HYDRAULIC REPORT
FOR
CHIPPEWA RIVER RESTORATION PROJECT
MT. PLEASANT, MICHIGAN

Submitted to:

CITY OF MT. PLEASANT
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Submitted by:

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ISO 9001 Certified

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I. Introduction

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a) Project Description

This project is located on the Chippewa River within the City of Mt. Pleasant in Isabella County. The Mill Pond Park West Dam/Bridge is in poor condition and in risk of failure during a flood event. This poses some serious concerns for the Mill Pond Park, Island Park and the Chippewa River. A dam failure would result in the loss of a bridge that provides a critical link in the City's trail system. Also of great concern would be the downstream movement of a large quantity of sediment that has built up over the years upstream of the dam. The sediment load would have a serious negative impact on the quality of the stream and fish habitats downstream.

The City of Mt. Pleasant wishes to remove the existing dam/bridge. An important aspect of the project will be to manage the deposited sediments that have accumulated upstream of the dam since the dam was built. Of critical concern with dam removal projects is the downstream sluicing and migration of those deposited sediments. Those sediments tend to create problems such as clogging the stream channel, increasing the chances of flooding, and destroying aquatic habitat. In addition, in this case, much of the wetland upstream of the dam, which the City has worked hard to create and protect, would be drained through removal of the dam. These wetland areas provide important habitat for water fowl and other wildlife.

As a means of overcoming these problems associated with removal of the dam, a series of weirs has been designed which will maintain the same upstream water surface elevation and will gently step the river down over a distance of several hundred feet through the series of weirs. This will prevent the downstream migration of sediment, which would be so deleterious to the stream. In addition, this scheme will protect the upstream wetland habitat areas. The weirs have been designed to be aesthetically pleasing and will provide gentle rapids as the water passes over the weirs.

The current dam is a barrier to the movement of fish. Another important aspect of the weirs will be their accommodation of fish that are migrating upstream. The River's flow will be distributed between the west channel where the weirs will be located and the east channel where the East Dam will remain in place. Because the west channel will pass a majority of the flow, the fish will naturally choose the west channel for their migration. The fish will not migrate up the east channel where the East Dam provides a barrier to their passage.

The weirs will have a notch somewhere near the center of the stream which will make the river navigable even during periods of low flow. Compensating cuts are being provided along the river corridor to offset the fill that is required in the overbank areas.

The west channel with the proposed weirs will be designed to have a natural look. Overbank areas that have stone rip-rap protection will be covered with topsoil and seeded to hide the harsh look that is sometimes seen with large areas of exposed stone. The weirs will be constructed of river stone with irregular shapes and irregular surfaces to provide a natural look. Indigenous species of trees, shrubs and other plants will be provided in the overbank areas.

b) River Information, Hydraulic Study Limits

This hydraulic study focuses on the Chippewa River from just upstream of Broadway Street (Section Number 97213) to just downstream of High Street/M20 (Section Number 100935). The downstream limit provides a sufficient distance downstream of the proposed project to mitigate the effect of inaccurate starting water surface elevations at the downstream model boundary (Section Number 97213). The upstream limit provides sufficient distance upstream of the proposed project to evaluate the project effects on upstream water surfaces.

The Mill Pond Park has two dams designated as the East Dam and the West Dam. The Chippewa River splits upstream of the dams and re-joins downstream of the dams. The alterations to the River will be confined to removal of the West Dam/Bridge and improvements to the left river channel between the divergence and the confluence of the two channels.

c) Discharge Information

The Michigan Department of Environmental Quality, Land and Water Management Division, Hydrologic Studies Unit has provided the following information in a letter dated November 3, 2000. The Chippewa River at High Street/M20 has a total drainage area of 395 square miles and a contributing drainage area of 382 square miles. The 10%, 2%, 1%, and 0.2% chance peak flows are estimated to be 3600 cubic feet per second (cfs), 5600 cfs, 6600 cfs, and 9100 cfs respectively (see Appendix I).

d) Sources of Information

The Federal Emergency Management Agency (FEMA), Flood Insurance Study (FIS) for Isabella County dated January 7, 1998 was used as a reference for this study. In 1994, the U.S. Army Corps of Engineers (USACE) modeled the Chippewa River through Isabella County as a basis for the FIS using the USACE HEC-2 step-backwater computer model.

An aerial survey topographic map completed by Abrams Aerial Survey Corporation was used as a base map for this hydraulic study. The aerial survey with two foot contours was supplemented near the West Dam and for the left river channel from the West Dam down to the confluence of the two river channels using conventional field survey methods.

II. Method of Analysis

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The USACE HEC-RAS River Analysis System software, Version 3.0, January 2001 was used for the modeling necessary for this hydraulic report. The HEC-RAS computer modeling software has been developed by the USACE to replace the HEC-2 modeling software. The HEC-RAS program has been designed to import HEC-2 river data.

Both the conditions for the 1% and 0.2% chance peak flows were modeled to determine the effects of the project on flood elevations. Several low flow conditions were also modeled to determine flow characteristics through the rock weirs and flow distribution between the two channels under typical flow conditions.

The existing dam/bridges have been modeled in the same manner as the original hydraulic model. The energy method of standard step computations was used for both low and high flow conditions. The bridge deck has been modeled as a broad crested weir with a maximum submergence factor of 0.95 and a weir coefficient of 2.6.

The proposed rock weirs have been modeled as inline broad crested weirs with two downstream and two upstream cross sections for each weir. A weir coefficient of 2.75 was used.

The proposed pedestrian bridge was modeled using the energy method of standard step computations for both low and high flow conditions. Two downstream and two upstream cross sections were used. The bridge deck has been modeled as a broad crested weir with a maximum submergence factor of 0.95 and a weir coefficient of 2.6.

The existing conditions Floodway (Encroachment) Model was run using the same left and right encroachment stations as the Floodway Model prepared by the Army Corps of Engineers with a run date of August 13, 1996. The existing conditions model floodway did not include the right channel and the right dam. The floodway was widened in the proposed conditions model to include the right channel and dam.

III. Modeling Description

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a) Introduction

An electronic copy of the HEC-2 model used in the 1998 FIS was obtained from the U.S. Army Corps of Engineers. The HEC-2 data was imported into HEC-RAS. To avoid having to deal with data for the Chippewa River through the entire county, the data was then trimmed to include only river data from upstream of Broadway Street (Section Number 97213) to upstream of Lincoln Road (Section Number 116500). The downstream boundary starting water surface elevations were taken from the water surface elevations for the same cross section as computed in the 1994 USACE model.

b) Variables and Coefficients

To maintain consistency, an attempt was made to use mannings "n" values that were the same as those used in the 1994 USACE model. These values are generally 0.05 within the stream channel and 0.12 in the overbank areas. According to the text entitled "Open-Channel Hydraulics" by Ven Te Chow, the value for the stream channel represents conditions described as a natural minor stream on a plain (not mountainous) that is clean and winding with some pools and shoals, weeds, and a significant number of stones. The value for the overbank areas represents conditions described as a heavy stand of timber with a few downed trees, little undergrowth and the flood stage reaching into the branches of the trees. Photographs of the channel and overbank areas are found in Appendix C.

The same general approach was taken with expansion and contraction coefficients as the USACE 1994 model. Within the area of proposed changes the expansion and contraction coefficients are 0.3 and 0.1 generally. This reflects the moderate expansion and contraction changes that are found within the river channel in this area, including the embankment at the proposed pedestrian bridge.

IV. Discussion of Modeling and Tables of Results

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a) Initial Model Run Without Changes

As mentioned previously, the HEC-2 data was imported into HEC-RAS. To avoid having to deal with data for the Chippewa River through the entire county, the data was then trimmed to include only river data from upstream of Broadway Street (Section Number 97213) to upstream of Lincoln Road (Section Number 116500). The existing conditions HEC-RAS model was run and conforms very closely to the HEC-2 results of the 1994 USACE model. The results are shown in Tables 1 and 2 for the 1% and 0.2% chance floods respectively. For the most part, the differences between the HEC-2 and the HEC-RAS results are less than 0.1 feet. The only exception is at Section Number 98982 for the 1% chance flow where the HEC-RAS shows a water surface elevation 0.35 feet greater than the HEC-2 model. It is important to note however, that the HEC-2 model shows the water surface elevation for Section Number 98982 to be less than the water surface elevations for the next two downstream cross sections. The 0.35 foot difference may be caused by improvements made to the software since the HEC-2 has been replaced with HEC-RAS.

The existing conditions Floodway (Encroachment) Model was run using the same left and right encroachment stations as the Floodway Model prepared by the Army Corps of Engineers with a run date of August 13, 1996. The rise in water surface elevation is indicated to be less that the limit of 0.1' throughout the study reach with the exception of Section Numbers 100735 and 100935 at the extreme upper limit of the study. Because no changes have been made to the original data other than a conversion from HEC-2 to HEC-RAS, it is assumed that the two programs are handling the data differently. These Floodway run results are reported in Appendix E.

b) Proposed Conditions

In 1994 the USACE modeled both dam/bridges and their associated river channels as one channel. Because the dam/bridges do not follow the same alignment, the cross sections upstream and downstream of the dam/bridges had significant jogs between the two river channels. Because of changes proposed for the left river channel, this scheme would not be appropriate for determining the effect of the rock weirs in the left channel. For this reason, the proposed conditions model incorporates a split flow regime with each river channel being modeled as a separate channel. The reaches are designated in the model as follows:

Location Description	River Name	Reach Name
Downstream of Confluence	Chippewa	Lower
Left Channel	Chippewa	Left
Right Channel	Chippewa	Right
Upstream of Divergence	Chippewa	Upper

During the 1% and 0.2% chance peak flows, water covers the embankment separating the two channels. Therefore, the line dividing the channels is indicated in the model as an ineffective flow boundary. The cross sections from the 1994 USACE model were revised for use in the right channel. The modified cross sections were given new river station names to reflect their actual location in the channel. Additional cross sections designated as 98460, 98803 and 98970 were added to provide better definition for the right channel.

One cross section was added at the confluence (Section Number 98450) and one cross section was added at the divergence (Section Number 99065). New cross sections were generated to reflect the proposed conditions of the left channel. Four cross sections are used for modeling each of the rock weirs and four cross sections are used for modeling the proposed pedestrian bridge. Two additional cross sections provide better definition of the stream channel in the island area.

The Flow Split Optimization function of HEC-RAS was used to compute the appropriate distribution of flow between the two channels through an iterative process. This function provides matching energy gradeline elevations between the two channels at the upstream and downstream junction points.

Ineffective flow areas were developed for cross sections immediately downstream and upstream of the rock weirs that are in effect under low flow conditions when the flow is confined to the notches in the rock weirs.

The elevation of the upstream most rock weir was adjusted to ensure the accomplishment of three objectives. They were:

1- Providing approximately two feet of water in the rock weir notches during low flow conditions (100 cfs),
2- Providing some flow over the East Dam even during low flow conditions, and
3- Providing a majority of flow (>80%) through the left channel for non-flood flow conditions.

Once this was accomplished the elevations of the other rock weirs were adjusted to provide a similar water surface drop through each of the weirs.

The flow velocities over the rock weirs and through the weir notches are less than four feet per second during non-flood conditions. These velocities ensure the success of migrating fish for which velocities less than five feet per second are desirable.

A comparison of water surface elevations for existing and proposed conditions upstream of the proposed project is found in Tables 1 and 2 for the 1% and 0.2% chance floods respectively. The numbers indicate a slight decrease in water surface elevations for the 1% chance peak flow. This decrease is less than 0.1 feet for everything but the upstream limit at Section Number 100935 where the decrease is 0.15 feet. This difference appears to result from differences between the HEC-2 And HEC-RAS software because the differences increase from Section Number 99150 upstream to Section Number 100935.

Table 1- Calculated Water Surface Elevations for the 1% Chance Flood

1	2	3	4	5	6
Section Number	**1994 USACE HEC-2 Model of Existing Conditions**	**HEC-RAS Model of Existing Conditions**	**Difference (3 minus 2)**	**HEC-RAS Model of Proposed Conditions**	**Difference (5 minus 2)**
Downstream of Confluence					
97213	758.45	758.45	0.00	758.45	0.00
97900	759.20	759.20	0.00	759.15	-0.05
98400	759.29	759.30	0.01	759.25	-0.04
Split Channels					
98575	759.34	759.35	0.01	N/A	
98961	759.29	759.31	0.02	N/A	
98982	759.25	759.60	0.35	N/A	
Upstream of Divergence					
99150	759.89	759.95	0.06	759.80	-0.09
99750	760.13	760.18	0.05	760.04	-0.09
100735	760.40	760.33	-0.07	760.20	-0.10
100935	760.46	760.44	-0.02	760.31	-0.15

The numbers also indicate a slight increase in water surface elevations upstream of the improvements for the 0.2% chance peak flow. This increase diminishes from 0.14 immediately upstream of the flow divergence to zero just downstream of High Street. The slight increase may be caused by proposed fill for the approaches to the proposed pedestrian bridge.

Table 2
Calculated Water Surface Elevations for the 0.2% Chance Flood

1	2	3	4	5	6
Section Number	**1994 USACE HEC-2 Model of Existing Conditions**	**HEC-RAS Model of Existing Conditions**	**Difference (3 minus 2)**	**HEC-RAS Model of Proposed Conditions**	**Difference (5 minus 2)**
Downstream of Confluence					
97213	762.23	762.23	0.00	762.23	0.00
97900	763.04	763.04	0.00	762.97	-0.07
98400	763.10	763.11	0.01	763.03	-0.07
Split Channels					
98575	763.14	763.16	0.02	N/A	
98961	763.16	763.19	0.03	N/A	
98982	763.15	763.21	0.06	N/A	
Upstream of Divergence					
99150	763.28	763.32	0.04	763.42	0.14
99750	763.41	763.42	0.01	763.52	0.11
100735	763.50	763.42	-0.08	763.52	0.02
100935	763.51	763.41	-0.10	763.51	0.00

Based on the results provided in Tables 1 and 2, the proposed project should not have any impact on the FEMA Flood Insurance Rate Map (FIRM). Because the floodplains were mapped using flown topographic mapping with two foot contour intervals, a decrease of 0.1 feet for the 1% chance peak flow or an increase of 0.14 feet for the 0.2% chance peak flow are well within mapping error tolerance.

The existing conditions floodway model was used as the basis for the floodway run for the proposed conditions model. However, the floodway was widened to include all of the right channel and right dam. The fact that this area was not included as part of the floodway in the original model was evidently an oversight. The rise in water surface elevation is indicated to be less that the limit of 0.1' throughout the study reach with the exception of Section Numbers 100735 and 100935 at the extreme upper limit of the study. This result was seen in the HEC-RAS existing conditions model and because it is far upstream of the proposed project its correction is seen to be outside the scope of this study. These Floodway run results are reported in Appendix F.

Additional computations were performed for typical non-flood flows in the Proposed Conditions Model. Results of those computations are found in Appendix G. Profile numbers, descriptions, and flow values are found in the following table.

Profile Number	Description	Flow (cfs)
1	1%Chance Peak Flow (100-Year)	6,590
2	Typical Flow Value	75
3	Typical Flow Value	100
4	Typical Flow Value	125
5	Typical Flow Value	250
6	Typical Flow Value	375
7	Typical Flow Value	500
8	Typical Flow Value	750
9	Typical Flow Value	1,500
10	0.2% Chance Peak Flow (500-Year)	9,110
11	Floodway (Encroachment) Run	6,590

V. Conclusions

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Based on a comparison of the 1994 USACE model and the model of the proposed conditions, the proposed project has negligible impacts to flooding for the 1% and 0.2% chance flows. This is due to the fact that most of the improvements being made are rather low in the stream valley compared to the overall depth of flooding under those conditions. Additional information is provided in the Appendices such as project plans, computations, photographs, plan views showing cross section locations, cross section plots, and profiles for both existing and proposed conditions.

Appendices

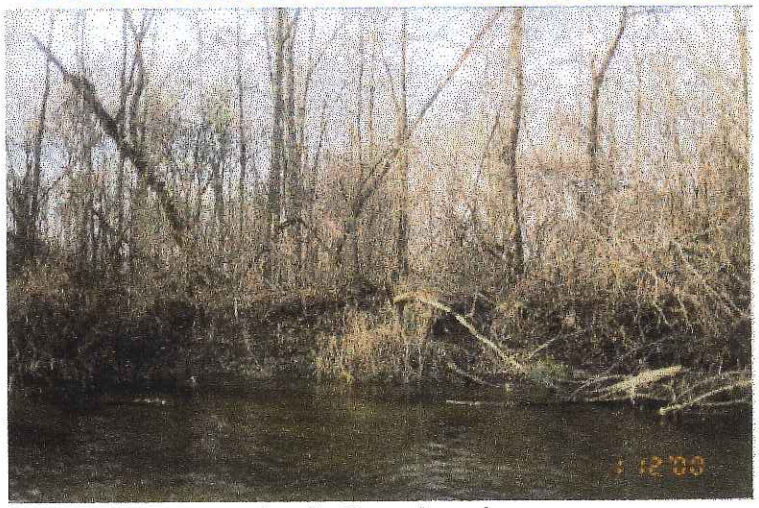
A. Complete Set of Preliminary Project Plans (Bound Separately)

B. Computations- Electronic Format

DIRECTORY	FILES	DESCRIPTION
Corps of Engineers	Chipewan.dat	100-Year, 500-Year (HEC-2 Model)
Corps of Engineers	Chip12.dat	Floodway (HEC-2 Model)
HEC-RAS Duplication of Corps	CHIPS2.*	Re-run of Corps Existing Conditions Model
HEC-RAS Proposed Conditions	CHIPS7.*	Proposed Conditions Model

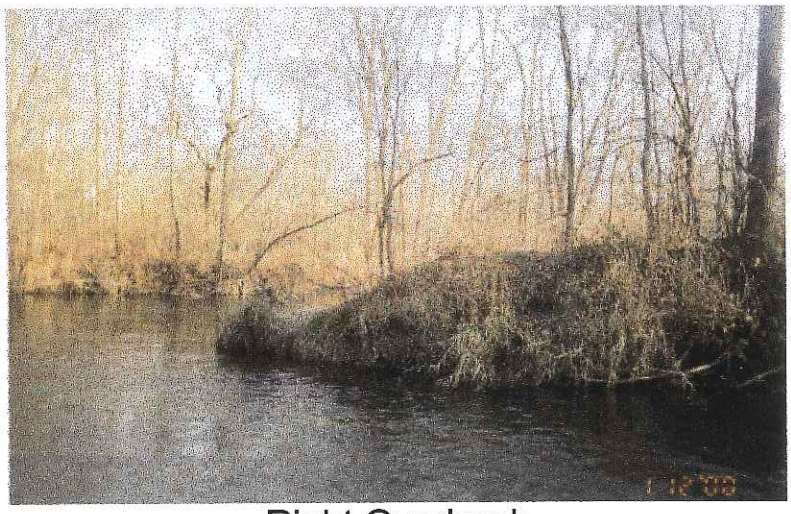
C. Photographs of Channel, Overbank Conditions

Chippewa River Valley Conditions
Left Branch River Station 30±



Left Overbank

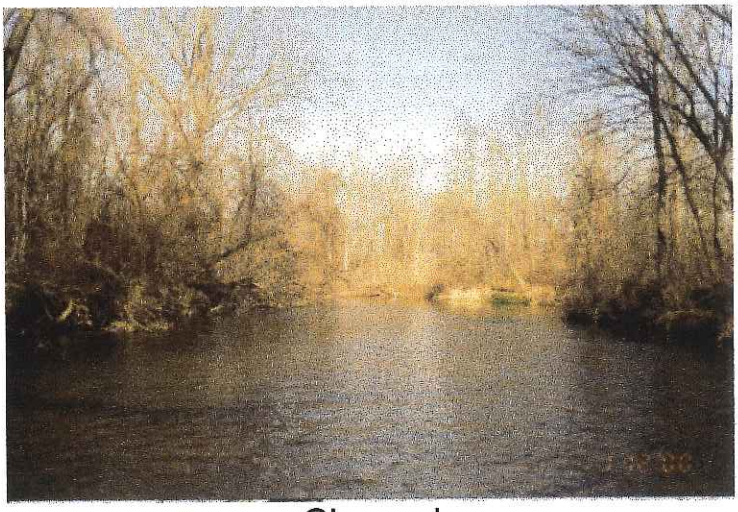
Channel



Right Overbank

Chippewa River Valley Conditions
Left Branch River Station 150±

Left Overbank



Channel

Right Overbank

Chippewa River Valley Conditions
Left Branch River Station 270±

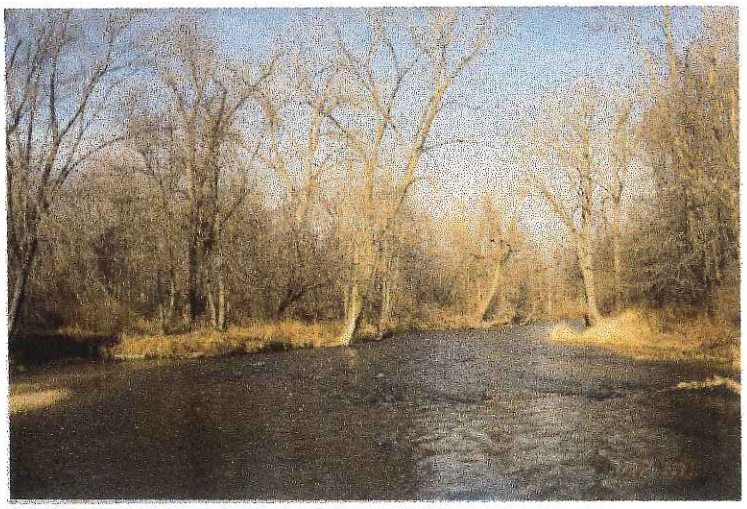
Left Overbank

Channel

Right Overbank

Chippewa River Valley Conditions
Left Branch River Station 410±

Left Overbank

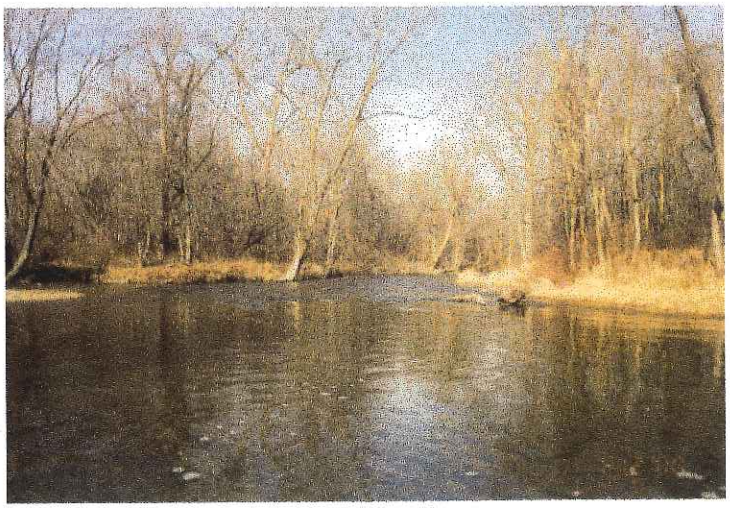


Channel

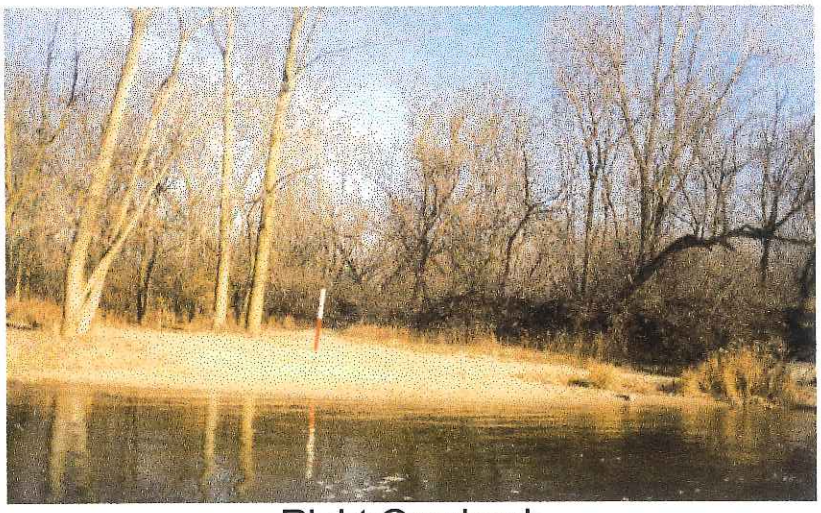
Right Overbank

Chippewa River Valley Conditions
Left Branch River Station 480±

Left Overbank



Channel



Right Overbank

D. USACE HEC-2 Model Output Table

1994 MODEL - 100, 500 YEAR

FILE: chipewan.out

```
1*****************************************
 *  HEC-2 WATER SURFACE PROFILES          *
 *                                        *
 *  Version   4.6.2;  May 1991            *
 *                                        *
 *  RUN DATE   12OCT94    TIME   15:29:19 *
 *****************************************
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```
****************************************
 *  U.S. ARMY CORPS OF ENGINEERS
 *  HYDROLOGIC ENGINEERING CENTER
 *  609 SECOND STREET, SUITE D
 *  DAVIS, CALIFORNIA 95616-4687
 *        (916) 756-1104
****************************************
```

```
X     X  XXXXXXX   XXXXX              XXXXX
X     X  X        X     X            X     X
X     X  X        X                        X
XXXXXXX  XXXX     X          XXXXX    XXXXX
X     X  X        X                  X
X     X  X        X     X            X
X     X  XXXXXXX   XXXXX             XXXXXXX
```

12OCT94 15:29:19 PAGE 1

THIS RUN EXECUTED 12OCT94 15:29:19

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*************************************
 HEC-2 WATER SURFACE PROFILES

 Version   4.6.2;  May 1991
*************************************
```

```
T1      ISABELLA COUNTY FIS
T2      CHIPPEWA RIVER
T3      100-YEAR DISCHARGE

J1  ICHECK    INQ      NINV     IDIR     STRT     METRIC   HVINS    Q        WSEL     FQ

      0        2        0        0     .00125      0        0      6800     683.0     0

J2  NPROF     IPLOT    PRFVS    XSECV    XSECH    FN       ALLDC    IBW      CHNIM    ITRACE

      1        0       -1

J3  VARIABLE CODES FOR SUMMARY PRINTOUT

    110      150

QT       2     6800     9390
NC     .05      .05     .035       .1       .3
                VALLEY SECTION A MOVED DOWNSTREAM TO CORPORATE
                BOUNDARY, i.e. COUNTY LINE, DOWNSTREAM STUDY LIMIT
X1       0       20      750      810        0        0                -0.55
GR    690.0       0    683.5      550    682.2      600    682.8      650    683.8      700
GR    680.4     750    677.8      755    676.3      766    674.3      776    670.7      786
GR    670.4     796    675.8      806    680.9      810    683.8      822    692.4      832
GR    692.8     885    693.2      935    692.4      985    692.1     1035    691.6     1060

                VALLEY SECTION A (63)
X1     600       20     750.      810.   600.0    600.0    600.0
GR    690.0       0    683.5      550    682.2      600    682.8      650    683.8      700
GR    680.4     750    677.8      755    676.3      766    674.3      776    670.7      786
GR    670.4     796    675.8      806    680.9      810    683.8      822    692.4      832
GR    692.8     885    693.2      935    692.4      985    692.1     1035    691.6     1060

X1     3.01      45     262.      353.   3500.0   4277.0   4277.0
GR    694.4       0.   694.3       36.    694.3      52.    694.2      60.    693.6      84.
GR    693.4     105.   693.4      108.   690.6     123.    693.3     138.    689.6     157.
GR    687.8     167.   687.7      191.   688.1     210.    688.0     215.    687.3     239.
```

```
X1    96122      25      71.     120.     101.6     76.2     107.0
GR    758.1      7.     756.5     12.     756.4     13.      749.6     58.     749.5     58.
GR    747.8     71.     746.6     71.     744.0     75.      743.9     76.     742.9     80.
GR    742.0     86.     742.0     86.     741.3     89.      739.4     96.     742.1    105.
GR    742.1    106.     743.1    111.     745.0    117.      745.7    118.     749.4    120.
GR    749.3    172.     749.4    173.     751.3    200.      751.4    201.     758.1    217.

               INTERPOLATED SECTION ADDED FOR HVINS NOTE
X1    96230      17      91.     149.     101.6     76.2     108.0
GR    756.2      5.     754.9     13.     749.1     74.      747.7     91.     745.9     92.
GR    743.6     97.     742.5    102.     742.0    110.      741.6    114.     739.5    122.
GR    742.2    133.     743.2    139.     746.2    147.      750.0    149.     750.7    195.
GR    752.6    219.     758.2    233.

NC                                .1       .3
               INTERPOLATED SECTION ADDED FOR HVINS NOTE
X1    96445      17     131.     209.     203.1    152.4     215.0
GR    752.5      3.     751.7     15.     748.2    107.      747.3    131.     744.8    134.
GR    743.0    140.     741.7    147.     742.0    157.      742.1    163.     739.7    175.
GR    742.4    188.     743.5    195.     748.4    205.      751.3    209.     753.4    240.
GR    755.2    257.     758.5    266.

NC                                .1       .3
               VALLEY SECTION Y   SECTION FROM EXISTING STUDY
               EXPANSION-CONTRACTION COEFFICIENTS MODIFIED
X1    96650       9     170.     265.     194.0    145.0     205.0
X3                                10
GR    748.9       0     747.0    170      743.8     173      741.0     190     742.6    210
GR    740.0     225     743.8    249      752.6     265      758.7     298

NC                                .5       1.0
X1    96850      10     144.     214.     200.0    200.0     200.0
X3                                35
GR    750.7      60     750.0     95      748.0     142      744.2     144     742.8    160
GR    741.5     180     741.8    198      744.2     214      750.0     230     758.0    240

NC      0.1      0.1      0.04
```



```
               VALLEY SECTION Z   SECTION FROM EXISTING STUDY
               EXPANSION-CONTRACTION COEFFICIENTS REMOVED
X1    97050      15     120      195      200.0    200.0     200.0
GR    758.7     100     759.1    120      744.2    120       744.0     126     743.5    134
GR    743.1     140     743.0    146      742.7    158       742.7     168     742.8    175
GR    743.2     182     743.8    190      744.2    195       760.0     195     760.0    210

               DOWNSTREAM FACE BROADWAY STREET  SECTION FROM EXISTING STUDY
               CHANGED FROM NORMAL TO SPECIAL BRIDGE ROUTINE
X1    97078      15     120      195       28       28        28
GR    758.7     100     759.1    120      744.2    120       744.0     126     743.5    134
GR    743.1     140     743.0    146      742.7    158       742.7     168     742.8    175
GR    743.2     182     743.8    190      744.2    195       760.0     195     760.0    210

SB               1.6      3.0                75                718
               UPSTREAM FACE BROADWAY STRET     SECTION FROM EXISTING STUDY
X1    97122       0        0        0       44        44        44
X2                         1      756.6     758.7
BT      13      100     758.7    758.7      120     759.1      744.2     126     759.3    748.4
BT     134     759.5    752.1    140       759.6    754.1      146      759.8    755.6    158
BT    760.0    756.6     168     760.0     756.0     175       760.0    754.5     182     760.0
BT    752.5     190     760.0    748.5      195     760.0      744.2     210     760.0    760.0

X1    97132       0        0        0       10        10        10
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               VALLEY SECTION AA  SECTION FROM EXISTING STUDY
               RIGHT ENCROACHMENT CHANGED FROM STA. 130 TO 180 BASED ON 2-FT MAP
X1    97213       9       50      109       81        81        81
X3                                                    180
GR    750.0      35     746.0     45      744.2     50       742.7      63     741.2     80
GR    738.8      93     744.2    109      750.0     115      750.2     200

NC     0.12     0.12      0.05
               VALLEY SECTION AB  SECTION FROM EXISTING STUDY
X1    97900      16      10.      84.     720.0    400.0     687.0
X3                                                    625
GR    760.0      10     744.7     28      741.0     42       741.5      55     742.2     70
GR    744.7      83     747.7     84      747.1    146       750.0     175     751.5    230
GR    750.0     290     749.3    370      750.0    460       751.9     550     752.0    660
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GR     754.0        665

NC                                   .1        .3
                VALLEY SECTION AC  SECTION FROM EXISTING STUDY
X1     98400        20       308.      386.      490.0     400.0     500.0
GR     754.0         0      752.0        13      750.0        38     748.0        50     748.0        58
GR     750.0       135      750.5       200      750.0       290     749.0       308     744.9       316
GR     743.4       330      742.3       345      743.1       358     744.9       371     745.6       381
GR     749.4       386      750.3       406      750.0       500     752.0       515     756.0       525
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X1     98575        19       330.      563.      170.0     190.0     175.0
X3                                     100
GR     750.0        30      750.0       200      751.3       250     750.0       311     746.0       325
GR     744.9       330      743.4       343      742.3       357     743.1       369     744.9       381
GR     749.8       385      750.0       410      745.1       475     742.7       495     741.0       511
GR     738.8       530      742.0       550      745.1       563     758.3       581

                RIGHT OVERBANK REACH LENGTH CORRECTED
X1     98961        34        52       522      420.0     345.0     386.0
GR     758.8         0      758.4        52      748.2        52     748.2        62     757.1        62
GR     757.1      63.5      748.2      63.5      748.2      76.5     757.1      76.5     757.1        78
GR     748.2        78      748.2        90      757.1        90     756.7       110     748.2       110
GR     748.2       122      756.7       122      756.7     123.5     748.2     123.5     748.5       137
GR     756.7       137      756.7     138.5      748.5     138.5     748.8     148.5     758.3     148.5
GR     758.3       180      758.7       482      749.1       482     746.0       493     743.8       505
GR     747.5       515      750.0     521.9      757.3       522     760.0       585

                DOWNSTREAM FACE OF FOOT BRIDGE AT DAM,SECTION FROM EXISTING STUDY
X1     98962         0         0         0         1         1         1
BT        13         0      758.8     758.8        52     758.4     757.1        62     758.3     757.1
BT        78     758.2      757.1        90     758.1     757.1       110     758.0     756.7       122
BT     758.1     756.7        137     758.2     756.6     148.5     758.3     756.7       180     758.3
BT     758.3       482      758.7     757.3       522     758.6     757.3       585     760.6     760.6

                UPSTREAM FACE OF FOOT BRIDGE AT DAM   SECTION FROM EXISTING STUDY
X1     98981        34        52       522      19.0      19.0      19.0
BT        13         0      758.8     758.8        52     758.4     757.1        62     758.3     757.1
BT        78     758.2      757.1        90     758.1     757.1       110     758.0     756.7       122
BT     758.1     756.7        137     758.2     756.7     148.5     758.3     756.7       180     758.3
BT     758.3       482      758.7     757.3       522     758.6     757.3       585     760.6     760.6
GR     758.8         0      758.4        52     750.6        52     750.6        62     757.1        62
GR     757.1      63.5      750.6      63.5      750.6      76.5     757.1      76.5     757.1        78
GR     750.6        78      750.3        90      757.1        90     756.7       110     750.2       110
GR     750.0       122      756.7       122      756.7     123.5     750.0     123.5     750.2       137
GR     756.7       137      756.7     138.5      750.2     138.5     750.2     148.5     758.3     148.5
GR     758.3       180      758.7       482      749.1       482     746.0       493     743.8       505
GR     747.5       515      750.0     521.9      757.3       522     760.6       585

X1     98982         0         0         0         1         1         1

NC      0.05      0.05      0.05
                VALLEY SECTION AD  SECTION FROM EXISTING STUDY
                RIGHT ENCROACHMENT CHANGED DUE TO BRIDGE GOING WEIR FLOW
                RIGHT OVERBANK REACH LENGTH CORRECTED
X1     99150        10        20       100        50       170       168
X3                                                         450
GR     758.2         0      750.4        20      747.0        38     744.5        61     748.0        80
GR     750.4       100      755.3       110      754.9       250     754.9       400     755.3       600
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NC      0.05     0.065     0.055        .2        .4
                VALLEY SECTION AE  SECTION FROM EXISTING STUDY
X1     99750        15       206.      311.      630.0     380.0     600.0
X3                                     105                 740
GR     755.6         0      755.8       100      755.0       200     750.4       206     747.0       230
GR     744.5       260      748.0       285      750.4       311     756.3       400     756.0       500
GR     756.2       600      756.8       700      756.0       800     756.1       900     755.6      1100

NC      0.08      0.08      0.04        .2        .4
                VALLEY SECTION AF  SECTION FROM EXISTING STUDY
X1    100735        12       200.      303.      850.0     800.0     985.0
X3                                     140                 363
GR     760.0       100      758.0       135      756.0       196     750.8       200     745.8       223
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GR    748.7      243     748.3      263     748.1      283     750.8      303     756.0      330
GR    756.9      400     756.2      500

NC      0.1     0.08      0.04       .3       .5
X1   100935       18       102      228    200.0    200.0    200.0
GR    772.0      102     758.2      102     750.8      118     746.8      130     748.1      145
GR    750.8      156     752.7      157     752.7      163     767.1      163     767.1      168
GR    752.7      168     752.7      171     750.8      172     748.1      180     749.8      190
GR    750.8      197     759.4      228     772.0      228
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                DOWNSTREAM FACE HIGH STREET    SECTION FROM EXISTING STUDY
X1   100945        0         0        0        10       10       10
X2                                   767.1     772.0

                UPSTREAM FACE HIGH STREET      SECTION FROM EXISTING STUDY
X1   101000        0         0        0        55       55       55
X2                                   767.1     772.0

X1   101010        0         0        0        10       10       10

                VALLEY SECTION AG  SECTION FROM EXISTING STUDY
X1   101067       13        95      235        57       57       57
GR    770.0       25     760.0       70     758.0       85     756.0       95     750.8      100
GR    748.9      124     748.0      149     749.9      174     750.3      199     750.8      227
GR    756.0      235     760.0      248     770.0      262

NC     0.12      0.1     0.035       .1       .3
                VALLEY SECTION AH  SECTION FROM EXISTING STUDY
X1   101800       15      582.     728.    580.0    770.0      733
GR    770.0        0     760.0       50     756.0       60     755.8      200     757.0      350
GR    755.7      400     755.5      500     757.6      582     751.4      597     749.9      625
GR    749.9      650     749.2      680     751.4      708     760.6      728     762.0      750

                INTERPOLATED SECTION ADDED
X1   102350       23      349.     469.    490.0    540.0    550.0
GR    765.0      30.     760.0      57.     758.0      63.     757.9     140.     758.4     222.
GR    757.8     249.     757.7     304.     758.7     349.     753.5     361.     752.2     368.
GR    750.9     382.     750.7     385.     750.0     405.     749.9     405.     749.5     430.
GR    751.5     451.     751.7     452.     757.8     469.     759.1     517.     759.1     569.
GR    759.2     622.     759.5     649.     759.3     675.
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NC     0.05     0.10     0.035
                VALLEY SECTION AI  SECTION FROM EXISTING STUDY
X1   102900       13      116.     209.    490.0    540.0    550.0
X3                                                   400
GR    760.0       60     759.8      116     753.5      131     751.8      142     750.0      160
GR    749.8      180     751.8      196     755.0      209     757.2      300     757.0      400
GR    756.8      500     757.1      550     756.5      600

NC     0.11    0.045     0.035
                VALLEY SECTION AJ  SECTION FROM EXISTING STUDY
X1   104150       15      610.     693.   1200.0    710.0   1250.0
GR    758.8        0     758.0      100     758.3      200     757.9      300     758.1      400
GR    757.9      500     758.4      570     753.0      582     753.0      610     752.4      611
GR    751.4      625     749.8      635     748.6      650     752.4      661     769.1      693

                INTERPOLATED SECTION ADDED
X1   104800       27      855.     925.    350.0    675.0    650.0
GR    764.4       0.     759.3      47.     758.2     140.     758.1     155.     758.3     280.
GR    758.1     420.     758.1     466.     758.2     544.     758.3     561.     758.2     622.
GR    758.4     700.     758.4     701.     758.6     777.     758.7     799.     756.0     816.
GR    756.0     852.     753.3     855.     752.9     856.     751.2     870.     750.5     880.
GR    750.4     885.     749.6     895.     751.9     903.     760.6     923.     761.5     925.
GR    761.5     934.     764.5     972.

NC     0.10     0.06     0.035
                VALLEY SECTION AK  SECTION FROM EXISTING STUDY
X1   105450       17     1100.    1157.    350.0    675.0    650.0
X3                                   250
GR    770.0        0     760.0       60     758.2      200     758.2      600     758.4      700
GR    758.4      800     758.9      900     759.0     1000     759.0     1096     753.5     1100
GR    750.9     1115     751.3     1130     750.6     1140     753.5     1156     753.8     1157
GR    754.0     1175     760.0     1250

X1   107.01       40      683.     750.   1960.0   1960.0   2663.0
GR    770.0       0.     765.8       20     760.7      56.     759.7     141.     759.8     167.
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NC                                  .5        1.0
X1   296071      21       250       304         15         15                  2.56
X3                                  241                    313
GR    954.9       0     954.2        25      935.3        125      934.3       150     933.6       175
GR    933.0     200     932.6       225      931.7        250      930.4       251     928.1       260
GR    926.9     270     926.7       280      926.7        303      931.6       304     931.7       319
GR    940.6     344     941.5       369      943.6        400      944.8       450     945.7       500
GR    946.0     550

X1   296148       0         0         0         95         65         77

NC                .12                  .1        .3
X1   298190      27      1236.     1300.     2150.0     1800.0     2042.0
GR    950.0       0     940.0       860      935.9       1000      936.2      1050     936.3      1105
GR    937.1    1130     938.4      1155      937.4       1180      935.7      1205     935.6      1236
GR    934.8    1240     933.0      1250      931.1       1260      931.1      1270     931.5      1280
GR    932.3    1290     934.8      1299      937.0       1300      936.8      1320     952.5      1360
GR    951.7    1390     947.0      1410      951.4       1435      952.3      1460     953.5      1485
GR    953.5    1510     953.9      1535

X1   298500       0         0         0        310        310        310                  0.27
1
   12OCT94      15:29:19                                                                          PAGE  273
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THIS RUN EXECUTED 12OCT94 15:30:03

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*************************************
 HEC-2 WATER SURFACE PROFILES

 Version   4.6.2;  May 1991
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NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

100-YEAR DISCHARGE

SUMMARY PRINTOUT TABLE 110

	SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STENCR
	.000	685.36	2.36	685.95	478.10	1783.81	4911.15	105.04	.00	.00	750.00	810.00	.00
	.000	686.56	3.56	687.17	581.73	3394.63	5820.02	175.35	.00	.00	750.00	810.00	.00
	600.000	686.14	.00	686.67	498.03	1921.38	4768.57	110.05	.00	.00	750.00	810.00	.00
	600.000	687.35	.00	687.89	601.88	3558.42	5651.81	179.77	.00	.00	750.00	810.00	.00
	3.010	690.79	.00	691.39	218.16	754.01	5950.04	95.95	.00	.00	262.00	353.00	.00
	3.010	692.12	.00	692.89	241.59	1440.53	7771.71	177.76	.00	.00	262.00	353.00	.00
	8854.000	695.28	.00	695.71	388.27	666.26	5850.06	283.68	.00	.00	275.00	397.00	.00
	8854.000	696.79	.00	697.25	392.26	1176.41	7414.33	799.26	.00	.00	275.00	397.00	.00
	9154.000	695.62	.00	696.18	250.00	374.74	6283.99	141.27	250.00	215.00	275.00	397.00	465.00
	9154.000	697.12	.00	697.79	250.00	697.22	8295.99	396.79	250.00	215.00	275.00	397.00	465.00
	9354.000	695.90	.00	696.49	149.20	.00	6800.00	.00	149.20	70.90	70.93	220.10	220.10
	9354.000	697.41	.00	698.18	149.20	.00	9390.00	.00	149.20	70.90	70.93	220.10	220.10
	9355.000	695.90	.00	696.50	149.20	.00	6800.00	.00	149.20	70.90	70.93	220.10	220.10
	9355.000	697.41	.00	698.20	149.20	.00	9390.00	.00	149.20	70.90	70.93	220.10	220.10
	9400.000	695.99	.00	696.58	149.20	.00	6800.00	.00	149.20	70.90	70.93	220.10	220.10
	9400.000	697.51	.00	698.28	149.20	.00	9390.00	.00	149.20	70.90	70.93	220.10	220.10
	9401.000	696.02	.00	696.59	150.80	.55	6798.35	1.10	150.80	70.20	70.93	220.10	221.00
	9401.000	697.54	.00	698.29	150.80	1.01	9386.53	2.46	150.80	70.20	70.93	220.10	221.00
	9576.000	696.53	.00	696.88	500.98	433.80	5663.33	702.87	.00	.00	275.00	397.00	.00
*	9576.000	698.36	.00	698.67	522.34	729.21	6811.90	1848.89	.00	.00	275.00	397.00	.00
	9.010	700.27	.00	700.68	383.13	66.28	5625.76	1107.96	.00	.00	262.00	365.00	.00
	9.010	701.59	.00	702.07	391.90	126.10	7071.35	2192.55	.00	.00	262.00	365.00	.00

1

	95550.000	754.06	.00	754.54	265.00	1222.30	6326.63	1561.07	265.00	13.00	100.00	180.00	278.00
*	95600.000	752.16	.00	753.03	252.17	657.92	4710.49	1221.59	.00	.00	159.00	215.00	.00
	95600.000	754.16	.00	754.89	288.33	1469.97	5504.62	2135.42	.00	.00	159.00	215.00	.00
	95605.000	752.19	.00	753.05	252.59	661.30	4703.15	1225.55	.00	.00	159.00	215.00	.00
	95605.000	754.17	.00	754.90	288.39	1472.56	5500.44	2137.00	.00	.00	159.00	215.00	.00
	95865.000	752.97	.00	753.70	94.00	.00	6590.00	.00	.00	.00	94.00	188.00	.00
	95865.000	754.73	.00	755.75	94.00	.00	9110.00	.00	.00	.00	94.00	188.00	.00
	95905.000	753.05	.00	753.97	79.00	.00	6590.00	.00	79.00	103.50	94.00	188.00	182.50
	95905.000	754.83	.00	756.13	79.00	.00	9110.00	.00	79.00	103.50	94.00	188.00	182.50
*	95909.000	753.06	.00	754.60	74.81	.00	6590.00	.00	.00	.00	101.00	178.00	.00
*	95909.000	754.84	.00	756.86	77.00	.00	9110.00	.00	.00	.00	101.00	178.00	.00
	95910.000	753.07	.00	754.75	74.86	.00	6590.00	.00	.00	.00	101.00	178.00	.00
*	95910.000	754.85	.00	757.68	77.00	.00	9110.00	.00	.00	.00	101.00	178.00	.00

	SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STENCR
	95930.000	753.36	.00	755.01	76.03	.00	6590.00	.00	.00	.00	101.00	178.00	.00
	95930.000	755.40	.00	758.12	77.00	.00	9110.00	.00	.00	.00	101.00	178.00	.00
*	95931.000	753.94	.00	755.21	77.00	.00	6590.00	.00	.00	.00	101.00	178.00	.00
*	95931.000	757.59	.00	758.85	77.00	.00	9110.00	.00	.00	.00	101.00	178.00	.00
	96015.000	754.25	.00	755.56	165.53	160.36	4912.92	1516.72	.00	.00	50.00	90.00	.00
	96015.000	758.18	.00	759.12	188.35	420.84	5914.74	2774.41	.00	.00	50.00	90.00	.00
	96122.000	754.91	.00	755.91	186.50	322.53	5343.94	923.53	.00	.00	71.00	120.00	.00
	96122.000	758.52	.00	759.32	210.00	775.77	6522.38	1811.86	.00	.00	71.00	120.00	.00
	96230.000	755.42	.00	756.15	216.25	527.56	5529.18	533.26	.00	.00	91.00	149.00	.00
	96230.000	758.85	.00	759.48	228.00	1153.62	6814.55	1141.84	.00	.00	91.00	149.00	.00
*	96445.000	756.04	.00	756.40	256.30	1094.51	5371.05	124.44	.00	.00	131.00	209.00	.00
	96445.000	759.31	.00	759.66	263.00	1893.35	6846.66	370.00	.00	.00	131.00	209.00	.00
	96650.000	756.33	.00	756.52	275.18	1578.45	4995.14	16.41	-10.00	10.00	170.00	265.00	298.00
	96650.000	759.55	.00	759.76	288.00	2450.00	6577.21	82.79	-10.00	10.00	170.00	265.00	298.00
	96850.000	756.43	.00	756.85	178.05	798.91	5522.31	268.78	-35.00	35.00	144.00	214.00	240.00
	96850.000	759.64	.00	760.11	180.00	1377.45	7298.81	433.74	-35.00	35.00	144.00	214.00	240.00
*	97050.000	756.63	.00	757.29	75.00	.00	6590.00	.00	.00	.00	120.00	195.00	.00
*	97050.000	759.82	.00	760.65	95.00	9.45	9100.55	.00	.00	.00	120.00	195.00	.00
	97078.000	756.67	.00	757.34	75.00	.00	6590.00	.00	.00	.00	120.00	195.00	.00
	97078.000	759.86	.00	760.69	95.00	10.04	9099.96	.00	.00	.00	120.00	195.00	.00
	97122.000	758.20	.00	758.73	75.00	.00	6590.00	.00	.00	.00	120.00	195.00	.00
	97122.000	761.92	.00	762.56	110.00	52.65	9038.42	18.94	.00	.00	120.00	195.00	.00
	97132.000	758.21	.00	758.74	75.00	.00	6590.00	.00	.00	.00	120.00	195.00	.00
	97132.000	761.93	.00	762.57	110.00	52.89	9038.03	19.08	.00	.00	120.00	195.00	.00
	97213.000	758.45	.00	758.86	145.00	237.99	5535.13	816.88	180.00	.00	50.00	109.00	180.00
	97213.000	762.23	.00	762.71	145.00	339.49	7389.84	1380.67	180.00	.00	50.00	109.00	180.00
*	97900.000	759.20	.00	759.24	614.06	.00	2613.94	3976.06	625.00	.00	10.00	84.00	625.00
*	97900.000	763.04	.00	763.08	615.00	.00	3103.55	6006.45	625.00	.00	10.00	84.00	625.00
	98400.000	759.29	.00	759.35	525.00	2418.01	3178.41	993.58	.00	.00	308.00	386.00	.00
	98400.000	763.10	.00	763.16	525.00	3629.00	3954.93	1526.07	.00	.00	308.00	386.00	.00
*	98575.000	759.34	.00	759.38	481.00	1041.52	5497.47	51.00	-100.00	100.00	330.00	563.00	581.00
*	98575.000	763.14	.00	763.18	481.00	1664.09	7363.54	82.36	-100.00	100.00	330.00	563.00	581.00
*	98961.000	759.29	.00	759.54	568.55	24.21	6525.97	39.81	.00	.00	52.00	522.00	.00
*	98961.000	763.16	.00	763.26	585.00	201.52	8663.80	244.67	.00	.00	52.00	522.00	.00

SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STENCR
* 98962.000	759.25	.00	759.57	567.44	33.07	6541.43	15.50	.00	.00	52.00	522.00	.00
98962.000	763.15	.00	763.26	585.00	272.29	8712.41	125.31	.00	.00	52.00	522.00	.00
98981.000	759.46	.00	759.80	563.17	54.20	6526.86	8.93	.00	.00	52.00	522.00	.00
98981.000	763.18	.00	763.29	585.00	283.84	8592.01	234.14	.00	.00	52.00	522.00	.00
* 98982.000	759.57	.00	759.82	565.29	41.28	6503.57	45.15	.00	.00	52.00	522.00	.00
98982.000	763.19	.00	763.29	585.00	211.05	8669.00	229.95	.00	.00	52.00	522.00	.00
* 99150.000	759.89	.00	760.00	450.00	197.33	3299.55	3093.13	450.00	.00	20.00	100.00	450.00
* 99150.000	763.28	.00	763.35	450.00	286.10	3549.93	5273.97	450.00	.00	20.00	100.00	450.00
99750.000	760.13	.00	760.20	635.00	754.08	3596.39	2239.53	635.00	105.00	206.00	311.00	740.00
99750.000	763.41	.00	763.46	635.00	1264.56	3853.64	3991.80	635.00	105.00	206.00	311.00	740.00
100735.000	760.40	.00	760.71	223.00	230.59	5898.24	461.17	223.00	140.00	200.00	303.00	363.00
* 100735.000	763.50	.00	763.83	223.00	548.10	7727.86	834.04	223.00	140.00	200.00	303.00	363.00
* 100935.000	760.46	.00	761.04	121.00	.00	6590.00	.00	.00	.00	102.00	228.00	.00
* 100935.000	763.51	.00	764.12	121.00	.00	9110.00	.00	.00	.00	102.00	228.00	.00
100945.000	760.48	.00	761.06	121.00	.00	6590.00	.00	.00	.00	102.00	228.00	.00
100945.000	763.53	.00	764.14	121.00	.00	9110.00	.00	.00	.00	102.00	228.00	.00
101000.000	760.60	.00	761.17	121.00	.00	6590.00	.00	.00	.00	102.00	228.00	.00
101000.000	763.62	.00	764.22	121.00	.00	9110.00	.00	.00	.00	102.00	228.00	.00
101010.000	760.63	.00	761.18	121.00	.00	6590.00	.00	.00	.00	102.00	228.00	.00
101010.000	763.64	.00	764.24	121.00	.00	9110.00	.00	.00	.00	102.00	228.00	.00
* 101067.000	761.05	.00	761.32	184.22	52.36	6502.72	34.92	.00	.00	95.00	235.00	.00
* 101067.000	764.07	.00	764.37	202.02	168.15	8836.19	105.66	.00	.00	95.00	235.00	.00
101800.000	761.48	.00	761.60	699.24	1779.34	4809.78	.87	.00	.00	582.00	728.00	.00
* 101800.000	764.48	.00	764.58	722.39	3055.19	6026.56	28.25	.00	.00	582.00	728.00	.00
* 102350.000	761.58	.00	761.86	626.51	723.93	5511.46	354.61	.00	.00	349.00	469.00	.00
102350.000	764.54	.00	764.75	642.50	1553.25	6583.41	973.34	.00	.00	349.00	469.00	.00
102900.000	761.89	.00	762.28	340.00	151.65	5112.38	1325.96	400.00	.00	116.00	209.00	400.00
102900.000	764.69	.00	765.03	340.00	520.76	6399.82	2189.42	400.00	.00	116.00	209.00	400.00
104150.000	762.95	.00	763.14	681.21	3085.24	3504.76	.00	.00	.00	610.00	693.00	.00
104150.000	765.48	.00	765.63	686.06	5009.30	4100.70	.00	.00	.00	610.00	693.00	.00
104800.000	763.27	.00	763.40	946.05	3505.36	3055.77	28.88	.00	.00	855.00	925.00	.00
104800.000	765.70	.00	765.79	972.00	5452.70	3493.42	163.89	.00	.00	855.00	925.00	.00
105450.000	763.49	.00	763.58	1000.00	3116.19	2469.66	1004.15	-250.00	250.00	1100.00	1157.00	1250.00
105450.000	765.84	.00	765.91	1000.00	4959.20	2816.49	1334.31	-250.00	250.00	1100.00	1157.00	1250.00

SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STENCR
107.010	764.29	.00	764.43	879.96	2329.07	2749.80	1511.13	.00	.00	683.00	750.00	.00
107.010	766.39	.00	766.49	896.86	3811.77	3156.50	2141.73	.00	.00	683.00	750.00	.00
110575.000	765.61	.00	765.84	683.53	1430.01	3490.89	1669.10	.00	.00	350.00	427.00	.00
110575.000	767.30	.00	767.51	730.54	2338.28	4180.66	2591.06	.00	.00	350.00	427.00	.00
110775.000	765.74	.00	766.07	507.00	1370.13	3930.30	1289.56	507.00	135.00	350.00	427.00	642.00
110775.000	767.38	.00	767.70	507.00	2221.95	4840.02	2048.03	507.00	135.00	350.00	427.00	642.00
111300.000	766.40	.00	767.12	244.00	677.74	5307.65	604.61	244.00	267.00	350.00	427.00	511.00
111300.000	767.95	.00	768.81	244.00	1154.12	6926.89	1028.99	244.00	267.00	350.00	427.00	511.00
111500.000	766.74	.00	767.72	144.00	299.56	5991.23	299.22	144.00	317.00	350.00	427.00	461.00
111500.000	768.28	.00	769.57	144.00	515.20	8091.83	502.97	144.00	317.00	350.00	427.00	461.00
111521.000	767.44	.00	767.97	134.00	.00	6383.81	206.19	134.00	500.00	499.90	612.00	634.00
111521.000	769.17	.00	769.89	134.00	.00	8770.68	339.32	134.00	500.00	499.90	612.00	634.00
111530.000	767.54	.00	768.01	134.00	.00	6079.06	510.94	134.00	500.00	499.90	612.00	634.00
111530.000	769.32	.00	769.95	134.00	.00	8275.91	834.09	134.00	500.00	499.90	612.00	634.00

280940.000	928.02	.00	928.25	249.81	.80	3173.76	605.43	.00	.00	250.00	364.00	.00
303.010	928.04	.00	928.16	314.72	2.79	2066.40	660.81	.00	.00	288.00	386.00	.00
303.010	928.96	.00	929.10	347.83	16.60	2702.21	1061.20	.00	.00	288.00	386.00	.00
286.010	928.63	.00	928.71	460.74	32.51	1730.16	967.33	.00	.00	325.00	407.00	.00
286.010	929.62	.00	929.71	510.76	112.53	2182.18	1485.29	.00	.00	325.00	407.00	.00
304.010	929.06	.00	929.11	648.46	206.11	1316.49	1207.40	.00	.00	363.00	429.00	.00
304.010	930.06	.00	930.12	745.78	408.72	1595.91	1775.37	.00	.00	363.00	429.00	.00
285810.000	929.33	.00	929.35	940.49	824.89	770.03	1135.08	.00	.00	400.00	450.00	.00
285810.000	930.33	.00	930.35	1000.00	1215.42	916.67	1647.91	.00	.00	400.00	450.00	.00
* 305.010	929.51	.00	929.58	687.20	757.51	1216.05	756.44	.00	.00	362.00	413.00	.00
* 305.010	930.50	.00	930.56	771.52	1165.36	1399.35	1215.28	.00	.00	362.00	413.00	.00
* 287.010	929.99	.00	930.18	470.88	656.50	1659.13	414.37	.00	.00	325.00	376.00	.00
* 287.010	930.92	.00	931.10	555.92	1086.71	1963.16	730.13	.00	.00	325.00	376.00	.00
354.010	930.93	.00	931.19	293.62	567.83	1868.89	293.28	.00	.00	288.00	339.00	.00
354.010	931.80	.00	932.11	362.71	988.66	2326.09	465.25	.00	.00	288.00	339.00	.00
233.010	932.01	.00	932.30	234.50	495.29	2019.08	215.63	.00	.00	250.00	302.00	.00
233.010	932.94	.00	933.29	258.22	881.26	2565.89	332.85	.00	.00	250.00	302.00	.00
288.010	934.11	.00	934.39	219.18	476.79	2078.11	175.10	.00	.00	250.00	303.00	.00
288.010	935.21	.00	935.53	230.79	866.64	2639.16	274.20	.00	.00	250.00	303.00	.00

SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STENCR
293340.000	936.03	.00	936.29	209.98	444.00	2141.22	144.78	.00	.00	250.00	304.00	.00
293340.000	937.22	.00	937.53	219.65	825.18	2721.23	233.59	.00	.00	250.00	304.00	.00
295627.000	938.18	.00	938.44	210.45	452.16	2131.76	146.08	.00	.00	250.00	304.00	.00
295627.000	939.45	.00	939.74	220.69	845.22	2698.04	236.74	.00	.00	250.00	304.00	.00
* 295947.000	938.61	.00	939.18	50.00	.00	2730.00	.00	50.00	252.00	250.00	304.00	302.00
* 295947.000	939.93	.00	940.75	50.00	.00	3780.00	.00	50.00	252.00	250.00	304.00	302.00
* 295967.000	938.68	.00	939.67	40.00	.00	2728.82	1.18	40.00	181.60	178.56	221.28	221.60
* 295967.000	940.00	.00	941.44	40.00	.00	3778.36	1.64	40.00	181.60	178.56	221.28	221.60
295968.000	938.55	.00	939.73	40.00	.00	2730.00	.00	40.00	181.60	178.56	221.28	221.60
295968.000	939.76	.00	941.55	40.00	.00	3780.00	.00	40.00	181.60	178.56	221.28	221.60
296055.000	939.12	.00	940.18	40.00	.00	2730.00	.00	40.00	181.60	178.56	221.28	221.60
296055.000	940.62	.00	942.18	40.00	.00	3780.00	.00	40.00	181.60	178.56	221.28	221.60
296056.000	939.40	.00	940.21	42.00	.00	2720.64	9.36	42.00	180.60	178.56	221.28	222.60
296056.000	941.14	.00	942.23	42.00	.00	3766.83	13.17	42.00	180.60	178.56	221.28	222.60
* 296071.000	940.13	.00	940.46	72.00	72.81	2590.22	66.97	72.00	241.00	250.00	304.00	313.00
* 296071.000	942.15	.00	942.58	72.00	112.48	3565.61	101.91	72.00	241.00	250.00	304.00	313.00
* 296148.000	940.48	.00	940.61	225.36	676.44	1894.24	159.32	.00	.00	250.00	304.00	.00
* 296148.000	942.65	.00	942.77	242.93	1184.26	2338.28	257.46	.00	.00	250.00	304.00	.00
298190.000	941.20	.00	941.25	573.95	1360.65	1318.24	51.10	.00	.00	1236.00	1300.00	.00
* 298190.000	943.19	.00	943.23	750.79	2208.01	1489.70	82.29	.00	.00	1236.00	1300.00	.00
298500.000	941.27	.00	941.33	556.92	1332.42	1347.64	49.93	.00	.00	1236.00	1300.00	.00
298500.000	943.24	.00	943.28	731.32	2178.10	1520.50	81.40	.00	.00	1236.00	1300.00	.00

100-YEAR DISCHARGE

SUMMARY PRINTOUT TABLE 150

SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
.000	.00	.00	.00	669.85	6800.00	685.36	.00	685.95	12.54	7.19	1617.66	1920.35

	96850.000	200.00	.00	.00	741.50	6590.00	756.43	.00	756.85	7.00	5.67	1732.69	2491.40
	96850.000	200.00	.00	.00	741.50	9110.00	759.64	.00	760.11	6.13	6.09	2307.00	3679.10
*	97050.000	200.00	.00	.00	742.70	6590.00	756.63	.00	757.29	14.36	6.56	1004.77	1738.92
*	97050.000	200.00	.00	.00	742.70	9110.00	759.82	.00	760.65	14.46	7.31	1262.54	2395.87
	97078.000	28.00	.00	.00	742.70	6590.00	756.67	.00	757.34	14.24	6.54	1007.55	1746.10
	97078.000	28.00	.00	.00	742.70	9110.00	759.86	.00	760.69	14.36	7.30	1266.05	2404.36
	97122.000	44.00	758.70	756.60	742.70	6590.00	758.20	.00	758.73	10.34	5.87	1122.71	2049.49
	97122.000	44.00	758.70	756.60	742.70	9110.00	761.92	.00	762.56	9.60	6.45	1491.27	2940.22
	97132.000	10.00	.00	.00	742.70	6590.00	758.21	.00	758.74	10.32	5.87	1123.55	2051.75
	97132.000	10.00	.00	.00	742.70	9110.00	761.93	.00	762.57	9.58	6.44	1492.44	2943.13
	97213.000	81.00	.00	.00	738.80	6590.00	758.45	.00	758.86	5.49	5.61	1769.67	2812.71
	97213.000	81.00	.00	.00	738.80	9110.00	762.23	.00	762.71	4.96	6.11	2318.19	4091.72
*	97900.000	687.00	.00	.00	741.00	6590.00	759.20	.00	759.24	2.22	2.46	5985.64	4426.37
*	97900.000	687.00	.00	.00	741.00	9110.00	763.04	.00	763.08	1.59	2.30	8348.30	7218.02
	98400.000	500.00	.00	.00	742.30	6590.00	759.29	.00	759.35	2.35	2.71	5269.16	4298.72
	98400.000	500.00	.00	.00	742.30	9110.00	763.10	.00	763.16	1.71	2.69	7269.79	6962.48
*	98575.000	175.00	.00	.00	738.80	6590.00	759.34	.00	759.38	.84	1.62	5667.33	7169.89
*	98575.000	175.00	.00	.00	738.80	9110.00	763.14	.00	763.18	.70	1.72	7492.13	10872.63
*	98961.000	386.00	.00	.00	743.80	6590.00	759.29	.00	759.54	48.18	4.03	1703.58	949.39
*	98961.000	386.00	.00	.00	743.80	9110.00	763.16	.00	763.26	6.92	2.52	3960.37	3462.56
*	98962.000	1.00	758.00	758.30	743.80	6590.00	759.25	.00	759.57	113.50	4.60	1469.69	618.56
	98962.000	1.00	758.00	758.30	743.80	9110.00	763.15	.00	763.26	12.63	2.67	3742.18	2563.04
	98981.000	19.00	758.00	758.30	743.80	6590.00	759.46	.00	759.80	120.71	4.74	1432.74	599.81
	98981.000	19.00	758.00	758.30	743.80	9110.00	763.18	.00	763.29	13.63	2.75	3586.48	2467.81
*	98982.000	1.00	.00	.00	743.80	6590.00	759.57	.00	759.82	46.75	4.05	1704.57	963.84
	98982.000	1.00	.00	.00	743.80	9110.00	763.19	.00	763.29	7.49	2.62	3808.95	3329.46
*	99150.000	168.00	.00	.00	744.50	6590.00	759.89	.00	760.00	4.32	3.30	2849.05	3172.12
*	99150.000	168.00	.00	.00	744.50	9110.00	763.28	.00	763.35	2.25	2.79	4371.92	6076.78
	99750.000	600.00	.00	.00	744.50	6590.00	760.13	.00	760.20	3.36	2.69	3740.95	3594.23
	99750.000	600.00	.00	.00	744.50	9110.00	763.41	.00	763.46	1.80	2.29	5821.94	6792.01

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	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	100735.000	985.00	.00	.00	745.80	6590.00	760.40	.00	760.71	5.98	4.75	1791.77	2694.68
*	100735.000	985.00	.00	.00	745.80	9110.00	763.50	.00	763.83	4.79	4.95	2483.10	4163.19
*	100935.000	200.00	.00	.00	746.80	6590.00	760.46	.00	761.04	18.86	6.11	1079.43	1517.64
*	100935.000	200.00	.00	.00	746.80	9110.00	763.51	.00	764.12	15.04	6.29	1448.38	2348.81
	100945.000	10.00	772.00	767.10	746.80	6590.00	760.48	.00	761.06	18.78	6.10	1080.93	1520.81
	100945.000	10.00	772.00	767.10	746.80	9110.00	763.53	.00	764.14	15.01	6.28	1449.56	2351.62
	101000.000	55.00	772.00	767.10	746.80	6590.00	760.60	.00	761.17	18.04	6.02	1095.47	1551.66
	101000.000	55.00	772.00	767.10	746.80	9110.00	763.62	.00	764.22	14.67	6.24	1460.98	2378.82
	101010.000	10.00	.00	.00	746.80	6590.00	760.63	.00	761.18	17.87	6.00	1098.83	1558.81
	101010.000	10.00	.00	.00	746.80	9110.00	763.64	.00	764.24	14.59	6.22	1463.51	2384.85
*	101067.000	57.00	.00	.00	748.00	6590.00	761.05	.00	761.32	5.31	4.18	1668.41	2858.54
*	101067.000	57.00	.00	.00	748.00	9110.00	764.07	.00	764.37	4.40	4.47	2250.95	4341.20
	101800.000	733.00	.00	.00	749.20	6590.00	761.48	.00	761.60	2.76	3.25	4316.80	3963.20
*	101800.000	733.00	.00	.00	749.20	9110.00	764.48	.00	764.58	1.83	3.15	6457.72	6737.07
*	102350.000	550.00	.00	.00	749.50	6590.00	761.58	.00	761.86	5.91	4.67	2742.49	2709.79
	102350.000	550.00	.00	.00	749.50	9110.00	764.54	.00	764.75	3.51	4.29	4620.48	4863.00
	102900.000	550.00	.00	.00	749.80	6590.00	761.89	.00	762.28	8.74	5.64	2023.33	2229.00
	102900.000	550.00	.00	.00	749.80	9110.00	764.69	.00	765.03	5.91	5.49	2972.36	3746.33
	104150.000	1250.00	.00	.00	748.60	6590.00	762.95	.00	763.14	5.91	4.75	3849.52	2711.55

SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
296055.000	87.00	942.40	943.50	928.20	2730.00	939.12	.00	940.18	45.80	8.24	331.45	403.40
296055.000	87.00	942.40	943.50	928.20	3780.00	940.62	.00	942.18	62.99	10.00	378.11	476.27
296056.000	1.00	.00	.00	928.20	2730.00	939.40	.00	940.21	36.96	7.19	385.96	449.04
296056.000	1.00	.00	.00	928.20	3780.00	941.14	.00	942.23	41.45	8.39	458.84	587.12
* 296071.000	15.00	.00	.00	929.26	2730.00	940.13	.00	940.46	8.25	4.72	653.71	950.19
* 296071.000	15.00	.00	.00	929.26	3780.00	942.15	.00	942.58	8.56	5.42	798.86	1292.25
* 296148.000	77.00	.00	.00	929.26	2730.00	940.48	.00	940.61	3.95	3.34	1299.43	1373.51
* 296148.000	77.00	.00	.00	929.26	3780.00	942.65	.00	942.77	3.22	3.42	1807.34	2106.53
298190.000	2042.00	.00	.00	931.10	2730.00	941.20	.00	941.25	2.40	2.37	2279.52	1763.66
* 298190.000	2042.00	.00	.00	931.10	3780.00	943.19	.00	943.23	1.53	2.18	3602.36	3052.00
298500.000	310.00	.00	.00	931.37	2730.00	941.27	.00	941.33	2.70	2.48	2170.81	1661.94
298500.000	310.00	.00	.00	931.37	3780.00	943.24	.00	943.28	1.71	2.27	3439.39	2888.21

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100-YEAR DISCHARGE

SUMMARY PRINTOUT TABLE 150

SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
.000	6800.00	685.36	.00	.00	2.36	478.10	.00
.000	9390.00	686.56	1.21	.00	3.56	581.73	.00
600.000	6800.00	686.14	.00	.78	.00	498.03	600.00
600.000	9390.00	687.35	1.21	.78	.00	601.88	600.00
3.010	6800.00	690.79	.00	4.65	.00	218.16	4277.00
3.010	9390.00	692.12	1.33	4.77	.00	241.59	4277.00
8854.000	6800.00	695.28	.00	4.49	.00	388.27	3977.00
8854.000	9390.00	696.79	1.51	4.67	.00	392.26	3977.00
9154.000	6800.00	695.62	.00	.34	.00	250.00	300.00
9154.000	9390.00	697.12	1.50	.33	.00	250.00	300.00
9354.000	6800.00	695.90	.00	.28	.00	149.20	200.00
9354.000	9390.00	697.41	1.50	.29	.00	149.20	200.00
9355.000	6800.00	695.90	.00	.00	.00	149.20	1.00
9355.000	9390.00	697.41	1.50	.00	.00	149.20	1.00
9400.000	6800.00	695.99	.00	.09	.00	149.20	45.00
9400.000	9390.00	697.51	1.52	.10	.00	149.20	45.00
9401.000	6800.00	696.02	.00	.03	.00	150.80	1.00
9401.000	9390.00	697.54	1.53	.04	.00	150.80	1.00
9576.000	6800.00	696.53	.00	.51	.00	500.98	175.00
* 9576.000	9390.00	698.36	1.83	.82	.00	522.34	175.00
9.010	6800.00	700.27	.00	3.73	.00	383.13	4509.00
9.010	9390.00	701.59	1.33	3.23	.00	391.90	4509.00
18600.000	6800.00	704.22	.00	3.95	.00	349.26	4515.00
18600.000	9390.00	705.72	1.50	4.13	.00	358.14	4515.00
10.010	6800.00	707.39	.00	3.18	.00	209.24	3612.00
10.010	9390.00	709.12	1.73	3.40	.00	232.55	3612.00
25825.000	6800.00	710.44	.00	3.05	.00	189.13	3613.00
25825.000	9390.00	712.40	1.96	3.28	.00	206.38	3613.00
25925.000	6800.00	710.78	.00	.34	.00	171.99	100.00
25925.000	9390.00	712.82	2.04	.42	.00	180.86	100.00
25926.000	6800.00	710.77	.00	-.01	.00	171.96	1.00
25926.000	9390.00	712.80	2.04	-.02	.00	180.83	1.00

	95905.000	9110.00	754.83	1.78	.09	.00	79.00	40.00
*	95909.000	6590.00	753.06	.00	.01	.00	74.81	4.00
*	95909.000	9110.00	754.84	1.78	.02	.00	77.00	4.00
	95910.000	6590.00	753.07	.00	.01	.00	74.86	1.00
*	95910.000	9110.00	754.85	1.79	.01	.00	77.00	1.00
	95930.000	6590.00	753.36	.00	.29	.00	76.03	20.00
	95930.000	9110.00	755.40	2.04	.54	.00	77.00	20.00
*	95931.000	6590.00	753.94	.00	.58	.00	77.00	1.00
*	95931.000	9110.00	757.59	3.66	2.20	.00	77.00	1.00
	96015.000	6590.00	754.25	.00	.31	.00	165.53	84.00
	96015.000	9110.00	758.18	3.92	.58	.00	188.35	84.00
	96122.000	6590.00	754.91	.00	.65	.00	186.50	107.00
	96122.000	9110.00	758.52	3.61	.34	.00	210.00	107.00
	96230.000	6590.00	755.42	.00	.51	.00	216.25	108.00
	96230.000	9110.00	758.85	3.43	.33	.00	228.00	108.00

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	96445.000	6590.00	756.04	.00	.62	.00	256.30	215.00
	96445.000	9110.00	759.31	3.27	.46	.00	263.00	215.00
	96650.000	6590.00	756.33	.00	.29	.00	275.18	205.00
	96650.000	9110.00	759.55	3.22	.24	.00	288.00	205.00
	96850.000	6590.00	756.43	.00	.10	.00	178.05	200.00
	96850.000	9110.00	759.64	3.21	.09	.00	180.00	200.00
*	97050.000	6590.00	756.63	.00	.19	.00	75.00	200.00
*	97050.000	9110.00	759.82	3.19	.18	.00	95.00	200.00
	97078.000	6590.00	756.67	.00	.05	.00	75.00	28.00
	97078.000	9110.00	759.86	3.19	.05	.00	95.00	28.00
	97122.000	6590.00	758.20	.00	1.53	.00	75.00	44.00
	97122.000	9110.00	761.92	3.72	2.06	.00	110.00	44.00
	97132.000	6590.00	758.21	.00	.01	.00	75.00	10.00
	97132.000	9110.00	761.93	3.72	.01	.00	110.00	10.00
	97213.000	6590.00	758.45	.00	.24	.00	145.00	81.00
	97213.000	9110.00	762.23	3.78	.30	.00	145.00	81.00
*	97900.000	6590.00	759.20	.00	.75	.00	614.06	687.00
*	97900.000	9110.00	763.04	3.84	.81	.00	615.00	687.00
	98400.000	6590.00	759.29	.00	.09	.00	525.00	500.00
	98400.000	9110.00	763.10	3.81	.06	.00	525.00	500.00
*	98575.000	6590.00	759.34	.00	.05	.00	481.00	175.00
*	98575.000	9110.00	763.14	3.80	.04	.00	481.00	175.00
*	98961.000	6590.00	759.29	.00	-.05	.00	568.55	386.00
*	98961.000	9110.00	763.16	3.87	.02	.00	585.00	386.00
*	98962.000	6590.00	759.25	.00	-.05	.00	567.44	1.00
	98962.000	9110.00	763.15	3.91	-.01	.00	585.00	1.00
	98981.000	6590.00	759.46	.00	.21	.00	563.17	19.00
	98981.000	9110.00	763.18	3.72	.02	.00	585.00	19.00
*	98982.000	6590.00	759.57	.00	.11	.00	565.29	1.00
	98982.000	9110.00	763.19	3.62	.01	.00	585.00	1.00
*	99150.000	6590.00	759.89	.00	.33	.00	450.00	168.00
*	99150.000	9110.00	763.28	3.38	.09	.00	450.00	168.00
	99750.000	6590.00	760.13	.00	.24	.00	635.00	600.00
	99750.000	9110.00	763.41	3.28	.13	.00	635.00	600.00

SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
100735.000	6590.00	760.40	.00	.27	.00	223.00	985.00
* 100735.000	9110.00	763.50	3.10	.09	.00	223.00	985.00
* 100935.000	6590.00	760.46	.00	.06	.00	121.00	200.00
* 100935.000	9110.00	763.51	3.05	.01	.00	121.00	200.00
100945.000	6590.00	760.48	.00	.02	.00	121.00	10.00
100945.000	9110.00	763.53	3.04	.02	.00	121.00	10.00
101000.000	6590.00	760.60	.00	.12	.00	121.00	55.00
101000.000	9110.00	763.62	3.02	.09	.00	121.00	55.00
101010.000	6590.00	760.63	.00	.02	.00	121.00	10.00
101010.000	9110.00	763.64	3.01	.02	.00	121.00	10.00
* 101067.000	6590.00	761.05	.00	.43	.00	184.22	57.00
* 101067.000	9110.00	764.07	3.02	.43	.00	202.02	57.00
101800.000	6590.00	761.48	.00	.43	.00	699.24	733.00
* 101800.000	9110.00	764.48	3.00	.41	.00	722.39	733.00
* 102350.000	6590.00	761.58	.00	.10	.00	626.51	550.00
102350.000	9110.00	764.54	2.96	.06	.00	642.50	550.00
102900.000	6590.00	761.89	.00	.31	.00	340.00	550.00
102900.000	9110.00	764.69	2.80	.15	.00	340.00	550.00
104150.000	6590.00	762.95	.00	1.06	.00	681.21	1250.00
104150.000	9110.00	765.48	2.53	.79	.00	686.06	1250.00
104800.000	6590.00	763.27	.00	.32	.00	946.05	650.00
104800.000	9110.00	765.70	2.43	.22	.00	972.00	650.00
105450.000	6590.00	763.49	.00	.22	.00	1000.00	650.00
105450.000	9110.00	765.84	2.35	.14	.00	1000.00	650.00
107.010	6590.00	764.29	.00	.80	.00	879.96	2663.00
107.010	9110.00	766.39	2.09	.54	.00	896.86	2663.00
110575.000	6590.00	765.61	.00	1.31	.00	683.53	2462.00
110575.000	9110.00	767.30	1.69	.91	.00	730.54	2462.00
110775.000	6590.00	765.74	.00	.13	.00	507.00	200.00
110775.000	9110.00	767.38	1.65	.08	.00	507.00	200.00
111300.000	6590.00	766.40	.00	.66	.00	244.00	525.00
111300.000	9110.00	767.95	1.56	.57	.00	244.00	525.00
111500.000	6590.00	766.74	.00	.34	.00	144.00	200.00
111500.000	9110.00	768.28	1.54	.32	.00	144.00	200.00

SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
111521.000	6590.00	767.44	.00	.70	.00	134.00	21.00
111521.000	9110.00	769.17	1.73	.89	.00	134.00	21.00
111530.000	6590.00	767.54	.00	.10	.00	134.00	9.00
111530.000	9110.00	769.32	1.78	.15	.00	134.00	9.00
111562.000	6590.00	768.00	.00	.46	.00	134.00	32.00
111562.000	9110.00	769.32	1.32	.00	.00	134.00	32.00
111571.000	6590.00	768.00	.00	.00	.00	134.00	9.00
111571.000	9110.00	769.32	1.32	.00	.00	134.00	9.00
* 111800.000	6590.00	768.68	.00	.68	.00	593.00	229.00
* 111800.000	9110.00	770.32	1.63	1.00	.00	593.00	229.00
111900.000	6590.00	768.71	.00	.03	.00	759.79	100.00
111900.000	9110.00	770.35	1.64	.04	.00	800.00	100.00

1996 Floodway (Encroachment) Model Data

NOTE: The following floodway model output data was provided by FEMA. Although the water surface elevations do not match those of the published Flood Insurance Study (FIS), the floodway information does match closely that of the published FIS. Therefore, because it is the best available information the data is provided here.

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1*******************************************
 *  HEC-2 WATER SURFACE PROFILES            *
 *                                          *
 *  Version   4.6.2;  May 1991              *
 *                                          *
 *  RUN DATE    13AUG96    TIME   09:14:30  *
 *******************************************
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****************************************
*  U.S. ARMY CORPS OF ENGINEERS        *
*  HYDROLOGIC ENGINEERING CENTER       *
*  609 SECOND STREET, SUITE D          *
*  DAVIS, CALIFORNIA 95616-4687        *
*          (916) 756-1104              *
****************************************
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X     X  XXXXXXX   XXXXX              XXXXX
X     X  X        X     X            X     X
X     X  X        X                        X
XXXXXXX  XXXX     X          XXXXX    XXXXX
X     X  X        X                  X
X     X  X        X     X            X
X     X  XXXXXXX   XXXXX             XXXXXXX
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1

13AUG96 09:14:31 PAGE 1

THIS RUN EXECUTED 13AUG96 09:14:31

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************************************
 HEC-2 WATER SURFACE PROFILES

 Version   4.6.2;  May 1991
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T1      ISABELLA COUNTY FIS
T2      CHIPPEWA RIVER
T3      100-YEAR DISCHARGE

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

                2                                                                   685.36

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

      1                  -1


J3  VARIABLE CODES FOR SUMMARY PRINTOUT

    110        115        200

QT        2       6800       6800
ET                            4.1        525         824
NC      .05        .05       .035        .1          .3
               VALLEY SECTION A MOVED DOWNSTREAM TO CORPORATE
               BOUNDARY, i.e. COUNTY LINE, DOWNSTREAM STUDY LIMIT
X1        0         20        750        810           0           0           0                  -0.55
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GR    742.4      188.      743.5      195.      748.4      205.      751.3      209.      753.4      240.
GR    755.2      257.      758.5      266.
1
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NC                                        .1        .3
ET                4.1       6.1       10        298        14       286
                VALLEY SECTION Y   SECTION FROM EXISTING STUDY
                EXPANSION-CONTRACTION COEFFICIENTS MODIFIED
X1    96650        9       170.      265.      194.0      145.0      205.0
GR    748.9        0      747.0      170       743.8       173       741.0      190       742.6       210
GR    740.0      225      743.8      249       752.6       265       758.7      298

NC                                        .5       1.0
ET                4.1                    35       240
X1    96850       10       144.      214.      200.0      200.0      200.0
GR    750.7       60      750.0       95       748.0       142       744.2      144       742.8       160
GR    741.5      180      741.8      198       744.2       214       750.0      230       758.0       240

NC      0.1       0.1      0.04
                VALLEY SECTION Z   SECTION FROM EXISTING STUDY
                EXPANSION-CONTRACTION COEFFICIENTS REMOVED
X1    97050       15       120       195       200.0      200.0      200.0
GR    758.7      100      759.1      120       744.2       120       744.0      126       743.5       134
GR    743.1      140      743.0      146       742.7       158       742.7      168       742.8       175
GR    743.2      182      743.8      190       744.2       195       760.0      195       760.0       210

                DOWNSTREAM FACE BROADWAY STREET  SECTION FROM EXISTING STUDY
                CHANGED FROM NORMAL TO SPECIAL BRIDGE ROUTINE
X1    97078       15       120       195        28         28         28
GR    758.7      100      759.1      120       744.2       120       744.0      126       743.5       134
GR    743.1      140      743.0      146       742.7       158       742.7      168       742.8       175
GR    743.2      182      743.8      190       744.2       195       760.0      195       760.0       210

SB                1.6       3.0                  75                   710
ET                4.1       4.1       100       195
                UPSTREAM FACE BROADWAY STREET    SECTION FROM EXISTING STUDY
X1    97122                                     44         44         44
X2                            1      756.6      758.7
BT      13       100      758.7      758.7       120       759.1      744.2      126       759.3       748.4
BT     134     759.5      752.1       140       759.6      754.1       146      759.8      755.6        158
BT   760.0     756.6       168      760.0       756.0       175       760.0      754.5       182       760.0
BT   752.5       190      760.0      748.5       195       760.0      744.2       210       760.0       760.0

ET                4.1       4.1       100       195
X1    97132                                     10         10         10

ET                4.1       6.1        35       180         35       180
                VALLEY SECTION AA  SECTION FROM EXISTING STUDY
                RIGHT ENCROACHMENT CHANGED FROM STA. 130 TO 180 BASED ON 2-FT MAP
X1    97213        9        50       109        81         81         81
GR    750.0       35      746.0        45       744.2       50       742.7       63       741.2        80
GR    738.8       93      744.2       109       750.0       115       750.2      200
1
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NC      0.12       0.12       0.05
ET                  4.1        6.1         10        625         10        625
                VALLEY SECTION AB  SECTION FROM EXISTING STUDY
X1     97900        16        10.         84.      720.0      400.0      687.0
GR     760.0        10      744.7         28      741.0         42      741.5         55      742.2         70
GR     744.7        83      747.7         84      747.1        146      750.0        175      751.5        230
GR     750.0       290      749.3        370      750.0        460      751.9        550      752.0        660
GR     754.0       665

NC                                       .1         .3
ET                              4.1       15        510
                VALLEY SECTION AC  SECTION FROM EXISTING STUDY
X1     98400        20       308.       386.      490.0      400.0      500.0
GR     754.0         0      752.0         13      750.0         38      748.0         50      748.0         58
GR     750.0       135      750.5        200      750.0        290      749.0        308      744.9        316
GR     743.4       330      742.3        345      743.1        358      744.9        371      745.6        381
GR     749.4       386      750.3        406      750.0        500      752.0        515      756.0        525

ET                  4.1        6.1        100        581        105        576
X1     98575        19       330.       563.      170.0      190.0      175.0
GR     750.0        30      750.0        200      751.3        250      750.0        311      746.0        325
GR     744.9       330      743.4        343      742.3        357      743.1        369      744.9        381
GR     749.8       385      750.0        410      745.1        475      742.7        495      741.0        511
GR     738.8       530      742.0        550      745.1        563      758.3        581

ET                              1.5
                RIGHT OVERBANK REACH LENGTH CORRECTED
X1     98961        34         52        522      420.0      345.0      386.0
GR     758.8         0      758.4         52      748.2         52      748.2         62      757.1         62
GR     757.1      63.5      748.2       63.5      748.2       76.5      757.1       76.5      757.1         78
GR     748.2        78      748.2         90      757.1         90      756.7        110      748.2        110
GR     748.2       122      756.7        122      756.7      123.5      748.2      123.5      748.5        137
GR     756.7       137      756.7      138.5      748.5      138.5      748.8      148.5      758.3      148.5
GR     758.3       180      758.7        482      749.1        482      746.0        493      743.8        505
GR     747.5       515      750.0      521.9      757.3        522      760.0        585

                DOWNSTREAM FACE OF FOOT BRIDGE AT DAM,SECTION FROM EXISTING STUDY
X1     98962                                         1          1          1
BT        13         0      758.8      758.8         52      758.4      757.1         62      758.3      757.1
BT        78     758.2      757.1         90      758.1      757.1        110      758.0      756.7        122
BT     758.1     756.7        137      758.2      756.6      148.5      758.3      756.7        180      758.3
BT     758.3       482      758.7      757.3        522      758.6      757.3        585      760.6      760.6

                UPSTREAM FACE OF FOOT BRIDGE AT DAM   SECTION FROM EXISTING STUDY
X1     98981        34         52        522       19.0       19.0       19.0
BT        13         0      758.8      758.8         52      758.4      757.1         62      758.3      757.1
BT        78     758.2      757.1         90      758.1      757.1        110      758.0      756.7        122
BT     758.1     756.7        137      758.2      756.7      148.5      758.3      756.7        180      758.3
BT     758.3       482      758.7      757.3        522      758.6      757.3        585      760.6      760.6
GR     758.8         0      758.4         52      750.6         52      750.6         62      757.1         62
GR     757.1      63.5      750.6       63.5      750.6       76.5      757.1       76.5      757.1         78
GR     750.6        78      750.3         90      757.1         90      756.7        110      750.2        110
GR     750.0       122      756.7        122      756.7      123.5      750.0      123.5      750.2        137
1
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GR     756.7       137      756.7      138.5       750.2       138.5       750.2       148.5       758.3       148.5
GR     758.3       180      758.7        482       749.1         482       746.0         493       743.8         505
GR     747.5       515      750.0      521.9       757.3         522       760.6         585

X1     98982                                           1           1           1

NC      0.05      0.05       0.05
ET                 4.1        6.1         .1         450          .1         390
                VALLEY SECTION AD  SECTION FROM EXISTING STUDY
                RIGHT ENCROACHMENT CHANGED DUE TO BRIDGE GOING WEIR FLOW
                RIGHT OVERBANK REACH LENGTH CORRECTED
X1     99150        10         20        100          50         170         168
GR     758.2         0      750.4         20       747.0          38       744.5          61       748.0          80
GR     750.4       100      755.3        110       754.9         250       754.9         400       755.3         600

NC      0.05     0.065      0.055         .2          .4
ET                 4.1        4.1        105         740         155         645
                VALLEY SECTION AE  SECTION FROM EXISTING STUDY
X1     99750        15       206.       311.       630.0       380.0       600.0
GR     755.6         0      755.8        100       755.0         200       750.4         206       747.0         230
GR     744.5       260      748.0        285       750.4         311       756.3         400       756.0         500
GR     756.2       600      756.8        700       756.0         800       756.1         900       755.6        1100

NC      0.08      0.08       0.04         .2          .4
ET                 4.1        4.1        140         363
                VALLEY SECTION AF  SECTION FROM EXISTING STUDY
X1    100735        12       200.       303.       850.0       800.0       985.0
GR     760.0       100      758.0        135       756.0         196       750.8         200       745.8         223
GR     748.7       243      748.3        263       748.1         283       750.8         303       756.0         330
GR     756.9       400      756.2        500

NC       0.1      0.08       0.04         .3          .5
ET                          1.5
X1    100935        18        102        228       200.0       200.0       200.0
GR     772.0       102      758.2        102       750.8         118       746.8         130       748.1         145
GR     750.8       156      752.7        157       752.7         163       767.1         163       767.1         168
GR     752.7       168      752.7        171       750.8         172       748.1         180       749.8         190
GR     750.8       197      759.4        228       772.0         228
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                DOWNSTREAM FACE HIGH STREET    SECTION FROM EXISTING STUDY
X1    100945                                          10          10          10
X2                                     767.1       772.0

                UPSTREAM FACE HIGH STREET      SECTION FROM EXISTING STUDY
X1    101000                                          55          55          55
X2                                     767.1       772.0

X1    101010                                          10          10          10
1
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ET                          4.1         95         230
                VALLEY SECTION AG  SECTION FROM EXISTING STUDY
X1    101067        13         95        235          57          57          57
GR     770.0        25      760.0         70       758.0          85       756.0          95       750.8         100
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3470 ENCROACHMENT STATIONS=      100.0     195.0  TYPE=      1  TARGET=       95.000
                UPSTREAM FACE BROADWAY STREET    SECTION FROM EXISTING STUDY
 97122.000     15.58    758.28       .00       .00    758.81       .53      1.48       .00    759.10
    6590.0        .0    6590.0        .0        .0    1129.2        .0    4944.4     870.5 100000.00
      7.25       .00      5.84       .00      .000      .040      .000      .000    742.70    120.00
   .001016       44.       44.       44.         2         0         2       .00     75.00    195.00


*SECNO 97132.000

3470 ENCROACHMENT STATIONS=      100.0     195.0  TYPE=      1  TARGET=       95.000
 97132.000     15.60    758.30       .00       .00    758.82       .53       .01       .00    759.10
    6590.0        .0    6590.0        .0        .0    1130.0        .0    4944.6     870.5 100000.00
      7.25       .00      5.83       .00      .000      .040      .000      .000    742.70    120.00
   .001014       10.       10.       10.         0         0         0       .00     75.00    195.00


*SECNO 97213.000
3280 CROSS SECTION  97213.00 EXTENDED      8.33 FEET


3470 ENCROACHMENT STATIONS=       35.0     180.0  TYPE=      1  TARGET=      145.000
                VALLEY SECTION AA  SECTION FROM EXISTING STUDY
                RIGHT ENCROACHMENT CHANGED FROM STA. 130 TO 180 BASED ON 2-FT MAP
 97213.000     19.73    758.53       .00       .00    758.94       .41       .06       .06    744.20
    6590.0     238.3    5529.8     822.0     172.5     991.3     618.1    4947.4     870.7    744.20
      7.25      1.38      5.58      1.33      .100      .040      .100      .000    738.80     35.00
   .000539       81.       81.       81.         2         0         0       .00    145.00    180.00
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    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


*SECNO 97900.000
3280 CROSS SECTION  97900.00 EXTENDED      5.27 FEET

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.58


3470 ENCROACHMENT STATIONS=       10.0     625.0  TYPE=      1  TARGET=      615.000
                VALLEY SECTION AB  SECTION FROM EXISTING STUDY
 97900.000     18.27    759.27       .00       .00    759.31       .04       .19       .18    810.00
    6590.0        .0    2605.0    3985.0        .0    1069.1    4961.7    4990.6     874.7    747.70
      7.36       .00      2.44       .80      .000      .050      .120      .000    741.00     10.86
   .000217      720.      687.      400.         2         0         0       .00    614.14    625.00


CCHV=     .100 CEHV=     .300
*SECNO 98400.000
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3280 CROSS SECTION  98400.00 EXTENDED      5.36 FEET

                VALLEY SECTION AC  SECTION FROM EXISTING STUDY
 98400.000      17.06    759.36       .00       .00    759.42       .06       .10       .01    749.00
    6590.0     2423.2    3170.5     996.3    2894.8    1176.7    1235.2    5048.3     880.4    749.40
      7.44        .84      2.69       .81      .120      .050      .120      .000    742.30       .00
   .000230       490.      500.      400.         2         0         0       .00    525.00    525.00


*SECNO 98575.000
3280 CROSS SECTION  98575.00 EXTENDED      1.11 FEET


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.67


3470 ENCROACHMENT STATIONS=      100.0     581.0  TYPE=      1  TARGET=      481.000
 98575.000      20.61    759.41       .00       .00    759.45       .03       .02       .00    744.90
    6590.0     1045.3    5493.4      51.2    2142.3    3420.2     138.7    5070.3     882.4    745.10
      7.47        .49      1.61       .37      .120      .050      .120      .000    738.80    100.00
   .000083       170.      175.      190.         1         0         0       .00    481.00    581.00


*SECNO 98961.000
3280 CROSS SECTION  98961.00 EXTENDED       .57 FEET

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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .14

                RIGHT OVERBANK REACH LENGTH CORRECTED
 98961.000      15.57    759.37       .00       .00    759.61       .24       .10       .06    758.40
    6590.0       27.7    6519.9      42.4      40.1    1656.5      50.0    5104.1     887.2    757.30
      7.50        .69      3.94       .85      .120      .050      .120      .000    743.80       .00
   .004474       420.      386.      345.         2         0         0       .00    570.31    570.31


*SECNO 98962.000
3280 CROSS SECTION  98962.00 EXTENDED       .53 FEET


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .66


3370 NORMAL BRIDGE, NRD=  13 MIN ELTRD=   758.00 MAX ELLC=   758.30

                DOWNSTREAM FACE OF FOOT BRIDGE AT DAM,SECTION FROM EXISTING STUDY
 98962.000      15.53    759.33       .00       .00    759.64       .31       .01       .02    758.40
    6590.0       38.3    6534.0      17.7      37.8    1458.7      17.0    5104.1     887.2    757.30
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      7.50      1.01      4.48      1.04      .120      .050      .120      .000    743.80       .00
   .010387        1.        1.        1.         2         0         0   -208.35    569.30    569.30


*SECNO 98981.000
3280 CROSS SECTION  98981.00 EXTENDED       .72 FEET


3370 NORMAL BRIDGE, NRD=  13 MIN ELTRD=   758.00 MAX ELLC=   758.30

                UPSTREAM FACE OF FOOT BRIDGE AT DAM   SECTION FROM EXISTING STUDY
 98981.000     15.72    759.52       .00       .00    759.85       .33       .21       .01    758.40
    6590.0      58.6    6521.1      10.3      47.7    1405.0      13.2    5104.8     887.4    757.30
      7.50      1.23      4.64       .78      .120      .050      .120      .000    743.80       .00
   .011257       19.       19.       19.         2         0         0   -209.95    564.33    564.33


*SECNO 98982.000
3280 CROSS SECTION  98982.00 EXTENDED       .82 FEET

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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.59

 98982.000     15.82    759.62       .00       .00    759.86       .24       .01       .01    758.40
    6590.0      43.9    6499.3      46.8      53.1    1629.9      51.4    5104.8     887.4    757.30
      7.50       .83      3.99       .91      .120      .050      .120      .000    743.80       .00
   .004437        1.        1.        1.         2         0         0       .00    566.30    566.30


*SECNO 99150.000
3280 CROSS SECTION  99150.00 EXTENDED      4.63 FEET


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  3.24


3470 ENCROACHMENT STATIONS=         .1     450.0  TYPE=      1  TARGET=      449.900
                VALLEY SECTION AD  SECTION FROM EXISTING STUDY
                RIGHT ENCROACHMENT CHANGED DUE TO BRIDGE GOING WEIR FLOW
                RIGHT OVERBANK REACH LENGTH CORRECTED
 99150.000     15.43    759.93       .00       .00    760.04       .11       .16       .01    750.40
    6590.0     197.5    3286.3    3106.2     112.5    1003.1    1751.9    5113.5     889.3    750.40
      7.52      1.76      3.28      1.77      .050      .050      .050      .000    744.50       .10
   .000423       50.       168.      170.         2         0         0       .00    449.90    450.00


CCHV=     .200 CEHV=     .400
*SECNO 99750.000
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3280 CROSS SECTION  99750.00 EXTENDED      4.57 FEET

3470 ENCROACHMENT STATIONS=      105.0     740.0  TYPE=      1  TARGET=      635.000
                VALLEY SECTION AE  SECTION FROM EXISTING STUDY
 99750.000      15.67    760.17       .00       .00    760.24       .07       .19       .01    750.40
    6590.0      756.9    3583.2    2249.9     499.8    1341.0    1923.7    5150.1     894.9    750.40
      7.59       1.51      2.67      1.17      .050      .055      .065      .000    744.50    105.00
   .000331       630.      600.      380.         2         0         0       .00    635.00    740.00

CCHV=     .200 CEHV=     .400
*SECNO 100735.000
3280 CROSS SECTION 100735.00 EXTENDED      4.23 FEET

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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST

3470 ENCROACHMENT STATIONS=      140.0     363.0  TYPE=      1  TARGET=      223.000
                VALLEY SECTION AF  SECTION FROM EXISTING STUDY
100735.000      14.63    760.43       .00       .00    760.74       .31       .41       .10    750.80
    6590.0      232.6    5894.4     463.0     224.7    1245.3     328.9    5207.1     903.3    750.80
      7.65       1.04      4.73      1.41      .080      .040      .080      .000    745.80    140.00
   .000592       850.      985.      800.         2         0         0       .00    223.00    363.00

CCHV=     .300 CEHV=     .500
*SECNO 100935.000

3265 DIVIDED FLOW

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .56

100935.000      13.69    760.49       .00       .00    761.07       .57       .19       .13    772.00
    6590.0         .0    6590.0        .0        .0    1083.1        .0    5213.7     904.1    772.00
      7.66        .00      6.08       .00      .000      .040      .000      .000    746.80    102.00
   .001866       200.      200.      200.         2         0         0       .00    121.00    228.00

*SECNO 100945.000

3265 DIVIDED FLOW

3370 NORMAL BRIDGE, NRD=   0 MIN ELTRD=   772.00 MAX ELLC=   767.10
                DOWNSTREAM FACE HIGH STREET    SECTION FROM EXISTING STUDY
100945.000      13.71    760.51       .00       .00    761.09       .57       .02       .00    772.00
    6590.0         .0    6590.0        .0        .0    1084.6        .0    5214.0     904.1    772.00
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 97122.000     15.63    758.33       .00    758.28    758.86       .53      1.48       .00    759.10
    6590.0        .0    6590.0        .0        .0    1133.0        .0    4653.8     724.6 100000.00
      6.94       .00      5.82       .00      .000      .040      .000      .000    742.70    120.00
   .001007       44.       44.       44.         2         0         2       .00     75.00    195.00


*SECNO 97132.000

3470 ENCROACHMENT STATIONS=      100.0     195.0  TYPE=      1  TARGET=       95.000
 97132.000     15.65    758.35       .00    758.30    758.87       .52       .01       .00    759.10
    6590.0        .0    6590.0        .0        .0    1133.8        .0    4654.0     724.6 100000.00
      6.94       .00      5.81       .00      .000      .040      .000      .000    742.70    120.00
   .001004       10.       10.       10.         0         0         0       .00     75.00    195.00


*SECNO 97213.000
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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


3280 CROSS SECTION  97213.00 EXTENDED      8.38 FEET


3470 ENCROACHMENT STATIONS=       35.0     180.0  TYPE=      1  TARGET=      145.000
                VALLEY SECTION AA  SECTION FROM EXISTING STUDY
                RIGHT ENCROACHMENT CHANGED FROM STA. 130 TO 180 BASED ON 2-FT MAP
 97213.000     19.78    758.58       .00    758.53    758.99       .41       .06       .06    744.20
    6590.0      238.4    5526.8     824.8     173.2     994.2     621.6    4656.8     724.8    744.20
      6.95       1.38      5.56      1.33      .100      .040      .100      .000    738.80     35.00
   .000533        81.       81.       81.         2         0         0       .00    145.00    180.00


*SECNO 97900.000
3280 CROSS SECTION  97900.00 EXTENDED      5.31 FEET


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.58


3470 ENCROACHMENT STATIONS=       10.0     625.0  TYPE=      1  TARGET=      615.000
                VALLEY SECTION AB  SECTION FROM EXISTING STUDY
 97900.000     18.31    759.31       .00    759.27    759.36       .04       .19       .18    810.00
    6590.0        .0    2599.8    3990.2        .0    1072.2    4984.7    4700.2     728.8    747.70
      7.06       .00      2.42       .80      .000      .050      .120      .000    741.00     10.81
   .000214       720.      687.      400.         2         0         0       .00    614.19    625.00


CCHV=     .100 CEHV=     .300
*SECNO 98400.000
3280 CROSS SECTION  98400.00 EXTENDED      3.40 FEET
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3470 ENCROACHMENT STATIONS=        15.0      510.0  TYPE=       1  TARGET=       495.000
                VALLEY SECTION AC  SECTION FROM EXISTING STUDY
 98400.000      17.10     759.40       .00     759.36     759.47       .06       .10       .01     749.00
    6590.0     2403.3     3241.6     945.1     2809.1     1179.9     1148.2    4757.1     734.4     749.40
      7.13        .86       2.75       .82       .120       .050      .120      .000    742.30     15.00
   .000238       490.       500.      400.          2          0         0       .00    495.00    510.00


*SECNO 98575.000
3280 CROSS SECTION  98575.00 EXTENDED      1.15 FEET

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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.70


3470 ENCROACHMENT STATIONS=       105.0      576.0  TYPE=       1  TARGET=       471.000
 98575.000      20.66     759.46       .00     759.41     759.49       .03       .02       .00     744.90
    6590.0     1028.6     5515.3      46.1     2105.0     3430.3     124.6    4778.7     736.3     745.10
      7.16        .49       1.61       .37       .120       .050      .120      .000    738.80     105.00
   .000083       170.       175.      190.          1          0         0       .00    471.00    576.00


*SECNO 98961.000
3280 CROSS SECTION  98961.00 EXTENDED       .61 FEET


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .14


3470 ENCROACHMENT STATIONS=        52.0      522.0  TYPE=       5  TARGET=          .011
                RIGHT OVERBANK REACH LENGTH CORRECTED
 98961.000      15.61     759.41       .00     759.37     759.65       .24       .10       .06     758.40
    6590.0        .0     6590.0        .0         .0     1676.9        .0    4812.0     740.6     757.30
      7.19        .00       3.93       .00       .000       .050      .000      .000    743.80      52.00
   .004419       420.       386.      345.          3          0         3       .00    470.00    522.00


*SECNO 98962.000
 2800 NAT Q1=     646.62  WSEL=     759.33  ENC Q1=     641.12  WSEL=     759.33  RATIO=    .0085
 NAT Q1=     647.  RATIOS LOB,CH,ROB=    .0058    .9915    .0027  WSEL=     759.33
3280 CROSS SECTION  98962.00 EXTENDED       .57 FEET


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .66


3370 NORMAL BRIDGE, NRD=  13 MIN ELTRD=   758.00 MAX ELLC=   758.30
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3470 ENCROACHMENT STATIONS=        52.0      522.0  TYPE=       5  TARGET=          .008
               DOWNSTREAM FACE OF FOOT BRIDGE AT DAM,SECTION FROM EXISTING STUDY
 98962.000     15.57     759.37       .00     759.33     759.68       .31        .01        .02     758.40
    6590.0        .0     6590.0        .0         .0     1480.1        .0     4812.0      740.6     757.30
      7.19       .00       4.45       .00       .000       .050      .000       .000     743.80      52.00
   .010095        1.         1.        1.          2          0         0    -177.45     470.00     522.00
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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST

*SECNO 98981.000
3280 CROSS SECTION  98981.00 EXTENDED       .77 FEET

3370 NORMAL BRIDGE, NRD=  13 MIN ELTRD=   758.00 MAX ELLC=   758.30

3470 ENCROACHMENT STATIONS=        52.0      522.0  TYPE=       5  TARGET=          .010
               UPSTREAM FACE OF FOOT BRIDGE AT DAM   SECTION FROM EXISTING STUDY
 98981.000     15.76     759.56       .00     759.52     759.89       .33        .20        .01     758.40
    6590.0        .0     6590.0        .0         .0     1428.0        .0     4812.7      740.8     757.30
      7.19       .00       4.61       .00       .000       .050      .000       .000     743.80      52.00
   .010932       19.        19.       19.          1          0         3    -176.28     470.00     522.00

*SECNO 98982.000
 2800 NAT Q1=    989.15  WSEL=    759.62  ENC Q1=    975.54  WSEL=    759.62  RATIO=   .0138
 NAT Q1=    989.  RATIOS LOB,CH,ROB=   .0067   .9862   .0071  WSEL=    759.62
3280 CROSS SECTION  98982.00 EXTENDED       .85 FEET

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.57

3470 ENCROACHMENT STATIONS=        52.0      522.0  TYPE=       5  TARGET=          .014
 98982.000     15.85     759.65       .00     759.62     759.90       .25        .01        .01     758.40
    6590.0        .0     6590.0        .0         .0     1645.0        .0     4812.7      740.8     757.30
      7.19       .00       4.01       .00       .000       .050      .000       .000     743.80      52.00
   .004461        1.         1.        1.          2          0         0        .00     470.00     522.00

*SECNO 99150.000
3280 CROSS SECTION  99150.00 EXTENDED      4.67 FEET

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  3.00

3470 ENCROACHMENT STATIONS=         .1      390.0  TYPE=       1  TARGET=      389.900
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                VALLEY SECTION AD  SECTION FROM EXISTING STUDY
                RIGHT ENCROACHMENT CHANGED DUE TO BRIDGE GOING WEIR FLOW
                RIGHT OVERBANK REACH LENGTH CORRECTED
 99150.000      15.47    759.97       .00    759.93    760.10       .13       .19       .01    750.40
    6590.0      215.4    3568.0    2806.6     113.2    1005.7    1461.8    4820.7     742.4    750.40
      7.21       1.90      3.55      1.92      .050      .050      .050      .000    744.50       .10
   .000495        50.      168.      170.         2         0         0       .00    389.90    390.00


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   13AUG96      09:14:31                                                                          PAGE  209


    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


CCHV=     .200 CEHV=     .400
*SECNO 99750.000
3280 CROSS SECTION  99750.00 EXTENDED      4.64 FEET


3470 ENCROACHMENT STATIONS=      105.0     740.0  TYPE=      1  TARGET=      635.000
                VALLEY SECTION AE  SECTION FROM EXISTING STUDY
 99750.000      15.74    760.24       .00    760.17    760.31       .07       .20       .01    750.40
    6590.0      762.5    3556.5    2271.0     507.4    1348.9    1956.2    4856.4     747.7    750.40
      7.28       1.50      2.64      1.16      .050      .055      .065      .000    744.50    105.00
   .000319        630.      600.      380.         2         0         0       .00    635.00    740.00


CCHV=     .200 CEHV=     .400
*SECNO 100735.000
3280 CROSS SECTION 100735.00 EXTENDED      4.29 FEET


3470 ENCROACHMENT STATIONS=      140.0     363.0  TYPE=      1  TARGET=      223.000
                VALLEY SECTION AF  SECTION FROM EXISTING STUDY
100735.000      14.69    760.49       .00    760.43    760.80       .31       .39       .10    750.80
    6590.0      236.8    5886.4     466.8     228.7    1252.1     332.9    4914.0     756.1    750.80
      7.34       1.04      4.70      1.40      .080      .040      .080      .000    745.80    140.00
   .000580        850.      985.      800.         2         0         0       .00    223.00    363.00


CCHV=     .300 CEHV=     .500
*SECNO 100935.000

3265 DIVIDED FLOW


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .56


3470 ENCROACHMENT STATIONS=      102.0     228.0  TYPE=      5  TARGET=          .000
100935.000      13.76    760.56       .00    760.49    761.12       .57       .19       .13    822.00
    6590.0         .0    6590.0        .0        .0    1090.9        .0    4920.6     756.9 100000.00
      7.35        .00      6.04       .00      .000      .040      .000      .000    746.80    102.00
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   .001827      200.      200.      200.         2         0         3       .00    121.00    228.00

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   13AUG96      09:14:31                                                                                  PAGE  210

    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST

 *SECNO 100945.000

 3265 DIVIDED FLOW

 3370 NORMAL BRIDGE, NRD=   0 MIN ELTRD=   772.00 MAX ELLC=   767.10

 3470 ENCROACHMENT STATIONS=      102.0     228.0  TYPE=      5  TARGET=         .000
                DOWNSTREAM FACE HIGH STREET    SECTION FROM EXISTING STUDY
 100945.000     13.78    760.58       .00    760.51    761.14       .56       .02       .00    822.00
     6590.0        .0    6590.0        .0        .0    1093.1        .0    4920.9     757.0 100000.00
       7.35       .00      6.03       .00      .000      .040      .000      .000    746.80    102.00
   .001816       10.       10.       10.         0         0         3       .00    121.00    228.00

 *SECNO 101000.000

 3265 DIVIDED FLOW

 3370 NORMAL BRIDGE, NRD=   0 MIN ELTRD=   772.00 MAX ELLC=   767.10

 3470 ENCROACHMENT STATIONS=      102.0     228.0  TYPE=      5  TARGET=         .000
                UPSTREAM FACE HIGH STREET      SECTION FROM EXISTING STUDY
 101000.000     13.89    760.69       .00    760.63    761.24       .55       .10       .00    822.00
     6590.0        .0    6590.0        .0        .0    1106.3        .0    4922.3     757.1 100000.00
       7.35       .00      5.96       .00      .000      .040      .000      .000    746.80    102.00
   .001751       55.       55.       55.         1         0         3       .00    121.00    228.00

 *SECNO 101010.000

 3265 DIVIDED FLOW

 3470 ENCROACHMENT STATIONS=      102.0     228.0  TYPE=      5  TARGET=         .000
 101010.000     13.91    760.71       .00    760.65    761.26       .55       .02       .00    822.00
     6590.0        .0    6590.0        .0        .0    1109.5        .0    4922.5     757.1 100000.00
       7.35       .00      5.94       .00      .000      .040      .000      .000    746.80    102.00
   .001736       10.       10.       10.         0         0         3       .00    121.00    228.00

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HEC-2 WATER SURFACE PROFILES

Version 4.6.2; May 1991
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NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

100-YEAR DISCHARGE

SUMMARY PRINTOUT TABLE 110

SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STENCR
.000	685.36	.00	685.96	478.37	1785.71	4909.18	105.11	.00	.00	750.00	810.00	.00
.000	685.46	.10	686.08	299.00	1682.80	5006.45	110.76	299.00	525.00	750.00	810.00	824.00
600.000	686.14	.00	686.67	498.17	1922.38	4767.54	110.08	.00	.00	750.00	810.00	.00
600.000	686.24	.10	686.81	299.00	1784.99	4898.53	116.49	299.00	525.00	750.00	810.00	824.00
3.010	690.79	.00	691.39	218.15	753.87	5950.19	95.94	.00	.00	262.00	353.00	.00
3.010	690.90	.11	691.48	214.65	778.36	5924.53	97.10	240.00	125.00	262.00	353.00	365.00
8854.000	695.28	.00	695.71	388.27	666.28	5850.02	283.70	.00	.00	275.00	397.00	.00
8854.000	695.36	.08	695.85	265.00	471.39	6149.31	179.30	265.00	205.00	275.00	397.00	470.00
9154.000	695.62	.00	696.18	250.00	374.75	6283.98	141.27	250.00	215.00	275.00	397.00	465.00
9154.000	695.71	.09	696.25	250.00	383.56	6266.48	149.96	250.00	215.00	275.00	397.00	465.00
9354.000	695.90	.00	696.49	149.20	.00	6800.00	.00	149.20	70.90	70.93	220.10	220.10
9354.000	695.98	.08	696.56	149.20	.00	6800.00	.00	149.20	70.90	70.93	220.10	220.10
9355.000	695.90	.00	696.50	149.20	.00	6800.00	.00	149.20	70.90	70.93	220.10	220.10
9355.000	695.98	.08	696.57	149.20	.00	6800.00	.00	149.20	70.90	70.93	220.10	220.10
9400.000	695.99	.00	696.58	149.20	.00	6800.00	.00	149.20	70.90	70.93	220.10	220.10
9400.000	696.06	.08	696.64	149.20	.00	6800.00	.00	149.20	70.90	70.93	220.10	220.10
9401.000	696.02	.00	696.59	150.80	.55	6798.35	1.10	150.80	70.20	70.93	220.10	221.00
9401.000	696.09	.07	696.65	150.80	.56	6798.29	1.15	150.80	70.20	70.93	220.10	221.00
9576.000	696.53	.00	696.88	500.98	433.80	5663.33	702.87	.00	.00	275.00	397.00	.00
9576.000	696.52	-.01	696.92	374.40	452.52	5924.55	422.93	375.00	165.00	275.00	397.00	540.00
9.010	700.27	.00	700.68	383.13	66.28	5625.76	1107.96	.00	.00	262.00	365.00	.00
9.010	700.40	.13	700.81	327.00	67.80	5631.32	1100.88	327.00	239.00	262.00	365.00	566.00

*	95931.000	753.93	.00	755.20	77.00	.00	6590.00	.00	.00	.00	101.00	178.00	.00
*	95931.000	754.02	.09	755.27	77.00	.00	6590.00	.00	.00	.00	101.00	178.00	.00
	96015.000	754.25	.00	755.55	165.50	160.19	4913.87	1515.94	.00	.00	50.00	90.00	.00
	96015.000	754.32	.07	755.61	150.00	150.90	4919.85	1519.25	150.00	35.00	50.00	90.00	185.00
	96122.000	754.90	.00	755.90	186.47	322.34	5344.57	923.09	.00	.00	71.00	120.00	.00
	96122.000	754.98	.08	755.96	187.17	327.01	5329.01	933.98	.00	.00	71.00	120.00	.00
	96230.000	755.42	.00	756.15	216.23	527.30	5529.69	533.01	.00	.00	91.00	149.00	.00
	96230.000	755.48	.06	756.20	216.77	533.88	5516.64	539.47	.00	.00	91.00	149.00	.00
*	96445.000	756.04	.00	756.40	256.30	1094.29	5371.36	124.35	.00	.00	131.00	209.00	.00
*	96445.000	756.08	.04	756.45	220.00	1051.78	5445.80	92.43	220.00	15.00	131.00	209.00	235.00
	96650.000	756.33	.00	756.52	275.17	1578.30	4995.30	16.39	288.00	10.00	170.00	265.00	298.00
	96650.000	756.38	.05	756.57	271.44	1556.05	5017.00	16.95	272.00	14.00	170.00	265.00	286.00
	96850.000	756.43	.00	756.85	178.05	798.77	5522.47	268.75	205.00	35.00	144.00	214.00	240.00
	96850.000	756.48	.05	756.90	178.11	802.64	5517.81	269.55	.00	.00	144.00	214.00	.00
*	97050.000	756.62	.00	757.29	75.00	.00	6590.00	.00	.00	.00	120.00	195.00	.00
*	97050.000	756.67	.05	757.33	75.00	.00	6590.00	.00	.00	.00	120.00	195.00	.00
	97078.000	756.67	.00	757.33	75.00	.00	6590.00	.00	.00	.00	120.00	195.00	.00
	97078.000	756.72	.05	757.38	75.00	.00	6590.00	.00	.00	.00	120.00	195.00	.00
	97122.000	758.28	.00	758.81	75.00	.00	6590.00	.00	95.00	100.00	120.00	195.00	195.00
	97122.000	758.33	.05	758.86	75.00	.00	6590.00	.00	95.00	100.00	120.00	195.00	195.00
	97132.000	758.30	.00	758.82	75.00	.00	6590.00	.00	95.00	100.00	120.00	195.00	195.00
	97132.000	758.35	.05	758.87	75.00	.00	6590.00	.00	95.00	100.00	120.00	195.00	195.00
	97213.000	758.53	.00	758.94	145.00	238.26	5529.79	821.95	145.00	35.00	50.00	109.00	180.00
	97213.000	758.58	.05	758.99	145.00	238.41	5526.75	824.84	145.00	35.00	50.00	109.00	180.00
*	97900.000	759.27	.00	759.31	614.14	.00	2604.95	3985.05	615.00	10.00	10.00	84.00	625.00
*	97900.000	759.31	.04	759.36	614.19	.00	2599.82	3990.18	615.00	10.00	10.00	84.00	625.00
	98400.000	759.36	.00	759.42	525.00	2423.20	3170.46	996.34	.00	.00	308.00	386.00	.00
	98400.000	759.40	.04	759.47	495.00	2403.30	3241.61	945.09	495.00	15.00	308.00	386.00	510.00
*	98575.000	759.41	.00	759.45	481.00	1045.33	5493.43	51.23	481.00	100.00	330.00	563.00	581.00
*	98575.000	759.46	.04	759.49	471.00	1028.58	5515.30	46.12	471.00	105.00	330.00	563.00	576.00
*	98961.000	759.37	.00	759.61	570.31	27.68	6519.95	42.37	.00	.00	52.00	522.00	.00
*	98961.000	759.41	.04	759.65	470.00	.00	6590.00	.00	.01	52.00	52.00	522.00	522.00

	SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STENCR
*	98962.000	759.33	.00	759.64	569.30	38.32	6534.02	17.66	.00	.00	52.00	522.00	.00
*	98962.000	759.37	.05	759.68	470.00	.00	6590.00	.00	.01	52.00	52.00	522.00	522.00
	98981.000	759.52	.00	759.85	564.33	58.60	6521.06	10.34	.00	.00	52.00	522.00	.00

