FLOODWAY IMPACT EVALUATION
COLTON RESIDENCE

34335 Hwy. 58

BEI Project 13-140

For
Don Colton
34335 Hwy. 58
Eugene, OR 97405

Branch ENGINEERING inc
Since 1977

civil · transportation
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August 9, 2013

310 5th Street
Springfield, OR 97477
p: 541.746.0637
f: 541.746.0389

This report was prepared to document the floodway impact evaluation performed for the proposed building improvements located on subject property, in Lane County. The building improvement includes construction of an elevated building pad. The building pad is located at the northeastern portion of the site and is approximately 100 x 150 feet in size. It is intended a home, garage, mechanical equipment, etc. will be constructed on the pad within the next several years (see attached site plan).

Per FEMA FIRM Panel 41039C1655 dated 6/2/1999, the entire parcel is located within the floodway of the Berkshire Slough. Per FEMA's Flood Insurance Study (FIS), the base flood elevation for the building pad is approximately 492.3 feet NGVD 29, and the encroached floodway elevation is approximately 493.0 feet NGVD.

In June 2013, Donn Rowe, PLS completed an on-site topographic survey to determine the existing ground elevations at the project site. The results of the survey indicate the existing elevations at the proposed improvements range from 464.0 - 471.5 feet NGVD 29. The attached site plan illustrates the existing ground elevations for the site.

A floodway evaluation must demonstrate there will be no impact to the 100-year flood elevations, floodway elevations, or floodway widths in the project vicinity due to the proposed construction. To do this, the floodway evaluation must satisfy two requirements. The first requirement is an equal conveyance calculation. This calculation must demonstrate there will be no net loss in conveyance due to the proposed construction. Any loss in conveyance resulting from the construction must be mitigated by improving the conveyance at another location. The second requirement is, using a step-backwater analysis computer program, it must be demonstrated that the proposed construction will not increase the 100-year floodplain and floodway water surface elevations in the area.

To satisfy the equal conveyance requirement, a calculation was performed to determine the loss in conveyance due to the proposed building pad. A mitigation area was then identified to offset the loss in conveyance. The mitigation area is located immediately southwest of the building pad. Calculations were performed to determine the size and geometry of the fill removal area necessary to offset the conveyance loss due to the construction of the building pad. The attached site plan and conveyance calculations illustrate the required size of the mitigation area.

For the second requirement, the improvements were modeled with the HEC-RAS computer program to determine if the proposed construction will cause a backwater effect during a 100-year discharge. The backwater analysis is conducted for the base flood (non-encroached) scenario and the floodway (encroached) scenario. The original FIS file for this stretch of the river is FILE80. In this file the building site is located approximately 200 feet upstream of the original Cross Section 140 (I as shown on the FIRM panel). A duplicate effective model (DEM) was

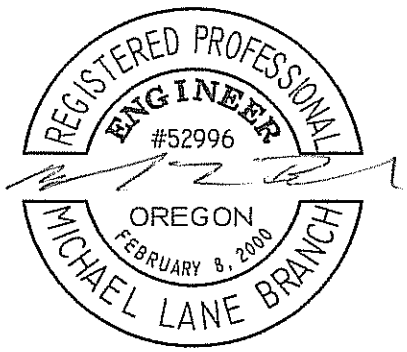
generated from the original FIS file. The DEM is comprised of the original cross sections of FILE80 within one mile upstream and downstream of the site. An existing conditions model (ECM) was then created by adding four new cross sections (140.5, 140.7, 140.9 and 141.5) to the DEM to reflect specific site conditions. The geometry of the new cross sections was generated by two-foot contour mapping from Lane County. The cross sections at the building pad were also modified to incorporate the new on-site topographic data from the field survey. The floodway limits were manually set based on scaled measurements from the FIRM panel. A proposed conditions model (PCM) was then generated by revising the ECM to reflect fill on the building pad. The models were then run and the floodplain and floodway elevations were compared between the ECM and the PCM. The results indicate construction on the building pad, coupled with the grading within the mitigation area, will result in no adverse impact to the 100-year discharge floodplain and floodway elevations in the project area (see attached HEC-RAS model printouts).

Based on the results of this analysis, the proposed fill removal area will mitigate the loss in conveyance due to construction of the identified building pad. In addition, the HEC-RAS computer model for the area indicates the proposed construction will not increase 100-year floodplain or floodway elevations in the project area.

If you have any questions, please do not hesitate to call.

Respectfully submitted,

Lane Branch, P.E.



EXPIRES: DECEMBER 31, 2013

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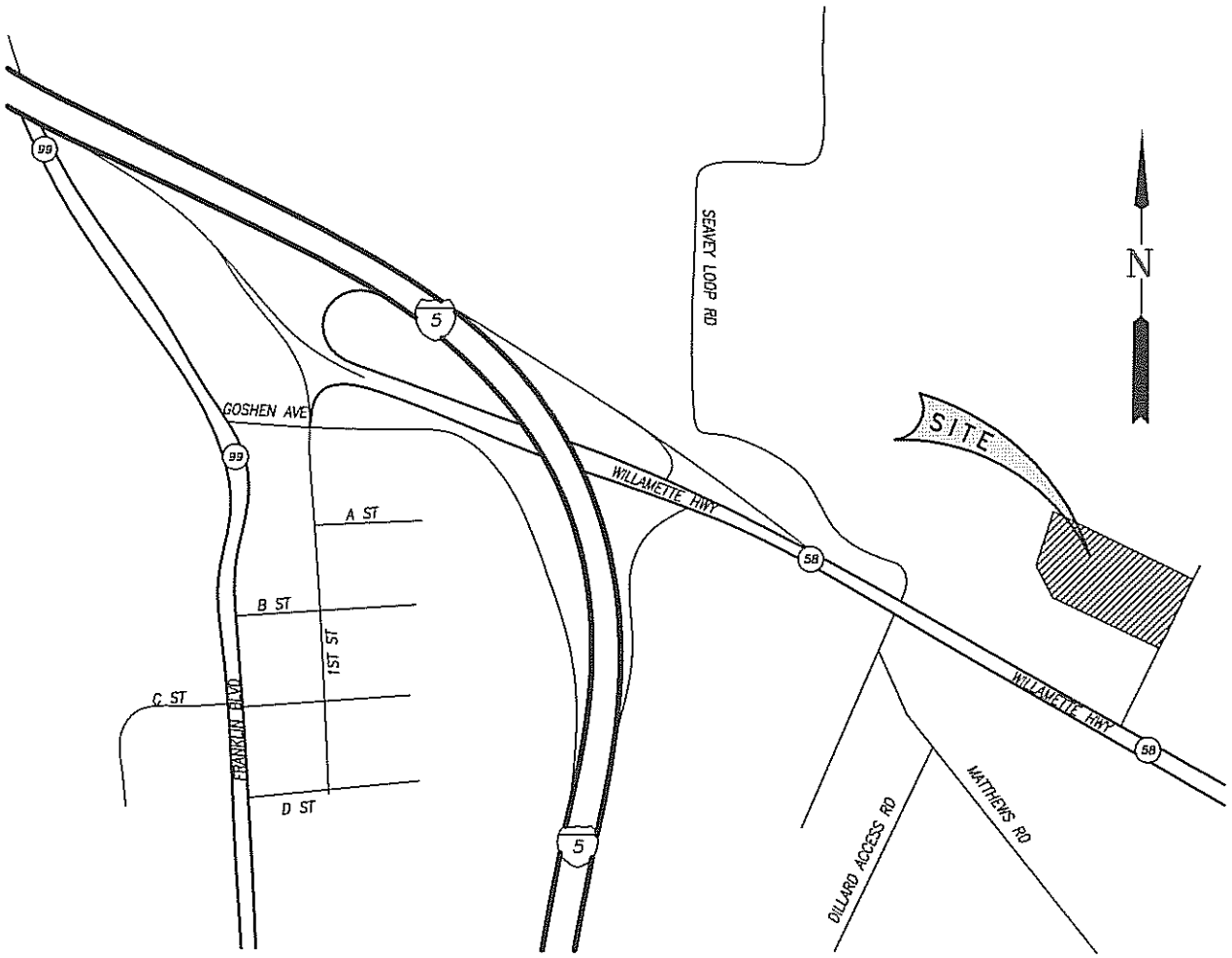


SCALE: N.T.S.

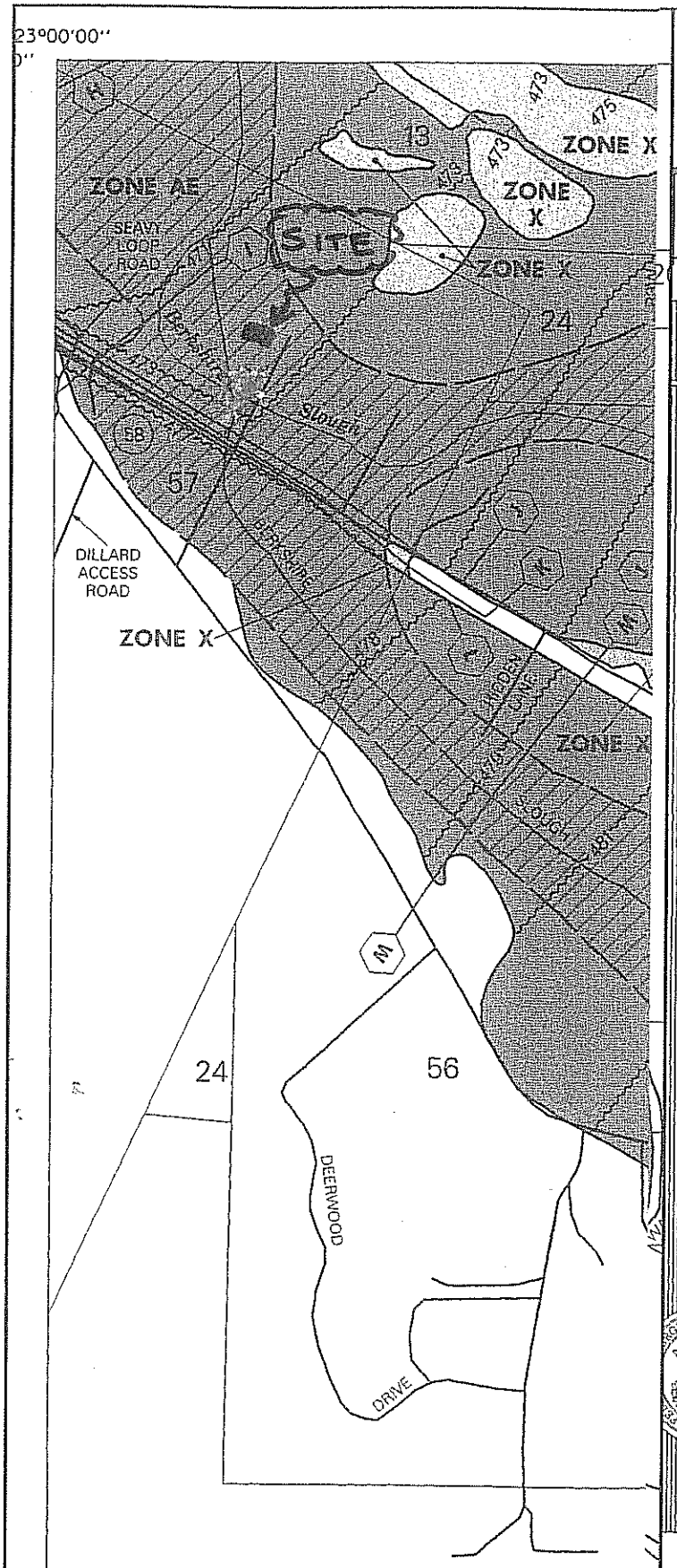
COLTON FLOODWAY STUDY

34335 HWY 58

VICINITY MAP

AUGUST 9, 2013

PROJECT NO: 13-140



APPROXIMATE SCALE IN FEET

1000 0 1000

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

LANE COUNTY, OREGON AND INCORPORATED AREAS

PANEL 1655 OF 2975

(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS: COMMUNITY	NUMBER	PANEL	SUFFIX
LANE COUNTY, UNINCORPORATED AREAS	415591	1655	F

MAP NUMBER 41039C1655 F

EFFECTIVE DATE: JUNE 2, 1999

Federal Emergency Management Agency

KEY NOTES

1. EXISTING CONCRETE PAD IS A FUTURE BUILDING PAD EXEMPT FROM FLOODWAY REQUIREMENTS
2. PROPOSED BUILDING PAD
3. FLOODWAY MITIGATION AREA

LEGEND

- POWER POLE
- TREE (DIAMETER AND SPECIES ON FILE)
- TELEPHONE PEDESTAL
- 476 EXISTING CONTOUR
- 476 NEW CONTOUR

EXISTING CONDITIONS SURVEY BY DONN ROWE, LLC

NOTES: ONE FOOT CONTOURS ARE SOLID LINES AND DASHED LINES ARE 1/2 FOOT INTERVALS.
CONTOUR LABELS TEXT TOP TOWARD UPHILL.
IN AUTOCAD - 'POINT tic & POINT elevations' WILL TURN ON SPOT ELEVATIONS.

