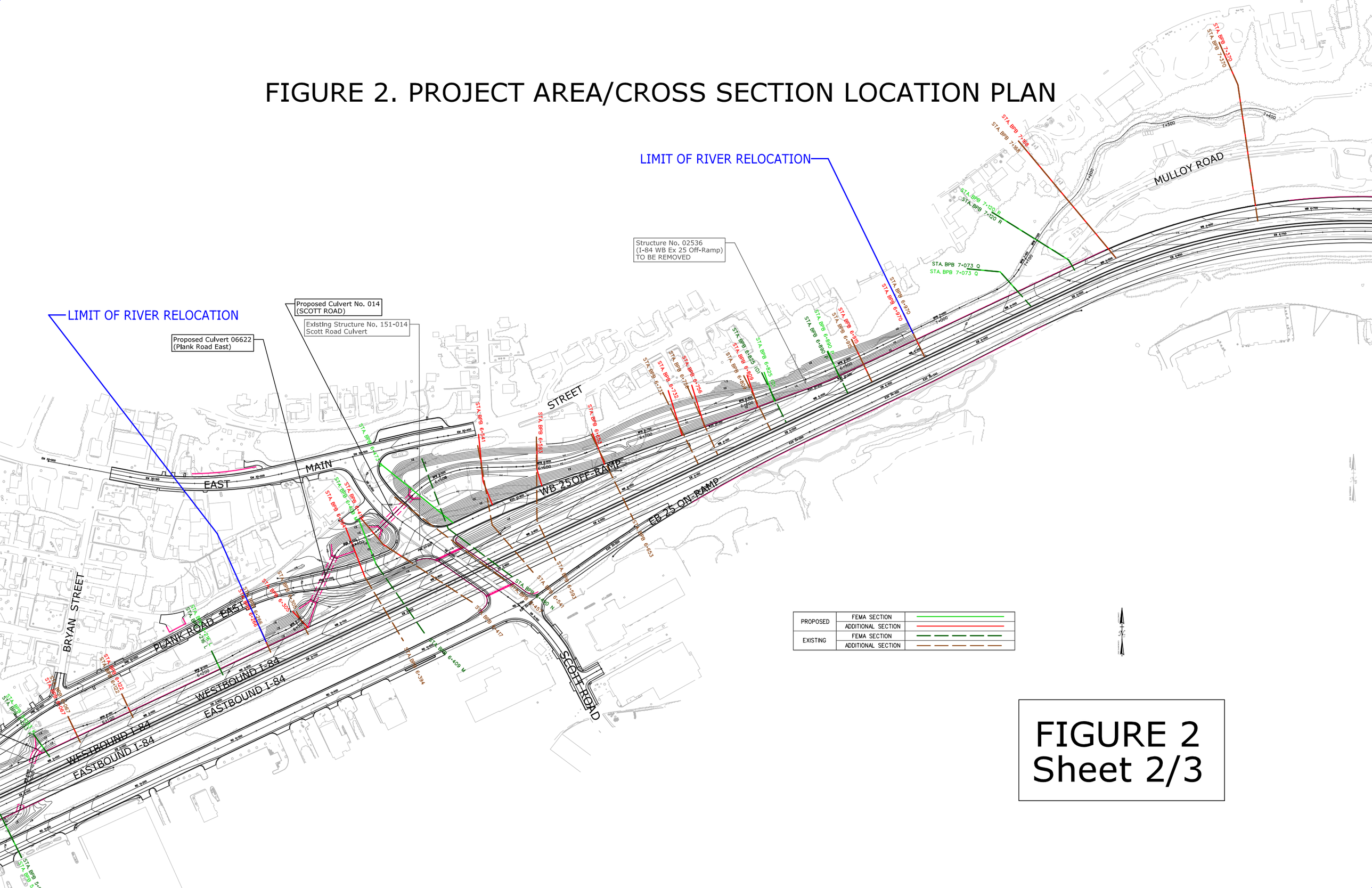

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FIGURE 2. PROJECT AREA/CROSS SECTION LOCATION PLAN

FIGURE 2
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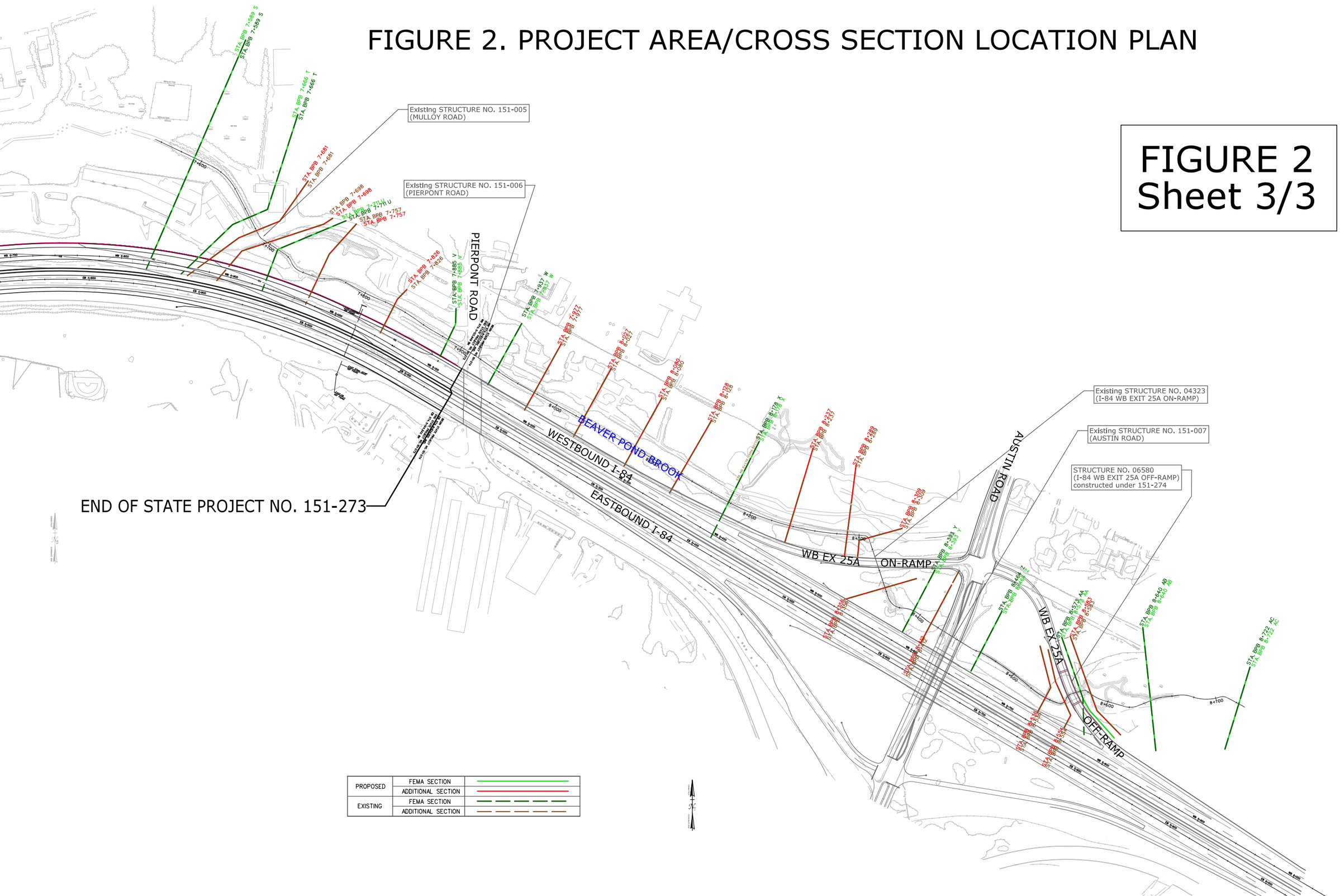


FIGURE 3. EFFECTIVE AND EXISTING (PRE-PROJECT) FEMA FLOOD BOUNDARY AND FLOODWAY

BEAVER POND BROOK

LEGENDS	
FLOOD BOUNDARY/PLAIN	EXISTING
500-YEAR	
100-YEAR	
FLOODWAY	
STREAM	
CROSS SECTION	
HIGHWAY/PROPERTY LINE (EX.)	

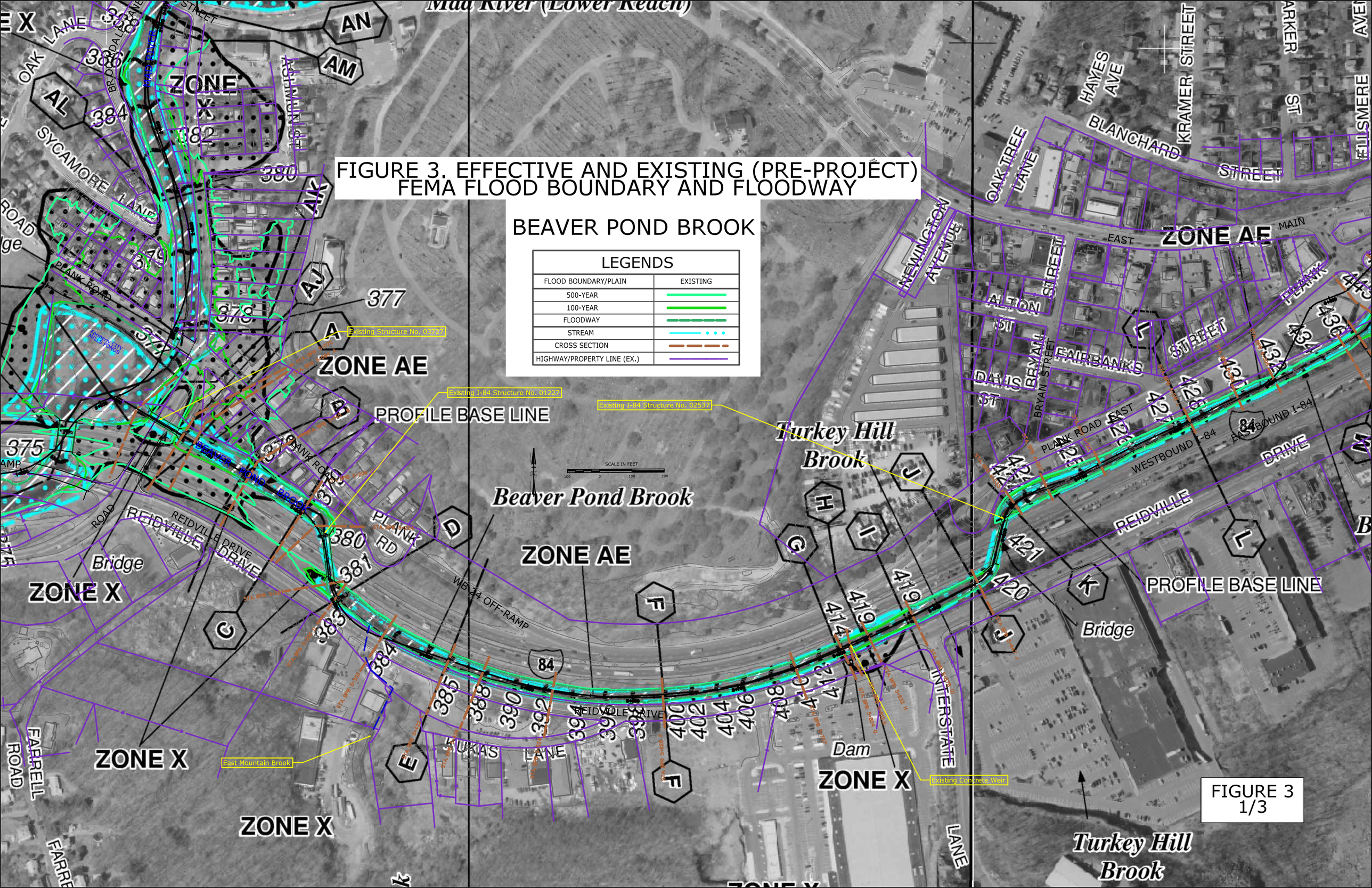
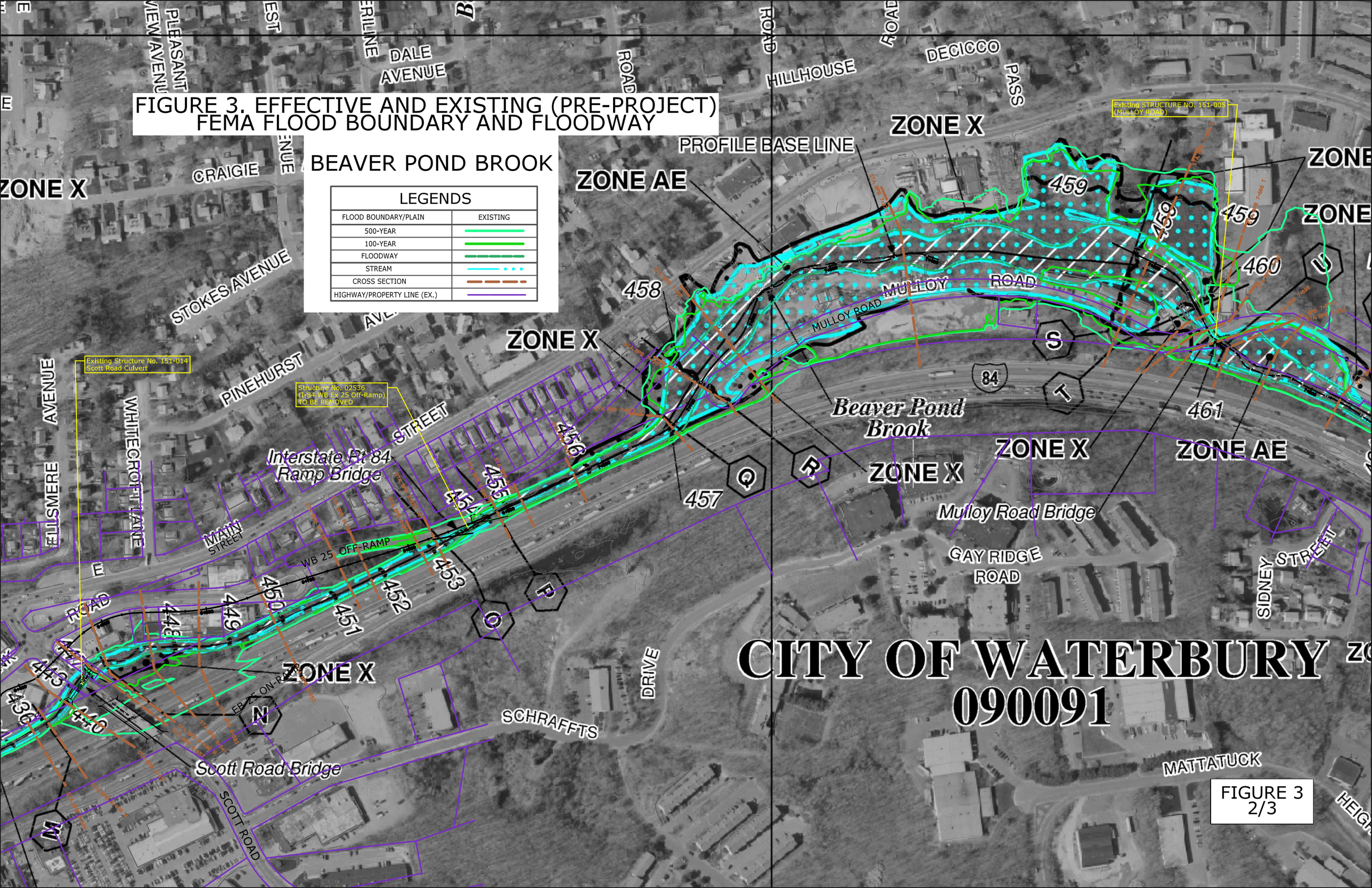


FIGURE 3. EFFECTIVE AND EXISTING (PRE-PROJECT) FEMA FLOOD BOUNDARY AND FLOODWAY

BEAVER POND BROOK

LEGENDS	
FLOOD BOUNDARY/PLAIN	EXISTING
500-YEAR	
100-YEAR	
FLOODWAY	
STREAM	
CROSS SECTION	
HIGHWAY/PROPERTY LINE (EX.)	



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090091

FIGURE 3
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FIGURE 3. EFFECTIVE AND EXISTING (PRE-PROJECT) FEMA FLOOD BOUNDARY AND FLOODWAY

BEAVER POND BROOK

LEGENDS	
FLOOD BOUNDARY/PLAIN	EXISTING
500-YEAR	
100-YEAR	
FLOODWAY	
STREAM	
CROSS SECTION	
HIGHWAY/PROPERTY LINE (EX.)	

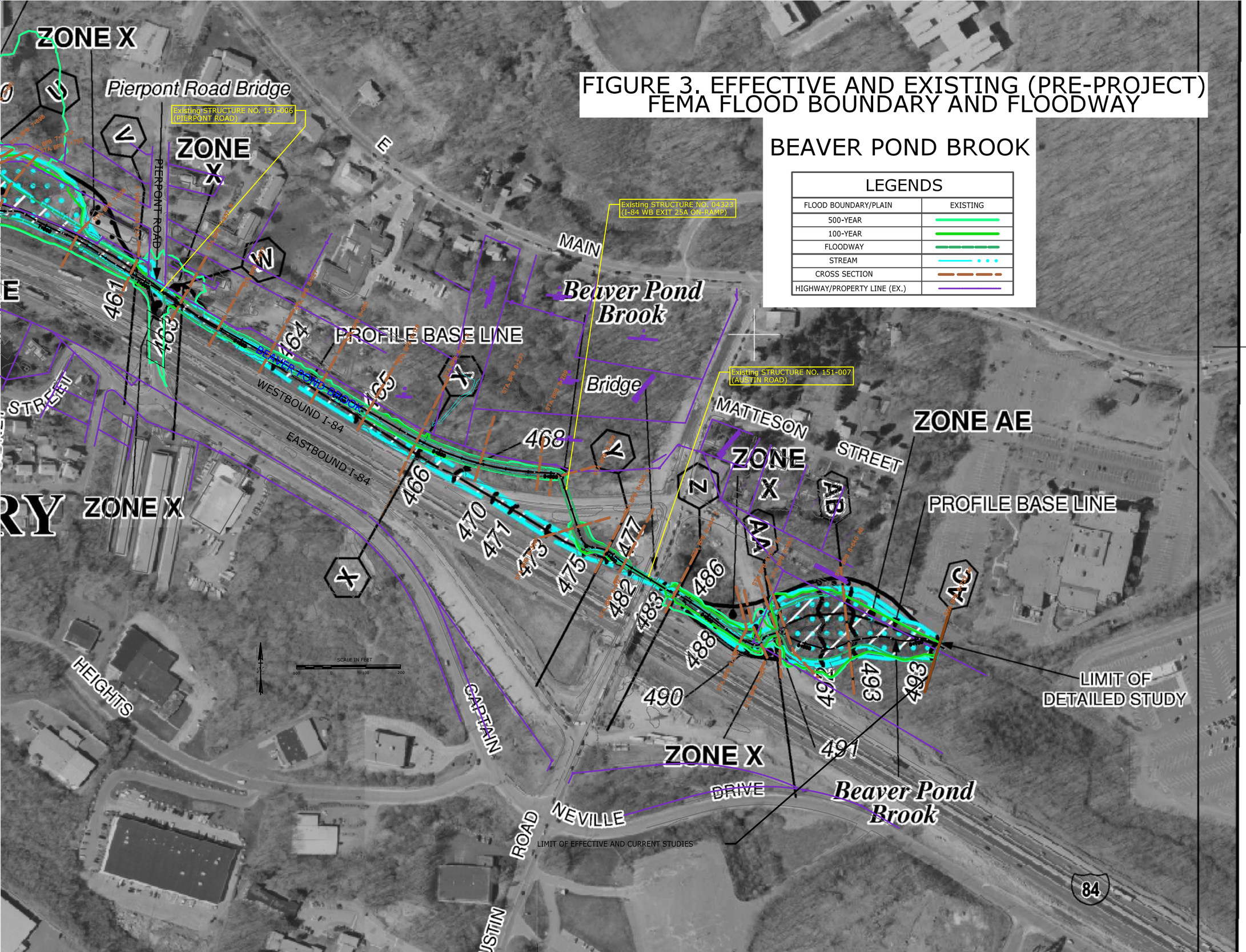

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FIGURE 4.
EXISTING (PRE-PROJECT) AND PROPOSED (POST-PROJECT) FEMA FLOOD BOUNDARY AND FLOODWAY

LEGENDS

FLOOD BOUNDARY/PLAIN	EXISTING	PROPOSED*
500-YEAR		
100-YEAR		
FLOODWAY		
STREAM		
CROSS SECTION		
PROPOSED STRUCTURE		
HIGHWAY/PROPERTY LINE(EX.)		
EASEMENT/TAKING LINE		
EFFECTIVE FEMA FLOODPLAIN BEYOND STUDY LIMITS		

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

SCALE IN FEET
100 0 100 200

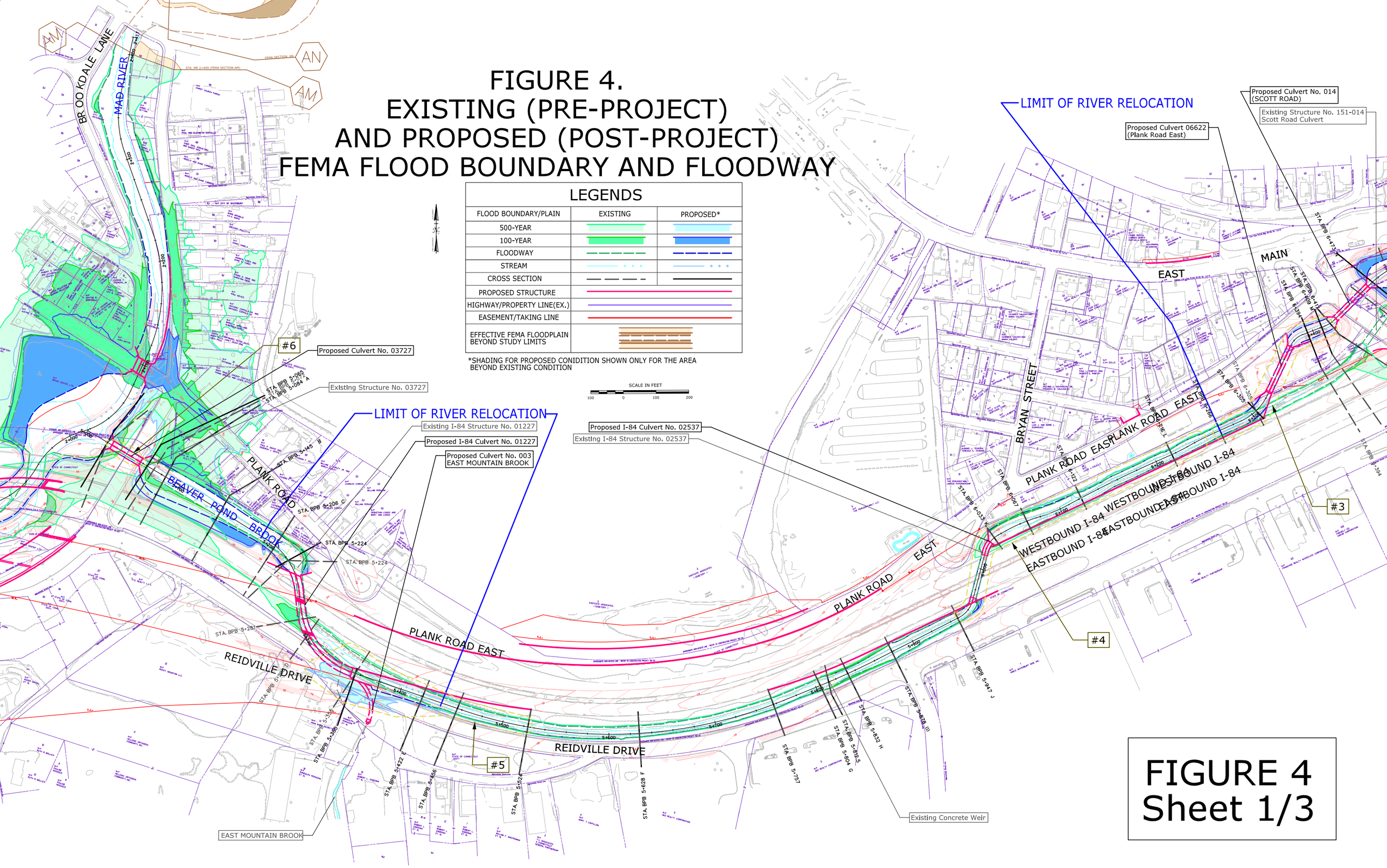

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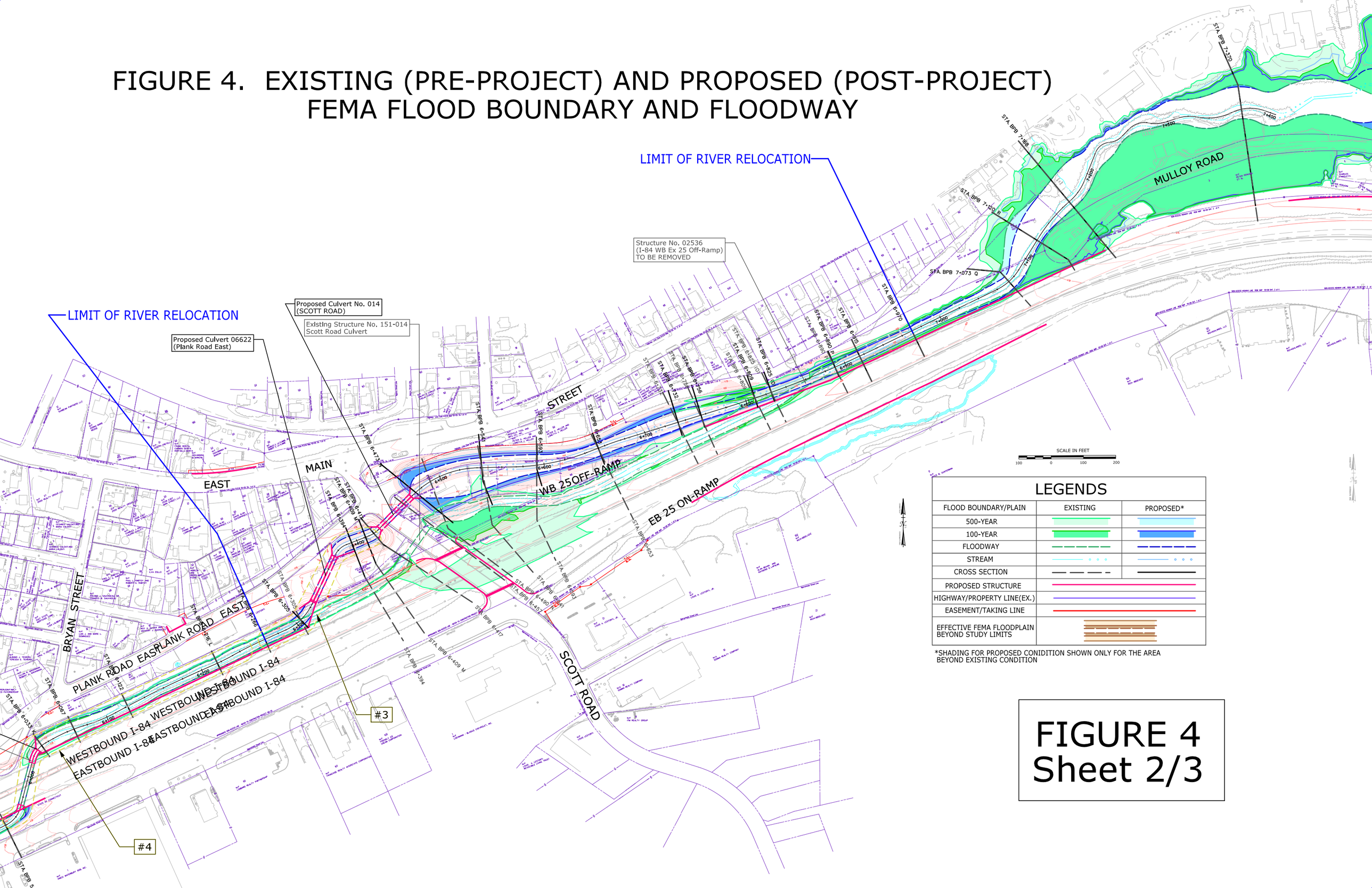
FIGURE 4. EXISTING (PRE-PROJECT) AND PROPOSED (POST-PROJECT) FEMA FLOOD BOUNDARY AND FLOODWAY



LEGENDS

FLOOD BOUNDARY/PLAIN	EXISTING	PROPOSED*
500-YEAR		
100-YEAR		
FLOODWAY		
STREAM		
CROSS SECTION		
PROPOSED STRUCTURE		
HIGHWAY/PROPERTY LINE(EX.)		
EASEMENT/TAKING LINE		
EFFECTIVE FEMA FLOODPLAIN BEYOND STUDY LIMITS		

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

FIGURE 4
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FIGURE 4. EXISTING (PRE-PROJECT) AND PROPOSED (POST-PROJECT) FEMA FLOOD BOUNDARY AND FLOODWAY

FIGURE 4
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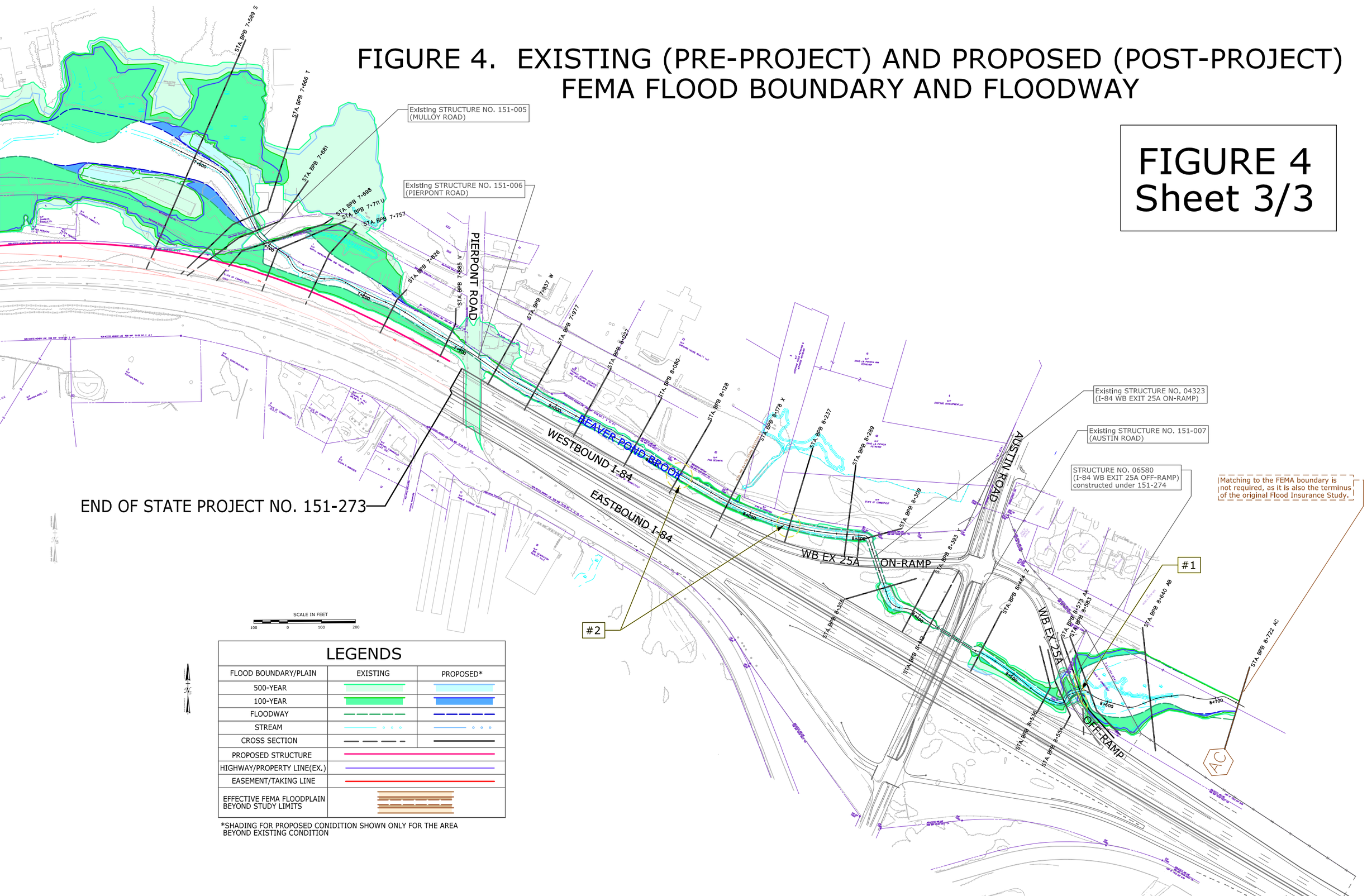

FIGURE 5.
PROPOSED (POST-PROJECT)
FEMA FLOOD BOUNDARY AND FLOODWAY

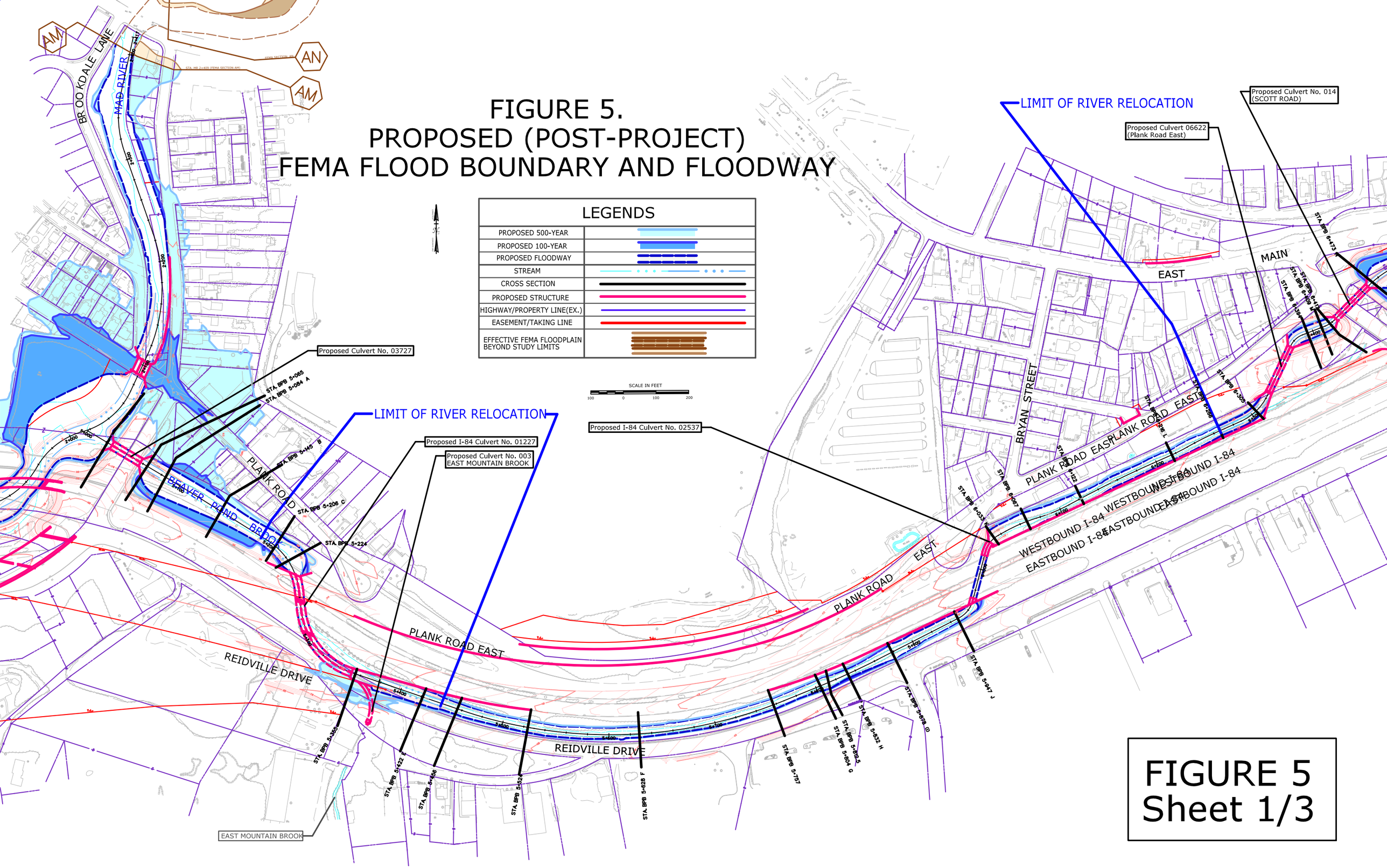

FIGURE 5
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FIGURE 5. PROPOSED (POST-PROJECT) FEMA FLOOD BOUNDARY AND FLOODWAY

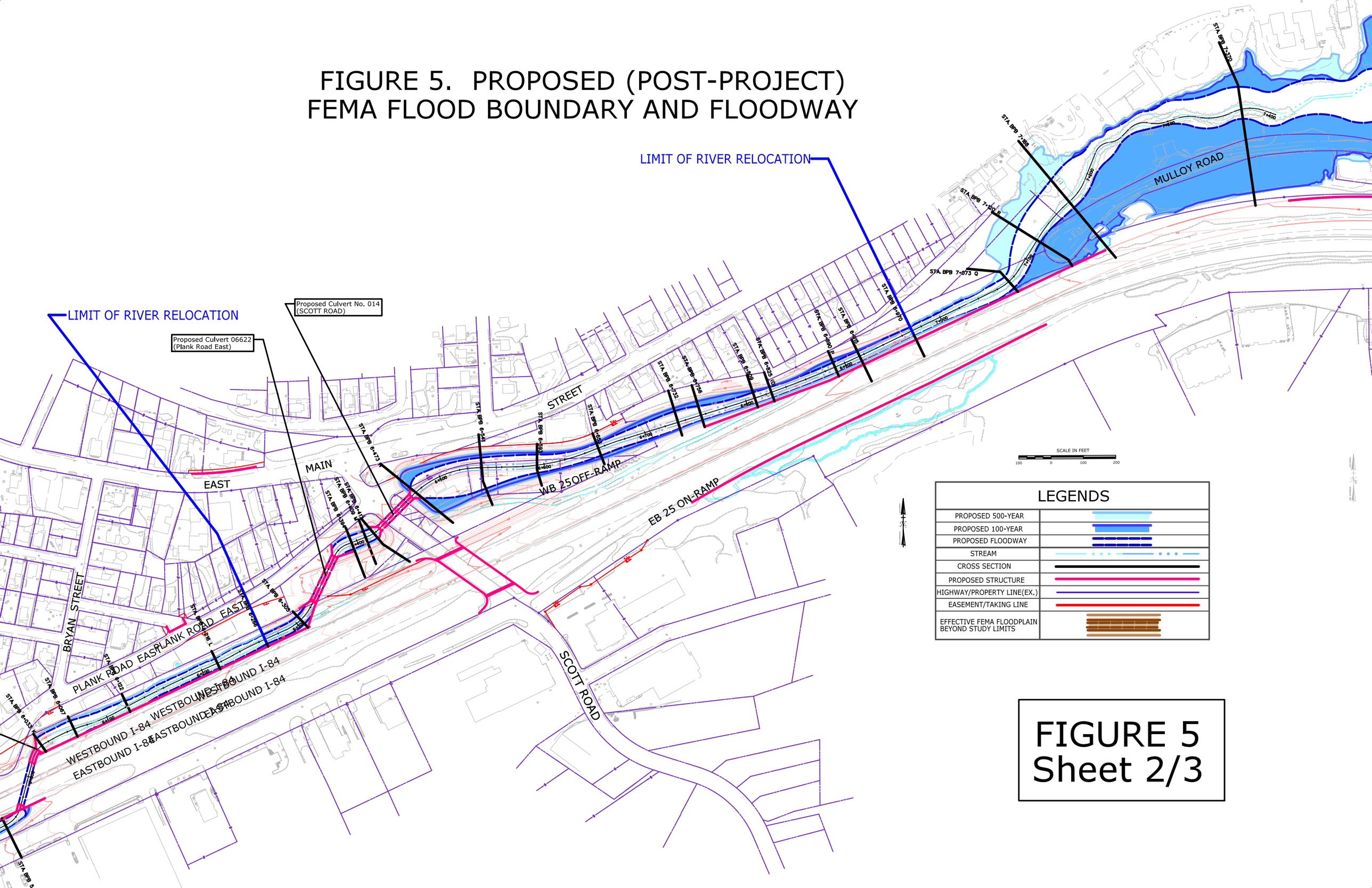

FIGURE 5
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FIGURE 5. PROPOSED (POST-PROJECT) FEMA FLOOD BOUNDARY AND FLOODWAY

FIGURE 5
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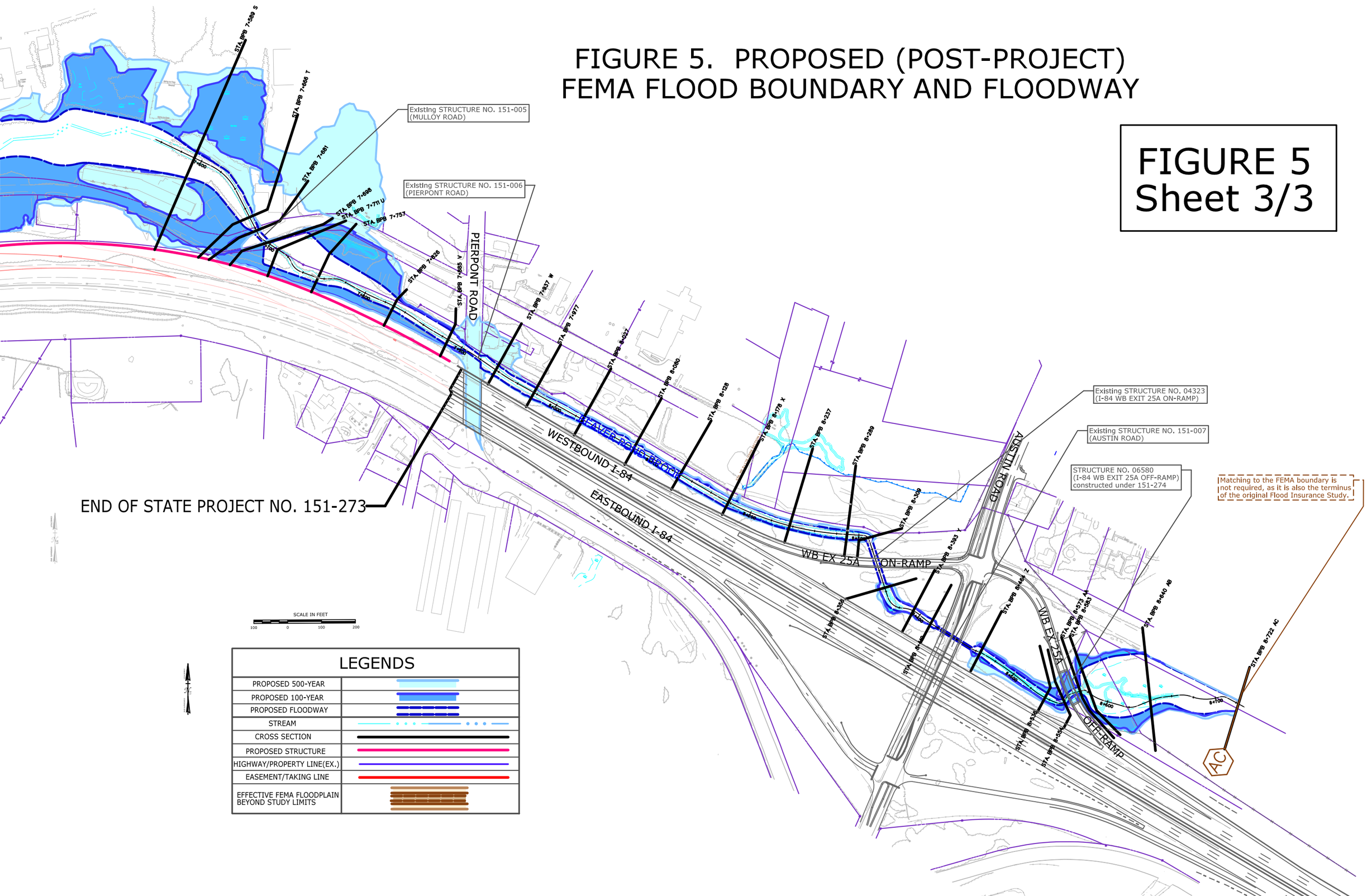

Figure 6- The Base (100-year) Flood Profile Plot: Existing vs. Proposed Conditions

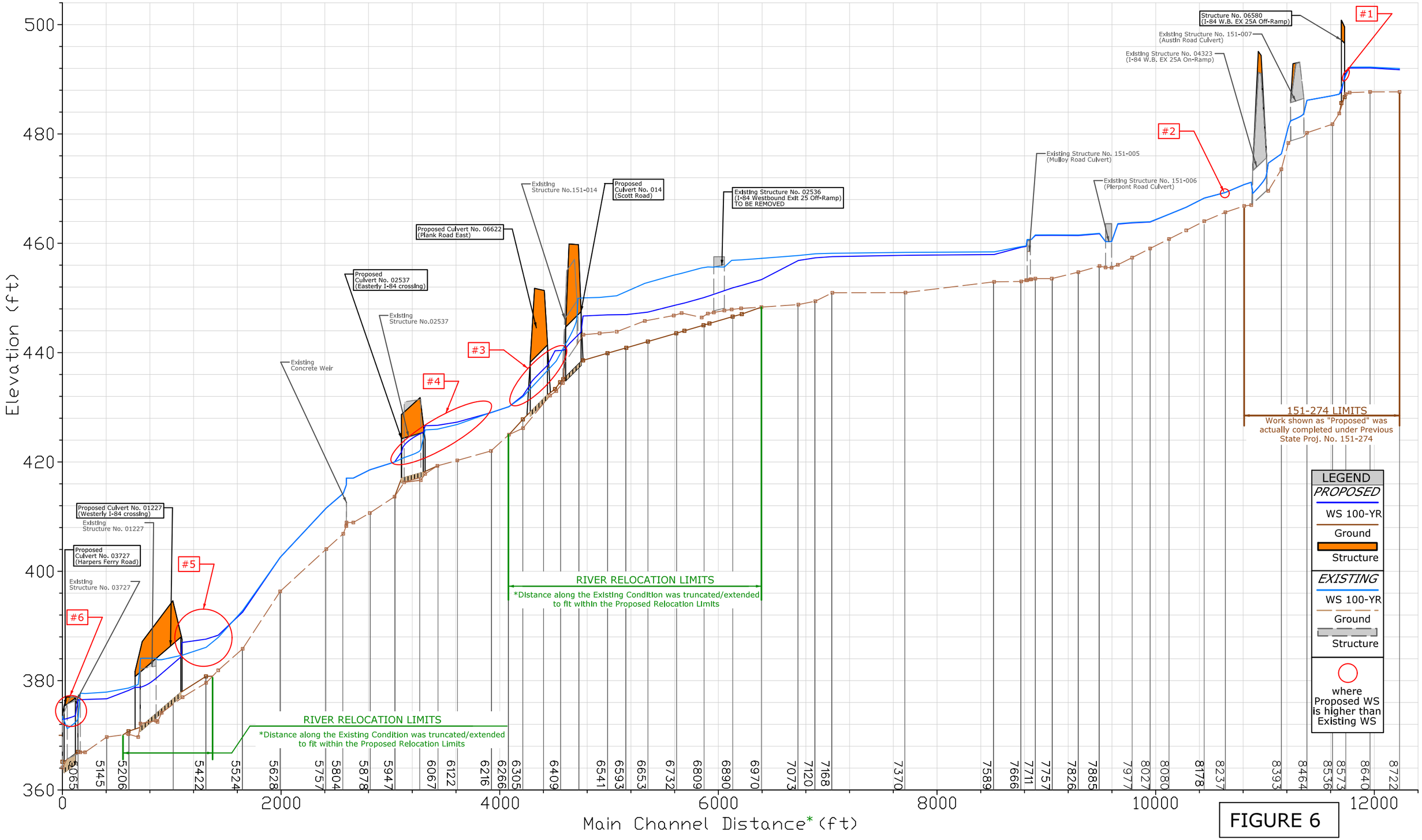

FIGURE 6

Figure 7- The 100-year Encroached (Floodway) Flood Profile Plot: Existing vs. Proposed Conditions (without Backwater from The Mad River)

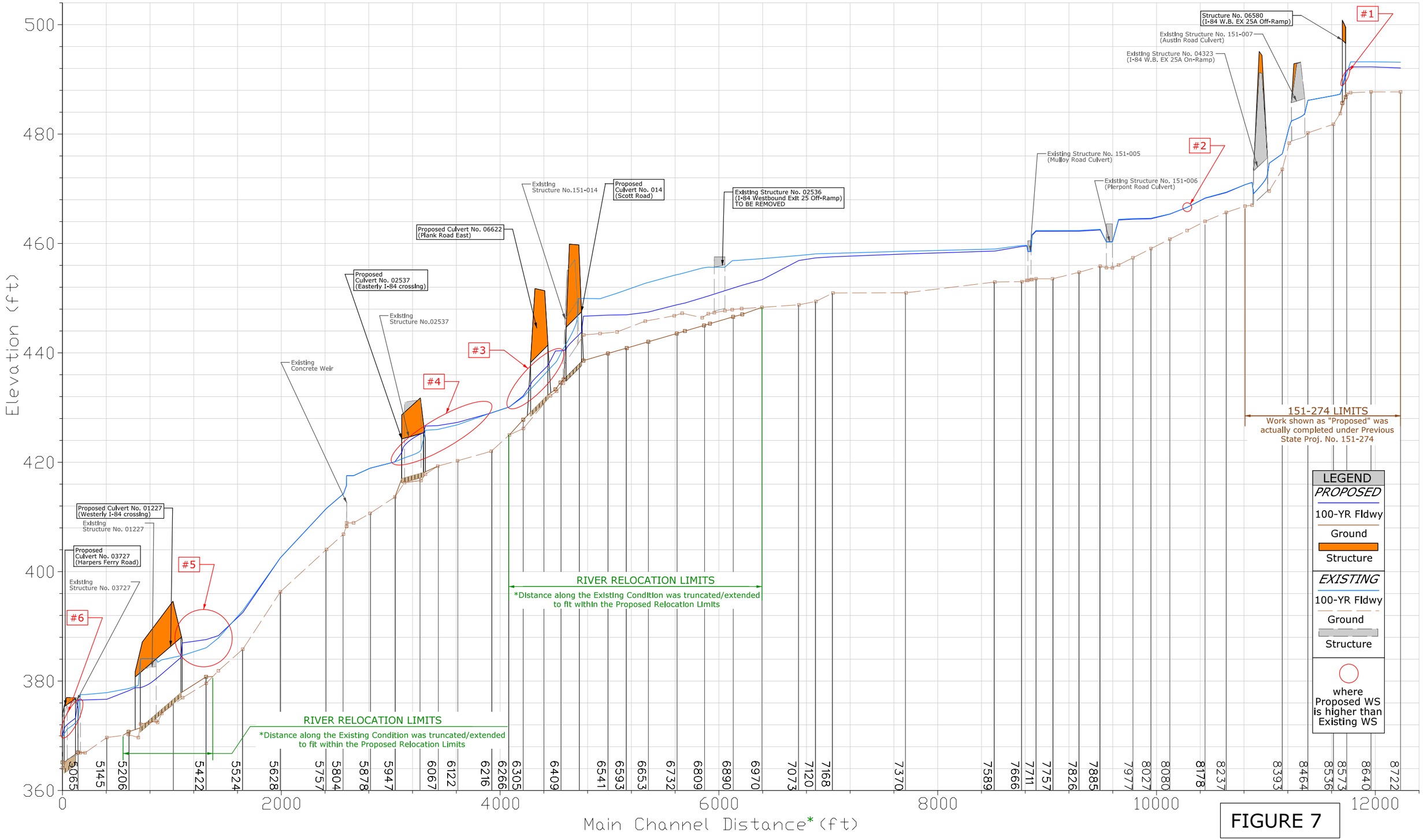

FIGURE 7

Figure 8- The 10-year Encroached (Floodway) Flood Profile Plot: Existing vs. Proposed Conditions (without Backwater from The Mad River)

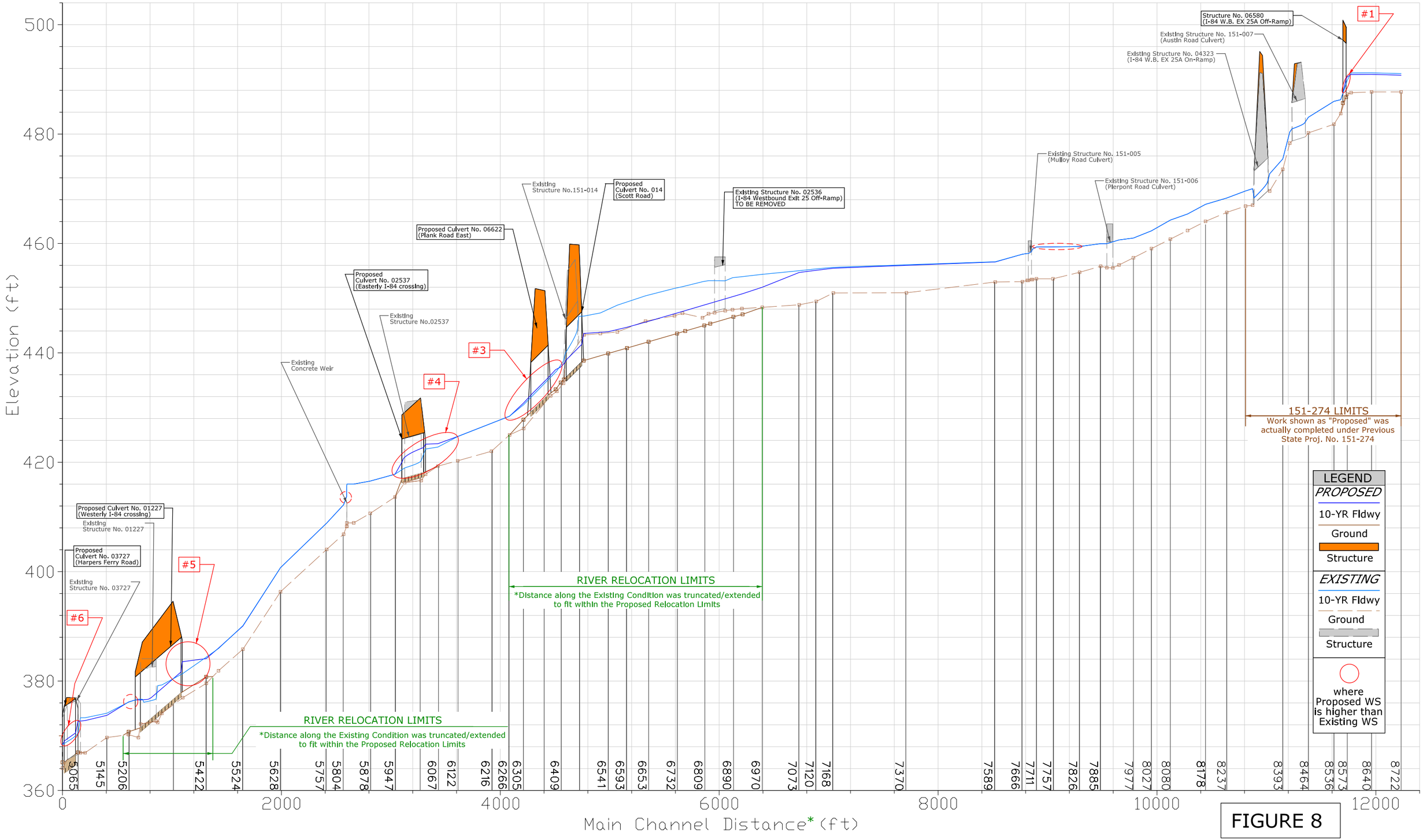

FIGURE 8

Figure 9- The 500-Year Regulatory Flood Profile Plot: Existing vs. Proposed Conditions

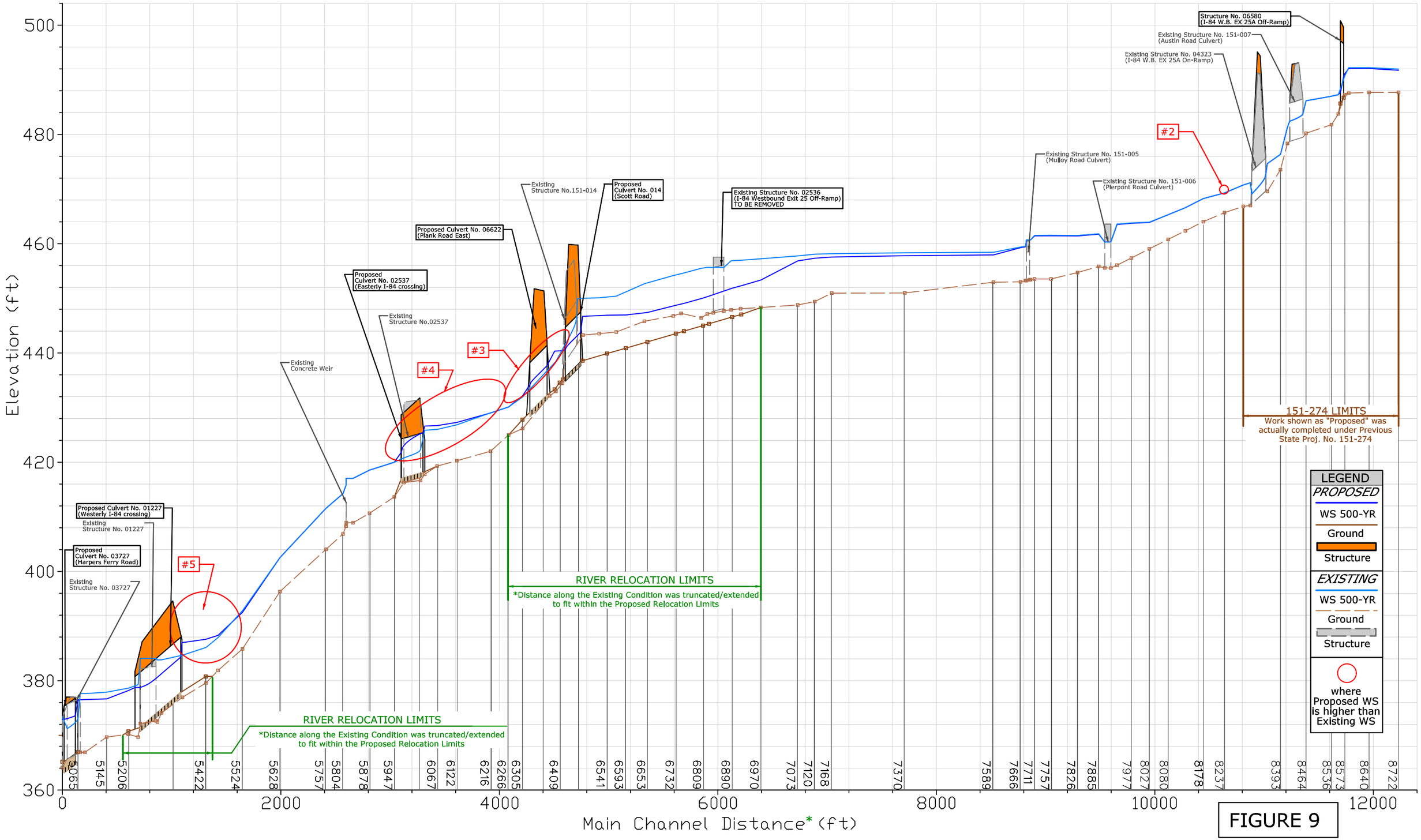

FIGURE 9

Figure 10- The Base (100-year) Flood Profile Plot: Proposed vs. Natural Conditions

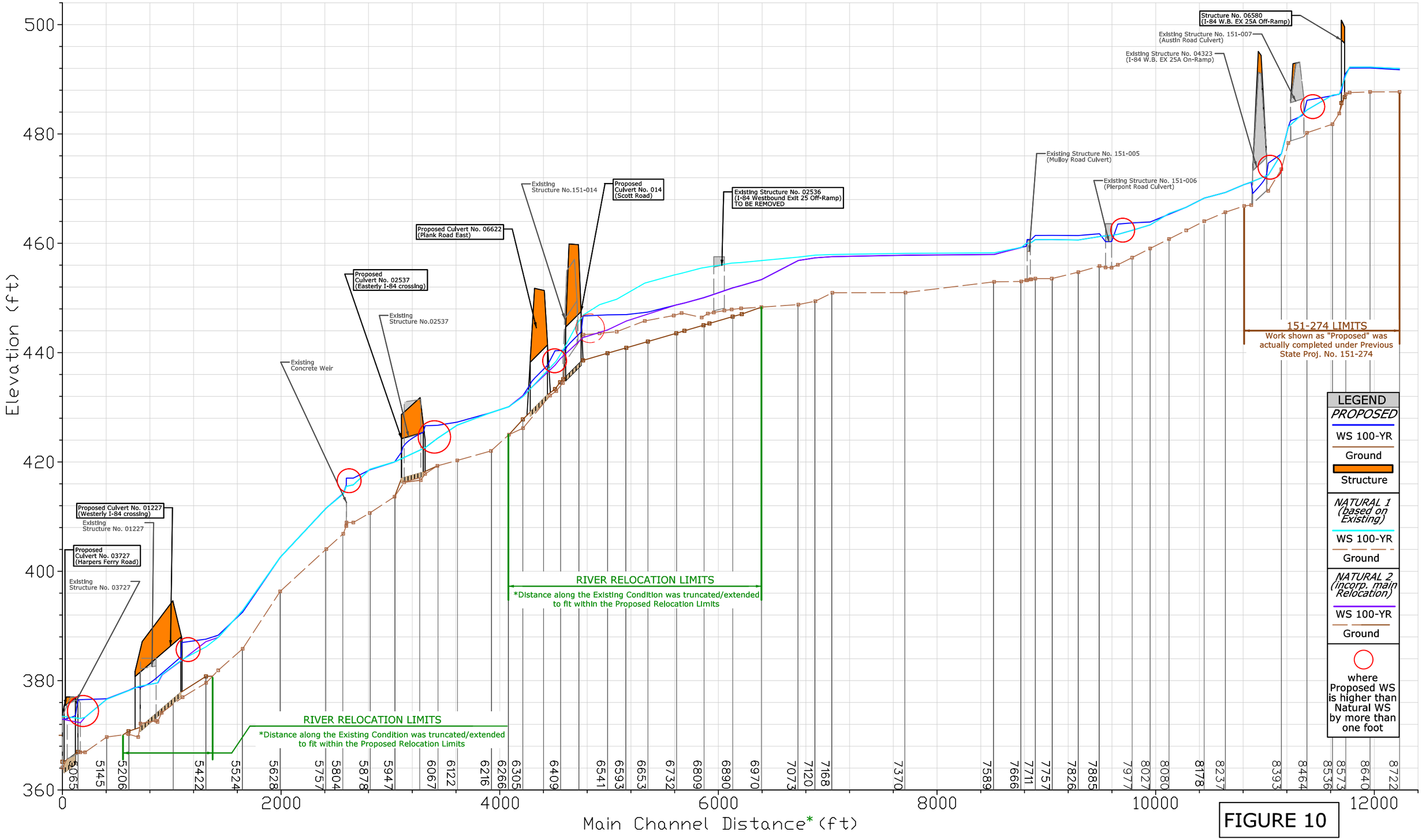

FIGURE 10

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 the partial relocation of the Beaver Pond Brook.

The Beaver Pond Brook has been studied in detail as a part of the City of Waterbury Flood Insurance Study (FIS), effective since May 1979. The regulatory flood elevations, flood plain limits and established floodway information are provided in the FIS, and shown on the Flood Boundary and Floodway Maps (FBFM), and Flood Insurance Rate Maps (FIRM) prepared by the study. The FIRMs and FBFMs have since been replaced with new FIRMs in 2010 which newly incorporates an aerial photo in the background. The FIS was also republished in 2010 using a different vertical datum which is North American Vertical Datum of 1988 (NAVD-88). However, the original 1979 study data still remains effective, as the equivalent elevation data in the republished study and maps remain the same as the previous study.

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. The overall length of the book studied under the original FIS is approximately 12,000 ft. Within the project limits, the total length of the watercourse is approximately 9,400 ft from its confluence with the Mad River to Pierpont Road. Except for an area downstream of Mulloy Road for approximately 1,800 ft, it generally lacks floodplain area.

The relocation is proposed primarily in two separate locations for a combined length of approximately 2,770 ft. One of these locations is upstream of the existing I-84 Structure No. 01227 for an approximate length of 510 ft 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 approximate length of 2,260 ft of the existing channel will be relocated northerly. The relocation will lengthen the channel by approximately 50 ft to 2,310 ft. 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 removing one (1) existing crossing.

This report has been prepared to describe the effects and consequent changes to the flood elevations, floodplain and the floodway of the Beaver Pond Brook resulting from the proposed project, based on the hydraulic analyses that were performed and documented herein.

Due to the flood plain involvement of this project, a Flood Management Certification (FMC) submission to the Connecticut Department of Environmental Protection (DEP) is required. The scope of the proposed project and changes also require that a Conditional Letter of Map Revision (CLOMR) be obtained from the Federal Emergency Management Agency (FEMA). Thus, the CLOMR for the project was obtained on January 22, 2007. As a subsequent requirement, a Letter of Map Revision (LOMR) will need to be obtained once the construction of the project is completed. As the project is still in the design phase, obviously the LOMR has not yet been obtained, which means that the 2010 publication of the FEMA maps and FIS does not reflect the changes resulting from this project – it is still based on the 1979 original study.

Subsequent to obtaining the CLOMR, minor revisions were made to the design as well as extending the study easterly to match the upper limit of the original Flood Insurance Study (FIS). However, those changes are believed to be within the essence of the obtained CLOMR and the extension of the study immaterial to the project and, thus, will formally be communicated to FEMA on a later date.

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.) of Rye, NY, the prime consultant engineer for State Project No. 151-273.

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 (remove)	Exit 25 Westbound Off-Ramp
Structure No. 151-005	none (no change)	Mulloy Road
Structure No. 151-006	none (no change)	Pierpont Road
Structure No. 04323	none (no change)	Exit 25A Westbound On-Ramp from Austin Rd
Structure No. 151-007	none (no change)	Austin Road
none**	Structure No. 06580**	Exit 25A Westbound Off-Ramp to Austin Road

*Listed from downstream to upstream

**Already exists. It was constructed in 2006 under the previous State Proj. 151-274. However, it is analyzed as a proposed structure to evaluate its hydraulic effects.

DISCHARGES

The discharges reported in the 1979 Waterbury Flood Insurance Study (FIS) were used for this study, as well as for the design. The use of the FIS discharges is required by both the FEMA and the State regulations. These discharges are shown in Table 2.

Table 2- Beaver Pond Brook Discharges (based on the 1979 Waterbury FIS)

Flooding Source & Location	Drainage Area (sq. mi.)	Peak Discharges (cfs)			
		10-yr	50-yr	100-yr	500-yr
Upstream Study Limit	1.1	205	340	410	615
Downstream of Unnamed Tributary (Just upstream of the Pierpont Road crossing, Structure No. 151-006)	1.7	305	515	625	940
Upstream of Unnamed Tributary (Just upstream of the Mulloy Road crossing, Structure No. 151-005)	2.5	430	715	870	1,315
Upstream of Unnamed Tributary* (approximately 750' upstream of the existing Westbound Exit 25 Off-Ramp Structure No. 02536)	2.8	475	795	965	1,460
Upstream of Turkey Hill Brook (approximately 320' downstream of the easterly I-84 Structure No. 02537)	3.0	515	865	1,055	1,595
Upstream of East Mountain Brook (approximately 185' 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)	4.8	795	1,335	1,625	2,465
Mouth at Mad River	5.7	955	1,610	1,960	2,975

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

The table lists seven (7) different locations where changes in the flow rate occur consistent with the published FIS except for one location. The discharge data at approximately 750 ft upstream of the existing Westbound Exit 25 Off-Ramp crossing (Structure No. 02536) were not listed in the published FIS, but included in the original FIS hydraulic analysis.

HYDRAULIC ANALYSIS

The hydraulic analysis data from the 1979 effective FIS was obtained from FEMA. The USACOE computer program HEC-2, a predecessor of the HEC-RAS program for these studies, had been used for the effective FIS hydraulic analysis. A copy of the HEC-2 data is located in Appendix C. This data will be referred to as the "effective FIS data" in this report.

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 effective (duplicate), existing (pre-project), proposed (post-project) and natural conditions.

In developing the existing and proposed condition models, the hydraulic cross sections were obtained from the project survey 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 survey and design plans for State. Project No. 151-273 were developed in Metric units. Accordingly, all the hydraulic models except for the Duplicate Effective were initially

developed, analyzed and completed in the Metric units including establishing the river stations and floodway encroachments. Since the results of the hydraulic analyses must be presented in U.S. Customary units for the CLOMR, these models had to be converted using the HEC-RAS convert function. This function converts all the geometry data, including the encroachment stations, except for the river stationing. Therefore, the stations or the river section numbers remain the same as the Metric design models.

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 in both the original FIS and the project survey are referenced to National Geodetic Vertical Datum of 1929 (NGVD-29). As the new FIS (2010) is based on NAVD-88, some of the tables in this report are presented in both datums.

The limits of the HEC-RAS models were established in consideration of the proposed construction activities and by estimating the resulting hydraulic effects. As the downstream limit, the Beaver Pond Brook study begins at the confluence with the Mad River where it will be impacted by the project. For the upstream limit, FIS Cross Section AC (River Sta. 8+722 or Sta. 5229 in the original study), which is the upper limit of the original 1979 FIS was selected. The main highway construction work actually ends at the westerly approach to the I-84 bridge over Pierpont Road. Thus, the study was initially set at Cross Section X which is the first FIS lettered section upstream of the Pierpont Road crossing. The 2007 CLOMR obtained for this project was based on this upper limit. However, subsequent to obtaining the CLOMR, new FEMA map was published. While reviewing the new published map, it was discovered that the alignment of the Beaver Pond Brook reflected on the effective FEMA map does not match with the actual condition. Furthermore, the I-84 Exit 25A Off-Ramp that encompasses a bridge spanning over the floodway of the brook was constructed in 2006 under the previous State Project No. 151-274. Although it resides within the 2010 FIS limits near the study's upstream end, this bridge is not reflected in the effective FIS.

Under the previous model used for obtaining the CLOMR, 80% (by length) of the brook in the FIS would have been revised under the current project, leaving 20% with these discrepancies. Therefore, it was decided to extend the hydraulic study to encompass the 100% of the FIS studied limit and correct the inconsistencies. This extended hydraulic study will serve as the basis of the LOMR, which is required later. The LOMR will then ensure that the information shown on the FEMA map will be consistent with the actual condition.

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.

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

In performing the analysis, the subcritical flow regime was assumed in accordance with the general modeling practices of the National Flood Insurance Program.

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

Tailwater Relationship

For all the models in the study, the upstream boundary condition was set to "Known Water Surface Elevation" matching the effective FIS data. For the downstream boundary, however, differing conditions had to be used for different models. For each of the Existing and Proposed Condition geometry models, two separate Plan models were developed - one with the consideration of the backwater from the Mad River which is termed "Regulatory" analysis, and the other without the backwater which is intended for the floodway analysis. This approach is consistent with the effective FIS.

For the Regulatory analysis 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 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 18 and 5.7 sq. miles for the main and tributary respectively. Using Table 8-3 of the manual, the following tailwater relationship was assumed:

Table 3. Assumed Tailwater Relationship

Flood Recurrence (Year)	
Beaver Pond Brook	Mad River
500	100
100	50
50	25
10	10

For the floodway analysis models, the downstream boundary condition was set at the Normal Depth using the downstream slope of the channel. The existing and proposed channel slopes will differ because of the proposed changes in the Mad River as well as in Beaver Pond Brook at this location. Critical Depth was not used because of the relatively flat channel gradients that would result in a lower flow depth than the Normal conditions.

Flood Insurance Study (Duplicate Effective/FEMA Reproduced Model)

HEC-2 vs. HEC-RAS

The Duplicate Effective/FEMA Reproduced Model was created in HEC-RAS by "importing" the effective FIS HEC-2 input data, which was obtained from the FEMA. The import function is a built-in feature in HEC-RAS which apparently brings in the geometric data in HEC-2. However, HEC-2 also has numeric input data that may differ from the geometric data. For example, a bridge's opening may be defined by the difference in the low chord and ground geometric data; however, it may also be defined numerically elsewhere causing a discrepancy. HEC-RAS mainly uses the geometric data in bringing the HEC-2 data ignoring such numeric values which often leads to differing results between the two software programs. Nonetheless, the Duplicate Effective model was created as how HEC-RAS imports the HEC-2 data.

After the import, some data had to be changed for the model to run. The original FIS analysis did not utilize contraction or expansion loss coefficients. In order to successfully convert the FIS HEC-2 to HEC-RAS and then make a fair comparison to the Existing Condition model later, the contraction and expansion coefficients were incorporated into the HEC-RAS model. These loss coefficients were estimated using the HEC-RAS Hydraulic Reference Manual, CPD-69, U.S. Army Corps of Engineers, August 1998.

In modeling an existing concrete weir across from BJ's Wholesale Club approximately 530 ft downstream of the easterly I-84 Structure No. 02537, it was entered as a bridge consistent with the approach in the original HEC-2 modeling, rather than using the Inline Structure option in HEC-RAS.

One other notable discrepancy is the floodway width at Section 5084 or A. Although the table in the published FIS states the width being 22 ft, the width applied in the Duplicated Effective is 47 ft which is consistent with the HEC-2 output and the graphical width on the FIRM. This width will also be used consistently in the Existing and Proposed Condition models.

WATER SURFACE PROFILE COMPARISON

The results of the analysis were compared to the original study, published data and the results of the Existing Condition model. The comparison is tabulated in Tables 4 and 5 for unencroached[1] and encroached[2] conditions, respectively. The profiles in these tables were developed without consideration of the backwater effects from the Mad River. For the unencroached condition, there were five (5) locations where the difference to the original study was greater than 0.5 foot. These occur at the FIS Sections A, D, N, P and Z which are all at the upstream station of a waterway crossing. Hence, the cause for the difference can be attributed to the added contraction and expansion coefficients. Also, the different computational procedures that the HEC-2 and HEC-RAS programs use may be the primarily contributing factor which the following discussions focus.

[1] The unencroached condition refers to the hydraulic model without the floodway encroachments applied.
[2] The encroached condition refers to the hydraulic model with the floodway encroachments applied.

Section A is the upstream cross section of the Harpers Ferry Road crossing, Structure No. 03727. In the Duplicate Effective model, the roadway is elevated 22 ft above the channel bottom directly above the structure, but it slopes down drastically in the northerly direction providing a low point 9.6 ft above the channel bottom just 35 ft north of the crossing. As the Base Flood rises above the main channel bank, it is directed to the low point and partially flows over the road as weir flow. Through the structure, it creates a pressure flow condition for which the HEC-RAS calculations are performed using the sluice gate equation, as the downstream end of the structure is not fully submerged. However, for the original study, this equation was not available in the HEC-2 program, and thus the pressure flow equation based on the fully submerged condition was used producing the different results. The difference resulted in the unencroached and encroached conditions being 1.50 ft and 2.71 ft higher, respectively. The encroachment keeps the flow within the main channel and forces all the flow through the opening of the structure. This creates a condition in which neither the Yarnell nor Momentum equation can be used; thus, HEC-RAS in response uses the energy equation to compute the water surface still differing from the pressure equation used in HEC-2. The higher water surface elevation in the encroached condition creates a backwater that affects the upstream sections (Sections B, C and D) as well, reaching beyond the westerly I-84 crossing, Structure No. 01227.

Upstream of the westerly I-84 crossing at Section D, the same situation involving the use of sluice gate equation exists in the unencroached condition. In this case, the equation also applies to the encroached condition. The resulting water surface elevations are 1.84 and 2.19 ft higher in the unencroached and encroached conditions, respectively. The encroached condition water surface is higher due to the backwater effect from the Harpers Ferry Road crossing, as described above.

Sections N and P are the upstream cross sections of the Scott Road Structure No. 151-014 and Westbound Exit 25 Off-Ramp Structure No. 02536, respectively. Unlike the conditions noted above, the Duplicated Effective profile is lower than the effective FIS. At Section N, both the unencroached and encroached conditions are 0.66 ft lower. Likewise, at Section P the unencroached and the encroached conditions are 0.67 ft and 0.69 ft lower, respectively. These lower water surface elevations may be attributed to mainly two different reasons. One of them is in the difference of the bridge opening areas. In case of the Scott Road structure, the area that manually entered in the HEC-2 program was 144 sq. ft. in the effective FIS. This is drastically different in the Duplicate Effective model, which is computed as being 312 sq.ft. by the HEC-RAS program using the bridge and cross section geometry data. For the Off-Ramp structure, the bridge opening area used in the effective FIS is 100 sq. ft, as opposed to 180 sq. ft in the Duplicate Effective model.

The other reason for the difference is in the computational method. For both structures, a Low Flow condition (water surface is below the low chord) exists under the Base Flood. The HEC-2 special bridge routine uses a trapezoidal approximation for the Low Flow; however, the HEC-RAS uses the actual bridge opening geometry. Furthermore, the HEC-2 program assumes the location of the pier at the middle of the trapezoid, whereas the HEC-RAS program evaluates the water surface in relation to the actual location of the pier. Accordingly, in case of the Scott Road structure, the HEC-RAS resorted to the energy equation as the water surface is not in contact

with the pier. In the effective study, the pier would have been considered and used the Yarnell equation.

Upstream of the Austin Road crossing at Section Z, again the situation involving the use of sluice gate equation exists in the unencroached condition, causing a difference of 2.3 ft. For the encroached condition, the upstream encroachment increases velocity and lowers the approach flood elevation closer to the original HEC-2 output - the difference there is 0.04 ft.

In the overall encroached condition, there are additional locations where the difference is greater than 0.5 ft. These differences occur upstream of Mulloy Road and at Pierpont Road. At the Mulloy Road crossing, a similar situation as the Harpers Ferry Road crossing exists in which the encroachment prevents the overflow over the road and forces all the flow to pass through the structure's opening. The water surface is computed using the energy equation only in HEC-RAS differing from the pressure/weir equations used in HEC-2. This generates 2.46 ft higher water surface compared to the effective FIS at Section U. The backwater from this section affects the Pierpont Road crossing in the encroached condition due to its relatively close proximity. As a result, the Duplicate Effective flood profile remains higher than the effective FIS by 2.47 and 2.07 ft at Sections V and W, respectively (downstream and upstream stations of the Pierpont Road crossing).

One of the requirements specified in the FEMA's *Application Forms and Instructions for Conditional Letters of Map Revision and Letters of Map Revision* (MT-2) calls for calibrating the duplicate model to reproduce the FIS profiles within 0.5 foot. Since all of the FIS cross sections within the project study reach will be replaced with the cross sections developed from the recent project survey, the calibration was not implemented. At the project study limits where the updated existing conditions model and proposed condition model tie into the duplicate effective model, the duplicate effective profile matches within 0.5 ft of the published (effective) profile.

Corrected Effective Model

Except for the bridge opening area differences and modeling techniques previously noted, there are no significant, known technical errors or any construction in the floodplain that occurred prior to November 1, 1979, which is the date of the effective model. The modeling techniques for several waterway crossings could have been updated, but deemed irrelevant to the purpose of this study, as the effective FIS data no longer seem to reflect the current channel geometry within an acceptable range, which would be discussed later. Therefore, a separate Corrected Effective Model was not created.

TABLE 4. Published FIS/HEC-2 Data Versus FEMA Reproduced and Existing Condition Models 100-Year FEMA Discharge (Unencroached Condition) Water Surface Elevations Without Backwater From Mad River Beaver Pond Brook, Waterbury

English (FT, NGVD-29)

	FEMA Sta.	***River Station***	(1) Published FIS	(2) Original HEC-2	(3) Duplicate Effective	(4) Existing Condition	(1) - (2)	(3) - (2)	(4) - (3)	(4) - (1)
AC	5229.0	8722	493.7	493.69	493.77	491.97	0.01	0.08	-1.80	-1.73
AB	5228.0	8640	493.8	493.80	493.80	492.23	0.00	0.00	-1.57	-1.57
		8583				492.22				
AA	5227.0	8573	491.9	491.91	491.92	490.73	-0.01	0.01	-1.19	-1.17
		8554				487.28				
		8536				487.00				
Z	5226.0	8464	486.5	486.47	488.77	486.16	0.03	2.30	-2.61	-0.34
		8435.5	EXISTING AUSTIN ROAD CROSSING(STRUCTURE NO. 151-007)							
		8412				481.31				
Y	5225.0	8393	476.9	476.93	476.92	476.36	-0.03	-0.01	-0.56	-0.54
		8356				474.66				
		8332.5	EXISTING I-84 WB Exit 25A ON-RAMP CROSSING(STRUCTURE NO. 04323)							
		8309				471.16				
		8289				470.75				
		8237				469.29				
X	5224.0	8178	466.8	466.75	466.76	468.26	0.05	0.01	1.50	1.46
		8128				466.60				
		8080				465.31				
		8027				463.95				
		7977				463.80				
W	5223.0	7937	463.9	463.91	463.69	463.59	-0.01	-0.22	-0.10	-0.31
		7911.5	EXISTING PIERPONT ROAD CROSSING(STRUCTURE NO. 151-006)							
V	5222.0	7885	462.4	462.40	462.58	461.82	0.00	0.18	-0.76	-0.58
		7826				461.52				
		7757				461.55				
U	5221.0	7711	462.4	462.42	462.60	461.53	-0.02	0.18	-1.07	-0.87
		7689.5	EXISTING MULLOY ROAD CROSSING(STRUCTURE NO. 151-005)							
T	5220.0	7666	460.5	460.48	460.48	459.39	0.02	0.00	-1.09	-1.11
S	5219.0	7589	460.4	460.40	460.40	458.43	0.00	0.00	-1.97	-1.97
		7370				458.34				
		7168				458.17				
R	5218.0	7120	458.7	458.73	458.69	458.08	-0.03	-0.04	-0.61	-0.62
Q	5217.5	7073	458.0	458.00	457.92	457.77	0.00	-0.08	-0.15	-0.23
		6970				457.24				
		6915				456.96				
P	5217.0	6890	455.9	455.86	455.19	456.88	0.04	-0.67	1.69	0.98
		6859.5	Existing I-84 Westbound Exit 25 Off-Ramp (Structure No. 02536)							
O	5216.0	6827(EX 6825)	454.2	454.20	454.59	455.67	0.00	0.39	1.08	1.47
		6809				455.50				
		6756				454.51				
		6732				454.17				
		6653				452.67				
		6593				450.40				
		6541				450.10				
N	5214.0	6490(PR 6473)	447.7	447.69	447.03	450.02	0.01	-0.66	2.99	2.32
		6457				449.94				
		6441.5	Existing Scott Road culvert, Structure No. 151-014							
		6417				440.67				
M	5213.0	6397(EX 6409)	436.8	436.79	436.78	438.44	0.01	-0.01	1.66	1.64
		6394				437.24				
		6305				431.96				
		6266				430.12				
L	5212.0	6216	428.1	428.09	428.10	429.04	0.01	0.01	0.94	0.94
		6122				426.86				
		6067				426.00				
K	5211.0	6033	424.7	424.68	424.58	425.86	0.02	-0.10	1.28	1.16
		5993.5	Existing I-84 Structure No. 02537, Easterly I-84 crossing							
J	5210.0	5947	420.6	420.58	420.57	419.99	0.02	-0.01	-0.58	-0.61
I	5209.0	5878	420.3	420.27	420.26	418.56	0.03	-0.01	-1.70	-1.74
H	5208.9	5832	420.0	419.99	419.97	417.04	0.01	-0.02	-2.93	-2.96
		5812.5(EX 5813)	Existing Concrete Weir							
	5208.2	5812(EX 5812.5)		415.23	415.23	415.78		0.00	0.55	
G	5208.1	5804	414.5	414.48	414.50	414.24	0.02	0.02	-0.26	-0.26
		5757				411.58				
F	5208.0	5628	400.8	400.77	400.79	402.54	0.03	0.02	1.75	1.74
		5524				392.83				
		5456				387.90				
E	5207.0	5422	386.2	386.23	386.25	386.09	-0.03	0.02	-0.16	-0.11
		5355				384.67				
D	5206.0	5296	383.6	383.58	385.42	383.83	0.02	1.84	-1.59	0.23
		5281				383.80				
		5254.5 (PR 5295.5)	Existing I-84 Structure No. 01227, Westerly I-84 crossing							
		5224				379.28				
C	5205.1	5206	380.4	380.41	380.82	378.64	-0.01	0.41	-2.18	-1.76
B	5205.0	5145	380.1	380.13	380.62	377.91	-0.03	0.49	-2.71	-2.19
A	5204.9	5084	377.8	377.85	379.35	377.64	-0.05	1.50	-1.71	-0.16
		5072				377.70				
		5050.5(PR 5042.5)	Existing Structure No. 03727, Harpers Ferry Road							
	5204.0	5021		376.50	376.50	369.86		0.00	-6.64	

Note: Without Backwater From Mad River

TABLE 4A. Published FIS/HEC-2 Data Versus FEMA Reproduced and Existing Condition Models 100-Year FEMA Discharge (Unencroached Condition) Water Surface Elevations Without Backwater From Mad River Beaver Pond Brook, Waterbury

English (FT, NAVD-88)

	FEMA Sta.	***River Station***	(1) Published FIS	(2) Original HEC-2	(3) Duplicate Effective	(4) Existing Condition	(1) - (2)	(3) - (2)	(4) - (3)	(4) - (1)
AC	5229.0	8722	492.7	492.69	492.77	490.97	0.01	0.08	-1.80	-1.73
AB	5228.0	8640	492.8	492.80	492.80	491.23	0.00	0.00	-1.57	-1.57
		8583				491.22				
AA	5227.0	8573	490.9	490.91	490.92	489.73	-0.01	0.01	-1.19	-1.17
		8554				486.28				
		8536				486.00				
Z	5226.0	8464	485.5	485.47	487.77	485.16	0.03	2.30	-2.61	-0.34
		8435.5	EXISTING AUSTIN ROAD CROSSING(STRUCTURE NO. 151-007)							
		8412				480.31				
Y	5225.0	8393	475.9	475.93	475.92	475.36	-0.03	-0.01	-0.56	-0.54
		8356				473.66				
		8332.5	EXISTING I-84 WB Exit 25A ON-RAMP CROSSING(STRUCTURE NO. 04323)							
		8309				470.16				
		8289				469.75				
		8237				468.29				
X	5224.0	8178	465.8	465.75	465.76	467.26	0.05	0.01	1.50	1.46
		8128				465.60				
		8080				464.31				
		8027				462.95				
		7977				462.80				
W	5223.0	7937	462.9	462.91	462.69	462.59	-0.01	-0.22	-0.10	-0.31
		7911.5	EXISTING PIERPONT ROAD CROSSING(STRUCTURE NO. 151-006)							
V	5222.0	7885	461.4	461.40	461.58	460.82	0.00	0.18	-0.76	-0.58
		7826				460.52				
		7757				460.55				
U	5221.0	7711	461.4	461.42	461.60	460.53	-0.02	0.18	-1.07	-0.87
		7689.5	EXISTING MULLOY ROAD CROSSING(STRUCTURE NO. 151-005)							
T	5220.0	7666	459.5	459.48	459.48	458.39	0.02	0.00	-1.09	-1.11
S	5219.0	7589	459.4	459.40	459.40	457.43	0.00	0.00	-1.97	-1.97
		7370				457.34				
		7168				457.17				
R	5218.0	7120	457.7	457.73	457.69	457.08	-0.03	-0.04	-0.61	-0.62
Q	5217.5	7073	457.0	457.00	456.92	456.77	0.00	-0.08	-0.15	-0.23
		6970				456.24				
		6915				455.96				
P	5217.0	6890	454.9	454.86	454.19	455.88	0.04	-0.67	1.69	0.98
		6859.5	Existing I-84 Westbound Exit 25 Off-Ramp (Structure No. 02536)							
O	5216.0	6827(EX 6825)	453.2	453.20	453.59	454.67	0.00	0.39	1.08	1.47
		6809				454.50				
		6756				453.51				
		6732				453.17				
		6653				451.67				
		6593				449.40				
		6541				449.10				
N	5214.0	6490(PR 6473)	446.7	446.69	446.03	449.02	0.01	-0.66	2.99	2.32
		6457				448.94				
		6441.5	Existing Scott Road culvert, Structure No. 151-014							
		6417				439.67				
M	5213.0	6397(EX 6409)	435.8	435.79	435.78	437.44	0.01	-0.01	1.66	1.64
		6394				436.24				
		6305				430.96				
		6266				429.12				
L	5212.0	6216	427.1	427.09	427.10	428.04	0.01	0.01	0.94	0.94
		6122				425.86				
		6067				425.00				
K	5211.0	6033	423.7	423.68	423.58	424.86	0.02	-0.10	1.28	1.16
		5993.5	Existing I-84 Structure No. 02537, Easterly I-84 crossing							
J	5210.0	5947	419.6	419.58	419.57	418.99	0.02	-0.01	-0.58	-0.61
I	5209.0	5878	419.3	419.27	419.26	417.56	0.03	-0.01	-1.70	-1.74
H	5208.9	5832	419.0	418.99	418.97	416.04	0.01	-0.02	-2.93	-2.96
		5812.5(EX 5813)	Existing Concrete Weir							
	5208.2	5812(EX 5812.5)		414.23	414.23	414.78		0.00	0.55	
G	5208.1	5804	413.5	413.48	413.50	413.24	0.02	0.02	-0.26	-0.26
		5757				410.58				
F	5208.0	5628	399.8	399.77	399.79	401.54	0.03	0.02	1.75	1.74
		5524				391.83				
		5456				386.90				
E	5207.0	5422	385.2	385.23	385.25	385.09	-0.03	0.02	-0.16	-0.11
		5355				383.67				
D	5206.0	5296	382.6	382.58	384.42	382.83	0.02	1.84	-1.59	0.23
		5281				382.80				
		5254.5 (PR 5295.5)	Existing I-84 Structure No. 01227, Westerly I-84 crossing							
		5224				378.28				
C	5205.1	5206	379.4	379.41	379.82	377.64	-0.01	0.41	-2.18	-1.76
B	5205.0	5145	379.1	379.13	379.62	376.91	-0.03	0.49	-2.71	-2.19
A	5204.9	5084	376.8	376.85	378.35	376.64	-0.05	1.50	-1.71	-0.16
		5072				376.70				
		5050.5(PR 5042.5)	Existing Structure No. 03727, Harpers Ferry Road							
	5204.0	5021		375.50	375.50	368.86		0.00	-6.64	

Note: Without Backwater From Mad River

TABLE 4M. Published FIS/HEC-2 Data Versus FEMA Reproduced and Existing Condition Models 100-Year FEMA Discharge (Unencroached Condition) Water Surface Elevations Without Backwater From Mad River Beaver Pond Brook, Waterbury

Metric (M, NGVD-29)

	FEMA Sta.	***River Station***	(1) Published FIS	(2) Original HEC-2	(3) Duplicate Effective	(4) Existing Condition	(1) - (2)	(3) - (2)	(4) - (3)	(4) - (1)
AC	5229.0	8722	150.5	150.48	150.50	149.95	0.00	0.02	-0.55	-0.53
AB	5228.0	8640	150.5	150.51	150.51	150.03	0.00	0.00	-0.48	-0.48
		8583				150.03				
AA	5227.0	8573	149.9	149.93	149.94	149.57	0.00	0.00	-0.36	-0.36
		8554				148.52				
		8536				148.44				
Z	5226.0	8464	148.3	148.28	148.98	148.18	0.01	0.70	-0.80	-0.10
		8435.5	EXISTING AUSTIN ROAD CROSSING(STRUCTURE NO. 151-007)							
		8412				146.70				
Y	5225.0	8393	145.4	145.37	145.37	145.19	-0.01	0.00	-0.17	-0.16
		8356				144.68				
		8332.5	EXISTING I-84 WB Exit 25A ON-RAMP CROSSING(STRUCTURE NO. 04323)							
		8309				143.61				
		8289				143.48				
		8237				143.04				
X	5224.0	8178	142.3	142.27	142.27	142.73	0.02	0.00	0.46	0.45
		8128				142.22				
		8080				141.83				
		8027				141.41				
		7977				141.37				
W	5223.0	7937	141.4	141.40	141.33	141.30	0.00	-0.07	-0.03	-0.09
		7911.5	EXISTING PIERPONT ROAD CROSSING(STRUCTURE NO. 151-006)							
V	5222.0	7885	140.9	140.94	140.99	140.76	0.00	0.05	-0.23	-0.18
		7826				140.67				
		7757				140.68				
U	5221.0	7711	140.9	140.95	141.00	140.67	-0.01	0.05	-0.33	-0.27
		7689.5	EXISTING MULLOY ROAD CROSSING(STRUCTURE NO. 151-005)							
T	5220.0	7666	140.4	140.35	140.35	140.02	0.01	0.00	-0.33	-0.34
S	5219.0	7589	140.3	140.33	140.33	139.73	0.00	0.00	-0.60	-0.60
		7370				139.70				
		7168				139.65				
R	5218.0	7120	139.8	139.82	139.81	139.62	-0.01	-0.01	-0.19	-0.19
Q	5217.5	7073	139.6	139.60	139.57	139.53	0.00	-0.02	-0.05	-0.07
		6970				139.37				
		6915				139.28				
P	5217.0	6890	139.0	138.95	138.74	139.26	0.01	-0.20	0.52	0.30
		6859.5	Existing I-84 Westbound Exit 25 Off-Ramp (Structure No. 02536)							
O	5216.0	6827(EX 6825)	138.4	138.44	138.56	138.89	0.00	0.12	0.33	0.45
		6809				138.84				
		6756				138.53				
		6732				138.43				
		6653				137.97				
		6593				137.28				
		6541				137.19				
N	5214.0	6490(PR 6473)	136.5	136.46	136.25	137.17	0.00	-0.20	0.91	0.71
		6457				137.14				
		6441.5	Existing Scott Road culvert, Structure No. 151-014							
		6417				134.32				
M	5213.0	6397(EX 6409)	133.1	133.13	133.13	133.64	0.00	0.00	0.51	0.50
		6394				133.27				
		6305				131.66				
		6266				131.10				
L	5212.0	6216	130.5	130.48	130.48	130.77	0.00	0.00	0.29	0.29
		6122				130.11				
		6067				129.84				
K	5211.0	6033	129.4	129.44	129.41	129.80	0.01	-0.03	0.39	0.35
		5993.5	Existing I-84 Structure No. 02537, Easterly I-84 crossing							
J	5210.0	5947	128.2	128.19	128.19	128.01	0.01	0.00	-0.18	-0.19
I	5209.0	5878	128.1	128.10	128.10	127.58	0.01	0.00	-0.52	-0.53
H	5208.9	5832	128.0	128.01	128.01	127.11	0.00	-0.01	-0.89	-0.90
		5812.5(EX 5813)	Existing Concrete Weir							
	5208.2	5812(EX 5812.5)		126.56	126.56	126.73		0.00	0.17	
G	5208.1	5804	126.3	126.33	126.34	126.26	0.01	0.01	-0.08	-0.08
		5757				125.45				
F	5208.0	5628	122.2	122.15	122.16	122.69	0.01	0.01	0.53	0.53
		5524				119.73				
		5456				118.23				
E	5207.0	5422	117.7	117.72	117.73	117.68	-0.01	0.01	-0.05	-0.03
		5355				117.25				
D	5206.0	5296	116.9	116.92	117.48	116.99	0.01	0.56	-0.48	0.07
		5281				116.98				
		5254.5 (PR 5295.5)	Existing I-84 Structure No. 01227, Westerly I-84 crossing							
		5224				115.60				
C	5205.1	5206	115.9	115.95	116.07	115.41	0.00	0.12	-0.66	-0.54
B	5205.0	5145	115.9	115.86	116.01	115.19	-0.01	0.15	-0.83	-0.67
A	5204.9	5084	115.2	115.17	115.63	115.10	-0.02	0.46	-0.52	-0.05
		5072				115.12				
		5050.5(PR 5042.5)	Existing Structure No. 03727, Harpers Ferry Road							
	5204.0	5021		114.76	114.76	112.73		0.00	-2.02	

Note: Without Backwater From Mad River

TABLE 5. Published FIS/HEC-2 Data Versus FEMA Reproduced and Existing Condition Models 100-Year FEMA Discharge (Encroached Condition - Floodway) Water Surface Elevations Beaver Pond Brook, Waterbury

English (FT, NGVD-29)

	FEMA Sta.	***River Station***	(1) Published FIS	(2) Original HEC-2	(3) Duplicate Effective	(4) Existing Condition	(1) - (2)	(3) - (2)	(4) - (3)	(4) - (1)
AC	5229.0	8722	493.8	493.70	493.73	493.13	0.10	0.03	-0.60	-0.67
AB	5228.0	8640	493.8	493.80	493.80	493.20	0.00	0.00	-0.60	-0.60
		8583				493.20				
AA	5227.0	8573	491.9	491.92	491.93	491.06	-0.02	0.01	-0.87	-0.84
		8554				487.29				
		8536				487.02				
Z	5226.0	8464	486.5	486.47	486.51	486.16	0.03	0.04	-0.35	-0.34
		8435.5	EXISTING AUSTIN ROAD CROSSING(STRUCTURE NO. 151-007)							
		8412				481.32				
Y	5225.0	8393	476.9	476.93	476.91	476.37	-0.03	-0.02	-0.54	-0.53
		8356				474.66				
		8332.5	EXISTING I-84 WB Exit 25A ON-RAMP CROSSING(STRUCTURE NO. 04323)							
		8309				471.16				
		8289				470.75				
		8237				469.38				
X	5224.0	8178	466.8	466.75	466.77	468.32	0.05	0.02	1.55	1.52
		8128				466.59				
		8080				465.40				
		8027				464.61				
		7977				464.55				
W	5223.0	7937	464.0	464.02	466.09	464.41	-0.02	2.07	-1.68	0.41
		7911.5	EXISTING PIERPONT ROAD CROSSING (STRUCTURE NO. 151-006)							
V	5222.0	7885	462.5	462.49	464.96	462.59	0.01	2.47	-2.37	0.09
		7826				462.38				
		7757				462.37				
U	5221.0	7711	462.5	462.51	464.97	462.37	-0.01	2.46	-2.60	-0.13
		7689.5	EXISTING MULLOY ROAD CROSSING(STRUCTURE NO. 151-005)							
T	5220.0	7666	460.7	460.63	460.62	459.63	0.07	-0.01	-0.99	-1.07
S	5219.0	7589	460.5	460.53	460.53	458.98	-0.03	0.00	-1.55	-1.52
		7370				458.58				
		7168				458.19				
R	5218.0	7120	458.7	458.73	458.69	458.10	-0.03	-0.04	-0.59	-0.60
Q	5217.5	7073	458.0	458.00	457.92	457.80	0.00	-0.08	-0.12	-0.20
		6970				457.23				
		6915				456.95				
P	5217.0	6890	455.9	455.86	455.17	456.85	0.04	-0.69	1.68	0.95
		6859.5	Existing I-84 Westbound Exit 25 Off-Ramp (Structure No. 02536)							
O	5216.0	6827(P&E 6825)	454.2	454.20	454.57	455.67	0.00	0.37	1.10	1.47
		6809				455.50				
		6756				454.52				
		6732				454.18				
		6653				452.72				
		6593				450.91				
		6541				449.91				
N	5214.0	6490(PR 6473)	447.7	447.69	447.03	449.96	0.01	-0.66	2.93	2.26
		6457				449.94				
		6441.5	Existing Scott Road culvert, Structure No. 151-014							
		6417				440.78				
M	5213.0	6397(EX 6409)	436.8	436.81	436.78	438.44	-0.01	-0.03	1.66	1.64
		6394				437.24				
		6305				431.96				
		6266				430.12				
L	5212.0	6216	428.1	428.08	428.09	429.04	0.02	0.01	0.95	0.94
		6122				426.86				
		6067				426.00				
K	5211.0	6033	424.7	424.72	424.64	425.86	-0.02	-0.08	1.22	1.16
		5993.5	Existing I-84 Structure No. 02537, Easterly I-84 crossing							
J	5210.0	5947	420.7	420.71	420.66	420.08	-0.01	-0.05	-0.58	-0.62
I	5209.0	5878	420.5	420.44	420.38	418.92	0.06	-0.06	-1.46	-1.58
H	5208.9	5832	420.0	419.89	419.81	417.55	0.11	-0.08	-2.26	-2.45
		5812.5(EX 5813)	Existing Concrete Weir							
	5208.2	5812(EX 5812.5)		415.24	415.24	415.78		0.00	0.54	
G	5208.1	5804	414.5	414.48	414.49	414.24	0.02	0.01	-0.25	-0.26
		5757				411.58				
F	5208.0	5628	400.8	400.77	400.80	402.54	0.03	0.03	1.74	1.74
		5524				392.90				
		5456				387.87				
E	5207.0	5422	386.2	386.22	386.25	386.09	-0.02	0.03	-0.16	-0.11
		5355				384.71				
D	5206.0	5296	383.6	383.59	385.78	383.88	0.01	2.19	-1.90	0.28
		5281				383.45				
		5254.5 (PR 5295.5)	Existing I-84 Structure No. 01227, Westerly I-84 crossing							
		5224				379.18				
C	5205.1	5206	380.5	380.47	381.52	378.63	0.03	1.05	-2.89	-1.87
B	5205.0	5145	380.1	380.15	381.36	377.89	-0.05	1.21	-3.47	-2.21
A	5204.9	5084	377.8	377.84	380.55	377.53	-0.04	2.71	-3.02	-0.27
		5072				377.54				
		5050.5(PR 5042.5)	Existing Structure No. 03727, Harpers Ferry Road							
	5204.0	5021		376.50	376.50	369.86		0.00	-6.64	

Note: Without Backwater From Mad River

TABLE 5A. Published FIS/HEC-2 Data Versus FEMA Reproduced and Existing Condition Models 100-Year FEMA Discharge (Encroached Condition - Floodway) Water Surface Elevations Beaver Pond Brook, Waterbury

English (FT, NAVD-88)

	FEMA Sta.	***River Station***	(1) Published FIS	(2) Original HEC-2	(3) Duplicate Effective	(4) Existing Condition	(1) - (2)	(3) - (2)	(4) - (3)	(4) - (1)
AC	5229.0	8722	492.8	492.70	492.73	492.13	0.10	0.03	-0.60	-0.67
AB	5228.0	8640	492.8	492.80	492.80	492.20	0.00	0.00	-0.60	-0.60
		8583				492.20				
AA	5227.0	8573	490.9	490.92	490.93	490.06	-0.02	0.01	-0.87	-0.84
		8554				486.29				
		8536				486.02				
Z	5226.0	8464	485.5	485.47	485.51	485.16	0.03	0.04	-0.35	-0.34
		8435.5	EXISTING AUSTIN ROAD CROSSING(STRUCTURE NO. 151-007)							
		8412				480.32				
Y	5225.0	8393	475.9	475.93	475.91	475.37	-0.03	-0.02	-0.54	-0.53
		8356				473.66				
		8332.5	EXISTING I-84 WB Exit 25A ON-RAMP CROSSING(STRUCTURE NO. 04323)							
		8309				470.16				
		8289				469.75				
		8237				468.38				
X	5224.0	8178	465.8	465.75	465.77	467.32	0.05	0.02	1.55	1.52
		8128				465.59				
		8080				464.40				
		8027				463.61				
		7977				463.55				
W	5223.0	7937	463.0	463.02	465.09	463.41	-0.02	2.07	-1.68	0.41
		7911.5	EXISTING PIERPONT ROAD CROSSING (STRUCTURE NO. 151-006)							
V	5222.0	7885	461.5	461.49	463.96	461.59	0.01	2.47	-2.37	0.09
		7826				461.38				
		7757				461.37				
U	5221.0	7711	461.5	461.51	463.97	461.37	-0.01	2.46	-2.60	-0.13
		7689.5	EXISTING MULLOY ROAD CROSSING(STRUCTURE NO. 151-005)							
T	5220.0	7666	459.7	459.63	459.62	458.63	0.07	-0.01	-0.99	-1.07
S	5219.0	7589	459.5	459.53	459.53	457.98	-0.03	0.00	-1.55	-1.52
		7370				457.58				
		7168				457.19				
R	5218.0	7120	457.7	457.73	457.69	457.10	-0.03	-0.04	-0.59	-0.60
Q	5217.5	7073	457.0	457.00	456.92	456.80	0.00	-0.08	-0.12	-0.20
		6970				456.23				
		6915				455.95				
P	5217.0	6890	454.9	454.86	454.17	455.85	0.04	-0.69	1.68	0.95
		6859.5	Existing I-84 Westbound Exit 25 Off-Ramp (Structure No. 02536)							
O	5216.0	6827(P&E 6825)	453.2	453.20	453.57	454.67	0.00	0.37	1.10	1.47
		6809				454.50				
		6756				453.52				
		6732				453.18				
		6653				451.72				
		6593				449.91				
		6541				448.91				
N	5214.0	6490(PR 6473)	446.7	446.69	446.03	448.96	0.01	-0.66	2.93	2.26
		6457				448.94				
		6441.5	Existing Scott Road culvert, Structure No. 151-014							
		6417				439.78				
M	5213.0	6397(EX 6409)	435.8	435.81	435.78	437.44	-0.01	-0.03	1.66	1.64
		6394				436.24				
		6305				430.96				
		6266				429.12				
L	5212.0	6216	427.1	427.08	427.09	428.04	0.02	0.01	0.95	0.94
		6122				425.86				
		6067				425.00				
K	5211.0	6033	423.7	423.72	423.64	424.86	-0.02	-0.08	1.22	1.16
		5993.5	Existing I-84 Structure No. 02537, Easterly I-84 crossing							
J	5210.0	5947	419.7	419.71	419.66	419.08	-0.01	-0.05	-0.58	-0.62
I	5209.0	5878	419.5	419.44	419.38	417.92	0.06	-0.06	-1.46	-1.58
H	5208.9	5832	419.0	418.89	418.81	416.55	0.11	-0.08	-2.26	-2.45
		5812.5(EX 5813)	Existing Concrete Weir							
	5208.2	5812(EX 5812.5)		414.24	414.24	414.78		0.00	0.54	
G	5208.1	5804	413.5	413.48	413.49	413.24	0.02	0.01	-0.25	-0.26
		5757				410.58				
F	5208.0	5628	399.8	399.77	399.80	401.54	0.03	0.03	1.74	1.74
		5524				391.90				
		5456				386.87				
E	5207.0	5422	385.2	385.22	385.25	385.09	-0.02	0.03	-0.16	-0.11
		5355				383.71				
D	5206.0	5296	382.6	382.59	384.78	382.88	0.01	2.19	-1.90	0.28
		5281				382.45				
		5254.5 (PR 5295.5)	Existing I-84 Structure No. 01227, Westerly I-84 crossing							
		5224				378.18				
C	5205.1	5206	379.5	379.47	380.52	377.63	0.03	1.05	-2.89	-1.87
B	5205.0	5145	379.1	379.15	380.36	376.89	-0.05	1.21	-3.47	-2.21
A	5204.9	5084	376.8	376.84	379.55	376.53	-0.04	2.71	-3.02	-0.27
		5072				376.54				
		5050.5(PR 5042.5)	Existing Structure No. 03727, Harpers Ferry Road							
	5204.0	5021		375.50	375.50	368.86		0.00	-6.64	

Note: Without Backwater From Mad River

TABLE 5M. Published FIS/HEC-2 Data Versus FEMA Reproduced and Existing Condition Models 100-Year FEMA Discharge (Encroached Condition - Floodway) Water Surface Elevations Beaver Pond Brook, Waterbury

Metric (M, NGVD-29)

	FEMA Sta.	***River Station***	(1) Published FIS	(2) Original HEC-2	(3) Duplicate Effective	(4) Existing Condition	(1) - (2)	(3) - (2)	(4) - (3)	(4) - (1)
AC	5229.0	8722	150.5	150.48	150.49	150.31	0.03	0.01	-0.18	-0.20
AB	5228.0	8640	150.5	150.51	150.51	150.33	0.00	0.00	-0.18	-0.18
		8583				150.33				
AA	5227.0	8573	149.9	149.94	149.94	149.68	-0.01	0.00	-0.27	-0.26
		8554				148.53				
		8536				148.44				
Z	5226.0	8464	148.3	148.28	148.29	148.18	0.01	0.01	-0.11	-0.10
		8435.5	EXISTING AUSTIN ROAD CROSSING(STRUCTURE NO. 151-007)							
		8412				146.71				
Y	5225.0	8393	145.4	145.37	145.36	145.20	-0.01	-0.01	-0.16	-0.16
		8356				144.68				
		8332.5	EXISTING I-84 WB Exit 25A ON-RAMP CROSSING(STRUCTURE NO. 04323)							
		8309				143.61				
		8289				143.48				
		8237				143.07				
X	5224.0	8178	142.3	142.27	142.27	142.74	0.02	0.01	0.47	0.46
		8128				142.22				
		8080				141.85				
		8027				141.61				
		7977				141.59				
W	5223.0	7937	141.4	141.43	142.06	141.55	-0.01	0.63	-0.51	0.12
		7911.5	EXISTING PIERPONT ROAD CROSSING (STRUCTURE NO. 151-006)							
V	5222.0	7885	141.0	140.97	141.72	141.00	0.00	0.75	-0.72	0.03
		7826				140.93				
		7757				140.93				
U	5221.0	7711	141.0	140.97	141.72	140.93	0.00	0.75	-0.79	-0.04
		7689.5	EXISTING MULLOY ROAD CROSSING(STRUCTURE NO. 151-005)							
T	5220.0	7666	140.4	140.40	140.40	140.10	0.02	0.00	-0.30	-0.33
S	5219.0	7589	140.4	140.37	140.37	139.90	-0.01	0.00	-0.47	-0.46
		7370				139.78				
		7168				139.66				
R	5218.0	7120	139.8	139.82	139.81	139.63	-0.01	-0.01	-0.18	-0.18
Q	5217.5	7073	139.6	139.60	139.57	139.54	0.00	-0.02	-0.04	-0.06
		6970				139.36				
		6915				139.28				
P	5217.0	6890	139.0	138.95	138.74	139.25	0.01	-0.21	0.51	0.29
		6859.5	Existing I-84 Westbound Exit 25 Off-Ramp (Structure No. 02536)							
O	5216.0	6827(P&E 6825)	138.4	138.44	138.55	138.89	0.00	0.11	0.34	0.45
		6809				138.84				
		6756				138.54				
		6732				138.43				
		6653				137.99				
		6593				137.44				
		6541				137.13				
N	5214.0	6490(PR 6473)	136.5	136.46	136.25	137.15	0.00	-0.20	0.89	0.69
		6457				137.14				
		6441.5	Existing Scott Road culvert, Structure No. 151-014							
		6417				134.35				
M	5213.0	6397(EX 6409)	133.1	133.14	133.13	133.64	0.00	-0.01	0.51	0.50
		6394				133.27				
		6305				131.66				
		6266				131.10				
L	5212.0	6216	130.5	130.48	130.48	130.77	0.01	0.00	0.29	0.29
		6122				130.11				
		6067				129.84				
K	5211.0	6033	129.4	129.45	129.43	129.80	-0.01	-0.02	0.37	0.35
		5993.5	Existing I-84 Structure No. 02537, Easterly I-84 crossing							
J	5210.0	5947	128.2	128.23	128.22	128.04	0.00	-0.02	-0.18	-0.19
I	5209.0	5878	128.2	128.15	128.13	127.69	0.02	-0.02	-0.45	-0.48
H	5208.9	5832	128.0	127.98	127.96	127.27	0.03	-0.02	-0.69	-0.75
		5812.5(EX 5813)	Existing Concrete Weir							
	5208.2	5812(EX 5812.5)		126.57	126.57	126.73		0.00	0.16	
G	5208.1	5804	126.3	126.33	126.34	126.26	0.01	0.00	-0.08	-0.08
		5757				125.45				
F	5208.0	5628	122.2	122.15	122.16	122.69	0.01	0.01	0.53	0.53
		5524				119.76				
		5456				118.22				
E	5207.0	5422	117.7	117.72	117.73	117.68	-0.01	0.01	-0.05	-0.03
		5355				117.26				
D	5206.0	5296	116.9	116.92	117.59	117.01	0.00	0.67	-0.58	0.09
		5281				116.88				
		5254.5 (PR 5295.5)	Existing I-84 Structure No. 01227, Westerly I-84 crossing							
		5224				115.57				
C	5205.1	5206	116.0	115.97	116.29	115.41	0.01	0.32	-0.88	-0.57
B	5205.0	5145	115.9	115.87	116.24	115.18	-0.02	0.37	-1.06	-0.67
A	5204.9	5084	115.2	115.17	115.99	115.07	-0.01	0.83	-0.92	-0.08
		5072				115.07				
		5050.5(PR 5042.5)	Existing Structure No. 03727, Harpers Ferry Road							
	5204.0	5021		114.76	114.76	112.73		0.00	-2.02	

Note: Without Backwater From Mad River

Existing (Pre-Project) Condition

DEVELOPMENT OF EXISTING CONDITION MODEL

Cross sections from the effective FIS data were compared to the project survey information. Numerous sections were found having significant differences in geometry or elevation greater than 0.5 ft. Some of the major differences are noted below:

- The surveyed information was generally lower than the effective FIS data.
- Field survey indicates that the inverts of existing Culvert No. 03727, Harpers Ferry Road, are 1.5-2.5 ft lower than as modeled in the FIS.
- The existing outlet of Turkey Hill Brook is located at least 150 ft upstream of its FIS location. The outlet was possibly relocated as part of the commercial development off of Interstate Lane with the FIS survey information predating the relocation.
- Culverts No. 03727 (Harpers Ferry Road), 151-014 (Scott Road) and 02536 (WB Exit 25 Off-Ramp), as modeled in the FIS, did not appear to be accurate geometric representations of the existing hydraulic crossings.
- Approximately 1,800 ft-long section of the Beaver Pond Brook downstream of Mulloy Road measures approximately 5% longer than indicated in the published FIS.
- In HEC-2, the opening of the Pierpont Road crossing was modeled resembling its skewed upstream and downstream faces.
- The original HEC-2 data did not include the I-84 Westbound On-Ramp Culvert No. 04323, and the path the brook actually takes at this crossing is different from the effective FEMA maps.

With these findings, it was decided to use cross sectional information from the project survey data for the entire reach. This approach ensures consistency between the existing and proposed conditions, where the project survey must be used for the design. The use of the project survey cross section will more accurately define the brook through the project limits, based on the current field conditions. Typically, the original FEMA data is used for the boundary sections in order to properly match the new study to the effective study. However, in this case, it is not applicable, as the entire study limit will be replaced.

Excluding the internal sections at the waterway crossings, seventy-one (71) stream cross sections were obtained, among which twenty-nine (29) represent the comparable locations to the FIS lettered sections. The additional cross sections beyond the twenty-nine were necessary to accurately portray the existing brook, and in some areas, to provide a matching section to a section in the Proposed Condition model. The cross section locations are shown on Figure 2.

The cross sections were cut from the Digital Terrain Model (DTM) surface file developed from the project survey information. The project survey/base map was generated with the photogrammetric mapping based 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 BLA (Amman & Whitney) initially, then by the ConnDOT survey forces. The hydraulic survey for the extended portion of the study from Pierpont Road to approximately 500' upstream of I-84 Westbound Exit 25A Off-Ramp was performed by AI Engineers, Inc.

The bank stations at 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, as the HEC-RAS program discourages setting the encroachment stations inside the bank stations. This allows setting the floodway encroachments stations on the bank that matches the width of the current effective study. These situations exist when the original encroachment stations are set inside the main channel and also when the flow is contained within the channel.

The floodway encroachment stations for the FIS representative sections were initially set to match the width determined in the effective study. For all the other sections, they were scaled from the 2010 FIRMs (included in Appendix C). The analysis, however, showed that the initial floodway settings fall outside the resulting 100-year flood boundary at numerous sections. In such cases, the floodway was graphically adjusted to match the 100-year flood boundary, as intended by the original study. See Figure 3 which shows both the effective and existing floodway limits.

A Manning's roughness coefficient of 0.04 was generally used for the main channel consistent with the effective FIS model. For the floodplain areas and upper portion of the channel banks, the Manning's roughness coefficients ranged from 0.02 to 0.08, 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.

In modeling the waterway crossings, most of them except for the Mulloy Road and Pierpont Road crossings were entered as culverts instead of the bridges in the FIS (the 1979 FIS predates the HEC-2 culvert routine). Also, the concrete weir located across from BJ's Wholesale Club (cross section 5812.5) was analyzed as an inline weir instead of bridge in the FIS (the inline weir routine was not available in HEC-2).

WATER SURFACE PROFILE COMPARISON TO EFFECTIVE (FIS and Duplicate Model)

As indicated previously, the resulting water surface profiles of the Existing Condition model were compared to the Duplicated Effective Model and also to the published profile, as shown in Tables 4 and 5.

Existing Condition vs. FIS Published

The comparison of the Existing Condition to the published FIS data (computed without consideration of the backwater from the Mad River) revealed numerous sections throughout the studied reach where the difference in the water surface elevation is greater than 0.5 ft. These are mostly attributed to the differences in the geometry data as well as the differing computational methods as described above.

The greatest difference occurred at the upstream station of the existing concrete weir across from the BJ's Wholesale Club where the unencroached and encroached conditions are 2.96 ft and 2.45 ft lower, respectively. Although the top weir elevation in the Existing Condition was lower only by approximately 0.5 ft, the channel bottom elevation at the immediate upstream section (Section 5832 or H in FIS) was 3.78 ft lower. These differences in the geometry data along with the difference of modeling it as an Inline Structure as opposed to a bridge appear to be the primary cause of the difference in the water surface elevation.

At the upstream station (Section 6490 or N in FIS) of the Scott Road crossing, Structure No. 151-014, the water surface elevation was 2.32 ft and 2.26 ft higher for the unencroached and encroached conditions, respectively. In the effective FIS, the upstream of the face of the structure was modeled as a trapezoidal channel with an 18-ft wide bottom and an average side slope of 2.5:1(v:h). The existing structure is actually a double cell culvert, each cell having an 8-ft wide opening. It also has a square-edge at the crown. The narrower opening width and thus the area would obviously produce a higher water surface elevation.

As stated above, the differences in the water surface elevation at other sections and waterway crossings were primarily due to the different geometry data and modeling approaches.

Existing Condition vs. Duplicate Effective

Similar to the results of the above comparison, numerous sections throughout the studied reach revealed differences of greater than 0.5 ft between the Duplicate Effective and Existing Condition water surfaces. Actually, the differences to the Duplicate Effective model were generally greater than to the FIS. For example, at the Section 6490 (N in FIS), the water surface elevations were higher by 2.99 ft in the unencroached and 2.93 ft in the encroached conditions respectively, which are higher than the comparisons to the original HEC-2 output.

Another notable location is at the downstream cross section (Section 5021) of the Harpers Ferry Road crossing, Structure No. 03727. The existing condition water surface elevations are 6.64 ft lower than the Duplicate Effective in both the unencroached and encroached conditions. Although this location was not discussed in the comparison section to the published FIS data, as it did not correspond to any FIS lettered section, this section was included in the original HEC-2 data and consequently in the Duplicate Effective model. One of the main causes of the lower water surface elevation at this location is in the differing boundary conditions of these models. The Existing Condition model was set at "Normal Depth", whereas the Duplicate Effective model's starting elevation was set as "Known Elevations" matching the boundary condition of the effective FIS data. Rerunning the Duplicate Effective model with the same boundary

condition as the Existing Condition yielded a water surface elevation 3.81 ft lower. Having eliminated the factor of differing boundary condition, the remaining difference can now be attributed to the difference in the geometry data. In the Duplicate Effective model, the lowest channel bottom elevation was 369.7 FT which is 5.59 ft higher than the surveyed elevation of 364.11 FT. There also was a difference in the hydraulic opening size, which was apparent not only for this structure but also for most other structures in the study. This is discussed later in the description sections for the individual structures. The effects of the lower water surface elevation at this location reach far upstream beyond the westerly I-84 crossing, Structure No. 01227.

Since both the Duplicate Effective and Existing Condition models were developed using the same hydraulic analysis program, their differences in most part represent better reflection of how the Beaver Pond Brook's hydraulic conditions have changed since the original study. As it has been shown that the geometric changes in many locations of the channel have altered the flood profiles beyond the acceptable range of 0.5 ft within the effective FIS, it validates the purpose of this study as well as the use of the project surveyed information.

The differences in the hydraulic results occurring at the waterway crossings are discussed further below.

HYDRAUILIC CONDITION AT INDIVIDUAL STRUCTURES

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

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:

In the original FIS study, its geometry data was entered as an 8’-span bridge having an 8’ high opening with 0.01 ft wide pier. However, the numeric data entered for the opening size was 56 sq. ft. This value is more consistent with the actual size, as the structure is a concrete box culvert (rigid bottom) with an 8 ft wide, 7 ft tall opening with no pier. It is not clear why the pier was added in the original study; nonetheless, when comparing the Existing Condition to the published FIS, the hydraulic results were reasonably close with the difference of just 0.34 ft at the upstream approach section (Section 5226 or Z in FIS) in both the encroached and unencroached conditions.

The comparison to the Duplicate Effective’s 100-year encroached condition model showed similar results; however, in the 100-year unencroached condition, the difference was 2.61 ft which is significantly greater. The difference is suspected to be caused by the modeling approach - as a culvert in the Existing Condition as opposed to a bridge in the

Duplicate Effective. This is found to be a common dilemma in which the Duplicate Effective model was developed simulating the original HEC-2 run in HEC-RAS by using the same or closest modeling approach as the original study. Doing so, a more appropriate method available in the new software was not utilized while the Existing Condition model did use the most appropriate method. As a result, although the Duplicate Effective model is based on the same software as the Existing Condition, it produced a greater difference to the Existing Condition than there was between the Existing and published FIS data. Accordingly, when such a situation prevailed, it was assessed irrelevant, as the difference between the Existing Condition model and the original FIS was given greater weight.

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

The alignment of the Beaver Pond Brook reflected in the current effective FEMA map at this location is not consistent with the actual condition. The map shows that, after passing through the Austin Road crossing in the westerly direction, the brook continually runs parallel to I-84 as an open channel. In reality, after Austin Road, the brook turns northwesterly and passes through the Westbound Exit 25A On-Ramp culvert. The culvert is consisted of twin 7' wide by 6' high concrete boxes. Immediately downstream of the culvert, it turns back southwesterly running along the on-ramp. The brook then matches back to the FEMA's depicted location approximately 170 ft east of the Pierpont Road crossing. This deviation in the flow path lengthened the brook by approximately 80 ft.

The cause of the discrepancy appears to be in the timing of the original FIS and the construction of the on-ramp. They were performed within the similar time frame, but independently such that their information apparently was not shared or communicated resulting in the discrepancy between the original FIS (published in 1979) and the ramp construction (completed in 1980).

The difference in the flood elevation caused by this discrepancy is most apparent at Section 8178 or X in FIS. The comparison shows an increase of 1.5 ft. This appears to be mostly due to the increased length of the brook. The Duplicate Effective model shows that the 100-year flood is at critical depth at the section when the flow path is not shifted. However, in the shifted path along the on-ramp and through the culvert, the flatter slope of the brook keeps it at subcritical condition but at the higher water surface elevation.

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 project. Considering the location, the FIS information on the structure was initially (in the CLOMR model) retained in the existing condition model, as it seemed to be within the 0.5-ft range of the field surveyed data. However, it was subsequently noticed that the bridge geometry in HEC-2 was entered modeling the skewed opening at the faces. The upstream and downstream faces of the Pierpont Road bridge is at approximately 56° skew to the brook,

rather than being at normal. Thus, the opening at the faces is larger than at the perpendicular section inside the bridge. In the existing condition model, it was modeled based on the perpendicular opening size.

The structure at the crossing is a concrete bridge with many resemblances to a culvert structure. As it includes a one-foot wide pier at the center of the opening with natural streambed material at the bottom, it was modeled as a bridge, as did in the original HEC-2 model. Besides using the normal-to-flow dimensions rather the skewed, one other difference is that the pier has a semi-circular nose shape with tail, rather the twin-cylinder piers with connecting diaphragm as defined in the effective model. Nevertheless, this was found irrelevant in the Base Flood, as the HEC-RAS resorted to using the orifice flow equation in the pressure flow condition with both ends of the structure fully submerged. The outlet velocity was 9.18 ft/s which is higher than 6.38 ft/s of the Duplicate Effective model. This is due to the reduction in the flow area. Nevertheless, at the upstream approach Section 7937 or W, approximately 50 ft upstream of the crossing the difference in the water surface elevation between the Existing Condition and the published FIS is shown to be less than 0.5 ft. The surveyed channel bottom elevation at this location was lower by roughly 0.5 ft.

Mulloy Road Crossing, Structure No. 151-005:

This crossing is also located well beyond the limits of channel relocation and outside of the area physically affected by the project. In modeling the crossing, the FIS information on the structure was retained and the channel geometry data was based on the project survey.

Again, this structure was modeled as a bridge with a one-foot wide pier at the center of the opening. The shape of the pier is a semi-circular nose, rather the square nose defined in the effective model. Nevertheless, this was found irrelevant as the structure is inadequate to convey the Base Flood and generates an overflow of the road creating a pressure flow condition through the structure. About 16% of the total flow is weir flow over the road as opposed to 9% in the Duplicate Effective model. This is because of the difference in the geometry in which the lowest overtopping elevation is 460.5 FT in the Existing Condition or approximately 1.2 ft lower than the Duplicate Effective. Also the opening area of the structure is approximately 4% larger in the Existing Condition model. Consequently, the water surface elevation at the crossing is 1.07 and 2.6 ft lower in the unencroached and encroached conditions respectively. On the other hand, the differences to the original FIS were smaller – 0.87 and 0.13 ft respectively. That is because the numeric value of the bridge opening entered in HEC-2 is larger than its geometrically determined value. The numeric value was used in HEC-2 to compute the high flow rather than the geometric data, but the Duplicate Effective model in HEC-RAS uses the geometric data in both the low and high flow conditions. Regardless of the differences to the Duplicated Effective, as the Existing Condition model produced moderately close results to the original FIS, the effective FIRM and FIS may still be considered valid for this location.

As for the flow velocity through the crossing, the reduced flow through the structure in the Base Flood reduced it to 8.79 ft/s from 9.87 ft/s of the Duplicate Effective model.

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

Aligned on a 70º skew with the roadway, the culvert crossing consists of twin 8 ft by 8 ft concrete boxes that measures approximately 94 ft in length along the brook.
The size of the culvert provides the total opening area of 128 sq. ft. In the effective FIS, the area inputted in HEC-2 was 170 sq. ft. In the Duplicate Effective model, HEC-RAS computed an opening area of 180 sq. ft. Because of these differences in the opening area, the resulting water surface elevation upstream of the crossing was higher than the Duplicate Effective profile by 1.69 and 1.68 ft for the unencroached and encroached conditions, respectively. For the 500-year flow, the water surface elevation was 1.18 ft higher. This higher water surface elevation causes the flow to rise above the road and overflow onto the ramp. The effects of this overtopping condition are discussed in the later section *Area of Flooding*.

The computed outlet flow velocity from the Base Flood was 7.53 ft/s, which is lower than the 8.27 ft/s velocity in the Duplicate Effective model.

Scott Road Crossing, Structure No. 151-014:

The crossing consists of a twin 8 ft by 8 ft concrete box culvert dated 1952. The culvert is approximately 109 feet 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 26 ft long by 3 ft deep and has caused the culvert to be perched 2 ft above the normal level of the pool. The hydraulic model indicates that the culvert outlet velocity is 20.95 ft/s for the Base Flood. This is significantly higher than the velocity of 10.30 ft/s computed for the Duplicate Effective.

Similar to the Exit 25 Off-Ramp crossing, the total opening area of the structure is 128 sq. ft., which is smaller than 144 sq. ft used in the effective FIS (numeric data) and 313 sq. ft used in the Duplicate Effective model based on the geometric data (computed by HEC-RAS). As described earlier for the Section 6490 or N, the resulting upstream backwater is higher than the other models. The higher headwater depth at the entrance forces the flow becomes supercritical upon entering the structure increasing the velocity.

In the 500-year event, the constriction at the crossing would generate significant upstream backwater which would cause the flow to overtop the southerly channel bank and spread onto the I-84 at Section 6593. The extent of the flooding is discussed in a later section *Area of Flooding*.

Easterly I-84 Crossing, Structure No. 02537:

The structure consists of a twin 8 ft by 8 ft concrete box culvert with a length of approximately 152 ft. The crossing is severely skewed to the watercourse, at approximately 55º at the upstream side.

At the downstream end of the structure, the crossing is skewed approximately 50º to the brook. It appears that culvert outlet velocities have contributed to the formation of a small scour hole downstream of the culvert. In the Base Flood analysis, HEC-RAS indicates that the existing outlet velocity would be a relatively high at 14.64 ft/s. The culvert is currently perched approximately 8 inches above the normal pool elevation of the scour hole.

The hydraulic analysis indicates that the existing structure is hydraulically adequate for the Base Flood as well as for the 500-year discharge. Similar to the Scott Road crossing, while the upstream headwater depth is higher, the computed water surface inside the structure was lower than the Duplicate Effective, as the flow becomes supercritical upon entering the structure.

The bridge opening size in the Existing Condition model is 128 sq. ft. with a narrower opening width than the Duplicated Effective model (16 ft vs. 19 ft). The opening size computed in the Duplicate Effective model was close to 150 sq. ft. which is smaller than 170 sq. ft entered as a numeric data in the original HEC-2 model.

The 100-year flow elevations at the upstream Section 6033 or K are 1.28 and 1.22 ft higher than the Duplicate Effective in the unencroached and encroached conditions, respectively. The 500-year flood elevation is 0.13 ft higher. Upstream flood levels are confined to a channelized reach of the Beaver Pond Brook constructed as part of the original I-84 project.

Westerly I-84 Crossing, Structure No. 01227:

The structure consists of a twin 10 ft by 10 ft concrete box culvert with a length of approximately 145 ft. The crossing is severely skewed at an approximate 50º angle to the watercourse at the upstream end and again by the same amount at the downstream end. 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 a moderately sized scour hole to the downstream. With the scour hole, the boxes are perched 6-12 inches above the elevation of the normal outlet pool. It also affected the stability of the northerly bank of the channel, 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. It is evident that minor undermining along 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 computed 100-year flow velocities upstream and downstream of the structure are 14.66 and 13.71 ft/s respectively.

As indicated earlier, this crossing is affected by the lowered water surface elevation downstream of the Harpers Ferry Road crossing such that the Base Flood elevation is 2.18 ft and 1.59 ft lower than the Duplicate Effective at the downstream Section 5206(C) and the upstream Section 5296 (D), respectively. Even with the lowered flood profile, however, the analysis indicates that an overtopping flow condition could potentially develop in the Base Flood, though such overflow would be less than 0.2% of the total flow. In the Existing Condition, the minimum elevation at which the overflow would occur at the inlet is 384.09, as opposed to 386.03 ft in the Duplicate Effective which allows the full conveyance of the Base Flood through the structure. In the 500-year flood, the overflow conditions prevail in both the Existing Condition and Duplicate Effective models. However, the overtopping flood elevation for the Existing Condition is 2.14 ft lower.

Harpers Ferry Road Crossing, Structure No. 03727:

The structure consists of a 101 ft long, twin 10 ft by 10 ft concrete box culvert, which is dated 1952. This provides a hydraulic opening size of 200 sq. ft. which is larger than 173 sq. ft. in the Duplicate Effective model and 170 sq. ft. used in the effective FIS. This larger hydraulic opening combined with the lower computed tailwater condition generates a lower upstream water surface profile than the effective FIS, by as much 2.71 ft and 3.47 ft (Section B or 5145) in the 100-year unencroached and encroached conditions respectively. The outlet flow velocity is considerably higher at 17.75 ft/s as compared to 9.97 ft/s in the Duplicate Effective model.

Even with the lowered downstream water surface, the crossing constricts the flow such that the Base Flood overtops the channel banks and spreads northerly onto the floodplain. In the 500-year flood, the flow spreads not only onto the northern floodplain, but also southerly onto the existing I-84. From the south, Harpers Ferry Road makes an overpass over I-84; stays elevated at least 23 feet above the channel bottom as it passes over the structure (similar to how it is modeled in the effective FIS); and then, at the Plank Road intersection, approximately 240 ft north of the crossing (rather the 35 ft shown in the original HEC-2), it declines sharply forming a low point at an elevation about 9 ft above the channel bottom. The portion of the 500-year flood on the northern floodplain flows over the low point, and then returns to the watercourse, which is the Mad River downstream of the Harpers Ferry Road. The overflow on I-84 would pass under the Harpers Ferry Road overpass, and then likewise enters the Mad River. The 500-year flood elevation at the crossing is 380.3 FT which is 2.8 ft lower than the computed elevation in the Duplicate Effective model. The effects of the overflow are discussed in the following section.

AREAS OF FLOODING

A map has been prepared showing the existing flood boundaries based on the FEMA discharges (see Figure 3). This map geo-references the 2010 FIRM in the background so that the comparison can easily be made. The existing flooding limits were drawn based on the contour lines developed from the project survey. These 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. 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 presence significant obstructions.

As described previously and shown on the Tables 4 and 5, the Existing Condition model produced flood profiles that are notably different from the published FIS in numerous locations. Such differences as well as the updated, more accurate survey affect the flood boundaries. Starting from the upstream end of the study, the current FIRM shows the 100- and 500-year flood boundaries partially inundating a private access road on the north side of the brook. However, based on the Existing Condition model, the flood elevations are well below the roadway elevation. When I-84 Westbound Exit 25A Off-Ramp to Austin Road was constructed, the access to this private road from Austin Road was blocked. Thus, the roadway is not used frequently in the present day.

The floodplain begins to narrow and contain within a channelized section at the W.B. Exit 25A Off-Ramp. This ramp was not included in the model, but the berm immediately upstream that actually creates the wide floodplain upstream was. The 500-year flood width over the berm is significantly narrower than the depicted width in the effective FIRM.

Downstream of Austin Road, the Beaver Pond Brook, as described previously, turns bare right, shifting northerly by as much as 150 ft off from the depicted path in FIRM before it turns back toward I-84 and merges back to the depicted path upstream of Pierpont Road. Accordingly, the location of the floodplain and flood path is likewise different.

At the Pierpont Road crossing, the 500-year flow overtops the road. Although the computed overtopping elevation (465.04 FT) of the Existing Condition model is lower than the published elevation (465.75 FT), the extent of the resulting flooding is greater, as it is drawn using the more accurate topographic information than the effective Floodway Map. On the north side near the upstream end of the crossing, a private property falls within the 500-year flood boundary.

Downstream of the crossing, again on the north side of the brook, there is a two-story apartment building which was shown being within the 500-year floodplain based on the effective map. However, this study shows that the existing 500-year flood elevation is approximately 0.66 ft lower than the published data and below the sill of the building.

At the Mulloy Road crossing, the Base Flood would overflow onto the roadway at a lower elevation than indicated in the effective FIS. Although it is assumed that the overflow would return back into the watercourse immediately downstream of the crossing, the overflow would

actually continue its path along the Mulloy Road until it merges with the flood flow that spreads across the downstream floodplain above the obstructions between the brook and the roadway.

In the 500-year flood, before it reaches the Mulloy Road crossing, it partially spills over the road and enters a wetland area spreading much wider than shown on the effective map. The 500-year flood elevations at the approach and over the road are lower than indicated in the effective study. In reviewing FIS Section U, it appears that the similar condition is described in the model, but it was not consistently reflected on the effective map.

Downstream of the Mulloy Road crossing for a distance of approximately 2,000 ft (to FIS Section Q or RS 7073), the Base Flood profile of the Existing Condition remains lower than the effective FIS; and for a distance of approximately 1,600 ft in case of the 500-year flood. However, the delineated floodplain limits were generally wider than shown on the effective map.

Downstream of the FIS Section R to the Westbound Exit 25 Off-Ramp crossing, the delineated Existing Condition floodplains (100- and 500-year) continue to be wider (though not by a significant degree) than shown on the effective map, with the higher flood elevations. The floodplains, nonetheless, are contained with the State's and the City of Waterbury's Right-Of-Way.

At the Westbound Exit 25 Off-Ramp crossing, the 500-year flood overtops the ramp with the computed flood elevation higher than the effective. The flooding from the overflow is limited southerly to the edge of I-84 pavement; northerly, it extends approximately 350 ft along the ramp primarily within the pavement. Thus, no private property is affected by the change.

At the Scott Road crossing, as the greatest difference in the study is found upstream of the crossing compared to the published profile, the difference in the floodplains is more pronounced as well. The 100-year flood overflow on the southerly floodplain extends beyond the limits of the effective map's 500-year floodplain. In case of the 500-year flood, it rises above the natural floodplain and spreads onto the both directions of I-84, starting at approximately 350 ft east of the Scott Road overpass over the Interstate route. Although it was assumed that all the overflow returns back into the channel immediately downstream of the crossing, as a conservative approach to modeling the Beaver Pond Brook flood profiles, some portion of the overflow, in reality, would likely take the path of the roadside swale along the I-84 Eastbound and eventually converge into the brook downstream of the easterly I-84 crossing, Structure No. 02537.

Downstream of the Scott Road crossing through the easterly I-84 crossing and then to the westerly I-84 crossing, both the 100- and 500-year floods are contained within the main channel inside the State's Non-Access Highway Lines. One notable location within this reach is at the existing concrete weir approximately 530 ft downstream of the easterly I-84 Structure No. 02537. In the effective map, a portion of Reidville Drive is located within the 500-year floodplain boundary. As the Existing Condition flood elevation is 4.5 ft lower than the effective FIS, the 500-year would also be contained within the channel banks.

Approximately 540 ft upstream of the westerly I-84 crossing (Structure No. 01227) at Section 5456, there is a depressed area, which might be a storm water detention basin that is connected to the Beaver Pond Brook through a drainage pipe. As the bottom of the basin is lower than the

Base Flood elevation, the area would also be inundated by the floods. Nonetheless, as it is not an active flow conveyance area, it was not delineated as a part of the floodplain, similar to the current effective FIRM.

Upstream of the westerly I-84 crossing, the 100-year flood limits is close to the 500-year flood boundary established in the effective map, even though the flood elevation is lower. Although the hydraulic analysis indicated a partial overtopping condition exists for the 100-year flow, this was ignored in the floodplain delineation as the miniscule overflow is 3.3 CFS or less than 0.2% of the total flow. In the 500-year flow condition, the overflow is significantly more at 12%. Although it was not separately modeled, this overflow would follow the path along the drainage swale that runs parallel to the southerly edge of I-84 Eastbound. This flow would likely continue westerly along the swale and merge with the overflow that spills onto the I-84 at approximately 380 ft east of the Interchange 24 (Harpers Ferry Road).

The overflow onto I-84 occurs due to the constriction at the Harpers Ferry Road crossing (Structure No. 03727), as described earlier. Although the 500-year flood elevation is 2.31 ft lower than the effective FIS elevation, the flood boundary follows relatively close to the corresponding boundary in the effective map. Vertically, the I-84 is on a sag at the Interchange. As the overflow reaches and passes beyond the sag, it is directed southerly toward the downstream side of the I-84 Structure No. 05774 (Westbound Exit 24 On-Ramp) over the Mad River.

Upstream of the Harpers Ferry Road crossing, the Base Flood overtops the channel banks and spreads northerly onto the floodplain, as indicated earlier. The overflow combines with the overflow from the Mad River at the Harpers Ferry Road intersection with Plank Road. In its path, the overflow inundates a building which is now owned by the State. In the effective map, the northerly extent of the 100-year floodplain extending beyond the main channel is approximately 45 ft, even with the higher water surface elevation.