	98981.000	759.56	.04	759.89	470.00	.00	6590.00	.00	.01	52.00	52.00	522.00	522.00
*	98982.000	759.62	.00	759.86	566.30	43.90	6499.34	46.76	.00	.00	52.00	522.00	.00
*	98982.000	759.65	.03	759.90	470.00	.00	6590.00	.00	.01	52.00	52.00	522.00	522.00
*	99150.000	759.93	.00	760.04	449.90	197.51	3286.34	3106.15	449.90	.10	20.00	100.00	450.00
*	99150.000	759.97	.03	760.10	389.90	215.37	3568.01	2806.62	389.90	.10	20.00	100.00	390.00
	99750.000	760.17	.00	760.24	635.00	756.88	3583.21	2249.91	635.00	105.00	206.00	311.00	740.00
	99750.000	760.24	.08	760.31	635.00	762.52	3556.52	2270.96	635.00	105.00	206.00	311.00	740.00
	100735.000	760.43	.00	760.74	223.00	232.61	5894.38	463.01	223.00	140.00	200.00	303.00	363.00
	100735.000	760.49	.07	760.80	223.00	236.79	5886.39	466.82	223.00	140.00	200.00	303.00	363.00
*	100935.000	760.49	.00	761.07	121.00	.00	6590.00	.00	.00	.00	102.00	228.00	.00
*	100935.000	760.56	.06	761.12	121.00	.00	6590.00	.00	.00	102.00	102.00	228.00	228.00
	100945.000	760.51	.00	761.09	121.00	.00	6590.00	.00	.00	.00	102.00	228.00	.00
	100945.000	760.58	.06	761.14	121.00	.00	6590.00	.00	.00	102.00	102.00	228.00	228.00
	101000.000	760.63	.00	761.19	121.00	.00	6590.00	.00	.00	.00	102.00	228.00	.00
	101000.000	760.69	.06	761.24	121.00	.00	6590.00	.00	.00	102.00	102.00	228.00	228.00
	101010.000	760.65	.00	761.21	121.00	.00	6590.00	.00	.00	.00	102.00	228.00	.00
	101010.000	760.71	.06	761.26	121.00	.00	6590.00	.00	.00	102.00	102.00	228.00	228.00
*	101067.000	761.08	.00	761.35	184.37	52.91	6501.82	35.27	.00	.00	95.00	235.00	.00
*	101067.000	761.11	.03	761.39	135.00	.00	6590.00	.00	135.00	95.00	95.00	235.00	230.00
	101800.000	761.50	.00	761.62	699.71	1783.69	4805.38	.93	.00	.00	582.00	728.00	.00
*	101800.000	761.57	.07	761.69	648.00	1727.48	4862.52	.00	648.00	80.00	582.00	728.00	728.00
*	102350.000	761.60	.00	761.88	626.63	727.75	5504.45	357.79	.00	.00	349.00	469.00	.00
*	102350.000	761.67	.07	761.95	615.42	737.86	5486.55	365.59	.00	57.31	349.00	469.00	672.73
	102900.000	761.91	.00	762.30	340.00	153.34	5108.37	1328.29	340.00	60.00	116.00	209.00	400.00
	102900.000	761.97	.06	762.35	340.00	159.16	5094.57	1336.27	340.00	60.00	116.00	209.00	400.00
	104150.000	762.96	.00	763.15	681.24	3088.45	3501.55	.00	.00	.00	610.00	693.00	.00
	104150.000	763.00	.04	763.20	659.32	3057.07	3532.93	.00	671.00	22.00	610.00	693.00	693.00
	104800.000	763.28	.00	763.41	946.26	3507.89	3052.97	29.14	.00	.00	855.00	925.00	.00
	104800.000	763.32	.04	763.46	842.00	3434.82	3136.93	18.25	842.00	93.00	855.00	925.00	935.00
	105450.000	763.50	.00	763.59	1000.00	3118.46	2467.55	1003.99	1000.00	250.00	1100.00	1157.00	1250.00
	105450.000	763.56	.06	763.64	1000.00	3133.74	2453.33	1002.93	1000.00	250.00	1100.00	1157.00	1250.00

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SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STENCR
107.010	764.30	.00	764.43	880.00	2330.42	2748.31	1511.27	.00	.00	683.00	750.00	.00
107.010	764.35	.05	764.49	825.00	2383.00	2822.66	1384.34	825.00	60.00	683.00	750.00	885.00
110575.000	765.61	.00	765.84	683.60	1430.47	3490.06	1669.47	.00	.00	350.00	427.00	.00
110575.000	765.70	.09	765.95	580.00	1228.94	3598.46	1762.60	580.00	145.00	350.00	427.00	725.00

```
NOTE    SECNO= 271439.000  PROFILE=  1  WSEL BASED ON X5 CARD
WARNING SECNO= 271439.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 271439.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
```



```
NOTE    SECNO= 271444.000  PROFILE=  1  WSEL BASED ON X5 CARD

WARNING SECNO= 271659.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 271659.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 274443.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 274443.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 277640.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=    305.010  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=    305.010  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=    287.010  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=    287.010  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 295947.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 295947.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 295967.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 295967.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 296071.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 296071.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 296148.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 296148.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
```


Floodway width summary: 100-YEAR DISCHARGE
Profile No. 2

Section Number	Elevation Increase	Top Width	Left Encroach Station	Left Sta Distance From Center	Center Station	Right Sta Distance From Center	Right Encroach Station
.000	.10	299.00	525.00	255.00	780.00	44.00	824.00
600.000	.10	299.00	525.00	255.00	780.00	44.00	824.00
3.010	.11	240.00	125.00	182.50	307.50	57.50	365.00
8854.000	.08	265.00	205.00	131.00	336.00	134.00	470.00
9154.000	.09	250.00	215.00	121.00	336.00	129.00	465.00
9354.000	.08	149.20	70.90	74.61	145.51	74.59	220.10
9355.000	.08	149.20	70.90	74.61	145.51	74.59	220.10
9400.000	.08	149.20	70.90	74.61	145.51	74.59	220.10
9401.000	.07	150.80	70.20	75.31	145.51	75.49	221.00

96230.000	*** Encroachments not set ***						
96445.000	.04	220.00	15.00	155.00	170.00	65.00	235.00
96650.000	.05	272.00	14.00	203.50	217.50	68.50	286.00
96850.000	*** Encroachments not set ***						
97050.000	*** Encroachments not set ***						
97078.000	*** Encroachments not set ***						
97122.000	.05	95.00	100.00	57.50	157.50	37.50	195.00
97132.000	.05	95.00	100.00	57.50	157.50	37.50	195.00
97213.000	.05	145.00	35.00	44.50	79.50	100.50	180.00
97900.000	.04	615.00	10.00	37.00	47.00	578.00	625.00
98400.000	.04	495.00	15.00	332.00	347.00	163.00	510.00
98575.000	.04	471.00	105.00	341.50	446.50	129.50	576.00
98961.000	.04	470.00	52.00	235.00	287.00	235.00	522.00
98962.000	.05	470.00	52.00	235.00	287.00	235.00	522.00
98981.000	.04	470.00	52.00	235.00	287.00	235.00	522.00
98982.000	.03	470.00	52.00	235.00	287.00	235.00	522.00
99150.000	.03	389.90	.10	59.90	60.00	330.00	390.00
99750.000	.08	635.00	105.00	153.50	258.50	481.50	740.00
100735.000	.07	223.00	140.00	111.50	251.50	111.50	363.00
100935.000	.06	126.00	102.00	63.00	165.00	63.00	228.00
100945.000	.06	126.00	102.00	63.00	165.00	63.00	228.00
101000.000	.06	126.00	102.00	63.00	165.00	63.00	228.00
101010.000	.06	126.00	102.00	63.00	165.00	63.00	228.00
101067.000	.03	135.00	95.00	70.00	165.00	65.00	230.00
101800.000	.07	648.00	80.00	575.00	655.00	73.00	728.00
102350.000	.07	615.42	57.31	351.69	409.00	263.73	672.73
102900.000	.06	340.00	60.00	102.50	162.50	237.50	400.00
104150.000	.04	671.00	22.00	629.50	651.50	41.50	693.00
104800.000	.04	842.00	93.00	797.00	890.00	45.00	935.00
105450.000	.06	1000.00	250.00	878.50	1128.50	121.50	1250.00
107.010	.05	825.00	60.00	656.50	716.50	168.50	885.00
110575.000	.09	580.00	145.00	243.50	388.50	336.50	725.00
110775.000	.11	507.00	135.00	253.50	388.50	253.50	642.00
111300.000	.08	244.00	267.00	121.50	388.50	122.50	511.00
111500.000	.07	144.00	317.00	71.50	388.50	72.50	461.00
111521.000	.05	134.00	500.00	55.95	555.95	78.05	634.00
111530.000	.05	134.00	500.00	55.95	555.95	78.05	634.00
111562.000	.08	134.00	500.00	55.95	555.95	78.05	634.00

111571.000	.08	134.00	500.00	55.95	555.95	78.05	634.00
111800.000	.07	593.00	92.00	296.50	388.50	296.50	685.00
111900.000	.06	666.76	67.85	320.65	388.50	346.11	734.61
116500.000	.09	601.00	426.00	448.50	874.50	152.50	1027.00
135.010	.11	671.00	243.00	515.50	758.50	155.50	914.00
144.010	.11	633.00	218.00	483.00	701.00	150.00	851.00
135.020	.12	644.00	100.00	542.50	642.50	101.50	744.00
120100.000	.13	575.00	150.00	360.00	510.00	215.00	725.00
115.010	.06	459.00	.00	403.00	403.00	56.00	459.00
115.020	.05	376.00	400.00	330.50	730.50	45.50	776.00
129470.000	.10	400.00	535.00	358.50	893.50	41.50	935.00
129950.000	.11	339.00	600.00	293.50	893.50	45.50	939.00
130480.000	.09	75.10	99.90	37.60	137.50	37.50	175.00
130488.000	.09	75.10	99.90	37.60	137.50	37.50	175.00
130513.000	.11	75.10	99.90	37.60	137.50	37.50	175.00
130521.000	.11	75.10	99.90	37.60	137.50	37.50	175.00

271434.000	.01	52.20	1000.00	26.05	1026.05	26.15	1052.20
271439.000	.05	780.00	290.00	27.50	317.50	752.50	1070.00
271444.000	.05	800.00	280.00	37.50	317.50	762.50	1080.00
271659.000	.05	1352.00	288.00	29.50	317.50	1322.50	1640.00
274443.000	.14	460.00	887.00	30.50	917.50	429.50	1347.00
277640.000	.10	643.76	129.76	250.24	380.00	393.52	773.52
280940.000	.13	234.00	250.00	57.00	307.00	177.00	484.00
303.010	.10	250.00	275.00	62.00	337.00	188.00	525.00
286.010	.09	375.00	290.00	76.00	366.00	299.00	665.00
304.010	.08	645.00	181.00	215.00	396.00	430.00	826.00
285810.000	.09	569.00	137.00	288.00	425.00	281.00	706.00
305.010	.13	550.00	120.00	267.50	387.50	282.50	670.00
287.010	.11	306.00	130.00	220.50	350.50	85.50	436.00
354.010	.10	221.00	144.00	169.50	313.50	51.50	365.00
233.010	.11	190.00	130.00	146.00	276.00	44.00	320.00
288.010	*** Encroachments not set ***						
293340.000	*** Encroachments not set ***						
295627.000	*** Encroachments not set ***						
295947.000	.00	50.00	252.00	25.00	277.00	25.00	302.00
295967.000	.00	40.00	181.60	18.32	199.92	21.68	221.60
295968.000	.00	40.00	181.60	18.32	199.92	21.68	221.60
296055.000	.00	40.00	181.60	18.32	199.92	21.68	221.60
296056.000	.00	42.00	180.60	19.32	199.92	22.68	222.60
296071.000	.00	72.00	241.00	36.00	277.00	36.00	313.00
296148.000	.00	214.45	117.52	159.48	277.00	54.97	331.97
298190.000	.06	500.00	1000.00	268.00	1268.00	232.00	1500.00
298500.000	.08	500.00	1000.00	268.00	1268.00	232.00	1500.00

1

FLOODWAY DATA, 100-YEAR DISCHARGE
PROFILE NO. 2

STATION	FLOODWAY WIDTH	FLOODWAY SECTION AREA	FLOODWAY MEAN VELOCITY	WATER SURFACE ELEVATION WITH FLOODWAY	WITHOUT FLOODWAY	DIFFERENCE
.000	299.	1460.	4.7	685.5	685.4	.1
600.000	299.	1529.	4.4	686.2	686.1	.1
3.010	215.	1302.	5.2	690.9	690.8	.1
8854.000	265.	1441.	4.7	695.4	695.3	.1
9154.000	250.	1338.	5.1	695.7	695.6	.1
9354.000	149.	1118.	6.1	696.0	695.9	.1
9355.000	149.	1106.	6.1	696.0	695.9	.1
9400.000	149.	1117.	6.1	696.1	696.0	.1
9401.000	151.	1138.	6.0	696.1	696.0	.1
9576.000	374.	1798.	3.8	696.5	696.5	.0
9.010	327.	1683.	4.0	700.4	700.3	.1
18600.000	230.	1604.	4.2	704.3	704.2	.1
10.010	170.	1338.	5.1	707.5	707.4	.1
25825.000	183.	1360.	5.0	710.4	710.4	.0
25925.000	172.	1648.	4.1	710.8	710.8	.0
25926.000	172.	1575.	4.3	710.8	710.8	.0
25974.000	172.	1579.	4.3	710.8	710.8	.0

95200.000	410.	2468.	2.7	751.7	751.7	.0
95550.000	265.	1824.	3.6	752.1	752.0	.1
95600.000	275.	1176.	5.6	752.2	752.1	.1
95605.000	275.	1180.	5.6	752.3	752.2	.1
95865.000	94.	964.	6.8	753.1	753.0	.1
95905.000	79.	858.	7.7	753.1	753.0	.1
95909.000	75.	667.	9.9	753.2	753.1	.1
95910.000	75.	634.	10.4	753.2	753.1	.1
95930.000	76.	641.	10.3	753.5	753.4	.1
95931.000	77.	736.	9.0	754.0	753.9	.1
96015.000	150.	1076.	6.1	754.3	754.2	.1
96122.000	187.	1227.	5.4	755.0	754.9	.1
96230.000	217.	1415.	4.7	755.5	755.4	.1
96445.000	220.	1886.	3.5	756.0	756.0	.0
96650.000	271.	2632.	2.5	756.3	756.3	.0
96850.000	178.	1741.	3.8	756.4	756.4	.0
97050.000	75.	1008.	6.5	756.6	756.6	.0
97078.000	75.	1011.	6.5	756.7	756.7	.0
97122.000	75.	1133.	5.8	758.4	758.3	.1
97132.000	75.	1134.	5.8	758.3	758.3	.0
97213.000	145.	1789.	3.7	758.5	758.5	.0

1

13AUG96 09:14:31

FLOODWAY DATA, 100-YEAR DISCHARGE
PROFILE NO. 2

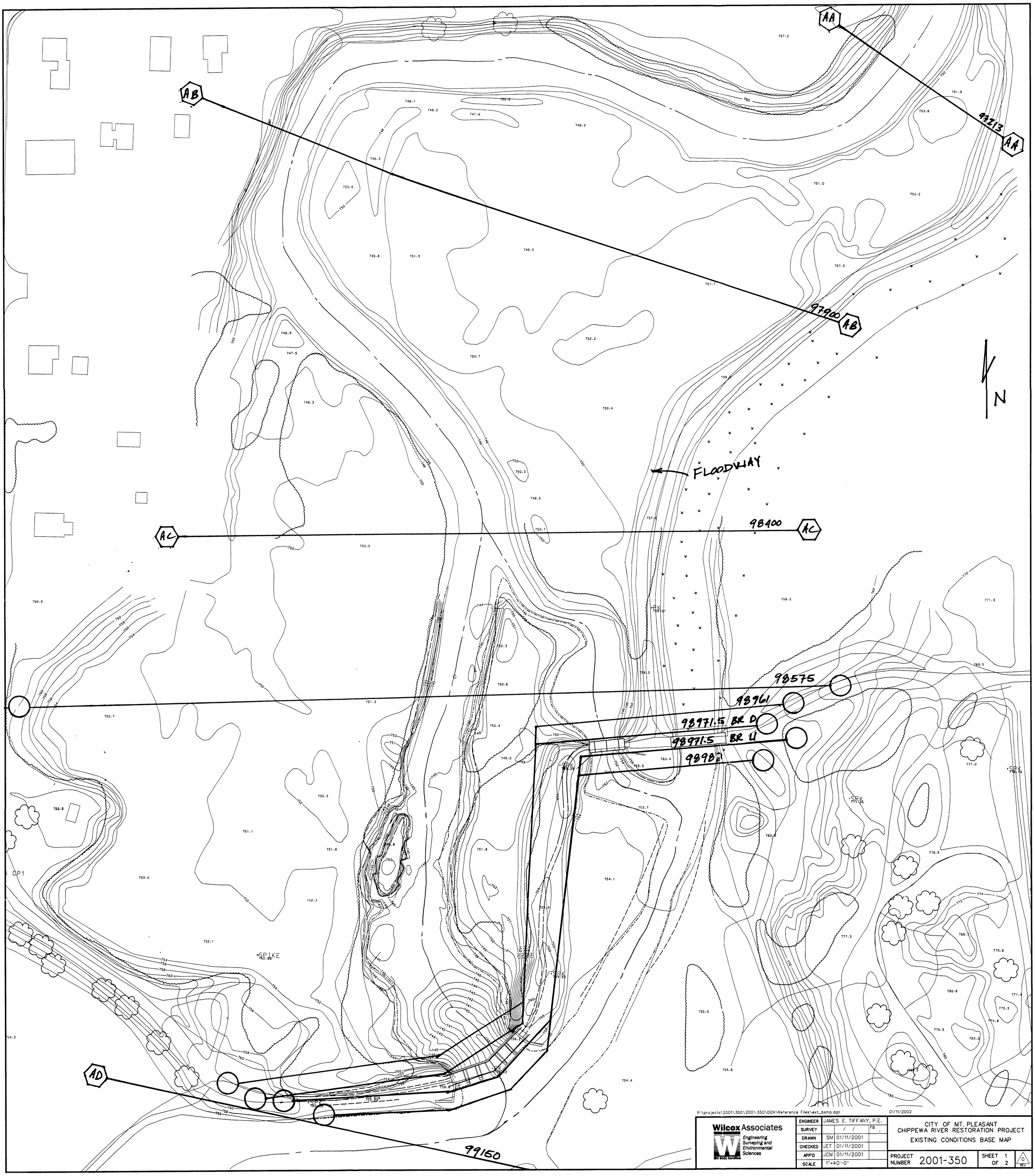
STATION	FLOODWAY WIDTH	FLOODWAY SECTION AREA	FLOODWAY MEAN VELOCITY	WATER SURFACE ELEVATION WITH FLOODWAY	WATER SURFACE ELEVATION WITHOUT FLOODWAY	DIFFERENCE
97900.000	614.	6057.	1.1	759.3	759.3	.0
98400.000	495.	5137.	1.3	759.4	759.4	.0
98575.000	471.	5660.	1.2	759.4	759.4	.0
98961.000	470.	1677.	3.9	759.4	759.4	.0
98962.000	470.	1480.	4.5	759.3	759.3	.0
98981.000	470.	1428.	4.6	759.5	759.5	.0
98982.000	470.	1645.	4.0	759.6	759.6	.0
99150.000	390.	2581.	2.6	759.9	759.9	.0
99750.000	635.	3813.	1.7	760.3	760.2	.1
100735.000	223.	1814.	3.6	760.5	760.4	.1
100935.000	126.	1091.	6.0	760.6	760.5	.1
100945.000	126.	1093.	6.0	760.6	760.5	.1
101000.000	126.	1106.	6.0	760.7	760.6	.1
101010.000	126.	1110.	5.9	760.8	760.7	.1
101067.000	135.	1528.	4.3	761.1	761.1	.0
101800.000	648.	4219.	1.6	761.6	761.5	.1
102350.000	615.	2789.	2.4	761.7	761.6	.1
102900.000	340.	2051.	3.2	762.0	761.9	.1
104150.000	659.	3792.	1.7	763.0	763.0	.0
104800.000	842.	4716.	1.4	763.3	763.3	.0
105450.000	1000.	5679.	1.2	763.6	763.5	.1
107.010	825.	4073.	1.6	764.3	764.3	.0
110575.000	580.	2853.	2.3	765.7	765.6	.1

E. Existing Conditions Model Supporting Information

Modeling Topographic Plan

Cross Sections

PF1 – 100 Yr.
PF2 – 500 Yr.
PF3 – Encroachment Run



P:\projects\2001\300\2001-350\DGN\Reference Files\ext_bsmp.dgn 01/11/2002

Wilcox Associates
Engineering Surveying and Environmental Sciences
ISO 9001 Certified

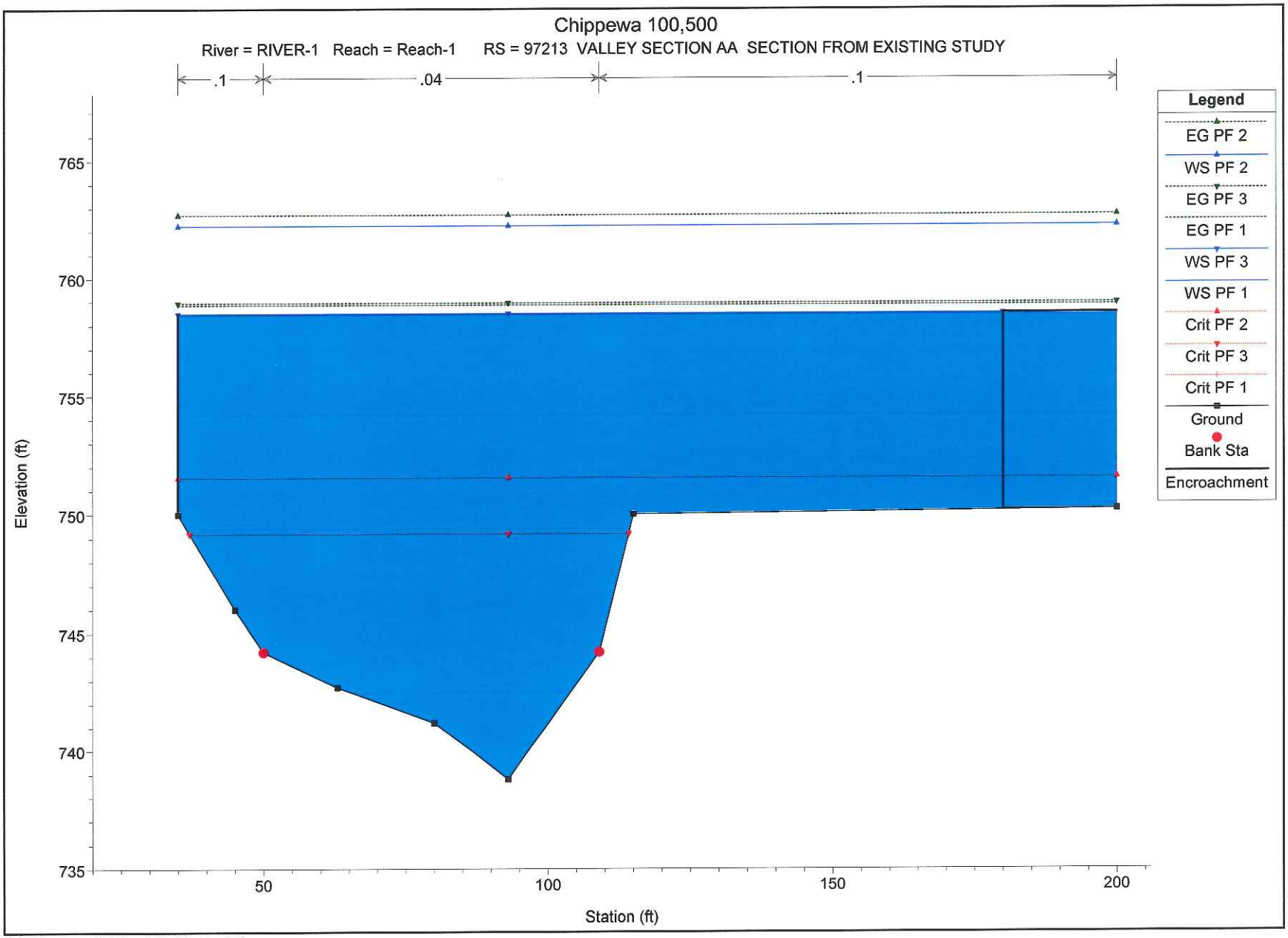
ENGINEER	JAMES E. TIFFANY, P.E.		
SURVEY	/ /	FB -	
DRAWN	SM	01/11/2001	
CHECKED	JET	01/11/2001	
APP'D	JCM	01/11/2001	
SCALE	1"=40'-0"		

CITY OF MT. PLEASANT
CHIPPEWA RIVER RESTORATION PROJECT
EXISTING CONDITIONS BASE MAP

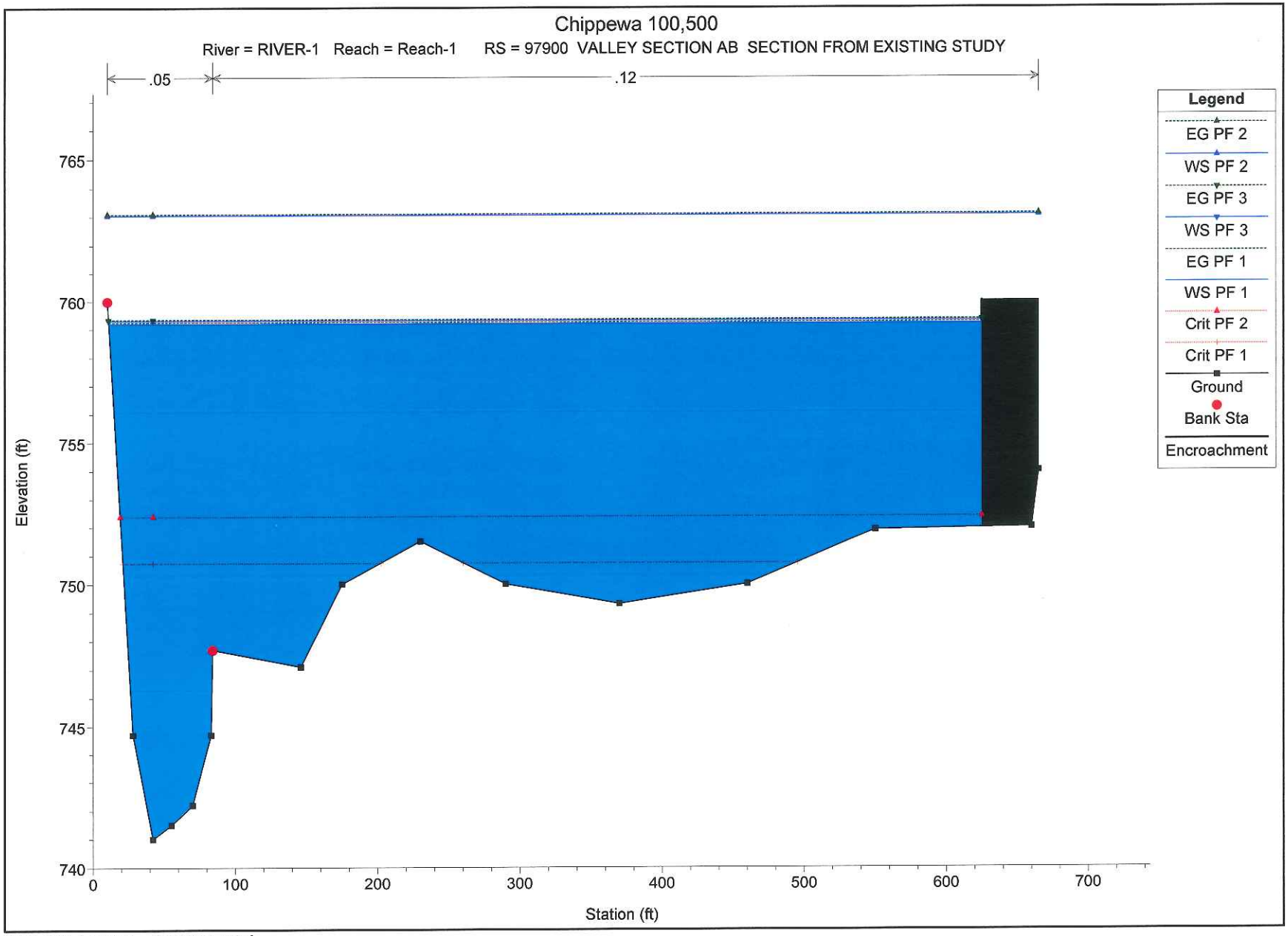
PROJECT NUMBER 2001-350

SHEET 1 OF 2

0 REV



1 in Horiz. = 25 ft 1 in Vert. = 6 ft



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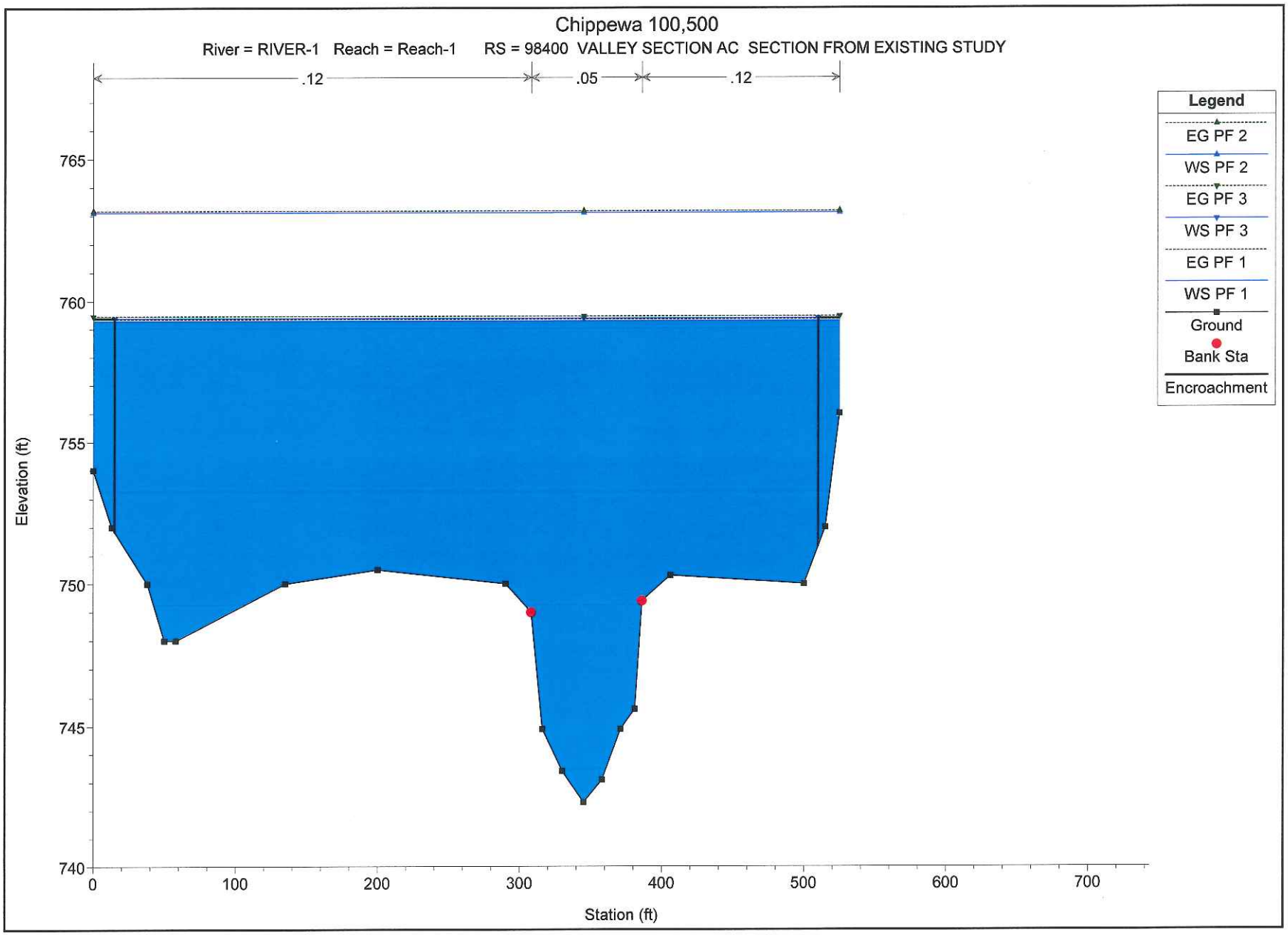
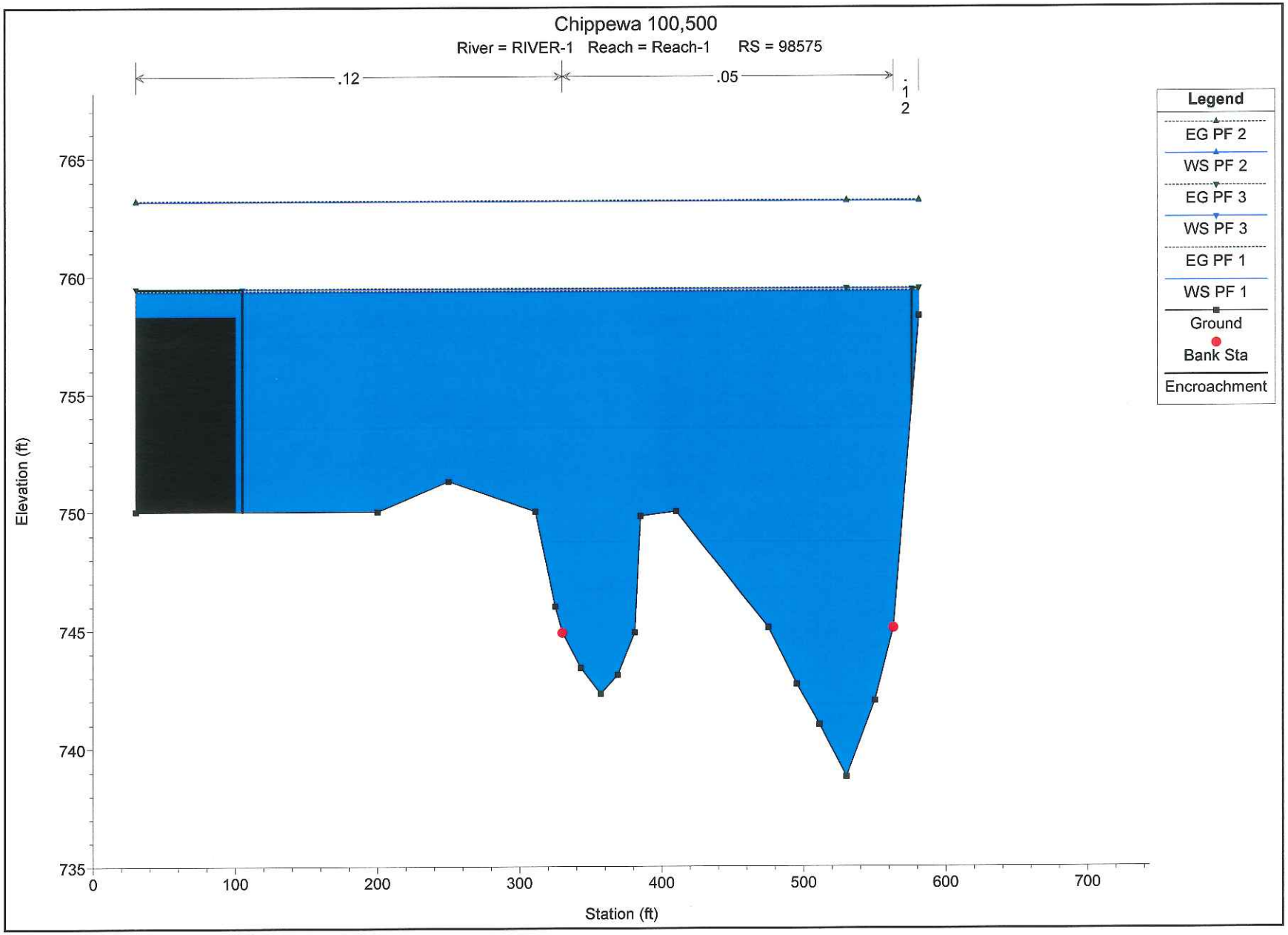
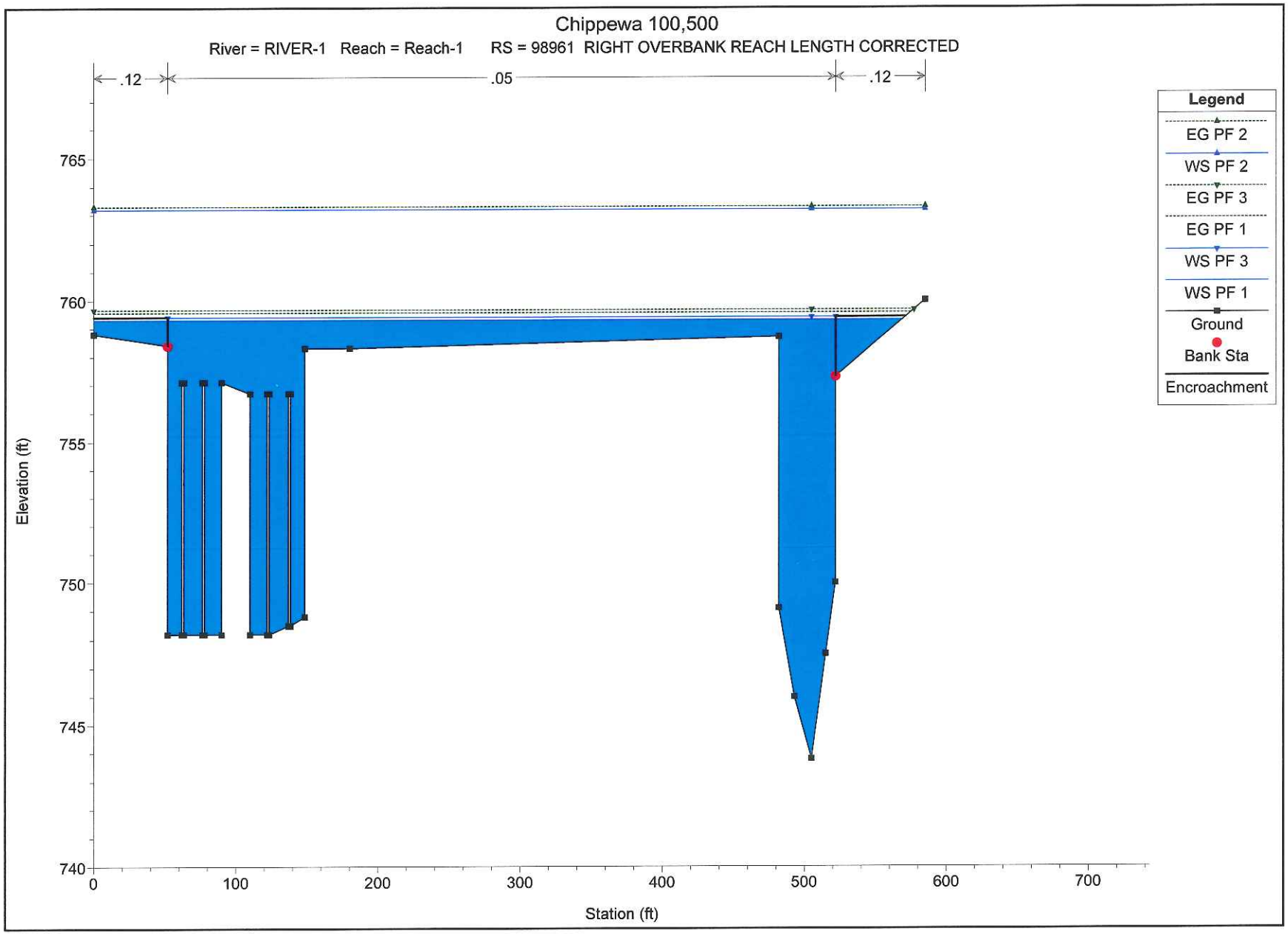