N

25' 0 50'

Branch ENGINEERING Inc
Since 1977
310 5th STREET, SPRINGFIELD, OREGON 97477

SCALE: 1"=50'

COLTON FLOODWAY STUDY

34335 HWY 58

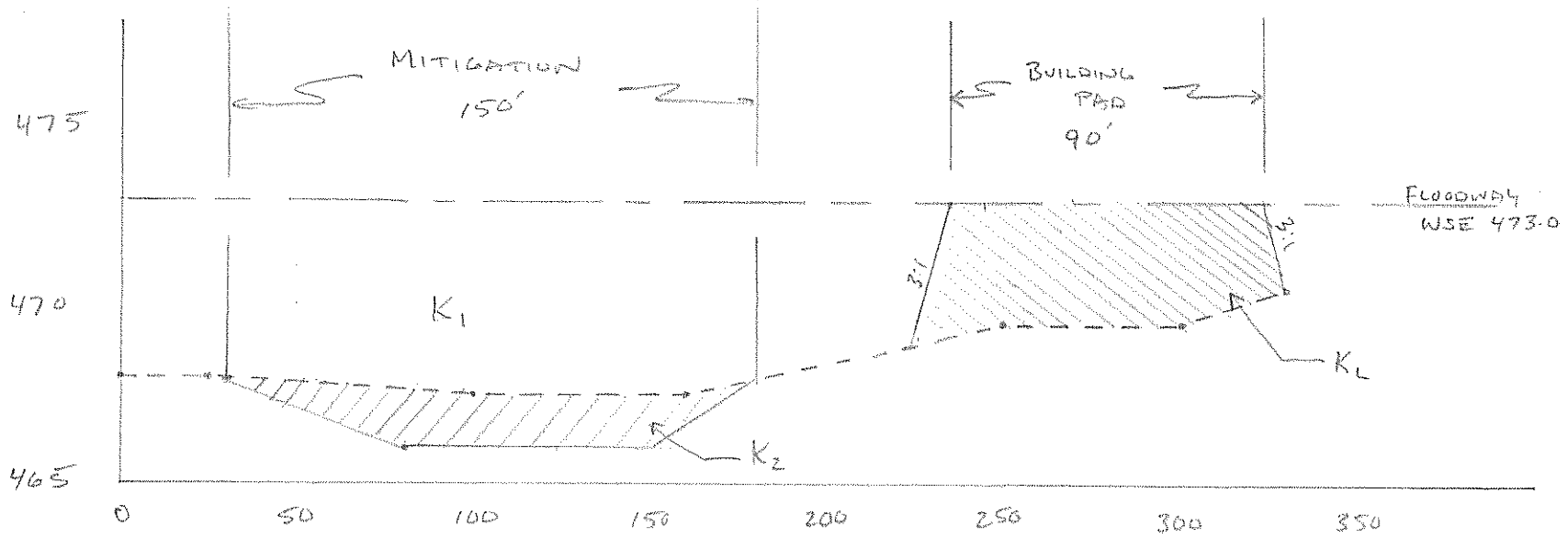
SITE PLAN

AUGUST 9, 2013

PROJECT NO: 13-140

Z:\2013\13-140 Colton Floodway\13-140 floodway map.dwg, 11X17 LAYOUT, 8/13/2013 11:21:04 AM, Winston, 1:1

EQUAL CONVEYANCE CALCULATION AT SECTION 140.7



CONVEYANCE GAIN (K_G) = $K_{1+2} - K_1$

$K_1 = \frac{1.49}{n_1}(A_1)(R_1)^{2/3}$

$n_1 = 0.035$
$A_1 = 780\ FT^2$
$R_1 = 780/150 = 5.2$

$K_1 = \frac{1.49}{0.035}(780)(5.2)^{2/3}$

$K_1 = \underline{99,666.3}$

$K_{1+2} = \frac{1.49}{0.035}(948)(6.3)^{2/3}$

$n_{1+2} = 0.035$
$A_{1+2} = 948$
$R_{1+2} = 948/150 = 6.3$

$K_{1+2} = \underline{137,663}$

$K_G = 137,663 - 99,666 = 37,997$

CONVEYANCE LOSS (K_L)

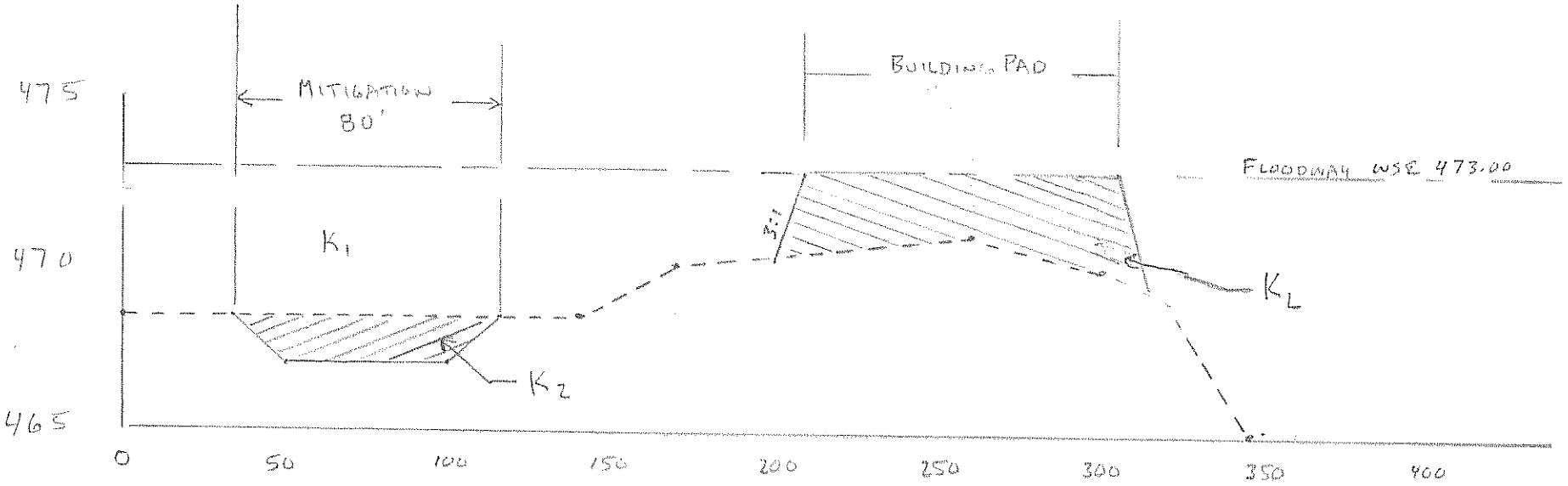
$n_L = 0.035$
$A_L = 350\ FT^2$
$R_L = 350/105 = 3.33$

$K_L = \frac{1.49}{0.035}(350)(3.33)^{2/3}$

$K_L = 33,249$

$K_G > K_L$ OK

EQUAL CONVEYANCE CALCULATION
AT SECTION 140.9



CONVEYANCE GAIN (K_{GAIN}) = $K_{1+2} - K_1$

$K_1 = \frac{1.49}{n_1}(A_1)(R_1)^{2/3}$

$n_1 = 0.035$
$A_1 = 360\ ft^2$
$R_1 = 360/80 = 4.50$

$K_1 = \frac{1.49}{0.035}(360)(4.5)^{2/3} = 41,773$

$K_{1+2} = \frac{1.49}{0.035}(457.5)(5.72)^{2/3}$

$n_{1+2} = 0.035$
$A_{1+2} = 457.5$
$R_{1+2} = 5.72$

$K_{1+2} = 62,284$

$K_G = K_{1+2} - K_1 = 62,284 - 41,773 = 20,511$

CONVEYANCE LOSS (K_L)