TABLE 6. Proposed (Post-Project) versus Existing (Pre-Project) Condition
100-Year FEMA Discharge (Unencroached Condition) - With Backwater From The Mad River
Beaver Pond Brook, Waterbury

English (FT, NGVD-29)

			English					
			Existing Condition		Proposed Condition		Difference	
	FEMA Sta.	***River Sta.***	W.S. Elev. (ft) (1)	Velocity (fps) (2)	W.S. Elev. (ft) (3)	Velocity (fps) (4)	W.S. Elev. (ft) (3) - (1)	Velocity (fps) (4) - (2)
AC	5229.0	8722	491.97	7.42	491.62	8.71	-0.35	1.29
AB	5228.0	8640	492.23	0.96	491.59	1.28	-0.64	0.32
		8583	492.22	0.82	491.56	1.04	-0.66	0.22
AA	5227.0	8573	490.73	9.22	491.13	4.98	**0.40**	-4.24
REMAIN		8565.5	I-84 WB OFF-RAMP CROSSING(STRUCTURE NO. 06580 - Constructed Under 151-274)					
		8554	487.28	7.38	487.28	7.38	0.00	0.00
		8536	487	5.49	487	5.49	0.00	0.00
Z	5226.0	8464	486.16	5.04	486.16	5.04	0.00	0.00
REMAIN		8435.5	EXISTING AUSTIN ROAD CROSSING(STRUCTURE NO. 151-007)					
		8412	481.31	8.74	481.31	8.74	0.00	0.00
Y	5225.0	8393	476.36	8.60	476.36	8.61	0.00	0.01
		8356	474.66	3.79	474.66	3.79	0.00	0.00
REMAIN		8332.5	EXISTING I-84 WB ON-RAMP CROSSING(STRUCTURE NO. 04323)					
		8309	471.16	4.80	471.16	4.80	0.00	0.00
		8289	470.75	5.36	470.75	5.36	0.00	0.00
		8237	469.29	6.43	469.3	6.43	**0.01**	0.00
X	5224.0	8178	468.26	5.10	468.26	5.08	0.00	-0.02
		8128	466.6	7.22	466.59	7.22	-0.01	0.00
		8080	465.31	6.21	465.31	6.20	0.00	-0.01
		8027	463.95	6.85	463.89	6.98	-0.06	0.13
		7977	463.8	3.43	463.73	3.49	-0.07	0.06
W	5223.0	7937	463.59	3.61	463.51	3.66	-0.08	0.05
REMAIN		7911.5	EXISTING PIERPONT ROAD CROSSING (STRUCTURE NO. 151-006)					
V	5222.0	7885	461.82	3.70	461.75	3.77	-0.07	0.07
		7826	461.52	3.31	461.42	3.40	-0.10	0.09
		7757	461.55	1.01	461.45	1.02	-0.10	0.01
U	5221.0	7711	461.53	0.98	461.43	1.00	-0.10	0.02
	5220.8	7698	460.7	6.55	460.7	6.28	0.00	-0.27
REMAIN		7689.5	EXISTING MULLOY ROAD CROSSING (STRUCTURE NO. 151-005)					
	5220.2	7681	459.52	7.36	459.42	7.48	-0.10	0.12
T	5220.0	7666	459.39	7.24	459.28	7.44	-0.11	0.20
S	5219.0	7589	458.43	3.28	457.94	3.87	-0.49	0.59
		7370	458.34	0.82	457.8	0.95	-0.54	0.13
		7168	458.17	2.33	457.56	2.62	-0.61	0.29
R	5218.0	7120	458.08	2.82	457.34	3.83	-0.74	1.01
Q	5217.5	7073	457.77	4.00	456.85	4.82	-0.92	0.82
		6970	457.24	4.38	453.35	9.90	-3.89	5.52
		6915	456.96	4.75	452.3	7.09	-4.66	2.34
P	5217.0	6890	456.88	4.22	451.85	7.01	-5.03	2.79
REMOVE		6859.5	Existing I-84 Westbound Exit 25 Off-Ramp (Structure No. 02536)					
O	5216.0	6825	455.67	4.56	450.4	7.49	-5.27	2.93
		6809	455.5	4.14	450.05	7.44	-5.45	3.30
		6756	454.51	4.99	449.07	6.84	-5.44	1.85
		6732	454.17	5.02	448.73	6.54	-5.44	1.52
		6653	452.67	5.64	447.41	6.63	-5.26	0.99
		6593	450.4	7.72	446.95	5.21	-3.45	-2.51
		6541	450.1	6.10	446.91	3.28	-3.19	-2.82
N	5214.0	6490(PR 6473)	450.02	4.18	446.7	3.31	-3.32	-0.87
		6457	449.94	3.96				
NEW		6445.5	Proposed Culvert No. 014, Scott Road					
REMOVE		6441.5	Existing Scott Road Culvert, Structure No. 151-014					
		6417	440.67	6.10	440.44	7.70	-0.23	1.60
M	5213.0	6409	438.44	11.11	440.38	6.65	**1.94**	-4.46
		6394	437.24	10.49	440.34	5.25	**3.10**	-5.24
NEW		6349.5	Proposed Culvert No. 06622, Plank Road East					
		6305	431.96	10.52	432.14	9.94	**0.18**	-0.58
		6266	430.12	10.00	430.12	10.00	0.00	0.00
L	5212.0	6216	429.04	7.60	429.02	7.63	-0.02	0.03
		6122	426.86	6.87	427.29	6.27	**0.43**	-0.60
		6067	426	5.09	426.7	4.30	**0.70**	-0.79
K	5211.0	6033	425.86	4.13	426.62	3.37	**0.76**	-0.76
EXTEND		5993.5	Proposed Culvert No. 02537, Easterly I-84 crossing (Existing I-84 Structure No. 02537)					
J	5210.0	5947	419.99	8.14	419.99	8.12	0.00	-0.02
I	5209.0	5878	418.56	7.29	418.56	7.29	0.00	0.00
H	5208.9	5832	417.04	9.53	417.04	9.53	0.00	0.00
REMAIN		5812.5(EX&PR 5813)	Existing Concrete Weir					
	5208.2	5812(EX&PR 5812.5)	415.78	7.10	415.78	7.10	0.00	0.00
G	5208.1	5804	414.24	10.74	414.24	10.75	0.00	0.01
		5757	411.58	9.10	411.58	9.09	0.00	-0.01
F	5208.0	5628	402.54	11.51	402.54	11.51	0.00	0.00
		5524	392.83	9.05	392.53	9.63	-0.30	0.58
		5456	387.9	11.54	388.31	10.52	**0.41**	-1.02
E	5207.0	5422	386.09	10.37	387.59	7.26	**1.50**	-3.11
		5355	384.67	7.83	386.97	6.19	**2.30**	-1.64
REPLACE		5295.5	Proposed Culvert No. 01227, Westerly I-84 crossing (Replaces Ex. I-84 Structure No. 01227)					
D	5206.0	5296	383.83	6.67				
		5281	383.8	6.01				
REPLACE		5254.5	Ex. I-84 Structure #01227					
		5224	379.28	5.35	378.77	3.94	-0.51	-1.41
C	5205.1	5206	378.64	7.05	378.21	6.25	-0.43	-0.80
B	5205.0	5145	377.91	6.74	376.68	8.56	-1.23	1.82
A	5204.9	5084	377.64	5.77	376.55	5.41	-1.09	-0.36
		5072	377.7	4.52				
		5065			376.48	4.93		
REPLACE		5050.5(PR 5042.5)	Proposed Culvert No. 03727, Harpers Ferry Road (Existing Structure No. 03727)					
	5204.0	5021	373.47	4.15	372.8	6.05	-0.67	1.90

- New/Replacement Structure - Existing Structure

TABLE 6A. Proposed (Post-Project) versus Existing (Pre-Project) Condition
100-Year FEMA Discharge (Unencroached Condition) - With Backwater From The Mad River
Beaver Pond Brook, Waterbury

English (FT, NAVD-88)

			English					
			Existing Condition		Proposed Condition		Difference	
	FEMA Sta.	***River Sta.***	W.S. Elev. (ft) (1)	Velocity (fps) (2)	W.S. Elev. (ft) (3)	Velocity (fps) (4)	W.S. Elev. (ft) (3) - (1)	Velocity (fps) (4) - (2)
AC	5229.0	8722	490.97	7.42	490.62	8.71	-0.35	1.29
AB	5228.0	8640	491.23	0.96	490.59	1.28	-0.64	0.32
		8583	491.22	0.82	490.56	1.04	-0.66	0.22
AA	5227.0	8573	489.73	9.22	490.13	4.98	**0.40**	-4.24
REMAIN		8565.5	I-84 WB OFF-RAMP CROSSING(STRUCTURE NO. 06580 - Constructed Under 151-274)					
		8554	486.28	7.38	486.28	7.38	0.00	0.00
		8536	486.00	5.49	486.00	5.49	0.00	0.00
Z	5226.0	8464	485.16	5.04	485.16	5.04	0.00	0.00
REMAIN		8435.5	EXISTING AUSTIN ROAD CROSSING(STRUCTURE NO. 151-007)					
		8412	480.31	8.74	480.31	8.74	0.00	0.00
Y	5225.0	8393	475.36	8.60	475.36	8.61	0.00	0.01
		8356	473.66	3.79	473.66	3.79	0.00	0.00
REMAIN		8332.5	EXISTING I-84 WB ON-RAMP CROSSING(STRUCTURE NO. 04323)					
		8309	470.16	4.80	470.16	4.80	0.00	0.00
		8289	469.75	5.36	469.75	5.36	0.00	0.00
		8237	468.29	6.43	468.30	6.43	**0.01**	0.00
X	5224.0	8178	467.26	5.10	467.26	5.08	0.00	-0.02
		8128	465.60	7.22	465.59	7.22	-0.01	0.00
		8080	464.31	6.21	464.31	6.20	0.00	-0.01
		8027	462.95	6.85	462.89	6.98	-0.06	0.13
		7977	462.80	3.43	462.73	3.49	-0.07	0.06
W	5223.0	7937	462.59	3.61	462.51	3.66	-0.08	0.05
REMAIN		7911.5	EXISTING PIERPONT ROAD CROSSING (STRUCTURE NO. 151-006)					
V	5222.0	7885	460.82	3.70	460.75	3.77	-0.07	0.07
		7826	460.52	3.31	460.42	3.40	-0.10	0.09
		7757	460.55	1.01	460.45	1.02	-0.10	0.01
U	5221.0	7711	460.53	0.98	460.43	1.00	-0.10	0.02
	5220.8	7698	459.70	6.55	459.70	6.28	0.00	-0.27
REMAIN		7689.5	EXISTING MULLOY ROAD CROSSING (STRUCTURE NO. 151-005)					
	5220.2	7681	458.52	7.36	458.42	7.48	-0.10	0.12
T	5220.0	7666	458.39	7.24	458.28	7.44	-0.11	0.20
S	5219.0	7589	457.43	3.28	456.94	3.87	-0.49	0.59
		7370	457.34	0.82	456.80	0.95	-0.54	0.13
		7168	457.17	2.33	456.56	2.62	-0.61	0.29
R	5218.0	7120	457.08	2.82	456.34	3.83	-0.74	1.01
Q	5217.5	7073	456.77	4.00	455.85	4.82	-0.92	0.82
		6970	456.24	4.38	452.35	9.90	-3.89	5.52
		6915	455.96	4.75	451.30	7.09	-4.66	2.34
P	5217.0	6890	455.88	4.22	450.85	7.01	-5.03	2.79
REMOVE		6859.5	Existing I-84 Westbound Exit 25 Off-Ramp (Structure No. 02536)					
O	5216.0	6825	454.67	4.56	449.40	7.49	-5.27	2.93
		6809	454.50	4.14	449.05	7.44	-5.45	3.30
		6756	453.51	4.99	448.07	6.84	-5.44	1.85
		6732	453.17	5.02	447.73	6.54	-5.44	1.52
		6653	451.67	5.64	446.41	6.63	-5.26	0.99
		6593	449.40	7.72	445.95	5.21	-3.45	-2.51
		6541	449.10	6.10	445.91	3.28	-3.19	-2.82
N	5214.0	6490(PR 6473)	449.02	4.18	445.70	3.31	-3.32	-0.87
		6457	448.94	3.96				
NEW		6445.5	Proposed Culvert No. 014, Scott Road					
REMOVE		6441.5	Existing Scott Road Culvert, Structure No. 151-014					
		6417	439.67	6.10	439.44	7.70	-0.23	1.60
M	5213.0	6409	437.44	11.11	439.38	6.65	**1.94**	-4.46
		6394	436.24	10.49	439.34	5.25	**3.10**	-5.24
NEW		6349.5	Proposed Culvert No. 06622, Plank Road East					
		6305	430.96	10.52	431.14	9.94	**0.18**	-0.58
		6266	429.12	10.00	429.12	10.00	0.00	0.00
L	5212.0	6216	428.04	7.60	428.02	7.63	-0.02	0.03
		6122	425.86	6.87	426.29	6.27	**0.43**	-0.60
		6067	425.00	5.09	425.70	4.30	**0.70**	-0.79
K	5211.0	6033	424.86	4.13	425.62	3.37	**0.76**	-0.76
EXTEND		5993.5	Proposed Culvert No. 02537, Easterly I-84 crossing (Existing I-84 Structure No. 02537)					
J	5210.0	5947	418.99	8.14	418.99	8.12	0.00	-0.02
I	5209.0	5878	417.56	7.29	417.56	7.29	0.00	0.00
H	5208.9	5832	416.04	9.53	416.04	9.53	0.00	0.00
REMAIN		5812.5(EX&PR 5813)	Existing Concrete Weir					
	5208.2	5812(EX&PR 5812.5)	414.78	7.10	414.78	7.10	0.00	0.00
G	5208.1	5804	413.24	10.74	413.24	10.75	0.00	0.01
		5757	410.58	9.10	410.58	9.09	0.00	-0.01
F	5208.0	5628	401.54	11.51	401.54	11.51	0.00	0.00
		5524	391.83	9.05	391.53	9.63	-0.30	0.58
		5456	386.90	11.54	387.31	10.52	**0.41**	-1.02
E	5207.0	5422	385.09	10.37	386.59	7.26	**1.50**	-3.11
		5355	383.67	7.83	385.97	6.19	**2.30**	-1.64
REPLACE		5295.5	Proposed Culvert No. 01227, Westerly I-84 crossing (Replaces Ex. I-84 Structure No. 01227)					
D	5206.0	5296	382.83	6.67				
		5281	382.80	6.01				
REPLACE		5254.5	Ex. I-84 Structure #01227					
		5224	378.28	5.35	377.77	3.94	-0.51	-1.41
C	5205.1	5206	377.64	7.05	377.21	6.25	-0.43	-0.80
B	5205.0	5145	376.91	6.74	375.68	8.56	-1.23	1.82
A	5204.9	5084	376.64	5.77	375.55	5.41	-1.09	-0.36
		5072	376.70	4.52				
		5065			375.48	4.93		
REPLACE		5050.5(PR 5042.5)	Proposed Culvert No. 03727, Harpers Ferry Road (Existing Structure No. 03727)					
	5204.0	5021	372.47	4.15	371.8	6.05	-0.67	1.90

- New/Replacement Structure - Existing Structure

TABLE 6M. Proposed (Post-Project) versus Existing (Pre-Project) Condition
100-Year FEMA Discharge (Unencroached Condition) - With Backwater From The Mad River
Beaver Pond Brook, Waterbury

Metric (M, NGVD-29)

			English					
			Existing Condition		Proposed Condition		Difference	
	FEMA Sta.	***River Sta.***	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)
AC	5229.0	8722	149.95	2.26	149.85	2.65	-0.11	0.39
AB	5228.0	8640	150.03	0.29	149.84	0.39	-0.20	0.10
		8583	150.03	0.25	149.83	0.32	-0.20	0.07
AA	5227.0	8573	149.57	2.81	149.70	1.52	**0.12**	-1.29
REMAIN		8565.5	I-84 WB OFF-RAMP CROSSING(STRUCTURE NO. 06580 - Constructed Under 151-274)					
		8554	148.52	2.25	148.52	2.25	0.00	0.00
		8536	148.44	1.67	148.44	1.67	0.00	0.00
Z	5226.0	8464	148.18	1.54	148.18	1.54	0.00	0.00
REMAIN		8435.5	EXISTING AUSTIN ROAD CROSSING(STRUCTURE NO. 151-007)					
		8412	146.70	2.66	146.70	2.66	0.00	0.00
Y	5225.0	8393	145.19	2.62	145.19	2.62	0.00	0.00
		8356	144.68	1.16	144.68	1.16	0.00	0.00
REMAIN		8332.5	EXISTING I-84 WB ON-RAMP CROSSING(STRUCTURE NO. 04323)					
		8309	143.61	1.46	143.61	1.46	0.00	0.00
		8289	143.48	1.63	143.48	1.63	0.00	0.00
		8237	143.04	1.96	143.04	1.96	**0.00**	0.00
X	5224.0	8178	142.73	1.55	142.73	1.55	0.00	-0.01
		8128	142.22	2.20	142.22	2.20	0.00	0.00
		8080	141.83	1.89	141.83	1.89	0.00	0.00
		8027	141.41	2.09	141.39	2.13	-0.02	0.04
		7977	141.37	1.05	141.34	1.06	-0.02	0.02
W	5223.0	7937	141.30	1.10	141.28	1.12	-0.02	0.02
REMAIN		7911.5	EXISTING PIERPONT ROAD CROSSING (STRUCTURE NO. 151-006)					
V	5222.0	7885	140.76	1.13	140.74	1.15	-0.02	0.02
		7826	140.67	1.01	140.64	1.04	-0.03	0.03
		7757	140.68	0.31	140.65	0.31	-0.03	0.00
U	5221.0	7711	140.67	0.30	140.64	0.30	-0.03	0.01
	5220.8	7698	140.42	2.00	140.42	1.91	0.00	-0.08
REMAIN		7689.5	EXISTING MULLOY ROAD CROSSING (STRUCTURE NO. 151-005)					
	5220.2	7681	140.06	2.24	140.03	2.28	-0.03	0.04
T	5220.0	7666	140.02	2.21	139.99	2.27	-0.03	0.06
S	5219.0	7589	139.73	1.00	139.58	1.18	-0.15	0.18
		7370	139.70	0.25	139.54	0.29	-0.16	0.04
		7168	139.65	0.71	139.46	0.80	-0.19	0.09
R	5218.0	7120	139.62	0.86	139.40	1.17	-0.23	0.31
Q	5217.5	7073	139.53	1.22	139.25	1.47	-0.28	0.25
		6970	139.37	1.34	138.18	3.02	-1.19	1.68
		6915	139.28	1.45	137.86	2.16	-1.42	0.71
P	5217.0	6890	139.26	1.29	137.72	2.14	-1.53	0.85
REMOVE		6859.5	Existing I-84 Westbound Exit 25 Off-Ramp (Structure No. 02536)					
O	5216.0	6825	138.89	1.39	137.28	2.28	-1.61	0.89
		6809	138.84	1.26	137.18	2.27	-1.66	1.01
		6756	138.53	1.52	136.88	2.08	-1.66	0.56
		6732	138.43	1.53	136.77	1.99	-1.66	0.46
		6653	137.97	1.72	136.37	2.02	-1.60	0.30
		6593	137.28	2.35	136.23	1.59	-1.05	-0.77
		6541	137.19	1.86	136.22	1.00	-0.97	-0.86
N	5214.0	6490(PR 6473)	137.17	1.27	136.15	1.01	-1.01	-0.27
		6457	137.14	1.21				
NEW		6445.5	Proposed Culvert No. 014, Scott Road					
REMOVE		6441.5	Existing Scott Road Culvert, Structure No. 151-014					
		6417	134.32	1.86	134.25	2.35	-0.07	0.49
M	5213.0	6409	133.64	3.39	134.23	2.03	**0.59**	-1.36
		6394	133.27	3.20	134.22	1.60	**0.94**	-1.60
NEW		6349.5	Proposed Culvert No. 06622, Plank Road East					
		6305	131.66	3.21	131.72	3.03	**0.05**	-0.18
		6266	131.10	3.05	131.10	3.05	0.00	0.00
L	5212.0	6216	130.77	2.32	130.77	2.33	-0.01	0.01
		6122	130.11	2.09	130.24	1.91	**0.13**	-0.18
		6067	129.84	1.55	130.06	1.31	**0.21**	-0.24
K	5211.0	6033	129.80	1.26	130.03	1.03	**0.23**	-0.23
EXTEND		5993.5	Proposed Culvert No. 02537, Easterly I-84 crossing (Existing I-84 Structure No. 02537)					
J	5210.0	5947	128.01	2.48	128.01	2.47	0.00	-0.01
I	5209.0	5878	127.58	2.22	127.58	2.22	0.00	0.00
H	5208.9	5832	127.11	2.90	127.11	2.90	0.00	0.00
REMAIN		5812.5(EX&PR 5813)	Existing Concrete Weir					
	5208.2	5812(EX&PR 5812.5)	126.73	2.16	126.73	2.16	0.00	0.00
G	5208.1	5804	126.26	3.27	126.26	3.28	0.00	0.00
		5757	125.45	2.77	125.45	2.77	0.00	0.00
F	5208.0	5628	122.69	3.51	122.69	3.51	0.00	0.00
		5524	119.73	2.76	119.64	2.94	-0.09	0.18
		5456	118.23	3.52	118.36	3.21	**0.12**	-0.31
E	5207.0	5422	117.68	3.16	118.14	2.21	**0.46**	-0.95
		5355	117.25	2.39	117.95	1.89	**0.70**	-0.50
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				
		5281	116.98	1.83				
REPLACE		5254.5	Ex. I-84 Structure #01227					
		5224	115.60	1.63	115.45	1.20	-0.16	-0.43
C	5205.1	5206	115.41	2.15	115.28	1.91	-0.13	-0.24
B	5205.0	5145	115.19	2.05	114.81	2.61	-0.37	0.55
A	5204.9	5084	115.10	1.76	114.77	1.65	-0.33	-0.11
		5072	115.12	1.38				
		5065			114.75	1.50		
REPLACE		5050.5(PR 5042.5)	Proposed Culvert No. 03727, Harpers Ferry Road (Existing Structure No. 03727)					
	5204.0	5021	113.83	1.26	113.63	1.84	-0.20	0.58

- New/Replacement Structure - Existing Structure

TABLE 7. Proposed (Post-Project) versus Existing (Pre-Project) Condition
100-Year FEMA Discharge (Encroached Condition - Floodway) - Without Backwater From The Mad River
Beaver Pond Brook, Waterbury

English (FT, NGVD-29)

			English					
			Existing Condition		Proposed Condition		Difference	
	FEMA Sta.	***River Sta.***	W.S. Elev. (ft) (1)	Velocity (fps) (2)	W.S. Elev. (ft) (3)	Velocity (fps) (4)	W.S. Elev. (ft) (3) - (1)	Velocity (fps) (4) - (2)
AC	5229.0	8722	493.13	4.5	492.08	6.9	-1.05	2.4
AB	5228.0	8640	493.2	0.69	492.29	0.94	-0.91	0.25
		8583	493.2	0.72	492.27	0.92	-0.93	0.2
AA	5227.0	8573	491.06	10.3	491.59	5.81	**0.53**	-4.49
REMAIN		8565.5	I-84 WB OFF-RAMP CROSSING(STRUCTURE NO. 06580 - Constructed Under 151-274)					
		8554	487.29	8	487.29	8	0.00	0
		8536	487.02	5.65	487.02	5.65	0.00	0
Z	5226.0	8464	486.16	5.04	486.16	5.04	0.00	0
REMAIN		8435.5	EXISTING AUSTIN ROAD CROSSING(STRUCTURE NO. 151-007)					
		8412	481.32	8.71	481.32	8.71	0.00	0
Y	5225.0	8393	476.37	8.56	476.37	8.56	0.00	0
		8356	474.66	3.79	474.66	3.79	0.00	0
REMAIN		8332.5	EXISTING I-84 WB ON-RAMP CROSSING(STRUCTURE NO. 04323)					
		8309	471.16	4.8	471.16	4.8	0.00	0
		8289	470.75	5.36	470.75	5.36	0.00	0
		8237	469.38	6.25	469.3	6.43	-0.08	0.18
X	5224.0	8178	468.32	5.06	468.26	5.08	-0.06	0.02
		8128	466.59	7.23	466.6	7.22	**0.01**	-0.01
		8080	465.4	6.03	465.36	6.1	-0.04	0.07
		8027	464.61	5.63	464.5	5.81	-0.11	0.18
		7977	464.55	2.92	464.43	3	-0.12	0.08
W	5223.0	7937	464.41	3.16	464.28	3.23	-0.13	0.07
REMAIN		7911.5	EXISTING PIERPONT ROAD CROSSING (STRUCTURE NO. 151-006)					
V	5222.0	7885	462.59	3.2	462.46	3.28	-0.13	0.08
		7826	462.38	3.08	462.22	3.26	-0.16	0.18
		7757	462.37	1.22	462.22	1.25	-0.15	0.03
U	5221.0	7711	462.37	0.73	462.21	0.75	-0.16	0.02
	5220.8	7698	461.64	6	461.45	6.14	-0.19	0.14
REMAIN		7689.5	EXISTING MULLOY ROAD CROSSING (STRUCTURE NO. 151-005)					
	5220.2	7681	459.67	7.73	459.51	7.93	-0.16	0.2
T	5220.0	7666	459.63	6.85	459.44	7.15	-0.19	0.3
S	5219.0	7589	458.98	2.77	458.64	3.09	-0.34	0.32
		7370	458.58	1.44	458.09	1.61	-0.49	0.17
		7168	458.19	3.13	457.56	3.51	-0.63	0.38
R	5218.0	7120	458.1	3.18	457.37	3.95	-0.73	0.77
Q	5217.5	7073	457.8	3.98	456.89	4.8	-0.91	0.82
		6970	457.23	4.5	453.37	9.86	-3.86	5.36
		6915	456.95	4.81	452.36	7.02	-4.59	2.21
P	5217.0	6890	456.85	4.42	451.85	7.15	-5.00	2.73
REMOVE		6859.5	Existing I-84 Westbound Exit 25 Off-Ramp (Structure No. 02536)					
O	5216.0	6825	455.67	4.57	450.49	7.32	-5.18	2.75
		6809	455.5	4.13	450.16	7.32	-5.34	3.19
		6756	454.52	4.99	449.11	7.16	-5.41	2.17
		6732	454.18	5.01	448.78	6.67	-5.40	1.66
		6653	452.72	5.59	447.46	6.72	-5.26	1.13
		6593	450.91	6.99	446.96	5.42	-3.95	-1.57
		6541	449.91	7.95	446.91	3.51	-3.00	-4.44
N	5214.0	6490(PR 6473)	449.96	4.88	446.7	3.28	-3.26	-1.6
		6457	449.94	3.96				
NEW		6445.5	Proposed Culvert No. 014, Scott Road					
REMOVE		6441.5	Existing Scott Road Culvert, Structure No. 151-014					
		6417	440.78	6.08	440.44	7.7	-0.34	1.62
M	5213.0	6409	438.44	11.13	440.38	6.65	**1.94**	-4.48
		6394	437.24	10.49	440.34	5.25	**3.10**	-5.24
NEW		6349.5	Proposed Culvert No. 06622, Plank Road East					
		6305	431.96	10.53	432.14	9.94	**0.18**	-0.59
		6266	430.12	10	430.12	10	0.00	0
L	5212.0	6216	429.04	7.6	429.02	7.63	-0.02	0.03
		6122	426.86	6.86	427.29	6.27	**0.43**	-0.59
		6067	426	5.1	426.7	4.3	**0.70**	-0.8
K	5211.0	6033	425.86	4.13	426.62	3.37	**0.76**	-0.76
EXTEND		5993.5	Proposed Culvert No. 02537, Easterly I-84 crossing (Existing I-84 Structure No. 02537)					
J	5210.0	5947	420.08	7.98	420.07	7.96	-0.01	-0.02
I	5209.0	5878	418.92	6.81	418.92	6.81	0.00	0
H	5208.9	5832	417.55	9.12	417.55	9.12	0.00	0
REMAIN		5812.5(EX&PR 5813)	Existing Concrete Weir					
	5208.2	5812(EX&PR 5812.5)	415.78	7.1	415.78	7.1	0.00	0
G	5208.1	5804	414.24	10.75	414.24	10.75	0.00	0
		5757	411.58	9.09	411.58	9.09	0.00	0
F	5208.0	5628	402.54	11.52	402.54	11.52	0.00	0
		5524	392.9	8.93	392.53	9.63	-0.37	0.7
		5456	387.87	11.63	388.31	10.52	**0.44**	-1.11
E	5207.0	5422	386.09	10.38	387.59	7.26	**1.50**	-3.12
		5355	384.71	7.77	386.97	6.19	**2.26**	-1.58
REPLACE		5295.5	Proposed Culvert No. 01227, Westerly I-84 crossing (Replaces Ex. I-84 Structure No. 01227)					
D	5206.0	5296	383.88	6.62				
		5281	383.45	7.6				
REPLACE		5254.5	Ex. I-84 Structure #01227					
		5224	379.18	5.97	378.79	3.93	-0.39	-2.04
C	5205.1	5206	378.63	7.07	378.24	6.21	-0.39	-0.86
B	5205.0	5145	377.89	6.76	376.69	8.6	-1.20	1.84
A	5204.9	5084	377.53	6.1	376.56	5.44	-0.97	-0.66
		5072	377.54	5.4				
		5065			376.5	4.92		
REPLACE		5050.5(PR 5042.5)	Proposed Culvert No. 03727, Harpers Ferry Road (Existing Structure No. 03727)					
	5204.0	5021	369.86	8.26	370.06	10.57	**0.20**	2.31

- New/Replacement Structure - Existing Structure

TABLE 7A. Proposed (Post-Project) versus Existing (Pre-Project) Condition
100-Year FEMA Discharge (Encroached Condition - Floodway) - Without Backwater From The Mad River
Beaver Pond Brook, Waterbury

English (FT, NAVD-88)

			English					
			Existing Condition		Proposed Condition		Difference	
	FEMA Sta.	***River Sta.***	W.S. Elev. (ft) (1)	Velocity (fps) (2)	W.S. Elev. (ft) (3)	Velocity (fps) (4)	W.S. Elev. (ft) (3) - (1)	Velocity (fps) (4) - (2)
AC	5229.0	8722	492.13	4.5	491.08	6.9	-1.05	2.4
AB	5228.0	8640	492.20	0.69	491.29	0.94	-0.91	0.25
		8583	492.20	0.72	491.27	0.92	-0.93	0.2
AA	5227.0	8573	490.06	10.3	490.59	5.81	**0.53**	-4.49
REMAIN		8565.5	I-84 WB OFF-RAMP CROSSING(STRUCTURE NO. 06580 - Constructed Under 151-274)					
		8554	486.29	8	486.29	8	0.00	0
		8536	486.02	5.65	486.02	5.65	0.00	0
Z	5226.0	8464	485.16	5.04	485.16	5.04	0.00	0
REMAIN		8435.5	EXISTING AUSTIN ROAD CROSSING(STRUCTURE NO. 151-007)					
		8412	480.32	8.71	480.32	8.71	0.00	0
Y	5225.0	8393	475.37	8.56	475.37	8.56	0.00	0
		8356	473.66	3.79	473.66	3.79	0.00	0
REMAIN		8332.5	EXISTING I-84 WB ON-RAMP CROSSING(STRUCTURE NO. 04323)					
		8309	470.16	4.8	470.16	4.8	0.00	0
		8289	469.75	5.36	469.75	5.36	0.00	0
		8237	468.38	6.25	468.30	6.43	-0.08	0.18
X	5224.0	8178	467.32	5.06	467.26	5.08	-0.06	0.02
		8128	465.59	7.23	465.60	7.22	**0.01**	-0.01
		8080	464.40	6.03	464.36	6.1	-0.04	0.07
		8027	463.61	5.63	463.50	5.81	-0.11	0.18
		7977	463.55	2.92	463.43	3	-0.12	0.08
W	5223.0	7937	463.41	3.16	463.28	3.23	-0.13	0.07
REMAIN		7911.5	EXISTING PIERPONT ROAD CROSSING (STRUCTURE NO. 151-006)					
V	5222.0	7885	461.59	3.2	461.46	3.28	-0.13	0.08
		7826	461.38	3.08	461.22	3.26	-0.16	0.18
		7757	461.37	1.22	461.22	1.25	-0.15	0.03
U	5221.0	7711	461.37	0.73	461.21	0.75	-0.16	0.02
	5220.8	7698	460.64	6	460.45	6.14	-0.19	0.14
REMAIN		7689.5	EXISTING MULLOY ROAD CROSSING (STRUCTURE NO. 151-005)					
	5220.2	7681	458.67	7.73	458.51	7.93	-0.16	0.2
T	5220.0	7666	458.63	6.85	458.44	7.15	-0.19	0.3
S	5219.0	7589	457.98	2.77	457.64	3.09	-0.34	0.32
		7370	457.58	1.44	457.09	1.61	-0.49	0.17
		7168	457.19	3.13	456.56	3.51	-0.63	0.38
R	5218.0	7120	457.10	3.18	456.37	3.95	-0.73	0.77
Q	5217.5	7073	456.80	3.98	455.89	4.8	-0.91	0.82
		6970	456.23	4.5	452.37	9.86	-3.86	5.36
		6915	455.95	4.81	451.36	7.02	-4.59	2.21
P	5217.0	6890	455.85	4.42	450.85	7.15	-5.00	2.73
REMOVE		6859.5	Existing I-84 Westbound Exit 25 Off-Ramp (Structure No. 02536)					
O	5216.0	6825	454.67	4.57	449.49	7.32	-5.18	2.75
		6809	454.50	4.13	449.16	7.32	-5.34	3.19
		6756	453.52	4.99	448.11	7.16	-5.41	2.17
		6732	453.18	5.01	447.78	6.67	-5.40	1.66
		6653	451.72	5.59	446.46	6.72	-5.26	1.13
		6593	449.91	6.99	445.96	5.42	-3.95	-1.57
		6541	448.91	7.95	445.91	3.51	-3.00	-4.44
N	5214.0	6490(PR 6473)	448.96	4.88	445.70	3.28	-3.26	-1.6
		6457	448.94	3.96				
NEW		6445.5	Proposed Culvert No. 014, Scott Road					
REMOVE		6441.5	Existing Scott Road Culvert, Structure No. 151-014					
		6417	439.78	6.08	439.44	7.7	-0.34	1.62
M	5213.0	6409	437.44	11.13	439.38	6.65	**1.94**	-4.48
		6394	436.24	10.49	439.34	5.25	**3.10**	-5.24
NEW		6349.5	Proposed Culvert No. 06622, Plank Road East					
		6305	430.96	10.53	431.14	9.94	**0.18**	-0.59
		6266	429.12	10	429.12	10	0.00	0
L	5212.0	6216	428.04	7.6	428.02	7.63	-0.02	0.03
		6122	425.86	6.86	426.29	6.27	**0.43**	-0.59
		6067	425.00	5.1	425.70	4.3	**0.70**	-0.8
K	5211.0	6033	424.86	4.13	425.62	3.37	**0.76**	-0.76
EXTEND		5993.5	Proposed Culvert No. 02537, Easterly I-84 crossing (Existing I-84 Structure No. 02537)					
J	5210.0	5947	419.08	7.98	419.07	7.96	-0.01	-0.02
I	5209.0	5878	417.92	6.81	417.92	6.81	0.00	0
H	5208.9	5832	416.55	9.12	416.55	9.12	0.00	0
REMAIN		5812.5(EX&PR 5813)	Existing Concrete Weir					
	5208.2	5812(EX&PR 5812.5)	414.78	7.1	414.78	7.1	0.00	0
G	5208.1	5804	413.24	10.75	413.24	10.75	0.00	0
		5757	410.58	9.09	410.58	9.09	0.00	0
F	5208.0	5628	401.54	11.52	401.54	11.52	0.00	0
		5524	391.90	8.93	391.53	9.63	-0.37	0.7
		5456	386.87	11.63	387.31	10.52	**0.44**	-1.11
E	5207.0	5422	385.09	10.38	386.59	7.26	**1.50**	-3.12
		5355	383.71	7.77	385.97	6.19	**2.26**	-1.58
REPLACE		5295.5	Proposed Culvert No. 01227, Westerly I-84 crossing (Replaces Ex. I-84 Structure No. 01227)					
D	5206.0	5296	382.88	6.62				
		5281	382.45	7.6				
REPLACE		5254.5	Ex. I-84 Structure #01227					
		5224	378.18	5.97	377.79	3.93	-0.39	-2.04
C	5205.1	5206	377.63	7.07	377.24	6.21	-0.39	-0.86
B	5205.0	5145	376.89	6.76	375.69	8.6	-1.20	1.84
A	5204.9	5084	376.53	6.1	375.56	5.44	-0.97	-0.66
		5072	376.54	5.4				
		5065			375.50	4.92		
REPLACE		5050.5(PR 5042.5)	Proposed Culvert No. 03727, Harpers Ferry Road (Existing Structure No. 03727)					
	5204.0	5021	368.86	8.26	369.06	10.57	**0.20**	2.31

- New/Replacement Structure - Existing Structure

TABLE 7M. Proposed (Post-Project) versus Existing (Pre-Project) Condition
100-Year FEMA Discharge (Encroached Condition - Floodway) - Without Backwater From The Mad River
Beaver Pond Brook, Waterbury

Metric (M, NGVD-29)

			English					
			Existing Condition		Proposed Condition		Difference	
	FEMA Sta.	***River Sta.***	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)
AC	5229.0	8722	150.31	1.37	149.99	2.10	-0.32	0.73
AB	5228.0	8640	150.33	0.21	150.05	0.29	-0.28	0.08
		8583	150.33	0.22	150.04	0.28	-0.28	0.06
AA	5227.0	8573	149.68	3.14	149.84	1.77	**0.16**	-1.37
REMAIN		8565.5	I-84 WB OFF-RAMP CROSSING(STRUCTURE NO. 06580 - Constructed Under 151-274)					
		8554	148.53	2.44	148.53	2.44	0.00	0.00
		8536	148.44	1.72	148.44	1.72	0.00	0.00
Z	5226.0	8464	148.18	1.54	148.18	1.54	0.00	0.00
REMAIN		8435.5	EXISTING AUSTIN ROAD CROSSING(STRUCTURE NO. 151-007)					
		8412	146.71	2.65	146.71	2.65	0.00	0.00
Y	5225.0	8393	145.20	2.61	145.20	2.61	0.00	0.00
		8356	144.68	1.16	144.68	1.16	0.00	0.00
REMAIN		8332.5	EXISTING I-84 WB ON-RAMP CROSSING(STRUCTURE NO. 04323)					
		8309	143.61	1.46	143.61	1.46	0.00	0.00
		8289	143.48	1.63	143.48	1.63	0.00	0.00
		8237	143.07	1.91	143.04	1.96	-0.02	0.05
X	5224.0	8178	142.74	1.54	142.73	1.55	-0.02	0.01
		8128	142.22	2.20	142.22	2.20	**0.00**	0.00
		8080	141.85	1.84	141.84	1.86	-0.01	0.02
		8027	141.61	1.72	141.58	1.77	-0.03	0.05
		7977	141.59	0.89	141.56	0.91	-0.04	0.02
W	5223.0	7937	141.55	0.96	141.51	0.98	-0.04	0.02
REMAIN		7911.5	EXISTING PIERPONT ROAD CROSSING (STRUCTURE NO. 151-006)					
V	5222.0	7885	141.00	0.98	140.96	1.00	-0.04	0.02
		7826	140.93	0.94	140.88	0.99	-0.05	0.05
		7757	140.93	0.37	140.88	0.38	-0.05	0.01
U	5221.0	7711	140.93	0.22	140.88	0.23	-0.05	0.01
	5220.8	7698	140.71	1.83	140.65	1.87	-0.06	0.04
REMAIN		7689.5	EXISTING MULLOY ROAD CROSSING (STRUCTURE NO. 151-005)					
	5220.2	7681	140.11	2.36	140.06	2.42	-0.05	0.06
T	5220.0	7666	140.10	2.09	140.04	2.18	-0.06	0.09
S	5219.0	7589	139.90	0.84	139.79	0.94	-0.10	0.10
		7370	139.78	0.44	139.63	0.49	-0.15	0.05
		7168	139.66	0.95	139.46	1.07	-0.19	0.12
R	5218.0	7120	139.63	0.97	139.41	1.20	-0.22	0.23
Q	5217.5	7073	139.54	1.21	139.26	1.46	-0.28	0.25
		6970	139.36	1.37	138.19	3.01	-1.18	1.63
		6915	139.28	1.47	137.88	2.14	-1.40	0.67
P	5217.0	6890	139.25	1.35	137.72	2.18	-1.52	0.83
REMOVE		6859.5	Existing I-84 Westbound Exit 25 Off-Ramp (Structure No. 02536)					
O	5216.0	6825	138.89	1.39	137.31	2.23	-1.58	0.84
		6809	138.84	1.26	137.21	2.23	-1.63	0.97
		6756	138.54	1.52	136.89	2.18	-1.65	0.66
		6732	138.43	1.53	136.79	2.03	-1.65	0.51
		6653	137.99	1.70	136.39	2.05	-1.60	0.34
		6593	137.44	2.13	136.23	1.65	-1.20	-0.48
		6541	137.13	2.42	136.22	1.07	-0.91	-1.35
N	5214.0	6490(PR 6473)	137.15	1.49	136.15	1.00	-0.99	-0.49
		6457	137.14	1.21				
NEW		6445.5	Proposed Culvert No. 014, Scott Road					
REMOVE		6441.5	Existing Scott Road Culvert, Structure No. 151-014					
		6417	134.35	1.85	134.25	2.35	-0.10	0.49
M	5213.0	6409	133.64	3.39	134.23	2.03	**0.59**	-1.37
		6394	133.27	3.20	134.22	1.60	**0.94**	-1.60
NEW		6349.5	Proposed Culvert No. 06622, Plank Road East					
		6305	131.66	3.21	131.72	3.03	**0.05**	-0.18
		6266	131.10	3.05	131.10	3.05	0.00	0.00
L	5212.0	6216	130.77	2.32	130.77	2.33	-0.01	0.01
		6122	130.11	2.09	130.24	1.91	**0.13**	-0.18
		6067	129.84	1.55	130.06	1.31	**0.21**	-0.24
K	5211.0	6033	129.80	1.26	130.03	1.03	**0.23**	-0.23
EXTEND		5993.5	Proposed Culvert No. 02537, Easterly I-84 crossing (Existing I-84 Structure No. 02537)					
J	5210.0	5947	128.04	2.43	128.04	2.43	0.00	-0.01
I	5209.0	5878	127.69	2.08	127.69	2.08	0.00	0.00
H	5208.9	5832	127.27	2.78	127.27	2.78	0.00	0.00
REMAIN		5812.5(EX&PR 5813)	Existing Concrete Weir					
	5208.2	5812(EX&PR 5812.5)	126.73	2.16	126.73	2.16	0.00	0.00
G	5208.1	5804	126.26	3.28	126.26	3.28	0.00	0.00
		5757	125.45	2.77	125.45	2.77	0.00	0.00
F	5208.0	5628	122.69	3.51	122.69	3.51	0.00	0.00
		5524	119.76	2.72	119.64	2.94	-0.11	0.21
		5456	118.22	3.54	118.36	3.21	**0.13**	-0.34
E	5207.0	5422	117.68	3.16	118.14	2.21	**0.46**	-0.95
		5355	117.26	2.37	117.95	1.89	**0.69**	-0.48
REPLACE		5295.5	Proposed Culvert No. 01227, Westerly I-84 crossing (Replaces Ex. I-84 Structure No. 01227)					
D	5206.0	5296	117.01	2.02				
		5281	116.88	2.32				
REPLACE		5254.5	Ex. I-84 Structure #01227					
		5224	115.57	1.82	115.46	1.20	-0.12	-0.62
C	5205.1	5206	115.41	2.15	115.29	1.89	-0.12	-0.26
B	5205.0	5145	115.18	2.06	114.82	2.62	-0.37	0.56
A	5204.9	5084	115.07	1.86	114.78	1.66	-0.30	-0.20
		5072	115.07	1.65				
		5065			114.76	1.50		
REPLACE		5050.5(PR 5042.5)	Proposed Culvert No. 03727, Harpers Ferry Road (Existing Structure No. 03727)					
	5204.0	5021	112.73	2.52	112.79	3.22	**0.06**	0.70

- New/Replacement Structure - Existing Structure

TABLE 8. Proposed (Post-Project) versus Existing (Pre-Project) Condition
10-Year FEMA Discharge (Encroached Condition - Floodway) - Without Backwater From The Mad River
Beaver Pond Brook, Waterbury

English (FT, NGVD-29)

			English					
			Existing Condition		Proposed Condition		Difference	
	FEMA Sta.	***River Sta.***	W.S. Elev. (ft) (1)	Velocity (fps) (2)	W.S. Elev. (ft) (3)	Velocity (fps) (4)	W.S. Elev. (ft) (3) - (1)	Velocity (fps) (4) - (2)
AC	5229.0	8722	491.06	5.90	490.76	7.09	-0.30	1.19
AB	5228.0	8640	491.20	0.80	490.91	0.96	-0.29	0.16
		8583	491.18	0.67	490.89	0.77	-0.29	0.10
AA	5227.0	8573	489.83	8.19	490.47	4.50	**0.64**	-3.69
REMAIN		8565.5	I-84 WB OFF-RAMP CROSSING(STRUCTURE NO. 06580 - Constructed Under 151-274)					
		8554	486.28	6.00	486.28	6.00	0.00	0.00
		8536	485.98	4.22	485.98	4.22	0.00	0.00
Z	5226.0	8464	483.08	7.81	483.08	7.81	0.00	0.00
REMAIN		8435.5	EXISTING AUSTIN ROAD CROSSING(STRUCTURE NO. 151-007)					
		8412	480.39	7.04	480.39	7.04	0.00	0.00
Y	5225.0	8393	475.46	6.98	475.46	6.98	0.00	0.00
		8356	472.74	3.67	472.74	3.67	0.00	0.00
REMAIN		8332.5	EXISTING I-84 WB ON-RAMP CROSSING(STRUCTURE NO. 04323)					
		8309	470.02	3.63	470.02	3.63	0.00	0.00
		8289	469.60	4.46	469.60	4.46	0.00	0.00
		8237	468.31	4.75	468.31	4.75	0.00	0.00
X	5224.0	8178	467.15	4.01	467.15	4.02	0.00	0.01
		8128	465.39	6.49	465.39	6.49	0.00	0.00
		8080	464.27	4.51	464.27	4.52	0.00	0.01
		8027	462.31	6.80	462.31	6.79	0.00	-0.01
		7977	460.99	4.22	460.98	4.24	-0.01	0.02
W	5223.0	7937	460.65	3.47	460.64	3.48	-0.01	0.01
REMAIN		7911.5	EXISTING PIERPONT ROAD CROSSING (STRUCTURE NO. 151-006)					
V	5222.0	7885	459.97	3.11	459.97	3.11	0.00	0.00
		7826	459.45	3.28	459.46	3.27	**0.01**	-0.01
		7757	459.37	1.15	459.38	1.14	**0.01**	-0.01
U	5221.0	7711	459.35	0.79	459.36	0.79	**0.01**	0.00
	5220.8	7698	458.95	4.45	458.96	4.44	**0.01**	-0.01
REMAIN		7689.5	EXISTING MULLOY ROAD CROSSING (STRUCTURE NO. 151-005)					
	5220.2	7681	458.16	5.03	458.16	5.03	0.00	0.00
T	5220.0	7666	458.03	5.15	458.03	5.15	0.00	0.00
S	5219.0	7589	456.66	3.48	456.65	3.51	-0.01	0.03
		7370	456.11	1.18	456.01	1.24	-0.10	0.06
		7168	455.63	2.82	455.47	2.97	-0.16	0.15
R	5218.0	7120	455.35	3.53	455.10	3.90	-0.25	0.37
Q	5217.5	7073	455.02	3.59	454.70	3.89	-0.32	0.30
		6970	454.36	3.75	452.00	7.79	-2.36	4.04
		6915	453.93	4.36	450.81	5.42	-3.12	1.06
P	5217.0	6890	453.74	3.88	450.32	5.49	-3.42	1.61
REMOVE		6859.5	Existing I-84 Westbound Exit 25 Off-Ramp (Structure No. 02536)					
O	5216.0	6825	453.20	3.75	449.07	5.48	-4.13	1.73
		6809	453.00	3.52	448.76	5.46	-4.24	1.94
		6756	452.10	4.40	447.72	5.51	-4.38	1.11
		6732	451.79	4.38	447.28	5.46	-4.51	1.08
		6653	450.43	4.91	445.77	5.46	-4.66	0.55
		6593	448.72	5.66	444.68	5.33	-4.04	-0.33
		6541	447.30	7.10	443.86	5.04	-3.44	-2.06
N	5214.0	6490(PR 6473)	446.73	5.11	443.55	3.09	-3.18	-2.02
		6457	446.67	3.57				
NEW		6445.5	Proposed Culvert No. 014, Scott Road					
REMOVE		6441.5	Existing Scott Road Culvert, Structure No. 151-014					
		6417	438.52	4.84	437.99	8.39	-0.53	3.55
M	5213.0	6409	436.70	9.27	437.41	8.50	**0.71**	-0.77
		6394	435.55	9.07	436.94	6.47	**1.39**	-2.60
NEW		6349.5	Proposed Culvert No. 06622, Plank Road East					
		6305	430.52	7.99	430.81	7.84	**0.29**	-0.15
		6266	428.42	8.71	428.42	8.71	0.00	0.00
L	5212.0	6216	427.13	6.17	427.13	6.16	0.00	-0.01
		6122	424.70	6.33	424.72	6.29	**0.02**	-0.04
		6067	422.79	6.51	423.40	5.15	**0.61**	-1.36
K	5211.0	6033	422.42	4.40	423.31	3.13	**0.89**	-1.27
EXTEND		5993.5	Proposed Culvert No. 02537, Easterly I-84 crossing (Existing I-84 Structure No. 02537)					
J	5210.0	5947	417.82	7.46	417.81	7.33	-0.01	-0.13
I	5209.0	5878	416.57	5.72	416.57	5.72	0.00	0.00
H	5208.9	5832	416.01	5.78	416.01	5.78	0.00	0.00
REMAIN		5812.5(EX&PR 5813)	Existing Concrete Weir					
	5208.2	5812(EX&PR 5812.5)	413.75	5.06	413.76	5.04	**0.01**	-0.02
G	5208.1	5804	412.25	9.50	412.22	9.59	-0.03	0.09
		5757	408.88	8.16	408.88	8.15	0.00	-0.01
F	5208.0	5628	400.74	9.53	400.73	9.55	-0.01	0.02
		5524	390.14	8.75	390.07	8.94	-0.07	0.19
		5456	385.96	9.81	386.02	9.60	**0.06**	-0.21
E	5207.0	5422	384.39	7.78	384.11	9.22	-0.28	1.44
		5355	381.39	9.13	383.54	4.69	**2.15**	-4.44
REPLACE		5295.5	Proposed Culvert No. 01227, Westerly I-84 crossing (Replaces Ex. I-84 Structure No. 01227)					
D	5206.0	5296	379.30	8.06				
		5281	379.16	6.90				
REPLACE		5254.5	Ex. I-84 Structure #01227					
		5224	376.71	4.22	376.56	2.77	-0.15	-1.45
C	5205.1	5206	376.16	5.81	376.20	4.69	**0.04**	-1.12
B	5205.0	5145	374.13	8.30	373.74	9.47	-0.39	1.17
A	5204.9	5084	373.30	5.87	372.78	5.72	-0.52	-0.15
		5072	373.29	4.74				
		5065			372.66	4.77		
REPLACE		5050.5(PR 5042.5)	Proposed Culvert No. 03727, Harpers Ferry Road (Existing Structure No. 03727)					
	5204.0	5021	368.37	6.52	368.43	8.48	**0.06**	1.96

- New/Replacement Structure - Existing Structure

TABLE 8A. Proposed (Post-Project) versus Existing (Pre-Project) Condition
10-Year FEMA Discharge (Encroached Condition - Floodway) - Without Backwater From The Mad River
Beaver Pond Brook, Waterbury

English (FT, NAVD-88)

			English					
			Existing Condition		Proposed Condition		Difference	
	FEMA Sta.	***River Sta.***	W.S. Elev. (ft) (1)	Velocity (fps) (2)	W.S. Elev. (ft) (3)	Velocity (fps) (4)	W.S. Elev. (ft) (3) - (1)	Velocity (fps) (4) - (2)
AC	5229.0	8722	490.06	5.90	489.76	7.09	-0.30	1.19
AB	5228.0	8640	490.20	0.80	489.91	0.96	-0.29	0.16
		8583	490.18	0.67	489.89	0.77	-0.29	0.10
AA	5227.0	8573	488.83	8.19	489.47	4.50	**0.64**	-3.69
REMAIN		8565.5	I-84 WB OFF-RAMP CROSSING(STRUCTURE NO. 06580 - Constructed Under 151-274)					
		8554	485.28	6.00	485.28	6.00	0.00	0.00
		8536	484.98	4.22	484.98	4.22	0.00	0.00
Z	5226.0	8464	482.08	7.81	482.08	7.81	0.00	0.00
REMAIN		8435.5	EXISTING AUSTIN ROAD CROSSING(STRUCTURE NO. 151-007)					
		8412	479.39	7.04	479.39	7.04	0.00	0.00
Y	5225.0	8393	474.46	6.98	474.46	6.98	0.00	0.00
		8356	471.74	3.67	471.74	3.67	0.00	0.00
REMAIN		8332.5	EXISTING I-84 WB ON-RAMP CROSSING(STRUCTURE NO. 04323)					
		8309	469.02	3.63	469.02	3.63	0.00	0.00
		8289	468.60	4.46	468.60	4.46	0.00	0.00
		8237	467.31	4.75	467.31	4.75	0.00	0.00
X	5224.0	8178	466.15	4.01	466.15	4.02	0.00	0.01
		8128	464.39	6.49	464.39	6.49	0.00	0.00
		8080	463.27	4.51	463.27	4.52	0.00	0.01
		8027	461.31	6.80	461.31	6.79	0.00	-0.01
		7977	459.99	4.22	459.98	4.24	-0.01	0.02
W	5223.0	7937	459.65	3.47	459.64	3.48	-0.01	0.01
REMAIN		7911.5	EXISTING PIERPONT ROAD CROSSING (STRUCTURE NO. 151-006)					
V	5222.0	7885	458.97	3.11	458.97	3.11	0.00	0.00
		7826	458.45	3.28	458.46	3.27	**0.01**	-0.01
		7757	458.37	1.15	458.38	1.14	**0.01**	-0.01
U	5221.0	7711	458.35	0.79	458.36	0.79	**0.01**	0.00
	5220.8	7698	457.95	4.45	457.96	4.44	**0.01**	-0.01
REMAIN		7689.5	EXISTING MULLOY ROAD CROSSING (STRUCTURE NO. 151-005)					
	5220.2	7681	457.16	5.03	457.16	5.03	0.00	0.00
T	5220.0	7666	457.03	5.15	457.03	5.15	0.00	0.00
S	5219.0	7589	455.66	3.48	455.65	3.51	-0.01	0.03
		7370	455.11	1.18	455.01	1.24	-0.10	0.06
		7168	454.63	2.82	454.47	2.97	-0.16	0.15
R	5218.0	7120	454.35	3.53	454.10	3.90	-0.25	0.37
Q	5217.5	7073	454.02	3.59	453.70	3.89	-0.32	0.30
		6970	453.36	3.75	451.00	7.79	-2.36	4.04
		6915	452.93	4.36	449.81	5.42	-3.12	1.06
P	5217.0	6890	452.74	3.88	449.32	5.49	-3.42	1.61
REMOVE		6859.5	Existing I-84 Westbound Exit 25 Off-Ramp (Structure No. 02536)					
O	5216.0	6825	452.20	3.75	448.07	5.48	-4.13	1.73
		6809	452.00	3.52	447.76	5.46	-4.24	1.94
		6756	451.10	4.40	446.72	5.51	-4.38	1.11
		6732	450.79	4.38	446.28	5.46	-4.51	1.08
		6653	449.43	4.91	444.77	5.46	-4.66	0.55
		6593	447.72	5.66	443.68	5.33	-4.04	-0.33
		6541	446.30	7.10	442.86	5.04	-3.44	-2.06
N	5214.0	6490(PR 6473)	445.73	5.11	442.55	3.09	-3.18	-2.02
		6457	445.67	3.57				
NEW		6445.5	Proposed Culvert No. 014, Scott Road					
REMOVE		6441.5	Existing Scott Road Culvert, Structure No. 151-014					
		6417	437.52	4.84	436.99	8.39	-0.53	3.55
M	5213.0	6409	435.70	9.27	436.41	8.50	**0.71**	-0.77
		6394	434.55	9.07	435.94	6.47	**1.39**	-2.60
NEW		6349.5	Proposed Culvert No. 06622, Plank Road East					
		6305	429.52	7.99	429.81	7.84	**0.29**	-0.15
		6266	427.42	8.71	427.42	8.71	0.00	0.00
L	5212.0	6216	426.13	6.17	426.13	6.16	0.00	-0.01
		6122	423.70	6.33	423.72	6.29	**0.02**	-0.04
		6067	421.79	6.51	422.40	5.15	**0.61**	-1.36
K	5211.0	6033	421.42	4.40	422.31	3.13	**0.89**	-1.27
EXTEND		5993.5	Proposed Culvert No. 02537, Easterly I-84 crossing (Existing I-84 Structure No. 02537)					
J	5210.0	5947	416.82	7.46	416.81	7.33	-0.01	-0.13
I	5209.0	5878	415.57	5.72	415.57	5.72	0.00	0.00
H	5208.9	5832	415.01	5.78	415.01	5.78	0.00	0.00
REMAIN		5812.5(EX&PR 5813)	Existing Concrete Weir					
	5208.2	5812(EX&PR 5812.5)	412.75	5.06	412.76	5.04	**0.01**	-0.02
G	5208.1	5804	411.25	9.50	411.22	9.59	-0.03	0.09
		5757	407.88	8.16	407.88	8.15	0.00	-0.01
F	5208.0	5628	399.74	9.53	399.73	9.55	-0.01	0.02
		5524	389.14	8.75	389.07	8.94	-0.07	0.19
		5456	384.96	9.81	385.02	9.60	**0.06**	-0.21
E	5207.0	5422	383.39	7.78	383.11	9.22	-0.28	1.44
		5355	380.39	9.13	382.54	4.69	**2.15**	-4.44
REPLACE		5295.5	Proposed Culvert No. 01227, Westerly I-84 crossing (Replaces Ex. I-84 Structure No. 01227)					
D	5206.0	5296	378.30	8.06				
		5281	378.16	6.90				
REPLACE		5254.5	Ex. I-84 Structure #01227					
		5224	375.71	4.22	375.56	2.77	-0.15	-1.45
C	5205.1	5206	375.16	5.81	375.20	4.69	**0.04**	-1.12
B	5205.0	5145	373.13	8.30	372.74	9.47	-0.39	1.17
A	5204.9	5084	372.30	5.87	371.78	5.72	-0.52	-0.15
		5072	372.29	4.74				
		5065			371.66	4.77		
REPLACE		5050.5(PR 5042.5)	Proposed Culvert No. 03727, Harpers Ferry Road (Existing Structure No. 03727)					
	5204.0	5021	367.37	6.52	367.43	8.48	**0.06**	1.96

- New/Replacement Structure - Existing Structure

TABLE 8M. Proposed (Post-Project) versus Existing (Pre-Project) Condition
10-Year FEMA Discharge (Encroached Condition - Floodway) - Without Backwater From The Mad River
Beaver Pond Brook, Waterbury

Metric (M, NGVD-29)

			English					
			Existing Condition		Proposed Condition		Difference	
	FEMA Sta.	***River Sta.***	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)
AC	5229.0	8722	149.68	5.90	149.58	7.09	-0.09	1.19
AB	5228.0	8640	149.72	0.80	149.63	0.96	-0.09	0.16
		8583	149.71	0.67	149.62	0.77	-0.09	0.10
AA	5227.0	8573	149.30	8.19	149.50	4.50	**0.20**	-3.69
REMAIN		8565.5	I-84 WB OFF-RAMP CROSSING(STRUCTURE NO. 06580 - Constructed Under 151-274)					
		8554	148.22	6.00	148.22	6.00	0.00	0.00
		8536	148.13	4.22	148.13	4.22	0.00	0.00
Z	5226.0	8464	147.24	7.81	147.24	7.81	0.00	0.00
REMAIN		8435.5	EXISTING AUSTIN ROAD CROSSING(STRUCTURE NO. 151-007)					
		8412	146.42	7.04	146.42	7.04	0.00	0.00
Y	5225.0	8393	144.92	6.98	144.92	6.98	0.00	0.00
		8356	144.09	3.67	144.09	3.67	0.00	0.00
REMAIN		8332.5	EXISTING I-84 WB ON-RAMP CROSSING(STRUCTURE NO. 04323)					
		8309	143.26	3.63	143.26	3.63	0.00	0.00
		8289	143.13	4.46	143.13	4.46	0.00	0.00
		8237	142.74	4.75	142.74	4.75	0.00	0.00
X	5224.0	8178	142.39	4.01	142.39	4.02	0.00	0.01
		8128	141.85	6.49	141.85	6.49	0.00	0.00
		8080	141.51	4.51	141.51	4.52	0.00	0.01
		8027	140.91	6.80	140.91	6.79	0.00	-0.01
		7977	140.51	4.22	140.51	4.24	0.00	0.02
W	5223.0	7937	140.41	3.47	140.40	3.48	0.00	0.01
REMAIN		7911.5	EXISTING PIERPONT ROAD CROSSING (STRUCTURE NO. 151-006)					
V	5222.0	7885	140.20	3.11	140.20	3.11	0.00	0.00
		7826	140.04	3.28	140.04	3.27	**0.00**	-0.01
		7757	140.02	1.15	140.02	1.14	**0.00**	-0.01
U	5221.0	7711	140.01	0.79	140.01	0.79	**0.00**	0.00
	5220.8	7698	139.89	4.45	139.89	4.44	**0.00**	-0.01
REMAIN		7689.5	EXISTING MULLOY ROAD CROSSING (STRUCTURE NO. 151-005)					
	5220.2	7681	139.65	5.03	139.65	5.03	0.00	0.00
T	5220.0	7666	139.61	5.15	139.61	5.15	0.00	0.00
S	5219.0	7589	139.19	3.48	139.19	3.51	0.00	0.03
		7370	139.02	1.18	138.99	1.24	-0.03	0.06
		7168	138.88	2.82	138.83	2.97	-0.05	0.15
R	5218.0	7120	138.79	3.53	138.71	3.90	-0.08	0.37
Q	5217.5	7073	138.69	3.59	138.59	3.89	-0.10	0.30
		6970	138.49	3.75	137.77	7.79	-0.72	4.04
		6915	138.36	4.36	137.41	5.42	-0.95	1.06
P	5217.0	6890	138.30	3.88	137.26	5.49	-1.04	1.61
REMOVE		6859.5	Existing I-84 Westbound Exit 25 Off-Ramp (Structure No. 02536)					
O	5216.0	6825	138.14	3.75	136.88	5.48	-1.26	1.73
		6809	138.07	3.52	136.78	5.46	-1.29	1.94
		6756	137.80	4.40	136.47	5.51	-1.34	1.11
		6732	137.71	4.38	136.33	5.46	-1.37	1.08
		6653	137.29	4.91	135.87	5.46	-1.42	0.55
		6593	136.77	5.66	135.54	5.33	-1.23	-0.33
		6541	136.34	7.10	135.29	5.04	-1.05	-2.06
N	5214.0	6490(PR 6473)	136.16	5.11	135.19	3.09	-0.97	-2.02
		6457	136.15	3.57				
NEW		6445.5	Proposed Culvert No. 014, Scott Road					
REMOVE		6441.5	Existing Scott Road Culvert, Structure No. 151-014					
		6417	133.66	4.84	133.50	8.39	-0.16	3.55
M	5213.0	6409	133.11	9.27	133.32	8.50	**0.22**	-0.77
		6394	132.76	9.07	133.18	6.47	**0.42**	-2.60
NEW		6349.5	Proposed Culvert No. 06622, Plank Road East					
		6305	131.22	7.99	131.31	7.84	**0.09**	-0.15
		6266	130.58	8.71	130.58	8.71	0.00	0.00
L	5212.0	6216	130.19	6.17	130.19	6.16	0.00	-0.01
		6122	129.45	6.33	129.45	6.29	**0.01**	-0.04
		6067	128.87	6.51	129.05	5.15	**0.19**	-1.36
K	5211.0	6033	128.75	4.40	129.02	3.13	**0.27**	-1.27
EXTEND		5993.5	Proposed Culvert No. 02537, Easterly I-84 crossing (Existing I-84 Structure No. 02537)					
J	5210.0	5947	127.35	7.46	127.35	7.33	0.00	-0.13
I	5209.0	5878	126.97	5.72	126.97	5.72	0.00	0.00
H	5208.9	5832	126.80	5.78	126.80	5.78	0.00	0.00
REMAIN		5812.5(EX&PR 5813)	Existing Concrete Weir					
	5208.2	5812(EX&PR 5812.5)	126.11	5.06	126.11	5.04	**0.00**	-0.02
G	5208.1	5804	125.65	9.50	125.64	9.59	-0.01	0.09
		5757	124.63	8.16	124.63	8.15	0.00	-0.01
F	5208.0	5628	122.15	9.53	122.14	9.55	0.00	0.02
		5524	118.91	8.75	118.89	8.94	-0.02	0.19
		5456	117.64	9.81	117.66	9.60	**0.02**	-0.21
E	5207.0	5422	117.16	7.78	117.08	9.22	-0.09	1.44
		5355	116.25	9.13	116.90	4.69	**0.66**	-4.44
REPLACE		5295.5	Proposed Culvert No. 01227, Westerly I-84 crossing (Replaces Ex. I-84 Structure No. 01227)					
D	5206.0	5296	115.61	8.06				
		5281	115.57	6.90				
REPLACE		5254.5	Ex. I-84 Structure #01227					
		5224	114.82	4.22	114.78	2.77	-0.05	-1.45
C	5205.1	5206	114.65	5.81	114.67	4.69	**0.01**	-1.12
B	5205.0	5145	114.03	8.30	113.92	9.47	-0.12	1.17
A	5204.9	5084	113.78	5.87	113.62	5.72	-0.16	-0.15
		5072	113.78	4.74				
		5065			113.59	4.77		
REPLACE		5050.5(PR 5042.5)	Proposed Culvert No. 03727, Harpers Ferry Road (Existing Structure No. 03727)					
	5204.0	5021	112.28	6.52	112.30	8.48	**0.02**	1.96

- New/Replacement Structure - Existing Structure

TABLE 9. Proposed (Post-Project) versus Existing (Pre-Project) Condition
500-Year FEMA Discharge (Unencroached Condition) - With Backwater From The Mad River
Beaver Pond Brook, Waterbury

English (FT, NGVD-29)

			English					
			Existing Condition		Proposed Condition		Difference	
	FEMA Sta.	***River Sta.***	W.S. Elev. (ft) (1)	Velocity (fps) (2)	W.S. Elev. (ft) (3)	Velocity (fps) (4)	W.S. Elev. (ft) (3) - (1)	Velocity (fps) (4) - (2)
AC	5229.0	8722	492.43	9.11	492.43	9.08	0	-0.03
AB	5228.0	8640	492.64	1.24	492.16	1.49	-0.48	0.25
		8583	492.62	1.08	492.13	1.27	-0.49	0.19
AA	5227.0	8573	491.49	8.83	490.95	8.17	-0.54	-0.66
REMAIN		8565.5	I-84 WB OFF-RAMP CROSSING(STRUCTURE NO. 06580 - Constructed Under 151-274)					
		8554	489	5.23	489	5.23	0.00	0.00
		8536	488.89	4.35	488.89	4.35	0.00	0.00
Z	5226.0	8464	488.6	4.09	488.6	4.08	0.00	-0.01
REMAIN		8435.5	EXISTING AUSTIN ROAD CROSSING(STRUCTURE NO. 151-007)					
		8412	482.07	9.88	482.07	9.88	0.00	0.00
Y	5225.0	8393	477.11	9.66	477.11	9.64	0.00	-0.02
		8356	476.29	3.84	476.29	3.84	0.00	0.00
REMAIN		8332.5	EXISTING I-84 WB ON-RAMP CROSSING(STRUCTURE NO. 04323)					
		8309	472	5.71	472	5.71	0.00	0.00
		8289	471.6	6.06	471.6	6.06	0.00	0.00
		8237	470.04	7.67	470.05	7.67	**0.01**	0.00
X	5224.0	8178	469.1	5.86	469.1	5.84	0.00	-0.02
		8128	467.4	8.16	467.4	8.16	0.00	0.00
		8080	466.26	7.09	466.26	7.10	0.00	0.01
		8027	465.36	6.89	465.36	6.89	0.00	0.00
		7977	465.3	3.80	465.3	3.80	0.00	0.00
W	5223.0	7937	465.04	4.31	465.04	4.31	0.00	0.00
REMAIN		7911.5	EXISTING PIERPONT ROAD CROSSING (STRUCTURE NO. 151-006)					
V	5222.0	7885	462.68	4.60	462.67	4.61	-0.01	0.01
		7826	462.33	4.04	462.31	4.06	-0.02	0.02
		7757	462.39	1.12	462.38	1.13	-0.01	0.01
U	5221.0	7711	462.39	0.85	462.37	0.86	-0.02	0.01
	5220.8	7698	460.7	9.49	460.66	9.54	-0.04	0.05
REMAIN		7689.5	EXISTING MULLOY ROAD CROSSING (STRUCTURE NO. 151-005)					
	5220.2	7681	460.03	10.24	459.62	10.93	-0.41	0.69
T	5220.0	7666	460.51	5.21	460.1	6.18	-0.41	0.97
S	5219.0	7589	460.46	1.17	459.23	3.81	-1.23	2.64
		7370	460.38	0.84	459.1	1.05	-1.28	0.21
		7168	460.28	1.78	458.89	2.44	-1.39	0.66
R	5218.0	7120	460.25	1.98	458.81	3.21	-1.44	1.23
Q	5217.5	7073	460	4.00	458.24	5.51	-1.76	1.51
		6970	459.5	4.85	454.37	11.45	-5.13	6.60
		6915	459.25	5.20	453.49	8.22	-5.76	3.02
P	5217.0	6890	459.2	4.67	453.07	8.06	-6.13	3.39
REMOVE		6859.5	Existing I-84 Westbound Exit 25 Off-Ramp (Structure No. 02536)					
O	5216.0	6825	457.25	4.89	451.52	8.82	-5.73	3.93
		6809	457.05	4.81	451.21	8.57	-5.84	3.76
		6756	455.98	5.70	450.56	7.08	-5.42	1.38
		6732	455.58	5.91	450.37	6.56	-5.21	0.65
		6653	454.17	6.41	449.67	6.22	-4.5	-0.19
		6593	453.6	5.16	449.53	4.74	-4.07	-0.42
		6541	453.51	4.49	449.55	3.05	-3.96	-1.44
N	5214.0	6490(PR 6473)	453.6	1.66	449.34	3.57	-4.26	1.91
		6457	453.56	1.76				
NEW		6445.5	Proposed Culvert No. 014, Scott Road					
REMOVE		6441.5	Existing Scott Road Culvert, Structure No. 151-014					
		6417	442.33	6.98	443.03	6.94	**0.7**	-0.04
M	5213.0	6409	439.77	12.31	443.06	5.98	**3.29**	-6.33
		6394	438.45	11.46	443.06	4.97	**4.61**	-6.49
NEW		6349.5	Proposed Culvert No. 06622, Plank Road East					
		6305	433.07	12.02	433.16	11.36	**0.09**	-0.66
		6266	431.32	11.18	431.67	10.36	**0.35**	-0.82
L	5212.0	6216	430.61	8.45	431.29	7.53	**0.68**	-0.92
		6122	429.61	6.19	430.7	5.46	**1.09**	-0.73
		6067	429.41	4.34	430.61	3.58	**1.2**	-0.76
K	5211.0	6033	429.34	3.94	430.57	3.16	**1.23**	-0.78
EXTEND		5993.5	Proposed Culvert No. 02537, Easterly I-84 crossing (Existing I-84 Structure No. 02537)					
J	5210.0	5947	421.54	8.92	421.53	8.94	-0.01	0.02
I	5209.0	5878	420.43	8.04	420.43	8.04	0	0.00
H	5208.9	5832	417.39	13.62	417.39	13.63	0	0.01
REMAIN		5812.5(EX&PR 5813)	Existing Concrete Weir					
	5208.2	5812(EX&PR 5812.5)	417.38	8.58	417.38	8.58	0	0.00
G	5208.1	5804	415.62	12.23	415.62	12.23	0	0.00
		5757	412.95	11.00	412.95	11.00	0	0.00
F	5208.0	5628	403.9	13.10	403.9	13.10	0	0.00
		5524	394.17	10.77	393.44	12.21	-0.73	1.44
		5456	389.26	13.19	390.59	10.56	**1.33**	-2.63
E	5207.0	5422	387.63	11.76	390.63	6.68	**3**	-5.08
		5355	387.13	7.89	389.9	7.20	**2.77**	-0.69
REPLACE		5295.5	Proposed Culvert No. 01227, Westerly I-84 crossing (Replaces Ex. I-84 Structure No. 01227)					
D	5206.0	5296	386.52	7.09				
		5281	386.46	6.92				
REPLACE		5254.5	Ex. I-84 Structure #01227					
		5224	381.23	6.47	380.88	4.60	-0.35	-1.87
C	5205.1	5206	380.63	7.75	380.31	6.76	-0.32	-0.99
B	5205.0	5145	380.05	7.18	379.9	6.83	-0.15	-0.35
A	5204.9	5084	380.34	3.48	379.94	4.45	-0.4	0.97
		5072	380.28	3.99				
		5065			379.92	4.11		
REPLACE		5050.5(PR 5042.5)	Proposed Culvert No. 03727, Harpers Ferry Road (Existing Structure No. 03727)					
	5204.0	5021	374.87	5.23	373.97	7.70	-0.9	2.47

- New/Replacement Structure - Existing Structure

TABLE 9A. Proposed (Post-Project) versus Existing (Pre-Project) Condition
500-Year FEMA Discharge (Unencroached Condition) - With Backwater From The Mad River
Beaver Pond Brook, Waterbury

English (FT, NAVD-88)

			English					
			Existing Condition		Proposed Condition		Difference	
	FEMA Sta.	***River Sta.***	W.S. Elev. (ft) (1)	Velocity (fps) (2)	W.S. Elev. (ft) (3)	Velocity (fps) (4)	W.S. Elev. (ft) (3) - (1)	Velocity (fps) (4) - (2)
AC	5229.0	8722	491.43	9.11	491.43	9.08	0	-0.03
AB	5228.0	8640	491.64	1.24	491.16	1.49	-0.48	0.25
		8583	491.62	1.08	491.13	1.27	-0.49	0.19
AA	5227.0	8573	490.49	8.83	489.95	8.17	-0.54	-0.66
REMAIN		8565.5	I-84 WB OFF-RAMP CROSSING(STRUCTURE NO. 06580 - Constructed Under 151-274)					
		8554	488.00	5.23	488.00	5.23	0.00	0.00
		8536	487.89	4.35	487.89	4.35	0.00	0.00
Z	5226.0	8464	487.60	4.09	487.60	4.08	0.00	-0.01
REMAIN		8435.5	EXISTING AUSTIN ROAD CROSSING(STRUCTURE NO. 151-007)					
		8412	481.07	9.88	481.07	9.88	0.00	0.00
Y	5225.0	8393	476.11	9.66	476.11	9.64	0.00	-0.02
		8356	475.29	3.84	475.29	3.84	0.00	0.00
REMAIN		8332.5	EXISTING I-84 WB ON-RAMP CROSSING(STRUCTURE NO. 04323)					
		8309	471.00	5.71	471.00	5.71	0.00	0.00
		8289	470.60	6.06	470.60	6.06	0.00	0.00
		8237	469.04	7.67	469.05	7.67	**0.01**	0.00
X	5224.0	8178	468.10	5.86	468.10	5.84	0.00	-0.02
		8128	466.40	8.16	466.40	8.16	0.00	0.00
		8080	465.26	7.09	465.26	7.10	0.00	0.01
		8027	464.36	6.89	464.36	6.89	0.00	0.00
		7977	464.30	3.80	464.30	3.80	0.00	0.00
W	5223.0	7937	464.04	4.31	464.04	4.31	0.00	0.00
REMAIN		7911.5	EXISTING PIERPONT ROAD CROSSING (STRUCTURE NO. 151-006)					
V	5222.0	7885	461.68	4.60	461.67	4.61	-0.01	0.01
		7826	461.33	4.04	461.31	4.06	-0.02	0.02
		7757	461.39	1.12	461.38	1.13	-0.01	0.01
U	5221.0	7711	461.39	0.85	461.37	0.86	-0.02	0.01
	5220.8	7698	459.70	9.49	459.66	9.54	-0.04	0.05
REMAIN		7689.5	EXISTING MULLOY ROAD CROSSING (STRUCTURE NO. 151-005)					
	5220.2	7681	459.03	10.24	458.62	10.93	-0.41	0.69
T	5220.0	7666	459.51	5.21	459.10	6.18	-0.41	0.97
S	5219.0	7589	459.46	1.17	458.23	3.81	-1.23	2.64
		7370	459.38	0.84	458.10	1.05	-1.28	0.21
		7168	459.28	1.78	457.89	2.44	-1.39	0.66
R	5218.0	7120	459.25	1.98	457.81	3.21	-1.44	1.23
Q	5217.5	7073	459.00	4.00	457.24	5.51	-1.76	1.51
		6970	458.50	4.85	453.37	11.45	-5.13	6.60
		6915	458.25	5.20	452.49	8.22	-5.76	3.02
P	5217.0	6890	458.20	4.67	452.07	8.06	-6.13	3.39
REMOVE		6859.5	Existing I-84 Westbound Exit 25 Off-Ramp (Structure No. 02536)					
O	5216.0	6825	456.25	4.89	450.52	8.82	-5.73	3.93
		6809	456.05	4.81	450.21	8.57	-5.84	3.76
		6756	454.98	5.70	449.56	7.08	-5.42	1.38
		6732	454.58	5.91	449.37	6.56	-5.21	0.65
		6653	453.17	6.41	448.67	6.22	-4.5	-0.19
		6593	452.60	5.16	448.53	4.74	-4.07	-0.42
		6541	452.51	4.49	448.55	3.05	-3.96	-1.44
N	5214.0	6490(PR 6473)	452.60	1.66	448.34	3.57	-4.26	1.91
		6457	452.56	1.76				
NEW		6445.5	Proposed Culvert No. 014, Scott Road					
REMOVE		6441.5	Existing Scott Road Culvert, Structure No. 151-014					
		6417	441.33	6.98	442.03	6.94	**0.7**	-0.04
M	5213.0	6409	438.77	12.31	442.06	5.98	**3.29**	-6.33
		6394	437.45	11.46	442.06	4.97	**4.61**	-6.49
NEW		6349.5	Proposed Culvert No. 06622, Plank Road East					
		6305	432.07	12.02	432.16	11.36	**0.09**	-0.66
		6266	430.32	11.18	430.67	10.36	**0.35**	-0.82
L	5212.0	6216	429.61	8.45	430.29	7.53	**0.68**	-0.92
		6122	428.61	6.19	429.70	5.46	**1.09**	-0.73
		6067	428.41	4.34	429.61	3.58	**1.2**	-0.76
K	5211.0	6033	428.34	3.94	429.57	3.16	**1.23**	-0.78
EXTEND		5993.5	Proposed Culvert No. 02537, Easterly I-84 crossing (Existing I-84 Structure No. 02537)					
J	5210.0	5947	420.54	8.92	420.53	8.94	-0.01	0.02
I	5209.0	5878	419.43	8.04	419.43	8.04	0	0.00
H	5208.9	5832	416.39	13.62	416.39	13.63	0	0.01
REMAIN		5812.5(EX&PR 5813)	Existing Concrete Weir					
	5208.2	5812(EX&PR 5812.5)	416.38	8.58	416.38	8.58	0	0.00
G	5208.1	5804	414.62	12.23	414.62	12.23	0	0.00
		5757	411.95	11.00	411.95	11.00	0	0.00
F	5208.0	5628	402.90	13.10	402.90	13.10	0	0.00
		5524	393.17	10.77	392.44	12.21	-0.73	1.44
		5456	388.26	13.19	389.59	10.56	**1.33**	-2.63
E	5207.0	5422	386.63	11.76	389.63	6.68	**3**	-5.08
		5355	386.13	7.89	388.90	7.20	**2.77**	-0.69
REPLACE		5295.5	Proposed Culvert No. 01227, Westerly I-84 crossing (Replaces Ex. I-84 Structure No. 01227)					
D	5206.0	5296	385.52	7.09				
		5281	385.46	6.92				
REPLACE		5254.5	Ex. I-84 Structure #01227					
		5224	380.23	6.47	379.88	4.60	-0.35	-1.87
C	5205.1	5206	379.63	7.75	379.31	6.76	-0.32	-0.99
B	5205.0	5145	379.05	7.18	378.90	6.83	-0.15	-0.35
A	5204.9	5084	379.34	3.48	378.94	4.45	-0.4	0.97
		5072	379.28	3.99				
		5065			378.92	4.11		
REPLACE		5050.5(PR 5042.5)	Proposed Culvert No. 03727, Harpers Ferry Road (Existing Structure No. 03727)					
	5204.0	5021	373.87	5.23	372.97	7.70	-0.9	2.47

- New/Replacement Structure - Existing Structure

TABLE 9M. Proposed (Post-Project) versus Existing (Pre-Project) Condition
500-Year FEMA Discharge (Unencroached Condition) - With Backwater From The Mad River
Beaver Pond Brook, Waterbury

Metric (M, NGVD-29)

			English					
			Existing Condition		Proposed Condition		Difference	
	FEMA Sta.	***River Sta.***	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)
AC	5229.0	8722	150.09	2.78	150.09	2.77	0.00	-0.01
AB	5228.0	8640	150.16	0.38	150.01	0.45	-0.15	0.08
		8583	150.15	0.33	150.00	0.39	-0.15	0.06
AA	5227.0	8573	149.81	2.69	149.64	2.49	-0.16	-0.20
REMAIN		8565.5	I-84 WB OFF-RAMP CROSSING(STRUCTURE NO. 06580 - Constructed Under 151-274)					
		8554	149.05	1.59	149.05	1.59	0.00	0.00
		8536	149.01	1.33	149.01	1.33	0.00	0.00
Z	5226.0	8464	148.93	1.25	148.93	1.24	0.00	0.00
REMAIN		8435.5	EXISTING AUSTIN ROAD CROSSING(STRUCTURE NO. 151-007)					
		8412	146.93	3.01	146.93	3.01	0.00	0.00
Y	5225.0	8393	145.42	2.94	145.42	2.94	0.00	-0.01
		8356	145.17	1.17	145.17	1.17	0.00	0.00
REMAIN		8332.5	EXISTING I-84 WB ON-RAMP CROSSING(STRUCTURE NO. 04323)					
		8309	143.87	1.74	143.87	1.74	0.00	0.00
		8289	143.74	1.85	143.74	1.85	0.00	0.00
		8237	143.27	2.34	143.27	2.34	**0.00**	0.00
X	5224.0	8178	142.98	1.79	142.98	1.78	0.00	-0.01
		8128	142.46	2.49	142.46	2.49	0.00	0.00
		8080	142.12	2.16	142.12	2.16	0.00	0.00
		8027	141.84	2.10	141.84	2.10	0.00	0.00
		7977	141.82	1.16	141.82	1.16	0.00	0.00
W	5223.0	7937	141.74	1.31	141.74	1.31	0.00	0.00
REMAIN		7911.5	EXISTING PIERPONT ROAD CROSSING (STRUCTURE NO. 151-006)					
V	5222.0	7885	141.02	1.40	141.02	1.41	0.00	0.00
		7826	140.92	1.23	140.91	1.24	-0.01	0.01
		7757	140.94	0.34	140.93	0.34	0.00	0.00
U	5221.0	7711	140.94	0.26	140.93	0.26	-0.01	0.00
	5220.8	7698	140.42	2.89	140.41	2.91	-0.01	0.02
REMAIN		7689.5	EXISTING MULLOY ROAD CROSSING (STRUCTURE NO. 151-005)					
	5220.2	7681	140.22	3.12	140.09	3.33	-0.12	0.21
T	5220.0	7666	140.36	1.59	140.24	1.88	-0.12	0.30
S	5219.0	7589	140.35	0.36	139.97	1.16	-0.37	0.80
		7370	140.32	0.26	139.93	0.32	-0.39	0.06
		7168	140.29	0.54	139.87	0.74	-0.42	0.20
R	5218.0	7120	140.28	0.60	139.85	0.98	-0.44	0.37
Q	5217.5	7073	140.21	1.22	139.67	1.68	-0.54	0.46
		6970	140.06	1.48	138.49	3.49	-1.56	2.01
		6915	139.98	1.58	138.22	2.51	-1.76	0.92
P	5217.0	6890	139.96	1.42	138.10	2.46	-1.87	1.03
REMOVE		6859.5	Existing I-84 Westbound Exit 25 Off-Ramp (Structure No. 02536)					
O	5216.0	6825	139.37	1.49	137.62	2.69	-1.75	1.20
		6809	139.31	1.47	137.53	2.61	-1.78	1.15
		6756	138.98	1.74	137.33	2.16	-1.65	0.42
		6732	138.86	1.80	137.27	2.00	-1.59	0.20
		6653	138.43	1.95	137.06	1.90	-1.37	-0.06
		6593	138.26	1.57	137.02	1.44	-1.24	-0.13
		6541	138.23	1.37	137.02	0.93	-1.21	-0.44
N	5214.0	6490(PR 6473)	138.26	0.51	136.96	1.09	-1.30	0.58
		6457	138.25	0.54				
NEW		6445.5	Proposed Culvert No. 014, Scott Road					
REMOVE		6441.5	Existing Scott Road Culvert, Structure No. 151-014					
		6417	134.82	2.13	135.04	2.12	**0.21**	-0.01
M	5213.0	6409	134.04	3.75	135.04	1.82	**1.00**	-1.93
		6394	133.64	3.49	135.04	1.51	**1.41**	-1.98
NEW		6349.5	Proposed Culvert No. 06622, Plank Road East					
		6305	132.00	3.66	132.03	3.46	**0.03**	-0.20
		6266	131.47	3.41	131.57	3.16	**0.11**	-0.25
L	5212.0	6216	131.25	2.58	131.46	2.30	**0.21**	-0.28
		6122	130.95	1.89	131.28	1.66	**0.33**	-0.22
		6067	130.88	1.32	131.25	1.09	**0.37**	-0.23
K	5211.0	6033	130.86	1.20	131.24	0.96	**0.37**	-0.24
EXTEND		5993.5	Proposed Culvert No. 02537, Easterly I-84 crossing (Existing I-84 Structure No. 02537)					
J	5210.0	5947	128.49	2.72	128.48	2.72	0.00	0.01
I	5209.0	5878	128.15	2.45	128.15	2.45	0.00	0.00
H	5208.9	5832	127.22	4.15	127.22	4.15	0.00	0.00
REMAIN		5812.5(EX&PR 5813)	Existing Concrete Weir					
	5208.2	5812(EX&PR 5812.5)	127.22	2.62	127.22	2.62	0.00	0.00
G	5208.1	5804	126.68	3.73	126.68	3.73	0.00	0.00
		5757	125.87	3.35	125.87	3.35	0.00	0.00
F	5208.0	5628	123.11	3.99	123.11	3.99	0.00	0.00
		5524	120.14	3.28	119.92	3.72	-0.22	0.44
		5456	118.65	4.02	119.05	3.22	**0.41**	-0.80
E	5207.0	5422	118.15	3.58	119.06	2.04	**0.91**	-1.55
		5355	118.00	2.40	118.84	2.19	**0.84**	-0.21
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				
		5281	117.79	2.11				
REPLACE		5254.5	Ex. I-84 Structure #01227					
		5224	116.20	1.97	116.09	1.40	-0.11	-0.57
C	5205.1	5206	116.02	2.36	115.92	2.06	-0.10	-0.30
B	5205.0	5145	115.84	2.19	115.79	2.08	-0.05	-0.11
A	5204.9	5084	115.93	1.06	115.81	1.36	-0.12	0.30
		5072	115.91	1.22				
		5065			115.80	1.25		
REPLACE		5050.5(PR 5042.5)	Proposed Culvert No. 03727, Harpers Ferry Road (Existing Structure No. 03727)					
	5204.0	5021	114.26	1.59	113.99	2.35	-0.27	0.75

- New/Replacement Structure - Existing Structure

Proposed (Post-Project) Condition

DEVELOPMENT OF PROPOSED CONDITION MODEL

Similar to the Existing Condition Model, the entire model was developed from the project data - survey data modified to reflect the proposed work. It includes sixty-eight (68) stream cross sections, excluding internal sections at the waterway crossings. Among them twenty-eight (28) represent the comparable locations of the FIS lettered sections. The reason that there are fewer cross-sections compared to the Existing Condition is that not all the sections in the Existing Condition model could feasibly be matched with a proposed condition section because of the proposed river relocation and the new structure locations. 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 HEC-RAS. Also, because of this situation, the comparable section to FIS Section D which would have been Section 5296 was not included in the Proposed Condition model.

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 the direction of flow and sufficient coverage to contain all flow ranges of the study. This ensures that the 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 developed from 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 exiting condition model. This is within the recommend range of roughness for the proposed Standard Riprap channel banks, gravel streambed with occasionally placed boulders, and other in-stream features.

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.

In setting the floodway encroachment stations, the following steps were taken.

- Initially, the encroachment stations for the sections outside of the relocation limits were set matching the existing condition encroachments.

- Where the resulting Base Flood was contained within the channelized sections of the relocation, no encroachment was proposed by setting the encroachment stations at or close to the water surface limits.

- Where the flood elevation rises above the relocated channel banks, the encroachment stations were located using a combination of the HEC-RAS' Encroachment Methods 2 to 5. The objectives were to:
  - achieve an equal conveyance reduction on both sides of the river.
  - have no negative surcharge.
  - prevent the surcharge raising more one foot above the Base Flood elevation.
  - limit the resulting water surface below the encroached flood elevation of the Existing Condition.

- The derived encroachment stations were then adjusted to provide a relatively smooth transition and uniformity where feasible.

- The Encroachment Method 1 was used in the final step for the entire reach, and verified that the surcharge is no greater than one foot above the 100-year unencroached condition water surface.

WATER SURFACE PROFILE COMPARISON TO EXISTING CONDITION

Compared to the existing condition, the proposed 100-year flood profiles for both the unencroached and encroached conditions are found generally lower (see Figure 4 and Tables 6 & 7). Also, it is apparent that the effects of the project are limited to the reach downstream of the I-84 Westbound Exit 25A On-Ramp from Austin Road (Structure No. 04323). Although the comparison does show the flood profile upstream of the I-84 Westbound Exit 25A Off-Ramp Structure No. 06580 is lower except at the immediate upstream section, it is not caused by this project. This location is discussed later in the description section for the individual structure.

The most upstream location affected by the current project is at downstream of the Exit 25A On-Ramp structure. At approximately 250 ft downstream from the structure, the 100-year unencroached condition flood elevation will be increased by 0.01 ft according to the hydraulic model. In the encroached condition, the model shows an increase of 0.01 ft occurring at Section 8128 or 180 ft downstream from the small channel (see Tag #2 on Figures 6 & 7). These increases are not believed to be realistic. They appear to be caused rather by the computational tolerances of the program. Nonetheless, there minor increases are contained within the main channel and within the State ROW.

Affected by the project, the greatest decrease will occur in the vicinity of the existing I-84 Westbound Exit 25 Off-Ramp crossing (Structure No. 02536) due to its removal and the downstream channel relocation which involves lowering the streambed. The decrease in the Base Flood elevation upstream of the structure at Section 6890 will be 5.03 and 5.00 ft for the unencroached and encroached conditions respectively. The decrease gradually diminishes and matches to the existing flood profile near the I-84 Westbound On-Ramp Structure No. 04323,

approximately 4,740 ft upstream of the structure. The reason it reaches this far upstream is because of the relatively flat gradient of the existing channel at this upstream location.

Toward the downstream side of the crossing, the decrease becomes greater. At Section 6809, the decrease will peak at 5.45 ft for the unencroached condition, and at 5.41 ft for the encroached condition at Section 6756. Then, these will reduce to 3.32 and 3.26 feet just upstream of the Scott Road crossing (Culvert No. 014).

After passing through the Scott Road crossing and as it 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 decline as the gradient of the channel steepens. These differences result in the higher Proposed Condition flood profiles than the Existing Condition from Section 6409 (116 ft upstream of the Plank Road East culvert or 50 ft downstream of the Scott Road culvert) to 6266 (195 ft downstream of the Plank Road East culvert). Between these sections, the greatest increase of 3.1 ft will occur at the upstream station of the Plank Road East culvert (Section 6394) for both the 100-year unencroached and encroached conditions (See Tag #3 on Figures 6 & 7). The increase will be greater in the 500-year flood (4.61 ft). 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 9.6 ft below the top of the channel bank

The Existing and Proposed Condition Base Flood profiles converge at Section 6266 which is the downstream relocation limit. Downstream of the relocation limit, the Proposed Condition profile drops below the Existing briefly, 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 of the culvert, increased roughness and reduced hydraulic opening due to the installation of baffles. The increase at the upstream section of the culvert (Section 6033) will be 0.76 ft in both the unencroached and encroached conditions (see Tag #4 on Figures 6 & 7). The maximum increase for the 500-year flood is 1.23 ft occurring at the same section, and it will be contained within the main channel, about 4.1 ft below the top of the channel bank.

Just downstream of the culvert at Section 5947, the proposed condition profile drops by 0.01 ft and then converges with the existing condition profile in both the 100-year unencroached and encroached conditions. Similarly, the proposed 500-year flood profile will be 0.01 ft lower than the existing condition at Sections 5947, and then it converge at Section 5878. Both the unencroached and encroached condition profiles remain converged downstream till Section 5628, approximately 1,130 ft downstream from the easterly I-84 crossing. Within that distance, there is an existing concrete weir at approximately 505 ft downstream of the easterly I-84 culvert. This weir will not physically be altered under this project.

At approximately 1,514 feet downstream from the weir, a new westerly I-84 Culvert No. 01227 is proposed of which the inlet will be located approximately 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 the East Mountain Brook will be relocated approximately 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 it conveys only the Beaver Pond Brook flow 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 2.30 ft above the existing profile in the unencroached condition and 2.26 ft in the encroached condition upstream of the culvert (see Tag #5 on Figures 6 & 7). These increases are contained within the main channel banks, within the State ROW. The increases diminish at approximately 910 ft upstream of the culvert at Section 5628, which is mentioned above.

For the 500-year flood, the increase upstream of the I-84 culvert is 2.77 ft which rises above the channel bank and above the Reidville Drive roadway elevation. The consequent area of flooding will be discussed in the later section *Area of Flooding*.

From the inlet end of the westerly I-84 culvert and to the confluence with the Mad River, except under and the immediate vicinity of the Harpers Ferry Road crossing, the proposed condition profiles for both the unencroached and encroached conditions will stay lower than the existing profiles primarily due to the lowered tailwater condition at the confluence and increased hydraulic capacity of the new Harpers Ferry Road Culvert No. 03727. The maximum decreases are 1.23 and 1.2 ft for the unencroached and encroached conditions, respectively, occurring at Section 5145, which is about the midpoint between Harpers Ferry Road and the westerly I-84 crossing. In the case of the 500-year flood, the decrease will be slightly smaller at the upstream section and slightly greater at the downstream section.

The effects of the above described increases and decreases are discussed in the later section *Area of Flooding*.

The flow conditions at each hydraulic crossing are discussed in the following section.

HYDRAUILIC CONDITION AT INDIVIDUAL STRUCTURES

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 14-ft wide opening (Section AA) which abruptly narrowed the 100-year upstream floodplain from 180 ft (Section AB), according to the original HEC-2 data. Approximately 330 feet downstream of the opening section, the 100-year floodplain slightly widened to 24 ft, again based on the HEC-2 data. 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. Spanning 100 ft across the floodway and floodplain, the bridge was, thus, qualitatively assessed to have no impact on the regulated flood elevations.

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. For example, in the reach 45 ft (Section 858) to 500 ft (Section 8722 or upstream limit of the hydraulic study) upstream of the bridge, the decrease is as much as 0.66 ft in the unencroached condition and about one foot in the encroached condition. At the immediate upstream section (8573 or FEMA AA), on the other hand, the analysis shows a brief increase. The increase is 0.40 for the unencroached and 0.53 ft for the encroached conditions (see Tag #1 on Figures 6 & 7). On the contrary to the hydraulic grade line elevations (water surface elevation), the energy gradeline elevations at this section are actually lower, just as the further upstream reach. Thus, the difference in the velocity head is translating into the brief increases. The velocity decreases from 9.2 to 5 ft/s in the unencroached condition, and from 10.3 to 5.8 ft/s in the encroached conditions. 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 elevations (unencroached and encroached) are contained within the main channel and thus were not affected by the construction.

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 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:

Although there are no proposed physical changes to this crossing, the analysis indicates that it is hydraulically affected by the removal of the existing downstream structure at the Westbound Exit 25 Off-Ramp (Structure No. 02536) and the channel relocation work further downstream. The 100-year unencroached condition water surface elevation at the crossing will be lowered by 0.08 ft and 0.07 ft at the upstream (RS 7937) and downstream (RS 7885) sections respectively. The decreases are slightly higher for the encroached condition which is 0.13 ft at both the upstream and downstream sections of the crossing. The overtopping condition will continue to exist under the 500-year flood flow, as the superflood elevation remains the same as the existing condition. The flow velocity through the crossing will also remain the same as the existing condition in the 100- and 500-year floods.

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. Although the tail water condition as well as further upstream flood elevation will be lowered, the 100-year unencroached condition water surface elevation will remain the same as the existing condition at the upstream approach (Section 7698) and across the crossing (overtopping). There are slight decreases in the encroached condition which are 0.19 and 0.19 ft for the upstream and downstream sections of the crossing, respectively. The 500-year overtopping flow will also be close to the existing condition.

Scott Road Crossing, Culvert No. 014

The proposed structure will consist of a twin 8.2 ft (2.5 m) wide by 9.8 ft (3.0 m) high concrete box culvert with a length of 141 ft (43 m). The structure will be located within a 2,310 ft reach of the relocated Beaver Pond Brook. The relocation is proposed as an alternative to constructing a single, 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 164 ft (50 m) 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 below the existing Scott Road culvert. The resulting slope of 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 8.7-inch (220-mm) 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 in individually prepared hydraulic reports for each structure.

Using the baffles, the resulting flow velocity for the 100-year flow will be 12.75 ft/s at the outlet, which is significantly lower than the outlet velocity of 20.95 ft/s of the existing Scott Road structure. The Base Flood elevation upstream of the culvert (Section 6473) will be 446.7 FT which is 12 ft below the lowest point of Scott Road above, and 3.3 ft lower than the water surface elevation at the comparable section of the Existing Condition model. The 500-year flood elevation will be 9.76 ft below the roadway low point, and 4.3 ft lower than the Existing Condition water surface.

Plank Road East, Culvert No.06622:

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

The resulting outlet velocity will also be 12.75 ft/s. The Base Flood elevation upstream of the culvert (Section 6394) will be 440.34 FT which is 3.1 ft higher than the Existing Condition as there is no comparable existing crossing at this location and thus a new constriction. The increase will still be contained within the channel, 7.66 ft below the lowest top of the bank elevation. The 500-year flood will be 4.92 ft below the top of the channel bank, and 4.6 ft higher than the existing condition water surface.

Easterly I-84 Crossing, Culvert No. 02537

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

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 8.7-inch (220-mm) high concrete baffles. This provides the composite Manning's roughness of 0.032 for the studied flow conditions.

With the baffle and extensions at both ends, the hydraulic losses through the crossing will be greater resulting in the upstream Base Flood elevation of 426.62 FT (at Section 6033) which his 0.76 ft higher than the existing condition. The increase in the 500-year flood elevation will be greater at 1.23 ft. In either flood condition, the flow will be contained within the main channel.

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 velocity will be 12.44 ft/s, which is 2.2 ft/s lower than the existing condition. However, the velocity outlet of the east barrel will be 15.08 ft/s or 0.44 ft/s higher than the existing condition. In order to provide a stable channel downstream, a rock ramp is proposed approximately 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 separately prepared *Final River Relocation Report for Mad River and Beaver Pond Brook*.

Westerly I-84 Crossing, Culvert No. 01227:

This structure will consist of a twin 11.5 ft (3.5m) wide by 10.8 ft (3.3 m) high concrete box culvert. To facilitate construction staging, the proposed culvert will be situated approximately 5 ft west of the existing crossing. The length of the proposed structure will be increased to 371 ft (113 m) 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 280 ft 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. 151-273-01227 will have a curved alignment that matches into the existing watercourse. This culvert will also be fitted with 8.7-inch (220-mm) high concrete baffles providing a composite Manning's n-value of 0.031. The resulting outlet flow velocity is 11.67 ft/s which is 2 ft/s lower than the Existing Condition. Downstream of the culvert, a scour hole will be constructed to further dissipate the flow energy.

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 6.14 ft, as opposed to 0.47 ft through the existing structure. Moreover, as described earlier, shifting the outlet from East Mountain Brook northerly just upstream of the proposed culvert places additional flow at the inlet. These conditions will produce the Base Flood elevation of 386.97 ft at the upstream station of culvert (Section 5355), which is 2.3 ft higher than the existing condition. It will still be contained within the main channel.

The increase in the 500-year flood elevation is 2.77 ft at the upstream section. As indicated earlier, from this section to the further upstream Section 5422, the flow overtops the channel bank and causes flooding on Reidville Drive.

Harpers Ferry Road Crossing, Culvert No. 03727

This structure will consist of a twin 11.5 ft (3.5 m) wide by 12.1 ft (3.7 m) high concrete box culvert. The length of the proposed culvert will be 103 ft (31.5 m) which is approximately the same as the existing structure. However, the proposed structure will be located 26 ft downstream of the existing crossing to accommodate the realignment of Harpers Ferry Road. Also, to facilitate construction staging, the proposed culvert will be situated 4 ft south (laterally) of the existing crossing.

This culvert will also be fitted with 8.7-inch (220-mm) high concrete baffles, but backfilled with 2 ft (600 mm) 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.

The outlet flow velocity for the 100-year flow will be 11.17 ft/s which is 6.58 ft/s lower than the existing condition. The Base Flood elevation at the first common upstream section (Section 5084) of both the existing and proposed structures will be decreased by 1.09 ft to 376.55 FT. Through the crossing, however, the proposed flood elevation will be higher than the existing condition due to the increase in the internal roughness of the crossing. In the exiting condition, as the flow enters the structure, it changes to supercritical flow with a normal flow depth of 4.68 ft regardless of the downstream condition (with or without the backwater from the Mad River). In the proposed condition, the flow remains subcritical at a normal flow depth of 8.56 ft. As this increase in the flood elevation extends only within the structure, it does not pose any adverse impact, but rather creates a more desirable condition with the significantly reduced flow velocity.

The 500-year flood will continue to overflow onto the northern floodplain; makes its way to the vertical sag on Harpers Ferry Road at the Plank Road intersection, approximately 240 ft north of the crossing; and then eventually converge with the Mad River west of Harpers Ferry Road. However, with the increased hydraulic opening of the proposed culvert, the flood elevation over the road will be lowered by 0.36 ft to 379.92 FT. With

the new Plank Road East which will be constructed between the Beaver Pond Brook and the realigned I-84, the 500-year flow will no longer spread onto the Interstate highway.

10-YEAR ENCROACHED FLOW CONDITION

In accordance with the CT DEEP's requirements, the 10-year Existing and Proposed water surface profiles based on the encroached condition were also compared (see Figure 8 and Table 8), and found several locations with the increase. Among them, most notable increases occurred upstream of the westerly I-84 Culvert No. 01227 with a 2.15 ft increase, upstream of the easterly I-84 Culvert No. 02537 having a 0.89 ft increase, and upstream of the Plank Road East Culvert No. 06622 with a 1.39 ft increase. The increases at these structures are caused by the same reasons described above for the 100- and 500-year events. That is, the increased internal roughness and increased length causes proportional increases in the water surface elevations for the Culverts No. 01227 and 02537; and the channel relocation combined with the placement a stream constriction where there was none before causes the noted increase at the Culvert No. 06622. The increases at these locations and any other locations in the study are contained in the channelized section of the brook and do not adversely affect any roads or properties.

AREAS OF FLOODING

A map has been prepared showing both the existing and proposed condition flood boundaries based on the 100-year base flood (see Figure 4). At the upstream and downstream limits of the study, the approximate FEMA effective boundaries were drawn by referencing in the current effective Floodway map into the project survey plan. The existing flooding limits were drawn based on the contour lines developed from the project survey whereas the proposed condition flooding limits were established based on the design contour lines provided by Ammann & Whitney, which was converted from Metric to US Customary units by the State for this map. 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.

In general, the proposed condition flood boundaries will closely follow the existing condition floodplains except obviously for the areas where the channel relocation is proposed. In the area of the upstream relocation in the vicinity of the Interchange 25 (Scott Road), the 500-year floodplain along the 2,260 ft of the existing channel was 22,340 SY, excluding the area under a structure. This will be reduced by 32 % to 15,170 SY in the proposed condition along the relocated channel length of approximately 2,310 ft. This reduction is largely due to the elimination of the overflow that would have spread across the I-84.

The 100-year floodplain, on the other hand, will be increased by 24% to 13,520 from 10,900 SY. This is primarily due to 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 detail in the *River Relocation Report*.

The proposed 100-year floodplain will predominantly be situated north of the existing floodplain, overlapping with less than 7 % of the existing area excluding where they match at the relocation limits. All the properties encompassing not only the 100-year, but also the 500-year flood in this area either have been acquired by the State or already belong to the existing State's ROW.

Upstream of the westerly I-84 crossing, the 100-year floodplains for both the existing and proposed conditions are confined within the main channel and inside the State's Non-Access Highway Lines.

Conversely, in case of the 500-year flood, the analysis has shown that the flow would rise above the channel bank at or near the inlet in both the existing and proposed conditions. Moreover, as the inlet of the I-84 replacement culvert is proposed approximately 230 ft upstream of the existing inlet, the area affected by the overflow in the proposed condition will also be at the same distance upstream of the existing culvert. 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 the Mad River. In the proposed condition, on the other hand, the flood flow will elevate above the vertical sag point of the realigned Reidville Drive near the inlet and spread across the road; but no diversion of flow will occur as the geometry of the sag confines the flooding to this location. The resulting 500-year floodplain outside of the 100-year floodplain (main channel) will be approximately 1,450 SY at this location. No part of this floodplain area will extend beyond the State’s ROW.

Between the Harpers Ferry Road Culvert No. 03727 and the westerly I-84 Culvert No. 01227, the decrease in the Base Food elevation limits the northerly overflow to extend no more than 40 ft from the main channel bank. The floodplain south of Plank Road will affect one private property by approximately 62 SY, as opposed to 119 SY in the existing condition. The overall floodplain area for this region will be reduced by approximately 23%.

In case of the 500-year flood, the floodplain will be reduced by 18%. The 500-year affects two private properties south of Plank Road including the one affected by the 100-year flood. In the property also affected by the 100-year flood, the flooding area from the 500-year flow will reduced by 86 SY. For the other property, the reduction will be about 4 SY. The discussion on the area of flooding north of Plank Road is provided in the *Mad River Floodplain/Floodway Analysis Report*.

Outside of the channel relocation and proposed structure replacement limits, there is one area worth noting. Near the eastern end of the project limit, both the 100- and 500-year floodplain will be reduced slightly due the decreases in the flood elevations induced by the channel relocation and removal of the Westbound Exit 25 Off-Ramp (Structure No. 02536) 3,500 ft downstream. From the upstream limit of the river of relocation to the Pierpont Road crossing, the 100-year floodplain will be reduced by 11 % from 84,650 SY (1.94 acres) to 75,230 SY (1.73 acres). For the 500-year floodplain, the reduction will be about 10% from 109,320 SY (2.51 acres) to 98,900 SY (2.27 acres). There is one private property that will benefit most from the

reduction. In the property located approximately 300 ft downstream of the Mulloy Road crossing (Section 7589) between the channel and the roadway, a 3-story residential building current exists. In the existing condition, the 100-year flood would come in contact with the building. The proposed condition improves this condition such that a buffer at an average distance of 20 ft around the building to the 100-year flood boundary will be created. The properties near the eastern end of the project limits will little difference in flooding along the brook.

Retaining Wall No. 111 proposed to limit the fill necessary for the northerly widening of I-84 at the project limit is found situated well outside the 500-year boundary of both the existing and proposed conditions. Retaining Wall No. 109 proposed upstream of the channel relocation limit for the same purpose, on the other hand, will fill a sliver of the existing 500-year floodplain (33 SY). The resulting flood elevation will still be lower than the existing condition.

FLOODWAY - UNENCROACHED VS. ENCROACHED

The comparison of the 100-year proposed unencroached and encroached condition profiles is shown in Table 10. The table also shows the comparison to the published data.

In most locations the width of encroachments or floodway for the proposed condition will either remain close to the existing condition or match the Base Flood width (no encroachment) if it is contained within the channelized section. There are mainly three areas where the floodway will be revised. One area is upstream the Harpers Ferry Road crossing. Since the CLOMR was obtained in 2007, the design has been revised to partially remove the existing I-84 Westbound embankment allowing the Base Flood to spread onto that excavated area. This required establishing a new floodway boundary for the brook between Harpers Ferry and the westerly I-84 Structure No. 01221. As described earlier regarding the methods used in setting the encroachment stations, the proposed floodway has been determined while striving for an equal conveyance reduction on both sides of the river, no negative surcharge, and no greater surcharge than one foot above the Base Flood elevation; and to limit the resulting water surface below the encroached flood elevation of the Existing Condition. At this reach, the widest floodway is 93 ft, at Section 5084 or approximately 90 ft upstream of the Harpers Ferry Road crossing. The 100-year regulatory floodplain width at the same location is 123; however, the surcharge is zero (0). This means that the encroachment into the floodplain up to the floodway boundary does not affect the hydraulic condition of the brook, which is controlled by the downstream culvert under Harpers Ferry Road.

Another area where the floodway is being newly established is at upstream of the Scott Road crossing for a length of approximately 1,470 ft along the relocated channel to approximately 180 ft downstream of the relocation limit. As described earlier regarding the methods used in setting the encroachment stations, the proposed floodway has been determined to attain an equal conveyance reduction on both sides of the river, no negative surcharge, and no greater surcharge than one foot above the Base Flood elevation; and to limit the resulting water surface below the encroached flood elevation of the Existing Condition. Within the relocation limit, the widest section of the proposed floodway is approximately 100 ft at 170 ft upstream of the Scott Road culvert, and the greatest surcharge is 0.11 ft occurring near the downstream end of the existing Exit 25 Off-Ramp crossing, which is to be removed.

Upstream of this location for approximately 470 ft to just downstream of where the watercourse turns westerly about 30º angle, the floodway width matches to the width of the Base Flood as the flow is confined to the channelized section of the brook. Upstream from this location for a length of approximately 350 ft is the other area where revising the floodway width is proposed. More precisely, the 350 ft section is from 40 ft downstream of Section 7073 to Section 7168 in which the 100-year flood boundary splits from the floodway boundary and widens as the flow spreads onto the existing floodplain. However, in the proposed condition, the resulting Base Flood width is narrower than the effective floodway width within this length requiring reestablishment of the floodway width. Since the unencroached flood elevations will be lowered than the existing condition, narrowing the floodway width is considered such that resulting encroached water surface elevation will still be lower than the existing condition. The proposed floodway width at Section 7073 is 45.4 ft reduced from 72.5 ft in the effective study. At Section 7120, the proposed width is 82.9 ft reduced from 119.1 ft. These results in 0.04 and 0.03 ft surcharges over the unencroached condition profile, and still lower than the existing and effective water surface elevations. At Section 7168, the floodway width is matched to the effective floodway width, was obtained from measuring the effective map.

For the area upstream of this section, an attempt was made to provide the floodway consistent with the effective map. In some locations, however, lateral adjustment had to be made as the main channel location was found different from the effective map. Also, certain situations had aroused where the resulting 100-year Base Flood (unencroached) width was narrower than the width specified in the effective FIS or measured on the effective map. Also, several locations produced negative surcharges. In such case, further adjustments to the floodway had to be made. For example, at Section 7370 (a none FEMA-lettered section), the floodway width slightly was narrowed compared to the existing condition, but is still relatively in a close range with the effective boundary. The narrowing was necessary to minimize undesirable decrease in the encroached condition flood elevation compared to the existing condition and to eliminate negative surcharges. The floodway boundaries shown on the Figures 4 and 5 are the results of these adjustments. It is believed that these boundaries are the closest feasible reproduction of the effective floodway based the differing geometric data, accuracy and hydraulic conditions.

Within the entire limits of the study, there is one location where a negative surcharge would occur from the floodway encroachment. At the Mulloy Road crossing, there are negative surcharges at the upstream and downstream faces. The floodway width at this location has been set to match the effective FIS, which also showed a negative surcharge. The encroachment increases the flow velocity which leads to the negative surcharge; however, the resulting velocity of 5.81 ft/s does not appear excessive.

Compared to the published FIS data, the Proposed Condition water surface profiles for both the unencroached and encroached conditions were found higher upstream of the westerly I-84 Culvert No. 01227, easterly I-84 Culvert No. 02537, upstream of the Plank Road East Culvert No. 06622, and at FEMA Section X or 8178 approximately 440 ft downstream of the existing Westbound 25 On-Ramp Structure No. 04323. The increases at the I-84 crossings are primarily due to the increased hydraulic losses associated with the proposed internal baffles and longer length. For the reach upstream of the Plank Road East culvert, the increase is attributed to the channel relocation combined with the placement a stream constriction where there was none

before. The increase at FEMA Section X is due to the geometric difference in the channel. As indicated earlier, the channel geometry modeled in the original FIS does not reflect the actual condition. It did not include the I-84 WB Exit 25A On-Ramp structure. With this structure, the Beaver Pond Brook is longer and thus less steep at this reach. Also, the FEMA ground data is about 0.5 ft lower. These differences are the main cause of the higher flood elevation for the proposed condition. At all these location, the increased water surfaces are still contained within the main channel; thus, it poses no adverse impact to any properties, buildings or roadways.

TABLE 10. Proposed Condition versus Published FIS Profile
100-Year FEMA Discharge - Encroached and Unencroached (Floodway) Elevations - Without Backwater
Beaver Pond Brook, Waterbury

English (FT, NGVD-29)

			English								
			Published FIS Data			***Proposed Condition***			***Comparison***		
	FEMA Sta.	***River Sta.***	100-yr Unencroach (Base) (ft) (1)	100-yr Encroach (Floodway) (ft) (2)	Published Surcharge (ft) (2-1)	100-yr Unencroach (Base) (ft) (3)	100-yr Encroach (Floodway) (ft) (4)	Proposed Condition Surcharge (ft) (4-3)	Unencro.: Proposed - Published (ft) (3) - (1)	Encroach.: Proposed - Published (ft) (4) - (2)	Proposed Surcharge - Published Surcharge (ft) (4-3) - (2-1)
AC	5229.0	8722	493.70	493.80	0.10	491.62	492.08	0.46	-2.08	-1.72	0.36
AB	5228.0	8640	493.80	493.80	0.00	491.59	492.29	0.70	-2.21	-1.51	0.70
		8583				491.56	492.27	0.71			
AA	5227.0	8573	491.90	491.90	0.00	491.13	491.59	0.46	-0.77	-0.31	0.46
REMAIN		8565.5	I-84 WB OFF-RAMP CROSSING(STRUCTURE NO. 06580 - Constructed Under 151-274)								
		8554				487.28	487.29	0.01			
		8536				487.00	487.02	0.02			
Z	5226.0	8464	486.50	486.50	0.00	486.16	486.16	0.00	-0.34	-0.34	0.00
REMAIN		8435.5	EXISTING AUSTIN ROAD CROSSING(STRUCTURE NO. 151-007)								
		8412				481.31	481.32	0.01			
Y	5225.0	8393	476.90	476.90	0.00	476.36	476.37	0.01	-0.54	-0.53	0.01
		8356				474.66	474.66	0.00			
REMAIN		8332.5	EXISTING I-84 WB ON-RAMP CROSSING(STRUCTURE NO. 04323)								
		8309				471.16	471.16	0.00			
		8289				470.75	470.75	0.00			
		8237				469.30	469.30	0.00			
X	5224.0	8178	466.80	466.80	0.00	468.26	468.26	0.00	1.46	1.46	0.00
		8128				466.59	466.60	0.01			
		8080				465.31	465.36	0.05			
		8027				463.89	464.50	0.61			
		7977				463.73	464.43	0.70			
W	5223.0	7937	463.90	464.00	0.10	463.51	464.28	0.77	-0.39	0.28	0.67
REMAIN		7911.5	EXISTING PIERPONT ROAD CULVERT (STRUCTURE NO. 151-006)								
V	5222.0	7885	462.40	462.50	0.10	461.75	462.46	0.71	-0.65	-0.04	0.61
		7826				461.42	462.22	0.80			
		7757				461.45	462.22	0.77			
U	5221.0	7711	462.40	462.50	0.10	461.43	462.21	0.78	-0.97	-0.29	0.68
	5220.8	7698				460.70	461.45	0.75			
REMAIN		7689.5	EXISTING MULLOY ROAD CULVERT (STRUCTURE NO. 151-005)								
	5220.2	7681				459.42	459.51	0.09			
T	5220.0	7666	460.50	460.70	0.20	459.28	459.44	0.16	-1.22	-1.26	-0.04
S	5219.0	7589	460.40	460.50	0.10	457.94	458.64	0.70	-2.46	-1.86	0.60
		7370				457.80	458.09	0.29			
		7168				457.56	457.56	0.00			
R	5218.0	7120	458.70	458.70	0.00	457.34	457.37	0.03	-1.36	-1.33	0.03
Q	5217.5	7073	458.00	458.00	0.00	456.85	456.89	0.04	-1.15	-1.11	0.04
		6970				453.35	453.37	0.02			
		6915				452.30	452.36	0.06			
P	5217.0	6890	455.90	455.90	0.00	451.85	451.85	0.00	-4.05	-4.05	0.00
REMOVE		6859.5	Existing I-84 Westbound Exit 25 Off-Ramp (Structure No. 02536)								
O	5216.0	6825	454.20	454.20	0.00	450.40	450.49	0.09	-3.80	-3.71	0.09
		6809				450.05	450.16	0.11			
		6756				449.07	449.11	0.04			
		6732				448.73	448.78	0.05			
		6653				447.41	447.46	0.05			
		6593				446.95	446.96	0.01			
		6541				446.91	446.91	0.00			
N	5214.0	6490(PR 6473)	447.70	447.70	0.00	446.70	446.70	0.00	-1.00	-1.00	0.00
NEW		6445.5	Proposed Culvert No. 014, Scott Road								
REMOVE		6441.5	Existing Scott Road Culvert, Structure No. 151-014								
		6417				440.44	440.44	0.00			
M	5213.0	6409	436.80	436.80	0.00	440.38	440.38	0.00	3.58	3.58	0.00
		6394				440.34	440.34	0.00			
NEW		6349.5	Proposed Culvert No. 06622, Plank Road East								
		6305				432.14	432.14	0.00			
		6266				430.12	430.12	0.00			
L	5212.0	6216	428.10	428.10	0.00	429.02	429.02	0.00	0.92	0.92	0.00
		6122				427.29	427.29	0.00			
		6067				426.70	426.70	0.00			
K	5211.0	6033	424.70	424.70	0.00	426.62	426.62	0.00	1.92	1.92	0.00
EXTEND		5993.5	Proposed Culvert No. 02537, Easterly I-84 crossing (Existing I-84 Structure No. 02537)								
J	5210.0	5947	420.60	420.70	0.10	419.99	420.07	0.08	-0.61	-0.63	-0.02
I	5209.0	5878	420.30	420.50	0.20	418.56	418.92	0.36	-1.74	-1.58	0.16
H	5208.9	5832	420.00	420.00	0.00	417.04	417.55	0.51	-2.96	-2.45	0.51
REMAIN		5812.5(EX&PR 5813)	Existing Concrete Weir								
	5208.2	5812(EX&PR 5812.5)				415.78	415.78	0.00			
G	5208.1	5804	414.50	414.50	0.00	414.24	414.24	0.00	-0.26	-0.26	0.00
		5757				411.58	411.58	0.00			
F	5208.0	5628	400.80	400.80	0.00	402.54	402.54	0.00	1.74	1.74	0.00
		5524				392.53	392.53	0.00			
		5456				388.31	388.31	0.00			
E	5207.0	5422	386.20	386.20	0.00	387.59	387.59	0.00	1.39	1.39	0.00
		5355				386.97	386.97	0.00			
REPLACE		5295.5	Proposed Culvert No. 01227, Westerly I-84 crossing (Replaces Ex. I-84 Structure No. 01227)								
D	5206.0	5296	383.60	383.60	0.00						
REPLACE		5254.5	Ex. I-84 Structure #01227								
		5224				378.77	378.79	0.02			
C	5205.1	5206	380.40	380.50	0.10	378.21	378.24	0.03	-2.19	-2.26	-0.07
B	5205.0	5145	380.10	380.10	0.00	376.69	376.69	0.00	-3.41	-3.41	0.00
A	5204.9	5084	377.80	377.80	0.00	376.56	376.56	0.00	-1.24	-1.24	0.00
		5065				376.50	376.50	0.00			
REPLACE		5050.5(PR 5042.5)	Proposed Culvert No. 03727, Harpers Ferry Road (Existing Structure No. 03727)								
	5204.0	5021				370.06	370.06	0.00			

- New/Replacement Structure

- Existing Structure

TABLE 10A. Proposed Condition versus Published FIS Profile
100-Year FEMA Discharge - Encroached and Unencroached (Floodway) Elevations - Without Backwater
Beaver Pond Brook, Waterbury

English (FT, NAVD-88)

			English								
			Published FIS Data			***Proposed Condition***			***Comparison***		
	FEMA Sta.	***River Sta.***	100-yr Unencroach (Base) (ft) (1)	100-yr Encroach (Floodway) (ft) (2)	Published Surcharge (ft) (2-1)	100-yr Unencroach (Base) (ft) (3)	100-yr Encroach (Floodway) (ft) (4)	Proposed Condition Surcharge (ft) (4-3)	Unencro.: Proposed - Published (ft) (3) - (1)	Encroach.: Proposed - Published (ft) (4) - (2)	Proposed Surcharge - Published Surcharge (ft) (4-3) - (2-1)
AC	5229.0	8722	492.70	492.80	0.10	490.62	491.08	0.46	-2.08	-1.72	0.36
AB	5228.0	8640	492.80	492.80	0.00	490.59	491.29	0.70	-2.21	-1.51	0.70
		8583				490.56	491.27	0.71			
AA	5227.0	8573	490.90	490.90	0.00	490.13	490.59	0.46	-0.77	-0.31	0.46
REMAIN		8565.5	I-84 WB OFF-RAMP CROSSING(STRUCTURE NO. 06580 - Constructed Under 151-274)								
		8554				486.28	486.29	0.01			
		8536				486.00	486.02	0.02			
Z	5226.0	8464	485.50	485.50	0.00	485.16	485.16	0.00	-0.34	-0.34	0.00
REMAIN		8435.5	EXISTING AUSTIN ROAD CROSSING(STRUCTURE NO. 151-007)								
		8412				480.31	480.32	0.01			
Y	5225.0	8393	475.90	475.90	0.00	475.36	475.37	0.01	-0.54	-0.53	0.01
		8356				473.66	473.66	0.00			
REMAIN		8332.5	EXISTING I-84 WB ON-RAMP CROSSING(STRUCTURE NO. 04323)								
		8309				470.16	470.16	0.00			
		8289				469.75	469.75	0.00			
		8237				468.30	468.30	0.00			
X	5224.0	8178	465.80	465.80	0.00	467.26	467.26	0.00	1.46	1.46	0.00
		8128				465.59	465.60	0.01			
		8080				464.31	464.36	0.05			
		8027				462.89	463.50	0.61			
		7977				462.73	463.43	0.70			
W	5223.0	7937	462.90	463.00	0.10	462.51	463.28	0.77	-0.39	0.28	0.67
REMAIN		7911.5	EXISTING PIERPONT ROAD CULVERT (STRUCTURE NO. 151-006)								
V	5222.0	7885	461.40	461.50	0.10	460.75	461.46	0.71	-0.65	-0.04	0.61
		7826				460.42	461.22	0.80			
		7757				460.45	461.22	0.77			
U	5221.0	7711	461.40	461.50	0.10	460.43	461.21	0.78	-0.97	-0.29	0.68
	5220.8	7698				459.70	460.45	0.75			
REMAIN		7689.5	EXISTING MULLOY ROAD CULVERT (STRUCTURE NO. 151-005)								
	5220.2	7681				458.42	458.51	0.09			
T	5220.0	7666	459.50	459.70	0.20	458.28	458.44	0.16	-1.22	-1.26	-0.04
S	5219.0	7589	459.40	459.50	0.10	456.94	457.64	0.70	-2.46	-1.86	0.60
		7370				456.80	457.09	0.29			
		7168				456.56	456.56	0.00			
R	5218.0	7120	457.70	457.70	0.00	456.34	456.37	0.03	-1.36	-1.33	0.03
Q	5217.5	7073	457.00	457.00	0.00	455.85	455.89	0.04	-1.15	-1.11	0.04
		6970				452.35	452.37	0.02			
		6915				451.30	451.36	0.06			
P	5217.0	6890	454.90	454.90	0.00	450.85	450.85	0.00	-4.05	-4.05	0.00
REMOVE		6859.5	Existing I-84 Westbound Exit 25 Off-Ramp (Structure No. 02536)								
O	5216.0	6825	453.20	453.20	0.00	449.40	449.49	0.09	-3.80	-3.71	0.09
		6809				449.05	449.16	0.11			
		6756				448.07	448.11	0.04			
		6732				447.73	447.78	0.05			
		6653				446.41	446.46	0.05			
		6593				445.95	445.96	0.01			
		6541				445.91	445.91	0.00			
N	5214.0	6490(PR 6473)	446.70	446.70	0.00	445.70	445.70	0.00	-1.00	-1.00	0.00
NEW		6445.5	Proposed Culvert No. 014, Scott Road								
REMOVE		6441.5	Existing Scott Road Culvert, Structure No. 151-014								
		6417				439.44	439.44	0.00			
M	5213.0	6409	435.80	435.80	0.00	439.38	439.38	0.00	3.58	3.58	0.00
		6394				439.34	439.34	0.00			
NEW		6349.5	Proposed Culvert No. 06622, Plank Road East								
		6305				431.14	431.14	0.00			
		6266				429.12	429.12	0.00			
L	5212.0	6216	427.10	427.10	0.00	428.02	428.02	0.00	0.92	0.92	0.00
		6122				426.29	426.29	0.00			
		6067				425.70	425.70	0.00			
K	5211.0	6033	423.70	423.70	0.00	425.62	425.62	0.00	1.92	1.92	0.00
EXTEND		5993.5	Proposed Culvert No. 02537, Easterly I-84 crossing (Existing I-84 Structure No. 02537)								
J	5210.0	5947	419.60	419.70	0.10	418.99	419.07	0.08	-0.61	-0.63	-0.02
I	5209.0	5878	419.30	419.50	0.20	417.56	417.92	0.36	-1.74	-1.58	0.16
H	5208.9	5832	419.00	419.00	0.00	416.04	416.55	0.51	-2.96	-2.45	0.51
REMAIN		5812.5(EX&PR 5813)	Existing Concrete Weir								
	5208.2	5812(EX&PR 5812.5)				414.78	414.78	0.00			
G	5208.1	5804	413.50	413.50	0.00	413.24	413.24	0.00	-0.26	-0.26	0.00
		5757				410.58	410.58	0.00			
F	5208.0	5628	399.80	399.80	0.00	401.54	401.54	0.00	1.74	1.74	0.00
		5524				391.53	391.53	0.00			
		5456				387.31	387.31	0.00			
E	5207.0	5422	385.20	385.20	0.00	386.59	386.59	0.00	1.39	1.39	0.00
		5355				385.97	385.97	0.00			
REPLACE		5295.5	Proposed Culvert No. 01227, Westerly I-84 crossing (Replaces Ex. I-84 Structure No. 01227)								
D	5206.0	5296	382.60	382.60	0.00						
REPLACE		5254.5	Ex. I-84 Structure #01227								
		5224				377.77	377.79	0.02			
C	5205.1	5206	379.40	379.50	0.10	377.21	377.24	0.03	-2.19	-2.26	-0.07
B	5205.0	5145	379.10	379.10	0.00	375.69	375.69	0.00	-3.41	-3.41	0.00
A	5204.9	5084	376.80	376.80	0.00	375.56	375.56	0.00	-1.24	-1.24	0.00
		5065				375.50	375.50	0.00			
REPLACE		5050.5(PR 5042.5)	Proposed Culvert No. 03727, Harpers Ferry Road (Existing Structure No. 03727)								
	5204.0	5021				369.06	369.06	0.00			

- New/Replacement Structure

- Existing Structure

TABLE 10M. Proposed Condition versus Published FIS Profile
100-Year FEMA Discharge - Encroached and Unencroached (Floodway) Elevations - Without Backwater
Beaver Pond Brook, Waterbury

Metric (M, NGVD-29)

			English								
			Published FIS Data			***Proposed Condition***			***Comparison***		
	FEMA Sta.	***River Sta.***	100-yr Unencroach (Base) (M) (1)	100-yr Encroach (Floodway) (M) (2)	Published Surcharge (m) (2-1)	100-yr Unencroach (Base) (M) (3)	100-yr Encroach (Floodway) (M) (4)	Proposed Condition Surcharge (m) (4-3)	Unencro.: Proposed - Published (m) (3) - (1)	Encroach.: Proposed - Published (m) (4) - (2)	Proposed Surcharge - Published Surcharge (m) (4-3) - (2-1)
AC	5229.0	8722	150.48	150.51	0.03	149.85	149.99	0.14	-0.63	-0.52	0.11
AB	5228.0	8640	150.51	150.51	0.00	149.84	150.05	0.21	-0.67	-0.46	0.21
		8583				149.83	150.04	0.22			
AA	5227.0	8573	149.93	149.93	0.00	149.70	149.84	0.14	-0.23	-0.09	0.14
REMAIN		8565.5	I-84 WB OFF-RAMP CROSSING(STRUCTURE NO. 06580 - Constructed Under 151-274)								
		8554				148.52	148.53	0.00			
		8536				148.44	148.44	0.01			
Z	5226.0	8464	148.29	148.29	0.00	148.18	148.18	0.00	-0.10	-0.10	0.00
REMAIN		8435.5	EXISTING AUSTIN ROAD CROSSING(STRUCTURE NO. 151-007)								
		8412				146.70	146.71	0.00			
Y	5225.0	8393	145.36	145.36	0.00	145.19	145.20	0.00	-0.16	-0.16	0.00
		8356				144.68	144.68	0.00			
REMAIN		8332.5	EXISTING I-84 WB ON-RAMP CROSSING(STRUCTURE NO. 04323)								
		8309				143.61	143.61	0.00			
		8289				143.48	143.48	0.00			
		8237				143.04	143.04	0.00			
X	5224.0	8178	142.28	142.28	0.00	142.73	142.73	0.00	0.45	0.45	0.00
		8128				142.22	142.22	0.00			
		8080				141.83	141.84	0.02			
		8027				141.39	141.58	0.19			
		7977				141.34	141.56	0.21			
W	5223.0	7937	141.40	141.43	0.03	141.28	141.51	0.23	-0.12	0.09	0.20
REMAIN		7911.5	EXISTING PIERPONT ROAD CULVERT (STRUCTURE NO. 151-006)								
V	5222.0	7885	140.94	140.97	0.03	140.74	140.96	0.22	-0.20	-0.01	0.19
		7826				140.64	140.88	0.24			
		7757				140.65	140.88	0.23			
U	5221.0	7711	140.94	140.97	0.03	140.64	140.88	0.24	-0.30	-0.09	0.21
	5220.8	7698				140.42	140.65	0.23			
REMAIN		7689.5	EXISTING MULLOY ROAD CULVERT (STRUCTURE NO. 151-005)								
	5220.2	7681				140.03	140.06	0.03			
T	5220.0	7666	140.36	140.42	0.06	139.99	140.04	0.05	-0.37	-0.38	-0.01
S	5219.0	7589	140.33	140.36	0.03	139.58	139.79	0.21	-0.75	-0.57	0.18
		7370				139.54	139.63	0.09			
		7168				139.46	139.46	0.00			
R	5218.0	7120	139.81	139.81	0.00	139.40	139.41	0.01	-0.41	-0.41	0.01
Q	5217.5	7073	139.60	139.60	0.00	139.25	139.26	0.01	-0.35	-0.34	0.01
		6970				138.18	138.19	0.01			
		6915				137.86	137.88	0.02			
P	5217.0	6890	138.96	138.96	0.00	137.72	137.72	0.00	-1.23	-1.23	0.00
REMOVE		6859.5	Existing I-84 Westbound Exit 25 Off-Ramp (Structure No. 02536)								
O	5216.0	6825	138.44	138.44	0.00	137.28	137.31	0.03	-1.16	-1.13	0.03
		6809				137.18	137.21	0.03			
		6756				136.88	136.89	0.01			
		6732				136.77	136.79	0.02			
		6653				136.37	136.39	0.02			
		6593				136.23	136.23	0.00			
		6541				136.22	136.22	0.00			
N	5214.0	6490(PR 6473)	136.46	136.46	0.00	136.15	136.15	0.00	-0.30	-0.30	0.00
NEW		6445.5	Proposed Culvert No. 014, Scott Road								
REMOVE		6441.5	Existing Scott Road Culvert, Structure No. 151-014								
		6417				134.25	134.25	0.00			
M	5213.0	6409	133.14	133.14	0.00	134.23	134.23	0.00	1.09	1.09	0.00
		6394				134.22	134.22	0.00			
NEW		6349.5	Proposed Culvert No. 06622, Plank Road East								
		6305				131.72	131.72	0.00			
		6266				131.10	131.10	0.00			
L	5212.0	6216	130.48	130.48	0.00	130.77	130.77	0.00	0.28	0.28	0.00
		6122				130.24	130.24	0.00			
		6067				130.06	130.06	0.00			
K	5211.0	6033	129.45	129.45	0.00	130.03	130.03	0.00	0.59	0.59	0.00
EXTEND		5993.5	Proposed Culvert No. 02537, Easterly I-84 crossing (Existing I-84 Structure No. 02537)								
J	5210.0	5947	128.20	128.23	0.03	128.01	128.04	0.02	-0.19	-0.19	-0.01
I	5209.0	5878	128.11	128.17	0.06	127.58	127.69	0.11	-0.53	-0.48	0.05
H	5208.9	5832	128.02	128.02	0.00	127.11	127.27	0.16	-0.90	-0.75	0.16
REMAIN		5812.5(EX&PR 5813)	Existing Concrete Weir								
	5208.2	5812(EX&PR 5812.5)				126.73	126.73	0.00			
G	5208.1	5804	126.34	126.34	0.00	126.26	126.26	0.00	-0.08	-0.08	0.00
		5757				125.45	125.45	0.00			
F	5208.0	5628	122.16	122.16	0.00	122.69	122.69	0.00	0.53	0.53	0.00
		5524				119.64	119.64	0.00			
		5456				118.36	118.36	0.00			
E	5207.0	5422	117.71	117.71	0.00	118.14	118.14	0.00	0.42	0.42	0.00
		5355				117.95	117.95	0.00			
REPLACE		5295.5	Proposed Culvert No. 01227, Westerly I-84 crossing (Replaces Ex. I-84 Structure No. 01227)								
D	5206.0	5296	116.92	116.92	0.00						
REPLACE		5254.5	Ex. I-84 Structure #01227								
		5224				115.45	115.46	0.01			
C	5205.1	5206	115.95	115.98	0.03	115.28	115.29	0.01	-0.67	-0.69	-0.02
B	5205.0	5145	115.85	115.85	0.00	114.82	114.82	0.00	-1.04	-1.04	0.00
A	5204.9	5084	115.15	115.15	0.00	114.78	114.78	0.00	-0.38	-0.38	0.00
		5065				114.76	114.76	0.00			
REPLACE		5050.5(PR 5042.5)	Proposed Culvert No. 03727, Harpers Ferry Road (Existing Structure No. 03727)								
	5204.0	5021				112.79	112.79	0.00			

- New/Replacement Structure

- Existing Structure

Natural Condition

DEVELOPMENT OF NATURAL CONDITION MODEL

Section 9.3.6 of the ConnDOT 2000 *Drainage Manual* recommends, for large structures (drainage area greater than 25.9 km^2), 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 purposed 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 second Natural Condition allows evaluation of the effects of the proposed structures in the river.

WATER SURFACE PROFILE COMPARISON TO PROPOSED CONDITION

The comparisons of the proposed to natural condition profiles based on the 100-year flow are shown on Figure 10 and in Table 11. These show that, except at the I-84 WB Exit 25, 25A Off-Ramps (Bridge No. 02536 and 06580) and the Mulloy Road crossings, all the other crossing structures including all the proposed structures and the existing concrete weir cause increases greater than one foot over the “natural” condition.

Upstream of the Scott Road Culvert No. 014, the maximum increase was 3.94 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 yields a decrease of 0.2 ft, instead of the increase. As the intended purpose of comparing the proposed and natural condition profiles is to assess and limit the backwater effect of a hydraulic crossing, the increase resulting from the differing channel geometry should be disregarded. Accordingly, the later mentioned decrease was not considered for this location.

Between the Scott Road crossing and the Plank Road East Culvert No. 06622, the proposed water surface profile is entirely above the "natural" condition profile by a maximum of 2.64 ft. Upstream of the easterly I-84 Culvert No.02537, the increase over the natural is greatest within the studied reach at 4.01 ft. The increases upstream of the westerly I-84 Culvert No. 01227 and upstream of Harpers Ferry Road were similar - 3.23 and 3.27 ft, respectively.

The increases over the natural condition profile at the proposed structures were investigated and it was recommended that this guideline be waived because designing the structures to limit such

increases to one foot would result in an overly wide culvert and channel that would be incompatible with the upstream reach and be prone to aggrading streambed conditions.

At the existing concrete weir across from BJ's Wholesale Club, the increase is 1.23 ft. Removing this structure would steepen an already steep gradient of the Beaver Pond Brook between the I-84 crossings and thus was not considered.

As 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, alternatives to the proposed crossings were not considered.

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.

TABLE 11. Proposed versus Natural Condition
100-Year FEMA Discharge Water Surface Elevation, (Without Backwater From Mad River)
Beaver Pond Brook, Waterbury

English (FT, NGVD-29)

			English				
	FEMA Sta.	***River Sta.***	Natural 1 (from EX) (ft) (1)	Natural 2 (using relocated PR segm.) (ft) (2)	Proposed (ft) (3)	Difference (3) - (2)	Difference (3) - (1)
AC	5229.0	8722	491.97	491.97	491.62	-0.35	-0.35
AB	5228.0	8640	492.23	492.23	491.59	-0.64	-0.64
		8583	492.22	492.22	491.56	-0.66	-0.66
AA	5227.0	8573	490.73	490.73	491.13	0.40	0.40
REMAIN		8565.5	I-84 WB OFF-RAMP CROSSING(STRUCTURE NO. 06580 - Constructed Under 151-274)				
		8554	487.26	487.26	487.28	0.02	0.02
		8536	487.11	487.11	487.00	-0.11	-0.11
Z	5226.0	8464	484.39	484.39	486.16	1.77	1.77
REMAIN		8435.5	EXISTING AUSTIN ROAD CROSSING(STRUCTURE NO. 151-007)				
		8412	481.31	481.31	481.31	0.00	0.00
Y	5225.0	8393	476.37	476.37	476.36	-0.01	-0.01
		8356	472.48	472.48	474.66	2.18	2.18
REMAIN		8332.5	EXISTING I-84 WB ON-RAMP CROSSING(STRUCTURE NO. 04323)				
		8309	471.22	471.22	471.16	-0.06	-0.06
		8289	470.75	470.75	470.75	0.00	0.00
		8237	469.29	469.29	469.30	0.01	0.01
X	5224.0	8178	468.26	468.26	468.26	0.00	0.00
		8128	466.59	466.59	466.59	0.00	0.00
		8080	465.45	465.45	465.31	-0.14	-0.14
		8027	463.37	463.36	463.89	0.53	0.52
		7977	462.36	462.37	463.73	1.36	1.37
W	5223.0	7937	461.62	461.63	463.51	1.88	1.89
REMAIN		7911.5	EXISTING PIERPONT ROAD CROSSING (STRUCTURE NO. 151-006)				
V	5222.0	7885	461.22	461.23	461.75	0.52	0.53
		7826	460.59	460.61	461.42	0.81	0.83
		7757	460.68	460.69	461.45	0.76	0.77
U	5221.0	7711	460.67	460.68	461.43	0.75	0.76
	5220.8	7698	460.14	460.16	460.70	0.54	0.56
REMAIN		7689.5	EXISTING MULLOY ROAD CROSSING (STRUCTURE NO. 151-005)				
	5220.2	7681	459.96	459.93	459.42	-0.51	-0.54
T	5220.0	7666	459.25	459.21	459.28	0.07	0.03
S	5219.0	7589	458.26	457.97	457.94	-0.03	-0.32
		7370	458.16	457.83	457.80	-0.03	-0.36
		7168	457.95	457.55	457.56	0.01	-0.39
R	5218.0	7120	457.84	457.34	457.34	0.00	-0.50
Q	5217.5	7073	457.47	456.85	456.85	0.00	-0.62
		6970	456.84	453.35	453.35	0.00	-3.49
		6915	456.48	452.29	452.30	0.01	-4.18
P	5217.0	6890	456.38	451.83	451.85	0.02	-4.53
REMOVE		6859.5	Existing I-84 Westbound Exit 25 Off-Ramp (Structure No. 02536)				
O	5216.0	6825	455.66	450.37	450.40	0.03	-5.26
		6809	455.48	450.02	450.05	0.03	-5.43
		6756	454.52	449.07	449.07	0.00	-5.45
		6732	454.19	448.73	448.73	0.00	-5.46
		6653	452.72	447.05	447.41	0.36	-5.31
		6593	449.76	445.78	446.95	1.17	-2.81
		6541	448.78	444.15	446.91	2.76	-1.87
N	5214.0	6490(PR 6473)	446.90	442.76	446.70	3.94	-0.20
		6457	445.50	439.37			
NEW		6445.5	Proposed Culvert No. 014, Scott Road				
REMOVE		6441.5	Existing Scott Road Culvert, Structure No. 151-014				
		6417	440.39	439.37	440.44	1.07	0.05
M	5213.0	6409	438.44	438.86	440.38	1.52	1.94
		6394	437.24	437.70	440.34	2.64	3.10
NEW		6349.5	Proposed Culvert No. 06622, Plank Road East				
		6305	431.96	432.12	432.14	0.02	0.18
		6266	430.12	430.12	430.12	0.00	0.00
L	5212.0	6216	429.03	429.03	429.02	-0.01	-0.01
		6122	426.74	426.74	427.29	0.55	0.55
		6067	424.31	424.31	426.70	2.39	2.39
K	5211.0	6033	422.61	422.61	426.62	4.01	4.01
EXTEND		5993.5	Proposed Culvert No. 02537, Easterly I-84 crossing (Existing I-84 Structure No. 02537)				
J	5210.0	5947	420.01	420.01	419.99	-0.02	-0.02
I	5209.0	5878	418.66	418.66	418.56	-0.10	-0.10
H	5208.9	5832	415.81	415.81	417.04	1.23	1.23
REMAIN		5812.5(EX&PR 5813)	Existing Concrete Weir				
	5208.2	5812(EX&PR 5812.5)	415.54	415.54	415.78	0.24	0.24
G	5208.1	5804	414.15	414.15	414.24	0.09	0.09
		5757	411.57	411.57	411.58	0.01	0.01
F	5208.0	5628	402.54	402.54	402.54	0.00	0.00
		5524	392.83	392.83	392.53	-0.30	-0.30
		5456	387.90	387.90	388.31	0.41	0.41
E	5207.0	5422	386.19	387.13	387.59	0.46	1.40
		5355	383.91	383.74	386.97	3.23	3.06
REPLACE		5295.5	Proposed Culvert No. 01227, Westerly I-84 crossing (Replaces Ex. I-84 Structure No. 01227)				
D	5206.0	5296	381.07	381.07			
		5281	379.59	379.59			
REPLACE		5254.5	Ex. I-84 Structure #01227				
		5224	378.91	378.91	378.77	-0.14	-0.14
C	5205.1	5206	378.16	378.16	378.21	0.05	0.05
B	5205.0	5145	376.60	376.60	376.69	0.09	0.09
A	5204.9	5084	373.29	373.29	376.56	3.27	3.27
		5072	373.08	372.30			
		5065			376.50		
REPLACE		5050.5(PR 5042.5)	Proposed Culvert No. 03727, Harpers Ferry Road (Existing Structure No. 03727)				
	5204.0	5021	373.47	372.93	370.06	-2.87	-3.41

- New/Replacement Structure - Existing Structure

Natural 1: Developed from the Existing Condition model by removing all the existing man-made structures that cross the Mad River within the studied reach. The breached Century Dam was also completed removed from the model.

Natural 2: Where the river will be 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 proposed water surface profile to the natural condition is not viable. Accordingly, a secondary natural condition model was created by combining the proposed channel geometry to the initial natural condition model from Section 1689 (120m upstream of Century Dam) to 2020 (downstream of confluence with Beaver Pond Brook). This segment is shown above in the blue colored columns above. Within this segment, the proposed retaining walls along the river were also removed.