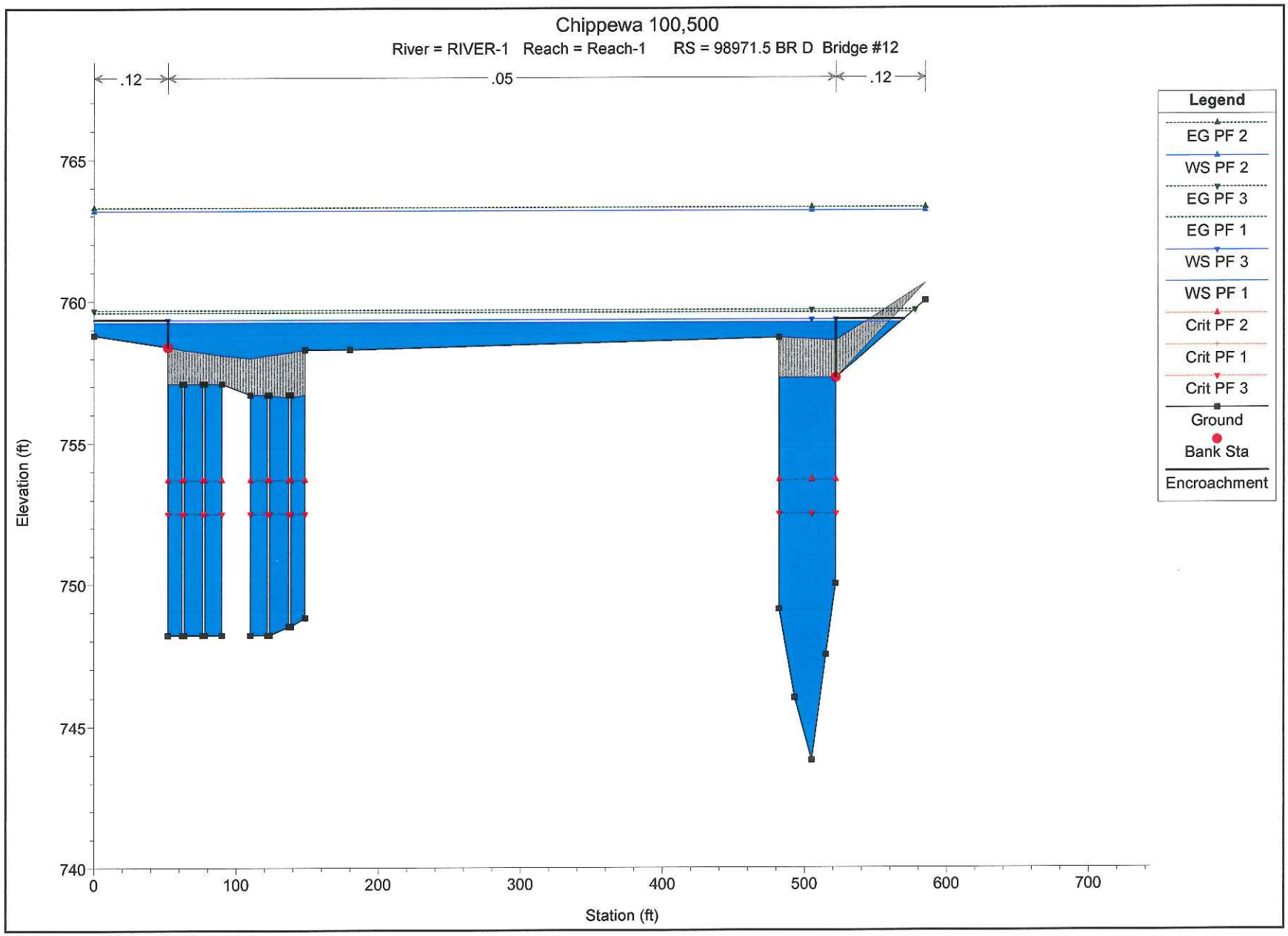
1 in Horiz. = 100 ft 1 in Vert. = 5 ft



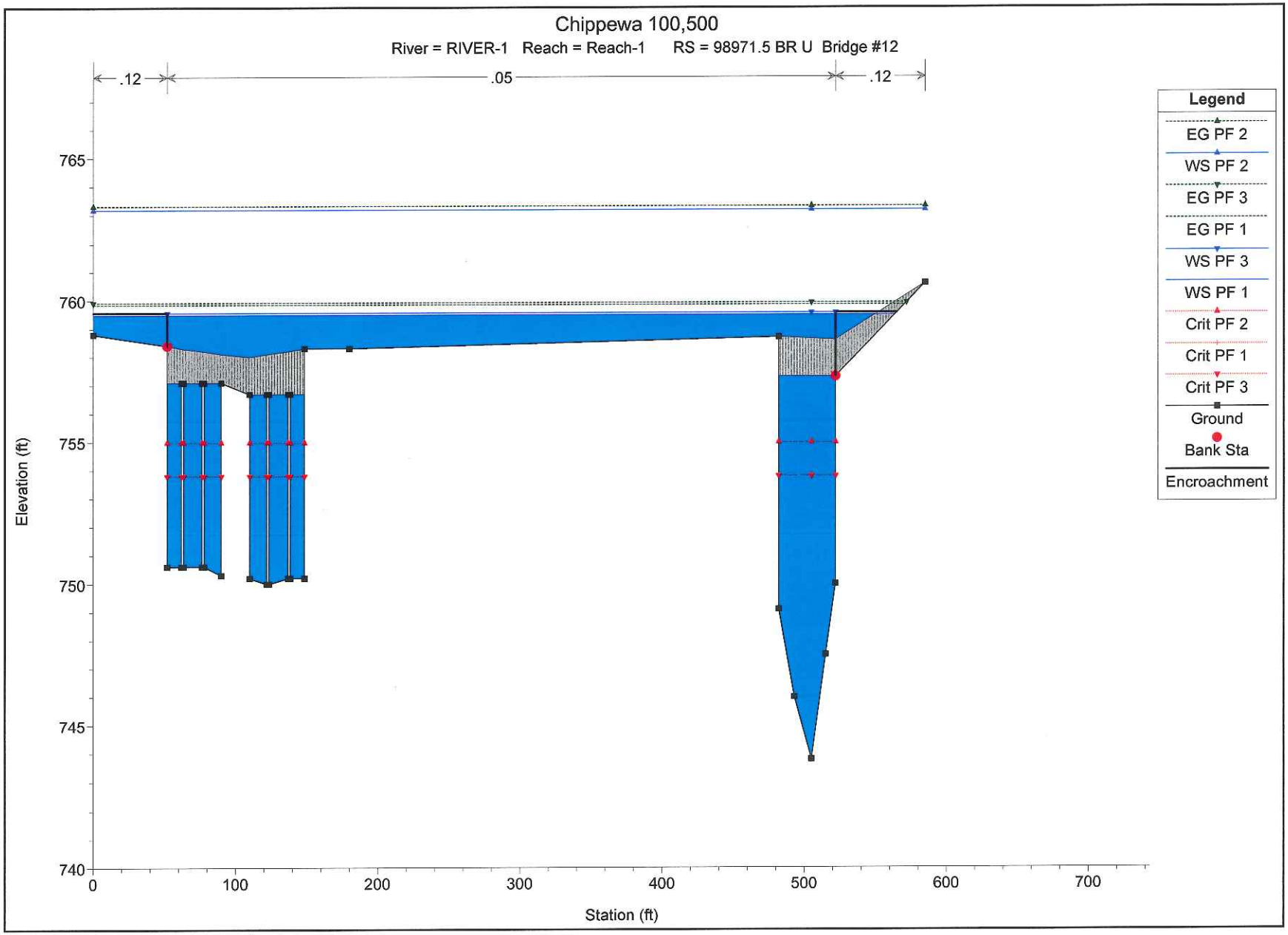
1 in Horiz. = 100 ft 1 in Vert. = 6 ft



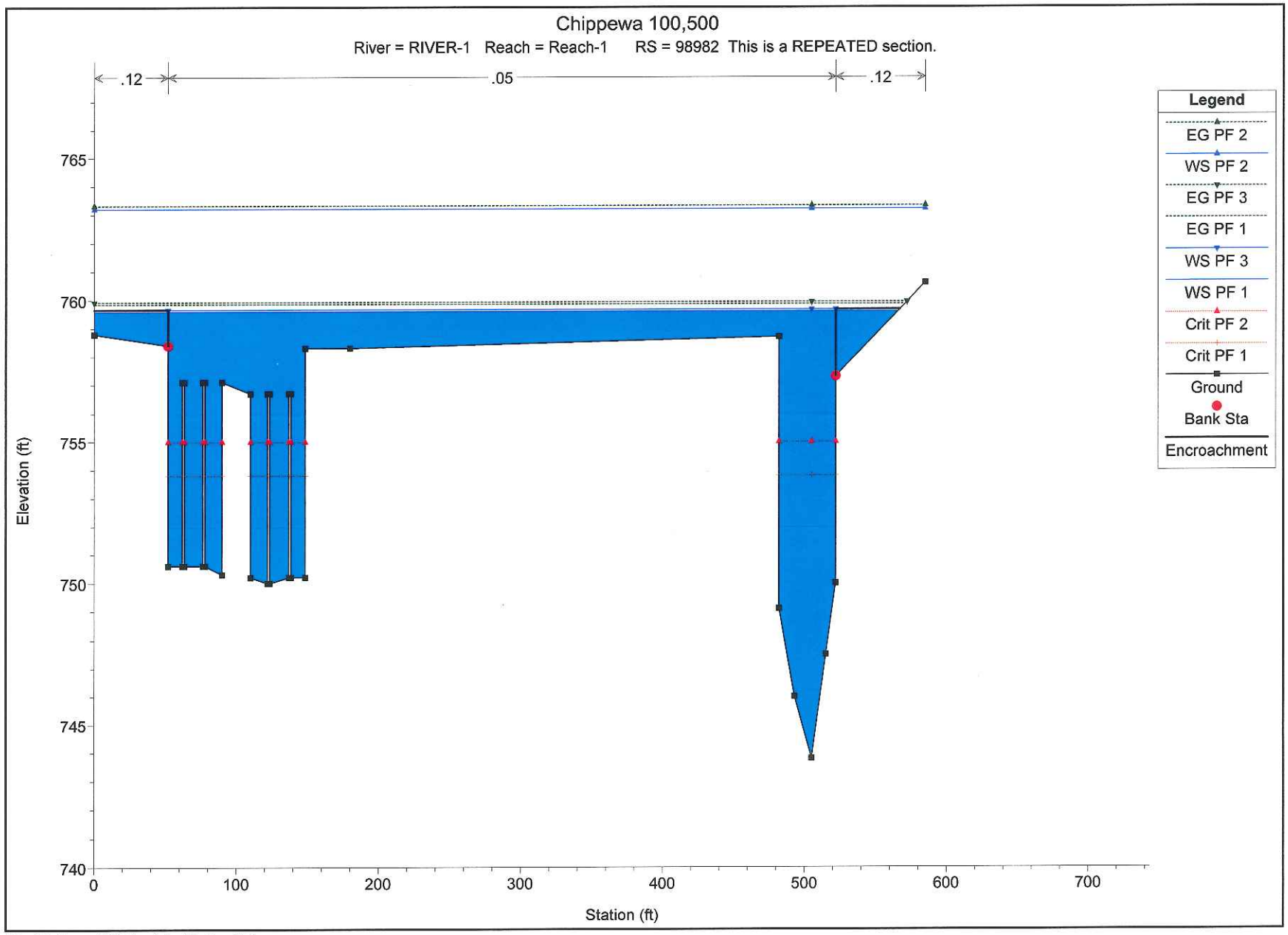
1 in Horiz. = 100 ft 1 in Vert. = 5 ft



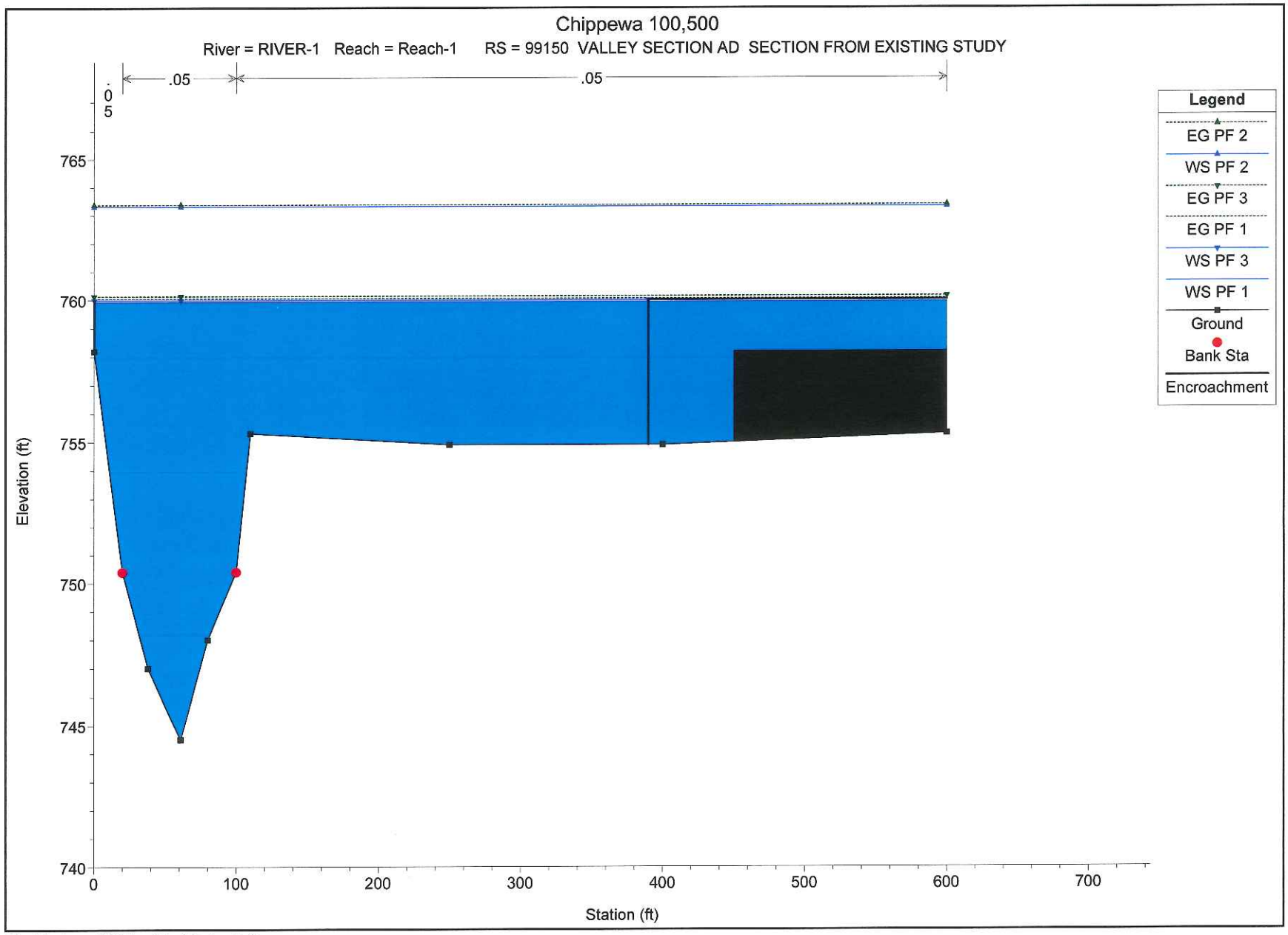
1 in Horiz. = 100 ft 1 in Vert. = 5 ft



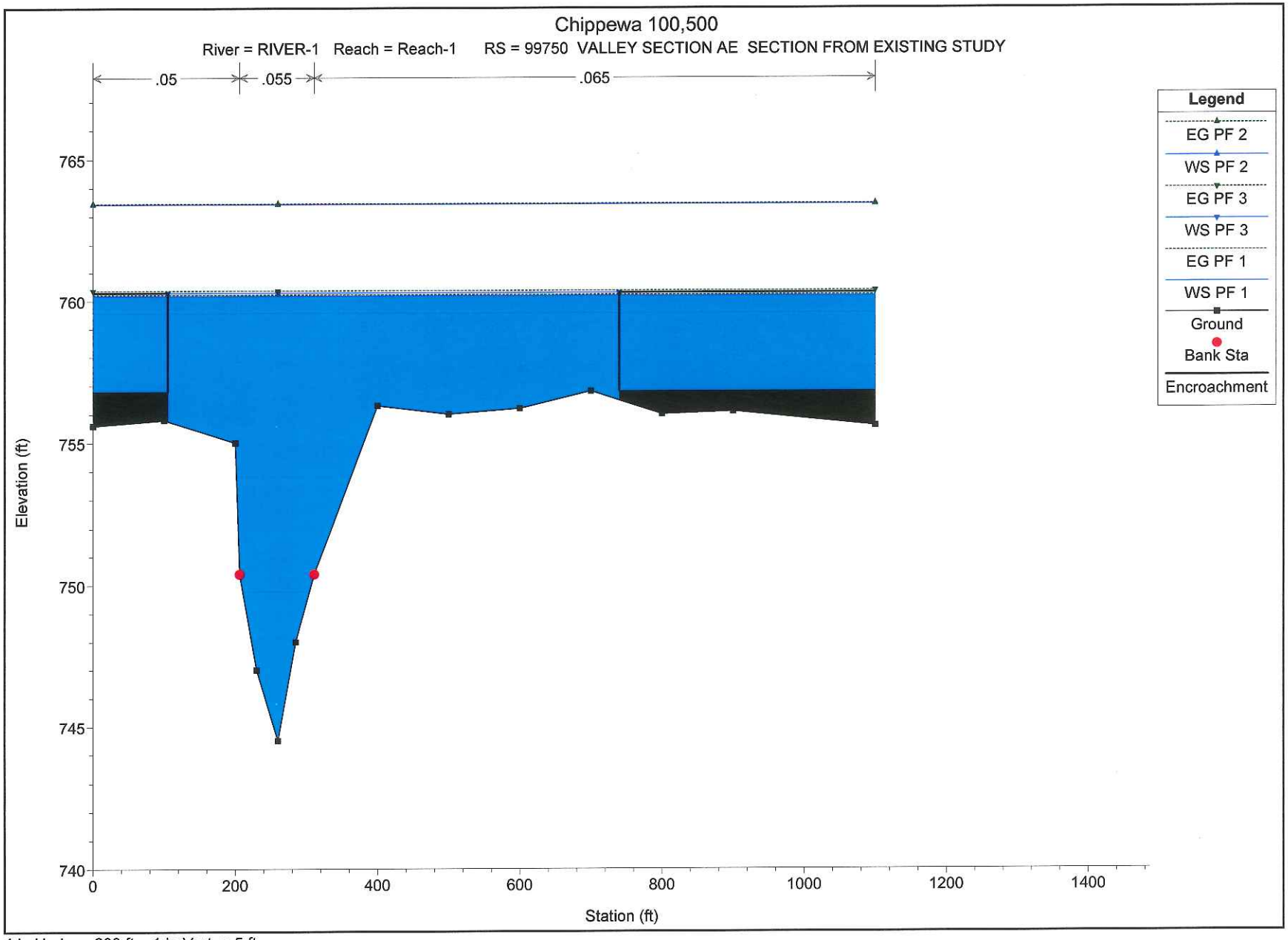
1 in Horiz. = 100 ft 1 in Vert. = 5 ft



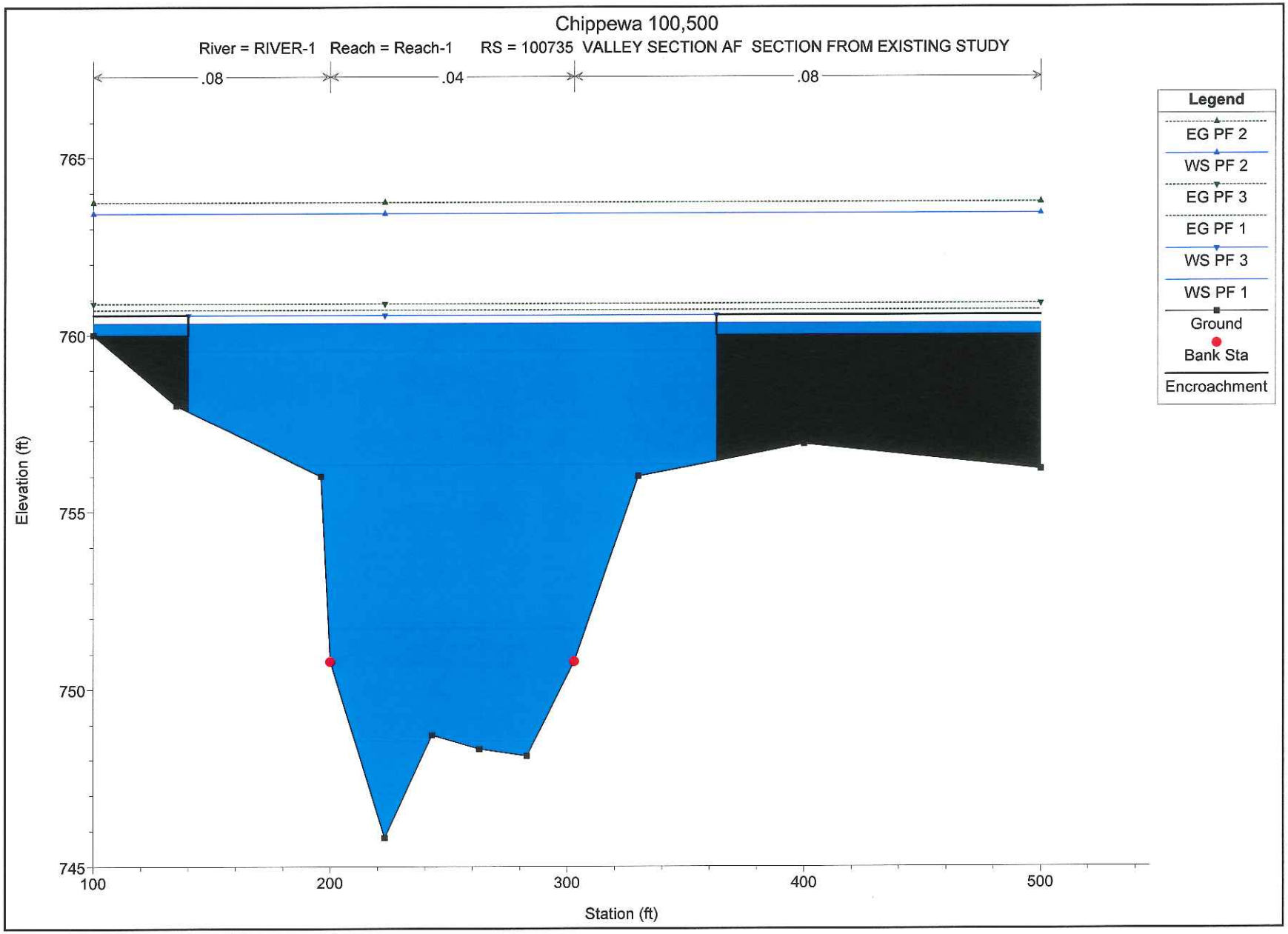
1 in Horiz. = 100 ft 1 in Vert. = 5 ft



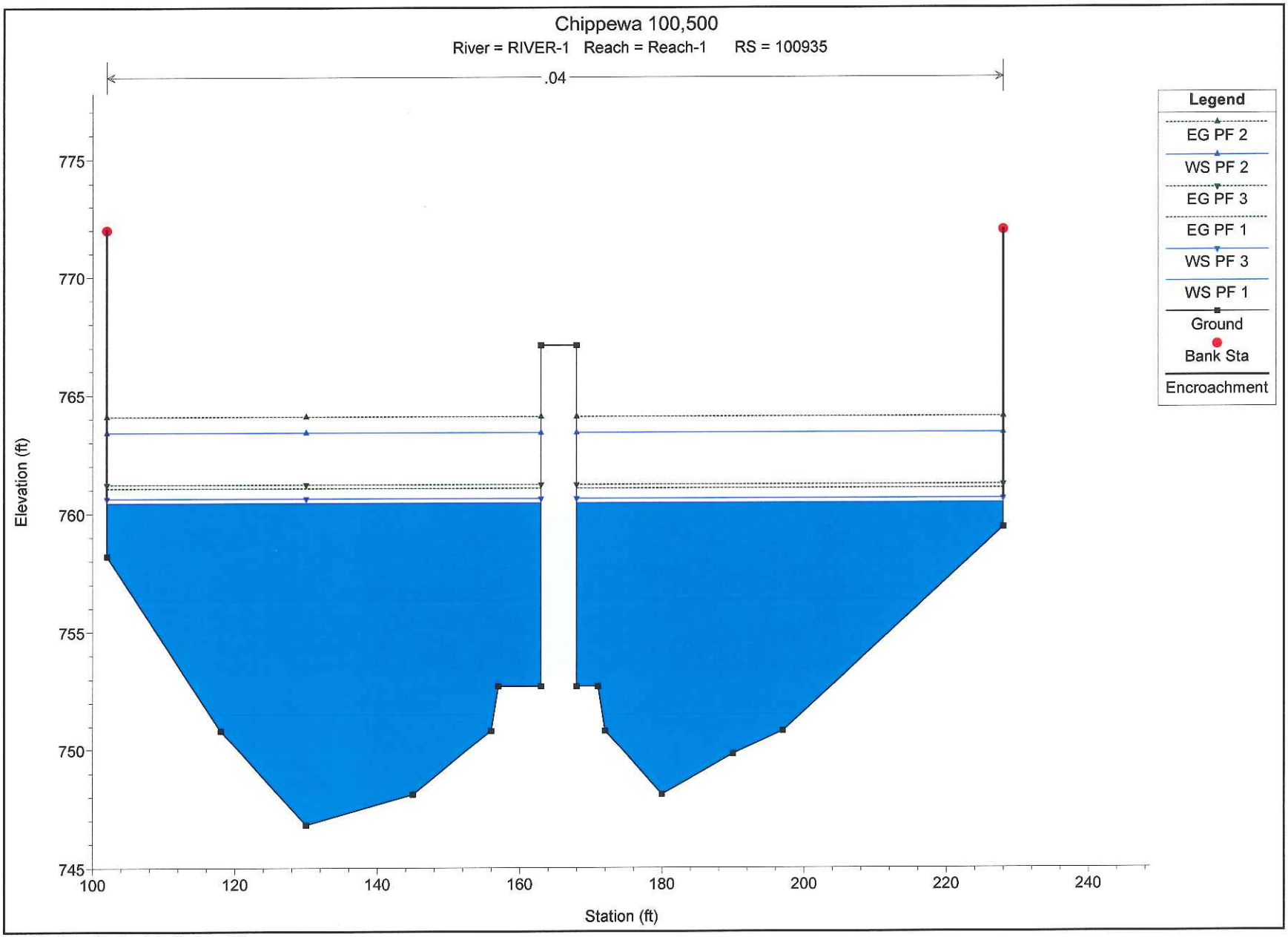
1 in Horiz. = 100 ft 1 in Vert. = 5 ft



1 in Horiz. = 200 ft 1 in Vert. = 5 ft



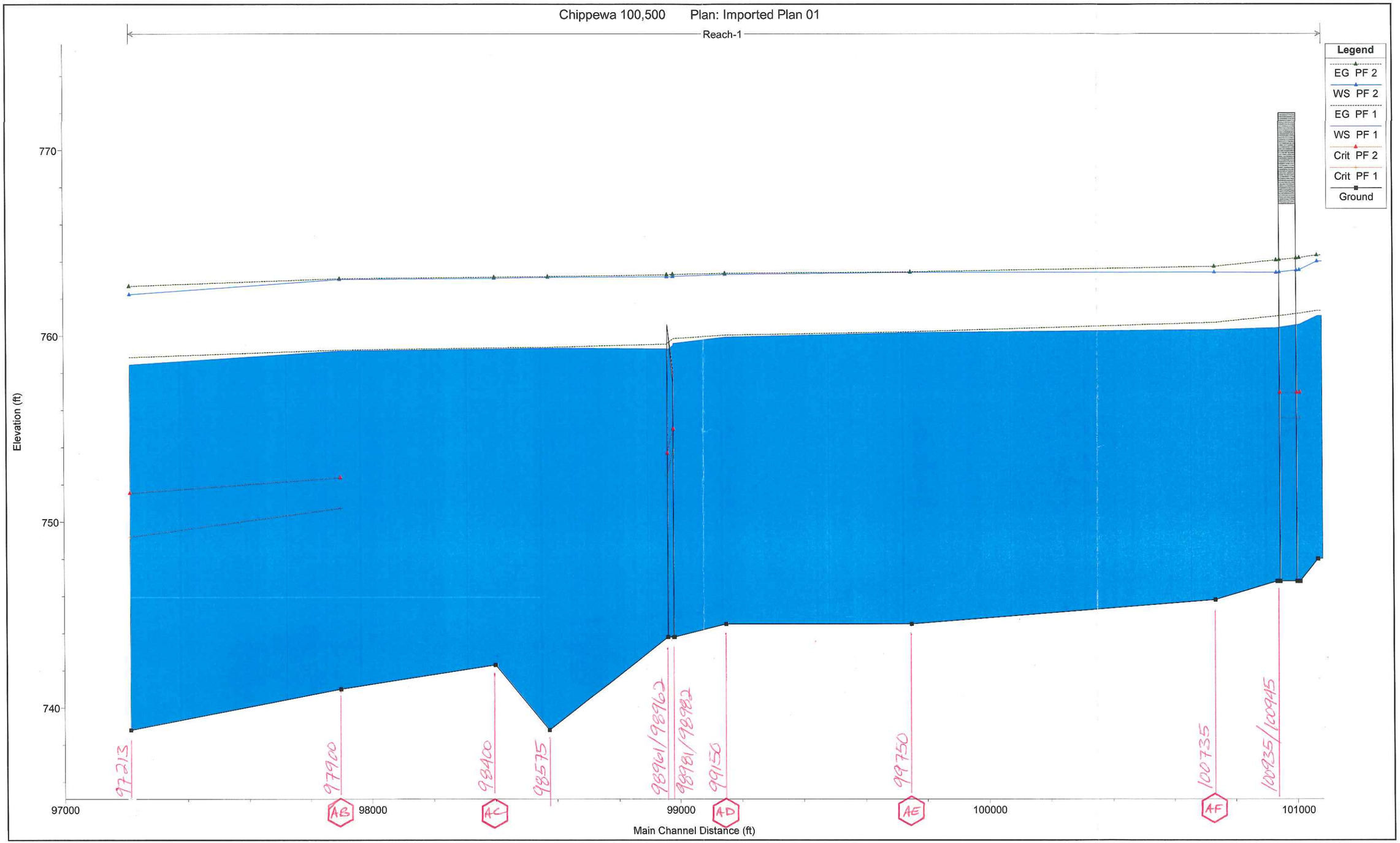
1 in Horiz. = 60 ft 1 in Vert. = 4 ft



1 in Horiz. = 20 ft 1 in Vert. = 6 ft

Profiles

PF1 – 100 Yr.
PF2 – 500 Yr.



1 in Horiz. = 300 ft 1 in Vert. = 5 ft

Output Tables

HEC-RAS Plan: Imported Pla River: RIVER-1 Reach: Reach-1 STANDARD TABLE 1

Reach	River Sta	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	97213	6800.00	738.80	758.45	749.20	758.85	0.000548	5.61	1935.18	165.00	0.24
Reach-1	97213	9390.00	738.80	762.23	751.55	762.68	0.000486	6.05	2558.88	165.00	0.24
Reach-1	97900	6800.00	741.00	759.20	750.74	759.24	0.000240	2.56	5984.23	614.05	0.12
Reach-1	97900	9390.00	741.00	763.04	752.39	763.08	0.000173	2.45	8470.04	655.00	0.10
Reach-1	98400	6800.00	742.30	759.30		759.36	0.000254	2.82	5272.01	525.00	0.13
Reach-1	98400	9390.00	742.30	763.11		763.17	0.000185	2.80	7273.16	525.00	0.11
Reach-1	98575	6800.00	738.80	759.35		759.39	0.000093	1.69	5748.00	551.00	0.08
Reach-1	98575	9390.00	738.80	763.16		763.20	0.000074	1.77	7845.15	551.00	0.07
Reach-1	98961	6800.00	743.80	759.31		759.57	0.005074	4.14	1709.97	568.81	0.39
Reach-1	98961	9390.00	743.80	763.19		763.29	0.000726	2.59	3976.44	585.00	0.17
Reach-1	98971.5	Bridge									
Reach-1	98982	6800.00	743.80	759.60	753.82	759.86	0.004823	4.14	1722.52	565.90	0.39
Reach-1	98982	9390.00	743.80	763.21	754.99	763.32	0.000786	2.69	3823.63	585.00	0.18
Reach-1	99150	6800.00	744.50	759.95		760.05	0.000451	3.38	3134.43	600.00	0.17
Reach-1	99150	9390.00	744.50	763.32		763.38	0.000197	2.62	5156.76	600.00	0.12
Reach-1	99750	6800.00	744.50	760.18		760.23	0.000236	2.26	5347.76	1100.00	0.11
Reach-1	99750	9390.00	744.50	763.42		763.45	0.000100	1.71	8911.35	1100.00	0.08
Reach-1	100735	6800.00	745.80	760.33		760.72	0.000702	5.13	1836.98	400.00	0.26
Reach-1	100735	9390.00	745.80	763.42		763.73	0.000474	4.91	3072.77	400.00	0.22
Reach-1	100935	6800.00	746.80	760.44		761.06	0.002025	6.32	1076.52	121.00	0.37
Reach-1	100935	9390.00	746.80	763.41		764.08	0.001638	6.54	1436.43	121.00	0.33

HEC-RAS Plan: Imported Pla River: RIVER-1 Reach: Reach-1 STANDARD TABLE 2

Reach	River Sta	E.G. Elev	W.S. Elev	Vel Head	Frctn Loss	C & E Loss	Q Left	Q Channel	Q Right	Top Width
		(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft)
Reach-1	97213	758.85	758.45	0.40			217.60	5532.52	1049.87	165.00
Reach-1	97213	762.68	762.23	0.45			299.85	7314.06	1776.09	165.00
Reach-1	97900	759.24	759.20	0.05				2721.08	4078.92	614.05
Reach-1	97900	763.08	763.04	0.04				3306.99	6083.01	655.00
Reach-1	98400	759.36	759.30	0.07	0.11	0.01	2482.93	3304.85	1012.23	525.00
Reach-1	98400	763.17	763.11	0.06	0.08	0.01	3725.35	4117.76	1546.89	525.00
Reach-1	98575	759.39	759.35	0.04	0.03	0.00	971.91	5774.46	53.63	551.00
Reach-1	98575	763.20	763.16	0.04	0.02	0.00	1725.91	7579.24	84.85	551.00
Reach-1	98961	759.57	759.31	0.26	0.11	0.07	25.51	6733.01	41.47	568.81
Reach-1	98961	763.29	763.19	0.10	0.07	0.02	208.40	8928.54	253.06	585.00
Reach-1	98971.5	Bridge								
Reach-1	98982	759.86	759.60	0.26	0.01	0.01	44.23	6708.18	47.60	565.90
Reach-1	98982	763.32	763.21	0.11	0.00	0.00	218.13	8934.02	237.85	585.00
Reach-1	99150	760.05	759.95	0.11	0.18	0.02	204.49	3395.11	3200.41	600.00
Reach-1	99150	763.38	763.32	0.06	0.06	0.00	269.18	3332.62	5788.21	600.00
Reach-1	99750	760.23	760.18	0.04	0.16	0.01	992.43	3034.21	2773.36	1100.00
Reach-1	99750	763.45	763.42	0.02	0.07	0.01	1669.35	2875.84	4844.81	1100.00
Reach-1	100735	760.72	760.33	0.38	0.35	0.13	194.14	6333.92	271.93	400.00
Reach-1	100735	763.73	763.42	0.31	0.17	0.11	640.61	7627.21	1122.19	400.00
Reach-1	100935	761.06	760.44	0.62	0.22	0.12		6800.00		121.00
Reach-1	100935	764.08	763.41	0.66	0.16	0.18		9390.00		121.00

Floodway (Encroachment) Output

EXISTING CONDITIONS
ENCROACHMENT TABLE 2

HEC-RAS Plan: Imported Pla River: RIVER-1 Reach: Reach-1 Profile: PF 3

Reach	River Sta	Prof Delta WS	Top Wdth Act	K Perc L	Enc Sta L	Dist Center L	Center Station	Dist Center R	Enc Sta R	K Perc R	Encr WD
		(ft)	(ft)		(ft)	(ft)	(ft)	(ft)	(ft)		(ft)
Reach-1	97213	0.05	145.00	0.00	35.00	44.50	79.50	100.50	180.00	3.45	145.00
Reach-1	97900	0.10	614.18		10.00	37.00	47.00	578.00	625.00	0.00	615.00
Reach-1	98400	0.10	495.00	1.05	15.00	332.00	347.00	163.00	510.00	1.09	495.00
Reach-1	98575	0.10	471.00	-1.30	105.00	341.50	446.50	129.50	576.00	0.08	471.00
Reach-1	98961	0.10	470.00	0.45	52.00	235.00	287.00	235.00	522.00	0.66	470.00
Reach-1	98971.5 BR D	0.10	470.00		52.00	235.00	287.00	235.00	522.00		470.00
Reach-1	98971.5 BR U	0.08	470.00		52.00	235.00	287.00	235.00	522.00		470.00
Reach-1	98982	0.07	470.00		52.00	235.00	287.00	235.00	522.00		470.00
Reach-1	99150	0.05	389.90	0.00	0.10	59.90	60.00	330.00	390.00	8.25	389.90
Reach-1	99750	0.11	635.00	5.30	105.00	153.50	258.50	481.50	740.00	14.10	635.00
Reach-1	100735	0.23	223.00	-0.57	140.00	111.50	251.50	111.50	363.00	-2.38	223.00
Reach-1	100935	0.19	121.00		102.00	63.00	165.00	63.00	228.00		126.00

EXISTING CONDITIONS
ENCROACHMENT TABLE 3

HEC-RAS Plan: Imported Pla River: RIVER-1 Reach: Reach-1 Profile: PF 3

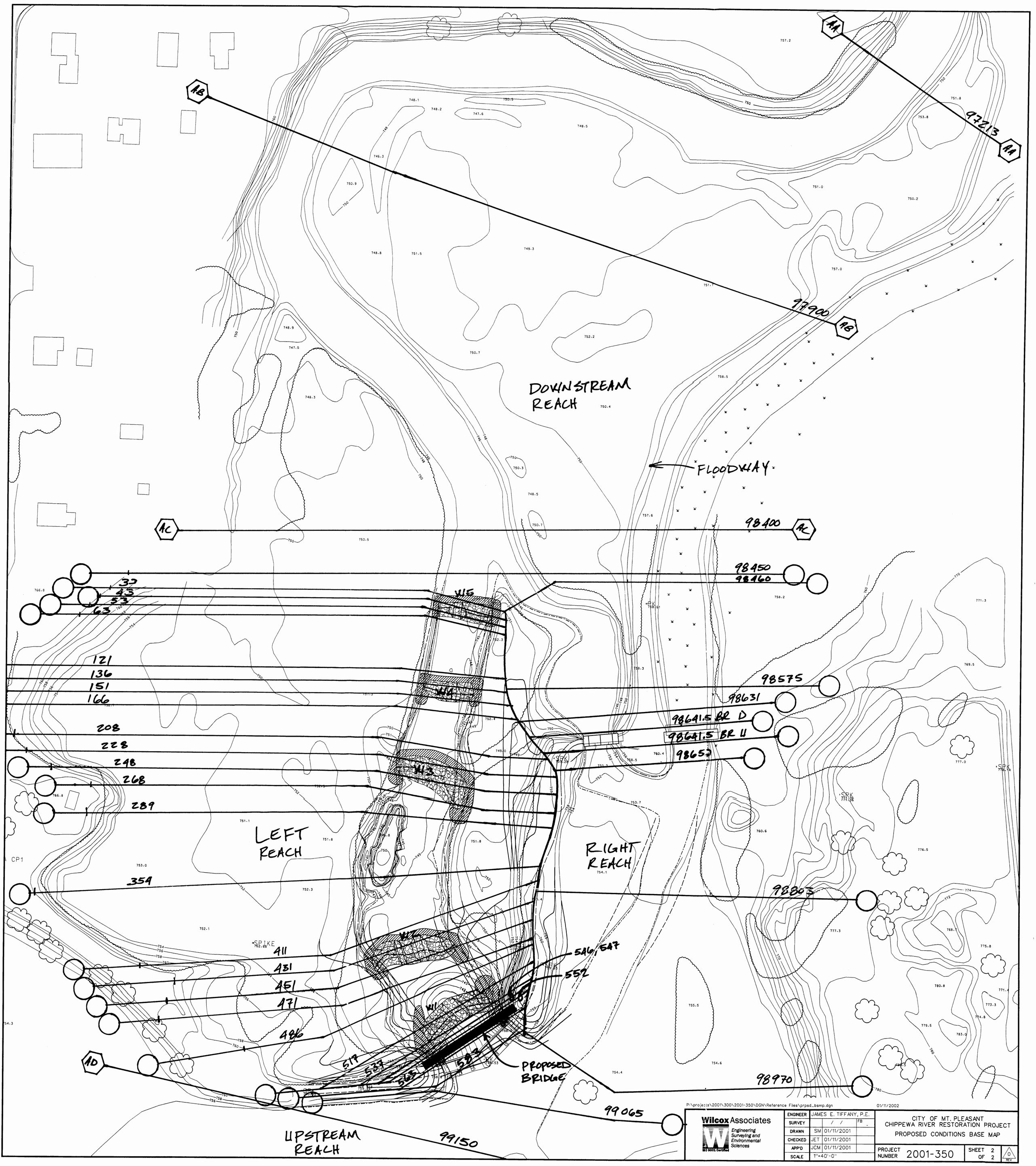
Reach	River Sta	Top Wdth Act	Area	Vel Total	W.S. Elev	Base WS	Prof Delta WS
		(ft)	(sq ft)	(ft/s)	(ft)	(ft)	(ft)
Reach-1	97213	145.00	1777.43	3.83	758.50	758.45	0.05
Reach-1	97900	614.18	6047.72	1.12	759.30	759.20	0.10
Reach-1	98400	495.00	5133.70	1.32	759.40	759.30	0.10
Reach-1	98575	471.00	5662.16	1.20	759.46	759.35	0.10
Reach-1	98961	470.00	1674.23	4.06	759.41	759.31	0.10
Reach-1	98971.5 BR D	470.00	1474.46	4.61	759.36	759.26	0.10
Reach-1	98971.5 BR U	470.00	1424.95	4.77	759.56	759.48	0.08
Reach-1	98982	470.00	1651.34	4.12	759.67	759.60	0.07
Reach-1	99150	389.90	2592.81	2.62	760.00	759.95	0.05
Reach-1	99750	635.00	3842.15	1.77	760.29	760.18	0.11
Reach-1	100735	223.00	1829.53	3.72	760.57	760.33	0.23
Reach-1	100935	121.00	1100.02	6.18	760.63	760.44	0.19

F. Proposed Conditions Model Supporting Information

Modeling Topographic Plan

Cross Sections

PF1 – 100 Yr.
PF10 – 500 Yr.
PF11 – Encroachment Run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Wilcox Associates
Engineering Surveying and Environmental Sciences
ISO 9001 Certified
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CHECKED JET 01/11/2001
APP'D JCM 01/11/2001
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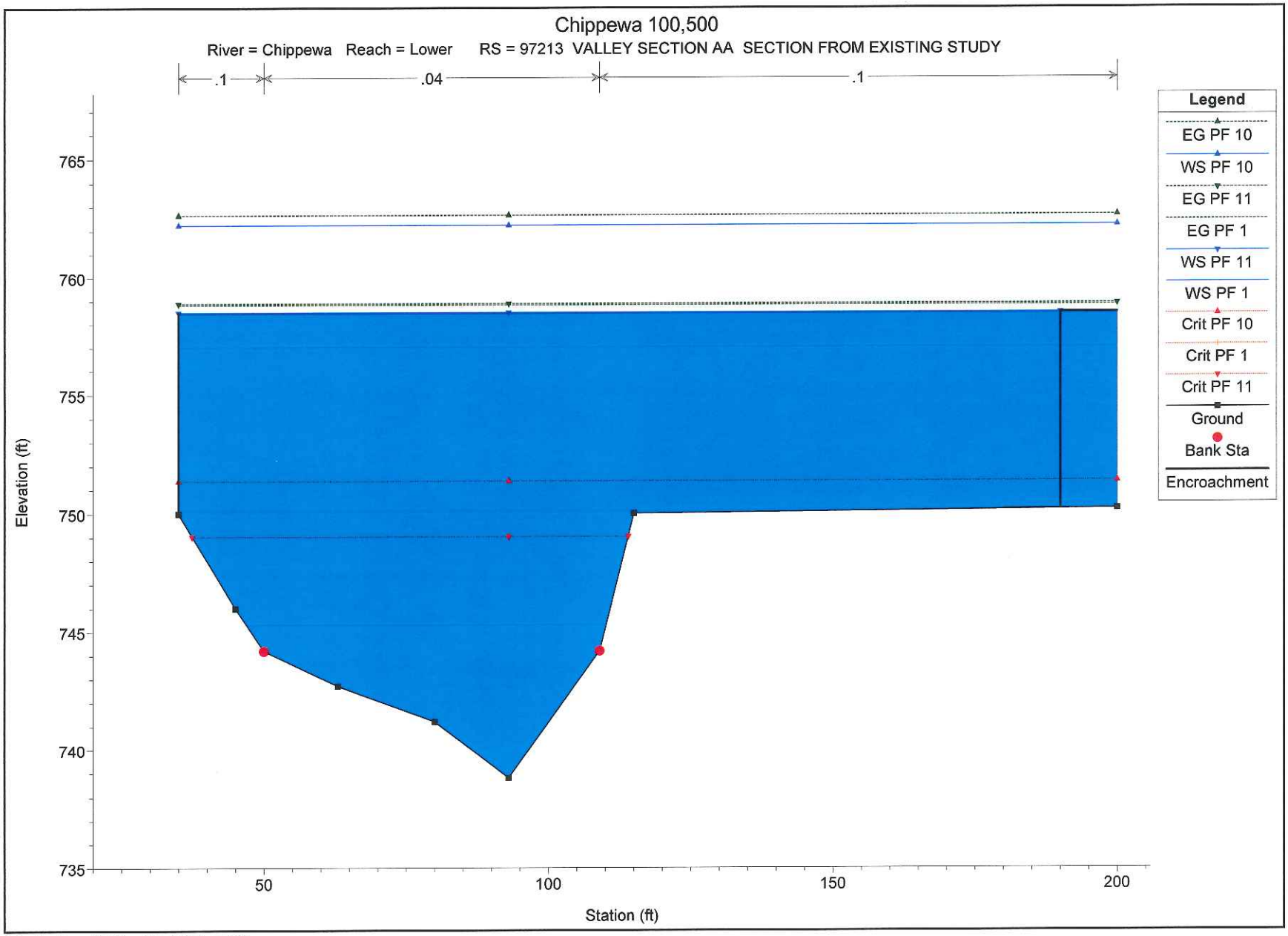
PROJECT NUMBER 2001-350
SHEET 2 OF 2
REV 0



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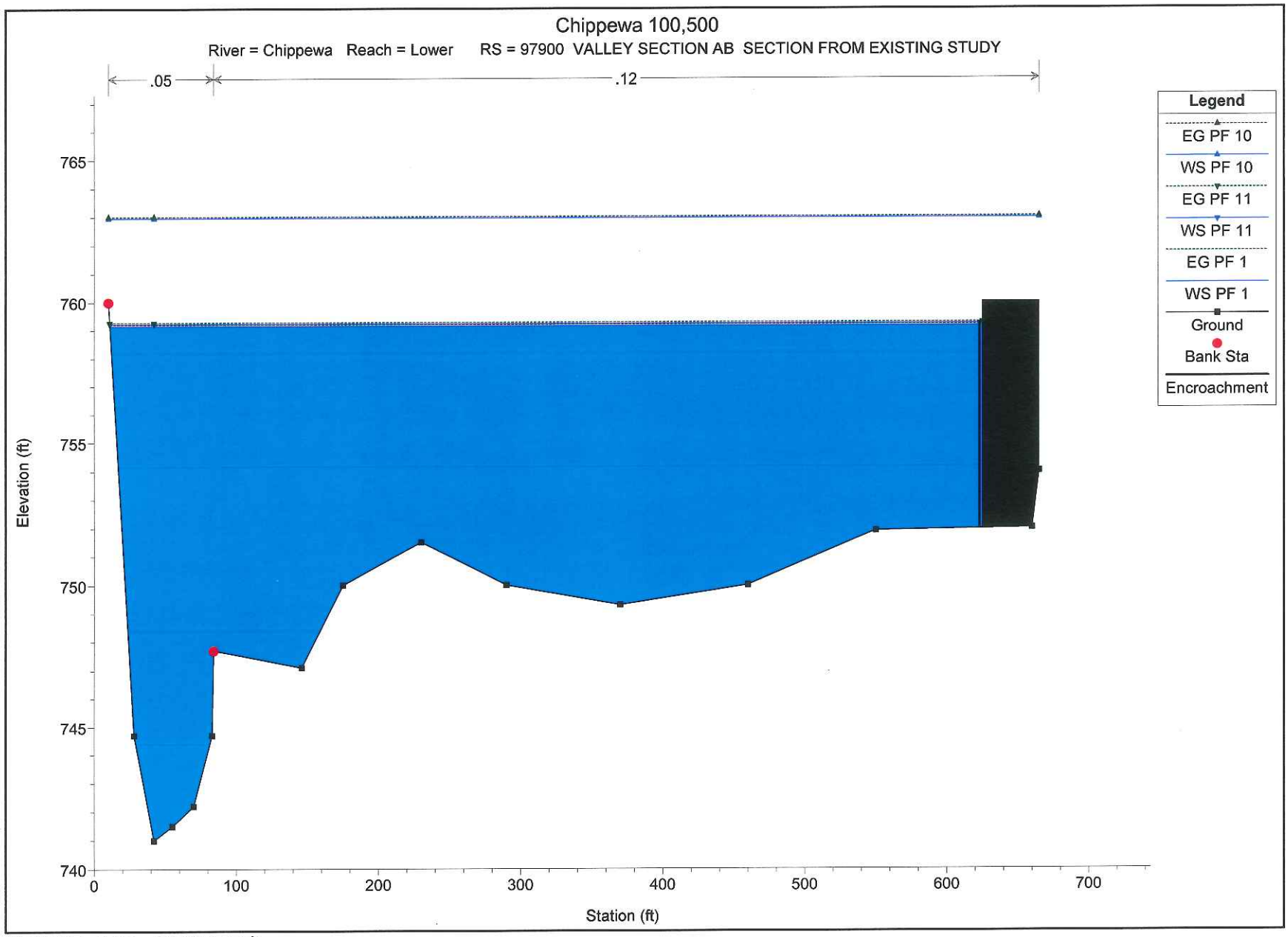

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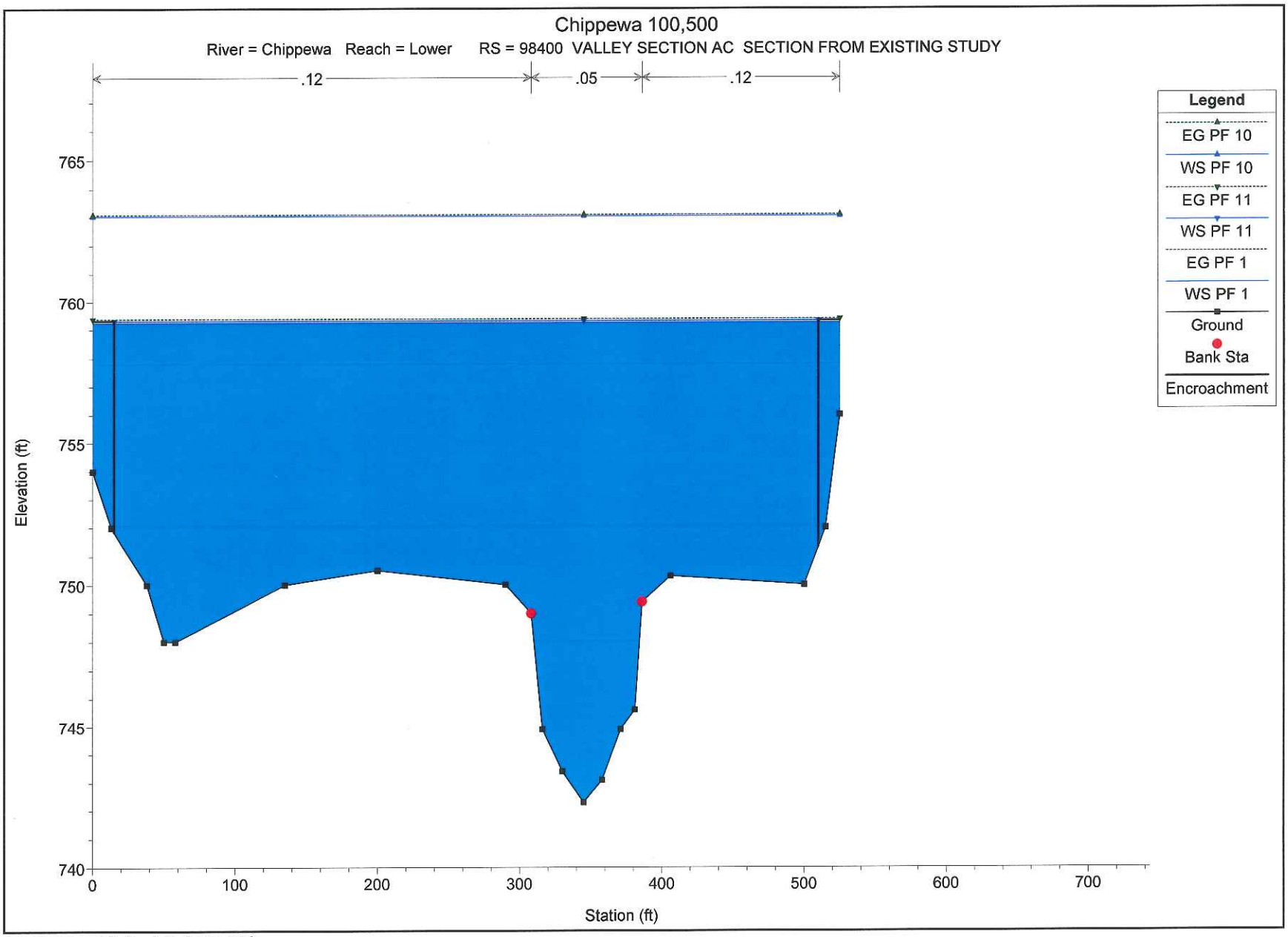

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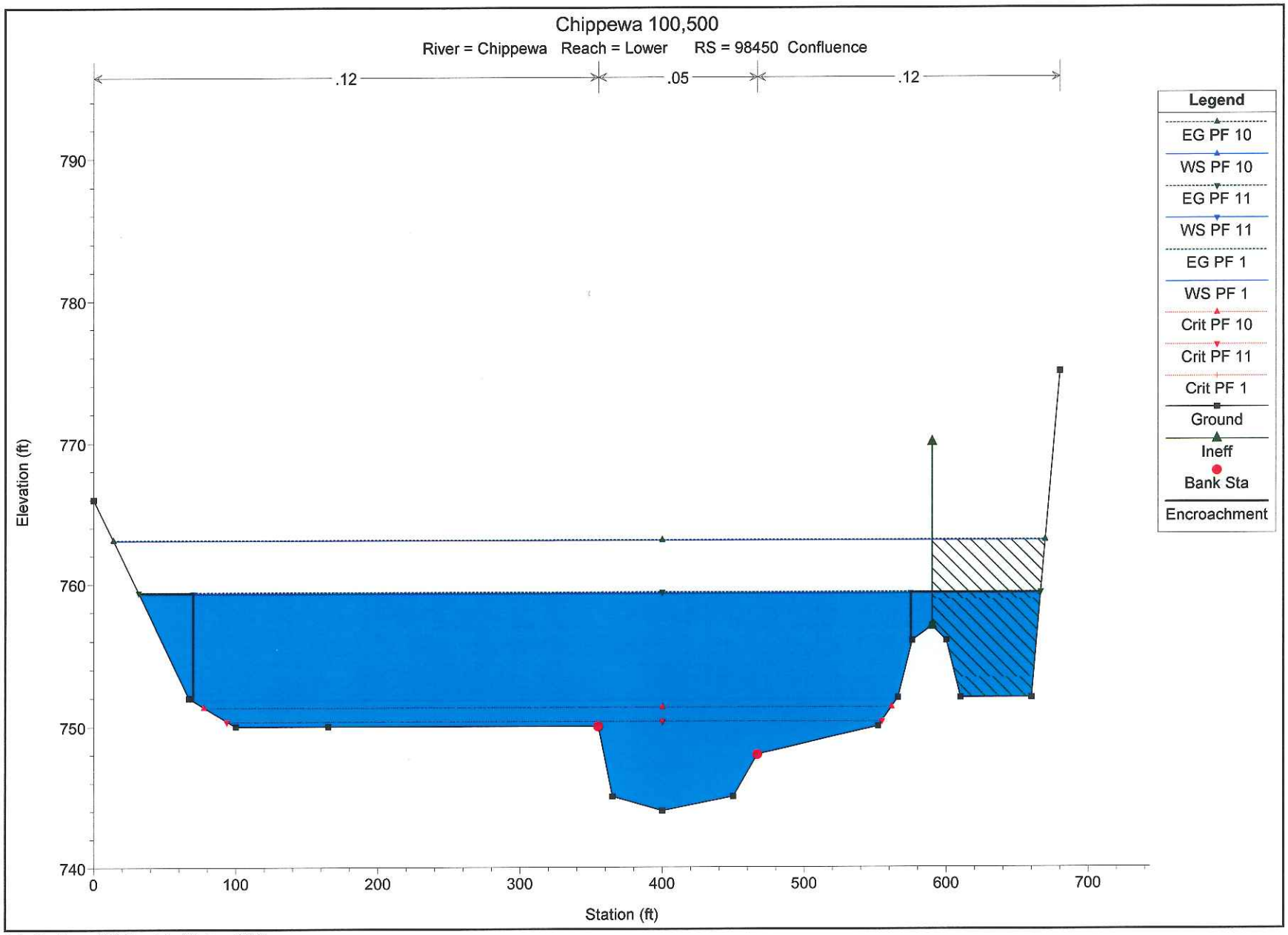

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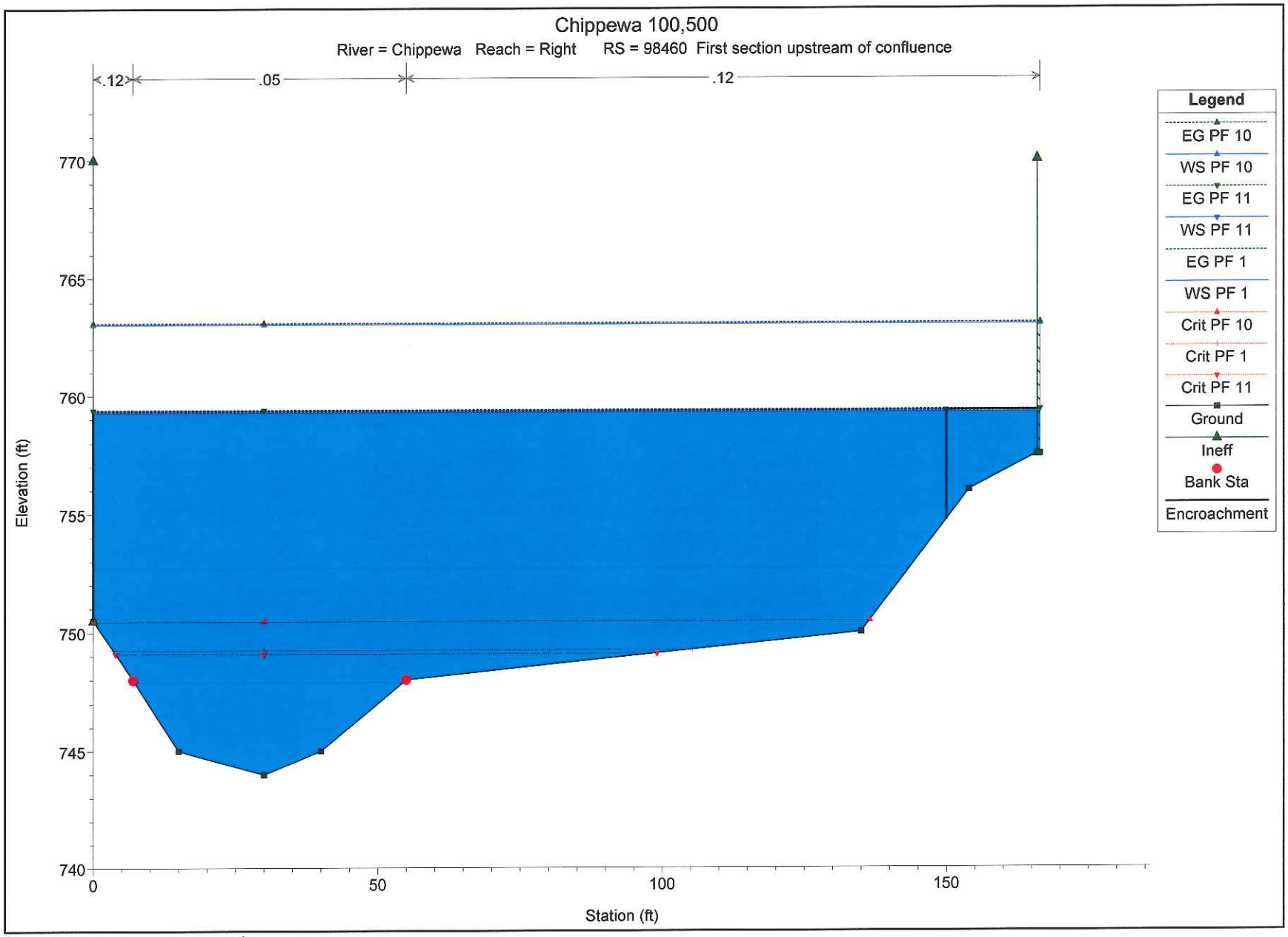

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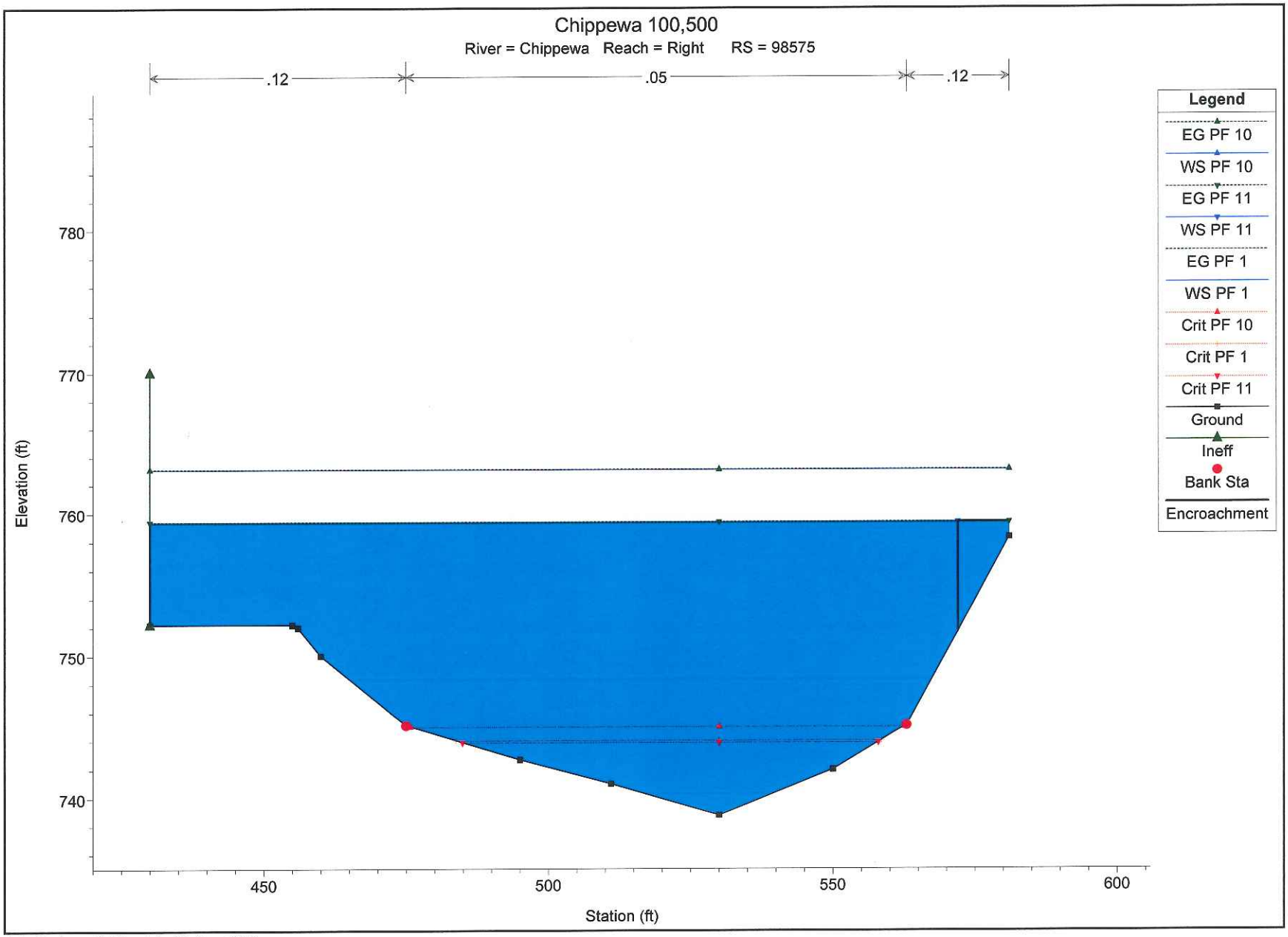

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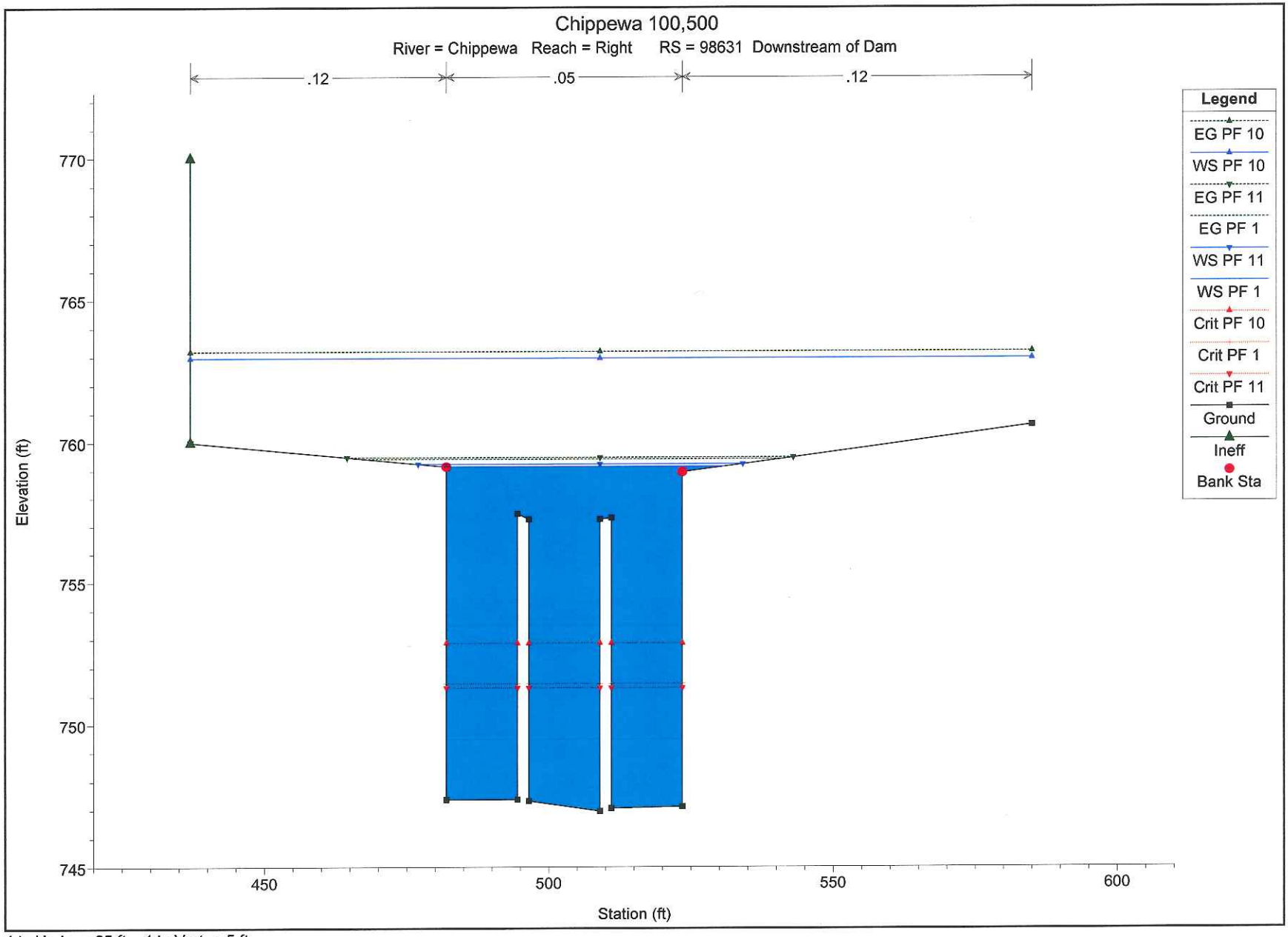

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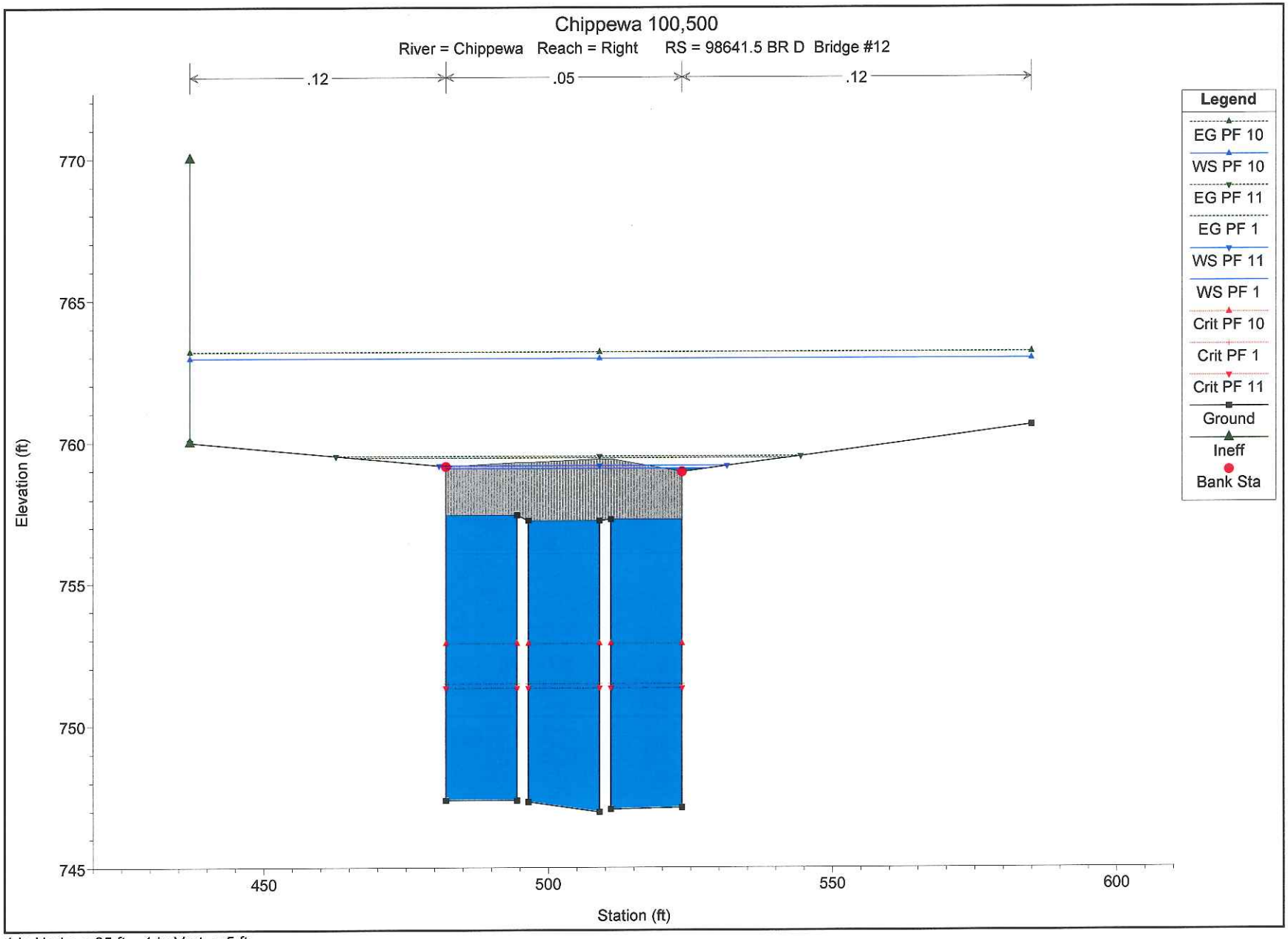

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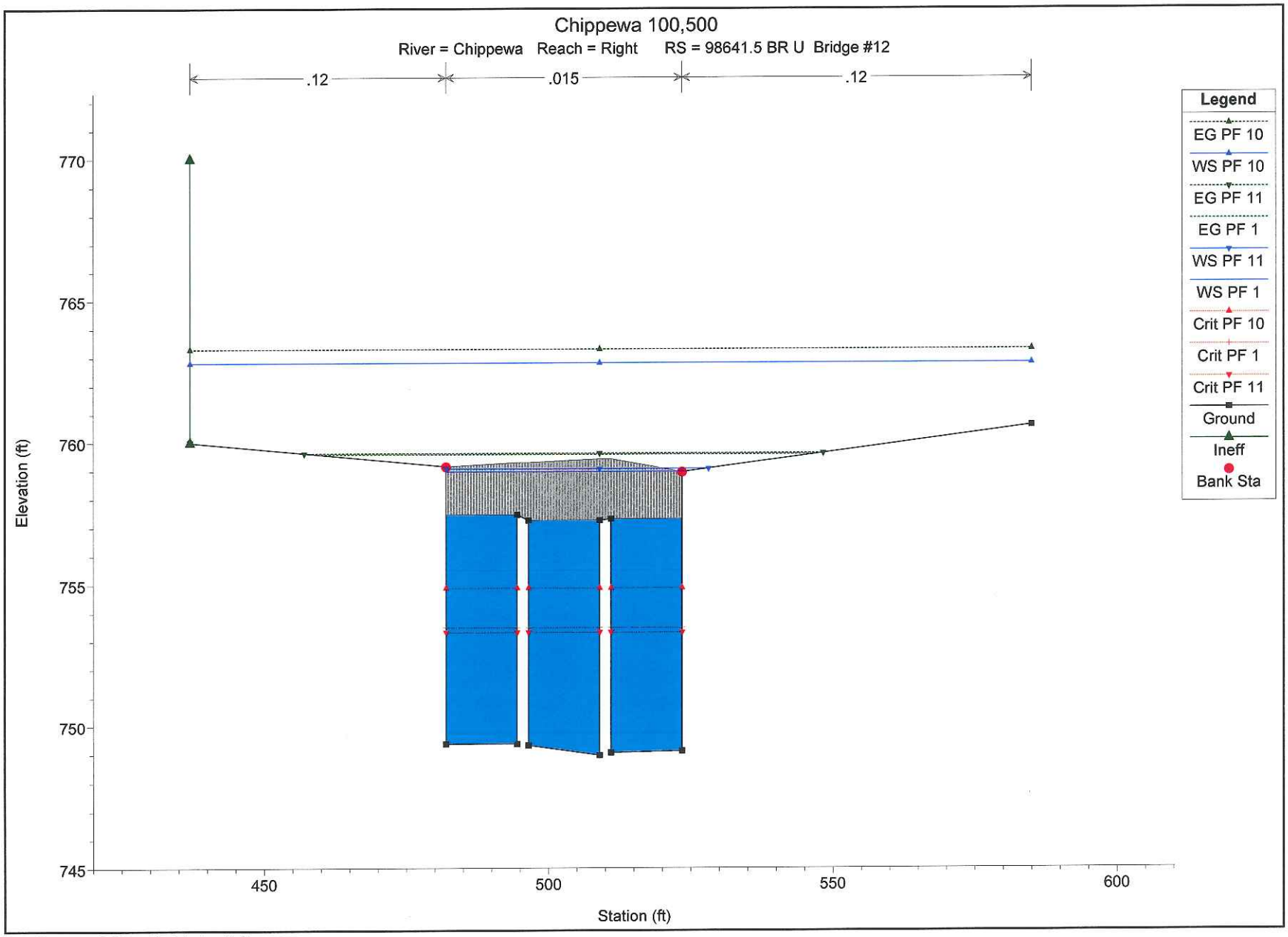

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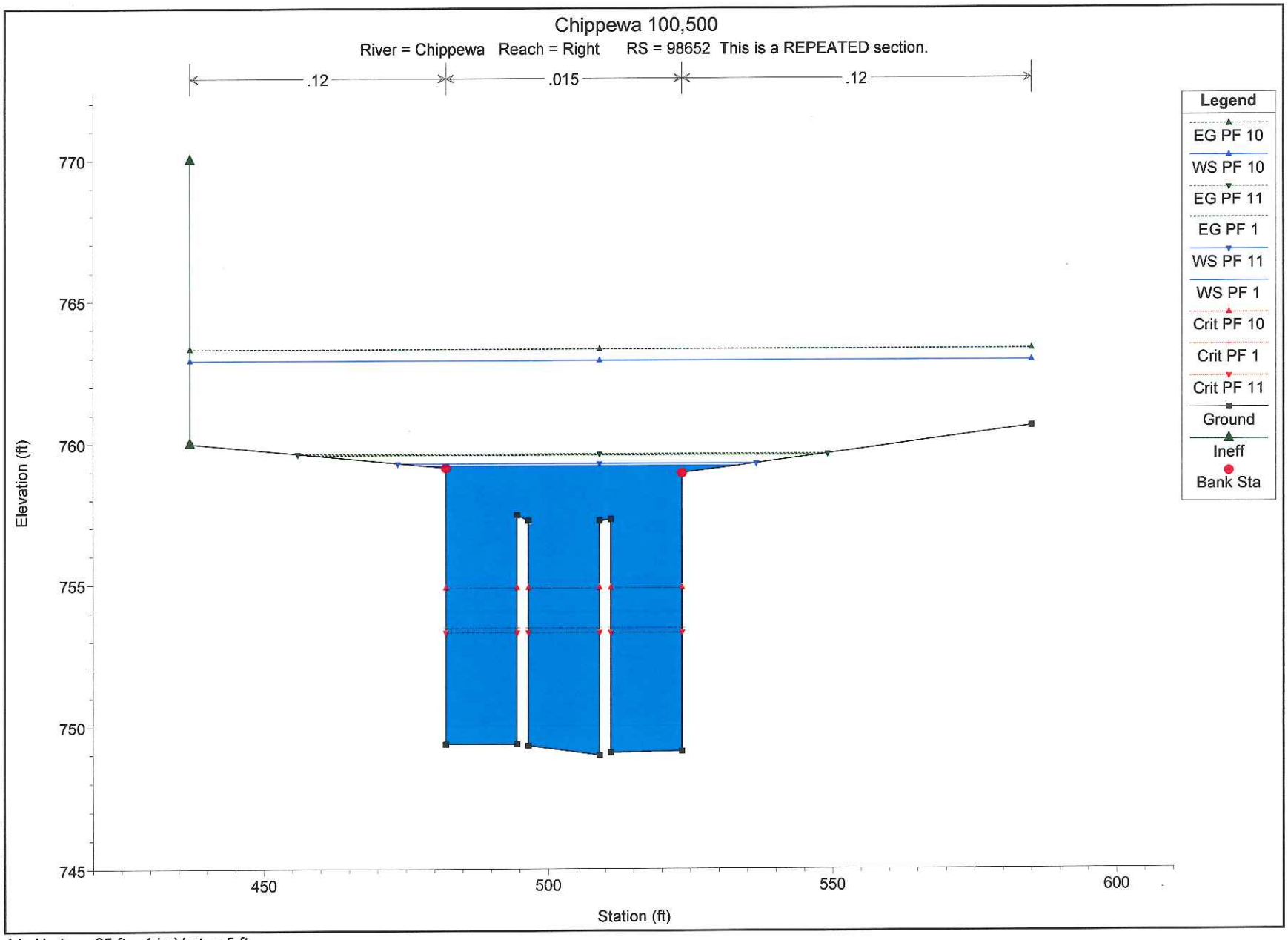