$K_L = \frac{1.49}{0.035}(270)(2.25)^{2/3}$

$= 19,736$

$n_L = 0.035$
$A_L = 270\ Ft^2$
$R_L = 270/120 = 2.25$

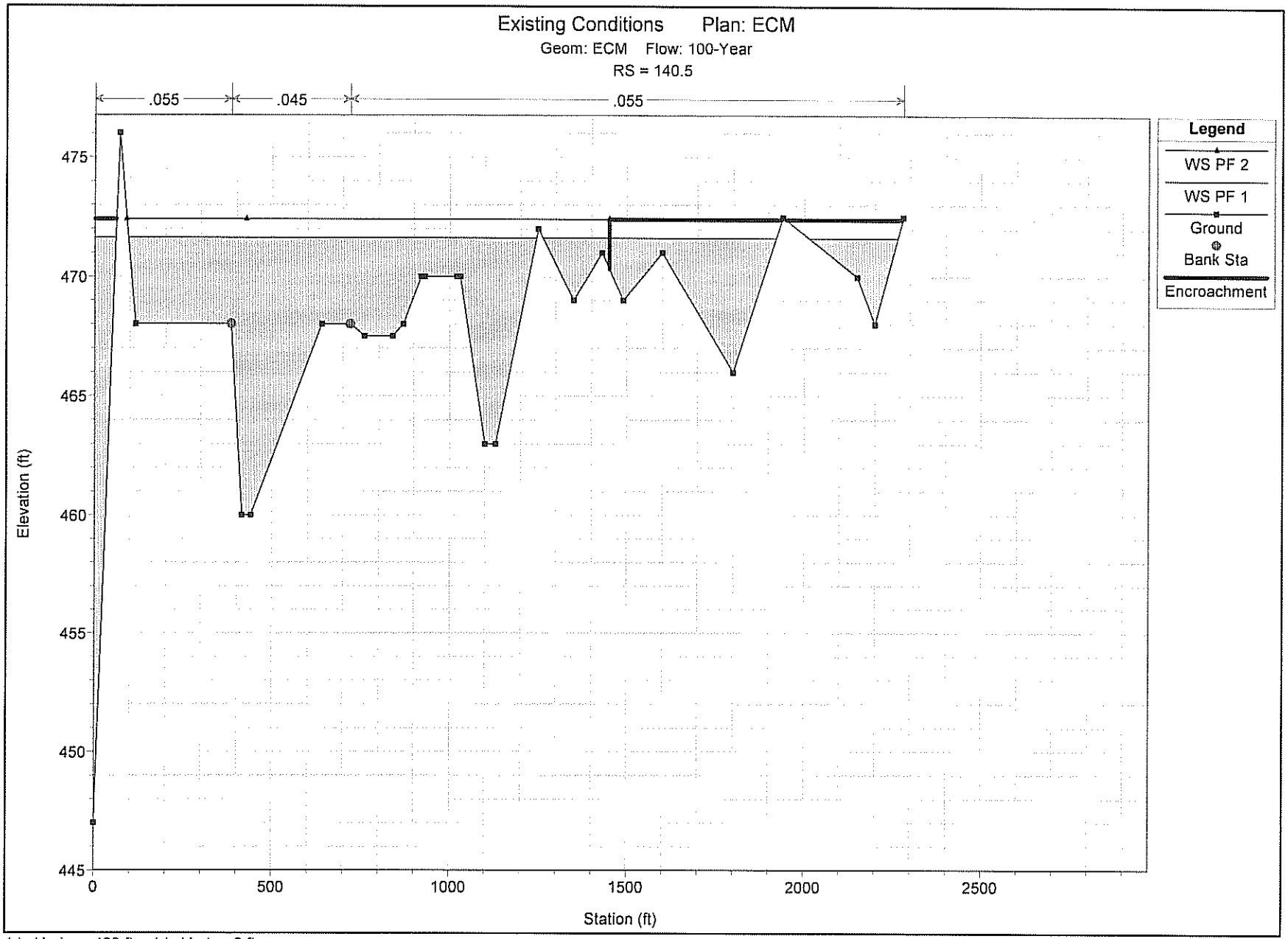
$K_G > K_L$ OK

HEC-RAS Plan: ECM River: RIVER-1 Reach: Reach-1

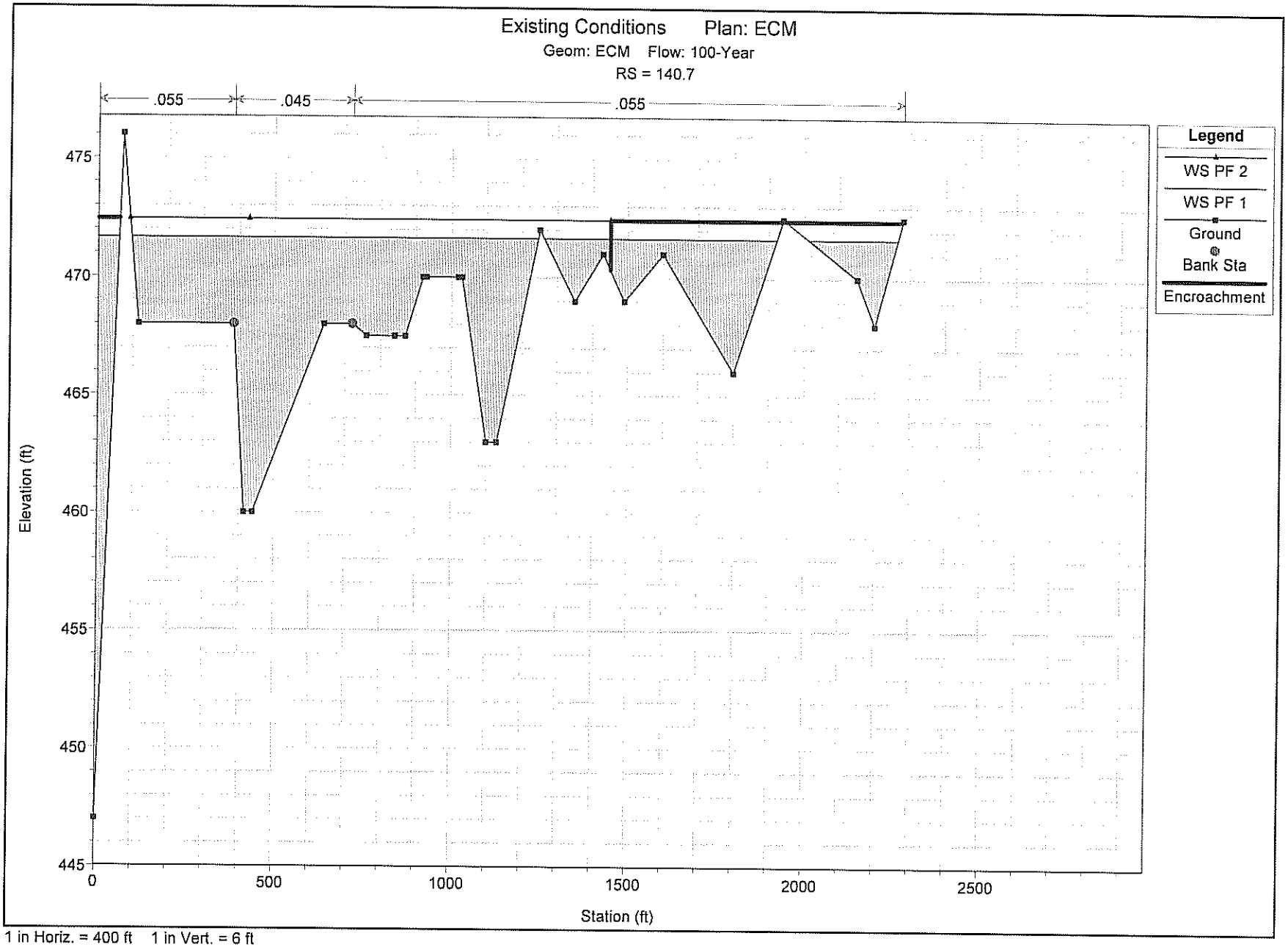
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	220	PF 1	50000.00	473.80	494.53		494.95	0.001134	6.83	13882.23	2644.44	0.30
Reach-1	220	PF 2	50000.00	473.80	494.91		495.56	0.001469	7.90	10859.42	1875.00	0.35
Reach-1	209	PF 1	15500.00	481.90	492.72		492.87	0.000765	3.22	5298.70	1015.02	0.22
Reach-1	209	PF 2	15500.00	481.90	492.80		492.97	0.000795	3.30	4916.97	820.00	0.22
Reach-1	200	PF 1	15500.00	485.80	488.53	488.40	489.23	0.019243	7.82	2589.70	1653.76	0.92
Reach-1	200	PF 2	15500.00	485.80	489.41		489.89	0.007826	6.21	2983.17	1180.40	0.62
Reach-1	180	PF 1	15500.00	482.50	487.73		487.79	0.000747	2.42	8006.96	2104.27	0.20
Reach-1	180	PF 2	15500.00	482.50	488.66		488.76	0.000720	2.68	6477.29	1252.40	0.21
Reach-1	150	PF 1	15500.00	475.60	478.96	478.96	479.75	0.027171	8.15	2329.59	1503.01	1.06
Reach-1	150	PF 2	15500.00	475.60	479.78	479.78	481.14	0.021975	9.35	1658.16	624.00	1.01
Reach-1	146	PF 1	15500.00	469.00	477.09		477.10	0.000083	1.07	14751.43	2527.68	0.07
Reach-1	146	PF 2	15500.00	469.00	477.16		477.18	0.000080	1.06	14939.03	2542.19	0.07
Reach-1	144	PF 1	15500.00	475.00	476.48	476.48	477.03	0.012338	6.08	2617.43	2407.06	0.99
Reach-1	144	PF 2	15500.00	475.00	476.50	476.50	477.10	0.012559	6.22	2491.91	2099.00	1.01
Reach-1	142	PF 1	15500.00	470.00	473.05		473.42	0.007591	4.92	3148.88	1405.87	0.58
Reach-1	142	PF 2	15500.00	470.00	473.89		474.09	0.003049	3.62	4279.55	1527.64	0.38
Reach-1	141.5	PF 1	23900.00	460.00	471.97		472.14	0.001185	4.17	8510.86	2180.78	0.28
Reach-1	141.5	PF 2	23900.00	460.00	472.80		473.03	0.001293	4.69	7044.03	1360.00	0.29
Reach-1	140.9	PF 1	23900.00	460.00	471.95		472.12	0.001197	4.19	8476.34	2177.96	0.28
Reach-1	140.9	PF 2	23900.00	460.00	472.78		473.01	0.001306	4.71	7020.29	1360.00	0.30
Reach-1	140.7	PF 1	23900.00	460.00	471.64		471.83	0.001372	4.46	8001.35	2121.86	0.30
Reach-1	140.7	PF 2	23900.00	460.00	472.42		472.68	0.001490	4.99	6740.27	1359.89	0.32
Reach-1	140.5	PF 1	23900.00	460.00	471.62		471.81	0.001400	4.49	7938.84	2118.29	0.30
Reach-1	140.5	PF 2	23900.00	460.00	472.40		472.66	0.001522	5.03	6688.02	1359.75	0.32
Reach-1	140	PF 1	23900.00	460.80	471.41		471.55	0.000949	3.37	8793.68	2393.20	0.24
Reach-1	140	PF 2	23900.00	460.80	472.15		472.37	0.001078	3.88	6489.39	1004.27	0.26

HEC-RAS Plan: ECM River: RIVER-1 Reach: Reach-1 (Continued)

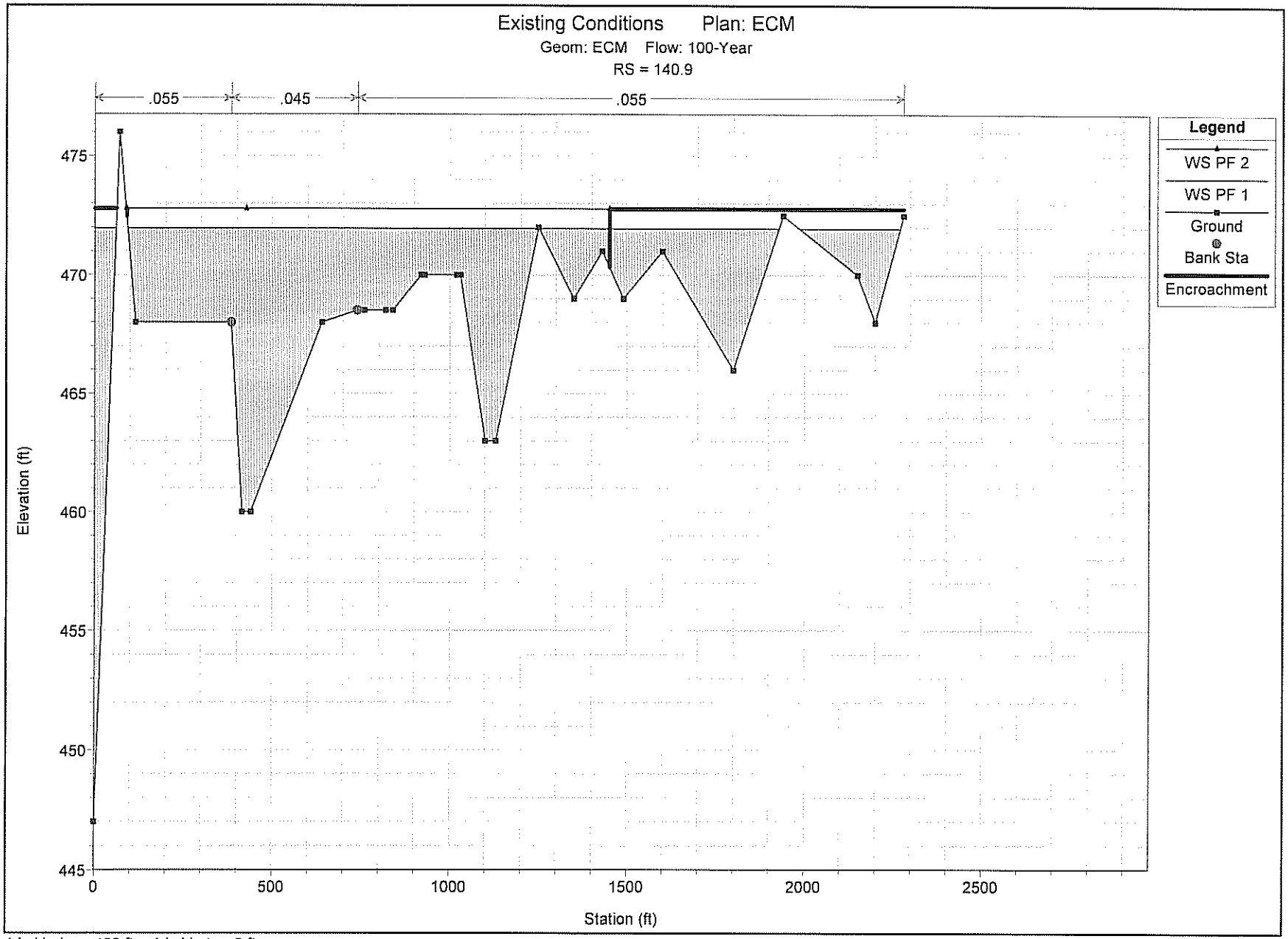
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	130	PF 1	23900.00	460.20	470.61		470.65	0.000330	1.59	15764.36	3668.30	0.13
Reach-1	130	PF 2	23900.00	460.20	471.23		471.29	0.000401	1.91	12412.87	1965.93	0.15
Reach-1	120	PF 1	23900.00	455.10	468.16		468.53	0.002745	5.37	6709.93	3542.92	0.40
Reach-1	120	PF 2	23900.00	455.10	468.65		468.99	0.002204	5.09	6257.78	2116.80	0.37
Reach-1	110	PF 1	23900.00	455.30	465.31		465.48	0.001967	4.32	8884.68	3297.77	0.34
Reach-1	110	PF 2	23900.00	455.30	466.12		466.34	0.001851	4.61	7263.63	1923.00	0.34
Reach-1	100	PF 1	23900.00	454.70	462.44		462.64	0.002745	4.46	7388.63	2671.84	0.42
Reach-1	100	PF 2	23900.00	454.70	462.94		463.28	0.003487	5.47	5750.96	1896.88	0.49
Reach-1	90	PF 1	23900.00	449.40	459.83		460.00	0.001142	3.73	8458.11	2537.31	0.29
Reach-1	90	PF 2	23900.00	449.40	460.57		460.75	0.000901	3.62	7978.74	1834.00	0.26
Reach-1	70	PF 1	23900.00	449.60	458.27		458.33	0.000718	2.91	13783.76	4356.47	0.23
Reach-1	70	PF 2	23900.00	449.60	458.94		459.05	0.000928	3.59	10200.30	2600.38	0.27
Reach-1	62	PF 1	52200.00	436.90	456.84	451.23	456.95	0.000681	4.71	26276.59	4129.14	0.21
Reach-1	62	PF 2	52200.00	436.90	456.84	451.55	457.03	0.001058	5.77	20317.12	3101.06	0.26