TABLE 11A. Proposed versus Natural Condition
100-Year FEMA Discharge Water Surface Elevation, (Without Backwater From Mad River)
Beaver Pond Brook, Waterbury

English (FT, NAVD-88)

			English				
	FEMA Sta.	***River Sta.***	Natural 1 (from EX) (ft) (1)	Natural 2 (using relocated PR segm.) (ft) (2)	Proposed (ft) (3)	Difference (3) - (2)	Difference (3) - (1)
AC	5229.0	8722	490.97	490.97	490.62	-0.35	-0.35
AB	5228.0	8640	491.23	491.23	490.59	-0.64	-0.64
		8583	491.22	491.22	490.56	-0.66	-0.66
AA	5227.0	8573	489.73	489.73	490.13	0.40	0.40
REMAIN		8565.5	I-84 WB OFF-RAMP CROSSING(STRUCTURE NO. 06580 - Constructed Under 151-274)				
		8554	486.26	486.26	486.28	0.02	0.02
		8536	486.11	486.11	486.00	-0.11	-0.11
Z	5226.0	8464	483.39	483.39	485.16	1.77	1.77
REMAIN		8435.5	EXISTING AUSTIN ROAD CROSSING(STRUCTURE NO. 151-007)				
		8412	480.31	480.31	480.31	0.00	0.00
Y	5225.0	8393	475.37	475.37	475.36	-0.01	-0.01
		8356	471.48	471.48	473.66	2.18	2.18
REMAIN		8332.5	EXISTING I-84 WB ON-RAMP CROSSING(STRUCTURE NO. 04323)				
		8309	470.22	470.22	470.16	-0.06	-0.06
		8289	469.75	469.75	469.75	0.00	0.00
		8237	468.29	468.29	468.30	0.01	0.01
X	5224.0	8178	467.26	467.26	467.26	0.00	0.00
		8128	465.59	465.59	465.59	0.00	0.00
		8080	464.45	464.45	464.31	-0.14	-0.14
		8027	462.37	462.36	462.89	0.53	0.52
		7977	461.36	461.37	462.73	1.36	1.37
W	5223.0	7937	460.62	460.63	462.51	1.88	1.89
REMAIN		7911.5	EXISTING PIERPONT ROAD CROSSING (STRUCTURE NO. 151-006)				
V	5222.0	7885	460.22	460.23	460.75	0.52	0.53
		7826	459.59	459.61	460.42	0.81	0.83
		7757	459.68	459.69	460.45	0.76	0.77
U	5221.0	7711	459.67	459.68	460.43	0.75	0.76
	5220.8	7698	459.14	459.16	459.70	0.54	0.56
REMAIN		7689.5	EXISTING MULLOY ROAD CROSSING (STRUCTURE NO. 151-005)				
	5220.2	7681	458.96	458.93	458.42	-0.51	-0.54
T	5220.0	7666	458.25	458.21	458.28	0.07	0.03
S	5219.0	7589	457.26	456.97	456.94	-0.03	-0.32
		7370	457.16	456.83	456.80	-0.03	-0.36
		7168	456.95	456.55	456.56	0.01	-0.39
R	5218.0	7120	456.84	456.34	456.34	0.00	-0.50
Q	5217.5	7073	456.47	455.85	455.85	0.00	-0.62
		6970	455.84	452.35	452.35	0.00	-3.49
		6915	455.48	451.29	451.30	0.01	-4.18
P	5217.0	6890	455.38	450.83	450.85	0.02	-4.53
REMOVE		6859.5	Existing I-84 Westbound Exit 25 Off-Ramp (Structure No. 02536)				
O	5216.0	6825	454.66	449.37	449.40	0.03	-5.26
		6809	454.48	449.02	449.05	0.03	-5.43
		6756	453.52	448.07	448.07	0.00	-5.45
		6732	453.19	447.73	447.73	0.00	-5.46
		6653	451.72	446.05	446.41	0.36	-5.31
		6593	448.76	444.78	445.95	1.17	-2.81
		6541	447.78	443.15	445.91	2.76	-1.87
N	5214.0	6490(PR 6473)	445.90	441.76	445.70	3.94	-0.20
		6457	444.50	438.37			
NEW		6445.5	Proposed Culvert No. 014, Scott Road				
REMOVE		6441.5	Existing Scott Road Culvert, Structure No. 151-014				
		6417	439.39	438.37	439.44	1.07	0.05
M	5213.0	6409	437.44	437.86	439.38	1.52	1.94
		6394	436.24	436.70	439.34	2.64	3.10
NEW		6349.5	Proposed Culvert No. 06622, Plank Road East				
		6305	430.96	431.12	431.14	0.02	0.18
		6266	429.12	429.12	429.12	0.00	0.00
L	5212.0	6216	428.03	428.03	428.02	-0.01	-0.01
		6122	425.74	425.74	426.29	0.55	0.55
		6067	423.31	423.31	425.70	2.39	2.39
K	5211.0	6033	421.61	421.61	425.62	4.01	4.01
EXTEND		5993.5	Proposed Culvert No. 02537, Easterly I-84 crossing (Existing I-84 Structure No. 02537)				
J	5210.0	5947	419.01	419.01	418.99	-0.02	-0.02
I	5209.0	5878	417.66	417.66	417.56	-0.10	-0.10
H	5208.9	5832	414.81	414.81	416.04	1.23	1.23
REMAIN		5812.5(EX&PR 5813)	Existing Concrete Weir				
	5208.2	5812(EX&PR 5812.5)	414.54	414.54	414.78	0.24	0.24
G	5208.1	5804	413.15	413.15	413.24	0.09	0.09
		5757	410.57	410.57	410.58	0.01	0.01
F	5208.0	5628	401.54	401.54	401.54	0.00	0.00
		5524	391.83	391.83	391.53	-0.30	-0.30
		5456	386.90	386.90	387.31	0.41	0.41
E	5207.0	5422	385.19	386.13	386.59	0.46	1.40
		5355	382.91	382.74	385.97	3.23	3.06
REPLACE		5295.5	Proposed Culvert No. 01227, Westerly I-84 crossing (Replaces Ex. I-84 Structure No. 01227)				
D	5206.0	5296	380.07	380.07			
		5281	378.59	378.59			
REPLACE		5254.5	Ex. I-84 Structure #01227				
		5224	377.91	377.91	377.77	-0.14	-0.14
C	5205.1	5206	377.16	377.16	377.21	0.05	0.05
B	5205.0	5145	375.60	375.60	375.69	0.09	0.09
A	5204.9	5084	372.29	372.29	375.56	3.27	3.27
		5072	372.08	371.30			
		5065			375.50		
REPLACE		5050.5(PR 5042.5)	Proposed Culvert No. 03727, Harpers Ferry Road (Existing Structure No. 03727)				
	5204.0	5021	372.47	371.93	369.06	-2.87	-3.41

- New/Replacement Structure - Existing Structure

Natural 1: Developed from the Existing Condition model by removing all the existing man-made structures that cross the Mad River within the studied reach. The breached Century Dam was also completed removed from the model.

Natural 2: Where the river will be 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 proposed water surface profile to the natural condition is not viable. Accordingly, a secondary natural condition model was created by combining the proposed channel geometry to the initial natural condition model from Section 1689 (120m upstream of Century Dam) to 2020 (downstream of confluence with Beaver Pond Brook). This segment is shown above in the blue colored columns above. Within this segment, the proposed retaining walls along the river were also removed.

TABLE 11M. Proposed versus Natural Condition
100-Year FEMA Discharge Water Surface Elevation, (Without Backwater From Mad River)
Beaver Pond Brook, Waterbury

Metric (M, NGVD-29)

			English				
	FEMA Sta.	***River Sta.***	Natural 1 (from EX) (M) (1)	Natural 2 (using relocated PR segm.) (M) (2)	Proposed (M) (3)	Difference (3) - (2)	Difference (3) - (1)
AC	5229.0	8722	149.95	149.95	149.85	-0.11	-0.11
AB	5228.0	8640	150.03	150.03	149.84	-0.20	-0.20
		8583	150.03	150.03	149.83	-0.20	-0.20
AA	5227.0	8573	149.57	149.57	149.70	0.12	0.12
REMAIN		8565.5	I-84 WB OFF-RAMP CROSSING(STRUCTURE NO. 06580 - Constructed Under 151-274)				
		8554	148.52	148.52	148.52	0.01	0.01
		8536	148.47	148.47	148.44	-0.03	-0.03
Z	5226.0	8464	147.64	147.64	148.18	0.54	0.54
REMAIN		8435.5	EXISTING AUSTIN ROAD CROSSING(STRUCTURE NO. 151-007)				
		8412	146.70	146.70	146.70	0.00	0.00
Y	5225.0	8393	145.20	145.20	145.19	0.00	0.00
		8356	144.01	144.01	144.68	0.66	0.66
REMAIN		8332.5	EXISTING I-84 WB ON-RAMP CROSSING(STRUCTURE NO. 04323)				
		8309	143.63	143.63	143.61	-0.02	-0.02
		8289	143.48	143.48	143.48	0.00	0.00
		8237	143.04	143.04	143.04	0.00	0.00
X	5224.0	8178	142.73	142.73	142.73	0.00	0.00
		8128	142.22	142.22	142.22	0.00	0.00
		8080	141.87	141.87	141.83	-0.04	-0.04
		8027	141.24	141.23	141.39	0.16	0.16
		7977	140.93	140.93	141.34	0.41	0.42
W	5223.0	7937	140.70	140.70	141.28	0.57	0.58
REMAIN		7911.5	EXISTING PIERPONT ROAD CROSSING (STRUCTURE NO. 151-006)				
V	5222.0	7885	140.58	140.58	140.74	0.16	0.16
		7826	140.39	140.39	140.64	0.25	0.25
		7757	140.42	140.42	140.65	0.23	0.23
U	5221.0	7711	140.41	140.42	140.64	0.23	0.23
	5220.8	7698	140.25	140.26	140.42	0.16	0.17
REMAIN		7689.5	EXISTING MULLOY ROAD CROSSING (STRUCTURE NO. 151-005)				
	5220.2	7681	140.20	140.19	140.03	-0.16	-0.16
T	5220.0	7666	139.98	139.97	139.99	0.02	0.01
S	5219.0	7589	139.68	139.59	139.58	-0.01	-0.10
		7370	139.65	139.55	139.54	-0.01	-0.11
		7168	139.58	139.46	139.46	0.00	-0.12
R	5218.0	7120	139.55	139.40	139.40	0.00	-0.15
Q	5217.5	7073	139.44	139.25	139.25	0.00	-0.19
		6970	139.24	138.18	138.18	0.00	-1.06
		6915	139.14	137.86	137.86	0.00	-1.27
P	5217.0	6890	139.10	137.72	137.72	0.01	-1.38
REMOVE		6859.5	Existing I-84 Westbound Exit 25 Off-Ramp (Structure No. 02536)				
O	5216.0	6825	138.89	137.27	137.28	0.01	-1.60
		6809	138.83	137.17	137.18	0.01	-1.66
		6756	138.54	136.88	136.88	0.00	-1.66
		6732	138.44	136.77	136.77	0.00	-1.66
		6653	137.99	136.26	136.37	0.11	-1.62
		6593	137.09	135.87	136.23	0.36	-0.86
		6541	136.79	135.38	136.22	0.84	-0.57
N	5214.0	6490(PR 6473)	136.22	134.95	136.15	1.20	-0.06
		6457	135.79	133.92			
NEW		6445.5	Proposed Culvert No. 014, Scott Road				
REMOVE		6441.5	Existing Scott Road Culvert, Structure No. 151-014				
		6417	134.23	133.92	134.25	0.33	0.02
M	5213.0	6409	133.64	133.76	134.23	0.46	0.59
		6394	133.27	133.41	134.22	0.80	0.94
NEW		6349.5	Proposed Culvert No. 06622, Plank Road East				
		6305	131.66	131.71	131.72	0.01	0.05
		6266	131.10	131.10	131.10	0.00	0.00
L	5212.0	6216	130.77	130.77	130.77	0.00	0.00
		6122	130.07	130.07	130.24	0.17	0.17
		6067	129.33	129.33	130.06	0.73	0.73
K	5211.0	6033	128.81	128.81	130.03	1.22	1.22
EXTEND		5993.5	Proposed Culvert No. 02537, Easterly I-84 crossing (Existing I-84 Structure No. 02537)				
J	5210.0	5947	128.02	128.02	128.01	-0.01	-0.01
I	5209.0	5878	127.61	127.61	127.58	-0.03	-0.03
H	5208.9	5832	126.74	126.74	127.11	0.37	0.37
REMAIN		5812.5(EX&PR 5813)	Existing Concrete Weir				
	5208.2	5812(EX&PR 5812.5)	126.66	126.66	126.73	0.07	0.07
G	5208.1	5804	126.23	126.23	126.26	0.03	0.03
		5757	125.45	125.45	125.45	0.00	0.00
F	5208.0	5628	122.69	122.69	122.69	0.00	0.00
		5524	119.73	119.73	119.64	-0.09	-0.09
		5456	118.23	118.23	118.36	0.12	0.12
E	5207.0	5422	117.71	118.00	118.14	0.14	0.43
		5355	117.02	116.96	117.95	0.98	0.93
REPLACE		5295.5	Proposed Culvert No. 01227, Westerly I-84 crossing (Replaces Ex. I-84 Structure No. 01227)				
D	5206.0	5296	116.15	116.15			
		5281	115.70	115.70			
REPLACE		5254.5	Ex. I-84 Structure #01227				
		5224	115.49	115.49	115.45	-0.04	-0.04
C	5205.1	5206	115.26	115.26	115.28	0.02	0.02
B	5205.0	5145	114.79	114.79	114.82	0.03	0.03
A	5204.9	5084	113.78	113.78	114.78	1.00	1.00
		5072	113.71	113.48			
		5065			114.76		
REPLACE		5050.5(PR 5042.5)	Proposed Culvert No. 03727, Harpers Ferry Road (Existing Structure No. 03727)				
	5204.0	5021	113.83	113.67	112.79	-0.87	-1.04

- New/Replacement Structure - Existing Structure

Natural 1: Developed from the Existing Condition model by removing all the existing man-made structures that cross the Mad River within the studied reach. The breached Century Dam was also completed removed from the model.

Natural 2: Where the river will be 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 proposed water surface profile to the natural condition is not viable. Accordingly, a secondary natural condition model was created by combining the proposed channel geometry to the initial natural condition model from Section 1689 (120m upstream of Century Dam) to 2020 (downstream of confluence with Beaver Pond Brook). This segment is shown above in the blue colored columns above. Within this segment, the proposed retaining walls along the river were also removed.

Summary

This hydraulic study demonstrates that although the proposed changes under the State Project No. 151-273 will result in an increase in the 100-year Base Flood elevation at several locations, it will not adversely impact any roads, buildings and adjacent private properties. Where the 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 not extend beyond the State ROW. Furthermore, in the proposed condition, the 500-year flood will no longer overflow onto I-84 upstream of the Scott Road and Harpers Ferry Road crossings, for which the potential currently exists.

The project will result in the increases in the 10-year water surface elevation (encroached condition) as well, primarily in the vicinity of the proposed waterway crossings. These increases are attributed to the baffles proposed inside the culverts to reduce the flow velocity and maintain stable channel downstream without widening the channel. These increases will require an exemption from the requirements of the State of Connecticut Flood Management Statutes and Regulations.

The greater-than-one-foot increases in the Base Flood elevation over the natural condition (no man-made crossings in the brook) will also require an exemption from the State requirements.

As this project involves partially relocating the Beaver Pond Brook, reestablishing the floodway and replacing numerous waterway crossing that results in the increases in the Base Flood elevation, it necessitates the issuance of the Conditional Letter of Map Revision (CLOMR) from the FEMA according to the National Flood Insurance Program (NFIP) standards and regulations (44 CFR, Chapter 1) and to the State statutes and regulations. Although CLOMR was originally obtained in 2007 for the project, it will be further coordinated with and additional approval will be sought from FEMA, if necessary, as there have been subsequent minor design changes which are incorporated and presented in this revised report.

This report along with all other reports, maps and documentation for this project has been prepared in conformance with the applicable sections of the NFIP standards and regulations and in accordance with the Hydraulic Analysis Guidance Document (revision date 1/26/05) published by DEP.

The areas where the increases will occur for the various conditions are summarized in the following table.

Table 12.
Summarized Locations of Increases

Location	*Profile*	*condition*	*Criteria*	*Comment*
Upstream of I-84 WB EX 25A Off-Ramp to Austin Road, Bridge No. 06580	Base Flood	0.4' increase	0.00' over Existing	- The increase only occurs at the immediate upstream section. Further upstream, the proposed condition flood profiles are lower than the existing condition.
	100-Year Encroached	0.53' increase	0.00' over Existing	
	10-Year Encroached	0.64' increase	0.00' over Existing	- No adverse impact, as the flow is contained within the State ROW.
Upstream of Austin Road, Structure No. 151-007	Base Flood	1.77' (max.)	< 1' over Natural	- Existing Condition
Upstream of I-84 WB EX 25A On-Ramp from Austin Road, Bridge No. 04323	Base Flood	2.18' (max.)	< 1' over Natural	- No adverse impact, as the flow is contained within the main channel, within the State ROW.
Downstream of I-84 WB EX 25A On-Ramp from Austin Road, Bridge No.04323	Base Flood	0.01' increase @ 250' downstream	0.00' over Existing	- No adverse impact, as the flow is contained within the main channel, within the State ROW.
	100-Year Encroached	0.01' increase @ 600' downstream	0.00' over Existing	
Upstream of Pierpont Road, Structure No. 151-006	Base Flood	1.88' (max.) to 250' upstream	< 1' over Natural	- Not caused by any direct physical impact at the crossing. - No adverse impact, as the flow is contained within the main channel. - Improvement compared to the existing condition.
Upstream of Mulloy Road, Structure No. 151-005	10-Year Encroached	0.01' increase	0.00' over Existing	- Not caused by any direct physical impact at the crossing. - Within the computational tolerance. (lowered water surface elevation further downstream is producing slightly different results upstream, but the real convergence of the existing and proposed 10-year encroached water surface profiles is anticipated 60' downstream of the Mulloy Road crossing.). - The project results in lower flood elevations at this location for higher storm frequency events. - No adverse impact, as the flow is contained within the channel.
Upstream of Scott Road Culvert No. 014	Base Flood	3.94' (max.) increase to 500' upstream	< 1' over Natural	- High backwater is intended to promote development of wetland vegetation in the proposed floodplain terrace. - Designing the structure to limit the increase to satisfactory range of the criteria would result in an overly wide culvert and channel that would be incompatible with the upstream reach and be prone to aggrading streambed conditions. - No adverse impact, as the flow is contained in the main channel within the State ROW. (no effect on private properties)
Upstream of Plank Road East Culvert No. 06622	Base Flood	3.10' (max.) increase	0.00' over Existing	-Due to the channel relocation.
	100-Year Encroached	3.10' (max.) increase	0.00' over Existing	- Fully contained in the main channel within the State ROW.
	10-Year Encroached	1.39' (max.) to 116' upstream	0.00' over Existing	
	Base Flood	2.64' (max.) to the Scott Road Culvert	< 1' over Natural	- Designing the structure to limit the increase to satisfactory range of the criteria would result in an overly wide culvert and channel that would be incompatible with the upstream reach and be prone to aggrading streambed conditions.
Downstream of Plank Road East Culvert No. 06622	Base Flood	0.18' increase	0.00' over Existing	
	100-Year Encroached	0.18' increase	0.00' over Existing	
	10-Year Encroached	0.29' increase	0.00' over Existing	

Location	Profile	condition	Criteria	Comment
Upstream of and through Easterly I-84 Culvert No. 02537	Base Flood	0.76' increase	0.00' over Existing	- Due to the extensions at both ends of the existing culvert, and proposed baffles (roughness elements) inside the culvert. Full replacement is necessary to eliminate the increase.
	100-Year Encroached	0.76' increase	0.00' over Existing	- Designing the structure to limit the increase to satisfactory range of the criteria would result in an overly wide culvert and channel that would be incompatible with the upstream reach and be prone to aggrading streambed conditions.
	10-Year Encroached	0.89' (max.) to 620' upstream	0.00' over Existing	
	Base Flood	4.01' (max.) to 200' upstream	< 1' over Natural	- No adverse impact, as all the studied flow conditions are contained within the channel in the State ROW.
Vicinity of Existing Concrete Weir (across from the BJ's Wholesale Club, approximately 500 ft downstream of the easterly I-84 Culvert NO. 02537)	10-Year Encroached	0.01' increases at the immediate downstream	0.00' over Existing	- Due to the proposed revision to the floodway intended to eliminate encroachment within the main channel limits, consistent with generally accepted procedures in establishing a floodway.
	Base Flood	1.23' increase at immediate upstream	< 1' over Natural	- No adverse impact, as all the studied flow conditions are contained within the channel in the State ROW.
Upstream of Westerly I-84 Culvert No. 01227	Base Flood	2.30' (max.) to 500' upstream	0.00' over Existing	- Due to shifting the inlet 250' upstream from the current location by using a longer culvert along with proposed baffles (roughness elements) inside.
	100-Year Encroached	2.26' (max.) to 500' upstream	0.00' over Existing	
	10-Year Encroached	2.15' increase immediate upstream & 0.06' at 340' upstream	0.00' over Existing	- Designing the structure to limit the increase to satisfactory range of the criteria would result in an overly wide culvert and channel that would be incompatible with the upstream reach and be prone to aggrading streambed conditions.
	Base Flood	3.23' (max.) increase	< 1' over Natural	- No adverse impact, as all the studied flow conditions are contained within the channel except for the 500-year flow. The 500-year floodplain is bound within the State ROW.
Dowstream of Westerly I-84 Culvert No. 01227	10-Year Encroached	0.04' increase @ 100' downstream	0.00' over Existing	- No adverse impact, as the flow is contained within the main channel, within the State ROW.
Through and Downstream of Harpers Ferry Road Culvert No. 03727	100-Year Encroached	0.2' increase immediate downstream	0.00' over Existing	- Improvement condition compared to the existing.
	10-Year Encroached	0.06' increase immediate downstream	0.00' over Existing	- Designing the structure to limit the increase to satisfactory range of the criteria would result in an overly wide culvert and channel that would be incompatible with the upstream reach and be prone to aggrading streambed conditions.
	Base Flood	3.27' (max.) increase	< 1' over Natural	- No adverse impact, as the Base Flood will be contained within the channel in the State ROW.

Appendix A

Hydraulic Backup: HEC-RAS Input Report

- Proposed Condition, FEMA Q - Regulatory
- Proposed Condition, FEMA Q - Floodway (Plan & Flow data only)

Proposed Condition, FEMA Q - Regulatory

```
                    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
          XXXXXXX  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  XXXXXX    XXXX        X    X   X    X   XXXXX


PROJECT DATA
Project Title: Beaver Pnd Brk, Waterbury, English
Project File : 151273BPB_CLOMR_English.prj
Run Date and Time: 10/10/2013 10:25:29 PM

Project in English units

Project Description:
Beaver Pond Brook, Waterbury
ConnDOT Project No. 151-273 - Reconstruction of
I-84 from Washington Ave. to Pierpont Rd.
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 both no backwater AND backwater
conditions from the Mad River.  The Connecticut DEP will review the 10 year and
floodway profiles assuming no backwater from the Mad River.
Floodway
encroachments for FEMA cross sections for the Existing Condtion model were
taken from the original FIS.  Encroachment stations for new cross sections were
estimated by scaling from the Floodway Maps, scale 1"=400'.
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 - FEMA - Regulatory
Plan File : C:\Users\Won\Documents\151-273\Beaver Pond
Brook_CLOMR_Rev03\151273BPB_CLOMR_English.p15

Geometry Title: PROPOSED CONDITION (Post-Construction)
Geometry File : C:\Users\Won\Documents\151-273\Beaver Pond
Brook_CLOMR_Rev03\151273BPB_CLOMR_English.g11

Flow Title    : FEMA Q's with Backwater (Proposed)
Flow File     : C:\Users\Won\Documents\151-273\Beaver Pond
Brook_CLOMR_Rev03\151273BPB_CLOMR_English.f10
```

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	=	0.0328
Critical depth calculation tolerance	=	0.0328
Maximum number of iterations	=	20
Maximum difference tolerance	=	0.9843
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:	Subcritical Flow

FLOW DATA

Flow Title: FEMA Q's with Backwater (Proposed)
Flow File : C:\Users\Won\Documents\151-273\Beaver Pond Brook_CLOMR_Rev03\151273BPB_CLOMR_English.f10

Flow Data (cfs)

River	Reach	RS	10 Year	50 Year	100 Year	500 Year
Beaver Pond Brk	Reach-1	8722	205	340	410	615
Beaver Pond Brk	Reach-1	7937	305	515	625	940
Beaver Pond Brk	Reach-1	7698	430	715	870	1315
Beaver Pond Brk	Reach-1	7120	475	795	965	1460
Beaver Pond Brk	Reach-1	6473	515	865	1055	1595
Beaver Pond Brk	Reach-1	5878	795	1335	1625	2465
Beaver Pond Brk	Reach-1	5355	955	1610	1960	2975

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Beaver Pond Brk	Reach-1	10 Year	Known WS = 491.73	Known WS = 370.25
Beaver Pond Brk	Reach-1	50 Year	Known WS = 493	Known WS = 371.72
Beaver Pond Brk	Reach-1	100 Year	Known WS = 493.69	Known WS = 372.8
Beaver Pond Brk	Reach-1	500 Year	Known WS = 494.73	Known WS = 373.97

GEOMETRY DATA

Geometry Title: PROPOSED CONDITION (Post-Construction)
Geometry File : C:\Users\Won\Documents\151-273\Beaver Pond Brook_CLOMR_Rev03\151273BPB_CLOMR_English.g11

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
-113.248	499.114	-82.48	498.885	-63.78	498.786	-51.411	499.147	-42.119	499.672
-33.491	499.639	-15.059	499.213	-13.123	499.016	-13.091	500	-11.942	500
-11.909	498.524	-10.827	497.244	-8.53	491.995	-7.612	489.895	0	487.697
4.298	489.501	6.929	489.797	24.016	491.699	48.825	493.11	69.692	494.521
70.085	494.554	70.348	494.587	70.413	494.587	70.446	494.587	70.512	494.587
70.545	494.587	70.61	494.587	87.244	495.112	87.343	495.112	87.408	495.112
87.539	495.112	87.671	495.112	87.736	495.112	87.802	495.112	87.966	495.112
88.097	495.112	88.163	495.112	88.327	495.112	88.425	495.112	88.524	495.112
88.688	495.112	88.852	495.112	88.917	495.112	89.081	495.112	89.18	495.112
89.278	495.112	89.442	495.112	89.573	495.112	89.672	495.112	89.803	495.079
89.869	495.079	89.967	495.079	90.098	495.079	94.068	495.013	108.274	495.21
115.591	495.177	127.697	495.21	136.522	495.21	139.738	495.144		

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-113.248	.02	-82.48	.04	-63.78	.02	-15.059	.06	-7.612	.04
48.825	.09								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
-7.612	6.929	255.906	269.849	310.039	.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= 62

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-217.247	497.08	-213.638	496.949	-210.948	496.949	-205.545	496.555	-199.596	496.621
-199.236	496.621	-198.973	496.621	-181.65	497.014	-178.829	497.014	-167.149	496.752
-161.844	496.654	-151.729	497.014	-151.368	497.014	-150.81	497.08	-146.447	497.277
-142.707	492.881	-138.802	491.109	-135.062	490.551	-130.371	489.764	-127.024	489.6
-108.947	489.239	-105.764	488.812	-103.665	488.419	-96.25	489.14	-87.195	489.6
-84.701	489.567	-72.136	489.37	-61.145	489.37	-36.9	489.436	-21.48	489.304
-13.934	489.272	-2.976	489.239	-2.812	489.239	.633	488.287	3.323	488.091
4.308	487.959	11.526	487.697	14.019	488.025	17.267	488.484	20.45	488.915
22.352	489.173	35.344	490.682	37.936	490.879	42.562	491.535	46.959	492.126
49.354	492.487	50.24	492.618	50.469	492.618	64.839	494.193	71.532	494.095
78.028	494.16	91.119	494.849	96.795	495.013	110.41	495.308	111.362	495.341
118.153	495.702	119.925	495.801	119.957	495.801	123.796	495.801	125.896	495.833
143.022	496.03	148.304	496.293						

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-217.247	.04	-205.545	.02	-161.844	.04	-151.729	.08	-135.062	.04
35.344	.09								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
-2.976	20.45	155.184	186.68	198.819	.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
-181.627	498.228	-176.772	497.835	-168.176	497.047	-143.701	495.472	-142.946	495.407
-134.35	493.766	-127.329	492.618	-123.72	492.126	-114.961	490.945	-113.353	490.879
-107.448	490.748	-107.349	490.748	-103.248	491.207	-99.606	490.879	-95.472	490.223
-93.865	490.026	-91.207	489.524	-88.32	488.976	-87.927	488.944	-83.399	489.337

```
 -82.054 489.337  -78.15 489.108 -59.383 489.337 -50.131 489.337 -46.982 489.272
 -16.306 488.451 -15.157 488.353 -12.598 488.287   2.428 487.566  10.138 487.795
  27.953 488.156  30.446 488.189  33.366  488.32  38.451 488.517  46.391 488.747
  51.739 488.911  60.991 489.042  69.291 489.075  74.541 489.862  82.054 490.157
   96.85 490.518  99.278 490.814 104.364 491.404 109.252 491.831  111.68 491.864
 115.157 491.831 117.585 491.634 118.406 491.634 119.029 491.667 120.243 491.732
 121.916 491.929 132.415 493.307 145.801 493.963 151.476 493.865

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
-181.627     .09 -93.865     .06 -59.383     .04  60.991     .06  74.541     .09

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       -12.598  30.446           64.633  35.105  35.105             .3       .5

CROSS SECTION


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

INPUT
Description: U/S of Brdg #06580, I-84 OffRamp to Austin Rd (FEMA AA - STA 5227)
Station Elevation Data    num=      69
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
-168.373 498.064-159.088 497.047-158.596 497.014-155.774 496.949-152.329 496.785
-150.984 496.752-142.684 496.588-135.335 496.194-123.163 495.505-121.818 495.407
-112.828  494.98-110.925 494.882 -96.883 494.095 -92.815 494.029 -85.138 493.832
 -81.988 493.766 -76.608 493.701 -75.492 493.668 -73.819 493.734  -71.49 493.766
 -70.702 493.832  -67.06 493.865 -63.419  493.93 -62.369 493.996 -61.975 493.996
 -61.713 493.996 -56.037  493.93 -50.262 493.766  -48.36 493.635 -46.391 493.241
 -43.865 493.176 -41.667 492.913 -36.647 492.618 -28.904 492.421 -23.458 492.257
  -21.49 492.126 -20.013  492.06 -17.717 491.896 -17.093 491.798 -15.518 491.306
 -12.959 490.486   -10.4 489.567  -8.333 488.845  -6.857 488.353      -6 488.222
       0 487.303       6 488.132   7.119 488.287   7.316 488.845   8.465 489.961
       9 490.381   9.383 490.682   9.711 490.912  15.846 490.486  21.621 490.125
  25.722 489.075  34.613 489.042  38.451 489.009  57.743 490.223   59.81 490.289
  62.598 490.387  63.386 490.387  80.184 490.715  95.013 490.945  98.425 493.996
 105.217 493.898 127.559 496.719 151.936 496.752  171.85  497.08

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
-168.373     .09 -15.518     .04   8.465     .06  21.621     .04  62.598     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       -12.959       9           48.885  59.711  58.399             .3       .5
Ineffective Flow     num=       3
   Sta L   Sta R    Elev  Permanent
-168.373 -98.425 498.064       F
   9.711  34.449 490.912       F
  34.449  171.85 497.047       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 =  10.663
Deck/Roadway Width        =  29.528
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=      13
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
-472.142 506.608       0-226.703 503.589       0-161.086 502.949       0
-107.854 502.306       0-107.851 505.817       0 -69.291 505.453 496.601
  26.083  503.75 494.843  65.787 503.455       0 154.698 503.287       0
 154.701 499.777       0 166.995 499.547       0 199.803 500.075       0
 232.612 500.797       0

Upstream Bridge Cross Section Data
Station Elevation Data    num=      36
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
-170.604 502.625-106.988 500.755-101.673 500.722 -79.462 493.766 -71.227 490.978
 -70.013  491.01 -62.894 489.764 -57.283 489.698 -57.054 489.698 -15.551  489.14
```

```
 -13.189  489.14  -12.27 489.009 -10.827 488.747  -8.235 487.533  -3.839 486.745
   -.984 487.402   3.871 489.665   5.413 490.059  11.319 491.175  12.369 491.404
  14.206 489.754  16.535 487.664  18.209 487.762  26.181 489.304  31.201 489.436
  34.055   489.6  62.566 491.273  62.828 491.273   63.32 491.306  65.551 491.404
  94.029 492.093  95.833 492.159 101.608 497.375 125.984  498.36  127.69 498.458
 167.126 499.344

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
-170.604     .06-101.673     .09 -13.189     .04   3.871     .06  14.206     .04
  26.181     .06

Bank Sta: Left   Right    Coeff Contr.   Expan.
       -13.189   5.413             .3       .5
Ineffective Flow     num=       3
   Sta L   Sta R    Elev  Permanent
-168.373 -98.425 498.064       F
   9.711  34.449 490.912       F
  34.449  171.85 497.047       F

Downstream  Deck/Roadway Coordinates
    num=      15
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
-472.142 506.608       0-226.703 504.154       0-161.086 503.497       0
-107.854 502.966       0-107.851 506.368       0 -71.555 506.083 497.192
  28.642 505.043 495.997  48.907 504.616       0  48.911 501.398       0
   68.57 501.089       0 101.378 500.843       0 134.186 500.794       0
 166.995 500.938       0 199.803  501.28       0 232.612 501.811       0

Downstream Bridge Cross Section Data
Station Elevation Data    num=      30
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
-167.323 502.953-103.248 501.772 -77.133 490.945 -75.951 490.518 -69.094 489.862
 -68.799 489.829 -55.052  487.73 -52.887 487.697 -38.484 487.336 -35.827 487.303
 -27.165 487.008 -18.832 486.745 -18.012 486.581 -16.864 486.549  -12.73 486.352
  -1.476  485.86   1.837 485.663   6.266 485.761  15.978 486.713  20.144 487.008
  21.391 488.386  21.883 488.451  30.938 491.109  37.566 494.259  38.353 494.619
  50.689 500.361  52.559 500.427  90.912 500.394 100.558 500.328 167.323     500

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
-167.323     .06-103.248     .09 -55.052     .04  20.144     .06  21.391     .09
  50.689     .06

Bank Sta: Left   Right    Coeff Contr.   Expan.
       -18.832  15.978             .3       .5
Ineffective Flow     num=       4
   Sta L   Sta R    Elev  Permanent
-161.273 -95.013 495.046       F
 -95.013 -21.575 487.959       F
  30.906  32.579 491.371       F
  32.579  86.516 497.047       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=      52
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
-161.273 495.046-154.383 494.751-130.105 494.423-126.266  494.39-124.954 494.357
 -113.93 493.766 -99.429  492.29 -98.117 492.192 -94.738 492.192 -88.537 491.896
 -87.651 491.831 -85.748 491.503 -78.366 490.486 -64.455  488.55 -58.878 487.795
  -56.45 487.566 -52.349 487.402 -44.934 487.303 -41.194  487.27 -36.306 487.336
 -33.615 487.467 -30.105 487.697  -26.07 487.861 -21.575 487.959 -21.345 487.927
 -17.736 487.205  -8.747 485.564  -7.533 484.711  -6.581 484.482  -2.841  483.76
    4.77 484.219   7.067 484.449    7.69 485.564  10.741  486.68      12 487.155
  14.482 488.091  17.959 489.304  20.715  490.19  21.306 490.354  22.356 490.617
  24.521 490.814  30.919 491.371  33.412 491.207  36.135 490.748   37.94 490.486
  39.219 490.486  44.797 491.109  56.772  492.06  58.773 492.257  61.778 492.717
  70.341 496.522  86.529 497.047

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
-161.273     .09 -21.575     .04  14.482     .09  61.778     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -8.747    7.69           83.333  62.008  18.701             .3       .5
Ineffective Flow     num=       4
   Sta L   Sta R    Elev  Permanent
-161.273 -95.013 495.046       F
 -95.013 -21.575 487.959       F
  30.906  32.579 491.371       F
  32.579  86.516 497.047       F

CROSS SECTION


RIVER: Beaver Pond Brk
REACH: Reach-1            RS: 8536

INPUT
Description:
Station Elevation Data    num=      46
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
-160.157 495.276-157.238 495.112-154.154 494.948-136.076  494.16-135.584  494.16
-131.286 494.062-114.455 493.734-111.503 493.701-101.693 493.504 -88.996  493.11
 -86.601 493.045 -83.812 492.749 -74.856 492.388 -62.618 491.864   -57.5 490.682
 -56.516 490.486 -49.331 489.108 -47.953 488.845  -37.06 487.336 -36.273 487.205
 -35.453 487.106 -33.747 487.008  -28.76 486.877 -24.954 486.745 -23.084 486.385
 -15.013  486.22 -11.896 485.499 -11.535 485.433  -5.663 483.825  -3.694 482.448
    2.31 481.791   4.672  483.76   4.836 483.891   4.934 483.924   5.853 484.547
     8.2 486.245   9.528 487.205  10.577 488.025  12.119 488.353  14.088 488.845
  15.663 489.108  21.437 490.092  24.226 490.486  32.349 491.568   42.29 493.963
  49.127 494.587

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
-160.157     .09 -24.954     .04   9.528     .09  32.349     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       -15.013     8.2          232.94 233.596 217.192             .1       .3

CROSS SECTION


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

INPUT
Description: U/S of Austin Road Str No. 151007 (FEMA Z -STA 5226)
Station Elevation Data    num=      39
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
-136.089 501.476-128.084 501.378-107.054 500.853-101.969 500.886 -94.816 501.181
```

```
  -89.14 501.476 -82.087 501.936 -67.881 501.936 -66.175 501.673 -64.108 501.542
 -49.344 500.328 -40.157 495.407 -36.909 493.766 -33.366 492.126 -24.738 488.845
 -18.307  486.68 -15.157 485.761   -12.6 484.996  -8.924 483.858  -6.234 482.644
  -5.545 482.283  -5.446 482.185  -3.215 480.873  -2.756 480.709   3.314 480.217
   4.035 480.381   5.545 482.218    5.61 482.283   7.743 483.924  10.072 485.564
  11.745 486.581  12.861 487.238  15.223 487.205  15.814 487.369  26.148 487.205
   26.64 487.205  36.506 488.025  55.774 488.625   62.27 489.173

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
-136.089     .09 -18.307     .04  15.223     .09  36.506     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -8.924   7.743          181.759 169.948 187.008             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
-136.089 -26.148 500.328       F
   40.19   62.27 489.895       F

CULVERT


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

INPUT
Description: Austin Road Str No. 151007
Distance from Upstream XS =  66.175
Deck/Roadway Width        =   61.68
Weir Coefficient          =    2.54
Upstream  Deck/Roadway Coordinates
    num=      51
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
-228.117 506.824         -183.53  507.48        -150.722 507.972
-117.913 508.465         -85.105 508.957         -52.297 509.449
 -19.488 509.941           13.32 510.433          29.724 510.433
  32.218 508.333           32.71 508.235          33.169 508.137
   33.76 507.972          34.055 507.874          39.764 505.249
  42.881 503.609          45.702 501.969          54.528 497.047
  57.644 495.407          60.925 493.766          64.403 492.126
  68.045 490.486           69.16 490.026          69.882 489.764
  73.491 489.862           82.48 490.322           96.26 490.322
  97.343 490.289         108.038 489.961         110.269 490.059
 110.367  494.39         110.499 494.882         112.566 506.201
   114.6 506.037         145.276 504.134         148.228 490.157
 148.786 490.157         149.409 490.059          151.87 490.223
 162.598 490.387         163.714 490.387         177.887 490.092
 186.516 489.961         186.877 490.223         187.402 490.486
 190.748 492.126          194.16 493.766         197.507 495.407
 200.558 497.047         204.035 498.688         204.823 499.081

Upstream Bridge Cross Section Data
Station Elevation Data    num=      39
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
-136.089 501.476-128.084 501.378-107.054 500.853-101.969 500.886 -94.816 501.181
  -89.14 501.476 -82.087 501.936 -67.881 501.936 -66.175 501.673 -64.108 501.542
 -49.344 500.328 -40.157 495.407 -36.909 493.766 -33.366 492.126 -24.738 488.845
 -18.307  486.68 -15.157 485.761   -12.6 484.996  -8.924 483.858  -6.234 482.644
  -5.545 482.283  -5.446 482.185  -3.215 480.873  -2.756 480.709   3.314 480.217
   4.035 480.381   5.545 482.218    5.61 482.283   7.743 483.924  10.072 485.564
  11.745 486.581  12.861 487.238  15.223 487.205  15.814 487.369  26.148 487.205
   26.64 487.205  36.506 488.025  55.774 488.625   62.27 489.173

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
-136.089     .09 -18.307     .04  15.223     .09  36.506     .06

Bank Sta: Left   Right    Coeff Contr.   Expan.
        -8.924   7.743             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
-136.089 -26.148 500.328       F
   40.19   62.27 489.895       F

Downstream  Deck/Roadway Coordinates
    num=      51
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
```

```
-228.117 506.824         -183.53  507.48        -150.722 507.972
-117.913 508.465         -85.105 508.957         -52.297 509.449
 -19.488 509.941           13.32 510.433          29.724 510.433
  32.218 508.333           32.71 508.235          33.169 508.137
   33.76 507.972          34.055 507.874          39.764 505.249
  42.881 503.609          45.702 501.969          54.528 497.047
  57.644 495.407          60.925 493.766          64.403 492.126
  68.045 490.486           69.16 490.026          69.882 489.764
  73.491 489.862           82.48 490.322           96.26 490.322
  97.343 490.289         108.038 489.961         110.269 490.059
 110.367  494.39         110.499 494.882         112.566 506.201
   114.6 506.037         145.276 504.134         148.228 490.157
 148.786 490.157         149.409 490.059          151.87 490.223
 162.598 490.387         163.714 490.387         177.887 490.092
 186.516 489.961         186.877 490.223         187.402 490.486
 190.748 492.126          194.16 493.766         197.507 495.407
 200.558 497.047         204.035 498.688         204.823 499.081

Downstream Bridge Cross Section Data
Station Elevation Data    num=      41
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
-128.281  499.77 -83.169 490.256 -80.781 489.993 -76.385 489.403  -72.94 488.845
 -71.168 488.615 -68.346 488.353 -64.377 488.484 -49.154 488.123 -45.741 487.927
 -35.571 487.434 -30.879 487.238 -26.549 487.106 -24.449 486.975 -22.546 486.745
 -22.448 486.713 -20.381  485.86 -17.986 485.105   -12.2  481.15  -8.963 478.937
  -8.373 478.511   -8.34 478.478  -2.992 478.379  -2.894 478.346  -2.795 478.379
   6.588 479.232   7.244 479.692    7.75 481.024   8.228 482.283  10.689 483.924
  13.806 485.335  15.709  486.22   16.07 486.319  19.252 486.713  22.664 487.369
  25.157 487.598  26.732 487.795  30.407 487.992  42.815 488.878  54.626 487.264
  62.854 488.012

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
-128.281     .08 -20.381     .04  13.806     .08  42.815     .04

Bank Sta: Left   Right    Coeff Contr.   Expan.
         -12.2    7.75             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
-128.281 -13.583 490.486       F
  13.123  62.854 489.337       F

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      Rise    Span
Culvert #1           Box       7       8
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
                    28.15 122.277     .012     .012        0                   .2
1
Upstream   Elevation =  479.495
           Centerline Station =  0
Downstream Elevation =  478.724
           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=      41
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
-128.281  499.77 -83.169 490.256 -80.781 489.993 -76.385 489.403  -72.94 488.845
```

```
 -71.168 488.615 -68.346 488.353 -64.377 488.484 -49.154 488.123 -45.741 487.927
 -35.571 487.434 -30.879 487.238 -26.549 487.106 -24.449 486.975 -22.546 486.745
 -22.448 486.713 -20.381  485.86 -17.986 485.105   -12.2  481.15  -8.963 478.937
  -8.373 478.511   -8.34 478.478  -2.992 478.379  -2.894 478.346  -2.795 478.379
   6.588 479.232   7.244 479.692    7.75 481.024   8.228 482.283  10.689 483.924
  13.806 485.335  15.709  486.22   16.07 486.319  19.252 486.713  22.664 487.369
  25.157 487.598  26.732 487.795  30.407 487.992  42.815 488.878  54.626 487.264
  62.854 488.012

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
-128.281     .08 -20.381     .04  13.806     .08  42.815     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -12.2    7.75           63.156  63.976  63.976              .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
-128.281 -13.583 490.486       F
  13.123  62.854 489.337       F

CROSS SECTION


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

INPUT
Description: FEMA STATION 5225, CROSS SECTION Y
Station Elevation Data    num=      36
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
-135.308 502.362-100.328 486.056 -96.102 485.827  -86.26   485.4 -81.732 485.269
 -72.119 484.908 -70.085  484.81 -66.804 484.744 -61.949 484.285 -45.184 482.415
 -44.364 482.316 -29.928 481.201 -26.745 481.037 -24.121 480.971 -17.854 481.037
  -16.28  481.07 -15.656 480.643 -11.785 477.986 -10.965 477.493  -10.25 475.841
  -9.488 474.081  -1.155 473.556    .387 473.622   7.244 474.114      10 475.722
  17.579 478.543   18.76 478.871  19.022 479.003  24.081 480.955  31.785 483.924
  35.262 485.269  37.297 485.564  40.512 485.958  44.436 486.385  68.425 487.956
  70.696 488.146

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
-135.308     .08 -17.854     .04  24.081     .06  44.436     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -10.25      10          134.514 120.079  97.769              .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=      51
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 -96.437 488.123 -81.791 484.449 -73.504 483.366 -63.333 481.923 -54.377 480.643
  -48.57 479.823 -45.846 479.396 -43.189 478.871 -35.446 477.297 -34.626 477.133
 -26.096  476.05 -21.732 475.853 -19.337 474.672   -19.2  474.61 -15.696 473.031
 -10.741 470.505 -10.512  470.21  -5.262 469.718  -4.508 469.587  -3.228 469.718
   1.857 470.341   5.531 470.538   6.056 470.571   9.895 471.096   9.961 471.161
  10.584 471.457  15.899 474.245  18.228 474.967  20.755 476.017  22.329 476.148
  26.923 476.608  28.465 477.034  34.567 477.329  37.159 477.362   43.36 477.362
  47.493 477.592   59.37 478.445  66.424 478.871   67.08 478.937  71.312 479.429
  72.461  479.56  81.614 480.643  85.912  481.43  88.963  481.89   89.39 481.988
  89.619 482.021  91.424 482.283   96.28 482.907 101.542 483.891 115.059 488.474
 120.472 488.802

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
 -96.437     .08 -21.732     .04  20.755     .08  71.312     .06 101.542     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       -10.741   9.961          173.885 155.512 164.042              .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 -96.437 -17.946 498.688       F
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  24.738 120.472 485.564       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 =  65.026
Deck/Roadway Width        =  25.919
Weir Coefficient          =    2.54
Upstream  Deck/Roadway Coordinates
    num=      13
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
-262.598 506.529         -229.79  505.84        -196.982  505.02
-164.173 504.134        -131.365 503.117         -98.556 502.034
 113.812 494.587         130.217 494.029         163.025 492.979
 195.833 492.028         228.642 491.142          261.45 490.387
 294.259 489.698

Upstream Bridge Cross Section Data
Station Elevation Data    num=      51
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 -96.437 488.123 -81.791 484.449 -73.504 483.366 -63.333 481.923 -54.377 480.643
  -48.57 479.823 -45.846 479.396 -43.189 478.871 -35.446 477.297 -34.626 477.133
 -26.096  476.05 -21.732 475.853 -19.337 474.672   -19.2  474.61 -15.696 473.031
 -10.741 470.505 -10.512  470.21  -5.262 469.718  -4.508 469.587  -3.228 469.718
   1.857 470.341   5.531 470.538   6.056 470.571   9.895 471.096   9.961 471.161
  10.584 471.457  15.899 474.245  18.228 474.967  20.755 476.017  22.329 476.148
  26.923 476.608  28.465 477.034  34.567 477.329  37.159 477.362   43.36 477.362
  47.493 477.592   59.37 478.445  66.424 478.871   67.08 478.937  71.312 479.429
  72.461  479.56  81.614 480.643  85.912  481.43  88.963  481.89   89.39 481.988
  89.619 482.021  91.424 482.283   96.28 482.907 101.542 483.891 115.059 488.474
 120.472 488.802

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
 -96.437     .08 -21.732     .04  20.755     .08  71.312     .06 101.542     .04

Bank Sta: Left   Right    Coeff Contr.   Expan.
       -10.741   9.961             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 -96.437 -17.946 498.688       F
  24.738 120.472 485.564       F

Downstream  Deck/Roadway Coordinates
    num=      13
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
-262.598 505.709         -229.79  505.02        -196.982 504.199
-164.173 503.314        -131.365 502.297         -98.556 501.214
 113.812 493.766         130.217 493.209         163.025 492.159
 195.833 491.207         228.642 490.322          261.45 489.567
 294.259 488.878

Downstream Bridge Cross Section Data
Station Elevation Data    num=      34
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
-103.442 482.054 -93.041 481.562 -76.867 479.888 -68.862 478.806 -58.789 477.723
 -39.268 475.623 -37.201 475.558 -34.019 475.131  -31.23 474.606 -23.848 473.261
 -22.339 472.966 -20.961 472.671 -18.665 472.146 -13.153  471.26  -12.95  471.06
 -11.152 469.291  -9.183 467.848  -4.295  467.06  -3.146 466.995   -.489 467.192
   6.106 467.585   9.255 468.045  16.309 468.701   17.72 468.996  27.956 470.735
  28.087 470.735  28.612 470.866  33.107 472.047  33.271 472.113  34.222 472.605
  74.052 494.685  75.692 495.144  75.791  495.21  76.348 495.177

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
-103.442     .08 -13.153     .04  28.612     .08  74.052     .04

Bank Sta: Left   Right    Coeff Contr.   Expan.
        -9.183   9.255             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
-103.442 -19.029 482.054       F
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          14.567  76.348 482.054       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       6       7
        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
                     14.764 127.789     .012     .012        0                   .5
1
        Upstream   Elevation =  469.652
                   Centerline Station = -3.97
        Downstream Elevation =  467.323
                   Centerline Station = -3.97

        Culvert Name     Shape      Rise    Span
        #1-West Cell         Box       6       7
        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
                     14.764 127.789     .012     .012        0                   .5
1
        Upstream   Elevation =  469.636
                   Centerline Station =  3.97
        Downstream Elevation =  467.224
                   Centerline Station =  3.97

        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=      34
             Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
        -103.442 482.054 -93.041 481.562 -76.867 479.888 -68.862 478.806 -58.789 477.723
         -39.268 475.623 -37.201 475.558 -34.019 475.131  -31.23 474.606 -23.848 473.261
         -22.339 472.966 -20.961 472.671 -18.665 472.146 -13.153  471.26  -12.95  471.06
         -11.152 469.291  -9.183 467.848  -4.295  467.06  -3.146 466.995   -.489 467.192
           6.106 467.585   9.255 468.045  16.309 468.701   17.72 468.996  27.956 470.735
          28.087 470.735  28.612 470.866  33.107 472.047  33.271 472.113  34.222 472.605
          74.052 494.685  75.692 495.144  75.791  495.21  76.348 495.177

        Manning's n Values        num=       4
             Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
        -103.442     .08 -13.153     .04  28.612     .08  74.052     .04

        Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
                -9.183   9.255           37.402  64.633   92.52             .3       .5
        Ineffective Flow     num=       2
           Sta L   Sta R    Elev  Permanent
        -103.442 -19.029 482.054       F
          14.567  76.348 482.054       F

        CROSS SECTION


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

        INPUT
        Description:
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Station Elevation Data    num=      33
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
-100.965 480.446 -94.829 480.282 -92.238 480.118 -79.738 479.495 -74.587 478.675
 -69.337 477.493 -65.302 477.067 -63.629 476.969 -56.378 475.459 -52.999 475.164
 -50.768     475 -31.509 473.294 -16.385 471.982 -15.335 471.555 -15.039 471.457
  -12.53 470.504  -9.167 469.226   -6.87 467.815   -6.05 467.356    .217 466.864
    .348 466.831    .545 466.864   7.467 467.356  12.848 468.996  13.635 469.554
  15.866 470.505   16.26 470.735   18.95 472.244  41.588 483.694  59.567 493.143
  59.928 493.438  61.043 493.701  61.995 493.701

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
-100.965     .08 -16.385     .04   16.26     .08  59.567     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -12.53  15.866          174.869 171.916 168.635             .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     Sta    Elev     Sta    Elev
-141.404 478.871 -126.64 478.182-117.126 477.822 -116.24  477.69-104.593 474.967
 -83.202 473.622 -53.576 472.638 -48.261 472.146 -42.585 471.982 -37.697 471.785
 -33.793 471.686 -18.077 470.669 -17.815 470.669 -17.618 470.636  -13.55  468.57
 -12.336 467.946   -9.81 467.028  -6.135 465.682   5.446 465.682   5.807 466.142
   7.546 467.585  10.925 469.193  13.058 470.144  17.487 472.047  47.999 488.091
  48.753  488.55  49.147 488.615   51.05 488.976  51.411 488.976

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
-141.404     .08 -53.576     .02 -42.585     .08   -9.81     .04   7.546     .08

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       -12.336   7.546          197.835 193.898 190.617             .1       .3

CROSS SECTION


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

INPUT
Description: FEMA STATION 5224, CROSS SECTION X
Station Elevation Data    num=      54
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
-202.641 477.428-196.407 477.461-188.829 477.297-185.778 475.131-174.623 469.783
-160.646 469.882-134.039 469.783-129.216 469.751 -95.915 469.619 -84.826 469.652
 -80.266 469.619 -78.297 469.685 -68.028 470.472 -64.879 471.391 -59.268 471.424
 -55.495 471.325 -48.671  471.03 -45.062 470.899 -36.073 470.407 -34.334  470.44
 -30.856 470.538 -30.659 470.538 -29.872 470.472 -17.536 469.291 -17.438 469.259
 -15.666 468.734  -14.52 468.195 -12.877 467.421   -12.4 467.238  -8.448 465.453
  -6.578 464.633  -6.414 464.534   1.854 464.042   5.331 464.272   7.201 465.387
   8.153 465.781    13.5  467.22  14.616  467.52  16.355 468.176  19.062 469.505
  29.249 474.508  30.725 475.033   33.94  476.64  39.009 479.396  39.009 486.818
   39.14 488.261   39.14 488.425  39.304 490.394  39.403 490.394  40.289 490.394
  40.322 490.164  40.584 487.736  40.617 487.671   41.01 487.146

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
-202.641     .08 -15.666     .04  16.355     .08  39.009     .02

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -12.4    13.5          164.042  164.37 165.354             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
-202.641 -59.285 471.424       F

CROSS SECTION


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

INPUT
Description:
Station Elevation Data    num=      59
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
-183.694 476.214-170.341 475.262-163.025 474.442-162.927 474.409  -162.5 474.409
-146.654 473.031-132.349 469.587-127.362 468.504-124.869  469.16-106.791  471.26
-100.394 470.801  -98.13 470.636 -77.789 470.997 -76.181 470.932 -73.491 472.178
   -64.6 476.903 -63.681 477.493 -62.697 477.854 -61.647  478.15 -59.186 479.068
 -58.038 479.265 -55.709 478.642 -54.364 477.953 -53.937 477.657 -51.936 476.444
 -51.476  476.05  -47.08 472.474  -44.16 470.932 -40.518 470.702 -38.255 470.571
 -36.483 470.374  -34.58 470.243 -26.214 469.882 -25.755 469.882 -24.836 469.718
 -16.732 468.143 -11.385 467.126  -9.186 466.273   -1.64 463.353   2.953 462.369
   6.988  463.32    9.81 464.665  11.188 465.486   13.33 466.227  22.474  469.39
  25.525 470.472  31.726 472.572  42.946 478.051  48.885 481.168   48.95  485.86
  49.081 487.303  49.081 487.467  49.245 489.436  49.344 489.436   50.23 489.436
  50.262 489.206  50.525 486.778  50.558 486.713  50.951 486.188

Manning's n Values        num=       8
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
-183.694     .06-100.394     .08 -54.364     .04  -44.16     .02 -38.255     .08
  -9.186     .04  11.188     .08  48.885     .02

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -9.186   13.33          156.496 157.152 157.808              .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
-183.694  -44.16 470.801       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
-168.133 473.425-168.002 473.425-165.673 473.491-159.111 473.589-151.368 474.081
-151.007 474.081-145.823 474.114-134.898 474.081-129.419 474.016-126.991 473.983
 -116.23 473.688-114.852 473.622 -114.36 473.556-104.321 473.064-100.614 472.835
 -99.859 472.835 -94.216 472.867 -93.724 472.867 -92.182 472.835 -91.132 472.769
 -89.688 472.703 -89.229 472.703   -84.8 472.277 -74.301 470.997 -71.119 470.997
 -57.405 471.293 -56.913 471.325 -56.093 471.325 -47.595 471.293 -43.199  471.03
 -41.985 470.997 -41.198 470.997 -39.721 470.932 -39.032 470.932 -36.473 470.801
 -34.931 470.735 -33.816 470.702 -33.389 470.604 -33.291 470.604 -33.192 470.571
 -31.913  469.98 -23.186 467.323 -18.199 465.879 -16.263  465.19 -13.671 464.239
  -8.061 462.073  -7.766 461.942  -5.906 460.991   -1.64 460.794   2.297 460.991
   3.356 462.106   3.455 462.238   3.553 462.303   3.881 462.598   5.784 464.239
   6.145 464.534  11.001 465.879  16.709  467.52  20.023  469.16  23.369 470.801
  26.913 472.441  30.325 474.081  33.835 475.722  38.166 477.362  42.562 479.003
  53.773 483.891  53.839 485.072   53.97 486.516   53.97  486.68  54.134 488.648
  54.232 488.648  55.118 488.648  55.151 488.419  55.413 485.991  55.446 485.925
   55.84   485.4

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
-168.133     .06 -74.301     .02 -43.199     .08 -13.671     .04   6.145     .06
  16.709     .08  53.773     .02

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       -13.671   5.784            172.9   172.9   172.9              .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
-171.916 472.244-170.308 472.244-165.289 472.441 -163.32 472.441-153.314 472.474
-141.962 471.949-132.546 472.047-129.331 472.014-116.568 471.916-115.748 471.883
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-113.419 471.883-108.399 471.654-107.251 471.588-107.185 471.654-106.037 471.654
-101.148 471.588 -94.816 471.424 -88.091 471.227 -85.663 471.096 -81.759 471.096
 -77.887  471.03  -75.23 470.997 -74.081 470.997 -73.392  471.03 -71.325 470.965
 -64.567 470.407 -62.467  470.44 -58.858 470.505 -39.469 470.276 -32.218 470.276
 -26.706 470.079 -20.997 467.585 -20.243 467.192 -10.499 462.556  -7.349 461.056
   -1.64 459.055    4.79 461.024   7.644 463.222   7.808 463.287  13.025  465.19
  14.698 465.879  17.093 466.864  19.685 467.782  31.529 472.047  33.727 473.327
  49.377 482.546  50.459 483.169  50.525  483.99  50.656 485.433  50.656 485.597
   50.82 487.566  50.919 487.566  51.804 487.566  51.837 487.336    52.1 484.908
  52.133 484.843  52.526 484.318

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
-171.916     .08 -10.499     .04  13.025     .06  17.093     .08  50.459     .02

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       -10.499   7.644           164.37  164.37  164.37              .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
-171.916 -42.323 482.283       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
-162.434 470.768-148.655 470.538-146.982 470.538-135.991 470.308  -122.9 469.948
-113.681 469.324-100.722 468.701 -96.719  468.34 -81.463 467.815 -76.444 468.045
  -66.01 467.421 -59.154 467.224 -55.381 467.224 -49.442 467.946 -44.751 468.209
 -41.306 468.176  -33.53 467.717 -32.448 467.684 -26.673 467.388  -23.13 467.421
 -21.293 467.224 -19.816  467.06 -10.236 461.745  -3.871  458.53   1.411 457.382
   7.776  458.53  10.499 459.646  11.352 459.974  14.764 461.778  19.783 464.436
  39.403 474.869  45.899 478.511  45.965 484.055  46.096 485.499  46.096 485.663
   46.26 487.631  46.358 487.631  47.244 487.631  47.277 487.402  47.539 484.974
  47.572 484.908  47.966 484.383

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
-162.434     .06 -59.154     .02 -49.442     .06 -10.236     .04  10.499     .08
  45.899     .02

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       -10.236  14.764          131.234 131.234 131.234              .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
-162.434 -71.227 482.283       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) is being constructed under the State Project No 151-274.
Station Elevation Data    num=      54
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
-156.266 468.504-155.906 468.504-150.755 468.209  -137.5 467.224-124.311 466.634
 -110.86 466.207 -97.966 465.584 -88.189 464.665 -84.777   464.6 -81.791 464.764
 -81.266 464.698 -78.478 464.764  -78.15 464.764 -67.323 464.698  -63.32 464.633
 -54.364 464.403 -52.887  464.37  -42.06 464.403 -40.781 464.403 -31.332 464.665
  -30.02 464.698 -25.131 465.059 -25.033 465.059 -24.869 465.026  -19.16  464.14
 -18.766  464.14 -16.699 463.845 -15.879 462.795  -14.93 461.891 -13.091 460.138
 -10.433  457.71  -5.643 456.791  -2.264 456.168   1.706 456.201   4.659  456.07
   7.185 456.824   7.251 456.759  14.304 461.647  16.699 463.169  21.785 466.404
  27.854 469.029  36.352 473.097  40.453  474.77  46.325 477.165  46.391 485.072
  46.522 486.516  46.522  486.68  46.686 488.648  46.785 488.648  47.671 488.648
  47.703 488.419  47.966 485.991  47.999 485.925  48.392   485.4
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Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
-156.266     .04 -88.189     .02 -25.131     .08 -13.091     .04  14.304     .08
  46.325     .02

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -14.93  14.304          167.323 167.421 170.374             .3       .5
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
-156.266 -20.341 475.722       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 =  56.759
Deck/Roadway Width        =  55.118
Weir Coefficient          =    2.81
Upstream  Deck/Roadway Coordinates
    num=      35
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
-211.713 467.717 452.756 -203.97 467.552 452.756-198.196 467.454 452.756
-168.209  467.06 452.756-165.617 467.028 452.756-109.514 465.551 452.756
 -104.56  465.42 452.756   -89.6 465.026 452.756 -85.466 464.961 452.756
 -27.756 463.583 452.756 -26.378 463.583 452.756 -23.524 463.583 452.756
 -23.524  465.64 452.756  -9.875 465.653 452.756  -8.825 465.617 452.756
  -8.825 465.617 460.299   6.594 465.289 460.299   6.594 465.289 452.756
  20.801  465.01 452.756  20.801 463.747 452.756  24.081 463.747 452.756
  24.442 463.747 452.756  51.411 463.517 452.756  51.837 463.517 452.756
  61.319 463.353 452.756  72.507 463.451 452.756  77.198 463.517 452.756
  81.037  463.55 452.756  127.69 464.042 452.756 135.499 464.108 452.756
 139.829 464.173 452.756 142.257 464.206 452.756 163.583 464.469 452.756
 170.997 464.567 452.756  193.11 464.829 452.756

Upstream Bridge Cross Section Data
Station Elevation Data    num=      55
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
-198.392 473.228-197.671  473.13 -188.32 469.652-182.218  467.06-180.381 467.224
-171.719 467.618-166.043 467.717 -150.23 467.782-141.404 467.126-133.497 466.634
-124.081 465.945-114.272 465.256-106.627 464.928 -90.879 464.698 -85.007 464.928
 -81.923 464.993 -75.131 464.534 -59.154 464.239 -41.503 463.058 -36.844 462.894
 -34.678 462.894  -28.15 462.992  -25.82 462.992 -14.108 463.287 -12.697 461.942
 -12.664 458.661 -12.631 456.004  -3.281 455.545   5.118 455.545   8.333 455.577
  15.912 459.252  22.507 462.434  25.197 463.648  29.888 463.583  45.997 463.583
   55.02 464.042  55.085 464.304  57.415  464.14   59.81  465.19  60.072 465.453
  71.358 482.283  74.606 483.268  77.822 484.514  78.084 484.318  78.642  484.58
  81.529 485.007   81.66 484.744  81.988 484.449  82.316 484.252  82.415 484.416
  90.518 484.285  91.568 484.318 105.479 484.186 108.694 484.219 108.825 484.186

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
-198.392     .04 -150.23     .02  -28.15     .08 -12.697     .04  15.912     .08
  71.358     .04  81.529     .02

Bank Sta: Left   Right    Coeff Contr.   Expan.
       -12.664  15.912             .3       .5
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
-198.392 -20.341 475.722       F

Downstream  Deck/Roadway Coordinates
    num=      34
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
-211.713 467.717 452.756 -203.97 467.552 452.756-198.196 467.454 452.756
-168.209  467.06 452.756-165.617 467.028 452.756-109.514 465.551 452.756
 -104.56  465.42 452.756   -89.6 465.026 452.756 -85.466 464.961 452.756
 -27.756 463.583 452.756 -26.378 463.583 452.756 -23.602 463.583 452.756
 -23.602 465.669 452.756 -11.253 465.486 452.756 -11.253 465.486 460.299
   4.167 465.256 460.299   4.167 465.256 452.756  21.752  465.01 452.756
  21.752 463.747 452.756  24.081 463.747 452.756  24.442 463.747 452.756
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  51.411 463.517 452.756  51.837 463.517 452.756  61.319 463.353 452.756
  72.507 463.451 452.756  77.198 463.517 452.756  81.037  463.55 452.756
  127.69 464.042 452.756 135.499 464.108 452.756 139.829 464.173 452.756
 142.257 464.206 452.756 163.583 464.469 452.756 170.997 464.567 452.756
  193.11 464.829 452.756

Downstream Bridge Cross Section Data
Station Elevation Data    num=      52
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
-163.287 466.404-159.613 466.535-152.723 466.864-149.573 466.634-145.571 466.371
-140.912 466.109-136.778 465.781-134.547  465.65-134.022  465.65 -131.66 465.715
 -128.15  465.65-125.722 465.617 -122.31 465.551-118.766 465.518-118.241 465.551
-116.503 465.584-115.453 465.486 -102.92 465.322 -98.196 465.289  -92.06 465.092
  -76.64 464.731 -70.735 464.403 -64.895 464.075 -60.761 464.075 -55.446 464.042
 -54.167 463.976 -40.748  463.32 -37.762  463.55  -31.07 463.386  -30.61 463.353
 -24.672 460.991 -17.651 458.301 -11.417 455.577   4.331 455.577   9.219 457.612
  20.801 462.566    22.9 462.762  25.722 462.992  29.429 462.992  36.614 466.306
  40.879 468.799   43.57 469.816  46.391 470.702  49.934 475.492  52.395 477.657
  55.741 479.429  67.684 484.482  68.209 484.678  68.471 484.711  71.522 484.744
  72.736 484.613  73.655 484.514

Manning's n Values        num=      10
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
-163.287     .04-149.573     .02-125.722     .04 -122.31     .08 -102.92     .04
 -40.748     .06 -24.672     .04   9.219     .06  55.741     .04  71.522     .02

Bank Sta: Left   Right    Coeff Contr.   Expan.
       -17.651   9.219             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
-163.287 -61.024 475.722       F
  52.264  73.655 489.009       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         = 463.999
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=  -1.115    Downstream=  -3.543
Upstream     num=       2
    Width   Elev    Width   Elev
   1.001 455.499   1.001 460.299
Downstream     num=       2
    Width   Elev    Width   Elev
   1.001 455.499   1.001 460.299

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                = 460.299

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
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REACH: Reach-1            RS: 7885

INPUT
Description: D/S of PIERPONT ROAD (FEMA V -STA 5222)
STRUCTURE NO. 151-006
Station Elevation Data    num=      41
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 -96.457 465.092 -93.602 464.928 -90.059 464.895 -89.436 464.895 -88.648 465.026
 -80.643  465.65 -63.287 464.961 -58.661 464.731  -57.48 464.633 -55.249 464.469
 -50.919 464.206 -45.735 463.845 -39.436 463.878 -38.583 463.878 -37.664 463.517
 -30.906  461.45 -27.592 460.433  -26.43 460.079  -18.11 457.546  -9.843 456.726
  -6.299 456.102   -.164  455.84   3.346 456.299   6.004 456.627   9.055 460.072
  16.306 460.171   17.52 460.466  25.459 465.026  34.843 468.832  41.535 471.752
  47.408 474.278  49.541 475.328  52.034 476.575    52.1 478.248  52.133 487.205
  52.264 489.009  53.248 489.009  53.314 488.484  53.543 486.352  53.609  486.22
  53.937 485.761

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
 -96.457     .04 -89.436     .02 -45.735     .04 -39.436     .08 -27.592     .04
   9.055     .08  52.034     .02

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -26.43   9.055          190.289  193.57 203.412              .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 -96.457 -61.024 475.722       F
  52.264  53.937 489.009       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
 -62.172 466.371 -61.056 466.207  -58.76 466.076   -47.9 463.911 -45.079 463.058
  -43.57 462.598 -42.651 462.533 -36.909 462.008 -35.138 461.516 -31.299 460.761
 -24.606 460.302 -22.211 459.646 -14.469 457.447 -12.828 456.988  -6.759 455.249
  -4.659 454.724   3.412 455.249   4.593 455.807   9.186  458.35  13.189 460.564
  17.257 459.711   23.36 458.497  24.409 458.563  27.362 458.825  28.215 458.924
  28.478 458.924  29.659 459.022  34.514 459.613   37.73 461.975  53.314 470.505
   57.94 472.802  60.138 473.786  63.091 475.197  63.156 486.024   63.32 489.633
  64.304 489.928  64.567 487.598    64.6  487.27  64.764 487.008

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
 -62.172     .02 -36.909     .08 -14.469     .04   9.186     .08  63.091     .02

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       -22.211  13.189          242.782 242.782 242.782              .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 -62.172 -61.352 479.003       F
  13.189  64.764 460.564       F

CROSS SECTION


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

INPUT
Description: 190ft (58m) U/S of EXISTING MULLOY ROAD
Station Elevation Data    num=      47
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
-196.818 462.139-184.974 461.909-184.121 461.909-183.563 461.877-173.228 461.385
-169.554 461.286-166.765 461.286-161.745 460.367-156.398 459.416-145.669 456.234
-143.209 455.643-141.404 455.315-116.339 455.315-100.394 455.282 -85.597 455.479
 -77.362 455.446 -68.537 455.479 -47.211 456.365 -39.665 456.529 -38.123 456.594
 -37.434 456.562  -35.86  456.66 -22.605 456.824 -15.059 456.562  -7.349 455.217
    .525 453.543   3.084 454.364   9.055 455.249  10.302 455.512  12.795  456.07
  15.322 456.824   19.16 456.759  23.589 456.791  24.147 456.726  36.877 463.025
  40.748 464.567  43.865 466.371   44.39 466.667  44.587 471.785  44.619 486.581
```

```
  44.652 487.139  44.783 488.747  45.768 488.747  45.833 488.123  46.063 486.056
  46.129 485.925  46.457 485.466

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
-196.818     .02-173.228     .08 -15.059     .04  12.795     .08   44.39     .02

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       -22.605  15.322           72.178 150.919 134.514             .1       .3
Ineffective Flow     num=       3
   Sta L   Sta R    Elev  Permanent
-196.818 -194.39 475.722       F
 -194.39-122.047 462.106       F
-122.047 -22.605 456.824       F

CROSS SECTION


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

INPUT
Description: 44ft (13.4m) U/S EXISTING MULLOY ROAD (FEMA U -STA
             5221)
STRUCTURE NO. 151-005
Station Elevation Data    num=      54
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
-218.209 462.041-208.169 461.909-199.409  461.68-192.552  461.45-180.577 460.958
-179.823 460.925 -176.05 460.827-173.294 460.696-157.283 458.268-155.873 458.104
-138.747 456.463-135.105  456.43 -129.79 455.643-125.984 455.315 -90.748 455.315
  -88.78 455.381 -87.566 455.381 -73.524  456.07 -71.457 456.102 -68.701 456.168
 -62.238 456.201  -45.44 455.545  -38.78 455.545 -28.773 455.479 -23.655 455.479
 -22.441 455.446 -21.982 455.446  -21.03 455.413 -18.307 455.217  -15.65 453.543
  -8.497 454.364   2.986  455.02    7.71 455.282  17.159  455.84  29.659 456.332
  30.741 456.332  35.761 456.496   42.06 456.726  56.923 457.776  64.075 458.793
  68.898 459.154  74.803 461.877  80.577  464.37  81.266 464.633  81.594 464.797
  81.857 464.895  82.021 464.961  82.382 465.092  82.448 483.858  82.612 488.058
  83.596 487.861  83.858   485.4  83.891 485.335  84.285  484.81

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
-218.209     .02-180.577     .08  -21.03     .04  17.159     .08  82.382     .02

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       -62.238  17.159           40.354  36.417  50.853             .3       .5
Ineffective Flow     num=       3
   Sta L   Sta R    Elev  Permanent
-218.209-206.857 472.441       F
-206.857  -68.57 461.877       F
   70.21    77.1 461.877       F

CROSS SECTION


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

INPUT
Description: U/S of MULLOY RD. (FEMA STATION 5220.8)
STRUCTURE NO. 151-005
Station Elevation Data    num=      81
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
-205.512 461.877-194.915 461.745-189.075 461.745-179.101 461.417-173.327 461.122
-169.554 461.024-169.127 460.991-168.438 460.991-160.761 460.696-151.772 460.663
-143.045 460.531-140.846 460.171-134.613 460.072-120.144  459.58-114.895 459.416
 -105.02 460.039-104.528 460.072-102.067 460.072-100.886 460.105 -94.521 459.908
 -92.815 460.007 -85.531 460.466 -83.596 460.433 -81.824 460.466 -79.003 460.531
 -67.651 460.663 -63.615 460.761 -59.449 460.827 -53.379 460.761 -47.474 460.466
 -41.207 460.367 -37.894 460.302 -34.744 460.269 -32.382 460.171 -26.673 459.744
 -23.196 459.318 -19.718 459.088 -17.881 458.989 -11.549 459.154 -10.827 459.154
 -10.597 458.727  -7.218  453.74  -2.723 453.412  10.761  453.74  16.667 459.416
  16.929 459.613  17.192 459.646   19.39 459.908  20.407 459.974  25.197 460.367
   26.87 460.499  33.432 460.335  37.795 460.564  55.906 460.499  61.647 460.663
  64.731 460.696  68.832 460.564  71.588   460.4  75.197 460.039  80.446  459.81
  87.467 459.186  87.992 459.186  94.455 459.121  107.48 458.957 112.927 459.449
  116.24 459.744  121.03 460.269 125.098 460.728 128.806 461.024 130.906 461.811
 131.955  462.27 132.513   462.5 132.743 462.566 132.776 477.395 132.808 485.367
```

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 132.907 486.713 132.972   487.5 134.055   487.5 134.219 486.253 134.383 484.843
  134.58  484.58

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
-205.512     .02-173.327     .08  -7.218     .04  10.761     .08 132.743     .02

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -7.218  10.761           47.572  47.572  47.572              .3       .5
Ineffective Flow     num=       4
   Sta L   Sta R    Elev  Permanent
-205.512 -188.78 472.441       F
 -188.78 -10.827 461.736       F
  16.076 132.972 460.696       T
 132.972  134.58   487.5       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 =   9.055
Deck/Roadway Width        =  28.707
Weir Coefficient          =    2.81
Upstream  Deck/Roadway Coordinates
    num=      50
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
-153.314 461.253 452.756-148.228 461.253 452.756-141.175 461.089 452.756
-140.256 461.089 452.756-139.633 461.056 452.756-131.168  461.22 452.756
-126.969 461.253 452.756-115.584 461.385 452.756-114.764 461.385 452.756
-100.361 461.549 452.756 -88.976 461.844 452.756 -87.434 461.877 452.756
  -67.52 461.909 452.756 -63.878 461.909 452.756 -49.902 461.811 452.756
 -38.484 461.713 452.756 -37.927 461.713 452.756 -25.098 461.581 452.756
 -10.827 461.581 452.756 -10.827 464.731 452.756  -9.055 464.731 452.756
  -7.218 464.698 452.756  -7.218 464.698 458.501  10.761 464.403 458.501
  10.761 464.403 452.756  15.092  464.37 452.756  16.929  464.37 452.756
  16.929 461.056 452.756  17.749 461.056 452.756  18.012 461.089 452.756
  28.117 460.925 452.756  28.314 460.925 452.756  29.495 460.892 452.756
  35.991 460.794 452.756  43.865 460.663 452.756  52.822 460.499 452.756
 155.577 460.696 452.756 161.319 462.598 452.756 165.322 464.042 452.756
 173.524 465.978 452.756  190.65 471.916 452.756 196.391 473.885 452.756
 198.786 475.033 452.756 207.644  478.74 452.756 212.041 480.348 452.756
 213.287 480.774 452.756 218.176 482.776 452.756 222.113 482.776 452.756
 226.312 482.808 452.756  229.79 482.907 452.756

Upstream Bridge Cross Section Data
Station Elevation Data    num=      63
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
-100.886 460.105 -94.521 459.908 -92.815 460.007 -85.531 460.466 -83.596 460.433
 -81.824 460.466 -79.003 460.531 -67.651 460.663 -63.615 460.761 -59.449 460.827
 -53.379 460.761 -47.474 460.466 -41.207 460.367 -37.894 460.302 -34.744 460.269
 -32.382 460.171 -26.673 459.744 -23.196 459.318 -19.718 459.088 -17.881 458.989
 -11.549 459.154 -10.827 459.154 -10.597 458.727  -7.218  453.74  -2.723 453.412
  10.761  453.74  16.667 459.416  16.929 459.613  17.192 459.646   19.39 459.908
  20.407 459.974  25.197 460.367   26.87 460.499  33.432 460.335  37.795 460.564
  55.906 460.499  61.647 460.663  64.731 460.696  68.832 460.564  71.588   460.4
  75.197 460.039  80.446  459.81  87.467 459.186  87.992 459.186  94.455 459.121
  107.48 458.957 112.927 459.449  116.24 459.744  121.03 460.269 125.098 460.728
 128.806 461.024 130.906 461.811 131.955  462.27 132.513   462.5 132.743 462.566
 132.776 477.395 132.808 485.367 132.907 486.713 132.972   487.5 134.055   487.5
 134.219 486.253 134.383 484.843  134.58  484.58

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
-100.886     .08  -7.218     .04  10.761     .08 132.743     .02

Bank Sta: Left   Right    Coeff Contr.   Expan.
        -7.218  10.761             .3       .5
Ineffective Flow     num=       4
   Sta L   Sta R    Elev  Permanent
-205.512 -188.78 472.441       F
 -188.78 -10.827 461.736       F
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  16.076 132.972 460.696       T
 132.972  134.58   487.5       F

Downstream  Deck/Roadway Coordinates
    num=      51
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
-153.314 461.253 452.756-148.228 461.253 452.756-141.175 461.089 452.756
-140.256 461.089 452.756-139.633 461.056 452.756-131.168  461.22 452.756
-126.969 461.253 452.756-115.584 461.385 452.756-114.764 461.385 452.756
-100.361 461.549 452.756 -88.976 461.844 452.756 -87.434 461.877 452.756
  -67.52 461.909 452.756 -63.878 461.909 452.756 -49.902 461.811 452.756
 -38.484 461.713 452.756 -37.927 461.713 452.756 -25.098 461.581 452.756
 -18.307 461.581 452.756 -18.307 464.731 452.756  -9.055 464.731 452.756
  -6.923 464.698 452.756  -6.923 464.698 458.501  11.056 464.403 458.501
  11.056 464.403 452.756  14.698  464.37 452.756  14.698 461.089        0
  15.092 461.089 452.756  17.749 461.056 452.756  18.012 461.089 452.756
  28.117 460.925 452.756  28.314 460.925 452.756  29.495 460.892 452.756
  35.991 460.794 452.756  43.865 460.663 452.756  52.822 460.499 452.756
 155.577 460.696 452.756 161.319 462.598 452.756 165.322 464.042 452.756
 173.524 465.978 452.756  190.65 471.916 452.756 196.391 473.885 452.756
 198.786 475.033 452.756 207.644  478.74 452.756 212.041 480.348 452.756
 213.287 480.774 452.756 218.176 482.776 452.756 222.113 482.776 452.756
 226.312 482.808 452.756  229.79 482.907 452.756 235.991  482.71 452.756

Downstream Bridge Cross Section Data
Station Elevation Data    num=      50
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
-101.575 461.056 -93.766 461.188  -75.23 461.385 -72.802 461.352 -69.816 461.352
 -58.497 461.286 -48.327  461.22 -40.682 460.991 -29.724 460.958 -20.735 460.663
 -19.948  460.63 -18.307 460.663  -6.923 453.576  -2.428 453.248  11.056 453.576
  12.795 456.004  14.698 458.596  14.731 458.629  21.457 458.202  24.541 458.825
  33.793 459.777  40.387 459.646  41.371 459.678  47.146 459.646   57.48 459.613
  61.089 459.646  63.091 459.678  66.896 459.678  77.986 459.744  86.253 459.711
 103.281 459.449  113.78 459.252 116.601 459.449 119.521 459.843 119.619 459.843
  130.02 459.711  132.71 459.613 145.472 459.416 147.146 459.547 148.196 459.646
 160.072  460.86 160.105  460.86 163.615 461.745 164.272 461.909 164.567 461.942
   164.6 478.215 164.633 485.039 164.764 486.483 164.829 487.205 166.142 487.205

Manning's n Values        num=       8
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
-101.575     .02 -29.724     .08  -6.923     .04  11.056     .08  21.457     .04
  33.793     .02 119.619     .04  132.71     .08

Bank Sta: Left   Right    Coeff Contr.   Expan.
        -6.923  11.056             .3       .5
Ineffective Flow     num=       6
   Sta L   Sta R    Elev  Permanent
-218.143 -74.475 475.722       F
 -74.475  -9.843 460.958       F
  13.123  38.386 460.958       F
  38.386  64.304 475.722       F
  64.304 164.272  460.63       F
 164.272 166.142 487.205       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         = 461.699
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=   1.772    Downstream=   2.067
Upstream     num=       2
    Width   Elev    Width   Elev
   1.001 453.301   1.001 458.501
Downstream     num=       2
    Width   Elev    Width   Elev
   1.001 453.301   1.001 458.501

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
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```
       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                = 458.501

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
-218.143 458.727-216.667 458.727-206.594 459.022-202.756 459.186-201.115 459.285
-196.785 459.252-194.947 459.219-189.337 459.252-188.123 459.318-183.268  459.35
-179.462 459.547-171.916 459.974-170.472 460.007-167.913 460.138-160.269 460.039
-160.039 460.039-157.972 460.007-154.626 460.105-135.171 460.663-132.808 460.696
-120.768 460.827-101.575 461.056 -93.766 461.188  -75.23 461.385 -72.802 461.352
 -69.816 461.352 -58.497 461.286 -48.327  461.22 -40.682 460.991 -29.724 460.958
 -20.735 460.663 -19.948  460.63 -18.307 460.663  -6.923 453.576  -2.428 453.248
  11.056 453.576  12.795 456.004  14.698 458.596  14.731 458.629  21.457 458.202
  24.541 458.825  33.793 459.777  40.387 459.646  41.371 459.678  47.146 459.646
   57.48 459.613  61.089 459.646  63.091 459.678  66.896 459.678  77.986 459.744
  86.253 459.711 103.281 459.449  113.78 459.252 116.601 459.449 119.521 459.843
 119.619 459.843  130.02 459.711  132.71 459.613 145.472 459.416 147.146 459.547
 148.196 459.646 160.072  460.86 160.105  460.86 163.615 461.745 164.272 461.909
 164.567 461.942   164.6 478.215 164.633 485.039 164.764 486.483 164.829 487.205
 166.142 487.205

Manning's n Values        num=       8
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
-218.143     .02 -29.724     .08  -6.923     .04  11.056     .08  21.457     .04
  33.793     .02 119.619     .04  132.71     .08

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -6.923  11.056           44.619  44.619  44.619              .3       .5
Ineffective Flow     num=       6
   Sta L   Sta R    Elev  Permanent
-218.143 -74.475 475.722       F
 -74.475  -9.843 460.958       F
  13.123  38.386 460.958       F
  38.386  64.304 475.722       F
  64.304 164.272  460.63       F
 164.272 166.142 487.205       F

CROSS SECTION


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

INPUT
Description: 48.6ft (14.8m) D/S EXISTING 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
-351.509 466.142 -321.85 463.451-318.176 463.123-315.912 463.058-288.944 462.073
-257.415 460.925-244.357 460.466-233.038 460.105-213.517 459.186-210.302 459.088
-187.467 458.596-173.425 458.432-165.846 458.366-160.302 458.432-111.909 460.728
-107.087  460.86 -95.932 461.155 -69.948 461.319 -65.223 461.516 -63.583 461.549
   -60.4 461.483 -57.776 461.417 -57.251 461.385 -40.518 461.024 -30.577 460.696
```

```
 -21.982 460.466  -17.06 460.302 -15.846 460.171 -13.747 460.072 -13.189  459.81
  -3.609 455.577   -.492 454.298   5.184 453.018  11.286 453.412  14.928  455.61
  22.703 456.824   24.77 456.955  25.033 456.955  25.262 456.988   25.82 457.021
  25.984 457.021  26.083 457.054  26.312 457.054  26.739 457.087    27.1 457.119
   27.69 457.152  30.709 457.382  31.726 457.447   31.89 457.447  38.386 457.513
  45.046  457.71   54.79 457.841   56.89 457.874  78.281 458.399  82.448 458.399
  86.942 458.366  87.467 458.366  89.009 458.301 100.787 458.268 111.647 458.202
 114.567 458.235  121.26 458.366 131.332 458.661  133.99 458.563 140.453 458.465
 143.734 458.366 148.524 458.235  153.74 458.989 156.562  459.35 158.957 459.514
  171.26 460.039  184.35 461.942 186.385 462.139 190.354 462.566 192.093  462.73
 192.224 462.762 192.782 462.795 192.848 484.875 192.881 485.499 193.045 486.975
 194.226 487.041 194.488 485.072 194.554  484.35 194.882 483.957 195.046  483.76
 195.079  483.76

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
-351.509     .04-160.302     .02 -21.982     .08  -3.609     .04  14.928     .08
  31.726     .02 148.524     .08

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -3.609  14.928          265.092 248.031 242.126             .3       .5
Ineffective Flow     num=       5
   Sta L   Sta R    Elev  Permanent
-262.467-147.638 460.958       F
-147.638 -53.806 475.722       T
  31.496 101.706 475.722       T
 101.706 193.045 459.646       F
 193.045 246.096 486.975       F
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
-131.234 -65.617 475.722  42.651  85.302 475.722

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
-379.528 465.223 -369.98 464.928-356.496 464.633 -344.98  464.37-324.049 462.336
-297.933 459.777-266.503 457.808-205.807 455.741-195.407 455.676-169.259 455.479
-159.711 455.381-149.245 455.315-125.722 456.004 -82.808 457.119 -73.064 458.268
 -71.654 458.432 -61.647 458.694 -48.753 458.924  -43.34 459.088 -40.223 458.957
 -26.017 458.957 -18.963 458.268 -10.663 455.545  -7.251 453.675  -1.509 452.953
   4.528 453.609   7.185  455.61  28.412 455.774  47.343 454.888  53.346 454.331
  56.791 454.757  66.371 458.891  69.816 458.629  72.441 458.629  73.491  458.53
  79.265 458.497  88.353 458.333  90.256 458.333  94.291 458.465 101.837 458.661
 103.478 458.727 109.383 458.891 152.657 458.596 162.598  458.53 165.059 458.432
 172.178 458.169  186.68 457.579 187.894 457.513 191.207 457.382 193.241 457.283
 194.947 457.119 204.692  457.48 206.004 457.513 206.037 457.513 206.332  457.48
 218.012 456.923 233.465 457.579 235.663 457.776 241.699 457.776 259.842 458.169
 262.664 458.661 282.513 460.203 285.564 460.499 286.713 460.466 287.861 460.433
 288.681 460.564 289.501  460.63 291.601  460.63 293.734 461.942 293.766 484.252
  293.93 486.385 294.948 486.385 295.243 483.727 295.669 483.104 295.682 482.874

Manning's n Values        num=      10
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
-379.528     .08 -61.647     .04 -40.223     .02 -26.017     .08 -10.663     .04
   7.185     .08  72.441     .04  90.256     .02 218.012     .08 293.766     .02

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       -26.017  66.371          811.024 811.024 811.024             .1       .3
Ineffective Flow     num=       4
   Sta L   Sta R    Elev  Permanent
-298.556  -43.34 459.088       T
  28.412  68.898 455.774       F
  72.441 162.598 475.722       T
 162.598 269.029 459.318       F
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
  72.441  73.819 465.879 121.391  157.48 475.722

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
-220.046 465.026-209.088 465.026 -196.03 464.895-174.114 464.993-171.227 464.961
-159.843 464.928-145.177  463.78-140.354 463.615-133.104  461.68-101.509 455.052
 -83.071 453.445 -76.312 453.379 -66.043 453.412 -61.483 453.018 -56.759 452.953
  -41.47 452.395 -23.983 451.837 -13.845 451.575 -12.992 451.476       0 451.115
    .492 451.115   5.282 450.984  10.269 452.001  22.966 454.252   25.82 454.757
  29.987 455.479  42.388 454.724  45.013  454.56  45.768  454.56  57.513 454.659
  76.181 455.151  78.182 455.217  79.757 455.217  81.135 455.282  97.375 455.774
 104.856 455.643 110.105 455.413 113.189  454.79 117.881 453.773 120.243 454.101
 121.522 454.265 128.084 454.199 132.415 454.199 135.925 454.134 142.388 454.003
 150.558 454.396 152.461 454.495 153.478 454.495 161.155 454.757 170.702 454.888
 175.033 454.888 179.396 455.315 182.283 455.413 189.075  455.02 192.552 455.118
 203.412 455.577 212.927 456.135 220.735 456.463 230.906  456.66 243.504  456.89
 245.472  456.89   247.9 456.988 255.381 457.119 257.644 457.251 258.465 457.283
  259.35 457.283 259.941 457.349  263.32 460.138 277.789 472.966 281.299 473.491
 291.995 478.839 301.903 479.659

Manning's n Values        num=      11
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
-220.046     .03-140.354     .08 -56.759     .06 -23.983     .04   5.282     .08
  29.987     .03  97.375     .04 121.522     .02 142.388     .04 257.644     .08
 291.995     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       -66.043  22.966          688.976 668.635 656.168              .1       .3
Ineffective Flow     num=       3
   Sta L   Sta R    Elev  Permanent
  29.987 110.236 459.318       T
 110.236 205.709 456.529       F
 205.709 262.467 459.318       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
-245.046 465.879-243.406  465.65-239.403 465.026-224.311 463.845-214.797 463.025
-204.331 461.844-194.685 460.302-188.583 459.285-183.399 458.793-172.211 458.202
-163.156 458.333-156.988 458.694-146.522 457.874-133.104 456.791-126.575 456.562
-111.024 457.087 -94.357 454.626 -92.192 454.593 -89.993 454.626 -67.028 455.249
  -57.94 454.856 -52.001 455.085 -41.503 455.217 -37.894 455.151 -36.975 455.118
 -36.089 455.085 -31.923 454.987 -24.967 454.888  -23.95 454.528 -18.865 452.986
  -17.29 452.493 -12.106 450.951       0 450.951   7.152 450.951  11.647 452.887
  13.714 453.773   14.14 453.937  16.765 454.199  19.587 454.495  20.308 454.495
  24.245 454.429  35.958 454.692   37.73 454.692   39.14 454.724  43.471  455.02
  54.068 455.512  57.152  455.84   67.06 456.332  68.373 456.398  78.117 456.234
   80.02 456.135  82.382 456.102  85.499  456.07  87.533 456.135  88.091 456.201
  96.916 456.201   98.36 456.168  99.639 456.168 101.181 456.201 102.592 456.234
 103.675 456.201 106.562 456.299 114.698  456.43 114.731  456.43 119.193 459.646
 120.112 459.941 126.115 461.253 129.331 462.008 130.643 462.106 133.268 459.843
 135.367 458.989 138.222 457.251 141.306 456.135 142.028 455.741 144.915 456.627
 149.508 457.841 150.361 458.104 162.106 458.399 165.682 458.366 173.556 458.104
  176.64 458.136  181.07 458.333 182.316 458.366 185.925 459.514 188.878   460.4
 188.911 460.433 188.944 460.433 189.173 460.499 189.272 460.531  189.37 474.934
 189.403 475.131 189.567   477.1 190.584   477.1  190.65 476.575 190.879 474.409
 190.978 474.278 191.306 473.819  200.23 473.852 203.609 473.852 207.907 473.655
 211.942 473.458 215.945 473.261 223.524   472.9 225.492 472.802

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
-245.046     .08 -18.865     .04  11.647     .08  57.152     .02 114.731     .08
 188.878     .02

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       -24.967   14.14          159.449  155.84 152.887              .1       .3
```

```
Ineffective Flow     num=       4
   Sta L   Sta R    Elev  Permanent
-190.289 -41.503 459.318       T
  20.341  45.932 459.318       T
  45.932 130.709 456.529       F
 130.709 189.304 462.106       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
-197.343 465.945-191.864 465.289-182.808 464.108-175.919 463.025-170.472 461.352
-166.371 461.352 -156.07 459.843-153.379 459.646-147.671 459.318-145.505 459.252
 -143.34 459.154-140.846 459.121-138.878 459.088-136.778 459.022-130.774 458.858
-127.231 458.727-122.277 458.596-118.077 458.465-115.157 458.366-110.925 458.038
-108.793 457.907-106.168 457.743-103.215 457.612 -94.882  456.89 -84.711 456.201
 -81.529 456.004 -78.018 455.807 -62.238 454.626 -57.513 454.298 -56.299 454.199
 -43.373 453.904  -33.99 453.839     -25 453.806 -21.785 453.806 -13.976 453.937
 -10.761 452.756   -6.07 450.131   -.131 449.409   5.807 450.131  12.172 453.937
  15.453 455.381  18.077  456.07  26.739 457.021  28.609 457.316  35.728 457.546
  36.713 457.579  37.861 457.546  41.995  457.48  43.898  457.48  46.129 457.447
  50.427 457.415  51.312 457.382  51.772 457.415  57.119 457.415  59.875 457.382
  61.778 457.382  64.928 457.349  67.093 457.349  70.669 457.316  75.066 457.316
  78.051 457.283  79.364 457.316  82.316 457.251   84.58 457.283  86.909 457.283
  90.978 457.349  91.962 457.349  93.307 457.382  97.769  457.48 103.707 457.579
 104.823 457.612 105.446 457.612 109.055 457.087  110.86 456.791 114.895 456.759
 118.012 456.529 127.986 455.381  130.02 456.463  134.58 458.661 134.711  458.76
 134.974 458.891 135.269 459.055 135.367 472.047 135.433 472.867 135.531  474.18
 135.925 474.213 136.549 474.213 136.713 472.441 136.811 471.522 137.106 471.129
 137.238 470.932

Manning's n Values        num=      10
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
-197.343     .04-166.371     .08 -57.513     .06 -13.976     .04  12.172     .06
  28.609     .04  37.861     .02 105.446     .04 127.986     .06 135.269     .02

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -13.976  12.172          154.199 155.512 158.465             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
  35.728 137.238 457.612       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
-142.717 463.451-137.008 463.091-130.249 462.992-126.083 463.156-112.369  463.32
-106.463 463.517-101.575 463.353 -99.114 462.992 -94.783 462.566 -85.236 462.073
 -82.644 461.909 -75.755  461.45 -75.098 461.417 -70.013  460.86 -65.814 460.367
  -61.68 459.744 -59.547 459.547 -55.938 459.121 -49.049 458.235 -41.437 457.677
 -40.322 457.612  -20.21 456.234 -13.944 454.396  -8.825 452.493  -5.512 450.131
  -1.608 449.311   3.707 448.786   8.891 449.475  12.927 450.492  17.093 455.741
  17.717 455.807  28.609  456.43  30.479 456.594  40.157 460.302  40.322 464.567
  40.453 467.749  40.584 469.488  40.617 469.915  41.634 469.915  41.667 469.652
  41.929 467.224  41.962 467.192  42.356 466.634

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
-142.717     .08  -8.825     .04  17.093     .08  40.157     .02

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -20.21  17.093          333.005  337.27 339.567             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
  40.617  42.356 469.915       F
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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
 -59.875 464.993 -50.066 464.206 -38.451 463.517 -32.283 463.944 -29.921 462.303
  -29.79 462.238 -28.576 461.549 -24.213 459.088 -21.949 457.808 -16.699 455.184
 -14.337 453.904 -12.598 453.051    -2.1 448.491   3.018 448.327   8.104 448.491
  13.058 451.509    15.9 452.904   18.34 454.101  18.766 454.298  19.783 454.921
  25.689 458.333  28.215  459.81  29.101 462.762  29.134 463.287  29.265 464.928
  30.249 464.928  30.446 462.894  30.512 462.238   30.84 461.811  30.938 461.647
  40.256 461.844  42.749 461.877  52.559 462.073   54.56 462.139  64.829  462.27
  66.371 462.303  77.133 462.139  78.182 462.139  87.697 461.942

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
 -59.875     .08 -16.699     .04   18.34     .08  28.215     .02

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       -12.598    15.9          180.118 180.118 180.118             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 -59.875 -32.283 463.944       F
  29.265  87.697 464.928       F

CROSS SECTION


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

INPUT
Description: 141ft (43m) U/S Existing Exit 25 WB Off-Ramp
Station Elevation Data    num=      33
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 -57.415 465.518 -56.266 465.387 -45.833 463.222 -38.517  461.68 -37.762 461.516
 -22.146 453.707 -16.667 450.951 -15.748 450.984  -7.874 447.047       0 447.047
   7.874 447.047  15.748 450.984  19.226 452.723  24.278 455.282   27.69 456.988
  27.723 461.286  27.854 463.058  27.887 463.419  28.871 463.419  29.101 461.188
  29.134 460.761  29.199 460.663   29.56 460.171  39.633 460.335  41.371 460.367
  51.739 460.597  53.182  460.63  63.845 460.794  64.993 460.794  75.951  460.63
  76.804  460.63  77.592 460.597  86.516 460.433

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 -57.415     .08 -22.146     .04   27.69     .02

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       -15.748  15.748          83.661  83.661  83.661             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 -57.415 -15.748 450.984       F
  27.887  86.516 463.419       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
 -54.003 464.042 -47.736 462.697 -46.883   462.5 -22.375 450.262 -15.748 450.525
  -7.874 446.588       0 446.588   7.874 446.588  15.748 450.525  28.871 457.087
  29.429 460.827  29.593 462.894  30.577 462.959  30.873 460.302  31.266 459.711

Manning's n Values        num=       4
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     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
 -54.003     .08 -15.748     .04  15.748     .08  28.871     .02

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       -15.748  15.748          211.942 211.942 211.942             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 -54.003 -15.748 450.525       F
  29.593  31.266 462.894       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
 -65.748 469.062 -53.084  466.01 -47.703 464.797 -47.244 464.633 -40.617 460.696
 -40.486 460.663  -40.19 460.531 -39.337 460.138 -36.778 458.989 -36.417 458.858
 -36.352 458.858 -35.696 458.661 -35.531 458.596 -35.269 458.497 -34.974 458.432
 -34.711 458.333 -34.252 458.202 -31.791 457.218 -15.748 449.245  -7.874 445.341
       0 445.341   7.874 445.341  15.748 449.278  27.329 455.052  27.461 461.385
  27.493 461.647  28.478 461.647   28.51 461.319   28.74 458.989  29.101 458.465
  29.167 458.399

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
 -65.748     .08 -15.748     .04  15.748     .08  27.329     .02

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       -15.748  15.748           54.134  54.134  54.134             .3       .5
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
  27.493  29.167 461.647       F

CROSS SECTION


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

INPUT
Description: 111.5ft (34m) D/S Existing Exit 25 WB Off-Ramp
Station Elevation Data    num=      25
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 -75.098 469.357 -68.766 467.815 -61.713 466.109 -61.417 466.043 -61.253 465.879
 -60.007 465.846 -58.924 465.846 -57.546 465.715 -56.759 465.026 -51.214 463.419
  -21.85  448.72 -15.748  448.95  -7.874 445.013       0 445.013   7.874 445.013
  15.748  448.95  28.314 455.249  28.346 459.154  28.379 459.613   28.51 461.286
  29.495 461.286  29.724 459.154   29.79 458.629  29.856 458.497  30.184 458.038

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
 -75.098     .08 -15.748     .04  15.748     .08  28.314     .02

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       -15.748  15.748          174.869 174.869 174.869             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 -75.098 -15.748  448.95       F
   28.51  30.184 461.286       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
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
```

```
 -97.047 474.738 -91.798 473.392 -91.634 473.228 -90.223 470.801 -89.534  470.44
 -86.942  469.16 -83.661  467.52 -80.381 465.879   -77.1 464.239 -73.819 462.598
  -61.68 457.513 -40.584 446.949 -15.748 447.933  -7.874 443.996       0 443.996
   7.874 443.996  15.748 447.933  32.808 456.463  38.583 456.759

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 -97.047     .08 -15.748     .04  15.748     .08

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       -15.748  15.748           74.475  74.475  74.475              .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 -97.047 -15.748 447.933       F

CROSS SECTION


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

INPUT
Description: 895ft (273m) U/S of Scott Road
Station Elevation Data    num=      20
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
-102.559 471.982-100.886 471.457 -94.554 471.358 -92.421 470.144 -88.976 468.274
 -87.205 467.323 -77.297 462.795 -72.343 460.794  -69.39 459.318 -62.008 456.857
 -41.207 446.457 -15.748 447.474  -7.874 443.537       0 443.537   7.874 443.537
  15.748 447.474  19.029 447.343  36.581 456.135  41.339 456.234  42.651 456.266

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
-102.559     .08 -15.748     .04  15.748     .08  41.339     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       -15.748  15.748          255.906 259.842 259.186              .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
-102.559 -15.748 447.474       F
  15.748  42.651 447.474       F

CROSS SECTION


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

INPUT
Description: 635.5ft (193.7m) U/S Proposed Scott Road Culvert
Station Elevation Data    num=      19
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
  -48.95 461.713 -45.308 458.989  -43.34 458.432  -42.52 458.268 -42.421 458.268
 -41.995 457.972 -41.634  457.71 -41.568 457.677 -37.303 456.923 -15.748 445.997
  -7.874 442.028       0 442.028   7.874 442.028  15.748 445.965  29.331  445.44
  50.951 456.234   51.05 456.266  53.346 456.299  53.379 456.299

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
  -48.95     .08 -15.748     .04  15.748     .08   51.05     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       -15.748  15.748          190.289 197.507 205.052              .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
  -48.95 -15.748 445.997       F
  15.748  53.379 445.965       F

CROSS SECTION


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

INPUT
Description: 438ft (133.5m) U/S of Scott Road
Station Elevation Data    num=      32
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
```

```
 -65.551 456.201 -65.092 456.102 -61.713 456.037 -61.188 456.037 -60.597 455.906
 -59.678 456.004 -59.646 455.906 -59.416 455.577 -58.038  455.61 -56.759 455.643
  -56.66 455.577 -53.839 454.396 -34.318 444.554 -33.694 444.094 -22.999 444.554
 -15.748 444.816 -15.322 444.554  -8.727 441.273  -7.874 440.879       0 440.879
   7.874 440.879  15.748 444.816  22.539 444.554  27.395 444.357  48.458 454.888
  50.427 456.037  53.675 457.677  56.955 459.318  61.024 461.647  64.567 461.942
  64.961 462.008  65.551 462.008

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
 -65.551     .08 -15.748     .04  15.748     .08  64.567     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       -15.748  15.748          170.604 171.588 173.885             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 -65.551 -15.748 444.816       F
  15.748  65.551 444.816       F

CROSS SECTION


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

INPUT
Description: 266ft (81m) U/S of Scott Road
Station Elevation Data    num=      30
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
-103.248 466.962-102.723 466.929 -102.69 466.962-102.625 467.356 -101.28 467.421
 -91.142 467.421 -88.123 467.585 -80.971 464.862   -64.6 457.119 -60.335 455.085
  -59.58  454.79 -58.235 454.593 -57.579 454.593 -55.545 454.626 -35.203 444.554
 -33.235 443.471 -16.404 444.127 -13.976 442.913  -7.874 439.895       0 439.895
   7.874 439.895  13.976 442.913  16.404 444.127  47.933 442.913   68.57 442.126
  70.112 442.913 115.322 465.879 116.601 466.207 117.684 466.273 120.538 466.535

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
-103.248     .04-102.625     .08 -16.404     .04  16.404     .08 117.684     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       -16.404  16.404          233.924 223.753 212.927             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
-103.248 -16.404 444.127       F
  16.404 120.538 444.127       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
-140.879 459.252-138.091 459.285-137.336 459.285-134.875 459.383-133.169 459.416
-131.955 459.547-129.167  459.81-129.035 459.843-128.937 459.843-123.589 462.533
-122.769 462.927-122.572 462.927 -120.21 462.959-119.226 462.959  -114.6 463.025
-107.644 462.795-106.004 462.762-102.953 462.664 -96.391 462.598 -75.951 452.756
 -68.832 449.475 -60.794 446.194  -56.07 444.554 -49.344 442.913 -41.634 441.634
 -22.769 441.634 -22.736 444.554 -21.161 444.554 -21.129 441.568 -13.451 441.273
  -7.874 438.583       0 438.583   7.874 438.583  10.105 439.633  11.286 440.289
  20.932 441.273  27.657 441.273  71.293 441.207  77.822 441.273  86.417 442.913
  92.388 444.554  96.325 446.194 100.886 447.835 105.151 449.475 109.219 451.115
 113.156 452.756 139.009 464.239 143.766 465.879 145.144 466.306 146.358 466.503
 148.885 466.929

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
-140.879     .04-123.589     .08 -21.129     .04  71.293     .08 145.144     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       -21.129  20.932          179.134  181.43 182.415             .3       .5
Ineffective Flow     num=       2
```

```
   Sta L   Sta R    Elev  Permanent
-140.879 -21.129 460.007       F
  27.395 148.885 462.598       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 =  42.651
Deck/Roadway Width        =  85.302
Weir Coefficient          =    2.61
Upstream  Deck/Roadway Coordinates
    num=      10
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
-145.735 460.171       0-112.927  459.81       0 -80.118 459.744       0
  -47.31 460.007       0 -14.501 460.564       0  18.307 461.417       0
  51.115 462.566       0  83.924 464.042       0 116.732 465.781       0
 149.541 467.684       0

Upstream Bridge Cross Section Data
Station Elevation Data    num=      17
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 -89.567 462.598 -72.047 456.037 -43.963 449.475 -37.828 448.983 -26.247 449.475
 -10.614 450.131 -10.597 453.084  -9.285 453.084  -9.281 438.386    9.15 438.386
   9.154 453.084  10.466 453.084  10.482 451.115  54.003 452.756  82.513 454.396
 120.079 465.879 125.656  467.52

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 -89.567     .08 -10.597     .02  10.466     .08

Bank Sta: Left   Right    Coeff Contr.   Expan.
        -9.281    9.15             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 -89.567 -21.129 460.007       F
  27.395 125.656 462.598       F

Downstream  Deck/Roadway Coordinates
    num=      10
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
-145.735 460.171       0-112.927  459.81       0 -80.118 459.744       0
  -47.31 460.007       0 -14.501 460.564       0  18.307 461.417       0
  51.115 462.566       0  83.924 464.042       0 116.732 465.781       0
 149.541 467.684       0

Downstream Bridge Cross Section Data
Station Elevation Data    num=      17
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 -65.223 456.824  -42.52 454.396 -36.745 452.756 -22.244 449.475 -10.614 449.147
 -10.597 450.459  -9.285 450.459  -9.268 435.564    9.17 435.564   9.186 450.459
  10.499 450.459  10.663 449.147  23.556 449.475  33.268 451.115   42.06 454.396
  50.197 456.037  60.925 460.958

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 -65.223     .08 -10.597     .02  10.663     .08

Bank Sta: Left   Right    Coeff Contr.   Expan.
        -9.268    9.17             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 -65.223 -22.966 459.318       F
  20.341  60.925 459.318       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   9.843   8.202
        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
                    18.143 141.076     .031     .031     .722                    .4
1
        Number of Barrels =  2
        Upstream   Elevation =  437.664
        Centerline Stations
            Sta.    Sta.
          -4.593   4.593
        Downstream Elevation =  434.842
        Centerline Stations
            Sta.    Sta.
          -4.593   4.593

        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=      39
             Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
         -60.302 454.987 -60.039 454.987 -49.606 454.396 -44.357 452.756 -26.739 444.554
         -22.736 442.913 -20.243 442.159 -19.324 441.995 -18.274 441.896 -17.881 441.896
          -16.05 440.367 -14.895 439.403 -14.206 438.517  -13.78 437.992 -12.566 437.369
          -8.366 435.138   -.951 435.171       0 435.171   7.382 435.171  10.138 436.286
            18.4 440.417   21.03 441.732   23.36 442.913  43.143 452.756  44.783 453.576
          46.555 454.396    52.1 455.249  53.707 455.971  65.453 461.089  67.093 461.877
          67.684 462.205  69.783  462.27  81.857  462.73  82.546 462.795  88.976 463.189
           92.29 463.287 113.025 463.878 138.944 463.944 143.077 463.845

        Manning's n Values        num=       6
             Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
         -60.302     .04 -49.606     .08 -18.274     .04   21.03     .08  67.684     .04
          81.857     .02

        Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
                -16.05    18.4           20.997  28.215  36.417             .3       .5
        Ineffective Flow     num=       2
           Sta L   Sta R    Elev  Permanent
         -60.302 -22.966 459.318       F
          20.341 143.077 459.318       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
         -58.366 454.626 -55.446 454.692 -51.083 454.396 -44.226 452.756 -41.962  451.64
         -40.387  450.82  -24.18 442.726  -19.16 440.219 -11.417 436.352  -7.874  434.58
               0  434.58   7.874  434.58   7.907 434.613  11.417 436.352   19.06 440.179
          24.147 442.726  44.226 452.756  62.336 461.122  64.665 461.319  71.686 461.352
          74.081 461.155  75.623 461.024  83.629 461.122  88.419  461.22  88.747  461.22

        Manning's n Values        num=       5
             Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
         -58.366     .08  -24.18     .04  24.147     .08  64.665     .04  74.081     .02

        Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
                -19.16   19.06           46.588  46.588  46.588             .3       .5
```

```
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 -58.366 -29.856 452.756       F
  29.199  88.747 452.756       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
 -49.377 452.723 -48.852 452.625 -47.638 452.428 -42.782 451.115 -41.207 450.328
 -23.622 441.535  -21.08  440.26 -13.287 436.352 -11.417 435.433  -9.974 434.711
  -7.907 433.333       0 433.333   7.907 433.333  13.287 436.352   20.93 440.173
  27.231 443.323  42.881 451.148  46.063 452.756  49.344 454.396  60.696 459.383
  63.747 459.646  70.046 459.646  73.917 459.318  74.836 459.318  86.811 459.547
  93.701 459.646  97.671 459.744 102.723 459.678 108.497  459.58   114.6 459.514

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
 -49.377     .08 -23.622     .04  27.231     .08  63.747     .04  73.917     .02

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -21.08   20.93          294.291 294.291 294.291              .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 -49.377 -42.979 451.312       F
  27.231   114.6  454.56       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 =  98.425
Deck/Roadway Width        =  88.583
Weir Coefficient          =    2.61
Upstream  Deck/Roadway Coordinates
    num=       4
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
 -52.657 450.755       0 -19.849 452.657       0  12.992 454.462       0
  45.801 455.315       0

Upstream Bridge Cross Section Data
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 -42.257 449.475 -14.436 435.564  -7.874 432.283   7.874 432.283  14.436 435.564
  42.257 449.475

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 -42.257     .08 -14.436     .04  14.436     .08

Bank Sta: Left   Right    Coeff Contr.   Expan.
       -14.436  14.436             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 -42.257 -42.979 451.312       F
  27.231  42.257  454.56       F

Downstream  Deck/Roadway Coordinates
    num=       4
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
 -52.657 450.755       0 -19.849 452.657       0  12.992 454.462       0
  45.801 455.315       0

Downstream Bridge Cross Section Data
Station Elevation Data    num=       6
```

```
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 -35.433 442.913 -14.436 432.415  -7.874 429.134   7.874 429.134   9.186  429.79
   9.186 442.913

Manning's n Values        num=       2
     Sta   n Val     Sta   n Val
 -35.433     .08 -14.436     .04

Bank Sta: Left   Right    Coeff Contr.   Expan.
       -14.436   9.186            .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 -35.433  -30.84 444.554       F
  22.178   9.186  446.26       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   9.843   8.202
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
                 69.226  157.48     .031     .031     .722                   .4
1
Number of Barrels =  2
Upstream   Elevation =  431.562
Centerline Stations
    Sta.    Sta.
  -4.593   4.593
Downstream Elevation =  428.412
Centerline Stations
    Sta.    Sta.
  -4.593   4.593

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=      18
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 -36.089 441.929 -30.512  439.14 -24.213 435.984 -16.831 432.283   -16.4 432.068
  -7.841 427.789       0 427.789   7.874 427.789   16.53 432.111  31.332 439.501
  31.398 440.945  31.529 443.832  31.627  446.26  32.644  446.26  32.808 444.783
   32.94 443.602  33.169 443.209  33.399 442.749

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 -36.089     .08 -24.213     .04  31.332     .02

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          -16.4   16.53         121.391 126.969 131.234             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 -36.089  -30.84 444.554       F
  22.178  33.399  446.26       F

CROSS SECTION


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

INPUT
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```
Description: D/S End of Proposed Brook Relocation
Station Elevation Data    num=      28
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 -40.486 440.092 -35.105 439.895  -33.53 439.829 -28.117 437.303 -26.608 436.581
 -25.066 435.663 -20.669 433.169 -16.503 430.807  -14.86 429.967 -10.728 427.854
  -5.709 425.197   -.033     425   1.411     425    5.61 425.131   9.252 426.804
   15.31 430.026   18.57 431.759  22.343 433.596  22.408 435.171  22.474 436.778
  22.736 442.487  22.835 443.832    22.9 444.619  23.885 444.619  24.049 442.979
  24.147 441.962  24.311 441.732  24.573 441.371

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
 -40.486     .04  -33.53     .08 -20.669     .04  22.343     .02

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -14.86   15.31          165.026 165.026 165.026             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    22.9  24.573 444.619       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     Sta    Elev     Sta    Elev     Sta    Elev
 -41.503 438.091 -39.042 437.959 -37.073 437.664 -29.593 436.811 -28.806 436.713
 -25.164 434.646 -21.752 432.612 -18.504 430.676  -15.37 428.594  -9.613  424.77
  -6.102  423.95  -4.265 422.572   -.197 422.014   5.184 422.375   6.857  423.95
  14.829 428.117  18.471 430.315  18.734 430.479  18.832 430.545  18.865 430.545
   18.93 430.577  18.953 435.007  18.976 440.518  19.029 441.699  19.127 442.651
  20.112 442.651  20.243 441.175  20.374 439.993  20.571 439.731  20.801 439.403

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
 -41.503     .04 -29.593     .08 -18.504     .04  18.734     .02

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -15.37  14.829          308.399 308.399 308.399             .1       .3

CROSS SECTION


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

INPUT
Description: 312ft (95m) U/S Prop I-84 Culvert No. 02537
Station Elevation Data    num=      29
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 -42.028 435.367 -41.667 435.367 -38.058 435.171 -31.791 434.088 -28.543 433.825
 -23.458 430.479 -23.163 430.315  -21.85 429.495 -18.373 427.133 -14.698 424.639
 -14.337 424.639 -13.517 424.475  -4.068 420.997  -2.953 420.276   2.953 420.604
   6.562 420.932    7.94 420.997  14.272 424.213  17.421 425.886  17.487 425.919
   17.52 431.988   17.52 436.811  17.618 437.992  17.684 438.944  18.668 438.944
  18.832 437.467  18.963 436.286  19.127 436.024  19.357 435.696

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
 -42.028     .04 -31.791     .08 -14.698     .04  14.272     .08  17.421     .02

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       -18.373  17.421          181.102 181.102 181.102             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
  17.684  19.357 438.944       F

CROSS SECTION


RIVER: Beaver Pond Brk
REACH: Reach-1            RS: 6067
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```
INPUT
Description: 131ft (40m) U/S Prop I-84 Culvert No. 02537
Station Elevation Data    num=      33
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 -43.012 434.613 -41.076 434.613  -41.01 434.547  -38.78 433.858 -37.861 433.629
 -30.184 427.723 -28.937 426.903 -28.707 426.739 -24.409 425.394 -14.633 422.244
 -14.567 422.211  -8.465 420.276   -7.48 420.046  -7.152 419.948   -3.51 419.488
   1.608 419.291   8.071 419.521  10.696 420.013  10.794 420.079   15.19 422.342
  15.223 422.342  16.929 423.097  24.344 426.385  24.377 427.034  24.409 427.297
  24.672 434.646  24.738 435.827  24.836 436.778   25.82 436.778  25.984 435.302
  26.083 434.121   26.28 433.858  26.509  433.53

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
 -43.012     .04  -38.78     .08 -14.633     .04  15.223     .08  24.344     .02

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       -24.409  24.344          117.454 112.533 107.612             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
  24.836  26.509 436.778       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
 -43.832 434.646 -34.088 429.823 -32.841 429.199 -30.741 428.314 -26.214 426.017
  -9.908 417.815  -9.252 417.487       0 417.487    .984 417.487   9.416 418.045
  20.669 424.409  21.457  424.77   21.49 433.333  21.588 434.318  21.654 435.499
  22.671 435.499  22.802 434.088  22.933 432.808   23.13 432.546   23.36 432.218

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 -43.832     .08 -26.214     .04  21.457     .02

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       -26.214  21.457          279.528 279.528 279.528             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 -43.832 -34.449 436.024       T
  21.654   23.36 435.499       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 =  46.161
Deck/Roadway Width        =  169.98
Weir Coefficient          =    2.63
Upstream  Deck/Roadway Coordinates
    num=       7
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
 -39.501 431.759       0  -8.333 431.759       0  -8.333 432.415       0
  16.732 432.415       0  16.732   435.4       0   18.57   435.4       0
  30.381  435.86       0

Upstream Bridge Cross Section Data
Station Elevation Data    num=      17
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 -43.963 435.827  -40.19 432.546 -36.417 429.265  -32.48 425.984  -28.74 424.344
```

```
 -24.705 422.703 -20.013 421.063 -15.748 419.423 -10.171 417.979  -8.333 417.388
   8.694 417.388   9.843 417.979  12.795 419.291  16.732 420.965  16.732  435.39
   18.57  435.39  30.381  435.86

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 -43.963     .08  -8.333     .04  16.732     .02

Bank Sta: Left   Right    Coeff Contr.   Expan.
        -8.333   8.694             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 -43.963 -34.449 436.024       T
  21.654  30.381 435.499       T

Downstream  Deck/Roadway Coordinates
    num=      61
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
-227.067 437.434       0 -223.36 437.106       0-223.261 437.106       0
-223.163 437.073       0-222.835 436.877       0-221.752 436.352       0
-219.226 435.105       0-213.353 434.974       0 -208.53 434.646
-199.081 434.055        -191.568 433.169        -190.157 433.005
-185.728 432.415        -182.743 432.251        -179.134 432.021
-175.689 430.315        -172.408 428.675        -166.962 429.134
-159.613 429.724        -155.807 429.888        -147.769 430.217
-145.177 430.282        -135.958 430.446        -134.547 430.479
-124.147 430.643        -123.917 430.643        -121.719  430.61
-112.336 430.479        -102.625 430.282        -100.525 430.249
-100.197 430.709        -100.098  430.84         -99.836 433.169
  -99.77  433.76         -98.983  433.76         -98.786  433.76
 -97.047  433.76         -94.455 433.793         -92.421 433.825
 -92.257 433.825         -91.404 433.825         -91.371 433.399
 -91.076 430.905          -91.01 430.807         -90.682 430.315
 -89.075 430.348         -78.871 430.545         -68.077 430.709
 -67.028 430.709         -55.906 430.545         -55.217 430.545
 -43.766 430.315         -43.406 430.315         -31.594 429.856
 -30.741 433.104         -29.757 433.104         -26.476 433.137
   6.332 433.497           39.14 433.891          71.949 434.285
   88.32 434.482

Downstream Bridge Cross Section Data
Station Elevation Data    num=      59
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
-227.067 437.434 -223.36 437.106-223.261 437.106-223.163 437.073-222.835 436.877
-221.752 436.352-219.226 435.105-213.353 434.974 -208.53 434.646-199.081 434.055
-191.568 433.169-190.157 433.005-185.728 432.415-182.743 432.251-179.134 432.021
-175.689 430.315-172.408 428.675-166.962 429.134-159.613 429.724-155.807 429.888
-147.769 430.217-145.177 430.282-135.958 430.446-134.547 430.479-124.147 430.643
-123.917 430.643-121.719  430.61-112.336 430.479-102.625 430.282-100.525 430.249
-100.197 430.709-100.098  430.84 -99.836 433.169  -99.77  433.76 -98.983  433.76
 -98.786  433.76 -97.047  433.76 -94.455 433.793 -92.421 433.825 -92.257 433.825
 -91.404 433.825 -91.371 433.399 -91.076 430.905  -91.01 430.807 -90.682 430.315
 -89.075 430.348 -78.871 430.545 -68.077 430.709 -67.028 430.709 -55.906 430.545
 -55.217 430.545 -43.766 430.315 -43.406 430.315 -39.501 429.134   -8.53 416.273
   8.497 416.273  16.732 420.965  36.089 430.643   88.32 431.201

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
-227.067     .04-221.752     .06-172.408     .04-159.613     .02 -39.501     .08
   -8.53     .04

Bank Sta: Left   Right    Coeff Contr.   Expan.
         -8.53   8.497             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 -98.425 -22.375 433.071       F
  69.652 112.205 431.004       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
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        Culvert Name     Shape      Rise    Span
        02537 West           Box   8.005   8.005
        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
                     17.257 198.885     .032     .032     .722                   .2
1
        Upstream   Elevation =  417.388
                   Centerline Station = -4.331
        Downstream Elevation =  416.273
                   Centerline Station = -4.528

        Culvert Name     Shape      Rise    Span
        02537 East           Box   8.005   8.005
        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
                     17.224 199.147     .012     .012     .722                   .2
1
        Upstream   Elevation =  417.388
                   Centerline Station =  4.692
        Downstream Elevation =  416.273
                   Centerline Station =  4.495

        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     Sta    Elev     Sta    Elev
         -24.049 429.823 -23.655 430.381 -23.625 430.413 -23.609 430.545  -23.36 433.071
         -22.375 433.071 -22.343  432.94 -22.211 430.938 -22.146 429.823 -21.916 421.916
          -18.03 419.973  -8.924  415.42  -7.448 415.223  -5.413 414.075  -1.083 413.944
           4.692 413.648   7.972 415.092  12.533 419.948  18.996 423.228  22.277 424.869
          36.122  429.79  40.125 430.118  42.454 430.315  44.062 430.446  46.391 430.545
          47.999  430.61  54.528 430.741  58.825 430.807  63.025 430.873  69.652 431.004
          74.114 430.938  84.843 430.873   90.65 430.938  98.556 431.004  98.589 431.037
          99.245  431.07 100.066 431.004 105.479 431.037 106.496  431.07 112.205 430.774

        Manning's n Values        num=       6
             Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
         -24.049     .02 -22.375     .04  22.277     .08  40.125     .04  44.062     .02
           90.65     .04

        Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
                -18.03  12.533          226.378 226.378 226.378             .3       .5
        Ineffective Flow     num=       2
           Sta L   Sta R    Elev  Permanent
         -98.425 -22.375 433.071       F
          69.652 112.205 431.004       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=      54
             Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
         -31.102 428.314 -31.037 428.314 -30.709 428.839 -30.643 428.904  -30.61 429.265
```

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 -30.348 431.595 -29.364 431.595 -29.331 431.299 -29.199 429.429 -29.144 425.197
 -29.134 424.934 -29.101 422.113 -29.068 420.407 -29.035 420.407 -27.329 419.816
 -26.148 419.127 -23.294 417.684 -21.293 417.224 -19.849 416.699 -19.127 416.765
 -17.913 416.371 -10.171 412.959  -8.301 411.909  -1.509 410.663   9.941 412.172
  12.303 413.189  13.386 414.108  19.488 415.945  19.554  416.01    27.1 421.096
  29.068  422.08  32.874 423.917  33.563  423.95   36.68 424.213    37.5 424.278
  40.617 424.409  41.404 424.442  50.098 424.606  52.231 424.672  61.024 424.803
  63.058 424.836  72.769 424.672  74.869 424.639  75.853 424.705  81.135 424.902
  83.104 424.803  83.891 424.803  84.744  424.77  86.483  424.77  88.091 424.738
  89.501 424.705  90.584 424.672 102.461 424.311 105.151 424.311

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
 -31.102     .02 -29.068     .08 -17.913     .04  19.488     .08  32.874     .04
    37.5     .02

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       -23.294  19.488          150.919 150.919 150.919             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 -31.102 -29.364 431.595       F
  63.058 105.151 424.836       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=      42
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 -35.039 427.658 -35.007 427.658 -34.843  427.92 -34.613 428.248 -34.449 429.757
 -34.318 430.938 -33.333 430.938 -33.235 429.692 -33.169 428.773  -32.94 424.377
 -32.874 422.835 -31.398 422.211  -20.44  417.52 -17.388 415.384 -15.289 413.911
  -11.68 411.385  -9.318 410.433  -1.083 408.924   7.251 411.713  10.597 412.992
  12.927 414.731  14.108  415.19   15.65 416.339  21.129 419.488  31.299 420.276
  33.596 420.472  35.236 420.604  37.566 420.702  39.173 420.768  45.669 420.899
      50 420.965  54.232 421.063  60.827 421.161  65.322 421.194  72.638 421.194
  74.114 421.325  76.575 421.522  81.135 421.522  81.726 421.785  83.957 422.211
    87.5 422.802  94.259 424.213

Manning's n Values        num=       8
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
 -35.039     .02 -32.874     .08 -17.388     .04  12.927     .08  31.299     .04
  33.596     .02  72.638     .04  81.135     .08

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       -15.289  10.597           60.696  64.304  67.257             .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 =  62.336
Deck/Roadway Width        =   1.312
Weir Coefficient          =    3.88
 Weir Embankment Coordinates    num =        7
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 -32.808 412.795 -14.304 412.772  -11.22 412.677  -1.969 412.575  10.236 412.667
   13.55 412.733  32.808 412.762

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
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Elevation at which weir flow begins         = 412.799
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
 -37.073 427.198  -36.68 427.723 -36.647 427.756 -36.385 430.151 -36.352 430.446
 -35.367 430.446 -35.236  428.51 -35.203 428.281 -35.105 426.181 -34.941  421.85
 -34.744 421.358 -21.325 416.404 -16.699 414.042 -15.912 413.287 -14.534 409.721
 -11.352 408.924  -1.706 408.284   10.63  408.74  13.714 408.848  18.373  414.19
  23.392 419.948  25.689 420.177  29.232 420.472  31.102 420.669  33.563 419.455
  33.891 419.324  34.383 419.357  37.894 419.619  38.123 419.652  38.189 419.652
  41.864 419.783  42.815 419.816   52.69 420.013  54.068 420.046  63.517 420.243
  65.486 420.276  75.361 420.472  76.148 420.538  79.298 420.801  80.151 420.735
  83.235 420.472  84.547 421.129  85.105 421.424  85.663 421.522  87.992 421.916
  91.503 422.835 100.755 425.656 108.661 427.986 109.186 428.117

Manning's n Values        num=       8
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
 -37.073     .02 -34.744     .08 -15.912     .04  18.373     .08  25.689     .04
  33.563     .02  79.298     .04  91.503     .08

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       -16.699  18.373           31.168  27.887  24.934              .3       .5
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
  31.102 109.186 420.669       F

CROSS SECTION


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

INPUT
Description: 30ft (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
 -37.894 426.772 -37.697 426.772 -37.631  426.87  -37.27 427.362 -37.041 429.593
 -37.008 430.052 -36.024 430.052 -35.991 429.692  -35.86 427.887 -35.728 425.558
 -35.696 424.442 -35.597 421.391 -33.629 420.472 -30.348 418.963  -23.36 415.584
 -21.522 414.009 -18.373 411.926 -13.484 408.694 -12.139  407.94  -5.315 406.857
   2.723 410.827   5.906 411.122    9.81 411.417  10.958 412.205  13.878 412.927
  19.423 416.634  20.899 417.552  22.474 418.406  37.861 419.357  38.123  419.39
  41.798 419.521   42.06 419.554  52.297 419.783  52.887 419.816  63.287 420.046
  63.747 420.079  64.206 420.079  75.558 420.374  79.396 420.669  79.495 420.702
  84.186 420.735  85.367 421.325  85.433 421.358  88.025 421.785  98.852 425.131
 101.575  426.05 109.088 428.543 111.056  428.97

Manning's n Values        num=       8
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
 -37.894     .02 -35.597     .08 -18.373     .04   2.723     .08  22.474     .04
  37.861     .02  75.558     .04  88.025     .08

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       -21.522  13.878          154.199 154.856  157.48              .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=      49
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
```

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 -47.999 424.606 -45.276 424.377 -44.094 424.278 -39.009 421.752 -28.478 416.568
 -24.278 414.436 -23.983 414.173 -23.852 413.911  -23.36 414.075 -22.146 413.255
  -19.25 411.175 -17.487 409.908 -14.764 407.769 -10.007 404.068    .033 404.199
    .951 404.199   4.626 404.232   5.085 404.626    8.99 407.703  11.745 409.875
    13.4  411.18  16.864 413.911  20.702 415.125  25.394 416.667  29.298 417.913
  32.841 418.143  33.202 418.176  36.778 418.471  37.172 418.504  40.715 418.602
  41.896 418.635  51.542 418.963   52.92 418.996  62.369 419.291  64.075 419.357
   74.18 419.685  74.803 419.751  78.117 420.013  82.743 420.013  84.613 420.965
  97.507 427.428  97.966 427.625  98.655 427.822  99.081  427.92   99.18  427.92
  99.213 427.887  99.672 427.953  99.836 428.018 101.214 428.215

Manning's n Values        num=       8
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
 -47.999     .04 -44.094     .08 -14.764     .04    8.99     .08  29.298     .04
  37.172     .02  74.803     .04  84.613     .08

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -19.25    13.4          415.682 421.916 424.213             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
  34.416 101.214 419.455       F

CROSS SECTION


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

INPUT
Description: FEMA STATION 5208, CROSS SECTION F
Station Elevation Data    num=      48
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 -65.978  417.29 -65.715 417.257 -62.762 417.028 -58.005 416.831 -56.234 416.765
 -55.217 416.699  -55.02 416.699 -53.675 416.568 -51.444 416.404 -32.054 407.415
 -26.214  404.56  -23.31  402.54  -22.31 401.844  -18.34 399.081 -12.697 398.031
  -9.514 396.621  -4.003 396.325   -.525 396.785   1.575 398.294   6.266 398.589
  10.171 401.837   10.99 402.519  15.059 405.906  23.556  408.76  25.787 409.567
  26.247 409.613  27.887 409.744  30.184 409.941  31.824 409.974  34.121 410.039
  36.713 410.138   40.19 410.236  46.621 410.466  51.345 410.597  58.071 410.827
  63.156 410.991  65.289 411.056  67.487 411.122   70.44 411.286  72.638 411.417
  74.836 411.253  76.575 411.122  84.711   412.5  85.827 412.762    87.5 413.484
  99.147  418.34 101.936 419.488 102.789 419.816

Manning's n Values        num=       8
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
 -65.978     .04 -51.444     .08  -18.34     .04   6.266     .08  25.787     .04
  30.184     .02  76.575     .04    87.5     .08

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -23.31   10.99          339.895 343.176 351.378             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
  72.638 102.789 411.417       F

CROSS SECTION


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

INPUT
Description: U/S End Prop. Retaining Wall No.118
558ft (170m) U/S proposed
             I-84 Culvert No. 01227.
The right side of the cross section
             models Reidville Drive.
Station Elevation Data    num=      55
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 -55.381 409.646 -55.282 409.646 -54.888 410.433 -54.856 410.499 -54.626 412.927
 -54.593 413.156 -53.609 413.156 -53.543 411.844 -53.478 408.957 -53.084 408.891
 -52.362 408.793 -49.377 408.333 -31.923 398.819 -26.673 395.909 -23.163 393.963
  -20.27 392.517 -17.585 391.175 -14.009 389.318  -8.235 386.319  -3.281 386.155
   6.562 385.827   8.563 386.417    12.5 389.567   15.95 392.471  19.554 395.505
  27.329 398.034  29.429 398.196   32.48 398.458  33.366 398.524  36.417 398.622
  37.303 398.655  38.189 398.688  38.419 398.688  41.076 398.786  50.066 399.049
  52.854 399.147  61.877 399.442  66.831 399.606  68.438 399.672  73.031 399.672
  77.461 399.672  85.564 400.066  96.588 400.558 103.904 400.591 106.857 401.444
```

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 113.878 401.673 117.356 401.804 122.638 400.623 129.593 400.919 135.564  401.87
 136.713 402.067 137.927 402.198 143.209 403.248 144.554 403.084 147.113 402.297

Manning's n Values        num=       8
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
 -55.381     .02 -53.478     .08 -14.009     .04    12.5     .08  27.329     .04
   32.48     .02  68.438     .04  73.031     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -20.27   15.95          219.816 223.425  232.94             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 117.356 147.113 401.804       F

CROSS SECTION


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

INPUT
Description: 338ft (103m) Upstream Proposed I-84 Culvert No. 01227
Station Elevation Data    num=      64
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 -36.385 404.692 -36.352 404.692 -36.319 404.757 -35.925 405.282 -35.669 407.776
  -35.65 407.972 -34.652 407.972 -34.639 407.808 -34.482 405.807 -34.318 402.625
 -33.924 399.147 -33.793  397.31 -33.694 396.883 -33.235 396.654 -31.693 395.801
 -21.358 390.092 -17.224 387.861  -13.78 386.004  -8.038 382.907   -7.71  382.71
  -1.969  381.89   5.577 382.218   9.547  382.71   13.78 385.876  16.404 387.841
  20.243 390.715  20.407 390.814  20.636 390.912  29.626 393.668  30.709 393.701
  37.139 393.996  37.205 393.504  41.175 393.635  48.491 393.734  53.018 393.799
   57.48 393.865  64.895  393.93  68.504 393.799  68.832 393.766  70.636 393.701
  71.161 394.193  71.194 394.193  80.381 394.029  84.941 392.126  89.239  390.19
  95.932 387.402  99.541 386.417  109.81 386.975 110.991 386.975  120.44 394.259
 122.244 395.144  122.31 395.144  123.36 395.177 139.862 395.276 141.699 395.243
  144.39 395.243 152.822 394.751 153.379 394.718 160.794  394.98 167.684 394.718
 173.064 394.685 178.675 394.619 183.563 394.685  188.55 394.619

Manning's n Values        num=       9
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
 -36.385     .02 -33.694     .08  -13.78     .04   13.78     .08  30.709     .04
  37.205     .02  71.161     .04  84.941     .06 122.244     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       -17.224  16.404          112.533 112.533 112.533             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
  30.709  73.491 393.701       F
  80.381 123.031 394.029       F

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
 -27.953 401.247  -27.69 401.247 -27.493 401.542 -27.264 401.837 -27.133 403.281
 -27.001 404.528 -25.984 404.528 -25.919 403.379  -25.82 402.362 -25.492 389.633
 -25.459 388.747 -24.081 388.058  -22.91 387.472 -17.028 384.531  -9.514 380.774
   9.646 380.774  17.224 384.514    23.3 387.508   26.28 388.976   28.97 390.289
  30.348 390.945  31.791 391.076  38.878 391.634  40.354 391.765  40.617 391.273
  42.881 391.339  44.554 391.404  47.966  391.47   56.43 391.568   56.89 391.568
  58.235 391.535  65.781 391.404  68.274 391.371  69.521 391.339  72.244 391.207
  72.441 391.404  72.736 391.699      75 391.732  76.115 391.896  77.428 391.896
  79.364 391.962  82.448 391.995  85.105 392.126  85.892 391.667  97.507 391.732
 109.055 392.028 111.024  392.06 112.664 392.126     125  392.52 133.432 392.684
 135.827 392.717 142.585 392.684 151.083 392.585 153.871 392.585 165.486 392.848
  172.31 393.012 180.052 393.143

Manning's n Values        num=       9
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
 -27.953     .02 -25.459     .08 -17.028     .04  17.224     .08  31.791     .04
  40.617     .02  72.244     .04  85.892     .02 135.827     .04
```

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -22.91    23.3          219.816 218.176 214.895              .1       .3
Ineffective Flow     num=       4
   Sta L   Sta R    Elev  Permanent
 -27.953 -27.001 404.528       F
  40.354  75.131 391.765       F
  85.105 113.189 392.126       F
 135.827 160.433 392.717       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=      49
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 -15.879 395.177 -15.584 395.177 -15.453 395.341 -15.157 395.768 -14.961 397.638
 -14.895 398.425 -13.911 398.425  -13.78 396.916 -13.747 396.293 -13.714 395.833
 -13.255 377.329       0 377.329  19.452 377.329  19.469 394.685  20.768 394.685
  20.801 386.975   22.08 387.139  34.022  388.78  44.423 389.436  46.916 389.633
  47.933 389.698  50.853 389.797  58.465 389.928  62.664 389.993  69.127 389.895
  74.475 389.797  76.509 389.731  78.412 389.633  78.576 389.633  79.429   389.6
  79.888 390.092  79.954 390.092  82.152  390.42  84.154 390.584  85.958 390.715
  89.337 390.879  101.05  391.47  101.64 391.503 106.398 391.437 107.743 391.437
 127.165  392.06  133.53 392.257 140.748 392.651 143.438 392.815 145.768 393.012
 153.281 393.537 163.747 394.324 167.487 394.587 168.668 394.652

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
 -15.879     .02 -13.714     .04  19.469     .02  20.801     .04  47.933     .02
  76.509     .04 106.398     .02

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       -13.714  19.469          429.79  429.79  429.79              .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 -15.879 -13.911 398.425       F
  19.455 168.668 394.685       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 =  84.646
Deck/Roadway Width        = 279.626
Weir Coefficient          =    2.63
Upstream  Deck/Roadway Coordinates
    num=       8
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
 -26.115 395.046       0 -14.304 394.587       0 -14.304 398.097       0
 -12.467 398.097       0 -12.467 394.685       0  19.685 394.685       0
  19.685 391.568       0  51.837  390.19       0

Upstream Bridge Cross Section Data
Station Elevation Data    num=       7
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 -26.115 395.046 -14.304 394.587 -14.304 398.097 -12.467 398.097 -12.467 377.133
  12.467 377.133  12.467 394.685

Manning's n Values        num=       2
     Sta   n Val     Sta   n Val
 -26.115     .02 -12.467     .04

Bank Sta: Left   Right    Coeff Contr.   Expan.
```

```
       -12.467  12.467             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 -26.115 -13.911 398.425       F
  19.455  12.467 394.685       F

Downstream  Deck/Roadway Coordinates
    num=       9
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
 -49.213 387.139       0 -42.651 387.139       0 -14.304 387.139       0
 -14.304 387.139       0 -12.467 387.139       0 -12.467  388.78       0
  19.685  388.78       0  19.685  388.78       0  51.837  388.78       0

Downstream Bridge Cross Section Data
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 -49.213 387.139 -42.651 386.549 -12.467 370.735  12.467 370.735  25.591 377.297
  51.837  390.19

Manning's n Values        num=       2
     Sta   n Val     Sta   n Val
 -49.213     .04  25.591     .08

Bank Sta: Left   Right    Coeff Contr.   Expan.
       -12.467  12.467             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 -49.213 -66.601 388.091       F
  23.294  51.837 387.762       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
01227              Box  10.827  11.483
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
                   11.483 371.555     .031     .031     .722                   .2
1
Number of Barrels =  2
Upstream   Elevation =  377.133
Centerline Stations
    Sta.    Sta.
  -6.726   6.726
Downstream Elevation =  370.735
Centerline Stations
    Sta.    Sta.
  -6.726   6.726

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
-112.861 388.091-110.991 388.123-110.925 388.123-110.794 388.091-107.448 387.533
-106.037   387.5-104.101 387.467 -89.862 387.008 -82.415 386.811 -69.226 386.024
 -68.176 385.499 -51.083 377.297  -46.26 375.656 -36.385 370.735       0 370.735
  11.286 370.735  14.698 372.375  21.129 375.656  37.402 383.858  37.795 384.055
  37.799  388.78  39.469  388.78  41.864 388.615  43.471 388.648

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
```

```
-112.861     .08  -46.26     .04  21.129     .08

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -46.26  21.129           76.444  60.039   54.79             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
-112.861 -66.601 388.091       F
  23.294  43.471 387.762       F

CROSS SECTION


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

INPUT
Description: 107ft (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=      30
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
-108.661 385.925-107.776 385.794-106.627 385.597 -94.094 385.531 -89.797 385.531
 -79.331 385.433 -73.753 385.335 -57.185 384.777 -54.724 384.514 -53.773 384.744
 -52.854 384.744 -52.067 384.219 -48.556  383.53 -42.651 380.577 -37.861 378.937
   -35.8 378.033 -34.121 377.297 -29.987 375.656 -25.262 374.016 -21.358 372.375
 -15.092 370.735   7.841 370.735  11.319 372.375    22.6 378.002  24.475 378.937
  28.248 380.577  37.992 382.218  42.487 383.858  49.442 387.139  53.084  387.73

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
-108.661     .02 -73.753       1 -57.185     .08 -37.861     .04  24.475     .08

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -35.8    22.6           193.57 198.491 198.491             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
-108.661 -52.034 393.701       T
   27.92  53.084 387.795       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
 -72.178 -59.055 393.701

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
-240.978 385.958-237.926 385.794-226.772 385.171-210.236 384.252-206.398 384.088
-202.592 383.891-199.705 383.727-192.159 383.268-190.486 382.874-190.125 382.776
-184.941 382.874-179.068  382.94-177.657 382.907-167.979 382.677-166.535 383.005
-165.978 383.136-165.453 383.136-162.205 383.169-160.433 383.202-159.908 383.268
 -156.89  383.76-154.298  383.76 -148.13 383.957-140.781 383.957-137.205 383.924
-137.106 383.924-136.844 383.891-130.906 383.727-104.724 383.333  -99.18 383.235
 -90.682 382.841 -84.744  382.71  -81.07  382.71 -72.146 382.054 -68.832 381.693
 -64.764 381.266  -54.79 379.724 -53.346 379.495 -42.979 378.346 -41.339 379.068
 -37.631 378.182  -33.53 376.903   -28.4 375.289 -14.862  371.03 -11.647 370.308
  -3.609 369.783  -1.772 369.685   9.514 371.161  15.157  375.23  27.395 375.656
  59.974 376.542  83.071 388.025  86.614  388.32  88.747 388.484  90.453 388.648

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
-240.978     .04-190.125     .02-167.979     .04 -72.146     .08  -33.53     .04
  15.157     .08  86.614     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -28.4  15.157          198.819 198.819 198.819             .1       .3
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Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
-240.978 -50.361 393.701       T
 -50.361 -41.339 379.068       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
-138.451-103.018 393.701

CROSS SECTION


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

INPUT
Description: 89ft (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=      79
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
-370.636 380.052-366.699 379.987-360.794 379.593-346.391 379.134-331.365 379.068
-322.769 379.199-310.335 379.429-294.948 379.265-284.416 379.035-265.289 378.609
-260.105 378.478-245.801  377.92-245.013 377.986-244.783 377.986-244.587 377.723
-237.172 378.182-232.185 378.182 -218.93  377.69 -215.19 377.625-214.797 377.986
-214.633 378.084-211.647 378.248-211.056 378.281-210.302 378.346-210.203 378.346
-210.138 378.412-210.072 378.346-209.941 378.346-206.955 378.576-198.392 379.199
-197.703 379.199-194.751 379.068-191.896 379.035-179.364  378.97-159.908 378.871
-155.413  378.74-150.886 378.281-150.197 378.215-147.474 378.281-144.423 378.215
-142.848 378.117 -140.42 378.051-139.567 377.986-134.777  377.92-133.104 377.887
-132.218 377.887-127.297 377.822-126.542 377.822-120.702  377.69-118.274  377.69
-114.501 377.756-109.449 377.822-105.249 377.756 -104.56 377.756 -72.507 377.165
 -68.602 377.231 -66.929 377.231 -62.106 377.264  -53.97 377.231 -52.198 377.165
 -50.361 377.067 -35.203 376.115 -34.547 375.689 -26.739     375  -25.47 374.635
 -23.655 374.114 -11.483 368.045  -2.723 367.618   3.215 366.896  10.499 367.552
  11.483 368.045  23.556 374.016  24.606 374.606  75.525 375.656  80.184 376.312
 111.417 391.929   114.6  392.06 117.552 392.323 118.307 392.388

Manning's n Values        num=      10
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
-370.636     .04-245.013     .02 -218.93     .04-194.751       1-150.886     .02
-105.249     .06  -53.97     .08  -25.47     .04  24.606     .08   114.6     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -25.47  24.606            63.32  65.617  68.241              .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
-370.636-109.383 387.139       T
-109.383-106.955 377.953       T
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
 -196.85-154.199 387.139