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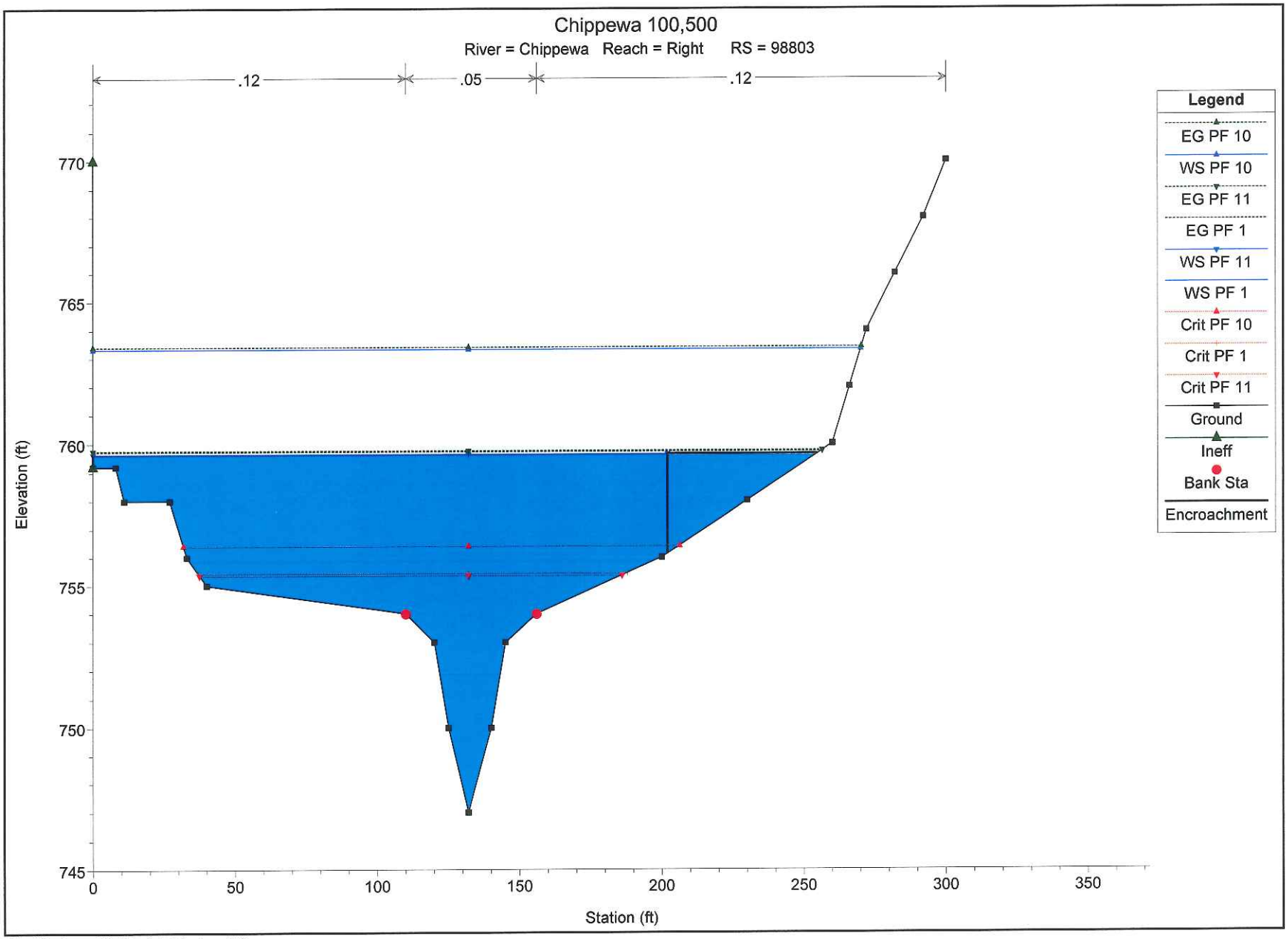

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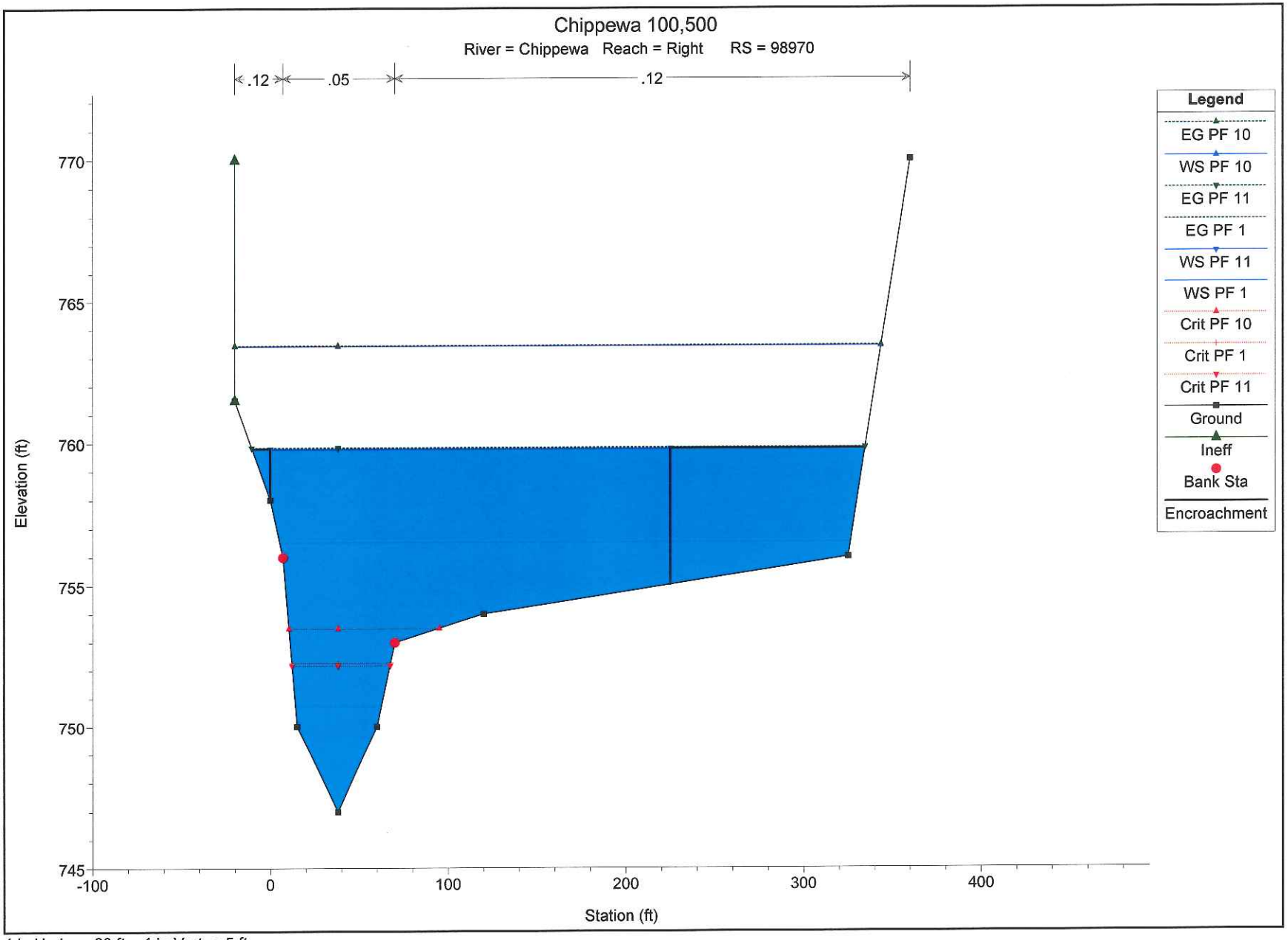

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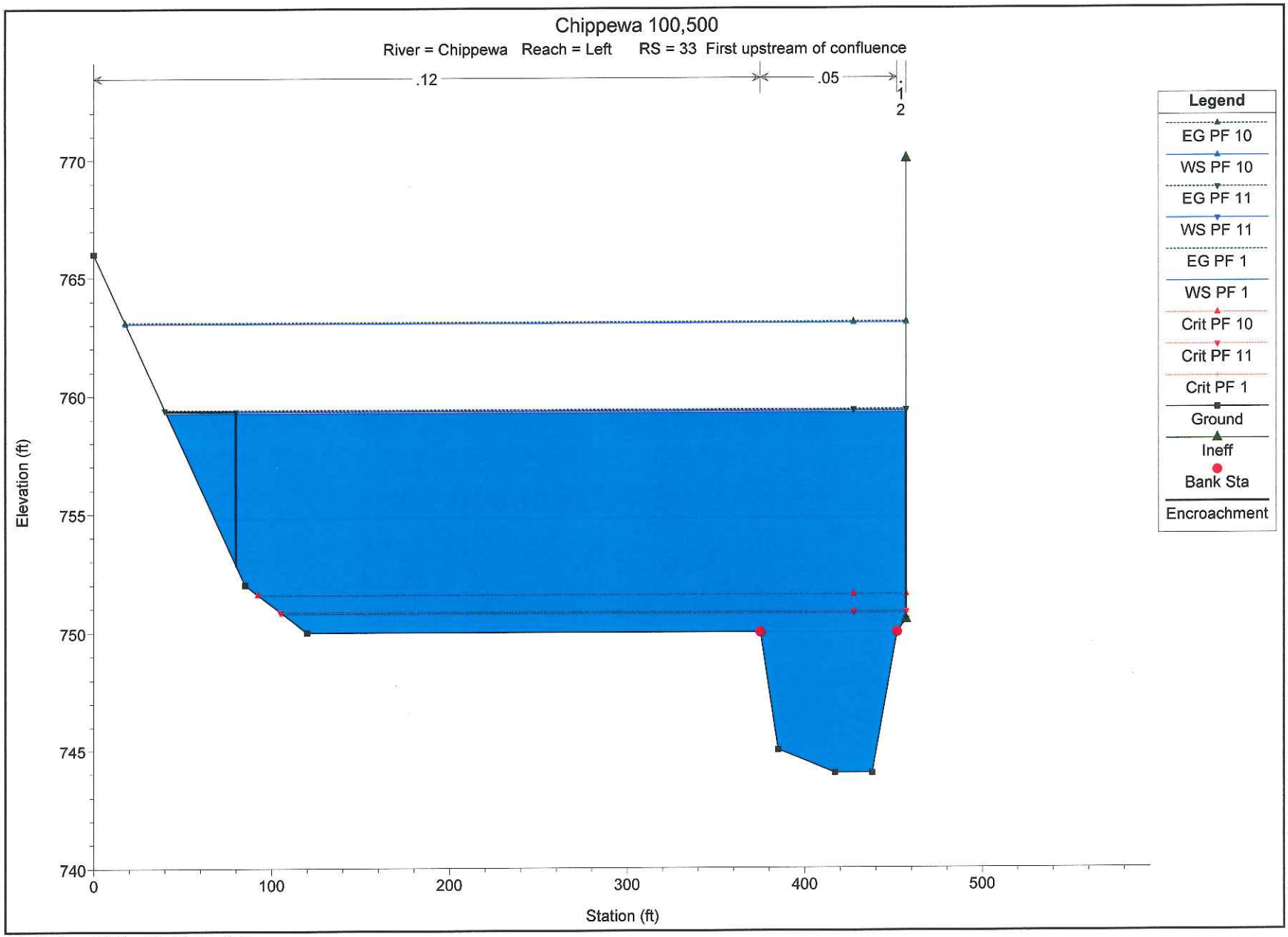

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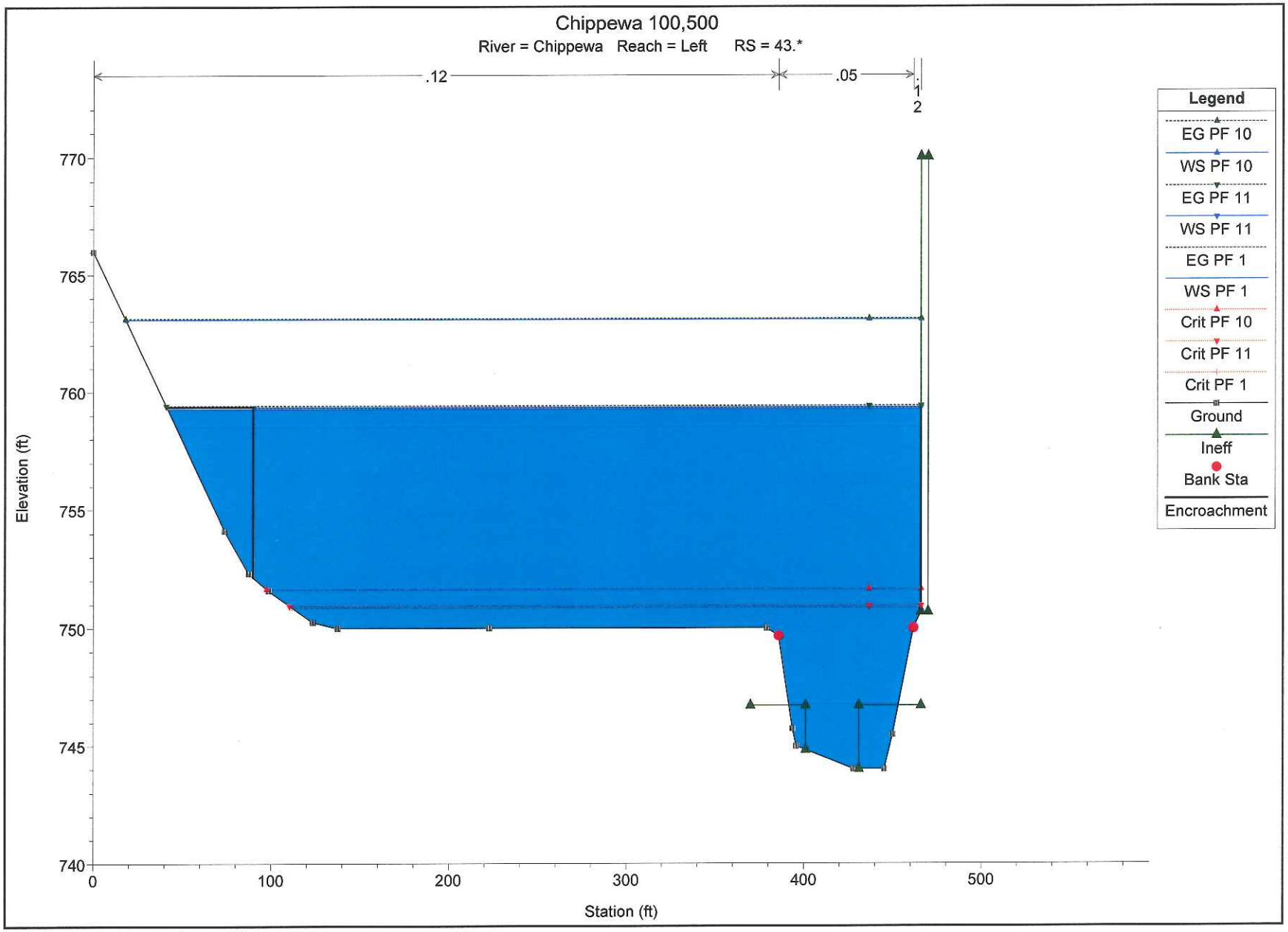

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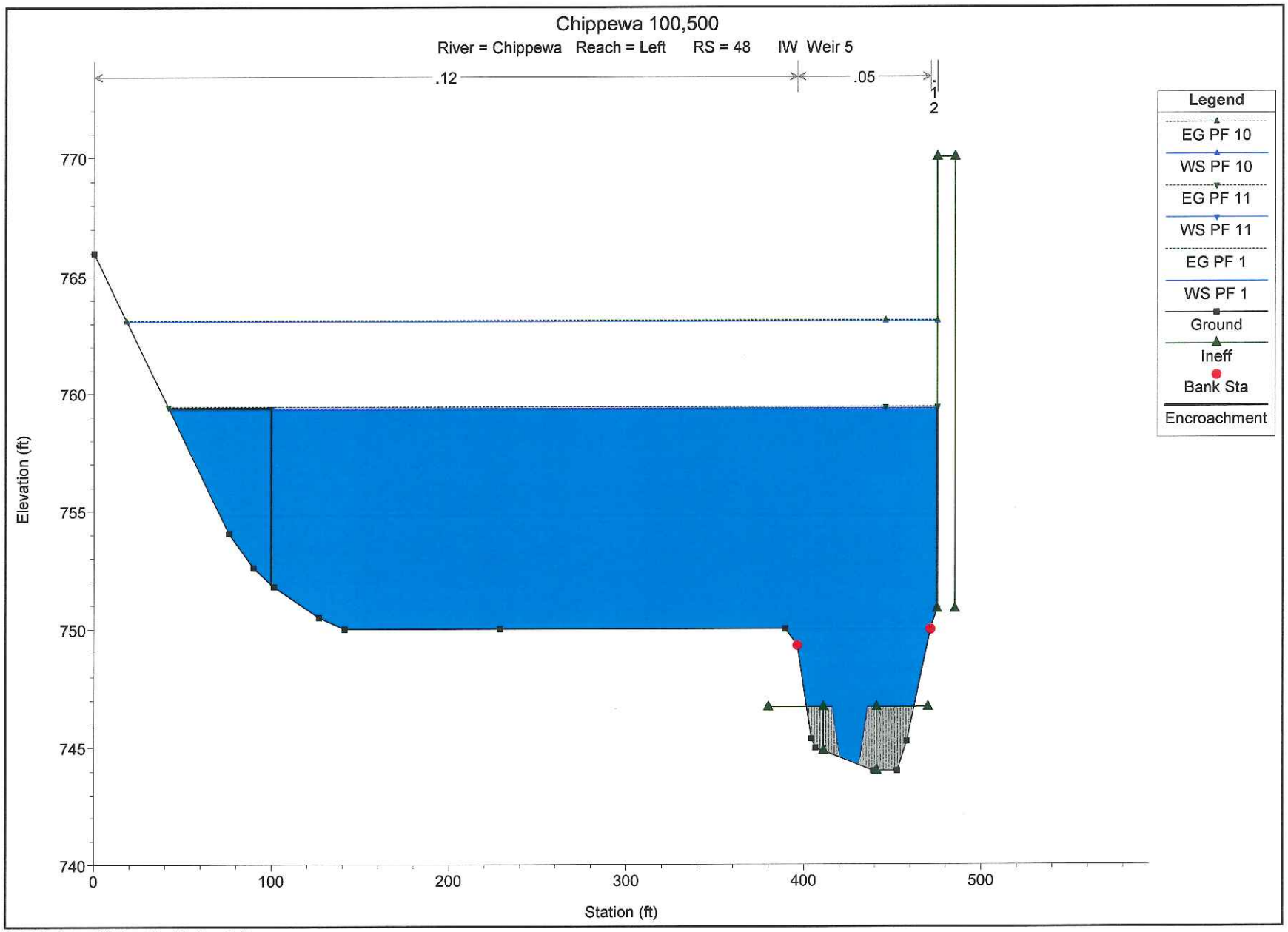

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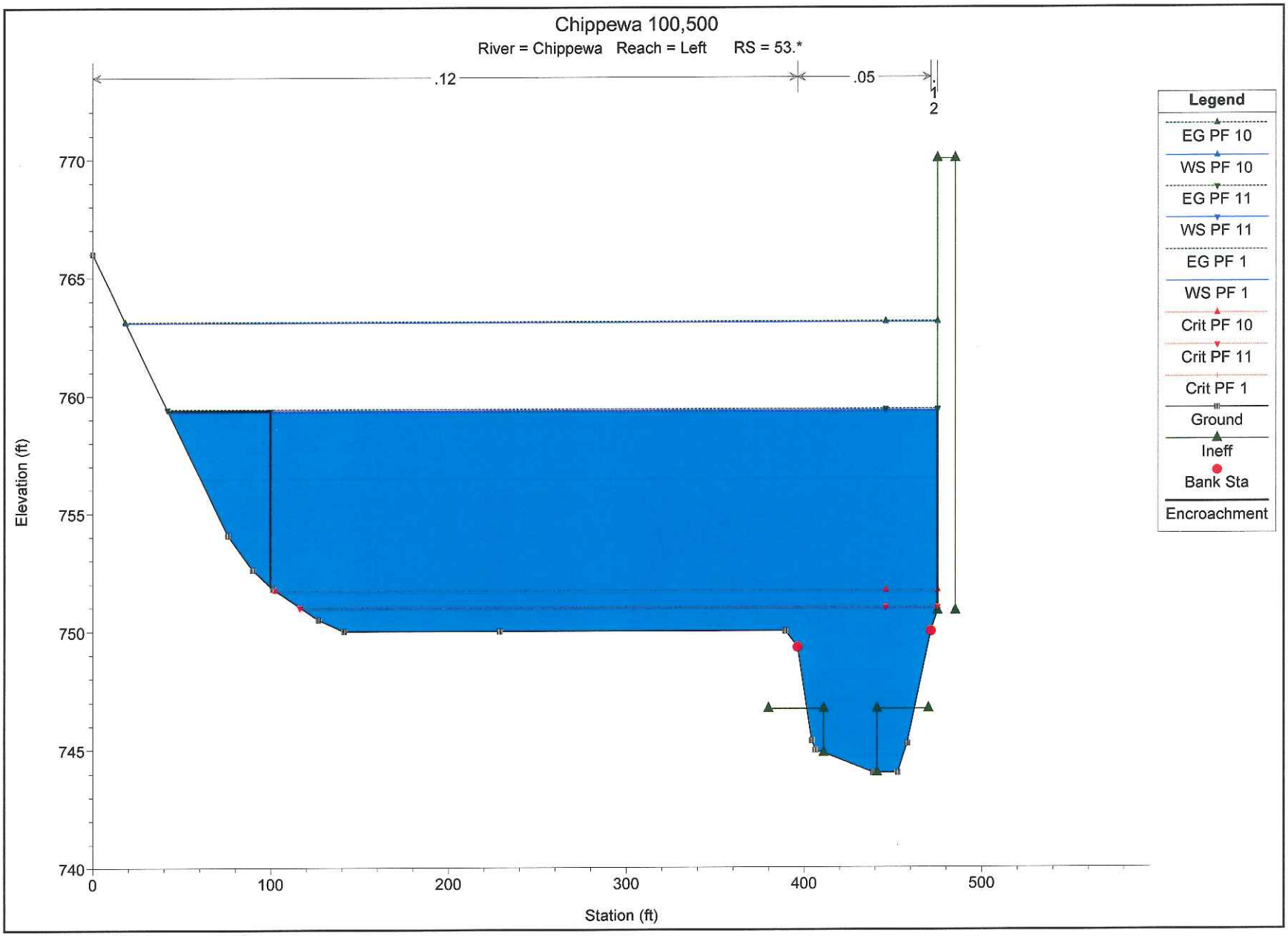

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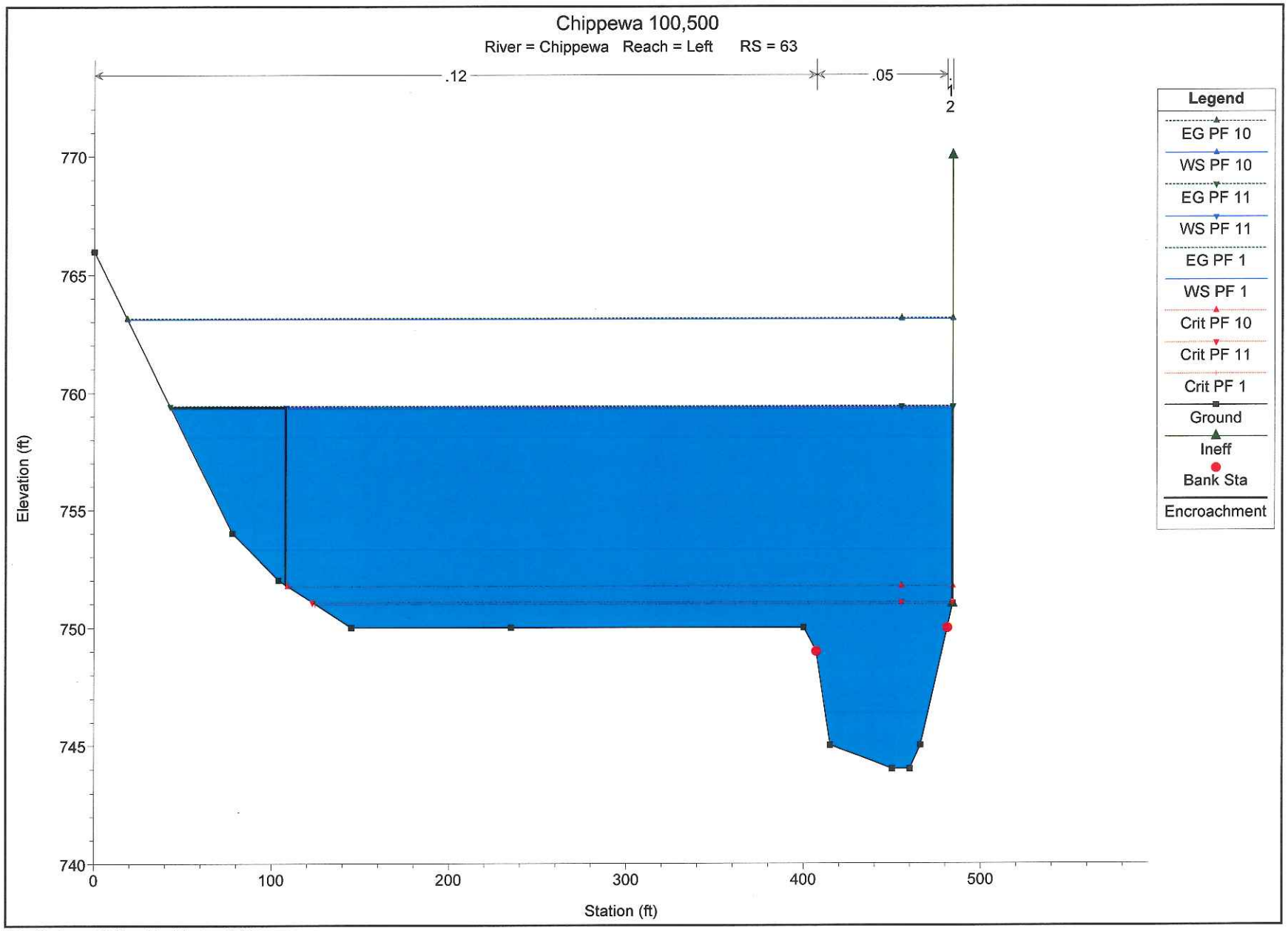

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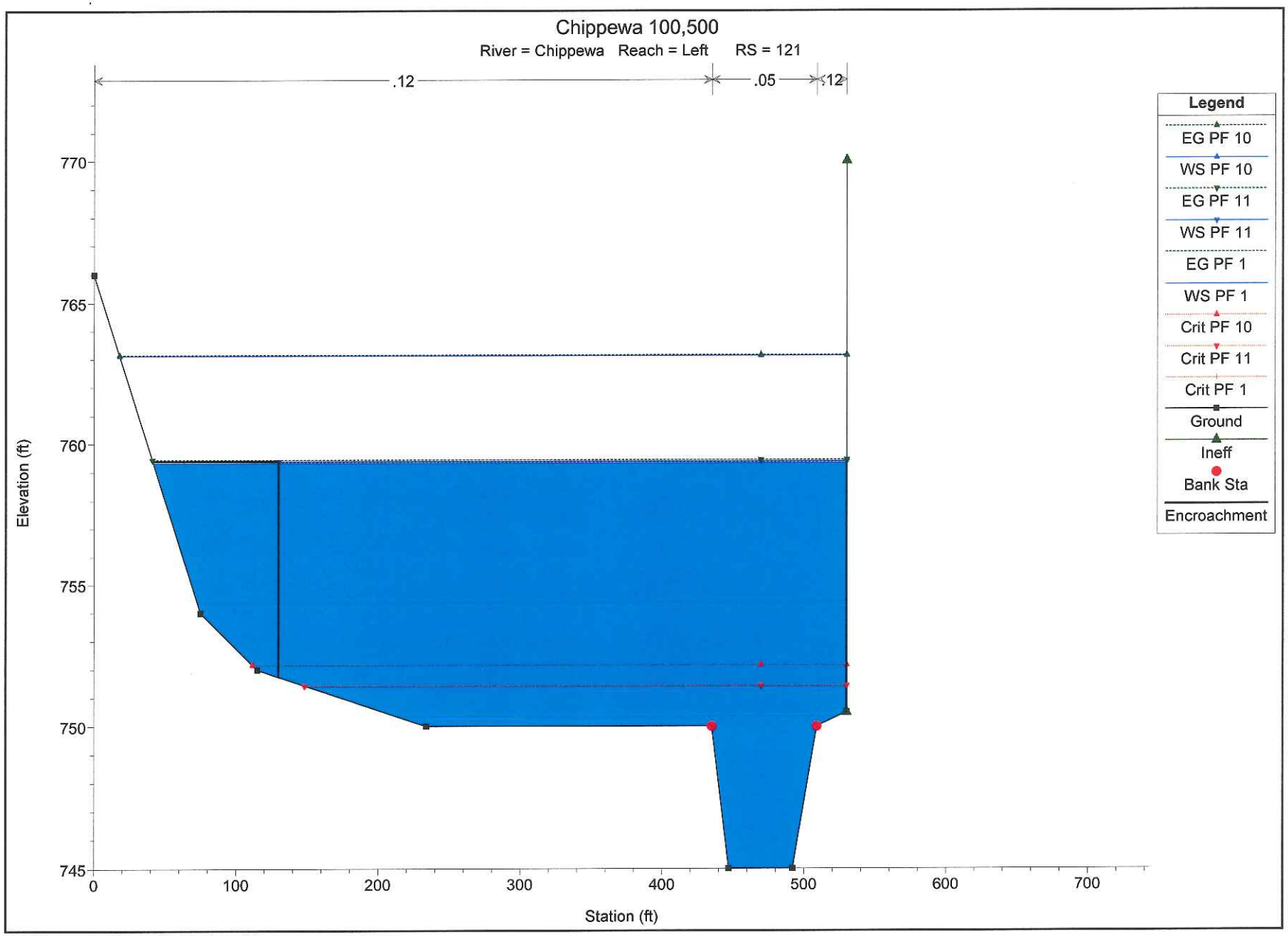

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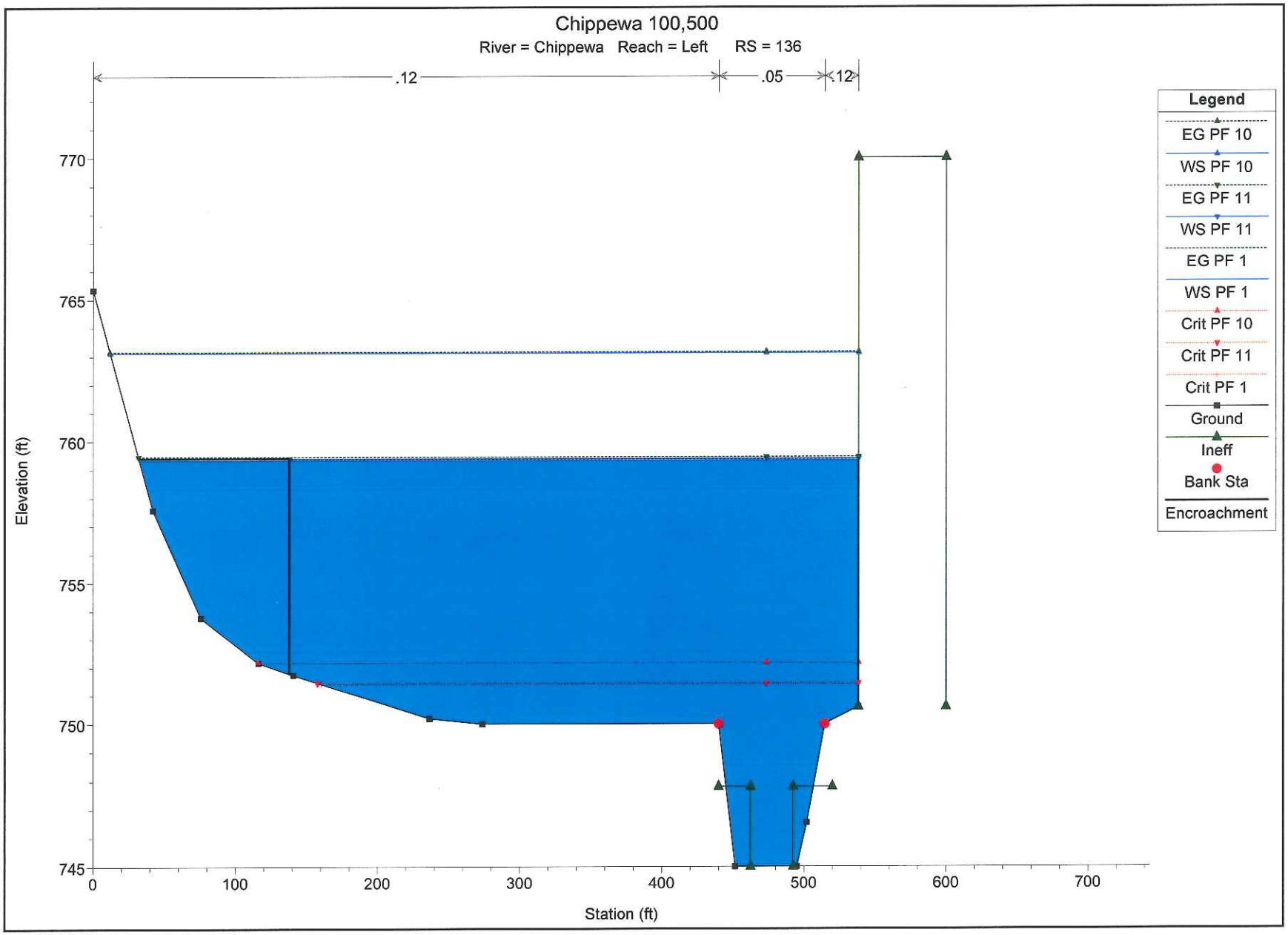

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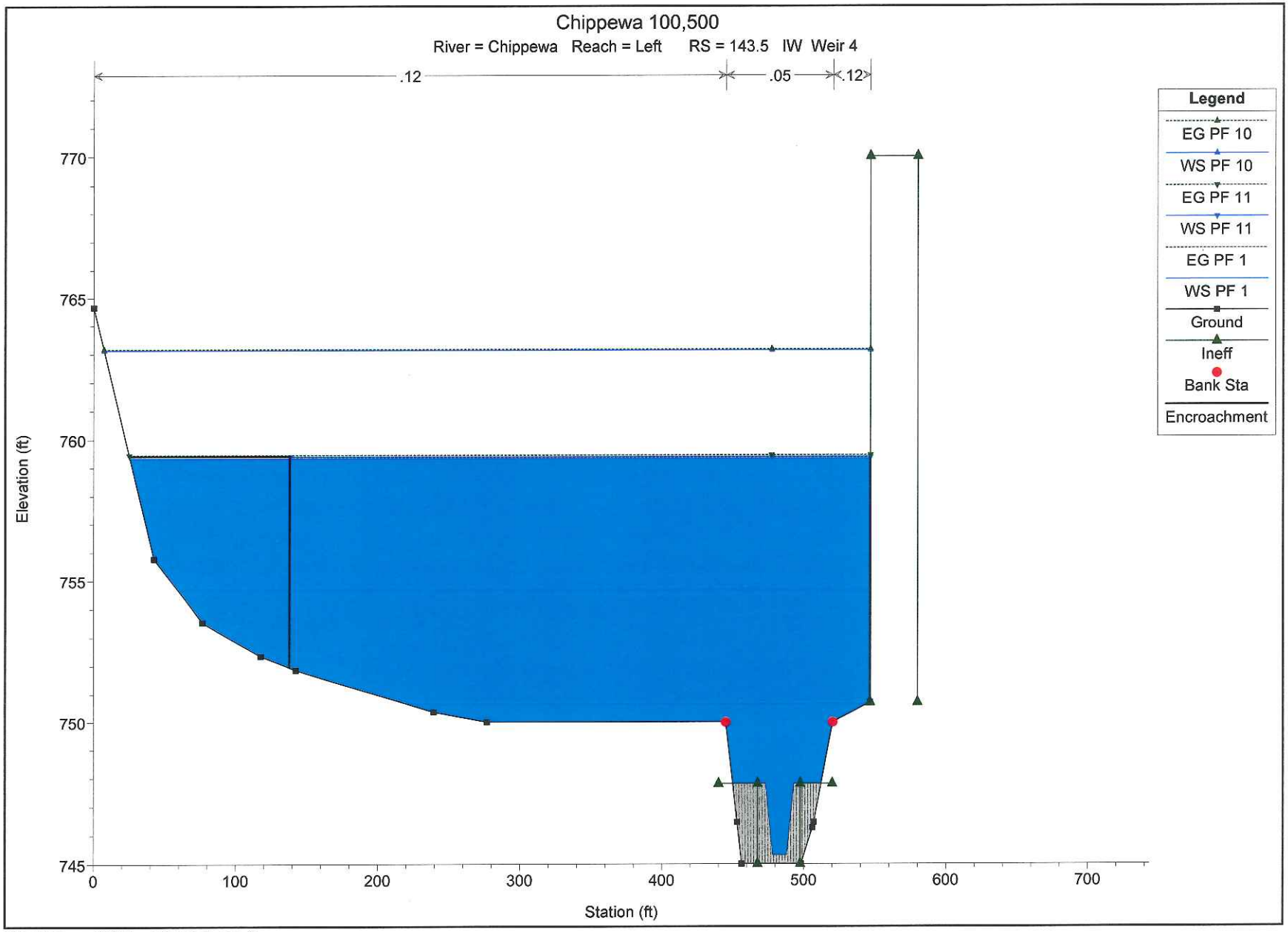

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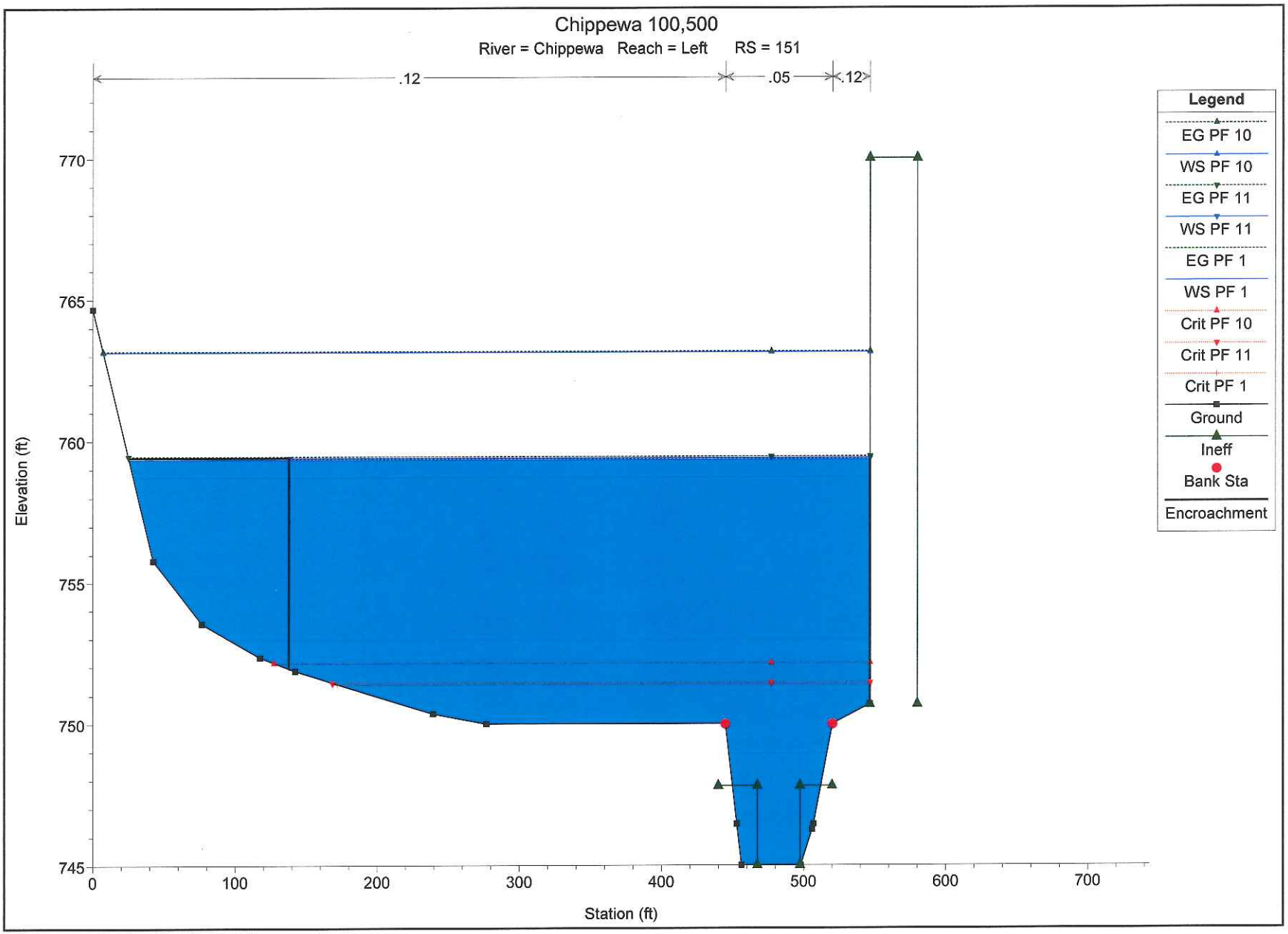

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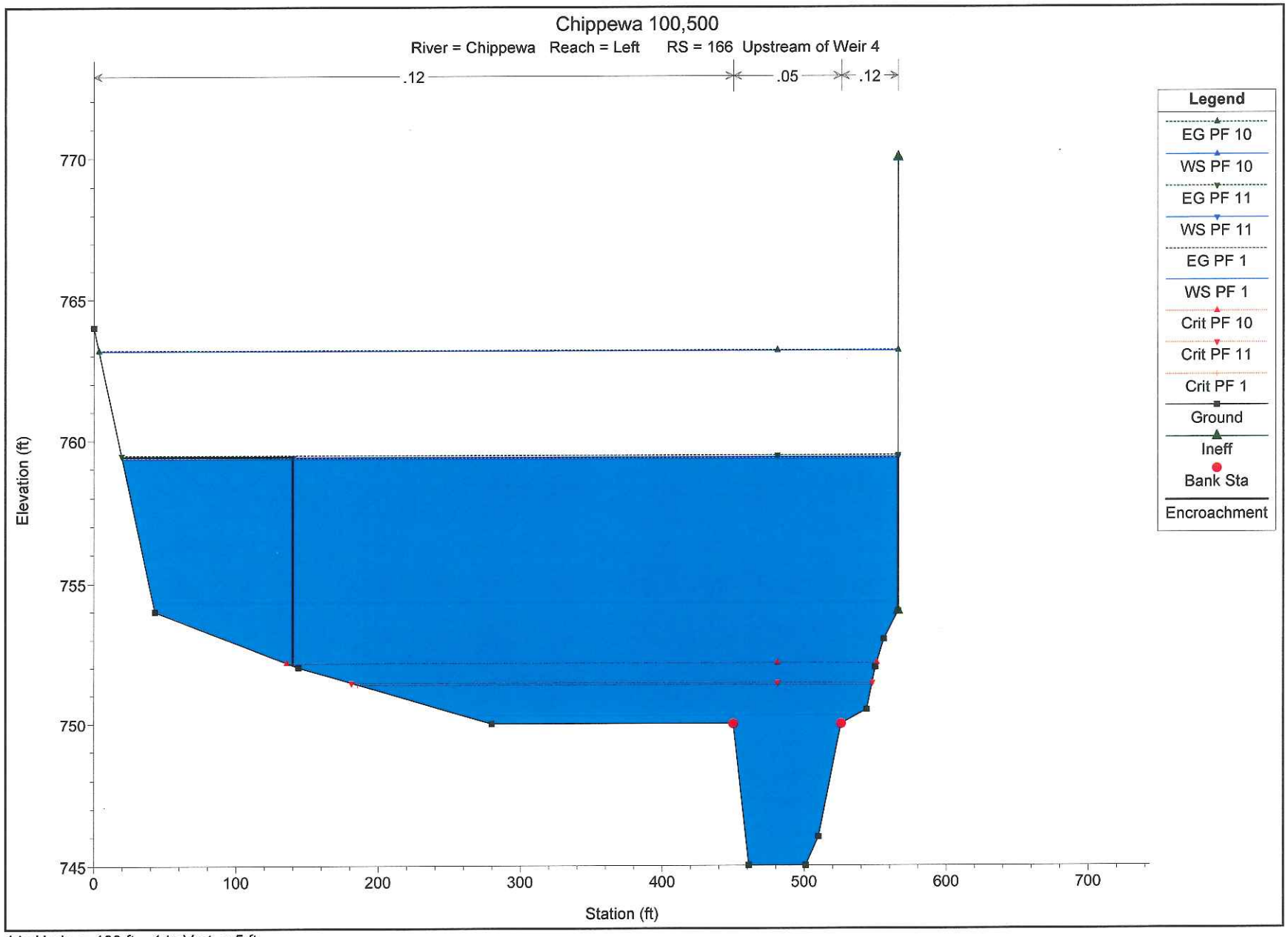

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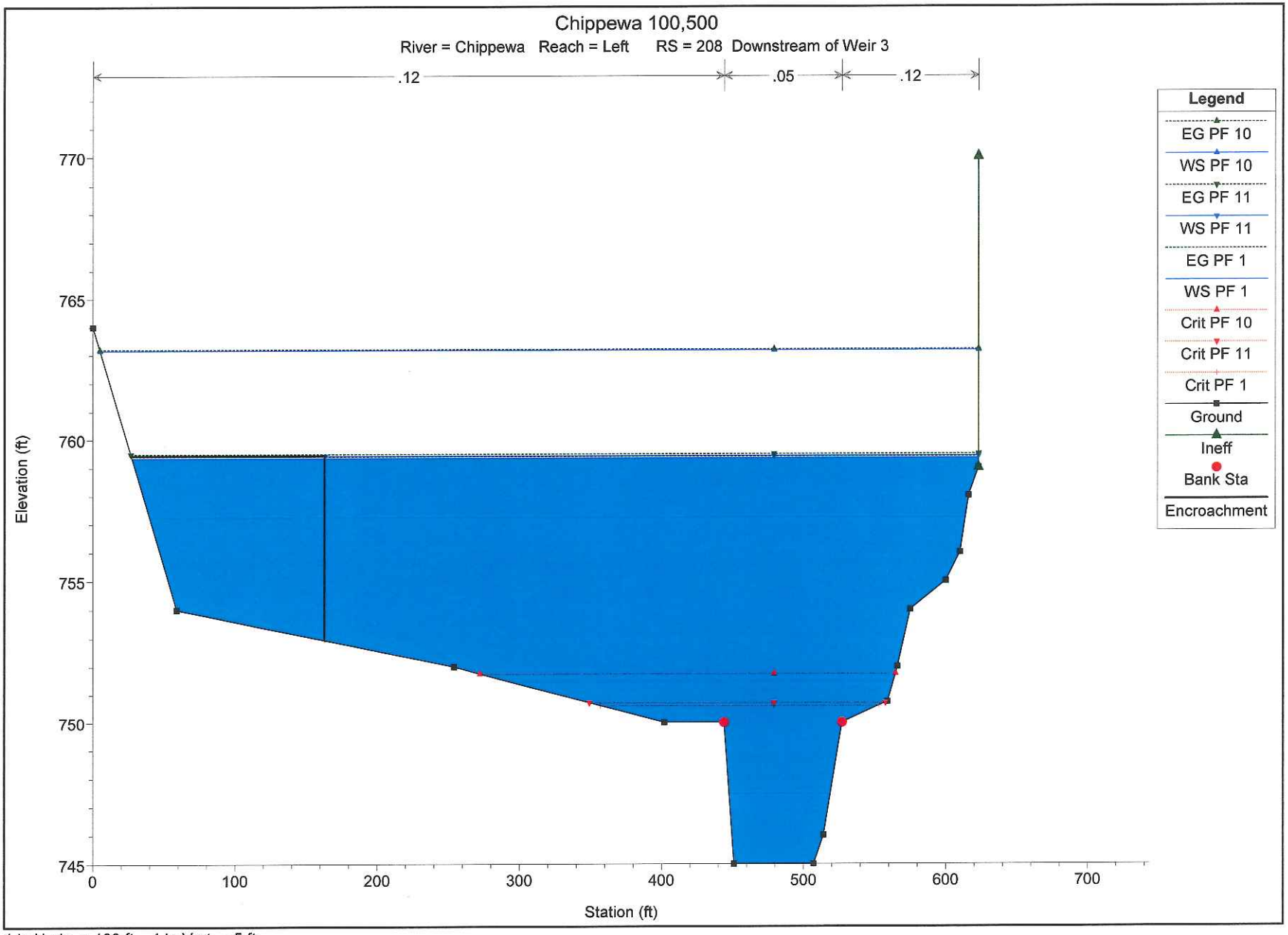

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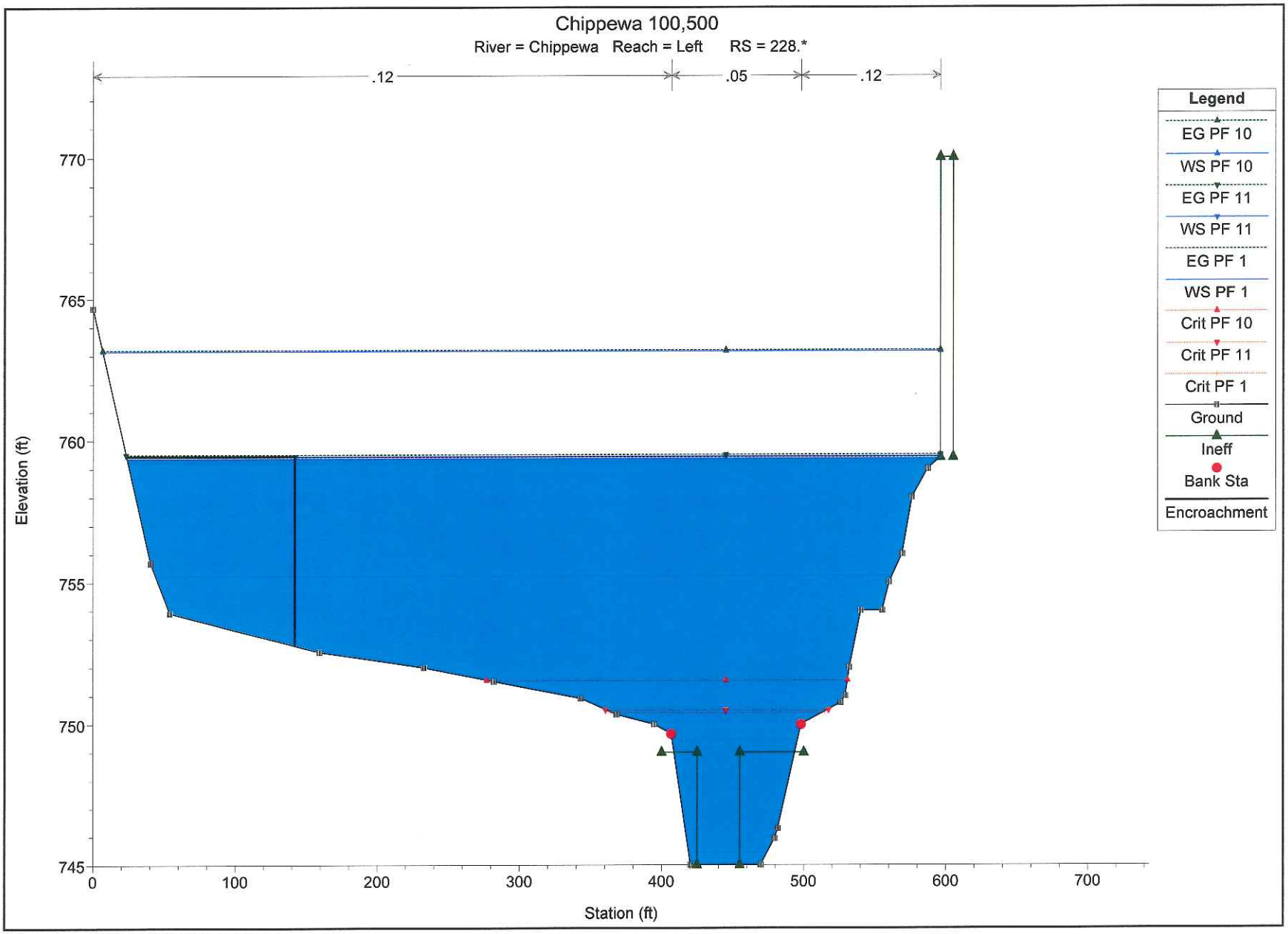

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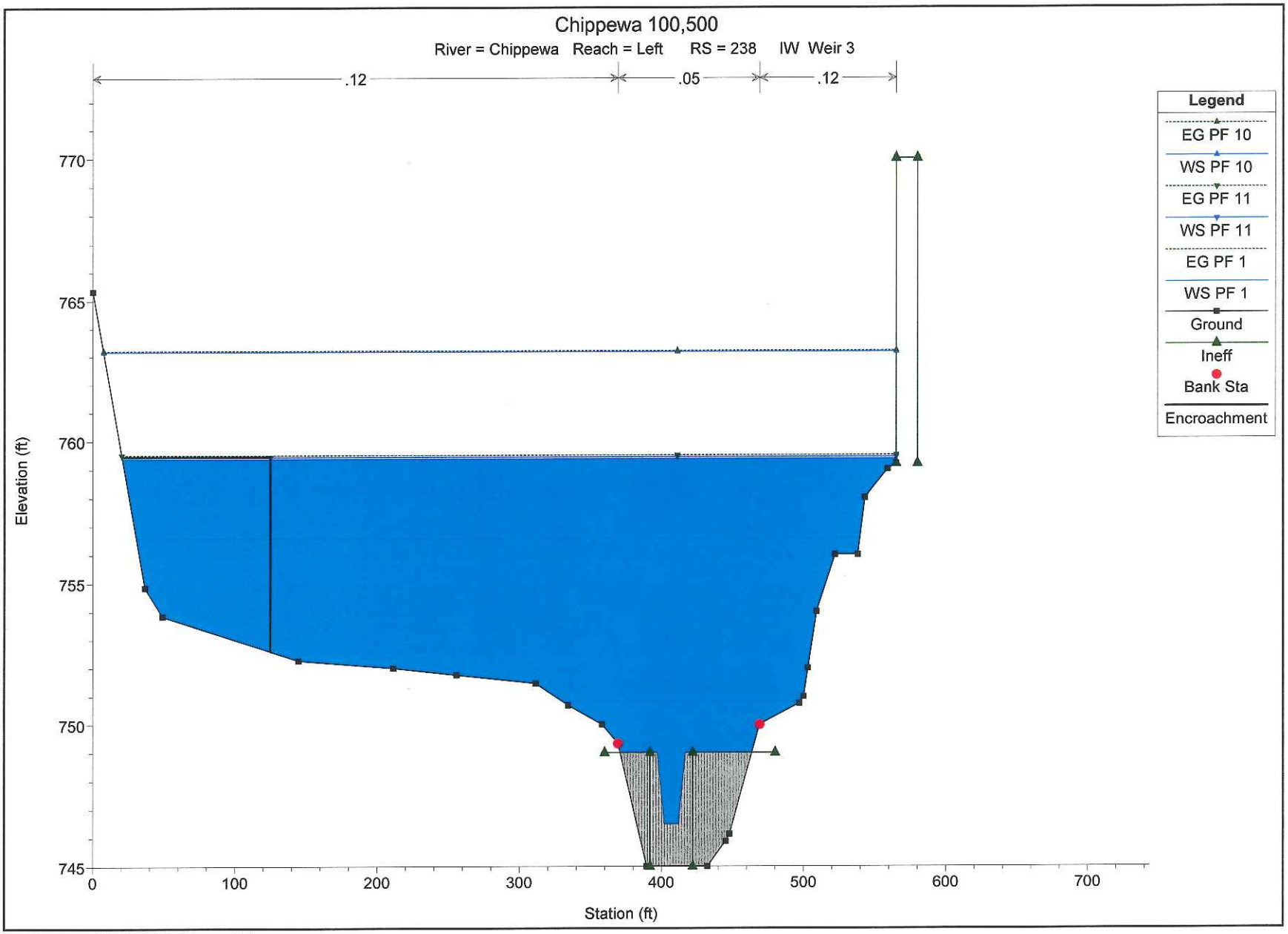

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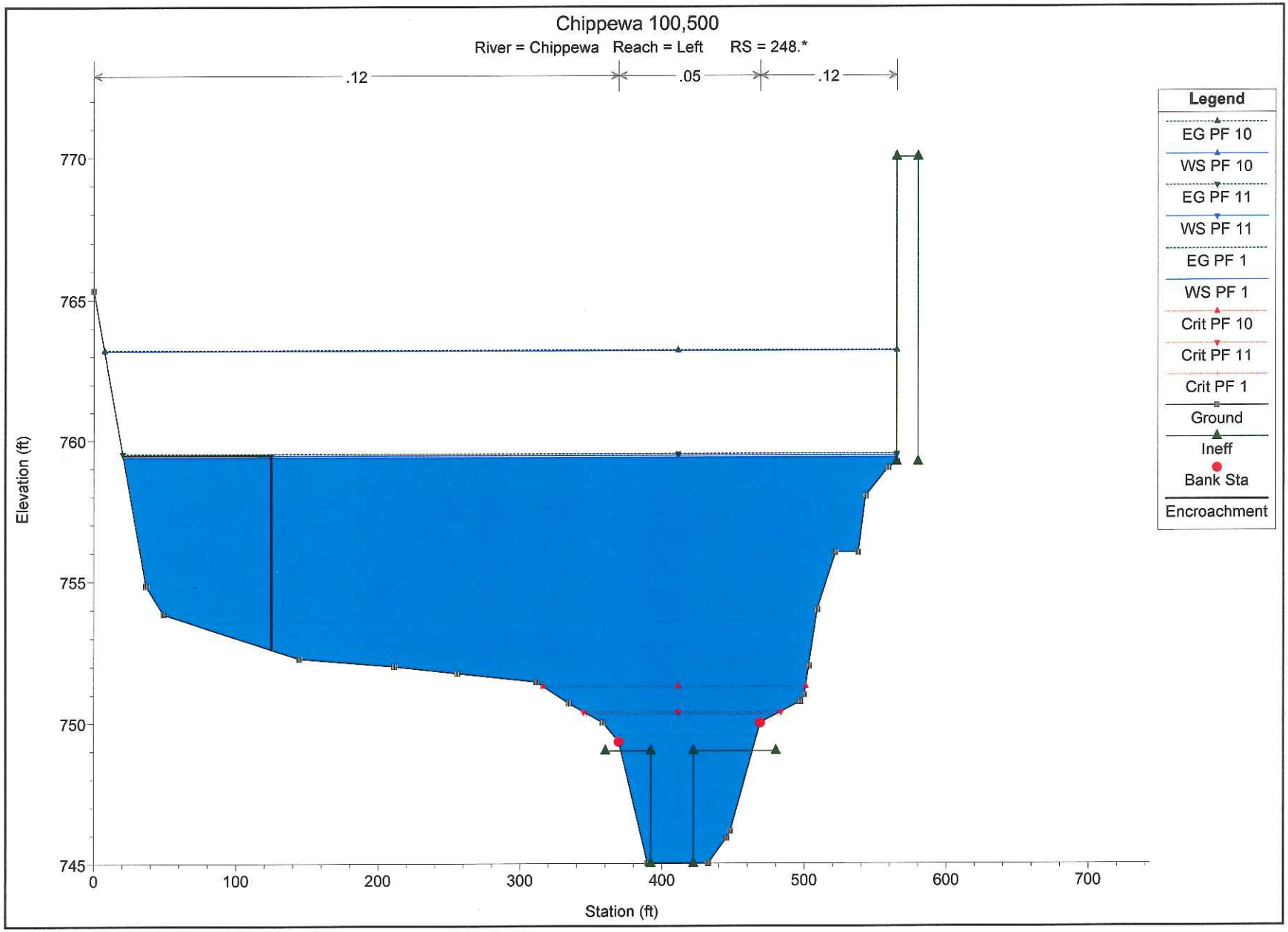