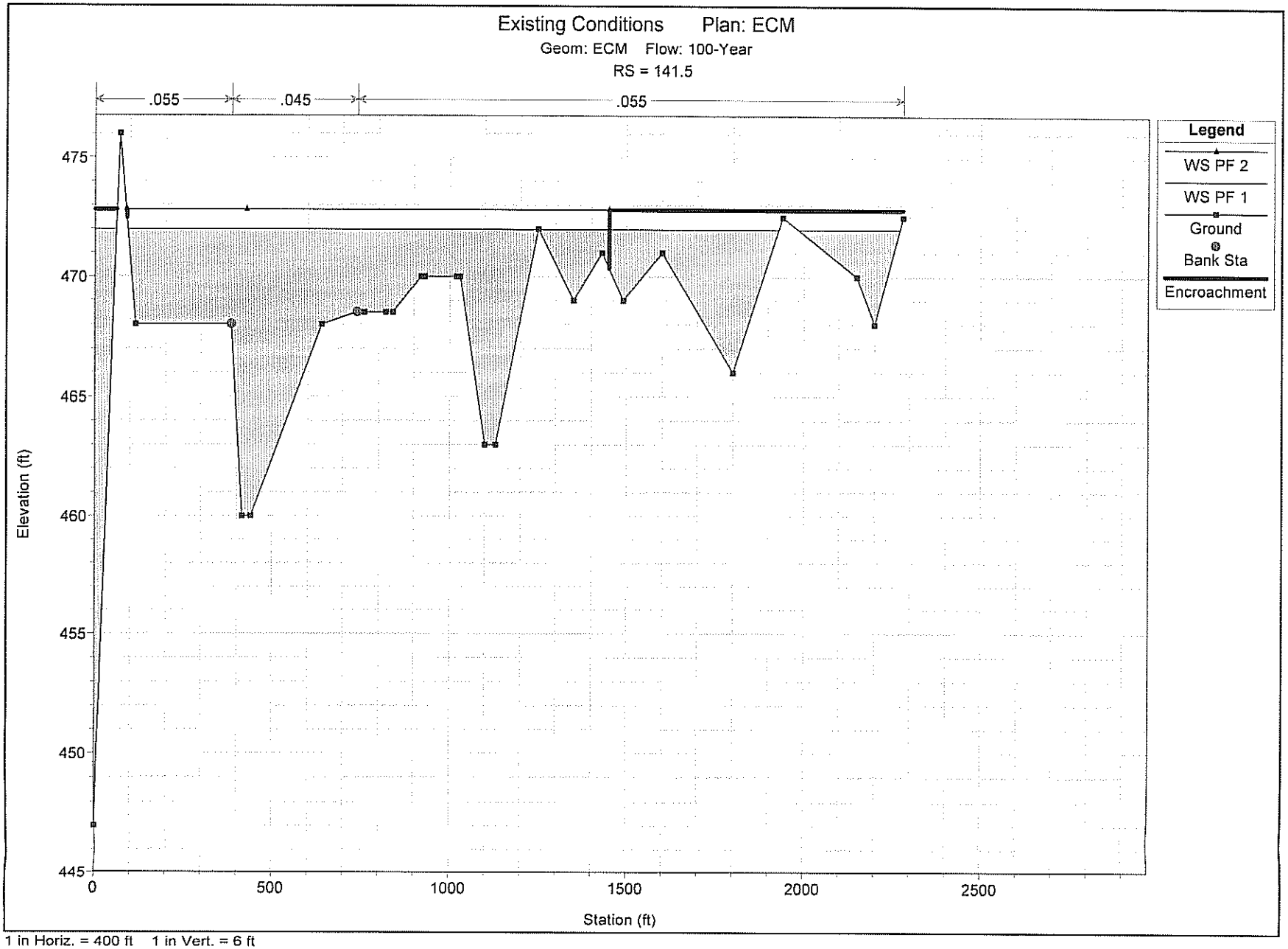
1 in Horiz. = 400 ft 1 in Vert. = 6 ft



1 in Horiz. = 400 ft 1 in Vert. = 6 ft



1 in Horiz. = 400 ft 1 in Vert. = 6 ft


Existing Conditions Plan: ECM
Geom: ECM Flow: 100-Year
RS = 141.5
.055
.045
.055
Legend
WS PF 2
WS PF 1
Ground
Bank Sta
Encroachment
Elevation (ft)
475
470
465
460
455
450
445
0
500
1000
1500
2000
2500
Station (ft)
1 in Horiz. = 400 ft 1 in Vert. = 6 ft