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=      89
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
-430.052 388.189-428.806   387.5-418.635 382.907-411.614 381.299 -405.02 379.954
 -398.36 379.528-394.652 379.331-381.168 379.003-367.192 379.035 -353.97 379.068
-333.169 379.167-331.135 379.003-330.479 379.035-318.865 378.937-309.744 378.806
-301.969 378.609-290.125 378.445-288.058 378.379-281.004 378.051-278.642  377.92
-273.819 377.625-271.949 377.526-271.654 377.559-270.932 377.657-268.734 377.625
-265.617 377.526-263.386 377.165-262.959 377.067-256.365 377.165-254.199 377.198
-251.247 377.264-249.245 377.198-247.769 377.165-244.291   377.1-239.534 377.001
-239.272 377.034-237.402 377.428-236.877 377.428-232.677 377.493-231.529 377.526
-230.873 377.395-229.626 377.198-229.265 377.165-224.672 377.198-220.505 377.198
-197.539 377.756-191.765 377.756-190.551 377.789-166.699 377.657-160.335  377.69
-156.529  377.69-152.165 377.723-148.392 377.723-127.493 377.297-127.001 377.297
-124.377 377.264-102.756 377.133 -102.69 377.001-102.592 376.706 -90.486 376.706
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  -78.51 376.837  -66.01 376.936 -64.534 377.001 -64.403 377.001 -46.621 377.526
 -46.424 377.526 -46.227 377.559 -44.816 377.592 -44.619 377.625 -42.487 378.018
 -33.629 378.018 -32.283 377.297  -26.45 374.321   -25.9  374.04 -12.992 367.454
 -11.483 366.962       0 366.962  11.483 366.962  13.025 367.454   25.84 374.016
  26.903 374.508  31.742 375.656  33.924 375.984  36.135 375.656  42.877 375.328
  49.843 375.656  74.967 377.297 109.088  392.06 121.424 394.521

Manning's n Values        num=       8
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
-430.052     .08 -398.36     .04-262.959     .02-239.534     .04-102.756     .08
  -26.45     .04  26.903     .08 109.088     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -25.9   25.84          144.029 141.732 139.108             .3       .5
Ineffective Flow     num=       3
   Sta L   Sta R    Elev  Permanent
-430.052-154.199 387.139       F
-147.605 -41.798 377.789       F
  29.331 121.424 377.297       F
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
-302.822-291.667 387.139-188.386-160.991 387.139

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 =  38.714
Deck/Roadway Width        =  65.617
Weir Coefficient          =    2.63
Upstream  Deck/Roadway Coordinates
    num=     323
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
-397.808 376.617       0-397.674 376.617       0-397.326 376.611       0
-394.347 376.578       0 -391.45 376.542       0 -391.02 376.539       0
-390.584 376.532       0-387.697 376.499       0-387.221 376.493       0
-384.373  376.46       0-381.578 376.427       0 -381.05 376.421       0
-378.284 376.388       0 -377.73 376.381       0-377.205 376.375
-374.633 376.345        -374.409 376.345         -371.69 376.316
-371.099 376.309        -370.502 376.302        -367.785 376.276
-367.178  376.27        -365.344 376.253        -364.534  376.23
  -359.8 376.158        -359.465 376.152        -359.413 376.152
-359.377 376.148        -359.213 376.148        -355.499 376.122
-354.081 376.102        -350.928 376.079        -348.215  376.05
-346.201 376.037        -343.461  376.01        -342.674 376.004
-340.059 375.984        -339.429 375.978        -339.131 375.971
-336.171 375.935        -334.091 375.915        -332.198 375.912
-330.351 375.902        -328.632 375.892        -326.703 375.905
-324.554 375.922        -317.136 375.925        -315.138 375.938
-313.005 375.945        -311.033 375.958        -308.881 375.965
-305.896 375.981        -305.164 375.984        -303.041 375.994
-302.854 375.994         -300.43 376.007        -299.879 376.007
-297.667  376.02        -293.491 376.047        -292.753  376.05
-291.978 376.053        -289.967 376.066        -289.009  376.07
-286.729 376.083        -284.131 376.093        -281.424 376.109
-278.914 376.122        -277.074 376.138        -275.801 376.148
-271.604 376.175        -270.928 376.178        -269.472 376.191
-267.871 376.207        -267.333 376.211        -264.957 376.237
-263.104 376.257         -258.74 376.312         -257.91 376.322
-257.293 376.329        -250.617 376.401        -243.517 376.476
-242.441  376.49        -242.159 376.493        -241.923 376.493
 -241.28 376.503        -241.037 376.503        -235.479 376.565
-233.635 376.585        -230.965 376.614        -230.007 376.624
-229.311 376.634        -229.042 376.634        -228.609  376.64
-220.069 376.801        -219.951 376.804        -214.577 376.913
-212.169 376.959        -211.552 376.972        -210.492 376.995
-209.416 377.018        -208.146 377.044        -207.618 377.057
-204.843 377.116        -204.708 377.119        -202.392 377.169
```

-201.686	377.185	-198.35	377.26	-198.278	377.264
-195.023	377.336	-194.898	377.339	-191.699	377.418
-188.596	377.49	-188.379	377.497	-188.156	377.503
-185.059	377.579	-182.037	377.657	-181.739	377.664
-178.757	377.743	-178.419	377.749	-175.472	377.828
-175.102	377.838	-174.718	377.851	-171.781	377.93
-170.942	377.953	-168.898	378.009	-168.468	378.022
-168.031	378.035	-165.151	378.114	-162.303	378.196
-161.837	378.212	-158.999	378.294	-158.52	378.307
-155.696	378.392	-155.207	378.409	-154.711	378.422
-151.893	378.51	-149.081	378.596	-148.576	378.612
-148.074	378.629	-145.262	378.717	-142.451	378.809
-141.949	378.825	-139.134	378.917	-138.635	378.934
-138.14	378.95	-135.322	379.045	-134.833	379.062
-132.005	379.157	-131.529	379.173	-128.691	379.272
-125.823	379.373	-125.377	379.39	-122.49	379.491
-122.06	379.508	-121.637	379.524	-118.743	379.629
-118.343	379.642	-115.427	379.751	-112.457	379.862
-112.11	379.875	-111.765	379.888	-108.789	380
-108.481	380.013	-106.565	380.085	-105.472	380.131
-102.484	380.249	-102.152	380.262	-101.821	380.279
-98.835	380.4	-95.899	380.522	-95.518	380.538
-95.135	380.554	-92.201	380.676	-89.308	380.801
-88.888	380.817	-88.461	380.837	-85.571	380.961
-82.703	381.086	-82.257	381.106	-81.804	381.125
-78.94	381.253	-76.093	381.381	-75.627	381.404
-72.779	381.532	-72.313	381.555	-71.844	381.575
-68.996	381.706	-66.148	381.841	-65.682	381.86
-65.22	381.883	-62.369	382.018	-59.505	382.156
-59.052	382.175	-56.178	382.316	-55.738	382.336
-52.844	382.477	-52.421	382.5	-52.005	382.52
-49.108	382.664	-48.707	382.684	-45.791	382.831
-42.884	382.976	-42.835	382.979	-42.474	382.999
-39.544	383.15	-39.157	383.173	-38.76	383.192
-35.84	383.346	-32.959	383.501	-32.523	383.524
-32.08	383.547	-29.206	383.701	-28.747	383.727
-25.892	383.881	-23.064	384.039	-22.579	384.065
-22.087	384.091	-19.262	384.249	-18.763	384.278
-15.948	384.436	-13.143	384.596	-12.635	384.626
-12.126	384.655	-9.321	384.816	-8.812	384.846
-6.007	385.007	-3.196	385.171	-2.694	385.2
.128	385.367	.623	385.397	1.115	385.427
3.937	385.594	4.416	385.623	7.251	385.794
10.115	385.968	10.568	385.997	13.451	386.171
13.881	386.201	16.404	386.355	16.791	386.378
17.198	386.404	20.135	386.588	20.515	386.611
21.591	386.68	23.461	386.798	23.832	386.824
24.206	386.847	27.149	387.037	27.523	387.06
30.463	387.251	30.84	387.277	33.78	387.467
34.154	387.493	37.096	387.687	37.461	387.713
40.41	387.907	43.379	388.107	43.727	388.13
46.713	388.333	47.044	388.356	47.372	388.379
50.361	388.583	53.386	388.789	53.678	388.809
56.729	389.022	56.998	389.042	57.26	389.058
60.315	389.272	63.425	389.491	63.635	389.508
63.842	389.521	66.955	389.744	67.126	389.757
70.276	389.98	70.413	389.99	73.599	390.22
74.423	390.279	76.893	390.456	76.926	390.456
76.959	390.459	78.327	390.558	79.895	390.669
80.427	390.702	80.659	390.719	82.014	390.81
83.176	390.892	85.062	391.01	86.017	391.076
86.985	391.152	89.544	391.329	90.656	391.404
93.261	391.581	94.35	391.65	95.453	391.732
97.07	391.85	98.809	391.969	99.554	392.011
100.013	392.06	104.101	392.359	104.386	392.388
106.985	392.569	107.802	392.625	110.335	392.802
112.71	392.969	113.691	393.035	114.738	393.107
117.047	393.268	119.203	393.419	120.407	393.501
121.696	393.589	123.766	393.734	125.696	393.868
127.133	393.967	128.684	394.072	130.502	394.199
132.185	394.314	133.871	394.429	135.43	394.537
137.244	394.662	138.675	394.76	140.623	394.895
141.923	394.984	142.211	395.003		

Upstream Bridge Cross Section Data
Station Elevation Data num= 121

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

```
-397.808 376.617-397.674 376.617-397.326 376.611-394.347 376.578 -391.45 376.542
 -391.02 376.539-390.584 376.532-387.697 376.499-387.221 376.493-384.373  376.46
-381.578 376.427 -381.05 376.421-378.284 376.388 -377.73 376.381-377.205 376.375
-374.633 376.345-374.409 376.345 -371.69 376.316-371.099 376.309-370.502 376.302
-367.785 376.276-367.178  376.27-365.344 376.253-364.534  376.23  -359.8 376.158
-359.465 376.152-359.413 376.152-359.377 376.148-359.213 376.148-355.499 376.122
-354.081 376.102-350.928 376.079-348.215  376.05-346.201 376.037-343.461  376.01
-342.674 376.004-340.059 375.984-339.429 375.978-339.131 375.971-336.171 375.935
-334.091 375.915-332.198 375.912-330.351 375.902-328.632 375.892-326.703 375.905
-324.554 375.922-317.136 375.925-315.138 375.938-313.005 375.945-311.033 375.958
-308.881 375.965-305.896 375.981-305.164 375.984-303.041 375.994-302.854 375.994
 -300.43 376.007-299.879 376.007-297.667  376.02-293.491 376.047-292.753  376.05
-291.978 376.053-289.967 376.066-289.009  376.07-286.729 376.083-284.131 376.093
-281.424 376.109-278.914 376.122-277.074 376.138-275.801 376.148-271.604 376.175
-270.928 376.178-269.472 376.191-267.871 376.207-267.333 376.211-264.957 376.237
-263.104 376.257 -258.74 376.312 -257.91 376.322-257.293 376.329-250.617 376.401
-243.517 376.476-242.441  376.49-242.159 376.493-241.923 376.493 -241.28 376.503
-241.037 376.503-235.479 376.565-233.635 376.585-230.965 376.614-230.007 376.624
-229.311 376.634-229.042 376.634-228.609  376.64-220.069 376.801-219.951 376.804
-214.577 376.913-212.169 376.959-211.552 376.972-210.492 376.995-209.416 377.018
-208.146 377.044-207.618 377.057-204.843 377.116-204.708 377.119-202.392 377.169
-201.686 377.185 -198.35  377.26-198.278 377.264-195.023 377.336-194.898 377.339
-191.699 377.418 -97.441 377.461  -54.79 377.625 -32.251 377.297 -15.846 369.094
 -12.467 366.634  12.467 366.634  15.814 369.094  32.218 377.297  84.022 377.297
 103.707 387.139

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
-397.808     .02-191.699     .06 -32.251     .04  32.218     .06

Bank Sta: Left   Right    Coeff Contr.   Expan.
       -32.251  32.218             .3        .5
Ineffective Flow     num=       3
   Sta L   Sta R    Elev  Permanent
-430.052-154.199 387.139       F
-147.605 -41.798 377.789       F
  29.331 121.424 377.297       F
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
-302.822-291.667 387.139-188.386-160.991 387.139

Downstream  Deck/Roadway Coordinates
    num=     299
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
-414.213 376.617       0-414.078 376.617       0 -413.73 376.611       0
-410.751 376.578       0-407.854 376.542       0-407.425 376.539       0
-406.988 376.532       0-404.101 376.499       0-403.625 376.493       0
-400.778  376.46       0-397.982 376.427       0-397.454 376.421       0
-394.688 376.388       0-394.134 376.381       0-393.609 376.375
-391.037 376.345        -390.814 376.345        -388.094 376.316
-387.503 376.309        -386.906 376.302         -384.19 376.276
-383.583  376.27        -381.749 376.253        -380.938  376.23
-376.204 376.158        -375.869 376.152        -375.817 376.152
-375.781 376.148        -375.617 376.148        -371.903 376.122
-370.486 376.102        -367.333 376.079        -364.619  376.05
-362.605 376.037        -359.865  376.01        -359.078 376.004
-356.463 375.984        -355.833 375.978        -355.535 375.971
-352.575 375.935        -350.495 375.915        -348.602 375.912
-346.755 375.902        -345.036 375.892        -343.107 375.905
-340.958 375.922         -333.54 375.925        -331.542 375.938
-329.409 375.945        -327.438 375.958        -325.285 375.965
  -322.3 375.981        -321.568 375.984        -319.446 375.994
-319.259 375.994        -316.834 376.007        -316.283 376.007
-314.072  376.02        -309.895 376.047        -309.157  376.05
-308.383 376.053        -306.371 376.066        -305.413  376.07
-303.133 376.083        -300.535 376.093        -297.828 376.109
-295.318 376.122        -293.478 376.138        -292.205 376.148
-288.009 376.175        -287.333 376.178        -285.876 376.191
-284.275 376.207        -283.737 376.211        -281.362 376.237
-279.508 376.257        -275.144 376.312        -274.314 376.322
-273.698 376.329        -267.021 376.401        -259.921 376.476
-258.845  376.49        -258.563 376.493        -258.327 376.493
-257.684 376.503        -257.441 376.503        -251.883 376.565
-250.039 376.585        -247.369 376.614        -246.411 376.624
-245.715 376.634        -245.446 376.634        -245.013  376.64
-245.013  376.64        -236.473 376.801        -236.355 376.804
-230.981 376.913        -228.573 376.959        -227.956 376.972
```

-226.896	376.995	-225.82	377.018	-224.551	377.044
-224.022	377.057	-221.247	377.116	-221.112	377.119
-218.796	377.169	-218.091	377.185	-214.754	377.26
-214.682	377.264	-211.427	377.336	-211.302	377.339
-208.104	377.418	-205	377.49	-204.783	377.497
-204.56	377.503	-201.463	377.579	-198.442	377.657
-198.143	377.664	-195.161	377.743	-194.823	377.749
-191.877	377.828	-191.506	377.838	-191.122	377.851
-188.186	377.93	-187.346	377.953	-185.302	378.009
-184.872	378.022	-184.436	378.035	-181.555	378.114
-178.707	378.196	-178.241	378.212	-175.404	378.294
-174.925	378.307	-172.1	378.392	-171.611	378.409
-171.115	378.422	-168.297	378.51	-165.486	378.596
-164.98	378.612	-164.478	378.629	-161.667	378.717
-158.855	378.809	-158.353	378.825	-155.538	378.917
-155.039	378.934	-154.544	378.95	-151.726	379.045
-151.237	379.062	-148.409	379.157	-147.933	379.173
-145.095	379.272	-142.228	379.373	-141.781	379.39
-138.894	379.491	-138.465	379.508	-138.041	379.524
-135.148	379.629	-134.747	379.642	-131.831	379.751
-128.862	379.862	-128.514	379.875	-128.169	379.888
-125.194	380	-124.885	380.013	-122.969	380.085
-121.877	380.131	-118.888	380.249	-118.556	380.262
-118.225	380.279	-115.24	380.4	-112.303	380.522
-111.923	380.538	-111.539	380.554	-108.606	380.676
-105.712	380.801	-105.292	380.817	-104.865	380.837
-101.975	380.961	-99.108	381.086	-98.661	381.106
-98.209	381.125	-95.344	381.253	-92.497	381.381
-92.031	381.404	-89.183	381.532	-88.717	381.555
-88.248	381.575	-85.4	381.706	-82.552	381.841
-82.087	381.86	-81.624	381.883	-78.773	382.018
-75.909	382.156	-75.456	382.175	-72.582	382.316
-72.142	382.336	-69.249	382.477	-68.825	382.5
-68.409	382.52	-65.512	382.664	-65.112	382.684
-62.195	382.831	-59.288	382.976	-59.239	382.979
-58.878	382.999	-55.948	383.15	-55.561	383.173
-55.164	383.192	-52.244	383.346	-49.364	383.501
-48.927	383.524	-48.484	383.547	-45.61	383.701
-45.151	383.727	-42.297	383.881	-39.469	384.039
-38.983	384.065	-38.491	384.091	-35.666	384.249
-35.167	384.278	-32.352	384.436	-29.547	384.596
-29.039	384.626	-28.53	384.655	-25.725	384.816
-25.217	384.846	-22.411	385.007	-19.6	385.171
-19.098	385.2	-16.276	385.367	-15.781	385.397
-15.289	385.427	-12.467	385.594	-11.988	385.623
-9.154	385.794	-6.289	385.968	-5.837	385.997
-2.953	386.171	-2.523	386.201	0	386.355
.387	386.378	.794	386.404	3.73	386.588
4.111	386.611	5.187	386.68	7.057	386.798
7.428	386.824	7.802	386.847	10.745	387.037
11.119	387.06	14.058	387.251	14.436	387.277
17.375	387.467	17.749	387.493	20.692	387.687
21.056	387.713	24.006	387.907	26.975	388.107
27.323	388.13	30.308	388.333	30.64	388.356
30.968	388.379	33.957	388.583	36.982	388.789
37.274	388.809	40.325	389.022	40.594	389.042
40.856	389.058	43.911	389.272	47.021	389.491
47.231	389.508	47.438	389.521	50.551	389.744
50.722	389.757	53.871	389.98	54.009	389.99
57.195	390.22	58.018	390.279	60.489	390.456
60.522	390.456	60.554	390.459	61.923	390.558
63.491	390.669	64.022	390.702	64.255	390.719
65.61	390.81	66.772	390.892	68.658	391.01
69.613	391.076	70.581	391.152	73.14	391.329
74.252	391.404	76.857	391.581	77.946	391.65
79.049	391.732	80.666	391.85	82.405	391.969
83.15	392.011	83.609	392.06		

Downstream Bridge Cross Section Data
Station Elevation Data num= 42

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-267.021	387.139	-267.021	376.401	-259.921	376.476	-258.845	376.49	-258.563	376.493
-258.327	376.493	-257.684	376.503	-257.441	376.503	-251.883	376.565	-250.039	376.585
-247.369	376.614	-246.411	376.624	-245.715	376.634	-245.446	376.634	-245.013	376.64
-236.473	376.801	-236.355	376.804	-230.981	376.913	-228.573	376.959	-227.956	376.972
-226.896	376.995	-225.82	377.018	-224.551	377.044	-224.022	377.057	-221.247	377.116
-221.112	377.119	-218.796	377.169	-218.091	377.185	-214.754	377.26	-214.682	377.264

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-211.427 377.336-211.302 377.339-208.104 377.418 -97.441 377.461  -54.79 377.625
 -41.667 377.001 -37.402 375.656 -23.622 370.735 -12.467 365.158  12.467 365.158
  20.013 370.079  50.853  388.78

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
-267.021     .02-208.104     .08 -23.622     .04  20.013     .08

Bank Sta: Left   Right    Coeff Contr.   Expan.
       -23.622  20.013            .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
-267.021 -29.068 376.969       F
   28.51  50.853 383.858       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  12.139  11.483
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
                 22.966 103.346     .029     .029    1.969                   .4
1
Number of Barrels =  2
Upstream   Elevation =  364.665
Centerline Stations
    Sta.    Sta.
  -6.726   6.726
Downstream Elevation =  363.189
Centerline Stations
    Sta.    Sta.
  -6.726   6.726

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
41ft (12.6m) downstream of Harpers Ferry Road
FEMA
                 Station 5204
Right ineffective area added to model the the I-84
                 median barrier.
Station Elevation Data    num=      76
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
-187.664 376.936-183.301 376.804-181.529 376.575-174.081 375.656-167.946 374.967
-150.755 373.327-126.083 372.014-118.734  371.85 -112.73 371.752-106.299 371.818
  -96.26 371.949 -85.794  372.31 -75.394   372.9 -65.453 373.655 -55.184 374.508
 -49.147  374.77 -43.373 374.836 -41.503 374.934 -38.714 374.836 -36.614 374.475
 -35.269 374.311  -33.76 374.016 -32.448 373.524  -31.66 373.556 -31.398 374.344
 -31.168 374.672 -29.068 374.672 -28.576 372.539 -28.478 372.113 -26.739 371.325
  -24.03 370.062 -18.438 367.454 -14.895 365.158       0 365.158   13.32 365.158
  18.307 367.454   24.22 369.995  26.706 371.063  27.789  371.49  28.445 371.752
   28.51  373.13  28.707 374.573  29.167 374.508  30.807 374.311  30.971 374.016
  31.004 374.016  31.365 373.294   31.66 373.294  32.513 373.261  34.383  373.36
   36.22 373.458  37.303 373.556  38.156 373.622  44.127 373.917  44.619 373.917
  45.735 374.016  51.804 374.639  54.823 375.098  60.728  376.05  65.978 377.297
  73.392 377.986  76.312 378.379  86.417 378.937  95.801 381.135  97.244 381.496
  98.392 381.824 101.969 382.907 115.223 387.205 121.883 389.436 128.248 391.699
  133.53 393.701  135.63 394.488 137.861 395.341 143.274 396.424 145.112 396.982
 159.121 399.147
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Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
-187.664     .08 -29.068     .04  28.445     .08

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -24.03   24.22                 0       0       0              .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
-187.664 -29.068 376.969       F
   28.51 159.121 383.858       F


SUMMARY OF MANNING'S N VALUES

River:Beaver Pond Brk

      Reach          River Sta.       n1        n2        n3        n4        n5
n6        n7        n8        n9        n10       n11

      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       .02
      Reach-1              8128               .06       .08       .04       .02       .08
.04       .08       .02
      Reach-1              8080               .06       .02       .08       .04       .06
.08       .02
      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       .02
      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       .04       .08
      Reach-1              7666               .04       .02       .08       .04       .08
.02       .08
      Reach-1              7589               .08       .04       .02       .08       .04
.08       .04       .02       .08       .02
      Reach-1              7370               .03       .08       .06       .04       .08
.03       .04       .02       .04       .08       .04
      Reach-1              7168               .08       .04       .08       .02       .08
.02
      Reach-1              7120               .04       .08       .06       .04       .06
.04       .02       .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	Culvert							
Reach-1	6417		.04	.08	.04	.08	.04	.02	
Reach-1	6409		.08	.04	.08	.04	.02		
Reach-1	6394		.08	.04	.08	.04	.02		
Reach-1	6349.5	Culvert							
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	Culvert							
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	.04 .08
Reach-1	5813	Inl Struct							
Reach-1	5812.5		.02	.08	.04	.08	.04	.02	.04 .08
Reach-1	5804		.02	.08	.04	.08	.04	.02	.04 .08
Reach-1	5757		.04	.08	.04	.08	.04	.02	.04 .08
Reach-1	5628		.04	.08	.04	.08	.04	.02	.04 .08
Reach-1	5524		.02	.08	.04	.08	.04	.02	.04 .06
Reach-1	5456		.02	.08	.04	.08	.04	.02	.04 .06 .04
Reach-1	5422		.02	.08	.04	.08	.04	.02	.04 .02 .04
Reach-1	5355		.02	.04	.02	.04	.02	.04	.02
Reach-1	5295.5	Culvert							
Reach-1	5224		.08	.04	.08				
Reach-1	5206		.02	1	.08	.04	.08		
Reach-1	5145		.04	.02	.04	.08	.04	.08	.04
Reach-1	5084		.04	.02	.04	1	.02	.06	.08 .04 .08 .04
Reach-1	5065		.08	.04	.02	.04	.08	.04	.08 .04
Reach-1	5042.5	Culvert							
Reach-1	5021		.08	.04	.08				

SUMMARY OF REACH LENGTHS

River: Beaver Pond Brk

Reach	River Sta.	Left	Channel	Right
Reach-1	8722	255.906	269.849	310.039
Reach-1	8640	155.184	186.68	198.819
Reach-1	8583	64.633	35.105	35.105
Reach-1	8573	48.885	59.711	58.399
Reach-1	8565.5	Bridge		
Reach-1	8554	83.333	62.008	18.701
Reach-1	8536	232.94	233.596	217.192
Reach-1	8464	181.759	169.948	187.008
Reach-1	8435.5	Culvert		
Reach-1	8412	63.156	63.976	63.976
Reach-1	8393	134.514	120.079	97.769
Reach-1	8356	173.885	155.512	164.042
Reach-1	8332.5	Culvert		
Reach-1	8309	37.402	64.633	92.52
Reach-1	8289	174.869	171.916	168.635
Reach-1	8237	197.835	193.898	190.617

Reach-1	8178	164.042	164.37	165.354
Reach-1	8128	156.496	157.152	157.808
Reach-1	8080	172.9	172.9	172.9
Reach-1	8027	164.37	164.37	164.37
Reach-1	7977	131.234	131.234	131.234
Reach-1	7937	167.323	167.421	170.374
Reach-1	7911.5	Bridge		
Reach-1	7885	190.289	193.57	203.412
Reach-1	7826	242.782	242.782	242.782
Reach-1	7757	72.178	150.919	134.514
Reach-1	7711	40.354	36.417	50.853
Reach-1	7698	47.572	47.572	47.572
Reach-1	7689.5	Bridge		
Reach-1	7681	44.619	44.619	44.619
Reach-1	7666	265.092	248.031	242.126
Reach-1	7589	811.024	811.024	811.024
Reach-1	7370	688.976	668.635	656.168
Reach-1	7168	159.449	155.84	152.887
Reach-1	7120	154.199	155.512	158.465
Reach-1	7073	333.005	337.27	339.567
Reach-1	6970	180.118	180.118	180.118
Reach-1	6915	83.661	83.661	83.661
Reach-1	6890	211.942	211.942	211.942
Reach-1	6825	54.134	54.134	54.134
Reach-1	6809	174.869	174.869	174.869
Reach-1	6756	74.475	74.475	74.475
Reach-1	6732	255.906	259.842	259.186
Reach-1	6653	190.289	197.507	205.052
Reach-1	6593	170.604	171.588	173.885
Reach-1	6541	233.924	223.753	212.927
Reach-1	6473	179.134	181.43	182.415
Reach-1	6445.5	Culvert		
Reach-1	6417	20.997	28.215	36.417
Reach-1	6409	46.588	46.588	46.588
Reach-1	6394	294.291	294.291	294.291
Reach-1	6349.5	Culvert		
Reach-1	6305	121.391	126.969	131.234
Reach-1	6266	165.026	165.026	165.026
Reach-1	6216	308.399	308.399	308.399
Reach-1	6122	181.102	181.102	181.102
Reach-1	6067	117.454	112.533	107.612
Reach-1	6033	279.528	279.528	279.528
Reach-1	5996.5	Culvert		
Reach-1	5947	226.378	226.378	226.378
Reach-1	5878	150.919	150.919	150.919
Reach-1	5832	60.696	64.304	67.257
Reach-1	5813	Inl Struct		
Reach-1	5812.5	31.168	27.887	24.934
Reach-1	5804	154.199	154.856	157.48
Reach-1	5757	415.682	421.916	424.213
Reach-1	5628	339.895	343.176	351.378
Reach-1	5524	219.816	223.425	232.94
Reach-1	5456	112.533	112.533	112.533
Reach-1	5422	219.816	218.176	214.895
Reach-1	5355	429.79	429.79	429.79
Reach-1	5295.5	Culvert		
Reach-1	5224	76.444	60.039	54.79
Reach-1	5206	193.57	198.491	198.491
Reach-1	5145	198.819	198.819	198.819
Reach-1	5084	63.32	65.617	68.241
Reach-1	5065	144.029	141.732	139.108
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

Proposed Condition, FEMA Q - Floodway (Plan & Flow data only)

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                    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
           XXXXXXX  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  XXXXXX    XXXX        X    X   X    X   XXXXX
```

PROJECT DATA
Project Title: Beaver Pnd Brk, Waterbury, English
Project File : 151273BPB_CLOMR_English.prj
Run Date and Time: 9/9/2013 1:54:40 PM

Project in English units

Project Description:
Beaver Pond Brook, Waterbury
ConnDOT Project No. 151-273 - Reconstruction of
I-84 from Washington Ave. to Pierpont Rd.
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 both no backwater AND backwater
conditions from the Mad River. The Connecticut DEP will review the 10 year and
floodway profiles assuming no backwater from the Mad River.
Floodway
encroachments for FEMA cross sections for the Existing Condtion model were
taken from the original FIS. Encroachment stations for new cross sections were
estimated by scaling from the Floodway Maps, scale 1"=400'.
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 - FEMA - Floodway
Plan File : C:\Users\Won\Documents\151-273\Beaver Pond
Brook_CLOMR_Rev03\151273BPB_CLOMR_English.p09