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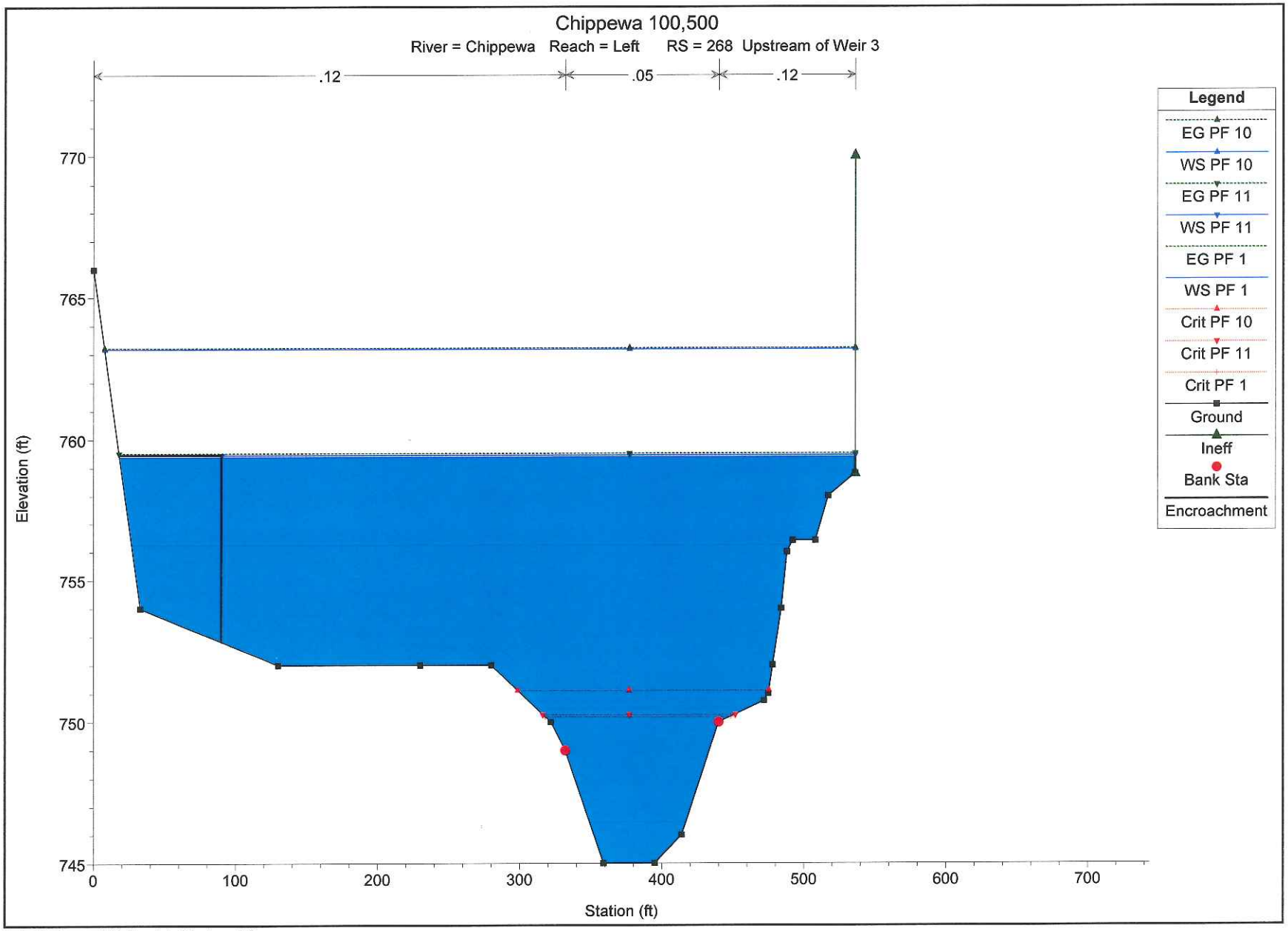

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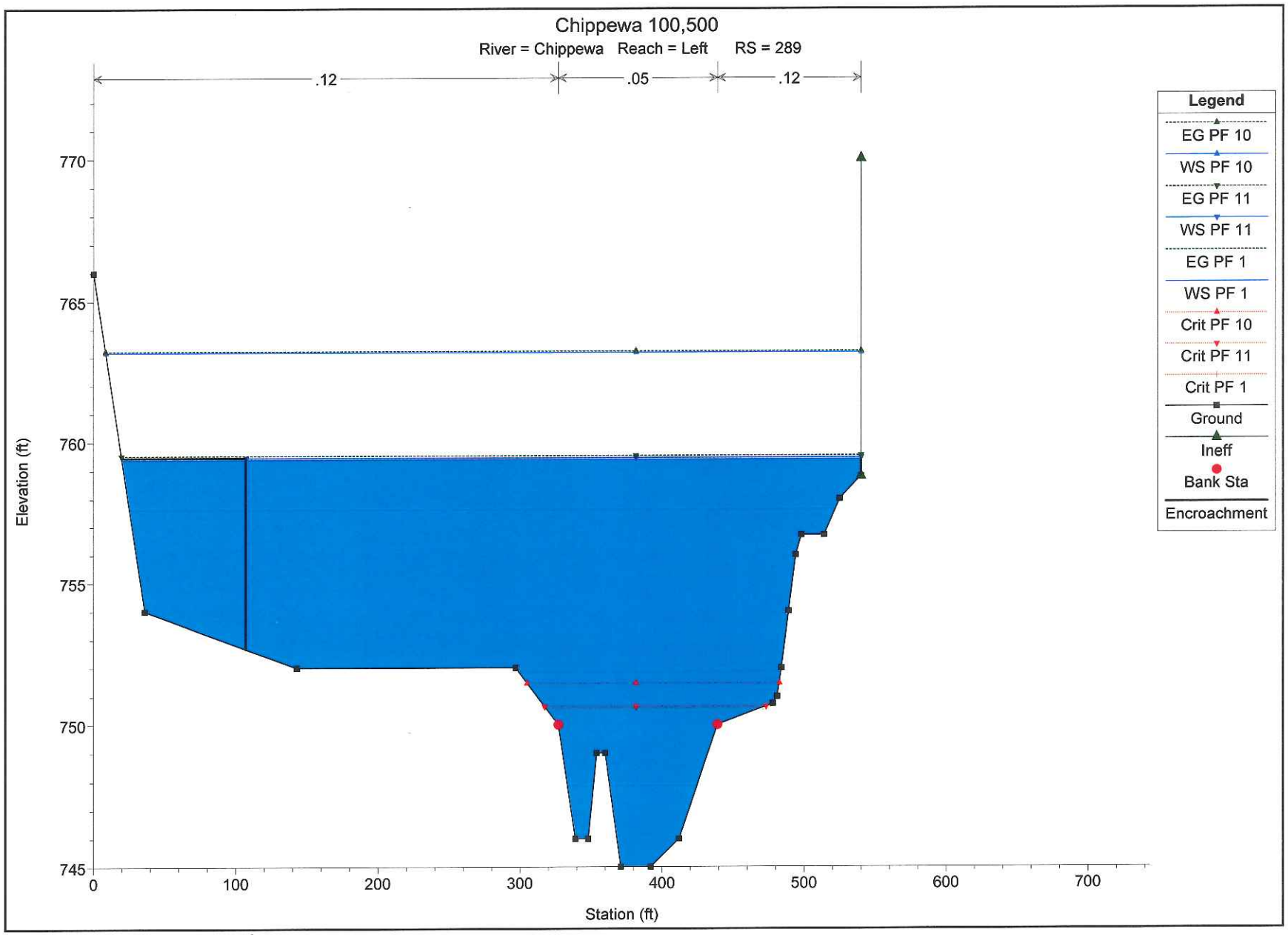
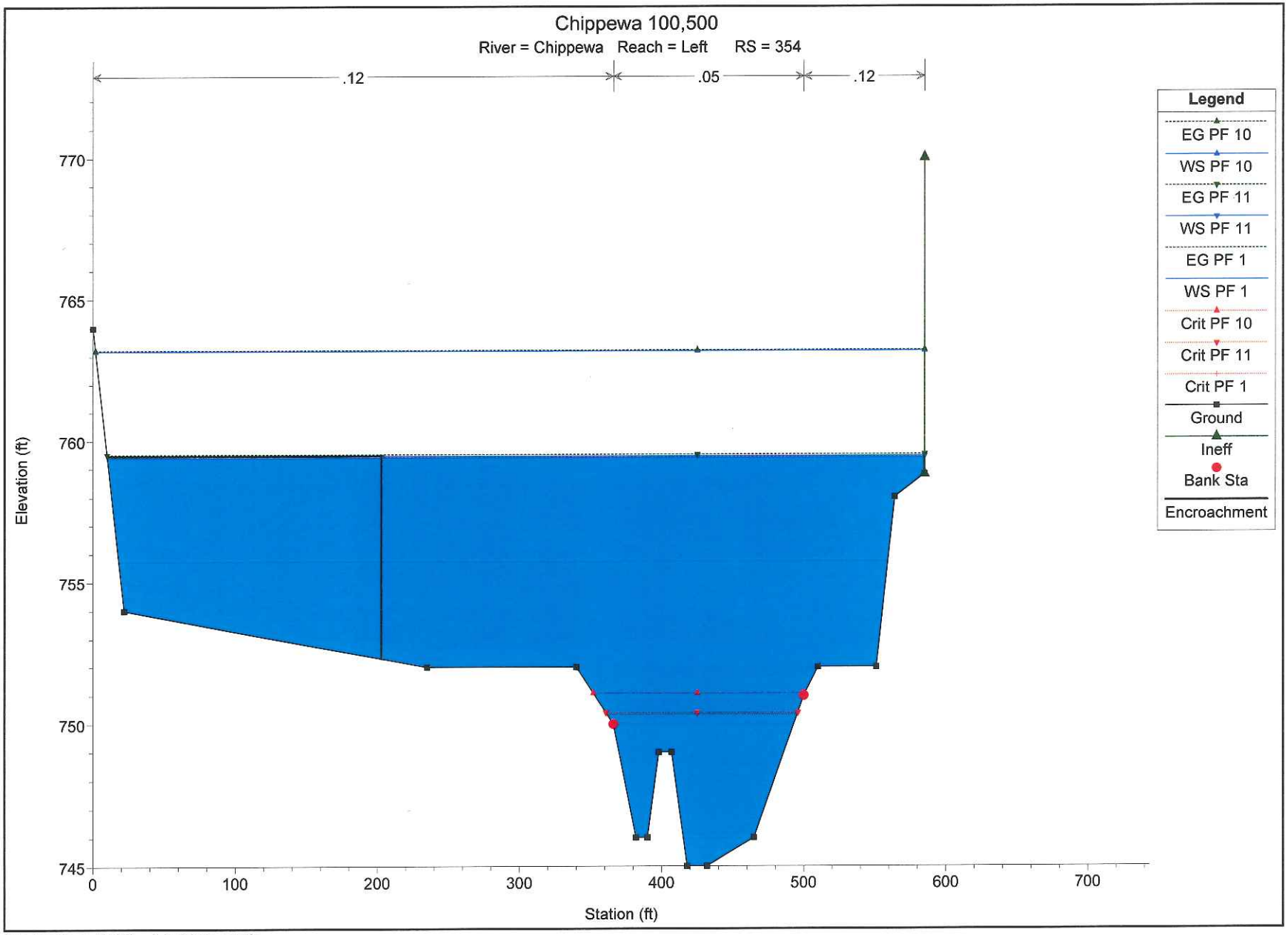
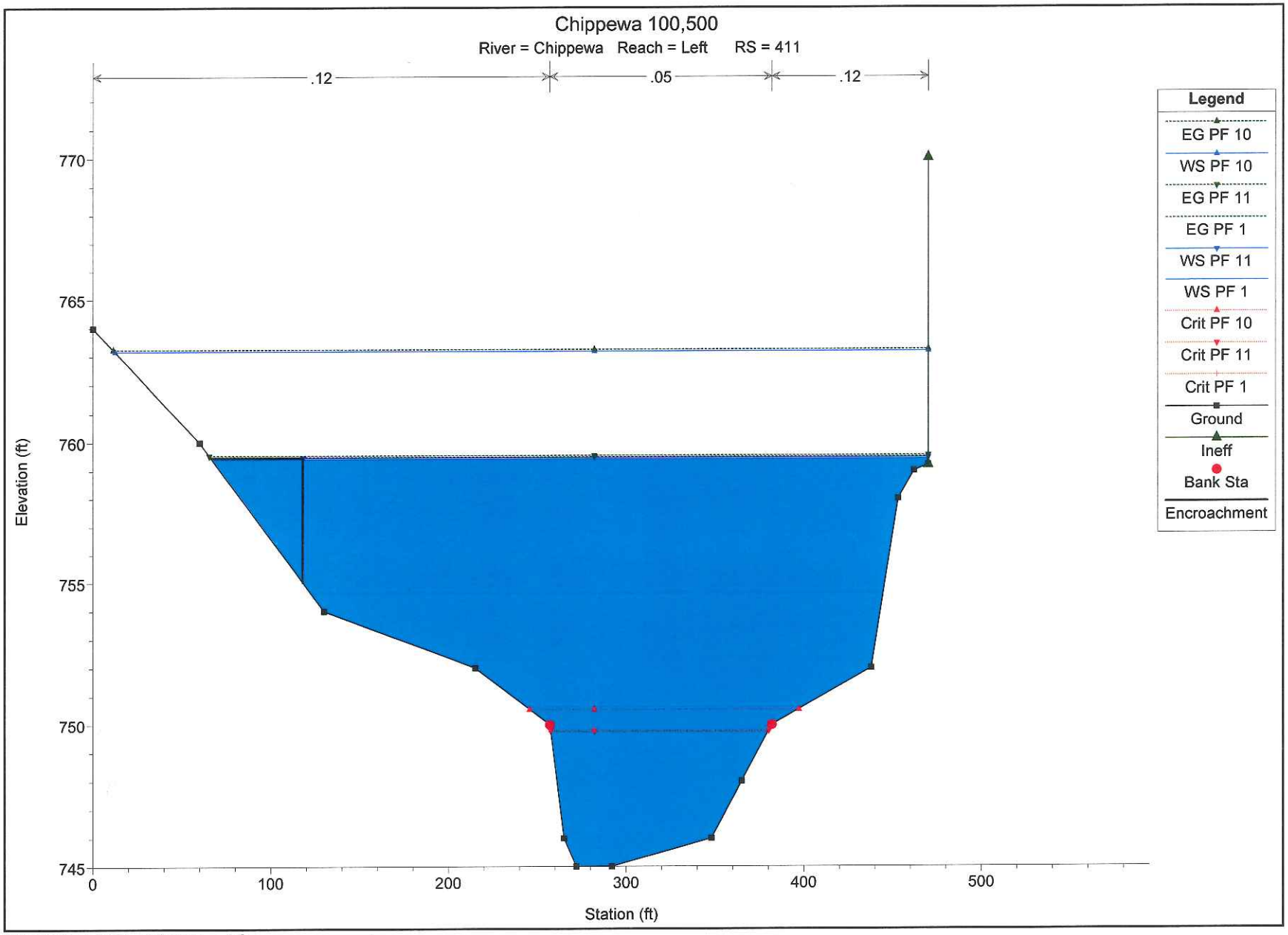