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

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X      X   X     X  X    X
X     X  X        X           X   X    X    X   X
XXXXXXX  XXXX     X       XXX XXXX     XXXXXX    XXXX
X     X  X        X                   X  X     X    X       X
X     X  X        X    X      X   X    X    X       X
X     X  XXXXXX    XXXX       X    X   X    X   XXXXX
```

PROJECT DATA
Project Title: Existing Conditions
Project File : ECM1.prj
Run Date and Time: 8/9/2013 11:53:07 AM

Project in English units

Project Description:
COLTON FLOODWAY STUDY
EXISTING CONDITIONS
FLOODPLAIN
BERKSHIRE SLOUGH

PLAN DATA

Plan Title: ECM
Plan File : z:\2013\13-140 Colton Floodway\ECM1.p01

Geometry Title: ECM
Geometry File : z:\2013\13-140 Colton Floodway\ECM1.g01

Flow Title : 100-Year
Flow File : z:\2013\13-140 Colton Floodway\ECM1.f01

Plan Summary Information:

Number of:	Cross Sections	= 20	Multiple Openings	=	0
	Culverts	= 0	Inline Structures	=	0
	Bridges	= 0	Lateral Structures	=	0

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

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

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

River = RIVER-1 Reach = Reach-1

RS	Profile	Method	Value1	Value2
220	PF 2	1	325	2200
209	PF 2	1	230	1050

200	PF 2	1	1058.2	2238.6
180	PF 2	1	700	1952.4
150	PF 2	1	1426.8	2050.8
144	PF 2	1	0	2100
142	PF 2	1	0	1533
141.5	PF 2	1	90	1450
140.9	PF 2	1	90	1450
140.7	PF 2	1	90	1450
140.5	PF 2	1	90	1450
140	PF 2	4	1	
130	PF 2	4	1	
120	PF 2	1	2383.2	4500
110	PF 2	1	3060	4983
100	PF 2	1	3000	4900
90	PF 2	1	3616	5450
70	PF 2	4	1	
62	PF 2	4	1	

FLOW DATA

Flow Title: 100-Year
Flow File : z:\2013\13-140 Colton Floodway\ECM1.f01

Flow Data (cfs)

River	Reach	RS	PF 1	PF 2
RIVER-1	Reach-1	220	50000	50000
RIVER-1	Reach-1	209	15500	15500
RIVER-1	Reach-1	141.5	23900	23900
RIVER-1	Reach-1	62	52200	52200

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
RIVER-1	Reach-1	PF 1		Known WS = 456.84
RIVER-1	Reach-1	PF 2		Known WS = 456.84

GEOMETRY DATA

Geometry Title: ECM
Geometry File : z:\2013\13-140 Colton Floodway\ECM1.g01

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 220

INPUT
Description:
Station Elevation Data num= 35

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	526.6	143.2	506.7	287.2	506.1	339.2	490	368.3	487.6
633.6	490	799	492.5	890	493	913	480.6	940	478.3
965	477.3	995	477.1	1029	475	1065	473.8	1086	473.9
1102	480.5	1108	483.4	1117	485.9	1137	492.1	1213	492.8
1285	493.5	1388.3	490.9	1684.2	491.7	1955.3	489.4	2024.8	487.6
2061.5	489.8	2193.5	489.2	2209.3	491.1	2237.9	491.1	2259.9	484.8
2278.8	489.8	2550.7	491.1	2705.6	489	2894.2	488	2969	491.1

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.055	890	.045	1137	.055

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
890	1137	1300	1960	.3	.5

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 209

INPUT
Description:
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	531.1	140.5	502.4	230	490	263.1	485.2	352.9	486.4
473.1	484.5	560.5	481.9	662.3	486.4	905.3	490	1225.4	490.4

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.055	230	.045	905.3	.055

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
230	905.3	1630	1650	.3	.5

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 200

INPUT
Description:
Station Elevation Data num= 16

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	528.9	271.1	496.7	535.7	486.2	625.8	486.4	633.6	482.3
637.5	486.6	671	486.6	685.2	485.6	690	487.2	1058.2	488.8
1395.7	487	1683.2	486.6	2049.5	486.2	2216.6	485.8	2238.6	488
2290	494.3								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.055	1683.2	.045	2238.6	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1683.2	2238.6	600	600	.1	.3

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 180

INPUT
Description:
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	509.5	130.6	486	240.1	484.5	401.5	484.3	414.2	482.3
425.3	484.3	450.9	484.3	655.8	483.3	989.9	483.9	1169	483.3
1364.4	483.9	1662.4	482.5	1952.4	484.5	2187.7	485.4	2276.6	490.9

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.055	1364.4	.045	1952.4	.07

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1364.4	1952.4	3660	3620	.1	.3

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 150

INPUT
Description:
Station Elevation Data num= 19

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

0	521.1	308.6	503	498.4	492.5	746.8	488	889.6	488.4
903.3	486	917.3	487.4	1076.2	479.7	1216.2	478.2	1426.8	477.6
1444	475.6	1459.7	476.8	1739.7	477	2050.8	477.8	2270.6	477.6
2506.9	477.4	2628.1	475.8	2654.9	479.9	2679.3	479.9		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.055	1426.8	.045	2050.8	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1426.8	2050.8	3000	2360	1680	.1	.3

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 146

INPUT
Description:
Station Elevation Data num= 20

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1	474	260	470	400	469.5	630	470	700	470
800	470	930	469.5	1030	470	1175	471	1330	470
1375	469	1420	470	1430	470	1450	470	1620	469.5
1790	470	2000	470	2120	475	3100	480	3340	480

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1	.055	1	.045	2120	.055

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1	2120	50	50	50	.1	.3

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 144

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1	476	700	475.3	1400	475	2100	475.3	3330	480

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1	.03	1	.03	2100	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1	2100	50	50	50	.1	.3

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 142

INPUT
Description:
Station Elevation Data num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1	473	150	470	340	470	790	470	1550	474
1650	475	1800	475.5	1880	475	1895	470	1915	470
1930	475	2100	475	2300	476	2450	477	2650	478
2850	479	3050	479.8	3290	479.8				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1	.055	1	.045	1930	.055

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1	1930	169	584	937	.1	.3

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 141.5

INPUT
Description:
Station Elevation Data num= 27

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	447	70	476	115	468	385	468	415	460
440	460	640	468	740	468.5	760	468.5	820	468.5
840	468.5	920	470	930	470	1020	470	1030	470
1100	463	1130	463	1250	472	1350	469	1430	471
1490	469	1600	471	1800	466	1940	472.5	2150	470
2200	468	2280	472.5						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.055	385	.045	740	.055

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
385	740	5	10	20	.1 .3

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 140.9

INPUT
Description:
Station Elevation Data num= 27

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	447	70	476	115	468	385	468	415	460
440	460	640	468	740	468.5	760	468.5	820	468.5
840	468.5	920	470	930	470	1020	470	1030	470
1100	463	1130	463	1250	472	1350	469	1430	471
1490	469	1600	471	1800	466	1940	472.5	2150	470
2200	468	2280	472.5						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.055	385	.045	740	.055

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
385	740	25	200	400 .1	.3

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 140.7

INPUT
Description:
Station Elevation Data num= 27

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	447	70	476	115	468	385	468	415	460
440	460	640	468	720	468	760	467.5	840	467.5
870	467.5	920	470	930	470	1020	470	1030	470
1100	463	1130	463	1250	472	1350	469	1430	471
1490	469	1600	471	1800	466	1940	472.5	2150	470
2200	468	2280	472.5						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.055	385	.045	720	.055

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
385	720	5	10	20 .1	.3

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 140.5

INPUT
Description:
Station Elevation Data num= 27

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	447	70	476	115	468	385	468	415	460
440	460	640	468	720	468	760	467.5	840	467.5
870	468	920	470	930	470	1020	470	1030	470
1100	463	1130	463	1250	472	1350	469	1430	471
1490	469	1600	471	1800	466	1940	472.5	2150	470
2200	468	2280	472.5						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.055	385	.045	720	.055

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
385	720	56	215	383	.1	.3

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 140

INPUT
Description:
Station Elevation Data num= 48

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1540.3	480.3	1646.2	480.3	1802.2	476.8	1893.6	471.5	1945.3	471.9
1971.6	475.4	2044.6	476	2070.3	473.8	2149.3	469.9	2208.9	463.8
2223.5	465.6	2359.9	467.1	2420.8	464.8	2468.1	467.1	2606.2	467.9
2664.2	460.8	2689.3	460.8	2710.7	461.8	2770	465	3418.6	466.9
3433.1	463.4	3454.3	463.4	3484	468.3	3577.2	469.3	3609.4	467.7
3657.9	471.5	3750.4	469.3	3965.8	471.5	4248.2	470.9	4481.4	469.3
4518	468.9	4598.8	472.8	4733.1	471.9	4998.4	471.9	5190.2	472.2
5231.4	472	5270.8	472	5299.8	472.8	5505.9	472.8	5689.5	472.1
5944.6	474.4	6148.2	475.6	6235.7	473.8	6300.6	473	6340.6	473
6355.2	472.1	6516.5	473.2	6846	474.2				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1540.3	.055	2606.2	.045	3418.6	.055

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
2606.2	3418.6	1860	1500	1280	.1	.3

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 130

INPUT
Description:
Station Elevation Data num= 41

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1634.4	495.5	1723.5	483.1	1762.2	483.7	1828.4	486.6	1869	485.8
1917.2	479.1	1936.9	479.9	2035.5	479.5	2076.9	476.6	2179.6	472.4
2324.8	471.1	2458.6	466.5	2534.9	465.6	2621.2	458.3	2947	460.4
2994.5	465.6	3154.3	466.9	3306.4	464.2	3538.5	464.6	3773.3	465.8
4161	466.3	4333.7	465.4	4344.1	460.2	4403.8	460.2	4437.8	467.3
4669.2	470.1	4816.9	469.7	4850.5	467.7	4883.3	469.1	5022	469.9
5139.3	470.1	5180.2	467.9	5205.1	468.3	5224.7	471.1	5253	468.7
5297	467.9	5626.5	467.7	5871.6	469.5	5895.2	467.9	5922.2	470.5
6092.2	470.7								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1634.4	.055	4161	.045	4669.2	.055

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
4161	4669.2	2600	3120	2780	.1	.3

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 120

INPUT
Description:
Station Elevation Data num= 31

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1980.5	479.3	2133.8	475.8	2338.1	469.1	2383.2	468.3	2441	462.4
2515.8	464.2	2669.6	463.8	2701.6	455.1	2810	458.5	2837.9	462.2
2940.5	465	3033.6	467.1	3094.3	465.4	3135.2	466.5	3354	465.9
3614.9	467.1	4500.2	467.9	4874.8	467.1	5057.2	466.9	5200	466.3
5236.3	467.5	5291.1	466.7	5330	464.2	5384.1	467.1	5549.5	467.5
5681.6	467.5	5874.6	468.3	6031	468.5	6074.3	462.8	6100.2	468.1
6344.7	468.9								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1980.5	.055	2383.2	.045	3033.6	.055