Geometry Title: PROPOSED CONDITION (Post-Construction)
Geometry File : C:\Users\Won\Documents\151-273\Beaver Pond
Brook_CLOMR_Rev03\151273BPB_CLOMR_English.g11

```
           Flow Title    : FEMA Floodway without Backwater (Proposed)
           Flow File     : C:\Users\Won\Documents\151-273\Beaver Pond
Brook_CLOMR_Rev03\151273BPB_CLOMR_English.f09

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  =  0.0328
    Critical depth calculation tolerance =  0.0328
    Maximum number of iterations         =  20
    Maximum difference tolerance         =  0.9843
    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:     Subcritical Flow

Encroachment Data
   Equal Conveyance = True
   Left Offset      =        0
   Right Offset     =        0

River = Beaver Pond Brk  Reach = Reach-1
RS      Profile           Method  Value1  Value2
8722    Floodway               1   -8.36   23.27
8640    Floodway               1 -136.55   20.45
8583    Floodway               1   -76.1    67.8
8573    Floodway               1     -14    9.71
8554    Floodway               1     -10       8
8536    Floodway               1  -15.01     8.2
8464    Floodway               1   -14.6     9.9
8412    Floodway               1  -12.44    7.86
8393    Floodway               1  -10.45   11.72
8356    Floodway               1  -17.95   17.25
8309    Floodway               1  -13.05    17.4
8289    Floodway               1  -13.17   16.28
8237    Floodway               1  -14.98   11.16
8178    Floodway               1  -14.67   16.53
8128    Floodway               1  -10.01   14.39
8080    Floodway               1  -16.61    8.96
8027    Floodway               1  -13.31    9.47
7977    Floodway               1  -13.81   18.45
7937    Floodway               1  -16.44   17.24
7885    Floodway               1  -26.71   15.49
7826    Floodway               1  -24.61   13.19
7757    Floodway               1     -82   15.32
7711    Floodway               1    -108      55
7698    Floodway               1   -7.22   10.79
7681    Floodway               1   -6.92   11.09
7666    Floodway               1  -11.98    31.5
7589    Floodway               1  -17.98   64.18
7370    Floodway               1     -70   29.99
7168    Floodway               1     -88      24
7120    Floodway               1  -70.44   12.47
7073    Floodway               1  -20.21   25.16
6970    Floodway               1  -13.22   16.82
6915    Floodway               1   -16.9   18.38
6890    Floodway               1 -15.748    18.4
6825    Floodway               1     -17      18
6809    Floodway               1   -18.6   17.49
6756    Floodway               1  -29.53   16.21
6732    Floodway               1  -36.09   19.59
6653    Floodway               1   -16.5    24.6
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6593	Floodway	1	-32.7	24.4
6541	Floodway	1	-31.3	66.57
6473	Floodway	1	-21.128	27.396
6417	Floodway	1	-16.15	18.47
6409	Floodway	1	-19.5	19.48
6394	Floodway	1	-21.24	21.26
6305	Floodway	1	-16.51	16.56
6266	Floodway	1	-15.36	15.68
6216	Floodway	1	-16.15	16.48
6122	Floodway	1	-18.71	17.49
6067	Floodway	1	-28.63	24.36
6033	Floodway	1	-27.41	24.74
5947	Floodway	1	-18.06	12.61
5878	Floodway	1	-25.02	23.33
5832	Floodway	1	-15.85	12.14
5812.5	Floodway	1	-20.33	19.86
5804	Floodway	1	-22.1	16.2
5757	Floodway	1	-20.1	14.1
5628	Floodway	1	-23.4	11.1
5524	Floodway	1	-20.6	16.21
5456	Floodway	1	-18.28	17.19
5422	Floodway	1	-23.15	23.47
5355	Floodway	1	-13.52	19.47
5224	Floodway	1	-54.15	23.29
5206	Floodway	1	-36.2	23.01
5145	Floodway	1	-32.85	31.5
5084	Floodway	1	-31.5	61.5
5065	Floodway	1	-30.71	29.33
5021	Floodway	1	-24.05	24.38

River = Beaver Pond Brk Reach = Reach-1

RS	Profile	Method	Value1	Value2
8722	10 Year	0	0	0
8640	10 Year	0	0	0
8583	10 Year	0	0	0
8573	10 Year	0	0	0
8554	10 Year	0	0	0
8536	10 Year	0	0	0
8464	10 Year	0	0	0
8412	10 Year	0	0	0
8393	10 Year	0	0	0
8356	10 Year	0	0	0
8309	10 Year	0	0	0
8289	10 Year	0	0	0
8237	10 Year	0	0	0
8178	10 Year	0	0	0
8128	10 Year	0	0	0
8080	10 Year	0	0	0
8027	10 Year	0	0	0
7977	10 Year	0	0	0
7937	10 Year	0	0	0
7885	10 Year	0	0	0
7826	10 Year	0	0	0
7757	10 Year	0	0	0
7711	10 Year	0	0	0
7698	10 Year	0	0	0
7681	10 Year	0	0	0
7666	10 Year	0	0	0
7589	10 Year	0	0	0
7370	10 Year	0	0	0
7168	10 Year	0	0	0
7120	10 Year	0	0	0
7073	10 Year	0	0	0
6970	10 Year	0	0	0
6915	10 Year	0	0	0
6890	10 Year	0	0	0
6825	10 Year	0	0	0
6809	10 Year	0	0	0
6756	10 Year	0	0	0
6732	10 Year	0	0	0
6653	10 Year	0	0	0
6593	10 Year	0	0	0
6541	10 Year	0	0	0
6473	10 Year	0	0	0
6417	10 Year	0	0	0
6409	10 Year	0	0	0
6394	10 Year	0	0	0

6305	10 Year	0	0	0
6266	10 Year	0	0	0
6216	10 Year	0	0	0
6122	10 Year	0	0	0
6067	10 Year	0	0	0
6033	10 Year	0	0	0
5947	10 Year	0	0	0
5878	10 Year	0	0	0
5832	10 Year	0	0	0
5812.5	10 Year	0	0	0
5804	10 Year	0	0	0
5757	10 Year	0	0	0
5628	10 Year	0	0	0
5524	10 Year	0	0	0
5456	10 Year	0	0	0
5422	10 Year	0	0	0
5355	10 Year	0	0	0
5224	10 Year	0	0	0
5206	10 Year	0	0	0
5145	10 Year	0	0	0
5084	10 Year	0	0	0
5065	10 Year	0	0	0
5021	10 Year	0	0	0

River = Beaver Pond Brk Reach = Reach-1

RS	Profile	Method	Value1	Value2
8722	10 Yr Fldwy	1	-8.36	23.27
8640	10 Yr Fldwy	1	-136.55	20.45
8583	10 Yr Fldwy	1	-76.1	67.8
8573	10 Yr Fldwy	1	-14	9.71
8554	10 Yr Fldwy	1	-10	8
8536	10 Yr Fldwy	1	-15.01	8.2
8464	10 Yr Fldwy	1	-14.6	9.9
8412	10 Yr Fldwy	1	-12.44	7.86
8393	10 Yr Fldwy	1	-10.45	11.72
8356	10 Yr Fldwy	1	-17.95	17.25
8309	10 Yr Fldwy	1	-13.05	17.4
8289	10 Yr Fldwy	1	-13.17	16.28
8237	10 Yr Fldwy	1	-14.98	11.16
8178	10 Yr Fldwy	1	-14.67	16.53
8128	10 Yr Fldwy	1	-10.01	14.39
8080	10 Yr Fldwy	1	-16.61	8.96
8027	10 Yr Fldwy	1	-13.31	9.47
7977	10 Yr Fldwy	1	-13.81	18.45
7937	10 Yr Fldwy	1	-16.44	17.24
7885	10 Yr Fldwy	1	-26.71	15.49
7826	10 Yr Fldwy	1	-24.61	13.19
7757	10 Yr Fldwy	1	-82	15.32
7711	10 Yr Fldwy	1	-108	55
7698	10 Yr Fldwy	1	-7.22	10.79
7681	10 Yr Fldwy	1	-6.92	11.09
7666	10 Yr Fldwy	1	-11.98	31.5
7589	10 Yr Fldwy	1	-17.98	64.18
7370	10 Yr Fldwy	1	-70	29.99
7168	10 Yr Fldwy	1	-88	24
7120	10 Yr Fldwy	1	-70.44	12.47
7073	10 Yr Fldwy	1	-20.21	25.16
6970	10 Yr Fldwy	1	-13.22	16.82
6915	10 Yr Fldwy	1	-16.9	18.38
6890	10 Yr Fldwy	1	-15.748	18.4
6825	10 Yr Fldwy	1	-17	18
6809	10 Yr Fldwy	1	-18.6	17.49
6756	10 Yr Fldwy	1	-29.53	16.21
6732	10 Yr Fldwy	1	-36.09	19.59
6653	10 Yr Fldwy	1	-16.5	24.6
6593	10 Yr Fldwy	1	-32.7	24.4
6541	10 Yr Fldwy	1	-31.3	66.57
6473	10 Yr Fldwy	1	-21.128	27.396
6417	10 Yr Fldwy	1	-16.15	18.47
6409	10 Yr Fldwy	1	-19.5	19.48
6394	10 Yr Fldwy	1	-21.24	21.26
6305	10 Yr Fldwy	1	-16.51	16.56
6266	10 Yr Fldwy	1	-15.36	15.68
6216	10 Yr Fldwy	1	-16.15	16.48
6122	10 Yr Fldwy	1	-18.71	17.49
6067	10 Yr Fldwy	1	-28.63	24.36
6033	10 Yr Fldwy	1	-27.41	24.74

5947	10 Yr Fldwy	1	-18.06	12.61
5878	10 Yr Fldwy	1	-25.02	23.33
5832	10 Yr Fldwy	1	-15.85	12.14
5812.5	10 Yr Fldwy	1	-20.33	19.86
5804	10 Yr Fldwy	1	-22.1	16.2
5757	10 Yr Fldwy	1	-20.1	14.1
5628	10 Yr Fldwy	1	-23.4	11.1
5524	10 Yr Fldwy	1	-20.6	16.21
5456	10 Yr Fldwy	1	-18.28	17.19
5422	10 Yr Fldwy	1	-23.15	23.47
5355	10 Yr Fldwy	1	-13.52	19.47
5224	10 Yr Fldwy	1	-54.15	23.29
5206	10 Yr Fldwy	1	-36.2	23.01
5145	10 Yr Fldwy	1	-32.85	31.5
5084	10 Yr Fldwy	1	-31.5	61.5
5065	10 Yr Fldwy	1	-30.71	29.33
5021	10 Yr Fldwy	1	-24.05	24.38

FLOW DATA

Flow Title: FEMA Floodway without Backwater (Proposed)
Flow File : C:\Users\Won\Documents\151-273\Beaver Pond Brook_CLOMR_Rev03\151273BPB_CLOMR_English.f09

Flow Data (cfs)

River	Reach	RS	100 Year	Floodway	10 Year	10 Yr Fldwy
Beaver Pond Brk	Reach-1	8722	410	410	205	205
Beaver Pond Brk	Reach-1	7937	625	625	305	305
Beaver Pond Brk	Reach-1	7698	870	870	430	430
Beaver Pond Brk	Reach-1	7120	965	965	475	475
Beaver Pond Brk	Reach-1	6473	1055	1055	515	515
Beaver Pond Brk	Reach-1	5878	1625	1625	795	795
Beaver Pond Brk	Reach-1	5355	1960	1960	955	955

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Beaver Pond Brk	Reach-1	100 Year	Known WS = 496.69	Normal S = 0.0143
Beaver Pond Brk	Reach-1	Floodway	Known WS = 493.7	Normal S = 0.0143
Beaver Pond Brk	Reach-1	10 Year	Known WS = 491.73	Normal S = 0.0143
Beaver Pond Brk	Reach-1	10 Yr Fldwy	Known WS = 491.73	Normal S = 0.0143

Appendix B

Appendix B - Output Printouts And Additional Plots

Duplicate Effective Model - Regulatory Run (with Backwater):

- "Standard Table 1" Output
- "Six XS Bridge" Output
- Water Surface Profiles (10-, 50-, 100- and 500-Year)

Duplicate Effective Model - Floodway Run (without Backwater):

- "Standard Table 1" Output
- "Encroachment 1"

Existing Condition Model - Regulatory Run

- "Standard Table 1" Output
- "Six XS Bridge" Output
- "Culvert Only" Output
- Water Surface Profiles (10-, 50-, 100- and 500-Year)

Existing Condition Model - Floodway Run

- "Standard Table 1" Output (100-Year, 100-encraoached, 10-Year and 10-encraoched)
- "Encroachment 1" Output

Proposed Condition Condition Model - Regulatory Run

- "Standard Table 1" Output
- "Six XS Bridge" Output
- "Culvert Only" Output
- Water Surface Profiles (10-, 50-, 100- and 500-Year)

Proposed Condition Model - Floodway Run

- "Standard Table 1" Output (100-Year, 100-encraoached, 10-Year and 10-encraoched)
- "Encroachment 1" Output

Cross Section Plots: 100-Year Base Flood Existing vs. Proposed Condition

BEAVER POND BROOK - DUPLICATE EFFECTIVE, FEMA REGULATORY (W/ BACKWATER)
HEC-RAS 4.1.0 - "Standard Table 1" Output

HEC-RAS Plan: FEMA w/Back 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
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	8722	10 Year	205	488.5	491.94	491.12	492.16	0.005139	3.76	54.56	30.7	0.49
Reach-1	8722	50 Year	340	488.5	493.17	491.7	493.33	0.004042	3.22	107.96	67.25	0.44
Reach-1	8722	100 Year	410	488.5	493.77	491.92	493.89	0.002286	2.79	151.57	76.98	0.34
Reach-1	8722	500 Year	615	488.5	494.81	492.76	494.92	0.001461	2.67	240.08	93.67	0.29
Reach-1	8640	10 Year	205	488.3	491.96	489.76	491.97	0.000152	0.7	291.94	153.67	0.09
Reach-1	8640	50 Year	340	488.3	493.21	490.1	493.22	0.000079	0.7	494.34	171.51	0.07
Reach-1	8640	100 Year	410	488.3	493.8	490.24	493.81	0.000064	0.71	598.29	180.44	0.06
Reach-1	8640	500 Year	615	488.3	494.83	490.58	494.84	0.000062	0.82	793.88	198.33	0.07
Reach-1	8573	10 Year	205	488.5	490.71	490.71	491.75	0.02667	8.2	25.01	12	1
Reach-1	8573	50 Year	340	488.5	491.55	491.55	493.01	0.027242	9.7	35.04	12	1
Reach-1	8573	100 Year	410	488.5	491.92	491.92	493.59	0.027888	10.36	39.59	12	1
Reach-1	8573	500 Year	615	488.5	493.86	493.86	494.71	0.010149	8.11	137.64	120.83	0.62
Reach-1	8464	10 Year	205	480.8	484.07	483.6	484.61	0.010764	5.89	34.81	16.93	0.72
Reach-1	8464	50 Year	340	480.8	485.71	484.37	486.12	0.004939	5.09	66.86	22.16	0.52
Reach-1	8464	100 Year	410	480.8	488.77	484.71	488.88	0.001223	2.62	156.77	50.88	0.26
Reach-1	8464	500 Year	615	480.8	490.49	485.55	490.59	0.000641	2.45	264.23	73.42	0.2
Reach-1	8455	10 Year	205	479.4	482.15	482.14	483.5	0.032917	9.33	21.97	8	0.99
Reach-1	8455	50 Year	340	479.4	483.25	483.24	485.14	0.036028	11.05	30.78	8	0.99
Reach-1	8455	100 Year	410	479.4	488.09	483.74	488.63	0.006312	5.9	69.51	41.06	0.35
Reach-1	8455	500 Year	615	479.4	489.32	485.09	490.25	0.009122	7.75	79.38	70.44	0.43
Reach-1	8439.5		Bridge									
Reach-1	8412	10 Year	205	479.4	482.13	482.13	483.5	0.03347	9.38	21.84	8	1
Reach-1	8412	50 Year	340	479.4	483.22	483.22	485.14	0.036611	11.11	30.59	8	1
Reach-1	8412	100 Year	410	479.4	483.72	483.72	485.91	0.038378	11.85	34.6	8	1
Reach-1	8412	500 Year	615	479.4	485.07	485.07	487.92	0.042682	13.55	45.39	8	1
Reach-1	8393	10 Year	205	473.4	475.75	475.67	476.42	0.0184	6.55	31.32	20.14	0.92
Reach-1	8393	50 Year	340	473.4	476.63	476.29	477.36	0.012529	6.82	49.85	21.99	0.8
Reach-1	8393	100 Year	410	473.4	476.92	476.57	477.74	0.012831	7.3	56.14	22.58	0.82
Reach-1	8393	500 Year	615	473.4	477.63	477.29	478.74	0.01358	8.46	72.71	24.08	0.86
Reach-1	8178	10 Year	205	463.5	466.17	465.91	466.66	0.013402	5.61	36.51	23.25	0.79
Reach-1	8178	50 Year	340	463.5	466.5	466.5	467.41	0.021008	7.65	44.42	24.62	1
Reach-1	8178	100 Year	410	463.5	466.76	466.76	467.76	0.020551	8.03	51.08	25.71	1
Reach-1	8178	500 Year	615	463.5	467.43	467.43	468.66	0.019661	8.88	69.27	28.49	1
Reach-1	7937	10 Year	305	456.6	460.07	459.08	460.46	0.005809	5.05	60.44	23.56	0.56
Reach-1	7937	50 Year	515	456.6	462.67	459.94	462.9	0.001868	3.86	133.37	32.52	0.34
Reach-1	7937	100 Year	625	456.6	463.69	460.32	463.91	0.001457	3.71	168.53	36.05	0.3
Reach-1	7937	500 Year	940	456.6	465.15	461.26	465.42	0.001458	4.18	228.99	51.64	0.31
Reach-1	7922	10 Year	305	455.5	459.98	458.13	460.18	0.002543	3.64	83.87	25.79	0.36
Reach-1	7922	50 Year	515	455.5	462.63	458.94	462.8	0.001184	3.23	159.58	31.31	0.25
Reach-1	7922	100 Year	625	455.5	463.66	459.29	463.83	0.001035	3.24	192.89	33.46	0.24
Reach-1	7922	500 Year	940	455.5	465.12	460.2	465.34	0.001074	3.74	297.23	104.04	0.25
Reach-1	7911.5		Bridge									
Reach-1	7900	10 Year	305	455.5	459.97	457.88	460.13	0.001581	3.28	92.95	42.66	0.31
Reach-1	7900	50 Year	515	455.5	462.01	458.64	462.12	0.000773	2.89	225.75	56.87	0.23
Reach-1	7900	100 Year	625	455.5	462.66	459	462.79	0.000768	3.05	265	62.83	0.23
Reach-1	7900	500 Year	940	455.5	463.68	459.88	463.86	0.000996	3.75	333.6	72.08	0.27
Reach-1	7885	10 Year	305	455.8	459.89	457.88	460.04	0.001803	3.16	96.59	31.91	0.32
Reach-1	7885	50 Year	515	455.8	461.92	458.65	462.06	0.001079	3.03	170.05	40.35	0.26
Reach-1	7885	100 Year	625	455.8	462.58	459	462.73	0.00104	3.17	200.48	65.64	0.26
Reach-1	7885	500 Year	940	455.8	463.58	459.85	463.8	0.00124	3.81	276.23	84.38	0.29
Reach-1	7711	10 Year	305	453.7	459.88	455.86	459.88	0.000052	0.61	496.19	140.1	0.06
Reach-1	7711	50 Year	515	453.7	461.93	456.2	461.94	0.000035	0.63	813.55	370.34	0.05
Reach-1	7711	100 Year	625	453.7	462.6	456.36	462.61	0.00003	0.64	1242.11	448.46	0.05
Reach-1	7711	500 Year	940	453.7	463.63	456.76	463.63	0.000034	0.76	1712.84	471.13	0.05
Reach-1	7698	10 Year	430	453.3	459.53	456.4	459.8	0.002359	4.17	103.22	18	0.31
Reach-1	7698	50 Year	715	453.3	461.38	457.46	461.81	0.003	5.23	136.64	18	0.33
Reach-1	7698	100 Year	870	453.3	461.89	457.96	462.44	0.003686	5.96	151.43	54.16	0.37

HEC-RAS Plan: FEMA w/Back 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
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	7698	500 Year	1315	453.3	462.11	459.29	463.27	0.007655	8.7	165.14	69.49	0.53
Reach-1	7689.5		Bridge									
Reach-1	7681	10 Year	430	453.3	459.13	456.4	459.45	0.00288	4.47	96.18	18	0.34
Reach-1	7681	50 Year	715	453.3	459.97	457.46	460.61	0.005289	6.43	111.24	18	0.46
Reach-1	7681	100 Year	870	453.3	460.16	457.96	461.06	0.007189	7.58	114.71	18	0.53
Reach-1	7681	500 Year	1315	453.3	460.55	459.29	462.37	0.013929	10.8	121.74	18	0.73
Reach-1	7666	10 Year	430	453.6	459.21	456.07	459.27	0.000486	1.9	243.28	96.99	0.18
Reach-1	7666	50 Year	715	453.6	460.18	456.7	460.27	0.000584	2.4	353.46	134.13	0.2
Reach-1	7666	100 Year	870	453.6	460.48	457	460.58	0.000683	2.71	395.4	151.59	0.22
Reach-1	7666	500 Year	1315	453.6	461.27	457.76	461.43	0.00086	3.37	534.37	198.77	0.25
Reach-1	7589	10 Year	430	453.8	459.11	457.02	459.13	0.000471	1.21	353.99	190.16	0.16
Reach-1	7589	50 Year	715	453.8	460.1	457.49	460.12	0.000381	1.23	598.66	463.19	0.15
Reach-1	7589	100 Year	870	453.8	460.4	457.69	460.42	0.000359	1.3	738.74	472.92	0.14
Reach-1	7589	500 Year	1315	453.8	461.22	458.13	461.25	0.000287	1.4	1139.01	499.67	0.14
Reach-1	7120	10 Year	475	451.9	456.5	455.55	457.08	0.008061	6.09	78.03	27.93	0.64
Reach-1	7120	50 Year	795	451.9	458.18	456.65	458.47	0.00643	4.36	182.35	98.88	0.57
Reach-1	7120	100 Year	965	451.9	458.69	457.59	458.95	0.004863	4.05	238.31	117.75	0.5
Reach-1	7120	500 Year	1460	451.9	460.17	458.23	460.3	0.001754	3.02	577	280.76	0.32
Reach-1	7073	10 Year	475	451	455.68	454.38	456.06	0.004618	4.93	96.36	33.41	0.51
Reach-1	7073	50 Year	795	451	457.29	455.34	457.64	0.004245	4.73	167.94	59.2	0.5
Reach-1	7073	100 Year	965	451	457.92	455.77	458.25	0.003822	4.62	208.99	71.02	0.47
Reach-1	7073	500 Year	1460	451	459.73	457.02	459.98	0.002201	3.96	368.53	105	0.37
Reach-1	6890	10 Year	475	448.5	453.19	451.47	453.57	0.003753	4.97	95.54	26.04	0.46
Reach-1	6890	50 Year	795	448.5	454.58	452.51	455.13	0.004071	5.95	133.72	28.88	0.49
Reach-1	6890	100 Year	965	448.5	455.19	452.99	455.82	0.004216	6.36	151.76	30.13	0.5
Reach-1	6890	500 Year	1460	448.5	458.02	454.2	458.58	0.002374	6	249.94	40.53	0.39
Reach-1	6875	10 Year	475	448.5	452.88	451.48	453.34	0.004792	5.42	87.7	25.41	0.51
Reach-1	6875	50 Year	795	448.5	454.23	452.51	454.87	0.005038	6.42	123.93	28.18	0.54
Reach-1	6875	100 Year	965	448.5	454.82	452.99	455.55	0.005179	6.85	140.95	29.39	0.55
Reach-1	6875	500 Year	1460	448.5	457.85	454.2	458.44	0.002572	6.17	236.74	39.8	0.4
Reach-1	6859.5		Bridge									
Reach-1	6843	10 Year	475	448.5	452.71	451.54	453.29	0.006381	6.11	77.69	22.87	0.58
Reach-1	6843	50 Year	795	448.5	453.98	452.66	454.82	0.007016	7.33	108.41	25.54	0.63
Reach-1	6843	100 Year	965	448.5	454.53	453.17	455.49	0.007323	7.86	122.75	26.7	0.65
Reach-1	6843	500 Year	1460	448.5	454.58	454.46	456.73	0.016273	11.77	124.07	26.8	0.96
Reach-1	6827	10 Year	475	448.3	452.69	450.74	452.94	0.002493	4.07	116.68	33.2	0.38
Reach-1	6827	50 Year	795	448.3	454.01	451.65	454.38	0.002692	4.87	163.29	37.18	0.41
Reach-1	6827	100 Year	965	448.3	454.59	452.07	455.01	0.002785	5.21	185.22	38.91	0.42
Reach-1	6827	500 Year	1460	448.3	454.75	453.12	455.65	0.005799	7.62	191.62	39.41	0.61
Reach-1	6490	10 Year	475	443.1	445.78	445.78	446.75	0.019207	7.9	60.16	30.8	1
Reach-1	6490	50 Year	795	443.1	446.63	446.63	447.9	0.017996	9.02	88.13	34.96	1
Reach-1	6490	100 Year	965	443.1	447.03	447.03	448.41	0.017419	9.44	102.24	36.88	1
Reach-1	6490	500 Year	1460	443.1	449.75	448.63	450.03	0.004014	4.23	344.76	140.61	0.48
Reach-1	6462	10 Year	515	441.5	444.79	444.32	445.46	0.010525	6.57	78.39	33.28	0.75
Reach-1	6462	50 Year	865	441.5	445.95	445.24	446.75	0.008853	7.17	120.63	39.19	0.72
Reach-1	6462	100 Year	1055	441.5	446.82	445.66	447.53	0.006373	6.73	156.75	43.61	0.63
Reach-1	6462	500 Year	1595	441.5	449.28	446.67	449.79	0.002998	5.71	279.29	56.06	0.45
Reach-1	6441.5		Bridge									
Reach-1	6420	10 Year	515	438.8	441.75	441.75	443.21	0.023613	9.71	53.02	18	1
Reach-1	6420	50 Year	865	438.8	442.95	442.95	445.03	0.024101	11.57	74.76	18	1
Reach-1	6420	100 Year	1055	438.8	443.53	443.53	445.91	0.024537	12.38	85.23	18	1
Reach-1	6420	500 Year	1595	438.8	445.06	445.06	448.17	0.025489	14.16	112.61	18	1
Reach-1	6397	10 Year	515	430.5	435.22	434.69	436.06	0.010877	7.36	69.97	24.71	0.77
Reach-1	6397	50 Year	865	430.5	436.3	435.8	437.5	0.011878	8.77	98.61	28.31	0.83
Reach-1	6397	100 Year	1055	430.5	436.78	436.32	438.15	0.012319	9.38	112.46	29.89	0.85
Reach-1	6397	500 Year	1595	430.5	437.95	437.55	439.71	0.013266	10.63	149.98	34.79	0.9
Reach-1	6216	10 Year	515	423.6	426.63	426.63	427.76	0.01919	8.54	60.32	26.96	1.01
Reach-1	6216	50 Year	865	423.6	427.64	427.64	429.08	0.017739	9.66	89.55	31.09	1

HEC-RAS Plan: FEMA w/Back 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
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	6216	100 Year	1055	423.6	428.1	428.1	429.69	0.017237	10.11	104.31	32.98	1
Reach-1	6216	500 Year	1595	423.6	429.2	429.2	431.13	0.016394	11.14	143.22	37.51	1
Reach-1	6033	10 Year	515	418.7	423.35	421.37	423.56	0.002118	3.68	139.77	42.52	0.36
Reach-1	6033	50 Year	865	418.7	425.33	422.23	425.55	0.001428	3.7	233.6	52.09	0.31
Reach-1	6033	100 Year	1055	418.7	424.58	422.63	425.03	0.003457	5.38	195.93	48.48	0.47
Reach-1	6033	500 Year	1595	418.7	429.21	423.61	429.38	0.000712	3.38	471.44	73.94	0.23
Reach-1	6016	10 Year	515	417.8	423.05	420.65	423.44	0.002059	5.01	102.72	41.34	0.39
Reach-1	6016	50 Year	865	417.8	424.81	421.78	425.42	0.002175	6.27	137.93	49.03	0.42
Reach-1	6016	100 Year	1055	417.8	422.9	422.33	424.64	0.009534	10.58	99.73	40.69	0.83
Reach-1	6016	500 Year	1595	417.8	429.01	423.74	429.33	0.000793	5.2	480.14	68.8	0.28
Reach-1	5993.5		Bridge									
Reach-1	5970	10 Year	515	416.8	419.63	419.63	421	0.016656	9.39	54.84	38.88	1
Reach-1	5970	50 Year	865	416.8	420.76	420.76	422.7	0.014814	11.16	77.53	46.65	1
Reach-1	5970	100 Year	1055	416.8	421.31	421.31	423.52	0.014178	11.92	88.5	50.41	1
Reach-1	5970	500 Year	1595	416.8	422.72	422.72	425.62	0.012901	13.67	116.66	60.05	1
Reach-1	5947	10 Year	515	414.5	418.31	417.55	418.9	0.007896	6.18	83.38	31.04	0.66
Reach-1	5947	50 Year	865	414.5	419.85	418.53	420.47	0.005675	6.34	136.43	37.79	0.59
Reach-1	5947	100 Year	1055	414.5	420.57	418.98	421.21	0.005025	6.4	164.8	40.95	0.56
Reach-1	5947	500 Year	1595	414.5	422.39	420.07	423.04	0.003832	6.47	246.54	48.92	0.51
Reach-1	5878	10 Year	515	412.5	417.9	415.3	418.06	0.001356	3.17	162.68	44.26	0.29
Reach-1	5878	50 Year	865	412.5	419.51	416.19	419.71	0.001304	3.6	240.11	51.93	0.3
Reach-1	5878	100 Year	1055	412.5	420.26	416.61	420.48	0.001268	3.76	280.32	55.49	0.3
Reach-1	5878	500 Year	1595	412.5	422.14	417.61	422.4	0.001152	4.06	393.23	64.45	0.29
Reach-1	5832	10 Year	515	412.7	417.67	415.22	417.86	0.001259	3.65	164.64	44.6	0.3
Reach-1	5832	50 Year	865	412.7	419.24	416.08	419.51	0.001245	4.42	239.8	50.73	0.31
Reach-1	5832	100 Year	1055	412.7	419.97	416.49	420.28	0.001255	4.77	278.78	58	0.32
Reach-1	5832	500 Year	1595	412.7	421.8	417.53	422.21	0.001209	5.48	415.38	104.56	0.33
Reach-1	5813	10 Year	795	412.7	416.8	415.92	417.53	0.00626	7.08	127.28	41.21	0.64
Reach-1	5813	50 Year	1335	412.7	418.01	417.05	419.1	0.006568	8.75	180.1	45.93	0.69
Reach-1	5813	100 Year	1625	412.7	418.56	417.58	419.83	0.006687	9.47	205.98	48.07	0.71
Reach-1	5813	500 Year	2465	412.7	419.7	418.95	421.58	0.007858	11.64	263.97	54.92	0.8
Reach-1	5812.5		Bridge									
Reach-1	5812	10 Year	795	409.6	413.87	412.94	414.61	0.006182	7.09	123.43	37.76	0.64
Reach-1	5812	50 Year	1335	409.6	414.89	414.09	416.14	0.007602	9.22	163.67	40.66	0.74
Reach-1	5812	100 Year	1625	409.6	415.23	414.63	416.82	0.008888	10.43	177.61	41.62	0.81
Reach-1	5812	500 Year	2465	409.6	416.05	416.03	418.67	0.012203	13.49	212.66	43.94	0.97
Reach-1	5804	10 Year	795	409.6	412.9	412.9	414.16	0.018265	9.02	88.11	35.01	1
Reach-1	5804	50 Year	1335	409.6	413.99	413.99	415.68	0.016908	10.43	128.04	38.1	1
Reach-1	5804	100 Year	1625	409.6	414.5	414.5	416.38	0.016446	11	147.79	39.54	1
Reach-1	5804	500 Year	2465	409.6	415.78	415.78	418.12	0.015596	12.28	200.74	43.16	1
Reach-1	5628	10 Year	795	394.7	398.91	398.91	400.37	0.017935	9.67	82.19	28.46	1
Reach-1	5628	50 Year	1335	394.7	400.2	400.2	402.07	0.016775	10.97	121.73	32.81	1
Reach-1	5628	100 Year	1625	394.7	400.79	400.79	402.84	0.016366	11.48	141.5	34.78	1
Reach-1	5628	500 Year	2465	394.7	402.23	402.23	404.71	0.015506	12.62	195.31	39.65	1
Reach-1	5422	10 Year	795	381.1	384.63	384.63	385.88	0.018099	8.95	88.83	35.9	1
Reach-1	5422	50 Year	1335	381.1	385.75	385.75	387.33	0.016798	10.11	132.1	41.85	1
Reach-1	5422	100 Year	1625	381.1	386.25	386.25	387.98	0.016355	10.57	153.71	44.53	1
Reach-1	5422	500 Year	2465	381.1	389.05	387.47	390.1	0.006051	8.23	299.61	59.53	0.65
Reach-1	5296	10 Year	955	375.4	381.25	379.15	381.69	0.003228	5.29	180.69	42.93	0.45
Reach-1	5296	50 Year	1610	375.4	382.4	380.44	383.15	0.00456	6.93	232.45	47.46	0.55
Reach-1	5296	100 Year	1960	375.4	385.42	381.03	385.8	0.001595	4.98	393.61	59.37	0.34
Reach-1	5296	500 Year	2975	375.4	388.72	382.46	389.09	0.001115	4.87	611.11	72.38	0.3
Reach-1	5276	10 Year	955	373	380.95	377.92	381.5	0.003007	5.94	160.83	40.92	0.4
Reach-1	5276	50 Year	1610	373	381.19	379.43	382.64	0.007674	9.66	166.61	41.86	0.65
Reach-1	5276	100 Year	1960	373	385.14	380.16	385.67	0.002006	6.31	420.83	78.73	0.34
Reach-1	5276	500 Year	2975	373	388.6	382.07	389.01	0.001257	6.01	802.62	133.78	0.28
Reach-1	5254.5		Bridge									
Reach-1	5232	10 Year	955	373.2	378.68	378.03	380.01	0.009045	9.24	103.32	53.2	0.79

HEC-RAS Plan: FEMA w/Back 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
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	5232	50 Year	1610	373.2	380.34	379.57	382.3	0.008678	11.25	143.12	66.34	0.81
Reach-1	5232	100 Year	1960	373.2	380.78	380.3	383.3	0.010124	12.75	153.77	69.86	0.89
Reach-1	5232	500 Year	2975	373.2	382.71	382.19	386.14	0.009715	14.88	199.98	96.32	0.91
Reach-1	5206	10 Year	955	373	377.65	377.26	378.73	0.012288	8.33	114.67	37.8	0.84
Reach-1	5206	50 Year	1610	373	380.19	378.54	380.97	0.005405	7.08	227.25	50.94	0.59
Reach-1	5206	100 Year	1960	373	380.78	379.1	381.68	0.005629	7.58	258.48	53.92	0.61
Reach-1	5206	500 Year	2975	373	383.43	380.5	384.22	0.003483	7.1	418.97	67.17	0.5
Reach-1	5145	10 Year	955	370.6	377.08	374.88	377.4	0.0025	4.53	210.94	52.17	0.4
Reach-1	5145	50 Year	1610	370.6	379.99	375.98	380.27	0.001221	4.24	401.99	83.98	0.3
Reach-1	5145	100 Year	1960	370.6	380.58	376.49	380.91	0.001348	4.69	454.41	103.09	0.32
Reach-1	5145	500 Year	2975	370.6	383.38	377.73	383.68	0.000812	4.58	861.75	163.05	0.26
Reach-1	5084	10 Year	955	368.9	375.9	373.53	376.65	0.005441	6.95	137.42	22	0.49
Reach-1	5084	50 Year	1610	368.9	378.87	375.14	379.71	0.007653	7.36	222.79	70.28	0.6
Reach-1	5084	100 Year	1960	368.9	379.23	375.91	380.28	0.008838	8.27	251.58	92.4	0.65
Reach-1	5084	500 Year	2975	368.9	383.18	379.6	383.46	0.001459	4.93	953.24	197	0.29
Reach-1	5066	10 Year	955	368.4	375.61	373.03	376.31	0.004946	6.72	142.11	22	0.47
Reach-1	5066	50 Year	1610	368.4	378.44	374.63	379.25	0.007316	7.26	227.35	74.22	0.59
Reach-1	5066	100 Year	1960	368.4	378.5	375.43	379.68	0.010383	8.71	232.01	78.05	0.7
Reach-1	5066	500 Year	2975	368.4	383.13	379.12	383.36	0.001156	4.54	1041.24	197	0.26
Reach-1	5050.5		Bridge									
Reach-1	5035	10 Year	955	368.4	374.72	373.03	375.66	0.007546	7.79	122.57	22	0.58
Reach-1	5035	50 Year	1610	368.4	375.89	374.65	377.72	0.012478	10.86	148.23	22	0.74
Reach-1	5035	100 Year	1960	368.4	377.36	375.43	379.19	0.01064	10.85	180.73	22	0.67
Reach-1	5035	500 Year	2975	368.4	382.38	379.13	382.7	0.001722	5.24	894	197	0.31
Reach-1	5021	10 Year	955	369.7	375.1	372.18	375.16	0.000536	2.04	469.2	127.23	0.19
Reach-1	5021	50 Year	1610	369.7	376.7	372.8	376.79	0.000471	2.38	680.24	142.25	0.18
Reach-1	5021	100 Year	1960	369.7	378.2	373.09	378.28	0.000299	2.23	913.3	168.5	0.15
Reach-1	5021	500 Year	2975	369.7	382.5	373.83	382.55	0.00012	1.92	1744.95	200	0.1

BEAVER POND BROOK - DUPLICATE EFFECTIVE, FEMA REGULATORY (W/ BACKWATER)
HEC-RAS 4.1.0 - "Six XS Bridge" Output

HEC-RAS Plan: FEMA w/Back River: Beaver Pond Brk Reach: Reach-1												
Reach	River Sta	Profile	E.G. Elev	W.S. Elev	Crit W.S.	Frctn Loss	C & E Loss	Top Width	Q Left	Q Channel	Q Right	Vel Chnl
			(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft/s)
Reach-1	8464	10 Year	484.61	484.07	483.6	0.87	0.24	16.93		205		5.89
Reach-1	8464	50 Year	486.12	485.71	484.37	0.53	0.45	22.16		340		5.09
Reach-1	8464	100 Year	488.88	488.77	484.71	0.12	0.13	50.88		410		2.62
Reach-1	8464	500 Year	490.59	490.49	485.55	0.08	0.25	73.42		608.98	6.02	2.45
Reach-1	8455	10 Year	483.5	482.15	482.14			8		205		9.33
Reach-1	8455	50 Year	485.14	483.25	483.24			8		340		11.05
Reach-1	8455	100 Year	488.63	488.09	483.74			41.06		410		5.9
Reach-1	8455	500 Year	490.25	489.32	485.09			70.44		615		7.75
Reach-1	8439.5 BR U	10 Year	483.5	482.13	482.13			7.99		205		9.38
Reach-1	8439.5 BR U	50 Year	485.15	483.24	483.24			7.99		340		11.09
Reach-1	8439.5 BR U	100 Year	488.63	487.4	483.74			7.99		410		6.41
Reach-1	8439.5 BR U	500 Year	490.25	487.4	485.09			7.99		615		9.62
Reach-1	8439.5 BR D	10 Year	483.5	482.14	482.14			7.99		205		9.36
Reach-1	8439.5 BR D	50 Year	485.15	483.23	483.23			7.99		340		11.12
Reach-1	8439.5 BR D	100 Year	485.91	483.74	483.74			7.99		410		11.83
Reach-1	8439.5 BR D	500 Year	487.93	485.08	485.08			7.99		615		13.55
Reach-1	8412	10 Year	483.5	482.13	482.13	1.94	0.35	8		205		9.38
Reach-1	8412	50 Year	485.14	483.22	483.22	1.6	0.6	8		340		11.11
Reach-1	8412	100 Year	485.91	483.72	483.72	1.65	0.68	8		410		11.85
Reach-1	8412	500 Year	487.92	485.07	485.07	1.78	0.87	8		615		13.55
Reach-1	8393	10 Year	476.42	475.75	475.67	9.68	0.09	20.14		205		6.55
Reach-1	8393	50 Year	477.36	476.63	476.29	9.89	0.06	21.99		340		6.82
Reach-1	8393	100 Year	477.74	476.92	476.57	9.93	0.05	22.58		410		7.3
Reach-1	8393	500 Year	478.74	477.63	477.29	10.04	0.03	24.08		615		8.46
Reach-1	7937	10 Year	460.46	460.07	459.08	0.18	0.1	23.56		305		5.05
Reach-1	7937	50 Year	462.9	462.67	459.94	0.07	0.03	32.52		515		3.86
Reach-1	7937	100 Year	463.91	463.69	460.32	0.06	0.03	36.05		625		3.71
Reach-1	7937	500 Year	465.42	465.15	461.26	0.06	0.03	51.64	1.81	938.19		4.18
Reach-1	7922	10 Year	460.18	459.98	458.13			25.79		305		3.64
Reach-1	7922	50 Year	462.8	462.63	458.94			31.31		515		3.23
Reach-1	7922	100 Year	463.83	463.66	459.29			33.46		625		3.24
Reach-1	7922	500 Year	465.34	465.12	460.2			104.04	22.25	910.09	7.66	3.74
Reach-1	7911.5 BR U	10 Year	460.19	459.97	458.19			24.77		305		3.81
Reach-1	7911.5 BR U	50 Year	462.79	460.3	459.01			25.46		515		5.83
Reach-1	7911.5 BR U	100 Year	463.82	460.3	459.38			25.46		625		7.07
Reach-1	7911.5 BR U	500 Year	465.33	465.12	460.31			69.04	147.9	745.59	45.07	8.43
Reach-1	7911.5 BR D	10 Year	460.15	459.97	457.93			26.14		305		3.42
Reach-1	7911.5 BR D	50 Year	462.12	460.3	458.72			26.79		515		5.26
Reach-1	7911.5 BR D	100 Year	462.79	460.3	459.07			26.79		625		6.38
Reach-1	7911.5 BR D	500 Year	464.91	464.52	459.98			49.28	147.9	745.59	45.07	7.61
Reach-1	7900	10 Year	460.13	459.97	457.88	0.08	0.01	42.66		305		3.28
Reach-1	7900	50 Year	462.12	462.01	458.64	0.05	0.01	56.87	74.72	440.28		2.89
Reach-1	7900	100 Year	462.79	462.66	459	0.04	0.01	62.83	96.98	528.02		3.05
Reach-1	7900	500 Year	463.86	463.68	459.88	0.06	0.01	72.08	163.5	776.47		3.75
Reach-1	7885	10 Year	460.04	459.89	457.88	0.09	0.07	31.91		305		3.16
Reach-1	7885	50 Year	462.06	461.92	458.65	0.06	0.07	40.35		515		3.03
Reach-1	7885	100 Year	462.73	462.58	459	0.05	0.07	65.64	0.51	624.49		3.17
Reach-1	7885	500 Year	463.8	463.58	459.85	0.06	0.11	84.38	21.35	918.65		3.81
Reach-1	7711	10 Year	459.88	459.88	455.86	0.01	0.08	140.1		305		0.61
Reach-1	7711	50 Year	461.94	461.93	456.2	0.01	0.13	370.34		514.92	0.08	0.63
Reach-1	7711	100 Year	462.61	462.6	456.36	0.01	0.16	448.46	35.11	589.59	0.3	0.64
Reach-1	7711	500 Year	463.63	463.63	456.76	0.01	0.35	471.13	108	830.77	1.2	0.76
Reach-1	7698	10 Year	459.8	459.53	456.4			18		430		4.17
Reach-1	7698	50 Year	461.81	461.38	457.46			18		715		5.23
Reach-1	7698	100 Year	462.44	461.89	457.96			54.16		868.13	1.87	5.96

HEC-RAS Plan: FEMA w/Back River: Beaver Pond Brk Reach: Reach-1												
Reach	River Sta	Profile	E.G. Elev	W.S. Elev	Crit W.S.	Frctn Loss	C & E Loss	Top Width	Q Left	Q Channel	Q Right	Vel Chnl
			(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft/s)
Reach-1	7698	500 Year	463.27	462.11	459.29			69.49	0	1303.72	11.28	8.7
Reach-1	7689.5 BR U	10 Year	459.8	458.5	456.49			17		430		5.36
Reach-1	7689.5 BR U	50 Year	461.81	461.38	457.57					712.42	2.63	8.88
Reach-1	7689.5 BR U	100 Year	462.44	461.89	458.12			36.16	5.22	792.28	72.53	9.87
Reach-1	7689.5 BR U	500 Year	463.28	462.11	463.57			51.49	117.9	866.89	332.82	10.8
Reach-1	7689.5 BR D	10 Year	459.45	458.5	456.49			17		430		5.36
Reach-1	7689.5 BR D	50 Year	461.8	461.38	457.57					712.42	2.63	8.88
Reach-1	7689.5 BR D	100 Year	462.42	461.89	458.12			36.16	5.22	792.28	72.53	9.87
Reach-1	7689.5 BR D	500 Year	463.28	462.11	463.58			51.49	117.9	866.89	332.82	10.8
Reach-1	7681	10 Year	459.45	459.13	456.4	0.05	0.13	18		430		4.47
Reach-1	7681	50 Year	460.61	459.97	457.46	0.07	0.28	18		715		6.43
Reach-1	7681	100 Year	461.06	460.16	457.96	0.08	0.39	18		870		7.58
Reach-1	7681	500 Year	462.37	460.55	459.29	0.11	0.83	18		1315		10.8
Reach-1	7666	10 Year	459.27	459.21	456.07	0.12	0.02	96.99		424.56	5.44	1.9
Reach-1	7666	50 Year	460.27	460.18	456.7	0.12	0.03	134.13	0.04	683.23	31.73	2.4
Reach-1	7666	100 Year	460.58	460.48	457	0.12	0.04	151.59	0.59	820.65	48.76	2.71
Reach-1	7666	500 Year	461.43	461.27	457.76	0.12	0.07	198.77	9.02	1188.05	117.93	3.37
Reach-1	6890	10 Year	453.57	453.19	451.47	0.21	0.02	26.04		475		4.97
Reach-1	6890	50 Year	455.13	454.58	452.51	0.23	0.03	28.88		795		5.95
Reach-1	6890	100 Year	455.82	455.19	452.99	0.23	0.03	30.13		965		6.36
Reach-1	6890	500 Year	458.58	458.02	454.2	0.12	0.01	40.53	6.81	1453.19		6
Reach-1	6875	10 Year	453.34	452.88	451.48			25.41		475		5.42
Reach-1	6875	50 Year	454.87	454.23	452.51			28.18		795		6.42
Reach-1	6875	100 Year	455.55	454.82	452.99			29.39		965		6.85
Reach-1	6875	500 Year	458.44	457.85	454.2			39.8		1460		6.17
Reach-1	6859.5 BR U	10 Year	453.27	452.71	451.58			24.07		475		5.98
Reach-1	6859.5 BR U	50 Year	454.77	453.98	452.65			26.67		795		7.12
Reach-1	6859.5 BR U	100 Year	455.43	454.53	453.13			27.79		965		7.62
Reach-1	6859.5 BR U	500 Year	458.44	457.85	454.37					1458.97	1.03	7.38
Reach-1	6859.5 BR D	10 Year	453.36	452.71	451.66			21.87		475		6.46
Reach-1	6859.5 BR D	50 Year	454.91	453.98	452.81			24.54		795		7.72
Reach-1	6859.5 BR D	100 Year	455.59	454.53	453.34			25.7		965		8.27
Reach-1	6859.5 BR D	500 Year	457.18	457.11	454.65			15.16		1458.97	1.03	7.95
Reach-1	6843	10 Year	453.29	452.71	451.54	0.19	0.16	22.87		475		6.11
Reach-1	6843	50 Year	454.82	453.98	452.66	0.21	0.23	25.54		795		7.33
Reach-1	6843	100 Year	455.49	454.53	453.17	0.21	0.27	26.7		965		7.86
Reach-1	6843	500 Year	456.73	454.58	454.46	0.45	0.62	26.8		1460		11.77
Reach-1	6827	10 Year	452.94	452.69	450.74	5.98	0.21	33.2		475		4.07
Reach-1	6827	50 Year	454.38	454.01	451.65	6.22	0.27	37.18		795		4.87
Reach-1	6827	100 Year	455.01	454.59	452.07	6.31	0.29	38.91		965		5.21
Reach-1	6827	500 Year	455.65	454.75	453.12	5.31	0.31	39.41		1460		7.62
Reach-1	6490	10 Year	446.75	445.78	445.78	0.69	0.15	30.8		475		7.9
Reach-1	6490	50 Year	447.9	446.63	446.63	0.6	0.23	34.96		795		9.02
Reach-1	6490	100 Year	448.41	447.03	447.03	0.48	0.34	36.88		965		9.44
Reach-1	6490	500 Year	450.03	449.75	448.63	0.17	0.07	140.61		1460		4.23
Reach-1	6462	10 Year	445.46	444.79	444.32	0	0.11	33.28		515		6.57
Reach-1	6462	50 Year	446.75	445.95	445.24	0	0	39.19		865		7.17
Reach-1	6462	100 Year	447.53	446.82	445.66	0	0	43.61		1055		6.73
Reach-1	6462	500 Year	449.79	449.28	446.67	0	0	56.06		1595		5.71
Reach-1	6441.5 BR U	10 Year	445.34	444.3	444.3	1.97	0.01	30.84		515		8.18
Reach-1	6441.5 BR U	50 Year	446.75	445.95	445.23	1.33	0.19	39.17		865		7.18
Reach-1	6441.5 BR U	100 Year	447.53	446.82	445.66	1.11	0.28	43.6		1055		6.73
Reach-1	6441.5 BR U	500 Year	449.79	449.27	446.68	0.84	0.78	55.01		1595		5.75
Reach-1	6441.5 BR D	10 Year	443.35	442.32	441.75	0	0.13	18		515		8.13
Reach-1	6441.5 BR D	50 Year	445.22	443.78	442.96	0	0.19	18		865		9.66
Reach-1	6441.5 BR D	100 Year	446.14	444.49	443.54	0	0.22	18		1055		10.3
Reach-1	6441.5 BR D	500 Year	448.17	445.06	445.06			18		1595		14.16

HEC-RAS Plan: FEMA w/Back River: Beaver Pond Brk Reach: Reach-1												
Reach	River Sta	Profile	E.G. Elev	W.S. Elev	Crit W.S.	Frctn Loss	C & E Loss	Top Width	Q Left	Q Channel	Q Right	Vel Chnl
			(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft/s)
Reach-1	6420	10 Year	443.21	441.75	441.75	1.54	0.31	18		515		9.71
Reach-1	6420	50 Year	445.03	442.95	442.95	1.64	0.44	18		865		11.57
Reach-1	6420	100 Year	445.91	443.53	443.53	1.69	0.51	18		1055		12.38
Reach-1	6420	500 Year	448.17	445.06	445.06	1.79	0.68	18		1595		14.16
Reach-1	6397	10 Year	436.06	435.22	434.69	8.21	0.09	24.71		515		7.36
Reach-1	6397	50 Year	437.5	436.3	435.8	8.33	0.08	28.31		865		8.77
Reach-1	6397	100 Year	438.15	436.78	436.32	8.39	0.07	29.89		1055		9.38
Reach-1	6397	500 Year	439.71	437.95	437.55	8.53	0.05	34.79		1595		10.63
Reach-1	6033	10 Year	423.56	423.35	421.37	0.1	0.02	42.52		515		3.68
Reach-1	6033	50 Year	425.55	425.33	422.23	0.09	0.04	52.09		865		3.7
Reach-1	6033	100 Year	425.03	424.58	422.63	0.27	0.13	48.48		1055		5.38
Reach-1	6033	500 Year	429.38	429.21	423.61	0.04	0.01	73.94		1595		3.38
Reach-1	6016	10 Year	423.44	423.05	420.65			41.34		515		5.01
Reach-1	6016	50 Year	425.42	424.81	421.78			49.03		865		6.27
Reach-1	6016	100 Year	424.64	422.9	422.33			40.69		1055		10.58
Reach-1	6016	500 Year	429.33	429.01	423.74			68.8	222	1154.84	218.2	5.2
Reach-1	5993.5 BR U	10 Year	423.4	422.95	420.76			19		515		5.38
Reach-1	5993.5 BR U	50 Year	425.36	424.65	421.93			19		865		6.76
Reach-1	5993.5 BR U	100 Year	424.78	422.49	422.49			19		1055		12.13
Reach-1	5993.5 BR U	500 Year	429.33	425.8	423.94					1595		10.65
Reach-1	5993.5 BR D	10 Year	421.14	419.72	419.72			19		515		9.57
Reach-1	5993.5 BR D	50 Year	422.9	420.9	420.9			19		865		11.34
Reach-1	5993.5 BR D	100 Year	423.75	421.47	421.47			19		1055		12.12
Reach-1	5993.5 BR D	500 Year	425.93	422.91	422.91			19		1595		13.95
Reach-1	5970	10 Year	421	419.63	419.63	0.83	0.39	38.88		515		9.39
Reach-1	5970	50 Year	422.7	420.76	420.76	0.65	0.65	46.65		865		11.16
Reach-1	5970	100 Year	423.52	421.31	421.31	0.59	0.79	50.41		1055		11.92
Reach-1	5970	500 Year	425.62	422.72	422.72	0.48	1.13	60.05		1595		13.67
Reach-1	5947	10 Year	418.9	418.31	417.55	0.62	0.22	31.04		515		6.18
Reach-1	5947	50 Year	420.47	419.85	418.53	0.55	0.21	37.79		865		6.34
Reach-1	5947	100 Year	421.21	420.57	418.98	0.52	0.21	40.95		1055		6.4
Reach-1	5947	500 Year	423.04	422.39	420.07	0.44	0.2	48.92		1595		6.47
Reach-1	5832	10 Year	417.86	417.67	415.22	0.17	0.16	44.6	30.02	471.8	13.18	3.65
Reach-1	5832	50 Year	419.51	419.24	416.08	0.17	0.25	50.73	69.05	765.62	30.33	4.42
Reach-1	5832	100 Year	420.28	419.97	416.49	0.17	0.29	58	94.67	924.31	36.02	4.77
Reach-1	5832	500 Year	422.21	421.8	417.53	0.18	0.44	104.56	179.5	1343.89	71.61	5.48
Reach-1	5813	10 Year	417.53	416.8	415.92	0	0.16	41.21	36.41	742.59	15.99	7.08
Reach-1	5813	50 Year	419.1	418.01	417.05	0	0.19	45.93	84.2	1213.83	36.97	8.75
Reach-1	5813	100 Year	419.83	418.56	417.58	0	0.2	48.07	114.8	1459.79	50.41	9.47
Reach-1	5813	500 Year	421.58	419.7	418.95	0	0.16	54.92	212.5	2168.39	84.14	11.64
Reach-1	5812.5 BR U	10 Year	417.36	416.09	416.09	0.05	0.02	38.45	36.45	742.54	16.01	9.33
Reach-1	5812.5 BR U	50 Year	418.91	417.19	417.19	0.04	0.06	42.76	86.29	1210.82	37.89	10.95
Reach-1	5812.5 BR U	100 Year	419.63	417.71	417.71	0.01	0.44	44.77	118.7	1454.24	52.11	11.63
Reach-1	5812.5 BR U	500 Year	421.42	419.01	419.01	0.01	0.58	49.84	229.9	2134.08	100.98	13.21
Reach-1	5812.5 BR D	10 Year	414.92	413.57	412.8	0	0.3	28.65	0.04	794.95	0.02	9.33
Reach-1	5812.5 BR D	50 Year	416.67	414.75	414.75	0	0.34	33.24	9.69	1321.05	4.26	11.18
Reach-1	5812.5 BR D	100 Year	417.46	415.36	415.36	0	0.26	35.65	25.44	1588.38	11.17	11.72
Reach-1	5812.5 BR D	500 Year	419.38	416.87	416.87	0	0.51	41.52	107.6	2310.15	47.25	13
Reach-1	5812	10 Year	414.61	413.87	412.94	0.3	0.16	37.76	35.92	752.94	6.14	7.09
Reach-1	5812	50 Year	416.14	414.89	414.09	0.33	0.13	40.66	74.62	1244.6	15.78	9.22
Reach-1	5812	100 Year	416.82	415.23	414.63	0.35	0.09	41.62	96.45	1507.12	21.44	10.43
Reach-1	5812	500 Year	418.67	416.05	416.03	0.41	0.14	43.94	166.6	2257.76	40.68	13.49
Reach-1	5804	10 Year	414.16	412.9	412.9	10.14	0.06	35.01		795		9.02
Reach-1	5804	50 Year	415.68	413.99	413.99	9.43	0.05	38.1		1335		10.43
Reach-1	5804	100 Year	416.38	414.5	414.5	9.19	0.05	39.54		1625		11
Reach-1	5804	500 Year	418.12	415.78	415.78	8.71	0.04	43.16		2465		12.28

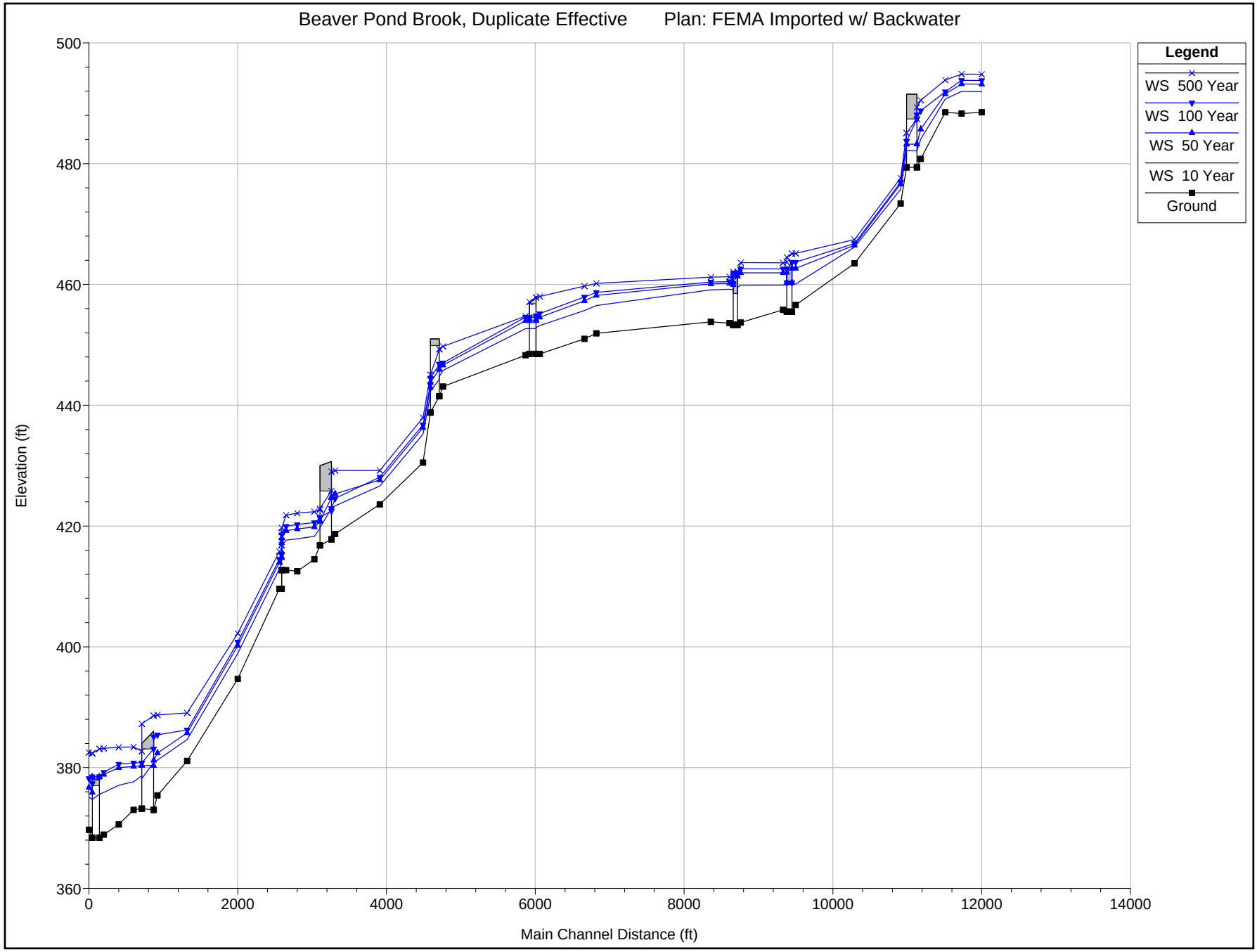
HEC-RAS Plan: FEMA w/Back River: Beaver Pond Brk Reach: Reach-1												
Reach	River Sta	Profile	E.G. Elev	W.S. Elev	Crit W.S.	Frctn Loss	C & E Loss	Top Width	Q Left	Q Channel	Q Right	Vel Chnl
			(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft/s)
Reach-1	5296	10 Year	381.69	381.25	379.15	0.16	0.03	42.93		955		5.29
Reach-1	5296	50 Year	383.15	382.4	380.44	0.29	0.21	47.46		1610		6.93
Reach-1	5296	100 Year	385.8	385.42	381.03	0.09	0.04	59.37		1960		4.98
Reach-1	5296	500 Year	389.09	388.72	382.46	0.06	0.01	72.38		2975		4.87
Reach-1	5276	10 Year	381.5	380.95	377.92			40.92		955		5.94
Reach-1	5276	50 Year	382.64	381.19	379.43			41.86		1610		9.66
Reach-1	5276	100 Year	385.67	385.14	380.16			78.73	304.1	1649.06	6.87	6.31
Reach-1	5276	500 Year	389.01	388.6	382.07			133.78	668.3	2069.39	237.32	6.01
Reach-1	5254.5 BR U	10 Year	381.45	380.83	378.04			23		955		6.32
Reach-1	5254.5 BR U	50 Year	382.4	380.34	379.6			23		1610		11.53
Reach-1	5254.5 BR U	100 Year	385.67	383.1	380.35			23		1960		9.65
Reach-1	5254.5 BR U	500 Year	389.01	388.6	382.3			54.47		2607.36	367.21	12.83
Reach-1	5254.5 BR D	10 Year	380.06	378.18	378.18			23		955		11
Reach-1	5254.5 BR D	50 Year	382.5	380.34	379.75			23		1610		11.79
Reach-1	5254.5 BR D	100 Year	383.53	380.78	380.49			23		1960		13.36
Reach-1	5254.5 BR D	500 Year	388.06	387.25	382.45			31.17		2607.36	367.21	13.03
Reach-1	5232	10 Year	380.01	378.68	378.03	1.15	0.12	53.2		955		9.24
Reach-1	5232	50 Year	382.3	380.34	379.57	0.74	0.59	66.34		1610		11.25
Reach-1	5232	100 Year	383.3	380.78	380.3	0.81	0.81	69.86		1960		12.75
Reach-1	5232	500 Year	386.14	382.71	382.19	0.6	1.33	96.32		2975		14.88
Reach-1	5206	10 Year	378.73	377.65	377.26	0.95	0.38	37.8		955		8.33
Reach-1	5206	50 Year	380.97	380.19	378.54	0.45	0.25	50.94		1610		7.08
Reach-1	5206	100 Year	381.68	380.78	379.1	0.49	0.28	53.92		1960		7.58
Reach-1	5206	500 Year	384.22	383.43	380.5	0.3	0.25	67.17		2975		7.1
Reach-1	5084	10 Year	376.65	375.9	373.53	0.31	0.02	22		955		6.95
Reach-1	5084	50 Year	379.71	378.87	375.14	0.45	0.01	70.28	2.3	1607.7		7.36
Reach-1	5084	100 Year	380.28	379.23	375.91	0.57	0.04	92.4	14.66	1945.34		8.27
Reach-1	5084	500 Year	383.46	383.18	379.6	0.08	0.02	197	767.6	2077.29	130.12	4.93
Reach-1	5066	10 Year	376.31	375.61	373.03	0	0	22		955		6.72
Reach-1	5066	50 Year	379.25	378.44	374.63			74.22	3.41	1606.59		7.26
Reach-1	5066	100 Year	379.68	378.5	375.43			78.05	5.77	1954.23		8.71
Reach-1	5066	500 Year	383.36	383.13	379.12	0	0.01	197	824.7	2004.63	145.64	4.54
Reach-1	5050.5 BR U	10 Year	376.31	375.61	373.04	0.57	0.07	22		955		6.72
Reach-1	5050.5 BR U	50 Year	379.25	378.44	374.65			28.1	108.4	1501.63	0.01	8.62
Reach-1	5050.5 BR U	100 Year	379.67	378.5	375.41			32.05	223.7	1728.85	3.16	9.85
Reach-1	5050.5 BR U	500 Year	383.35	383.1	380.98	0.58	0.04	160.28	1675	1029.56	270.3	5.18
Reach-1	5050.5 BR D	10 Year	375.66	374.72	373.03	0	0	22		955		7.79
Reach-1	5050.5 BR D	50 Year	379.2	378.44	374.65			28.1	108.4	1501.63	0.01	8.62
Reach-1	5050.5 BR D	100 Year	379.61	378.5	375.42			32.05	223.7	1728.85	3.16	9.85
Reach-1	5050.5 BR D	500 Year	382.73	382.35	380.98	0	0.03	158.77	1509	1237.25	228.32	6.45
Reach-1	5035	10 Year	375.66	374.72	373.03	0.06	0.44	22		955		7.79
Reach-1	5035	50 Year	377.72	375.89	374.65	0.06	0.87	22		1610		10.86
Reach-1	5035	100 Year	379.19	377.36	375.43	0.04	0.88	22		1960		10.85
Reach-1	5035	500 Year	382.7	382.38	379.13	0.01	0.13	197	724.6	2131.87	118.51	5.24
Reach-1	5021	10 Year	375.16	375.1	372.18			127.23		955		2.04
Reach-1	5021	50 Year	376.79	376.7	372.8			142.25		1608.86	1.14	2.38
Reach-1	5021	100 Year	378.28	378.2	373.09			168.5		1940.69	19.31	2.23
Reach-1	5021	500 Year	382.55	382.5	373.83			200		2747.9	227.1	1.92

BEAVER POND BROOK - DUPLICATE EFFECTIVE, FEMA FLOODWAY (W/O BACKWATER)
HEC-RAS 4.1.0 - "Standard Table 1" Output

HEC-RAS Plan: FEMA w/oBack 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
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	8722	100 Year	410	488.5	493.77	491.92	493.89	0.002286	2.79	151.57	76.98	0.34
Reach-1	8722	Floodway	410	488.5	493.73	491.92	493.92	0.003906	3.43	119.57	60.7	0.43
Reach-1	8640	100 Year	410	488.3	493.8	490.24	493.81	0.000064	0.71	598.29	180.44	0.06
Reach-1	8640	Floodway	410	488.3	493.8	490.24	493.81	0.000066	0.71	578	157	0.07
Reach-1	8573	100 Year	410	488.5	491.92	491.92	493.59	0.027888	10.36	39.59	12	1
Reach-1	8573	Floodway	410	488.5	491.93	491.93	493.59	0.027656	10.32	39.71	12	1
Reach-1	8464	100 Year	410	480.8	488.77	484.71	488.88	0.001223	2.62	156.77	50.88	0.26
Reach-1	8464	Floodway	410	480.8	486.51	484.71	486.87	0.003658	4.79	85.58	24.5	0.45
Reach-1	8455	100 Year	410	479.4	488.09	483.74	488.63	0.006312	5.9	69.51	41.06	0.35
Reach-1	8455	Floodway	410	479.4	483.75	483.73	485.91	0.037769	11.78	34.81	8	1
Reach-1	8439.5		Bridge									
Reach-1	8412	100 Year	410	479.4	483.72	483.72	485.91	0.038378	11.85	34.6	8	1
Reach-1	8412	Floodway	410	479.4	483.72	483.72	485.91	0.038377	11.85	34.6	8	1
Reach-1	8393	100 Year	410	473.4	476.92	476.57	477.74	0.012831	7.3	56.14	22.58	0.82
Reach-1	8393	Floodway	410	473.4	476.91	476.57	477.74	0.012927	7.32	55.98	22.54	0.82
Reach-1	8178	100 Year	410	463.5	466.76	466.76	467.76	0.020551	8.03	51.08	25.71	1
Reach-1	8178	Floodway	410	463.5	466.77	466.77	467.76	0.020363	8	51.22	25.7	1
Reach-1	7937	100 Year	625	456.6	463.69	460.32	463.91	0.001457	3.71	168.53	36.05	0.3
Reach-1	7937	Floodway	625	456.6	466.09	460.32	466.18	0.000423	2.44	256.64	36.8	0.16
Reach-1	7922	100 Year	625	455.5	463.66	459.29	463.83	0.001035	3.24	192.89	33.46	0.24
Reach-1	7922	Floodway	625	455.5	466.08	459.3	466.16	0.000369	2.27	274.83	33.9	0.14
Reach-1	7911.5		Bridge									
Reach-1	7900	100 Year	625	455.5	462.66	459	462.79	0.000768	3.05	265	62.83	0.23
Reach-1	7900	Floodway	625	455.5	464.99	458.99	465.05	0.000223	2	408.13	61.4	0.13
Reach-1	7885	100 Year	625	455.8	462.58	459	462.73	0.00104	3.17	200.48	65.64	0.26
Reach-1	7885	Floodway	625	455.8	464.96	459	465.03	0.000301	2.1	297.8	42.2	0.14
Reach-1	7711	100 Year	625	453.7	462.6	456.36	462.61	0.00003	0.64	1242.11	448.46	0.05
Reach-1	7711	Floodway	625	453.7	464.97	456.36	464.98	0.000011	0.48	1308.05	163	0.03
Reach-1	7698	100 Year	870	453.3	461.89	457.96	462.44	0.003686	5.96	151.43	54.16	0.37
Reach-1	7698	Floodway	870	453.3	464.57	457.97	464.88	0.001746	4.48	194.02	18	0.24
Reach-1	7689.5		Bridge									
Reach-1	7681	100 Year	870	453.3	460.16	457.96	461.06	0.007189	7.58	114.71	18	0.53
Reach-1	7681	Floodway	870	453.3	460.35	457.96	461.19	0.006649	7.37	117.98	18	0.51
Reach-1	7666	100 Year	870	453.6	460.48	457	460.58	0.000683	2.71	395.4	151.59	0.22
Reach-1	7666	Floodway	870	453.6	460.62	457	460.75	0.000739	2.79	312.01	63	0.22
Reach-1	7589	100 Year	870	453.8	460.4	457.69	460.42	0.000359	1.3	738.74	472.92	0.14
Reach-1	7589	Floodway	870	453.8	460.53	457.68	460.57	0.000409	1.68	517.2	150	0.16
Reach-1	7120	100 Year	965	451.9	458.69	457.59	458.95	0.004863	4.05	238.31	117.75	0.5
Reach-1	7120	Floodway	965	451.9	458.69	457.59	458.95	0.004866	4.05	238.25	117.73	0.5
Reach-1	7073	100 Year	965	451	457.92	455.77	458.25	0.003822	4.62	208.99	71.02	0.47
Reach-1	7073	Floodway	965	451	457.92	455.77	458.25	0.003824	4.62	208.94	71	0.47
Reach-1	6890	100 Year	965	448.5	455.19	452.99	455.82	0.004216	6.36	151.76	30.13	0.5
Reach-1	6890	Floodway	965	448.5	455.17	452.99	455.8	0.004254	6.38	151.27	30.1	0.5
Reach-1	6875	100 Year	965	448.5	454.82	452.99	455.55	0.005179	6.85	140.95	29.39	0.55
Reach-1	6875	Floodway	965	448.5	454.8	453	455.54	0.005248	6.88	140.29	29.34	0.55
Reach-1	6859.5		Bridge									

HEC-RAS Plan: FEMA w/oBack 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
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	6843	100 Year	965	448.5	454.53	453.17	455.49	0.007323	7.86	122.75	26.7	0.65
Reach-1	6843	Floodway	965	448.5	454.51	453.16	455.48	0.007355	7.91	121.97	25.9	0.64
Reach-1	6827	100 Year	965	448.3	454.59	452.07	455.01	0.002785	5.21	185.22	38.91	0.42
Reach-1	6827	Floodway	965	448.3	454.57	452.07	454.99	0.002778	5.24	184.25	37.8	0.42
Reach-1	6490	100 Year	965	443.1	447.03	447.03	448.41	0.017419	9.44	102.24	36.88	1
Reach-1	6490	Floodway	965	443.1	447.03	447.03	448.41	0.017402	9.44	102.27	36.89	1
Reach-1	6462	100 Year	1055	441.5	446.82	445.66	447.53	0.006373	6.73	156.75	43.61	0.63
Reach-1	6462	Floodway	1055	441.5	446.82	445.66	447.53	0.006374	6.73	156.75	43.6	0.63
Reach-1	6441.5		Bridge									
Reach-1	6420	100 Year	1055	438.8	443.53	443.53	445.91	0.024537	12.38	85.23	18	1
Reach-1	6420	Floodway	1055	438.8	443.54	443.54	445.91	0.024463	12.37	85.32	18	1
Reach-1	6397	100 Year	1055	430.5	436.78	436.32	438.15	0.012319	9.38	112.46	29.89	0.85
Reach-1	6397	Floodway	1055	430.5	436.78	436.32	438.15	0.012274	9.37	112.61	29.91	0.85
Reach-1	6216	100 Year	1055	423.6	428.1	428.1	429.69	0.017237	10.11	104.31	32.98	1
Reach-1	6216	Floodway	1055	423.6	428.09	428.09	429.69	0.017302	10.13	104.12	32.9	1
Reach-1	6033	100 Year	1055	418.7	424.58	422.63	425.03	0.003457	5.38	195.93	48.48	0.47
Reach-1	6033	Floodway	1055	418.7	424.64	422.62	425.08	0.003322	5.31	198.76	48.76	0.46
Reach-1	6016	100 Year	1055	417.8	422.9	422.33	424.64	0.009534	10.58	99.73	40.69	0.83
Reach-1	6016	Floodway	1055	417.8	422.9	422.33	424.64	0.016089	10.58	99.69	20	0.84
Reach-1	5993.5		Bridge									
Reach-1	5970	100 Year	1055	416.8	421.31	421.31	423.52	0.014178	11.92	88.5	50.41	1
Reach-1	5970	Floodway	1055	416.8	421.32	421.32	423.52	0.023142	11.91	88.56	20	1
Reach-1	5947	100 Year	1055	414.5	420.57	418.98	421.21	0.005025	6.4	164.8	40.95	0.56
Reach-1	5947	Floodway	1055	414.5	420.66	418.98	421.27	0.004695	6.26	168.53	41	0.54
Reach-1	5878	100 Year	1055	412.5	420.26	416.61	420.48	0.001268	3.76	280.32	55.49	0.3
Reach-1	5878	Floodway	1055	412.5	420.38	416.61	420.59	0.001182	3.68	286.8	55.5	0.29
Reach-1	5832	100 Year	1055	412.7	419.97	416.49	420.28	0.001255	4.77	278.78	58	0.32
Reach-1	5832	Floodway	1055	412.7	419.81	416.58	420.3	0.002911	5.57	189.36	28	0.38
Reach-1	5813	100 Year	1625	412.7	418.56	417.58	419.83	0.006687	9.47	205.98	48.07	0.71
Reach-1	5813	Floodway	1625	412.7	418.4	417.64	419.75	0.007404	9.77	197.03	44.3	0.74
Reach-1	5812.5		Bridge									
Reach-1	5812	100 Year	1625	409.6	415.23	414.63	416.82	0.008888	10.43	177.61	41.62	0.81
Reach-1	5812	Floodway	1625	409.6	415.24	414.63	416.82	0.008845	10.42	177.91	41.64	0.81
Reach-1	5804	100 Year	1625	409.6	414.5	414.5	416.38	0.016446	11	147.79	39.54	1
Reach-1	5804	Floodway	1625	409.6	414.49	414.49	416.38	0.01649	11.01	147.62	39.48	1
Reach-1	5628	100 Year	1625	394.7	400.79	400.79	402.84	0.016366	11.48	141.5	34.78	1
Reach-1	5628	Floodway	1625	394.7	400.8	400.8	402.84	0.016295	11.47	141.72	34.8	1
Reach-1	5422	100 Year	1625	381.1	386.25	386.25	387.98	0.016355	10.57	153.71	44.53	1
Reach-1	5422	Floodway	1625	381.1	386.25	386.25	387.98	0.01632	10.57	153.69	44.4	1
Reach-1	5296	100 Year	1960	375.4	385.42	381.03	385.8	0.001595	4.98	393.61	59.37	0.34
Reach-1	5296	Floodway	1960	375.4	385.78	381.03	386.15	0.001328	4.83	406.04	52.1	0.3
Reach-1	5276	100 Year	1960	373	385.14	380.16	385.67	0.002006	6.31	420.83	78.73	0.34
Reach-1	5276	Floodway	1960	373	384.98	380.16	385.88	0.004071	7.61	257.45	24	0.41
Reach-1	5254.5		Bridge									
Reach-1	5232	100 Year	1960	373.2	380.81	380.3	383.31	0.009996	12.7	154.36	70.06	0.88
Reach-1	5232	Floodway	1960	373.2	381.52	380.3	383.55	0.012731	11.43	171.43	24	0.75
Reach-1	5206	100 Year	1960	373	380.82	379.1	381.7	0.005518	7.53	260.37	54.09	0.6
Reach-1	5206	Floodway	1960	373	381.52	379.1	382.2	0.00358	6.61	296.42	52	0.49

HEC-RAS Plan: FEMA w/oBack 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
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	5145	100 Year	1960	370.6	380.62	376.49	380.95	0.00132	4.66	458.69	106.27	0.31
Reach-1	5145	Floodway	1960	370.6	381.36	376.49	381.65	0.001066	4.29	456.35	59.5	0.27
Reach-1	5084	100 Year	1960	368.9	379.35	375.91	380.35	0.008105	8.05	263.61	100.21	0.63
Reach-1	5084	Floodway	1960	368.9	380.55	375.91	381.22	0.004391	6.59	297.29	47	0.46
Reach-1	5066	100 Year	1960	368.4	378.87	375.43	379.86	0.007977	8	265.93	101.64	0.62
Reach-1	5066	Floodway	1960	368.4	379.69	375.43	380.8	0.005403	8.45	231.97	22	0.46
Reach-1	5050.5		Bridge									
Reach-1	5035	100 Year	1960	368.4	375.43	375.43	378.56	0.022602	14.19	138.09	22	1
Reach-1	5035	Floodway	1960	368.4	375.42	375.42	378.56	0.022721	14.22	137.83	22	1
Reach-1	5021	100 Year	1960	369.7	376.5	373.09	376.64	0.000795	3.01	652.14	138.75	0.24
Reach-1	5021	Floodway	1960	369.7	376.5	373.09	376.64	0.000795	3.01	652.14	138.75	0.24


Beaver Pond Brook, Duplicate Effective
Plan: FEMA Imported w/ Backwater
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Elevation (ft)
Main Channel Distance (ft)
500
480
460
440
420
400
380
360
0
2000
4000
6000
8000
10000
12000
14000

BEAVER POND BROOK - DUPLICATE EFFECTIVE, FEMA FLOODWAY (W/O BACKWATER)
HEC-RAS 4.1.0 - "Encroachment 1" Output

HEC-RAS Plan: FEMA w/oBack River: Beaver Pond Brk Reach: Reach-1													
Reach	River Sta	Profile	W.S. Elev	Prof Delta	E.G. Elev	Top Wdth	Q Left	Q Channel	Q Right	Enc Sta L	Ch Sta L	Ch Sta R	Enc Sta R
			(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)
Reach-1	8722	100 Year	493.77		493.89	76.98	4.99	405.01			220	320	
Reach-1	8722	Floodway	493.73	-0.04	493.92	60.7		410		229.1	220	320	289.8
Reach-1	8640	100 Year	493.8		493.81	180.44	0	407.52	2.48		213	370	
Reach-1	8640	Floodway	493.8	0	493.81	157		410		213	213	370	370
Reach-1	8573	100 Year	491.92		493.59	12		410			320	332	
Reach-1	8573	Floodway	491.93	0.01	493.59	12		410		320	320	332	332
Reach-1	8464	100 Year	488.77		488.88	50.88		410			269	324	
Reach-1	8464	Floodway	486.51	-2.26	486.87	24.5		410		276	269	324	300.5
Reach-1	8455	100 Year	488.09		488.63	8		410			625	633	
Reach-1	8455	Floodway	483.75	-4.34	485.91	8		410		625	625	633	633
Reach-1	8439.5 Bl	100 Year	487.4		488.63	7.99		410			625	633	
Reach-1	8439.5 Bl	Floodway	483.74	-3.66	485.91	7.99		410		625	625	633	633
Reach-1	8439.5 Bl	100 Year	483.74		485.91	7.99		410			625	633	
Reach-1	8439.5 Bl	Floodway	483.74	0	485.91	7.99		410		625	625	633	633
Reach-1	8412	100 Year	483.72		485.91	8		410			625	633	
Reach-1	8412	Floodway	483.72	0	485.91	8		410		625	625	633	633
Reach-1	8393	100 Year	476.92		477.74	22.58		410			660	738	
Reach-1	8393	Floodway	476.91	-0.01	477.74	22.54		410		691.1	660	738	713.7
Reach-1	8178	100 Year	466.76		467.76	25.71		410			380	450	
Reach-1	8178	Floodway	466.77	0.01	467.76	25.7		410		384.3	380	450	410
Reach-1	7937	100 Year	463.69		463.91	36.05		625			350	390	
Reach-1	7937	Floodway	466.09	2.4	466.18	36.8		625		350.8	350	390	387.6
Reach-1	7922	100 Year	463.66		463.83	33.46		625			345	380	
Reach-1	7922	Floodway	466.08	2.42	466.16	33.9		625		345	345	380	378.9
Reach-1	7911.5 Bl	100 Year	460.3		463.82	25.46		625			345	380	
Reach-1	7911.5 Bl	Floodway	460.3	0	466.16	25.46		625		345	345	380	378.9
Reach-1	7911.5 Bl	100 Year	460.3		462.79	26.79		625			345	380	
Reach-1	7911.5 Bl	Floodway	460.3	0	465.05	26.79		625		315.7	345	380	377.1
Reach-1	7900	100 Year	462.66		462.79	62.83	96.98	528.02			345	380	
Reach-1	7900	Floodway	464.99	2.33	465.05	61.4	128.22	496.78		315.7	345	380	377.1
Reach-1	7885	100 Year	462.58		462.73	65.64	0.51	624.49			335	391	
Reach-1	7885	Floodway	464.96	2.38	465.03	42.2		625		335	335	391	377.2
Reach-1	7711	100 Year	462.6		462.61	448.46	35.11	589.59	0.3		520	683	
Reach-1	7711	Floodway	464.97	2.37	464.98	163		625		520	520	683	683
Reach-1	7698	100 Year	461.89		462.44	54.16		868.13	1.87		350	368	
Reach-1	7698	Floodway	464.57	2.68	464.88	18		870		350	350	368	368
Reach-1	7689.5 Bl	100 Year	461.89		462.44	36.16	5.22	792.28	72.53		350	368	
Reach-1	7689.5 Bl	Floodway	462.6	0.71	464.43			870		350	350	368	368
Reach-1	7689.5 Bl	100 Year	461.89		462.42	36.16	5.22	792.28	72.53		350	368	
Reach-1	7689.5 Bl	Floodway	459.86	-2.03	461.68			870		350	350	368	368
Reach-1	7681	100 Year	460.16		461.06	18		870			350	368	
Reach-1	7681	Floodway	460.35	0.18	461.19	18		870		350	350	368	368
Reach-1	7666	100 Year	460.48		460.58	151.59	0.59	820.65	48.76		570	633	
Reach-1	7666	Floodway	460.62	0.15	460.75	63		870		570	570	633	633
Reach-1	7589	100 Year	460.4		460.42	472.92	15.24	854.64	0.12		550	810	
Reach-1	7589	Floodway	460.53	0.13	460.57	150		870		550	550	810	700
Reach-1	7120	100 Year	458.69		458.95	117.75		965			310	472	
Reach-1	7120	Floodway	458.69	0	458.95	117.73		965		352.4	310	472	471.5

HEC-RAS Plan: FEMA w/oBack River: Beaver Pond Brk Reach: Reach-1													
Reach	River Sta	Profile	W.S. Elev	Prof Delta	E.G. Elev	Top Wdth	Q Left	Q Channel	Q Right	Enc Sta L	Ch Sta L	Ch Sta R	Enc Sta R
			(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)
Reach-1	7073	100 Year	457.92		458.25	71.02		965			340	450	
Reach-1	7073	Floodway	457.92	0	458.25	71		965		365	340	450	437.5
Reach-1	6890	100 Year	455.19		455.82	30.13		965			260	293	
Reach-1	6890	Floodway	455.17	-0.02	455.8	30.1		965		260.2	260	293	291.7
Reach-1	6875	100 Year	454.82		455.55	29.39		965			260	293	
Reach-1	6875	Floodway	454.8	-0.02	455.54	29.34		965		260.5	260	293	291.6
Reach-1	6859.5 Bl	100 Year	454.53		455.43	27.79		965			260	293	
Reach-1	6859.5 Bl	Floodway	454.51	-0.02	455.42	27.74		965		260.5	260	293	291.6
Reach-1	6859.5 Bl	100 Year	454.53		455.59	25.7		965			260	293	
Reach-1	6859.5 Bl	Floodway	454.51	-0.02	455.58	24.9		965		263.2	260	293	289.1
Reach-1	6843	100 Year	454.53		455.49	26.7		965			260	293	
Reach-1	6843	Floodway	454.51	-0.02	455.48	25.9		965		263.2	260	293	289.1
Reach-1	6827	100 Year	454.59		455.01	38.91		965			265	350	
Reach-1	6827	Floodway	454.57	-0.02	454.99	37.8		965		287.3	265	350	325.1
Reach-1	6490	100 Year	447.03		448.41	36.88		965			345	540	
Reach-1	6490	Floodway	447.03	0	448.41	36.89		965		363.5	345	540	403.6
Reach-1	6462	100 Year	446.82		447.53	43.61		1055			358	500	
Reach-1	6462	Floodway	446.82	0	447.53	43.6		1055		380.8	358	500	428.5
Reach-1	6441.5 Bl	100 Year	446.82		447.53	43.6		1055			358	500	
Reach-1	6441.5 Bl	Floodway	446.82	0	447.53	43.6		1055		380.8	358	500	428.5
Reach-1	6441.5 Bl	100 Year	444.49		446.14	18		1055			358	500	
Reach-1	6441.5 Bl	Floodway	444.48	-0.01	446.14	18		1055		390	358	500	408
Reach-1	6420	100 Year	443.53		445.91	18		1055			358	500	
Reach-1	6420	Floodway	443.54	0.01	445.91	18		1055		390	358	500	408
Reach-1	6397	100 Year	436.78		438.15	29.89		1055			220	305	
Reach-1	6397	Floodway	436.78	0.01	438.15	29.91		1055		231.5	220	305	261.5
Reach-1	6216	100 Year	428.1		429.69	32.98		1055			330	408	
Reach-1	6216	Floodway	428.09	-0.01	429.69	32.9		1055		354.7	330	408	387.6
Reach-1	6033	100 Year	424.58		425.03	48.48		1055			240	335	
Reach-1	6033	Floodway	424.64	0.06	425.08	48.76		1055		266.7	240	335	315.6
Reach-1	6016	100 Year	422.9		424.64	20		1055			275	295	
Reach-1	6016	Floodway	422.9	0	424.64	20		1055		275	275	295	295
Reach-1	5993.5 Bl	100 Year	422.49		424.78	19		1055			275	295	
Reach-1	5993.5 Bl	Floodway	422.49	0	424.78	19		1055		275	275	295	295
Reach-1	5993.5 Bl	100 Year	421.47		423.75	19		1055			275	295	
Reach-1	5993.5 Bl	Floodway	421.45	-0.02	423.75	19		1055		275	275	295	295
Reach-1	5970	100 Year	421.31		423.52	20		1055			275	295	
Reach-1	5970	Floodway	421.32	0	423.52	20		1055		275	275	295	295
Reach-1	5947	100 Year	420.57		421.21	40.95		1055			250	333	
Reach-1	5947	Floodway	420.66	0.09	421.27	41		1055		271.4	250	333	312.4
Reach-1	5878	100 Year	420.26		420.48	55.49		1055			250	335	
Reach-1	5878	Floodway	420.38	0.12	420.59	55.5		1055		270.1	250	335	325.6
Reach-1	5832	100 Year	419.97		420.28	58	94.67	924.31	36.02		227	255	
Reach-1	5832	Floodway	419.81	-0.15	420.3	28		1055		227	227	255	255
Reach-1	5813	100 Year	418.56		419.83	48.07	114.8	1459.79	50.41		227	255	
Reach-1	5813	Floodway	418.4	-0.16	419.75	44.3	113.87	1462.08	49.05	217	227	255	261.3
Reach-1	5812.5 Bl	100 Year	417.71		419.63	44.77	118.66	1454.24	52.11		227	255	
Reach-1	5812.5 Bl	Floodway	418.4	0.69	419.75	44.3	281.22	1344.55		217	227	255	261.3
Reach-1	5812.5 Bl	100 Year	415.36		417.46	35.65	25.44	1588.38	11.17		227	255	

HEC-RAS Plan: FEMA w/oBack River: Beaver Pond Brk Reach: Reach-1													
Reach	River Sta	Profile	W.S. Elev	Prof Delta	E.G. Elev	Top Wdth	Q Left	Q Channel	Q Right	Enc Sta L	Ch Sta L	Ch Sta R	Enc Sta R
			(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)
Reach-1	5812.5 Bl	Floodway	417.74	2.37	419.71	44.87	281.22	1344.55			227	255	
Reach-1	5812	100 Year	415.23		416.82	41.62	96.45	1507.12	21.44		227	255	
Reach-1	5812	Floodway	415.24	0.01	416.82	41.64	96.57	1506.95	21.48		227	255	
Reach-1	5804	100 Year	414.5		416.38	39.54		1625			205	264	
Reach-1	5804	Floodway	414.49	0	416.38	39.48		1625		219.2	205	264	258.7
Reach-1	5628	100 Year	400.79		402.84	34.78		1625			200	277	
Reach-1	5628	Floodway	400.8	0.01	402.84	34.8		1625		223.1	200	277	257.9
Reach-1	5422	100 Year	386.25		387.98	44.53		1625			210	287	
Reach-1	5422	Floodway	386.25	0	387.98	44.4		1625		227.5	210	287	271.9
Reach-1	5296	100 Year	385.42		385.8	59.37		1960			210	290	
Reach-1	5296	Floodway	385.78	0.37	386.15	52.1		1960		221.3	210	290	273.4
Reach-1	5276	100 Year	385.14		385.67	78.73	304.07	1649.06	6.87		400	424	
Reach-1	5276	Floodway	384.98	-0.16	385.88	24		1960		400	400	424	424
Reach-1	5254.5 Bl	100 Year	383.1		385.67	23		1960			400	424	
Reach-1	5254.5 Bl	Floodway	383.1	0	385.88	23		1960		400	400	424	424
Reach-1	5254.5 Bl	100 Year	380.81		383.53	23		1960			400	424	
Reach-1	5254.5 Bl	Floodway	381.52	0.71	383.55	23		1960		400	400	424	424
Reach-1	5232	100 Year	380.81		383.31	24		1960			400	424	
Reach-1	5232	Floodway	381.52	0.71	383.55	24		1960		400	400	424	424
Reach-1	5206	100 Year	380.82		381.7	54.09		1960			310	380	
Reach-1	5206	Floodway	381.52	0.7	382.2	52		1960		319	310	380	371
Reach-1	5145	100 Year	380.62		380.95	106.27	37.89	1921.79	0.32		450	510	
Reach-1	5145	Floodway	381.36	0.74	381.65	59.5		1960		450	450	510	509.5
Reach-1	5084	100 Year	379.35		380.35	100.21	21.43	1938.57			325	372	
Reach-1	5084	Floodway	380.55	1.2	381.22	47		1960		325	325	372	372
Reach-1	5066	100 Year	378.87		379.86	101.64	22.82	1937.18			325	372	
Reach-1	5066	Floodway	379.69	0.82	380.8	22		1960		350	325	372	372
Reach-1	5050.5 Bl	100 Year	378.87		379.86	56.41	290.97	1660.83	7.23		325	372	
Reach-1	5050.5 Bl	Floodway	378.53	-0.34	380.53			1960		350	325	372	372
Reach-1	5050.5 Bl	100 Year	378.87		379.79	56.41	290.97	1660.83	7.23		325	372	
Reach-1	5050.5 Bl	Floodway	376.65	-2.23	378.84	22		1960		350	325	372	372
Reach-1	5035	100 Year	375.43		378.56	22		1960			325	372	
Reach-1	5035	Floodway	375.42	-0.01	378.56	22		1960		350	325	372	372
Reach-1	5021	100 Year	376.5		376.64	138.75		1959.39	0.61		200	330	
Reach-1	5021	Floodway	376.5	0	376.64	138.75		1959.39	0.61	200	200	330	338.8

BEAVER POND BROOK - EXISTING CONDITION, FEMA REGULATORY (W/ BACKWATER)
HEC-RAS 4.1.0 - "Standard Table 1" Output

HEC-RAS Plan: EX_FEMA_Reg 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
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	8722	10 Year	205	487.7	490.76	490.76	491.5	0.016771	7.08	31.54	23.59	0.91
Reach-1	8722	50 Year	340	487.7	491.52	491.43	492.31	0.012225	7.58	52.13	30.73	0.82
Reach-1	8722	100 Year	410	487.7	491.97	491.62	492.7	0.00948	7.42	67.2	37.29	0.75
Reach-1	8722	500 Year	615	487.7	492.43	492.43	493.47	0.011884	9.11	86.08	45.51	0.85
Reach-1	8640	10 Year	205	487.7	490.8	489.63	490.81	0.000225	1.04	264.65	173.55	0.11
Reach-1	8640	50 Year	340	487.7	491.8	489.81	491.81	0.000123	0.96	444.7	184.83	0.09
Reach-1	8640	100 Year	410	487.7	492.23	489.89	492.24	0.000106	0.96	526.33	188.95	0.08
Reach-1	8640	500 Year	615	487.7	492.64	490.09	492.65	0.000156	1.24	603.08	192.8	0.1
Reach-1	8583	10 Year	205	487.57	490.77		490.78	0.000102	0.75	359.81	199.4	0.08
Reach-1	8583	50 Year	340	487.57	491.78		491.79	0.000075	0.79	581	234.81	0.07
Reach-1	8583	100 Year	410	487.57	492.22		492.23	0.000069	0.82	688.1	248.57	0.07
Reach-1	8583	500 Year	615	487.57	492.62		492.63	0.000108	1.08	787.85	254.5	0.09
Reach-1	8573	10 Year	205	487.3	489.72	489.72	490.53	0.016866	7.55	30.03	19.04	0.95
Reach-1	8573	50 Year	340	487.3	490.41	490.41	491.46	0.015295	8.78	44.13	38.97	0.95
Reach-1	8573	100 Year	410	487.3	490.73	490.73	491.88	0.014471	9.22	51.39	48.71	0.94
Reach-1	8573	500 Year	615	487.3	491.49	491.49	492.36	0.009838	8.83	106.19	62.12	0.8
Reach-1	8554	10 Year	205	483.76	486.29	485.95	486.82	0.010543	5.93	36.03	22.38	0.73
Reach-1	8554	50 Year	340	483.76	486.91	486.67	487.67	0.010968	7.21	51.57	27.47	0.78
Reach-1	8554	100 Year	410	483.76	487.28	487	488.06	0.009678	7.38	62.31	32.53	0.74
Reach-1	8554	500 Year	615	483.76	489	487.73	489.31	0.002675	5.23	184.59	84.82	0.42
Reach-1	8536	10 Year	205	481.79	485.98		486.26	0.005046	4.22	48.54	21.81	0.5
Reach-1	8536	50 Year	340	481.79	486.52		486.99	0.007015	5.56	62.67	32.35	0.6
Reach-1	8536	100 Year	410	481.79	487		487.46	0.005473	5.49	79.92	42.71	0.55
Reach-1	8536	500 Year	615	481.79	488.89		489.14	0.00182	4.35	179.31	62.57	0.34
Reach-1	8464	10 Year	205	480.22	483.08	483.08	484.03	0.022153	7.81	26.26	13.84	1
Reach-1	8464	50 Year	340	480.22	485.27	483.92	485.71	0.004371	5.39	66.05	23.15	0.49
Reach-1	8464	100 Year	410	480.22	486.16	484.25	486.53	0.002859	5.04	88.7	27.58	0.41
Reach-1	8464	500 Year	615	480.22	488.6	485.16	488.81	0.001069	4.09	198.1	67.17	0.27
Reach-1	8435.5		Culvert									
Reach-1	8412	10 Year	205	478.35	480.39	480.39	481.16	0.021692	7.05	29.08	18.6	0.99
Reach-1	8412	50 Year	340	478.35	481.03	481.03	482.08	0.020859	8.24	41.26	19.77	1.01
Reach-1	8412	100 Year	410	478.35	481.31	481.31	482.5	0.020018	8.74	46.96	20.3	1
Reach-1	8412	500 Year	615	478.35	482.07	482.07	483.58	0.017668	9.88	62.85	21.69	0.99
Reach-1	8393	10 Year	205	473.56	475.45	475.45	476.21	0.022583	6.99	29.32	19.62	1.01
Reach-1	8393	50 Year	340	473.56	476.07	476.07	477.1	0.020323	8.14	41.89	21.29	1
Reach-1	8393	100 Year	410	473.56	476.36	476.36	477.5	0.019085	8.6	48.09	22.18	0.99
Reach-1	8393	500 Year	615	473.56	477.11	477.11	478.53	0.016603	9.66	65.59	24.51	0.97
Reach-1	8356	10 Year	205	469.59	472.74	471.67	472.94	0.002896	3.67	59.52	28.15	0.41
Reach-1	8356	50 Year	340	469.59	474.05	472.24	474.25	0.001755	3.77	99.8	33.47	0.34
Reach-1	8356	100 Year	410	469.59	474.66	472.5	474.86	0.001452	3.79	120.88	36.56	0.32
Reach-1	8356	500 Year	615	469.59	476.29	473.16	476.49	0.000981	3.84	181.95	51.69	0.27
Reach-1	8332.5		Culvert									
Reach-1	8309	10 Year	205	467	470.02	468.97	470.21	0.002691	3.63	60.24	35.61	0.4
Reach-1	8309	50 Year	340	467	470.83	469.48	471.11	0.002764	4.41	82.23	41.2	0.42
Reach-1	8309	100 Year	410	467	471.16	469.73	471.49	0.002892	4.8	91.26	42.8	0.44
Reach-1	8309	500 Year	615	467	472	470.34	472.47	0.003132	5.71	116.16	50.68	0.47
Reach-1	8289	10 Year	205	466.83	469.6		469.91	0.006377	4.46	45.98	23.89	0.57
Reach-1	8289	50 Year	340	466.83	470.42		470.81	0.006156	5.06	67.16	27.96	0.58
Reach-1	8289	100 Year	410	466.83	470.75		471.19	0.005926	5.36	76.61	29.45	0.58
Reach-1	8289	500 Year	615	466.83	471.6		472.17	0.005241	6.06	103.58	33.56	0.57
Reach-1	8237	10 Year	205	465.68	468.31		468.66	0.008351	4.76	43.68	22.1	0.57
Reach-1	8237	50 Year	340	465.68	468.99		469.53	0.009016	5.94	59.78	24.88	0.62
Reach-1	8237	100 Year	410	465.68	469.29		469.93	0.009258	6.43	67.5	26.13	0.64
Reach-1	8237	500 Year	615	465.68	470.04		470.93	0.009915	7.67	88.21	29.28	0.68
Reach-1	8178	10 Year	205	464.04	467.16	466.21	467.41	0.004897	4.01	51.13	25.54	0.5
Reach-1	8178	50 Year	340	464.04	467.95	466.88	468.29	0.004376	4.72	73.19	29.76	0.5

HEC-RAS Plan: EX_FEMA_Reg 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
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	8178	100 Year	410	464.04	468.26	467.15	468.66	0.004435	5.1	82.54	31.17	0.51
Reach-1	8178	500 Year	615	464.04	469.1	467.82	469.61	0.00425	5.86	110.29	35.12	0.52
Reach-1	8128	10 Year	205	462.37	465.38	465.19	466.04	0.015639	6.51	31.5	17.9	0.86
Reach-1	8128	50 Year	340	462.37	466.27	465.93	467	0.016165	6.88	49.39	22.62	0.82
Reach-1	8128	100 Year	410	462.37	466.6	466.24	467.4	0.014777	7.22	57.09	24.41	0.8
Reach-1	8128	500 Year	615	462.37	467.4	466.95	468.42	0.013055	8.16	78.49	29.52	0.79
Reach-1	8080	10 Year	205	460.79	464.29		464.6	0.005328	4.49	45.65	19.64	0.52
Reach-1	8080	50 Year	340	460.79	465.07		465.54	0.005582	5.57	62.5	23.99	0.55
Reach-1	8080	100 Year	410	460.79	465.31		465.9	0.006293	6.21	68.45	25.52	0.6
Reach-1	8080	500 Year	615	460.79	466.26		467.02	0.005895	7.09	95.67	31.82	0.6
Reach-1	8027	10 Year	205	459.06	462.27	462.14	463.02	0.017558	6.94	29.54	16.31	0.91
Reach-1	8027	50 Year	340	459.06	463.12	462.88	464.03	0.014484	7.67	44.61	19.19	0.86
Reach-1	8027	100 Year	410	459.06	463.95	463.2	464.67	0.007913	6.85	62.06	23.05	0.67
Reach-1	8027	500 Year	615	459.06	465.36	464.02	466.07	0.004957	6.89	99.45	29.83	0.56
Reach-1	7977	10 Year	205	457.38	461.14	460.01	461.38	0.005548	3.96	51.75	22.58	0.46
Reach-1	7977	50 Year	340	457.38	462.64	460.7	462.87	0.003134	3.83	89.98	28.24	0.36
Reach-1	7977	100 Year	410	457.38	463.8	460.99	463.98	0.001725	3.43	125.27	32.52	0.28
Reach-1	7977	500 Year	615	457.38	465.3	461.76	465.52	0.001463	3.8	178.16	38.05	0.27
Reach-1	7937	10 Year	305	456.07	460.84	458.63	461	0.00185	3.28	92.96	26.96	0.31
Reach-1	7937	50 Year	515	456.07	462.35	459.44	462.58	0.00185	3.78	136.56	30.82	0.31
Reach-1	7937	100 Year	625	456.07	463.59	459.82	463.8	0.001227	3.61	176.9	33.87	0.26
Reach-1	7937	500 Year	940	456.07	465.04	460.73	465.34	0.001306	4.31	231.43	111.5	0.28
Reach-1	7911.5		Bridge									
Reach-1	7885	10 Year	305	455.84	459.87	458.22	460.03	0.00211	3.22	94.77	34.63	0.34
Reach-1	7885	50 Year	515	455.84	461.23	458.9	461.43	0.001527	3.54	154.89	49.06	0.31
Reach-1	7885	100 Year	625	455.84	461.82	459.2	462.03	0.001394	3.7	184.48	51.99	0.3
Reach-1	7885	500 Year	940	455.84	462.68	459.99	462.99	0.001717	4.6	231.04	56.3	0.35
Reach-1	7826	10 Year	305	454.72	459.28	457.54	459.47	0.004081	3.48	87.61	44.22	0.37
Reach-1	7826	50 Year	515	454.72	460.88	458.36	461.03	0.002515	3.29	182.64	68.12	0.29
Reach-1	7826	100 Year	625	454.72	461.52	458.72	461.67	0.002082	3.31	227.76	72.26	0.27
Reach-1	7826	500 Year	940	454.72	462.33	459.59	462.55	0.002514	4.04	288.14	78.77	0.3
Reach-1	7757	10 Year	305	453.54	459.32	456.61	459.32	0.000137	0.81	525.08	185.44	0.07
Reach-1	7757	50 Year	515	453.54	460.9	456.83	460.91	0.000115	0.94	768.11	197.26	0.07
Reach-1	7757	100 Year	625	453.54	461.55	456.83	461.56	0.000114	1.01	867.92	210.5	0.07
Reach-1	7757	500 Year	940	453.54	462.39	456.97	462.41	0.000119	1.12	1255.89	232.42	0.08
Reach-1	7711	10 Year	305	453.54	459.3	456.01	459.31	0.00012	0.8	453.49	233.27	0.07
Reach-1	7711	50 Year	515	453.54	460.89	456.37	460.9	0.000104	0.92	673.96	251	0.07
Reach-1	7711	100 Year	625	453.54	461.53	456.54	461.54	0.000104	0.98	763.13	268.96	0.07
Reach-1	7711	500 Year	940	453.54	462.39	456.92	462.39	0.000067	0.85	1542.98	294.19	0.06
Reach-1	7698	10 Year	430	453.41	458.96	456.16	459.22	0.001362	4.21	120.08	26.91	0.32
Reach-1	7698	50 Year	715	453.41	460.33	457.18	460.76	0.0017	5.47	156.92	167.02	0.37
Reach-1	7698	100 Year	870	453.41	460.7	457.66	461.32	0.002272	6.55	166.89	271.37	0.43
Reach-1	7698	500 Year	1315	453.41	460.7	458.97	462.07	0.00477	9.49	166.89	271.36	0.63
Reach-1	7689.5		Bridge									
Reach-1	7681	10 Year	430	453.25	458.22	455.97	458.54	0.00194	4.66	103.95	29.16	0.37
Reach-1	7681	50 Year	715	453.25	459.06	456.95	459.69	0.0031	6.56	123.25	54.97	0.49
Reach-1	7681	100 Year	870	453.25	459.52	457.44	460.31	0.00352	7.36	133.79	112.15	0.52
Reach-1	7681	500 Year	1315	453.25	460.03	458.64	461.55	0.006125	10.24	145.5	219.43	0.7
Reach-1	7666	10 Year	430	453.02	458.02	456.51	458.41	0.003126	5.16	105.36	51.8	0.45
Reach-1	7666	50 Year	715	453.02	458.91	457.66	459.52	0.004058	6.69	142.23	173.53	0.53
Reach-1	7666	100 Year	870	453.02	459.39	458.08	460.09	0.004207	7.24	162.99	204.51	0.54
Reach-1	7666	500 Year	1315	453.02	460.51	459.1	460.81	0.001704	5.21	341.06	269.91	0.36
Reach-1	7589	10 Year	430	452.95	456.58	455.99	456.79	0.017558	3.67	117.15	201.43	0.52
Reach-1	7589	50 Year	715	452.95	457.73	456.43	457.91	0.008301	3.46	206.93	319.65	0.38
Reach-1	7589	100 Year	870	452.95	458.43	456.62	458.6	0.005908	3.28	265.13	397.09	0.33
Reach-1	7589	500 Year	1315	452.95	460.46	457.16	460.49	0.000415	1.17	1134.86	553.58	0.09
Reach-1	7370	10 Year	430	450.98	456.08	452.97	456.1	0.000242	1.12	437.49	318.43	0.1
Reach-1	7370	50 Year	715	450.98	457.62	453.4	457.63	0.000088	0.82	930.81	373.98	0.06

HEC-RAS Plan: EX_FEMA_Reg 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
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	7370	100 Year	870	450.98	458.34	453.62	458.35	0.000076	0.82	1105.26	378.32	0.06
Reach-1	7370	500 Year	1315	450.98	460.38	454.11	460.39	0.000055	0.84	1755.6	390.5	0.05
Reach-1	7168	10 Year	430	450.95	455.63	453.18	455.75	0.001622	2.82	166.07	156.36	0.26
Reach-1	7168	50 Year	715	450.95	457.39	453.96	457.48	0.000885	2.69	340.77	266.34	0.2
Reach-1	7168	100 Year	870	450.95	458.17	454.3	458.24	0.000556	2.33	464.76	289.69	0.16
Reach-1	7168	500 Year	1315	450.95	460.28	455.26	460.32	0.00022	1.78	946.15	371.81	0.11
Reach-1	7120	10 Year	475	449.41	455.34	453.04	455.51	0.00144	3.54	183.87	87.21	0.3
Reach-1	7120	50 Year	795	449.41	457.24	454.51	457.35	0.000745	3.25	385.47	150.6	0.23
Reach-1	7120	100 Year	965	449.41	458.08	454.88	458.16	0.000474	2.82	593.13	244.87	0.19
Reach-1	7120	500 Year	1460	449.41	460.25	455.64	460.29	0.000163	1.98	1188.94	296.36	0.12
Reach-1	7073	10 Year	475	448.79	455.01		455.21	0.002573	3.59	132.19	32.56	0.31
Reach-1	7073	50 Year	795	448.79	456.91		457.15	0.002406	3.92	213.97	61.5	0.3
Reach-1	7073	100 Year	965	448.79	457.77		458.01	0.002054	4	272.61	76.12	0.28
Reach-1	7073	500 Year	1460	448.79	460		460.21	0.001368	4	473.97	102.65	0.24
Reach-1	6970	10 Year	475	448.33	454.36	451.74	454.57	0.001461	3.74	130.98	34.12	0.31
Reach-1	6970	50 Year	795	448.33	456.35	452.72	456.61	0.001126	4.17	206.6	41.55	0.29
Reach-1	6970	100 Year	965	448.33	457.24	453.18	457.52	0.001046	4.38	244.98	44.85	0.28
Reach-1	6970	500 Year	1460	448.33	459.5	454.34	459.83	0.000906	4.85	355.14	53.47	0.27
Reach-1	6915	10 Year	475	448.1	453.93	452.06	454.22	0.00258	4.36	113.79	34.3	0.39
Reach-1	6915	50 Year	795	448.1	456.05	453.02	456.37	0.001578	4.57	194.84	41.96	0.33
Reach-1	6915	100 Year	965	448.1	456.96	453.44	457.3	0.00141	4.75	234.52	45.24	0.32
Reach-1	6915	500 Year	1460	448.1	459.25	454.5	459.64	0.001155	5.2	349.02	56.07	0.3
Reach-1	6890	10 Year	475	447.9	453.74	451.31	453.97	0.003027	3.85	126.45	34.71	0.34
Reach-1	6890	50 Year	795	447.9	455.96	452.34	456.2	0.001916	4.04	210.9	40.88	0.29
Reach-1	6890	100 Year	965	447.9	456.88	452.77	457.15	0.001732	4.22	249.76	42.96	0.28
Reach-1	6890	500 Year	1460	447.9	459.2	453.92	459.51	0.001462	4.67	361.03	67.63	0.27
Reach-1	6859.5		Culvert									
Reach-1	6825	10 Year	475	447.15	453.2	450.49	453.42	0.003548	3.75	126.74	31.41	0.33
Reach-1	6825	50 Year	795	447.15	455.01	451.55	455.29	0.003276	4.23	190.53	40.77	0.32
Reach-1	6825	100 Year	965	447.15	455.67	452.03	455.99	0.00327	4.56	217.25	43.65	0.32
Reach-1	6825	500 Year	1460	447.15	457.25	453.25	457.59	0.002778	4.89	325.9	87.48	0.31
Reach-1	6809	10 Year	475	446.42	453	450.13	453.19	0.004393	3.52	134.87	34.8	0.32
Reach-1	6809	50 Year	795	446.42	454.83	451.23	455.07	0.004246	3.88	204.91	41.71	0.31
Reach-1	6809	100 Year	965	446.42	455.5	451.72	455.76	0.00436	4.14	233.51	50.17	0.31
Reach-1	6809	500 Year	1460	446.42	457.05	452.9	457.4	0.004193	4.81	312.32	99.34	0.32
Reach-1	6756	10 Year	475	447.24	452.09	450.11	452.39	0.004227	4.4	107.88	30.63	0.41
Reach-1	6756	50 Year	795	447.24	453.92	451.16	454.26	0.004488	4.67	170.27	37.66	0.39
Reach-1	6756	100 Year	965	447.24	454.51	451.63	454.9	0.004983	4.99	193.2	39.93	0.4
Reach-1	6756	500 Year	1460	447.24	455.98	452.8	456.49	0.005768	5.7	256.43	75.88	0.42
Reach-1	6732	10 Year	475	446.79	451.79	449.83	452.08	0.004588	4.39	108.19	31.04	0.41
Reach-1	6732	50 Year	795	446.79	453.6	450.88	453.94	0.004593	4.65	170.85	37.88	0.38
Reach-1	6732	100 Year	965	446.79	454.17	451.34	454.56	0.004569	5.02	193.04	39.99	0.39
Reach-1	6732	500 Year	1460	446.79	455.58	452.47	456.12	0.00458	5.91	254.07	47.53	0.41
Reach-1	6653	10 Year	475	445.8	450.42	448.72	450.79	0.00548	4.93	96.37	28.25	0.47
Reach-1	6653	50 Year	795	445.8	452.09	449.81	452.53	0.006607	5.31	149.62	35.98	0.46
Reach-1	6653	100 Year	965	445.8	452.67	450.29	453.17	0.006491	5.64	171.51	39.17	0.46
Reach-1	6653	500 Year	1460	445.8	454.17	451.53	454.8	0.005769	6.41	236.57	52.96	0.45
Reach-1	6593	10 Year	475	443.83	448.57	447.34	449.11	0.008399	5.92	81.87	25.4	0.56
Reach-1	6593	50 Year	795	443.83	449.57	448.43	450.46	0.010198	7.62	108.97	28.67	0.63
Reach-1	6593	100 Year	965	443.83	450.4	448.92	451.31	0.008334	7.72	133.97	31.42	0.59
Reach-1	6593	500 Year	1460	443.83	453.6	450.15	453.91	0.001991	5.16	426.07	188.63	0.31
Reach-1	6541	10 Year	475	443.54	447.3	446.65	447.96	0.006728	6.75	83.93	53.18	0.64
Reach-1	6541	50 Year	795	443.54	449.12	447.69	449.56	0.003013	6.01	202.32	64.75	0.46
Reach-1	6541	100 Year	965	443.54	450.1	448.03	450.55	0.002472	6.1	276.96	95.25	0.43
Reach-1	6541	500 Year	1460	443.54	453.51	448.93	453.7	0.000746	4.49	668.46	262.47	0.25
Reach-1	6490	10 Year	475	443.27	446.74	445.72	447.11	0.004302	4.97	103.33	43.21	0.51
Reach-1	6490	50 Year	795	443.27	448.94	446.52	449.21	0.001562	4.33	219.84	116.31	0.34
Reach-1	6490	100 Year	965	443.27	450.02	446.9	450.25	0.001132	4.18	281.24	126.94	0.29
Reach-1	6490	500 Year	1460	443.27	453.6	447.92	453.62	0.000098	1.66	1295.16	296.83	0.09

HEC-RAS Plan: EX_FEMA_Reg 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
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	6457	10 Year	515	440.91	446.67	444.12	446.87	0.002571	3.57	144.39	37.85	0.31
Reach-1	6457	50 Year	865	440.91	448.87	445.06	449.1	0.002115	3.84	225.42	48.81	0.28
Reach-1	6457	100 Year	1055	440.91	449.94	445.48	450.18	0.0018	3.96	267.79	65.33	0.26
Reach-1	6457	500 Year	1595	440.91	453.56	446.54	453.61	0.000262	1.76	939.3	222.2	0.1
Reach-1	6441.5		Culvert									
Reach-1	6417	10 Year	515	434.45	438.51	437.02	438.87	0.005421	4.85	106.34	30.68	0.45
Reach-1	6417	50 Year	865	434.45	440	437.91	440.5	0.004769	5.71	156.28	36.45	0.45
Reach-1	6417	100 Year	1055	434.45	440.67	438.32	441.24	0.004621	6.1	181.63	39.07	0.45
Reach-1	6417	500 Year	1595	434.45	442.33	439.46	443.06	0.004307	6.98	251.59	45.55	0.45
Reach-1	6409	10 Year	515	432.97	436.7	436.7	438.04	0.019104	9.28	55.5	20.69	1
Reach-1	6409	50 Year	865	432.97	437.87	437.87	439.63	0.01832	10.64	81.28	23.35	1.01
Reach-1	6409	100 Year	1055	432.97	438.44	438.44	440.36	0.017671	11.11	94.94	24.65	1
Reach-1	6409	500 Year	1595	432.97	439.77	439.77	442.12	0.017103	12.31	129.6	27.66	1
Reach-1	6394	10 Year	515	432.15	435.55	435.55	436.82	0.019557	9.05	56.9	22.3	1
Reach-1	6394	50 Year	865	432.15	436.73	436.73	438.3	0.018216	10.04	86.14	27.3	1
Reach-1	6394	100 Year	1055	432.15	437.24	437.24	438.95	0.017905	10.49	100.61	29.46	1
Reach-1	6394	500 Year	1595	432.15	438.45	438.45	440.49	0.016822	11.46	139.29	34.59	1
Reach-1	6305	10 Year	515	426.18	430.52	430.11	431.51	0.012953	7.99	64.43	22.43	0.83
Reach-1	6305	50 Year	865	426.18	431.5	431.31	433	0.015669	9.82	88.1	25.81	0.94
Reach-1	6305	100 Year	1055	426.18	431.96	431.85	433.68	0.016423	10.52	100.31	27.39	0.97
Reach-1	6305	500 Year	1595	426.18	433.07	433.07	435.31	0.016861	12.02	132.84	31.1	1.01
Reach-1	6266	10 Year	515	425	428.42	428.37	429.6	0.018071	8.71	59.16	24.13	0.98
Reach-1	6266	50 Year	865	425	429.63	429.46	431.03	0.015513	9.5	91.02	28.75	0.94
Reach-1	6266	100 Year	1055	425	430.12	429.95	431.67	0.015066	10	105.57	30.64	0.94
Reach-1	6266	500 Year	1595	425	431.32	431.09	433.25	0.012718	11.18	145.08	35.14	0.91
Reach-1	6216	10 Year	515	422.01	427.13		427.72	0.006665	6.17	83.54	26.1	0.61
Reach-1	6216	50 Year	865	422.01	428.5		429.27	0.006426	7.07	122.44	30.68	0.62
Reach-1	6216	100 Year	1055	422.01	429.04		429.93	0.006322	7.6	139.53	32.4	0.62
Reach-1	6216	500 Year	1595	422.01	430.61		431.7	0.005286	8.45	194.21	37.37	0.6
Reach-1	6122	10 Year	515	420.28	424.7	423.9	425.33	0.009046	6.33	81.34	29.99	0.68
Reach-1	6122	50 Year	865	420.28	426.18		426.87	0.009212	6.69	129.22	34.94	0.61
Reach-1	6122	100 Year	1055	420.28	426.86		427.59	0.008915	6.87	153.65	37.22	0.59
Reach-1	6122	500 Year	1595	420.28	429.61		430.2	0.003691	6.19	268.21	45.8	0.41
Reach-1	6067	10 Year	515	419.29	422.79		423.44	0.011922	6.51	79.14	32.54	0.74
Reach-1	6067	50 Year	865	419.29	424.94		425.39	0.006689	5.36	161.67	44.06	0.48
Reach-1	6067	100 Year	1055	419.29	426		426.4	0.004355	5.09	211.26	49.77	0.41
Reach-1	6067	500 Year	1595	419.29	429.41		429.69	0.001552	4.34	406.62	63.51	0.27
Reach-1	6033	10 Year	515	417.82	422.42	420.65	422.72	0.003112	4.4	117.01	35.28	0.43
Reach-1	6033	50 Year	865	417.82	424.74	421.63	425.01	0.001581	4.15	209.46	45.15	0.32
Reach-1	6033	100 Year	1055	417.82	425.86	422.07	426.13	0.001205	4.13	258.95	50.09	0.29
Reach-1	6033	500 Year	1595	417.82	429.34	423.16	429.58	0.000604	3.94	429.28	64.38	0.22
Reach-1	5993.5		Culvert									
Reach-1	5947	10 Year	515	413.65	417.8	417.31	418.67	0.011439	7.51	68.55	24.12	0.79
Reach-1	5947	50 Year	865	413.65	419.42	418.45	420.34	0.008397	7.73	111.95	29.51	0.7
Reach-1	5947	100 Year	1055	413.65	419.99	418.96	421.02	0.008293	8.14	129.57	31.43	0.7
Reach-1	5947	500 Year	1595	413.65	421.54	420.19	422.77	0.006526	8.92	182.19	36.77	0.66
Reach-1	5878	10 Year	795	410.66	416.46	415.02	417	0.004994	5.88	135.26	38.41	0.55
Reach-1	5878	50 Year	1335	410.66	417.93	416.26	418.65	0.006318	6.84	197.6	46.17	0.56
Reach-1	5878	100 Year	1625	410.66	418.56	416.8	419.38	0.006038	7.29	227.5	48.36	0.56
Reach-1	5878	500 Year	2465	410.66	420.43	418.08	421.42	0.00487	8.04	323.88	55.17	0.53
Reach-1	5832	10 Year	795	408.92	415.9	413.85	416.41	0.003026	5.82	142.16	33.19	0.45
Reach-1	5832	50 Year	1335	408.92	416.76	415.18	417.78	0.004941	8.25	171.75	35.74	0.59
Reach-1	5832	100 Year	1625	408.92	417.04	415.81	418.4	0.006211	9.53	182.04	36.64	0.67
Reach-1	5832	500 Year	2465	408.92	417.39	417.35	420.15	0.011801	13.62	194.94	37.74	0.93
Reach-1	5813		Inl Struct									
Reach-1	5812.5	10 Year	795	408.28	413.75	411.53	414.14	0.003045	5.06	157.23	34.38	0.42
Reach-1	5812.5	50 Year	1335	408.28	415.16	412.69	415.81	0.003652	6.46	208.26	38.11	0.47

HEC-RAS Plan: EX_FEMA_Reg 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
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	5812.5	100 Year	1625	408.28	415.78	413.24	416.56	0.003858	7.1	232.57	39.87	0.49
Reach-1	5812.5	500 Year	2465	408.28	417.38	414.62	418.52	0.004212	8.58	300.31	45.12	0.53
Reach-1	5804	10 Year	795	406.86	412.25	412.25	413.65	0.032355	9.49	83.82	30.02	1
Reach-1	5804	50 Year	1335	406.86	413.63	413.48	415.28	0.030592	10.32	129.64	35.86	0.94
Reach-1	5804	100 Year	1625	406.86	414.24	414.03	416.03	0.028028	10.74	152.34	37.64	0.92
Reach-1	5804	500 Year	2465	406.86	415.62	415.35	417.93	0.024991	12.23	206.85	41.35	0.91
Reach-1	5757	10 Year	795	404.07	408.88	408.15	409.91	0.013088	8.15	97.53	26.66	0.75
Reach-1	5757	50 Year	1335	404.07	410.87	409.56	412.01	0.013392	8.58	155.54	31.82	0.68
Reach-1	5757	100 Year	1625	404.07	411.58	410.21	412.86	0.013423	9.1	178.74	33.71	0.69
Reach-1	5757	500 Year	2465	404.07	412.95	411.73	414.82	0.014536	11	227.62	37.37	0.74
Reach-1	5628	10 Year	795	396.33	400.73	400.73	402.15	0.027525	9.55	83.26	29.55	1
Reach-1	5628	50 Year	1335	396.33	401.98	401.98	403.83	0.029799	10.93	122.11	32.84	1
Reach-1	5628	100 Year	1625	396.33	402.54	402.54	404.6	0.030733	11.51	141.14	34.33	1
Reach-1	5628	500 Year	2465	396.33	403.9	403.9	406.56	0.027161	13.1	190.33	37.93	0.99
Reach-1	5524	10 Year	795	385.83	390.14	389.81	391.33	0.016154	8.75	90.83	28.77	0.87
Reach-1	5524	50 Year	1335	385.83	392.12	391.14	393.29	0.014491	8.67	153.97	35.01	0.73
Reach-1	5524	100 Year	1625	385.83	392.83	391.73	394.1	0.014084	9.05	179.75	37.29	0.72
Reach-1	5524	500 Year	2465	385.83	394.17	393.14	395.97	0.014497	10.77	232.63	41.52	0.76
Reach-1	5456	10 Year	795	381.89	385.96	385.96	387.45	0.018417	9.81	81.01	27.58	1.01
Reach-1	5456	50 Year	1335	381.89	387.29	387.29	389.19	0.023011	11.06	120.73	46.92	1
Reach-1	5456	100 Year	1625	381.89	387.9	387.9	389.97	0.024218	11.54	140.77	51.26	0.99
Reach-1	5456	500 Year	2465	381.89	389.26	389.26	391.96	0.021713	13.19	189.66	60.63	0.99
Reach-1	5422	10 Year	795	379.59	384.4	383.65	385.34	0.009295	7.75	102.52	29.57	0.73
Reach-1	5422	50 Year	1335	379.59	385.59	384.98	387	0.013354	9.54	139.9	33.41	0.82
Reach-1	5422	100 Year	1625	379.59	386.09	385.61	387.76	0.013757	10.37	157	35.22	0.85
Reach-1	5422	500 Year	2465	379.59	387.63	386.98	389.77	0.012075	11.76	215.87	40.96	0.83
Reach-1	5355	10 Year	795	376.97	381.37	381.27	382.68	0.016095	9.19	86.53	29.91	0.95
Reach-1	5355	50 Year	1335	376.97	383.4	382.54	384.54	0.009132	8.56	156.01	38.54	0.75
Reach-1	5355	100 Year	1625	376.97	384.67	383.13	385.62	0.006116	7.83	208.43	43.8	0.61
Reach-1	5355	500 Year	2465	376.97	387.13	384.44	388.09	0.003661	7.89	329.08	54.73	0.51
Reach-1	5296	10 Year	955	374.11	379.35	378.53	380.33	0.009174	7.95	120.16	32.88	0.73
Reach-1	5296	50 Year	1610	374.11	382.39	379.98	383.14	0.005231	6.93	232.34	40.88	0.51
Reach-1	5296	100 Year	1960	374.11	383.83	380.57	384.52	0.004739	6.67	293.67	44.71	0.46
Reach-1	5296	500 Year	2975	374.11	386.52	382.16	387.3	0.003927	7.09	419.59	53	0.42
Reach-1	5281	10 Year	955	372.44	379.34	377.52	379.9	0.003748	6.01	160.57	39.34	0.49
Reach-1	5281	50 Year	1610	372.44	382.39	378.81	382.92	0.001852	5.92	293.64	55.74	0.38
Reach-1	5281	100 Year	1960	372.44	383.8	379.42	384.34	0.001519	6.01	356.76	59.85	0.35
Reach-1	5281	500 Year	2975	372.44	386.46	380.99	387.17	0.001431	6.92	475.73	74.62	0.36
Reach-1	5254.5		Culvert									
Reach-1	5224	10 Year	955	369.69	376.73	373.68	376.97	0.001284	3.87	247.01	50.92	0.3
Reach-1	5224	50 Year	1610	369.69	378.35	374.73	378.73	0.001496	4.99	325.86	54.41	0.33
Reach-1	5224	100 Year	1960	369.69	379.28	375.22	379.72	0.001449	5.35	373.04	56.82	0.34
Reach-1	5224	500 Year	2975	369.69	381.23	376.46	381.87	0.001579	6.47	475.69	60.89	0.36
Reach-1	5206	10 Year	955	370.21	376.16	374.42	376.68	0.00421	5.81	164.34	41.4	0.51
Reach-1	5206	50 Year	1610	370.21	377.63	375.72	378.4	0.004672	7.02	229.3	46.57	0.56
Reach-1	5206	100 Year	1960	370.21	378.64	376.32	379.41	0.004205	7.05	277.92	49.96	0.53
Reach-1	5206	500 Year	2975	370.21	380.63	377.74	381.56	0.004282	7.75	383.99	56.69	0.52
Reach-1	5145	10 Year	955	369.69	374.12	373.76	375.19	0.012191	8.3	115.04	38.32	0.84
Reach-1	5145	50 Year	1610	369.69	376.57	375.01	377.38	0.005514	7.24	222.24	49.41	0.6
Reach-1	5145	100 Year	1960	369.69	377.91	375.56	378.61	0.003573	6.74	292.69	55.58	0.5
Reach-1	5145	500 Year	2975	369.69	380.05	376.95	380.83	0.002648	7.18	453.61	162.48	0.45
Reach-1	5084	10 Year	955	366.9	373.3	371.34	373.83	0.003608	5.87	165.82	40.99	0.48
Reach-1	5084	50 Year	1610	366.9	376.17	372.7	376.69	0.001922	5.9	320.12	88.72	0.38
Reach-1	5084	100 Year	1960	366.9	377.64	373.29	378.11	0.001452	5.77	444.03	219.07	0.34
Reach-1	5084	500 Year	2975	366.9	380.34	374.89	380.48	0.000372	3.48	1208.26	484.3	0.18
Reach-1	5072	10 Year	955	366.9	373.29	370.45	373.63	0.001625	4.74	208.06	53.07	0.35
Reach-1	5072	50 Year	1610	366.9	376.17	371.68	376.56	0.001122	5.16	327.88	80.92	0.31
Reach-1	5072	100 Year	1960	366.9	377.7	372.25	377.97	0.000692	4.52	549.24	350.07	0.25
Reach-1	5072	500 Year	2975	366.9	380.28	373.73	380.45	0.000399	3.99	1155.36	556.75	0.2

HEC-RAS Plan: EX_FEMA_Reg 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
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	5050.5		Culvert									
Reach-1	5021	10 Year	955	364.11	370.53	367.68	370.71	0.001209	3.41	280.92	65.53	0.29
Reach-1	5021	50 Year	1610	364.11	372.22	368.76	372.48	0.001161	4.14	396.69	78.63	0.3
Reach-1	5021	100 Year	1960	364.11	373.47	369.17	373.73	0.00091	4.15	494.27	103.71	0.27
Reach-1	5021	500 Year	2975	364.11	374.87	370.21	375.29	0.00115	5.23	604.05	130.98	0.31

BEAVER POND BROOK - EXISTING CONDITION, FEMA REGULATORY (W/ BACKWATER)
HEC-RAS 4.1.0 - "Six XS Bridge" Output

HEC-RAS Plan: EX_FEMA_Reg River: Beaver Pond Brk Reach: Reach-1												
Reach	River Sta	Profile	E.G. Elev	W.S. Elev	Crit W.S.	Frctn Loss	C & E Loss	Top Width	Q Left	Q Channel	Q Right	Vel Chnl
			(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft/s)
Reach-1	7977	10 Year	461.38	461.14	460.01	0.35	0.02	22.58		205		3.96
Reach-1	7977	50 Year	462.87	462.64	460.7	0.29	0	28.24	0.53	339.08	0.38	3.83
Reach-1	7977	100 Year	463.98	463.8	460.99	0.18	0	32.52	3.65	403.59	2.76	3.43
Reach-1	7977	500 Year	465.52	465.3	461.76	0.18	0.01	38.05	14.47	589.36	11.17	3.8
Reach-1	7937	10 Year	461	460.84	458.63			26.96		305		3.28
Reach-1	7937	50 Year	462.58	462.35	459.44			30.82	0.03	514.84	0.14	3.78
Reach-1	7937	100 Year	463.8	463.59	459.82			33.87	0.68	622.62	1.7	3.61
Reach-1	7937	500 Year	465.34	465.04	460.73			111.5	5.6	926.65	7.75	4.31
Reach-1	7911.5 BR U	10 Year	460.48	460.15	458.01			14.42		305		4.65
Reach-1	7911.5 BR U	50 Year	462.57	460.3	458.99					515		7.6
Reach-1	7911.5 BR U	100 Year	463.8	460.3	459.46					625		9.22
Reach-1	7911.5 BR U	500 Year	465.33	465.04	465.52			107.18		728.04	210.25	10.55
Reach-1	7911.5 BR D	10 Year	460.22	459.84	457.97			14.42		305		4.97
Reach-1	7911.5 BR D	50 Year	461.43	460.3	458.97					515		7.56
Reach-1	7911.5 BR D	100 Year	462.03	460.3	459.45					625		9.18
Reach-1	7911.5 BR D	500 Year	465.33	465.01	465.01			76.9		728.04	210.25	10.58
Reach-1	7885	10 Year	460.03	459.87	458.22	0.55	0.01	34.63		305		3.22
Reach-1	7885	50 Year	461.43	461.23	458.9	0.37	0.02	49.06	1.98	506.15	6.87	3.54
Reach-1	7885	100 Year	462.03	461.82	459.2	0.33	0.03	51.99	4.95	606.38	13.67	3.7
Reach-1	7885	500 Year	462.99	462.68	459.99	0.4	0.05	56.3	14.24	894.56	31.21	4.6
Reach-1	7826	10 Year	459.47	459.28	457.54	0.1	0.05	44.22		305		3.48
Reach-1	7826	50 Year	461.03	460.88	458.36	0.08	0.04	68.12	2.5	468.52	43.98	3.29
Reach-1	7826	100 Year	461.67	461.52	458.72	0.07	0.04	72.26	9.29	545.94	69.77	3.31
Reach-1	7826	500 Year	462.55	462.33	459.59	0.08	0.06	78.77	29.62	782.99	127.39	4.04
Reach-1	7711	10 Year	459.31	459.3	456.01	0.01	0.08	233.27	8.55	257.43	39.02	0.8
Reach-1	7711	50 Year	460.9	460.89	456.37	0.01	0.13	251	15.81	409.31	89.88	0.92
Reach-1	7711	100 Year	461.54	461.53	456.54	0.01	0.19	268.96	19.58	488.26	117.16	0.98
Reach-1	7711	500 Year	462.39	462.39	456.92	0.01	0.39	294.19	334.8	482.44	122.75	0.85
Reach-1	7698	10 Year	459.22	458.96	456.16			26.91	8.15	406.88	14.98	4.21
Reach-1	7698	50 Year	460.76	460.33	457.18			167.02	18.18	663.4	33.42	5.47
Reach-1	7698	100 Year	461.32	460.7	457.66			271.37	24.43	838.47	7.1	6.55
Reach-1	7698	500 Year	462.07	460.7	458.97			271.36	35.39	1214.79	64.82	9.49
Reach-1	7689.5 BR U	10 Year	459.22	458.5	456.29					430		5.15
Reach-1	7689.5 BR U	50 Year	460.76	458.5	457.39					715		8.56
Reach-1	7689.5 BR U	100 Year	461.34	460.7	457.92					734.27	144.94	8.79
Reach-1	7689.5 BR U	500 Year	462	460.7	462.19				31.99	785.14	441.79	9.4
Reach-1	7689.5 BR D	10 Year	458.54	458.22	456.12			16.98		430		5.27
Reach-1	7689.5 BR D	50 Year	459.69	458.5	457.21					715		8.28
Reach-1	7689.5 BR D	100 Year	461.22	460.7	457.75			113.7		734.27	144.94	8.5
Reach-1	7689.5 BR D	500 Year	462	460.7	461.52			113.7	31.99	785.14	441.79	9.09
Reach-1	7681	10 Year	458.54	458.22	455.97	0.11	0.02	29.16	19.25	402.54	8.21	4.66
Reach-1	7681	50 Year	459.69	459.06	456.95	0.16	0.01	54.97	34.13	665.56	15.31	6.56
Reach-1	7681	100 Year	460.31	459.52	457.44	0.17	0.04	112.15	42.65	807.84	19.52	7.36
Reach-1	7681	500 Year	461.55	460.03	458.64	0.13	0.61	219.43	66.08	1218.13	30.79	10.24
Reach-1	7666	10 Year	458.41	458.02	456.51	1.53	0.09	51.8	7.59	394.88	27.53	5.16
Reach-1	7666	50 Year	459.52	458.91	457.66	1.39	0.21	173.53	19.7	621.88	73.42	6.69
Reach-1	7666	100 Year	460.09	459.39	458.08	1.23	0.27	204.51	28.72	737.57	103.71	7.24
Reach-1	7666	500 Year	460.81	460.51	459.1	0.18	0.13	269.91	29.28	639.53	646.19	5.21

BEAVER POND BROOK - EXISTING CONDITION, FEMA REGULATORY (W/ BACKWATER)

HEC-RAS 4.1.0 - "Culvert Only" Output

HEC-RAS Plan: EX_FEMA_Reg 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
			(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(ft)	(ft/s)	(ft/s)
Reach-1	8435.5 Culvert #1	10 Year	483.93	483.08	483.93	483.87	493.14	205		2.69	9.38	11.56
Reach-1	8435.5 Culvert #1	50 Year	485.71	485.27	485.71	485.62	493.14	340		4.24	11.1	13.27
Reach-1	8435.5 Culvert #1	100 Year	486.53	486.16	486.53	486.43	493.14	410		4.85	11.82	13.94
Reach-1	8435.5 Culvert #1	500 Year	488.82	488.6	488.82	488.59	493.14	615		6.53	13.53	15.5

Culvert Output

File Type Options Help

River: Beaver Pond Brk Profile: 100 Year Culv Group: Culvert #1

Reach Reach-1 RS: 8435.5 Plan: EX_FEMA_Reg

Plan: EX_FEMA_Reg Beaver Pond Brk Reach-1 RS: 8435.5 Culv Group: Culvert #1 Profile: 100 Year

Q Culv Group (cfs)	410.00	Culv Full Len (ft)	
# Barrels	1	Culv Vel US (ft/s)	11.82
Q Barrel (cfs)	410.00	Culv Vel DS (ft/s)	13.94
E.G. US. (ft)	486.53	Culv Inv El Up (ft)	479.50
W.S. US. (ft)	486.16	Culv Inv El Dn (ft)	478.72
E.G. DS (ft)	482.50	Culv Frctn Ls (ft)	0.58
W.S. DS (ft)	481.31	Culv Exit Loss (ft)	2.92
Delta EG (ft)	4.04	Culv Entr Loss (ft)	0.53
Delta WS (ft)	4.85	Q Weir (cfs)	
E.G. IC (ft)	486.53	Weir Sta Lft (ft)	
E.G. OC (ft)	486.43	Weir Sta Rgt (ft)	
Culvert Control	Inlet	Weir Submerg	
Culv WS Inlet (ft)	483.83	Weir Max Depth (ft)	
Culv WS Outlet (ft)	482.40	Weir Avg Depth (ft)	
Culv Nml Depth (ft)	3.46	Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	4.34	Min El Weir Flow (ft)	493.14

Errors, Warnings and Notes

Warning: Since the culvert has supercritical flow, the program should be run in mixed flow in order to check if the cross section downstream of the culvert has supercritical flow.

Note: The flow in the culvert is entirely supercritical.

Select Profile

HEC-RAS Plan: EX_FEMA_Reg 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
			(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(ft)	(ft/s)	(ft/s)
Reach-1	8332.5 #2-East Ce	10 Year	472.94	472.74	472.53	472.9	491.26	100.37		2.72	7.73	13.15
Reach-1	8332.5 #1-West Ce	10 Year	472.94	472.74	472.6	472.97	491.26	104.63		2.72	7.84	13.43
Reach-1	8332.5 #2-East Ce	50 Year	474.26	474.05	473.76	474.21	491.26	167.15		3.21	9.16	14.9
Reach-1	8332.5 #1-West Ce	50 Year	474.26	474.05	473.84	474.3	491.26	172.85		3.21	9.26	15.17
Reach-1	8332.5 #2-East Ce	100 Year	474.87	474.66	474.34	474.83	491.26	201.93		3.5	9.76	15.57
Reach-1	8332.5 #1-West Ce	100 Year	474.87	474.66	474.42	474.91	491.26	208.07		3.5	9.85	15.83
Reach-1	8332.5 #2-East Ce	500 Year	476.49	476.29	475.91	476.48	491.26	305.86		4.29	11.21	17.09
Reach-1	8332.5 #1-West Ce	500 Year	476.49	476.29	475.94	476.51	491.26	309.14		4.29	11.25	17.29

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_FEMA_Reg

Plan: EX_FEMA_Reg Beaver Pond Brk Reach-1 RS: 8332.5 Culv Group: #1-West Cell Profile: 100 Year

Q Culv Group (cfs)	208.07	Culv Full Len (ft)	
# Barrels	1	Culv Vel US (ft/s)	9.85
Q Barrel (cfs)	208.07	Culv Vel DS (ft/s)	15.83
E.G. US. (ft)	474.87	Culv Inv El Up (ft)	469.64
W.S. US. (ft)	474.66	Culv Inv El Dn (ft)	467.22
E.G. DS (ft)	471.49	Culv Frctn Ls (ft)	1.17
W.S. DS (ft)	471.16	Culv Exit Loss (ft)	1.50
Delta EG (ft)	3.38	Culv Entr Loss (ft)	0.75
Delta WS (ft)	3.50	Q Weir (cfs)	
E.G. IC (ft)	474.42	Weir Sta Lft (ft)	
E.G. OC (ft)	474.91	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	472.65	Weir Max Depth (ft)	
Culv WS Outlet (ft)	469.10	Weir Avg Depth (ft)	
Culv Nml Depth (ft)	1.63	Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	3.02	Min El Weir Flow (ft)	491.26

Errors, Warnings and Notes

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_FEMA_Reg

Plan: EX_FEMA_Reg Beaver Pond Brk Reach-1 RS: 8332.5 Culv Group: #2-East Cell Profile: 100 Year

Q Culv Group (cfs)	201.93	Culv Full Len (ft)	
# Barrels	1	Culv Vel US (ft/s)	9.76
Q Barrel (cfs)	201.93	Culv Vel DS (ft/s)	15.57
E.G. US. (ft)	474.87	Culv Inv El Up (ft)	469.65
W.S. US. (ft)	474.66	Culv Inv El Dn (ft)	467.32
E.G. DS (ft)	471.49	Culv Frctn Ls (ft)	1.15
W.S. DS (ft)	471.16	Culv Exit Loss (ft)	1.45
Delta EG (ft)	3.38	Culv Entr Loss (ft)	0.74
Delta WS (ft)	3.50	Q Weir (cfs)	
E.G. IC (ft)	474.34	Weir Sta Lft (ft)	
E.G. OC (ft)	474.83	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	472.61	Weir Max Depth (ft)	
Culv WS Outlet (ft)	469.18	Weir Avg Depth (ft)	
Culv Nml Depth (ft)	1.62	Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	2.96	Min El Weir Flow (ft)	491.26

Errors, Warnings and Notes

Note: The flow in the culvert is entirely supercritical.

Enter to move to next downstream river station location

HEC-RAS Plan: EX_FEMA_Reg 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
			(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(ft)	(ft/s)	(ft/s)
Reach-1	6859.5 02536	10 Year	453.98	453.74	453.35	453.98	457.56	475		0.54	5.89	5.33
Reach-1	6859.5 02536	50 Year	456.21	455.96	455.49	456.21	457.56	795		0.94	7.24	6.73
Reach-1	6859.5 02536	100 Year	457.15	456.88	456.51	457.15	457.56	965		1.21	8	7.53
Reach-1	6859.5 02536	500 Year	459.51	459.2	458.74	459.51	457.56	1203.25	256.75	1.95	9.39	9.39

Culvert Output

File Type Options Help

River: Beaver Pond Brk Profile: 100 Year Culv Group: 02536

Reach Reach-1 RS: 6859.5 Plan: EX_FEMA_Reg

Plan: EX_FEMA_Reg Beaver Pond Brk Reach-1 RS: 6859.5 Culv Group: 02536 Profile: 100 Year

Q Culv Group (cfs)	965.00	Culv Full Len (ft)	7.60
# Barrels	2	Culv Vel US (ft/s)	8.00
Q Barrel (cfs)	482.50	Culv Vel DS (ft/s)	7.53
E.G. US. (ft)	457.15	Culv Inv El Up (ft)	448.13
W.S. US. (ft)	456.88	Culv Inv El Dn (ft)	447.64
E.G. DS (ft)	455.99	Culv Frctn Ls (ft)	0.10
W.S. DS (ft)	455.67	Culv Exit Loss (ft)	0.56
Delta EG (ft)	1.16	Culv Entr Loss (ft)	0.50
Delta WS (ft)	1.21	Q Weir (cfs)	
E.G. IC (ft)	456.51	Weir Sta Lft (ft)	
E.G. OC (ft)	457.15	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	455.66	Weir Max Depth (ft)	
Culv WS Outlet (ft)	455.64	Weir Avg Depth (ft)	
Culv Nml Depth (ft)	4.17	Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	4.83	Min El Weir Flow (ft)	457.56

Errors, Warnings and Notes

Enter to move to next downstream river station location

HEC-RAS Plan: EX_FEMA_Reg 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
			(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(ft)	(ft/s)	(ft/s)
Reach-1	6441.5 151-014	10 Year	446.87	446.67	446.41	446.87	459.59	515		8.16	10.12	18.13
Reach-1	6441.5 151-014	50 Year	449.11	448.87	448.58	449.11	459.59	865		8.87	12.03	20.13
Reach-1	6441.5 151-014	100 Year	450.19	449.94	449.65	450.19	459.59	1055		9.27	12.85	20.95
Reach-1	6441.5 151-014	500 Year	453.61	453.56	453.61	452.95	459.59	1595		11.23	12.45	24.2

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_FEMA_Reg

Plan: EX_FEMA_Reg Beaver Pond Brk Reach-1 RS: 6441.5 Culv Group: 151-014 Profile: 100 Year

Q Culv Group (cfs)	1055.00	Culv Full Len (ft)	
# Barrels	2	Culv Vel US (ft/s)	12.85
Q Barrel (cfs)	527.50	Culv Vel DS (ft/s)	20.95
E.G. US. (ft)	450.19	Culv Inv El Up (ft)	441.47
W.S. US. (ft)	449.94	Culv Inv El Dn (ft)	438.16
E.G. DS (ft)	441.24	Culv Frctn Ls (ft)	1.05
W.S. DS (ft)	440.67	Culv Exit Loss (ft)	6.87
Delta EG (ft)	8.95	Culv Entr Loss (ft)	1.03
Delta WS (ft)	9.27	Q Weir (cfs)	
E.G. IC (ft)	449.65	Weir Sta Lft (ft)	
E.G. OC (ft)	450.19	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	446.60	Weir Max Depth (ft)	
Culv WS Outlet (ft)	441.30	Weir Avg Depth (ft)	
Culv Nml Depth (ft)	2.35	Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	5.13	Min El Weir Flow (ft)	459.59

Errors, Warnings and Notes

Note: The flow in the culvert is entirely supercritical.

Enter to move to next downstream river station location

HEC-RAS Plan: EX_FEMA_Reg 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
			(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(ft)	(ft/s)	(ft/s)
Reach-1	5993.5 02537	10 Year	422.72	422.42	422.67	422.72	431.53	515		4.62	10.12	12.09
Reach-1	5993.5 02537	50 Year	425.02	424.74	424.95	425.02	431.53	865		5.33	12.03	13.9
Reach-1	5993.5 02537	100 Year	426.13	425.86	426.05	426.13	431.53	1055		5.87	12.85	14.64
Reach-1	5993.5 02537	500 Year	429.58	429.34	429.58	428.98	431.53	1595		7.8	12.45	18.96

Culvert Output

File Type Options Help

River: Beaver Pond Brk Profile: 100 Year Culv Group: 02537

Reach Reach-1 RS: 5993.5 Plan: EX_FEMA_Reg

Plan: EX_FEMA_Reg Beaver Pond Brk Reach-1 RS: 5993.5 Culv Group: 02537 Profile: 100 Year

Q Culv Group (cfs)	1055.00	Culv Full Len (ft)	
# Barrels	2	Culv Vel US (ft/s)	12.85
Q Barrel (cfs)	527.50	Culv Vel DS (ft/s)	14.64
E.G. US. (ft)	426.13	Culv Inv El Up (ft)	417.16
W.S. US. (ft)	425.86	Culv Inv El Dn (ft)	416.31
E.G. DS (ft)	421.02	Culv Frctn Ls (ft)	0.72
W.S. DS (ft)	419.99	Culv Exit Loss (ft)	3.11
Delta EG (ft)	5.11	Culv Entr Loss (ft)	1.28
Delta WS (ft)	5.87	Q Weir (cfs)	
E.G. IC (ft)	426.05	Weir Sta Lft (ft)	
E.G. OC (ft)	426.13	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	422.29	Weir Max Depth (ft)	
Culv WS Outlet (ft)	420.81	Weir Avg Depth (ft)	
Culv Nml Depth (ft)	4.34	Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	5.13	Min El Weir Flow (ft)	431.53

Errors, Warnings and Notes

Note: The flow in the culvert is entirely supercritical.

Enter to move to next downstream river station location

HEC-RAS Plan: EX_FEMA_Reg 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
			(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(ft)	(ft/s)	(ft/s)
Reach-1	5254.5 01227	10 Year	379.9	379.34	379.84	379.9	384.1	955		2.61	11.54	10.41
Reach-1	5254.5 01227	50 Year	382.92	382.39	382.83	382.92	384.1	1610		4.04	13.74	12.98
Reach-1	5254.5 01227	100 Year	384.34	383.8	384.25	384.34	384.1	1956.69	3.31	4.52	14.66	13.71
Reach-1	5254.5 01227	500 Year	387.17	386.46	387.17	386.87	384.1	2615.91	359.09	5.24	14.97	14.4

Culvert Output

File Type Options Help

River: Beaver Pond Brk Profile: 100 Year Culv Group: 01227

Reach Reach-1 RS: 5254.5 Plan: EX_FEMA_Reg

Plan: EX_FEMA_Reg Beaver Pond Brk Reach-1 RS: 5254.5 Culv Group: 01227 Profile: 100 Year

Q Culv Group (cfs)	1956.69	Culv Full Len (ft)	
# Barrels	2	Culv Vel US (ft/s)	14.66
Q Barrel (cfs)	978.34	Culv Vel DS (ft/s)	13.71
E.G. US. (ft)	384.34	Culv Inv El Up (ft)	372.66
W.S. US. (ft)	383.80	Culv Inv El Dn (ft)	372.15
E.G. DS (ft)	379.72	Culv Frctn Ls (ft)	0.47
W.S. DS (ft)	379.28	Culv Exit Loss (ft)	2.48
Delta EG (ft)	4.62	Culv Entr Loss (ft)	1.67
Delta WS (ft)	4.52	Q Weir (cfs)	3.31
E.G. IC (ft)	384.25	Weir Sta Lft (ft)	-11.32
E.G. OC (ft)	384.34	Weir Sta Rgt (ft)	4.42
Culvert Control	Outlet	Weir Submerg	0.00
Culv WS Inlet (ft)	379.34	Weir Max Depth (ft)	0.25
Culv WS Outlet (ft)	379.28	Weir Avg Depth (ft)	0.18
Culv Nml Depth (ft)	6.59	Weir Flow Area (sq ft)	2.88
Culv Crt Depth (ft)	6.67	Min El Weir Flow (ft)	384.10

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_FEMA_Reg 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
			(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(ft)	(ft/s)	(ft/s)
Reach-1	5050.5 03727	10 Year	373.63	373.29	373.16	373.63	378.32	955		2.76	11.54	14.73
Reach-1	5050.5 03727	50 Year	376.56	376.17	376.01	376.56	378.32	1610		3.95	13.74	16.87
Reach-1	5050.5 03727	100 Year	377.96	377.7	377.38	377.96	378.32	1960		4.23	14.67	17.75
Reach-1	5050.5 03727	500 Year	380.44	380.28	381.19	380.44	378.32	2636.61	293.94	5.41	16.19	19.17

Culvert Output

File Type Options Help

River: Beaver Pond Brk Profile: 100 Year Culv Group: 03727

Reach Reach-1 RS: 5050.5 Plan: EX_FEMA_Reg

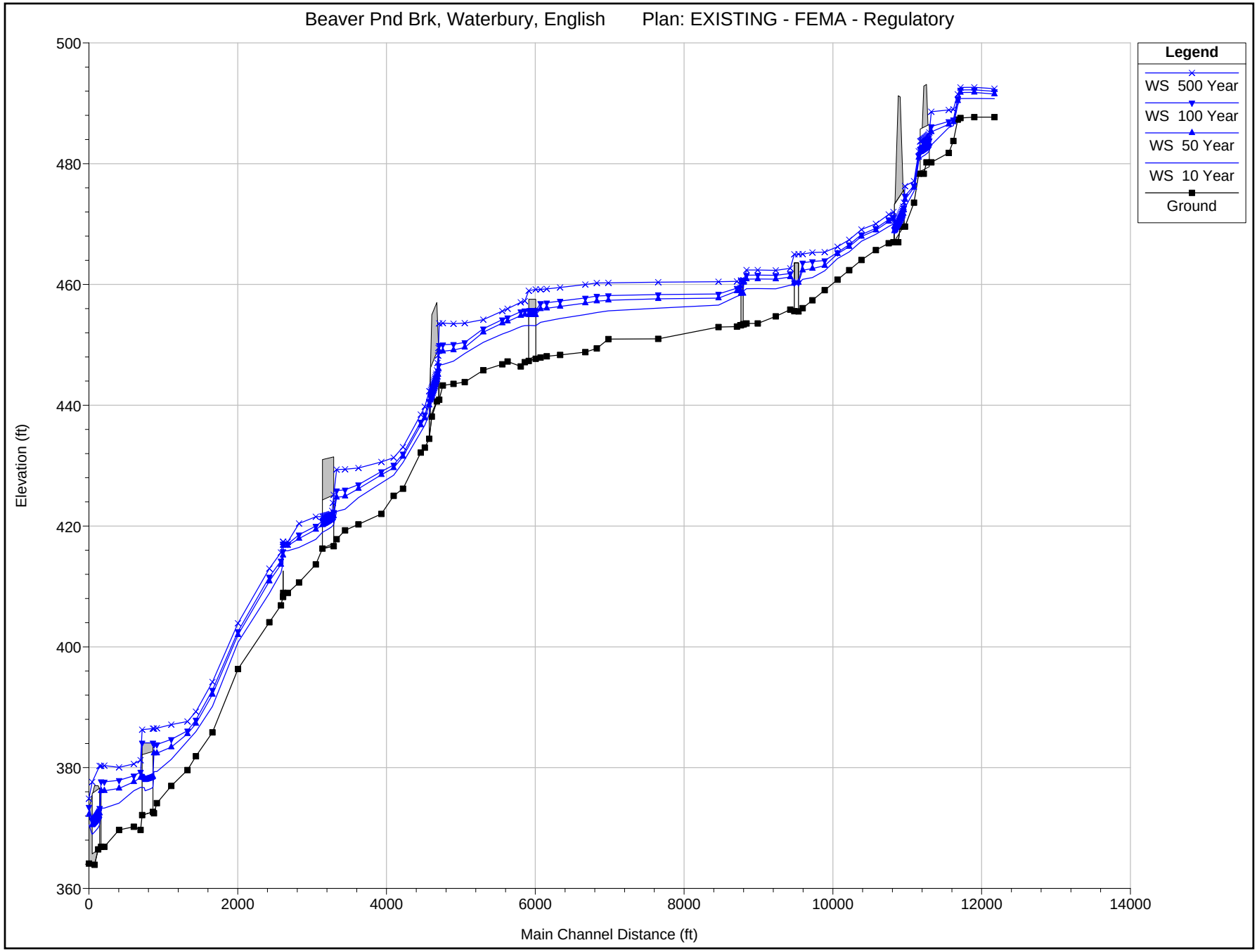
Plan: EX_FEMA_Reg Beaver Pond Brk Reach-1 RS: 5050.5 Culv Group: 03727 Profile: 100 Year

Q Culv Group (cfs)	1960.00	Culv Full Len (ft)	
# Barrels	2	Culv Vel US (ft/s)	14.67
Q Barrel (cfs)	980.00	Culv Vel DS (ft/s)	17.75
E.G. US. (ft)	377.96	Culv Inv El Up (ft)	366.60
W.S. US. (ft)	377.70	Culv Inv El Dn (ft)	365.72
E.G. DS (ft)	373.73	Culv Frctn Ls (ft)	0.49
W.S. DS (ft)	373.47	Culv Exit Loss (ft)	2.39
Delta EG (ft)	4.23	Culv Entr Loss (ft)	1.34
Delta WS (ft)	4.23	Q Weir (cfs)	
E.G. IC (ft)	377.38	Weir Sta Lft (ft)	
E.G. OC (ft)	377.96	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	373.28	Weir Max Depth (ft)	
Culv WS Outlet (ft)	371.24	Weir Avg Depth (ft)	
Culv Nml Depth (ft)	4.68	Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	6.68	Min El Weir Flow (ft)	378.32

Errors, Warnings and Notes

Note: The flow in the culvert is entirely supercritical.

Enter to move to next downstream river station location


Beaver Pnd Brk, Waterbury, English Plan: EXISTING - FEMA - Regulatory
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Elevation (ft)
Main Channel Distance (ft)
500
480
460
440
420
400
380
360
0
2000
4000
6000
8000
10000
12000
14000

BEAVER POND BROOK - EXISTING CONDITION, FEMA FLOODWAY (W/O BACKWATER)
HEC-RAS 4.1.0 - "Standard Table 1" Output

HEC-RAS Plan: EX_FEMA_Fldw 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
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	8722	100 Year	410	487.7	491.97	491.62	492.7	0.00948	7.42	67.2	37.29	0.75
Reach-1	8722	Floodway	410	487.7	493.13		493.37	0.002274	4.5	122.82	58.2	0.39
Reach-1	8722	10 Year	205	487.7	490.76	490.76	491.5	0.016771	7.08	31.54	23.59	0.91
Reach-1	8722	10-Yr Floodv	205	487.7	491.06		491.56	0.009598	5.9	38.88	26.36	0.71
Reach-1	8640	100 Year	410	487.7	492.23	489.89	492.24	0.000106	0.96	526.33	188.95	0.08
Reach-1	8640	Floodway	410	487.7	493.2	489.89	493.21	0.000051	0.69	627.96	157	0.05
Reach-1	8640	10 Year	205	487.7	490.8	489.63	490.81	0.000225	1.04	264.65	173.55	0.11
Reach-1	8640	10-Yr Floodv	205	487.7	491.2	489.63	491.2	0.000123	0.8	312.83	157	0.08
Reach-1	8583	100 Year	410	487.57	492.22		492.23	0.000069	0.82	688.1	248.57	0.07
Reach-1	8583	Floodway	410	487.57	493.2		493.2	0.000041	0.72	657.92	143.9	0.06
Reach-1	8583	10 Year	205	487.57	490.77		490.78	0.000102	0.75	359.81	199.4	0.08
Reach-1	8583	10-Yr Floodv	205	487.57	491.18		491.19	0.000067	0.67	368.15	143.9	0.07
Reach-1	8573	100 Year	410	487.3	490.73	490.73	491.88	0.014471	9.22	51.39	48.71	0.94