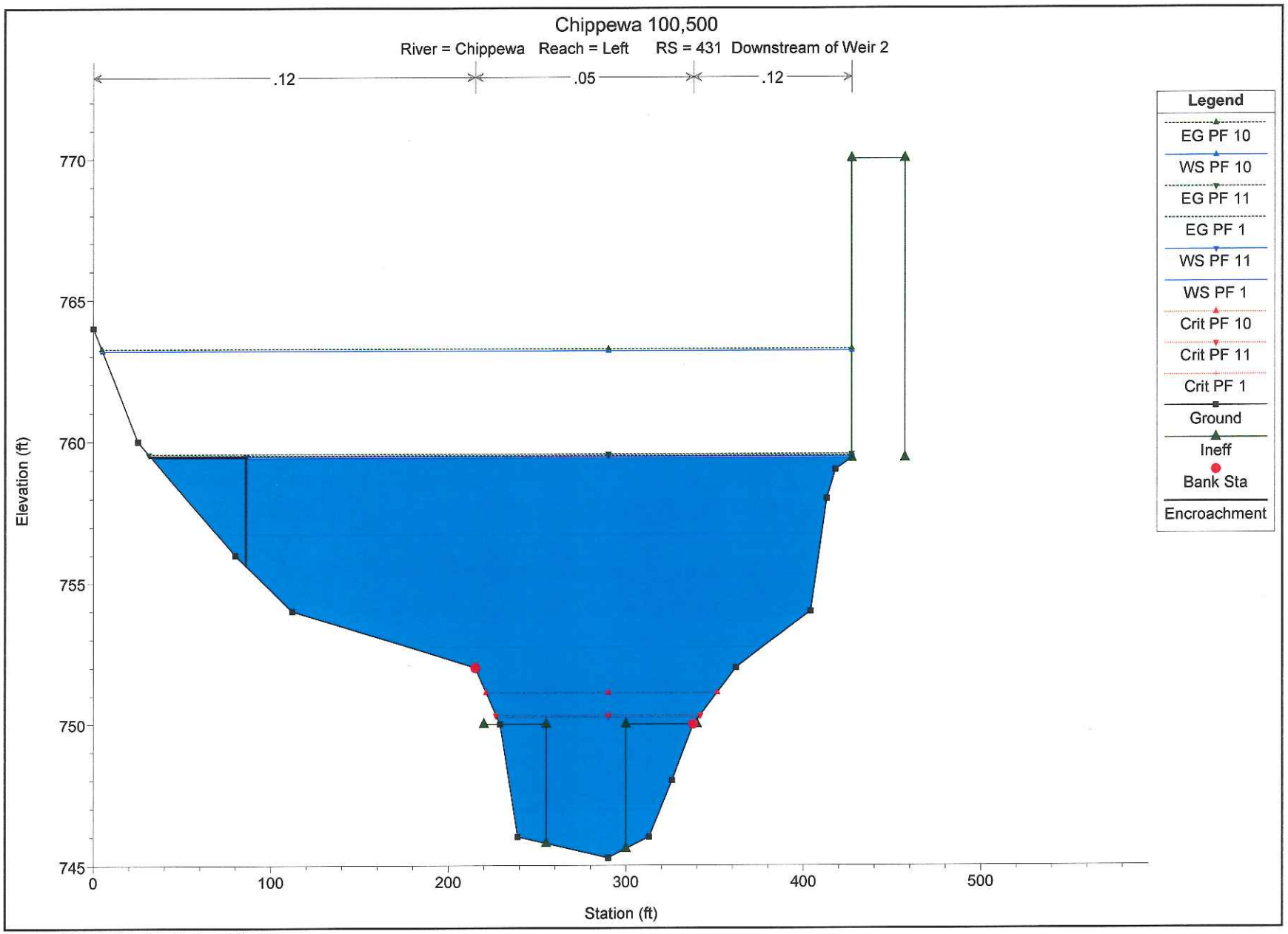
1 in Horiz. = 100 ft 1 in Vert. = 5 ft



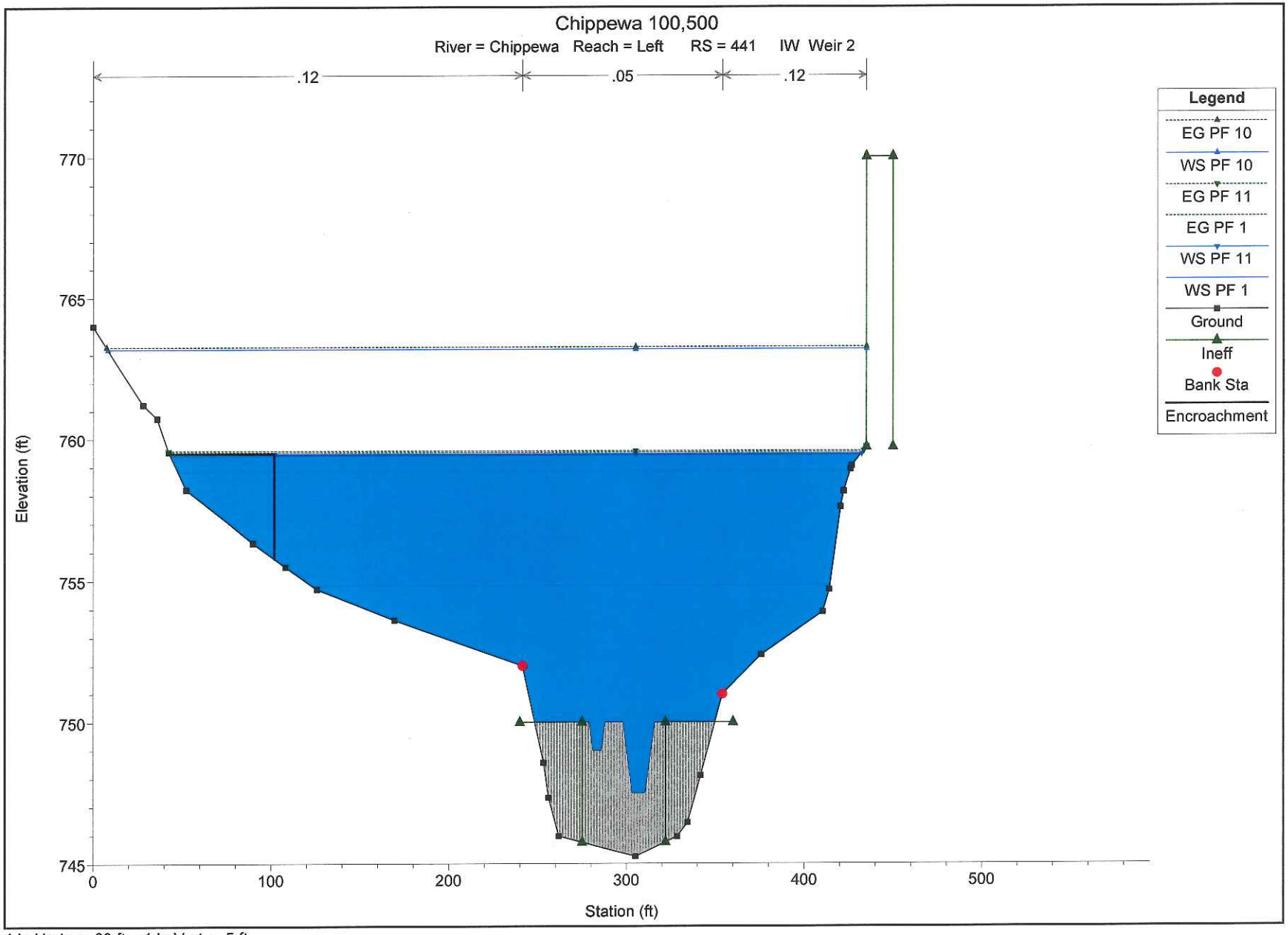
1 in Horiz. = 100 ft 1 in Vert. = 5 ft



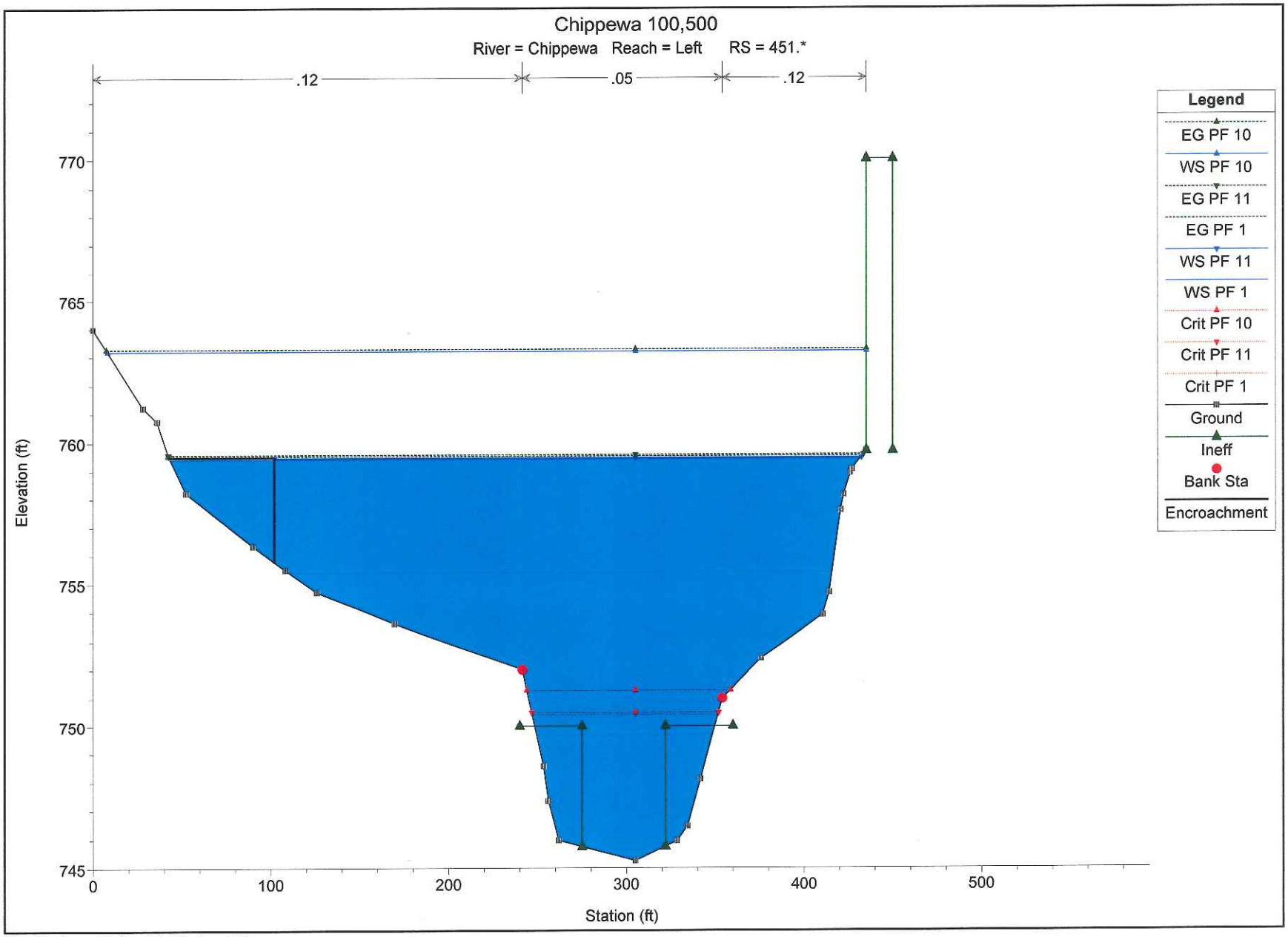
1 in Horiz. = 80 ft 1 in Vert. = 5 ft



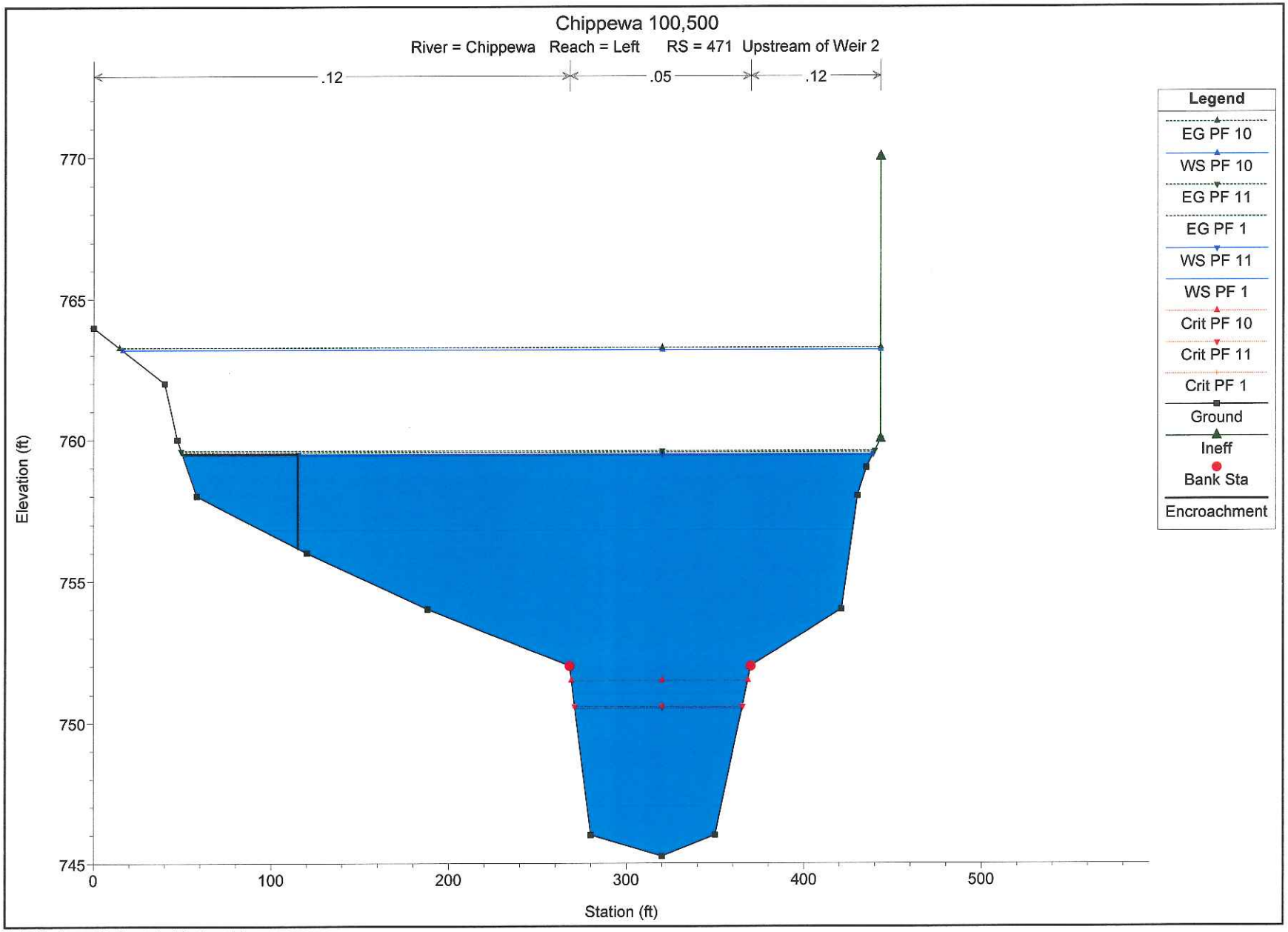
1 in Horiz. = 80 ft 1 in Vert. = 5 ft



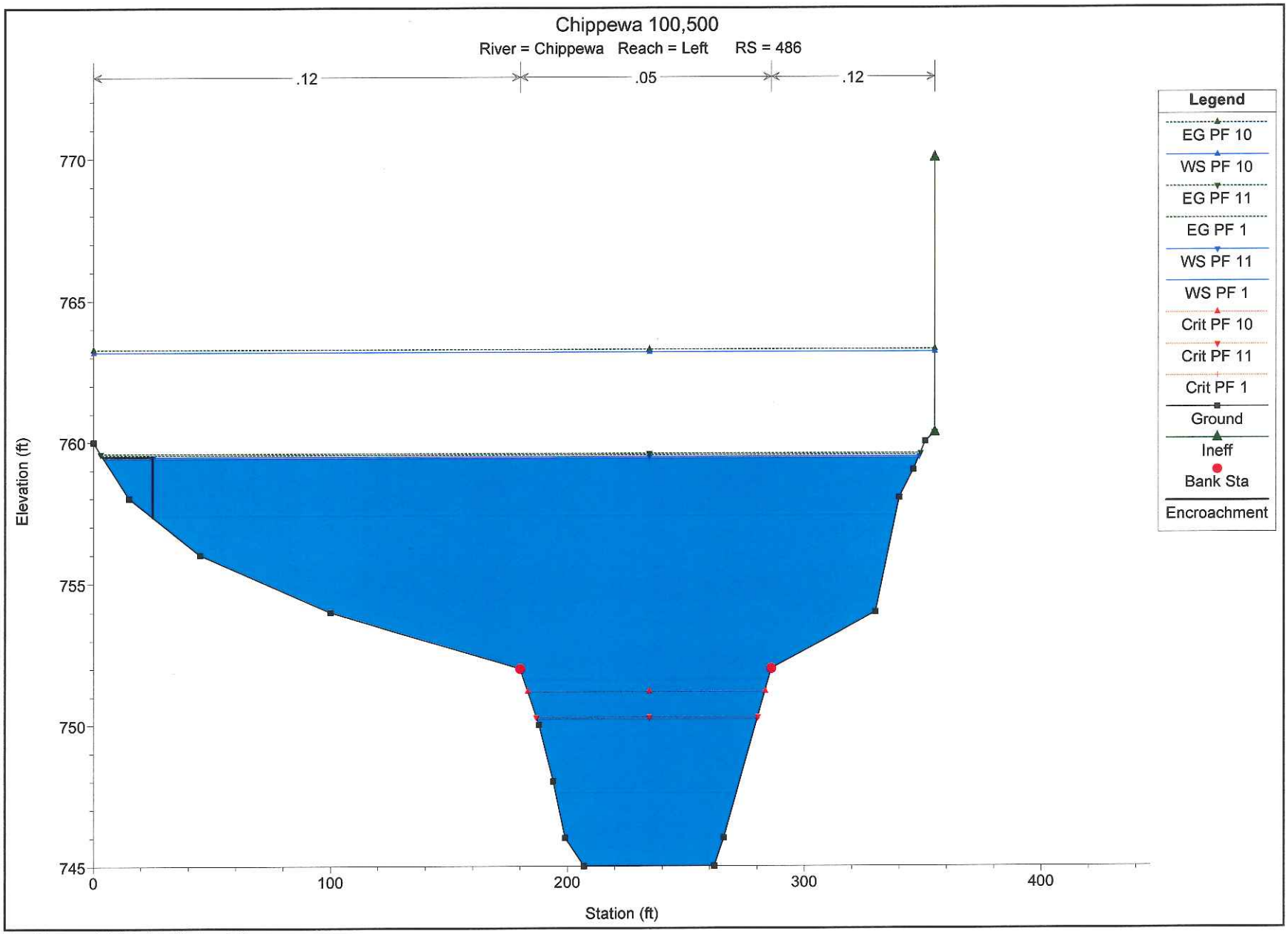
1 in Horiz. = 80 ft 1 in Vert. = 5 ft



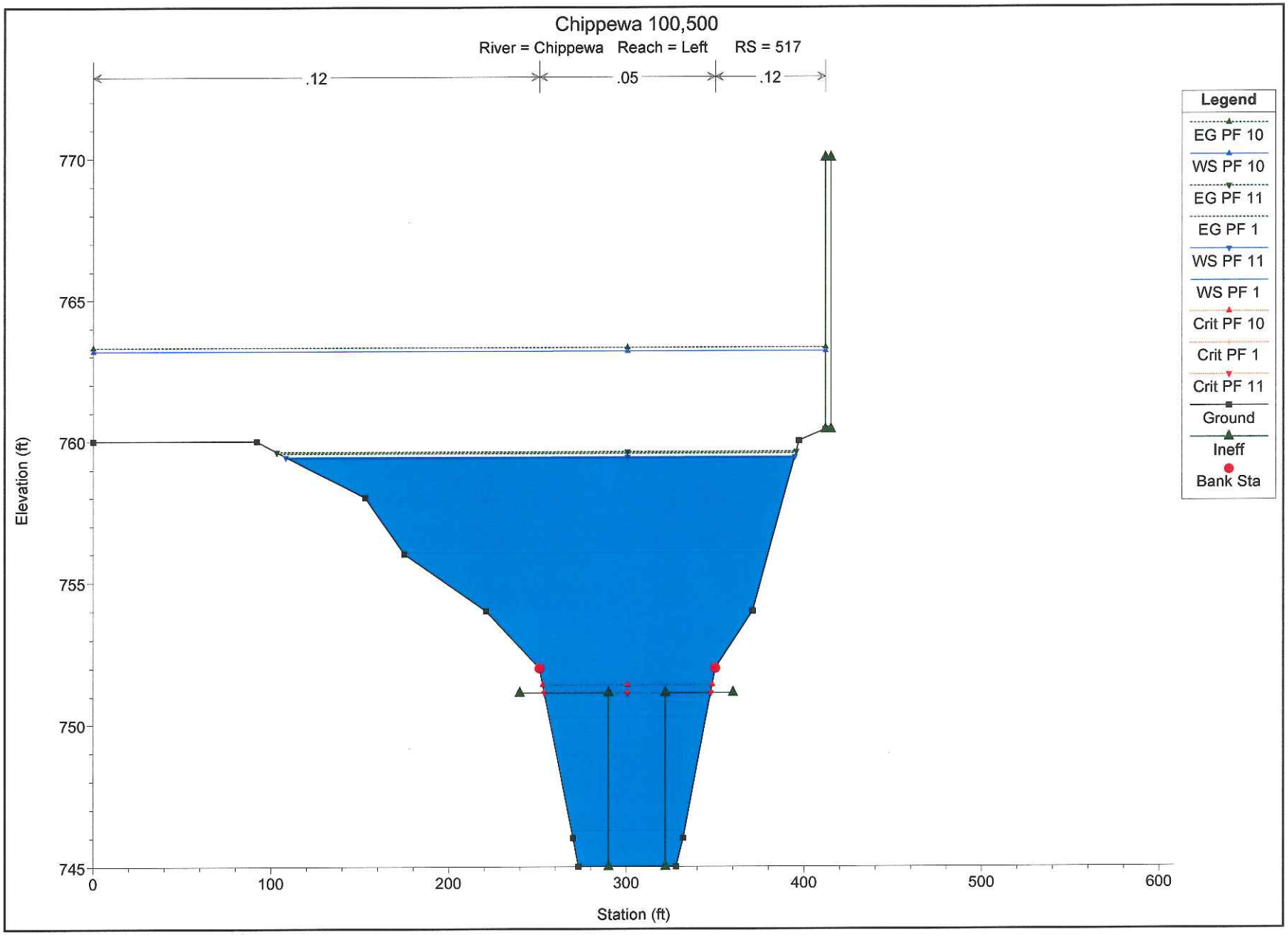
1 in Horiz. = 80 ft 1 in Vert. = 5 ft



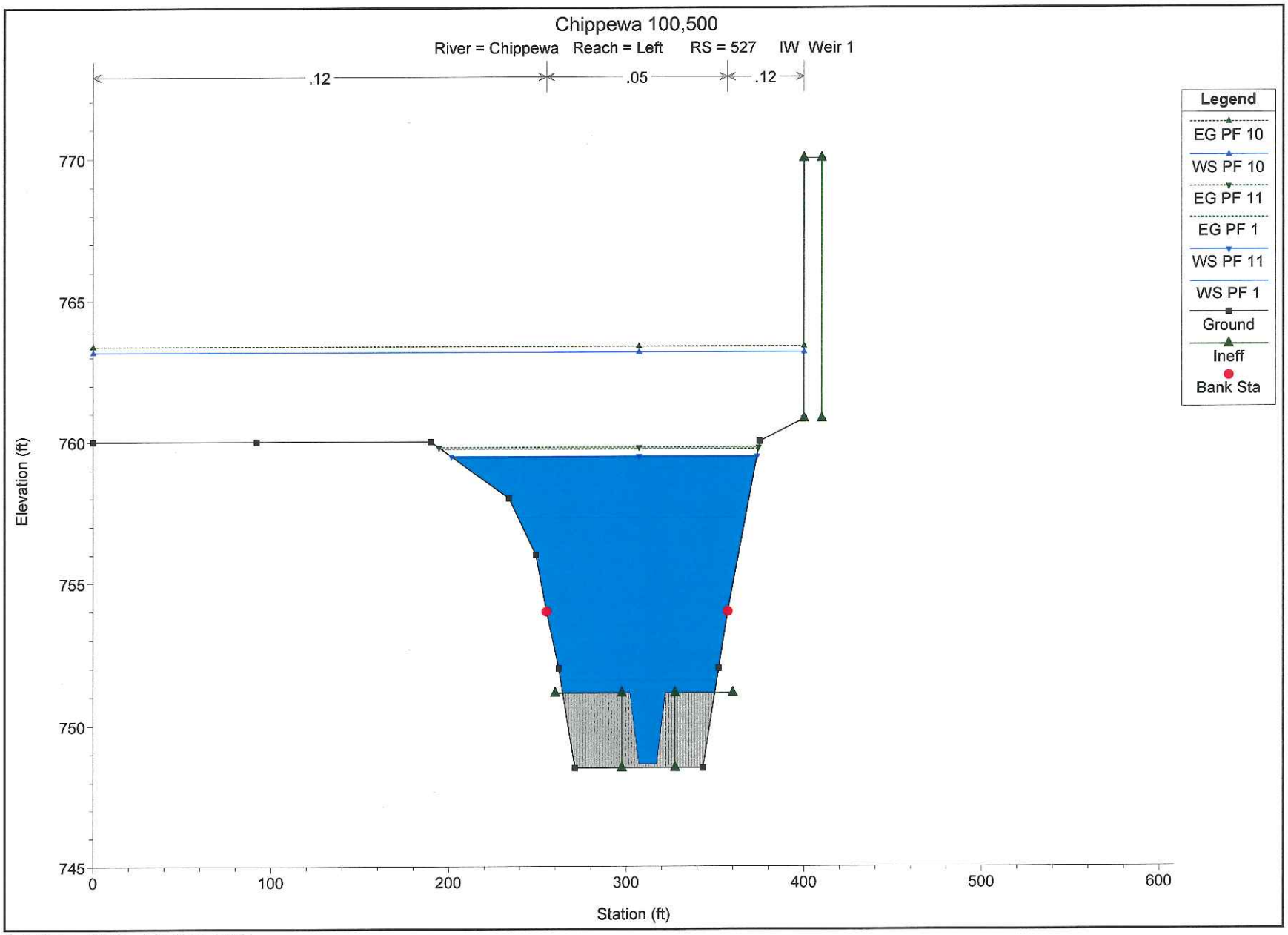
1 in Horiz. = 80 ft 1 in Vert. = 5 ft



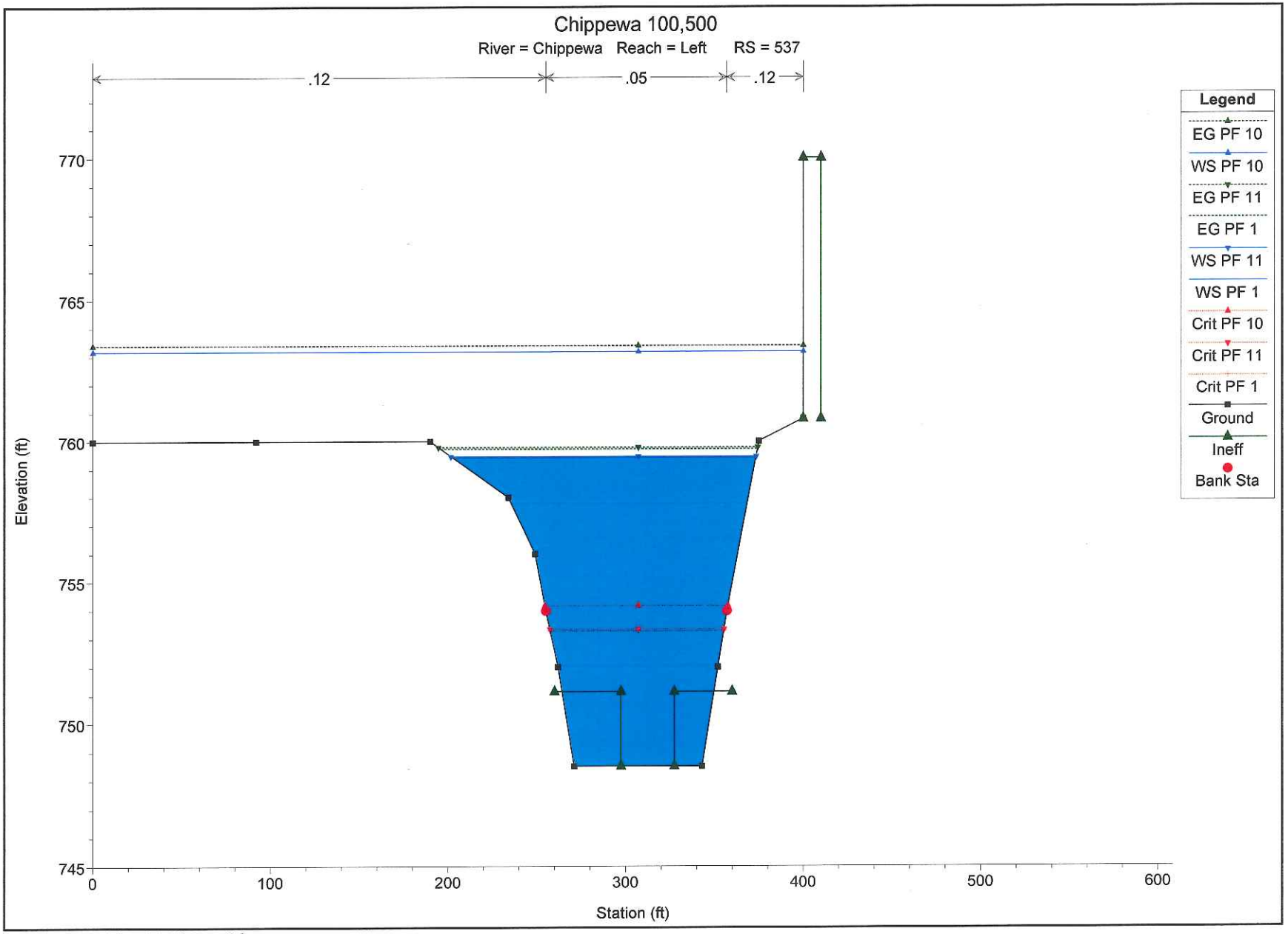
1 in Horiz. = 60 ft 1 in Vert. = 5 ft



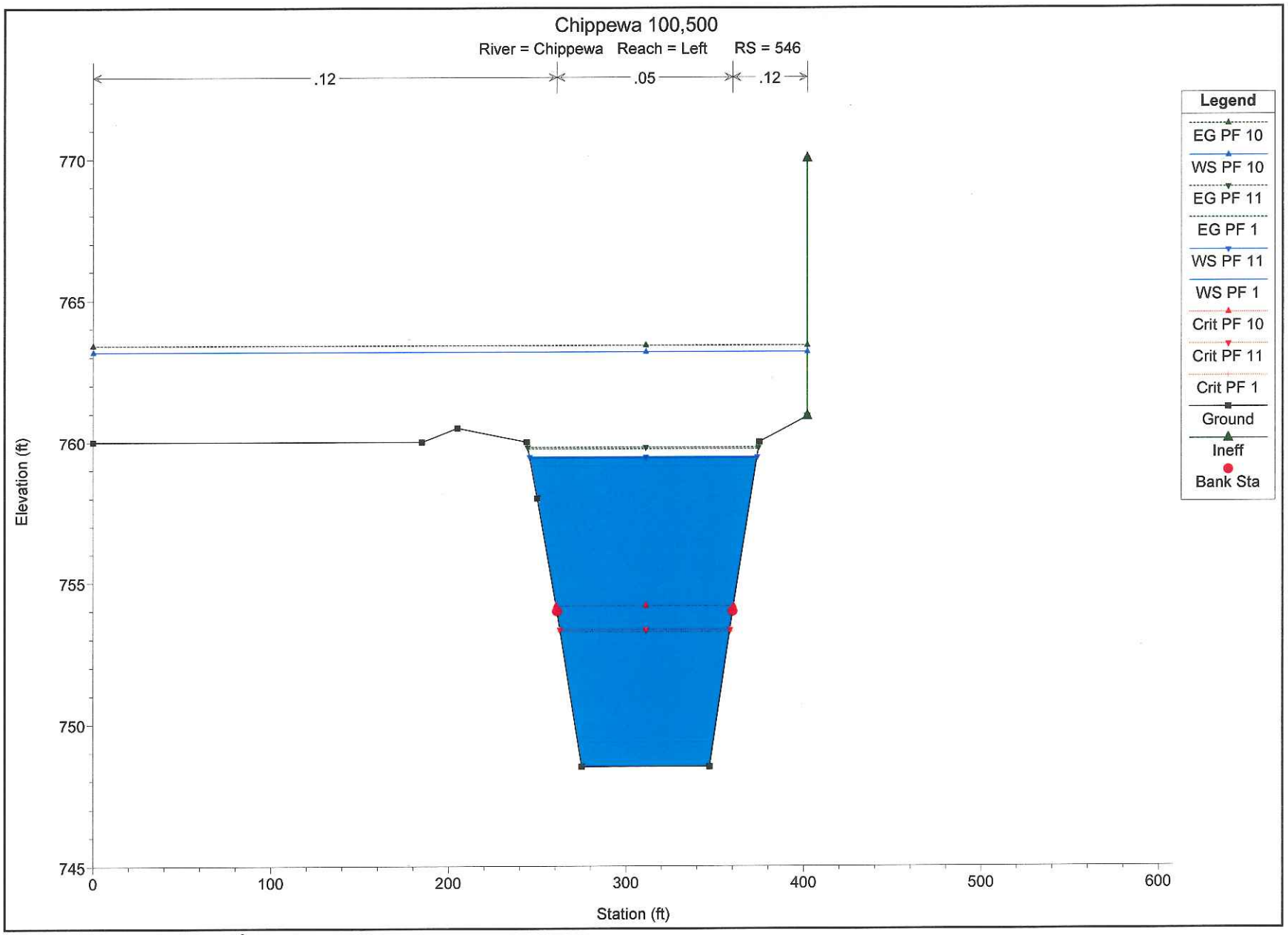
1 in Horiz. = 80 ft 1 in Vert. = 5 ft



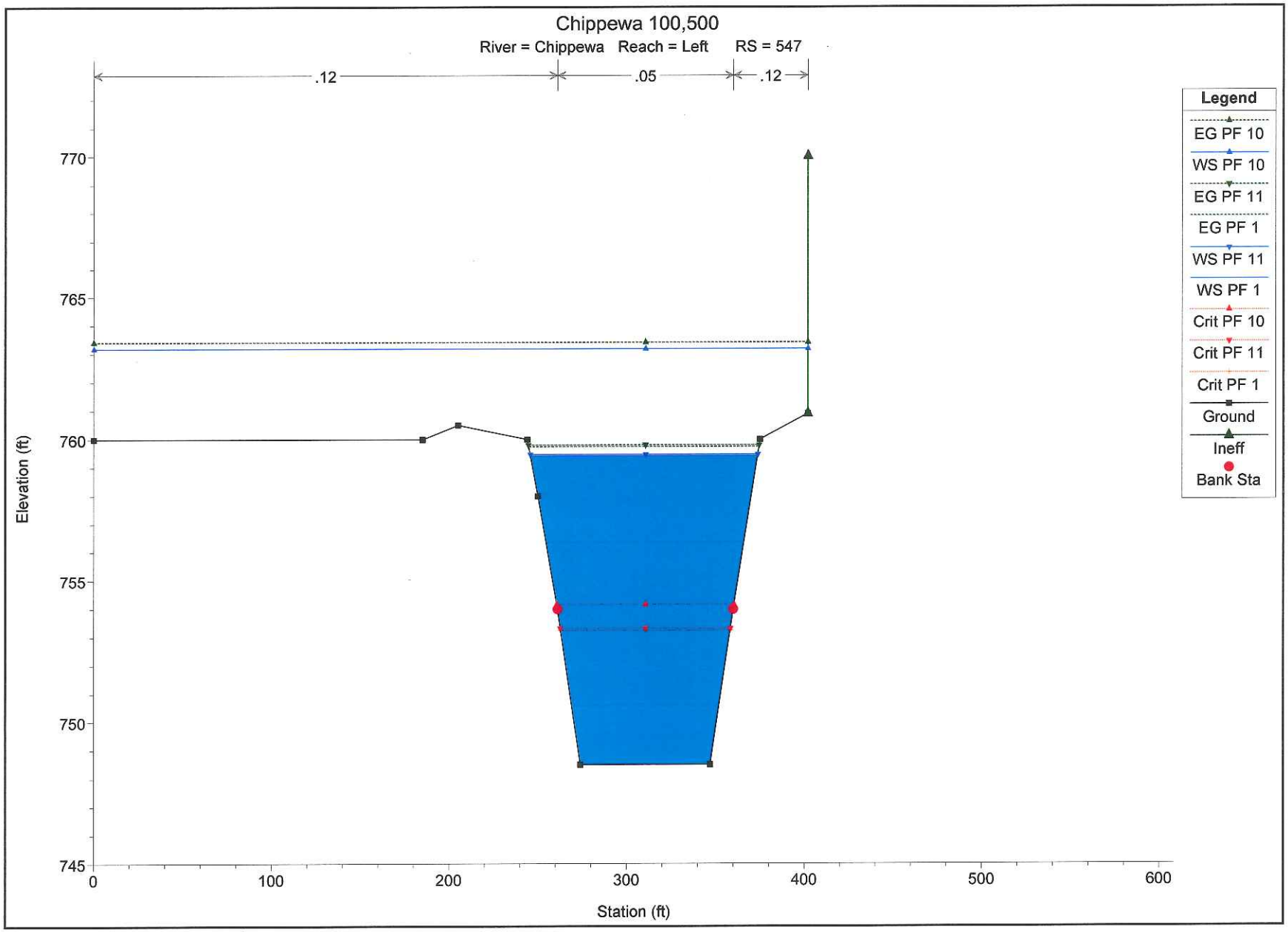
1 in Horiz. = 80 ft 1 in Vert. = 5 ft



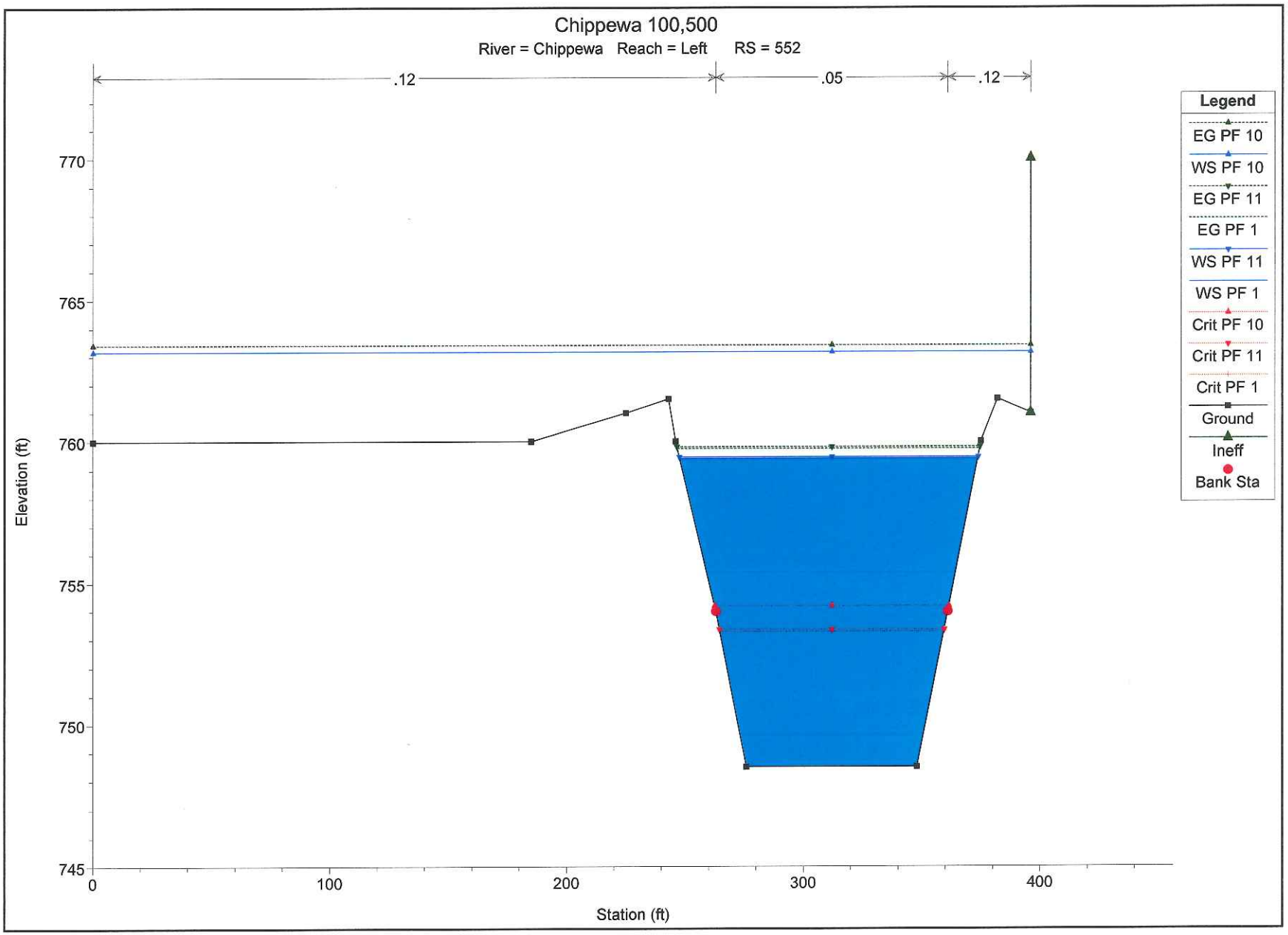
1 in Horiz. = 80 ft 1 in Vert. = 5 ft



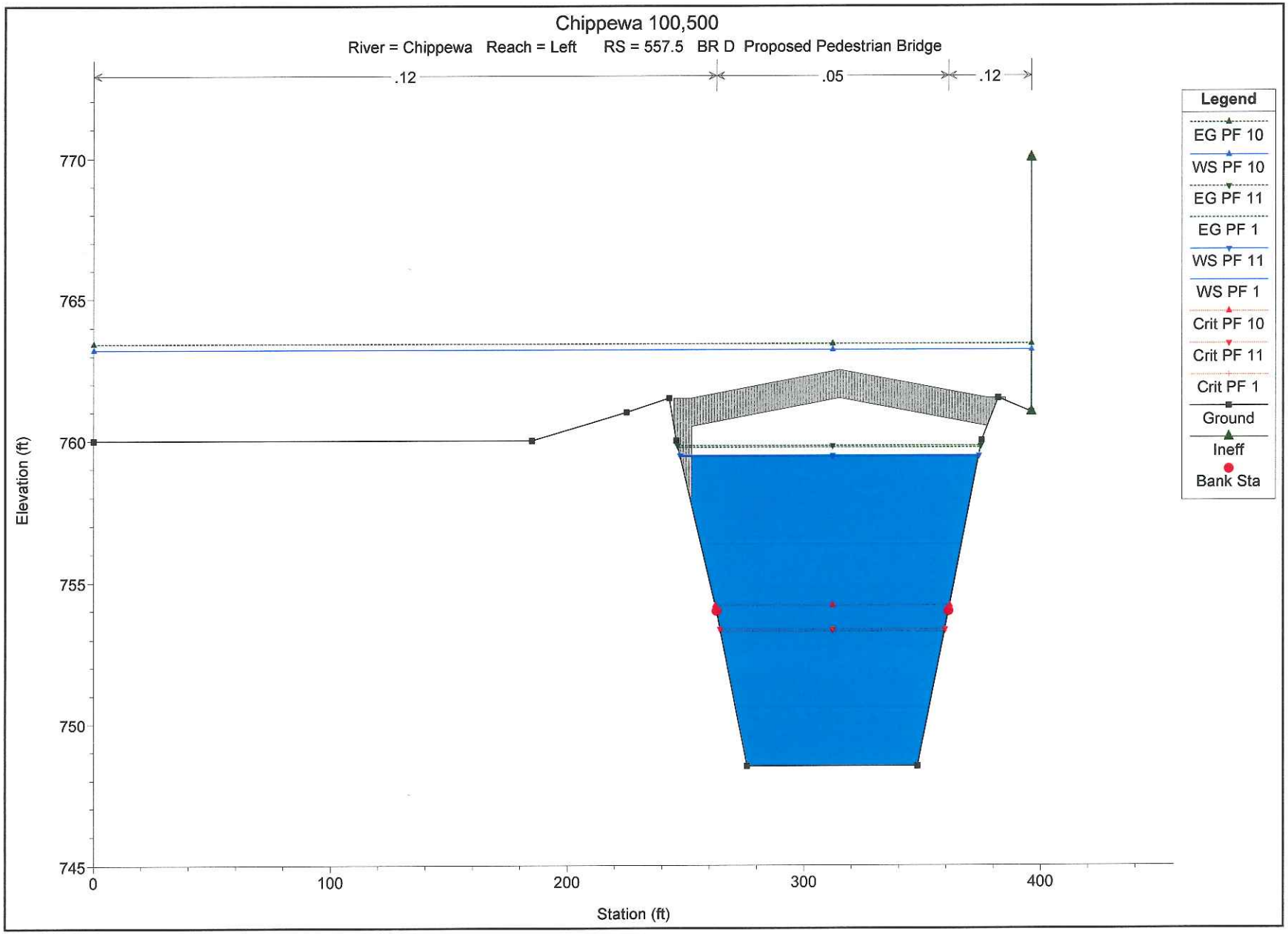
1 in Horiz. = 80 ft 1 in Vert. = 5 ft



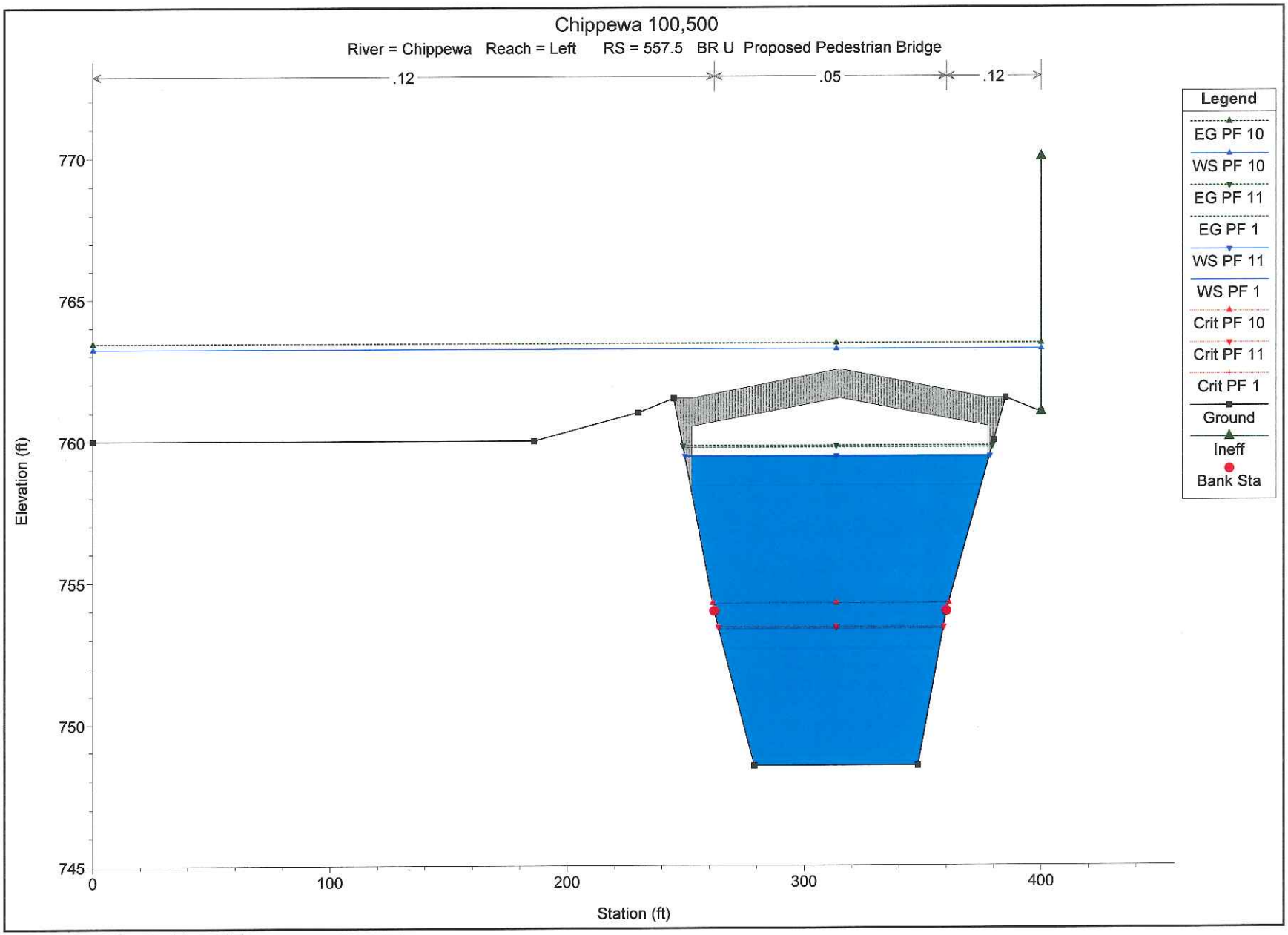
1 in Horiz. = 80 ft 1 in Vert. = 5 ft



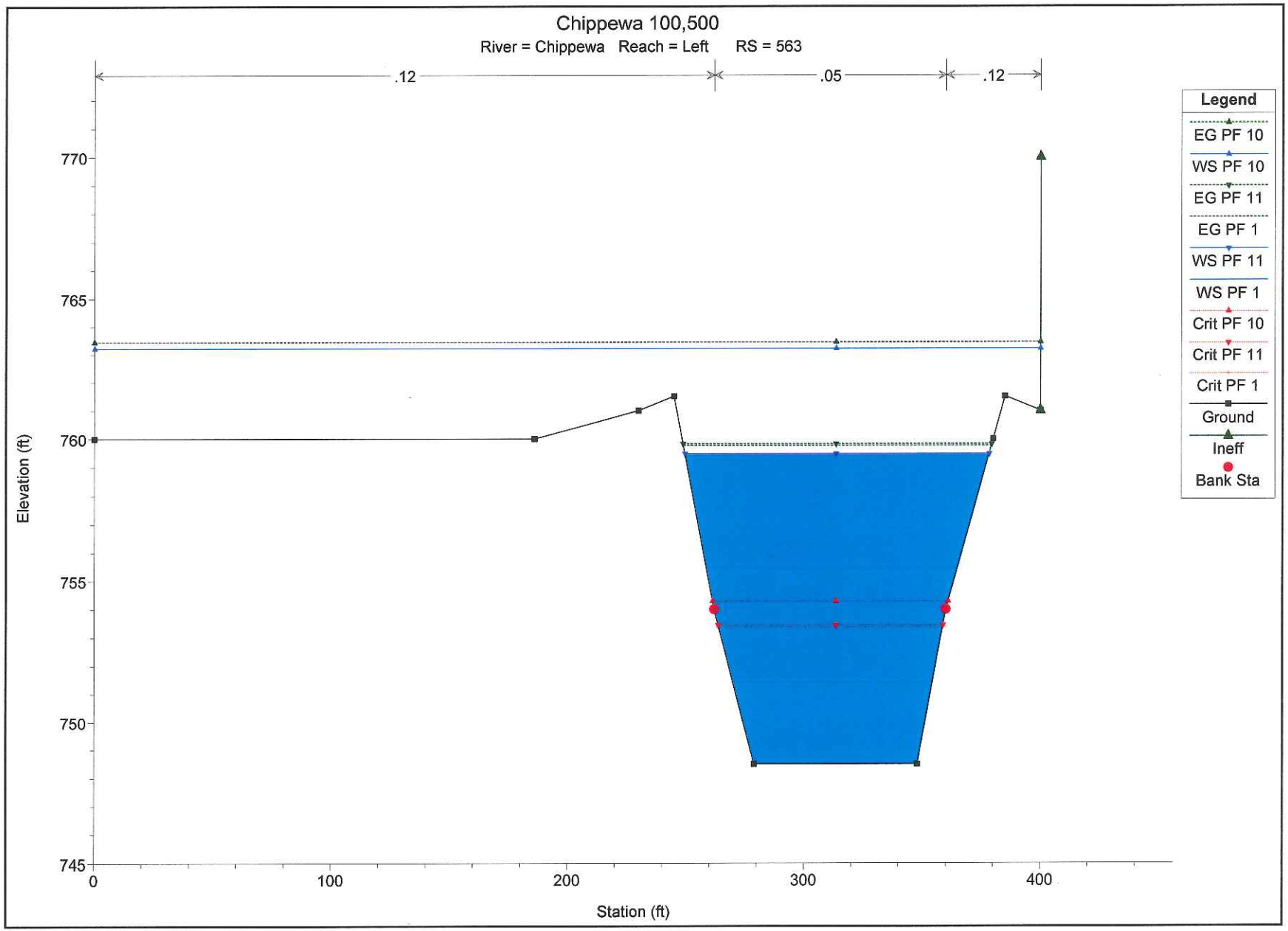
1 in Horiz. = 60 ft 1 in Vert. = 5 ft



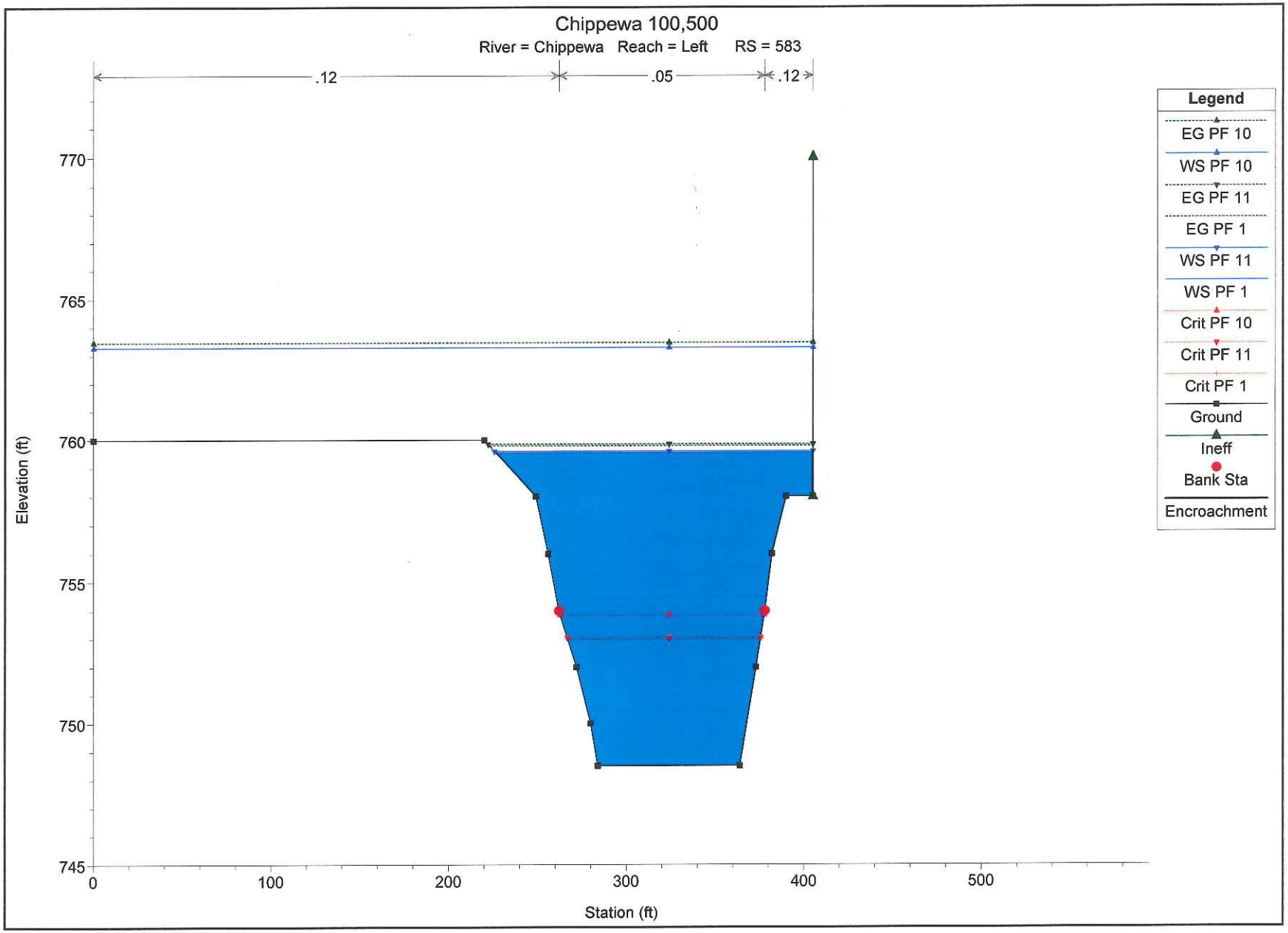
1 in Horiz. = 60 ft 1 in Vert. = 5 ft



1 in Horiz. = 60 ft 1 in Vert. = 5 ft



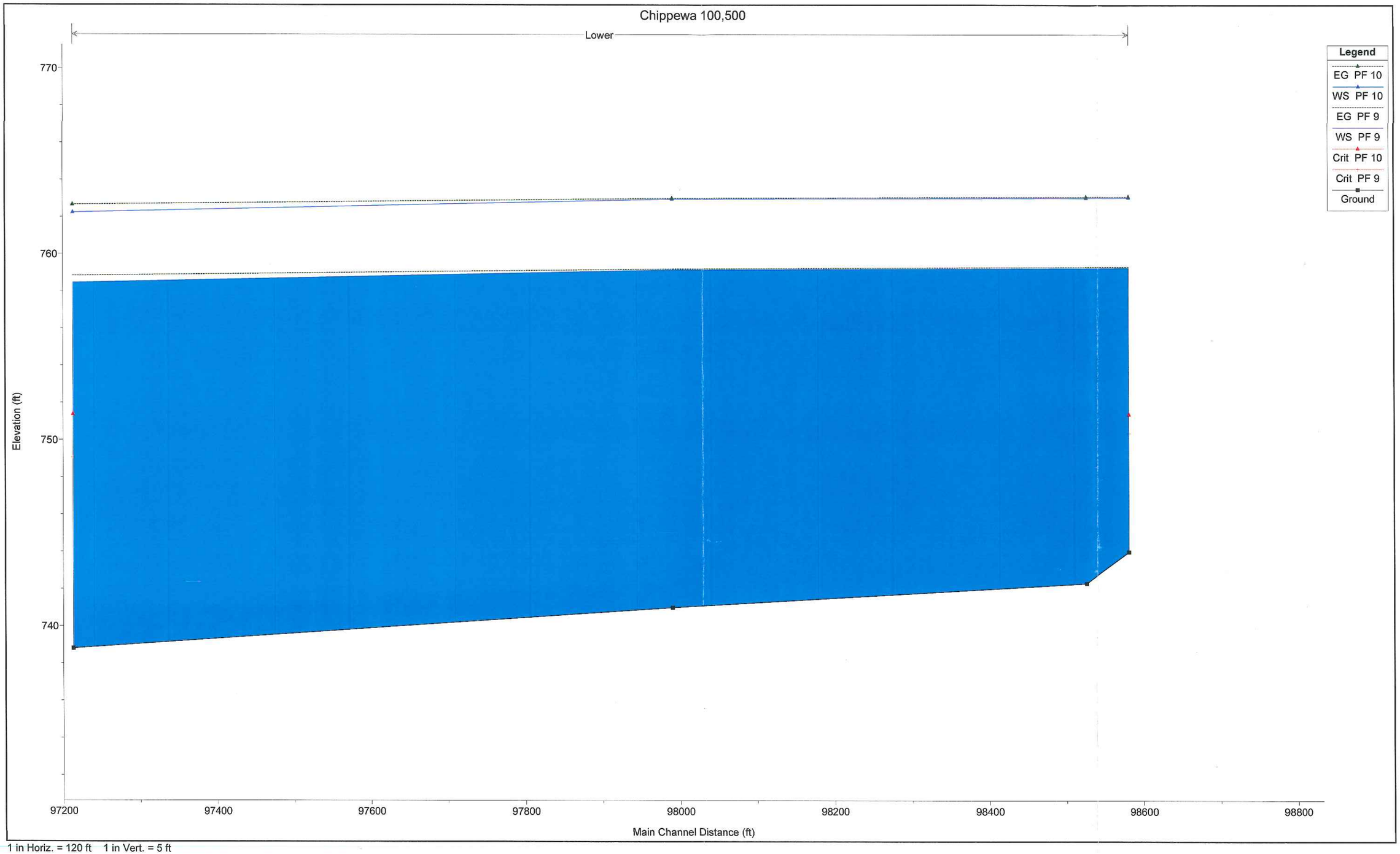
1 in Horiz. = 60 ft 1 in Vert. = 5 ft



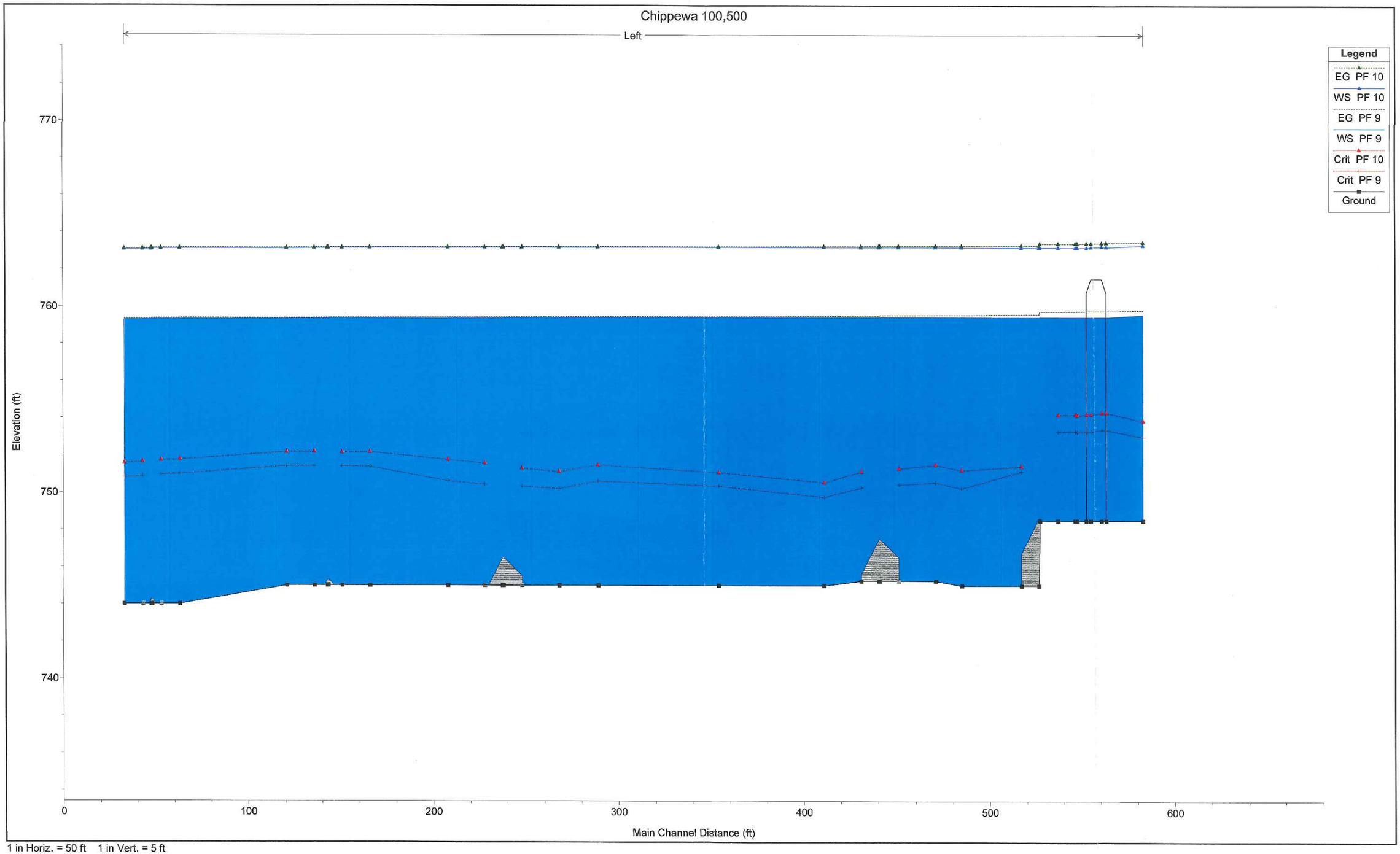
1 in Horiz. = 80 ft 1 in Vert. = 5 ft

Profiles

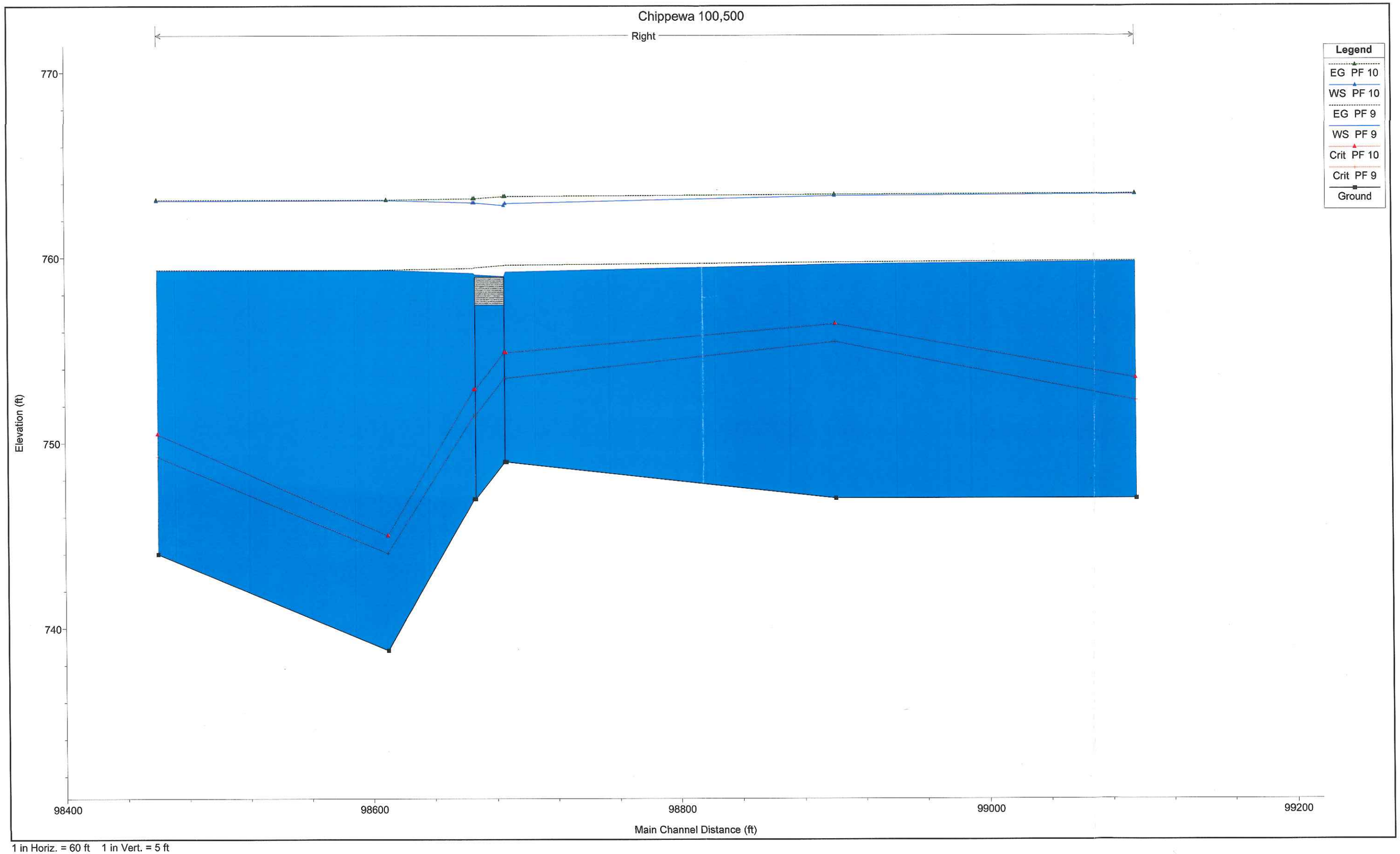
PF9 – 100 Yr.
PF10 – 500 Yr.



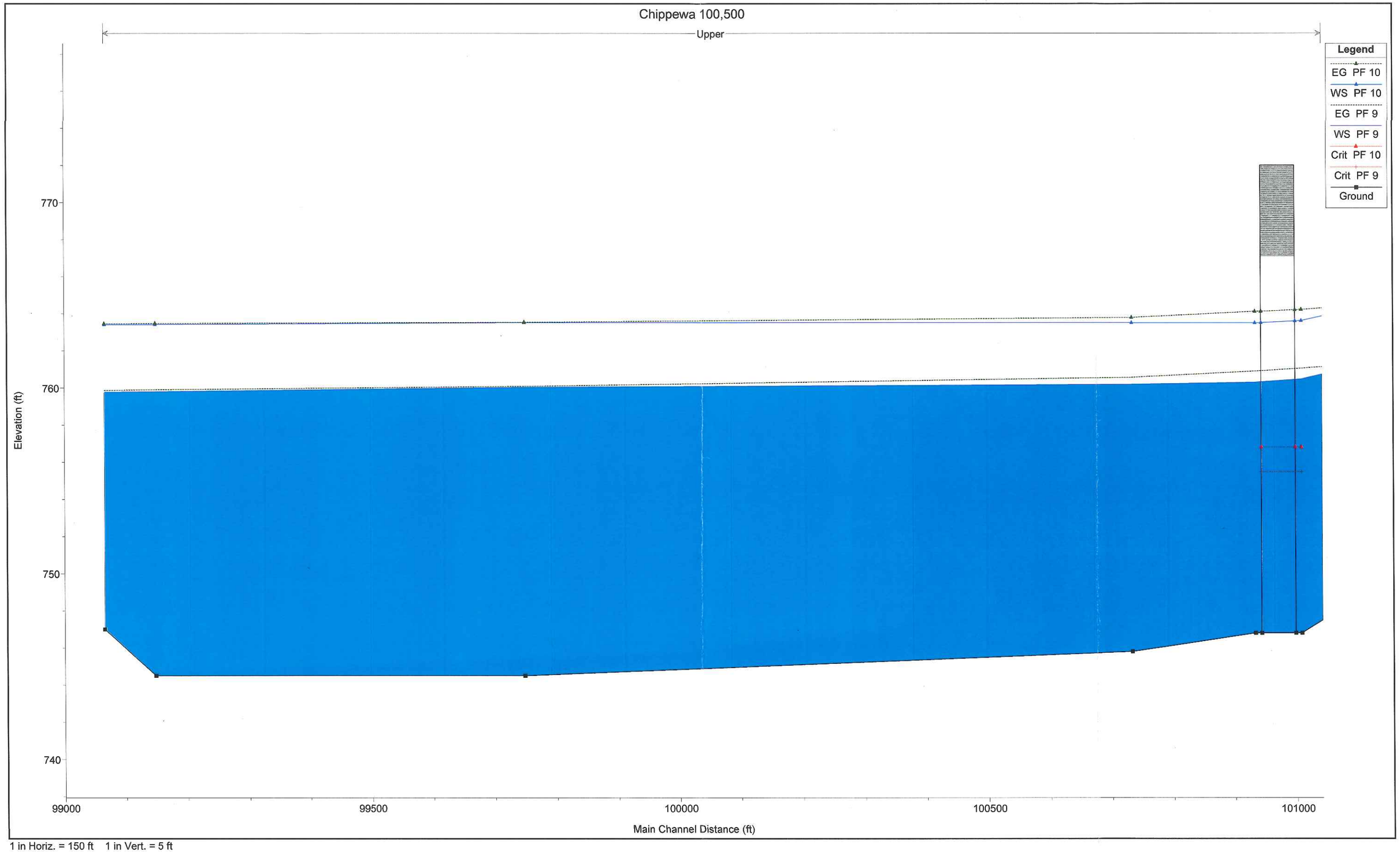
1 in Horiz. = 120 ft 1 in Vert. = 5 ft



1 in Horiz. = 50 ft 1 in Vert. = 5 ft



1 in Horiz. = 60 ft 1 in Vert. = 5 ft



1 in Horiz. = 150 ft 1 in Vert. = 5 ft

Output Tables

STANDARD TABLE 1 100, 500 YEAR

HEC-RAS Plan: Imported Pla

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Lower	97213	6590.00	738.80	758.45	749.05	758.83	0.000515	5.43	1935.18	165.00	0.23
Lower	97213	9110.00	738.80	762.23	751.37	762.65	0.000457	5.87	2558.88	165.00	0.23
Lower	97900	6590.00	741.00	759.15		759.20	0.000229	2.49	5958.89	614.00	0.12
Lower	97900	9110.00	741.00	762.97		763.01	0.000165	2.40	8422.62	655.00	0.10
Lower	98400	6590.00	742.30	759.25		759.31	0.000242	2.75	5246.12	525.00	0.13
Lower	98400	9110.00	742.30	763.03		763.09	0.000178	2.74	7232.08	525.00	0.11
Lower	98450	6590.00	744.00	759.27	750.38	759.32	0.000193	2.40	5431.58	634.09	0.11
Lower	98450	9110.00	744.00	763.04	751.37	763.10	0.000141	2.40	7573.12	655.46	0.10
Right	98460	1894.79	744.00	759.29	749.26	759.33	0.000131	1.94	1706.69	166.50	0.09
Right	98460	2890.87	744.00	763.06	750.48	763.11	0.000120	2.18	2333.11	166.50	0.09
Right	98575	1894.79	738.80	759.31	744.05	759.33	0.000033	1.14	2071.73	151.00	0.05
Right	98575	2890.87	738.80	763.09	745.01	763.11	0.000039	1.41	2641.32	151.00	0.05
Right	98631	1894.79	746.96	759.15	751.48	759.41	0.002796	4.16	456.01	49.10	0.22
Right	98631	2890.87	746.96	762.96	752.89	763.18	0.001804	4.08	961.28	148.00	0.19
Right	98641.5	Bridge									
Right	98652	1894.79	748.97	759.22	753.50	759.60	0.000381	4.95	384.60	55.35	0.29
Right	98652	2890.87	748.97	762.92	754.90	763.30	0.000260	5.12	880.64	148.00	0.25
Right	98803	1894.79	747.00	759.61	755.45	759.74	0.000856	3.39	1111.72	254.20	0.21
Right	98803	2890.87	747.00	763.33	756.42	763.40	0.000372	2.87	2092.30	269.98	0.15
Right	98970	1894.79	747.00	759.78	752.29	759.82	0.000196	1.90	1984.42	344.61	0.10
Right	98970	2890.87	747.00	763.41	753.50	763.44	0.000118	1.81	3280.62	363.53	0.09
Left	33	4695.21	744.00	759.27	750.80	759.33	0.000204	2.42	3943.17	416.16	0.11
Left	33	6219.14	744.00	763.06	751.59	763.10	0.000135	2.31	5560.26	439.12	0.10
Left	43.*	4695.21	744.00	759.28	750.88	759.33	0.000203	2.42	3993.40	424.23	0.11
Left	43.*	6219.14	744.00	763.07	751.66	763.11	0.000134	2.30	5643.51	447.76	0.10
Left	48	Inline Weir									
Left	53.*	4695.21	744.00	759.30	750.96	759.35	0.000202	2.41	4049.77	432.42	0.11
Left	53.*	6219.14	744.00	763.10	751.73	763.14	0.000132	2.29	5736.25	456.54	0.10
Left	63	4695.21	744.00	759.31	751.00	759.36	0.000201	2.41	4100.72	440.50	0.11
Left	63	6219.14	744.00	763.11	751.76	763.15	0.000130	2.28	5820.42	465.19	0.10
Left	121	4695.21	745.00	759.32	751.42	759.37	0.000201	2.33	4383.97	488.27	0.11
Left	121	6219.14	745.00	763.12	752.18	763.15	0.000125	2.17	6280.96	511.98	0.09
Left	136	4695.21	745.00	759.33	751.42	759.38	0.000197	2.31	4474.63	505.83	0.11
Left	136	6219.14	745.00	763.13	752.19	763.16	0.000120	2.13	6433.83	526.40	0.09
Left	143.5	Inline Weir									
Left	151	4695.21	745.00	759.35	751.41	759.39	0.000190	2.27	4585.82	521.21	0.11
Left	151	6219.14	745.00	763.14	752.15	763.17	0.000115	2.09	6595.68	539.34	0.09
Left	166	4695.21	745.00	759.35	751.39	759.39	0.000180	2.21	4752.94	546.02	0.11
Left	166	6219.14	745.00	763.15	752.17	763.18	0.000108	2.02	6855.09	562.33	0.09
Left	208	4695.21	745.00	759.36	750.61	759.41	0.000183	2.25	4669.32	595.64	0.11
Left	208	6219.14	745.00	763.16	751.75	763.19	0.000105	2.01	6973.06	618.03	0.08
Left	228.*	4695.21	745.00	759.37	750.44	759.42	0.000184	2.25	4451.78	571.48	0.11
Left	228.*	6219.14	745.00	763.16	751.57	763.20	0.000107	2.02	6653.79	589.22	0.09
Left	238	Inline Weir									
Left	248.*	4695.21	745.00	759.39	750.33	759.44	0.000183	2.23	4263.09	544.20	0.11
Left	248.*	6219.14	745.00	763.17	751.31	763.21	0.000107	2.02	6347.61	557.45	0.09

HEC-RAS Plan: Imported Pla (Continued)

Reach	River Sta	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)	
Left	268	4695.21	745.00	759.39	750.20	759.45	0.000179	2.20	4127.30	517.84	0.11
Left	268	6219.14	745.00	763.17	751.12	763.21	0.000107	2.01	6104.41	528.23	0.09
Left	289	4695.21	745.00	759.40	750.61	759.45	0.000190	2.19	4085.33	520.21	0.11
Left	289	6219.14	745.00	763.18	751.48	763.22	0.000111	1.99	6070.92	531.53	0.09
Left	354	4695.21	745.00	759.42	750.36	759.46	0.000149	1.92	4519.82	574.93	0.10
Left	354	6219.14	745.00	763.19	751.09	763.22	0.000087	1.75	6702.40	583.22	0.08
Left	411	4695.21	745.00	759.42	749.76	759.49	0.000196	2.30	3264.58	403.24	0.11
Left	411	6219.14	745.00	763.19	750.54	763.24	0.000127	2.19	4882.19	457.78	0.09
Left	431	4695.21	745.25	759.42	750.27	759.50	0.000251	2.52	2931.72	394.03	0.13
Left	431	6219.14	745.25	763.18	751.13	763.25	0.000153	2.34	4472.56	421.88	0.10
Left	441	Inline Weir									
Left	451.*	4695.21	745.25	759.43	750.44	759.53	0.000288	2.71	2790.83	388.48	0.13
Left	451.*	6219.14	745.25	763.19	751.30	763.26	0.000174	2.51	4323.16	426.82	0.11
Left	471	4695.21	745.25	759.43	750.55	759.54	0.000342	2.95	2636.15	388.30	0.15
Left	471	6219.14	745.25	763.19	751.50	763.27	0.000203	2.70	4150.50	426.71	0.12
Left	486	4695.21	745.00	759.43	750.23	759.55	0.000324	2.90	2524.99	343.93	0.14
Left	486	6219.14	745.00	763.19	751.21	763.27	0.000199	2.69	3851.64	355.00	0.12
Left	517	4695.21	745.00	759.42	751.14	759.58	0.000434	3.35	1954.70	284.83	0.16
Left	517	6219.14	745.00	763.17	751.43	763.30	0.000262	3.09	3429.99	412.00	0.13
Left	527	Inline Weir									
Left	537	4695.21	748.50	759.43	753.29	759.74	0.001070	4.48	1159.21	170.77	0.25
Left	537	6219.14	748.50	763.18	754.19	763.39	0.000525	3.87	2523.82	400.00	0.18
Left	546	4695.21	748.50	759.42	753.29	759.75	0.001120	4.60	1084.73	127.83	0.25
Left	546	6219.14	748.50	763.17	754.20	763.40	0.000563	4.02	2407.35	402.00	0.19
Left	547	4695.21	748.50	759.43	753.27	759.75	0.001110	4.59	1087.75	127.84	0.25
Left	547	6219.14	748.50	763.17	754.17	763.40	0.000560	4.02	2410.46	402.00	0.19
Left	552	4695.21	748.50	759.43	753.30	759.76	0.001135	4.64	1075.60	126.05	0.26
Left	552	6219.14	748.50	763.17	754.21	763.41	0.000582	4.09	2337.69	396.00	0.19
Left	557.5	Bridge									
Left	563	4695.21	748.50	759.43	753.39	759.77	0.001159	4.67	1074.54	128.43	0.26
Left	563	6219.14	748.50	763.21	754.29	763.44	0.000581	4.08	2367.38	400.00	0.19
Left	583	4695.21	748.50	759.56	753.01	759.80	0.000813	3.93	1301.86	178.63	0.22
Left	583	6219.14	748.50	763.30	753.86	763.46	0.000411	3.45	2716.34	405.00	0.16
Upper	99065	6590.00	747.00	759.77		759.86	0.000332	2.76	3165.94	646.58	0.14
Upper	99065	9110.00	747.00	763.41		763.46	0.000144	2.18	5658.11	694.86	0.10
Upper	99150	6590.00	744.50	759.80		759.91	0.000459	3.38	3045.88	600.00	0.17
Upper	99150	9110.00	744.50	763.42		763.48	0.000178	2.50	5219.57	600.00	0.11
Upper	99750	6590.00	744.50	760.04		760.08	0.000241	2.27	5189.99	1100.00	0.11
Upper	99750	9110.00	744.50	763.52		763.54	0.000091	1.63	9019.71	1100.00	0.07
Upper	100735	6590.00	745.80	760.20		760.57	0.000693	5.06	1783.10	400.00	0.26
Upper	100735	9110.00	745.80	763.52		763.80	0.000434	4.71	3111.45	400.00	0.21
Upper	100935	6590.00	746.80	760.31		760.90	0.001989	6.21	1060.54	121.00	0.37
Upper	100935	9110.00	746.80	763.51		764.12	0.001506	6.29	1447.94	121.00	0.32
Upper	100972.5	Bridge									
Upper	101010	6590.00	746.80	760.48	755.49	761.06	0.001874	6.09	1081.75	121.00	0.36

HEC-RAS Plan: Imported Pla (Continued)

Reach	River Sta	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)	
Upper	101010	9110.00	746.80	763.62	756.82	764.23	0.001464	6.23	1462.12	121.00	0.32
Upper	101067	6590.00	748.00	760.92		761.20	0.000555	4.24	1644.53	183.45	0.23
Upper	101067	9110.00	748.00	764.05		764.36	0.000445	4.49	2247.50	201.92	0.21
Upper	101800	6590.00	749.20	761.37		761.49	0.000291	3.32	4237.98	696.90	0.18
Upper	101800	9110.00	749.20	764.47		764.58	0.000185	3.16	6452.60	722.36	0.15
Upper	102350	6590.00	749.50	761.47		761.77	0.000624	4.76	2675.71	625.94	0.27
Upper	102350	9110.00	749.50	764.53		764.74	0.000355	4.31	4616.64	642.46	0.21
Upper	102900	6590.00	749.80	761.81		762.20	0.000890	5.66	2357.96	540.00	0.32
Upper	102900	9110.00	749.80	764.72		764.98	0.000489	5.01	3930.44	540.00	0.25
Upper	104150	6590.00	748.60	762.89		763.09	0.000623	4.86	3805.74	681.09	0.27
Upper	104150	9110.00	748.60	765.37		765.53	0.000441	4.53	5505.08	685.86	0.23
Upper	104800	6590.00	749.60	763.23		763.36	0.000459	4.24	4916.50	945.09	0.23
Upper	104800	9110.00	749.60	765.60		765.71	0.000303	3.95	7209.61	972.00	0.19
Upper	105450	6590.00	750.60	763.46		763.55	0.000287	3.70	5580.18	1000.00	0.19
Upper	105450	9110.00	750.60	765.76		765.83	0.000207	3.54	7877.54	1000.00	0.17
Upper	107010	6590.00	753.30	764.28		764.41	0.000526	4.31	4174.90	879.91	0.24
Upper	107010	9110.00	753.30	766.32		766.43	0.000368	4.10	5992.17	896.49	0.21
Upper	110575	6590.00	755.90	765.62		765.86	0.000894	5.20	3045.74	683.92	0.31
Upper	110575	9110.00	755.90	767.28		767.50	0.000732	5.28	4218.79	729.99	0.29
Upper	110775	6590.00	756.10	765.76		766.09	0.001132	5.83	2451.98	507.00	0.35
Upper	110775	9110.00	756.10	767.38		767.70	0.000977	6.06	3273.19	507.00	0.33
Upper	111300	6590.00	756.38	766.42		767.14	0.001794	7.55	1393.30	244.00	0.44
Upper	111300	9110.00	756.38	767.95		768.82	0.001829	8.45	1768.37	244.00	0.46
Upper	111500	6590.00	756.49	766.75		767.74	0.002108	8.32	1017.22	144.00	0.48
Upper	111500	9110.00	756.49	768.28		769.58	0.002335	9.68	1236.75	144.00	0.52
Upper	111521	6590.00	757.20	767.45		767.99	0.001107	5.97	1194.79	134.00	0.34
Upper	111521	9110.00	757.20	769.18		769.91	0.001228	6.96	1426.65	134.00	0.36
Upper	111530	6590.00	757.20	767.56		768.03	0.000716	5.64	1209.11	134.00	0.32
Upper	111530	9110.00	757.20	769.34		769.97	0.000778	6.51	1447.29	134.00	0.34
Upper	111546	Bridge									
Upper	111562	6590.00	757.20	768.05	762.58	768.48	0.000606	5.35	1274.89	134.00	0.30
Upper	111562	9110.00	757.20	769.82	763.69	770.39	0.000679	6.24	1511.26	134.00	0.32
Upper	111571	6590.00	757.20	768.05		768.51	0.000886	5.54	1274.87	134.00	0.31
Upper	111571	9110.00	757.20	769.81		770.44	0.001003	6.50	1510.58	134.00	0.33
Upper	111800	6590.00	756.26	768.73		768.79	0.000157	2.61	4504.22	593.00	0.14
Upper	111800	9110.00	756.26	770.72		770.79	0.000183	3.14	5800.85	800.00	0.15
Upper	111900	6590.00	756.26	768.76		768.80	0.000145	2.52	5054.50	761.12	0.13
Upper	111900	9110.00	756.26	770.78		770.82	0.000126	2.61	6640.22	800.00	0.12
Upper	116500	6590.00	757.00	769.46		769.52	0.000175	2.61	4150.92	1025.72	0.14
Upper	116500	9110.00	757.00	771.30		771.35	0.000110	2.31	6141.76	1097.68	0.12

STANDARD TABLE 2 100, 500 YEAR

HEC-RAS Plan: Imported Pla

Reach	River Sta	E.G. Elev (ft)	W.S. Elev (ft)	Vel Head (ft)	Frctn Loss (ft)	C & E Loss (ft)	Q Left (cfs)	Q Channel (cfs)	Q Right (cfs)	Top Width (ft)
Lower	97213	758.83	758.45	0.38			210.88	5361.67	1017.45	165.00
Lower	97213	762.65	762.23	0.42			290.91	7095.96	1723.13	165.00
Lower	97900	759.20	759.15	0.04	0.21	0.17		2642.31	3947.69	614.00
Lower	97900	763.01	762.97	0.04	0.16	0.19		3216.11	5893.90	655.00
Lower	98400	759.31	759.25	0.06	0.11	0.01	2402.59	3208.31	979.10	525.00
Lower	98400	763.09	763.03	0.06	0.08	0.01	3609.88	4001.50	1498.62	525.00
Lower	98450	759.32	759.27	0.06	0.01	0.00	1985.81	3817.37	786.82	634.09
Lower	98450	763.10	763.04	0.05	0.01	0.00	3052.52	4836.03	1221.45	655.46
Right	98460	759.33	759.29	0.04	0.01	0.00	26.48	1285.41	582.90	166.50
Right	98460	763.11	763.06	0.05	0.00	0.00	37.54	1839.75	1013.58	166.50
Right	98575	759.33	759.31	0.02	0.01	0.00	106.47	1756.62	31.70	151.00
Right	98575	763.11	763.09	0.03	0.01	0.00	199.70	2630.49	60.67	151.00
Right	98631	759.41	759.15	0.27	0.01	0.08	0.00	1894.69	0.10	49.10
Right	98631	763.18	762.96	0.23	0.01	0.06	173.09	2500.90	216.87	148.00
Right	98641.5	Bridge								
Right	98652	759.60	759.22	0.38	0.00	0.02	0.00	1894.70	0.08	55.35
Right	98652	763.30	762.92	0.39	0.00	0.01	64.52	2745.61	80.74	148.00
Right	98803	759.74	759.61	0.12	0.12	0.03	390.89	1274.22	229.68	254.20
Right	98803	763.40	763.33	0.07	0.07	0.03	760.90	1568.22	561.75	269.98
Right	98970	759.82	759.78	0.04	0.07	0.01	6.81	1227.81	660.17	344.61
Right	98970	763.44	763.41	0.03	0.04	0.00	40.16	1583.55	1267.15	363.53
Left	33	759.33	759.27	0.05	0.01	0.00	2056.39	2621.26	17.56	416.16
Left	33	763.10	763.06	0.05	0.00	0.00	3023.24	3174.09	21.80	439.12
Left	43.*	759.33	759.28	0.05	0.00	0.00	2102.86	2578.19	14.16	424.23
Left	43.*	763.11	763.07	0.05	0.00	0.00	3087.23	3114.47	17.44	447.76
Left	48	Inline Weir								
Left	53.*	759.35	759.30	0.05			2149.49	2534.70	11.02	432.42
Left	53.*	763.14	763.10	0.04			3151.35	3054.33	13.46	456.54
Left	63	759.36	759.31	0.05	0.00	0.00	2194.23	2492.89	8.09	440.50
Left	63	763.15	763.11	0.04	0.00	0.00	3213.13	2996.21	9.79	465.19
Left	121	759.37	759.32	0.05	0.01	0.00	2276.52	2303.60	115.09	488.27
Left	121	763.15	763.12	0.04	0.01	0.00	3313.56	2755.63	149.94	511.98
Left	136	759.38	759.33	0.04	0.00	0.00	2270.30	2294.43	130.48	505.83
Left	136	763.16	763.13	0.04	0.00	0.00	3322.48	2726.49	170.16	526.40
Left	143.5	Inline Weir								
Left	151	759.39	759.35	0.04			2276.54	2273.98	144.69	521.21
Left	151	763.17	763.14	0.03			3336.98	2692.83	189.33	539.34
Left	166	759.39	759.35	0.04	0.00	0.00	2274.80	2233.44	186.97	546.02
Left	166	763.18	763.15	0.03	0.00	0.00	3322.29	2630.83	266.02	562.33
Left	208	759.41	759.36	0.05	0.01	0.00	1825.45	2549.32	320.45	595.64
Left	208	763.19	763.16	0.03	0.00	0.00	2773.46	2912.22	533.45	618.03
Left	228.*	759.42	759.37	0.05	0.00	0.00	1677.99	2752.37	264.85	571.48
Left	228.*	763.20	763.16	0.04	0.00	0.00	2565.16	3173.10	480.87	589.22
Left	238	Inline Weir								

HEC-RAS Plan: Imported Pla (Continued)

Reach	River Sta	E.G. Elev	W.S. Elev	Vel Head	Frctn Loss	C & E Loss	Q Left	Q Channel	Q Right	Top Width
		(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft)
Left	248.*	759.44	759.39	0.05			1522.35	2940.64	232.23	544.20
Left	248.*	763.21	763.17	0.04			2346.05	3428.69	444.40	557.45
Left	268	759.45	759.39	0.05	0.00	0.00	1351.45	3103.74	240.01	517.84
Left	268	763.21	763.17	0.04	0.00	0.00	2103.33	3662.28	453.52	528.23
Left	289	759.45	759.40	0.05	0.00	0.00	1308.39	3101.15	285.67	520.21
Left	289	763.22	763.18	0.04	0.00	0.00	2040.03	3665.13	513.98	531.53
Left	354	759.46	759.42	0.04	0.01	0.00	1291.02	3191.19	213.00	574.93
Left	354	763.22	763.19	0.03	0.01	0.00	2046.21	3792.88	380.05	583.22
Left	411	759.49	759.42	0.07	0.01	0.01	586.75	3789.75	318.70	403.24
Left	411	763.24	763.19	0.06	0.01	0.01	1026.81	4643.44	548.88	457.78
Left	431	759.50	759.42	0.08	0.00	0.00	496.30	3882.00	316.91	394.03
Left	431	763.25	763.18	0.07	0.00	0.00	973.15	4688.06	557.92	421.88
Left	441	Inline Weir								
Left	451.*	759.53	759.43	0.09			550.95	3859.88	284.38	388.48
Left	451.*	763.26	763.19	0.07			1082.35	4629.91	506.88	426.82
Left	471	759.54	759.43	0.11	0.01	0.01	602.69	3840.82	251.70	388.30
Left	471	763.27	763.19	0.08	0.00	0.00	1210.04	4550.34	458.75	426.71
Left	486	759.55	759.43	0.11	0.01	0.00	530.54	3950.11	214.56	343.93
Left	486	763.27	763.19	0.09	0.00	0.00	1078.78	4738.27	402.08	355.00
Left	517	759.58	759.42	0.16	0.01	0.01	279.35	4278.62	137.25	284.83
Left	517	763.30	763.17	0.12	0.01	0.01	837.17	5092.96	289.00	412.00
Left	527	Inline Weir								
Left	537	759.74	759.43	0.31			47.71	4613.83	33.67	170.77
Left	537	763.39	763.18	0.21			619.84	5472.16	127.13	400.00
Left	546	759.75	759.42	0.32	0.01	0.01	31.17	4635.84	28.20	127.83
Left	546	763.40	763.17	0.22	0.00	0.01	557.07	5546.27	115.80	402.00
Left	547	759.75	759.43	0.32	0.00	0.00	31.06	4636.04	28.11	127.84
Left	547	763.40	763.17	0.22	0.00	0.00	555.84	5547.77	115.53	402.00
Left	552	759.76	759.43	0.33	0.01	0.00	32.59	4636.24	26.38	126.05
Left	552	763.41	763.17	0.23	0.00	0.00	539.05	5592.41	87.68	396.00
Left	557.5	Bridge								
Left	563	759.77	759.43	0.33	0.00	0.00	25.89	4630.05	39.26	128.43
Left	563	763.44	763.21	0.23	0.00	0.01	537.55	5560.29	121.29	400.00
Left	583	759.80	759.56	0.24	0.02	0.01	32.09	4626.89	36.23	178.63
Left	583	763.46	763.30	0.17	0.01	0.01	551.10	5549.36	118.68	405.00
Upper	99065	759.86	759.77	0.09	0.03	0.02	133.00	4439.94	2017.06	646.58
Upper	99065	763.46	763.41	0.05	0.01	0.01	1155.88	4603.65	3350.47	694.86
Upper	99150	759.91	759.80	0.11	0.04	0.01	198.19	3357.56	3034.25	600.00
Upper	99150	763.48	763.42	0.06	0.02	0.00	260.61	3208.18	5641.22	600.00
Upper	99750	760.08	760.04	0.04	0.16	0.01	945.98	3007.96	2636.06	1100.00
Upper	99750	763.54	763.52	0.02	0.06	0.01	1624.66	2766.78	4718.57	1100.00
Upper	100735	760.57	760.20	0.37	0.36	0.13	174.79	6176.49	238.72	400.00
Upper	100735	763.80	763.52	0.28	0.16	0.10	630.55	7371.64	1107.82	400.00
Upper	100935	760.90	760.31	0.60	0.22	0.11		6590.00		121.00
Upper	100935	764.12	763.51	0.61	0.15	0.17		9110.00		121.00

HEC-RAS Plan: Imported Pla (Continued)

Reach	River Sta	E.G. Elev (ft)	W.S. Elev (ft)	Vel Head (ft)	Frctn Loss (ft)	C & E Loss (ft)	Q Left (cfs)	Q Channel (cfs)	Q Right (cfs)	Top Width (ft)
Upper	100972.5	Bridge								
Upper	101010	761.06	760.48	0.58	0.02	0.00		6590.00		121.00
Upper	101010	764.23	763.62	0.60	0.01	0.00		9110.00		121.00
Upper	101067	761.20	760.92	0.28	0.05	0.09	43.53	6515.00	31.47	183.45
Upper	101067	764.36	764.05	0.31	0.04	0.09	148.78	8866.52	94.70	201.92
Upper	101800	761.49	761.37	0.13	0.28	0.01	1743.77	4845.61	0.62	696.90
Upper	101800	764.58	764.47	0.11	0.19	0.02	3022.41	6059.26	28.33	722.36
Upper	102350	761.77	761.47	0.30	0.22	0.05	697.17	5557.58	335.26	625.94
Upper	102350	764.74	764.53	0.21	0.13	0.03	1525.98	6612.93	971.10	642.46
Upper	102900	762.20	761.81	0.39	0.40	0.03	142.94	5086.67	1360.39	540.00
Upper	102900	764.98	764.72	0.26	0.22	0.01	480.10	5852.03	2777.87	540.00
Upper	104150	763.09	762.89	0.21	0.87	0.02	3024.92	3565.08		681.09
Upper	104150	765.53	765.37	0.16	0.54	0.01	4958.27	4151.73		685.86
Upper	104800	763.36	763.23	0.14	0.27	0.01	3468.90	3094.92	26.18	945.09
Upper	104800	765.71	765.60	0.10	0.17	0.01	5414.11	3540.10	155.79	972.00
Upper	105450	763.55	763.46	0.09	0.18	0.00	3113.49	2487.99	988.53	1000.00
Upper	105450	765.83	765.76	0.07	0.12	0.00	4949.79	2839.94	1320.27	1000.00
Upper	107010	764.41	764.28	0.14	0.85	0.01	2322.88	2773.78	1493.34	879.91
Upper	107010	766.43	766.32	0.11	0.59	0.01	3792.10	3201.35	2116.56	896.49
Upper	110575	765.86	765.62	0.24	1.41	0.03	1407.55	3537.90	1644.55	683.92
Upper	110575	767.50	767.28	0.22	1.03	0.03	2288.58	4265.96	2555.47	729.99
Upper	110775	766.09	765.76	0.33	0.20	0.03	1369.11	3934.20	1286.69	507.00
Upper	110775	767.70	767.38	0.33	0.17	0.03	2214.94	4848.17	2046.89	507.00
Upper	111300	767.14	766.42	0.72	0.74	0.32	672.87	5314.09	603.04	244.00
Upper	111300	768.82	767.95	0.87	0.68	0.43	1138.00	6951.59	1020.41	244.00
Upper	111500	767.74	766.75	0.98	0.39	0.21	296.07	6000.70	293.23	144.00
Upper	111500	769.58	768.28	1.31	0.41	0.35	502.06	8119.12	488.83	144.00
Upper	111521	767.99	767.45	0.54	0.03	0.22		6396.21	193.79	134.00
Upper	111521	769.91	769.18	0.73	0.03	0.29		8803.88	306.12	134.00
Upper	111530	768.03	767.56	0.47	0.01	0.03		6108.88	481.12	134.00
Upper	111530	769.97	769.34	0.63	0.01	0.05		8355.98	754.02	134.00
Upper	111546	Bridge								
Upper	111562	768.48	768.05	0.43				6088.33	501.67	134.00
Upper	111562	770.39	769.82	0.58				8337.75	772.25	134.00
Upper	111571	768.51	768.05	0.46	0.01	0.03		6310.04	279.97	134.00
Upper	111571	770.44	769.81	0.63	0.01	0.04		8677.35	432.65	134.00
Upper	111800	768.79	768.73	0.05	0.07	0.20	2290.57	2331.76	1967.68	593.00
Upper	111800	770.79	770.72	0.07	0.08	0.28	3221.47	3278.82	2609.71	800.00
Upper	111900	768.80	768.76	0.05	0.02	0.00	2227.99	2252.49	2109.52	761.12
Upper	111900	770.82	770.78	0.05	0.02	0.01	3319.60	2738.30	3052.10	800.00
Upper	116500	769.52	769.46	0.06	0.71	0.00	3038.91	2387.76	1163.33	1025.72
Upper	116500	771.35	771.30	0.04	0.53	0.00	5058.52	2486.66	1564.82	1097.68

Floodway (Encroachment) Output

HEC-RAS Plan: Imported Pla Profile: PF 11

Reach	River Sta	Prof Delta WS	Top Wdth Act	K Perc L	Enc Sta L	Dist Center L	Center Station	Dist Center R	Enc Sta R	K Perc R	Encr WD
		(ft)	(ft)		(ft)	(ft)	(ft)	(ft)	(ft)		(ft)
Lower	97213	0.05	155.00	0.00	35.00	44.50	79.50	110.50	190.00	1.73	155.00
Lower	97900	0.07	612.00		11.00	36.00	47.00	576.00	623.00	0.15	612.00
Lower	98400	0.07	495.00	1.04	15.00	332.00	347.00	163.00	510.00	1.07	495.00
Lower	98450	0.07	505.00	0.75	70.00	341.00	411.00	164.00	575.00	0.04	505.00
Right	98460	0.08	150.00	0.00	0.00	31.00	31.00	119.00	150.00	0.28	150.00
Right	98575	0.07	142.00	0.00	430.00	89.00	519.00	53.00	572.00	0.57	142.00
Right	98631	0.09	57.09	0.00	437.00	65.75	502.75	57.25	560.00	0.00	123.00
Right	98641.5 BR D	0.09	16.97		437.00	65.75	502.75	57.25	560.00		123.00
Right	98641.5 BR U	0.10			437.00	65.75	502.75	57.25	560.00		123.00
Right	98652	0.09	63.05		437.00	65.75	502.75	57.25	560.00		123.00
Right	98803	0.03	202.00	0.00	0.00	133.00	133.00	69.00	202.00	1.64	202.00
Right	98970	0.02	225.00	0.07	0.00	38.50	38.50	186.50	225.00	10.37	225.00
Left	33	0.07	377.00	0.31	80.00	333.50	413.50	43.50	457.00	0.00	377.00
Left	43.*	0.07	376.00	1.06	90.00	333.67	423.67	42.33	466.00	0.00	376.00
Left	48	Inline Weir									
Left	53.*	0.06	375.00		100.00		433.83		475.00		375.00
Left	63	0.06	376.00	2.29	108.00	336.00	444.00	40.00	484.00	0.00	376.00
Left	121	0.06	400.00	4.66	130.00	342.00	472.00	58.00	530.00	0.00	400.00
Left	136	0.06	400.33	5.64	138.00	339.34	477.34	61.00	538.33	0.00	400.33
Left	143.5	Inline Weir									
Left	151	0.06	408.67		138.00		482.67		546.67		408.67
Left	166	0.07	426.00	7.27	140.00	348.00	488.00	78.00	566.00	0.00	426.00
Left	208	0.07	460.00	7.14	163.00	322.50	485.50	273.50	759.00	0.00	596.00
Left	228.*	0.07	454.00	6.67	142.00	310.34	452.34	143.67	596.00	0.00	454.00
Left	238	Inline Weir									
Left	248.*	0.06	440.00		125.00		419.17		565.00		440.00
Left	268	0.06	446.00	4.20	90.00	296.00	386.00	150.00	536.00	0.00	446.00
Left	289	0.06	433.00	5.49	107.00	276.00	383.00	157.00	540.00	0.00	433.00
Left	354	0.04	382.00	12.73	203.00	230.00	433.00	152.00	585.00	0.00	382.00
Left	411	0.05	352.00	-0.04	118.00	201.50	319.50	150.50	470.00	0.00	352.00
Left	431	0.05	341.00	-0.05	86.00	190.50	276.50	150.50	427.00	0.00	341.00
Left	441	Inline Weir									
Left	451.*	0.05	330.24		102.00		297.75		435.00		333.00
Left	471	0.05	323.80	0.49	115.00	204.00	319.00	124.00	443.00	0.00	328.00
Left	486	0.05	323.41	-0.27	25.00	208.00	233.00	122.00	355.00	0.00	330.00
Left	517	0.05	286.44	0.00	75.00	225.50	300.50	111.50	412.00	0.00	337.00
Left	527	Inline Weir									
Left	537	0.05	171.92		75.00		306.00		400.00		325.00
Left	546	0.05	128.08	0.00	75.00	235.50	310.50	91.50	402.00	0.00	327.00