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
2383.2	3033.6	1260	1320	1260	.1	.3

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 110

INPUT
Description:
Station Elevation Data num= 41

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1499.7	529.9	1569.5	523.4	1695.3	503.7	1858.6	494.5	1923.6	491.1
2136.9	490.2	2330.7	485.6	2639.8	478.4	2777.2	468.9	3056.3	466.5
3060	465	3107.3	458.5	3244.9	457.9	3265	455.3	3308.3	455.3
3334.9	463.4	3536.1	462.2	3711.5	463.8	3834.7	462.2	3850	464.2
3923.6	463.6	4008.9	462.4	4129.2	463	4176.3	462.4	4367.8	463
4473.2	462.4	4554.6	463.8	4707.2	462.8	4883.7	463	4983	464.6
5166	463.4	5315.7	464.4	5344.6	461.8	5406.3	465	5709.8	463.8
6002.8	464.4	6066	455.9	6088.9	455.3	6195.3	461.6	6275.7	461
6357	462.2								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1499.7	.055	3060	.045	3536.1	.055

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
3060	3536.1	1230	1230	1230	.1	.3

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 100

INPUT
Description:
Station Elevation Data num= 50

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
438.3	502	478.9	495.5	510.8	495.9	532.6	494.5	542.6	495.1
723.1	490.2	858.7	484.6	951.9	481.9	1014.6	477.2	1228.1	473.8
1553.1	469.7	1851.2	466.3	2164.4	462.8	2521.3	463.6	2949.9	464
3030.7	461	3115.5	463	3169.3	454.7	3284.2	454.7	3335	460.4
3450.9	459.1	3520.8	460.8	3666.9	459.6	3793.7	462.2	4035.5	460.4
4128.8	459.5	4315	460.4	4404.2	460.4	4796.5	459.6	5564.4	459.6
5657.6	453.7	5698.7	464.4	5931.6	464.6	5985	463.2	6290.9	464
6369	464	6430.9	464	6467.9	465.2	6518.8	465.4	6732.8	465.4

6965.3	464	7190.7	465	7437.7	465.9	7719.9	465.8	7923.8	466.3
8139	465.9	8371.3	465.4	8528.5	466.1	8693.3	467.3	8837.4	467.9

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
438.3	.055	3115.5	.04	3793.7	.055

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
3115.5	3793.7	1000	1600	1520	.1	.3

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 90

INPUT
Description:
Station Elevation Data num= 39

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1574.5	480.5	1833	474.6	1956.8	463	2418.6	461	2426.8	461
2437.2	461	2590.3	461	2927.7	461	3240.5	459.6	3267	455.1
3299.6	460.8	3455.4	459.6	3616.6	460.4	3705.7	457.1	3740.1	457.3
3797.5	459.6	3844.5	459.6	3863.2	457.1	3923	460.2	3995.8	459.8
4099.9	455.9	4212.2	453.7	4241.2	449.4	4355.6	449.4	4393.1	454.5
4560.2	453.2	4612.6	456.1	4756.2	456.5	4902.3	458.1	5193.5	456.1
5414.8	457.1	5652.8	455.9	5848.4	456.9	6105.2	460.4	6416.3	460.6
6592.5	460	6829.9	461.8	7021.2	461.4	7565.3	461.8		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1574.5	.055	3995.8	.04	4902.3	.055

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
3995.8	4902.3	2100	1700	1720	.1	.3

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 70

INPUT
Description:
Station Elevation Data num= 42

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1335.8	485.2	1448.8	469.9	1522.5	455.9	1706.6	453.9	1810.9	457.9
1990.2	458.1	2023.9	455.9	2067.2	449.2	2093.2	451.2	2266.1	453.2
2447.2	453.5	2498.7	451.4	2550.1	453.9	2591.1	453.9	2618.9	455.3
2785.5	454.5	2995.2	455.5	3417.2	456.9	3536.4	453	3613	453.9
3661.3	453.5	3760.2	455.5	3824.9	453.7	3922	456.7	4018	454.9
4157.2	457.7	4265.3	454.5	4421.7	457.3	4585.3	457.5	4679.4	455.1
4729.6	452.4	4793.6	450.8	4798.6	449.6	4852.1	449.6	4870.7	452
4962.2	453	5050.6	456.3	5124.1	456.3	5161.9	455.1	5399.5	455.5
5551.4	455.7	5866.5	457.1						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1335.8	.055	4585.3	.04	5050.6	.055

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
4585.3	5050.6	2000	1960	1900	.1	.3

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 62

INPUT
Description:
Station Elevation Data num= 68

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	488.3	89.9	485.2	124.8	475.3	143.2	476.7	211.9	476.7

226.7	475.9	249.2	482.6	375.1	480.8	419.4	487.3	457.3	489.9
500.3	480.8	532.1	485.5	578.3	485.4	596.2	477.1	609.8	478.5
628.7	475.5	745.6	473.1	882.1	465.3	927.1	464.9	1002.8	458.8
1197.1	453.9	1585.5	454.8	1618.7	446.2	1746.5	449.1	1810.4	448.5
1819.8	446	2070.2	446.4	2155.8	446	2176.1	446.1	2321.1	446.4
2351	446.5	2430.3	446.8	2522.5	451.9	2717.2	451.9	2867.7	452.7
3152.4	451.9	3177.9	452.9	3196.8	452.7	3225.9	449.9	3291.7	446.2
3411.2	447	3522	447.6	3592.3	455	3639.7	450.9	3784.6	451.3
3929.2	452.5	4151.8	452.5	4329	452.9	4540.6	450.9	4605.7	449.7
4688.8	449.9	4794	451.7	4872.1	452.3	4955.3	454.1	5030.8	452.9
5061	439.1	5080	437.4	5098	437.9	5118	436.9	5143	437.5
5185	452.9	5200	457.8	5228.7	456.8	5343.2	457.2	5539.1	458.6
5589	457.4	5746.2	458.6	5932.9	458.6				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.075	5030.8	.05	5185	.06

Bank Sta: Left	Right	Lengths: Left Channel		Right	Coeff Contr.	Expan.
5030.8	5185		200	200	.1	.3

SUMMARY OF MANNING'S N VALUES

River:RIVER-1

Reach	River Sta.	n1	n2	n3
Reach-1	220	.055	.045	.055
Reach-1	209	.055	.045	.055
Reach-1	200	.055	.045	.05
Reach-1	180	.055	.045	.07
Reach-1	150	.055	.045	.06
Reach-1	146	.055	.045	.055
Reach-1	144	.03	.03	.03
Reach-1	142	.055	.045	.055
Reach-1	141.5	.055	.045	.055
Reach-1	140.9	.055	.045	.055
Reach-1	140.7	.055	.045	.055
Reach-1	140.5	.055	.045	.055
Reach-1	140	.055	.045	.055
Reach-1	130	.055	.045	.055
Reach-1	120	.055	.045	.055
Reach-1	110	.055	.045	.055
Reach-1	100	.055	.04	.055
Reach-1	90	.055	.04	.055
Reach-1	70	.055	.04	.055
Reach-1	62	.075	.05	.06

SUMMARY OF REACH LENGTHS

River: RIVER-1

Reach	River Sta.	Left	Channel	Right
Reach-1	220	1300	1960	1960
Reach-1	209	1630	1630	1650
Reach-1	200	600	600	600
Reach-1	180	3660	3620	3560
Reach-1	150	3000	2360	1680
Reach-1	146	50	50	50
Reach-1	144	50	50	50
Reach-1	142	169	584	937
Reach-1	141.5	5	10	20
Reach-1	140.9	25	200	400
Reach-1	140.7	5	10	20
Reach-1	140.5	56	215	383
Reach-1	140	1860	1500	1280
Reach-1	130	2600	3120	2780
Reach-1	120	1260	1320	1260

Reach-1	110	1230	1230	1230
Reach-1	100	1000	1600	1520
Reach-1	90	2100	1700	1720
Reach-1	70	2000	1960	1900
Reach-1	62	200	200	200

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: RIVER-1

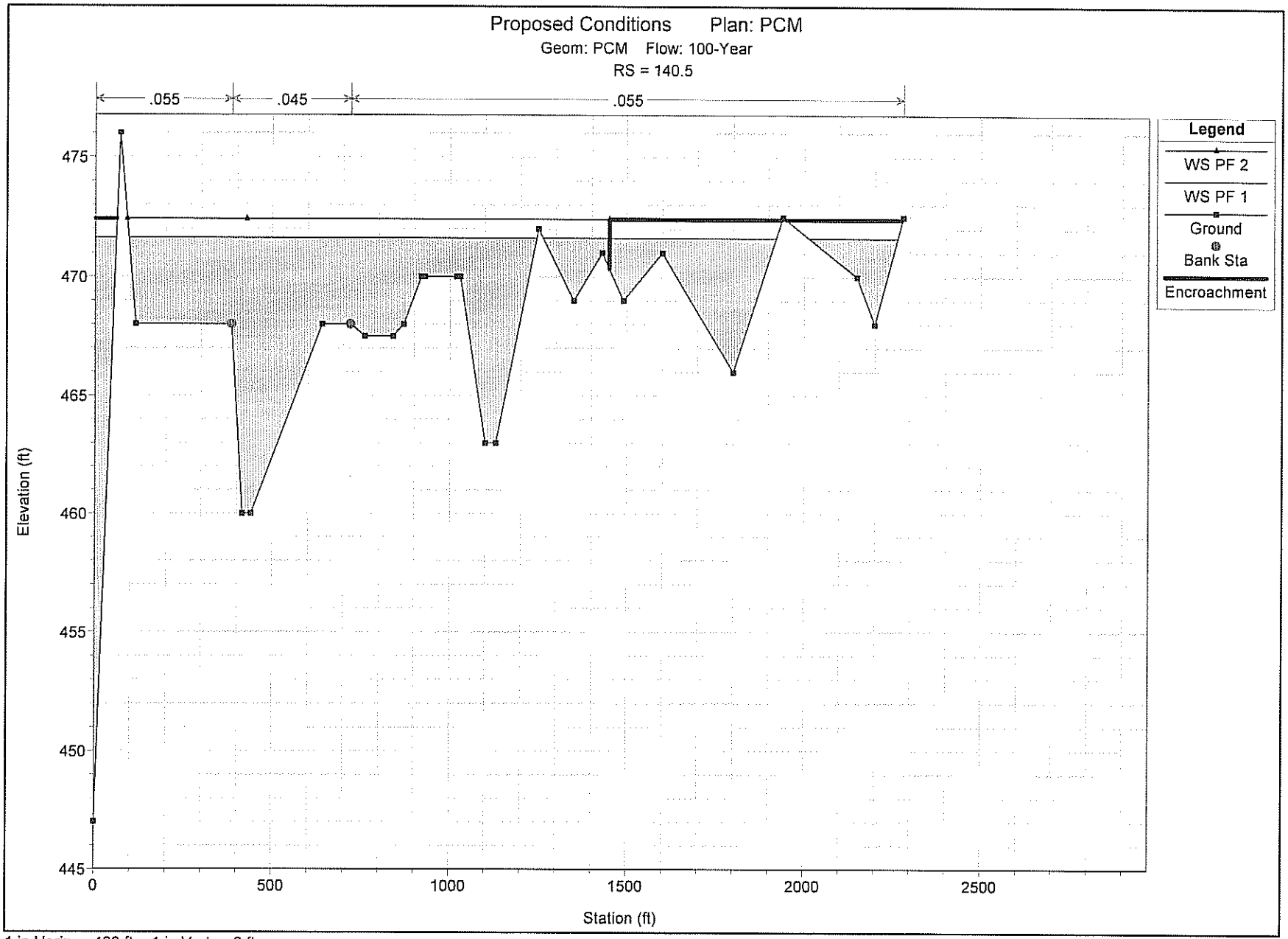
Reach	River Sta.	Contr.	Expan.
Reach-1	220	.3	.5
Reach-1	209	.3	.5
Reach-1	200	.1	.3
Reach-1	180	.1	.3
Reach-1	150	.1	.3
Reach-1	146	.1	.3
Reach-1	144	.1	.3
Reach-1	142	.1	.3
Reach-1	141.5	.1	.3
Reach-1	140.9	.1	.3
Reach-1	140.7	.1	.3
Reach-1	140.5	.1	.3
Reach-1	140	.1	.3
Reach-1	130	.1	.3
Reach-1	120	.1	.3
Reach-1	110	.1	.3
Reach-1	100	.1	.3
Reach-1	90	.1	.3
Reach-1	70	.1	.3
Reach-1	62	.1	.3

HEC-RAS Plan: PCM River: RIVER-1 Reach: Reach-1

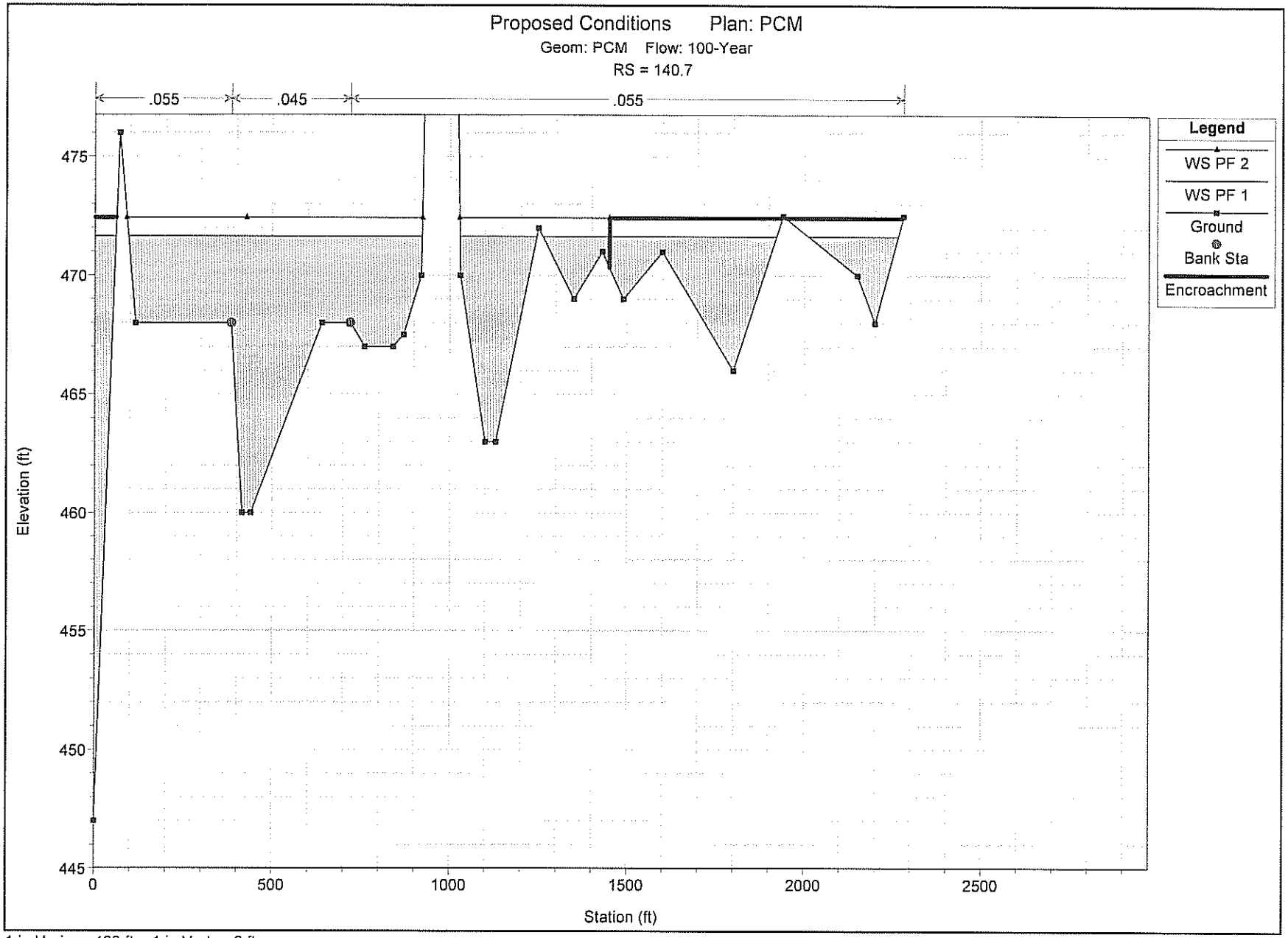
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	220	PF 1	50000.00	473.80	494.53		494.95	0.001134	6.83	13882.23	2644.44	0.30
Reach-1	220	PF 2	50000.00	473.80	494.91		495.56	0.001469	7.90	10859.42	1875.00	0.35
Reach-1	209	PF 1	15500.00	481.90	492.72		492.87	0.000765	3.22	5298.70	1015.02	0.22
Reach-1	209	PF 2	15500.00	481.90	492.80		492.97	0.000795	3.30	4916.97	820.00	0.22
Reach-1	200	PF 1	15500.00	485.80	488.53	488.40	489.23	0.019243	7.82	2589.70	1653.76	0.92
Reach-1	200	PF 2	15500.00	485.80	489.41		489.89	0.007826	6.21	2983.17	1180.40	0.62
Reach-1	180	PF 1	15500.00	482.50	487.73		487.79	0.000747	2.42	8006.96	2104.27	0.20
Reach-1	180	PF 2	15500.00	482.50	488.66		488.76	0.000720	2.68	6477.29	1252.40	0.21
Reach-1	150	PF 1	15500.00	475.60	478.96	478.96	479.75	0.027171	8.15	2329.59	1503.01	1.06
Reach-1	150	PF 2	15500.00	475.60	479.78	479.78	481.14	0.021975	9.35	1658.16	624.00	1.01
Reach-1	146	PF 1	15500.00	469.00	477.09		477.10	0.000083	1.07	14751.43	2527.68	0.07
Reach-1	146	PF 2	15500.00	469.00	477.16		477.18	0.000080	1.06	14939.03	2542.19	0.07
Reach-1	144	PF 1	15500.00	475.00	476.48	476.48	477.03	0.012338	6.08	2617.43	2407.06	0.99
Reach-1	144	PF 2	15500.00	475.00	476.50	476.50	477.10	0.012559	6.22	2491.91	2099.00	1.01
Reach-1	142	PF 1	15500.00	470.00	473.04		473.42	0.007603	4.93	3147.17	1405.63	0.58
Reach-1	142	PF 2	15500.00	470.00	473.89		474.09	0.003044	3.62	4281.74	1527.91	0.38
Reach-1	141.5	PF 1	23900.00	460.00	471.97		472.13	0.001188	4.18	8501.54	2180.02	0.28
Reach-1	141.5	PF 2	23900.00	460.00	472.80		473.03	0.001290	4.69	7048.97	1360.00	0.29
Reach-1	140.9	PF 1	23900.00	460.00	471.95		472.12	0.001157	4.11	8384.23	2071.78	0.27
Reach-1	140.9	PF 2	23900.00	460.00	472.78		473.02	0.001310	4.71	6841.00	1255.56	0.30
Reach-1	140.7	PF 1	23900.00	460.00	471.64		471.83	0.001335	4.40	7889.04	2015.83	0.29
Reach-1	140.7	PF 2	23900.00	460.00	472.42		472.68	0.001512	5.02	6527.58	1254.68	0.32
Reach-1	140.5	PF 1	23900.00	460.00	471.62		471.81	0.001400	4.49	7938.84	2118.29	0.30
Reach-1	140.5	PF 2	23900.00	460.00	472.40		472.66	0.001522	5.03	6688.02	1359.75	0.32
Reach-1	140	PF 1	23900.00	460.80	471.41		471.55	0.000949	3.37	8793.68	2393.20	0.24
Reach-1	140	PF 2	23900.00	460.80	472.15		472.37	0.001078	3.88	6489.39	1004.27	0.26

HEC-RAS Plan: PCM River: RIVER-1 Reach: Reach-1 (Continued)

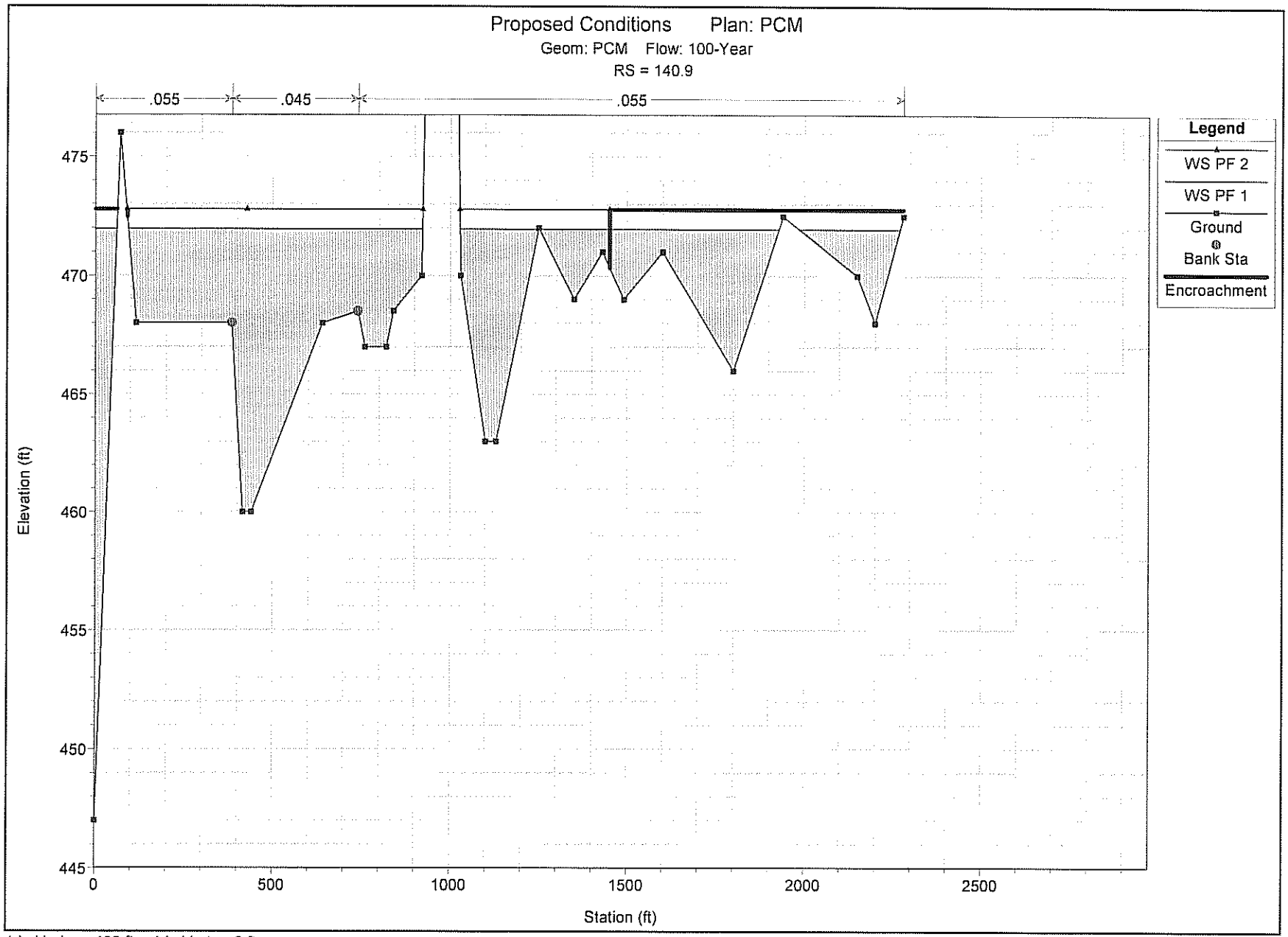
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	130	PF 1	23900.00	460.20	470.61		470.65	0.000330	1.59	15764.36	3668.30	0.13
Reach-1	130	PF 2	23900.00	460.20	471.23		471.29	0.000401	1.91	12412.87	1965.93	0.15
Reach-1	120	PF 1	23900.00	455.10	468.16		468.53	0.002745	5.37	6709.93	3542.92	0.40
Reach-1	120	PF 2	23900.00	455.10	468.65		468.99	0.002204	5.09	6257.78	2116.80	0.37
Reach-1	110	PF 1	23900.00	455.30	465.31		465.48	0.001967	4.32	8884.68	3297.77	0.34
Reach-1	110	PF 2	23900.00	455.30	466.12		466.34	0.001851	4.61	7263.63	1923.00	0.34
Reach-1	100	PF 1	23900.00	454.70	462.44		462.64	0.002745	4.46	7388.63	2671.84	0.42
Reach-1	100	PF 2	23900.00	454.70	462.94		463.28	0.003487	5.47	5750.96	1896.88	0.49
Reach-1	90	PF 1	23900.00	449.40	459.83		460.00	0.001142	3.73	8458.11	2537.31	0.29
Reach-1	90	PF 2	23900.00	449.40	460.57		460.75	0.000901	3.62	7978.74	1834.00	0.26
Reach-1	70	PF 1	23900.00	449.60	458.27		458.33	0.000718	2.91	13783.76	4356.47	0.23
Reach-1	70	PF 2	23900.00	449.60	458.94		459.05	0.000928	3.59	10200.30	2600.38	0.27
Reach-1	62	PF 1	52200.00	436.90	456.84	451.23	456.95	0.000681	4.71	26276.59	4129.14	0.21
Reach-1	62	PF 2	52200.00	436.90	456.84	451.55	457.03	0.001058	5.77	20317.12	3101.06	0.26



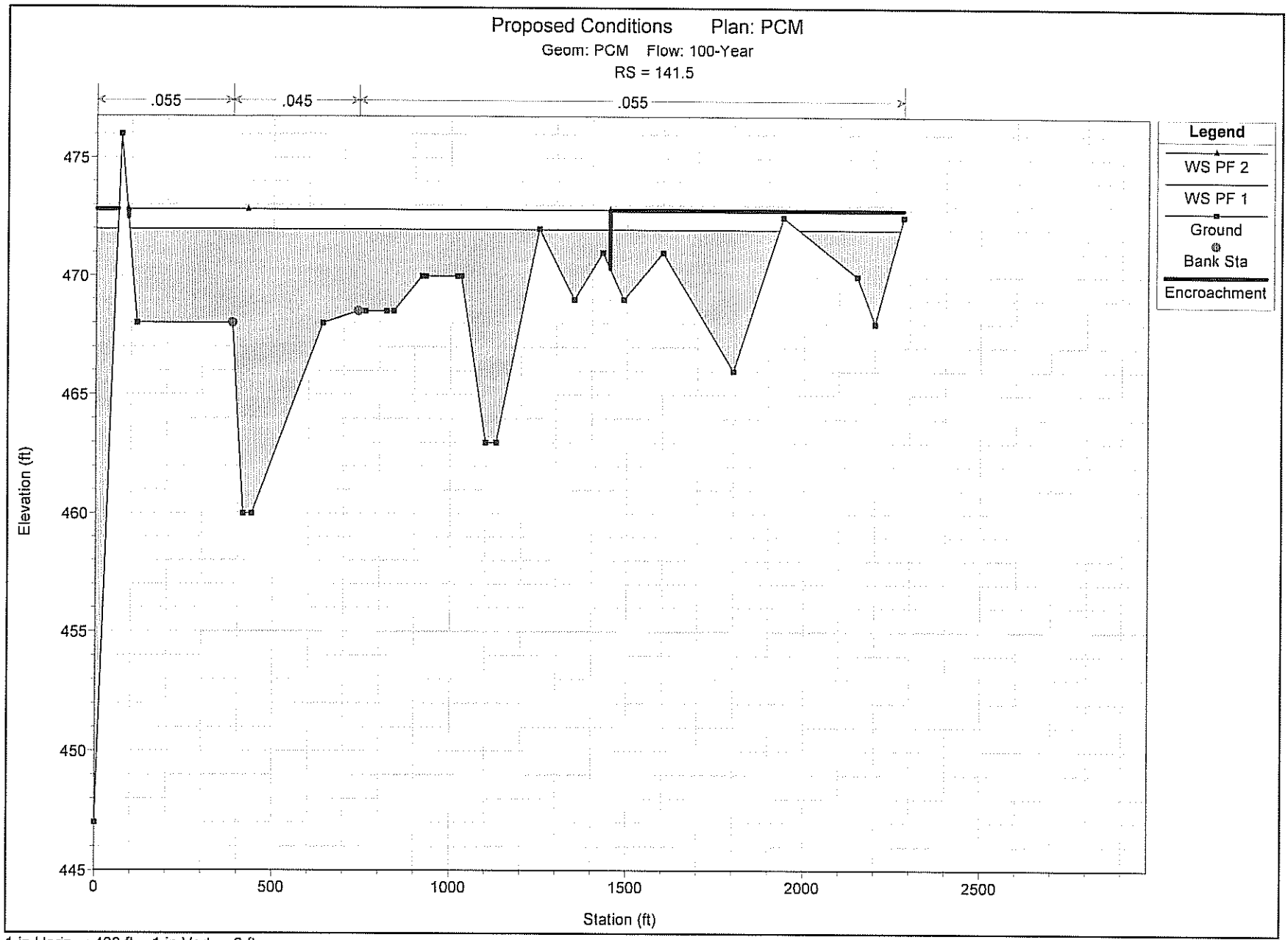
1 in Horiz. = 400 ft 1 in Vert. = 6 ft



1 in Horiz. = 400 ft 1 in Vert. = 6 ft



1 in Horiz. = 400 ft 1 in Vert. = 6 ft



1 in Horiz. = 400 ft 1 in Vert. = 6 ft

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

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X       X   X     X  X    X
X     X  X        X            X   X    X    X   X
XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
X     X  X        X            X  X     X    X        X
X     X  X        X    X       X   X    X    X        X
X     X  XXXXXX    XXXX        X    X   X    X   XXXXX
```