Reach-1	8573	Floodway	410	487.3	491.06	491.06	492.7	0.026428	10.3	39.82	12	1
Reach-1	8573	10 Year	205	487.3	489.72	489.72	490.53	0.016866	7.55	30.03	19.04	0.95
Reach-1	8573	10-Yr Floodv	205	487.3	489.83	489.83	490.87	0.02547	8.19	25.04	12	1
Reach-1	8554	100 Year	410	483.76	487.28	487	488.06	0.009678	7.38	62.31	32.53	0.74
Reach-1	8554	Floodway	410	483.76	487.29	486.9	488.27	0.011305	8	52.9	18	0.81
Reach-1	8554	10 Year	205	483.76	486.29	485.95	486.82	0.010543	5.93	36.03	22.38	0.73
Reach-1	8554	10-Yr Floodv	205	483.76	486.28	485.94	486.84	0.010824	6	34.8	18	0.74
Reach-1	8536	100 Year	410	481.79	487		487.46	0.005473	5.49	79.92	42.71	0.55
Reach-1	8536	Floodway	410	481.79	487.02		487.52	0.006216	5.65	72.55	23.21	0.56
Reach-1	8536	10 Year	205	481.79	485.98		486.26	0.005046	4.22	48.54	21.81	0.5
Reach-1	8536	10-Yr Floodv	205	481.79	485.98		486.26	0.005037	4.22	48.57	21.82	0.5
Reach-1	8464	100 Year	410	480.22	486.16	484.25	486.53	0.002859	5.04	88.7	27.58	0.41
Reach-1	8464	Floodway	410	480.22	486.16	484.25	486.53	0.002862	5.04	87.73	24.5	0.41
Reach-1	8464	10 Year	205	480.22	483.08	483.08	484.03	0.022153	7.81	26.26	13.84	1
Reach-1	8464	10-Yr Floodv	205	480.22	483.08	483.08	484.03	0.022214	7.81	26.23	13.84	1
Reach-1	8435.5		Culvert									
Reach-1	8412	100 Year	410	478.35	481.31	481.31	482.5	0.020018	8.74	46.96	20.3	1
Reach-1	8412	Floodway	410	478.35	481.32	481.32	482.5	0.019797	8.71	47.12	20.3	1
Reach-1	8412	10 Year	205	478.35	480.39	480.39	481.16	0.021692	7.05	29.08	18.6	0.99
Reach-1	8412	10-Yr Floodv	205	478.35	480.39	480.39	481.16	0.021624	7.04	29.11	18.6	0.99
Reach-1	8393	100 Year	410	473.56	476.36	476.36	477.5	0.019085	8.6	48.09	22.18	0.99
Reach-1	8393	Floodway	410	473.56	476.37	476.37	477.5	0.018768	8.56	48.35	22.17	0.98
Reach-1	8393	10 Year	205	473.56	475.45	475.45	476.21	0.022583	6.99	29.32	19.62	1.01
Reach-1	8393	10-Yr Floodv	205	473.56	475.46	475.46	476.21	0.022447	6.98	29.38	19.63	1.01
Reach-1	8356	100 Year	410	469.59	474.66	472.5	474.86	0.001452	3.79	120.88	36.56	0.32
Reach-1	8356	Floodway	410	469.59	474.66	472.5	474.86	0.001452	3.79	120.88	35.2	0.32
Reach-1	8356	10 Year	205	469.59	472.74	471.67	472.94	0.002896	3.67	59.52	28.15	0.41
Reach-1	8356	10-Yr Floodv	205	469.59	472.74	471.67	472.94	0.002896	3.67	59.52	28.15	0.41
Reach-1	8332.5		Culvert									
Reach-1	8309	100 Year	410	467	471.16	469.73	471.49	0.002892	4.8	91.26	42.8	0.44
Reach-1	8309	Floodway	410	467	471.16	469.73	471.49	0.002893	4.8	91.25	30.45	0.44
Reach-1	8309	10 Year	205	467	470.02	468.97	470.21	0.002691	3.63	60.24	35.61	0.4
Reach-1	8309	10-Yr Floodv	205	467	470.02	468.97	470.21	0.002691	3.63	60.24	29.29	0.4
Reach-1	8289	100 Year	410	466.83	470.75		471.19	0.005926	5.36	76.61	29.45	0.58
Reach-1	8289	Floodway	410	466.83	470.75		471.19	0.005919	5.36	76.64	29.45	0.58
Reach-1	8289	10 Year	205	466.83	469.6		469.91	0.006377	4.46	45.98	23.89	0.57
Reach-1	8289	10-Yr Floodv	205	466.83	469.6		469.91	0.006377	4.46	45.98	23.89	0.57
Reach-1	8237	100 Year	410	465.68	469.29		469.93	0.009258	6.43	67.5	26.13	0.64
Reach-1	8237	Floodway	410	465.68	469.38		469.98	0.008423	6.25	69.77	26.13	0.61
Reach-1	8237	10 Year	205	465.68	468.31		468.66	0.008351	4.76	43.68	22.1	0.57
Reach-1	8237	10-Yr Floodv	205	465.68	468.31		468.66	0.00835	4.75	43.68	22.1	0.57
Reach-1	8178	100 Year	410	464.04	468.26	467.15	468.66	0.004435	5.1	82.54	31.17	0.51
Reach-1	8178	Floodway	410	464.04	468.32	467.15	468.72	0.00475	5.06	81	25.7	0.5

HEC-RAS Plan: EX_FEMA_Fldw 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
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	8178	10 Year	205	464.04	467.16	466.21	467.41	0.004897	4.01	51.13	25.54	0.5
Reach-1	8178	10-Yr Floodv	205	464.04	467.15	466.21	467.4	0.004907	4.01	51.09	25.53	0.5
Reach-1	8128	100 Year	410	462.37	466.6	466.24	467.4	0.014777	7.22	57.09	24.41	0.8
Reach-1	8128	Floodway	410	462.37	466.59	466.25	467.4	0.014843	7.23	57.01	24.39	0.8
Reach-1	8128	10 Year	205	462.37	465.38	465.19	466.04	0.015639	6.51	31.5	17.9	0.86
Reach-1	8128	10-Yr Floodv	205	462.37	465.39	465.18	466.04	0.015544	6.49	31.57	17.92	0.86
Reach-1	8080	100 Year	410	460.79	465.31		465.9	0.006293	6.21	68.45	25.52	0.6
Reach-1	8080	Floodway	410	460.79	465.4		465.96	0.005727	6.03	70.82	25.52	0.57
Reach-1	8080	10 Year	205	460.79	464.29		464.6	0.005328	4.49	45.65	19.64	0.52
Reach-1	8080	10-Yr Floodv	205	460.79	464.27		464.59	0.00542	4.51	45.41	19.59	0.52
Reach-1	8027	100 Year	410	459.06	463.95	463.2	464.67	0.007913	6.85	62.06	23.05	0.67
Reach-1	8027	Floodway	410	459.06	464.61	463.19	465.09	0.004173	5.63	77.3	23.04	0.5
Reach-1	8027	10 Year	205	459.06	462.27	462.14	463.02	0.017558	6.94	29.54	16.31	0.91
Reach-1	8027	10-Yr Floodv	205	459.06	462.31	462.15	463.03	0.016595	6.8	30.14	16.43	0.89
Reach-1	7977	100 Year	410	457.38	463.8	460.99	463.98	0.001725	3.43	125.27	32.52	0.28
Reach-1	7977	Floodway	410	457.38	464.55	461	464.68	0.001028	2.92	149.71	32.52	0.22
Reach-1	7977	10 Year	205	457.38	461.14	460.01	461.38	0.005548	3.96	51.75	22.58	0.46
Reach-1	7977	10-Yr Floodv	205	457.38	460.99	460.01	461.27	0.006516	4.22	48.52	22.02	0.5
Reach-1	7937	100 Year	625	456.07	463.59	459.82	463.8	0.001227	3.61	176.9	33.87	0.26
Reach-1	7937	Floodway	625	456.07	464.41	459.81	464.57	0.000789	3.16	205.99	36.8	0.21
Reach-1	7937	10 Year	305	456.07	460.84	458.63	461	0.00185	3.28	92.96	26.96	0.31
Reach-1	7937	10-Yr Floodv	305	456.07	460.65	458.62	460.83	0.002128	3.47	87.87	26.49	0.34
Reach-1	7911.5		Bridge									
Reach-1	7885	100 Year	625	455.84	461.82	459.2	462.03	0.001394	3.7	184.48	51.99	0.3
Reach-1	7885	Floodway	625	455.84	462.59	459.21	462.74	0.000851	3.2	207.58	42.2	0.24
Reach-1	7885	10 Year	305	455.84	459.87	458.22	460.03	0.00211	3.22	94.77	34.63	0.34
Reach-1	7885	10-Yr Floodv	305	455.84	459.97	458.21	460.12	0.001915	3.11	98.04	35.02	0.33
Reach-1	7826	100 Year	625	454.72	461.52	458.72	461.67	0.002082	3.31	227.76	72.26	0.27
Reach-1	7826	Floodway	625	454.72	462.38	458.72	462.52	0.001438	3.08	219.43	49.69	0.23
Reach-1	7826	10 Year	305	454.72	459.28	457.54	459.47	0.004081	3.48	87.61	44.22	0.37
Reach-1	7826	10-Yr Floodv	305	454.72	459.45	457.53	459.62	0.003599	3.28	92.91	32.69	0.34
Reach-1	7757	100 Year	625	453.54	461.55	456.83	461.56	0.000114	1.01	867.92	210.5	0.07
Reach-1	7757	Floodway	625	453.54	462.37	457.09	462.39	0.000196	1.22	634.19	97.32	0.08
Reach-1	7757	10 Year	305	453.54	459.32	456.61	459.32	0.000137	0.81	525.08	185.44	0.07
Reach-1	7757	10-Yr Floodv	305	453.54	459.37	456.61	459.39	0.000312	1.15	342.73	97.32	0.1
Reach-1	7711	100 Year	625	453.54	461.53	456.54	461.54	0.000104	0.98	763.13	268.96	0.07
Reach-1	7711	Floodway	625	453.54	462.37	456.54	462.37	0.000049	0.73	1088.99	163	0.05
Reach-1	7711	10 Year	305	453.54	459.3	456.01	459.31	0.00012	0.8	453.49	233.27	0.07
Reach-1	7711	10-Yr Floodv	305	453.54	459.35	456.01	459.36	0.000114	0.79	448.85	163	0.07
Reach-1	7698	100 Year	870	453.41	460.7	457.66	461.32	0.002272	6.55	166.89	271.37	0.43
Reach-1	7698	Floodway	870	453.41	461.64	457.73	462.2	0.001616	6	145.22	18.01	0.37
Reach-1	7698	10 Year	430	453.41	458.96	456.16	459.22	0.001362	4.21	120.08	26.91	0.32
Reach-1	7698	10-Yr Floodv	430	453.41	458.95	456.18	459.26	0.001523	4.45	96.85	18.01	0.34
Reach-1	7689.5		Bridge									
Reach-1	7681	100 Year	870	453.25	459.52	457.44	460.31	0.00352	7.36	133.79	112.15	0.52
Reach-1	7681	Floodway	870	453.25	459.67	457.59	460.6	0.005539	7.73	112.78	18.01	0.54
Reach-1	7681	10 Year	430	453.25	458.22	455.97	458.54	0.00194	4.66	103.95	29.16	0.37
Reach-1	7681	10-Yr Floodv	430	453.25	458.16	456.03	458.56	0.003116	5.03	85.57	18.01	0.41
Reach-1	7666	100 Year	870	453.02	459.39	458.08	460.09	0.004207	7.24	162.99	204.51	0.54
Reach-1	7666	Floodway	870	453.02	459.63	458.08	460.25	0.003556	6.85	173.57	55.02	0.5
Reach-1	7666	10 Year	430	453.02	458.02	456.51	458.41	0.003126	5.16	105.36	51.8	0.45
Reach-1	7666	10-Yr Floodv	430	453.02	458.03	456.51	458.41	0.003104	5.15	105.66	51.82	0.45
Reach-1	7589	100 Year	870	452.95	458.43	456.62	458.6	0.005908	3.28	265.13	397.09	0.33
Reach-1	7589	Floodway	870	452.95	458.98	456.62	459.1	0.003738	2.77	316.26	142.45	0.26
Reach-1	7589	10 Year	430	452.95	456.58	455.99	456.79	0.017558	3.67	117.15	201.43	0.52
Reach-1	7589	10-Yr Floodv	430	452.95	456.66	455.99	456.85	0.014859	3.48	123.54	75.27	0.48
Reach-1	7370	100 Year	870	450.98	458.34	453.62	458.35	0.000076	0.82	1105.26	378.32	0.06
Reach-1	7370	Floodway	870	450.98	458.58	453.6	458.61	0.00022	1.44	648.6	106.29	0.1

HEC-RAS Plan: EX_FEMA_Fldw 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
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	7370	10 Year	430	450.98	456.08	452.97	456.1	0.000242	1.12	437.49	318.43	0.1
Reach-1	7370	10-Yr Floodv	430	450.98	456.11	452.98	456.13	0.000267	1.18	385.56	106.29	0.11
Reach-1	7168	100 Year	870	450.95	458.17	454.3	458.24	0.000556	2.33	464.76	289.69	0.16
Reach-1	7168	Floodway	870	450.95	458.19	454.31	458.33	0.000997	3.13	329.93	112	0.22
Reach-1	7168	10 Year	430	450.95	455.63	453.18	455.75	0.001622	2.82	166.07	156.36	0.26
Reach-1	7168	10-Yr Floodv	430	450.95	455.63	453.17	455.75	0.001617	2.82	166.25	112	0.26
Reach-1	7120	100 Year	965	449.41	458.08	454.88	458.16	0.000474	2.82	593.13	244.87	0.19
Reach-1	7120	Floodway	965	449.41	458.1	454.88	458.2	0.000601	3.18	481.45	119.1	0.21
Reach-1	7120	10 Year	475	449.41	455.34	453.04	455.51	0.00144	3.54	183.87	87.21	0.3
Reach-1	7120	10-Yr Floodv	475	449.41	455.35	453.04	455.51	0.001434	3.53	184.23	87.27	0.3
Reach-1	7073	100 Year	965	448.79	457.77		458.01	0.002054	4	272.61	76.12	0.28
Reach-1	7073	Floodway	965	448.79	457.8		458.03	0.00202	3.98	272.96	72.5	0.28
Reach-1	7073	10 Year	475	448.79	455.01		455.21	0.002573	3.59	132.19	32.56	0.31
Reach-1	7073	10-Yr Floodv	475	448.79	455.02		455.22	0.002567	3.59	132.35	32.58	0.31
Reach-1	6970	100 Year	965	448.33	457.24	453.18	457.52	0.001046	4.38	244.98	44.85	0.28
Reach-1	6970	Floodway	965	448.33	457.23	453.18	457.53	0.001108	4.5	230.13	37.35	0.29
Reach-1	6970	10 Year	475	448.33	454.36	451.74	454.57	0.001461	3.74	130.98	34.12	0.31
Reach-1	6970	10-Yr Floodv	475	448.33	454.36	451.74	454.57	0.00147	3.75	129.92	31.92	0.31
Reach-1	6915	100 Year	965	448.1	456.96	453.44	457.3	0.00141	4.75	234.52	45.24	0.32
Reach-1	6915	Floodway	965	448.1	456.95	453.43	457.3	0.001451	4.81	222.5	39.43	0.32
Reach-1	6915	10 Year	475	448.1	453.93	452.06	454.22	0.00258	4.36	113.79	34.3	0.39
Reach-1	6915	10-Yr Floodv	475	448.1	453.93	452.06	454.22	0.002582	4.36	113.11	32.88	0.39
Reach-1	6890	100 Year	965	447.9	456.88	452.77	457.15	0.001732	4.22	249.76	42.96	0.28
Reach-1	6890	Floodway	965	447.9	456.85	452.76	457.15	0.001916	4.42	220.45	31.5	0.29
Reach-1	6890	10 Year	475	447.9	453.74	451.31	453.97	0.003027	3.85	126.45	34.71	0.34
Reach-1	6890	10-Yr Floodv	475	447.9	453.74	451.31	453.97	0.00308	3.88	122.79	30.6	0.34
Reach-1	6859.5		Culvert									
Reach-1	6825	100 Year	965	447.15	455.67	452.03	455.99	0.00327	4.56	217.25	43.65	0.32
Reach-1	6825	Floodway	965	447.15	455.67	452.04	456	0.003291	4.57	214.44	37.8	0.33
Reach-1	6825	10 Year	475	447.15	453.2	450.49	453.42	0.003548	3.75	126.74	31.41	0.33
Reach-1	6825	10-Yr Floodv	475	447.15	453.2	450.5	453.42	0.003544	3.75	126.79	31.41	0.33
Reach-1	6809	100 Year	965	446.42	455.5	451.72	455.76	0.00436	4.14	233.51	50.17	0.31
Reach-1	6809	Floodway	965	446.42	455.5	451.71	455.76	0.004351	4.13	233.64	44.8	0.31
Reach-1	6809	10 Year	475	446.42	453	450.13	453.19	0.004393	3.52	134.87	34.8	0.32
Reach-1	6809	10-Yr Floodv	475	446.42	453	450.12	453.2	0.004387	3.52	134.94	34.81	0.32
Reach-1	6756	100 Year	965	447.24	454.51	451.63	454.9	0.004983	4.99	193.2	39.93	0.4
Reach-1	6756	Floodway	965	447.24	454.52	451.64	454.9	0.004969	4.99	193.44	39.96	0.4
Reach-1	6756	10 Year	475	447.24	452.09	450.11	452.39	0.004227	4.4	107.88	30.63	0.41
Reach-1	6756	10-Yr Floodv	475	447.24	452.1	450.11	452.4	0.004217	4.4	108	30.64	0.41
Reach-1	6732	100 Year	965	446.79	454.17	451.34	454.56	0.004569	5.02	193.04	39.99	0.39
Reach-1	6732	Floodway	965	446.79	454.18	451.34	454.57	0.004546	5.01	193.35	40.02	0.39
Reach-1	6732	10 Year	475	446.79	451.79	449.83	452.08	0.004588	4.39	108.19	31.04	0.41
Reach-1	6732	10-Yr Floodv	475	446.79	451.79	449.83	452.09	0.004574	4.38	108.35	31.06	0.41
Reach-1	6653	100 Year	965	445.8	452.67	450.29	453.17	0.006491	5.64	171.51	39.17	0.46
Reach-1	6653	Floodway	965	445.8	452.72	450.3	453.2	0.006284	5.59	173.3	39.42	0.45
Reach-1	6653	10 Year	475	445.8	450.42	448.72	450.79	0.00548	4.93	96.37	28.25	0.47
Reach-1	6653	10-Yr Floodv	475	445.8	450.43	448.73	450.8	0.005433	4.91	96.8	28.31	0.47
Reach-1	6593	100 Year	965	443.83	450.4	448.92	451.31	0.008334	7.72	133.97	31.42	0.59
Reach-1	6593	Floodway	965	443.83	450.91	448.92	451.64	0.006056	6.99	149.89	31.46	0.51
Reach-1	6593	10 Year	475	443.83	448.57	447.34	449.11	0.008399	5.92	81.87	25.4	0.56
Reach-1	6593	10-Yr Floodv	475	443.83	448.72	447.34	449.22	0.007441	5.66	85.85	25.86	0.52
Reach-1	6541	100 Year	965	443.54	450.1	448.03	450.55	0.002472	6.1	276.96	95.25	0.43
Reach-1	6541	Floodway	965	443.54	449.91	448.13	450.85	0.004387	7.95	140.28	31.43	0.57
Reach-1	6541	10 Year	475	443.54	447.3	446.65	447.96	0.006728	6.75	83.93	53.18	0.64
Reach-1	6541	10-Yr Floodv	475	443.54	447.3	446.56	448.07	0.007435	7.1	70.53	23.15	0.68
Reach-1	6490	100 Year	965	443.27	450.02	446.9	450.25	0.001132	4.18	281.24	126.94	0.29
Reach-1	6490	Floodway	965	443.27	449.96	446.87	450.32	0.001557	4.88	216.64	39.93	0.35
Reach-1	6490	10 Year	475	443.27	446.74	445.72	447.11	0.004302	4.97	103.33	43.21	0.51
Reach-1	6490	10-Yr Floodv	475	443.27	446.73	445.69	447.13	0.004566	5.11	96.11	34.62	0.52

HEC-RAS Plan: EX_FEMA_Fldw 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
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	6457	100 Year	1055	440.91	449.94	445.48	450.18	0.0018	3.96	267.79	65.33	0.26
Reach-1	6457	Floodway	1055	440.91	449.94	445.48	450.18	0.0018	3.96	267.79	45.94	0.26
Reach-1	6457	10 Year	515	440.91	446.67	444.12	446.87	0.002571	3.57	144.39	37.85	0.31
Reach-1	6457	10-Yr Floodv	515	440.91	446.67	444.1	446.87	0.002571	3.57	144.38	37.85	0.31
Reach-1	6441.5		Culvert									
Reach-1	6417	100 Year	1055	434.45	440.67	438.32	441.24	0.004621	6.1	181.63	39.07	0.45
Reach-1	6417	Floodway	1055	434.45	440.78	438.33	441.35	0.006313	6.08	173.53	29.72	0.44
Reach-1	6417	10 Year	515	434.45	438.51	437.02	438.87	0.005421	4.85	106.34	30.68	0.45
Reach-1	6417	10-Yr Floodv	515	434.45	438.52	437.02	438.88	0.005535	4.84	106.41	29.71	0.45
Reach-1	6409	100 Year	1055	432.97	438.44	438.44	440.36	0.017671	11.11	94.94	24.65	1
Reach-1	6409	Floodway	1055	432.97	438.44	438.44	440.36	0.01774	11.13	94.8	24.63	1
Reach-1	6409	10 Year	515	432.97	436.7	436.7	438.04	0.019104	9.28	55.5	20.69	1
Reach-1	6409	10-Yr Floodv	515	432.97	436.7	436.7	438.04	0.019045	9.27	55.56	20.69	1
Reach-1	6394	100 Year	1055	432.15	437.24	437.24	438.95	0.017905	10.49	100.61	29.46	1
Reach-1	6394	Floodway	1055	432.15	437.24	437.24	438.95	0.017898	10.49	100.61	29.45	1
Reach-1	6394	10 Year	515	432.15	435.55	435.55	436.82	0.019557	9.05	56.9	22.3	1
Reach-1	6394	10-Yr Floodv	515	432.15	435.55	435.55	436.82	0.019646	9.07	56.8	22.28	1
Reach-1	6305	100 Year	1055	426.18	431.96	431.85	433.68	0.016423	10.52	100.31	27.39	0.97
Reach-1	6305	Floodway	1055	426.18	431.96	431.85	433.68	0.016432	10.53	100.22	27.3	0.97
Reach-1	6305	10 Year	515	426.18	430.52	430.11	431.51	0.012953	7.99	64.43	22.43	0.83
Reach-1	6305	10-Yr Floodv	515	426.18	430.52	430.11	431.51	0.012953	7.99	64.43	22.43	0.83
Reach-1	6266	100 Year	1055	425	430.12	429.95	431.67	0.015066	10	105.57	30.64	0.94
Reach-1	6266	Floodway	1055	425	430.12	429.96	431.67	0.015065	10	105.58	30.64	0.94
Reach-1	6266	10 Year	515	425	428.42	428.37	429.6	0.018071	8.71	59.16	24.13	0.98
Reach-1	6266	10-Yr Floodv	515	425	428.42	428.37	429.6	0.018071	8.71	59.16	24.13	0.98
Reach-1	6216	100 Year	1055	422.01	429.04		429.93	0.006322	7.6	139.53	32.4	0.62
Reach-1	6216	Floodway	1055	422.01	429.04		429.93	0.006322	7.6	139.52	32.4	0.62
Reach-1	6216	10 Year	515	422.01	427.13		427.72	0.006665	6.17	83.54	26.1	0.61
Reach-1	6216	10-Yr Floodv	515	422.01	427.13		427.72	0.006665	6.17	83.54	26.1	0.61
Reach-1	6122	100 Year	1055	420.28	426.86		427.59	0.008915	6.87	153.65	37.22	0.59
Reach-1	6122	Floodway	1055	420.28	426.86		427.59	0.008896	6.86	153.75	37.23	0.59
Reach-1	6122	10 Year	515	420.28	424.7	423.9	425.33	0.009046	6.33	81.34	29.99	0.68
Reach-1	6122	10-Yr Floodv	515	420.28	424.7	423.9	425.33	0.009046	6.33	81.34	29.99	0.68
Reach-1	6067	100 Year	1055	419.29	426		426.4	0.004355	5.09	211.26	49.77	0.41
Reach-1	6067	Floodway	1055	419.29	426		426.4	0.004372	5.1	209.38	45.94	0.41
Reach-1	6067	10 Year	515	419.29	422.79		423.44	0.011922	6.51	79.14	32.54	0.74
Reach-1	6067	10-Yr Floodv	515	419.29	422.79		423.44	0.011922	6.51	79.14	32.54	0.74
Reach-1	6033	100 Year	1055	417.82	425.86	422.07	426.13	0.001205	4.13	258.95	50.09	0.29
Reach-1	6033	Floodway	1055	417.82	425.86	422.07	426.13	0.001205	4.13	258.95	48.9	0.29
Reach-1	6033	10 Year	515	417.82	422.42	420.65	422.72	0.003112	4.4	117.01	35.28	0.43
Reach-1	6033	10-Yr Floodv	515	417.82	422.42	420.65	422.72	0.003112	4.4	117.01	35.28	0.43
Reach-1	5993.5		Culvert									
Reach-1	5947	100 Year	1055	413.65	419.99	418.96	421.02	0.008293	8.14	129.57	31.43	0.7
Reach-1	5947	Floodway	1055	413.65	420.08	418.96	421.07	0.007759	7.98	132.21	31.72	0.68
Reach-1	5947	10 Year	515	413.65	417.8	417.31	418.67	0.011439	7.51	68.55	24.12	0.79
Reach-1	5947	10-Yr Floodv	515	413.65	417.82	417.31	418.68	0.011217	7.46	69.04	24.19	0.78
Reach-1	5878	100 Year	1625	410.66	418.56	416.8	419.38	0.006038	7.29	227.5	48.36	0.56
Reach-1	5878	Floodway	1625	410.66	418.92	416.81	419.63	0.004813	6.81	245.1	49.6	0.51
Reach-1	5878	10 Year	795	410.66	416.46	415.02	417	0.004994	5.88	135.26	38.41	0.55
Reach-1	5878	10-Yr Floodv	795	410.66	416.57	415.04	417.07	0.004679	5.72	139.32	38.89	0.53
Reach-1	5832	100 Year	1625	408.92	417.04	415.81	418.4	0.006211	9.53	182.04	36.64	0.67
Reach-1	5832	Floodway	1625	408.92	417.55	415.69	418.83	0.005119	9.12	184.04	28	0.62
Reach-1	5832	10 Year	795	408.92	415.9	413.85	416.41	0.003026	5.82	142.16	33.19	0.45
Reach-1	5832	10-Yr Floodv	795	408.92	416.01	413.86	416.53	0.002899	5.78	140.88	28	0.44
Reach-1	5813		Inl Struct									
Reach-1	5812.5	100 Year	1625	408.28	415.78	413.24	416.56	0.003858	7.1	232.57	39.87	0.49
Reach-1	5812.5	Floodway	1625	408.28	415.78	413.24	416.56	0.003858	7.1	232.58	39.87	0.49

HEC-RAS Plan: EX_FEMA_Fldw 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
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	5812.5	10 Year	795	408.28	413.75	411.53	414.14	0.003045	5.06	157.23	34.38	0.42
Reach-1	5812.5	10-Yr Floodv	795	408.28	413.75	411.54	414.15	0.003043	5.06	157.26	34.38	0.42
Reach-1	5804	100 Year	1625	406.86	414.24	414.03	416.03	0.028028	10.74	152.34	37.64	0.92
Reach-1	5804	Floodway	1625	406.86	414.24	414.02	416.03	0.02807	10.75	152.27	37.63	0.92
Reach-1	5804	10 Year	795	406.86	412.25	412.25	413.65	0.032355	9.49	83.82	30.02	1
Reach-1	5804	10-Yr Floodv	795	406.86	412.25	412.25	413.65	0.032434	9.5	83.72	30	1
Reach-1	5757	100 Year	1625	404.07	411.58	410.21	412.86	0.013423	9.1	178.74	33.71	0.69
Reach-1	5757	Floodway	1625	404.07	411.58	410.19	412.87	0.013362	9.09	178.99	33.73	0.68
Reach-1	5757	10 Year	795	404.07	408.88	408.15	409.91	0.013088	8.15	97.53	26.66	0.75
Reach-1	5757	10-Yr Floodv	795	404.07	408.88	408.15	409.91	0.013128	8.16	97.39	26.65	0.75
Reach-1	5628	100 Year	1625	396.33	402.54	402.54	404.6	0.030733	11.51	141.14	34.33	1
Reach-1	5628	Floodway	1625	396.33	402.54	402.54	404.6	0.030797	11.52	141.05	34.33	1
Reach-1	5628	10 Year	795	396.33	400.73	400.73	402.15	0.027525	9.55	83.26	29.55	1
Reach-1	5628	10-Yr Floodv	795	396.33	400.74	400.74	402.15	0.027408	9.53	83.41	29.57	1
Reach-1	5524	100 Year	1625	385.83	392.83	391.73	394.1	0.014084	9.05	179.75	37.29	0.72
Reach-1	5524	Floodway	1625	385.83	392.9	391.73	394.14	0.014099	8.93	181.88	36.05	0.7
Reach-1	5524	10 Year	795	385.83	390.14	389.81	391.33	0.016154	8.75	90.83	28.77	0.87
Reach-1	5524	10-Yr Floodv	795	385.83	390.14	389.8	391.33	0.016154	8.75	90.83	28.77	0.87
Reach-1	5456	100 Year	1625	381.89	387.9	387.9	389.97	0.024218	11.54	140.77	51.26	0.99
Reach-1	5456	Floodway	1625	381.89	387.87	387.87	389.97	0.024799	11.63	139.77	33.7	1.01
Reach-1	5456	10 Year	795	381.89	385.96	385.96	387.45	0.018417	9.81	81.01	27.58	1.01
Reach-1	5456	10-Yr Floodv	795	381.89	385.96	385.96	387.45	0.018417	9.81	81.01	27.58	1.01
Reach-1	5422	100 Year	1625	379.59	386.09	385.61	387.76	0.013757	10.37	157	35.22	0.85
Reach-1	5422	Floodway	1625	379.59	386.09	385.61	387.76	0.013764	10.38	156.97	35.22	0.85
Reach-1	5422	10 Year	795	379.59	384.4	383.65	385.34	0.009295	7.75	102.52	29.57	0.73
Reach-1	5422	10-Yr Floodv	795	379.59	384.39	383.65	385.33	0.009391	7.78	102.14	29.53	0.74
Reach-1	5355	100 Year	1625	376.97	384.67	383.13	385.62	0.006116	7.83	208.43	43.8	0.61
Reach-1	5355	Floodway	1625	376.97	384.71	383.11	385.65	0.005969	7.77	210.04	43.8	0.61
Reach-1	5355	10 Year	795	376.97	381.37	381.27	382.68	0.016095	9.19	86.53	29.91	0.95
Reach-1	5355	10-Yr Floodv	795	376.97	381.39	381.26	382.68	0.015804	9.13	87.11	29.99	0.94
Reach-1	5296	100 Year	1960	374.11	383.83	380.57	384.52	0.004739	6.67	293.67	44.71	0.46
Reach-1	5296	Floodway	1960	374.11	383.88	380.57	384.56	0.004644	6.62	296.26	44.81	0.45
Reach-1	5296	10 Year	955	374.11	379.35	378.53	380.33	0.009174	7.95	120.16	32.88	0.73
Reach-1	5296	10-Yr Floodv	955	374.11	379.3	378.55	380.31	0.009537	8.06	118.5	32.7	0.75
Reach-1	5281	100 Year	1960	372.44	383.8	379.42	384.34	0.001519	6.01	356.76	59.85	0.35
Reach-1	5281	Floodway	1960	372.44	383.45	379.56	384.34	0.003219	7.6	259.64	28.39	0.44
Reach-1	5281	10 Year	955	372.44	379.34	377.52	379.9	0.003748	6.01	160.57	39.34	0.49
Reach-1	5281	10-Yr Floodv	955	372.44	379.16	377.52	379.9	0.005185	6.9	138.67	28.07	0.55
Reach-1	5254.5		Culvert									
Reach-1	5224	100 Year	1960	369.69	379.28	375.22	379.72	0.001449	5.35	373.03	56.82	0.34
Reach-1	5224	Floodway	1960	369.69	379.18	375.36	379.73	0.002098	5.97	328.35	46.68	0.37
Reach-1	5224	10 Year	955	369.69	376.73	373.68	376.97	0.001284	3.87	247.01	50.92	0.3
Reach-1	5224	10-Yr Floodv	955	369.69	376.71	373.74	376.98	0.001616	4.22	226.04	44.57	0.32
Reach-1	5206	100 Year	1960	370.21	378.64	376.32	379.41	0.004206	7.05	277.91	49.96	0.53
Reach-1	5206	Floodway	1960	370.21	378.63	376.31	379.41	0.004224	7.07	277.38	49.92	0.53
Reach-1	5206	10 Year	955	370.21	376.16	374.42	376.68	0.004211	5.81	164.34	41.4	0.51
Reach-1	5206	10-Yr Floodv	955	370.21	376.16	374.44	376.68	0.004211	5.81	164.33	41.4	0.51
Reach-1	5145	100 Year	1960	369.69	377.91	375.56	378.61	0.003574	6.74	292.67	55.57	0.5
Reach-1	5145	Floodway	1960	369.69	377.89	375.55	378.6	0.00361	6.76	291.73	55.5	0.5
Reach-1	5145	10 Year	955	369.69	374.12	373.76	375.19	0.012189	8.3	115.05	38.32	0.84
Reach-1	5145	10-Yr Floodv	955	369.69	374.13	373.75	375.19	0.012182	8.3	115.07	38.33	0.84
Reach-1	5084	100 Year	1960	366.9	377.64	373.29	378.11	0.001453	5.77	443.98	218.97	0.34
Reach-1	5084	Floodway	1960	366.9	377.53	373.29	378.09	0.00165	6.1	360.94	47	0.36
Reach-1	5084	10 Year	955	366.9	373.3	371.34	373.83	0.003607	5.87	165.84	40.99	0.48
Reach-1	5084	10-Yr Floodv	955	366.9	373.3	371.34	373.83	0.003601	5.87	165.93	41	0.48
Reach-1	5072	100 Year	1960	366.9	377.7	372.25	377.97	0.000692	4.52	549.24	350.07	0.25
Reach-1	5072	Floodway	1960	366.9	377.54	372.25	377.97	0.001007	5.4	388.09	44.16	0.3
Reach-1	5072	10 Year	955	366.9	373.29	370.45	373.63	0.001625	4.74	208.06	53.07	0.35
Reach-1	5072	10-Yr Floodv	955	366.9	373.29	370.45	373.63	0.001625	4.74	208.06	40.08	0.35

HEC-RAS Plan: EX_FEMA_Fldw 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
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	5050.5		Culvert									
Reach-1	5021	100 Year	1960	364.11	369.86	369.17	370.92	0.008818	8.26	237.35	64.07	0.75
Reach-1	5021	Floodway	1960	364.11	369.86	369.17	370.92	0.008804	8.26	237.46	64.07	0.75
Reach-1	5021	10 Year	955	364.11	368.37	367.68	369.03	0.008804	6.51	146.62	56.07	0.71
Reach-1	5021	10-Yr Floodv	955	364.11	368.37	367.68	369.03	0.008816	6.52	146.54	56.05	0.71

BEAVER POND BROOK - EXISTING CONDITION, FEMA FLOODWAY (W/O BACKWATER)
HEC-RAS 4.1.0 - "Encroachment 1" Output

HEC-RAS Plan: EX_FEMA_Fldw River: Beaver Pond Brk Reach: Reach-1													
Reach	River Sta	Profile	W.S. Elev	Prof Delta	E.G. Elev	Top Wdth	Q Left	Q Channel	Q Right	Enc Sta L	Ch Sta L	Ch Sta R	Enc Sta R
			(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)
Reach-1	8722	100 Year	491.97		492.7	37.29	1.26	331.97	76.76		-7.61	6.93	
Reach-1	8722	Floodway	493.13	1.16	493.37	58.2	2.03	277.53	130.44	-9.03	-7.61	6.93	51.67
Reach-1	8722	10 Year	490.76	-1.21	491.5	23.59	0.16	192.5	12.33		-7.61	6.93	
Reach-1	8722	10-Yr Floodv	491.06	-0.91	491.56	26.36	0.27	185.77	18.96	-9.03	-7.61	6.93	51.67
Reach-1	8640	100 Year	492.23		492.24	188.95	293.19	90.59	26.22		-2.98	20.45	
Reach-1	8640	Floodway	493.2	0.97	493.21	157	329.44	80.56		-136.55	-2.98	20.45	20.45
Reach-1	8640	10 Year	490.8	-1.44	490.81	173.55	133.68	63.32	8.01		-2.98	20.45	
Reach-1	8640	10-Yr Floodv	491.2	-1.04	491.2	157	149.08	55.92		-136.55	-2.98	20.45	20.45
Reach-1	8583	100 Year	492.22		492.23	248.57	153.67	151.73	104.6		-12.6	30.45	
Reach-1	8583	Floodway	493.2	0.97	493.2	143.9	147.57	164.58	97.85	-76.1	-12.6	30.45	67.8
Reach-1	8583	10 Year	490.77	-1.45	490.78	199.4	65.31	92.71	46.98		-12.6	30.45	
Reach-1	8583	10-Yr Floodv	491.18	-1.04	491.19	143.9	64.19	94.33	46.48	-76.1	-12.6	30.45	67.8
Reach-1	8573	100 Year	490.73		491.88	23.19	53.92	331.11	24.97		-6	6	
Reach-1	8573	Floodway	491.06	0.32	492.7	12		410		-6	-6	6	6
Reach-1	8573	10 Year	489.72	-1.01	490.53	19.04	16.3	179.29	9.41		-6	6	
Reach-1	8573	10-Yr Floodv	489.83	-0.91	490.87	12		205		-6	-6	6	6
Reach-1	8554	100 Year	487.28		488.06	30.45	26.43	370.81	12.76		-8.75	7.69	
Reach-1	8554	Floodway	487.29	0.01	488.27	18	6.46	402.7	0.85	-10	-8.75	7.69	8
Reach-1	8554	10 Year	486.29	-0.99	486.82	22.38	2.75	200.92	1.33		-8.75	7.69	
Reach-1	8554	10-Yr Floodv	486.28	-1	486.84	18	1.67	203.04	0.29	-10	-8.75	7.69	8
Reach-1	8536	100 Year	487		487.46	42.71	13.55	395.95	0.49		-15.01	8.2	
Reach-1	8536	Floodway	487.02	0.02	487.52	23.21		410		-15.01	-15.01	8.2	8.2
Reach-1	8536	10 Year	485.98	-1.02	486.26	21.81		205			-15.01	8.2	
Reach-1	8536	10-Yr Floodv	485.98	-1.02	486.26	21.82		205		-15.01	-15.01	8.2	8.2
Reach-1	8464	100 Year	486.16		486.53	27.58	18.15	385.21	6.64		-8.92	7.74	
Reach-1	8464	Floodway	486.16	0	486.53	24.5	18.61	385.28	6.11	-14.6	-8.92	7.74	9.9
Reach-1	8464	10 Year	483.08	-3.08	484.03	13.84		205			-8.92	7.74	
Reach-1	8464	10-Yr Floodv	483.08	-3.08	484.03	13.84		205		-14.6	-8.92	7.74	9.9
Reach-1	8435.5		Culvert										
Reach-1	8412	100 Year	481.31		482.5	20.3	0.02	409.97	0.01		-12.2	7.75	
Reach-1	8412	Floodway	481.32	0.01	482.5	20.3	0.02	409.97	0.01	-12.44	-12.2	7.75	7.86
Reach-1	8412	10 Year	480.39	-0.92	481.16	18.6		205			-12.2	7.75	
Reach-1	8412	10-Yr Floodv	480.39	-0.92	481.16	18.6		205		-12.44	-12.2	7.75	7.86
Reach-1	8393	100 Year	476.36		477.5	22.18	0.06	408.7	1.23		-10.25	10	
Reach-1	8393	Floodway	476.37	0.01	477.5	22.17	0.07	408.65	1.29	-10.45	-10.25	10	11.72
Reach-1	8393	10 Year	475.45	-0.9	476.21	19.62		205			-10.25	10	
Reach-1	8393	10-Yr Floodv	475.46	-0.9	476.21	19.63		205		-10.45	-10.25	10	11.72
Reach-1	8356	100 Year	474.66		474.86	35.19	39.18	348.75	22.07		-10.74	9.96	
Reach-1	8356	Floodway	474.66	0	474.86	35.19	39.18	348.75	22.07	-17.95	-10.74	9.96	17.25
Reach-1	8356	10 Year	472.74	-1.92	472.94	28.15	9.74	191.34	3.91		-10.74	9.96	
Reach-1	8356	10-Yr Floodv	472.74	-1.92	472.94	28.15	9.74	191.34	3.91	-17.95	-10.74	9.96	17.25
Reach-1	8332.5		Culvert										
Reach-1	8309	100 Year	471.16		471.49	27.62	16.78	331.86	61.36		-9.18	9.26	
Reach-1	8309	Floodway	471.16	0	471.49	27.62	16.79	331.86	61.36	-13.05	-9.18	9.26	17.4
Reach-1	8309	10 Year	470.02	-1.15	470.21	26.46	5.58	174.13	25.29		-9.18	9.26	
Reach-1	8309	10-Yr Floodv	470.02	-1.15	470.21	26.46	5.58	174.13	25.29	-13.05	-9.18	9.26	17.4
Reach-1	8289	100 Year	470.75		471.19	29.45	0.05	409.92	0.03		-12.53	15.87	
Reach-1	8289	Floodway	470.75	0	471.19	29.45	0.05	409.92	0.03	-13.17	-12.53	15.87	16.28
Reach-1	8289	10 Year	469.6	-1.15	469.91	23.89		205			-12.53	15.87	
Reach-1	8289	10-Yr Floodv	469.6	-1.15	469.91	23.89		205		-13.17	-12.53	15.87	16.28
Reach-1	8237	100 Year	469.29		469.93	26.13	2.25	403.14	4.61		-12.34	7.55	
Reach-1	8237	Floodway	469.38	0.09	469.98	26.13	2.58	402.32	5.1	-14.98	-12.34	7.55	11.15
Reach-1	8237	10 Year	468.31	-0.99	468.66	22.1	0.06	204.5	0.44		-12.34	7.55	
Reach-1	8237	10-Yr Floodv	468.31	-0.99	468.66	22.1	0.06	204.5	0.44	-14.98	-12.34	7.55	11.15
Reach-1	8178	100 Year	468.26		468.66	31.17	2.02	404.87	3.11		-12.3	13.4	
Reach-1	8178	Floodway	468.32	0.06	468.72	25.7		410		-12.3	-12.3	13.4	13.4

HEC-RAS Plan: EX_FEMA_Fldw River: Beaver Pond Brk Reach: Reach-1													
Reach	River Sta	Profile	W.S. Elev	Prof Delta	E.G. Elev	Top Wdth	Q Left	Q Channel	Q Right	Enc Sta L	Ch Sta L	Ch Sta R	Enc Sta R
			(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)
Reach-1	8178	10 Year	467.16	-1.1	467.41	25.54		205			-12.3	13.4	
Reach-1	8178	10-Yr Floodv	467.15	-1.1	467.4	25.53		205		-12.3	-12.3	13.4	13.4
Reach-1	8128	100 Year	466.6		467.4	24.41	0.09	409.78	0.14		-9.19	13.33	
Reach-1	8128	Floodway	466.59	0	467.4	24.39	0.08	409.78	0.13	-10.02	-9.19	13.33	14.39
Reach-1	8128	10 Year	465.38	-1.21	466.04	17.9		205			-9.19	13.33	
Reach-1	8128	10-Yr Floodv	465.39	-1.21	466.04	17.92		205		-10.02	-9.19	13.33	14.39
Reach-1	8080	100 Year	465.31		465.9	25.52	1.44	406.69	1.87		-13.67	5.78	
Reach-1	8080	Floodway	465.4	0.09	465.96	25.52	1.76	405.91	2.33	-16.59	-13.67	5.78	8.93
Reach-1	8080	10 Year	464.29	-1.02	464.6	19.64	0	205	0		-13.67	5.78	
Reach-1	8080	10-Yr Floodv	464.27	-1.03	464.59	19.59	0	205	0	-16.59	-13.67	5.78	8.93
Reach-1	8027	100 Year	463.95		464.67	23.05	2.47	406.39	1.14		-10.5	7.64	
Reach-1	8027	Floodway	464.61	0.66	465.09	23.04	4.82	401.25	3.93	-13.42	-10.5	7.64	9.62
Reach-1	8027	10 Year	462.27	-1.68	463.02	16.31		205			-10.5	7.64	
Reach-1	8027	10-Yr Floodv	462.31	-1.64	463.03	16.43		205		-13.42	-10.5	7.64	9.62
Reach-1	7977	100 Year	463.8		463.98	32.52	3.65	403.59	2.76		-10.24	14.76	
Reach-1	7977	Floodway	464.55	0.75	464.68	32.52	6.3	398.86	4.84	-13.94	-10.24	14.76	18.58
Reach-1	7977	10 Year	461.14	-2.66	461.38	22.58		205			-10.24	14.76	
Reach-1	7977	10-Yr Floodv	460.99	-2.81	461.27	22.02		205		-13.94	-10.24	14.76	18.58
Reach-1	7937	100 Year	463.59		463.8	33.87	0.68	622.62	1.7		-14.93	14.3	
Reach-1	7937	Floodway	464.41	0.82	464.57	36.8	1.59	619.89	3.52	-18.74	-14.93	14.3	18.06
Reach-1	7937	10 Year	460.84	-2.76	461	26.96		305			-14.93	14.3	
Reach-1	7937	10-Yr Floodv	460.65	-2.95	460.83	26.49		305		-18.74	-14.93	14.3	18.06
Reach-1	7911.5 Bl	100 Year	460.3		463.8			625			-12.66	15.91	
Reach-1	7911.5 Bl	Floodway	460.3	0	464.56			625		-18.74	-12.66	15.91	18.06
Reach-1	7911.5 Bl	10 Year	460.15	-0.15	460.48	14.42		305			-12.66	15.91	
Reach-1	7911.5 Bl	10-Yr Floodv	460.3	0	460.83			305		-18.74	-12.66	15.91	18.06
Reach-1	7911.5 Bl	100 Year	460.3		462.03			625			-17.65	9.22	
Reach-1	7911.5 Bl	Floodway	460.3	0	462.74			625		-26.71	-17.65	9.22	15.49
Reach-1	7911.5 Bl	10 Year	459.84	-0.46	460.22	14.42		305			-17.65	9.22	
Reach-1	7911.5 Bl	10-Yr Floodv	459.97	-0.33	460.12	14.42		305		-26.71	-17.65	9.22	15.49
Reach-1	7885	100 Year	461.82		462.03	51.99	4.95	606.38	13.67		-26.43	9.06	
Reach-1	7885	Floodway	462.59	0.77	462.74	42.2	0.3	611.98	12.72	-26.71	-26.43	9.06	15.49
Reach-1	7885	10 Year	459.87	-1.95	460.03	34.63		305			-26.43	9.06	
Reach-1	7885	10-Yr Floodv	459.97	-1.85	460.12	35.02		305		-26.71	-26.43	9.06	15.49
Reach-1	7826	100 Year	461.52		461.67	72.26	9.29	545.94	69.77		-22.21	13.19	
Reach-1	7826	Floodway	462.38	0.86	462.52	49.69	22.88	602.12	0	-36.5	-22.21	13.19	13.19
Reach-1	7826	10 Year	459.28	-2.24	459.47	31.81		305			-22.21	13.19	
Reach-1	7826	10-Yr Floodv	459.45	-2.07	459.62	32.69		305		-36.5	-22.21	13.19	13.19
Reach-1	7757	100 Year	461.55		461.56	155.93	363.32	232.71	28.97		-22.61	15.32	
Reach-1	7757	Floodway	462.37	0.82	462.39	97.32	304.76	320.24		-82	-22.61	15.32	15.32
Reach-1	7757	10 Year	459.32	-2.23	459.32	151.43	175.55	119.43	10.01		-22.61	15.32	
Reach-1	7757	10-Yr Floodv	459.37	-2.17	459.39	97.32	134.21	170.79		-82	-22.61	15.32	15.32
Reach-1	7711	100 Year	461.53		461.54	138.78	19.58	488.26	117.16		-62.24	17.16	
Reach-1	7711	Floodway	462.37	0.84	462.37	163	129.21	411.49	84.29	-108	-62.24	17.16	55
Reach-1	7711	10 Year	459.3	-2.23	459.31	137.78	8.55	257.43	39.02		-62.24	17.16	
Reach-1	7711	10-Yr Floodv	459.35	-2.17	459.36	123.57	8.6	256.93	39.47	-108	-62.24	17.16	55
Reach-1	7698	100 Year	460.7		461.32	135.64	24.43	838.47	7.1		-7.22	10.76	
Reach-1	7698	Floodway	461.64	0.94	462.2	18.01	0	869.98	0.02	-7.22	-7.22	10.76	10.79
Reach-1	7698	10 Year	458.96	-1.74	459.22	26.8	8.15	406.88	14.98		-7.22	10.76	
Reach-1	7698	10-Yr Floodv	458.95	-1.74	459.26	18.01	0	429.99	0.01	-7.22	-7.22	10.76	10.79
Reach-1	7689.5 Bl	100 Year	460.7		461.34			734.27	144.94		-7.22	10.76	
Reach-1	7689.5 Bl	Floodway	458.5	-2.2	462.2			870		-7.22	-7.22	10.76	10.79
Reach-1	7689.5 Bl	10 Year	458.5	-2.2	459.22			430			-7.22	10.76	
Reach-1	7689.5 Bl	10-Yr Floodv	458.5	-2.2	459.26			430		-7.22	-7.22	10.76	10.79
Reach-1	7689.5 Bl	100 Year	460.7		461.22	91.27		734.27	144.94		-6.92	11.06	
Reach-1	7689.5 Bl	Floodway	458.5	-2.2	460.6			870		-6.92	-6.92	11.06	11.09
Reach-1	7689.5 Bl	10 Year	458.22	-2.48	458.54	16.98		430			-6.92	11.06	
Reach-1	7689.5 Bl	10-Yr Floodv	458.16	-2.53	458.56	16.98		430		-6.92	-6.92	11.06	11.09
Reach-1	7681	100 Year	459.52		460.31	22.97	42.65	807.84	19.52		-6.92	11.06	

HEC-RAS Plan: EX_FEMA_Fldw River: Beaver Pond Brk Reach: Reach-1													
Reach	River Sta	Profile	W.S. Elev	Prof Delta	E.G. Elev	Top Wdth	Q Left	Q Channel	Q Right	Enc Sta L	Ch Sta L	Ch Sta R	Enc Sta R
			(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)
Reach-1	7681	Floodway	459.67	0.16	460.6	18.01		869.97	0.03	-6.92	-6.92	11.06	11.09
Reach-1	7681	10 Year	458.22	-1.3	458.54	22.97	19.25	402.54	8.21		-6.92	11.06	
Reach-1	7681	10-Yr Floodv	458.16	-1.35	458.56	18.01		429.98	0.02	-6.92	-6.92	11.06	11.09
Reach-1	7666	100 Year	459.39		460.09	43.74	28.72	737.57	103.71		-3.61	14.93	
Reach-1	7666	Floodway	459.63	0.24	460.25	43.87	31.57	728.44	109.99	-12.37	-3.61	14.93	50.63
Reach-1	7666	10 Year	458.02	-1.37	458.41	40.64	7.59	394.88	27.53		-3.61	14.93	
Reach-1	7666	10-Yr Floodv	458.03	-1.36	458.41	40.66	7.62	394.69	27.69	-12.37	-3.61	14.93	50.63
Reach-1	7589	100 Year	458.43		458.6	85.92		870			-26.02	66.37	
Reach-1	7589	Floodway	458.98	0.55	459.1	113.2	0.12	869.11	0.78	-63.3	-26.02	66.37	86.7
Reach-1	7589	10 Year	456.58	-1.85	456.79	74.81		430			-26.02	66.37	
Reach-1	7589	10-Yr Floodv	456.66	-1.77	456.85	75.27		430		-63.3	-26.02	66.37	86.7
Reach-1	7370	100 Year	458.34		458.35	242.62	70.17	451.71	348.13		-66.04	22.97	
Reach-1	7370	Floodway	458.58	0.24	458.61	106.29	33.36	819.46	17.18	-76.3	-66.04	22.97	29.99
Reach-1	7370	10 Year	456.08	-2.26	456.1	136.4	37.83	389.32	2.85		-66.04	22.97	
Reach-1	7370	10-Yr Floodv	456.11	-2.23	456.13	106.29	14	412.91	3.09	-76.3	-66.04	22.97	29.99
Reach-1	7168	100 Year	458.17		458.24	158.65	48.66	575.51	245.83		-24.97	14.14	
Reach-1	7168	Floodway	458.19	0.02	458.33	65.5	65.85	774.49	29.66	-88	-24.97	14.14	24
Reach-1	7168	10 Year	455.63	-2.54	455.75	61.84	5.22	416.83	7.95		-24.97	14.14	
Reach-1	7168	10-Yr Floodv	455.63	-2.54	455.75	61.84	5.25	416.78	7.97	-88	-24.97	14.14	24
Reach-1	7120	100 Year	458.08		458.16	244.87	314.62	518.03	132.35		-13.98	12.17	
Reach-1	7120	Floodway	458.1	0.02	458.2	119.1	362.39	585.35	17.27	-101.1	-13.98	12.17	18
Reach-1	7120	10 Year	455.34	-2.74	455.51	87.21	77.26	396.16	1.58		-13.98	12.17	
Reach-1	7120	10-Yr Floodv	455.35	-2.73	455.51	87.27	77.48	395.93	1.59	-101.1	-13.98	12.17	18
Reach-1	7073	100 Year	457.77		458.01	76.12	12.04	928.37	24.59		-20.21	17.09	
Reach-1	7073	Floodway	457.8	0.03	458.03	72.5	12.9	928.12	23.98	-42.03	-20.21	17.09	30.47
Reach-1	7073	10 Year	455.01	-2.75	455.21	32.56		475			-20.21	17.09	
Reach-1	7073	10-Yr Floodv	455.02	-2.75	455.22	32.58		475		-42.03	-20.21	17.09	30.47
Reach-1	6970	100 Year	457.24		457.52	44.85	47.03	888.41	29.57		-11.19	15.85	
Reach-1	6970	Floodway	457.23	-0.01	457.53	37.35	48.25	912.08	4.66	-20.5	-11.19	15.85	16.85
Reach-1	6970	10 Year	454.36	-2.89	454.57	34.12	4.57	467.47	2.96		-11.19	15.85	
Reach-1	6970	10-Yr Floodv	454.36	-2.89	454.57	31.92	4.59	469	1.41	-20.5	-11.19	15.85	16.85
Reach-1	6915	100 Year	456.96		457.3	45.24	37.07	916.63	11.3		-11.16	16.93	
Reach-1	6915	Floodway	456.95	-0.01	457.3	39.43	37.47	927.53	0	-22.5	-11.16	16.93	16.93
Reach-1	6915	10 Year	453.93	-3.04	454.22	34.3	4.93	469.69	0.38		-11.16	16.93	
Reach-1	6915	10-Yr Floodv	453.93	-3.03	454.22	32.88	4.94	470.06	0	-22.5	-11.16	16.93	16.93
Reach-1	6890	100 Year	456.88		457.15	42.96	39.97	923.31	1.71		-11.21	19.52	
Reach-1	6890	Floodway	456.85	-0.04	457.15	31.5	0.46	962.8	1.74	-11.49	-11.21	19.52	20.01
Reach-1	6890	10 Year	453.74	-3.14	453.97	34.71	3.69	471.31			-11.21	19.52	
Reach-1	6890	10-Yr Floodv	453.74	-3.15	453.97	30.6	0.2	474.8		-11.49	-11.21	19.52	20.01
Reach-1	6859.5		Culvert										
Reach-1	6825	100 Year	455.67		455.99	41.26	4.1	957.79	3.11		14.4	48.69	
Reach-1	6825	Floodway	455.67	0	456	37.8	3.55	961.25	0.2	11.16	14.4	48.69	48.96
Reach-1	6825	10 Year	453.2	-2.47	453.42	31.41		475			14.4	48.69	
Reach-1	6825	10-Yr Floodv	453.2	-2.47	453.42	31.41		475		11.16	14.4	48.69	48.96
Reach-1	6809	100 Year	455.5		455.76	45.48	0	964.89	0.11		13.45	56.89	
Reach-1	6809	Floodway	455.5	0	455.76	44.8	0	964.89	0.11	13.42	13.45	56.89	58.43
Reach-1	6809	10 Year	453	-2.49	453.19	34.8		475			13.45	56.89	
Reach-1	6809	10-Yr Floodv	453	-2.49	453.2	34.81		475		13.42	13.45	56.89	58.43
Reach-1	6756	100 Year	454.51		454.9	39.93		965			37.17	82.05	
Reach-1	6756	Floodway	454.52	0.01	454.9	39.96		965		39.9	37.17	82.05	80.32
Reach-1	6756	10 Year	452.09	-2.42	452.39	30.63		475			37.17	82.05	
Reach-1	6756	10-Yr Floodv	452.1	-2.41	452.4	30.64		475		39.9	37.17	82.05	80.32
Reach-1	6732	100 Year	454.17		454.56	39.99	0.15	964.59	0.26		50.67	88.32	
Reach-1	6732	Floodway	454.18	0.01	454.57	40.02	0.15	964.58	0.27	49.34	50.67	88.32	89.76
Reach-1	6732	10 Year	451.79	-2.39	452.08	31.04		475			50.67	88.32	
Reach-1	6732	10-Yr Floodv	451.79	-2.38	452.09	31.06		475		49.34	50.67	88.32	89.76
Reach-1	6653	100 Year	452.67		453.17	39.17	0.07	964.66	0.27		89.23	125.82	
Reach-1	6653	Floodway	452.72	0.05	453.2	39.42	0.09	964.57	0.34	88.39	89.23	125.82	127.82
Reach-1	6653	10 Year	450.42	-2.26	450.79	28.25		475			89.23	125.82	

HEC-RAS Plan: EX_FEMA_Fldw River: Beaver Pond Brk Reach: Reach-1													
Reach	River Sta	Profile	W.S. Elev	Prof Delta	E.G. Elev	Top Wdth	Q Left	Q Channel	Q Right	Enc Sta L	Ch Sta L	Ch Sta R	Enc Sta R
			(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)
Reach-1	6653	10-Yr Floodv	450.43	-2.24	450.8	28.31		475		88.39	89.23	125.82	127.82
Reach-1	6593	100 Year	450.4		451.31	31.42	3.06	940.46	21.47		98.62	121.56	
Reach-1	6593	Floodway	450.91	0.51	451.64	31.46	5.21	932.84	26.95	95.9	98.62	121.56	127.36
Reach-1	6593	10 Year	448.57	-1.84	449.11	25.4		472.31	2.69		98.62	121.56	
Reach-1	6593	10-Yr Floodv	448.72	-1.68	449.22	25.86		471.73	3.27	95.9	98.62	121.56	127.36
Reach-1	6541	100 Year	450.1		450.55	95.25	21.48	731.75	211.76		104.89	124.18	
Reach-1	6541	Floodway	449.91	-0.19	450.85	31.43	24.02	924.7	16.29	94.23	104.89	124.18	126.08
Reach-1	6541	10 Year	447.3	-2.8	447.96	35.56	1.32	445.33	28.35		104.89	124.18	
Reach-1	6541	10-Yr Floodv	447.3	-2.8	448.07	23.15	1.38	467.8	5.82	94.23	104.89	124.18	126.08
Reach-1	6490	100 Year	450.02		450.25	58.18	13.92	810.17	140.92		100.39	131.4	
Reach-1	6490	Floodway	449.96	-0.05	450.32	39.93	15.77	936.56	12.67	93.31	100.39	131.4	133.41
Reach-1	6490	10 Year	446.74	-3.28	447.11	43.21	0.55	458.06	16.39		100.39	131.4	
Reach-1	6490	10-Yr Floodv	446.73	-3.29	447.13	34.62	0.55	468.62	5.83	93.31	100.39	131.4	133.41
Reach-1	6457	100 Year	449.94		450.18	40.66	0.76	1054.24			81.02	127.1	
Reach-1	6457	Floodway	449.94	0	450.18	40.65	0.76	1054.24		78.77	81.02	127.1	124.71
Reach-1	6457	10 Year	446.67	-3.27	446.87	34.85		515			81.02	127.1	
Reach-1	6457	10-Yr Floodv	446.67	-3.27	446.87	34.85		515		78.77	81.02	127.1	124.71
Reach-1	6441.5		Culvert										
Reach-1	6417	100 Year	440.67		441.24	39.07	2.14	1040.01	12.85		112.01	141.73	
Reach-1	6417	Floodway	440.78	0.1	441.35	29.72		1055		112.01	112.01	141.73	141.73
Reach-1	6417	10 Year	438.51	-2.16	438.87	30.68		514.94	0.06		112.01	141.73	
Reach-1	6417	10-Yr Floodv	438.52	-2.15	438.88	29.71		515		112.01	112.01	141.73	141.73
Reach-1	6409	100 Year	438.44		440.36	24.65		1055			130.61	162.01	
Reach-1	6409	Floodway	438.44	-0.01	440.36	24.63		1055		128.8	130.61	162.01	158.8
Reach-1	6409	10 Year	436.7	-1.74	438.04	20.69		515			130.61	162.01	
Reach-1	6409	10-Yr Floodv	436.7	-1.74	438.04	20.69		515		128.8	130.61	162.01	158.8
Reach-1	6394	100 Year	437.24		438.95	29.46		1055			140.26	174.64	
Reach-1	6394	Floodway	437.24	0	438.95	29.45		1055		141.96	140.26	174.64	171.42
Reach-1	6394	10 Year	435.55	-1.69	436.82	22.3		515			140.26	174.64	
Reach-1	6394	10-Yr Floodv	435.55	-1.69	436.82	22.28		515		141.96	140.26	174.64	171.42
Reach-1	6305	100 Year	431.96		433.68	27.39		1055			-2.59	27.56	
Reach-1	6305	Floodway	431.96	0	433.68	27.3		1055		-1.74	-2.59	27.56	25.56
Reach-1	6305	10 Year	430.52	-1.44	431.51	22.43		515			-2.59	27.56	
Reach-1	6305	10-Yr Floodv	430.52	-1.44	431.51	22.43		515		-1.74	-2.59	27.56	25.56
Reach-1	6266	100 Year	430.12		431.67	30.64	0.02	1054.98	0		-14.86	15.31	
Reach-1	6266	Floodway	430.12	0	431.67	30.64	0.02	1054.98	0	-15.39	-14.86	15.31	15.65
Reach-1	6266	10 Year	428.42	-1.7	429.6	24.13		515			-14.86	15.31	
Reach-1	6266	10-Yr Floodv	428.42	-1.7	429.6	24.13		515		-15.39	-14.86	15.31	15.65
Reach-1	6216	100 Year	429.04		429.93	32.4	0.14	1053.74	1.12		-15.37	14.83	
Reach-1	6216	Floodway	429.04	0	429.93	32.4	0.14	1053.74	1.12	-16.1	-15.37	14.83	16.8
Reach-1	6216	10 Year	427.13	-1.91	427.72	26.1		515			-15.37	14.83	
Reach-1	6216	10-Yr Floodv	427.13	-1.91	427.72	26.1		515		-16.1	-15.37	14.83	16.8
Reach-1	6122	100 Year	426.86		427.59	37.22	0.03	1054.97	0		-17.52	19.2	
Reach-1	6122	Floodway	426.86	0	427.59	37.23	0.03	1054.97	0	-17.98	-17.52	19.2	19.29
Reach-1	6122	10 Year	424.7	-2.15	425.33	29.99		515			-17.52	19.2	
Reach-1	6122	10-Yr Floodv	424.7	-2.15	425.33	29.99		515		-17.98	-17.52	19.2	19.29
Reach-1	6067	100 Year	426		426.4	49.77	2.15	1050.47	2.38		-22.38	20.08	
Reach-1	6067	Floodway	426	0	426.4	45.94	0.47	1052.09	2.44	-22.97	-22.38	20.08	22.97
Reach-1	6067	10 Year	422.79	-3.21	423.44	32.54		515			-22.38	20.08	
Reach-1	6067	10-Yr Floodv	422.79	-3.21	423.44	32.54		515		-22.97	-22.38	20.08	22.97
Reach-1	6033	100 Year	425.86		426.13	45.47	2.75	1052.25			-19.85	22.38	
Reach-1	6033	Floodway	425.86	0	426.13	45.47	2.75	1052.25		-24.15	-19.85	22.38	24.75
Reach-1	6033	10 Year	422.42	-3.44	422.72	35.28		515			-19.85	22.38	
Reach-1	6033	10-Yr Floodv	422.42	-3.44	422.72	35.28		515		-24.15	-19.85	22.38	24.75
Reach-1	5993.5		Culvert										
Reach-1	5947	100 Year	419.99		421.02	31.43	0	1054.99	0.01		-18.28	12.9	
Reach-1	5947	Floodway	420.08	0.08	421.07	31.72	0.01	1054.97	0.03	-27.58	-18.28	12.9	13.42
Reach-1	5947	10 Year	417.8	-2.2	418.67	24.12		515			-18.28	12.9	

HEC-RAS Plan: EX_FEMA_Fldw River: Beaver Pond Brk Reach: Reach-1													
Reach	River Sta	Profile	W.S. Elev	Prof Delta	E.G. Elev	Top Wdth	Q Left	Q Channel	Q Right	Enc Sta L	Ch Sta L	Ch Sta R	Enc Sta R
			(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)
Reach-1	5947	10-Yr Floodv	417.82	-2.18	418.68	24.19		515		-27.58	-18.28	12.9	13.42
Reach-1	5878	100 Year	418.56		419.38	48.36	0.58	1616.88	7.54		-23.29	19.49	
Reach-1	5878	Floodway	418.92	0.36	419.63	49.6	1.3	1614.18	9.52	-28.64	-23.29	19.49	26.86
Reach-1	5878	10 Year	416.46	-2.1	417	38.41		794.92	0.08		-23.29	19.49	
Reach-1	5878	10-Yr Floodv	416.57	-1.99	417.07	38.89		794.87	0.13	-28.64	-23.29	19.49	26.86
Reach-1	5832	100 Year	417.04		418.4	36.64	25.31	1551.78	47.92		-15.29	10.6	
Reach-1	5832	Floodway	417.55	0.51	418.83	28	3.29	1603.75	17.96	-15.86	-15.29	10.6	12.14
Reach-1	5832	10 Year	415.9	-1.14	416.41	33.19	5.53	774.97	14.5		-15.29	10.6	
Reach-1	5832	10-Yr Floodv	416.01	-1.03	416.53	28	1.28	786.21	7.51	-15.86	-15.29	10.6	12.14
Reach-1	5813		Inl Struct										
Reach-1	5812.5	100 Year	415.78		416.56	39.87	2.89	1621.28	0.83		-16.7	18.37	
Reach-1	5812.5	Floodway	415.78	0	416.56	39.87	2.89	1621.28	0.83	-20.41	-16.7	18.37	19.92
Reach-1	5812.5	10 Year	413.75	-2.04	414.14	34.38		795			-16.7	18.37	
Reach-1	5812.5	10-Yr Floodv	413.75	-2.03	414.15	34.38		795		-20.41	-16.7	18.37	19.92
Reach-1	5804	100 Year	414.24		416.03	37.64	0.02	1622.29	2.69		-21.52	13.88	
Reach-1	5804	Floodway	414.24	0	416.03	37.63	0.02	1622.3	2.68	-23.52	-21.52	13.88	15.98
Reach-1	5804	10 Year	412.25	-1.99	413.65	30.02		795			-21.52	13.88	
Reach-1	5804	10-Yr Floodv	412.25	-1.99	413.65	30		795		-23.52	-21.52	13.88	15.98
Reach-1	5757	100 Year	411.58		412.86	33.71	0.07	1624.87	0.06		-19.25	13.4	
Reach-1	5757	Floodway	411.58	0.01	412.87	33.73	0.07	1624.86	0.06	-24.29	-19.25	13.4	14.42
Reach-1	5757	10 Year	408.88	-2.69	409.91	26.66		795			-19.25	13.4	
Reach-1	5757	10-Yr Floodv	408.88	-2.7	409.91	26.65		795		-24.29	-19.25	13.4	14.42
Reach-1	5628	100 Year	402.54		404.6	34.33		1625	0		-23.31	10.99	
Reach-1	5628	Floodway	402.54	0	404.6	34.33		1625	0	-23.58	-23.31	10.99	11.22
Reach-1	5628	10 Year	400.73	-1.81	402.15	29.55		795			-23.31	10.99	
Reach-1	5628	10-Yr Floodv	400.74	-1.81	402.15	29.57		795		-23.58	-23.31	10.99	11.22
Reach-1	5524	100 Year	392.83		394.1	37.29	0.06	1624.89	0.05		-20.27	15.95	
Reach-1	5524	Floodway	392.9	0.07	394.14	36.05		1625		-20.14	-20.27	15.95	15.91
Reach-1	5524	10 Year	390.14	-2.69	391.33	28.77		795			-20.27	15.95	
Reach-1	5524	10-Yr Floodv	390.14	-2.69	391.33	28.77		795		-20.14	-20.27	15.95	15.91
Reach-1	5456	100 Year	387.9		389.97	33.79	0	1625	0		-17.22	16.4	
Reach-1	5456	Floodway	387.87	-0.03	389.97	33.7	0	1625	0	-17.29	-17.22	16.4	22.2
Reach-1	5456	10 Year	385.96	-1.95	387.45	27.58		795			-17.22	16.4	
Reach-1	5456	10-Yr Floodv	385.96	-1.95	387.45	27.58		795		-17.29	-17.22	16.4	22.2
Reach-1	5422	100 Year	386.09		387.76	35.22	0.13	1624.71	0.16		-19.75	13.78	
Reach-1	5422	Floodway	386.09	0	387.76	35.22	0.13	1624.71	0.16	-21	-19.75	13.78	23.4
Reach-1	5422	10 Year	384.4	-1.69	385.34	29.57		795			-19.75	13.78	
Reach-1	5422	10-Yr Floodv	384.39	-1.7	385.33	29.53		795		-21	-19.75	13.78	23.4
Reach-1	5355	100 Year	384.67		385.62	43.8	0.39	1624.46	0.14		-49.21	-8.01	
Reach-1	5355	Floodway	384.71	0.04	385.65	43.8	0.46	1624.37	0.17	-50.92	-49.21	-8.01	-7.12
Reach-1	5355	10 Year	381.37	-3.3	382.68	29.91		795			-49.21	-8.01	
Reach-1	5355	10-Yr Floodv	381.39	-3.28	382.68	29.99		795		-50.92	-49.21	-8.01	-7.12
Reach-1	5296	100 Year	383.83		384.52	44.71		1960			-41.34	6.04	
Reach-1	5296	Floodway	383.88	0.06	384.56	44.81		1960		-40.72	-41.34	6.04	11.38
Reach-1	5296	10 Year	379.35	-4.48	380.33	32.88		955			-41.34	6.04	
Reach-1	5296	10-Yr Floodv	379.3	-4.53	380.31	32.7		955		-40.72	-41.34	6.04	11.38
Reach-1	5281	100 Year	383.8		384.34	44.66	1.16	1878.13	80.7		-17.88	16.6	
Reach-1	5281	Floodway	383.45	-0.36	384.34	28.39	1.49	1958.51		-22.9	-17.88	16.6	10
Reach-1	5281	10 Year	379.34	-4.46	379.9	39.34	0.16	954.09	0.74		-17.88	16.6	
Reach-1	5281	10-Yr Floodv	379.16	-4.64	379.9	28.07	0.17	954.84		-22.9	-17.88	16.6	10
Reach-1	5254.5		Culvert										
Reach-1	5224	100 Year	379.28		379.72	51.33	6.45	1953.55			-50.59	-1.67	
Reach-1	5224	Floodway	379.18	-0.1	379.73	41.31		1960		-45.25	-50.59	-1.67	1.54
Reach-1	5224	10 Year	376.73	-2.55	376.97	47.64	0.1	954.9			-50.59	-1.67	
Reach-1	5224	10-Yr Floodv	376.71	-2.57	376.98	41.31		955		-45.25	-50.59	-1.67	1.54
Reach-1	5206	100 Year	378.64		379.41	49.96		1960			-45.93	13.55	
Reach-1	5206	Floodway	378.63	-0.01	379.41	49.92		1960		-40.11	-45.93	13.55	11.89
Reach-1	5206	10 Year	376.16	-2.48	376.68	41.4		955			-45.93	13.55	

HEC-RAS Plan: EX_FEMA_Fldw River: Beaver Pond Brk Reach: Reach-1													
Reach	River Sta	Profile	W.S. Elev	Prof Delta	E.G. Elev	Top Wdth	Q Left	Q Channel	Q Right	Enc Sta L	Ch Sta L	Ch Sta R	Enc Sta R
			(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)
Reach-1	5206	10-Yr Floodv	376.16	-2.48	376.68	41.4		955		-40.11	-45.93	13.55	11.89
Reach-1	5145	100 Year	377.91		378.61	55.57	1.12	1958.49	0.39		-33.53	17.52	
Reach-1	5145	Floodway	377.89	-0.02	378.6	55.5	1.08	1958.55	0.38	-38.63	-33.53	17.52	20.87
Reach-1	5145	10 Year	374.12	-3.78	375.19	38.32		955			-33.53	17.52	
Reach-1	5145	10-Yr Floodv	374.13	-3.78	375.19	38.33		955		-38.63	-33.53	17.52	20.87
Reach-1	5084	100 Year	377.64		378.11	101.78	88.97	1802.44	68.59		-16.77	17.85	
Reach-1	5084	Floodway	377.53	-0.11	378.09	47	56.17	1883.35	20.48	-25.66	-16.77	17.85	21.34
Reach-1	5084	10 Year	373.3	-4.34	373.83	40.99	1.32	952.26	1.42		-16.77	17.85	
Reach-1	5084	10-Yr Floodv	373.3	-4.34	373.83	41	1.33	952.25	1.42	-25.66	-16.77	17.85	21.34
Reach-1	5072	100 Year	377.7		377.97	171.09	121.78	1557.75	280.47		-16.24	17.72	
Reach-1	5072	Floodway	377.54	-0.16	377.97	44.16	126.74	1830.14	3.11	-25.95	-16.24	17.72	18.21
Reach-1	5072	10 Year	373.29	-4.41	373.63	40.08	22.94	924.66	7.41		-16.24	17.72	
Reach-1	5072	10-Yr Floodv	373.29	-4.41	373.63	40.08	22.94	924.66	7.41	-25.95	-16.24	17.72	18.21
Reach-1	5050.5		Culvert										
Reach-1	5021	100 Year	369.86		370.92	64.07	0.02	1959.95	0.03		-41.7	21.76	
Reach-1	5021	Floodway	369.86	0	370.92	64.07	0.02	1959.95	0.03	-98.09	-41.7	21.76	40.71
Reach-1	5021	10 Year	368.37	-1.49	369.03	56.07		955			-41.7	21.76	
Reach-1	5021	10-Yr Floodv	368.37	-1.49	369.03	56.05		955		-98.09	-41.7	21.76	40.71

BEAVER POND BROOK - PROPOSED CONDITION, FEMA REGULATORY (W/ BACKWATER)

HEC-RAS 4.1.0 - "Standard Table 1" Output

HEC-RAS Plan: PR_FEMA_Reg 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
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	8722	10 Year	205	487.7	490.76	490.76	491.5	0.016924	7.1	31.43	23.55	0.92
Reach-1	8722	50 Year	340	487.7	491.43	491.43	492.31	0.01407	7.95	49.4	29.88	0.88
Reach-1	8722	100 Year	410	487.7	491.62	491.62	492.65	0.015376	8.71	55.12	31.64	0.93
Reach-1	8722	500 Year	615	487.7	492.43	492.43	493.47	0.011796	9.08	86.35	45.61	0.85
Reach-1	8640	10 Year	205	487.7	490.82		490.83	0.000213	1.02	269.29	174.08	0.11
Reach-1	8640	50 Year	340	487.7	491.68		491.69	0.000143	1.01	423.75	183.73	0.1
Reach-1	8640	100 Year	410	487.7	491.59		491.61	0.000236	1.28	406.63	182.83	0.12
Reach-1	8640	500 Year	615	487.7	492.16		492.18	0.00026	1.49	511.54	188.26	0.13
Reach-1	8583	10 Year	205	487.57	490.8		490.81	0.000097	0.74	365.37	201.3	0.08
Reach-1	8583	50 Year	340	487.57	491.67		491.67	0.000085	0.83	554.08	229.56	0.08
Reach-1	8583	100 Year	410	487.57	491.56		491.57	0.00014	1.04	530.52	225.74	0.1
Reach-1	8583	500 Year	615	487.57	492.13		492.14	0.000172	1.27	664.23	247.13	0.11
Reach-1	8573	10 Year	205	487.3	490.32	489.67	490.69	0.007793	4.86	42.16	63.58	0.61
Reach-1	8573	50 Year	340	487.3	490.88	490.34	491.48	0.009482	6.24	54.84	104.5	0.7
Reach-1	8573	100 Year	410	487.3	491.13	490.61	491.46	0.005312	4.98	92.75	110.2	0.53
Reach-1	8573	500 Year	615	487.3	490.95	490.95	491.85	0.015624	8.17	84.06	109.45	0.9
Reach-1	8565.5		Bridge									
Reach-1	8554	10 Year	205	483.76	486.29	485.95	486.82	0.010543	5.93	36.04	22.38	0.73
Reach-1	8554	50 Year	340	483.76	486.91	486.67	487.67	0.010968	7.21	51.57	27.47	0.78
Reach-1	8554	100 Year	410	483.76	487.28	487	488.06	0.009678	7.38	62.31	32.53	0.74
Reach-1	8554	500 Year	615	483.76	489	487.73	489.31	0.002676	5.23	184.56	84.82	0.42
Reach-1	8536	10 Year	205	481.79	485.98		486.26	0.005046	4.22	48.54	21.81	0.5
Reach-1	8536	50 Year	340	481.79	486.52		486.99	0.007015	5.56	62.67	32.35	0.6
Reach-1	8536	100 Year	410	481.79	487		487.46	0.005473	5.49	79.92	42.71	0.55
Reach-1	8536	500 Year	615	481.79	488.89		489.14	0.00182	4.35	179.28	62.56	0.34
Reach-1	8464	10 Year	205	480.22	483.08	483.08	484.03	0.022153	7.81	26.26	13.84	1
Reach-1	8464	50 Year	340	480.22	485.27	483.92	485.71	0.004371	5.39	66.05	23.15	0.49
Reach-1	8464	100 Year	410	480.22	486.16	484.25	486.53	0.002859	5.04	88.7	27.58	0.41
Reach-1	8464	500 Year	615	480.22	488.6	485.16	488.81	0.001064	4.08	198.6	78.93	0.27
Reach-1	8435.5		Culvert									
Reach-1	8412	10 Year	205	478.35	480.39	480.39	481.16	0.021692	7.05	29.08	18.6	0.99
Reach-1	8412	50 Year	340	478.35	481.03	481.03	482.08	0.020859	8.24	41.26	19.77	1.01
Reach-1	8412	100 Year	410	478.35	481.31	481.31	482.5	0.020018	8.74	46.96	20.3	1
Reach-1	8412	500 Year	615	478.35	482.07	482.07	483.58	0.017668	9.88	62.85	21.69	0.99
Reach-1	8393	10 Year	205	473.56	475.45	475.45	476.21	0.022588	6.99	29.32	19.62	1.01
Reach-1	8393	50 Year	340	473.56	476.07	476.07	477.1	0.020331	8.14	41.89	21.28	1
Reach-1	8393	100 Year	410	473.56	476.36	476.36	477.5	0.01909	8.61	48.09	22.18	0.99
Reach-1	8393	500 Year	615	473.56	477.11	477.11	478.53	0.0165	9.64	65.73	24.53	0.96
Reach-1	8356	10 Year	205	469.59	472.74	471.67	472.94	0.002896	3.67	59.52	28.15	0.41
Reach-1	8356	50 Year	340	469.59	474.05	472.24	474.25	0.001755	3.77	99.8	33.47	0.34
Reach-1	8356	100 Year	410	469.59	474.66	472.5	474.86	0.001452	3.79	120.88	36.56	0.32
Reach-1	8356	500 Year	615	469.59	476.29	473.16	476.49	0.000981	3.84	181.95	51.69	0.27
Reach-1	8332.5		Culvert									
Reach-1	8309	10 Year	205	467	470.02	468.97	470.21	0.002691	3.63	60.24	35.61	0.4
Reach-1	8309	50 Year	340	467	470.83	469.48	471.11	0.002764	4.41	82.23	41.2	0.42
Reach-1	8309	100 Year	410	467	471.16	469.73	471.49	0.002892	4.8	91.26	42.8	0.44
Reach-1	8309	500 Year	615	467	472	470.34	472.47	0.003131	5.71	116.18	50.69	0.47
Reach-1	8289	10 Year	205	466.83	469.6		469.91	0.006378	4.46	45.98	23.89	0.57
Reach-1	8289	50 Year	340	466.83	470.42		470.81	0.006156	5.06	67.16	27.96	0.58
Reach-1	8289	100 Year	410	466.83	470.75		471.19	0.005926	5.36	76.61	29.45	0.58
Reach-1	8289	500 Year	615	466.83	471.6		472.17	0.005244	6.06	103.45	33.26	0.57
Reach-1	8237	10 Year	205	465.68	468.31		468.66	0.008344	4.75	43.69	22.1	0.57
Reach-1	8237	50 Year	340	465.68	469		469.54	0.008972	5.93	59.88	24.9	0.62
Reach-1	8237	100 Year	410	465.68	469.3		469.93	0.00922	6.43	67.6	26.15	0.64
Reach-1	8237	500 Year	615	465.68	470.05		470.93	0.009886	7.67	88.3	29.29	0.68

HEC-RAS Plan: PR_FEMA_Reg 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
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	8178	10 Year	205	464.04	467.15	466.21	467.41	0.004907	4.02	51.05	25.47	0.5
Reach-1	8178	50 Year	340	464.04	467.96	466.87	468.3	0.004372	4.71	73.35	29.79	0.5
Reach-1	8178	100 Year	410	464.04	468.26	467.15	468.66	0.004432	5.08	82.68	31.2	0.51
Reach-1	8178	500 Year	615	464.04	469.1	467.82	469.62	0.004254	5.84	110.36	35.15	0.52
Reach-1	8128	10 Year	205	462.37	465.38	465.19	466.04	0.015624	6.51	31.51	17.9	0.86
Reach-1	8128	50 Year	340	462.37	466.27	465.93	467	0.016171	6.89	49.38	22.62	0.82
Reach-1	8128	100 Year	410	462.37	466.59	466.24	467.4	0.014799	7.22	57.06	24.41	0.8
Reach-1	8128	500 Year	615	462.37	467.4	466.95	468.42	0.013055	8.16	78.49	29.51	0.79
Reach-1	8080	10 Year	205	460.79	464.28		464.6	0.005343	4.49	45.61	19.63	0.52
Reach-1	8080	50 Year	340	460.79	465.07		465.55	0.005573	5.56	62.53	24	0.55
Reach-1	8080	100 Year	410	460.79	465.31		465.9	0.00625	6.2	68.63	25.56	0.59
Reach-1	8080	500 Year	615	460.79	466.26		467.02	0.005898	7.1	95.65	31.82	0.6
Reach-1	8027	10 Year	205	459.06	462.28	462.14	463.02	0.017397	6.92	29.63	16.33	0.9
Reach-1	8027	50 Year	340	459.06	463.11	462.88	464.03	0.01457	7.69	44.52	19.18	0.86
Reach-1	8027	100 Year	410	459.06	463.89	463.2	464.64	0.008399	6.98	60.78	22.77	0.69
Reach-1	8027	500 Year	615	459.06	465.36	464.02	466.06	0.004966	6.89	99.37	29.82	0.56
Reach-1	7977	10 Year	205	457.38	461.14	460.01	461.38	0.005539	3.96	51.79	22.59	0.46
Reach-1	7977	50 Year	340	457.38	462.62	460.7	462.85	0.003177	3.84	89.58	28.18	0.36
Reach-1	7977	100 Year	410	457.38	463.73	460.99	463.92	0.001819	3.49	122.97	32.26	0.29
Reach-1	7977	500 Year	615	457.38	465.3	461.76	465.51	0.001465	3.8	178.07	38.04	0.27
Reach-1	7937	10 Year	305	456.07	460.84	458.63	461.01	0.001848	3.28	93.01	26.97	0.31
Reach-1	7937	50 Year	515	456.07	462.33	459.44	462.56	0.001874	3.8	136	30.77	0.31
Reach-1	7937	100 Year	625	456.07	463.51	459.82	463.73	0.001285	3.66	174.21	33.68	0.27
Reach-1	7937	500 Year	940	456.07	465.04	460.73	465.33	0.001308	4.31	231.32	111.41	0.28
Reach-1	7911.5		Bridge									
Reach-1	7885	10 Year	305	455.84	459.88	458.22	460.04	0.002101	3.21	94.91	34.65	0.34
Reach-1	7885	50 Year	515	455.84	461.22	458.9	461.41	0.001549	3.55	154.09	48.98	0.31
Reach-1	7885	100 Year	625	455.84	461.75	459.2	461.96	0.001475	3.77	180.68	51.62	0.31
Reach-1	7885	500 Year	940	455.84	462.67	459.99	462.98	0.00173	4.61	230.39	56.24	0.35
Reach-1	7826	10 Year	305	454.72	459.29	457.54	459.48	0.004058	3.47	87.83	44.35	0.37
Reach-1	7826	50 Year	515	454.72	460.85	458.36	461.01	0.002572	3.32	181.04	67.97	0.29
Reach-1	7826	100 Year	625	454.72	461.42	458.72	461.58	0.00226	3.4	220.76	71.64	0.28
Reach-1	7826	500 Year	940	454.72	462.31	459.59	462.53	0.002542	4.06	286.94	78.58	0.31
Reach-1	7757	10 Year	305	453.54	459.32	456.61	459.33	0.000136	0.81	526.17	185.48	0.07
Reach-1	7757	50 Year	515	453.54	460.88	456.83	460.89	0.000116	0.94	764.55	197.09	0.07
Reach-1	7757	100 Year	625	453.54	461.45	456.83	461.46	0.000121	1.02	853.01	208.29	0.07
Reach-1	7757	500 Year	940	453.54	462.38	456.97	462.39	0.00012	1.13	1252.49	232.39	0.08
Reach-1	7711	10 Year	305	453.54	459.3	456.01	459.31	0.000119	0.8	454.49	233.33	0.07
Reach-1	7711	50 Year	515	453.54	460.86	456.37	460.87	0.000105	0.92	670.73	250.05	0.07
Reach-1	7711	100 Year	625	453.54	461.43	456.54	461.45	0.00011	1	749.72	265.96	0.07
Reach-1	7711	500 Year	940	453.54	462.37	456.92	462.38	0.000067	0.86	1538.78	294.16	0.06
Reach-1	7698	10 Year	430	453.41	458.96	456.16	459.22	0.001355	4.2	120.3	27.56	0.32
Reach-1	7698	50 Year	715	453.41	460.3	457.18	460.74	0.001725	5.49	156.15	163.8	0.37
Reach-1	7698	100 Year	870	453.41	460.7	457.66	461.28	0.002088	6.28	166.89	271.36	0.41
Reach-1	7698	500 Year	1315	453.41	460.66	458.97	461.99	0.004845	9.54	166.03	256.48	0.63
Reach-1	7689.5		Bridge									
Reach-1	7681	10 Year	430	453.25	458.22	455.97	458.54	0.001937	4.66	104	29.21	0.37
Reach-1	7681	50 Year	715	453.25	459.04	456.95	459.67	0.003145	6.58	122.69	54.14	0.49
Reach-1	7681	100 Year	870	453.25	459.42	457.44	460.24	0.003712	7.48	131.6	95.1	0.54
Reach-1	7681	500 Year	1315	453.25	459.62	458.64	461.36	0.007584	10.93	136.22	135.4	0.77
Reach-1	7666	10 Year	430	453.02	458.03	456.51	458.41	0.003121	5.16	105.42	51.8	0.45
Reach-1	7666	50 Year	715	453.02	458.88	457.66	459.5	0.004151	6.74	140.97	171.27	0.53
Reach-1	7666	100 Year	870	453.02	459.28	458.07	460.02	0.004569	7.44	157.94	198.18	0.57
Reach-1	7666	500 Year	1315	453.02	460.1	459.1	460.51	0.002612	6.18	290.72	244.95	0.44
Reach-1	7589	10 Year	430	452.95	456.53	455.99	456.75	0.019442	3.79	113.42	197.78	0.54
Reach-1	7589	50 Year	715	452.95	457.42	456.43	457.66	0.012279	3.93	182.15	289.06	0.46
Reach-1	7589	100 Year	870	452.95	457.94	456.62	458.18	0.009574	3.87	224.58	346.85	0.41
Reach-1	7589	500 Year	1315	452.95	459.23	457.16	459.45	0.006447	3.81	380.58	521.78	0.35

HEC-RAS Plan: PR_FEMA_Reg 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
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	7370	10 Year	430	450.98	455.98	452.96	456	0.000266	1.16	422.72	316.15	0.1
Reach-1	7370	50 Year	715	450.98	457.26	453.42	457.27	0.000118	0.92	845.77	369.93	0.07
Reach-1	7370	100 Year	870	450.98	457.8	453.62	457.82	0.000112	0.95	975.13	375.11	0.07
Reach-1	7370	500 Year	1315	450.98	459.1	454.1	459.12	0.000105	1.05	1291.59	382.89	0.07
Reach-1	7168	10 Year	430	450.95	455.47	453.19	455.61	0.001899	2.97	156.19	153.29	0.28
Reach-1	7168	50 Year	715	450.95	456.98	453.95	457.09	0.001061	2.8	311.78	254.57	0.22
Reach-1	7168	100 Year	870	450.95	457.56	454.29	457.65	0.000808	2.62	387.74	269.67	0.19
Reach-1	7168	500 Year	1315	450.95	458.89	455.25	458.98	0.000527	2.44	564.55	350.98	0.16
Reach-1	7120	10 Year	475	449.41	455.1	453.04	455.3	0.001885	3.89	162.79	83.34	0.34
Reach-1	7120	50 Year	795	449.41	456.75	454.51	456.91	0.001093	3.72	326.31	132.84	0.28
Reach-1	7120	100 Year	965	449.41	457.34	454.88	457.5	0.001014	3.83	398.86	176.69	0.27
Reach-1	7120	500 Year	1460	449.41	458.81	455.64	458.9	0.00054	3.21	776.74	264.23	0.2
Reach-1	7073	10 Year	475	448.79	454.7	452.13	454.93	0.003033	3.89	122.19	31.24	0.35
Reach-1	7073	50 Year	795	448.79	456.3	453.2	456.61	0.003666	4.47	180.15	47.64	0.36
Reach-1	7073	100 Year	965	448.79	456.85	453.7	457.21	0.003692	4.82	210.28	60.4	0.37
Reach-1	7073	500 Year	1460	448.79	458.24	454.9	458.69	0.003535	5.51	310.69	83.88	0.38
Reach-1	6970	10 Year	475	448.33	452	451.72	452.94	0.014062	7.79	60.98	24.24	0.87
Reach-1	6970	50 Year	795	448.33	452.97	452.8	454.28	0.015119	9.18	86.64	28.46	0.92
Reach-1	6970	100 Year	965	448.33	453.35	453.24	454.87	0.015151	9.9	97.78	30.04	0.94
Reach-1	6970	500 Year	1460	448.33	454.37	454.37	456.39	0.014367	11.45	130.24	34.07	0.96
Reach-1	6915	10 Year	475	447.05	450.81	449.74	451.27	0.005677	5.42	87.72	30.82	0.57
Reach-1	6915	50 Year	795	447.05	451.84	450.69	452.51	0.005713	6.59	122.31	35.9	0.6
Reach-1	6915	100 Year	965	447.05	452.3	451.13	453.08	0.005682	7.09	139.3	37.74	0.6
Reach-1	6915	500 Year	1460	447.05	453.49	452.14	454.51	0.005498	8.22	186.86	42.45	0.62
Reach-1	6890	10 Year	475	446.59	450.32	449.29	450.79	0.005895	5.49	86.55	32.18	0.58
Reach-1	6890	50 Year	795	446.59	451.37	450.22	452.03	0.005671	6.56	128.13	42.04	0.59
Reach-1	6890	100 Year	965	446.59	451.85	450.7	452.6	0.005532	7.01	148.68	43.95	0.6
Reach-1	6890	500 Year	1460	446.59	453.07	451.68	454.04	0.005236	8.06	205.34	48.84	0.61
Reach-1	6825	10 Year	475	445.34	449.07	448.04	449.54	0.005873	5.48	86.72	30.74	0.57
Reach-1	6825	50 Year	795	445.34	450	449	450.73	0.006471	6.86	116.94	34.46	0.63
Reach-1	6825	100 Year	965	445.34	450.4	449.4	451.27	0.006732	7.49	131.08	36.07	0.65
Reach-1	6825	500 Year	1460	445.34	451.52	450.4	452.72	0.006748	8.82	174.04	40.58	0.68
Reach-1	6809	10 Year	475	445.01	448.76	447.71	449.22	0.005817	5.46	86.96	31.74	0.57
Reach-1	6809	50 Year	795	445.01	449.65	448.66	450.37	0.006495	6.84	121.52	40.87	0.63
Reach-1	6809	100 Year	965	445.01	450.05	449.11	450.9	0.00671	7.44	137.98	42.44	0.65
Reach-1	6809	500 Year	1460	445.01	451.21	450.12	452.31	0.006358	8.57	189.99	47.08	0.66
Reach-1	6756	10 Year	475	444	447.72	446.69	448.19	0.005954	5.51	86.24	51.5	0.58
Reach-1	6756	50 Year	795	444	448.65	447.64	449.26	0.0057	6.43	149.27	61.18	0.59
Reach-1	6756	100 Year	965	444	449.07	448.2	449.74	0.005598	6.84	175.06	62.84	0.6
Reach-1	6756	500 Year	1460	444	450.56	449.06	451.23	0.003959	7.08	273.09	68.8	0.53
Reach-1	6732	10 Year	475	443.54	447.28	446.23	447.75	0.005793	5.45	87.09	53.09	0.57
Reach-1	6732	50 Year	795	443.54	448.28	447.18	448.84	0.005135	6.2	159.11	65.76	0.56
Reach-1	6732	100 Year	965	443.54	448.73	447.77	449.33	0.004938	6.54	188.58	67.53	0.56
Reach-1	6732	500 Year	1460	443.54	450.37	448.61	450.94	0.003188	6.56	305.26	74.12	0.48
Reach-1	6653	10 Year	475	442.03	445.77	444.73	446.24	0.005814	5.46	86.93	39.97	0.57
Reach-1	6653	50 Year	795	442.03	446.76	445.68	447.41	0.005801	6.56	134.37	49.21	0.6
Reach-1	6653	100 Year	965	442.03	447.41	446.2	448.06	0.00478	6.63	167.44	51.81	0.56
Reach-1	6653	500 Year	1460	442.03	449.67	447.15	450.21	0.002417	6.22	294.77	60.8	0.42
Reach-1	6593	10 Year	475	440.88	444.68	443.58	445.12	0.005453	5.34	88.99	54.73	0.56
Reach-1	6593	50 Year	795	440.88	446.01	444.53	446.45	0.003603	5.55	181.13	67.92	0.48
Reach-1	6593	100 Year	965	440.88	446.95	445.15	447.32	0.002417	5.21	246.89	71.67	0.41
Reach-1	6593	500 Year	1460	440.88	449.53	445.97	449.81	0.001158	4.74	444.97	81.94	0.3
Reach-1	6541	10 Year	475	439.9	443.84	442.59	444.24	0.004733	5.07	93.68	90.08	0.52
Reach-1	6541	50 Year	795	439.9	445.89	443.54	446.04	0.001164	3.52	360	113.89	0.28
Reach-1	6541	100 Year	965	439.9	446.91	443.96	447.03	0.000789	3.28	477.88	117.94	0.24
Reach-1	6541	500 Year	1460	439.9	449.55	444.8	449.65	0.000415	3.05	803.47	128.48	0.18
Reach-1	6473	10 Year	515	438.58	443.55	441.56	443.69	0.001259	3.1	170.14	139.06	0.28
Reach-1	6473	50 Year	865	438.58	445.68	442.21	445.83	0.000738	3.21	273.55	154.39	0.23
Reach-1	6473	100 Year	1055	438.58	446.7	442.52	446.87	0.000631	3.31	323.29	159.78	0.22
Reach-1	6473	500 Year	1595	438.58	449.34	443.29	449.54	0.000475	3.57	451.46	173.32	0.2

HEC-RAS Plan: PR_FEMA_Reg 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
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	6445.5		Culvert									
Reach-1	6417	10 Year	515	435.14	437.99	437.97	439.09	0.018496	8.39	61.36	27.33	0.99
Reach-1	6417	50 Year	865	435.14	439.47	438.95	440.53	0.01091	8.24	104.92	31.49	0.8
Reach-1	6417	100 Year	1055	435.14	440.44	439.4	441.37	0.007602	7.7	137.02	34.6	0.68
Reach-1	6417	500 Year	1595	435.14	443.03	440.52	443.77	0.003161	6.94	237.54	46.63	0.48
Reach-1	6409	10 Year	515	434.58	437.42	437.42	438.53	0.018873	8.47	60.81	27.1	1
Reach-1	6409	50 Year	865	434.58	439.34	438.41	440.14	0.007811	7.2	120.18	34.78	0.68
Reach-1	6409	100 Year	1055	434.58	440.38	438.87	441.07	0.005252	6.65	158.73	38.96	0.58
Reach-1	6409	500 Year	1595	434.58	443.06	439.99	443.6	0.002191	5.98	277.06	49.64	0.4
Reach-1	6394	10 Year	515	433.33	436.94	436.22	437.59	0.008552	6.47	79.57	28.9	0.69
Reach-1	6394	50 Year	865	433.33	439.27	437.24	439.73	0.003631	5.48	157.81	38.22	0.48
Reach-1	6394	100 Year	1055	433.33	440.34	437.71	440.77	0.002743	5.25	201.16	42.51	0.42
Reach-1	6394	500 Year	1595	433.33	443.06	438.87	443.44	0.001355	4.97	331.46	53.37	0.32
Reach-1	6349.5		Culvert									
Reach-1	6305	10 Year	515	427.79	430.81	430.62	431.76	0.015103	7.84	65.73	27.81	0.9
Reach-1	6305	50 Year	865	427.79	431.7	431.63	433.07	0.016475	9.4	91.97	31.36	0.97
Reach-1	6305	100 Year	1055	427.79	432.14	432.08	433.67	0.016283	9.94	106.15	33.12	0.98
Reach-1	6305	500 Year	1595	427.79	433.16	433.16	435.16	0.014747	11.36	142.07	37.2	0.97
Reach-1	6266	10 Year	515	425	428.42	428.39	429.6	0.018115	8.71	59.11	24.13	0.98
Reach-1	6266	50 Year	865	425	429.63	429.48	431.03	0.015529	9.51	90.99	28.75	0.94
Reach-1	6266	100 Year	1055	425	430.12	429.96	431.67	0.015093	10	105.51	30.63	0.94
Reach-1	6266	500 Year	1595	425	431.67	431.11	433.32	0.009927	10.36	157.64	36.42	0.81
Reach-1	6216	10 Year	515	422.01	427.13		427.72	0.006648	6.16	83.62	26.11	0.61
Reach-1	6216	50 Year	865	422.01	428.44		429.24	0.006691	7.17	120.8	30.51	0.63
Reach-1	6216	100 Year	1055	422.01	429.02		429.92	0.006421	7.63	138.84	32.33	0.63
Reach-1	6216	500 Year	1595	422.01	431.29		432.15	0.003647	7.53	220.02	38.46	0.51
Reach-1	6122	10 Year	515	420.28	424.72	423.92	425.34	0.008926	6.29	81.84	30.05	0.67
Reach-1	6122	50 Year	865	420.28	426.45	424.98	427.06	0.007211	6.24	138.67	34.86	0.55
Reach-1	6122	100 Year	1055	420.28	427.29	425.43	427.9	0.00615	6.27	168.33	36.1	0.51
Reach-1	6122	500 Year	1595	420.28	430.7	426.5	431.16	0.002251	5.46	300.09	41.31	0.34
Reach-1	6067	10 Year	515	419.29	423.4	422.25	423.81	0.007385	5.15	100.04	35.82	0.54
Reach-1	6067	50 Year	865	419.29	425.61	423.2	425.92	0.004772	4.5	192.21	47.67	0.39
Reach-1	6067	100 Year	1055	419.29	426.7	423.63	426.99	0.003425	4.3	247.71	52.95	0.34
Reach-1	6067	500 Year	1595	419.29	430.61	424.66	430.8	0.001105	3.58	465.64	58.46	0.21
Reach-1	6033	10 Year	515	417.49	423.31	420.25	423.46	0.001161	3.13	164.59	39.56	0.27
Reach-1	6033	50 Year	865	417.49	425.51	421.22	425.68	0.000895	3.32	260.28	46.66	0.25
Reach-1	6033	100 Year	1055	417.49	426.62	421.66	426.8	0.00074	3.37	313.6	48.88	0.23
Reach-1	6033	500 Year	1595	417.49	430.57	422.76	430.73	0.000347	3.16	522.28	57.08	0.17
Reach-1	5996.5		Culvert									
Reach-1	5947	10 Year	515	413.65	417.79	417.25	418.64	0.010896	7.39	69.73	24.17	0.77
Reach-1	5947	50 Year	865	413.65	419.4	418.36	420.32	0.008127	7.69	112.51	28.91	0.69
Reach-1	5947	100 Year	1055	413.65	419.99	418.9	421.01	0.00812	8.12	129.89	30.66	0.69
Reach-1	5947	500 Year	1595	413.65	421.53	420.14	422.77	0.006495	8.94	182.12	36.81	0.65
Reach-1	5878	10 Year	795	410.66	416.46	415.02	417	0.004993	5.88	135.28	38.42	0.55
Reach-1	5878	50 Year	1335	410.66	417.93	416.26	418.65	0.006316	6.84	197.61	46.17	0.56
Reach-1	5878	100 Year	1625	410.66	418.56	416.8	419.38	0.006038	7.29	227.5	48.36	0.56
Reach-1	5878	500 Year	2465	410.66	420.43	418.08	421.42	0.004869	8.04	323.92	55.18	0.53
Reach-1	5832	10 Year	795	408.92	415.9	413.83	416.42	0.003024	5.82	142.19	33.19	0.45
Reach-1	5832	50 Year	1335	408.92	416.76	415.17	417.78	0.004938	8.24	171.79	35.74	0.59
Reach-1	5832	100 Year	1625	408.92	417.04	415.77	418.4	0.006212	9.53	182.03	36.64	0.67
Reach-1	5832	500 Year	2465	408.92	417.39	417.29	420.15	0.011813	13.63	194.87	37.73	0.93
Reach-1	5813		Inl Struct									
Reach-1	5812.5	10 Year	795	408.28	413.76	411.53	414.16	0.003017	5.04	157.8	34.41	0.41
Reach-1	5812.5	50 Year	1335	408.28	415.16	412.69	415.81	0.003652	6.46	208.26	38.11	0.47
Reach-1	5812.5	100 Year	1625	408.28	415.78	413.24	416.56	0.003858	7.1	232.58	39.87	0.49
Reach-1	5812.5	500 Year	2465	408.28	417.38	414.62	418.52	0.004213	8.58	300.31	45.13	0.53

HEC-RAS Plan: PR_FEMA_Reg 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
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	5804	10 Year	795	406.86	412.22	412.22	413.65	0.033096	9.59	82.9	29.84	1.01
Reach-1	5804	50 Year	1335	406.86	413.63	413.44	415.28	0.030586	10.32	129.64	35.86	0.94
Reach-1	5804	100 Year	1625	406.86	414.24	413.98	416.03	0.028058	10.75	152.29	37.64	0.92
Reach-1	5804	500 Year	2465	406.86	415.62	415.34	417.93	0.024989	12.23	206.86	41.35	0.91
Reach-1	5757	10 Year	795	404.07	408.88	408.15	409.91	0.013068	8.15	97.6	26.67	0.75
Reach-1	5757	50 Year	1335	404.07	410.86	409.56	412.01	0.01341	8.59	155.44	31.82	0.68
Reach-1	5757	100 Year	1625	404.07	411.58	410.21	412.86	0.013381	9.09	178.91	33.72	0.68
Reach-1	5757	500 Year	2465	404.07	412.95	411.73	414.82	0.014542	11	227.58	37.37	0.74
Reach-1	5628	10 Year	795	396.33	400.73	400.73	402.15	0.027525	9.55	83.26	29.55	1
Reach-1	5628	50 Year	1335	396.33	401.98	401.98	403.83	0.029799	10.93	122.11	32.84	1
Reach-1	5628	100 Year	1625	396.33	402.54	402.54	404.6	0.030733	11.51	141.14	34.33	1
Reach-1	5628	500 Year	2465	396.33	403.9	403.9	406.56	0.027161	13.1	190.33	37.93	0.99
Reach-1	5524	10 Year	795	385.83	390.06	389.81	391.31	0.016939	8.96	88.77	28.54	0.89
Reach-1	5524	50 Year	1335	385.83	391.99	391.14	393.23	0.015475	8.93	149.47	34.59	0.76
Reach-1	5524	100 Year	1625	385.83	392.53	391.72	393.97	0.017357	9.63	168.69	36.32	0.79
Reach-1	5524	500 Year	2465	385.83	393.44	393.12	395.76	0.021947	12.21	203.19	39.23	0.91
Reach-1	5456	10 Year	795	381.89	386.03	385.96	387.45	0.017429	9.58	83	27.81	0.98
Reach-1	5456	50 Year	1335	381.89	387.49	387.29	389.2	0.020676	10.51	127	48.4	0.94
Reach-1	5456	100 Year	1625	381.89	388.31	387.9	390.03	0.017781	10.52	154.75	54.06	0.87
Reach-1	5456	500 Year	2465	381.89	390.59	389.26	392.3	0.01046	10.56	243.04	69.67	0.71
Reach-1	5422	10 Year	795	380.77	384.1	384.1	385.43	0.018078	9.25	85.95	32.55	1
Reach-1	5422	50 Year	1335	380.77	386.37	385.3	387.32	0.010986	7.85	170.15	41.69	0.68
Reach-1	5422	100 Year	1625	380.77	387.59	385.82	388.4	0.008682	7.26	223.95	46.6	0.58
Reach-1	5422	500 Year	2465	380.77	390.63	387.14	391.32	0.003845	6.68	381.12	55.21	0.42
Reach-1	5355	10 Year	955	377.33	383.54	380.31	383.88	0.001938	4.69	203.75	32.87	0.33
Reach-1	5355	50 Year	1610	377.33	385.86	381.56	386.38	0.002049	5.75	280.05	32.93	0.35
Reach-1	5355	100 Year	1960	377.33	386.97	382.14	387.57	0.002086	6.19	316.57	32.96	0.35
Reach-1	5355	500 Year	2975	377.33	389.9	383.67	390.71	0.00215	7.2	413.21	80.22	0.36
Reach-1	5295.5		Culvert									
Reach-1	5224	10 Year	955	370.74	376.56	372.97	376.68	0.000663	2.77	346.09	71.82	0.22
Reach-1	5224	50 Year	1610	370.74	378.11	373.87	378.3	0.000772	3.57	461.32	78.77	0.24
Reach-1	5224	100 Year	1960	370.74	378.77	374.29	379.01	0.000829	3.94	512.24	81.46	0.26
Reach-1	5224	500 Year	2975	370.74	380.88	375.34	381.21	0.000806	4.6	680.53	90.06	0.26
Reach-1	5206	10 Year	955	370.74	376.2	373.99	376.54	0.002613	4.69	203.72	50.34	0.41
Reach-1	5206	50 Year	1610	370.74	377.61	375.16	378.13	0.003059	5.76	279.33	56.65	0.46
Reach-1	5206	100 Year	1960	370.74	378.21	375.69	378.81	0.003209	6.25	313.89	59.21	0.47
Reach-1	5206	500 Year	2975	370.74	380.31	377.01	381.02	0.002424	6.76	448.71	69.5	0.44
Reach-1	5145	10 Year	955	369.69	373.76	373.76	375.14	0.017511	9.43	101.25	36.64	1
Reach-1	5145	50 Year	1610	369.69	375.62	375.01	376.9	0.009798	9.07	179.63	55.86	0.79
Reach-1	5145	100 Year	1960	369.69	376.68	375.57	377.79	0.006399	8.56	260.54	93.07	0.67
Reach-1	5145	500 Year	2975	369.69	379.9	377.18	380.52	0.002128	6.83	598.14	122.69	0.42
Reach-1	5084	10 Year	955	366.9	372.77		373.28	0.004127	5.75	166.07	41.98	0.51
Reach-1	5084	50 Year	1610	366.9	375.31		375.8	0.002447	5.62	298.42	88.8	0.41
Reach-1	5084	100 Year	1960	366.9	376.55		376.99	0.001741	5.41	436.13	122.79	0.36
Reach-1	5084	500 Year	2975	366.9	379.94		380.19	0.000695	4.45	1039.48	410.8	0.24
Reach-1	5065	10 Year	955	366.96	372.63	370.28	372.99	0.002557	4.79	199.33	46.29	0.41
Reach-1	5065	50 Year	1610	366.96	375.24	371.5	375.61	0.001571	4.86	333.99	58.25	0.34
Reach-1	5065	100 Year	1960	366.96	376.48	372.07	376.86	0.001273	4.93	407.06	93.22	0.31
Reach-1	5065	500 Year	2975	366.96	379.92	373.45	380.13	0.000541	4.11	1127.54	446.89	0.22
Reach-1	5042.5		Culvert									
Reach-1	5021	10 Year	955	365.16	370.25	368.22	370.62	0.002887	4.91	194.79	49.25	0.43
Reach-1	5021	50 Year	1610	365.16	371.72	369.4	372.28	0.002875	6.02	272.06	55.98	0.45
Reach-1	5021	100 Year	1960	365.16	372.8	369.91	373.36	0.002286	6.05	333.45	120.83	0.42
Reach-1	5021	500 Year	2975	365.16	373.97	371.18	374.87	0.002976	7.7	400.47	169.67	0.49

BEAVER POND BROOK - PROPOSED CONDITION, FEMA REGULATORY (W/ BACKWATER)

HEC-RAS 4.1.0 - "Six XS Bridge" Output

HEC-RAS Plan: PR_FEMA_Reg River: Beaver Pond Brk Reach: Reach-1												
Reach	River Sta	Profile	E.G. Elev	W.S. Elev	Crit W.S.	Frctn Loss	C & E Loss	Top Width	Q Left	Q Channel	Q Right	Vel Chnl
			(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft/s)
Reach-1	8583	10 Year	490.81	490.8		0.01	0.11	201.3	65.64	92.21	47.15	0.74
Reach-1	8583	50 Year	491.67	491.67		0.01	0.18	229.56	122	133.71	84.34	0.83
Reach-1	8583	100 Year	491.57	491.56		0.02	0.1	225.74	145.6	163.38	101.05	1.04
Reach-1	8583	500 Year	492.14	492.13		0.02	0.26	247.13	229.2	229.94	155.88	1.27
Reach-1	8573	10 Year	490.69	490.32	489.67			63.58		205		4.86
Reach-1	8573	50 Year	491.48	490.88	490.34			104.5	0.29	339.58	0.13	6.24
Reach-1	8573	100 Year	491.46	491.13	490.61			110.2	0.8	298.64	110.56	4.98
Reach-1	8573	500 Year	491.85	490.95	490.95	0.11	0.25	109.45	0.59	458.12	156.29	8.17
Reach-1	8565.5 BR U	10 Year	490.3	489.83	489.8			80.22	18.21	186.79		5.74
Reach-1	8565.5 BR U	50 Year	490.86	490.35	490.24			86.21	71.66	268.18	0.16	6.37
Reach-1	8565.5 BR U	100 Year	491.1	490.56	490.43			88.69	100.4	308.95	0.65	6.73
Reach-1	8565.5 BR U	500 Year	491.33	490.92	490.92	0.1	0.12	93.08	132.2	317.89	164.89	6.04
Reach-1	8565.5 BR D	10 Year	487.63	487.16	487.16			52.05	2.9	199	3.09	5.52
Reach-1	8565.5 BR D	50 Year	488.17	487.55	487.55			67.75	8.93	319.44	11.63	6.45
Reach-1	8565.5 BR D	100 Year	488.43	487.71	487.71			74.41	12.22	381.31	16.47	6.93
Reach-1	8565.5 BR D	500 Year	489.4	489.24	488.1	0.05	0.04	89.49	192.5	389.82	32.69	3.6
Reach-1	8554	10 Year	486.82	486.29	485.95	0.44	0.13	22.38	2.75	200.92	1.33	5.93
Reach-1	8554	50 Year	487.67	486.91	486.67	0.54	0.14	27.47	14.68	318.21	7.11	7.21
Reach-1	8554	100 Year	488.06	487.28	487	0.44	0.16	32.53	26.43	370.81	12.76	7.38
Reach-1	8554	500 Year	489.31	489	487.73	0.14	0.03	84.82	157.5	410.93	46.62	5.23
Reach-1	8536	10 Year	486.26	485.98		2.16	0.07	21.81		205		4.22
Reach-1	8536	50 Year	486.99	486.52		1.28	0.01	32.35	1.91	338.05	0.04	5.56
Reach-1	8536	100 Year	487.46	487		0.9	0.02	42.71	13.55	395.95	0.49	5.49
Reach-1	8536	500 Year	489.14	488.89		0.32	0.01	62.56	102.4	504.52	8.1	4.35
Reach-1	7977	10 Year	461.38	461.14	460.01	0.35	0.02	22.59		205		3.96
Reach-1	7977	50 Year	462.85	462.62	460.7	0.3	0	28.18	0.51	339.12	0.37	3.84
Reach-1	7977	100 Year	463.92	463.73	460.99	0.19	0	32.26	3.41	404.01	2.58	3.49
Reach-1	7977	500 Year	465.51	465.3	461.76	0.18	0.01	38.04	14.45	589.39	11.16	3.8
Reach-1	7937	10 Year	461.01	460.84	458.63			26.97		305		3.28
Reach-1	7937	50 Year	462.56	462.33	459.44			30.77	0.02	514.85	0.13	3.8
Reach-1	7937	100 Year	463.73	463.51	459.82			33.68	0.62	622.83	1.56	3.66
Reach-1	7937	500 Year	465.33	465.04	460.73			111.41	5.59	926.68	7.74	4.31
Reach-1	7911.5 BR U	10 Year	460.48	460.15	458.01			14.42		305		4.65
Reach-1	7911.5 BR U	50 Year	462.55	460.3	458.99					515		7.6
Reach-1	7911.5 BR U	100 Year	463.72	460.3	459.46					625		9.22
Reach-1	7911.5 BR U	500 Year	465.33	465.04	465.52			106.92		728.55	209.74	10.56
Reach-1	7911.5 BR D	10 Year	460.22	459.84	457.98			14.42		305		4.96
Reach-1	7911.5 BR D	50 Year	461.41	460.3	459					515		7.56
Reach-1	7911.5 BR D	100 Year	461.96	460.3	459.45					625		9.18
Reach-1	7911.5 BR D	500 Year	465.33	465.04	465.32			80.65		728.55	209.74	10.59
Reach-1	7885	10 Year	460.04	459.88	458.22	0.55	0.01	34.65		305		3.21
Reach-1	7885	50 Year	461.41	461.22	458.9	0.38	0.02	48.98	1.93	506.33	6.75	3.55
Reach-1	7885	100 Year	461.96	461.75	459.2	0.35	0.03	51.62	4.6	607.38	13.02	3.77
Reach-1	7885	500 Year	462.98	462.67	459.99	0.4	0.05	56.24	14.14	894.79	31.07	4.61
Reach-1	7826	10 Year	459.48	459.29	457.54	0.09	0.05	44.35		305		3.47
Reach-1	7826	50 Year	461.01	460.85	458.36	0.08	0.04	67.97	2.34	469.24	43.42	3.32
Reach-1	7826	100 Year	461.58	461.42	458.72	0.08	0.05	71.64	8.26	549.19	67.56	3.4
Reach-1	7826	500 Year	462.53	462.31	459.59	0.08	0.06	78.58	29.24	783.71	127.05	4.06
Reach-1	7711	10 Year	459.31	459.3	456.01	0.01	0.08	233.33	8.55	257.35	39.1	0.8
Reach-1	7711	50 Year	460.87	460.86	456.37	0.01	0.13	250.05	15.8	409.59	89.61	0.92
Reach-1	7711	100 Year	461.45	461.43	456.54	0.01	0.17	265.96	19.53	489.42	116.05	1
Reach-1	7711	500 Year	462.38	462.37	456.92	0.01	0.39	294.16	334.5	482.85	122.7	0.86
Reach-1	7698	10 Year	459.22	458.96	456.16			27.56	8.16	406.82	15.01	4.2
Reach-1	7698	50 Year	460.74	460.3	457.18			163.8	18.09	663.64	33.27	5.49

HEC-RAS Plan: PR_FEMA_Reg River: Beaver Pond Brk Reach: Reach-1												
Reach	River Sta	Profile	E.G. Elev	W.S. Elev	Crit W.S.	Frctn Loss	C & E Loss	Top Width	Q Left	Q Channel	Q Right	Vel Chnl
			(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft/s)
Reach-1	7698	100 Year	461.28	460.7	457.66			271.36	23.41	803.7	42.88	6.28
Reach-1	7698	500 Year	461.99	460.66	458.97			256.48	35.23	1215.23	64.54	9.54
Reach-1	7689.5 BR U	10 Year	459.22	458.5	456.29					430		5.15
Reach-1	7689.5 BR U	50 Year	460.73	458.5	457.39					715		8.56
Reach-1	7689.5 BR U	100 Year	461.27	460.7	457.92					746.4	118.98	8.93
Reach-1	7689.5 BR U	500 Year	461.98	460.66	462.19				28.7	841.55	432.3	10.07
Reach-1	7689.5 BR D	10 Year	458.54	458.22	456.12			16.98		430		5.27
Reach-1	7689.5 BR D	50 Year	459.67	458.5	457.21					715		8.28
Reach-1	7689.5 BR D	100 Year	461.15	460.7	457.75			113.7		746.4	118.98	8.64
Reach-1	7689.5 BR D	500 Year	461.98	460.66	461.52			95.15	28.7	841.55	432.3	9.75
Reach-1	7681	10 Year	458.54	458.22	455.97	0.11	0.02	29.21	19.25	402.53	8.21	4.66
Reach-1	7681	50 Year	459.67	459.04	456.95	0.16	0.01	54.14	34.08	665.66	15.27	6.58
Reach-1	7681	100 Year	460.24	459.42	457.44	0.18	0.04	95.1	42.43	808.23	19.34	7.48
Reach-1	7681	500 Year	461.36	459.62	458.64	0.19	0.66	135.4	64.82	1220.4	29.78	10.93
Reach-1	7666	10 Year	458.41	458.03	456.51	1.58	0.08	51.8	7.6	394.86	27.54	5.16
Reach-1	7666	50 Year	459.5	458.88	457.66	1.65	0.19	171.27	19.46	622.95	72.59	6.74
Reach-1	7666	100 Year	460.02	459.28	458.07	1.59	0.26	198.18	27.58	742	100.42	7.44
Reach-1	7666	500 Year	460.51	460.1	459.1	0.96	0.1	244.95	34.7	711.08	569.21	6.18

BEAVER POND BROOK - PROPOSED CONDITION, FEMA REGULATORY (W/ BACKWATER)

HEC-RAS 4.1.0 - "Culvert Only" Output

HEC-RAS Plan: PR_FEMA_Reg 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
			(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(ft)	(ft/s)	(ft/s)
Reach-1	8435.5 Culvert #1	10 Year	483.93	483.08	483.93	483.87	493.14	205		2.69	9.38	11.56
Reach-1	8435.5 Culvert #1	50 Year	485.71	485.27	485.71	485.62	493.14	340		4.24	11.1	13.27
Reach-1	8435.5 Culvert #1	100 Year	486.53	486.16	486.53	486.43	493.14	410		4.85	11.82	13.94
Reach-1	8435.5 Culvert #1	500 Year	488.82	488.6	488.82	488.59	493.14	615		6.53	13.53	15.5

Culvert Output

File Type Options Help

River: Beaver Pond Brk Profile: 100 Year Culv Group: Culvert #1

Reach Reach-1 RS: 8435.5 Plan: PR_FEMA_Reg

Plan: PR_FEMA_Reg Beaver Pond Brk Reach-1 RS: 8435.5 Culv Group: Culvert #1 Profile: 100 Year

Q Culv Group (cfs)	410.00	Culv Full Len (ft)	
# Barrels	1	Culv Vel US (ft/s)	11.82
Q Barrel (cfs)	410.00	Culv Vel DS (ft/s)	13.94
E.G. US. (ft)	486.53	Culv Inv El Up (ft)	479.50
W.S. US. (ft)	486.16	Culv Inv El Dn (ft)	478.72
E.G. DS (ft)	482.50	Culv Frctn Ls (ft)	0.58
W.S. DS (ft)	481.31	Culv Exit Loss (ft)	2.92
Delta EG (ft)	4.04	Culv Entr Loss (ft)	0.53
Delta WS (ft)	4.85	Q Weir (cfs)	
E.G. IC (ft)	486.53	Weir Sta Lft (ft)	
E.G. OC (ft)	486.43	Weir Sta Rgt (ft)	
Culvert Control	Inlet	Weir Submerg	
Culv WS Inlet (ft)	483.83	Weir Max Depth (ft)	
Culv WS Outlet (ft)	482.40	Weir Avg Depth (ft)	
Culv Nml Depth (ft)	3.46	Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	4.34	Min El Weir Flow (ft)	493.14

Errors, Warnings and Notes

Warning:	Since the culvert has supercritical flow, the program should be run in mixed flow in order to check if the cross section downstream of the culvert has supercritical flow.
Note:	The flow in the culvert is entirely supercritical.

Select River Station

HEC-RAS Plan: PR_FEMA_Reg 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
			(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(ft)	(ft/s)	(ft/s)
Reach-1	8332.5 #2-East Cell	10 Year	472.94	472.74	472.53	472.9	495.12	100.37		2.72	7.73	13.15
Reach-1	8332.5 #1-West Cell	10 Year	472.94	472.74	472.6	472.97	495.12	104.63		2.72	7.84	13.43
Reach-1	8332.5 #2-East Cell	50 Year	474.26	474.05	473.76	474.21	495.12	167.15		3.21	9.16	14.9
Reach-1	8332.5 #1-West Cell	50 Year	474.26	474.05	473.84	474.3	495.12	172.85		3.21	9.26	15.17
Reach-1	8332.5 #2-East Cell	100 Year	474.87	474.66	474.34	474.83	495.12	201.93		3.5	9.76	15.57
Reach-1	8332.5 #1-West Cell	100 Year	474.87	474.66	474.42	474.91	495.12	208.07		3.5	9.85	15.83
Reach-1	8332.5 #2-East Cell	500 Year	476.49	476.29	475.91	476.48	495.12	305.86		4.29	11.21	17.09
Reach-1	8332.5 #1-West Cell	500 Year	476.49	476.29	475.94	476.51	495.12	309.14		4.29	11.25	17.29

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_FEMA_Reg

Plan: PR_FEMA_Reg Beaver Pond Brk Reach-1 RS: 8332.5 Culv Group: #1-West Cell Profile: 100 Year

Q Culv Group (cfs)	208.07	Culv Full Len (ft)	
# Barrels	1	Culv Vel US (ft/s)	9.85
Q Barrel (cfs)	208.07	Culv Vel DS (ft/s)	15.83
E.G. US. (ft)	474.87	Culv Inv El Up (ft)	469.64
W.S. US. (ft)	474.66	Culv Inv El Dn (ft)	467.22
E.G. DS (ft)	471.49	Culv Frctn Ls (ft)	1.17
W.S. DS (ft)	471.16	Culv Exit Loss (ft)	1.50
Delta EG (ft)	3.38	Culv Entr Loss (ft)	0.75
Delta WS (ft)	3.50	Q Weir (cfs)	
E.G. IC (ft)	474.42	Weir Sta Lft (ft)	
E.G. OC (ft)	474.91	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	472.65	Weir Max Depth (ft)	
Culv WS Outlet (ft)	469.10	Weir Avg Depth (ft)	
Culv Nml Depth (ft)	1.63	Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	3.02	Min El Weir Flow (ft)	495.12

Errors, Warnings and Notes

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_FEMA_Reg

Plan: PR_FEMA_Reg Beaver Pond Brk Reach-1 RS: 8332.5 Culv Group: #2-East Cell Profile: 100 Year

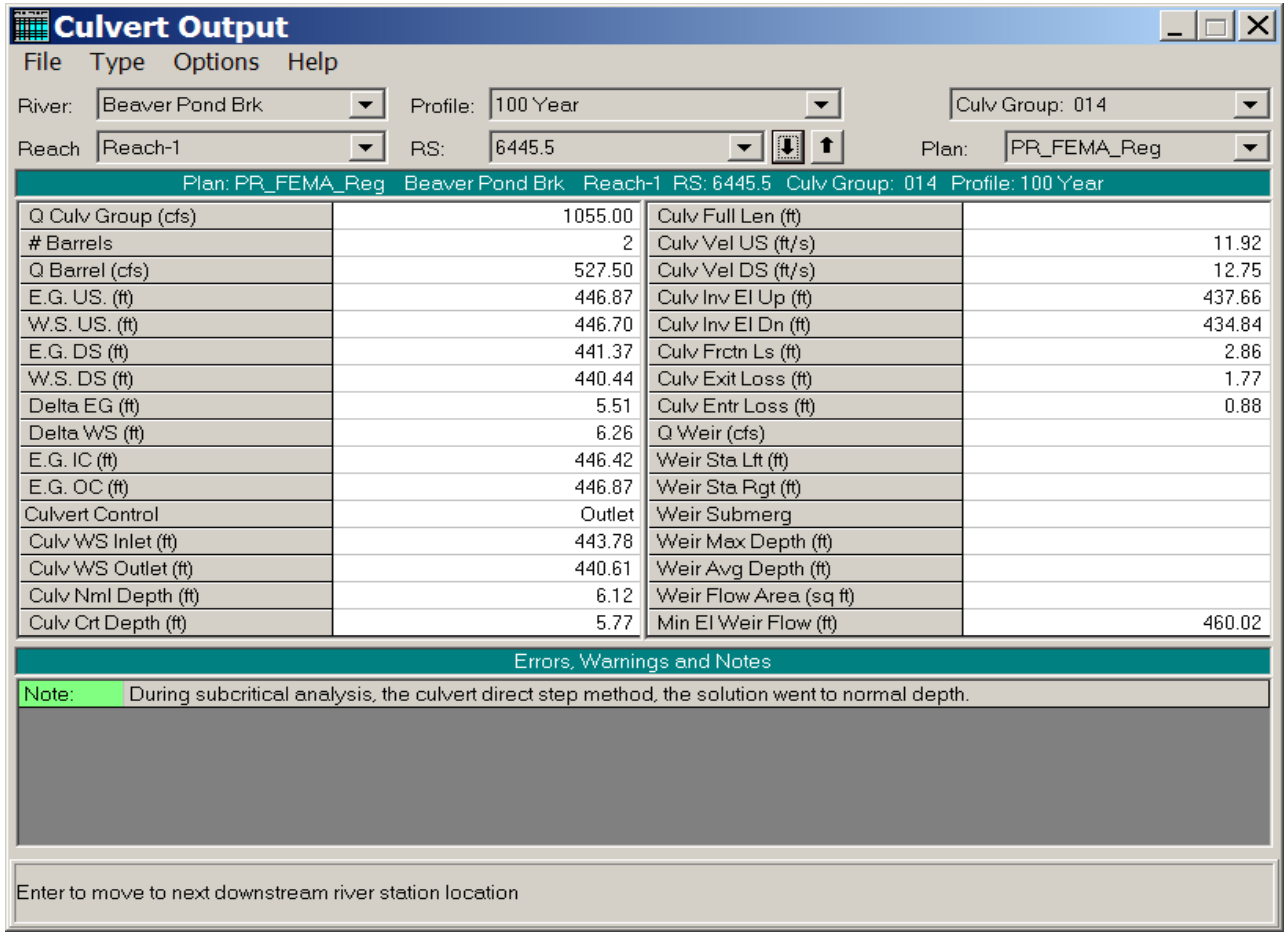
Q Culv Group (cfs)	201.93	Culv Full Len (ft)	
# Barrels	1	Culv Vel US (ft/s)	9.76
Q Barrel (cfs)	201.93	Culv Vel DS (ft/s)	15.57
E.G. US. (ft)	474.87	Culv Inv El Up (ft)	469.65
W.S. US. (ft)	474.66	Culv Inv El Dn (ft)	467.32
E.G. DS (ft)	471.49	Culv Frctn Ls (ft)	1.15
W.S. DS (ft)	471.16	Culv Exit Loss (ft)	1.45
Delta EG (ft)	3.38	Culv Entr Loss (ft)	0.74
Delta WS (ft)	3.50	Q Weir (cfs)	
E.G. IC (ft)	474.34	Weir Sta Lft (ft)	
E.G. OC (ft)	474.83	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	472.61	Weir Max Depth (ft)	
Culv WS Outlet (ft)	469.18	Weir Avg Depth (ft)	
Culv Nml Depth (ft)	1.62	Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	2.96	Min El Weir Flow (ft)	495.12

Errors, Warnings and Notes

Note: The flow in the culvert is entirely supercritical.

Enter to move to next downstream river station location

HEC-RAS Plan: PR_FEMA_Reg 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
			(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(ft)	(ft/s)	(ft/s)
Reach-1	6445.5 014	10 Year	443.69	443.55	443.26	443.69	460.02	515		5.55	9.95	10.04
Reach-1	6445.5 014	50 Year	445.84	445.68	445.38	445.84	460.02	865		6.2	11.39	11.93
Reach-1	6445.5 014	100 Year	446.87	446.7	446.42	446.87	460.02	1055		6.26	11.92	12.75
Reach-1	6445.5 014	500 Year	449.54	449.34	449.16	449.54	460.02	1595		6.31	12.99	13.02



HEC-RAS Plan: PR_FEMA_Reg 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
			(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(ft)	(ft/s)	(ft/s)
Reach-1	6349.5 06622	10 Year	437.59	436.94	437.16	437.59	451.76	515		6.13	9.95	10.04
Reach-1	6349.5 06622	50 Year	439.73	439.27	439.28	439.73	451.76	865		7.57	11.39	11.93
Reach-1	6349.5 06622	100 Year	440.77	440.34	440.31	440.77	451.76	1055		8.2	11.92	12.75
Reach-1	6349.5 06622	500 Year	443.44	443.06	443.06	443.44	451.76	1595		9.9	12.99	14.63

Culvert Output

File Type Options Help

River: Beaver Pond Brk Profile: 100 Year Culv Group: 06622

Reach Reach-1 RS: 6349.5 Plan: PR_FEMA_Reg

Plan: PR_FEMA_Reg Beaver Pond Brk Reach-1 RS: 6349.5 Culv Group: 06622 Profile: 100 Year

Q Culv Group (cfs)	1055.00	Culv Full Len (ft)	
# Barrels	2	Culv Vel US (ft/s)	11.92
Q Barrel (cfs)	527.50	Culv Vel DS (ft/s)	12.75
E.G. US. (ft)	440.77	Culv Inv El Up (ft)	431.56
W.S. US. (ft)	440.34	Culv Inv El Dn (ft)	428.41
E.G. DS (ft)	433.67	Culv Frctn Ls (ft)	3.18
W.S. DS (ft)	432.14	Culv Exit Loss (ft)	3.03
Delta EG (ft)	7.10	Culv Entr Loss (ft)	0.88
Delta WS (ft)	8.20	Q Weir (cfs)	
E.G. IC (ft)	440.31	Weir Sta Lft (ft)	
E.G. OC (ft)	440.77	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	437.68	Weir Max Depth (ft)	
Culv WS Outlet (ft)	434.18	Weir Avg Depth (ft)	
Culv Nml Depth (ft)	6.12	Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	5.77	Min El Weir Flow (ft)	451.76

Errors, Warnings and Notes

Note: During subcritical analysis, the culvert direct step method, the solution went to normal depth.

Enter to move to next downstream river station location

HEC-RAS Plan: PR_FEMA_Reg 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
			(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(ft)	(ft/s)	(ft/s)
Reach-1	5996.5 02537 West	10 Year	423.47	423.31	422.78	423.49	431.77	238.45		5.52	6.48	9.86
Reach-1	5996.5 02537 East	10 Year	423.47	423.31	423.27	423.44	431.77	276.55		5.52	10.36	12.45
Reach-1	5996.5 02537 West	50 Year	425.68	425.51	424.64	425.64	431.77	394.1		6.11	7.64	11.66
Reach-1	5996.5 02537 East	50 Year	425.68	425.51	425.46	425.72	431.77	470.9		6.11	12.37	14.33
Reach-1	5996.5 02537 West	100 Year	426.8	426.62	425.55	426.79	431.77	478.76		6.64	8.21	12.44
Reach-1	5996.5 02537 East	100 Year	426.8	426.62	426.54	426.81	431.77	576.24		6.64	13.23	15.08
Reach-1	5996.5 02537 West	500 Year	430.73	430.57	427.18	430.74	431.77	642.52		9.04	11.02	13.72
Reach-1	5996.5 02537 East	500 Year	430.73	430.57	430.8	430.72	431.77	952.48		9.04	16.34	16.34

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_FEMA_Reg

Plan: PR_FEMA_Reg Beaver Pond Brk Reach-1 RS: 5996.5 Culv Group: 02537 West Profile: 100 Year

Q Culv Group (cfs)	478.76	Culv Full Len (ft)	18.68
# Barrels	1	Culv Vel US (ft/s)	8.21
Q Barrel (cfs)	478.76	Culv Vel DS (ft/s)	12.44
E.G. US. (ft)	426.80	Culv Inv El Up (ft)	417.39
W.S. US. (ft)	426.62	Culv Inv El Dn (ft)	416.27
E.G. DS (ft)	421.01	Culv Frctn Ls (ft)	2.39
W.S. DS (ft)	419.99	Culv Exit Loss (ft)	3.20
Delta EG (ft)	5.79	Culv Entr Loss (ft)	0.21
Delta WS (ft)	6.64	Q Weir (cfs)	
E.G. IC (ft)	425.55	Weir Sta Lft (ft)	
E.G. OC (ft)	426.79	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	425.39	Weir Max Depth (ft)	
Culv WS Outlet (ft)	421.80	Weir Avg Depth (ft)	
Culv Nml Depth (ft)	8.01	Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	5.53	Min El Weir Flow (ft)	431.77

Errors, Warnings and Notes

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.

Select opening

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_FEMA_Reg

Plan: PR_FEMA_Reg Beaver Pond Brk Reach-1 RS: 5996.5 Culv Group: 02537 East Profile: 100 Year

Q Culv Group (cfs)	576.24	Culv Full Len (ft)	
# Barrels	1	Culv Vel US (ft/s)	13.23
Q Barrel (cfs)	576.24	Culv Vel DS (ft/s)	15.08
E.G. US. (ft)	426.80	Culv Inv El Up (ft)	417.39
W.S. US. (ft)	426.62	Culv Inv El Dn (ft)	416.27
E.G. DS (ft)	421.01	Culv Frctn Ls (ft)	0.97
W.S. DS (ft)	419.99	Culv Exit Loss (ft)	4.29
Delta EG (ft)	5.79	Culv Entr Loss (ft)	0.54
Delta WS (ft)	6.64	Q Weir (cfs)	
E.G. IC (ft)	426.54	Weir Sta Lft (ft)	
E.G. OC (ft)	426.81	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	423.55	Weir Max Depth (ft)	
Culv WS Outlet (ft)	421.77	Weir Avg Depth (ft)	
Culv Nml Depth (ft)	5.38	Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	6.16	Min El Weir Flow (ft)	431.77

Errors, Warnings and Notes

Note: The flow in the culvert is entirely supercritical.

Select opening

HEC-RAS Plan: PR_FEMA_Reg 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
			(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(ft)	(ft/s)	(ft/s)
Reach-1	5295.5 01227	10 Year	383.88	383.54	383.69	383.88	394.7	955		6.99	10.91	8.16
Reach-1	5295.5 01227	50 Year	386.38	385.86	386.12	386.38	394.7	1610		7.76	12.57	10.54
Reach-1	5295.5 01227	100 Year	387.57	386.97	387.28	387.57	394.7	1960		8.2	13.21	11.67
Reach-1	5295.5 01227	500 Year	390.71	389.9	390.33	390.71	394.7	2975		9.02	14.5	13.74

Culvert Output

File Type Options Help

River: Beaver Pond Brk Profile: 100 Year Culv Group: 01227

Reach Reach-1 RS: 5295.5 Plan: PR_FEMA_Reg

Plan: PR_FEMA_Reg Beaver Pond Brk Reach-1 RS: 5295.5 Culv Group: 01227 Profile: 100 Year

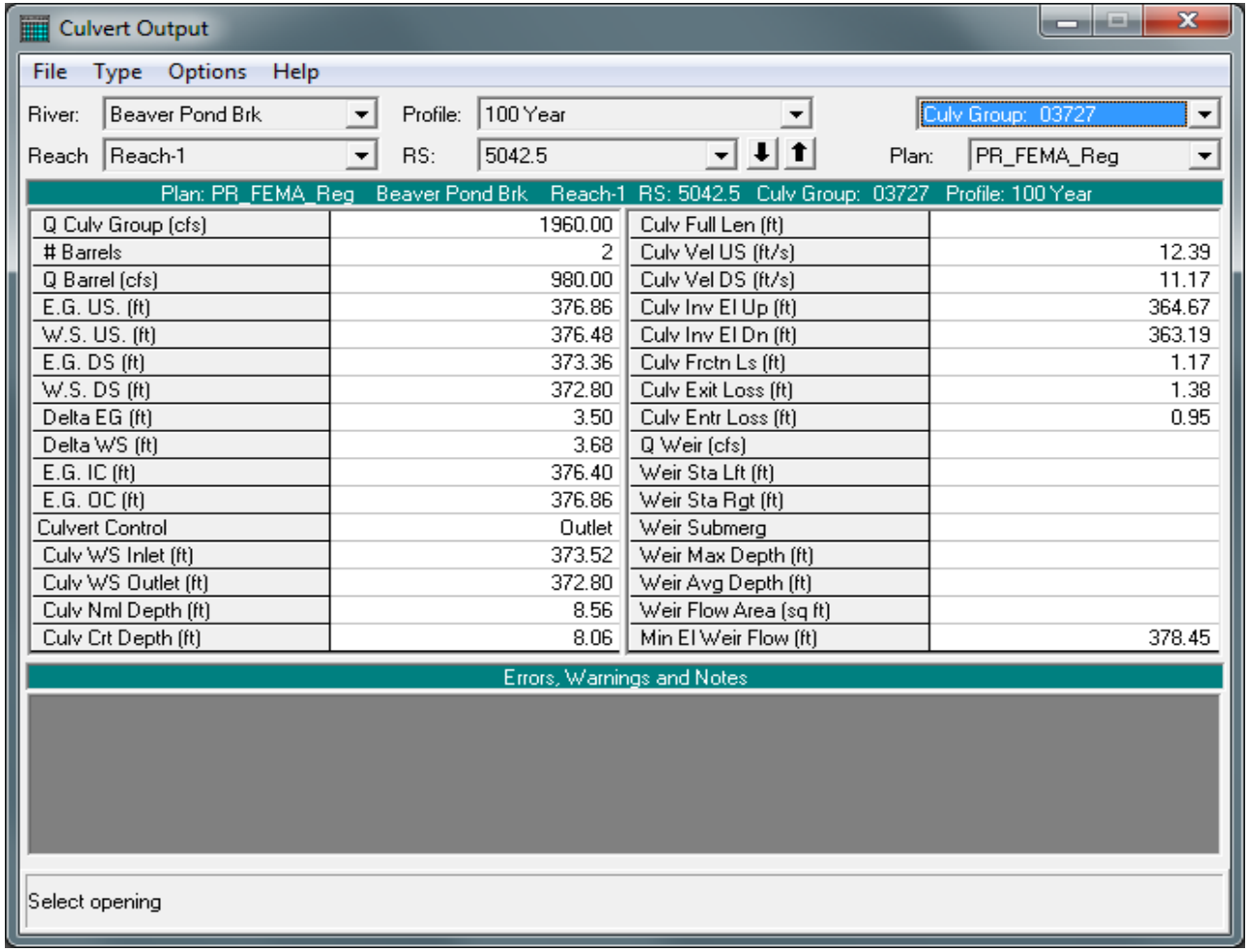
Q Culv Group (cfs)	1960.00	Culv Full Len (ft)	
# Barrels	2	Culv Vel US (ft/s)	13.21
Q Barrel (cfs)	980.00	Culv Vel DS (ft/s)	11.67
E.G. US. (ft)	387.57	Culv Inv El Up (ft)	377.13
W.S. US. (ft)	386.97	Culv Inv El Dn (ft)	370.74
E.G. DS (ft)	379.01	Culv Frctn Ls (ft)	6.14
W.S. DS (ft)	378.77	Culv Exit Loss (ft)	1.87
Delta EG (ft)	8.56	Culv Entr Loss (ft)	0.54
Delta WS (ft)	8.20	Q Weir (cfs)	
E.G. IC (ft)	387.28	Weir Sta Lft (ft)	
E.G. OC (ft)	387.57	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	384.32	Weir Max Depth (ft)	
Culv WS Outlet (ft)	378.77	Weir Avg Depth (ft)	
Culv Nml Depth (ft)	7.18	Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	6.81	Min El Weir Flow (ft)	394.70

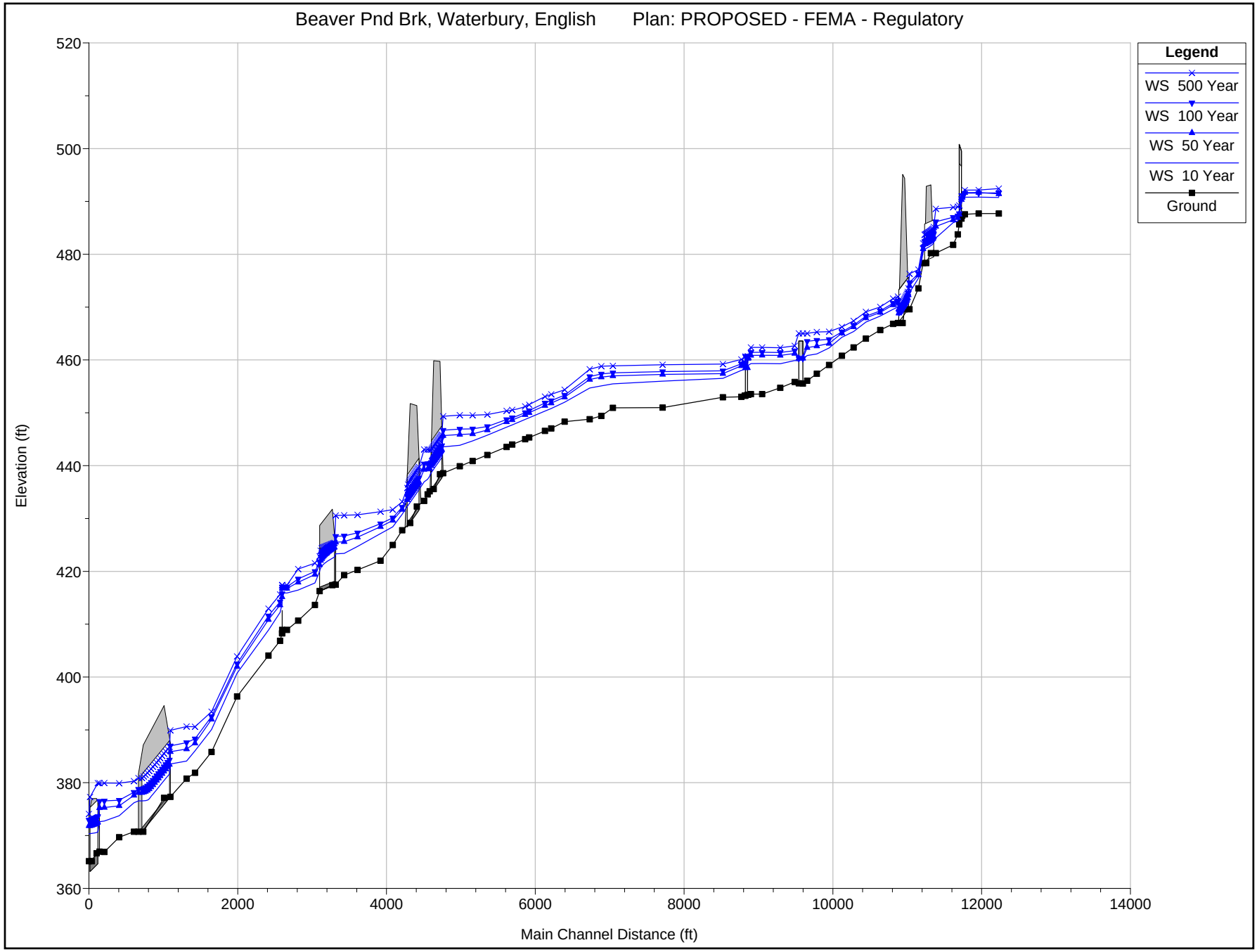
Errors, Warnings and Notes

Note: During subcritical analysis, the culvert direct step method, the solution went to normal depth.

Enter to move to next downstream river station location

HEC-RAS Plan: PR_FEMA_Reg 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
			(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(ft)	(ft/s)	(ft/s)
Reach-1	5042.5 03727	10 Year	372.99	372.63	372.56	372.99	378.45	955		2.38	10.5	8.17
Reach-1	5042.5 03727	50 Year	375.61	375.24	375.15	375.61	378.45	1610		3.52	12.06	10.68
Reach-1	5042.5 03727	100 Year	376.86	376.48	376.4	376.86	378.45	1960		3.68	12.39	11.17
Reach-1	5042.5 03727	500 Year	380.12	379.92	380.12	379.89	378.45	2857.84	117.16	5.95	14.08	14.12




Beaver Pnd Brk, Waterbury, English
Plan: PROPOSED - FEMA - Regulatory
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Elevation (ft)
Main Channel Distance (ft)
520
500
480
460
440
420
400
380
360
0
2000
4000
6000
8000
10000
12000
14000

BEAVER POND BROOK - PROPOSED CONDITION, FEMA FLOODWAY (W/O BACKWATER)
HEC-RAS 4.1.0 - "Standard Table 1" Output

HEC-RAS Plan: PR_FEMA_Fldw 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
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	8722	100 Year	410	487.7	491.62	491.62	492.65	0.015376	8.71	55.12	31.64	0.93
Reach-1	8722	Floodway	410	487.7	492.08		492.71	0.007829	6.9	69.76	31.63	0.68
Reach-1	8722	10 Year	205	487.7	490.76	490.76	491.5	0.016924	7.1	31.43	23.55	0.92
Reach-1	8722	10 Yr Fldwy	205	487.7	490.76	490.76	491.5	0.016863	7.09	31.48	23.56	0.91
Reach-1	8640	100 Year	410	487.7	491.59		491.61	0.000236	1.28	406.63	182.83	0.12
Reach-1	8640	Floodway	410	487.7	492.29		492.3	0.000119	0.94	483.78	157	0.08
Reach-1	8640	10 Year	205	487.7	490.82		490.83	0.000213	1.02	269.29	174.08	0.11
Reach-1	8640	10 Yr Fldwy	205	487.7	490.91		490.92	0.000202	0.96	267.71	157	0.1
Reach-1	8583	100 Year	410	487.57	491.56		491.57	0.00014	1.04	530.52	225.74	0.1
Reach-1	8583	Floodway	410	487.57	492.27		492.28	0.000086	0.92	524.51	143.9	0.08
Reach-1	8583	10 Year	205	487.57	490.8		490.81	0.000097	0.74	365.37	201.3	0.08
Reach-1	8583	10 Yr Fldwy	205	487.57	490.89		490.89	0.0001	0.77	325.7	143.9	0.08
Reach-1	8573	100 Year	410	487.3	491.13	490.61	491.46	0.005312	4.98	92.75	110.2	0.53
Reach-1	8573	Floodway	410	487.3	491.59	490.61	492.11	0.005881	5.81	71.72	23.71	0.57
Reach-1	8573	10 Year	205	487.3	490.32	489.67	490.69	0.007793	4.86	42.16	63.58	0.61
Reach-1	8573	10 Yr Fldwy	205	487.3	490.47	489.67	490.79	0.006252	4.5	45.54	22.05	0.55
Reach-1	8565.5		Bridge									
Reach-1	8554	100 Year	410	483.76	487.28	487	488.06	0.009678	7.38	62.31	32.53	0.74
Reach-1	8554	Floodway	410	483.76	487.29	486.9	488.27	0.011305	8	52.9	18	0.81
Reach-1	8554	10 Year	205	483.76	486.29	485.95	486.82	0.010543	5.93	36.04	22.38	0.73
Reach-1	8554	10 Yr Fldwy	205	483.76	486.28	485.94	486.84	0.010824	6	34.8	18	0.74
Reach-1	8536	100 Year	410	481.79	487		487.46	0.005473	5.49	79.92	42.71	0.55
Reach-1	8536	Floodway	410	481.79	487.02		487.52	0.006216	5.65	72.55	23.21	0.56
Reach-1	8536	10 Year	205	481.79	485.98		486.26	0.005046	4.22	48.54	21.81	0.5
Reach-1	8536	10 Yr Fldwy	205	481.79	485.98		486.26	0.005037	4.22	48.57	21.82	0.5
Reach-1	8464	100 Year	410	480.22	486.16	484.25	486.53	0.002859	5.04	88.7	27.58	0.41
Reach-1	8464	Floodway	410	480.22	486.16	484.25	486.53	0.002862	5.04	87.73	24.5	0.41
Reach-1	8464	10 Year	205	480.22	483.08	483.08	484.03	0.022153	7.81	26.26	13.84	1
Reach-1	8464	10 Yr Fldwy	205	480.22	483.08	483.08	484.03	0.022214	7.81	26.23	13.84	1
Reach-1	8435.5		Culvert									
Reach-1	8412	100 Year	410	478.35	481.31	481.31	482.5	0.020018	8.74	46.96	20.3	1
Reach-1	8412	Floodway	410	478.35	481.32	481.32	482.5	0.019797	8.71	47.12	20.3	1
Reach-1	8412	10 Year	205	478.35	480.39	480.39	481.16	0.021692	7.05	29.08	18.6	0.99
Reach-1	8412	10 Yr Fldwy	205	478.35	480.39	480.39	481.16	0.021624	7.04	29.11	18.6	0.99
Reach-1	8393	100 Year	410	473.56	476.36	476.36	477.5	0.01909	8.61	48.09	22.18	0.99
Reach-1	8393	Floodway	410	473.56	476.37	476.37	477.5	0.018768	8.56	48.35	22.17	0.98
Reach-1	8393	10 Year	205	473.56	475.45	475.45	476.21	0.022588	6.99	29.32	19.62	1.01
Reach-1	8393	10 Yr Fldwy	205	473.56	475.46	475.46	476.21	0.022447	6.98	29.38	19.63	1.01
Reach-1	8356	100 Year	410	469.59	474.66	472.5	474.86	0.001452	3.79	120.88	36.56	0.32
Reach-1	8356	Floodway	410	469.59	474.66	472.5	474.86	0.001452	3.79	120.88	35.2	0.32
Reach-1	8356	10 Year	205	469.59	472.74	471.67	472.94	0.002896	3.67	59.52	28.15	0.41
Reach-1	8356	10 Yr Fldwy	205	469.59	472.74	471.67	472.94	0.002896	3.67	59.52	28.15	0.41
Reach-1	8332.5		Culvert									
Reach-1	8309	100 Year	410	467	471.16	469.73	471.49	0.002892	4.8	91.26	42.8	0.44
Reach-1	8309	Floodway	410	467	471.16	469.73	471.49	0.002892	4.8	91.26	30.45	0.44
Reach-1	8309	10 Year	205	467	470.02	468.97	470.21	0.002691	3.63	60.24	35.61	0.4
Reach-1	8309	10 Yr Fldwy	205	467	470.02	468.97	470.21	0.002691	3.63	60.24	29.29	0.4
Reach-1	8289	100 Year	410	466.83	470.75	469.78	471.19	0.005926	5.36	76.61	44.18	0.58
Reach-1	8289	Floodway	410	466.83	470.75	469.8	471.19	0.005926	5.36	76.61	29.45	0.58
Reach-1	8289	10 Year	205	466.83	469.6	468.91	469.91	0.006378	4.46	45.98	23.89	0.57
Reach-1	8289	10 Yr Fldwy	205	466.83	469.6	468.92	469.91	0.006378	4.46	45.98	23.89	0.57
Reach-1	8237	100 Year	410	465.68	469.3	468.53	469.93	0.00922	6.43	67.6	26.15	0.64
Reach-1	8237	Floodway	410	465.68	469.3	468.53	469.93	0.00922	6.43	67.6	26.14	0.64
Reach-1	8237	10 Year	205	465.68	468.31	467.61	468.66	0.008344	4.75	43.69	22.1	0.57
Reach-1	8237	10 Yr Fldwy	205	465.68	468.31	467.61	468.66	0.008344	4.75	43.69	22.1	0.57

HEC-RAS Plan: PR_FEMA_Fldw 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
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	8178	100 Year	410	464.04	468.26	467.15	468.66	0.004432	5.08	82.68	31.2	0.51
Reach-1	8178	Floodway	410	464.04	468.26	467.15	468.66	0.004437	5.08	82.65	31.19	0.51
Reach-1	8178	10 Year	205	464.04	467.15	466.21	467.41	0.004907	4.02	51.05	25.47	0.5
Reach-1	8178	10 Yr Fldwy	205	464.04	467.15	466.21	467.4	0.004913	4.02	51.02	25.47	0.5
Reach-1	8128	100 Year	410	462.37	466.59	466.24	467.4	0.014799	7.22	57.06	24.41	0.8
Reach-1	8128	Floodway	410	462.37	466.6	466.25	467.4	0.014775	7.22	57.09	24.4	0.8
Reach-1	8128	10 Year	205	462.37	465.38	465.19	466.04	0.015624	6.51	31.51	17.9	0.86
Reach-1	8128	10 Yr Fldwy	205	462.37	465.39	465.18	466.04	0.015538	6.49	31.57	17.92	0.86
Reach-1	8080	100 Year	410	460.79	465.31		465.9	0.00625	6.2	68.63	25.56	0.59
Reach-1	8080	Floodway	410	460.79	465.36		465.93	0.005946	6.1	69.87	25.57	0.58
Reach-1	8080	10 Year	205	460.79	464.28		464.6	0.005343	4.49	45.61	19.63	0.52
Reach-1	8080	10 Yr Fldwy	205	460.79	464.27		464.59	0.005425	4.52	45.4	19.59	0.52
Reach-1	8027	100 Year	410	459.06	463.89	463.2	464.64	0.008399	6.98	60.78	22.77	0.69
Reach-1	8027	Floodway	410	459.06	464.5	463.19	465.01	0.004629	5.81	74.52	22.78	0.52
Reach-1	8027	10 Year	205	459.06	462.28	462.14	463.02	0.017397	6.92	29.63	16.33	0.9
Reach-1	8027	10 Yr Fldwy	205	459.06	462.31	462.15	463.03	0.016536	6.79	30.18	16.44	0.88
Reach-1	7977	100 Year	410	457.38	463.73	460.99	463.92	0.001819	3.49	122.97	32.26	0.29
Reach-1	7977	Floodway	410	457.38	464.43	461	464.56	0.001115	3	145.49	32.26	0.23
Reach-1	7977	10 Year	205	457.38	461.14	460.01	461.38	0.005539	3.96	51.79	22.59	0.46
Reach-1	7977	10 Yr Fldwy	205	457.38	460.98	460.01	461.26	0.006575	4.24	48.35	21.99	0.5
Reach-1	7937	100 Year	625	456.07	463.51	459.82	463.73	0.001285	3.66	174.21	33.68	0.27
Reach-1	7937	Floodway	625	456.07	464.28	459.81	464.44	0.000847	3.23	199.93	33.68	0.22
Reach-1	7937	10 Year	305	456.07	460.84	458.63	461.01	0.001848	3.28	93.01	26.97	0.31
Reach-1	7937	10 Yr Fldwy	305	456.07	460.64	458.62	460.82	0.002145	3.48	87.58	26.46	0.34
Reach-1	7911.5		Bridge									
Reach-1	7885	100 Year	625	455.84	461.75	459.2	461.96	0.001475	3.77	180.68	51.62	0.31
Reach-1	7885	Floodway	625	455.84	462.46	459.21	462.62	0.000922	3.28	202.27	42.2	0.25
Reach-1	7885	10 Year	305	455.84	459.88	458.22	460.04	0.002101	3.21	94.91	34.65	0.34
Reach-1	7885	10 Yr Fldwy	305	455.84	459.97	458.22	460.12	0.001907	3.11	98.18	35.04	0.33
Reach-1	7826	100 Year	625	454.72	461.42	458.72	461.58	0.00226	3.4	220.76	71.64	0.28
Reach-1	7826	Floodway	625	454.72	462.22	458.72	462.39	0.001681	3.26	195.39	37.8	0.25
Reach-1	7826	10 Year	305	454.72	459.29	457.54	459.48	0.004058	3.47	87.83	44.35	0.37
Reach-1	7826	10 Yr Fldwy	305	454.72	459.46	457.54	459.62	0.00358	3.27	93.13	32.72	0.34
Reach-1	7757	100 Year	625	453.54	461.45	456.83	461.46	0.000121	1.02	853.01	208.29	0.07
Reach-1	7757	Floodway	625	453.54	462.22	457.09	462.23	0.00021	1.25	619.31	97.32	0.08
Reach-1	7757	10 Year	305	453.54	459.32	456.61	459.33	0.000136	0.81	526.17	185.48	0.07
Reach-1	7757	10 Yr Fldwy	305	453.54	459.38	456.61	459.4	0.00031	1.14	343.46	97.32	0.1
Reach-1	7711	100 Year	625	453.54	461.43	456.54	461.45	0.00011	1	749.72	265.96	0.07
Reach-1	7711	Floodway	625	453.54	462.21	456.54	462.22	0.000053	0.75	1063.99	163	0.05
Reach-1	7711	10 Year	305	453.54	459.3	456.01	459.31	0.000119	0.8	454.49	233.33	0.07
Reach-1	7711	10 Yr Fldwy	305	453.54	459.36	456.01	459.37	0.000114	0.79	449.79	163	0.07
Reach-1	7698	100 Year	870	453.41	460.7	457.66	461.28	0.002088	6.28	166.89	271.36	0.41
Reach-1	7698	Floodway	870	453.41	461.45	457.73	462.04	0.001748	6.14	141.82	18.01	0.39
Reach-1	7698	10 Year	430	453.41	458.96	456.16	459.22	0.001355	4.2	120.3	27.56	0.32
Reach-1	7698	10 Yr Fldwy	430	453.41	458.96	456.18	459.27	0.001515	4.44	97.01	18.01	0.34
Reach-1	7689.5		Bridge									
Reach-1	7681	100 Year	870	453.25	459.42	457.44	460.24	0.003712	7.48	131.6	95.1	0.54
Reach-1	7681	Floodway	870	453.25	459.51	457.59	460.49	0.005989	7.93	109.87	18.01	0.57
Reach-1	7681	10 Year	430	453.25	458.22	455.97	458.54	0.001937	4.66	104	29.21	0.37
Reach-1	7681	10 Yr Fldwy	430	453.25	458.16	456.03	458.56	0.003116	5.03	85.57	18.01	0.41
Reach-1	7666	100 Year	870	453.02	459.28	458.07	460.02	0.004569	7.44	157.94	198.18	0.57
Reach-1	7666	Floodway	870	453.02	459.44	458.07	460.13	0.004052	7.15	165.22	43.48	0.54
Reach-1	7666	10 Year	430	453.02	458.03	456.51	458.41	0.003121	5.16	105.42	51.8	0.45
Reach-1	7666	10 Yr Fldwy	430	453.02	458.03	456.51	458.41	0.003105	5.15	105.64	40.66	0.45
Reach-1	7589	100 Year	870	452.95	457.94	456.62	458.18	0.009574	3.87	224.58	346.85	0.41
Reach-1	7589	Floodway	870	452.95	458.64	456.61	458.79	0.004628	3.09	281.44	82.16	0.29
Reach-1	7589	10 Year	430	452.95	456.53	455.99	456.75	0.019442	3.79	113.42	197.78	0.54
Reach-1	7589	10 Yr Fldwy	430	452.95	456.65	455.99	456.84	0.015282	3.51	122.44	75.19	0.49

HEC-RAS Plan: PR_FEMA_Fldw 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
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	7370	100 Year	870	450.98	457.8	453.62	457.82	0.000112	0.95	975.13	375.11	0.07
Reach-1	7370	Floodway	870	450.98	458.09	453.6	458.13	0.000302	1.61	566.7	99.99	0.12
Reach-1	7370	10 Year	430	450.98	455.98	452.96	456	0.000266	1.16	422.72	316.15	0.1
Reach-1	7370	10 Yr Fldwy	430	450.98	456.01	452.96	456.03	0.000303	1.24	358.41	99.99	0.11
Reach-1	7168	100 Year	870	450.95	457.56	454.29	457.65	0.000808	2.62	387.74	269.67	0.19
Reach-1	7168	Floodway	870	450.95	457.56	454.3	457.74	0.001445	3.51	285.48	112	0.26
Reach-1	7168	10 Year	430	450.95	455.47	453.19	455.61	0.001899	2.97	156.19	153.29	0.28
Reach-1	7168	10 Yr Fldwy	430	450.95	455.47	453.18	455.61	0.001896	2.97	156.29	112	0.27
Reach-1	7120	100 Year	965	449.41	457.34	454.88	457.5	0.001014	3.83	398.86	176.69	0.27
Reach-1	7120	Floodway	965	449.41	457.37	454.86	457.54	0.001075	3.95	349.55	82.91	0.28
Reach-1	7120	10 Year	475	449.41	455.1	453.04	455.3	0.001885	3.89	162.79	83.34	0.34
Reach-1	7120	10 Yr Fldwy	475	449.41	455.1	453.05	455.3	0.001894	3.9	161.54	81	0.34
Reach-1	7073	100 Year	965	448.79	456.85	453.7	457.21	0.003692	4.82	210.28	60.4	0.37
Reach-1	7073	Floodway	965	448.79	456.89	453.7	457.24	0.003774	4.8	206.51	45.37	0.37
Reach-1	7073	10 Year	475	448.79	454.7	452.13	454.93	0.003033	3.89	122.19	31.24	0.35
Reach-1	7073	10 Yr Fldwy	475	448.79	454.7	452.15	454.93	0.003033	3.89	122.19	31.24	0.35
Reach-1	6970	100 Year	965	448.33	453.35	453.24	454.87	0.015151	9.9	97.78	30.04	0.94
Reach-1	6970	Floodway	965	448.33	453.37	453.23	454.88	0.014949	9.86	98.19	30.04	0.94
Reach-1	6970	10 Year	475	448.33	452	451.72	452.94	0.014062	7.79	60.98	24.24	0.87
Reach-1	6970	10 Yr Fldwy	475	448.33	452	451.72	452.94	0.014062	7.79	60.98	24.24	0.87
Reach-1	6915	100 Year	965	447.05	452.3	451.13	453.08	0.005682	7.09	139.3	37.74	0.6
Reach-1	6915	Floodway	965	447.05	452.36	451.13	453.12	0.005453	7.02	139.99	35.28	0.59
Reach-1	6915	10 Year	475	447.05	450.81	449.74	451.27	0.005677	5.42	87.72	30.82	0.57
Reach-1	6915	10 Yr Fldwy	475	447.05	450.81	449.74	451.27	0.005677	5.42	87.72	30.82	0.57
Reach-1	6890	100 Year	965	446.59	451.85	450.7	452.6	0.005532	7.01	148.68	43.95	0.6
Reach-1	6890	Floodway	965	446.59	451.85	450.66	452.64	0.006078	7.15	136.38	34.14	0.61
Reach-1	6890	10 Year	475	446.59	450.32	449.29	450.79	0.005895	5.49	86.55	32.18	0.58
Reach-1	6890	10 Yr Fldwy	475	446.59	450.32	449.28	450.79	0.005895	5.49	86.55	30.67	0.58
Reach-1	6825	100 Year	965	445.34	450.4	449.4	451.27	0.006732	7.49	131.08	36.07	0.65
Reach-1	6825	Floodway	965	445.34	450.49	449.4	451.32	0.006242	7.32	134.06	35	0.63
Reach-1	6825	10 Year	475	445.34	449.07	448.04	449.54	0.005873	5.48	86.72	30.74	0.57
Reach-1	6825	10 Yr Fldwy	475	445.34	449.07	448.05	449.54	0.005873	5.48	86.72	30.74	0.57
Reach-1	6809	100 Year	965	445.01	450.05	449.11	450.9	0.00671	7.44	137.98	42.44	0.65
Reach-1	6809	Floodway	965	445.01	450.16	449.09	450.98	0.006261	7.32	135.96	36.09	0.63
Reach-1	6809	10 Year	475	445.01	448.76	447.71	449.22	0.005817	5.46	86.96	31.74	0.57
Reach-1	6809	10 Yr Fldwy	475	445.01	448.76	447.71	449.22	0.005817	5.46	86.96	30.72	0.57