PROPOSED CONDITIONS
ENCROACHMENT TABLE 2

HEC-RAS Plan: Imported Pla Profile: PF 11 (Continued)

Reach	River Sta	Prof Delta WS	Top Wdth Act	K Perc L	Enc Sta L	Dist Center L	Center Station	Dist Center R	Enc Sta R	K Perc R	Encr WD
		(ft)	(ft)		(ft)	(ft)	(ft)	(ft)	(ft)		(ft)
Left	547	0.05	128.10	0.00	75.00	235.50	310.50	91.50	402.00	0.00	327.00
Left	552	0.05	126.28	0.00	75.00	237.00	312.00	84.00	396.00	0.00	321.00
Left	557.5 BR D	0.05	121.28		75.00	237.00	312.00	84.00	396.00		321.00
Left	557.5 BR U	0.05	125.00		75.00	236.00	311.00	85.00	396.00		321.00
Left	563	0.05	128.69		75.00	236.00	311.00	89.00	400.00		325.00
Left	583	0.05	179.35	0.00	75.00	245.00	320.00	85.00	405.00	0.00	330.00
Upper	99065	-0.04	382.00	-0.16	75.00	256.00	331.00	126.00	457.00	21.05	382.00
Upper	99150	0.03	389.90	0.00	0.10	59.90	60.00	330.00	390.00	7.49	389.90
Upper	99750	0.08	635.00	5.09	105.00	153.50	258.50	481.50	740.00	13.57	635.00
Upper	100735	0.20	223.00	-0.67	140.00	111.50	251.50	111.50	363.00	-2.72	223.00
Upper	100935	0.16	121.00		102.00	63.00	165.00	63.00	228.00		126.00

PROPOSED CONDITIONS
ENCROACHMENT TABLE 3

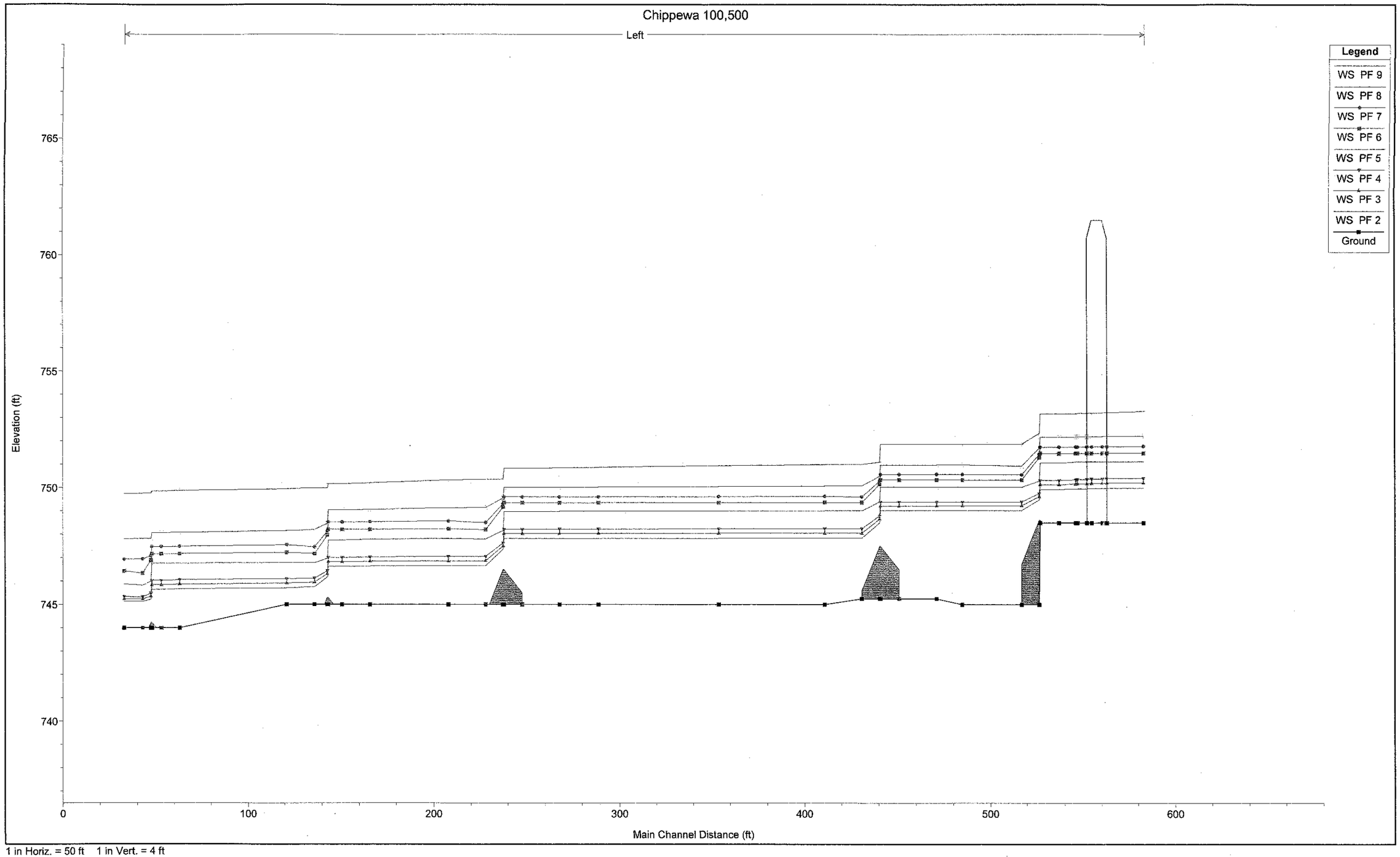
HEC-RAS Plan: Imported Pla Profile: PF 11

Reach	River Sta	Top Wdth Act	Area	Vel Total	W.S. Elev	Base WS	Prof Delta WS
		(ft)	(sq ft)	(ft/s)	(ft)	(ft)	(ft)
Lower	97213	155.00	1860.43	3.54	758.50	758.45	0.05
Lower	97900	612.00	5989.64	1.10	759.23	759.15	0.07
Lower	98400	495.00	5095.30	1.29	759.32	759.25	0.07
Lower	98450	505.00	5278.40	1.25	759.34	759.27	0.07
Right	98460	150.00	1672.09	1.08	759.36	759.29	0.08
Right	98575	142.00	2042.80	0.88	759.38	759.31	0.07
Right	98631	57.09	460.75	3.90	759.24	759.15	0.09
Right	98641.5 BR D	16.97	381.50	4.72	759.16	759.07	0.09
Right	98641.5 BR U		304.94	5.90	759.08	758.97	0.10
Right	98652	63.05	389.69	4.62	759.30	759.22	0.09
Right	98803	202.00	1027.66	1.75	759.65	759.61	0.03
Right	98970	225.00	1534.84	1.17	759.80	759.78	0.02
Left	33	377.00	3844.23	1.25	759.35	759.27	0.07
Left	43.*	376.00	3836.69	1.25	759.35	759.28	0.07
Left	48	Inline Weir					
Left	53.*	375.00	3830.40	1.25	759.36	759.30	0.06
Left	63	376.00	3837.93	1.25	759.37	759.31	0.06
Left	121	400.00	3953.80	1.21	759.38	759.32	0.06
Left	136	400.33	3950.90	1.21	759.39	759.33	0.06
Left	143.5	Inline Weir					
Left	151	408.67	4010.65	1.19	759.41	759.35	0.06
Left	166	426.00	4106.91	1.17	759.42	759.35	0.07
Left	208	460.00	4004.36	1.20	759.43	759.36	0.07
Left	228.*	454.00	3860.76	1.24	759.44	759.37	0.07
Left	238	Inline Weir					
Left	248.*	440.00	3723.72	1.29	759.45	759.39	0.06
Left	268	446.00	3772.92	1.27	759.45	759.39	0.06
Left	289	433.00	3635.80	1.32	759.46	759.40	0.06
Left	354	382.00	3369.55	1.42	759.47	759.42	0.04
Left	411	352.00	3169.76	1.51	759.47	759.42	0.05
Left	431	341.00	2845.96	1.68	759.47	759.42	0.05
Left	441	Inline Weir					
Left	451.*	330.24	2679.06	1.79	759.48	759.43	0.05
Left	471	323.80	2511.32	1.91	759.48	759.43	0.05
Left	486	323.41	2514.71	1.91	759.48	759.43	0.05
Left	517	286.44	1967.90	2.43	759.47	759.42	0.05
Left	527	Inline Weir					
Left	537	171.92	1167.13	4.10	759.48	759.43	0.05
Left	546	128.08	1090.59	4.39	759.47	759.42	0.05
Left	547	128.10	1093.60	4.38	759.47	759.43	0.05
Left	552	126.28	1081.38	4.43	759.47	759.43	0.05
Left	557.5 BR D	121.28	1077.32	4.45	759.48	759.43	0.05
Left	557.5 BR U	125.00	1078.19	4.44	759.48	759.43	0.05
Left	563	128.69	1080.42	4.43	759.48	759.43	0.05
Left	583	179.35	1310.81	3.66	759.61	759.56	0.05
Upper	99065	382.00	2184.36	3.02	759.73	759.77	-0.04
Upper	99150	389.90	2524.58	2.61	759.82	759.80	0.03
Upper	99750	635.00	3733.32	1.77	760.12	760.04	0.08
Upper	100735	223.00	1792.78	3.68	760.40	760.20	0.20
Upper	100935	121.00	1080.28	6.10	760.47	760.31	0.16

G. Proposed Conditions, Typical Flows

Profiles

PF2 – 75 CFS
PF3 – 100 CFS
PF4 – 125 CFS
PF5 – 250 CFS
PF6 – 375 CFS
PF7 – 500 CFS
PF7 – 750 CFS
PF9 – 1,500 CFS



1 in Horiz. = 50 ft 1 in Vert. = 4 ft

Output Tables

STANDARD TABLE 1

HEC-RAS Plan: Imported Pla River: Chippewa Reach: Left

Reach	River Sta	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)	
Left	33	50.49	744.00	745.13	744.49	745.15	0.001873	1.11	45.30	55.89	0.22
Left	33	64.10	744.00	745.24	744.56	745.27	0.001952	1.24	51.84	56.39	0.23
Left	33	77.93	744.00	745.34	744.63	745.37	0.002090	1.36	57.28	56.81	0.24
Left	33	146.61	744.00	745.88	744.89	745.92	0.001832	1.65	88.63	59.15	0.24
Left	33	232.91	744.00	746.44	745.13	746.50	0.001674	1.90	122.32	61.57	0.24
Left	33	320.18	744.00	746.94	745.32	747.01	0.001555	2.08	153.65	63.74	0.24
Left	33	504.39	744.00	747.81	745.68	747.90	0.001464	2.39	210.71	67.51	0.24
Left	33	1059.99	744.00	749.74	746.55	749.88	0.001419	3.04	349.20	75.88	0.25
Left	43.*	50.49	744.00	745.13	744.81	745.20	0.008051	2.22	22.77	53.58	0.45
Left	43.*	64.10	744.00	745.24	744.89	745.33	0.008283	2.46	26.05	54.24	0.47
Left	43.*	77.93	744.00	745.33	744.96	745.44	0.008858	2.72	28.70	54.78	0.49
Left	43.*	146.61	744.00	745.82	745.27	746.00	0.007755	3.36	43.65	57.54	0.49
Left	43.*	232.91	744.00	746.34	745.59	746.58	0.007081	3.93	59.21	59.91	0.49
Left	43.*	320.18	744.00	746.95	745.89	747.02	0.001691	2.15	148.76	62.71	0.25
Left	43.*	504.39	744.00	747.82	746.43	747.91	0.001576	2.46	204.91	66.68	0.25
Left	43.*	1059.99	744.00	749.76	746.72	749.91	0.001490	3.09	342.95	77.21	0.26
Left	48	Inline Weir									
Left	53.*	50.49	744.00	745.65	744.83	745.68	0.001461	1.33	37.99	55.47	0.21
Left	53.*	64.10	744.00	745.84	744.90	745.88	0.001471	1.47	43.74	56.39	0.21
Left	53.*	77.93	744.00	746.03	744.97	746.07	0.001460	1.58	49.30	57.28	0.22
Left	53.*	146.61	744.00	746.77	745.29	746.79	0.000500	1.11	132.45	60.82	0.13
Left	53.*	232.91	744.00	747.17	745.61	747.21	0.000740	1.48	157.54	62.77	0.16
Left	53.*	320.18	744.00	747.48	745.90	747.53	0.000981	1.81	177.01	64.24	0.19
Left	53.*	504.39	744.00	748.08	746.45	748.16	0.001330	2.33	216.17	67.10	0.23
Left	53.*	1059.99	744.00	749.86	746.72	750.01	0.001456	3.08	344.96	80.04	0.25
Left	63	50.49	744.00	745.67	744.62	745.68	0.000519	0.77	65.89	54.36	0.12
Left	63	64.10	744.00	745.88	744.70	745.89	0.000508	0.83	77.14	55.38	0.12
Left	63	77.93	744.00	746.07	744.77	746.08	0.000501	0.89	87.72	56.33	0.13
Left	63	146.61	744.00	746.77	745.04	746.79	0.000539	1.14	128.71	59.86	0.14
Left	63	232.91	744.00	747.18	745.27	747.22	0.000792	1.52	153.55	61.90	0.17
Left	63	320.18	744.00	747.49	745.47	747.55	0.001038	1.85	173.18	63.47	0.20
Left	63	504.39	744.00	748.09	745.85	748.18	0.001405	2.38	211.81	66.44	0.24
Left	63	1059.99	744.00	749.88	746.74	750.04	0.001501	3.13	341.13	79.84	0.26
Left	121	50.49	745.00	745.71	745.34	745.75	0.004321	1.51	33.48	49.13	0.32
Left	121	64.10	745.00	745.92	745.39	745.95	0.002964	1.47	43.70	50.32	0.28
Left	121	77.93	745.00	746.10	745.45	746.14	0.002345	1.47	53.19	51.40	0.25
Left	121	146.61	745.00	746.80	745.68	746.84	0.001582	1.62	90.27	55.43	0.22
Left	121	232.91	745.00	747.23	745.92	747.29	0.001913	2.03	114.65	57.92	0.25
Left	121	320.18	745.00	747.55	746.13	747.64	0.002258	2.39	133.82	59.81	0.28
Left	121	504.39	745.00	748.16	746.52	748.30	0.002658	2.94	171.45	63.36	0.32
Left	121	1059.99	745.00	749.96	747.44	750.16	0.002391	3.60	294.36	73.75	0.32
Left	136	50.49	745.00	745.76	745.44	745.84	0.007875	2.20	22.91	48.65	0.44
Left	136	64.10	745.00	745.96	745.52	746.03	0.005983	2.23	28.71	49.99	0.40
Left	136	77.93	745.00	746.13	745.59	746.21	0.005144	2.31	33.78	51.17	0.38
Left	136	146.61	745.00	746.78	745.90	746.90	0.003955	2.75	53.40	55.47	0.36
Left	136	232.91	745.00	747.18	746.23	747.38	0.005087	3.56	65.38	57.85	0.43
Left	136	320.18	745.00	747.47	746.52	747.76	0.006364	4.33	73.99	59.56	0.49
Left	136	504.39	745.00	748.21	747.06	748.34	0.002593	2.91	173.37	63.98	0.31
Left	136	1059.99	745.00	750.00	747.82	750.19	0.002344	3.56	297.47	74.66	0.31
Left	143.5	Inline Weir									
Left	151	50.49	745.00	746.63	745.44	746.64	0.000632	1.03	48.84	55.01	0.14
Left	151	64.10	745.00	746.83	745.52	746.85	0.000692	1.17	54.85	56.22	0.15
Left	151	77.93	745.00	747.01	745.59	747.04	0.000741	1.29	60.40	57.33	0.16
Left	151	146.61	745.00	747.76	745.90	747.81	0.000920	1.77	82.72	61.82	0.19
Left	151	232.91	745.00	748.22	746.23	748.24	0.000551	1.34	174.11	64.58	0.14
Left	151	320.18	745.00	748.53	746.52	748.57	0.000746	1.64	194.85	66.49	0.17
Left	151	504.39	745.00	749.05	747.05	749.13	0.001131	2.19	230.19	69.62	0.21
Left	151	1059.99	745.00	750.18	747.82	750.35	0.001997	3.38	344.08	267.99	0.29
Left	166	50.49	745.00	746.65	745.36	746.65	0.000279	0.63	79.95	55.20	0.09
Left	166	64.10	745.00	746.86	745.42	746.86	0.000294	0.70	91.67	56.50	0.10
Left	166	77.93	745.00	747.04	745.48	747.04	0.000314	0.76	101.96	57.62	0.10

HEC-RAS Plan: Imported Pla River: Chippewa Reach: Left (Continued)

Reach	River Sta	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)	
Left	166	146.61	745.00	747.80	745.72	747.82	0.000358	0.99	147.96	62.38	0.11
Left	166	232.91	745.00	748.22	745.97	748.25	0.000548	1.33	174.83	64.99	0.14
Left	166	320.18	745.00	748.54	746.18	748.59	0.000739	1.63	195.92	66.97	0.17
Left	166	504.39	745.00	749.08	746.56	749.15	0.001107	2.17	232.57	70.28	0.21
Left	166	1059.99	745.00	750.22	747.47	750.39	0.001923	3.33	355.74	268.53	0.29
Left	208	50.49	745.00	746.66	745.29	746.67	0.000152	0.49	103.93	67.48	0.07
Left	208	64.10	745.00	746.87	745.34	746.88	0.000164	0.54	118.15	68.46	0.07
Left	208	77.93	745.00	747.06	745.39	747.06	0.000175	0.60	130.96	69.32	0.08
Left	208	146.61	745.00	747.83	745.59	747.84	0.000208	0.79	185.70	72.90	0.09
Left	208	232.91	745.00	748.25	745.79	748.26	0.000326	1.08	216.61	74.85	0.11
Left	208	320.18	745.00	748.57	745.98	748.60	0.000441	1.33	241.43	76.37	0.13
Left	208	504.39	745.00	749.14	746.30	749.19	0.000659	1.77	285.36	79.00	0.16
Left	208	1059.99	745.00	750.34	747.10	750.45	0.001163	2.76	403.68	164.26	0.23
Left	228.*	50.49	745.00	746.67	745.44	746.68	0.000585	1.01	49.99	67.79	0.14
Left	228.*	64.10	745.00	746.87	745.52	746.89	0.000637	1.14	56.22	69.32	0.15
Left	228.*	77.93	745.00	747.06	745.59	747.08	0.000687	1.26	61.81	70.69	0.15
Left	228.*	146.61	745.00	747.81	745.90	747.86	0.000864	1.74	84.28	76.20	0.18
Left	228.*	232.91	745.00	748.21	746.23	748.30	0.001403	2.42	96.22	79.12	0.24
Left	228.*	320.18	745.00	748.51	746.52	748.65	0.001963	3.04	105.29	81.34	0.29
Left	228.*	504.39	745.00	749.16	747.06	749.20	0.000681	1.73	291.09	86.09	0.17
Left	228.*	1059.99	745.00	750.37	748.37	750.48	0.001125	2.64	414.39	144.93	0.22
Left	238	Inline Weir									
Left	248.*	50.49	745.00	747.83	745.44	747.83	0.000100	0.60	84.82	80.65	0.06
Left	248.*	64.10	745.00	748.04	745.52	748.04	0.000128	0.70	91.05	82.77	0.07
Left	248.*	77.93	745.00	748.22	745.59	748.23	0.000155	0.81	96.58	84.65	0.08
Left	248.*	146.61	745.00	748.97	745.90	748.99	0.000273	1.23	119.03	92.29	0.11
Left	248.*	232.91	745.00	749.36	746.23	749.36	0.000125	0.73	317.68	96.55	0.07
Left	248.*	320.18	745.00	749.60	746.52	749.61	0.000189	0.94	342.00	101.97	0.09
Left	248.*	504.39	745.00	750.01	747.06	750.03	0.000334	1.32	385.24	111.29	0.12
Left	248.*	1059.99	745.00	750.83	748.37	750.91	0.000758	2.27	501.58	168.06	0.19
Left	268	50.49	745.00	747.83	745.38	747.83	0.000031	0.27	184.26	86.03	0.03
Left	268	64.10	745.00	748.04	745.44	748.04	0.000038	0.32	202.65	88.81	0.04
Left	268	77.93	745.00	748.23	745.49	748.23	0.000045	0.36	219.44	91.29	0.04
Left	268	146.61	745.00	748.99	745.73	749.00	0.000069	0.50	292.91	101.39	0.05
Left	268	232.91	745.00	749.36	745.96	749.37	0.000121	0.70	331.24	107.42	0.07
Left	268	320.18	745.00	749.61	746.15	749.62	0.000181	0.90	358.25	111.49	0.09
Left	268	504.39	745.00	750.02	746.50	750.05	0.000313	1.26	406.15	119.42	0.11
Left	268	1059.99	745.00	750.87	747.29	750.94	0.000690	2.14	529.29	169.56	0.18
Left	289	50.49	745.00	747.84	745.51	747.84	0.000052	0.33	153.76	79.39	0.04
Left	289	64.10	745.00	748.05	745.59	748.05	0.000062	0.37	170.98	82.48	0.05
Left	289	77.93	745.00	748.24	745.66	748.24	0.000071	0.42	186.81	85.21	0.05
Left	289	146.61	745.00	749.00	745.94	749.00	0.000104	0.57	255.85	96.25	0.06
Left	289	232.91	745.00	749.36	746.24	749.37	0.000188	0.79	293.53	105.78	0.08
Left	289	320.18	745.00	749.61	746.44	749.63	0.000274	1.00	320.13	108.20	0.10
Left	289	504.39	745.00	750.03	746.80	750.06	0.000455	1.38	366.40	114.02	0.13
Left	289	1059.99	745.00	750.88	747.63	750.96	0.000917	2.28	487.59	165.83	0.20
Left	354	50.49	745.00	747.84	745.58	747.84	0.000046	0.30	166.13	87.99	0.04
Left	354	64.10	745.00	748.06	745.65	748.06	0.000054	0.35	185.44	91.53	0.04
Left	354	77.93	745.00	748.25	745.72	748.25	0.000061	0.38	203.22	94.66	0.05
Left	354	146.61	745.00	749.01	746.03	749.01	0.000098	0.52	279.89	116.08	0.06
Left	354	232.91	745.00	749.37	746.25	749.38	0.000161	0.72	322.94	120.09	0.08
Left	354	320.18	745.00	749.63	746.44	749.64	0.000231	0.91	353.73	122.88	0.09
Left	354	504.39	745.00	750.06	746.78	750.08	0.000376	1.24	407.58	128.11	0.12
Left	354	1059.99	745.00	750.96	747.56	751.02	0.000759	2.02	531.01	146.12	0.18
Left	411	50.49	745.00	747.85	745.45	747.85	0.000021	0.23	222.74	102.40	0.03
Left	411	64.10	745.00	748.06	745.52	748.07	0.000025	0.26	245.28	104.68	0.03
Left	411	77.93	745.00	748.26	745.58	748.26	0.000029	0.29	265.70	106.71	0.03
Left	411	146.61	745.00	749.02	745.79	749.02	0.000046	0.42	349.53	114.66	0.04
Left	411	232.91	745.00	749.38	746.00	749.39	0.000082	0.59	392.31	118.52	0.06
Left	411	320.18	745.00	749.64	746.15	749.65	0.000124	0.76	423.27	121.23	0.07
Left	411	504.39	745.00	750.08	746.43	750.10	0.000214	1.06	477.77	128.96	0.10
Left	411	1059.99	745.00	751.01	747.09	751.06	0.000454	1.78	619.05	174.58	0.14

HEC-RAS Plan: Imported Pla River: Chippewa Reach: Left (Continued)

Reach	River Sta	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)	
Left	431	50.49	745.25	747.85	745.83	747.86	0.000081	0.47	106.47	90.67	0.05
Left	431	64.10	745.25	748.07	745.88	748.08	0.000097	0.55	116.37	92.62	0.06
Left	431	77.93	745.25	748.26	745.94	748.27	0.000113	0.62	124.79	94.21	0.07
Left	431	146.61	745.25	749.01	746.17	749.03	0.000180	0.92	158.74	100.62	0.09
Left	431	232.91	745.25	749.38	746.42	749.40	0.000328	1.33	175.07	103.70	0.12
Left	431	320.18	745.25	749.62	746.64	749.67	0.000506	1.72	185.97	105.76	0.15
Left	431	504.39	745.25	750.09	747.05	750.11	0.000313	1.25	404.50	110.69	0.11
Left	431	1059.99	745.25	751.01	748.06	751.08	0.000694	2.08	514.53	128.19	0.18
Left	441	Inline Weir									
Left	451.*	50.49	745.25	749.02	745.83	749.02	0.000020	0.31	165.51	93.80	0.03
Left	451.*	64.10	745.25	749.22	745.89	749.22	0.000026	0.37	174.91	95.35	0.03
Left	451.*	77.93	745.25	749.40	745.94	749.40	0.000034	0.43	183.04	96.68	0.04
Left	451.*	146.61	745.25	750.03	746.17	750.04	0.000031	0.39	374.54	101.60	0.04
Left	451.*	232.91	745.25	750.35	746.41	750.36	0.000061	0.57	407.00	104.03	0.05
Left	451.*	320.18	745.25	750.58	746.63	750.59	0.000097	0.74	431.13	105.81	0.06
Left	451.*	504.39	745.25	750.98	747.03	751.00	0.000183	1.06	474.37	108.91	0.09
Left	451.*	1059.99	745.25	751.87	748.00	751.92	0.000448	1.85	578.23	125.70	0.14
Left	471	50.49	745.25	749.03	745.84	749.03	0.000010	0.19	262.65	86.15	0.02
Left	471	64.10	745.25	749.23	745.90	749.23	0.000013	0.23	280.19	87.23	0.02
Left	471	77.93	745.25	749.40	745.95	749.40	0.000016	0.26	294.89	88.12	0.03
Left	471	146.61	745.25	750.03	746.14	750.04	0.000033	0.42	352.03	91.51	0.04
Left	471	232.91	745.25	750.35	746.32	750.36	0.000066	0.61	381.23	93.20	0.05
Left	471	320.18	745.25	750.58	746.49	750.59	0.000106	0.79	402.89	94.43	0.07
Left	471	504.39	745.25	750.99	746.79	751.01	0.000199	1.14	442.01	96.62	0.09
Left	471	1059.99	745.25	751.87	747.52	751.93	0.000518	2.00	528.74	101.29	0.15
Left	486	50.49	745.00	749.03	745.29	749.03	0.000007	0.17	291.29	85.21	0.02
Left	486	64.10	745.00	749.24	745.34	749.24	0.000009	0.21	308.88	86.50	0.02
Left	486	77.93	745.00	749.40	745.39	749.40	0.000012	0.24	323.00	87.53	0.02
Left	486	146.61	745.00	750.03	745.59	750.04	0.000026	0.39	379.83	91.59	0.03
Left	486	232.91	745.00	750.35	745.80	750.36	0.000053	0.57	409.22	93.91	0.05
Left	486	320.18	745.00	750.58	745.98	750.59	0.000086	0.74	431.19	95.61	0.06
Left	486	504.39	745.00	751.00	746.30	751.02	0.000165	1.07	471.52	98.66	0.09
Left	486	1059.99	745.00	751.88	747.07	751.93	0.000444	1.89	560.95	105.09	0.14
Left	517	50.49	745.00	749.04	745.43	749.04	0.000027	0.39	129.21	80.73	0.03
Left	517	64.10	745.00	749.25	745.50	749.25	0.000037	0.47	135.84	82.01	0.04
Left	517	77.93	745.00	749.40	745.57	749.41	0.000048	0.55	140.86	82.96	0.05
Left	517	146.61	745.00	750.04	745.86	750.05	0.000109	0.91	161.13	86.88	0.07
Left	517	232.91	745.00	750.34	746.18	750.37	0.000225	1.36	170.96	88.78	0.10
Left	517	320.18	745.00	750.57	746.45	750.62	0.000371	1.80	178.15	90.16	0.13
Left	517	504.39	745.00	750.94	746.97	751.05	0.000739	2.65	190.22	92.49	0.19
Left	517	1059.99	745.00	751.89	748.23	751.95	0.000492	2.00	530.23	98.30	0.15
Left	527	Inline Weir									
Left	537	50.49	748.50	749.94	748.94	749.96	0.000946	1.17	43.27	79.42	0.17
Left	537	64.10	748.50	750.15	749.02	750.17	0.000981	1.30	49.39	80.47	0.18
Left	537	77.93	748.50	750.33	749.09	750.36	0.001026	1.42	54.78	81.39	0.19
Left	537	146.61	748.50	751.07	749.40	751.12	0.001167	1.90	77.02	85.20	0.21
Left	537	232.91	748.50	751.49	749.73	751.50	0.000290	0.98	237.88	87.35	0.10
Left	537	320.18	748.50	751.76	750.02	751.78	0.000408	1.22	261.79	88.75	0.13
Left	537	504.39	748.50	752.19	750.55	752.23	0.000665	1.68	300.26	91.11	0.16
Left	537	1059.99	748.50	753.18	751.14	753.29	0.001295	2.69	394.13	97.10	0.24
Left	546	50.49	748.50	749.96	748.75	749.97	0.000152	0.46	110.73	79.19	0.07
Left	546	64.10	748.50	750.17	748.79	750.18	0.000156	0.50	127.39	80.22	0.07
Left	546	77.93	748.50	750.36	748.83	750.36	0.000162	0.55	142.29	81.12	0.07
Left	546	146.61	748.50	751.12	749.00	751.13	0.000179	0.71	205.81	84.88	0.08
Left	546	232.91	748.50	751.49	749.18	751.50	0.000291	0.98	236.97	86.66	0.10
Left	546	320.18	748.50	751.76	749.34	751.78	0.000408	1.23	260.86	88.01	0.13
Left	546	504.39	748.50	752.19	749.63	752.23	0.000664	1.69	299.17	90.12	0.16
Left	546	1059.99	748.50	753.19	750.34	753.31	0.001286	2.71	391.85	95.03	0.23
Left	547	50.49	748.50	749.97	748.75	749.97	0.000146	0.45	112.55	79.96	0.07
Left	547	64.10	748.50	750.18	748.79	750.19	0.000150	0.50	129.49	80.95	0.07

HEC-RAS Plan: Imported Pla River: Chippewa Reach: Left (Continued)

Reach	River Sta	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)	
Left	547	77.93	748.50	750.37	748.83	750.37	0.000156	0.54	144.66	81.83	0.07
Left	547	146.61	748.50	751.12	749.00	751.13	0.000175	0.71	207.84	85.41	0.08
Left	547	232.91	748.50	751.49	749.17	751.50	0.000284	0.97	239.27	87.13	0.10
Left	547	320.18	748.50	751.76	749.33	751.79	0.000398	1.22	263.47	88.43	0.12
Left	547	504.39	748.50	752.20	749.62	752.24	0.000646	1.67	302.14	90.47	0.16
Left	547	1059.99	748.50	753.20	750.33	753.31	0.001252	2.68	395.43	95.22	0.23
Left	552	50.49	748.50	749.98	748.75	749.98	0.000148	0.45	111.63	78.99	0.07
Left	552	64.10	748.50	750.19	748.79	750.19	0.000152	0.50	128.48	79.99	0.07
Left	552	77.93	748.50	750.38	748.83	750.38	0.000157	0.54	143.60	80.88	0.07
Left	552	146.61	748.50	751.12	749.00	751.13	0.000180	0.71	205.25	84.41	0.08
Left	552	232.91	748.50	751.49	749.18	751.51	0.000291	0.99	236.41	86.13	0.10
Left	552	320.18	748.50	751.77	749.34	751.79	0.000407	1.23	260.51	87.45	0.13
Left	552	504.39	748.50	752.20	749.63	752.25	0.000660	1.69	298.96	89.50	0.16
Left	552	1059.99	748.50	753.21	750.35	753.32	0.001276	2.71	391.61	94.27	0.23
Left	557.6	Bridge									
Left	563	50.49	748.50	750.00	748.75	750.00	0.000152	0.46	109.39	76.91	0.07
Left	563	64.10	748.50	750.22	748.80	750.22	0.000156	0.51	126.16	78.05	0.07
Left	563	77.93	748.50	750.41	748.84	750.41	0.000161	0.55	141.29	79.06	0.07
Left	563	146.61	748.50	751.13	749.01	751.13	0.000193	0.74	199.34	82.84	0.08
Left	563	232.91	748.50	751.49	749.20	751.51	0.000311	1.01	230.25	84.79	0.11
Left	563	320.18	748.50	751.78	749.36	751.80	0.000432	1.26	254.54	86.29	0.13
Left	563	504.39	748.50	752.22	749.66	752.27	0.000695	1.72	293.12	88.61	0.17
Left	563	1059.99	748.50	753.24	750.39	753.36	0.001329	2.74	386.16	93.99	0.24
Left	583	50.49	748.50	750.01	748.73	750.01	0.000112	0.40	126.46	87.90	0.06
Left	583	64.10	748.50	750.22	748.77	750.23	0.000115	0.44	145.76	89.33	0.06
Left	583	77.93	748.50	750.42	748.81	750.42	0.000119	0.48	163.24	90.61	0.06
Left	583	146.61	748.50	751.13	748.97	751.14	0.000145	0.64	229.33	95.28	0.07
Left	583	232.91	748.50	751.50	749.14	751.51	0.000234	0.88	265.23	97.72	0.09
Left	583	320.18	748.50	751.79	749.28	751.81	0.000323	1.09	293.61	99.62	0.11
Left	583	504.39	748.50	752.24	749.56	752.27	0.000519	1.49	339.04	102.79	0.14
Left	583	1059.99	748.50	753.30	750.22	753.38	0.000973	2.35	451.94	110.72	0.20

STANDARD TABLE 2

HEC-RAS Plan: Imported Pla River: Chippewa Reach: Left

Reach	River Sta	E.G. Elev	W.S. Elev	Vel Head	Frctn Loss	C & E Loss	Q Left	Q Channel	Q Right	Top Width
		(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft)
Left	33	745.15	745.13	0.02	0.23	0.02		50.49		55.89
Left	33	745.27	745.24	0.02	0.25	0.02		64.10		56.39
Left	33	745.37	745.34	0.03	0.25	0.02		77.93		56.81
Left	33	745.92	745.88	0.04	0.11	0.00		146.61		59.15
Left	33	746.50	746.44	0.06	0.08	0.00		232.91		61.57
Left	33	747.01	746.94	0.07	0.06	0.00		320.18		63.74
Left	33	747.90	747.81	0.09	0.05	0.00		504.39		67.51
Left	33	749.88	749.74	0.14	0.04	0.01		1059.99		75.88
Left	43.*	745.20	745.13	0.08	0.03	0.02		50.49		53.58
Left	43.*	745.33	745.24	0.09	0.04	0.02		64.10		54.24
Left	43.*	745.44	745.33	0.11	0.04	0.03		77.93		54.78
Left	43.*	746.00	745.82	0.18	0.03	0.04		146.61		57.54
Left	43.*	746.58	746.34	0.24	0.03	0.06		232.91		59.91
Left	43.*	747.02	746.95	0.07	0.02	0.00		320.18		62.71
Left	43.*	747.91	747.82	0.09	0.02	0.00		504.39		66.68
Left	43.*	749.91	749.76	0.15	0.01	0.00	0.01	1059.98		77.21
Left	48	Inline Weir								
Left	53.*	745.68	745.65	0.03				50.49		55.47
Left	53.*	745.88	745.84	0.03				64.10		56.39
Left	53.*	746.07	746.03	0.04				77.93		57.28
Left	53.*	746.79	746.77	0.02				146.61		60.82
Left	53.*	747.21	747.17	0.03				232.91		62.77
Left	53.*	747.53	747.48	0.05				320.18		64.24
Left	53.*	748.16	748.08	0.08				504.39		67.10
Left	53.*	750.01	749.86	0.15			0.28	1059.71		80.04
Left	63	745.68	745.67	0.01	0.01	0.00		50.49		54.36
Left	63	745.89	745.88	0.01	0.01	0.00		64.10		55.38
Left	63	746.08	746.07	0.01	0.01	0.00		77.93		56.33
Left	63	746.79	746.77	0.02	0.01	0.00		146.61		59.86
Left	63	747.22	747.18	0.04	0.01	0.00		232.91		61.90
Left	63	747.55	747.49	0.05	0.01	0.00		320.18		63.47
Left	63	748.18	748.09	0.09	0.01	0.00		504.39		66.44
Left	63	750.04	749.88	0.15	0.01	0.00	0.76	1059.23		79.84
Left	121	745.75	745.71	0.04	0.07	0.01		50.49		49.13
Left	121	745.95	745.92	0.03	0.06	0.01		64.10		50.32
Left	121	746.14	746.10	0.03	0.05	0.01		77.93		51.40
Left	121	746.84	746.80	0.04	0.05	0.01		146.61		55.43
Left	121	747.29	747.23	0.06	0.07	0.01		232.91		57.92
Left	121	747.64	747.55	0.09	0.09	0.01		320.18		59.81
Left	121	748.30	748.16	0.13	0.11	0.01		504.39		63.36
Left	121	750.16	749.96	0.20	0.11	0.01		1059.99		73.75
Left	136	745.84	745.76	0.08	0.09	0.01		50.49		48.65
Left	136	746.03	745.96	0.08	0.06	0.01		64.10		49.99
Left	136	746.21	746.13	0.08	0.05	0.01		77.93		51.17
Left	136	746.90	746.78	0.12	0.04	0.02		146.61		55.47
Left	136	747.38	747.18	0.20	0.04	0.04		232.91		57.85
Left	136	747.76	747.47	0.29	0.05	0.06		320.18		59.56
Left	136	748.34	748.21	0.13	0.04	0.00		504.39		63.98
Left	136	750.19	750.00	0.20	0.04	0.00		1059.99		74.66
Left	143.5	Inline Weir								
Left	151	746.64	746.63	0.02				50.49		55.01
Left	151	746.85	746.83	0.02				64.10		56.22
Left	151	747.04	747.01	0.03				77.93		57.33
Left	151	747.81	747.76	0.05				146.61		61.82
Left	151	748.24	748.22	0.03				232.91		64.58
Left	151	748.57	748.53	0.04				320.18		66.49
Left	151	749.13	749.05	0.07				504.39		69.62
Left	151	750.35	750.18	0.18			5.27	1054.65	0.06	267.99
Left	166	746.65	746.65	0.01	0.01	0.00		50.49		55.20

HEC-RAS Plan: Imported Pla River: Chippewa Reach: Left (Continued)

Reach	River Sta	E.G. Elev	W.S. Elev	Vel Head	Frctn Loss	C & E Loss	Q Left	Q Channel	Q Right	Top Width
		(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft)
Left	166	746.86	746.86	0.01	0.01	0.00		64.10		56.50
Left	166	747.04	747.04	0.01	0.01	0.00		77.93		57.62
Left	166	747.82	747.80	0.02	0.01	0.00		146.61		62.38
Left	166	748.25	748.22	0.03	0.01	0.00		232.91		64.99
Left	166	748.59	748.54	0.04	0.01	0.00		320.18		66.97
Left	166	749.15	749.08	0.07	0.02	0.00		504.39		70.28
Left	166	750.39	750.22	0.17	0.03	0.00	7.33	1052.56	0.10	268.53
Left	208	746.67	746.66	0.00	0.01	0.00		50.49		67.48
Left	208	746.88	746.87	0.00	0.01	0.00		64.10		68.46
Left	208	747.06	747.06	0.01	0.01	0.00		77.93		69.32
Left	208	747.84	747.83	0.01	0.01	0.00		146.61		72.90
Left	208	748.26	748.25	0.02	0.02	0.00		232.91		74.85
Left	208	748.60	748.57	0.03	0.02	0.00		320.18		76.37
Left	208	749.19	749.14	0.05	0.04	0.00		504.39		79.00
Left	208	750.45	750.34	0.12	0.06	0.01	3.26	1056.41	0.31	164.26
Left	228.*	746.68	746.67	0.02	0.01	0.00		50.49		67.79
Left	228.*	746.89	746.87	0.02	0.01	0.00		64.10		69.32
Left	228.*	747.08	747.06	0.02	0.01	0.01		77.93		70.69
Left	228.*	747.86	747.81	0.05	0.01	0.01		146.61		76.20
Left	228.*	748.30	748.21	0.09	0.01	0.02		232.91		79.12
Left	228.*	748.65	748.51	0.14	0.02	0.03		320.18		81.34
Left	228.*	749.20	749.16	0.05	0.01	0.00		504.39		86.09
Left	228.*	750.48	750.37	0.11	0.02	0.00	2.18	1057.46	0.34	144.93
Left	238	Inline Weir								
Left	248.*	747.83	747.83	0.01				50.49		80.65
Left	248.*	748.04	748.04	0.01				64.10		82.77
Left	248.*	748.23	748.22	0.01				77.93		84.65
Left	248.*	748.99	748.97	0.02				146.61		92.29
Left	248.*	749.36	749.36	0.01			0.00	232.91		96.55
Left	248.*	749.61	749.60	0.01			0.03	320.15		101.97
Left	248.*	750.03	750.01	0.03			0.41	503.98	0.00	111.29
Left	248.*	750.91	750.83	0.08			6.30	1051.14	2.54	168.06
Left	268	747.83	747.83	0.00	0.00	0.00		50.49		86.03
Left	268	748.04	748.04	0.00	0.00	0.00		64.10		88.81
Left	268	748.23	748.23	0.00	0.00	0.00		77.93		91.29
Left	268	749.00	748.99	0.00	0.00	0.00		146.61		101.39
Left	268	749.37	749.36	0.01	0.00	0.00	0.03	232.88		107.42
Left	268	749.62	749.61	0.01	0.00	0.00	0.14	320.04		111.49
Left	268	750.05	750.02	0.02	0.01	0.00	0.72	503.67	0.00	119.42
Left	268	750.94	750.87	0.07	0.01	0.00	5.84	1051.04	3.11	169.56
Left	289	747.84	747.84	0.00	0.00	0.00		50.49		79.39
Left	289	748.05	748.05	0.00	0.00	0.00		64.10		82.48
Left	289	748.24	748.24	0.00	0.00	0.00		77.93		85.21
Left	289	749.00	749.00	0.01	0.00	0.00		146.61		96.25
Left	289	749.37	749.36	0.01	0.00	0.00		232.91		105.78
Left	289	749.63	749.61	0.02	0.00	0.00		320.18		108.20
Left	289	750.06	750.03	0.03	0.01	0.00	0.00	504.39	0.00	114.02
Left	289	750.96	750.88	0.08	0.02	0.00	1.27	1054.08	4.64	165.83
Left	354	747.84	747.84	0.00	0.00	0.00		50.49		87.99
Left	354	748.06	748.06	0.00	0.00	0.00		64.10		91.53
Left	354	748.25	748.25	0.00	0.00	0.00		77.93		94.66
Left	354	749.01	749.01	0.00	0.01	0.00		146.61		116.08
Left	354	749.38	749.37	0.01	0.01	0.00		232.91		120.09
Left	354	749.64	749.63	0.01	0.02	0.00		320.18		122.88
Left	354	750.08	750.06	0.02	0.03	0.00	0.00	504.39		128.11
Left	354	751.02	750.96	0.06	0.05	0.00	1.24	1058.75		146.12
Left	411	747.85	747.85	0.00	0.00	0.00		50.49		102.40
Left	411	748.07	748.06	0.00	0.00	0.00		64.10		104.68
Left	411	748.26	748.26	0.00	0.00	0.00		77.93		106.71
Left	411	749.02	749.02	0.00	0.00	0.00		146.61		114.66

HEC-RAS Plan: Imported Pla River: Chippewa Reach: Left (Continued)

Reach	River Sta	E.G. Elev	W.S. Elev	Vel Head	Frctn Loss	C & E Loss	Q Left	Q Channel	Q Right	Top Width
		(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft)
Left	411	749.39	749.38	0.01	0.01	0.00		232.91		118.52
Left	411	749.65	749.64	0.01	0.01	0.00		320.18		121.23
Left	411	750.10	750.08	0.02	0.02	0.00	0.00	504.39	0.00	128.96
Left	411	751.06	751.01	0.05	0.03	0.00	1.80	1055.79	2.40	174.58
Left	431	747.86	747.85	0.00	0.00	0.00		50.49		90.67
Left	431	748.08	748.07	0.00	0.00	0.00		64.10		92.62
Left	431	748.27	748.26	0.01	0.00	0.00		77.93		94.21
Left	431	749.03	749.01	0.01	0.00	0.00		146.61		100.62
Left	431	749.40	749.38	0.03	0.00	0.01		232.91		103.70
Left	431	749.67	749.62	0.05	0.00	0.01		320.18		105.76
Left	431	750.11	750.09	0.02	0.01	0.00		504.39	0.00	110.69
Left	431	751.08	751.01	0.07	0.01	0.01		1058.73	1.26	128.19
Left	441	Inline Weir								
Left	451.*	749.02	749.02	0.00				50.49		93.80
Left	451.*	749.22	749.22	0.00				64.10		95.35
Left	451.*	749.40	749.40	0.00				77.93		96.68
Left	451.*	750.04	750.03	0.00				146.61		101.60
Left	451.*	750.36	750.35	0.01				232.91		104.03
Left	451.*	750.59	750.58	0.01				320.18		105.81
Left	451.*	751.00	750.98	0.02				504.39		108.91
Left	451.*	751.92	751.87	0.05				1059.10	0.89	125.70
Left	471	749.03	749.03	0.00	0.00	0.00		50.49		86.15
Left	471	749.23	749.23	0.00	0.00	0.00		64.10		87.23
Left	471	749.40	749.40	0.00	0.00	0.00		77.93		88.12
Left	471	750.04	750.03	0.00	0.00	0.00		146.61		91.51
Left	471	750.36	750.35	0.01	0.00	0.00		232.91		93.20
Left	471	750.59	750.58	0.01	0.00	0.00		320.18		94.43
Left	471	751.01	750.99	0.02	0.00	0.00		504.39		96.62
Left	471	751.93	751.87	0.06	0.01	0.00		1059.99		101.29
Left	486	749.03	749.03	0.00	0.00	0.00		50.49		85.21
Left	486	749.24	749.24	0.00	0.00	0.00		64.10		86.50
Left	486	749.40	749.40	0.00	0.00	0.00		77.93		87.53
Left	486	750.04	750.03	0.00	0.00	0.00		146.61		91.59
Left	486	750.36	750.35	0.01	0.00	0.00		232.91		93.91
Left	486	750.59	750.58	0.01	0.00	0.00		320.18		95.61
Left	486	751.02	751.00	0.02	0.00	0.00		504.39		98.66
Left	486	751.93	751.88	0.06	0.01	0.00		1059.99		105.09
Left	517	749.04	749.04	0.00	0.00	0.00		50.49		80.73
Left	517	749.25	749.25	0.00	0.00	0.00		64.10		82.01
Left	517	749.41	749.40	0.00	0.00	0.00		77.93		82.98
Left	517	750.05	750.04	0.01	0.00	0.00		146.61		86.88
Left	517	750.37	750.34	0.03	0.00	0.01		232.91		88.78
Left	517	750.62	750.57	0.05	0.01	0.01		320.18		90.16
Left	517	751.05	750.94	0.11	0.01	0.03		504.39		92.49
Left	517	751.95	751.89	0.06	0.01	0.00		1059.99		98.30
Left	527	Inline Weir								
Left	537	749.96	749.94	0.02				50.49		79.42
Left	537	750.17	750.15	0.03				64.10		80.47
Left	537	750.36	750.33	0.03				77.93		81.39
Left	537	751.12	751.07	0.06				146.61		85.20
Left	537	751.50	751.49	0.01				232.91		87.35
Left	537	751.78	751.76	0.02				320.18		88.75
Left	537	752.23	752.19	0.04				504.39		91.11
Left	537	753.29	753.18	0.11				1059.99		97.10
Left	546	749.97	749.96	0.00	0.00	0.00		50.49		79.19
Left	546	750.18	750.17	0.00	0.00	0.00		64.10		80.22
Left	546	750.36	750.36	0.00	0.00	0.00		77.93		81.12
Left	546	751.13	751.12	0.01	0.00	0.00		146.61		84.88
Left	546	751.50	751.49	0.02	0.00	0.00		232.91		86.66

HEC-RAS Plan: Imported Pla River: Chippewa Reach: Left (Continued)

Reach	River Sta	E.G. Elev	W.S. Elev	Vel Head	Frctn Loss	C & E Loss	Q Left	Q Channel	Q Right	Top Width
		(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft)
Left	546	751.78	751.76	0.02	0.00	0.00		320.18		88.01
Left	546	752.23	752.19	0.04	0.01	0.00		504.39		90.12
Left	546	753.31	753.19	0.11	0.01	0.00		1059.99		95.03
Left	547	749.97	749.97	0.00	0.00	0.00		50.49		79.96
Left	547	750.19	750.18	0.00	0.00	0.00		64.10		80.95
Left	547	750.37	750.37	0.00	0.00	0.00		77.93		81.83
Left	547	751.13	751.12	0.01	0.00	0.00		146.61		85.41
Left	547	751.50	751.49	0.01	0.00	0.00		232.91		87.13
Left	547	751.79	751.76	0.02	0.00	0.00		320.18		88.43
Left	547	752.24	752.20	0.04	0.00	0.00		504.39		90.47
Left	547	753.31	753.20	0.11	0.00	0.00		1059.99		95.22
Left	552	749.98	749.98	0.00	0.00	0.00		50.49		78.99
Left	552	750.19	750.19	0.00	0.00	0.00		64.10		79.99
Left	552	750.38	750.38	0.00	0.00	0.00		77.93		80.88
Left	552	751.13	751.12	0.01	0.00	0.00		146.61		84.41
Left	552	751.51	751.49	0.02	0.00	0.00		232.91		86.13
Left	552	751.79	751.77	0.02	0.00	0.00		320.18		87.45
Left	552	752.25	752.20	0.04	0.00	0.00		504.39		89.50
Left	552	753.32	753.21	0.11	0.01	0.00		1059.99		94.27
Left	557.5	Bridge								
Left	563	750.00	750.00	0.00	0.00	0.00		50.49		76.91
Left	563	750.22	750.22	0.00	0.00	0.00		64.10		78.05
Left	563	750.41	750.41	0.00	0.00	0.00		77.93		79.06
Left	563	751.13	751.13	0.01	0.00	0.00		146.61		82.84
Left	563	751.51	751.49	0.02	0.00	0.00		232.91		84.79
Left	563	751.80	751.78	0.02	0.00	0.00		320.18		86.29
Left	563	752.27	752.22	0.05	0.00	0.00		504.39		88.61
Left	563	753.36	753.24	0.12	0.00	0.00		1059.99		93.99
Left	583	750.01	750.01	0.00	0.00	0.00		50.49		87.90
Left	583	750.23	750.22	0.00	0.00	0.00		64.10		89.33
Left	583	750.42	750.42	0.00	0.00	0.00		77.93		90.61
Left	583	751.14	751.13	0.01	0.00	0.00		146.61		95.28
Left	583	751.51	751.50	0.01	0.01	0.00		232.91		97.72
Left	583	751.81	751.79	0.02	0.01	0.00		320.18		99.62
Left	583	752.27	752.24	0.03	0.01	0.00		504.39		102.79
Left	583	753.38	753.30	0.09	0.02	0.00		1059.99		110.72

H. MDEQ Discharge Letter

STATE OF MICHIGAN

JOHN ENGLER, Governor

DEPARTMENT OF ENVIRONMENTAL QUALITY

"Better Service for a Better Environment"

HOLLISTER BUILDING, PO BOX 30473, LANSING MI 48909-7973

INTERNET: www.deq.state.mi.us

RUSSELL J. HARDING, Director

REPLY TO:

LAND & WATER MANAGEMENT DIVISION
PO BOX 30458
LANSING MI 48909-7958

November 3, 2000

Mr. James E. Tiffany
Sundberg, Carlson and Associates, Inc.
1028 Hannah Avenue, Suite A
Traverse City, MI 49686

Dear Mr. Tiffany:

We have estimated the flood frequency discharge requested in your transmittal of October 25, 2000 (Process No. 20000510), as follows:

> Chippewa River at M-20 (High Street), Section 15, T14N, R4W, Union Township, Isabella County, has a total drainage area of 395 square miles and a contributing drainage area of 382 square miles. The 10%, 2%, 1%, and 0.2% chance peak flows are estimated to be 3600 cubic feet per second (cfs), 5600 cfs, 6600 cfs, and 9100 cfs, respectively. (Watershed Basin No. 32E).

Please include a copy of this letter with your application for permit. These estimates should be confirmed by our office if an application is not submitted within one year. If you have any questions concerning the discharge estimates, please do not hesitate to contact me at the number below or by e-mail at: sorrell@state.mi.us. Any questions concerning the hydraulics or the proper procedure for filing for a permit should be directed to Ms. Joy Brooks, Land and Water Management Division, Saginaw Bay Office, at 517-686-8025.

Sincerely,

Richard C. Sorrell

Richard C. Sorrell, P.E., Chief
Hydrologic Studies Unit
Land and Water Management Division
517-335-3176

RCS:AA:BW

cc: Ms. Joy Brooks, DEQ (P23SE)

STATE OF MICHIGAN

JOHN ENGLER, Governor

DEPARTMENT OF ENVIRONMENTAL QUALITY

"Better Service for a Better Environment"

HOLLISTER BUILDING, PO BOX 30473, LANSING MI 48909-7973

INTERNET: www.deq.state.mi.us

RUSSELL J. HARDING, Director

REPLY TO:

LAND & WATER MANAGEMENT DIVISION
PO BOX 30458
LANSING MI 48909-7958

December 10, 2001

RECEIVED
WILCOX ASSOCIATES, INC.
CADILLAC, MI

Mr. James E. Tiffany
Wilcox Associates, Inc.
One Madison Avenue
Cadillac, MI 49601

Dear Mr. Tiffany:

We have estimated the flood frequency discharges requested in your transmittal of November 19, 2001 (Process No. 20010676), as follows:

1. Chippewa River at Harris Dam, Dam ID 119, Section 15, T14N, R4W, Union Township, Isabella County, has a total drainage area of 396 square miles and a contributing drainage area of 390 square miles. The design discharge for this dam is the 1% chance (100-year) flood. The 50%, 20%, 10%, 2%, 1%, and 0.2% chance peak flows are estimated to be 1800 cubic feet per second (cfs), 2800 cfs, 3600 cfs, 5500 cfs, 6300 cfs, and 8700 cfs, respectively. (Watershed Basin No. 32E Chippewa/Quad P23SE). (SEE LETTER DATED 1/14/02)

2. East Pond Creek at Fisher Dam, Dam ID 608, Section 17, T5N, R12E, Bruce Township, Macomb County, has a total drainage area of 11.8 square miles and a contributing drainage area of 11.4 square miles. The design discharge for this dam is the 1% chance (100-year) flood. The 10%, 2%, and 1% chance peak flows are estimated to be 100 cfs, 200 cfs, and 260 cfs, respectively. The 1% chance flood volume is estimated to be 900 acre-feet. (Watershed Basin No. 12 Clinton/Quad S30SE).

3. Tributary to Adams Creek at White Lake Dam, Dam ID 479, Section 11, T23N, R11W, Antioch Township, Wexford County, has a drainage area of 0.42 square miles. The design discharge for this dam is the 1% chance (100-year) flood. The 10%, 2%, and 1% chance peak flows are estimated to be 10 cfs, 40 cfs, and 60 cfs, respectively. The 1% chance flood volume is estimated to be 15 acre-feet. (Watershed Basin No. 20 Manistee/Quad M20NE).

4. Tributary to Little Muskegon River at Lake Laura Dam, Dam ID 797, Section 33, T14N, R8W, Morton Township, Mecosta County, has a drainage area of 0.59 square miles. The design discharge for this dam is the 1% chance (100-year) flood. The

10%, 2%, and 1% chance peak outflows are estimated to be 1 cfs, 5 cfs, and 10 cfs, respectively. The 1% chance flood volume is estimated to be 110 acre-feet. (Watershed Basin No. 22 Muskegon/Quad P21SE).

5. Tributary to Little Muskegon River at Sunset Lake Dam, Dam ID 796, Section 33, T14N, R8W, Morton Township, Mecosta County, has a drainage area of 0.68 square miles. The design discharge for this dam is the 1% chance (100-year) flood. The 10%, 2%, and 1% chance peak inflows are estimated to be 2 cfs, 7 cfs, and 10 cfs, respectively. (Watershed Basin No. 22 Muskegon/Quad P21SE).

6. Tributary to Little Muskegon River at Fawn Lake Dam, Dam ID 2595, Section 33, T14N, R8W, Morton Township, Mecosta County, has a drainage area of 0.44 square miles. The design discharge for this dam is the 1% chance (100-year) flood. The 10%, 2%, and 1% chance peak flows are estimated to be 15 cfs, 40 cfs, and 60 cfs, respectively. The 1% chance flood volume is estimated to be 60 acre-feet. (Watershed Basin No. 22 Muskegon/Quad P21SE).

Please include a copy of this letter with your inspection report or any subsequent application for permit. These estimates should be confirmed by our office if an application is not submitted within one year. If you have any questions concerning the discharge estimates, please contact Mr. Jon Grace, Hydrologic Studies Unit, at 517-373-4786 or by e-mail at: gracej@michigan.gov. If you have any questions concerning the requirements for the dam safety inspection report, please contact our Dam Safety Program at 517-373-1170.

Sincerely,

Richard C. Sorrell, P.E., Chief
Hydrologic Studies Unit
Land and Water Management Division
517-335-3176

RCS:JG:BW

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING

JOHN ENGLER
GOVERNOR

RUSSELL J. HARDING
DIRECTOR

January 14, 2002

Mr. James E. Tiffany
Wilcox Associates, Inc.
One Madison Avenue
Cadillac, MI 49601

Dear Mr. Tiffany:

We have revised the flood frequency discharges in our letter dated December 10, 2001 for the following location (Process No. 20010676):

> Chippewa River at Harris Dam, Dam ID 119, Section 15, T14N, R4W, Union Township, Isabella County, has a total drainage area of 396 square miles and a contributing drainage area of 390 square miles. The design discharge for this dam is the 1% chance (100-year) flood. The 1% and 0.2% chance peak flows are estimated to be 6600 cubic feet per second (cfs) and 9100 cfs, respectively. (Watershed Basin No. 32E Chippewa/Quad P23SE).

Please include a copy of this letter with your inspection report or any subsequent application for permit. These estimates should be confirmed by our office if an application is not submitted within one year. If you have any questions concerning the discharge estimates, please Mr. Arthur Armour, Hydrologic Studies Unit, at 517-335-3177, or by email at: armoura@michigan.gov. If you have any questions concerning the requirements for the dam safety inspection report, please contact our Dam Safety Program at 517-373-1170.

Sincerely,

Richard C. Sorrell, P.E., Chief
Hydrologic Studies Unit
Land and Water Management Division
517-335-3176

RCS:AA:BW