PROJECT DATA
Project Title: Proposed Conditions
Project File : PCM1.prj
Run Date and Time: 8/9/2013 11:37:36 AM

Project in English units

Project Description:
COLTON FLOODWAY STUDY
EXISTING CONDITIONS
FLOODPLAIN
BERKSHIRE SLOUGH

PLAN DATA

Plan Title: PCM
Plan File : z:\2013\13-140 Colton Floodway\PCM1.p01

Geometry Title: PCM
Geometry File : z:\2013\13-140 Colton Floodway\PCM1.g01

Flow Title : 100-Year
Flow File : z:\2013\13-140 Colton Floodway\PCM1.f01

Plan Summary Information:
Number of: Cross Sections = 20 Multiple Openings = 0
Culverts = 0 Inline Structures = 0
Bridges = 0 Lateral Structures = 0

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

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

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

River = RIVER-1 Reach = Reach-1

RS	Profile	Method	Value1	Value2
220	PF 2	1	325	2200
209	PF 2	1	230	1050

200	PF 2	1	1058.2	2238.6
180	PF 2	1	700	1952.4
150	PF 2	1	1426.8	2050.8
144	PF 2	1	0	2100
142	PF 2	1	0	1533
141.5	PF 2	1	90	1450
140.9	PF 2	1	90	1450
140.7	PF 2	1	90	1450
140.5	PF 2	1	90	1450
140	PF 2	4	1	
130	PF 2	4	1	
120	PF 2	1	2383.2	4500
110	PF 2	1	3060	4983
100	PF 2	1	3000	4900
90	PF 2	1	3616	5450
70	PF 2	4	1	
62	PF 2	4	1	

FLOW DATA

Flow Title: 100-Year
Flow File : z:\2013\13-140 Colton Floodway\PCM1.f01

Flow Data (cfs)

River	Reach	RS	PF 1	PF 2
RIVER-1	Reach-1	220	50000	50000
RIVER-1	Reach-1	209	15500	15500
RIVER-1	Reach-1	141.5	23900	23900
RIVER-1	Reach-1	62	52200	52200

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
RIVER-1	Reach-1	PF 1		Known WS = 456.84
RIVER-1	Reach-1	PF 2		Known WS = 456.84

GEOMETRY DATA

Geometry Title: PCM
Geometry File : z:\2013\13-140 Colton Floodway\PCM1.g01

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 220

INPUT
Description:
Station Elevation Data num= 35

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	526.6	143.2	506.7	287.2	506.1	339.2	490	368.3	487.6
633.6	490	799	492.5	890	493	913	480.6	940	478.3
965	477.3	995	477.1	1029	475	1065	473.8	1086	473.9
1102	480.5	1108	483.4	1117	485.9	1137	492.1	1213	492.8
1285	493.5	1388.3	490.9	1684.2	491.7	1955.3	489.4	2024.8	487.6
2061.5	489.8	2193.5	489.2	2209.3	491.1	2237.9	491.1	2259.9	484.8
2278.8	489.8	2550.7	491.1	2705.6	489	2894.2	488	2969	491.1

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.055	890	.045	1137	.055

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
890	1137	1300	1960	.3	.5

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 209

INPUT
Description:
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	531.1	140.5	502.4	230	490	263.1	485.2	352.9	486.4
473.1	484.5	560.5	481.9	662.3	486.4	905.3	490	1225.4	490.4

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.055	230	.045	905.3	.055

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
230	905.3	1630	1650	.3	.5

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 200

INPUT
Description:
Station Elevation Data num= 16

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	528.9	271.1	496.7	535.7	486.2	625.8	486.4	633.6	482.3
637.5	486.6	671	486.6	685.2	485.6	690	487.2	1058.2	488.8
1395.7	487	1683.2	486.6	2049.5	486.2	2216.6	485.8	2238.6	488
2290	494.3								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.055	1683.2	.045	2238.6	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1683.2	2238.6	600	600	.1	.3

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 180

INPUT
Description:
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	509.5	130.6	486	240.1	484.5	401.5	484.3	414.2	482.3
425.3	484.3	450.9	484.3	655.8	483.3	989.9	483.9	1169	483.3
1364.4	483.9	1662.4	482.5	1952.4	484.5	2187.7	485.4	2276.6	490.9

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.055	1364.4	.045	1952.4	.07

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1364.4	1952.4	3660	3620	3560	.1	.3

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 150

INPUT
Description:
Station Elevation Data num= 19

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

0	521.1	308.6	503	498.4	492.5	746.8	488	889.6	488.4
903.3	486	917.3	487.4	1076.2	479.7	1216.2	478.2	1426.8	477.6
1444	475.6	1459.7	476.8	1739.7	477	2050.8	477.8	2270.6	477.6
2506.9	477.4	2628.1	475.8	2654.9	479.9	2679.3	479.9		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.055	1426.8	.045	2050.8	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1426.8	2050.8	3000	2360	1680	.1	.3

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 146

INPUT
Description:
Station Elevation Data num= 20

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1	474	260	470	400	469.5	630	470	700	470
800	470	930	469.5	1030	470	1175	471	1330	470
1375	469	1420	470	1430	470	1450	470	1620	469.5
1790	470	2000	470	2120	475	3100	480	3340	480

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1	.055	1	.045	2120	.055

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1	2120	50	50	50	.1	.3

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 144

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1	476	700	475.3	1400	475	2100	475.3	3330	480

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1	.03	1	.03	2100	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1	2100	50	50	50	.1	.3

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 142

INPUT
Description:
Station Elevation Data num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1	473	150	470	340	470	790	470	1550	474
1650	475	1800	475.5	1880	475	1895	470	1915	470
1930	475	2100	475	2300	476	2450	477	2650	478
2850	479	3050	479.8	3290	479.8				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1	.055	1	.045	1930	.055

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1	1930	169	584	937	.1	.3

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 141.5

INPUT
Description:
Station Elevation Data num= 27

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	447	70	476	115	468	385	468	415	460
440	460	640	468	740	468.5	760	468.5	820	468.5
840	468.5	920	470	930	470	1020	470	1030	470
1100	463	1130	463	1250	472	1350	469	1430	471
1490	469	1600	471	1800	466	1940	472.5	2150	470
2200	468	2280	472.5						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.055	385	.045	740	.055