Reach-1	6756	100 Year	965	444	449.07	448.2	449.74	0.005598	6.84	175.06	62.84	0.6
Reach-1	6756	Floodway	965	444	449.11	448.15	449.88	0.006046	7.16	150.51	45.74	0.62
Reach-1	6756	10 Year	475	444	447.72	446.69	448.19	0.005954	5.51	86.24	51.5	0.58
Reach-1	6756	10 Yr Fldwy	475	444	447.72	446.7	448.19	0.005956	5.51	86.24	38.91	0.58
Reach-1	6732	100 Year	965	443.54	448.73	447.77	449.33	0.004938	6.54	188.58	67.53	0.56
Reach-1	6732	Floodway	965	443.54	448.78	447.75	449.43	0.005038	6.67	174.47	55.68	0.57
Reach-1	6732	10 Year	475	443.54	447.28	446.23	447.75	0.005793	5.45	87.09	53.09	0.57
Reach-1	6732	10 Yr Fldwy	475	443.54	447.28	446.23	447.75	0.005796	5.46	87.07	46.31	0.57
Reach-1	6653	100 Year	965	442.03	447.41	446.2	448.06	0.00478	6.63	167.44	51.81	0.56
Reach-1	6653	Floodway	965	442.03	447.46	446.14	448.14	0.004846	6.72	155.59	41.1	0.56
Reach-1	6653	10 Year	475	442.03	445.77	444.73	446.24	0.005814	5.46	86.93	39.97	0.57
Reach-1	6653	10 Yr Fldwy	475	442.03	445.77	444.73	446.24	0.005809	5.46	86.96	34.6	0.57
Reach-1	6593	100 Year	965	440.88	446.95	445.15	447.32	0.002417	5.21	246.89	71.67	0.41
Reach-1	6593	Floodway	965	440.88	446.96	445.1	447.38	0.00261	5.42	222.77	57.1	0.42
Reach-1	6593	10 Year	475	440.88	444.68	443.58	445.12	0.005453	5.34	88.99	54.73	0.56
Reach-1	6593	10 Yr Fldwy	475	440.88	444.68	443.57	445.13	0.005419	5.33	89.19	49.58	0.55
Reach-1	6541	100 Year	965	439.9	446.91	443.96	447.03	0.000789	3.28	477.88	117.94	0.24
Reach-1	6541	Floodway	965	439.9	446.91	443.96	447.05	0.000901	3.51	427.59	97.87	0.25
Reach-1	6541	10 Year	475	439.9	443.84	442.59	444.24	0.004733	5.07	93.68	90.08	0.52
Reach-1	6541	10 Yr Fldwy	475	439.9	443.86	442.59	444.26	0.004644	5.04	94.32	83.21	0.51
Reach-1	6473	100 Year	1055	438.58	446.7	442.52	446.87	0.000631	3.31	323.29	159.78	0.22
Reach-1	6473	Floodway	1055	438.58	446.7	442.52	446.87	0.000722	3.28	323.32	48.52	0.22
Reach-1	6473	10 Year	515	438.58	443.55	441.56	443.69	0.001259	3.1	170.14	139.06	0.28
Reach-1	6473	10 Yr Fldwy	515	438.58	443.55	441.56	443.69	0.00133	3.09	170.16	48.52	0.28

HEC-RAS Plan: PR_FEMA_Fldw 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
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	6445.5		Culvert									
Reach-1	6417	100 Year	1055	435.14	440.44	439.4	441.37	0.007602	7.7	137.02	34.6	0.68
Reach-1	6417	Floodway	1055	435.14	440.44	439.39	441.37	0.0076	7.7	137.03	34.6	0.68
Reach-1	6417	10 Year	515	435.14	437.99	437.97	439.09	0.018496	8.39	61.36	27.33	0.99
Reach-1	6417	10 Yr Fldwy	515	435.14	437.99	437.98	439.09	0.018496	8.39	61.36	27.33	0.99
Reach-1	6409	100 Year	1055	434.58	440.38	438.87	441.07	0.005252	6.65	158.73	38.96	0.58
Reach-1	6409	Floodway	1055	434.58	440.38	438.86	441.07	0.005251	6.65	158.74	38.96	0.58
Reach-1	6409	10 Year	515	434.58	437.42	437.42	438.53	0.018873	8.47	60.81	27.1	1
Reach-1	6409	10 Yr Fldwy	515	434.58	437.41	437.41	438.53	0.019057	8.5	60.61	27.07	1
Reach-1	6394	100 Year	1055	433.33	440.34	437.71	440.77	0.002743	5.25	201.16	42.51	0.42
Reach-1	6394	Floodway	1055	433.33	440.34	437.72	440.77	0.002743	5.25	201.16	42.5	0.42
Reach-1	6394	10 Year	515	433.33	436.94	436.22	437.59	0.008552	6.47	79.57	28.9	0.69
Reach-1	6394	10 Yr Fldwy	515	433.33	436.94	436.21	437.59	0.008553	6.47	79.57	28.9	0.69
Reach-1	6349.5		Culvert									
Reach-1	6305	100 Year	1055	427.79	432.14	432.08	433.67	0.016283	9.94	106.15	33.12	0.98
Reach-1	6305	Floodway	1055	427.79	432.14	432.08	433.67	0.01628	9.94	106.15	33.07	0.98
Reach-1	6305	10 Year	515	427.79	430.81	430.62	431.76	0.015103	7.84	65.73	27.81	0.9
Reach-1	6305	10 Yr Fldwy	515	427.79	430.81	430.63	431.76	0.015103	7.84	65.73	27.81	0.9
Reach-1	6266	100 Year	1055	425	430.12	429.96	431.67	0.015093	10	105.51	30.63	0.94
Reach-1	6266	Floodway	1055	425	430.12	429.97	431.67	0.015093	10	105.51	30.63	0.94
Reach-1	6266	10 Year	515	425	428.42	428.39	429.6	0.018115	8.71	59.11	24.13	0.98
Reach-1	6266	10 Yr Fldwy	515	425	428.42	428.39	429.6	0.018115	8.71	59.11	24.13	0.98
Reach-1	6216	100 Year	1055	422.01	429.02		429.92	0.006421	7.63	138.84	32.33	0.63
Reach-1	6216	Floodway	1055	422.01	429.02		429.92	0.006421	7.63	138.84	32.33	0.63
Reach-1	6216	10 Year	515	422.01	427.13		427.72	0.006648	6.16	83.62	26.11	0.61
Reach-1	6216	10 Yr Fldwy	515	422.01	427.13		427.72	0.006648	6.16	83.62	26.11	0.61
Reach-1	6122	100 Year	1055	420.28	427.29	425.43	427.9	0.00615	6.27	168.33	36.1	0.51
Reach-1	6122	Floodway	1055	420.28	427.29	425.42	427.9	0.00615	6.27	168.33	36.09	0.51
Reach-1	6122	10 Year	515	420.28	424.72	423.92	425.34	0.008926	6.29	81.84	30.05	0.67
Reach-1	6122	10 Yr Fldwy	515	420.28	424.72	423.92	425.34	0.008926	6.29	81.84	30.05	0.67
Reach-1	6067	100 Year	1055	419.29	426.7	423.63	426.99	0.003425	4.3	247.71	52.95	0.34
Reach-1	6067	Floodway	1055	419.29	426.7	423.63	426.99	0.003425	4.3	247.71	52.95	0.34
Reach-1	6067	10 Year	515	419.29	423.4	422.25	423.81	0.007385	5.15	100.04	35.82	0.54
Reach-1	6067	10 Yr Fldwy	515	419.29	423.4	422.25	423.81	0.007385	5.15	100.04	35.82	0.54
Reach-1	6033	100 Year	1055	417.49	426.62	421.66	426.8	0.00074	3.37	313.6	48.88	0.23
Reach-1	6033	Floodway	1055	417.49	426.62	421.66	426.8	0.00074	3.37	313.6	48.87	0.23
Reach-1	6033	10 Year	515	417.49	423.31	420.25	423.46	0.001161	3.13	164.59	39.56	0.27
Reach-1	6033	10 Yr Fldwy	515	417.49	423.31	420.25	423.46	0.001161	3.13	164.59	39.56	0.27
Reach-1	5996.5		Culvert									
Reach-1	5947	100 Year	1055	413.65	419.99	418.9	421.01	0.00812	8.12	129.89	30.66	0.69
Reach-1	5947	Floodway	1055	413.65	420.07	418.9	421.06	0.007598	7.96	132.52	30.67	0.67
Reach-1	5947	10 Year	515	413.65	417.79	417.25	418.64	0.010896	7.39	69.73	24.17	0.77
Reach-1	5947	10 Yr Fldwy	515	413.65	417.81	417.25	418.65	0.010674	7.33	70.24	24.23	0.76
Reach-1	5878	100 Year	1625	410.66	418.56	416.8	419.38	0.006038	7.29	227.5	48.36	0.56
Reach-1	5878	Floodway	1625	410.66	418.92	416.79	419.63	0.00481	6.81	244.92	48.35	0.51
Reach-1	5878	10 Year	795	410.66	416.46	415.02	417	0.004993	5.88	135.28	38.42	0.55
Reach-1	5878	10 Yr Fldwy	795	410.66	416.57	415.03	417.07	0.004678	5.72	139.33	38.89	0.53
Reach-1	5832	100 Year	1625	408.92	417.04	415.77	418.4	0.006212	9.53	182.03	36.64	0.67
Reach-1	5832	Floodway	1625	408.92	417.55	415.67	418.83	0.005117	9.12	184.03	27.99	0.62
Reach-1	5832	10 Year	795	408.92	415.9	413.83	416.42	0.003024	5.82	142.19	33.19	0.45
Reach-1	5832	10 Yr Fldwy	795	408.92	416.01	413.83	416.53	0.002899	5.78	140.87	27.99	0.44
Reach-1	5813		Inl Struct									
Reach-1	5812.5	100 Year	1625	408.28	415.78	413.24	416.56	0.003858	7.1	232.58	39.87	0.49
Reach-1	5812.5	Floodway	1625	408.28	415.78	413.22	416.56	0.003858	7.1	232.58	39.87	0.49
Reach-1	5812.5	10 Year	795	408.28	413.76	411.53	414.16	0.003017	5.04	157.8	34.41	0.41
Reach-1	5812.5	10 Yr Fldwy	795	408.28	413.76	411.54	414.16	0.003017	5.04	157.8	34.41	0.41

HEC-RAS Plan: PR_FEMA_Fldw 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
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	5804	100 Year	1625	406.86	414.24	413.98	416.03	0.028058	10.75	152.29	37.64	0.92
Reach-1	5804	Floodway	1625	406.86	414.24	413.98	416.03	0.028063	10.75	152.28	37.64	0.92
Reach-1	5804	10 Year	795	406.86	412.22	412.22	413.65	0.033096	9.59	82.9	29.84	1.01
Reach-1	5804	10 Yr Fldwy	795	406.86	412.22	412.22	413.65	0.033096	9.59	82.9	29.84	1.01
Reach-1	5757	100 Year	1625	404.07	411.58	410.21	412.86	0.013381	9.09	178.91	33.72	0.68
Reach-1	5757	Floodway	1625	404.07	411.58	410.19	412.86	0.013373	9.09	178.95	33.72	0.68
Reach-1	5757	10 Year	795	404.07	408.88	408.15	409.91	0.013068	8.15	97.6	26.67	0.75
Reach-1	5757	10 Yr Fldwy	795	404.07	408.88	408.15	409.91	0.013071	8.15	97.59	26.67	0.75
Reach-1	5628	100 Year	1625	396.33	402.54	402.54	404.6	0.030733	11.51	141.14	34.33	1
Reach-1	5628	Floodway	1625	396.33	402.54	402.54	404.6	0.030764	11.52	141.1	34.33	1
Reach-1	5628	10 Year	795	396.33	400.73	400.73	402.15	0.027525	9.55	83.26	29.55	1
Reach-1	5628	10 Yr Fldwy	795	396.33	400.73	400.73	402.15	0.02751	9.55	83.28	29.55	1
Reach-1	5524	100 Year	1625	385.83	392.53	391.72	393.97	0.017357	9.63	168.69	36.32	0.79
Reach-1	5524	Floodway	1625	385.83	392.53	391.74	393.97	0.017357	9.63	168.69	36.32	0.79
Reach-1	5524	10 Year	795	385.83	390.06	389.81	391.31	0.016939	8.96	88.77	28.54	0.89
Reach-1	5524	10 Yr Fldwy	795	385.83	390.07	389.81	391.31	0.016861	8.94	88.96	28.56	0.89
Reach-1	5456	100 Year	1625	381.89	388.31	387.9	390.03	0.017781	10.52	154.75	54.06	0.87
Reach-1	5456	Floodway	1625	381.89	388.31	387.88	390.03	0.017781	10.52	154.75	35.09	0.87
Reach-1	5456	10 Year	795	381.89	386.03	385.96	387.45	0.017429	9.58	83	27.81	0.98
Reach-1	5456	10 Yr Fldwy	795	381.89	386.02	385.97	387.45	0.017513	9.6	82.8	27.79	0.98
Reach-1	5422	100 Year	1625	380.77	387.59	385.82	388.4	0.008682	7.26	223.95	46.6	0.58
Reach-1	5422	Floodway	1625	380.77	387.59	385.81	388.4	0.008682	7.26	223.95	46.6	0.58
Reach-1	5422	10 Year	795	380.77	384.1	384.1	385.43	0.018078	9.25	85.95	32.55	1
Reach-1	5422	10 Yr Fldwy	795	380.77	384.11	384.11	385.43	0.017894	9.22	86.26	32.58	1
Reach-1	5355	100 Year	1960	377.33	386.97	382.14	387.57	0.002086	6.19	316.57	32.96	0.35
Reach-1	5355	Floodway	1960	377.33	386.97	382.14	387.57	0.002086	6.19	316.57	32.96	0.35
Reach-1	5355	10 Year	955	377.33	383.54	380.31	383.88	0.001938	4.69	203.75	32.87	0.33
Reach-1	5355	10 Yr Fldwy	955	377.33	383.54	380.31	383.88	0.001938	4.69	203.75	32.87	0.33
Reach-1	5295.5		Culvert									
Reach-1	5224	100 Year	1960	370.74	378.77	374.29	379.01	0.000829	3.94	512.23	81.46	0.26
Reach-1	5224	Floodway	1960	370.74	378.79	374.29	379.03	0.000822	3.93	513.89	77.44	0.26
Reach-1	5224	10 Year	955	370.74	376.56	372.97	376.68	0.000663	2.77	346.11	71.82	0.22
Reach-1	5224	10 Yr Fldwy	955	370.74	376.56	372.97	376.67	0.000664	2.77	346.01	71.82	0.22
Reach-1	5206	100 Year	1960	370.74	378.21	375.69	378.81	0.00321	6.25	313.88	59.21	0.47
Reach-1	5206	Floodway	1960	370.74	378.24	375.7	378.84	0.00315	6.21	315.67	59.21	0.47
Reach-1	5206	10 Year	955	370.74	376.2	373.99	376.54	0.002613	4.69	203.74	50.34	0.41
Reach-1	5206	10 Yr Fldwy	955	370.74	376.2	374	376.54	0.002616	4.69	203.64	50.33	0.41
Reach-1	5145	100 Year	1960	369.69	376.69	375.57	377.79	0.006355	8.54	261.41	93.12	0.66
Reach-1	5145	Floodway	1960	369.69	376.69	375.57	377.81	0.006453	8.6	245.88	64.34	0.67
Reach-1	5145	10 Year	955	369.69	373.76	373.76	375.14	0.017511	9.43	101.25	36.64	1
Reach-1	5145	10 Yr Fldwy	955	369.69	373.74	373.74	375.14	0.017737	9.47	100.79	36.59	1.01
Reach-1	5084	100 Year	1960	366.9	376.56		377	0.001731	5.4	437.46	122.99	0.36
Reach-1	5084	Floodway	1960	366.9	376.56		377	0.001758	5.44	414.56	93	0.36
Reach-1	5084	10 Year	955	366.9	372.79		373.29	0.004068	5.72	166.93	42.06	0.51
Reach-1	5084	10 Yr Fldwy	955	366.9	372.78		373.29	0.004073	5.72	166.85	42.05	0.51
Reach-1	5065	100 Year	1960	366.96	376.5	372.07	376.87	0.001267	4.92	407.76	93.42	0.31
Reach-1	5065	Floodway	1960	366.96	376.5	372.06	376.87	0.001268	4.92	407.72	60.04	0.31
Reach-1	5065	10 Year	955	366.96	372.66	370.28	373.01	0.00252	4.77	200.37	46.38	0.4
Reach-1	5065	10 Yr Fldwy	955	366.96	372.66	370.29	373.01	0.00252	4.77	200.37	46.38	0.4
Reach-1	5042.5		Culvert									
Reach-1	5021	100 Year	1960	365.16	370.06	369.91	371.79	0.014305	10.57	185.42	48.39	0.95
Reach-1	5021	Floodway	1960	365.16	370.06	369.92	371.79	0.014308	10.57	185.41	48.39	0.95
Reach-1	5021	10 Year	955	365.16	368.43	368.22	369.55	0.014326	8.48	112.57	41.11	0.9
Reach-1	5021	10 Yr Fldwy	955	365.16	368.43	368.21	369.55	0.014324	8.48	112.57	41.11	0.9

BEAVER POND BROOK - PROPOSED CONDITION, FEMA FLOODWAY (W/O BACKWATER)
HEC-RAS 4.1.0 - "Encroachment 1" Output

HEC-RAS Plan: PR_FEMA_Fldw River: Beaver Pond Brk Reach: Reach-1													
Reach	River Sta	Profile	W.S. Elev	Prof Delta	E.G. Elev	Top Wdth	Q Left	Q Channel	Q Right	Enc Sta L	Ch Sta L	Ch Sta R	Enc Sta R
			(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)
Reach-1	8722	100 Year	491.62		492.65	31.64	0.98	345.02	64.01		-7.61	6.93	
Reach-1	8722	Floodway	492.08	0.46	492.71	31.63	1.23	319.78	88.99	-8.36	-7.61	6.93	23.27
Reach-1	8722	10 Year	490.76	-0.86	491.5	23.55	0.16	192.6	12.23		-7.61	6.93	
Reach-1	8722	10 Yr Fldwy	490.76	-0.86	491.5	23.56	0.16	192.56	12.27	-8.36	-7.61	6.93	23.27
Reach-1	8640	100 Year	491.59		491.61	182.83	286.14	101.23	22.63		-2.98	20.45	
Reach-1	8640	Floodway	492.29	0.7	492.3	157	320.01	89.99		-136.55	-2.98	20.45	20.45
Reach-1	8640	10 Year	490.82	-0.77	490.83	174.08	134.17	62.68	8.15		-2.98	20.45	
Reach-1	8640	10 Yr Fldwy	490.91	-0.68	490.92	157	143.91	61.09		-136.55	-2.98	20.45	20.45
Reach-1	8583	100 Year	491.56		491.57	225.74	145.57	163.38	101.05		-12.6	30.45	
Reach-1	8583	Floodway	492.27	0.71	492.28	143.9	141.36	172.28	96.36	-76.1	-12.6	30.45	67.8
Reach-1	8583	10 Year	490.8	-0.76	490.81	201.3	65.64	92.21	47.15		-12.6	30.45	
Reach-1	8583	10 Yr Fldwy	490.89	-0.68	490.89	143.9	61.39	97.91	45.7	-76.1	-12.6	30.45	67.8
Reach-1	8573	100 Year	491.13		491.46	49.42	0.8	298.64	110.56		-12.96	9	
Reach-1	8573	Floodway	491.59	0.46	492.11	23.71	1.81	407.47	0.72	-14	-12.96	9	9.71
Reach-1	8573	10 Year	490.32	-0.81	490.69	21.42		205			-12.96	9	
Reach-1	8573	10 Yr Fldwy	490.47	-0.66	490.79	22.05		205	0	-14	-12.96	9	9.71
Reach-1	8565.5 BF	100 Year	490.56		491.1	75.47	100.39	308.95	0.65		-13.19	5.41	
Reach-1	8565.5 BF	Floodway	491.26	0.71	491.96	23.71	4.1	399.59	6.31	-14	-13.19	5.41	9.71
Reach-1	8565.5 BF	10 Year	489.83	-0.72	490.3	67.82	18.21	186.79			-13.19	5.41	
Reach-1	8565.5 BF	10 Yr Fldwy	490.11	-0.45	490.56	19.66	1.2	203.8	0	-14	-13.19	5.41	9.71
Reach-1	8565.5 BF	100 Year	487.71		488.43	42.35	12.22	381.31	16.47		-18.83	15.98	
Reach-1	8565.5 BF	Floodway	488.42	0.71	489.68	18		410		-10	-18.83	15.98	8
Reach-1	8565.5 BF	10 Year	487.16	-0.54	487.63	41.86	2.9	199	3.09		-18.83	15.98	
Reach-1	8565.5 BF	10 Yr Fldwy	487.49	-0.22	488.28	18		205		-10	-18.83	15.98	8
Reach-1	8554	100 Year	487.28		488.06	30.45	26.43	370.81	12.76		-8.75	7.69	
Reach-1	8554	Floodway	487.29	0.01	488.27	18	6.46	402.7	0.85	-10	-8.75	7.69	8
Reach-1	8554	10 Year	486.29	-0.99	486.82	22.38	2.75	200.92	1.33		-8.75	7.69	
Reach-1	8554	10 Yr Fldwy	486.28	-1	486.84	18	1.67	203.04	0.29	-10	-8.75	7.69	8
Reach-1	8536	100 Year	487		487.46	42.71	13.55	395.95	0.49		-15.01	8.2	
Reach-1	8536	Floodway	487.02	0.02	487.52	23.21		410		-15.01	-15.01	8.2	8.2
Reach-1	8536	10 Year	485.98	-1.02	486.26	21.81		205			-15.01	8.2	
Reach-1	8536	10 Yr Fldwy	485.98	-1.02	486.26	21.82		205		-15.01	-15.01	8.2	8.2
Reach-1	8464	100 Year	486.16		486.53	27.58	18.15	385.21	6.64		-8.92	7.74	
Reach-1	8464	Floodway	486.16	0	486.53	24.5	18.61	385.28	6.11	-14.6	-8.92	7.74	9.9
Reach-1	8464	10 Year	483.08	-3.08	484.03	13.84		205			-8.92	7.74	
Reach-1	8464	10 Yr Fldwy	483.08	-3.08	484.03	13.84		205		-14.6	-8.92	7.74	9.9
Reach-1	8435.5		Culvert										
Reach-1	8412	100 Year	481.31		482.5	20.3	0.02	409.97	0.01		-12.2	7.75	
Reach-1	8412	Floodway	481.32	0.01	482.5	20.3	0.02	409.97	0.01	-12.44	-12.2	7.75	7.86
Reach-1	8412	10 Year	480.39	-0.92	481.16	18.6		205			-12.2	7.75	
Reach-1	8412	10 Yr Fldwy	480.39	-0.92	481.16	18.6		205		-12.44	-12.2	7.75	7.86
Reach-1	8393	100 Year	476.36		477.5	22.18	0.06	408.7	1.23		-10.25	10	
Reach-1	8393	Floodway	476.37	0.01	477.5	22.17	0.07	408.65	1.29	-10.45	-10.25	10	11.72
Reach-1	8393	10 Year	475.45	-0.9	476.21	19.62		205			-10.25	10	
Reach-1	8393	10 Yr Fldwy	475.46	-0.9	476.21	19.63		205		-10.45	-10.25	10	11.72
Reach-1	8356	100 Year	474.66		474.86	35.19	39.18	348.75	22.07		-10.74	9.96	
Reach-1	8356	Floodway	474.66	0	474.86	35.19	39.18	348.75	22.07	-17.95	-10.74	9.96	17.25
Reach-1	8356	10 Year	472.74	-1.92	472.94	28.15	9.74	191.34	3.91		-10.74	9.96	
Reach-1	8356	10 Yr Fldwy	472.74	-1.92	472.94	28.15	9.74	191.34	3.91	-17.95	-10.74	9.96	17.25
Reach-1	8332.5		Culvert										
Reach-1	8309	100 Year	471.16		471.49	27.62	16.78	331.86	61.36		-9.18	9.26	
Reach-1	8309	Floodway	471.16	0	471.49	27.62	16.79	331.85	61.36	-13.05	-9.18	9.26	17.4
Reach-1	8309	10 Year	470.02	-1.15	470.21	26.46	5.58	174.13	25.29		-9.18	9.26	
Reach-1	8309	10 Yr Fldwy	470.02	-1.15	470.21	26.46	5.58	174.13	25.29	-13.05	-9.18	9.26	17.4
Reach-1	8289	100 Year	470.75		471.19	29.45	0.05	409.92	0.03		-12.53	15.87	
Reach-1	8289	Floodway	470.75	0	471.19	29.45	0.05	409.92	0.03	-13.17	-12.53	15.87	16.28

HEC-RAS Plan: PR_FEMA_Fldw River: Beaver Pond Brk Reach: Reach-1													
Reach	River Sta	Profile	W.S. Elev	Prof Delta	E.G. Elev	Top Wdth	Q Left	Q Channel	Q Right	Enc Sta L	Ch Sta L	Ch Sta R	Enc Sta R
			(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)
Reach-1	8289	10 Year	469.6	-1.15	469.91	23.89		205			-12.53	15.87	
Reach-1	8289	10 Yr Fldwy	469.6	-1.15	469.91	23.89		205		-13.17	-12.53	15.87	16.28
Reach-1	8237	100 Year	469.3		469.93	26.15	2.27	403.11	4.63		-12.34	7.55	
Reach-1	8237	Floodway	469.3	0	469.93	26.14	2.27	403.11	4.63	-14.98	-12.34	7.55	11.16
Reach-1	8237	10 Year	468.31	-0.99	468.66	22.1	0.06	204.5	0.44		-12.34	7.55	
Reach-1	8237	10 Yr Fldwy	468.31	-0.99	468.66	22.1	0.06	204.5	0.44	-14.98	-12.34	7.55	11.16
Reach-1	8178	100 Year	468.26		468.66	31.2	1.82	405.25	2.93		-12.4	13.5	
Reach-1	8178	Floodway	468.26	0	468.66	31.19	1.82	405.26	2.92	-14.67	-12.4	13.5	16.53
Reach-1	8178	10 Year	467.15	-1.11	467.41	25.47		205			-12.4	13.5	
Reach-1	8178	10 Yr Fldwy	467.15	-1.11	467.4	25.47		205		-14.67	-12.4	13.5	16.53
Reach-1	8128	100 Year	466.59		467.4	24.41	0.08	409.78	0.14		-9.19	13.33	
Reach-1	8128	Floodway	466.6	0	467.4	24.4	0.09	409.78	0.14	-10.01	-9.19	13.33	14.39
Reach-1	8128	10 Year	465.38	-1.21	466.04	17.9		205			-9.19	13.33	
Reach-1	8128	10 Yr Fldwy	465.39	-1.21	466.04	17.92		205		-10.01	-9.19	13.33	14.39
Reach-1	8080	100 Year	465.31		465.9	25.56	1.46	406.64	1.9		-13.67	5.78	
Reach-1	8080	Floodway	465.36	0.05	465.93	25.57	1.63	406.23	2.14	-16.61	-13.67	5.78	8.96
Reach-1	8080	10 Year	464.28	-1.03	464.6	19.63	0	205	0		-13.67	5.78	
Reach-1	8080	10 Yr Fldwy	464.27	-1.04	464.59	19.59	0	205	0	-16.61	-13.67	5.78	8.96
Reach-1	8027	100 Year	463.89		464.64	22.77	2.28	406.77	0.95		-10.5	7.64	
Reach-1	8027	Floodway	464.5	0.6	465.01	22.78	4.4	402.3	3.31	-13.31	-10.5	7.64	9.47
Reach-1	8027	10 Year	462.28	-1.62	463.02	16.33		205			-10.5	7.64	
Reach-1	8027	10 Yr Fldwy	462.31	-1.58	463.03	16.44		205		-13.31	-10.5	7.64	9.47
Reach-1	7977	100 Year	463.73		463.92	32.26	3.41	404.01	2.58		-10.24	14.76	
Reach-1	7977	Floodway	464.43	0.7	464.56	32.26	5.84	399.68	4.48	-13.81	-10.24	14.76	18.45
Reach-1	7977	10 Year	461.14	-2.59	461.38	22.59		205			-10.24	14.76	
Reach-1	7977	10 Yr Fldwy	460.98	-2.75	461.26	21.99		205		-13.81	-10.24	14.76	18.45
Reach-1	7937	100 Year	463.51		463.73	33.68	0.62	622.83	1.56		-14.93	14.3	
Reach-1	7937	Floodway	464.28	0.76	464.44	33.68	1.17	620.83	3	-16.44	-14.93	14.3	17.24
Reach-1	7937	10 Year	460.84	-2.67	461.01	26.97		305			-14.93	14.3	
Reach-1	7937	10 Yr Fldwy	460.64	-2.88	460.82	26.46		305		-16.44	-14.93	14.3	17.24
Reach-1	7911.5 BF	100 Year	460.3		463.72			625			-12.66	15.91	
Reach-1	7911.5 BF	Floodway	460.3	0	464.44			625		-16.44	-12.66	15.91	17.24
Reach-1	7911.5 BF	10 Year	460.15	-0.15	460.48	14.42		305			-12.66	15.91	
Reach-1	7911.5 BF	10 Yr Fldwy	460.3	0	460.82			305		-16.44	-12.66	15.91	17.24
Reach-1	7911.5 BF	100 Year	460.3		461.96			625			-17.65	9.22	
Reach-1	7911.5 BF	Floodway	460.3	0	462.62			625		-26.71	-17.65	9.22	15.49
Reach-1	7911.5 BF	10 Year	459.84	-0.46	460.22	14.42		305			-17.65	9.22	
Reach-1	7911.5 BF	10 Yr Fldwy	459.97	-0.33	460.12	14.42		305		-26.71	-17.65	9.22	15.49
Reach-1	7885	100 Year	461.75		461.96	51.62	4.6	607.38	13.02		-26.43	9.06	
Reach-1	7885	Floodway	462.46	0.71	462.62	42.2	0.3	612.46	12.25	-26.71	-26.43	9.06	15.49
Reach-1	7885	10 Year	459.88	-1.87	460.04	34.65		305			-26.43	9.06	
Reach-1	7885	10 Yr Fldwy	459.97	-1.78	460.12	35.04		305		-26.71	-26.43	9.06	15.49
Reach-1	7826	100 Year	461.42		461.58	71.64	8.26	549.19	67.56		-22.21	13.19	
Reach-1	7826	Floodway	462.22	0.8	462.39	37.8	4.7	620.3	0	-24.61	-22.21	13.19	13.19
Reach-1	7826	10 Year	459.29	-2.13	459.48	31.85		305			-22.21	13.19	
Reach-1	7826	10 Yr Fldwy	459.46	-1.97	459.62	32.72		305		-24.61	-22.21	13.19	13.19
Reach-1	7757	100 Year	461.45		461.46	155.74	363.27	233.06	28.67		-22.61	15.32	
Reach-1	7757	Floodway	462.22	0.77	462.23	97.32	303.76	321.24		-82	-22.61	15.32	15.32
Reach-1	7757	10 Year	459.32	-2.13	459.33	151.44	175.57	119.4	10.03		-22.61	15.32	
Reach-1	7757	10 Yr Fldwy	459.38	-2.07	459.4	97.32	134.27	170.73		-82	-22.61	15.32	15.32
Reach-1	7711	100 Year	461.43		461.45	138.78	19.53	489.42	116.05		-62.24	17.16	
Reach-1	7711	Floodway	462.21	0.78	462.22	163	129.24	411.95	83.81	-108	-62.24	17.16	55
Reach-1	7711	10 Year	459.3	-2.13	459.31	137.79	8.55	257.35	39.1		-62.24	17.16	
Reach-1	7711	10 Yr Fldwy	459.36	-2.07	459.37	123.57	8.61	256.87	39.52	-108	-62.24	17.16	55
Reach-1	7698	100 Year	460.7		461.28	26.9	23.41	803.7	42.88		-7.22	10.76	
Reach-1	7698	Floodway	461.45	0.76	462.04	18.01	0	869.98	0.02	-7.22	-7.22	10.76	10.79
Reach-1	7698	10 Year	458.96	-1.73	459.22	26.8	8.16	406.82	15.01		-7.22	10.76	
Reach-1	7698	10 Yr Fldwy	458.96	-1.73	459.27	18.01	0	429.99	0.01	-7.22	-7.22	10.76	10.79
Reach-1	7689.5 BF	100 Year	460.7		461.27			746.4	118.98		-7.22	10.76	

HEC-RAS Plan: PR_FEMA_Fldw River: Beaver Pond Brk Reach: Reach-1													
Reach	River Sta	Profile	W.S. Elev	Prof Delta	E.G. Elev	Top Wdth	Q Left	Q Channel	Q Right	Enc Sta L	Ch Sta L	Ch Sta R	Enc Sta R
			(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)
Reach-1	7689.5 BF	Floodway	458.5	-2.2	462.04			870		-7.22	-7.22	10.76	10.79
Reach-1	7689.5 BF	10 Year	458.5	-2.2	459.22			430			-7.22	10.76	
Reach-1	7689.5 BF	10 Yr Fldwy	458.5	-2.2	459.27			430		-7.22	-7.22	10.76	10.79
Reach-1	7689.5 BF	100 Year	460.7		461.15	91.27		746.4	118.98		-6.92	11.06	
Reach-1	7689.5 BF	Floodway	458.5	-2.2	460.49			870		-6.92	-6.92	11.06	11.09
Reach-1	7689.5 BF	10 Year	458.22	-2.47	458.54	16.98		430			-6.92	11.06	
Reach-1	7689.5 BF	10 Yr Fldwy	458.16	-2.53	458.56	16.98		430		-6.92	-6.92	11.06	11.09
Reach-1	7681	100 Year	459.42		460.24	22.97	42.43	808.23	19.34		-6.92	11.06	
Reach-1	7681	Floodway	459.51	0.09	460.49	18.01		869.97	0.03	-6.92	-6.92	11.06	11.09
Reach-1	7681	10 Year	458.22	-1.2	458.54	22.97	19.25	402.53	8.21		-6.92	11.06	
Reach-1	7681	10 Yr Fldwy	458.16	-1.26	458.56	18.01		429.98	0.02	-6.92	-6.92	11.06	11.09
Reach-1	7666	100 Year	459.28		460.02	43.47	27.58	742	100.42		-3.61	14.93	
Reach-1	7666	Floodway	459.44	0.17	460.13	43.48	29.65	735.34	105.01	-11.98	-3.61	14.93	31.5
Reach-1	7666	10 Year	458.03	-1.25	458.41	40.65	7.6	394.86	27.54		-3.61	14.93	
Reach-1	7666	10 Yr Fldwy	458.03	-1.24	458.41	40.66	7.62	394.72	27.66	-11.98	-3.61	14.93	31.5
Reach-1	7589	100 Year	457.94		458.18	82.16		870			-26.02	66.37	
Reach-1	7589	Floodway	458.64	0.69	458.79	82.16		870		-17.98	-26.02	66.37	64.18
Reach-1	7589	10 Year	456.53	-1.42	456.75	74.54		430			-26.02	66.37	
Reach-1	7589	10 Yr Fldwy	456.65	-1.3	456.84	75.19		430		-17.98	-26.02	66.37	64.18
Reach-1	7370	100 Year	457.8		457.82	240.08	68.17	474.16	327.67		-66.04	22.97	
Reach-1	7370	Floodway	458.09	0.29	458.13	99.99	9.95	844.27	15.78	-70	-66.04	22.97	29.99
Reach-1	7370	10 Year	455.98	-1.83	456	135.9	36.66	390.84	2.5		-66.04	22.97	
Reach-1	7370	10 Yr Fldwy	456.01	-1.79	456.03	99.99	4.5	422.7	2.8	-70	-66.04	22.97	29.99
Reach-1	7168	100 Year	457.56		457.65	132.21	40.88	585.54	243.58		-24.97	14.14	
Reach-1	7168	Floodway	457.56	0	457.74	61.84	54.7	783.12	32.17	-88	-24.97	14.14	24
Reach-1	7168	10 Year	455.47	-2.09	455.61	61.84	3.35	419.63	7.02		-24.97	14.14	
Reach-1	7168	10 Yr Fldwy	455.47	-2.09	455.61	61.84	3.37	419.6	7.03	-88	-24.97	14.14	24
Reach-1	7120	100 Year	457.34		457.5	129.5	318.01	628.96	18.03		-13.98	12.17	
Reach-1	7120	Floodway	457.37	0.02	457.54	82.91	312.81	651.84	0.35	-70.44	-13.98	12.17	12.47
Reach-1	7120	10 Year	455.1	-2.24	455.3	83.34	63.39	410.53	1.08		-13.98	12.17	
Reach-1	7120	10 Yr Fldwy	455.1	-2.24	455.3	81	63.48	411.38	0.14	-70.44	-13.98	12.17	12.47
Reach-1	7073	100 Year	456.85		457.21	60.4	1.44	955.48	8.08		-20.21	17.09	
Reach-1	7073	Floodway	456.89	0.03	457.24	45.37		957.86	7.14	-20.21	-20.21	17.09	25.16
Reach-1	7073	10 Year	454.7	-2.15	454.93	31.24		475			-20.21	17.09	
Reach-1	7073	10 Yr Fldwy	454.7	-2.15	454.93	31.24		475		-20.21	-20.21	17.09	25.16
Reach-1	6970	100 Year	453.35		454.87	30.04	0.11	964.56	0.33		-12.6	15.9	
Reach-1	6970	Floodway	453.37	0.01	454.88	30.04	0.13	964.52	0.35	-13.22	-12.6	15.9	16.82
Reach-1	6970	10 Year	452	-1.35	452.94	24.24		475			-12.6	15.9	
Reach-1	6970	10 Yr Fldwy	452	-1.35	452.94	24.24		475		-13.22	-12.6	15.9	16.82
Reach-1	6915	100 Year	452.3		453.08	37.74	7.18	954.39	3.42		-15.75	15.75	
Reach-1	6915	Floodway	452.36	0.06	453.12	35.28	3.28	957.88	3.85	-16.9	-15.75	15.75	18.38
Reach-1	6915	10 Year	450.81	-1.49	451.27	30.82		475			-15.75	15.75	
Reach-1	6915	10 Yr Fldwy	450.81	-1.49	451.27	30.82		475		-16.9	-15.75	15.75	18.38
Reach-1	6890	100 Year	451.85		452.6	43.95	18.96	944.33	1.71		-15.75	15.75	
Reach-1	6890	Floodway	451.85	0	452.64	34.14		963.22	1.78	-15.75	-15.75	15.75	18.4
Reach-1	6890	10 Year	450.32	-1.53	450.79	30.67		475			-15.75	15.75	
Reach-1	6890	10 Yr Fldwy	450.32	-1.53	450.79	30.67		475		-15.75	-15.75	15.75	18.4
Reach-1	6825	100 Year	450.4		451.27	36.07	1.32	962.47	1.22		-15.75	15.75	
Reach-1	6825	Floodway	450.49	0.09	451.32	35	1.2	962.33	1.48	-17	-15.75	15.75	18
Reach-1	6825	10 Year	449.07	-1.33	449.54	30.74		475			-15.75	15.75	
Reach-1	6825	10 Yr Fldwy	449.07	-1.33	449.54	30.74		475		-17	-15.75	15.75	18
Reach-1	6809	100 Year	450.05		450.9	42.44	14.05	949.81	1.14		-15.75	15.75	
Reach-1	6809	Floodway	450.16	0.11	450.98	36.09	4.79	958.83	1.38	-18.6	-15.75	15.75	17.49
Reach-1	6809	10 Year	448.76	-1.29	449.22	30.72		475			-15.75	15.75	
Reach-1	6809	10 Yr Fldwy	448.76	-1.29	449.22	30.72		475		-18.6	-15.75	15.75	17.49
Reach-1	6756	100 Year	449.07		449.74	62.84	82.55	881.3	1.14		-15.75	15.75	
Reach-1	6756	Floodway	449.11	0.04	449.88	45.74	34.14	930.52	0.34	-29.53	-15.75	15.75	16.21
Reach-1	6756	10 Year	447.72	-1.35	448.19	30.63		475			-15.75	15.75	
Reach-1	6756	10 Yr Fldwy	447.72	-1.35	448.19	30.62		475		-29.53	-15.75	15.75	16.21

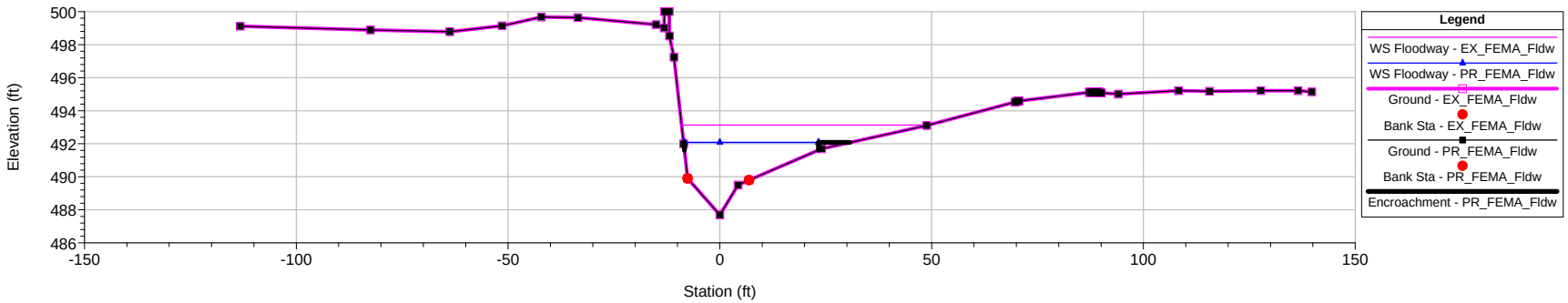
HEC-RAS Plan: PR_FEMA_Fldw River: Beaver Pond Brk Reach: Reach-1													
Reach	River Sta	Profile	W.S. Elev	Prof Delta	E.G. Elev	Top Wdth	Q Left	Q Channel	Q Right	Enc Sta L	Ch Sta L	Ch Sta R	Enc Sta R
			(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)
Reach-1	6732	100 Year	448.73		449.33	67.53	90.46	866.53	8.01		-15.75	15.75	
Reach-1	6732	Floodway	448.78	0.06	449.43	55.68	61.78	896.14	7.07	-36.09	-15.75	15.75	19.59
Reach-1	6732	10 Year	447.28	-1.44	447.75	30.74		475			-15.75	15.75	
Reach-1	6732	10 Yr Fldwy	447.28	-1.44	447.75	30.73		475		-36.09	-15.75	15.75	19.59
Reach-1	6653	100 Year	447.41		448.06	51.81	1.86	917.48	45.66		-15.75	15.75	
Reach-1	6653	Floodway	447.46	0.05	448.14	41.1	0.77	940.64	23.58	-16.5	-15.75	15.75	24.6
Reach-1	6653	10 Year	445.77	-1.64	446.24	30.67		475			-15.75	15.75	
Reach-1	6653	10 Yr Fldwy	445.77	-1.64	446.24	30.67		475		-16.5	-15.75	15.75	24.6
Reach-1	6593	100 Year	446.95		447.32	71.67	79.22	836.67	49.11		-15.75	15.75	
Reach-1	6593	Floodway	446.96	0.01	447.38	57.1	65.52	871.42	28.06	-32.7	-15.75	15.75	24.4
Reach-1	6593	10 Year	444.68	-2.28	445.12	31		475			-15.75	15.75	
Reach-1	6593	10 Yr Fldwy	444.68	-2.27	445.13	31.02		475		-32.7	-15.75	15.75	24.4
Reach-1	6541	100 Year	446.91		447.03	117.94	62.97	637.19	264.84		-16.4	16.4	
Reach-1	6541	Floodway	446.91	0	447.05	97.87	47	680.26	237.73	-31.3	-16.4	16.4	66.57
Reach-1	6541	10 Year	443.84	-3.07	444.24	31.67		475			-16.4	16.4	
Reach-1	6541	10 Yr Fldwy	443.86	-3.05	444.26	31.75		475		-31.3	-16.4	16.4	66.57
Reach-1	6473	100 Year	446.7		446.87	48.52		953.88	101.12		-21.13	20.93	
Reach-1	6473	Floodway	446.7	0	446.87	48.52		946.81	108.19	-21.13	-21.13	20.93	27.4
Reach-1	6473	10 Year	443.55	-3.16	443.69	48.52		481.54	33.46		-21.13	20.93	
Reach-1	6473	10 Yr Fldwy	443.55	-3.16	443.69	48.52		480.59	34.41	-21.13	-21.13	20.93	27.4
Reach-1	6445.5		Culvert										
Reach-1	6417	100 Year	440.44		441.37	34.6	0	1055	0		-16.05	18.4	
Reach-1	6417	Floodway	440.44	0	441.37	34.6	0	1055	0	-16.15	-16.05	18.4	18.47
Reach-1	6417	10 Year	437.99	-2.45	439.09	27.33		515			-16.05	18.4	
Reach-1	6417	10 Yr Fldwy	437.99	-2.45	439.09	27.33		515		-16.15	-16.05	18.4	18.47
Reach-1	6409	100 Year	440.38		441.07	38.96	0.01	1054.96	0.02		-19.16	19.06	
Reach-1	6409	Floodway	440.38	0	441.07	38.96	0.01	1054.96	0.02	-19.5	-19.16	19.06	19.48
Reach-1	6409	10 Year	437.42	-2.96	438.53	27.1		515			-19.16	19.06	
Reach-1	6409	10 Yr Fldwy	437.41	-2.97	438.53	27.07		515		-19.5	-19.16	19.06	19.48
Reach-1	6394	100 Year	440.34		440.77	42.51	0	1054.99	0.01		-21.08	20.93	
Reach-1	6394	Floodway	440.34	0	440.77	42.5	0	1054.99	0.01	-21.24	-21.08	20.93	21.26
Reach-1	6394	10 Year	436.94	-3.41	437.59	28.9		515			-21.08	20.93	
Reach-1	6394	10 Yr Fldwy	436.94	-3.41	437.59	28.9		515		-21.24	-21.08	20.93	21.26
Reach-1	6349.5		Culvert										
Reach-1	6305	100 Year	432.14		433.67	33.12	0	1055	0		-16.4	16.53	
Reach-1	6305	Floodway	432.14	0	433.67	33.07	0	1055	0	-16.51	-16.4	16.53	16.56
Reach-1	6305	10 Year	430.81	-1.33	431.76	27.81		515			-16.4	16.53	
Reach-1	6305	10 Yr Fldwy	430.81	-1.33	431.76	27.81		515		-16.51	-16.4	16.53	16.56
Reach-1	6266	100 Year	430.12		431.67	30.63	0.02	1054.98	0		-14.86	15.31	
Reach-1	6266	Floodway	430.12	0	431.67	30.63	0.02	1054.98	0	-15.36	-14.86	15.31	15.68
Reach-1	6266	10 Year	428.42	-1.69	429.6	24.13		515			-14.86	15.31	
Reach-1	6266	10 Yr Fldwy	428.42	-1.69	429.6	24.13		515		-15.36	-14.86	15.31	15.68
Reach-1	6216	100 Year	429.02		429.92	32.33	0.13	1053.81	1.06		-15.37	14.83	
Reach-1	6216	Floodway	429.02	0	429.92	32.33	0.13	1053.81	1.06	-16.15	-15.37	14.83	16.48
Reach-1	6216	10 Year	427.13	-1.89	427.72	26.11		515			-15.37	14.83	
Reach-1	6216	10 Yr Fldwy	427.13	-1.89	427.72	26.11		515		-16.15	-15.37	14.83	16.48
Reach-1	6122	100 Year	427.29		427.9	36.1	0	1054.9	0.09		-18.37	17.42	
Reach-1	6122	Floodway	427.29	0	427.9	36.09	0	1054.91	0.09	-18.71	-18.37	17.42	17.49
Reach-1	6122	10 Year	424.72	-2.57	425.34	30.05		515			-18.37	17.42	
Reach-1	6122	10 Yr Fldwy	424.72	-2.57	425.34	30.05		515		-18.71	-18.37	17.42	17.49
Reach-1	6067	100 Year	426.7		426.99	52.95	2.17	1052.83	0		-24.41	24.34	
Reach-1	6067	Floodway	426.7	0	426.99	52.95	2.17	1052.83	0	-28.63	-24.41	24.34	24.36
Reach-1	6067	10 Year	423.4	-3.31	423.81	35.82		515			-24.41	24.34	
Reach-1	6067	10 Yr Fldwy	423.4	-3.31	423.81	35.82		515		-28.63	-24.41	24.34	24.36
Reach-1	6033	100 Year	426.62		426.8	48.88	0.08	1054.92	0		-26.21	21.46	
Reach-1	6033	Floodway	426.62	0	426.8	48.87	0.08	1054.92	0	-27.41	-26.21	21.46	24.74
Reach-1	6033	10 Year	423.31	-3.31	423.46	39.56		515			-26.21	21.46	
Reach-1	6033	10 Yr Fldwy	423.31	-3.31	423.46	39.56		515		-27.41	-26.21	21.46	24.74

HEC-RAS Plan: PR_FEMA_Fldw River: Beaver Pond Brk Reach: Reach-1													
Reach	River Sta	Profile	W.S. Elev	Prof Delta	E.G. Elev	Top Wdth	Q Left	Q Channel	Q Right	Enc Sta L	Ch Sta L	Ch Sta R	Enc Sta R
			(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)
Reach-1	5996.5		Culvert										
Reach-1	5947	100 Year	419.99		421.01	30.66	0	1055	0		-18.03	12.53	
Reach-1	5947	Floodway	420.07	0.09	421.06	30.67	0	1055	0	-18.06	-18.03	12.53	12.61
Reach-1	5947	10 Year	417.79	-2.2	418.64	24.17		515			-18.03	12.53	
Reach-1	5947	10 Yr Fldwy	417.81	-2.17	418.65	24.23		515		-18.06	-18.03	12.53	12.61
Reach-1	5878	100 Year	418.56		419.38	48.36	0.58	1616.88	7.54		-23.29	19.49	
Reach-1	5878	Floodway	418.92	0.36	419.63	48.35	1.26	1614.1	9.64	-25.02	-23.29	19.49	23.33
Reach-1	5878	10 Year	416.46	-2.1	417	38.42		794.92	0.08		-23.29	19.49	
Reach-1	5878	10 Yr Fldwy	416.57	-1.99	417.07	38.89		794.87	0.13	-25.02	-23.29	19.49	23.33
Reach-1	5832	100 Year	417.04		418.4	36.64	25.3	1551.78	47.91		-15.29	10.6	
Reach-1	5832	Floodway	417.55	0.51	418.83	27.99	3.2	1603.84	17.97	-15.85	-15.29	10.6	12.14
Reach-1	5832	10 Year	415.9	-1.14	416.42	33.19	5.54	774.96	14.51		-15.29	10.6	
Reach-1	5832	10 Yr Fldwy	416.01	-1.03	416.53	27.99	1.25	786.24	7.51	-15.85	-15.29	10.6	12.14
Reach-1	5813		Inl Struct										
Reach-1	5812.5	100 Year	415.78		416.56	39.87	2.89	1621.28	0.83		-16.7	18.37	
Reach-1	5812.5	Floodway	415.78	0	416.56	39.87	2.89	1621.28	0.83	-20.33	-16.7	18.37	19.86
Reach-1	5812.5	10 Year	413.76	-2.02	414.16	34.41		795			-16.7	18.37	
Reach-1	5812.5	10 Yr Fldwy	413.76	-2.02	414.16	34.41		795		-20.33	-16.7	18.37	19.86
Reach-1	5804	100 Year	414.24		416.03	37.64	0.02	1622.3	2.68		-21.52	13.88	
Reach-1	5804	Floodway	414.24	0	416.03	37.64	0.02	1622.3	2.68	-22.1	-21.52	13.88	16.2
Reach-1	5804	10 Year	412.22	-2.02	413.65	29.84		795			-21.52	13.88	
Reach-1	5804	10 Yr Fldwy	412.22	-2.02	413.65	29.84		795		-22.1	-21.52	13.88	16.2
Reach-1	5757	100 Year	411.58		412.86	33.72	0.07	1624.86	0.06		-19.25	13.4	
Reach-1	5757	Floodway	411.58	0	412.86	33.72	0.07	1624.86	0.06	-20.1	-19.25	13.4	14.1
Reach-1	5757	10 Year	408.88	-2.7	409.91	26.67		795			-19.25	13.4	
Reach-1	5757	10 Yr Fldwy	408.88	-2.7	409.91	26.67		795		-20.1	-19.25	13.4	14.1
Reach-1	5628	100 Year	402.54		404.6	34.33		1625	0		-23.31	10.99	
Reach-1	5628	Floodway	402.54	0	404.6	34.33		1625	0	-23.4	-23.31	10.99	11.1
Reach-1	5628	10 Year	400.73	-1.81	402.15	29.55		795			-23.31	10.99	
Reach-1	5628	10 Yr Fldwy	400.73	-1.81	402.15	29.55		795		-23.4	-23.31	10.99	11.1
Reach-1	5524	100 Year	392.53		393.97	36.32	0	1625	0		-20.27	15.95	
Reach-1	5524	Floodway	392.53	0	393.97	36.32	0	1625	0	-20.6	-20.27	15.95	16.21
Reach-1	5524	10 Year	390.06	-2.47	391.31	28.54		795			-20.27	15.95	
Reach-1	5524	10 Yr Fldwy	390.07	-2.46	391.31	28.56		795		-20.6	-20.27	15.95	16.21
Reach-1	5456	100 Year	388.31		390.03	35.09	0.16	1624.72	0.12		-17.22	16.4	
Reach-1	5456	Floodway	388.31	0	390.03	35.09	0.16	1624.72	0.12	-18.28	-17.22	16.4	17.19
Reach-1	5456	10 Year	386.03	-2.28	387.45	27.81		795			-17.22	16.4	
Reach-1	5456	10 Yr Fldwy	386.02	-2.29	387.45	27.79		795		-18.28	-17.22	16.4	17.19
Reach-1	5422	100 Year	387.59		388.4	46.6	0	1625	0		-22.91	23.3	
Reach-1	5422	Floodway	387.59	0	388.4	46.6	0	1625	0	-23.15	-22.91	23.3	23.47
Reach-1	5422	10 Year	384.1	-3.49	385.43	32.55		795			-22.91	23.3	
Reach-1	5422	10 Yr Fldwy	384.11	-3.48	385.43	32.58		795		-23.15	-22.91	23.3	23.47
Reach-1	5355	100 Year	386.97		387.57	32.95		1960			-13.71	19.47	
Reach-1	5355	Floodway	386.97	0	387.57	32.95		1960		-13.52	-13.71	19.47	19.47
Reach-1	5355	10 Year	383.54	-3.43	383.88	32.86		955			-13.71	19.47	
Reach-1	5355	10 Yr Fldwy	383.54	-3.43	383.88	32.86		955		-13.52	-13.71	19.47	19.47
Reach-1	5295.5		Culvert										
Reach-1	5224	100 Year	378.77		379.01	77.45	9.62	1945.2	5.18		-46.26	21.13	
Reach-1	5224	Floodway	378.79	0.02	379.03	77.44	9.77	1946.76	3.47	-54.15	-46.26	21.13	23.29
Reach-1	5224	10 Year	376.56	-2.21	376.68	71.82	0.32	954.47	0.21		-46.26	21.13	
Reach-1	5224	10 Yr Fldwy	376.56	-2.22	376.67	71.82	0.32	954.47	0.21	-54.15	-46.26	21.13	23.29
Reach-1	5206	100 Year	378.21		378.81	59.21	0.01	1959.97	0.02		-35.8	22.6	
Reach-1	5206	Floodway	378.24	0.03	378.84	59.21	0.02	1959.95	0.03	-36.2	-35.8	22.6	23.01
Reach-1	5206	10 Year	376.2	-2.01	376.54	50.34		955			-35.8	22.6	
Reach-1	5206	10 Yr Fldwy	376.2	-2.01	376.54	50.33		955		-36.2	-35.8	22.6	23.01
Reach-1	5145	100 Year	376.69		377.79	93.12	7.06	1910.22	42.73		-28.4	15.16	
Reach-1	5145	Floodway	376.69	0	377.81	64.34	7.05	1922.21	30.74	-32.85	-28.4	15.16	31.5
Reach-1	5145	10 Year	373.76	-2.93	375.14	36.64		955			-28.4	15.16	

HEC-RAS Plan: PR_FEMA_Fldw River: Beaver Pond Brk Reach: Reach-1													
Reach	River Sta	Profile	W.S. Elev	Prof Delta	E.G. Elev	Top Wdth	Q Left	Q Channel	Q Right	Enc Sta L	Ch Sta L	Ch Sta R	Enc Sta R
			(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)
Reach-1	5145	10 Yr Fldwy	373.74	-2.95	375.14	36.59		955		-32.85	-28.4	15.16	31.5
Reach-1	5084	100 Year	376.56		377	122.99	9.18	1879.69	71.14		-25.47	24.61	
Reach-1	5084	Floodway	376.56	0	377	93	7.55	1892.75	59.71	-31.5	-25.47	24.61	61.5
Reach-1	5084	10 Year	372.79	-3.77	373.29	42.06		955			-25.47	24.61	
Reach-1	5084	10 Yr Fldwy	372.78	-3.78	373.29	42.05		955		-31.5	-25.47	24.61	61.5
Reach-1	5065	100 Year	376.5		376.87	60.04	5.73	1945.42	8.85		-25.9	25.84	
Reach-1	5065	Floodway	376.5	0	376.87	60.04	5.73	1946.41	7.86	-30.71	-25.9	25.84	29.33
Reach-1	5065	10 Year	372.66	-3.84	373.01	46.38		955			-25.9	25.84	
Reach-1	5065	10 Yr Fldwy	372.66	-3.84	373.01	46.38		955		-30.71	-25.9	25.84	29.33
Reach-1	5042.5		Culvert										
Reach-1	5021	100 Year	370.06		371.79	48.39		1960	0		-24.03	24.22	
Reach-1	5021	Floodway	370.06	0	371.79	48.39		1960	0	-24.05	-24.03	24.22	24.38
Reach-1	5021	10 Year	368.43	-1.63	369.55	41.11		955			-24.03	24.22	
Reach-1	5021	10 Yr Fldwy	368.43	-1.63	369.55	41.11		955		-24.05	-24.03	24.22	24.38

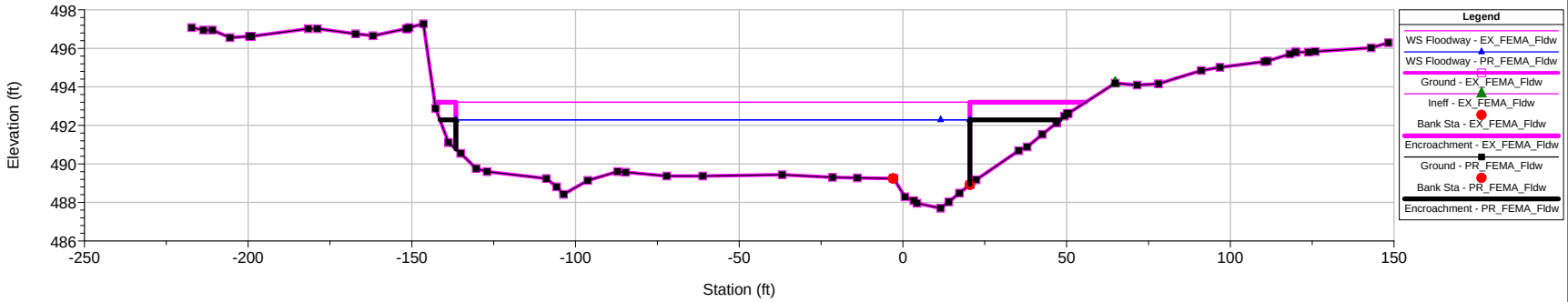
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

FEMA STATION 5229, CROSS SECTION AC

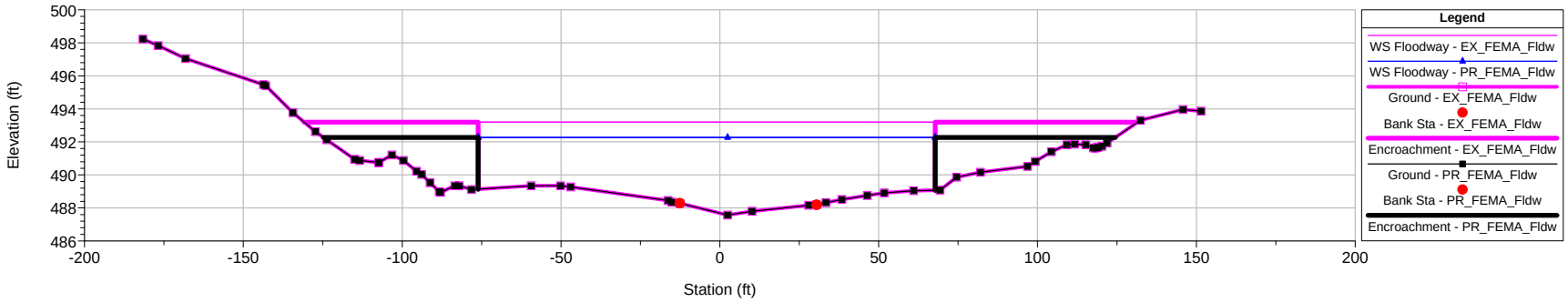


Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

FEMA STATION 5228, CROSS SECTION AB

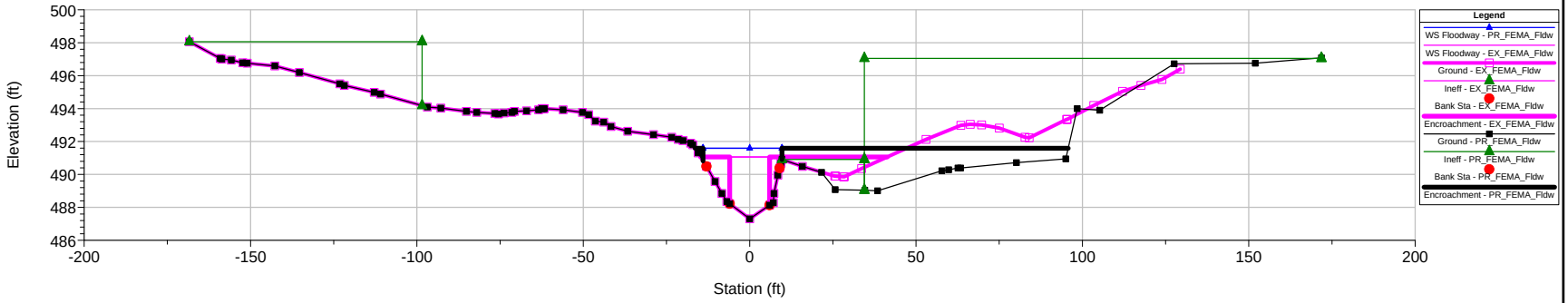


Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw



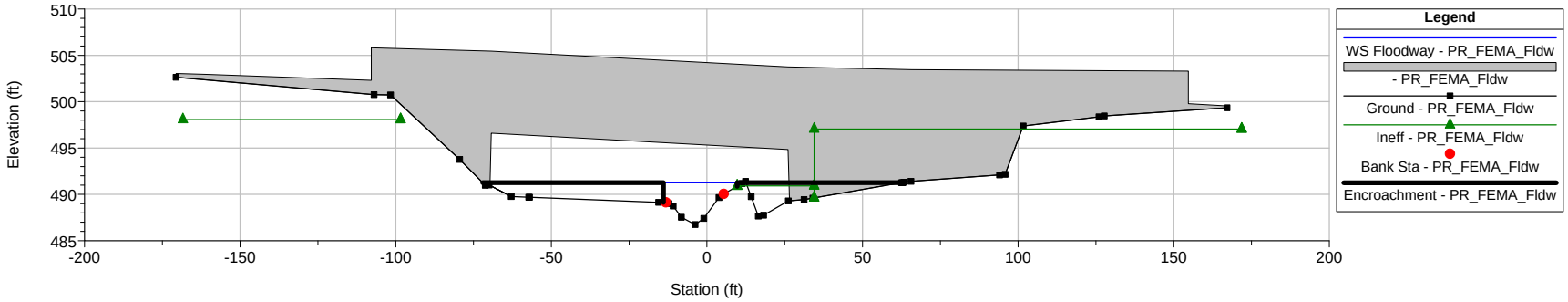
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

U/S of Brdg #06580, I-84 OffRamp to Austin Rd (FEMA AA - STA 522



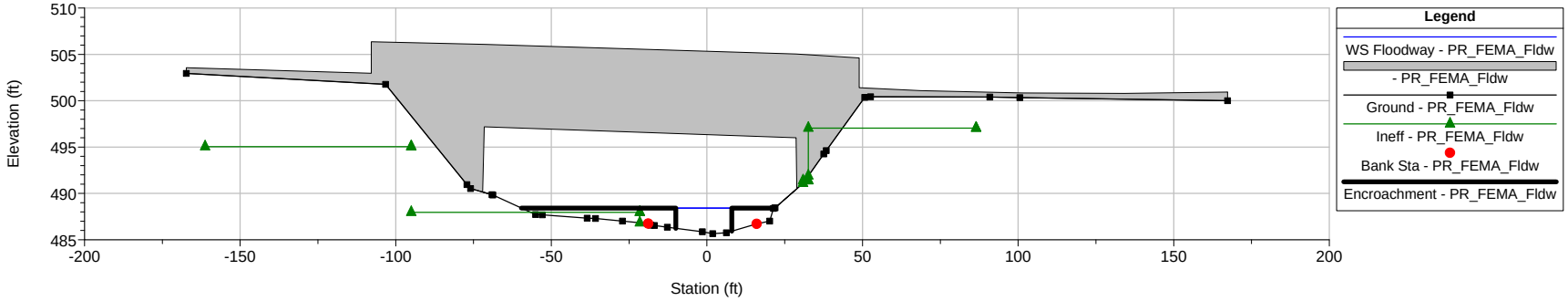
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

Bridge No. 06580, I-84 Off-Ramp to Austin Rd



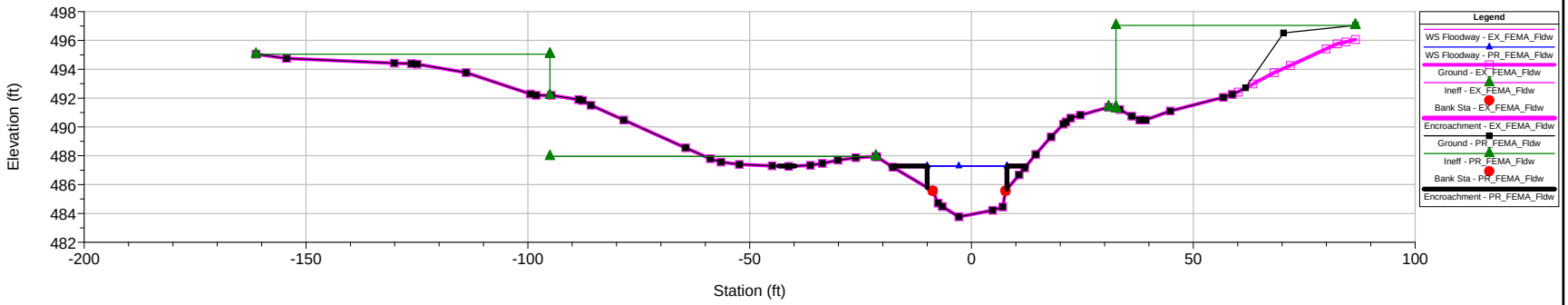
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

Bridge No. 06580, I-84 Off-Ramp to Austin Rd

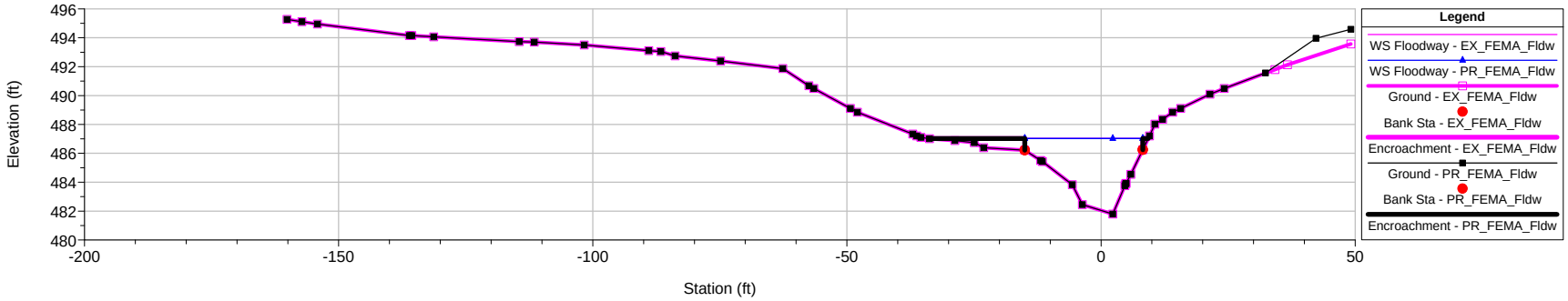


Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

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

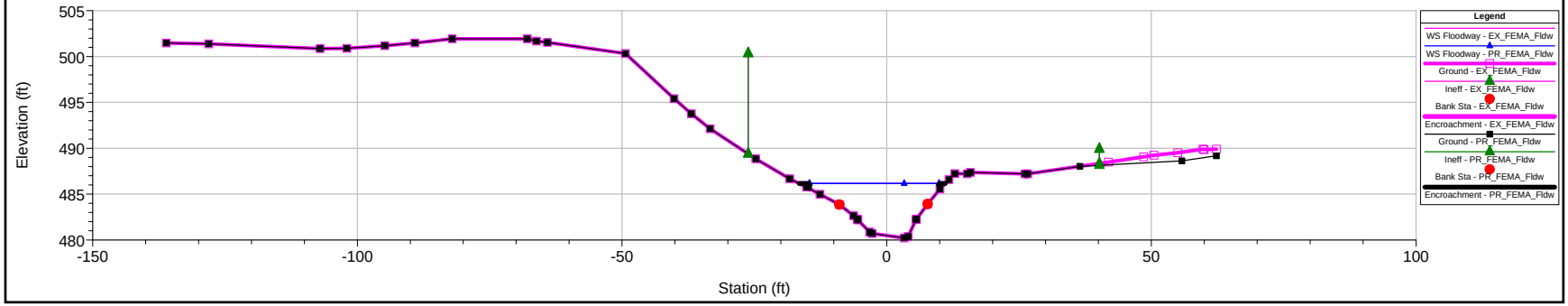


Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw



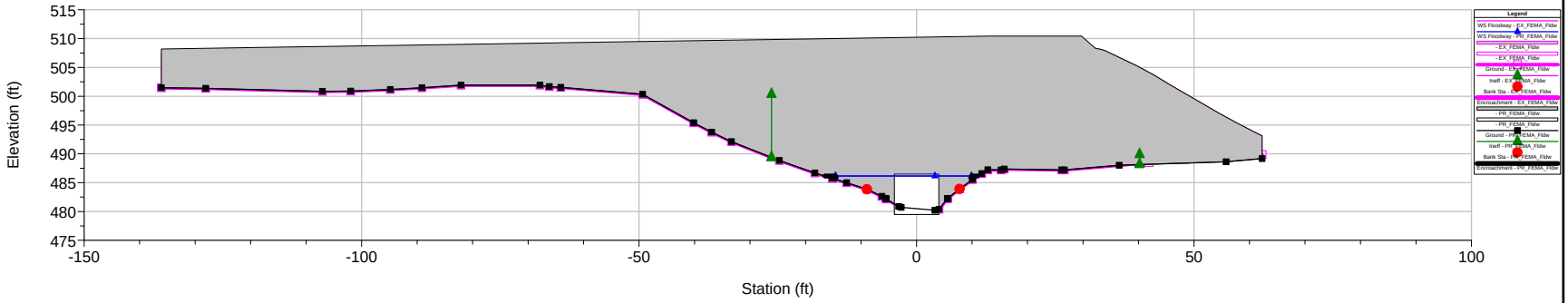
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

U/S of Austin Road Str No. 151007 (FEMA Z -STA 5226)



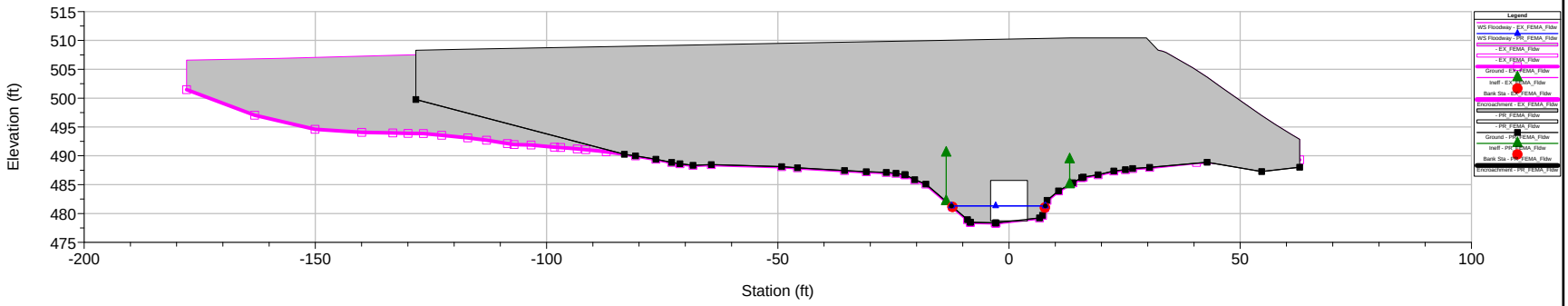
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

Austin Road Str No. 151007



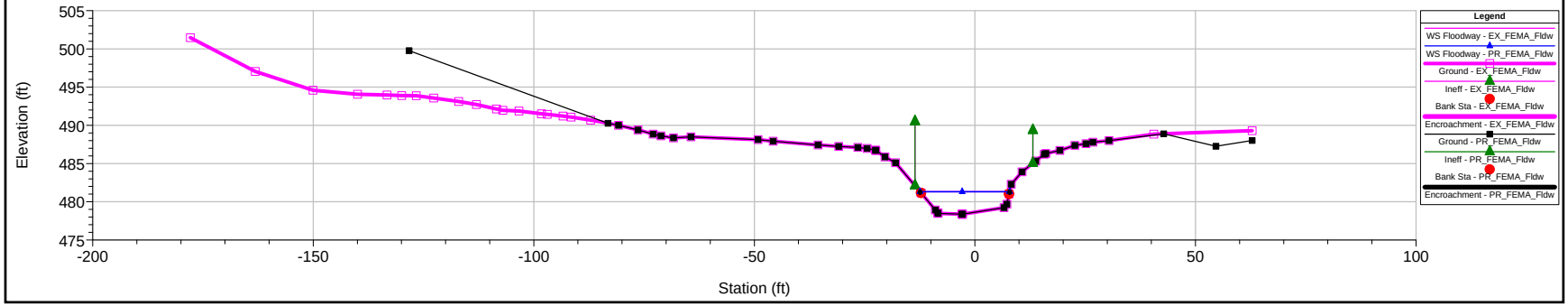
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

Austin Road Str No. 151007



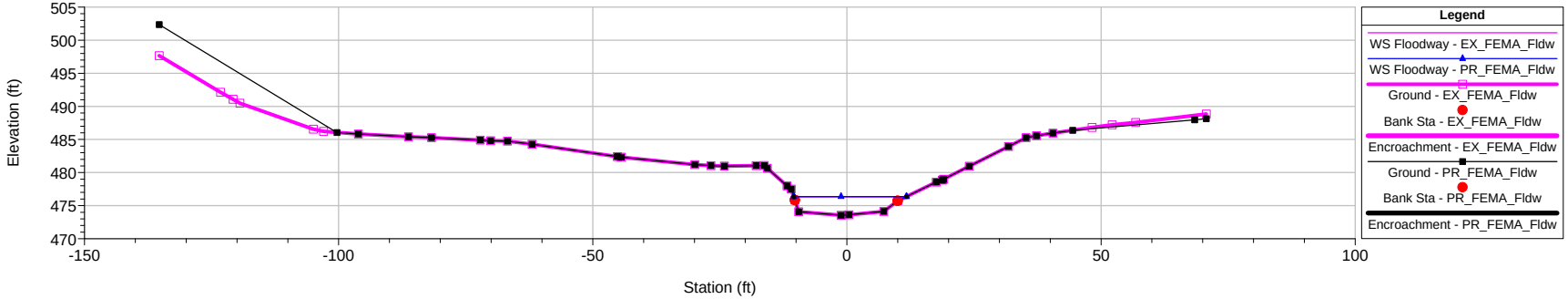
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

D/S of Austin Road Str No. 151007



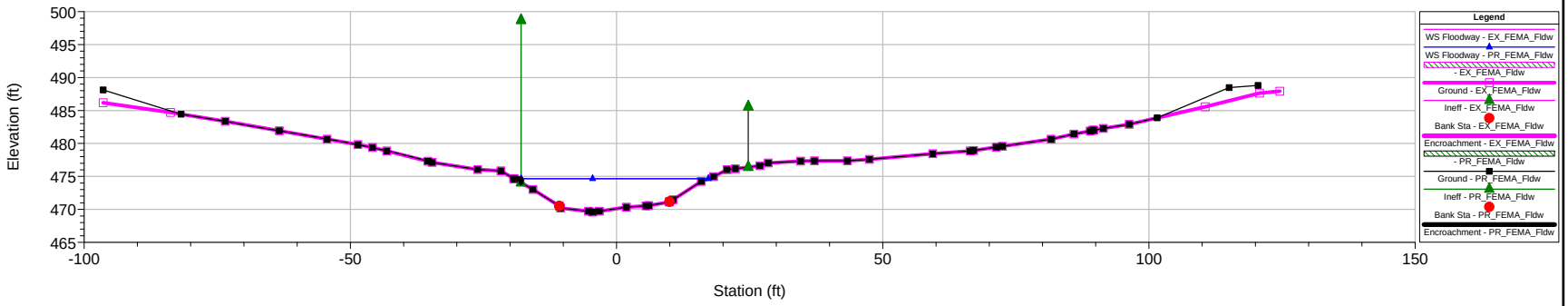
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

FEMA STATION 5225, CROSS SECTION Y



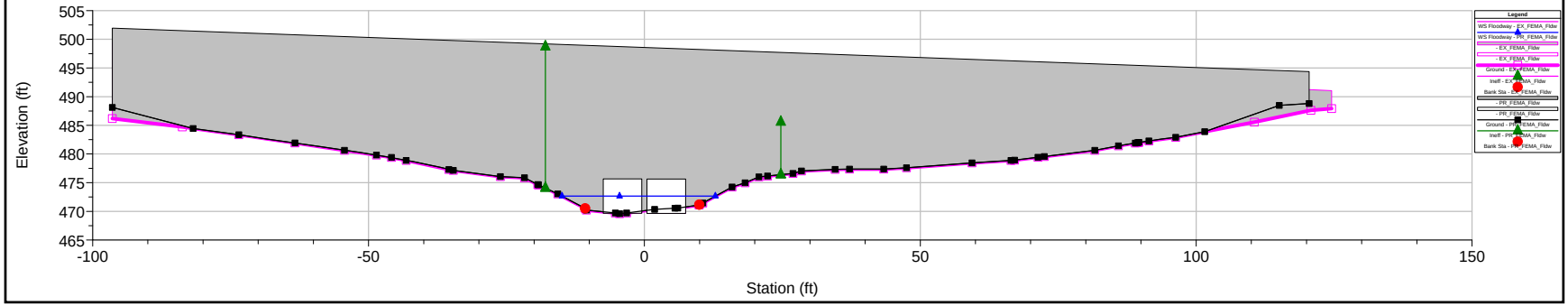
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

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



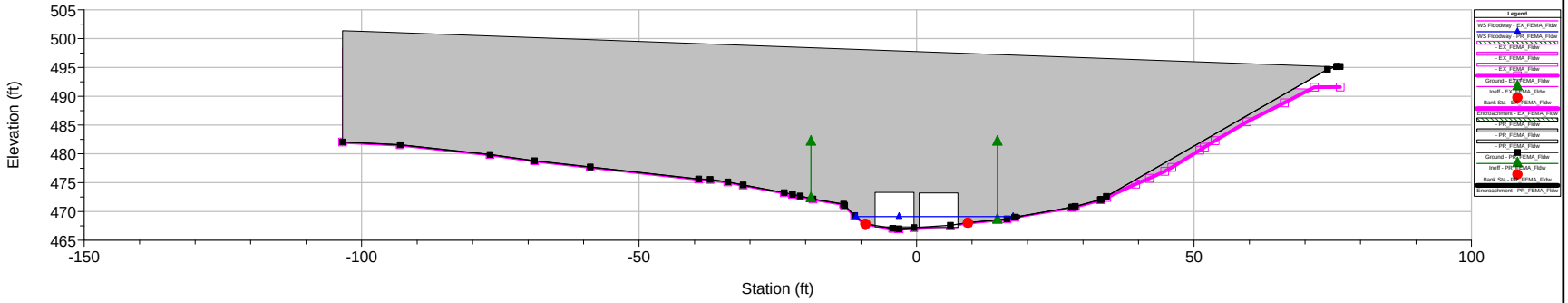
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

Str 04323, I-84 WB On-Ramp from Austin Rd



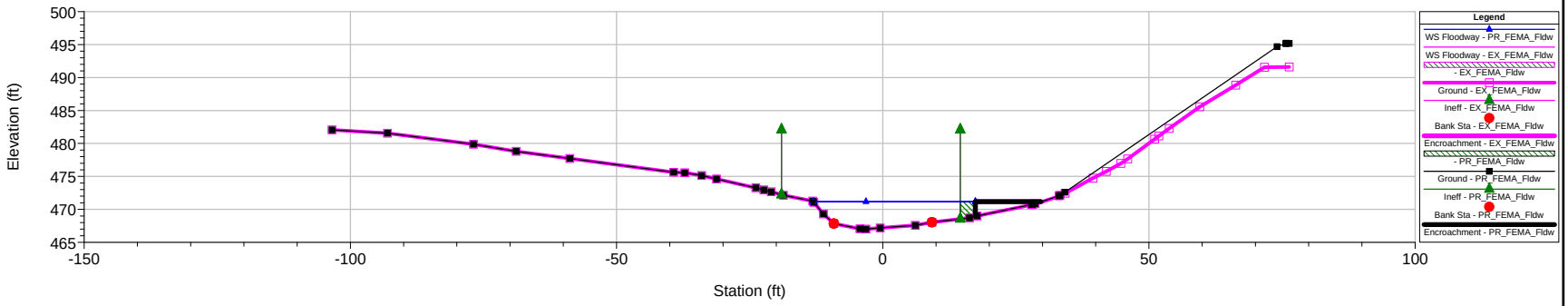
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

Str 04323, I-84 WB On-Ramp from Austin Rd

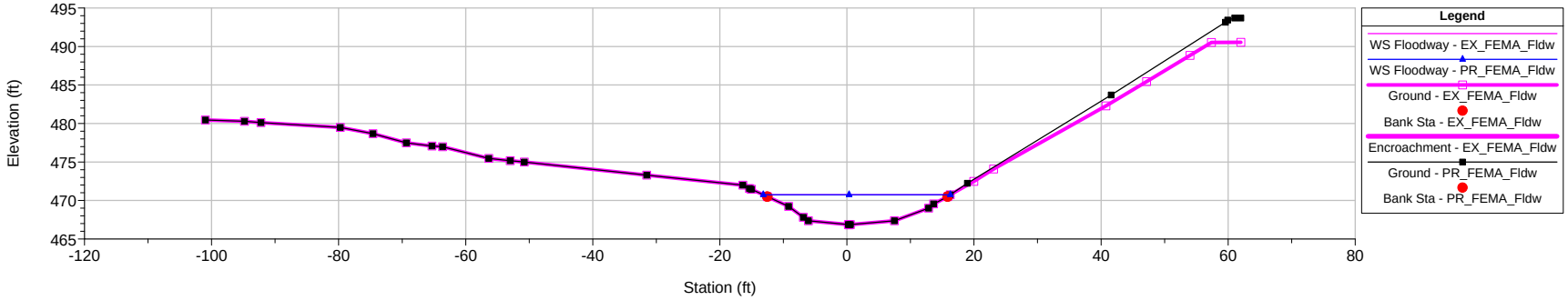


Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

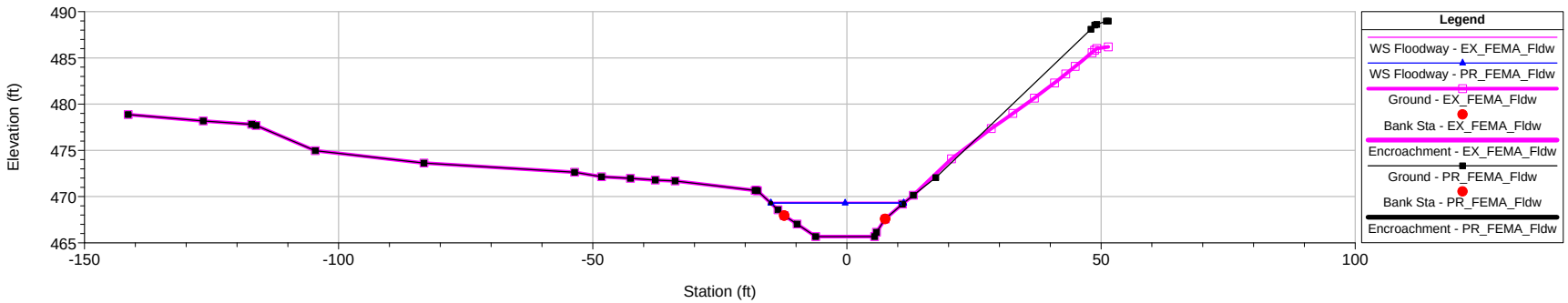
D/S of Str 04323, I-84 WB On-Ramp from Austin Rd



Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

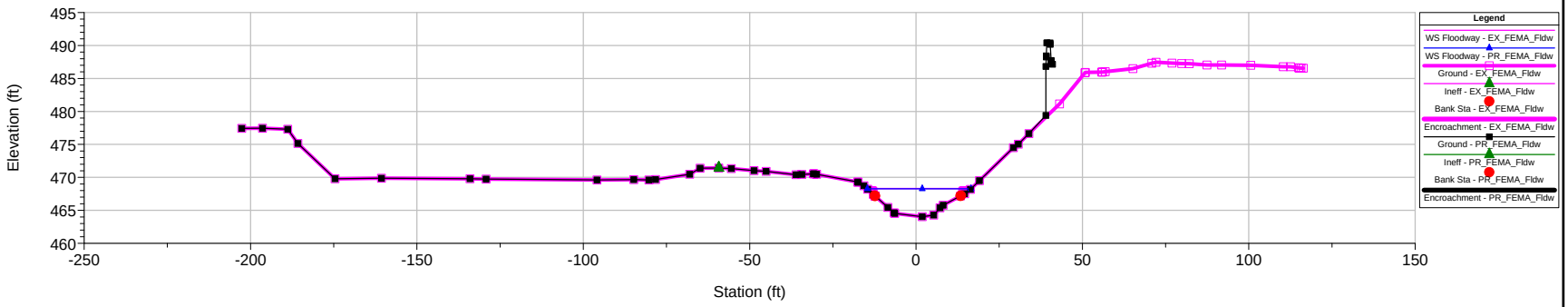


Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

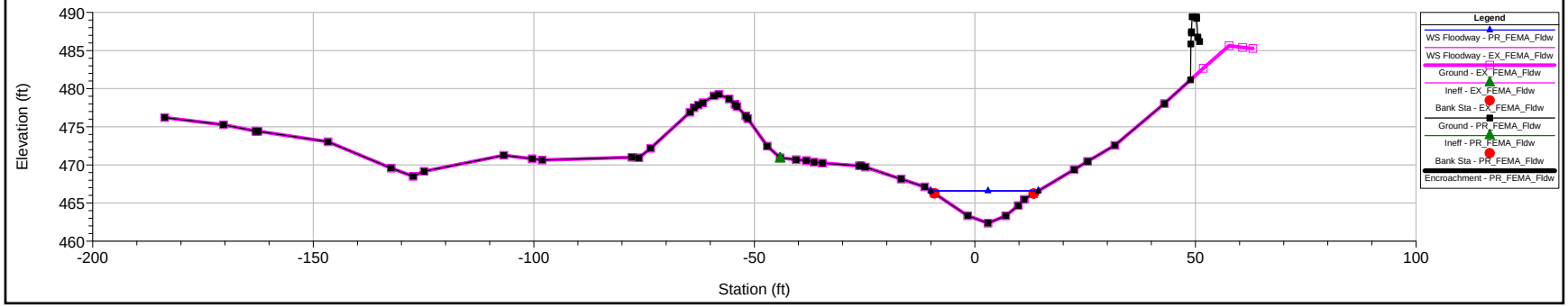


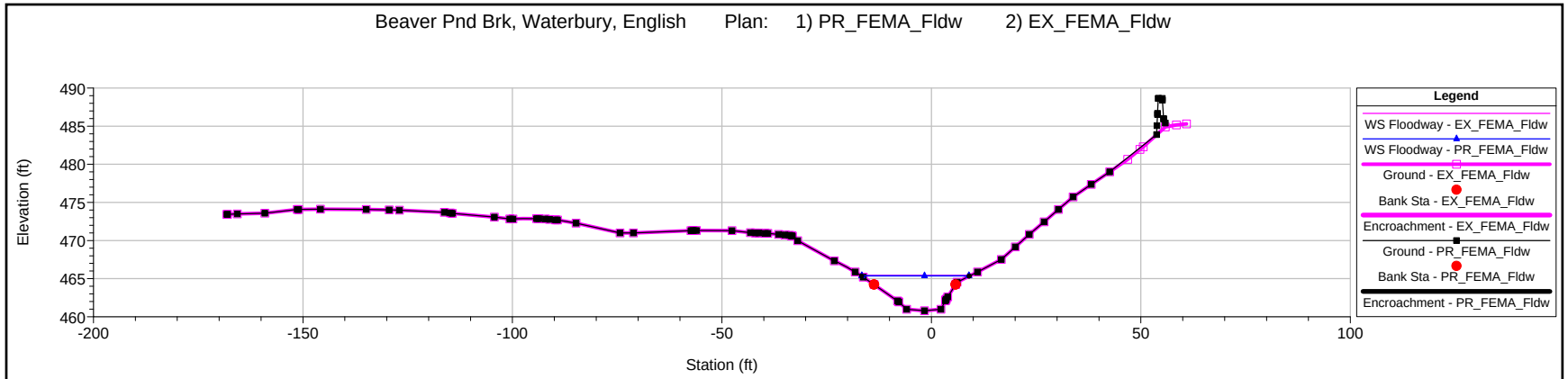
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

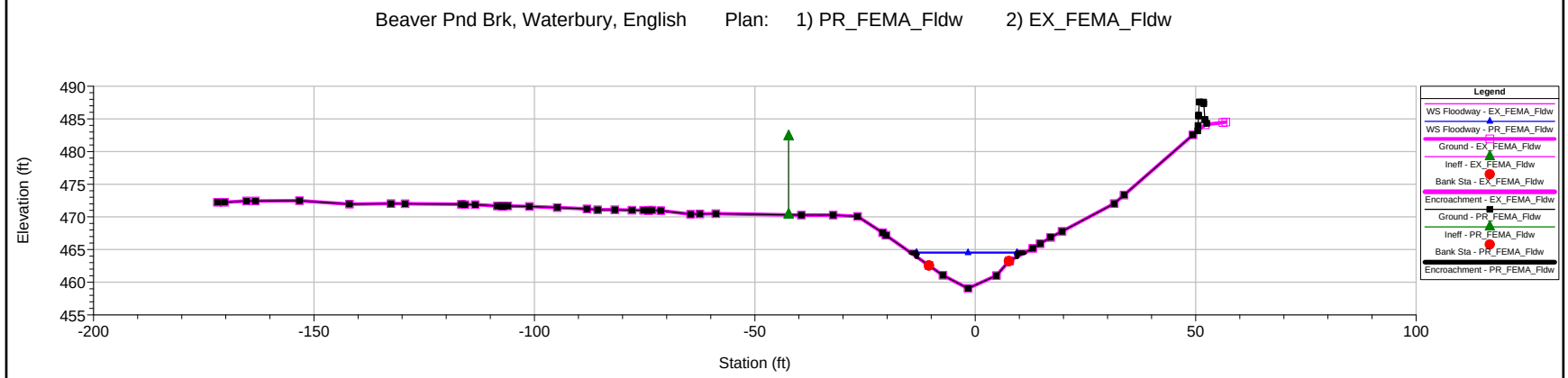
FEMA STATION 5224, CROSS SECTION X

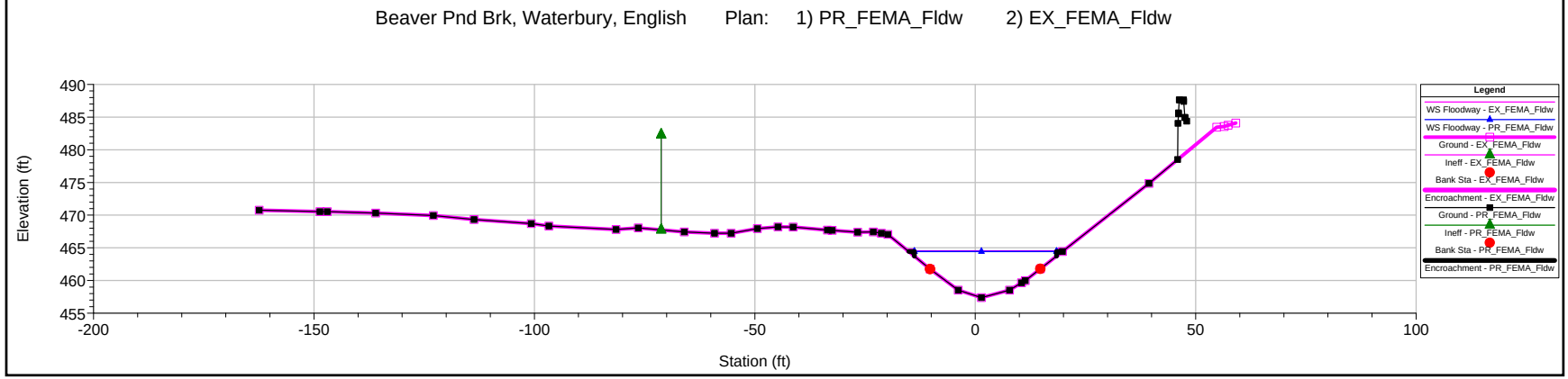


Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw



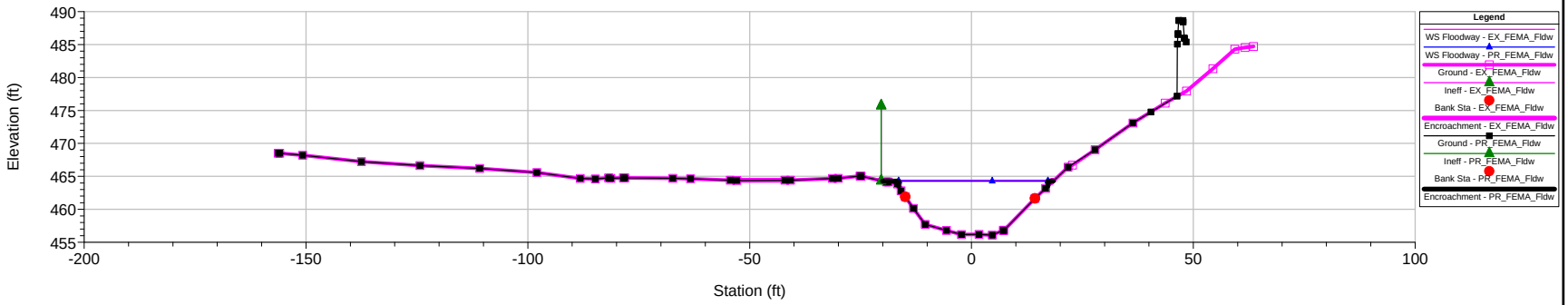

Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw
Elevation (ft)
Station (ft)
Legend
WS Floodway - EX_FEMA_Fldw
WS Floodway - PR_FEMA_Fldw
Ground - EX_FEMA_Fldw
Bank Sta - EX_FEMA_Fldw
Encroachment - EX_FEMA_Fldw
Ground - PR_FEMA_Fldw
Bank Sta - PR_FEMA_Fldw
Encroachment - PR_FEMA_Fldw


Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw
Elevation (ft)
Station (ft)
Legend
WS Floodway - EX_FEMA_Fldw
WS Floodway - PR_FEMA_Fldw
Ground - EX_FEMA_Fldw
Ineff - EX_FEMA_Fldw
Bank Sta - EX_FEMA_Fldw
Encroachment - EX_FEMA_Fldw
Ground - PR_FEMA_Fldw
Ineff - PR_FEMA_Fldw
Bank Sta - PR_FEMA_Fldw
Encroachment - PR_FEMA_Fldw


Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw
Elevation (ft)
Station (ft)
Legend
WS Floodway - EX_FEMA_Fldw
WS Floodway - PR_FEMA_Fldw
Ground - EX_FEMA_Fldw
Ineff - EX_FEMA_Fldw
Bank Sta - EX_FEMA_Fldw
Encroachment - EX_FEMA_Fldw
Ground - PR_FEMA_Fldw
Ineff - PR_FEMA_Fldw
Bank Sta - PR_FEMA_Fldw
Encroachment - PR_FEMA_Fldw

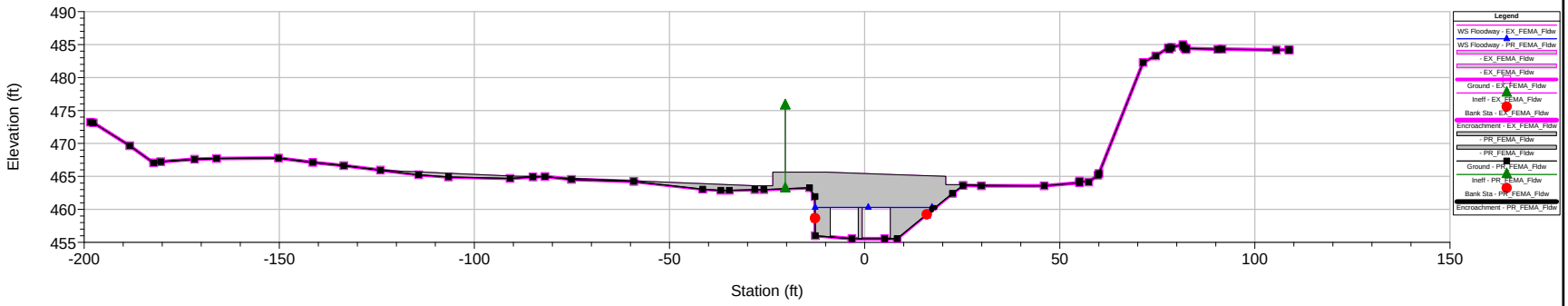
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

U/S of PIERPONT ROAD (FEMA W -STA 5223)



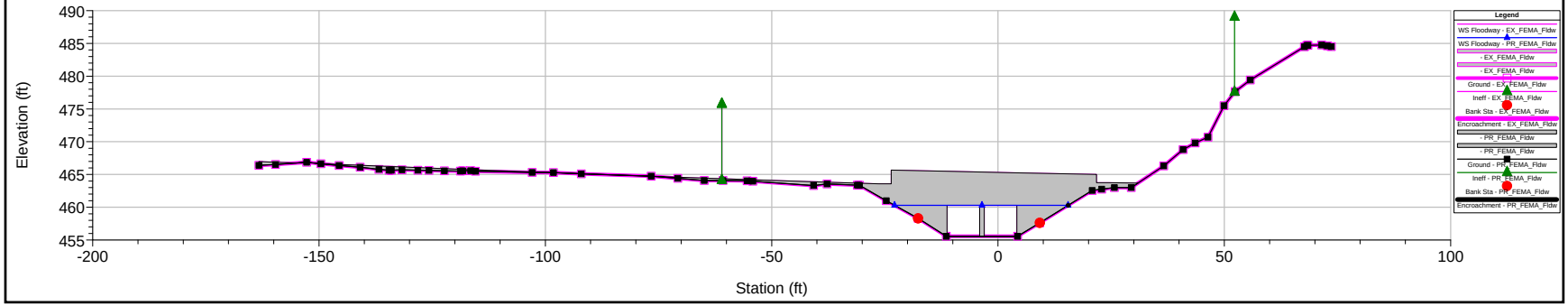
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

EXISTING PIERPONT ROAD STRUCTURE NO. 151-006



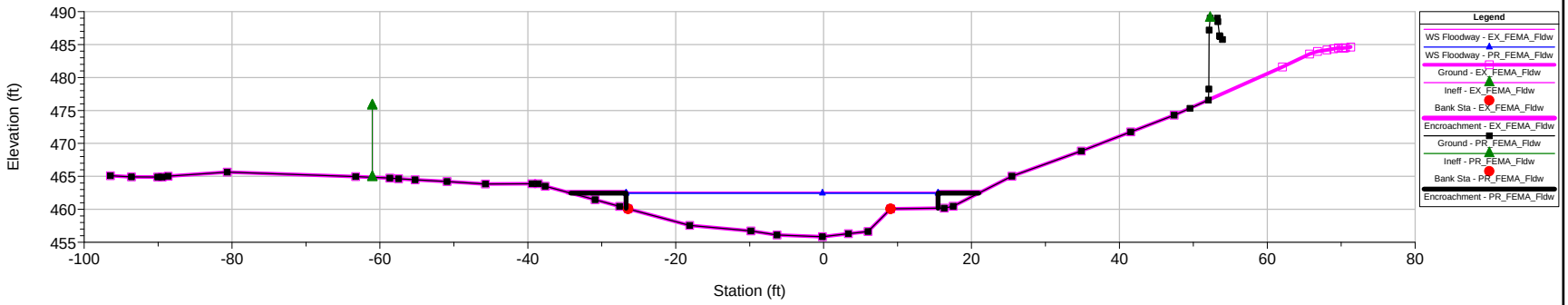
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

EXISTING PIERPONT ROAD STRUCTURE NO. 151-006



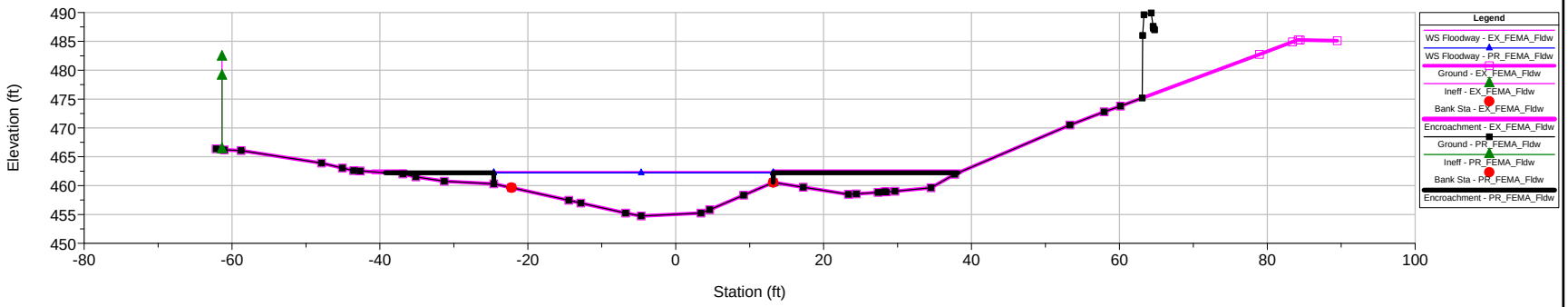
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

D/S of PIERPONT ROAD (FEMA V -STA 5222)



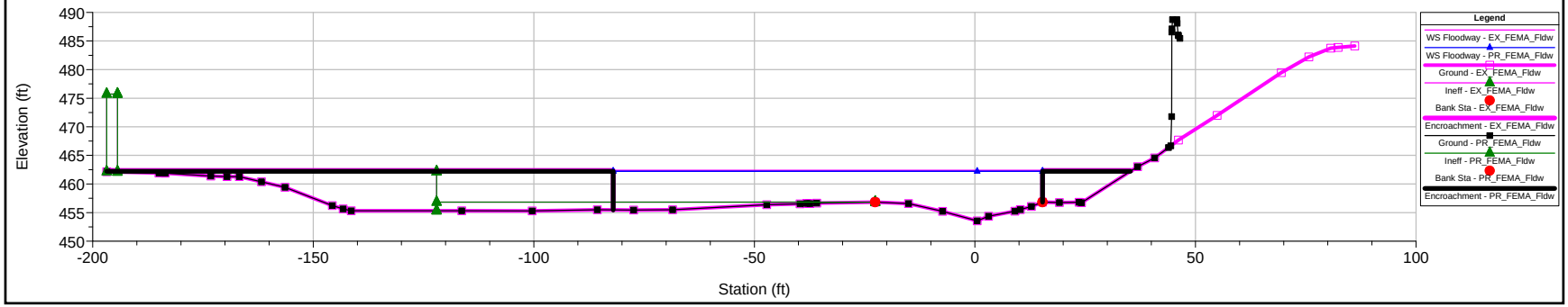
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

D/S End Prop. Retaining Wall No.111



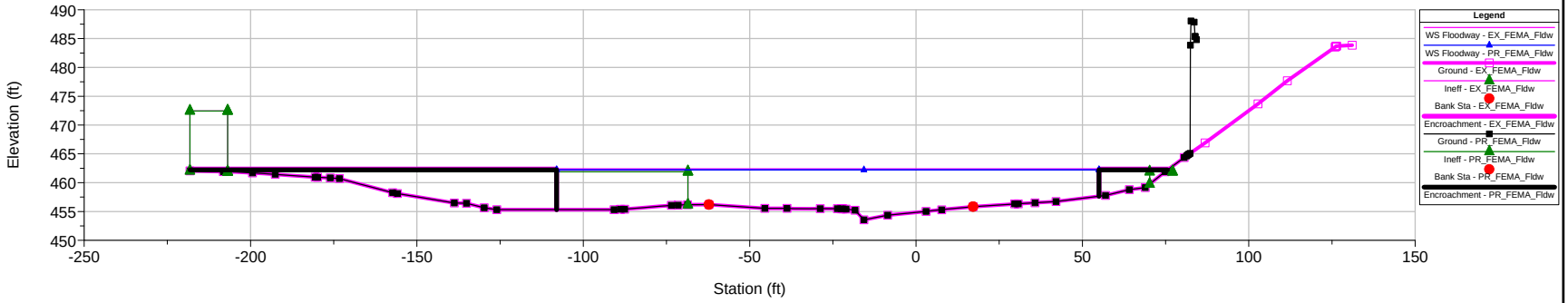
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

190ft (58m) U/S of EXISTING MULLOY ROAD



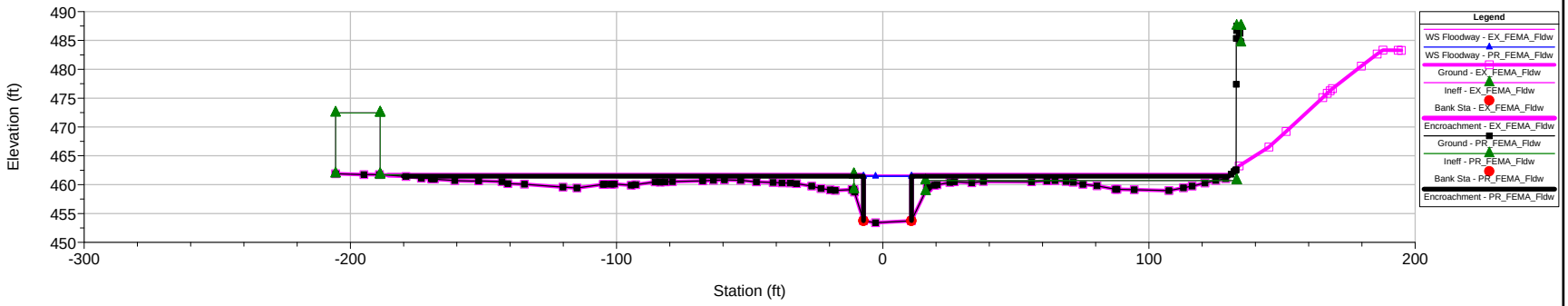
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

44ft (13.4m) U/S EXISTING MULLOY ROAD (FEMA U -STA 5221)



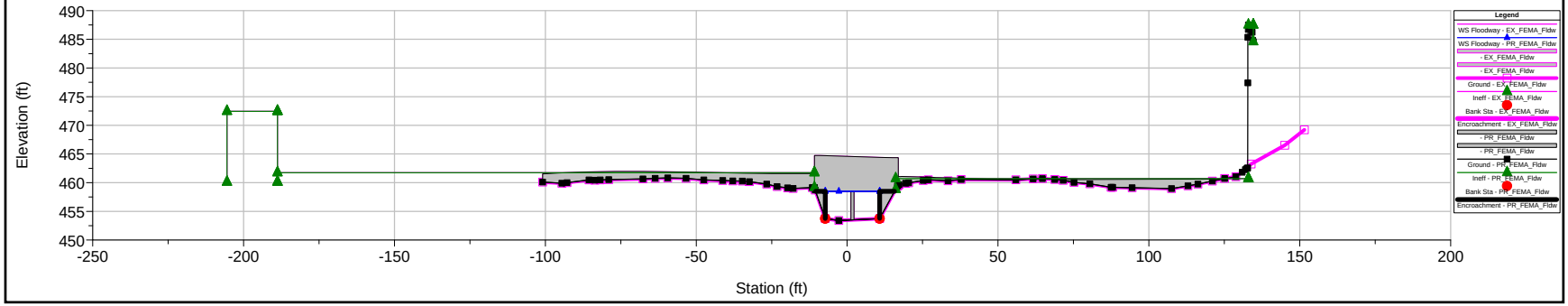
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

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



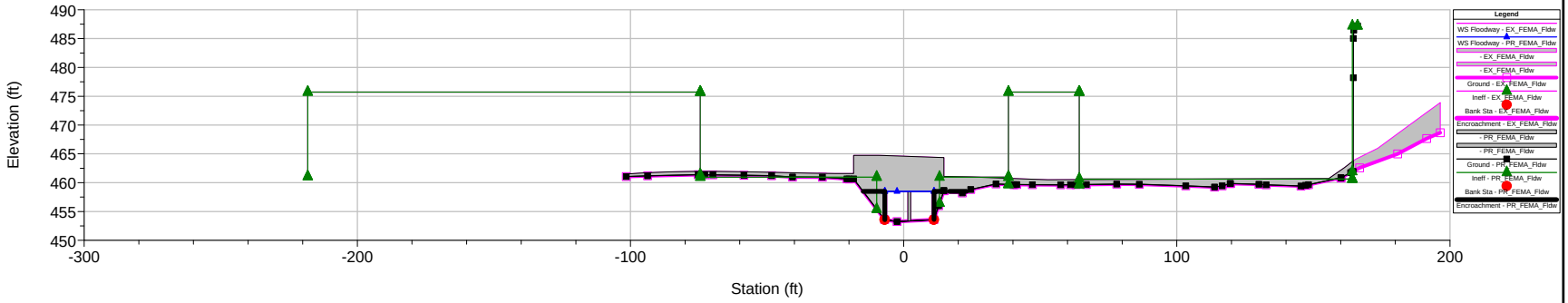
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

EXISTING MULLOY ROAD STRUCTURE NO. 151-005



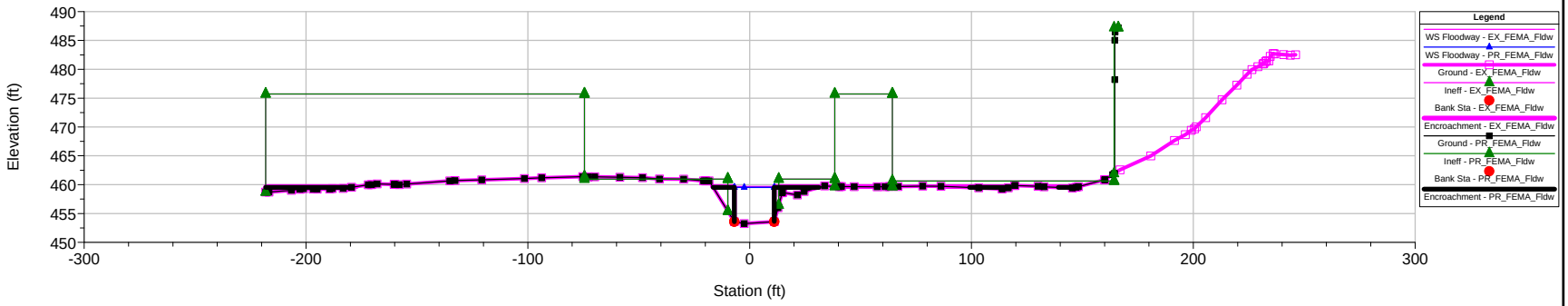
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

EXISTING MULLOY ROAD STRUCTURE NO. 151-005



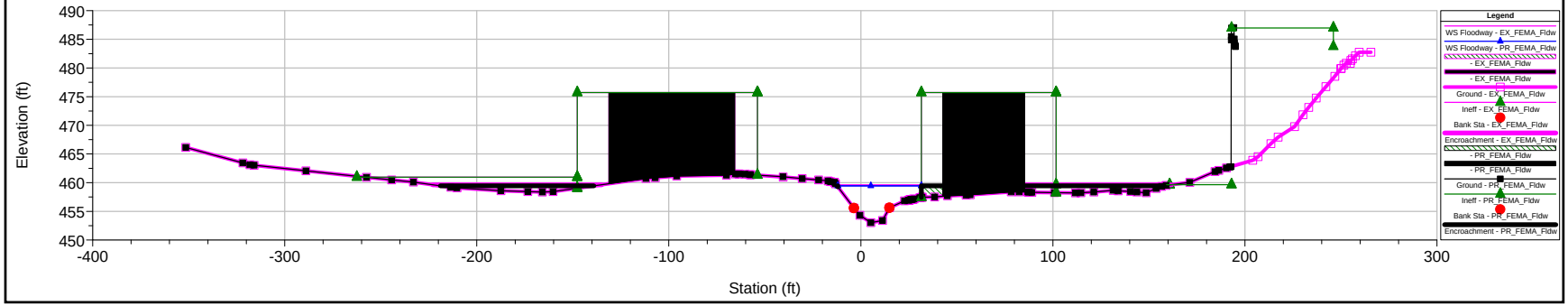
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

D/S of MULLOY RD (FEMA STATION 5220.2)



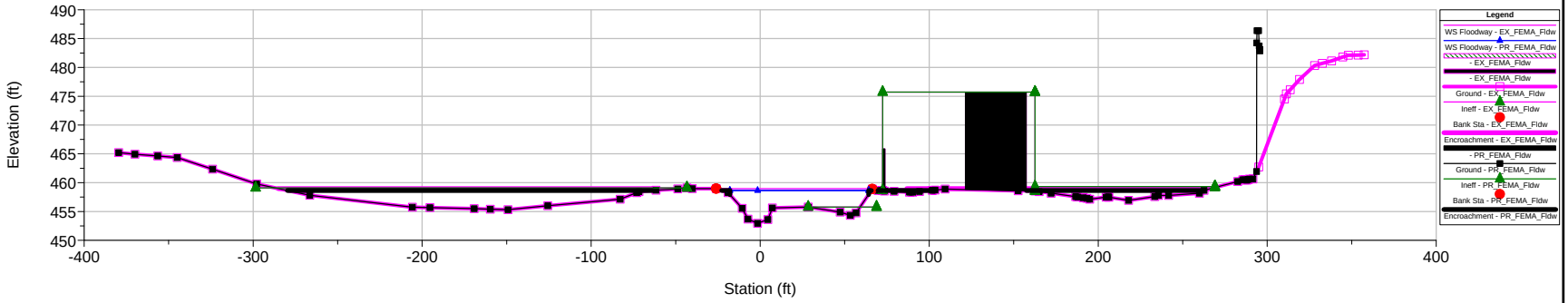
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

48.6ft (14.8m) D/S EXISTING MULLOY ROAD (FEMA T -STA 5220)

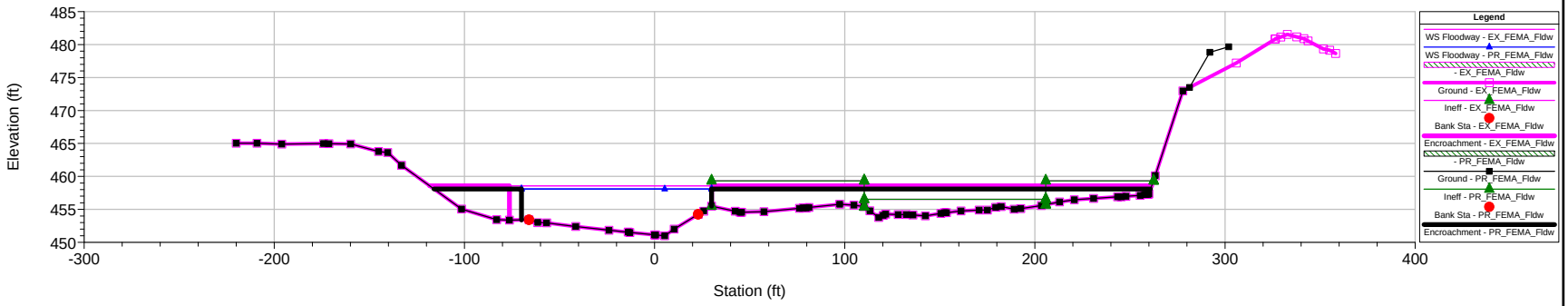


Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

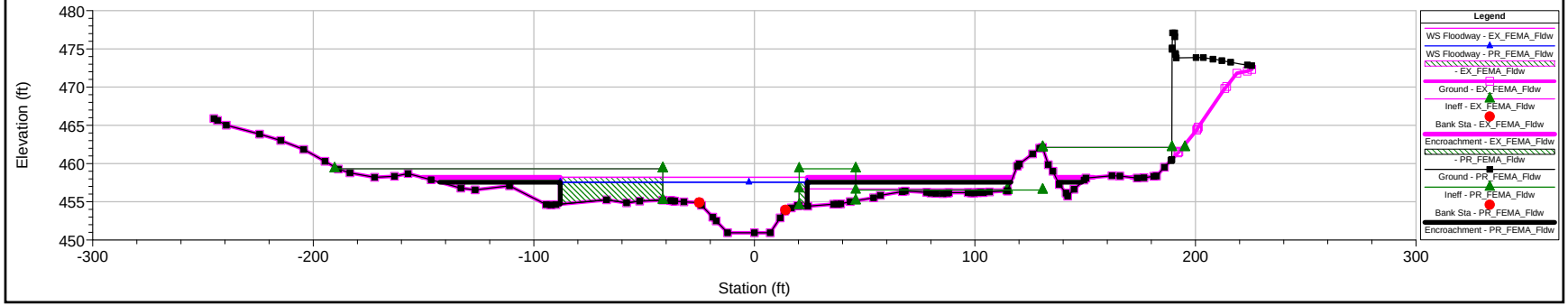
FEMA STATION 5219, CROSS SECTION S



Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

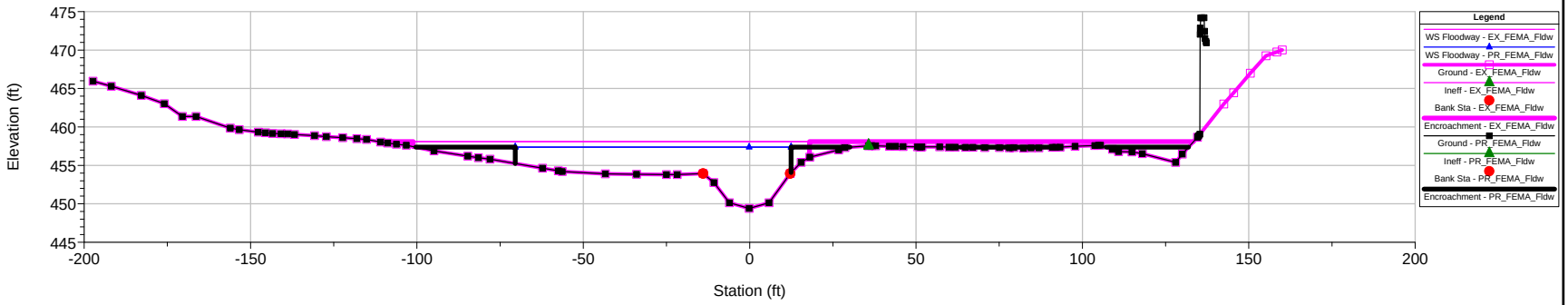


Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw



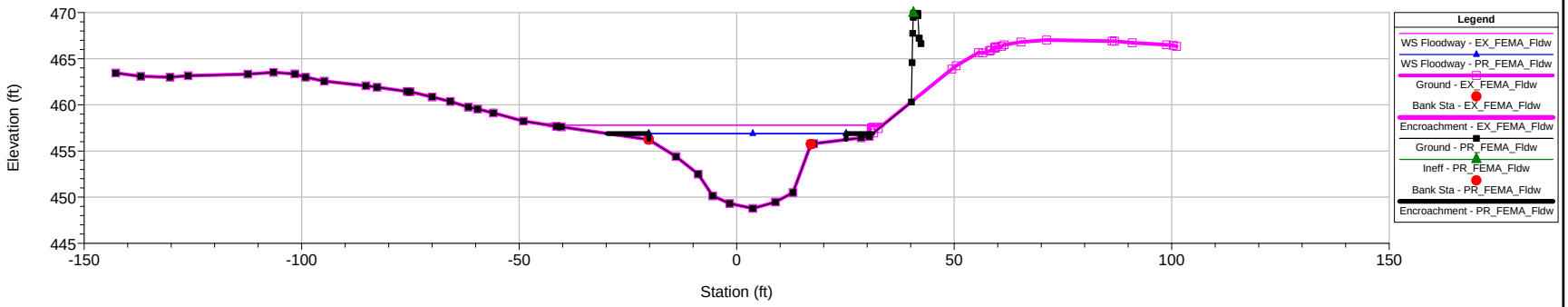
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

FEMA Station 5218, Cross Section R



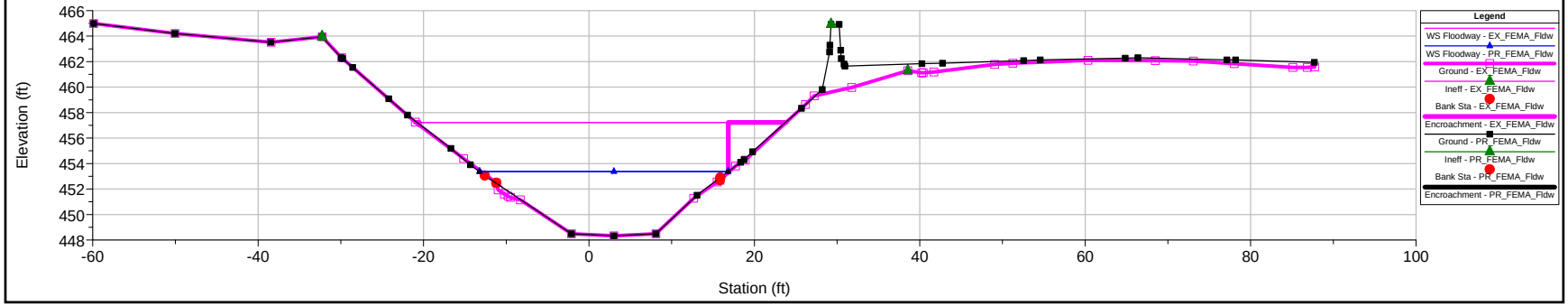
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

FEMA STATION 5217.5, CROSS SECTION Q



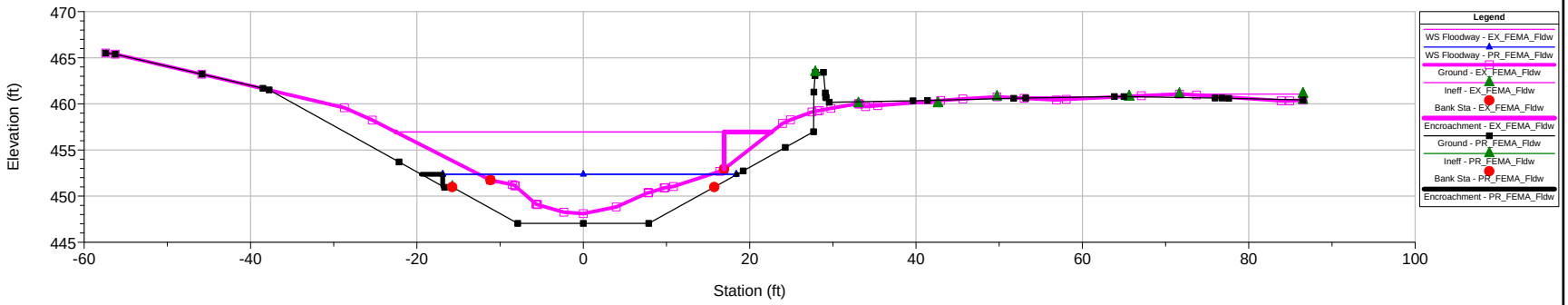
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

Upstream Limit of Proposed Brook Relocation



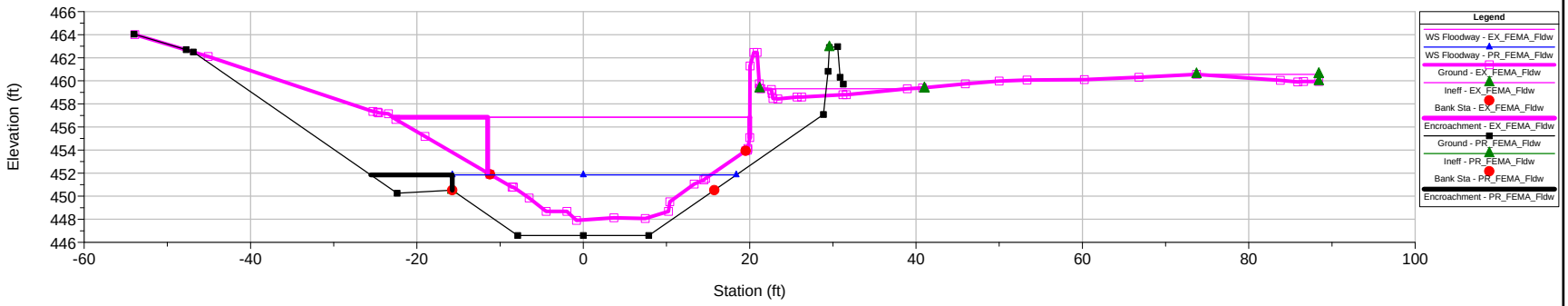
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

141ft (43m) U/S Existing Exit 25 WB Off-Ramp



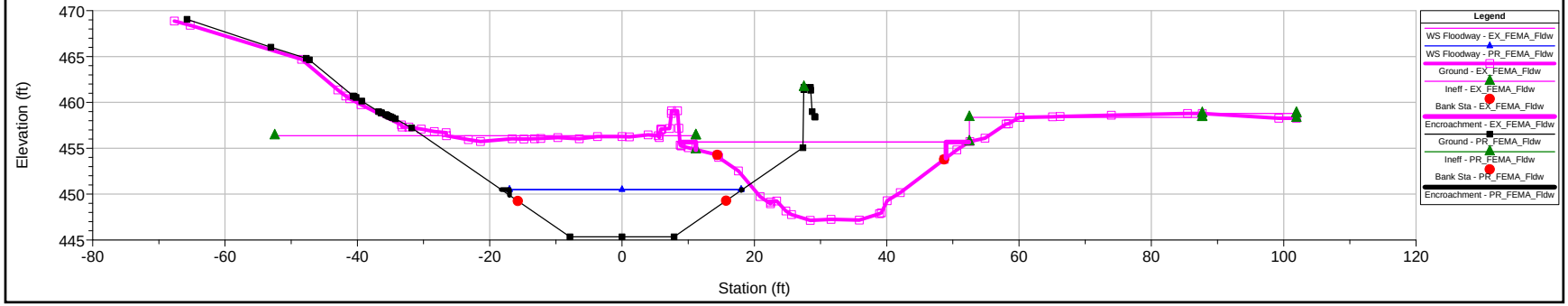
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

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



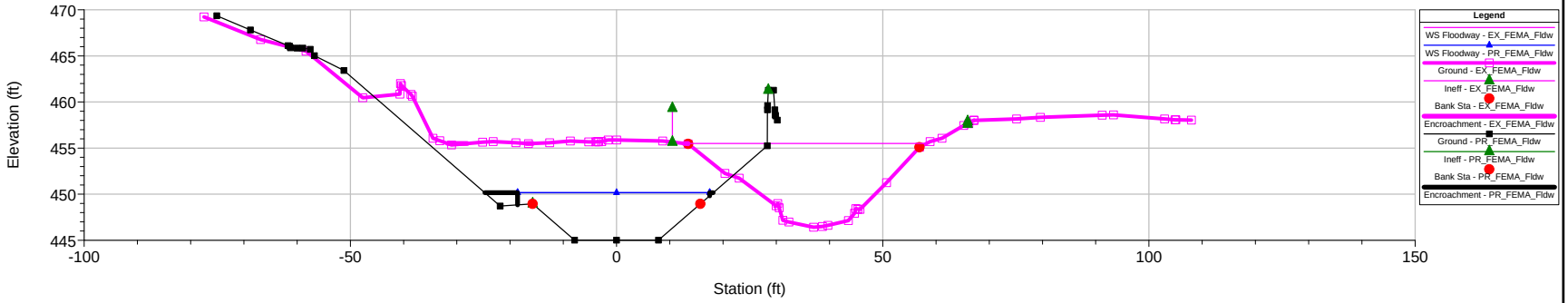
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

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



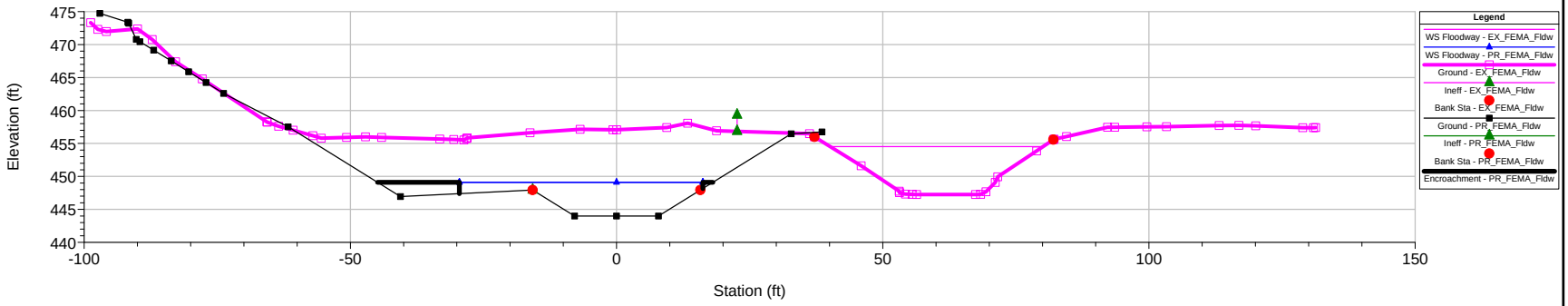
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

111.5ft (34m) D/S Existing Exit 25 WB Off-Ramp



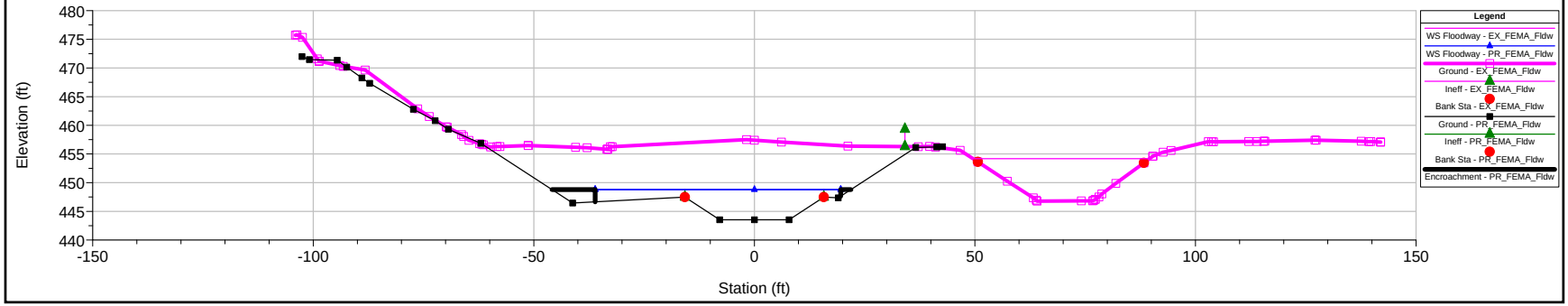
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

D/S End Prop. Retaining Wall No.109



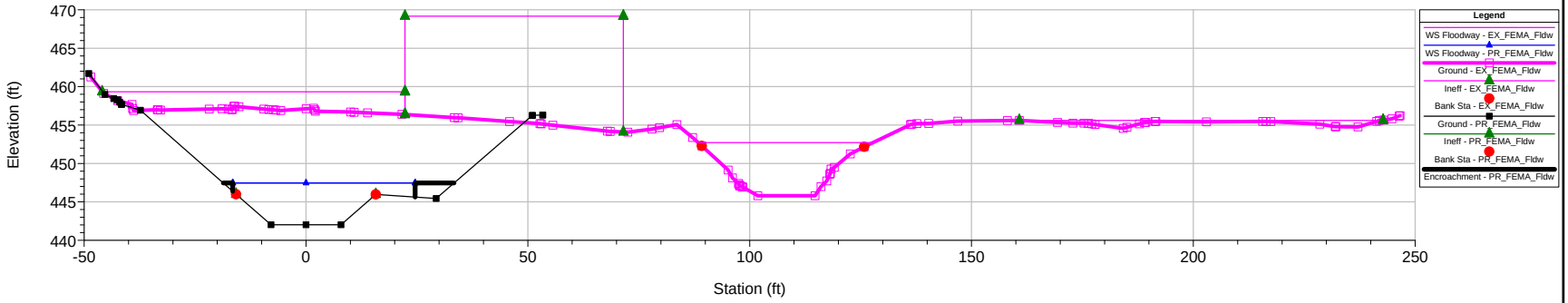
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

895ft (273m) U/S of Scott Road



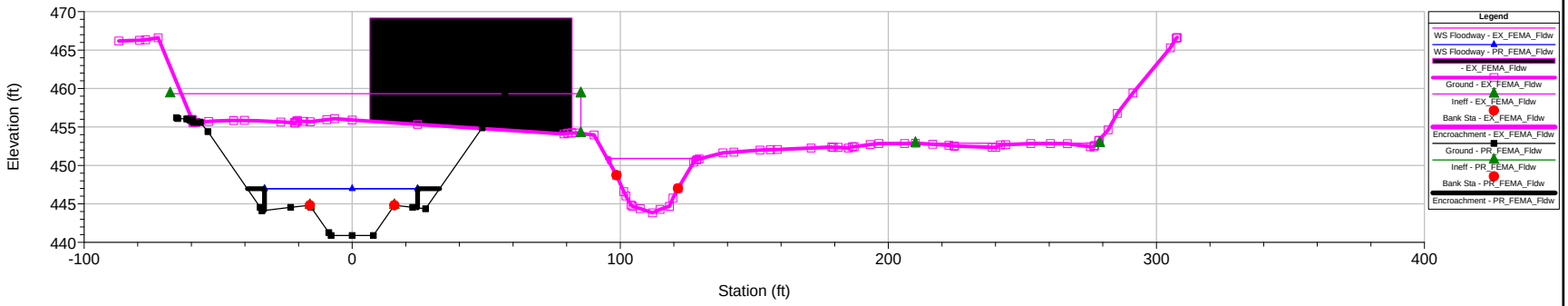
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

635.5ft (193.7m) U/S Proposed Scott Road Culvert



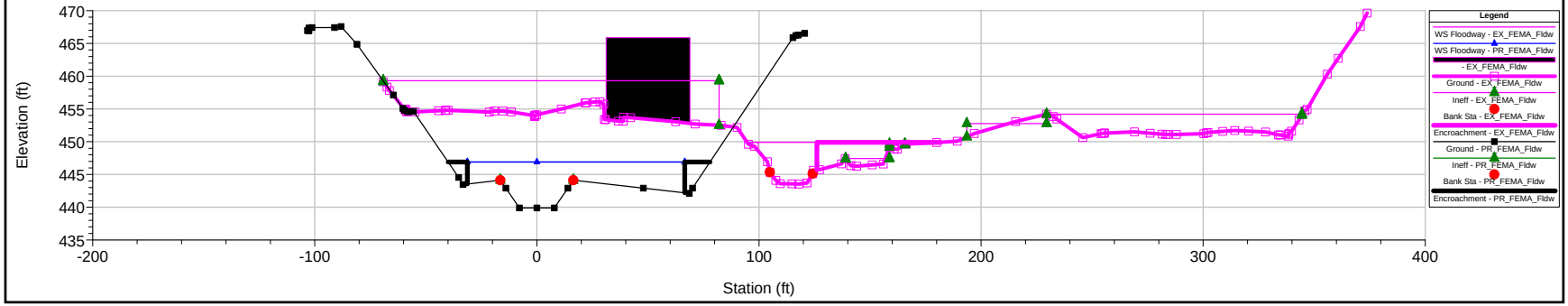
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

438ft (133.5m) U/S of Scott Road



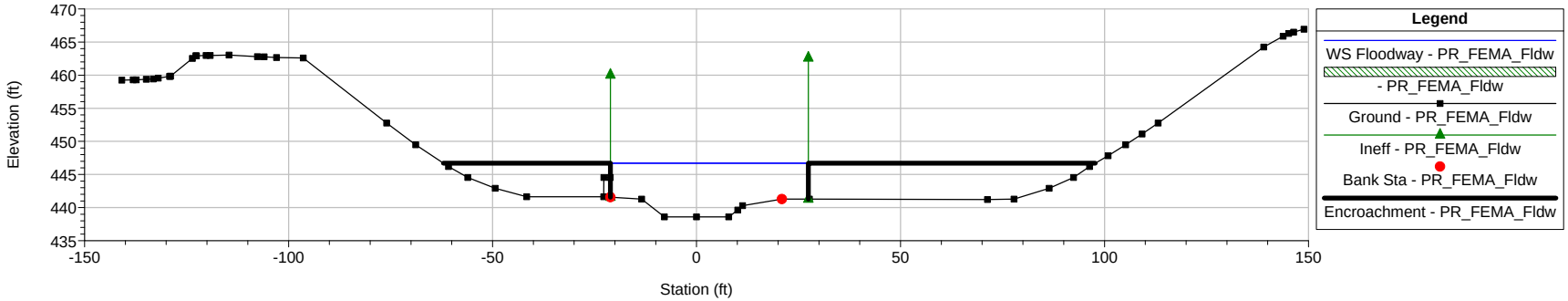
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

266ft (81m) U/S of Scott Road



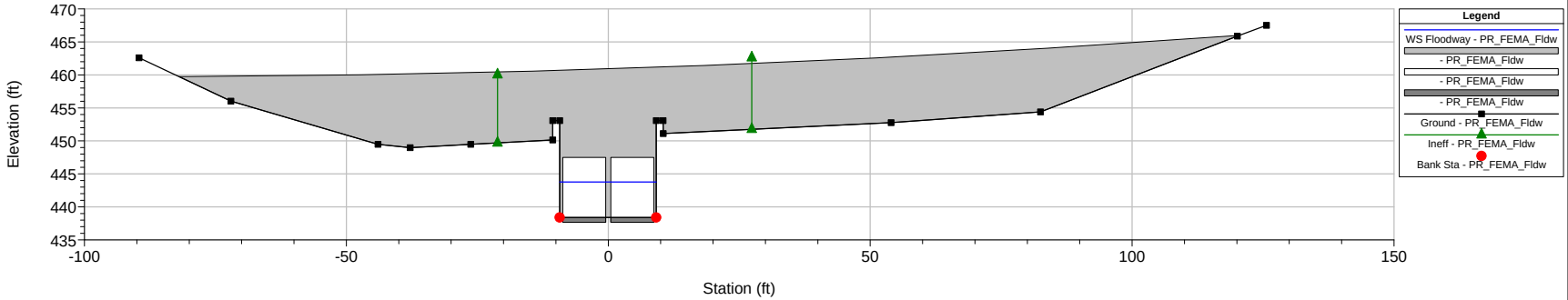
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

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



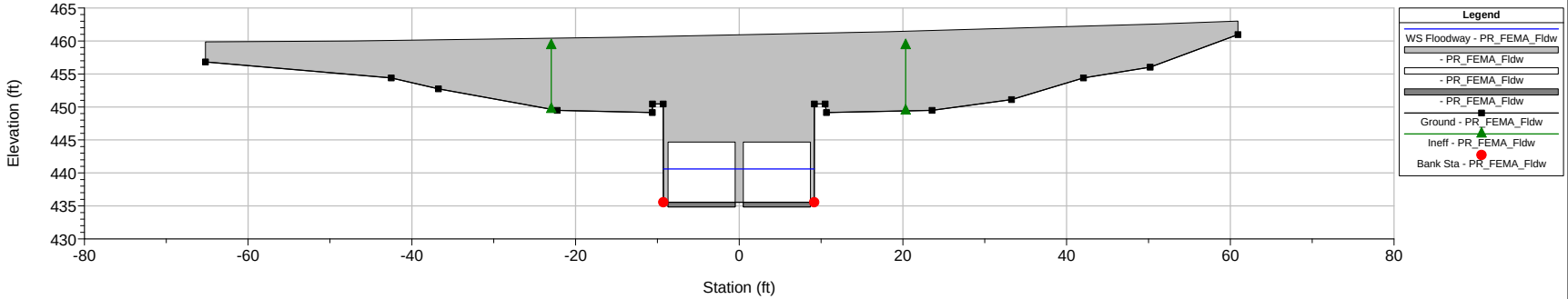
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

Proposed Culvert No. 014 - Scott Road



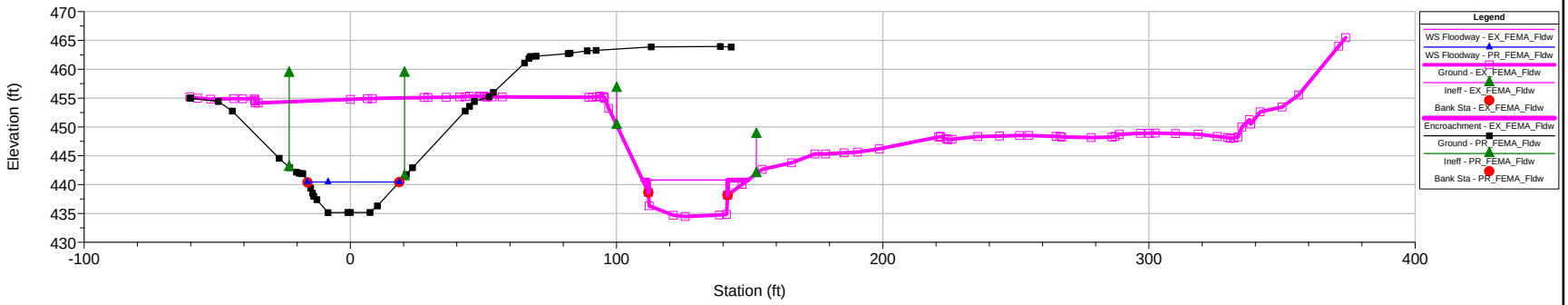
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

Proposed Culvert No. 014 - Scott Road



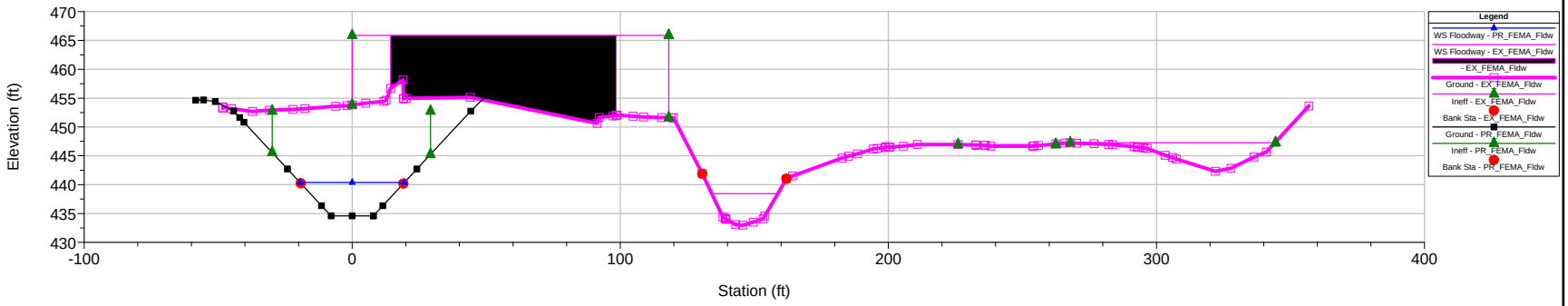
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

D/S of Scott Road Culvert



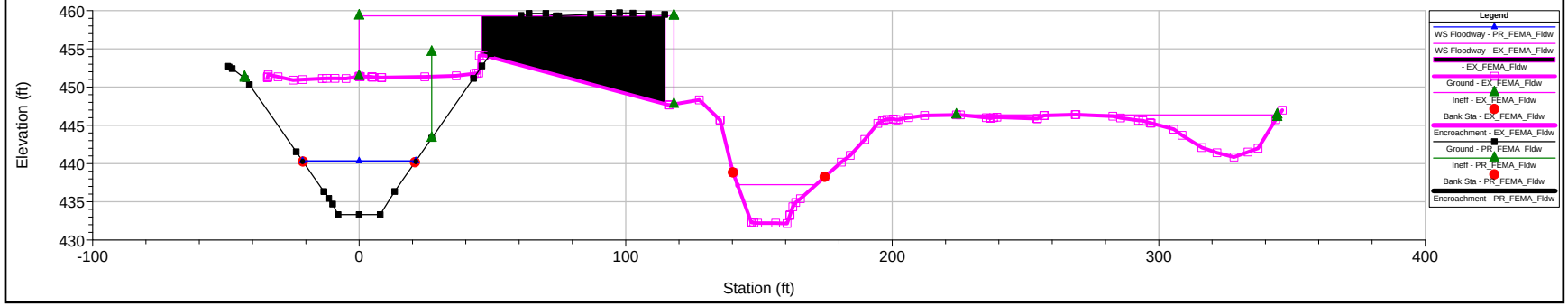
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

(comp. FEMA Sec M, STATION 5213)



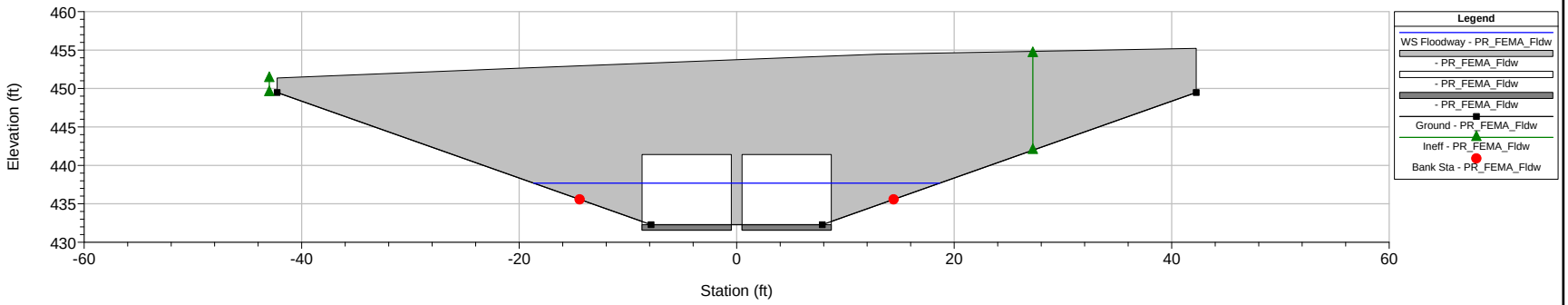
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

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



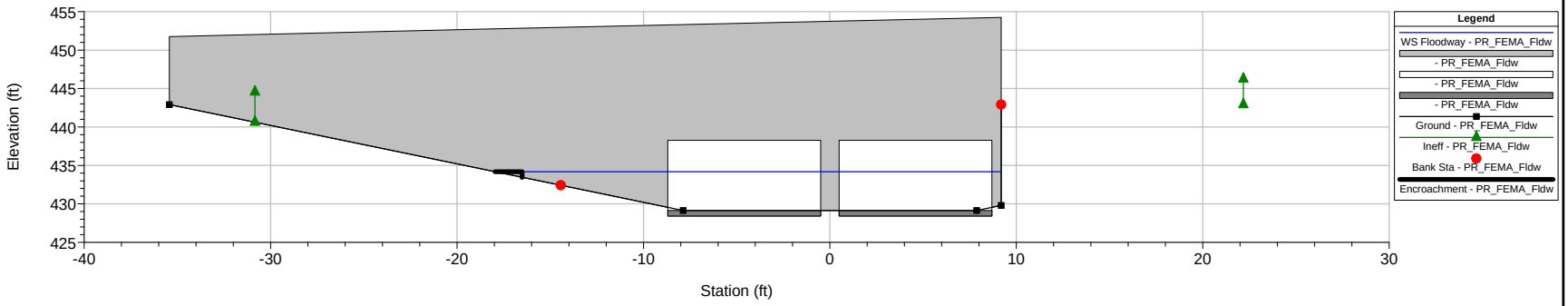
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

Proposed Culvert No. 06622 - Plank Road East



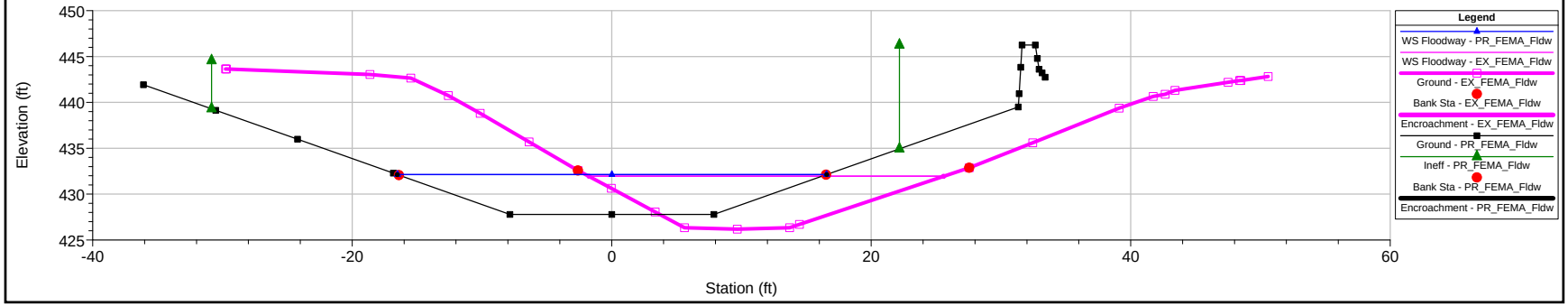
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

Proposed Culvert No. 06622 - Plank Road East



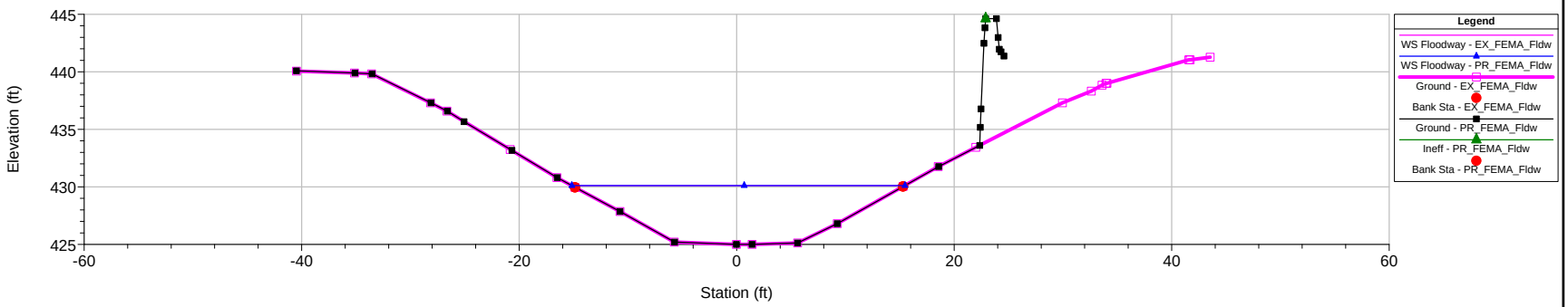
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

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



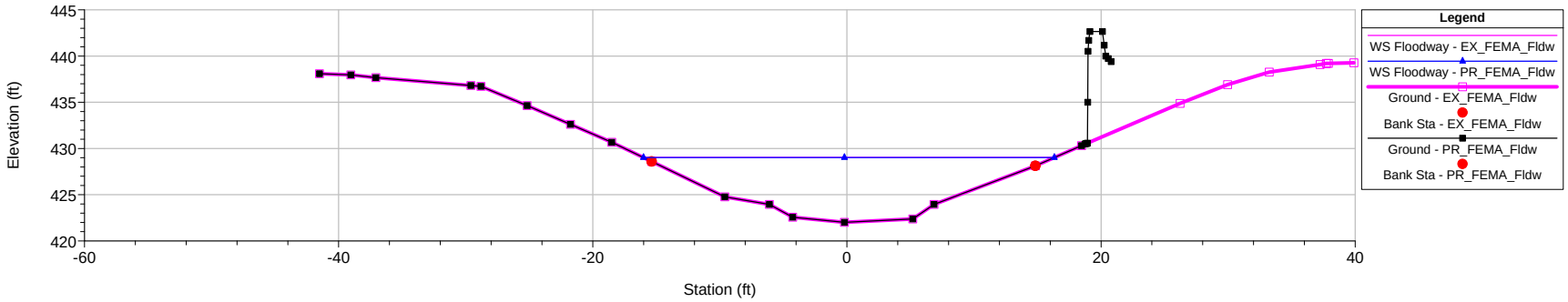
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

D/S End of Proposed Brook Relocation



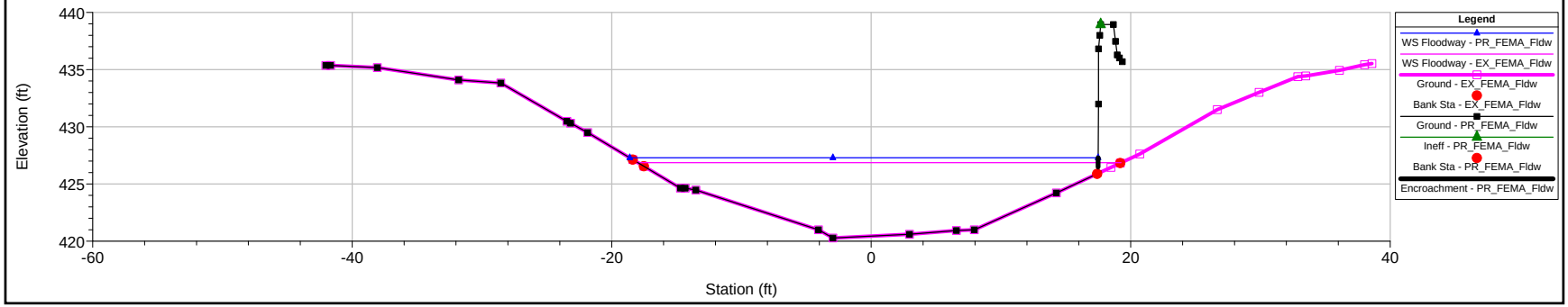
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

FEMA STATION 5212, CROSS SECTION L



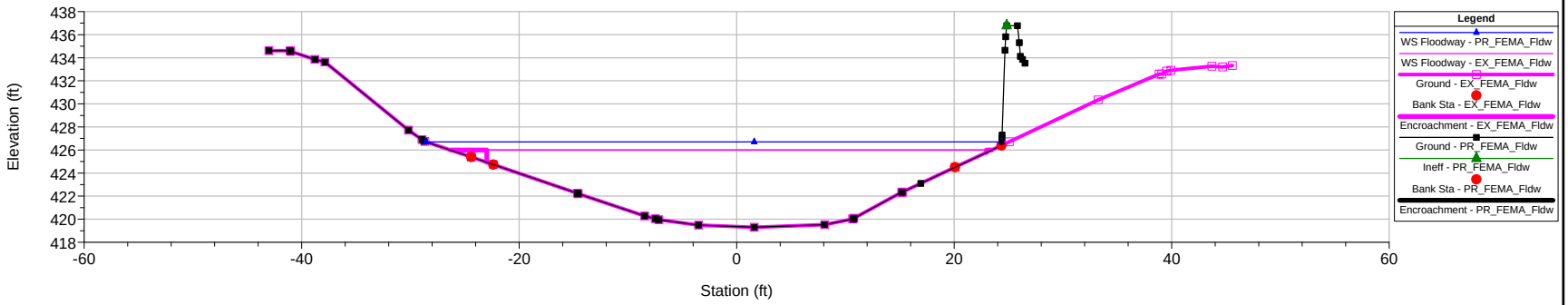
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

312ft (95m) U/S Prop I-84 Culvert No. 02537



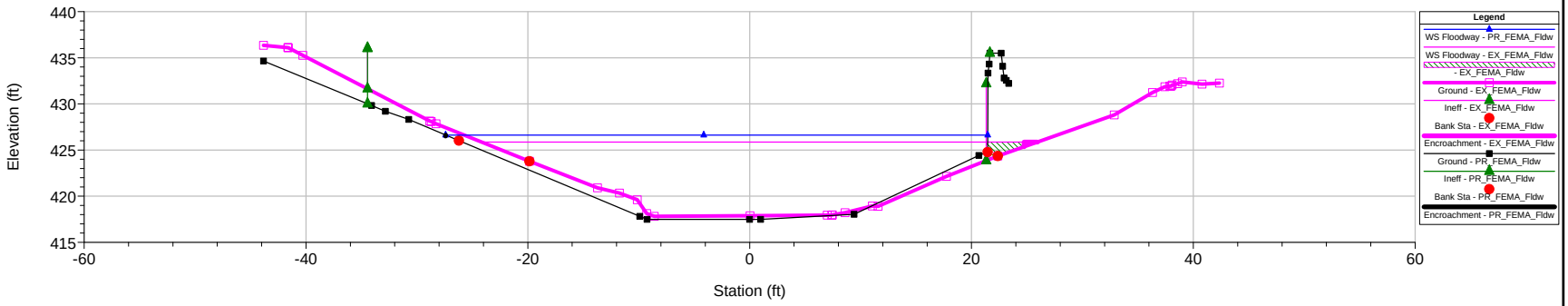
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

131ft (40m) U/S Prop I-84 Culvert No. 02537



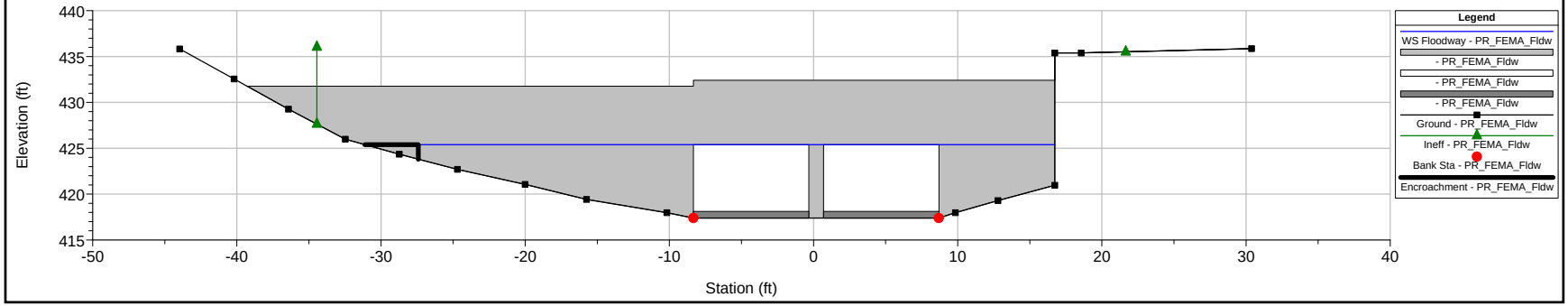
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

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



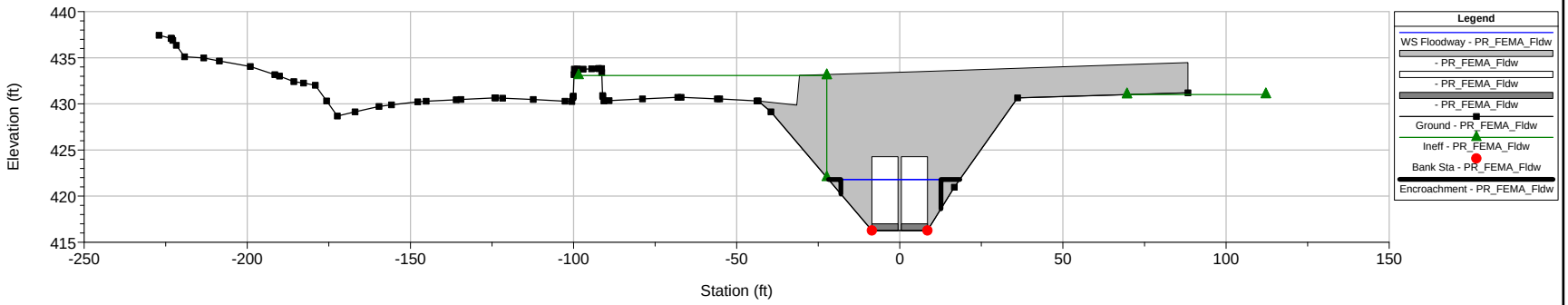
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

Proposed Culvert No. 02537, Easterly I-84 crossing



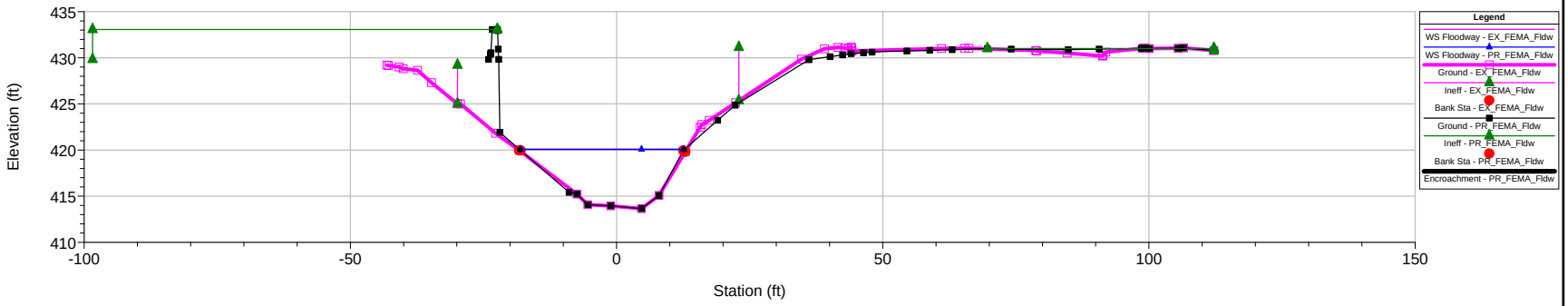
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

Proposed Culvert No. 02537, Easterly I-84 crossing



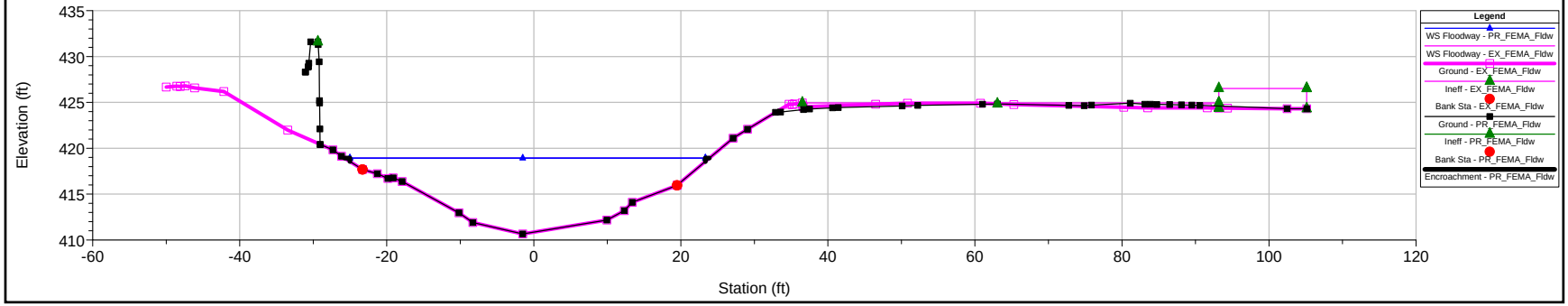
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

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



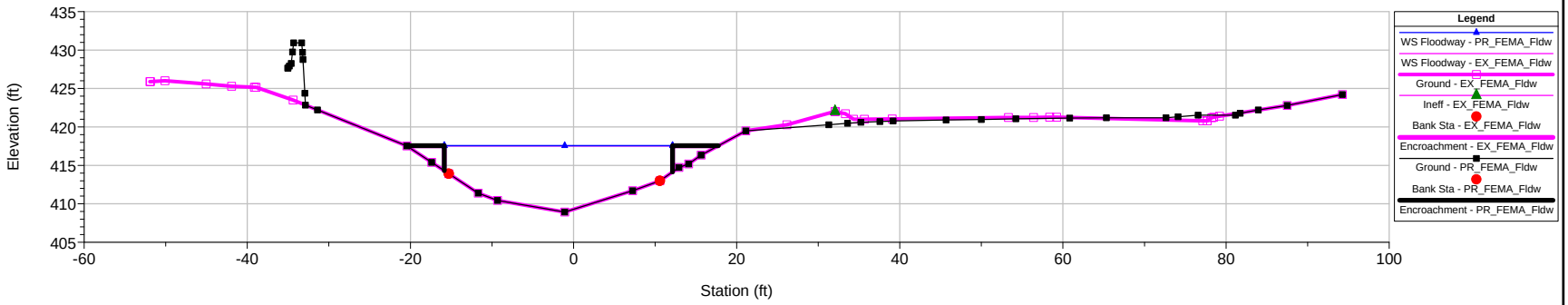
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

FEMA STATION 5209, CROSS SECTION I



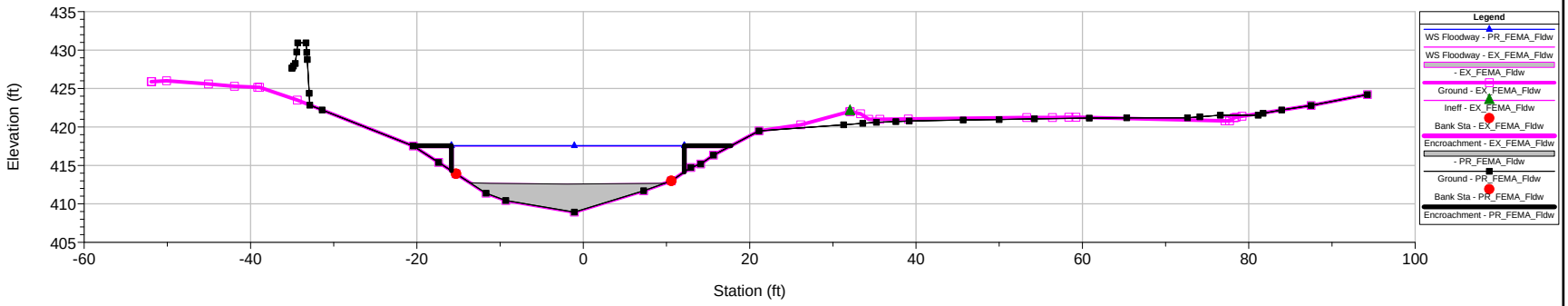
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

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



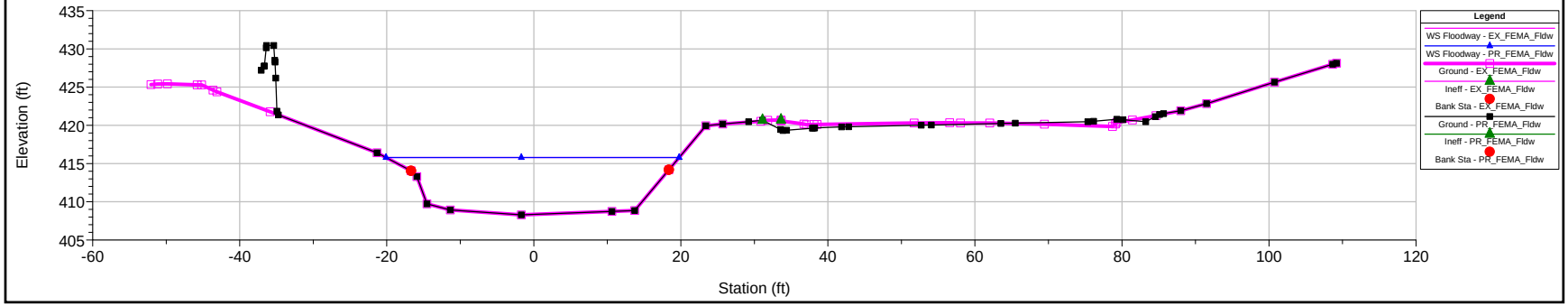
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

Existing Concrete Weir



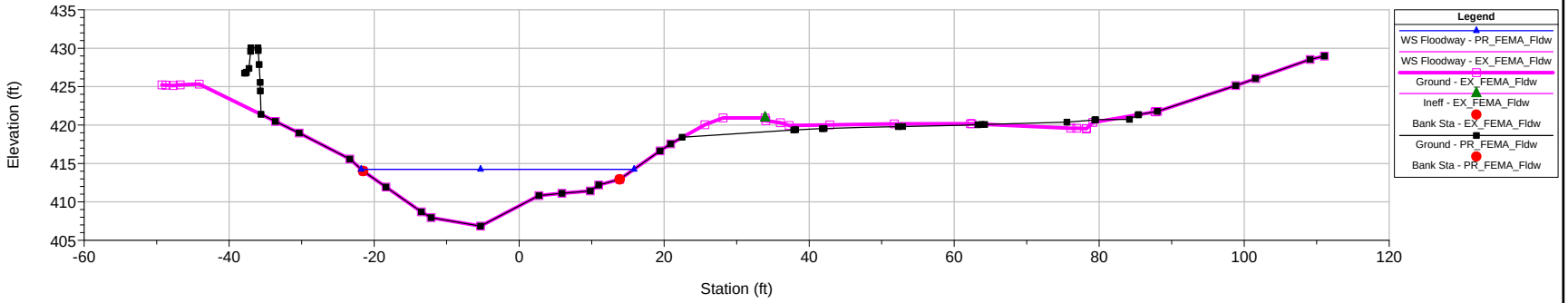
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

D/S of Concrete Weir Across from BJ's



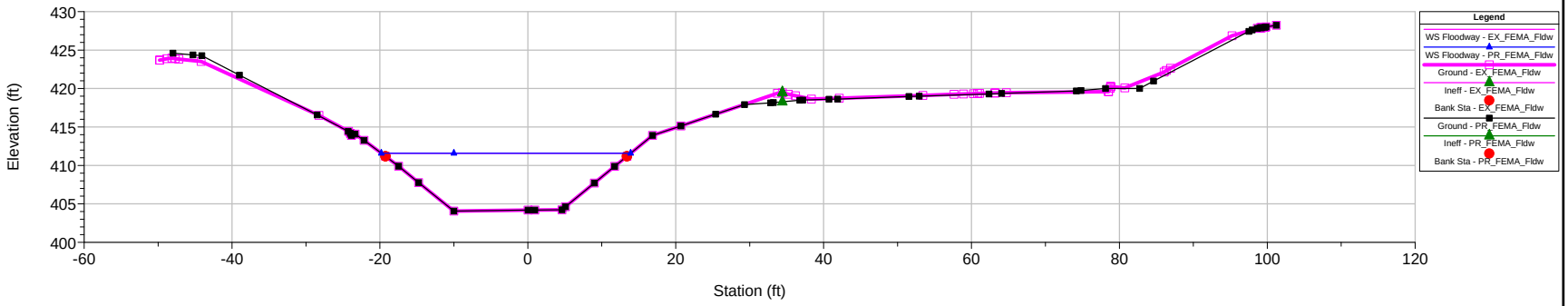
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

30ft (9m) D/S Concrete Weir (FEMA G -STA 5208.1)



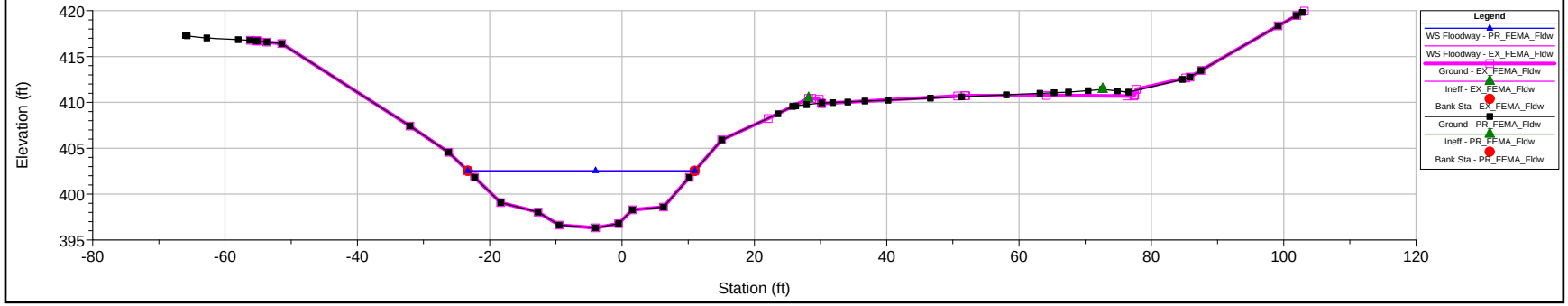
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

D/S End Prop. Retaining Wall No.107



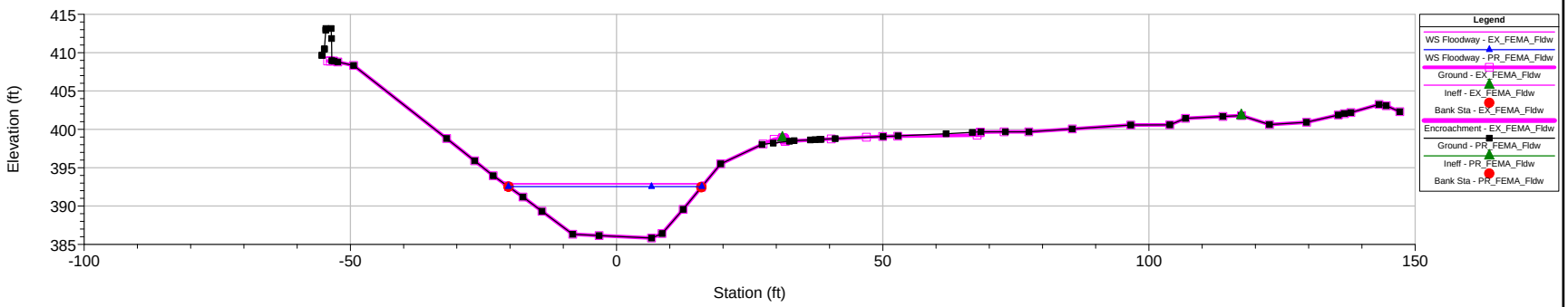
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

FEMA STATION 5208, CROSS SECTION F



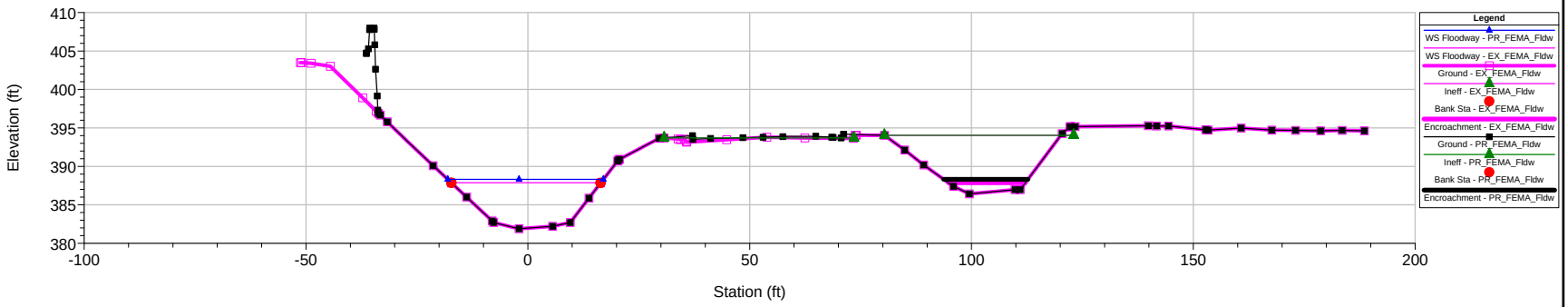
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

U/S End Prop. Retaining Wall No.118



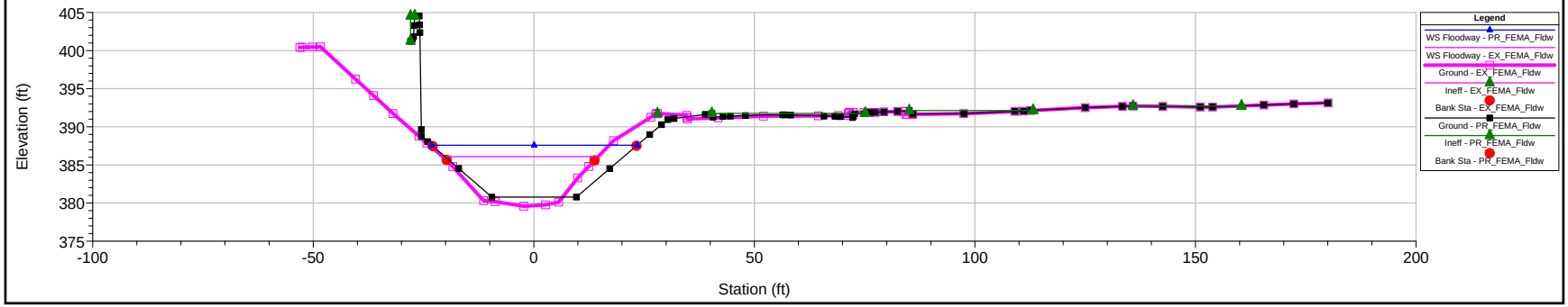
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

338ft (103m) Upstream Proposed I-84 Culvert No. 01227



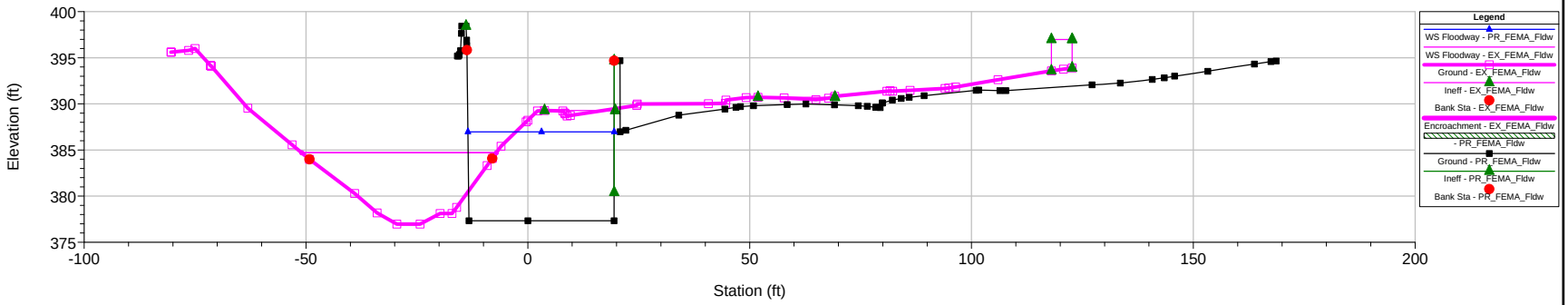
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

FEMA STATION 5207, CROSS SECTION E



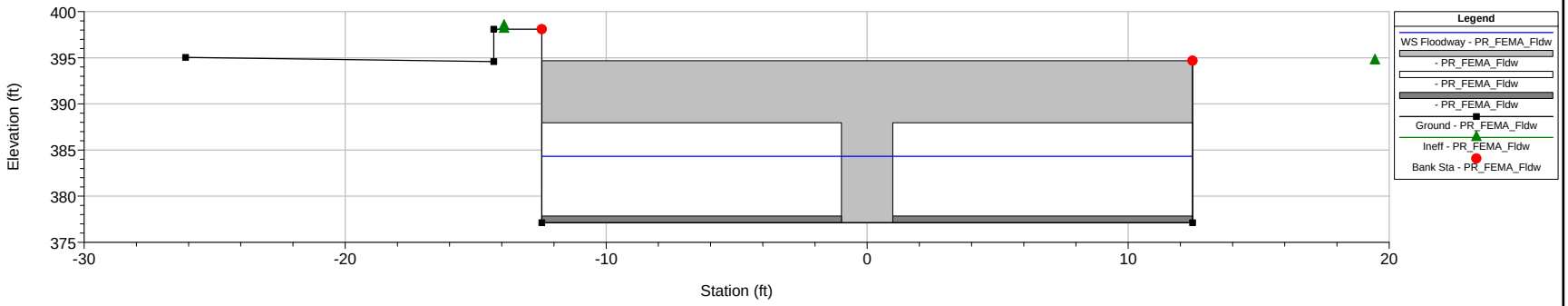
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

U/S of Prop I-84 Culvert No.01227



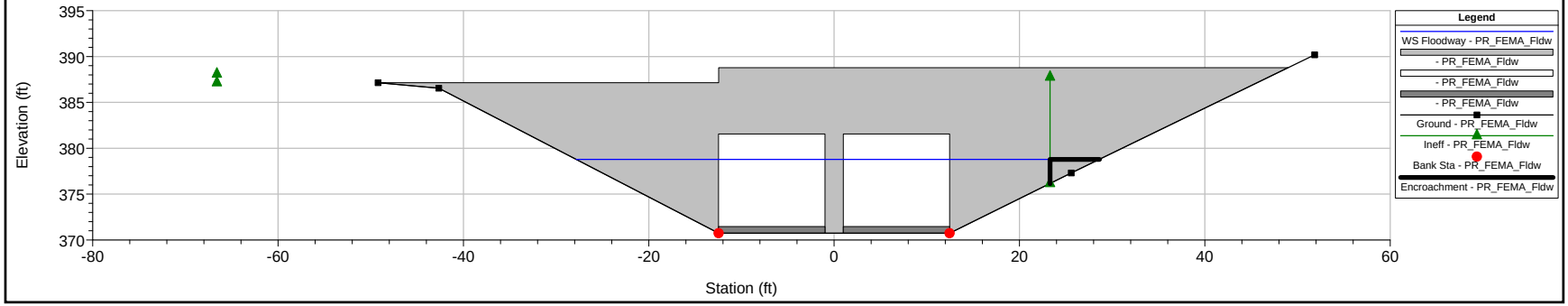
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

Proposed Culvert No.01227, Westerly I-84 crossing



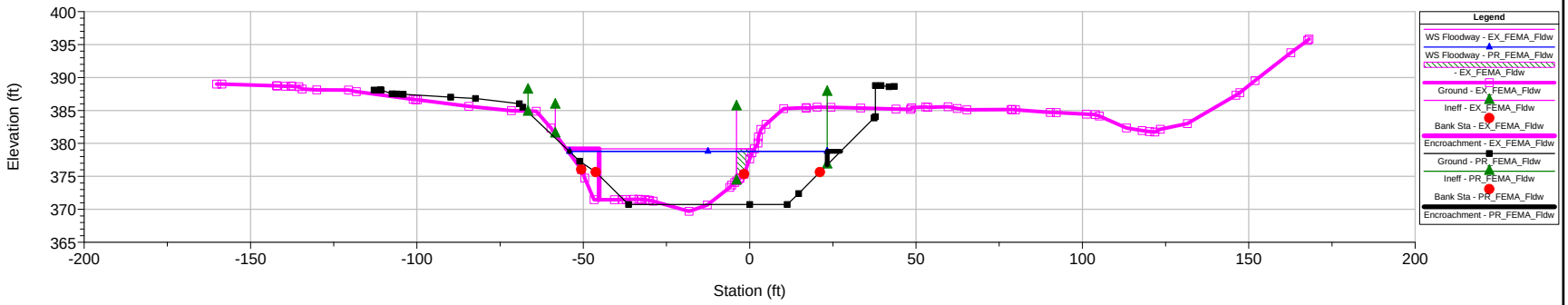
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

Proposed Culvert No.01227, Westerly I-84 crossing



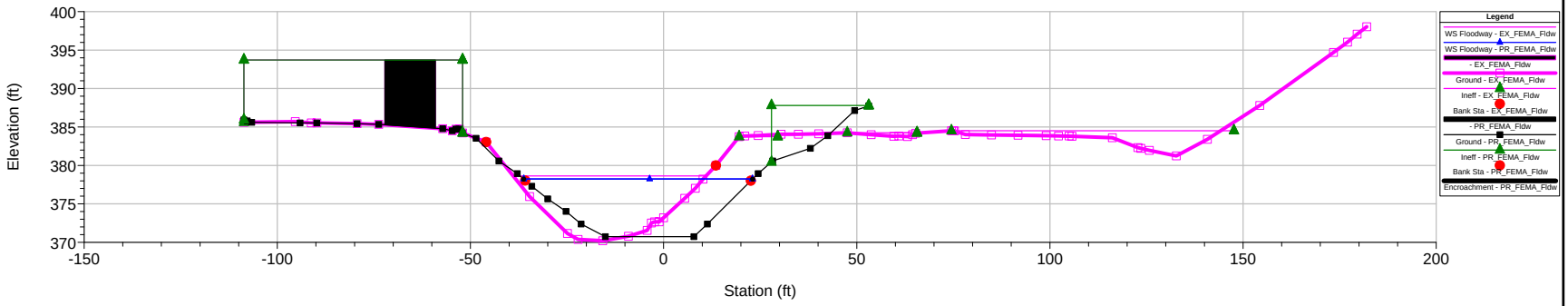
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

D/S of I-84 Culvert No. 01227



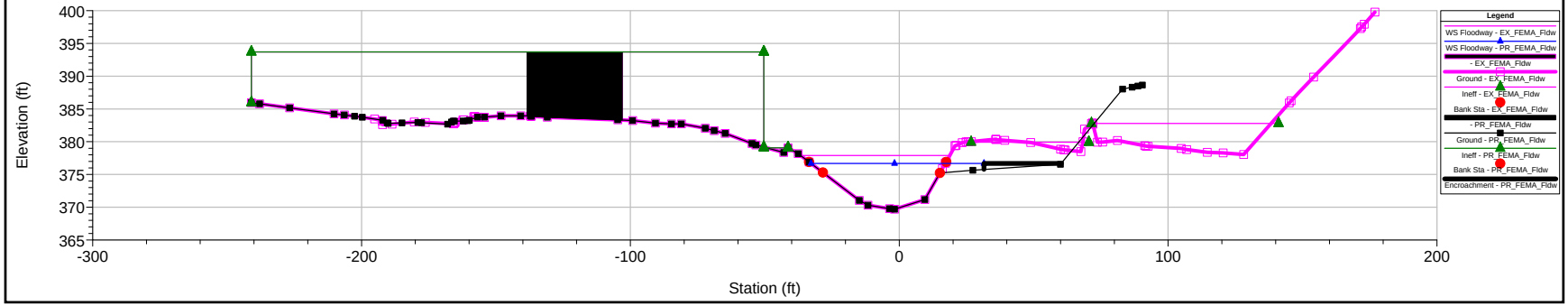
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

107ft (32.6m) D/S I-84 Culvert No.01227 (FEMA C -STA 5205.1)



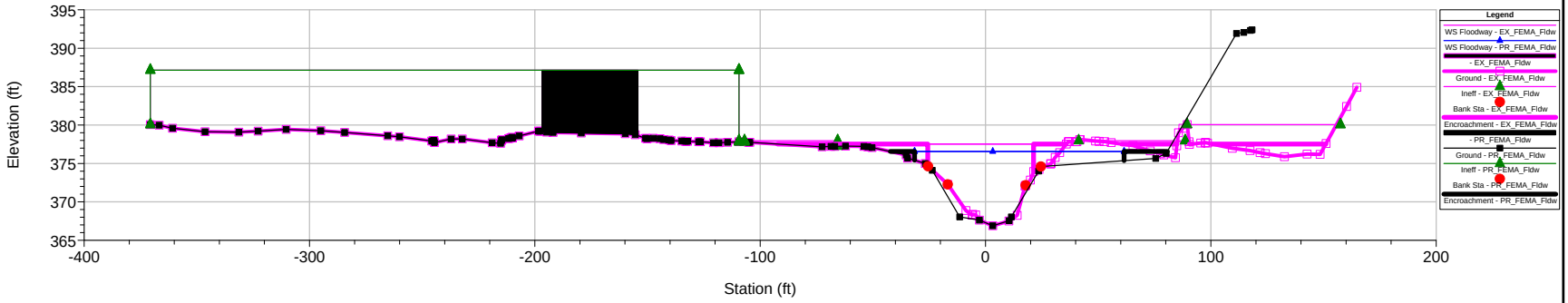
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

FEMA Station 5205, Cross Section B



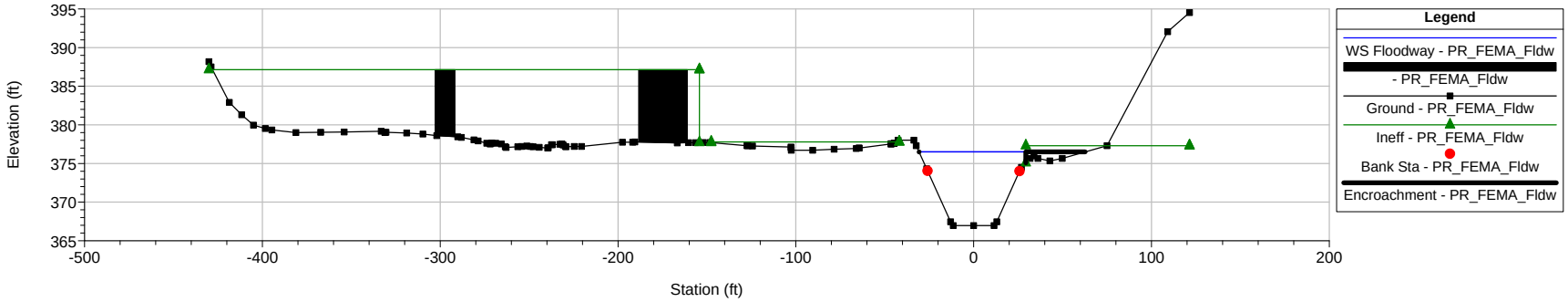
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

89ft (27m) U/S Harpers Ferry Road (FEMA A -STA 5204.9)



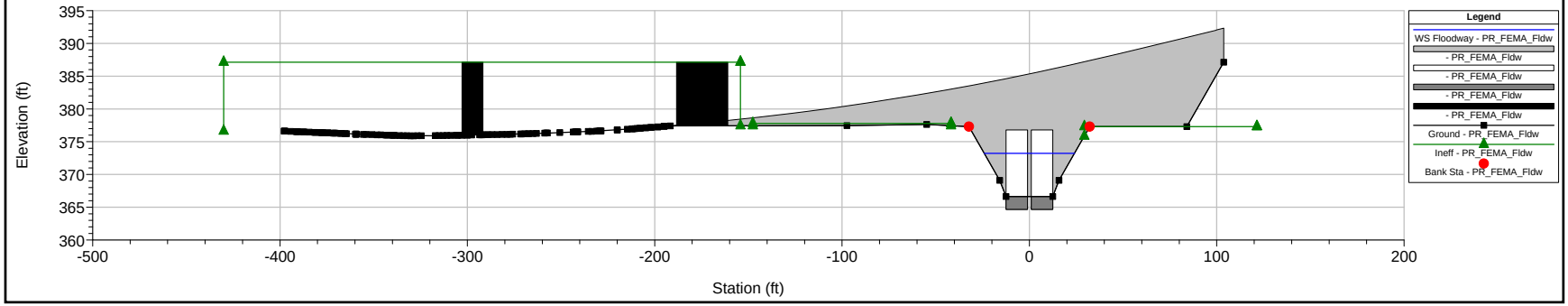
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

U/S of Harpers Ferry Road Culvert No. 03727



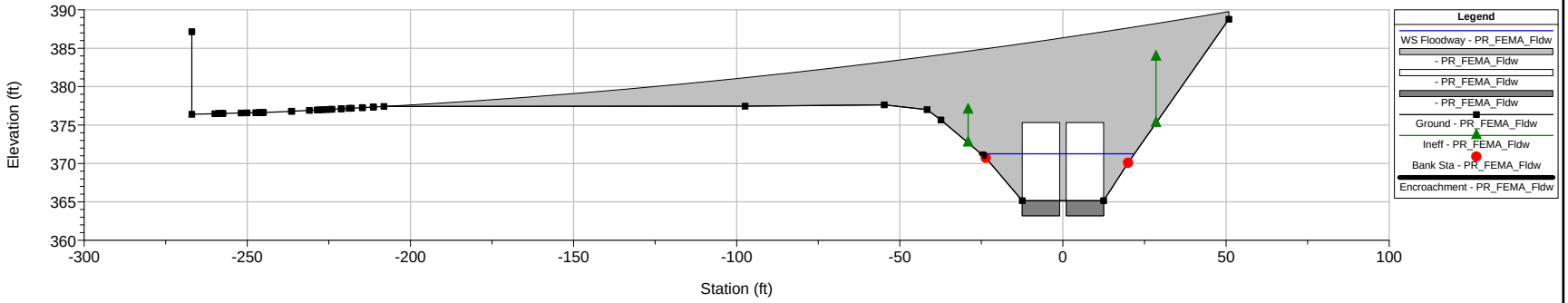
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

Proposed Culvert No. 03727 - Harpers Ferry Road



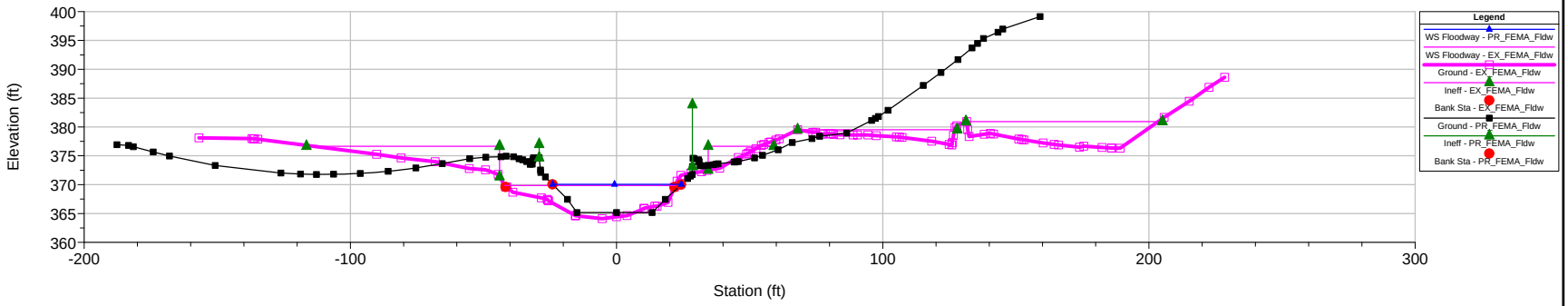
Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

Proposed Culvert No. 03727 - Harpers Ferry Road



Beaver Pnd Brk, Waterbury, English Plan: 1) PR_FEMA_Fldw 2) EX_FEMA_Fldw

Confluence with the Mad River; D/S of Harpers Ferry Road



Appendix C

Waterbury Flood Insurance Study,
Effective FIRM and Floodway Maps,
and the original HEC-2 input and output printout

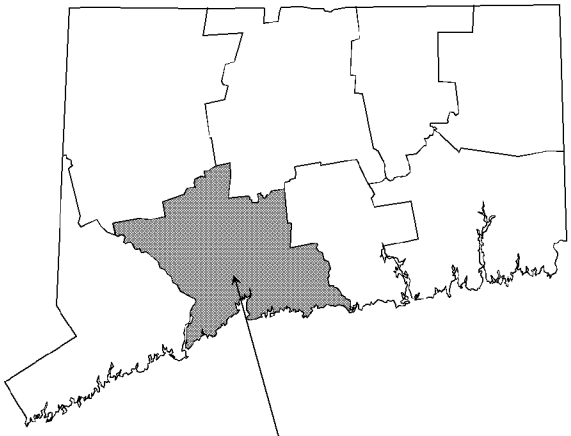
Cross Section Key
Beaver Pond Brook
Project 151-273

Stations		
Project	FIS HEC-2	FIS
5021	5204	
5035	5204.2	
5066	5204.8	
5084	5204.9	A
5145	5205	B
5206	5205.1	C
5232	5205.2	
5276	5205.8	
5296	5206	D
5422	5207	E
5628	5208	F
5804	5208.1	G
5812	5208.2	
5813	5208.8	
5832	5208.9	H
5878	5209	I
5947	5210	J
5970	5210.2	
6016	5210.8	
6033	5211	K
6216	5212	L
6397	5213	M
6420	5213.2	
6462	5213.8	
6490	5214	N
6843	5216.2	
6875	5216.8	
7073	5217.5	Q
7120	5218	R
7589	5219	S
7666	5220	T
7681	5220.2	
7698	5220.8	
7711	5221	U
7885	5222	V
7900	5222.2	
7922	5222.8	
7937	5223	W

FLOOD INSURANCE STUDY

VOLUME 1 OF 6

NEW HAVEN COUNTY, CONNECTICUT
(ALL JURISDICTIONS)



COMMUNITY NAME	COMMUNITY NUMBER	COMMUNITY NAME	COMMUNITY NUMBER
ANSONIA, CITY OF	090071	NEW HAVEN, CITY OF	090084
BEACON FALLS, TOWN OF	090072	NORTH BRANFORD, TOWN OF	090085
BETHANY, TOWN OF	090144	NORTH HAVEN, TOWN OF	090086
BRANFORD, TOWN OF	090073	ORANGE, TOWN OF	090087
CHESHIRE, TOWN OF	090074	OXFORD, TOWN OF	090150
DERBY, CITY OF	090075	PROSPECT, TOWN OF	090151
EAST HAVEN, TOWN OF	090076	SEYMOUR, TOWN OF	090088
GUILFORD, TOWN OF	090077	SOUTHBURY, TOWN OF	090089
HAMDEN, TOWN OF	090078	WALLINGFORD, TOWN OF	090090
MADISON, TOWN OF	090079	WATERBURY, CITY OF	090091
MERIDEN, CITY OF	090081	WEST HAVEN, CITY OF	090092
MIDDLEBURY, TOWN OF	090080	WOLCOTT, TOWN OF	090093
MILFORD, CITY OF	090082	WOODBRIDGE, TOWN OF	090153
NAUGATUCK, BOROUGH OF	090137		

EFFECTIVE:
DECEMBER 17, 2010

Federal Emergency Management Agency

FLOOD INSURANCE STUDY NUMBER
09009CV001A

FEMA, under Contract Number H-3962. That work was completed in April 1977.

Waterbury, City of: The hydrologic and hydraulic analyses for the May 1979 study were prepared by Harris-Toups Associates for the FIA, under Contract No. H-3987. This work, which was completed in November 1977, covered all significant flooding sources affecting the City of Waterbury.

West Haven, City of: The supplemental wave height analysis for the October 18, 1982, study was prepared by Dewberry & Davis for FEMA, under an unknown contract number.

The hydrologic and hydraulic analyses for the July 1978 study were performed by the USACE, New England Division, for the FIA, under Inter-Agency Agreement No. IAAH-19-74, Project Order Nos. 17 and 23. This work, which was completed in February 1976, covered all significant flooding sources affecting the City of West Haven.

Wolcott, Town of: The hydrologic and hydraulic analyses for the January 5, 1982, study were prepared by Philip W. Genovese and Associates, Inc., for FEMA, under Contract No. H-4711. This work was completed in April 1980.

Woodbridge, Town of: The hydrologic and hydraulic analyses in the March 18, 1991, revision were prepared by the New England Division of the USACE under Inter-Agency Agreement No. EMW-84-E-1506, Project Order No. 26. This work was completed in July 1989.

The hydrologic and hydraulic analyses for the original study were prepared by the USGS for FEMA, under Inter-Agency Agreement No. IAA-H-9-77, Project Order No. 27. The work for the original study was completed in December 1978.

For this countywide FIS, the hydraulic analysis for the revised portions of Willow Brook (No. 1) in the Town of Hamden was taken from Technical Support Data Notebook (TSDN) prepared by Roald Haestad, Inc., for FEMA under Contract No. EMB-1999-CO-0564. This work was completed in October 2002.

The New Haven County coastal special flood hazard areas have been re-delineated on new topographic mapping as part of this countywide study. The

Table 3, "Stream Name Changes," lists streams that have names in this countywide FIS other than those used in the previously printed FISs for the communities in which they are located.

TABLE 3 - STREAM NAME CHANGES

Community	Old Name	New Name
City of Ansonia	Beaver Brook	Beaver Brook No. 1
City of Milford	Beaver Brook	Beaver Brook No. 2
City of New Haven	Beaver Brook	Beaver Brook No. 3
Town of Seymour	Bladens River	Bladens River (Lower Reach)
Town of Woodbridge/ Town of Bethany	Bladens River	Bladens River (Upper Reach)
Town of Branford	Branford River	Branford River (Lower Reach)
Town of North Branford	Branford River	Branford River (Upper Reach)
Town of North Branford	Eightmile Brook	Eightmile Brook No. 1
Town of Oxford	Eightmile Brook	Eightmile Brook No. 2
Borough of Naugatuck	Hop Brook	Hop Brook (Lower Reach)
Town of Middlebury	Hop Brook	Hop Brook (Upper Reach)
City of Milford/Town of Orange/ City of Derby/Town of Seymour/ Town of Oxford	Housatonic River	Housatonic River (Lower Reach)
Town of Southbury	Housatonic River	Housatonic River (Upper Reach)
Town of Prospect	Tributary to Fulling Mill Brook	Fulling Mill Brook Tributary
City of Waterbury	Mad River	Mad River (Lower Reach)
Town of Wolcott	Mad River	Mad River (Upper Reach)
Town of North Haven	Muddy River	Muddy River (Lower Reach)
Town of Wallingford	Muddy River	Muddy River (Upper Reach)
Town of North Branford	Tributary C	Muddy River Tributary C
City of Milford	Quirks Pond	Farley Creek
Town of Orange/City of Milford	Wepawaug River	Wepawaug River (Lower Reach)
Town of Woodbridge	Wepawaug River	Wepawaug River (Upper Reach)
Town of Guilford	West River	West River No. 1
Town of Woodbridge/City of New Haven/ City of West Haven	West River	West River No. 2
Town of Cheshire/ Town of Hamden	Willow Brook	Willow Brook No. 1
City of Meriden	Willow Brook	Willow Brook No. 2

rainfall-runoff methods. The peak discharge at the Muddy River (Upper Reach) railroad bridge is lower than the upstream bridge discharge due to the storage capacity behind the bridge structure. Discharges for the portion of Meetinghouse Brook studied by approximate methods were computed using the same method.

For the June 4, 1990, FIS, flood-flow frequency values for the Quinnipiac River were based on statistical analysis of streamflow records covering a 55-year period of record at the USGS gage in Wallingford. The analyses followed log-Pearson Type III procedures as outlined in USGS Bulletin 17B, 1981.

For Hanover Street Brook and Mansion Road Brook, peak discharges for floods of the selected recurrence intervals were determined using regression analysis. The USGS 1975 floodflow formulas discharges were related to basin characteristics such as drainage area, stream length, streambed slope, and rainfall parameters.

For the September 7, 2000, revision, the Quinnipiac River flood-flow frequency values were based on statistical records covering a 66-year period of record at the USGS Quinnipiac River gage in Wallingford.

Waterbury, City of

Peak discharge-frequency relationships for the Naugatuck River were determined using gaging records recorded by the USGS at Gage No. 1208500 located in Beacon Falls on the Naugatuck River. This gage has a recording period extending from 1920 to the present. A log-Pearson Type III distribution was fitted to the annual peak flows at the gage and then modified for the effect of the USACE flood control reservoir system located within the Naugatuck River Basin.

Hopeville Pond Brook, Mad River (Lower Reach), Beaver Pond Brook, Steel Brook, Hancock Brook, and Wooster Brook do not have stream gages with which frequency-discharge relationships can be developed. The peak discharges for these streams, when the drainage area is equal to or greater than 1 square mile, was calculated using the USGS 1975 floodflow formulas.

The discharge-frequency estimates for small drainage areas of less than one square mile in developed areas were calculated utilizing the rational method, for which the input parameters included:

1. Runoff Coefficient - the measure of runoff losses due to infiltration from soil; obtained from zoning maps of Waterbury, Scale 1:13,200, August 1976.
2. Time of Concentration - the time required for rain falling at the most remote point to reach the discharge point; taken from the USGS quadrangle sheets, Maps of Flood-Prone Areas, Scale 1:2,400, Contour Interval 20 feet, Waterbury, Connecticut, 1971.

3. Intensity of Rainfall - in inches per hour, based on time of concentration; obtained from the U. S. Weather Bureau's Technical Paper No. 40, 1961.
4. Area of watershed in acres.

The peak discharges for the upper reaches of Hopeville Pond Brook and Wooster Brook were calculated using the rational method.

West Haven, City of

In order to be fairly consistent with the existing report information, the Bigwood-Thomas flood flow formula for Connecticut described in USGS Circular 365, A Flood-flow Formula for Connecticut, 1955, was used to calculate the design flows for the West River No. 2 and the Cove River. The rational formula was used to calculate the design flows on the other detailed study streams. This yielded results which are consistent with those reported by Bowe, Walsh & Associates in their study for the City of West Haven entitled, Drainage Computations from Master Drainage Plan, dated 1976.

For the detailed study stream, the 10-, 2-, 1-, and 0.2-percent annual chance return frequency storms were computed. The 0.2-percent annual chance rainfall intensity was determined by the extrapolation of a curve fit to the 10-, 2- and –percent annual chance rainfall intensities probability graph found in the Weather Bureau's Technical Paper No. 40, May 1961, out to the 0.2-percent annual chance rainfall intensity. For the streams studied by approximate methods, the 1-percent annual chance return frequency storm was used.

Wolcott, Town of

There is no gage information for any of the streams located within the Town of Wolcott. Peak discharges were determined for floods of the selected recurrence intervals using the USGS 1975 floodflow formulas. The topographical information was scaled from USGS 7.5-Minute Series Topographic Maps, Scale 1:24,000, Contour Interval 10 feet: Southington, Waterbury and Bristol, Connecticut, 1968, Photorevised 1972. The peak discharges were later modified by the hydraulic effects of the four reservoirs and dams located in Wolcott. These reservoirs and dams are as follows: Chestnut Hill Reservoir, Hitchcock Lake, Southington Reservoir and two Scovill Reservoirs. The resulting flows were then checked against existing information from 1955 flood measurements and an earlier flood routing and were found to be in agreement.

Woodbridge, Town of

For the Bladens River (Upper Reach), the Wepawaug River (Upper Reach), and Race Brook, peak discharges of floods of the selected recurrence intervals were determined by regression analysis. Discharges were related to basin characteristics such as drainage area, stream length, streambed slope, and rainfall parameters, as described in the USGS floodflow formulas.

TABLE 6 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-PERCENT ANNUAL CHANCE	2-PERCENT ANNUAL CHANCE	1-PERCENT ANNUAL CHANCE	0.2-PERCENT ANNUAL CHANCE
BAILEY CREEK					
At Railroad	0.67	30	50	60	90
At Interstate Route 95	0.35	50	80	90	120
At a point approximately 170 feet downstream of Sandlewood Drive	0.35	60	110	130	190
BEACON HILL BROOK					
At mouth of Naugatuck River	10.44	975	1,610	1,940	2,870
At Beacon Falls/Naugatuck corporate limits	10.00	845	1,380	1,675	2,500
Below Straitsville Brook	9.13	815	1,335	1,620	2,400
Below Marks Brook	7.77	765	1,250	1,520	2,250
At upper study limit	5.33	665	1,080	1,320	1,950
BEAVER BROOK NO. 1					
At confluence with the Naugatuck River	3.53	497	892	1,220[1]	2,000[1]
BEAVER BROOK NO. 2					
At Naugatuck Avenue	2.17	450	890	1,100	1,425
At Bridgeport Avenue	1.60	390	760	920	1,100
At Bic Drive	1.50	460	750	900	1,150
At Interstate Route 95	0.98	315	524	607	768
At Naugatuck Avenue	0.57	270	400	450	600
At Plains Road	0.39	100	170	200	370
BEAVER BROOK NO. 3					
At Blake Street	2.03	150	230	280	370
At Crescent Street	1.77	80	100	110	130
BEAVER POND BROOK					
At mouth at Mad River (Lower Reach)	5.7	955	1,610	1,960	2,975
Upstream of East Mountain Brook	4.8	795	1,335	1,625	2,465
Upstream of Turkey Hill Brook	3.0	515	865	1,055	1,595
Upstream of Unnamed Tributary	2.5	430	715	870	1,315
Downstream of Unnamed Tributary	1.7	305	515	625	940
At upstream study limit	1.1	205	340	410	615

[1]Except where split flow occurs

TABLE 6 - SUMMARY OF DISCHARGES - continued

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-PERCENT ANNUAL CHANCE	2-PERCENT ANNUAL CHANCE	1-PERCENT ANNUAL CHANCE	0.2-PERCENT ANNUAL CHANCE
LONG SWAMP BROOK					
At Mouth	1.81	278	536	691	1,202
Above Brook Lane	1.57	241	465	600	1,044
Above State Highway 64	1.45	223	430	555	965
Below Memorial School	1.18	182	351	453	787
At upper study limit	0.84	131	232	406	566
LYMAN HALL BROOK					
At Reskin Drive	1.14	330	530	620	810
MAD RIVER (LOWER REACH)					
Mouth at Naugatuck River	26.4	2,795	4,825	5,935	9,240
Downstream of Beaver Pond Brook	23.9	2,350	4,060	4,990	7,775
Upstream of Beaver Pond Brook	18.0	1,505	2,595	3,190	4,970
At upstream study limit	15.9	1,410	2,435	2,995	4,660
MAD RIVER (UPPER REACH)					
Above the confluence with Old Tannery Brook	12.6	1,295	2,195	2,665	4,190
Above the confluence with Lily Brook	8.4	700	1,500	2,310	3,280
At Scovill Reservoir	5.5	450	980	1,375	1,980
MALONEY BROOK					
At confluence with Farm River	1.0	255	425	532	761
MANSION ROAD BROOK					
At confluence with the Quinnipiac River	0.90	115	215	330	660
MEETINGHOUSE BROOK					
At confluence with the Quinnipiac River	3.72	1,580	2,310	2,680	3,440
At cross section I	1.93	1,170	1,660	1,900	2,400
MILL RIVER					
At Whitney Dam	36.4	1,400	2,200	2,500	3,200
At Connolly Parkway	32.9	1,300	2,000	2,300	3,000
At Clarks Pond Dam	25.0	1,100	1,700	1,900	2,500
At River Road	20.0	900	1,400	1,600	2,100

All elevations are referenced to the North American Vertical Datum of 1988 (NAVD 88).

Qualifying bench marks within a given jurisdiction that are cataloged by the National Geodetic Survey (NGS) and entered into the National Spatial Reference System (NSRS) as First or Second Order Vertical and have a vertical stability classification of A, B, or C are shown and labeled on the FIRM with their 6-character NSRS Permanent Identifier.

Bench marks cataloged by the NGS and entered into the NSRS vary widely in vertical stability classification. NSRS vertical stability classifications are as follows:

- Stability A: Monuments of the most reliable nature, expected to hold position/elevation well (e.g., mounted in bedrock)
- Stability B: Monuments which generally hold their position/elevation well (e.g., concrete bridge abutment)
- Stability C: Monuments which may be affected by surface ground movements (e.g., concrete monument below frost line)
- Stability D: Mark of questionable or unknown vertical stability (e.g., concrete monument above frost line, or steel witness post)

In addition to NSRS bench marks, the FIRM may also show vertical control monuments established by a local jurisdiction; these monuments will be shown on the FIRM with the appropriate designations. Local monuments will only be placed on the FIRM if the community has requested that they be included, and if the monuments meet the aforementioned NSRS inclusion criteria.

To obtain current elevation, description, and/or location information for bench marks shown on the FIRM for this jurisdiction, please contact the Information Services Branch of the NGS at (301) 713-3242, or visit their Web site at http://www.ngs.noaa.gov.

It is important to note that temporary vertical monuments are often established during the preparation of a flood hazard analysis for the purpose of establishing local vertical control. Although these monuments are not shown on the FIRM, they may be found in the Technical Support Data Notebook associated with this FIS and FIRM. Interested individuals may contact FEMA to access this data.

Roughness factors (Manning's "n") used in the hydraulic computations were chosen by engineering judgment and were based on field observations of the streams and floodplain areas. Roughness factors for all streams studied by detailed methods are shown in Table 8, “Manning’s “n” Values.”

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Beaver Brook No. 2 (Continued)								
M	10,250[1]	75	782	0.3	41.9	41.9	42.4	0.5
N	10,900[1]	80	649	0.9	42.0	42.0	42.5	0.5
O	12,998[1]	231	460	1.0	74.8	74.8	74.8	0.0
P	14,128[1]	19	31	7.4	79.6	79.6	79.6	0.0
Beaver Brook No. 3								
A	2,370[2]	45	82	2.6	18.8	18.8	19.3	0.5
B	2,620[2]	19	124	1.8	22.2	22.2	23.2	1.0
C	3,850[2]	36	117	1.9	23.1	23.1	23.2	0.1
Beaver Pond Brook								
A	200[3]	22	180	10.9	377.2	376.8[4]	376.8	0.0
B	400[3]	59	384	5.1	379.1	379.1	379.1	0.0
C	600[3]	52	242	8.1	379.4	379.4	379.5	0.1
D	920[3]	52	292	6.7	382.6	382.6	382.6	0.0
E	1,320[3]	44	153	10.6	385.2	385.2	385.2	0.0
F	2,000[3]	35	141	11.5	399.8	399.8	399.8	0.0
G	2,560[3]	39	147	11.1	413.5	413.5	413.5	0.0
H	2,650[3]	28	191	5.5	419.0	419.0	419.0	0.0
I	2,800[3]	55	290	3.6	419.3	419.3	419.5	0.2
J	3,030[3]	41	170	6.2	419.6	419.6	419.7	0.1
K	3,310[3]	49	202	5.2	423.7	423.7	423.7	0.0

[1]Stream distance in feet from the centerline of Naugatuck Avenue
[2]Stream distance in feet above mouth
[3]Stream distance in feet above confluence with Mad River (Lower Reach)
[4]Elevation computed without consideration of backwater effects from the Mad River (Lower Reach)

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

NEW HAVEN COUNTY, CT (ALL JURISDICTIONS)

FLOODWAY DATA

BEAVER BROOK NO. 2 – BEAVER BROOK NO. 3 – BEAVER POND BROOK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Beaver Pond Brook (continued)								
L	3,910	33	104	10.2	427.1	427.1	427.1	0.0
M	4,490	30	113	9.3	435.8	435.8	435.8	0.0
N	4,760	40	128	7.6	446.7	446.7	446.7	0.0
O	5,870	38	170	5.7	453.2	453.2	453.2	0.0
P	6,060	31	173	5.6	454.9	454.9	454.9	0.0
Q	6,660	72	215	4.5	457.0	457.0	457.0	0.0
R	6,820	119	243	4.0	457.7	457.7	457.7	0.0
S	8,360	150	518	1.7	459.4	459.4	459.5	0.1
T	8,610	63	312	2.8	459.5	459.5	459.7	0.2
U	8,760	163	907	0.7	461.4	461.4	461.5	0.1
V	9,330	42	194	3.2	461.4	461.4	461.5	0.1
W	9,500	37	181	3.5	462.9	462.9	463.0	0.1
X	10,290	26	51	8.1	465.8	465.8	465.8	0.0
Y	10,910	23	56	7.3	475.9	475.9	475.9	0.0
Z	11,180	24	85	4.8	485.5	485.5	485.5	0.0
AA	11,510	12	40	10.4	490.9	490.9	490.9	0.0
AB	11,730	157	578	0.7	492.8	492.8	492.8	0.0
AC	12,000	61	104	3.9	492.7	492.7	492.8	0.1

[1]Stream distance in feet above confluence with Mad River (Lower Reach)

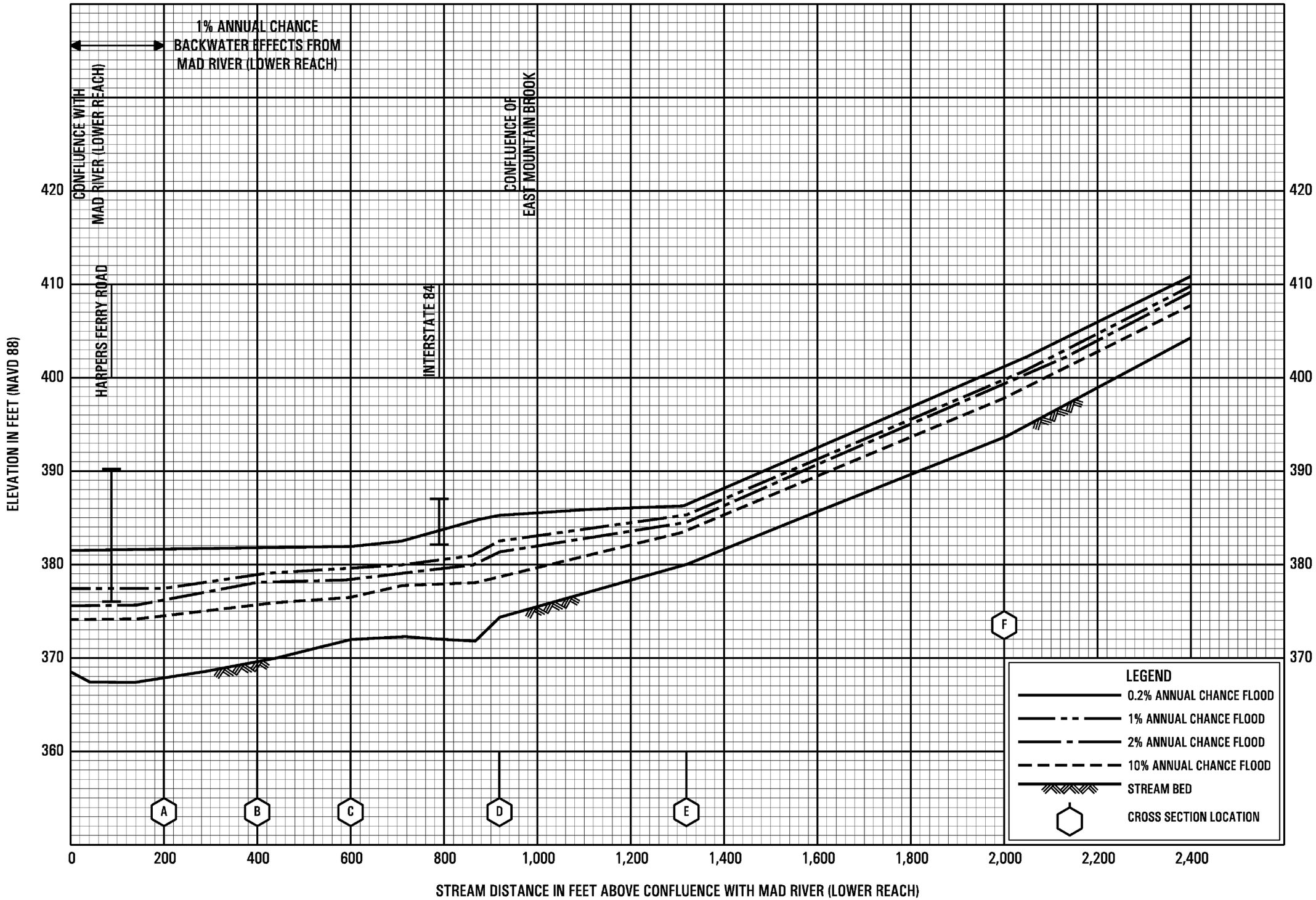
TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

NEW HAVEN COUNTY, CT (ALL JURISDICTIONS)

FLOODWAY DATA

BEAVER POND BROOK



FLOOD PROFILES

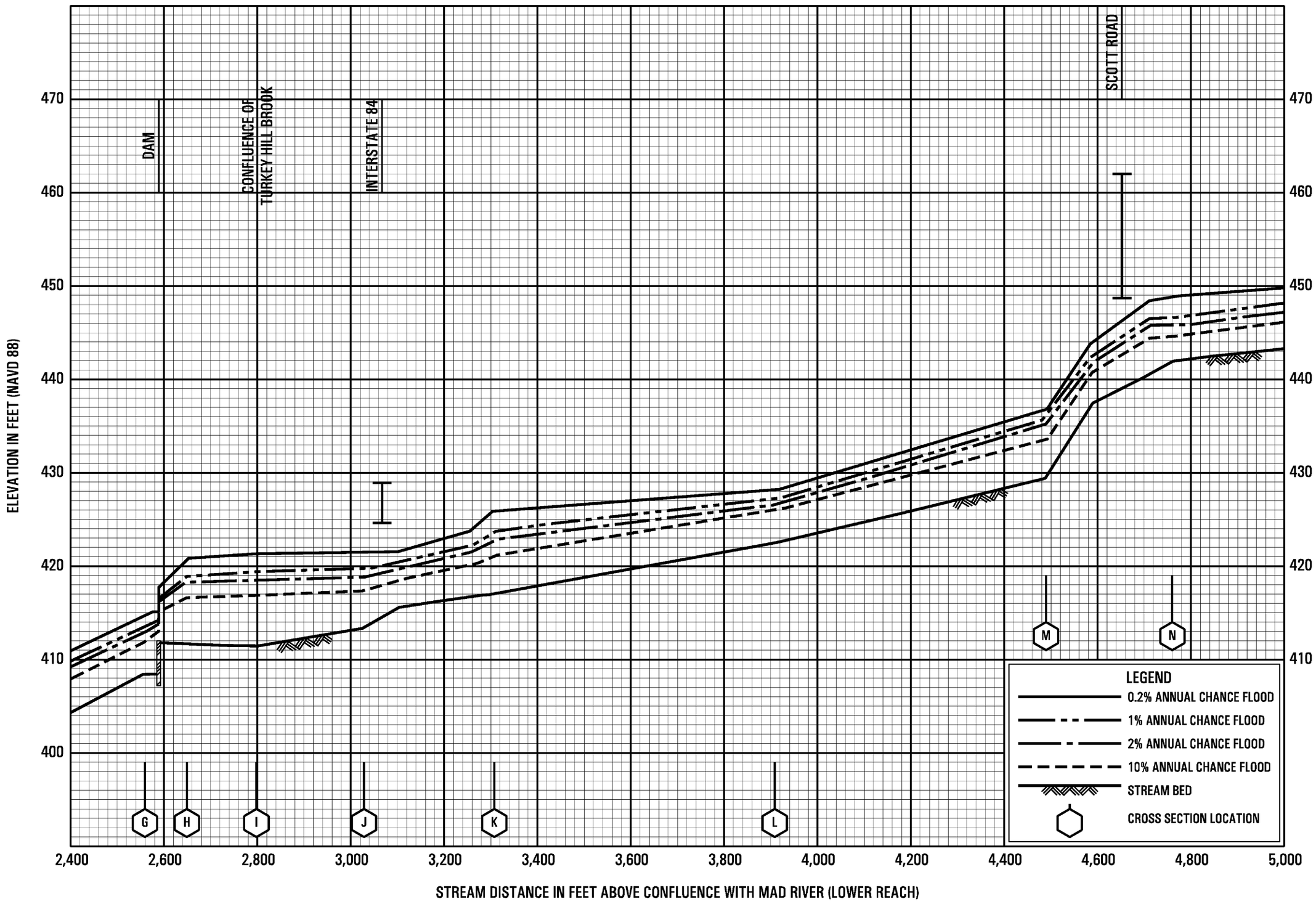
BEAVER POND BROOK

FEDERAL EMERGENCY MANAGEMENT AGENCY

NEW HAVEN COUNTY, CT

(ALL JURISDICTIONS)

029P



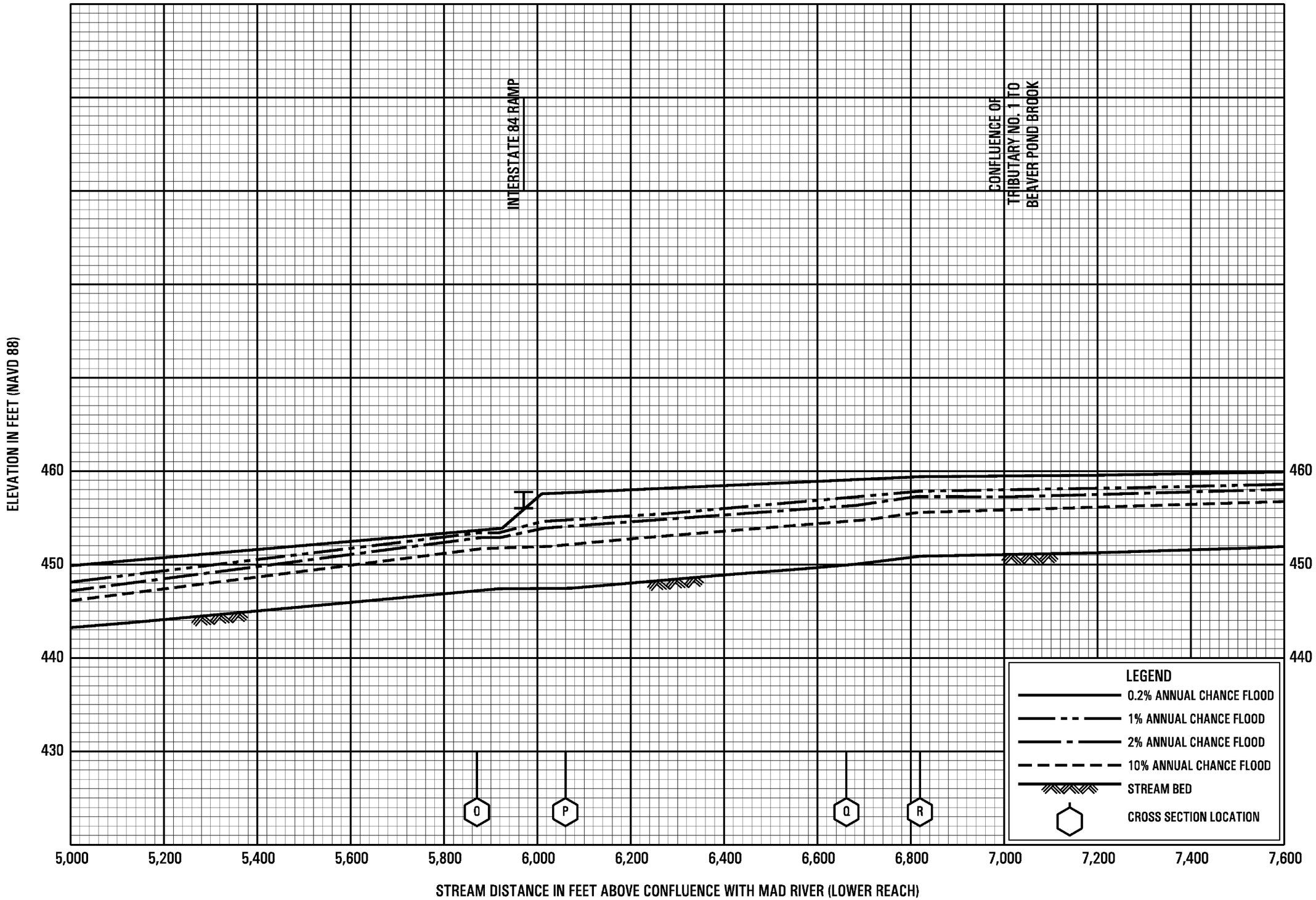
FLOOD PROFILES

BEAVER POND BROOK

FEDERAL EMERGENCY MANAGEMENT AGENCY

NEW HAVEN COUNTY, CT

(ALL JURISDICTIONS)



FLOOD PROFILES

BEAVER POND BROOK

FEDERAL EMERGENCY MANAGEMENT AGENCY

NEW HAVEN COUNTY, CT

(ALL JURISDICTIONS)

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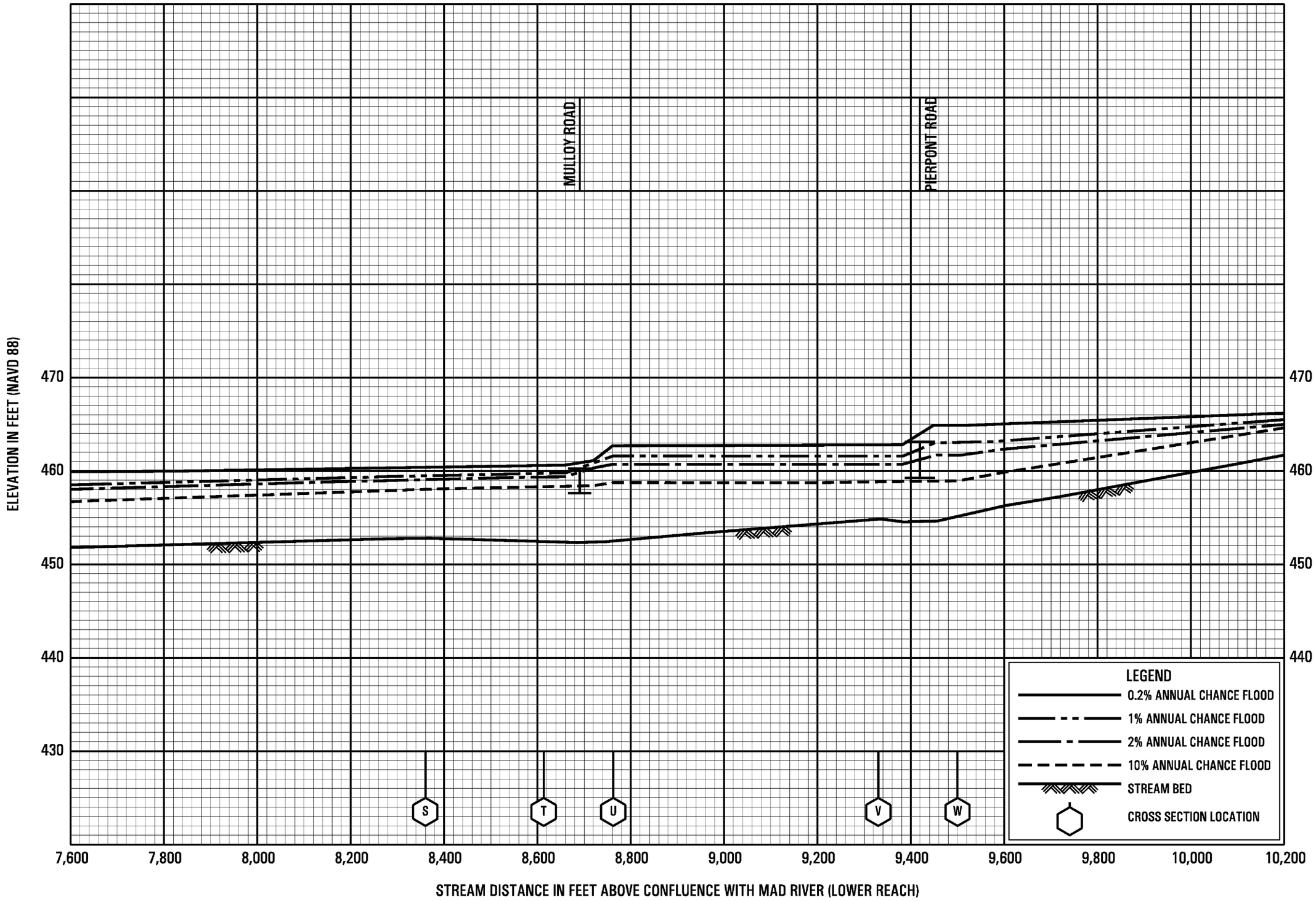


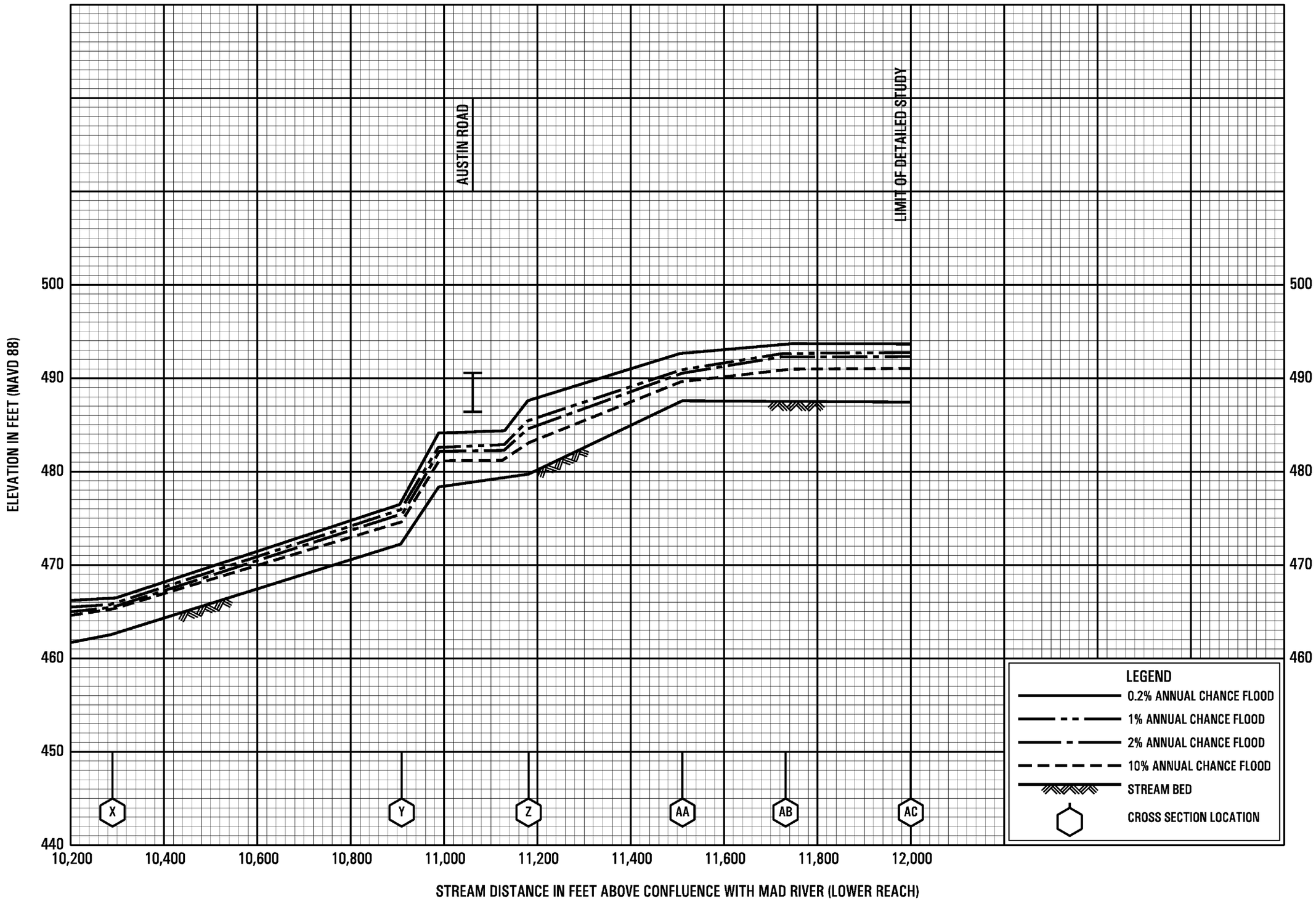
FLOOD PROFILES

BEAVER POND BROOK

FEDERAL EMERGENCY MANAGEMENT AGENCY

NEW HAVEN COUNTY, CT

(ALL JURISDICTIONS)



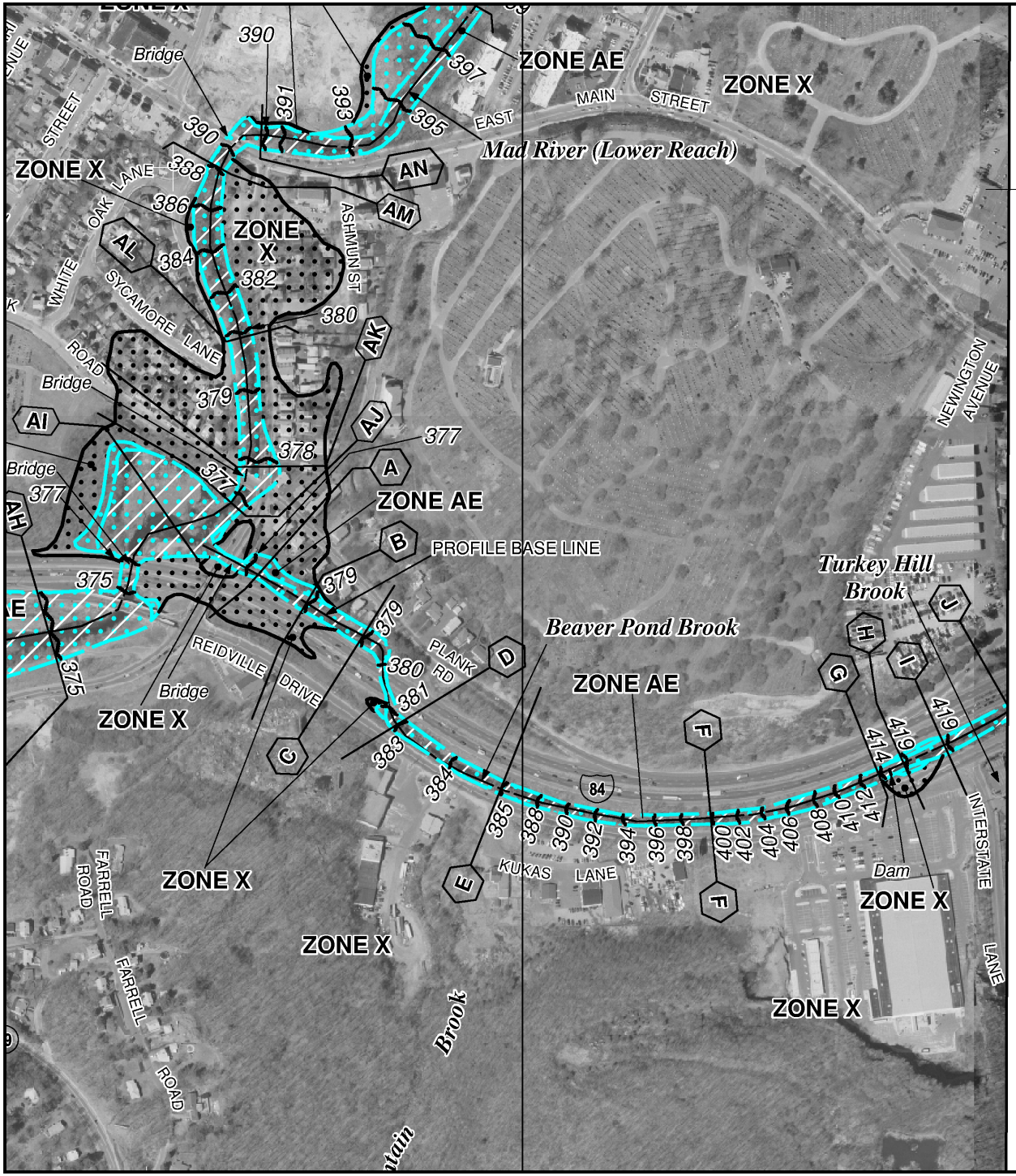
FLOOD PROFILES

BEAVER POND BROOK

FEDERAL EMERGENCY MANAGEMENT AGENCY

NEW HAVEN COUNTY, CT

(ALL JURISDICTIONS)



MAP SCALE 1" = 500'

250 0 500 1000 FEET

METER

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0117H

FIRM

FLOOD INSURANCE RATE MAP

NEW HAVEN COUNTY, CONNECTICUT

(ALL JURISDICTIONS)

PANEL 117 OF 635

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
WATERBURY, CITY OF	090091	0117	H

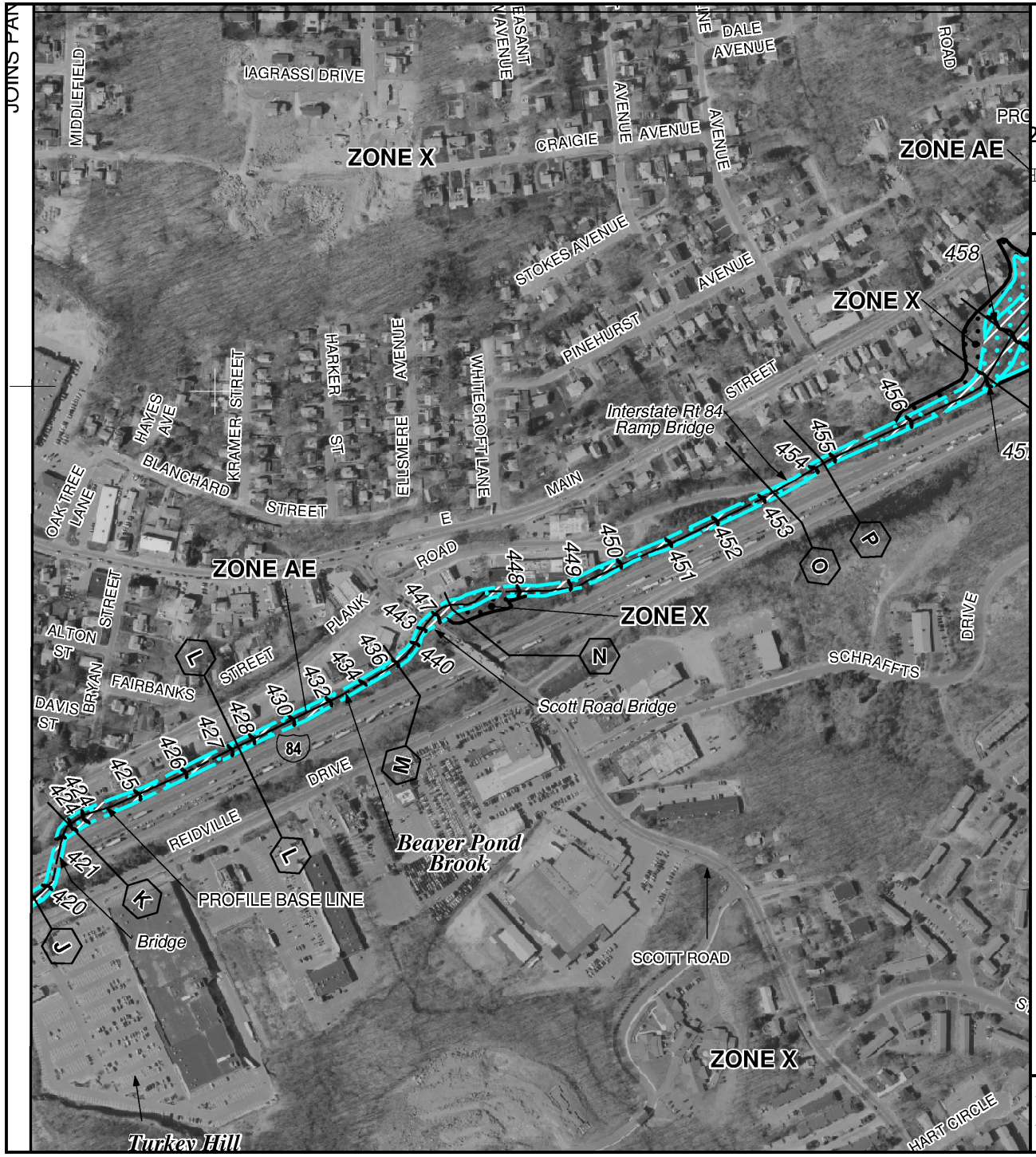
Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
09009C0117H

EFFECTIVE DATE
DECEMBER 17, 2010

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov



MAP SCALE 1" = 500'

250 0 500 1000 FEET

METERS

PANEL 0136H

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

NEW HAVEN COUNTY, CONNECTICUT

(ALL JURISDICTIONS)

PANEL 136 OF 635

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CHESHIRE, TOWN OF	090074	0136	H
PROSPECT, TOWN OF	090151	0136	H
WATERBURY, CITY OF	090091	0136	H
WOLCOTT, TOWN OF	090093	0136	H

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MAP NUMBER
09009C0136H

EFFECTIVE DATE
DECEMBER 17, 2010

Federal Emergency Management Agency

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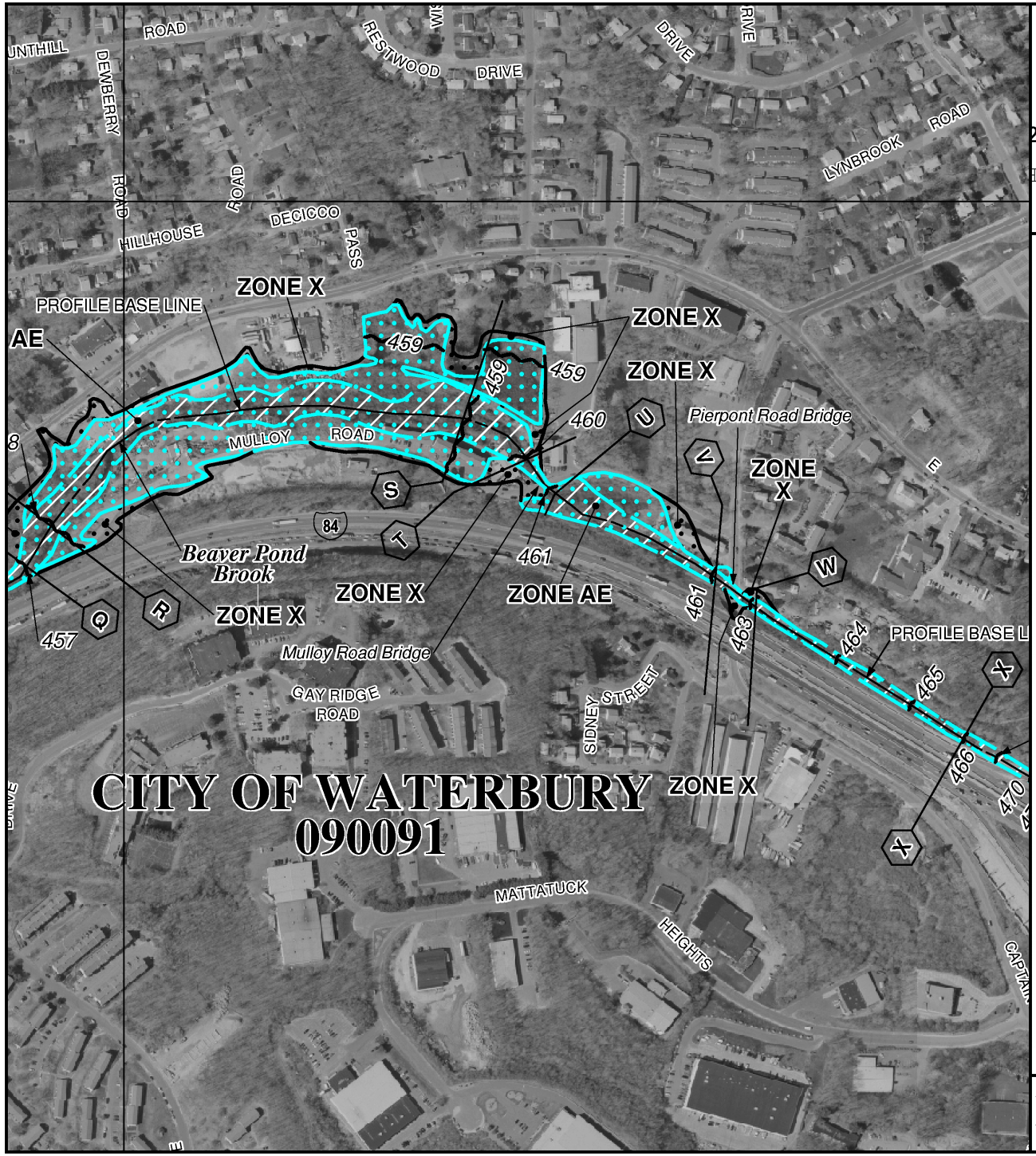

MAP SCALE 1" = 500'

250 0 500 1000 FEET

METER

PANEL 0136H

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

NEW HAVEN COUNTY, CONNECTICUT

(ALL JURISDICTIONS)

PANEL 136 OF 635

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CHESHIRE, TOWN OF	090074	0136	H
PROSPECT, TOWN OF	090151	0136	H
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PANEL 0136H

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

NEW HAVEN COUNTY, CONNECTICUT

(ALL JURISDICTIONS)

PANEL 136 OF 635

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

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COMMUNITY	NUMBER	PANEL	SUFFIX
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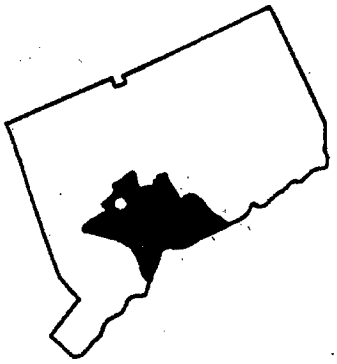
FLOOD INSURANCE STUDY

CITY OF
WATERBURY,
CONNECTICUT
NEW HAVEN COUNTY



MAY 1979

U.S. DEPARTMENT of HOUSING & URBAN DEVELOPMENT
FEDERAL INSURANCE ADMINISTRATION

FLOOD INSURANCE STUDY
CITY OF WATERBURY, CONNECTICUT

1.0 INTRODUCTION

1.1 Purpose of Study

The purpose of this Flood Insurance Study is to investigate the existence and severity of flood hazards in the City of Waterbury, New Haven County, Connecticut, and to aid in the administration of the National Flood Insurance Act of 1973. Initial use of this information will be to convert Waterbury to the regular program of flood insurance by the Federal Insurance Administration (FIA). Further use of this information will be made by local and regional planners in their efforts to promote sound land use and flood plain development.

1.2 Coordination

The selection of the community base map and identification of streams requiring detailed study were accomplished in a meeting attended by personnel of Harris-Toups Associates (study contractor), the FIA, and officials of the City of Waterbury in March 1976.

The hydrology and water-surface profiles of the Naugatuck River were coordinated at meetings attended by members of the New England District of the U. S. Army Corps of Engineers (COE).

In September 1976 an initial Consultation and Coordination Officer's (CCO) meeting was held, at which time the purpose and scope of the study and the methods for performing the study were explained by personnel of the study contractor. In addition, information pertaining to high priority problem areas and other pertinent flood data was collected. An intermediate CCO meeting was held in November 1977 to illustrate preliminary profiles, the delineation of the 100-year flood boundaries, and proposed floodways. Personnel of the study contractor and officials of Waterbury attended these meetings.

On November 2, 1978, the results of the study were reviewed at the final CCO meeting attended by representatives of the City of Waterbury, the FIA, and the study contractor.

1.3 Authority and Acknowledgements

The source of authority for this Flood Insurance Study is the National Flood Insurance Act of 1968, as amended.

The hydrologic and hydraulic analyses for this study were prepared by Harris-Toups Associates for the Federal Insurance Administration, under Contract No. H-3987. This work, which was completed in November 1977, covered all significant flooding sources affecting the City of Waterbury.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated area of the City of Waterbury, New Haven County, Connecticut. The area of study is shown on the Vicinity Map (Figure 1).

The areas studied by detailed methods were selected with priority given to all known flood hazard areas, and areas of projected development and proposed construction for the next five years, through November 1982.

Sources of flooding studied by detailed methods included the Naugatuck River, the Mad River and its tributaries, Beaver Pond Brook, Steel Brook, Hancock Brook, Hopeville Pond Brook, and Wooster Brook. The Naugatuck River and Wooster Brook were studied between the city's downstream and upstream corporate limits. Hopeville Pond Brook was studied from the Naugatuck River to 50 feet upstream of Spring Lake Road. For the Mad River, the study area extended from the Naugatuck River to 50 feet upstream of Sharon Road; for Beaver Pond Brook it extended from the Mad River to 470 feet upstream of Austin Road; for Hancock Brook, from the Naugatuck River to 1,250 feet upstream of Sheffield Road; and for Steel Brook the study area included from the Naugatuck River to the upstream corporate boundary.

Approximate methods of analysis were used to study those areas having low development potential and minimal flood hazards as identified at the initiation of the study. The scope and methods of study were proposed to and agreed upon by the FIA. Using approximate methods, a total of 27 streams were studied including: Turkey Hill Brook, East Mountain Brook, City Mill Pond, Great Brook, Sled Haul Brook, Wilton Brook, Pritchards Pond, Hills Pond, Lower and Upper Fulton Park Pond, Chase Brook, Spruce Brook, Lake Wequapauset, Clough Brook, and 13 unnamed tributaries.

2.2 Community Description

The City of Waterbury was first inhabited in 1674 by settlers from nearby Farmington, who purchased the land from the Indians. They

were seeking land and water power which could support a self-contained community. However the land proved to be poor for farming and was subject to erosion by frequent flooding. The original settlement was named Mattatuck, until 1686, when the township was officially recognized by the General Court of Connecticut and became the 28th town in the state (Reference 1).

Waterbury was a part of Hartford County until 1728 when it was added to New Haven County by its own choice. During the eighteenth century, Waterbury lost some of its territory as a result of the incorporation of Watertown in 1780, Plymouth in 1795, Wolcott in 1796, Middlebury in 1807, Prospect in 1827, and Naugatuck in 1844, which left it with its present corporate limits. Waterbury slowly developed as it changed from a farming community into a manufacturing establishment. The nineteenth century brought with it a rapid industrial explosion. The period from 1874 to the 1950s saw a small factory town develop into an industrial giant. The rapid industrial development included the manufacture of buttons, brass goods, and clockmaking. At one time, Waterbury led the world in brass production and the manufacture of brass goods. It was also known as the "Watch City" because Waterbury once was the center of Connecticut clockmaking and the largest producer of the famous "Dollar Watch."

Today Waterbury is better known for its industrial diversification. Although it has recently experienced economic recession and its population of approximately 112,000 has increased only by about 4,000 since the 1970 census, Waterbury has the manpower and potential to remain an industrial leader of Connecticut. Its future depends on the maintenance of its position as an historic business and industrial center and on the attraction of new business and industry to replace those establishments which have moved or are no longer in existence.

Waterbury is located in the northern portion of New Haven County, 28 miles southwest of Hartford and 26 miles north of New Haven. It is adjoined to the north by Watertown and Plymouth, to the east by Wolcott and Cheshire, to the south by Prospect and Naugatuck, and to the west by Middlebury. The city is well situated with respect to business and personal transportation. Waterbury is served by Conrail, intercity, and local bus service in addition to being the crossroads for State Route 8 and Interstate Route 84.

The topography of Waterbury is generally moderate with steeply sloping land toward the Naugatuck River. The relief of the community ranges from an elevation of 220 feet to as high as 900 feet

in the northeastern corner of the city. A variable climate prevails throughout the area. Waterbury frequently experiences periods of heavy precipitation produced by local thunderstorms and large weather systems of tropical and extra-tropical origin. The mean annual temperature of the drainage basin is approximately 47 degrees Fahrenheit (°F) having an annual precipitation averaging 46 inches.

The major river in the area is the Naugatuck River, a principal tributary of the Housatonic River. From its source in the northern part of Litchfield County, the Naugatuck River flows in a southerly direction. From Watertown, to the north, the Naugatuck River enters the City of Waterbury and bisects the entire community continuing beyond its southern border into Naugatuck. Along its course through Waterbury, the Naugatuck River intercepts the tributary flows of Hancock Brook, Steel Brook, Mad River, and Hopeville Pond Brook. The entire length of the Naugatuck River within Waterbury is densely developed.

Hopeville Pond Brook, between Baldwin and Jersey Streets, experiences minor flooding as does Wooster Brook between Mason and Wooster Avenue. Mad River floods from its confluence with the Naugatuck River upstream to the railroad crossing at Century Brass on Plank Road. Minor flooding occurs on Beaver Pond Brook from its confluence with Mad River upstream to and including Harpers Ferry Road, Mulloy Road, and Pierpont Road. Steel Brook, in the vicinity of its confluence with the Naugatuck River, and Hancock Brook, from its confluence with the Naugatuck River upstream to the railroad bridge, at the intersection of Thomaston Avenue and Boyden Streets, floods.

2.3 Principal Flood Problems

Flooding on the Naugatuck River can occur during any season as a result of intense rainfall, particularly during the coastal storm and hurricane season from May to October. The probability of major flooding is also increased in the period of December through April due to the combination of precipitation and increased runoff from frozen ground and from snowmelt.

A total of six major floods have occurred since 1900; one each in 1927, 1936, 1938, 1948, and two in 1955. The greatest of these took place in August 1955 and had an estimated return period of 250 years. The August 1955 storm resulted in a devastating loss of property and life in the Naugatuck River Basin. The heavily industrialized and commercial areas bordering the Naugatuck River in

Waterbury all experienced flooding at the first or second story levels. Industrial damage, which affected 84 establishments, was estimated at $14,258,000, and total municipal losses were put at $39,096,042. These sums do not include the staggering loss of personal property, business, payrolls, and cleanup and rehabilitation costs. Waterbury's greatest loss was to its inhabitants; there were 24 known dead within the city (Reference 2). Scenes of this historic flood are shown on the following pages (Figures 2 through 6).

In October 1955, a major storm again struck the Naugatuck River. However, because the August storm had produced such catastrophic damage, eliminating most of the damageable property, the resultant October losses were much lower than expected.

2.4 Flood Protection Measures

Two major flood control projects have been completed in Waterbury since the floods of 1955.

The COE has constructed a local protection project in the Waterville section of the City of Waterbury extending from the Chase Brass and Copper Company Dam to the railroad crossing upstream. The protection project consists of channel improvements, a floodwall, and a protective dike. This confines the 500-year flood and protects the major industrial area in the city.

The COE has also developed and constructed a comprehensive Naugatuck River Basin plan for reducing the flooding potential of the Naugatuck River. Flood damage reduction measures completed by the COE include six flood control dams which control and impound the headwaters above Waterbury resulting in a significant reduction in effective drainage area and in future flood levels on the Naugatuck River.

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the city, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Floods having recurrence intervals of 10, 50, 100, and 500 years have been selected as having special significance for flood plain management and for flood insurance premium rates. The analyses reported here reflect current conditions in the watersheds of the flooding sources.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for floods of the selected recurrence intervals for each flooding source studied in detail in the city.

Naugatuck River

Peak discharge-frequency relationships for the Naugatuck River were determined using gaging records recorded by the U. S. Geological Survey (USGS) at gage number 1208500 located in Beacon Falls on the Naugatuck River. This gage has a recording period extending from 1920 to the present. A log-Pearson Type III distribution was fitted to the annual peak flows at the gage and then modified for the effect of the COE flood control reservoir system located within the Naugatuck River Basin.

Hopeville Pond Brook, Mad River, Beaver Pond Brook, Steel Brook, Hancock Brook, and Wooster Brook

The above tributaries of the Naugatuck River do not have stream gages with which frequency-discharge relationships can be developed. As a result, the hydrology for these streams is based upon flood-flow formulas developed by Lawrence A. Weiss, an hydrologist for the USGS in Hartford, Connecticut (Reference 3). The flood-flow formulas developed in 1975 evolved from a regression analysis done on 107 stream gaging stations throughout Connecticut. These gaging stations have a mean record length of 34 years and are supplemented by almost 200 years of historic records. The resultant statistical parameters for use in the flood-flow equations - skew and standard deviation, were computed at each gaging station and plotted on an isopleth map. From these maps, values of skew and standard deviation can be selected for any stream located in Connecticut. Other parameters taken into account by these flood-flow formulas are localized stream length and slope, and urbanization and rainfall intensity.

These empirically developed flood-flow equations were adopted with the approval of the FIA.

Hopeville Pond Brook, Wooster Brook

Discharge-frequency estimates for small drainage areas of less than one square mile in developed areas were calculated utilizing the rational method, for which the input parameters included:

A. Runoff Coefficient - the measure of runoff losses due to infiltration from soil; obtained from zoning maps of Waterbury (Reference 4).

B. Time of Concentration - the time required for rain falling at the most remote point to reach the discharge point; taken from the USGS quadrangle sheets (Reference 5).

C. Intensity of Rainfall - in inches per hour, based on time of concentration; obtained from the U. S. Weather Bureau (Reference 6).

D. Area of watershed in acres.

A summary of peak discharges for the 10-, 50-, 100-, and 500-year floods for those streams studied in detail is shown in Table 1.

TABLE 1 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
NAUGATUCK RIVER					
Downstream corporate limit	206.0	6,900	15,700	21,900	50,900
Downstream of Mad River	205.0	6,650	15,100	21,100	49,100
Upstream of Mad River	179.0	5,800	10,850	15,100	36,800
Freight Street Bridge	175.0	5,700	9,600	13,350	33,100
Upstream of Steel Brook	155.0	5,500	5,600	8,580	23,200
Chase Brass Bridge	137.0	5,300	5,400	8,000	21,600
HOPEVILLE POND BROOK					
Mouth at Naugatuck River	1.3	280	480	585	890
Upstream of Unnamed Tributary	0.9	215	355	435	650
Upstream study limit	0.5	155	240	290	420
MAD RIVER					
Mouth at Naugatuck River	26.4	2,795	4,825	5,935	9,240
Downstream of Beaver Pond Brook	23.9	2,350	4,060	4,990	7,775
Upstream of Beaver Pond Brook	18.0	1,505	2,595	3,190	4,970
Upstream study limit	15.9	1,410	2,435	2,995	4,660

TABLE 1 - SUMMARY OF DISCHARGES (continued)

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
BEAVER POND BROOK					
Mouth at Mad River	5.7	955	1,610	1,960	2,975
Upstream of East Mountain Brook	4.8	795	1,335	1,625	2,465
Upstream of Turkey Hill Brook	3.0	515	865	1,055	1,595
Upstream of Unnamed Tributary	2.5	430	715	870	1,315
Downstream of Unnamed Tributary	1.7	305	515	625	940
Upstream study limit	1.1	205	340	410	615
STEEL BROOK					
Mouth at Naugatuck River	17.0	1,970	3,820	4,950	8,705
Downstream of Clough Brook	16.5	1,915	3,715	4,810	8,465
Upstream of Clough Brook	16.2	1,870	3,630	4,700	8,265
Downstream of Turkey Brook	14.9	1,725	3,345	4,335	7,620
Upstream study limit	12.4	1,410	2,740	3,550	6,245
HANCOCK BROOK					
Mouth at Naugatuck River	3.5	980	1,720	2,190	3,850
Downstream of Unnamed Tributary	1.4	625	930	1,125	1,810
Upstream study limits	1.1	570	800	950	1,470
WOOSTER BROOK					
Downstream corporate limit	1.3	285	525	665	1,100
Downstream of Route 64	1.0	230	380	465	720
Mouth of Tracy Pond	0.7	205	315	375	555
Upstream Study Limit	0.2	170	220	245	310

The discharges computed for Hancock Brook have been adjusted to take into consideration the effect of the Hancock Brook Dam located upstream of the Waterbury city limit. A non-damaging outlet capacity discharge at the dam of 380 cfs was utilized for the 10-, 50-, 100-, and 500-year floods as recommended by the COE who are in control of this reservoir. This discharge was then added to the discharges calculated below the dam which were based upon the effective drainage areas downstream of the reservoir not controlled by the dam.

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of the flooding sources in the community studied in detail were carried out to provide estimates of the elevations of floods of the selected recurrence intervals along each of these flooding sources.

Water-surface elevations of floods of the selected recurrence intervals were computed using the COE HEC-2 step-backwater computer program (Reference 7). The cross sections for the backwater analyses of all detailed study streams were determined by a field survey in 1976, and by strip aerial photographs taken in April 1977 along the stream channel and mapped at a scale of 1:2,400 with a 4-foot contour interval (Reference 8). Cross sections were located at close intervals above and below bridges, culverts, and dams in order to compute the significant backwater effect of these structures. In addition, cross sections were taken between hydraulic controls whenever warranted by topographic changes. All bridges, culverts, and dams were surveyed to obtain elevation data and structural geometry.

Channel roughness factors (Manning's "n") for these computations were assigned on the basis of field inspection of channel and overbank areas, photographs, and any previous reports or findings dealing with hydraulically similar streams. These factors range from 0.025 to 0.04 for the channel and from 0.04 to 0.10 for the overbanks.

Starting water-surface elevations for the Naugatuck River and Wooster Brook profiles were based on water-surface profiles downstream developed by Harris-Toups Associates for the Borough of Naugatuck (Reference 9) and the Town of Middlebury (Reference 10), respectively. The starting water-surface elevations for the tributary streams Hopeville Pond Brook, Mad River, Beaver Pond Brook, Steel Brook, and Hancock Brook were taken from the initially determined mainstream profiles at the points of confluence.

Flood profiles were drawn showing computed water-surface elevations to an accuracy of 0.5 foot for floods of the selected recurrence intervals. Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1). For stream segments for which a floodway is computed (Section 4.2), selected cross section locations are shown on the Flood Boundary and Floodway Map (Exhibit 3).

All elevations used in this study are referenced to National Geodetic Vertical Datum of 1929 (NGVD), formerly referred to as Sea Level Datum of 1929. Locations of the elevation reference marks used in the study are shown on the maps.

The hydraulic analyses for this study are based on the effects of unobstructed flow. The flood elevations shown on the profiles are valid only if the hydraulic structures remain unobstructed and dams and other flood-control structures operate properly and do not fail.

The elevations of the 100-year flood for each stream studied by approximate methods were delineated based upon the Flood Hazard Boundary Map for the Town of Waterbury (Reference 11). Those approximate streams not mapped previously on the Flood Hazard Boundary Map were delineated based upon use of a stage-drainage area curve developed by the USGS (Reference 12). The stage above the mean annual flood for the 100-year flood had been calculated at over 100 gaging stations throughout Connecticut. These values were plotted and an equation developed to determine the depth of flow above the mean annual flood for the 100-year flood event at variable drainage areas. This depth was then plotted on USGS quad sheets to delineate the approximate 100-year flood elevations (Reference 13).

4.0 FLOOD PLAIN MANAGEMENT APPLICATIONS

A prime purpose of the National Flood Insurance Program is to encourage state and local governments to adopt sound flood plain management programs. Each Flood Insurance Study, therefore, includes a flood boundary map designed to assist communities in developing sound flood plain management measures.

4.1 Flood Boundaries

In order to provide a national standard without regional discrimination, the 100-year flood has been adopted by the FIA as the base flood for purposes of flood plain management measures. The 500-year flood is employed to indicate additional areas of flood risk in the community. For each stream studied in detail, the boundaries of the 100- and the 500-year floods have been delineated using the flood elevations determined at each cross section; between cross sections, the boundaries were interpolated using topographic maps at a scale of 1:2,400 with a contour interval of 4 feet (Reference 14). In cases where the 100- and 500-year flood boundaries are close together, only the 100-year boundary has been shown.

The boundaries of the 100- and 500-year floods are shown on the Flood Boundary and Floodway Map (Exhibit 3). Small areas within the flood boundaries may lie above the flood elevations and, therefore, may not be subject to flooding. Owing to limitations of the map scale or lack of detailed topographic information, such areas are not shown.

The boundaries of the 100-year flood for each stream studied by approximate methods have been delineated by using the flooding limits as shown on the Special Flood Hazard Boundary Map and by developing stage-discharge relationships (Reference 11).

4.2 Floodways

Encroachment on flood plains, such as artificial fill, reduces the flood-carrying capacity, increases the flood heights of streams, and increases flood hazards in areas beyond the encroachment itself. One aspect of flood plain management involves balancing the economic gain from flood plain development against the resulting increase in flood hazard. For purposes of the Flood Insurance Program, the concept of a floodway is used as a tool to assist local communities in this aspect of flood plain management. Under this concept, the area of the 100-year flood is divided into a floodway and a floodway fringe. The floodway is the channel of a stream plus any adjacent flood plain areas that must be kept free of encroachment in order that the 100-year flood can be carried without substantial increases in flood heights. Minimum standards of the FIA limit such increases in flood heights to 1.0 foot at any point, provided that hazardous velocities are not produced. The floodways in this report are presented to local agencies as minimum standards that can be adopted or that can be used as a basis for additional studies.

The floodways presented in this study were computed on the basis of equal conveyance reduction from each side of the flood plain. The results of these computations are tabulated at selected cross sections for each stream segment for which a floodway is computed (Table 2).

As shown on the Flood Boundary and Floodway Map (Exhibit 3), the floodway boundaries were determined at cross sections; between cross sections the boundaries were interpolated. In cases where the floodway and the 100-year flood are either close together or collinear, only the floodway boundary has been shown.

6.0 OTHER STUDIES

The 1973 Flood Plain Information report published by the COE for the Naugatuck River was based upon dated field cross sections done in 1938 and 1957, and photogrammetry in the form of USGS quadrangle sheets (References 15 and 11). The FIA determined that due to the age of the field cross sections and accuracy of the mapping, flood profiles for the Naugatuck River should be recomputed based upon current wet cross sections and the latest aerial photogrammetry. As a result, any discrepancies between the Intermediate Regional Flood and the 100-year flood profiles as exhibited in this study were due to stream invert changes, subsequent flood plain development, the construction of State Highway Route No. 8 which runs parallel to the Naugatuck River, and the availability of more accurate overbank mapping.

The State of Connecticut Department of Environmental Protection had prepared an Encroachment Line Report for the Naugatuck River published in 1961 (Reference 16). Since the Department of Environmental Protection study did not take into account the modifying effect of all the flood control reservoirs constructed by the COE, the hydrology and resultant delineations are no longer consistent and applicable to this study. Two additional Channel Encroachment Line Reports on Steel Brook and Hancock Brook were completed in 1966 and 1969, respectively (References 17 and 18). Since the floodway of this Flood Insurance Study bears no relationship to the 100-year flood boundaries of the Encroachment Line Reports in terms of flood plain management, no effort was applied to reconcile differences in results between these two separate studies.

This study is authoritative for purposes of the Flood Insurance Program and the data presented here either supersede or are compatible with previous determinations.

7.0 LOCATION OF DATA

Survey, hydrologic, hydraulic, and other pertinent data used in this study can be obtained by contacting the office of the Federal Insurance Administration, Regional Director, 15 New Chardon Street, Boston, Massachusetts 02114.

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FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION		
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	WITH FLOODWAY (NGVD)	WITHOUT FLOODWAY (NGVD)	DIFFERENCE (FT.)
Mad River (continued)							
S	7,745	145	1,146	4.8	323.3	323.3	0.0
T	8,100	130	1,360	4.0	323.7	323.7	0.0
U	8,515	84	1,016	5.4	323.8	323.8	0.0
V	8,905	150	1,383	4.0	324.9	324.9	0.0
W	9,260	85	575	9.5	325.1	325.1	0.0
X	9,404	95	808	6.8	327.2	327.1	0.1
Y	10,335	81	394	12.7	329.9	329.9	0.0
Z	10,545	67	487	10.2	335.3	335.3	0.0
AA	11,135	110	418	11.9	341.4	341.4	0.0
AB	11,985	122	517	9.7	349.9	349.7	0.2
AC	12,295	93	819	6.1	352.2	352.2	0.0
AD	12,395	116	970	5.1	353.6	353.6	0.0
AE	12,700	97	418	11.9	354.4	354.4	0.0
AF	13,200	100	637	7.8	359.2	358.7	0.5
AG	13,745	396	4,660	1.1	376.2	376.2	0.0
AH	14,275	217	1,694	2.9	376.2	376.2	0.0
AI	14,875	424	4,190	1.2	378.2	378.2	0.0

[1] Feet above confluence with the Naugatuck River

TABLE 2

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration

CITY OF WATERBURY, CT

(NEW HAVEN CO.)

FLOODWAY DATA

MAD RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION		
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	WITH FLOODWAY (NGVD)	WITHOUT FLOODWAY (NGVD)	DIFFERENCE (FT.)
Mad River (continued)							
AJ	15,065	222	865	3.7	378.2	378.2	0.0
AK	15,190	142	440	7.3	378.8	378.8	0.0
AL	15,590	96	404	7.9	380.8	380.8	0.0
AM	16,150	45	241	13.3	388.9	388.9	0.0
AN	16,350	70	344	9.3	391.4	391.4	0.0
AO	17,270	54	273	11.7	399.7	399.7	0.0
AP	18,220	190	458	7.0	412.9	412.9	0.0
AQ	19,230	86	298	10.7	426.3	426.3	0.0
AR	19,935	272	3,132	1.0	451.0	450.9	0.1
AS	20,435	169	1,057	3.0	451.0	450.9	0.1
AT	20,935	72	503	6.3	451.2	451.2	0.0
AU	21,080	69	486	6.6	451.7	451.6	0.1
AV	21,790	102	735	4.3	453.1	453.1	0.0
AW	22,790	164	765	3.9	454.4	454.4	0.0
AX	23,230	77	330	9.1	454.8	454.7	0.1
AY	23,750	73	399	7.5	458.6	458.6	0.0
AZ	23,950	75	548	5.5	459.3	459.3	0.0

[1] Feet above confluence with the Naugatuck River

TABLE 2

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration

CITY OF WATERBURY, CT

(NEW HAVEN CO.)

FLOODWAY DATA

MAD RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION		
CROSS SECTION	DISTANCE	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	WITH FLOODWAY (NGVD)	WITHOUT FLOODWAY (NGVD)	DIFFERENCE (FT.)
Mad River (continued)							
BA	25,075[1]	225	1,358	2.2	460.4	460.4	0.0
BB	26,435[1]	119	733	4.1	461.0	460.9	0.1
BC	27,035[1]	169	988	3.0	461.7	461.6	0.1
BD	27,665[1]	179	1,037	2.9	462.1	462.0	0.1
BE	28,045[1]	130	875	3.4	462.3	462.1	0.2
BF	28,180[1]	131	888	3.4	462.4	462.2	0.2
BG	28,300[1]	128	802	3.7	462.5	462.3	0.2
Beaver Pond Brook							
A	200[2]	22	180	10.9	377.8	377.8[3]	0.0
B	400[2]	59	384	5.1	380.1	380.1	0.0
C	600[2]	52	242	8.1	380.5	380.4	0.1
D	920[2]	52	292	6.7	383.6	383.6	0.0
E	1,320[2]	44	153	10.6	386.2	386.2	0.0
F	2,000[2]	35	141	11.5	400.8	400.8	0.0

[1]Feet above confluence with the Naugatuck River
[2]Feet above confluence with the Mad River
[3]Elevations computed without consideration of backwater effects from the Mad River

TABLE 2

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration

CITY OF WATERBURY, CT
(NEW HAVEN CO.)

FLOODWAY DATA

MAD RIVER AND BEAVER POND BROOK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION		
CROSS SECTION	DISTANCE [1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	WITH FLOODWAY (NGVD)	WITHOUT FLOODWAY (NGVD)	DIFFERENCE (FT.)
Beaver Pond Brook (continued)							
G	2,560	39	147	11.1	414.5	414.5	0.0
H	2,650	28	191	5.5	420.0	420.0	0.0
I	2,800	55	290	3.6	420.5	420.3	0.2
J	3,030	41	170	6.2	420.7	420.6	0.1
K	3,310	49	202	5.2	424.7	424.7	0.0
L	3,910	33	104	10.2	428.1	428.1	0.0
M	4,490	30	113	9.3	436.8	436.8	0.0
N	4,760	40	128	7.6	447.7	447.7	0.0
O	5,870	38	170	5.7	454.2	454.2	0.0
P	6,060	31	173	5.6	455.9	455.9	0.0
Q	6,660	72	215	4.5	458.0	458.0	0.0
R	6,820	119	243	4.0	458.7	458.7	0.0
S	8,360	150	518	1.7	460.5	460.4	0.1
T	8,610	63	312	2.8	460.7	460.5	0.2
U	8,760	163	907	0.7	462.5	462.4	0.1
V	9,330	42	194	3.2	462.5	462.4	0.1

[1] Feet above confluence with the Mad River

TABLE 2

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration

CITY OF WATERBURY, CT
(NEW HAVEN CO.)

FLOODWAY DATA

BEAVER POND BROOK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION		
CROSS SECTION	DISTANCE	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	WITH FLOODWAY (NGVD)	WITHOUT FLOODWAY (NGVD)	DIFFERENCE (FT.)
Beaver Pond Brook (continued)							
W	9,500[1]	37	181	3.5	464.0	463.9	0.1
X	10,290[1]	26	51	8.1	466.8	466.8	0.0
Y	10,910[1]	23	56	7.3	476.9	476.9	0.0
Z	11,180[1]	24	85	4.8	486.5	486.5	0.0
AA	11,510[1]	12	40	10.4	491.9	491.9	0.0
AB	11,730[1]	157	578	0.7	493.8	493.8	0.0
AC	12,000[1]	61	104	3.9	493.8	493.7	0.1
Steel Brook							
A	130[2]	69	374	13.3	264.8	264.8[3]	0.0
B	330[2]	89	520	9.5	267.7	267.7[3]	0.0
C	870[2]	102	633	7.8	270.4	270.2	0.2
D	1,370[2]	92	593	8.4	272.0	271.5	0.5
E	1,612[2]	204	987	5.0	273.9	273.8	0.1
F	2,870[2]	102	529	9.1	279.2	279.2	0.0

[1]Feet above confluence with the Mad River
[2]Feet above confluence with the Naugatuck River
[3]Elevations computed without consideration of backwater effects from the Naugatuck River

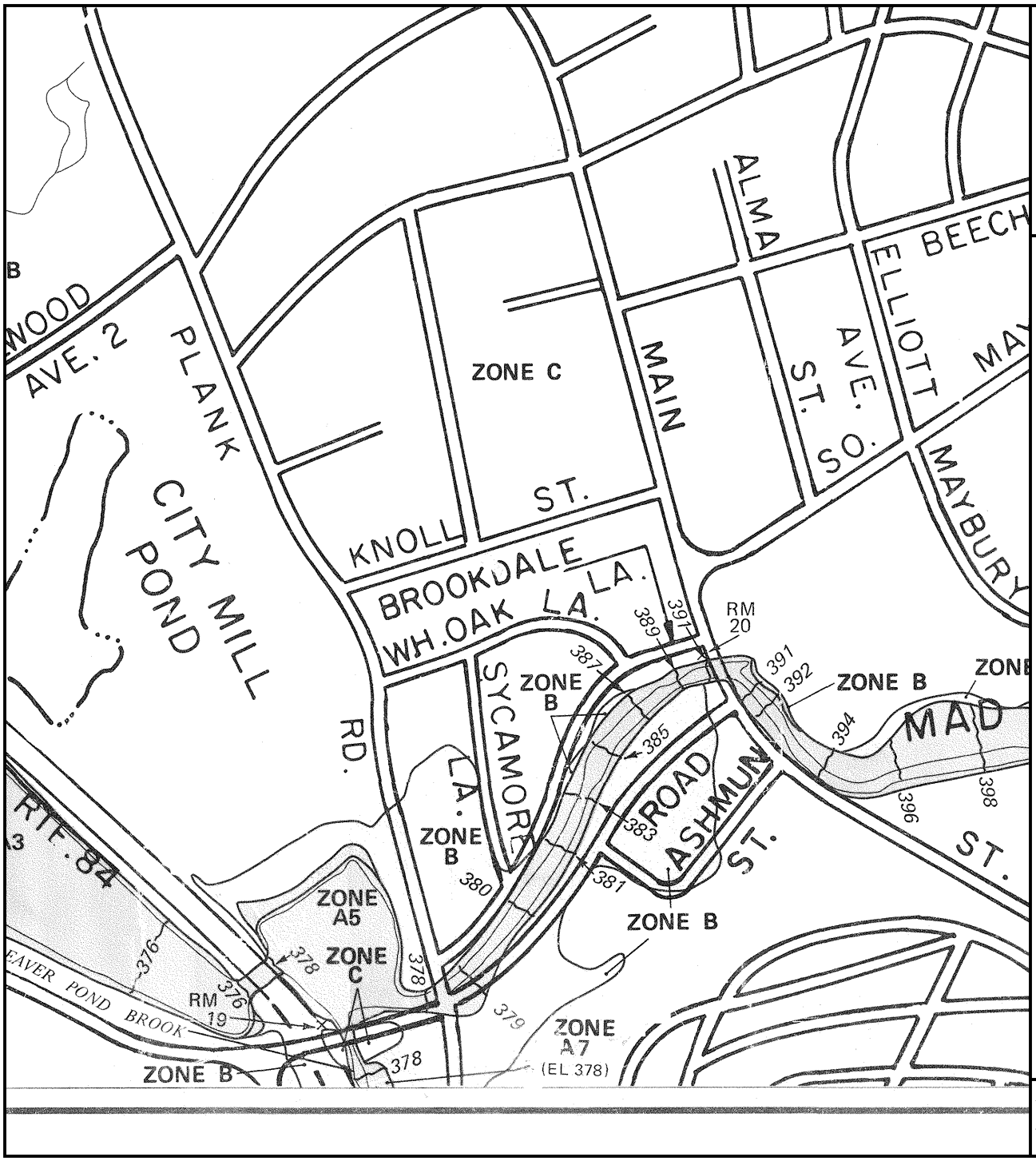
TABLE 2

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration

CITY OF WATERBURY, CT
(NEW HAVEN CO)

FLOODWAY DATA

BEAVER POND BROOK AND STEEL BROOK



APPROXIMATE SCALE

400 0 400 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

CITY OF
WATERBURY, CONNECTICUT
NEW HAVEN COUNTY

PANEL 8 OF 12
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
090091 0008 B

EFFECTIVE DATE:
NOVEMBER 1, 1979

U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
FEDERAL INSURANCE ADMINISTRATION

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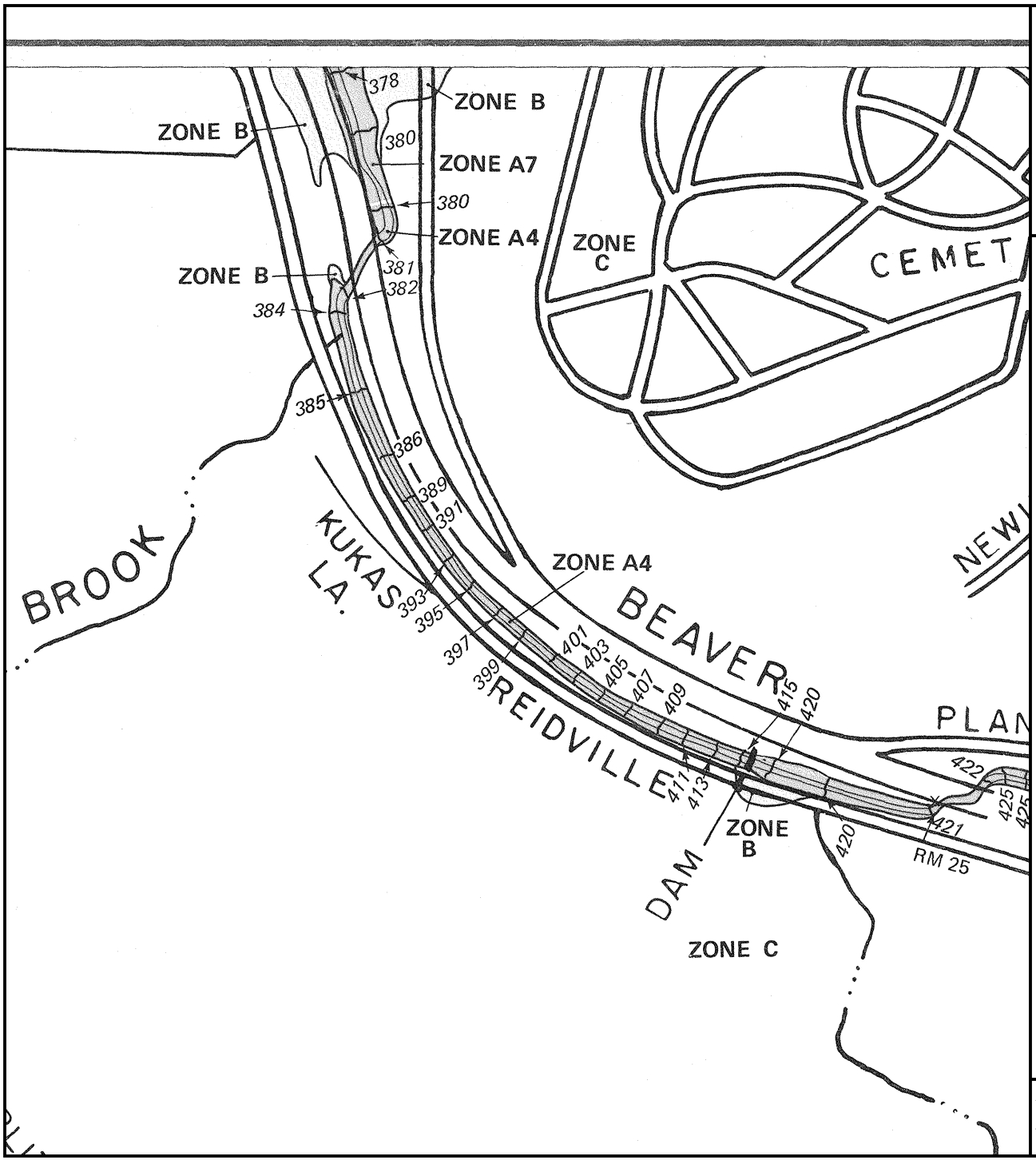

APPROXIMATE SCALE

400 0 400 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

CITY OF
WATERBURY,
CONNECTICUT
NEW HAVEN COUNTY

PANEL 11 OF 12
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
090091 0011 B

EFFECTIVE DATE:
NOVEMBER 1, 1979

U.S. DEPARTMENT OF HOUSING
AND URBAN DEVELOPMENT
FEDERAL INSURANCE ADMINISTRATION

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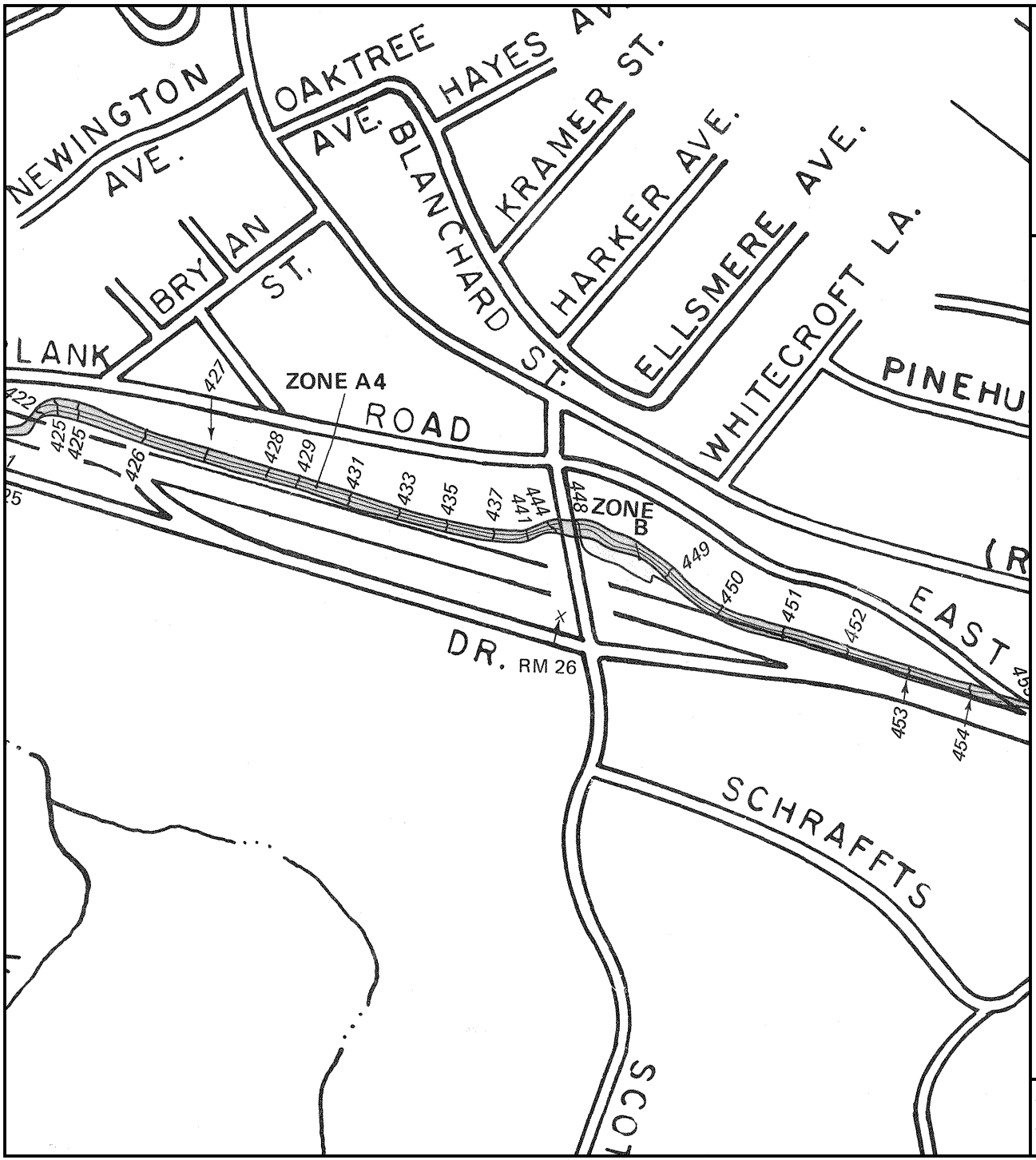

APPROXIMATE SCALE

400 0 400 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

CITY OF
WATERBURY,
CONNECTICUT
NEW HAVEN COUNTY

PANEL 11 OF 12
(SEE MAP INDEX FOR PANELS NOT PRINTED)

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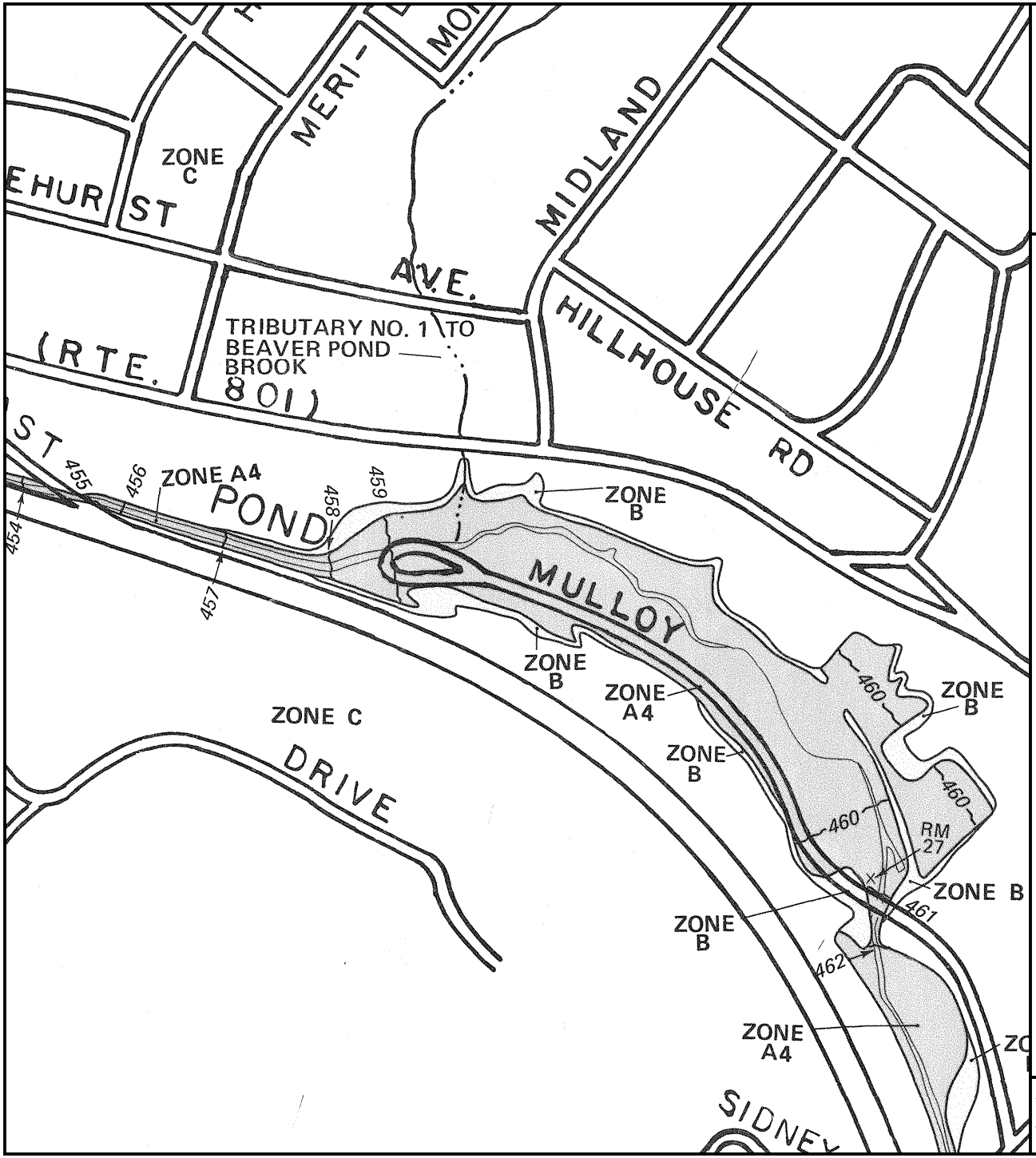

APPROXIMATE SCALE

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NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

CITY OF
WATERBURY,
CONNECTICUT
NEW HAVEN COUNTY

PANEL 11 OF 12
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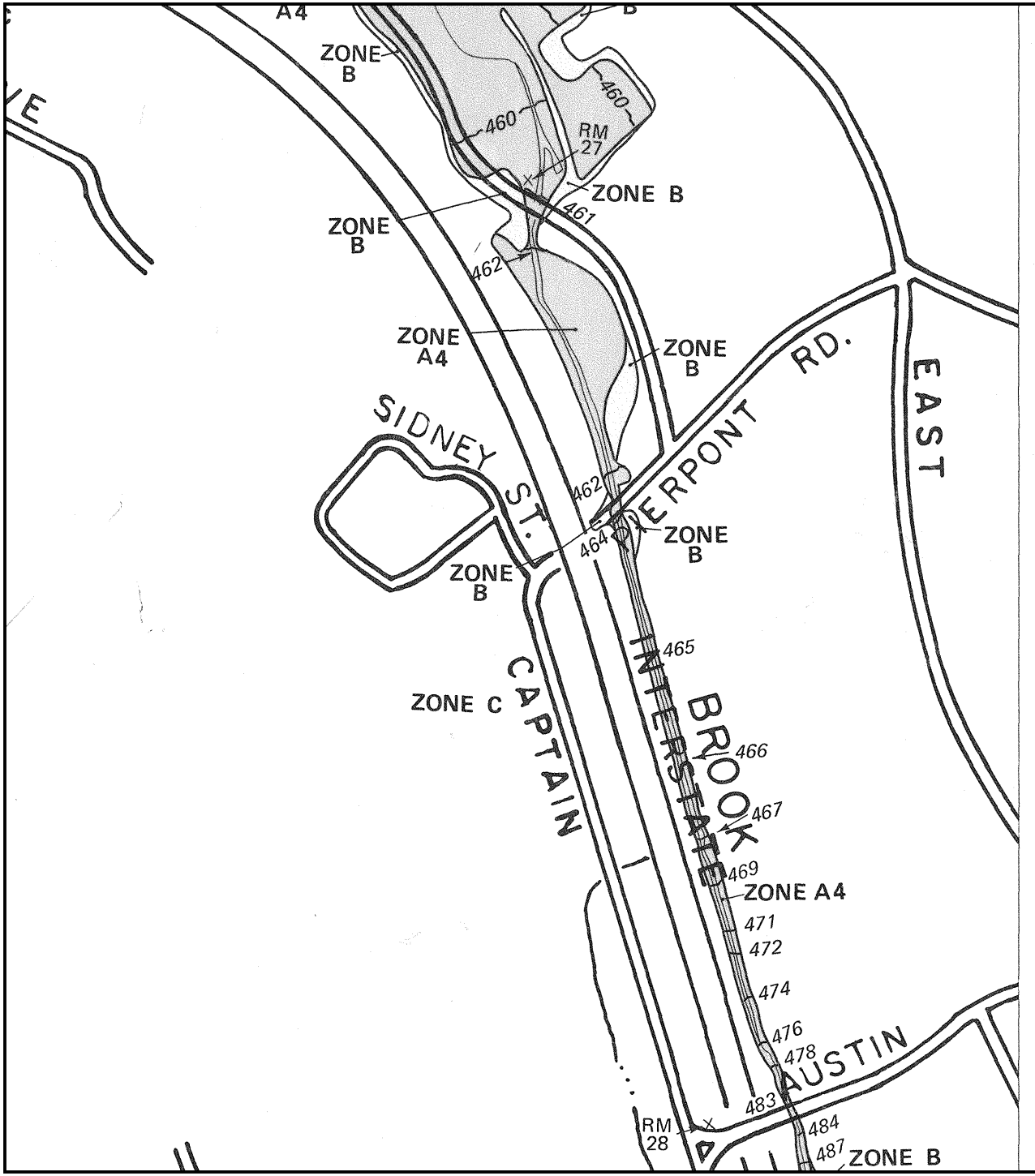

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FIRM
FLOOD INSURANCE RATE MAP

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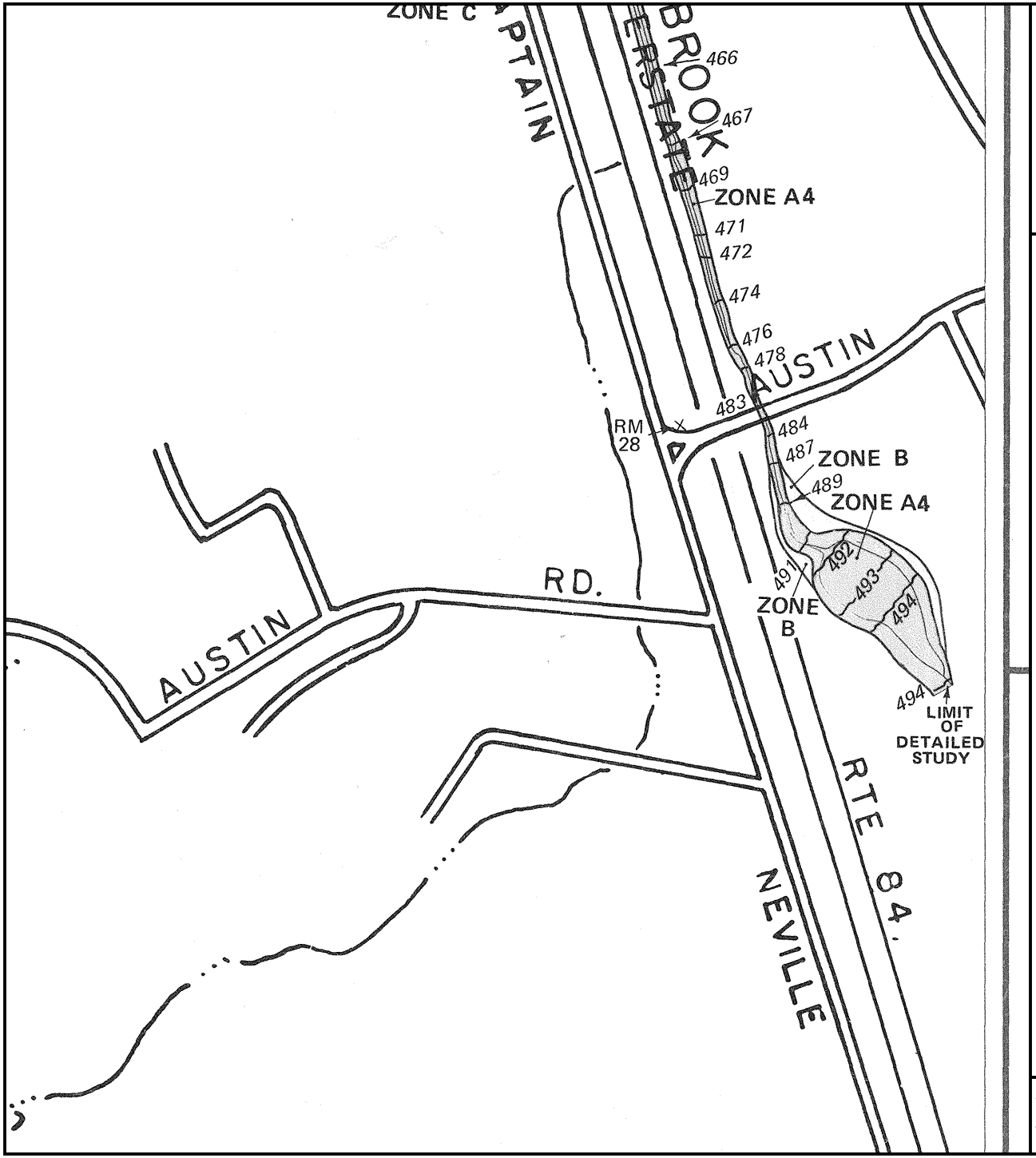

APPROXIMATE SCALE

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FLOOD INSURANCE RATE MAP

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Federal Emergency Management Agency

Washington, D.C. 20472

RECEIVED
FEB 16 1999
BERGER LEHMAN ASSOCIATES

TO: Berger, Lehman Associates, P.C.
20-30 Beaver Road
Wethersfield, CT 06109-2201

DATE: 2-11-99

Request #: D9901018

RE: Waterbury, CT

Attention: Arnold Weitzman

WE ARE SENDING YOU THE FOLLOWING ITEMS

Copies	Date or Number	Description
1 ea.		HEC-2 multiple run w/ output only for a floodway run

TOTAL PAYMENT DUE: $130.00

DATE RECEIVED: 2-9-99

DATE OF PURCHASE ORDER: —

AMOUNT OUTSTANDING $0

COMMENTS:

for Mad River, elevations are off at x-sections H, W, AE, AJ, AK, AT + AY on the floodway + x-sections H, W, AJ, AK + AT on the multiple run. for Beaver Pond Brook, x-sections A-C + H on the multiple run. Due to the quality of the microfiche, areas will be faded + hard to read.

```
*********************************************
HEC2 RELEASE DATED NOV 76 UPDATED AUG1977
ERROR CORR -  01,02
MODIFICATION -  50,51,52,53
*********************************************

T1   CONNECTICUT FLOOD INSURANCE STUDY
T2      TOWN OF WATERBURY
T3      BEAVER POND BROOK        10 YR

J1  ICHECK    INQ      NINV     IDIR     STRT     METRIC   HVINS    Q        WSEL     FQ

     -1.      2.       0.       0.   0.000000     0.00    -1.0      0.     375.100   0.000

J2  NPROF    IPLOT    PRFVS    XSECV    XSECH    FN       ALLDC    IBW      CHNIM    ITRACE

     0.000    0.000   -1.000    0.000    0.000    0.000    0.000    0.000    0.000    0.000

J3  VARIABLE CODES FOR SUMMARY PRINTOUT

    100.000   0.000  150.000    0.000  201.000    0.000    0.000    0.000    0.000    0.000

J5  LPRNT    NUMSEC                  ********REQUESTED SECTION NUMBERS********

    -10.000  -10.000   0.000    0.000    0.000    0.000    0.000    0.000    0.000    0.000
OT    4.000 -955.000 1610.000 1960.000 2975.000    0.000    0.000    0.000    0.000    0.000
NC     .080     .060     .040    0.000    0.000    0.000    0.000    0.000    0.000    0.000
NC    0.000    0.000    0.000     .300     .500    0.000    0.000    0.000    0.000    0.000

X1 5204.000   10.000  200.000  330.000    0.000    0.000    0.000    0.000    0.000    0.000
GR  375.000  200.000  371.300  227.000  369.700  247.000  370.200  268.000  370.600  281.000
GR  371.300  307.000  372.000  307.000  372.100  318.000  376.000  330.000  360.000  400.000

X1 5204.200   10.000  325.000  372.000   45.000   45.000    5.000    0.000    0.000    0.000
X3   10.000    0.000    0.000    0.000    0.000    0.000    0.000  377.000  377.000    0.000
GR  380.000  200.000  378.000  325.000  377.500  350.000  370.200  350.000  370.000  355.000
GR  368.400  361.000  368.800  367.000  368.800  372.000  379.200  372.000  380.400  397.000
SB    1.250    1.500    2.800    0.000   22.000    1.000  170.000    0.000  367.000  369.000

X1 5204.800    0.000    0.000    0.000   95.000   95.000   95.000    0.000    0.000    0.000
X2    0.000    0.000    1.000  377.000  378.000    0.000    0.000    0.000    0.000    0.000
X3   10.000    0.000    0.000    0.000    0.000    0.000    0.000  378.000  378.000    0.000
BT    7.000  200.000  380.000    0.000  325.000  379.000    0.000  350.000  390.400    0.000
BT  361.000  391.300    0.000  372.000  391.900    0.000  372.000  379.200    0.000  397.000
BT  380.400    0.000    0.000    0.000    0.000    0.000    0.000    0.000    0.000    0.000

X1 5204.900    0.000    0.000    0.000   60.000   60.000   60.000    0.000     .500    0.000
NC    0.000    0.000    0.000     .100     .300    0.000    0.000    0.000    0.000    0.000

X1 5205.000   11.000  450.000  510.000  200.000  200.000  200.000    0.000    0.000    0.000
GR  388.000  200.000  384.000  270.000  384.000  380.000  377.800  450.000  372.400  463.000
GR  373.700  475.000  371.400  478.000  370.600  485.000  371.700  494.000  380.400  510.000
GR  361.000  550.000    0.000    0.000    0.000    0.000    0.000    0.000    0.000    0.000
NC    0.000    0.000    0.000     .300     .500    0.000    0.000    0.000    0.000    0.000
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X1	5205.100	12.000	310.000	380.000	200.000	200.000	200.000	0.000	0.000	0.000
GR	388.000	200.000	384.000	310.000	380.000	320.000	374.500	325.000	373.000	333.000
GR	373.000	340.000	380.000	370.000	384.000	380.000	386.000	440.000	384.000	490.000
GR	388.000	520.000	392.000	530.000	0.000	0.000	0.000	0.000	0.000	0.000
X1	5205.200	9.000	400.000	424.000	80.000	120.000	110.000	0.000	0.000	0.000
X3	10.000	0.000	0.000	0.000	0.000	0.000	0.000	384.000	384.000	0.000
GR	388.000	200.000	384.000	360.000	375.900	400.000	375.900	406.000	373.700	412.000
GR	373.200	418.000	373.500	424.000	381.200	447.000	383.600	472.000	0.000	0.000
SB	1.250	1.500	2.800	0.000	24.000	1.000	210.000	0.000	374.500	374.000
X1	5205.800	12.000	400.000	424.000	160.000	160.000	160.000	0.000	0.000	0.000
X2	0.000	0.000	1.000	383.100	384.000	0.000	0.000	0.000	0.000	0.000
X3	10.000	0.000	0.000	0.000	0.000	0.000	0.000	384.000	384.000	0.000
BT	5.000	200.000	395.000	0.000	320.000	392.000	0.000	400.000	390.000	0.000
BT	424.000	389.000	0.000	472.000	384.000	0.000	0.000	0.000	0.000	0.000
GR	397.000	200.000	392.000	340.000	386.400	354.000	382.000	379.000	376.600	400.000
GR	375.300	406.000	373.900	412.000	373.000	418.000	373.000	424.000	364.000	424.000
GR	388.000	480.000	396.000	510.000	0.000	0.000	0.000	0.000	0.000	0.000
NC	.060	.080	.040	0.000	0.000	0.000	0.000	0.000	0.000	0.000
X1	5206.000	8.000	210.000	290.000	70.000	35.000	50.000	0.000	0.000	0.000
GR	389.300	200.000	389.300	210.000	375.600	237.000	375.400	247.000	375.800	253.000
GR	384.900	276.000	392.000	290.000	396.000	340.000	0.000	0.000	0.000	0.000
QT	4.000	795.000	1335.000	1625.000	2465.000	0.000	0.000	0.000	0.000	0.000
NC	0.000	0.000	0.000	.100	.300	0.000	0.000	0.000	0.000	0.000
X1	5207.000	10.000	210.000	287.000	390.000	410.000	400.000	0.000	0.000	0.000
GR	400.000	200.000	395.300	210.000	389.400	221.000	381.600	237.000	381.100	247.000
GR	381.700	257.000	390.800	287.000	391.600	325.000	396.000	500.000	400.000	535.000
X1	5208.000	7.000	200.000	277.000	670.000	690.000	680.000	0.000	0.000	0.000
GP	415.700	200.000	395.700	231.000	394.700	240.000	395.900	249.000	411.300	277.000
GR	412.000	290.000	412.000	450.000	0.000	0.000	0.000	0.000	0.000	0.000
NC	0.000	0.000	0.000	.300	.500	0.000	0.000	0.000	0.000	0.000
X1	5208.100	10.000	205.000	264.000	555.000	565.000	560.000	0.000	0.000	0.000
GR	425.300	200.000	422.600	205.000	410.000	227.000	409.600	241.000	411.100	255.000
GR	419.400	264.000	421.000	279.000	424.000	400.000	428.000	440.000	432.000	450.000
X1	5208.200	10.000	227.000	255.000	30.000	30.000	30.000	0.000	0.000	0.000
X3	10.000	0.000	0.000	0.000	0.000	0.000	0.000	413.400	413.400	0.000
GP	425.300	200.000	422.600	205.000	410.000	227.000	409.600	241.000	411.100	255.000
GR	419.400	264.000	421.000	279.000	424.000	400.000	428.000	440.000	432.000	450.000
SB	0.000	1.500	3.200	0.000	.100	0.000	.010	0.000	412.700	409.600
X1	5208.800	10.000	227.000	255.000	1.500	1.500	1.500	0.000	0.000	0.000
X2	0.000	0.000	1.000	412.800	413.100	0.000	0.000	0.000	0.000	0.000
X3	10.000	0.000	0.000	0.000	0.000	0.000	0.000	413.100	413.100	0.000
BT	11.000	200.000	425.300	0.000	205.000	422.600	0.000	227.000	413.400	0.000
BT	241.000	413.100	0.000	255.000	413.400	0.000	264.000	419.400	0.000	279.000
BT	421.000	0.000	400.000	424.000	0.000	440.000	428.000	0.000	450.000	432.000
BT	0.000	490.000	436.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
GR	425.300	200.000	422.600	205.000	413.400	227.000	412.700	241.000	413.400	255.000
GR	419.400	264.000	421.000	279.000	424.000	400.000	428.000	440.000	432.000	450.000
QT	4.000	515.000	865.000	1055.000	1595.000	0.000	0.000	0.000	0.000	0.000

X1	5208.900	0.000	0.000	0.000	58.500	58.500	58.500	0.000	0.000	0.000
NC	0.000	0.000	0.000	.100	.300	0.000	0.000	0.000	0.000	0.000
X1	5209.000	10.000	250.000	335.000	150.000	150.000	150.000	0.000	0.000	0.000
GR	427.500	200.000	427.500	250.000	413.100	290.000	412.500	301.000	413.400	312.000
GR	425.000	335.000	424.400	339.000	424.000	365.000	424.000	480.000	428.000	590.000
NC	0.000	0.000	0.000	.300	.500	0.000	0.000	0.000	0.000	0.000
X1	5210.000	8.000	250.000	333.000	230.000	230.000	230.000	0.000	0.000	0.000
GR	429.700	200.000	429.700	250.000	415.200	284.000	414.600	292.000	414.500	300.000
GR	430.700	333.000	430.700	400.000	432.000	610.000	0.000	0.000	0.000	0.000
X1	5210.200	8.000	275.000	295.000	70.000	100.000	75.000	0.000	0.000	0.000
X3	10.000	0.000	0.000	0.000	0.000	0.000	0.000	428.000	428.000	0.000
GR	430.000	200.000	430.000	250.000	416.800	275.000	416.900	280.000	416.900	295.000
GR	428.000	350.000	432.000	400.000	436.000	440.000	0.000	0.000	0.000	0.000
SB	1.250	1.500	2.800	0.000	22.000	1.000	170.000	0.000	417.900	416.900
X1	5210.800	9.000	275.000	295.000	155.000	155.000	155.000	0.000	0.000	0.000
X2	0.000	0.000	1.000	425.800	430.000	0.000	0.000	0.000	0.000	0.000
X3	10.000	0.000	0.000	0.000	0.000	0.000	0.000	428.000	428.000	0.000
ST	4.000	200.000	430.000	0.000	275.000	431.000	0.000	295.000	431.500	0.000
BT	440.000	434.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
GR	434.000	200.000	432.000	250.000	417.800	275.000	417.800	280.000	417.900	290.000
GR	418.400	295.000	428.000	320.000	433.000	340.000	433.000	440.000	0.000	0.000
NC	.080	.060	.040	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NC	0.000	0.000	0.000	.100	.300	0.000	0.000	0.000	0.000	0.000
X1	5211.000	10.000	240.000	335.000	60.000	40.000	50.000	0.000	0.000	0.000
X3	10.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	432.600	0.000
GR	438.000	200.000	435.900	240.000	419.100	280.000	418.700	292.000	419.500	303.000
GR	432.600	335.000	432.700	341.000	432.000	440.000	429.000	470.000	440.000	530.000
X1	5212.000	9.000	330.000	408.000	600.000	600.000	600.000	0.000	0.000	0.000
GR	440.000	200.000	439.800	299.000	438.900	330.000	424.000	364.000	423.600	372.000
GR	423.900	380.000	439.300	408.000	439.400	413.000	441.500	440.000	0.000	0.000
NC	0.000	0.000	0.000	.300	.500	0.000	0.000	0.000	0.000	0.000
X1	5213.000	8.000	220.000	305.000	580.000	580.000	580.000	0.000	0.000	0.000
GR	452.000	200.000	444.800	220.000	433.000	237.000	430.500	245.000	432.300	253.000
GR	437.600	263.000	446.500	305.000	449.000	460.000	0.000	0.000	0.000	0.000
X1	5213.200	13.000	358.000	500.000	90.000	110.000	100.000	0.000	0.000	0.000
X3	10.000	0.000	0.000	0.000	0.000	0.000	0.000	447.700	447.800	0.000
GR	458.000	200.000	456.000	358.000	453.600	375.000	447.700	390.000	438.800	390.000
GR	438.800	408.000	447.800	408.000	445.500	421.000	448.100	442.000	450.000	500.000
GR	450.000	580.000	452.000	595.000	460.000	620.000	0.000	0.000	0.000	0.000
SB	1.250	1.500	2.800	0.000	19.000	1.000	144.000	0.000	441.700	438.800
X1	5213.800	15.000	358.000	500.000	120.000	120.000	120.000	0.000	0.000	0.000
X2	0.000	0.000	1.000	449.900	463.000	0.000	0.000	0.000	0.000	0.000
X3	10.000	0.000	0.000	0.000	0.000	0.000	0.000	460.700	468.000	0.000
ST	11.000	200.000	458.000	0.000	310.000	460.000	0.000	390.000	463.000	0.000
BT	408.000	463.500	0.000	500.000	468.000	0.000	500.000	460.000	0.000	540.000
BT	452.000	0.000	560.000	451.000	0.000	640.000	451.000	0.000	660.000	452.000
BT	0.000	670.000	460.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
GR	458.000	200.000	459.200	333.000	460.700	358.000	452.000	374.000	441.700	390.000

GR	441.500	399.000	442.000	403.500	441.800	408.000	468.000	500.000	460.000	500.000
GR	452.000	540.000	451.000	560.000	451.000	640.000	452.000	640.000	460.000	670.000
QT	4.000	475.000	795.000	865.000	1460.000	0.000	0.000	0.000	0.000	0.000
X1	5214.000	13.000	345.000	540.000	60.000	0.000	50.000	0.000	0.000	0.000
X3	10.000	0.000	0.000	0.000	0.000	0.000	0.000	457.700	452.000	0.000
GR	460.000	200.000	457.000	210.000	457.000	320.000	457.700	345.000	444.200	370.000
GR	443.100	380.000	443.200	390.000	447.800	404.000	448.600	480.000	452.000	540.000
GR	451.500	550.000	451.500	630.000	460.000	660.000	0.000	0.000	0.000	0.000
X1	5216.000	10.000	265.000	350.000	1110.000	1110.000	1110.000	0.000	0.000	0.000
GR	468.000	200.000	464.000	220.000	460.000	230.000	458.500	265.000	456.000	285.000
GR	448.300	295.000	448.300	315.000	460.000	335.000	461.500	350.000	461.500	440.000
X1	5216.200	10.000	260.000	293.000	50.000	50.000	50.000	0.000	0.000	0.000
X3	10.000	0.000	0.000	0.000	0.000	0.000	0.000	456.800	456.800	0.000
GR	468.000	200.000	464.000	220.000	457.000	230.000	456.800	260.000	448.500	270.000
GR	448.500	284.000	458.500	293.000	458.800	300.000	462.000	335.000	462.000	425.000
SB	1.250	1.500	2.800	0.000	14.000	1.000	100.000	0.000	0.000	0.000
X1	5216.800	11.000	260.000	293.000	90.000	90.000	90.000	0.000	0.000	0.000
X2	0.000	0.000	1.000	456.800	458.000	0.000	0.000	0.000	0.000	0.000
X3	10.000	0.000	0.000	0.000	0.000	0.000	0.000	458.000	458.000	0.000
BT	4.000	245.000	460.000	0.000	260.000	459.000	0.000	293.000	458.000	0.000
BT	300.000	458.800	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
GR	468.000	220.000	460.000	245.000	456.000	260.000	449.200	270.000	448.700	274.000
GR	448.500	284.000	449.400	288.000	458.100	293.000	459.000	310.000	462.500	340.000
GR	462.500	430.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
X1	5217.000	0.000	0.000	0.000	50.000	50.000	50.000	0.000	0.000	0.000
NC	0.000	0.000	0.000	.100	.300	0.000	0.000	0.000	0.000	0.000
X1	5217.500	12.000	340.000	450.000	600.000	600.000	600.000	0.000	0.000	0.000
GR	472.000	200.000	468.000	220.000	464.000	290.000	460.000	340.000	456.000	390.000
GR	452.000	395.000	451.000	403.000	452.000	410.000	456.000	425.000	460.000	450.000
GR	468.000	470.000	468.000	680.000	0.000	0.000	0.000	0.000	0.000	0.000
NC	.080	.080	.040	0.000	0.000	0.000	0.000	0.000	0.000	0.000
X1	5218.000	15.000	310.000	472.000	160.000	160.000	160.000	0.000	0.000	0.000
GR	472.000	200.000	468.000	250.000	464.000	300.000	460.000	310.000	457.000	410.000
GR	457.100	435.000	454.200	442.000	452.700	442.000	451.900	450.000	453.200	458.000
GR	454.500	458.000	458.900	472.000	458.900	550.000	460.000	590.000	470.000	610.000
QT	4.000	430.000	715.000	870.000	1315.000	0.000	0.000	0.000	0.000	0.000
X1	5219.000	14.000	550.000	810.000	1600.000	1480.000	1540.000	0.000	0.000	0.000
GR	472.000	200.000	468.000	225.000	464.000	270.000	460.000	350.000	460.000	550.000
GR	459.200	573.000	455.300	581.000	453.000	591.000	455.500	601.000	456.500	604.000
GR	456.300	616.000	460.000	810.000	464.000	860.000	472.000	875.000	0.000	0.000
NC	0.000	0.000	0.000	.300	.500	0.000	0.000	0.000	0.000	0.000
X1	5220.000	13.000	570.000	633.000	280.000	220.000	250.000	0.000	0.000	0.000
GR	472.000	200.000	468.000	250.000	464.000	330.000	461.800	520.000	460.000	570.000
GR	455.800	577.000	454.800	589.000	453.600	600.000	454.000	611.000	458.000	624.000
GR	458.100	633.000	464.000	820.000	472.000	870.000	0.000	0.000	0.000	0.000
X1	5220.200	9.000	350.000	368.000	50.000	50.000	50.000	0.000	0.000	0.000

X3	10.000	0.000	0.000	0.000	0.000	0.000	0.000	462.100	461.700	0.000
GR	464.000	200.000	462.100	350.000	454.000	350.000	454.000	359.000	453.300	364.000
GR	463.700	368.000	461.700	368.000	461.700	392.000	464.000	540.000	0.000	0.000
SB	1.250	1.500	2.800	0.000	18.000	1.000	87.000	0.000	453.700	453.500
X1	5220.800	0.000	0.000	0.000	57.000	57.000	57.000	0.000	0.000	0.000
X2	0.000	0.000	1.000	458.500	461.700	0.000	0.000	0.000	0.000	0.000
X3	10.000	0.000	0.000	0.000	0.000	0.000	0.000	461.700	461.700	0.000
BT	7.000	200.000	464.000	0.000	350.000	462.100	0.000	350.000	464.700	0.000
BT	368.000	464.400	0.000	368.000	461.700	0.000	392.000	461.700	0.000	540.000
BT	464.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NC	.080	.060	.040	0.000	0.000	0.000	0.000	0.000	0.000	0.000
QT	4.000	305.000	515.000	625.000	940.000	0.000	0.000	0.000	0.000	0.000
X1	5221.000	13.000	520.000	683.000	43.000	43.000	43.000	0.000	0.000	0.000
X3	10.000	0.000	0.000	0.000	0.000	0.000	0.000	462.200	0.000	0.000
GR	468.000	200.000	464.000	210.000	461.000	270.000	461.000	380.000	462.200	480.000
GR	462.200	520.000	455.300	550.000	455.200	596.000	453.700	596.000	454.500	607.000
GR	455.300	618.000	461.000	683.000	466.600	695.000	0.000	0.000	0.000	0.000
X1	5222.000	9.000	335.000	391.000	550.000	590.000	570.000	0.000	0.000	0.000
GR	470.000	200.000	462.600	310.000	462.300	335.000	455.800	347.000	455.900	358.000
GR	456.100	365.000	458.000	367.000	468.400	391.000	472.000	400.000	0.000	0.000
X1	5222.200	11.000	345.000	380.000	50.000	50.000	50.000	0.000	0.000	0.000
X3	10.000	0.000	0.000	0.000	0.000	0.000	0.000	460.300	460.300	0.000
GR	470.000	200.000	464.700	300.000	461.200	325.000	455.700	345.000	455.500	350.000
GR	456.100	355.000	456.300	360.000	456.300	365.000	464.000	380.000	460.400	406.000
GR	472.000	410.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SB	.950	1.500	2.800	0.000	20.000	1.000	76.400	0.000	455.900	454.300
X1	5222.800	11.000	345.000	380.000	70.000	70.000	70.000	0.000	0.000	0.000
X2	0.000	0.000	1.000	460.300	464.000	0.000	0.000	0.000	0.000	0.000
X3	10.000	0.000	0.000	0.000	0.000	0.000	0.000	464.000	464.000	0.000
BT	6.000	320.000	464.000	0.000	345.000	464.000	0.000	345.000	466.400	0.000
BT	365.000	466.400	0.000	380.000	466.200	0.000	380.000	464.400	0.000	0.000
GR	470.000	200.000	464.000	320.000	464.000	345.000	455.500	345.000	455.500	350.000
GR	456.300	355.000	456.600	360.000	457.200	365.000	464.400	380.000	464.600	401.000
GR	472.000	410.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
X1	5223.000	9.000	350.000	390.000	50.000	50.000	50.000	0.000	0.000	0.000
GR	472.000	200.000	468.000	300.000	464.800	343.000	464.400	350.000	456.600	362.000
GR	456.600	368.000	456.800	374.000	465.200	390.000	472.000	400.000	0.000	0.000
QT	4.000	205.000	340.000	410.000	615.000	0.000	0.000	0.000	0.000	0.000
NC	0.000	0.000	0.000	.100	.300	0.000	0.000	0.000	0.000	0.000
X1	5224.000	10.000	380.000	450.000	810.000	770.000	790.000	0.000	0.000	0.000
GR	480.000	200.000	476.000	215.000	471.200	369.000	471.000	380.000	467.800	380.000
GR	464.900	392.000	463.500	401.000	465.400	410.000	467.800	410.000	485.700	450.000
NC	0.000	0.000	0.000	.300	.500	0.000	0.000	0.000	0.000	0.000
X1	5225.000	12.000	660.000	738.000	620.000	620.000	620.000	0.000	0.000	0.000
GR	492.000	200.000	488.000	260.000	488.000	600.000	482.800	660.000	481.700	685.000
GR	474.700	694.000	473.400	703.000	474.800	712.000	480.900	717.000	487.600	734.000
GR	488.700	761.000	491.500	780.000	0.000	0.000	0.000	0.000	0.000	0.000
X1	5225.200	13.000	625.000	635.000	80.000	80.000	80.000	0.000	0.000	0.000

X3	10.000	0.000	0.000	0.000	0.000	10.000	0.000	0.000	0.000	0.000
GR	496.000	200.000	492.000	260.000	492.000	550.000	487.800	600.000	487.700	625.000
GR	479.400	625.000	479.400	633.000	487.700	633.000	489.800	658.000	491.500	700.000
GR	491.500	810.000	492.000	830.000	496.000	850.000	0.000	0.000	0.000	0.000
SB	.900	1.500	2.800	0.000	48.000	.010	56.000	0.000	0.000	0.000

X1	5225.800	0.000	0.000	0.000	140.000	140.000	140.000	0.000	0.000	0.000
X2	0.000	0.000	1.000	487.400	491.500	0.000	0.000	0.000	0.000	0.000
X3	10.000	0.000	0.000	0.000	0.000	0.000	0.000	491.000	491.000	0.000
BT	9.000	200.000	500.000	0.000	400.000	500.000	0.000	580.000	507.300	0.000
BT	630.000	509.000	0.000	680.000	510.400	0.000	700.000	500.000	0.000	720.000
BT	491.500	0.000	830.000	491.500	0.000	850.000	492.000	0.000	0.000	0.000

Z

X1	5226.000	11.000	269.000	324.000	50.000	50.000	50.000	0.000	0.000	0.000
GR	500.000	200.000	496.000	230.000	492.800	245.000	490.900	269.000	482.000	283.000
GR	480.800	288.000	481.800	293.000	488.000	303.000	488.800	324.000	492.000	360.000
GR	492.000	520.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NC	.090	.090	.040	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NC	0.000	0.000	0.000	.100	.300	0.000	0.000	0.000	0.000	0.000

AA

X1	5227.000	9.000	320.000	332.000	310.000	360.000	330.000	0.000	0.000	0.000
GR	496.000	200.000	493.800	270.000	493.100	320.000	488.800	320.000	488.500	326.000
GR	488.700	332.000	492.100	332.000	493.500	382.000	496.000	430.000	0.000	0.000

AB

X1	5228.000	7.000	213.000	370.000	220.000	220.000	220.000	0.000	0.000	0.000
GR	496.300	200.000	493.600	213.000	490.900	211.000	490.000	252.000	488.300	276.000
GR	492.000	370.000	496.000	420.000	0.000	0.000	0.000	0.000	0.000	0.000

AC

X1	5229.000	9.000	220.000	320.000	290.000	250.000	270.000	0.000	0.000	0.000
GR	498.400	200.000	491.700	220.000	489.800	238.000	488.500	244.000	489.900	250.000
GR	492.400	250.000	493.100	282.000	496.000	320.000	498.000	420.000	0.000	0.000
EJ	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

BEAVER POND BROOK

SUMMARY PRINTOUT TABLE 150

SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10K*S	VCH	AREA	.01K
5204.000	0.00	0.00	0.00	369.70	955.00	375.10	0.00	375.16	5.36	2.04	469.20	412.60
5204.000	0.00	0.00	0.00	369.70	1610.00	376.70	0.00	376.79	4.71	2.38	680.24	741.55
5204.000	0.00	0.00	0.00	369.70	1960.00	378.20	0.00	378.28	2.99	2.23	913.30	1133.34
5204.000	0.00	0.00	0.00	369.70	2975.00	382.50	0.00	382.55	1.20	1.92	1744.95	2718.59
5204.200	45.00	0.00	0.00	368.40	955.00	374.72	0.00	375.66	75.30	7.79	122.65	110.05
5204.200	45.00	0.00	0.00	368.40	1610.00	375.89	0.00	377.72	124.72	10.86	148.24	144.17
5204.200	45.00	0.00	0.00	368.40	1960.00	377.36	0.00	379.19	106.30	10.84	180.78	190.10
5204.200	45.00	0.00	0.00	368.40	2975.00	382.38	0.00	382.70	17.22	5.24	894.03	716.96
5204.800	95.00	378.00	377.00	368.40	955.00	374.97	0.00	375.83	66.64	7.46	127.98	116.99
5204.800	95.00	378.00	377.00	368.40	1610.00	376.73	0.00	378.18	89.91	9.66	166.61	169.80
5204.800	95.00	378.00	377.00	368.40	1960.00	378.59	0.00	379.71	96.95	8.53	239.87	199.05
5204.800	95.00	378.00	377.00	368.40	2975.00	382.584	0.00	382.87	15.40	5.03	933.73	758.18
5204.900	60.00	0.00	0.00	368.90	955.00	375.36	0.00	376.26	70.24	7.60	125.66	113.95
5204.900	60.00	0.00	0.00	368.90	1610.00	377.30	0.00	378.72	87.37	9.56	168.33	172.24
5204.900	60.00	0.00	0.00	368.90	1960.00	379.23	0.00	380.29	87.88	8.26	252.31	209.07
5204.900	60.00	0.00	0.00	368.90	2975.00	382.65	0.00	383.01	19.63	5.50	848.86	671.40
5205.000	200.00	0.00	0.00	370.60	955.00	376.83	0.00	377.19	30.04	4.83	197.90	174.24
5205.000	200.00	0.00	0.00	370.60	1610.00	379.16	0.00	379.53	18.98	4.91	336.69	369.58
5205.000	200.00	0.00	0.00	370.60	1960.00	380.58	0.00	380.91	13.48	4.69	454.43	533.87
5205.000	200.00	0.00	0.00	370.60	2975.00	382.94	0.00	383.28	9.84	4.89	790.67	948.43
5205.100	200.00	0.00	0.00	373.00	955.00	377.54	0.00	378.70	135.25	8.62	110.7	82.12
5205.100	200.00	0.00	0.00	373.00	1610.00	379.51	0.00	380.58	83.47	8.41	193.68	176.22
5205.100	200.00	0.00	0.00	373.00	1960.00	380.79	0.00	381.68	56.20	7.58	258.61	261.45
5205.100	200.00	0.00	0.00	373.00	2975.00	383.02	0.00	383.92	41.84	7.60	391.55	459.95
5205.200	110.00	0.00	0.00	373.20	955.00	378.88	0.00	380.01	93.32	9.24	103.38	98.86
5205.200	110.00	0.00	0.00	373.20	1610.00	380.00	0.00	382.21	112.83	11.93	134.97	151.57
5205.200	110.00	0.00	0.00	373.20	1960.00	380.82	0.00	383.31	108.45	12.65	154.88	188.21
5205.200	110.00	0.00	0.00	373.20	2975.00	382.34	382.15	386.10	130.52	15.56	191.14	260.40
5205.800	160.00	384.00	383.10	373.00	955.00	379.16	0.00	380.18	81.84	8.10	117.93	105.57
* 5205.800	160.00	384.00	383.10	373.00	1610.00	381.04	0.00	382.55	89.57	9.88	162.90	170.11
* 5205.800	160.00	384.00	383.10	373.00	1960.00	381.95	0.00	383.70	92.37	10.60	184.89	203.93
* 5205.800	160.00	384.00	383.10	373.00	2975.00	385.85	0.00	386.78	33.40	8.50	482.30	514.76
5206.000	50.00	0.00	0.00	375.40	955.00	379.62	0.00	380.68	113.43	8.26	115.63	69.67
5206.000	50.00	0.00	0.00	375.40	1610.00	382.33	0.00	383.10	47.64	7.04	228.78	233.25
5206.000	50.00	0.00	0.00	375.40	1960.00	383.58	0.00	384.29	36.46	6.74	290.84	324.60
5206.000	50.00	0.00	0.00	375.40	2975.00	386.32	0.00	387.00	25.75	6.63	448.59	586.25
5207.000	400.00	0.00	0.00	381.10	795.00	384.77	0.00	385.88	154.06	8.45	94.04	64.05
* 5207.000	400.00	0.00	0.00	381.10	1335.00	385.74	385.74	387.33	169.30	10.14	131.72	102.60
* 5207.000	400.00	0.00	0.00	381.10	1625.00	386.23	386.23	387.98	165.61	10.62	153.01	126.27
* 5207.000	400.00	0.00	0.00	381.10	2465.00	387.49	387.49	389.57	153.45	11.57	212.97	198.99
* 5208.000	680.00	0.00	0.00	394.70	795.00	398.92	398.92	400.37	178.69	9.66	82.29	59.47
* 5208.000	680.00	0.00	0.00	394.70	1335.00	400.19	400.19	402.07	169.61	11.01	121.24	102.51
* 5208.000	680.00	0.00	0.00	394.70	1625.00	400.77	400.77	402.84	165.47	11.53	140.93	126.33
* 5208.000	680.00	0.00	0.00	394.70	2465.00	402.21	402.21	404.71	157.17	12.68	194.33	196.62

SECNO	XLCH	ELTRD	ELLO	ELMIN	Q	CWSEL	CRIWS	EG	10K*S	VCH	AREA	.01K
5208.100	560.00	0.00	0.00	409.60	795.00	412.89	412.89	414.16	184.98	9.06	87.73	58.45
5208.100	560.00	0.00	0.00	409.60	1335.00	413.98	413.98	415.68	171.08	10.47	127.92	102.07
5208.100	560.00	0.00	0.00	409.60	1625.00	414.48	414.48	416.38	166.40	11.04	147.19	125.97
5208.100	560.00	0.00	0.00	409.60	2465.00	415.76	415.76	418.12	157.36	12.32	200.10	196.50
5208.200	30.00	0.00	0.00	409.60	795.00	413.87	0.00	414.62	81.68	7.08	123.51	101.23
5208.200	30.00	0.00	0.00	409.60	1335.00	414.91	0.00	416.14	75.33	9.20	164.18	153.82
5208.200	30.00	0.00	0.00	409.60	1625.00	415.23	0.00	416.82	89.59	10.46	177.11	171.69
5208.200	30.00	0.00	0.00	409.60	2465.00	416.05	416.01	418.67	122.37	13.50	212.44	222.83
5208.800	1.50	413.10	412.80	412.70	795.00	416.02	415.91	417.25	140.81	9.10	96.41	67.00
5208.800	1.50	413.10	412.80	412.70	1335.00	417.08	417.04	418.83	136.95	10.99	139.01	114.08
5208.800	1.50	413.10	412.80	412.70	1625.00	417.58	417.58	419.57	134.05	11.76	160.76	140.35
5208.800	1.50	413.10	412.80	412.70	2465.00	418.94	418.94	421.43	120.93	13.31	224.66	224.15
5208.900	58.50	0.00	0.00	412.70	515.00	417.59	0.00	417.79	13.32	3.72	161.40	141.14
5208.900	58.50	0.00	0.00	412.70	865.00	419.23	0.00	419.50	12.57	4.43	238.92	243.98
5208.900	58.50	0.00	0.00	412.70	1055.00	419.99	0.00	420.29	12.23	4.72	279.93	301.67
5208.900	58.50	0.00	0.00	412.70	1595.00	421.90	0.00	422.26	11.03	5.27	425.12	480.22
5209.000	150.00	0.00	0.00	412.50	515.00	417.84	0.00	418.00	14.21	3.22	159.99	136.63
5209.000	150.00	0.00	0.00	412.50	865.00	419.50	0.00	419.70	13.11	3.61	239.62	238.92
5209.000	150.00	0.00	0.00	412.50	1055.00	420.27	0.00	420.49	12.59	3.75	281.09	297.38
5209.000	150.00	0.00	0.00	412.50	1595.00	422.19	0.00	422.44	11.27	4.02	396.46	475.17
5210.000	230.00	0.00	0.00	414.50	515.00	418.26	0.00	418.87	82.59	6.28	82.06	56.67
5210.000	230.00	0.00	0.00	414.50	865.00	419.84	0.00	420.46	57.28	6.36	135.97	114.29
5210.000	230.00	0.00	0.00	414.50	1055.00	420.58	0.00	421.21	50.02	6.39	165.06	149.17
5210.000	230.00	0.00	0.00	414.50	1595.00	422.43	0.00	423.07	37.30	6.41	248.97	261.15
5210.200	75.00	0.00	0.00	416.80	515.00	419.62	419.62	421.00	176.42	9.43	54.63	38.77
5210.200	75.00	0.00	0.00	416.80	865.00	420.75	420.75	422.70	163.21	11.20	77.24	67.71
5210.200	75.00	0.00	0.00	416.80	1055.00	421.30	421.30	423.52	159.57	11.97	88.17	83.52
5210.200	75.00	0.00	0.00	416.80	1595.00	422.69	422.69	425.62	154.65	13.74	116.12	128.26
5210.800	155.00	430.00	425.80	417.80	515.00	421.17	0.00	422.14	99.98	7.89	65.24	51.51
5210.800	155.00	430.00	425.80	417.80	865.00	422.53	0.00	423.89	93.56	9.37	92.28	89.43
5210.800	155.00	430.00	425.80	417.80	1055.00	423.18	0.00	424.74	91.97	10.01	105.38	110.01
5210.800	155.00	430.00	425.80	417.80	1595.00	424.86	0.00	426.90	90.30	11.48	138.89	167.85
5211.000	50.00	0.00	0.00	418.70	515.00	422.11	0.00	422.61	71.45	5.65	91.13	60.92
5211.000	50.00	0.00	0.00	418.70	865.00	423.83	0.00	424.28	40.52	5.39	160.50	135.88
5211.000	50.00	0.00	0.00	418.70	1055.00	424.68	0.00	425.11	32.52	5.27	200.28	185.00
5211.000	50.00	0.00	0.00	418.70	1595.00	426.87	0.00	427.26	20.56	4.99	319.35	351.75
5212.000	600.00	0.00	0.00	423.60	515.00	427.12	0.00	427.87	106.62	6.94	74.21	49.87
5212.000	600.00	0.00	0.00	423.60	865.00	427.63	427.63	429.08	179.26	9.70	89.21	64.61
5212.000	600.00	0.00	0.00	423.60	1055.00	428.09	428.09	429.69	173.76	10.14	104.00	80.03
5212.000	600.00	0.00	0.00	423.60	1595.00	429.19	429.19	431.13	165.35	11.17	142.76	124.04
5213.000	580.00	0.00	0.00	430.50	515.00	434.75	434.67	435.94	177.46	8.77	58.72	38.66
5213.000	580.00	0.00	0.00	430.50	865.00	436.32	0.00	437.51	117.88	8.75	98.68	79.67
5213.000	580.00	0.00	0.00	430.50	1055.00	436.79	0.00	438.15	122.34	9.36	112.74	95.38
5213.000	580.00	0.00	0.00	430.50	1595.00	437.97	0.00	439.71	131.62	10.60	150.47	139.03

SEGNO	XLEN	ELTRD	ELLO	ELMIN	Q	CWSEL	CRIWS	EG	10K*S	VCH	AREA	*01K
5213.200	100.00	0.00	0.00	438.80	515.00	441.73	441.73	443.21	239.20	9.75	52.79	33.30
5213.200	100.00	0.00	0.00	438.80	865.00	442.95	442.95	445.03	240.94	11.57	74.76	55.73
5213.200	100.00	0.00	0.00	438.80	1055.00	443.53	443.53	445.91	246.54	12.40	85.08	67.19
5213.200	100.00	0.00	0.00	438.80	1595.00	445.03	445.03	448.17	257.81	14.22	112.14	99.34
5213.800	120.00	463.00	449.90	441.50	515.00	445.38	0.00	445.80	54.52	5.20	98.98	69.75
5213.800	120.00	463.00	449.90	441.50	865.00	446.90	0.00	447.35	40.52	5.41	159.95	135.89
5213.800	120.00	463.00	449.90	441.50	1055.00	447.63	0.00	448.09	35.62	5.45	193.67	176.76
5213.800	120.00	463.00	449.90	441.50	1595.00	449.52	0.00	449.98	26.46	5.45	292.44	310.10
5214.000	50.00	0.00	0.00	443.10	475.00	445.77	445.77	446.75	197.34	7.97	59.59	33.81
5214.000	50.00	0.00	0.00	443.10	795.00	446.95	0.00	447.94	127.29	7.98	99.59	70.46
5214.000	50.00	0.00	0.00	443.10	965.00	447.69	0.00	448.58	94.01	7.58	127.34	99.53
5214.000	50.00	0.00	0.00	443.10	1460.00	449.95	0.00	450.19	31.79	3.90	373.90	258.96
5216.000	1110.00	0.00	0.00	448.30	475.00	452.70	0.00	452.95	24.70	4.06	117.05	95.58
5216.000	1110.00	0.00	0.00	448.30	795.00	453.82	0.00	454.22	30.50	5.09	156.19	143.94
5216.000	1110.00	0.00	0.00	448.30	965.00	454.20	0.00	454.70	35.10	5.66	170.54	162.89
5216.000	1110.00	0.00	0.00	448.30	1460.00	454.51	0.00	455.51	66.65	8.01	182.30	176.84
5216.200	50.00	0.00	0.00	448.50	475.00	452.73	0.00	453.30	62.85	6.08	78.10	59.92
5216.200	50.00	0.00	0.00	448.50	795.00	453.80	0.00	454.71	78.98	7.65	103.89	89.45
5216.200	50.00	0.00	0.00	448.50	965.00	454.15	0.00	455.29	92.37	8.55	112.88	100.41
5216.200	50.00	0.00	0.00	448.50	1460.00	454.45	454.45	456.73	175.88	12.10	120.63	110.09
5216.800	90.00	458.00	456.80	448.50	475.00	452.93	0.00	453.38	45.90	5.34	89.03	70.11
5216.800	90.00	458.00	456.80	448.50	795.00	454.79	0.00	455.29	35.86	5.68	139.94	132.77
5216.800	90.00	458.00	456.80	448.50	965.00	455.66	0.00	456.18	32.80	5.81	166.13	168.49
5216.800	90.00	458.00	456.80	448.50	1460.00	458.60	0.00	459.07	18.33	5.54	276.43	341.00
5217.000	50.00	0.00	0.00	448.50	475.00	453.22	0.00	453.60	36.76	4.94	96.23	78.34
5217.000	50.00	0.00	0.00	448.50	795.00	455.02	0.00	455.47	31.49	5.42	146.61	141.67
5217.000	50.00	0.00	0.00	448.50	965.00	455.86	0.00	456.35	29.53	5.59	172.57	177.59
5217.000	50.00	0.00	0.00	448.50	1460.00	458.71	0.00	459.16	17.49	5.46	282.16	349.13
5217.500	600.00	0.00	0.00	451.00	475.00	455.68	0.00	456.06	46.07	4.93	96.44	69.98
5217.500	600.00	0.00	0.00	451.00	795.00	457.31	0.00	457.65	41.84	4.70	169.06	122.90
5217.500	600.00	0.00	0.00	451.00	965.00	458.00	0.00	458.31	35.88	4.49	214.71	161.10
5217.500	600.00	0.00	0.00	451.00	1460.00	460.03	0.00	460.24	17.57	3.64	401.50	348.26
5218.000	160.00	0.00	0.00	451.90	475.00	456.50	0.00	457.08	80.67	6.09	78.00	52.89
5218.000	160.00	0.00	0.00	451.90	795.00	458.18	0.00	458.48	64.66	4.37	181.92	130.57
5218.000	160.00	0.00	0.00	451.90	965.00	458.73	0.00	458.97	46.54	3.98	242.48	141.45
5218.000	160.00	0.00	0.00	451.90	1460.00	460.38	0.00	460.49	13.26	2.76	637.26	401.01
5219.000	1540.00	0.00	0.00	453.80	430.00	459.11	0.00	459.13	4.71	1.21	354.13	198.19
5219.000	1540.00	0.00	0.00	453.80	715.00	460.10	0.00	460.12	3.80	1.23	599.85	366.90
5219.000	1540.00	0.00	0.00	453.80	870.00	460.40	0.00	460.43	3.57	1.30	740.49	460.24
5219.000	1540.00	0.00	0.00	453.80	1315.00	461.28	0.00	461.31	2.65	1.37	1175.31	808.49
5220.000	250.00	0.00	0.00	453.60	430.00	459.21	0.00	459.27	4.87	1.90	243.03	194.84
5220.000	250.00	0.00	0.00	453.60	715.00	460.18	0.00	460.27	5.83	2.40	353.66	296.00
5220.000	250.00	0.00	0.00	453.60	870.00	460.48	0.00	460.59	6.82	2.71	395.82	333.25
5220.000	250.00	0.00	0.00	453.60	1315.00	461.33	0.00	461.48	8.25	3.32	545.98	457.75

	SEEDG	ALGIN	ELTOP	ELLO	ELWTN	Q	CWSEL	CRINS	EG	10K*S	VCH	AREA	.01K
	5220.200	50.00	0.00	0.00	453.30	430.00	459.13	0.00	459.45	28.80	4.47	96.18	80.13
	5220.200	50.00	0.00	0.00	453.30	715.00	459.97	0.00	460.61	52.83	6.43	111.28	98.37
	5220.200	50.00	0.00	0.00	453.30	870.00	460.17	0.00	461.06	71.74	7.58	114.79	102.72
	5220.200	50.00	0.00	0.00	453.30	1315.00	460.62	0.00	462.40	135.37	10.69	122.99	113.02
	5220.800	57.00	461.70	458.50	453.30	430.00	459.42	0.00	459.70	24.79	4.24	101.41	86.36
	5220.800	57.00	461.70	458.50	453.30	715.00	461.09	0.00	461.55	33.41	5.44	131.35	123.69
	5220.800	57.00	461.70	458.50	453.30	870.00	461.66	0.00	462.25	40.43	6.15	141.44	136.82
	5220.800	57.00	461.70	458.50	453.30	1315.00	462.00	0.00	463.21	80.06	8.84	158.31	146.97
	5221.000	43.00	0.00	0.00	453.70	305.00	459.79	0.00	459.80	.56	.63	483.84	409.00
	5221.000	43.00	0.00	0.00	453.70	515.00	461.68	0.00	461.69	.41	.67	772.62	808.21
	5221.000	43.00	0.00	0.00	453.70	625.00	462.42	0.00	462.43	.34	.67	1160.42	1071.24
	5221.000	43.00	0.00	0.00	453.70	940.00	463.57	0.00	463.58	.35	.77	1687.22	1584.32
	5222.000	570.00	0.00	0.00	455.80	305.00	459.80	0.00	459.97	19.45	3.25	93.99	69.16
	5222.000	570.00	0.00	0.00	455.80	515.00	461.67	0.00	461.83	12.68	3.21	160.27	144.60
	5222.000	570.00	0.00	0.00	455.80	625.00	462.40	0.00	462.56	11.69	3.29	190.20	182.78
	5222.000	570.00	0.00	0.00	455.80	940.00	463.52	0.00	463.75	12.79	3.85	271.61	262.89
	5222.200	50.00	0.00	0.00	455.50	305.00	459.89	0.00	460.07	18.24	3.36	90.89	71.41
	5222.200	50.00	0.00	0.00	455.50	515.00	461.78	0.00	461.90	8.69	3.00	212.89	174.72
	5222.200	50.00	0.00	0.00	455.50	625.00	462.50	0.00	462.62	8.04	3.08	254.88	220.37
	5222.200	50.00	0.00	0.00	455.50	940.00	463.64	0.00	463.82	9.49	3.65	331.17	305.14
	5222.800	70.00	464.00	460.30	455.50	305.00	459.91	0.00	460.12	27.14	3.72	81.98	58.54
	5222.800	70.00	464.00	460.30	455.50	515.00	462.67	0.00	462.83	11.56	3.20	160.97	151.47
	5222.800	70.00	464.00	460.30	455.50	625.00	463.88	0.00	464.03	9.33	3.12	200.24	204.56
	5222.800	70.00	464.00	460.30	455.50	940.00	465.75	0.00	465.90	7.41	3.29	366.61	345.28
	5223.000	50.00	0.00	0.00	456.60	305.00	460.00	0.00	460.42	61.83	5.16	59.10	38.79
	5223.000	50.00	0.00	0.00	456.60	515.00	462.71	0.00	462.94	18.08	3.81	135.00	121.13
	5223.000	50.00	0.00	0.00	456.60	625.00	463.91	0.00	464.10	12.84	3.54	176.57	174.40
	5223.000	50.00	0.00	0.00	456.60	940.00	465.76	0.00	465.98	10.24	3.75	263.16	293.70
	5224.000	790.00	0.00	0.00	463.50	205.00	466.23	465.90	466.69	122.45	5.44	37.67	18.53
*	5224.000	790.00	0.00	0.00	463.50	340.00	466.50	466.50	467.41	210.04	7.68	44.42	23.46
*	5224.000	790.00	0.00	0.00	463.50	410.00	466.75	466.75	467.76	208.97	8.07	50.78	28.36
*	5224.000	790.00	0.00	0.00	463.50	615.00	467.42	467.42	468.66	199.73	8.93	68.88	43.52
	5225.000	620.00	0.00	0.00	473.40	205.00	475.71	0.00	476.42	202.38	6.75	30.35	14.41
	5225.000	620.00	0.00	0.00	473.40	340.00	476.64	0.00	477.36	125.40	6.82	49.83	30.36
	5225.000	620.00	0.00	0.00	473.40	410.00	476.93	0.00	477.75	126.57	7.27	56.39	36.44
	5225.000	620.00	0.00	0.00	473.40	615.00	477.64	0.00	478.74	133.89	8.42	73.06	53.15
*	5225.200	80.00	0.00	0.00	479.40	205.00	482.13	482.13	483.50	333.88	9.38	21.86	11.22
*	5225.200	80.00	0.00	0.00	479.40	340.00	483.23	483.23	485.14	364.88	11.10	30.63	17.80
*	5225.200	80.00	0.00	0.00	479.40	410.00	483.72	483.72	485.91	384.59	11.86	34.57	20.91
*	5225.200	80.00	0.00	0.00	479.40	615.00	485.06	485.06	487.92	428.38	13.57	45.32	29.71
*	5225.800	140.00	491.50	487.40	479.40	205.00	482.25	0.00	483.51	295.93	8.98	22.83	11.92
*	5225.800	140.00	491.50	487.40	479.40	340.00	483.40	0.00	485.15	324.95	10.63	31.99	18.86
*	5225.800	140.00	491.50	487.40	479.40	410.00	483.93	0.00	485.92	339.66	11.31	36.24	22.25
*	5225.800	140.00	491.50	487.40	479.40	615.00	485.34	0.00	487.94	380.41	12.95	47.48	31.53

SECND	FLOW	FLTRD	FLLO	FLMIN	Q	CWSEL	CBTWS	EG	10K*S	VCH	AREA	.01K
5226.000	50.00	0.00	0.00	480.80	205.00	484.02	0.00	484.59	115.41	6.04	33.94	19.08
5226.000	50.00	0.00	0.00	480.80	340.00	485.67	0.00	486.08	51.08	5.15	66.03	47.57
5226.000	50.00	0.00	0.00	480.80	410.00	486.47	0.00	486.83	38.19	4.86	84.39	66.34
5226.000	50.00	0.00	0.00	480.80	615.00	488.75	0.00	488.99	27.73	3.95	155.75	116.80
5227.000	330.00	0.00	0.00	488.50	205.00	490.70	490.70	491.75	268.68	8.22	24.95	12.51
5227.000	330.00	0.00	0.00	488.50	340.00	491.53	491.53	493.01	275.24	9.74	34.91	20.49
5227.000	330.00	0.00	0.00	488.50	410.00	491.91	491.91	493.59	282.86	10.41	39.40	24.38
5227.000	330.00	0.00	0.00	488.50	615.00	493.87	493.87	494.69	98.55	8.00	138.81	61.95
5228.000	220.00	0.00	0.00	488.30	205.00	491.96	0.00	491.97	1.52	.70	292.04	166.11
5228.000	220.00	0.00	0.00	488.30	340.00	493.21	0.00	493.22	.79	.70	494.75	383.62
5228.000	220.00	0.00	0.00	488.30	410.00	493.80	0.00	493.81	.64	.70	598.75	513.54
5228.000	220.00	0.00	0.00	488.30	615.00	494.81	0.00	494.82	.63	.82	788.18	772.61
5229.000	270.00	0.00	0.00	488.50	205.00	491.73	0.00	492.26	110.58	5.87	34.90	19.49
5229.000	270.00	0.00	0.00	488.50	340.00	493.00	0.00	493.41	134.76	5.16	65.84	29.29
5229.000	270.00	0.00	0.00	488.50	410.00	493.69	0.00	493.93	59.28	3.94	104.02	53.25
5229.000	270.00	0.00	0.00	488.50	615.00	494.73	0.00	494.92	31.50	3.50	175.52	109.57

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HEC2-RELEASE DATED NOV 76 UPDATED AUG 1977
ERROR CORR - 01,02
MODIFICATION - 50,51,52,53
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NOTE— ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

BEAVER POND BROOK

Why are FW elevations lower than Normal Elevations?

SUMMARY PRINTOUT TABLE 110

Why are subcriticals < 0.5?

	SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STENCR
	5204.000	376.50	0.00	376.64	138.75	0.00	1959.39	.61	0.00	0.00	200.00	330.00	0.00
	5204.000	376.50	0.00	376.64	138.75	0.00	1959.39	.61	138.80	200.00	200.00	330.00	338.80
*	5204.200	375.39	0.00	378.56	22.00	0.00	1960.00	0.00	0.00	0.00	325.00	372.00	0.00
*	5204.200	375.39	.00	378.56	22.00	0.00	1960.00	0.00	22.00	350.00	325.00	372.00	372.00
*	5204.800	376.75	0.00	378.88	22.00	0.00	1960.00	0.00	0.00	0.00	325.00	372.00	0.00
*	5204.800	376.75	.00	378.88	22.00	0.00	1960.00	0.00	22.00	350.00	325.00	372.00	372.00
A	5204.900	377.85	0.00	379.68	22.00	0.00	1960.00	0.00	0.00	0.00	325.00	372.00	0.00
	5204.900	377.84	-.00	379.68	22.00	0.00	1960.00	0.00	47.00	325.00	325.00	372.00	372.00
	5205.000	380.13	0.00	380.52	85.81	25.82	1934.18	0.00	0.00	0.00	450.00	510.00	0.00
	5205.000	380.15	.02	380.55	59.50	0.00	1960.00	0.00	59.50	450.00	450.00	510.00	509.60
	5205.100	380.41	0.00	381.46	52.05	0.00	1960.00	0.00	0.00	0.00	310.00	380.00	0.00
	5205.100	380.47	.06	381.49	52.00	0.00	1960.00	0.00	52.00	319.00	310.00	380.00	371.00
	5205.200	380.59	0.00	383.27	24.00	0.00	1960.00	0.00	0.00	0.00	400.00	424.00	0.00
	5205.200	380.86	.27	383.32	24.00	0.00	1960.00	0.00	24.00	400.00	400.00	424.00	424.00
*	5205.800	381.95	0.00	383.70	24.00	0.00	1960.00	0.00	0.00	0.00	400.00	424.00	0.00
*	5205.800	381.95	.00	383.70	24.00	0.00	1960.00	0.00	24.00	400.00	400.00	424.00	424.00
	5206.000	383.58	0.00	384.29	52.09	0.00	1960.00	0.00	0.00	0.00	210.00	290.00	0.00
	5206.000	383.59	.01	384.30	52.10	0.00	1960.00	0.00	52.10	221.30	210.00	290.00	273.40
*	5207.000	386.23	0.00	387.98	44.44	0.00	1625.00	0.00	0.00	0.00	210.00	287.00	0.00
*	5207.000	386.22	-.01	387.98	44.38	0.00	1625.00	0.00	44.40	227.50	210.00	287.00	271.90
*	5208.000	400.77	0.00	402.84	34.72	0.00	1625.00	0.00	0.00	0.00	200.00	277.00	0.00
*	5208.000	400.77	-.00	402.84	34.70	0.00	1625.00	0.00	34.80	223.10	200.00	277.00	257.90
*	5208.100	414.48	0.00	416.38	39.50	0.00	1625.00	0.00	0.00	0.00	205.00	264.00	0.00
*	5208.100	414.48	-.00	416.38	39.46	0.00	1625.00	0.00	39.50	219.20	205.00	264.00	258.70
	5208.200	415.23	0.00	416.82	41.59	96.25	1507.39	21.36	0.00	0.00	227.00	255.00	0.00
	5208.200	415.24	.01	416.83	41.58	96.58	1506.99	21.43	41.60	217.90	227.00	255.00	259.50

	SECNO	SWSEL	DIFKNS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STENCR
*	5208.800	417.58	0.00	419.57	44.26	92.71	1491.58	40.71	0.00	0.00	227.00	255.00	0.00
*	5208.800	417.67	.09	419.87	44.30	95.37	1487.90	41.74	44.30	217.00	227.00	255.00	261.30
	5208.900	419.99	0.00	420.29	58.24	94.21	916.88	43.90	0.00	0.00	227.00	255.00	0.00
	5208.900	419.89	-.10	420.36	28.00	0.00	1055.00	0.00	28.00	227.00	227.00	255.00	255.00
	5209.000	420.27	0.00	420.49	55.56	0.00	1055.00	0.00	0.00	0.00	250.00	335.00	0.00
	5209.000	420.44	.17	420.64	55.50	0.00	1055.00	0.00	55.50	270.10	250.00	335.00	325.60
	5210.000	420.58	0.00	421.21	40.98	0.00	1055.00	0.00	0.00	0.00	250.00	333.00	0.00
	5210.000	420.71	.13	421.30	41.00	0.00	1055.00	0.00	41.00	271.40	250.00	333.00	312.40
*	5210.200	421.30	0.00	423.52	20.00	0.00	1055.00	0.00	0.00	0.00	275.00	295.00	0.00
*	5210.200	421.38	.01	423.52	20.00	0.00	1055.00	0.00	20.00	275.00	275.00	295.00	295.00
*	5210.800	423.18	0.00	424.74	20.00	0.00	1055.00	0.00	0.00	0.00	275.00	295.00	0.00
*	5210.800	423.18	-.00	424.74	20.00	0.00	1055.00	0.00	20.00	275.00	275.00	295.00	295.00
	5211.000	424.68	0.00	425.11	48.91	0.00	1055.00	0.00	0.00	0.00	240.00	335.00	0.00
	5211.000	424.72	.04	425.14	48.90	0.00	1055.00	0.00	48.90	266.70	240.00	335.00	315.60
*	5212.000	428.09	0.00	429.69	32.94	0.00	1055.00	0.00	0.00	0.00	330.00	408.00	0.00
*	5212.000	428.08	-.01	429.69	32.89	0.00	1055.00	0.00	32.90	354.70	330.00	408.00	387.60
	5213.000	436.79	0.00	438.15	29.92	0.00	1055.00	0.00	0.00	0.00	220.00	305.00	0.00
	5213.000	436.81	.02	438.15	29.99	0.00	1055.00	0.00	30.00	231.50	220.00	305.00	261.50
*	5213.200	443.53	0.00	445.91	18.00	0.00	1055.00	0.00	0.00	0.00	358.00	500.00	0.00
*	5213.200	443.53	.00	445.91	18.00	0.00	1055.00	0.00	18.00	390.00	358.00	500.00	408.00
*	5213.800	447.63	0.00	448.09	47.70	0.00	1055.00	0.00	0.00	0.00	358.00	500.00	0.00
*	5213.800	447.63	-.00	448.09	47.69	0.00	1055.00	0.00	47.70	380.80	358.00	500.00	428.50
	5214.000	447.69	0.00	448.58	40.08	0.00	965.00	0.00	0.00	0.00	345.00	540.00	0.00
	5214.000	447.69	.00	448.57	40.00	0.00	965.00	0.00	40.00	363.60	345.00	540.00	403.60
	5216.000	454.20	0.00	454.70	37.76	0.00	965.00	0.00	0.00	0.00	265.00	350.00	0.00
	5216.000	454.20	-.00	454.70	37.74	0.00	965.00	0.00	37.80	287.30	265.00	350.00	325.10
	5216.200	454.15	0.00	455.29	25.91	0.00	965.00	0.00	0.00	0.00	260.00	293.00	0.00
	5216.200	454.15	.00	455.29	25.89	0.00	965.00	0.00	25.90	263.20	260.00	293.00	289.10
*	5216.800	455.66	0.00	456.18	31.09	0.00	965.00	0.00	0.00	0.00	260.00	293.00	0.00
*	5216.800	455.66	.00	456.18	31.09	0.00	965.00	0.00	31.10	260.50	260.00	293.00	291.60
	5217.000	455.86	0.00	456.35	31.51	0.00	965.00	0.00	0.00	0.00	260.00	293.00	0.00
	5217.000	455.86	.00	456.35	31.50	0.00	965.00	0.00	31.50	260.20	260.00	293.00	291.70
	5217.500	458.00	0.00	458.31	72.51	0.00	965.00	0.00	0.00	0.00	340.00	450.00	0.00
	5217.500	458.00	.00	458.32	72.50	0.00	965.00	0.00	72.50	365.00	340.00	450.00	437.50
	5218.000	458.73	0.00	458.97	119.03	0.00	965.00	0.00	0.00	0.00	310.00	472.00	0.00
	5218.000	458.73	.00	458.97	119.06	0.00	965.00	0.00	119.10	352.40	310.00	472.00	471.50
	5219.000	460.40	0.00	460.43	473.04	15.52	854.36	.12	0.00	0.00	550.00	810.00	0.00
	5219.000	460.53	.13	460.58	150.00	0.00	870.00	0.00	150.00	550.00	550.00	810.00	700.00

	SECNO	CWSEL	DIFKWS	EG	TOPWID	GLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STENCR
	5220.000	460.48	0.00	460.59	151.79	.60	820.55	48.85	0.00	0.00	570.00	633.00	0.00
	5220.000	460.63	.15	460.75	63.00	0.00	870.00	0.00	63.00	570.00	570.00	633.00	633.00
	5220.200	460.17	0.00	461.06	18.00	0.00	870.00	0.00	0.00	0.00	350.00	368.00	0.00
	5220.200	460.35	.19	461.19	18.00	0.00	870.00	0.00	18.00	350.00	350.00	368.00	368.00
	5220.800	461.66	0.00	462.25	18.00	0.00	870.00	0.00	0.00	0.00	350.00	368.00	0.00
	5220.800	461.78	.12	462.34	18.00	0.00	870.00	0.00	18.00	350.00	350.00	368.00	368.00
	5221.000	462.42	0.00	462.43	444.41	31.19	593.58	.23	0.00	0.00	520.00	683.00	0.00
	5221.000	462.51	.09	462.52	163.00	0.00	625.00	0.00	163.00	520.00	520.00	683.00	683.00
	5222.000	462.40	0.00	462.56	50.48	.04	624.96	0.00	0.00	0.00	335.00	391.00	0.00
	5222.000	462.49	.10	462.66	42.20	0.00	625.00	0.00	42.20	335.00	335.00	391.00	377.20
	5222.200	462.50	0.00	462.62	61.35	108.12	516.88	0.00	0.00	0.00	345.00	380.00	0.00
	5222.200	462.59	.09	462.71	61.40	109.50	515.49	0.00	61.40	315.70	345.00	380.00	377.10
	5222.800	463.88	0.00	464.03	33.91	0.00	625.00	0.00	0.00	0.00	345.00	380.00	0.00
	5222.800	463.98	.11	464.13	33.90	0.00	625.00	0.00	33.90	345.00	345.00	380.00	378.90
	5223.000	463.91	0.00	464.10	36.81	0.00	625.00	0.00	0.00	0.00	350.00	390.00	0.00
	5223.000	464.02	.11	464.20	36.80	0.00	625.00	0.00	36.80	350.80	350.00	390.00	387.60
*	5224.000	466.75	0.00	467.76	25.66	0.00	410.00	0.00	0.00	0.00	380.00	450.00	0.00
*	5224.000	466.75	.00	467.76	25.65	0.00	410.00	0.00	25.70	384.30	380.00	450.00	410.00
Y	5225.000	476.93	0.00	477.75	22.61	0.00	410.00	0.00	0.00	0.00	660.00	738.00	0.00
	5225.000	476.93	.00	477.75	22.57	0.00	410.00	0.00	22.60	691.10	660.00	738.00	713.70
*	5225.200	483.72	0.00	485.91	8.00	0.00	410.00	0.00	0.00	0.00	625.00	633.00	0.00
*	5225.200	483.72	.00	485.91	8.00	0.00	410.00	0.00	8.00	625.00	625.00	633.00	633.00
*	5225.800	483.93	0.00	485.92	8.00	0.00	410.00	0.00	0.00	0.00	625.00	633.00	0.00
*	5225.800	483.93	.00	485.92	8.00	0.00	410.00	0.00	8.00	625.00	625.00	633.00	633.00
Z	5226.000	486.47	0.00	486.83	24.55	0.00	410.00	0.00	0.00	0.00	269.00	324.00	0.00
	5226.000	486.47	.00	486.83	24.50	0.00	410.00	0.00	24.50	276.00	269.00	324.00	300.50
AA *	5227.000	491.91	0.00	493.59	12.00	0.00	410.00	0.00	0.00	0.00	320.00	332.00	0.00
*	5227.000	491.92	.01	493.59	12.00	0.00	410.00	0.00	12.00	320.00	320.00	332.00	332.00
AB	5228.000	493.80	0.00	493.81	180.49	.00	407.51	2.49	0.00	0.00	213.00	370.00	0.00
	5228.000	493.80	.00	493.81	157.00	0.00	410.00	0.00	157.00	213.00	213.00	370.00	370.00
AC	5229.000	493.69	0.00	493.93	60.65	0.00	410.00	0.00	0.00	0.00	220.00	320.00	0.00
	5229.000	493.70	.00	493.94	60.68	0.00	410.00	0.00	60.70	229.10	220.00	320.00	289.80