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
385	740	5	10	20	.1	.3

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 140.9

INPUT
Description:
Station Elevation Data num= 27

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	447	70	476	115	468	385	468	415	460
440	460	640	468	740	468.5	760	467	820	467
840	468.5	920	470	930	480	1020	480	1030	470
1100	463	1130	463	1250	472	1350	469	1430	471
1490	469	1600	471	1800	466	1940	472.5	2150	470
2200	468	2280	472.5						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.055	385	.045	740	.055

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
385	740	25	200	400	.1	.3

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 140.7

INPUT
Description:
Station Elevation Data num= 27

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	447	70	476	115	468	385	468	415	460
440	460	640	468	720	468	760	467	840	467
870	467.5	920	470	930	480	1020	480	1030	470
1100	463	1130	463	1250	472	1350	469	1430	471
1490	469	1600	471	1800	466	1940	472.5	2150	470
2200	468	2280	472.5						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.055	385	.045	720	.055

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
385	720	5	10	20	.1	.3

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 140.5

INPUT
Description:
Station Elevation Data num= 27

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	447	70	476	115	468	385	468	415	460
440	460	640	468	720	468	760	467.5	840	467.5
870	468	920	470	930	470	1020	470	1030	470
1100	463	1130	463	1250	472	1350	469	1430	471
1490	469	1600	471	1800	466	1940	472.5	2150	470
2200	468	2280	472.5						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.055	385	.045	720	.055

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
385	720	56	215	383	.1	.3

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 140

INPUT
Description:
Station Elevation Data num= 48

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1540.3	480.3	1646.2	480.3	1802.2	476.8	1893.6	471.5	1945.3	471.9
1971.6	475.4	2044.6	476	2070.3	473.8	2149.3	469.9	2208.9	463.8
2223.5	465.6	2359.9	467.1	2420.8	464.8	2468.1	467.1	2606.2	467.9
2664.2	460.8	2689.3	460.8	2710.7	461.8	2770	465	3418.6	466.9
3433.1	463.4	3454.3	463.4	3484	468.3	3577.2	469.3	3609.4	467.7
3657.9	471.5	3750.4	469.3	3965.8	471.5	4248.2	470.9	4481.4	469.3
4518	468.9	4598.8	472.8	4733.1	471.9	4998.4	471.9	5190.2	472.2
5231.4	472	5270.8	472	5299.8	472.8	5505.9	472.8	5689.5	472.1
5944.6	474.4	6148.2	475.6	6235.7	473.8	6300.6	473	6340.6	473
6355.2	472.1	6516.5	473.2	6846	474.2				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1540.3	.055	2606.2	.045	3418.6	.055

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
2606.2	3418.6	1860	1500	1280	.1	.3

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 130

INPUT
Description:
Station Elevation Data num= 41

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1634.4	495.5	1723.5	483.1	1762.2	483.7	1828.4	486.6	1869	485.8
1917.2	479.1	1936.9	479.9	2035.5	479.5	2076.9	476.6	2179.6	472.4
2324.8	471.1	2458.6	466.5	2534.9	465.6	2621.2	458.3	2947	460.4
2994.5	465.6	3154.3	466.9	3306.4	464.2	3538.5	464.6	3773.3	465.8
4161	466.3	4333.7	465.4	4344.1	460.2	4403.8	460.2	4437.8	467.3
4669.2	470.1	4816.9	469.7	4850.5	467.7	4883.3	469.1	5022	469.9
5139.3	470.1	5180.2	467.9	5205.1	468.3	5224.7	471.1	5253	468.7
5297	467.9	5626.5	467.7	5871.6	469.5	5895.2	467.9	5922.2	470.5
6092.2	470.7								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1634.4	.055	4161	.045	4669.2	.055

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
4161	4669.2	2600	3120	2780	.1	.3

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 120

INPUT
Description:
Station Elevation Data num= 31

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1980.5	479.3	2133.8	475.8	2338.1	469.1	2383.2	468.3	2441	462.4
2515.8	464.2	2669.6	463.8	2701.6	455.1	2810	458.5	2837.9	462.2
2940.5	465	3033.6	467.1	3094.3	465.4	3135.2	466.5	3354	465.9
3614.9	467.1	4500.2	467.9	4874.8	467.1	5057.2	466.9	5200	466.3
5236.3	467.5	5291.1	466.7	5330	464.2	5384.1	467.1	5549.5	467.5
5681.6	467.5	5874.6	468.3	6031	468.5	6074.3	462.8	6100.2	468.1
6344.7	468.9								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1980.5	.055	2383.2	.045	3033.6	.055

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
2383.2	3033.6	1260	1320	1260	.1	.3

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 110

INPUT
Description:
Station Elevation Data num= 41

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1499.7	529.9	1569.5	523.4	1695.3	503.7	1858.6	494.5	1923.6	491.1
2136.9	490.2	2330.7	485.6	2639.8	478.4	2777.2	468.9	3056.3	466.5
3060	465	3107.3	458.5	3244.9	457.9	3265	455.3	3308.3	455.3
3334.9	463.4	3536.1	462.2	3711.5	463.8	3834.7	462.2	3850	464.2
3923.6	463.6	4008.9	462.4	4129.2	463	4176.3	462.4	4367.8	463
4473.2	462.4	4554.6	463.8	4707.2	462.8	4883.7	463	4983	464.6
5166	463.4	5315.7	464.4	5344.6	461.8	5406.3	465	5709.8	463.8
6002.8	464.4	6066	455.9	6088.9	455.3	6195.3	461.6	6275.7	461
6357	462.2								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1499.7	.055	3060	.045	3536.1	.055

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
3060	3536.1	1230	1230	1230	.1	.3

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 100

INPUT
Description:
Station Elevation Data num= 50

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
438.3	502	478.9	495.5	510.8	495.9	532.6	494.5	542.6	495.1
723.1	490.2	858.7	484.6	951.9	481.9	1014.6	477.2	1228.1	473.8
1553.1	469.7	1851.2	466.3	2164.4	462.8	2521.3	463.6	2949.9	464
3030.7	461	3115.5	463	3169.3	454.7	3284.2	454.7	3335	460.4
3450.9	459.1	3520.8	460.8	3666.9	459.6	3793.7	462.2	4035.5	460.4
4128.8	459.5	4315	460.4	4404.2	460.4	4796.5	459.6	5564.4	459.6
5657.6	453.7	5698.7	464.4	5931.6	464.6	5985	463.2	6290.9	464
6369	464	6430.9	464	6467.9	465.2	6518.8	465.4	6732.8	465.4

6965.3	464	7190.7	465	7437.7	465.9	7719.9	465.8	7923.8	466.3
8139	465.9	8371.3	465.4	8528.5	466.1	8693.3	467.3	8837.4	467.9

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
438.3	.055	3115.5	.04	3793.7	.055

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
3115.5	3793.7	1000	1600	1520	.1	.3

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 90

INPUT
Description:
Station Elevation Data num= 39

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1574.5	480.5	1833	474.6	1956.8	463	2418.6	461	2426.8	461
2437.2	461	2590.3	461	2927.7	461	3240.5	459.6	3267	455.1
3299.6	460.8	3455.4	459.6	3616.6	460.4	3705.7	457.1	3740.1	457.3
3797.5	459.6	3844.5	459.6	3863.2	457.1	3923	460.2	3995.8	459.8
4099.9	455.9	4212.2	453.7	4241.2	449.4	4355.6	449.4	4393.1	454.5
4560.2	453.2	4612.6	456.1	4756.2	456.5	4902.3	458.1	5193.5	456.1
5414.8	457.1	5652.8	455.9	5848.4	456.9	6105.2	460.4	6416.3	460.6
6592.5	460	6829.9	461.8	7021.2	461.4	7565.3	461.8		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1574.5	.055	3995.8	.04	4902.3	.055

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
3995.8	4902.3	2100	1700	1720	.1	.3

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 70

INPUT
Description:
Station Elevation Data num= 42

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1335.8	485.2	1448.8	469.9	1522.5	455.9	1706.6	453.9	1810.9	457.9
1990.2	458.1	2023.9	455.9	2067.2	449.2	2093.2	451.2	2266.1	453.2
2447.2	453.5	2498.7	451.4	2550.1	453.9	2591.1	453.9	2618.9	455.3
2785.5	454.5	2995.2	455.5	3417.2	456.9	3536.4	453	3613	453.9
3661.3	453.5	3760.2	455.5	3824.9	453.7	3922	456.7	4018	454.9
4157.2	457.7	4265.3	454.5	4421.7	457.3	4585.3	457.5	4679.4	455.1
4729.6	452.4	4793.6	450.8	4798.6	449.6	4852.1	449.6	4870.7	452
4962.2	453	5050.6	456.3	5124.1	456.3	5161.9	455.1	5399.5	455.5
5551.4	455.7	5866.5	457.1						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1335.8	.055	4585.3	.04	5050.6	.055

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
4585.3	5050.6	2000	1960	1900	.1	.3

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 62

INPUT
Description:
Station Elevation Data num= 68

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	488.3	89.9	485.2	124.8	475.3	143.2	476.7	211.9	476.7

226.7	475.9	249.2	482.6	375.1	480.8	419.4	487.3	457.3	489.9
500.3	480.8	532.1	485.5	578.3	485.4	596.2	477.1	609.8	478.5
628.7	475.5	745.6	473.1	882.1	465.3	927.1	464.9	1002.8	458.8
1197.1	453.9	1585.5	454.8	1618.7	446.2	1746.5	449.1	1810.4	448.5
1819.8	446	2070.2	446.4	2155.8	446	2176.1	446.1	2321.1	446.4
2351	446.5	2430.3	446.8	2522.5	451.9	2717.2	451.9	2867.7	452.7
3152.4	451.9	3177.9	452.9	3196.8	452.7	3225.9	449.9	3291.7	446.2
3411.2	447	3522	447.6	3592.3	455	3639.7	450.9	3784.6	451.3
3929.2	452.5	4151.8	452.5	4329	452.9	4540.6	450.9	4605.7	449.7
4688.8	449.9	4794	451.7	4872.1	452.3	4955.3	454.1	5030.8	452.9
5061	439.1	5080	437.4	5098	437.9	5118	436.9	5143	437.5
5185	452.9	5200	457.8	5228.7	456.8	5343.2	457.2	5539.1	458.6
5589	457.4	5746.2	458.6	5932.9	458.6				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.075	5030.8	.05	5185	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5030.8	5185	200	200	200	.1	.3

SUMMARY OF MANNING'S N VALUES

River:RIVER-1

Reach	River Sta.	n1	n2	n3
Reach-1	220	.055	.045	.055
Reach-1	209	.055	.045	.055
Reach-1	200	.055	.045	.05
Reach-1	180	.055	.045	.07
Reach-1	150	.055	.045	.06
Reach-1	146	.055	.045	.055
Reach-1	144	.03	.03	.03
Reach-1	142	.055	.045	.055
Reach-1	141.5	.055	.045	.055
Reach-1	140.9	.055	.045	.055
Reach-1	140.7	.055	.045	.055
Reach-1	140.5	.055	.045	.055
Reach-1	140	.055	.045	.055
Reach-1	130	.055	.045	.055
Reach-1	120	.055	.045	.055
Reach-1	110	.055	.045	.055
Reach-1	100	.055	.04	.055
Reach-1	90	.055	.04	.055
Reach-1	70	.055	.04	.055
Reach-1	62	.075	.05	.06

SUMMARY OF REACH LENGTHS

River: RIVER-1

Reach	River Sta.	Left	Channel	Right
Reach-1	220	1300	1960	1960
Reach-1	209	1630	1630	1650
Reach-1	200	600	600	600
Reach-1	180	3660	3620	3560
Reach-1	150	3000	2360	1680
Reach-1	146	50	50	50
Reach-1	144	50	50	50
Reach-1	142	169	584	937
Reach-1	141.5	5	10	20
Reach-1	140.9	25	200	400
Reach-1	140.7	5	10	20
Reach-1	140.5	56	215	383
Reach-1	140	1860	1500	1280
Reach-1	130	2600	3120	2780
Reach-1	120	1260	1320	1260

Reach-1	110	1230	1230	1230
Reach-1	100	1000	1600	1520
Reach-1	90	2100	1700	1720
Reach-1	70	2000	1960	1900
Reach-1	62	200	200	200

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: RIVER-1

Reach	River Sta.	Contr.	Expan.
Reach-1	220	.3	.5
Reach-1	209	.3	.5
Reach-1	200	.1	.3
Reach-1	180	.1	.3
Reach-1	150	.1	.3
Reach-1	146	.1	.3
Reach-1	144	.1	.3
Reach-1	142	.1	.3
Reach-1	141.5	.1	.3
Reach-1	140.9	.1	.3
Reach-1	140.7	.1	.3
Reach-1	140.5	.1	.3
Reach-1	140	.1	.3
Reach-1	130	.1	.3
Reach-1	120	.1	.3
Reach-1	110	.1	.3
Reach-1	100	.1	.3
Reach-1	90	.1	.3
Reach-1	70	.1	.3
Reach-1	62	.1	.3